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CHATTANOOGA GROUP, INC.

Vectra™
by Chattanooga Group

User Manual

PRO4 and PRO2

Vectra Vision™
Vectra Touch™
Clinical Protocol System™
User Defined Protocols
Dual Frequency Ultrasound
Optical IrDA Port
Zip™ Drive
Gel Warmer

Table of Contents

Foreword

This manual has been written for the owners and operators of the Vectra Pro2 and Vectra Pro4. It contains general instructions on operation, precautionary practices, maintenance and parts information. In order to maximize use, efficiency and the life of your Vectra Pro2 and Vectra Pro4, please read this manual thoroughly and become familiar with the controls as well as the accessories before operating the unit.

Specifications put forth in this manual were in effect at the time of publication. However, owing to Chattanooga Group's policy of continual improvement, changes to these specifications may be made at any time without obligation on the part of Chattanooga Group, Inc.

Product Description

The Vectra Pro2 and Vectra Pro4 offer a new dimension in electrotherapy, ultrasound and combination treatments. They offer seven Pain Management and Muscle contraction waveforms, Ultrasound and Combination therapy. Features include VectraTouch™ , a unique touch-screen operating system and VectraVision™, an anatomical library and multimedia educational modules displayed on a high-resolution color display. A computerized Zip™ drive (floppy disk drive) operates educational presentations and color anatomical illustration library.

The Clinical Protocol System™ offers over 100 protocols. With user defined protocols, the clinician can create up to 200 unique electrotherapy and ultrasound protocols.

Vectra Pro2 and Vectra Pro4 are prescription devices used under the supervision or by the order of a physician or other licensed healthcare provider.

User Maintenance

To clean, turn unit off and unplug the power supply. Clean the unit with a damp cloth. Do not use abrasive cleaners. A small amount of mild household detergent may be used, if desired.

Technical Maintenance

No attempt should be made to disassemble the unit. Maintenance and all repairs should be made by authorized personnel only. The manufacturer will not be held responsible for the results of maintenance or repairs by unauthorized persons.

To fully maintain compliance with Federal Regulation Title 21 (21 CFR), this unit must be recalibrated annually. It is recommended that all Chattanooga Group, Inc. ultrasound products be returned to the factory or an authorized servicing dealer for repairs or recalibration. It is also recommended after the replacement or repair of any major component.

The following items should be checked at least monthly to ensure proper operation of this unit:

1. *Power cord and plug:* Check to make sure the cord is not frayed, kinked or does not have torn or cut insulation.
2. *Sound head cable:* Check to make sure the cable is flexible, free of kinks, not frayed and the insulation is intact.
3. *Sound head face:* Check to see that there is no build-up of gel or foreign material on the aluminum face.
4. *Lead Wires:* Check that the cables are not frayed, kinked or do not have torn or cut insulation.

Precautionary Instructions

1. **CAUTION** Read, understand and practice the precautionary and operating instructions. Know the limitations and hazards associated with using any electrical stimulation or ultrasound device. Observe the precautionary and operational decals placed on the unit.

2. **CAUTION** DO NOT operate the Vectra Pro when connected to any unit other than Chattanooga Group, Inc. devices. Do not operate the unit in an environment of short-wave diathermy use.

3. **WARNING** Federal law restricts this device to sale by, or on the order of, a physician or licensed practitioner. This device should be used only under the continued supervision of a physician or licensed practitioner.

4. **CAUTION** The Ultrasound generator should be routinely checked before each use to determine that all controls function normally; especially that the intensity control does properly adjust the intensity of the ultrasonic power output in a stable manner. Also, determine that the treatment time control does actually terminate ultrasonic power output when the timer reaches zero.

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

6. **CAUTION** DO NOT use sharp objects such as a pencil point or ballpoint pen to operate the buttons on the control panel as damage may result.

7. **WARNING** Explosion hazard if used in the presence of flammable anesthetics. The warning symbol for this hazard is prominently displayed on the cabinet. 

8. **WARNING** For continued protection against fire hazard, replace fuses only with ones of the same type and rating.

9. **WARNING** Make certain that the unit is electrically grounded by connecting only to a grounded electrical service receptacle conforming to the applicable national and local electrical codes.

10. **WARNING** This device should be kept out of the reach of children.

11. **WARNING** Care must be taken when operating this equipment around other equipment. Potential electromagnetic or other interference could occur to this or to the other equipment. Try to minimize this interference by not using other equipment in conjunction with it.

12. **CAUTION** This unit should be operated, transported and stored in temperatures between 59° F and 104° F (15° C and 40° C), with Relative Humidity ranging from 30% - 60%.

13. **CAUTION**: Handle ultrasound applicator with care. Inappropriate handling of the ultrasound applicator may adversely affect its characteristics.

14. **CAUTION**: Inspect treatment head for cracks, which may allow the ingress of conductive fluid before each use.

15. **CAUTION**: Inspect treatment head cables and associated connectors before each use.

Before administering any treatment to a patient you should become acquainted with the operating procedures for each mode of treatment available, as well as the indications, contraindications, warnings and precautions. Consult other resources for additional information regarding the application of electrotherapy.

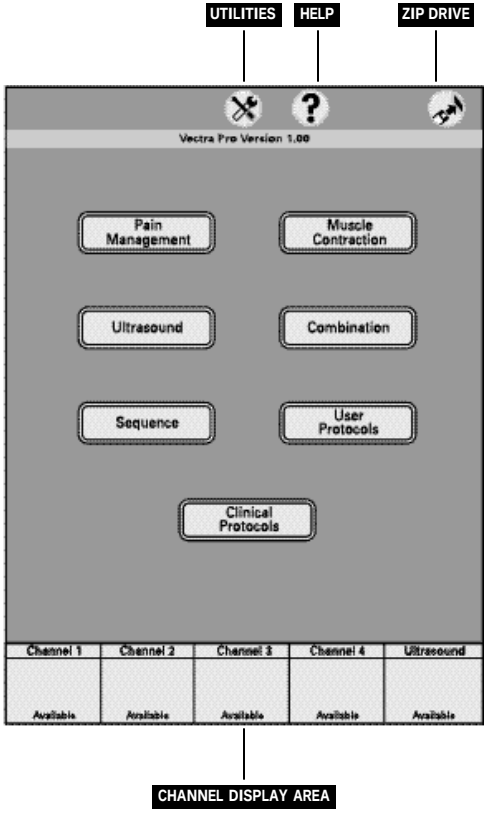
Installation

Initial Setup Instructions

Remove the Vectra Pro4 or Pro2 unit and any additional items ordered from the carton and inspect for damage that may have occurred during shipment. Check the voltage rating on the serial decal located on the bottom of the unit. Plug the system power supply in to a 100 Volt to 220-240 Volt AC outlet, as required.

CAUTION

- DO NOT attempt to use Direct Current (DC).
- DO NOT place unit in a location where the power cord could be tripped over or pulled out during treatment.
- DO NOT attempt to use the unit if it is not properly grounded.



Operator Interface

The operator interface conists of a liquid crystal display that has a touch screen overlay. The operator is able to view parameter options and make a selection by touching a designated area of the screen. The display will also provide information about ongoing treatments, such as amplitude and elapsed time. At the completion of treatment, a summary of the parameters used will be displayed until the next treatment is initiated or the unit is powered off. Ultrasound and stimulation intensities are adjusted with a rotary knob. The stimulation output can be stopped by pressing a stop button located on the touch screen.

