



# VITALOGIK

## Configured Patient Monitor SERVICE MANUAL



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**0473**

Conformity according to the Council Directive 93/42/EEC  
concerning Medical Devices

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# CHAPTER 1 - SYSTEM DESCRIPTION

## 1.1 Overview

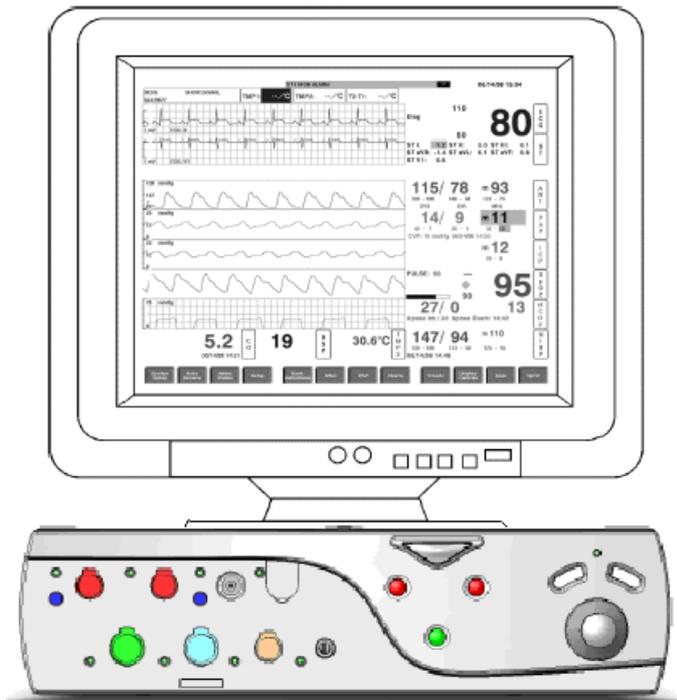
The *VitaLogik* bedside monitor is a standalone bedside unit consisting of a main processing unit and a mountable color monitor.

The *VitaLogik* monitors the patient's vital signs.

The vital sign data derived by the *VitaLogik* is presented on the monitor as waveform and numeric displays.

The *VitaLogik*'s user interface is especially designed for user-friendly operation. The fixed buttons and unique QuicKnob control on the front panel of the main processing unit enables quick and direct access to system parameters and functions.

An optional Touch Screen is available for control of the *VitaLogik* setting and menus without the hardware keys and QuicKnob.



*Figure 1-1: The VitaLogik Bedside Monitor*

## 1.2 System Features and Capabilities

The *VitaLogik* displays a wide range of vital sign clinical parameters. It includes:

- ECG/Respiration multi-lead for monitoring ECG and respiration.
- Dual BP inputs for monitoring two invasive blood pressures.
- CO/2TMP connector to measure either thermodilution Cardiac Output or two temperatures.
- Temp connector.
- NIBP input for monitoring non-invasive blood pressure using the oscillometric method.
- Pulse Oximetry.
- Microstream End Tidal CO<sub>2</sub> (EtCO<sub>2</sub>) for monitoring CO<sub>2</sub> during exhalation (EtCO<sub>2</sub>) and inhalation (inCO<sub>2</sub>) and Respiration Rate.
- Serial Input for communication and interface with an external, auxiliary device.

Vitalogik is supplied in four customized configurations which are combinations of:

- Invasive / non-invasive BP/CO
- Nellcor / Masimo SPO<sub>2</sub>

In addition an optional EtCO<sub>2</sub> Microstream option can be added.

The *VitaLogik*'s main monitoring features include:

- Continuously updated vital sign parameter data displayed as numeric values and continuous waveforms.
- Clinical and technical alarm detection as well as alarm notification in audio and visual formats.
- Easy access to collected data in the form of tabular charts and graphical trends as well as various types of clinical reports.
- Patient data output to a recorder or a printer, if connected.

You can interact with the *VitaLogik*:

- Using interactive panels

These panels include menus and dialog panels that enable you to configure system and monitoring parameters.

- Responding to Events

Fixed keys on the front panel of the main processing unit enable you to respond quickly to events such as alarms.

- Reviewing Clinical Data

Charts, Trends, Full Disclosure and Overview enable you to view and compare data in different formats and over selected time periods.

## 1.2.1 Monitor and Main Processing Unit

The *VitaLogik* can display up to eight traces, depending on how the vital sign display is configured. For monitor control procedures, refer to the User's Manual.

All clinical data collected from the inputs is stored in the main processing unit. This data includes waveforms, vital signs, trends, charts and beat-to-beat data.

The main processing unit can store at least 36 hours of patient data for review purposes. The front panel of the main processing unit contains 5 fixed keys and the Quicknob. These features enable you to interact with the system. The back panel contains connectors to connect the main processing unit to other components in the system (the display monitor and the network) and to the power supply.

A remote keypad provides direct access, via the orange keys, to the menus of Vital signs, Patient data, and Setup, via the green keys, to Event, Print, Record, and Freeze and by the yellow key to Timer.

This allows the user to reach these functions without opening the Main menu.

### ***Display Features***

The main screen display is divided into four areas:

- Global Header Area
- Patient Area
- Patient Display Area
- QuicKeys

## 1.2.2 Inputs

The Vital Signs inputs are housed on the front panel. They include:

- 12 Lead ECG/RSP
- Dual BP
- CO/2TMP
- Temp
- NIBP
- SpO2
- EtCO2 MicroStream

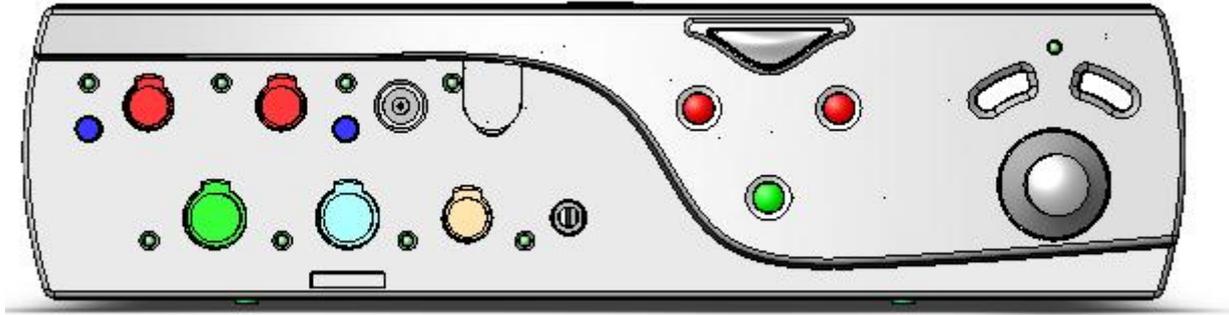


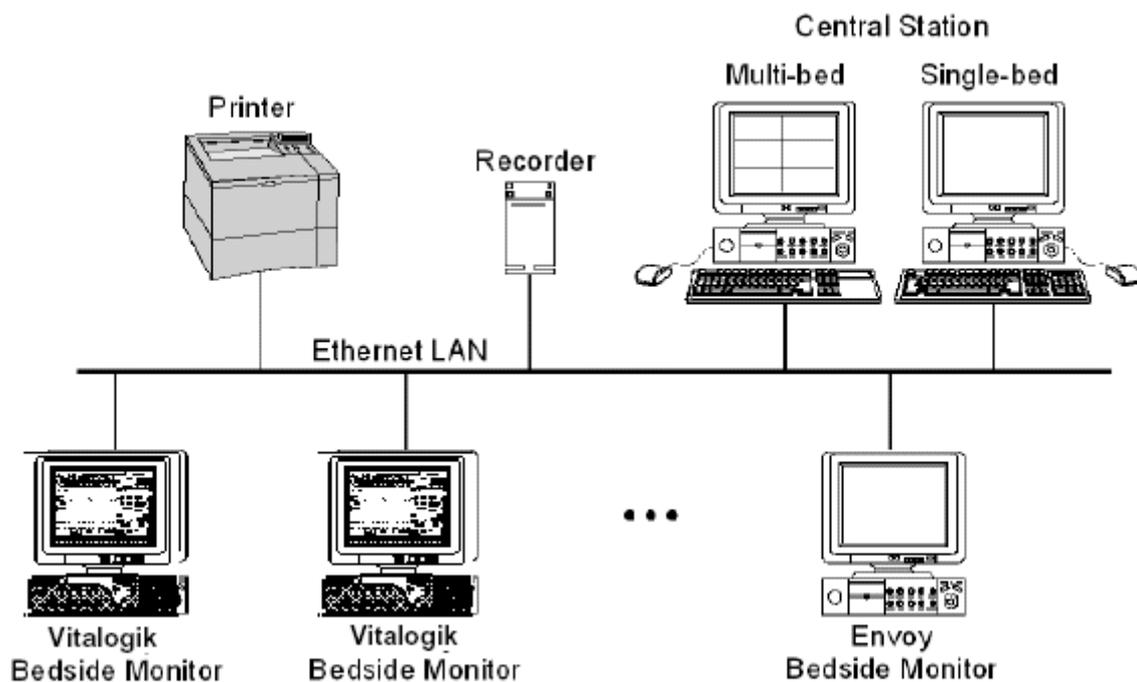
Figure 1-2: The VitaLogik Front Panel Inputs Connectors



Figure 1-3: The VitaLogik Remote Keypad

### 1.3 System Configuration Setup (Basic)

The system configuration setup consists of a Central Nurse Station (“Ensemble”) connected through an Ethernet-LAN hub to the VitaLogik bedside monitors, local recorder and central recorder. The VitaLogik bedside monitors and recorders are hard-wired and remain stationary.



*Figure 1-4: System Basic Setup (with recorder)*

## 1.4 System Specifications

### **General**

- Configured monitor
- CPU with user controls
- Class II Equipment (Enclosure Grounded)  
Ordinary equipment continuous operation  
Applied Part Type BF for: NIBP, SpO<sub>2</sub>, EtCO<sub>2</sub>
  - Defibrillation-proofApplied Part Type CF for: ECG, BP, CO<sub>2</sub> Temp
  - Defibrillation-proof

### **CPU Details**

- Intel X86 family main CPU
- Sound Blaster, 4W audio power
- 128 MB RAM (subject to change/upgrade)
- Mass storage: 40GB fixed disk, optional expansion available
- Operating system: QNX
- Window manager: Photon

### **User Controls**

- Fixed Keys
- QuicKnob™
- Remote keypad

### **Unit Dimensions (not including display)**

- Height: 9.0 cm/3.625 in
- Width: 33.0 cm/13.0 in
- Depth: 37.0 cm/14.5 in
- Weight: 8 kg/17.6 lb

### **Power Requirements**

- 90-230 VAC, 50/60 Hz

### **Network**

- Physical: IEEE 802.3 Ethernet interface with Category 5, 10BaseT and 100BaseT twisted pair media. Other media available.
- Protocol: TCP/IP

**Color Display**

- Size: 15", 17" LCD display.
- Traces: 1 to 8, depending on parameter-specific setup choices
- Resolution: 1024 x 768

**12 lead ECG/RSP**

- LED for function indication

**ECG**

- Sampling Rate and Resolution
    - 640Hz sampling rate
    - 22 bit resolution
  - Frequency Response
    - 0.05 to 150 Hz
    - 0.5 to 40 Hz
    - 1.0 to 25 Hz
  - QRS Detection Range
    - 0.25 to 5.0 millivolt height
    - 70 to 120 milliseconds width
  - Heart Rate Counting
    - 20 to 350 BPM
    - Accuracy:  $\pm 2$  BPM
- Note: Values below 20 are forced to zero.*
- Heart Rate Alarm Settings
    - High and low rate: 20 - 350 BPM non-overlapping

- Leads analyzed for:
  - Heart Rate and Arrhythmia Configuration
- Top two displayed
- Fixed:
  - I, II, III, aVR, aVL, aVF, V (5 Lead cable)
  - I, II, III, aVR, aVL, aVF, Va, Vb (6 Lead cable); V1-V6 (12 Lead cable)
  - Common Mode Rejection
  - 120 dB, minimum
  - Lead Fault Detection: based on impedance
  - Pacemaker Detection and Rejection
- Amplitude: 2 mV to 700 mV
- Width: 0.1 ms to 2.0 ms
- Pacemaker flag inserted into displayed waveform
- ST Measurements
  - All leads
  - ST Range: -0.9 to +0.9 mVolt
  - ST Alarm Limits : -0.6 to +0.6 mVolt
- Data Storage:
  - Beat notification
  - RR Interval
  - Heart Rate
  - ST values
  - Arrhythmia
  - Alarms

**Respiration**

- Lead Selection
  - RA-LA or RA-LL
- Respiration Sensitivity Range
  - 0.2 oHm to 5.0 oHm
- Impedance Range
  - 100 to 3,000 oHm @ 65kHz
- Respiration Rate Counting Range
  - 8 to 150 BPM
- Respiration Frequency Response
  - 0.13 to 2.5 Hz (-3 dB)
  - Sampling rate: 640 Hz
- Respiration Alarm Settings
  - Low rate: 0 - 150 BPM
  - High rate: 8 - 150 BPM
  - Apnea: User configurable 10-90 seconds duration and reset
  - Cardiac coincidence alarm
- Data Storage:
  - Respiration rate
  - Respiration rate Alarms
  - Apnea alarms

**Blood Pressure**

- LED for function indication.
- Site Labels:
  - BPX, ART, PAP, CVP, RAP, LAP, ICP
- Input Sensitivity
  - 5 microVolt/Volt/mmHg
- Dynamic Range
  - Pressure range: -50 to +350 mmHg
  - Zero range:  $\pm 150$  mmHg
  - Total dynamic range: -200 to +450 mmHg

- Transducer Excitation Voltage
  - +7.5 VDC
  - Separate excitation driver for each channel
- Zero Accuracy
  - $\pm 0.2$  mmHg
- Zero Drift
  - Less than  $\pm 0.2$  mmHg in 24 hours (at constant temperature)
- Blood Pressure Accuracy
  - $\pm 2$  mmHg or  $\pm 2\%$ , whichever is greater, exclusive of transducer
- Blood Pressure Linearity
  - within 1% across entire range
- Waveform Frequency Response
  - 0 - 15 Hz
- Sampling Rate
  - 320 Hz
- Fault Detection
  - Shorted transducer
  - Transducer in/out
  - Cable out
- **Data Storage:**
  - Systolic, Diastolic and Mean
  - Alarms

## Temperature

- YSI 400
  - Blood temperature: 0 degrees C to 45 C
  - Injectate temperature: 0 degrees C to 45 C
  - Body temperature: 0 degrees C to 45 C
- Temperature Alarm range : 25 degrees C to 45 C

**Cardiac Output and Temperature**

- Adapter and Compatibility Cables
  - COSet™ Interface cable
  - Ice Bath Cardiac Output interface cable
  - Dual temperature interface cable (ysi-400)
- Temperature Ranges
  - Blood temperature: 0 degrees C to 45 C
  - Injectate temperature: 0 degrees C to 45 C
  - Body temperature: 0 degrees C to 45 C
- Accuracy
  - Blood temperature:  $\pm 0.1^{\circ}\text{C}$
  - Injectate temperature:  $\pm 0.1^{\circ}\text{C}$
- Excitation
  - $10\mu\text{A}$ , maximum
- Cardiac Output Determination Range
  - 0 to 20 liters per minute
- Injectate Volumes
  - 1, 3, 5, and 10cc
- Computation Constants
  - Table built as new values are used
- Displayed Data
  - Cardiac Output, Cardiac Index, Stroke Volume, Stroke Volume Index, Blood Temperature, Injectate Temperature, Trial Number

- **Data Storage:**
    - In Cardiac Output mode:
      - Cardiac Output
      - Hemodynamic Calculation results
      - Measuring time
    - -In Two Temp mode:
      - Temperatures and Delta-Temp
      - Temperature Alarms
- Non-Invasive Blood Pressure***
- LED for function indication
  - Oscillometric Method
  - Displayed Parameters
    - Systolic, Diastolic, Mean pressure values
    - Time of last measurement, Next measurement time
  - Cuff Size
    - Adult, Pediatric, Infant, Neonatal
  - Inflation Time - Depends on cuff type and inflation pressure
    - Adult - typical within 20 sec.
    - Neonatal - typical within 5 sec.
    - initial inflation target: 150 mmHg, Adult/Pediatric
    - initial inflation target: 120 mmHg, Neonatal
  - Cuff Pressure Limits - Adult/Pediatric
  - Software Over Pressure Limits
    - Adult: 290 mmHg
    - Neonate: 145 mmHg
  - Redundant Hardware Over Pressure Limits
    - Adult: 300 to 330 mmHg
    - Neonate: 150 to 165 mmHg

