

**RICH-MAR THERATOUCHE 3.3/4.7
OPERATION HANDBOOK AND MANUAL**



*Part # MN 2426
Rev. D
Batch 001*

CAUTION

This device is not designed to be connected with any electrical equipment unless manufactured and approved by Rich-Mar.

NOTE: This includes whirlpools and carbon electrodes NOT manufactured by Rich-Mar.

CAUTION: When using carbon electrodes with any Rich-Mar stimulator, a moistened interface (cloth or sponge) **MUST** be utilized between these electrodes and the patient to avoid skin irritation and/or electrical burns.

NOTE: This device is equipped with a Low Current Sensor that detects poor conduction of current and will give a caution if detected. This sensor can be overridden or disabled. Please identify the problem before overriding the sensor.

TABLE OF CONTENTS

Theratouch 3.3/4.7 Warranty.....	4
Stimulation Indications for Treatment.....	5
Microcurrent Indications for Treatment.....	5
Stimulation Contraindications & Warnings.....	6
Microcurrent Contraindications & Warnings.....	7
Introduction.....	8
Theratouch 3.3/4.7 Operation.....	9
Logo Screen.....	9
Main Menu & QuikSets.....	9
Presets, Wave & System.....	9
Defaults and Setting QuikSets/Presets.....	9
General Operations/Wave Operation.....	10
Lead Cord Tester.....	10
Trouble-Shooting.....	10
Electrode Site Preparation & Guidelines.....	11
Patient Electrode Hook-Up.....	12
Waveform Specifications.....	13
Theratouch 3.3/4.7 Specifications.....	16

APPENDIX A

Theratouch 3.3/4.7 Parts List

APPENDIX B

Schematics

LIMITED WARRANTY

This equipment is sold under an exclusive one-year warranty from date of sale, which warrants it to be free from defects in material and workmanship. We agree to repair or replace at the point of manufacture, without charge, all parts showing such defects, provided the unit is delivered to us, prepaid to our factory, intact for our examination, within one year from date of sale, and provided such examination discloses in our final judgement that it is defective.

This warranty does not apply if the equipment has been subject to misuse, neglect, accidents, incorrect wiring (not our own), improper installation, or put to use in violation of instructions furnished by us, has been damaged by excess voltage or has been repaired or altered outside our factory or if the equipment has had its serial number altered or removed.

Changes: Rich-Mar reserves the right to modify or change the equipment in whole or in part, at any time prior to delivery, in order to include refinements deemed appropriate by the Company but without incurring any liability to modify or change equipment previously delivered, or to supply new equipment in accordance with earlier specifications. This warranty will be honored only if the enclosed card is filled out and returned to the factory. This warranty is valid only to original purchaser.

This warranty is expressly in lieu of all other warranties expressed or implied including the warranties of merchantability and fitness for use and all other obligations on our part, and we neither assume, nor authorize any other person to assume for us, any other liability in connection with the sale or use of this equipment. In no event shall we be liable for consequential or special damages. We make no warranty whatsoever in respect to accessories or parts not supplied by us.

Rich-Mar Muscle Stimulator Indications for Treatment **(For Biphasic, Monophasic, and Russian Waveforms)**

Rich-Mar stimulation devices are indicated for the following conditions:

- 1) Relaxation of muscle spasms.
- 2) Prevention or retardation of disuse atrophy.
- 3) Increasing local blood circulation.
- 4) Muscle re-education.
- 5) Maintaining or increasing range of motion.
- 6) Immediate post-surgical stimulation of calf muscles to prevent venous thrombosis.

If the device has Quadpolar Interferential or Bipolar Interferential output capabilities they are also indicated for the following conditions:

- 7) Symptomatic relief of chronic, intractable pain.
- 8) Management of pain associated with post-traumatic or post-operative conditions.

Rich-Mar Microamperage Pulsed Current Indications for Treatment **(Microcurrent)**

Rich-Mar stimulators that have microcurrent output are indicated for the following conditions:

- 1) Symptomatic relief of chronic, intractable pain.
- 2) Management of pain associated with post-traumatic or post-operative conditions.

Rich-Mar Muscle Stimulator

Contraindications and Warnings

(For Quadpolar, Bipolar, Biphasic, Monophasic & Russian Waveforms)

WARNING - Federal law restricts this device to sale by or on the order of a physician or any other practitioner licensed by the law of the state in which said person practices.

Contraindications

This device should not be used in the following areas:

- 1) On persons wearing a cardiac pacemaker.
- 2) On persons who have known or suspected malignant lesions. This includes cancer patients.
- 3) Over the carotid sinus area.
- 4) Transcerebrally.
- 5) Over the pregnant uterus.

Warnings

- 1) The long-term effects of chronic electrical stimulation are unknown.
- 2) Adequate precautions should be taken when stimulation is used on persons with suspected heart problems.
- 3) Adequate precautions should be taken when stimulation is used on persons with suspected or diagnosed epilepsy.
- 4) Severe spasm of the laryngeal and pharyngeal muscles may occur when the electrodes are positioned over the neck or mouth. The contractions may be strong enough to close the airway or cause difficulty in breathing.
- 5) Electrical stimulation should not be used in electrically sensitive areas.
- 6) Electrical muscle stimulation (EMS) should not be used over swollen, infected, or inflamed areas of skin eruptions (e.g., phlebitis, thrombo phlebitis, varicose veins).
- 7) Caution should be used in the transthoracic application of electrical muscle stimulation (EMS) in that the introduction of electrical current into the heart may cause arrhythmias.
- 8) Electrical muscle stimulation (EMS) devices should be kept out of the reach of children.
- 9) Safety has not been established for use of electrical stimulation during pregnancy.
- 10) This device should be used only under the continued supervision of a physician.

11) Transcutaneous Electrical Nerve Stimulation (TENS) is a symptomatic treatment and as such suppresses the sensation of pain, which would otherwise serve as a protective mechanism.

Precautions

Precautions should be taken when using a Rich-Mar muscle stimulator in the presence of one or more of the following conditions:

- 1) When there is a tendency to hemorrhage following acute trauma or fracture.
- 2) Following recent surgical procedures when muscle contractions may disrupt the healing process.
- 3) Over the menstruating uterus.
- 4) When sensory damage is present by a loss of normal skin sensation.
- 5) When using this device at current outputs above 40mA, extra caution should be observed to avoid burns by using an adequate conductive medium and by frequently using an alternate electrode placement.
- 6) Isolated cases of skin irritation may occur at the site of electrode placement following long-term application.

Adverse Reactions

Adverse reactions to electrical stimulation are usually limited to sensations of discomfort. Excessive stimulation can cause muscle spasms as well as soreness such as can be expected with excessive natural exercise. In all cases, treatment should not exceed the patient's comfortable tolerance to the stimulation level.

NOTE: Skin irritation and burns beneath the electrodes have been reported with the use of muscle stimulators.

Contraindications and Warnings

(For Microamperage Pulsed Current Waveform/ Microcurrent)

Contraindications

This device should not be used in the following areas:

- 1) On persons wearing a cardiac pacemaker.
- 2) On persons who have known or suspected malignant lesions. This includes cancer patients.
- 3) Over the carotid sinus area.
- 4) Transcerebrally.
- 5) Over the pregnant uterus.
- 6) Whenever pain syndromes are undiagnosed, until etiology has been established.