Operational steps are as follows:

1. Operator may choose between performing patient treatments (electrical stimulation or ultrasound) or view educational information on the display screen. Educational information consists of medical illustrations of major muscles, bones and nerves. (This anatomical information does not include electrode placement. Electrode placement is determined by the operator.) Definitions of electrotherapy terminology and listing of pertinent screens are also included.
2. The operator's choice is displayed on a screen in a summary fashion. From this screen, the adjustable parameters may be modified. Numerical choices are made from either a numerical key pad that appears on the Touch Screen or by incrementing or decrementing the desired parameter by pressing the corresponding portion of the button. Other choices toggle options.

3. Once parameter selections are confirmed, the operator is prompted to adjust amplitude using the rotary knob. The actual current delivered is displayed clearly in real time.
4. When treatment parameters are adjusted appropriately, the operator touches an area on the screen designated as the start button and the treatment timer begins to count down.
5. The status area of the display continuously shows information relating to the channel(s) running and elapsed time.
6. After the expiration of the treatment time, an audible tone is sounded and the display shows a summary of the parameters/treatment that was administered.

Screen layout

The Vectra Pro's main screen, also called the "Home Screen," contains touch buttons for all functions and applications. The color touch screen is divided into three sections:

Top of screen – This includes icons or symbol buttons.

Center of screen – This includes options and control functions of the various waveforms and ultrasound.

Bottom of screen – This is dedicated to the channel display.

Screen Controls

Utilities – This icon gives you access to the Vectra Pro utility screen.

Help – This icon opens an online manual to provide you with detailed explanation of the particular screen you are viewing.

Zip drive – This icon gives you access to the clinical resource programs on the zip drive. You have three clinically based resource programs: Vectra Pro user in-service, anatomical library and patient programs. Note: The Zip disk provided with your Vectra Pro must be in the Zip drive to access the clinical resource programs.

Pain Management – This icon provides multiple waveforms for pain management and a Clinical Protocol mode to help you select the appropriate waveform and parameter setting. When in the Pain Management Section, the Clinical Protocol library is dedicated to protocols using the pain management waveforms.

Ultrasound – This icon gives you access to the ultrasound applications.

Sequence – This icon allows you to select or create a sequential program of electrotherapy applications, giving you the ability to link together up to three wavefroms per sequence.

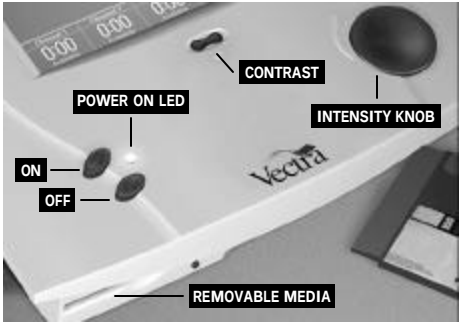
Muscle Contraction – This icon provides multiple waveforms for muscle contraction and a Clinical Protocol mode to help you select the appropriate waveform and parameter setting.

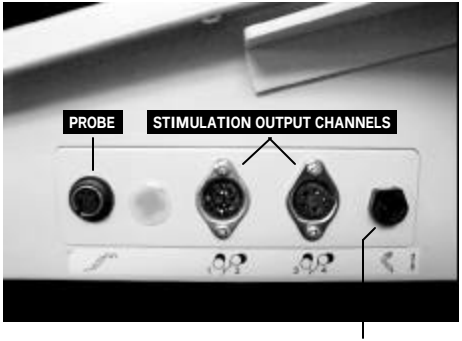
Combination – This icon combines ultrasound therapy with one of several waveforms.

User Protocols – This icon gives you access to the protocols that you created in the Pain Management, Muscle Contraction, Ultrasound or Combination mode of use. Up to 200 user protocols can be stored by name using the Vectra Pro keyboard, which appears when the Save icon is selected for any particular waveform.

Navigate through the User Protocols using the Up and Down boxes or the Page Up or Page Down functions.

Clinical Protocols – This icon allows you access to the entire Clinical Protocol library of Pain Management, Muscle Contraction and Ultrasound protocols. You identify the needs and desired results you wish from the waveform or ultrasound application and the Clinical Protocols algorithm will select the ultrasound or waveform parameter settings. All Clinical Protocols can be edited to suit patient comfort.





Unit Orientation

Operating channels – The Vectra Pro4 includes four channels of electrical stimulation. The Vectra Pro2 has two channels of output, but can easily be upgraded to a four-channel system.

Probe ports – The Vectra Pro4 and Pro2 include High Volt and Microcurrent probe kits as standard features. Simply connect your probe of choice to the appropriate port.

Ultrasound port – The Vectra Pro comes with two applicators (a 5 cm^2 and a 2 cm^2 diameter) which connect to the labeled ultrasound port. The advanced electronics of the Vectra Pro read the calibration requirements of the ultrasound applicator every time you plug in an applicator or access the ultrasound mode. This sophisticated Electronic Signature™ assures accurate calibration when you apply ultrasound.

IR port – The infrared port (IrDA) is used to transmit patient treatment information to a printer equipped with a JetEye IrDA adapter.

Zip Drive – The Zip disk provided with your Vectra Pro is placed in this drive to operate multimedia educational programs and anatomical library.

Amplitude control – To increase intensity, turn the knob clockwise. To decrease intensity, turn the knob counter clockwise.

ON/OFF – The unit's on and off controls. The Power on LED will illuminate when the on button has been pressed.

Contrast controls – Use this button to change the contrast of the touch screen display. Touch the left side of the button to decrease contrast, touch the right side of the button to increase contrast.

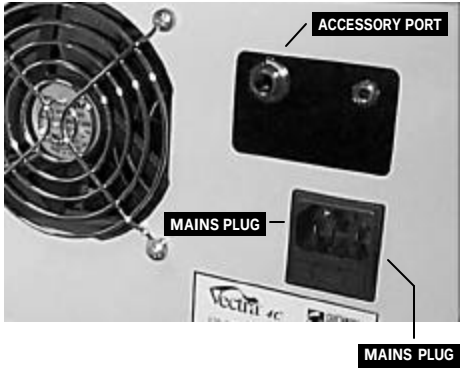
Operating Controls

- Intensity Knob
- Contrast Button
- Power ON
- Power OFF
- Power ON LED

Gel Warmer – The Vectra Pro includes a gel warmer as a standard feature. Gel is warmed to a soothing temperature to increase patient comfort.

Accessory Port – This port can be used for the placement of a manual stimulation switch and/or patient switch.

Mains Plug – This is where your main power supply is connected.



Package Contents

The following is a list of accessories which are included with the Vectra Pro2 and Vectra Pro4.

Standard Accessories

Part No.	Description
78047	Applicator, Ultrasound 5 cm^2
78048	Applicator, Ultrasound 2 cm^2
4248	Ultrasound Gel
12213	Lead, 120", Red/Black, Channels 1 and 2
12214	Lead, 120", Red/Black, Channels 3 and 4 (Pro4 only)
72853	Electrode Carbonflex, 3" Round, Red
72852	Electrode Carbonflex, 3" Round, Black
10648	Nylatex, 2-½" x 24", Sewn
57000	Microcurrent Probe with Switch
79977	High Volt Probe Kit
42040	2" Round Self-Adhesive Electrode Sample
79540	Patient Switch
79412	Operator's Manual
8356	Vectra Cart

Optional Accessories

The following is a list of optional accessories available for the Vectra Pro2 and Vectra Pro4.

