

**RICH-MAR THERAMINI 3C/3P
OPERATION HANDBOOK AND MANUAL**



Part # MN 2431

Rev. J

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 accessories NOT manufactured by Rich-Mar. These include patient lead cords, self-adhesive electrodes, and carbon electrodes.

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.

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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.

Ultrasound Indications for Treatment **(Therapeutic Ultrasound)**

Rich-Mar Ultrasound devices are indicated to produce therapeutic deep heat for the following conditions:

- 1) Relief of pain.
- 2) Muscle spasms.
- 3) Joint contractures.

But not for the treatment of malignancies.

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.

Ultrasound Contraindications

Contraindications

Ultrasound should not be used in the following areas:

- 1) Near or over the heart.
- 2) Near or over the eyes.
- 3) On the head.
- 4) Near or over reproductive organs.
- 5) On the lower back during pregnancy or over the pregnant uterus.
- 6) Directly over the spinal column.
- 7) Over growing bone in children.
- 8) Where the skin suffers from any sensory impairment.
- 9) Over areas of malignancies.
- 10) In the area of visceral plexus and large autonomous ganglion.
- 11) Over the thoracic area if the patient is using a cardiac pacemaker.
- 12) Over a healing fracture.
- 13) Over ischemic tissues in individuals with vascular disease where the blood supply would be unable to follow the increase in metabolic demand and tissue necrosis might result.

Precautions

Precautions should be taken when used:

- 1) Over anesthetized areas.
- 2) On patients with hemorrhagic diatheses.
- 3) Ultrasound treatment should not be performed over an area of the spinal cord following laminectomy (i.e.- when major covering tissues have been removed).

Caution

- 1) Excessive doses of ultrasound may cause damage to tissue. Periosteal pain is an indication of excess intensity and if it occurs, the power should be reduced; the transducer should be moved more rapidly over the area being treated; or a lower pulsed duty cycle should be used.
- 2) If the soundhead has been operated unloaded for an extended period of time, the transducer will get hot. If the soundhead is applied to the patient while the transducer is hot, a burn may result.

Warning

Do not operate the soundhead in an unloaded condition. It is possible that unreparable damage may occur to the transducer in an unloaded state.

Introduction

The Rich-Mar Theramini 3C and 3P are products that result from dedication to research and development. The Theramini 3 offers the most flexible treatment possibilities in a convenient, easy-to-use clinical or portable package.

This manual is meant to familiarize the user with the controls, operations, and waveforms and ultrasound therapies available in the Theramini 3C and 3P. The simple control of the unit allows the user to master the unit's vast capabilities more quickly and easily.

User Interface

The main controls for the Theramini 3 are the buttons labeled, "Set/Enter," "Start," and "Stop/Clear." These buttons work in conjunction with the control dial to operate all aspects of the multi-stimulation/ultrasound therapy parameters of the Theramini 3.

AC Power Switch

This switch will turn the unit on and off. The power switch for the Theramini 3 is located on the rear left side of the unit. "I" represents the on position and "O" represents the off position.

Set/Enter Button

This button performs a multitude of tasks and allows the user to change and set treatment parameters.

Start Button

The main function of this button is to begin a treatment. It also allows the user to conduct the electrode lead cord test and will duplicate the set/enter button in some applications.

Stop/Clear Button

This button will pause any treatment in progress. If pressed again, it will clear the treatment in use and return the user to the corresponding treatment menu. If the stop/clear button is pressed a third time, it will return the user to the main menu. **This button functions as the immediate treatment override.**

Control Dial

The control dial will allow the user to select a treatment or treatment parameters as well as access the system and help menus. The dial can be used to scroll through general parameter options and to set quantifiable limits such as pulse rates, phase durations, interphase intervals, vectors, intensity, soundhead size/frequency, duty cycle, time, etc. These controls are displayed on the panel illustration below.

Theramini 3C and 3P Operation

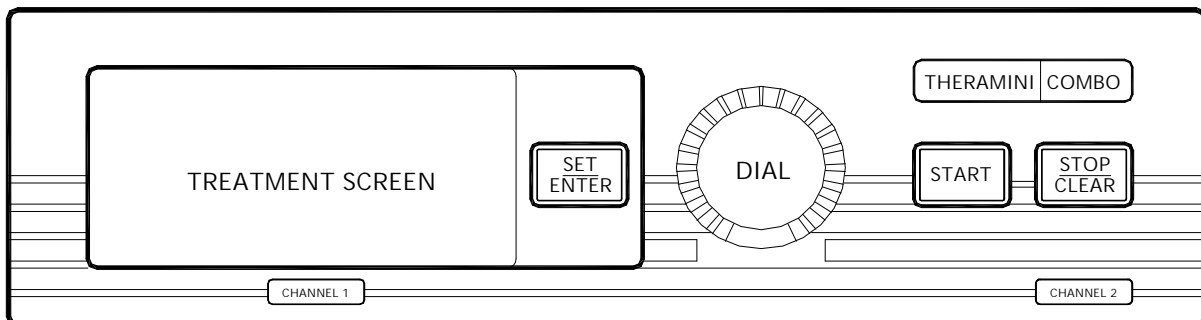
Overview

The Theramini 3 units are two-channel, multi-waveform/frequency, upgradeable, stimulation-ultrasound combination units. The Theramini 3C and 3P will output any one of the following waveforms: Quadpolar Classic Interferential, Bipolar Premod-ulated Interferential, Monophasic (High Volt), Symmetric Square Biphasic (Low Volt), Russian, and Microcurrent. Dependent upon the waveform in use, any one of the following treatment modes can also be used: Continuous output, Surged output, Alternating output, and Rich-Mar's unique "Chain" mode. (NOTE: for more information on outputs, see the "Waveforms" section.)

The Theramini 3C and 3P also provide 1MHz and 3MHz ultrasound frequencies via the unique, patented "Therapy Hammer" transducer with a 2cm² soundhead on one side and a 5cm² soundhead on the other. The ultrasound function on the Theramini 3 also has the unique feature of pre-setting the desired output wattage. This allows the user to select the treatment, press start, and the treatment begins.

Main Menu

The main menu is the first screen shown after switching on the power on the Theramini 3. The main menu will allow the user to select treatment types and settings from one of the five boxes labeled, "STIM," "COMBO," "USOUND," "SYSTEM," and "HELP."



Stimulation

Use the dial to scroll through the five boxes. The dial highlights and moves from box to box. Use the dial to highlight the “Stim” box and press set/enter or start. The stim menu should then appear. The stim menu should have eight QuikSet boxes at the bottom of the screen with corresponding treatment information listed above. Notice that when the dial is used to scroll through the eight QuikSet boxes, the corresponding treatment parameters for that box are shown at the top of the screen. These QuikSets can be customized with all parameters and named for quick and easy treatment.

To begin a treatment, highlight the desired QuikSet box with the dial and press start. The user will then be prompted to increase the intensity on channel one with the dial. Once the intensity is set at the appropriate level, press set/enter to set channel one. The Theramini 3 will then prompt the user to set intensity for channel two. Repeat the same process if channel two will be in use, otherwise press set/enter without setting the intensity for channel two. Treatment should begin. (Treatment time will begin immediately in the Continuous and Chain mode. In Surge or Alternate mode, time will only start after set/enter has been pressed for each channel.)

NOTE: If the Quadpolar IFC therapy is in use, it requires both channels one and two and will subsequently set the same intensity level on both channels at the same time. Once the intensity levels are set on channels one and two in Quadpolar IFC, the Theramini 3 will prompt the user to adjust the balance. If desired, use the dial to balance patient sensation and press set/enter.

To Adjust Stimulation Intensity during Treatment

Intensity can be adjusted during treatment, even during the off cycle in Surge or Alternating modes, simply by pressing set/enter. Once the level is adjusted, press set/enter and the user will be prompted to do the same for channel two, if applicable.

NOTE: If the Surge or Alternating modes are in use, treatment will pause on channel two, if applicable, and bring channel one to the set intensity level. The intensity level of channel one can then be adjusted, pressing set/enter to accept. Output on channel one will pause and the intensity level for channel two can be adjusted in the same manner.

