G-FORCE
Service Manual
1st Edition
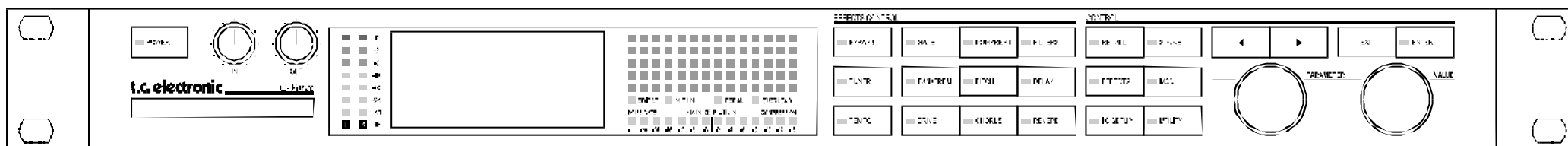
Table of Contents:

Introduction

The purpose of this manual is to support technicians in repairing the G-Force

The manual begins with a Quick Trouble Shooting table. Here, hints, advices and possible problems are described.

If the problem is more serious, the next step is to use the Built-in Test Program. With this program the problem can often be narrowed down to a specific section, channel or even component.

The next section consist of disassembly and exchange procedures. Please be aware of warranty rights before disassembling. See the warranty card.

The Block diagram for the signal flow in the G-Force shows the order of all the effects.

Circuit description is a brief description of the circuits on the different boards.

In a table the Power On Sequence is described step by step and certain test points are referred to.

The Power On Sequence is followed by LED error codes and Jumper settings.

Software Changes describes the changes from older software versions to newer versions.

Appendix contains Schematics, Part lists, PCB Layouts and service notes.

Schematics start with a main sheet, where sub sheets are shown as blocks. Even sub sheets might have sub sheets. In the Schematics some connections have label names to help the reader. If a label name is framed, it means that it is "connected" to another sheet. Label names followed by the symbol "*" mean that the signal is active low, i.e. RESET*: the reset function takes place when the signal is low.

This service manual does not contain schematics for the power supply module, because any attempt to repair the power supply module must be completed with some safety tests such as high voltage and EMC tests. Hence, it is strongly recommended that the entire power supply module is replaced in case of malfunction.

Part lists contain a column called TCcode. Use this code when ordering spare parts. If the TCcode field is empty; it means the component cannot be ordered separately.
The coordinates in the column Pos. refer to the PCB layout page. The column named Page refers to page no. in the schematics. In column comments a short explanation of the function is stated. For some components, alternative types are mentioned.

PCB layouts are made as gatefolds (fold-out page).

Finally appendix contains a list for mechanical parts.

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Quick Trouble Shooting

Use this table to solve problems or find out what to do next.

Symptom	Comments / Action:
No sound	Killdry in the I/O setup is set to ON and the unit is bypassed
Cannot turn power off with power switch at front	The switch must be pressed for at least 1 second to turn off power. The delay provide unintended power off.
Right input meter is not showing any signal	Is L-Only selected in the I/O Setup, Audio menu.
Still problems with presets made in version 1.05 after installing new sofware version.	Recall the affected preset and store it in a new preset number. Or store all presets to a card and then make a master reset. Load in the presets afterwards.
Message "Invalid software" appears when loading software from G-Card	Here is correct procedure for loading Application Software from the G-Card: 1. Insert the G-Card into the G-Force. 2. Turn on power with the power switch at the front. (Use this switch during the whole procedure) 2. As soon as you see the Window "CARD ACCEPTED" turn off power. 4. Quickly press ENTER while turning on power again. (gives access to the boot menu) 5. Quickly press ENTER to load the software. (loading takes approx. 15 seconds)
Blank display. Cannot run application software.	Enter the SOFTWARE BOOT menu, by keeping ENTER button pressed at power on. Dial option to INFO, press ENTER to check the application software. If corrupted; load the application software again.
Lines or spots in display Backlight is blinking	Make sure no external equipment is influencing the display, i.e. magnetic fields, hot fields. If the picture is still distorted, replace the display. If the backlight is bad or blinking; check the soldering on the display itself, especially the two connections going to the upper part of the display.
Message: "User Preset Error, Cleared All Presets "	Appears normally at first power up after RESET. All Presets are set to factory default!
Bad LED's, keys or Parameter/Value wheel.	See section "Built-in Test program".
Analog in/out fails	Try with other cables or read section "Built-in Test program". Note: When analog in/out is connected to unbalanced equipment, XLR pin 3 must be connected to pin 1. Note: If IC35 + IC36 are defective, they should be replaced with type MC33079
Digital or Midi in/out fails	Try with other cables or read section "Built-in Test program". Digitech pedals are incompatible.
External Control In fails	Try with other cables or read section "Built-in Test program".

More hints to solve setup problems can be found in the G-Force Users manual. Check also FAQ on TCs web site: www.tcelectronic.com

Software Boot Menu

To access the Software Boot Menu; press the ENTER button while powering on.

