GR-700

SERVCE NOTES
First Edition

MEMORY
Internal: 64 Patch Programs
(16kbyte RAM, battery backed-up)
External: 32 Patch Programs
(2kbyte Memory Cartridge)

EDTBLE PARAMETERS: 32

DISPLAY: 1" 4 Fig. 7 Seg LED

OUTPUTS
XLR: 0dB/600 Ohm
Standard Jack: 0dB/5kOhm; -15dB, or -30dB
Guitar: -20dB/1kOhm

TUNE RANGE: ± 50 cents

POWER CONSUMPTION: 45W

DIMENSIONS: 690(W) x 375(D) x 155(H) mm
27-3/16(W) x 14-3/4(D) x 6-1/8(H) in

WEIGHT: 12 kg/26 lb. 70 oz.

ACCESSORIES
Connection Cable (LP-25): 2
Connection Cable (C-24D): 1
(6P DIN/1.5 m): 1
AC Cord: 1
Memory Cartridge (M-16C): 1
2kbyte

OPTIONS: Programmer PG-200
Foot Volume FV-200
Carrying Case

Case Openable screws
3(lower) on each side panel
3(front) on bottom panel

Switch Film Sheet
(22663105)

Display Window
(2202368201)
7-seg. LED
NAR-101B
(15029414)

Side panel (L)
(21123192)

Side panel (R)
(21123194)

Front Panel
(2221341002)

Bottom Panel
(1281342601)

Foot Switch Ass'y (housing, pedal, switch)
SW-2 (23123904)
For Name/Number plate see Parts List.

Screws
Tapping A1
4 x 6 mm (3 pcs.)

RUBBER FOOT PLATE
(2212315900)
# PARTS LIST

## CHASSIS, PANEL, HOLDER
- 2221341002: Front panel
- 2281342601: Bottom panel
- 21123193: Side panel (L)
- 21123194: Side panel (R)
- 2212315900: Rubber foot plate
- 2219346100: Push switch holder
- 22663105: Push switch film sheet
- 2202368201: Display window

## SWITCH
- 23123904: Foot switch SW-2 (housing, pedal, switch)
- 22123148: Pedal plate 1
- 22123149: Pedal plate 2
- 22123150: Pedal plate 3
- 22123151: Pedal plate 4
- 22123152: Pedal plate 5
- 22123153: Pedal plate 6
- 22123154: Pedal plate 7
- 22123155: Pedal plate 8
- 22123156: Pedal plate HOLD
- 22223157: Pedal plate EDIT
- 22123158: Pedal plate BANK
- 13159316: HSW0372-01-530 slide
- 13129715: KHC10901 light touch
- 22473718: Button

## POTENTIOMETER
- 13219401: EVTTOAS10B14 TUNE 10kΩ
- 13299189: H0615C119-4.7kΩ trimmer
- 13299177: H0615C119-10kΩ trimmer
- 13299190: H0615C119-47kΩ trimmer

## SOCKET, CONNECTOR
- 13449125: HLJ0520-01-110 All jacks
- 13429615: TCS5350-01-111 DIN MIDI output
- 13429621: TCS5360-01-111 DIN PG-200 input
- 13429122: FHI12S-2.54DSA Flexible PCB connector
- 13429405: SLC1204-2324F Guitar input
- 12139302: SLC1204-24L1 Lock shell
- 22910167: Flexible PCB
- 13439851: HA-16R-3P XLR receptacle

## AC CORD, INLET
- 13429710: PA-126 Inlet 100/117/220V
- 13429708: CM-3 Inlet 240V
- 13439825: DC-320-J01 Cord 100V
- 13439812F0: UC-704-J01 Cord 117V
- 13439813F0: EC-210-J06 Cord 220V
- 13439817F0: EC-702-J05 Cord 240V 3P England
- 13439814F0: SC-415-J06 Cord 240V 3P Australia

## TRANSFORMER, COIL, RESONATOR
- 2245537600: Power transformer 100/117/220/240V
- 12449221: 40M-067-018 10kHz OSC
- 12449229: FKOB-160MH15 Line filter
- 12389719: KMPFC1007T31 Main 12MHz
- 12389720: CSA12.00MHz Interface 12MHz
- 13529105: DSS310-55D223S EMI filter
FUSE
12559336  GGS 2.0A  100/117V
12559513  CEE T1A  220/240V