- Measurement Time (Excluding cuff pressurization time)
    - 25 seconds typical; 120/80 @75 BPM Adult
    - 20 seconds typical; 120/80 @75 BPM Adult STAT mode
    - 20 seconds typical; 60/30 @160 BPM Neonate
  - BP time-out: 60 - 180 sec.
  - Measurement Ranges (in mmHg) Adult/Pediatric
    - Systolic: 30-255
    - Diastolic: 15-220
    - Mean: 20-235
  - Measurement Ranges (in mmHg) Neonatal
    - Systolic: 30-135
    - Diastolic: 15-110
    - Mean: 20-125
  - Modes: Adult, Auto, Manual, STAT, Neonatal
  - Pressure (Transducer) Accuracy
    - $\pm 3$  mmHg or  $\pm 2\%$ , whichever is greater
  - **Data Storage:**
    - Systolic, Diastolic, Mean pressures
    - Measuring time
    - Alarms
- Pulse Oximetry (SpO<sub>2</sub>)**
- Masimo Technology
  - Saturation Range (Functional)
    - 50% to 100% SpO<sub>2</sub>
  - SpO<sub>2</sub> Accuracy
    - % SpO<sub>2</sub>  $\pm 1$  standard deviation
  - Pulse Rate Range
    - 20 to 250 BPM  $\pm 3$  BPM

***End Tidal CO<sub>2</sub>  
Microstream  
(EtCO<sub>2</sub>) (Option)***

- Saturation alarm limits: 50% to 100%
- **Data Storage:**
  - Heart rate and O<sub>2</sub> saturation
  - Alarms
- LED for function indication
- Air outlet for sidestream monitoring
- Displayed Data
  - Waveform labels and annotations
  - EtCO<sub>2</sub>, in CO<sub>2</sub> and respiration rate values
- CO<sub>2</sub> Display Range: 0-100 mmHg
- Measurement Resolution; Typical Accuracy:
  - ±2 mmHg for CO<sub>2</sub> range of 0-38 mmHg
  - ±5% for CO<sub>2</sub> range of 39-99 mmHg + 0.08% for every 1 mmHg above 38 mmHg
- Respiration Rate
  - 0 - 70 bpm +/- 1 bpm
  - 71 - 120 bpm +/- 2 bpm
  - 121 - 150 bpm +/- 3 bpm
- Rise Time 190 msec (10% - 90%)
- Delay Time 2.7 Sec (10% - 90%) typical.
- CO<sub>2</sub> Alarm Limits: 0 to 100 mmHg/0 - 10%/0-15 kPA
- Accuracy:
  - for % measurement: 0.1%
  - for mmHg measurement: 1mm

- Respiration Rate Alarm Limits:
  - Neonatal: 0 to 150 BMP
  - Adult: 0-50 BPM
- Sidestream Flow Rate: 130 ml/min nominal
- Start-up Time:
  - 30 sec. typical
- Automatic Compensation: At least once per hour
- Ambient Temperature:
  - 0-65° C Sidestream
  - 10-40° C Mainstream
- Humidity: 10-95% RH, non-condensing
- Barometric Pressure: 430-795 Hg (-1250 to 15,000 ft.)
- **Data Storage:**
  - EtCO<sub>2</sub>, in CO<sub>2</sub> and Respiration Rate values
  - Alarms
  - Apnea Alarm



# CHAPTER 2 - HARDWARE SYSTEM DESCRIPTION

Chapter 2 includes the following sections:

- “Vitalogik Overview” on page 2-1
- “Front End Board Inputs” on page 2-5
  - “ECG / RSP” on page 2-6
  - “2BP / CO” on page 2-7
  - “Temp” on page 2-8
  - “NIBP” on page 2-9
  - “SPO2 (Nellcor)” on page 2-12
  - “SPO2 (Masimo)” on page 2-12
  - “Micrestream” on page 2-13

## ***2.1 Vitalogik Overview***

Vitalogik consists of the following hardware components:

- CPU card
- BIOS Setup Flash Memory
- Sound card
- Main storage unit (hard disk)
- Main power supply unit
- Front Panel board (MCU - Mennen Control Unit)
- FE (Front End) board
- Speaker
- Fans

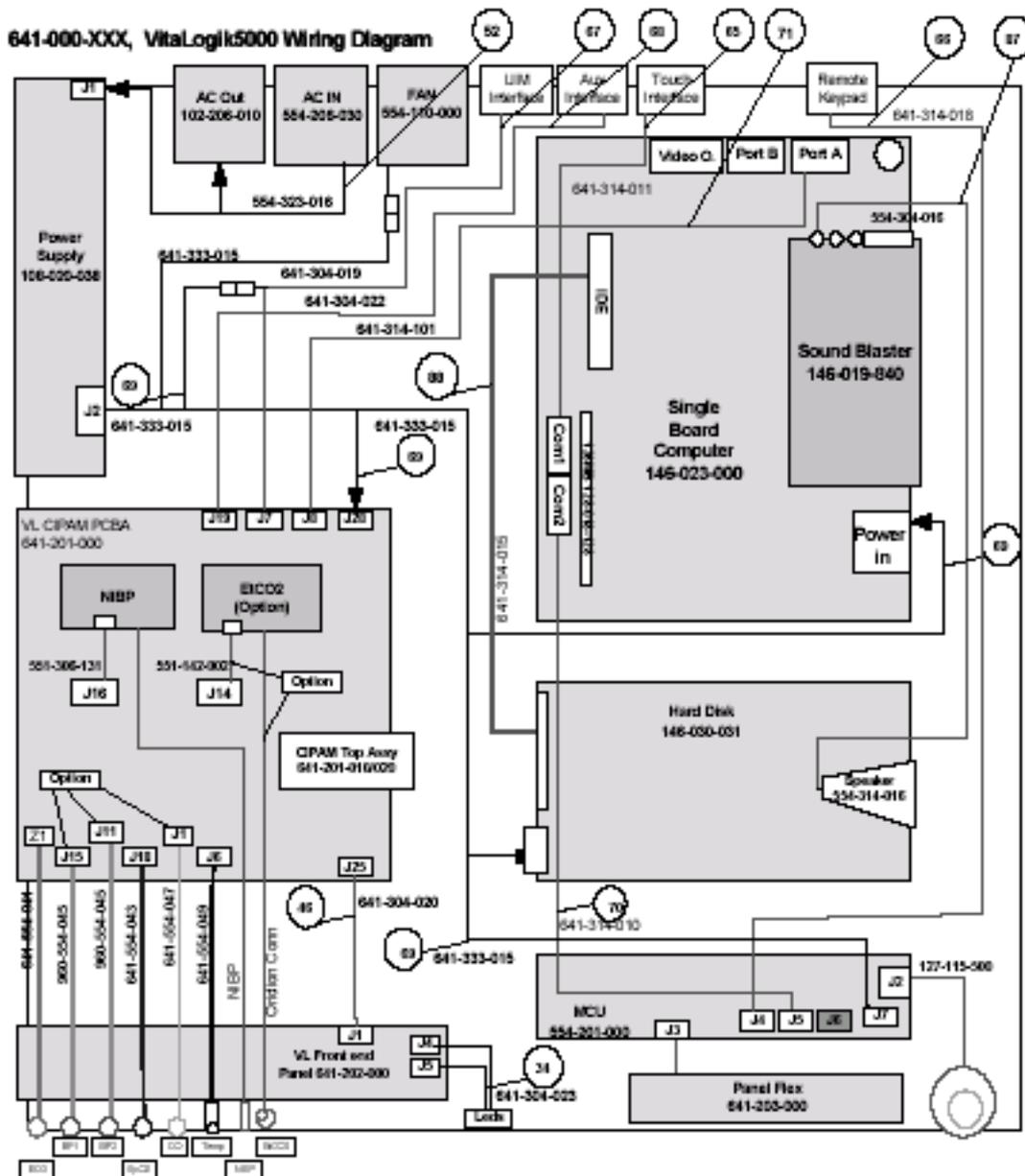


Figure 2-5: Vitalogik Block Diagram

### 2.1.1 CPU Card

The CPU card consists of a Celeron 733 or higher and 128 MB DRAM or higher. The CPU handles all the communications and processing data with the other components.

The CPU card includes also the following:

- A video adapter output through standard connector.

- 2 LAN adapter interfaces through standard RJ-45 connector: one for communicating with external devices (i.e. Central Station, Enguard, Recorder etc.), the second is for internal communication with the Data Acquisition (CIPAM /BEP) board for parameter inputs.
- Hard disk interface
- Communications ports COM 1 and COM 2
- PC/104 bus for connection to the sound card and communication card.

## 2.1.2 BIOS Setup Flash Memory

The BIOS setup flash memory provides the CPU card the necessary parameters needed for initialing the Vitalogik after turning on or reset.

The Vitalogik is supplied setup for working with the Mennen Application. If any problem arises you can setup the BIOS and select Mennen BIOS defaults. For details, see section *BIOS Setup* in *Chapter 6 – Maintenance*.

## 2.1.3 Sound Card

The sound card provides an interface between the CPU card and the speaker. It converts digital output to audio signals.

The sound card is an OEM board, for more information, see manufacturer documentation.

## 2.1.4 Main Storage

The main storage consists of a hard disk 1.4 GB or higher which stores the QNX operation system with PHOTON window manager and the Vitalogik system application software.

The MPU stores all of a patient's clinical data (vital signs and waveforms) on the hard disk. These files are retrieved when the user enters the data review panels.

- The MPU also saves configuration items and user preferences on the hard disk. A library of saved configuration sets is also maintained on the MPU's hard disk.

## 2.1.5 Main Power Supply

The main power supply supplies to all other components through the power distribution block (J59/J60) the following DC voltages:

- Output 1: + 5V  $\pm$  0.5%. Current 12.0A
- Output 2: +12V  $\pm$  3.0%. Current 3.0A (5.0A pk)
- Output 3: +12V(ISO)  $\pm$  3.0%. Current 3.0A (5.0A pk)

- Output 4: - 12V  $\pm$  3.0%. Current 3.0A
- Output 5: - 5V  $\pm$  1.0%. Current 0.6A

The output power is 110W max.

*Note: Note: Outputs 2 & 3 have the same voltage and regulation, when they are connected in parallel, output currents are added to give 6.0A .*

The power supply meets UL544 or UL2601 medical standards for patient connection specifications.

The AC input voltage is 90-230 VAC. This input is connected directly to the power supply and to the AC output for local LCD display.

*Note: There is no field adjustment or repair. In case of malfunction, replace with a new power supply supplied by Mennen Medical.*

## 2.1.6 Front Panel

### **MCU (Mennen Control Unit) and RS-232 Splitter**

The MCU and RS-232 Splitter provides an interface between the user console and the CPU card, and also connects three RS-232 channels to the RS-232 (COM2) of the CPU card.

### **Local Keypad and QuickKnob**

The local keypad includes 12 fixed keys. Each key has a specific function (for details see Chapter 1). The keypad and the QuickKnob enable the user to operate the Vitalogik bedside monitor.

The keypad is connected to the MCU and RS-232 splitter with a flat cable through connector J3 that has 12 pins. Pins 1 through 9 are for the keypad. The keypad consists of switches arranged in a row and column matrix. Up to 5 rows and 4 columns are provided for in the interface. Identification of which key was pressed is handled by a scanning algorithm in the micro-controller. One micro-controller port is dedicated for each row and column.

## 2.1.7 Front End Board Inputs

### Overview

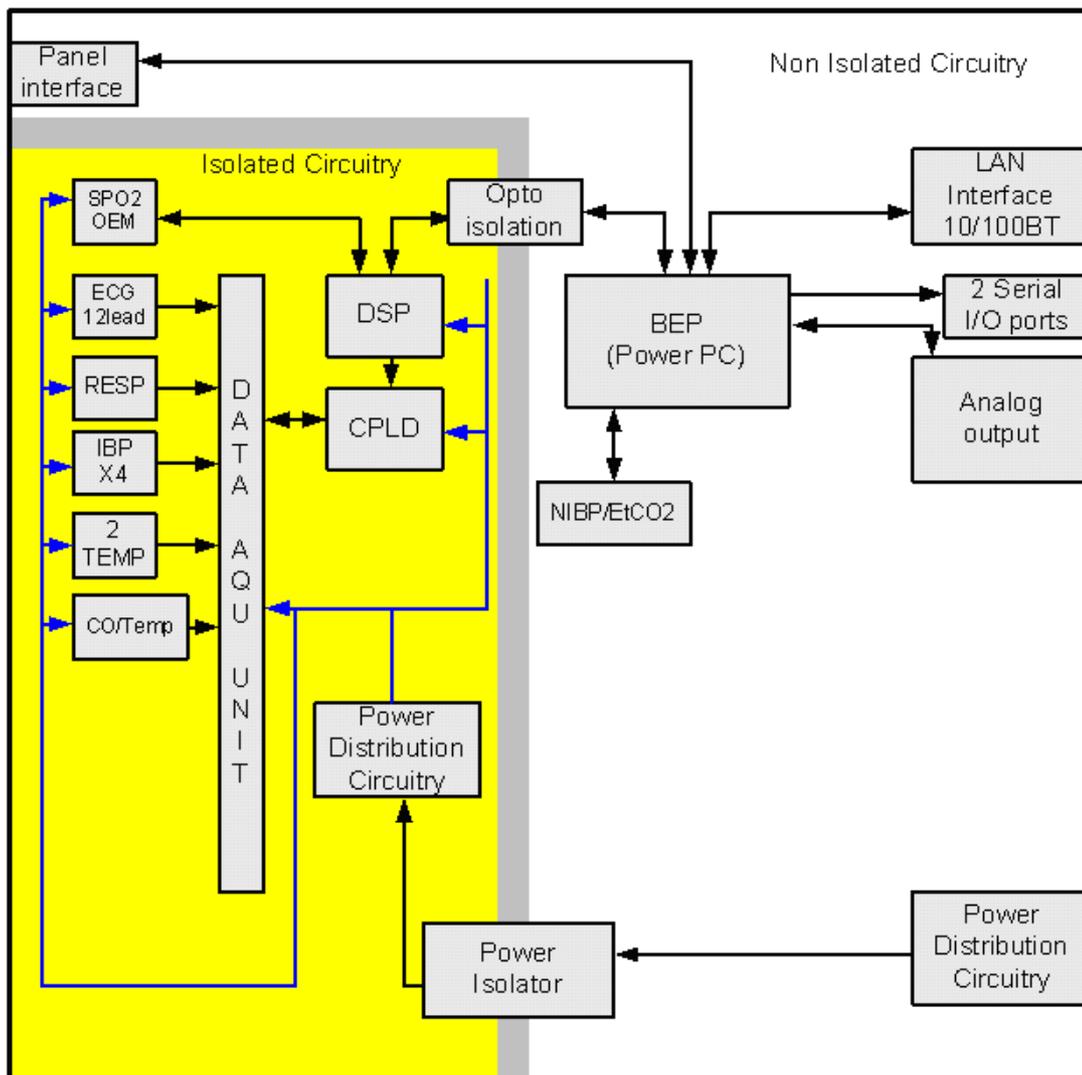


Figure 2-6: Data Acquisition Block Diagram

## Connectors

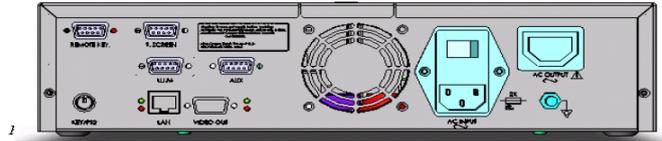


Figure 4-1: VitaLogik Table Interconnection

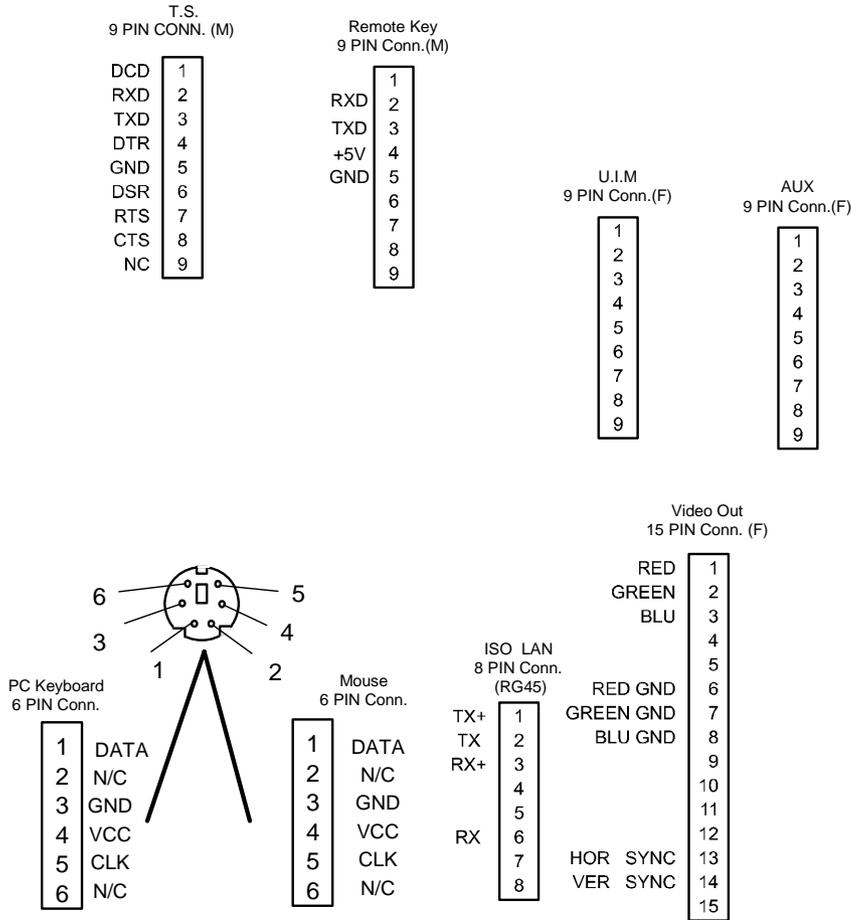


Figure 2-7: External Connection Input Connectors

### 2.1.8 ECG / RSP

#### Overview

The multi-lead ECG/RSP module is the source of all ECG data in the *Envoy* bedside monitor. The ECG is measured using a multi-lead cable via electrodes attached to the patient’s chest.