Option	Description
Load PCMCIA	Load Application or Boot software directly from PCMCIA card. See also service note no. 720 10 04 02 in appendix
Load Link	Used for loading Application software from MIDI IN. See also service note no. 720 10 04 01 in appendix
Save Link	Used for saving Application software to MIDI OUT. See also service note no. 720 10 04 01 in appendix
Reset	Master Reset. Run this command and all global and preset settings are reset!!!
Info	Display the Device type, the Serial no. and software version
Start	Start the loaded software

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Built-in Test Program

The G-Force has a Built-in Test Program. To run the program; Press the BYPASS button while powering on. Select RUN TEST PROGRAM and Press ENTER. Follow the instructions on the display. To leave the Built-in Test Program; turn off the power.

G-Force Built-in-Test Program v3.05 has following tests:

TEST	Function / Comments
Keys	Tests the keys at the front panel one by one. If a key hasn't been pushed a warning message will appear when leaving the test
IN/OUT knobs	Tests the function of the In and Out potentiometers
PARAM+VALUE	Tests the steps of the encoders. Each step is counted at the display, if not; check soldering at encoder and front connector.
LED's	Tests the LED's at the front panel one by one. If no light; check soldering at the LED and at flat cables between the front boards.
Display	Tests all dots in the display. If any missing; replace the display. If the backlight is bad or blinking; check the soldering on the display itself, especially the two connections going to the upper of the display.
Analog I/O	A sine wave is generated on both analog outputs. When connected to one of the analog inputs the display reads OK if the level is correct. In this way a problem might be narrowed down to a specific input or output. Note: In case of defective IC35 + IC36, they should be replaced with type MC33079
Digital I/O	A digital signal is generated on the digital output. When connected to the digital input the display reads OK if the level is correct.
Midi I/O	A midi signal is generated on output. When connected to the input the display reads OK if the signal is correct. The midi signal from input is sent on to MIDI THRU. If not OK; try with another midi cable or check soldering and components in the midi circuit.
Pedal socket	Tests the status on the EXTERNAL CONTROL IN. When no jack plug is inserted the tip of the jack socket is connected to ground, this is the reason for showing OK without jack plug.
PCMCIA	Tests whether programming, reading or deleting are OK. NOTE: All data on PCMCIA card will be destroyed.
Battery	Tests the DC voltage at the Back up battery. If low; check battery voltage with a multimeter and check also the standby current by measuring the voltage across R135; max. 20mV (numerical value). If the voltage is higher; replace IC30. When replacing battery, please refer to section "exchange of battery"
System.	Tests the MPU, DSP, ASIC and SOUND RAM to some extent. If not OK; see section "startup sequence".

Disassembly Procedure for Main Board

1. **Turn Off Power and Disconnect Power Cord.**

2. Loosen 5 screws, see fig. 1, and remove the top cover.

3. Disconnect front connector, J1, see fig. 2.

4. Remove screws at MT7, MT8, MT2 on the main board, see fig. 2.

5. Remove 5 nuts at the Jack connectors on the back panel, see fig. 3.

6. Remove screw at SPDIF in/out connector, see fig. 3.

7. Push the main board into the front profile a little to free the connectors from the back panel, then lift out the board.

8. Desolder the seven wires from power supply.

Fig. 1: Screws at top lid

5 screws

Top view
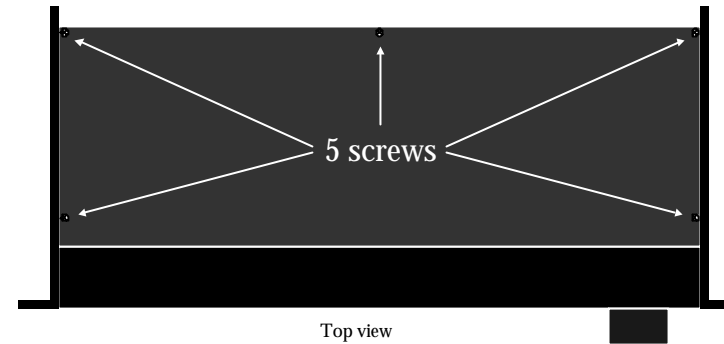
Fig. 2: Screws and front connector at main board

main board

Power Supply

J1

MT7   MT8   MT2

Top view

Fig. 3: Screws at back panel.

