TeleRehab™ 2004

Service Manual

ScottCare

CARDIOPULMONARY MONITORING SYSTEM

TELEREHAB 2004

Service Manual

U.S. Patent No. 5,474,090

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PREFACE

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TELEREHAB 2004 HARDWARE CONFIGURATIONS

PREFACE

Design

The ScottCare TeleRehab™ 2004 Cardiopulmonary Monitoring System is designed to allow monitoring and recording of electrocardiograph (ECG) rhythm strips and related information for patients undergoing an exercise therapy program. Patients are monitored via the use of medical telemetry. The TeleRehab 2004 Cardiopulmonary Monitoring System includes a Program Management module that provides the means to print reports of exercise sessions, cumulative patient progress, and compliance.

Intended Use

The ScottCare TeleRehab 2004 Cardiopulmonary Monitoring System is intended for use as a group rhythm strip-monitoring device for cardiac rehabilitation patients. The system is comprised of the computerized central unit located at the monitoring site, and the RF transmitting equipment.

The RF transmitting equipment is intended for use by a cardiac rehabilitation patient enrolled in a group rhythm strip-monitoring program. These transmitters are only to be used under the instruction and supervision of qualified personnel. **Federal law restricts this device to sale by or on the order of a physician.** (Qualified personnel are defined as hospital or clinical personnel that have been trained in the proper application and use of this equipment).

Diagnostic Use Warning

ScottCare Patient Equipment is designed to amplify and process rhythm strips. The shape of transmitted ECG waveforms may be affected by body movement causing intermittent electrode contact or by other factors external to the Transmitter module. ACCORDINGLY, SCOTTCARE MAKES NO CLAIMS OR WARRANTIES, EXPRESS OR IMPLIED (INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE), AS TO THE QUALITY OF THE ECG SIGNAL RECEIVED, OR AS TO ITS EFFECTIVENESS AS A DIAGNOSTIC TOOL.

System Limitations:

The ScottCare TeleRehab Advantage monitoring system is capable of multi tasking, however, as with all computer systems, there are limitations. Changes to the TeleRehab Advantage configuration files should not be accomplished if any component of the system is in use, whether a monitoring terminal or a work station being utilized for use of the program management applications.

The ScottCare TeleRehab Advantage monitoring system is designed to extensively utilize the multi tasking capabilities of the Windows XP Professional operating system. As a result, it is possible that events may occur that cause what appear to be software anomalies that, in reality, are a result of the interaction between the Advantage system software and the operating system. Although **<u>rare</u>**, these idiosyncrasies can be a source of frustration for the equipment operator.

Examples include:

- When using the mouse and/or touchscreen to provide manipulation of the Advantage system, it is possible to provide commands via clicking of the mouse or touching of the touch screen monitor, faster than the system can respond. In a small number of cases, the operating system will overload with a backup of input commands producing undesirable results. Although the software has been 'hardened' to ignore commands when an too many commands are backed up, system crashes are still a possibility.

  To avoid these undesirable results, one should be patient when manipulating the Advantage system, and not provide a new command until the last command has been satisfied.

- It is possible for the interaction between the Advantage software and the operating system to cause the random discontinuation of the recording of one or more sessions when monitoring several patients at once. The Advantage system continuously checks the recording function to verify that the recording of each session is taking place. When a discontinuation occurs, the system will provide notification as follows:

> If you wish to continue monitoring without recording, left click on the 'Cancel' button.

> If left clicking on the 'Retry' button only results in this window being displayed again, call ScottCare customer service (800-243-9412) for assistance.

Disclaimer of Liabilities

The ScottCare Corporation, its parent, affiliates, agents, officers and employees, shall not be liable for special, incidental, or consequential loss or damages of any kind resulting from or caused by any defect, failure or malfunctioning of the equipment described herein, whether a claim for such loss or damages is based upon warranty, contract or otherwise. The ECG Transmitter/Receiver system, manufactured by The ScottCare Corporation, is designed to amplify and transmit Rhythm Strips. THE SCOTTCARE CORPORATION MAKES NO CLAIMS OR WARRANTIES, EXPRESS OR IMPLIED (INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE) AS TO ITS EFFECTIVENESS AS A DIAGNOSTIC, LIFE SAVING OR LIFE SUPPORT TOOL.

FCC Part 15 Information

The Telemetry Transmitter provided complies with the limits for a biomedical telemetry device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

Operation of the Telemetry equipment is subject to the following two conditions:

> 1. The Telemetry Transmitter may not cause harmful interference.

> 2. The Telemetry Transmitter must accept any interference received, including interference that may cause undesired operation.

Any changes or modification not expressly approved by ScottCare could void the user's authority to operate the telemetry equipment.

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Important Safety Information

Read all of these instructions before operating the equipment, and save these instructions for later reference. There are many instructions that relate to your safety.

WARNING: Use of Computer for Other Software

The Computer(s) used with the Tele-Rehab 2004 Cardiopulmonary Monitoring System have excess capacity that might be used to run other software applications. It should be noted that the installation and use of software or hardware other than that installed by ScottCare might compromise system performance or cause system failure. ScottCare recommends against using any workstation as a common computer, and is not responsible for any problems or system failure caused by use of other software not expressly approved in writing by ScottCare for use on its systems.

TELEREHAB 2004 MONITORING SYSTEM

Overview

The ScottCare TeleRehab Monitoring System Software is a comprehensive software package for use on the TeleRehab 2004 computer based cardiopulmonary monitoring system designed to provide monitoring capability specifically for patients involved in an exercise schedule prescribed as a part of a cardiac or pulmonary rehabilitation program. Monitoring takes place while the patient exercises locally within an exercise facility via the use of telemetry.

QRS Detection

The TeleRehab 2004 Monitoring System software detects QRS complexes in accordance with the AAMI standard for Cardiac Monitors, Heart Rate Meters and Alarms (EC-13).

Heart Rate

The TeleRehab™ 2004 Monitoring System software detects the patient heart rate by counting

the QRS complexes detected and displaying a running average of the last four (4) intervals. Sampling occurs constantly and the display is adjusted with each interval. If the patient's heart rate exceeds a prescribed high limit value or drops below a prescribed low limit value, the QRS complex and rate indication will turn RED and an alarm will sound to alert the system operator that the rate limit has been violated.

Arrhythmia Detection

Rate related arrhythmias generally create a change in the R-to-R interval that is detectable by the system. As the Tele-Rehab 2004 Monitoring System software monitors the interval between QRS complexes, a change in R-to-R interval of greater than 25% will cause the displayed QRS complex to turn blue and an alarm to sound to alert the system operator that an event has occurred that might require attention. Rates displayed while the heart rate indicator is blue will not be accurate heart rates.

Artifact

 In order for the heart rate detection system and arrhythmia detection systems to perform at optimum efficiency, artifact must be minimized. Detected intervals that make no sense to the system will cause the display grid and rate indication to turn orange. Rates displayed while the display is orange will not be accurate. Some forms of artifact are of a type that will be detected by the system as potential arrhythmia in which case the QRS complex will turn blue and a soft alarm will sound giving a false indication of arrhythmia. Rates displayed while the QRS complex is blue will not be accurate.