Monitoring the ECG produces a continuous waveform of cardiac electrical activity to enable an accurate assessment of a patient’s current physiological condition.

With the ECG module, you can use a 3, 5 or 6-lead electrode ECG cable set to display up to seven selectable ECG leads in up to three channels.

## 2.1.9 2BP / CO

### Overview

The Dual BP and CO/2TMP input is housed in the *Vitalogik* front panel, where it occupies a single slot. It supports two channels that enable it to simultaneously monitor two BPs as well as Cardiac Output or two body temperatures.

#### Blood Pressure Principle of Operation

Blood pressure usually is considered to be the pressure in the brachial arm artery at heart level. There is a maximum and minimum pressure that occurs in this artery due to the heart action. The maximum pressure, called *systolic pressure*, occurs at the completion of contraction of the heart. The minimum pressure, called *diastolic pressure*, occurs at the completion of the resting (repolarization) phase of the heart. *Pulse pressure* is the difference between systolic and diastolic pressures. As one of the physiological variables that can be quite readily measured, blood pressure is considered a good indicator of the status of the cardiovascular system.

The indirect (noninvasive) method of blood pressure measurement has certain disadvantages in that it does not provide a continuous recording of pressure variations and its practical repetition rate is limited. Furthermore, only systolic and diastolic arterial pressure readings can be obtained, with no indication of the details of pressure waveform. The indirect method is also somewhat subjective and often fails when the blood pressure is very low (as would be the case when a patient is in shock).

Direct (invasive) blood pressure measurement, on the other hand, do provide a continuous readout of the blood pressure waveform and are considerably more accurate than the indirect method. They require, however, that a blood vessel be punctured in order to introduce the sensor.

Blood pressure is measured via a fluid-filled catheter and dome pressure transducer. The active element of a typical transducer consists of a thin membrane and resistive element, which changes in resistance as the membrane deflects with pressure. Impressing a fixed voltage across the resistive element derives the blood pressure signal. The amount of current that flows through the variable resistance element, once sealed, is considered the blood pressure signal.

The blood pressure signal than pass through a low pass filter to cut noise signals, than to the analog to digital converter (ADC). The ADC serial data output pass to the P&SB for further processing and data storage .

#### Cardiac Output Principle of Operation

Cardiac output is perhaps the most important parameter of the entire circulatory system because it determines the blood flow to all issues of the body. Diseases of

the heart can result in a decrease of cardiac output leading to an inadequate nutrition of the cells of the body.

Cardiac output may be expressed as the product of heart rate and volume of blood pumped per beat of the heart, assuming a consistent stroke volume:

Cardiac Output = (Heart Rate) (Stroke Volume)

Cardiac output or blood flow is directly proportional to mean blood pressure and inversely proportional to peripheral resistance.

Cardiac Output by Thermodilution

An exact amount of a solution of known temperature is injected into the right atrium or superior vena cava and the resultant change in blood temperature is detected by the thermistor in the pulmonary artery. Cardiac output is inversely proportional to the integral temperature change.

The following equation is used to compute cardiac output by the thermodilution method:

$$C.O. = \frac{(1.08)(C_t)(60)V_i(T_b - T_i)}{\int_0^{\infty} \Delta T_b(t) dt}$$

Where:

C.O.= Cardiac Output (ml/min)

1.08= Correlation constant

C<sub>t</sub>= Correction for injectate temperature rise (from the table)

60= Seconds/minute

V<sub>i</sub>= Volume of injectate

T<sub>b</sub>= Initial blood temperature (°C)

T<sub>i</sub>= Initial injectate temperature (°C)

The ADC converts the analog signals from the CO catheter and the injection bath to digital signals. The ADC serial data output pass to the P&SB for further processing and data storage .

## 2.1.10 Temp

### Overview

Temperature is detected either through the Temp. input or from the CO/2 Temp. input when Cardiac Output (CO) is not being monitored.

### Temperature Monitoring Procedures

The **Temperature** panel provides access to the specific dialog panels enabling interaction with all aspects of **Temperature and Delta Temperature** monitoring.

Each dialog panel enables control of different aspects of **Temperature** monitoring. The available dialog panels are:

- **Alarm Limits**

Use this panel to activate and set limits for high and/or low limit alarms.

- **Alarm Response**

Use this panel to define the way the *VitaLogik* visually and audibly responds to a detected alarm.

- **Display Options**

Use this panel to define how temperature values appear on the main screen display.

- **Activate**

Use this panel to activate or deactivate, discontinue, and resume **Temperature** monitoring, and to define the location of the probe.

All the above panels are accessed from the **Temperature** menu.

## 2.1.11 NIBP

### Overview

Non-Invasive blood pressure is detected in the NIBP . Pressure is measured using a cuff and is derived by the oscillometric method. The cuff is automatically inflated and systolic, diastolic and mean pressures are derived as the cuff deflates. Adults and neonates may be monitored. The *Vitalogik* bedside monitor can be configured to take NIBP readings in one of three modes: manual, automatic and stat mode.

- In the manual mode, a single NIBP measurement is taken as required.
- In the automatic mode, measurements are repeated at regular, pre-set intervals.
- In the stat mode, blood pressure is measured as many times as possible during a period of five minutes.

Readings can be logged in the patient's chart.

*Note: During NIBP operation, isolated readings may be displayed which indicate a significant change in blood pressure values. This may have been caused by a change in the patient's actual pressure or by a movement artifact, muscle tremors, or a weak pulse. Take a manual auscultatory blood pressure to verify the patient's pressure before administering any medication.*

*Note: The width of the cuff should be 50% of the limb circumference or 2/3 of the upper arm length. The inflation part of the cuff should be long enough to encircle 50-80% of the limb.*

*Note: Inflation pressures used in adult NIBP monitoring are not appropriate for neonates. Also, neither the pediatric nor the adult cuff is suitable for neonates.*

### **Limitations of the Oscillometric Method**

The patient's actual condition at the time of measurement has a direct bearing on the reliability of that measurement. When taking an NIBP measurement, a regular arterial pressure pulse is sought. When a patient's condition makes that pulse hard to detect, it may take longer to get a reading and the reading may be unreliable. In some cases, the patient's condition may make it impossible to take a reading.

The following conditions may interfere with the oscillometric method:

- Heart-Lung Machine - It is impossible to take an NIBP reading when a patient is connected to a heart-lung machine.
- Arrhythmia - An irregular heartbeat caused by cardiac arrhythmia may cause the NIBP reading to be unreliable or impossible to perform. Again, measurement time is increased.
- Changes in Pressure - If a patient's blood pressure changes rapidly over the period of time during which the arterial pressure pulses are being analyzed for the reading, the measurement will be unreliable and may be impossible to obtain.
- Patient Movement - Patient movement, shivering, tremors, and convulsions may interfere with detection of partial pressure pulses. NIBP measurements may be unreliable or impossible to perform. In any case, measurement time is increased.
- Heart Rate Extremes - An NIBP reading cannot be taken if the patient's heart rate is less than 40 BPM or more than 300 BPM.
- Severe Shock - Reduced blood flow to the extremities due to shock or hypothyroid causes reduced pulsations of the arteries. This causes the NIBP readings taken under such conditions to be unreliable.
- Limitations for Neonates - Due to the small size of arteries in premature babies and in neonates, it becomes more difficult to sense the arterial pulse. To achieve optimal results in Neonatal NIBP:

1. Use the shortest practical tube length possible between the NIBP input and the Cuff. Use approximately 1.5 meters as a practical compromise.

2. Do not tighten the Cuff on the baby's limb. Leave a space of approximately 5 mm between the Cuff and the limb.

### Preparatory Checklist

- Make sure that the NIBP monitoring is activated.
- Select the correct cuff size for the patient. Cuff width should be either 40% of the arm's circumference or 2/3 the upper arm length. If you are unsure whether the cuff is large enough, use a larger cuff.
- Connect the fitting at the end of the pressure hose to the corresponding fitting on the cuff and the monitor.
- Ensure that the cuff is not open and that fittings are tight to prevent air leaks. No reading can be obtained when cuff is open.

#### *Note:*

- 1. An incorrect cuff size, especially a normal cuff on obese patients, may result in incorrect readings.*
- 2. Always take care to avoid compression or restriction of pressure tubes.*

### **WARNING!!!**

- Do not perform NIBP measurements on patients with sickle-cell anemia or any condition involving skin damage.*
- Do not apply the cuff to a limb where an intravenous infusion or catheter is inserted. The infusion is slowed or blocked during cuff inflation, and tissue damage may result around the catheter.*
- Due to the risk of hematoma in the limb where the cuff is placed, use clinical judgment when deciding whether or not to perform automatic blood pressure readings on patients with severe blood clotting disorders.*
- It is important when measuring blood pressure in neonatal patients, to make sure that the Vitalogik is correctly configured for neonatal readings, due to the lower overpressure level used.*

### **Leakage Test**

The Leakage test procedure is described in Chapter 5 – System Setup of the Service Manual.

**WARNING!!!** *Never perform a leakage test when the cuff is attached to a patient*

## 2.1.12 SPO<sub>2</sub> (Nellcor)

### Overview

The SPO<sub>2</sub> measures the patient's arterial oxygen saturation and pulse rate. Arterial oxygen saturation is the percentage of oxygenated hemoglobin in relation to the total hemoglobin. For example, if 95 percent of the hemoglobin molecules in the arterial red blood cells combine with oxygen, the blood has an oxygen saturation of 95 percent. The SpO<sub>2</sub> numeric value represents the percentage of hemoglobin molecules that have combined with oxygen molecules to form oxyhemoglobin.

The SPO<sub>2</sub> measures oxygen saturation using the Pulse Oximetry method. This continuous, non-invasive method measures the light absorption in the patient's tissue (for example, using a finger probe) to a receiver on the other side.

Absorption by tissue and venous blood is constant. However, the blood flow in the arterioles is pulsate and, therefore, varies with time. Measuring light absorption during pulsation can derive oxygen saturation of the arterial blood.

The *Vitalogik* provides continuous monitoring of arterial oxygen saturation expressed as a percentage. Moment-to-moment variations in capillary filling are presented as a continuous pulse waveform. The pulse rate is derived from the pulse waveform.

## 2.1.13 SPO<sub>2</sub> (Masimo)

### Overview

The SpO<sub>2</sub> input measures the patient's arterial oxygen saturation and pulse rate. Arterial oxygen saturation is the percentage of oxygenated hemoglobin in relation to the total hemoglobin. For example, if 95 percent of the hemoglobin molecules in the arterial red blood cells combine with oxygen, the blood has an oxygen saturation of 95 percent. The SpO<sub>2</sub> numeric value represents the percentage of hemoglobin molecules that have combined with oxygen molecules to form oxyhemoglobin.

The SpO<sub>2</sub> input measures oxygen saturation using the Pulse Oximetry method. This continuous, non-invasive method measures the light absorption in the patient's tissue (for example, using a finger probe).

Absorption by tissue and venous blood is constant. However, the blood flow in the arterioles is pulsatile and, therefore, varies with time. Measuring light absorption during pulsation can derive oxygen saturation of the arterial blood.

The *Vitalogik* provides continuous monitoring of arterial oxygen saturation expressed as a percentage. Moment-to-moment variations in capillary filling are

presented as a continuous pulse waveform. The pulse rate is derived from the pulse waveform.

## 2.1.14 Microstream

### **Overview**

The End Tidal CO<sub>2</sub> (EtCO<sub>2</sub>) input together with the Oridion sidestream CO<sub>2</sub> control) sensor provides CO<sub>2</sub> measurement data to the MPU through the front panel.

### **Principles of Operation**

Vitalogik's End Tidal CO<sub>2</sub> (EtCO<sub>2</sub>) input uses Non-Dispersive Infrared Spectroscopy (NIDS) with single beam, single detector and fully chopped ratiometric measurement with spinning gas cell.

The EtCO<sub>2</sub> input uses infrared (IR) light to measure the concentration of CO<sub>2</sub> in a sample of respiratory gas. It then measures the inspiratory and end tidal (end expiratory) CO<sub>2</sub> levels (inCO<sub>2</sub> and EtCO<sub>2</sub>) and converts the data to percentages or mmHg. Changes in carbon dioxide levels are displayed graphically as a CO<sub>2</sub> waveform. The *MicroStream* EtCO<sub>2</sub> uses sidestream monitoring with low sampling volume of 50 ml/min.

In Sidestream monitoring, a tube is attached to the patient's airway circuit.

Respiratory gas is then drawn into the tube and sent to an IR sensor in a separate measuring device. This method can be used on patients who are not intubated. The unit performs automatic barometric pressure compensation to adjust the CO<sub>2</sub> reading for changes due to pressure fluctuations. The barometric pressure is determined continuously in the mainstream mode and during power-up in the sidestream mode. The system incorporates an internal pressure transducer that measures barometric pressure continuously. The EtCO<sub>2</sub> value is given in mmHg or as a percentage. The effects of humidity are eliminated by a Nafion dryer tube and a filter in the sampling set.

The unit automatically senses when a sampling tube is installed and begins drawing a gas sample for sidestream operation.

### **Intended Use**

The Vitalogik's End Tidal CO<sub>2</sub> (EtCO<sub>2</sub>) Microstream, input is intended for use with both intubated and non-intubated patients. The input uses real-time data to calculate and display the numerical values for End-tidal carbon dioxide (EtCO<sub>2</sub>), inspired carbon dioxide (inCO<sub>2</sub>) and Respiration rate.

## ***Cleaning***

### **Airway Adapter**

The airway adapter is intended for use on a single patient and should be discarded after use. Do not attempt to clean with air or Oxygen

## ***Calibration***

The EtCO<sub>2</sub> input performs auto zero calibrating when there is a change in the internal temperature of the input. It will happen about every hour after starting the input and every about 12 hour when the input works continuously and temperature stabilizes.

Annually, it will require perform span calibration with standard CO<sub>2</sub> concentration. The calibration procedure is described in Chapter 5 – System Setup, of the service manual

The EtCO<sub>2</sub> single-size input is housed in the *Vitalogik* front panel. It supports both side stream monitoring.

## ***2.2 Display Monitor***

The display monitor is a standard monitor and can be one of the following:

- 15” screen size
- 17” screen size

*Note: Display should be approved by Mennen medical.*

## 2.3 Remote Keypad and QuicKnob Functional Description

The remote keypad and QuicKnob (Remote) enables the user to operate the Vitalogik system through an external cable connected to the Auxiliary port of the MPU. The Remote performs the same functions as the local keypad and QuicKnob located in the MPU.



*Figure 2-8: Remote Keypad – General View*

The Remote consists of 12 fixed keys, QuicKnob, LEDs, buzzer, MCU and RS-232 interface (see *Figure 2-18*).

The MCU, QuicKnob, Keypad and Buzzer are the same as found in the MCU and RS-232 Splitter. The LEDs provide debugging indicators to assist in firmware development and service of the board. The RS-232 Interface converts the MCU's CMOS signal levels to the MPU's RS-232 level signals.

The connection to the MPU includes power for the Remote that is provided by the MPU via the MCU and RS232 Splitter's +5V supply. The terminal labeled "present" allows the MPU to determine if the Remote is plugged in.

## 2.4 Patient Preparation Checklist

### 2.4.1 Electrode Types

The type of electrode used with the Vitalogik EEG may vary with the application and the circumstances of individual cases. Electrodes with wires should have a DIN protected plug. The patient cable should be taped to the skin to provide strain relief. The advantage

of this type of electrode is the rapidity of attachment and the intimate contact with subcutaneous tissue. Pre-gelled disposable electrodes are attached directly to the skin of the patient. The advantage of this type of electrode is the ease of attachment to the patient. The four display channels are differential, with the following channels:

(A-B), (B-C), (C-D), (D-E).

Two examples of recommended locations that provide left to right side signal comparison appear below:

*Note: We recommend that you use a montage that allows two of the four channels to be on the left hemisphere; and the other two channels to be on the right hemisphere.*

Frontal A = F7 B = F3 C = Fz D = F4 E = F8

Occipital A = T5 B = P3 C = Pz D = P4 E = T6

The EEG cable allows the user to use either electrodes attached to the scalp without wires; or electrodes equipped with a wire that has a DIN protected plug.

# CHAPTER 3 - SYSTEM INSTALLATION

Chapter 3 includes the following sections:

- Overview
- Safety precautions
- Site survey
- Unpacking and inspection
- Setting up the basic system
- Mounting options

## **3.1 Overview**

The basic *Vitalogik* system usually consists of more than one Vitalogik bedside monitor, recorder, laser printer and local area network (LAN).