Warnings

- 1) This device is not effective for pain of the central origin (this includes headaches).
- 2) The long-term effects of chronic electrical stimulation are unknown.
- 3) Safety has not been established for the use of microcurrent during pregnancy.
- 4) Adequate precautions should be taken in the cases of persons with suspected or diagnosed seizures or heart problems.
- 5) This device is to be used as asymptomatic treatment for pain and has no curative value.
- 6) Patients should be cautioned and their activities regulated if pain is suppressed that would otherwise serve as a protective mechanism.
- 7) Electronic monitoring equipment (such as ECG monitors and ECG alarms) may not operate properly when the stimulation is on.
- 8) This device should be used only under the continued supervision of a physician.
- 9) The user **MUST** keep the device out of the reach of children.

Precautions

- 1) Isolated cases of skin rash may occur at the site of electrode placement, following long-term application. The irritation can usually be reduced by use of an alternate electrode placement and/or an alternative conductive medium.
- 2) Effectiveness of this treatment is dependent upon patient selection.

Adverse Reactions

Skin irritation and burns beneath the electrodes have been reported with the use of transcutaneous nerve stimulators.

Introduction

The Rich-Mar Theratouch 3.3 and 4.7 are powerful and easy-to-use stimulators, providing the most flexible selection of waveforms for treatment. This manual is meant to give a brief introduction to the Theratouch 3.3 and 4.7

The Theratouch 4.7 makes use of a touch screen and the 3.3 uses the director dial exclusively. Both formats make the Theratouch operation extremely easy and flexible.

The Theratouch 3.3 and 4.7 screens may have slightly different graphics but their content and flow are almost identical. The Theratouch 3.3 provides the option of picking any three waveforms, whereas the 4.7 provides six. The Theratouch 3.3 may have some waveforms in the following examples not available in other units.

User Interface

The Theratouch units are meant to use, not confuse. Paramount to their design was an interface that actually made treatment set up less daunting and more efficient. To facilitate this, the main input controls include the touch screen (for the 4.7 only), the director dial, and the stop/clear button.

Touch-Screen/Status Screen

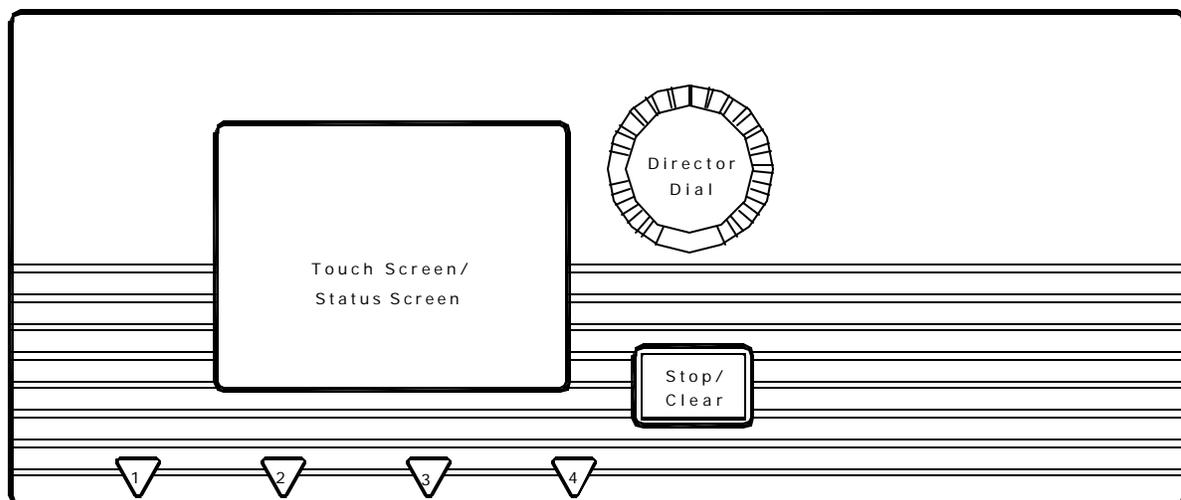
The 4.7 utilizes a touch-screen to navigate through the software-driven operation of the Theratouch. The touch-screen on the 4.7 is activated by a moderate amount of pressure to any of the buttons on the screen. After pressing each button, an audible beep will sound to signify that a choice has

been accepted. The screen on the Theratouch 3.3 functions as a status screen, with the director dial functioning as a mouse to choose different treatment options.

Director Dial

The director dial is a very useful and powerful input tool for the 4.7 and especially the 3.3. For the 4.7, the dial will allow precise control over parameters such as intensity, balance, pulse rates, time, etc. Another feature of the director dial is its accept mechanism which activates by “clicking down” on the dial. Thus, when setting intensity, turn the dial to an acceptable level and click down to accept or select. The Theratouch 4.7 will beep when the information has been accepted. The dial icon will appear on the 4.7 screen when the dial is active for an application (i.e.- to set a pulse rate or scroll through treatment choices).

The director dial is the single input device for the 3.3. The director dial works much like a computer mouse to highlight and choose selections. It controls all aspects of the machine except for the immediate treatment override provided by the stop/clear button. The director dial allows selection of treatment modes, waveforms, and provides precise control over parameters such as intensity, balance, pulse rates, time, etc. Once a choice is highlighted on the screen, select that choice by clicking down on the knob. Thus, when setting the intensity, turn the knob to an acceptable level and push it down to accept. The Theratouch 3.3 will also beep to signify that the information has been accepted.



Stop/Clear Button

The stop/clear button is a touch-sensitive button that will stop treatment and clear the screen back to the main menu when pressed. **This button functions as the immediate treatment override.**

Theratouch Operation

Logo Screen

First, turn the unit on by pressing the switch on the back of the device. Screen 1 will appear with the Rich-Mar logo, Theratouch name, and the software version of the unit. After five seconds, the main menu will automatically be painted.

Main Menu

The main menu for both the Theratouch 4.7 and the 3.3 stimulators will appear next. From this menu, any combination of treatments, frequencies, and waveforms can be utilized, including alternating, surged, and pulsed rate chain options as well as 1MHz and 3MHz. There are three basic Theratouch forms of treatment. Each will be explained along with instructions for set up and the parameters involved. The three forms include: QuikSets, Presets, and Wave(form) treatments.

QuikSets

The QuikSets are the first three buttons from the left of the channel indicator. They are labeled Quik1, Quik2, and Quik3. By selecting one of the QuikSets, treatment is completely set up for the user. Only the intensity will need to be set. The QuikSets are ideal for most common treatments. Simply enter the QuikSet's parameters once, or use the factory settings. Each QuikSet can also be named (up to five characters). The "Defaults" section will further explain how to set parameters and name QuikSets.

Presets

The preset button will allow access to a menu of six preset treatments that work in the same manner as the QuikSets. Each of the presets can be programmed with specific names. By selecting the preset button, the user can scroll through the preset menu settings. Once a preset is selected and intensity is set, set up is complete. The "Defaults" section will further explain set up of Presets.

Wave

The wave button shows all the waveforms available in the Theratouch. Once a waveform is selected, all parameters will appear for that choice, including

mode, time, pulse rate, vector, phase duration, phase interval, etc., depending upon the waveform. The QuikSets and Presets allow a set treatment to be accessed very quickly, whereas the wave button allows the user to customize and adjust all parameters of a particular treatment. Operation of the wave button will be explained in greater detail in the "General Operation" section.