HI-Z INPUTS   BALANCED OUTPUTS   CAUTION   MIDI / RS485   PEDAL
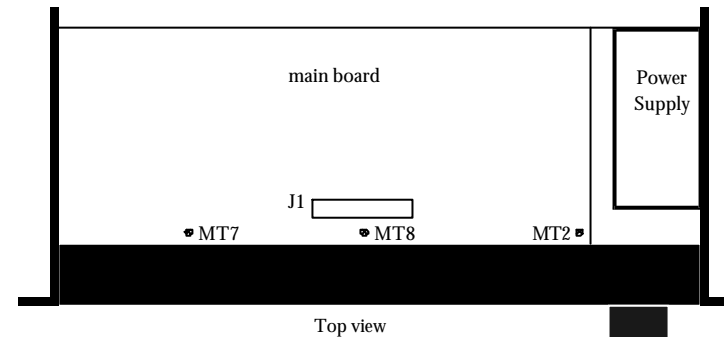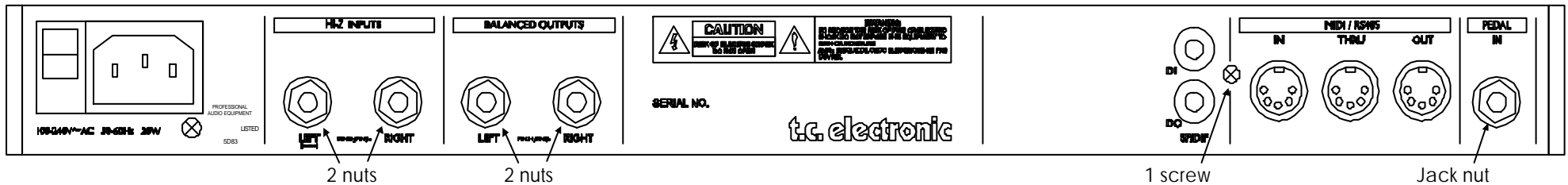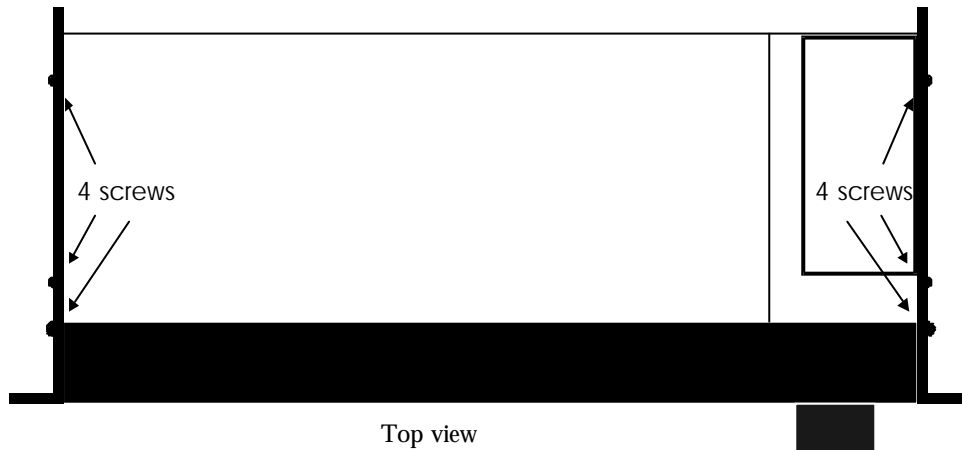
SERIAL NO.

t.c. electronic

2 nuts   2 nuts   1 screw   Jack nut

Disassembly Procedure for Front Section

1. **Turn Off Power and Disconnect Power Cord.**

2. Loosen 5 screws, see fig. 1, and remove the top cover.

3. Disconnect front connector J1, see fig. 2.

4. Remove side panels by unscrewing 4 screws at each side, see fig. 4.

4 screws

4 screws

Top view

Fig. 4: Screws at side panels.

5. Remove the front section.

6. Pull off the PARAMETER and VALUE knobs by hand.

7. Place the front profile horizontally with the buttons facing down. Place the profile on some stand-off to avoid any pressure on the push buttons.

8. At the end with PARAMETER and VALUE knobs, pull out the two white PCB guides. Opening up the profile a little will lighten the pressure at the PCB guides, see fig. 5.

   Note: All push buttons are loose in the profile after removing the guides.

9. Use the ribbon cable to lift up the front board assembly a little and then slide it out gently at the end with PARAMETER and VALUE encoders. The shafts of the encoders can just pass the profile in this way.
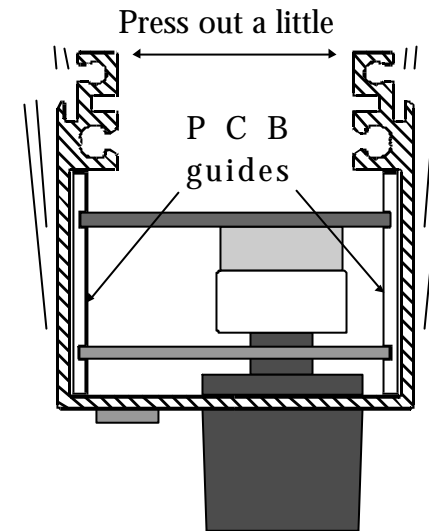
Press out a little

P C B guides

Fig. 5: Front profile shown from VALUE end.

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Exchange of Power Supply Module

1.   Turn Off Power and Disconnect Power Cord.

2.   Loosen 5 screws, see fig. 1, and remove the top cover.

3.   Disconnect the front connector J1, see fig. 2.

4.   Loosen the front section by removing two <u>small</u> screws at each side panel, see fig. 6.
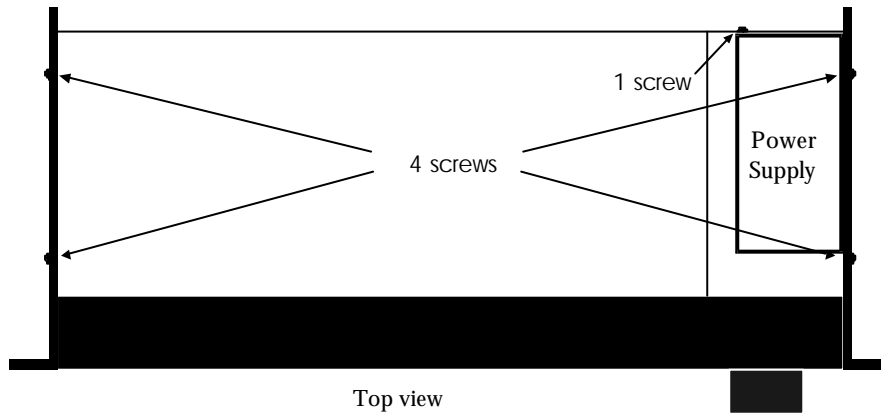
9.   Solder the seven wires to the main board. Make sure they are correctly placed.

