

# GT-X

# GUITAR EFFECTS PROCESSORS

---

---

**Set-up....**

---

---

Welcome!

This document will provide you with all the information Roland/Boss forgot to tell you about in the official Owner's manual, and much more besides. This document isn't just about the GT-3/5 Guitar Effects Processors. We will also examine your entire guitar system to ensure that you can get the most from it and your GT-3/5.

I hope you find this document both informative and useful,  
Barry Pearce

Release: 0.2 draft, 04 Feb 2002  
Author: Barry Pearce et al.

**THIS IS NOT AN OFFICIAL BOSS/ROLAND MANUAL**



# Contents

IMPORTANT NOTES .....	7
REVISION HISTORY .....	8
OUTSTANDING ISSUES .....	11
How to use this document .....	12

## Section 1

### Introduction..... 15

Welcome to 'Set-up....'!	15
What Is the Aim?	15
Other Information	15
Stompbox City	15
Thank You	16
And Finally...	17

## Section 2

### Audio Terminology ..... 18

Audio Terms .....	18
Signal .....	18
Mono Signal .....	18
Stereo Signal .....	18
Unbalanced Signal .....	18
Balanced Signal .....	18
Signal Path .....	18
Signal Level .....	18
Signal-Noise Ratio .....	18
Clipping .....	19

## Section 3

### Guitar Set-up..... 20

Preliminary Electrical .....	20
Strings I .....	20
Final Electrical .....	20
Shielding .....	20
Strings II .....	21
Neck .....	21
Intonation .....	21
Action .....	21
Pickups .....	21
Adjusting Pickup Height .....	22

## Section 4

### Connections..... 23

Understanding Connectors .....	23
Standard Wiring Schemes .....	23
Unbalanced Mono 0.25" TS Jack .....	23
Unbalanced Stereo 0.25" & 3.5mm TRS Jack .....	24
Balanced Mono XLR .....	24
Balanced Mono 0.25" TRS Jack .....	24
GT3/5 Audio Connections .....	25
Amplifier Connections .....	25
GT3/5 In Front (Mono/Stereo) .....	26
Effects Return (Mono/Stereo) .....	26
Inside Amp/Other Effects Loop (Mono/Stereo) ....	26

4 Cable Method (Mono) .....	27
5 Cable Method (Stereo) .....	27
Power Amp Only and GT-3/5 External Effects Loop .....	27
GT-3/5 as Two-Loop System .....	27
PA/Mixing Desk (Recording/Sound Reinforcement) .....	28
Soundcards (Recording) .....	28
<Global>Your Setting? .....	28
Bypass Mode .....	29
Headphones .....	29
External Footswitches .....	29
Extra Footswitches! .....	30
The Sutton Mod .....	30
External Expression Pedals .....	31
MIDI Connections .....	32

## Section 5

### Basic Configuration..... 33

Introduction .....	33
General Configuration .....	33
Utility Function Settings .....	33
<Global> .....	33
<SYSTEM> .....	34
<HARMONIST SCALE> .....	34
<MIDI> .....	34
Tuner Settings .....	34
Patches .....	34
Base Patches .....	34
Patch Organisation .....	34
User (Quick) Settings .....	35

## Section 6

### Effects Ordering..... 36

General Advice .....	36
OD-PRE or PRE-OD Ordering? .....	36

## Section 7

### Level Metering ..... 37

The GT-3/5 Level Meters .....	37
Marking up the LCD .....	37

## Section 8

### Level Matching..... 39

Concepts .....	39
Level Matching Definitions .....	39
Tuner/Bypass Mode .....	39
Creating patch 'Clean' .....	39
Basic Level Matching Procedure .....	40
How to Measure Levels .....	40
Set the Standard Master Level Setting .....	40
Input Level Adjustment .....	41
Determine Target FX Chain Level .....	42

## Contents

---

Effects Chain Level Matching .....	42
Apparent Volume Adjustment .....	43
Output Level Adjustment .....	43
Level Matching Existing Patches .....	44
Preset Patch Level Matching Example .....	44
Advanced Level Matching .....	45
Summary .....	45

## Section 9

### Noise Elimination..... 46

What Causes Noise? .....	46
Ground Loops .....	46
Clipping .....	47
Impedance Mismatch .....	47
Noise Elimination .....	47
Cables .....	47
Basics .....	48
Amp & Speakers .....	49
Mr Guitar .....	49
BOSS GT-3/5 .....	50
Samson Wireless .....	51
Korg DTR-1 Tuner .....	52
Palmer PGA-05 Speaker Simulator .....	52
Final Check .....	52
Removing Unwanted Distortion .....	53
Speakers/Headphones .....	54
Mixing Desk .....	55
In Sound Forge/Cakewalk: .....	55
Noise Elimination—Recording onto Computer .....	56
Hi-Tech Noise Elimination .....	56

## Section 9a

### Noise Suppressor ..... 57

Using the Noise Suppressor .....	57
Noise Gating .....	57
Associated Problems .....	57
The GT-3/5 Noise Suppressor .....	58
Using the NS for problem solving: .....	58
Using the NS as an effect .....	58
Effects of GT-3/5 NS Parameters .....	59

## Section 10

### Speaker Simulator ..... 60

What is it? .....	60
When is it on? .....	60
<b>GT-5</b> Simulator Type .....	60
Mic Position .....	60
Mic Level and Direct Level .....	60
<b>GT-3</b> Problems .....	61
<b>GT-3</b> Creating On/Off Functionality .....	61

## Section 11

### Manual Mode..... 62

A Pedal Assignment Template .....	62
Switching In/Out .....	62
Suggested Pedal Assignments .....	63
Automatic Manual Mode .....	63

## Section 12

### Patch Problems..... 64

Why Don't Patches Sound Right? .....	64
Tweaking the Patch .....	64
Sound .....	64
Volume .....	64
Noise Suppression .....	65
Making Life Easier .....	65

## Section 13

### Compressor/Limiter..... 66

Introduction to Dynamics .....	66
Dynamics Control .....	66
Limiting .....	66
Compression .....	66

## Section 14

### Preamps ..... 67

General .....	67
External preamp + GT-x preamp: Breaking the Myth.....	67
Using the Preamps for Clean Sounds .....	68
<b>GT-3</b> AC.Guitar .....	68
JC-120 .....	68
Clean TWIN .....	69
Problems .....	70
Clean Sounds From Other Preamps .....	70
Clean Preamp Presets .....	70
Clean Preamp Summary .....	72
Using the Preamps for Overdrive/Distortion .....	72
Dirty Preamp Presets .....	74
Distorted Preamp Summary .....	74
<b>GT-5</b> Preamp Customisation .....	74

## Section 15

### Overdrive/Distortion ..... 75

Distortion Problems .....	75
GT-3/5 OD/DS .....	75
Noise .....	76
Preset Patches .....	76
<b>GT-5</b> OD/DS Customisation .....	77

## Section 15a

### Applied Principles of Distortion Dynamics..... 78

Introduction.....	78
Frequency Control .....	78
Equalization Theory.....	78
More Theory.....	78
The Example .....	79
The Results .....	80
Summary .....	81

## Section 16

### Digital Aliasing (YUK Noise) ..... 82

What is Digital Aliasing? .....	82
Increasing Digital Aliasing.....	82
Clean Preamps: Patch 'YUK Noise 1'.....	83
OD/DS: Patch 'YUK Noise 2'.....	83
Dirty Preamps: Patch 'YUK Noise 3'.....	83
Avoiding Audible Aliasing .....	83
Clean Preamps.....	83
OD/DS.....	83
Dirty Preamps.....	83
Summary .....	83

## Section 17

### Slow Gear ..... 85

What is the Slow Gear?.....	85
Rise Time .....	85
Sensitivity .....	85
Effects Chain Ordering .....	85
Using the Slow Gear .....	85
Problems .....	86
Presets .....	86

## Section 18

### Tremolo/Pan ..... 87

What does the tremolo/pan do?.....	87
<b>GT-3</b> Wave Shape.....	87
<b>GT-5</b> Modulation Wave .....	87
Rate .....	87
Depth.....	88
<b>GT-5</b> Balance .....	88
Tremolo.....	88
Pan .....	88
Presets .....	89

## **GT-3** Section 19

### Slicer..... 91

What is the Slicer? .....	91
---------------------------	----

Slicing Patterns .....	91
Rate .....	91
Problems .....	92
Trigger Sensitivity.....	92
Using It For Effect .....	92
Presets .....	92

## Section 20

### Equalisation (EQ)..... 93

Some Generalities .....	93
The GT-3/5's Parametric Equaliser .....	93
How to Use It.....	94
EQ Tips .....	94
EQ Update.....	95
EQPlot Software .....	95
Summary .....	95

## Section 21

### Foot Volume ..... 96

Construction .....	96
What is it? .....	96
Using it for Effect.....	96
Placement in the chain.....	96
Noise Suppression .....	96
Fade in .....	96
Slow Gear/Attack Delay .....	96
Fade Out .....	97
Decay Acceleration.....	97
Tremolo .....	97
Swelling & Reverse Swelling .....	97
Feedback Control .....	97
Modifying the Sweep Range .....	97
Summary .....	97

## Section 22

### The Guitar's Volume Control ..... 98

Effect on Tone.....	98
Effect When Using Distortion.....	98
Knob Effects! .....	98
Noise Suppression .....	98
Fade In.....	98
Slow Gear/Attack Delay .....	98
Fade Out .....	98
Decay Acceleration.....	98
Tremolo .....	98
Swelling and Reverse Swelling.....	98
Slicing.....	98
Feedback control .....	98
Summary .....	98

## Section 23

### Control Assigns ..... 100

Common Questions .....	100
------------------------	-----

## Contents

---

Unusual Targets & Sources.....	101
Targets.....	101
Sources.....	101
The Internal Pedal Source.....	101
Expression & Footswitch Triggers.....	101
Using MIDI CC For Triggering.....	101
Sweep Time.....	102
The Wave Pedal Source.....	102
Rate.....	102
Dynamic Volume Effects.....	103
Control Assigns using the Internal Pedal.....	104
Control Assigns using the Wave Pedal.....	104
Tuner On Using The EXP Pedal.....	105
Summary.....	105
<b>GT-3</b> GT-3 Quick Settings.....	106
EXP PEDAL.....	106
CTL PEDAL.....	106
Control Assigns.....	106
<b>GT-5</b> GT-5 Quick Settings.....	106
EXP PEDAL.....	106
CTL PEDAL.....	107
Control Assigns.....	107

## Section 24

### Getting Boost for your Solo ..... 108

---

Increase the Amount of Distortion.....	108
Increase Volume.....	108
Reduce Dynamics to Provide an Increase in Average Volume.....	109
Reduce the Volume of Everything Else.....	109

## Section 25

### Using Multiple Guitars..... 110

---

Differences in Guitar Tone.....	110
Differences in Guitar Output Volume.....	110

## Section 26

### Signal Delay & Polarity..... 111

---

Signal Delay.....	111
Signal Polarity.....	111

## Section 27

### Factory Reset/Commissioning . 112

---

<b>GT-3</b> GT-3 Factory Reset Mode.....	112
<b>GT-5</b> GT-5 Factory Reset Mode.....	112
Factory Commissioning Mode.....	112
<b>GT-3</b> GT-3 Factory Commissioning Mode ...	112
<b>GT-5</b> GT-5 Factory Commissioning Mode ...	114

Summary.....	117
--------------	-----

## Section 28

### All About MIDI ..... 118

---

What MIDI Can and Can't Do for You.....	118
MIDI Primer.....	118
Program Change Messages.....	118
Bank Change Messages.....	119
Control Change Messages.....	119
Velocity Messages.....	120
Pitch Bend Messages.....	120
SYSEX Messages.....	120
Connections.....	121
MIDI In/Out.....	121
MIDI THRU or MIDI OUT/THRU.....	121
MIDI Routing.....	121
Computer Hook-ups.....	123
Configuration.....	125
<MIDI> Utility Function Settings.....	125
<b>GT-5</b> <System> Utility Function Settings.....	126
Control Assigns.....	127
Common Connection & Configuration Problems.....	128
Bulk Dump/Load.....	130
Bulk Dump Procedure.....	130
Bulk Load Procedure.....	130
MIDI Applications.....	131
Cloning Your GT-3/5!!.....	131
GT-3/5 Controlling Other MIDI Units.....	131
MIDI Devices Controlling The GT-3/5.....	132
Sequencers Controlling The GT-3/5.....	132
MIDI Foot Controllers.....	132
MIDI Switching/Loop Systems.....	133
Patch Editors.....	134
Other MIDI Software.....	134
MIDI Implementation.....	135

## Section 29

### External Effects Loop..... 136

---

The 'External Effects Loop'.....	136
Send Level Adjustment.....	136
Return Level Adjustment.....	136
Level Matching.....	136
Noise.....	136
Creating Patch 'Ext FX Loop'.....	136
Applications.....	137
External Effects.....	137
Preamp Connection.....	137
Signal Tap.....	137
Jam Along.....	137

## Appendices ..... 138

---

Appendix A Patch Reference Library.....	138
1-1/U1-1-1 '<Empty>'.....	138
1-2/U1-1-2 '<BYPASS>'.....	138

1-3/U1-1-3 'Clean' .....	138	Appendix D Analysis Methods .....	155
1-4/U1-1-4 'Ext FX Loop' .....	138	Equipment Set-up & Connections .....	155
2-1/U1-1-5 'Noise check' .....	139	GT-3 Patch used .....	155
2-2/U1-2-1 'YUK Noise 1' .....	139	Spectrum Analysis .....	155
2-3/U1-2-2 'YUK Noise 2' .....	139	Level Analysis .....	156
2-4/U1-2-3 'YUK Noise 3' .....	140	Summary .....	156
3-1/U1-2-4 'Metal Dist*' .....	140	Appendix E LCD Meter Overlay Templates .....	157
3-2/U1-2-5 'Metal SG' .....	140	Appendix F Electrical Safety .....	158
3-3/U1-3-1 'Metal Trem' .....	140	Use a LED/neon socket tester .....	158
3-4/U1-3-2 'Metal Pan' .....	141	Use an RCD permanently on your rig .....	158
4-1/U1-3-3 'JC-120 Trem' .....	141	Avoid solder for electrical connections .....	158
4-2/U1-3-4 'C.TWIN Pan' .....	141	Ground/EARTH Connections .....	158
<b>GT-3</b> 4-3 'Metal Chop' .....	141		
<b>GT-3</b> 4-4 'Metal GibSL' .....	142		
Appendix B Level Settings Overview .....	143		
Appendix C Quick Settings Overview .....	144		
<b>GT-3</b> Effect Group: SFX .....	144		
<b>GT-3</b> Effect Group: COMP/LM .....	144		
<b>GT-3</b> Effect Group: WAH .....	144		
<b>GT-3</b> Effect Group: OD/DS .....	144		
<b>GT-3</b> Effect Group: PRE/SP SIM .....	145		
<b>GT-3</b> Effect Group: EQ .....	145		
<b>GT-3</b> Effect Group: MOD .....	146		
<b>GT-3</b> Effect Group: DELAY .....	148		
<b>GT-3</b> Effect Group: CHORUS .....	148		
<b>GT-3</b> Effect Group: REVERB .....	149		
<b>GT-5</b> Effect Group: FB/SLOWGEAR .....	149		
<b>GT-5</b> Effect Group: COMP/LM .....	149		
<b>GT-5</b> Effect Group: WAH .....	149		
<b>GT-5</b> Effect Group: OD/DS .....	149		
<b>GT-5</b> Effect group: PREAMP .....	150		
<b>GT-5</b> Effect group: SP SIM .....	150		
<b>GT-5</b> Effect Group: EQ .....	151		
<b>GT-5</b> Effect Group: MOD .....	151		
<b>GT-5</b> Effect Group: DELAY .....	153		
<b>GT-5</b> Effect Group: CHORUS .....	153		
<b>GT-5</b> Effect Group: TREM/PAN .....	154		
<b>GT-5</b> Effect Group: REVERB .....	154		

# IMPORTANT NOTES

This document has been formatted a similar style as the GT-3/5 Owners Manual to provide a consistent style of presentation. It must be noted however, that the presentation in no way represents any endorsement by the Roland Corporation.

THIS IS NOT AN OFFICIAL BOSS/ROLAND MANUAL.

© Copyright 2000-2002 Barry S. Pearce  
EQ Portions © Copyright 2000 Philippe Martin  
MIDI Section © Copyright 2001 PLANK, Ron Worley & Barry Pearce  
LCD Meter Templates © Copyright 2001 Manuel "Jed" Saldaña  
Cabling & Connector Images in sections 2 & 4 © Copyright Behringer International GmbH

Section 15a Applied Principles of Distortion Dynamics,  
© Copyright 2001 Vince Baim. All Rights Reserved.  
(Version 1.3) This text may **not** be copied, edited, or publicly printed, in part or in whole, without prior written consent from the author.  
Email: sauceydog\_2000@yahoo.com

Boss is a registered trademark of the Roland Corporation.  
GT-3/5 Owner's manual information (used in the MIDI section) was added with the kind permission of Roland Corporation.

GT-3 and 5 editor information used with the kind permission of their respective authors.

Some of the computer MIDI hook-up info was "borrowed" from Shawn Deveau's web site, who in turn got it from an article in Roland's User Group Magazine, by Peter Swiadon. Hope nobody minds!

Permission to distribute this material is hereby granted ONLY under the following conditions:

1. It must remain intact with no edits, additions or deletions either to content or the structure.
2. It must be offered freely and without cost of any kind.
3. It may not be republished, or altered from its original state without the expression permission of Barry S. Pearce.

Permission is also granted for the publication, duplication or replication of small extracts from the text. This permission does NOT apply to section 15a. Permission should be sought separately from the author specified above.

The authors of, or the contributors to, this document may not be held liable for any damage that occurs as a result of using the information presented in this document. Any action based on this information is performed entirely at your own risk.



# REVISION HISTORY

Version	Status	Date	Name	Description of Changes
0.1a	Draft	27 Sept 2000	Barry Pearce	Initial release. NOTE: Section 4 on noise elimination is not yet complete.
0.1b	Draft	17 Oct 2000	Barry Pearce	Revision History given its own section due to column width constraints being too tight. Minor font/text formatting changes in section 3. Minor spelling corrections to section 3. Section 1 had some minor updates to increase the list of thank you's! Section 2 updated with how to shield a guitar guide. Section 4 edited and revised. Section is now complete. Section 17 was updated the fact that the EQPlot program had been written and is now available. Section 21 was updated with more methods on boosts for solos, after a discussion with Kent Andersen and Sutton Reid. Section 24 was written! Appendix B was updated to reflect the changes in my set-up.
0.1c	Draft	16 Jan 2001	Barry Pearce	Corrected reference on page 66 from the EXT OD/DS, to refer to section 23 on Signal Delay.
0.1d	Draft	17 Jan 2001	Barry Pearce	Margins modified to allow better conversion to PDF. Minor re-formatting following margin changes. Copyright dates updated. Minor spelling omission in section 12 corrected.
0.1e	Draft	26 Jan 2001	Barry Pearce	Outstanding Issues section added. How to use this document updated to overview new Section 8 EV5 contents. Section 8 updated for my current set-up. Added additional sub-section on configuring and using a Roland EV5 expression pedal. Sections 22,23,24 updated for corrected spelling & rewording of confusing sentences. Appendix A updated for corrected spelling & rewording of confusing sentences. Appendix C updated with minor reformatted changes. Global replacement of 'hum bucker' to humbucker' to ensure consistency. Made grammar and spelling corrections throughout, after proof reading by Dave Stewart. Section 1 modified to include thanks to Dave Stewart for proofreading this document. Section 4 Added sub-section on Noise Suppressor; Effect of Parameters. Section 2; added additional paragraph warning about overloading pickups caused by the pickup set too high.
0.1f	Draft	22 Jan 2002	Barry Pearce, Ron Worley	New Connections, Audio Terminology and Level Metering sections added resulting in a complete re-number of ALL sections in the document. During the re-numbering process a number of sections were moved around to provide a more logical order. Added Section 15a added – Distortion Dynamics. Added Section 28 All About MIDI. Removed Appendix B. Other Appendices renumbered. Added Appendix D to provide background on the methods and settings used to analyse the GT-3/5. Added Appendix E – Jed's LCD Meter templates. Completed Section 13 Compressor/Limiter. Globally replaced ' – ' with em's. Links & text changed from Yahoo Groups to Yahoo Groups.



## Contents

Version	Status	Date	Name	Description of Changes
				<p>Document renamed from 'GT3 Set-up Series' to 'Boss GT-x Set-up'.</p> <p>Added GT-5 information.</p> <p>GT-3/GT-5 specifics highlighted with use of graphics.</p> <p>GT-3 references changed to GT-3/5 where both units are applicable.</p> <p>Important Notes changed to include newly required copyright recognition.</p> <p>Section 16 changed from YUK Noise to Digital Aliasing to describe what is really happening.</p> <p>Supporting spectrum analysis files revised – all spectrum analysis has been re-done and is now saved as even smaller gif files at 1024x768 for clearer viewing.</p> <p>Patch '1-4 Flat Amp' removed to avoid perpetuating a Roland LIE about the AC.Guitar preamp.</p> <p>Section 27, recommendations about acceptable internal battery voltages added.</p> <p>.....and a huge number of other minor changes throughout the ENTIRE document way too many to mention...sorry.</p>
v0.2	Draft	04 Feb 2002	Barry Pearce	<p>This document is now 100% GT-5 compatible (it was originally based on the GT-3).</p> <p>Section 1 – Credit given to Simonen Sampo for writing the 'Sutton Mod' description presented in section 4.</p> <p>Section 4 – corrected statement about GT-5 being able to calibrate external exp pedals – it cannot. Included results from spectrum analysis revealing that the global setting 'your setting?' only affects the preamp sims. Added reference to section 14 regarding the use of external preamps &amp; the GT-x preamp sim. Also corrected the credit about the 'Sutton Mod' description, and added 1 missing paragraph to it as well.</p> <p>Section 7 – meters fully calibrated; description included &amp; diagram added.</p> <p>Section 8 Level Matching – completely rewritten. Since it was presented in the series it has had a 60% re-write and now it's received a HUGE revision in order to further improve clarity and hopefully make it less confusing.</p> <p>Section 9 now includes a reference to Appendix F on electrical safety. Also corrected references to 'Metal Chop' to make it GT-3 only.</p> <p>Noise Suppressor from section 9 given its own section – Section 9a.</p> <p>Section 14 – was modified to make it 100% GT-5 compatible. Now mentions the GT-5 customisations. Also added in comments amount driving the input of the preamp sim for added gain. Added a sub-section called 'External preamp + GT-x preamp: Breaking the Myth' to dispel misinformation about not being able to use BOTH at the same time.</p> <p>Section 15 – was modified to make them 100% GT-5 compatible. Now mentions the GT-5 customisations.</p> <p>Section 16 – new information regarding aliasing across the whole unit added, and revised my rather scornful attitude to the preamps – this is a personal choice &amp; should be worded to suggest so.</p> <p>Sections 23 - minor corrections from Ron Worley's proof reading, including GT-3 only blocks added for BPM references and use of NS threshold &amp; release as control assign targets.</p>

## Revision History

Version	Status	Date	Name	Description of Changes
				<p>Section 26 – added some words explaining why signal delay &amp; signal polarity are important and how they can affect the signal. Also added some additional measurements regarding delay caused by effect processing, and corrected the GT-3 bias of the text.</p> <p>Section 28 – MIDI connection/configuration problems – corrected the bullet points back to bullet points! For some bizarre reason they become numbered points...damn MS Word!</p> <p>Added Section 29 External Effects Loop – the [GT-3]EXT OD/DS and [GT-5]Loop really deserved their own section. Added details that spectrum analysis of the SEND jack reveals a full range signal.</p> <p>Appendix A – Patches shuffled round and completely renumbered. 'Metal Chop' made GT-3 only.</p> <p>Appendix D – Corrected subsequent page header – thanks to federaik_2001 of the GT-3 Yahoo Group.</p> <p>Added Appendix F Electrical Safety.</p> <p>Sections 9, 10, 11, 12, 14, 15, 15a, 16, 18, 19 &amp; 24 - minor corrections from Ron Worley's proof reading.</p> <p>All references to patch numbers in the patch reference library have been removed from the text to make the text more applicable to both the GT-3 and the GT-5.</p> <p>All references to 'Flat Amp' have at last been removed.</p> <p>Patch 'Extern Only' renamed 'Ext FX Loop'.</p> <p>Both GT-3 &amp; GT-5 .SYX patch reference library files revised to fit in line with the new patch numbering as defined in the revised Appendix A, and released as v0.2.</p>

# OUTSTANDING ISSUES

Issue Number	Date	Raised By	Description
0001	Ongoing	Barry Pearce	Section 13 – Compressor/limiter - to be completed

# How to use this document

This document covers a number of topics regarding general guitar system set-up, operation and maintenance, and operation of the Boss GT-3/5 Guitar Effects Processors. It is divided into twenty-five sections and four appendices.

I recommend reading sections 1-8 in order. Having read these sections I then recommend diving into the rest of the document as necessary.

## Section 1 Introduction

This section examines why this document exists, provides links to the most important GT-3/5 web sites, suggests other documents to read and I also get a chance to thank the people that have contributed to 'Set-up....'.

## Section 2 Audio Terminology

This section describes some basic audio terms that are heavily used throughout this document.

## Section 3 Guitar Set-up

This section examines how your guitar could be preventing you from sounding good. Consider this a health check for your guitar!

## Section 4 Connections

There are a number of methods to connect up your GT-3/5. This section shows you what can be done and what the relative pros and cons of each method are. We also examine the different connector types, balanced/unbalanced signals and setting up external CTL & expression pedals, including a walkthrough of connecting a Roland EV5 Expression Pedal.

## Section 5 Basic Configuration

This section presents a suggestion for setting up your GT-3/5. The patch ' <Empty> ' is presented to help you keep a track of free patch slots and we examine how you might wish to organise your patches. Finally I mention quick settings; what they are and how they can help you.

## Section 6 Effects Ordering

This section examines a recommended effects order, including a comparison of OD-PRE or PRE-OD orderings to see if one way works better than the other.

## Section 7 Level Metering

Understanding the GT-3/5's meters is critical to successfully matching levels, and avoiding problems such as clipping. In this section we look at what the meters can do for you.

## Section 8 Level Matching

This section explains my GT-3/5 volume set-up philosophy. It examines how to measure the input/output levels, and how to balance/tweak them.

## Section 9 Noise Elimination

This section takes a look at removing noise, hum and unwanted distortion from your guitar system. It takes a look at impedance, signal-noise ratio, ground loops and clipping. A small departure is made into some tips for eliminating noise when recording onto computer.

## Section 9a Noise Suppressor

The differences between suppression, gating and filtering are examined. We will look at what a Noise Gate does, and how to use it to solve noise problems, and discover how to use the NS as an effect!!!!

## Section 10 Speaker Simulation

This section examines the speaker simulator, when it is on, when it is off and its characteristics as well as tips for use.

## Section 11 Manual Mode

Manual mode seems to have caused some confusion. We take a look at what it can and can't do and examine how we can be more sophisticated with it, using it to open up a patch.

## **Section 12**

### **Patch Problems**

We examine why patches we obtain from other people and the internet just don't cut it when we use them on our own GT-3/5s, and find out what steps we can take to help fix these Patches and help ensure that others can benefit more from Those that we have created.

## **Section 13**

### **Compressor/Limiter**

This section examines what compressors and limiters do, what is available on the GT-3/5 and how we can apply them.

## **Section 14 Preamps**

We examine the preamps to obtain both clean and distorted sounds.

## **Section 15**

### **Overdrive/Distortion**

We take a look at the OD/DS.

## **Section 15a**

### **Applied Principles of Distortion Dynamics**

In this section Vince Baim takes us through getting that killer distortion that we all strive for.

## **Section 16**

### **Digital Aliasing (YUK Noise)**

In this section I explain what Digital Aliasing is why it was called 'YUK Noise', how to induce it and how to avoid it.

## **Section 17**

### **Slow Gear**

In this section we take an in depth look at the Slow Gear effect; what it is, what it does and how to apply it.

## **Section 18**

### **Tremolo/Pan**

This section examines the Tremolo and Pan effects. We make a detail examination of them to see what they are all about and what they can do for us.

## **Section 19**

### **Slicer**



We examine what the Slicer does and how to apply it.

## **Section 20**

### **Equalisation (EQ)**

In this section Phillippe Martin provides an introduction into EQ, and I supply some information about the Low EQ/High EQ parameters.

## **Section 21**

### **Foot Volume**

This section takes a close look at getting the most from the foot volume pedal.

## **Section 22**

### **The Guitar's Volume Control**

It may not be on the GT-3/5 but this section takes a look at using it for effect, and examines what affect it has on the sound from the GT-3/5.

## **Section 23**

### **Control Assigns**

This section examines control assigns and I give you the information that Roland forgot to put in their manual. We take a look at the technical aspects of the Internal and Wave pedals. Finally we put together what we have just learnt to create a range of real-time changing volume effects.

## **Section 24**

### **Getting Boost for your Solo**

This section examines a number of ways to give you a boost when you start getting hot!

## **Section 25**

### **Using Multiple Guitars**

This section examines what problems are associated with using multiple guitars and looks at how these problems can be resolved.

## **Section 26**

### **Signal Delay & Polarity**

Sutton Reid prompted a look at signal delay and signal polarity. This section describes what they are and how they affect the GT-3/5.

## How to use this document

---

### **Section 27**

#### **Factory Reset/Commissioning**

This section takes a quick look at the two factory modes, how to get into them and what to watch out for!

### **Section 28**

#### **All About MIDI**

In this section we take a look at the power that MIDI can unleash. It examines the use of MIDI for controlling the GT-3/5 and using the GT-3/5 to control other MIDI devices and even non-MIDI devices.

### **Section 29**

#### **External Effects Loop**

In this section we take a look at the use of external devices in the GT-3/5's effects loop via the GT-3's EXT OD/DS and the GT-5's Loop. We also answer the question - which is best; placing an external pedal in the external effects loop or before the GT-3/5? And we even look at some novel ways to use the effects loop.

### **Appendix A**

#### **Patch Reference Library**

This section describes what the patch reference library is, where to find it and provides text versions of all of the patches presented as part of the 'Set-up....' series.

### **Appendix B**

#### **Level Settings Overview**

There are an awful lot of level settings on the GT-3/5. I describe what each does, so you have a quick reference to altering your sound.

### **Appendix C**

#### **Quick Settings Overview**

This section takes a peek at all the preset effect Quick settings on offer—all 211 of them!!! This makes up for the fact the GT-3/5 manual doesn't!!

### **Appendix D**

#### **Analysis Methods**

This section will provide information about the methods and settings used during the spectrum and level analysis of the GT-3/5, which has revealed so much technical information about the Boss GT3/5.

### **Appendix E**

#### **LCD Meter Overlay Templates**

Kindly provided by Jed, this section provides a single page that maybe printed out on a transparency that may be used for more accurate metering measurements.

# Section 1 Introduction

## Welcome to 'Set-up....'!

'Set-up....' started off as a series of six postings on the GT-3 Yahoo Group. This document represents the entire work of the series, bundled up, in a single handy reference. I started the series to answer some of the large number of requests on the group regarding set-up or volume related matters. Answering some of these questions involves a bit of investigation and you will be pleased to know that I'm going to be doing a lot of legwork for you!

Although this document was originally developed using a GT-3, many subjects cover any guitar system, and a lot of the GT-3 information is applicable to the GT-5 with little or no translation. Since the original release the document has been made 100% compatible with the GT-5. Where differences between the GT-3 & GT-5 exist, the following graphics have been used to show that a particular piece of text is GT-3 or GT-5 specific. If something is applicable to both units then these symbols will NOT be shown.



GT-3 specific items



GT-5 specific items

If there is a minor difference the text may talk about 'on the GT-3 something and on the GT-5 something else', alternatively the difference may be prefixed by '[GT-3]' for GT-3 specific items and '[GT-5]' for GT-5 specific ones. I hope this helps highlight the differences between the two units.

I haven't considered doing other effects stuff; only those that are volume related. Perhaps someone else would like to volunteer to do some 'Effects Set-up....' specials???? Any offers....?

## What Is the Aim?

The aim is quite straight forward:

*To help Boss GT-3/5 users (including myself) have a better understanding of the unit, be more confident with it, be able to set it up more efficiently and most of all—to make better sounds from it.*

## Other Information

Before embarking on reading this document I do recommend that you read through the GT-3/5 owners manual supplied by Roland. I do assume that you have read this.

The GT-3 Yahoo Group has two further documents that I would also recommend reading; the GT-3 FAQ and the Unofficial GT-3 Owners Manual Supplement both of which can be found at

<http://groups.yahoo.com/group/gt-3/files>

The GT-3, GT-5 and GT-6 Yahoo Groups are forums with a combined membership of over 1000 existing or potential GT-3/5 users. The group HQs are at

<http://groups.yahoo.com/group/GT-3>

<http://groups.yahoo.com/group/GT-5>

<http://groups.yahoo.com/group/GT-6>

My band is called **BREAKING TABOO**. All of the files and materials referenced in this document are available from the band's website:

<http://www.breakingtaboo.com>

Or may be accessed directly at:

[http://www.breakingtaboo.com/gear/boss\\_gt-x](http://www.breakingtaboo.com/gear/boss_gt-x)

The GT-3 Yahoo Group also serves as a mirror for all the files mentioned by the set-up series and this document. These files can be found at:

<http://groups.yahoo.com/group/gt-3/files/Set-up..../>

If you have more general set-up guitar related queries rather than GT-3/5 related queries then try the GuiTech or The-Guitar-Cafe Yahoo Groups which can be found at:

<http://groups.yahoo.com/group/GuiTech>

<http://groups.yahoo.com/group/The-Guitar-Cafe>

And finally some links to Roland:

<http://www.roland.co.uk>

<http://www.rolandus.com>

## Stompbox City

One GT-5 group member called PLANK (from Manchester in the UK) summed up what I have been trying to get at all along:

*'The best way to work with the unit is NOT to think of it as a big blue box with loads of effects, or as a multi effects unit. Think of it as a load of stompboxes...you know, like the small Boss pedals.'*

This is why I level match as I do, so manual mode can be used to treat the GT-3/5 just as a set of stompboxes. The level matching ideas are exactly what you would do if you had a set of stompboxes in front of you.



## Section 1 Introduction

---

Cheers PLANK for putting into words that which I had assumed everyone understood already!

### Thank You

---

There are one or two people that must be thanked for their hard work and effort in the creation of the series and more recently this document, as well as the other truly great reference materials such as the FAQ and the Unofficial Owners Manual Supplement....

#### Ron Worley

Fort Worth, TX USA

[ron.worley@honeywell.com](mailto:ron.worley@honeywell.com)

[flapsjr@charter.net](mailto:flapsjr@charter.net)

I cannot thank Ron enough – He has not only been the main driving force behind the creation of the MIDI section. (Which Ron initially developed using Plank's original MIDI document – to which I and Ron added more information, diagrams and technical detail on MIDI connections and control, turning it into what you see in the MIDI section today), but he has also helped me immensely in preparing the GT-5 compatibility of the document; which has included a complete and thorough proof-read of the document AND if that wasn't enough he wrote the GT-5 side of the factory reset/commissioning section, AND prepared the GT-5 version of the .syx file for me. Ron – You are a true star.

#### Vince Baim

For kindly allowing me to include his own work on 'Applied Principles of Distortion Dynamics' as section 15a. It's a cracking piece of work and should help a great many people obtain the sound they want and the killer distortion that they wish for.

#### Philippe Martin

For authoring the section on EQ. I am indebted to him for covering this!

#### Stephen Soukup

For all his helpful comments, and discussions during the series and also for the mammoth task of proof-reading this document! The series would have been much smaller and much poorer without him.

#### PLANK

Manchester, UK.

[plank@tinyonline.co.uk](mailto:plank@tinyonline.co.uk)

[plank.@libertysurf.co.uk](mailto:plank.@libertysurf.co.uk)

<http://users.tinyonline.co.uk/plank/home.html>

For saying what I haven't said but assumed about treating the GT3/5 as stompboxes. Additionally the MIDI section in this document was based on the MIDI Tutorial written by PLANK, and posted on the GT-5 Users Group Site.

#### Manuel "Jed" Saldaña

For his effort producing the LCD Meter Templates in Appendix E, and allowing me to include them here.

#### Simonen Sampo

For his description of the 'Sutton Mod' to install additional external footswitches freeing up the CTL pedal and external footswitches.

#### Sutton Reid

For his idea of a 'mod' to install additional external footswitches freeing up the CTL pedal and external footswitches (documented by Simonen Sampo). And also for his helpful comments and also for his questions on signal delay/polarity and volume boosts for solos and more besides.

#### Ed Lauwerens

For the idea of using MIDI to control non-MIDI devices.

#### Kleber A. Gonçalves

For his suggestions for GT-3 speaker simulator on/off functionality.

#### Kent Anderson

For his suggestions for his suggests about volume boosts for solos.

#### Kaido (Draconic) Haavandi

For bringing the GT-3 factory commissioning mode into the limelight!

#### Suzanne Archibald

For advice on the compressor and opening my eyes and memory to the fact that the compressor may not be a downwards but an upwards compressor.

#### Russ Poncher

For his effort producing the GT-3 FAQ. Its an invaluable reference and great companion to this document. I only wish more people read it...

#### Stephen M. Golden

For his effort producing the Unofficial GT-3 Owners Manual Supplement. Like the FAQ this is another great reference – great work.

#### Dave Stewart (GT-3 Yahoo Group Moderator)

For proofreading what is, a rather large document.

#### Mark Meyer

For bringing Vince Baim's work to my attention and negotiating its inclusion in this document.

**Thank you all very much  
indeed.**

I would also like to thank everyone who has made comments, given words of encouragement, or thanks. These have helped me understand that there was a need for this document and it wasn't just me who needed the information!

### **And Finally...**

---

I hope this document helps you understand your GT-3/5 better. If you take away from this just one new piece of information then it has all been worthwhile. Hopefully this document will provide a useful reference for the future.

Although at the time of this final update the GT-6 has been released, I have no plans to update the document to accommodate the GT-6. Firstly I do not feel that such a close similarity exists between the GT-3/5 and the GT-6, as does between the GT-3 and the GT-5. Secondly, and more importantly, I'm afraid I really don't have the time. This document so far has taken a lot of time, and whilst I hope it helps at least a few people it is now time for me to move on and get on with writing some songs (not to mention one or two other things in life).

I hope this document is at least everything I ever promised it would be. It has certainly grown to something far bigger than I first imagined.

If you have a problem or subject area you would like to see addressed here then send me an e-mail or post a message to the either the GT-3 or GT-5 Yahoo group.

If anyone has any comments, corrections, suggestions they would like to make please please please make them! All comments will be taken into consideration, and all comments help everyone (including me!) understand their GT-3/5 better. Please make all comments public via the GT-3 and GT-5 Yahoo Groups.

To those of you who are American I would like to point out that I am not atrocious at spelling; I'm English! I will however apologise for any differences in language that make this document harder for others to understand, particularly one or two references and phrases that may be turn out to be rather quaint English.

**Barry Pearce**

E-Mail: [bsp.gt3@freenet.co.uk](mailto:bsp.gt3@freenet.co.uk)

## Section 2 Audio Terminology

### Audio Terms

Before we get going, I feel that I should explain some common terms. A good understanding of what these terms mean, their implications and their relevance to us, will certainly make the descriptions in the rest of this document much more meaningful. It is possible that many of you have come across these terms before. Maybe others haven't so please bear with me for a little while, while I explain these terms.

### Signal

An audio signal is an analogue or digital representation of the sound that we hear. The analogue representation is a voltage. For instance, when your strings vibrate on your guitar the pickups convert the vibration to a voltage. This voltage is the audio signal. An Analogue to Digital Converter (ADC) changes an analogue signal (voltage) into a digital one. To move the other direction you use a Digital to Analogue Converter (DAC). Both these may be integrated into a single chip known as an ADAC.

### Mono Signal

A mono signal is a single audio signal. As there is only one channel, it is not possible to have different sounds for left and right. To do this you need 2 signals, which leads me nicely on to...

### Stereo Signal

This signal is in fact **two** mono signals; one for left, and one for right. It is fairly normal to group the two together and talk about a single stereo signal. The left and right channels must differ. If they do not they what you have is '2 Channel Mono'. Two Channel Mono is often misinterpreted as Stereo, but this is not so.

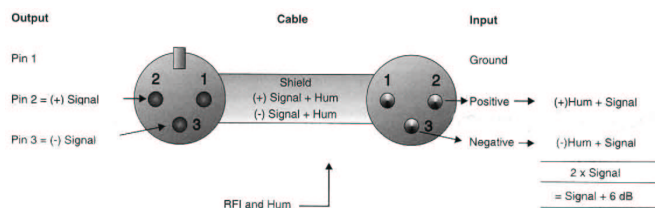
### Unbalanced Signal

This term is used with regard to wiring. An unbalanced signal will use a single wire to transmit a signal. Typically, a guitar outputs an unbalanced signal. The GT-3/5 inputs and outputs are all unbalanced as well. To change between unbalanced, balanced and vice versa you need a special converter, although that said, some equipment have converters built in.

### Balanced Signal

A balanced signal uses two wires to transmit the SAME audio signal. Do NOT confuse balanced with stereo. Although two wires are need and the two signals differ a balanced signal is still MONO. The point of using balanced signals is primarily one of noise reduction. Typically there are two signal wires called 'hot' and 'cold' respectively. The 'hot' signal is our normal unbalanced signal, and the 'cold' signal is the hot one phase inverted. The theory is that when external noise affects the cable it will affect both signals equally. So on the 'hot' wire we have +signal+noise

and on the cold wire we have -signal+noise. When the signal arrives at its destination the cold signal is inverted giving us +signal-noise. The two wires have their signal mixed to return us to a single signal (which is effectively addition) and this gives us +signal+noise+signal-noise. Simple maths gives us the answer as 2 x signal and NO noise!!! Here is a good diagram (courtesy of Behringer International GmbH) that shows this visually.



### Signal Path

The route the audio signal takes through the various cables and pieces of equipment is known as the signal path.

### Signal Level

This is the amplitude of the voltage. It can be measured in two ways – peak levels and RMS (Root Mean Square) levels. RMS is a way of taking an oscillating signal (AC electricity) and resolving it into an equivalent non-oscillating signal (DC voltage). This is a way of determining the total power of a signal. Signal-Noise ratios (explained below) are measured in RMS.

### Signal-Noise Ratio

This is sometimes called 'Dynamic Range'. All electronic and electrical devices generate noise. Signal-Noise Ratio is basically how much louder the audio signal is, compared with the noise. Many electronic devices such as stompboxes and mixers etc are marked with their S/N ratio. Basically the lower the better—i.e. (quoting from 'Guitar gadgets') A -60dB S/N ratio means noise you can clearly hear but is probably not overly objectionable. A ratio of -70dB S/N means the noise is still there but is considerably less objectionable. If the S/N ratio is -80dB then the device will be quiet enough for everyone and at -90dB and greater you are going to have to really look for the noise.

My mixer comes in at about -97dB, my Alesis RA100 is at -100dB, the Samson wireless is better than -100dB.—you get the idea. The GT-3 is -100dB or better., and the GT-5 is marginally quieter at -105dB or better. (Although not labelled SNR the GT-3/5 manuals use the term 'Dynamic Range' to define the SNRs).

However, there are some general principles we can observe here. Let us say I have a signal of level 100 and this goes through a device that will generate 10 units of noise. If I now amplify this signal by 10 then I get 1000 units audio

signal level but 100 units noise. If I put a louder signal through the unit initially—for instance 200 units and amplify it by 10 the audio is 2000, however the noise is still only 100; Instead of 10% its now only 5%. Indeed If I now reduce the amplification—to say 5 times, I get 1000 units of audio and **ONLY** a mere 50 units of noise. We have the same audio level but a significant reduction in noise. This is clearly an improvement over our initial case.

The problem is once noise has been introduced it is a bugger to get rid of—moral of the story is to try to reduce noise **at its source**, especially from noisy units. This is why so many pages are devoted to this subject in section 9.

It can be seen that if a louder signal can be fed into a fixed-noise level unit, then we actually end up better off at the end. Thus it is better to feed a loud signal rather than a quiet one. However, the receiving device **MUST** be able to cope with this loud signal. If it can't, clipping will occur...

### Clipping

I originally presented this as part of noise elimination. However, it is so fundamentally important to the GT-3/5.

Some people would perhaps consider clipping as noise but it isn't really.

Let's use an analogy here. We are going to drive a double-decker bus underneath a bridge designed to accommodate a single-decker. No, I'm not into violence. There are no passengers and the driver is a stunt driver who knows what he is doing! **DO NOT TRY THIS AT HOME!** OK. Here we go, 30mph. 50mph. 70mph (its a good bus!). **BANG.** The Bus has come out the other side. Hang on a mo. Half the upper deck is missing! The top is now rather ragged and mangled. Other than that the bottom half of the bus is OK.

If you take a loud signal and pump it into a 'space' designed for a not so loud signal the top will be lopped off! Clipping is the audio term for such an event.

Clipping alters the sound you hear, manifesting itself as speaker rumble, harsh clicks or even distortion. In fact the principle of clipping is behind every distortion or fuzz we have today. However, there are times when this clipping is undesired—this is unwanted distortion. For instance we want a nice clean warm sound. Any clipping that occurs will cause distortion and will ruin our clean sound.

## Section 3 Guitar Set-up

OK. I know you are going to get all shirty (yes shirty—it's a quaint English thing) and whilst prodding me in the ribs say 'What has this got to do with my GT-3/5?'. Well, it has and it hasn't. Let's face it, if your guitar is not set-up correctly there is no way on this planet the GT-3/5 is going to make it sound good—and that, after all is one of the aims of this series. What we are going to do is give your guitar a quick check-up and make sure that it won't inhibit you in your playing. Anyway, please bear with me on this one—we will be looking at your guitars electrics briefly as a precursor to noise elimination. So...

### Preliminary Electrical

Before we start let's do a quick check on the old tone/volume pots and switches on your guitar. Plug into your amp (using only the good cables determined above) and turn the volume up full. Ignore any amp-generated noise for the moment. Now without playing anything rotate the volume pots one by one. Do each one backwards fully and forwards fully a couple of times. If there is any sign of noise—which will typically be a scratchy sound then the pot needs attention. Once you have done the volume pots, leave the volumes at full and then try the same with each of the tone pots.

OK, same again this time with the pickup selector switch. You will get some switching noise here but this should be acceptably low. Give the switch a waggle around as well—this showed up a dodgy switch on my Strat. My Jackson was deathly silent.

Finally waggle the cable at the point where it goes into the guitar. If this produces any noise attention is required.

If any faults need to be rectified I suggest either seeking out the services of a professional luthier or buying a book on guitar maintenance; recommendations are 'How to make your electric guitar PLAY GREAT!' by Dan Erlewine and Guitar Player Magazine's 'Guitar Player Repair Guide' which is also by Dan Erlewine. Whatever you do, solve them before continuing.

### Strings I

Now let's check the simple stuff. You have changed your strings in the last year right? Ah. Well, go do it now!! Old strings that are fully stretched have lost a lot of tone compared with new strings. The harmonic overtones that are also produced have diminished. The sound will be dull and your guitar will be harder to tune. Nothing will sound good on old strings. Nuff said. One more thing though; always wipe your strings after playing. This helps avoid a build up of crud that attaches itself to your strings and helps to corrode them!

### Final Electrical

Actually, while you have the strings off – let's do a quick electronics check. I take no credit for what comes next—this is direct from the Jackson website:

*Check the wiring in the control cavity and make sure the pickup is wired correctly. No loose wires or strange animals crawling around inside? If not then it's time to check out the grounding system. You'll need a multimeter to check for continuity between each solder joint.*

*Check for any broken continuity between joints and the cavity ground (ground wires that should be connected to the body of the guitar) if all check out be sure to look for the ground that leads to the bridge and double check it out be sure. The ground wire for the bridge should be secured to the spring claw or the baseplate depending on the model and type. This will ground the strings and keep many outside interference from taking over your guitar.*

NOTE: Many active pickup systems such as those from EMG recommend that the strings ARE NOT connected to the cavity grounding, or the electronics. At ALL times make sure your guitar adheres to recommendations such as these from the manufacturers. These instructions are normally issued for your safety.

### Shielding

While you've got the strings off you may wish to shield the cavities of your guitar. This may not be necessary in some case but certainly won't hurt matters if you are experiencing noise difficulties. After shielding three of my own guitars, I have certainly noticed a complete removal of the noise you get when you haven't got your pinkies on the strings (which then disappears as soon as you touch them). I think this is down to bad grounding, and certainly found that shielding the guitar helped.

So what do you need and how do you do it?

It's actually quite simple...first be prepared to take everything off your guitar...and I mean everything!

Buy some 25mm EMI/RF copper shielding foil. It's quite expensive at 25 UKP for 25m (well I suppose it's about the same as guitar cables really...) but you can get about 4-5 guitars out of this depending on the type of the guitar—strats with their large cover plates take a bit more maybe 5-7m of the stuff. I got mine in the UK from RS Components (<http://rswww.com>). In the US, Stewart MacDonald (<http://www.stewmac.com>) sells a complete cavity shielding kit, as well as shielding paint and other items. Incidentally, this is the company that Dan Erlewine either runs or works for.



OK...ditch the strings.... take off every panel you can...and yes even the plate where the jack socket is.

As a general rule—when placing two strips of this stuff side by side overlap by about 2-3mm...this gives a good electrical connection.

BTW..just in case I call the cover plate the large white plastic crappy scratch guard thing on the front of the guitar...

Firstly cover the back of the cover plate...you only need to do enough to generously cover the pickup and electronics areas...make sure that when the cover plate is screwed back onto the guitar you will have at least 2mm around the edges of the cavities...unless cover plate shape dictates otherwise. You will have to remove the pots and pickup selector switch to do this properly.

So now you have a guitar with the back of the cover plate shielded.

Next line the main cavities. Start by lining the edges, allowing about 2-3mm wrap over the top of the edge, then line the bottom of the cavities, ensure you have a good overlap in all cases as this ensures electrical connectivity.

Now do the dirty and line the jack socket cavity.

OK...now simply put it all back together...

As for the cover panel on the back of the guitar—I didn't bother with this as this only covers the tremolo, however do make sure that the grounding wire connection to the trem system (if fitted/required) is good.

That's about it really....

## Strings II

---

Before you fit new strings make sure you clean the guitar thoroughly, and once you have fitted the new strings make sure you have stretched the strings. It will be very hard to set intonation if you haven't. This takes time. It is NOT a 2minute job to do all 6-7 strings. It could take maybe 30mins. Use a tuner and keep stretching the strings until they settle.

## Neck

---

OK, next we will check the neck. If your neck dips too much or doesn't dip enough then you will be unable to adjust the action correctly. This is easily checked. Place a capo on the first fret and at the body fret press the string down. Now measure the gap around the 7<sup>th</sup> fret (could be 5<sup>th</sup>-8<sup>th</sup> depending on guitar). It should be anywhere from perfectly straight to about 0.020". 0.007" or thereabouts is a fairly typical figure. If > 0.020" you have a problem. In

most cases I recommend the book 'How to make your Electric Guitar Play Great' by Dan Erlewine. This will help you sort it out or if you are feeling a bit squeamish go see a repairman.

## Intonation

---

Next up is intonation. If you don't have one already get yourself a decent tuner. Be prepared to spend as much money on the tuner as you would on a stompbox. You will never regret it.

Incorrect intonation is a big reason for a bad sound especially if barre chords above the 5<sup>th</sup> fret sound pretty awful. One point to make here—you need to have an adjustable bridge, preferably on individual strings. If you don't then I suggest speaking to a tech/repairman.

Do each string individually. First tune the string to exact pitch. Play the open string, and then play it at the 12<sup>th</sup> fret. It should be a perfect octave. If the fretted note is lower in pitch (flat) than the open string then the string is too long and you need to shorten the string by moving the saddle forwards towards the nut. Conversely, if the fretted note is higher in pitch (sharp) then the string is too short and the saddle needs to be moved backwards away from the nut. In each case detune the string somewhat \*before\* moving the saddle. Then re-tune and try again. Perfect is the open string, the 12th fretted and the 12th harmonic all together on the exact pitch, although a very small (and I mean small) deviation between them will not be noticeable. If you cannot achieve this situation then I suggest you have a chat with a repairman.

## Action

---

Finally check the action—if you have it set up too high you will find fretting barre chords hard, and fast phrases difficult. Too low and you will suffer fret buzz which can often add unusual harmonics to a string that make it sound pretty awful. How high action should be is very much down to personal taste and 'feel'. Personally, I go as low as I can without inducing fret buzz. (i.e. down to fret buzz and then back off a little.)

OK we are now fairly certain that the guitar is in reasonable shape. So let's start hitting that noise!

## Pickups

---

Often people have asked 'What are the best pickups to use with the GT-3'. The answer is simple. Any passive or active pickups system will work. Use the pickups that give your guitar the best tone for you.

So other than the type of pickup used what else do we need to know about pickups and their ability to deliver tone? Well, the height your pickup is away from the strings can

## Section 3 Guitar Set-up

---

drastically alter the power output, tone, noise and sensitivity characteristics. An incorrectly set pickup can make you sound awful. Get it right and you can really make it sing beautifully.

OK, Barry, so what is correct? Well. This is where life gets a little difficult, the only thing that is generally agreed as being bad by almost all guitarists is a pickup that 'chokes' the string (I will explain this in a moment). Apart from that, it's down to what pickups you have and a large dosing of personal taste! Some manufacturers offer a range of recommended heights, others don't.

However, to help you out, there are some general differences between a pickup that is closer to the strings than one that is further away. For this you need to ignore the tonal difference that occurs between pickups placed in different positions on the guitar body. Consider that we are always talking about the same pickup in the same position, just nearer to, or further away from the strings.

At this point I would like to say that I am specifically talking about pickup->string height – NOT string height above the frets. If your action is correct then providing you have adjustable pickups—which most will be—then you do not need to alter the strings in any way. I am purely talking about pickups here.

### Pickup-String Distance

#### Closer:

If the pickup is closer to the strings you will get:

- More volume
- A 'bigger' sound
- Easier to overdrive amplifiers

On the downside you will get:

- Less clarity
- Increased sensitivity to pick/finger noise

If it is too close then you may get unwanted harmonics. These harmonics manifest themselves as a distorted ringing. Also by having the pickup too close the magnetic pole pieces will suck your string down and kill all sustain. This is known as 'choking'.

#### Further:

If the pickup is moved further away from the strings you will get:

- Better tone and clarity
- Less sensitive to pick/finger noise.
- No choking so no unwanted harmonics.

On the downside however you will get

- Less volume

If the pickup is a bit too far away from the string you will get reduced sustain and sometimes there is a drop off of sustain on a bend due to magnetic field being too far from the string.

## Adjusting Pickup Height

Most pickups are height adjustable. For single coils there are normally two screws, one each side of the pickup. These look like they are there to 'hold' the pickup down. In fact they are usually spring loaded and have a dual purpose. By adjusting these two screws you can therefore adjust the height of your pickup. Be careful not to go too low—your pickup may come off! Humbuckers are similar. Here, you will probably have six screws. The 4 outside screws bolt down the pickup housing and the 2 middle screws adjust the pickup height—again these are spring loaded to ensure the pickup rises and lowers.

If your guitar has several pickups then it is a good idea to try to balance the output volumes. This is a fairly easy task, and fits in with the philosophy I have with the GT-3/5, of using GT-3/5 for colour and an amplifier for volume. Here we are looking at the same thing—pickups for colour, amp for volume. The slight difference here is that you want a reasonable output from your pickups to avoid problems in the signal path and to keep a good S-N ratio.

Now, in order to reduce the imbalance between single coil and humbuckers you can start by putting them all at the same distance from the strings, then moving the humbucker away, or the single coils slightly closer. You may also find that it is beneficial to tilt the pickups to be closer to the top strings.

Now given this information you now need to 'juggle' it all and adjust your guitar so the pickups produce the tone you require and are relatively balanced in terms of volume between pickups.

It should be noted that by setting the pickups too high, you can cause the pickup to overdrive when then string is plucked. This is especially true with bass guitars. I find myself lowering my bass guitar pickups significantly to avoid a 'clipping' situation where the slapping of the string, caused so much movement it overloaded the pickup. This is even more important to watch out for if you use a drop D tuning on the bass, as the bottom string moves so much further during its vibration. Check out <http://www.mrgearhead.net>. There's a set-up document in the Fender section. Also, the 'Guitar Player Repair Guide' and 'How to make your electric guitar PLAY GREAT' have many factory settings.



## Section 4 Connections

This section will deal with the wide and varied questions regarding ALL aspects of connections and hook-ups. Here we look at everything from cabling schemes through to GT-3/5 global setting configuration! Hang on to your hat!

### Understanding Connectors

There are a number of different connectors that are typically used on audio equipment. They tend to be used for one specific purpose; audio, MIDI or power. Some of these connectors are listed below with their typical uses.

- ❖ Audio
  - 0.25" TS (Tip-Sleeve) Jack
    - unbalanced mono – typically used for guitars and their associated effects, also found on mixing desks. Also known as a ¼" connector.
  - 0.25" TRS (Tip-Ring-Sleeve) Jack
    - unbalanced stereo, balanced mono, dual direction insert cables, GT-3 footswitches – typically found on mixing desks.
  - 3.5mm TRS Jack
    - unbalanced stereo – often used for headphones and also found on soundcards as in/outs. Also known as a 1/8" connector in the US.
  - XLR
    - balanced mono – typically found on microphones and mixing desks.
  - RCA (a.k.a Phono)
    - unbalanced mono – typically used in consumer audio equipment, also found on soundcards as in/outs.
- ❖ MIDI
  - DIN
    - This is **the** standard MIDI connector.
  - Mini DIN
    - Often found on PC MIDI cards.
- ❖ Power
  - IEC
    - Used for mains supply.
  - Mini jack
    - Typically used for low voltage supply – such as the GT-3's power cable/socket.

Choosing the right connector for the right job can be crucial to ensuring your unit and audio systems perform at their best.

**Just because the source or destination uses a particular connector DOES NOT MEAN THAT THE SAME MUST BE USED AT THE OTHER END.**

A typical example of this is the number of people who connector their GT-3/5 to a soundcard using a 3.5mm TRS jack at both ends, plugging the GT-3/5 end into the headphone connector purely on the basis that 'they are the

same type of connector and the cable is easy to find'. Yeah, the cable might be easy to find, but it will NOT produce the best results. We discuss this particular topic when we examine audio connections below.

There are five parts to consider every cable. Yes **FIVE**. The two connectors, the cable itself and the two wiring schemes used for signal type carried. For instance I have cables that have an (1) XLR connector wired in a (2) standard configuration for a balanced signal over a (3) Van Damme single braid screened OFC 2 core balanced patch cable ending in a (4) 0.25" TRS again wired in a (5) standard configuration for a balanced signal.

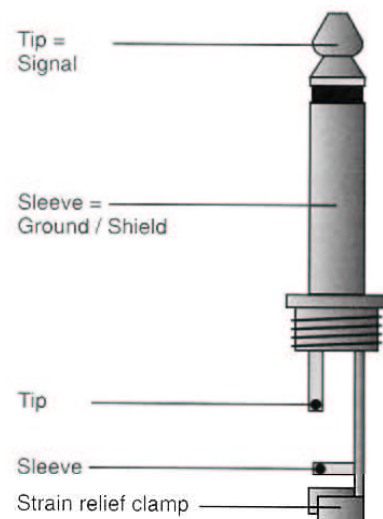
It takes a bit of thought, and sometimes you must make cables up yourself as they are hard to find in the shops, but when it comes down to it, you must UNDERSTAND what is connected to what in what fashion, and why. Failing to have this understanding can result in unwanted noise, poor audio connections, poor audio quality or at worse loss of signal (for instance - a poorly configured balanced -> unbalanced cable). Below I shall be giving you some advice on the correct cables to use.

### Standard Wiring Schemes

For the most part, each of the different audio connectors will not affect the signal, or noise levels. It is the cable construction and wiring scheme used which determines the susceptibility of a cable to noise. We will now examine some common cabling schemes and their pros & cons.

Behringer have produced some nice diagrams in their manuals with regard to wiring schemes. I'm not the most 'arty' of people so I've swiped them (all due credit to Behringer) and these are reproduced below for you.

#### Unbalanced Mono 0.25" TS Jack



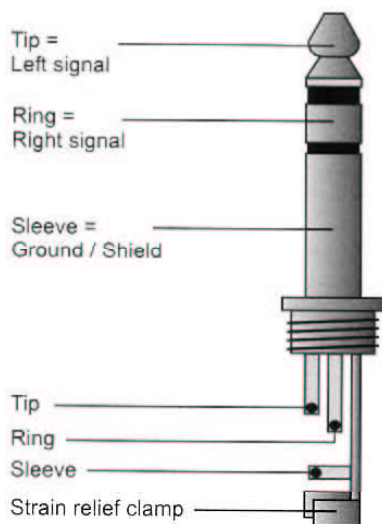
## Section 4 Connections

For guitarists this is the most common of wiring schemes. The cable used is normally a single lap spiral screened (typically 95% braid) coaxial cable, with a PVC insulated outer and conductive PVC inner surrounding a multi-stranded copper core. Typically this type of cable is often marketed as 'instrument' cable. The best cables however, are double screened; they have a 95% braid outer screen and a 100% conductive foil inner screen. The outer braid rejects RFI (as it forms a Faraday Cage) and the inner screen protects against EMI.

The problem with these cables are that they are susceptible to noise, because unbalanced cables do not reject noise like balanced ones do. Lap spiral screening is pretty poor, and although the double screened cables easily, and audibly beat the pants off of lap spiral screened cables the unbalanced configuration just isn't the best. Also these cables may suffer signal loss over large distances (> 20ft).

On the plus side these cables are easily available and are pretty much bog standard when it comes to connecting guitar's and their associated gear. However, make sure you invest in some good cables.... cheap ones use pathetic lap spiral screens...I'll be mentioning this again!

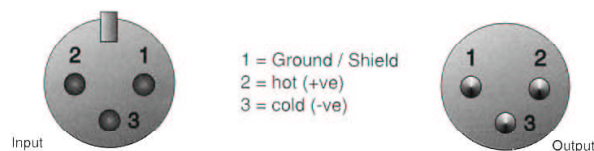
### Unbalanced Stereo 0.25" & 3.5mm TRS Jack



A typical configuration found with unbalanced, lap spiral screened, with 2 PVC insulated multi-strand copper cores. This sort of connector and cabling is often found on headphones, and in the case of 3.5mm jacks on PCs. On a PC the line in, line out and speaker outs will all use this configuration. Whilst a higher quality cable can be used it inevitably isn't due to the width of high quality cable exceeding the maximum permitted by the 3.5mm connectors. As this cable is rarely used where audio quality is paramount it is unusual to find high quality cable being used – even with 0.25" jacks.

### Balanced Mono XLR

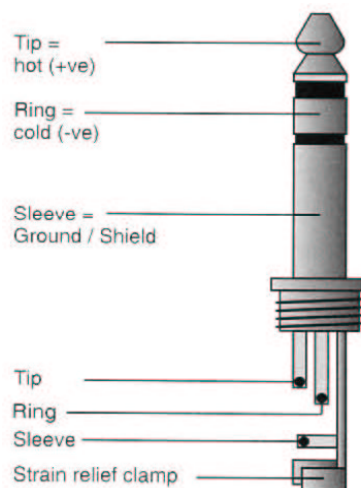
Balanced use with XLR connectors



Typically found connected by lap spiral or 95% braid screened cable, with 2 PVC insulated multi-strand copper cores. This is the most common of balanced wiring schemes. It is used by microphones, mixing desks, FOH snakes in large theatres etc etc. Its use is extremely widespread. For the most part the wiring scheme is standard, but one or two equipment manufacturers have been known to use different schemes, although these days that is rare. Often sold as 'microphone' cables these cables offer fantastic noise rejection and may be used on extremely long runs before preamps are necessary. XLR connectors may be used freely interchanged with TRS connectors for balanced applications without conversion.

These cables are also the type used with DMX based lighting controllers and dimmer packs. Pays to have a few extra of these about at a gig.

### Balanced Mono 0.25" TRS Jack



This wiring scheme is gaining popularity, and in the past has been used less than XLR connectors. It is theoretically identical to the balanced mono XLR cable. In fact, given the same spec cable the actual use of connector (either TRS or XLR) will be irrelevant in terms of audio quality. Thus, TRS connectors may be used freely interchanged with XLR connectors for balanced applications without conversion.

Although it is possible to wire a 3.5mm jack in the same manner it is extremely unlikely – again due to cable size constraints. I must say I have never seen a balanced application using a 3.5mm jack.

### GT3/5 Audio Connections

First before I say anything else, let me say **BUY THE BEST CABLES YOU CAN AFFORD**. Do not skimp here. Don't buy the \$5-10 cheap cable. I recommend Planet Waves from D'Addario – Suzanne Archibald has recently bought some and I'm sure she'd be willing to give you an opinion on them too. You can find these cables at a local retailer – on the web Planet Waves may be found at

<http://www.planet-waves.com>

You may consider Monster Cables, however, I personally feel they are overpriced, do not match the Planet Waves quality and I am **DEEPLY** suspicious of any company who categorises their cables BY GENRE!

Right that's that out of the way. So we have taken a dip into cables and the various wiring schemes. Now lets look at what our GT-3/5s have to offer and how we may best connect them.

In every case presented below I **ALWAYS** recommend using the **MAIN OUPUTS** on the GT-3/5 as your **PRIMARY** high quality audio connection. The GT-3/5 headphone amps are not going to be the best in the world and the main outputs are almost without question of higher quality. Use the headphone output for what it was intended and do not abuse it because 'you didn't happen to have the right cable'.

The main outputs, and the send and return connectors are unbalanced mono 0.25". There are two main output connectors (left & right) and one send and one return. The send-return is in fact an effects loop for your GT-3/5. Now lets examine how we can connect up the GT-3/5 and what cables to use in each specific case – remembering that I am **ALWAYS** going to connect the main outputs, or the send/return using unbalanced mono 0.25" jacks. I will **NEVER** be connecting the **HEADPHONE** output to anything other than a pair of headphones for monitoring.

In almost every case the cables you require will be a simple unbalanced mono 0.25" TS jacks. Exactly the same as pretty much every guitar instrument cable in existence.

Right then. Lets look at the various ways to connect the GT-3 to our amps followed by a quick look at connection the GT-3 direct to a PA or Mixing Desk (for recording/sound reinforcement) or direct to our soundcard (for recording).

There are two sorts of amplifiers (pre & power), which come in three configurations (separate power amp, separate pre-amp or pre & power combined into a single cab):

**Power Amplifiers** – which typically are either one channel (mono) or two channel (stereo). The amps tend to be found on large systems, or guitar rack based systems, or studio

systems. PA's also use power amplifiers. The power amplifier actually powers the speakers and will **ALWAYS** colour the sound to some degree; tube power amps will colour the most and solid-state studio flat response reference power amps the least.

**Pre-amplifiers** – The whole purpose of this type of amplifier is to colour the sound, often providing distortion. Some preamps might be stereo, others mono. When preamps are discussed, especially regarding guitar preamps, the term channels usually refers to 'clean' and 'dirty' channels. Preamp channels are typically switched via MIDI or a hardwire footswitch.

**Amp Head**– Generally these are guitar amps. It is a combination of pre-amplifier and power amplifier in a single case. Sometimes the amp head is in the same cab as the speakers – this is known as a **COMBO**.

To avoid confusion in the rest of this section, when I refer to an Amp Head (incl. combo), I shall refer to it as a **GUITAR AMP**.

Can I also ask anyone who uses an external amp to read the bit in section 14 on preamps called 'External preamp + GT-x preamp: Breaking the Myth'. There seems to be some misinformation around, claiming that this is not possible, or cannot give good results...this is just not true. Please read section 14 for more information.

### Amplifier Connections

Different amplifiers have different connections. Whilst preamps and power amps are fairly obvious, many combos or amp heads have a variety of connections. So before diving in and telling you what the various methods of connecting the GT-3/5 are, lets take a quick look at the guitar amp's connection labelling. Remember - what we are trying to do with the guitar amp is separate out the preamp from the power amp. Here's a quick guide:

#### Preamp Input

- ❖ GUITAR IN
- ❖ INPUT

#### Preamp Output

- ❖ SEND

#### Power Amp input

- ❖ RETURN
- ❖ MAIN IN

#### Power Amp output

- ❖ SPEAKERS(!)

It has become apparent from the list that there is another form of send/return on some guitar amps marked as **INSERT**. I would assume that this is a normal insert connection as found on mixing desks. Wiring is fairly easy **TIP** = **SEND**, and **RING** = **RETURN**. The connector is likely to be in between the preamp amp and the power amp.

## Section 4 Connections

---

You can use a cable made by someone like HOSA here, and these will have a TRS split into two TS 0.25" jacks, one will be marked TIP and the other RING. Simply use TIP as though it was SEND, and RING as though it was RETURN. If you do have such a connection I would hesitate to use a standard TS 0.25" cable and plug it in thinking it will act as a RETURN. **THIS COULD DAMAGE YOUR AMPLIFIER OR GT-3/5.** Because you are connect the amp's send to your gt-3/5 output. Check you amp's manual before even thinking about doing this!!!

### GT3/5 In Front (Mono/Stereo)

This is probably the simplest of all connection schemes using only 2-3 cables. Simply connect the main outputs of the GT-3/5 to your amplifier. If your amplifier only has a single mono input then use the just LEFT main output of the GT-3/5. Plug your guitar into the GT-3/5. If stereo is required with mono amplifiers you can always use two amps.

This set-up works well for Keyboard amps, or studio power amps either into guitar cabs or full range cabs.

This is shown in the first diagram on page 10 of the GT-5 manual, or the first page 11 of the GT-3 manual.

#### Pros

- ❖ A guitar amp's preamp is usable and colours the sound.
- ❖ Guitar amp volume controls work normally.
- ❖ Simple

#### Cons

- ❖ Extra footswitches may be required if you need to change channels on a multi-channel guitar amp between clean and dirty.
- ❖ Extra footswitches means more foot presses unless you use MIDI interfacing equipment or have a MIDI controllable amplifier.
- ❖ If using a guitar amplifier you cannot remove the preamp colouration of the sound.