Control of Artifact

It is essential that artifact be minimized to keep from interfering with the monitoring of the exercising patient. Some types of artifact can cause the system to react as though it were seeing ectopy, and other types cause the system to identify as erroneous, data generated when artifact is detected. In general, artifact can be controlled. There is always the patient who generates artifact no matter what you do; however, those are normally few and far between.

Several parameters can be involved in the production of artifact. Following are some causes and cures:

Preparation of the Patient - The greatest cause of artifact is inadequate contact between the patient and the electrodes. This condition is evident when artifact disappears when the transmitter is attached to a patient simulator where optimum contact is assured. Some causes of inadequate contact include the use of outdated pre-gelled electrodes where the conducting medium is dried out, or inadequate preparation of the area where the electrode is to be placed.

Alcohol is a commonly used means of patient prep. Although alcohol kills bacteria and cleans the area, alcohol tends to dry out the skin thereby increasing the skins electrical resistance. Roughing the area by rubbing with a gauze pad or terry cloth towel often helps to reduce skin resistance when alcohol is to be used as the prep medium.

The best prep is usually done for stress test patients and is normally extensive in that the skin is severely stressed before application of electrodes.

ScottCare recommends that a commercially available prep medium such as "Omniprep™" or "Nuprep™" be used with the cardiopulmonary rehab patient. When adequately prepped, artifact is rarely a problem.

Electrode Position - Often electrodes are placed on the patient's chest area over the pectoral muscle and/or over the soft area under the rib cage. Artifact is then created when the patient exercises due to the contraction of the pectoral muscle.

ScottCare recommends that electrodes be placed above the pectoral muscle just under the clavicle for the right arm and left arm leads, and on the lower rib area for the Left Leg and/or Right Leg lead. This placement will not normally have a significant effect the QRS complex but will eliminate motion artifact caused by muscle movement.

Cable Position - Patient Cables are frequently run from the patient transmitter, under the shirt, to the electrode site. When the lead wires are against the skin, it is possible for artifact to be introduced due to the rubbing of the wire against the skin during exercise.

ScottCare recommends that wires be run in such a manner as to minimize contact between the skin and the patient lead wire.

Transmitter/Cable Motion – Transmitters are provided with belt clips and can be worn on the belt line, placed in a pocket, placed in a pouch, or worn wherever comfortable and well supported. Transmitters that are not well supported can move about freely which can create motion artifact.

ScottCare recommends that transmitters be attached to the belt line off the hip to the rear in order to minimize jostling by the leg during exercise. If a pouch is used, it should be secured to the patient in a location least susceptible to jarring during exercise such as the center of the upper chest area.

Out of Range or Low Battery – Depending upon the specific type of transmitter in use, transmitter range is approximately 100 feet depending upon the environment and what material is between the transmitter and receiver. If the patient is "out of range" or if the battery voltage drops below an acceptable level, the QRS signal will be diminished and may be over written by artifact. Normal battery life is approximately 70 hours. When artifact appears as though the transmitter is not connected, try changing the battery and patient lead in that order. If artifact persists, call ScottCare for assistance. Refer to the section in the service manual regarding the specific transmitter in use for more information.

HARDWARE CONFIGURATIONS

Configuration #1 - One Server Workstation and one monitor.

Standard configuration includes:

1 Windows XP Server Workstation with 2004 Software
1 Flat Panel, Touchscreen Monitor with Integrated Speakers
1 Receiver Module with Antenna (not shown)
2 Digital Telemetry Interface Box (DTIB1 and DTIB2) not shown
1-16 Telemetry Channels with 608-614 MHz Digital Transmitters
1 Strip Chart Recorder
1 Printer Interface Box (PIB)
1 Network Laser Printer

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Configuration #2 – Configuration #1 with an additional workstation.

</div>

Standard configuration includes:

1 Windows XP Server Workstation with 2004 Software
1 Windows XP Workstation with 2004 Software
2 Flat Panel, Touchscreen Monitor with Integrated Speakers
1 Receiver Module with Antenna (not shown)
2 Digital Telemetry Interface Box (DTIB1 and DTIB2) not shown
1-16 Telemetry Channels with 608-614 MHz Digital Transmitters
1 Strip Chart Recorder
1 Printer Interface Box (PIB)
1 Network Laser Printer

System Description

The **TeleRehab™** 2004 Monitoring System is an ECG monitoring system with the capability of monitoring up to sixteen channels of data simultaneously on one workstation. The system also maintains and processes a myriad of data regarding patients participating in the Cardiopulmonary Rehabilitation Program.

The system receives the patients ECG signal from up to sixteen patient worn radio frequency (RF) telemetry transmitters. ECG signals are received by the RF receiver module and coupled through the telemetry interface box to the workstation via the network HUB where the signals are then processed and displayed on the SVGA Monitor. The monitoring system is operated either through the use of a touchscreen installed as a part of the SVGA monitor, a mouse, or a standard computer keyboard. A thermal array printer is employed to provide a hard copy of the displayed rhythm strip on command.

The 2004 File Server workstation employs the File Server software to function as the network controller. The workstation also functions as the repository of all data regarding patients seen by the monitoring system. A laser printer is provided to generate reports applicable to the cardiac rehabilitation environment.

