HP M1165/66/67/75/76/77A Viridia Component Monitoring System and HP M1205A Viridia 26/24 Ser

User's Reference Manual
Volume 1
System Information

HEWLETT® PACKARD
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Printing History

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when extensive technical changes are incorporated.

First Edition..... February 1999

Important

United States federal law restricts these devices to sale by or on the order of a

The M1165/66/75/76A Systems comply with UL544, CSA 22.2-125, IEC 601-1, EN
EN 60601-1-2 and carries CE 0366 Marking to Council Directive 93/42/EEC, Eu
Device Directive (MDD).

The M1167/77A Systems comply with UL2601-1, CSA 22.2 No. 601.1-M90, IEC 6
EN 60601-1, and EN 60601-1-2 and carries CE 0366 Marking to Council Directi
European Medical Device Directive (MDD).

The M1205A option 020 and 022 complies with UL2601, IEC 601-1, CSA C22.2 n
EN60601-1, and EN60601-1-2 and carries CE 0123 Marking to Council Directiv
European Medical Device Directive (MDD).

The M1205A option 021 complies with UL2601, IEC 601-1, CSA C22.2 no. 601-1,
through 5, and VDE 0871 level A.

Electromagnetic Compatibility (M1205A Viridia 26/24

The electromagnetic compatibility (EMC) validation of the M1205A included tes performed according to international standards for EMC with medical devices. Manufacturer's Declaration for details.

EMC Testing

During the test program the M1205A was subjected to many EMC tests, both int standard and HP proprietary tests. During most of the testing no anomalies wer For two of the tests, IEC 801-3 Radiated Immunity and IEC 801-4 Fast Transient Immunity, some reduced performance was observed. IEC 801-3 specifies that th subjected to a field of 3 V/m over a frequency range of 26 to 1000 MHz with no d performance. At many of the test frequencies over the specified range no anoma observed. However at a number of test points, increased width of the ECG and observed. For these test points the radiated field was reduced to the level at wh returned to normal. These reduced levels are shown in the table below.

	From 26 to 200 MHz	From 200 to 10
Immunity Levels (V/m)		
ECG	.175 worst case	.220 worst case
Pleth	no problems	.391 worst case

IEC 801-4 specifies that the product be subjected to high speed pulses up to 100 the power cord and all I/O cables greater than 3 m. During and after most of the no anomalies were observed. However at pulse levels greater than 680 V applie power cord, anomalies were sometimes observed in the form of display transie numerics and RS-232 disruption. At voltages greater than 300 V applied to the R disruption in RS-232 communication was observed.

In compliance with IEC 801-4, the M1205A performs its intended function witho satefy hazard, at the reduced levels specified above.

System Characteristics

The phenomena discussed above are not unique to the M1205A but are charact patient monitors in use today. This performance is due to the very sensitive hig amplifiers used to display the physiological signals. Among the many similarly monitors already in use by customers, interference from electromagnetic sourc problem in actual use.

Avoiding Electromagnetic Interference

When electromagnetic interference (EMI) is encountered there are a number o can be taken to mitigate the problem.

- Eliminate the source. Possible sources of EMI can be turned off or move reduce their strength.
- Attenuate the coupling. If the coupling path is through the patient leads, t may be reduced by moving and/or rearranging the leads. If the coupling is power cord, plugging the M1205A into a different circuit may help.
- Reduce the sensitivity of the system. In all of the EMC testing the M1205A to maximum sensitivity. For the ECG amplifier the gain was four times w required. By reducing the gain of the system receiving the EMI, the interf often be eliminated.
- Add external attenuators. If EMI becomes an unusually difficult problem devices such as an isolation transformer or a transient suppressor may be Customer Engineer can be of help in determining the need for external d

Intended Use

Description

The HP M1165/66/67/75/76/77A Viridia Component Monitoring System and the H
Viridia 26/24 Series Monitors are network connectable bedside patient monitori

The HP M1205A Viridia Models 24CT and 26 CT may powered by either AC line
battery power.

Purpose

The HP M1165/66/67/75/76/77A Viridia Component Monitoring System and the H
Viridia 26/24 Series measures and displays multiple physiological parameters an
generates alarms and recordings. It exchanges information with compatible dev
M1165/66/67/75/76/77A Viridia Component Monitoring System and the HP M120
24 Series Monitors are not therapeutic devices.

Patient Population

The HP M1165/66/67/75/76/77A Viridia Component Monitoring System and the H
Viridia 26/24 Series is intended to be used on adult, pediatric, and neonatal patie

Environment

The HP M1165/66/67/75/76/77A Viridia Component Monitoring System and the H
Viridia 26/24 Series is intended to be used in a clinical environment by licensed
is not intended for home use.

It communicates with devices such as a central station through network interfac
serial I/O port.

The HP M1165/66/67/75/76/77A Viridia Component Monitoring System and the H
Viridia 26/24 Series Monitors are prescription devices and will carry the followi
"United States Federal law restricts this device to sale by or on the order of a ph

Indications for Use

Condition

The HP M1165/66/67/75/76/77A Viridia Component Monitoring System and the I
Viridia 26/24 Series Monitors are generally indicated when the clinician decides
to measure and display multiple physiological parameters and waves, to genera
recordings of adult, pediatric, or neonatal patients.

Part of Body or Type of Tissue with Which the Device Interac

The HP M1165/66/67/75/76/77A Viridia Component Monitoring System and the I
Viridia 26/24 Series does not contact the body or tissue of the patient. Signals a
from accessory electrode, transducer, and sensor devices.

Frequency of Use

The HP M1165/66/67/75/76/77A Viridia Component Monitoring System and the I
Viridia 26/24 Series Monitors are indicated for use when prescribed by a clinici

Physiological Purpose

The HP M1165/66/67/75/76/77A Viridia Component Monitoring System and the I
Viridia 26/24 Series Monitors are indicated when the purpose is to gain informa
treatment, to assess adequacy of treatment, or to rule out causes of symptoms.
66/67/75/76/77A Viridia Component Monitoring System and the HP M1205A Viri
are well suited for patient monitoring.

Patient Population

Adult, pediatric, and neonatal non-ambulatory patients.

Prescription Versus Over-the-Counter

The HP M1165/66/67/75/76/77A Viridia Component Monitoring System and the H
Viridia 26/24 Series Monitors are prescription devices.

Warnings, Cautions, and Notes

Warnings, cautions, and notes are used throughout this User's Manual to give y information about the The HP M1165/66/67/75/76/77A Viridia Component Monit and the HP M1205A Viridia 26/24 Series. The warnings and cautions included ir section refer to the equipment in general.

Warning

A "warning" calls attention to the user of imminent hazard to people if procedures are not followed.

- For continued safe use of this equipment, it is necessary that the listed in followed. Instructions in this manual in no way supersede established me procedures.
- Explosion Hazard- Do not use this equipment in the presence of flammab
- Alarms - Do not rely exclusively on the audible alarm system for patient r Adjustment of alarm volume to a low level or off during patient monitorir patient jeopardy. Remember that the most reliable method of patient mor combines close personal surveillance with correct operation of monitorir
- This equipment is only intended for use in healthcare facilities by trained professionals.
- The product is not intended for outside hospital use such as a helicopters ambulances.
- This product is not intended for home use.
- To reduce the risk of electrical shock, do **NOT** remove any cover. Refer s qualified personnel.
- This equipment may interfere with ultrasound imaging equipment by cau interference on the ultrasound display. Try to keep the instruments as fa possible.

- Exposure of electrical contacts or connections to saline or other liquids a dangerous. Electrical contacts and connections such as cable connectors, supplies, parameter module plug-in connections and rack connections mu clean and dry. Thoroughly dry any electrical connections that become cor with liquids. If additional decontamination is required please contact your department or Hewlett-Packard Response Center.

- Although this equipment is shielded against Electromagnetic Interference recommended to avoid the use of electrically radiating devices in close pr this equipment.

- Connecting the HP Viridia monitoring network (SDN) cable when the pro powered on is not supported. Error codes and HP Viridia monitoring netw interface lock-up may occur. Power cycling the product will recover the p permanent damage will result. To prevent unintentional disruption in mor sure the SDN interface cable is properly secured at both ends when conne HP Viridia monitoring network (SDN).

- Do not connect a second rack by a cable when using a module rack docke of the Viridia Model 24CT or 26CT. Using a second rack connected by a ca disrupt Viridia module communication.

Caution

A "caution" calls attention to a condition or possible situation that could cause user.

- Ventilation Requirements - Failure to meet ventilation requirements may equipment failure and, in turn, jeopardize the functions of automated mor not locate equipment in an enclosed area which could restrict heat dissipa

- Maintenance - Failure on the part of the responsible individual, hospital, c employing the use of this equipment to implement a satisfactory maintena may cause undue equipment failure and possible health hazards.

- Do not spray cleaning solutions directly onto the monitor. Moisture drop the internal components and cause equipment malfunction or failure. Cle solutions should be applied to a cloth and the cloth used to wipe the moni The monitor should be turned off during cleaning.

- Replacement Parts - It is highly recommended that only Hewlett-Packard parts and accessories be used with this equipment. Failure to do so may r degradation of performance. Accessories and parts for individual module components are listed at the back of the appropriate section in this manu

Note—A note gives special instructions to highlight an operating procedure or p may precede or follow the applicable text.

At this time, Hewlett-Packard will make available on request, and in English on diagrams, component part lists, descriptions, calibration instructions, or other which will assist the user's appropriate qualified technical personnel to repair t the equipment which are classified by Hewlett-Packard to be repairable. A list Support Offices is provided at the end of this manual.

Using This Manual

To enable you to find information easily, there is a contents list at the front of th
comprehensive index at the back.

The User's Reference Manual is separated into two parts; the core document an
parameter module guides.

The Core Document

This section of the guide contains all the general information about the system.
place for new users to start because it gives an introduction to the system and t
works, and shows you how to get started. Here is a list of the major sections:

- Introducing the HP M1165/66/67/75/76/77A Viridia Component Monitoring
  the HP M1205A Viridia 26/24 Series
- Getting Started
- Configuring the System
- Other Patients
- Alarm Functions
- Recording Functions
- Trends and Data Management
- Installation and Patient Safety
- Care and Cleaning

Parameter Module Sections

These sections each contain information for one parameter module. This cover monitoring, and problem solving if you encounter difficulty. Each section is sep white tab which has the title of the section.

Note— The User's Reference Manual contains information for all the parameter available for the system. This means, of course, that depending on the model ar modules you have ordered, the screens will not always apply to your system. H information for the parameters and functions is valid for all the systems.

Note—The screenshots displayed in this manual were generated in demo mode therefore differ from what actually appears on your screen during patient moni

Notice to the User

Although there may be products in your area that look similar to the HP M1165 77A Viridia Component Monitoring System and the HP M1205A Viridia 26/24 Se functionality may not be the same. This User's Reference Manual is intended to the HP M1165/66/67/75/76/77A Viridia Component Monitoring System, the M102 Gas Module and the HP M1205A Viridia 26/24 Series only.

This Manual is only applicable for Release B.0 versions of the monitors listed al B.0 monitor can be identified by:

a. the Release B.0 label on the monitor, or

b. the suffix of the EPROMpack part number. To view this number, pre
Monitor Setup → **Monitor Revision** → **Show SW Rev** .
The suffix of the EPROMpack part number on a Release B.0 Monitor

Responsibility of the Manufacturer

Hewlett-Packard only considers itself responsible for any effects on safety, reli
performance of the equipment if:

assembly operations, extensions, re-adjustments, modifications or repairs
out by persons authorized by HP, and

the electrical installation of the relevant room complies with national stan

the instrument is used in accordance with the instructions for use.

To ensure optimum usage, we recommend that HP parts and accessories are us
conjunction with the HP M1165/66/67/75/76/77A Viridia Component Monitoring
HP M1026A Anesthetic Gas Module and the HP M1205A Viridia 26/24 Series Mo
wherever available. If non-HP parts are used, Hewlett Packard is not liable for a
that these parts may cause to the HP equipment.

Manufacturer's Address

For South America, North America and Canada:

Hewlett-Packard Company
3000 Minuteman Road
Andover
MA 01810-1099

For all other countries:

Hewlett-Packard GmbH
Herrenberger Str. 130
71034 Böblingen
Germany

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The HP Viridia CM
26/24 Series Mo

This chapter provides an overview of the HP Virid
24 Series Monitors. It includes the following sectio

- Introduction . . . . . .
- Parameter Modules . . . . . .
- HP Viridia Model 26CT/24CT Power Supply
- Operating Levels . . . . . .
- The Viridia CMS Computer Modules . . . . .
- The Viridia 26/24 Series Parameter Module
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Introduction

The HP M1165/66/67/75/76/77 Viridia CMS and the HP M120 24 Series Monitors, hereafter referred to as the "monitor", a patient monitors with networking and data management ca the systems can have modules added or removed at a later needed, or you can interchange the modules between syste unit.

Note—Some features explained in this manual are not avail the HP Viridia CMS and the HP Viridia 26/24 Series Monitor respective sections are marked throughout the manual with **"Viridia CMS only"** or **"Viridia 26/24 Series only"**.