Part No.	Description
78046	Applicator, Ultrasound 10 cm^2
79541	Manual Stim Switch
79976	Microcurrent Probe Kit

Indications, Contraindications and Adverse Effects for Electrical Stimulation

Interferential Current

Indications

- Symptomatic relief of chronic, intractable pain.
- Management of pain associated with post-traumatic or postoperative conditions.

Contraindications

- This device should not be used for symptomatic pain relief unless etiology is established or unless a pain syndrome has been diagnosed.
- This device should not be used on patients with demand type cardiac pacemakers.
- This device should not be used over cancerous lesions.
- Electrode placements must be avoided that apply current to the carotid sinus region (anterior neck) or transcereberally (through the head).

Warnings

- The long-term effects of chronic electrical stimulation are unknown.
- Safety has not been established for the use of therapeutic electrical stimulation during pregnancy.
- Adequate precautions should be taken when treating individuals with suspected or diagnosed heart problems, or epilepsy.

- Benefits of Interferential stimulation have not been established for pain of central origin.
- This device is to be used as a symptomatic treatment for pain and has no curative value. Patients should be cautioned and their activities regulated if pain is suppressed that would otherwise serve as a protective mechanism.
- Electronic monitoring equipment (such as ECG monitors and ECG alarms) may not operate properly when electrical stimulation is being utilized.

Precautions

- Isolated cases of skin rash may occur at the site of electrode placement following long-term applications. The irritation may be reduced by use of an alternate conductive medium or an alternative electrode placement.
- Effectiveness of this treatment is dependent upon patient selection.

Adverse Effects

- Skin irritation and burns beneath the electrodes have been reported with the use of therapeutic electrical stimulation.

Premodulated Current

Indications

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

Contraindications

- This device should not be used for symptomatic pain relief unless etiology is established or unless a pain syndrome has been diagnosed.
- This device should not be used on patients with demand type cardiac pacemakers.
- This device should not be used over cancerous lesions.
- Electrode placements must be avoided that apply current to the carotid sinus region (anterior neck) or transcereberally (through the head).

Warnings

- Long-term effects of chronic electrical stimulation are unknown.
- Safety has not been established for the use of therapeutic electrical stimulation during pregnancy.
- Adequate precautions should be taken when treating individuals with suspected or diagnosed heart problems, or epilepsy.
- Benefits of Premodulated stimulation have not been established for pain of central origin.
- This device is to be used as a symptomatic treatment for pain and has no curative value. Patients should be cautioned and their activities regulated if pain is suppressed that would otherwise serve as a protective mechanism.
- Electronic monitoring equipment (such as ECG monitors and ECG alarms) may not operate properly when electrical stimulation is being utilized.

Precautions

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

Adverse Effects

- Skin irritation and burns beneath the electrodes have been reported with the use of therapeutic electrical stimulation.

VMS, Russian, High Volt

Indications

- Relaxation of muscle spasms.
- Prevention or retardation of disuse atrophy.
- Increasing local blood circulation.
- Muscle re-education
- Maintaining or increasing range of motion.
- Immediate postsurgical stimulation of calf muscles to prevent venous thrombosis.

Contraindications

- This device should not be used on patients with demand type cardiac pacemakers.
- This device should not be used on cancer patients.

Warnings

- The long-term effects of chronic electrical stimulation are unknown.
- Safety has not been established for the use of therapeutic electrical stimulation during pregnancy.
- Adequate precautions should be taken when treating individuals with suspected or diagnosed heart problems.
- Adequate precautions should be taken in the cases of persons with suspected or diagnosed epilepsy.
- Do not stimulate over the carotid sinus nerve, especially in persons with a known sensitivity to the carotid sinus reflex.
- Severe spasm of the laryngeal and pharyngeal muscles may occur if the electrodes are placed over the neck or mouth. The contractions may be strong enough to cause breathing difficulty or even close the airway.
- Do not perform therapeutic electrical stimulation transcerebrally (through the head).
- Therapeutic electrical stimulation should not be applied over swollen, infected or inflamed areas of skin eruptions, (e.g., phlebitis, thrombophlebitis and varicose veins).

- Use extreme caution in transthoracic application of therapeutic electrical stimulation. Introduction of electrical current into the heart may cause arrhythmia.
- This device should only be used under medical supervision for adjunctive therapy for the treatment of medical diseases and conditions.
- This device should be kept out of the reach of children.

Precautions should be observed in the presence of the following:

- Following recent surgical procedures especially when muscle contractions could disrupt the healing process.
- Where sensory nerve damage is present by a loss of normal skin sensation.
- When there is a tendency to hemorrhage following acute trauma or fracture.
- Over the menstruating uterus.
- Some patients may experience skin irritation or hypersensitivity due to the electrical stimulation or the electrical conductive medium. The irritations can usually be reduced by the use of an alternate conductive medium or alternative electrode placement.

Adverse Effects

- Skin irritation and burns beneath the electrodes have been reported with the use of therapeutic electrical stimulation.

Microamperage Pulsed Current (Microcurrent)

Indications

- Symptomatic relief of chronic, intractable pain.
- Management of pain associated with post-traumatic or postoperative conditions.

Contraindications

- This device should not be used for symptomatic pain relief unless etiology is established or unless a pain syndrome has been diagnosed.
- This device should not be used on patients with demand type cardiac pacemakers.
- This device should not be used over cancerous lesions.
- Electrode placements must be avoided that apply current to the carotid sinus region (anterior neck) or transcereberally (through the head).

Warnings

- Long-term effects of chronic electrical stimulation are unknown.
- Safety has not been established for the use of transcutaneous nerve stimulation during pregnancy.
- Adequate precautions should be taken when treating individuals with suspected or diagnosed heart problems, or epilepsy.
- Benefits of microcurrent have not been established for pain of central origin.

- This device is to be used as a symptomatic treatment for pain and has no curative value. Patients should be cautioned and their activities regulated if pain is suppressed that would otherwise serve as a protective mechanism.
- Electronic monitoring equipment (such as ECG monitors and ECG alarms) may not operate properly when electrical stimulation is being utilized.

Precautions

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

Adverse Effects

- Skin irritation and burns beneath the electrodes has been reported with the use of transcutaneous nerve stimulation. The microamperage current levels of this device may minimize this possibility.

Indications, Contraindications and Precautions for Ultrasound

Indications

Ultrasound for use in applying deep heat can be used for treatment of selected medical conditions such as the relief of pain, muscle spasms and joint contractures. These conditions may be associated with adhesive capsulitis, bursitis with slight calcification, myositis, and soft tissue injuries. The Vectra Pro4 and Pro2 can provide therapeutic deep heating between 40 and 45° C in all of its operating modes, while using any of the applicators available for this device.