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┌──────────────┐              ┌──────────────┐
│  Telemetry   │              │ Strip Chart  │
│  Receivers   │              │   Recorder   │
└──────┬───────┘              └──────┬───────┘
       │                             │
       ▼                             ▼
┌──────────────┐              ┌──────────────┐
│  Telemetry   │              │   Printer    │
│Interface Box │              │Interface Box │
│    (TIB)     │              │    (PIB)     │
└──────┬───────┘              └──────┬───────┘
       │                             │
       ▼                             ▼
┌────────────────────────────────────────────────────────┐
│                  Network Switch/HUB                     │
└───────▲────────────────────▲──────────────────▲────────┘
        │                     │                  │
┌───────┴──────┐      ┌───────┴──────┐    ┌──────┴───────┐
│  Additional  │      │ File Server/ │    │ Laser Printer│
│  Workstation │      │ Workstation  │    │              │
└──────────────┘      └──────────────┘    └──────────────┘
```
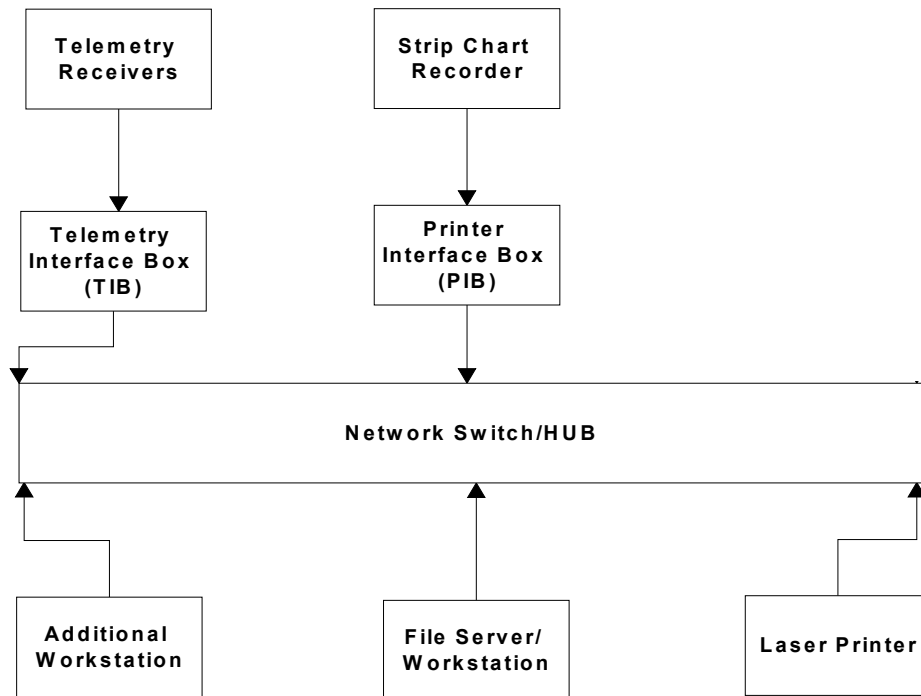
Telemetry Receivers/Transmitters

The TeleRehab™ 2004 system is designed to utilize either analog or digital transmitter/receivers in the 608–614 MHz range.

Analog transmitters are not tunable and generally not field serviceable, although mechanical parts are available and easily replaced. ScottCare employs an exchange program at reasonable cost to facilitate speed and accuracy of repair. Likewise, receiver cards are available on an exchange.

Digital transmitters being waterproof and therefore sealed units are not field repairable. Exchange units are readily available through ScottCare service. Digital transmitters are tunable to various frequencies in the 608-614 MHz range through the use of calibration material available from ScottCare.

Digital Receiver cards are designed to include 2 receivers on each circuit board. These receivers, as with others, are not field serviceable and can be exchanged when found to be defective.

Telemetry Interface Box(s) (TIB)

The Telemetry Interface Box contains the electronics needed to convert the method of communication of the telemetry signal from RS232 technology to TCP/IP technology. The firmware is programmed at the factory and is not changeable in the field with the exception of setting up the frequencies for the receiver modules. A computer with specific software is required to change receiver frequencies.

Strip Chart Recorder

The Strip Chart Recorder is a stand alone Thermal Array Printer manufactured by GSI Lumonics. It uses standard thermal strip paper.

Printer Interface Box (PIB)

The Printer Interface Box (PIB) contains the electronics needed to convert the method of communication of rhythm strip information from RS232 technology to TCP/IP technology. The firmware is programmed at the factory and is not programmable in the field.

Network Switch/HUB

The Network Switch/HUB is the device that allows communication between all of the components of the system. Each component is attached to the network switch through CAT5 cable connections.

Laser Printer

The Laser Printer is supplied to provide "hard copy" data concerning a patient's activity. It is a standard laser printer that uses TCP/IP communication technology to receive information regarding reports as processed by a workstation.

File Server Workstation

The File Server Workstation is the heart of the system consisting of a computer with a proprietary data base application that allows storage of patient information including session data. The File Server application that controls patient lists and schedules, and the Program Management and Monitoring application software as well as Outcomes software also reside on this computer. The Monitor used with the File Server Workstation can be a 17" or 19" SVGA color flat panel, which

may or may not be equipped with a touch screen.

Additional Workstation

The optional Additional Workstation consists of a computer with Outcomes, Program Management and Monitoring application software resident. The Monitor used with the Additional Workstation can be a 17" or 19" SVGA color flat panel, which may or may not be equipped with a touch screen.

Accessories

Battery, 9V, Alkaline (analog transmitters)
Battery, 1.5V AAA, Alkaline (digital transmitters)
Patient Lead Set, 2-wire Alligator Clip or Dot Snap (analog transmitters)
ANSI/AAMI DIN style shielded lead wire set (digital Transmitters)
Chart Paper, Recorder
Zip Disks (250MB)
Base Station Headset
Telemetry Antenna
Telephone Cables
Telemetry Cable
Receiver Power Supply, 9 Volt
Transtelephonic RS232 Cable
Transtelephonic Voice Cable

Software Provided

Windows® XP
TeleRehab™ 2004 Monitoring System Software
Outcomes Software.

INSTALLATION AND MAINTENANCE

Equipment

The TeleRehab™ 2004 Monitoring System consists of a combination of the previously listed components optimized to meet the needs of the customer. The number of telemetry channels will vary from 0 to 16 for each monitoring.

Site Requirements

The **TeleRehab™** 2004 Monitoring System is typically located at a nurse's station or at a cardiac rehab monitoring station. The monitoring system may rest on a table or a shelf at a height and position for easy viewing and operation of both the keyboard and touchscreen. Any components placed on the floor should be placed so they are not subject to inadvertent contact.

The 2004 Data Management System can be co-located with the monitoring terminal either on the same computer or as an additional workstation. An additional workstation can be located in an office or other location more convenient to operating personnel. Connection is made between the server workstation and the other components via CAT5 cables and a Network Switch/Hub.

All computers and laser printer are equipped with exhaust fans for cooling. The monitoring system should be installed allowing a minimum of two inches airspace at the rear, top and both sides of the computers, flat panel monitors and laser printer to allow for adequate ventilation and cooling. If the system is to be installed into a console, the console must be designed to provide for adequate ventilation and cooling.

115 Volt 60 Hz electrical outlets should be provided for each component.

Electrical Safety

Major components of the TeleRehab™ 2004 Monitoring System are equipped with approved 3-wire line cords and meet leakage current specifications for office type equipment, and the system as a whole has UL or ETL approval.

Electrical Safety testing should be in accordance with NFPA 99, and all interconnecting cables should be in place when testing is performed.

If electrical outlets controlled from a central switch are not provided and an outlet strip is used to power the various components of the system, it may be necessary to affix a redundant ground wire to the system or provide an isolation transformer.

Preparation for Installation

Before interconnecting the individual components of the system, an equipment configuration should be decided upon. The system components can be positioned in many different ways allowing for installation

