MR-20

Part I Quick Start Guide
Part II Manual

FOR ASSISTANCE, CALL YOUR LOCAL SALES REPRESENTATIVE, DISTRIBUTOR, OR THE PROMETHEUS GROUP AT 800-442-2325 IN THE US AND CANADA OR AT 603-749-0733. FOR TECHNICAL ASSISTANCE, CALL THE PROMETHEUS GROUP TECH SUPPORT LINE AT 800-272-8492 IN THE US AND CANADA OR 603-742-6053.

Web site: www.theprogrp.com
E-mail: info@theprogrp.com

MR-20
Quick- Start

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The Prometheus Group
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Web site: www.theprogrp.com

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Indications for use:

Surface electromyography is a safe and effective technique for relaxation training and muscle re-education.

Using internal perineometer electrodes such as the PerryVaginal:
EMG biofeedback is a safe end effective technique for the assessment and treatment of pelvic floor dysfunction, monitoring the performance of Kegel exercises. The pelvic floor muscles include the Levator Ani group as well as the pubococcygeus (PC), ileococcygeus, and coccygeus. These are skeletal muscles which respond to re-education, strengthening, endurance building, and relaxation.

Conditions that can be assessed or treated using this technique include: stress incontinence, mixed incontinence, and urge incontinence.

Contraindications: Do not use this device for treatment of incontinence in the presence of any bladder infection, vaginal infection, or during pregnancy.

Caution: Federal law (USA) restricts this device for sale by or on the order of a licensed medical practitioner, licensed by law in the state in which they practice.

Caution: Federal law (USA) restricts this device to sale be or on the order of a physician hen used for the treatment of incontinence.

Caution: Use only electrodes from The Prometheus Group with your Pathway surface EMG device. Any other electrode may not be compatible with the Pathway device.

Warnings:
- Be sure to read this operator's guide before using this device.
- Do not put this device underwater or get device wet. It could damage the device.
- Use only batteries with this device, do not use any type of line-powered adapter.
- Do not connect any preamp, lead wire, electrode, or any other component to a wall outlet. Do not leave electrodes attached when device is not in use.
- For the treatment of incontinence do not attempt to use this device concurrently with stimulation being supplied from an electrical muscle stimulator.

CABLE CONNECTION FOR PRACTICE SESSION

Connect gray preamp (Patient Cable) to channel "A".
Snap Pathway Electrode onto the black molded end (with three snaps).
Place the Electrode on your flexor muscle of forearm.
(parallel with the muscle fibers; long edge of electrode will be same direction as arm).
Place on the "Belly" of the muscle.
Also see Cable Connection illustrations.

Turning On the MR20, Checking Status, Testing.

Turn the unit ON by turning the **Thumbwheel** clockwise.
Mode (Locked or Unlocked), ***Software version***, *and* ***Battery Voltage*** *will be displayed.*
Current Session # *will be displayed.*
*Unit will then default to its' **"Measurement Mode".***
The unit is in "Continuous" mode meaning there are no Work/Rest intervals set.
The unit is ready to measure.

*Note: **Change battery if voltage is under 8V (Unit uses a 9V battery)***
Note: Unit only gives you approx. 3 seconds to view information.

Rest your target muscle (arm).
The channel "A" bargraph should read 5 or under. (2 or 3 is not uncommon)

Contract your muscle.
The reading on the bargraph should increase.

The continuous mode could be used to check a patients' **Resting Baseline** *by instructing the patient to relax and reading the bargraph.*

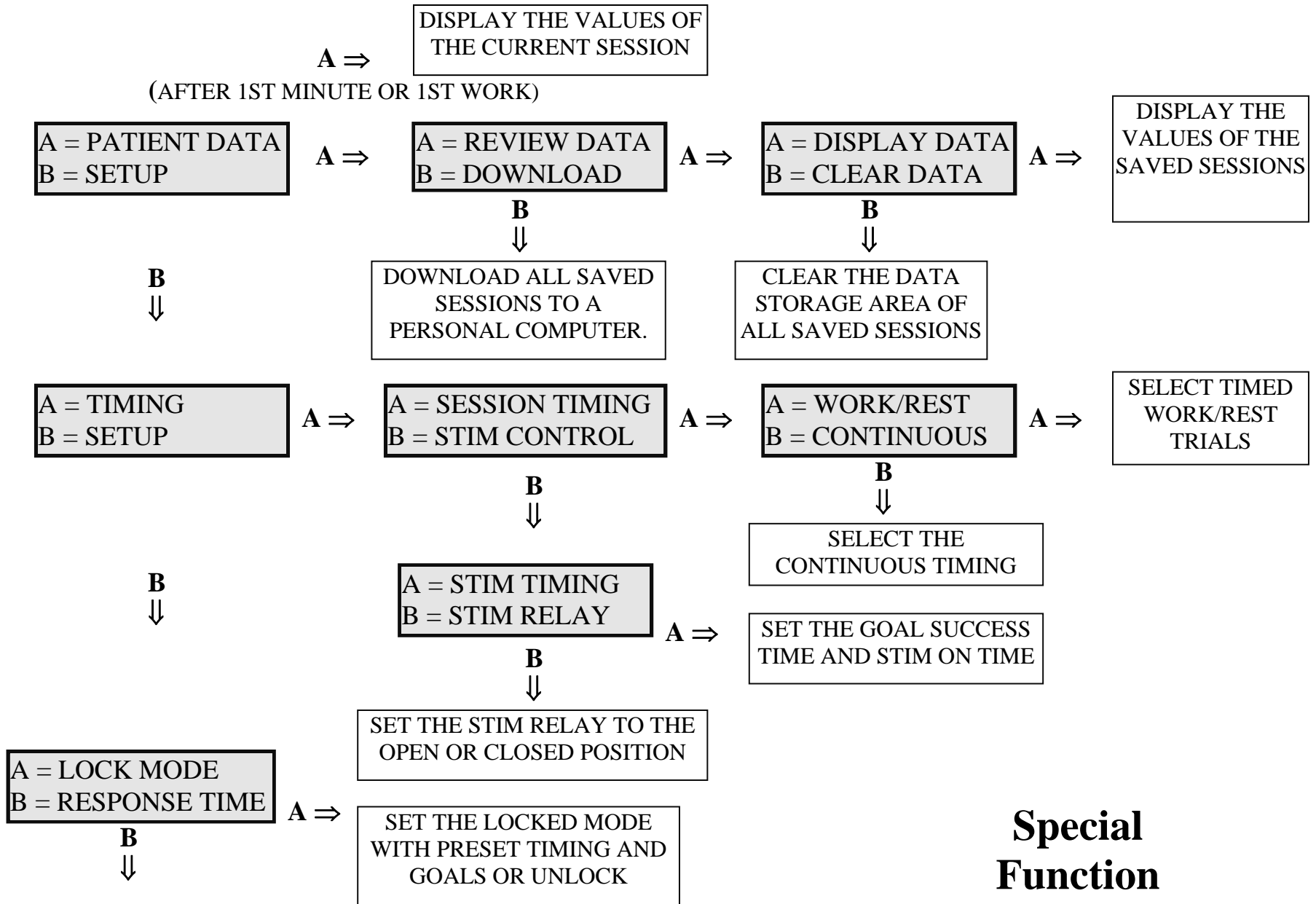# MR20 Overview of Features and Operation:

(MR20 Operation "in a nutshell")

- **<u>To Set an A Channel Goal press the A key Repeatedly.</u>**
  To Change Goal Press the Up and Down Arrows.
- **<u>To Set B Channel Goal Press The B key Repeatedly</u>**.
  To Change Goal Press the Up and Down Arrows.
- **<u>To Access Special Functions Menu, Press the A and B keys at the same time.</u>**
  (for about 4 seconds)
  This will accomplish the following five things:
  - 1.Review Data   (Push A,A,A) Then use up/down arrows to select session.
  - 2.Clear Data   (Push A,A,B,A)
  - 3.Work/Rest mode (Push B,A,A,A then use up/down arrows
       to select Work time, Rest time, and number of sessions.
       Session automatically begins).
  - 4.Lock/Unlock (Push B,B,A, (Then A or B)
  - 5. Download   (Push A,B)

Notes:

- **Turn MR-20 off to save the session. (Session must be at least 1 minute
   if in continuous mode).**

- **When using Work/Rest, set goal <u>first</u>, then Work/Rest, because session automatically
   begins. (if goal is desired).**

Use this Overview in conjunction with the flow chart on the following page for a quick reference.

DISPLAY THE VALUES OF THE CURRENT SESSION

A ⇒

(AFTER 1ST MINUTE OR 1ST WORK)

A = PATIENT DATA
B = SETUP

A ⇒

A = REVIEW DATA
B = DOWNLOAD

A ⇒

A = DISPLAY DATA
B = CLEAR DATA

A ⇒

DISPLAY THE VALUES OF THE SAVED SESSIONS

B
⇓

B
⇓

DOWNLOAD ALL SAVED SESSIONS TO A PERSONAL COMPUTER.

CLEAR THE DATA STORAGE AREA OF ALL SAVED SESSIONS

A = TIMING
B = SETUP

A ⇒

A = SESSION TIMING
B = STIM CONTROL

A ⇒

A = WORK/REST
B = CONTINUOUS

A ⇒

SELECT TIMED WORK/REST TRIALS

B
⇓

SELECT THE CONTINUOUS TIMING

B
⇓

A = STIM TIMING
B = STIM RELAY

A ⇒

SET THE GOAL SUCCESS TIME AND STIM ON TIME

B
⇓

SET THE STIM RELAY TO THE OPEN OR CLOSED POSITION

A = LOCK MODE
B = RESPONSE TIME

A ⇒

SET THE LOCKED MODE WITH PRESET TIMING AND GOALS OR UNLOCK

B
⇓

Special Function Menus

6

SETTING A GOAL

Press the "A" key.
No Goal Set will be displayed.