PCB ASS'Y
7922404000  Main board (synthesizer)
             (pcb 2291391601)
7922409000  Interface board
             (pcb 2291391502)
7922405100  Power supply board (pcb 2291391201)  100V
7922405200  Power supply board (pcb 2291391201)  117V
7922405400  Power supply board (pcb 2291391201)  220V
7922405500  Power supply board (pcb 2291391201)  240V
7922410000  Switch board  (pcb 2291391301)
7922412000  Memory cartridge connector board
             (pcb 2291391400)
             (Ass'y including socket, mounting PCB, holder)

DIGITAL IC
15179142  18051  CPU
15179654  2764/SH  Program
15179655  2764/IF  Program
15179317  TC5517APL  CMOS RAM
15179110B0  M5L8253P-5  Timer/Counter
15229818  HD61J222P  IF gate array
15219130  ADC0803  AD converter
15169304H0  HD74LS04P  Hex inverter
15169307H0  HD74LS27P  Tri NOR
15169339H0  HD74LS32P  Quad OR
15169360X0  SN74LS92P  Counter
15169318H0  HD74LS138P  Decoder
15169321H0  HD74LS161P  Counter
15169322H0  HD74LS174P  Hex D-FF
15169327H0  HD74LS367P  Hex buffer
15159503  TC40H00OP  CMOS inverter
15159524  TC40H245P  CMOS driver
15159511  TC40H174P  CMOS D-FF
15159508  TC40H373P  CMOS latch
1515910480  LC4011BP  Quad NAND
15159134H0  HD14028BP  Decoder
15159112H0  HD14049BP  Hex inverter
15159128H0  HD14050BP  Hex buffer
15159113H0  HD14051BP  Analog switch
15159129H0  HD14053BP  Analog switch
15149115  M54523P  LED driver
15159702  M54563P  LED driver

ANALOG IC
151891290A  TL-072CP  selected in offset
15189129  TL-072CP  OP amp
15189105  uPC4558  OP amp
15189136  M5218L  OP amp
15229802  BA662A  VCA
15229817  A1QH800170  VCF/VCA pack
15199123  M5231L  V-regulator
15199117  M5230L  V-regulator
### TRANSISTOR

<table>
<thead>
<tr>
<th>Number</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>15119133</td>
<td>DTA114F</td>
<td>Digital TR</td>
</tr>
<tr>
<td>15129150</td>
<td>DTC114F</td>
<td>Digital TR</td>
</tr>
<tr>
<td>15119106D</td>
<td>2SA933</td>
<td>PNP</td>
</tr>
<tr>
<td>15119108</td>
<td>2SA798</td>
<td>PNP pair (INTF. BRD)</td>
</tr>
<tr>
<td>15119601</td>
<td>2SB605</td>
<td>PNP drive (PS. BRD)</td>
</tr>
<tr>
<td>15119814</td>
<td>2SB834</td>
<td>PNP power (PS. BRD)</td>
</tr>
<tr>
<td>15129107</td>
<td>2SC945Q</td>
<td>NPN</td>
</tr>
<tr>
<td>15129107G</td>
<td>2SC945Q</td>
<td>red Selected and grouped in orange terms of Gm. All TR3's</td>
</tr>
<tr>
<td>15129107H</td>
<td></td>
<td>yellow and TR4's on a given Main Board must be of a color.</td>
</tr>
<tr>
<td>15129107I</td>
<td></td>
<td>green Selected for NOISE</td>
</tr>
<tr>
<td>15129107J</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15129107NZ</td>
<td></td>
<td></td>
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<tr>
<td>151291300G</td>
<td>2SC1583</td>
<td>NPN pair (PS. BRD)</td>
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<tr>
<td>15129201</td>
<td>2SD880</td>
<td>NPN power (PS. BRD)</td>
</tr>
<tr>
<td>15139103</td>
<td>2SK30A-GR</td>
<td>FET</td>
</tr>
<tr>
<td></td>
<td>or 15139101 2SK30A-Y</td>
<td></td>
</tr>
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### DIODE, ZENER, LED, PHOTOCOUPLER