        TAKE CARE: The wire ends must not touch the bottom panel!

10.   Remount the front section with two screws in each side panel.

        Make sure the edge of the bottom panel is pressed into the front profile.

11.   Connect the front connector J1.

12   Mount the top lid with five screws.

13.   Connect power cord and turn on power.

If the unit has a malfunction; turn off power and check the following:

   Is the front connector mounted correctly?

   Are the power supply wires correctly placed?

   Do the wire ends short circuit to the bottom panel?

1 screw

4 screws

Power
Supply

Top view

Fig. 6: Screws at side panels.

5   Press out the side panels a little and gnetly push out the front section.

6   At the main board, desolder all seven power supply wires.

7.   Dismount the power supply by removing the screw, just below the mains plug at the back panel, see fig. 6.

8.   Mount the new power supply with the screw at the back panel.

Exchange of Battery

CAUTION:

DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE
ONLY WITH SAME OR EQUIVALENT TYPE RECOMMENDED BY THE
MANUFACTURER. DISCARD USED BATTERIES ACCORDING TO THE
MANUFACTURERS INSTRUCTIONS.

VARNING:

Felaktigt batteribyte kan medfora fara for explosion. Anvand darfor endast samma
typ eller likvardig typ enligt apparattillverkarens rekommendation.

Kassera forbrukade batterier enligt tillverkarens anvisning

ADVARSEL:

Lithiumbatteri. Eksplosionsfare ved fejlagtig håndtering. Må kun udskiftes med
batteri af samme fabrikat og type.

Lever det brugte batteri tilbage til leverandøren.

Recommended battery type: CR2032-FT-4-2.

TC stock no. (TCcode) for battery: 342 0000 11

Exchange procedure

1. **Turn Off Power and Disconnect Power Cord.**

2. Loosen 5 screws, see fig. 1, and remove the top cover.

3. Desolder the old battery by warming up each terminal <u>one by one</u>. Avoid any short circuit of the terminals. Be careful not to damage the wiring on the board.

4. Insert new battery and solder the terminals <u>one by one</u>. Avoid any short circuit of the terminals.

5. The voltage measured directly across the terminals of the new battery should be higher than 3.0VDC.

6. Do not discard the old battery. Hand it over to a recycling company or your dealer.

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Block Diagram

The block diagram in figure 7 gives a quick view of the signal flow in the G-Force.
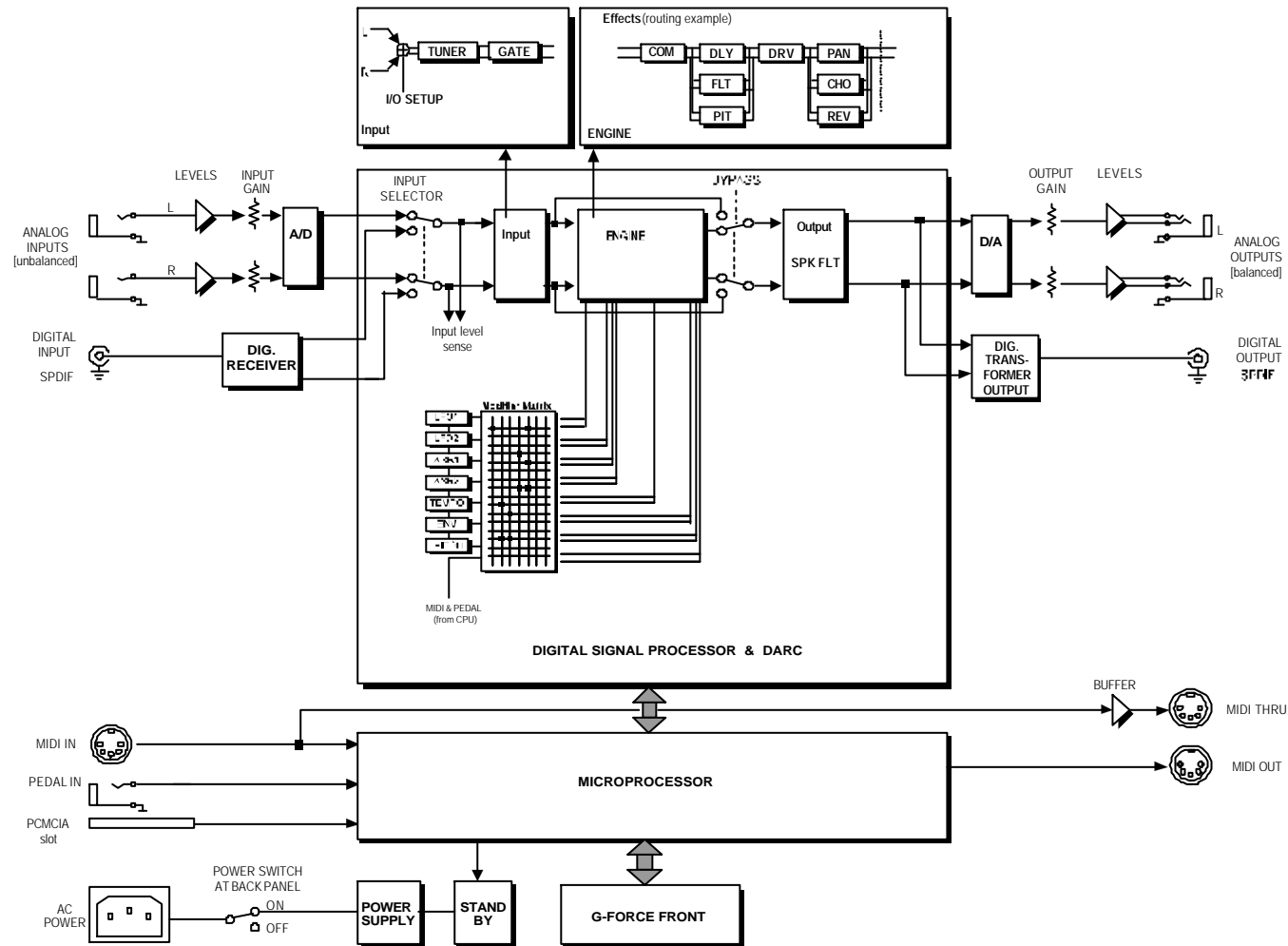As the block diagram shows the input and output sections will always be active, even in Bypass mode.

