

# **Theramini 3C and 3P Combo Unit**

## **Service Info**

### **Theramini 3C\P Set Up**

1. Hold Set/Enter and Stop/Clear down. Turn the unit on.  
On calibration screen, XCDR should be darkened.
2. Push Set and turn knob to 2cm/1MHz. Push Set.
3. Turn knob to freq. Push Set. Adjust knob to achieve maximum output and add five to reading. (ie.- 947 go to 952). Push Set.
4. Turn knob to corr. Push Set and adjust knob to 4 Watts of output and push Set.
5. Turn knob to XCDR and push Set. Turn knob to 2cm/3MHz and push Set.
6. Repeat steps 3 and 4 (Note: Add 10 to freq. on 3meg).
7. Turn knob to XCDR and push Set. Turn knob to 5cm/1MHz and push Set.
8. Repeat steps 3 and 4 (Add 10 to freq. Maximum output is 10 watts).
9. Turn knob to XCDR and push Set. Turn knob to 5cm/3MHz and push Set.
10. Repeat steps 3 and 4 (Add 10 to freq. Maximum output is 10 watts).
11. After step 10 is completed, push Stop/Clear and go through presets to verify outputs and no CAL flashing.

# Troubleshooting the Theramini 3C\P

To check software version, turn display to system and push Start.

## ULTRASOUND

### **LOW OUTPUT FROM EITHER HEAD.**

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

### **FLASHING BETWEEN CAL AND TREAT WITH OUTPUT.**

- A. Memory may have been lost. Recalibrate.
- B. Output may be low. Check outputs for proper watts.

### **FLASHING CAL WITH NO OUTPUT.**

*Verify which head and frequency is causing CAL.*

- A. If one head and one frequency:
  - 1. Radio wire to deck is bad. If it is not hardwired to the main board, do so.
  - 2. If it is hardwired to the 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 shorted. Replace as needed.
  
- C. If no output on the 3MHz side:
  - 1. Check for a signal on J8 of main board. If there is no signal, replace U9 4423 IC.
  - 2. If there is a signal on J8 2N20L transistor in deck is probably shorted. Check and replace as needed.
  
- D. If no output on 1MHz:
  - 1. Check for a signal on J9 of main board. If there is no signal, replace U9 4423 IC.
  - 2. If there is a signal on J9 10N40E, transistor in deck is probably shorted. Check and replace as needed.
  
- E. If no output on either head:
  - 1. Check signal on J8 and J9. If no signal, replace U9 4423 IC.
  - 2. Check hi-volt on J2. If no hi-volt, replace U4 LM317HVK.

## **STIM**

1. If no output from one or both channels:

Relays not closing. Main reason for this is Q3 or Q4 2N7000. Replace as needed.

2. No combo treatment. Main cause is Q5 2N7000. Replace as needed.

3. Small shock when unit is turned on. Determine which channel. Change relay transistor for that channel.

## **PANEL**

1. Comes on reading "Restore Factory Defaults":

Set/Enter button bad. Replace panel.

2. Comes on reading "Rich-Mar Mini-Combo Stop/Clear":

Button bad. Replace panel.

3. No screen or half screen:

Open unit. Verify that ribbon cable is plugged in and secured. Verify that processor chip is installed completely by applying pressure to chip with thumb.

## **DISPLAY**

Half screen or dark screen:

1. Reinstall ribbon onto main board.

2. Replace display.

3. Check -12V and -5V. If not there, replace U24 on main board.

# **RICH-MAR CORPORATION**

## **Theramini 3C/3P Main Board Rev. B**

### **Modification Procedure**

1/27/99

**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. **NOTE:** When soldering the diode that connects to Pin 5 of the IC (U31), be careful in that it does not short to one of the other pins.

Once the diodes are installed, place a **SMALL** dab of silicone along the body of each of the diodes. (See sample and Illustration 1) Also, place a small dab of silicone along the side of each of the transistors already installed on the solder side of the board (See sample and Illustration 2). Call Alan Clingenpeel if you have any questions regarding the correct positioning of the diodes.

#### **R57 – 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 R57 (See sample and Illustration 3 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.