Contraindications

Ultrasound should not be used over:

- An area of the body where a malignancy is known to be present.
- The eyes.
- The reproductive organs.
- An acute infection or sepsis.
- A pregnant uterus.
- Deep vein thrombosis.
- An arterial disease.
- An anesthetized area or condition that causes impairment of sensation, such as chemotherapy.
- The epiphyses of skeletally immature children.

- The thoracic area if the patient is using a cardiac pacemaker.
- A healing fracture.
- 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:

- For acute conditions of bursitis and tendonitis that can be exacerbated by the use of ultrasound.
- Over an area of the spinal cord following a laminectomy (i.e., when major covering tissues have been removed).
- On patients with a tendency toward hemorrhaging.

Technical Specifications

Vectra Unit

Physical	Dimensions: 16"W x 21.5"D x 8"H (40.6 cm W x 54.6 cm D x 20.3 cm H) Weight: 13 lbs. (5.9 kg) (less accessories) Case Material: Polycarbonate Plastic and Steel
Power	Input: 100-240 V~, 1.0 A, 50/60 Hz, Output: +12 V, 8.3 A
Number of Outputs	Pro2: 2 Stimulator Outputs, 1 Ultrasound Output Pro4: 4 Stimulator Outputs, 1 Ultrasound Output
Electrotherapy Waveforms	Interferential (Quad-Polar) Premodulated (Bi Polar) Russian VMS (Symmetrical Biphasic) High Volt Microcurrent
Fuse	1.0 A Time Lag
Electrical	Class: Class I Type: Type B

Ordinary Equipment as far as harmful ingress fo water.
Product suitable for continuous operation.
⚠ Attention: Consult accompanying documents.

Stimulator Output Parameters

Parameter	Interferential	Premodulated	Microcurrent
Function	Electrodes	Electrodes	Electrodes, Probes
Carrier Frequency	5000 Hz	5000 Hz	N/A
Frequency	0-200 Hz (Beat)	0-200 Hz (Beat)	0.1-1000 Hz
Scan Mode	On/Off	N/A	N/A
Scan Time	15 sec	N/A	N/A
Sweep Time	15 sec	15 sec	N/A
Duty Cycle	N/A	N/A	N/A
Ramp Up / Ramp Down	N/A	N/A	1 sec Alternating only
Cycle Time	15 sec	N/A	N/A
Alternating Time in Seconds	N/A	N/A	2.5 sec
Polarity	N/A	N/A	+,-, +/-
Amplitude	0-50 mA RMS	0-50 mA RMS	10-995 uA
Voltage (max)	200 Volts	200 Volts	N/A
Treatment Time	1 to 60 min	1 to 60 min	1 to 60 min

N/A = Not Applicable

Stimulator Output Parameters

Parameter	Russian	High Volt	VMS	VMS Burst
Function Mode	Electrodes Single, Recipr. Co-Contraction	Electrodes, Probes Single	Electrodes, Probes Single, Recip. Co-Contraction	Electrodes, Probes Single, Recip. Co-Contraction
Carrier Frequency	2500 Hz	N/A	N/A	N/A
Pulse Frequency	N/A	10-120 pps	5-200 pps	5-200 pps
Burst Frequency	20-100 bps	N/A	N/A	N/A
Phase Duration	N/A	N/A	20-300 microseconds	20-300 microseconds
Interphase Interval	N/A	N/A	100 microseconds	100 microseconds
Duty Cycle	10-50%	N/A	N/A	N/A
Ramp Up / Ramp Down	.5, 1, 2, 5 sec	N/A	.5, 1, 2, 5 sec	.5, 1, 2, 5 sec
Cycle Time	5/5, 4/12, 10/10, 10/20, 10/30, 10/50, Continuous, User Defined	5/5, 4/12, 10/10, 10/20, 10/30, 10/50, Continuous, User Defined	5/5, 4/12, 10/10, 10/20, 10/30, 10/50, Continuous, User Defined	5/5, 4/12, 10/10, 10/20, 10/30, 10/50, Continuous, User Defined
Polarity	N/A	Pos. (+), Neg. (-)	N/A	N/A
Amplitude	0-100 mA RMS into 500 ohm load	0-500 mA RMS	0-200 mA Peak into 500 ohm load	0-200 mA Peak into 500 ohm load
Voltage (max)	200 Volts	0-500 Volts	200 Volts, Peak to Peak	200 Volts, Peak to Peak
Output Current	N/A	0-2500 mA Peak	N/A	N/A
Treatment Time	0-60 min	0-60 min	0-60 min	0-60 min

N/A = Not Applicable

Ultrasound Output Description

Channel	US (ultrasound)
Frequency	1 MHz + 5% & 3.3 MHz + 5%
Duty Cycle	100% (continuous mode) 50%, 20%, 10% (pulsed mode)
Pulse Duration	5 msec ± 20% (50% duty cycle, pulsed mode) 2 msec ± 20% (20% duty cycle, pulsed mode)
Ultrasonic Power	Variable from 1-20 watts, 10 cm^2 crystal Variable from 0.4-10 watts, 5 cm^2 crystal Variable from 0.2-4 watts, 2 cm^2 crystal
Output Meter Accuracy	± 20% for any output above 10% of maximum
Temporal Peak/Average Intensity Ratio	2:1 ± 20% for 50% duty cycle 5:1 ± 20% for 20% duty cycle 9:1 ± 20% for 10% duty cycle
Output	Continuous: 1 MHz or 3.3 MHz nominal signal that is activated as long as the timer is operating. Pulsed: 1 MHz or 3 MHz signal, modulated 100% by the 100 Hz rectangular wave with the selected duty cycle.
Timer Acuracy	±0.2 minute
Sound Head	Effective Radiating Area: 8.5 cm^2 ± 1.5 cm^2 for the 10 cm^2 crystal 4.0 cm^2 ± 1.0 cm^2 for the 5 cm^2 crystal 1.8 cm^2 ± 0.4 cm^2 for the 2 cm^2 crystal
Maximum Beam Non-uniformity Ratio	<6.0:1
Beam Type	Collimating