The installation includes the following stages:

- Site survey
- Unpacking and inspection
- Setting up the basic system

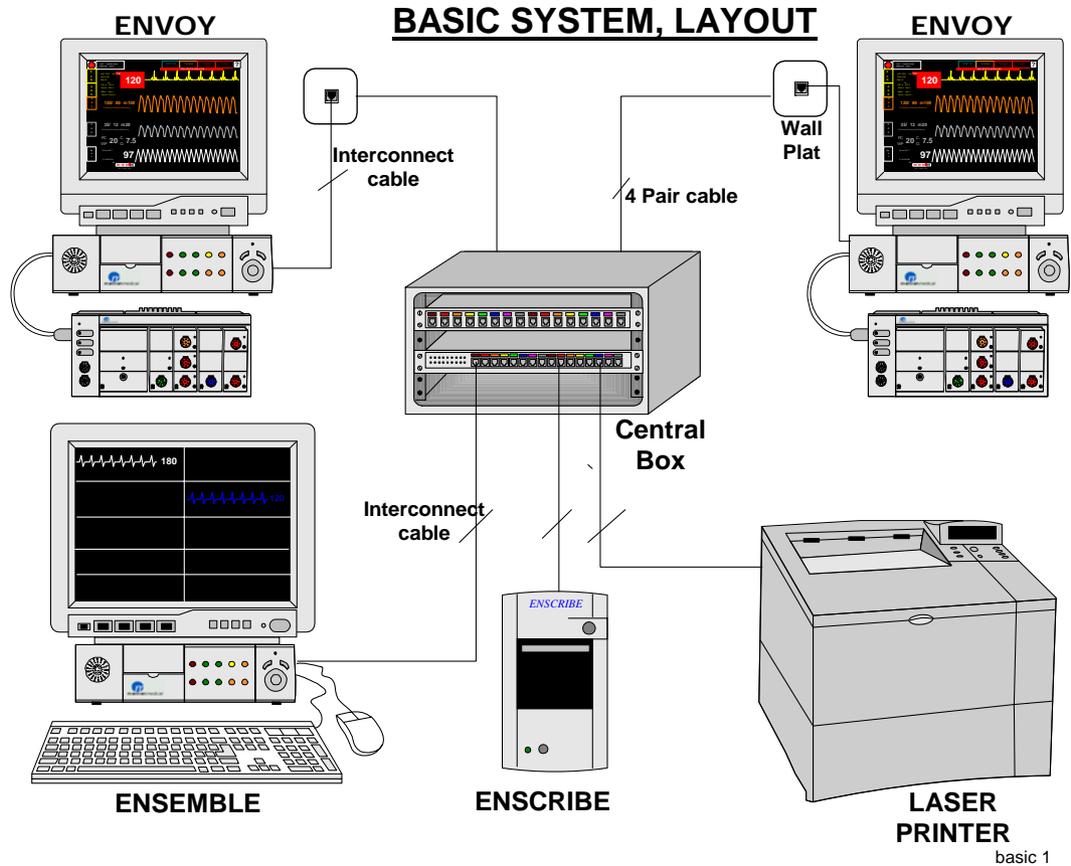


Figure 3-1: Vitalogik System Basic Setup

In addition, various options exist for mounting the *Vitalogik* bedside monitor – see Section Mounting Options on page 21.

## 3.2 Safety Precautions

Before installing the system, you must consider the following safety precautions:

- System grounding
- Equipotential grounding
- Electrosurgery, diathermy and defibrillation protection
- Monitor Mounting
- Accidental wetting of the equipment
- Patient connections
- General hazards

### 3.2.1 Grounding the System

To protect patients and hospital personnel, the Vitalogik system must be grounded. Accordingly, the system is equipped with a detachable 3-wire cable which grounds the instrument to the power line ground (protective earth) when plugged into an appropriate 3-wire receptacle. If a 3-wire receptacle is not available, consult the hospital electrician.

**WARNING!!!** *Do not use a 3-wire to 2-wire adapter with this instrument.*

If the MPU and the display screen are set up together, connect the grounded wire to the equipotential grounding terminal on the display. If the MPU and the display screen are separated, connect the grounding wire to the display as well as to the MPU.

**WARNING!!!** *If it is not evident from the instrument specifications whether a particular instrument combination is hazardous or not. For example, due to summation of leakage currents, the user should consult the manufacturers concerned or an expert in the field to ensure that the necessary safety of all instruments concerned will not be impaired by the combination.*

**Note:** *The input data cable includes a grounding shield, which automatically provides grounding protection between the front panel and the MPU.*

### 3.2.2 Equipotential Grounding

Protection class 1 instruments are already included in the protective grounding (protective earth) system of the room by way of grounding contacts in the power plug. For internal examination on the heart or the brain, the Vitalogik must have a separate connection to the equipotential grounding system.

One end of the equipotential grounding cable (potential equalization conductor) is connected to the equipotential grounding terminal on the instrument's rear panel and the other end to one point of the equipotential grounding system. The equipotential grounding system assumes the safety function of the protective grounding conductor if ever there is a break in the protective grounding system.

Examinations in or on the heart (or brain) should only be carried out in medically used rooms incorporating an equipotential grounding system.

Check each time before use that the instrument is in perfect working order. The cable connecting the patient to the instrument must be dry and clean.

**WARNING!!!** *When performing examinations in or on the heart (or brain), the conductive parts of electrodes and associated connectors, including the neutral electrode, should not contact other conductive parts including earth.*

### 3.2.3 Electrosurgery, Diathermy and Defibrillation Protection

Neither electrosurgery and diathermy instruments nor defibrillation will damage the monitor. If the correct electrodes are used and applied according to the manufacturer's instructions, the screen display will recover within 10 seconds of defibrillation. The inputs have floating inputs are defibrillator-proof.

**WARNING!!!** *Do not touch the patient, bed or instrument during defibrillation.*

### 3.2.4 Mounting of Monitors

Mount the monitors on Mennen Medical wall mounts. Different wall mounts or shelves have to be checked by Mennen medical to confirm safety.

**CAUTION!** *Mennen Medical is responsible for monitor's wall mount and shelves if and only if they were installed by Mennen Medical or by person authorized by Mennen Medical.*

**WARNING!!!** *Mennen Medical will not be responsible for the stability of the wall mounts and shelves unless checked by Mennen Medical at least once a year.*

**Note:** *Mennen Medical will perform the required check during the warranty period.*

At the end of the warranty period it is the responsibility of the hospital to provide a service call to Mennen medical service department, or to have a service contract.

### 3.2.5 Accidental Wetting of the Equipment

If, for whatever reason, the equipment accidentally gets wet, remove all patient connections and turn the unit off. Thoroughly wipe all wet areas and then allow sufficient time to ensure that the equipment is completely dry before proceeding.

### 3.2.6 Patient Connections

All patient connections on the Vitalogik Vital Signs inputs have special keys to prevent user error.

**WARNING!!!** *The rear panels of the MPU, display screen and front panel have no patient connections.*

### 3.2.7 General Hazards

It is the responsibility of the hospital, its consultants and/or contractors to ensure that the wall is adequately safe for mounting the bedside monitor. This includes selecting the appropriate fasteners and installing them properly.

In constructions and remodeling work where the wall covering may be partially or entirely removed, a 16 gauge steel stud must be used for attaching the wall channel. The following mounting instructions are provided as guideline information only.

It is recommended that the hospital establish a policy for periodical check of the wall mounting structure for proper installation.

**WARNING!!!** *Do not place any portion of the monitor directly over a patient's bed.*

To ensure easy reach and handling of the bedside monitor, all controls should not be higher than 182 cm (72") above the floor.

## 3.3 Site Survey

Performing a site survey ensures that all environmental, electrical, and cabling requirements are taken into consideration. This ensures that the actual installation proceeds as smoothly as possible and that the installed equipment will run reliably.

Perform a site survey every time an Vitalogik bedside monitor is installed. The hospital Biomedical Engineer and Facilities Engineer should participate in any discussion, which must include:

- Reviewing details and drawings of hospital layout and architecture.
- Planning of all cable ducts, raceways, runs, wall plates, pull boxes and other interconnection details.
- Establishing length of cable runs.
- Reviewing AC power requirements, locations and types of outlets.

- Discussing the type of emergency (backup) AC power supply to be used, time of transfer (periodic test), degree of transient introduced into the power line (how long is power interrupted?), frequency and voltage of emergency power.
- Reviewing environmental considerations, such as ambient temperature, humidity control, potential static charge, and expected tolerances in the area planned for the Vitalogik.

Measure AC power disturbances over a period of at least 24 hours with a power line analyzer. It is important to perform this test over the period of emergency power transfer to measure the severity of transients during the transfer.

**Environmental Requirements**

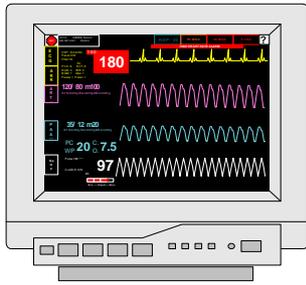
Locate the Vitalogik out of direct sunlight and in a clean air atmosphere. Avoid dusty areas or areas where there are airborne dirt particles. Avoid static build-up and discharge, which may result in disruptions of operation and loss of data.

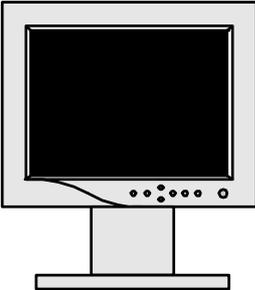
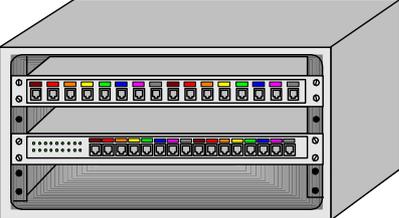
Reasonable environmental parameters are:

- 2 Temperature 10° to 32° C (50° to 90° F)
- 2 Relative Humidity 30% to 95% (non-condensing)
- 2 Temp. rate of change 3.6 F/hr (2 C/hr)
- 2 Humidity rate of change 2% hr

The following table describes the equipment physical dimensions and power consumption.

Item	Height [cm]	Width [cm]	Depth [cm]	Weight [kg]	Power [W]	Current Peak [A]	B.T.U
20" Display	51 (20")	51.5 (20.2")	50 (19.6")	30 (66.1pd)	150	2.7	500
17" Display	44 (17.3")	42 (16.5")	43.5 (17.1")	20 (44pd)	120	2.2	500
15" Display	38.5 (15.1")	36.5 (14.3")	37 (14.5")	14 (30.8pd)	100	2.0	350



<p>Flat Screen</p> 	<p>39 (15.3")</p>	<p>38 (14.9")</p>	<p>21 (8.2")</p>	<p>7 15.4pd</p>			
<p>Laser Printer</p> 	<p>34 (13.3")</p>	<p>39 15.3")</p>	<p>50 (19.6")</p>	<p>20 (44pd)</p>			
<p>LAN Hub</p> 	<p>5.5 (2.1")</p>	<p>44 (17.3")</p>	<p>25 (9.8")</p>	<p>-</p>	<p>100</p>		<p>30</p>
<p>Patch panel</p> 	<p>5.5 (2.1")</p>	<p>44 (17.3")</p>	<p>25 (9.8")</p>		<p>-</p>		<p>-</p>
<p>Recorder</p> 	<p>17 (6.7")</p>	<p>10 (3.9")</p>	<p>24 (9.4")</p>	<p>2.0 (4.4pd)</p>	<p>100</p>	<p>0.5</p>	<p>30</p>
<p>MPU</p> 	<p>9.5 (3.7")</p>	<p>34 (13.3")</p>	<p>46 (18.1")</p>	<p>8 (17.6pd)</p>	<p>200</p>	<p>2.0</p>	<p>700</p>
<p>Hub and Patch Panel Enclosure</p> 							

To complete the site survey please fill the following form and send it with the purchase order.

### **3.4 Unpacking and Inspection**

Before unpacking the Vitalogik bedside monitor, inspect visually the packaging for any signs of damage or abuse, which may have resulted during shipment. If any signs of external damage are visible, you have to contact your nearest Mennen Medical agent before proceeding to unpack the unit. Failure to do so could invalidate the warranty.

Unpack carefully the package and check all components against the packing list to confirm their availability. If any damage appears or any part is missing, contact your Mennen Medical agent immediately. Do not attempt to set up the system if any component is damaged.

### **3.5 Setting Up the Basic System**

The Vitalogik basic system consists of the following parts: the LAN hub and patch panel, the display screen, the MPU, the front panel, and the nurse station. These should be set up according to system description. Take care when handling the components.

The display screen can be placed either on top of the MPU or on a wall mount. A variety of different types of wall mounts can be used. Select the wall mount according to your hospital's individual requirements. Wall mounts obtained from Mennen Medical are supplied with detailed instructions.

Proper installation of the Vitalogik is divided into the following steps:

- 2** Connecting and wiring the LAN cables
- 2** Mounting the LAN outlets
- 2** Mounting and connecting the LAN hub and the patch panel
- 2** Mounting the Vitalogik monitor on the wall
- 2** Connecting the interconnection cables for each device
- 2** Mounting the nurse station devices

***Note:** If a hospital has special installation requirements, these may call for special planning and materials that must be furnished by that hospital and are not covered by this manual.*

### 3.5.1 Connecting and Wiring the LAN Cables

► *To connect and wire the LAN cables:*

1. After determining the location of the nurse station and the Vitalogik bedside monitors, for each Vitalogik bedside monitor, place a standard shielded twisted pair LAN cable from the nurse station to the bedside monitor. Leave 20cm (7.8”) spare cable on the bedside monitor side, and 120cm (47.2”) spare cable on the nurse station side.
2. For each Vitalogik bedside monitor, connect the four wires (two Rx and two Tx wires, according to the connections drawing) to the LAN outlet.

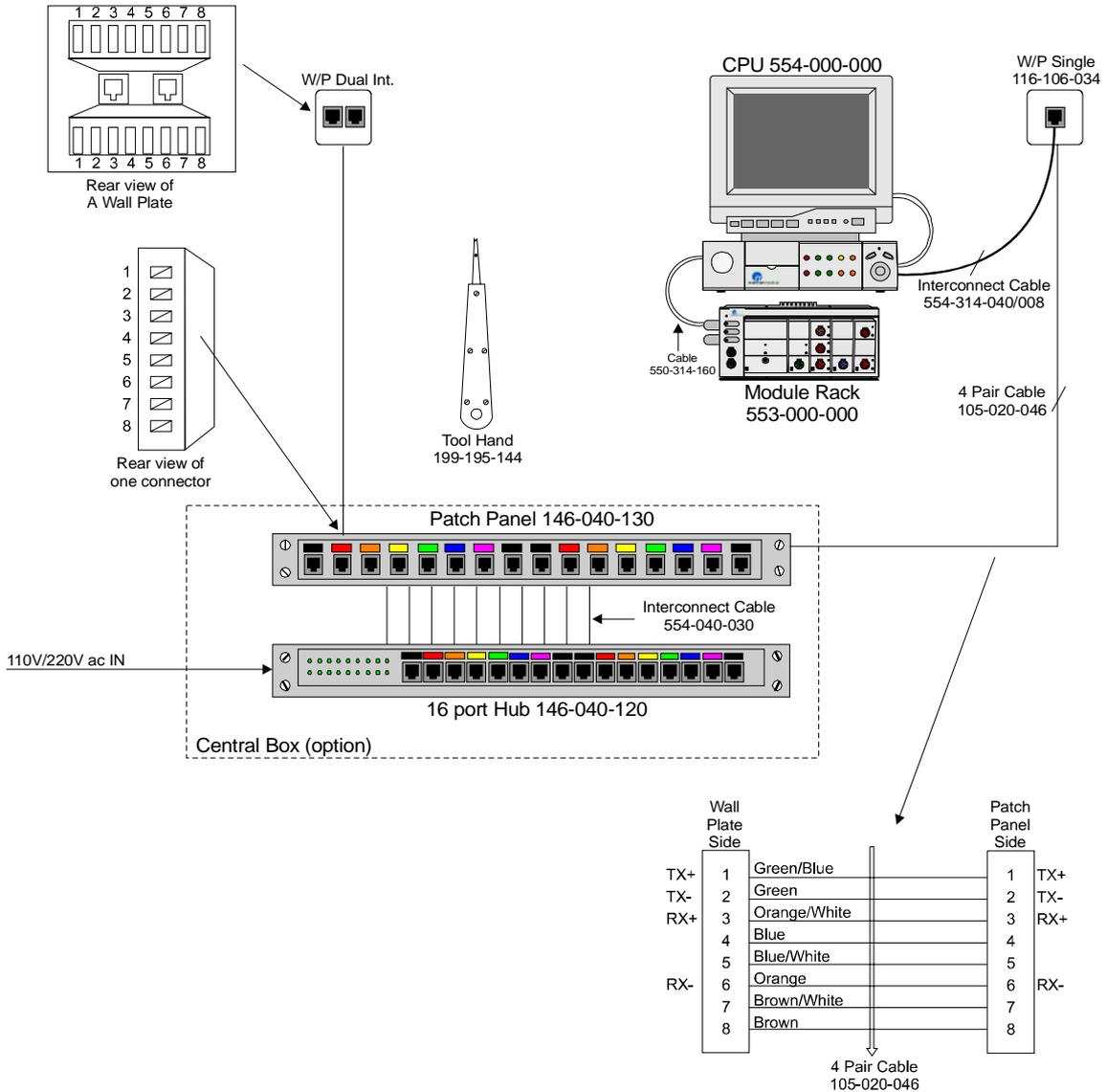


Figure 3-2: LAN Cables Wiring Diagram

### 3.5.2 Mounting the LAN outlets

After placing the LAN cables, mount the LAN outlets on its place according to the hospital requirements. The following three types of LAN outlets are available:

- Wall outlet mounted on the wall surface.
- Wall outlet mounted behind the wall surface.
- Wall outlet mounted together with other outlets on an aluminum plate.