To Pause Stimulation and/or Adjust Treatment Time

To pause treatment output and time during a treatment, press the stop/clear button. Output will cease and time will stop. The treatment time will begin flashing to remind the user that treatment time can be increased or decreased with the dial. To resume treatment, press set/enter or start.

To Clear Treatment

To stop treatment and return to the stim menu press stop/clear twice. Press stop/clear again to return to the main menu.

To Customize or Change a Stim QuikSet

To customize a Stim QuikSet go to the stim menu and use the dial to highlight the desired QuikSet. Then press the set/enter button to see the available parameters. Use the dial to highlight the parameter to be changed and press set/enter. A prompt will appear at the bottom of the screen explaining the parameter to be changed. Use the dial scroll through the options and press set/enter to enter the change. The following section will explain how stim QuikSet parameters and options can be changed.

Name

Each of the eight stim QuikSets can be named for easy reference. The name parameter allows the user to choose characters from the alphabet, numbers from zero to nine, symbols #, ., +, -, and a blank space. Scroll through and select each character by pressing set/enter to name the stim QuikSets (e.g. “BACK,” “HVWH#1,” “SPASM,” “JIM,” or “ACL-3”).

Waveform

The waveform should always be selected first because some of the parameters are specific to each waveform and will therefore vary. Waveform choices include Quadpolar IFC, Premodulated Bipolar IFC, Monophasic (High Volt), Inverted Monophasic (High Volt), Symmetrical Square Biphasic (Low Volt), Russian, and Microcurrent.

NOTE: The high volt in the Theramini 3 is a non-dispersive mode, meaning that for each channel, one of the electrodes is positive and the other is negative. When using the Monophasic waveform, the red pin is positive and the white pin is negative. When using Inverted Monophasic, the pins are reversed.

Pulse Rate

Depending upon the waveform therapy selected, the user can choose from a fixed pulse rate or a pulse rate scan. Once the type of pulse rate has been selected, enter the pulse rate. If scan is selected, the user must enter the low end of the scan and press set/enter. Then enter the high end of the scan and press set/enter to accept. **NOTE:** When using the “Chain” mode, this pulse rate will be the first pulse rate.

Waveform-Specific Parameters

To the right side of the pulse rate will be those parameters that are specific to each waveform, some of which are adjustable. They include:

- Quadpolar IFC and Premodulated Bipolar IFC - Vector depth adjustable from shallow, medium, and deep. Vector speed is adjustable from slow, normal, and fast.

- Russian - 50% duty cycle, which is not adjustable.

- Symmetrical Square Biphasic - Phase durations are adjustable between 50, 100, 150, or 200 microseconds each. The interphase interval can also be adjusted between 50, 100, 150, or 200 microseconds.

- Monophasic and Inv-Monophasic - Interphase interval can be adjusted between the twin 30 μ S phases, to either 50, 100, 150, or 200 microseconds (μ S).

- Microcurrent - 2.7 second cycle, which is not adjustable.

*(For more information on waveform parameters, please see the “Waveform Specifications” section.)

Mode

Depending upon the waveform selected, the user can choose from continuous, surge, alternating, and chain modes. For information on the surge and alternating time ranges, please see the “Waveform Specifications” section. Rich-Mar’s unique Chain mode allows the user to “chain” two different pulse rates (fixed, scanned, or both) together in one treatment. The Chain mode is unique in that the amount of time for each pulse rate can be specified from a one-minute minimum to any portion of the treatment.

For example, a 2-10pps scan can be entered for the first three minutes as the first pulse rate, with a fixed 200pps pulse rate entered for the next seven minutes. If the treatment time is ten minutes, then it will time out after the second pulse rate. If the treatment time is 15 minutes, then the 2-10pps will be used for the first three minutes, 200pps will be used for the next seven minutes, and it will revert back to the 2-10pps for the next three minutes, and back to the 200pps for the

remaining two minutes.

Treatment Time

Select the desired treatment time between one and 99 minutes.

Once the QuikSets have been set and named for the most common treatments, highlight that QuikSet and press start to begin treatment. All customized QuikSets will remain in the unit’s memory until they are changed, even if the unit is turned off.

Ultrasound

To access the ultrasound portion of the Theramini 3C and 3P return to the main menu and highlight the “USOUND” box and press either start or set/enter. The Ultrasound QuikSet menu will appear, which is very similar to the Stim QuikSet menu. The ultrasound menu works in the same manner as the stim menu with the eight QuikSet boxes on the bottom portion of the screen and the parameters for each QuikSet displayed above when highlighted. Starting treatment, adjusting intensity during treatment, pausing treatment/adjusting treatment time, clearing treatment, and customizing/ changing parameters for the ultrasound menu are done in the same manner as the stim menu. Some of the parameters and ranges for the ultrasound menu do differ.

Name

Each of the eight ultrasound QuikSets can be named in the same manner as the stim QuikSets for easy reference. The name parameter allows the user to choose characters from the alphabet, numbers from zero to nine, symbols #, ., +, -, and a blank space. Scroll through and select each character by pressing set/enter to name the ultrasound QuikSets (e.g., “5CM-1M,” “HEAT,” “PHONO,” “ELBOW,” etc.).

Head Size/Frequency

Use the dial to select from 2cm²/1MHz, 5cm²/3MHz, 2cm²/1MHz, or 5cm²/3MHz. Remember that the lower (1MHz) the frequency, the deeper the penetration, if intensity levels are equal.

Ultrasound Wattage (Output)

The Theramini 3 units will allow the user to preset the ultrasound output by using the dial, setting the output level, and pressing set/enter. To avoid presetting the output, use the dial to turn the output down past 0.1 w/cm² to “Manual”. If the QuikSet is in the manual mode the unit will display a prompt to set the appropriate output level when treatment begins.

Duty Cycle

Pulsed outputs can be selected from 5% to 95% in 5% increments, as well as 100%.

Treatment Time

Select the desired treatment time between one and 99 minutes.

CAUTION: Do not operate the soundhead in an unloaded condition (without a coupling lotion and patient contact). This can cause the transducer to get very hot and may cause unrepairable damage to the transducer.

NOTE: When administering an ultrasound treatment, be sure that the treatment area of the patient has an ample quantity of Rich-Mar lotion or gel as a coupling medium. The quantity and quality of the coupling medium used has a direct bearing on the amount of ultrasonic energy transmitted to the treatment area.

Combo

The Theramini 3C and 3P allow the user to combine a stim treatment with an ultrasound treatment by emitting stimulation and ultrasound through the soundhead at the same time.

The unit utilizes channel two for combo treatments. For treatments in combination, use a regular electrode on the white pin of channel two. The soundhead will then become the red pin of channel two for stimulation.

NOTE: The red pin of the lead from channel two is not active. Both the 2cm² and 5cm² metal portions of the soundhead will emit stimulation.

To access the Combination menu, highlight the “COMBO” box in the main menu and press set/enter or start. Once again, notice that the combination menu is very similar to the stim and ultrasound menus. The eight QuikSets will have treatment parameters displayed above when the corresponding QuikSet box is highlighted.

Refer to the stim and ultrasound menus for operation information when starting treatment, adjusting intensity during treatment, pausing treatment/adjusting treatment time, clearing treatment, and customizing/changing parameters for the combination menu.

NOTE: Once a combination QuikSet has been selected, the user will be prompted to set the stimulation intensity level and then the ultrasound output level. Stimulation in combo is only available in continuous output mode.

US and Stim Used Separately During Simultaneous Treatments

The Theramini 3C and 3P allow the user to conduct both a stimulation and ultrasound treatment simultaneously. Whether a stimulation or ultrasound treatment is running, pressing the start button can start another treatment. The screen will then split and the user can select from the corresponding “STIM” or “USOUND” QuikSet buttons to start the other treatment. Set intensity or output for the second treatment, enter it by pressing set/enter, and the two different treatments will run concurrently while viewing all pertinent information for both treatments.

