

Theratouch Service Info

Troubleshooting the Theratouch 7.7/4.7/3.3

To check software version, turn unit on. Main screen will show software version.

ULTRASOUND

LOW OUTPUT FROM EITHER HEAD

- A. May have lost memory. Go through calibration procedure.
- B. Crystal may be bad. Replace transducer and calibrate.

FLASHING CAL WITH NO OUTPUT.

Verify which head and frequency is causing CAL.

A. If one head and one frequency:

- 1. Radio wire in deck is bad. If it is not hardwired to the main board, do so.
- 2. If radio wire is hardwired to main board, cut off and redo.

B. If 2cm/1MHz and 5cm/3MHz or 2cm/3MHz and 5cm/1MHz:

- 1. Check radio wire and redo if necessary.
- 2. Q1 or Q2 on main board is shorted. Replace as needed.

C. If no output on the 3MHz side:

- 1. Check for a signal on J5 of main board. If there is no signal, replace U9 4423.
- 2. If there is a signal on J5 2N20L transistor in deck is probably shorted. Check and replace as needed.

D. If no output 1MHz:

- 1. Check for a signal on J6 of main board. If there is no signal, replace U9 4423 IC.
- 2. If there is a signal on J6 10N40E, transistor on deck is probably shorted. Check and replace as needed,

E. If no output on either head:

- 1. Check signal on J4 and J5. If no signal, replace U9 4423 IC.
- 2. Check hi-volt on J3. If no hi-volt, replace U4 LM317HVK.

STIM

A. No output from one channel:

- 1. Relays not closing. Main cause is Q10-Q14 2N7000 shorted. Replace as needed.
- 2. No combo treatment. Main cause is Q9 2N7000. Replace as needed.
- 3. Small shock when unit is turned on. Determine which channel. Change relay transistor for that channel.

PANEL

A. No touch control on screen:

1. Go through calibration of screen.
2. Reseat processor chip.
3. Replace panel.

B. No Stop/Clear control:

1. Reseat processor chip.
2. Replace panel.

DISPLAY

A. Comes up black or with black lines:

1. Reseat processor chip.
2. Update software.

B. Screen rolls or dual screen:

1. Reseat processor chip.
2. Update software.
3. Check ribbon cable to make sure that it is installed correctly.

C. Screen too dark -- cannot lighten up with contrast.

1. Replace back light.

RICH-MAR CORPORATION

7.7 Main Board Rev. B

Modification Procedure

1/28/99

NOTE: Make certain you make this modification ONLY at a static protected (ESD) workstation. Be sure you are grounded to the workstation with your wrist strap whenever you handle or work on the Main Board.

CAUTION: Do not use a 50 watt soldering iron when installing these components. Use only a 30 watt iron. Too much heat will damage the circuit board.

11DQ04 Diodes

First, install the 4 protection diodes (11DQ04) as per the sample and Illustration 1. Be sure the banded ends (cathode) of the diodes are positioned exactly like the sample and Illustration 1. Once the diodes are installed, place a SMALL dab of silicone along the body of each of the diodes (See sample and Illustration 1). Call Alan Clingenpeel if you have any questions regarding the correct positioning of the diodes.

R44 – 15.8K Resistor

Place a 15.8K resistor in the number 12 slot of the small (MK1) lead bending tool and clip the leads flush with the edge of the toll. Bend the ends into small hooks with the needle nose pliers.

Remove the RF shield (has the sample notification on it), by carefully using a small bladed screwdriver to pry it up around the edges. It will be tight, but once it is loosened from the clips, it should come off easily.

Once the RF shield is removed, clip R44 (See sample and Illustration 2 for proper location) loose from the main board. **NOTE: Clip the leads right next to the resistor body.** Stand the leads that are soldered into the board straight up.

Place the hooked ends of the resistor around the clipped leads that are standing up. Crimp the hooked ends onto the leads with the needle nose pliers and solder these connections. Trim off the excess lead wire sticking up.