The following system types are available:

Viridia CMS

The HP Viridia CMS is available as a choice of three system system consists of three individual parts; a display module, module and parameter modules:

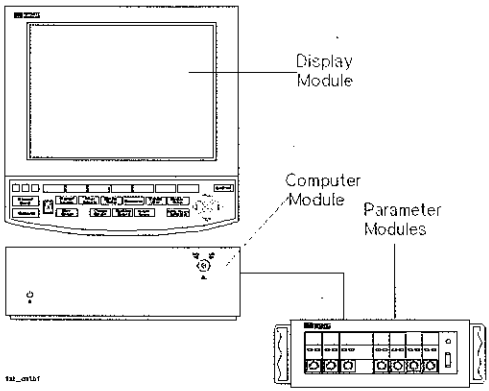
1. M1167/77A Color Flatscreen Display and Computer M Satellite Module Rack

Note—This system is also available with an External Alarm an XGA compatible display controller to drive commerciall ITE (Information Technology Equipment) displays (XGA T

2. M1165/75/A Monochrome CRT Display and Computer Integral Module Rack

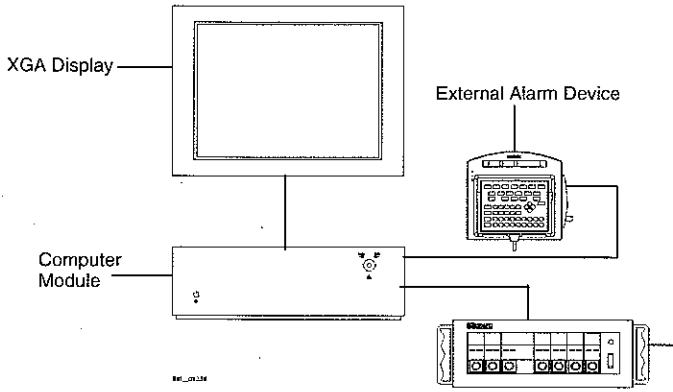
3. M1166/76A color CRT Display and Computer Module Module Rack

M1167/77A System



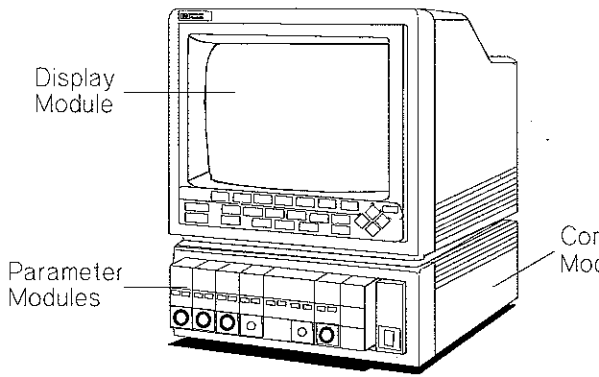
Display Module	M1095A 10.4" Flatscreen Display
Computer Module	M1046B Computer Module
Parameter Modules	Satellite Rack

M1167/77A System with External Alarm Device



Display Module	ITE Display (XGA Type)
Computer Module	M1046B Computer Module
Parameter Modules	Satellite Rack

M1165/75A and M1166/76A System



Display Module	M1094A/B/92A 14" CRT Display
Computer Module	M1046A Computer Module
Parameter Modules	Integral and/or Satellite Rack

Model Types

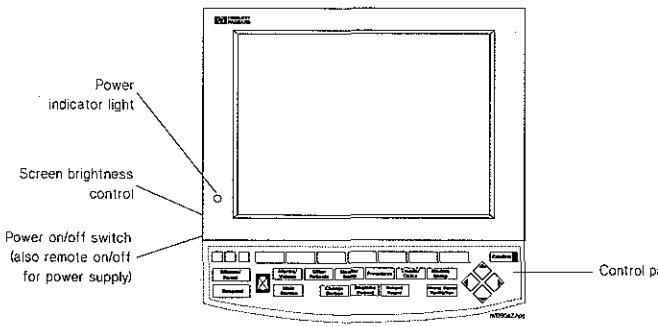
All system types are also available as a choice of three diff types:

Full Title	Abb
The HP Viridia Component Monitoring System	HP V
The HP Viridia Component Monitoring System for Anesthesia Care	HP V
The HP Viridia Component Monitoring System for Neonatal Care	HP V

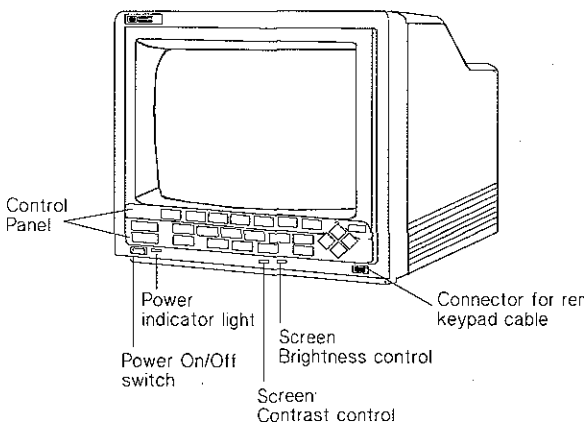
Note—In this manual, the system will be referred to as the CMS, the HP Viridia ACMS and the HP Viridia NCMS.

Display Modules

Below are labeled diagrams of the display modules. The co described in more detail in the following sections



M1095A Flatscreen Display Module



M1092A / M1094B CRT Display Module

Viridia 26/24 Series

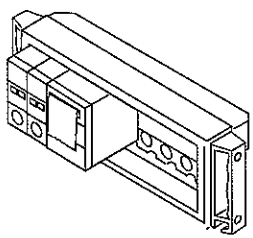
Each Viridia 26/24 Series monitor consists of two individua

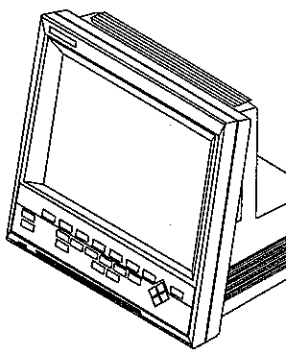
1. One of two types of Display Modules, depending on t model monitor you have purchased—either:

   a. A monochrome display with control panel supp Viridia Model 24, or

   b. A color flat panel display with control panel su Viridia Model 24C, the HP Viridia Model 24CT, t Model 26C and the HP Viridia Model 26CT.

2. The Rack with Parameter Modules





The HP Viridia Models 24, 24C and 26C are powered by co AC power supply. The HP Viridia Models 24CT and 26CT c by rechargeable batteries or by connection to an AC powe "HP Viridia Model 26CT/24CT Power Supply" on page 1-14

Control Panel

The control panel consists of softkeys, hardkeys and alarm

Softkeys

The softkeys perform multiple functions. Their functions c the labels displayed at the bottom of the screen. When no s are on the screen, the softkeys do not function.

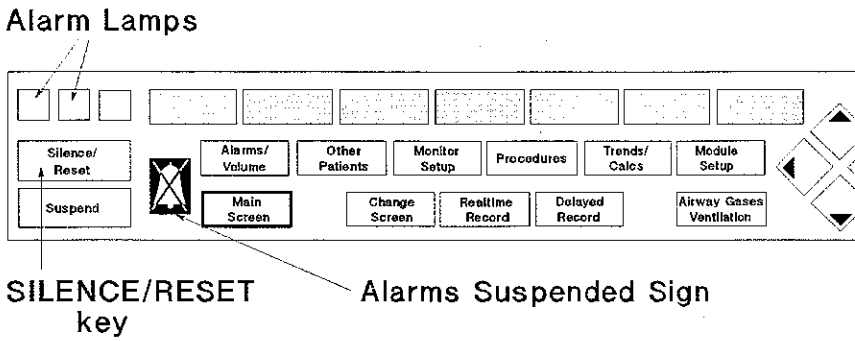
Hardkeys

The hardkeys have only one function defined by the label c

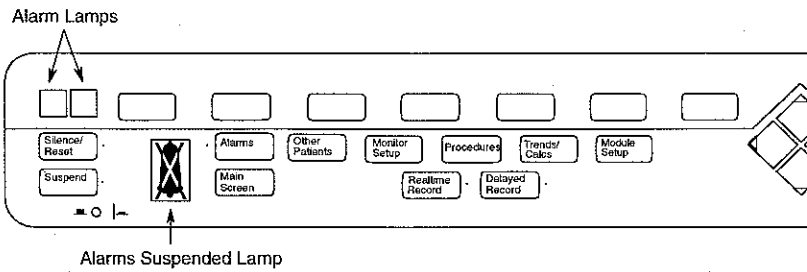
The hardkeys are labeled in blue. Each one of these keys g level where adjustments and changes can be made or perfo immediate action. The keys are labeled according to their f example, **Realtime Record** key allows you to start a recor waveform.

Note—If you are using the M1167/77A system with the Exte Device, the handheld keypad is the only means of operatin and entering data. It contains all the softkeys available on t panel of the other systems.

Alarm Lamps The alarm lamps are lit when a red or yellow alarm conditi



Viridia CMS Control Panel



Viridia 26/24 Series Control Panel

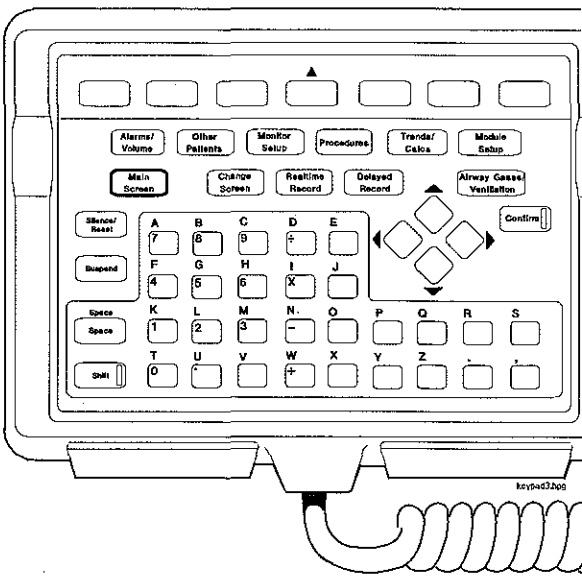
Note—Earlier versions of the HP Viridia Model 24 feature a instead of the **Trends/Calcs** key.

The Handheld Keypad

(Viridia CMS only):

The handheld keypad consists of the same softkeys and ha
are available on the control panel. In addition, the keypad p
entry keys which enable you to enter letters, numbers, pun
marks, and arithmetic symbols.

Note—The handheld keypad is the only means of operating
M1167/77A System with External Alarm Device.



Softkeys and Hardkeys

The softkeys and hardkeys on the keypad are in the same r
position and operate in the same manner as the keys on the
panel.

Data Entry Keys

The data entry keys are located on the bottom half of the k

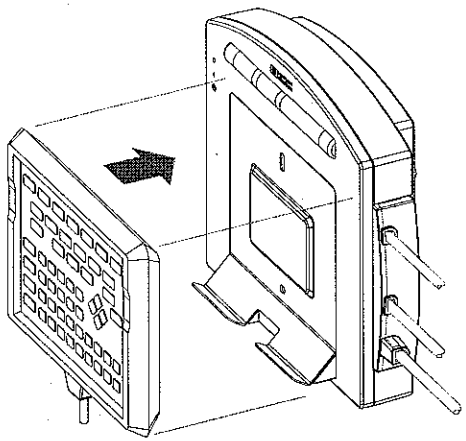
- To enter numbers and arithmetic symbols (labeled in
  simply press the keys you want.

- To enter letters and punctuation marks (labeled in bl
  Shift key. The lamp in the Shift key lights up and
  until Shift is pressed again. The softkeys and hardk
  normal.

External Alarm Device

(Viridia CMS only):

Since the External Alarm Device is used only with commer
ITE displays that do not have a control panel, it contains al
lamps, the Alarms Suspended Lamp and the loudspeaker. I
contain any hardkeys or softkeys and therefore can only b
conjunction with the Handheld Keypad. The Handheld Key
mounted onto the External Alarm Device as illustrated bel



Hardkey Functions

[Silence/Reset] - press to silence an alarm or alarms that a or, if alarms are latching, to reset them.

[Suspend] - press to suspend or switch on all alarms. The is indicated by the Alarm Suspend Lamp.

[Main Screen] - press to return to the main monitoring scre

[Change Screen] - **(Viridia CMS only)** press to change b screen layouts or to access a 2nd or 3rd display. You can al wave movement on the screen (INOPs, alarms and numeric affected).

[Realtime Record] - press to record pre-selected waves ont recorder or a bedside recorder.

[Delayed Record] - press to record pre-selected waveform longer on the monitor screen.

[Alarms] - press to enable you to suspend or switch on alar review alarm limits, enter Monitor Standby, or set the alarm

[Other Patients] - press to enable you to view data from oth your group.

[Monitor Setup] - press to enable you to pre-select certain s characteristics.

[Procedures] - press to enable you to set up and perform p such as Cardiac Output, Wedge Pressure **(Viridia CMS on** analysis, Drug Calculations, admit and discharge patients, particular patient case and transfer patient data.

[Trends/Calcs] - press to enable you to view vital signs an trends, make and review calculations, print reports and ma view in graphs.

[Module Setup] - press to enable you to change or adjust p settings, switch parameters on or off, or set up parameters.

[Arrow] Keys

The arrow keys consist of up/down/left/right keys. They or
when illuminated. The arrow keys allow you to move betw
operating screens to enable you to change or adjust setting
procedures, or make changes to the screen display.

Confirm Key
This key functions only when it is illuminated. A prompt m
CONFIRM..." appears on the screen when you need to use

Airway Gases/Ventilation - **(Viridia CMS only)** Press t
gases or ventilator waves and numerics.

HP Viridia Model 26CT/24CT Power Supply

The HP Viridia Models 24CT and 26CT are powered by an e
(line power) or by their own internal battery power supply.
monitoring needs will determine which power source is us
recommend that you plug the monitor into line or AC powe
the monitor is not being moved or used, or for long term be
monitoring. When transporting a patient or when monitorin
area, where AC power is not feasible, use battery power.

Warning

**Do not disconnect the power cord from the monitor a
connected to the AC power source. This could cause
the power cord. Instead, keep the power cord connec
monitor and unplug it from the AC power source.**

**The power cord must be inspected periodically for cr
exposed metal parts. Replace immediately if there ar
cracks, exposed metal parts, or any other signs of we**

Battery Power Supply

The HP Viridia Models 24CT and 26CT can be powered by
lead-acid batteries with 12 Volt 2.3 Amp-Hour capacity. The
battery discharge is dependent on temperature and power
power load is a function of the number and type of parame
as well as parameter settings being used. The battery life fo
Viridia Models 24CT and 26CT ranges from approximately
for a fully loaded system operating on one battery to:

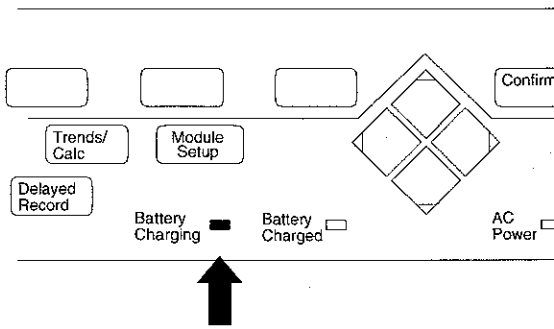
- 1 hour for a fully loaded system operating on two bat
loaded with the following parameter modules:
ECG/Resp, NBP, SpO_2, Pressure, Recorder and
- 1 hour 15 minutes for a minimally loaded system ope
batteries when loaded with the following parameter
ECG/Resp, NBP, SpO_2, Pressure.

We recommend you use 2 fully charged batteries to get the
battery life when using the battery power supply.

Battery Specifications

- 1 or 2 lead-acid batteries.
- 12 Volt 2.3 Amp-hour capacity.
- Up to 1.25 hours battery capacity typical on full char depending on modules used in the product.

Note—Charging time is 4 hours to 90% of full capacity if the 16 hours to 90% of full capacity if the monitor is on.