<table>
<thead>
<tr>
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<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>15019103</td>
<td>1S2473</td>
<td>Small switching</td>
</tr>
<tr>
<td>15019236</td>
<td>W-02</td>
<td>Stack rectifier 2A</td>
</tr>
<tr>
<td>15019257</td>
<td>4D4B41</td>
<td>Stack rectifier 4A</td>
</tr>
<tr>
<td>15019208</td>
<td>1SR35-200</td>
<td>Rectifier</td>
</tr>
<tr>
<td>150196120Z</td>
<td>05Z-5.1Z</td>
<td>Zener 5.1V</td>
</tr>
<tr>
<td>15029177</td>
<td>GL58-5</td>
<td>Dot LED</td>
</tr>
<tr>
<td>15029414</td>
<td>NAR-101B</td>
<td>7 segment LED</td>
</tr>
<tr>
<td>15229703</td>
<td>P-873</td>
<td>Photocoupler</td>
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### RESISTOR

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<thead>
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<tbody>
<tr>
<td>13919310</td>
<td>RM-8 103J</td>
<td>10K x 8 array</td>
</tr>
<tr>
<td>13919321</td>
<td>RML13 103J</td>
<td>10K x 13 array</td>
</tr>
<tr>
<td>13919146</td>
<td>RKM14L503F</td>
<td>R-2R D/A array</td>
</tr>
<tr>
<td>13769155K0</td>
<td>SN14K2EF 1.8K</td>
<td>Metal oxide</td>
</tr>
<tr>
<td>13769161K0</td>
<td>SN14K2EF 3.3K</td>
<td>Metal oxide</td>
</tr>
<tr>
<td>13769165K0</td>
<td>SN14K2EF 4.7K</td>
<td>Metal oxide</td>
</tr>
<tr>
<td>13769169K0</td>
<td>SN14K2EF 6.8K</td>
<td>Metal oxide</td>
</tr>
<tr>
<td>13769162K0</td>
<td>SN14K2EF 3.6K</td>
<td>Metal oxide</td>
</tr>
<tr>
<td>13769173K0</td>
<td>SN14K2EF 10K</td>
<td>Metal oxide</td>
</tr>
<tr>
<td>13769181K0</td>
<td>SN14K2EF 22K</td>
<td>Metal oxide</td>
</tr>
<tr>
<td>13769182K0</td>
<td>SN14K2EF 24K</td>
<td>Metal oxide</td>
</tr>
<tr>
<td>13769183K0</td>
<td>SN14K2EF 27K</td>
<td>Metal oxide</td>
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<tr>
<td>13839191F0</td>
<td>M04S5WKS.1</td>
<td>5W 5.0ohm cemented</td>
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<tr>
<td>15229909</td>
<td>ERSB33G561</td>
<td>560ohm posistor</td>
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### CAPACITOR

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<th>Description</th>
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<tbody>
<tr>
<td>13569167</td>
<td>CQ09S1H100RJ05</td>
<td>Polystyrene</td>
</tr>
<tr>
<td>13529104</td>
<td>DE7150F472VMAl</td>
<td>Line bypass</td>
</tr>
<tr>
<td>13529106</td>
<td>HM11SJYE472P</td>
<td>OSC 470P</td>
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### OTHERS

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>22373602</td>
<td>Memory cartridge M-16C</td>
</tr>
<tr>
<td></td>
<td>(GR-700 sample sounds)</td>
</tr>
<tr>
<td>7922415000</td>
<td>Connector cable C-24D</td>
</tr>
</tbody>
</table>
NOTE: Circuits of a configuration have representative.
CIRCUIT DESCRIPTIONS

When the GR-700 is connected to a guitar controller, for example, G-707 that is especially designed to use with the GR-700, it can accept the following signals:
1. Independent 6 notes from the Divided Pickup
2. CUTOFF controll voltage (COFCV)
3. RESONANCE amount control voltage (RESCV)
4. VIBRATO depth (TPCV)
5. Selection between standard guitar and synthesizer sounds, and sensitivity of synthesizer module.
6. VOLUME controls (M. VOL, SY VOL, GT VOL)
7. Standard electric GUITAR pickup (GT SIG)

These control signals from the Guitar Controller are first routed to the Interface Board of the GR-700 through 24-pin connector. Except for volume control signals and the standard guitar sounds, these signals are digitized and sent to the Main Board in a serial format via IFSIG line connecting Interface CPU IC15 and Main Board CPU IC48 which controls synthesizer modules and memory section.