Press the "A" key several times.
Notice that the unit will select (cycle through) all of the goals; No Goal Set, Above Tone, Below Tone, Above Stim, Below Stim, Max Display, Ratio A/B .

Press the "A" key until the **Above Tone** goal is selected. (Not Above Stim)
*The unit will automatically select the **Above Tone** goal in about 3 seconds.*

IMPORTANT: THE UNIT WILL NOW DEFAULT BACK TO MEASUREMENT MODE.

Notice an "Up arrow" appears; This is your "Goal Level" or "Threshold"
You may adjust the goal up or down **by pressing the Up or Down Arrow keys.**
The goal value will be displayed while setting is being adjusted.

Flex your muscle so that the bar graph deflects above the arrow; *notice that the unit will beep because the goal was successfully achieved.*

Press the "A" key (twice) until the "Below Tone" goal is selected.
*The unit will now default to **"Measurement Mode"** and will work the same as the "Above Tone" example, but the beep will be heard when the lights are below the threshold. (This could be a success tone for training someone to relax for example)*

Press the "A" key until "No Goal" is selected.
Goals will be shut off.

WORK/REST MODE

Press the "A" key and the "B" keys at the same time for approximately 4 seconds.
A= Patient Data B=Setup will be displayed
Press the "B" key (Setup).
Press the "A" key (Timing).
Press the "A" key (Session Timing)
Press the "A" key (Work/Rest)

*After 3 seconds you are prompted to change the "**Work Period: 10 Seconds**"*
Select the desired work time by pressing the up or down arrow keys.

*After 3 seconds you are prompted to change the "**Rest Interval: 10 Seconds**"*
Select the desired rest time by pressing the up or down arrow keys.

*After 3 seconds you are prompted to change the "**# Trials" 10.***
Select the desired # of trials by pressing the up or down arrow keys.

*Unit will default back to **Measurement Mode** and <u>immediately</u> start a session prompting patient to work for (the set amount of seconds) and rest for (the set amount of seconds).*

You may have to try this a few times until you learn the equipment. If you have to start over simply wait for the machine to enter measurement mode and start over.

*When the session is complete "**END OF SESSION**" will be displayed.*
Turn the unit off and then turn the unit back on, *note the session number has incremented by 1*.

RUNNING SESSIONS

CONTINUOUS MODE SESSION
Turn unit off.
Turn unit on.
Note session #.
Put unit into continuous mode. (Unit will power-up in continuous mode if unlocked)
Run unit for at least 1 minute.
Turn unit off to save session.

WORK / REST SESSION
Turn unit on.
Record session #
Set goal if desired.. (if training session; no goal necessary for evaluation session)
Set work/rest time.
Session automatically begins and prompts patient to work and rest.
At end of session "END OF SESSION" is displayed.
Shut off unit to save session.

Note: Always set goal FIRST, then set Work/ Rest Mode.

VIEWING A SESSION
Press the "A" and the "B" keys at the same time or approx. 4 seconds.
Press the "A" key (Patient Data).
Press the "A" key (Review Data).
Press the "A" key (Display Data).
Press the up/down arrows to select proper session #.
Session# will be displayed.
Time of session will be displayed.
Average EMG will be displayed. (A=   uV)
*# of Trials displayed if Work/Rest mode used;**Time of Session** displayed if Continuous.*
*% Success will be displayed(if a goal was set) **No Goal** (if no goal was set)*

CLEARING ALL SESSIONS
Press "A" and "B" keys at the same time for about 4 seconds.
Press the "A" key (Patient Data)
Press the "A" key (Review Data)
Press the "B" key (Clear Data)
Press the "A" key (Clear All)

CABLE CONNECTIONS

- Use illustrations to **connect cables**, electrodes and accessories.
  Choose from the following configurations:
1. Orthopedic
2. Continence: Internal Sensor
3. Continence: External Pelvic Floor Monitoring

Illustrations also helpful for **part identification** and **re-order numbers.**
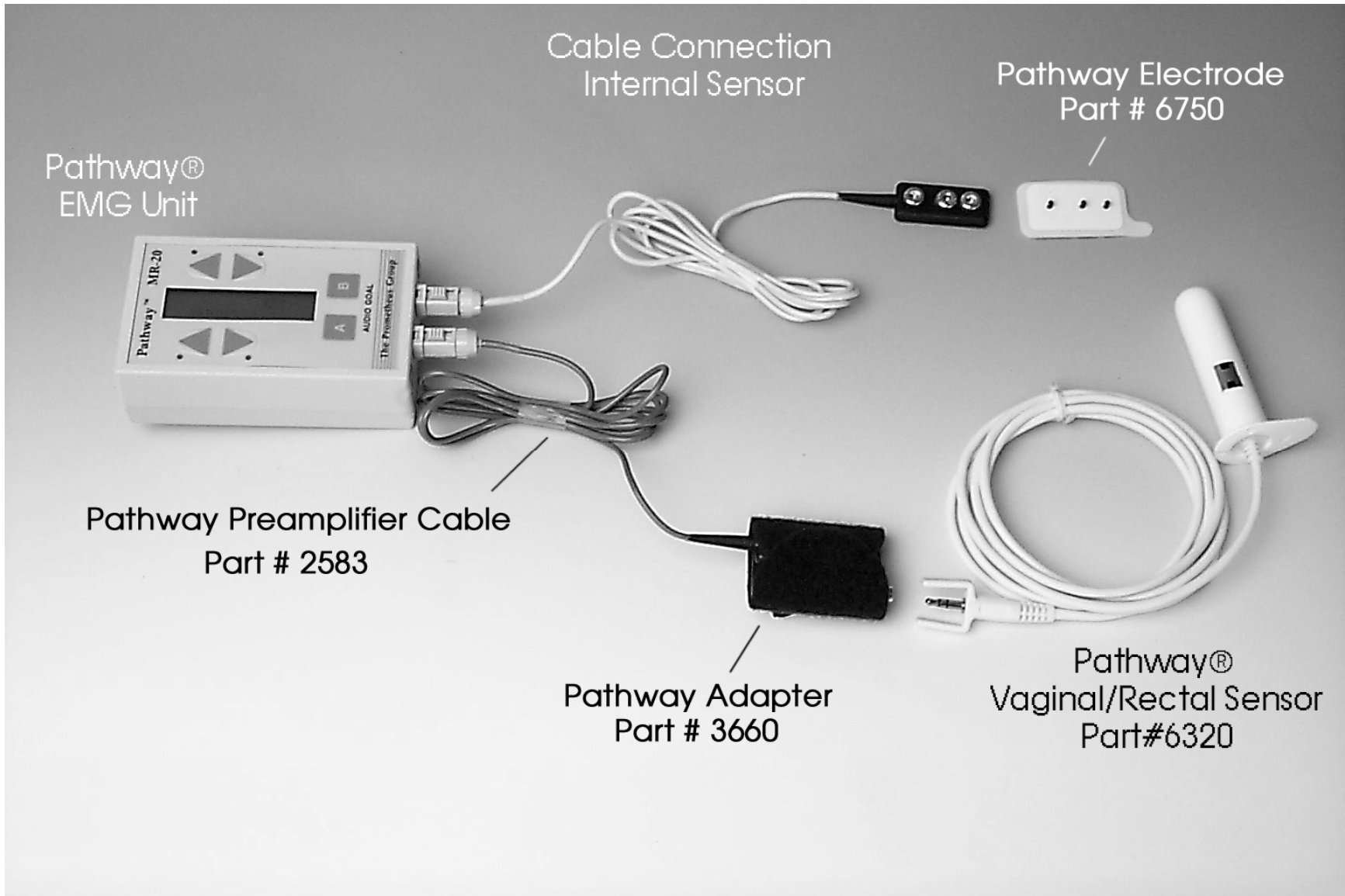
Cable Connection
Orthopedic