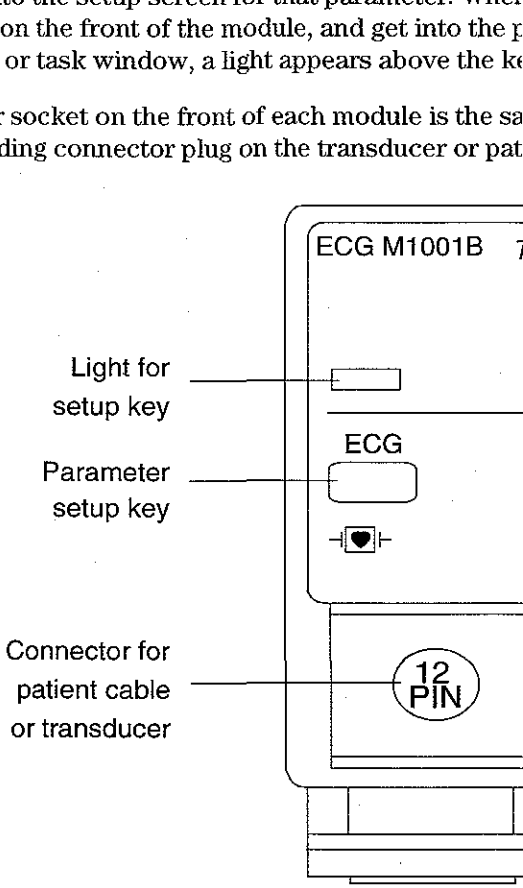
Note—When AC is connected and the monitor is on, the Ba LEDs may take some time to cycle to the appropriate char and may underreport battery capacity during this setting p fuel guage rather than the Battery Charge LEDs during thi estimate battery capacity or turn the monitor off to accele setting time.

See Chapter 12, "Battery Information (Viridia 26/24 only)" information on battery operation and Battery Charge LED indicators.

Parameter Modules

The parameter modules have one or more hardkeys on the
key labeled with the parameter name is called the Setup ke
you directly into the setup screen for that parameter. Wher
the Setup key on the front of the module, and get into the p
setup window or task window, a light appears above the ke

The connector socket on the front of each module is the sa
the corresponding connector plug on the transducer or pat



Note—If a "*T*" is present on the front of a module, certain p
settings may be transferred with that module when it is mo
rack to another. This behavior is dependent on a setting ma

special Service Mode, either by your biomedical engineeri
or the HP service engineer. You can find a description of t
(called *"Parameter Settings Transfer")* in Chapter 3.

Parameter modules can be plugged into the following type

Rack Type	Mounting	Comm
Viridia CMS		
Integral Rack	This is fitted to the front of the M1046A computer module.	Cannot the M1 System
Satellite Rack	You can have one or more satellite racks attached to an I.V. pole, bedside or wall.	Can be CMS Sy Availab 8-slot r
Viridia 26/24 Series		
8-slot Satellite Rack (Standard)	Same as Satellite Rack for Viridia CMS.	Only o Rack c with a Series
6-slot Satellite Rack (Optional)	Same as Satellite Rack for Viridia CMS. This can also be mounted to the back of the M1205A Viridia 24CT and 26 CT Monitors	

Caution

When the rack is mounted in close proximity to any intrav
equipment, do not let saline solution get onto the rack or
modules. Severe damage to the equipment can result if sa
leaks into the connectors at the rear of the modules.

You can plug the parameter modules into the rack and rem
you require them. The number of modules you can plug in
the type of rack and the model of monitor you have ordere

For most types of parameter modules, the system allows o
each type per patient (ECG, for example). Other types of m
more than one per patient (Invasive Pressure, for example)

If too many modules or an unsupported module are plugge
message detailing where the extra module is, appears in th
message field:

`Currently ignored module in rack position` *`R-P`*
where:

R is the number of the rack
(e.g. 1=integral rack, 2=first satellite rack, ...
or 1=first satellite rack, 2=second satellite rack, ...

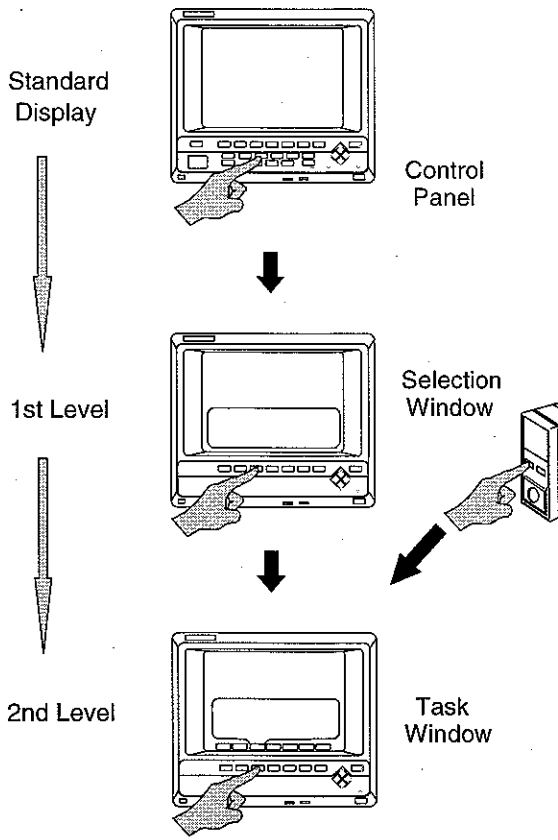
P is the slot number in that rack
(counted from left to right)

The message
`Unrecognized module in rack position R-P`
is displayed if an unknown module is plugged into the rack

Note—Since the Viridia 26/24 Series Monitors only support
rack, *R* will always be 1.

Operating Levels

There are three types of screens which you will see on the
module. The three types of screen and the interconnection
them are shown below.

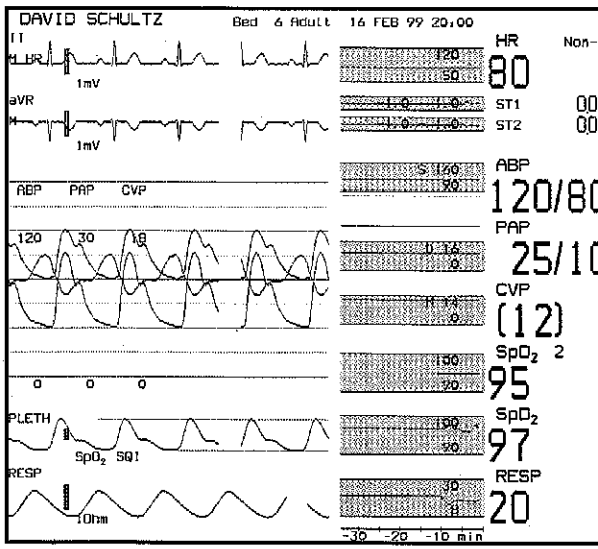


Main Screen

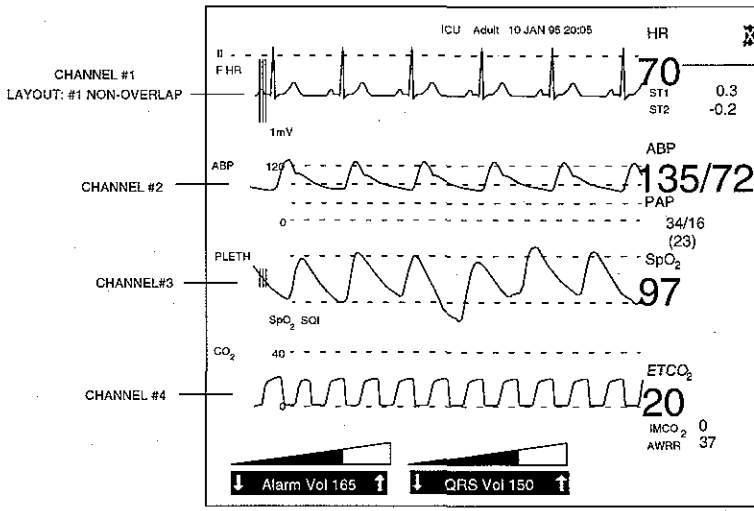
This display shows the waveforms and numerical readouts parameters you have chosen to monitor, alarms, INOP mes label, date and time, and arrhythmia messages (when assig

You can configure the number and position of the wavefor display screen. The numerics are aligned with the correspo The numeric information is updated every two seconds. Wi model, the numeric appears in the same color thet you hav the corresponding waveform.

The hardkey **Main Screen** always returns you directly to t Screen.



Note—The Main Screen of the Viridia 26/24 Series Monitors Alarm Volume Control and QRS Volume Control Bars (see


CHANNEL #1
LAYOUT: #1 NON-OVERLAP
CHANNEL #2
CHANNEL#3
CHANNEL #4
ICU Adult 10 JAN 95 20:05
HR
II
F HR
70
ST1 0.3
ST2 -0.2
1mV
ABP
ABP
120
135/72
PAP
0
34/16
(23)
PLETH
SpO2
97
SpO2 SQI
CO2
40
ETCO2
20
IMCO2 0
AWRR 37
Alarm Vol 165
QRS Vol 150

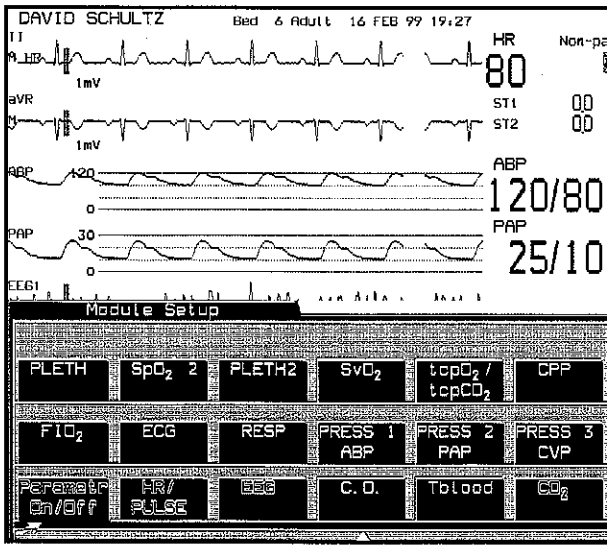
Selection Window

This is the first operating level where you can choose a spe or function.

You get into a Selection Window by pressing one of the blu hardkeys on the control panel.

When you get into the Selection Window the bottom line is active. This is indicated by a bar below the keys and the ye The selection can be changed within the Selection Windo time. For information on how to change the selection see p

There is also an arrow symbol in the Window that moves a selected line when the cursor keys are pressed. To enter th Window to which the arrow is pointing, press **Confirm**.



Task Window

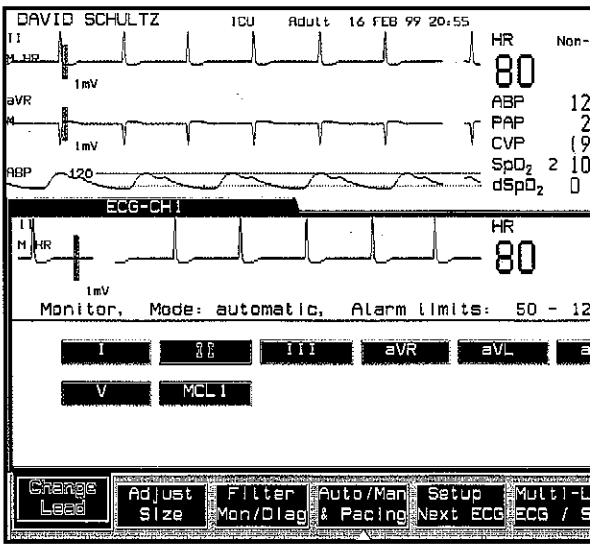
This is the second operating level, which allows you to ma
adjustments to the parameters and screen displays, or to p
procedures. Each parameter or procedure has a series of 7

There are two ways to get into the second operating level:

via the Selection Window,

or for parameters:

by pressing the Setup key on the parameter module.



Getting into the Operating Levels

Before you can start to make adjustments or changes to the or perform a procedure, you need to know how to get into levels and how to navigate through the selections. Follow t procedures below to get into the Selection and Task Windo

Selection Window

1. Press the blue-labeled hardkey for the function you r
2. When you get into a Selection Window, the bottom li active. Select the line with the parameter or function by pressing the same hard key again that got you into window, or use the arrow keys if they are illuminated
3. Press either the softkey corresponding to the parame function you require or **Confirm**. This gets you into Window.

For example, to get into the Noninvasive Blood Pressure (N Window:

1. Press the hardkey **Module Setup**
2. If it is not already active, select the line containing NI pressing **Module Setup** again.
3. Press the softkey **NBP** to get into the Noninvasive I Pressure Task Window.

Task Window

There are two ways to get into a parameter Task Window,

via the Selection Window,

or

by pressing the Setup key on the parameter module v you directly into the Task Window.

Getting into other Task Windows for functions like Other F
Monitor Setup is only possible via the Selection Window. I
Window there are separate keys. The selections that are cu
for the parameter or function you have chosen are indicate
labeling. In addition the selected keys appear to be "pushe
screen.

There are two reasons for changing the selection in the Ta
you will either want to move to the next Task Window, or
adjustment to a setting.

1. To move to the next Task Window, press the softkey
function you require, for example **Filter/Mon/Diag** . T
into the Filter/Mon/Diag Task Window where you ca
necessary adjustments.

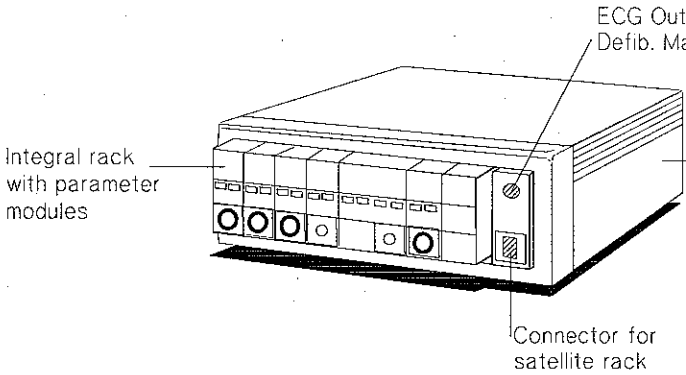
2. To make an adjustment, change the selection by pres
softkey for that window again, until the adjustment c
want is active, or use the arrow keys if they are illum

The Viridia CMS Computer Modules

The signals from the parameters being monitored are trans
computer module, where they are processed and then disp
screen as waveforms and numerical readouts.

M1046A Computer Module

The M1046A Computer Module is for use with the HP M116
the HP M1175/76A Viridia CMS.



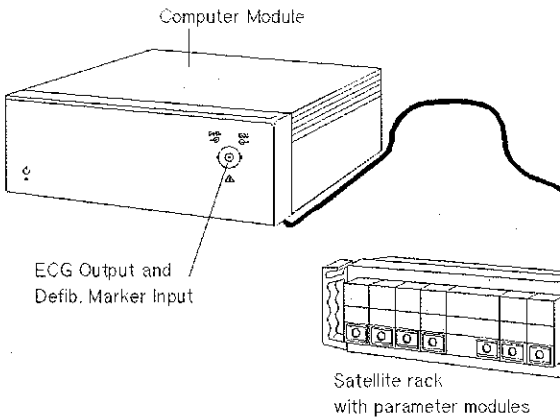
Maximum Voltages

ECG Output and Defib. Marker Input	3.2 V p-p
Connector for satellite rack	60 V

The parameter module rack can be attached to the comput
a blank panel can be fitted to the computer module if you v
satellite parameter module rack.