### Effects Return (Mono/Stereo)

This is not much more complicated than the first scheme, and is a fairly straightforward 2 or 3 cable affair.

This time, instead of connecting the GT-3/5 to the guitar main input, connect the main outputs of the GT-3/5 to your amplifier's RETURN socket (often to be found on the back of the amplifier). If your amplifier only has a single mono RETURN input then use the just LEFT main output of the GT-3/5. Plug your guitar into the GT-3/5. Again if stereo is required with mono amplifiers then simply use two amplifiers.

This set-up works well where you do NOT want a guitar amplifier's preamp to colour the sound of the guitar, as this technique normally bypasses the preamp and plugs into the

amp immediately prior to the power amp stage. Some amplifiers (like the Marshall Valvestate range – so I believe) may require a dummy connector plugged into the main guitar input before this connection method works.

This is shown in the second diagram on page 10 of the GT-5 manual, or the second diagram page 11 of the GT-3 manual.

#### Pros

- ❖ Uncoloured sound from a guitar (as best as it gets anyway)
- ❖ Simple

#### Cons

- ❖ If using a guitar amplifier you cannot obtain the preamp colouration of the sound if desired.
- ❖ The guitar amplifiers volume controls may not work at all. In this case the GT-3/5 **MUST** be used to control volume. This occurs because power amps run at a fixed gain all the time – normally your guitar amp controls limit the input volume to the power amp stage. However, as you have bypassed this by plugging into the return you may have bypassed them!!!

### Inside Amp/Other Effects Loop (Mono/Stereo)

This set-up is probably described in your amplifier's manual or the manual for the piece of equipment you have put the GT-3/5 in the loop of (such as a JMP-1 or Lexicon MPX G2). This configuration requires 3 cables for mono and 4 for stereo if using an amplifier, or 4 cables for mono and 6 cables for stereo if the device is not an amp, and you need to connect up to an external amplifier. Stereo is only possible with an amplifier or other device that supports stereo.

- ❖ Connect your guitar to the other device input (such as you amp's main input).
- ❖ Connect the device's loop send to the GT-3/5 main IN.
- ❖ Then take either one or two cables from the GT-3/5's main outputs back to the returns on the device in question. If the device is not an amplifier run one or two cables from your device to your amp.

#### Pros

- ❖ Useful when the GT-3 is not a main part of a system but more of a secondary effects device.
- ❖ Useful if you want to use the GT-3 for effects **ONLY** and are not really interested in the GT-3 Preamps, or distortion.
- ❖ GT-3 OD/DS is still useable.
- ❖ Can be easily used in a loop switching system.

#### Cons

- ❖ Preamp of a guitar amp is not moveable in the signal chain.



- ❖ If using a guitar amp the preamp will be in front of the GT-3.

### 4 Cable Method (Mono)

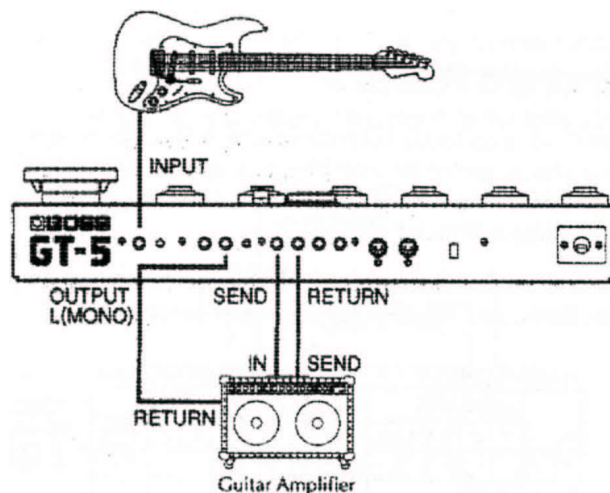
This method allows the use of an external preamp in the middle of the GT-3/5 effects chain.

In effect it is treating a guitar amplifier as two separate units. The first unit is the preamp, and the second is the power amp. The Main Input & Send form the preamp section of a guitar amp and thus are contained in a loop. The main output could go to another amplifier completely (I do this with a similar set-up when using a bass guitar preamp) – this is described below as the ‘Power amp only with GT-3/5 External Effects Loop’

As this is a very common set-up lets look at the connections we need to make.

- ❖ Plug your guitar into the Input of the GT-3/5.
- ❖ Connect the GT-3/5 SEND to the amplifier Input
- ❖ Connect the Amplifier SEND to the GT-3/5 RETURN
- ❖ Connect the GT-3/5 main output (L) to the amplifier RETURN.

This is shown in the first diagram on page 11 of the GT-5 manual. However, the diagram is missing from the GT-3 manual – so I have included it below. It is not the best of diagrams and hopefully the explanation above will help sort out the precise



#### Pros

- ❖ Control over the placing of the guitar preamp in the effects chain.
- ❖ Allows you to unlock the power of your amplifier.

#### Cons

- ❖ Can produce unsatisfactory results, especially from level mismatches and sometimes (although less likely) impedance mismatches.

- ❖ Not the simplest of methods.
- ❖ The guitar amplifiers volume controls may not work at all. In this case the GT-3/5 MUST be used to control volume. This occurs because power amps run at a fixed gain all the time – normally your guitar amp controls limit the input volume to the power amp stage. However, as you have bypassed this by plugging into the return, you may have bypassed them!!!
- ❖ [GT-3] Loss of use of the internal OD/DS as this must be configured to EXT OD/DS.

### 5 Cable Method (Stereo)

Exactly the same as the four cable method but a second cable from the RIGHT main output to the RETURN RIGHT on the amplifier thus giving stereo. Pros & cons as above.

### Power Amp Only and GT-3/5 External Effects Loop

The 4 & 5 cable methods are variations on this method. The only difference is that the ‘Effect’ in the loop is a preamp from a combined pre/power amp set-up, and instead of going to the **same** amplifier the main outputs from the GT-3/5 go direct to a second guitar amplifier. Again only 4 cables are required for mono and 5 for stereo.

#### Pros

- ❖ Any preamp/effects system can be used in the GT-3/5 loop. Quite often preamp, distortions feature. But it could easily be another effects system or a rack preamp such as the Marshall JMP-1.
- ❖ Flexible.
- ❖ The amplifier’s volume controls still work.
- ❖ Not tied to the power amplifier that is with the preamp.

#### Cons

- ❖ More equipment/cabling can mean more noise.
- ❖ [GT-3] Loss of use of the internal OD/DS as this must be configured to EXT OD/DS.

### GT-3/5 as Two-Loop System

Again this is really a variation of the method above. The best thing to do here is to think of the GT-3/5 as two effects loops. The point that divides the two loops is where the [GT-3] EXT OD/DS is placed or [GT-5] Loop is placed.

Effect loop one is the Main input -> GT-3/5 SEND, and effect loop two is from the GT-3/5 RETURN to the GT-3/5 Main outs. Only Effect Loop two has stereo capabilities.

#### Pros

- ❖ Flexible.
- ❖ Can place the GT-3/5 effects around ANY device.
- ❖ Useful as a secondary effects system.
- ❖ Any amplifier controls are unaffected.

## Section 4 Connections

- ❖ Can be easily used in a loop switching system.

### Cons

- ❖ More equipment/cabling can mean more noise.
- ❖ Effects may only be used once. You cannot use the same effect in both effects loops (With the exception of the EQ). Whilst this may not be an issue for some effects it may well be an issue with the NS.
- ❖ GT-3 loses use of the internal OD/DS as this must be configured to EXT OD/DS.

## PA/Mixing Desk (Recording/Sound Reinforcement)

OK, whatever you do here, use the GT-3/5 main outputs. If you are using stereo, take two cables, otherwise just use the left output. You can use a standard guitar cable (unbalanced mono) to connect the main outputs to the mixing desk OR you can use a DI (Direct Inject) box to convert the signal to a balanced one. If you do this you will need one DI box for mono, along with one unbalanced cable (normally 0.25" TS jacks) and one standard balanced mono XLR cable. If using stereo just double the number of cables and DI boxes required.

When using a DI, use the shortest unbalanced cables possible (from the GT-3/5 to the DI box); balanced cables are less of an issue.

When going direct either use the GT-3/5 speaker simulator or use good quality external one such as Palmer PGA-05, DMC Cabtone, H&K Red boxes. If you don't then distortions will sound harsh and fuzzy. However, acoustic or clean guitars will actually sound much brighter.

## Soundcards (Recording)

Once again the important thing here is to use the main outputs.

For mono connect a cable with unbalanced mono 0.25" TS jack to the GT-3/5, and a 3.5mm TRS jack into the soundcard with just the LEFT side of the connector connected.

For stereo you need a Y cable. The cable should have 2 unbalanced mono 0.25" TS jacks which are plugged into the GT-3/5 L & R outs, and terminating in a 3.5mm TRS jack which is plugged into the soundcard. The cable from the GT-3/5 LEFT out should be connected to the LEFT of the 3.5mm jack and the other cable from the RIGHT of the GT-3/5 should be connected to the RIGHT of the 3.5mm jack.

If you have RCA connectors on the soundcard then you will require 2 cables. Both will have an unbalanced mono 0.25" jack that you connect to the GT-3 and the other end should terminate in an RCA connector that you connect to your soundcard. If you do not require stereo then only 1 cable

will be required. This should be connected to the LEFT out on the GT-3/5 and either input of your soundcard.

If your soundcard only offers balanced connectors then use a DI box to convert to a balanced signal.

Once again just like with a PA/Mixing desk set-up, when going direct either use the GT-3/5 speaker simulator or use good quality external one such as Palmer PGA-05, DMC Cabtone, H&K Red boxes. If you don't then distortions will sound harsh and fuzzy. However, acoustic or clean guitars will actually sound much brighter.

## <Global>Your Setting?

This discussion first appeared in the next section on GT-3/5 configuration. However, it is so extremely important to the particular set-up that is being used, (with regard to the external equipment and cabling) that I feel we should consider it now.

Spectrum analysis has shown that this setting ONLY AFFECTS THE PREAMP SIMULATOR. It does NOT affect any other effect. The OD/DS & compressor etc. are all completely unaffected. This means if you use an external preamp (i.e. 4/5 cable methods) and do not use on-board preamp sims then changing your setting will have NO effect.

**GT-3** It should be noted that 'Line (headphones)' only turns on the speaker simulator if you have a pre-amp on! If you don't use a pre-amp then the setting will produce the same as 'Power Amp (Stack)'!!!! In this case the distortions WILL sound harsh UNLESS you are running through and amp & speakers. Incorrect setting of this parameter, or not realising when the speaker simulator is on may account for many of the criticisms of the overdrives/distortions on the GT-3.

Use the table below to help identify your situation. Start by using the suggested setting, but don't feel that you cannot change this and use a different setting not suggested below. After all what is right for one set-up will not necessarily be right for another.

Your Setting?	Suggested use
Line (Headphones)	Use when you need the GT-3/5 speaker simulator, or are using full range speakers. Use for: <ul style="list-style-type: none"><li>❖ PA</li><li>❖ Recording</li><li>❖ Keyboard Amp</li><li>❖ Acoustic Amp</li></ul>

Your Setting?	Suggested use
Power Amp (Stack)	Use when you do NOT require use of the built in speaker simulator. Use for: <ul style="list-style-type: none"> <li>❖ Effects return with guitar cabs</li> <li>❖ Pure power amp with guitar cabs</li> <li>❖ Inside the effects loops of a stack (with guitar cabs)</li> </ul> And with an external speaker simulator use for: <ul style="list-style-type: none"> <li>❖ PA</li> <li>❖ Recording</li> </ul>
Power Amp (Combo)	Use for: <ul style="list-style-type: none"> <li>❖ Effects return of Combo</li> <li>❖ Inside the effects loops of a combo</li> </ul>
Guitar Amp (Stack)	Use for: <ul style="list-style-type: none"> <li>❖ Main input of a stack</li> </ul>
Guitar Amp (Combo)	Use for: <ul style="list-style-type: none"> <li>❖ Main input of a combo</li> </ul>

## Bypass Mode

The GT-3/5 does not provide a **true** bypass (true bypass defined as - direct physical connection of input to output with all circuits isolated from the signal path). If you switch the GT-3/5 into bypass mode (Tuner On, mode bypass) then the ADACs are still used, so one AD and one DA conversion will still take place. However, spectrum analysis shows that this hardly affects the sound at all. If this is unacceptable then I recommend using some form of loop switch, such as found on rack systems or the Boss LS-2 (I think this isolates the circuit).

It should also be noted that the [GT-5] input volume control and the GT-3/5 output volumes control knobs are still active **EVEN** when the unit is in bypass mode, and on both units the expression pedal operates as a foot volume pedal controlling the direct sound.

The bypass mode is equivalent to an empty patch with no effects/noise suppressor; with the EXP PEDAL assign set to Foot Volume and the Master Level for the patch set at 100. If you use the Master Level to control patch level (particularly when level matching below) you may find that you experience an increase in volume when switching into the bypass mode, and conversely a drop of volume when switching out of bypass mode.

Entering the built in tuner enters the bypass mode. In the tuner settings the bypass/tuner mode must be set to **BYPASS**. If it is set to **MUTE** then nothing will be heard!! Take a look at the GT-3 manual page 16 or the GT-5 manual page 17 for info on setting the Tuner/Bypass Mode.

## Headphones

The headphone socket is a standard 3.5mm unbalanced stereo jack. It is fairly certain that the headphone output is of a lower quality than the main outs and therefore should not be used where the main outputs are available.

It is recommended that the headphone socket be used for monitoring outputs only, preferably with headphones. Some people have routed this signal to another amplifier, again for monitoring when the main outputs have gone to a FOH mixing desk. However, loading issues (impedance) and signal level issues can result. Feel free to experiment but be careful.

One thing to be aware of is that the output volume control knob controls both the main output levels and the headphone levels. Therefore it is not possible to alter the headphones output independently of the main outputs. This is a major reason for not using the headphones socket as the main output. Of course, in situations where the GT-3/5 is being used in isolation the output volume control knob may be used to alter the headphone volume levels.

## External Footswitches

There are two types of footswitches can be connected to the [GT-3] SUB CTL 1/2 or [GT-5] EXP/CTL 1/2; latching or non-latching (momentary).

It is often said (incl. in the GT-3 FAQ) that you can do everything with a non-latching footswitch that you can do with a latching one, and that the use of a latching footswitch results in two presses where one would do. But this IS **ONLY PARTLY TRUE**. For most people the recommendation is to get non-latching footswitches, and this is probably fair enough. However, latching footswitches are not all bad and there is one occasion that I have come across where they work very well...

If you configure your GT-3/5 to transmit MIDI CC messages when a footswitch is depressed, you can control external equipment such as a MIDI Loop Switcher. However, what is transmitted is the **POSITION** of the footswitch, regardless of any control assigns that are configured. This means if you have your MIDI Loop Switcher configured so that one of your footswitches activates a loop, then when you depress the switch the loop is activated, but with a non-latching pedal as soon as you remove your foot the loop de-activates. Whilst in some cases this may be desirable it is not always so. To solve the situation you need a latching footswitch. Now the loop will come ON when depress the switch and will stay on when you let go, then when you depress it a second time the loop will go off. As I said this is all independent of any control assigns.



## Section 4 Connections

OK now we have seen that sometimes a latching footswitch can be useful, you can now make a decision about what to connect. The GT-3 may connect TWO footswitches or ONE expression pedal; you cannot have a combination of both. The GT-5 however has two sockets and each will support either a footswitch OR an expression pedal, therefore providing slightly more flexibility, and allowing you to add two footswitches, two expression pedal or one of each.

You do not have to use the Roland FS5U (non-latching) or FS5L (latching) footswitches – other makes will work, providing the circuitry is compatible and as the footswitch circuits are merely push to make (i.e. normally open) it shouldn't be too hard to find other sources.

To connect footswitches to a GT-5 use a standard unbalanced mono 0.25" jack cable. The GT-3 is slightly more unusual as there is only 1 jack socket for 2 pedals. The cable you require here is often called an 'Insert' cable (sometimes it is also called a 'Y' cable but this is not strictly correct). It has a single 0.25" TRS jack at the end connected to the GT-3, with 2 cables coming out of it which are terminated in 0.25" TS jacks. One cable connects to the tip and shield of the TRS (this is footswitch 1), and the other connects to the ring and the shield (this is footswitch 2). HOSA make an Insert cable that works just great.

OK so you have your footswitch connected. If you have a Roland footswitch (FS5U/L) then you have a 'polarity' switch. This is misleading, as it is nothing to do with polarity at all. It is in fact a 'normally open' or 'normally closed' configuration switch. Still it's important to have the switch in the right setting. The diagram in the manual is not intuitive and most guitarists do not see the footswitch from the back. So.... here is a simple clarification.

*Standing in front and above the footswitch as you would for normal operation the switch must be moved to the RIGHT*

The external footswitches should work as well as the on-board CTL pedal, although there are a couple of configuration parameters to be aware of tho.

In the <Global> settings you can allocate a specific function to each pedal, or you can specify them as being assignable. If you specify them as assignable they may be freely used in a patch's control assigns. However, if you assign them a specific function then this is a GLOBAL assignment and OVERRIDES any control assigns, regardless whether or not the control assign in question is on or off. When it comes to specific functions the GT-5 has more than the GT-3. These additional functions cover the patch group up/down functionality of the GT-5 and also MIDI Start/Stop & MMC Play/Stop. These last two functions are dealt with in section 28 All About MIDI.

To use the external footswitches you must use one of the eight Control assigns. When configuring these set the Internal 'Source' to [GT-3] SUB CTL 1 or 2 or [GT-5] EXP/CTL1 or EXP/CTL2. If you are configuring the control assign to set off the Internal Pedal set the 'Trigger' to [GT-3] SUB CTL 1 or 2 or [GT-5] EXP/CTL1 or EXP/CTL2.

If you find yourself running out of footswitches then you can use an external intelligent MIDI foot controller OR you can take a look at this....

### Extra Footswitches!

One suggestion (which I believe came from Sutton Reid) that was placed on the list was a quick and simple solution to allow quick access to the TUNER without the need of external footswitches. All you need is one of those caster glides you get in shops that protect your carpet from the sofa's castor. Simply glue the castor to the top of the on-board tuner button – make sure when activated it doesn't catch any other buttons, and voila! a simple, quick and dirty solution avoiding the need for external switches. This can allow you reclaim the CTL or a [GT-3]SUB CTL/[GT-5]EXP/CTL switch. However, if you want to go further then check out this....

### The Sutton Mod

I believe the text below describing the 'Sutton Mod' was written by Simonen Sampo.

This modification requires some basic soldering skills and a multi-meter. The advantage you get from the mod is effectively access to the GT-3/5 front panel buttons via dedicated footswitches. This can free up your CTL and [GT-3]SUB CTL/[GT-5]EXP/CTL footswitches from having to be assigned to the manual & Tuner on/off and much much more... OK over to Simonen ...

I don't know if it is cool - it may destroy your resale value as the unit has been tampered with :-)

Open the GT-3/5 back cover (10 screws?)

Disconnect the 4 cables (exp. pedal cable, display cable and two flat parallel cables) from the topmost print board (the processor board). They are all easy to remove.

Remove the topmost (well, topmost from the perspective that the unit is now upside down on your table/lap) board (if my memory serves right there are 2 screws on the board plus all the connector panel nuts + 2 MIDI connector screws + 1 power connector screw also on the connector panel).

Now you can see the board that has the mini switches connected. It consists of two parts, 1) the part that has the

value dial, the mechanical mini-switch buttons and the display and 2) the actual second PCB.

If you are not able to identify the right mini-switch connectors, you need to take first the 1) & 2) block (lots of screws!!) apart and then 1) and 2) apart from each other by first popping the value dial out from the backside and then unscrewing the nut of the value dial.

Identify the right connectors. It helps to hold the board against the light and to use a multi-meter to check which connectors short circuit when you press the mini-switch. Each mini-switch has 2 connectors, a led parallel to the mini-switch above it and a diode (methinks) vertically on the side (alternating left/right side).

Solder 4 connector wire (say, 30-40 cm long) to the "manual" and tuner/bypass" mini-switch connectors. Make a note of the colour coding of the wires you soldered (I had red & green -pair and white & blue -pair).

Assemble the parts back.

Before you screw the back plane back, test your wires: Power the unit, and shortly short circuit the pairs - if everything went fine you'll be able to turn the manual mode / the tuner on and off by short circuiting the respective pairs. These switches work in unlatching mode, so the wires in a pair need to touch each other only for a very short period (kind of giving a "pulse" to the unit) i.e. they do not need to stay connected!

If everything is ok, you need to attach a jack to the wire to make it practical to use; I drilled a hole between the big GT-3 text and the guitar input jack for this purpose. I was planning to use a 4-connector mini-din jack for it, but I took by chances and tested whether all the 4 wires are really needed and they are not - it works with 3 wires only! (Disclaimer: seems to work, I have not thoroughly tested this thing, so it is possible that I will someday notice that all 4 are really needed...).

I did not notice this while the unit was open and un-powered (remember, there are the diodes and who-knows-what...) but I was curious enough to test it and take my chances of the consequences. So, I noticed that it does not matter whether (my colour coding follows...) the green wire touches the red OR the white to get the desired result. And the same applies to the blue wire!

Therefore, as 3 wires are enough, you can use standard 6,3mm stereo jack or even a 3,5mm stereo jack so that you do not need to drill such a big hole. I used the bigger one (did not need to alter my SUB CTL pedal cable...).

If you use conventional metal-bodied 6,3mm TRS stereo jack (or respectively the mini 3,5mm headphone jack or any

other jack where the body is connected to one of the contactors to be used...) you **have to** isolate the sleeve (/the jack) from the GT-3 body (common earth!), otherwise the mod will not work!!

Connect the (again, my colour coding follows...) 'common' wire (red in my case) to the sleeve, green to sleeve and blue to tip. Test your external pedals. The order of green and blue does not really matter other than to the left-to-right-order of manual/tuner (if your pedal control order is 'hardwired'). If you can order your pedals anyway you prefer or if you use an insert cable in the pedal end you swap the insert cable in the pedal end the green/blue order doesn't matter at all. I use home made pedals, so I just solder them into the order I like (manual left, tuner right, just like on the mini-switches). I left the white totally unconnected, as I did not seem to need it. I decided not to connect it to red as they do not seem to be directly connected to each other.

Screw your back cover back and you are ready!

In the end, it looks very clean and the cost is negligible; I had the wire and the jack already available, other parts are not needed. It took me about three hours all the way, but I am no fast hand shredder, trust me! Besides, I was lurking the GT-3 chat at the same time (until my computer hang... :-).

Thanks to Simonen for that.

I have dwelled on this matter further and have considered that you can in fact wire up a lot more pedals; in fact, you can sort of recreate manual mode with individual pedals – the problem is it takes 2 presses of each pedal to turn an effect on or off and then you need to have wired an EXIT button as well so you can go back to the main screen to change patches. It may be that just doing the Manual & Tuner buttons can provide the most benefit. Still, perhaps the idea will unlock the genius of someone somewhere – and if you have any great ideas tell the rest of us on the list!!

### External Expression Pedals

Sometimes these cause people problems. If only it were a case of plug-in-and-go. But it isn't quite. There are a couple of things to trip you up here. So let's examine a patch set-up to check your external expression pedal works. I did this with a Roland EV-5, but there are a number of pedals (including from other manufacturers) that will work satisfactorily. Whilst we are doing this I will point out the important bits as we go.

- ❖ Select an empty patch
- ❖ Turn off the EXP PEDAL control assign (Failing to do so can cause conflicts if both are set to control FV:Level).

## Section 4 Connections

- ❖ Turn off the CTL PEDAL control assign (just too be sure)
- ❖ Set Assigns 2-8 off
- ❖ Set Assign 1:
  - Assign 1 On
  - Target FV:level min:0 Max:100
  - Source [GT-3] SUB EXP PEDAL or [GT-5] EXP/CTL 1 or 2. Mode: normal Act lo:0 act hi:127
- ❖ Now exit back to the main play display
- ❖ Press the UTILITY button 3 times to get the 'SYSTEM' parameters up.
- ❖ Check the [GT-3] SUB CTL 1 **and** SUB CTL 2 or [GT-5] EXP/CTL 1 **or** 2 parameters are set to ASSIGNABLE as appropriate. On the GT-3 if either are set to manual or tuner on/off the EV5 ceases to work. The same is true on the GT-5 if the EXP/CTL jack in question is set to manual or tuner on/off.
- ❖ Exit back to the main play display
- ❖ Press the MASTER button and step through the parameters until you get to the FV: Level parameter.
- ❖ Set the minimum volume control on the external expression pedal (Such as on the EV5) to 0. This is very important.
- ❖ Move the expression pedal.
- ❖ Et Viola! You should be able to see the FV:Level changing in the display.

This example teaches us that the most important settings when setting up the external expression pedal are the global [GT-5]EXP/CTL 1/2 or [GT-3]SUB CTL 1/2 parameters are set to 'Assignable', and to avoid conflicting assignments.

Neither the GT-3 nor the GT-5 provides facilities to calibrate external expression pedals. Thus, the only problem with the Roland EV5 is that it suffers from LARGE dead spots at the top and bottom of the pedal travel making it unsuitable for use a WAH controller. This can be avoided by using the on-board pedal for WAH and the external as a foot volume (which is less sensitive in terms of use, to any dead spots which exist – unless you are using foot controlled tremolo) but ensure you are consistent as swapping pedal usage between patches is only likely to cause confusion.

The external expression pedals should work as well as the on-board expression pedal, although there are a couple of configuration parameters to be aware of though.

### GT-5

In the <Global> settings you can allocate each pedal as being either a Foot Volume or assignable. It obviously makes no sense to set both external expression pedals to control FV. If you specify them as assignable, they may be freely used in a patch's control assigns. However, if

you assign them the FV functionality, then this is a GLOBAL assignment and OVERRIDES any control assigns, regardless whether or not the control assign in question is on or off.

To use the external expression pedals, you must use one of the eight Control assigns. When configuring these, set the Internal 'Source' to [GT-3] SUB EXP or [GT-5] EXP/CTL1 or EXP/CTL2. If you are configuring the control assign to set off the Internal Pedal, set the 'Trigger' to [GT-3] SUB EXP L, M or H or [GT-5] EXP/CTL1 L, M or H or EXP/CTL 2 L, M or H.

If you find yourself without enough expression pedals (!) then I recommend you use MIDI based ones that output CC messages. The GT-3/5 control assigns can all be triggered by MIDI instead of the on-board/external pedals.

## MIDI Connections

These are fully covered under section 28 All About MIDI.

## Section 5 Basic Configuration

### Introduction

Many people on the group have asked about various general configuration issues, including how to organise patches on their GT-3/5s. In this section I present the philosophy I have used to configure my GT-3, and give advice on making sure your GT-3/5 does work for you, and doesn't get in the way.

There are two things I am going to continually stress here; 'have a plan' and 'consistency'. If you haven't planned how you will organise your patches and use the controls then you are going to find yourself lost quicker than you think, and being lost in the middle of a gig is not a fun situation... Secondly consistency must be the watchword used in the planning and configuring of the GT-3/5. By being consistent you will find the GT-3/5 becomes quicker to configure and the risk of getting lost diminishes greatly.

### General Configuration

Find a hook-up method that you are happy with (see the previous section) and for the most part try to remain with that set-up. If you keep changing your amp/effects unit/footswitch/expression pedal connections around then you will have trouble obtaining consistent results from the GT-3/5, and will find yourself forever tweaking patches.

I recommend obtaining some external footswitches and/or an external expression pedal. Doing so vastly increases your ability to consistently use a given pedal to do a single job. This helps provide some of the consistency that I believe is so essential to operating the unit successfully.

Right now you need a plan to determine how, for the most part, you will utilise these pedals. For instance, I will try to set up ALL of my patches on my GT-3 so that the on-board expression pedal is FV. I have an external MIDI expression pedal that I use differently on a patch-by-patch basis. I also have two FS5U footswitches. I set the first pedal to toggle Manual Mode, thus allowing me to 'open' up a patch and turn the effects on/off individually, and the second pedal usually gets automatic manual mode assigned via Assign 8. I don't use the on-board tuner as my Korg DTR1 rack tuner is far more accurate, convenient to use and is on-line all the time, and this has saved me from having to account for it with a CTL pedal. Although you can still have both Manual mode and the Tuner available by switching manual mode on/off via the CTL pedal and then allocating the tuner to one of the pedals. If you do like manual mode and the tuner available without zapping precious footswitch resources you may wish to consider the 'Sutton Mod' presented in the previous section....I am considering this myself.

I suggest finding a foot switch/expression pedal set-up that suits 90% of your needs and include it in your <Empty> and 'Clean' patches.

### Utility Function Settings

**GT-5** The GT-5 has two additional sections; <Overdrive/Distortion Customize> and <Preamp Customize>. This section will not discuss these. These will be discussed under sections 15 and 14 respectively.

**GT-3** The GT-3 has an additional section called <Auto-Riff Scale>. As I have no need of the auto-riff functionality, and thus have never ventured into this part of the GT-3 realm, it is not discussed here. If anyone else cares to fill in the information here I'm sure others would appreciate it.

#### <Global>

The previous section contains some good recommendations for setting the '<Global>[Your Setting?]'. Give this a read through if you haven't already because I won't be repeating the information here.

On my GT-3 I use the following settings:

[Your Setting?]	Power Amp (Stack)
[Low EQ]	0dB
[High EQ]	0dB
[NS Threshold]	0dB
[Reverb Level]	100%

**GT-5** The GT-5 has an additional parameter to control the speaker simulator to force the speaker simulator to be always on, always off or to be switched on or off according to the patch data. This will not be dealt with here but will be discussed in more detail in section 10.

The Low/High EQ, and Reverb level settings are designed to accommodate different environments (such as different venues) without you having to change EVERY patch.

I cannot see a sensible reason to change the NS Threshold parameter.

Don't use the global NS threshold or EQ to account for the differences when switching between guitars. It is much better (I think so anyway) to use separate patches tweaked appropriately. If you don't then you will have to alter the GT-3/5 on-stage...glug.

In the studio I have the [Dial Function] set to 'P.NUMBER & VALUE'. For live use I have the [Dial Function] set to 'VALUE Only' and reduce the [BANK Extent] to cover only those patches intended for live use. This helps avoid any embarrassing moments.

## Section 5 Basic Configuration

### <SYSTEM>

On my GT-3 I use the following settings:

[LCD Contrast]	16
[Dial Function]	P.NUMBER & VALUE
[SUB CTL1 Func]	Manual Mode
[SUB CTL2 Func]	Assignable
[PatchChange Mode]	Wait for a NUM.
[BANK Extent]	35
[Assign Hold]	On

#### GT-5

- The GT-5 does not have the ability to alter the LCD display brightness this is a GT-3 only feature. Thus the GT-5 will NOT have the [LCD Contrast] setting.
- The GT-5's external footswitches are known as EXP/CTL1 Jack and EXP/CTL2 Jack rather than SUB CTL. The GT-5 does however have more functions, (Group up/down & MIDI/MMC interaction) and external expression pedals may also be configured (as assignable for FV).
- The GT-5 does not have the BANK extent setting. No limiting of the up/down bank or group is possible.

### <HARMONIST SCALE>

As yet I haven't delved in enough with the harmoniser to alter the harmonist scale.

### <MIDI>

The MIDI settings are discussed in section 28 All About MIDI.

## Tuner Settings

Although I don't use the tuner I used to, and I recommend the following settings:

[TUNER Pitch]	A = 440Hz
[TUNER Out]	Mute

When flat or double flat tuning on a GT-3 the actual note name of the string will be displayed. The GT-5 however, allows you to configure the display, so you DON'T have to see the new string names, and can still tune using the standard tuning note names, even tho the pitch is different. On the GT-5 this string name display is determined by the tuner setting called [TUNER String].

## Patches

Try to obtain some form of consistency between your patches, not only in terms of volume control, but in terms of organisation and control usage...if you have an external expression pedal as well try to use it or the on-board

expression pedal for FV all the time rather than alternating it between the two. If you do constantly change which pedal/footswitch does what then you will only cause yourself grief as you switch between patches and forget what's what. This could be extremely embarrassing during a gig!.

## Base Patches

I strongly recommend you have a base patch into which you put all your basic settings, including for effects which are turned off, control assigns etc. Being able to use a patch as a base will save you time later allowing you to copy it knowing your 'basic' set up is included.

When we discussed Metering and Level matching we set up the library patch 'Clean'. I use this patch as the ultimate base for most of the patches that I present. I recommend that you copy 'Clean' and tailor it to your needs.

## Patch Organisation

The GT-3 has 140 user patches available and the GT-5 100 patches. To help you find your way around these patches I strongly recommend that you come up with a plan to organise these patches. Below is how I organise my patches on my GT-3.

Patch Banks	Use
1-10	Lead Guitar (Recording)
11-20	Lead Guitar (Live)
21-23	Electro-Acoustic (Recording)
24-26	Electro-Acoustic (Live)
27-29	Bass Guitar (Recording)
30-32	Bass Guitar (Live)
33-34	Test / Set-up / Temporary / WIP patches
35	Reference Patches – <Empty>, Clean, [Noise Check], [Analyser]

Interesting eh? I record all guitars without reverb. This means I can apply reverb during mixing so that a studio album sounds 'right'. Reverb is used to control the front to back position of an instrument within the 'sound stage', whereas panning gives left-right placing. Thus it is reverb that provides the ability to place instruments three dimensionally within a song. By recording 'wet' you cannot alter the reverb and if you find you have used too much or too little then the guitar part must be re-recorded. By recording dry the reverb can be altered at will, without rerecording the track, so the guitar can be placed appropriately in the mix.

Each patch in a 'Recording' bank has a 'Live' counterpart in its matching 'Live' bank. For instance patches in bank 5 are duplicated 'Live' in bank 15. This is done regardless of whether or not the 'Live' patch is wet or dry. This may seem excessive but this consistency helps keep me sane when switching between the two environments.



This is just one example of how patches may be organised. Patches are also organised by sound, i.e. bank 1 clean, bank 2 distorted and so on. Others who have to cope with using multiple guitars often use 1 & 2 from each bank for one guitar and 3 & 4 for another. Others have used say patch bank 2 for one guitar and patch bank 3 for another and patch bank 1 for yet another—all loaded with the same patches but tweaked for different guitars. You could also organise patches based on your gig. Song 1 patch bank 1, song 2 patch bank 2 and so on. The GT-5 concepts of groups of banks can help aid this organisation. You just need to sit down with a pen and some paper and work out what will work best for you in your situation.

As you can see in all of these examples though, each has been planned, and even more importantly each one is consistent.

Before filling in the user patches with my own stuff I cleared down the user patches. I did this by using a patch called ‘ <Empty> ’. This patch contains my basic settings for every patch and is based on ‘Clean’, except that it has the Master Level at 0, NS and control assigns all turned off. This avoids any accidents if you accidentally select it. Using this patch enables me to quickly determine which patches are available for programming and which are already full.

### User (Quick) Settings

---

If you examine Appendix C and the section on Control Assigns you will see that there are a large number of quick settings available. It is possible for you, the user to have four of your own quick settings saved. These are U1-U4.

I would suggest using these user quick settings for your favourite effects parameters. This can save you lots of time when you are building new patches. Not only will you have the presets available but your four favourite settings!

When I set up my quick settings I obviously didn’t use all four user settings. This can lead to some confusion as they are all named. So I went through each one, zeroed the effect parameters and saved it with the name ‘ <Unused> ’. Now this was laborious and did take about an hour to an hour and a half, but I only need to do it the once and it has removed any confusion when using the quick settings. Unfortunately you have no choice but to set these up by hand. AFAIK no editor supports them (configuring them that is – I know the editors do at least allow selection). Similarly if you rename the quick settings the GT-3 Editor (and possibly the GT-5 Editor) will not pick these up.

## Section 6 Effects Ordering

### General Advice

Check out the GT-3 FAQ and Official Manual for information about how to change the effect ordering. The Unofficial GT-3 Owners Manual gives a recommendation for the effects chain but it can be a bit woolly (sorry!). This may be because of the source it was taken from. Here the effects ordering that I recommend—It must be remembered that although this follows the 'rules', do not let it get in the way of innovation—this really is just a starting point. If you are happy with it—fine—just don't be afraid to experiment with it!

Here is my recommended order in the language of the GT3/5:

```
AFB; Anti Feedback
AR; Auto Riff
FB; Feedbacker
SG; Slow Gear
SYN; Guitar Synth
  AC; Acoustic Guitar Simulator
  PIC; Pickup Simulator
  CS; Compressor
  LM; Limiter
  AW; Auto Wah
  WAH; Pedal Wah
  HU; Humanizer
  OD; Overdrive/Distortion
  PRE; Preamp
  EQ; Equaliser
  NS; Noise Suppressor
  FV; Foot Volume
  HR; Harmonist
  SDD; Short Delay
  VB; Vibrato
  2CE; 2x2 Chorus
  FL; Flanger
  PH; Phaser
  RM; Ring Modulator
  DD; Delay
  CE; Chorus
  SL; Slicer
  TR; Tremolo/Pan
  RV; Reverb
```

As per the GT-3 Unofficial Owners Manual, effects at the same level of indentation may be interchanged in terms of position. Although in most cases they can't be used together due to the nature of the MOD and [GT-3] SFX effect allocations! The 'SEQ; Sub-Equaliser' is quite at home almost anywhere in the chain.

For practical purposes my base setting (set in patch '<Empty>' and 'Clean') is:

```
CS—WAH—OD—PRE—EQ—NS—FV—HR—DD—CE—TR—RV
```

As said in the GT3 FAQ, the Synthesizer and Harmonist are often used near the front of the effects chain in order to improve tracking. If you examine the presets on the GT-3/5 it will reveal that 'NS—SYN—FV—Other FX' is a very

common ordering. It should be noted though, that there are no effects \*before\* the NS.

Again the GT3 FAQ says 'The Foot Volume will give different effects when used at various points in the chain. For example, when used before delay, it allows the delay to continue repeating notes, even after the volume is set to 0. When used post delay, it will silence the repeats from the delay as well.

And not just the delay...it will silence the natural decay of the reverb as well. I prefer it before dd/ce/tr/rv but this is just my preference. The Tremolo/pan is best before the RV or at start of the chain. When placed before the Reverb each sound will still get its own natural decay. This is especially true if used in a panning mode in stereo. Here the reverb will produce a nice decay on each channel separately as the pan switches between channels.

### OD-PRE or PRE-OD Ordering?

One thing I examined was the OD-PRE ordering and the difference if they are swapped around.

Start off by using the 'Metal Dist\*' patch. Now play something—chords single notes and so on. The current ordering is OD-PRE this produces a treble sound, perhaps a little harsh on the distortion for some peoples taste. OK then. Now put the PRE in front of the OD. Hmm. Quite a change eh? The sound has lost a lot of the highs—it sounds more muffled—much like the speaker sim—but on my system at least the speaker sim ISN'T turned on. Indeed if I turn the speaker sim ON then there is very little difference in sound.

So is there a better way round? Well, I prefer the harsher OD-PRE, others may prefer it the other way round. This is mainly because a nice screeching pinched harmonic + a whammy dive REALLY SQUEALS with the additional treble. The main point to take away from this is that even though all the tone controls in both effects were tone-neutral the ordering alone made a huge difference.

If anyone has comments about this—please bring them up – especially less usual orderings.



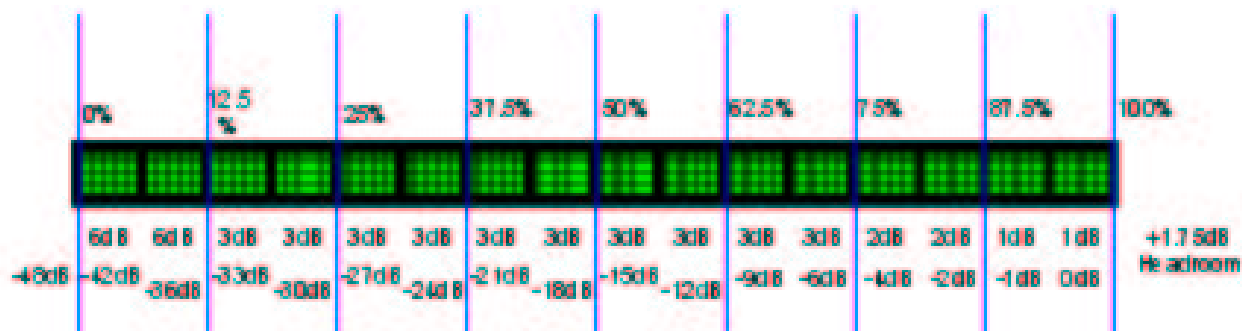
## Section 7 Level Metering

### The GT-3/5 Level Meters

If you are not familiar with the Meters under <Utility> then I suggest you familiarise yourself now. Check out the Official Manual for how to do this. They really are very simple and extremely valuable.

Roland tech support seem to be unaware of the calibration of the scale of the meters. So here is the technical jargon.

All meters are non-linear. The bottom 2 segments represent 6 dB each, then next 10 segments represent 3dB each, the next 2, 2dB each and finally the last 2 segments represent 1dB each. Above the 100% mark there is approximately 1.75dB of headroom before clipping occurs. So in total you have about 48dB shown on the meters. Now wouldn't that look better in a diagram eh?



OK so across the top we have the percentages. The first dB row shows the amount of gain necessary to light that segment (5 mini segments). So to light the topmost segment with the second topmost segment lit you need to increase gain by 1dB. The third row shows an effective dB relative to top scale. Therefore at -48dB no segments will be lit – if you raise it by 6dB to -42dB the bottommost segment will be lit. Make sense? I hope so.

The Input/Output meters are not calibrated to the same level as the effects chain meters. The effects chain meters show 12dB LESS than the input/output meters. However, the general calibration of segments is still the same.

I should also say that when using the meters it is easier to change the level parameters using the GT-3/5 Editors. Doing this means you can leave the meters showing and alter the level simultaneously. Without the MIDI access you have to exit the meters, change the level and then re-enter the meters. This latter approach is very much a case of give it a try and see how you go, and I would definitely recommend using the GT-3/5 Editors with MIDI.

I should also point out here that the GT-3/5's meters are not the most responsive and do not have a 'peak hold' facility. This means that a peak may be very fast, clip and the GT-

3/5's meter hasn't had time to react. You will see the meter start to head towards the top but you never see the full peak. The way to combat this situation is to use your ears and trust them. Also if you have a gut feeling that the GT-3/5 is really peaking and clipping very fast go with it and reduce levels. Better to be safe.

My personal recommendation is:

**NO SIGNAL EVER PEAKS ABOVE 90%.**

Many think that I am over cautious about this but I have spent many hours looking at the meter and know that they do not react fast enough. Mind you I don't care. It's not me having to listen to it. After all, it's your *sound*, and if you are happy having it clip...Please bear in mind this only give 3-4dB of headroom.

### Marking up the LCD

OK, now we get down to the interesting stuff. We are going to start talking about volume levels. Unfortunately the meters on the GT-3/5 use an unmarked visual display. Not much use when you are trying to discuss specific levels. What we need to do is to mark up the GT-3/5's LCD display with volume marks, so that we can easily see what the levels are.

The LCD has 16 character segments. We will mark 0%, 25% (four segs), 50% (eights segs), 75% (twelve segs) and 100%. I also mark every 2 segments (12.5%, 37.5%, 62.5% and 87.5%, this doesn't clutter the display, makes your estimates of the level more accurate by making the level easier to read.

To mark it up I place the GT-3/5 LCD directly in front of me, and look at the display at an angle of 30-45deg. This allows you to clearly see the character segments. I use a permanent marker—a green Lumocolor to be precise. Although permanent the marker may be removed via the use of a small amount of meths or rubbing alcohol on a cloth if needs be. One suggestion from the GT-3 group is to switch into tuner mode. This helps as it lights up the segments which makes marking them up easier.

## Section 7 Level Metering

---

I now mark the display by drawing in a line in-between the character segments. The display is 2 characters high. I draw 2 high for 0%, 50%, and 100%, and 1 high for the others. You now have a meter use can refer to in terms of volume%.

An alternative suggestion has come from Scott Russell on the GT-3 group, who suggested placing masking tape on the front beneath the LCD and then marking the tape up as above.

Manuel "Jed" Saldaña on the GT-3/5 Yahoo Groups suggested an alternative to marking up the LCD display. Simply print out the template in Appendix E onto a transparency/acetate cut it out. This provides a nice quick way of marking up the display. However, it works better with colour printers – black can be a little hard to read.

Any further ideas please let me know!

## Section 8 Level Matching

### Concepts

Level matching is not an alien subject matter I just happened to think up one day. It's tried, tested and guitarists were doing it long long before the GT-3/5 and other multi-effects units arrived on the scene. The trick is recognising what you are doing, and being consistent in doing it.

Lets look at a standard configuration for a guitarist; your guitar is plugged into a set of say 3 effects units; a distortion, flanger and a chorus. What you do is set the output volume of each unit in such a way that as you turn each one on and off there is little difference to the overall sound level (unless desired – like a boost for a solo). What you are doing is **level matching**.

The GT-3/5 is exactly the same, albeit a little more involved. What we shall be doing is setting the levels in the same way we would if we had a number of stompboxes/units in front of us. The difference is we must treat the GT-3/5 in two ways; firstly treating it as a single overall unit itself, and then secondly treating each effect within the GT-3/5 as individual stompboxes. By matching the levels in this way we ensure that we won't clip and we have a standard approach to matching volume levels. The benefits are obvious; it avoids each patch producing a different volume level, and huge volume fluctuations when turning effects on & off either through control assigns or manual mode.

One neat thing here is that a patch that has been level matched on one persons rig should only need very minor tweaking for another persons rig!! This makes swapping patches on the Internet much much easier.

In addition to the benefits described above it is possible to 'open' up a level matched patch by using manual mode. Having ensured that all the effects are level matched (except where a volume boost is required – such as for a solo) turning on/off an effect should not affect the volume output.

When level matching the GT-3/5 there are three really important things we need to know to level match **any** patch:

- Standard Master Level Setting (Always 81!)
- Target FX Chain Level
- Target Output Level

Before I explain why they are important and how to use the information, lets take a quick look at some of the terms I might refer to when describing how to level match.

### Level Matching Definitions

OK. No acronyms, just plain speak, and just the things you need to know. (Woohoo I hear some of you shout!)

- Standard Master Level Setting

This is the value of the master level setting that is reached AFTER the input-output levels have been matched on a patch containing no effects (not even NS/FV). Analysis using a computer & I/O meters has shown that this should be 81.

- Target FX Chain Level  
This is the level that should be aimed for when level matching effects in the effects chain. It is based on a palm-muted stroke.
- Target Output Level  
This is the level that should be aimed for as an output level for all patches.

### Tuner/Bypass Mode

Use of the Tuner in BYPASS mode does not really fit in with the level-matching concept. The reason is that the bypass mode is louder than everything else and there is no way to output a volume as high as is passed through in bypass mode.

If you use an empty patch and set your master level to 100 on an empty patch you effectively get 'bypass mode' from a patch. However the output is still -0.6dB BELOW the bypass mode output.

For further information on the Tuner/Bypass mode please read section 4 - Connections.

### Creating patch '<BYPASS>'

The problem is that if you level match patches any use of the bypass mode or the 'bypass patch' with a master level of 100 results in a jump of volume. This defeats the purpose of level matching in the first place. Because of this problem I recommend that those requiring bypass mode set up a level matched bypass patch – which will NOT have a jump. So lets take a look at it...

Take patch '<Empty>'. Set the FV:Level to 100 and Master:Level to 81 et voila one patch called '<BYPASS>'.

For those of you concerned about frequency response, there is little difference between true bypass mode and the patch '<BYPASS>'. Obviously the patch has a little lower volume output than the tuner/bypass mode. Analysis has shown that the tuner/bypass mode is actually +2.5dB louder. This difference in volume levels reinforces my recommendation of using a bypass patch rather than tuner/bypass mode if you level match all your other patches.

### Creating patch 'Clean'

'Clean' is a straight through patch that provides Noise Suppression and Foot Volume ONLY. It is useful for learning, and creating a 'base' patch from which others are created.

## Section 8 Level Matching

---

This is just all too easy to set up. Take patch '<BYPASS>' copy it, and add a control assign so the EXP PEDAL acts as a Foot Volume – you can use a quick setting to make it even easier. Then turn on the NS and set it up as described in section 9a Noise Suppressor. Easy eh? And not even a single meter to match!!

### Basic Level Matching Procedure

---

Right. Let's look at the basic procedure we are going to follow:

- Set the Standard Master Level Setting
- Input Level Adjustment
- Determine Target FX Chain Level
- Effects Chain Level Matching
- Output Level Adjustment

All level matching is performed on a patch-by-patch basis, with the exception of input level adjustment, determining the target FX chain Level and some output level adjustments, which affect ALL patches. We will use this procedure EVERY time we build a patch. When modifying a patch, you only really need to re-level the FX chain to your target level, and possibly make a small output level adjustment. Let's take a quick look at each step.

#### Set the Standard Master Level Setting

This used to be Input-Output level matching. However, there really isn't much to do here. Having carefully analysed the GT-3/5 the **Standard Master Level Setting** should be 81 to provide unity gain between the input and the output. Simply eh?

#### Input Level Adjustment

This is done to get a good signal into the GT-3/5, ensuring we maximise the S/N ratio. We will discuss the various methods of boosting or taming your input level and by the end of this step we will have arrived at an appropriate input level. This input level becomes our **target output level**.

#### Determine the Target FX Chain Level

We will create patch 'Clean' and use this to help us determine what are **target FX chain level** should be. This is probably the most important level measurement you will ever make!! (Ok – just a little exaggerated!!).

#### Effects chain Level Matching

We match the output of each effect to the **target FX chain level** by altering the output of each effect (although effects before the preamp, and the DD, CE and RV require special treatment – but this will all be explained).

#### Apparent Volume Adjustment

We now make adjustments to account for RMS (apparent volume) differences. Don't worry if the terms RMS of

apparent volume mean nothing – all will be revealed shortly.

#### Output Level Adjustment

Finally, we adjust the output volume control knob to make sure we send a good loud signal into the next unit/amp without clipping it.

Right. I have talked a lot about various levels. Let's now examine just **how** we should go about measuring them.

### How to Measure Levels

The key to matching volume levels is to know how to measure them.

When measuring volume levels use your loudest pickup, which typically will be a bridge humbucker. This ensures that no patch will overload and clip. When you choose a quieter pickup such as a neck single everything still sounds great and perceived volumes aren't that different, despite what the GT-3/5's meters will tell you!

I find it easiest to palm mute and down stroke over

E-----  
B-----  
G--5---  
D--5---  
A--0---  
E-----

This produces a nice stable volume output to check with. Once I've settled with the volume I want I then check open up/down strokes to check for max peaks.

Admittedly this whole process relies on you playing fairly loudly (guitar wise not amp wise!!), and CONSISTENTLY. If you don't then you may find it hard to match your levels.

### Set the Standard Master Level Setting

Right start this with a copy of patch '<Empty>'. Turn the FV:Level to 100 and set the Master:Level to 81. What could be simpler? Easy or what?! This is a great starting point – if you apply this instantly to any unruly patch some of the horrid output clipping can disappear immediately. It's definitely the quickest and easiest step of all!

Now. I have been asked "Do I put the <Master>[Master Level] to 81 on ALL my patches, including any that I re-work, be they presets or patches from the internet?".

Yes. 100% of the time this is my first step. However, as we will see when we look at FX chain matching and output level matching I may alter it, so by the end of the level matching process it may not be 81 any more. Don't ever try

to pre-empt the level matching process by setting a different value – always set it to 81.

### Input Level Adjustment

The basic idea here is that you get the loudest signal into the GT-3/5 as possible without clipping. This maximises the S/N ratio. This only needs to be done ONCE ever.

Your friend here is your 'Input' level meter. Get this up on your GT-3/5. Right, play(!) - preferably as loud as you can., making of note of how high the peaks are.

You want the peaks as high as possible in the 75-90% region. If you get any single peak > 90% then you probably need to turn the input level down, anything less than 50-60% most definitely needs a boost – try and get those peaks right up as near top 90% as you can.

OK how do we adjust the input level then? Well this is where I must split the GT-3 and GT-5 out...the GT-5 has an input level volume control and the GT-3 doesn't – which leads to different procedures. However, in all cases aim to get your peaks as near to 90% as you can.

#### GT-3

OK. How the input level is adjusted is based very much on your set-up.

##### Guitar -> GT-3

Remedies for a volume that is high include:

- ☐ Reducing the pickup height on your guitar
- ☐ If you have active pickups then reduce the boost
- ☐ Place another unit before the GT-3 that has more headroom and an adjustable output level
- ☐ Add in a volume control before the GT-3 input

Failing to take action may result in clipping remaining in your system. This can lead to excessive noise, uncontrollable feedback and a distorted unpleasant side effect on your sound.

If the volume is too quiet then you have a decision to make. You can accept the low input volume, or do something about it. If you do something about it the solution may increase noise in your system. Solutions include:

- ☐ Rising the height of your pickups
- ☐ If you have active pickups, increase the boost
- ☐ Place another device before the GT-3 to act as a preamp

##### Other device -> GT-3

Right this is a little easier. If your problem is the input volume is too high simply reduce the output level of the device feeding the signal to the GT-3, and conversely, if

your input level is too low raise the device's output level.

#### GT-5

OK. How the input level is adjusted is based very much on your set-up. – but you have a much easier time than the GT-3 users because of the input level control.

##### Guitar -> GT-5

Your first means of adjusting input level are the input volume level control knob on the GT-5. When adjusting the input level check the overload indicator. It should briefly flash occasionally, but not remain lit for any longer than that – If it does you must either turn the volume down more or take other action.

If your input level is too high turn it down. If your input level is too low, turn it up. This should sort out 95% of all input level issues on the GT-5. However, If you find yourself at minimum and the volume is too high you must consider the following remedies:

- ☐ Reducing the pickup height on your guitar
- ☐ If you have active pickups then reduce the boost
- ☐ Place another unit before the GT-5 that has more headroom and an adjustable output level
- ☐ Add in a volume control before the GT-5 input

Failing to take action may result in clipping remaining in your system. This can lead to excessive noise, uncontrollable feedback and a distorted unpleasant side effect on your sound.

If your input level volume control is at maximum and your volume is still to quiet then you have a decision to make. You can accept the low input volume, or do something about it. If you do something about it the solution may increase noise in your system. Solutions include:

- ☐ Rising the height of your pickups
- ☐ If you have active pickups, increase the boost
- ☐ Place another device before the GT-5 to act as a preamp

##### Other device -> GT-5

The aim here is to have the device feeding the signal into the GT-5 feed the loudest signal it can, whilst having the input volume on the GT-5 as low as possible, without clipping the analogue circuits and again whilst trying to get your peaks as near to 90% as you can. Its just a matter of juggling the controls until you get a nice loud signal in, without clipping. If the other device is outputting as much as it can without clipping then just raise the GT-5 input level control until you get a satisfactory reading. Once again, while adjusting the input level check the overload indicator. It should briefly flash occasionally, but not remain lit for any longer than that.



## Section 8 Level Matching

---

OK. So the input level has now been adjusted. Whatever level is shown on the input meter is the same level we want to see on the output meter. To find a suitable target by which we can judge whether or not we have boosted the output in our effects chain, use the '<BYPASS>' patch, palm mute and strum the chords as described above in How to Measure Levels. Hopefully you should be able to determine from the input meter what our Target Output Level is. Our Target Output Level is the same for ALL our patches. This only needs to be done ONCE, ever. It is used to monitor the output from the GT-3/5 whilst we are Effects Chain Level Matching - more on this in a bit. Just as a ball park, my Jackson PS2 with EMG-81 in the bridge gets about 62.5% on the input level when using the palm muting. Normal level of playing thus ends up around 75% and peaks up to about 90%.

### Determine Target FX Chain Level

Once again here is another step that we only ever need to do once! In fact it's not really much of a step even. As I said in section 7 the FX chain meters are calibrated 12dB less than the input/output meters. Therefore are target FX chain level is 12dB less than our target output level which we just discovered. Or put it another way still, 25% less than the target output level. In my case this will be 37.5%. Now you may be thinking that's low – but remember palm muting will give levels at about 12.5%-25% lower than open strings etc.

Crumbs that was easy eh? Right, one bit of maths later and we have our figure – and we never have to calculate it again. Cool or what eh?

### Effects Chain Level Matching

OK So now we need to level match our effects chain. The basic concept here is that we start at the start of the chain, examine each level meter in turn and adjust its output. Unfortunately it's not quite that simple. One thing that should be remembered is that because every effect in the chain is set to output the same Target FX Chain Level, we don't have to have all the effects ON at the same time. Indeed we can turn them off and just have the effect we are levelling active, putting them all back on again at the end. So lets look at each effect and examine just exactly how we adjust their output level.

#### Direct Only Level Controls

- AC – Acoustic Guitar Simulator
- AW – Auto WAH
- CS – Compressor
- EQ – Equaliser
- [GT-3] FL – Flanger
- HU – Humaniser
- LM – Limiter
- OD/DS – Overdrive/Distortion
- [GT-3] PH – Phaser
- [GT-3] PIC – Pickup Simulator

- PRE - Preamp
- SEQ – Sub-Equaliser
- WAH – Pedal WAH

All these effects are simple to deal with. Simply adjust the 'Level' parameter until the output level of the effect matches your Target FX Chain Level.

The Preamp Simulations are slightly different. Because they are simulations they actually behave like the real thing. Therefore they will respond to being driven louder. If the effect prior to the preamp outputs a higher level then it will drive the preamp sim into distortion better. However, using the output level of one effect in the chain to increase distortion of the preamp is not compatible with level matching (see Section 8). Instead, turn up the gain of the preamp and leave the output level of the preceding effect well alone. Use the Gain and volume controls of the preamp to adjust preamp tone/distortion & gain. Use the MASTER VOLUME parameter of the preamps to perform level matching, as this does not alter the sound of the preamp, merely the output level.

#### Direct & Effect Level Controls

- [GT-3] AR – Auto Riff
- [GT-5] DD – Delay
- HR – harmonist
- RM – Ring Modulator
- SP - Speaker Simulator (GT-3/5)
- SYN - Synth

To reduce the output level of these effects you must reduce BOTH the direct and effect levels equally, in proportion to their value in order to preserve the balance, and thus their sound.

For instance, the Harmonist has HR1, HR2 and Direct levels. To reduce the output level of the effect you must reduce ALL 3. However you cannot simply take 10 (for example) off of each level parameter, because this changes the balance of the sound. Instead you must reduce each by the same **percentage**. For example you could try to reduce each value by 10%. So HR1 becomes 0.9\*HR1, HR2 becomes 0.9\*HR2 and the Direct level becomes 0.9\*Direct.



### Unity Gain Effects

[GT-3] AFB – Anti-Feedback  
[GT-5] FL - Flanger  
FV – Foot Volume  
NS – Noise Suppressor  
[GT-5] PH - Phaser  
SG – Slow Gear  
[GT-3] SL - Slicer  
TR – Tremolo/Pan  
VB - Vibrato

These effects make NO difference to the level of the effects chain. If you see their output level higher than the target FX Chain Level, then check the preceding effect, because it is most likely that it is not correctly level matched.

### Effect Only Level Controls

CE - Chorus  
[GT-3]2CE – 2x2 Chorus  
[GT-3]DD – Digital Delay  
FB - Feedbacker  
RV - Reverb  
SDD – Short Digital Delay

These represent more of a problem. Here you have three choices.

- ☐ Use Master Level to correct.
- ☐ Alter the level going into them
- ☐ Accept the increase

OK Lets go through them.

If you **use the master level to correct** any volume gain here is OK providing you are not going to switch the effects on & off. If you do then you will also need to set a control assign to alter the master level as well. This is probably the best method for dealing with these effects.

If you **alter the level going into them** then you need to make sure that you are not going to switch the effects on or off AND that you aren't going to switch the effect feeding them on or off or you will also upset the volume levels. It is basically twice as bad as the first solution.

If you **accept the increase** then you need to determine how audible the increase actually is, as any sizeable increase can defeat level matching.

To be honest I recommend using the first method and altering the master level to cope with the volume increase.

### External effects loop

When level matching using the external effects loop treat the loop in the same way as the other effects. Make sure that the output of the effects loop is level matched with your Target FX Chain Level. GT-3 users will use the Level

parameter of the OD/DS (Ext OD/DS) to do this; whereas GT-5 users should use the output level controls of the external effects to match the Target FX Chain Level. Have a read through section 29.

### Apparent Volume Adjustment

Apparent volume is the situation where we hear a patch louder or quieter than another patch, even though they are at the same level on the meters. This 'apparent volume' is caused by effects that restrict the signal dynamics i.e. limiters, compressors, distortion, preamp distortion. The Compressor, Limiter, OD/DS, and distortion producing Preamp Sims are usually the biggest culprits.

There are two methods that may be employed to deal with this issue:

- ☐ Change the output level of the effect that is causing the increase in apparent volume. This has an added benefit, in that should you use a manual mode and switch that effect off (i.e. like distortion) your effects chain remains level matched and will now output a higher level to compensate for the lower apparent volume.
- ☐ Change the master level to accommodate the apparent volume difference between patches. This method is OK if you do not switch effects on/off within a patch and really are more worried about simply the apparent volume between patches.

Although the choice is up to you I would urge you to use the first solution.

Now the other problem here is that chorus, reverb and delay can make a sound seem 'further away' possibly even sound quieter than they actually are. Thus you may find yourself not only lowering the volume of a patch but also increasing the output of another. Now the problem here is going to be immediately obvious. If you have a patch whose *apparent volume* is less and yet its output is quite high, do you boost it? Well the answer is Yes & No. You can apply some boost but you must never break the rule of no peak > 90%. If the patches are still unbalanced in terms of volume levels you must lower the output of the other patches (typically dryer patches require less output than wetter, more reverb, delay, chorus intensive patches). Other times may result in you actually altering the amount of reverb/delay you put on a patch to stop it disappearing backwards.

### Output Level Adjustment

Start cheering because yet again here is another step that only ever needs to be done ONCE!

The output control knob should be set to give the loudest possible signal into the next device, without clipping its input. Most users find setting it to about 9 o'clock is good.

## Section 8 Level Matching

---

If you require unity gain across the input/output of the GT-3/5 you will find that the output volume knob needs to be at about 7 o'clock.

### Level Matching Existing Patches

One question that I have been asked was with relation to fixing up already existing patches. I hope this provides some clarity on this point:

These patches DO NOT have to be COMPLETELY rebuilt. Simply follow the procedure shown above. Once you have done this you will find that the patch will have now been 'tamed', and is at the same volume level as all your other patches.

### Preset Patch Level Matching Example

OK. So you want an example eh? OK Lets look at level matching the preset patch 'METAL DIST' on the GT-3, GT-5 users should use the 'METAL ZONE' patch which I believe is the same thing. Copy the patch to a spare patch and call it 'Metal Dist\*'. Right lets level match it.

#### Set the Master Level Setting

Come on! You don't need to read this anymore – you know it already! Set the MASTER:Level to 81, and make sure the EXP Pedal is fully forward and the FV:Level is set to 100. This patch has the master level set to 100 so we turn it down to 81.

#### Input Level Adjustment

Well we only ever needed to do this once ever. Nothing should have changed so we should have nothing to do.

#### Determine Target FX Chain Level

Well we already have our target level – it's the same for every patch! As I said above, when palm muting I am looking for 37.5%.

#### Effects Chain Level Matching

OK. So we step through the chain. The order is

OD/DS-PRE-(SP)-NS-FV-DD-CE-RV

Remember here that although the DD is not initially on the CTL pedal is set using a control assign to turn it on and off. So for level matching we first use it off. Then we try it on and examine the difference. OK First up - OD/DS.

#### OD/DS

Looking the meter is running quite low. The initial level is 50 so we increase this until the meter shows the peaks as per our Target FX Chain Level. I get the new level to be around 68.

#### PREAMP

Compared to where the input volume was before we altered the OD/DS output level we find that we have raised the volume running into the preamp and this **may** cause an increase in distortion or a change of tone – if it does then we can simply turn the preamp volume down. Personally I don't think it's changed much so I will leave it alone.

So looking at the preamp output level we can see the level is now boosted above our Target FX Chain Level. So we need to turn it down. Leave the 'volume' and gain controls well alone – or you will alter the sound. Just change the Preamp's Master Volume parameter. I find that from the original 80 I need to come down to 69.

#### Speaker Simulator

OK GT-3 users check it out under the PREAMP, GT-5 users you have your own effect for this.

The direct & mic level do not have to add up to 100 to work. Nor will adding them both to make 100 work – this would produce a lesser output due to the effects of mixing. GT-5 owners will have their own meter for this, GT-3 owners use the preamp meter. Because of this quirk of the GT-3, GT-3 owners should level match the preamp with the speaker sim OFF, THEN turn it back on and level match the speaker sim.

Mic level = 100, direct = 0 OR mic = 0, direct = 100 will result in unity gain & no change. If you use a blend then you may need to adjust it. Do this adjustment using the percentage rules I described above.

#### NS & FV

The NS & FV are unity gain effects and therefore we do not need to do anything with these. Indeed the meters should confirm that we still are meeting our Target FX Chain Level.

#### DD, CE, RV

Well to be honest these seem to make very little difference to the effects chain level - so I'm not going to compensate for them. If I did I would initially try lowering the master level, and if turning any of the off/on caused a large volume jump & would use a control assign to correct the problem.

#### Apparent Volume Adjustment

Right the patch has been levelled within itself. So now how does it compare with our other patches – 'Clean' for instance. As I said earlier reverb can cause problems by setting the guitar further back in terms of apparent volume – even though the output level is the same. In this case I can live with the difference – to be honest the METAL DIST patch has way too much reverb for my liking anyway.

#### Output Level Adjustment

As I said earlier this only ever need be done once, and we already set this up earlier! Finished!

## Advanced Level Matching

I personally found that playing **and** trying to alter levels and bounce around between meters was way too awkward. These days I now use my PC to generate either a 1kHz signal or white noise. I alter the level to match my guitar input level on the meter. I then use GT-3 Manager to alter my levels, whilst using the GT-3 on the meters only. The whole procedure is now so much easier for me.

## Summary

OK. Hopefully by this point you've got a really good understand of the concepts involved and how to put all this knowledge into practice. We have seen that once we have set-up the GT-3/5 for level matching, the actual level matching of each patch really just consists of two steps:

- Effects Chain Level Matching
- Apparent Volume Adjustment

Just before we are finished though I just want to say that level matching does not suit every situation, and although I have presented a set of guidelines here there are exceptions to the rule. In practice I have seen level matching, make some quite useless patches that squealed like there was no tomorrow, sound really quite good. So now take what I have said, add to it your own style/taste and experience and let me know how you get on. I just hope this has all proved useful.

Remember that you can apply this philosophy to your entire rig, not jut the GT-3/5. If you have an effect before the GT-3/5, you can use the GT-3/5's meters to help you set the output level by doing an A-B between the effect on and the effect off whilst watching the input meter. You can use this same technique to level your entire external effects chain.

## Section 9 Noise Elimination

This section was written quite a long time ago – at least as far as my equipment, rig and set-up are concerned. My rig has now changed significantly, none more so than in the studio/recording environment. I am also using more hi-tech techniques for noise elimination that I do explain a little of in a small description that I have added to the end. However, the principals presented here remain sound (no pun), and are probably more representative of most users' set-ups than my new set-up is. Thus, although this section has now been edited, much of my equipment described here is as it was when I originally wrote the piece. That said I hope you still find the following information useful.

### What Causes Noise?

Noise can be generated from a number of sources. Humbuckers will be quieter than single coils, ground loops can introduce noise, hum or interference into a set-up, and an impedance mismatch can ruin your sound too. Some devices and stompboxes may be noisy. This is especially true where high gain is used. It is important to be aware that compressors, limiters, and fuzz/overdrive/distortion will accentuate the problem. Sometimes something as simple as the routing of signal cables near transformers or alongside power cables is often to blame.

Eliminating the noise is very important; it will interfere with the sound, making it sound muddy, and it will make you unhappy, as you can't get a 'professional' sound. Oh and its even worse when you record and listen to it! Don't worry; the chances are it will be solvable! We will be looking at noise removal extensively. Showing you how to find it, and how the GT-3/5 can help by creating a patch called 'Noise Check'. We will also be tracking down and removing unwanted distortion.

### Ground Loops

Ground loops are also known as earth loops or induction loops. A ground loop occurs when there multiple paths to earth are available. For instance we have two effects earthed (grounded) to the electricity supply and a shielded cable running between the two. There are now two paths to ground (earth) et voila—you now have a ground loop.

Ground loops can introduce unexplainable noise, hum or interference into your system.

The first thing to do if a ground loop is suspected is to eliminate other causes of hum. You need to be sure a ground loop is the problem. Following the noise elimination process detailed below, will help you identify these situations.

Let's say we have two effects, with the casing earthed, and thus the cable shield on both goes to earth. You now have two paths from effect 1 to earth. Firstly down its own earth cable, and secondly down the shield of the linking cable to

effect 2 and then down effect 2's earth! This problem can also manifest itself as crosstalk. Other interference is possible in such situation the ground loop acts like an aerial!

Craig Anderton gives a detailed explanation of why a ground loop occurs in his book 'Guitar Gadgets'. What I will do here is merely provide the means to solving it.

The most effective way to solve a ground loop is the break the shield in our signal cable. Although we now have a break in the shield the cable is still screened by it, and one end is still connected to ground. The easiest way to do this is in the cable connector. Make sure you do this properly though, breaking only ONE end in this manner and make sure it cannot re-connect! Don't leave a bit of cable flapping! This is also the cheapest method. You could buy a special cable for this but it is far simpler to do this yourself. It is possible to do this on cables with moulded connectors but heck; most good quality cables don't use moulded ends. It is also a somewhat more difficult procedure, and I'd rather not encourage it. Suffice to say the easiest way is to chop of the connector and replace it with a new one that you solder yourself.

If you put one of these broken ground cables in place and the hum gets worse instead of better, then put the original cable back. Your problem here is a lack of direct connection from the effect to ground.

So the idea here is any device that has 3 mains wires (one of which is earth) which connects to another device that has 3 mains wires should have between the two a broken shield cable. If between these two 3-wire devices you have a two-wire device place the broken shield cable in the chain immediately prior to the second three-core cable. This will prevent ground loops.