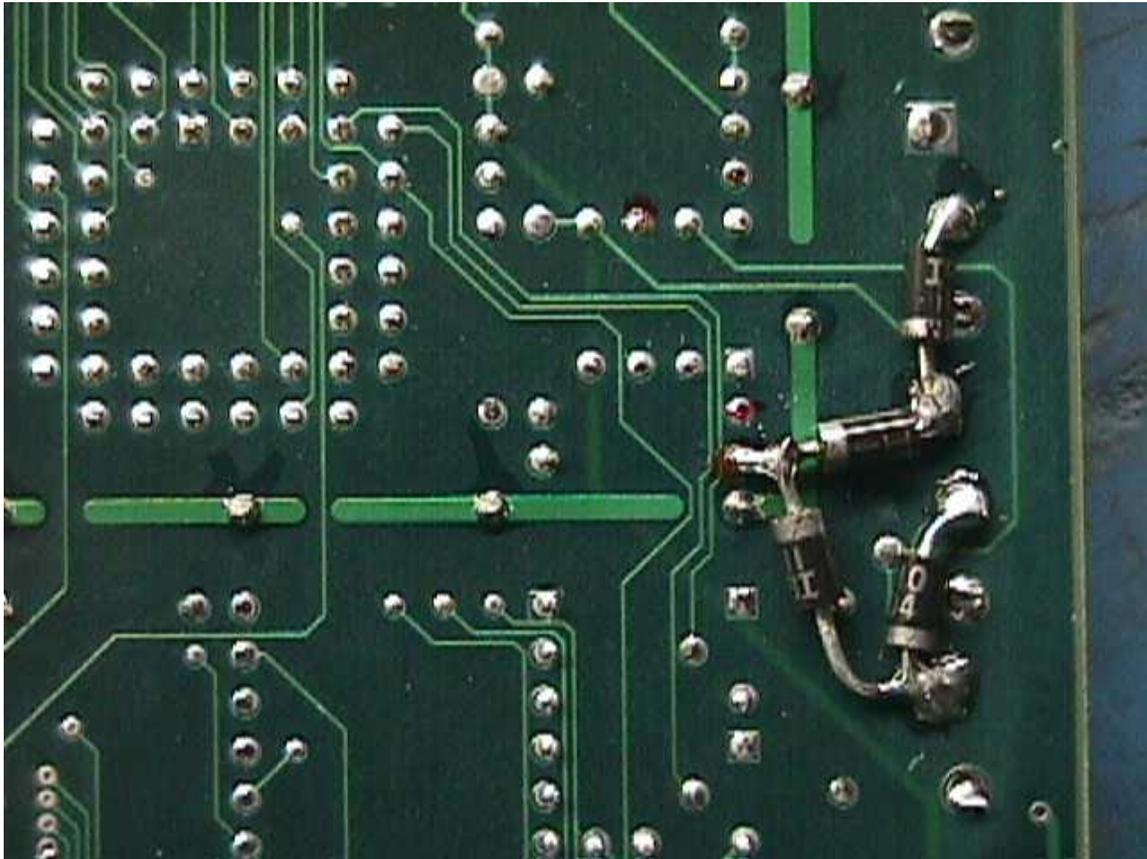
Reinstall the RF shield. Be sure the edges of the shield set into the clips mounted on the board. After all modifications have been made and the RF shield has been reinstalled, place a colored dot on the top of the RF shield. This will allow anyone to know at a glance that this board has the required modification.

Head Select Cable (Radio Wire) Verification

Using an Ohm meter verify the following connections on the male connector hard wired to the P8 designator.

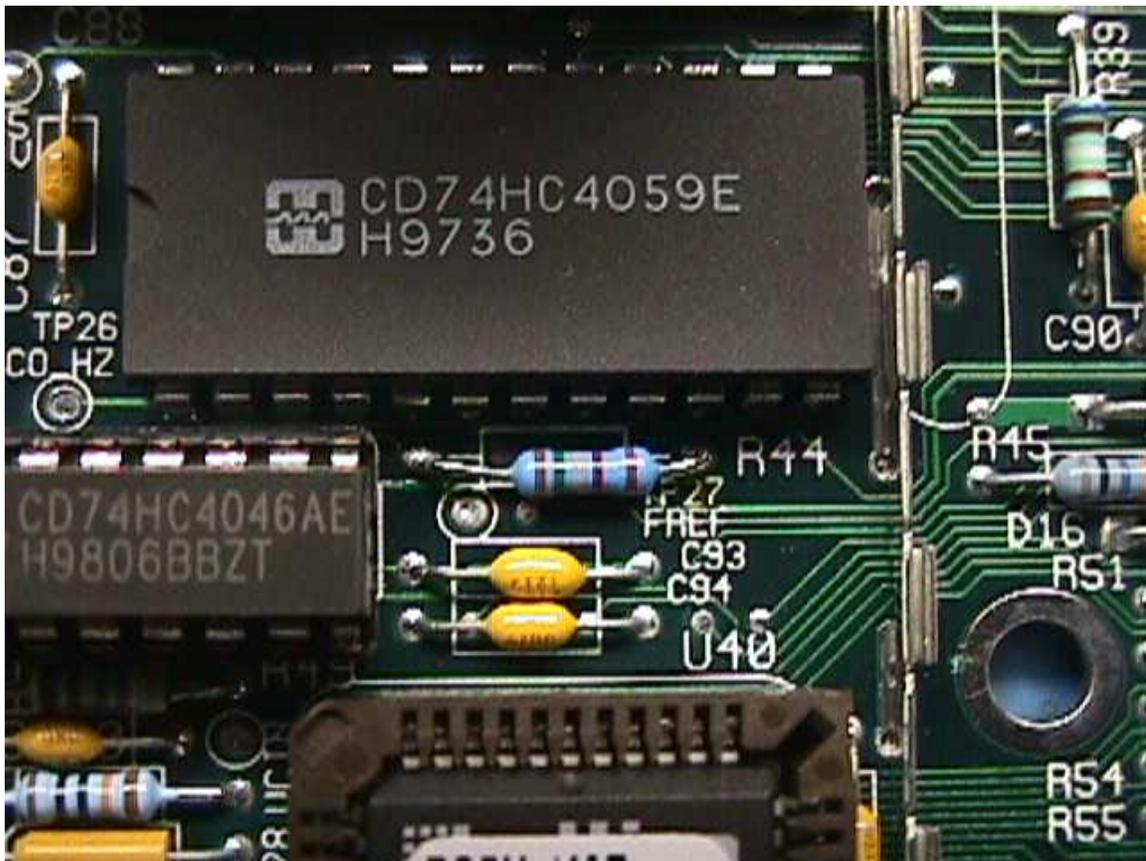
1. Tip of connector goes to pin 2
2. Shield goes to pin 1
3. Middle of connector goes to pin 3
4. Pin 4 has no connection