Pathway®
EMG Unit

Pathway Electrode
Part # 6750

Pathway Electrode
Part # 6750

Pathway Preamplifier Cable
Part # 2583

Cable Connection
Internal Sensor

Pathway Electrode
Part # 6750

Pathway®
EMG Unit

Pathway Preamplifier Cable
Part # 2583

Pathway Adapter
Part # 3660

Pathway®
Vaginal/Rectal Sensor
Part #6320

Cable Connection
External Pelvic Floor Monitoring

Pathway Electrode
Part # 6750

Pathway®
EMG Unit

Pathway Preamplifier Cable
Part # 2583

Pathway Adapter
Part # 3660

18" Lead Wire Set
Part # 5328

Pregelled Electrodes
Part #6801
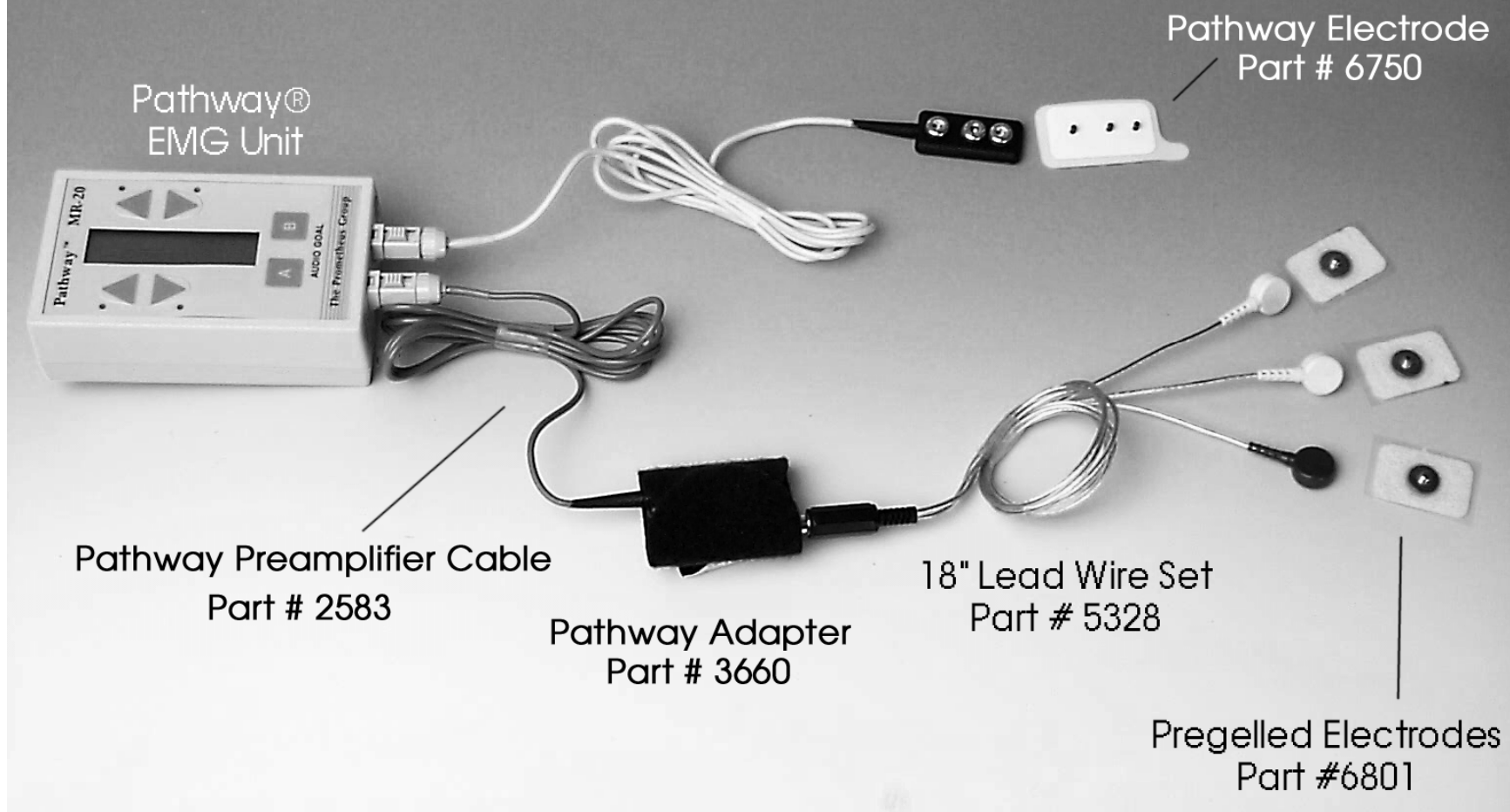
Using the MR-20 with a Computer

Connecting MR-20 to the computer

This step must be performed for **Real -Time** or **Downloading.**

Connect the MR-20 to the computer using the **Serial Cable** provided.

Plug the cable into the port on the MR-20 labeled "Serial" first, then plug the other end into back of computer. Usually there is only one port that it will plug into-look for pins on the back of your computer not holes. If you have more than one serial port on your computer choose any one.

These instructions for Utilities / Compliance Software (Included with every MR-20)

This software performs two functions (1) Real -Time display on screen and (2) Download sessions from MR-20 to be stored in a computer file.

Installing Software

Utilities/Compliance Software

Software Installation:
For Widows 95 or 98:
Insert disk.
Close all programs.
At "Desktop" click **Start**; select **Run**.
Type **A:Pathway**; click **OK**.

For DOS:
Insert disk.
At **A:** type **Pathway,** Press **Enter**

For Both Windows and DOS:
Click **OK** (or press **Enter**).
Click **Utilities** (or press **ALT U**).
Select **Install to Another Drive.**
Type **A**; Press the **Tab** key; Type **C.**
Press **Tab** to get to Install, Press **Enter.**
When prompted, Press **Enter.**
Press **F10** to exit program.
Remove disk.

To Run Program:

Windows 95 or 98:
Click **Start**, Click **Run.**
Type **C:Pathway,** Click **OK.**
A paragraph will appear; Click **OK** or press **Enter.**

DOS:
Type **Pathway** at **C** Prompt, Press **Enter**.
A paragraph will appear; Click **OK** or press **Enter.**

Set-Up Software

(Step 1) Select Proper Model:
Select **Setup** by clicking (or by pressing ALT+S)
Select **Pathway Model** by clicking (or by using the **down arrow** then pressing **Enter**)
Select **MR-20.**
Click **OK** or press **Enter.**

(Step 2) Select Proper serial port:
Select **Setup** by clicking (or ALT+S)
Select **Pathway Port** by clicking (or by pressing the **down arrow** key and then pressing **Enter)**
Select **Com Port 1** by clicking (or using the arrow keys) **Note: the com port should read "Available".**
Click **OK** or press **Enter.**

Using Real -Time Mode (Running a Session)

Click **Real-Time/Download Data** (or press ALT+R)
Click **Real time display** (or use arrow keys and then press Enter)
Click **Continuous** (or use arrow keys); then click **OK** (or press Enter)
Click **30 Second** under **Sweep Length** heading (or use arrow keys); then click **OK** (or press Enter)
Real time display (plot) appears.
Read instructions at top of screen that explain command keys.
Turn on the MR-20 and set Goals/Timing if desired./Start session on the MR-20).
Press space bar to start the trace. (Start MR-20 session and computer session at the same time).
A red and green trace (line) should begin to move across the screen.
The session has now begun and the traces will respond to muscle contractions.
Important! If you do not get a trace go back to **Set-up Software** section; **Select the proper serial port** and try com 2, com3, or com 4.
When finished, turn off the MR-20; this saves the session.
Note: The summary data is stored in the MR-20 unit, not the computer. There are two ways to retrieve the data: Download the data to a computer or view the data in the MR-20 itself.
Press **Escape** on the computer keyboard.
The following functions are now available:

PRINTING - Press **P** to print (only what appears on screen)
SAVING DATA TO A FILE – (for advanced users only) Press S This will save the "Raw" data that could be sent to a spreadsheet for creating a graph.
EXIT TO MAIN MENU - Press Escape to get back to the Main Menu

Exiting the Program

 From the Main Menu press **F10** or Select **File** then **Exit**

Downloading Sessions from the MR-20

Start Program (if not already open)

Windows 95 or 98:
Click **Start**, Click **Run.**
Type **C:Pathway,** Click **OK.**
A paragraph will appear; Click **OK** or press **Enter.**

DOS:
Type **Pathway** at **C** Prompt, Press **Enter**.
A paragraph will appear; Click **OK** or press **Enter.**

Select **Real-Time / Download** by clicking (or ALT+R)
Select **Download data to file by clicking** (or using the **down arrow** then pressing **Enter).**
Type a name for your file.
Click **OK** (or press **Enter).**

!!!!! STOP !!!!!

<u>**DO NOT**</u> **CLICK OK WHEN "NOW BEGIN DOWNLOADING FROM THE PATHWAY AND PRESS [ENTER] ON THE KEYBOARD" IS DISPLAYED ON THE SCREEN.**
THESE STEPS WILL BE PERFORMED ON THE MR20:

Turn on MR20.
Press "A" and "B" keys at the same time for about 4 seconds.
Press the "A" key (Patient Data).
Press the "B" key (Download).
MR20 will say **Sending Data** on its display.

THESE STEPS WILL BE PERFORMED ON THE COMPUTER:
Click "OK" or press Enter.
 Beginning Download message will appear.
 Session data will be displayed on computer screen.
 Session# ,AVE(average microvolt level), Goal, (type and goal value), Success(% of time that goal was achieved)
 Press any key to continue will be displayed at bottom of screen.
 Press any key when ready.
 Download Complete will appear.
 Click **OK** or press **Enter**.

<u>**Note: If file download does not occur go back to" Set-up Software section;" Select Proper Serial Port" and try com 2, com3, or com 4.**</u>

VIEWING DOWNLOADED DATA
Click **File or (ALT + F)**
Click **View downloaded File** (or use **down arrow** then press **Enter.**)
Select file from list by **clicking** the name of the file or by using **arrow keys.**
Click **OK** or press **Enter.**

Print a downloaded File
Click **File or (ALT + F)**
Click **Print a Downloaded file** (or use **down arrow** then press **Enter.**)
Select file from list by **clicking** the name of the file or by using **arrow keys.**
Click **OK** or press **Enter.**

Exiting the Program
From the Main Menu press **F10** or Select **File** then **Exit**

PATHWAY MR-20
DUAL CHANNEL
SURFACE EMG
SYSTEM
OPERATOR'S GUIDE

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WEB SITE: WWW.THEPROGRP.COM

E-MAIL: INFO@THEPROGRP.COM

CONTENTS

The Pathway MR-20 kit contains the following items:
- The Pathway MR-20 module
- Two preamplifiers for EMG A & EMG B
- One PC computer 9 pin serial cable
- One Pathway Utilities software program disk
- One 9 volt alkaline battery
- One carrying case, and this
- Operator's guide

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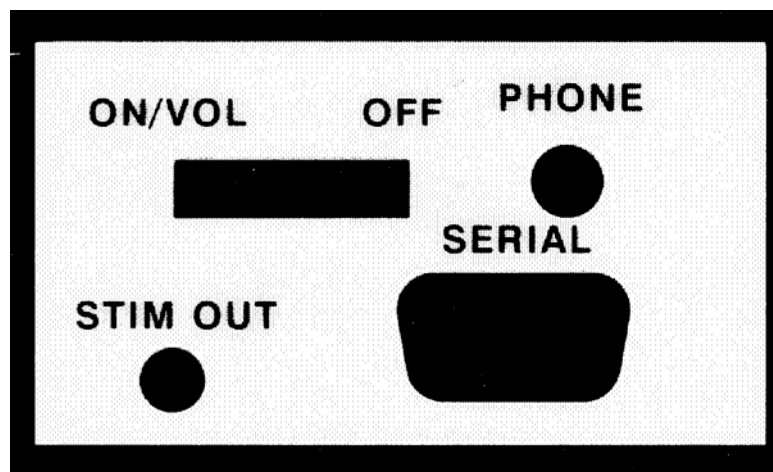
TABLE OF CONTENTS

PHYSICAL

The Top Panel:
- An ON/VOL OFF rotary thumbwheel which turns the Pathway MR-20 on and off and controls audio volume
- A mini PHONE jack to use an optional headset
- A STIM OUT jack to plug in a functional stimulator, and
- A SERIAL output for PC computer interface

The Bottom Panel:
- Two inputs to plug in the preamplifiers

The Back Panel:
- A clip for attaching the MR-20 to a belt or clothing, and
- The 9 volt battery compartment. The serial number label is inside the compartment.

