Service Manual

SQ1

SQ1 PLUS

SQR

ensoniq ®

THE TECHNOLOGY THAT PERFORMS

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IMPORTANT THINGS TO KNOW ABOUT THE SQ-1, SQ-1 PLUS AND SQ-R

As with every ENSONIQ product, all SQ-1, SQ-1 PLUS and SQ-R service will be handled through the ENSONIQ Module Exchange Program. Rather than diagnose and exchange individual components, you will replace complete modules. We feel that this is the most time and cost effective method of repair, both for you and your customers. IF YOU DON'T READ ANY OTHER PART OF THIS MANUAL, READ THIS SECTION.

When troubleshooting an SQ-1, SQ-1 PLUS or SQ-R, remove any memory card which might be present. This will prevent a faulty card from complicating your troubleshooting.

1. SQ-1 and SQ-1 PLUS SIMILARITIES
The primary difference between these two products is the Main Board. All the debugging processes are the same. They have the same transformer board, keypad/display board, keyboard, and wheel assembly. There are more sounds available on the SQ-1 PLUS due to an extra waveform ROM on the main board.

IMPORTANT: In this manual, "SQ-1" applies to both the SQ-1 and SQ-1 PLUS unless otherwise noted.

2. REINITIALIZATION
The SQ-1 and SQ-R are essentially computers with 64K of RAM. It is possible for the SQ-1/SQ-R to become confused if bad data is loaded into this memory. This can result from loading data off of a bad card or a bad MIDI Sys-Ex transfer. If the memory does get scrambled, it will be necessary to reinitialize the system. For this reason, periodic backing up of all data is recommended.

The SQ-1/SQ-R is heavily software dependent and, as with all computers, certain events can cause a unit to glitch and contract a severe case of amnesia. Sometimes these units merely require reinitialization. Since scrambled software can cause problems that at first glance appear to be hardware-related, reinitialization is recommended as a first step in troubleshooting. (For more information on reinitializing, see p. 1-14 of the *SQ-1* or p. 1-13 of the *SQ-R Musician's Manual*.)

A given SQ-1/SQ-R is likely to have data in its internal memory that is near and dear to the owner of that unit. When reinitializing an SQ-1/SQ-R, all of the current data will be lost. However, the 80 ROM sounds are automatically loaded back into the internal memory after reinitializing. It is highly recommended that the internal memory be saved by the end user before servicing. See p. 13 (for SQ-1) or p. 29 (for SQ-R) of this manual or Section 11 of the *SQ-1 Musician's Manual* or Section 8 of the *SQ-R Musician's Manual* for instructions on saving data.

IMPORTANT! Unplug all audio cables before reinitializing. The audio outputs of the SQ-1/SQ-R may make a pop when reinitializing.

TO REINITIALIZE THE SQ-1/SQ-1 PLUS FROM THE FRONT PANEL
- Save all Sound, Sequence and Preset data.
- Press the *Edit Sequence* button (see Figure 1 for button locations).
- While holding down *System* (Bank 9), quickly press *Screen 9*.
- The display should read, "Re-initialize sound & seq RAM?" Press *Yes*. The SQ-1 erases its internal memory and then starts up just as it does when you turn the power on, and reinitialization is complete. The ROM Sounds are automatically placed in the internal memory.
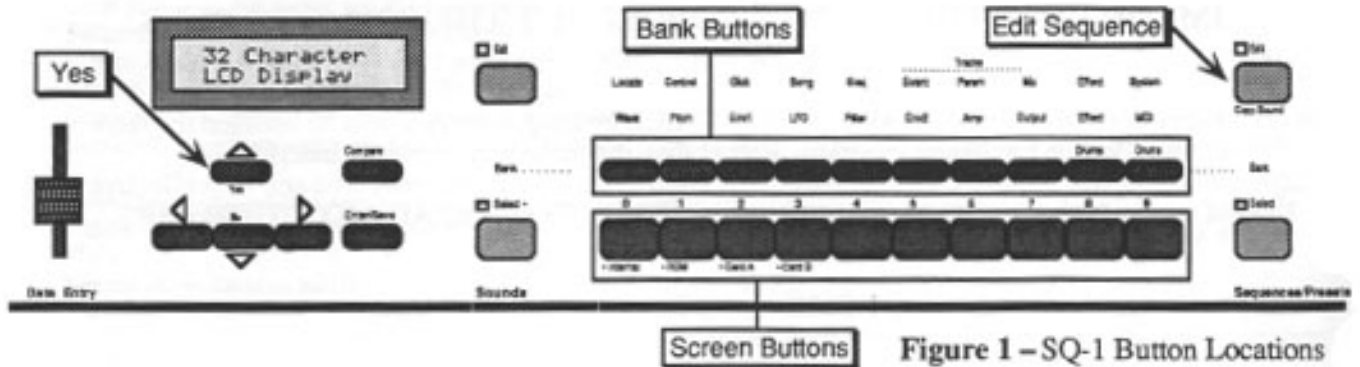
Figure 1 – SQ-1 Button Locations

TO REINITIALIZE THE SQ-R FROM THE FRONT PANEL
- Save all Sound and Preset data.
- While holding down *System*, quickly press *No*.
- The display should read "Re-initialize all RAM?"
- Press *Yes*. The ROM sounds will be placed in the internal memory.

If the system is so scrambled that the front panel isn't working, try the following Reset Sequence

SQ-1 and SQ-R SYSTEM RESET SEQUENCE
- Turn the unit off and then on slowly (at about 2 second intervals) seven times.
- The eighth time you turn it on, the unit will automatically reinitialize itself and should show the wake-up screen. If it doesn't then there is another problem.

If the unit is open, you can try the following Hard Reset:

SQ-1 and SQ-R HARD RESET
- **Make sure the power is off!**
- Short the <u>minus</u> side of the battery (center of the Main Board) to pin 28 of U28 for a few seconds (see Figure 6 for location).

If the above methods do not return the system to normal operation then there is a problem in one of the modules.

3. SQ-1 ONLY — GROUND WIRE
A new ground wire (Service Kit P/N 9710 0020 01, available from Customer Service) should be added to all SQ-1's below serial number 15250 (higher serial numbers have this wire). This wire enhances the grounding of the SQ-1 and improves the SQ-1's resistance to static damage. The existing ground wire (that connects between the ground spade lug of the line cord connector and a PEM next to it on the power side rear panel) should be removed and the new wire put in its place (see Figure 2). *All SQ-1 PLUS's already have this wire in place.*

This ground wire is connected in four places (see Figure 2):
1) The ground spade lug on the line cord connector.
2) The ground screw/star washer (PEM) on the power side rear panel (with star washer on side closest to the PEM).
3) Use a new screw and one star washer to secure one end of the ground wire to the exposed extrusion (mounting) rail between the transformer board and the keypad/display board.
4) Use the other star washer included to attach the wire to one of the screws that connects the main board mounting bracket to the heat sink on the main board. Be sure to place the ring lug on the screw first then the star washer.

Ground wire mounting locations
1 line cord connector (see below)
2 ground PEM (see below)
3 mounting rails (use new screw and star washer)
4 main board mounting bracket (use new star washer)

Figure 2 – Attaching the new SQ-1 ground wire
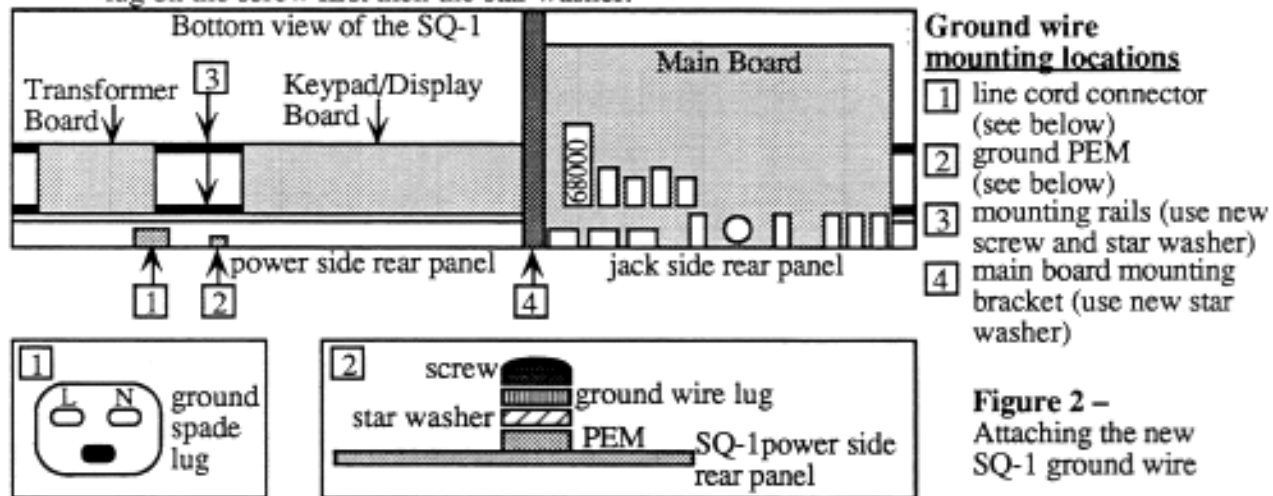
4. SQ-1/SQ-1 PLUS KEYBOARD

When installing the keyboard, it is important to justify it away from wheel cover and toward the rear jack panel. This is important since the memory card connector on the main board is keyed off the placement of the keyboard in the unit. Check that a memory card can be inserted and removed properly before closing up a unit in which the keyboard has been removed.

When attaching the keyboard cable to the keyboard, be sure to support the keyboard circuit board when pushing the connector on to avoid breaking solder joints or traces.

5. SQ-1/SQ-1 PLUS CASE (Avoid Stripping Screws)

Care should be exercised when assembling or disassembling any part of the SQ-1. **Avoid over-tightening screws when executing any repair procedure! Use no more than 8 inch/lbs of torque when tightening any screw.**

The case of the SQ-1 is an aluminum extrusion. The various parts are held in place by screws which tighten into mounting rails that are part of the case. When replacing any of these screws, it is possible to over-tighten the screws and strip a hole in the case. A second set of holes is provided on the keypad/display board. If a screw hole for this board screw becomes stripped, the hole next to it can be used.

6. POWER SUPPLY

The SQ-1 and SQ-R are different from previous ENSONIQ products in that the power supply is integrated onto the main board. Therefore, all the power supply voltages are measured at test points on the main board. The transformer is on a separate board. For more information, see pp. 4-7.

7. SHIPPING

Please do not ship an SQ-1/SQ-1 PLUS or SQ-R in a box packed with peanuts. If you must, wrap the entire unit in plastic first. These peanuts may cause damage to the Keyboard, or card port. When possible, use the original shipping box and packing materials.

CHECKING THE POWER SUPPLY CIRCUITRY
Some SQ-1/SQ-R problems may be related to a fault in the power supply circuitry. You should check this before troubleshooting the rest of the unit.

Plug the SQ-1/SQ-R in and turn it on. After it has warmed up for five minutes, begin to test the voltages. It is normal for Line Voltage to vary +/- 10%.

Check all the fuses to make sure they are not blown.

SQ-1 TRANSFORMER CONFIGURATIONS
The original SQ-1 has one of two possible transformer configurations.
1) One is a transformer with a separate transformer adapter board (see Figure 3). In this configuration, there is a different transformer for each line voltage:

Voltage	Transformer Part #		Voltage	Transformer Part #
100V	1450000322		220V	1450000512
115V	1450000502		240V	1450000532
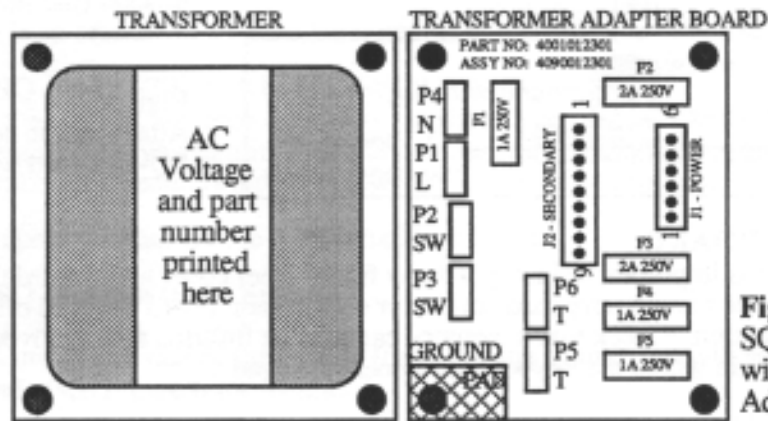
Figure 3 –
SQ-1 Transformer
with Transformer
Adapter Board

2) The second SQ-1 configuration is the transformer mounted on a PC board (see Figure 4). Here, there is only one transformer and the line voltage is selected by the position of the jumpers. *The SQ-1 PLUS has only this configuration.*
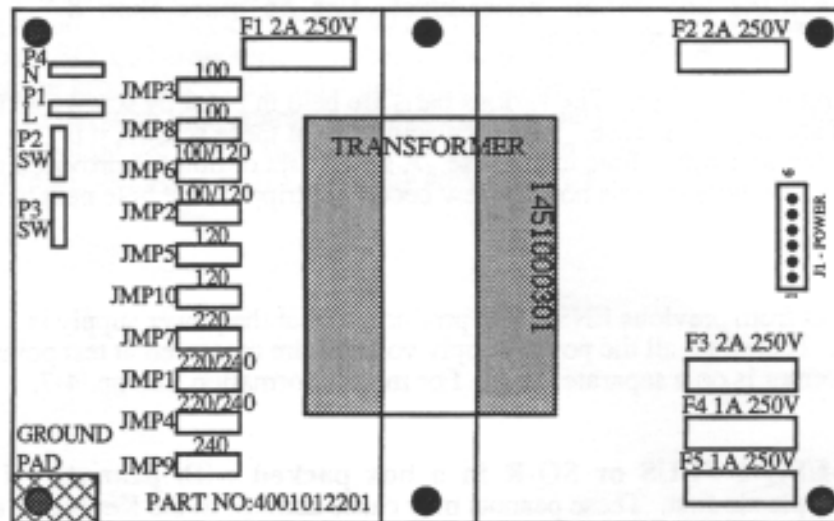
NOTE: On early SQ-1's F1 was 1A 250V. Replace F1 with the value indicated on the silkscreen.