System

Select the system button at the bottom of the main menu. The ramps and low flow monitor buttons will appear.

Ramp up and Ramp Down

The ramp up button allows the user to adjust the amount of time it takes to achieve the set treatment intensity in a surged or alternating mode. For example, if the ramp up is set at four seconds, it will take four seconds of on time to reach the treatment intensity. The same applies to the ramp down. If set for three seconds, it will take three seconds of off time for the intensity to decrease to zero in a surge mode. Ramp up is adjustable from one to five seconds and ramp down is adjustable from zero to five seconds. These are adjusted by selecting the appropriate button, rotating the dial to select ramp time, and clicking down to enter.

Defaults

In the main menu, select the defaults button next to the system button. The defaults set up menu allows the user to customize the Theratouch via QuikSets and Presets set up.

Setting QuikSets and Presets

Customizing QuikSets and Presets is very simple. To start, select the Quik3 button. All parameters will appear to customize the Quik3 treatment. If the waveform button is selected, the knob icon will appear in the upper-right corner of the screen. This indicates that the knob should be used to scroll through the waveform options. Click down on the knob to accept the desired option. Treatment parameters are provided after the waveform is chosen.

The QuikSets can be named after parameters have been adjusted and chosen. Select TMT NAME and rotate the dial to the desired letter or number. Click down on each desired letter or number until complete. Choices will be saved when the Exit button is selected.

Presets are programmed in much the same way as the QuikSets. In the defaults screen, select any of the TMT DEFAULTS buttons. The same parameter choices will appear as were used for the QuikSets. Select the waveform and all subsequent parameters for treatment, name the treatment, and select the Exit button to save the Preset.

General Operation

Wave Operation

Depending upon the device in use (Theratouch 4.7 or 3.3) some or all of the following waveforms will be available for use: Quadpolar Classic Interferential, Premodulated Bipolar Interferential, Monophasic (High Volt), Symmetric Square Biphasic, Russian, and Microcurrent.

Each of these waveforms has different parameters to some degree, but generally follow the same path for set up in the wave and/or default menus.

Treatment Mode

Modes available in the Theratouch 3.3/4.7, depending upon the waveform selected, include continuous, surge, alternate, and chain.

- Continuous will output continuously from one channel (two for Quadpolar) at a single pulse rate or scan.
- Surge will output intermittently on one channel at a single pulse rate scan with a stated on and off time.
- Alternate mode will output the same pulse rate or scan between two different channels alternating at a set time. It is capable of outputting different intensities for each channel.
- Chain mode will allow the user to treat with one pulse rate or scan for an entered time and then switch to a different pulse rate or scan for another entered time. It will continue to switch between the two pulse rates or scans as long as treatment time remains.

Treatment Time

To select the treatment time, select one of the preset buttons or enter a different number with the dial. Click down on the dial to enter the time.

Pulse Rate

Select any of the preset rates or scans, or select scan or fixed, which will allow the user to enter a different number with the dial. When entering a scan, use the dial to enter the low end, click down on the dial, enter the high end, and click the dial down to accept that scan. To select fixed, enter the

fixed pulse rate with the dial and click down to accept.

Vector and Phase

Depending upon the chosen waveform, one of the following may need to be entered:

- If Quadpolar or Bipolar Interferential is selected, vector selection options will include depth and speed. Depth options include shallow, normal, deep and none. If none is selected, the vector is turned off. If depth is chosen, a speed of vector depth movement must be selected. Vector speed choices are slow, medium, and fast.
- If a phasic waveform was selected (Monophasic or Biphasic), the phase duration and phase interval must be selected.

Set Intensity

The final step is to set intensity and press the dial down to accept.

Lead Cord Tester

The Theratouch units come incorporated with a convenient and time-saving lead cord tester. To access it, go to the system screen and press "Lead Test".

The warning to disconnect the leads from the patient will appear. Once this has been completed, press start.

Select one of the lead cords that is plugged in. Take the two ends of that lead cord and press them together. If the lead cord is still functioning correctly, a constant tone will sound and the graphics for that channel will come together. Repeat the same process for the other lead cords and channels.

Press the stop button to stop the test. Press exit to return to the system menu.

Trouble Shooting

Rich-Mar Corporation takes pride in its Technical Support Hotline: 1-800-762-4665. We have an outstanding staff ready to take your calls and help with diagnosing and troubleshooting problems.

If the screen is not bright enough:

Try adjusting the screen contrast located in the rear under the silver cap.

Electrical Stimulation Site Preparation, Electrode Attachment, and Maintenance Guidelines

- 1) Know the stimulation characteristics, indications, and contraindications of the desired waveform. For most patients, the Micro amperage current will be sub-sensory. However, if stimulation sensation is perceived, be sure it is set at a level that is comfortable for the patient. On all other muscle stimulation and interferential current therapy, be sure that the intensity is set to a comfortable level. **DO NOT BRING UP THE INTENSITY UNTIL THE FOLLOWING PROCEDURES HAVE BEEN OBSERVED.**
- 2) Clean the area(s) of the skin to be treated with soap and water or an alcohol wipe.
- 3) Excessive hair may be trimmed, but shaving is not recommended immediately prior to electrode placement.
- 4) Choose the appropriate size electrode(s) for the body part being treated.
- 5) Be sure that the electrodes are securely attached to the lead wires. See the illustration on the following page for the appropriate patient lead wire connections.
- 6) Avoid placing an electrode over areas of broken skin, scars, moles, or unusual areas of skin discoloration. Also avoid skin folds/creases or areas of impaired sensation.
- 7) The single patient self-adhesive electrodes are well suited for most body areas in which electrical stimulation would be used. Remove the electrodes from the pouch and save it for subsequent storage of the product. Carefully peel the electrodes from the release backing and apply it to the chosen site. Press firmly to ensure uniform and secure contact with the skin and begin stimulation treatment.

Electrode Storage and Maintenance

IMPORTANT: The adhesive properties of these electrodes may be affected by ambient or patient skin conditions. While out of the package, extreme variations in humidity levels may affect the adhesive properties of these electrodes.

To increase the adhesive properties of the electrodes, add a few drops of water to the electrodes conductive surface and spread evenly. Allow a couple of minutes for the increase in tack.

REMOVAL AND STORAGE OF ELECTRODES: Turn off the stimulation device and disconnect the cabling. Remove the electrodes from the skin and reapply to the plastic backing. Place in the pouch and reseal for storage to maintain proper adhesive quality when not in use. If possible, store the electrodes in a refrigerator to maintain adhesive.

CAUTION: In multiple, consecutive treatments of a patient, the electrodes should be discarded and replaced if damaged, or when proper adhesive tack or comfort can no longer be achieved. Electrodes should be replaced when they lose their adhesive quality, or when a change in stimulation intensity is noticed, or if the gel is separated. If in doubt about the integrity or proper function, replace the electrode before proceeding. In any instance, Rich-Mar recommends that the self-adhesive electrode NOT be used for more than 20 consecutive treatments.