The Front Panel:
- A two line, dual channel supertwist LCD to display channel options, moving bar graphics, goal level, goal direction and, microvolt levels
- Four LEDs to enhance goal success
- Two up and down arrow keys to position the goal arrow on the LCD for each channel, and
- An "A" and "B" key to define EMG A and B goal type, direction and control special functions
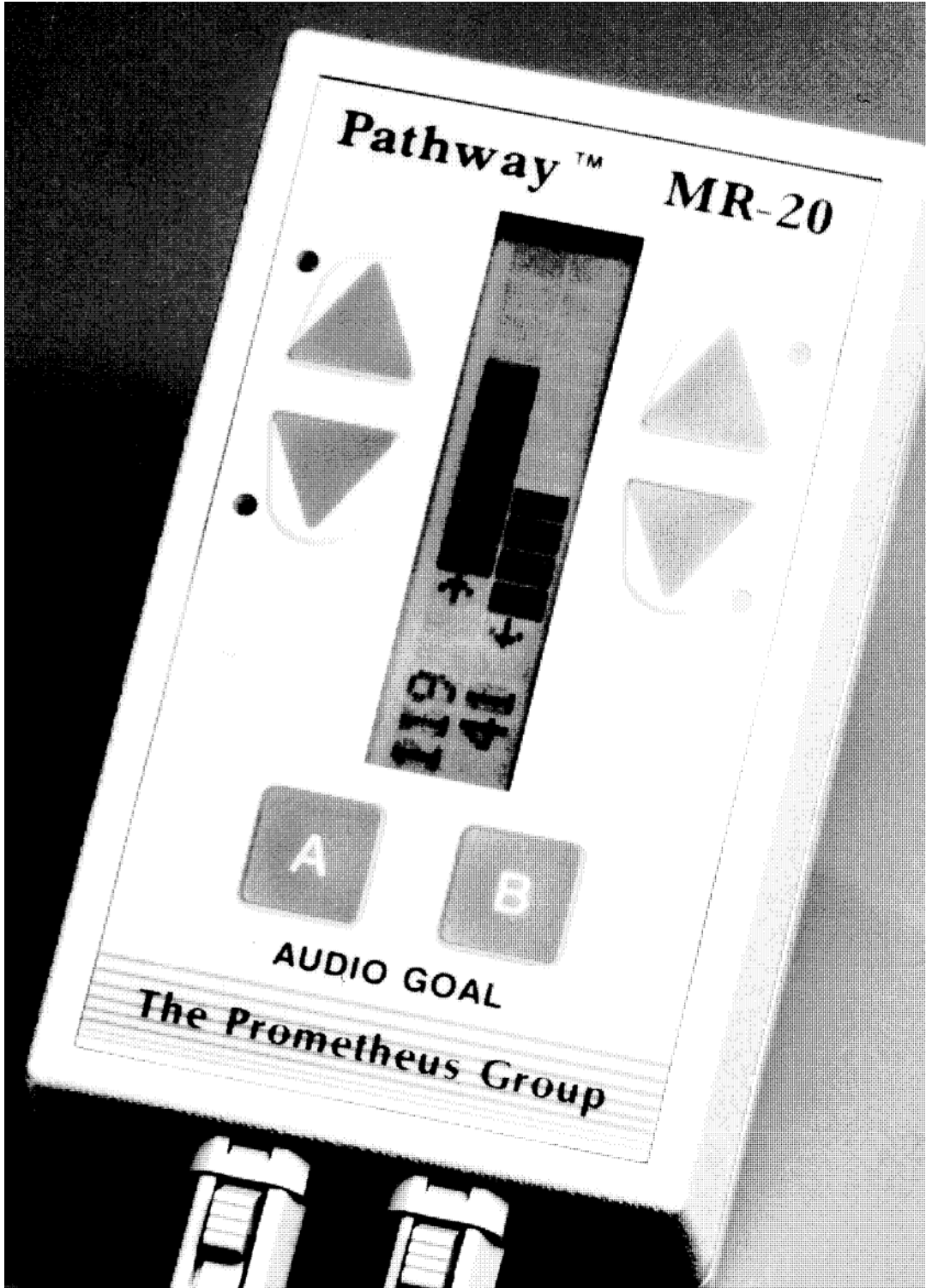
MECHANICAL

Installing or Changing the Battery

On the back panel is a 9 volt battery compartment. To install or change the battery simply press down on the designated area and slide the cover in the direction indicated. Clip on the new battery, place the battery in the compartment and replace the cover, snapping firmly into place. Either a disposable or rechargeable battery may be used. If using a disposable, an alkaline battery is recommended for longer life. A fresh alkaline battery will have 20-25 hours of useful life.

Attaching the Preamplifiers

Plug in one preamplifier for EMG A into the input below the "A" key, and the other preamplifier for EMG B into the input below the "B" key. Snap on a disposable electrode to EMG A and EMG B. Each preamplifier has 3 snaps; 2 labeled ACT for Active and 1 GND for Ground. The disposable electrode must be completely snapped into all 3.

Prepare the skin by wiping the area with an alcohol pad and then wiping it dry with a tissue or cloth, to avoid high impedance artifact. Remove the backing on the disposable electrode to expose the adhesive surface and adhere fully to the skin. The two active electrodes must be placed parallel to the muscle fiber.

Optional preamplifier adapters are available for applications where lead wires or interface to incontinence sensors are required.

Using a Headset

On the top panel is an output labeled PHONE. This output will accept any headset with a mono mini plug and will allow the audio feedback to be heard only by the person wearing the headset.

Plugging in a Functional Stimulator

On the top panel is an output labeled STIM OUT. This output will accept any functional stimulator that has an accessory or manual input jack for activating stimulation. An interface cable between the Pathway MR-20 and the stimulator is available from The Prometheus Group.

Interfacing to a PC Computer

On the top panel is an output labeled SERIAL. This output will interface to the serial port of any IBM PC compatible computer using the 9 pin serial cable. The male end of the cable is connected to the Pathway MR-20 and the female end to the computer. If the serial port requires a 25 pin connector, an adapter may be purchased from The Prometheus Group or at any local computer store. In conjunction with the Pathway Utilities software program disk, the PC computer may now be used to display real-time, full color EMG activity as well as download, store, and print patient data.

OPERATION

Start-up Display

The thumbwheel switch turns the MR-20 on and adjusts the volume. This will activate the 4 LEDs in sequence, sound a tone which can be used to adjust the volume level, and then automatically display:

```
MODE: UNLOCKED
VER:  2.16        8.5V
```

The MR-20 has two basic operating modes: UNLOCKED and LOCKED. In the UNLOCKED mode the type of goal, goal direction and goal position can be changed by the user.

If the Pathway MR-20 is to be used in an unsupervised environment such as the home, it can be LOCKED so that none of these parameters may be changed. Thus the patient must perform the preset training protocol. In this case the MR-20 would display -- MODE: LOCKED. Locking and unlocking the MR-20 is explained in the Special Functions section.

On the display the VER: 2.16 refers to the current version of software and the 8.5V to the voltage level of the 9 volt battery. These numbers will be different on your MR-20.

After a few seconds a screen showing the current training session will appear:

```
CURRENT SESSION
IS #   1
```

Following this screen there may be a warning screen if the battery voltage is becoming too low. If this message is "BATTERY LOW! REPLACE SOON!", the battery should be replaced before much additional use. The message "BATTERY MUST BE REPLACED!" indicates that the battery voltage is too low to use at all. If the battery is not replaced at this time the MR-20 may stop operating during a training session. (Since the battery may also go low during a long session, this message may appear later on instead of at start-up.)

Note that the internal memory of the MR-20 does not require the battery. Even if the battery is completely discharged or removed, the saved training session data will be preserved, as will all LOCKED mode parameters.

IF THE MR-20 IS TURNED ON AND IT DOES NOT WORK PROPERLY, FIRST TRY REPLACING THE BATTERY WITH A NEW ONE.

Running Training Sessions

The Pathway MR-20 can run in two different training session modes, either the CONTINUOUS mode, or the WORK/REST mode. In the CONTINUOUS mode the Pathway MR-20 will run a single session for up to one hour, with no interruptions. In the WORK/REST mode the Pathway MR-20 will automatically prompt and control a predetermined number of alternate work periods and rest intervals.

Use the Saved Session Summary sheet in the back of this guide to record which patients are saved under each session number.

Continuous Mode

In the CONTINUOUS mode, which is the normal unlocked startup mode, the Pathway MR-20 will begin displaying EMG activity with no interruptions. A CONTINUOUS mode training session is defined very simply: WHEN THE MR-20 IS TURNED ON AND EMG ACTIVITY IS DISPLAYED FOR AT LEAST ONE MINUTE, A NEW TRAINING SESSION IS SAVED IN MEMORY. A readily distinguished beep will occur at the end of one minute to indicate this. When the MR-20 is turned off and back on, the next session will automatically begin. The maximum length of each CONTINUOUS mode training session is 60 minutes. At the end of this time the MR-20 will beep and the display will be:

> END OF SESSION

Turn the MR-20 off when this message appears.