Figure 4 –
SQ-1/SQ-1 PLUS
Transformer Board

SQ-R TRANSFORMER BOARD

The SQ-R has two transformers (T1 and T2) both mounted on one PC board (see Figure 5). This unit runs on one of two voltages: 115VAC or 230VAC. This voltage is selected by the position of the jumpers.
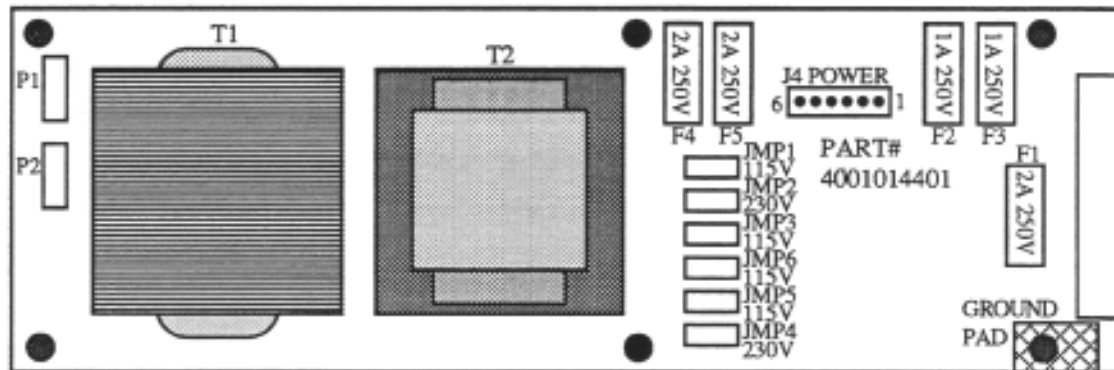
Figure 5 – SQ-R Transformer Board

POWER SUPPLY VOLTAGE CHART

The following chart lists the voltage ranges for proper operation of each supply (fully loaded) and the appropriate points to read across with the voltmeter:

Designation	Terminals		Connector	Allowable range			Units
SQ-1 Transformer and Transformer Adapter Board (see Figures 3 and 4)							
Digital Supply	4	6	J1	15	to	23	VACrms
Analog Supply	1	3	J1	23	to	37	VACrms
SQ-R Transformer Board (see Figure 5)							
Digital Supply	4	6	J4	21	to	27	VACrms
Analog Supply	1	3	J4	30	to	38	VACrms
SQ-1 and SQ-R Main Board							
	+	-					
+VD	TP9	TP10 (DGND)		+8.00	to	+11.00	VDC
+5D	TP11	TP10		+4.75	to	+5.25	VDC
+5M	TP12	TP10		+4.75	to	+5.25	VDC
+VA	TP7	TP1 (AGND)		+17.00	to	+23.00	VDC
-VA	TP6	TP1		-17.00	to	-23.00	VDC
+12A	TP5	TP1		+11.40	to	+12.60	VDC
+5A	TP4	TP1		+4.75	to	+5.25	VDC
-12A	TP2	TP1		-11.40	to	-12.60	VDC
-5A	TP3	TP1		-4.75	to	-5.25	VDC
-15A	TP13	TP1		-14.25	to	-15.75	VDC

(TP=test point, see Figure 6 for location; DGND=digital ground; AGND=analog ground)

SQ-1 Keypad/Display Board							
+VD	1	2	J1	+8.0	to	+11.0	VDC
SQ-R Keypad/Display Board							
+5 Display	4	3	J2	+4.75	to	+5.25	VDC

Main Board Test Point Locations
(The test points are labelled on the main board silkscreen, see Figure 6)

TP1 (AGND)   center of the left endcap side (clip-on test point)
TP2 (-12A)   next to the mid-board heat sink
TP3 (-5A)   next to the mid-board heat sink
TP4 (+5A)   next to Q11 and U5 (TDA1541)
TP5 (+12A)   next to Q11 and U5 (TDA1541)
TP6 (-VA)   between U12 (OTIS) and the long edge of the board without the jacks
TP7 (+VA)   same as TP6
TP8   (not used)
TP9 (+VD)   between U35 (68000), MIDI Thru jack and the edge mounted heat sink
TP10 (DGND)   same as TP9
TP11 (+5D)   same as TP9
TP12 (+5M)   same as TP9
TP13 (-15A)   between Q21 and the edge of the board
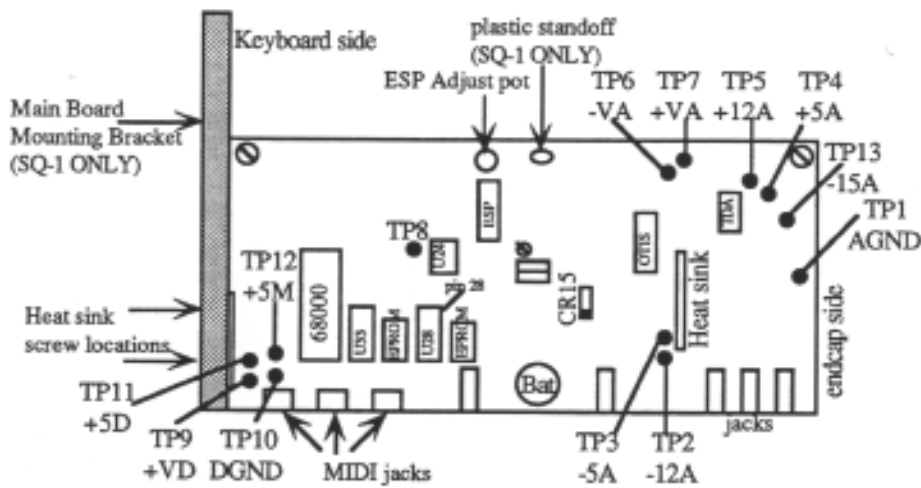
Figure 6 – Main Board Test Point Locations

TESTING THE TRANSFORMER BOARD UNLOADED

If a fuse blows, is replaced and then blows again:

**TESTING THE
TRANSFORMER
BOARD UNLOADED**

```
                    ( A fuse(s) has blown. )
                              │
                              ▼
              ┌───────────────────────────────┐
              │ Turn the unit off. Replace the│
              │ fuse(s).  Turn the unit on.   │
              └───────────────────────────────┘
                              │
                              ▼
                    ╱ Did the fuse(s) ╲                    ( All better )
                    ╲ blow again?     ╱ ── NO ──▶          (   now!     )
                              │
                             YES
                              │
                              ▼
          ┌──────────────────────────────────────┐
          │ Turn the unit OFF.  Replace the       │
          │ fuse(s). Disconnect the cable between │
          │ the main board and the keypad/display │
          │ board.  Turn the unit ON.             │
          └──────────────────────────────────────┘
                              │
                              ▼
                    ╱ Did the fuse(s) ╲                ┌─────────────────┐
                    ╲ blow again?     ╱ ── NO ──▶      │ Replace the     │
                              │                        │ Keypad/Display  │
                             YES                       │ Board           │
                              │                        └─────────────────┘
                              ▼
          ┌──────────────────────────────────────┐
          │ Turn the unit OFF.  Replace the       │
          │ fuse. Disconnect the cable between    │
          │ the transformer board and the main    │
          │ board.  Turn the unit ON.             │
          └──────────────────────────────────────┘
                              │
                              ▼
                    ╱ Did the fuse(s) ╲                ┌─────────────────┐
                    ╲ blow again?     ╱ ── NO ──▶      │ Replace the     │
                              │                        │ Main Board      │
                             YES                       └─────────────────┘
                              │
                              ▼
                 ( Replace the        )
                 ( Transformer Board  )
```

Figure 7 –
Testing the Transformer
Board Unloaded

The above method can also be used to determine the defective module if the voltages are incorrect when fully loaded.

DISPLAY SELF-TEST MODE

When the Keypad/Display is receiving power from the Main Board but is not in proper communication with the Main Board, the SQ-1/SQ-R enters **Self-test mode**. In Self-test mode, the display remains blank until you press the buttons on the front panel. Pressing various front panel buttons will cause the display to show "BUTTON," then a number.

**TROUBLESHOOTING AN SQ-1/SQ-R
WITH NO DISPLAY OR
DISPLAY IS IN SELF-TEST**
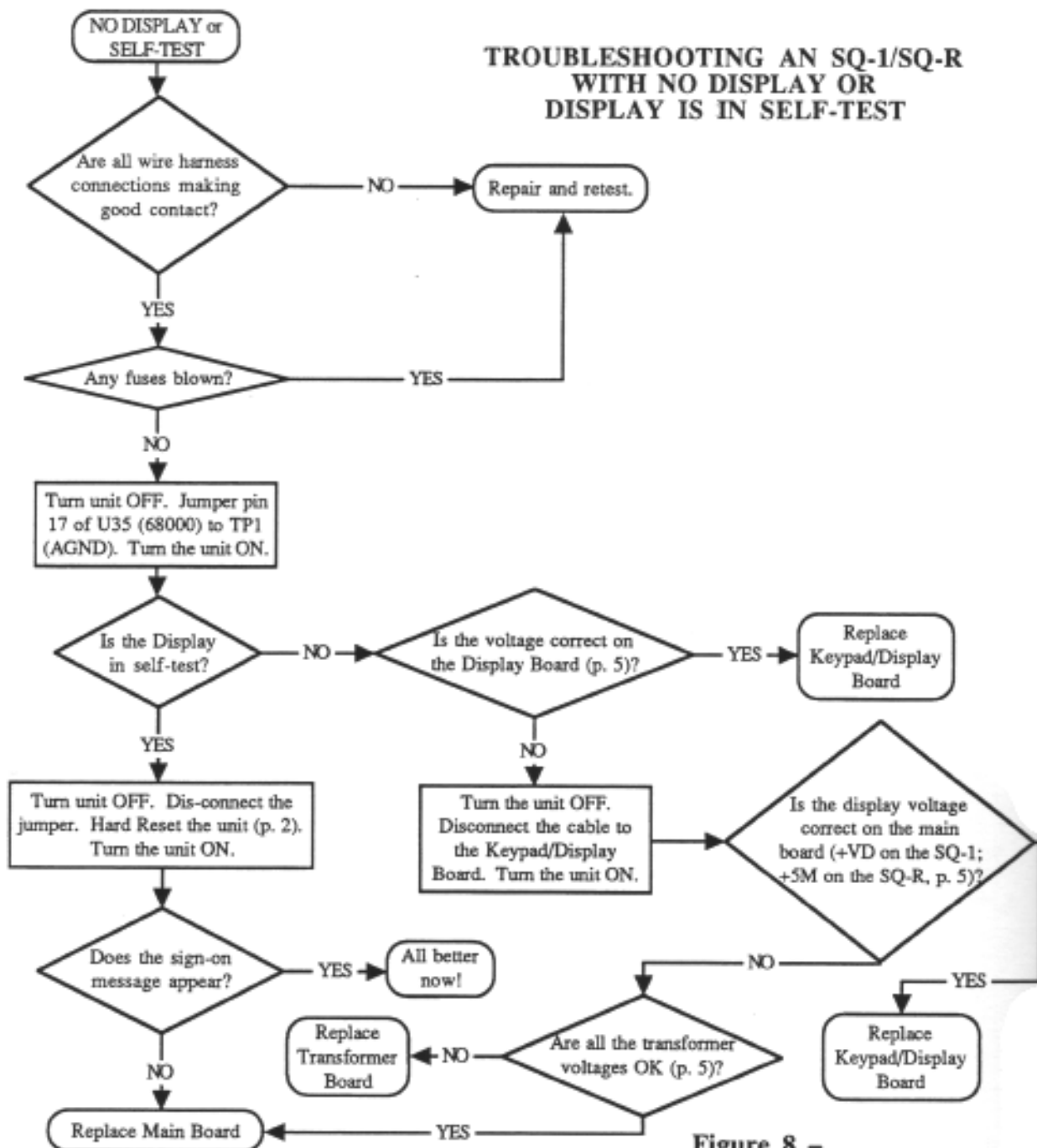
Figure 8 –
SQ-1/SQ-R with No Display
or Display is in Self-Test

SQ-1/SQ-R UNEXPECTED EVENT MESSAGES

Occasional unexpected event messages are not unusual, and unless they become chronic, they are not a cause for concern. It is important to realize that these messages are diagnostics and do not necessarily indicate a problem. These messages were designed to help our software engineers in the development of the software, not as hardware diagnostics.