Electrode Types and Sizes

Rich-Mar Corporation recommends the use of our self-adhesive electrodes with this device. Either the Blue Stim or Super Stim self-adhesive will provide the proper conductive properties. The Blue Stim electrodes come in sizes of 1.75" x 1.75" or 3.75" x 3.75". The sizes of the Super Stim electrodes are 1.75" x 1.75", 3.75" x 3.75", and a 2" diameter round electrode.

Patient Lead Cord Maintenance

Rich-Mar Corporation recommends that your patient lead cords be replaced annually.

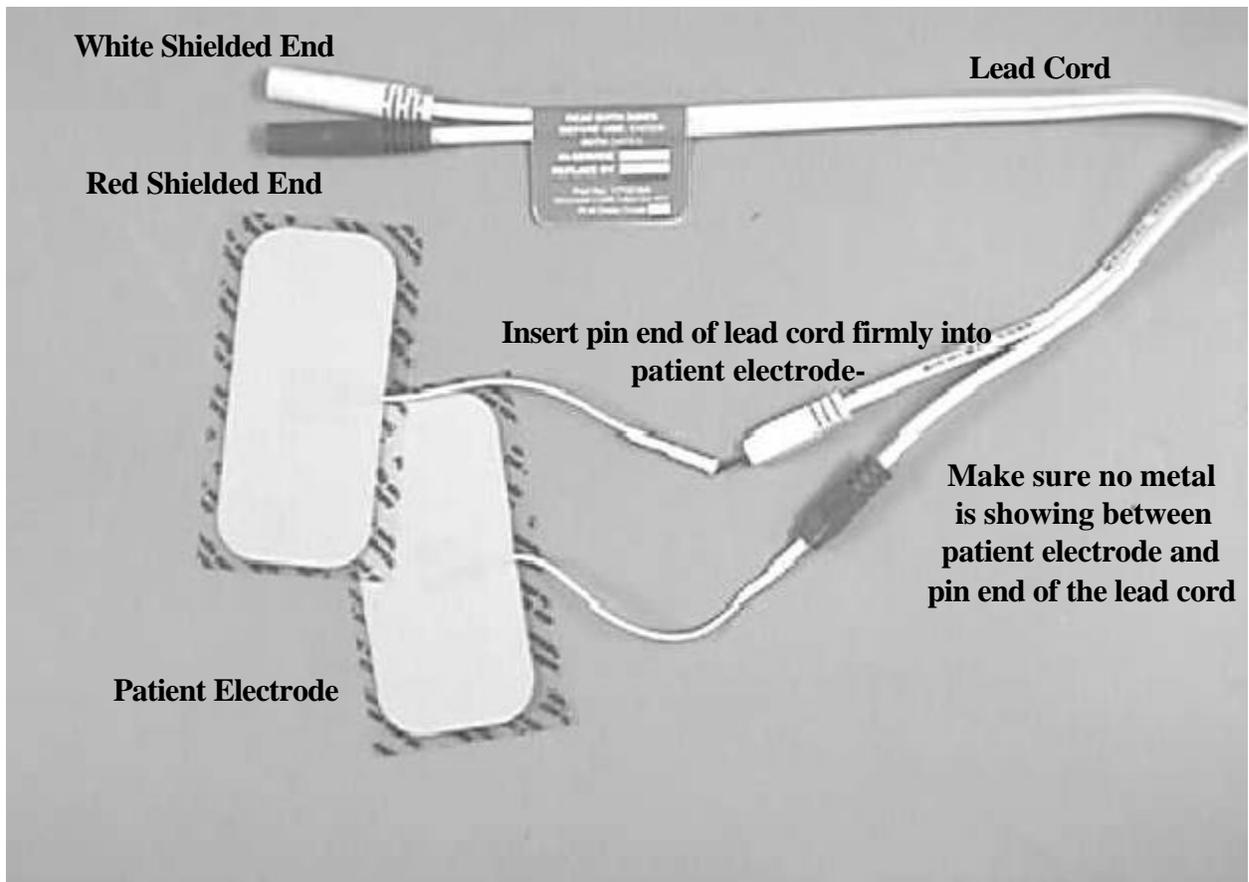
Please note that your patient lead cords bear a label with a space provided to write in the date that the lead cord was put into service ("Date in Service"). There is also a space to write in the replacement due date ("Replace By"), which will be one year from the date the lead cord was put into service.

Please take the time to write in these dates with a permanent marker. This will serve as a convenient reminder of the age of your lead cords.

Some Rich-Mar muscle stimulators are equipped with a feature that allows you to check lead cord continuity. If your device is equipped with this feature, it is recommended that the lead cords be checked at least monthly. Checking lead cords on a routine basis, and replacing them annually, will ensure your patient's comfort, safety, and the effectiveness of the treatment.

Patient Electrode Connection

**Plug shielded ends of lead cord into the output jacks on the device
(red end into red jack and white end into white jack for each channel)**



Waveforms

The Theratouch 3.3/4.7 represent the most sophisticated electrical waveform generation ever developed in electrotherapy. The waveforms are software generated by an extremely sophisticated computer that resides in each Theratouch. Because of this generation, the Theratouch 3.3 and 4.7 can grow with the future of electrotherapy.

Each waveform has characteristics that are particularly well suited to a physiological response. Classic, or Quadpolar Interferential, is the most conventionally thought to provide the smoothest “feeling” current available for sensory stimulation. Symmetric, Square-Wave Biphasic current is conventionally thought to provide the smoothest muscle contraction. Monophasic current provides a net charge effect, when needed, provides low current density stimulation, and historically has been used when an ultrasound combination is utilized. The Russian waveform is thought to be the best waveform for motor contraction.

Within each waveform, a particular pulse rate or “beat” frequency can be chosen. Low pulse rates (0-10) are thought to be the best for indications involving chronic problems, while higher pulse rates (80-200) are thought to be best for indications involving acute problems. A pulse rate of 50Hz is thought to provide the best motor stimulation (contraction) without rapid fatigue.

Broad base protocol conventions exist for all electrical stimulation as described above, but within each waveform, certain parameters are the key to eliciting a particular response.

Helpful Hint:

If you desire further information regarding waveform descriptions, recommended reading to supplement this section is

ELECTROTHERAPEUTIC TERMINOLOGY in Physical Therapy, published by the American Physical Therapy Association. For more information, contact the APTA, 1111 North Fairfax Street, Alexandria, VA 22314-1488.

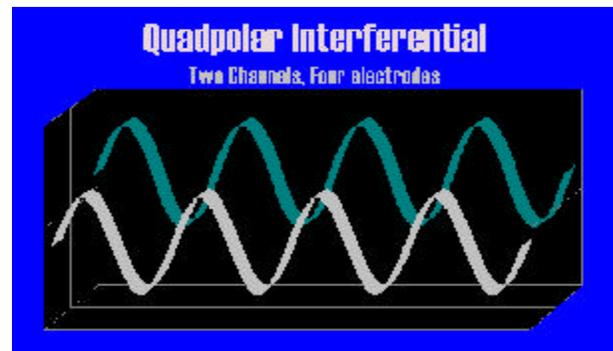
Quadpolar Interferential

(four pads)

Electrical stimulation at higher frequencies (5000Hz) penetrates the skin easily (due to capacitive effects of the skin) but has little therapeutic effect. Lower frequencies (0-200) are therapeutic, yet produce irritation or even pain if applied directly. Interferential current utilizes two high frequencies to pass through the skin barrier and then mixes the two frequencies to produce a low frequency within the tissues.