The Work/Rest Mode

In the WORK/REST mode the Pathway MR-20 will begin the session by first displaying a "WORK" message, making three short beeps, and then displaying EMG activity. At the end of the set work period, the Pathway MR-20 will display a "REST" message on the screen, make one long beep, and then return to an active EMG display. During this rest interval the EMG activity is being displayed so that the resting levels may be observed. However, audio and visual (LED) feedback are not active. The readings during this time are not included in the session data in any way. The session average, the maximum values, and the percent success are not affected by anything which occurs during a rest interval. At the beginning of the work period the Pathway MR-20 will display:

```
WORK #   1
10 SECONDS
```

This message is accompanied by three short beeps from the internal speaker. The message will shortly disappear and the active EMG will be displayed. At the end of the work period the screen will show:

```
REST #   1
10 SECONDS
```

This message is accompanied by one long beep from the internal speaker. The message will shortly disappear and the active EMG will be displayed (so the resting activity can be observed). At the end of the rest interval the next work period will automatically begin.

The WORK/REST mode has three parameters which can be set to customize the session for each application. The work period of each trial can be set between 3 and 180 seconds. The rest interval between trials can be set between 0 and 180 seconds. The number of trials in the WORK/REST session can be set between 1 and 20.

A WORK/REST mode training session is defined very simply: WHEN THE MR-20 IS TURNED ON AND THE FIRST WORK PERIOD IS COMPLETED, A NEW TRAINING SESSION IS SAVED IN MEMORY. This is true even though the full set number of trials were not completed. For example, if the session were set up to have 10 trials, but the MR-20 was turned off after the end of the seventh work period, the saved session would include the data obtained for the 7 completed trials. When the MR-20 is turned off and back on, the next session will automatically begin.
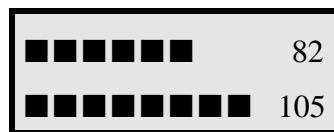
If the set number of trials is completed, the MR-20 will beep and the display will be:

```
END OF SESSION
```

Turn the MR-20 off when this message appears.

The Training Displays

A few seconds after being turned on, the Pathway MR-20 will automatically display EMG activity. For example:

```
■■■■■■        82
■■■■■■■■ 105
```

This is the beginning of a training session. The top line shows the EMG A channel and the bottom shows the EMG B channel. Each line of the display shows the level of EMG activity in a moving bar display. In addition there is a digital (numeric) display which also shows the EMG value in microvolts. The MR-20 is designed to be held either horizontally or vertically. The horizontal position is appropriate for reading the text on the display, while the vertical position is often used during training sessions. In the vertical position increasing muscle activity moves the bar up and decreasing activity moves the bar down.

To observe the operation of the display, connect the EMG preamplifiers to the MR-20 and apply the electrodes to a convenient area such as the forearms, as described in the section "Attaching the Preamplifiers". Note how the moving bar display ascends and descends, as the hand and wrist muscles are contracted and relaxed.

Because EMG is essentially a logarithmic function, this type of scaling is used for the moving bar display. As a result, the movement of the bar relates directly to the change in muscle activity.

The changing digital numbers represent microvolt (uV) levels of EMG activity and increase when contracting and decrease when relaxing. The total microvolt scale is 1 to 800 uV RMS.

If the MR-20 is being held horizontally, the digital display is normally at the right side of the display. If the level of activity is very large and the bar reaches the right, the digital display will automatically shift from the right to the left, so it does not interfere with the bar.

Setting the Feedback Mode

The A key is used to set the feedback mode for EMG A and the B key for EMG B. Since the EMG A is the controlling channel, set up the mode for EMG A first, then EMG B. By pressing the A key once, the current mode will be momentarily displayed on the EMG A channel. In this case the display will read NO GOAL SET. To change the mode simply press the A key again until the desired mode is displayed. When no keys are pressed for a few seconds, the MR-20 will return to the real-time EMG display.

Feedback Modes

Feedback mode choices are:
1) A = ABOVE TONE -- audio feedback when contracting above goal,
2) A = BELOW TONE -- audio feedback when inhibiting below goal,
3) A = ABOVE STIM -- stimulator activation when contracting above goal,
4) A = BELOW STIM -- stimulator activation when inhibiting below goal,
5) A = MAX DISPLAY -- the maximum value measured is displayed in the digital display   until reset by a keypress,
6) A = RATIO A/B - the ratio of EMG A divided by EMG B is displayed.

The B key has the first five choices plus one additional: B = CHANNEL OFF. Select this mode if only EMG A is to be utilized (single channel mode).

NOTE: The EMG A channel is the controlling channel for feedback modes. If a STIM feedback mode is selected for the EMG A channel, the EMG B channel cannot be in a TONE mode. Similarly, if a TONE mode is selected for the EMG A channel, the EMG B channel cannot be in a STIM mode. Therefore always set the A channel to the desired mode first.

Above and Below Goals

When ABOVE or BELOW goal choices are made, an arrow will appear. The arrow serves a dual function. The position of the arrow in the display represents an absolute microvolt goal. The direction of the arrow shows the goal direction. If an ABOVE goal choice is made an arrow pointing up will appear, prompting a contraction goal. If a BELOW goal choice is made an arrow pointing down will appear, prompting an inhibition goal.

When a goal arrow is present, the moving bar display fills the space between the goal arrow and the current activity level. Thus the length of the bar shows either the change in level needed to reach the goal or the amount the goal is being exceeded.

```
┌─────────────────────────────┐
│                             │
│   <■■              88       │
│                             │
│      ■■>            59       │
│                             │
└─────────────────────────────┘
```
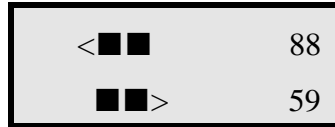
If a TONE goal is selected for a single channel and the EMG activity meets or exceeds the goal, a pulsed tone will be heard. If TONE goals are selected for BOTH channels and the EMG activity meets or exceeds the goals for BOTH channels simultaneously, then a pulsed tone will be heard. By presenting audio feedback only when BOTH goal parameters are met, there is no confusion on the patient's or therapist's part as to what constitutes success.

Similarly, if a STIM goal is selected for a single channel and the EMG activity meets or exceeds the goal (for the SUCCESS TIME), the stimulator will be activated. If STIM goals are selected for BOTH channels and the EMG activity meets or exceeds the goals for BOTH channels simultaneously (for the SUCCESS TIME), then the stimulator will be activated.

Changing the Goal Value

When a tone or stim goal is initially selected, the default goal value is 10 microvolts. To change the goal value, the up and down arrow keys for each channel are used. If any of the 4 arrow keys are pressed, the digital displays show the current goal setting rather than the current level of EMG. Note that the bar itself still shows the current level of EMG activity, so that goals can be changed without interrupting the training session.

To change the goal value, simply press the appropriate arrow key until the desired goal is reached. Use single key presses to increment or decrement the goal value, or hold the key down for larger changes. Both the digital display and the position of the goal arrow will change to reflect the current value. When the desired goal value is displayed, do not press any keys. The MR-20 will return to the real-time display in a few seconds.

Max Display Mode

In the MAX DISPLAY mode, the digital numbers on the display show the highest reading of the current session for that channel. Any time the value shown is exceeded, the new higher value will be displayed. At any time the value can be reset by pressing one of the arrow keys for that channel. In the WORK/REST mode the value is automatically reset at the beginning of each trial.

The bar display always shows the current level of EMG activity in addition to the most recent maximum. The current level is indicated as the top of the moving bar display. The maximum is shown by a small indicator at the previous maximum of the bar. When the digital display is reset (by pressing one of the arrow keys for the channel) the maximum indicator is also reset to the end of the moving bar.

The MAX DISPLAY mode can be used for either or both channels, and either channel may be set to the MAX DISPLAY mode while the other channel is set to any of the other modes.

Ratio Display Mode

The ratio display mode shows the value of EMG A divided by EMG B on the bar display. The digital numbers show the individual EMG A and EMG B values as well as the ratio. This mode generates a very clear comparison of the activation of one muscle to another. It may be used in bilateral training, comparing a muscle on the left side to the same one on the right. It also may be used to train activation of one muscle while inhibiting an opposing or substituting muscle.

The ratio goal is an ABOVE TONE type of feedback, with a tone generated when the ratio goal is exceeded. The center of the bar is the 1:1 ratio position, the top of the bar is 10:1, and the bottom is 0.1:1.

When the ratio mode is initially selected, the default ratio goal value is 1 to 1. If either of the A arrow keys are pressed, the digital displays show the current ratio goal setting rather than the current EMG ratio. To change the ratio goal value, simply continue to press the appropriate A arrow key until the desired ratio goal is reached. Use single key presses to increment or decrement the ratio goal value, or hold the key down for larger changes. Both the digital display and the position of the goal arrow will change to reflect the current ratio goal value. When the desired ratio goal value is displayed, do not press any keys. The MR-20 will return to the real-time display in a few seconds.

In the ratio mode pressing either of the B arrow keys temporarily halts the operation of the MR-20, freezing the display. This allows the values at any point in time to be easily recorded. When the MR-20 is halted, pressing either of the B arrow keys causes operation to resume.

Special Functions Mode

The special functions mode accesses all of the data functions and is used to review, clear and download training session data. In addition this mode accesses the session timing modes and the stimulator setup allowing the stimulator timing and relay control to be changed. Also this mode allows the MR-20 to be locked in a special patient use mode. Pressing both the A and B keys simultaneously for a short time will access these special functions.

When this mode is accessed the following screen appears:

```
A = PATIENT DATA
B = SETUP
```

Patient Data Menus

In either the LOCKED or UNLOCKED mode, the MR-20 can save the data of up to thirty-two training sessions in its memory storage area. This memory is non-volatile, meaning it will be preserved EVEN IF THE BATTERY IS DISCONNECTED. The battery can be replaced with no danger of losing the stored training sessions.

As discussed in the Running Training Sessions section, a training session is generated when the MR-20 is on and in the real-time EMG display for more than one minute when in the CONTINUOUS MODE, or after the first completed trial when in the WORK/REST mode. The training session begins when the MR-20 is turned on and ends when the MR-20 is turned off.