ILLUSTRATION 1
7.7 MAIN BOARD



NOTE POSITION OF BANDED END (CATHODE)
OF THE DIODES

ILLUSTRATION 2
7.7 MAIN BOARD



REMOVE THIS RESISTOR

RICH-MAR CORPORATION

Theratouch 7.7

Preventive Maintenance Procedure

Serial No. _____

Date _____

Software Version E5.00

Quadpolar Function Connect test load 500 ohm 5 watt resistor to an Oscilloscope. Set up the following waveform on all Channels: Quadpolar, Cont., 10:00, 80-150, shallow, normal, max. intensity.

Verify that:

- (1) The maximum peak-to-peak voltage of each Channel is approximately 65 volts.
- (2) Each Channel is vectoring approximately 2 volts.
- (3) All outputs are fluctuating from approximately 23 to 25 VAC.
- (4) The Maximum current measured on each channel is 50mA or less.

Biphasic Function Tests

Set up the following waveform on all Channels: Biphasic, Cont., 10:00, 50, 100, 50, max. intensity.

Verify for all Channels that:

1. The peak-to-peak voltage is approximately 200 volts.
2. The pulse width is 100uS.
3. The Pulse interphase is 50uS.
4. The Maximum current measured on each channel is 200mA or less.

UltraSound Function Tests

Clamp the transducer into a wattmeter with the 2cm diaphragm pointed down into the tank.

Setup the treatment: US Wave, Usound, 2cm1Mhz, 100%, 10:00.

Adjust the intensity to the watt settings below and verify that the watt meter measurements fall into the range listed.

<u>WATT SETTING</u>	<u>WATT METER RANGE</u>
4 watts (max)	3.4 - 4.6

watts

Setup the treatment: US Wave, Usound, 2cm3Mhz, 100%, 10:00.

- (1) Adjust the intensity to the watt settings below and verify that the wattmeter measurements fall into the range listed.

4 watts (max)	3.4 - 4.6 watts
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Setup the treatment: US Wave, Usound, 5cm 1Mhz, 100%, 10:00.

- (2) Adjust the intensity to the watt settings below and verify that the wattmeter measurements fall into the range listed.

5 watts	4.3 - 5.7 watts
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10 watts (max)	8.6 - 11.4 watts
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Set up the treatment: US Wave, Usound, 5cm3Mhz, 100%, 10:00.

RICH-MAR CORPORATION

Theratouch 4.7/3.3

Preventive Maintenance Procedure

Serial No. _____

Date _____

Software Version M4.05

Quadpolar Function Connect test load 500 ohm 5 watt resistor to an Oscilloscope. Set up the following waveform on all Channels: Quadpolar, Cont., 10:00, 80-150, shallow, normal, max. intensity.

Verify that:

- (1) The maximum peak-to-peak voltage of each Channel is approximately 65 volts.
- (2) Each Channel is vectoring approximately 2 volts.
- (3) All outputs are fluctuating from approximately 23 to 25 VAC.
- (4) The Maximum current measured on each channel is 50mA or less.

Biphasic Function Tests

Set up the following waveform on all Channels: Biphasic, Cont., 10:00, 50, 100, 50, max. intensity.

Verify for all Channels that:

- (1) The peak-to-peak voltage is approximately 200 volts.
- (2) The pulse width is 100uS.
- (3) The Pulse interphase is 50uS.

Safety & Appearance Tests

- (2) Verify zero volts between all outputs and ground.
- (3) Check the units operation at 108 and 132 line volts AC
- (4) Check the line leakage using a Simpson 229-2 line leakage meter.
Forward _____ Reflected _____
- (7) Verify that the patient lead cord test functions correctly.
- (8) Check screen calibration by accessing Thera - Etch and seeing that display tracks where you touch it.
- (9) Check function of STOP\CLEAR BUTTON.

All checks completed by _____