INTERFACE BOARD

Output from the Divided Pickup signals are fed to LPFs ICs 31 and 32 which block unwanted high frequency components and pass the signals onto Zero Crossing Comparator IC30. The periods between edges are determined through counters 1 (ICs 22 and 23) and 2 (ICs 20 and 21); Counter 1 measures the high periods and 2 low. Two Flip-flops in the Gate Array IC19 detect the positive going and the negative going edges respectively and send the result to the CPU IC15.

The CPU reads Counter 1 (high period) on a negative going edge and Counter 2 on a positive.

It seems easier to determine a period of one fundamental when the high and the low periods are summed. However, the attack period of a guitar sound is rather unstable in frequency. The number of edges in one fundamental cycle varies from time to time; the high and low counts have to be summed through several fundamental cycles before the sound pitch is determined. The measurement involves complicated program.

Before placing note data on the CPU data bus, the software checks the mode: Normal or Chromatic. In normal mode a note data (CV DATA) actually represents the pitch as it is on the guitar. In CHROMATIC mode all notes are converted to the nearest predetermined pitch even if the guitar is slightly out of tune.

Since the chromatic system is liable to bring a confusion in relation to guitar and synthesizer tuning, it is detailed in the later sections:
CHROMATIC SCALING and TUNING.

ENVELOPE

The output at IC31 LPF is also applied to Peak Hold IC29 where the changes in peak are detected and fed through the Level Shifter IC26 to ENV F.F. in the Gate Array IC19, triggering the F.F. which in turn informs the CPU IC15 of the level changes of the output of the string being played. Then the CPU reads the peak value through Analog Multiplexer IC12, Buffer IC11a and through Analog to Digital Converter IC14.

As mentioned earlier, the CPU does not deal with volume controls and standard pickup output sounds directly.
MAIN BOARD

DCO

Master Oscillator
TR14 (13) generates a frequency of approx. 5.7MHz which is variable by changing the base emitter bias from TUNE (DCO 1 and DCO 2) and FINE TUNE (DCO 2, TR13 only).
The Master Oscillator is divided by either 1/2, 1/4 or 1/8 at IC39 (IC37) which in turn receives footage selection data (RANGE) from the CPU through IC41. This will enable the Programmable Counters to have the greater frequency resolution capabilities (16 bits plus 2 bits).

Programmable counters
Programmable Counter 8253 containing three 16-bit counters is capable of dividing high frequency signals. Assume that the master oscillator runs at 5MHz and divisor is 5000, the counter develops 1kHz rectangular signals.
Beside note information, divisor signal contains the following:
For DCO 1: - LFO, ENV
For DCO 2: - Above plus DCO TUNE.
In SYNC mode, pulses from DCO 1 are applied to the gate of mated counter of DCO 2 as reset pulses.

D/A & S/H

Parameters that determine the timbre of audio signal flowing into Synthesizer module are converted into analog equivalent (0 to 4,7V) at D/A converter consisting of IC28, 29, 30, R-2R ladder resistor RM1 and IC61. Buffers (IC29) on MSB 2 bit lines significantly reduce the effects of output impedance of ICs 28 and 30.
The D/Aed parameters are then applied commonly to Demultiplexers ICs 21 to 24 and are sampled and held into correct channel in individual stages.

SWITCH OUTPUT AND SELECTION

ON or OFF and selection between circuit functions in the Modules and successive stages are performed by electronic switches named as DCO WAVEFORM, SYNC, SYNMET and NOISE. Switch Control signals from Latch IC27 are fed to switch gears either directly or through IC26.
NOISE ON signal is also routed to pin 1 of IC37 to block DCO 2 master frequency.