in various space allocations. The toner cartridge should be installed in the laser printer in accordance with the manufacturers instructions.

CONNECTING THE TELEREHAB 2004 SYSTEM

Laser Printer

- Connect the Laser Printer network cable to the network switch/hub.

- Connect the Laser Printer Power Cord to the power connector on the rear of the Laser Printer, then to the Power Outlet.

Server/Workstation Computers

- Connect the Windows XP Server/Workstation power cord to the power connector at the rear of the unit, then to an acceptable power outlet. Install a CAT5 cable between the RJ45 port on the back of the Server/Workstation Computer and the network switch/hub.

- Plug the keyboard cable into the jack provided on the rear of the PC.

- Plug the mouse cable into the jack provided on the rear of the PC.

- Connect the Modem phone cable to the RJ11 connector on the back of the Server/Workstation computer and to the external RJ11 phone jack providing availability of an analog phone line to the computer for use with the pcAnywhere application.

Flat Panel Monitors

- Connect the Touchscreen Cable if present, to the serial port labeled "Touchscreen" at the rear of the Windows XP Server/Workstation.

- Connect the SVGA Cable to the DB15 Connector labeled "Monitor" at the rear of the Windows XP Server/Workstation.

- Connect the flat panel monitor power cord to the power connector at the rear of the flat panel monitor, then to the power outlet

- Connect the speaker cables between the Flat Panel Monitor and the audio output jack on the back of the File Server/Workstation Computer. (Note: Some monitors may not have built in speakers in which case separate speakers will be provided.)

Telemetry Receivers (Analog)

- Connect the Telemetry Cable between the DB9 connector at the rear of the telemetry receiver module and the DB9 connector at the rear of the Telemetry Interface Box (TIB). Plug the telemetry receiver module power cable into an acceptable power outlet. Connect the TIB box to the network switch/hub with the CAT5 cable. Attach the AC adapter to the TIB box and plug into an acceptable power outlet. If system has more than eight channels, and therefore requires a secondary TIB box, attach the TIB2 box to the TIB box using the supplied serial cable being sure to also attach the AC adapter to the TIB2 box and plugging it in to an acceptable power outlet.

- Connect the antenna wire attached to the telemetry antenna to the SO-239 jack provided at the rear of each receiver module. The antenna should be placed at least 12" away from the receiver box. Avoid coiling the antenna wires to cut down on the possibility of interference caused by magnetic fields.

Telemetry Receivers (Digital)

- Connect a CAT5 Cable from the RJ45 connector on the Receiver Box to the network switch/hub. Connect the Receiver Box Power Cable to an acceptable power outlet. The power supply required for the receiver is a Volgen, Model SPU15A-3, Listed ITE Power Supply.

Strip Chart Recorder

- Connect the serial cable between the DB9 connector on the Strip Chart Recorder and the DB9 Connector on the Printer Interface Box (PIB). Attach the AC adapter to the Strip Chart Recorder and plug into an acceptable power outlet.

- Connect a CAT5 Cable from the RJ45 Connector on the Printer Interface Box to the network switch/hub. Attach the AC adapter to the Printer Interface Box and plug into an acceptable power outlet.

Network Switch/Hub

- Plug the AC adapter into the back of the network switch/hub, and then plug the other end into an approved electrical outlet.

System Set Up and Calibration

- Turn each individual power switch to the on position. Upon power-up, the Windows XP

Server/Workstation will perform a self-test, while the laser printer will begin its warm-up period. If the systems self tests are satisfactory, the system software will automatically boot, and the desktop screen will be displayed (unless changed at initial installation). If the systems self tests are unsatisfactory, an error message will be displayed on the screen. Record the error message and try to correct the problem. Contact the Service Department for assistance if you are unsuccessful. Start the TeleRehab 2004 Program by double-clicking the 2004 Icon on the desktop. The 2004 Splash screen will be displayed as below.
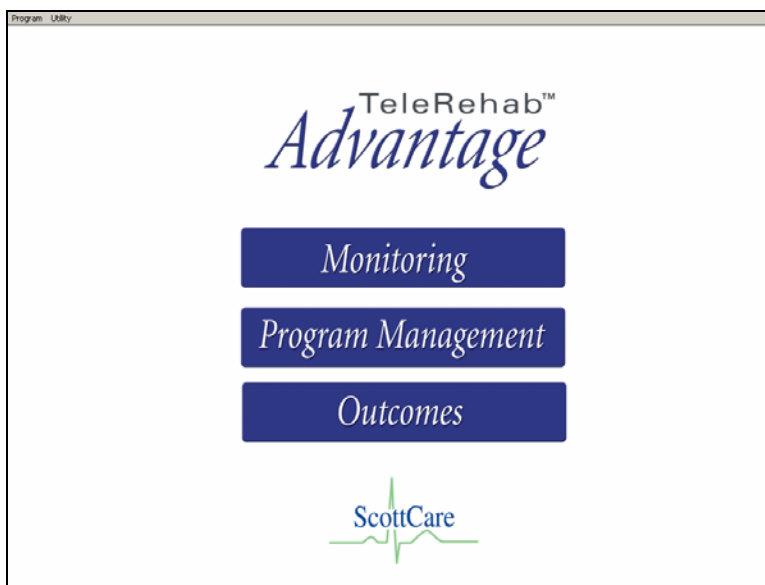
Calibration of the Touch Screen

- From the Server's desktop, double-touch the *Touchware* icon to start the calibration software. Follow the onscreen prompts to calibrate.

- Close the *Touchware* window when finished, then double-click the 2004 Server and 2004 software icons to restart the program.

- Verify that the various screens can be selected either by using the touchscreen, or through use of the keyboard function keys.

Set Time and Date

- The 2004 software will update its time and date information using the Microsoft Windows set date and time. Therefore, to change its time and date, first change that data in MS Windows.

System Hardware Configuration

System Configuration is pre-set at the factory and should not be changed without direction from the ScottCare Corporation. Call 1-800-243-9412 for assistance.

System Operation Check

Refer to the Operators Manual for the different functions, menu selections, and report data format. From the 2004 Splash Screen, click the Monitoring button. Install battery(s) in each telemetry transmitter and attach patient leads to an ECG simulator. Put a name (Scott Care, e.g.) on the screen for each channel and start the display. Activate the strip chart recorder to verify proper calibration and operation. Verify that the QRS is accurately detected, recorded and displayed in accordance with the applicable parts of AAMI/ANSI standard EC-13 and an acceptable QRS is displayed on the monitor.

For All Systems

- Using a patient simulator and either a telemetry unit or patient kit, set up and record a session with a minimum duration of 10 minutes. Be sure to go through each step and verify that the touchscreen, function keys, and software function properly. Verify that the high and low alarms operate, and that the heart rate displayed is within two beats of actual.

- Generate a full session report and verify that all of the various parameters are accurately reported.

- Using the pre-generated "Scott Care" data, generate monthly, 36 sessions, and compliance reports and verify that all of the various reports are properly produced.

Digital Telemetry Transmitter, Model DS2

The ScottCare DS2 telemetry transmitter is intended only as an adjunct to patient assessment. It cannot replace skilled nursing care and proper surveillance. Carefully read this operator's manual, all directions for use of the ScottCare 2004 cardiopulmonary monitoring system, and all precautionary information before attempting clinical use of the transmitter. Always keep high-risk patients under close surveillance. The information in this document is subject to change without notice.

Type CF Defibrillation Protected Equipment

Isolated patient connections comply with allowable leakage current limits for direct cardiac application and are protected against effects of defibrillation. Does not contain latex.