NOTE: When adding a “USOUND” treatment, press Set/Enter before any ultrasound output can be set into the unit. Once the desired output is set, press Set/Enter a second time.

To Adjust Intensity or Output During Concurrent Treatments

For simultaneous treatments, press the set/enter button. The ultrasound output must be adjusted first. Whether using the dial to adjust the output or not, press the set/enter button again and adjust the stimulation intensity on channel one. Pressing set/enter will then allow the user to adjust the intensity on channel two. After adjustments have been made, press set/enter.

To Pause and/or Adjust Treatments Running Concurrently

Press the stop/clear button and both the stimulation and ultrasound treatments will cease output and pause time. The treatment time on the stimulation side will begin flashing. If desired, the treatment time can be adjusted with the dial and press set/enter to accept the change. The ultrasound treatment time will begin flashing. Use the dial to adjust the ultrasound treatment time, if desired, and press set/enter or start and both treatments will resume.

To Stop Concurrent Stim and US Treatments

Press stop/clear and both treatments will pause. Press stop/clear again and treatments will clear and return to the main menu.

Help

Highlight the “HELP” button on the main menu and press either set/enter or start to access the help menu for text directions and tips on unit operation. Press the set/enter button to access the first help screen. Press the set/enter button to scroll through each help screen. Press stop/clear to return to the main menu.

Lead Cord Tester

The Theramini units come with a convenient and time-saving lead cord tester incorporated into the unit. 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.

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.

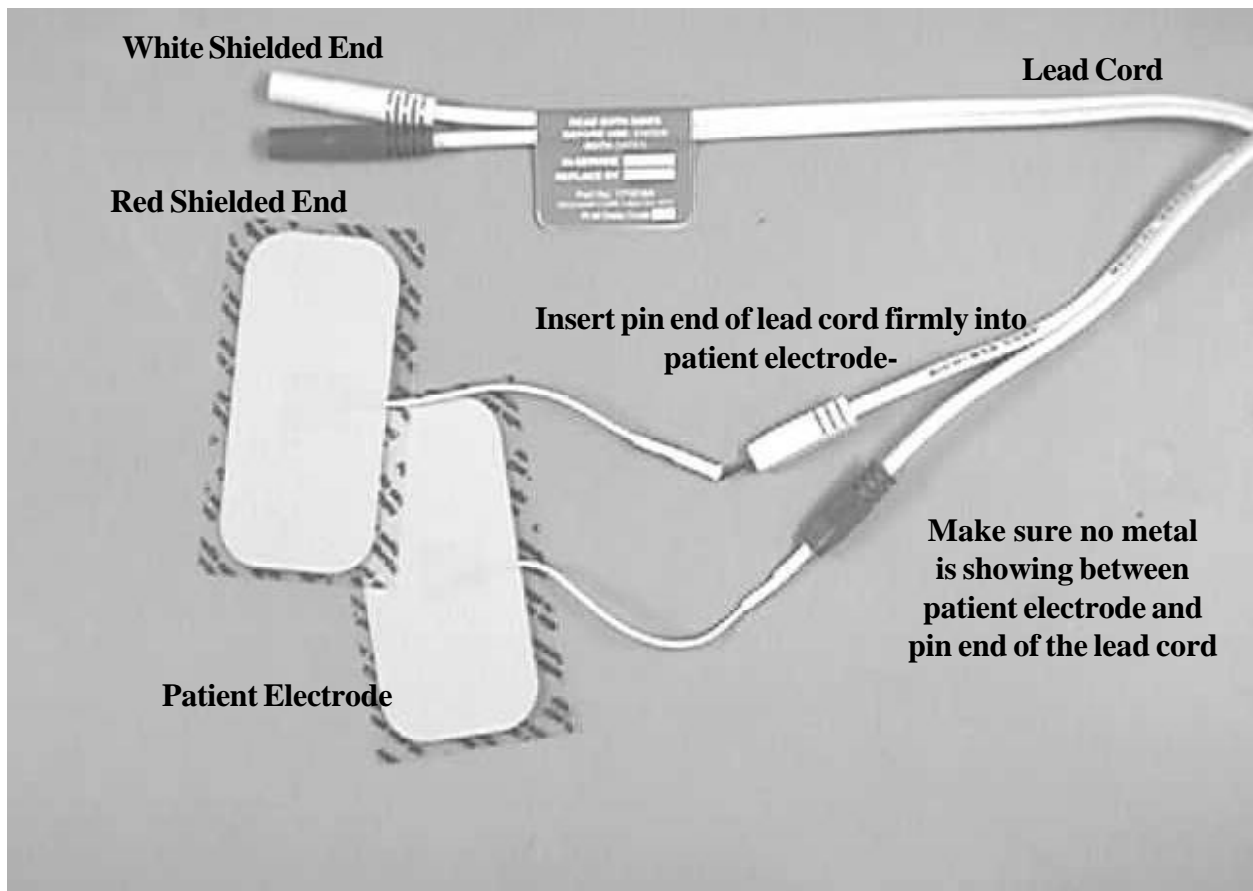
Please note that your patient lead cords bear a label with a space provided to write in the date that the lead cord was put into service ("Date in Service"). There is also a space to write in the replacement due date ("Replace By"), which will be one year from the date the lead cord was put into service.

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 Theramini 3C and 3P 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 Theramini. Because of this generation, the Theramini units can grow with the future of electrotherapy.

Each waveform has particular 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.

The Theramini 3C and 3P have been programmed to have the most common treatment options as factory settings. However, the Theramini 3C and 3P are designed to provide the most sophisticated and customized treatments imaginable.

Helpful Hint:

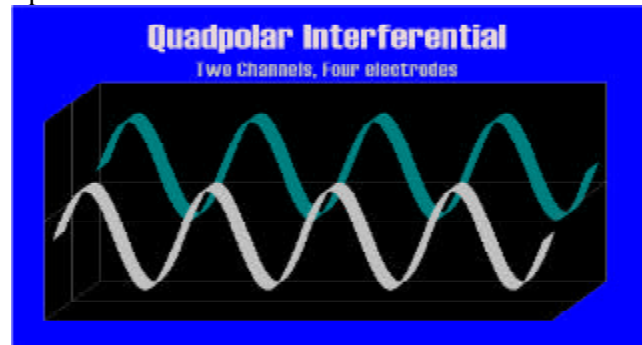
If you desire further information regarding waveform descriptions, recommended reading to supplement this section is ELECTROTHERAPEUTIC TERMINOLOGY in Physical Therapy, published by the American Physical Therapy Association. For more information, contact the APTA, 1111 North Fairfax Street, Alexandria, 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 Theramini stimulators can provide 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 Theramini stimulators produce 5000Hz sine waves from channel one and produce between 5000 and 5200Hz sine waves and channel two. Channels one and two operate in concert 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: Fixed 2 Seconds

Ramp Off: Fixed .5 Second

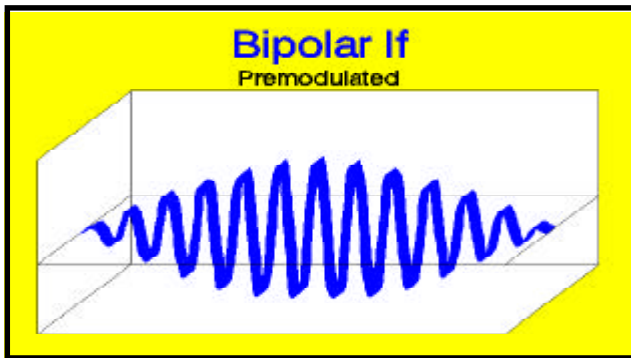
Quadpolar Interferential

The Total Output Current = 50mA rms. The meter shown on the screen of the Theramini 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 Theramini stimulators. 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: 5-200Hz
- 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: 5-99 Seconds
- Surge Rates: On: 5-99 seconds, Off: 5-180 seconds
- Ramp On: Fixed 2 Seconds
- Ramp Off: Fixed .5 Second

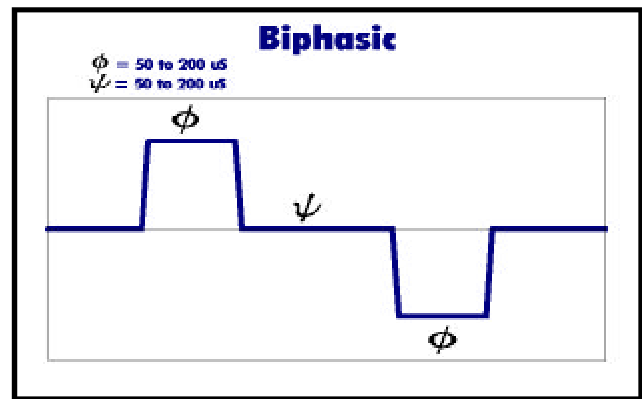
Bipolar Interferential

The Total Output Current = 30mA rms. The meter shown on the screen of the Theramini 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 Theramini stimulators also have the capability to produce a Symmetric Square-Wave Biphasic stimulation having two phases per pulse - a positive phase, followed by an interphase interval, followed by a negative phase. This produces a net charge of zero.