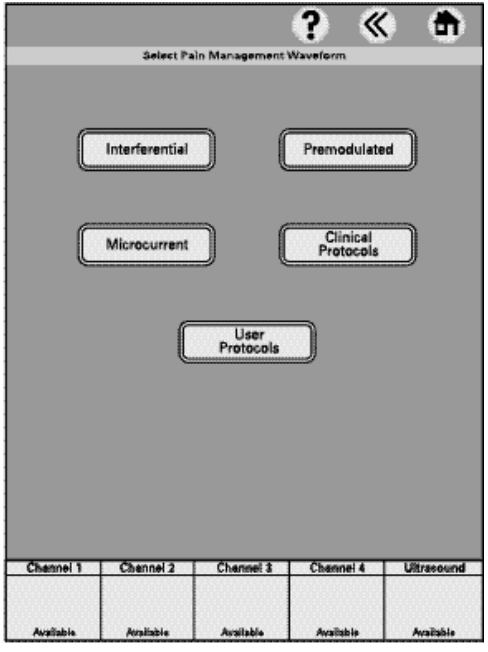
Other Features

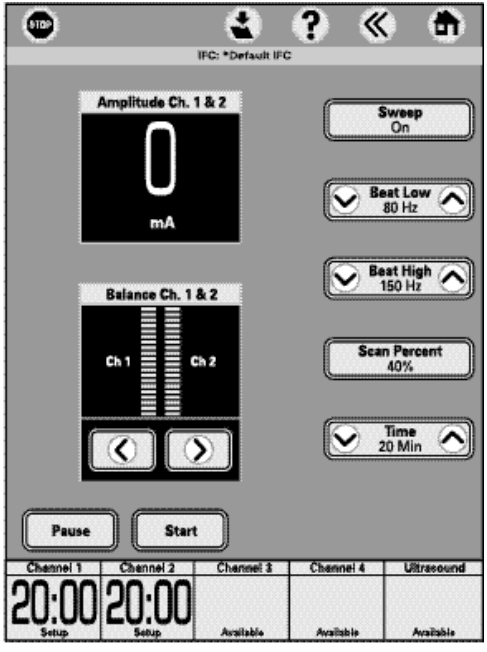
- Ultrasound Head Warming - 50% of Maximum output until crystal temperature reaches approximately 100° F (38 °C), then 10% of maximum or off to maintain temperature.
- Ultrasound gel Warmer - Maintains temperature of coupling gel at approximately 100° F (38 °C); can be disabled by user.
- Removeable Media Storage - Currently ultilizes a ZIP drive to allow user to view anatomical libraries.
- Infrared Data Port - Allows the treatment information to be printed to an infrared - capable printer.

Pain Management

The management of post-traumatic, post-operative or chronic intractable pain associated with many areas of the body can be a difficult task. The Vectra Pro provides multiple waveforms and a Clinical Protocol mode to help you select the appropriate waveform and parameter settings.

The three waveforms available in Pain Management therapy include Interferential, Premodulated and Microcurrent.





Interferential

The Interferential waveform consists of two channels, each with a sinusoidal waveform: one of fixed frequency and one of variable frequency. When the four electrodes are positioned so that the two channels cross each other, the waveforms mix within the tissue to produce a train of pulses whose frequencies and amplitude are dependent on the sweep mode, beat frequency and amplitude settings, respectively.

Stop icon: Function button always located at the top left corner of the screen when a treatment session is running. When pressed, it will stop all treatment sessions.

Save: Function button that allows you to save any parameter modifications you make to this waveform and store is as a User Protocol.

Help: An online manual to provide you with detailed explanation of the particular screen you are viewing.

Back: Function button that allows you to move back one screen in the software.

Home: Function button to take you directly you the main menu of the Vectra Pro software.

Amplitude: This displays the level of output set by the user with the amplitude control knob.

Balance: This controls the percent level of your set amplitude by channel. If you wish the patient to have a greater level of stimulation intensity focused in a particular channel press the arrow button below that channel.

Sweep: Frequency modulation of the Interferential current. Sweep is a function that can be toggled on or off.

Beat Low: When using a sweep mode the frequency varies from one level to another. Beat Low describes the lowest frequency in that range. For example using a sweep of 80-150 Hz, 80 Hz is the lowest frequency.

Beat High: When using a sweep mode the frequency varies from one level to another. Beat High describes the highest frequency in that range. For example using a sweep of 80-150 Hz, 150 Hz is the highest frequency.

Scan Percentage: Scan Percentage is the percentage of the Interferential amplitude that will decrease from its maximum level over a 15-second period. Scan is Amplitude modulation, expressed as a percentage of the amplitude. The rhythmical varying of the current amplitude of each channel produces the perceived movement of the Interferential field by the patient.

Treatment Time: The time of your therapy session is set here.

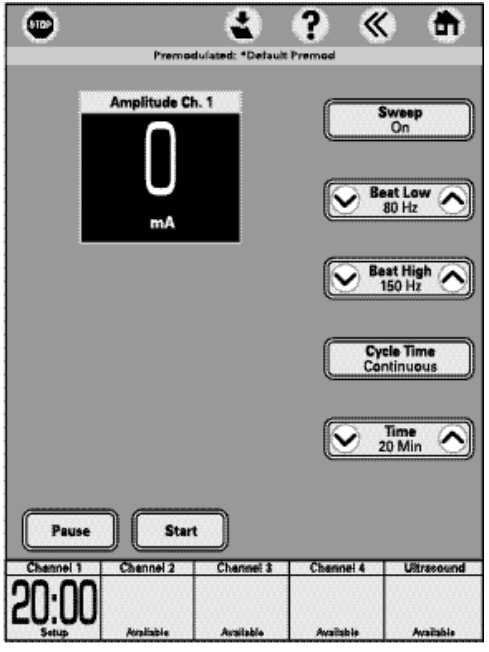
Pause: Function button to temporarily pause a treatment. If you are in an active treatment session and pause that channel. The word resume will appear in this box and is the button the user should touch to resume treatment after a pause.

Start: Function button to initiate or start a treatment session.

Printing Treatment Results: The results of a treatment session can be displayed and printed on any printer that has an IrDA adapter (JetEye) by selecting the Print button represented as an icon of a printer located on the top of the Vectra Pro screen.

Channel: The bottom section of the screen is reserved for channel display. The Vectra Pro4 will display Channel 1, Channel 2, Channel 3, Channel 4, and Ultrasound. The Vectra Pro2 will display Channel 1, Channel 2 and Ultrasound. The individual channel displays have the word Available in them. This means they are currently unused and available for use. When you select a waveform the Vectra Pro assigns the channel for you. As you select a waveform, the word available in the channel box changes to Setup, meaning that that channel is being setup preparing for use. And finally, when you are running the channel on a patient the text in the channel box will display the word Running. When a treatment session is running the countdown display becomes a useable button, if you wish to review the parameters of a particular channel during a session you can touch the channel display desired and you will go directly to the parameter display of that channel.

Premodulated



Premodulated is a single sine wave that has modulated amplitude. This waveform is similar to the beat frequency, or pattern created by Interferential current. In some cases, Premodulated therapy provides a good alternative for Interferential treatment especially when treating areas of the body where four electrodes can not be utilized.

Stop icon: Function button always located at the top left corner of the screen when a treatment session is running. When pressed, it will stop all treatment sessions.

Save: Function button that allows you to save any parameter modifications you make to this waveform and store is as a User Protocol.

Help: An online manual to provide you with detailed explanation of the particular screen you are viewing.

Back: Function button that allows you to move back one screen in the software.

Home: Function button to take you directly you the main menu of the Vectra Pro software.

Amplitude: This displays the level of output set by the user with the amplitude control knob.

Sweep: Frequency modulation of the Premodulated current. Sweep is a function that can be toggled on or off.

Beat Low: When using a sweep mode the frequency varies from one level to another. Beat Low describes the lowest frequency in that range. For example using a sweep of 80-150 Hz, 80 Hz is the lowest frequency.

Beat High: When using a sweep mode the frequency varies from one level to another. Beat High describes the highest frequency in that range. For example using a sweep of 80-150 Hz, 150 Hz is the highest frequency.