WAVEFORM CONVERSION

Output from Programmable Counter 8253 is a rectangular. So there is a need to convert it to sawtooth when selected. The conversion is carried out on the constant-current integrating-circuit (C8) making use of IC4. The rate of current flowing into C8 is determined by the output from the S/H circuit of DCO CV. Pulse at TR6 base (differentiated IC31 output) discharges C8 at the rectangular rate.
As already mentioned, DCO CV contains amounts of ENV, LFO, RANGE, etc. whatever relating to note pitch, and keeps the sawtooth amplitude constant over the frequency range.
The CPU will add a bias to DCO CV to excessively increase charging current when the program needs a pulse-like sawtooth.
When rectangular is selected, it is allowed to pass NAND gate IC5, while TR6 is kept conducting by forward bias from pins 1 and 15 of IC26, bypassing C8 charging current.

NOTE: With sawtooth selected pin 4 of IC5 stays high (+5V).

SYNC

With positive voltages fed at pins 2 and 12 IC5 develops and applies reset pulses to DCO 2 Programmable Counter and to TR5 base at a DCO 1 rate.
CHROMATIC SCALING

To give the GR-guitar synthesizer a definite pitch of keyboard-like equal temperament, a chromatic system is furnished in the GR-700. The system inevitably functions like an AFC or automatic fine tunings when in Chromatic mode: when input guitar signal is slightly out of tune with respect to the system's reference pitch, the system adds or subtracts compensation CV data. For example, the chromatic system converts input frequencies ranging 430–455Hz to a note A of 442Hz. Therefore, there are three main factors that determine the whole system tuning: Guitar, Synthesizer (DCO) and Chromatic system.

REFERENCE PITCH CHANGE

In early products the software (Ver. 1) does not allow the chromatic system to shift the reference pitch (A = 442Hz) to another frequency. Ver. 2 removes this restriction. See “SOFTWARE REVISION” in the later section. Whether the chromatic pitch is shiftable or not, the functions of Chromatic and TUNE on the GR-700 rear panel must clearly be understood for achieving complete system tuning.

CAUTION

For tuning, select a tone which is reproduced by DCO-1 or DCO-2 (synced to DCO-1). Also the voice should be unmodulated one.

Unit with fixed standard pitch A=442Hz --SNs below 410450 or ROM ver. 1.
1. Adjust BALANCE on the guitar for proper guitar and synthesizer sound loudness.
2. Adjust TUNE on the GR-700 rear panel for zero beat. The tune of the guitar has no relation to this adjustment. The heat of this adjustment is to let the DCO-1 faithfully track the CVs from the guitar controller.
3. Enter Edit mode and select parameter 48. The synthesizer will produce absolute pitch of open string for each string picked based on A above middle C = 442Hz. Tune each string to the synthesizer pitch.
4. Confirm that the synthesizer pitch does not change between Chromatic ON and OFF modes.

CAUTION

If the guitar is not tuned the way in step 3 above, there will be pitch differences between guitar and chromatic synthesizer sounds. Also, do not adjust synthesizer TUNE during chromatic mode. If doing so, synthesizer will generate at different pitch in chromatic OFF mode.

Unit with adjustable standard pitch --SNs 410450-up or ROM ver. 2.
1 and 2. Follow steps 1 and 2 described above.
3. Tune the guitar to a reference pitch (instruments or tuner, etc.).
4. Enter the edit mode and select parameter 48. Adjust EDIT (RES) on the guitar for zero beat (guitar and synthesizer).
5. Escape edit mode. While switching between chromatic on and off, verify that there is no pitch difference.
In the subsequent performance, the guitar can be tuned to the GR-700's standard pitch, which will be generated whenever parameter 48 is selected, on the condition that the parameter 48 has not been re-edited after adjustment.
MEMORY -- PROGRAM TRANSFER FROM ROM TO RAM --

ROM IC46 of the Main Board contains Adjustment program and some factory presets of BANK 1 to BANK 4. These programs can be transferred into RAM IC45 as required. It should be noted that the existing BANKs 1–4 memories will be replaced at the same time and should be saved into the memory cartridge before transferring the ROM program. Also remember that the memory protection must be set to OFF and ON as necessary.

FACTORY PRESETS

Turning ON the power switch while pressing WRITE (COPY) button will restore BANKs 1–4 by writing the data from the ROM. No data are prepared for BANKs 5–8.

ADJUSTMENT PROGRAM

Turning the power switch ON while pressing WRITE and STRING SELECT NO. 6 will load the adjustment program into BANK 1. At the same time, factory preset data for BANKs 1–3 are also loaded into BANKs 2–4 (being shifted by one BANK). Of course, these presets are actually not for the adjustment purpose. This rather strange phenomenon is due to the fact that the data loading process in this mode is designed to be done four bank memories as a set.