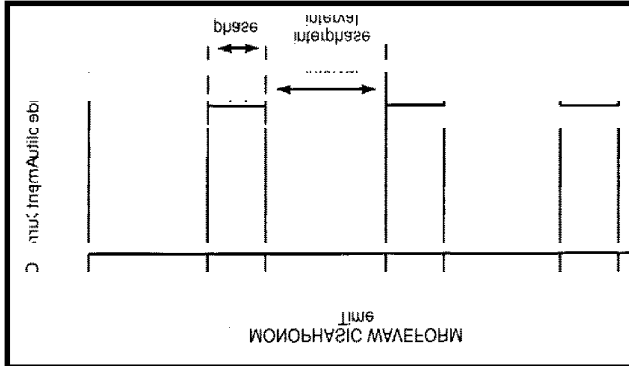


Biphasic Parameters:

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

Monophasic

The Theramini stimulators also have 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).

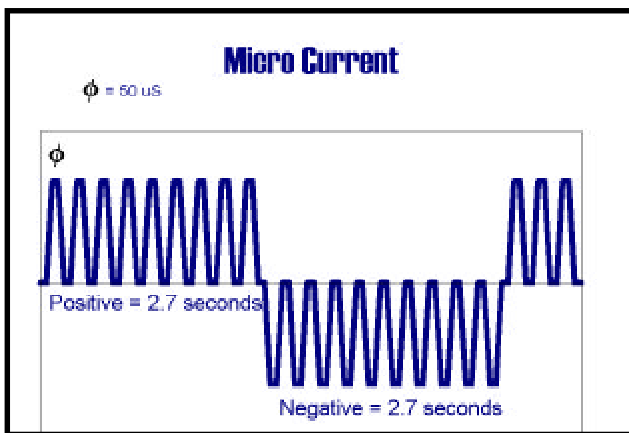


Monophasic Parameters:

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

Micro Current

Micro current is a pulsed waveform that produces 50 μ S phases from 1-1000 pulses-per-second. The phases alternate from positive to negative every 2.7 seconds. The amplitude is adjustable from zero to 1000 μ A.

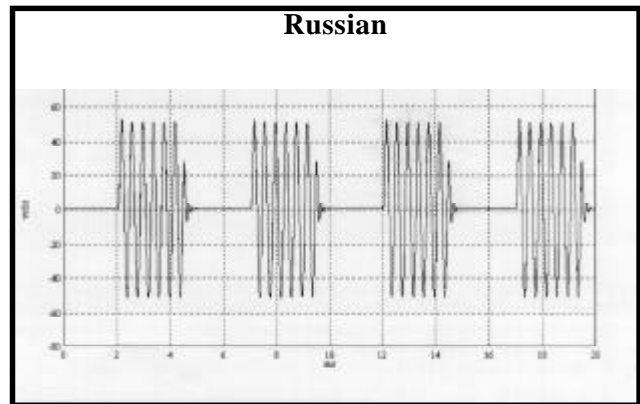


Microcurrent Parameters:

Carrier Frequency: Not Applicable
 Pulse Rate: Fixed 1-1000Hz
 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 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: 5-99 seconds
 Vector Options: Not Available
 Surge Rates: On 5-99 seconds, Off 5-180 seconds
 Ramp On: Fixed 2 seconds
 Ramp Off: Fixed .5 seconds

Ultrasound Calibration and Tuning Procedure

Ultrasound Service Information

Rich-Mar Corporation recommends that all Rich-Mar ultrasonic therapy products be returned to the factory or to a servicing Rich-Mar distributor for service or calibration.

It is recommended that the device be calibrated annually or when any major component is changed.

Caution

Calibration and peaking adjustments must not be attempted unless the person performing these adjustments has the proper test equipment, which must include an acceptable ultrasonic wattmeter, such as the Ohmic UPM-30 or equivalent. Degassed water must be used to obtain accurate readings.

Warning

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous exposure to ultrasonic energy.

Calibration and Tuning Procedure

Annual Ultrasound Calibration Check

1. Place the transducer to be tested in an Ohmic UPM-30 wattmeter, or equivalent.
2. Set up an ultrasound treatment to activate the transducer at either 1MHz or 3MHz and 100% duty cycle.
3. Increase the intensity to maximum.
4. If the 2cm transducer is being tested, it should be emitting at least 3.2 and no more than 4.8 watts. The 5cm transducer should emit at least 9 and no more than 11 watts. If this is not the case, perform the full calibration procedure listed in the following section.

Crystal Preparation

1. While depressing the Set/Enter and the Stop/Clear buttons simultaneously, turn the system power on to access the factor calibration mode.
2. Clamp the transducer being calibrated into the ultrasound wattmeter.
3. Select one of the transducer and frequency buttons located in the bottom half of the display.
4. If the transducer or portions of the RF Generator have been changed, go through the crystal peaking procedure. Otherwise, skip to step 6 in Crystal Peaking Procedure.

NOTE: Before and after each adjustment is made, the Set/Enter button must be activated.

Crystal Peaking Procedure

1. Select "XDCR" bar and adjust to appropriate head and frequency by rotating the encoder knob.
 2. Select the "VOLTS" bar. Adjust the reading to 10.0 volts.
 3. Select the "FREQ" bar. While observing the wattmeter adjust the frequency setting until the maximum power reading is measured by the watt meter.
 4. Advance the frequency 5 kHz for the 2cm transducer, 10 kHz for the 5cm transducer. Record this setting on the "Calibration Parameters" chart on the following page. (For example, on the 2cm transducer, if the frequency of maximum output is .938MHz then set the frequency to .943MHz. For the 5cm transducer, if the frequency of maximum output is .938MHz then set the frequency to .948MHz.)
 5. Select the "CORR" bar.
 6. While observing the wattmeter, increase the volts setting until the appropriate watt reading is measured. Record this on the "Calibration Parameters" chart.
- NOTE: 4 watts for the 2cm and 10 watts for the 5cm.
7. Repeat the calibration procedure for the remaining transducer and frequency combinations.
 8. After all transducers and frequencies combination have been set, press Stop/Clear to return the unit to treatment mode.

Theramini 3C & CP Ultrasound Calibration Parameters

2cm - 1MHz	_____	MHz	_____	Volts
2cm - 3MHz	_____	MHz	_____	Volts
5cm - 1MHz	_____	MHz	_____	Volts
5cm - 3MHz	_____	MHz	_____	Volts

Cal. at Volts 10.0 Volts

NOTE: When resetting calibration parameters, the setting must be set to 10.0 Volts

Disinfecting Recommendations

To disinfect the soundhead between therapy treatments, Rich-Mar recommends using a disinfectant cleaner for ultrasound. OSHA addresses the need for prudent infection control (OSHA Instruction CPL 2-2.44C) to include decontamination of equipment between patients.

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. Listed below are several options for troubleshooting the Theramini 3C or 3P.