Quadpolar mode is named such because two channels totaling four (quad) electrodes work in conjunction to provide treatment of one site.

The Theratouch 3.3/4.7 provides Quadpolar Interferential by producing two separate sine wave outputs. By crossing these electrodes, the two sine waves mix and produce a “beat” frequency within the tissue. This beat is the difference in the two sine wave outputs.



The Theratouch 3.3/4.7 produces 5000Hz sine waves from channels one and three and produces between 5000 and 5200Hz sine waves and channels two and four. Channels one and two operate in concert to treat one site. Channels three and four also operate together to treat one site. The user may select a fixed “beat” or pulse rate between zero and 200. The user may also select a scan setting which scans between a low “beat” and a high “beat” setting.

Quadpolar Interferential Parameters:

Carrier Frequency: 5000Hz

Beat Frequency Fixed: 0-200Hz

Beat Frequency Scan Low: 0Hz to 200Hz

Beat Frequency Scan High: 0Hz to 200Hz

Pulse Rate Chain: 0-200Hz, either Fixed and/or Scan

Vector Options: Shallow, Normal, Deep

Vector Speeds: Slow, Medium, Fast

Alternating Rate:* Not Available
 Surge Rates:* On: Not Available, Off: Not Available

Ramp On: Variable 1-5 Seconds
 Ramp Off: Variable 0-5 Seconds

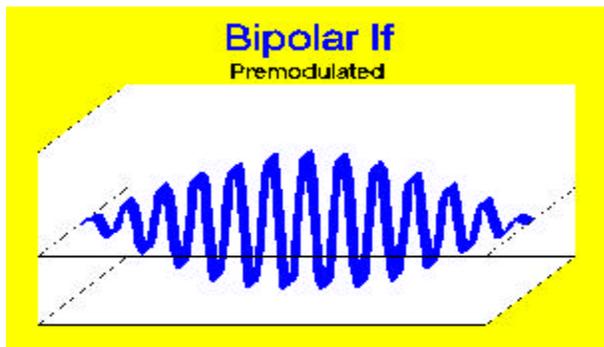
Quadpolar Interferential

The Total Output Current = 50mA rms. The meter shown on the screen of the Theratouch is listed as rms current. To convert rms to peak current, multiply rms by 1.414. Examples are given below.

Meter Reading (ms) Milliamps (mA)	Peak Current Conversion (mA)
5	7.1
10	14.1
15	21.2
20	28.2
25	35.4
30	42.4
35	49.5
40	56.6
45	63.6
50	70.7

Bipolar Interferential

Bipolar Interferential operates with a carrier frequency but it is premodulated within the Theratouch 3.3/4.7. This enables a single channel (two-electrode) system to be used. Bipolar Interferential can select a pulse rate or a "beat" frequency between five and 200Hz.



Bipolar Interferential Parameters:

Carrier Frequency: 5000Hz
 Beat Frequency Fixed: 0-200Hz
 Beat Frequency Scan Low: 5Hz to 200Hz
 Beat Frequency Scan High: 5Hz to 200Hz
 Pulse Rate Chain: 5-200Hz, either Fixed and/or Scan
 Vector Options: Shallow, Normal, Deep
 Vector Speeds: Slow, Medium, Fast
 Alternating Rate: 2-99 Seconds
 Surge Rates: On: 2-99 seconds, Off: 2-180 seconds
 Ramp On: Variable 1-5 Seconds
 Ramp Off: Variable 0-5 Seconds

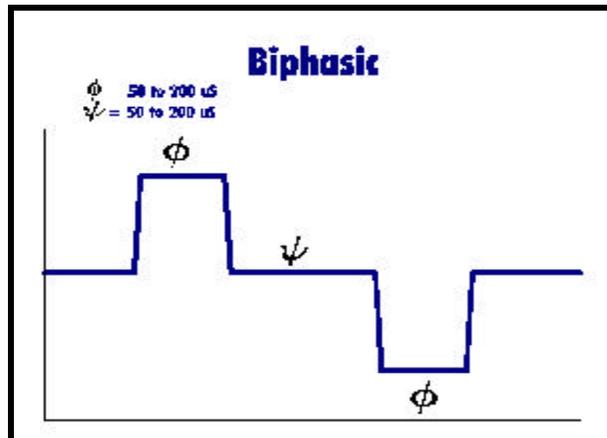
Bipolar Interferential

The Total Output Current = 30mA rms. The meter shown on the screen of the Theratouch is listed as rms current. To convert rms to peak current, multiply rms by 2.34 (1.414/.707). Examples are given below:

Meter Reading (ms) Milliamps (mA)	Peak Current Conversion (mA)
5	11.7
10	23.4
15	35.1
20	46.8
25	58.5
30	70.1

Biphasic

The Theratouch 3.3/4.7 also has the capability to produce a Symmetric Square-Wave Biphasic stimulation having two phases per pulse - a positive phase, followed by a negative phase. This produces a net charge of zero.

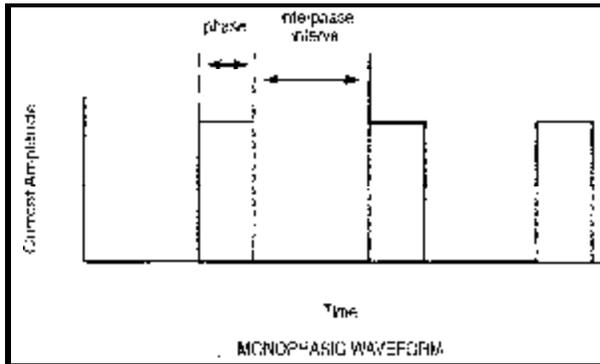


Biphasic Parameters:

Carrier Frequency: Not Applicable
 Beat Frequency Fixed: 2-200Hz
 Pulse Rate Chain: 2-200Hz, either Fixed and/or Scan
 Phase Duration: 50, 100, 150, 200 μ S
 Interphase Interval: 50, 100, 150, 200 μ S
 Alternating Rate: 2-99 Seconds
 Surge Rates: On: 2-99 seconds, Off: 2-180 seconds
 Ramp On: Variable 1-5 Seconds
 Ramp Off: Variable 0-5 Seconds

Monophasic

The Theratouch 3.3/4.7 also has the capability to produce a Symmetric Square-Wave Monophasic stimulation having two equal positive phases per pulse. This results in a net charge effect. The polarity of monophasic can be either positive or negative (referring to the red pin for each channel). The Theratouch has the ability to change polarity “on-the-fly”. To change polarity of the waveform select the +/- button at any time while adjusting the intensity of the monophasic waveform. The polarity change utilizes a one-second “comfort ramp” down and back up in intensity to make the polarity change more gradual and comfortable.



ADDITIONAL METERING

The Theratouch 3.3/4.7 displays three meters for each monophasic waveform. The peak reading is shown to the right of the bar. Below and left of the bar (while treating) is a meter that shows average charge per second. This will vary with the number of pulses-per-second. The third meter is to the right and below the bar (while treating) and is an accumulative net charge meter. It works much like an odometer, multiplying average charge meter time by the treatment time. Most experts say that this is an excellent way to determine the amount of total current a site has received.