It is possible that chronic unexpected event messages could result from scrambled memory. Be sure to reinitialize the system (see pp. 1-2) before troubleshooting any further.

Software Messages
The following unexpected event messages could be caused by software:

| ID #	Description	ID #	Description
16	poly or mono pressure events sent to VC	133	trapv instruction overflow error
20	unknown button event	134	privilege violation
48	parameter error	135	trace
49	layer error	137	line 1111 emulator
80	bad buffer to MIDI	138	spurious interrupt
128	bus error	139	unused vector
129	odd address error	192	load all data error (from MIDI or card)
130	divide by zero	193	keyup playback error
131	illegal instruction	194	out of SDB's error
132	chk instruction register out of bounds		

Main Board Problems
The following unexpected event messages could be caused by a problem on the Main Board:

32	bad download	40	bad ESP error
33	bad ESP chip	138	spurious interrupt
34	bad ESP RAM	145	unknown DUART interrupt error

MIDI or Main Board Problems
The following unexpected event message is usually caused by too much incoming MIDI data. It could also be caused by a problem on the Main Board:

144   out of buffers

SQ-1/SQ-R LOW BATTERY MESSAGES
A number of things could cause this message to appear when the *unit is powered up*:

> WARNING! Battery
> low. See manual.

Press any button to continue. Sometimes the unit in question can wake up in a state of mild confusion and this message might appear. If you get this message after a RAM card (MC-32 or MC-64) is inserted, this message is referring to the battery in the card, not the one in the unit. See Section 11 of the *SQ-1 Musician's Manual* or Section 8 of the *SQ-R Musician's Manual*.

To check the battery, go to the Analog Test Page:
SQ-1: press **Edit Sequence**, then while holding **System** (Bank 9), press **Screen 0**. The display shows ANALOG TESTS, then press **Screen 2** (see p. 1).
SQ-R: press **System**; while holding down **System**, quickly press **Enter/Save**. Press < or >.

The value next to BAT= should read between 125 and 205. If this is the case, it usually indicates that the system is confused and you should reinitialize (see pp. 1-2), and check it again (see p. 10).

**TROUBLESHOOTING AN SQ-1/SQ-R
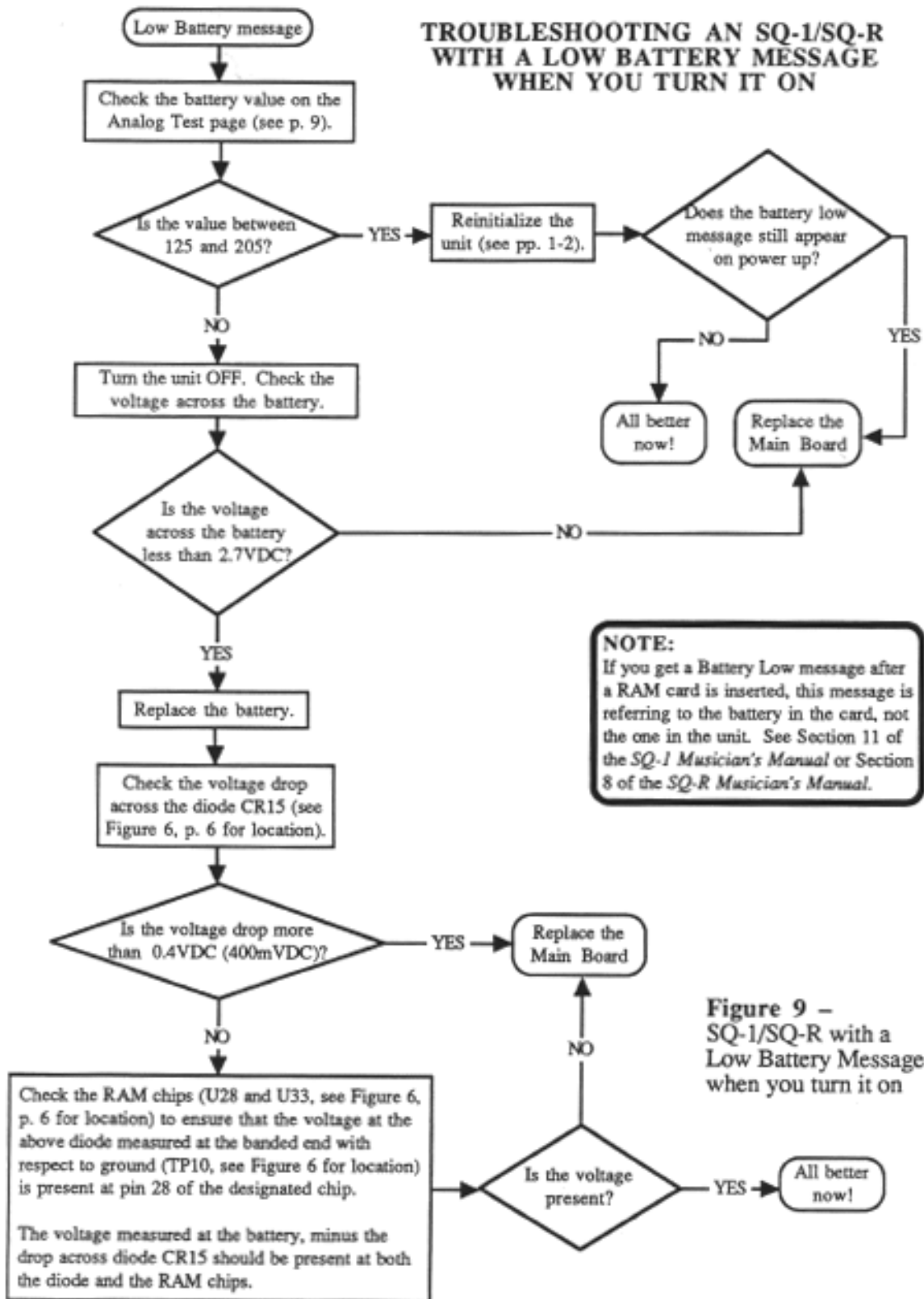WITH A LOW BATTERY MESSAGE
WHEN YOU TURN IT ON**

```
                    ( Low Battery message )
                              |
                              v
                 +--------------------------+
                 | Check the battery value  |
                 | on the Analog Test page  |
                 | (see p. 9).              |
                 +--------------------------+
                              |
                              v
                         / Is the value \
                        <  between        >---YES--->+----------------+
                         \ 125 and 205? /            | Reinitialize   |
                              |                       | the unit (see  |
                              NO                      | pp. 1-2).      |
                              |                       +----------------+
                              v                              |
                 +--------------------------+                v
                 | Turn the unit OFF. Check |          / Does the battery \
                 | the voltage across the   |         <  low message still >
                 | battery.                 |          \ appear on power up? /
                 +--------------------------+            |            |
                              |                          NO           YES
                              v                          |            |
                         / Is the voltage \              v            v
                        <  across the       >       ( All better )  ( Replace )
                         \ battery less     / --NO-- (  now!     )  ( the Main )
                          \ than 2.7VDC? /              |         ( Board     )
                              |                         |              ^
                              YES                       |              |
                              |                         +--------------+
                              v
                 +--------------------------+
                 |    Replace the battery.  |
                 +--------------------------+
                              |
                              v
                 +--------------------------+
                 | Check the voltage drop   |
                 | across the diode CR15    |
                 | (see Figure 6, p. 6 for  |
                 | location).               |
                 +--------------------------+
                              |
                              v
                    / Is the voltage drop \
                   <  more than 0.4VDC      >--YES-->( Replace the )
                    \ (400mVDC)?           /         ( Main Board  )
                              |                            ^
                              NO                           |
                              |                            NO
                              v                            |
```

NOTE:
If you get a Battery Low message after a RAM card is inserted, this message is referring to the battery in the card, not the one in the unit. See Section 11 of the *SQ-1 Musician's Manual* or Section 8 of the *SQ-R Musician's Manual.*

Check the RAM chips (U28 and U33, see Figure 6, p. 6 for location) to ensure that the voltage at the above diode measured at the banded end with respect to ground (TP10, see Figure 6 for location) is present at pin 28 of the designated chip.

The voltage measured at the battery, minus the drop across diode CR15 should be present at both the diode and the RAM chips.

/ Is the voltage present? \ ---YES---> (All better now!)

**Figure 9 –
SQ-1/SQ-R with a
Low Battery Message
when you turn it on**

SQ-1/SQ-1 PLUS ONLY
SECTION

Contents:

Rear Power Panel

Rear Jack Panel

Jack Nuts

Slider Knobs

F Wheel Cover

Frame

D Transformer Board

Main Board
Mounting Bracket

B Keypad/Display
Board

C Keyboard

Main Board
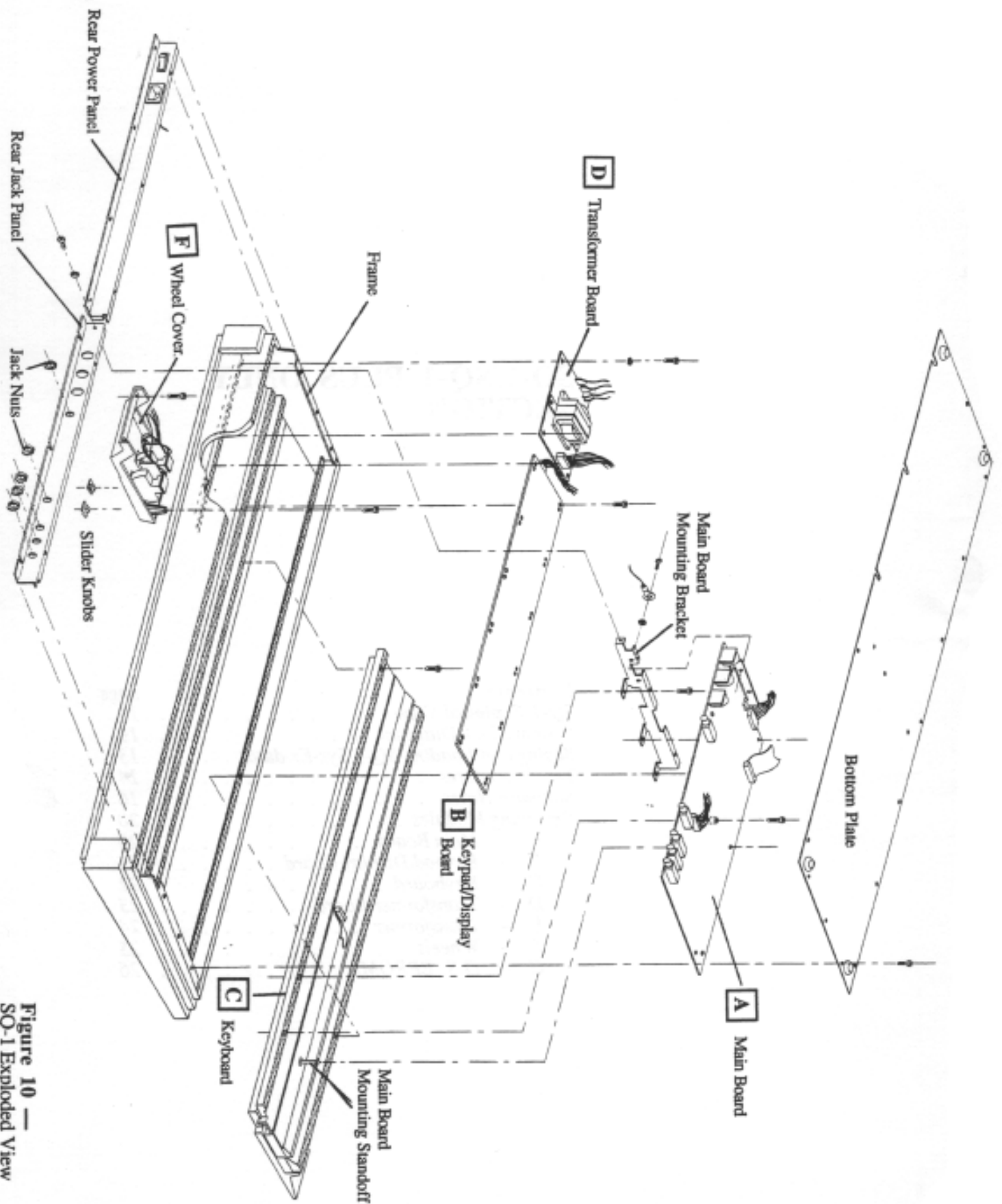Mounting Standoff

A Main Board

Bottom Plate

Figure 10 —
SQ-1 Exploded View

SQ-1 SYSTEM BLOCK DIAGRAM
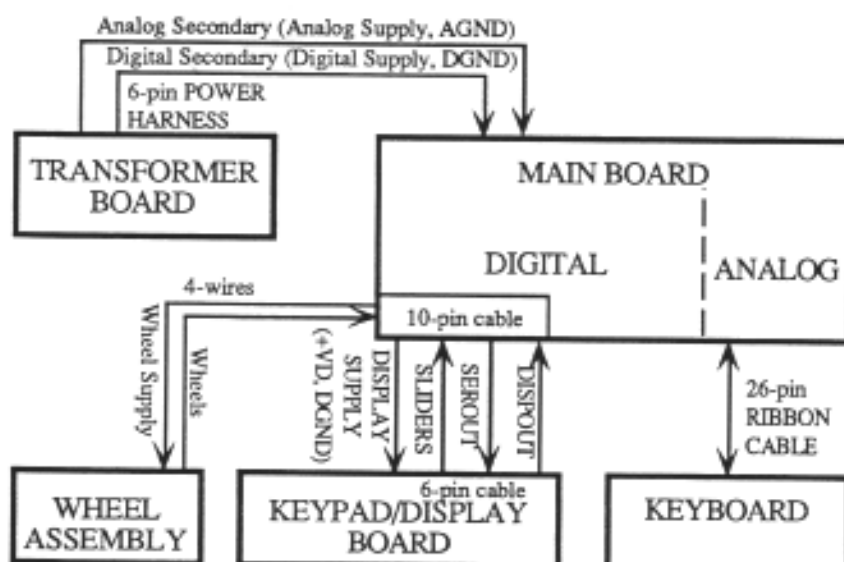
Figure 11 –
SQ-1 System
Block Diagram

SAVING SQ-1 DATA TO MIDI (see Section 11 of the *SQ-1 Musician's Manual*):
Sounds:
1) Connect a MIDI cable from the SQ-1 MIDI Out jack to the MIDI In jack of the Sys-Ex Recorder.
2) Press the ***Edit Sequences/Presets*** button.
3) Select the System bank by pressing the ***Bank 9*** button (see Figure 1, p. 1).
4) Press the ***Screen 4*** button. The display reads, "Press ENTER to Store Sounds."
5) Press ***Enter***. The display now lets you choose which type of storage to use.
6) Use the ***Up/Down Arrow*** buttons to select "Storage Type=MIDI SYS-EX."
7) Press ***Enter***.
8) Use the ***Up/Down Arrow*** buttons to select "Operation=SAVE INT TO MIDI." This command transmits the entire contents of the eight Internal Sound Banks (0-7) as a system exclusive message. The dump contains data for the complete set of 80 sounds.
9) Press ***Enter***. The display will read "Please wait ... sending data" while the sounds are being transmitted.

Sequences/Presets:
1) Follow steps 1 thru 3 above.
2) Press the ***Screen 5*** button. The display reads, "Press ENTER to Store Sequences."
3) Press ***Enter***. The display now lets you choose which type of storage to use.
4) Use the ***Up/Down Arrow*** buttons to select "Storage Type=MIDI SYS-EX."
5) Press ***Enter***.
6) Use the ***Up/Down Arrow*** buttons to select "Operation=SAVE ALL SEQUENCES." This command transmits the entire contents of the sequencer memory as a system exclusive message. The dump contains data for the complete set of 70 sequence locations and 30 song locations.
7) Press ***Enter***. The display will read "Please wait ... sending data" while the sounds are being transmitted.

RECEIVING MIDI SYS-EX DATA ON THE SQ-1

The receiving of data dumps is initiated automatically by system exclusive messages sent from the transmitting unit. No front panel commands are necessary to receive dumps if the receiving of System Exclusive messages is enabled (***Edit Sounds, Bank 9, Screen 4***, System Excl=ON).

SQ-1 TEST PROCEDURES

The following test procedure will ensure the thorough testing of an SQ-1 and will also help qualify customer complaints about: MIDI malfunctions, audio quality, wheel problems, footswitch or pedal problems, keyboard problems, and memory problems.

The SQ-1 should be connected in stereo to a sound system. To perform the following tests you will need:
- a short MIDI cable
- a CV Pedal (model CVP-1)
- a dual pedal Foot Switch (model SW-5)

The SQ-1 is heavily software dependent, and like all computers, certain events can cause the unit to glitch and contract a severe case of amnesia. Sometimes these units merely require reinitialization (see pp. 1-2). Be sure to save the customer's sounds and sequences before reinitializing (see p. 13).

1. MIDI Test
a. Plug in audio cables on the rear panel and connect MIDI In to MIDI Out with a MIDI cable.
b. Hold down a few keys.
c. Disconnect one end of the MIDI cable.
d. When you release the keys, the notes should sustain.
e. Play twenty or more keys simultaneously to reinitialize the voices.
* **Failure indicates a Main Board problem.**

2. Audio Quality Test
a. Press *Select Sounds* until the ROM sounds are selected (the display will show "ROM" in the upper left corner).
b. Select and individually test the following sounds for sound quality, pops, glitches, clicks, reverb, etc. Play each of the following sounds for at least 5 seconds.
c. Verify that there is sound coming from both outputs.

Bank	Sound#	Sound Name	Effect	
0	2	Dirt Guitar	CMPRSS+DIST+VERB	
1	6	Jazz Izz	HALL REVERB	
1	1	Classic Grand	CONCERT REVERB	(SQ-1 PLUS ONLY)
2	5	Harpsichord	HALL REVERB	(SQ-1 PLUS ONLY)
2	6	Jazz Keys	CONCERT REVERB	
3	9	Chuk Guitar	PHASER+REVERB	
4	0	Super Pad	8-VOICE CHORUS	
5	9	Wailin' Synth	FLANGER+REVERB	
6	2	Phaser Bass	PHASE SHIFTER	
7	4	Classic Bell	CHORUS & REVERB	
8	8	Beefy Kit	WARM CHAMBER	

d. Plug headphones directly into the headphone jack and verify that there is sound in both sides.
* **Failure indicates a Main Board problem.**

3. Footswitch Test
a. Select INT Bank 0, screen 0 (*SQ-1 and SQ-R—Grand Act, SQ-1 PLUS—Dynamic Grand*).
b. Plug the dual footswitch into the Ft. Sw. jack.
c. Press the right (Sustain) footswitch and verify that notes continue to sound after the key is released but stop when the footswitch is released.
d. Select the Sostenuto function:
   1) Press *Edit Sequence* until the Edit LED is on but not blinking.
   2) Press *System* (Bank 9).

    3) Press **Screen 2**. The display should read "FtswL=..."
    4) Select "FtswL=SOSTENUTO" using the **Up/Down** arrow buttons.
  e. Press **Select Sounds**.
  f. Play and hold a note, then press the left footswitch. Release the note and verify that the note continues to sound after the key is released but stops when the footswitch is released.
  * **Failure indicates a Main Board problem.**

4. Keyboard Test
  a. With INT Bank 0, screen 0 selected (*SQ-1 and SQ-R—Grand Act, SQ-1 PLUS—Dynamic Grand*), play briefly to verify sound quality.
  b. Verify that the sound gets louder with higher key velocity.
  c. Verify that all keys function and that velocity response is uniform across the keyboard.
  * **Failure indicates a Keyboard cable, Keyboard, or Main Board problem.**

5. Analog Tests
  a. Plug the CV pedal into the Pedal•CV jack.
  b. Select the Analog Test Page:
    1) Press **Edit Sequences** until the Edit LED is on but not blinking.
    2) While holding down **System** (Bank 9), quickly press **Screen 0**.
  c. Move the appropriate controller throughout its range and check the following readings:

Controller	Display	Down	Up	Center
1) Pitch Wheel	PW=	0	127	64
2) Mod Wheel	Mod=	0	127	-

  d. Press **Screen 1** and check the following:

	Display	Down	Up	
3) CV Pedal	CV=	0	127	-
4) Volume Slider	Vol=	0	127	-

    Unplug the CV pedal and verify that CV=127.

  e. Press **Screen 2** and check the following:

	Display	Down	Up	
5) Data Entry Slider	Knob=	0	255	-
6) Battery	Bat=	between 125 and 205		

  f. Press **Screen 4**, then press **Select Sounds** to exit the Analog Test Page.
  * **Failure indicates a Main Board problem or a problem with the associated controller.**

6. Write Test
  a. Press **Select Sounds** until the display shows "ROM" in the upper left corner.
  b. Use the **Up/Down** arrow buttons to select location 00 (*SQ-1 and SQ-R—Grand Act, SQ-1 PLUS—Dynamic Grand*).
  c. Press **Enter**. The display should read "Replace edit sound?"
  d. Press **Enter**. The display should read "Save SOUND" followed by the name of the current sound.
  e. Using the **Up/Down** arrow buttons, change the name of the sound (one character will do).
  f. Press **Enter**. The display should read "Save to INT XX."
  g. Select a sound to overwrite using the **Up** arrow button. The location number is on the upper line of the display and the name of the sound at that location is on the bottom of the display.
  h. Press **Enter**. The display should briefly read "Saved" then display the sound and location.
  i. Verify that the name has changed.
  j. Play a few notes to verify that there is no scrambled sound data.
  * **Failure usually indicates a Main Board problem.**

7. Battery Backup Test

    a. Turn the unit off and verify that there is no squeal at the main outputs on power-down.

    b. Toggle the power switch on and off rapidly 5 times ONLY. Then, leave the unit off for 10 seconds.

    NOTE: Remember, if you turn it on and off 7 times, it will reinitialize itself (see p. 2).

    c. Power the unit on and verify that there are no loud pops at the main outputs on power-up.

    NOTE: The headphone outputs will produce a pop at power-up and power-down as there is no muting on the headphone outputs.

    d. Press *Select Sounds* until INT sounds are selected and verify that the sound you wrote in step 6 has not been replaced by the ROM sound.

    * Failure usually indicates a Main Board problem although a Power Supply problem is also possible.

To Check the SQ-1/SQ-1 PLUS Software Version:
- Press *Edit Sequences* until the Edit LED is on but not blinking (see Figure 1, p. 1).
- While holding down *System* (Bank 9), quickly press *Screen 1*.
- The display should read "ENSONIQ SQ-1 OS Version X.XX".

SQ-1 ONLY SOFTWARE NOTES
The following changes were included in SQ-1 Software Version 1.01 (*=new feature):

AUTOPUNCH AND EDIT TIMES:
- Autopunch now defaults to OFF when a new sequence is selected.
- Changing the sequence length either with the Change Length or Append Sequence commands will reset the edit times for the new length, but this length was not saved unless the sequence was saved after the command. This could result in punch-out times being past or ahead of the actual end of the sequence. The new edit times are now saved when the sequence length is changed.
- With Autopunch on and Record Mode = LOOPED, the punch-in point only worked on the first pass of the sequence. Subsequent loops only recorded from the start of the sequence to the punch-out point. Punch times with looped record mode now work correctly.
- When recording with autopunch and Click=RECORD, after passing the punch-out point, the metronome click is no longer heard for the duration of the sequence.
- Event editor no longer causes the punch-out time to be reset to maximum.

EFFECTS LOADER:
- Unexpected event #33 could be caused by rapidly selecting sounds in select sound mode. This has been fixed.
- ESP download retry message will now only appear after ten retries instead of one.

EVENT EDITOR:
- Insert Event command could put the event on the wrong beat and clock. This would happen if the user was trying to move a key-event by first removing the event, changing the current location field, then inserting the event. This has been fixed.
- Changing the current location field did not display events that may be present at that location. Display showed "no event." The only way to see events was to scroll with cursor positioned on the Key-Name or "***" field. Events are now displayed as current location field is changed.
- After exiting the event-editor and selecting a new sequence, the display could show a discrepancy between the sequence location that is selected and the displayed sequence name. This has been corrected.
- Insert Key Event could cause subsequent notes in track to shift forward. This would happen if attempting to insert a key event without deleting an event since the last reinitialization. Key event is now inserted correctly.
- Insert Key Event logic did not always work when the last event that was deleted or modified was not a key event. (Key number never being validated.) Key event is now inserted correctly.
- Attempting to do an INSERT EVENT in the event editor while the event mask = ALL EVENTS caused serious problems. It's now ignored.