An alternative, sounder approach is to use the 'GND LIFT' or 'Ground Lift' feature of some devices, although such features normally only appears on rack units or DI's.

One way to help identify these problems is to draw a block diagram. First drawn in your amp, effects units, guitar and so on, in the order they appear in your chain. Draw in the signal cables between them. Then drawn in a line about 2 inches above all this. Label it 'GND'. For each device with a 3 wire mains lead, draw a line from the unit to the GND. You should now have a very easy way of identifying possible ground loops. Oh. If you have a rack with a metal assembly, then draw a line 2 inches below and label this 'Rack'. Then draw a line from each unit in the rack to this line IF the unit has some form of metal-metal contact. For most equipment this contact is made by the faceplate of the unit being screwed (metal) onto the rack. I hadn't done this when I started checking for noise below. I wish I had, possible ground loops would have been easier to spot.

Needless to say I have done this now to confirm what I have done!

As a final note—prefer the use of GND LIFT or broken ground cables...

**ANY ATTEMPT TO REMOVE THE EARTH FROM A POWER SUPPLY IS DANGEROUS. THIS INCLUDES PLUG CHEATS – 3 PIN PLUGS WITHOUT THE EARTH WIRED. YOU MAY WELL INVALIDATE THE MANUFACTURERS WARRANTY AND PLACE YOUR LIFE OR SOMEONE ELSE'S LIFE IN DANGER. YOU DECIDE.**

**PLEASE REFER TO APPENDIX F FOR MORE TIPS ON ELECTRICAL SAFETY.**

### Clipping

As defined in section 2, clipping alters the sound you hear, manifesting itself as anything from clicks or crackles through speaker rumble through to distortion. In fact the principle of clipping is behind every distortion or fuzz we have today. However, there are times when this clipping is undesired—this is unwanted distortion. For instance we want a nice clean warm sound. Any clipping that occurs will cause distortion and will ruin our clean sound. Indeed, even when using a distortion digital clipping is clearly audible and seriously mars the sound.

### Impedance Mismatch

Impedance seems to be cause for concern, but most manufacturers of modern equipment know what we want and how we are likely to set it up, so these days impedance problems are less common. Having said that, given the number of increasing complex cabling systems people are using including the 4/5 cable methods that many GT-3/5 users use, impedance must be treated with respect.

In general your guitar should always feed a high-impedance input (>100k ohm), thus providing a low loading on the guitar pickups. The GT-3/5's input is 1M ohm—so no problems there. A 100-220k ohm input is an acceptable compromise between a lack of loading and a lack of noise (high impedance inputs can generate noise and are susceptible to RF interference).

Generally, a device with a given output impedance should drive a device whose input impedance is at least 10 times that of the output. Therefore 10k ohm driving 100k ohm is good, 10k driving 10k is bad. It should also be noted that 1k can feed 100k without a problem.

If your guitar sounds muddy, thin, and loaded down you may have an impedance problem. For more information I suggest reading 'Guitar Gadgets' by Craig Anderton.

## Noise Elimination

### Cables

First up we are going to check ALL your cables. Including those between your amp and the speaker cab (if you have such an arrangement—i.e. a stack). If the cables are suspect we could have problems checking everything else. One word of wisdom first; buy the best cables you can afford. Try to ensure that all unbalanced cables you use are 20ft or under. Any longer you will be liable to RF interference and signal loss. For all noise checks I am assuming that you are using unbalanced cables of this length or less, fitted with 1/4" jacks.

To check a cable properly you will need a multi-meter. One with crocodile clips on the ends of the probes would make life easier.

There are three things we need to check:

1. Continuity of the signal path
2. Continuity of the shield
3. Short-circuit between the shield and the signal path

All these tests can be performed using either a continuity test setting or a resistance measurement. I will say that a continuity tester usually uses an audible monitor it is far easier to use. **DO NOT HAVE THE CABLES CONNECTED TO ANYTHING WHEN PERFORMING THESE TESTS!**

#### *To check continuity of the signal path*

Place each meter probe on the 'tip' of the jack. Then waggle the cable where it goes into the connector and down the length of the cable to the other connector, and waggle the cable where it enters it. If you are using a continuity test you should hear no break in the sound. If you are using resistance measurement, resistance should remain at 0 (at the most it should remain < 1ohm). Any deviation from these results means you have a break in the cable.

#### *To check continuity of the shield*

Now place the probes on the shield side of the jack. Perform the same test as for the tip. Results should be checked for and interpreted in the same manner.

#### *To check for a short-circuit between the shield and the signal path*

Now place one probe on the tip and one on the shield. Perform the same test. The difference here is that a continuity tester should not make any sound. If it does you have a short. If measuring resistance, resistance should



## Section 9 Noise Elimination

---

always remain off the scale, or at the top end. ANY movement away from this will indicate a short.

ANY failure however small, should result in the cable being rejected. Fixing faults in leads is really beyond the scope of this series. I suggest reading a book, asking on the Internet, or consulting someone who works in a music shop, another musician or a repairman.

For your information I found 2 cables with dodgy signal wires. One was a Peavey 2ft cable and the other some unbranded thing I had lying around which I used as a spare. Both were failing near the connectors (but not at the solder joints inside—oddly enough).

For those that are interested I use Planet Waves cables as my main signal carriers for long runs and for 1ft patches in my rack. All my studio cables and balanced cables I made myself using Switchcraft and Neutrik connectors and the appropriate Van Damme cables (instrument/microphone/balanced patch).

Ron Worley uses George L's cable, which is the stuff that Eric Johnson uses. Don't know if it available in the UK. This stuff is DEAD quiet, and comes in bulk with special no solder connectors. I hear you saying "no solder connectors—bullshit"! Well, Ron was also sceptical, but Ron says it really works. Check out their website: <http://www.georgels.com>, and look at Eric's bohemian rig at <http://www.ericjohnson.com>.

OK, so now we've sorted out which cables are dodgy and which are good.

### Basics

First up we will check the amp, speakers and guitar. Then we will create our new 'Noise Check' patch and then look at eliminating the noise in the rest of our system. Be warned this procedure will take quite some time. I think I must have spent about 6-8hrs checking all my stuff out! This could be the most important time you have ever spent with your equipment!

As noise can be generated from a number of sources, we are going to be systematic, and check each piece of equipment. Finding noise at any point requires immediate removal.

Before you get stuck in though get some space around your equipment. You need to space things out to determine where the noise is coming from. It's much easier to work when you aren't cramped.

Another thing—NEVER plug in or remove cables with the volumes on your equipment at FULL. You stand a very good chance of damaging something. Always change a configuration with the volumes at zero (0!).

One more thing, please be careful with your ears when doing this. The volumes will be loud – at least they will if you PLAY anything. DON'T play and you won't damage your equipment or your ears, and it will be a fairly quiet exercise. This exercise is about removing noise, and you cannot remove noise unless you have a quiet environment (i.e. lack of washing machine). So, as a final warning, unless I specifically say otherwise the GUITAR volume control MUST be at zero.

OK, now for some golden rules:

***At the least use a multiple socket block, preferably filtered. If you can afford better and feel it is worth the investment then get a power conditioner.***

A filtered socket strip is a cheap way of removing a little noise. Your equipment then only requires 1 wall socket. However, beware that you do not overload the strip. In the UK 13amps is normally the maximum. Most set-ups will be well below this as this covers 3120W!!! I have a Furman PL-Plus-E power conditioner at the top of my rack, which supplies 10 Euro-sockets. This ensures ALL equipment is protected in the same way. It also means I only need 1 wall socket!

The four gang I was using in the rack has now been modified. I was getting a small amount of noise from the four gang when I plugged it into the Furman—even with nothing plugged into socket strip! The problem appears to have been caused by the neon bulb (and its resistor). I have now removed this from the socket strip, and this has stopped the additional noise from entering the rack. The four gang is now completely silent. I therefore recommend using a strip WITHOUT a neon, or removal of the neon from the power strip as it may introduce noise into the mains. If you do alter the strip keep electrical safety in mind. Only do this if you understand what you are doing.

***Keep ALL signal cables away from power supplies and power supply cables.***

Failing to do so will result in you picking up some noise. This will typically manifest itself as a hum, sounding very similar to a transformer. Looking at my rack from behind I route all power from bottom left, up the left rear side and then across the top, plugging into the Furman. I have a socket strip that is attached to the left side of my rack, again plugged into the Furman, and wall warts go into this. Power transformers like the GT-3/5's go velcro'd onto the floor of the rack on the LEFT side. Signal cables however, enter & leave the rack on the bottom right. They are routed up the right hand side rear of the rack and spur off as required horizontally into the equipment. The signal cables between rack components use the shortest leads possible. The way the power is routed ensures that these are well away from anything.



Never coil power cords - inductance really increases (heat, current draw). Also if you must run a signal cable across a power cable, do it at 90 degrees to minimize crosstalk.

Let's move on now and take a look at our equipment. I suggest starting with multiple socket strip, plugged into the wall. Move all your other equipment out of the way. Plug in your amplifier ONLY. And when I say 'plug in X' I mean only the things I mention. Just turning the power off on an item of equipment is not enough: they must be unplugged otherwise the earth leads will remain connected and this could alter the results.

### Amp & Speakers

OK, now we shall test your amp and speakers. If you run in stereo, test each channel individually. If you use multiple amps and/or cabs test each in isolation.

Make sure your speakers can handle full power (If they can't you really are dicing with death. At an absolute minimum, you should have speakers rated 10%-15% higher than the amp, preferably about 150% and the 'no chance of problem ever' recommendation of 200%. But I think that's a bit extreme. My cabs are 140W and my amps were 100W and 75W. This is pretty much an acceptable situation.

Don't plug anything into the amp (other than the speakers!). Volume 0. Turn it on. Listen. Any noise already? This is the basic level of amp noise you will get. Start to bring the volume up - use a clean channel first. If you have a gain control as well bring up the master first then the gain control. Try this with all your channels one after the other. High gain channels will produce noise but hopefully nothing too alarming.

OK there should be very little noise at all (except high gain channels). Anything else is a problem at this stage. OK. Now turn the volume up FULL. Go on. Don't be scared. BTW I should mention now that you have the volume up full that I take no responsibility for damage to any part of your system here :-)-check your manufacturer's warnings beforehand—if you have the kit correctly warned it shouldn't be a problem. Now bring up ALL the tone controls as well.

My RA100 power amp is very silent. Apart from very very quiet mains type hum which is always present (and you need to put your ear next to the speaker to hear it) changing the volume control from 0 to 10 makes little difference, except on the right hand side where the transformer is in the amp. But this is not worth worrying about. This is how it should be.

OK turn it down! Do anything else you use individually now. If you use more than 1 amp/cab arrangement now is the time to plug them all into the power supply together.

Connect them up and do the same test. The results should be exactly the same.

If at any point you have heard more than a hiss/v. low hum you need to investigate your cables, and the power supply to the amp itself. At worst case here you may have a noisy amp. Start unplugging things until the problem disappears—this last item is the one where the problem manifests itself. It may not be the piece of equipment at fault—funny interactions can happen with electronic equipment. At least you know where the problem is.

The problem may be noise in the power supply. Turning off other things in the house can check this—washing machines etc won't help. A noisy amp at this stage is a pain in the bum. You need to decide if you can live with the noise generated. If it is only at very high volumes, then it may not be problem—but remember what you hear at high volumes is generally present at low volumes; only it may be so quiet that you can't hear it. A noisy transformer in the amp (i.e. a buzzing sound rather than a humming) should be investigated—it can affect signal cables that travel anywhere near it and if close to your amp will quite probably induce noise.

I've also checked my Marshall Valvestate VS100 head. Yikes!!!! It's a noisy beast. In fact I am NOT prepared to live with this noise—one of the reasons I am selling it. This appears to be a Valvestate problem as I know a chap who plays in a band with a guy who has a Valvestate and he says this is very noisy as well. This thing hums without the speakers plugged in and the volume zero. Plug them in and the hum goes straight through to them at a loud enough volume for me to be concerned. Bringing the volume up from zero makes no difference on the clean channel. The channel itself is very quiet it's just the rest of the amp! It would be useless to mike this up for recording purposes.

BTW you cannot solve this sort of hum with a broken shield cable. It is NOT a ground loop. If you don't have signal and shield connected the speakers won't work!

If you have a complex set-up and hook up signal cables \*between\* your amps then a hum may be caused by a ground loop, and we have already talked about how to remove them. Other than that, with regard to solving the problem I can only suggest speaking to someone qualified to comment – the manufacturer, repairman etc.

If you have a simple rig like me—one amp, two cabs this has been a fairly quick and easy affair. Next we will look at Mr Guitar.

### Mr Guitar

Although we did some preliminary checks earlier now let's see how it works with our amp in section 3.

## Section 9 Noise Elimination

---

First off though, single coils will hum. Especially around powered devices (amps, TVs, computers, neons or fluorescent lights, etc.) and there is not a lot anyone can do short of modifying the pickup. But if your humbucker is humming there may be something wacky going on. Noise to be concerned about is noise which does not change even if you place yourself well away from the amp and turning the angle the guitar is at to the amp does not help. Mind you if you stand close to the amp and change the angle it sounds like you are using a light sabre!! (Woah horsey. Let's be safe out there!!)

Single coil users should try to avoid fluorescent lights, and may find that shielding the guitar cavities may help. Failing that there are some very good pickups which are hum cancelling (such as the Seymour Duncan Duckbuckers and Fender Noiseless) which retain that single coil sound.

Guitar volume down. Amp volumes down. Plug the guitar in and bring the amp volumes right up. There shouldn't be any extra noise.

Now start to bring the guitar volume up. You should hear just the quiet no strings sound of your guitar; be careful not to play the strings—this would be very loud.

OK, volumes all down. Check each pickup/pickup combination in the same way. Moving away from the amp, or turning to face a different direction may alleviate any untoward noise. If this solves the problem, then this is probably just standard pickup noise. You may or may not benefit from completely screening the cavities in your guitar. If you do have problems here then these need to be investigated before continuing.

It should be remembered that any noise you hear here will become the 'noise floor'. This will be the minimum noise that will be generated in the final system. If excessive it could be amplified greatly by high gain effects, such as compression or distortion.

Be careful when doing these checks—don't stand in front of the amp/speakers and wave your pickups in the cones—that's a recipe for sore ears as the feedback tears your eardrums out! While you have the guitar volume up check the pickup selector switches and give a waggle side-to-side up/down sort of thing. You shouldn't get any sound from it. My Jackson is dead silent here, and switching between pickups gives a normal but acceptably low level switching sound.

Right then. We are fairly happy with the guitar and amp. I should say that I hadn't really expected you to find too many problems here so far.

Many problems are simply caused by running signal cables past transformers, and you have been keeping them away

from each other so you shouldn't have picked up a noise problem so far. In fact the old guitar seems very clean—even through the high gain channels of the amp. Good. If that's the case and things don't sound so good when you have your effects systems on then perhaps we are starting to isolate the problem.

### BOSS GT-3/5

What I am going to do now is explain exactly what I did on my system; what I found and how I solved it. We will also be laying down some general procedures for finding problems. I have decided that this is better than trying to discuss what is effectively a subject of infinite possibilities. I believe it will be more helpful for you to see what I did, so that you may then relate it to your particular set-up.

At this stage we are happy with the guitar, amp, speakers and cables. What I did next was to isolate each piece of equipment and check it on its own. Then slowly start combining the equipment one by one until I had built my full set-up.

So here goes....

First of all we will set up the GT-3/5 to aid the testing by producing a significant gain to amplify any noise on the signal path.

Previously we've created a couple of 'useful' patches, which we can play our guitar through. We are now going to create 'Noise Check'. If you have the volume turned up on your amp I do NOT recommend playing ANYTHING through this patch. It is NOT level matched. It is NOT worried about noise. In fact it is encouraging it!!! It's flipping LOUD and flipping NOISY!

This is going to be fairly easy. Copy the 'Clean' patch into patch a spare patch, and rename it. Turn on the pre-amp. Any pre-amp will do but I recommend a JC120, as we want to add volume but to try and avoid adding too much noise. Turn volume up to 100, bass = 100, middle = 100, treble = 100, master = 100, presence = 0, bright = off, gain = high any other settings don't matter unless you are on 'Line (Headphones)' in which case make the mike position = centre, mike level=0 and direct level=100. while we are about it also set up the NS. NS off, threshold = 100, release = 0. Finally as a safety in case you accidentally select the patch in the future (I have!) change the master level to 0 (Yes ZERO). Store the patch and we are ready to go. Whenever you need to use the patch just remember to turn the master level back up to 100.

Right now it's time to start checking out the GT-3/5...for the moment I suggest using just the amp and the GT-3/5—don't connect a guitar to anything yet.

Turn the amp volumes down (or switch to standby on amps like the Mesa Boogie MKIV), and bring the foot volume back to minimum. Connect up the stuff. Turn your amp back up again. There will be a small amount of hiss coming from the GT-3/5. I'm afraid to say that the noise you hear is that of the GT-3/5 itself. There isn't much you can do about this.

Now rock forward on the GT-3/5's pedal. Glug. A lot of noise arrives in the form of hiss. Turn on the noise suppressor—the hiss should return to the same level with the foot volume down. Turn the NS off again. This level of hiss you are now hearing will only be present on patches that use extreme high gain and I personally wouldn't recommend that. Bring the volume pedal back to zero. Turn the guitar volume to zero—make sure it really is.

Then plug the guitar into the GT-3/5. Now bring the volume pedal back up again. The noise you get should be precisely the same. If so, then that's good. If it isn't then you need to work out if it is your guitar, the cable or the GT-3/5 itself. Try another guitar, try a different cable and so on. My GT-3 sounds the same. If anyone gets a different result from this then please let me know. Bring the foot volume back to zero. OK now don't play anything and turn up the volume on the guitar. Gently bring up the foot volume. I don't recommend bringing it up too far as you will start to feedback—I get about half way before I give up. There should be no more noise than was individually generated by the GT-3/5 or your guitar straight into the amp. Great. Things are shaping up.

OK, I am fairly happy the Guitar -> GT-3/5 -> Amp set-up is now OK. So I'll press on with the rest of my equipment. Volumes down and unplug the GT-3/5 including from the power supply. Keep the equipment down to just the Amp plus whatever we are testing at the moment.

### Samson Wireless

My Samson Wireless is rated at better than 100dB below full volume. i.e. -100dB so I am not expecting any new noise from it. The Samson wireless has two outputs one XLR one 1/4inch jack. If I use a balanced XLR -> 0.25" jack cable to the input on the GT-3, the input level drops by 12.5-25%. The sound is also a lot thinner. Just be wary of such set-ups and try to avoid them.

OK, all volumes down. Power off and unplug the GT-3/5. I have the wireless transmitter off. I plug the receiver straight into the amp. Volumes up again. Argh! I get a mains hum. Instantly suspecting a ground loop with no evidence I try a broken shield cable. No difference.

Hmm. So now I decide to go through the GT-3/5. Again volumes down in between checks. Plug the GT-3/5 in with 'Noise Check' dialed in. Nothing in the input. Amps up. Foot Volume forward to remind ourselves of the noise we

expect with no volumes up. Plug in the wireless and feed the output signal to the GT-3/5. Volumes up—should be no change. Any problems here might indicate a problem between the GT-3/5 and the wireless. Well. There is no change—the hum is still there! (you get the idea anyway). I now replace the GT-3/5 to amp cable with a broken shield cable (broken at the amp end). Wow. The humming has gone. I've had a ground loop somewhere.

What had happened here was I hadn't yet come up with the advice I gave about drawing a diagram to help identify ground loops. I hadn't realised the rack would be acting as one giant ground! Even though the wireless system has a 2 wire power lead, it was being earthed through the rack. Thus if I disconnected the Samson and put a cable direct from the guitar -> GT-3 the noise came back! I did say funny things can happen with electronics. The basic rule I found was that with the guitar directly cabled to my GT-3 I require full normal cables to the amp. But if the Samson is plugged in I require broken shield cables to the amp.

The solution is insulating the equipment from the rack. There are two parts to solve here. Firstly to stop the front panels of the units touching the rack, and secondly to avoid the fixings (the screws) from defeating the first part's solution.

This is how I did it.

To solve the first part I purchased a bicycle inner tube, and cut out two pieces. Each piece's length was the height of the rack. I then split each piece down 1 side. Each piece was then wrapped around one-side of the rack sub-frame (where the screw 'pods' are). This was then Superglue'd to the rack along the outside front edge. Looking down from above the rack, the vertical profile of what I have done looks like this:

```

_____—inner Tube
/
|{{{}}—screw 'pod' which the screws go into.
|OOOOOO—rack sub-frame (
\_____^—Super glued on this edge!
```

Front of Rack

I then cut holes for each of the screw points on the rack. These holes were square and were roughly the size of the screw pod opening. If you just slit the tube, rather than create a hole, then when you put the screw in and tighten it up it snags the rubber. So make sure the holes are a little larger than the screw. Part one of the problem solved. As the front facia of the rack equipment are fitted in front of the inner tube you don't even notice that its there. Being, black the inner tube is quite hard to see. BTW, inner tubes are chalked inside. Remove this chalk dust with a damp rag before putting it \*anywhere\* near your equipment.

## Section 9 Noise Elimination

---

OK problem part deux. This was solved through the use of some plastic bolts of similar size to the metal ones I had been using on the rack. For those living in the UK, I got the plastic bolts from Halfords (for everyone else this is sort of a car part/accessory superstore). They are car number plate bolts! This is why two are orange and two are grey!! heehee.

The plastic bolts are slightly harder to fit than the metal ones and you have to be a little more careful about avoiding cross-threading them. Thus what I did was to re-fit the equipment using the original metal screws and then I went across the rack changing each metal screw in turn for a plastic one instead.

The plastic bolts seem fairly sturdy but the concern is obviously whether or not they will shear if the rack is mishandled during transit. Only time will tell on this one, but I do carry some plastic bolts, and the original metal ones as spares. Et voila! Problem Solved!

Alternatives are use a piece of plastic corner moulding and cut it to size (my new rack set-up). Another alternative is to use rubber grommets.

Result! Now this may all sound a bit Heath Robinson, but apart from the orange and grey screws it looks OK and it does the job! Mind you I am leaning towards liking the different screw colours now anyway! Let's face it, its not how it looks its how is sounds that counts. (Trust me it does look fine!)

If you have any other effects, use this same method. Test alone into the amp, test into the GT-3/5 then the amp, and finally guitar into unit with volume down and then volume up. Don't forget to zero ALL volumes between configuration changes and to bring the amp volumes up first and work backwards down the chain. When the guitar is in, I don't recommend bringing the volume up beyond half way if that!

### Korg DTR-1 Tuner

Again, same checks with my tuner. The DTR-1 on its own produced some noise (ground loops aside) and this was more pronounced with the guitar and GT-3/5 in line. I don't need the tuner on the signal path. If I can spur to it then I can avoid the noise. The Samson provides two outputs—One balanced XLR and one unbalanced 1/4" jack. As I said previously the sound from the XLR -> jack -> GT-3/5 does not sound good. So I'll use the unbalanced outputs for the GT-3/5 signal feed and the XLR balanced with an XLR->jack cable to feed the Korg DTR-1. And there you have it. The noise of the Korg no longer interferes in the signal path. I must say many people find the DTR-1 noisy and isolate it in this way.

### Palmer PGA-05 Speaker Simulator

Again, I try the same checks with both channels of the speaker simulator, (which is deathly deathly silent—but there again it is my most expensive piece of kit at 350 UKP and let's face it—if its good enough for Van Valen [no pun] the its good enough [no pun] for me!) and finally I check the Cry-Baby Wah. Wow. This is a very quiet piece of kit, except for the footswitch at high gain that makes a definite thump. Still not a problem because noise check + full volume is an unrealistic situation!

Any device fails you need to check to see if it is an interaction problem (i.e. ground loop, level matching, impedance) or just a general unit problem (like my DTR-1).

### Final Check

Finally, let's build up the system, with final volume/noise checks. The final noise check is quite simply just volumes down—make the configuration change—volumes all the way up. There shouldn't be a noise problem by this stage, but it is possible for the units to react to one another and cause a ground loop.

1. Guitar—Amp : vol check—OK
2. Guitar—PGA-05—Amp : vol check—OK
3. Guitar—GT-3—PGA-05—Amp : vol check—OK
4. Guitar—Cry-Baby—GT-3—PGA-05—Amp : vol check—OK
5. Guitar—Wireless—Cry-Baby—GT-3—PGA-05—Amp : vol check—OK

Finally add in the spur for the Korg DTR-1 tuner. Vol check—OK.

Wahey! We've done it! Oh hang on a mo—I've got to connect the Palmer PGA-05 up to the mixing desk. For this I use the simulated output and the balanced XLR connectors.

Argh. There is a great big hum. The Palmer has ground lift switches so I punch them in and all is now OK. Must have been a ground loop there. That's no great surprise.

At last! It's finished! It's been a long haul, but at least the system is now very quiet. Yes, it possibly could be quieter still but now you are talking serious money, as it will mean buying equipment/pickups with a better Signal-Noise ratio, possibly even better even more expensive cables as well.

Anyway, as a final word on this subject I hope you have found this useful. Hopefully we all now have a better understanding of where the noise is being generated and how we can solve it. I also hope that everyone is now happy with a noise free (!?) system.

Well, We have covered a huge amount here; only about half of it really covers the GT-3/5. However, I hope you won't



be disappointed; indeed, I was about to throw out my GT-3 because I thought it was too noisy—but having eliminated noise from my system (which cost very little!), I realised the GT-3 was great! Anyway...enjoy!

### Removing Unwanted Distortion

Remember we took a good look at the meters? Well, the GT-3/5 level meters are your friend here as well. In section 7, I said make sure NO SIGNAL EVER PEAKS ABOVE 95%. Well I meant it. What happens if you go too far is the signal exceeds the GT-3/5's limit and clips. As I have already mentioned, this clipping will be heard as distortion, which may be just little clicks or a crackle.

Removing this distortion is fairly easy. First, re-read section 8 where we set up the master level appropriately, and found out what the target effects chain level is.

The GT-3/5 manual suggests using the meters to identify clipping by any device and turn its output down. However, clipping may not manifest itself against the device that is at the root of the problem. It is most likely that the Master Output clips, but the other effects don't. You may be tempted to reduce the master level, but that is not the appropriate way to do it. What is happening is that you are putting a boost on one of the effects in the middle of the effects chain. This will not show up as a clipping in the middle of the chain. If you use the 'Clean' patch to find out what your target master level, and target effects chain levels should be, you can then identify which effect is boosting the volume above the expected effects chain level and turn it down.

As I said—although most clipping appears to be at the output, turning down the master level just isn't the appropriate way of going about fixing it. What will happen is that one patch will be loud, another of your patches will be quiet, and you really haven't gained anything. Indeed you are effectively introducing another problem—that is one of uneven output levels between patches. This is exactly what we fixed in section 8.

We will now take a look at how we can identify clipping at any point in your system and eliminating it—I will also be going right through into Cakewalk or Sound Forge on the PC as well to show you how you can identify clipping in the sounds you are recording.

There are four places that you are going to be able to detect clipping, elsewhere than on the GT-3/5. These are:

1. The main output—either Speakers (or) headphones.
2. The mixing desk meters, monitors or main outputs.
3. On the PC once you have the .wav file.

We will look at each of these in turn.

© Copyright 2000-2002 Barry S. Pearce et al.

Again, there is a huge variety in equipment and possible configurations out there so I will talk about my equipment so that you can relate my experience to your own particular situation.

The filtered output from my Palmer PGA-05 goes via 2 XLR balanced patches into 2 channels of my Peavey RQ200 six channel mini console. I have one set of main outputs from the console going to another Alesis RA100 studio reference amp and then into a pair of Alesis Point Seven Shielded Reference Monitor speakers. The other main outputs go to my PC audio in. I have a Creative labs SB Live, under Windows 98. I then use Cakewalk for recording/sequencing and production and Sound Forge for .wav file editing and CD Architect for audio CD production. I also have a set of headphones coming from the RQ200 to provide monitoring. In addition to the above I use an Alesis SR16 drum machine, which is connected via 2 unbalanced cables into one of the RQ200's stereo channels. Just for curiosities sake, for vocals, I use a Samson S12 mic, which goes direct to the mixing desk.

As we have said before, hard clipping generally manifests itself as clicks, crackles, or general distortion and soft-clipping as more of a light->heavy overdrive type sound, or in one case of a clip on a low frequency on my system it sounded very similar to speaker rumble or rattle! The point is that it is fairly obvious once you know what you are listening for—and if you don't know what to listen for you will certainly be unhappy about your sound already. Maybe it sounds a little crunchy when you wanted clean.

To identify the cause you need to run through your system bit by bit. Clipping will usually be caused by one unit's output being too high and overdriving the input of the next in line. However, be aware that with units like the GT-3/5 it can be completely internal, and also you may have more than one unit clipping so cutting back may not solve the problem completely first time.

I would like to point out that if a battery is running out of power, and that battery is used in one of your units, the clipping that is caused is unlikely to be resolved by reducing signal levels. So, before you start make sure that ALL your equipment is correctly powered and that any suspect batteries have been checked and/or changed.

One last thing should be said before we start. It is possible for bad cables to cause a distorted sound, even if they passed our checks in above. The only way to check these is individually by driving them with a 'loud' unit direct into the amp with little else in the way. However, I should say this may not identify them; as I have said before strange things can happen with electronics!

## Section 9 Noise Elimination

---

### Speakers/Headphones

OK, so where do we start? What we do here is work our way backwards through the system. I didn't have a problem here, but I'll take you through the steps I would use so you can see the approach you should take.

Listening to your speakers you can hear something which you believe is clipping. Start by turning down the amp. Is the clipping still present or has it diminished/vanished? If problem goes away then you are clipping the amp internally, or driving the speakers too hard. If not, then try another set of (preferably the same) speakers at the same level as before. If these are OK it is the speakers which are the problem. If it doesn't go away turn down the device feeding the amp. Keep the volume up, and re-check. If the problem has gone then you were driving the amp too hard, or possibly the output of the device you turned down, but this is less likely.

My RA100 is a very sturdy beast, but it will clip if pushed. It warns about this, and ANY other non-linear operation (such as extreme out-of-spec loading—e.g. too many speakers wired in parallel or a short across the speaker terminals) by flashing the red clip LED of the channel in question. If your amp or speakers have something similar, then check this as a first step. If these are flashing then turn down the input slightly to avoid clipping. Some units have the clip indicators cut in 2dB or so before actual clip occurs. On these units it is desirable to have the indicator blip occasionally, however frequent blips should be avoided. Other units only indicate when clipping actually occurs. Some units only indicate clipping when as much as 10dB has been clipped. Obviously you will hear this even though the unit hasn't indicated a clip. Make sure you trust your ears, and these procedures as they will work regardless of the clip indication provided. According to my RA100 manual, if the unit has been running for a long time running under a heavy load the output protection circuitry may have kicked in. Alesis recommend turning the power off for a minute or two and then checking to see if the problem has gone away. If it does they recommend checking for thermal problems, such as obstructed air-flow. Indeed if you use too low speaker impedances or the unit starts to overheat due to poor ventilation it will limit the signal by clipping. This results in distortion but it still produces some sound. Again, check your amp's manual to see if something similar can happen.

Right then. Assuming you still have the clipping and its not been solved above we continue to work backwards down the chain.

Next in line in my set-up is my Palmer PGA-05. The input to my PGA-05 is linked direct to the output via a THRU connector. This thru link has no volume control and works even when the power is down. I would assume therefore

that this is a hard wired thru connection. I therefore don't believe that this unit is clipping the amp.

So, continuing to move backwards, we come to the dear old faithful GT-3/5.

The GT-3/5 has an external volume control. It is possible that this is clipping the PGA-05 input, and thru. Turn down the volume control significantly; say by 25%. Again check to see if the problem has disappeared. If there is no change then maybe the GT-3/5 is clipping internally. We looked at checking and resolving any GT-3/5 internal clipping in section 8 so give yourself a quick re-read if you need to. The meters on the GT-3/5 might well show that we are in fact clipping the GT-3/5 input.

Let me take you back to where I said that if you have an input signal that clips the GT-3/5, then you need to turn down the output level from the device that is feeding your GT-3/5. If the unit prior to the GT-3/5 is your guitar, you could turn down the volume control. This isn't very satisfactory. Instead I recommend that you check your pickup outputs first (see above) and then buy a simple volume control device or a decent compressor/limiter. I recommend the Behringer Composer Pro. Indeed this solution can be used whenever you cannot control the output levels of the preceding device. Obviously the device you use must have a better input range and headroom than what it is driving or you will merely just repeat the problem.

The output of my Cry-Baby Wah is fixed. I believe it is governed by the input though—i.e. it has unity gain. If this clips the GT-3/5 input I can place a compressor/limiter after it which has a higher input limit than the GT-3/5, or even a simple volume control device.

OK, so we are working back through the chain, next up is my Samson Wireless Receiver. This has an output volume control knob. If you recall in section 8 I talked about level matching. I set-up my Samson output level to be the same as my guitar so there is no difference between the two. It is worthwhile checking at this point that this really is the case. If it is, the guitar should clip the input as well, and turning down the guitar volume control knob should help identify the problem. Anyway, back to the Samson, again we check for clipping of the WAH by turning down the output level.

Wireless systems also have two more places they can clip. The air interface signal may be too strong (!) or you might be clipping the input of the wireless transmitter. Either, can be checked by bypassing the wireless system with a cable. Also, the wireless transmitter may have its own level control (a belt pack gain trimmer - as does the Samson), which you can turn down.

One problem I do have here is that the Samson receiver has a set of LEDs indicating signal strength. These are marked



up to 125% with 100% representing unity gain. The 125% is in red. Samson state that its OK to have this light up occasionally. Mine lights up a good deal more frequently than I would like, although my system appears not to be clipping. The transmitter level pot is at minimum. Yet I still get the problem. The output volume control does not affect this as it is after the air interface, and this is showing signal level over the air interface. I found that my humbucker was too close to the strings and was clipping the transmitter. I have now altered my pickup height and the problem has been resolved.

If you use an effects loop—or a loop of any kind...and I don't mean feeding the GT-3/5 into the return when you didn't use the send... Then treat this just a normal 'mini chain', using the same approach as above. Before you do however, place a cable direct from send to return—check for clipping. Any clip here will be because the return/send signal was already clipped, or (and not so believable) the send output is clipping the return input.

If you are using headphones, use exactly the same approach as above.

OK, that's one end sorted. Now let's take a look at the other end; the mixing desk and recording.

### Mixing Desk

Essentially the mixing desk will provide two mechanisms for detecting clipping; firstly through any meters that it may provide, and secondly through any headphones, monitor speakers, or output speakers.

Detecting clipping through the headphones or speakers attached to the mixing desk is exactly the same as discussed above. Here we will look at using the meters.

With Gain/Faders on the individual channels the aim is normally to aim for unity gain and then use the master level to control the output.

My mixing desk only has 1 set of stereo LED meters. These measure the output level after the master level fader. The scale is -24, -6, 0, +6, Clip. The -24, -6 and 0 LEDs are green, +6 yellow and Clip are red.

To obtain unity gain the faders are set to unity (0), the master is also set to unity (0). Then watching the LEDs you raise the input gain until you have 0dB on the LEDs often, but no peaks over this. At least this is the usual set-up. My Peavey RQ200 recommends setting up as before but this time raising the input gain until clipping just starts to occur, and then backing off to ensure no clipping takes place. Clipping as they define it is when the red LEDs light up. This can be fairly dim if the clip is quick, so a slightly dim room is a good start here. I suppose the Peavey theory behind this set-up is by using the loudest signal possible

without clipping, you are getting the best Signal-Noise ratio possible. Fair dinkum.

If you are clipping with all faders at unity and the input gain at 0 then you might be tempted to back off the channel fader. If you can, try to avoid this. You might still be clipping the input that isn't necessarily metered on some mixing desks. Instead go back up the chain and turn down whatever is driving the desk.

Well, that's the desk done. Now the only problems that can occur will be with what the desk is driving. If your PA speakers are suggesting clipping, start at the far end with the PA speakers and work backwards as per the speakers above. The other thing the mixing desk is likely to be driving is some recording equipment such as a sound card on a PC...

### In Sound Forge/Cakewalk:

Problems here are slightly harder to find, due to the length of the chain involved, but are often easier to see. It is possible to see a clipping here that lurks way down your chain, even though you can't hear it, and it hasn't been indicated anywhere else. Indeed, what I relate to you now is an actual problem I had. The techniques will be similar for other PC set-ups and other wave editing/recording software, such as other version of Cakewalk Pro Audio, Guitar Studio etc, SONAR, Steinberg Cubase VST, Emagic's Logic Audio, DigiDesign's ProTools etc etc etc.

Right then, we can assume that the mixing desk has been set-up correctly as I detailed in the above. So the output meters are showing around 0dB.

The PC is set up in the Volume Control dialog box to record from line in on the SB Live. The fader in the dialog box is the same as when windows was installed—about 85% of the way up. For reference I set line out playback to mute to avoid any problems with feedback.

OK. I run up Cakewalk. I have two tracks set to record from the SB Live. Wave Left & Wave Right. I set the record buttons, and then bring up the mixing desk in cakewalk. There are now meters showing for the two channels I have set to record. Playing the guitar now will show me the levels being received.

Right, I now alter the Master Out fader on the mixing desk so that the clip indicators in Cakewalk didn't show up. OK. I set the record off and record some guitar stuff.

I then pulled the wave file up into an editor (in this case Cakewalk's own). It is in the wave editor (by zooming in slightly) that you will notice the clip. If you are driving the card too hard you are likely to get a clip around 95%. But don't always expect this. It is possible that a unit elsewhere in the chain is clipping. This will be should be a series of peaks all being what looks to be 'chopped' at the same level.

## Section 9 Noise Elimination

---

Be careful though, remember that peak limiters, limiters, and compressors can alter dynamic ranges to give this sort of pattern. It is best to check for clipping without these devices in the way if you can.

In the wave editor it was very noticeable that although I had a nice loud signal there was a significant clipping at about 95%. As I just said, this is indicative of driving the card too hard. But the clip indicators didn't show. Well, that's Cakewalk for you.

Whilst Sound Forge still doesn't show clipping, I used it to monitor the setting up of record levels, as SF gives the peak as a figure not just a meter (you have peak hold!). Here SF showed a peak at -0.4dB. Seems to be a bit tight. Indeed on playback clipping is evident. I reduce the Master Out fader on the mixing desk (the real one not the Cakewalk one!) so the peak is now at -2dB. Don't worry about changing the levels in the Volume Control dialog box in windows—If you are driving the card too hard it won't matter what you do on windows.

So I turn down the master fader. Most of the problem has been alleviated. But even with a max peak at 87% there appeared to be several peaks that looked 'chopped' at this limit. I am still suspicious of a clip. Indeed, with this particular piece I am playing it is around these bits that the monitor speakers show some kind of distortion/rattle.

Hmm. There is so much headroom that it can't be the mixing desk output, and the mixing desk certainly has been correctly set up so its not clipping on the PC—it must be elsewhere down the line.

At this point I checked the sound from the speaker cabinets—did this clip? I don't think so. Now the difference here is that the two signal paths split at my Palmer PGA-05. So I turn down the filtered output levels—this affects the level going into the desk. I check again and the clip is still present. I reset the volume (no I didn't balance the desk for the new level in case it was the desk input that was being clipped). OK, so the next unit down the line is the GT-3—hang on, this feeds both signal paths - the clip cannot be here can it? I've checked the GT-3 meters and everything is fine. OK. But you haven't got a meter showing the output AFTER the external control knob. If you turn this to zero the master output level which is shown on the meter remains—it doesn't drop. Therefore you need to be careful as you have no real indication of the actual output volume from the GT-3.

Maybe I am driving the PGA-05 too hard. But how? Surely the amp would amplify the PGA-05's problem. The trick lies in the fact that, as I said earlier, the PGA-05 has a thru jack and filtered outputs. If you switch the unit OFF the thru jacks keep working. So I turn down the GT-3's level and re-

record. The problem has disappeared from both the recorded .wav and the monitors.

I can now set up the GT-3 so it doesn't clip the PGA-05, the PGA-05 so it doesn't clip the desk and finally use the Master Out fader on the desk to avoid clipping the sound card.

Although you may not be running such a set-up, you may have a similar set-up with a digital multi-tracker such as the Roland BR-8 or a Tascam. The principles are basically the same, the details just need adapting to your particular set-up.

You can also help yourself avoid clipping by knowing and understanding the technical specs of your equipment, where equipment specifies max output/input levels and nominal output/input levels you can see whether or not one unit will overdrive another.

Phew. That covered a lot as well. I hope by now that your system is now nice and quiet noise wise and additionally is now free from clipping.

Please let me know if you have any further advice. Especially regarding specific units you have had a problem with which needed a slightly different solution than that which I have described.

## Noise Elimination—Recording onto Computer

---

Well, this is going to be quite a quick follow up to our discussions on noise elimination.

If you are recording near or onto a computer it is possible that your pickups (especially single coils) will be picking up a lot of noise. Most (probably 80-90%) of that noise will come from the computer monitor. Thus whenever you can, switch the monitor OFF. What I do is set the software recording, obviously giving myself plenty of time before I need to play. I then switch the monitor off – let the noise subside and then start recording. When I've finished recording I then switch the monitor back on. This can eliminate a huge amount of noise.

## Hi-Tech Noise Elimination

---

Many of you have computers with software such as Sonic Foundry's Sound Forge. Did you know that SF comes with a spectrum analyser? Even if you don't have SF then there are a number of freebie analysers out there on the web. You can use these spectrum analysers to assist in eliminating noise rather than turning up volume controls. It is much more accurate and you instantly get to see if something you plugged in has caused a ground loop or not.

# Section 9a Noise Suppressor

## Using the Noise Suppressor

The noise suppressor is probably the most used least understood, least well applied device in the GT-3/5. Some might even say it is the most BORING!! We are going to take a look at what it actually does, we examine the difference between suppression/gating and filtering. We will then look at using the NS for problem solving, i.e. in a noise reduction capacity and finally we will round it all off by using the NS as an effect in its own right!

Let's get this out the way now. Suppression = gating. Why Roland called it a noise suppressor instead of a noise gate I don't know; they are basically one of the same thing. Noise gates alter the volume of the signal to suppress noise. A noise filter on the other hand only operates on a particular frequency band. A noise filter is nearer to EQ (such as a low-pass filter) than it is to a noise gate. The noise gate is also known as an expander—we will see why in a mo.

## Noise Gating

Sound masks noise. When you play your guitar most noise becomes inaudible—it is masked by the overwhelming level of your guitar. However, as the sound decays and signal level lowers the noise more prevalent.

This noise is quite annoying and detrimental to our sound. We could use a foot volume pedal or an amp volume knob and turn down the volume so the noise can't be heard but with an instrument like a guitar you'd have to be pretty darn quick. This is in fact what a noise gate does. It is nothing more than a bag of tricks that monitors the signal level and turns down the volume once it reduces to a particular level, and then turns it up again once it exceeds that same level. By doing this a noise gate helps remove noise and hiss.

The threshold is the level at which the volume will be turned up or down. Think of the noise gate literally as a 'gate'. As long as a signal with a level greater than the gate threshold is present the gate remains open, and when it lowers below that signal the gate closes. Once again when the signal level then goes above the threshold it opens again. How fast the gate opens is called attack time and how fast it closes is called decay time (or release in GT-3/5 terms!). The threshold level control is similar to the squelch control found on radios and wireless equipment.

Earlier I said that a noise gate is also known as an expander. Let's say I have a signal with a level of 10, and a noise level of 2. When sound is present the noise is masked and the signal has a dynamic range of 10. If we were to chop the signal so that no noise is present we reduce our dynamic range to 8. Using a noise suppressor to make the unmasked noise disappear we no longer need to 'chop' the signal and thus now have a full dynamic range of 10 again. Hence the noise gate has 'expanded' the dynamic range of the signal in a complementary way to which a compressor reduces it.

Hence the terms compressor/limiter and expander are all associated.

## Associated Problems

**Noise gating is no panacea**, and there are some drawbacks.

The NS works far better on signals that don't need much cleaning up. If you have a low noise signal, you only require a low threshold to remove the noise, and vice versa, a higher noise signal will require a higher threshold. However, it isn't just a case of pushing the threshold up – this can bring with it other problems. If you recall from our discussion above, when the signal drops below the threshold the gate will close. If we have low noise and therefore a low threshold the guitar will decay a long way before the gate cuts in. Conversely if we have a high noise signal then we need a high threshold. When the guitar decays it reaches the threshold and the gate closes before the guitar has decayed properly. This leads to an unnatural sounding decay. Although the decay/release time is adjustable, you have to remember why you altered the threshold to start with. OK. Let's say we are back at the high threshold again. In order to make the decay sound more natural we increase the decay time. What happens is that as the sound decays, the threshold is crossed, the gate starts to lower the volume but this is much more gradual than before. However, the noise becomes more obvious as the decay continues. This is what we were trying to avoid being heard to start with!

What needs to be remembered here is that eliminating large amounts of noise with a gate will eliminate large amounts of signal, (unless you want the noise to be heard!). This is why you should try to eliminate as much noise from your system that you can before looking at noise gating.

One other problem is associated with a low noise signal but a decay time that is too short. As the sound decays and eventually drops below the threshold the gate triggers and closes. If the gate closes too fast an unnatural decay will result. This is fairly easy to remedy by increasing the release time.

There is final problem associated with guitar decay, is that it isn't uniform, and tends to become erratic near the end. If it hovers too much around the threshold then a chopping can start to occur and the gate opens and closes. This chopping causes a chatter. If you experience this problem try raising or lowering the threshold slightly to get a cleaner 'cut'.

Right. Then now armed with this information go and re-program the NS for your system on patches 'Clean' and 'Ext FX Loop'. You should find the same setting will do all three. No great surprise really. They are almost all the same!

## Section 9a Noise Suppressor

### The GT-3/5 Noise Suppressor

The setting for the NS on the GT-3/5 can be found under <Master>.

The NS does not clamp down to 0. The Noise Check Patch at full whack proves this. What is happening here is that the NS has a minute leak, which will only be noticeable if you run the GT-3/5 at full whack, and to do so will mean you are clipping something terrible. If you are prepared to sound that bad then why worry about noise!

The gate attack time is not variable. Testing the unit appears to reveal that it appears to be very fast and well matched the guitar. It is likely to be around 1ms.

### Using the NS for problem solving:

To use the NS for noise reduction patch it in after all the noisy effects. The usual place in the GT-3/5 chain is before the FV (and thus before the DD/CE/RV which don't really generate much noise).

Now to set it up.

First turn down the guitar volume. Turn the NS off. You should hear some noise. Now turn the threshold to 0 and the release time to 0. This ensures that when we raise the threshold the noise disappears instantly. Turn on the NS and there should be NO effect on the noise. Now slowly raise the threshold. As soon as the NS cuts in and the noise disappears—STOP. This is a basic NS threshold setting without the pickups picking up(!) noise. This effectively is the point where your 'system' noise has been masked. Now turn up your guitar volume—the NS should open up allowing noise to be heard again. This is because your pickups have added more noise. If they don't, then create some noise by touching the strings so it opens up. If it immediately closes again you have found the right threshold for your guitar as well! Many of us however, will have to continue increasing the threshold until once again it clamps down. This is the right setting for the current set-up.

Now, strike a chord. Keep increasing the release until you get a natural decay, without chopiness. Once you have found the correct setting with a chord, try again with a single note on various strings and confirm the decay is natural. Adjust as necessary.

Each patch has different effects in use and a different amount of noise associated with it. Set up the NS on each patch using the same method above. It will probably be different in every case. Also, switching between different pickups may require changing the NS settings.

### Using the NS as an effect

Now I'll bet you hadn't thought of exploiting the NS as an effect eh? Well, although its use is limited it can add some real punch to a patch.

Pick up a nice distortion patch. Make sure it has your normal NS setting (or weaker!) on it. Now play a real short blast of a chord—say up/down stroke in quick succession and mute it as soon as the chord has been struck. Hmm. Bit of body and string rumble eh? Would be nice to give it more punch in and punch out eh?

OK here goes —set the NS threshold to 100 and the release to 0. Now strike the chord in the same way again. Wow. It gives it a real staccato, cutting edge effect with loads of punch! I call it 'Chop'! :-)

I think this setting tends to work better with a hard edged really crunchy distortion patch but feel free to experiment with others!

\*\*\* Now that will make your friends  
listen when you play! \*\*\*

A friend I know uses this on a Roland GP-16 and a Boss VF-1. He says it's great for distinct chord chopping on a Therapy? song that they play.

Whilst the GT-3 can use the the NS:Threshold and NS:Release as control assign targets, the GT-5 cannot. Therefore apologies to GT-5 owners but this next patch is GT-3 users only.

#### GT-3

Now for a nice little treat! Here is a patch called 'Metal Chop'. This patch uses a JC-120 pre-amp and the Metal 1 distortion. One thing that can make all the difference to a distortion patch is the \*other\* effects you add to it. I was just looking through the quick settings (while I was producing the overview above) and I came across a reverb setting 'P8: AMBIENCE'. So I added it to the patch—I think it sounds cool. You may have noticed the NS is set to threshold=100 and release=0. However, what you probably haven't noticed is that there are two control assigns—Assign 1 & 2. These are set-up for the SUB EXP PEDAL on the GT-3, but feel free to change them to match your set-up. What I needed was to drop off the 'chop' slightly so it didn't stifle a single note lead line. So with the pedal forwards I get full chop—with it right back I am given room to breathe. You may feel you need to come back a bit more—perhaps more on the release time than I have given it here. So what do the assigns do? Well the first one changes the threshold, so as you rock back on the pedal the threshold reduces and as you rock forward it increases. The minimum it goes down to is 80 so it is still quite a tight NS. The second assign then does a similar thing but rather than the

forwards = increase it does the reverse—the GT-3 is more than happy to do this for you. So as you rock backwards the release time increases from 0 to 20. As you rock forwards it decreases to 0. Oh, a one more quick thing on this—The CTL pedal is set up to enter/exit manual mode.

I stumbled on the Beastie Boys, "No Sleep 'Til Brooklyn" riff while creating this patch—try this with (all power chords root 5th string—3 notes/strings):

A5 A5 C5 D5 D5 E5 C5

and repeat ad-infinitum. Simple. But it shows the patch off if nothing else!! (And NO I am NOT a Beastie Boys fan...)

the notes, all you hear will be varying levels of noise.

In section 23 we will be looking at using the control assigns, in combination with the internal wave, and EXP, CTL [GT-3]SUB EXP, [GT-3]SUB CTL, [GT-5] EXP/CTL1 and [GT-5]EXP/CTL2 pedals to produce some volume related real-time dynamic effects. It just gets better doesn't it!!!

If you have any other great NS settings please let me know! Hopefully the NS is no longer misunderstood, and maybe just a little less boring!!!

### Effects of GT-3/5 NS Parameters

It can be easy to set the GT-3/5 to an 'extreme' setting without quite realising how extreme the setting is, and how it will affect your sound. So let's look at how too high or too low a setting will affect your sound.

#### *Threshold too high*

This will stifle your sound, if strings are picked quietly, pinch harmonics can be strangled, and chords can disappear before your very eyes.

#### *Threshold too low*

This is probably the least drastic of the effects but results in making the use of the NS a joke. The problem here is that the NS will never close, resulting in the noise remaining present.

#### *Release too short*

Similar to setting the threshold too high it will bite at the guitar's decay, shortening it, resulting in an unnatural sound.

#### *Release too long*

Very similar in effect to setting the threshold too low, except when the gate shuts, the noise remains present for a significant length of time. This means that the guitar decays, the noise becomes apparent and sometime later the noise is faded. This can make the effect of noise even more pronounced. Alternatively the gate may only partially shut between notes/chords therefore partially defeating the point of having a noise gate. Instead, between



## Section 10 Speaker Simulator

### What is it?

Roland hasn't really described what this is or really why you would want to use it. So I will fill in. The Speaker Simulator simulates the effect of a speaker cabinet that is being mic'd. This is essential when trying to get a reasonable sound through direct in recording and when using headphones.

Why? The characteristics of a speaker (in particular its frequency response) will alter the sound significantly. Given that a Celestion G12L-75T has a frequency response of 85Hz-5.5kHz you can see why. Distortions sound really fuzzy unless the upper frequencies are reduced either by playing through cabinets – or in this case – using speaker simulation.

In essence the speaker simulator is just a bit of EQing. Turning on the speaker simulator will result in a loss of higher frequencies—very much as you would experience from a low-pass filter.

The speaker simulator provided on the GT-3 is fairly basic and is very limited. Roland haven't seen fit to tell use what is being simulated here but I would guess at something like a closed back Marshall 4x12 or 2x12 close miked with a Shure SM-58 (dynamic mic) or such like.

The speaker simulator on the GT-5 is much more versatile and in fact is quite full-featured, allowing a complete choice of cabinet types, and whether they are mic'd by a dynamic or a condenser mike. For those not in the know, dynamic mikes tend to colour the sound more, whereas a condenser mike will have increased upper and lower frequency response, often a flatter frequency response when compared to a dynamic mike, apart from a fairly characteristic peak in the upper frequencies.

Apart from the cabinet type choice on the GT-5, both the GT-3 and the GT-5 speaker simulators have three parameters that help change the 'colour' of the sound. These will tend to mainly affect the high frequencies. They are mic position, mic level and direct level.

### When is it on?

This is a MAJOR source of confusion. Let me make this absolutely clear.

#### GT-3

The speaker simulator is only ON when <Global>[Your Setting?] is set to 'Line (Headphones)' AND you are using one of the preamps. If you do not have a preamp turned on then what you will hear is the same as though the unit was set to 'Power Amp (Stack)'.

#### GT-5

The GT-5 is much more flexible than the GT-3 and the speaker simulator on/off is stored with the patch in the same manner as any other effect. It is not affected by the preamp on/off nor is it affected by the <Global> Utility function [Your Setting?]. However, a word of warning to the wise; Page 32 of the manual describes a <Global> setting that defines the speaker simulator as ALWAYS ON, ALWAYS OFF or on/off based on patch data. Be sure to set this parameter for your particular preference. If you use patches from the Internet or other sources, be aware that the unit the patch was authored on may have been configured to have the speaker simulator permanently on or off.

#### GT-5

### Simulator Type

The GT-5 has a choice of 14 different cabinet configurations to choose from. It must be said – this is a NICE speaker simulator – very impressive. Page 42 of the official manual lists the various types and page 43 suggests the best match – although don't be afraid to mix and match preamp and speaker sim as you wish. There is certainly no harm using a Clean TWIN preamp with an MS Stack.

Most of the cabinet choices are marked as being 'on' or 'off'. At first look this seems strange. However, the explanation is fairly simple. Those cabinets configurations marked as 'on' simulate the sound obtained from a dynamic mike, whereas those marked 'off' simulate a sound obtained from a condenser mike. Typically the 'off' (condenser mike) simulations will sound brighter than their 'on' counterparts.

### Mic Position

This ranges from Centre -> 10cm (4inches). OK, let's say I close mike up a cab with the mike at a 30degree angle to the speaker and positioned just away from the mesh. The Mic Position setting determines where the horizontal position of the mike will be in relation to the centre of the speaker cone. If this was 10cm then the mike could be considered to be at a 30 deg angle, just away from the mesh, vertically central with the speaker cone but 10cm horizontally left (or right) of the centre.

The way this affects the sound is quite simple. The further away the mike is from the centre, the less high frequencies you will have. Indeed with 10cm away I think the speaker simulator gives a very muffled sound. But that's me.

### Mic Level and Direct Level

These two parameters allow you to mix the mic signal and the original signal in the output. Many people use a blend here so that some of the high frequencies lost are replaced—thus putting some brightness back into the signal. It is effectively a configurable blending of the direct, non-



miked signal and the miked signal. (Which is a very common set-up – typical of guitarists such as Eddie Van Halen).

The sound that comes out of the speaker simulator is felt by some to be more pleasing—a more rounded sound. I would say this is mainly down to the low-pass filter and that a similar effect is achievable with the EQ functionality. Mind you the speaker simulator is certainly easier to use. It should be said that just as any guitar sound is a matter of personal taste, the speaker simulation is so too. If you do use it, experiment and find out what works best for you.

I personally think it sounds best if using headphones, and I feel that using it to feed a mixing desk loses more high frequencies than if I had miked up a cabinet.

I myself don't use the GT-3 speaker simulator as I have an external unit, a Palmer PGA-05, which, apart from being more flexible, means I can use both simulated and direct sounds simultaneously. The simulated sound goes to the mixing desk and the direct thru goes to my power amp and 2x12s. Thus the power amp/2x12s are in effect my monitors.

### **GT-3 Problems**

The worst feature of the speaker simulator is that it is NOT related to any patch—it is a global setting and you cannot simply switch this on or off between patches. It is also dependent on the use of a preamp therefore if you don't use an amp model you don't get the speaker simulator – you could see Roland's thinking behind this but I think their thinking is somewhat flawed, especially as the only true flat response from the unit comes from preamps off.

This problem doesn't affect the GT-5, which provides a choice of cabinets & a speaker simulator that may be switched on/off on a per patch basis.

### **GT-3 Creating On/Off Functionality**

Given that I have just said that you cannot switch the speaker simulator on and off between patches here is a cunning idea suggested by Kleber A. Gonçalves on the GT-3 Yahoo Group. If you set your [Global]<Your Setting?> to 'Line (Headphones)' then under the preamp speaker simulator, set mic level = 0, and direct level = 100. This effectively turns the speaker simulator OFF and you now get a sound equivalent of 'Power Amp (Stack)'. This now means that the speaker simulator can be turned on and off at will on different patches. There is however a downside to this; If you ever use any of the preset patches the speaker simulator will almost always be turned on for them and there is little you can do about it other than copy the patch and modify it appropriately. Still at least there is a workaround.

This could also be useful for people who wish to make a patch slightly more portable.

Obviously this is not required for the GT-5 that stores the speaker sim on/off information in the patch.

# Section 11 Manual Mode

Manual mode seems to have caused quite a few problems for some people and I just thought that I'd take a couple of minutes to clear up some possible points of confusion.

## A Pedal Assignment Template

Manual mode allows us to treat the GT-3 like a collection of stompboxes. What needs to be remembered is that there is only ONE manual mode. Manual Mode is nothing more than a set of pedal assignments. Therefore as there is only one set of pedal assignments that you can make, if I set up manual mode in patch [GT-3]1-1/[GT-5]U-1-1-1 and then switch the patch [GT-3]1-4/[GT-5]U1-1-4 the pedal assignments will remain the same. This is probably what caused most of the confusion to start with.

The way I think about it is that manual mode is a TEMPLATE of PEDAL ASSIGNMENTS only, which we may place OVER THE TOP OF the currently selected patch. As there is only one manual mode there if therefore only one template (have I said that enough? <grin>)

One thing that is interesting here is that if you assign a pedal to an effect in the groups CS, MOD etc, it will operate the effect in that \*group\*. Let's say we have two patches. In one of them the MOD effect in use is the Harmonist (HR) and in the other is the Flanger (FL). We select one of those patches, and enter manual mode. We assign pedal [GT-3]'Bank Up'/[GT-5]'B' to be HR. OK. Switch back from manual mode; change patches and swap back to manual mode again. This time the same pedal will now operate the Flanger, and the display will show an allocation of FL.

In summary the pedal assignments are not made against individual effects but against the on/off effect buttons on the front panel of the GT-3/5. It's just that the current effect in that group is used to 'name' the button.

Some people have criticised the fact that there is only one manual mode, however as Russ Poncher pointed out in May 2000:

*'Honestly, it wouldn't make that much sense to do otherwise. The unit has a total of 340 patches. Then there are 6 pedals that can be programmed, and there are ten or so effects to choose from. So in the heat of a gig, do you think you would remember what pedal to choose if they were all set differently?'*

Although his comments are directed at the GT-3 they are equally applicable to the GT-5.

The ability to use manual mode as a set of stompboxes stresses the importance of level matching the effects in a patch. Failing to do so will mean that when you switch effects on/off in manual mode your output volume may alter significantly.

One quick thing the GT-3/5 official manual doesn't mention is that the display shows effects that are off as lowercase, and effects that are ON in uppercase. Apart from the tuner (TU) which always seems to be on—even when it's not, and if it was on you wouldn't be able to see this display anyway!

When you program a patch you can save not just the parameters for effects that are turned on but for ALL effects. This means that you could program a patch with the delay off, but specify the delay parameters that you want. We then make sure that the 'manual mode pedal assignment template' included an assignment of DD to a pedal. Then when playing the patch you could switch to manual mode and turn on the delay. The delay would have the parameters that we saved in the patch.

Oh and one other thing. There is no need to 'write' manual mode as there is only one! Changes are remembered as soon as you make them.

## Switching In/Out

If you use a control assign to switch manual mode on/off via a CTL pedal then you can consider manual mode as 'opening up' the patch. Thinking about it this way gives you more variations from a single patch than are possible using just the CTL/EXP switches.

Switching back and forth from manual mode will NOT alter which effects are on or off, nor will switching affect any of the effect parameters. When you switch from a patch to manual mode the currently active effects set-up remains. If you have CS-WAH-DS-PRE-NS-FV active then these will be active when you switch to manual mode. Then having turned on the delay in manual mode we can switch back to patch mode. This now enables us to continue playing with the delay on. Once back in 'patch mode', we could select another patch. But does the GT-3/5 give us a quick way to revert back to the original patch setting? No. If you turn on an effect in manual mode, or three perhaps, if you switch back to patch mode you cannot just re-select the same patch to re-initialise it, and turn off all the effects added or even turn on the effects removed by manual mode. However, you could set up two identical patches and effectively achieve this by swapping to the duplicate. If you don't mind the footwork, (and sound gap when the patch changes) you can also simply select an adjacent patch and then swap back again.

When a patch contains 'Control Assigns' for the expression pedal, control pedal, external expression pedal and/or footswitches the control assigns remain active in manual mode. These assignments are part of the patch and therefore manual mode does not have its own set of control assigns.

## Suggested Pedal Assignments

I find the following pedal assignment template (I like re-emphasising this) useful:

### GT-3

Bank Up:CS, Bank Down:TR  
1:OD, 2:HR, 3:DD, 4:CE

### GT-5

1:CS, 2:OD, 3:HR  
4:DD, 5:CE, B:TR

As I have an external tuner I have no real need to use the on-board one (which I found temperamental with a drop D tuning anyway). So I don't have the GT-3/5 tuner available in manual mode that many of you may like to have available. Also, if you use the pre-amps for distortion, you might wish to alter the settings to:

### GT-3

Bank Up:CS, Bank Down:TU  
1:PRE, 2:HR, 3:DD, 4:CE

### GT-5

1:CS, 2:PRE, 3:HR  
4:DD, 5:CE, B:TU

Or, if you use the tremolo and OD/DS you might wish to alter the settings to:

### GT-3

Bank Up:CS, Bank Down:TU  
1:OD, 2:HR, 3:DD, 4:TR

### GT-5

1:CS, 2:OD, 3:HR  
4:DD, 5:TR, B:TU

Whichever way you choose these should give you a good idea about how to approach setting up manual mode for the most benefit.

## Automatic Manual Mode

This is great idea from Russ Poncher, which was posted to the GT-3 Yahoo Group at the start of April 2000. The term used was 'Automatic Manual Mode' and I think this describes it perfectly.

Here is Russ's control assignment:

### Assign 1

Target:	MANUAL On/Off
Min:	On
Max:	Off
Source:	Internal Pedal
Mode:	Normal
Act. Range Lo:	0
Act. Range Hi:	127
Trig:	PatchChange
Time:	70
Curve:	Slow Rise

This goes into manual mode for 7 seconds following a patch change. If you need to use manual mode again, just press the patch number again. The Slow Rise curve is used to delay the switch over which occurs when the internal pedal reaches about 63/64 in value. Oh. Don't be caught out by Min:On and Max:Off – make sure you change them or it won't be a very automatic manual mode!!

There are a couple more extended possibilities here. If you cast your mind back I said that if you swap into manual mode, turn some effects on or off, and the swap back to the patch, pressing the patch number again WON'T reset the patch. If you use the assignment above then what will happen is the patch WILL RESET. If you don't like this behaviour you can also set-up the CTL pedal to go in and out of automatic mode. Thus providing you with two ways of entering it; one automatic with patch reset and one manual method. However, if you extend the automatic mode idea further you can use two automatic modes, one of which will reset the patch, the other won't. This can be done by using the CTL pedal as a trigger rather than patch change (don't forget to turn the CTL PEDAL stuff off as I'm sure you won't want it as well). Thus by using 2 assignments you get the best of both worlds.

One advantage of the patch change trigger is that the CTL pedal remains free, and able to perform other tasks! One disadvantage however, becomes apparent if you ever change patches using the dial, or can't remember where the patch you want is and you therefore are going up the patches in relatively quick succession. With the dial, once manual mode has been entered, continuing to turn the dial will change which effect is controlled by whatever pedal happened to be currently selected for editing....argh. Painful. Although I should say I only use dial changing rarely, normally I limit the patch selection to and set the dial to be value change only. With the foot switch patch changes all you end up doing is turning one two effects on/off.

## Section 12 Patch Problems

### Why Don't Patches Sound Right?

Ever wondered why you've been disappointed with a patch that you have obtained from someone else? Why it is that it doesn't sound right on your system? Well, we are going to look at why this happens, and what we can do about it.

ANY patch you download or copy from someone else is unlikely to sound the same with your set-up. Sometimes this change can be fairly small, other times extremely noticeable. As David Stewart said one posting:

*'They will sound different on different guitars, pickups, cables, other effects units between, volume pedals, preamps, amps, and speakers. There's so much colour in a guitar line that reproducing someone's tone from one rig to another is probably nearly impossible if you leave a patch as-is. They're starting points for each person to use. What gets someone all the way there with his Les Paul might get me there on my Strat if I add a bit more compression (for sustain), use the pickup simulator to get a humbucker sim going, and then do a bit of EQ work.'*

Well, if that is the case, and it is, it would appear there is little we can do. These patches will just sound bad. Actually, it's not all that bad. As David says—it's a starting point and a few tweaks might well set us on the right path. What we are going to do is look at where we can start to 'correct' the patch for our set-up.

### Tweaking the Patch

There are three main areas we need to look at; how the patch sounds, how the patch's volume levels are set and how it deals with noise.

#### Sound

It should be said that 'clean' patches tend to sound better when transferred than distortion based patches. One major reason for this could be that many people set up the patch using a speaker simulator, but the recipient of the patch is not. Therefore people such as myself who don't use it will find the distortions harsher, and at times fuzzier! The converse is equally true as well. A patch I create without the speaker simulator will perhaps sound dull and lifeless to someone using one even though it really kicks for me.

The most readily available speaker simulator is the built in one. I personally find the on-board speaker simulator cuts too many high frequencies and muffles the sound somewhat compared to running through a 4x12 or 2x12 cab. Thus I am reluctant to turn it on.

Another problem here is that the author will increase the distortion over and above what is needed in order to obtain the correct sound with the speaker simulation on. This leaves us with two possibilities. If you are like me and pick up patches built with the speaker simulator, I suggest you try using a filter or reduce the amount of distortion slightly. A typical Celestion G12 speaker has a frequency range of 82hz-5khz. Thus a 6khz low-pass filter would be great. Unfortunately the GT-3/5 EQ section doesn't really help here – you could try knocking the High EQ down a few dB or so. There are one or two places you can get this sort of filter – the delay, chorus and reverb effects for instance. However, using these won't work as the filter ONLY applies to the effect sound, and thus is dependent on the effect level. It doesn't work on the direct sound.

The guitar and pickups used when building a patch make a large difference to sound. For instance, Gibson Les Pauls are extremely distinctive. What we need to do is customise the patch to try to even out the differences between our system, and the one used to make the patch. This of course requires some background knowledge.

If the pickups used are humbuckers or singles try to use the same sort of pickup in the same position on your guitar. Don't have the same sort in the same position—try the position next to it—it might be close enough. Don't have the same sort of pickup full stop? Then try using one of the pickup simulators (assuming if you have a GT-3 that the patch doesn't touch the SFX group!) Failing that, try to play about with the EQ. As for differences between guitars, which manifest themselves as 'body tone' etc. then a good long hard play with EQ is what your after. As David said, if the guitar has MORE sustain than yours (naturally) then try a little bit of compression or limiting, to increase apparent sustain.

#### Volume

Most patches I have seen vary greatly in volume levels, some clip, others are too quiet! Incorrect volume level set-up can completely ruin a patch. Indeed—some patches I am surprised the person who did it could use it without clipping!

As we saw in section 8, your system has a master level that will balance your pickup's input and the GT-3/5's output. First apply this as a quick fix and immediately set the master level to be your target. This in itself may solve many problems. Indeed if all patches are programmed with the levels matched then all that should be needed is to reset the master volume.

Unfortunately, one system behaves completely different to another and even if the patch was set-up 'correctly' then it still may not work on your system. If it wasn't—well you're in the same boat. What needs to be done here is to go through the effects and set the levels to match your effects

chain target which we determined in section 8. This is likely to be fiddly. Sorry!

### Noise Suppression

Some patches I have seen use no noise suppression, some use loads. The question is—effect or just problem solving? Bit hard to tell. The main thing here though is that if a patch is too 'noisy' for you, check out the compression—it may have been overused, and then tweak the NS.

If the NS has been underused it will either not cut in or will reluctantly cut in. This case is easy to solve – just set up the NS as described in section 9a. It is also possible that the NS has been overused for your set-up resulting in the NS cutting in and cramping decay. In this case you will actually end up lowering the NS threshold. Again, just set up the NS as per section 9a. The NS however, may not have just been used as a problem solver but may have been used for effect. However, this is most likely to take the form of a very high threshold (80-90+), and thus is unlikely to be a problem.

### Making Life Easier

---

Hopefully, we will now find it a little easier to start modifying patches we receive. However, I think it would be much easier all round if the following information was provided with a patch: (The GT-3 Manager does make some attempt at doing this, however, the additional information is proprietary to the GT-3 manager and will not transfer to other applications).

<Global> [Your Setting?], Guitar type, and pickups used, GT-3/5 placement in the rig, and the amp/speaker set-up used and in the case of the GT-5 whether the speaker sim is set to permanently on or off.