### 3.5.3 Mounting and Connecting the LAN Hub and the Patch Panel

➤ *To mount the LAN hub and the patch:*

1. Mount the LAN hub and the patch panel inside the enclosure and place them under the nurse station desk (or at any other convenient place). Secure them if necessary.
2. At the nurse station side, connect each LAN cable to the patch panel according to the wiring installation diagram (see Figure 3-3).
3. For each Vitalogik bedside monitor, connect a bridge cable from the patch panel to the LAN hub.

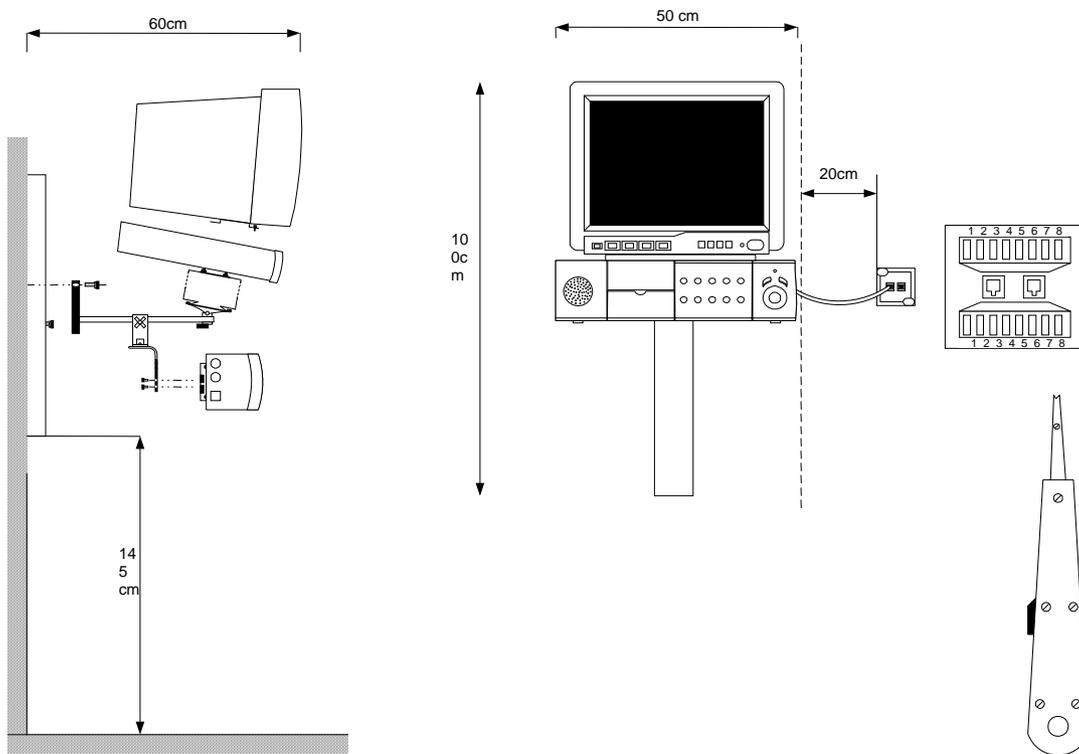


Figure 3-3: Vitalogik Mounting Diagram

### 3.5.4 Mounting the Vitalogik Monitor on the Wall

To properly mount the Vitalogik bedside monitor, refer to the wall mounting instructions supplied with your wall mounting kit. It is the responsibility of the hospital, its consultants, and/or contractors to determine that the wall is adequate to

safely mount instrumentation. This includes the selection of appropriate fasteners and the proper installation.

The Vitalogik bedside monitor can be installed as a permanently mounted fixture on a wall. The following are mounting instructions for mounting the Vitalogik bedside monitor on different types of walls, using a Mennen Medical mounting system.

Mennen Medical has a number of different mounting kits for mounting the Vitalogik, depending on the size and type of display screen and individual hospital conditions, see section Mounting Options on page 21. Mennen Medical employs a Polymount Biomedical Monitor Mounting System. The mounting kit described as follows is for mounting the display screen, the MPU, the front panel and a recorder.

The items required for the mounting kit of the basic non-split mounting are given in Bill of Material no. 800-050-820 below:

**Table 3-1: Bill of Material (800-050-820) REV. C**

Desg	Item no.	Rev	Description	Unit	Qty	SR
ECN 8073 REV. A ECN 8208 REV. B ECN 8274 REV. C						
001	260-375-010		WALL MOUNT – HOR 2000 OEM	EA	1	
002	260-375-015		POLY QUIP INFUSION PUMP MOUNT (5")	EA	1	B
003	135-101-040		WASHER – SPLIT LOCK #8	EA	4	B
004	134-103-019		SCREW, 8-32" X 3/8", PH, PHIL, SS	EA	4	B
005	260-375-016		V-BLOCK MOUNTING SYSTEM WITH KNOB SCREWS	EA	2	B
006	134-401-011		SCREW 1/4-20 X 1/2 PH PHIL SS	EA	8	B
007	800-050-821	C	VITALOGIK INST. FOR MOUNT NON-SPLIT DISPL. W2 MRW REC	EA	1	S
011	134-103-030		SCREW 8-32 X 1/2 PH PHIL	EA	2	B
012	134-102-200		THUMB SCREW 6-32 X 5/16 SS	EA	2	B
013	134-102-032		SCREW 6-32 X 7/16 PH SS PHIL	EA	2	B
014	133-102-031		NUT – FIBER NUT 6-32	EA	2	B
015	135-101-030		WASHER SPLIT LOCK #6	EA	4	B

When the mounting of the **Vitalogik** bedside monitor is completed, the display screen is on top of the MPU, and the front panel is below the MPU. If there is a recorder, it is located on the right hand side of the front panel.

**Note:** *The non-split mounting option is for a 15" display only – a 17" display must not be used.*

The items required for the mounting kit of the basic split mounting option are found in Bill of Material no. 800-050-825 below:

**Table 3-2: Bill of Material (800-050-825) REV. C**

Desg	Item no.	Rev	Description	Unit	Qty	SR
ECN 8073 REV. A ECN 8208 REV. B ECN 8274 REV. C						
001	260 375-010		GCX mounting channel	EA	1	
002	260-375-015		BCX polyquip - 8"	EA	1	B
003	135-101-040		Washer split locks - 8"	EA	4	B
004	134-103-026		Screw/washer 8-32X3/8	EA	4	B
005	134-102-040		Screw 6-32ZX1/2 soc cap s	EA	2	B
006	260-137-016		2 V-block	EA	2	B
007	134-401-011		Plate carrier, recorder	EA	1	S

Make sure to unpack and inspect the mounting kit package.

## ***Mounting the Wall Channel***

### **Wall Channel Positioning Guidelines**

See Wall Channel Positioning<sup>4</sup> for an illustration of the wall channel.

The following mounting guidelines apply to both 15" and 17" display screens.

- Place the bottom edge of a 19" (48.26cm) wall channel approximately 56" (142.24cm) above the floor. Taller monitors require lower channel placement.
- The bottom of the monitor should be 4½" (11.43cm) above the bottom of the channel [6½" (16.51cm) when using a 15" (38.1cm) support arm with diagonal brace], with the arm at its lowest position.
- To ensure easy reach, all controls should not be higher than 72" (182.88cm) above the floor. Monitors can always be adjusted up over a 12" (30.48cm) range in a standard 19" (48.26cm) wall channel. For example: 15" (38.1cm) high monitors: Bottom of channel + 52" (132.08cm).
- Allow 14" (35.56cm) clearance on either side of the channel centerline to clear objects, such as over-bed lighting, privacy curtains, adjacent walls or columns, door swing arcs, etc.

- Power and signal outlets should be 68" - 72" (172.72-182.88cm) above the floor. Avoid oxygen, vacuum, and air outlets and space for attendant flow meters and regulators.

**Note:** Do not place any part of the monitor directly over a patient's bed.

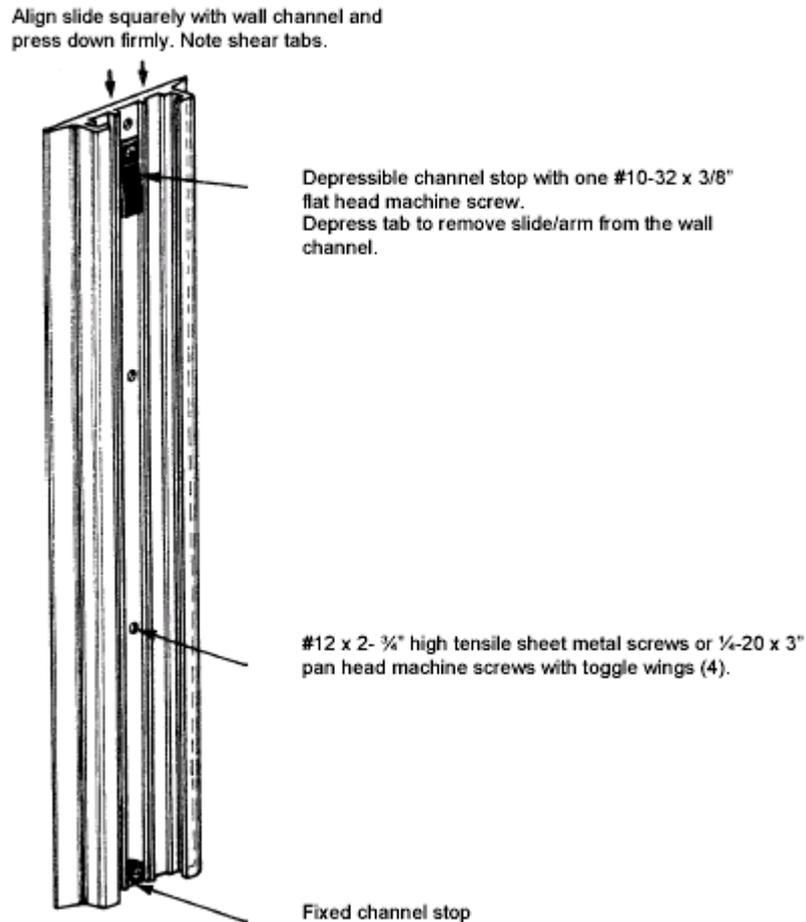


Figure 3-4: Wall Channel Positioning

When positioning the wall channel the following options are available:

- Positioning the wall channel on drywall (gypsum board) over 16 gauge sheet metal or wood studs.
- Positioning the wall channel on drywall (gypsum board) over sheet metal studs less than 16 gauge.
- Positioning the wall channel on plaster coat over expanded metal lath on steel studs, hollow tile, or hollow block.
- Positioning the wall channel on concrete walls.

## Positioning the Wall Channel on Drywall (GYPSUM Board) Over 16 Gauge Sheet Metal or Wood Studs

See Figure 3-5 for the maximum load rating for 5/8" gypsum board walls used for wall mounted instrumentation.

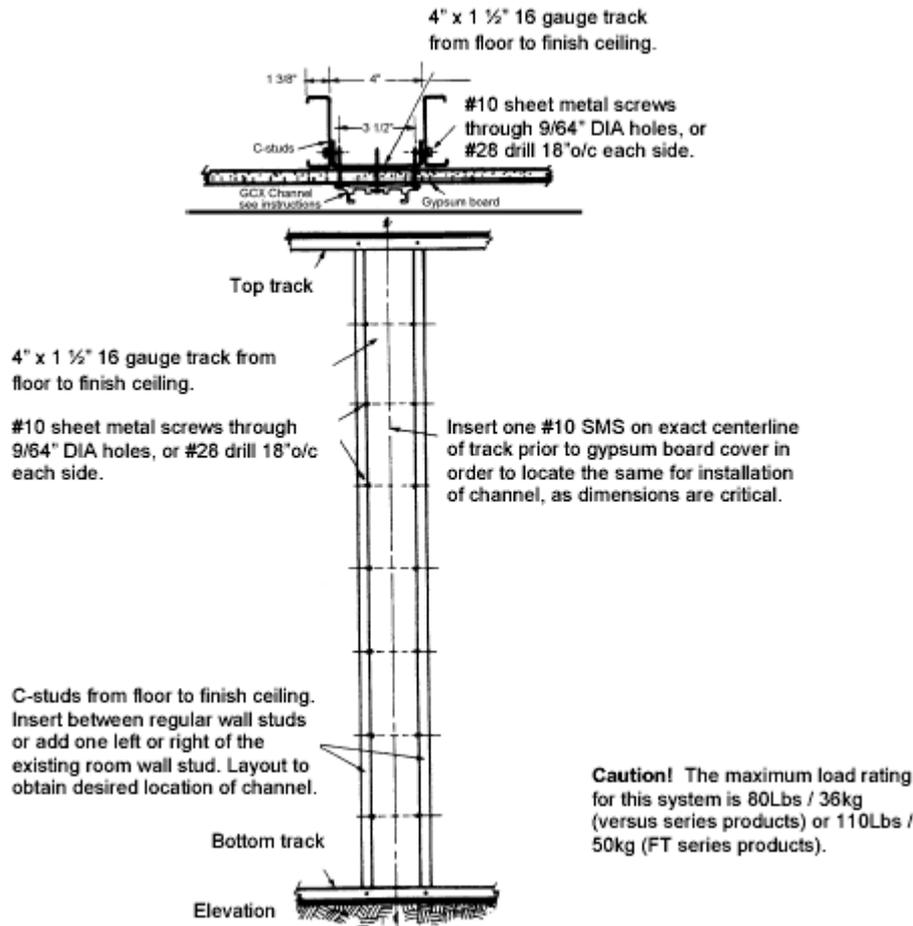


Figure 3-5: Positioning the Wall Channel on Drywall

### ► To position the wall channel:

1. Locate the exact centerline of the stud.
2. Drive a #4 finishing nail through the drywall to contact the stud.
3. Withdraw and drive again 3/8" (0.95cm) to the right and left until the edges of the stud are located and the centerline is determined. The wall channel is 4" (10.16cm) wide and covers these exploratory holes.
4. Drill four 11/64" (0.43cm) diameter holes for #12x2 - 3/4" high tensile combination head screws in a single 16-gauge stud through the channel centerline.

5. Insert the top screw and level the channel and then mark and drill the other holes.

*Note: The wall channel must be anchored into the stud.*

### **Positioning the Wall Channel on Drywall (GYPSUM Board) Over Sheet Metal Studs Less than 16 Gauge**

➤ ***To position the wall channel:***

1. Locate the centerline of the stud, as in the previous procedure (step 1).
2. Use ¼ - 20x3” pan head machine screws.
3. Drill 11/16” (1.74cm) diameter holes with a sharp speed bore or twist drill (requires pilot hole). The round stop at the bottom of the channel goes over the shank of the bottom screw.
4. Affix the spring wings to the screws. Starting at the top, push in and align the wings in a vertical mode and tighten.
5. Use a level to make sure that the channel is vertical prior to final seating of the screws.

*Note: The wall channel must be anchored into the stud.*

### **Positioning the Wall Channel on Plaster Coat Over Expanded Metal Lath on Steel Studs, Hollow Tile, or Hollow Block**

➤ ***To position the wall channel:***

1. Drill 5/8” (1.58cm) holes.
2. Branch the holes in hard materials to allow for the toggle wing to pass through.
3. Install the machine screws and toggle wings.

### **Positioning the Wall Channel on Concrete Walls**

This type of installation should not be attempted by anyone lacking experience and expertise in concrete and concrete fasteners, and/or is not willing or able to follow explicit instructions by the manufacturer of the fasteners.

It is recommended that #12x2” Rawl Plugs (lead/hemp) be used due to the alignment problem of drilling holes in concrete.

**WARNING!!!** *Any fastener can be misused due to incorrect selection or poor workmanship.*

➤ ***To position the wall channel:***

1. Use #11x2-1/4" Buildex combination head screws in the lower three holes.
2. Use a 1/4-20 steel expansion anchor of at least 1 1/2" (3.81cm) depth in the top hole.
3. Holes must be marked very accurately and center punched to reduce drill bit walking. Sharp carbide-tipped drills and roto-hammers must be used.
4. Holes must be drilled straight, and be of the correct diameter and depth when drilled into concrete, and the bulb-blown clean of any debris. Disregard the thickness of any plaster and make compensatory allowance in the length of the screw.
5. Use only sheet metal screws, never use grade 2 screws such as wood screws or lag bolts. Never attempt to mount into crumbly materials or into improperly prepared holes. Special fasteners are not included with the wall channels but are available from construction supply companies, or from the manufacturer upon request.

**Through Wall, Solid Partition Wall, and Back to Back Installations**

Sufficient length 1/4-20" machine screws, nuts, washers, and/or back plates must be provided by the user to mount the channel by drilling all the way through the thin partition wall.

If two channels are to be mounted back to back, internally threaded sleeves, exact length screws, and specific procedures are available from the manufacturer upon request. A Portalign drill fixture is recommended for this procedure.