- Event-edit of an empty track resulted in a "Sorry! No data on source track" message and all of free memory being allocated. Free memory showed 0% after subsequent attempts to record or edit sequences or tracks. This was fixed.
- In previous versions, event-editing an empty track allocated all memory and never released it.

MIDI:
- Receiving an All Sequence dump via MIDI Sys-Ex while the Select Sequences LED is flashing no longer fails to setup selected song tracks properly.
- Song tracks defined as MIDI, EXT, or BOTH now send program changes and controllers.
- Sequence tracks that change MIDI status during playback in a song no longer cause unpredictable results.
- Locating by MIDI song position pointer, either from external sequencer or tape sync box, could result in the slaved SQ-1 (Clock source = MIDI) ignoring the MIDI CONTINUE command or not starting in sync with the master device. The slaved SQ-1 now locates and starts in sync with the master timing device.

MUSICIAN'S MANUAL ERRORS:
- Song step repeat count of "FS" not described (*Musician's Manual* p. 9-7). See **Song-Specific Problems**.
- Description of real-time setting of punch points incorrect (*Musician's Manual* p. 8-12). See **Autopunch and Edit Times**.
- Creating a preset describes an empty location being displayed as "EMPTY LOCATION." Actually, locations 00-69 are displayed as "EMPTY SEQ/PSET" and locations 70-99 are displayed as "EMPTY SONG" (*Musician's Manual* p. 8-7).
- When auditioning new sounds while the sequencer is playing back, going into Select Sounds mode changes the effect that the sequence is playing back through. Each sound that is selected in Select Sounds mode causes that sound's effect to be the effect used by the sequencer (*Musician's Manual* p. 8-26). This does not change the sequence, but allows the user to audition the sequence with different effects.
- While the sequencer is playing back in Select Seq mode, it *is* possible to layer tracks by double-clicking on the track buttons (*Musician's Manual* p. 8-26). This allows the user to play a multi-timbral lead with the sequencer.
- When the footswitch is set to control sequencer START/STOP, depressing the footswitch while the sequencer is running in Punch-In Standby mode (lowercase "odub"), forces the sequencer into Record (capital "ODUB"). This allows for hands-free punch-ins without using punch times. **Undocumented feature**.
- To reformat an MC-32 RAM card, the battery may need to be removed from the card for several minutes (exact time varies for each card). Manual states 1 minute.
- The manual incorrectly describes the real-time setting of Punch Points. After pressing **Enter** to set the punch-in time "on the fly," user needs to scroll to the Punch Out time screen to set the punch-out time "on the fly." (The screen is not selected automatically, as described.) *Not a software error*.
- When song step repeat count is set to "FS" (footswitch), the step repeated indefinitely and the sequencer tracks were not normalized at all. Song steps are now normalized correctly and repeat until the left pedal is depressed. **Undocumented feature**.

PROGRAM CHANGES:
- Program Changes received in OMNI or POLY mode selected sounds without changing the effect. Now the new effect is loaded with the sound.
- Creating a new preset used to inherit the MIDI Program Change numbers from the last selected preset. The MIDI Program Change numbers now default to 1.
- When a sequence contains a program change event recorded as part of the track data, after the sequencer played back the program change:
1. The sustain pedal for that track was turned off for the remainder of the sequence.
2. If track was set to MIDI, BOTH, or EXT, the program change went out MIDI but was never "normalized" (reset) at the end of the sequence. Bad data went out MIDI.
3. If track was set to BOTH and program change number was 0, the program change went out MIDI, but never changed the sound locally.
4. Selecting a new sequence resulted in the "Save Changes?" prompt, though no changes were made to the sequence. All the above problems were addressed.

SEQUENCER:
- In prior software versions, the Create Sequence command did not check for proper free memory space.
- Sequencer timing is tighter between song steps.
- Real-time changing of track mute/solo switches during sequence and song playback has been addressed.
- Entering Record mode when Step Entry = ON will now always put you on the first screen of Step Entry ("Step Recording! Autopunch=xx").
- Viewing sequence tracks when a song is selected can no longer result in a state where the tracks pile does not get updated when selecting sequences and presets.
- Entering Step Recording from Select Sequence mode changes the mode to Edit Sequence.
- When record mode = MIXDOWN:
  > Mix Pan is displayed as +/-99, and recorded as 0-127 (Left to Right).
  > Mixdown of song tracks is now recorded properly.
  > Entering record does not automatically put you on locate screen.
- The Locate command now works in audition mode.
- Pressing *Enter* on "KEEP NEW TRACK" could result in display locking up on "Editing Data..." This has been addressed.
- Doing a sequence append now verifies that enough memory is available before attempting the append. This command used to append only the tracks that would fit in available memory, leaving the others empty. Additional appends after this point used to crash the unit.
- Going into Edit Seq mode on the Track Parameter or Output Pages no longer results in a discrepancy between the track number that appears in the display and the track LED that is lit.
- Pressing *Play* while in "Punch-In Standby" mode (lowercase "odub") no longer causes remaining sequencer memory to get allocated. Any subsequent attempts to edit tracks or sequences resulted in an "Out of Memory" message.
- An error in the track quantization algorithm resulted in a "Sorry! Out of Memory" error when quantizing some tracks to high values (1/4 or 1/8), though there was memory available to do the track command. This has been fixed.
- The Copy Sequence and Copy Song commands now cause the name of the source sequence to be retained in the copy.

SONG-SPECIFIC PROBLEMS:
- When recording in mixdown mode, the mixdown volume and pan are no longer reset each time the song changes steps.
- When a song is selected, the tempo parameter on the click page used to show a range of 25-250. The range is now correctly displayed as plus or minus 99.
- When a song step repeat count is set to 2 or higher, the sequence tracks were not "normalized" when the last repeat played. This means that any program changes that occurred as part of the sequence would not be reset at the start of the last repeat. Also any mod wheel or pitch bend that overhangs the end of the sequence could result in the last repeat of the step starting with the same amount of modulation and pitch bend as what the sequence ended with. Last repeat could be "out of tune" with rest of song. Last repeats are now normalized properly.
* When song step repeat count is set to "FS" (footswitch), the step repeated indefinitely and the sequencer tracks were not normalized at all. Song steps are now normalized correctly and repeat until the left pedal is depressed. **Undocumented feature.**
- If there are a total of 14 tracks loaded with track data at the same time (for example: 8 tracks used by a sequence and 6 song tracks on top of that), the system would not allow you to do any track edits, would not allow you to overdub on any existing tracks, and would not allow you to record on the 15th track. Display showed "Unexplained Event 194." All 16 tracks (plus the audition track) are now available.
- Timing between song steps has been improved even more.
- When editing song steps, the data slider no longer allows "EMPTY SEQ LOC" to be selected as a sequence to be played for that step.
- Copying a sequence track to a song track auditions properly.

SOUNDS:
- The following sounds were modified to reduce effect noises: 00 Grand Act, 10 Piano & Strings, 12 Clarinet, 17 String Section, 38 Slam Guitar, and 39 Chuk Guitar. A few other sounds were modified to correct minor voicing problems.
- The ANALOG POWER sound has been tweaked so as not to cut out on the left side as voices are stolen.

SYSTEM:

- A free system blocks display is now available. Press *Edit Sequences*, then while holding down *System* press *Screen 3*.
- Data slider now works in Event Editor.
- LEDs no longer track the Sequence pile when viewing sequence tracks when a song is selected and you are in Edit Sequence mode.
- *Edit Sequence* button no longer waits for the second half of a double-click after keeping the first track recorded from Edit Sequence mode after being in Edit Sequence Flashing mode.
- Reinitialization of sequencer used to display SONG-00 with Sequence-00 selected. This has been fixed so now the display shows PRESET-00 after Reinitialization.
- Selecting an empty sequence or song location and pressing ENTER now makes that location the default in the Create Sequence or Create Song command.
- When viewing sequence tracks of a song in Edit Sequence mode, the track LED and display remain fixed on the track selected. The sound played by the keyboard will agree with the track being displayed.
- When a song is selected, toggling back and forth between Edit and Select Sequence modes, the track LED's will remember whether you are viewing Sequence tracks or Song tracks.
- Moving the data slider on Keep OLD/NEW screen now works.
- Creating a new preset no longer shows extra tracks "layered-in" that were not defined.
- An error in the cartridge write/read algorithms prevented the last byte of sequencer track data from being read from the cartridge. This could result in crashes when attempting to "KEEP NEW TRACK" after an overdub or track-edit. Version 1.01 writes the data correctly and reads it back correctly. Furthermore, the new version will read cards written incorrectly and repair the bad data. *Sequencer cards written with Version 1.01 cannot be read by earlier O.S. versions.*

SECTION
A

Replacing the SQ-1 Main Board

Removing

1. Remove all cables connected to the SQ-1, including the power cord.
2. Turn the unit upside-down on a soft surface. Place something under the wheels to support them and to keep them from bending.
3. Remove all the screws from the bottom plate.
4. Disconnect the cables from the Main Board:
   a) the 10-pin Display/Wheels cable (J5), NOTE that it is keyed,
   b) the 6-pin Power cable (J12) NOTE that it is keyed, and
   c) the Keyboard ribbon cable (J11).
5. Remove the five (5) nuts from the rear panel jacks marked Ft. Sw., Pedal•CV, Left Mono, Right Mono, and Phones.
6. Remove the Main Board mounting screws (see Figure 12 for locations):
   a) Remove two big screws from the Main Board.
   b) Remove the small screw from the center of the Main Board (next to C61).
   c) Remove the two screws that go from the side of the Main Board mounting bracket into the regulator heat sink.
   d) Squeeze the sides of the standoff (located next to the ESP Adjust pot) and lift the board off the standoff.
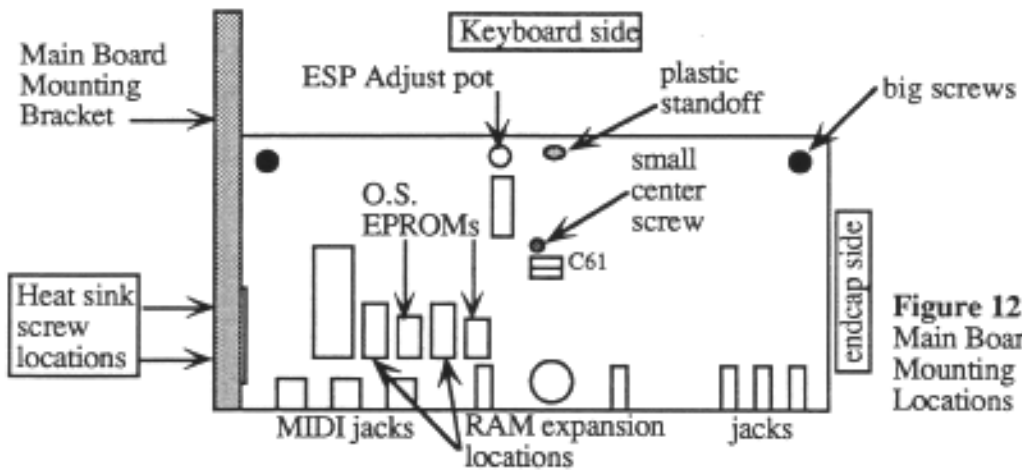
Figure 12 — Main Board Mounting Screw Locations

7. Slide the board towards the keyboard end of the case, then away from the main board mounting bracket. Lift the side closest to the main board mounting bracket up and remove the board.