M1046B Computer Module

The M1046B Computer Module is for use with the HP M11 CMS.



	Maximum Voltage
ECG Output and Defib. Marker Input	3.2 V p-p

The parameter modules are inserted into one or several sa
They cannot be attached to the front of the computer mod

ECG Output and Defibrillator Marker Input

Applies to both the M1046A and M1046B Computer Modu

The ECG output and defibrillator marker input connector computer module is used during cardioversion to provide waveform for synchronizing a defibrillator. It is also used marker pulse from the defibrillator for indicating the defib discharge in the ECG waveform on the monitor display.

If you are using an HP defibrillator without a built-in recor pulse from the defibrillator is returned to the monitor. If th defibrillator has a built-in recorder, then the marker pulse that recorder rather than to the monitor. The ECG output used for other applications, such as synchronizing intra-ac pump systems.

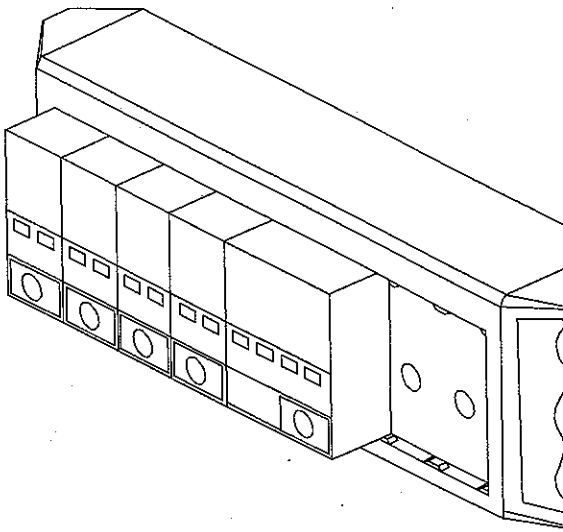
The Viridia 26/24 Series Parameter Module Rack

The Virida 26/24 Series parameter module rack is attached t
module by a cable to a connector on the left side of the disp
In addition, the HP Viridia Models 24CT and 26CT allow you
slot rack directly to the mainframe.

Warning

**Do not connect a second rack by a cable when using t
Model 24CT or 26CT with a 6 wide rack docked to the
mainframe. Docking a second rack by a cable may disr
communication.**

The signals from the parameters being monitored are transr
internal computer, where they are processed and then displ
screen as waveforms and numerical readouts.



Operating Rules to Remember

- Pressing **Main Screen** key always returns you to the
- To get into a Selection Window press a hardkey.
- What is labeled in yellow and appears "pushed in" is
- Softkeys function only in the Selection and Task Win exception of the Alarm Volume Control and the QRS Control on the Viridia 26/24 Series Monitors).
- The parameter module Setup key gets you directly in Window.
- The arrow keys and **Confirm** key are illuminated w for use.

Performance Specifications of the HP Displays

M1095A Flatscreen Display

Useful Screen: (±5% *unless otherwise noted)*	158 mm x 211 mm (6.2" x 8.3")
Pixel Size	0.33 mm x 0.33 mm
Storage Time at 25 mm/sec	5.5 seconds
Trace Speeds	6.25, 12.5, 25, 50 mm/sec ±10%

M1094A/B and M1092A CRT Display

Useful Screen: (±5% *unless otherwise noted)*	180 mm x 225 mm (7.1" x 8.9")
Pixel Size	0.22 mm x 0.35 mm
Storage Time at 25 mm/sec	6 seconds
Trace Speeds	6.25, 12.5, 25, 50 mm/sec ±10%

Using an ITE Display

The M1167A/77A Viridia CMS provides means for custome displays. There are several restrictions associated with thi the display is used as part of a medical device within the p there are additional requirements to be fulfilled in order to compliance with the European Council Directive 93/42/EE Device Directive) and with FDA recognized consensus sta

- **Safety**
- **EMC**
- **Performance Requirements**

Safety

1. The display must either comply with the requiremen EN60601-1 +A1 +A2 {IEC601-1 +A1 +A2}, or

   it must conform to the requirements of an IEC XXX standard and fulfill specific requirements according 1-1 +A1 {IEC601-1-1 + A1} to provide the same level EN60601-1 {IEC601-1}:

   - The display must be constructed or protected s of liquids does not wet parts of the display whic safety hazard (IEC601-1; 44.3).
   - The ITE display must be used with an isolation (e.g. HP M1389A), if the enclosure leakage curr requirements of EN60601-1/IEC601-1 (normal a condition). The power cable must be secured s transformer cannot be disconnected without th

2. A test of the Enclosure Leakage Current (normal an condition) of the complete system, including the dis performed and documented.

EMC

1. The display must either fulfill the requirements of the {IEC 601-1-2}, or

   it must conform to the requirements of the EMC stan devices, EN50082-1: 1997 and EN50081-1 / CISPR 22.

2. The video cable between M1167A/77A Viridia CMS an display must not exceed a length of 3.0m. For cables 3.0m EMC testing according to IEC 801-4:1988 has to

Performance Requirements

HP cannot assure compliance with the ANSI/AAMI EC-13 S Cardiac Monitors, Heartrate Meters and Alarms when using displays. Compliance with the ECG aspect ration and 25 m sweep-speed specifications can only be assured when using Displays M1092A, M1094B and M1095A. In addition, the fol display specifications are recommended:

Specification	Requirement or Value	Units
Resolution (pixel addressability)	1280 x 1024	Dots x li
Vertical Refresh Rate	60	Hz (non-
Red, Green and Blue Video Inputs	~0.7	V p-p
Vertical & Horizontal Multi-Sync Inputs	5	V TTL
Video-Cable Connector	HD15male	

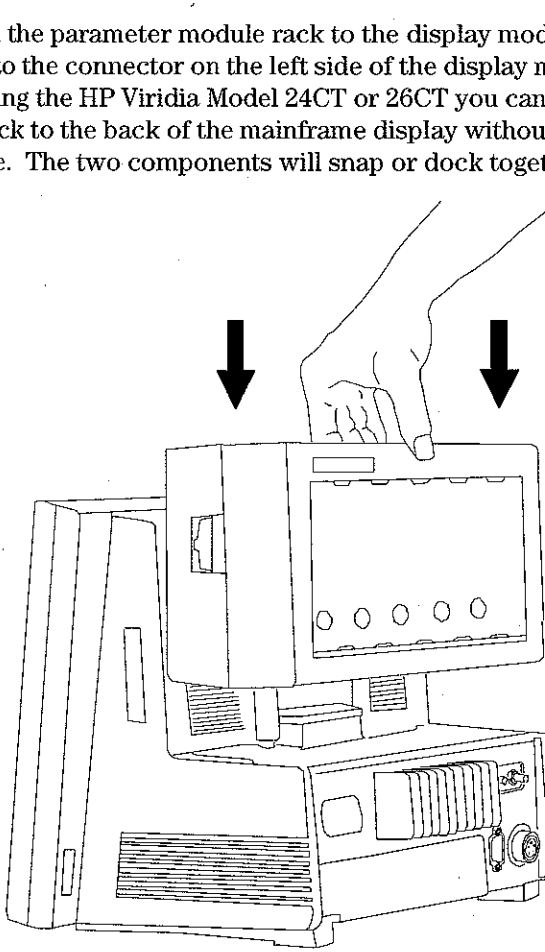
Getting S

Now that you have been introduced to the monito
probably ready to start using it. This chapter will
started. It contains the following sections:

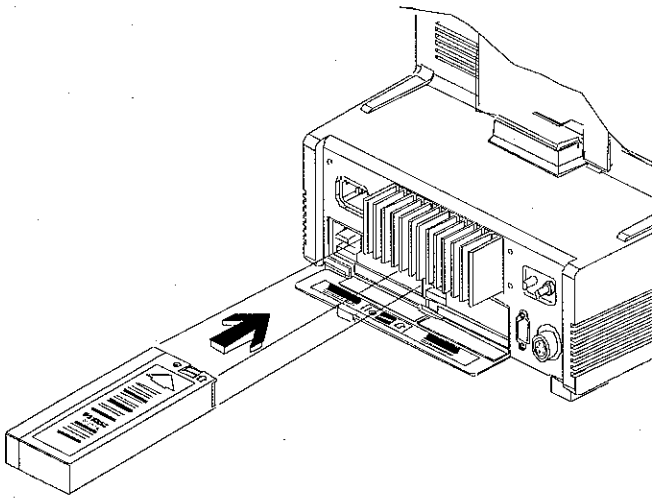
- Setting up the Monitor (Viridia 26/24 only) .
- Setting up the Parameter Modules .....
- Attaching the Patient .....

Setting up the Monitor (Viridia 26/24 only)

1. Attach the parameter module rack to the display mod
   cable to the connector on the left side of the display n
   are using the HP Viridia Model 24CT or 26CT you can
   slot rack to the back of the mainframe display withou
   a cable. The two components will snap or dock toget



2. If you are using the HP Viridia Model 24CT and 26CT batteries are not already in place, insert 2 HP 40488A Amp-hour sealed lead-acid batteries into the spring-lo door in the back of the monitor. The batteries should with the grey HP battery label facing upwards and the pointing into the monitor. The batteries will snap or when properly inserted.



Caution

Hewlett-Packard recommends you fully charge the batterie the HP Viridia Models 24CT or 26 CT for the first time. Plu into an AC power supply (line power) for an initial chargin the monitor is plugged in and the power is off, it takes appr hours for the batteries to reach a charge of 90% capacity ar for the batteries to be fully charged. If the monitor is plugg power and external battery charger is on, it takes approxir to charge the batteries.

3. If using an AC power supply, plug the power cord int source.

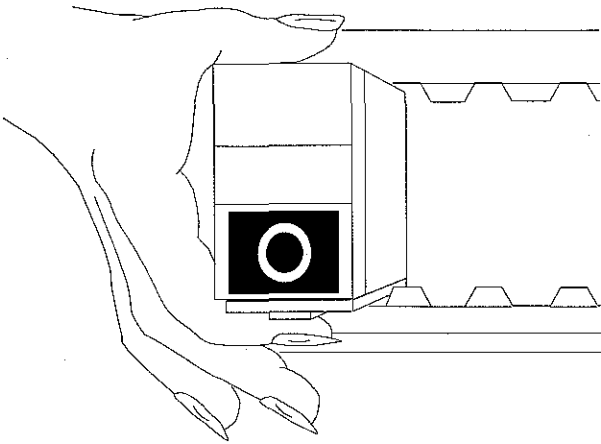
4. Switch on the system using the power On\Off switch.
then performed.

Warning

Connecting the HP Viridia monitoring network (SDN) cable
product is powered on is not supported. Error codes and H
monitoring network (SDN) interface lock-up may occur. Po
the product will recover the product. No permanent damag
To prevent unintentional disruption in monitoring, be sure t
interface cable is properly secured at both ends when conn
HP Viridia monitoring network (SDN).

Setting up the Parameter Modules

1. Decide which parameters you want to monitor.
2. Make sure the appropriate modules are plugged into insert the module into the rack until the lever on the module clicks into place. To remove a module, press upwards and pull the module out. (See diagram belo



3. Check that you have the correct patient cables and t plugged into the modules. The module connectors a to the patient cables and transducers, for easy identi

Your monitor may have *Parameter Settings Transfer* set understand the effect this has when using modules with th to *Parameter Settings Transfer* in Chapter 3.

Attaching the Patient

1. Attach the electrodes, probes, transducers, and inser
   catheters as required for monitoring the patient.

2. Connect the electrodes, probes and transducers to th
   modules.

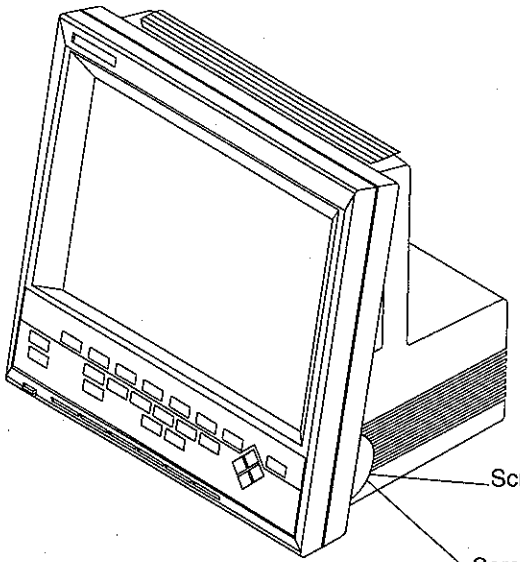
After less than 10 or 20 seconds you should see a display o
similar to the one under "Main Screen" in Section 1. The nu
waveforms depends on the waveforms you have selected t
displayed and also on the model of your system.

The numerics are aligned with the corresponding waveforn

Adjusting Screen Contrast

Viridia 26/24 Series:

The brightness or contrast of the screen display can be adj
the dial located behind the edge of the display, on the lowe
the monitor. The HP Viridia Model 24 uses a contrast contr
Models 24C, 24CT, 26C and 26CT are equipped with a brigh
Make sure that all of the screen information is visible.



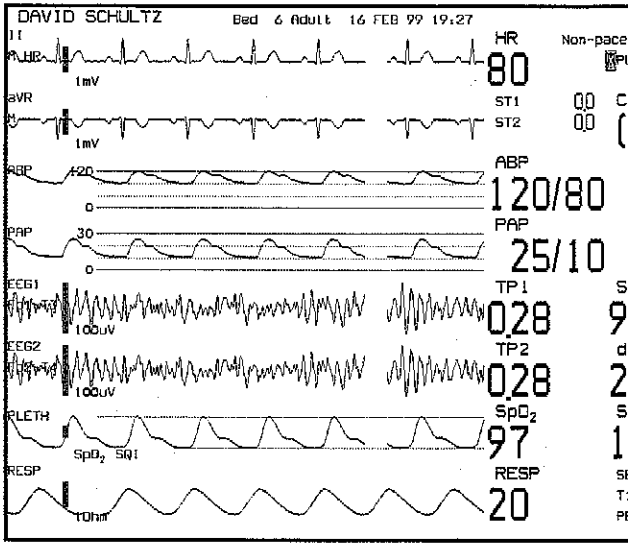
Viridia CMS:

The brightness and contrast of the screen display can be a
means of the two dials underneath the hardkeys.
Follow this procedure to achieve the optimum screen disp

1. Turn the brightness and contrast controls to their ma
   settings.

2. Slowly turn the brightness and contrast controls dov
   acceptable position where the display can still be se
   most acceptable position will be dependent upon the
   light conditions. Please ensure that all the screen inf
   visible.

