

**RICH-MAR THERAMINI 2  
OPERATION HANDBOOK AND MANUAL**



*Part # MN 2429*

*Rev. E*

*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.



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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.



# **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)**

## **Adverse Reactions**

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

### **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.

## Introduction

The Rich-Mar Theramini 2 is the product of dedication to research and development. The Theramini 2 offers the most flexible treatment possibilities in a convenient, easy-to-use package.

This manual is meant to familiarize the user with the controls, operations, and waveform therapies available in the Theramini 2. The simple control of the unit allows the user to master the unit's vast capabilities quickly and easily.

### User Interface

The main controls for the Theramini 2 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-waveform Theramini 2.

### AC Power Switch

This switch will turn the unit on and off. The power switch 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 sole function of this button is to start a treatment or to initiate the electrode lead cord test.

### Stop/Clear Button

This button will stop a treatment in progress. If

pressed again it will return to the TMT menu.

### Control Dial

The control dial will allow the user to select a treatment or alter treatment parameters. This dial can be used to scroll through general parameter options when making changes. The control dial can be used to set quantifiable limits such as pulse rates, phase durations, interphase intervals, vectors, intensity, time, etc. These controls are displayed on the panel illustration below.

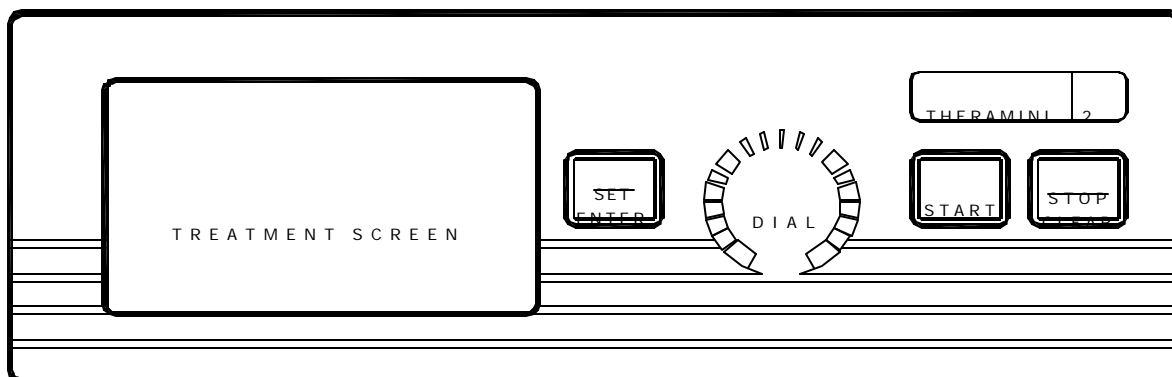
## Theramini 2 Operation

### Overview

The Theramini 2 is a two-channel, multi-waveform, upgradeable stimulator. The unit can output any one of the following waveforms: Quadpolar Classic Interferential, Bipolar Premodulated Interferential, Monophasic (High Volt), Symmetric Square Biphasic (Low Volt), Russian, and Microcurrent. Dependent upon the waveform in use, the Theramini 2 can also provide the following treatment modes: Continuous output, Surged output, Alternating output, and Rich-Mar's unique "Chain" mode.

(NOTE: For more information on outputs, see the "Waveforms" section.)

When the Theramini 2 is powered on, the TMT (treatment) menu will appear on the screen. The bottom half of this screen will display seven boxes: six TMT boxes, labeled "TMT1" through "TMT6" and a "✓" box. The six TMT boxes represent stored treatments that can be programmed and named. To view the type of treatments stored in each box, use the control dial to highlight the



desired box. The treatment parameters for that TMT will be listed above in the treatment information area. The treatment information area will display the following information: Treatment name, Waveform, Pulse rate, Specific waveform parameters (vector, phase duration, etc.), Treatment mode, and Treatment time.

### **Starting a Treatment**

When starting a Theramini 2 treatment, the user will have the option to use one of the preset TMT treatments or to customize one of the TMT treatments with new parameters.

### **To Start a Preset TMT Treatment**

To start a preset TMT treatment, highlight the desired TMT box and press the start button. Set the intensity on channel one with the control dial and press the set/enter button. If channel two will be used, set the intensity in the same manner as channel one. Otherwise, simply press set/enter.