Fig. 7: Block diagram for the G-Force

Circuit Description

The G-Force consist of a front, a digital, an analog and a power supply section. Here is a brief description of the sections:

Front section consist of three boards and a display, all placed in the front profile. The big board has two matrix circuits; one for LED's and one for keys. The two encoders and the two pots are scanned by the PAL. The EEPROM contains the serial no.

The small boards are for LED's and key switches.

Digital section is placed mainly in the middle and in the left side of the main board.

This section contains the Reset, MPU, SRAM, DSP, DARC, Sound RAM, PLL, FLASH and Interfaces.

Reset controls the MPU the DA.

The Software for MPU is placed in FLASH. The MPU controls DSP, SRAM, Jeida, Front, MIDI, External Contrl In and analog gain settings.

The major task for DSP is to "calculate" sound. It also generates the 80MHz clock for the DARC chip.

The DARC chip controls sound data to and from; DSP, Sound RAM, digital in/outputs and AD/DA converters.

The PLL circuit makes a very stable frequency at 256 x sample rate , this frequency is divided down to 64 x sample rate and to 1 x sample rate by the DARC. The PLL has its own power regulation. In newer units the PLL circuit is mounted on a separate PCB.

Interface for MIDI and External Control In consist almost of discrete components.

Interface for Jeida is simplified by using a PAL.

The interface for the front has an integrator, which converts a 3.3kHz square wave to a negative DC voltage for the display contrast. By changing the duty cycle of the square wave the DC voltage and thereby contrast will also change. An attenuator allows the MPU to measure the contrast voltage.

Analog section is placed mainly on the right side of the main board.

The analog input is balanced, thus pin 3 should be connected to pin 1 when used with unbalanced equipment.

Input levels are controlled by digital potentiometers. These potentiometers are located in a single chip, which controls both the two analog input levels and the two analog output levels.

The A/D converter is a 24bit converter . The A/D and D/A converters have also a separate power regulation.

The D/A converter is also 24bit. A DC voltage is applied to the left & right signal output at the converter.

After the D/A comes a 2nd. order filter, then the output level and then a 1st. order filter.

An electronic balanced circuit perform the output stage. Again XLR pin 3 should be connected to pin 1 when used with unbalanced equipment.

Power supply section consist of a separate Power Supply Module and some regulation circuits on the main board.

One regulation circuit has an electronic switch for the +/-15V. The electronic switch for the +5V is mounted inside the Power Supply Module. The switches are controlled by the Stand By circuit. The Stand By circuit is supplied from a separate power wire from the Power Supply Module.

This service manual does not contain schematics for the Power Supply Module, because any attempt to repair the module must be completed with some safety tests such as high voltage and EMC test. Hence it is strongly recommended that the entire Power Supply Module is replaced in case of malfunction.

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Power On Sequence

The table below shows the Power On Sequence for main board version **PC13002-2**, when the G-Force is switched on by using the power switch at the back panel. Equal sequence numbers mean that the events are independent of each other. The column named Trouble Shooting has hints about what to check if the event fails.