Starting Monitoring



The patient's vital signs are now appearing on the screen. T configured default settings for the parameters and screen d were set up at installation or have been stored in the modu ("Parameter Settings Transfer"), are active.

If you want to make changes to the screen display see the s *"Configuring the System"*. If you want to make changes to parameter settings see the individual parameter sections.

Switch the system alarms ON (by pressing the **Suspend** l the Alarm Suspend lamp goes out). The patient is now bein

Screen Messages

Two types of messages appear at the top of the display scre

- Prompt messages - these instruct the user to perform
- Status messages - these give information about the cu situation. For instance:

  `"sync output not available, plug-in ECG`

this message stays as long as the ECG module is not

Prompt and status messages are displayed either in the ap
Window, or at the top of the Main Display screen, dependi
operating level.

On the Main Screen display the prompt and status messa
below the alarm and INOP messages.

Prompt messages appear for 3 seconds.

Status message are displayed in rotation for 3 secon

In the Task Window the prompt and status messages rem
appropriate user action is performed.

Reserving a Channel

A parameter module may be turned OFF, but left in the ra
channel where the waveform should be still appears on th
There is no waveform, waveform label, or numeric. Anoth
use its screen channel temporarily, but will be discarded a
assigned wave is reactivated.

This ensures that particular waveforms can always be allo
same place on the Main Screen, and avoids inconsistencie
waveform display of different patients in the same departm

Note—If trend data for this patient is to be collected, old d
previous patient should be deleted. The old data will be au
deleted if the monitor has been shut off for three hours or
"Discharging a Patient/Ending a Case" on page 7-9 for mo

Power Failure

If a power failure occurs, any alarm conditions that were st
monitor will NOT be retained when power is restored. Sett
alarm limits stored in "*T*" modules ARE retained - see "Para
Settings Transfer" on page 3-61.

Caution

You are advised to check all the monitor settings after any

The monitor reacts according to the length of the power fa

Less than 60 seconds — Patient Data Management data a
settings retained.

Less than 3 hours — Patient Data Management data r
settings revert to user defaults.

More than 3 hours — Patient Data Management data r
All settings revert to user defaul
setting may be lost if not netwo

Patient Information Center

If the monitor is connected to a Patient Information Center
78504 and HP 78508) and you select the same lead for ECG
and 2, the wave is not displayed in channel 2 of the Patient
Center.

Monitor Standby

If you want to stop patient monitoring, but keep all settings
Data Management information, you can switch the monitor
"Monitor Standby":

1. Press **Alarms / Volume** or **Alarms**
2. Press **Monitor Standby**.

All waves and numerics disappear from the display, and all
suspended. The word "Standby" appears in big letters on th

If your monitor is connected to an HP Viridia patient care
the monitor is in standby, no parameter data from your mo
over the system. Instead, a message indicating that your m
"Standby" is sent to other beds in the system, and is displa
Central Station. If your bed is configured to receive alarms
bed in the system goes into alarm, the status message "Oth
Alarm" is displayed on your monitor. You will hear the ove
tone (two double beeps), but the Alarm Bed Task Window
displayed.

To resume monitoring, simply press one of the keys (exce
on the control panel on the front of the display or on the h
(Viridia CMS only). The changes and adjustments that you
settings before going into Monitor Standby are retained. P
Management information collected before going into Moni
also retained.

As all monitoring is suspended, no patient data is collecte
monitor is in Monitor Standby.

The **Suspend** hardkey operates as usual when you are i
Standby, so you can prepare the monitor alarm capability
resume monitoring.

Setting up your M

This chapter describes the characteristics of your
can be changed during monitoring, using the Mo
key. It includes: the following sections:

- Changing Display Screens .....
- Selecting a Screen .....
- What you Can Configure.....
- Changes to the Configuration .....
- Assigning Waves to Screen Channels .....
- Selecting the Number of Waves.....
- Changing the Wave Overlap.....
- Selecting Realtime Wave Speeds.....
- Displaying Split Screen Trends .....
- oxyCRG Display.....
- CSA Display (Viridia CMS only) .....
- Configuring a Second Independent Display (V
  3-32
- Adjusting the Volume Control.....
- Adjusting the Date and Time .....
- Selecting Waves for Central Recorders ....
- Configuring Module, Bedside and Central R
- Other Patients Controls .....
- The Status Log Function.....
- The Monitor Revision Function.....
- Changing Default Settings and Patient Cate
- Changing the Patient Category .....
- Changing the Configuration Set.....
- Changing Operating Modes .....
- The Test Signals Function .....
- Parameter Settings Transfer .....

Changing Display Screens

A display screen is a pre-selected arrangement of realtime v
numerics and overlayed application windows. A particular
screen can, for instance, be created to monitor a patient du
specific procedure in a department or unit.

There are five separate display screens which can be config
default names of these screens are Screen A, Screen B, Scre
D and Screen E. You can select additional screen labels (su
Standard, or Surgeon) for these screens.

A softkey corresponding to each screen is available in the C
Screen Task Window (Viridia CMS) or the Monitor Setup Ta
(Viridia 26/24 Series). The display screen which is active is
an inactive softkey for that screen.

You can change to one of the other screens at any time, by
of the other softkeys.

You can reconfigure only the screen which is currently acti
display screen has been configured, the settings remain eith
user changes them, or the monitor is switched off. When th
switched off, the settings automatically revert to the defaul

Viridia CMS only: If you have a second or third independe
the **Next Display** softkey is available in the Change Screen
Window. This key is used to configure the second or third d

Selecting a Screen

If the screen you want to change is not the currently activ must select the required screen (for example, Screen A, Sc C, screen D or Screen E).

Procedure

1. Press the hardkey **Change Screen** (Viridia CMS) o **Monitor Setup** (Viridia 26/24 Series).
2. Press the softkey corresponding to the screen you w The Main Display appears for the selected screen.

Freezing Waves (Viridia CMS only)

You can freeze any wave movement on the screen via the Change Screen → Freeze Waves keys. Press Start Wa key to restart the waves.

You can also freeze the waves on your 2nd and 3rd indepen To restart the waves on an independent display, press St

Note—This function is not available when the alarms are su silenced.

What you Can Configure

Changes and adjustments you make to the settings in Moni
screens remain active while the system is switched on. Wit
of changes to the date and time, all settings revert back to
settings (factory defaults or user defaults) if the system is
longer than 60 seconds. The settings for the date and time
the system when it is switched off.

Note—If necessary, these default settings can also be chan
done in a special configuration mode, either by your biome
engineering department or the HP service engineer. See th
Default Settings and Patient Category" on page 3-44 for mo

Changes to the Configuration

To make changes to the settings, you need to get into the M
Selection Window. The key sequence to get into the Task V
shown above the screen figures in this guide.

The softkeys are indicated in the text like this:

Display .

The hardkeys are indicated in the text like this:

Monitor Setup .

Making Changes to the Main Display

The following describes how to change screen A, B, C, D, a label. The description includes:

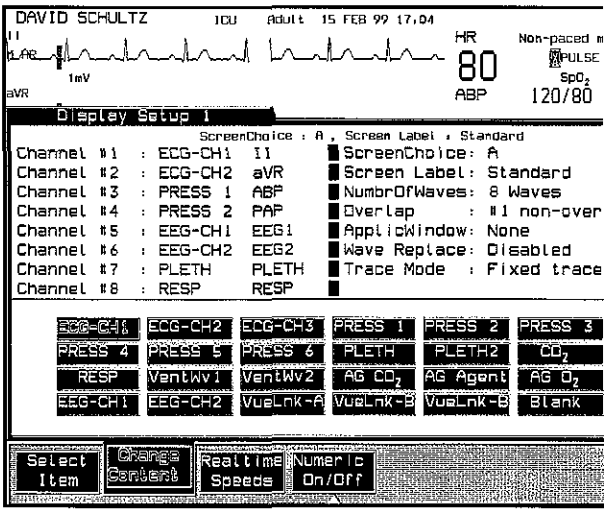
- Assigning Waves to Screen Channels
- Selecting a Screen
- Selecting Screen Labels for Realtime Display Screens
- Selecting the Number of Waves
- Selecting the Wave Overlap Configuration
- Selecting Realtime Wave Speeds
- Numerics On/Off
- Selecting an Application Window
- Wave Replace Mode
- Trace Mode

A description is then given for changing a completely sepa screen.

Assigning Waves to Screen Channels

You can assign realtime waves to positions on the screen. T
where the waves appear on the Main Screen.

Monitor Setup → **Display1 Setup**



Notes—

- You can also return to the Display Setup Task Windo
  Realtime Speeds Task Window by pressing the softke
  Setup.

Procedure

1. Press **Select Item** repeatedly to select a channe screen.
2. Press **Change Content** to move the selection to the to place in your selected channel.
3. Repeat steps 1 and 2 for each wave position you wan
4. Press **Main Screen** to return to the Main Screen scr

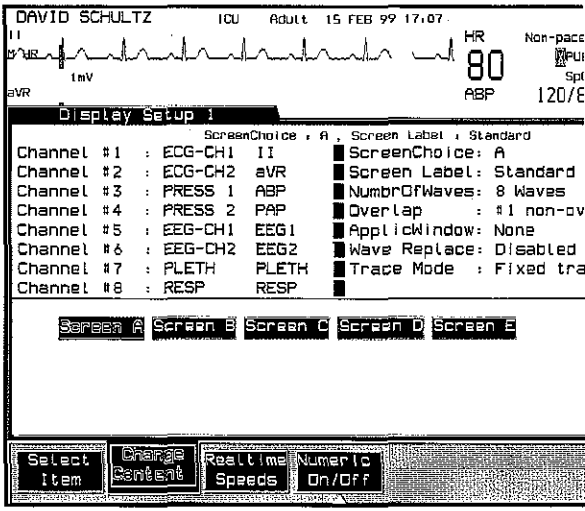
Note—If one of the assigned waves is not available (param off or unplugged), then another wave will use its channel u assigned wave is reactivated, provided Wave Replace Mod The channel will only remain blank if:

- It is assigned to ECG or Blank.
- Another wave is available, but numerics aligned to th switched off.

Selecting a Screen

You can switch between the five available screens (A-E) in
Setup Task window.

Monitor Setup → **Display1 Setup** → **Select Item**



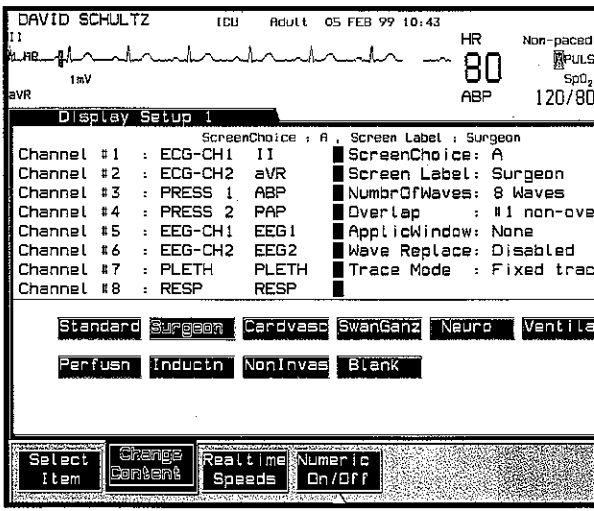
Procedure

1. Press **Select Item** until "Screen Choice" is selec
screen.
2. Press **Change Content** to select a screen (A-E). The
screen choice and its screen label will appear at the t
Task Window. The other items on the screen will cha
depending on the configuration of the different scree
3. Press **Main Screen** to return to the Main Screen.

Selecting Screen Labels for Realtime Display Scree

A screen label may be selected for a realtime display scree
eight choices.

Monitor Setup → **Display1 Setup** → **Select Ite**



Procedure

1. Press **Select Item** until "Screen Label" is select
screen.

2. Press **Change Content** to select the key label that y
choices are:
   a. Neuro
   b. Cardvasc
   c. SwanGanz
   d. Standard
   e. Ventilat
   f. Perfusn
   g. Surgeon
   h. Inductn
   i. Non Invasive

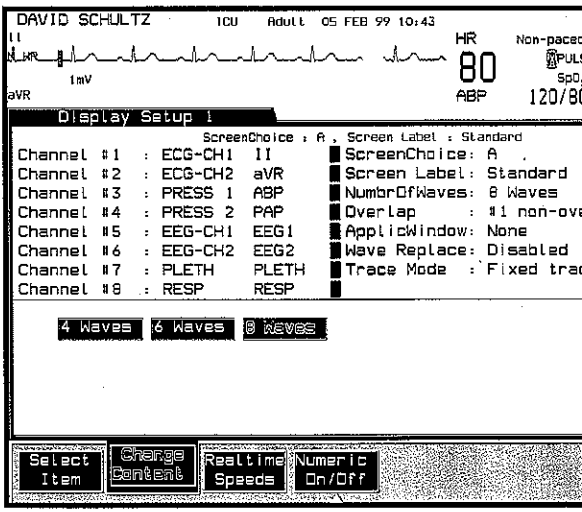
j. Blank (No screen label).

3. Press **Monitor Setup** to return to the Selection Wind
Main Screen to return to the Main Screen screen.

Selecting the Number of Waves

You can select how many waves you want displayed on the
the capabilities of the model you have ordered).

Monitor Setup → **Display1 Setup** → **Select Item**



Procedure

1. Press **Select Item** until "NumbrOfWaves" is sel
screen.

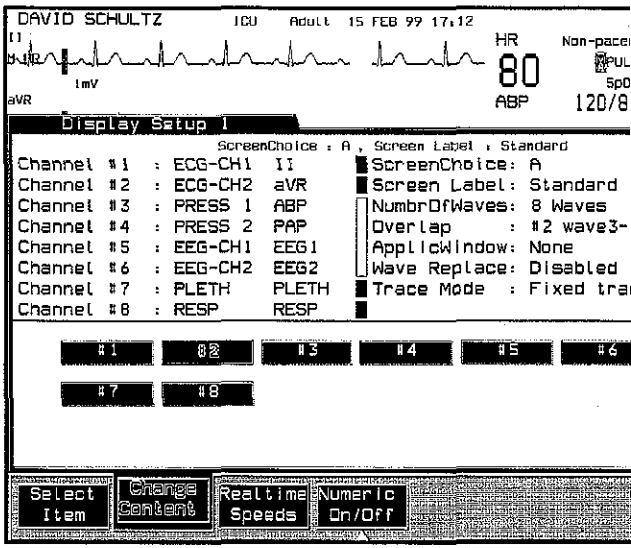
2. Press **Change Content** to choose 4, 6, or 8 waves t
depending on your model.