Installing

8. With the board tilted on a slight angle, insert the jacks into the holes in the rear panel. Press the board down into place.
9. If this is a problem, you can remove the rear jack panel (see Figure 13) and attach the main board to it first (using the jack nuts). Then, install the main board along with the rear jack panel assembly.
10. Reinstall the center Main Board screw first to locate the board.
11. Reinstall the other Main Board screws and secure the jacks with the nuts (if you haven't already). Connect the harness cables, and the Keyboard cable.
12. **SQ-1 ONLY: If the serial number is below 15250**, add the new ground wire (see p. 2).
13. Power up, test the unit. Reinstall all the screws on the bottom plate (use no more than 8 in/lbs of torque). See Figure 14 for location of the star washers.
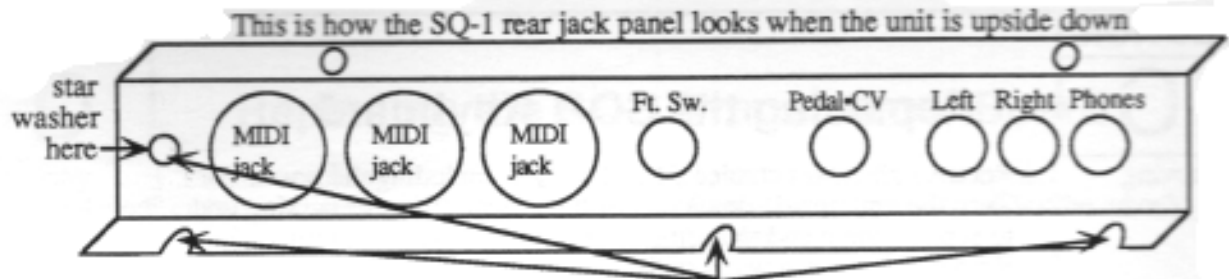
This is how the SQ-1 rear jack panel looks when the unit is upside down

Figure 13 – To remove the SQ-1 rear jack panel, remove these screws

● = location of star washers   **Figure 14** – SQ-1 Bottom Plate

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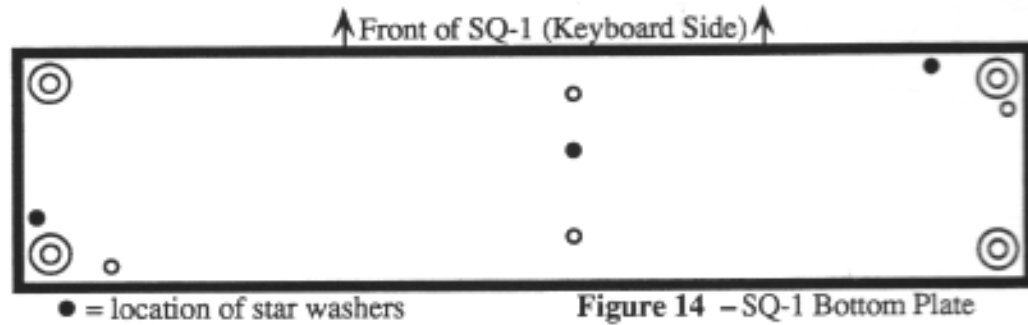| SECTION |
|---------|
| **B** |

Replacing the SQ-1 Keypad/Display Board

Removing
1. Remove all cables connected to the SQ-1, including the power cord.
2. Remove the Volume and the Data Entry knobs.
3. Turn the unit upside-down on a soft surface. Place something under the wheels to support them and to keep them from bending.
4. Remove all the screws from the bottom plate.
5. Remove the Main Board (see Section A).
6. Remove the rear jack panel and the rear power panel (see Figures 13 and 15).
7. Disconnect the 6-pin cable from the Keypad/Display Board. Note that it is keyed.
8. Remove the twelve (12) screws (Phillips head or hex-head) that hold the Keypad/Display board in place and carefully slide it out from under the main board mounting bracket. Note that there are two pins which are used to align the board to the case.

Installing
9. To reassemble, first make sure that the lens is clean. Slide the board under the main board mounting bracket.
10. Use the alignment pins to line up the Keypad/Display board. Install the twelve (12) Phillips head or hex-head screws (use no more than 8 in/lbs of torque).
11. Reconnect the 6-pin cable to the new Keypad/Display board paying attention to polarity.
12. Reinstall the Main Board (see Section A).
13. Attach both back panel pieces to the unit (see Figures 13 and 15).
14. **SQ-1 ONLY: If the serial number is below 15250**, add the new ground wire (see p. 2).
15. Reinstall the Data Entry and Volume knobs. Power up, test the unit.
16. Reinstall all the screws on the bottom plate. See Figure 14 for location of the star washers.

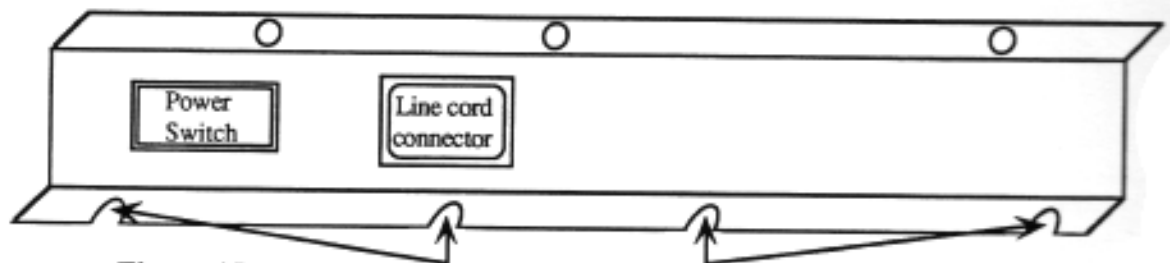| SECTION |
|---|
| **C** |

Replacing the SQ-1 Keyboard

Removing

1. Remove all cables connected to the SQ-1, including the power cord.
2. Turn the unit upside-down on a soft surface. Place something under the wheels to support them and to keep them from bending.
3. Remove all the screws from the bottom plate.
4. Disconnect the 6-pin and 10-pin cables from the Main Board. Disconnect the Keyboard end of the Keyboard ribbon cable.
5. Remove the Main Board (see Section A).
6. Remove the Main Board Mounting Bracket (one screw and star washer from the rear jack panel, one screw into the keyboard rail, and one screw into the front rail).
7. Remove the eleven (11) screws that attach the Keyboard to the case. Note that the screws that attach the keyboard to the back rail of the keyboard (near the springs) are longer than the ones that attach it to the front rail (near the key tips).
8. Remove the Keyboard from the case.

Installing

9. Insert the new Keyboard key tips first.
10. Slide the keyboard away from the wheel cover in the cavity.
11. Replace the eleven (11) screws that secure the Keyboard to the case. Be sure to use the longer screws on the back rail of the keyboard (near the springs) and the shorter ones on the front rail (near the key tips). **Use no more than 8 in/lbs of torque**.
12. Install the Main Board Mounting Bracket and the Main Board (see Section A). Be sure that the plastic standoff is installed on the keyboard to help support the main board (see Figure 6 for location).
13. Reconnect all the cables.
14. **SQ-1 ONLY: If the serial number is below 15250**, add the new ground wire (see p. 2).
15. Power up, test the unit.
16. If you have a storage card available, check to make sure that it can be inserted and removed easily.
17. Replace all the screws on the bottom plate. See Figure 14 for location of the star washers.

SECTION D

Replacing the SQ-1 Transformer Board

Removing

1. Remove all cables connected to the SQ-1, including the power cord.
2. Turn the unit upside-down on a soft surface. Place something under the wheels to support them and to keep them from bending.
3. Remove all the screws from the bottom plate.
4. Remove the four (4) screws that hold the rear power panel to the unit (see Figure 15).
5. Disconnect the following cables and wires from the Transformer Board (see Figure 4, p. 4):
   a) the six (6) pin connector (J1) (note that this connector is keyed),
   b) P1 (L) wire from the line cord connector (from where this wire attaches to the line cord connector)
   c) P2 (SW) wire from the power switch
   d) P3 (SW) wire from the power switch
   e) P4 (N) wire from the line cord connector (from where this wire attaches to the line cord connector)
6. Remove the six (6) self-tapping screws (Phillips or hex-head) and one star washer that secure the Transformer Board to the case.

Installing

7. Insert the replacement Transformer Board.
8. Reinstall the Transformer screws and star washer (on the ground pad). **Use no more than 8 in/lbs of torque.**
9. Carefully connect the cable and wires. **Make sure that P1 and P4 are attached to the correct wires from the line cord connector (see Figure 2).**
10. Attach the rear power panel to the unit (see Figure 15).
11. **SQ-1 ONLY: If the serial number is below 15250,** add the new ground wire (see p. 2).
12. Power up, test the unit.
13. Replace all the screws on the bottom plate. See Figure 14 for location of the star washers.

Power Switch

Line cord connector

Figure 15 – To remove the SQ-1 rear power panel, remove these screws.

SECTION	
E	# Replacing the SQ-1 Transformer and Transformer Adapter Board

Removing

1. Remove all cables connected to the SQ-1, including the power cord.
2. Turn the unit upside-down on a soft surface. Place something under the wheels to support them and to keep them from bending.
3. Remove all the screws from the bottom plate.
4. Remove the three (3) screws that hold the rear power panel to the unit (see Figure 15).
5. Disconnect the following cables and wires from the Transformer Adapter Board (see Figure 3, p. 4):
   a) the six (6) pin connector (J1) (note that this connector is keyed),
   b) the nine (9) pin connector (J2) (note that this connector is keyed),
   c) P1 (L) wire from the line cord connector
   d) P2 (SW) wire from the power switch
   e) P3 (SW) wire from the power switch
   f) P4 (N) wire from the line cord connector
   g) P5 (T) wire from the transformer
   h) P6 (T) wire from the transformer
6. Remove the four (4) screws (Phillips or hex-head) that secure the Transformer to the case.
7. Remove the four (4) (Phillips or hex-head) and one star washer that the Transformer Adapter board (see Figure 3, p. 4) to the case.

Installing

8. You will be replacing these two parts with a single board that has the transformer soldered to it.
9. Follow steps 7 to 12 in Section D, p. 23.

SECTION F

Replacing the SQ-1 Wheel Assembly

The Pitch and Mod Wheels are replaced as an assembly along with the cable harness.

Removing

1. Remove all cables connected to the SQ-1, including the power cord.
2. Turn the unit upside-down on a soft surface. Place something under the wheels to support them and to keep them from bending.
3. Remove all the screws from the bottom plate.
4. Remove the four (4) screws that attach the Wheel Assembly to the case.
5. Cut the wire ties that hold the wire harness to the chassis. Disconnect the harness from the Main Board, from the Keypad/Display board and from the Transformer Board. Note that these connectors are keyed and have connector locks. Carefully lift the Wheel Assembly out of the case.

Installing

6. Insert the Wheel Assembly from the bottom (when the unit is upside-down, see Figure 10).
7. Connect the new wire harness to the Main Board (J12, J5), to the Keypad/Display board (6-pin), and to the Transformer Board (J1), paying particular attention to the alignment of pins and connectors. Reconnect the wire harness to the case using wire ties.
8. Reattach the Wheel Assembly to the case using the four screws (**use no more than 8 in/lbs of torque**).
9. **SQ-1 ONLY: If the serial number is below 15250**, add the new ground wire (see p. 2).
10. Return the unit to an upright position. Power up, test the unit.
11. Replace all the screws on the bottom plate. See Figure 14 for location of the star washers.

SECTION

G | Replacing the SQ-1 O.S. EPROMs

The SQ-1 operating system can be updated by replacing the O.S. EPROMs. Each SQ-1 has two Operating System EPROMs located on the Main Board near the MIDI jacks. After replacing these EPROMs, the SQ-1 must be reinitialized (see p. 2). The Internal sounds are automatically replaced by the ROM sounds during reinitialization.

All Sounds and Presets must be saved before starting this procedure!
(For more information on saving Sounds and Sequences/Presets, see p. 13 or Section 11 of the *SQ-1 Musician's Manual*).

Removing
1. Remove all cables connected to the SQ-1, including the power cord.
2. Turn the unit upside-down on a soft surface. Place something under the wheels to support them and to keep them from bending.
3. Remove all the screws from the bottom plate.

Installing
4. The two Operating System EPROMs, LOWER (U27) and UPPER (U32), are located in the center of the Main Board next to the Ft Sw. and MIDI In jacks respectively (see Figure 6). Carefully remove the two EPROMs and insert the replacement EPROMs into their respective sockets. Be sure the notch in each EPROM is facing away from the jacks.

IMPORTANT! **Make sure all audio cables are unplugged BEFORE turning the unit on. The first time you turn on the SQ-1 after updating the software, the unit may make a pop.**

5. Power up, reinitialize by pressing the *Edit Sequence* button once, then while holding down *System* (Bank 9), quickly press *Screen 9* (see Figure 1). The display should read Re-initialize Sound and Seq RAM? Then press *Yes*.
6. Check the software version by pressing the *Edit Sequence* button once, then while holding down *System* (Bank 9), quickly press *Screen 1*. The version number should be the same as that printed on the label of the newly installed EPROMs.
7. **SQ-1 ONLY: If the serial number is below 15250**, add the new ground wire (see p. 2).
8. Test the unit (see p. 14).
9. Replace all the screws on the bottom plate (**use no more than 8 in/lbs of torque**). See Figure 14 for location of the star washers.
10. Reload the Sounds and Presets that were saved prior to replacing the EPROMs (see p. 13).