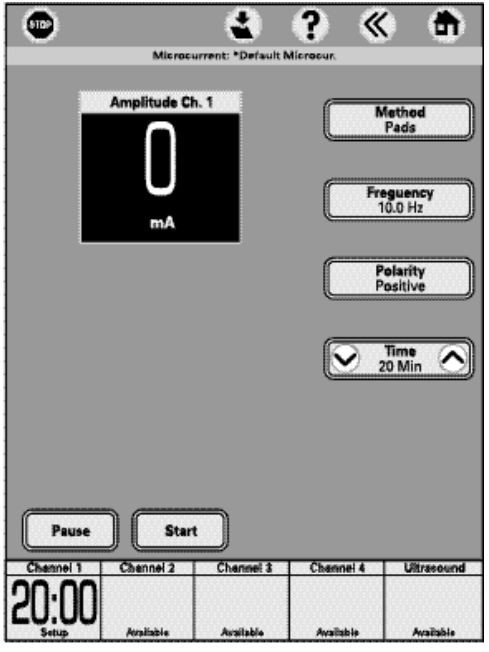
Cycle Time: This section provides control over the waveforms Cycle Time and Ramp. The Cycle Time is the time in seconds of the stimulation on time followed by the rest time or off time. Ramp is the amount of time required for the amplitude level to be reached at the beginning of a cycle and the amount of time required to decrease to amplitude to zero at the end of a cycle. The ramp time is applied to the beginning and end of a contraction. There are many preset Cycle Times and Ramps to select and the ability to create a user defined Cycle Time with user defined Ramps.

Treatment Time: The time of your therapy session is set here.

Pause: Function button to temporarily pause a treatment. If you are in an active treatment session and pause that channel. The word resume will appear in this box and is the button the user should touch to resume treatment after a pause.

Start: Function button to initiate or start a treatment session.

Microcurrent



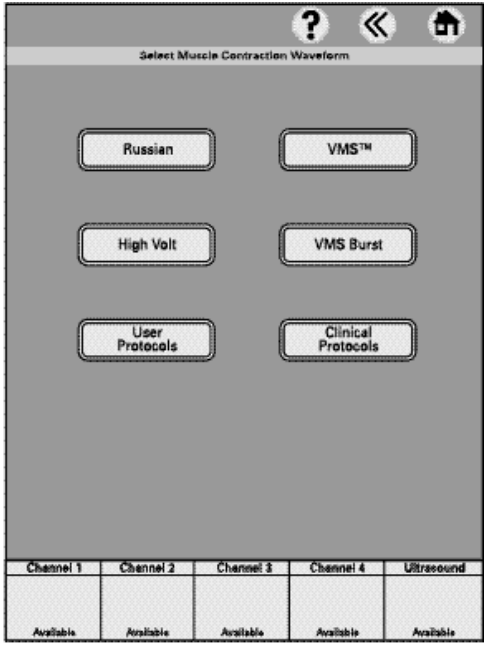
Microcurrent is a monophasic rectangular wave with selectable or alternating polarity. Many clinicians prefer microcurrent therapy because of the low amperage utilized with selectable polarity. For long, unattended therapy sessions, electrodes are usually placed on each side of the affected area so treatment is administered "through" the affected area.

If attended, hands-on therapy is preferred, simply use the microcurrent probe that comes standard with the Vectra Pro. Microcurrent is available through channel 1 and 3 on the Pro4 and channel 1 on the Pro2.

Method: You have the option of delivering Microcurrent to the patient either by electrode or probe application.

Frequency: The number of cycles delivered per second. The number of cycles per second is expressed in Hertz (Hz). The range of frequency options is .1 to 1000.0 Hz. To change frequency enter your desired frequency in using the provided numerical keypad.

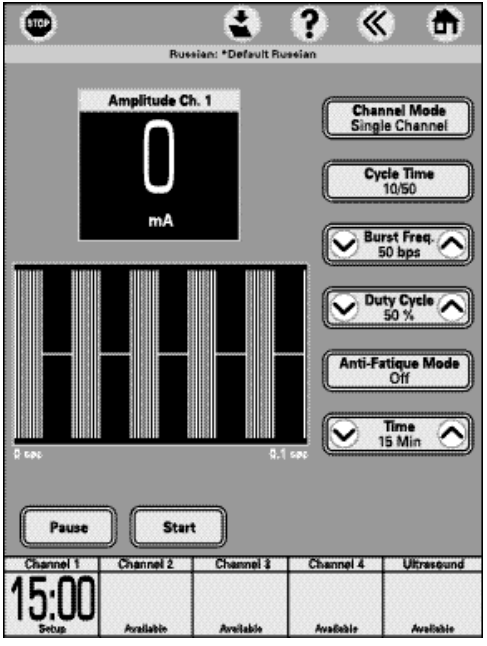
Polarity: The waveform polarity can be set as either positive or negative or alternating.



Muscle Contraction

Four waveforms are available for muscle contraction therapy: Russian, VMS, VMS Burst and Twin-Peak High Volt. The appropriate selection of a waveform for relaxing muscle spasms, increasing local circulation, re-educating muscles that have been atrophied from disuse or injury, or to maintain or improve joint range of motion can be difficult. Vectra provides multiple waveforms to address these clinical problems and a Clinical Protocol mode that will help direct you to the appropriate waveform and parameter setting as a starting point.

Russian



The Russian current is a 2,500Hz sinusoidal carrier wave, interrupted to create pulse trains or "bursts." The number of bursts per second is set by the burst frequency and the length of the bursts is set by the duty cycle.

Channel Mode: Three methods of treatment are available including single channel application, reciprocal application where you can alternate stimulation over agonists and antagonists and co-contract where the timing of stimulation can be coordinated through two channels to co-contract agonist and antagonist or differing sections of a larger muscle group.

Cycle Time: This section provides control over the waveforms Cycle Time and Ramp. The Cycle Time is the time in seconds of the stimulation on time followed by the rest time or off time. Ramp is the amount of time required for the amplitude level to be reached at the beginning of a cycle and the amount of time required to decrease to amplitude to zero at the end of a cycle. The ramp time is applied to the beginning and end of a contraction. There are many preset Cycle Times and Ramps.

Burst Frequency: The number of bursts per second of the waveform.

Duty Cycle: The ratio of on time to total time of bursts. Duty cycle is expressed as a percentage.

Anti-Fatigue™ Mode: This mode begins the first contraction with a frequency of 60 Hz, decreasing 5 Hz with successive contractions, until a minimum of 25 Hz is obtained. It will remain at that level until treatment time expires.

Treatment Time: The time of your therapy session is set here.

Pause: Function button to temporarily pause a treatment. If you are in an active treatment session and pause that channel. The word resume will appear in this box and is the button the user should touch to resume treatment after a pause.

Start: Function button to initiate or start a treatment session.

Waveform Picture: This will give you a physical view of the selected waveform and the physical effects of the parameter alterations you make. This graphic is very helpful when this waveform is used in a reciprocal or co-contract format.

VMS™

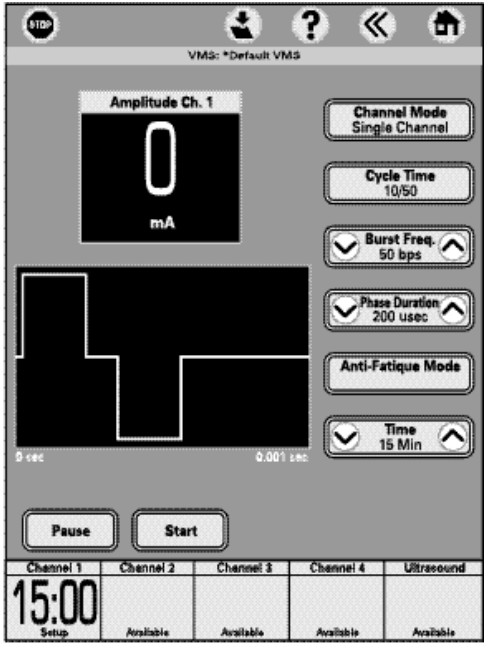
VMS is a symmetrical biphasic square waveform with an inter-phase interval that treats the tissue under each electrode equally. Its single pulses have the same physiologic function as the beat frequency of the Interferential waveform. Low total current makes this waveform good for comfortable sub-maximal muscle contractions.