- 1) If the screen is not bright enough, press and hold the Stop button while turning the dial until the desired contrast is achieved.
- 2) Make certain that if the Theramini is outputting Quadpolar IF, four electrodes are being used.
- 3) Make certain that the lead cords are not broken. They can be tested by using the Theramini's built-in lead cord test function in the system menu.
- 4) Although this will rarely occur, if the machine seems to "hang up" or if the display seems odd at all, turn the machine off for a moment and then turn it on again.

Theramini 3C Specifications

Dimensions: 19"W x 10"D x 4"H

Weight: 13 lbs.

Power Input: 120 VAC, 60Hz
220 VAC, 50 Hz

Power

Consumption: 110 Watts

Fuse: 1 Amp

Line Leakage: Less than 50 mA

Theramini 3P Specifications

Dimensions: 17"W x 10"D x 8"H

Weight: 20 lbs.

Power Input: 120 VAC, 60Hz
220 VAC, 50 Hz

Power Consumption: 110 Watts

Fuse: 1 Amp

Line Leakage: Less than 50 mA

Theramini 3C/3P Accessories

The accessories that come standard with the Theramini 3C and 3P, as well as the optional accessories available for the unit, are listed below. Their part numbers are included for easy reordering

Standard Accessory Package

- | | |
|------------------------------------|---------|
| 1) White pin lead cord | LC1718A |
| 1) Red pin lead cord | LC1719A |
| 1 package 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

- | | |
|--------------------------------|--------|
| 4) 4" round carbon electrodes | PD1042 |
| 4) 4" round sponges for PD1042 | PD1054 |
| 4) 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 (3" round) | PD1044 |
|------------------------------|--------|

- | | |
|--------------------|--------|
| Sponges for PD1044 | PD1055 |
|--------------------|--------|

- | | |
|---------------------|--------|
| Micro-Current Probe | PR6713 |
|---------------------|--------|

- | | |
|--------|--------|
| Handle | CH3749 |
|--------|--------|

- | | |
|--------------|--------|
| Wall Bracket | CH3753 |
|--------------|--------|

APPENDIX A
ULTRASOUND TECHNICAL INFORMATION

Ultrasound Technical Information

Applicator Type:

The ultrasonic radiation fields produced by Rich-Mar therapeutic ultrasound transducers are of the plane wave type and are essentially cylindrical in shape. This type of applicator is referred to as a collimating applicator.

Applicator Label:

Each Rich-Mar applicator is labeled to provide the user with information on its applicable parameters. The following abbreviations are used on the label.

Gen: The Rich-Mar ultrasonic generator for which the applicator is intended.

f: The operating frequency in MHz for the applicator.

Area: The effective radiating area of the applicator in square centimeters.

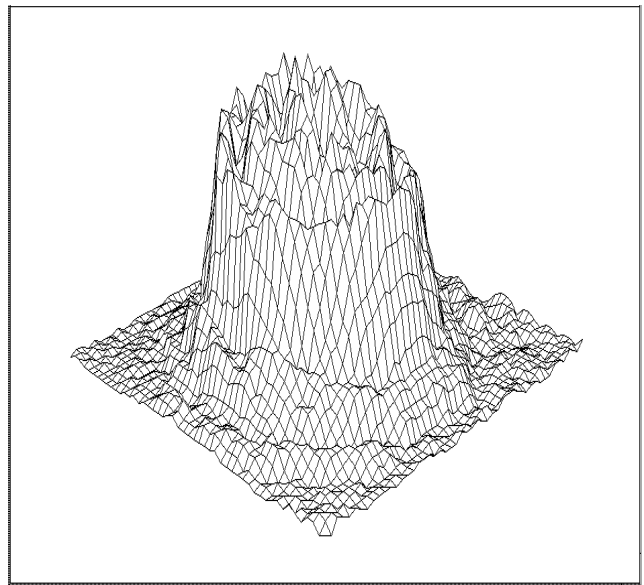
BNR: The Beam Nonuniformity Ratio.

Type: Coll-means collimating applicator.

Near Field/ Far Field

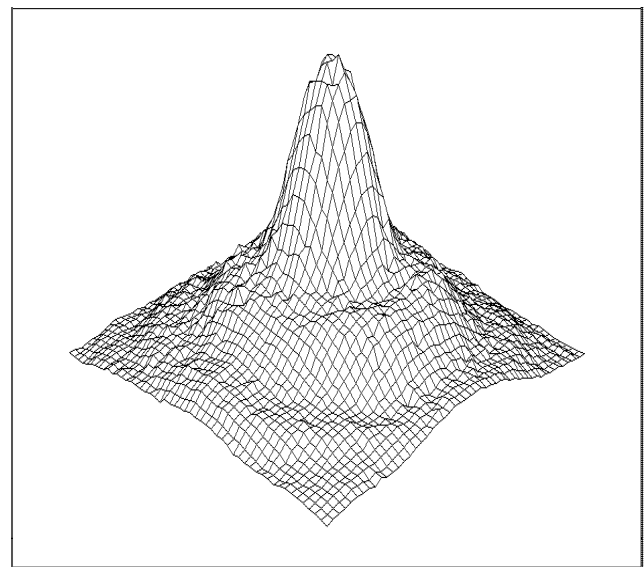
If measurements are made of the sound intensity along the central axis of the beam produced by the applicator, the intensity distribution shows maxima and minima near the applicator and then a gradual decline beyond the last maximum intensity.

The “interference” or “near field” is the area in the ultrasound beam extending from the applicator surface to the location of the most distant intensity maximum. In this area, maxima and minima of intensity are located close to each other. This is the area in which most therapeutic application occurs. This is shown in the following figure measured 0.5cm from the transducer face.



Near Field Distribution

Beyond this point, the beam has a more uniform intensity and is called the “far field”. Below is shown the far field distribution at 16cm from the transducer face.



Far Field Distribution

The preceding descriptions apply for radiation emitted into the equivalent of an infinite medium of distilled, degassed water at 30°C.

Transducer Parameters and Tolerances:

The Rich-Mar ultrasound units operate at frequencies of either 1MHz or 3MHz +/- 10%. The effective radiating areas (ERA) of the transducers are ten, five, or two square centimeters, depending upon the size of the transducer being used. The tolerance for the ERA

is +/- 25% on the 2 and 5 square centimeter transducers. The tolerance for the 10 square centimeter transducers is +0, -25%. The Beam-Nonuniformity-Ratio (BNR) for any Rich-Mar transducer is 5.5:1 or less.

100% Mode

When operated in the 100% mode, the generator produces a non-interrupted sinusoidal waveform of one or three MHz. The peak power and average power are therefore the same.

The error in indication of radiated power in intensity for the continuous mode does not exceed +/- 14% allowing for a 6% error in the wattmeter, which equals +/- 20%.

Pulsed Mode

When operated in the pulsed mode, the generator produces a square-wave burst of sinusoidal waveform of 1MHz or 3MHz of 2.5 milliseconds in duration.

Depending upon the Rich-Mar model of therapeutic ultrasound in use, the duty cycle can be chosen between 5% and 95% duty. This then implies the repetition rate is selectable between 20 and 380 pulses per second. (This is computed by taking the inverse of the duty cycle $1/380 = .0026$, $1/20 = .05$). The tolerance for the pulsed mode is +/- 20%.

See the following chart for second comparison on %Duty cycle to pulses.

% Duty Cycle <small>(Indicated on front panel of device)</small>	Pulses/Second
5	20
10	40
15	60
20	80
25	100
30	120
35	140
40	160
45	180
50	200
55	220
60	240
65	260
70	280
75	300
80	320
85	340
90	360
95	380

The error in indication of radiated power in intensity for the pulsed mode does not exceed +/-14% allowing for an allowable 6% error in the wattmeter, which equals +/-20%.

Timer Accuracy

The Food and Drug Administration requires that the treatment timer accuracy is to within 0.5 minutes for the preset duration of emission for settings less than five minutes, to within 10% of the preset duration of emission for settings from five to ten minutes, and to within one minute of the preset duration of emission for settings greater than ten minutes.

Ratio of Temporal Peak to Temporal Average (Rtpa):

The ratios of temporal peak to temporal average intensities (Rtpa) will vary with the pulse rate of the device. Depending upon the Rich-Mar model of therapeutic ultrasound in use, the duty cycle can be chosen between 5% and 95% duty.