No	Event	Trouble shooting
1a	SB_VCC (POWER_SB, Violet wire) goes to approx. 5VDC and supplies IC1.	Power cord, DZ1, IC1 or power supply.
1b	+15V (POWER_+15V, Orange wire) goes to approx. +15VDC.	power supply, load (normal current load is approx. ?mA)
1c	-15V (POWER_-15V, Yellow wire) goes negative to approx. -15VDC.	power supply, load (normal current load is approx. ?mA)
2	TP4 goes to +4.7VDC. C8 is discharged and keeps IC1 pin 13 low and subsequently IC1 pin 8 goes high.	IC1, DZ1
3a	+5VSB, (+5V_STANDBY*, Brown wire) goes to approx. +3.2VDC	R7
3b	Q1 and Q2 turns on IC2	Q1, Q2, IC2
3c	Standby LED is lit	Q1, Q2, IC2
4a	+5V (POWER +5V, Red wire) goes high.	power supply, load (normal current load is approx. ?A)
4b	TP1, -15V starts up.	IC2
4c	TP2, +15V starts up.	IC2
5a	Display backlight turns on	Ribbon cable at Front connector J1, two solderings at display for back light.
5b	IC9 pin8, CPU clock starts up, 14.112MHz	IC9, X1, (unstable until clean power comes from IC27)
5c	IC27 pin2+3+6+7, power for PLL, goes high.	IC25, IC27
5d	TP68, 256FS starts up	IC9, IC28 + soldering, If CPU clock is missing the frequency is undefined.
5e	LD4 turns on.	IC33. NOTE: If IC35, 36 or 41 are defective they can turn LD4 off via IC33 !!
5f	Q8 emitter, +5VA (+5VAD) starts up.	IC26, Q8
5g	IC37 pin2, +5VA (+5VDA) starts up.	IC37
5h	TP3, rises to +3.3V .	IC42
6a	TP8, DSP clock starts up, 44.100KHz	IC24 + soldering
6b	TP70, ADA_64FS starts up (2.822MHz)	IC24 + soldering
6c	TP72, ADA_1FS starts up (44.1KHz)	IC24 + soldering

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Power On Sequence, continued

No	Event	Trouble shooting
6d	TP68, 256FS starts up (11.2896MHz).	
7	IC 15 pin59, DARC3 clock. Starts up (44.1KHz).	IC15
8	TP5, Reset signal goes high.	Battery connections, IC4
9	A: MPU, IC3 sets ports. B: The signal DSP RESET* is set low. C: SER MUTE is set to low. D: Checks checksum in Flash. E: VCA left/right out is set to zero.	Reload Boot Sector or replace the Flash, IC35.
10	MPU checks if the ENTER button is pressed	If pressed; Boot menu appears. Check D8 if no picture.
11	MPU tests SRAM	If reset or not OK; this message appears: "User Preset Error, Cleared All Presets ". Check IC8, IC4 or battery.
12	MPU checks header in application software.	If not OK; Boot menu appears. Try to reload application software
13	MPU checks if the BYPASS button is pressed	If pressed; Reset menu appears.
14	MPU tests Preset information in SRAM	If not OK; message appears: "Preset Error". Check IC8, IC4 or battery.
15	MPU, IC3 pin 107 goes high, (DSP RESET*)	IC3 + soldering, see sequence picture in schematics for main board
16a	MPU tests DSP	If not OK; message appears: "DSP not OK"
16b	IC 15 pin59, DARC3 clock goes from 44.1KHz to 80MHz	IC15 + soldering
16c	TP71, DA1_DATA starts up	IC24
16d	TP73, AD_DATA starts up	IC39
17	Picture with "G-Force" and software version appears on the display.	Front connection, display,
17	Picture with "Pitch Technology" appears on the display.	Application software
18	RECALL picture appears on the display.	Application software

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LED Error Codes

LD1	LD2	LD3	Code explanation	Comment
off	off	off	Normal	At power on all LEDs will blink once.
on	on	on	Checksum error in boot software	Reload boot software

LD4 has two functions: 1: Show power on. 2: Defines the voltage named +5VDA (+5.5VDC)

Jumper settings

Main board version PC13002-2:

J7, (JTAG) is unused. JP3, JP4, JP5 & JP6 controls boot mode:

JUMPER SETTING: JP3 JP4 JP5 JP6

Boot from Flash (normal mode)

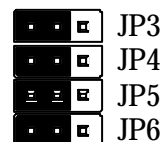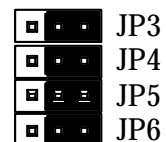JUMPER SETTING: JP3 JP4 JP5 JP6

Boot from PCMCIA (only used at factory)

Main board version PC13002-4:

J12 and JTAG are unused. JP3, JP4, JP5 & JP6 controls boot mode:

Boot from Flash
(normal mode)

JP3 JP4 JP5 JP6

Boot from PCMCIA
(only used at factory)

JP3 JP4 JP5 JP6

J11
(one valid setting only)

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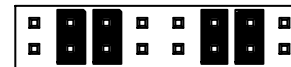
Software Changes

Changes from v.2.00 to v. 2.02:
1. Preset 142 replaced by preset 42
2. Simple reverb - distortion when changing color. Corrected.
3. Self test program fixed.

Changes from version 1.14 to 2.00:
1. MIDI bulk dump, is not received properly in e.g. Cubase. A delay has been inserted between the data packets. Fixed.
2. The mute-errors and initialization-errors relating to preset-change relating to insertion of algo's are fixed.
3. Stereo-delay algo - does not function correctly - fixed.
4. Pitch-detection problems are fixed.
5. Stereo-delay algo fixed.
6. Dual TwoTap delay - Error in tap-link - fixed.
7. The Drive algorithm has been improved.
8. New Pitch-subalgorithm : 2 voice - 2 octave implemented.
9. Gate algorithm updated - Maxdamping now goes to 90 dB & Release rate goes to 200 dB/s.
10. Real ByPass (mute) - meaning that Gate is allways active in background.
11. Real ByPass (mute) - meaning that Compressor is allways active in background.

Changes from version 1.13 to 1.14:
1. New revision of mainboard will not lock, need to implement PLL help support. This is backward compatible with old mainboard. Corrected.