Channel Mode: Three methods of treatment are available including single channel application, reciprocal application where you can alternate stimulation over agonists and antagonists and co-contract where the timing of stimulation can be coordinated through two channels to co-contract agonist and antagonist or differing sections of a larger muscle group.

Cycle Time: This section provides control over the waveforms Cycle Time and Ramp. The Cycle Time is the time in seconds of the stimulation on time followed by the rest time or off time. Ramp is the rate of time to set amplitude levels at the beginning and end of the stimulation on cycle. The ramp time is applied to the beginning and end of a contraction. You have many preset cycle times and Ramps.

Frequency: The number of pulses per second of the waveform. Use the Up and Down arrow buttons on the box to make your change.

Phase Duration: Phase duration is the time elapsed from the beginning to the termination of one phase. Use the Up and Down arrow buttons on the box to make your change.

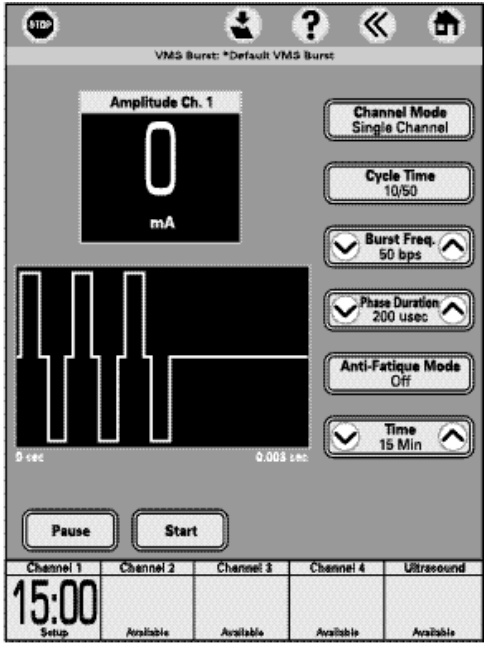


Treatment Time: The time of your therapy session is set here.

Pause: Function button to temporarily pause a treatment. If you are in an active treatment session and pause that channel. The word resume will appear in this box and is the button the user should touch to resume treatment after a pause.

Start: Function button to initiate or start a treatment session.

VMS™ Burst



VMS BURST is a train of three consecutive symmetrical biphasic square waveforms, followed by a rest. The train of symmetrical biphasic pulses includes an inter-phase interval that treats the tissue under each electrode equally.

Channel Mode: Three methods of treatment are available including single channel application, reciprocal application where you can alternate stimulation over agonists and antagonists and co-contract where the timing of stimulation can be coordinated through two channels to co-contract agonist and antagonist or differing sections of a larger muscle group.

Cycle Time: This section provides control over the waveforms Cycle Time and Ramp. The Cycle Time is the time in seconds of the stimulation on time followed by the rest time or off time. Ramp is the rate of time to set amplitude levels at the beginning and end of the stimulation on cycle. The ramp time is applied to the beginning and end of a contraction. You have many preset cycle times and Ramps.

Burst Frequency: The number of bursts per second of the waveform.

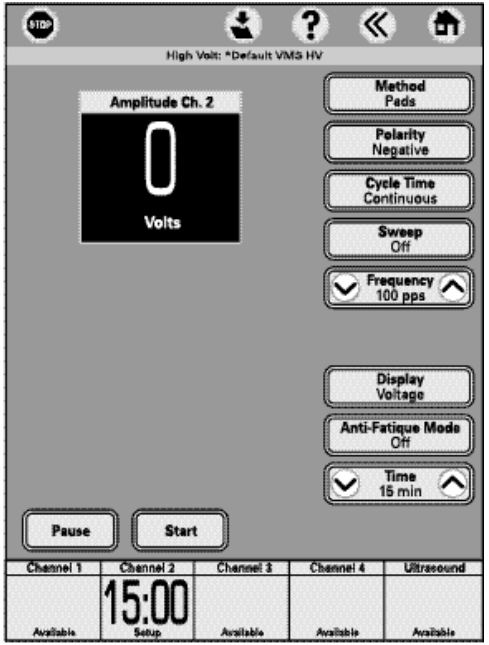
Phase Duration: Phase duration is the time elapsed from the beginning to the termination of one phase. Use the Up and Down arrow buttons on the box to make your change.

Treatment Time: The time of your therapy session is set here.

Pause: Function button to temporarily pause a treatment. If you are in an active treatment session and pause that channel. The word resume will appear in this box and is the button the user should touch to resume treatment after a pause.

Start: Function button to initiate or start a treatment session.

High Volt



High Volt stimulation has output ranges between 300 and 500 volts. True twin-peak High Volt is designed to deliver very short-duration pulses, which are very low in pulse charge. High Volt is available through channel 2 and 4 on the Pro4 and channel 2 on the Pro2.

Method: You have the option of delivering High Volt to the patient either by electrode or probe application.

Polarity: The polarity of the active electrode can be changed from Positive (default) to Negative by pressing the Polarity button. When Positive (default) polarity is selected, the Red leadwire is positive polarity and the Black leadwire is negative polarity. IF YOU SELECT NEGATIVE POLARITY, the Red leadwire becomes negative polarity and the Black leadwire becomes positive polarity.

Cycle Time: This section provides control over the waveforms Cycle Time and Ramp. The Cycle Time is the time in seconds of the stimulation on time followed by the rest time or off time. Ramp is the amount of time required for the amplitude level to be reached at the beginning of a cycle and the amount of time required to decrease to amplitude to zero at the end of a cycle. The ramp time is applied to the beginning and end of a contraction. There are many preset Cycle Times and Ramps.

Sweep: Frequency modulation of the High Volt current. Sweep is a function that can be toggled on or off.

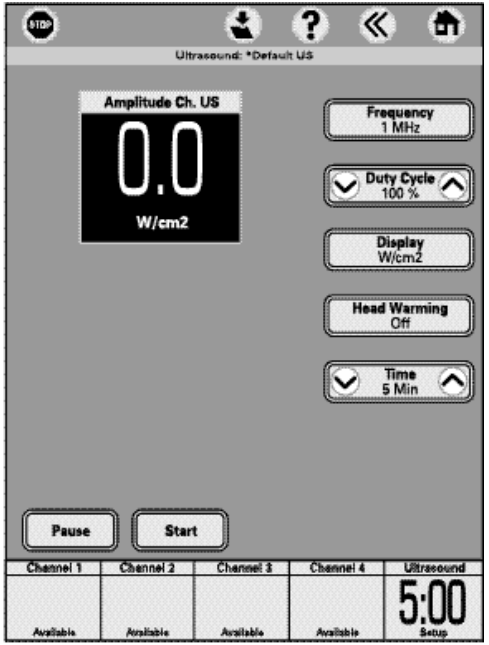
Frequency: The number of pulses per second of the waveform. Use the Up and Down arrow buttons on the box to make your change.