Exposure to Radio Frequency Radiation

The radiated output power of the internal wireless radio is far below the FCC radio frequency exposure limits.

OPERATION OF THE SCOTTCARE DS2 TRANSMITTER

Power Up

The ScottCare DS2 transmitter will activate upon placement of three 1.5V AAA alkaline batteries into battery compartment and turning the knob on battery cover to the **ON** position. Placement of batteries and turning the knob to **ON** automatically enables the telemetry receiver.
CAUTION: To avoid damage to transmitter, use only 1.5V AAA alkaline batteries.
To install batteries and activate transmitter:
1. Access battery compartment by turning the knob on battery cover counterclockwise until the cover can be removed.
2. Install batteries (noting correct polarity), install battery cover and turn the knob clockwise until snug (Do not over tighten).
3. Connect the patient cables to the transmitter by plugging the connection block into the receptacle in the top of the transmitter. Be sure to align the color-coded ports (See picture below).
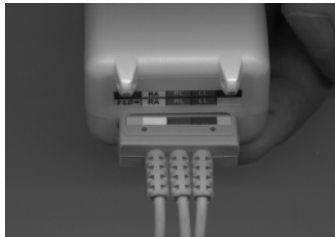
Patient Preparation

Proper skin prep and electrode placement is critical to ensure patient safety and accurate readings.

1. SCOTTCARE recommends that a commercially available prep medium such as "Omniprep" or "Nuprep" be used with the cardiac rehab patient. When adequately prepped, artifact is rarely a problem. (NOTE: Omniprep and Nuprep are registered trademarks of Weaver and Company, 565-C Nucla Way, Aurora, CO 80011).
2. Attach lead wires to electrodes before applying electrodes to patient.
3. Apply electrodes to skin, pressing firmly around entire edge of adhesive surface (refer to the illustration below for lead placement).
4. Ensure electrodes are placed in proper locations.

5. Confirm appropriate alarm status and limits exist for patient based on clinical assessment.
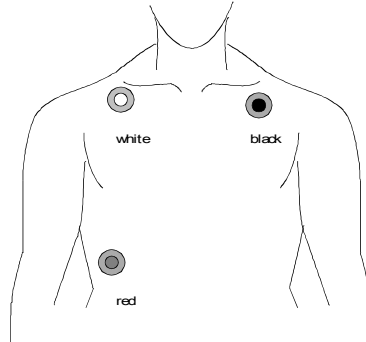
Power Down

Discontinuation of the ScottCare DS2 transmitter requires that all leads and cables be removed from patient. Scottcare DS2's power remains on while batteries are in battery compartment and the battery cover is in place. Remove batteries from the ScottCare DS2 for overnight storage or nonuse.

Caring for the ScottCare DS2

For cleaning, use only a lint-free, nonabrasive cloth, which has been slightly dampened with mild detergent, a glass cleaner, or a non-alcoholic based solvent.

Avoid harsh cleaning solutions such as isopropyl alcohol or other solvents that might harm plastic surfaces. Avoid anti-bacterial cleaning solutions, especially those containing Phenol. Do not spray liquids directly on the DS2.

Do not allow liquids to penetrate connectors or the DS2's case.

Troubleshooting

Excessive noise or artifact on display….Check skin prep. Check electrodes. Placement may be causing motion pick-up. Signal loss…. Electrode is lost or disconnected. ScottCare DS2 telemetry is not displayed at the monitoring terminal…. Replace batteries. Ensure battery cover switch is in the

"ON" position. Confirm the transmitter channel is the channel selected at the monitoring station.

Specifications

Physical
Size: 4.6 x 2.0 x 1.3 inches (HWD)
Weight: 3.7 oz less batteries, 5.0 oz with batteries

RF Characteristics
Transmission type: Digital
Frequency range: 608 – 614 MHz WMTS band
Frequency tolerance: Plus or minus 5 ppm
Output power: 5dbm

ECG
Leads transmitted: Lead II, V
Number of electrodes: 3 or 5
Leads transmitted simultaneously: 2
Input impedance (megohms): >20
Frequency response (Hz): 0.05 – 100
Pacer ID: Yes, 2mV to 700mV, 100usec. To 2msec.
Dynamic range: Plus or minus 5mV
DC Offset: Plus or minus 400mV
Common Mode Rejection Ratio: 80db @ 60Hz minimum
Defibrillation Recovery Time: within 8 seconds

Power
Battery type: 3-1.5V AAA, Alkaline
Battery life (days): Minimum 3 days with alkaline battery
Reverse battery protection: Yes
Low battery signal: Yes

Environmental
Temperature range: 10 – 40 degrees Celsius
Humidity range: 15% - 95% relative humidity

INSTALLING SOFTWARE UPDATES

Follow these procedures for all Scottcare 2004 updates. Note that there is only one Server/Workstation. This is the system that contains the 2004 Server software. All other units are referred to as workstations only.

You need to edit and print all current session reports and run the back-up utility.

If you have any problems, or otherwise need help with the installation, please call us at 1-800-243-9412 Option 2. We will be happy to assist you.

Note: To upgrade your SERVER computer, you need to do the following:

Step 1 To upgrade **Advantage Server Software**, ensure that no other programs are running at the bottom of the screen to the right of the windows START button. I.E. [ScottCare TCP/IP Ser…]

Step 2 Insert your upgrade CD-ROM into your system's CD tray. The software will AUTORUN and display the program screen shown in figure 1 on page 2.

Step 3 Click the **[1. Remove Advantage PM]** button on the program screen. Follow the onscreen prompts using all default options.

Step 4 When that removal is complete, click the **[2. Remove Advantage Server]** button on the program screen. Again, follow the onscreen prompts using all default options.

Step 5 When that removal is complete, click the **[3. Install Advantage PM]** button on the program screen. Follow the onscreen prompts using all default options.

Step 6 When that installation is complete, click the **[4. Install Advantage Server]** button on the program screen. Follow the onscreen prompts using all default options.

Step 7 When that installation is complete, click the **[Eject CD]** button, then the **[Exit]** button. Software upgrade is complete.

Note: To upgrade each of your WORKSTATION computers, you need to do the following:

Step 1   To upgrade **Advantage Program Software**, ensure that no other programs are running at the bottom of the screen to the right of the windows START button. I.E. [ScottCare TCP/IP Ser…]

Step 2   Insert your upgrade CD-ROM into your system's CD tray. The software will AUTORUN and display the program screen shown in figure 1 on page 2.

Step 3   Click the **[1. Remove Advantage PM]** button on the program screen. Follow the onscreen prompts using all default options.

Step 4   When that removal is complete, click the   **[3. Install Advantage PM]** button on the program screen. Follow the onscreen prompts using all default options.

Step 5   When that installation is complete, click the **[Eject CD]** button, then the **[Exit]** button. Software upgrade is complete.

Figure 1: ScottCare Software Installation/Upgrade Menu
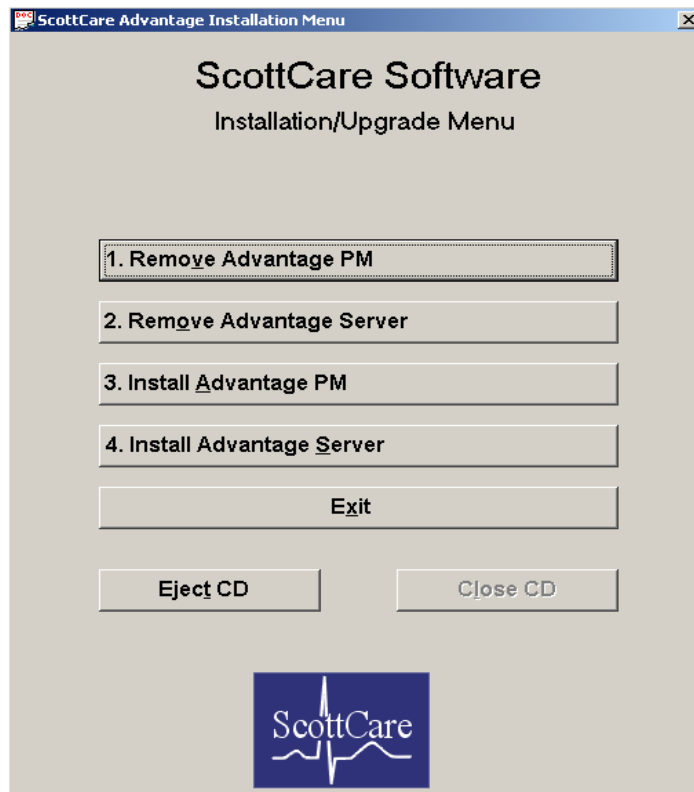
PREVENTIVE MAINTENANCE

To assure continued optimum function, system components should be serviced at least annually and kept clean as recommended below:

1. Visual Inspection

Examine the exterior of each of the components for cleanliness and general physical condition.

Examine all line cords and interconnecting cables to detect breaks in the insulation and to ensure that strain relief is adequate to prevent rotation or other strain.