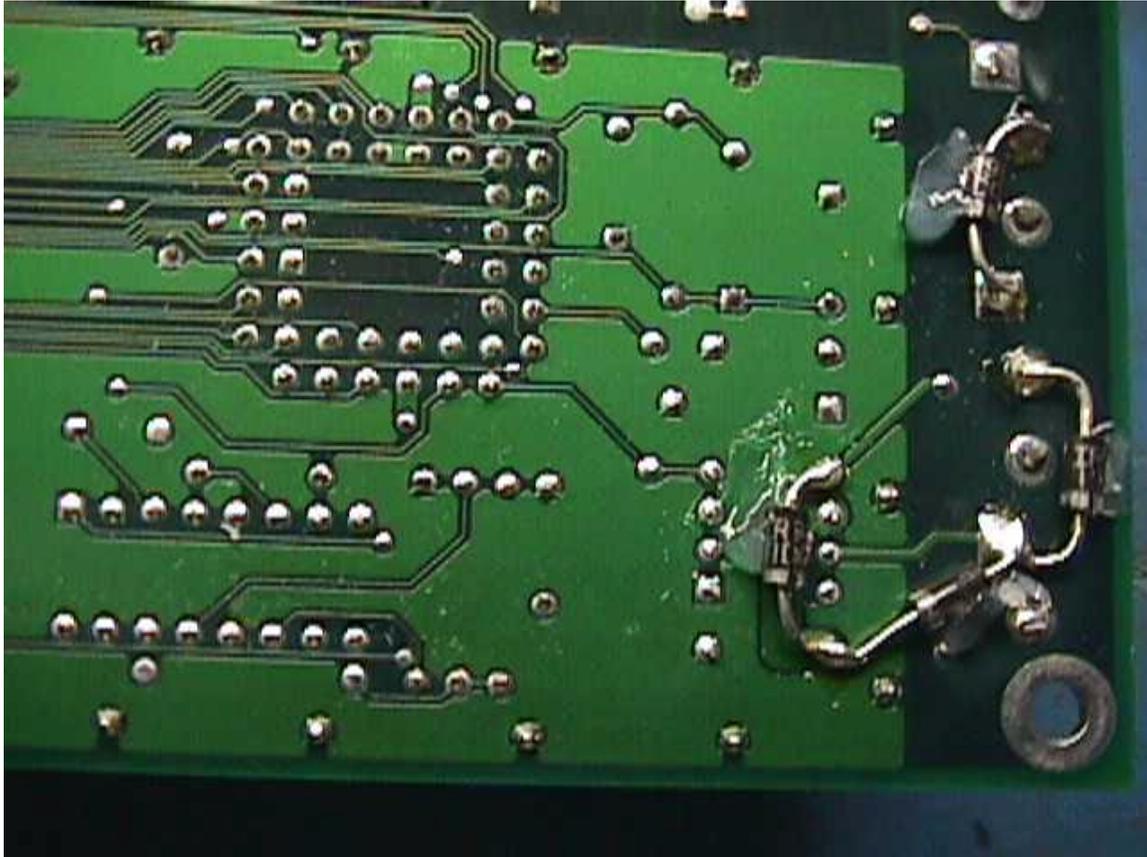
Place the hooked ends of the resistor around the clipped leads that are standing up. Crimp the hooked ends onto the leads with the needle nose pliers and solder these connections. **NOTE: When soldering this resistor in place be careful not to cause a solder bridge to the via next to the resistor. See Illustration 3.**

#### **Head Select Cable (Radio Wire) Verification**

Using an Ohm meter, verify the following connections on the male connector hard wire to the P6 designator.