Display: A unique feature that will display output as Voltage or Peak Current. Being able to assess peak current can help determine tissue response, and a view of the level of impedance to current at the electrode skin interface.

Anti-Fatigue™ Mode: This mode begins the first contraction with a frequency of 60 Hz, decreasing 5 Hz with successive contractions, until a minimum of 25 Hz is obtained.

Treatment Time: The time of your therapy session is set here.

Ultrasound/Combination



Ultrasound is a form of mechanical energy that consists of high frequency vibrations delivered to the body by means of an ultrasound beam emitted out of an applicator. These high frequency vibrations pass through the tissues of the body and are gradually absorbed and transformed into heat. This temperature increase triggers biological changes to occur in tissues for the relief of pain, relaxation of muscle spasms and reduction of joint contractures. The ultrasound frequency, duty cycle and level of intensity can all be adjusted to produce the desired therapeutic effect.

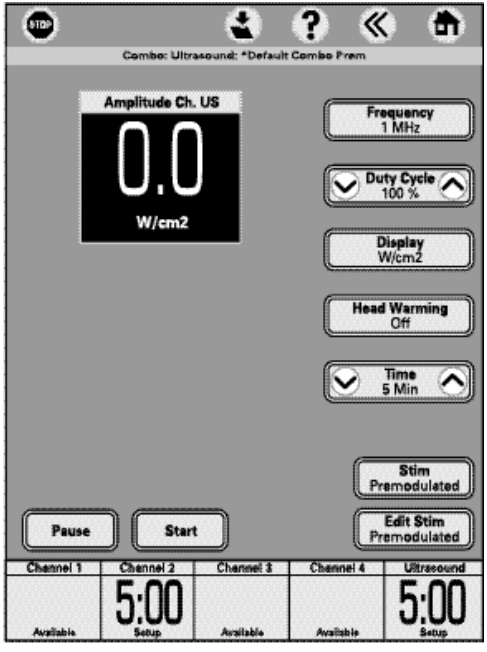
Frequency: Ultrasound frequency is measured in cycles per second and expressed in megahertz. At 1.0 megahertz, there are 1 million cycles per second. At 3 megahertz, there are 3 million cycles per second. Frequency of Ultrasound determines the depth of penetration. One megahertz penetrates approximately 5 centimeters, and 3 megahertz penetrates to 2 centimeters. Both 1 and 3.3 megahertz frequencies are available on your Vectra Pro and can be toggled on and off throughout the course of treatment.

Duty Cycle: Continuous and pulsed duty cycles are available in 10% increments from 10% to 100%.

Display: Ultrasound output can be displayed in Watts, or Watts Per Centimeter Squared.

Head Warming is a unique feature of the Vectra Pro that allows the aluminum surface of the Ultrasound applicator to warm up to room temperature, enhancing patient comfort.

Treatment Time: The time of your therapy session is set here.



Combination Therapy

In the Combination mode, ultrasound therapy is combined with one of several waveforms to generate a therapeutic effect. In this mode of therapy the aluminum face of the ultrasound applicator becomes one half of the electrical circuit. An electrode attached to the **red** lead wire completes the circuit.

The benefits of ultrasound as expressed in the ultrasound section are coupled with electrical stimulation; a typical application of combination therapy is the reduction of muscle spasm. Combination mode is limited to channel 2 of both the Vectra Pro4 and Pro2.

Step-By-Step Instructions

- Select Combo
- Make any desired parameter changes
- Set ultrasound intensity
- Select Edit Stim
- Set Stimulation intensity
- Press Start to begin treatment

Frequency: Ultrasound frequency is measured in cycles per second and expressed in megahertz. At 1.0 megahertz, there are 1 million cycles per second. At 3 megahertz, there are 3 million cycles per second. Frequency of Ultrasound determines the depth of penetration. One megahertz penetrates approximately 5 centimeters, and 3 megahertz penetrates to 2 centimeters. Both 1 and 3.3 megahertz frequencies are available on your Vectra and can be toggled on and off throughout the course of treatment.

Duty Cycle: Continuous and pulsed duty cycles are available in 10% increments from 10% to 100%.

Display: Ultrasound output can be displayed in Watts, or Watts Per Centimeter Squared.

Head Warming is a unique feature of the Vectra Pro that allows the aluminum surface of the Ultrasound applicator to warm up to room temperature, enhancing patient comfort.

Treatment Time: The time of your therapy session is set here.

Stim: The area in which waveforms are selected for combination with ultrasound.

Edit Stim: The area where you can modify the selected waveform's parameters.

Vectra Utilities

Utilities: Options are located here.

Clinic Name: Enter the name of your clinic to be viewed on the Touch Screen and be displayed on all printed reports.

Ultrasound Calibration: This feature calibrates the ultrasound. A valid password is required to enter and should only be executed by a qualified technician.

Language: Allows you to select the desired language that is displayed on the Vectra screens. Supported languages include English, Spanish and French.

Two Year Limited Warranty

The Chattanooga Group, Inc. ("Company") warrants that the Vectra™ Pro models 2 and 4 ("Product") excluding accessories is free of defects in material and workmanship. This warranty shall remain in effect for two(2) years from the date of the original consumer purchase of this and extends to any owner of the product during the warranty period. Accessories that are included as standard with the product (as listed in the users manual) are warranted for 90 days. Ultrasound applicators are warranted for one (1) year. If this product fails to function during the two year warranty period because of a defect in material or workmanship, the company or the selling dealer will replace or repair this product without charge within a period of 30 days from the date on which the defective product is returned to the company or the dealer. The company or the dealer will ship the replacement or the repaired product to the owner.

All repairs must be performed by a service center authorized by the Chattanooga Group, Inc. Any modifications or repairs performed by unauthorized centers or groups will void this warranty. To participate in warranty coverage, the products warranty registration card (included with the product) must be filled out and returned to the Chattanooga Group, Inc. by the original owner within 10 business days of purchase.

This warranty does not cover:

- Replacement parts or labor furnished by anyone other than the Company, the dealer or an approved Company service agent.
- Defects or damage caused by labor furnished by someone other than Company, the dealer or an approved Company service agent.

- Any malfunction or failure in the Product while it is in the possession of the owner during the warranty period if the malfunction of failure is not caused by a defect in material or workmanship or if the malfunction or failure is caused by unreasonable use, applications in which the product was not intended or the failure to prove reasonable and necessary maintenance.

To Obtain Service

From Company or the selling dealer under this warranty, the owner must do or abide by the following:

- A written claim must be made within the warranty period to Company or the selling dealer.
- If the claim is made to the Company, the written claim should be sent to:

  4717 Adams Rd., P.O. Box 489
  Hixson, TN 37343
  Phone: (800) 592-7329, *Outside the US:* (423) 870-2281

- The Product must be returned to Company or the selling dealer by the owner.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

The Company does not authorize any person or representative to create for it any other obligation or liability in connection with the sale of the Product. Any representative or agreement not contained in the warranty shall be void and of no effect.

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Problem
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Through
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