### **To Change or Customize a TMT Treatment**

To change any part of a preset TMT treatment, or to change it in its entirety, select the TMT to be changed or overwritten. The Theramini 2 will always select a TMT even if the user is completely customizing a treatment. When customizing treatments, it is suggested that TMT 1 through 5 be utilized for the most common treatments and TMT 6 be used as the “custom” treatment option. The TMT can even be named “CUSTOM” for easy reference.

To make a change to any TMT parameter, highlight the desired TMT and press set/enter. The treatment name will be highlighted above in the treatment information area. To change the name, press set/enter and use the dial to select the desired letters, pressing set/enter after each to accept, until all six characters have been entered. To leave the name as it is currently set, do not press set/enter, but use the dial to scroll through the list of choices, pressing set/enter only when making a change to that option. Press set/enter to accept all changes, when finished.

NOTE: When changing parameters it is best to

select the waveform first because other parameter choices are waveform specific. For example, it is not possible to use the alternating mode in Quadpolar Interferential. (See “Waveforms” section for further details.)

Once all treatment changes have been made to the TMT, press start and begin the treatment. Set intensity on channel one with the control dial, and set intensity for channel two, if desired. Press set/enter to accept all changes.

### **Modifying a Treatment in Progress**

Once a treatment has started, intensity can be modified at any time on either channel one or two. If the Quadpolar waveform is being used, the intensity for both channels one and two are linked together and will be modified at the same time. Balance can also be modified in Quadpolar.

To make these modifications while the treatment is running, press set/enter to see a “SET” arrow pointing at channel one (it will point at both channels for Quadpolar). Use the control dial to make an intensity adjustment. When the adjustment is complete press the set/enter button again to accept changes. The “SET” arrow will then point to channel two. In Quadpolar there will be a “BALANCE” arrow pointing at both channels one and two. If desired, make the adjustment to channel two and press the set/enter button to accept changes.

Note that if a surge or alternating treatment was running, treatment was paused while adjustments were made. This feature allows the user to make intensity adjustments even in “off time” without worrying about intensity being increased while there was no output to the patient.

### **To Stop a Treatment**

To stop a treatment, press the stop/clear button. This will interrupt all output and cancel treatment time. To restart the same treatment, press start and reset the intensity. To clear the treatment and return to the TMT menu, press stop/clear again.

### **Changing Pulse Rate**

When the pulse rate is highlighted with the dial press set/enter to select either the fixed or scan pulse rate, depending upon the waveform in use. The Russian and Microcurrent will only output a fixed pulse rate. To use one of those waveforms, or if fixed was selected, use the dial to choose the pulse rate and press set/enter to accept. If scan is selected, press set/enter to set the low end of the scan. The high end is then highlighted and can be selected with the dial. Press set/enter to accept.

### **Changing Waveform-Specific Parameters**

After adjusting the pulse rate, special parameters can be set specific to certain waveforms. These include vector depth and speed for Quadpolar and Bipolar Interferential; phase duration for Monophasic (High Volt); and phase duration and interphase interval in Biphasic (Low Volt). There are no options available for Russian and Microcurrent.

### **Treatment Mode**

Depending upon the waveform model in use, the following is a description of the four treatment modes available in the Theramini 2.

- Continuous: This mode provides continuous output of the selected parameters.
- Surge: Surge mode allows the user to specify an “on time” of output, followed by an “off time”. This on and off cycle will continue throughout the entire treatment.
- Alternating: The alternating mode will output a treatment alternating at a set rate between one and two at an adjustable rate. For example, channel one can output for ten seconds and then switch to channel two for 14 seconds.
- Chain: The chain mode allows the user to output two different pulse rates in a single treatment for varying amounts of time. Example: Set pulse rate one at a fixed 100Hz for two minutes and then set pulse rate two at a scan of 80-150Hz for four minutes. If the treatment time is only six minutes the treatment will end with pulse rate two. If treatment time is longer than the sum of the two pulse rates it will begin again with pulse rate one and continue on to pulse rate two, depending upon the treatment time remaining.

### **Treatment Time**

To enter the desired treatment time, highlight the time displayed and use the dial to select one to 99 minutes. Press set/enter to accept.