SQ-R ONLY SECTION

Contents:

Jack Nuts

F Lid

Screw-in Standoff

A Main Board

C Transformer Board

Insulator

D Card Connector Board

Chassis Base

Keypad/Chassis Bracket

Screw-in Standoffs

Card Connector Bezel

Volume Knob

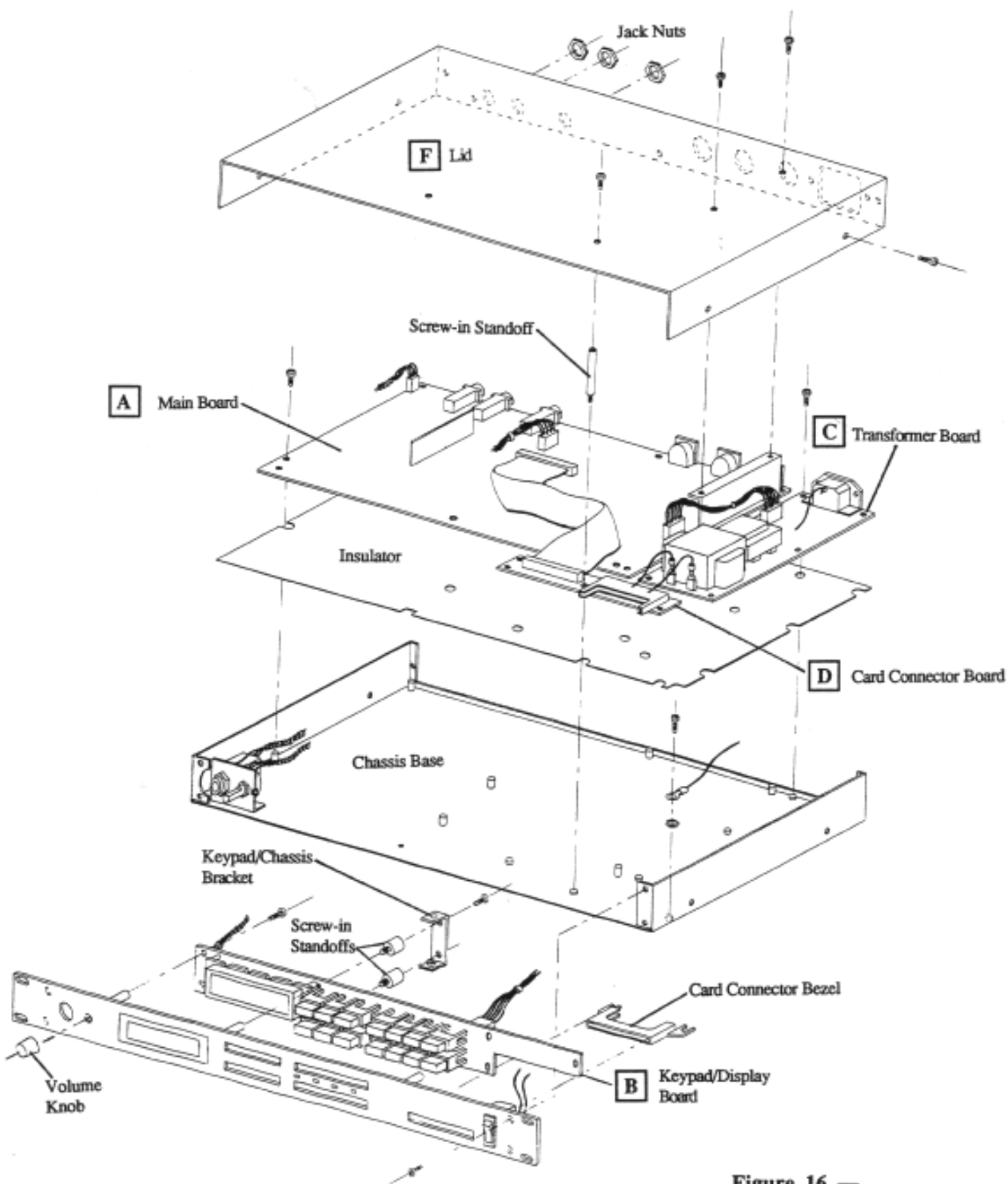B Keypad/Display Board

Figure 16 —
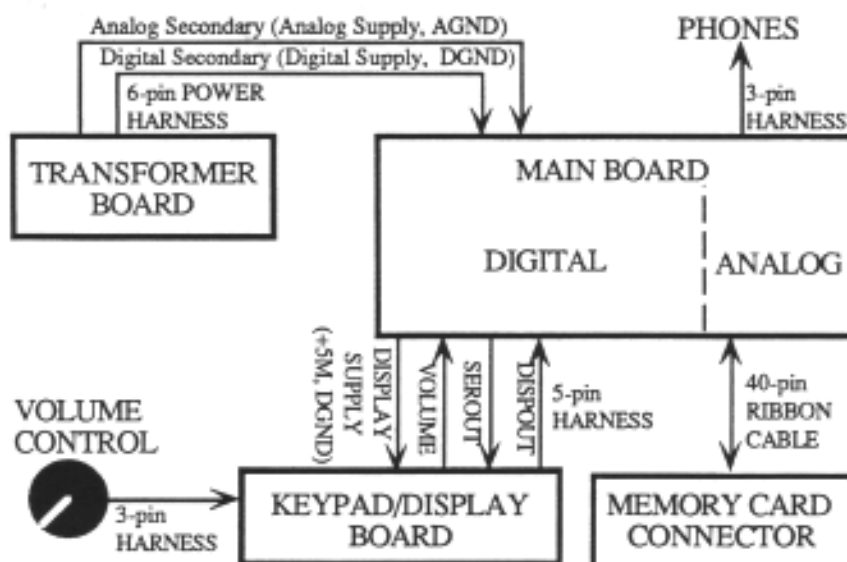SQ-R Exploded View

SQ-R BLOCK DIAGRAM

Figure 17 – SQ-R System Block Diagram

SAVING SQ-R DATA TO MIDI (see Section 8 of the *SQ-R Musician's Manual*):

Sounds:

1) Connect a MIDI cable from the SQ-R MIDI Out jack to the MIDI In jack of the Sys-Ex Recorder.
2) Press the **System** button.
3) Press the > or **System** button repeatedly until the display reads, "Press ENTER to Store Sounds."
4) Press **Enter/Save**. The display now lets you choose which type of storage to use.
6) Use the **Up/Down** arrow buttons to select "Storage Type=MIDI SYS-EX."
7) Press **Enter/Save**.
8) Use the **Up/Down** arrow buttons to select "Operation=SAVE INT TO MIDI." This command transmits the entire contents of the eight Internal Sound Banks (0-7) as a system exclusive message. The dump contains data for the complete set of 80 sounds.
9) Press **Enter/Save**. The display will read "Please wait ... sending data" while the sounds are being transmitted.

Presets:

1) Follow steps 1 and 2 above.
2) Press the > or **System** button repeatedly until the display reads, "Press ENTER to Store Presets."
3) Press **Enter/Save**. The display now lets you choose which type of storage to use.
4) Use the **Up/Down** arrow buttons to select "Storage Type=MIDI SYS-EX."
5) Press **Enter/Save**.
6) Use the **Up/Down** arrow buttons to select "Operation=SAVE ALL PRESETS." This command transmits the entire contents of the preset memory as a system exclusive message. The dump contains data for the complete set of 80 preset locations.
7) Press **Enter/Save**. The display will read "Please wait ... sending data" while the sounds are being transmitted.

RECEIVING MIDI SYS-EX DATA ON THE SQ-R

The receiving of data dumps is initiated automatically by system exclusive messages sent from the transmitting unit. No front panel commands are necessary to receive dumps if the receiving of System Exclusive messages is enabled (press **System** and scroll to System Excl=ON).

SQ-R TEST PROCEDURES

The following test procedure will ensure the thorough testing of an SQ-R and will also help qualify customer complaints about: MIDI malfunctions, audio quality, and memory problems.

The SQ-R should be connected in stereo to a sound system with headphones. To perform the following tests you will need:
- a MIDI keyboard
- a MIDI cable
- a CV Pedal (model CVP-1)

The SQ-R is heavily software dependent, and like all computers, certain events can cause the unit to glitch and contract a severe case of amnesia. Sometimes these units merely require reinitialization (see pp. 1-2). Be sure to save the customer's sounds and presets before reinitializing (see p. 29).

1. Audio Quality
a. Press **Select Sound**, then press **Bank Select** until the ROM sounds are selected (the display will show "ROM" in the upper left corner).
b. Using the < or > buttons to select the bank and the **Up/Down** arrow buttons to select the sound, individually test the following sounds for sound quality, pops, glitches, clicks, reverb, etc. Play each of the following sounds for at least 5 seconds:
c. Verify that there is sound coming from both outputs.

Bank	Sound#	Sound Name	Effect
0	2	Dirt Guitar	CMPRSS+DIST+VERB
1	6	Jazz Izz	HALL REVERB
2	6	Jazz Keys	CONCERT REVERB
3	9	Chuk Guitar	PHASER+REVERB
4	0	Super Pad	8-VOICE CHORUS
5	9	Wailin' Synth	FLANGER+REVERB
6	2	Phaser Bass	PHASE SHIFTER
7	4	Classic Bell	CHORUS & REVERB
8	8	Beefy Kit	WARM CHAMBER

d. Plug the headphones directly into the headphone jack and verify that there is sound in both sides.
* **Failure indicates a Main Board problem.**

2. Analog Tests
a. Select the Analog Test Page. While holding down **System**, quickly press **Enter/Save**.
b. Move the appropriate controller throughout its range and check the following readings:

Controller	Display	Down	Up
1) Volume Knob	Vol=	0	127
2) CV Pedal	CV=	0	127

Unplug the CV pedal and verify that CV=127.

c. Press < or > and check the following:

3) Reference	Ref=	greater than 80	
4) Battery	Bat=	between 125 and 205	

d. Press **Select Sound** to exit the Analog Test Page.
* **Failure indicates a Main Board problem or a problem with the associated controller.**

3. **Write Test**
   a. Press *Select Sounds*, then use the arrow buttons to select Grand Act (location 00).
   b. Press *Bank Select* until the display shows "ROM" in the upper left corner.
   c. Press *Enter/Save*. The display should read "Replace edit sound?"
   d. Press *Enter/Save*. The display should read "Save SOUND" followed by the name of the current sound.
   e. Using the arrow buttons, change the name of the sound (one character will do).
   f. Press *Enter/Save*. The display should read "Save to INT XX."
   g. Select a sound to overwrite using the arrow buttons. The name of the sound at that location will appear at the bottom of the display.
   h. Press *Enter/Save*. The display should briefly read "Saved." then display the new sound at that location.
   i. Verify that the name has changed.
   j. Play a few notes to check for scrambled sound data.
   * **Failure usually indicates a Main Board problem.**

4. **Battery Backup Test**
   a. Turn the unit off and verify that there is no squeal at the main outputs on power-down.
   b. Toggle the power switch on and off rapidly 5 times ONLY. Then, leave the unit off for 10 seconds.
   NOTE: Remember, if you turn it on and off 7 times, it will reinitialize itself (see p. 2-3).
   c. Power the unit on and verify that there are no loud pops at the main outputs on power-up.
   NOTE: The headphone outputs will produce a pop at power-up and power-down as there is no muting on the headphone outputs.
   d. Press *Bank Select* until INT sounds are selected and verify that the sound you wrote in step 3 has not been replaced by the ROM sound.
   * **Failure usually indicates a Main Board problem although a Power Supply problem is also possible.**

SQ-R SOFTWARE NOTES

To check the SQ-R Software Version:
   • While holding down *System*, press *Bank Select*.
   • The display should read "ENSONIQ SQ-R OS Version X.XX".

The following changes were included in SQ-R Software Version 1.00A:
• The Demo player is now more reliable.
• The Compressor+Distortion algorithm was replaced with one that has a lower ESP voltage susceptibility.
• This version minimizes the occurrence of unexpected event 33 after reinitialization.

The following changes were included in SQ-R Software Version 1.01:
• In previous versions, an unexpected event 33 could be generated anytime that a new effect was loaded. This was most commonly reported when users were hitting the inc/dec buttons very rapidly to scroll through sounds, but could also happen any time that an effect changed (selecting presets, starting the demo player, receiving program changes etc.).
• In previous versions, the Demo player could have a muted output due to an error loading an effect (see above). This would happen when the user was in Select Sound mode and went to play the demo. If the demo's effect was different from the selected sound's effect, the display would read "Press any button to stop" but no sound was heard from the module.
• In previous versions, when certain Yamaha® devices were connected to the MIDI In of the SQ-R (the SY77 and possibly others), and the demo player was started on the SQ-R, the demo played but all the notes sounded chopped off.
• The preset-multi effect program change (program change #124) did not work. This has been fixed.

The following change was included in SQ-R Software Version 1.02:
This version fixes a bug (only in version 1.01) that caused inbound program changes to always select internal sound 0 when the SQ-R was in MULTI or MONO B mode.