If we all supply this sort of information then there we have some good information to start from and it will take less time to adapt a patch to our particular set-up.

The 'Patch Central' patch repository on the GT-3 Yahoo Group web site contains a .txt template that includes this information. If all patch authors supply the .txt with the .syx then making tweaks to patches should be a lot easier as you will know what the author was creating the patch using. This method of disseminating information seems to have met with some success. I for one find it very useful and I am grateful to those who made the effort and spent that small, but important amount of time to provide the details. I can only encourage others to do the same.



# Section 13 Compressor/Limiter

.....2nd

## Introduction to Dynamics

3rd

## Dynamics Control

4th

## Limiting

do this first

## Compression

5th

<b>GT-5</b> Patch	Type CS (LM)	Sust (Thr)	Attk (Rel)	Rate	Depth
1-4-1 SWEET LEAD	LM	40	30	0	45
1-4-4 BOSTON LEAD	LM	40	30	0	45
1-5-3 DUAL DRIVE	CS	50	40	0	50
2-2-2 NY JAZZROCK	CS	75	59	-13	31
2-4-5 LARRYS 335	LM	60	20	0	25
2-5-3 MILD CRUNCH	CS	49	37	0	39
3-1-1 I WANT TELL	LM	60	20	0	25
3-1-3 CLEAN LEAD	CS	50	40	0	40
3-1-4 80'S UK	CS	40	35	-20	50
3-1-5 USA CRUNCH	CS	60	20	-4	39
3-2-3 CUTTING	LM	70	20	0	20
3-2-4 ARPEGGIO	LM	75	10	0	17
3-3-2MELLOW COMP	CS	50	40	0	50
3-3-3 R&B CRUNCH	CS	50	40	0	50
3-3-4 MILD SOLO	LM	60	30	0	17
3-3-5 CLEAN LINE	LM	60	30	0	17
3-4-1 VERY JUICY	LM	53	45	0	20
3-4-2 NEW ENGLAND	CS	75	79	+3	20
3-4-3 SOLO E AcGt	CS	50	60	0	32
3-4-4 SLOW ATTACK	LM	32	30	0	30
3-4-5 PRESENCE	CS	31	40	+15	40
3-5-1 GEORGE 12ST	LM	50	10	0	25
3-5-2 SWEDISH POP	LM	60	20	0	20
3-5-3 DUAL ECHO	CS	50	40	0	50
3-5-4 UNPLUGGED	LM	85	10	0	12
3-5-5 SWAY CHORUS	CS	50	40	0	50
4-1-1 -1 OCT	CS	50	40	0	50
4-1-2 HARMONY IN C	CS	50	40	0	50
4-2-2 PEDAL UP	CS	50	40	0	50
4-2-3 3 VOICES HR	LM	60	20	0	25
4-2-4 STEREO HR	LM	60	20	0	25
4-3-3 COMP WAH	CS	50	40	0	50
4-3-4 WAH DRIVE	CS	50	40	0	50
4-4-1 FUNKY WAH	CS	50	40	0	50
4-4-3 PEDAL VCF	LM	40	30	0	45
4-4-5 FUNK RHYTHM	LM	60	20	0	25
4-5-4 FLANGING CH	LM	60	20	0	25
4-5-5 CLASSIC PH	CS	25	60	0	55
5-1-1 SUPERPHASE	LM	40	30	0	40
5-1-2 PHASE ECHO	LM	35	30	0	40

5-1-3 BI PHASE	CS	50	40	0	50
5-1-4 COMP PHASE	CS	50	40	0	50
5-1-5 RHODES PAN	LM	70	30	0	30
5-2-1 SURF MUSIC	CS	50	40	0	50
5-2-2 MACHINE GUN	CS	50	40	0	50
5-2-3 VIBRATO	CS	50	40	0	50
5-2-4 PAN PHASE	LM	60	20	0	25
5-2-5 TALKING MOD	CS	50	40	0	50
5-3-4 RING ECHO	LM	40	30	0	45
5-4-2 -1 OCT RING	CS	50	40	0	50
5-4-3 PEDAL RING	LM	60	20	0	25
6-1-4 SYNTH + GT	LM	60	20	0	25
6-2-1 FANTASY	LM	30	30	0	25
6-2-2 TRIP PHASE	LM	50	230	0	25
6-2-4 SPACE ECHO	LM	30	30	0	50
6-3-1 TELEPHONE	LM	40	30	0	45
6-3-4 MOD ECHO	LM	40	20	0	28
6-3-5 ORGAN TONE	LM	30	40	0	50
6-4-3 FADE OUT	CS	25	60	0	55
6-4-4 NOISE STORM	LM	60	20	0	0
6-5-2 AUTO RING	LM	60	20	0	25
6-5-3 PHASE DELAY	LM	65	10	0	17

# Section 14 Preamps

## General

The general consensus would appear to be that the GT-3/5 preamp simulations are pretty spot on and that you should set-up the preamps using the same settings as you would with the genuine article.

In general this is real good advice, but it is possible to generate some noise problems (and I don't mean 'natural' amp type noise) when using extreme volume settings. We will be going into this in section 16, when I talk about digital aliasing.

One or two people have posted messages asking how can they get a great sound from the preamps, as they don't own the real thing. Well, if they thought about it the answer is fairly obvious. I don't own a Peavey 5150 but if you gave me one to use I would do two things. Firstly I would ask for recommendations from others, and I would have a jolly good old play with it as well. I mean—how else do you find that great sound?

Well, these simulations are pretty good. As we said already, treat them as you would the real thing. Yes I know its easier to deal with knobs than the GT-3/5 but it isn't that bad really. Just have a good play with them!

To help you out as well you can equate many of the GT-3/5 settings to the real amp as well. For instance the 'Gain' setting relates to my Marshall VS100 channels—it has 3: clean, overdrive 1, and overdrive 2. This relates to the GT-3/5 settings 'low', 'middle' and 'high'. OK, not exactly but the comparison can be made. You see what I mean?

The actual setting values also can cause confusion—GT-3/5 uses 0-100 and the real thing uses 0-10. OK so you want to select three and half on the amp eh? Well, just set 35 on the GT-3/5. It's just as easy as the real thing!

The preamp simulations will respond to being driven louder. If the effect prior to the preamp outputs a higher level then it will drive the preamp sim into distortion better. However, using the output level of one effect in the chain to increase distortion of the preamp is not compatible with level matching (see Section 8). Instead, turn up the gain of the preamp and leave the output level of the preceding effect well alone.

## External preamp + GT-x preamp: Breaking the Myth

Right. This is a subject that keeps appearing on the Yahoo Groups, and I would just like to take a few moments to discuss the real story.

A preamp is an electronic circuit which is merely capable of amplifying a signal, that is the output signal is higher than

the input signal. That's it. End of story. Check out 'Guitar Gadgets' by Craig Anderton for more in-depth descriptions and diagrams.

Right armed with this knowledge we can now see that the GT-3, almost ANY stompbox, guitar preamp etc are ALL preamps to some degree. They ALL contain preamp circuits. Indeed some effects such as distortion couldn't exist without the preamp circuit, because it is driving that circuit into clipping which causes distortion, and the GT-3/5 analogue distortions are no different.

So if you put a distortion pedal in front of the GT-3/5, or indeed in the effects loop then you effectively have one preamp feeding another. Now normally this doesn't cause any problems, and nor should it. To suggest it should, would be to discredit every guitar rig that almost ever existed.

The problems come when you put one distortion into another, or a distortion into a distorting preamp or vice versa, and this is one reason for the statements about using external preamps & the preamp sims together. In fact this isn't the problem necessarily, its not a question of distortion into distortion – as many people do this, use an overdrive pedal before going into a distortion box/preamp in order to get a more saturated sound. Where people come across problems is actually in two areas...

1. Gain structure
2. Impedance mismatches

Gain structure? yep. What people tend to do is use their guitar preamps in the external effects loop and continue to use them as they would normally. However with the preamp sim giving gain and the external preamp giving gain you end up with a bad sound. However this is ONLY TRUE if you fail to manage the gain. If you level match as I say then you wont go far wrong.

The second reason was impedance mismatches and I think this was the cause of similar problems I had when trying to use my Marshall Valvestate preamp in the effects loop. The sound was thin and most dissatisfying.

So just because the sound isn't right don't blame it on 'preamp into preamp'. OK. Not all combinations are going to work, but there is no reason why you couldn't use and external distorting preamp into a GT-3/5 clean one, nor the other way round without problem.

My advice is to use your ears, experiment. Just because one particular combination doesn't work, doesn't mean that there is some kind of generic problem. Anyway, back to the preamp simulations...

### Using the Preamps for Clean Sounds

There are three main preamps that can provide a clean sound. We will examine each in turn and see how they react to different setting changes. Now you might be thinking that there shouldn't be too much to say about these, but you would in fact be incorrect in your thinking—I've gone pretty deep and thrown a spectrum analyser on them to suss out some of the characteristics. I hope you find this interesting and useful. In many cases I have included a screen shot of the analyser that illustrates what I am talking about. Rather than include these images and bloat the size of this document, I have merely made them available on the GT-3 Yahoo Groups file area as well as on my band's website (URLs at top of this document). The images are named in square brackets in the appropriate places. In all cases I examined the controls at 50, the cut at 0 and the boost at 100. For presence I assumed 0 was off and 100 was on full.

#### **GT-3** AC.Guitar

The manual is quite interesting with regards to this preamp. Apparently we only get a flat amp when the speaker simulator is turned off. Reading further on under the speaker sim we can see a comment detailing us to use Mic Level = 100 and direct level = 0. So it therefore follows the AC.Guitar has two modes; one where it acts like a flat amp, and one where it acts like something else(???)...hmm...read on....apparently Roland seem confused about a flat amp...

[GTx-PRE-Compare.gif]

Let's examine AC.Guitar as a flat amp. Well, hmmm. Flat amp? Like hell it is! Whoever said this provided a flat amp was off their trolley or didn't understand what a flat amp was! For a start at the low end of the frequencies there appears to be a high-pass filter cutting in at 800Hz. The signal drops off slowly in a linear fashion through until 75Hz where the drop off increases significantly down towards a minimum at 8Hz. At the top end there is a peak equivalent to a parametric EQ setting of 8kHz/Q4/+3dB. This peak starts rising from 2.5kHz, peaking at 8kHz where a low pass filter cuts in (at the peak or shortly thereafter) and the signal drops off very quickly down to a minimum at 22kHz. Not exactly insignificant. Some flat amp eh?

[GTx-PRE-ACGuitar-Bass.jpg]

The Bass Control provides a boost/cut from 63Hz down, and appears to be based on a highpass shelving filter, with the max difference between boost/cut levels in the 10-80Hz region. It also appears that the available cut is about twice as much as the boost. The boost appears to be similar

to Low EQ +5dB but the cut is completely different from the Low EQ settings in response. The mid scoop is kept and cuts the bass down to something like -14dB.

[GT-PRE-ACGuitar-Mid.jpg]

The Middle control again provides significantly more cut than boost. In fact the boost is very small. It is most apparent in the 100-3kHz region with a peak at 700Hz. It also seems to produce a general increase in all frequencies by a very small amount. The cut at 0 is the same as a parametric EQ of 600Hz/Q2/-20dB, affecting frequencies between 90Hz to 4kHz most noticeably. Again, there is a general affect on all frequencies that manifests itself as a small decrease in level.

[GTx-PRE-ACGuitar-Treble.jpg]

The Treble control provides a boost of +4dB and a cut of -7dB. Both cut and boost start coming in at 500Hz.

[GTx-PRE-ACGuitar-Presnc.jpg]

The presence control gives a massive boost to our peak region by a further +7dB, starting from 200Hz.

[GTx-PRE-ACGuitar-Sprk.jpg]

So with the speaker simulator turned on what happens? Well the speaker simulator itself boosts the 8-4kHz region, with a slight drop off after 4kHz followed by a drastic cut starting at 7kHz continuing to 8kHz and a gentler drop from there on up.

Either way neither has a flat response.

[GTx-PRE-ACGuitar-Gain.jpg]

The gain/volume controls work in combination. The gain provides the rough setting and the volume control the fine. Apart from the response to frequencies below 70Hz, the gain/volume provides a flat response—maybe this is what they meant when they said flat amp?

#### **JC-120**

[GTx-PRE-JC120-Ref.jpg]

The JC-120 is a pretty straightforward preamp. Here we see a high-pass filter cutting the frequencies below 70Hz, and a low pass filter cutting the frequencies above 3kHz, although the 3-10kHz drop is slight and most drop occurs above 10kHz. The JC-120 however, has a slight mid scoop equivalent to a parametric EQ of 400Hz/Q2/-6dB.

[GTx-PRE-JC120-Bass.jpg]

The Bass control is a low pass shelving filter operating at 80Hz. Again, far more cut than boost is available.

[GTx-PRE-JC120-Mid.jpg]

The Middle control provides much more cut than boost. The cut is in the region of -14dB whereas the boost is only about +4dB.

[GTx-PRE-JC120-Treble.jpg]

The Treble control is interesting providing a large cut in high frequencies starting at 600Hz and sliding off until 10kHz where it drops off sharply. However, it also boosts frequencies between 100-600Hz in order to keep the curve between the bass and treble balanced. Boosting the treble provides only a very very minor increase in treble above 300Hz, with it most noticeable in the 300-4kHz region, with a peak at 1.5kHz. However, it also cuts the bass frequencies below 300Hz ever so slightly, and the mid-scoop is now centred on approx 280Hz, rather than 600Hz.

[GTx-PRE-JC120-Presnc.jpg]

The Bright control adds an interesting combination of boosts and cuts. The 40-150Hz region has been cut slightly, and the 500Hz to 3kHz is region is slightly boosted with the boost centred on 1.5kHz. There is a more significant boost to signals above 10kHz. The Presence control provides exactly the same boosts/cuts as bright. This therefore gives you an adjustable 'Bright' control if you like.

[GTx-PRE-JC120-Spkr.jpg]

Turning on the speaker simulator significantly changes the sound. There is a drastic cut high-pass filter cutting frequencies below 150Hz. The 150-700Hz region is boosted and there is a significant scoop in level between 700Hz and 4kHz with the lowest level shown at 2kHz. It then dips again between 4kHz and 6.5kHz before entering a sharp dropping low-pass filter at 6.5kHz.

[GTx-PRE-JC120-Gain.jpg]

The gain/volume controls work in combination. The gain provides the rough setting and the volume control the fine. The low gain provides a deep mid scoop, this scoop lessens and lessens until at very high gain a crunch is apparent and the frequency response has flattened off. The gap between low-middle is greater than that of middle to high. Indeed, Middle + volume increased to 100 is not far from High, volume 60.

## Clean TWIN

[GTx-PRE-CleanTWIN-Ref.jpg]

The Clean TWIN is similar to the JC-120, with its mid scoop. However, the Clean Twin accentuates this by boosting the Bass and treble significantly. So what you get is a bandpass boost between 20Hz and 200Hz centred somewhere around 60Hz (approx 60Hz/Q1/+7dB), a mid cut between 200Hz and 1.5kHz (600Hz/Q2/-9dB), another boost between 1.5kHz to 13kHz (approx 5kHz/Q1/+5dB) and thereafter a significant drop off with a low-pass filter.

[GTx-PRE-CleanTWIN-Bass.jpg]

The Bass control provides much more cut than boost. 10-60Hz shows a slight boost with the 60Hz peak the same as normal. 150-800Hz is boosted and the trough of the scoop sneaks up from 600Hz to 800Hz. Cutting, cuts below 70Hz greatly and between 70-300Hz is a slight linear shelf. The cut also boosts the 450Hz to 4kHz region slightly in order to maintain the curve smoothness. Interestingly enough the mid scoop has effectively disappeared here.

[GTx-PRE-CleanTWIN-Mid.jpg]

The Middle control again increases the 600Hz/Q2 cut by a further -6dB. Cutting also seems to produce a small cut in level at all frequencies. When boosting the frequencies above 3kHz are all boosted quite a bit. Even at full boost the scoop is severely lessened but the mid levels never equal or exceed the bass or treble.

[GTx-PRE-CleanTWIN-Treble.jpg]

The Treble control cuts high frequencies above 800Hz in a quite drastic manner bringing it down to an almost flat response from 800Hz upwards, until about 5kHz where it then drops off to 22kHz. The scoop has effectively disappeared and frequencies between 450-800 are boosted slightly to ensure a smooth curve. When boosted a significant boost above 350Hz is available, but this is also combined with a reduction between 15Hz and 350Hz. The 60-350Hz region suffers a cut because of the shift in mid-scoop centre frequency from 600Hz to about 250Hz.

[GTx-PRE-CleanTWIN-Presnc.jpg]

The Bright control increases treble, by boosting 600Hz and above. The Presence control again is basically adjustable bright. Except bright contains a slightly higher boost in the 600Hz-3.5kHz region.

[GTx-PRE-CleanTWIN-spkr.jpg]

## Section 14 Preamps

Turning on the Speaker Simulator gives some interesting results. A high -pass filter cuts in sharply at 100Hz dropping off the lower frequencies quite drastically. There is a notch cut at 1.5kHz extending out to 1kHz and 2kHz. The 2kHz—7kHz region is boosted and looks like a two pole 'Big Top' tent with the peaks at 2.5kHz and 6.3kHz. Above 6.3kHz there is another drastic drop off from a low-pass filter down to 10kHz where there is a minor recovery at 12kHz before dropping completely by 16kHz.

[GTx-PRE-CleanTWIN-Gain.jpg]

This amp reacts in a very similar manner to the JC-120; the gap between low and middle is greater than middle—high, and as the gain increases the mid scoop lessens. However, unlike the JC-120, the scoop still remains a prominent feature because it was so acute to start with. It can also be seen that low->middle is fairly flat but middle -> high sees only a very small boost to low frequencies whilst although the higher frequencies are boost the whole mid-high structure is flattened significantly.

### Problems

Right, now let's take a look at some problems we might hit with the clean preamps. There are two types of noise to watch out for on this unit. First is distortion and the second is a horrible 'someone tuning a radio' type underlying harmonic type thingyme type noise—and it is YUK! I explain this second noise in the section 16 Digital Aliasing (YUK Noise).

Distortion:

You shouldn't be getting any distortion from clipping providing you have matched the levels properly. However, you will get distortion by driving the preamp sims hard. By this I mean on Middle gain anything with Volume>60 (Master Volume is irrelevant). Go above this level and things will start to take on a slight-medium crunch.

### Clean Sounds From Other Preamps

It is possible to get clean sounds from other preamps, although you need to use low gain in preference to middle gain to obtain a completely/almost completely clean sound. I haven't gone into the tone characteristics in this section but if you look at the preamp distortions below you will find these descriptions.

When trying to use these preamps you will find that you need to keep the Volume down even on Low Gain. Here are some rough figures to get you started:

Middle Gain:

Crunch	<= 40
Match Drive	<= 30

Low Gain:

Crunch	<= 60
MATCH Drive	<= 50
VOXY Drive	<= 40
Blues	<= 20
BG Lead	<= 25
MS1959 (I)	<= 20
MS1959 (II)	<= 55
MS1959 (I+II)	<= 45
SLDN	Forget It!
Metal 5150	Forget It!
Metal Drive	Forget It!

### Clean Preamp Presets

Now I'm not going to present any further patches to you here. The preamps on their own are pretty flat and are for the most part, dull. However, we will look at some the presets, which as you will see use other effects to brighten up and colour the basic tone provided by the preamp. I won't be examining every clean preset but a selection of them.

#### 64-3/PG3-3-4 MILD SOLO

This is an interesting patch that uses a Crunch preamp and keeps the volume down to 34 to limit any overdrive. It is a good example of using one the dirtier preamps in a cleaner mode.

#### 66-2/PG3-2-1 JC120

A slightly barer JC-120 but shows the JC-120 off at its nicest.

#### 68-3/PG-3-2-2 BLACK PANEL

This is basically the same as CLEAN TWIN and Roland have re-used it to show off the tremolo!

#### 68-4/PG3-2-3 CUTTING

Again a copy of JC120 with limiting and EQ.

#### 69-1/PG3-2-4 ARPEGGIO

This is probably one of the heaviest processed clean patches but it's great isn't it. Using a JC-120 straight with no funnies, except for the EQ and a host of other effects. Great patch Roland.

#### 69-2/PG-3-3-2 MELLOW COMP

Another great patch, very similar to ARPEGGIO but using a Clean TWIN.

### GT-3

#### 37-2 CLEAN JC120

Nice good clean patch. Chords sound dull with a bridge humbucker but liven up with a neck single. Single notes sound good on both; open, although a bit tinny. Here Roland have used a Limiter, Chorus



and Reverb to liven it up as well as applying EQ. Examining the EQ shows us that they have dropped the Low EQ 4dB, Pushed up 500Hz and around by 2dB and 4kHz has been cut by 2dB. I suspect the main tinny sound is from the cut to the Low EQ combined with preamp colouring of B=20, M=50, T=80 which certainly is biased towards a more trebly sound. It is supposed to be this way!

### 57-3 POWER TWIN

Good example of pushing the Clean TWIN too far. If you do this is what it will sound like. It is actually pretty damn crunchy. Certainly given over to a fuzz vein.

### 63-1 COOL CLEAN

Another Clean TWIN patch with much more body than Clean JC-120. Here the compressor, delay, chorus and reverb are all employed to help create the sound. A light dosing of EQ has been applied (+3dB High, +1dB 1kHz), as well as a preamp colouring of B=60, M=80, T=60, adds up to cancel out a lot of middle scoop from this patch.

### 64-1 JAZZ CLEAN

I feel this Clean TWIN patch is a little on the more treble side on a humbucker than I would like. This just goes to show how a fixed frequency wah can affect the sound.

### 64-2 CLEAN LINE

If you excuse the EQing you can hear the AC.Guitar preamp jangle from a mile away. Again, a familiar style of patch from Roland with a Limiter, Chorus and Reverb thrown in with the EQ to liven the sound up. This is a nice light patch—even with a neck single. You can now see how the preamp at the centre of the patch can influence the general body and feel.

### 65-1 CLEAN TWIN

Well, well, well. Just about as near to 'Flat Amp' as Roland would go! Here we have nothing but the straight preamp and a little bit of reverb. This is the sort of thing that you might set-up for use as a base.

### 65-2 BRIGHT TWIN

This patch is very similar to CLEAN JC120. The contrast between this and Clean TWIN just shows you how versatile the Clean TWIN is. Here the preamp has the bass cut right back to give a more treble sound.

### 65-3 CLEAN STACK

If you play this without the speaker sim through a

clean power amp the excessive reverb makes it sound like it is overdriving. Well, at times it does—but not all the time. I think this clean sound is really starting to border onto an overdriven sound though—you know the feeling of 'any further and you are going to know!! Interestingly enough here is an MS1959 preamp being used at a volume of 60 but at low gain. Indeed the preamp seems relatively clean. However play really heavily and it is possible to get this to crunch.

### 65-4 MILD CLEAN

This is another Crunch preamp but although this time it is at 35 it will crunch if pushed slightly. The main problem with this patch, is too much reverb.

## Section 14 Preamps

---

### Clean Preamp Summary

In summary, the best way to use the preamps are as a base for a patch, providing the patch with the basic tone characteristics, and then use other effects to colour and shape as necessary. Always remember that the EQ is there to alter the colouring. Examining the presets has shown us how effective this can be.

The Master Volume control is in all cases a flat response control that provides a good way of managing the output level of the preamp without changing the colour of the sound.

Looking at our three pre-amps we can see that the JC-120 gives a fairly well balanced sound, warmer than nothing/[GT-3]AC.Guitar. The Clean Twin with its boosted bass, and treble gives very a rich warm sound, and would be very well suited as a basis for some pretty heavy patches especially with a good dosing of distortion. Which preamp you choose will greatly affect the underlying sound of the patch. Thus, to help you choose there is a file in the 'set-up....' folder called 'GTx-PRE-Compare.jpg'. This image will give you a handy reference to choosing a clean preamp.

In practice, Bass = Warmth, Middle = Body, Treble/Presence/Bright = Jangle/Sparkle. For versatility I love the Clean TWIN. It seems to have more dynamic control and range than the other preamps. It's very much my favourite. It's 'In your face', 'Bright' and yet full of warmth and oompf. It definitely tops the lot of them in my book!

### Using the Preamps for Overdrive/Distortion

---

As we have said before, all three clean preamps will produce overdriven sounds, but they are best suited to clean. Here the preamps are best suited to overdriven/distorted sounds. Some of them will give acceptable clean results but they are probably best used in their distortion modes, as it would be pretty hard for any of these to beat Clean TWIN (IMHO).

Well, you may now be thinking that I'm going to give the other preamps a good going over as well. I'm afraid that I am likely to disappoint here. I feel that having looked at the clean preamps you should, by now, have a good feel for how the amps shape up with regard to altering settings. So what I have done is broken them down into four groups, and provided four images in the files area so you can contrast the basic tone characteristics.

One thing you will find is that none of the preamps presented here have a tonal variation as extreme as the Clean TWIN. All these preamps are more modest in their tone.

The groups are (along with a short summary of the tonal characteristics):

[GTx-PRE-CrMaVx.jpg]

All these three are very similar. All have a slight, and I mean slight mid scoop, in the 100Hz-2kHz region and a slight boost to the treble end of things from 2kHz up. All the bass frequencies are dropped off via a high pass filter from about 70Hz down.

#### Crunch

Of these three, this preamp has the most bass boost in the 40-300Hz area, however it has the smallest treble boost which only covers 2-7kHz. Above 7kHz is a low pass filter dropping off the frequencies down to 22kHz. In practice this preamp gives light->heavy overdriven type sounds.

#### MATCH Drive

This amp has the least bass of the group. However it has an enhanced treble compared with the Crunch, but nothing like the VOXY. The Treble here extends from 2-13kHz before dropping off via a low pass filter. The treble boost is at a similar level to the Crunch. The mids have the lowest scoop but only by virtue of the fact that the bass has been cut slightly. Again this preamp can give quite a heavy overdriven sound.

#### VOXY Drive

This is the amp with the most treble, with the boost starting at 1.5kHz, boosting the treble well above the others before starting to drop off at 10kHz but not dropping off sharply until about 15kHz. Bass wise the VOXY is very much middle of the road. In practice this preamp appears to give a very muddy overdrive, very similar to the MATCH Drive but with more bass.

[GTx-PRE-BIBG.jpg]

These two preamps show more character than the (I think) wishy-washy first three. Here the mid scoops are deeper, but the bass and treble are balanced.

#### Blues

Basic well balanced preamp which has a quite deep but broad mid scoop from 90Hz-2.5kHz. The bass is boosted slightly in the 50-90Hz region, and the treble above 2.5kHz is boosted, but drops off quickly after 9kHz reaching the same level as the GT-3/5 reference, and the BG Lead by 10kHz, and continues to drop these frequencies off more quickly than

the BG Lead. In practice this preamp produces a light sound, with what is definitely describable as distortion rather than overdrive.

### BG Lead

Plenty of lower end character here. Again the bass frequencies drop off at a similar rate to Blues from 60Hz down, but a deep cut at 100Hz followed by a slow recovery up to 6kHz gives this amp a shallower but much wider mid scoop. The treble end is not boosted at all and drops off sharply via a low pass filter from 15kHz. In practice this preamp gives a very muddy boomy distortion perhaps suitable in its raw form to fuzz.

[GTx-PRE-MS1959.jpg]

Well, here are the Marshalls. Three very similar preamps. All three pretty much share the same mid scoop between 70Hz-5kHz, with minor variations due to extreme cuts in bass or treble. All three give a typical Marshall overdriven sound but I wouldn't go as far as to say it was a distortion sound. Definitely more an overdrive sound.

### MS1959 (I)

The (I) drops off from 70Hz, but has a cut bass anyway. Mid scoop is exactly the same here as the others. The scoop recovers to a non boosted treble which follows the GT-3 reference from 6kHz upwards.

### MS1959 (II)

The (II) is similar to the (I) except the bass has not been cut so much. Here it drops off from 60Hz. The mid scoop is similar to the I except the treble has been cut significantly, and before the mid scoop has had chance to recover at 2kHz a rounded low pass filter cuts in to knock off a large amount of high end.

### MS1959 (I+II)

A pretty good combination of the two. The mid-scoop again remains pretty similar, but here you have the Bass response from the (II) and the high end response above 800Hz from the (I). Also, this preamp still has the notch at 125Hz which marks the start of the mid scoop.

[GTx-PRE-SLM5MD.jpg]

OK, now let's look at the three heaviest distortion preamps. Again, all three preamps have a characteristic mid scoop. All three preamps have boosted bass and

treble in differing degrees. Also all three have low pass filters cutting the higher frequencies at a lowest value of 15kHz, which puts them all exceeding all the other preamps. All three also have a notch at 100Hz which recovers partially by 150Hz before starting the mid scoop.

### SLDN Lead

Medium bass boost in the 40-85Hz region, before notching at 100Hz and starting the quite deep mid scoop. The mid scoop then recovers earlier than the other by 2kHz before boosting the treble significantly before it drops off at 15kHz. This preamp has 'medium' bass and 'max' treble of this group. The SLDN gives a reasonable middle of the range type distortion. It is slightly crisper than the Metal 5150 or Metal Drive.

### Metal 5150

Of the group the Metal 5150 has the most boost to the bass, and a medium boost on the treble but only just above that of the Metal Drive. Apart from the lower bass boost, the bass and mids of this are identical to the SLDN. However, the mid scoop takes longer to recover, not recovering until 3.5kHz above which a medium treble boost is apparent. The most significant feature here is a very sharp drop off of high frequencies starting at 15kHz. Definitely a full on metal distortion comes from this preamp—not as crisp as the Soldano but definitely heavier!

### Metal Drive

This preamp has a very much boosted bass region of 30- 90Hz, again with the 100Hz notch starting the mid scoop. Unlike the others where the mid scoop is centred on 500Hz the boosted bass has shifted the scoop to centre on about 630Hz. Again the mid scoop recovers by 3.5kHz to enter a treble boost that is the least of these three preamps. However, whereas the Metal 5150 has an extreme drop at 15kHz, this preamp doesn't continue in a natural drop off instead, paralleling the GT3 reference response. Very similar to the Metal 5150 with the sparkle taken off the high end. Probably suited to more boomy styles.

Again I am not going to present any new patches here. For a basic sound start with 'Clean' and then add the preamp you want. This will give you a basic preamp patch to work from.

## Section 14 Preamps

### Dirty Preamp Presets

OK, let's take a look at some presets which highlight the characteristics of these preamps.

Preamp	<b>GT-3</b> Preset Patches	<b>GT-5</b> Preset Patches
Crunch	36-2 COOL CRUNCH	2-4-3 WEST COAST 2-5-2 COOLCRUNCH
MATCH Drive	42-3 MATCH LEAD 53-2 NICE CRUNCH	2-3-1 MATCH DRIVE 3-1-2 TIGHT DRIVE
VOXY Drive	53-4 YOUNG UK	2-4-2 VOXY BEATLE 2-5-1 FISH & CHIPS
Blues	38-1 COMBO LEAD	1-2-1 HARD BLUES 2-2-4 90'S ERIC 2-3-6 BLUES LEAD
BG Lead	40-3 BG LEAD	1-2-1-2 BOOGIE LEAD 1-5-5 CARLOS LEAD
MS1959 (I)	37-3 '70S STACK 42-4 LED STACK	1-1-1 TUBE STACK 1-3-5 FAT MS1959
MS1959 (II)	umm....where are they!?	umm....where are they!?
MS1959 (I+II)	50-3 SMOOTH LEAD 61-4 SATCH TONE	2-1-4 FIXED WAH
SLDN LEAD	36-1 TUBE STACK 40-1 LA LEAD 43-2 METAL POP	1-1-4 SLDN LEAD 1-4-2 MELLOW LEAD 2-1-2 NICE BULGE
Metal 5150	41-1 5150 CRUNCH 47-2 METAL 5150	1-1-3 EDDIES 5150 2-1-3 ERUPTION
Metal Drive	41-2 BOTTOM MTL 41-4 METAL SOLO	1-1-5 HEAVY METAL

### **GT-5** Preamp Customisation

My my! You GT-5 users are spoiled! You can even design you own preamps! The GT-5 allows two custom preamps to be defined. Full details are on pages 34-35 of the official manual. What you get it is 10 'building blocks' and you choose the characteristic of each. So if you ever find yourself wishing you could have one of the preamps – but changed just a little in character here is where you can do it!

### Distorted Preamp Summary

The basic preamp controls should be familiar to you now from our earlier look at clean preamps. What is really different with these preamps is that by using the Gain/Volume combination you can control the amount of drive that is available. Remember that any increase or decrease to the gain/volume will result in a change to the Master Volume in order to keep the effects output checked and in line with out level matching policy.

So use Gain/Volume for drive, Bass / Middle / Treble / Presence / Bright for colour and Master Volume to match the output level.

Again, remember that the EQ is there to help alter the colouring; 40-3 BG Lead shows this up well.

One disadvantage of using any increase in gain we discussed in distortions is increased \*noise\*. The preamps are no exception here; more gain—more noise. Again, as discussed above you may need to change the NS settings. Also, remember I mentioned the 'Yuk' noise, with regard to both clean preamps and the OD/DS? Well the distortion preamps are even more susceptible. I describe this noise in the section 16.

Anyway that concludes the preamps. Hopefully you will have found some of the information useful and now know how to avoid some of noise problems that exist.

# Section 15    Overdrive/Distortion

## Distortion Problems

Let me say this now. There is no such thing as a BAD distortion—merely a distortion which you don't like or isn't the sound you were looking for. That's not to say that it isn't part of the sound you are looking for. As we saw with the preamps, what effects you mix together can greatly change the sound. Distortion is the same. Please, NO MORE—'There are NO GOOD distortions on the GT-3/5'. My answer is

1. Learn to use your GT-3/5
2. Learn to use your equipment,
3. Learn how to set it all up properly
4. Take the time to play around, and seek out the sound you want.

Secondly, 'The distortions all sound too harsh'. Gibberish. Anyone who says this probably hasn't got the speaker sim on when they should have. On the GT-3, you need a preamp ON to get the speaker simulator working. And that brings me to my third point. 'The preamp distortions aren't as harsh and sound more natural'. Poppcock. I would suggest that this is because the GT-3/5 has been set to 'Line (Headphones)' and the OD/DS is being used without a preamp. Again, as I said before, on the GT-3 - No PREAMP—No Speaker Sim. Make sure you do use a speaker simulator when you are using full range speakers – particularly when using headphones. It is quite easy to see how the GT-3/5 could be criticised given these scenarios.

Please take the time to learn how to use the unit effectively. Understand what is on when and off when.

Right then folks, with that off my chest let's take a look at the OD/DS effect on the GT-3/5.

## GT-3/5 OD/DS

First let's take a quick look at the basic controls. Many of these will be familiar. If you are used to pedals like the Boss MT-2 Metal Zone you may be thinking that the pedal is provides more controls than the GT-3/5. This is not necessary true. "OK Barry, so what about the MT-2's parametric tone controls?". Well, quite simply the GT-3/5 already has more than this available on the EQ section. Anyway, the GT-3/5 does supply some basic tone controls with the OD/DS. Let's take a quick look at these basic controls then:

### Bass

This is a low pass shelving filter, providing boost and cut to roughly 50-700Hz. With roughly slightly more boost than cut available. The largest boost/cut is available around 60-70Hz.

### Treble

This is a high pass shelving filter, providing boost and cut to roughly the 500Hz-22kHz region. With the largest boost/cut available around about 5kHz. Again slightly more boost than cut is available.

### Drive

Use this to control the amount of distortion.

### Level

Use this to level match the output.

It should be remembered that just like the preamps, the distortions carry with them their own frequency response, and that the figures above for Bass and Treble are rough guidelines.

Now I've not really given the Drive control much of a description here so before we move on I would like to say a bit more about it.

Distortion is traditionally formed by clipping a preamp. This is done by driving it too hard, not so much driving the input too hard but generating a enough gain within the preamp for it to clip internally.

Picture a threshold above which, everything clips. If the threshold is real high then no clipping will occur, therefore no distortion. As the threshold is lowered more and more of the signal level exceeds the threshold and is clipped, thus providing more distortion.

However, the threshold for clipping is seldom adjustable and instead a varying amount of gain is used to control how much clipping occurs. Small amounts of gain against a fixed threshold will provide small amounts of distortion, large amounts of gain produces large amounts of distortion, as more of the signal exceeds the threshold and clips.

As a quick aside, different preamps (tube/solid state) behave differently in this clipping and thus we have different types of distortions. For instance a tube will clip more softly than a transistor, adding add even order harmonics, whereas solid state add odd order harmonics. Even order harmonics sound better- kinda like 3rds and 5ths versus flat 3<sup>rd</sup> or #7's in chords. When you start looking at digital systems the end result will not be so obvious as the clipping is now dependent on the software algorithm, which ultimately is derived from a processing model. For simplicity's sake we will look on the GT-3/5 distortions from a traditional point of view rather than a software point of view. This is quite a sensible approach, after all the software is typically just an implementation of a model of the traditional system.

Anyway, the change of gain in the preamp is effectively what the Drive controls. It increases the gain, as the drive is increased. Thus a low drive figure will give a lower distortion than a higher one. OK so why do different



## Section 15 Overdrive/Distortion

---

distortions give differing amounts of distortion for the same drive figure. Well, there are two things affecting this, firstly as described above is the clipping characteristics that are used—the form of the clip itself, and secondly is where the clipping threshold is. There is no guarantee that the clipping threshold is the same on each of the distortions. Indeed, in all probability it is different. Thus drive 35 on one distortion is not equivalent to drive 35 on another.

The GT-3/5 manual provides reasonable descriptions of the overdrives/distortions and I have nothing to add to them. One question that may arise is what is the difference between overdrive, distortion and fuzz? Well, the answer really is not much technically. Most of the difference is how the amount of distortion is perceived. Overdrive tends to be light-middle distortions, distortion tends to be middle-heavy and extreme distortions tend to come out as fuzz. The names do (I think) tend to characterise the distortions pretty well.

For tone analysis once again I have grouped the effects into several groups. These were measured with `dist=50,bass=0,treble=0,level=50`. Increasing/decreasing the drive doesn't change the frequency response much. Here are the images:

[GTx-OD-Overdrive.jpg]

Natural OD  
Vintage OD  
Turbo OD

[GTx-OD-BluesCrunch.jpg]

Blues  
Crunch

[GTx-OD-DistGrunge.jpg]

Distortion 1  
Distortion 2  
Grunge

[GTx-OD\_MetalFuzz.jpg]

Metal 1  
Metal 2  
Fuzz

I will say this—Turbo OD, Grunge and Metal 1 are my favourites. Oh, BTW one thing to note – the more distortion you use the less defined individual tones become. So picking with Turbo OD allows much more tone and definition of the note than when picking with Fuzz. The same is true within a single distortion. A drive of 30 will give much more tone and definition than a drive of 80. It's all horses for courses really and (once again) you need to experiment to find the sound you want. If you think hard about the way you would describe the sound, then you will find yourself saying things like 'hard edged distortion' or

'fuzzy' or 'light distortion' and these can lead you into the distortions that you should use as a starting point.

There are 11 internal distortions and 12 preamps!!!! It is very likely that you will find what you want in amongst this lot. You might need to tweak further, EQ perhaps etc but you should still find a distortion that meets your needs here. Also don't forget that there is no reason not to use a distortion with a distorting preamp—again it's all down to experimentation.

## Noise

---

It is appropriate at this point to talk about noise. As I have said above, the distortion is generated through gain control. Thus in order to generate large amounts of distortion we need large amounts of gain. The problem that can arise here is that any noise that occurs before the distortion will be amplified. Thus more gain more noise. This is why we concentrated so much on noise elimination in section 9.

Now if you are using high levels of distortion/gain you \*will\* get some additional noise. However, the GT-3/5s distortions do vary in their characteristics. Thus by changing to a different distortion you may be able to obtain the same level of distortion for less drive and possibly less noise. You really need to experiment to find out what works best.

In all cases a change of gain does mean a change of noise and a change of signal level thus requiring a change to the Noise Suppressor set-up.

I have NOT found it possible to induce the YUK noise which I describe fully in section 16 below. It seems to be a preamp only problem.

## Preset Patches

---

We have already seen two patches in earlier sections that use the OD/DS as the main distortion and use a clean preamp to colour the sound; these are [GT-3]'Metal Chop' and 'Metal Dist\*'. Also, we already have a patch that allows us to use the external effects loop—this one is 'Ext FX Loop' and I introduced that earlier too.

Rather than just present more of the same on the patch front, I think the best thing to do is take 'Metal Dist\*' and just change the OD/DS that has been used. This will give you a good idea of the available distortions.

Once again, to round up we will take a look at some of the preset patches:

Distortion	<b>GT-3</b> Preset Patches	<b>GT-5</b> Preset Patches
Natural OD	61-3 CHK'NPIK'N	2-5-4 UK CRUNCH
Vintage OD	39-2 STACK OD	2-4-5 LARRY'S 335
Turbo OD	43-3 TURBO LEAD 46-3 TURBO OD	1-2-2 TURBO OD-2 1-4-1 SWEET LEAD
Blues	58-1 BLUES BD-2	1-5-4 BLUES MAN
Crunch	58-2 CRUNCH OD	2-4-1 FAT CRUNCH
Distortion 1	46-4 DISTORTION	1-2-3 POWER DIST
Distortion 2	38-3 CLASSIC DS 42-2 DISTORTION-	1-3-4 MIDRANGE DIST
Grunge	39-3 GRUNGE OD 41-3 GRUNGE DIST 44-3 GRUNGE DS	1-3-1 HARD GRUNGE
Metal 1	37-1 METAL DIST	1-2-4 METAL ZONE
Metal 2	47-1 METAL LEAD	1-4-4 BOSTON LEAD
Fuzz	40-4 BOOMY FUZZ 42-1 FAT FUZZ	1-3-2 60'S FUZZ 2-2-1 VERY HAZY

You will note that many of the patches shown above also use a clean preamp of some description. This follows our policy of get the basic tone through the preamp. Of course my favourite in all of these is 'METAL DIST'. But by now I guess that is no surprise!!!

### **GT-5** OD/DS Customisation

Not only does the GT-5 allow you to set up two preamp customisations – you can set up two overdrive/distortion customisations too!

You will find the full details on pages 34-35 of the official manual. Here you are given 7 'building blocks' and you choose the characteristic of each. So if you ever find yourself wishing you could have one of the main distortions – but changed just a little in character here is where you can do it!

# Section 15a Applied Principles of Distortion Dynamics

When Mark Meyer first e-mailed me Vince's document I was intrigued by the title. Already hooked, I eagerly read it through quite thoroughly and was excited to find that someone had written down some real good tips on how to approach creating that killer distortion. Vince's agreement to allow me to include his work in the Set-up document was extremely exciting. The contents of this section are 98% Vince with only one or two minor revisions to make the text GT-5 compatible and also the odd interruption from myself. Apart from those small changes and some basic formatting changes it remains as per Vince's 1.3 version of his original document.

OK. Enough guff....on with the really interesting stuff. I'll now leave you with Vince Baim...

## Introduction

I haven't gone to any great length in making this an official, properly written document that includes a thesis, and super-correct, or fancy grammar, etc. Likewise, I didn't care to extend to the physics aspect of distortion and acoustics, blah, blah, blah. Rather, I simply wanted to get some basic principles across, which I use, to get some great distortions and tones. I did include a bit of techno-babble for those of you who like to understand what you're actually doing. If you simply want to jump right in, go to the sub-section called, "The Example". Please feel free to email me with comments (Which may be found in the Important Notices at the start of this document – Barry). I'll try to answer emails depending on how many I receive, but I ask you to *puhhleez* not send emails asking me to custom-create tones for you, send you my patches, or help you configure your GT-3/5! Also, if you don't appreciate this section, please don't send me hate mail (Nor me! – Barry)

## Frequency Control

The bottom line to everything I do concerning tone has its basis in what I refer to as "**Frequency Control**". Simply put, distortion and tone (herein, "**tone**"), is basically made up of various types of sound curves, which occur both before and after distortion, and we want to shape these curves in an attempt to gain control over our sound. These sound curves play a major role in determining the characteristics of our tone. For example, some people change the pickups in their guitars in order to gain control over their tone. What happens is that pickups often emphasize or de-emphasize specific areas of a frequency range (pickups do not accurately interpret the tone of the guitar itself), and so the amplifier's input reacts to it accordingly. If a pickup's frequency response has an emphasis say, in the **midrange**, then the amplifier's input is going to be more sensitive in that area, and the tonal characteristics will be changed. Not only does this yield a distinct sound character, but it also changes the feel of the guitar to the player, because of the way the amplifier is

reacting to the signal being sent to it. Changing your guitar's pickups is one way to control your tone. However, unless you can be sure exactly how a given pickup is going to sound in *your* guitar, it may be a waste of time and money, if you find that after you've installed it you don't like it.

## Equalization Theory

So then, if guitar tones can be manipulated through their frequency curves, what do we need to do to get the sounds we want? Well, the simplest way to do this would be to use your amp's bass, middle, treble, and presence controls, right? Though it's usually quite effective, most of the time this just gives you control of your amp's general output. Furthermore, if you compare those tone controls on your amp to say, a 31 band graphic EQ, it kinda makes your amp look very limited. To take this even further, even if you did have 31 bands of EQ on your amp instead of 4, it still wouldn't do much to change the characteristics of your distortion unless you knew how to use it. That's where the idea of "PRE and POST distortion EQ" comes in. **Theoretically**, (and I do mean *theoretically* here), you would be able to alter the tonal structure of any guitar and amp to sound exactly like anyone else out there, even exactly like another instrument, such as a set of bagpipes, (bagpipes???). But, the sad fact is that in reality, it ain't gonna happen. The reason you cannot get the *exact* sounds is because, even though you may have 31 bands with a typical 1/3 octave equalizer, it's still not nearly complex enough to control every single aspect of the full audio frequency range. That kind of complexity would make a 31 band EQ look more like your amp's 4 tone controls, for that matter! Also, the human ear may not be complex enough to reproduce those sounds even if the technology was there. Still, for us the principle does apply, that by having greater control over our frequency spectrum, we can get much closer to what we want to hear in our tone. Therefore, we are going to do this through the use of not one, not two, but (yes), **THREE** equalizers, and our beloved BOSS GT-3/5 and guitar amp. These are exactly the tools that will do it for us!

## More Theory...

Before we get into some exercises, let me point out that it is my belief (and the belief of countless others), that our friends at Marshall have it quite backwards with their approach to guitar tone, exemplified in their famous long-time Valvestate series of guitar amplifiers. Backwards, in that, it doesn't so much matter whether the **preamp** section is Tube, or Solid-State. Contrary to popular belief (imposed on us by bogus marketing strategies), it is the **OUTPUT** section that needs to be Tube, rather than the preamp section, because it's the output distortion that makes the spine tingle! "Awesome Guitar Tone" began years ago, when players cranked up their non-master volume amp's to the max, and thereby overdrove the output section of the

## Section 15a Applied Principles of Distortion Dynamics

amp. The result sometimes gave a “growling” or “roaring” distortion effect. With louder pickups, their preamps would add too this by overdriving the preamp a bit. (Incidentally, “A single 12AX7 Does Not A Tube-Amp Make”!). Regardless, it's ok if your amp has a solid-state output section- you'll still get cool tone, but you won't be able to add that way-cool output/power tube distortion element. Again, it's the theory that applies here, that Tube output is preferred over solid-state for a specific reason. Anyway, let's get on with an example, using the GT-3/5's EQ sections to alter tone. Here we go...

### The Example

Get with your guitar and your GT-3/5. We are going to create what I consider to be a high-gain “Eighties Metal” type of distortion sound with a tight-bottom and nice pick-attack, employing the above principles. Many of you have tried to use the “high-gain” setting at the end of an Amp-Sim/Mod on the GT-3/5 and found it to be the kind of sound that you might think would pull in radio stations! We are going to approach “higher-gain” in a different way than simply using presets. Execute the following:

- Set your amp up like you usually do.
- Plug the output of the GT-3/5 into the FX return of your amp. If you don't have an FX loop, plug into the main input. Get a basic amp tone and volume level for now, -just something we can work with.
- Find a patch on the GT-3/5 that you don't mind altering, and **turn ALL the effects off**, except reverb if you like. Basically, you want to start with a “blank page” to work with. [Such as the ‘Clean’ patch – BSP]
- Use the UTILITY function, and **set the bass and treble to Zero**, then choose one of the four amp-types that sounds the best to you. I like either the boxy sound of the “Gt.Amp(combo)” or the mid-scoop of the “Power Amp(Stack)” settings, because they sound good through my amp.
- Select the [GT-3]PREAMP/SP SIM or [GT-5]PREAMP, and choose “SLDN Lead”. Adjust the following: **Vol:30 / Bass: 50 / Mid: 50 / Treb: 50 / Pres: 50 / Master: 70 / Gain: middle**. On the GT-3 continue to select **Mic Set: Center / Mic Level: 100** and on the GT-5 select the SP SIM button, and set **SP Simulator On / Type SLDN Lead / Mic Set: Center / Mic Level: 100**. Play this setting, listen to its character, and when you've finally realized how displeasingly “un-metal” it is, go on to step 6.
- Next, you're going to see the difference made by using two methods of adding gain:
  - In the SLDN Lead preamp, scroll back to the VOL.30 setting, and while you play, increase the gain using the Value Dial, and listen to the sound. In my opinion, this basically increases the aforementioned “displeasure”. Turn the VOL. Back down to 30 when you're done.
  - This time, press the MASTER button once, and tap the right arrow > 6 times to enter the EFFECTS CHAIN section. Use the Value Dial to move that little “dude” to where he's parked just before PRE. Tap the OD/DS button, to put your Overdrive/Distortion right before your Preamp in the effects chain. Press WRITE then tap EXIT. (If you get lost, tap EXIT and start over). Next, you need to tap the OD/DS button again to make the following settings: **ON / Type: Vintage OD / Drive: 60 / Bass: 0 / Treble: 0 / Level: 50**. When you've made these settings tap WRITE, then tap EXIT. Check the sound out- you should be getting a lot more gain without sounding like you're going to get radio stations or feedback.
- So far we've worked on setting up the basic “gain structure” as I would call it, but we haven't done much with the tone yet. It seems at this point, the natural tendency might be to crank up the bass in the SLDN Lead Sim for more punch or low end. In this example, doing this works **against** you, because what you're doing is increasing the level of bass that the preamp sees. It distorts the bass more, giving perhaps a more “grungy” sound. Desirable to some, but not for this example. To hear the effect this has, try it two ways: increase the bass in the SLDN Lead Sim, then return the bass to 50, then crank up the bass in the OD/DS, then return it to 0. Tap EXIT when you're finished.
- We have a few more steps to go before we finish our patch. Next, is to go back into the effects chain section. Tap MASTER, then tap the right arrow > 6 times to get to the effect chain section. With the Value Dial, scroll the “little guy” until he's parked in front of the OD. Tap MOD to place Mod before the overdrive in your effects chain. When you're finished, tap WRITE then tap EXIT.
- Now we can begin the first stage of **Frequency Control**. Tap MOD twice to turn it on. Tap the right arrow > to FX Select, and turn the Value Dial

## Section 15a Applied Principles of Distortion Dynamics

---

to select SUB EQUALIZER SEQ. Tap the right arrow > and make the following settings: **Low: -9 / Lo-Mid f: 800Hz / Lo-Mid Q: 1 / Lo-Mid EQ: +9db / Hi-Mid EQ: 0db / High EQ: 0 / Level: 0**. After you've made these settings, tap WRITE then tap EXIT. What you should hear now, is something that resembles a metal distortion from the 1980's, and it should lack bass, but have a thick, powerful midrange quality that responds very easily to the pick. I said it lacks bass, so we'll work on that next.

- Our patch is not far from being complete! Read the above steps to enter back into the effects chain. This time, park that "little guy" directly after PRE, and tap the EQ button once to add the EQ between PRE and NS. When you're finished, tap WRITE then tap EXIT.
- Now tap EQ and make the following settings: **ON / Low EQ: +12db / Low-Mid EQ: 0db / Hi-Mid f: 4.00Hz / Hi-Mid Q: 1 / Hi-Mid EQ: +3db / High EQ: +3db / Level: 0db**. When you're finished, tap WRITE then tap EXIT. Make sure that the following buttons have their red LED's on: OD/DS, [GT-3]PREAMP/SP SIM or GT-5]PREAMP and SP SIM, EQ, MOD, and REVERB if you like ambience. You should hear the sound you finished in step 10, except there should now be plenty of bass, the bass should sound fairly tight, the midrange should be punchy, and you should have a nice pick attack without sounding thin. Notice that the original tone of the SLDN Lead sim has changed dramatically. You may want to take a break here and do some metal soloing and/or some ripping power chords for a while. You can experiment with the following if you like:
  - Adjust the MOD section's Sub Equalizer (pre EQ), to change the volume and frequency(s) that will distort the most, according to your liking.
  - Adjust the "main" EQ (post EQ), for the overall tone shape, according to your liking.
- This last part is optional: After you've made all these settings and feel successful, you can then tap the UTILITY button, and add perhaps +9 or 12db to the bass, and perhaps +6 or 9db to the treble, for a super powerful sound!
- And for those of you who have full tube amp's, particularly of a lower wattage, plugging the GT-3/5 into the FX return (which bypasses the preamp), and turning the GT-3/5 full up, can seriously drive those power tubes! You may need

to crank the Amp up to get this effect, and it may not work well with all amp's (some output stages distort more easily than others). What is happening in this case, is that you are using your guitar and GT-3/5 for tone and preamp distortion, but when you add the growl of the output stage on top of that, you get an amazing sound with quite a bit of depth and dynamics. Isn't life wonderful?

## The Results

---

What we have effectively done in the example is, we:

- Shaped the guitar's **tone** in way much easier than changing pickups, (Pre Equalization).
- Chose an overdrive/distortion "pedal" to add **gain** to the Preamp Sim, in a way similar to using say, a "Tube Screamer".
- Chose an **amplifier** model, like choosing a Marshall, Boogie, Soldano, Twin, etc. We also shaped the amplifier's tone minimally.
- Added Post EQ to give us the output-type frequencies we need, without making things sound "muddy".

We've taken some bass away from the guitar (before the preamp), to help clean up some of the "mud" that we might get, and added some midrange to put an emphasis there. Then we added some additional gain by using our overdrive/distortion along with our amplifier model. Lastly, we changed the output (after the preamp), using EQ to put back some of the bass that we took out of the guitar, and emphasize the higher frequencies a bit to help the sound gain a little clarity, or "cut".

You can use the principles I've just described to custom-create your own sounds.

For example, instead of adding Mid EQ, subtract it for a "Mid-scooped" type of tone. Try boosting and cutting different frequencies to find your personal sound.

The formula then is, **1)Shape The Input Signal with Pre EQ, 2)Add & Shape The Gain with OD/DS, 3)Choose The Amplifier Model**, and adjust it as you would your own amplifier, **4)Shape The Output Signal with Post EQ**. Play around and find what suits you the best, but always remember to LISTEN.

Basically, in my experience, these principles are the formula for gaining ultimate control over tone. You may not be able to make exact copies of a Seymour Duncan pickup, per-se, but you may be able to get very close if you have a good ear. Here are some basic tips to remember:



Vince Baim

- EQ the input signal (before distortion) to change your distortion characteristics, and to some degree, your tone.
- EQ the output signal (after distortion) to emphasize the CLEAN output, such as bass and treble.
- Cutting lower frequencies at the input increases clarity. You can then make up for it in the output EQ.
- Adding a bit of upper frequencies around the 4K area to the output EQ can increase clarity, by allowing the sound to cut through a mix.
- Put most of your “ambient” type of effects, i.e.; reverb, delay, chorus, AFTER the distortion. Otherwise, you will distort your effects.
- Use the EQ in the UTILITY section of the GT-3/5 for adapting to room acoustics, rather than making it a part of your tone-chain. For example, if you find you have awesome tone in your bedroom, but not in the practice room, you can quickly access the UTILITY function to add/cut bass and treble-how cool and easy!
- If you play in a band and find you’re always fighting your bass player, try turning some of your bass down. This will give the bass player more frequency space- YOUR space will be more in the mid-to-high frequency range. Now, each of you has his or her own sonic space. No more fights!
- LISTEN, LISTEN, LISTEN, to all those wonderful frequencies that you can control. Find your space, put your tone there, and you’ll stand out from the rest.
- Lastly, while you’re doing all this listening, take some time to listen to your ears- they may be telling you to take a break! Loud practice volumes only waste your ears. We like it loud because volume compresses the eardrum, and attempts to make all frequency levels even. You can do the same thing with EQ WITHOUT blowing your ears out! Remember, your hearing is the most valuable tool you have for tone. It’s not cool to be deaf!!!

### Summary

---

I hope this small bit of information helps many of you, as it’s worked for me for years. It not only applies to the GT-3/5, it applies to all guitar set-ups. We are fortunate to have so many features in one box. I’ve given one example to show you some general principles for achieving better tone, what you do with it from here is up to you. There are far more possibilities than what I’ve written in this text, but I simply wouldn’t have the time to write it all in a text. Good luck with your tone! I am willing to answer questions, and appreciate suggestions, but if too many people write, I won’t have the time to answer everyone.

Thanks for reading!

Sincerely,

## Section 16 Digital Aliasing (YUK Noise)

### What is Digital Aliasing?

OK before the noise was identified as aliasing I called it 'YUK Noise'. No it is not an official term. Never has been, never will be. But it is the best way to sum up this particular noise in one word. What it is, is a horrible 'someone tuning a radio' type underlying harmonic type thingyme type noise—and it is YUK!

In order to define and tell you about digital aliasing, allow me to quote from an article in the May 1998 issue of Sound on Sound (SoS) magazine called 'ONE BIT AT A TIME: All about digital recording'. The full article may be found at

<http://www.sospubs.co.uk/sos/may98/articles/digital.html>

*In analogue systems, distortion produces additional signals, above the original audio components, which are related harmonically -- as in second or third harmonic distortion. These may be undesirable, but being 'musically' related to the source they tend to be acceptable -- even beneficial -- if sufficiently mild. However, aliasing in digital signals produces tones that are not musically or harmonically related to the source signals. Instead, they are mathematically related to the sampling rate and the aliases appear below the signal which caused them. Since this is a very unnatural phenomenon, the ear can detect aliasing even when there is only the smallest trace of it, and it is particularly unpleasant.*

*The visual equivalent of aliasing is strobing -- the classic example being the wheels on the stage coach in an old western movie which appear to be going backwards slowly when in reality they are going forwards very quickly! The true rate of rotation is too fast for a film camera (with its slow 24 frames-per-second 'sampling rate') to capture, but the 'alias' of that rate is visible as a much slower, often reversed, rotation.*

*As it sounds so unpleasant, it is essential that aliasing is not allowed to occur in an audio sampling system, and the original analogue audio is low-pass filtered to ensure that nothing above half the sampling frequency can enter the system. This filter is called an **anti-alias filter** (since that is what it filters!), and it prevents the lower image and the audio signal from overlapping.*

*The sharpest low-pass audio filters normally encountered on mixers or synths might have rolloff slopes of up to 24dB/octave, which means that for each doubling of frequency (i.e. octave rise in pitch), the signal is attenuated by a further 24dB. However, to achieve sufficient isolation between the wanted audio signal and the unwanted lower*

*image in a sampled signal, we need perhaps 90 or 100dB of attenuation for an anti-alias filter -- and there is typically only a fraction of an octave to do it in! Anti-alias filters therefore have to be extremely steep, with rolloff slopes in the order of 200 or 300dB/octave, and in order to allow them sufficient space to achieve a useful degree of attenuation, the Nyquist theorem requires that the sampling rate is actually around 2.2 times the highest wanted audio frequency.*

The worst thing about aliasing is that you can only hear it in a particular situation. The rest of the time you cannot hear it as such. However, this doesn't mean it isn't affecting you—it is – and it can muddy your sound, making solos and chords sound bad.

Now the GT-3/5 is not a perfect digital unit. The sampling rates used just do not give it enough room to sufficiently remove all aliasing artefacts. However, despite the fact that the unit will show signs of aliasing in almost every situation, the artefacts of that aliasing are normally so quiet that they are masked by the main signal going through the unit. However, what I am going to show you know is two patches that highlight digital aliasing (quite audible artefacts present) and one, which although extreme in its levels, does NOT produce any additional increase in volume of the aliasing artefacts. Firstly with a clean preamp we will increase the affect of aliasing, then we will look at the OD/DS to try and re-create the problem here and finally with a dirty preamp.

I will say now that the OD/DS version does not really suffer from this problem. It is a COSM PREAMP ONLY problem. The GT-3, GT-5, VF-1 suffer from it, and I've seen reports on many other Roland COSM based units that suffer aliasing problems too.

**I believe the reason for the problem is that when the COSM preamps model distortion, they also produce harmonics outside the range of the normal sampling frequency. This results in a misread of the frequencies – digital aliasing. The aliasing artefacts produce here are, unfortunately, rather audible compared with any other negligible artefacts produced by the GT-3/5 normally.**

The aliasing is most discernible at high gain. Once I have shown you how to highlight aliasing I shall give you some recommendations on how to resolve it. To help you identify the sound there is a very small 10sec .wav file that I have is available on my bands website called GTx-YUK-Noise.wav. Which can be found at [http://www.breakingtaboo.com/gear/boss\\_gt-x](http://www.breakingtaboo.com/gear/boss_gt-x).

### Increasing Digital Aliasing

To increase aliasing, set-up each of the patches as I show below and then bend the 2nd string at the 15<sup>th</sup> fret, up one

whole tone or more and hold it allowing it to decay. Give it a good strike with the pick to start with and once held you can strike again to hear some more. Listen for the noise in the lower register and it will make a kind of whiiiiirrrr-wooo-warr type sound. It is fairly quiet but once you have heard it once you will be able to identify it again and again. If you can't get it with the 2nd string try the same thing with the first and/or third strings. I should say that the aliasing is far, far easier to hear through a speaker powered by a loud amp than it is on headphones which loose so much low volume definition it is hard to make out the sound; still possible but harder.

### **Clean Preamps: Patch 'YUK Noise 1'**

You probably would have put these under any high gain category. However, basing this on 'Clean', choose the JC-120, set Volume=100, bass=50,middle=50 treble=50, gain=High and master volume = 100. Bring down the master level to about 20. Now play as described above to hear the aliasing—listen carefully, try the bend two or three times if necessary. This patch is one of the clearest showing this fault and it was the one I recorded in the file I described above.

### **OD/DS: Patch 'YUK Noise 2'**

This time use 'Clean' as a base patch for this. Turn the OD/DS on. Set the Drive = 100, Bass=0, Treble=0, and Level = 100. Turn down the master to about 40. Now play as described above to hear the aliasing—listen carefully, try the bend two or three times if necessary. Personally I cannot detect anything even with the amp up loud.

### **Dirty Preamps: Patch 'YUK Noise 3'**

OK. This time use 'YUK Noise 1' as a base, and the preamp Metal 5150. Once again play as described above to hear the aliasing—listen carefully, and again try the bend two or three times if necessary.

## **Avoiding Audible Aliasing**

OK. So now we know it's there what is the best way to avoid it? Well. Let's take a look at each scenario one by one.

### **Clean Preamps**

The main problem appears to be associated with higher signal levels. My GT-3 meters are showing the preamp output up to TWICE that of my target effects chain level, and it is herein I believe the problem lies. If you level match the effects chain properly you should avoid aliasing. I found I had to reduce the gain to middle, volume to 70 and master volume to 90 to really get rid of it noticeably, but this was

still way above the target effects chain level. If I use volume 100, and my normal master level, I find that to level match, I must come back to around 65 on the preamp master volume and the problem is certainly not discernible if not completely vanished. However, with master volume at 58 and set to high gain then the noise has returned, albeit low level but enough to muddy the sound.

### **OD/DS**

Well. Not much remedial action required here—it does not appear to be affected by audible aliasing issues.

### **Dirty Preamps**

Um...I'm afraid to say even with volume set to 10, master volume at 61 and gain=middle I can STILL hear the problem. Whilst I really would like to tell you how to avoid the aliasing, I can't get rid of it from Metal 5150 and I have now given up. Other preamps may not be so bad. Sorry!

## **Summary**

In summary I would say—keep your patches level matched throughout the effects chain, avoid the setting gain=High and keep the volume/master volume settings as low as you can. This will help avoid problems. However, kick the gain all the way up and you will find life getting tougher and you will start getting a crap sound out of your GT-3/5.

Personally I prefer to use the Clean TWIN, and JC-120 with the OD/DS distortions and as you can see this combination does not produce the sound as the preamp volumes are kept fairly low. This is why I like 'Metal Dist\*' so much and I am not so keen on [GT-3]'47-2 METAL 5150' or [GT-5]'PG1-1-3 EDDIES 5150'. With this patch I can hear the problem and the preamp is set well below the target effects chain level..glug..glug..glug!

What you need to do is determine whether or not you are prepared to accept the audibility of the aliasing. Be wary that whilst it might not be present at bedroom levels, when you go and do that gig you may find things getting ugly.

The GT-6 apparently (according to Roland) has the aliasing problem fixed – but I am a little sceptical not having had access to assess a GT-6 yet.

Note that I have highlighted a section of the text in the first paragraph in the SoS magazine article at the start of this section. This particular part of the piece sums up why I dislike the COSM preamps so much. Maybe it's that my ears pick it up and I notice more so than other people. Whatever the reason you must determine whether or not the level of the aliasing is acceptable to you, and whether or not you can live with it.

## Section 16 Digital Aliasing (YUK Noise)

---

OK. So hopefully you can now hear what I mean. The important thing is that you now know how to avoid the aliasing.

## Section 17 Slow Gear

### What is the Slow Gear?

The Slow Gear lives under the SFX group on the GT-3 and with the Feedbacker on the GT-5. Many guitarists probably don't know this effect as 'Slow Gear' but as an 'Attack Delay' instead. In its simplest form it's an automatic foot volume. The Slow Gear will fade in each note/chord that you play.

### Rise Time

The time it takes to change the volume level from 0 to full is determined by the Rise Time parameter....I feel a table coming on!! Roland HAVEN'T supplied me with ANY information, so the timings are obtained from observations using Sound Forge as a .wav recorder/editor, and SpectraLab (to use the 1kHz signal generator) to obtain a pure signal with no decay. The timings below were derived using a GT-3 but the GT-5 is expected to be identical.

Rise Time Parameter	Rise Time in Milliseconds	Approx. Time in Seconds
0	100	
10	110	
20	125	
30	150	
40	180	
50	230	0.25
60	285	
70	380	
75	450	0.50
80	560	0.50
85	730	0.75
90	1050	1.00
91	1170	
92	1310	1.25
93	1470	1.50
94	1670	1.75
95	1950	2.00
96	2350	2.50
97	2920	3.00
98	3910	4.00
99	5860	6.00
100	11700	12.00

As you can see from the table the increase in rise time is not linear! Indeed once the rise time gets to 95 it starts to lengthen extremely rapidly. Below 75 a rounding effect occurs and above this the delay becomes more pronounced.

Using short times will give a sound similar to woodwind or bowed instruments, longer rise times give organ type swells.

It is possible that with the longer rise times your string decays quicker than the rise and therefore you never reach full volume, fading in to a quiet note or worse—almost nothing. Using a compressor in front can help this by producing increased sustain.

© Copyright 2000-2002 Barry S. Pearce et al.

### Sensitivity

The sensitivity control is probably the hardest to juggle and yet is very easy to understand. With the sensitivity set at 100 everything will trigger the slow gear. This may be a problem as it may be triggered by noise etc. this is known as false triggering. At 0 it is actually insensitive and you have to play extremely hard in order to get the slow gear to trigger. In fact, on my system setting this to 0 is pretty much a guaranteed way of avoiding triggering! I just cannot get it to go! I need the sensitivity at an absolute minimum of 5, but 10-20 is a better minimum for me.

In all cases you will need to fiddle with this until you find the best response for what you are playing. If you are having problems you may find that inserting an extremely brief pause between notes may help you get a more consistent trigger response. The triggering can be very sensitive to picking technique, so you may need to experiment and alter your technique to get this effect to work to your satisfaction.

By reducing sensitivity down from 100, we can achieve two things. Firstly we can obtain a more natural run, and secondly we can 'play' the slow gear. One thing to be aware of here though is that sometimes non-slow gear notes may sound louder than those trigger the effect.

### Effects Chain Ordering

The slow gear can be placed anywhere in the effects chain of course, feel free to experiment, but there are two places which are most likely:

At the start of the chain:

This is least desirable if used before compression or distortion. What happens here is the sound fades in but then compressor/distortions get hold of it and before you know it the rise time has disappeared almost completely.

At the end of the chain after DD/CE but before RV:

My favourite place for the SG is here. Just before the RV. You get the rise time you expected, and distortions are faded in better.

### Using the Slow Gear

OK, at this point I would like to present a new patch called 'Metal SG'. This is quite a simple one to use. Take our level matched METAL DIST called 'Metal Dist\*' and then add the Slow Gear, sensitivity 50, and rise time 60. Make sure the slow gear is at the end of the effects chain just before the RV. OK. When you play use single notes and a lot of wrist vibrato. This makes it really sing and the vibrato helps make it sound more violin like. Of course you could use the VB effect to make life easier. By having the sensitivity at 50



## Section 17 Slow Gear

we can 'play' the slow gear—pick quietly on a run and no slow gear—same run pick loudly—slow geared!

### Problems

I'm afraid that there are one or two more problems associated with attack-delay units:

- It is possible to have the unit double-triggering from a single strike. Set the sensitivity to 70 and rise time to 60 play a loud chord and you will probably be able to get it to double-trigger. In fact chords generate double trigger more than anything else. This is due to the complex nature of a chord.
- As you pick new notes during a rise re-triggering should occur. Sometimes however, it can be fooled—but this is mainly when given a more constant volume level as input.

Sometimes, using a compressor in front of the slow gear may help stop the dynamics from causing the false re-triggering.

OK, now we need to look at a GT-3/5 specific problem. When there is no rise active the gain across the slow gear runs at 1:1. When you strike a note/chord the unit must recognise this react and reduce the volume to zero before starting the rise. The GT-3/5 takes a little time to react and doesn't drop the volume down as fast as is desirable, thus you can hear the initial strike. This 'breakthrough' is more noticeable on chords, and well-spaced apart notes. Careful picking/strumming technique can help reduce the noticeable this is.