### **Lead Cord Test**

Press the stop/clear button to return to the TMT menu. Use the dial to highlight the “/” box. The words “Lead Test” will appear in the information area at the top of the screen. Press start. A warning advising removal of lead cords from the patient will appear because the device will output current to conduct the test. Press start again and follow the on-screen directions to test the lead cords.

### **To Adjust the Screen Contrast**

The Theramini 2 has a built-in screen contrast adjustment. Press the stop/clear button and continue to hold it down while turning the control dial. This allows the screen contrast to be adjusted for optimum viewing.

### **Operating the Theramini in Combination**

The Theramini may be operated in combination with any Rich-Mar ultrasound unit. To utilize the transducer of the ultrasound as an electrode and simultaneously output ultrasound, split the stimulator lead cord and place one of the banana plugs into the ultrasound jack while the other plug is used for a regular electrode. The receptacle jack for all Rich-Mar ultrasound units is located on the right, rear side of the unit.

To perform combination therapy in the Bipolar, Biphasic, Monophasic, Russian, and Microcurrent modes, use the transducer as an active electrode while simultaneously emitting ultrasound.

For Quadpolar Classic Interferential, the transducer can be used as the fourth electrode while emitting ultrasound, or the transducer can be used to provide ultrasound therapy only with four electrodes used to provide stimulation.

# **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**

The 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.*

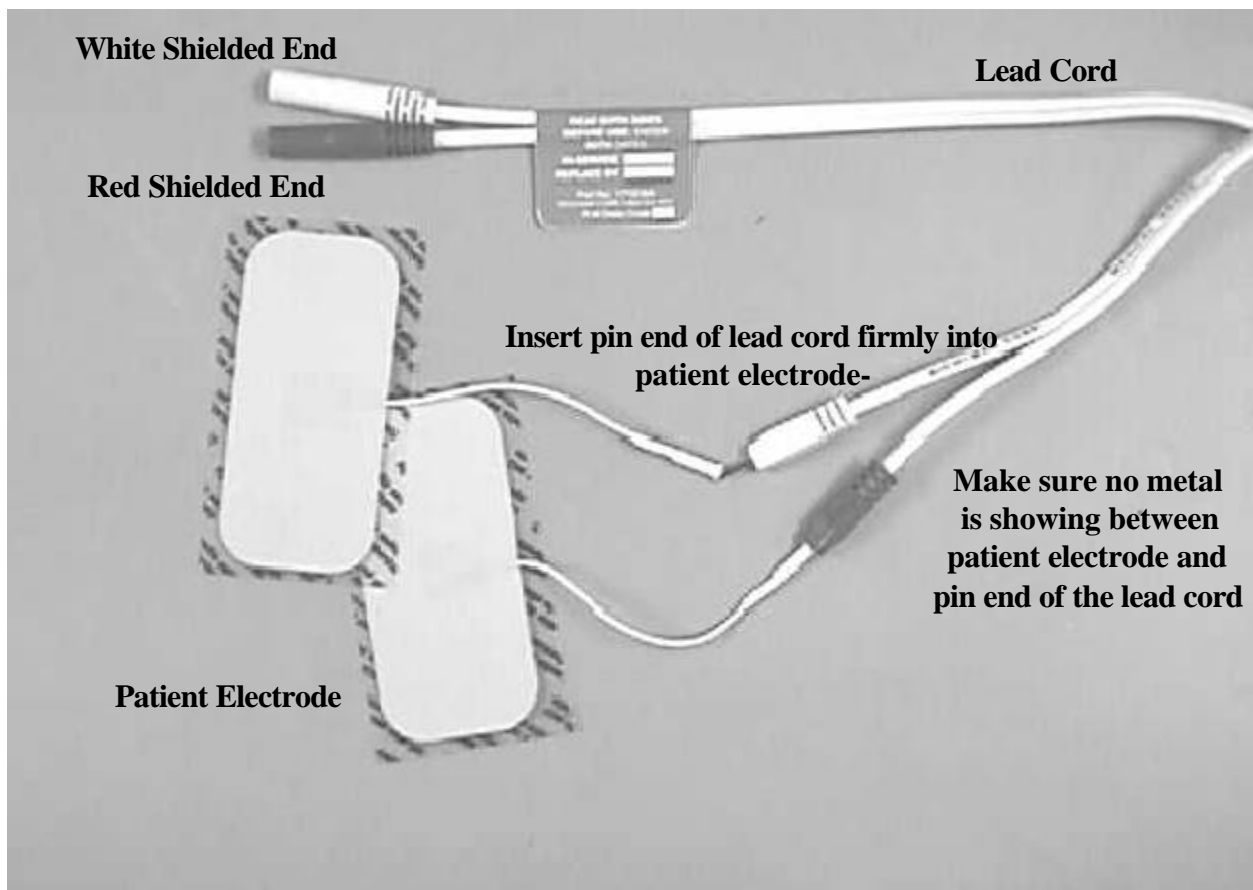
Please note that your patient lead cords bear a label with a space provided to write in the date that the lead cord was put into service ("Date in Service"). There is also a space to write in the replacement due date ("Replace By"), which will be one year from the date the lead cord was put into service.