The data stored for each session consists of the training session number, the average microvolt level, the maximum microvolt level, the type of goal and its value, the percent goal success or the number of times the stimulator was activated. In the CONTINUOUS mode the number of minutes of use is stored, and in the WORK/REST mode the number of completed trials is stored.

Reviewing Data

If the MR-20 has just been turned on, so that a new session has not yet been generated, the data from all stored training sessions can be reviewed and downloaded. Alternatively, if the MR-20 has been on and used long enough to create valid current session, only that session may be reviewed.

In the CONTINUOUS mode, if real-time EMG activity HAS BEEN DISPLAYED FOR LESS THAN ONE MINUTE (the MR-20 has just been turned on), the A = PATIENT DATA selection will display ALL PREVIOUS SESSION DATA. If real-time EMG activity HAS BEEN DISPLAYED FOR MORE THAN ONE MINUTE (creating a valid current session) ONLY THAT SESSION MAY BE REVIEWED. Note that the MR-20 will beep to indicate when this first minute of activity has occurred.

In the WORK/REST mode, if the FIRST WORK PERIOD HAS NOT BEEN COMPLETED (the MR-20 has just been turned on) the A = PATIENT DATA selection will display ALL PREVIOUS SESSION DATA. If the FIRST WORK PERIOD HAS BEEN COMPLETED (creating a current session) ONLY THAT SESSION MAY BE REVIEWED.

Therefore, to review or download the data from all stored training sessions, access the special functions mode immediately after turning on the MR-20.

Reviewing the Current Session Data

To review the current session data, go into the special functions mode and select A = PATIENT DATA. As long as the MR-20 has been turned on long enough to create a valid current session, the display will show the data for the current session:

```
# 11    A =    95 uV
86%            11 MIN
```

This screen shows the current session number and the EMG A average microvolt level on the first line with the percent goal success and the amount of time elapsed so far (or the number of trials completed) on the second line. The percent goal success represents a TONE goal selection.

If STIM were selected the display would show the number of times the stimulator has been activated so far. If the MAX MODE were selected MAX DISP would be shown, and if no goal were selected, the display would read NO GOAL. Pressing the B key will show EMG B data similarly. When a ratio mode session is reviewed, pressing the A key shows the average EMG A value and the percent success of A/B. Pressing the B key shows the average EMG B value and the average A/B ratio for the session.

If no key is pressed for a few seconds the MR-20 will return to the real-time EMG display and continue with the current session.

Reviewing Stored Session Data

If the MR-20 has just been turned on, choosing A = PATIENT DATA will reveal the following choices:

```
A = REVIEW DATA
B = DOWNLOAD
```

Selecting A = REVIEW DATA will yield the following choices:

```
A = DISPLAY DATA
B = CLEAR DATA
```
Selecting A = DISPLAY DATA will allow the review of the data for all the stored training sessions. The data for the most recently completed session for EMG A is initially displayed.

```
# 11    A =    95 uV
86%           11 MIN
```

This screen shows the current session number and the EMG A average microvolt level on the first line with the percent goal success and the amount of time elapsed (or the number of trials completed) on the second line. The percent goal success represents a TONE goal selection.

If STIM were selected the display would show the number of times the stimulator was activated. If MAX MODE were selected MAX DISP would be shown, and if no goal were selected, the display would read NO GOAL. Press the B key to reveal the data for the same session for EMG B and press the A key to return to EMG A. When a ratio mode session is reviewed, pressing the A key shows the average EMG A value and the percent success of A/B. Pressing the B key shows the average EMG B value and the average A/B ratio for the session.

Use either down arrow to display the data of previous training sessions. Use either up arrow to display the data of subsequent training sessions. When no key is pressed for a short time the display will return to the real-time EMG display.

No Stored Data

If there are currently no training sessions stored, trying to review or download data will invoke the following display:

```
┌─────────────────┐
│ NO DATA HAS     │
│ BEEN SAVED!     │
└─────────────────┘
```

The MR-20 will return to the real-time EMG display in a few seconds.

Clearing Data

The B = CLEAR DATA choice will allow the stored data from the training sessions to be erased. The MR-20 can store the data from 32 separate training sessions. The MR-20 will stop storing the data of training sessions when 32 training sessions have been stored. Therefore, it is important to regularly clear the memory storage area. Before doing this, make sure that the data from training sessions has been either written down or transferred (downloaded) to a PC computer. After selecting B = CLEAR DATA the display will read:

```
┌─────────────────┐
│ A = CLEAR ALL   │
│ SAVED DATA      │
└─────────────────┘
```

Pressing the A key will erase the data of all the training sessions stored in memory, so be sure that this is the desired choice. If this is not the desired choice, simply wait a few seconds without pressing any keys and the display will return to the real-time EMG display without clearing the stored sessions.

Downloading Data

Although the essential data from patient sessions can be reviewed on the screen, a more complete report can be generated by downloading to a personal computer. The section WORKING WITH A PC COMPUTER contains complete instructions for downloading data.

Setup Menus

To change the setup or configuration of the MR-20, access the special functions mode. When this mode is accessed the following screen appears:

```
┌─────────────────┐
│ A = PATIENT DATA│
│ B = SETUP       │
└─────────────────┘
```

To set the desired trial mode or stimulation configuration, or to lock or unlock the MR-20 select B = SETUP. The next display will read:

```
A = TIMING
B = LOCK MODE
```

Session Timing

If the A = TIMING choice is selected, the next menu presented is the following:

```
A = SESSION TIMING
B = STIM CONTROL
```

The A = SESSION TIMING choice will allow selection of the CONTINUOUS or the WORK/REST session mode, while the B = STIM CONTROL selection accesses changing the stim timing and stim relay.

If the choice A = SESSION TIMING is made the following menu appears:

```
A = WORK/REST
B = CONTINUOUS <-
```

Note the arrow pointing to the CONTINUOUS choice, indicating that this is the current mode. If the CONTINUOUS mode is desired, pressing the B = CONTINUOUS key will keep that mode active. Similarly, if no key is pressed the mode will not be changed and the screen will soon return to the active EMG display.

The WORK/REST mode, as described in the Running Training Sessions section is the mode which will include a set number of active work periods, separated by rest intervals. To select this mode press A = WORK/REST. Note that the active selection indicator will shift and now point to the A = WORK/REST choice:

```
A = WORK/REST <-
B = CONTINUOUS
```

After a few seconds the screen will show the current work period:

```
WORK PERIOD:
10 SECONDS
```

Use the up and down arrow keys to increase or decrease the new work period. The work period may be set from 3 to 180 seconds. When no key is pressed for a few seconds the next screen will appear:

```
REST INTERVAL:
10 SECONDS
```

Use the up and down arrow keys to increase or decrease the new rest interval. The rest interval may be set from 0 to 180 seconds. When no key is pressed for a few seconds the next screen will appear:

```
# OF TRIALS:
10
```

Use the up and down arrow keys to increase or decrease the new number of trials. The number of trials may be set from 1 to 20 trials. When no key is pressed for a few seconds the screen will return to the active EMG display.

The MR-20 has a default WORK PERIOD of 10 seconds, a default REST INTERVAL of 10 seconds, and a default NUMBER OF TRIALS of 10. These are the initial values when in the UNLOCKED mode.

Working with a Functional Stimulator

To use the MR-20 to control a stimulator, the stimulator must be configured properly and the MR-20 must be connected via the stim interface cable. Basically the stimulator is set to be controlled by a switch connected to its accessory input jack. The MR-20 STIM OUT jack provides the switch connection.

For the MR-20 to be able to control the stimulator, there are settings on the stimulator itself which must be correct. The stimulator must be configured with the ON TIME set for the maximum, the OFF TIME set for the minimum, and set to CONTINUOUS stimulation.

Once it is verified the stimulator is working correctly, plug one end of the stim interface cable into the stimulator accessory jack and the other end into the STIM OUT jack of the MR-20. The stimulator should now be controlled by the MR-20 in the stim feedback mode.

If the stimulator is ON when it should be OFF, change the polarity of the stim relay in the MR-20 Special Functions mode. (Refer to the Stim Relay section below.) If the stimulator is not working correctly contact the dealer or manufacturer of the stimulator.

The stimulator cycle is composed of three time periods.

First there is a GOAL SUCCESS time, settable between 1 and 25 seconds. The level of EMG activity must meet the goal continuously for the GOAL SUCCESS time before the stimulator is activated. This prevents the stimulator from being activated prematurely.

When the goal is met, the MR-20 will activate the stimulator for a set time period, the STIM ON TIME. At the end of this time the stimulator will be turned off. This time is can be set between 1 and 180 seconds. When the stimulator is activated, pressing any key on the MR-20 will immediately stop the stimulation.

Following the activation of the stimulator, there is a REST TIME of 10 seconds, to allow patient recovery before the active display begins.

Stim Setup

At the earlier screen showing:

```
A = SESSION TIMING
B = STIM CONTROL
```

When interfacing the MR-20 to a functional stimulator, timing parameters or the relay position may have to be changed. To change these parameters select B = STIM CONTROL. The next display will read:

```
A = STIM TIMING
B = STIM RELAY
```

Stim Timing

To set the timing parameters for stimulation, press the A key. The display will read:

```
GOAL SUCCESS:
5 SECONDS
```

The GOAL SUCCESS is the number of seconds of continuous goal success necessary to activate the stimulator and may be set from 1 to 25 seconds. Use the up and down arrow keys to increase or decrease the new GOAL SUCCESS time. When no key is pressed for a few seconds the next screen will appear:

```
┌─────────────────────────┐
│ STIM ON TIME:           │
│ 30 SECONDS              │
└─────────────────────────┘
```

The STIM ON TIME is the number of seconds the stimulator will be activated when the GOAL SUCCESS time criteria is met. Use the up and down arrow keys to increase or decrease the new STIM ON TIME. The STIM ON TIME may be set from 1 to 180 seconds. When no key is pressed for a few seconds the screen will return to the active EMG display.