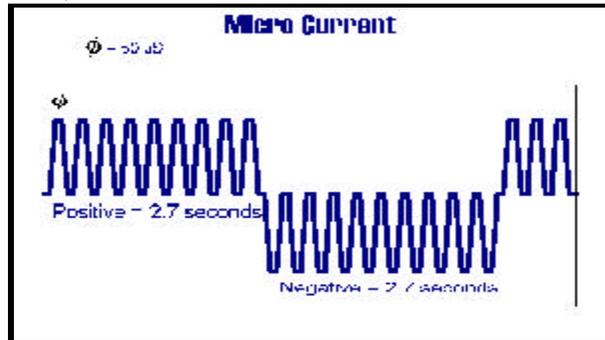
Monophasic Parameters:

Carrier Frequency: Not Applicable
Pulse Rate: 2-200Hz
Pulse Rate Chain: 2-20Hz, either Fixed and/or Scan
Phase Duration: 50 μ S
Interphase Interval: 50, 100, 150, 200 μ S
Alternating Rate: 2-99 Seconds
Surge Rates: On: 2-99 seconds, Off: 2-180 seconds
Ramp On: Variable 1-5 Seconds
Ramp Off: Variable 0-5 Seconds

Micro Current

Micro current is a pulsed waveform that produces 50 μ S phases from .3-1000 pulses-per-second. The

phases alternate from positive to negative every 2.7 seconds. The amplitude is adjustable from zero to 1000 μ A.

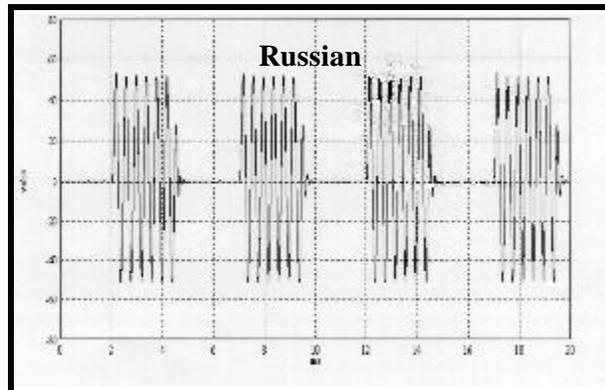


Microcurrent Parameters:

Carrier Frequency: Not Applicable
Pulse Rate: Fixed .3-1000Hz
Pulse Rate Chain: Fixed Low, Fixed High
Phase Duration: 50 μ S
Interphase Interval: Dependent upon pulse rate
Positive/Negative Interval: 2.7 seconds
Alternating Rate: Not Applicable
Surge Rates: Not Applicable
Ramp On: Not Applicable
Ramp Off: Not Applicable

Russian

Russian is a 2500Hz time-modulated waveform having a sinusoidal frequency that is burst modulated at 50% duty. Russian is not available in a continuous mode, but it is available in surge, alternating, and continuous modes.



Russian Parameters:

Carrier Frequency: 2500Hz
Beat Frequency: Fixed 5-200Hz
Scan: Low 5Hz to 200Hz, High 5Hz to 200Hz
Pulse Rate: 5-200Hz Fixed
Alternating Rate: 2-99 seconds
Vector Options: Not Available
Surge Rates: On 2-99 seconds, Off 2-180 seconds
Ramp On: Variable 1-5 seconds
Ramp Off: Variable 0-5 seconds

Theratouch 3.3/4.7 Specifications

Dimensions:	17"W x 10"D x 5"H
Weight:	14 lbs.
Power Input:	110 VAC, 60Hz 220 VAC, 50 Hz
Power Consumption:	110 Watts
Fuse:	1 Amp
Line Leakage:	Less than 50 mA

Theratouch 3.3/4.7 Accessories

The accessories that come standard with the Theratouch 3.3/4.7 as well as the optional accessories available for the unit are listed below. Their part numbers are included for easy reordering.

Standard Accessory Package

2) White pin lead cords	LC1718A
2) Red pin lead cords	LC1719A

2 packages of one of the following:

SuperStim self-adhesive electrodes (1.75" x 1.75")	PD1071
(2" Round)	PD1072
(1.75" x 3.75")	PD1073

Optional Accessory Package

8) 4" round carbon electrodes	PD1042
8) 4" round sponges for PD1042	PD1054
8) 2" x 30" Velcro straps	VS2105

Other Accessories

BlueStim self-adhesive electrodes (1.75" x 1.75")	PD1031
(1.75" x 3.75")	PD1033
SuperStim self-adhesive electrodes (1.75" x 1.75")	PD1071
(2" Round)	PD1072
(1.75" x 3.75")	PD1073
Banana to Pin adapter (set of two)	LC1720
Pin to Banana adapter (set of two)	LC1721
Carbon electrodes (2.5" round)	PD1044
Sponges for PD1044	PD1055
Handle	CH3750
Wall Bracket	CH3754

APPENDIX A
PARTS LIST

Therataouch 3.3/4.7 Parts List

Main Board (Part name 2667)

Reference Designators	Part Name	Description	Qty/Board
(TO-220 HS)(U15-U18, U1)	4x1/4 SCREW, TAPPING	SCREW, TAPPING TYPE B, 4-40x1/4, PH	10
(TO-3 HS)(U19)	6-32x1/2 MS-PAN-PH SS	SCREW, MACH PH PAN 6-32x1/2, SS	2
(TO-3 HS)(U3,U4)	6-32x3/8 MS-PAN-PH SS	SCREW, MACH PH PAN 6-32x3/8, SS	2
(TO-3 HS)(U3,U4,U19)	6-SPLT-LK-W. SS	WASHER, LOCK SPLIT #6, STAINLESS STEEL	4
(TO-3 HS)(U3,U4,U19)	6-HEX NUT SS	NUT, HEX 6-32, STAINLESS STEEL	4
(U1 HS)(U15 HS)(U16 HS)(U17 HS)	4880S	MOUNTING KIT, TO220	5
(U18 HS)	6398B	HEAT SINK, TO-220, SHORT	5
(U1 HS)(U15 HS)(U16 HS)(U17 HS)	6398B	HEAT SINK, TO-220, SHORT	5
(U18 HS)	53-03-2	INSULATION PAD, T-03, THERMAL SIL	1
(U19 HS)	2-641933-3	SOCKET, IC 24 PIN .3 LS	2
(U23,U36)	2-641599-1	SOCKET, IC 14 PIN	7
(U27, U30, U8, U41, U42, U14, U31)	821949-5	SOCKET, HOUSING, 132 LEAD PQFP (TO	1
(U34)	821942-1	SOCKET, COVER, 132 LEAD PQFP (TO CQFP)	1
(U34)	821574-1	SOCKET, PLCC, 68 PIN	1
(U35)	2-641604-1	SOCKET, IC 24 PIN .6 LS	1
(U37)	HS-PAD-01	HEAT SINK, GAP PAD, 8-PIN DIP, .125" THICK	1
(U39)	821575-1	SOCKET, PLCC, 44 PIN	2
(U40, U45)	2-641602-1	SOCKET, IC 20 PIN	4
(U46,U24,U20,U32)	2-641605-1	SOCKET, IC 28 PIN .6 LS	2
(U47)(U33)		TUBING SLEEVES	4
(U53)	2-641600-1	SOCKET, IC 16 PIN	5
(U6,U22,U43,U44,U38)	2-640463-1	SOCKET, IC 8 PIN	11
(U7,U21,U52,U39,U25,U26,U28,U29 U49,U50,U31)	ECE-A1VU101	CAP, A., 100 uF, 35V, RADIAL, +/-20%	5
C1,C2,C4,C5,C18	ECE-A1VU102	CAP, A., 1000uF, 35V, RADIAL, +/-20%	10
C10-C17,C33,C34	C410C102K1G5CA	CAP, CERAMIC .001uF, AXIAL, 100V +/-10%	5
C115,C117,C129,C131,C134	C410C103M5R5CA	CAP, CERAMIC, .01uF, AXIAL, 50V, +/-20%, X7R	2
C125,C126	ECE-A1CU221	CAP, AL, 220 uF, 16V, RADIAL, +/-20%	1
C135	C430C474M5U5CA	CAP, CERAMIC .47uF, AXIAL, 50V, +/-20%	1
C137	ECE-A1JU220	CAP, AL, 22 uF, 63V, RADIAL, +/-20%	1
C28,C41-C43	ECE-A1CU222	CAP, AL, 2200 uF, 16V, RADIAL, +/-20%	4
C29			1