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

# 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 stimulators 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 especially 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*

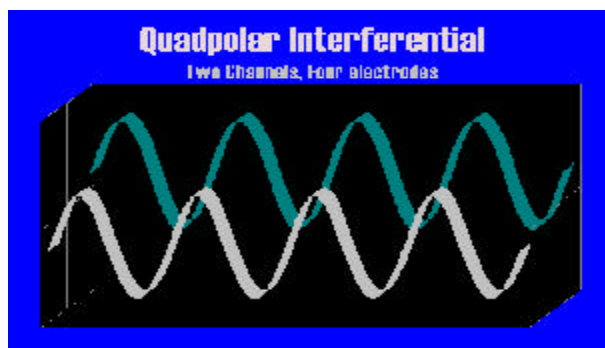
*ELECTROTHERAPEUTIC TERMINOLOGY in Physical Therapy, published by the American Physical Therapy Association. For more information, contact the APTA, 1111 North Fairfax Street, Alexandria, VA 22314-1488.*

### **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 Theramini 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. The “Chain” mode can also be utilized for two pulse rates, either scan or fixed in one treatment.

### **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

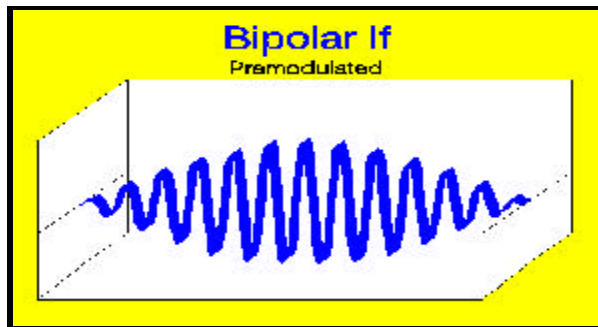
### Quadpolar Interferential

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. 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 200 Hz.



#### 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: 2-99 Seconds
- Surge Rates: On: 1-99 seconds, Off: 1-180 seconds
- Ramp On: Fixed 2 Seconds
- Ramp Off: Fixed .5 Second

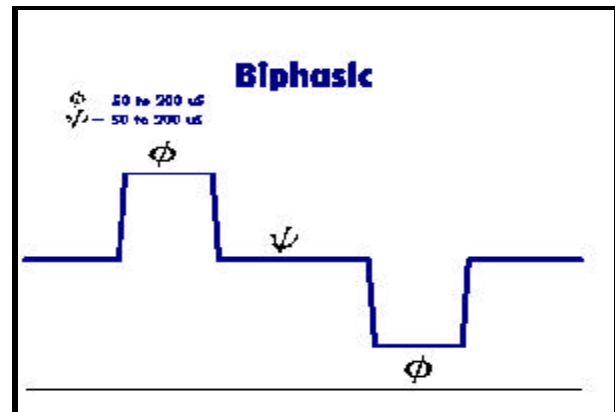
### Bipolar Interferential

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 also has 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.