Changes from version 1.12 to 1.13:
1. Pitcher is not properly initialized! Corrected.
2. Controllers must be reset (according to setting) at power-up. Corrected.
3. ADSR not properly initalized at power-up. Corrected.
4. Added support for multiple CARD banks to support G-Card. Corrected

Changes from version 1.05 to 1.12:
1. Pitch detection trouble – *Verify*- **There might still be when playing multiple notes.**
2. Preset change clicks and volume jumps. *Verify*.
   Preset change is now in one of two modes : muting on or muting off.
   When in 'on'-mode, output from every effect is muted during change.
   When in 'off' mode, the effects are muted according to the setting of their 'mute mode'
3. LFO's not tempo based. **Fixed**
4. Duck on crack; ADSR cycle. Reset at preset change. **Fixed**
5. Reverb oscillation at middle D. *Verify* **Fixed**
6. Pitch-shifter Feedback parameters cause hard crash when turned up.
7. Will be limited. **Fixed** – **There is still a sound-problem when turning up. But there will be no crash**
8. Delay preset change from Quad (or single Tap) to Dual Two Tap caused incorrect Line Two. **Fixed**
9. Fixed pitch algos are not initialized correctly at startup meaining 4-500 ms Delay even though Delayparam are set at 0ms. **Fixed**
10. Startup sequence needs to be controlled to avoid any Reverb spillover etc. **This has been improved, but not entirely fixed. There are not resources to clear sound-mem.**
11. Level Problems with changing filter-subalgo's from ParEQ to and from Resonance. **Fixed**
12. Loop-like noise at startup in certain presets (e.x. Preset 93). **Fixed**
13. Partial Recall must jump back to "All" after Recalling. **Fixed**
14. Roland FC 200 compatibility needs to be fixed (add "Bank size" to Utility). **Done**
15. Add Partial recall via MIDI. **Done**
16. Add Bob Bradshaw board, Lexicon board and ADA MXC to default list. **Done**
17. Store should jump back to Store after Delete (when leaving the Store display). **Done**
18. Dotted notes in Subdivision parameters. **Done**
19. Deactivate the Tuner by a preset change. **Done**
20. Link/curve regulation of the pedal input (Will be placed in Utility). **Done**
21. Pedal read at preset change (Will be a choice in Utility). **Done**
22. Overall bypass will also bypass the In section. **Done**
23. Stop possibility in LFO's. **Done**
24. Ext 1 default to "Pedal". **Done**
25. Move level in Pitcher to right after Pitch param. **Done**
26. Drive above 80% sounds incorrect. *Verify*. **No action taken**
27. Formant bagpibes noise. *Verify*. **No action taken**

Technical Specifications

Analog Input

Connectors:	¼" jack socket, unbalanced
Impedance:	1 MOhm
Max. Input Level:	+21 dBu
Sensitivity:	@ 15 dB headroom: -26 dBu to +6 dBu
A to D Conversion:	24 bit (1 bit, 128 times oversampling)
A to D Delay:	0,9ms @ 44.1kHz
Dynamic Range:	> 105 dB
THD:	< 0.003% @ 1 kHz, 6dB below full scale
Frequency Response:	+0/-0.5dB (20 Hz - 20 kHz)
Crosstalk:	< -60 dB (20 Hz - 20 kHz)

Analog Output

Connectors:	¼" jack socket, balanced
Impedance:	100 Ohm (active transformer)
Max Output Level:	+22 dBu
Full Scale Output Range:	-10 to +22 dBu
D to A Conversion:	24 bit (1 bit 128 times oversampling)
Dynamic Range:	> 100 dB
THD:	< 0.005% @ 1 kHz, 6dB below full scale
Frequency Response:	+0/-0.5dB (20 Hz - 20 kHz)
Crosstalk:	< -60 dB (20 Hz - 20 kHz)

Digital Input and Output

S/PDIF In/Out:	Coaxial, RCA Type
Formats:	EIAJ CP-340, IEC 958, S/PDIF (24 bit)
Sample Rate:	44.1 kHz

PCMCIA Interface

Connector:	PCMCIA Type 1 cards
Standards:	PCMCIA 2.0, JEIDA 4.0
Card Format:	Supports up to 2 MB SRAM

Control Interface

MIDI:	In/Out/Thru: 5 Pin DIN
External control:	¼" jack socket

General

Finish:	Anodized aluminum face plate
	Painted and plated steel chassis
LED:	3 LED meters, 5 x 14 dot LED-matrix
LCD:	56 x 128 dot graphic LCD-display
Dimensions:	19" x 1.75" x 8.2" (483 x 44 x 208mm)
Weight:	5.0 lbs (2.25 kgs)
Mains Voltage:	100 - 240 VAC, 50 to 60 Hz (auto-select)
Power Consumption:	< 20W
Backup Battery Life:	>10 years

EMC

Complies with:	EN55103-1, EN55103-2 and
	Class B limits of FCC rules, part 15

Safety

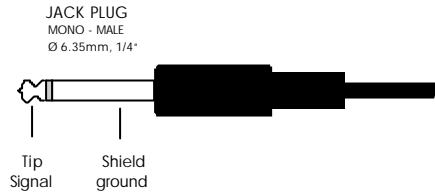|	
Complies with:	EN60065, UL 1419

Environment

Operating Temperature:	32 °F to 122 °F (0 °C to 50 °C)
Storage Temperature: -	-22 °F to 167 °F (-30 °C to 70 °C)
Humidity:	Max. 90% non-condensing