SQ-R HARDWARE NOTES

Dim displays in the SQ-R

The SQ-R uses a 16 character by 2 line LCD (Liquid Crystal Display) module. This module has an LED (Light Emitting Diode) backlight which allows the display to appear as light characters on a dark background. The display is designed to be viewed from above and has a fixed contrast setting. The setting provides an optimum view from above a straight-on position. There are two items which relate to display viewability:

• The contrast setting can't be changed by the user and is subject to a small amount of drift as the unit warms up. Once the unit has warmed up, the viewing angle remains constant.

• On some early displays, the LED backlight connections are intermittent. This can cause the display to appear blank. You can tell if this is the case by looking closely at the display. If the backlight is working, the entire display area should have a soft green glow. If the backlight isn't working, the display area will appear completely dark and, under bright light at certain viewing angles, information will appear dimly in the display.

If the backlight is working, then there is some other problem with the system that is not allowing it to put messages up on the display (see p. 8 "Troubleshooting an SQ-1/SQ-R with No Display"). If the backlight isn't working, it is easily repaired by removing the keypad/display board (see Section B, p. 34) and touching up some solder joints.

Place the Keypad/Display board face up and examine the 14-pin connector at the left of the LCD module. The connections for the LED backlight are at the bottom left of the display module. They appear as a white strip of plastic which is soldered onto pins 1 and 2 of the connector (see Figure 18).
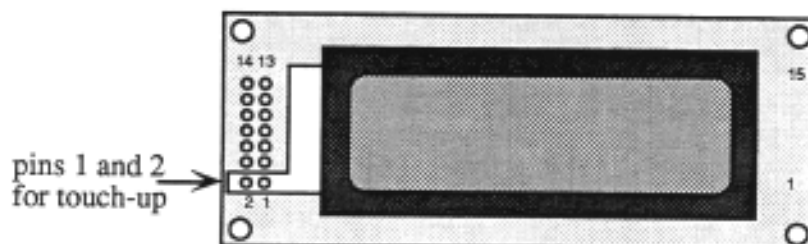

Figure 18 –
Touch-up locations for
SQ-R Dim Displays

pins 1 and 2
for touch-up

• Being careful not to melt the white plastic, resolder these two connections. Make sure that the pads are well soldered to the pins of the connector. Avoid short circuits from solder bridging.
• Plug the 5-pin cable from the main board back into the display board and power up the unit. The LED backlight should light. If it doesn't, either the pins are still not making proper contact to the backlight, or something else is wrong. If power is being applied to the Keypad/Display board and the connections are good but the backlight is still not lit, the LCD module itself must be defective and the Keypad/Display board should be replaced.

SECTION

A

Replacing the SQ-R Main Board

Removing
1. See Section F, p. 37 to remove the Lid.
2. Disconnect the cables from the Main Board:
   a) the 4-pin Phones cable (J1), NOTE that it is keyed,
   b) the 5-pin Display cable (J5) NOTE that it is keyed
   c) the 40-pin Cartridge ribbon cable (J6)
   d) the 6-pin Power cable (J12)
3. Remove the seven (7) screws that secure the Main Board to the base (there is a screw hiding under the 40-pin ribbon cable). Note that there is a star washer on the grounding pad (next to the MIDI Thru jack, see Figure 19).
4. Remove the main board and place it in the anti-static bag that the replacement board came in.

Installing
5. Install the replacement board and secure it with the seven screws (don't forget the one that goes into the center of the board under the 40-pin connector). Be sure to put a star washer on the screw in the ground location (next to the MIDI Thru jack).
6. Connect all the cables.
7. Power up, test the unit.
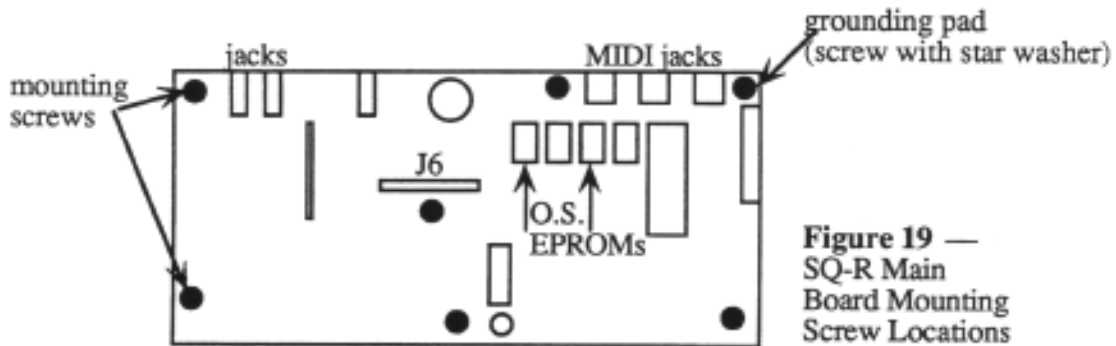8. See Section F, p. 37 to Attach the Lid.

Figure 19 —
SQ-R Main
Board Mounting
Screw Locations

SECTION B

Replacing the SQ-R Keypad/Display Board

Removing

1. See Section F, p. 37 to remove the Lid.
2. Remove the Volume knob.
3. Carefully turn the unit over and remove the one Phillips flat head screw from the base of the unit.
4. Disconnect the 5-pin and 4-pin cables from the Keypad/Display Board. NOTE that they are keyed.
5. Remove the four (4) 5/64" hex-head screws that hold the front panel in place and carefully remove the front panel assembly.
6. Place the front panel assembly on a soft surface. Remove the two (2) screws that hold the keypad/chassis bracket to the Keypad/Display board (see Figure 20).
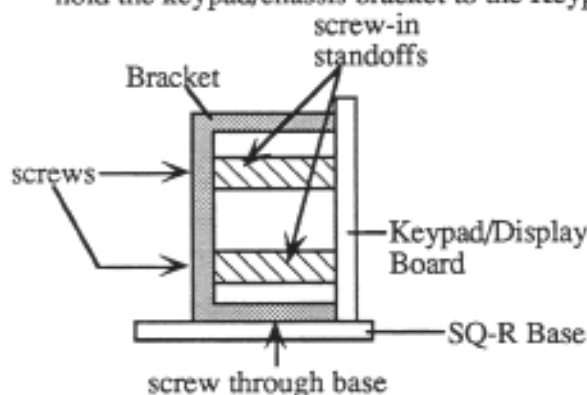
Figure 20 –
Side View of SQ-R
Keypad/Chassis
Bracket

7. Remove the two (2) screw-in standoffs that hold the Keypad/Display board to the front panel (see Figures 20 and 21).
8. Remove the six (6) screws that hold the Keypad/Display board to the front panel.

Installing

9. To reassemble, first make sure that the lens is clean.
10. Attach the replacement board to the front panel using the six (6) screws (see Figure 21).
11. Attach the two screw-in standoffs where shown in Figure 21.
12. Attach the bracket to the screw-in standoffs using two screws (see Figure 20).
13. Attach the front panel assembly to the chassis with the four (4) hex-head screws.
14. Reconnect the cables to the new Keypad/Display board paying attention to the alignment of pins.
15. Replace the one flat head screw into the base
16. Power up, test the unit.
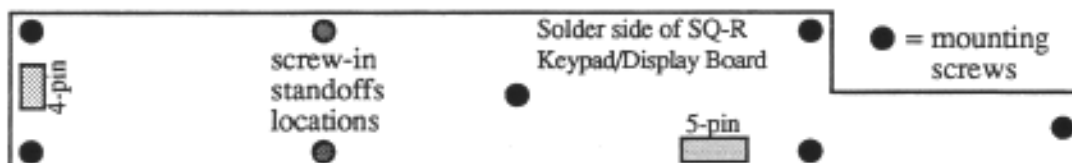17. See Section F, p. 37 to attach the Lid.
18. Reinstall the Volume knob.

Figure 21 — SQ-R Keypad/Display Board Mounting Screw Locations

SECTION C

Replacing the SQ-R Transformer Board

Removing

1. See Section F, p. 37 to remove the Lid.
2. Disconnect the six-pin connector (J4), and the two single wires from the Transformer Board to the Power switch.
3. Remove the screw and star washer that connects the ground wire to the base (located next to the power switch).
4. Remove the six (6) screws that secure the Transformer Board to the base. Note that there is a star washer on the grounding pad (next to the line cord connector on the PC board).

Installing

5. Install the replacement Transformer Board using the six (6) screws. Be sure to put the star washer on the screw that goes on the grounding pad.
6. Carefully reconnect the cable and two wires, paying particular attention to the alignment of pins and connectors.
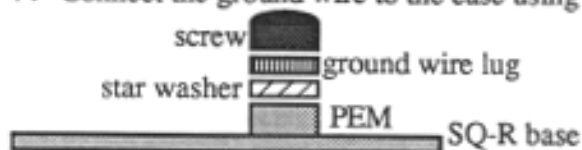7. Connect the ground wire to the case using a screw and star washer (see Figure 22).

**Figure 22 –
Attaching the
SQ-R ground wire**

8. Power up, test the unit.
9. See Section F, p. 37 to attach the Lid.

SECTION D

Replacing the SQ-R Card Connector Board

Removing

1. See Section F, p. 37 to remove the Lid.
2. Disconnect the Card ribbon cable (J2) from the Card Connector Board.
3. Remove the screw closest to J2. Remove the screw-in standoff.
4. Remove the screw and flat washer closest to J1. Note that this screw is longer than the other.
5. Slide the Card Connector board out of the card bezel.

Installing

6. Slide J1 of the replacement board into the card bezel (the bezel should be on top of the Card Connector board).
7. Install the screw-in standoff into the hole in the middle of the Card Connector Board (see Figure 23).
8. Attach replacement board to base using the two screws (see Figure 23).
9. Reconnect the ribbon cable to J2.
10. Power up, test the unit.
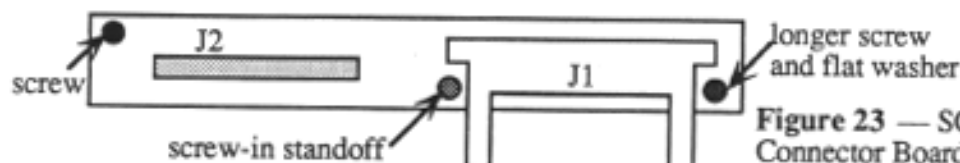11. See Section F, p. 37 to attach the Lid.

**Figure 23 — SQ-R Card
Connector Board Mounting**

SECTION
E

Replacing the SQ-R O.S. EPROMs

The SQ-R operating system can be updated by replacing the O.S. EPROMs. Each SQ-R has two Operating System EPROMs located on the Main Board near the MIDI jacks. After replacing these EPROMs, the SQ-R must be reinitialized (see pp. 1-2). The Internal sounds are automatically replaced by the ROM sounds during reinitialization.

All Sounds and Presets must be saved before starting this procedure! (For more information on saving Sounds and Presets, see p. 29 or Section 8 of the *SQ-R Musician's Manual*).

1. See Section F, p. 37 to remove the Lid.
2. The two Operating System EPROMs, LOWER (U27) and UPPER (U32), are located on the Main Board next to the MIDI In jack (see Figure 6, p. 6). Carefully remove the two EPROMs and insert the replacement EPROMs into their respective sockets. Be sure the notch in each EPROMs is facing away from the jacks.

IMPORTANT! Make sure all audio cables are unplugged BEFORE turning the unit on. The first time you turn on the SQ-R after updating the software, the unit may make a pop.

3. Power up and reinitialize the unit:
    a) Press *System* and while holding down *System*, quickly press *No*.
    b) The display should read "Re-initialize all RAM?"
    c) Press *Yes*.
4. Check the Software Version:
    a) Press *System* and while holding down *System*, quickly press *Bank Select*.
    b) The display should briefly read "ENSONIQ SQ-R OS Version X.XX."
5. Test the unit (see p. 30).
6. See Section F, p. 37 to attach the Lid.
7. Reload the Sounds and Presets that were saved prior to replacing the EPROMs (see p. 29).

SECTION F

Removing and Attaching the SQ-R Lid

Removing the Lid:
1. Remove all cables connected to the SQ-R, including the power cord.
2. Remove all the screws from the lid:
   a) four (4) flat head Phillips screws from the top,
   b) eight (8) small Phillips head screws on sides and back (note that there is a star washer on the rear center screw), and
   c) two (2) large Phillips screws on either side of the Line (power) input.
3. Remove the three (3) nuts from the rear panel jacks marked Pedal•CV, Left Mono, and Right Mono.

Attaching the Lid:
4. Replace all the screws on the lid:
   a) four (4) flat head Phillips screws from the top,
   b) eight (8) small Phillips head screws (with the star washer on the center rear panel screw), and
   c) two (2) large Phillips screws on either side of the Line (power) input.
5. Attach the three (3) nuts to the rear panel jacks marked Pedal•CV, Left Mono, and Right Mono.