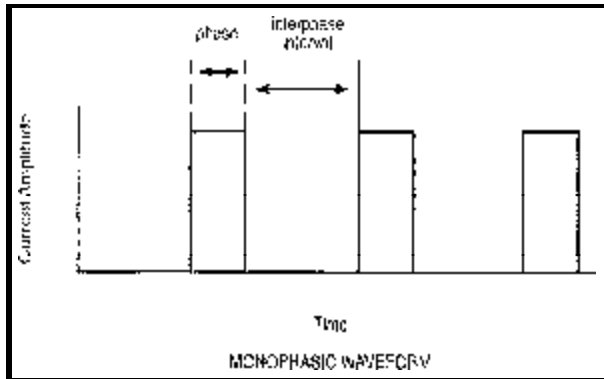


#### Biphasic Parameters:

- 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: 2-99 Seconds
- Surge Rates: On: 1-99 seconds, Off: 1-180 seconds
- Ramp On: Fixed 2 Seconds
- Ramp Off: Fixed .5 Second

## Monophasic

The Theramini 2 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).

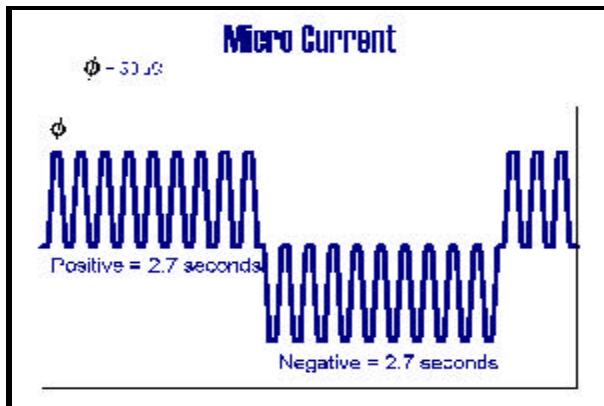


## Monophasic Parameters:

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 $\mu$ S  
Interphase Interval: 50, 100, 150, 200 $\mu$ S  
Alternating Rate: 2-99 Seconds  
Surge Rates: On: 1-99 seconds, Off: 1-180 seconds  
Ramp On: Fixed 2 Seconds  
Ramp Off: Fixed .5 Second

## Micro Current

Micro current is a pulsed waveform that produces 50 $\mu$ 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 $\mu$ A.

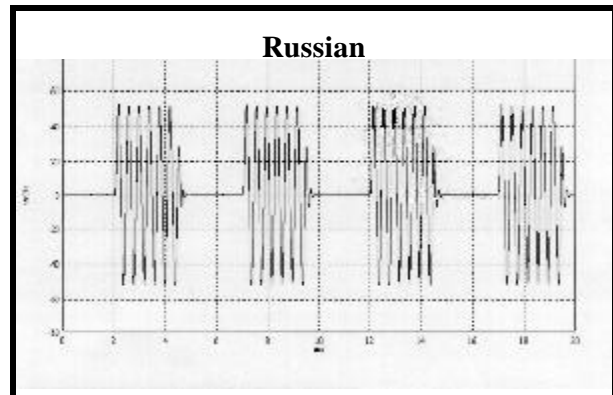


## Microcurrent Parameters:

Carrier Frequency: Not Applicable  
Pulse Rate: Fixed .3-1000Hz  
Pulse Rate Chain: Fixed Low, Fixed High  
Phase Duration: 50 $\mu$ 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 pulse rate chain modes.



## Russian Parameters:

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

## **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 2.

- 1) If the screen is not bright enough, hold the Stop/Clear button down and turn 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 2 Specifications

Dimensions: 11"W x 9.75"D x 2.75"H

Weight: 5lbs. 12 oz.

Power Input: 110 VAC, 60Hz or  
220 VAC, 50Hz

Power  
Consumption: 110 Watts

Fuse: 1 Amp

Line Leakage: Less than 50 mA

## Theramini 2 Accessories

The accessories that come standard with the Theramini 2, as well as the optional accessories available for the unit, are listed below. Their part numbers are included for easy reordering.