3. Press **Monitor Setup** to return to the Selection Win
Main Screen to return to the main screen.

Changing the Wave Overlap

The wave overlap refers to the position of particular waves screen. You can select to have overlapping and non-overlap Overlapping waves allow a larger wave amplitude and you waveforms of various parameters (i.e. pressure waves).

Monitor Setup ⟶ **Display1 Setup** ⟶ **Select Item**



Procedure

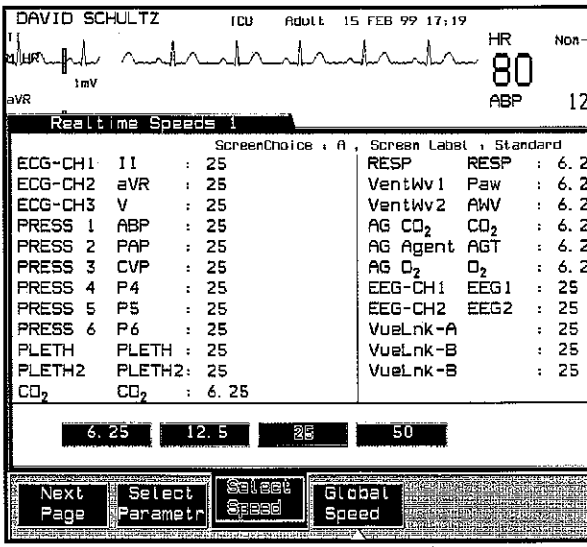
1. Press **Select Item** until "Overlap" is selected on
2. Press **Change Content** to choose one of the availabl (dependent on model). The boxes in the middle of th indicate which waves are overlapping.
3. Press **Monitor Setup** to return to the Selection Wind **Main Screen** to return to the Main Screen.

Selecting Realtime Wave Speeds

The same speed can be selected for all the waveforms or d
can be chosen for different waveforms. You can select the
waveforms from the following:

50 mm/sec
25 mm/sec
12.5 mm/sec
6.25 mm/sec

Monitor Setup → **Display1 Setup** → **Realtime Sp**



Procedure

To select different speeds for the waveforms:

1. Press the softkey **Select Parameter** repeatedly to se
parameter to which you want to assign a different sp

2. Press **Select Speed** repeatedly to select the speed

3. Repeat steps 1 and 2 for each parameter speed you w change.

Press the softkey **Display Setup** to return to the Realtim Task Window, press **Monitor Setup** to return to the Select or **Main Screen** to return to the Main Screen.

To select the same speed for all the waveforms:

1. Press **Global Speed** repeatedly to select the speed y
2. Press the softkey **Display Setup** to return to the Waves Task Window, press **Monitor Setup** to return Selection window or **Main Screen** to return to the M

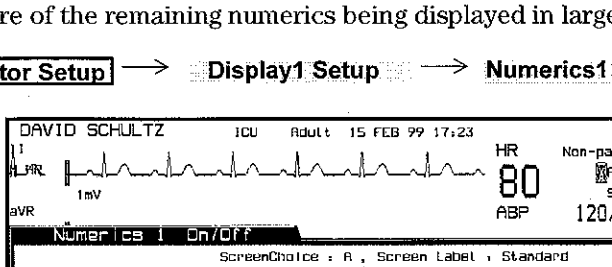
Note—

- The speed of the Resp or CO_2 waves and of the AG w always be set individually. You cannot alter their spee pressing **Global Speed**.
- If waves overlap, all the waves travel at the speed of the first overlapping channel. If the overlap is then ch non-overlapping waves each wave travels at its assig

Numerics On/Off

To tailor the numeric display format to specific needs, indi
numerics can be switched on or off. This is possible for ea
screen (A-E) of an independent dispaly. When monitoring
parameters, switching off the numerics for some of the par
in more of the remaining numerics being displayed in large

Monitor Setup → **Display1 Setup** → **Numerics1**



1. Press the softkey **Select Numeric** to highlight the parameter numeric. (**Viridia CMS only:** To view pa are not displayed, press the softkey **Next Page**.)

2. Press the softkey **On/Off Numeric** to set the selec display on or off.

3. Repeat Steps 1 and 2 for each numeric that requires

4. Press the softkey **All Num On/Off** to switch ALL off at the same time.

5. Press **Main Screen** to return to the Main Screen.

If numerics are switched off, the status message "Not all displayed" is displayed. This message can be disabled ir configuration mode by your biomedical engineer or by the engineer.

Numeric Positioning

Parameter numerics on the Main Screen screen are shown **numerics** - the numerics are next to the corresponding wa

Aligned Numerics:

The monitor controls the position of numerics on the scree controls the size of some numerics.

Numeric Positions:

- Parameters with waveforms (such as Pressure). The aligned with the corresponding waveform.
- Parameters without a waveform (such as Temperatu numerics are placed from bottom to top, in a column of the waveform numerics.

  Empty spaces to the right of the waveforms (for insta the second ECG wave) can be filled by pressure num a waveform.

  If there is space in the right column, the monitor will with the following large numerics:

  - Temperature
  - SpO_2.

  followed by the smaller numerics:
  - ST1
  - ST2
  - ST3
  - Pulse
  - AWRR
  - $IMCO_2$
  - CO
  - PAWP
  - FiO_2

Numeric Sizes:
Parameter numerics on the screen are displayed in 2 sizes

When there are too many large numerics to be displayed o
Screen display, the monitor performs the following actions
space available:

- The large temperature numerics decrease in size, sta
highest numbered temperature.
- If more than one temperature is being monitored, the
temperatures are shown continuously in rotation in t
the third temperature numeric
- Invasive pressures are multi-numeric parameters bec
pressure has numerics for systolic, diastolic and mea
They are decreased in size.

The numerics automatically become small, starting with th
the pressure with the lowest priority. (The lowest priority
one with the highest number. See Chapter 20, "Pressure M
for information on how the pressure parameters are numb
exceptions are:

Pressure 1 (P1) numerics. These are always big.

Mean only pressure numerics. These are always big.

Additional Information

- The ST1, ST2, and ST3 values are shown next to the
channel if present.
- The NBP numerics are displayed big next to the 2nd
channels or a blank channel.
- IMCO$_2$ and AWRR (airway respiration rate) are disp
underneath ETCO$_2$.
- If ETCO$_2$ and respiration (via ECG electrodes) are b
only the numeric for the airway respiration rate (AW
displayed. The respiration rate numeric derived from
electrodes is not displayed, unless the oxyCRG Appl
is configured ON.

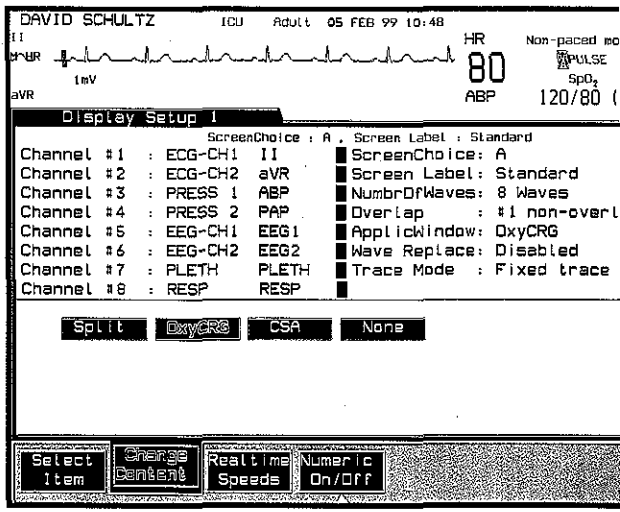
Selecting an Application Window

One of three application windows can be selected for displ screen:

- Split Screen
- oxyCRG
- CSA

They are described in more detail in the following sections.

Monitor Setup → **Display1 Setup** → **Select Iten**



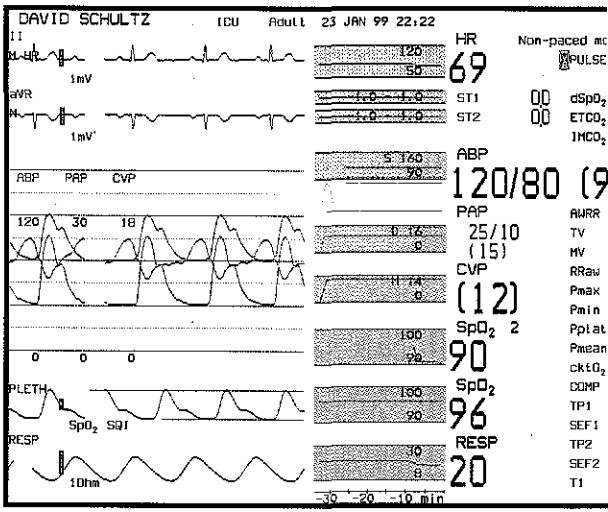
Procedure

1. Press **Select Item** until "ApplicWindow" is selec screen.
2. Press **Change Content** to choose Split, OxyCRG, CSA application window) to be displayed.
3. Press **Monitor Setup** to return to the selection wind **Main Screen** to return to the Main Screen.

Note—If you have configured a second or third independer
oxyCRG and CSA can only be on one of these displays at a
Screen can be configured for all displays simultaneously.

Displaying Split Screen Trends

Split Screen trends display the last 30 minutes of the patien along with any alarm limits that are set. The trend values a every minute. The trend value itself is calculated as the ave values sampled with the previous minute.



With Split Screen trending you can:

- Display the preceding 30 minutes of trend data for all next to their waves.
- Obtain a clear indication if a patient's vital signs tend exceeding the alarm limits.

Note—Split Screen Trends are not available with HP Viridia selected ICU bundles.

The alarm limits are represented by a rectangle, filled with parameter's color at low intensity. When a measurement e alarm limit, it is clearly visible against the screen's black b limits themselves are displayed on the right side of the tre to their corresponding boundaries.

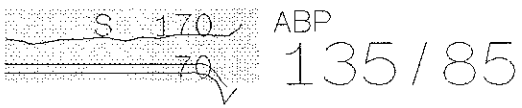
The alarm-limit values are always displayed within the rec by alarm limits, if they fit.

Note—Some trends, such as vital signs that are received th do not have alarm limits associated with them. In this case is displayed for the alarm range. Instead, the default range displayed with low intensity on the left side of the trend di distinguish them from alarm limits.

Trend data is only displayed for those vital signs that are p left column of the numeric display.

Viewing Trend Data for Invasive Blood Pressure

Three trend values are displayed for invasive pressure; sys and mean pressure. These three trends are displayed toget the diagram below.



s-invas.tif

Display of Trend Data for Invasive Blood Pressure

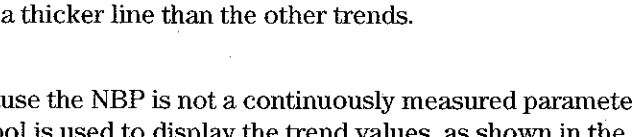
The alarm limits can apply to any of the three pressures, d how they are configured. The alarm limits are therefore pr letter, which identifies the pressure to which they are con letters are:

S	Systolic pressure
D	Diastolic pressure
M	Mean pressure

In addition to this, the trend to which the alarm limits apply with a thicker line than the other trends.

Viewing Trend Data for Non-invasive Blood Pressure

Because the NBP is not a continuously measured paramete symbol is used to display the trend values, as shown in the below.



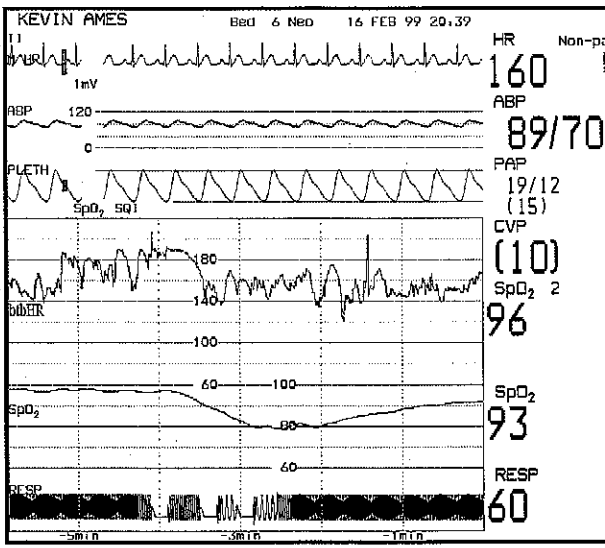
Display of Trend Data for Non-invasive Blood Pressur

oxyCRG Display

The oxyCRG (oxygen CardioRespiroGram) display provid simultaneous presentation of the following three waveforn the Main Screen:

- Beat-to-beat heartrate trend
- An oxygen parameter trend
- Compressed respiration wave

Approximately the last six minutes of information is displa parameter.



Main Screen Display with oxyCRG

Note—OxyCRG is not available on the HP Viridia ACMS.

The oxyCRG display can help you to make early detection regulation problems in neonates, by comparing trend patt interrelationships among the three parameters.

Approximately the bottom two thirds of the Main Screen ar
covered with the three oxyCRG waveforms.