### Presets

The Slow Gear appears to be quite popular with the techies at Boss. Looking at the preset patches we find the following settings are used:

<b>GT-3</b> Patch	Sens	Rise Time	Quick Setting
38-4 ARPEGIATOR	50	60	SLOW GEAR 2
70-1 ORGAN TONE	50	0	
71-1 SPACE ECHO	50	60	SLOW GEAR 2
71-2 FANTASY	50	60	SLOW GEAR 2
74-1 RING TRIP	73	77	
74-3 RING ECHO	50	60	SLOW GEAR 2
77-3 PAD GUITAR	50	90	SLOW GEAR 3
81-3 DIMINISHED	50	30	SLOW GEAR 1

<b>GT-5</b> Patch	Sens	Rise Time	Note
P3-4-4 SLOW ATTACK	50	50	
P4-2-1 DIMINISHED	50	30	[CTL] ON
P4-4-2 CRYING CAT	50	60	
P5-1-2 PHASE ECHO	50	60	[CTL] OFF
P5-3-4 RING ECHO	50	60	
P5-4-4 RING TRIP	73	77	
P6-2-1 FANTASY	50	60	
P6-2-2 TRIP PHASE	50	60	[CTL] ON
P6-2-4 SPACE ECHO	50	60	
P6-3-2 FLASHBACK	50	77	[CTL] OFF
P6-3-4 MOD ECHO	50	60	[CTL] ON
P6-3-5 ORGAN TONE	50	0	
P6-4-4 NOISESTORM	50	60	[CTL] ON

As you can see, most of the patches set the sensitivity at 50, which incidentally all the Quick Settings use as well. One final thing before we go I must make an additional mention of the preset patch 'FANTASY'. This is a great patch that shows the Slow Gear in action. This patch has real potential.

A similar effect to Slow Gear is possible by using the foot volume, your guitar's volume control or the control assigns. These are examined in the appropriate sections.

## Section 18 Tremolo/Pan

### What does the tremolo/pan do?

The tremolo lives under the SFX group on the GT-3 and is privileged enough to have its own group on the GT-5!! There are two modes; tremolo and pan. Tremolo cyclically varies the volume levels up and down, whereas pan still cyclically varies the volume level but does so whilst alternating between left and right channels. We shall look at exactly how all this is varied in a moment. Firstly let's clear up a possible source of confusion that exists in the guitar world. Somehow, some plonker somewhere called the tremolo arm (whammy bar) on a guitar a 'tremolo arm'. Unfortunately, the guitar does NOT use this bar for a tremolo effect. The effect of using the bar is vibrato. The difference between vibrato and tremolo is that vibrato is a cyclic variation in PITCH whereas tremolo is a cyclic variation in VOLUME. OK, let's look at each of the tremolo/pan controls in turn.

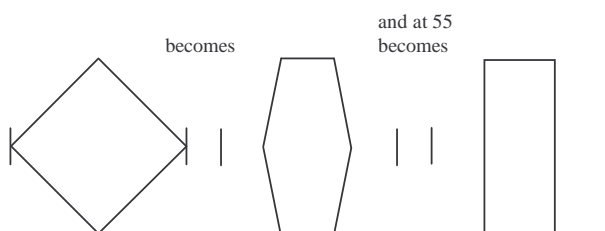
#### GT-3 Wave Shape

A Low Frequency Oscillator (LFO) generates the cyclic variation that is the basis for the tremolo and pan. The wave shape parameter determines what the LFO's generated waveform looks like.

Set at 0, the wave is triangular. The volume rises and falls in a linear fashion, the same rate going up as down. Thus forming a triangle. As soon as the bottom of the triangle is reached (0 volume) then the up cycle starts again. As the wave parameter setting is increased, the peak becomes fatter and the base thinner, but the time frame remains the same, thus the wave is starting to square itself up.

The tremolo and the pan behave slightly differently. Tremolo squares the wave quicker than the pan. By 50 the wave is almost square, and then the tremolo wave snaps to being pretty much square at 55. The square wave here has the on and the off being almost equal—the ON is longer by about 50ms (at rate 50). But that isn't much worth worrying about. From here on up to 100, the time the volume is full lengthens and the time the signal is off therefore decreases. By 100 the signal is on almost all the time apart from a little blip here and there.

I think the best way to show this us via a diagram:



The pan on the other hand does not suddenly snap to a square wave at 55 but continues to slide from the triangular

wave at 0 to an almost near as damn it square wave at 100. Therefore the pan is much gentler in its changing of the waveform. It never goes into this blipping state, always keeping a separation between on periods and off periods on a single channel. In summary, the basic 2 wave extremes are:

Tremolo	Triangular = 0, Square = 55
Pan	Triangular = 0, Square = 100

It should be noted that these are effectively equivalents, and produce a similar effect on a given channel.

#### GT-5 Modulation Wave

A Low Frequency Oscillator (LFO) generates the cyclic variation that is the basis for the tremolo and pan. Just like the GT-3's wave shape parameter the modulation wave parameter determines what the LFO's generated waveform looks like.

The GT-5 is slightly limited here compared to the GT-3 and rather than a variable waveform you only have the choice of 'Square' or 'Triangle'.

#### Rate

This control determines how rapid the cycles will be. I feel a table suddenly coming on!! Times have been obtained through observation and have NOT been supplied from Roland. Again these were tested using a 1kHz tone generator. Cycle times for the tremolo and pan are identical. Although these times were determined using a GT-3 it is expected that the GT-5 is identical.

Rate	1 x Cycle Time in ms	Approx Time in seconds
0	INFINITE!	
1	15850	16.0
2	13590	13.5
3	11185	11.0
4	9510	9.5
5	7925	8.0
6	7610	7.5
7	7045	7.0
8	6675	
9	6340	
10	6000	6.0
12	5285	5.25
14	4695	4.5
16	4175	
18	3690	
20	3275	3.25
25	2445	2.5
30	1800	

## Section 18 Tremolo/Pan

Rate	1 x Cycle Time in ms	Approx Time in seconds
35	1343	
40	1000	1.0
50	660	
55	535	0.5
60	435	
65	355	
70	287.5	
75	232.5	0.25
80	190	
85	155	
90	125	
95	88	
100	62.5	

Yes. The rate of zero appears to do naff all with the levels fixed in what seems to be a random result. Now, I first that this was completely pointless. Cheers Roland. Bugged that one up big time. But then I got thinking what if I set the CTL PEDAL up to say zero the rate when I chose? By doing so the tremolo/pan freezes the levels at the moment when it goes to 0! Maybe it's not so useless after all—think of this setting as a 'level hold' feature.

The rate continues above 100 into the BPM synchronisation modes to help you get a better synchronisation with the music tempo. However, this can cause problems as the keeps good time but the drummer is likely to vary. Craig Anderton suggests in 'Guitar Gadgets' that using a rate twice the song tempo will help make any variations between the GT-3/5 and the drummer more hidden as the tremolo will tend to catch up and slide back into place.

### Depth

Depth determines what percentage of the input signal level is available for alteration by the effect. In other words it will determine the minimum volume level. So at 100 (%) the whole volume is available for tremolo/pan so the minimum volume would be 0. However at 50% the minimum volume is half the input signal and again at 30% the minimum volume level will be 70% of the input signal. A depth of 0 means the volume isn't dropped at all (on pan both channels will be even). Pretty useless at this setting? Not necessarily by doing so you can turn the effect on without it effecting the signal and then by using the expression pedal say increase the depth.

Right let us take a more specific look at the two modes individually.

### GT-5 Balance

The GT-5 includes a Stereo Balance parameter to both the Tremolo and Pan functions, and defaults to a 50R /50L setting. In both effects, the balance control moves the relative centre-point of the signal, making it more "right-centric" or "left-centric" as desired. This is exactly like the Pan knob on most mixers. Remember that the parameter values are percentages, and therefore the right and left values must add up to 100.

### Tremolo

OK. With the tremolo left and right channels are treated identically and the volumes are changed in the same manner at the same time. So both channels are at the same volume level at any given point in time.

Whilst similar to the GT-3 Slicer which only uses a square wave type on/off cycle (albeit with different patterns) the variable wave shape of the tremolo provides a smoother sounding transition between on fully and off fully.

Looking at rate, a fast rate will create a slicer effect almost regardless of wave shape, although a triangular wave will appear smoother than the slicer, whereas a slow rate and a triangular wave produces an ebbing effect, and with a square wave produces a slicer type effect.

Right then, let's start to look at some patches. First up is "JC-120 Trem". To create this patch copy 'Clean, turn on the preamp as set the preamp type to JC-120, set the volume to be about 35 and master level 67. Then Turn on the Tremolo, mode will be tremolo, [GT-3]wave shape=0/[GT-5]modulation wave=Triangle, rate=90, depth=50, and on the GT-5 make sure the balance is L50:50R. This will give you a medium tremolo effect. Next up a distortion patch called 'Metal Trem'. To create this patch copy 'Metal Dist\*' and again turn on the tremolo. Mode is tremolo, but this time set the [GT-3]wave shape=55/[GT-5]modulation wave=Square, rate to 92, depth to 100, and again GT-5 owners should set the balance to L50:50R. This will give a slicing type effect.

### Pan

As I said previously this is a stereo effect. Let's say that the left channel is in the standard tremolo pattern. The question is what happens on the right channel? Well, the easiest way to describe this is via a formula. OK, clam down. We aren't talking advanced complex arithmetic here, just a simple bit of algebra. So the formula is:

$$\text{Left Volume} + \text{Right Volume} = 100$$

Simple eh? What this means in practice is that if the left channel is at 100 then the right channel is at 0; when the left channel is at 80 the right channel is at 20; and when the

## Section 18 Tremolo/Pan

right channel is at 100 then the left channel is at 0. 100 in our case here is equivalent to unity gain, as the tremolo/pan does not have a level control and the maximum gain is 1:1.

Looking at rate, a fast rate will create a detuned warbling effect with a square wave and a more shimmering sound with a triangular wave, whereas a slow rate with a triangular wave produces a subtle effect and with a square wave you stand a chance of sounding like a police car if you don't watch it.

One good effect that can be created with the pan is to use a slow rate with a square wave and depth 100. and then combine it with a single delay with reasonable feedback so that the timings of the panning match. The effect you get is echo left echo right and so on.

OK. Now for a couple of pan patches. Let us create 'C.Twin Pan' Copy 'JC-120 Trem' and change the preamp to Clean TWIN. Turn on the tremolo, mode pan, [GT-3]wave shape=0/[GT-5]modulation wave=Triangle, rate=10 and depth=80 and again GT-5 owners set the balance to L50:50R. This creates a slow meandering pan as you play never quite emptying out one channel but definitely switching prominence between the two. And oh yes - it is a stereo effect! Right then now for something more extreme, again a Slicer type thing for the distortion patch but this time panning from side to side. So copy 'Metal Dist\*' to 'Metal Pan', turn on the tremolo, mode=pan, [GT-3]wave shape=70/[GT-5]modulation wave=square, rate=50, depth=80, and yet again GT-5 owners set the balance to L50:50R. By striking a chord on one side of the pan and stopping it on the other you get obtain an effect that makes it feel like the chord itself is travelling.

### Presets

And finally just before we leave the Tremolo/Pan let's take a quick look at some of the presets that use this effect. Phew. The techies at Roland really liked this one!

<b>GT-3</b> Patch	Type	Wave Shape	Rate	Depth
52-1 CRUNCH TR (CTL)	Trem	75	90	70
55-1 VOXY DRIVE [CTL]	Trem	75	85	70
59-1 '60s CRUNCH [CTL]	Trem	75	90	60
64-4 COUNTRY TW [CTL]	Trem	75	90	70
65-1 CLEAN TWIN [CTL]	Trem	75	80	70
68-1 PANNED JC	Pan	0	21	50
68-3 BLACK PANEL [CTL]	Trem	75	90	70
70-2 MOD ECHO	Pan	75	15	100
70-3 TELEPHONE	Trem	75	92	50
71-3 GATE SYNTH	Trem	75	85	90
78-1 RING PAN	Pan	0	20	100
78-2 STEP PHASER	Trem	0	100	100
79-4 VOXY TREM	Trem	75	85	70
81-4 PANNING SL	Pan	0	BPM/4	100
82-1 HUMAN GATE	Trem	50	4*BPM	100
82-2 ROTARY	Pan	75	85	40

<b>GT-3</b> Patch	Type	Wave Shape	Rate	Depth
82-3 TRIP PHASE	Pan	75	20	100
82-4 PrePH Drive (CTL)	Trem	60	60-94	100
83-2 MID CUT TR	Trem	80	80	60
83-3 REBEL ROUSER	Trem	65	88	60

### GT-3

Those patches marked (CTL) only induce the TR when the CTL pedal is held down. Those marked [CTL] are the same except the CTL is used in a toggle mode. On all other patches the TR is on permanently.

I would like to make one or two comments about what is an otherwise rather boring and monotonous use of the tremolo/pan.

#### 68-1 PANNED JC

Uses the pan so the sound wanders gently from one channel to the other. This is a nice subtle effect.

#### 70-2 MOD ECHO, & 82-3 TRIP PHASE

These show a more imaginative use of the pan, with a slightly fuller pan than PANNED JC.

#### 71-3 GATE SYNTH, 78-2 STEP PHASER, & 82-1 HUMAN GATE

Great use of the tremolo that really makes these sounds kick. Without it the sounds are just plain and boring!

#### 79-4 VOXY TREM

I think this is a good sounding example that could be used for good rhythmic effect.

#### 81-4 PANNING SL

Wahey! OK, not brilliant but it shows a good rhythmic effect of the pan combined with a Slicer.

#### 82-2 ROTARY

What a great patch. This really shows the tremolo warble effect. It reminds me of twin peaks!!

#### 82-4 PrePH Drive

Hold the CTL PEDAL down and here the cut speed up!!! This is a square wave trem—effectively a Slicer, which speeds up. Next time we will be examining the control assigns which were used to create this sort of effect.

Right. Now lets take a look at what the GT-5 has to offer....and it has to be said its fairly extensive.

## Section 18 Tremolo/Pan

<b>GT-5</b> Patch	Type	Wave Shape	Rate	Depth
P2-3-2 CRUNCH TWIN [CTL]	Trem	Tri	85	100
P3-1-1 I WANT TELL [CTL]	Trem	Tri	85	50
P3-2-2 BLACK PANEL [CTL]	Trem	Tri	86	90
P3-4-4 SLOW ATTACK	Pan	Tri	70	50
P3-5-1 GEORGE 12ST [CTL]	Trem	Tri	75	80
P3-5-5 SWAY CHORUS	Trem	Tri	62	45
P4-3-5 PANNING WAH	Pan	Tri	50	100
P4-4-2 CRYING CAT [CTL]	Trem	Tri	95	100
P4-5-2 JET POWER	Trem	Square	80	80
P4-5-4 FLANGING CH [CTL]	Pan	Tri	25	100
P4-5-5 CLASSIC PH [CTL]	Pan	Tri	70	100
P5-1-1 SUPER PHASE [CTL]	Pan	Tri	15	100
P5-1-5 RHODES POWER	Pan	Square	73	30
P5-2-1 SURF MUSIC	Trem	Tri	80	50
P5-2-2 MACHINE GUN	Trem	Square	94	100
P5-2-3 VIBRATO	Trem	Tri	90	30
P5-2-1 PAN PHASE	Pan	Tri	85	100
P5-3-1 RANDOM TALK	Pan	Tri	20	77
P5-3-2 GROOVE! [CTL]	Trem	Square	86	100
P5-3-4 RING ECHO [CTL]	Pan	Tri	20	100
P5-4-3 PEDAL RING [CTL]	Trem	Tri	85	100
P6-1-3 PAD ECHO [CTL]	Trem	Tri	85	100
P6-1-5 GATE SYNTH	Trem	Square	85	90
P6-2-1 FANTASY	Pan	Tri	25	100
P6-2-2 TRIP PHASE	Pan	Tri	20	100
P6-2-3 ROTARY	Pan	Tri	85	40
P6-3-1 TELEPHONE	Trem	Square	92	50
P6-3-2 FLASHBACK	Pan	Tri	45	100
P6-3-3 REVERSE PAN	Pan	Tri	20	100
P6-3-4 MOD ECHO	Pan	Tri	15	100
P6-4-2 SYNTH—LEAD	Trem	Tri	85	0
P6-4-4 NOISE STORM	Pan	Tri	15	100
P6-5-1 PEDAL F.B. [CTL]	Trem	Tri	85	100
P6-5-3 PHASE DELAY	Pan	Tri	20	100

### GT-5

A few of the GT-5 TR patches are the same: Gate Synth, Trip Phase, Rotary and Mod Echo, so refer the GT-3 section for comments on these patches.

Again, many of the GT-5 TR patches fairly boring, and some are downright annoying if used through headphones. If these more extreme Panning patches were used with a stereo amp set-up and 2 fairly closely placed cabinets, the effect might sound much better. When used in a near-field extreme separation setting like headphones, you can get a headache from some of these patches. Here's a taste of some of the more useful and musical TR based patches.

#### P2-3-3 Crunch Twin

A fast Tremolo effect very reminiscent of the Tremolo unit in many of the old Fender amps like the Bandmaster.

#### P3-4-4 SLOW ATTACK

An interesting fast Pan effect that interacts nicely with the Chorus.

#### 4-5-2 JET POWER

An almost novelty effect with cool Flanging effects that appear to use both Tremolo and Pan (but really don't since it's either Tem or Pan).

#### 4-5-4 FLANGING CH

A nice slow pan that works well with the Flange and Chorus.

#### P5-3-2 GROOVE!

A humanizer patch, giving vowel sounds. CTL selected Tremolo creates distinction between each vowel sound. A gimmick but uses the effect well.

#### P6-2-1 FANTASY

Nice slow pan over a Fripp-like patch. Very ambient in nature.

#### P6-3-3 REVERSE PAN

Very useable reverse tape effect that uses an effective medium speed pan.

#### P6-5-3 PHASE DELAY

A medium speed Pan over a nice spacious Phaser effect. Good for chiming chord arpeggios.

Well that wraps up the tremolo/pan...enjoy!



## GT-3 Section 19 Slicer

### What is the Slicer?

The Slicer is ONLY available on the GT-3.

As the Official Owners Manual says, the Slicer interrupts the sound you are playing. It is very similar to a square wave tremolo, but rather than just interrupt it using an on-off-on-off pattern the effect provides a number of different patterns.

### Slicing Patterns

Each pattern consists of 12 or 16 individual 'slices'. Each slice may be on or off. Each preset pattern that is available defines which are on and which are off. Unfortunately it is not possible to define your own patterns. Patterns P1-P12 use 16 slices. These are 4 beat patterns and therefore work well with pieces that have a time signature of 4/4. Patterns P13-P20 use 12 slices, and are 3 beat patterns, so these will work well with time signatures of 3/4, 6/8 or even 3/2.

Now it should be said that each slice, may not only be turned on or off but may also vary in volume. The patterns in the GT-3 have up to 8 possible volume levels per slice.

Now is probably a good time to introduce the pattern table to you. Each pattern is shown below along with the slices that are on/off and the relative amplitude of that slice. A dash means the slice is turned off and a number from '1' to '8' indicates the relative amplitude with 8 being full volume, 4 being half volume and so on. Here is the table:

Pattern	Amplitude/Slices
P1	8-8-8-8-8-8-8-8-
P2	88--88--88--88--
P3	888-888-888-888-
P4	8---8---8---8---
P5	888-8-8-888-8-8-
P6	8---8-8-8---8-8-
P7	8-8-888-8-8-888-
P8	8-4-2-1-8-4-2-1-
P9	8-7-6-5-4-3-2-1-
P10	8-6-4-2-1-2-4-6-
P11	8-6-4-2-1-2-4-6-
P12	1-2-3-4-5-6-7-8-
P13	8--8--8--8--
P14	88-88-88-88-
P15	88--8-88--8-
P16	8---8-8---8-
P17	8-6-4-8-6-4-
P18	8-7-6-5-4-3-
P19	8-6-4-2-4-6-
P20	4-6-8-4-6-8-

Just before we move to look at the rate parameter, I should say that the interrupt isn't perfectly square, there is a slight

rise and decay time, which appear to be 10-20ms and 5-15ms respectively.

### Rate

Rate is selectable between 0-100, and additionally has BPM settings. Below I provide two tables showing how rate affects the sound. Each 'cycle' is a single execution of the 12 or 16 slices. i.e. 1 cycle = 1 full pattern.

The following 4 beat timings were determined from observation using Sound Forge as a wave editor/recorder. They are for 4 beat patterns (P1-P12). P9 was used to ascertain the timings.

Rate	Cycle Time in ms	Approx Time in seconds	Slice Time in ms
0	3000	3.0	187.50
10	2000	2.00	125.00
20	1500	1.50	93.75
30	1200	1.20	75.00
40	1000	1.00	62.50
50	860		53.75
60	760	0.75	47.50
70	670		41.87
80	600		37.50
90	560		35.00
100	500	0.50	31.25

The following timings were determined from observation using Sound Forge as a wave editor/recorder. There are 3 beat patterns (P13-P20). P18 was used to ascertain the timings. Rates 0, 50 and 100 were done from timings and the rest from calculations from the 4 beat table above, as there is a definite link between the slice times.

Rate	Cycle Time in ms	Approx Time in seconds	Slice Time in ms
0	2250	2.25	187.50
10	1500	1.5	125.00
20	1125		93.75
30	900		75.00
40	750	0.75	62.50
50	645		53.75
60	570		47.50
70	502	0.50	41.87
80	450		37.50
90	420		35.00
100	375		31.25

Now many of you might be thinking that a rate of 375/500ms isn't much. But what you need to remember is that each pattern has 12 or 16 time slices, and the 375/500ms contains a single pattern's full cycle. We can see

## Section 16 Slicer

from the timings that each time slice spans a time from as long as 187.50ms down to as little as 31.25ms, which is an extremely short length of time.

One thing that isn't immediately obvious from the tables is how well suited the 4 beat rates of 40 or 100 are suited to songs using 60 or 120 beats per minute.

### Problems

Unfortunately just like the Slow Gear, there appears to be a break through of sound lasting 10ms followed by a silence of 14ms before the pattern actually gets going. Often this becomes evident in a disruption during the first time slice, and the initial pattern often appears to be shorter by roughly 10-20ms. This 'thinking' time appears just to be the GT-3 getting itself sorted out—after that it's OK, and this time spent prating about shouldn't affect the sound.

### Trigger Sensitivity

There are two things of note here. Firstly the official Manual is completely incorrect. The text was just copied from auto-riff trigger sensitivity description! Nothing like a good bit of cut and paste eh?

Anyway, Trigger sensitivity seems to make only a minor difference in playing. It's not like the Slow Gear where the sensitivity determines when the effect kicks off or when it doesn't. Oh no. Here the sensitivity is down to how the re-triggering occurs. I have only really tried it at the extremes of 0 and 100 so that I could find out what it is doing. To be honest with you I think this will be tricky to use in practice, and you will find people using 0 or 100 (i.e. the extremes). Anyway, back to the plot. With the sensitivity at 0 it is extremely hard to get it to re-trigger unless you insert a brief pause. When sensitivity is at 100 it is easier to get it to re-trigger but by 'eck its touchy and unreliable. Sheesh.

When playing chords with the Slicer, the actual chord sound is less well defined, and a more general rhythmic feeling is imparted.

Strumming whilst using the Slicer can cause some interesting interactions—for smoothness strum/change chord at the start of an 'ON' slice, preferably where the relative volume is 8.

### Using It For Effect

We can use the Slicer to make your guitar sound like a Gibson Les Paul with a cutout switch. Well, this is a tiny lie as the cutout switch – well, it's not a cutout switch at all. The Gibson has independent volume controls for the two pickups and a normal pickup selector switch. What you do is set one pickup at zero and the other as required. Then by flipping the pickup selector switch you get the slicing sound. Typically people tend to vary the rate but here we will look at a fixed rate patch.

The patch I have created is called 'Metal GibSL' and is based once again on 'Metal Dist\*'. All you have to do is turn on the Slicer, Pattern P1, Rate 60, and Trigger Sensitivity = 0, and make sure that the SL has been moved to the first item in the effects chain, and hey presto! There you go. OK I know it's not as flexible, but you can see where to start. The section on control assigns will improve this patch using the expression pedal to provide a better control, and give us the variable rate we desire. Also, I think the patch works better with chords rather than single notes. See what you think.

It should be said that the Slicer cannot be re-created using the volume pedal as you just cannot move the volume pedal fast enough!

### Presets

Just before I finish with the Slicer, I think we should take a look at what the preset patches are doing with the Slicer. This list is extremely long and will no doubt take you more than 24 hours to work your way through. Boss obviously felt it was a really useful effect. Ho hum.

Patch	P'tn	Rate	Trigger Sens	Quick Setting
37-4 SLICE WAH	P6	50	0	
67-1 SLICEN DICE	P5	7	80	
77-2 SLICE METAL	P5	50	0	
81-4 PANNING SL	P5	4.0* BPM	0	

Well, no great surprises there, low-medium rates and trigger sensitivity set at one of the extremes. Patch 'SLICE METAL' doesn't have the Slicer on permanently—it is switch via the CTL pedal, which is configured to be momentary so the Slicer is only on when you have the CTL pedal depressed. Interestingly enough, the preset patches don't use any of the Quick Settings!

For best effect I think SLICEN DICE and PANNING SL show the Slicer in the best light, with SLICEN DICE as my top patch in this little group.

One last note on the Quick Settings I prefer 'SLICER 1' and I'm fairly sure most of you will – the rest are just not set-up in a way that yields a reasonable sound (IMHO).

## Section 20 Equalisation (EQ)

I am especially pleased to be introducing this section, as this has started to help me solve some of my problems. I am indebted to Philippe Martin for producing this information, as I am sure you all are too. Again, all credit goes to Philippe Martin – and I shall leave you with him now.

### Some Generalities

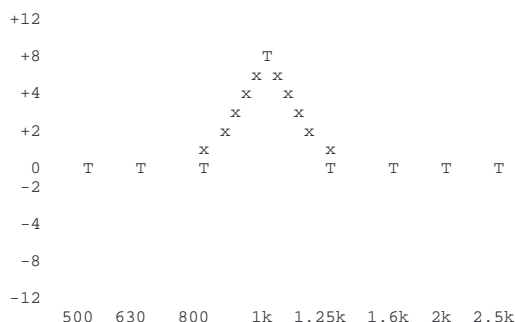
Each sound is composed of several frequencies, at different levels. Most of the time, lots of frequencies are involved in a sound. Only frequency generators (or synthesizers) can make sounds whose spectrum is narrowed to one frequency only.

OTOH, if you've already heard the big white noise in the PA when the sound engineer was setting it up, that's exactly the contrary; all frequencies are generated at the same level and the sound guy uses a spectrum analyser to adjust the EQ of his system, trying to render all frequencies at the same level.

Most of the time, he uses a graphic equalizer, to adjust the PA. You've all already seen graphic equalizers. They can have 10, 15 or 30 bands (etc), but the principle is the same: From left to right, you get sliders that allow you to increase or decrease the level of a given frequency, starting from left with bass and finishing at right with trebles. The central position of each slider is 0 dB (no change), the upper position boosts the given frequency by 6, 12, 15 or 20 dB (depending on the equalizer), and the lower position cuts it by the same values.

But the audible spectrum doesn't have only 10 or 31 frequencies. So depending on the equalizer, each slider will act not only on its frequency, but also on the frequencies around it.

Let's take a look at a graphic equalizer.



Say this is a part of a 1/3 octave graphic EQ (in other words, 31 bands). Each T is a cursor. When they're all at 0, the equalization is flat and the sound doesn't change at all (at least it shouldn't). If you move the 1k band up to +8, you'll boost this frequency by 8 dB. But not only this frequency. You'll raise also a number of adjacent frequencies, like 999 Hz, 980, 900, etc.

This is what the curve made of x's represents, there. That's the equalizer's frequency response for this frequency. How many and how much adjacent frequencies are affected depends on the equalizer, and is symbolized by 'Q'.

Now what is a parametric equalizer?

Basically, that's the same thing with a different interface. Instead of a slider for each frequency, you have two, three or four bands and you decide on which frequency each one will act. That's "Lo-Mid f" and "Hi-Mid f" in the GT-3/5 (in this case, it's called a two band parametric equalizer). And since you have less bands than in a graphic equalizer, you always have the Q setting that allows you to affect more or less frequencies around the one you've selected.

### The GT-3/5's Parametric Equaliser

Let's look into the GT-3/5. Press EQ, and parameter >.

#### Low EQ

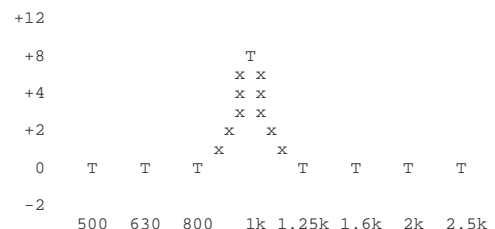
Nothing "parametric", here. This controls a fixed frequency, with a fixed Q. All I found in GT-3/5's doc is that it boosts or cuts that frequency by 20 dB. I'd say it works on 100 Hz with a Q of 1.

#### Lo-Mid f

Here's the first parameter of our parametric equalizer: The editable value is the frequency on which this band of the EQ will work. On the GT3/5, both "Lo-Mid f" and "Hi-mid f" have a range from 100 Hz to 10kHz.

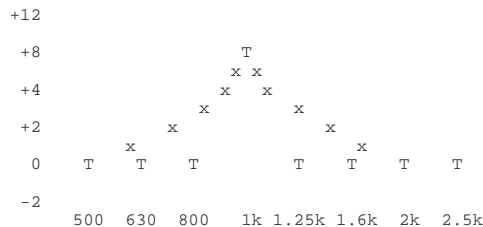
#### Lo-mid Q

This is where you set how many and how much adjacent frequencies will be affected. The more this value is, the less you'll affect adjacent frequencies (put differently, the more your equalization will be sharp). So setting it to 16 (the maximum) would make something like this:



## Section 20 Equalisation (EQ)

While setting it to the minimum (0,5), would give something like this:



Note that the scale is certainly wrong. ;-)

### Lo-Mid EQ

This is the value by which you'll boost or cut the frequency you chose (and of course the frequencies around). That's the last parameter of this band.

### Hi-Mid f, Hi-Mid Q and Hi-Mid EQ

These are just duplicates of Lo-Mid f, Lo-Mid Q and Lo-Mid EQ, so I won't explain them again.

### Hi-EQ

Like Low EQ, this is a fixed frequency, with a fixed Q. In the GT-3/5 it can be boosted/cut by 20 dB but they don't give its frequency and Q. I'd say it's 10 kHz with a Q of 1.

### Level

Allows you to compensate the changes you've done. For example if you raise two different frequencies by 20 dB (what I wouldn't recommend anyway), the output volume of the equalizer will be a lot louder than it is in input. Adjust Level to get the same volume with the equalizer On and OFF. [This is the level matching of the effects chain—Barry]

## How to Use It

Now, how to use it? If you know exactly which frequency you want to increase or decrease, there's no problem. But what when you don't? First, don't worry, there's an easy way. Second good news, by using this way repeatedly, you'll learn to recognize the frequencies. Set the EQ up like this:

EQUALIZER	
Low EQ:	0
Low-Mid freq:	1.00kHz
Low-Mid Q:	16
Low-Mid EQ:	0
High-Mid freq:	whatever
High-Mid Q:	whatever
High-Mid EQ:	0
High EQ:	0
Level:	0

Note that all "EQ" settings are set to 0 (and Level too) so our equalization is flat. As long as all EQ settings are set to 0, you can set the other settings to whatever you want, and you won't hear any difference.

Connect your guitar and play a couple of notes. Since your equalization is flat, your sound shouldn't have changed. Turn the equalizer ON/OFF if you want to make sure. You should hear no difference.

Now make sure the equalizer is ON, and boost Low-Mid EQ to 20 (don't do this at home with your amp's volume all the way up!). Since we've set the Low-Mid Q to 16 (the sharper), you'll hear immediately what frequency 1 kHz is. Now go back to Low-Mid f, and move the dial both ways. You'll hear very easily the difference between each frequency. When you've got the frequency you're looking for, go to Low-Mid Q, and decrease its value slowly, to affect the frequencies around. You'll hear more and more adjacent frequencies being boosted. Set it as you want, then go to Low-Mid EQ, and adjust the value as you want. You may have to go back and forth between Low-Mid Q and Low-Mid EQ to find the correct setting for both.

You can repeat this operation with the High-Mid band. Note that if you select the same frequency as in the Low-Mid band, you may boost or cut it by 20dB more.

## EQ Tips

Remember that your ears have a short memory. That is, they'll get quickly used to the equalized sound. So when you're doing your equalization, often turn the equalizer OFF and back ON, to compare the equalized sound with the flat sound.

As a general rule, it's a good idea to avoid over-equalization. Extreme EQ values should be used only to make "wild" sounds or to cut a feedback. BTW, to cut a feedback, use the method described above, but start with the EQ at -20 instead of +20. Move the dial until you cut the feedback. When you find it, bring the EQ up slowly until the feedback comes again, then lower it just until the feedback stops.

It's often faster and easier to find which frequency is too loud and to lower it, rather than boosting a lot of other frequencies. So if you can't find the equalization you're looking for by boosting frequencies, try to think the other way around: what do I need to remove?

I was asked questions like "where is the body?", or "what makes it sound muddy?". The problem, with these kind of sound descriptions, is that everyone has his own image associated with it. IMHO, it's better to learn identifying the frequencies, and the method I've described in "How To Use It" is the key: each time you use it, you train your ears to

differentiate the frequencies. If you use your eyes too, looking at the frequency on the display, you'll finish to associate the frequency with its name, and one of these days you'll be able to tell your monitors engineer "gimme some more 2K". And he will know *exactly* what you mean. :-)

Anyway, here are some common terms.

- sub: 20 Hz to 100 Hz (more felt than heard)
- boom: 100 Hz to 160 Hz
- body: 250 Hz to 1 kHz
- crunch: around 1.6 kHz (using distortion)
- clarity: 2.5 kHz to 4 kHz
- fuzzy: 4 kHz to 10 kHz (using distortion)

If your sound is too muddy, try to remove some 250Hz (and around) or add some clarity. If your sound is not round enough, try to remove some clarity and to raise a bit 250Hz to 400Hz. If your sound is too nasal like, try to remove some 1kHz and around. If you want a telephone like sound, cut everything under 200Hz and everything over 2kHz.

Finally, your sound is rarely alone. You have to take into account the sound and register of other instruments. In other words, your guitar could often sound great alone, and sound not so good when the entire band is playing. Try to "see" the audible spectrum as a whole and make sure the band is covering it all. For example, if the keyboard plays relatively high frequencies in a given section, try to compensate it by using a rounder sound.

### EQ Update

Since Philippe Martin wrote the above piece I decided I'd take a peak at some of the EQ stuff...Some of you will know that I have been using a spectrum analyser recently. Well, I turned my attention during one of my quiet moments (!) to take a look at the EQ/SUB-EQ/Global Low EQ/High EQ settings. I should say now that all three Low EQ/High EQ settings are the same.

Low EQ:

This is a low-pass shelving filter which cuts in at about 6kHz.

High EQ:

This is a high pass shelving filter which cuts in at about 200Hz.

To make this all quite clear in the 'Set-up....' folder of the GT-3 Yahoo Groups file area there is a file called 'GTx-EQ-LoHi.jpg' which is a screenshot of the spectrum analyser. The yellow line is the GT-3/5 freq. response reference line, which effectively is at 0dB as far as EQ is concerned.

### EQPlot Software

For those of you who wish for a more graphic view of what the GT-3/5 EQ parameters are all about a nice neat piece of software written by Nick Oatley called 'EQPlot' is available on the GT-3 Yahoo Groups files section. It may be found at:

<http://groups.yahoo.com/GT-3/files/GT-3+Software/>

The program very neatly displays the actual EQ filter in a graphical form, as you adjust the controls in the dialog box. As yet there is no direct link through to the GT-3/5....but list members have been muttering...

### Summary

Cheers Philippe, very useful to those who understood the basics but needed some guitar/GT-3/5 oriented information, and for all those new to the GT-3/5 and EQ itself.



## Section 21 Foot Volume

I assume that many of you run the expression pedal as a foot volume pedal. The volume pedal is without a doubt one of the most useful and versatile of effects.

### Construction

The GT-3/5 expression pedal is rugged in its construction and appears to be of the rack and pinion type. There are no dead spots (ascertained through watching the FV level parameter whilst moving the pedal), and the pedal requires even pressure from fully back to fully forward, and is smooth and consistent in its action. Change occurs through the pedal sweep in a linear fashion. If you have problems with sweep having dead spots at the top and/or bottom of the range, then firstly check that you have the control assigns set up correctly and none are conflicting. Secondly it may be worth re-calibrating the EXP PEDAL through the Roland factory-commissioning mode explained in section 27. However, the problem with the EXP PEDAL when used as a foot volume is that the FV quantisation of 0-100 is not smooth. There is a big leap from 0-1 and 0 is not 100% deathly silent.

### What is it?

The FV is ultimately nothing more than a volume control point in the GT-3/5's effects chain coupled with a control assign which targets the FV level (Under <Master>) and uses the expression pedal as the source. Control Assigns are discussed below and we shall examine the FV set-up there.

In addition to basic volume duties the volume pedal can be used in a number of ways. For many of you there will be little here that is new, and I apologise if I am teaching people to suck eggs, but I'll cover everything anyway, just in case. Oh, and just for you smart alecs or 'special' people out there who prefer to have the FV operate the opposite way round, I assume for the purposes of this document that fully forwards=full volume and fully back=min volume. Just so there is absolutely no confusion, forwards means the toe of the pedal is depressed (the pedal appears horizontal) and backwards means the heel of the pedal is depressed (the pedal is at a 30deg angle with the toe pointing skywards—and for those in Australia, skywards is the same as it is in the UK.....UP!). ;-)

### Using it for Effect

OK, let's take a look at some of the available options.

#### Placement in the chain

By placing the FV at the end of the chain you achieve a complete cut-off of the sound, including reverb trails. However, by placing the FV before the delay and reverb when you come back on the expression pedal you shut off the input to them and the sound trails off in a more natural way as the DD and RV are allowed to complete their effect.

If you place the FV before the OD/DS then you will control the amount/saturation of the distortion. Coming back on the pedal gives less distortion and going forwards gives more. This way you can 'play' the distortion, coming back for verse and hiking it up for solos or chorus riffs and the like.

Of course you can have the best of both worlds by setting the FV up AFTER the OD/DS but BEFORE the DD/RV. You use the guitar volume to control the distortion (this is discussed later in this issue) and the FV controls basic volume levels, but the sound maintains a natural decay when cut completely.

### Noise Suppression

If you come back on the foot volume while not playing you can eliminate some of the ambient noise coming from your pickups. Of course this doesn't really absolve you from trying to obtain the minimum noise you can through noise elimination, as we have discussed earlier in the series. The NS does a good job but when closed will open up if you accidentally catch one of the strings. Using the NS and FV in a combined method gives you good NS characteristics whilst avoiding premature or unwanted opening of the noise gate. Even if you out the guitar volume at 0/minimum you will probably find the effects chain before the FV has a bit of noise that using the FV will remove. There is also a good possibility that using the FV is actually quieter than using your guitar volume control. Also poor quality guitar volume controls have a habit of increasing noise as they are turned down – particularly hum – although this may be related to shielding issues.

### Fade in

This is a fairly easy one. Although it can also be created using control assigns or using the guitar volume control (we look at both these later), using the expression pedal gives a much longer timescale possibility than the control assign and much smoother response than your guitar volume control. It also avoids the tone altering characteristics associated with the guitar volume control such as changing the amount of distortion. Anyway, start with the FV all the way back and then strike the chord or note (it sounds better with chords but there you go). Then smoothly push the volume level forwards. What you are doing is pretty much an extreme attack delay and therefore you may suffer from the associated decay problem. To avoid the guitar decaying before you have completed the fade you can use a compressor to help maintain sustain.

### Slow Gear/Attack Delay

Very similar to fade in, the FV can be used for attack delay. Just rock back and forwards as you pick the notes, every time you pick the note rock forwards and then rock back just before picking the next. The difference between this and tremolo is that the starting volume for the pick is always zero (if it isn't, you haven't delayed the attack!). The advantage of using the FV for this is that you get more

(expressional) control over the attack and you have the option of turning the attack delay on and off at will! Although it takes a little practice, it is much easier than using your pinky on the guitar's volume knob, and therefore additionally leaves your right hand free for whammy bar moves or other techniques.

## Fade Out

Well, it's just the opposite of fade in really. Strike the chord and smoothly come back on the pedal. Nuff said.

## Decay Acceleration

Just as you can use the FV for attack delay, you can use it to accelerate the decay. This is attack delay turned round if you like, and is the same for the attack delay as fade out is to fade in. Although it is possible to use the guitar volume control for this, the GT-3/5 has no effect that can adequately do this for you!! Here's something the FV has which is unique on the GT-3/5!! Push the FV forwards pick the note and then roll back on the pedal. Make sure the note no longer rings by muting the string and roll the pedal forwards again ready for the next pick. Now, I'll bet not many of you had considered Decay Acceleration...

## Tremolo

The FV can produce a tremolo effect. This is fairly easy to recreate. Just rock backwards and forwards on the pedal as you play. Although for faster or more accurate variations you can use the tremolo/pan effect or a wave pedal, it is easier to synchronise with the song tempo—mainly because your ear is the controlling factor here. You can also add more expression here by very easily changing the tremolo depth and rate, in an extremely variable manner. Don't forget you don't have to use it full depth, you could rock back and forth over just a small sweep.

## Swelling & Reverse Swelling

The FV can be used to creating a swelling effect. This is done quite simply starting off with the pedal back a bit and then pushing it forwards, you can reverse the action to produce a diminishing effect (reverse swell), as well without going as far as a fade out.

## Feedback Control

Sometimes, (in certain situations) feedback will start to develop, sometimes controlled, sometimes uncontrolled. Certainly if you experience uncontrolled feedback backing off the volume pedal may help tame it.

It must be said that you aren't going to be able to create a Slicer effect from a standard FV. If you really do wish to do this then you will need to look at the Control Assigns that are covered in section 23.

## Modifying the Sweep Range

Normally the volume will change over the full sweep of the pedal. However, it is possible to limit the active range so that only part of the sweep alters the volume. It is also possible to alter the amount of volume change (i.e. Minimum/maximum volumes) that occurs over the active sweep range. I shall explain all of this fully below when we discuss control assigns.

## Summary

One more thing I would like to say is now and again you should let your imagination go. With one simple setting and one simple pedal you can instantly switch from attack delay to tremolo then reverse the swell slightly before swelling up and fading out. We can play with the volume, toying with it, or we can be brutal and use it to really attack a piece. Combining this sort of playing with other effects can result in an absolutely stunning roller coaster of a sound. Put the EXPRESSION into what most people see as a mundane piece of equipment. Learn to **feel it**.

### GT-3

On a final note, using the foot volume to produce Attack Delay (Slow Gear) or Tremolo can overcome some of the limitations of the GT-3's grouping of these effects under SFX, allowing you to use another SFX effect at the same time. Thus using the FV for attack delay and setting the SFX for Pan you can get both simultaneously!

As you can see the FV is much more useful than it would first appear. In fact when I started writing this I only expected to have to write about a quarter of what I have!

## Section 22 The Guitar's Volume Control

Okay, okay. So I'm talking about your guitar and not the GT-3/5. I did say the 'Set-up....' series would have a wider scope than just the GT-3/5 but I have included comments on interaction with the GT-3/5, so it is still quite relevant really.

### Effect on Tone

One thing I would like to say first. Different guitars and different pickups have different characteristics. On some guitars you may find that when using the volume control there is an effect on tone, on others you may not. Also some amps, like the MK IV Boogie are really sensitive (in a good way) to the volume knob. It is possible to clean up the tone really well by backing off the knob with little apparent change in volume. Either way, what I am concerned about here is not what tonal changes occur on your guitar but the effect that changing the input level has on the GT-3/5 and its subsequent output. We will however also be looking at some volume knob techniques that you can use whilst playing.

### Effect When Using Distortion

On clean sounds the volume control has little effect other than on volume levels. However, when you turn down the knob with a distorted patch you get less distortion. Therefore you can vary the volume control to vary the amount of distortion. For instance you can turn down the volume control to get a less distorted, more rhythmic sound for the verse say, and then crank it up again for the chorus or a lead riff which in turn increases the distortion. Of course a similar effect is possible by using a control assign and the expression pedal to alter distortion amounts.

### Knob Effects!

Right. Now let's take a look at using the volume control knob as an effect in its own right. There are a number of things you can do here; most we have talked about already when we looked at the foot volume:

### Noise Suppression

The guitar volume control is really your first line of defence here. Turn it down during longer pauses to avoid the noise from the pickups and miscellaneous guitar handling noises passing through your GT-3/5 and amps.

### Fade In

This is a fairly easy one. Turn the volume control to minimum, strike a chord and bring it up at a speed to taste.

### Slow Gear/Attack Delay

Similar to fade in, it is commonplace to use your right hand pinky to roll the volume control. So set the control to minimum, pick the single note and then roll the volume control up using your pinky. Do this for each note you pick.

This can get rapid sometimes! Not particularly easy to get the right amount of turn on the volume control knob but with practice this can work quite well. The Slow Gear effect does exactly this.

### Fade Out

As per fade in, but starting with the volume control at maximum and rotating the knob towards minimum.

### Decay Acceleration

Attack Delay is the same to Fade In as Decay Acceleration is to Fade Out. When Fade Out is used repeatedly with single picking, it gives the guitar a much more rapid decay. Use the same technique as fade out, controlling the pot with Mr Pinky again.

### Tremolo

Well, this is basically Fade In followed immediately by Fade Out. What you do is use Mr Pinky again to roll the volume control backwards and forwards while you play. Of course the depth of the tremolo is completely variable – just reduce or increase the extent of the roll, and of course the rate/tempo is completely variable and is just down to you!

### Swelling and Reverse Swelling

Just as the foot volume can be used to creating a swelling effect so can the guitar volume control. This is done quite simply starting off with the volume control backed off a bit and then typically using Mr Pinky (again!) to increase the volume. You can reverse the action to produce a diminishing effect (reverse swell) as well without going as far as a fade out.

### Slicing

Well, this isn't possible using the volume control alone. What you need is two pickups with individual volume controls (like many bass guitars or Les Paul lead guitars). One volume knob is set as required and the other is set to zero. Then by waggling the pickup selector back and forth you get a slicing effect. This is a famous technique used by a lot of Gibson guitarists, and one that we have recreated in the patch 'Metal GibSL'.

### Feedback control

Sometimes, in certain situations feedback will start to develop, sometimes controlled, sometimes uncontrolled. Certainly if you experience uncontrolled feedback, backing off the guitar volume may help tame it.

### Summary

Remember that many of these effects may be obtained via a number of methods; GT-3/5 effect, Foot volume or guitar volume. Not all methods are as expressive as each other, some work better than others for particular effects. Think

about what you need, experiment and choose the best for the situation. Remember the options that exist. Doing so can mean that you free up one or two of the GT-3/5's effect groups, so they are available for other tasks, or in the case where the effect you want is in a group that's already in use, you may be able to obtain what you want from the guitar of volume pedal. If you are on stage and out of leg-reach of the GT-3/5, then guitar volume control techniques can prove to be extremely useful. When performed correctly, they can appear amazing and show a real mastering of the instrument. Mind you, then again it might just show that you happen to have long fingers!

One final note about volume control; it's the third easiest effects system to reach—the strings and pick being the first, the vibrato/pitch sliding/dives from the whammy bar as the second! However, it seems to be the least used! I was certainly guilty of this and to some extent I am still. So my advice is say hello to an old friend and give it some exercise!! Doing so is healthier for your guitar as failing to use the pots leads to them becoming scratchy...Go on—you know its right!!

## Section 23 Control Assigns

First up read the GT-3 user's manual pages 26-29, or pages 24-27 of the GT-5 owners manual (which will probably confuse) and then the Unofficial GT-3 Owners Manual Supplement (well worth a read even if you own a GT-5), in particular pages 13-18, 28 and 34-36. Both contain some good stuff on the EXP PEDAL, CTL PEDAL and control assigns available from under the PEDAL/ASSIGN button.

What I am not going to do here is provide another re-iteration of what they do or basic settings. Instead I am going to look at the technical aspects of the control assigns, internal pedal, and wave pedal which AREN'T described in these other references. Also, Mathias Miller produced a good section (pages 34-36 Using the GT-3 to Breathe Life Into Your Guitar) in the supplement on these and therefore I don't feel the need to fire your imagination here. However, later on we will be looking at using the control assigns to produce dynamic volume changes.

### Common Questions

Right then, assuming you have read the above, let's examine some questions that aren't answered in these references.

***What is the manual twittering on about with its funny ON/Off diagrams on pages 28 & 29 of the official GT-3 manual or pages 26 & 27 of the GT-5 manual?***

Yeah. This is really unclear. What has caused the confusion is the odd position diagrams used to explain changing a two position parameter # such as on/off, or one value or another. Let's say that we have minimum and maximum positions for a controller. At \*half way\* the value will toggle. So let's say min = off and max = on, here at half way between the two the value will switch. Now, the active range determines these minimum and maximum positions but in all cases the switch over is half way between the two. If the target values are not on/off, then the source mode must be in toggle to provide this switchover functionality.

***What affect does toggle mode have with expression pedals?***

Using toggle in conjunction with an expression pedal it effectively turns it into a latching pedal; therefore requiring two presses to activate and deactivate.

When using on/off parameters with the expression pedal, it swaps over half way. Although you would think that it is possible to produce a similar result when using effect parameter values that are numbers and making the mode toggle, you can't. This is because the toggle makes it latching and this messes up the whole thing, as the return of the

pedal does not trigger the reverse toggling of the parameters.

To avoid this problem set the control assign active range to cover two specific points i.e. 63-64 and then provide the min/max for the values you wish to have toggled.

This applies equally to the wave pedal but not to the internal pedal as the internal pedal never returns as such.

***What is the effect of active range on expression or control pedals?***

The parameter will only be affected whilst the controller is within the active range. Here the bottom of the active range will be the min target value and the top of the active range relates to the max target value. If the mode is set to toggle, the switchover will occur at the halfway point between the top of the active range and the bottom of the active range.

***If multiple control assigns are set for one source what order are they executed in if they are triggered together?***

As you should not be using two control assigns triggering at the same point to operate the same value this should not be an issue. This is because two assigns operating different values do not have any form of execution dependency. Indeed, if you try to get two control assigns to change the same value the unit gets confused and appears to get stuck at the last assigns maximum. You can probably safely assume from this that the assigns are evaluated in the order they are presented EXP, CTL, Assign #1-8.

It must be noted that it is NOT possible to alter the settings of any control assign (including on/off) from another control assign. This is unfortunate, as with this functionality it would have been possible to create a patch where the expression pedal controlled the FV, for most of its range and then when fully depressed switched to a WAH and then when fully depressed again became was restored to controlling FV. This is effectively combing two different pedal uses in such a way that we could access both. Such functionality would also allow us to alter the wave pedal's rate dynamically. Oh well. Ho hum.



## Unusual Targets & Sources

The GT-3 and GT-5 both have some more unusual targets and sources for the control assigns. Lets now take a quick peek at them!

### Targets

You can target almost any parameter on the GT-3/5. Both the GT-3 and the GT-5 have some 'extra' targets available.

#### GT-3

##### Master BPM (Tap Entry)

The GT-3 allows you to 'tap' your toe on a footswitch and set the Master BPM value to match the tempo that you are tapping at. Use this target for either an expression pedal or a footswitch.

By altering the Master BPM on the fly you can easily adjust effects such as the delay to match the tempo of the music you are playing.

#### GT-5

##### MIDI Start/Stop

This is described in section 28 – All About MIDI.

##### MMC Start/Stop

This is described in section 28 – All About MIDI.

### Sources

Most sources are fairly obvious. However, there are one or two which might raise an eyebrow...

#### MIDI CC#1-31,64-95

Again, described in section 28 – All About MIDI.

#### GT-5

##### MIDI Velo

This is described in section 28 – All About MIDI.

##### MIDI P.B.

Once again, this is described in section 28 – All About MIDI.

OK. Now let's look at the two most interesting sources on the GT-3/5; the internal pedal and the wave pedal. We will look at each in turn.

## The Internal Pedal Source

The Internal Pedal is one of the 'bolt in' sources for a control assign. It is described on pages 29/30 of the official GT-3 manual and page 27 of the GT-5 manual. Again, the unofficial owners' manual supplement contains some information on the internal pedal and I assume that both of

these references have been read. However, once again, I think there are a few blanks that need filling in.

Firstly the internal pedal is triggered. So it is a single shot variation. In other words, once triggered it executes and then completes. It doesn't continue. To produce a cyclic, re-occurring variation use the wave pedal described below.

## Expression & Footswitch Triggers

The manual is okay at describing the possible triggers, but lacks a bit of detail when talking about the control, expression and external expression/control pedals. So here is the information they left out:

The EXP pedal is split into three trigger points, L, M, and H. These trigger as follows:

#### EXP PEDAL-L

Pedal fully back (30 deg toe up) after travelling back.

#### EXP PEDAL-M

Pedal at midpoint ONLY when passing through it travelling forwards.

#### EXP PEDAL-H

Pedal fully forwards (horizontal) after travelling forwards.

The trigger points are 'points' rather than regions. Pushing the pedal forwards from halfway forwards but not fully forwards will NOT trigger EXP PEDAL-H. The pedal needs to travel to the fully forwards position before the trigger occurs. NOTE: These trigger points are available for the ON-BOARD expression pedal ONLY.

The CTL, [GT-3]SUB CTL 1/SUB CTL 2 and [GT-5]EXP/CTL1, EXP/CTL2 (when used for footswitches) triggers are on when depressing the appropriate pedal only, they do **not** function on pedal release.

The manual is much worse on the subject of the external expression pedals. Here it merely says that the trigger occurs whenever the [GT-3]SUB EXP PEDAL or [GT-5]EXP/CTL1 and EXP/CTL2 is depressed. SO what does this mean? When it is moved forwards/backwards or just fully forwards? Well, what they mean here is that the trigger will occur when the pedal is moved to the fully forwards position. Again it is a point rather than a region we are talking about here, and it only occurs with a forward movement of the pedal.

## Using MIDI CC For Triggering

This is described in section 28 – All About MIDI.

## Section 23 Control Assigns

### Sweep Time

Taking a look at the manual you quickly discover that the Sweep Time is described as having a range of 0-100. Big deal. Glad I know that. So here is what you really need to use the thing properly—A TABLE! Again these timings were determined using a GT-3 but the GT-5 is expected to be identical.

Sweep Time	Total Time in ms	Approx Time in seconds
0	140	
10	400	
20	775	0.75
30	1275	1.25
40	2410	2.50
50	3540	3.50
60	5425	5.50
70	8205	8.25
80	12485	12.50
90	18910	19.00
100	37810	38.00

If a source mode of toggle is used, then the value change will take place at the following points:

Linear (Rise)	:	50% of sweep time
Slow Rise	:	75% of sweep time
Fast Rise	:	17.5% of sweep time

Again, these figures are approximate and have been derived by observation. These figures also hold good for on/off values even when the mode is normal.

If you change the active range then only when the source is within the active range does the target value change. This in effect allows you to choose the point at which the portion of any the three curves the value will change. It should also be remembered, that choosing an active range, which does not start at zero, will mean that the change of parameter value will be delayed until the active range is entered. Conversely if the active range ends at less than 127, the change of parameter value will end prematurely. If the mode has been set to toggle, you are effectively altering the position of the half way value, and therefore altering the toggle switchover point. This means you should be able to set any length of delay that you desire, rather than being restricted to 50/75/17.5% of the sweep time.

The Unofficial GT-3 Owner's Manual Supplement talks about delay time between the trigger occurring and the sweep starting. On page 35 "You tell the internal pedal how much time to wait before executing this function" and again on page 36 "-- and just tell these assigns to wait much longer before executing these functions.". Whilst this is great article I am afraid to say that there is no such 'delay' parameter. This 'delay' functionality can only be obtained

through sacrificing part of the sweep range by using a smaller active range or by using toggle mode rather than normal mode, or a combination of the two.

If you require a reverse of one of the sweep curves then simply reverse the target min and max values. This will then give you Linear (Fall), Slow Fall and Fast Fall. Thus you have in fact got six possibilities not just three!

If the trigger re-occurs before the time has expired, the current assign is cancelled and the new one started instead.

### The Wave Pedal Source

Again the Wave Pedal is one of the 'bolt in' sources for a control assign. It is described on page 30 of the official GT-3 manual, and page 27 of the official GT-5 manual, as well as in the unofficial supplement. Once again, there are a few blanks that need filling in.

### Rate

Let's examine the rate parameter and see how long one cycle really is. As per normal, all these timings have been obtained from observation – none of the following data has come from Roland. As before, the timings were derived using a GT-3 but the GT-5 is expected to be identical.

Rate	1 x Cycle Time in ms	Approx Time in seconds
0	28670	28.50
10	12030	12.00
20	6660	6.50
30	3710	3.75
40	2177	2.25
50	1274	1.25
60	900	1.00
70	650	
80	465	0.50
90	340	
100	250	0.25

It must be said that above 50, the wave shape is lost slightly and is no longer perfectly crisp.

### GT-3

The biggest disadvantage of the Wave Pedal is that it doesn't have BPM settings for song tempo synchronisation.

The affect of active range on triggering is the same as for normal control assigns and the internal pedal. The target parameter value will only be changed whilst the wave pedal's position is inside the active range.

Setting the source mode to toggle will cause the value to change at the median point on the rise of the wave and on

the fall. This effectively will create a SQUARE wave regardless of which waveform has been set.

### Dynamic Volume Effects

Now that we have a better understanding of how the control assigns, I-PDL and W-PDL work, let's put the information together to create some changing volume effects.

#### GT-3

Remember I said in section 19 when we discussed the Slicer that we would liven up the Metal GibSL patch to provide rate control? Well that's what we are going to do. Turn the EXP PEDAL off. Now enter these two assigns:

Assign 1

Target:	SL: Rate
Min:	0
Max:	80
Source:	EXP PEDAL
Mode:	Normal
Act.Range Lo:	1
Act.Range Hi:	127

Assign 2

Target:	SL: On/Off
Min:	Off
Max:	On
Source:	EXP PEDAL
Mode:	Normal
Act.Range Lo:	0
Act.Range Hi:	1

You can now control the Slicer rate. Pedal backwards the Slicer is off. Rock forwards and it cuts in—getting faster the further forward you go. As you come back on the pedal the Slicer rate slows down and finally back at 0 the Slicer is turned off.

Try this—Strike a Chord, now push forward maybe 75% of the way forward to achieve a nice fast slice, bring slowly back until you have a fairly slow slice and then finally finish off by coming all the way back quickly and shutting off the Slicer. Now you sound just like a Gibson Les Paul!

On a similar note, we can control the tremolo rate in a similar manner again but this time the assign targets TR: Rate.

Assign 1

Target:	TR: Rate
Min:	0
Max:	80
Source:	EXP PEDAL
Mode:	Normal
Act.Range Lo:	0
Act.Range Hi:	127

Use this with the 'Metal Trem' patch. Once again, strike a chord and come back on the pedal. This produces a nice slowing effect.

Another thing we can do is create a slicing effect using the EXP PEDAL. First turn the EXP PEDAL assign off and enter the three assignments:

Assign 1

Target:	FV: Level
Min:	0
Max:	100
Source:	EXP PEDAL
Mode:	Normal
Act.Range Lo:	31
Act.Range Hi:	32

Assign 1

Target:	FV: Level
Min:	100
Max:	0
Source:	EXP PEDAL
Mode:	Normal
Act.Range Lo:	63
Act.Range Hi:	64

Assign 3

Target:	FV: Level
Min:	0
Max:	100
Source:	EXP PEDAL
Mode:	Normal
Act.Range Lo:	95
Act.Range Hi:	96

This provides us with two areas of on and two of off. Rocking backwards and forwards on the pedal produces the slicing, and the rate is simply controlled by how fast you do it!

#### GT-3

One last thing we will examine is the way we can control two parameters to produce combined effect. We have already taken a sneak preview at this with the 'Metal Chop' patch and we shall have another look at it now. The patch uses two assignments which are:

Assign 1

Target:	NS: Threshold
Min:	50
Max:	100
Source:	EXP Pedal
Mode:	Normal
Act.Range Lo:	0
Act.Range Hi:	127

## Section 23 Control Assigns

### Assign 2

Target:	NS: Release
Min:	50
Max:	0
Source:	EXP Pedal
Mode:	Normal
Act.Range Lo:	0
Act.Range Hi:	127

You may need to adjust the minimum threshold for your system. Now that we are fairly familiar with these assigns, it's fairly obvious that with the expression pedal forward a very tight noise suppression is used which will cut any noise or ambience from the guitar, giving the patch its characteristic punch-in punch-out when played with chords. Coming back on the pedal reduces the threshold, and increases the release time, thus allowing the guitar to breath in a more natural manner.

## Control Assigns using the Internal Pedal

There are two uses that immediately pop into mind for this; fade in and fade out. These are best illustrated by examining the preset patches that are interesting as they each combine 4 control assigns to produce the effect.

### FADE IN

Although this is a GT-3 supplied patch it is equally applicable to the GT-5. Let's take a look at the assignments that have been used in creating this patch:

#### Assign 1

Target:	FV: Level
Min:	0
Max:	100
Source:	Internal Pedal
Mode:	Normal
Act.Range Lo:	0
Act.Range Hi:	127
Trigger:	Patch Change
Time:	90
Curve:	Slow Rise

#### Assign 2

Target:	RV: Effect Level
Min:	100
Max:	14
Source:	Internal Pedal
Mode:	Normal
Act.Range Lo:	0
Act.Range Hi:	127
Trigger:	Patch Change
Time:	90
Curve:	Linear

#### Assign 3

Target:	DD: Effect Level
---------	------------------

Min:	100
Max:	0
Source:	Internal Pedal
Mode:	Normal
Act.Range Lo:	0
Act.Range Hi:	64
Trigger:	Patch Change
Time:	90
Curve:	Linear

#### Assign 4

Target:	PRE: Treble
Min:	0
Max:	80
Source:	Internal Pedal
Mode:	Normal
Act.Range Lo:	0
Act.Range Hi:	48
Trigger:	Patch Change
Time:	90
Curve:	Linear

As you can see not only does it fade in the volume, but it starts off with lots of delay, reverb, and reduced treble; so low volumes echo around and sound spacey. As the fade in becomes more prominent the treble is brought all the way up, the delay is reduced as is the reverb. To kick it off again, all you need to do is press the patch number for a second time.

### FADE OUT

This patch is very much the opposite of fade in, except that rather than being triggered on patch change, they are triggered when the CTL pedal is pressed.

Just as the fade in reduces delay and reverb, and increases the preamp treble the, 'Fade Out' patch reverses these and increases delay and reverb as the sound fades whilst reducing preamp treble.

What is interesting here is the fade out on the FV is performed using a fast rise curve. This effectively produces a fast drop curve due to the FV level reducing. Which is exactly the opposite of a slow rise curve.

One of the possible aspects of the internal pedal is to use it as a timing device. Although limited in this respect one good example of this is discussed in section 11 that takes a look at 'Automatic Manual Mode'.

## Control Assigns using the Wave Pedal

You have a GT-3 and are already using the SFX group but want tremolo as well? Or you have a GT-3/5 and want tremolo and pan together? Well here the wave pedal can

## Section 23 Control Assigns

help you out. Set the min/max to correspond to the depth of tremolo you require, and set the rate as appropriate, for example:

### Assign 1

Target:	FV: Level
Min:	0
Max:	100
Source:	Wave Pedal
Mode:	Normal
Act.Range Lo:	0
Act.Range Hi:	127
Rate:	60
Waveform:	TRI

For tremolo effects a waveform of SIN or TRI is best, the SAW waveform produces a sort of repeated fade in effect—I am sure someone will find a use for this somewhere. In the assignment shown you can see that the depth is 100 (i.e. full) and that the rate is 60. These parameters correspond almost 1:1 with those provided with the TR.

Got a GT-5 and need a slicer? It is possible to turn the above control assign into a slicing effect. Make the mode toggle and hey presto. However as mentioned previously the rate is now effectively halved. Turning the rate up to 100 still produces a rather slow Slicer but someone might like it! You could use the same principle we used above to turn the expression pedal into a Slicer by using 2 or more assigns with different active ranges—This would solve the rate problem.

## Tuner On Using The EXP Pedal

This is a popular set-up and many people set the tuner to come on when the FV is at zero, with the tuner set into a mute mode. Here is the assign control.

### Assign 1

Target:	Tuner On/Off
Min:	On
Max:	Off
Source:	EXP PEDAL
Mode:	Normal
Act.Range Lo:	0
Act.Range Hi:	1

Unfortunately, this will cut off any reverb/chorus/delay that is present as the mute of the tuner works at the very end of the effects chain effectively switching the MASTER Level to 0. One or two people have found that this isn't acceptable and prefer to have the tuner available at the top of the pedal by using the assign:

### Assign 1

Target:	Tuner On/Off
Min:	Off

Max:	On
Source:	EXP PEDAL
Mode:	Normal
Act.Range Lo:	126
Act.Range Hi:	127

However, this also presents itself with a problem. Firstly you need to mute the strings when going to/from tuning mode to avoid volume leaps. Also it is now extremely hard to obtain full volume from the pedal. I therefore suggest turning the normal EXP PEDAL assignment off and using the following two assignments used instead:

### Assign 1

Target:	FV: Level
Min:	0
Max:	100
Source:	EXP PEDAL
Mode:	Normal
Act.Range Lo:	0
Act.Range Hi:	100

### Assign 2

Target:	Tuner On/Off
Min:	Off
Max:	On
Source:	EXP PEDAL
Mode:	Normal
Act.Range Lo:	126
Act.Range Hi:	127

The reduced active range of the FV provides an increased area at the top of the pedal travel where full volume can be found without accidentally blasting into the tuning mode. Let's now look at a couple of effects we can generate without using the internal pedal system.

For these I recommend turning the EXP PEDAL assign off and using just assigns 1-8 to create these effects.

## Summary

One problem that can occur on changing some parameters is a zip zip zip type sound, similar to fast forwarding over a CD – changing the delay time seems to be a common cause of complaint here. The best way to avoid this is to find another method to achieve the same goal.

Although we have concentrated on using the control assigns, internal pedal and wave pedal for volume effects, they are not restricted to controlling volume. The GT-3 Owners Manual Supplement article by Matthias Miller is a great way to start getting your imagination going.

As we can see the whole control assign/internal pedal/wave pedal system is extremely versatile—let your imagination rip!



## Section 23 Control Assigns

### **GT-3** GT-3 Quick Settings

Now, whilst the both official and unofficial manuals list the preset 'Quick Settings' for the EXP PEDAL and the CTL PEDAL, neither provide the details. So here goes.

#### EXP PEDAL

No.	Name	Target	Target Min	Target Max
P1	FOOT VOLUME	FV : Level	0	100
P2	WAH PEDAL	WAH: Pedal	0	100
P3	PEDAL SHIFT	HR : HR1 Pitch	0	+12
P4	DELAY LEVEL	DD : Effect Level	0	50
P5	PEDAL DRIVE	OD : Drive	0	70
P6	PREAMP VOL	PRE: Volume	30	70
P7	CHORUS LEV	CE : Effect Level	0	50
P8	REVERB LEV	RV : Effect Level	0	50
P9	HUMAN PEDAL	HU : Manual	0	100
P10	MASTER LEV	MST: Master Level	0	100
P11	A.WAH FREQ	AW : Freq	15	72
P12	PEDAL RING	RM : Freq	24	96

#### CTL PEDAL

No.	Name	Target	Trgt Min	Trgt Max	Source Mode
P1	MASTER BPM	Master BPM(Tap)	Off	On	Normal
P2	FEEDBACKER	TR : On/Off	Off	On	Normal
P3	VIBRATO	VB : Trigger	Off	On	Normal
P4	DELAY ON	DD : On/Off	Off	On	Toggle
P5	AFB SEARCH	AFB: Search	Off	On	Normal
P6	AR HOLD	AR : Hold	Off	On	Normal
P7	SYNTH HOLD	SYN: Hold	Off	On	Normal
P8	MUTE	FV : Level	0	100	Toggle
P9	TUNER ON	TUNER On/Off	Off	On	Toggle
P10	MANUAL ON	Manual On/Off	Off	On	Toggle

### Control Assigns

Again, neither manuals list the preset quick settings that are available for control assigns. So to again make up for a manual inadequacy here is the full list:

No.	Name	Description
P1	FOOT VOLUME	Target = FV:Level, Min:0, Max:100 Source = EXP PEDAL, Mode:Normal Act.Range Lo:0, Act.Range Hi:127
P2	WAH PEDAL	Target = WAH:Pedal, Min:0, Max:100 Source = EXP PEDAL, Mode:Normal Act.Range Lo:0, Act.Range Hi:127
P3	PEDAL SHIFT	Target = HR:HR1 Pitch, Min:0, Max:+12 Source = EXP PEDAL, Mode:Normal Act.Range Lo:0, Act.Range Hi:127
P4	DELAY LEVEL	Target = DD:Effect Level, Min:0, Max:50 Source = EXP PEDAL, Mode:Normal Act.Range Lo:0, Act.Range Hi:127
P5	PEDAL DRIVE	Target = OD:Drive, Min:0, Max:70 Source = EXP PEDAL, Mode:Normal Act.Range Lo:0, Act.Range Hi:127
P6	PREAMP VOL	Target = PRE:Volume, Min:30, Max:70 Source = EXP PEDAL, Mode:Normal Act.Range Lo:0, Act.Range Hi:127

No.	Name	Description
P7	CHORUS LEV	Target = CE:Effect Level, Min:0, Max:50 Source = EXP PEDAL, Mode:Normal Act.Range Lo:0, Act.Range Hi:127
P8	REVERB LEV	Target = RV:Effect Level, Min:0, Max:50 Source = EXP PEDAL, Mode:Normal Act.Range Lo:0, Act.Range Hi:127
P9	HUMAN PEDAL	Target = HU:Manual, Min:0, Max:100 Source = EXP PEDAL, Mode:Normal Act.Range Lo:0, Act.Range Hi:127
P10	MASTER LEV	Target = MST:Master Level, Min:0, Max:100 Source = EXP PEDAL, Mode:Normal Act.Range Lo:0, Act.Range Hi:127
P11	MASTER BPM	Target = Master BPM(Tap), Min:Off, Max:On Source = CTL PEDAL, Mode:Normal Act.Range Lo:0, Act.Range Hi:127
P12	FEEDBACKER	Target = TR:On/Off, Min:Off, Max:On Source = CTL PEDAL, Mode:Normal Act.Range Lo:0, Act.Range Hi:127
P13	VIBRATO	Target = VB:Trigger, Min:Off, Max:On Source = CTL PEDAL, Mode:Normal Act.Range Lo:0, Act.Range Hi:127
P14	DELAY ON	Target = DD:On/Off, Min:Off, Max:On Source = CTL PEDAL, Mode:Toggle Act.Range Lo:0, Act.Range Hi:127
P15	MUTE	Target = FV:Level, Min:0, Max:100 Source = CTL PEDAL, Mode:Normal Act.Range Lo:0, Act.Range Hi:127
P16	TUNER ON	Target = Tuner On/Off, Min:Off, Max:On Source = CTL PEDAL, Mode:Toggle Act.Range Lo:0, Act.Range Hi:127
P17	MANUAL ON	Target = Manual On/Off, Min:Off, Max:On Source = CTL PEDAL, Mode:Toggle Act.Range Lo:0, Act.Range Hi:127
P18	FADE IN	Target = FV:Level, Min:0, Max:100 Source = Internal PEDAL, Mode:Normal Act.Range Lo:0, Act.Range Hi:127 Trig:CTL PEDAL, Time:70, Curve:Slow Rise
P19	FADE OUT	Target = FV:Level, Min:100, Max:0 Source = Internal PEDAL, Mode:Normal Act.Range Lo:0, Act.Range Hi:127 Trig:CTL PEDAL, Time:70, Curve:Fast Rise
P20	WAVE PEDAL	Target = FV:Level, Min:0, Max:100 Source = Wave PEDAL, Mode:Normal Act.Range Lo:0, Act.Range Hi:127 Rate:50, Waveform:SIN

### **GT-5** GT-5 Quick Settings

Now, whilst the official manual lists the preset 'Quick Settings' for the EXP PEDAL and the CTL PEDAL, neither provide the details. So here goes.