### Standard Accessories

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 Accessories

4" round carbon electrodes PD1042

4" round sponges PD1054

2" x 30" Velcro straps VS2105

Banana to Pin adapter  
(set of two) LC1720

Pin to Banana adapter  
(set of two) LC1721

Sponge electrodes (4"x4") PD1036

Sponge electrodes (3"x3") PD1039

3" round carbon electrodes PD1077

3" round sponges PD1076

Micro-Current Probes  
(set of two) PR6715

Handle CH3750

BlueStim self-adhesive electrodes  
(1.75" x 1.75") PD1031  
(1.75" x 3.75") PD1033



**APPENDIX A**  
**PARTS LIST**

## Theramini 2 Parts List

### Main Board (Part name 2666)

Reference Designator(s)	Part Name	Description	Qty/Board
	DMF-50427	DISPLAY, GRAPHIC, 128x64	1
(U1)	6-32x3/8 MS-PAN-PH	SCREW, MACH PH PAN 6-32 X 3/8 SS	1
(U1)	6-SPLT-LK-W. SS	WASHER, LOCK SPLIT #6, STAINLESS	1
(U1)	6-32 HEX NUT SS	NUT, HEX 6-32, STAINLESS STEEL	1
(U10,U12)	2-641932-1	SOCKET, IC 24 PIN .3 LS	2
(U14,U21,U22,U25)	2-641599-1	SOCKET, IC 14 PIN	4
(U18)	821551-1	SOCKET, PLCC, 52 PIN	1
(U19)	821575-1	SOCKET, PLCC, 44 PIN	1
(U2,U3,U15)	2-641600-1	SOCKET, IC 16 PIN	3
(U23)	2-641602-1	SOCKET, IC 20 PIN	1
(U4,U6,U16,U17,U20,U24)	2-640463-1	SOCKET, IC 8 PIN	6
(U7, U13)	4880S	MOUNTING KIT, TO220	2
(U9)	821574-1	SOCKET, PLCC, 68 PIN	1
C1-C4,C7-C10,C15-C19, C23-C27,C29,C33, C34,C36, C38,C40,C41,C43,C46-C53, C55,C56,C58-C62,C64-C66	CAP-CER-0.1uF		46
C13,C14,C54	T322A105K025AS	CAP, TANTALUM 1uF, 25V AXIAL, ±10%	3
C20,C42	CAP-AL-22pF,63V		2
C22	CAP-AL-2200uF,16		1
C35,C37,C39,C45	CAP-CER-22pF		4
C5,C21,C28,C30,C31,C44	CAP-AL-2200uF,35V		6
C57	CAP-CER-0.001uF		1
C6,C11,C12,C32	CAP-AL-100uF,35V		4
C63	CAP-4-33-220uF,16V		1
C67	CAP-CHV-0.47uF,100V		1
D1,D2	KBU4J		2
D3	LS3360-KN		1
D4,D8	1N4148		2
D5,D6,D9,D10	11DQ04		4
D7,D11	1N4005		2
P1	747840-4	CONN, DB9, MALE, RIGHT-ANGLE,	1
P10 (MEMBRANES)	103185-4	HEADER, 1x4 PIN UNSHIELDED, .100	1
P11 (PATIENT OUTPUT)	640445-8	HEADER, SINGLE ROW 8 PIN, POLARIZED,	1
P2 (PWR SW)	640445-4	HEADER, SINGLE ROW 4 PIN, POLARIZED,	1
P3,P5,P7	HEADER - DNS		3
P4 (AC IN)	640445-2	HEADER, SINGLE ROW 2 PIN, POLARIZED,	1