The number of realtime waves that you can display simulta
oxyCRG is related to the maximum number of realtime wav
system is capable of displaying. Details are provided in the
table:

Main Screen

Standard Display	oxyCRG Display
4 realtime waves	oxyCRG + 1 realtime wa
6 realtime waves	oxyCRG + 2 realtime wa
8 realtime waves	oxyCRG + 3 realtime wa

Notes on oxyCRG

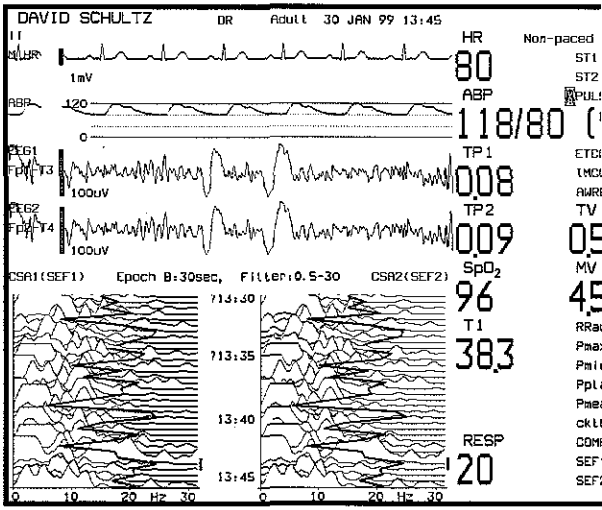
- The oxyCRG information is overlayed on the realtime
bottom of the Main Screen. These realtime waves dis
the display, but the parameters are still being monitor
parameter alarms are still active.
- If oxyCRG covers part of an overlap channel, the enti
channel disappears from the display.
- The **Freeze Waves** softkey has no effect on the oxy
of the Main Screen, because the display speed is very
- The beat-to-beat heart rate (btbHR) in the oxyCRG di
vary from the heart rate (HR) numeric on the Main Sc
the HR numeric is an averaged value.
- If the monitor is switched off for less than 60 seconds
data is retained. However, when the power is switche
you will see gaps in the oxyCRG display. The gaps co
the amount of time it takes the monitor to get the firs
after power is restored, **not** the amount of time that t
was switched off. For this reason, you cannot proper
the time difference between an event which occurs b

is switched off, and one which happens after the pow

You can find information about oxyCRG recording in Chap

CSA Display (Viridia CMS only)

The CSA (Compressed Spectral Array) is a format presentin
processed EEG. It compresses a large amount of data into a
easy to read trend and consists of 30 complete spectral line



The bottom half of the Main Screen area is covered with th

The number of realtime waves that you can display simulta
CSA is related to the maximum number of realtime waves t
system is capable of displaying. Details are provided in the
table:

Main Screen

Standard Display	CSA Display
4 realtime waves	CSA + 2 realtime wav
6 realtime waves	CSA + 3 realtime wav
8 realtime waves	CSA + 4 realtime wav

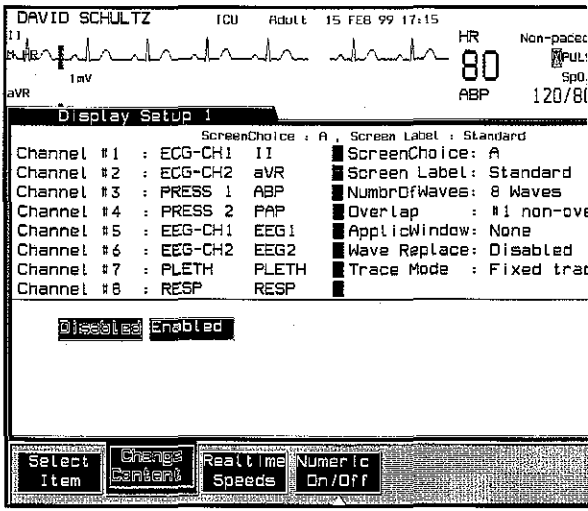
Notes on CSA

- The CSA information is overlayed on the realtime wa bottom of the Main Screen. These realtime waves dis the display, but the parameters are still being monito parameter alarms are still active.
- If CSA covers part of an overlap channel, the entire c disappears from the display.

Wave Replace

Wave Replace allows you to fill a currently unused channel assigned to a specific wave, and replace it temporarily with wave.

Monitor Setup → **Display1 Setup** → **Select Item**



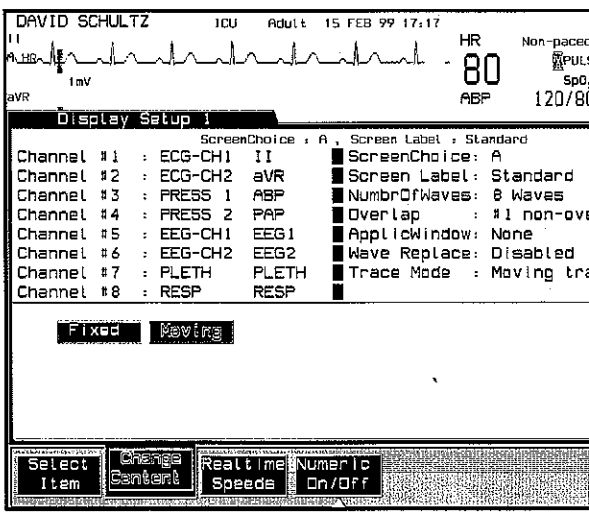
Procedure

1. Press **Select Item** until "Wave Replace" is selec screen.
2. Press **Change Content** to enable or disable Wave Re Wave Replace enabled, assigned, but currently unuse will be filled with another wave.
3. Press **Monitor Setup** to return to the selection wind **Main Screen** to return to the Main Screen.

Trace Mode

Trace Mode allows you to choose between fixed and movi

Monitor Setup → **Display1 Setup** → **Select Ite**



Procedure

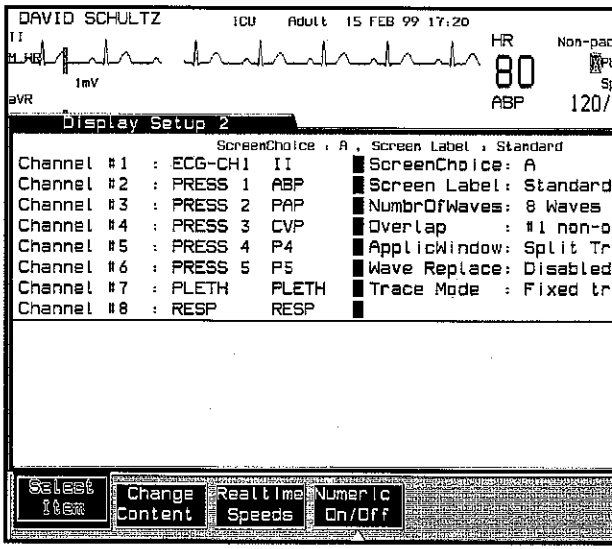
1. Press **Select Item** until "Trace Mode" is selecte screen.
2. Press **Change Content** to choose fixed or moving tr
3. Press **Monitor Setup** to return to the selection win **Main Screen** to return to the Main Screen.

Note—Moving Trace is not recommended for flatscreen di

Configuring a Second Independent Display (Viridia C

The second independent display is normally configured as surgeon's display. We suggest that "Surgeon" is the most ap keylabel. It does NOT contain any alarm indications (blinki or 🔔) or alarm controls or outputs (alarm sounds or lamps change the screen to have the same display as the main dis can have a different configuration. There are again five sep screens: the default names are Screen A, Screen B, Screen and Screen E. To get into the Task Windows, press **Displa** in the Monitor Setup Selection Window. The procedures ar same as for changing the main display (described in "Chan Screens").

Monitor Setup → **Display2 Setup**

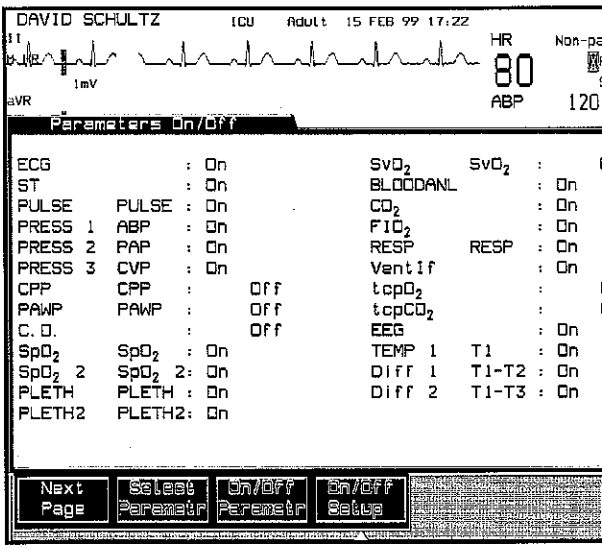


Other Functions You Can Configure

Parameters On/Off

Individual parameters can be switched ON or OFF on the r
alarms or INOPs are reported for parameters that are swit
they are not available for display, trending, or recording on

Module Setup → **Parametr On/Off**



1. Press the softkey **Select Parametr** to highlight the r
parameter. (**Viridia CMS only:** To view parameters
displayed, press the softkey **Next Page**.)

2. Press the softkey **On/Off Parametr** to set the selecte
or off. Repeat this procedure for each parameter you

3. Press the softkey **On/Off Setup** if you want to pr
settings when the module is plugged in WITHOUT th

   Switch this setup off again using **On/Off Setup** or **S**

4. Press **Main Screen** to return to the Main Screen.

You can also switch OFF parameters in the following ways

- **Any parameter**: unplug the module, and suspend or alarms.
- **Any parameter** except **ECG**, **RESP** or **NBP**: disconn transducer or adapter cable from the module, and sus silence the alarms.

If you switch off a parameter, you can ONLY enter the para Task Window (via the module's hardkey) by first pressing **Module Setup** → **On/Off Setup**.

When you plug in a parameter module and connect the tran adapter cable, the parameter is automatically switched on. and NBP are automatically switched on when you plug in t module.)

Adjusting the Volume Control

You can adjust the QRS and alarm volume independently.

The QRS tone is the audible tone produced by the ECG pu
indicate each QRS complex or pulse trigger event picked u

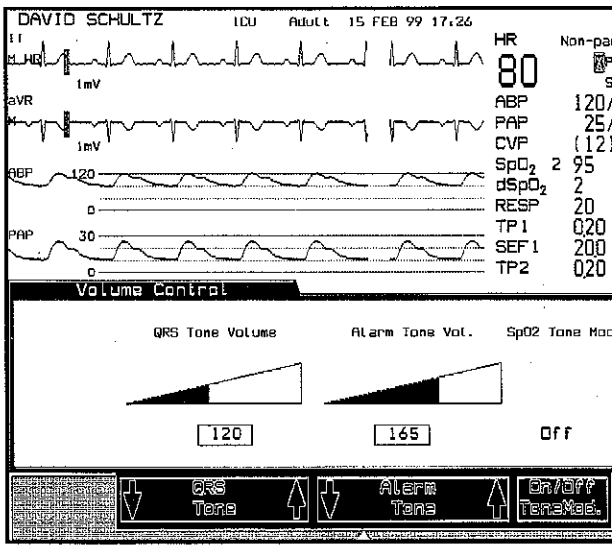
Procedure

Viridia CMS:

Monitor Setup → **Volume Control** or

Alarms/Volume → **Volume Control** or

SpO_2 → **Volume Control**



1. Increase or decrease the QRS or alarm tone volume
corresponding softkeys. If there is currently no activ
INOP, two short alarm tones sound at each press of
keys so that you can hear the effect of changing the

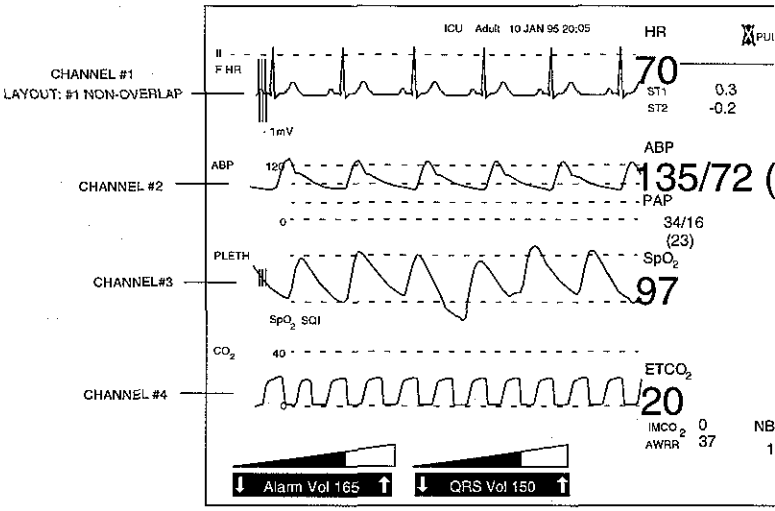
2. Press **Monitor Setup** to return to the Selection Wind
Main Screen to return to the Main Screen.

Note—Tone Modulation can also be set to On or Off in this
the **On/Off Tone Mod** key. (see also SpO_2 Module chapter i

Viridia 26/24 Series:

If not already in the Main Screen, press **Main Screen**.

Increase or decrease the QRS or alarm tone volume by pres
corresponding softkeys directly under the Alarm Volume a
Volume indicators.

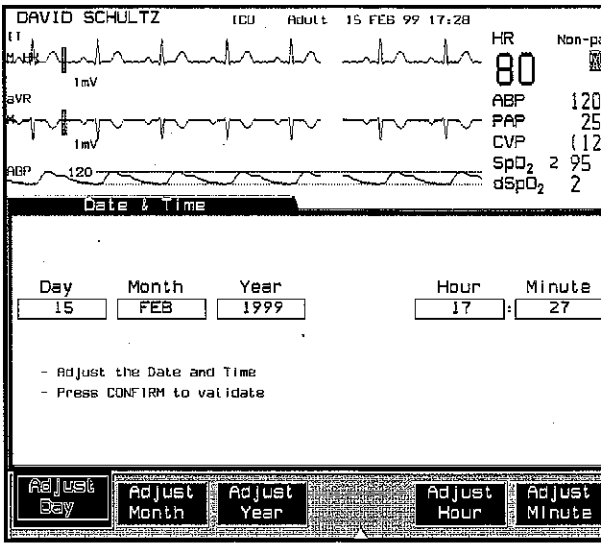


Adjusting the Date and Time

You can set the date and time to be displayed on the scree
been set, the internal clock retains the setting even when t
turned off.

If your monitoring system is connected to a Central Statio
Viridia patient care system network, the date and time on
automatically taken from the Central Station.

Monitor Setup → **Date Time**



Procedure

1. Change the day, month, year, hour and minute by pr
corresponding softkeys.

2. Press **Confirm** after all the adjustments have beer
message will appear with the date and time settings.

3. Press **Monitor Setup** to return to the Selection Wind
Main Screen to return to the Main Screen.

Selecting Waves for Central Recorders

You can select two waves to be used for delayed alarm rec
HP Viridia patient care system central recorder. The waves
also be displayed at the central station. With a single chan
you can record the primary wave, or with a dual channel re
record the primary and secondary waves. The primary wav
which wave is the default wave at the central station and a
bedsides in the overview screen.

When ECG is available it **must** be selected as the primary
be deselected.

The procedures for configuring delayed recordings are des
section *"Recording Functions"*.

Configuring Module, Bedside and Central Recording

Note—Recordings on a 4-channel bedside recorder are only with the Viridia CMS.

The [Recordng Setup] key enables you to configure five ty recordings:

1. Delayed and Alarm Recordings on a module, bedside recorder. A maximum of four delayed waves can be r depending on the type of recorder. Up to four additio can be selected for alarm recordings, depending on th the monitor.

2. Realtime Recordings. Three recording modes can be record waveforms at your request. For each mode yo the waves to be recorded, their position on the recor the recorder to be used. Realtime recordings can be p module, 4-channel bedside or central recorders.

Note—To ensure an optimal **realtime recording** check tha recording configuration is appropriate for your recorder.

3. Monitoring Procedure Recordings on a module, beds recorder. You can record the curves produced during output and pulmonary artery wedge pressure measur

4. Vital Signs Recordings. Automatic Vital Signs Record option of printing out all parameter numerics on the Recorder Module either at user programmed time int upon completion of an NBP measurement.

5. OxyCRG and Neonatal Event Review Recordings.You the contents of the oxyCRG display and Neonatal Ev M1116B plug-in recorder module. For Neonatal Even Recordings, the M1116B plug-in recorder module has selected as the procedure recorder.

The procedures for configuring recordings are described in *"Recording Functions"*.