Upon completion of the adjustments, these banks should be reloaded with the previous data now being stored in the memory cartridge.

SOFTWARE REVISION

In addition to the label on top surface, PROM SH (IC46 of Main Board) has a version identification program which reads its number in the display window (PATCH) when the unit is powered up while STRING SELECT NO.4 is pressed. (Incidentally, the PATCH corresponding to the revision number will be selected at the same time). The number will not change until another pedal is pressed.

PROM IF (IC17 of Interface Board) does not have such identification means except for a mark on the label. To prevent confusion, the factory changes revision number of both PROMs at the same time whenever either of them is updated.

<table>
<thead>
<tr>
<th>VERSION</th>
<th>PROGRAM CHANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SN 410450-UP 2</td>
<td>PROM SH (IC46, MAIN BOARD) does not allow Chromatic circuit to change its equal temperament pitch, e.g. A above middle C = 442Hz. (Ver. 1)</td>
</tr>
<tr>
<td></td>
<td>Revision 2 enables chromatic pitch to shift within the range 438–446Hz when adjusted from EDIT (RES) on the guitar controller with parameter 48 selected in the EDIT mode.</td>
</tr>
<tr>
<td>SN 431550-UP 3</td>
<td>PROM IF (IC17, INTERFACE BOARD) sometimes fails to maintain sustain level if RES (EDIT) is turned to MAX, when SUSTAIN LEVEL is being edited.</td>
</tr>
<tr>
<td>SN 442050-UP 4</td>
<td>PROM IF (IC17, INTERFACE BOARD) The frequency range which is covered and defined as note B by the chromatic system is rather narrower when compared with that of other notes. As a result, a note in lower B range would be recognized as A#. Revision 4 correct the problem.</td>
</tr>
</tbody>
</table>
**GUITAR CONTROLLER MODE SWITCH VS GR-700**

**OPERATION MODE**

The setting position of MODE on a guitar controller is sent to the GR-700 through the MODE 1 and 2 signal lines over 24 pin cable. This means that the selection of VCAs and controllability of volume controls are determined by the 2 bit code represented on MODE lines.

<table>
<thead>
<tr>
<th>GUITAR CONTROLLER</th>
<th>GR-700</th>
</tr>
</thead>
<tbody>
<tr>
<td>MODE SWITCH (G-203, G-808)</td>
<td>MODE 1 (ON 7 PIN)</td>
</tr>
<tr>
<td>(DST)</td>
<td>L</td>
</tr>
<tr>
<td>(VCG+DST)</td>
<td>L</td>
</tr>
<tr>
<td>(VCO)</td>
<td>H</td>
</tr>
</tbody>
</table>

**NOTES:** MODE 1 and 2 — low active, CPU pin 17 — don't care

**INTERFACE BOARD**

7922409000

(pcb 2291391502)
POWER SUPPLY BOARD

7922405100 100V (pcb 2291391201)
7922405200 117V (pcb 2291391201)
7922405400 220V (pcb 2291391201)
7922405500 240V (pcb 2291391201)
SW BOARD
7922410000
 pcb 2291391301

View from foil side
ADJUSTMENT

The GR-700 is provided with a test program. When in test mode the test program is dumped into BANK 1 area of Main Board RAM. At the same time factory presets for BANKs 1–3 are also dumped into BANKs 2–4 as shown in the table. (These factory presets have no relation to the adjustments and can be ignored.) Therefore, if necessary, BANKs 1 to 4 should be saved into the memory cartridge before performing adjust-

<table>
<thead>
<tr>
<th>DATA</th>
<th>BANK</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEST</td>
<td>1</td>
</tr>
<tr>
<td>BANK 1</td>
<td>2</td>
</tr>
<tr>
<td>BANK 2</td>
<td>3</td>
</tr>
<tr>
<td>BANK 3</td>
<td>4</td>
</tr>
</tbody>
</table>

ENTERING TEST MODE

1. Switch the power OFF.
2. Set MEMORY PROTECT to OFF.
3. While pressing MEMORY WRITE and STRING SELECT NO.6, turn the power ON.
   The test program will be loaded into BANK 1.
4. Allow for about 10 minutes as a warmup.