The MR-20 has a default GOAL SUCCESS time of 5 seconds and a STIM ON TIME of 30 seconds. These are the initial values when in the UNLOCKED mode.

Stim Relay

The STIM RELAY determines whether the relay on the MR-20 is normally OPEN or normally CLOSED. Some models of stimulators require one setting and some require the other.

If the stimulator is activated immediately when the stim interface cable is plugged into the MR-20, the stim relay setting may need to be changed. The MR-20 is shipped with the relay CLOSED which works with the majority of stimulators. Therefore, to change the relay setting choose B = STIM RELAY. The display will now read:

```
┌─────────────────────────┐
│ A = OPEN                │
│ B = CLOSED <-           │
└─────────────────────────┘
```

Note the arrow pointing to the closed choice, indicating that this is the current setting. If the closed setting is desired, pressing the B = CLOSED key will keep that mode active. Similarly, if no key is pressed the mode will not be changed and the screen will soon return to the active EMG display.

To select the open setting press A = OPEN. Note that the active selection indicator will shift and now point to the A = OPEN:

```
┌─────────────────────────┐
│ A = OPEN     <-         │
│ B = CLOSED              │
└─────────────────────────┘
```

This will allow the MR-20 and the functional stimulator to work properly together if the CLOSED setting did not work correctly. The relay may be CLOSED in a similar manner. In a few seconds the screen will return to the active EMG display.

Stimulator Activation

If STIM is selected as the goal type and the goal or goals have been met continuously for the number of seconds specified by the GOAL SUCCESS time, the stimulator will be activated and the MR-20 display will read:

```
STIM ON:
30 SECONDS
```

The number of seconds of stimulation left is displayed and will count down until reaching zero at which time the stimulation will stop. The duration of the stimulation is determined by the STIM ON TIME. The stimulation may also be stopped at any time during the count down by pressing any key. A patient rest interval is provided after stimulation is completed. The display will read:

```
RESTING:
10 SECONDS
```

This display will count down the rest interval and then automatically return to real-time EMG activity, ready to activate the stimulator again when the goal is met.

Lock Mode

When the MR-20 is LOCKED, none of the goal types or microvolt goal levels can be changed. To set this mode, go into the special functions mode and select B = SETUP and B = SETUP again. This will display the following screen:

```
A = LOCK MODE
B = RESPONSE TIME
```

Select A = LOCK MODE. The display will now read:

```
A = LOCK VALUES
B = UNLOCK        <-
```

Note the arrow pointing to the UNLOCK choice, indicating that this is the current setting. If the UNLOCKED setting is desired, pressing the B = UNLOCK key will keep that mode active. Similarly, if no key is pressed the mode will not be changed and the screen will soon return to the active EMG display.

To select the LOCKED setting press A = LOCK VALUES. Note that the active selection indicator will shift and now point to the A = LOCK VALUES:

```
A = LOCK VALUES <-
B = UNLOCK
```

If LOCK VALUES is chosen, the display will read:

```
MR-20 IS NOW
LOCKED
```

At this point, turn the MR-20 off and then back on. Note that the MR-20 start-up screen now reads MODE: LOCKED and the keys are not active. In this mode, the patient cannot change the goal parameters established by the therapist. Notice that when LOCKED, the digital microvolt values are no longer displayed to simplify feedback to the patient. In addition the one minute session beep is not made. The MR-20 may be UNLOCKED in a similar manner by selecting B = UNLOCK.

Response Time

The Response Time is used by the MR-20 to smooth or filter the EMG signal. Dynamic training exercises may require less filtering to see the more raw signal with the individual spikes; this requires a fast Response Time. Relaxation training may require a smoothed less spiky plot; this requires a slower Response Time. The Response Time may be set from 1 - 15 where 1 is the fastest and 15 is the slowest. The normal MR-20 Response Time is 7. To set the Response Time, choose B = RESPONSE TIME.

```
A = LOCK MODE
B = RESPONSE TIME
```

Special Start-up Modes

The MR-20 has two alternative start-up modes available. These are activated by holding down one of the keys while turning the MR-20 on.

Demonstration Mode

One of the modes is the Demonstration or Slow mode. All of the menus in the Special Functions Mode have a time delay during which the choices remain on the screen. The length of time is a tradeoff between allowing enough time to read the menu and make a selection, and not having to wait too long to return to the active screen. The standard time was chosen to work well for the normal user.

However for teaching someone else, or for the beginning user, the menus may not allow enough time. Holding down the A key while turning the MR-20 on will activate the Demonstration mode. In this mode the selection times are significantly longer. Note that this must be done each time the unit is turned on to be active.

Custom Settings Mode

The other special start-up mode is the Custom Settings mode. Normally, when the MR-20 is turned on (in the unlocked mode) the goal and timing settings have standard default values. The Custom Settings mode makes all of the settings have the same values that had been set the last time the MR-20 was turned off.

For example, if the goals, goal values, and timing were set for a particular exercise, and the user wanted to start an identical new session, this would easily be done.

Simply turn the MR-20 off, ending the present session. Then turn the MR-20 on while holding down the B key. All of the goal and timing values will remain, just as if the MR-20 were in the LOCKED MODE. Note that this must be done each time the unit is turned on to be active.

Note that the above two start-up modes cannot be used together.

WORKING WITH A PC COMPUTER

The Pathway Utilities software supplied with the MR-20 provides the capabilities of viewing real-time EMG activity (on an EGA or VGA display), and of downloading the data from the stored training sessions. The cable supplied must be connected to the serial port of the computer, and plugged into the serial connector of the MR-20.

The Pathway Utilities software may be run on the floppy diskette provided, or may be installed on a hard disk drive. To begin running the Pathway software, place the diskette in a drive, and make that drive the default drive by typing the drive letter followed by a colon ":" and pressing [ENTER].

For example, to make the "A" drive the default drive type: "A:" and press [ENTER].

Next, type the command "PATHWAY" and press [ENTER].

The Pathway software has a simple menu-driven interface. Selections can be made using either the keyboard or a mouse. The prompt line at the bottom of the screen explains each choice.

After the Utilities software begins running, the title window will appear in the middle of the screen. Note that the bottom line of the screen shows a help prompt to press the [ENTER] key to continue. There is also an "OK" box in the center of the screen. Either press the [ENTER] key, or point and click on the OK box with a mouse.

Now the screen shows the main menu. Across the top of the screen are the menu choices. Each menu choice has one letter highlighted in a different color. Pressing the [ALT] key along with the highlighted key opens the menu. (Pointing and clicking with the mouse does the same thing.) When the menu is opened, the cursor keys change the highlighted selection. Pressing [ENTER] selects the highlighted choice, as does pointing and clicking with a mouse. Pressing [ESCAPE] exits without making a choice.

Installation to Another Disk

The Pathway Utilities software cannot be installed by just copying the files to another disk. To install the Pathway software to a hard drive, start running the Utilities software as described above, select the "Utilities" menu, and then choose "Install to another disk".

Configuring the Pathway Utilities Software

The Pathway Utilities software must be set for the correct model of the Pathway, the correct serial port the MR-20 cable is connected to, and the correct printer type.

A SERIAL PORT on the back of the computer is normally either a 9 pin or a 25 pin MALE connector (with pins showing, not holes). A PARALLEL PORT is a 25 pin FEMALE connector (with holes showing). The Pathway MR-20 WILL NOT WORK CONNECTED TO A PARALLEL PORT.

In the "Setup" menu choose "Pathway Setup". First select the correct model choice, the MR-20. Then use the [TAB] key to choose the serial port the cable is plugged into, either COM1 or COM2.

To set up the printer configuration, also in the "Setup" menu, choose "Type of Printer", and choose the printer type or its emulation mode. Most printers are designed to emulate one of the industry standard types listed. Refer to the instruction manual that came with the printer for this information.

After choosing the type of printer, also in the "Setup" menu, choose "Setup of Printer". Select LPT1 or LPT2 depending on which port the printer is connected to. On most systems this will be LPT1.

Serial Test

There is a Serial Test choice in the Utility menu which is designed to easily make sure that the connections and the configuration are correct for either Viewing Real-time EMG or for Downloading Data. This test is the first thing to use to determine whether the Pathway is able to communicate with the PC computer. The instructions for its use appear on the screen.

Viewing Real-time EMG

To view real-time EMG, select the "Real time / Download data" menu. Then choose "Real time display". After choosing the session length, press any key to begin the session. During the session the EMG activity of both channels from the MR-20 is plotted on the screen. At the end of the session time, press "P" to print an image of the screen on the printer, or press [ENTER] to do another session, or press [ESCAPE] to return to the main menu. The printer must be set up correctly before attempting to print a session plot.

Downloading Data

To download data the 9 pin serial cable must be connected to the SERIAL output of the MR-20 and to the SERIAL input of the PC computer with the Pathway Utilities software running.

Utilities Software Download Commands

To download MR-20 session data, start running the Utilities software, select the "Real time / Download data" menu. Then choose "Download data to file". Then enter a file name to download the data into. (Be aware that re-using an existing name will replace the old data with the new.) Then the screen shows instructions to first begin downloading from the MR-20 and then press [ENTER] on the computer. It is important that this be done in the correct order. Do not press [ENTER] yet since the MR-20 is not ready to download.

MR-20 Download Commands

Next prepare the MR-20 to download the data of all the stored training sessions.

Select the special functions mode just after turning the MR-20 on, and choose A = PATIENT DATA. The next display will read:

```
A = REVIEW DATA
B = DOWNLOAD
```

First press the B key on the MR-20 to begin downloading. Then press the [ENTER] key on the PC computer.

While downloading the MR-20 display will read:

```
SENDING DATA
B = STOP
```

When the download is complete, a message appears either that the download was complete, or that there may have been an error. If there was an error, downloading should be repeated or else the data may not be correct.

The data is shown on the PC screen as it is downloaded.