**Special Applications**

Channels can be attached to a GCX 4"X4", 1/8" wall aluminum support column or certain mullions, etc. GCX Corporation will discuss innovative solutions to wall mounting problems for any situation not covered by these guidelines.

## Physical Mounting of the Monitor

### Recommended Mounting Systems

Mennen Medical recommends the following mounting systems:

- Polymount Biomedical Monitor Mounting System, VB Series
- Polymount Biomedical Monitor Mounting System, Side Clamping

### Mounting Attachment Method

**Table 3-3:**

Plate size	Monitor width ranges
8" (20.32cm)	8 ¼" - 11 ¼"
11" (27.94cm)	11 ¼" - 14 ¼"
14" (35.56cm)	14 ¼" - 17 ¼"
17" (43.18cm)	17 ¼" - 20 ¼"

Other monitor attachment methods are available, using “Clip Strips”, Adapter Plates, prepared hole patterns for direct screw attachment on other stock-size plates [5" (12.7cm); 7.6" (19.30cm); 9" (22.86cm); 15.36" (39.01cm)].

Only VB series systems are modular and may be changed as to mounting plate size and style at nominal cost. 15" arms with diagonal braces are available by special order in conjunction with the above.

### Pre-Attachment Considerations

- The maximum load limit of the system is 80 lb. (36 kg.). The instrument's center of gravity should not be more than 6 ft (1.82m) above the bottom of the monitor and not in front of the Elevating Bar, to which the mounting plate is attached.

*Note: The turning radius of larger monitors may be restricted under these conditions.*

- The side clamps are at an 89° angle to the side of the monitor. Tighten the screws to bring them flush with the sides of the monitor (90°). Over-tightening the screws can crush the sides of the monitor or destroy the function of the clamp by exceeding the 90° angle. The purpose of the small screws penetrating the side of the case is not to clamp, but to prevent the loss of clamping pressure in the unlikely event of a sharp blow to the monitor.

- Make sure that the channel is properly positioned and is securely mounted to the wall according to the wall channel mounting instructions (supplied separately).

### **Sequential Monitor Attachment Procedure**

See Figure 3-6 for an illustration of the wall channel and a 12” arm.

➤ ***To attach the monitor:***

1. Insert the adjustable stop (small aluminum bar, 2½” x ½” x ¼” with black nylon thumbscrew) in the top of the wall channel and rest against the fixed stop at the bottom of the wall channel.
2. Insert the black slide of the Arm/Mounting Plate assembly in the top of the wall channel. Align squarely and push down into the channel until the desired mounting height is reached. Apply force at the base end of the arm nearest the slide. Push the adjustable stop up, until it is flush with the bottom surface of the slide, and with your fingers, tighten the nylon thumbscrews.
3. Rotate the mounting plate so that the black plug in the sidewall of the elevating head faces the wall channel. Insert the side clamps in the mounting plate and begin tightening the screws with your fingers. This ensures a straight start. Now use a no.1 Phillips screwdriver to tighten the screws. Center the monitor on the mounting plate and swivel to test the turning radius clearance. Do not allow the front to back center of the monitor to extend beyond the clamping screw even if a full turning radius is not possible.
4. Measure to ensure that each clamp extends an equal distance from the end of the mounting plate. Also measure the distance from the edge of the clamp to the front of the monitor to ensure that the case is square with the plate and the mounting plate is solidly in contact with the bottom of the monitor. Tighten the clamping screws as previously described in “Pre-Attachment Considerations”, step B. At least 3/8” of the screw’s thread must penetrate the plate.
5. Use a 3/32” diameter bit with a sleeve exposing no more than ¼” of the bit to drill through the upper holes of the clamps into the sides of the case.

In some cases, it is preferable to mark the holes, remove the monitor, slide out the chassis and only then drill the holes. Use judgment and take into consideration the type and thickness of the case material and the design of the monitor.

6. When the channel has been firmly secured to the wall, install the isolation transformer (optional) and the two arms by sliding them through the channel. If the arm height must be readjusted after installation, loosen the adjustable stop. Grasp the arm at the base end nearest the wall with one hand while

supporting the weight of the monitor with the other hand. Apply force at the base end of the arm and slowly push up or pull down as necessary.

**WARNING!!!** *Never attempt to remove the mounting assembly from the wall channel while loaded with instruments.*

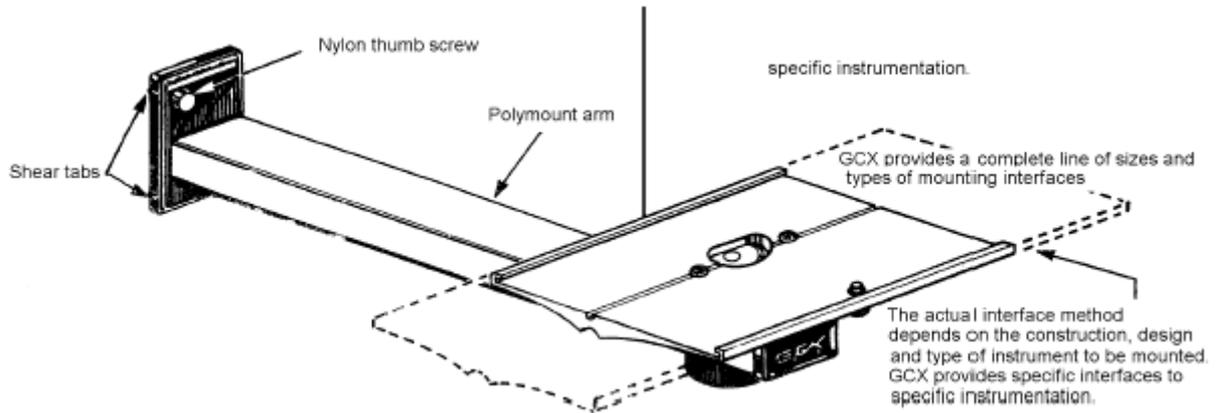


Figure 3-6: Wall Channel and a 12" Arm

### 3.5.5 Mounting Options

As mentioned above on page 11, Mennen Medical has a number of different mounting kits for mounting the Vitalogik. The two basic options for mounting the *Vitalogik* bedside monitor are the following:

**Non-split** – the display screen is placed directly on the MPU, the MPU sits on a support arm, the MR can be attached in various ways depending on the configuration of the system.

**Split** – the display screen and MPU are each placed on separate support arms, the MR can be attached in various ways depending on the configuration of the system.

**Note:** *For optimal safety, when mounting the Vitalogik bedside monitor make sure to carefully follow the instructions*

## ***Attachment of the Display Screen, the Front Panel and the Recorder***

The Mennen Medical mounting kit includes the relevant drawing for each of the mounting options (see Section 3.6 above), as well as instructions for attaching the Display Screen, Front Panel/s and Recorder.

The following mounting instructions apply to the basic non-split mounting option for the Display Screen, Front Panel and Recorder – see also the attached BM (800-050-820), and the attached drawing (800-050-821) on page 23.

**Table 3-4: Bill of Material (800-050-820)**

<b>Desg</b>	<b>Item no.</b>	<b>Rev</b>	<b>Description</b>	<b>Unit</b>	<b>Qty</b>	<b>SR</b>
	ECN-8073-REV.	A				
	ECN-8208-REV.	B				
001	260-375-010		WALL MOUNT-HOR OEM	EA	1	
002	260-375-015		POLY QUIP INFUSION PUMP MOUNT WITH 8" SUPPORT	EA	1	B
003	135-101-040		WASHER-SPLIT LOCK #8	EA	4	B
004	134-103-019		SCREW, 8"-32X3/8, PH, PHIL, SS	EA	4	B
005	260-375-016		V-BLOCK MOUNTING SYSTEM WITH KNOB SCREWS	EA	2	B
006	134-401-011		SCREW 1/4-20X 1/2 PH PHIL SS	EA	8	B
007	800-050-821	B	VITALOGIK INST DWG FOR MOUNT NONSPLIT DISPL W MR W R	EA	1	S
011	134-103-030		SCREW 8-32 X 1/2 PH PHIL	EA	2	B
012	134-102-041		SCREW 6-32 X 1/2 PH PHIL	EA	4	B



the arms (items 1, 2), by sliding them through the channel. The bottom of the channel should be at least 1.45 m from the ground. Use GCX assembly instructions for item 1.

2. Attach the MPU adapter plate (item 1) to the bottom of the MPU using screws (items 3, 4).
3. Place the MPU on the mounting interface (item 1) by sliding the MPU adapter plates sideways into the mounting plate.
4. Attach the display adapter plate to the MPU using screws (item 12).
5. Attach the display base to the adapter plate (See display assembly instructions).
6. Attach the front panel to GCX V-block (item 5) using screws (item 6).
7. Join the V-block around the left arm of item 2 by turning in the four screws. Keep the V-block surfaces parallel to each other.
8. Attach the recorder plate carrier (item 8) to the V-block (item 5) using screws (item 6).
9. Attach the plate carrier to the recorder using screws (item 11).
10. Attach the assembly to the right arm of item 2.
11. Connect cables from MPU to the display.
12. Connect the MPU to transformer cable from MPU back panel to transformer, and from the transformer to the mains with the transformer power cable.
13. Connect the recorder power cable from the recorder to the mains.
14. Connect the MPU cable to the front panel.
15. Fix the wall plate to the data wall outlet socket.
16. Connect the two LAN cables from the MPU back panel to data wall outlet socket, and the LAN cable from the recorder back panel to the MPU side panel.
17. Connect the ground cable from the MPU back panel to the hospital ground point.

**Note:** *If the transformer is not in use, connect the power cord from the MPU to the mains.*

## Mounting of Split Display with Front panel and Recorder

The following mounting instructions apply to the basic split mounting option for the Display Screen, Front Panel and Recorder – see also the attached BM (800-050-825), and the attached drawing (800-050-826) on page 26.

*Note: Mounting instructions and Bill of Materials for the other possible combinations can be obtained from Service by request.*

**Table 3-5: Bill of Material (800-050-825)**

Desg	Item no.	Rev	Description	Unit	Qty	SR
ECN-8072-REV.		A				
001	260-375-013		CHANNEL 25"	EA	1	B
002	265-375-019		WALL MOUNT, SUPPORT ARM 15"	EA	2	S
003	265-375-015		POLY QUIP INFUSION PUMP MOUNT WITH 8" SUPPORT	EA	1	B
004	135-101-040		WASHER-SPLIT LOCK "8	EA	4	B
005	134-103-019		SCREW, 8-32"x3\8, PH, PHIL, SS	EA	4	B
006	260-375-016		V-BLOCK MOUNTING SYSTEM WITH KNOB SCREWS	EA	2	B
007	134-401-011		SCREW ¼-20 x ½ PH PHIL SS	EA	8	B
008	557-506-000	B	PLATE CARRIER, RECORDER	EA	1	S
009	260-375-018		ADAPTER PLATE	EA	1	B
010	800-050-826	A	VITALOGIK INST DWG FOR MOUNT SPLIT DISPL W MR W R	EA	1	S
011	134-103-030		SCREW 8-32 X ½ PH PHIL	EA	2	B

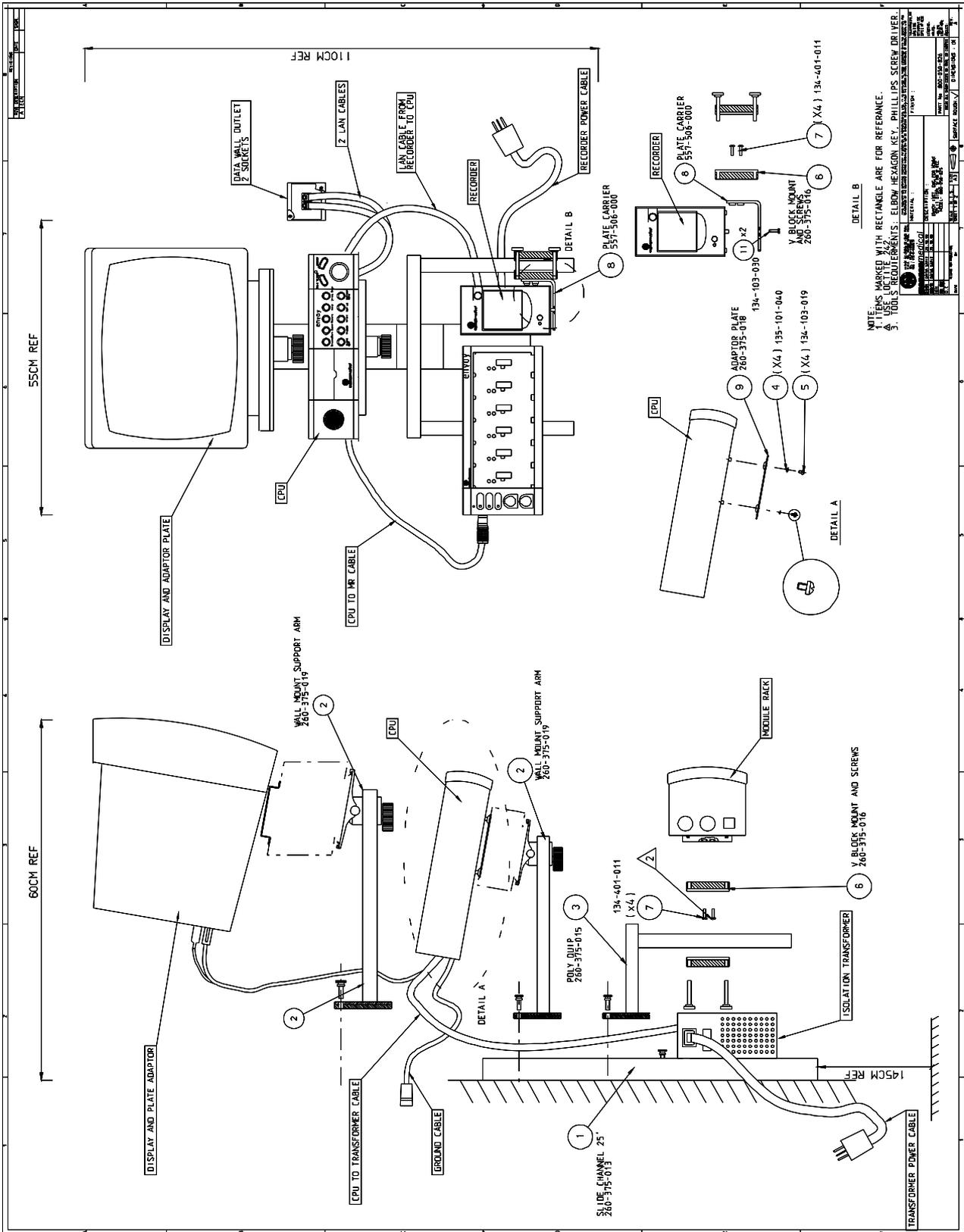


Figure 3-8: Installation of Split Display with Front panel and Recorder

➤ ***To mount a split display with front panel and recorder:***

1. Attach the channel (item 1) to the wall and install the isolation transformer and the arms (items 1, 2, 3), by sliding them through the channel. The bottom of the channel should be at least 1.45 m from the ground. Use GCX assembly instructions for item 1.
2. Attach the display base to the display (See display assembly instructions).
3. Place the display assembly on its mounting plate (item 2), by sliding the adapter plate sideways into the mounting plate.
4. Attach the MPU adapter plate (item 9) with the plunger hole facing front, to the bottom of the MPU, using screws (items 4, 5).
5. Place the MPU assembly on its mounting plate (item 2), by sliding the adapter plate sideways into the mounting plate.
6. Attach the front panel to GCX V-block (item 6) using screws (item 7).
7. Join the V-block around the left arm of item 3 by turning in the four screws. Keep the V-block surfaces parallel to each other.
8. Attach the recorder plate carrier (item 8) to the V-block (item 6) using screws (item 7).
9. Attach the plate carrier (item 8) to the recorder using screws (item 11).
10. Attach the assembly to the right arm of item 2.
11. Connect cables (video and power) from the display to the MPU.
12. Connect the MPU to transformer cable from MPU back panel to the transformer, and from the transformer to the mains using the transformer power cable.
13. Connect the recorder power cable from the recorder to the mains.
14. Connect the MPU cable to the front panel.
15. Fix the two sockets data wall outlet to the wall.
16. Connect the two LAN cables from the MPU back panel to the two sockets data wall outlet, and the LAN cable from the recorder back panel to the MPU side panel.
17. Connect the ground cable from the MPU back panel to the hospital ground point.

**Note:** *If the transformer is not in use, connect the power cord from the MPU to the mains.*

### 3.5.6 Mounting the Nurse Station Devices

It is recommended to mount the nurse station according to the following figure.