## Theramini 2 Parts List, Cont.

Main Board (Part name 2666)		Part Name	Description	Qty/Board
Reference Designator(s)	Part Name	Description	Qty/Board	
P6 (ENCODER)	640454-4	HEADER, SINGLE ROW 4 PIN, POLARIZED,	1	
P8 (CHAR LCD)	1-103185-4	HEADER, SINGLE ROW 14 PIN	1	
P9 (GRAPHIC LCD)	2-103185-0	HEADER, SINGLE ROW 20 PIN	1	
PCB	RM 1119-C	PCB, THERA MINI I/II	1	
Q2,Q3	VN0104N3	TRANSISTOR, MOSFET, N-CHANNEL,2	2	
R1,R33,R41	RES-MF-4.75K	RES, MF 4.75K 1/4W 1%	3	
R10,R14	RES-MF-4.75	RES, MF 4.75 1/4W 1%	2	
R11,R12,R15,R16	RES-MF-22.6K	RES, MF 22.6K 1/4W 1%	4	
R13,R19	RES-MF-681	RES, MF 681 1/4W 1%	2	
R17	RES-MF-20K	RES, MF 20K 1/4W 1%	1	
R2,R4,R18,R25,R27,R29, R32,R34,R35,R36,R40	RES-MF-10K	RES, MF 10K 1/4W 1%	11	
R20	RES-MF-10M	RES, MF 10M 1/4W 1%	1	
R22	RES-MF-38.3K	RES, MF 38.3K 1/4W 1%	1	
R23,R24,R26,R28	RES-MF-100K	RES, MF 100K 1/4W 1%	4	
R3,R5	RES-MF-1.43K	RES, MF 1.43K 1/4W 1%	2	
R30,R37	RS-2B .31%	RES, WIRE WOUND, 0.3, 3W, 1% AXIAL	2	
R31	RES-MF-100	RES, MF 100 1/4W 1%	1	
R39	RES-MF-402	RES, MF 402 1/4W 1%	1	
R42-R45	RES-MF-20	RES, MF 20 1/4W 1%	4	
R6,R8,R21	RES-MF-1K	RES, MF 1K 1/4W 1%	4	
R7,R9	RES-MF-12.7K	RES, MF 12.7K 1/4W 1%	2	
RLY1,RLY2	122AY*1K0BAA	RELAY, REED, 2 FORM A, MOLDED	2	
RP1,RP2	RESNET-BSIP10-10K	RES, SIP NETWK 10k, BUSSED, 10 PIN	2	
RP3	RESNET-BSIP10-1K	RES, SIP NETWK 1k, BUSSED, 10 PIN	1	
SP1	AT-40	SPEAKER, 100, .15W, PC-MOUNT	1	
T1	CTM32895	TRANSFORMER, PCB MOUNT,AM-17639	1	
T2,T3	LA-12	TRANSFORMER, PULSE (LA-12)	2	
U1	LM2940T-5.0	IC, REGULATOR, + 5V - TO220	1	
U10,U12	AD7245AAN-DIP24	IC, DAC, 12-BIT, PARALLEL, DIP24	2	
U11	NJM78L12A	IC, REGULATOR, VOLTAGE, +12V, TO-92	1	
U14	74HC107-DIP	IC, DECODER/DEMULTIPLEXER,	1	
U15	74HC138AP-DIP16	IC, OP AMP, DUAL,DIP8	1	
U16,U20	LF412ACN-DIP8	IC, SUPERVISORY CIRCUIT, 0°/+70°C,DIP8	2	
U17	MAX690-DIP8	IC, SUPERVISORY CIRCUIT, 0°/+70°C,DIP8	1	
U18	MC68HC11E1FN	IC, μCONTROLLER, HCMOS,-40°/+85°C	1	



## Theramini 2 Parts List, Cont.

Chassis (Part name 0167) Rich-Mar Part No.	Part Name	Description	Qty/Board
4169	AMP 640433-4	4 PIN .156 AMP CONNECTOR (AC SWITCH)	1
4167	AMP 640440-4	4 PIN .1 AMP CONNECTOR (RIBBON EXTENSION ENCODER POT)	3
4215	4-102978-0	DISPLAY CONNECTOR	1
4163	AMP 640433-2	2 PIN .156 AMP CONNECTOR (AC CORD)	1
0727		DISPLAY MOUNTING HARDWARE	4
5720	PT-3-S	ENCODER KNOB	1
7471	2-004 N-70	O-RING	4
0723	SMITH 8320		9
9171	7721-3PPS	#4 WASHER	2
2666		THERAMINI MAIN BOARD	1
2429		TM 2 MANUAL	1
1718A		WHITE LEAD CORD W/ PIN LEAD	1
1719A		RED LEAD CORD W/ PIN	1
3761		THERAMINI 1/2 PORT COVER	1
7673		MODEL TM FCC LABELS	1
7695		LEAD CORD LABEL	1
7696		OUTPUT JACK LABEL	1
7651	T33364	RM LOGO STICKER LABEL	1
7620		WARNING 1 AMP FUSE LABEL	1
7603	T760S	WARNING ACCESSORY LABEL	1
7676		MAROON THERAMINI 2 INSTRUCTION LABEL	1

**APPENDIX B**  
**SCHEMATICS**