Note: Due to continuous development and standardization all specifications are subject to change without notice
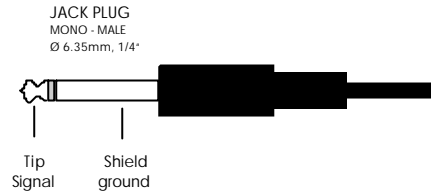
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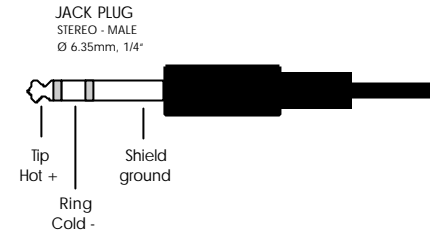TC Electronic A/S   G-Force Service manual   page 18

Cable Specifications

ANALOG IN CABLE

JACK PLUG
MONO - MALE
Ø 6.35mm, 1/4"

Tip
Signal

Shield
ground

ANALOG OUT CABLE

For connection to Unbalanced inputs

JACK PLUG
MONO - MALE
Ø 6.35mm, 1/4"

Tip
Signal

Shield
ground

ANALOG OUT CABLE

For connection to Balanced inputs

JACK PLUG
STEREO - MALE
Ø 6.35mm, 1/4"

Tip
Hot +

Shield
ground

Ring
Cold -

MIDI CABLE

DIN CONNECTOR
5 POLE - MALE
45 degrees

max. 15m

DIN CONNECTOR
5 POLE - MALE
45 degrees

SHIELDED CABLE (3 or 5 wires + shield)

1
4
2
5
3
C

see note

see note

1
4
2
5
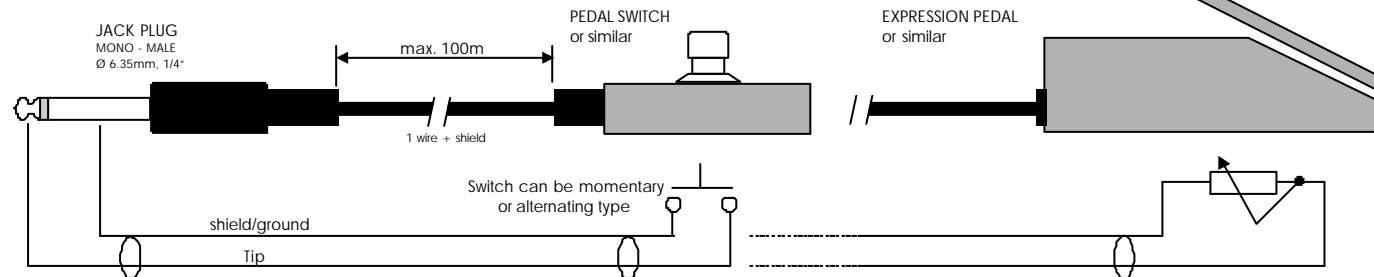3
C
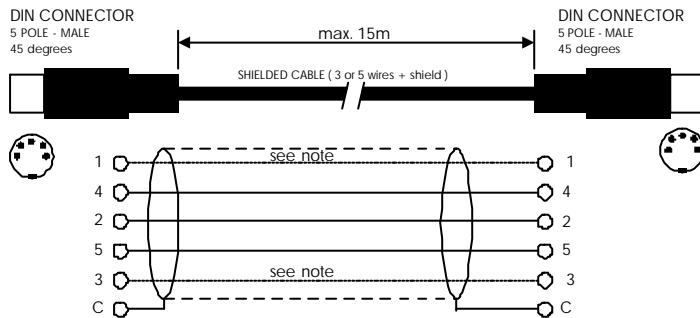
Note: Pin 1 and 3 are reserved for optional RS485 interface
Therefore, use only 3-wires if the G-Force is connected to other equipment that use these pins

EXTERNAL CONTROL CABLE

JACK PLUG
MONO - MALE
Ø 6.35mm, 1/4"

max. 100m

PEDAL SWITCH
or similar

EXPRESSION PEDAL
or similar

1 wire + shield

Switch can be momentary
or alternating type

shield/ground

Tip

Appendix list: Service notes, Schematics, Part lists, PCB Lay-out

The list below show the contents and the order of appendix.

Service note no. 720 1004 03	1 page
Service note no. 720 1004 04	1 page
Service note no. 720 1004 05	4 pages
Service note no. 720 1004 06	1 page
Schematic for Main board ver. PC13002-2	15 pages
Part list for Main board ver. PC13002-2	9 pages
PCB lay-out for Main board ver. PC13002-2	2 pages
Schematic for Main board ver. PC13002-4	14 pages
Part list for Main board ver. PC13002-4	16 pages
PCB lay-out for Main board ver. PC13002-4	2 pages
Schematic for Front boards ver. PC12504-10	4 pages
Part list for Front boards ver. PC12504-10	6 pages
PCB lay-out for Front boards ver. PC12504-10	1 page
Schematic for PLL board ver. PC12903-3	3 pages
Part list for PLL board ver. PC12903-3	2 pages
PCB lay-out for PLL board ver. PC12903-3	1 page
Part list for mechanical parts in G-Force	pages

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