Therataouch 3.3/4.7 Parts List, Cont.

Main Board (Part name 2667)

Reference Designators

C3,C6-C9,C19-C27,C36-C40,C44-C46,
 C51-C62,C64-C75,C81,C82,C84-C88
 C90,C92,C94,C95,C99,C100,C102,
 C103-C109,C112,C114,C116,C118-C124,
 C127,C128,C130,C132,C133,C136,C138,
 C141,C142-C144

	Part Name	Description	Qty/Board
	C410C104M5U5CA	CAP, CERAMIC .1uF, AXIAL, 50V +/-20%	88
	T322C106M015AS	CAP, TANTALUM 10uF, 15V AXIAL, +/-20%	2
	T322A105K025AS	CAP, TANTALUM 1uF, 25V AXIAL, +/-10%	10
	ECE-A1JU101	CAP, AL, 100 uF, 63V, RADIAL, +/-20%	2
	ECE-A1JU100	CAP, AL, 10 uF, 63V, RADIAL, +/-20%	1
	C430C104M1G5CA	CAP, CERAMIC .1uF, AXIAL,100V +/-20%, X7R	2
	ECE-A1JU102	CAP, AL, 1000uF, 63V, RADIAL, +/-20%	2
	CAP-DNS		1
	C410C121J1G5CA	CAP, CERAMIC 120pF, AXIAL, 100V, +/-5%	1
	C410C220J1G5CA	CAP, CERAMIC 22pF, AXIAL, 100V +/-5%, NPO	6
	KBU4J	DIODE BRIDGE, FULL WAVE	3
	LS3360-KN	LED, RED, PCB, MOUNT, SMALL	2
	1N4148	DIODE, SIGNAL	1
	W02G	DIODE BRIDGE, FULL WAVE, 1.5A	1
	1N4005	DIODE, 5 AMP 100V	8
	11DQ04	DIODE, SCHOTTKY, 60V	12
	103186-5	HEADER, 2x5 PIN UNSHIELDED, .100	1
	RL359	JACK, PHONO, PC-MOUNT	5
	102977-2	WIRE, JUMPER-01	2
	747840-4	HEADER, DUAL ROW 4 PIN	1
	2-103185-0	WIRE, JUMPER-02	1
	1-640445-6	CONN, DB9, MALE, RIGHT-ANGLE	1
	2-640445-2	HEADER, SINGLE ROW 20 PIN	1
	HEADER - DNS	HEADER, SINGLE ROW 16 PIN, POLARIZED	1
	640456-5	HEADER, SINGLE ROW 22 PIN, POLARIZED	1
	640456-6	HEADER, 5 PIN POLARIZED, 0.1	3
	103185-6	HEADER, 6 PIN, MTA-100, FRICTION LOCK	1
	640454-4	HEADER, 1x6 PIN UNSHIELDED, .100	1
		HEADER, SINGLE ROW 4 PIN, POLARIZED, .1	1

Theratouch 3.3/4.7 Parts List, Cont.

Main Board (Part name 2667)		Part Name	Description	Qty/Board
P9	Reference Designators	640454-2	HEADER, SGL ROW 2 PIN, POLARIZED, .1	2
PCB		RM 1140-B	PCB, THERATOUCH 4.7	1
Q1-Q3,Q5,Q9-Q13		VN0104N3	TRANSISTOR, MOSFET, N-CHANNEL, 2 AMP	9
Q4,Q6,Q7		VP0104N3	TRANSISTOR, MOSFET, P-CHANNEL, 40V	3
R1		SFR55D-38.3K	RES, MF 38.3K 1/4W 1%	1
R16,R20,R24,R28		SFR55D-1.43K	RES, MF 1.43K 1/4W 1%	4
R17,R21,R25,R29		SFR55D-4.75	RES, MF 4.75 1/4W 1%	4
R2,R15,R19,R23,R27,R31,R32,R35, R36,R37,R57,R63,R65,R67,R68,R73, R75		SFR55D-10K	RES, MF 10K 1/4W 1%	17
R3		SFR55D-243	RES, MF 243 1/4W 1%	1
R30,R45		SFR55D-806K	RES, MF 806K 1/4W 1%	2
R33,R56,R74,R79,R80-R82		SFR55D-1K	RES, MF 1K 1/4W 1%	7
R39		SFR55D-61.9K	RES, MF 61.9K 1/4W 1%	1
R4		SFR55D-4.42K	RES, MF 4.42K 1/4W 1%	1
R40-R43		43FR30	RES, WIRE WOUND, 0.3, 3W, 1% AXIAL	4
R44		SFR55D-13.7K	RES, MF 13.7K 1/4W 1%	1
R46,R50,R52,R53		SFR55D-100K	RES, MF 100K 1/4W 1%	4
R47		SFR55D-332K	RES, MF 332K 1/4W 1%	1
R48		SFR55D-10M	RES, MF 10M 1/4W 1%	1
R5,R34,R38,R49,R51,R55,R59,R62, R64,R70,R72		SFR55D-4.75K	RES, MF 4.75K 1/4W 1%	11
R54,R60		SFR55D-200K	RES, MF 200K 1/4W 1%	2
R58,R66		SFR55D-2.55K	RES, MF 2.55K 1/4W 5%	2
R6,R8,R10,R12		SFR55D-681	RES, MF 681 1/4 1%	4
R61		SFR55D-1M	RES, MF 1M 1/4W 1%	1
R69		SFR55D-20K	RES, MF 20K 1/4W 1%	1
R7,R9,R11,R13,R14,R18,R22,R26		SFR55D-22.6K	RES, MF 22.6K 1/4W 1%	8
R71		SFR55D-6.81K	RES, MF 6.81K 1/4W 1%	1
R76		SFR55D-17.8K	RES, MF 17.8K 1/4W 1%	1
R77		SFR55D-100	RES, MF 100 1/4W 1%	1
R78		SFR55D-402	RES, MF 402 1/4W 1%	1
R83		SFR55D-5.76K	RES, MF 5.76K 1/4W 1%	1
RLY1-RLY5		122AY*1K0BAA	RELAY, REED, 2 FORM A, MOLDED	5

Therataouch 3.3/4.7 Parts List, Cont.