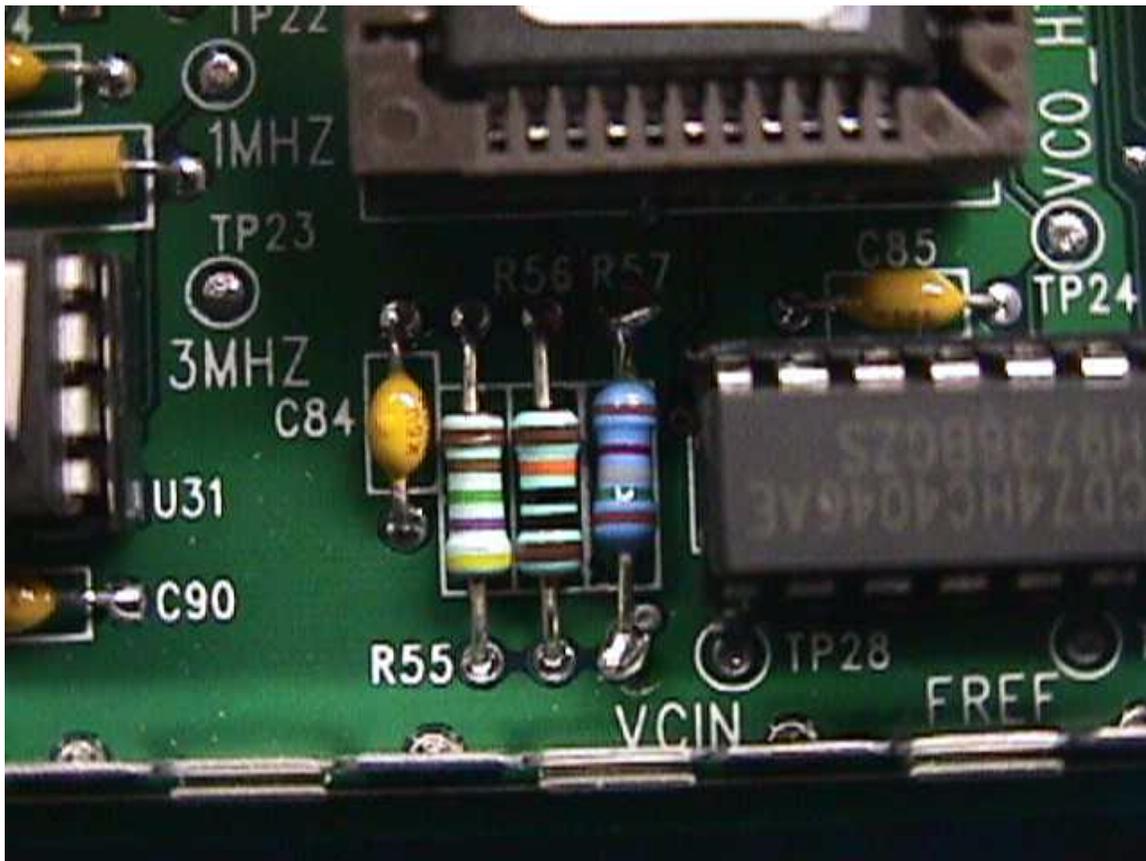
1. Tip of connector goes to pin 3
2. Shield goes to pin 4
3. Middle of connector goes to pin 2
4. Pin 4 has no connection

**ILLUSTRATION 1  
3CP MAIN BOARD**



**NOTE POSITION OF BANDED END (CATHODE)  
OF THE DIODES**

**ILLUSTRATION 2**  
**3C/3P Main Board Rev. B**  
**Modification**



- 1. Remove and replace this resistor**
- 2. Be careful when soldering the resistor in place that you do cause a solder bridge with this circuit board via.**

**RICH-MAR CORPORATION**  
**Theramini 3C/3P circle one**

**Preventative Maintenance Procedure**

**Serial No.** \_\_\_\_\_

**Date** \_\_\_\_\_

**Software Version** \_\_\_\_\_

Using a test load of 500ohm 5 watts resistor in parallel with channel 1 output with an oscilloscope

X10 probe

**Quadpolar function tests.**

Set up scope to read 50 uS/division and 20 volts/division.

Start STIM 1. Increase the intensity to maximum.

(1) Verify the treatment as Quadpolar, 80-150 Hz, shallow/fast, Continuous, 10:00.

(2) Verify the peak-to-peak voltage of channel 1 and channel 2 is approximately 70 volts.

**Biphasic Function Tests**

Set the scope to read 50 volts/division and 50 uS/division.

Start STIM 3. Increase the intensity to maximum.

(1) Verify the treatment as Biphasic, 100 Hz, 200 - 50 uS, Surge 10 on 10 off,3:00.

(2) Verify that the peak-to-peak voltage on channel 1 and channel 2 is 200 volts.

**Ultrasound Function Tests**

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

Using presets that are already in unit.

(1) Start USND 1. Verify that the wattmeter measurement falls into the range of 3.4 - 4.6 watts.

(2) Start USND 2. Verify that the wattmeter measurement falls into the range of 3.4 - 4.6 watts.

(3) Start USND 7. Make sure the 2cm output falls into the range of .75 - 1.75 watts

**Clamp the transducer into a wattmeter with the 5cm diaphragm pointed down into the tank.**

(4) Start USND 3 and verify that the wattmeter measurements fall into the range listed.

<u>WATT SETTING</u>	<u>WATT METER RANGE</u>
5 watts	4.3 - 5.7 watts
10 watts (max)	8.6 - 11.4 watts

(5) Start USND 4 and verify that the watt meter measurements fall into the range listed.

<u>WATT SETTING</u>	<u>WATT METER RANGE</u>
5 watts	4.3 - 5.7

10 watts (max) 8.6 - 11.4 watts

(6) Start USND 6. Make sure the watt meter measurement falls into the range of 1.75 - 2.75 watts.

**Safety & Appearance Tests**

Check the units operation at 108 and 132 line volts AC.

Check all labeling, serial numbering, and manufactures date.

**All checks completed by** \_\_\_\_\_