#### EXP PEDAL

No.	Name	Target	Target Min	Target Max
P1	FOOT VOLUME	FV : Level	0	100
P2	WAH PEDAL	WAH: Pedal	0	100
P3	PEDAL SHIFT	HR : HR1 Pitch	0	+12
P4	DELAY TIME	DD: Dly Time	200 ms	800 ms
P5	DELAY LEVEL	DD: E. Level	0	50
P6	REV LEVEL	REV: E. Level	0	50
P7	PEDAL DRIVE	OD:Drive	0	70
P8	PREAMP VOL	PRE:Volume	0	100
P9	HUMAN PEDAL	HU: Manual	0	100
P10	MASTER LEV	Master Level	0	100

**CTL PEDAL**

No.	Name	Target	Trgt Min	Trgt Max	Source Mode
P1	TEMPO DELAY	DD: Tempo In	Off	On	Normal
P2	FEEDBACKER	FB : On/Off	Off	On	Normal
P3	VIBRATO	VB : Trigger	Off	On	Normal
P4	DELAY HOLD	DD: Hold	Off	On	Normal
P5	DELAY S.O.S	DD: Record	Off	On	Normal
P6	SYNTH HOLD	Syn: Hold	Off	On	Normal
P7	TUNER ON	TUNER On/Off	Off	On	Toggle
P8	MANUAL ON	Manual On/Off	Off	On	Toggle

**Control Assigns**

Again, neither manual lists the preset quick settings that are available for control assigns. So to again make up for a manual inadequacy here is the full list:

No.	Name	Description
P1	FOOT VOLUME	Target = FV:Level, Min:0, Max:100 Source = EXP PEDAL, Mode:Normal Act.Range Lo:0, Act.Range Hi:127
P2	WAH PEDAL	Target = WAH:Pedal, Min:0, Max:100 Source = EXP PEDAL, Mode:Normal Act.Range Lo:0, Act.Range Hi:127
P3	PEDAL SHIFT	Target = HR:HR1 Pitch, Min:0, Max:+12 Source = EXP PEDAL, Mode:Normal Act.Range Lo:0, Act.Range Hi:127
P4	DELAY TIME	Target= DD:Dly Time, Min: 200ms, Max: 800ms Source = EXP PEDAL, Mode:Normal Act.Range Lo: 0 , Act.Range Hi: 127
P5	DELAY LEVEL	Target = DD: E. Level, Min:0, Max:50 Source = EXP PEDAL, Mode:Normal Act.Range Lo:0, Act.Range Hi:127
P6	REV LEVEL	Target = RV:Effect Level, Min:0, Max:50 Source = EXP PEDAL, Mode:Normal Act.Range Lo:0, Act.Range Hi:127
P7	PEDAL DRIVE	Target = OD:Drive, Min:0, Max:70 Source = EXP PEDAL, Mode:Normal Act.Range Lo:0, Act.Range Hi:127
P8	PREAMP VOL	Target = PRE:Volume, Min:30, Max:70 Source = EXP PEDAL, Mode:Normal Act.Range Lo:0, Act.Range Hi:127
P9	HUMAN PEDAL	Target = HU:Manual, Min:0, Max:100 Source = EXP PEDAL, Mode:Normal Act.Range Lo:0, Act.Range Hi:127
P10	MASTER LEV	Target = MST:Master Level, Min:0, Max:100 Source = EXP PEDAL, Mode:Normal Act.Range Lo:0, Act.Range Hi:127
P11	TEMPO DELAY	Target = Tempo: In , Min: Off , Max: On Source = CTL PEDAL, Mode:Normal
P12	FEEDBACKER	Target = TR:On/Off, Min:Off, Max:On Source = CTL PEDAL, Mode:Normal
P13	VIBRATO	Target = VB:Trigger, Min:Off, Max:On Source = CTL PEDAL, Mode:Normal
P14	DELAY HOLD	Target = DD:Hold, Min: Off , Max: On Source = CTL PEDAL, Mode:Normal
P15	DELAY S.O.S	Target = DD:Record, Min: Off , Max: On Source = CTL PEDAL, Mode:Normal
P16	SYNTH HOLD	Target = Syn: Hold, Min: Off , Max: On Source = CTL PEDAL, Mode:Normal
P17	TUNER ON	Target = Tuner On/Off, Min:Off, Max:On Source = CTL PEDAL, Mode:Toggle
P18	MANUAL ON	Target = Manual On/Off, Min:Off, Max:On Source = CTL PEDAL, Mode:Toggle

## Section 24 Getting Boost for your Solo

I have seen a lot of debate and confusion over how to give yourself a boost for a solo. Obviously life would be a little easier if we all had sound engineers available to move the little fader as we wind up and down or change the volume control on our amps (for those who don't go through the PA). The odd automated mixing desk might be quite nice as well—say MIDI controlled from our foot controller. However, most of us live with the harsh realities of the world and that means almost all of the above isn't available. Even when you are playing through a PA, the chances are there is no sound engineer to change anything and once you've set up, that's that.

So what can we do? Well, there are many many possibilities, and what I would like to do, is to present a few ideas to you.

The actual point in all of this isn't really to get a volume boost per se, but to increase the prominence of the guitar so that the soloist is centre stage. Really there are only four basic ideas behind getting the required prominence:

1. Increase the amount of distortion.
2. Increase volume.
3. Reduce dynamics to provide an increase in average volume.
4. Reduce the volume of everything else.

Let's look at each of these in turn.

### Increase the Amount of Distortion

Although this gives your part slightly more emphasis it may not be what you desire in terms of sound. It should also be said that it is possible that you might not gain any prominence at all from this.

### Increase Volume

This is a much better way of ensuring that you are more prominent. Indeed it is probably the most reliable method. However, there are a number of ways this may be achieved but in all cases you must be careful not to overdrive or clip something further down the line.

One way to get the volume boost that ensures that clipping won't occur is to set the levels at the required soloing volume. Then come back off the foot pedal to 'normal' volume. When you want to solo simply push the pedal forward. This solution does require a bit of juggling and might require a bit of practice to get right. Although it can be made simpler through the use of control assigns and setting a minimum value – or indeed using an EV-5 as an external expression pedal and setting the minimum value on the knob.

It is possible to use a two pedal set-up to help here as well. If you set up an external volume control after the GT-3/5 that has a volume control minimum (like the FV300 has I think), you can set the 'normal' volume as the minimum and the maximum volume is fully forward. The GT-3/5's FV will still operate over the full range regardless of which position the second pedal is in. This also has the advantage of being easier to control although an increase in footwork may be problematic.

On the GT-3/5 a common set-up is to configure the CTL pedal to alter the level of one of the effects in the effects chain. You need to do this with an effect that provides direct signal path control, and preferably doesn't have a direct/effect split. It certainly won't work with an effect that only has an 'effect level'. You can examine the table provided in Appendix B to find a suitable candidate. One particular favourite would appear to be the EQ level. This is a signal path level control and even if you don't use EQ you can turn it on for the boost. The EQ has a huge volume range. Again, the only thing you must be careful about is clipping. Check all the effects output meters thoroughly and use your ears to detect any possible clipping.

Carrying on this similar vein of using the CTL pedal, you can use a control assign triggered in a number of ways to give you that boost. For instance you could set up three assigns so that the expression pedal operates over a reduced range, with a flat shelf before going to full boost at fully forward. This makes the first suggestion easier to implement and control.

A similar sort of combination set-up can be gained by using an external expression pedal and the GT-3/5's FV pedal. Here the external pedal would control say EQ level between 'normal' and 'boost', whilst the FV still retains full range volume control.

Another way of gaining volume is to alter the amp output. Some amplifiers allow for electronic external control of the volume, possibly via MIDI. If you have such an amp you can use this external controller or a MIDI pedalboard to punch in the boost when you need it. Indeed some amps have a switchable EQ which could be switched in to provide the required increase.

Kent Andersen started off discussions on the list with the following question...

*I would ask if the way is to lower the master level on all patches and crack the volume on the amp a little bit upwards, and when solo is needed use the CTL-pedal to give a boost on the output level from GT-3? Is this good for the level balance on the patches? I mean: It is in the end, so no clipping in between effects??? Perhaps use the EQ to boost, but I am not that fond of EQ :) Any good ideas?*

Well, Kent's question is related to the important aspect of clipping whilst using a volume boost. For some people (like myself) this can be a problem (e.g. already high levels caused by high output pickups). For these situations, Kent's suggestion of lowering the master volume on a patch and using it normally at this lower volume and then boosting using the CTL pedal is a capital idea!

I also suggested a different possibility; If you have two pedals (two EXP pedals, e.g. EXP + SUB EXP or as I have EXP + MIDI EXP) then you can assign the master level to one and the FV level to the other—regardless of the pedal positions both pedals work correctly over their full range.

Keep the questions and suggestions rolling!

### **Reduce Dynamics to Provide an Increase in Average Volume**

---

Well, by now as soon as you hear the term 'reduce dynamics' you should be thinking compression and/or programme limiting.

Although we went over compression/limiting in section 13, let's just recap how the signal is affected. By compressing the signal we reduce the dynamic range of the signal. We can then boost the signal back to its original level. What we gain is an increase in average volume levels, whilst remaining within the original signal level. Thus we avoid any clipping problems whilst still getting an increase in volume. However, it must be said that if there are any other compressors the signal path (i.e. in the PA system) this effect might be lessened, or indeed may make no noticeable difference.

### **Reduce the Volume of Everything Else**

---

No don't laugh this isn't as silly as it first sounds. I'm not necessarily talking about turning down the volume of everyone else on the PA but having the other musicians play quieter, such as a quieter piece of music, or having them play a bit softer can generate all the prominence you need. Another trick here is to use less complex rhythm lines—on many backings to solos you hear a chord progression or chord/limited lead riff rather than a full blown lead riff screaming along in the background. Changes like this require you to think more about the music and the coordination between musicians to achieve your particular goal.

Hopefully this has given you a few ideas to be getting on with. If you have any other suggestions please let me know.

## Section 25 Using Multiple Guitars

There are two problems associated with using multiple guitars and the GT-3/5. These are:

- Difference in guitar tone
- Difference in guitar output volume

We will examine each of these separately.

### Differences in Guitar Tone

When dealing with differences in tone a patch set-up for one guitar just might not cut it with another guitar. Now, whilst there are a number of CTL-type switching solutions, these all tie up a control pedal and the control assigns. A better way to deal with this is to set-up 2 patches instead of one; one for each guitar. Some members of the GT-3/5 groups organise their patches so that when only using three banks; guitar 1 patches are on the lower bank, shared patches which are acceptable for both are on the middle bank and the patches for guitar 2 are on the upper bank. Before you dive in, think about how you will be using these in practice, and come up with a plan for organising your patches.

### Differences in Guitar Output Volume

Differences in guitar output volume can be handled in exactly the same way above—indeed the first method kills two birds with one stone, but you have paid a penalty here—you have used up to twice as many patches. Given 140 user patches on the GT-3 and 100 on the GT-5 I wouldn't see this being a problem however, and it doesn't cost any more. However, it is possible to solve the guitar input volume problem in a number of other ways:

- The cheapest solution is to just use the guitar volume controls to balance the output volume, but sometimes this can affect the pickup tone, and isn't exactly the most precise solution. This is probably the most unsatisfactory way to deal with these problems. This also has the disadvantage of restricting the volume control movement that is available, and thus restricts any level/tonal expressions that you may wish to use.
- Use an EQ pedal or volume pedal in front of the GT-3/5. Set it up so on/pedal forward matches one guitar and off/pedal back matches the other. I think volume pedals such as the FV300 allow you to set a minimum. Here you set the guitar with the lesser volume to pedal forward and the higher output guitar to pedal back. By using an effect pedal such as an EQ pedal, which way round the guitars and the on/off settings are is irrelevant. The reason behind suggesting using an EQ pedal as opposed to any other effect is it can be set-up to be completely frequency neutral. It is effectively a two-position

volume pedal. I think the volume pedal is the best solution of the two, and a good quality one will add extremely little, if any, noise to the signal path.

- It is possible to match the output levels between guitars in the same way you can level match between pickups on a single guitar by altering the pickup heights. This solution does of course have the side affect of altering tone and thus may be less preferable than other solutions. However, it does cost not anything and is simple to do.
- Finally it is also possible to electronically alter the output levels of your guitars. This is the mid-point solution between changing pickup height or using the guitar volume control, and using an external device (such as an EQ pedal). Obviously any change here would be done on-board the guitar and would avoid affecting the tonal output of the guitar. Whilst simple circuits are possible on guitars with active pickups, passive pickup based systems may require more advanced electronics to avoid changing the tonal output. How, or what might be done here I cannot say as I am not qualified to do so.

You need to decide whether or not the patch duplication solution is required. If all of your patches suit both of your guitars, then you may well prefer to use an external volume matching solution so that you only have to juggle a single set of patches. Bear in mind that if you do duplicate patches, you may well find yourself having to change two or three patches rather than one patch every time you make a tweak.

Of course, things get much more complicated the more guitars you use. But if you think upon similar lines to the above, you should be able to adapt a solution to match your needs. Indeed by bending down and altering an EQ level setting on an EQ pedal before the GT-3/5 you can quickly accommodate 3 guitars, but this does have other problems associated with it such as on-stage lighting (being able to see the pedal controls!).

If anyone has any other solutions please let me know.



## Section 26 Signal Delay & Polarity

The issue of signal delay and signal polarity were raised on the GT-3 Yahoo Group by Sutton Reid. In this section we will examine what they are, and I shall present the results from some tests that were performed to determine the GT-3/5's affect on the signal.

Both signal delay and polarity were measured using the following set-up:

- PC Line Out □ Peavey RQ200 Mixing desk Channel 6.
- Channel 6 Monitor Out □ Channel 5 panned hard right
- Channel 5 Send Effects □ GT-3 In.
- GT-3 Out (or Send effects) □ Channel 4 panned hard left

### Signal Delay

Signal delay is the term used to describe the time it takes a signal to travel between two points. Almost all audio processors incur some sort of delay in their circuits, which is inherent in their design and in the nature of what they do. Indeed, sometimes this delay is exploited and is mixed back with the original signal to produce effects such as delay, chorus and reverb. We however, will be examining what delay is incurred by the GT-3/5, without any time delay effects being used. This is the raw delay inherent in the unit.

When performing the tests for signal delay I have checked the delay on a straight cable, without the GT-3/5, and this shows a 0.000ms delay. The test set-up is therefore \*not\* an affecting factor in any of these tests.

GT-3/5 State	Signal Travel Distance	Delay Incurred
Bypass Mode	Input □ Output	1.088ms
No Bypass, No Effects	Input □ Output	1.383ms
External Effects Loop	Input □ SEND	1.156ms
External Effects Loop in loopback	Input □ SEND □ RETURN □ OUTPUT	2.471ms
Preamp Simulation	Input □ Output	1.474ms
OD/DS	Input □ Output	2.177ms
Preamp + OD/DS	Input □ Output	2.313ms

As you can see, adding more effects results in increased delay times. The OD/DS is not surprising in its leap in delay, due to the fact it is an analogue distortion circuit, and therefore it must pass through the ADAC process. Again you can see the cost of the ADAC process when the effects loop is used with a small straight patch cable directly connecting the SEND to the RETURN.

Although these times were measured on a GT-3, it is expected that the GT-5 is identical.

So why are these times important to you? Well, if you use the GT-3/5 in a parallel effects system you may get different delays times causes a slight out-of-phase situation and thus some frequency cancellation, often leading to a thinner sound. If you read section 29, which describes the external effects loop being used as a tap, then you can experience different timings between the main output signal and the SEND jack signal. Again this can lead to phase cancellation, and a thinning of the sound.

### Signal Polarity

The term signal polarity (also called 'signal phase') refers to whether an effect is 'non-inverting' or 'inverting'. A 'non-inverting' effect produces a positive-going output signal from a positive-going input signal. However, an 'inverting' effect produces a negative-going output signal from a positive-going input signal. Problems with polarity only occur when using parallel effects systems, where a mix of inverting and non-inverting effects can produce a partial or complete cancelling of the signal.

The direct signal and the output signal show the same signal polarity. The mixing desk is neutral as well and does not invert the phase.

Therefore I must conclude the GT-3 and GT-5 do not phase invert, and are neutral with regard to signal polarity.

So why is phase inversion an issue? Well if you apply a phase inverted signal to a normal one, the result is phase cancellation and either a thinning, or if the signals are exactly the same, a disappearing of the signal all together! This obviously will only concern people using parallel effects systems or are mixing the wet GT-3/5 output with a dry signal as well.

## Section 27 Factory Reset/Commissioning

### **GT-3** GT-3 Factory Reset Mode

The Roland published factory reset mode is described on page 66 of the official owners manual. It may be entered by holding down the following key combinations while turning on the power:

[MOD] [SFX]

What it allows you to do is to just reset the user settings, and patches, so that these are just as they were when the unit was shipped.

Once you are in this mode just press [EXIT] to avoid re-initialising the settings. If you *really* panic then power the unit off!

What this mode doesn't allow you to do is re-calibrate your EXP pedal, or check that your unit works. This is what the factory commissioning mode can do for you.

### **GT-5** GT-5 Factory Reset Mode

The Roland published factory reset mode is described on page 70 of the official owners manual. It may be entered by holding down the following key combinations while turning on the power:

[MOD] [FEEDBACKER/SLOWGEAR]

What it allows you to do is to just reset the user settings, and patches, so that these are just as they were when the unit was shipped.

Once you are in this mode just press [EXIT] to avoid re-initialising the settings. If you *really* panic then power the unit off!

What this mode doesn't allow you to do is re-calibrate your EXP pedal, or check that your unit works. This is what the factory-commissioning mode can do for you.

## Factory Commissioning Mode

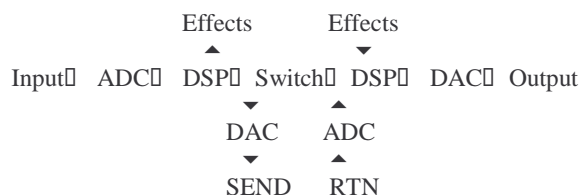
This mode allows you to test the functionality of the GT-3/5, confirming that it is functioning correctly, and most importantly, it allows calibration of the EXP pedal in the unlikely event of your unit losing its calibration. It is obviously used in the factory as part of the final commissioning process prior to boxing up.

Remember here that if you don't like what you see at any point just hit the power button! However, I will tell you in advance of any nasties lurking...

OK. A bit of theory and philosophy here. I will go out on a limb here and give you some theories I have about the GT-3/5's design architecture, the Test Modes, and what they are

© Copyright 2000-2002 Barry S. Pearce et al.

used for. The GT-3/5 has essentially the following architecture:



The tests included in this section are generally designed to test the major signal path for Production Quality Control. It is important to note that most of the effects in the GT-3/5 are DIGITAL SOFTWARE computations made by the DSP processors. Therefore, the actual signal path is limited to the INPUT through several ADC and DAC stages, including the external FX loop, to the OUTPUTS. It is important to note that most of the test mode steps involve measuring noise and converter functions. I should also mention that the OD/DS is based on a digitally controlled ANALOGUE distortion circuit. This circuit also is preceded by a DAC and followed by an ADC. Again many of the tests are aimed at this particular circuit and checking it for noise.

There are really only a few things that you should take away from using the Test Modes:

- Correct operation of the LCD, the effects switches and their respective LED indicators.
- Proper EXP Pedal sweep operation
- -Memory battery voltage. Could save your ass, this one!
- -EXP Pedal Calibration.

It is advisable to disconnect all audio and midi cables prior to entering this mode. Failing to do so can sometimes mean the unit behaves in an unusual manner. If you do have a MIDI cable, you can use it to link the in directly to the out but do so ONCE the test mode has been entered.

### **GT-3** GT-3 Factory Commissioning Mode

This mode is somewhat un-documented and was brought to light on the GT-3 Yahoo Group by Kaido (Draconic) Haavandi.

The test mode may be entered by holding down one of the following combinations whilst powering up the GT-3:

[Master][Pedal Assign]  
[Reverb][Master]  
[PREAMP][EQ] (brings you in at step 12)

The [Master][Pedal Assign] combination is the preferred method. It is advisable to disconnect all audio and midi

## Section 27 Factory Rest/Commissioning

cables prior to entering this mode. Failing to do so can sometimes mean the unit behaves in an unusual manner.

OK. So when you start up the factory-commissioning mode you will first get a single page display. The first line will display 'GT-3' and the second line informs you of the software you are running and will look something like 'ver. 1.01'. The current version is v1.03, and is upgradeable via EPROM replacement at a Roland Service Centre. Then you are into the 19 steps to a commissioned unit...each step starts automatically once the last step is complete, unless the unit cannot determine when the test is complete, in which case you need to press [EXIT] to continue.

**If you happen to have your unit plugged into an amp and speaker you should hear a rather quiet continuous tone at about 500Hz or so. DON'T turn your speaker system up. In fact make sure it is at a VERY LOW output...it could ruin your day later in the testing cycle. The fact is, you really don't need (or probably want) your GT-3 hooked up to an amp here- these test were designed for the factory test bench.**

### 1. Display Check

This step merely lights up every single part of the GT-3 LCD display and all of the red LEDs on the effects buttons and the five footswitches (1-4 and CTL). To move onto the next step press [EXIT].

### 2. LCD Contrast Check

This step enables you to check the full range of the LCD contrast. The display will show the contrast level at 15. What it wants you to do is to use the value dial and change the contrast to 0 and then back to 15. Doing this is the only way to proceed to step 3.

### 3. Switch Check

This step systematically forces you to press every button in a specific order. If you press the wrong button it let's you know with a message on the LCD! As you press each button it's associated LED (if any) is extinguished. This test therefore checks that all your buttons/footswitches and their associated LEDs are functioning correctly. It is not possible to exit this mode without following the test through.

### 4. Expression Pedal Sweep Check

This simple test, like the last one, must be completed; there is no way to bypass it. It is simply checking that the Top, Bottom and Middle trigger points used for triggering the internal pedal can be detected. To execute the test start with the EXP pedal fully forward then simply bring the EXP pedal all the way back, this should light up the middle point. Then push it all the way forward, thus lighting the top, and finally bring it all the way back again to light the bottom.

The test then goes on to try the same thing with a SUB EXP PEDAL. Once again, simply execute the test as above. If you don't have an external SUB EXP pedal then connect your guitar to the GT-3 using a normal guitar lead, and put the guitar volume control at max. First plug the lead into the SUB CTL/SUB EXP socket. Push it all the way in. Then pull it out – as you do so the middle and top will light up and then push it all the way in once more to light the bottom. You can then remove the guitar lead.

### 5. Battery Check

The display shows the battery voltage. Press [EXIT] to move onto the next test.

Normal voltage is 3.1v-3.2v. According to the GT-5 Service Manual issued by Roland, the battery low display comes on if the battery voltage reaches 2.71v or less. If your battery voltage is 2.8v-2.9v it's probably time to prepare yourself for a battery change. Certainly if you have a gig approaching change it, but failing that, perform the change at 2.7v when the Battery Low warning appears.

### 6. MIDI Connection Check

This appears to be a MIDI loopback style test. This is done using a single MIDI cable in a simple connection from the MIDI Out -> MIDI In.

If you have no MIDI cable connected, the display will read 'No Connect' and you may simply press [EXIT] to move on to the next test. If you have a MIDI cable, simply connect in to out. The test should produce 'Verify OK' if the MIDI ports are OK.

### 7. Output D/A Converter Test

**Be careful with this next test. Have your volume control set FAIRLY LOW to avoid damaging anything! I suggest not having an amp connected at all for the next few signal tests!**

This test is designed to be done on an oscilloscope. A rectangular waveform is applied to the input, and the GT-5 OUTPUT control is adjusted from 0-100% to verify level changes. If you don't have an O-scope, you can connect the GT-3 to your amplifier (with the volume starting at ZERO). Slowly turn up the volume, you will hear something like a 500Hz tone being muted and un-muted...in time with the Mute Off/On display in fact! If you haven't turned the output level knob up do so now. Do it slowly and carefully. On the other hand, if you've just parted with your speakers and/or your eardrums, then turn it down. I told you so (before we started!). When you are bored press [EXIT] to move on.

## Section 27 Factory Rest/Commissioning

---

### 8. DS A/D/A:Low Check

This test is checking a complex analogue test signal that is converted to digital, then back to analogue for comparison using an Oscilloscope. [GAIN LOW] is displayed on the display's bottom line. Press [EXIT] to continue.

### 9. DS A/D/A:High Check

This test is checking a square wave analogue test signal that is converted to digital, then back to analogue for comparison using an Oscilloscope. [GAIN HIGH] is displayed on the bottom line. Once again, press [EXIT] to continue.

### 10. DS A/D/A:OD Check

This test is checking a square wave analogue test signal that is converted to digital, then back to analogue for comparison using an Oscilloscope. This test is checking the DS A/D D/A converters. [OVERDRIVE] is displayed on the bottom line. Once again, press [EXIT] to continue.

### 11. DS A/D/A:CV Check

This test is checking the DS Control Voltage test signal using an Oscilloscope. [CV Check] is displayed on the bottom followed by a control voltage number that scans up and down. Once again, press [EXIT] to continue.

### 12.EXT OD/DS Check

This test checks a generated DSP signal to the SEND jack of the loop. Again, this is designed to be done on an Oscilloscope showing a nice rectangular waveform output. When a blank plug is inserted into the RETURN jack, the signal should stop at the SEND Jack, and show up at the OUTPUT (L) Jack. This verifies the cut-off function of the RETURN Jack. The display bottom line reads [DSP-> EXT -> OUT]. Once again, press [EXIT] to continue.

### 13.INPUT A/D Check

This test is checking a square wave analogue test signal that is input into the INPUT Jack, run through the ADC / DAC process, then to the OUTPUT Jack for comparison using an Oscilloscope. First the INPUT Level, then the OUTPUT Level are slowly adjusted to show output level change on the scope. [IN----OUT] is displayed in the bottom line. Once again press [EXIT] to continue.

### 14. DSP INTO(67p) Check

Um...The test quickly displays '--- OK! ---' and then moves on. Um...yeah..right...

### 15. Noise (IN->OUT) Check

This test checks the residual noise of the I/O system with the INPUT and OUTPUT levels at MAX. Using a noise meter, connect to the OUTPUT Jacks (R, then L with a blank plug in R), look for noise at -79Dbm or better. Once again, press [EXIT] to continue.

### 16. Noise (EXT) Check

This test checks the residual noise with the EXT OD/DS loop system converters engaged. Set the INPUT and OUTPUT levels at MAX. Using a noise meter, connect to the OUTPUT Jacks. Connect a cable between the loop SEND and RETURN Jacks. Look for noise at -79Dbm or better. Once again, press [EXIT] to continue.

### 17. Noise (DS)

This test checks the residual noise of the DS system with the INPUT and OUTPUT levels at MAX. Using a noise meter, connect to the OUTPUT Jacks (R, then L with a blank plug in R), look for noise at -71Dbm or better. Once again, press [EXIT] to continue.

### 18. Expression Pedal Calibration!

Crumbs. Probably the one you all wanted to know about and its here!!! If you are feeling a bit wimpy and don't want to alter your GT-3 in any way NOW is the time to hit the 'Power Button' super-escape-capsule-key-thing and progress on to the Summary.

OK now the folks with no bottle skimming their way to the Summary let's get down to the stuff that requires a steady nerve!

This one is quite simple. Just follow the instructions. Bring the pedal all the way back and press [WRITE] – you should get an OK message. Then push it all the way forward press [WRITE] again. You should get another OK message and then onto...

### 19. Factory Load

If you don't want to completely reset your GT-3 then power it off NOW...else press [WRITE] and its as good as new!!!!

## **GT-5** GT-5 Factory Commissioning Mode

The GT-5 Service Manual calls this the "Test Mode". You can download the Service Manual from the files section of the GT-5 Yahoo group.

## Section 27 Factory Rest/Commissioning

Holding down the following whilst powering up the GT-5 to enter the test mode:

[PEDAL ASSIGN] [NAME]

The [PEDAL ASSIGN] [NAME] combination is the only method listed. There may be other combinations like the GT-3, but they are unknown to me.

OK. So when you start up the factory-commissioning mode you will first get a single page display. The first line will display 'GT-5', and the second line informs you of the software you are running. The display will look something like 'ver. 1.0'. BTW, if you're running anything previous to version 1.06, you really must upgrade your unit. The display will then show "NOW DSP CHECKING" for 6 seconds, then to a blank display (if everything is OK so far).

You then have two choices: run all the tests in order (Automatic Test), or to jump to a specific test by number (Manual Test).

To enter the Automatic Test Mode press: [FEEDBACKER/SLOWGEAR].

Then you are into the 18 steps to a commissioned unit...each step starts automatically once the last step is complete, unless the unit cannot determine when the test is complete, in which case you need to press [EXIT] to continue.

To enter the Manual Test Mode press: [PARAMETER (□)], then [WRITE] to start the selected test.

Select the desired test number using the [PARAMETER (□)] or (□) buttons. Press the [WRITE] button to start the test.

**If you happen to have your unit plugged into an amp and speaker you should hear a rather quiet continuous tone at about 500Hz or so. DON'T turn your speaker system up. In fact make sure it is at a VERY LOW output...it could ruin your day later in the testing cycle. The fact is, you really don't need (or probably want) your GT-5 hooked up to an amp here- these test were designed for the factory test bench.**

### 1. LCD/LED, Switches

This test has two parts- testing the LCD display, the LED's in the effect switches, and the switches themselves.

#### LCD/LED Test

This step merely lights up every single part of the GT-5 LCD display and all of the red LEDs on the effects buttons and the five footswitches (1-5 and CTL). To move onto the next step press [FEEDBACKER/SLOWGEAR].

#### Switch Test

This step systematically forces you to press every button in a specific order. The order is:

- Effect Selector Buttons: Left to right, upper to lower.
- Pedal switches: B-C-5-4-3-2-1

If you press the wrong button, it will let you know with a message on the LCD! As you press each button, its associated LED (if any) is extinguished. This test therefore checks that all your buttons/footswitches and their associated LED's are functioning correctly. It is not possible to exit this mode without following the test through.

### 2. Expression Pedal Sweep Check

This simple test, like the last one, must be completed; there is no way to bypass it. It is simply checking that the Top, Bottom and Middle trigger points used for triggering the internal pedal can be detected. To execute the test, start with the EXP pedal fully forward, then simply bring the EXP pedal all the way back. This should light up the middle point. Push the pedal all the way forward, thus lighting the top, and finally bring it all the way back again to light the bottom. The test then goes on to try the same thing with an EXP Pedal installed in EXP/CTL Jack 1 then EXP/CTL Jack 2 (in that order). Once again, simply execute the test as above. If you don't have an external EXP pedal then connect your guitar to the GT-5 using a normal guitar lead, and put the guitar volume control at max. First plug the lead into the EXP/CTL1 or EXP/CTL2 socket (depending on which you are trying to check). Push it all the way in. Then pull it out – as you do so the middle and top will light up and then push it all the way in once more to light the bottom. You can then remove the guitar lead.

### 3. Encoder Check

This test checks the VALUE rotary dial. First click the encoder wheel three clicks Clockwise; the display reads "OK". Then three clicks Counter clockwise, and the display reads "OK" again. A no-brainer, me thinks.

### 4. Battery Check

The display shows the battery voltage. Normal voltage is 3.1v-3.2v. According to the GT-5 Service Manual issued by Roland, the battery low display comes on if the battery voltage reaches 2.71v or less. If your battery voltage is 2.8v-2.9v it's probably time to prepare yourself for a battery change. Certainly if you have a gig approaching change it, but failing that, perform the change at 2.7v when the Battery Low warning appears. Press [EXIT] to move onto the next test.



## Section 27 Factory Rest/Commissioning

---

### 5. MIDI IN/OUT Check

This appears to be a MIDI loopback style test. This is done using a single MIDI cable in a simple connection from the MIDI Out -> MIDI In.

If you have no MIDI cable connected, the display will read 'No Connect' and you may simply press [EXIT] to move on to the next test. If you have a MIDI cable, simply connect in to out. The test should produce 'Verify OK' if the MIDI ports are OK.

### 6. Output D/A Converter Test

**Be careful with this next test. Have your volume control set FAIRLY LOW to avoid damaging anything! I suggest not having an amp connected at all for the next few signal tests!**

This test is designed to be done on an oscilloscope. A rectangular waveform is applied to the input, and the GT-5 OUTPUT control is adjusted from 0-100% to verify level changes. If you don't have an O-scope, you can connect the GT-5 to your amplifier (with the volume starting at ZERO). Slowly turn up the volume, you will hear something like a 500Hz tone being muted and un-muted...in time with the Mute Off/On display in fact! If you haven't turned the output level knob up do so now. Do it slowly and carefully. On the other hand, if you've just parted with your speakers and/or your eardrums, then turn it down. I told you so (before we started!). When you are bored press [EXIT] to move on.

### 7. DS A/D/A: Low Gain Check

This test is checking a complex analogue test signal that is converted to digital, then back to analogue for comparison using an Oscilloscope. [GAIN LOW] is displayed on the display's bottom line. Press [EXIT] to continue.

### 8. DS A/D/A: High Gain Check

This test is checking a square wave analogue test signal that is converted to digital, then back to analogue for comparison using an Oscilloscope. [GAIN HIGH] is displayed on the bottom line. Once again, press [EXIT] to continue.

### 9. DS A/D/A: Overdrive Check

This test is checking a square wave analogue test signal that is converted to digital, then back to analogue for comparison using an Oscilloscope. This test is checking the DS A/D D/A converters. [OVERDRIVE] is displayed on the bottom line. Once again, press [EXIT] to continue.

### 10. DS A/D/A: CV Check

This test is checking the DS Control Voltage test signal using an Oscilloscope. [CV Check] is displayed on the bottom followed by a control voltage number that scans up and down. Once again, press [EXIT] to continue.

### 11. LOOP Check

This test checks a generated DSP signal to the SEND jack of the LOOP. Again, this is designed to be done on an O-scope showing a nice rectangular waveform output. When a blank plug is inserted into the RETURN jack, the signal should stop at the SEND Jack, and show up at the OUTPUT (L) Jack. This verifies the cut-off function of the RETURN Jack. The display bottom line reads [DSP-> EXT -> OUT]. Once again, press [EXIT] to continue.

### 12. Noise (IN->OUT) Check

This test checks the residual noise of the I/O system with the INPUT and OUTPUT levels at MAX. Using a noise meter, connect to the OUTPUT Jacks (R, then L with a blank plug in R), look for noise at -79Dbm or better. Once again, press [EXIT] to continue.

### 13. Noise (LOOP) Check

This test checks the residual noise with the LOOP system converters engaged. Set the INPUT and OUTPUT levels at MAX. Using a noise meter, connect to the OUTPUT Jacks. Connect a cable between the LOOP SEND and RETURN Jacks. Look for noise at -79Dbm or better. Once again, press [EXIT] to continue.

### 14. Noise (DS)

This test checks the residual noise of the DS system with the INPUT and OUTPUT levels at MAX. Using a noise meter, connect to the OUTPUT Jacks (R, then L with a blank plug in R), look for noise at -71Dbm or better. Once again, press [EXIT] to continue.

### 15. INPUT A/D Check

This test is checking a square wave analogue test signal that is input into the INPUT Jack, run through the ADC / DAC process, then to the OUTPUT Jack for comparison using an Oscilloscope. First the INPUT Level, then the OUTPUT Level are slowly adjusted to show output level change on the scope. [IN----OUT] is displayed in the bottom line. Once again press [EXIT] to continue.

### 16. DSP Pitch Interrupt Signal Test Check

An interrupt signal generated by IC9 on the board is checked. It either passes or fails. The test quickly displays '--- OK! ---' Once again press [EXIT] to continue.

### ***17. Expression Pedal Calibration!***

Crumbs. Probably the one you all wanted to know about and it's here!!! If you are feeling a bit wimpy and don't want to alter your GT-5 in any way, NOW is the time to hit the 'Power Button' super-escape-capsule-key-thing and progress on to the Summary.

This one is quite simple. Just follow the instructions. Bring the pedal all the way back and press [WRITE] – you should get an OK message. Then push it all the way forward press [WRITE] again. You should get another OK message. Once again press [EXIT] to continue.

### ***18. Factory Presets Load***

If you don't want to completely reset your GT-5 then power it off NOW...else press [WRITE] and it's as good as new!!!!

## **Summary**

Not much fun here. It can be a useful health check if you just rescued your GT-3/5 from something liquidy and not very nice after a Saturday night gig. Anyway, have fun...the worst you can do with these modes is completely wipe out your user settings(!) – so be careful.

## Section 28 All About MIDI

### What MIDI Can and Can't Do for You

MIDI opens up your GT-3/5 to control and be controlled by other units automatically, with an almost seamless integration. MIDI is extremely powerful and can really unlock the potential of your GT3/5.

#### You can:

1. change patches on your GT-3/5 from another unit
2. control parameters on your GT-3/5 in real-time from another unit
3. control real-time parameters/loops etc on other units
4. (with the right equipment) turn amp channels on & off

However, MIDI is not an all-encompassing panacea, there are some things MIDI won't let you do with your GT-3/5.

#### You cannot:

1. control the GT-3/5 with your guitar (not even with a MIDI pickup)
2. obtain sounds from the GT-3/5 with MIDI notes (such as obtained from a MIDI pickup)
3. use the GT-3/5 to re-transmit MIDI messages (MIDI Thru)

What we are going to do in this section is provide you with a MIDI primer, and take you through the GT-3/5 MIDI functionality right the way through to some very advanced use in multi-unit rack configured systems with external MIDI foot controllers. In fact – everything you need to have a big head start.

### MIDI Primer

Let's start right at the beginning: "What do you know about MIDI?"- if the answer is nothing, do not worry. To use MIDI and the GT-3/5, you do not need to be a rocket scientist.

The MIDI capabilities of the GT-3/5 make the Blue Box more than a mere effects unit; you can now control your effects in real time, save your hard work and effort spent patch programming and even control your entire rig! We'll start with some basic information about what MIDI is, and how it works, then we'll progress onto how to apply the "theory" of MIDI to your situation.

Think of MIDI as a phone system: it lets your GT-3/5 "talk" to other MIDI capable units. Inside that MIDI cable are 16 phone lines that are called channels. Each has its own number (1-16). All of the phone lines are one-way and all of them are used in the direction. This means for a bi-directional MIDI conversation you need two cables; one for receiving and one for transmitting.

For receiving data, the GT-3/5 can be set to one specific MIDI channel (1-16), or it can be set to OMNI mode, which allows it to listen on all 16 channels. For transmitting data, the GT-3/5 can be set to either one specific channel, or to "RX", which means the GT-3/5 transmits on the same channel number on which it receives. This is the normal preset value from the factory. The details on how to set this up are detailed later.

These phone lines (channels) allow MIDI capable devices to send "messages" to each other in order to communicate specific pieces information. These messages come in various forms; each designed to communicate certain categories of information.

Channel Messages are specific to the Channel set on the communicating units, and are used to convey real time performance information. There are several types of Channel Messages: Program Change Messages, Bank Change Messages, Control Change Messages and Velocity and Pitch Bend Messages. We will detail the meaning and uses for Program Change and Control Change Messages later on. Pitch Bend and Velocity Messages are real-time pieces of information that can be programmed to control specific parameters.

System Messages are more background in nature. You won't be dealing with them when "Playing" the GT-3/5 at a gig; you use them in the setting up of the unit. More specifically, we deal mostly with System Exclusive or SYSEX messages. These messages are used in the DATA DUMP/LOAD functions.

### Program Change Messages

Program Change Messages are used to select specific sounds or patches in MIDI devices. In the case of the GT-3/5, selecting different patches with the numbered ([GT-3] 1-4, [GT-5] 1 -5) footswitches does more than just change the patch; it can also be configured to send a Program Change Message from the MIDI OUT connector! The Program Changes are numbered from 1 to 128, and all MIDI devices use this protocol. (Just so you know, there's a way to get beyond 128 patches: the Bank Change Message allows us to go further).

What this means to you is that when you select patch 53 (U3-1-3 on the GT-5, 13-4 on the GT-3) it will also select patch number 53 on any other MIDI devices that you have set up to receive Program Change Messages. If you set up your rig properly, you can configure everything to follow the patch changes on the GT-3/5. You can also customise how Program Change Messages operate using the MIDI Program Map, discussed later in the Configuration paragraph of this MIDI Section.

## Bank Change Messages

Bank Change or CC# 0 and CC# 32 are control messages to get past the 128 program/patch limit.

I hear you say: “What limit? I thought that the GT-5 had 250 patches and the GT-3 had 340 patches?!”. Yes, it’s true the GT-3/5 both have more than 128 patches. Back in the 1980’s when MIDI was born; it was thought that synths could not end up with more than 128 patches in the times to come. At that time, having 100 patches was out of this world. Most synths topped out at 56 or 64 patches, and that was top of the line gear. When synths started to get near the 128 limit, something had to be done to allow more patches. “Bank Select” was then added to the MIDI Specification, and each bank can have another 128 patches.

When you change a patch above 128 on the GT-3/5, the Bank change message is sent along with the Program Change Message.

The GT-3/5 uses this combination of Bank Change and Program Change messages to allow greater Patch selection:

1. Bank Select 0 (CC# 0:0, CC#32:0), PC# 1-128 Patches 1-128  
[GT-5] U-1-1-1 to P-2-1-3  
[GT-3] 1-1 to 25-4 (100-128 all select 25-4)
2. Bank Select 1 (CC# 0:1, CC#32:0), PC# 1-128 Patches 129-256  
[GT-5] P-1-1-1 to P-6-1-3  
[GT-3] 26-1 to 50-4 (100-128 all select 50-4)
3. Bank Select 2 (CC# 0:2, CC#32:0), PC# 1-128 Patches 257-384  
[GT-5] P-5-1-1 to P-6-5-5 (50-128 all select P6-5-5)  
[GT-3] 51-1 to 75-4 (100-128 all select 75-4)
4. Bank Select 3 (CC# 0:2, CC#32:0), PC# 1-128 Patches 385-512  
[GT-5] NOT USED  
[GT-3] 76---1 to 85-4 (40-128 all select 85-4)

As you can see, both the GT-3 and GT-5 will sometimes select the same patch despite different program change messages. With the GT-3 all PC messages over 100 select the same patch as 100 (except for bank 3 PC messages where everything over 40 selects the same patch) and on the GT-5 only bank 2 patches over 50 select the same patch as 50. The reason behind this will have been an ‘ease of design’ issue decided by Roland which make the PC map easier to implement.

For example:

GT-3 Patch	GT-5 Patch	Bank Select #	Patch Change #
43-2	P-3-4-5	CC# 0:1, CC# 32:0	PC# 70,
50-4	P-5-4-3	CC# 0:1, CC# 32:0	PC# 118
18-1	U-3-4-4	CC# 0:0, CC# 32:0	PC# 69
63-1	P-6-5-4	CC# 0:2, CC# 32:0	PC# 49

The GT-3/5 Owner’s manuals have a full listings of the Patch Number versus Bank Change Messages and Patch Change numbers.

**Note:** Bank Change messages only work if the receiving unit knows what they are. Therefore if you have the GT-3/5 controlling another device that does not recognise Bank Change Messages, it will only react to the Program Change Message.

## Control Change Messages

MIDI Control Messages or CC Messages (CC#) as they are commonly called, are an important part of the power of MIDI allowing real-time control of parameters.

Each CC number from 0-127 has it’s own ‘job’ to do. The ‘job’ for CC#1 is to control ‘Modulation’, for CC#7 to control ‘Volume’, and so forth.

Each specific CC number has a range of values from 0-127. For example, CC#7 ‘Vol.’ can go from ‘0’ (No Sound / Volume fully down) all the way to ‘127’ (Volume full up / Max Volume).

For example, you can set the on-board expression pedal of the GT-3/5 to send a CC#7 message out of its MIDI OUT to the MIDI IN of a synthesizer. The synth will read the CC#7 messages over MIDI, thus allowing you to control that synth’s volume with the GT-3/5’s built in expression pedal. Since the GT-3/5’s expression and footswitches can be set to any range between Min and Max setting (including the external footswitches & pedals), you can have a very tight control of all sorts of MIDI gear from your GT-3/5.

There is just too much info on Control Change messages to cover here. Due to the complex and detailed nature of MIDI, this topic would, and does, fill a good-sized book.

For more on control messages go to [www.synthzone.com](http://www.synthzone.com).

### MIDI CC# Messages the GT-3/5 will send

CC#	Parameter
0	Bank Select MSB *
1	Modulation wheel / lever
2	Breath Controller
3	Not Defined
4	Foot Controller
5	Portamento Time
6	Data Entry MSB

## Section 28 All About MIDI

CC#	Parameter
7	Channel Volume
8	Balance
9	Not Defined
10	Pan
11	Expression Controller
12	Effect Control Change 1
13	Effect Control Change 2
14-15	Not defined
16-19	Multi Purpose Controllers (1-4)
20-31	Not defined
32-63	LSB for control changes 0-31 **
64	Sustain Pedal
65	Portamento On / Off
66	Sostenuto
67	Soft Pedal
68	Legato Footswitch
69	Hold 2.
70	Sound Variation/Exciter.
71	Harmonic Content/Compressor.
72	Release Time/Distortion.
73	Attack Time/EQ.
74	Brightness / Expander or Noise Gate.
75	Not Defined / Reverb.
76	Not Defined / Delay.
77	Not Defined / Pitch Transposer
78	Not Defined / Flanger or Chorus
79	Not Defined/Special Effects
80-83	Multi-purpose Controllers (5-8)
84	Portamento Control
85-90	Not Defined
91	Effects 1 / Effects Depth
92	Effects 2 / Tremolo Depth
93	Effects 3 / Chorus Depth
94	Effects 4 / Detune Depth
95	Effects 5 / Phaser Depth
96-97	Data Increment, Data Decrement
98-99	Non-registered Parameter # LSB, MSB
100-101	Registered Parameter # LSB, MSB
102-119	Not Defined
120-127	Reserved for Channel Mode Messages

\*MSB= Most Significant Byte.

\*\*LSB= Least Significant Byte.

### Velocity Messages

These messages are the ‘notes’ that are sent from equipment such as keyboards and synthesizers. The GT-3 is unable to use these messages but they can be used by the GT-5 to trigger the internal pedal as part of a control assign. We will examine the use of these messages when we look at configuration.

### Pitch Bend Messages

These messages are the sent from equipment such as keyboards and synthesizers. The GT-3 is unable to use these messages but they can be used by the GT-5 to trigger the internal pedal as part of a control assign. We will examine the use of these messages when we look at configuration.

### SYSEX Messages

System Exclusive (“Sysex” for short) Messages are used to transfer device specific data. They can be used to control the device in a fuller implementation outside the normal ability of MIDI and they are also used for ‘dumps’ and ‘bulk loads’. These dump and bulk loads are effectively the backup & restore. Most MIDI units provide at least these facilities.

The GT-3 & GT-5 have full implementations and the patch editors that are available for these two units takes advantage of these messages to alter ALL of the set-up. That means from a PC you can control the on/off of an effect change the type of effect and even change any of the parameters of any effect real-time! You can even change the global settings!!

On a PC, patches are often backed up into ‘.syx’ files. These ‘.syx’ files contain the Sysex information for the patch. A single ‘.syx’ file may contain everything from a single patch to multiple patches to an entire backup of a unit.

Because of the device specific nature of the Sysex messages, the GT-3 & GT-5 are as such incompatible. This means you cannot feed GT-3 patches into a GT-5 using SYSEX and vice versa. If you try you may achieve some changes, but whilst it won’t damage your unit you may find the need to re-configure. At best part of the patch information will have been transferred.

There is obviously much more that we could go into, but the details behind Sysex Messages are just so involved. To go too deeply into these details would likely cause unnecessary confusion.



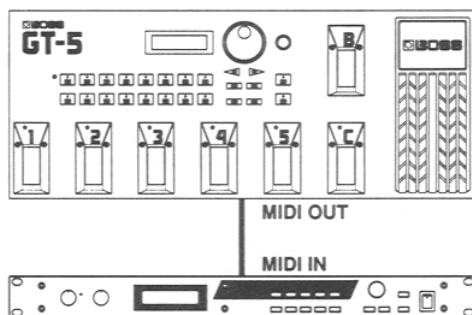
## Connections

Lets now deal with how you physically connect MIDI devices. On the back of the GT-3/5 (and most other MIDI devices) you will see two MIDI (5-pin DIN socket) connectors labeled "MIDI IN" and "MIDI OUT". On some MIDI devices (but not the GT-3/5) there is also a connector labeled "MIDI THRU"; and still others that have double up on the use of the output socket and these are labeled "MIDI OUT/THRU". We will talk about MIDI THRU too, even though the GT-3/5 does not support it, as more sophisticated rigs will make good use of it as well.

### MIDI In/Out

As you can imagine, the MIDI IN and MIDI OUT connectors perform those exact functions; the MIDI OUT connection is where the GT-3/5 sends data to other MIDI devices, and the MIDI IN connector is where the GT-3/5 receives MIDI data.

You must connect the GT-3/5's MIDI OUT to the other unit's MIDI IN, and vice versa with the GT-3/5's, you must connect the other unit's MIDI OUT to the GT-3/5's MIDI IN (see diagram below).



### MIDI THRU or MIDI OUT/THRU

As we mentioned before, there can also be a MIDI THRU or a MIDI OUT / THRU connector on some devices (but not the GT-3/5).

MIDI THRU is where a unit will re-transmit ALL messages that appear at its MIDI IN. In the case of a MIDI THRU port it contains just those retransmitted messages, and messages generated by the unit itself will go to the MIDI OUT port. If the unit has a combined MIDI OUT/THRU then its own output will be merged with the messages that are being re-transmitted.

MIDI THRU (sometimes called MIDI 'Echo') is often configurable as being on or off, especially with those units with a combined MIDI OUT/THRU.

**WARNING:** Do not cable the connections of your MIDI devices in a ring and allow MIDI THRU to be enabled on

ALL units. Break the cycle on at least one unit by turning MIDI THRU off. Failing to do so can lead to a MIDI feedback loop, which results in bizarre and unwanted things happening! Typically this feedback is manifested as either a lockup of one or more units OR units running out of control, such as a patch change being executed repeated at VERY high speed once the first patch change is made.

MIDI THRU is extremely useful as it allows you to daisy chain multiple MIDI units. In the case of using the GT-3/5 as a controller for racked devices, you place the GT-3/5 at the start of the chain and use the MIDI THRU of the racked units to send the MIDI data stream onto the next MIDI capable units. If the GT-3/5 is not the controller then you have a more complicated routing, as you cannot place the GT-3/5 mid-chain. However, there are products out there that can help route your MIDI to your exact requirements...which leads us nicely on to our next topic...

### MIDI Routing

MIDI is not like audio. You cannot split MIDI with a simple Y cable and merge it by connecting wires together. What you need are special units. You can get 'splitters' and 'merging' units and a whole heap of other MIDI accessory units. These can be useful when using the GT-3/5 in a system where it is NOT the controller. Because the GT-3/5 does not support MIDI thru you cannot use it in the middle of a chain. Thus you use a splitter; and a star or cascade configuration as described below. In this case you would plug the controller into the splitter as the input, take one output to your chain or other units and a second cable to the GT-3/5. Philip Rees is the most notable manufacturer of such products in the UK, and these can be purchased from many high-street outlets as well as Maplin. There are other manufacturers around the world, such as Midi Solutions in the U.S., Axess Electronics in Canada, and Nobels in Germany. Try these links:

<http://www.philrees.co.uk>

<http://www.maplin.co.uk>

<http://www.axess-electronics.com>

<http://www.nobles.com>

<http://www.midisolutions.com>

OK. Now lets look at the various MIDI cabling configurations that can be used to hook up your gear and route the MIDI.

## Section 28 All About MIDI

### Chain Cabling Scheme

The MIDI chain is the most basic MIDI configuration – and probably the most widely used – simply because its easy and requires no extra hardware. The basic configuration looks like this.



#### Pros

1. Simple.
2. No additional hardware required other than MIDI cables.
3. No MIDI feedback loops.

#### Cons

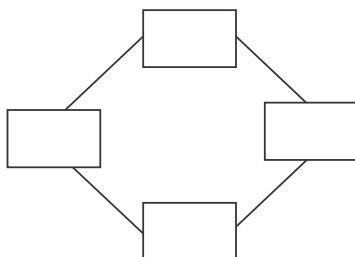
1. Failure of a single unit affects all subsequent units.
2. MIDI THRU features required on ALL mid-chain units.
3. Long chains can cause signal loss issues and message corruption.

Careful consideration of unit placement can alleviate problems of MIDI THRU. But if two of the units you want to control require MIDI THRU then you really need a star configuration.

### Ring Cabling Scheme

This is a chain that has had the last unit connected to the first. This scheme is not recommended due to MIDI THRU problems and the possibility of MIDI feedback loops.

However it is VERY common when using the GT-3/5 connected to a computer for an editor – here you have a ring between the computer and the GT-3/5. However, problems do not occur because MIDI THRU is NOT enabled on the PC. If you use the same configuration with a sequencer that has MIDI THRU turned on then the same problems can occur.



#### Pros

1. No additional hardware required other than MIDI cables.

#### Cons

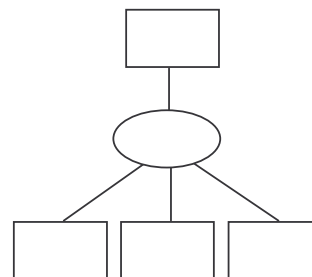
1. Failure of a single unit affects all subsequent units.
2. MIDI THRU features required on ALL units.
3. Long chains can cause signal loss issues and message corruption.
4. MIDI feedback loops are common

To break the MIDI feedback loop means turning OFF MIDI THRU on one of the units. This then breaks the ring and effectively makes two (connected) chains.

### Star Cabling Scheme

This is probably the BEST of all MIDI cabling schemes. Well structured, failure of a single unit is isolated, no problems of feedback loops. All said this is truly a great set-up.

In the diagram below the oval represents a splitter such as the Philip Rees V3 MIDI THRU Unit which is a very small 1->3 splitter or the V10 which is a mains powered (from a wall socket – not a wall wart) splitter providing an incredible 10 outputs from a single input.



#### Pros

1. Failure of a single unit doesn't affect any other unit (except the splitter)
2. MIDI THRU features not required on ANY unit.
3. The splitter normally provides buffered outputs so signal chain length is no longer an issue (cable length however is still an issue).
4. No MIDI feedback loops.

#### Cons

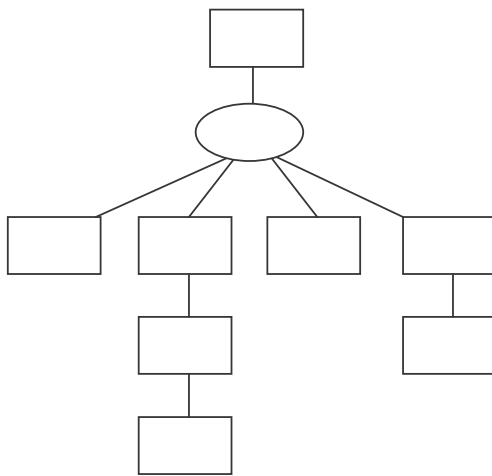
1. Requires more hardware and money.
2. Failure of the splitter brings down the entire system.
3. Slaved units cannot transmit MIDI to other units.

This configuration is typical of switching systems described below. MIDI is distributed to all units from a central controller. When used with such systems this configuration yields phenomenal power. Quite awesome.

### Cascade Cabling Scheme

The cascade scheme is a merging of the star and chain concepts. The star configuration forms the heart of the MIDI distribution system. The only gain here is that some units can send MIDI they generate on to other units. However, as it's a combination you get ALL of the cons of both schemes. Where possible prefer the star configuration.

In the diagram below the oval once again represents a MIDI splitter.



#### Pros

1. MIDI THRU features not required on ALL units – various capabilities could be accommodated.
2. The splitter normally provides buffered outputs so signal chain length is no longer an issue (except where chains are used - cable length is still an issue as ever).
3. No MIDI feedback loops.
4. Slaved units can transmit MIDI to other units.

#### Cons

1. Requires more hardware and money.
2. Failure of a single unit affects all subsequent units used in a chain.
3. MIDI THRU features required on ALL mid-chain units.
4. Failure of the splitter brings down the entire system.
5. Long chains can cause signal loss issues and message corruption.

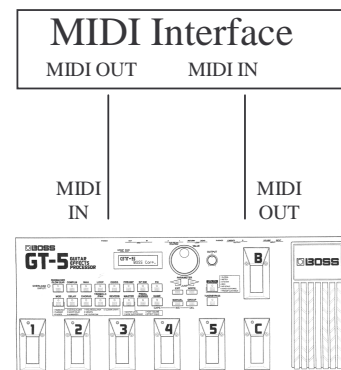
### Computer Hook-ups

As you may have gathered by now, the GT-3/5 is really a computer in a stomp box's clothing. We can gain further capability by connecting it to a computer as well.

Connecting to a PC is not too hard if you have a soundcard with MIDI DIN (or Mini-DIN) connectors or a modern USB capable system, but if not, there's also ways to use other ports as well. You may be able to use one of several types of connections; USB, joystick /game port and printer parallel ports. It's important to note that USB only works with Windows 98 and 2000. Although there is a Win 95 upgrade ('B') that allows for USB access, it is not reliable enough for MIDI applications.

The first thing you need is a MIDI Interface or soundcard that supports MIDI. How you connect the soundcard to your MIDI device (GT-3/5) is where things diverge.

**IMPORTANT!!!** You MUST have the MIDI cables hooked up correctly - the MIDI OUT from the GT-3/5 MUST go to the IN of the Computer interface, and the MIDI IN of the GT-5/5 MUST be connected to the OUT of the computer interface. If you do otherwise, nothing will work. The diagram below should help.



### Non-USB Computer Hook-ups

Most PC soundcards are MPU-401 compatible. As in everything on the PC, "whatever became popular first, dictates what user's will use in the future" The Roland MPU-401 MIDI Interface is the de-facto standard. The MPU-401 came on the scene in 1983, and the Soundblaster, as well as most sound cards with either MIDI or Joystick ports provide an "emulation" of this hardware.

Here are a few ways to get an MPU-401 MIDI interface going with MS Windows (If you use DOS then most methods below will work but much of the limitation comes from available software – there are certainly no DOS based patch editors for the GT-3/5).

## Section 28 All About MIDI

---

Just a quick note before we look at the various methods of connectivity – Use MIDI DIN/mini-DIN connectors or a USB MIDI interface as the connection of choice.

### 1. MIDI DIN/MIDI Mini-DIN

Some interfaces provide MIDI DIN connectors and these are very simple to use...just plug in and go. Other interfaces such as some soundcards like the early SB Live card have mini-DIN MIDI connectors. The mini-DIN (which look like PS/2) connectors require small patch cables to convert the connector to a normal DIN socket. These normally come with the soundcard, however they can be purchased separately.

### 2. 'Joystick to MIDI' conversion cable.

The de-facto standard 'SoundBlaster' typically includes a 15 pin 'D' shaped connector called a 'Joystick' port, where a game joystick controller is attached. This same connector performs double duty as a Roland MPU-401 compatible MIDI interface, using an optional 'Joystick to MIDI' conversion cable. Many of the soundcard manufacturers produce these cables; Creative Labs markets one that includes a limited version of Cakewalk MIDI Sequencer for around \$60 (US). These cables can also be ordered separately via computer accessory suppliers/dealers. Because SoundBlaster compatibility has become embraced by most general purpose sound card manufacturers, these days virtually every soundcard which features a 15 pin joystick port can accept the 'Joystick to MIDI' conversion cable, even if the card was not made by Creative Labs. Consult your sound card's manual or spec sheet and see if MIDI is supported via the joystick connector. For example, the Turtle Beach Pinnacle sound card and the Creative Labs MIDI/Joystick cable conversion cable work just fine together. It features MIDI IN, MIDI Out, and joystick pass-through to maintain your connection with a joystick.

### 3. Parallel Printer Port to MIDI Converter Box

This requires the purchase of a MIDI interface that attaches to the printer connector on the PC. There are several available such as the Midiman PC/P, priced between \$75-\$600 (US) – remember - you get what you pay for. The simplest units provide MIDI in and MIDI out and are convenient for laptop machines, while the elaborate expensive units (Mark of the Unicorn MIDI Timepiece A/V) provide 8 MIDI inputs, 8 MIDI outputs, and control tape automation on an ADAT tape machine.

### 4. MIDI-Serial connections.

The serial port connection scheme becomes confusing, because there appears to be three separate methods utilized. There are several available such as the Midiman PC/S.

1. -The first method occurs in some notebook computers and a few recent BIOS sets on new motherboards. It allows the serial ports (COM 1 or COM 2) to support a MIDI option. Unfortunately the required Serial (D9) to MIDI (5pin DIN) cable is typically a proprietary item which, if not

purchased at time of original purchase of the laptop, will be a difficult item to track down.

2. -A second method was used with a popular piano training keyboard, which included a proprietary 'Serial to MIDI IN/OUT' cable and Windows software driver disk. Haven't seen this available separately.
3. -Units such as the newer Roland Sound Canvas, Alesis QS keyboards, and a few others use a third Serial method, which never uses the traditional 5 pin DIN connectors. It uses a "mini-DIN" connector borrowed from an Apple Macintosh modem/printer port. When these units are interfaced to a Mac, a standard 'Mac modem cable' is used, and when these units are used with a PC, a custom cable with the proper D-9 connector is used.

## USB Computer Hook-ups

If you have a USB based PC, then your life is going to probably be a lot easier (but you never know, after all *it is a computer*). Most of the USB interfaces (such as the Midiman Midisport and others) only require that you plug in the interface via USB to the PC, install the driver software, and you're off to the races! But there's always a catch isn't there? It seems that some interfaces don't play well with some sequencing and editor software, so you may experience some bumps in the road.

## Safe & Quick Testing

Okay, now you've got everything set up. Before you send a bunch of stuff to your GT-3/5 and overwrite all of your patches (horror of horrors!), send something FROM your GT-3/5 to the computer first. That way you won't inadvertently lose patch information already stored in your machine. Set up your GT-3/5 to send a Bulk Dump as per the manual, or later in this section; open the MIDI Editor program of choice (MIDIWatch, GT-5 Editor, GT-3 Editor, etc.); press Write on the GT-3/5; you should see a box telling you how many bytes have been received on your computer screen. Save the file as you wish. That's it! You can now send and receive SYSEX (.syx) files with your PC. If you have problems, read through some of the posts and files on the User's group sites.

## Configuration

The GT-3/5 has three sets of configuration data; <MIDI>, and <SYSTEM> - both of these may be found under the Utility function settings accessed using the GT-3/5 Utility Button (naturally) which are global and the control assigns which are stored on a per patch basis.

### <MIDI> Utility Function Settings

To edit the <MIDI> settings we use the 'Utility' button to select '4. MIDI' sub-menu. Then by using the parameter '<' and '>' buttons, we can select a specific MIDI parameter to edit. Finally by using the VALUE dial or 'jog wheel' (as such controls are more normally known), we can select the value or setting desired for the selected parameter.

Below are the specific MIDI parameters that we can edit on the GT-3/5, and what they mean to guitar players (not computer technicians!):

#### MIDI RX Channel

Here you set the MIDI channel that the GT-3/5 will receive on. This parameter should normally be set to the same MIDI channel that the "Transmitting Unit" (MV-4, computer, sequencer) is sending MIDI Messages to the GT-3/5. You would use this if you want to control the GT-3/5 from some other MIDI unit.

#### MIDI OMNI Mode

If this parameter is set to "ON", the GT-3/5 will "Listen" to ALL 16 channels at the same time, regardless of the MIDI RX Channel that has been set above. OMNI mode only affects on which channel receiving messages occurs and does **not** affect the transmission channel in any way. It is often best to set this to "OFF", unless you understand why you are turning it on when using an advanced MIDI based rig.

#### MIDI TX Channel:

Here you set the MIDI channel that the GT-3/5 will transmit on. If it is set to "RX", it will transmit on the same MIDI Channel as the 'MIDI RX Channel'. The GT-3/5 will only transmit on **one** channel (the TX channel) even if 'OMNI mode' is set to 'ON'.

#### MIDI Device ID

The Device ID is used inside SYSEX messages. The Device ID identifies a specific GT-3/5 if there is more than one in the MIDI chain. In other words, if you had two GT-3 or GT-5 processors in your rig, you would need to be able to differentiate between them- hence the Device ID number.

Normally the Device ID is set to 1 for the GT-3/5, but can be changed to any of 32 different Device ID's. 99.9% of the time there is no need to change the 'Device ID' on ANY unit since there is usually only one in the MIDI chain. If you

have more than one GT-3/5 (you show off!), then both GT-3/5's will load the 'DUMP' if they are set to the same midi channel at the same time; unless the DEVICE ID's are set to different numbers. Providing the Device IDs are different SYSEX messages will find the correct unit **even** if MIDI OMNI Mode is set to ON.

#### MIDI PC OUT

This one is easy. When you have MIDI leads hooked up to other units, you tell the GT-3/5 whether or not to send "Program Change Messages". Set to "ON" it will send them, and set to "OFF" it will not.



MIDI EXP Number



MIDI EXP OUT

You can use the built in expression (EXP) pedal of the GT-3/5 to send out MIDI Control ('CC') messages to other MIDI units. With this parameter you set which 'CC' messages the GT-3/5 will send when the pedal is moved.

This allows you to use the EXP pedal to change parameters in real time. For a synthesizer or other FX unit, the GT-3/5's EXP pedal will act as if you were turning that the actual unit's knob or moving one of its sliders; for example, to control output volume or chorus depth or speed. You can turn this function "OFF", or pick a 'CC' number from 1-31 or 33-95.



MIDI CTL Number



MIDI CTL OUT

Similar to the expression pedal above, this setting allows you to configure the built-in control (CTL) pedal to output MIDI CC messages. However, whilst the expression pedal will transmit the entire range of "CC" values ("0-127") as you move the pedal in a linear fashion, the CTL Pedal will only have an on/off value like a switch. A value of 127 is transmitted when the pedal is depressed and a value of 0 transmitted when the pedal is released. It must be noted that this occurs **regardless** of any control assigns. As the built-in CTL pedal is momentary the MIDI messages will also reflect a momentary switch.



MIDI EXP/CTL1 Number  
MIDI EXP/CTL2 Number

These are for the external expression pedals/footswitches. Their behaviour is exactly the same as that described under 'MIDI EXP Number' for external expression pedals, and 'MIDI CTL Number' for external footswitches. The GT-5 allows you to connect either an expression pedal or footswitch to either jack. Therefore you have the flexibility to connect 2 EXP pedals, 2 CTL Footswitches or one of each.



### GT-3

#### MIDI SUB CTL1 OUT MIDI SUB CTL2 OUT

These are for the external footswitches. Their behaviour is exactly the same as that described under 'MIDI CTL OUT'.

### GT-3

#### SUB EXP

It is not possible to send CC messages for a SUB EXP pedal on the GT-3.

#### MIDI Bulk Dump

This setting controls the dumping of Sysex information from the GT-3/5. More on this later.

#### MIDI Bulk Load

This setting controls the dumping of Sysex information from the GT-3/5. More on this later.

#### MIDI Map Select

This setting controls the type of Program Change Map. The Program Change Map determines how MIDI PC messages that the GT-3/5 receives are resolved into actual patch selections. If this value is set to 'Fix' the 'map' used to resolve the PC number to a patch is that defined by Roland at the factory. However, if it is set to 'Prog' the map is user defined. We will examine this next.

#### MIDI Program Map

The Program Change Map allows you to modify how a 'Program Change Message' that arrives at the GT-3/5's MIDI IN connector is resolved to a particular patch. It should be noted that, according to the GT-3 & GT-5 manuals, that the map is only used to resolve received messages, and doesn't alter out-going messages. In the simplest terms, it's a converter, changing one Program Change (patch) number into another (patch) number.