INSTRUMENTS

Digital voltmeter (DVM): 3-1/2 digits minimum
Oscilloscope (scope)
Roland G-series Guitar controller

5. D/A OFFSET
   Main Board
5-1. Connect scope to POLY OUT (IC80b pin 7) of the PCB.
5-2. Select BANK 1, PATCH 1.
5-3. Pick first open string.
5-4. Adjust VR5 (D/A OFFSET) for the onset of clipping.

6. LEVEL
   Main Board
6-1. Select BANK 1, PATCH 3.
6-2. Connect scope to POLY OUT (IC80b pin 7).
6-3. Adjust VR2 (LEVEL) of each channel for 800mV to 1Vp-p.

7. VCA DC BALANCE
   Main Board
7-1. Select BANK 1, PATCH 4.
7-2. Play tremolo on the first string and adjust VR4 (DCBAL) of channel 1 for the minimum click sound.
7-3. In the similar manner, adjust channels 2 to 4.

8. VCF
   Main Board
8-1. Select BANK 1, PATCH 5.
8-2. Connect the scope to POLY OUT (IC60b pin 7).
8-3. Pick first string and adjust VR3 (COC) of channel 1 for 1kHz. Also adjust VR1 (RESO) for 400mVp-p.
8-4. In the same manner, adjust channels 2 to 4.

9. CHORUS BIAS
   Interface Board
9-1. Select BANK 1, CHANNEL 1. Press CHORUS for ON.
9-2. Connect the scope to TP1 of channel R of the PCB. (scope: DC couple, 5V/div. preferable)
9-3. Pluck any 3 strings (out of harmony - open string) simultaneously and adjust VR1 (BBD BIAS) so that the positive and negative tops are clipped to the same degree.
9-4. Adjust channel L in a similar way.
10. Load BANK 1 to BANK 4 with data from the memory cartridge.

11. PROTECT ON.
MIDI IMPLEMENTATION

1. TRANSMITTED DATA

The GR-700 always transmits data in channel 1 POLY mode.

<table>
<thead>
<tr>
<th>Status</th>
<th>Second</th>
<th>Third</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1001 0000</td>
<td>0kkk kkkk</td>
<td>0vvv vvvv</td>
<td>Note on</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>kkkkkkk = 36 - 96</td>
</tr>
<tr>
<td>1001 0000</td>
<td>0kkk kkkk</td>
<td>0000 0000</td>
<td>Note off</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>kkkkkkk = 36 - 96</td>
</tr>
<tr>
<td>1011 0000</td>
<td>0100 0000</td>
<td>0111 1111</td>
<td>hold on</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>hold off</td>
</tr>
<tr>
<td>1100 0000</td>
<td>0ppp pppp</td>
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<td></td>
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<td>ppppppp = 0 - 127</td>
</tr>
<tr>
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<td>0111 1011</td>
<td>0000 0000</td>
<td>ALL NOTES OFF</td>
</tr>
<tr>
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<td>0111 1100</td>
<td>0000 0000</td>
<td>OMNI OFF</td>
</tr>
<tr>
<td>1011 0000</td>
<td>0111 1111</td>
<td>0000 0000</td>
<td>POLY ON</td>
</tr>
</tbody>
</table>

Notes:
*1 If enabled.
*2 If enabled.
*3 When all notes turn OFF, this message is sent.
*4 See next section.

Program change assignments are as follows:

For internal memory

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<tr>
<th>patch</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
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<td>3</td>
<td>4</td>
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<td>1</td>
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For memory cartridge

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<td>127</td>
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</tbody>
</table>
2. FRONT PANEL CODED FUNCTION

If the power switch is turned on while pressing one of the STRING SELECT switches. MIDI functions are enabled for transmission as follows:

<table>
<thead>
<tr>
<th>switch</th>
<th>function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>HOLD ON/OFF</td>
</tr>
<tr>
<td>2</td>
<td>PROGRAM CHANGE</td>
</tr>
<tr>
<td>3</td>
<td>transmits OMNI OFF and POLY ON once</td>
</tr>
</tbody>
</table>

Simply turn on the power, all mentioned functions are disabled.