If the download is completed successfully the MR-20 display will read:

```
DOWNLOAD
COMPLETE
```

When data has been successfully downloaded, the file will be in the "\PATHWAY\DATA" directory on the disk. Note that once the data from a set of MR-20 sessions has been successfully downloaded to the PC computer, clearing the memory of the MR-20 will make room for more new sessions.

The MR-20 normally takes just a few seconds to complete downloading the stored data. If it does not seem to be progressing correctly it can be stopped by pressing the B key. The following message will be displayed:

DOWNLOADING
HAS BEEN STOPPED

The display will return to real-time EMG in a few seconds.

If the MR-20 is not successful downloading the data, the display will read:

MR-20 IS UNABLE
TO DOWNLOAD!

Again, the display will return to real-time EMG in a few seconds. If this message is seen, check all connections and make sure the PC software is set up properly.

No Stored Data

If there are currently no training sessions stored, trying to review or download data will invoke the following display:

NO DATA HAS
BEEN SAVED!

The MR-20 will return to the real-time EMG display in a few seconds.

Viewing or Printing Data

The previously downloaded data may easily be viewed on the PC computer screen or printed on a printer. In the File menu select "View a downloaded file". Use the cursor keys to highlight the desired file from the list which appears, and press [ENTER]. The selected file will appear on the screen. Use the [PAGE UP] and [PAGE DOWN] keys to move within the file, and the [ESCAPE] key to exit. To print a downloaded file select the "Print a downloaded file" menu choice. Again a list of files will appear. Choose the desired file and printing will begin.

Deleting Downloaded Data Files

As noted before, if the same file name is reused, the old data file will be overwritten and will be lost. Thus, if new names are often used, eventually a large collection of files will exist in the downloaded data directory. The menu choice: "Delete a downloaded file" can be used to eliminate files which are no longer needed. Note that once such files are deleted the data is lost.

In the File menu select "Delete a downloaded file". Use the cursor keys to highlight the desired file from the list which appears, and press [ENTER]. After being asked to confirm deleting the file, it will be deleted. If you do not want to delete the file press the [ESCAPE] key instead of the [ENTER] key.

View Instruction Manual

In the File menu the selection "View Instruction Manual" will display the instruction manual on the screen. Use the [PAGE UP] and [PAGE DOWN] keys to move within the manual, and the [ESCAPE] key to exit.

Pathway MR-20

Technical Specifications

- Two EMG Channels
- Active Electrode Preamplifier
- 1 - 800 Microvolt Range
- One Logarithmic Display Range
- Above/Below Goals
- True RMS Conversion
- Reading Rate: Every 100 Milliseconds
- 20 to 500 Hz Bandpass
- No Notch Filter
- Input Common Mode Rejection greater than 110dB
- Input Noise Level of <1 Microvolt
- Active Electrode Impedance of 10 gigohms
- Accuracy of 2% +/- 2 Microvolts (Less Than 500 Microvolts)
- Isolated Computer Port
- Belt/Pocket Clip
- Dimensions: 4.6" x 2.7" x 1.5"
- Weight: 8 Ounces
- Power: Standard 9 Volt Battery

Electrodes

To re-order electrodes for any Pathway device please call your dealer or The Prometheus Group sales office at (800)-442-2325.

For surface EMG applications the compatible electrodes are order numbers (from The Prometheus Group) of 6750 for the DeLuca preamplifiers, 6581 for the microamp preamplifiers, and 6801 for individual lead wires.

For incontinence applications the compatible electrodes are the PerryVaginal Sensor, the Empi Vaginal Elec Sense/Stim, or the Hollister In/care perineometer.

Electromagnetic Compatibility and Interference

The Pathway MR- 20 has been tested for Electromagnetic Compatability and Electromagnetic Interference and complies with the requirements set forth in EN 60601-1-2:1993, to include EN55011:1991 for radiated emissions, IEC 801-2:1991, and IEC 801-3:1991 (Draft).

SAVED SESSION SUMMARY

Session/Patient Name	Type	By	Date	Time	Muscle Placement
1. _____	_____	____	____	____	_____
2. _____	_____	____	____	____	_____
3. _____	_____	____	____	____	_____
4. _____	_____	____	____	____	_____
5. _____	_____	____	____	____	_____
6. _____	_____	____	____	____	_____
7. _____	_____	____	____	____	_____
8. _____	_____	____	____	____	_____
9. _____	_____	____	____	____	_____
10. _____	_____	____	____	____	_____
11. _____	_____	____	____	____	_____
12. _____	_____	____	____	____	_____
13. _____	_____	____	____	____	_____
14. _____	_____	____	____	____	_____
15. _____	_____	____	____	____	_____
16. _____	_____	____	____	____	_____
17. _____	_____	____	____	____	_____
18. _____	_____	____	____	____	_____
19. _____	_____	____	____	____	_____
20. _____	_____	____	____	____	_____
21. _____	_____	____	____	____	_____
22. _____	_____	____	____	____	_____
23. _____	_____	____	____	____	_____
24. _____	_____	____	____	____	_____
25. _____	_____	____	____	____	_____
26. _____	_____	____	____	____	_____
27. _____	_____	____	____	____	_____
28. _____	_____	____	____	____	_____
29. _____	_____	____	____	____	_____
30. _____	_____	____	____	____	_____
31. _____	_____	____	____	____	_____
32. _____	_____	____	____	____	_____

PATHWAY STARTUP / INSTALLATION INSTRUCTIONS

System Requirements for Pathway Utilities Software

In order to view the real-time plots of EMG Activity, the IBM compatible computer system must have an EGA or VGA compatible graphic display. In order to print out a copy of the screen on the printer it must be compatible with one of the supported graphic printers. These include printers which emulate the Epson 9 pin and 24 pin printers, those which emulate the HP Laser Jet and Deskjet printers, and many others. Refer to the printer manual to determine its emulation or compatibility capabilities. The Utilities Software also requires a free (unused) serial port on the computer.

Startup Instructions

The Pathway Utilities software may be run on the diskette provided, or may be installed on a hard disk drive. To begin running the Pathway software, place the diskette in a drive, and make that drive the default drive by typing the drive letter followed by a colon ":" and pressing [ENTER].

For example, to make the "A" drive the default drive type: "A:" and press [ENTER]. Next, type the command "PATHWAY" and press [ENTER].

The Pathway software has a simple menu-driven interface. Selections can be made using either the keyboard or a mouse. The prompt line at the bottom of the screen explains each choice.

Installation to Another Disk

To install the Pathway Utilities software to a hard drive, start running the software as above, select the "Utilities" menu, and then choose "Install to another disk". Follow the instructions on the screen.

Working with a Stimulator

To use the Pathway to control a stimulator, the stimulator must be configured properly and the Pathway must be connected via the stim interface cable. The stimulator must be configured with the ON TIME set for the maximum, the OFF TIME set for the minimum, and set to CONTINUOUS stimulation. Once it is verified the stimulator is working correctly, plug one end of the stim interface cable into the stimulator accessory jack and the other end into the stim out jack of the Pathway. The stimulator should now be controlled by the Pathway in the stim feedback mode. If the stimulator is ON when it should be OFF, change the polarity of the stim relay in the Pathway Special Functions mode. If the stimulator is not working correctly contact the dealer or manufacturer of the stimulator.

The Prometheus Group
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603.749.0733 / 800.442.2325 (US & Canada) Fax: 603.749.0511
E-Mail: info@theprogrp.com Web Site: www.theprogrp.com

Standard Warranty Service Agreement

The Prometheus Group warrants equipment of its own manufacture to be free from defects in material and workmanship as follows:

One year from the date of shipment to the original purchaser, subject to the terms, conditions, limitations , and exclusions specified herein.

1. Service: The Prometheus Group of New Hampshire, Ltd., hereafter "The Prometheus Group", shall provide, for the term of this warranty, repair of defective "Pathway" units. This warranty shall include all parts and labor charges. The purchaser must obtain a Return Authorization Number and must return the defective unit, at the purchaser's own expense to The Prometheus Group. The Prometheus Group may, at its option, repair and return the unit or provide a replacement unit. Should The Prometheus Group elect to provide a replacement unit, then this warranty is automatically transferred to the replacement unit. The Prometheus Group shall return, at The Prometheus Group's own expense, the repaired or replacement "Pathway" unit.

2. Exclusions: The following conditions are excluded from service under this warranty:

   A. Preventative maintenance. Preventative maintenance, defined as maintenance performed for the purpose of preventing a malfunction, is excluded from service under this warranty.
   B. Repair of damage or malfunction of "Pathway" equipment resulting from abuse, accident, modification, or other cause other than normal usage, including but not limited to operator error, failure of other user-supplied equipment, and equipment operation in excess of design specifications is excluded from service under this warranty.
   C. Loss due to fire, flood, robbery, burglary, theft, vandalism, radioactive contamination, or other natural disasters or Acts of God is excluded from service under this warranty
   D. Replacement of batteries, accessories and expendables such as electrodes, are excluded from service under this warranty.

3. Optional Warranty Extension: This warranty may be renewed or extended by written agreement and acceptance of both parties.   The price for such extension shall be the price in effect at the time the extension is put in force. The Prometheus Group shall waive any inspection and conditional repair requirements for uninterrupted warranty extensions.

4. Limitation of Remedy: The Prometheus Group shall not be liable for any damages caused by the delay in furnishing warranty services or other performance under this warranty. The service warranty expressed in paragraph 1 represents the sole and exclusive remedy for any warranty clams under expressed or implied warranties, including without limitation any warranty of merchantability or fitness. This warranty specifically limits the liability of The Prometheus Group, including liability for negligence claims by users and disclaiming any other claims of non-performance by The Prometheus Group. In no event shall The Prometheus Group be held liable for any incidental or consequential damages of any kind.

5. Assignment: This warranty shall not be assigned by the purchaser without prior written consent of The Prometheus Group. The warranty shall be binding upon all of the parties and their successors and assigns.