Confirm the operation of all visual indicators and the integrity of the visual display on the monitor. Adjustment of the monitor should be accomplished in accordance with the manufacturers manual provided with the system.

2. Electrical Safety

Ground Resistance: Check the resistance between the male grounding pin and the chassis of each component of the system. Line cords whose grounding resistance exceeds 0.5 Ohms should be replaced.

Leakage Current: Leakage current for each component of the system shall be less than 500 micro amps.

3. Performance Testing

Functionally test the system to verify operation of all operating modes. Connect an ECG simulator to each telemetry transmitter and verify transmission of data and its display at the monitor. Check alarm function, heart rate accuracy, and both touchscreen and keyboard operation. Patient kits should be assembled and tested for proper operation before giving to a patient for use. Refer to the Operators Manual for the different functions, menu selections, and report data format.

4. Care and Cleaning

Outside panels and housings should be cleaned with a soft cloth moistened with a mild soap solution. Wipe dry with a clean cloth. Be sure system is off before cleaning the viewing area of the touchscreen monitor.

Vacuum air inlets, fan outlets and interior surfaces of the system to minimize the potential for damage caused by heat build up.

External surfaces of the telemetry transmitters should be cleaned as needed with a soft cloth moistened with a mild soapy solution. Ensure that batteries are removed before cleaning.

NOTE: Patient cable life can be decreased through the use of alcohol or other chemicals in the cleaning process. ScottCare recommends only the use of a mild soap solution for cleaning of patient cables.

Patient kits should be cleaned thoroughly after each patient has completed his/her program and returns the kit to the facility. Each component should be cleaned with a soft cloth moistened with a mild soapy solution. Remove the battery from the patient transmitter before cleaning. **IT IS RECOMMENDED THAT PATIENT HEADSETS (if so equipped) BE REPLACED WITH A NEW HEADSET FOR EACH PATIENT.** To purchase replacement headsets, order Part No. 103HS101A.

TROUBLESHOOTING

The **SCOTTCARE** philosophy for field service is to isolate the problem to a component. The defective

component is replaced with one known to function correctly. Some components are exchanged, and others are returned to the factory for repair while a loaned component allows system operation.

In all cases, 24-hour service assistance is available by calling the ScottCare factory at 1-800-243-9412.

System Operational Problems - Experience has shown that the vast majority of problems encountered with the TeleRehab™ 2004 system are related to system operation. In other words, the system operator has either done something that the system doesn't like, or has not done something that the system expects, and the system doesn't respond as expected. The best aid to troubleshooting a system operational problem is the operator manual. Assistance is also readily available by calling 1-800-243-9412 option 2.

Control of Artifact - Care must be taken to prevent artifact from interfering with the monitoring of the exercising patient. Some types of artifact can cause the system to react as though it were seeing arrhythmia, and other types cause the system to identify as erroneous, data generated when artifact is detected. In general, all artifacts can be controlled. There is always the patient who generates artifact no matter what you do; however, those are normally few and far between.

Several parameters can be involved in the production of artifact. Following are some causes and cures:

- *Preparation of the Patient* - The greatest cause of artifact is inadequate contact between the patient and the electrodes. This condition is evident when artifact disappears when the transmitter is attached to a patient simulator. Inadequate contact can be caused by using outdated pre-gelled electrodes where the conducting medium is dried out, or by inadequate preparation of the area where the electrode is to be placed. Alcohol is a commonly used means of patient prep. Although alcohol kills bacteria and cleans the area, it doesn't do much to reduce skin resistance. Roughing the area by rubbing with a terry cloth towel is often helpful.

  The ideal prep is usually done for stress test patients and is normally extensive in that the skin is severely stressed before application of electrodes.

  ScottCare recommends that a commercially available prep medium such as "Omniprep" or "Nuprep" be used with the cardiac rehab patient. When adequately prepped, artifact is rarely a problem. (NOTE: Omniprep and Nuprep are registered trademarks of Weaver and Company, 565-C Nucla Way, Aurora, CO 80011).

- *Electrode Position* - Often it is noted that electrodes are placed on the patient's chest area over the pectoral muscle and/or over the soft area under the rib cage. Artifact is then created when the patient exercises due to the movement of the muscle tissue under the skin. This type of artifact often manifests itself as a "wandering" base line.

  ScottCare recommends that electrodes be placed above the pectoral muscle just under the clavicle for the right arm and left arm leads, and on the lower rib area for the Left Leg lead.

This placement will not dramatically affect the QRS complex while eliminating motion artifact caused by muscle movement.

- *Cable Position* - Patient Cables are frequently run from the patient transmitter, under the shirt, to the electrode site. When the lead wires are against the skin, it is possible for artifact to be introduced due to the rubbing of the wire against the skin during exercise. This type of artifact often manifests itself as low to moderate level interference that may or may not interfere with the QRS complex.

  ScottCare recommends that wires be run in such a manner as to minimize contact between the skin and the patient lead wire.

- *Transmitter/Cable Motion* - Transmitters are provided with belt clips and can be worn on the belt line, placed in a shirt pocket, placed in a pouch, or worn wherever comfortable and well supported. Transmitters that are not well supported tend to swing around which can create motion artifact similar to that caused by muscle use.

  ScottCare recommends that transmitters be attached to the belt line off the hip to the rear in order to minimize jostling by the leg during exercise. If a pouch is used, it should be secured to the patient in a location least susceptible to jarring during exercise, generally in the top center area of the chest.

- *Out of Range or Low Battery* – The Analog transmitter range is approximately 100 feet depending upon the environment and what material is between the transmitter and receiver. The battery will remain effective until the loaded voltage drops to approximately 7 volts. If the patient is "out of range" or if the battery voltage drops below an acceptable level, the QRS signal will be diminished and over written by artifact.