If you wanted to control the GT-3/5 from an external MIDI device (like a sequencer or MIDI foot controller) without changing all your patches around, you could develop a Program Change Map. Let's say you select Program 13 on the external MIDI device. Normally the GT-3/5 would follow with to it's own patch 13 (U1-1-3 on the GT-5, 4-1 on the GT-3). With a correctly designed Program Change Map, you can instead insist that the GT-3/5 go to the patch you really want, i.e. program 69 (U3:4:4 on the GT-5, 18-1 on the GT-3).

*Setting up a 'Program Change Map', will require the use of pen, paper and some brains!*

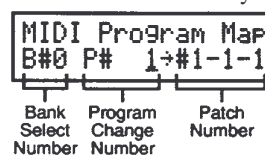
1. Using the Utility button, select the "4. MIDI" menu.

2. PRESS Parameter > till "MIDI MAP Select" is displayed.
3. You use the VALUE dial to make one of two choices:

**Fix:** a fixed map where an incoming Program Change 1 message calls up Program 1 on the GT-3/5, Program Change 2 calls up Program 2, 3 calls up 3 and so on. The GT-3/5 owner's manuals contain a matrix that shows the patch numbers that correspond to the GT-3/5 User patches.

**Prog:** this is where you make your own map. PRESS PARAMETER> again and you're into the 'MAP' edit page.

4. There are 3 Parameters to change. The first two (Bank Select Number/Program Change Number) deal with the in-coming Program Change Messages, and the last is your GT-3/5's Patch Numbers. It's not hard to do this, so just relax! With the first two parameters, you are telling the GT-3/5 that for specific Bank and Program Change Numbers (Parameters 1 & 2) arriving at the 'MIDI IN' Port, it should call up the patch you have designated with parameter 3 in the far right part of the screen. See diagram below (although this is a GT-5 screenshot the GT-3 is very similar).



5. Do this for each patch that you want the controlling unit (sequencer or whatever) to specify a certain patch on the GT-3/5.

### GT-5

#### <System> Utility Function Settings

Using the Utility function button, find the '3. SYSTEM' sub-menu. There are two specific settings for each of the external pedal jacks that affect MIDI.

#### EXP/CTL1 JACK EXP/CTL2 JACK

There are a number of settings that may be selected however the following two control how the EXP/CTL1 or EXP/CTL2 transmits MIDI.

#### MIDI Start/Stop

With this setting you can use an EXP or CTL pedal for starting / stopping a MIDI sequencer. Be aware that some sequencers cannot run off the GT-5 MIDI start/stop. This is because the GT-5 does not send out a MIDI clock to tell the sequencer what speed to run at and its timing. (If your sequencer can run without this information, you must set it to "REMOTE MODE").

**MMC Play/Stop**

This is short for 'MIDI Machine Control'. With this setting you can use an EXP or CTL pedal to start and stop units with a 'MMC IN' connection, like tape decks, multi-track recorders and sequencers using MIDI.

**Control Assigns**

Using the control assign functions on the GT-3/5, you can do further MIDI magic – they allow you to have real-time control over the various effects and their parameters from another unit, and in the case of the GT-5 allow you to signal start/stop to another unit.

**Target****GT-5**

There are two additional control assign targets on the GT-5. These both allow you to signal a start and stop to control another MIDI based unit.

**MIDI Start/Stop & MMC Play/Stop**

These are both toggled parameters. In other words they are either ON or OFF, and thus behave in the same way as other toggled parameters do (explained in section 23 Control Assigns).

Using either of these as the target allows you to determine when MIDI start/stop or MMC play/stop are sent on the MIDI OUT connector.

You could use these to tell a sequencer to start/stop playback of a sequenced synth part, or a drum machine to start/stop. Which one you use would be dependent on the receiving device.

**Source**

Being able to select a MIDI source is an extremely rich and versatile way of controlling your GT-3/5 in real-time from another unit. Indeed complete automation of real-time parameter changes is possible. Both the GT-3 & GT-5 share the ability to react to MIDI CC messages, and the GT-5 can further recognised an act upon MIDI Velocity and Pitch Bend messages. Lets take a look at each of these possibilities.

**MIDI CC#01-31, 64-95:** Definitely the most useful of all of the MIDI extensions to the control assigns. The ::::

**GT-5**

**MIDI Velo:** The velocity of the MIDI Note is used as the source value. This could be used by a sequencer to control individual parameters of the GT-5. However, looking at both the official manual and the MIDI implementation document, it looks like ANY MIDI Note on message will be used as the source rather than a specific note. This lessens the usability as you effectively have a single control source for the values. Use of MIDI CC is preferable to this.

**MIDI P.B:** A pitch bend message is used to as the source for the control assign. This means the modulation wheel from a synth can be used to directly control a real-time parameter of the GT-5. However Pitch Bend only provides a single source of information (whereas CC has many sources depending on the CC number) and thus the use of Pitch Bend messages may be limited in practice.

This ability to control the GT-3/5 in real-time is extremely useful for synchronisation of effects in the live environment. It can also allow you to expand your system, and particularly on the GT-3 allows you to overcome the limitation of ONE external expression pedal OR external footswitches. For instance I own a Digitech MC<sup>2</sup> MIDI expression pedal that transmits the pedal position as a MIDI CC message. This allows me to use my GT-3 with two expression pedals AND two external footswitches. The need may not be so pressing for the GT-5 but you can see the possibilities – especially if you use an expression pedal on an external foot controller.

**Internal Pedal Trigger**

The Internal Pedal (I-PDL) was discussed in section 23 Control Assigns. Both the GT-3 & GT-5 can trigger the I-PDL based on the value of a CC message, and additionally the GT-5 can trigger the I-PDL from a MIDI Velocity or Pitch Bend message. Lets take a quick look at each.

**MIDI CC#01-31, 64-95:** Activates the trigger when the value of a MIDI Control Change Message from an external MIDI device exceeds the middle value.

**GT-5**

**MIDI Velo:** Activates the trigger when the value of a MIDI Velocity Message received from an external MIDI device exceeds the median value. This could a message from a synth's velocity sensitive keyboard. Examining both the official manual and the MIDI implementation document, it would appear that ANY MIDI Velocity message (note on messages) and thus ANY NOTE which has a velocity > than the median value will trigger the I-PDL. Once again use MIDI CC messages in preference.

**MIDI P.B:** Activates the trigger when the value of a MIDI Pitch Bend Message from an external MIDI device exceeds the middle value. This could a message from a Synth's Velocity Mod wheel. This is probably more useful than the above setting. Again, remember that Pitch Bend only provides a single source of information (whereas CC has many sources depending on the CC number) and thus the use of Pitch Bend messages may be limited in practice.

What this allows us to do is to set up a synth or other device to trigger an effect such as fade in/fade out (or whatever your imagination has come up with!) on the GT-3/5. Once again, this is extremely useful for synchronisation of effects in the live environment.

### Common Connection & Configuration Problems

OK. Before we go any further lets now look at some of the reasons why your MIDI devices wont talk to each other. If you have problems with MIDI communications while trying a bulk dump/load, any of the applications or patch editing described below then revisit this section. As they say, forewarned is forearmed. A LOT of users have problems when connecting up MIDI so I'll try and go through as MUCH as I can think of.

#### PROBLEM

1. GT-3/5 does not transmit

#### TYPICAL CAUSES

2. MIDI OUT not connected properly
3. Wrong type of cable - for instance 15pin DIN-5pin DIN audio cable (crossed wires)
4. TX channel incorrect

#### POSSIBLE SOLUTIONS

1. Reseat connectors
2. Make sure the GT-3/5's MIDI OUT is connected to the target device's MIDI IN
3. Make sure you have a proper MIDI cable (wired straight thru not crossed like some audio 5-pin DIN cables)
4. Check the MIDI TX Channel. Also if using TX Channel set to 'RX' make sure the MIDI RX Channel is correct
5. If transmitting SYSEX data (i.e. Bulk Dump) make sure the Device ID is correct
6. Check the receiving channel on the receiving unit is set to the same as the GT-3/5 TX Channel.

#### PROBLEM

1. GT-3/5 does not receive

#### TYPICAL CAUSES

2. MIDI IN not connected properly
3. Wrong type of cable - or instance 15pin DIN-5pin DIN audio cable (crossed wires)
4. RX channel incorrect

#### SOLUTIONS

1. Reseat the connectors
2. Make sure the transmitting device's MIDI OUT is connected to the GT-3/5's MIDI IN
3. Make sure you have a proper MIDI cable (wired straight thru not crossed like some audio 5-pin DIN cables)
4. Check the MIDI RX Channel is correct
5. Check the transmitting channel on the transmitting unit is set to the same as the GT-3/5 RX Channel.

#### PROBLEM

1. GT-3/5 (built-in/external) footswitches do not send MIDI but everything else is OK

#### TYPICAL CAUSES

2. MIDI utility function settings not configured correctly

#### SOLUTIONS

3. Check MIDI utility function settings are configured correctly
4. [GT-5] Check SYSTEM utility function settings – make sure MIDI or MMC start/stop is not selected as a global assignment.

#### PROBLEM

1. GT-3/5 built-in expression pedal does not send MIDI but everything else is OK

#### TYPICAL CAUSES

2. MIDI utility function settings not configured correctly

#### SOLUTIONS

3. Check MIDI utility function settings are configured correctly

#### PROBLEM

4. GT-3/5 external expression pedals do not send MIDI but everything else is OK

#### TYPICAL CAUSES

5. [GT-3] MIDI output based on SUB EXP NOT SUPPORTED!
6. [GT-5] MIDI utility function settings not configured correctly
7. [GT-5] SYSTEM utility function settings not configured correctly

#### SOLUTIONS

1. [GT-3] None(!) – Sorry! Buy an external MIDI expression pedal like the Digitech MC-2.
2. [GT-5] Check MIDI utility function settings are configured correctly
3. [GT-5] Check SYSTEM utility function settings – make sure MIDI or MMC start/stop is not selected as a global assignment.

#### PROBLEM

1. GT-3/5 is mid-chain, but MIDI messages do not get to a unit linked to the output of the GT-3/5 even though the GT-3/5 is receiving OK.

#### TYPICAL CAUSES

2. MIDI Thru is not supported by the GT-3/5

#### SOLUTIONS

3. Use a MIDI splitter such as those produced by Philip Rees in the UK. If you then require the output from the GT-3/5 merge the signal from the GT-3/5 back into the chain using a MIDI Merge unit also available from Philip Rees.

### PROBLEM

4. GT-3/5 is either mid-chain or at the end of the chain but does not receive MIDI from the device preceding it even though the preceding device is receiving the messages OK – this other device just doesn't seem to be passing the messages on to the GT-3/5. If the other unit generates MIDI the GT-3/5 receives it OK.

### TYPICAL CAUSES

5. MIDI Thru not selected
6. MIDI Thru not supported by preceding unit

### SOLUTIONS

1. MIDI Thru must be turned on
2. Use MIDI Thru Port
3. Also see solutions for 'GT-3/5 does not receive' above

### PROBLEM

1. Things go manic! The GT-3/5 or another unit runs away uncontrollably. It appears to be continuously receiving MIDI messages.
2. The GT-3/5 or another unit locks up.

### TYPICAL CAUSES

1. MIDI feedback loop (because of MIDI thru/echo)

### SOLUTIONS

2. Turn off MIDI Thru on one of the devices or
3. Avoid cabling a complete ring with MIDI Thru turned on.

### PROBLEM

1. Footswitches/expression pedals transmit MIDI but patches don't change on another unit

### TYPICAL CAUSES

2. MIDI Program Change Messages aren't being transmitted due to incorrect configuration

### SOLUTIONS

3. Check MIDI utility functions settings and make sure MIDI PC OUT is On

### PROBLEM

4. Patches don't change properly on the GT-3/5 it picks the wrong patch even though the MIDI sent to the GT-3/5 is correct.

### TYPICAL CAUSES

5. Program change map incorrectly configured

### SOLUTIONS

6. Set the Program change map to 'FIX' for default mapping
7. Correct the user-defined program change map.

### PROBLEM

1. The GT-3/5 doesn't change a real-time parameter value when using real-time controls via CC messages

### TYPICAL CAUSES

2. Control assigns not configured
3. Source unit not sending the data

### SOLUTIONS

1. Configure one of the 8 control assigns. The source must be the appropriate MIDI CC# message controller number.
2. Check the source unit to make sure messages are being sent.

### PROBLEM

1. The GT-3/5 is acting on messages NOT intended for it.

### TYPICAL CAUSES

2. OMNI mode ON

### SOLUTIONS

3. In the MIDI utility function settings set MIDI Omni Mode to OFF

### PROBLEM

4. SYSEX information affects two GT-3/5 units at once even though only one unit is to be targeted

### TYPICAL CAUSES

5. Device ID incorrect on one of the units

### SOLUTIONS

6. Correct the Device IDs in the MIDI utility functions settings making sure each unit has a unique Device ID.

## Section 28 All About MIDI

### Bulk Dump/Load

What is a “BULK DUMP”? Well, in this case, it is not the product of a high fibre diet!

MIDI BULK DUMP/LOAD.... It's called “BULK” due to the larger amount of data being saved or retrieved.

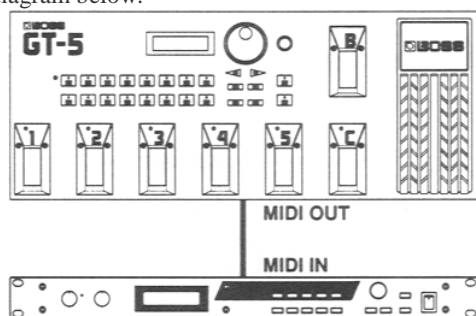
The GT-3/5 can save its memory in several ways:

1. Save the unit's entire memory, using the “SYSTEM” setting, which contains all the settings under the UTILITY button's menu.
2. Save all the ‘User Quick Settings’ for the effects, and control assigns using the [GT-5]’FX SET’ or [GT-3]’Quick FX’ parameter.
3. Save the entire USER patch banks, or a specific range of patches that you select.
4. Save the currently selected patch using the “TEMP” parameter.

You do not have to save everything at once; you can pick which bits to send. You can save just the ‘System and FX set’, and then later save your patches. For instance, if you had 2 or 3 sets of patches for different types of gigs (Rock, Jazz, Country), you can just load in the patches and not have to change the System and FX Set settings. You can load any combination, even just one patch. It's up to you!

### Bulk Dump Procedure

1. Make sure that you have your MIDI leads hooked up to whatever is going to ‘Receive’ (record) your dump. See diagram below.

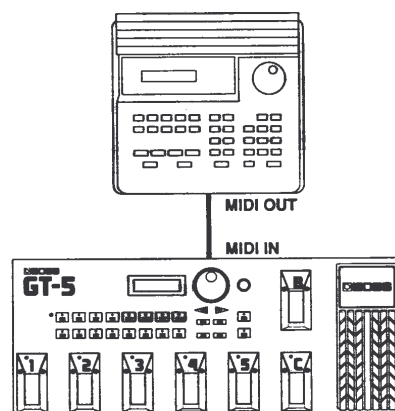


2. Set the MIDI Channels on each unit to match each other and press record on the ‘Receiver unit’.
3. Make sure the Device ID's are set correctly.
4. Using the Utility button, select the ‘4. MIDI’ menu.
5. Press Parameter > until it reads “MIDI BULK Dump”.
6. You will have to select the “Starting Point” and “Ending Point” of the data using the Value wheel and the Parameter >. You will need to cycle through the screens here to see the options available.
7. Press record on the receiver unit. When the receiving unit starts recording, press the WRITE button on the GT-3/5 and sit back. ‘DATA Dumping...’ will show in the GT-3/5 display.

8. When the GT-3/5 has dumped the portion of its memory that you selected, the display will return to the screen where you made your data dump selections.
9. Press stop on the receiver unit if necessary, and save the file.
10. Press the EXIT button the GT-3/5.

### Bulk Load Procedure

Again make sure your MIDI leads are connected correctly. This will be the opposite of the Dump connection. If you have two MIDI cables, hook them both up to make sure. See Diagram below.



1. Set the MIDI Channels on each unit to match each other.
2. Make sure the Device ID's are set correctly.
3. Using the Utility button, select the ‘4. MIDI’ menu.
4. Press Parameter > till it reads ‘MIDI BULK Load’.
5. Press PLAY/START on the transmitting unit.
6. The GT-3/5's display will change from ‘Waiting’.... to ‘Receiving...’ and then ‘Idling...’. In the “Idle” mode, it is waiting to receive more data (if you want to send more).
7. Press stop if necessary on the “Transmitting Unit”
8. Press the EXIT button the GT-3/5. The display will show ‘Checking...’ and will then return to the main patch display.

There- that was easy, wasn't it?



## MIDI Applications

We will now explore how to apply all of the MIDI theory, connections and configuration explained above to a practical user's set-up.

### Cloning Your GT-3/5!!

Setting up another GT-3/5 to be a copy of another GT-3/5 is very easy. Simply connect a pair of GT-3s or GT-5s together using the MIDI OUT from one to the MIDI IN of the other. Set them both to the same MIDI channel and Device ID (very important this). Then set the receiving unit to bulk load. When the receiving unit shows 'Waiting...' set the transmitting unit to bulk dump, the start position will be 'System' and the end position will be '#35-4' on the GT-3 and '#4-5-5' on the GT-5. Press WRITE and away you go! When complete press EXIT on both units and there you have it.

You cannot clone a GT-3 to a GT-5 nor vice-versa. Whilst it may appear to have some affect, I personally would not like to vouch for the results. Whilst you will not harm the units involved you may 'alter' the configuration of the receiving unit. This may result in you retrieving a backup or re-configuring the unit from scratch after a factory restore. If you do try this and find yourself in a pickle take a look at section 27 for information about resetting your unit!

### GT-3/5 Controlling Other MIDI Units

#### 'Turbo-Start' MIDI Set-up Tutorial

Lets get going with a quick tutorial which will show you how to quickly set up a MIDI device to follow your blue box patch for patch. In its most basic form, MIDI will let your GT-3/5 tell another unit to change from one patch to another as you change patches on the GT-3/5. (For example purposes, we will say that you want to control a MIDIVERB-4 or MV-4 for short).

If you set the GT-3/5 to transmit on MIDI Channel 1, and set the MV-4 to receive on MIDI Channel 1, the MV-4 will follow the GT-3/5 patch for patch. When you call up patch U1-1-1 on the GT-5 or 1-1 on the GT-3, the MV-4 will also go to patch 1 in its memory. As you call up other patches on the GT-3/5 the MV-4 will call up the corresponding program numbers.

Here's the quick and dirty on how you set this up:

1. Plug a MIDI cable into the GT-3/5's MIDI OUT, and the other end into the MV-4's MIDI IN.
2. Press the UTILITY button on the GT-3/5 till it displays "4. MIDI".
3. Press the Right (>) PARAMETER button until "MIDI RX" is showing and set the CHANNEL to '1'.

4. Press PARAMETER > and set OMNI MODE to 'OFF'.
5. Press PARAMETER > and set MIDI TX to either '1 or RX'.
6. Press PARAMETER > and set MIDI PC OUT to 'ON'
7. Press PARAMETER > and set all the others to 'OFF'

Now with whatever patch you call up on the GT-3/5, the MV-4 will go to the same patch number in its memory. For example:

GT-3	GT-5	MV-4
1-1	U-1-1-1	01
8-2	U-2-1-5	30
25-4	U-4-5-5	100
n/a	P-3-1-3	128

You get the idea. The GT-3/5 manuals have a full listing of the patch numbers that correspond to the GT-3/5's numbering convention (the default Program Change Map).

Now if you program your patches into the right order in the MV-4, the GT-3/5 will call up the right patch on the MV-4 EVERY time.

### Setting up the rig

Now that we've shown a quick set-up, let's look at the basic procedure to set up a more advanced rig.

1. PLAN THE CABLING SCHEME. Start with the GT-3/5, and use either a 'star' or use a 'chain' configuration.
2. Connect up your equipment using proper MIDI cables. Remember OUT->IN between every device.
3. Configure the GT-3/5 MIDI utility functions settings as required.
4. Any mid-chain devices must have MIDI THRU capabilities. It should also be noted that some units' MIDI THRU capabilities are programmed for on/off using the MIDI OUT rather than a separate connector. If this is true for your unit – make sure the unit has MIDI THRU enabled if it is mid-chain.
5. Set all receiving devices to receive on the same channel that the GT-3/5 is transmitting on or MIDI Omni (if you use MIDI omni make sure you know WHY you chose to).

As you can see the basic procedure is fairly simple. In fact when it comes down to it MIDI is almost as simple as connecting a guitar and amp together - it just needs some prior thought and planning.

## Section 28 All About MIDI

---

### Further Possibilities

There are some “MIDI Smart” combo amps (like the Fender Cyber Twin, ENGL amp), and Preamps (like the Mesa Boogie Triaxis and ADA MP-1) on the market these days. These amps will allow you to use your GT-3/5 as a MIDI foot controller to change amp channels and voicing along with your patches.

We will examine some of the ‘control’ possibilities when we look at MIDI switching below.

### MIDI Devices Controlling The GT-3/5

Converse to the previous discussion, you can also use other devices to control your GT-3/5. In this mode you would be treating your blue box as a passive device that responds to the commands of other devices such as external MIDI foot controllers, hardware and software sequencers, MIDI switching systems and so on.

Because the GT-3/5 does not support MIDI thru you must use it either at the end of a chain or as part of a star configuration.

You can take the control idea to its limits – use a star configuration and set the GT-3/5 up as a slave. Control the system using a MIDI foot controller. Although some might think that using a MIDI foot controller (like the DMC Ground Control or Rocktron All Access) to control the GT-3/5 is overkill, you are overlooking the foot controller’s vast capabilities.

Using a separate foot controller allows you to change every MIDI device’s patch however you want- instead of following the specific Program Change message (i.e. everybody on patch # 10) from the GT-3/5. The foot controller allows you ultimate flexibility in your set-up, and you can still use the GT-3/5’s expression and control pedals to change things within the blue box itself.

### Sequencers Controlling The GT-3/5

As mentioned, you can use a sequencer to control your GT-3/5. This might be used in a studio situation during an automated MIDI mix down, or live with a band that uses extensive use of MIDI in performance situations. Using this capability, (in theory) you could use a sequencer to do all of the “toe tapping” for you, and all you have to deal with is six strings and your imagination!

Examples of Software sequencers are Cakewalk’s Pro Audio 9.0 and SONAR, Home Studio, Guitar Studio, Steinberg’s Nuendo & Cubase VST, Emagic’s Logic series, MOTU’s Digital Performer and finally the high-end package, Protools. Hardware Sequencers are items such as those from Yamaha, Roland and others.

Sequencers not only allow you to set-up patch changes but you can set ‘controllers’ to vary parameters real-time – Its like having tens of MIDI expression pedals at your feet!

### MIDI Foot Controllers

As discussed somewhat already, the GT-3/5 and other external MIDI Foot controllers can control the parameters of MIDI systems, and perform even more subtle control functions. Here we’re going to wander off somewhat, but in the end you’ll see some great new things that your blue box can do as part of a sophisticated MIDI rig.

There are many stand-alone MIDI foot controllers available that allow various degrees of intelligent control of MIDI systems. Although the GT-3/5 is very capable of performing MIDI control functions, some players will want greater, more flexible MIDI control capability. Also, there are situations where a player might want to make a MIDI controlled change to his setup without disturbing the setup of the GT-3/5 itself.

We will try to explain the basics, and the models available. MIDI Foot Controllers are sometimes ‘Dumb’ controllers in that they simply send Program Change or Bank change messages to a MIDI system. Other controllers are ‘intelligent’ in that they can be programmed to send customized SYSEX messages that have specific meanings for specific MIDI devices.

#### Examples of “Dumb” controllers:

1. Digitech C7, C8, PMC-10, MC-2/7, PDS-3500
2. ART X-11/ 12 / 15
3. Roland FC-200, GFC-50
4. Boss FC-50
5. Yamaha MFC-1 / 5 / 10
6. Rolls MIDI Buddy, MIDI Wizard, Patchwork
7. Peavey PFC10, RMC 2010, Pro EFX II
8. ADA MC-1, MXC
9. Zoom 8050
10. Korg FC6
11. MEICO MIDI Commander
12. Rockman MIDI pedal
13. Tech 21 MIDI Mouse
14. T.C. Electronic G Minor

#### Examples of “Intelligent” Controllers:

1. Digital Music Corp Ground Control
2. Lake Butler RFC-1 Midigator (out of Production)
3. Mesa Boogie Abacus (out of Production)
4. Rocktron MIDI Mate, All Access (Bradshaw)
5. Lexicon MPX R1
6. Peavey RMC 4510 (Out of Production??)
7. Custom Audio Electronics RS-10

## MIDI Switching/Loop Systems

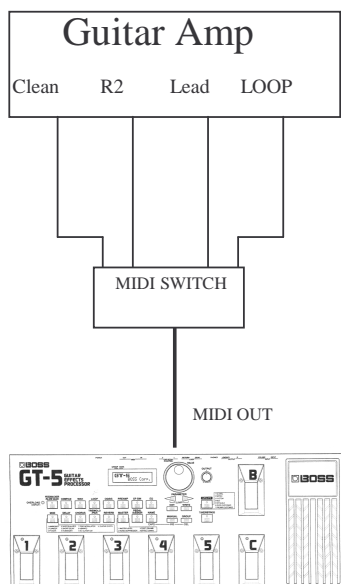
Thanks to the development of some of the really cool MIDI control technology mentioned above, we can now set up the GT-3/5 to control both MIDI and non-MIDI devices such as our “dumb” guitar amplifiers (and other devices that use tip-to-ground and momentary footswitches – including the GT-3/5 itself!). We can also control the signal path of guitar using the loop control/switching available on many of these devices. Companies such as Digital Music Corporation, Rocktron Nobels, Axess Electronics, MIDI Solutions and others have developed devices that will switch relays based on specified MIDI commands. OK, that sounds really impressive, but what the hell does it mean to me, the average guitar player?

In past few decades folks like Bob Bradshaw and Pete Cornish have made a killing by building custom made rack-switching systems that were (and still are) out of reach for the regular musician. The development of cheap MIDI controlled switching and relay boxes has changed all that now mates!

### MIDI Switching Control

As we have discussed in this section, the GT-3/5 can be programmed to send out lots of MIDI information. By installing a simple MIDI Relay in our rack (or the back of the amp), we can now command non-MIDI devices to play along with our patch or controller changes.

Here’s a simple diagram on how to do it:



### MIDI Loop Control

Many of the switching units (listed below) also have the ability to control the signal path of your guitar. These units

allow you to specify the direction of the guitar signal along with your patch changes (Program Change Messages). So what good is all this nonsense? It will allow you to switch in or out an effects units (like the effects loop on most amps), allowing you to route the signal to different amps (in a multi-amp set-up, or select which input you want to go to the what amp (i.e. route the magnetic pickups to the guitar amp, the piezo pickup to an acoustic amp, or the synth output to the keyboard amp)! This adds complexity to things, but if you can sit down and map things out, it will allow you to radically change your rig (and sound) with the touch of one button.

There are numerous MIDI Switching units that will do some or all of these functions:

1. Nobels MS-4: a 4-channel switch relay that’s about DM 245 at: [www.music-productiv.de](http://www.music-productiv.de) Download the PDF manual at [www.nobles.com](http://www.nobles.com)
2. Axess Electronics CFX4: a 4-channel switch relay that you order direct for \$160.00. More info at [www.axess-electronics.com](http://www.axess-electronics.com) They also make custom products for specific amps such as ENGL.
3. MIDI Solutions R8: an 8-channel switch relay that retails for \$429. You can find it for \$329 at [www.midi-classics.com](http://www.midi-classics.com) Download the PDF manual at: [www.midisolutions.com](http://www.midisolutions.com)
4. DMC GCX Ground Control Switcher: 8 channel switcher and Loop controller Get info on the system: <http://www.voodoolab.com/gcssystem.html>
5. Peavey MIDI Pro (out of production): an 8 channel MIDI switcher and 4 channel A/B Loop controller. Download the PDF manual at: [www.Peavey.com](http://www.Peavey.com)
6. Rocktron Patchmate (out of production): a programmable switching system with nine stereo loops/controls and one stereo channel of HUSH noise reduction. Download the PDF manual at: [www.rocktron.com](http://www.rocktron.com)
7. Kenton GS8 (out of production): a 2 channel switcher, and 6 channel loop controller loop. Download the PDF manual at [www.kenton.co.uk](http://www.kenton.co.uk)
8. Mesa Boogie Matrix (out of production): Supposedly the king of all MIDI switchers, but REALLY hard to find, and expensive. This thing will make breakfast for you, I think!
9. Scholz/Rockman Octopus (out of production):
10. Sound Sculpture Switchblade 8 /8B / GL : Rack mount units about (\$750-2000). See more at [www.soundsculpture.com](http://www.soundsculpture.com) They also make a 4 channel switcher called the Foot Sim.
11. Other units: Kitty Hawk Switcher, Ibanez EPP-400 3 stereo / 2 mono Looper, Custom Audio Electronics 4x4, Rocktron / Bradshaw RSB-12 / 16, Lab Systems Plus, DW Labs Quick Change Artist, MXR Loop Selector, Peavey RMC-4512.

## Section 28 All About MIDI

These units are only representative- there's probably a lot more available around the world.

This is just a start- if you added a MIDI foot controller to this set-up, you could then have automated channel changing for your Amp, numerous effects loops switched in and out as well as patch changes on effects units like the GT-3/5 all singing and dancing together without you having to perform a Michael Jackson dance routine just to get it all sorted out!!! Only your imagination (and budget) is the limit!

There's more info on this stuff at [www.amptone.com](http://www.amptone.com)

### Patch Editors

There are several freeware/shareware patch editor programs available for the both GT-3 and GT-5. These programs make the business of managing patches, Bulk Dumps and Loads much easier. Additionally these programs also allow easier patch building. Some of the applications have issues with running under MS Windows 2000. Whilst almost all the software runs up under Win2K most will NOT communicate with your GT-3 via MIDI. Often the result is a crash.

Note: Bulk Dump/Load procedures may vary with each program.

#### EQ-Plot

This great piece of software from Partheus gives you MIDI control over the EQ and SEQ sections of the GT-3 and the GT-5. The visual representation of the affect of EQ makes it VERY easy to see how you are shaping your sound. You can download the GT-3 Manager program at [www.bossgt3.co.uk](http://www.bossgt3.co.uk)

#### GT-3

##### GT-3 Manager

The Partheus GT-3 Manager gives you access to the full functionality of your GT-3 within the Windows environment of your PC. The basic program is free, for a limited time, for you to download and use on the understanding that this is a beta version of the program. You can also unlock .SYX files and see the patch information even if your GT-3 is not connected via MIDI. \*WIN2K Compatible\*. You can download the GT-3 Manager program at [www.bossgt3.co.uk](http://www.bossgt3.co.uk)

##### GT-3 Patchworks

GT-3 Patchworks is a simple backup and restore/load tool developed by Partheus Software for system exclusive message data. It receives bulk dumps from and sends bulk loads to the Boss GT-3 guitar effects processor. Download the program at: [www.bossgt3.co.uk](http://www.bossgt3.co.uk)

#### GT-3 Editor

This GT-3 Editor is a fully featured editor with patch building and management facilities. It also allows easy translation between .SYX and .TXT formats so you can unlock the patch settings even if your GT-3 is not connected via MIDI. This program was developed by AMC Software, and you can download it at [www.kagi.com](http://www.kagi.com)

#### GT-5

##### GT-5 Editor

This program was developed by AMC Software, and you can download it at [www.kagi.com](http://www.kagi.com)

This GT-5 editor program will not fully function with the version 1.03 firmware. Editing a patch will not change the sound on the GT-5 because of various bugs when sending and receiving MIDI messages. This program will work with version 1.06 but has not been tested on other versions. To find which GT-5 software version you have, hold down the NAME and PEDAL/ASSIGN buttons while switching on your GT-5. If you have an older version contact your nearest Roland Service Centre about getting an upgrade. This will involve upgrading the EPROM chip.

#### GT-5

##### Ranger 5

This program is very simple patch organizer program for Win95 and NT written by Rolf Antony. This program is not a patch editor or a loader, so it's limited in its usefulness. Ranger-5 recalculates the Checksum, and it automatically corrects the wrong checksum sometimes produced by the GT-5 V1.03 bulk dump. Only use Ranger-5 if you are sure that the GT-5 V1.03 bug produced the checksum error! Ranger-5 only works with files stored in raw Sysex format (\*.syx) generated by programs like "MIDI-OX" and "MIDIWatch" (described below)

You can download it at: <http://www.bossgt5.de.vu/>

### Other MIDI Software

There are many other useful pieces of MIDI software around. Most of these are shareware so checkout the shareware sites for an overwhelming list of software. Of the additional MIDI software available the following are quite noteworthy...

#### MIDI Watch

A nice little program for transferring sysex files between the GT-5 and your computer, which is easy to use and free. Runs also on Win 95. The only problem is that it can't handle the whole bulk dump of the GT-3/5 in one piece.

Download it at:

<http://members.aol.com/bossgt5/midi/midi.htm>



**MIDI-OX 6.4**

MIDI OX is a 32-bit MS-Windows program that will not operate under earlier versions of Windows (i.e. 3.1, WFWG). MIDI-OX is a multi-purpose tool: it is both a diagnostic tool and a System Exclusive librarian. It can perform filtering of MIDI data streams. It displays incoming MIDI streams, and passes the data to a MIDI output driver or the MIDI Mapper. It can convert any type of MIDI message into almost any other type of MIDI message. You can generate MIDI data using the computer keyboard or the built-in control panel. You can even record and log MIDI data and then convert it to a standard MIDI file (.mid) for playback by a sequencer.

MIDI-OX is freeware: this means individuals in non-commercial environments can freely use it. Download it at:

<http://www.midiox.com> .

**Emagic Sound Diver**

This is a commercial product, and is a full featured Universal Editor. It is rumoured that there is a GT-5 profile available (although I recall some comments about it being extremely limited) for this great bit of software but I think it's hard to track down. As far as I am aware there is no GT-3 profile Available. Download a demo version at

<http://www.emagic.de/english/support/download/demo.html>

**MIDI Implementation**

This stuff is for the advanced users. The basic guitar player out there probably doesn't need to know much more than what we've discussed so far (if that much). For those of you who are curious (or sick) enough to go deeper, Roland offers lots of in-depth MIDI data. On the next two pages are the basic MIDI Implementation charts from the GT-5 and GT-3 manuals. This chart merely scratches the surface of the goings-on inside the Blue Box.

Roland does offer a full 16 page MIDI Implementation document that spells out the "1's and 0's" of MIDI in the GT-3/5. There is a separate document for each box since they sometimes function differently. This document is available at any Roland Service Station, or you can download a scanned copy of the GT-5 version at PLANK's web site: <http://users.tinyonline.co.uk/plank/home.html>

The MIDI Implementation document is too big to include within this one due to the size of the scanned files. Perhaps if there is demand and time available, an MS Word version might be created (a lot of work), and included in a later version.

Here's a handy HEX conversion chart that will help in your advanced MIDI efforts:

00	00	16	10	32	20	48	30	64	40	80	50	96	60	112	70
01	01	17	11	33	21	49	31	65	41	81	51	97	61	113	71
02	02	18	12	34	22	50	32	66	42	82	52	98	62	114	72
03	03	19	13	35	23	51	33	67	43	83	53	99	63	115	73
04	04	20	14	36	24	52	34	68	44	84	54	100	64	116	74
05	05	21	15	37	25	53	35	69	45	85	55	101	65	117	75
06	06	22	16	38	26	54	36	70	46	86	56	102	66	118	76
07	07	23	17	39	27	55	37	71	47	87	57	103	67	119	77
08	08	24	18	40	28	56	38	72	48	88	58	104	68	120	78
09	09	25	19	41	29	57	39	73	49	89	59	105	69	121	79
10	0a	26	1a	42	2a	58	3a	74	4a	90	5a	106	6a	122	7a
11	0b	27	1b	43	2b	59	3b	75	4b	91	5b	107	6b	123	7b
12	0c	28	1c	44	2c	60	3c	76	4c	92	5c	108	6c	124	7c
13	0d	29	1d	45	2d	61	3d	77	4d	93	5d	109	6d	125	7d
14	0e	30	1e	46	2e	62	3e	78	4e	94	5e	110	6e	126	7e
15	0f	31	1f	47	2f	63	3f	79	4f	95	5f	111	6f	127	7f

Here's a MIDI Channel HEX conversion table:

Chan	cc	Chan	cc	Chan	cc
1	00	7	06	13	0c
2	01	8	07	14	0d
3	02	9	08	15	0e
4	03	10	09	16	0f
5	04	11	0a	ALL	7f
6	05	12	0b		



## Section 29 External Effects Loop

### The 'External Effects Loop'

Whilst the concept of an external effects loop is fairly obvious to GT-5 owner, GT-3 owners are probably say 'Eh? What loop? Well the GT-3 has one just as good as the GT-5 – only its hidden away under the OD/DS and is known as 'EXT OD/DS'. However, contrary to the name the EXT OD/DS can be used for more than just distortions. Indeed, both the GT-3 & GT-5 loops can be used for \*any\* external mono effects device, and this includes external preamps. The GT-5 naming of 'loop' describes this much better and would have been more appropriate but c'est la vie.

The SEND and RETURN jacks on the back of the GT-3/5 provide the connections for the loop. This is a mono effects loop only (AFAIK). So only a mono signal will be sent and only a mono signal can be returned.

The GT-5 loop is bypassed when the effect is not switched on and the same is true of the GT-3; the loop is bypassed unless the OD/DS effect is turned on.

Both the GT-5 loop & GT-3 EXT OD/DS output a full range signal to the SEND jack (20Hz-20kHz) – which will come as a relief to some GT-3 owners who may have been concerned that the frequencies were cut in the bass & highs in the same manner the on-board distortions are.

#### GT-3

The GT-3 has some additional tone shaping controls useable with the external effects loop. It should be noted that the treble, bass and level controls are all after the RETURN and therefore in no way affect the signal sent via SEND. They can however be useful for rough EQing of the signal once back into the GT-3.

One more thing to watch with the loop is that the RETURN impedance is only 220Kohm, so with more unusual set-ups you may get an impedance mismatch problem. I think this is most likely the problem I experienced with my Valvestate, however even when quizzed Marshall failed to supply me with ANY impedance information. Of course right alongside impedance I must mention signal levels. It is also possible in more unusual configurations to suffer from level matching problems—similar to the problems with professional studio equipment working on +4dBm whereas semi-pro equipment uses -10dBV. Indeed, a check of the specs shows the GT-3/5 effects loop at -10dBm. In essence I think hooking up an amp (or an amps preamp) in the effects loop is more fraught with problems than hooking up a load of stompboxes. Especially when you consider that the GT-3/5 loop really appears to have been designed with stompboxes in mind.

### Send Level Adjustment

There are no external output level knobs on the GT-3/5 AFTER the D/A converters. This means you must use an

internal level parameter to control the send level so as to avoid clipping the external device's input.

On the GT-5 this is simple, as there is a parameter to control the actual volume level of the SEND output. The GT-3 however, does not have the direct ability to control SEND level. However, this can be achieved simply altering the output level of the effect immediately prior to the EXT OD/DS in the effects chain.

### Return Level Adjustment

Again, there are no external volume knobs prior to the A/D converters. Therefore you must use the external device's output control to ensure that the A/D converter on the return path does not clip.

The GT-5 is now the poor man and does not provide a level parameter to adjust the effects chain level – so use the external device's output control to do this. However, the GT-3 EXT OD/DS does provide a Level parameter and this is used to control the effects chain level as described in the section on level matching.

### Level Matching

Level matching external devices is slight more complicated than the internal effects on the GT-3/5. This is because you have more level controls; there are those on the effects as well as those on the GT-3/5.

To level match an external effect place the effect before the input on the GT-3/5. Turn it on and off and use the external effect's level control to match the on/off levels using the GT-3/5's input meter. Use this same technique to level match all the external effects you will use. Now, when you place the effect(s) in the GT-3/5's send/return effects loop it will give the same result on or off. You now have a stable signal level within the loop. On the GT-3, use the level control to match the output to your target effects chain level.

### Noise

I made a comparison of noise between a stompbox before the GT-3 and inside the effects loop—and the external configuration IS SIGNIFICANTLY NOISER (surprising as the unit itself outside the GT-3 is very very quiet with an SN ratio better than -100dB). Therefore my recommendation is: If you can prefer the internal effects over and above ANY external effects unless you have to. After all, the external loop itself is going to be slightly noisy just by virtual of the fact that you are going through a second set of DA and AD converters.

### Creating Patch 'Ext FX Loop'

This patch is similar to clean except that you can plug other devices/effects into the external effects loop on the GT-3/5. This can be useful when trying to re-create the sound of an

effect allowing you quick switching between your new 'recreation' patch and the sound you are trying to emulate.

This is dead simple really. Copy patch 'Clean'. Then...

### GT-3

Turn on the OD/DS. Select Type of 'EXT OD/DS'. Leave the Bass & Treble controls, and set the Level so the return level matches your Target FX Chain Level as described above and in section 8.

### GT-5

Turn on the Loop. The Send level should be set to 100 unless you find that you are clipping the external device or wish to use a lower output for sound shaping (i.e. driving a preamp less hard). The return level is not controllable on the GT-5. Here use the external device to control the return level into the GT-5, using the meter for the LOOP adjust the external devices output until the level matches your Target FX Chain Level as described above and in section 8.

Easy eh?! And this gives you a simply patch that allows quick access to the external effects loop.

## Applications

Right that's the technical details out of the way. Lets look at what we can use the external effects loop for...

### External Effects

Simply connect you external effects into the loop. It could be anything from a chain of your favourite stompboxes to entire multi-effect rack units.

### Preamp Connection

This can be used to simply connect a preamp for sound shaping or distortion, or in a more complex set-up such as the 4/5 cable methods. These possibilities are discussed in Section 4 Connections.

### Signal Tap

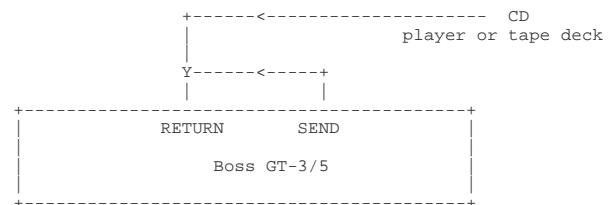
Another idea that has turned up is to use the external effects loop as a signal tap; when the effect is turned on and there is no cable plugged into the RETURN, the effect operates in a bypass mode. This means the SEND can be used as a signal tap. This idea was first put forward on the GT-3 Yahoo Group by Bill Davies. Although, it should be noted that this signal will suffer a different delay to that produced from the main outputs (see section 26 Signal Delay) and this may cause undesired effects. Also, on the GT-3, using the EXT OD/DS in this way means that the OD/DS has just been sacrificed, but once again c'est la vie.

## Jam Along

One or two people asked in March this year about the possibility of a 'Jam Along Jack' on the GT-3/5. Well, here is a natty idea presented on the GT-3 list in May last year by Joseph E. Cronin. This idea uses the [GT-3]EXT OD/DS or [GT-5]LOOP as a 'Line IN' and you can push a CD player or any other audio output through the GT-3/5 whilst playing at the same time. Admittedly this can prove to be an awkward set-up which is not conducive to patch levelling, and on the GT-3, you do lose the OD/DS...some will find this a greater loss than others...I certainly would.

If you want to use the external effects loop as a line in do the following.

1. Place the [GT-3]OD/DS or [GT-5]Loop last in the effects chain. You do this so effects will not be added to your line in.
2. Now to hook up the Y cord.



In fact, I think an easier way would be to use the Y-cable between the GT-3/5 and the amp, but I could see this being more of a problem for headphone users.

# Appendix A Patch Reference Library

The Patch Reference Library was built up over the series and contains useful patches which will help you get the most from your GT-3/5 and its volume control capabilities.

A sysex file of the patches presented in this document is available. The GT-3 file is called 'Boss GT-3 Set-up v02.syx' and the GT-5 is called 'Boss GT-5 Set-up v02.syx'. Both may be found at

[http://www.breakingtaboo.com/gear/boss\\_gt-x](http://www.breakingtaboo.com/gear/boss_gt-x)

Or

<http://groups.yahoo.com/gt-3/files/Set-up.../>

One thing to remember – although these patches are available as a sysex I actually recommend creating them yourself following the instructions in the appropriate sections. The reason is that volume levels will be matched for \*my\* set-up. You may find your guitar produces a similar level output and that the sysex's work well without tweaking. However, you will have lost a great learning opportunity—one that could make you more comfortable with the GT-3/5.

Since producing this combined document the order of presentation of these patches has altered and the numbering would be better changed so that patches like '<Empty>' were first. However, I have refrained from doing so, in order to maintain compatibility with the original text files.

Both GT-3 & GT-5 patches are presented together below – the numbering is quite simple, the first number is for the GT-3 and the second number (prefixed with a 'U') is for the GT-5. Other differences in the patch are shown in the usual way.

## 1-1/U1-1-1 '<Empty>'

Description	This patch makes an empty patch slot easier to spot!
Based On	n/a
Uses	You can use this patch to track all unused user patches, thus removing the clutter from them.
Settings:	
MASTER	
Master Level:	0
[GT-3]Master BPM:	120
Noise Suppressor Effect:	Off
NS Threshold:	45
NS Release:	50
Foot Volume:	0
CHAIN	
Comp/Lim	
Wah	
Preamp	
Overdrive	

Equalizer  
Noise Sup  
Foot Volume  
Modulation  
Delay  
Chorus  
[GT-3]SFX  
[GT-5]Tremolo/Pan  
Reverb

## 1-2/U1-1-2 '<BYPASS>'

Description	Level matched bypass.
Based On	Empty
Uses	You can use this patch to provide a no effects bypass of the GT-3/5 similar to that produced by the BYPASS button, but this patch is level matched.
Settings:	<Differences From '<Empty>' Only>
MASTER	
Master Level:	81
Foot Volume:	100

## 1-3/U1-1-3 'Clean'

Description	This patch is your guitar straight through with nothing but a NS and the FV active.
Based On	'<BYPASS>'
Uses	This can be used as the starting point for creating patches. The volumes are already balanced for your guitar, effects chain ordering, basic EXP control assigns have been made thus saving you time.
Settings:	<Differences From '<BYPASS>' Only>
MASTER	
Noise Suppressor Effect:	On
NS Threshold:	45
NS Release:	50
EXP PEDAL	
Target: FV:	Level
Target Min:	0
Target Max:	100

## 1-4/U1-1-4 'Ext FX Loop'

Description	This patch provides a straight through guitar with NS and FV as does clean, but operates in two modes; 'Bypass' when there is no lead plugged into the GT-3/5 RETURN, or 'External' when there is.
Based On	Clean
Uses	This can be useful when trying to re-create the sound of an effect allowing you quick switching from your new 'recreation' patch and the sound you are trying to emulate. It is also useful as a base for patches based around the use of one or more devices in the effects loop.
Settings:	<Differences From 'Clean' Only>

## Appendix A Patch Reference Library

<b>GT-3</b>	
OVERDRIVE/DISTORTION	
Type:	EXT OD/DS
Bass:	0
Treble:	0
Level:	42
<b>GT-5</b>	
LOOP	
Send Level:	100

### 2-1/U1-1-5 'Noise check'

**Description** This patch has one aim. To amplify ALL noise that exists in the signal path before the GT-3/5!

**Based On** n/a

**Uses** This patch can be used to help track down and eliminate unwanted noise. DO NOT use a speaker simulator on this patch, as it will mask some of the noise. This is why the GT-3 specifics make SURE the speaker sim will not be used – even if the global setting is set to line/headphones – if you have a GT-5 the GT-5 specifics make sure the speaker sim will not affect the result, even if your global settings have it set to permanently ON.

**Settings:**

PREAMP/[GT-3]SPEAKER SIM	
Type:	JC-120
Volume:	100
Bass:	100
Middle:	100
Treble:	100
Presence:	0
Master:	100
Bright:	Off
Gain:	High

<b>GT-3</b>	
Mic Setting:	Center
Mic Level:	0
Direct Level:	100
<b>GT-5</b>	
SPEAKER SIM	
Type:	JC-120
Mic Setting:	Center
Mic Level:	0
Direct Level:	100

**MASTER**

Master Level:	0
[GT-3]Master BPM:	120
Noise Suppressor Effect:	Off
NS Threshold:	100
NS Release:	0
Foot Volume:	0

**EXP PEDAL**

Target: FV:	Level
Target Min:	0
Target Max:	100

**CTL PEDAL**

Target:	MANUAL On/Off
Target Min:	Off
Target Max:	On
Source Mode:	Toggle

### 2-2/U1-2-1 'YUK Noise 1'

**Description:** Shows YUK Noise on Clean Preamps.

**Based On:** Clean

**Uses:** No use. Only in hearing the digital aliasing!

**Settings:** <Differences from 'Clean' ONLY>

PREAMP/[GT-3]SPEAKER SIM	
Type:	JC-120
Volume:	100
Bass:	50
Middle:	50
Treble:	50
Presence:	0
Master:	100
Gain:	High

<b>GT-3</b>	
Mic Setting:	Center
Mic Level:	0
Direct Level:	100
<b>GT-5</b>	
SPEAKER SIM	
Type:	JC-120
Mic Setting:	Center
Mic Level:	0
Direct Level:	100

**MASTER**

Master Level:	20
---------------	----

### 2-3/U1-2-2 'YUK Noise 2'

**Description:** Fails to show digital aliasing on OD/DS.

**Based On:** Clean

**Uses:** No use. Only in NOT(!) hearing the digital aliasing!

**Settings:** <Differences from 'Clean' ONLY>

OVERDRIVE/DISTORTION	
Type:	Metal 1
Drive:	100
Bass:	0
Treble:	0
Level:	100

**MASTER**

Master Level:	40
---------------	----

## Appendix A Patch Reference Library

### 2-4/U1-2-3 'YUK Noise 3'

Description: Shows digital aliasing on Clean Preamps.  
Based On: YUK Noise 1  
Uses: No use. Only in hearing the digital aliasing!  
Settings: Differences from 'YUK Noise 1' ONLY>  
PREAMP / SPEAKER SIM  
Type: Metal 5150

### 3-1/U1-2-4 'Metal Dist\*'

Description: A level matched version of the preset 'METAL DIST'.  
Based On: METAL DIST  
Uses: General distortion patch.  
Settings:  
OVERDRIVE/DISTORTION  
Type: Metal 1  
Drive: 35  
Bass: 0  
Treble: 0  
Level: 68  
PREAMP/[GT-3]SPEAKER SIM  
Type: JC-120  
Volume: 35  
Bass: 50  
Middle: 50  
Treble: 50  
Presence: 0  
Master: 67  
Bright: Off  
Gain: Middle

#### GT-3

Mic Setting: Center  
Mic Level: 0  
Direct Level: 100

#### GT-5

##### SPEAKER SIM

Type: JC-120  
Mic Setting: Center  
Mic Level: 0  
Direct Level: 100

##### CHORUS

Mode: Mono  
Rate: 20  
Depth: 40  
Pre Delay: 16.0  
High Cut Filter: 2.00kHz  
Effect Level: 70

##### REVERB

Type: Room 1  
Reverb Time: 1.8  
Pre Delay: 0  
Low Cut Filter: 165Hz  
High Cut Filter: 4.00kHz  
Density: 8

Effect Level: 20  
MASTER  
Master Level: 80  
[GT-3]Master BPM: 120  
Noise Suppressor Effect: On  
NS Threshold: 55  
NS Release: 50  
Foot Volume: 100

##### CHAIN

Comp/Lim  
Wah  
Overdrive  
Preamp  
Equalizer  
Noise Sup  
Foot Volume  
Delay  
Modulation  
Chorus  
[GT-3]SFX  
[GT-5]Tremolo/Pan  
Reverb

##### EXP PEDAL

Target: FV:Level  
Target Min: 0  
Target Max: 100

##### CTL PEDAL

Target: MANUAL On/Off  
Target Min: Off  
Target Max: On  
Source Mode: Toggle

### 3-2/U1-2-5 'Metal SG'

Description: Slow Gear example patch use a lot of wrist vibrato for a violin sound.  
Based On: Metal Dist\*  
Uses: General effect.  
Settings: <Differences from 'Metal Dist\*' ONLY>  
[GT-3]SFX/[GT-5]FEEDBACKER/SLOW GEAR  
FX Select: Slow Gear  
Sensitivity: 50  
Rise Time: 60

### 3-3/U1-3-1 'Metal Trem'

Description: Distortion based tremolo demonstration, producing an effect similar to slicing.  
Based On: Metal Dist\*  
Uses: General effect.  
Settings : <Differences from 'Metal Dist\*' ONLY>  
[GT-3]SFX, [GT-5]TREMOLLO/PAN  
[GT-3]FX Select: Tremolo/Pan  
Mode: Tremolo  
[GT-3]Wave Shape: 55  
[GT-5]Modulation Wave: Square  
Rate: 92  
Depth: 100



[GT-5]Balance: L50:50R

### 3-4/U1-3-2 'Metal Pan'

Description: Distortion based pan demonstration, producing an effect similar to slicing but aggressively panned between channels.

Based On: Metal Dist\*

Uses: General effect.

Settings: <Differences from 'Metal Dist\*' ONLY>

[GT-3]SFX, [GT-5]TREMOLO/PAN  
[GT-3]FX Select: Tremolo/Pan  
Mode: Pan  
[GT-3]Wave Shape: 70  
[GT-5]Modulation Wave: Square  
Rate: 50  
Depth: 80  
[GT-5]Balance: L50:50R

### 4-1/U1-3-3 'JC-120 Trem'

Description: Tremolo demonstration producing a medium tremolo effect.

Based On: Clean

Uses: General effect.

Settings: <Differences from 'Clean' ONLY>

PREAMP/[GT-3]SPEAKER SIM  
Type: JC-120  
Volume: 35  
Bass: 50  
Middle: 50  
Treble: 50  
Presence: 0  
Master: 67  
Bright: Off  
Gain: Middle

<b>GT-3</b>	
Mic Setting:	Center
Mic Level:	0
Direct Level:	100
<b>GT-5</b>	
SPEAKER SIM	
Type:	JC-120
Mic Setting:	Center
Mic Level:	0
Direct Level:	100

[GT-3]SFX, [GT-5]TREMOLO/PAN  
[GT-3]FX Select: Tremolo/Pan  
Mode: Tremolo  
[GT-3]Wave Shape: 0  
[GT-5]Modulation Wave: Triangle  
Rate: 90  
Depth: 50  
[GT-5]Balance: L50:50R

### 4-2/U1-3-4 'C.TWIN Pan'

Description: Pan demonstration producing a gentle meandering between channels.

Based On: JC-120 Trem

Uses: General effect.

Settings: <Differences from 'JC-120 Trem' ONLY>

[GT-3]SFX, [GT-5]TREMOLO/PAN  
[GT-3]FX Select: Tremolo/Pan  
Mode: Pan  
[GT-3]Wave Shape: 0  
[GT-5]Modulation Wave: Triangle  
Rate: 10  
Depth: 80  
[GT-5]Balance: L50:50R

PREAMP

Type: Clean TWIN

<b>GT-5</b>	
SPEAKER SIM	
Type:	Twin ON

### GT-3 4-3 'Metal Chop'

Description: This patch shows how reverb, preamp and OD are combined, along with the NS used for effect, and control assigns used to control the NS.

Based On: Clean

Uses: This is a general distortion patch, but it useful for rhythm pieces where staccato playing is required.

Settings: <Differences from Clean ONLY>

OVERDRIVE/DISTORTION  
Type: Metal 1  
Drive: 35  
Bass: 0  
Treble: 0  
Level: 68

PREAMP/[GT-3]SPEAKER SIM  
Type: JC-120  
Volume: 50  
Bass: 50  
Middle: 50  
Treble: 50  
Presence: 0  
Master: 55  
Bright: Off  
Gain: Middle  
Mic Setting: Center  
Mic Level: 0  
Direct Level: 100

REVERB

## Appendix A Patch Reference Library

Type:	Room 2	FX Select:	Slicer
Reverb Time:	0.8	Pattern:	P1
Pre Delay:	0	Rate:	60
Low Cut Filter:	55.0Hz	Trigger Sens:	0
High Cut Filter:	4.00kHz	CHAIN	
Density:	2	Modulation	
Effect Level:	30	Comp/Lim	
MASTER		Wah	
Master Level:	82	Overdrive	
[GT-3]Master BPM:	120	Preamp	
Noise Suppressor Effect:	On	Equalizer	
NS Threshold:	80	Noise Sup	
NS Release:	20	Foot Volume	
Foot Volume:	100	Delay	
CHAIN		Chorus	
Comp/Lim		SFX	
Wah		Reverb	
Overdrive			
Preamp			
Equalizer			
Noise Sup			
Foot Volume			
Modulation			
Delay			
Chorus			
[GT-3]SFX			
[GT-5]Tremolo/Pan			
Reverb			
EXP PEDAL			
Off			
CTL PEDAL			
Off			
ASSIGN 1			
Target:	NS Threshold		
Target Min:	80		
Target Max:	100		
Source:	EXP PEDAL		
Source Mode:	Normal		
Active Range Low:	0		
Active Range High:	127		
ASSIGN 2			
Target:	NS Release		
Target Min:	20		
Target Max:	0		
Source:	EXP PEDAL		
Source Mode:	Normal		
Active Range Low:	0		
Active Range High:	127		
<b>GT-3</b>	<b>4-4 'Metal GibSL'</b>		
Description	Make your guitar like a Gibson with pickup cut-off without volume controls or pickup selector!		
Based On:	Metal Dist*		
Uses:	General effect.		
Settings:	<Differences from 'Metal Dist*' ONLY>		
MODULATION			

# Appendix B Level Settings Overview

Crikey there are a lot, and I mean A LOT of volume controls on this beast. In fact there are 32 places on the GT-5 and 36 places on the GT-3 where the volume levels may be changed! The problem is knowing whether or not it really is the effect level (thereby proving a mix), direct volume level or what?

Well, this handy dandy level gauge is what you need!

Quick legend—Control Type can be:

- Effect Only - The level affects only the effect not the direct sound. Therefore you can decide on how much the effect colours the sound.
- Direct Only - Determines how much of the unchanged signal is passed through.
- Signal - The level is basically an in-line volume control knob. Putting this at 0 means no sound!

An effect that has 'Effect Only' and 'Direct Only' controls gives you the ultimate in mix options.

Effect	Setting Name	Control Type
AC	Level	Signal
AW	Level	Signal
CE	Effect Level	Effect Only
CS	Level	Signal
DD	Effect Level	Effect Only
EQ	Level	Signal \$\$\$
FB	Level	Effect Only
FB	Level (^)	Effect Only
FV	Level	Signal
HR	HR1 Level	Effect Only
HR	HR2 Level	Effect Only
HR	Direct Level	Direct Only
HU	Level	Signal
LM	Level	Signal
Master	Master Level	Signal
OD/DS	Level	Signal
PRE	Volume	Signal ***
PRE	Master Volume	Signal
PRE	Gain	Signal ***
RM	Effect Level	Effect Only
RM	Direct Level	Direct Only
RV	Effect Level	Effect Only
SDD	Effect Level	Effect Only
SEQ	Level	Signal \$\$\$
SYN	Synth Level	Effect Only
SYN	Direct Level	Direct Only
WAH	Level	Signal

The SG—Slow Gear, TR—Tremolo/Pan, NS—Noise Suppressor, and FV—Foot Volume all work over the whole volume range, however the maximum gain is 1:1 (unity gain).

\$\$\$ The EQ level is an adjustment used to balance the overall effect of the EQ so as to obtain unity gain.

\*\*\* The Preamp volume (not the master volume) will not only affect the signal level, but it also changes the character of the amp, tending to produce distortion at higher volumes.

Well it does what the real thing does, really! The Gain control, whilst not exactly providing an obvious volume control, will significantly alter the signal level if changed.

GT-3 Effect	Setting Name	Control Type
2CE	Lo Level	Effect Only
2CE	Hi Level	Effect Only
AR	Effect Level	Effect Only
AR	Direct Level	Direct Only
FL	Level	Signal
PH	Level	Signal
PIC	Level	Signal
PRE	Mic Level	Effect Only
PRE	Direct Level	Direct Only

**GT-3**  
The SL—Slicer works over the whole volume range, however the maximum gain is 1:1 (unity gain).

GT-5 Effect	Setting Name	Control Type
DD	Direct Level	Direct Only
Loop	Send Level	Signal !!!
SP	Mic Level	Effect Only
SP	Direct Level	Direct Only
TR	Balance	Signal %%%

**GT-5**  
!!! The send level only determines the level sent to the SEND output jack. It does NOT change the level of the signal received at the RETURN jack. This means the external device used last in the loop **must** send an appropriate level back to the GT-5.

%%% The Tremolo/Pan balance control adjusts the balance of the stereo field rather than providing a traditional volume control.

In general Roland has been very consistent. Where they say 'effect level' or 'direct level' they mean just that and plain old 'level' means signal level.

# Appendix C Quick Settings Overview

Well, while I'm on the subject of overview tables I thought I would fill in what I believe is a glaring gap in the GT-3/5 manuals and provide a list of all the Quick Settings that are available for each of the individual effects. There are in fact 191 on the GT-3 and 183 on the GT-5, and these are in addition to the patches!! Some of you may not have noticed they are there. They are described on page 21 of the Official GT-3 manual, and page 19 of the Official GT-5 manual. You can even create up to four of your own quick settings ([GT-3]page 21-22, [GT-5]19-20). These can really save you time when setting up your effects. If you don't know what you want, it is nice just to plough through and browse the effects capabilities using these. Anyway here they are!