Main Board (Part name 2667)

Reference Designators	Part Name	Description	Qty/Board
RPI-RP5	L101C103	RES, SIP NETWK 10k, BUSED, 10 PIN	5
SOCKET	2-644018-1	SOCKET, IC 32 PIN .6 LS	4
SPI	AT-40	SPEAKER, 100, .15W, PC-MOUNT	1
T1-T4	LA-12	TRANSFORMER, PULSE (LA-12)	4
U1	LM2940T-5.0	IC, REGULATOR, +5V - TO220	1
U10,U11	AM29F010-120PC	IC, FLASH, 120NS, DIP32, 0/+70°C	2
U12,U13,U47	HM62256ALP-10	IC, RAM, STATIC, 32kX8 100ns, 0/70°C	3
U14	74HC74	IC, FLIP-FLOP, DUAL D W/SET & RESET	1
U15-U18	LM1875T	IC, AMP, AUDIO POWER - VERTICAL	4
U2	MC78L12CT	IC, REGULATOR, VOLTAGE, +12V, TO-92	1
U20,U32	74HC273	IC, OCTAL D FLIP-FLOP W/CLOCK & RESET	2
U21	CAT35C116P	IC, EEPROM, SERIAL, 16-KBIT	1
U22	74HC175	IC, FLIP-FLOP, QUAD D, 0/+70°C	1
U23,U36	AD7242JN	IC, CONVERTER, DUAL DA, 0/70°C	2
U24	AD7226KN	IC, D/A QUAD, 8-BIT	1
U25,U26,U28,U29	MAX291CPA	IC, FILTER	4
U27,U30	DG307ACJ	IC, ANALOG SWITCH	2
U3	LM2940CT-12	IC, REGULATOR, +12V - TO220	1
U31	OPA445AP	IC, OP AMP, HIGH VOLTAGE	1
U33	DNS - X28C256P-15	IC, u CONTROLLER, PQFP -40/+85°C	1
U34	MC68331CFC16	IC, DSP, 10.24MHz, 68 PIN PLCC, 0/70°C	1
U35	ADSP-2101KP-40	IC, REGULATOR, -5V, TO220	1
U4	LM7905	IC, CPLD, 2000 GATES, 44 PIN, 0/+70°C	2
U40,U45	PLS11016-60LJ	IC, DETECTOR, MONOLITHIC PEAK, 0/70°C	2
U41,U42	PKD-01FP	IC, GAIN-SET, DIGITAL BINARY-SCALED SET	1
U43	LF13006N	IC, MULTIPLEXER, 8-TO-1, 0/70°C	1
U44	ADG508AKN	IC, CONVERTER, SERIAL	1
U46	TLC154IIN	IC, CONTROLLER, LCD, SURFACE MOUNT	1
U48	SED1330FBA	IC, OP AMP, DUAL	1
U49	LF412A	IC, REGULATOR, -12V, TO-92, 10%	1
U5	MC79L12CT	IC, OP AMP, DUAL OPER., LOW PWR	1
U50	LM358N	IC, INVERTER, SCHMIDT	1
U51	74HC14	IC, AUDIO AMP, 1W, W/DC VOL CONTROL	1
U52	TDA7052A	INVERTER, BACKLIGHT, 12V INPUT, PCB	1
U53	CXA-L10L		1

Theratoch 3.3/4.7 Parts List, Cont.

Main Board (Part name 2667)

Reference Designators	Part Name	Description	Qty/Board
U6	MAX202CPE	IC, DRIVER/RECEIVER, 5V RS232, VARIABLE	1
U7	MAX690ACPA	IC, SUPERVISORY CIRCUIT, 0/+70°C	1
U8	74HC125	IC, BUFFER, QUAD W/TS OUT	1
U9	LM337LZ	IC, REGULATOR, -ADJUSTABLE	1
V1-V4	V220ZA05	VARIABLE, 220V RMS, 5MM	4
Y1	MMCC-1	CRYSTAL, 32.768 KHz, -40/+85°C	1
Y2, Y3	ATS49-10.000	CRYSTAL, 10.000 MHz, LO PROFILE	21

Chassis (Part name 0161)

Rich-Mar Part No.	Part Name	Description	Qty/Board
3759		THE RATOUCH 4.7 CHASSIS	1
9800	4880-03M-GG	AC CORD	1
6523	61C00-01-08-02	ENCODER POT	1
8331	AM17627	TRANSFORMER	1
6340	8010	THE RATOUCH PANEL	1
3755	2S0055011ASSY	CORD WRAP	1
3510	SMITH 2182	FEET	4
4802		4.7 FAN	1
7801		ON/OFF ROCKER SWITCH	1
5519	POMONA 4921-9	WHITE OUTPUT JACK	4
5520	POMONA 4921-2	RED OUTPUT JACK	4
9114		BLACK STRAIN RELIEF (AC CORD)	1
5001		FUSE HOLDER	1
5008		SLOW BLOW 1 AMP FUSE	1
9174		3/8" OUTPUT JACK INSULATORS	8
3745		NEW STYLE RIGHT BAIL (HAMMER)	1
3269	10FNNEZ	10 SELF LOCKING NUTS FOR BAIL	2
5718	PT-7-S	BONE GREY KNOB	1
9116	NP-07-GY	STRAIN RELIEF NUT FOR SOUNDHEAD	1
3771		4.7 PORT COVER	1

Theratouch 3.3/4.7 Parts List, Cont.

Chassis (Part name 0161)

Rich-Mar Part No.	Part Name	Description	Qty/Board
4163	AMP 640433-2	.156 AMP CONNECTOR (LINE CORD)	2
4169	640433-4	.156 AMP CONNECTOR (AC SWITCH)	1
4173	AMP 640433-6	.156 AMP CONNECTOR TRANSFORMER	1
4176	AMP 640433-8	.156 AMP CONNECTOR TRANSFORMER	3
9139	RB14-250F	OUTPUT JACK WIRING HARNESS	1
9143	1815H	SPADE CONNECTOR (FEMALE)	1
4181	AMP 2-640440-0	SPADE CONNECTOR (MALE)	1
0723	SMITH 8320	20 .1 AMP CONNECTOR (DISPLAY RIBBON)	2
9836	AMP 64044-5	SPACER (MAIN BOARD MOUNTING)	12
7651	T33364	5 PIN .1 AMP CONNECTOR DISPLAY	1
6346	CSA-2G	RM LOGO STICKER	1
7658		3.3/4.7 PANEL LABEL	1
7660		RISK CLASS LABEL	1
7620		THERATOUCH FCC LABEL	1
7603		WARNING 1 AMP FUSE LABEL	1
7609		WARNING ACCESSORY LABEL	1
5931	DMF-50174ZNB-FW	PATENT LABELS	1
9836	WI2045	OPTREX DISPLAY	1
2667		RIBBON CABLE FROM DISPLAY TO MAIN BOARD	1
1718A		SMART COMBO MAIN BOARD	1
1719A		WHITE LEAD CORD W/ PIN LEAD	2
7695		RED LEAD CORD W/ PIN	2
7696		LEAD CORD LABEL	1
		OUTPUT JACK LABEL	1

APPENDIX B
SCHEMATICS