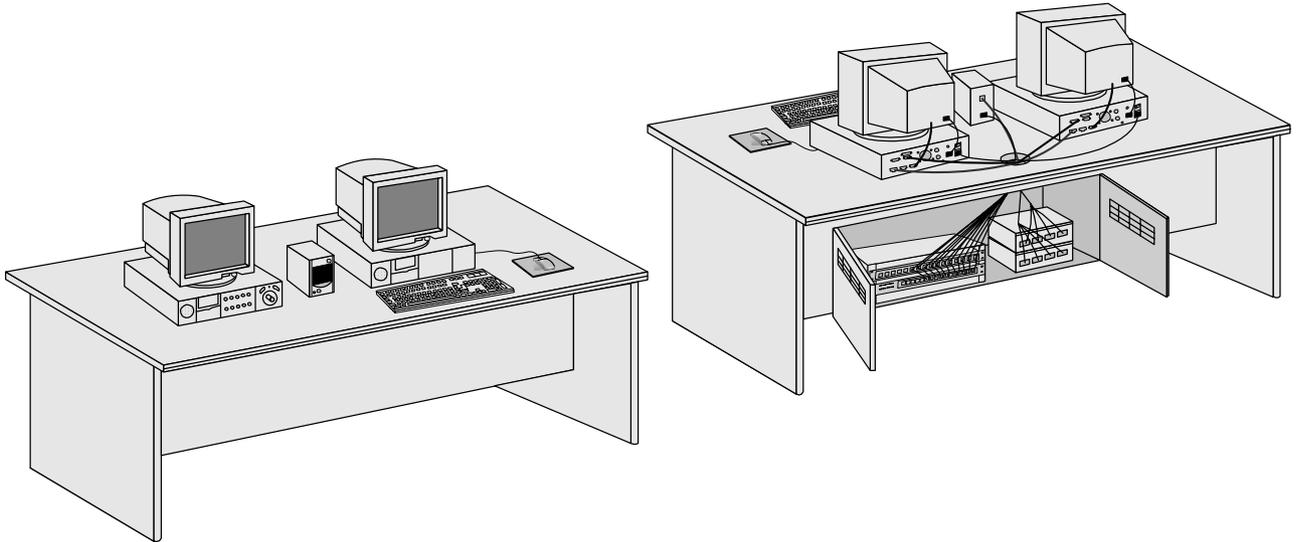
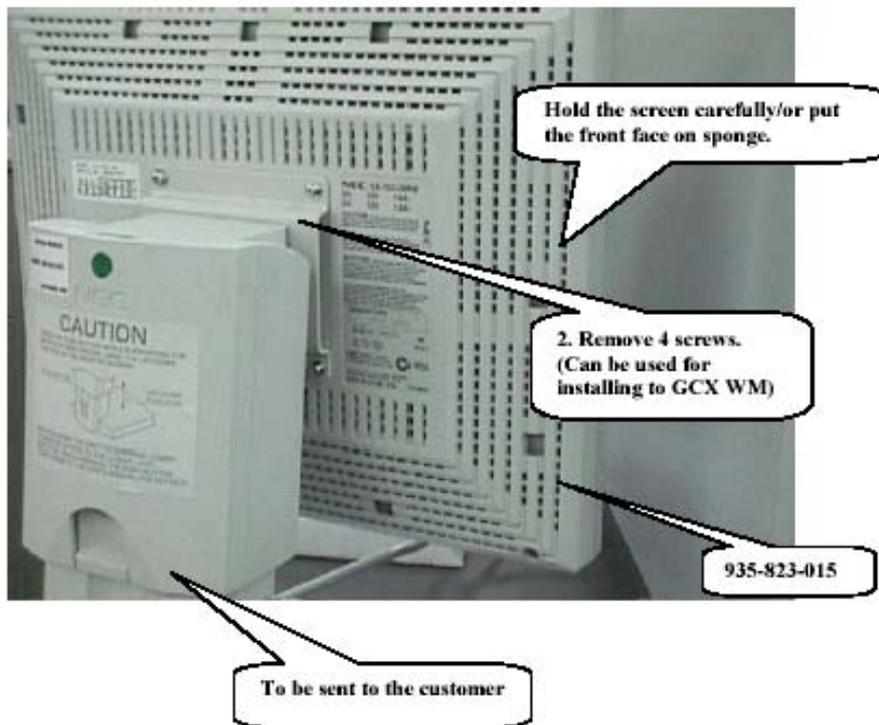


Figure 3-9: Mounting the Nurse Station Devices

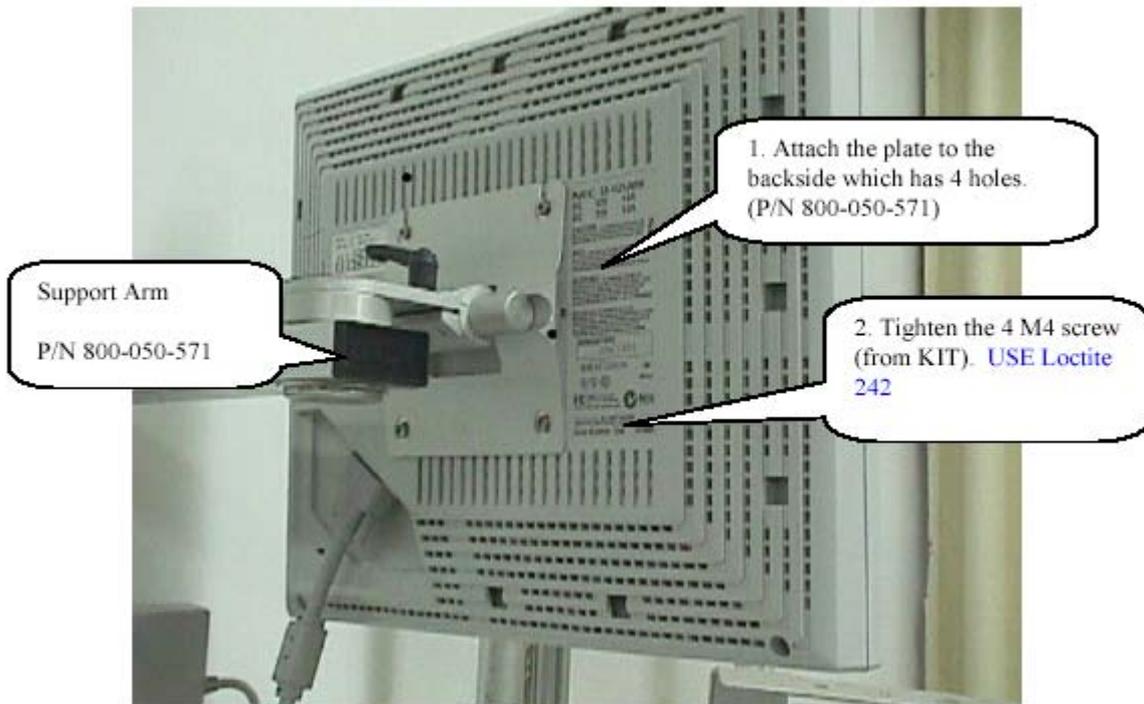
### 3.5.7 Mounting the Flat Screen

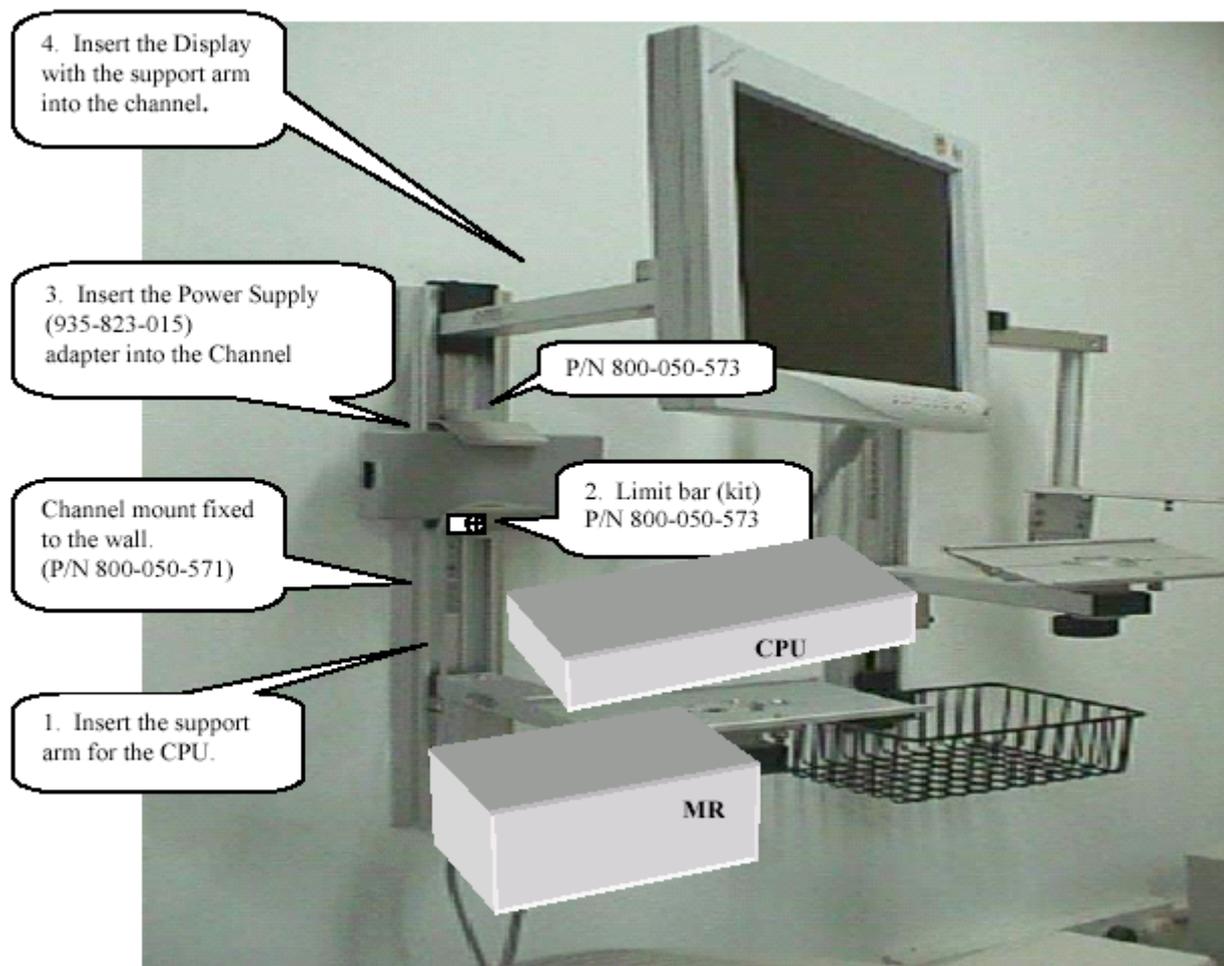
To assemble and Disassemble the LCD NEC type 1510 from its base and in the field, follow the steps in the Figure below:



➤ *To install the support arm to the back of the LCD NEC 1510,*

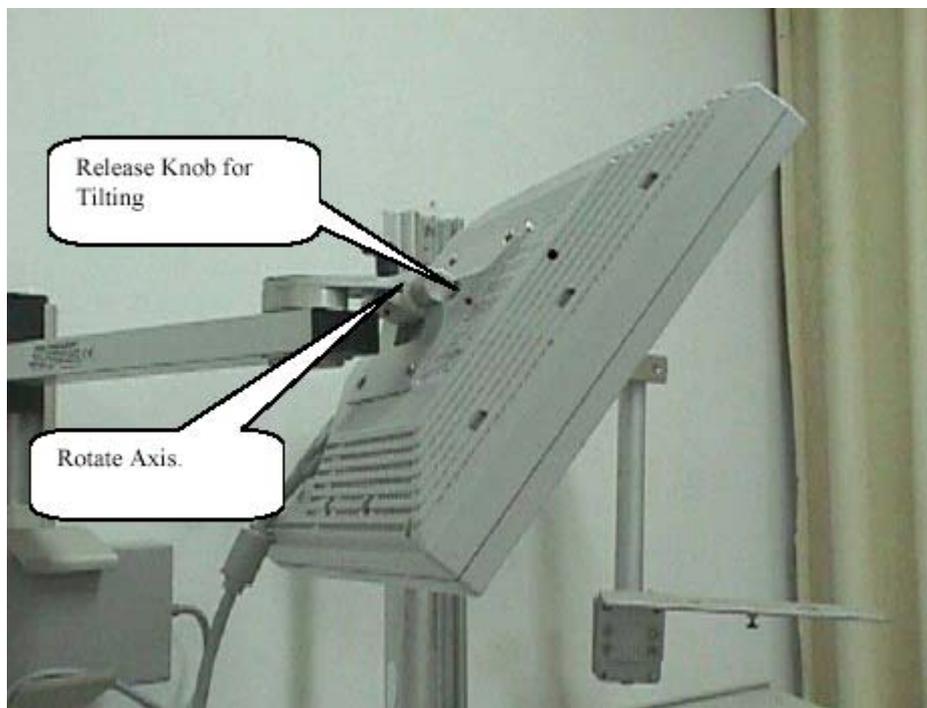
1. Follow the steps set out in the two Figures below.



**General Comments:**

1. All components should be fixed at a height convenient to the User.
2. The Power Supply should be assembled to the clamp before inserting to the channel.
3. Ensure that all Screws and Clamps are securely fixed.
4. Connect all Power/Communication cables.
5. Test the system on completion of the above Setup.

- ***To Release, Rotate and Tilt the display***
  1. Follow the steps in the Figure below:



### **Monitor Mounting**

**CAUTION!** *Mennen Medical is responsible for the monitor's wall mount and shelves if and only if they were installed by Mennen Medical or by a person authorized by Mennen Medical.*

**WARNING!!!** *Mennen Medical will not be responsible for the stability of the wall mounts and shelves unless checked by Mennen Medical at least once a year.*

**Note:** *Mennen Medical will perform the required check during the warranty period. At the end of the warranty period it is the responsibility of the hospital to provide a service call to Mennen medical service department, or to have a service contract.*



# CHAPTER 4 - UPGRADING SOFTWARE

This chapter describes the technique employed to support Vitalogik software upgrades.

The proposed method attempts to resolve the various possible installation scenarios, as experienced by personnel servicing the Vitalogik with the various tools. There are two methods for upgrading Vitalogiks:

- Replacing the Hard Disk .
- Upgrading using Microsoft Windows utilities .

In addition the following is also described:

- Upgrading Main software of Vitalogik.
- Upgrading the inputs and/or Front panel

*Note: You should check the system after upgrading!*

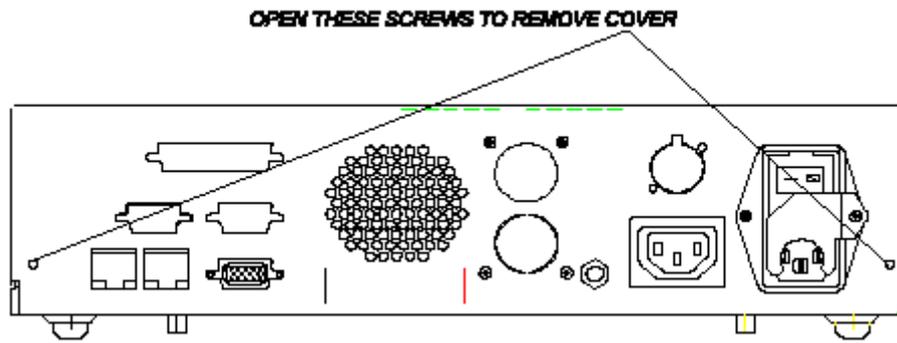
*Note: Send to Mennen Medical Service Department, the p/n and the serial numbers of any device that you upgraded.*

## **4.1 Replacing the Hard Disk:**

Before Replacing any Vitalogik Hard Disk, you should turn off the MPU. Use the MCU and click shutdown before turning off, if the S.W. is >v3.3

➤ ***To remove the MPU cover:***

1. Remove the two Phillips screws located at both sides of the back panel
2. Carefully pull the cover toward the back of the unit and lift it slightly upward.
3. Place the cover where it won't be damaged or damage other equipment.

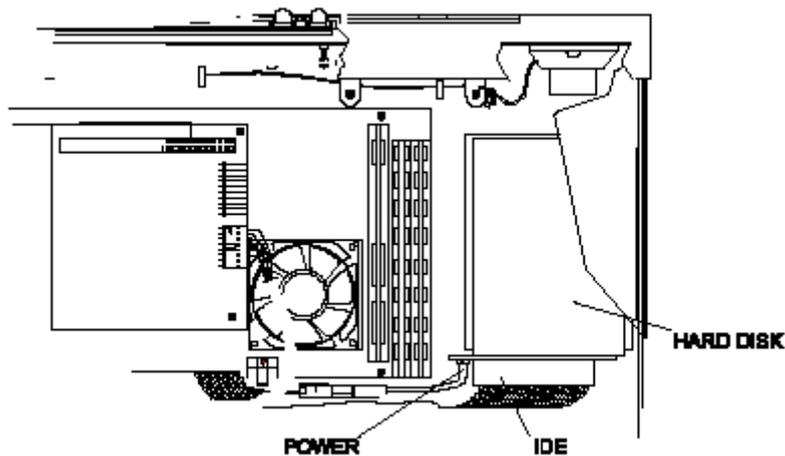


*Figure 4-10: Removing the Computer Cover*

4. When reinstalling the cover, make sure it is properly inserted into the case.
5. In order to continue the Vitalogik software upgrade you should replace the hard disk.

► **To replace the Hard Disk**

1. Carefully disconnect the IDE cable and power cable from the rear of the hard disk (in Figure 4-11:).



*Figure 4-11: Hard Disk IDE and Power Connectors*

2. Turn the unit on its side.

The hard disk is attached to a bracket, which is secured by four Phillips screws through the base of the unit.