## GT-3 Effect Group: SFX

No.	Effect	Name	Description
P1	AC	AC for ST	Top=45, Body=50, Level=70
P2	AC	AC for LP	Top=55, Body=50, Level=70
P3	AC	Bright AC	Top=50, Body=30, Level=70
P4	AC	Boomy AC	Top=50, Body=70, Level=70
P5	AC	Mild AC	Top=30, Body=50, Level=70
P6	SG	SLOW GEAR 1	Sens=50, Rise Time=30
P7	SG	SLOW GEAR 2	Sens=50, Rise Time=60
P8	SG	SLOW GEAR 3	Sens=50, Rise Time=90
P9	AFB	ANTI FDBK 1	Manual Freq=3, Manual Depth=50, Search=Off
P10	AFB	ANTI FDBK 2	Manual Freq=18, Manual Depth=50, Search=Off
P11	FB	FEEDBACKER	Mode=OSC, Rise Time=70, Rise Time (^)=85 F.B.Level =30, F.B.Level (^)=0 Vib Rate=85, Vib Depth=8
P12	FB	FB +loct	Mode=OSC, Rise Time=70, Rise Time (^)=85 F.B.Level =15, F.B.Level (^)=30 Vib Rate=85, Vib Depth=8
P13	FB	FB BOOST 1	Mode=Boost, Rise Time=85, F.B.Depth=25 F.B.Tone=Normal
P14	FB	FB BOOST 2	Mode=Boost, Rise Time=85, F.B.Depth=50 F.B.Tone=Normal
P15	FB	FB BOOST +1	Mode=Boost, Rise Time=85, F.B.Depth=50 F.B.Tone=+1oct
P16	PIC	PIC S->HUM	Type='S'to'H', Tone=0, Level=100
P17	PIC	PIC HUM->S	Type='H'to'S', Tone=0, Level=100
P18	PIC	PIC H->HF	Type='H'to'HF', Tone=0, Level=100
P19	TR	FAST TREM	Mode=Tremolo, Wave Shape=75, Rate=92, Depth=80
P20	TR	MEDIUM TR	Mode=Tremolo, Wave Shape=75, Rate=85, Depth=70
P21	TR	SLOW TREM	Mode=Tremolo, Wave Shape=75, Rate=75, Depth=50
P22	TR	FAST PAN	Mode=Pan, Wave Shape=0, Rate=90, Depth=100
P23	TR	SLOW PAN	Mode=Pan, Wave Shape=0, Rate=20, Depth=100
P24	TR	MOD GATE	Mode=Tremolo, Wave Shape=50, Rate=80, Depth=100
P25	TR	STEREO GATE	Mode=Pan, Wave Shape=100, Rate=70, Depth=100
P26	TR	RHODES PAN	Mode=Pan, Wave Shape=30, Rate=80, Depth=50
P27	TR	LIGHT PAN	Mode=Pan, Wave Shape=10, Rate=80, Depth=30
P28	TR	LIGHT TREM	Mode=Tremolo, Wave Shape=75, Rate=85, Depth=30

## GT-3 Effect Group: COMP/LM

No.	Effect	Name	Description
P1	CS	NORMA LCOMP	Sustain=50, Attack=40, Tone=0, Level=50
P2	CS	DEEP COMP	Sustain=75, Attack=50, Tone=0, Level=50
P3	CS	LIGHT COMP	Sustain=25, Attack=60, Tone=0, Level=55
P4	LM	NATURAL LM	Threshold=60, Release=20 Tone=0, Level=25
P5	LM	DEEP LIMIT	Threshold=40, Release=30 Tone=0, Level=45
P6	LM	PEAK CUT LM	Threshold=75, Release=10 Tone=0, Level=17
P7	CS	MILD COMP	Sustain=40, Attack=35, Tone=-20, Level=50
P8	CS	BRIGHT COMP	Sustain=40, Attack=45, Tone=+30, Level=50
P9	LM	BRIGHT LM	Threshold=60, Release=20 Tone=+20, Level=26
P10	CS	ATTACK COMP	Sustain=60, Attack=80, Tone=+10, Level=50

## GT-3 Effect Group: WAH

No.	Effect	Name	Description
P1	WAH	PEDAL WAH	Pedal=42, Level=100
P2	AW	T.WAH UP	Mode=BPF, Polarity=Up, Sens=50 Freq=15, Peak=50, Rate=50, Depth=0 Level=100
P3	AW	T.WAH DOWN	Mode=BPF, Polarity=Down, Sens=20 Freq=80, Peak=50, Rate=50, Depth=0 Level=100
P4	AW	AUTO WAH	Mode=BPF, Polarity=Up, Sens=0 Freq=15, Peak=50, Rate=55, Depth=58 Level=100
P5	AW	MOD WAH	Mode=LPF, Polarity=Up, Sens=0 Freq=25, Peak=15, Rate=75, Depth=70 Level=100
P6	AW	MID BOOST	Mode=BPF, Polarity=Up, Sens=0 Freq=50, Peak=0, Rate=50, Depth=0 Level=100
P7	AW	LIGHT WAH	Mode=BPF, Polarity=Up, Sens=0 Freq=50, Peak=25, Rate=50, Depth=0 Level=100
P8	AW	PEAK WAH	Mode=BPF, Polarity=Up, Sens=0 Freq=50, Peak=75, Rate=50, Depth=0 Level=80
P9	AW	BOTTOM WAH	Mode=LPF, Polarity=Up, Sens=50 Freq=15, Peak=50, Rate=50, Depth=0 Level=100
P10	AW	PEDAL FLT	Mode=LPF, Polarity=Up, Sens=0 Freq=50, Peak=90, Rate=50, Depth=0 Level=60

## GT-3 Effect Group: OD/DS

No.	Effect	Name	Description
P1	OD	NATURAL OD	Type=Natural OD, Drive=15 Bass=0, Treble=0, Level=50
P2	OD	VINTAGE OD1	Type=Vintage OD, Drive=20 Bass=0, Treble=0, Level=50
P3	OD	TURBO OD-2	Type=Turbo OD, Drive=40 Bass=0, Treble=0, Level=50
P4	OD	BLUES DRIVE	Type=Blues, Drive=40 Bass=0, Treble=0, Level=50
P5	OD	CRUNCH	Type=Crunch, Drive=40 Bass=0, Treble=0, Level=50
P6	OD	DISTORTION 1	Type=Distortion1, Drive=40 Bass=0, Treble=0, Level=50
P7	OD	DISTORTION 2	Type=Distortion2, Drive=40 Bass=0, Treble=0, Level=50
P8	OD	GRUNGE	Type=Grunge, Drive=40 Bass=0, Treble=0, Level=50

## Appendix C Quick Settings Overview

No.	Effect	Name	Description
P9	OD	METAL 1	Type=Metal 1, Drive=35 Bass=0, Treble=0, Level=50
P10	OD	METAL 2	Type=Metal 2, Drive=35 Bass=0, Treble=0, Level=50
P11	OD	FUZZ	Type=Fuzz, Drive=40 Bass=0, Treble=0, Level=50

### GT-3 Effect Group: PRE/SP SIM

No.	Effect	Name	Description
P1	PRE	JC-120	Type=JC-120, Volume=30, Bass=50, Middle=50, Treble=50, Presence=0, Master=80, Bright=Off, Gain=Middle, SP Sim: Mic set.=Center, Mic Level=100, Direct Level=0
P2	PRE	CLEAN TWIN	Type=Clean TWIN, Volume=50, Bass=50, Middle=50, Treble=50, Presence=0, Master=50, Bright=Off, Gain=Middle, SP Sim: Mic set.=Center, Mic Level=100, Direct Level=0
P3	PRE	CRUNCH	Type=Crunch, Volume=50, Bass=50, Middle=50, Treble=50, Presence=0, Master=50, Bright=On, Gain=Middle, SP Sim: Mic set.=Center, Mic Level=100, Direct Level=0
P4	PRE	MATCH DRIVE	Type=MATCH Drive, Volume=50, Bass=50, Middle=50, Treble=50, Presence=0, Master=50, Gain=Middle, SP Sim: Mic set.=Center, Mic Level=100, Direct Level=0
P5	PRE	VOXY DRIVE	Type=VOXY Drive, Volume=50, Bass=50, Middle=50, Treble=50, Presence=0, Master=50, Gain=Middle, SP Sim: Mic set.=Center, Mic Level=100, Direct Level=0
P6	PRE	BLUES	Type=Blues, Volume=50, Bass=50, Middle=50, Treble=50, Presence=0, Master=50, Bright=On, Gain=Middle, SP Sim: Mic set.=Center, Mic Level=100, Direct Level=0
P7	PRE	BG LEAD	Type=BG Lead, Volume=70, Bass=50, Middle=50, Treble=50, Presence=0, Master=50, Bright=Off, Gain=Middle, SP Sim: Mic set.=Center, Mic Level=100, Direct Level=0
P8	PRE	MS1959(1)	Type=MS1959(I), Volume=100, Bass=100, Middle=100, Treble=100, Presence=100, Master=50, Gain=Middle, SP Sim: Mic set.=Center, Mic Level=100, Direct Level=0
P9	PRE	MS1959(2)	Type=MS1959(II), Volume=100, Bass=100, Middle=100, Treble=100, Presence=100, Master=50, Gain=Middle, SP Sim: Mic set.=Center, Mic Level=100, Direct Level=0
P10	PRE	MS1959(1+2)	Type=MS1959(I+II), Volume=100, Bass=100, Middle=100, Treble=100, Presence=100, Master=50, Gain=Middle, SP Sim: Mic set.=Center, Mic Level=100, Direct Level=0
P11	PRE	SLDN LEAD	Type=SLDN Lead, Volume=70, Bass=50, Middle=50, Treble=50, Presence=0, Master=50, Gain=Middle, SP Sim: Mic set.=Center, Mic Level=100, Direct Level=0

No.	Effect	Name	Description
P12	PRE	METAL 5150	Type=Metal 5150, Volume=75, Bass=50, Middle=50, Treble=50, Presence=0, Master=50, Gain=Middle, SP Sim: Mic set.=Center, Mic Level=100, Direct Level=0
P13	PRE	METAL DRIVE	Type=Metal Drive, Volume=75, Bass=50, Middle=50, Treble=50, Presence=0, Master=50, Gain=Middle, SP Sim: Mic set.=Center, Mic Level=100, Direct Level=0
P14	PRE	CRUNCH TWIN	Type=Clean TWIN, Volume=50, Bass=30, Middle=60, Treble=60, Presence=0, Master=50, Bright=Off, Gain=Middle, SP Sim: Mic set.=Center, Mic Level=100, Direct Level=0
P15	PRE	JAZZ CLEAN	Type=Clean TWIN, Volume=30, Bass=60, Middle=60, Treble=30, Presence=0, Master=80, Bright=Off, Gain=Middle, SP Sim: Mic set.=Center, Mic Level=100, Direct Level=0
P16	PRE	70s STACK	Type=MS1959(I), Volume=100, Bass=0, Middle=0, Treble=100, Presence=100, Master=50, Gain=Middle, SP Sim: Mic set.=Center, Mic Level=100, Direct Level=0
P17	PRE	VOXY BEAT	Type=VOXY Drive, Volume=70, Bass=20, Middle=50, Treble=60, Presence=0, Master=50, Gain=Middle, SP Sim: Mic set.=Center, Mic Level=100, Direct Level=0
P18	PRE	FAT BG LEAD	Type=BG Lead, Volume=100, Bass=50, Middle=100, Treble=50, Presence=0, Master=50, Bright=Off, Gain=Middle, SP Sim: Mic set.=Center, Mic Level=100, Direct Level=0
P19	PRE	METAL LEAD	Type=Metal Drive, Volume=100, Bass=60, Middle=80, Treble=60, Presence=20, Master=50, Gain=Middle, SP Sim: Mic set.=Center, Mic Level=100, Direct Level=0
P20	PRE	MELLOW LEAD	Type=Blues, Volume=100, Bass=60, Middle=75, Treble=25, Presence=0, Master=50, Bright=Off, Gain=Middle, SP Sim: Mic set.=Center, Mic Level=100, Direct Level=0
P21	PRE	Acoustic	Type=AC.Guitar, Volume=30, Bass=50, Middle=50, Treble=50, Presence=50, Master=80, Gain=Middle, SP Sim: Mic set.=Center, Mic Level=100, Direct Level=0

### GT-3 Effect Group: EQ

No.	Effect	Name	Description
P1	EQ	FAT LEAD	Low EQ=0dB, Lo-Mid f=800Hz, Lo-Mid Q=1, Lo-Mid EQ=+10dB Hi-Mid f=6.30kHz, Hi-Mid Q=1, Hi-Mid EQ=+4dB High EQ=0dB Level=-4dB
P2	EQ	CUTTING 1	Low EQ=-4dB, Lo-Mid f=1.00kHz, Lo-Mid Q=1, Lo-Mid EQ=-8dB Hi-Mid f=8.00kHz, Hi-Mid Q=1, Hi-Mid EQ=+4dB High EQ=0dB Level=+3dB



## Appendix C Quick Settings Overview

No.	Effect	Name	Description
P3	EQ	MID BOOST 1	Low EQ=-2dB, Lo-Mid f=500Hz, Lo-Mid Q=1, Lo-Mid EQ=+8dB Hi-Mid f=8.00kHz, Hi-Mid Q=1, Hi-Mid EQ=+4dB High EQ=0dB Level=-2dB
P4	EQ	MILD TONE	Low EQ=0dB, Lo-Mid f=500Hz, Lo-Mid Q=1, Lo-Mid EQ=+2dB Hi-Mid f=2.00kHz, Hi-Mid Q=0.5, Hi-Mid EQ=+5dB High EQ=-20dB Level=0dB
P5	EQ	BRIGHT TONE	Low EQ=-2dB, Lo-Mid f=500Hz, Lo-Mid Q=1, Lo-Mid EQ=0dB Hi-Mid f=4.00kHz, Hi-Mid Q=1, Hi-Mid EQ=+4dB High EQ=0dB Level=0dB
P6	EQ	POWER METAL	Low EQ=0dB, Lo-Mid f=100Hz, Lo-Mid Q=1, Lo-Mid EQ=+6dB Hi-Mid f=1.00kHz, Hi-Mid Q=1, Hi-Mid EQ=-4dB High EQ=+6dB Level=0dB
P7	EQ	CUTTING 2	Low EQ=-4dB, Lo-Mid f=500Hz, Lo-Mid Q=1, Lo-Mid EQ=+6dB Hi-Mid f=2.50kHz, Hi-Mid Q=1, Hi-Mid EQ=-6dB High EQ=+8dB Level=-1dB
P8	EQ	MID BOOST 2	Low EQ=+2dB, Lo-Mid f=1.00kHz, Lo-Mid Q=1, Lo-Mid EQ=+10dB Hi-Mid f=4.00kHz, Hi-Mid Q=1, Hi-Mid EQ=0dB High EQ=+2dB Level=-4dB
P9	EQ	TIGHT LOW	Low EQ=-15dB, Lo-Mid f=315Hz, Lo-Mid Q=0.5, Lo-Mid EQ=+5dB Hi-Mid f=4.00kHz, Hi-Mid Q=1, Hi-Mid EQ=0dB High EQ=0dB Level=0dB
P10	EQ	HOLLOW BODY	Low EQ=+6dB, Lo-Mid f=630Hz, Lo-Mid Q=1, Lo-Mid EQ=+8dB Hi-Mid f=4.00kHz, Hi-Mid Q=0.5, Hi-Mid EQ=+6dB High EQ=-15dB Level=-4dB
P11	EQ	FLAT	Low EQ=0dB, Lo-Mid f=500Hz, Lo-Mid Q=1, Lo-Mid EQ=0dB Hi-Mid f=4.00kHz, Hi-Mid Q=1, Hi-Mid EQ=0dB High EQ=0dB Level=0dB

### **GT-3** Effect Group: MOD

No.	Effect	Name	Description
P1	HR	DETUNE MONO	Voice=1-Voice, HR1: Mode=Medium, HR1: Pitch=0, Fine=+12, HR1: PreDly=0ms, Feedback=0, HR1: Level=100, Direct Level=100

No.	Effect	Name	Description
P2	HR	-1 OCTAVE	Voice=1-Voice, HR1: Mode=Mono, HR1: Pitch=-12, Fine=0, HR1: PreDly=0ms, Feedback=0, HR1: Level=100, Direct Level=100
P3	HR	TWIN LEAD C	Voice=1-Voice, HR1: Mode=Harmony, HR1: Harm=-3rd, HR1: PreDly=0ms, Feedback=0, HR1: Level=100, Key=C (Am), Direct Level=100
P4	HR	DETUNE ST	Voice=2-Stereo, HR1: Mode=Medium, HR1: Pitch=0, Fine=+12, HR1: PreDly=0ms, Feedback=0, HR1: Level=50, HR2: Mode=Medium, HR2: Pitch=0, Fine=-12, HR2: PreDly=0ms, HR2: Level=50, Direct Level=100
P5	HR	+1 OCTAVE	Voice=1-Voice, HR1: Mode=Mono, HR1: Pitch=+12, Fine=0, HR1: PreDly=0ms, Feedback=0, HR1: Level=100, Direct Level=100
P6	HR	PEDAL SHIFT	Voice=1-Voice, HR1: Mode=Mono, HR1: Pitch=0, Fine=0, HR1: PreDly=0ms, Feedback=0, HR1: Level=100, Direct Level=0
P7	HR	DIMINISH	Voice=2-Mono, HR1: Mode=Medium, HR1: Pitch=+3, Fine=0, HR1: PreDly=200ms, Feedback=95, HR1: Level=100, HR2: Mode=Medium, HR2: Pitch=0, Fine=+12, HR2: PreDly=0ms, HR2: Level=100, Direct Level=100
P8	HR	DETUNE+OCT	Voice=2-Mono, HR1: Mode=Medium, HR1: Pitch=0, Fine=+12, HR1: PreDly=0ms, Feedback=0, HR1: Level=100, HR2: Mode=Mono, HR2: Pitch=-12, Fine=0, HR2: PreDly=0ms, HR2: Level=100, Direct Level=100
P9	HR	-3rd + -5th	Voice=2-Stereo, HR1: Mode=Harmony, HR1: Harm=-3rd, HR1: PreDly=0ms, Feedback=0, HR1: Level=50, HR2: Mode=Harmony, HR2: Harm=-5th, HR2: PreDly=0ms, HR2: Level=50, Key=C (Am), Direct Level=100
P10	HR	-1oct + -5th	Voice=2-Mono, HR1: Mode=Mono, HR1: Pitch=-12, Fine=0, HR1: PreDly=0ms, Feedback=0, HR1: Level=100, HR2: Mode=Harmony, HR2: Harm=-5th, HR2: PreDly=0ms, HR2: Level=100, Key=C (Am), Direct Level=100
P11	FL	FLANGER	Rate=25, Depth=50, Manual=75, Resonance=80, Separation=0, Level=70

## Appendix C Quick Settings Overview

No.	Effect	Name	Description
P12	FL	Hi BAND FL	Rate=25, Depth=40, Manual=85, Resonance=50, Separation=0, Level=70
P13	FL	LIGHT FL	Rate=20, Depth=35, Manual=70, Resonance=35, Separation=0, Level=70
P14	FL	FAST FLANGE	Rate=70, Depth=20, Manual=85, Resonance=0, Separation=0, Level=70
P15	FL	STEREO FL	Rate=20, Depth=55, Manual=80, Resonance=80, Separation=100, Level=70
P16	PH	VINTAGE PH	Type=4 Stage, Rate=70, Depth=50, Manual=55, Resonance=0, Step=Off, Level=70
P17	PH	LIGHT PHASE	Type=8 Stage, Rate=35, Depth=45, Manual=65, Resonance=30, Step=Off, Level=70
P18	PH	SUPER PHASE	Type=12 Stage, Rate=15, Depth=60, Manual=85, Resonance=95, Step=Off, Level=30
P19	PH	Bi-PHASE	Type=Bi-Phase, Rate=15, Depth=50, Manual=70, Resonance=70, Step=Off, Level=22
P20	PH	STEP PHASE	Type=12 Stage, Rate=15, Depth=60, Manual=85, Resonance=90, Step=On, Step Rate=70, Level=30
P21	AR	PHRASE 1	Phrase=Preset3, Loop=On, Tempo=85, Sens=100, Key=C (Am), Attack=50, Hold=off, Effect Level=100, Direct level=0
P22	AR	PHRASE 2	Phrase=Preset4, Loop=On, Tempo=85, Sens=100, Key=C (Am), Attack=50, Hold=off, Effect Level=100, Direct level=0
P23	AR	PHRASE 3	Phrase=Preset10, Loop=On, Tempo=85, Sens=100, Key=C (Am), Attack=50, Hold=off, Effect Level=100, Direct level=0
P24	AR	PHRASE 4	Phrase=Preset19, Loop=On, Tempo=85, Sens=100, Key=C (Am), Attack=50, Hold=off, Effect Level=100, Direct level=0
P25	AR	PHRASE 5	Phrase=Preset21, Loop=On, Tempo=85, Sens=100, Key=C (Am), Attack=50, Hold=off, Effect Level=100, Direct level=0
P26	SEQ	FAT LEAD	Low EQ=0dB, Lo-Mid f=800Hz, Lo-Mid Q=1, Lo-Mid EQ=+10dB, Hi-Mid f=6.30kHz, Hi-Mid Q=1, Hi-Mid EQ=+4dB, High EQ=0dB, Level=-4dB
P27	SEQ	CUTTING	Low EQ=-4dB, Lo-Mid f=1.00kHz, Lo-Mid Q=1, Lo-Mid EQ=-8dB, Hi-Mid f=8.00kHz, Hi-Mid Q=1, Hi-Mid EQ=+4dB, High EQ=0dB, Level=+3dB
P28	SEQ	MID BOOST	Low EQ=-2dB, Lo-Mid f=500Hz, Lo-Mid Q=1, Lo-Mid EQ=+8dB, Hi-Mid f=8.00kHz, Hi-Mid Q=1, Hi-Mid EQ=+4dB, High EQ=0dB, Level=-2dB

No.	Effect	Name	Description
P29	SEQ	MILD TONE	Low EQ=0dB, Lo-Mid f=500Hz, Lo-Mid Q=1, Lo-Mid EQ=+2dB, Hi-Mid f=2.00kHz, Hi-Mid Q=0.5, Hi-Mid EQ=+5dB, High EQ=-20dB, Level=0dB
P30	SEQ	BRIGHT TONE	Low EQ=-2dB, Lo-Mid f=500Hz, Lo-Mid Q=1, Lo-Mid EQ=0dB, Hi-Mid f=4.00kHz, Hi-Mid Q=1, Hi-Mid EQ=+4dB, High EQ=0dB, Level=0dB
P31	SEQ	FLAT	Low EQ=0dB, Lo-Mid f=500Hz, Lo-Mid Q=1, Lo-Mid EQ=0dB, Hi-Mid f=4.00kHz, Hi-Mid Q=1, Hi-Mid EQ=0dB, High EQ=0dB, Level=0dB
P32	2CE	2x2 CHORUS	Xover f=800Hz, Lo Rate=20, Lo Depth=20, Lo PreDly=8.0ms, Lo Level=50, Hi Rate=40, Hi Depth=50, Hi PreDly=4.0ms, Hi Level=100
P33	2CE	TIGHT CE	Xover f=1.00kHz, Lo Rate=20, Lo Depth=20, Lo PreDly=4.0ms, Lo Level=30, Hi Rate=40, Hi Depth=50, Hi PreDly=4.0ms, Hi Level=100
P34	2CE	BRIGHT CE	Xover f=200Hz, Lo Rate=40, Lo Depth=50, Lo PreDly=4.0ms, Lo Level=0, Hi Rate=40, Hi Depth=50, Hi PreDly=4.0ms, Hi Level=100
P35	2CE	MILD CHORUS	Xover f=1.00kHz, Lo Rate=40, Lo Depth=50, Lo PreDly=10.0ms, Lo Level=100, Hi Rate=40, Hi Depth=50, Hi PreDly=2.0ms, Hi Level=0
P36	SDD	400ms DELAY	DlyTime=400ms, Feedback=20, Effect Level=10
P37	SDD	300ms DELAY	DlyTime=300ms, Feedback=30, Effect Level=10
P38	SDD	200ms DELAY	DlyTime=400ms, Feedback=40, Effect Level=10
P39	SDD	DOUBLING	DlyTime=30ms, Feedback=0, Effect Level=70
P40	SDD	COMB FILTER	DlyTime=5ms, Feedback=0, Effect Level=70
P41	HU	AUTO a-i	Mode=Auto, Vowel 1='a'-'>'i', Vowel 2='a'-'>'i' Rate=50, Depth=100, Manual=50, Level=100
P42	HU	AUTO o-i	Mode=Auto, Vowel 1='o'-'>'i', Vowel 2='o'-'>'i' Rate=50, Depth=100, Manual=50, Level=100
P43	HU	PICKING a-e	Mode=Picking, Vowel 1='a'-'>'e', Vowel 2='a'-'>'e' Sens=50, Rate=50, Depth=100, Level=100
P44	HU	RANDOM HU	Mode=Random, Rate=50, Depth=100, Level=100
P45	HU	HUMAN PEDAL	Mode=Auto, Vowel 1='a'-'>'i', Vowel 2='a'-'>'i' Rate=50, Depth=0, Manual=0, Level=100
P46	VB	VB CTL	Rate=80, Depth=15, Trigger=Off, Rise Time=80
P47	VB	FAST VB CTL	Rate=90, Depth=10, Trigger=Off, Rise Time=80
P48	VB	SLOW VB CTL	Rate=40, Depth=20, Trigger=Off, Rise Time=80
P49	VB	Light VB CTL	Rate=80, Depth=5, Trigger=Off, Rise Time=50

## Appendix C Quick Settings Overview

No.	Effect	Name	Description
P50	VB	DEEP VB	Rate=90, Depth=15, Trigger=On, Rise Time=0
P51	SYN	SQUARE LEAD	Sens=100, Wave=Square, Chromatic=Off, Octave Shift=0, PWM Rate=50, PWM Depth=0, Cutoff Freq=50, Resonance=15 FLT.Sens=0, FLT.Decay=50, FLT.Depth=0, Attack=0, Release=10, Velocity=0 Hold=Off, Synth Level=44, Direct Level=0
P52	SYN	PWM LEAD	Sens=100, Wave=Square, Chromatic=Off, Octave Shift=0, PWM Rate=50, PWM Depth=0, Cutoff Freq=75, Resonance=10 FLT.Sens=0, FLT.Decay=50, FLT.Depth=+20, Attack=0, Release=10, Velocity=0 Hold=Off, Synth Level=40, Direct Level=0
P53	SYN	SAW LEAD	Sens=100, Wave=Saw, Chromatic=Off, Octave Shift=0, Cutoff Freq=50, Resonance=20 FLT.Sens=0, FLT.Decay=50, FLT.Depth=+30, Attack=5, Release=10, Velocity=0 Hold=Off, Synth Level=40, Direct Level=0
P54	SYN	Gt.BRASS	Sens=100, Wave=Brass, Cutoff Freq=50, Resonance=0 FLT.Sens=0, FLT.Decay=50, FLT.Depth=0, Attack=0, Release=50, Velocity=0 Synth Level=40, Direct Level=0
P55	SYN	SYNTH BASS1	Sens=100, Wave=Square, Chromatic=Off, Octave Shift=-1, PWM Rate=40, PWM Depth=50, Cutoff Freq=50, Resonance=70 FLT.Sens=0, FLT.Decay=70, FLT.Depth=+50, Attack=0, Release=10, Velocity=0 Hold=Off, Synth Level=35, Direct Level=0
P56	SYN	SYNTH BASS2	Sens=100, Wave=Square, Chromatic=Off, Octave Shift=-1, PWM Rate=50, PWM Depth=0, Cutoff Freq=50, Resonance=20 FLT.Sens=0, FLT.Decay=50, FLT.Depth=+30, Attack=0, Release=10, Velocity=0 Hold=Off, Synth Level=35, Direct Level=0
P57	SYN	RESO LEAD	Sens=100, Wave=Square, Chromatic=Off, Octave Shift=0, PWM Rate=50, PWM Depth=50, Cutoff Freq=75, Resonance=80 FLT.Sens=0, FLT.Decay=60, FLT.Depth=-60, Attack=10, Release=70, Velocity=0 Hold=Off, Synth Level=35, Direct Level=0
P58	SYN	SYNTH PAD	Sens=100, Wave=Square, Chromatic=On, Octave Shift=0, PWM Rate=70, PWM Depth=50, Cutoff Freq=25, Resonance=50 FLT.Sens=0, FLT.Decay=80, FLT.Depth=+50, Attack=Decay, Release=80, Velocity=0 Hold=Off, Synth Level=40, Direct Level=0
P59	SYN	Gt.BOW	Sens=100, Wave=Bow, Cutoff Freq=100, Resonance=0 FLT.Sens=0, FLT.Decay=50, FLT.Depth=-100, Attack=49, Release=50, Velocity=0 Synth Level=40, Direct Level=0

No.	Effect	Name	Description
P60	SYN	SLOW ATTACK	Sens=100, Wave=Saw, Chromatic=Off, Octave Shift=0, Cutoff Freq=75, Resonance=20 FLT.Sens=0, FLT.Decay=70, FLT.Depth=+50, Attack=94, Release=70, Velocity=0 Hold=Off, Synth Level=40, Direct Level=0
P61	RM	RING MOD 1	Mode=Normal, Freq=50, Effect Level=100, Direct level=0
P62	RM	RING MOD 2	Mode=Normal, Freq=80, Effect Level=50, Direct level=100
P63	RM	RING -1oct	Mode=Intelligent, Freq=24, Effect Level=100, Direct level=100
P64	RM	PEDAL RING1	Mode=Normal, Freq=50, Effect Level=100, Direct level=0
P65	RM	PEDAL RING2	Mode=Intelligent, Freq=24, Effect Level=100, Direct level=0
P66	SL	SLICER 1	Pattern=P1, Rate=50, Trigger Sens=50
P67	SL	SLICER 2	Pattern=P5, Rate=50, Trigger Sens=50
P68	SL	SLICER 3	Pattern=P9, Rate=50, Trigger Sens=50
P69	SL	SLICER 4	Pattern=P11, Rate=50, Trigger Sens=50
P70	SL	SLICER 5	Pattern=P16, Rate=50, Trigger Sens=50

### GT-3 Effect Group: DELAY

No.	Effect	Name	Description
P1	DD	MEDIUM DELAY1	Type=Single, DlyTime=420ms, Feedback=20, High Cut=Flat, Effect level=10
P2	DD	MEDIUM DLY2	Type=Single, DlyTime=600ms, Feedback=10, High Cut=Flat, Effect level=10
P3	DD	MEDIUM DLY3	Type=Single, DlyTime=300ms, Feedback=32, High Cut=Flat, Effect level=10
P4	DD	MILD DELAY	Type=Single, DlyTime=400ms, Feedback=20, High Cut=4.00kHz, Effect level=15
P5	DD	SHORT DELAY	Type=Single, DlyTime=180ms, Feedback=40, High Cut=Flat, Effect level=40
P6	DD	ANALOG DLY	Type=Single, DlyTime=300ms, Feedback=30, High Cut=2.00kHz, Effect level=40
P7	DD	LONG TAP DD	Type=Tap, DlyTime=1600ms, Tap Time=50%, Feedback=20, High Cut=Flat, Effect level=15
P8	DD	DOUBLING	Type=Single, DlyTime=30ms, Feedback=0, High Cut=Flat, Effect level=70
P9	DD	TEMPO DD4/4	Type=Single, DlyTime=BPM<crochet>, Feedback=20, High Cut=Flat, Effect level=30
P10	DD	TEMPO DD3/4	Type=Single, DlyTime=BPM<dotted quaver>, Feedback=10, High Cut=Flat, Effect level=100

### GT-3 Effect Group: CHORUS

No.	Effect	Name	Description
P1	CE	MONO CHORUS	Mode=Mono, Rate=40, Depth=50 Pre Delay=4.0ms, High cut=Flat, Effect Level 100
P2	CE	STEREO CE	Mode=Stereo, Rate=40, Depth=50 Pre Delay=4.0ms, High cut=Flat, Effect Level 100
P3	CE	ANALOG CE	Mode=Mono, Rate=40, Depth=50 Pre Delay=2.0ms, High cut=2.00kHz, Effect Level 100
P4	CE	DIMENSION	Mode=Stereo, Rate=30, Depth=50 Pre Delay=5.0ms, High cut=8.00kHz, Effect Level 100

## Appendix C Quick Settings Overview

No.	Effect	Name	Description
P5	CE	LIGHT CE	Mode=Mono, Rate=30, Depth=45 Pre Delay=4.0ms, High cut=Flat, Effect Level 50
P6	CE	SLOW CHORUS	Mode=Stereo, Rate=20, Depth=75 Pre Delay=2.0ms, High cut=Flat, Effect Level 100
P7	CE	PRE DLY CE	Mode=Stereo, Rate=20, Depth=50 Pre Delay=10.0ms, High cut=Flat, Effect Level 100
P8	CE	FAST CHORUS	Mode=Mono, Rate=75, Depth=15 Pre Delay=2.0ms, High cut=Flat, Effect Level 100
P9	CE	DEEP CHORUS	Mode=Stereo, Rate=50, Depth=50 Pre Delay=10.0ms, High cut=Flat, Effect Level 100
P10	CE	DOUBLING CE	Mode=Stereo, Rate=20, Depth=30 Pre Delay=30.0ms, High cut=Flat, Effect Level 50

### GT-3 Effect Group: REVERB

No.	Effect	Name	Description
P1	RV	PLATE	Type=Plate, Rev Time=2.8s, Pre Delay=0ms Low Cut=165Hz, High Cut=6.00kHz Density=8, Effect Level=8
P2	RV	ROOM 1	Type=Room 1, Rev Time=1.5s, Pre Delay=5ms Low Cut=110Hz, High Cut=4.00kHz Density=5, Effect Level=12
P3	RV	ROOM 2	Type=Room 2, Rev Time=1.8s, Pre Delay=10ms Low Cut=110Hz, High Cut=6.00kHz Density=4, Effect Level=12
P4	RV	HALL 1	Type=Hall 1, Rev Time=3.0s, Pre Delay=30ms Low Cut=110Hz, High Cut=4.00kHz Density=10, Effect Level=8
P5	RV	HALL 2	Type=Hall 2, Rev Time=3.5s, Pre Delay=30ms Low Cut=165Hz, High Cut=6.00kHz Density=8, Effect Level=8
P6	RV	RICH PLATE	Type=Plate, Rev Time=3.0s, Pre Delay=10ms Low Cut=110Hz, High Cut=8.00kHz Density=10, Effect Level=16
P7	RV	LIVE HOUSE	Type=Room 1, Rev Time=2.0s, Pre Delay=5ms Low Cut=110Hz, High Cut=4.00kHz Density=4, Effect Level=15
P8	RV	AMBIENCE	Type=room 2, Rev Time=0.8s, Pre Delay=0ms Low Cut=55.0Hz, High Cut=4.00kHz Density=2, Effect Level=30
P9	RV	LARGE HALL	Type=Hall 1, Rev Time=4.0s, Pre Delay=30ms Low Cut=110Hz, High Cut=3.00kHz Density=5, Effect Level=20
P10	RV	BRIGHT ROOM	Type=Room 1, Rev Time=1.6s, Pre Delay=5ms Low Cut=110Hz, High Cut=8.00kHz Density=5, Effect Level=30

### GT-5 Effect Group: FB/SLOWGEAR

No.	Effect	Name	Description
P1	FB	FEEDBACKER	Mode=OSC, Rise Time=70, Rise Time (^)=85 F.B.Level=30, F.B.Level (^)=0 Vib Rate=85, Vib Depth=8
P2	FB	FB +loct	Mode=OSC, Rise Time=70, Rise Time (^)=85 F.B.Level=15, F.B.Level (^)=30 Vib Rate=85, Vib Depth=8
P3	SG	SLOW GEAR 1	Sens=50, Rise Time=30
P4	SG	SLOW GEAR 2	Sens=50, Rise Time=60

No.	Effect	Name	Description
P5	SG	SLOW GEAR 3	Sens=50, Rise Time=90

### GT-5 Effect Group: COMP/LM

No.	Effect	Name	Description
P1	CS	NORMA LCOMP	Sustain=50, Attack=40, Tone=0, Level=50
P2	CS	DEEP COMP	Sustain=75, Attack=50, Tone=0, Level=50
P3	CS	LIGHT COMP	Sustain=25, Attack=60, Tone=0, Level=55
P4	LM	NATURAL LM	Threshold=60, Release=20 Tone=0, Level=25
P5	LM	DEEP LIMIT	Threshold=40, Release=30 Tone=0, Level=45
P6	LM	PEAK CUT LM	Threshold=75, Release=10 Tone=0, Level=17
P7	CS	MILD COMP	Sustain=40, Attack=35, Tone=-20, Level=50
P8	CS	BRIGHT COMP	Sustain=40, Attack=45, Tone=+30, Level=50
P9	LM	BRIGHT LM	Threshold=60, Release=20 Tone=+20, Level=26
P10	CS	ATTACK COMP	Sustain=60, Attack=80, Tone=+10, Level=50

### GT-5 Effect Group: WAH

No.	Effect	Name	Description
P1	WAH	PEDAL WAH	Pedal=42, Level=100
P2	AW	T.WAH UP	Mode=BPF, Polarity=Up, Sens=50 Freq=15, Peak=50, Rate=50, Depth=0 Level=100
P3	AW	T.WAH DOWN	Mode=BPF, Polarity=Down, Sens=20 Freq=80, Peak=50, Rate=50, Depth=0 Level=100
P4	AW	AUTO WAH	Mode=BPF, Polarity=Up, Sens=0 Freq=15, Peak=50, Rate=55, Depth=58 Level=100
P5	AW	MOD WAH	Mode=LPF, Polarity=Up, Sens=0 Freq=25, Peak=15, Rate=75, Depth=70 Level=100
P6	AW	MID BOOST	Mode=BPF, Polarity=Up, Sens=0 Freq=50, Peak=0, Rate=50, Depth=0 Level=100
P7	AW	LIGHT WAH	Mode=BPF, Polarity=Up, Sens=0 Freq=50, Peak=25, Rate=50, Depth=0 Level=100
P8	AW	PEAK WAH	Mode=BPF, Polarity=Up, Sens=0 Freq=50, Peak=75, Rate=50, Depth=0 Level=80
P9	AW	WIDE WAH	Mode=BPF, Polarity=Up, Sens=0 Freq=50, Peak=50, Rate=50, Depth=0 Level=100
P10	AW	PEDAL FLT	Mode=LPF, Polarity=Up, Sens=0 Freq=50, Peak=90, Rate=50, Depth=0 Level=60

### GT-5 Effect Group: OD/DS

No.	Effect	Name	Description
P1	OD	NATURAL OD	Type=Natural OD, Drive=15 Bass=0, Treble=0, Level=?
P2	OD	VINTAGE OD1	Type=Vintage OD, Drive=20 Bass=0, Treble=0, Level=45
P3	OD	TURBO OD-2	Type=Turbo OD, Drive=40 Bass=0, Treble=0, Level=40
P4	OD	BLUES DRIVE	Type=Blues, Drive=40 Bass=0, Treble=0, Level=40
P5	OD	CRUNCH	Type=Crunch, Drive=40 Bass=0, Treble=0, Level=40
P6	OD	DISTORTION 1	Type=Distortion1, Drive=40 Bass=0, Treble=0, Level=40

## Appendix C Quick Settings Overview

No.	Effect	Name	Description
P7	OD	DISTORTION 2	Type=Distortion2, Drive=40 Bass=0, Treble=0, Level=40
P8	OD	GRUNGE	Type=Grunge, Drive=40 Bass=0, Treble=0, Level=40
P9	OD	METAL 1	Type=Metal 1, Drive=35 Bass=0, Treble=0, Level=40
P10	OD	METAL 2	Type=Metal 2, Drive=35 Bass=0, Treble=0, Level=40
P11	OD	FUZZ	Type=Fuzz, Drive=40 Bass=0, Treble=0, Level=40

### **GT-5** Effect group: PREAMP

No.	Effect	Name	Description
P1	PRE	JC-120	Type=JC-120, Volume=30, Bass=50, Middle=50, Treble=50, Presence=0, Master=80, Bright=Off, Gain=Middle,
P2	PRE	CLEAN TWIN	Type=Clean TWIN, Volume=30, Bass=50, Middle=50, Treble=50, Presence=0, Master=50, Bright=Off, Gain=Middle,
P3	PRE	CRUNCH	Type=Crunch, Volume=50, Bass=50, Middle=50, Treble=50, Presence=0, Master=80, Bright=On, Gain=Middle,
P4	PRE	MATCH DRIVE	Type=MATCH Drive, Volume=50, Bass=50, Middle=50, Treble=50, Presence=0, Master=50, Gain=Middle,
P5	PRE	VOXY DRIVE	Type=VOXY Drive, Volume=50, Bass=50, Middle=50, Treble=50, Presence=0, Master=50, Gain=Middle,
P6	PRE	BLUES	Type=Blues, Volume=50, Bass=50, Middle=50, Treble=50, Presence=0, Master=50, Bright=On, Gain=Middle,
P7	PRE	BG LEAD	Type=BG Lead, Volume=70, Bass=50, Middle=50, Treble=50, Presence=0, Master=50, Bright=Off, Gain=Middle,
P8	PRE	MS1959(I)	Type=MS1959(I), Volume=100, Bass=100, Middle=100, Treble=100, Presence=100, Master=50, Gain=Middle,
P9	PRE	MS1959(II)	Type=MS1959(II), Volume=100, Bass=100, Middle=100, Treble=100, Presence=100, Master=50, Gain=Middle,
P10	PRE	MS1959(I+II)	Type=MS1959(I+II), Volume=100, Bass=100, Middle=100, Treble=100, Presence=100, Master=50, Gain=Middle,
P11	PRE	SLDN LEAD	Type=SLDN Lead, Volume=100, Bass=100, Middle=100, Treble=100, Presence=100, Master=50, Gain=Middle,
P12	PRE	METAL 5150	Type=Metal 5150, Volume=75, Bass=50, Middle=50, Treble=50, Presence=0, Master=50, Gain=Middle,
P13	PRE	METAL DRIVE	Type=Metal Drive, Volume=75, Bass=50, Middle=50, Treble=50, Presence=0, Master=50, Gain=Middle,
P14	PRE	CRUNCH TWIN	Type=Clean TWIN, Volume=50, Bass=30, Middle=60, Treble=60, Presence=0, Master=50, Bright=Off, Gain=Middle,
P15	PRE	JAZZ CLEAN	Type=Clean TWIN, Volume=30, Bass=60, Middle=60, Treble=30, Presence=0, Master=80, Bright=Off, Gain=Middle,
P16	PRE	70s STACK	Type=MS1959(I), Volume=100, Bass=0, Middle=0, Treble=100, Presence=100, Master=50, Gain=Middle,

No.	Effect	Name	Description
P17	PRE	VOXY BEAT	Type=VOXY Drive, Volume=70, Bass=20, Middle=50, Treble=60, Presence=0, Master=50, Gain=Middle,
P18	PRE	FAT BG LEAD	Type=BG Lead, Volume=100, Bass=50, Middle=100, Treble=50, Presence=0, Master=50, Bright=Off, Gain=Middle,
P19	PRE	METAL LEAD	Type=Metal Drive, Volume=100, Bass=60, Middle=80, Treble=60, Presence=20, Master=50, Gain=Middle,
P20	PRE	MELLOW LEAD	Type=Blues, Volume=100, Bass=60, Middle=75, Treble=25, Presence=0, Master=50, Bright=Off, Gain=Middle,
P21	PRE	Acoustic	Type=AC.Guitar, Volume=30, Bass=50, Middle=50, Treble=50, Presence=50, Master=80, Gain=Middle,

### **GT-5** Effect group: SP SIM

No.	Effect	Name	Description
P1	SP SIM	SMALL	Type=Small, Mic set.= 5cm Mic Level=100, Direct Level=0
P2	SP SIM	MIDDLE	Type=Middle, Mic set.= 5cm Mic Level=100, Direct Level=0
P3	SP SIM	JC-120	Type=JC-120 Mic set.= 2cm Mic Level=100, Direct Level=0
P4	SP SIM	TWIN ON	Type=Twin On Mic set.= 5cm Mic Level=100, Direct Level=0
P5	SP SIM	TWIN OFF	Type=Twin Off Mic set.=Center, Mic Level=100, Direct Level=0
P6	SP SIM	MATCH ON	Type=Match On Mic set.= 5cm Mic Level=100, Direct Level=0
P7	SP SIM	MATCH OFF	Type=Match Off Mic set.=Center, Mic Level=100, Direct Level=0
P8	SP SIM	VOXY ON	Type=Voxy On Mic set.= 5cm Mic Level=100, Direct Level=0
P9	SP SIM	VOXY OFF	Type=Voxy Off Mic set.=Center, Mic Level=100, Direct Level=0
P10	SP SIM	BG STACK ON	Type=BG Stack On Mic set.= 5cm Mic Level=100, Direct Level=0
P11	SP SIM	BG STACK OFF	Type=BG Stack Off Mic set.=Center, Mic Level=100, Direct Level=0
P12	SP SIM	MS STACK ON	Type=MS Stack On Mic set.= 5cm Mic Level=100, Direct Level=0
P13	SP SIM	MS STACK OFF	Type=MS Stack Off Mic set.=Center, Mic Level=100, Direct Level=0
P14	SP SIM	METAL STACK	Type=Metal Stack Mic set.=Center, Mic Level=100, Direct Level=0



## Appendix C Quick Settings Overview

### GT-5 Effect Group: EQ

No.	Effect	Name	Description
P1	EQ	FAT LEAD	Low EQ=0dB, Lo-Mid f=800Hz, Lo-Mid Q=1, Lo-Mid EQ=+10dB Hi-Mid f=6.30kHz, Hi-Mid Q=1, Hi-Mid EQ=+4dB High EQ=0dB Level=-4dB
P2	EQ	CUTTING 1	Low EQ=-4dB, Lo-Mid f=1.00kHz, Lo-Mid Q=1, Lo-Mid EQ=-8dB Hi-Mid f=8.00kHz, Hi-Mid Q=1, Hi-Mid EQ=+4dB High EQ=0dB Level=+3dB
P3	EQ	MID BOOST 1	Low EQ=-2dB, Lo-Mid f=500Hz, Lo-Mid Q=1, Lo-Mid EQ=+8dB Hi-Mid f=8.00kHz, Hi-Mid Q=1, Hi-Mid EQ=+4dB High EQ=0dB Level=-2dB
P4	EQ	MILD TONE	Low EQ=0dB, Lo-Mid f=500Hz, Lo-Mid Q=1, Lo-Mid EQ=+2dB Hi-Mid f=2.00kHz, Hi-Mid Q=0.5, Hi-Mid EQ=+5dB High EQ=-20dB Level=0dB
P5	EQ	BRIGHT TONE	Low EQ=-2dB, Lo-Mid f=500Hz, Lo-Mid Q=1, Lo-Mid EQ=0dB Hi-Mid f=4.00kHz, Hi-Mid Q=1, Hi-Mid EQ=+4dB High EQ=0dB Level=0dB
P6	EQ	POWER METAL	Low EQ=0dB, Lo-Mid f=100Hz, Lo-Mid Q=1, Lo-Mid EQ=+6dB Hi-Mid f=1.00kHz, Hi-Mid Q=1, Hi-Mid EQ=-4dB High EQ=+6dB Level=0dB
P7	EQ	CUTTING 2	Low EQ=-4dB, Lo-Mid f=500Hz, Lo-Mid Q=1, Lo-Mid EQ=+6dB Hi-Mid f=2.50kHz, Hi-Mid Q=1, Hi-Mid EQ=-6dB High EQ=+8dB Level=-1dB
P8	EQ	MID BOOST 2	Low EQ=+2dB, Lo-Mid f=1.00kHz, Lo-Mid Q=1, Lo-Mid EQ=+10dB Hi-Mid f=4.00kHz, Hi-Mid Q=1, Hi-Mid EQ=0dB High EQ=+2dB Level=-4dB
P9	EQ	TIGHT LOW	Low EQ=-15dB, Lo-Mid f=315Hz, Lo-Mid Q=0.5, Lo-Mid EQ=+5dB Hi-Mid f=4.00kHz, Hi-Mid Q=1, Hi-Mid EQ=0dB High EQ=0dB Level=0dB
P10	EQ	HOLLOW BODY	Low EQ=+6dB, Lo-Mid f=630Hz, Lo-Mid Q=1, Lo-Mid EQ=+8dB Hi-Mid f=4.00kHz, Hi-Mid Q=0.5, Hi-Mid EQ=+6dB High EQ=-15dB Level=-4dB

No.	Effect	Name	Description
P11	EQ	FLAT	Low EQ=0dB, Lo-Mid f=500Hz, Lo-Mid Q=1, Lo-Mid EQ=0dB Hi-Mid f=4.00kHz, Hi-Mid Q=1, Hi-Mid EQ=0dB High EQ=0dB Level=0dB

### GT-5 Effect Group: MOD

No.	Effect	Name	Description
P1	HR	DETUNE MONO	Voice=1-Voice, HR1: Mode=Medium, HR1: Pitch=0, Fine=+12, HR1: PreDly=0ms, Feedback=0, HR1: Level=100, Direct Level=100
P2	HR	-1 OCTAVE	Voice=1-Voice, HR1: Mode=Mono, HR1: Pitch=-12, Fine=0, HR1: PreDly=0ms, Feedback=0, HR1: Level=100, Direct Level=100
P3	HR	TWIN LEAD C	Voice=1-Voice, HR1: Mode=Harmony, HR1: Harm=-3rd, HR1: PreDly=0ms, Feedback=0, HR1: Level=100, Key=C (Am), Direct Level=100
P4	HR	DETUNE ST	Voice=2-Stereo, HR1: Mode=Medium, HR1: Pitch=0, Fine=+12, HR1: PreDly=0ms, Feedback=0, HR1: Level=50, HR2: Mode=Medium, HR2: Pitch=0, Fine=-12, HR2: PreDly=0ms, HR2: Level=50, Direct Level=100
P5	HR	+1 OCTAVE	Voice=1-Voice, HR1: Mode=Mono, HR1: Pitch=+12, Fine=0, HR1: PreDly=0ms, Feedback=0, HR1: Level=100, Direct Level=100
P6	HR	PEDAL SHIFT	Voice=1-Voice, HR1: Mode=Mono, HR1: Pitch=0, Fine=0, HR1: PreDly=0ms, Feedback=0, HR1: Level=100, Direct Level=0
P7	HR	DIMINISH	Voice=2-Mono, HR1: Mode=Medium, HR1: Pitch=+3, Fine=0, HR1: PreDly=200ms, Feedback=95, HR1: Level=100, HR2: Mode=Medium, HR2: Pitch=0, Fine=+12, HR2: PreDly=0ms, HR2: Level=100, Direct Level=100
P8	HR	DETUNE+OCT	Voice=2-Mono, HR1: Mode=Medium, HR1: Pitch=0, Fine=+12, HR1: PreDly=0ms, Feedback=0, HR1: Level=100, HR2: Mode=Mono, HR2: Pitch=-12, Fine=0, HR2: PreDly=0ms, HR2: Level=100, Direct Level=100

## Appendix C Quick Settings Overview

No.	Effect	Name	Description
P9	HR	-3rd + -5th	Voice=2-Stereo, HR1: Mode=Harmony, HR1: Harm=-3rd, HR1: PreDly=0ms, Feedback=0, HR1: Level=50, HR2: Mode=Harmony, HR2: Harm=-5th, HR2: PreDly=0ms, HR2: Level=50, Key=C (Am), Direct Level=100
P10	HR	-1oct + -5th	Voice=2-Mono, HR1: Mode=Mono, HR1: Pitch=-12, Fine=0, HR1: PreDly=0ms, Feedback=0, HR1: Level=100, HR2: Mode=Harmony, HR2: Harm=-5th, HR2: PreDly=0ms, HR2: Level=100, Key=C (Am), Direct Level=100
P11	FL	FLANGER	Rate=25, Depth=50, Manual=75, Resonance=80, Separation=0,
P12	FL	Hi BAND FL	Rate=25, Depth=40, Manual=85, Resonance=50, Separation=0,
P13	FL	LIGHT FL	Rate=20, Depth=35, Manual=70, Resonance=35, Separation=0,
P14	FL	FAST FLANGE	Rate=70, Depth=20, Manual=85, Resonance=0, Separation=0,
P15	FL	STEREO FL	Rate=20, Depth=55, Manual=80, Resonance=80, Separation=100,
P16	PH	VINTAGE PH	Type=4 Stage, Rate=70, Depth=50, Manual=55, Resonance=0, Step=Off
P17	PH	LIGHT PHASE	Type=8 Stage, Rate=35, Depth=45, Manual=65, Resonance=30, Step=Off
P18	PH	SUPER PHASE	Type=12 Stage, Rate=15, Depth=60, Manual=85, Resonance=95, Step=Off
P19	PH	Bi-PHASE	Type=Bi-Phase, Rate=15, Depth=50, Manual=70, Resonance=70, Step=Off
P20	PH	STEP PHASE	Type=12 Stage, Rate=15, Depth=60, Manual=85 Resonance=90, Step=On, Step Rate=70,
P21	SEQ	FAT LEAD	Low EQ=0dB, Lo-Mid f=800Hz, Lo-Mid Q=1, Lo-Mid EQ=+10dB Hi-Mid f=6.30kHz, Hi-Mid Q=1, Hi-Mid EQ=+4dB High EQ=0dB Level=-4dB
P22	SEQ	CUTTING	Low EQ=-4dB, Lo-Mid f=1.00kHz, Lo-Mid Q=1, Lo-Mid EQ=-8dB Hi-Mid f=8.00kHz, Hi-Mid Q=1, Hi-Mid EQ=+4dB High EQ=0dB Level=+3dB
P23	SEQ	MID BOOST	Low EQ=-2dB, Lo-Mid f=500Hz, Lo-Mid Q=1, Lo-Mid EQ=+8dB Hi-Mid f=8.00kHz, Hi-Mid Q=1, Hi-Mid EQ=+4dB High EQ=0dB Level=-2dB
P24	SEQ	MILD TONE	Low EQ=0dB, Lo-Mid f=500Hz, Lo-Mid Q=1, Lo-Mid EQ=+2dB Hi-Mid f=2.00kHz, Hi-Mid Q=0.5, Hi-Mid EQ=+5dB High EQ=-20dB Level=0dB

No.	Effect	Name	Description
P25	SEQ	BRIGHT TONE	Low EQ=-2dB, Lo-Mid f=500Hz, Lo-Mid Q=1, Lo-Mid EQ=0dB Hi-Mid f=4.00kHz, Hi-Mid Q=1, Hi-Mid EQ=+4dB High EQ=0dB Level=0dB
P26	SEQ	FLAT	Low EQ=0dB, Lo-Mid f=500Hz, Lo-Mid Q=1, Lo-Mid EQ=0dB Hi-Mid f=4.00kHz, Hi-Mid Q=1, Hi-Mid EQ=0dB High EQ=0dB Level=0dB
P27	SDD	400ms DELAY	DlyTime=400ms, Feedback=30, Effect Level=30
P28	SDD	300ms DELAY	DlyTime=300ms, Feedback=35, Effect Level=35
P29	SDD	200ms DELAY	DlyTime=200ms, Feedback=40, Effect Level=40
P30	SDD	DOUBLING	DlyTime=30ms, Feedback=0, Effect Level=70
P31	SDD	COMB FILTER	DlyTime=5ms, Feedback=0, Effect Level=70
P32	HU	AUTO a-i	Mode=Auto, Vowel 1='a'->'i', Vowel 2='a'->'i' Rate=50, Depth=100, Manual=50 Level=100
P3	HU	AUTO o-i	Mode=Auto, Vowel 1='o'->'i', Vowel 2='o'->'i' Rate=50, Depth=100, Manual=50 Level=100
P34	HU	PICKING a-e	Mode=Picking, Vowel 1='a'->'e', Vowel 2='a'->'e' Sens=50, Rate=50, Depth=100, Level=100
P35	HU	RANDOM HU	Mode=Random, Rate=50, Depth=100 Level=100
P36	HU	HUMAN PEDAL	Mode=Auto, Vowel 1='a'->'i', Vowel 2='a'->'i' Rate=50, Depth=0, Manual=0 Level=100
P37	RM	RING MOD 1	Mode=Normal, Freq=50, Effect Level=100, Direct level=0
P38	RM	RING MOD 2	Mode=Normal, Freq=80, Effect Level=50, Direct level=100
P39	RM	RING -1oct	Mode=Intelligent, Freq=24, Effect Level=100, Direct level=100
P40	RM	PEDAL RING1	Mode=Normal, Freq=50, Effect Level=100, Direct level=0
P41	RM	PEDAL RING2	Mode=Intelligent, Freq=24, Effect Level=100, Direct level=0
P42	VB	NORMAL VB	Rate=80, Depth=15, Trigger=Off, Rise Time=80
P43	VB	FAST VB CTL	Rate=90, Depth=10, Trigger=Off, Rise Time=80
P44	VB	SLOW VB CTL	Rate=40, Depth=20, Trigger=Off, Rise Time=80
P45	VB	Light VB CTL	Rate=80, Depth=5, Trigger=Off, Rise Time=50
P46	VB	DEEP VB	Rate=90, Depth=15, Trigger=On, Rise Time=0
P47	AC	AC for ST	Top=45, Body=50, Level=70
P48	AC	AC for LP	Top=55, Body=50, Level=70
P499	AC	Bright AC	Top=50, Body=30, Level=70
P50	AC	Boomy AC	Top=50, Body=70, Level=70
P51	AC	Mild AC	Top=30, Body=50, Level=70
P52	SYN	SQUARE LEAD	Sens=50, Wave=Square, Chromatic=Off, Octave Shift=0, PWM Rate=50, PWM Depth=0, Cutoff Freq=50, Resonance=15 FLT.Sens=0, FLT.Decay=50, FLT.Depth=0, Attack=0, Release=10, Velocity=0 Hold=Off, Synth Level=44, Direct Level=0

## Appendix C Quick Settings Overview

No.	Effect	Name	Description
P53	SYN	PWM LEAD	Sens=50, Wave=Square, Chromatic=Off, Octave Shift=0, PWM Rate=50, PWM Depth=50, Cutoff Freq=75, Resonance=10 FLT.Sens=0, FLT.Decay=50, FLT.Depth=+20, Attack=0, Release=10, Velocity=0 Hold=Off, Synth Level=40, Direct Level=0
P54	SYN	SAW LEAD	Sens=50, Wave=Saw, Chromatic=Off, Octave Shift=0, Cutoff Freq=50, Resonance=20 FLT.Sens=0, FLT.Decay=50, FLT.Depth=+30, Attack=5, Release=10, Velocity=0 Hold=Off, Synth Level=40, Direct Level=0
P55	SYN	Gt.BRASS	Sens=80, Wave=Brass, Cutoff Freq=50, Resonance=0 FLT.Sens=0, FLT.Decay=50, FLT.Depth=0, Attack=0, Release=50, Velocity=0 Synth Level=40, Direct Level=0
P56	SYN	SYNTH BASS1	Sens=50, Wave=Square, Chromatic=Off, Octave Shift=-1, PWM Rate=40, PWM Depth=50, Cutoff Freq=50, Resonance=70 FLT.Sens=0, FLT.Decay=70, FLT.Depth=+50, Attack=0, Release=10, Velocity=0 Hold=Off, Synth Level=35, Direct Level=0
P57	SYN	SYNTH BASS2	Sens=50, Wave=Square, Chromatic=Off, Octave Shift=-1, PWM Rate=50, PWM Depth=0, Cutoff Freq=50, Resonance=20 FLT.Sens=0, FLT.Decay=50, FLT.Depth=+30, Attack=0, Release=10, Velocity=0 Hold=Off, Synth Level=35, Direct Level=0
P58	SYN	RESO LEAD	Sens=50, Wave=Square, Chromatic=Off, Octave Shift=0, PWM Rate=50, PWM Depth=50, Cutoff Freq=75, Resonance=80 FLT.Sens=0, FLT.Decay=60, FLT.Depth=-60, Attack=10, Release=70, Velocity=0 Hold=Off, Synth Level=35, Direct Level=0
P59	SYN	SYNTH PAD	Sens=50, Wave=Square, Chromatic=On, Octave Shift=0, PWM Rate=70, PWM Depth=50, Cutoff Freq=25, Resonance=50 FLT.Sens=0, FLT.Decay=80, FLT.Depth=+50, Attack=Decay, Release=80, Velocity=0 Hold=Off, Synth Level=40, Direct Level=0
P60	SYN	Gt.BOW	Sens=80, Wave=Bow, Cutoff Freq=100, Resonance=0 FLT.Sens=0, FLT.Decay=50, FLT.Depth=-100, Attack=49, Release=50, Velocity=0 Synth Level=40, Direct Level=0
P61	SYN	SLOW ATTACK	Sens=50, Wave=Saw, Chromatic=Off, Octave Shift=0, Cutoff Freq=75, Resonance=20 FLT.Sens=0, FLT.Decay=70, FLT.Depth=+50, Attack=94, Release=70, Velocity=0 Hold=Off, Synth Level=40, Direct Level=0

### **GT-5** Effect Group: DELAY

No.	Effect	Name	Description
P1	DD	MEDIUM DELAY1	Mode: Normal Delay Type=Single, DlyTime=400ms, Feedback=30, Hold: Off, Smooth: Off High Cut=Flat, Effect level=30 Direct Level: 100
P2	DD	LONG DELAY	Mode: Normal Delay Type=Single, DlyTime=1000ms, Feedback=20, Hold: Off, Smooth: Off High Cut=Flat, Effect level=30 Direct Level: 100
P3	DD	SHORT DELAY	Mode: Normal Delay Type=Single, DlyTime=180ms, Feedback=40, Hold: Off, Smooth: Off High Cut=Flat, Effect level=40 Direct Level: 100
P4	DD	ANALOG DLY	Mode: Normal Delay Type=Single, DlyTime=300ms, Feedback=30, Hold: Off, Smooth: On High Cut=2.00kHz, Effect level=40 Direct Level: 100
P5	DD	LONG TAP DD	Mode: Normal Delay Type=Tap, DlyTime=1200ms, Tap Time=50%, Feedback=25, Hold: Off, Smooth: Off High Cut=Flat, Effect level=20 Direct Level: 100
P6	DD	DOUBLING	Mode: Normal Delay Type=Single, DlyTime=30ms, Feedback=0, Hold: Off, Smooth: Off High Cut=Flat, Effect level=70 Direct Level: 100
P7	DD	TEMPO DD4/4	Mode: Tempo Delay Type=Single, Interval=Quarter 1.0, Feedback=20, Hold: Off, Smooth: Off High Cut=Flat, Effect level=30 Direct Level: 100
P8	DD	TEMPO DD3/4	Mode: Normal Delay Type=Single, Interval=BPM<dotted eight> 3/4, Feedback=10, Hold: Off, Smooth: On High Cut=Flat, Effect level=100 Direct Level: 100
P9	DD	REVERSE DELAY	Mode: Normal Delay Type=Reverse, DlyTime=1000 ms Feedback=0, Hold: Off, High Cut=Flat, Effect level=100, Direct Level: 100
P10	DD	SOUND ON SOUND	Mode: Tempo Dly Type=Sound On Sound Dly Interval= Whole, 4.0, Record: Off High Cut=Flat, Effect level=50 Direct Level: 100

### **GT-5** Effect Group: CHORUS

No.	Effect	Name	Description
P1	CE	MONO CHORUS	Mode=Mono, Rate=40, Depth=50 Pre Delay=4.0ms, High cut=Flat, Effect Level 100
P2	CE	STEREO CHO	Mode=Stereo, Rate=40, Depth=50 Pre Delay=4.0ms, High cut=Flat, Effect Level 100
P3	CE	ANALOG CHO	Mode=Mono, Rate=40, Depth=50 Pre Delay=2.0ms, High cut=2.00kHz, Effect Level 100
P4	CE	DIMENSION	Mode=Stereo, Rate=30, Depth=50 Pre Delay=5.0ms, High cut=8.00kHz, Effect Level 100
P5	CE	LIGHT CHO	Mode=Mono, Rate=30, Depth=45 Pre Delay=4.0ms, High cut=Flat, Effect Level 50
P6	CE	SLOW CHORUS	Mode=Stereo, Rate=20, Depth=75 Pre Delay=2.0ms, High cut=Flat, Effect Level 100

## Appendix C Quick Settings Overview

No.	Effect	Name	Description
P7	CE	PRE DLY CHO	Mode=Stereo, Rate=20, Depth=50 Pre Delay=10.0ms, High cut=Flat, Effect Level 100
P8	CE	FAST CHORUS	Mode=Mono, Rate=75, Depth=15 Pre Delay=2.0ms, High cut=Flat, Effect Level 100
P9	CE	DEEP CHORUS	Mode=Stereo, Rate=50, Depth=50 Pre Delay=10.0ms, High cut=Flat, Effect Level 100
P10	CE	DOUBLING	Mode=Stereo, Rate=20, Depth=30 Pre Delay=30.0ms, High cut=Flat, Effect Level 50

No.	Effect	Name	Description
			Low Cut=110Hz, High Cut=4.00kHz Density=4, Effect Level=25
P8	RV	AMBIENCE	Type=room 2, Rev Time=0.8s, Pre Delay=0ms Low Cut=55.0Hz, High Cut=4.00kHz Density=2, Effect Level=30
P9	RV	LARGE HALL	Type=Hall 1, Rev Time=4.0s, Pre Delay=30ms Low Cut=110Hz, High Cut=3.00kHz Density=5, Effect Level=30
P10	RV	BRIGHT ROOM	Type=Room 1, Rev Time=1.6s, Pre Delay=5ms Low Cut=110Hz, High Cut=8.00kHz Density=5, Effect Level=30

### **GT-5** Effect Group: TREM/PAN

No.	Effect	Name	Description
P1	TR	FAST TREM	Mode=Tremolo, ModWave=Triangle, Rate=85, Depth=100 Balance= L50 / R50
P2	TR	SLOW TREM	Mode=Tremolo, ModWave=Triangle, Rate=60, Depth=100 Balance= L50 / R50
P3	TR	FAST PAN	Mode=Pan, ModWave=Triangle, Rate=80, Depth=100 Balance= L50 / R50
P4	TR	SLOW PAN	Mode=Pan, ModWave=Triangle, Rate=20, Depth=100 Balance= L50 / R50
P5	TR	MOD GATE	Mode=Tremolo, ModWave=Square, Rate=80, Depth=100 Balance= L50 / R50
P6	TR	STEREO GATE	Mode= Pan, ModWave=Square, Rate=70, Depth=100 Balance= L50 / R50
P7	TR	RHODES PAN	Mode=Pan, ModWave=Square, Rate=80, Depth=50 Balance= L50 / R50
P8	TR	LIGHT PAN	Mode=Pan, ModWave=Triangle, Rate=80, Depth=50 Balance= L50 / R50
P9	TR	LIGHT TREM	Mode=Tremolo, ModWave=Triangle, Rate=85, Depth=50 Balance= L50 / R50
P10	TR	PEDAL PAN	Mode=Tremolo, ModWave=Square, Rate=95, Depth=0 Balance= L50 / R50

### **GT-5** Effect Group: REVERB

No.	Effect	Name	Description
P1	RV	PLATE	Type=Plate, Rev Time=2.8s, Pre Delay=0ms Low Cut=165Hz, High Cut=6.00kHz Density=8, Effect Level=15
P2	RV	ROOM 1	Type=Room 1, Rev Time=1.5s, Pre Delay=5ms Low Cut=110Hz, High Cut=4.00kHz Density=5, Effect Level=20
P3	RV	ROOM 2	Type=Room 2, Rev Time=1.8s, Pre Delay=10ms Low Cut=110Hz, High Cut=6.00kHz Density=4, Effect Level=20
P4	RV	HALL 1	Type=Hall 1, Rev Time=3.0s, Pre Delay=30ms Low Cut=110Hz, High Cut=4.00kHz Density=10, Effect Level=15
P5	RV	HALL 2	Type=Hall 2, Rev Time=3.5s, Pre Delay=30ms Low Cut=165Hz, High Cut=6.00kHz Density=8, Effect Level=15
P6	RV	RICH PLATE	Type=Plate, Rev Time=3.0s, Pre Delay=10ms Low Cut=110Hz, High Cut=8.00kHz Density=10, Effect Level=16
P7	RV	LIVE HOUSE	Type=Room 1, Rev Time=2.0s, Pre Delay=5ms

# Appendix D Analysis Methods

This appendix will provide information about the methods and settings used during the spectrum and level analysis of the GT-3/5 which has revealed so much technical information.

Much of the information presented in this document has been obtained through careful, and lengthy analysis of a GT-3. So that these findings may be understood, and the analysis repeated, I have detailed the methods and settings for analysis below.

## Equipment Set-up & Connections

The set-up is not overly complex, but is flexible enough to suit all needs.

PC Out- RQ200 Mixer - Mixer Monitor Out - GT-3 In - GT-3 Out - MX2004A Mixer – Mixer Main Out - PC In

This method of connection was used for much of the analysis with the left channel being the primary channel. Both channels of the GT-3 were tested and yielded identical results during frequency analysis; therefore only the left channel is shown in the resultant analysis as this allows a greater display resolution.

At times, a second routing was added. The right channel input on the mixing desk was replaced, so that instead of coming from the GT-3 it was split from the same Monitor Out signal and routed DIRECT to the R in of the MX2004A.

These two connections provide the following scenarios (respectively)

1. GT-3 analysis
2. GT-3 vs. Direct signal comparison

This second method is particularly useful where a comparison between the GT-3 and the original signal were required.

## GT-3 Patch used

The GT-3 was programmed with a completely empty patch. NOTHING was turned on, not even the FV or NS. Neither were any control assigns were used. The '[Master] Level' was set to 20 to avoid overloading the GT-3 output when checking EQ  $\pm 20$ dB.

## Spectrum Analysis

The spectrum analysis was conducted using the first configuration described above and a piece of software called SpectraLAB 4.32.14, which may be found here...

[http:// www.SoundTechnology.com](http://www.SoundTechnology.com)

Spectrum analysis was used to determine the various frequency characteristics of the GT-3.

SpectraLAB was configured using the following settings.

### Frequency & Range Resolution

Sample Rate (Hz)	96kHz
Decimation Ratio	1
FFT size (samples)	65536
Spectral Line Resolution	1.465Hz
Frequency Limit	48000.000Hz

### Sampling Format

Bit Depth	16bit
-----------	-------

### Smoothing Window

Window Type	Hanning
-------------	---------

The Hanning smoothing window algorithm was chosen because although its frequency resolution is not the best possible, it does have excellent amplitude resolution and leakage suppression. This means the resultant analysis is far more accurate than with any other type of window.

### Averaging Settings

Block Size	1
Style	Exponential

### Scaling Control

Amplitude Axis	Logarithmic
Frequency Axis	Narrowband:Logarithmic
Standard Freq. Weighting	Flat(none)
Mic Compensation	None

In order to prove the analysis bed was accurate, four tests were performed:

1. PC out-PC In direct connection  
This proves the PC soundcard is not affecting the results.
2. PC-Out -> Mixers -> PC In  
This proves the mixers are not affecting the results.
3. Full Set-up thru GT-3 with the GT-3 in BYPASS mode.  
This profiles the GT-3 bypass mode.
4. Full set-up thru GT-3 with the GT-3 running the analysis patch.  
This profiles the GT-3 analysis patch vs. the 3 other tests.

The above results are all shown in the image file called 'GTx-Reference.gif', which may be found at:

[http://www.breakingtaboo.com/gear/boss\\_gt-x/GTx-Reference.gif](http://www.breakingtaboo.com/gear/boss_gt-x/GTx-Reference.gif)

Or



## Appendix D Analysis Methods

---

<http://groups.yahoo.com/gt-3/files/Set-up.../GTx-Reference.gif>

As can be seen, the GT-3 does affect the sound below 300Hz with a slight drop off. The only difference between the patch and the BYPASS mode was a slight drop off in the patch between 20-35Hz. Below 20Hz is outside of the GT-3 specifications and therefore should be disregarded.

### Level Analysis

Not all of the analysis of the GT-3 was frequency related. The timings for the control assigns, compressor, limiter, slicer, tremolo, pan, slow gear and signal delay/polarity were all obtained by comparing the GT-3 output vs. the signal output from the PC. This used to second configuration explained above.

Steinberg's Wavelab software was used to generate the signals sent to the GT-3, and to record and analyse the signals returning from the GT-3.

There were two basic procedures:

1. Generate a .wav of the signal to be sent. Recording started and then the .wav sent out (typically a 1kHz sine wave) at 0dBFS. Both L & R channels from the GT-3 outputs were used. This method was used to analyse:

- Tremolo
- Pan
- Slicer
- Level Meters

2. Generate a .wav of the signal to be sent (again typically a 1kHz sine wave at 0dBFS). Recording started and then the .wav sent out. The left channel showed the GT-3 output and the right channel contained the output from the mixer split off **directly** before entering the GT-3. This method provides an accurate comparison of the GT-3 output vs. the original signal. This method was used to analyse:

- Compressor
- Limiter
- Slow Gear
- Signal Delay (latency)
- Signal Polarity(Phase)

### Summary

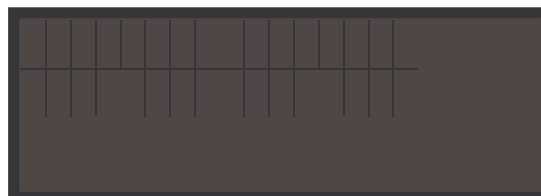
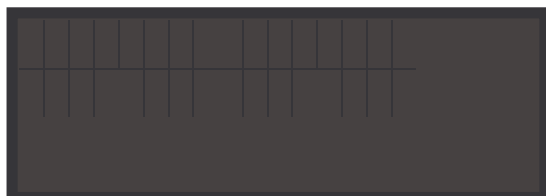
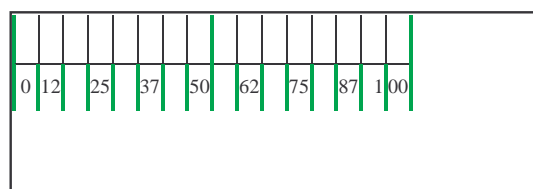
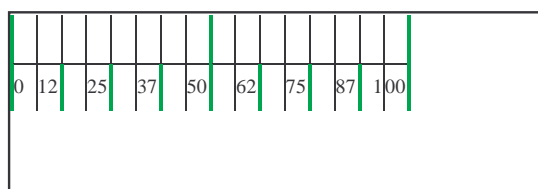
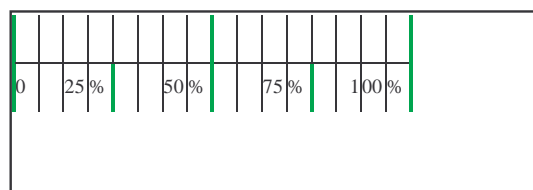
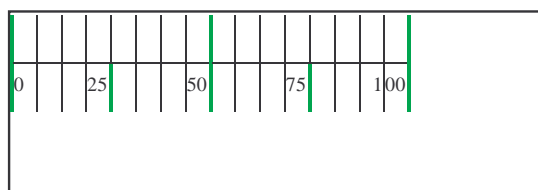
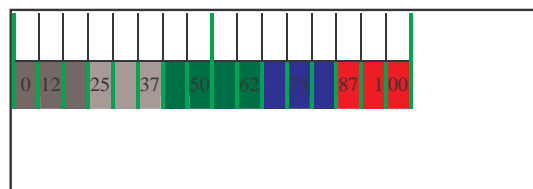
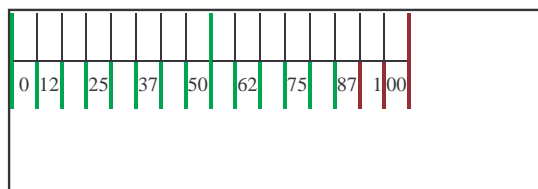
Should anyone have any comments/ideas about the analysis, ways to improve, corrections (!!! it does happen!) or more information, particularly if they are going to repeat the analysis, then please, please drop me an e-mail!

# Appendix E LCD Meter Overlay Templates

**Jed** (Manuel "Jed" Saldaña) from the GT-3 Yahoo Group has produced some great templates to as an alternative to marking up your LCD display. These templates may be used for a better reference in % of the levels signals on the GT-3/5.

Print this page on a transparent sheet, cut out what you need and that's it!! You can make modifications to font, colours, paragraph, etc!

Thanks very much indeed to **Jed**.



# Appendix F Electrical Safety

Now I know this may seem like an odd subject to include in a document about the GT-3/5, but as the document has been pretty much all encompassing I cannot pass by the opportunity to make you more aware about electrical safety and what it means to you as a musician.

## Use a LED/neon socket tester

These are fantastic testers and are dead cheap. You just plug them in and you normally have 2 or 3 lights that illuminate, which will tell you if the socket you are about to plug into is correctly wired. I use one. So should you.

## Use an RCD permanently on your rig

Residual Current Device. Another fantastic cheap addition to your gear which will keep you VERY VERY safe. What they are is a clever and VERY fast circuit breaker. Its not like an earth leakage trip which just detects earth leakage problems (as it says). These little beggars monitor the live & neutral as well and if any discrepancy occurs it kills the circuit. I fitted such a device to my house consumer unit the minute I moved in. You can buy small portable ones at very reasonable sums from must high street retail outlets. Failing that Radio Shack, RS Components & Maplins most definitely will have them.

## Avoid solder for electrical connections

I know how everyone likes nice tidy mains connections. But when wiring up mains cables to plugs/sockets DO NOT USE SOLDER.

Every wondered why you've just been able to tighten up a plug that you made up some time ago – the connections seemed not as tight as you remember making them? You even used solder to make sure you had a good connection and the end of the wire was tidy didn't you. Well, read on.

The problem with solder is it suffers from something called COLD FLOW. It's basically a very slow liquid metal, and over the years the wires become loose in the connectors. This can initially cause noise, but more seriously can lead to fire due to arcing.

You have been warned – use solder for signal cables ONLY – NOT power cables where you are using ANY FORM OF screw connection to provide the electrical connection/keep the conductor in place.

## Ground/EARTH Connections

**ANY ATTEMPT TO REMOVE THE EARTH FROM A POWER SUPPLY IS DANGEROUS. THIS INCLUDES PLUG CHEATS – 3 PIN PLUGS WITHOUT THE EARTH WIRED. YOU MAY WELL INVALIDATE THE MANUFACTURERS**

**WARRANTY AND PLACE YOUR LIFE OR SOMEONE ELSE'S LIFE IN DANGER. YOU DECIDE.**

If you have problems with ground/earth causing noise check out Section 9 Noise Elimination.