The Rtpa is calculated in the following manner:

$Rtpa = (1/Duty):1$

Example 5% duty = .05 (min. duty, max. Rtpa)

$Rtpa = (1/.05):1$

$Rtpa = 20:1$

Example 95% duty = .95 (max. pulsed duty, min. Rtpa)

$Rtpa = (1/.95):1$

$Rtpa = 1.05:1$

See the following chart for %Duty cycle to Rtpa comparison.

% Duty Cycle <small>(Indicated on front panel of device)</small>	Rtpa
5	20:1
10	10:1
15	8.33:1
20	5:1
25	4:1
30	3.33:1
35	2.86:1
40	2.5:1
45	2.22:1
50	2:1
55	1.82:1
60	1.66:1
65	1.54:1
70	1.43:1
75	1.33:1
80	1.25:1
85	1.18:1
90	1.11:1
95	1.05:1

The Rtpa tolerance does not exceed +/- 20%.
The temporal maximum intensity for each duty cycle as well as the 100% modulation is whatever is indicated on the meter.

The temporal average intensity for each duty cycle will be the meter indication multiplied by the percentage duty cycle.

Temporal Average = (Duty) x (Meter Indication)
Example, 5 Watts, 35% Duty
Temporal Average = .35 x 5 Watts = 1.75 Watts

The Spatial Average Intensities for each of these setting will be divided by the transducer's Effective Radiating Area (ERA)

Spatial Average = (Temporal Average)/(ERA)
Example, 5 Watts, 35% Duty, 5cm² Transducer

Spatial Average = (1.75 Watts)/(5cm²) = 0.35 Watts/cm²

The pulse width (On time) of all Rich-Mar therapeutic ultrasound devices is 2.5 milliseconds (mS). The time between pulses (Off time) in milliseconds is calculated as follows:

$$\text{Pulse width (On time)} = 2.5\text{mS}$$

$$\text{Off time} = [2.5 - 2.5(\% \text{Duty cycle})] / (\% \text{Duty cycle})$$

Where %Duty cycle is represented as a decimal.

Please see the following example for computing the Off time for a 10% Duty cycle:

$$\text{Off time} = [2.5 - 2.5(0.10)] / (0.10) = 22.5 \text{ milliseconds}$$

Additional Technical Notes:

The peak power is the same in the pulsed modes as in the 100% modulated mode.

Unless otherwise stated, all technical parameters are accurate within +/- 20%.

When in the pulse modes the unit is still generating therapeutic heat, although it is an amount reduced by a factor directly related to the duty cycle. The pulse rates are used to allow the practitioner to treat areas of bony prominences without creating periosteal pain.

The line leakage is tested in both the forward and reverse polarities to be less than 50 microamperes exceeding all standards for medical devices in this class.

The device is designed to meet or exceed UL Standards 544 for medical devices and the Canadian Standards Association (CSA), No. 125.

APPENDIX B
PARTSLIST

TheraMini 3C/3P Parts List

Reference Designator(s)	Part Name	Description	Qty /Board
Main Board (Part name 2670)			
(Covers U29, U32, U33)	14R-CBS-1.75x2.25x4	BOX, SHIELDING	1
(FOR	53-03-2	INSULATION PAD, T-03 THERMASIL	1
(FOR HEAT SINK)	4x1/4 SCREW,TAPNG	SCREW, TAPPING, 4-40x1/4, HEX, SLOT	6
(FOR U1, U22)	4-40 HEX NUT,SS	NUT, 4-40, HEX, SS	2
(FOR U1, U22)	4-40x3/8 MS-PAN-PH S	SCREW, MACHINE, 4-40x3/8, PAN, PHILPS, SS	2
(FOR U1, U22)	4-FLAT-W,SS	WASHER, FLAT, #4, SS	2
(FOR U1, U22)	4-SPLT-LK-W,S	WASHER, SPLIT-LOCK, #4, SS	2
(FOR U13, U32)	2-641600-1	SOCKET,IC 16 PIN .3 LS	2
(FOR U17, U18)	2-644018-1	SOCKET, IC 32 PIN .6 LS	2
(FOR U27, U33)	2-640463-1	SOCKET,IC 8 PIN	3
(For U4)	6354B-2	HEATSINK, TO-3	1
(FOR U4)	6-32 HEX NUT SS	NUT, 6-32, HEX, SS	2
(FOR U4)	6-32x1/2 MS-PAN-PH S	SCREW, MACHINE, 6-32x1/2, PAN, PHILPS, SS	2
(FOR U4)	6-SPLT-LK-W,SS	WASHER, SPLIT-LOCK, #6, SS	2
(For U5, U6, U12)	6398B	HEAKSINK, TO-220, SHORT	3
(FOR U5, U6, U12)	4880S	KIT, MOUNTING, TO-220	3
C1, C11, C16, C30, C33, C6, C60, C61, C65	CAP-AL-22uF,63V	CAP, ALUM, 22uF,63V, RADIAL	9
C10, C12, C13, C14, C15, C17, C18, C19, C20, C21, C24, C25, C31, C32, C34, C35, C37, C39, C40, C41, C42, C44, C45, C46, C47, C48, C51, C52, C53, C56, C57, C58, C59, C62, C63, C64, C70, C71, C72, C73, C75, C76, C79, C80, C81, C85, C87, C88, C89, C9, C90, C91, C92, C94, C95	CAP-CER-0.1uF	CAP, CERAMIC,0.1uF,50V,20%,AXIAL	55
C2, C3, C4, C5, C54, C55	CAP-AL-1000uF,50V	CAP, ALUM,1000uF,50V, RADIAL	6
C22, C36	CAP-AL-100uF,63V	CAP, ALUM,100uF,63V, RADIAL	2
C23	CAP-CER-0.001uF	CAP, CERAMIC,0.001uF, 50V,20%,AXIAL	1
C26, C27, C68, C69, C78	CAP-TANTB-1uF	CAP, TANT, 1uF, B, 25V, 10%, AXIAL	5
C28	CAP-AL-0.1uF,500V	CAP, ALUM, 0.1uF, 500V, RADIAL	1

Theramini 3C/3P Parts List, Cont.