3. Locate these screws at the outside bottom of the case" opposite the four corners of the hard disk bracket (in Figure 4-12:).

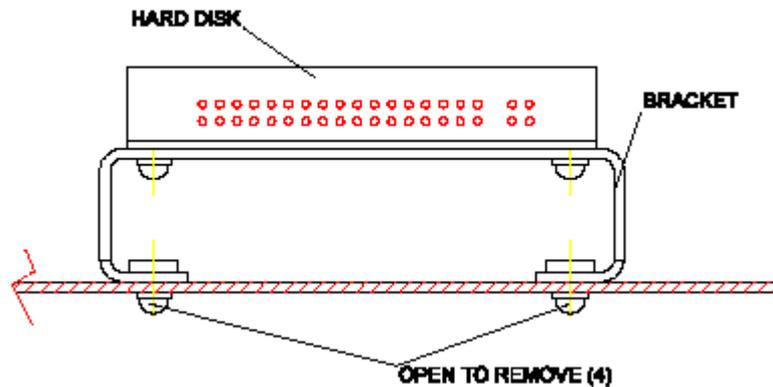


Figure 4-12: Hard Disk and bracket

4. Hold the hard disk in place with one hand and remove the mounting screws.

**WARNING!!!** Do not remove the small screws that secure the hard disk cover in place. Opening the cover may permanently damage the hard disk.

5. Remove the old hard disk together with its bracket, and install the new hard disk and bracket in its place.
6. Reinsert and tighten the four bracket mounting screws, and lay the unit flat.
7. Carefully reconnect the IDE cable plug and DC power connector.
8. Make sure that all the connectors are firmly in place and properly installed (in Figure 4-13:).

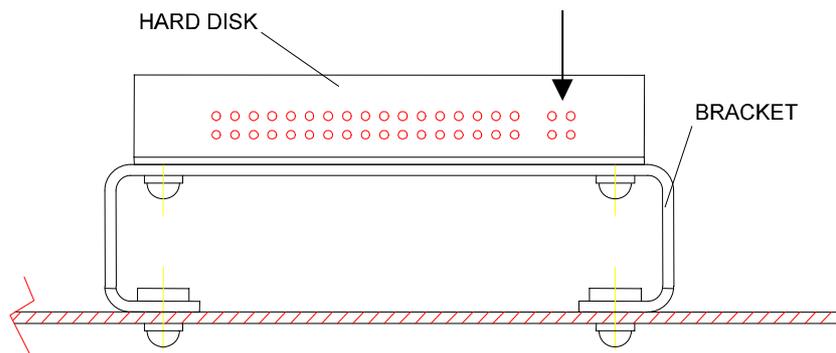


Figure 4-13: Connectors

9. Test the new hard disk before closing the cover:
  - Connect the main power cable power socket.
  - Connect the video display monitor.
  - Turn ON the unit main power switch.
10. If the unit boots up correctly, put the cover in place.
11. If the unit does not function properly, recheck the IDE cable plug and DC power connector.

## ***4.2 Upgrading Using Microsoft Windows Utilities***

### **4.2.1 General**

The Vitalogik software consists of:

- QNX operating system
- Vitalogik Application software

The following instructions cover all the procedures needed to achieve a successful upgrade of one Vitalogik.

### **4.2.2 Required Hardware**

- Personal computer
- Modem
- Network Card with RJ45 connector
- Network Patch Cable for a connection to the switch or Network Cross Connect cable for a direct connection to an Vitalogik.

### **4.2.3 Required Software**

- Windows 95 or 98
- Internet browser software (AOL, Internet Explorer, etc.)
- WS\_FTP95 or compatible program
- Winzip

## 4.2.4 Downloading the New Version

You can download a new version from the Mennen Medical FTP site.

► ***To download an update version from the Mennen medical FTP site:***

1. Use the following parameters:

**host name/address:** <customer id>  
**host type :** Automatic detect  
**user ID:** <customer id>  
**password:** <customer password>

2. Select the new version file and copy it to your laptop.

*The file you just download is a compressed one in a zip format. The zip file contains one file in tar format.*

3. Run winzip to extract the tar file.

*You should see now a file with the following format: Vitalogik.tar.xxx where the xxx is the version number.*

## 4.3 Upgrading Vitalogik

**WARNING!!!** *Before upgrading Vitalogiks, make sure there is no patient connected to the Vitalogik.*

### 4.3.1 Changing the IP Address of your Laptop

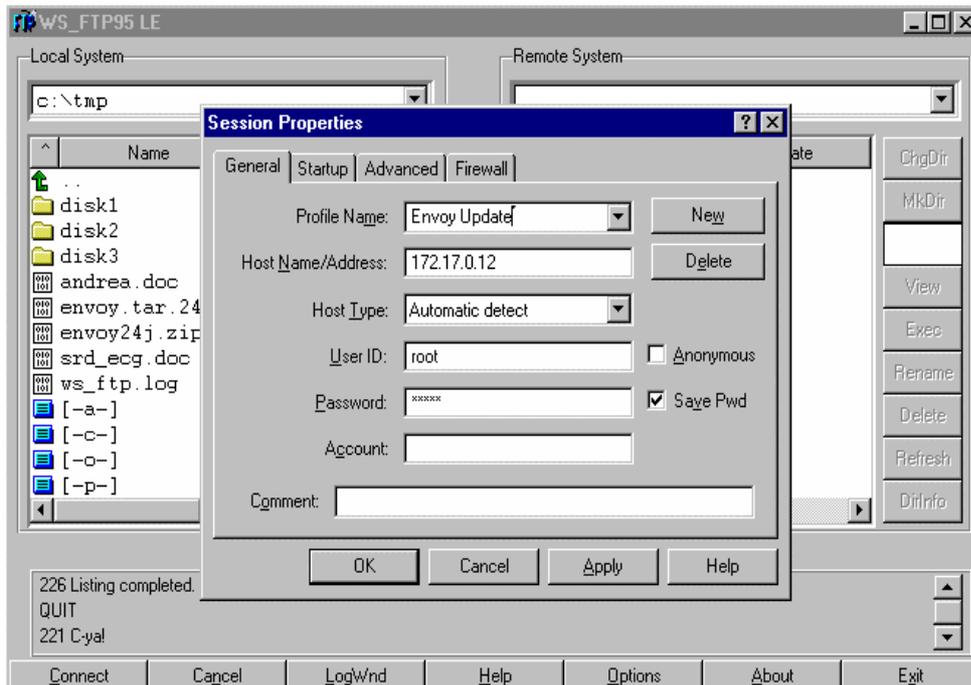
1. Connect your computer to the Vitalogik network.
2. Select the Network Neighborhood icon and press the right button of your mouse.
3. Select **Properties**.
4. In the **Configuration** area, select the TCP/IP that is bound to your network card.
5. Click on **Properties**.
6. Select “**IP Address**” tab
7. Change the following properties:  
IP Address = 172. 17 . 0 . 250 (250 or number higher than 180)  
Subnet Mask = 255.255. 0 . 0
8. Click **OK** twice to exit and save the new settings.
9. Reboot the PC.

## 4.3.2 Copying the Tar file from a Laptop to a Vitalogik

- *To copy a TAR file from the laptop to Vitalogik*

*Note: If the current Software is not 3.3C skip to step 12.*

1. Connect a local Keyboard to the Vitalogik
2. Power off the Vitalogik.
3. Power on the Vitalogik.
4. As soon as the BIOS information box appears press "ESC" button three times and wait until you get : **login**,
5. Type : root , followed by Enter. you will get QNX prompt "#"
6. Type the following : vedit /etc/config/sysinit.1
7. Change the line "on -n1 -p25 inetd&" to "on - n1- p20 inetd&"
8. Save and Exit
9. Type: **sync**
10. Type: **shutdown -f**



11. On your PC : Using WS\_FTP95 program, create a new session called Vitalogik Update. In the Host Name field type the IP address of the Vitalogik you wish to connect to. Use root as User ID and go4it as Password. Set the "Save Password" option to save the setting for the next update.

12. In the Remote System field, select the **Vitalogik.tar** file (old) under /UPDATE directory and click **Delete** to delete it.
13. Select the tar file (Local System field ) and transfer it into the Vitalogik (Remote System field) into /UPDATE directory). When the transfer is completed, click on the Rename button and rename the file you have just transferred from **Vitalogik.tar.xxx** to **Vitalogik.tar**

### 4.3.3 Upgrading Vitalogik Software

Use the new version of the tar file to create a new **Vitalogik** software version .

➤ ***To Upgrade Vitalogik Software (from v3.1x / 3.2x to v3.3x or later)***

1. Discharge the Vitalogik, admit, and wait for 10 sec and discharge again.
2. On your PC Open MS-DOS prompt
3. Type in the following commands:
4. telnet <Vitalogik IP address> (for example: telnet 172.17.0.10)
5. login as # root
6. stop the system, type # stop
7. Type : # touch /app/VITALOGIK/Need\_cleanup
8. Type : # sync
9. Type : # sync
10. Type : # Shutdown -f
11. Wait till the Vitalogik system will build the new version and will scan check the disk automatically ( This may take up to 5 minutes).
12. At the end of this procedure you will get the normal Vitalogik monitor screen.

**Note:** *At the end of the software update check the Vitalogik functionality and confirm that all the parameters work properly.*

➤ ***To upgrading Vitalogik Software (from v3.3x to v3.3x or later)***

1. Discharge the Vitalogik, admit, and wait for 10 sec and discharge the monitor again.
2. On your PC Open MS-DOS prompt
3. Type in the following commands:
4. telnet <Vitalogik IP address>(for example: telnet 172.17.0.10)
5. login as root

6. stop the system, type # stop
7. Type # uflags –csm (Ignore RealyMe error message)
8. Type : # sync
9. Type : # sync
10. Type : # Shutdown –f
11. Wait till the Vitalogik system will build the new version and will scan check the disk automatically ( This may take up to 5 minutes).
12. At the end of this procedure you will get the normal Vitalogik monitor screen.
13. At the end of the Vitalogik update, the Vitalogik will automatically update the software versions of all the inputs that are connected to the front panel.

**Note:** *You can skip the automatic update of the inputs by using # uflags –cs instead of # uflags –csm.*

**Note:** *At the end of the software update check the Vitalogik functionality and confirm that all the parameters work properly.*

➤ **To upgrading Vitalogik Software (from v3.4x to later version)**

1. Discharge the monitor, admit, and wait for 10 sec, and discharge the monitor again.
2. On your PC Open MS-DOS prompt
3. Type in the following commands:  
telnet <Vitalogik IP address > (for example: telnet 172.17.0.10)
4. Login as root
5. Run the command # uflags –sm

*A window, requesting confirmation for the software update, will pop-up.*

6. Press ‘Start’. The Vitalogik will reboot and the new software will be installed.
7. Wait till the Vitalogik system will build the new version and will scan check the disk automatically ( This may take up to 5 minutes)

*At the end of this procedure you will get the normal Vitalogik monitor screen.*

8. At the end of the Vitalogik update, the Vitalogik will automatically update the software versions of all the inputs that are connected to the front panel.

**Note:** *You can skip the automatic update of the inputs by using # uflags –s instead of # uflags –sm*

***Note:** At the end of the software update check the Vitalogik functionality and confirm that all the parameters work properly.*

**Please note :**

- 1. If the Vitalogik is not in discharge mode, the confirmation window will be displayed once the patient is discharged.**
- 2. If the button (start) is not pressed within two minutes, the update will start automatically.**



# CHAPTER 5 - MAINTENANCE AND CLEANING

## 5.1 *Cleaning the VitaLogik Bedside Monitor*

The VitaLogik bedside monitor can be cleaned with most common hospital cleaning solutions and detergents. Be careful not to use caustic detergents or ammonia or acetone-based cleaning solutions. These may damage the bedside monitor.

► *To clean the VitaLogik bedside monitor and accessories:*

1. Switch the monitor off and disconnect from the power supply before cleaning.
2. Dust the monitor regularly. Clean with a lint-free cloth or sponge dampened with cleaning solution. Abrasive scouring powders and pads should be avoided to prevent damage to the monitor.
3. Clean the display screen with non-abrasive glass cleaners, such as “Ajax” or “Windex”. Use a lint-free cloth. A paper towel may damage the screen.

Before cleaning a Touch Screen disable the Touch functionality. To disable Touch enter System Setup (password protected) and press the "Touch Screen" key. At the end of the cleaning re-activate the Touch functionality.

4. Clean patient cables and all exposed surfaces with mild soap solution only. Using alcohol or any type of concentrated cleaning solution may impair patient cable flexibility.
5. Remove any adhesive used to attach the cable to the patient. To remove adhesive residue, use a plaster remover solution made up of one-third alcohol, two-thirds water, or use a commercial tape remover such as Scholl Double Seal tape remover. Do not use strong solvents (acetone, straight alcohol, ammonia, etc.). These will damage the cable.
6. Do not autoclave patient leads, transducer components or other sensors. Autoclaving permanently damages these instruments. If you need to sterilize accessories, we recommend EtO gas sterilization.

## 5.2 Calibration and Preventive Maintenance

Mennen Medical Ltd. recommends that the *VitaLogik* be checked at least once a year by qualified Mennen Medical personnel for proper calibration of the unit.

The exterior of the unit should be periodically checked for any signs of damage or abuse. Units or parts which show any signs of damage should be immediately referred to a qualified technician.

Before commencing monitoring on a patient:

- check for any mechanical damage.
- check all external leads and accessories.
- check all functions of the instrument needed to monitor the patient and ensure that the instrument is in good working order.

Do not use the *VitaLogik* for any monitoring procedure on a patient if you identify features which demonstrate impaired functioning on the instrument. Contact the hospital biomedical engineer, or Mennen Medical service engineer.

Full performance checks, including safety checks, must be performed by qualified service personnel at least once a year and after every repair.

The synchronization of the monitor and defibrillator should be checked as often as required by the Hospital Procedures Policy, and must be tested at least every three months by qualified service personnel.

The grounding and equipotential resistances of the monitor and power cables must be tested at least every 3 months.

All checks which require the instrument to be opened must be made by qualified service personnel. Safety and maintenance checks can also be made by Mennen Medical personnel. Your local Mennen Medical agent will be glad to give you information about service contracts.

## 5.3 VitaLogik5500 And VitaLogik5000 Patient Monitors BOM

**Table 5-6: Bill of Materials**

	641502000	VL Main Computer Unit Cover	
	641601600	VL Front panel NI Assy.	
	641601610	VL Front panel Invasive Assy.	
	641201010	PCBA With Nellcor	
	641201020	PCBA With Massimo	
	551139012	Massimo PCBA	
	641201000	CIPAM PCBA	
<b>641601600</b>	<b>VitaLogik5000 Front panel Assy.</b>		
	641601000	V.L. Front panel without IBP/CO	
	641601002	Cover of Front panel led	
	641601001	EtCO door	
	641602000	V.L. Rubber for Keypad	
<b>641201020</b>	<b>PCBA With Nellcor</b>		
	641201000	CIPAM PCBA	
	551139012	Massimo PCBA	
	551130040	NIBP ASSY.	
	551306131	NIBP cable	

**Table 5-6: Bill of Materials**

<b>641201010</b>	<b>PCBA With Nellcor</b>		
	641201000	CIPAM PCBA	
	261330040	SPO2 NELLCOR	
	551130040	NIBP ASSY.	
	551306131	NIBP cable	

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**Table 5-6: Bill of Materials**

<b>641501010</b>	<b>VitaLogik Main Frame Assy.</b>		
	127115500	SW OPTICAL ENCODER,24 POS W-NUT	
	641304023	Cable led Assy	
	554201000	MCU Board	
	641554049	TEMP. CONNECTOR ASSY. FOR CFE	
	641554043	SPO2 CONNECTOR ASSY. FOR CFE	
	641554041	ECG CONNECTOR ASSY. FOR CFE	
	199104401	PLUG,AIR CONNECTOR,3MMHOSE TAIL.	
	960554045	IBP Conn. ASSY.	
	641554047	CO / TEMP. CONN. ASSY.	
	554603010	TRIM KNOB W/SPRING	
	641202000	F.E Board	
	641304020	Cable, front end board to Main board	
	124015027	CIPAM board spacers	
	641108038	power supply support bracket	
	134301503	power supply external bracket screw	
	134101013	power supply screw (internal)	
	108020038	POWER SUPPLY +5V,+12V,-5V,-12V,110W	
	554323016	cable input ac to p/s	
	554206030	AC INPUT MODULE-ASSY	
	102206010	AC APPLIANCE OUTLET	
	241593010	BKT-LINE CORD RETAINER	
	554110000	FAN ASSY	
	641314011	CABLE ASSY M.B TO SERIAL PORT	
	641304018	Cable for Remote Keypad	
	641304019	Cable for U.I.M.	
	641304022	Cable Assy. For Analog Output	
	641333015	Cable P/S DC Outputs	
	641314010	CABLE ASSY-M.B TO MCU/SPLITTER	
	641314101	Cable, Lan Cross (30cm)	
	146023000	PC Card (FTW-SBCE2)	

**Table 5-6: Bill of Materials**

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<b>641OPT200</b>	<b>Etco2 Option (option on 641210010 or 641201020)</b>		
	551242242	Oredion ASSY.	
	551142002	Cable for etco2	