  Normal battery life is approximately 60 hours. When artifact appears as though the transmitter is not connected, try changing the battery and patient lead in that order. Digital transmitters are equipped with the electronics necessary to monitor battery voltage. When the battery voltage is low (approximately 3.2 Volts), the words 'LOW BATTERY' will appear on the monitoring screen. If artifact persists, call **ScottCare** for assistance.

2004 TROUBLESHOOTING GUIDE

1. System does not come on (No CRT Display):

Does the File Server/Workstation computer appear to boot up?

If **NO**, then
- Verify that the File Server/Workstation is plugged in to an acceptable, functioning power source. If using a power strip, confirm that the power switch is in the 'on' position.
- Confirm that the power cable in use is not defective by exchanging it with one known to be functional.
- If the power source is found to be adequate, call ScottCare for assistance.

If **YES**, then
- Verify that the Flat Panel Monitor is plugged in to an acceptable, functioning power source. If using a power strip, confirm that the power switch is in the 'on' position.
- Confirm that the power cable in use is not defective by exchanging it with one known to be functional.
- Check the connections/cable between the Flat Panel Monitor and the video card connection on the back of the computer to confirm that the video signal is activated.
- Call ScottCare for assistance.

2. System boots up fine but fails to get to the windows desktop:

- Confirm that there is no floppy disk in the disk drive. If a disk is present in the drive, remove it and press the <Enter> key to resume operation.
- If the system starts in windows 'Safe' mode, restart the system and when the menu appears asking which mode to use in the start up, select '1 – Normal', and the system will boot to the windows desktop.
- Call ScottCare for assistance.

3. Touchscreen erratic or otherwise doesn't work correctly:

- The touchscreen may be out of calibration. From the desktop, run the *touchware* calibration utility. Follow the on screen prompts to recalibrate. Close the *touchware* window when finished and restart the 2004 software to restart the program and verify that the touchscreen works correctly.
- Confirm that the touchscreen cable is plugged into the DB9 connector on the back of the computer labeled 'touchscreen cable'.
- Call ScottCare for assistance.

4. System Locks up during Monitoring:

- If this is a multi station system, monitoring system lock up can be caused by a loss of network connection to the File Server/Workstation computer. Check all CAT5 connections to the network switch/hub, to the workstation where monitoring is being done, and to the File Server/Workstation computer.
- A static charge may have been introduced into the keyboard. Reboot the system. If this is

a chronic problem, an anti static pad can be placed under the keyboard to reduce the effects of static.
- Call ScottCare for assistance.

5. Unable to Start the 2004 Program:

- Confirm that the 2004 Server is running in the background. If not, activate the 2004 Server software from the desktop. When the menu appears, left click on 'Start'. The 2004 Server software must be running to start the 2004 application.
- If the 2004 program will not start on a workstation other than the File Server/Workstation, the network connection may be defective. Verify the connection of the CAT5 cables between the network switch/hub, the File Server/Workstation and the Workstation in question. Confirm that the network Switch/hub is functioning and that the green lights on the network switch/hub are illuminated for the corresponding ports.
- TCP/IP addresses may have been changed. Call ScottCare for assistance.

6. Monitoring Software Displays Correctly, but Traces will not Start:

Analog Transmitters:

- Ensure leads and batteries are properly installed in transmitters.
- Confirm that the receiver box is plugged in to a reliable power source.
- Confirm that the receiver box is attached to the Telemetry Interface Box (TIB) via the DB9 cable.
- Verify that the blue power light is on for the TIB and that the light on the rear of the TIB is flashing green-amber-red. If not, reset the TIB by unplugging the power connector from the TIB and reinserting it.
- Confirm that the TIB is connected to the network via the CAT5 cable between the TIB box and the network switch/hub, and that the green light on the network switch/hub is illuminated.
- Call ScottCare for assistance.

Digital Transmitters:

- Ensure that the transmitters are turned on.
- Confirm that batteries are in place and that patient lead sets are correctly installed.
- Confirm that the receiver box is plugged into a reliable power source and that the green power indicator is on.
- Confirm that the antenna is correctly connected to the back of the receiver module.
- Verify that the blue power lights are on for the two digital interface boxes, and that the lights on the back of each are green. Use the chart below to determine the status of the DTIB boxes.

The following is a description of the meaning of the blinking LED located on the rear of the DTIB boxes:

DTIB box	LED status	INDICATION
MDE	Blink red	No connection
MDE	Blink yellow	DTIB-MDE box communicating with MDE receiver box.
MDE	Blink green	DTIB-MDE box has successfully setup channel frequencies in the MDE receiver box.
ADV	Blink red	No connection
ADV	Blink yellow	DTIB-ADV box is successfully receiving data from the DTIB-MDE box OR the DTIB-ADV box is connected to the 2004 successfully.
ADV	Blink green	DTIB-ADV box is successfully receiving data from the DTIB-MDE box AND the DTIB-ADV box is connected to the 2004 successfully.

- Confirm that the DB9 cable is correctly installed between the DTIB-MDE and DTIB-ADV box.
- Verify that the CAT5 connecter is securely fastened between the DTIB-ADV and the network switch/hub, and that the green light on the network switch/hub is illuminated.
- Call ScottCare for assistance.

7. TCP/IP ERROR-Receiver module not responding (Loss of remote data):

- This message is displayed when the network connection between the TIB and the network switch/hub is broken. Reestablish the connection by locating and resolving the disconnect. Restart the monitoring function to continue. If the above fails, power down the switch, wait for 20 seconds and power up.

8. "Check Leads" message appears on a monitoring channel (Digital only):

- Ensure that lead wires are securely pushed into the transmitter, and that the patient electrodes are securely fastened to the patient in a medically accepted lead alignment including proper placement of the ground lead.

9. "Check Battery" message appears on a monitoring channel (Digital only):

- Normally, this message will appear when the battery voltage is low. Replace the batteries in the transmitter.
- Confirm that the power knob on the transmitter is on tightly.
- Confirm that the selected channel on the screen corresponds to the number of the

transmitter being used by the patient

10. Strip Chart Recorder will not print a strip:

- Ensure that the strip chart printer is turned on.
- Verify that the Printer Interface Box (PIB) power cable is plugged in and the blue power light is on. The amber light on the back of the PIB should be flashing to indicate connection to the strip chart recorder.