Main Board (Part name 2670)		Part Name	Description	Qty /Board
Reference Designator(s)				
C29		CAP-AL-2200uF,16V	CAP, ALUM,2200uF,16V, RADIAL	1
C38, C43, C83, C86		CAP-CER-22pF	CAP, CERAMIC,22pF,100V,5%,AXIAL,NPO	4
C49, C50		CAP-AL-1000uF,63V	CAP, ALUM,1000uF,63V, RADIAL	2
C66, C67		CAP-CER-0.01uF	CAP, CERAMIC,0.01uF,50V,20%,AXIAL	2
C7, C8		CAP-CHV-0.1uF,100V	CAP, CERAMIC HIGH-VOLT,	2
C74		CAP-4-33-220uF,16V	CAP, ALUM,220uF,16V, RADIAL	1
C77		T322B475M015AS	CAP, TANT, 4.7uF, B, AXIAL	1
C82		CAP-CHV-0.47uF,100V	CAP, CERAMIC	1
C84		C410C561J5G5CA	CAP, CERAMIC, 560pF, 5%, 50V, AXIAL	1
C93		T322A275J010AS	CAP, TANT, 2.7uF,10V, A, AXIAL	1
D1, D12, D2, D9		KBU4J	DIODE BRIDGE, RECTIFIER, FULL-WAVE	4
D10, D11, D19		1N4148	DIODE, 1N4148	3
D13, D14, D15, D16, D17, D18,		11DQ04	DIODE, SCHOTTKY	12
D23, D26, D27, D28, D6, D7				
D20, D21, D22, D3, D4, D5		1N40 5	DIODE, 1N4005	6
D24, D25		LS3360-KN	LED, RED, LOW-PROFILE, HI-INTENSITY	2
D8		WO2G	DIODE BRIDGE, FULL WAVE, 1.5A	1
J1		103186-5	HEADER,10-PIN (2X5)	1
J2, J6, J7, J8, J9		RL359	JACK, PHONO, PCB MOUNT	5
J4		103186-2	HEADER, 4-PIN (2x2)	1
L1		RES-MF-0	RES, 0, 1/4W, 1%, METAL FILM, 0.500LS	1
P1		640454-2	HEADER, 2-PIN (1X2) LATCHING, .100LS	1
P10, P6, P9		640454-4	HEADER, 4-PIN (2X2) LATCHING, .100LS	3
P11		640445-8	HEADER, 8-PIN (2X4) LATCHING, .156LS	1
P12		87220-6	HEADER, 6-PIN, LATCHING	1
P2		747840-4	CONN, DB9, RIGHT-ANGLE, PCB MOUNT	1
P3		640445-2	HEADER, 2-PIN (1x2) LATCHING, .156LS	1
P4		640445-4	HEADER, 4-PIN (2X2) LATCHING, .156LS	1
P7		HEADER, 20-PIN	HEADER, 20-PIN (2X10), LATCHING	1
PCB		SE17A	PCB, TheraMini 3c/3p/3s Revision C, Version	1
Q1, Q2, Q3, Q4, Q5, Q6, Q7 VN0104N3			TRANSISTOR, MOSFET, N-CHANNEL, 2A	7
R1, R26, R42		RES-MF-243	RES, 243, 1/4W, 1%, METAL FILM, 0.500LS	3
R10, R9		RES-MF-681	RES, 681, 1/4W, 1%, METAL FILM, 0.500LS	2
R11, R6		RES-MF-806K	RES, 806K, 1/4W, 1%, METAL FILM, 0.500LS	2
R12, R29, R30, R33, R34, R48,		RES-MF-100K	RES, 100K, 1/4W, 1%, METAL FILM, 0.500LS	8
R7R71				
R13 R14 R45 R49 R67 R73		RES-MF-4.75K	RES, 4.75K, 1/4W, 1%, METAL FILM, 0.500LS	6

Theramini 3C/3P Parts List, Cont.

Main Board (Part name 2670)		Part Name	Description	Qty/Board
Reference Designator(s)		RES-MF-22.6K	RES, 22.6K, 1/4W, 1%, METAL FILM, 0.500LS	4
R15, R16, R17, R18		RES-MF-10K	RES, 10K, 1/4W, 1%, METAL FILM, 0.500LS	14
R19, R21, R37, R38, R4, R5, R58, R61, R62, R63, R64, R65, R66, R72		RES-MF-768	RES, 768, 1/4W, 1%, METAL FILM, 0.500LS	1
R2		RES-MF-1.43K	RES, 1.43K, 1/4W, 1%, METAL FILM, 0.500LS	2
R20, R22		RES-MF-4.7	RES, 4.7, 1/4W, 1%, METAL FILM, 0.500LS	2
R23, R24		RES-MF-3.83K	RES, 3.83K, 1/4W, 1%, METAL FILM, 0.500LS	1
R25		RES-MF-1K	RES, 1K, 1/4W, 1%, METAL FILM, 0.500LS	6
R27, R32, R35, R46, R55, R60		R36	RES-MF-12.7K RES, 12.7K, 1/4W, 1%, METAL FILM, 0.500LS	2
R28		RES-MF-61.9K	RES, 61.9K, 1/4W, 1%, METAL FILM, 0.500LS	1
R3		RES-MF-2.94K	RES, 2.94K, 1/4W, 1%, METAL FILM, 0.500LS	1
R31		RES-MF-2.1K	RES, 2.1K, 1/4W, 1%, METAL FILM, 0.500LS	1
R39		RES-PO-3-3W	RES, 0.3, 3W, 1%, POWER OXIDE	2
R40, R41		RES-MF-200K	RES, 200K, 1/4W, 1%, METAL FILM, 0.500LS	2
R43, R50		RES-MF-8.45K	RES, 8.45K, 1/4W, 1%, METAL FILM, 0.500LS	1
R44		RES-MF-150K	RES, 150K, 1/4W, 1%, METAL FILM, 0.500LS	1
R47		RES-MF-10	RES, 10, 1/4W, 1%, METAL FILM, 0.500LS	1
R51		RES-MF-5.62K	RES, 5.62, 1/4W, 1%, METAL FILM, 0.500LS	1
R52		RES-MF-402	RES, 402, 1/4W, 1%, METAL FILM, 0.500LS	1
R53		RES-MF-10M	RES, 10M, 1/4W, 1%, METAL FILM, 0.500LS	1
R54		RES-MF-38.3K	RES, 38.3, 1/4W, 1%, METAL FILM, 0.500LS	2
R56, R59		RES-MF-332K	RES, 332, 1/4W, 1%, METAL FILM, 0.500LS	1
R57		RES-MF-2.21K	RES, 2.21K, 1/4W, 1%, METAL FILM, 0.500LS	1
R68		RES-MF-301K	RES, 301K, 1/4W, 1%, METAL FILM, 0.500LS	1
R69		RES-MF-3.74K	RES, 3.74K, 1/4W, 1%, METAL FILM, 0.500LS	1
R70		RES-MF-100	RES, 100, 1/4W, 1%, METAL FILM, 0.500LS	1
R8		122AY*1K0BA	RELAY, REED, 2-FORM A, MOLDED	3
RLY1, RLY2, RLY3		RESNET-BSIP10-10K	RES NET, 10K, 10-PIN, BUS, SIP10	5
RP1, RP2, RP3, RP4, RP6		RESNET-BSIP10-1K	RES NET, 1K, 10-PIN, BUS, SIP10	1
RP5		AT-40	SPEAKER, 100 OHM, 0.15W	1
SP1		CTM32695	TRANSFORMER, 2 SEC, AM17830	1
T1		LA-12	LA-12, XFRM/LA-12	2
T2, T3		CTM33295	TRANSFORMER, 2 SEC, AM17828	1
T4		LM2991T-TO220	IC, REGULATOR, VOLTAGE, NEGATIVE	1
U1		MAX291-DIP8	IC, FILTER, 8TH ORDER, LOWPASS,	2
U10, U11		LM2941-TO220	IC, REGULATOR, VOLTAGE, ADJUSTABLE,	2
U12, U22		74HC4316-DIP16	IC, ANALOG SWITCH, QUAD, W/ ANALOG &	1
U13				

Theramini 3C/3P Parts List, Cont.

Main Board (Part name 2670)

Reference Designator(s)	Part Name	Description	Qty/Board
U14, U7	AD7245A-DIP24	IC, DAC, 12-BIT, BUS,DIP 24	2
U15	TLC1541-DIP20	IC, A/D, 10-BIT, 11-CHNL, SPI, DIP20	1
U16, U30	LF412ACN	IC, OP AMP, DUAL, PRECISION	2
U17	TC55257DPL-DIP32	IC, STATIC RAM, 128K X 8, 85NS	1
U18	AT29F010A-DIP32	IC, FLASH, 1024x8, 120NS, DIP32	1
U19	PLS11016-TM3-U19	IC, CPLD, 60MHZ, 2K-GATES, CODE TM3-U19,	1
U2	DS232A-DIP16	IC, RS-232 INTERFACE, DIP16	1
U20	TLC5620-DIP14	IC, DAC, 8-BIT, 4-CHNL, SPI, DIP14	1
U21, U9	LM337-TO220	IC, REGULATOR, ADJUSTABLE, TO-220	2
U23	CXA-L10L	INVERTER, BACKLIGHT	1
U24	74HC652-DIP24S	IC,OCTAL BUS TRANCEIVER, DIP24S	1
U25	MC68331CFC16-PQFP1	IC, MICROCONTROLLER, PQFP132	1
U26	74HC14-DIP14	IC, HEX INVERTER, SCHMIDT, DIP14	1
U27	CSI93LC86-DIP8	IC, EEPROM, 16KBIT SERIAL, DIP8	1
U28	TDA7052A-DIP8	IC, AMP, 1W AUDIO WITH DC VOLUME	1
U29	PLS11016-TM3-U29	IC, CPLD, 60MHZ, 2K-GATES, CODE TM3-U29,	1
U3	OPA445-DIP8	IC, High Voltage OP Amp, OPA445, DIP8	1
U31	MAX690A-DIP8	IC, SUPERVISORY CIRCUIT, DIP8	1
U32	74HC9046-DIP16	IC, PLL WITH BANDGAP CONTROLLED	1
U33	EL7212CN-DIP8	IC, 3A DUAL MOSFET DRIVER, DIP8	1
U4	LM317HV-TO3	IC, REGULATOR, +HIGH-VOLT ADJUSTABLE,	1
U5, U6	LM1875T-TO220	IC, AUDIO POWERE AMP, TO-220	2
U8	ADSP2105-PLCC68	IC, DSP, 40MHZ (OR >), PLCC68	1
V1, V2	V220ZA05	VARIABLE, 220V RMS, 5MM	2
Y1	ATS49-10.000	CRYSTAL, 10MHZ, AT-CUT, 49U,	1
Y2	3x8-32.768	CRYSTAL, 32.768KHz WATCH CRYSTAL	1

Theramini 3C/3P Parts List, Cont.

3C Chassis (Part name 0173-P1)

Rich-Mar Part No.

Part Name	Description	Qty/Board
9834	RF TO MAIN BOARD INTERFACE CABLES	4
9139	SPADE CONNECTOR (FEMALE)	1
9143	SPADE CONNECTOR (MALE)	1
3755	AC CORD WRAP	1
5001	FUSE HOLDER	1
5008	SLOW BLOW 1 AMP FUSE	1
7801	ON/OFF ROCKER SWITCH	1
4804	TM3C/3P FAN	1
9114	BLACK STRAIN RELIEF (AC CORD)	1
5519	WHITE OUTPUT JACK	2
5520	RED OUTPUT JACK	2
4163	2 PIN .156 AMP CONNECTOR (LINE CORD)	1
4169	4 PIN .156 AMP CONNECTOR (AC SWITCH)	1
4161	2 PIN .1 AMP CONNECTOR (FAN)	1
4167	4 PIN .1 AMP CONNECTOR (RIBBON EXTENSION)	3
4200	6 PIN .1 AMP CONNECTOR (RIBBON EXTENSION)	1
4176	9 PIN .156 AMP CONNECTOR (OUTPUT JACK ASSY)	1
4216	FLAT RIBBON CONNECTOR DISPLAY TO MAIN BD.	2
4130	CONNECTOR PANEL FLAT ROW RIBBON CABLE EXTENSION HARDWARE	.133
5720	ENCODER KNOB	1
3269	10 SELF-LOCKING NUTS FOR BAIL	2
0704	#4 x 1/4" SPACER (MAIN BOARD MOUNTING)	12
0723	SPACER - MAIN BOARD MOUNTING	4
0600	#4 SOLDER LUG	3
9116	STRAIN RELIEF NUT FOR SOUNDHEAD	1
9308	STACKED RF DECK WITHOUT BOARDS	1
7488	COMPLETE HAMMERHEAD W/O TRANSDUCERS	1
2670	THERAMINI 3C/3P MAIN BOARD	1
2664	COMPLETE RF DECK BOARD (1MHz SIDE)	1
2665	COMPLETE RF DECK BOARD (3MHz SIDE)	1
7402	2cm TRANSDUCER	1
7403	5cm TRANSDUCER	1
1904	16oz BOTTLE OF LOTION	1

Theramini 3C/3P Parts List, Cont.

3C Chassis (Part name 0173-P1)

Rich-Mar Part No.	Part Name	Description	Qty/Board
1718A		WHITE LEAD CORD W/PIN LEAD	1
1719A		RED LEAD CORD W/PIN	1
5928	DMF-50316NFD-FW	OPTREX DISPLAY	1
3770		TM 3C PORT COVER	1
9106	BEAU 1830	TIE POINT PANEL MOUNTING HARDWARE	2
7471	2-004 N-70	DISPLAY MOUNTING HARDWARE	4
0727		#2x1/16" SPACER - MAIN BOARD MOUNTING	4
7695		LEAD CORD LABEL	1
7696		OUTPUT JACK LABEL	1
7673		MODEL TM FCC LABELS	1
7672		US THERAPY APPARATUS LABEL	1
7669		HAMMERHEAD SOUNDHEAD LABEL	1
6350		THERAMINI 3 PANEL LABEL	1
7651	T33364	RM LOGO STICKER LABEL	1
7620		WARNING 1 AMP FUSE LABEL	1
7603	T760S	WARNING ACCESSORY LABEL	1
7609		PATENT LABEL	1
7683		TM3C/3P INSTRUCTION LABEL	1

Additional Parts for the Theramini 3P

3765		THERAMINI 3P CHASSIS	1
9154		3P STRAIN RELIEF FOR SOUNDHEAD	1
9153		BLACK 3P STRAIN RELIEF AC CORD	1
7673		MODEL TM-3P FCC LABEL	1
9152		SILVER TM-3P CARRYING CASE	1
6348		TM 3P OVERLAY FOR TOP	1
3508		SCREEN PLUGS FOR CARRYING CASE	2

RF Deck Box (Part name 9308)

Rich-Mar Part No.	Part Name	Description	Qty/Board
3766		STACKED RF DECK BOX	1
8581	RFP 2N20L RCA	3MHz FET (TRANSISTOR)	1
8502	MTP10N40E	1MHz BD FET (TRANSISTOR)	1
0715	8716 (8248)	#6 STANDOFFS ON BOTTOM	4
0726	KEYSTONE 2121	#6 STANDOFFS BETWEEN NECK BOARDS	4
5501	S/C 3501 FP	INTERFACE CABLE JACKS	6
9186	THERMALLOY 7721-7PPS	THERMAL PADS FOR TRANSISTORS	2
9185	53-77-9 small thermalloy	FIBER INSULATORS FOR TRANSISTOR	2

Theramini 3C/3P Parts List, Cont.

RF Deck Box (Part name 9308)

Rich-Mar Part No.

Rich-Mar Part No.	Part Name	Description	Qty/Board
0720	KEYSTONE 7687	WHITE PLASTIC INSULATING WASHER FOR RELAY	1
4161	AMP 640440-2	2 PIN .1" AMP CONNECTOR	5
4166	AMP 640440-3	3 PIN .1" AMP CONNECTOR	6
5514	35RAPC4BH3	SWITCHCRAFT RELAY	1
4617	IN4732A	DIODE	1

Deck Board - 1MHz side (Part name 2664)

Reference Designator Rich-Mar Part No.

Reference Designator	Rich-Mar Part No.	Description	Qty/Board
P6	4166	3 PIN .1 AMP CONNECTOR FOR P6 ASSY.	1
C5,C7	0054	BLANK DECK BOARD	1
	2823	CAPACITOR	2
C1,C3	2809	CAPACITOR	1
	2901	1000V CAPACITOR	2
C6,C6A	2888	500V CAPACITOR	2
C2	2904	1000V CAPACITOR	1
CR1	4602	DIODE	1
T1,T3,T4	4417	TORROID	3
T2	4420	TORROID	1
T6	4418	TORROID	1
Q1	4132	PINS @Q1	1
K1,K2	6901	RELAY	2
P1-P5	4219	CONNECTOR	5

Deck Board - 3MHz side (Part name 2665)

Reference Designator Rich-Mar Part No.

Reference Designator	Rich-Mar Part No.	Description	Qty/Board
C5,C7	0054	BLANK DECK BOARD	1
C4	2823	CAPACITOR	2
C1,C3	2809	CAPACITOR	1
C2	2902	1000V CAPACITOR	2
C6	2903	1000V CAPACITOR	1
CR1	2989	500V CAPACITOR	1
T1,T3,T4	4602	DIODE	1
T2	4417	TORROID	3
T6	4420	TORROID	1
K1,K2	4418	TORROID	1
	4132	CONNECTOR PIN ON SOLDER SIDE	1
C6A	6901	RELAY	2
	2936	CAPACITOR	1