- Verify that the DB9 cable is securely fashioned to both the PIB and the back of the strip chart recorder.
- Verify that the CAT5 cable is securely connected to both the PIB box and the network switch/hub, and that the green light on the network switch/hub is illuminated.
- Reset the PIB box by unplugging the power cable from the back of the unit. Wait ten seconds, and then re-attach the cable. A message indicating that the strip chart recorder is ready should be printed by the strip chart recorder.
- Reset the strip chart printer by turning the unit off and on by way of the power switch on the rear of the unit.
- Contact ScottCare for assistance.

11. Unable to print to the ScottCare network laser printer:

- Ensure that the printer's power cable is plugged in and that the power switch is in the 'on' position.
- Ensure that the CAT5 cable is securely fastened to the port on the rear of the printer and to the network switch/hub.
- Verify that the printer selected as the default printer within the windows printer setup area is the printer in use.
- Contact ScottCare for assistance.

12. Unable to back up files to the zip drive:

- Ensure that a correctly formatted zip disk is correctly loaded into the zip drive.
- Verify that the correct drive designation appears in the 'Backup Drive' block in the backup utility.
- Restart the computer to assure establishment of communication with the zip drive.
- Contact ScottCare for assistance.

2004 SPECIFICATIONS

Monitoring/Server Workstation

MODEL	TELEREHAB 2004
Type:	IBM Compatible
Environment:	See Manufacturer's Manual
Dimensions:	Approx. 7"Wx16"Dx14"H
Power:	120 V AC, 60Hz, 200 W Max.
Memory:	1024 Meg Min.
Disk Drives:	1 - 1.44 MB - 3.25: Floppy Drive
	1 - 40 Gb (Min.) Fixed Disk
	1 – Zip 250 Disk Drive
	1 – 52X (Min) CD ROM
I/O:	1 - RS232 Serial Ports
	1 - Parallel Printer Port
	1 – LAN Port
	2 – USB Ports
	On Board Audio & Video
Display Output:	Super VGA Compatible Color
Keyboard:	102 Key, ATX Style
Telemetry Input:	8-1.1 KHz ECG Sub carrier Signals via TCP/IP
Controls:	Power Switch
	Reset

Flat Panel Monitor

Type:	Super VGA Compatible Color
Environment:	See Manufacturer's Manual
Dimensions:	Approx. 21.2"Wx10.6"Dx20.4"H
Power:	120 V AC, 60Hz, 95 W Max.
Screen Size:	17" Diagonally
Colors:	Super VGA 256 Color Mode
Resolution:	1,024 x 768
Modifications:	Touchscreen
	Connector labels added
Controls:	Power Switch
	Brightness
	Contrast
	See Manufacturer's Manual for
	Others
Standards:	UL & FCC

Flat Panel Touchscreen

Type:	Capacitive Overlay - Position Screening
Power:	Internal
Resolution:	256 H x 256 V

Strip Chart Recorder

Type:	Thermal Array Recorder - Printer
Mounting:	Stand Alone case
Paper:	50mm Thermal, wound sensitive Side-in
Print Width:	48mm
Chart Speed:	20mm/hr. to 50mm/sec. (25mm/sec. In Base Unit)
Resolution:	200 dots/in. (8 dots/mm) Y-axis 800 dots/in (32 dots/mm) Time-axis
Standards:	AAMI Diagnostic Electrocardiographic Device UL 2601-1 CSA C22.2
European Union:	93/42/EEC

Network Printer

Type:	Laser Jet ® Compatible
Environment:	See Manufacturer's Manual
Size:	See Manufacturer's Manual
Power:	120 V AC, 60 Hz, and 7.8A
Paper:	8.5" x 11" Electrostatic Copier or Equivalent Paper
Resolution:	600 dots per inch
Connection:	TCP/IP
Controls:	Power Switch On/Off Line Reset See Manufacturer's Manual for Others
Standards:	UL FCC

IECS 003 (Canadian)
NYCE

Data Storage

Session ECG
Recording: 2 GB min. available on fixed drive
128-bytes/sec avg. storage rate
Includes session parameters recording
Selected data retained on fixed drive
Patient Data Storage: 36 GB minimum available on
fixed drive
System Storage: 2 GB minimum available on
fixed drive

Transmitter (Digital)

PHYSICAL

Weight (oz):   4 oz less batteries
Size (in) approx: 4.1 x 2.0 x 1.2

RF

Frequency Range: 608-614MHz (US and Canada)
Transmission: Digital
Output Power: 5 dBM
Channel Spacing: 12.5KHz
Programmable Frequency: Yes

ECG

Leads Transmitted: Lead II, V
Number of Electrodes: 3 or 5
Leads transmitted
Simultaneously: 2
Input Impedance, Megohms: 20
Frequency response (Hz): 0.05-100
Pacer I.D.:   Yes, 2mV to 700mV, 100usec. To 2msec.
Dynamic Range: Plus or minus 5mV
DC Offset: Plus or minus 400mV
Common Mode:

Rejection Ratio: 80dB @ 60Hz minimum
Defibrillation Recovery: Within 8 seconds
Lead wires: Removable DIN (AAMI/AANSI Standard)

POWER

Battery Type: 3 AAA, alkaline
Reverse Battery Protection: Yes
Low-Battery Signal: Yes
ON/OFF switch: Yes

MISCELLANEOUS

Waterproof: Yes, sealed design
Cleaning: Dampened mild detergent, a glass cleaner, or a non-alcoholic based solvent. Avoid anti-bacterial cleaning solutions, especially Phenol based cleaners

Receiver Base Technical Information (Digital)

Type: 8 Channel
Manufacturer: ScottCare
Model: TR600-2
Size: Approx. 10"Wx6"Dx4"H
Required Power Supply: Volgen, Model SPU15A-3, Listed ITE Power Supply
Input: 50-Ohm RF Antenna, 600MHZ Band
Controls: None

Telemetry Band

INTERFACE

FCC WMTS (608-614 MHz)
Central: Standard 10Base-T ethernet.
Maximum distance: 285 feet
Telemetry Interface: Standard "F" connector
AutoNet (WLAN)Interface: Standard SMA

DIAGNOSTICS

Green Indicator for good AutoNet (WLAN) communication
Green Indicator for each telemetry channel
Diagnostic Service panel for performance monitoring and setup assistance

ENVIRONMENTAL

Temperature: 10 to 40° C
 Relative Humidity: 10 to 90 %

ECG Telemetry Transmitter (Analog)

Type: Battery Operated Telemetry
                 Transmitter
Size: 2.75"Lx5"Dx1"H
Power: 9V DC, 0.9mA max.
Power Source: 9V Li, Alkaline, or carbon zinc
                 Battery
Input: 2 or 3 wire ECG, 4mVP-P
Output: FM 176-216 MHz Band
Controls: Calibration Check Button
Battery Life: 60 hours

ECG Channel Related (Analog)

ECG Signal Bandwidth: 0.05Hz - 40Hz ± 3db
ECG Voltage Range: 4mVP-P
Calibration Pulse: 1mV
CMRR: 80db min.
ECG Recording Sampling:
                 120 Samples/sec recording
                 Peak Capture @ 240 samples/sec
                 8 bits/sample; Resolution=0.016mV
ECG Rate Detection: 30-240 beats/minute
Rate Detection Method: Slope change interval
                             Identification
Rate Detection Sensitivity: 0.25mV/0.125mV QRS

Telemetry Receiver Unit (Analog)

Type: 8 Channel, VHF
Manufacturer: ScottCare
Model: TR403
Size: Approx. 10"Wx6"Dx4"H
Power: 9V DC, 0.3A max.
Power Supply: 120V AC to 9V DC UL Listed Plug-
                      In Converter
Input: 50-Ohm RF Antenna, 176-216 MHz
                      Band
Output: 8-1.1KHz FM Sub carrier ECG
                      Signals via 9 pin D Connector
Controls: None

Telemetry Antenna

Type: VHF Base mounted Y wave whip
Size: 15"H, Base 3"Wx4"Dx1"H
Cable: 10' RG-58
Connector: PL-259

Mounting

Tabletop or Wall-Mount (bracket included)

FDA Approvals/Certifications

K012336
K970763
K895719
UL 1950
CSA IEC 950

Typical TCP/IP Addresses Used for TeleRehab 2004 Components:

Server Workstation	**192.254.0.191**
Workstation #1	**192.254.0.190**
Workstation #2	**192.254.0.189**
Network Laser Printer	**192.254.0.192**
Printer Interface Box #1	**192.254.0.99**
Printer Interface Box#2	**192.254.0.98**
DTIB-ADV (Ch. 1-16)	**192.254.0.100**
DTIB-ADV (Ch. 17-32)	**192.254.0.101**
Receiver Module	**192.254.0.149**