Other Patients Controls

If your system is connected via the HP Viridia patient care
network to other bedsides you can choose to send alarms,
and assign your bed to a care group. The procedures for se
networking system are described in Chapter 4 *"Other Pati*

The Status Log Function

The softkey **Status Log** is used by service engineers. It p
of accumulated error codes.

The Monitor Revision Function

The softkey **Monitor Revision** is used by service engineer information about the current hardware and software revis monitor.

Changing Default Settings and Patient Category

Each system is configured in the factory with the **factory d**
settings. The settings are collected together to form **Confi**
Sets. There are 4 Configuration Sets available with univers

Configuration Set 1 is for adult, intensive care unit ap

Configuration Set 2 is for adult, operating room applic

Configuration Set 3 is for neonatal, intensive care unit

Configuration Set 4 is for neonatal, operating room ap

The Configuration Sets also include parameter default setti

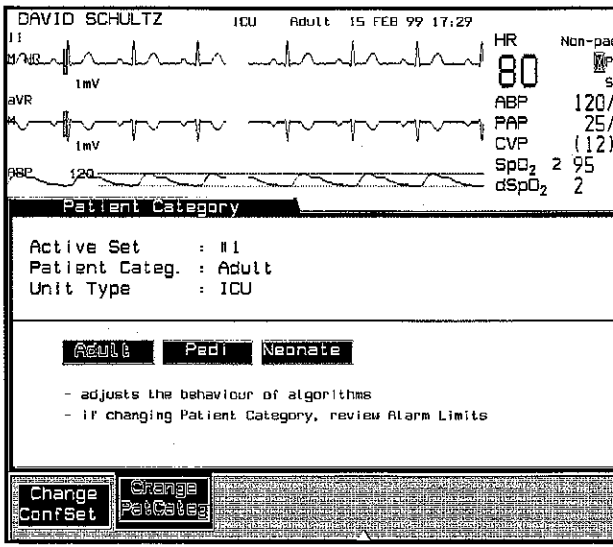
If your hospital requested it, these Configuration Sets will h
customized at installation to your specific requirements. In
those new settings are the **user default settings**; if the se
not changed at installation, the user default settings and th
default settings are the same.

You can change the patient category within a Configuratio
normal monitoring. However, if after delivery of your syste
to change any of the other parameters or universal settings
need to contact your HP service engineer or your biomedic
engineering department, as this procedure has to be done i
Configuration Mode. Changes can be made to a Configurat
suit an individual clinician's needs, for example, or to provi
settings for a particular medical procedure.

Changing the Patient Category

The monitor processes patient signals in different ways (u
algorithms) depending on the patient category. The patie
within a Configuration Set can be changed during normal

Monitor Setup → **Adult/Pedi/Neo** → **Change PatCate**



In general, all the parameter settings and patient data man
information are kept if you change the patient category wi
Configuration Set.

Possible exceptions occur because measurement ranges a
ranges for some parameters are different for each patient
the following list). If active alarm limits are no longer with
you change patient category, the alarm limits are automat
to the closest possible values within the new range.

The following table details the differences between the pati
categories for those parameters where differences occur:

Parameter	Patient Category		
	Adult	Pedi	Neo
NBP	Adult	Pedi	Neo
ECG	Adult	Neo	Neo
HR/PULSE	Adult	Neo	Neo
RESP	Adult	Adult	Neo
Inv. Pressure	Adult	Neo	Neo
CO_2	Adult	Adult	Neo

For example:
The ECG parameter uses the neonatal algorithm if you choo
Neonatal or *Pediatric* patient category. If you choose the *A*
category, the ECG parameter uses the adult algorithm.

The following pages describe in detail how the choice of pa
category influences monitoring.

NBP

The patient's tolerance for the cuff pressure (i.e. stress) w measurement is made is an important factor to consider w patient category. The amount of stress is determined by:

- the size of the cuff, and
- the duration of time the cuff pressure is applied.

Since a neonate can usually tolerate less stress than a pedi and a pediatric patient can tolerate less than an adult, the algorithm has *category-dependent safety values*. If the cuf exceeds these *values* for more than a given time period, th immediately deflates and a severe INOP Alarm is given. Th adapted to normal physiological values.

NBP Examples

Overpressure

Overpressure occurs if the cuff maintains a pressure abov value for more than two seconds. The safety values are:

Adult:	300 mmHg
Pediatric:	300 mmHg
Neonate:	150 mmHg

Continuous Pressure

Continuous Pressure occurs if, for any reason, a safety pr maintained in the cuff for more than a safety period, depe patient category.

Adult:	if over 15 mmHg for more than 120 sec
Pediatric:	if over 15 mmHg for more than 120 sec
Neonate:	if over 5 mmHg for more than 60 secon

These safety values effect the measurement range of each c
Adult category has the greatest range (systolic 30 to 270 mm
Neonate has the smallest (systolic 30 to 130 mmHg). **There
cannot use Neonate or Pediatric if the expected press
are outside the measurement range for that category.**

The following tables list the measurement ranges and safet
each patient category.

**NBP Measurement Range (in mmHg) for Differing Patie
Categories**

Measurement Range	Patient Category		
	Adult	Pedi	
Systolic	30 to 270	30 to 180	
Mean	20 to 255	20 to 160	
Diastolic	10 to 245	10 to 150	
Cuff Size	A to E	Any Cuff	
Default Inflation Pressure	165 mmHg	125 mmHg	

NBP Safety Values for Differing Patient Categories

Safety Value	Patient Category		
	Adult	Pedi	
Continuous Pressure	15 mmHg (for 120s)	5 mmHg (for 120s)	
Time to inflate from 0 to 60 mm Hg	40s	20s	
Max. inflation time	60s	40s	

NBP Safety Values for Differing Patient Categories

Safety Value	Patient Categ	
	Adult	Pedi
Max. deflation time	80s	80s
Max. measurement time	100s	100s
Overpressure protection[1]	300 mmHg	200 mmHg
Cuff Size	A to E	Any Cuff
Default Inflation Pressure	165 mmHg	125 mmHg

[1]The figure given for overpressure protection is the maxim
the cuff can reach for 2 seconds before it deflates.

NBP Recommendations

Hewlett-Packard makes the following recommendations w
patient category for NBP:

1. Choose the category with the most appropriate safet
   your patient.
2. Reduce the stress on the patient by choosing the app
   size (a cuff that is too large prolongs inflation time).
3. Use a repetition time appropriate to the patient.

ECG

The following factors can cause the cardiotach to calculat
heart rate:

- Morphology of the ECG,
- Weak signal,
- Paced patients.

Morphology of the ECG

HP offers two different ECG algorithms to allow for differ
morphologies.

Recommendation

Choose the patient category according to the QRS morphol
than the patient's age. Use Adult if the duration of the QRS
70 ms: use Neonate/Pediatric if the duration is less than 50

Weak signal

The signal may be weak due to the patient's constitution, th
placement or other factors. A 1 mV calibration bar at the le
ECG channel enables you to estimate the quality of the sign

Recommendation

- Use the strongest signal on channel 1 and compare th
amplitude with the 1 mV bar; the height should be at
that size. If not, change the lead or try a different elec
placement.

Paced Patients

Paced pulse rejection is available for patient categories.

Recommendations

- Derive the cardiac rate from pulse.
- Look for a lead on channel 1, where the pace pulse a
zero to avoid paced pulses being counted as beats.
- Whenever acceptable use the Adult category.

Heart Rate (HR) / Pulse

	Adult (bpm)	Ped
Cardiotach Range	15 to 300	15 to
HR Alarm Limit Range	15 to 250	15 to
Pleth/Pressure Pulse Alarm Limit Range	30 to 250	30 to

The expected range can be estimated by performing a mar count.

RESP

	Adult/Pedi (rpm)	Neo (rp
Respirotach Range	0 to 120	0 to 180
High Alarm Limit Range	10 to 100	30 to 150
Low Alarm Limit Range	0 to 95	0 to 145

In general, use the Adult or Pediatric category if rates belo expected; use Neonatal if expected rate is above 100.

Pressure

The algorithm responsible for respiration artifact suppres all three patient categories for the 10 and 30 scales. In the Adult categories, the algorithm is also used for the 60 scal

SpO_2

Default for averaging time is 10 seconds for Adult, Pedi ar

Note—Default can be changed in Configuration Mode.

CO_2

	Adult/Pedi	Neo
AWRR High Range	10 to 100 rpm	30 to 1
AWRR Low Range	0 to 95 rpm	0 to 14
Delay before alarm sounds	20 s	20 s

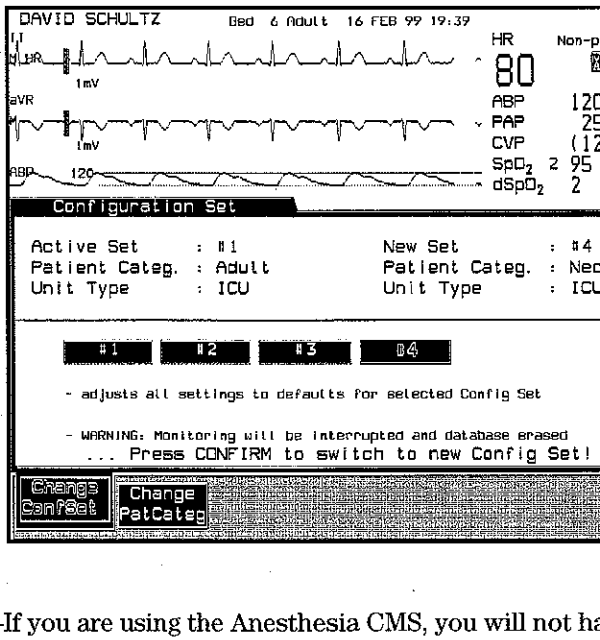
Note—The Apnea alarm delay time cannot be changed

Changing the Configuration Set

If you want to change the application of your system, for e
Configuration Set 1 adult to Configuration Set 3 neonatal,
in monitoring mode by getting into the Monitor Setup setu
procedure will not *modify* a Configuration Set, but will ch
completely from one Configuration Set to another.

Note—Changing the Configuration Set causes all the monit
revert automatically to user default settings. All patient da
Change ConfS

Monitor Setup → **Adult/Pedi/Neo** →



Note—If you are using the Anesthesia CMS, you will not ha
"Unit Type", as this is automatically set to OR.

Note—If you do not want to store the default settings in th
modules, do one of the following:

- Remove the plug-in modules from the rack before sta procedure.
- Ask your biomedical engineering department or HP engineer to set Parameter Settings Transfer to OFF.

Procedure

The current Configuration Set for the monitor is highlighte universal settings are displayed at the top of the Task Winc

1. Press the softkey **Change ConfSet** to select the Co Set you require. The universal settings for the selecte Configuration Set are displayed.
2. Press the hardkey **Confirm** to switch to the selecte

Wait at least one minute before plugging in or removing an from the rack.

Changing Operating Modes

This function will be mainly used by service engineers for
system on installation or for servicing the system. Before y
in this Task Window you have to use a *password.*

There are three levels of password:

Level 1 password allows you to select Monitor or Con

Level 2 password allows you to select Monitor or Serv

Level 3 password allows you to select any of the four
modes listed below:

Monitor This is the usual operating mode and full
patient monitoring. If the system is attach
it must be in this mode.

Config This mode is for configuring the monitor
on installation. The settings that are sele
mode will be the active default settings f
system is turned on.

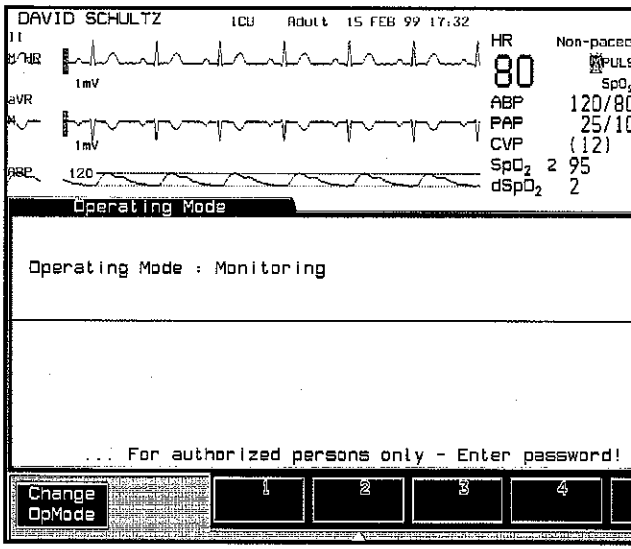
Service This mode is used by service personnel.

Demo This mode can be used for training purp
base has 24 hrs of simulated waveform a

Warning

**The Configuration, Service and Demo modes do not
patient monitoring. When the monitor is attached to
must be in the monitor mode.**

Monitor Setup → **Operatng Modes**



Procedure

1. Enter the password by pressing the appropriate com
softkeys which are numbered 1-5.

   If you enter the password correctly, you can proceed
step. If not, exit the Task Window by pressing **Main**
again.

2. Press the softkey **Change Opmode** . Move the highl
mode you require.

3. The prompt message "Press CONFIRM to switch to
appears. Press the hardkey **Confirm** .

   The instrument goes through the boot-up sequence a
automatically to default settings and the mode of yo
becomes active.

The Test Signals Function

The Test Signals function allows a check of the way signals processed from the parameter module to the screen. The a function is to identify broken lines and cables in the signal areas.

Note—While the Test Signals function is active, no patient supported - parameter values are not collected. Alarms wil depending on the test values, as part of the monitor's self t procedure. They are patient alarms. See for individual test module.

Procedure

1. Press hardkey **Monitor Setup**
2. Press softkey **Test Signals** in the Instrument C Selection Window.

The monitor returns to Main Screen. Test waves for each p monitored are generated for 30 seconds to test the process the monitor. The message "Test Signals active - no monito on the screen.

After 30 seconds, the monitor automatically switches back Mode.

If you want to go back to Monitoring Mode before 30 seco elapsed, press **Monitor Setup**, then **Stop Signals**.

Analog Output (CMS only)

The Analog Output function provides eight channels of An connection to recorders and other data collection instrum information on Analog Output, refer to Appendix B.

System Self-Test Values:

Module	Test Numeric Limits	Test Waveform
ECG and EC/RESP		
ECG	100 bpm in ADULT mode 125 bpm in NEO/PEDI mode	Simulated squarewave and
RESP	15 rpm in ADULT mode 30 rpm in PEDI mode 55 rpm in NEO mode	Simulated Resp wave and
Pressure		Simulated squarewave and
Systolic	120 mmHg ADULT 60 mmHg PEDI/NEO	
Diastolic	0 mmHg ADULT/PEDI/NEO	
SpO_2/Pleth		
SpO_2	100%	Numeric only
Pleth	Wave on display	Simulated Wave
$tcpO_2$/$tcpCO_2$		Numeric only
$tcpO_2$	60 mmHg (8.0 kPa)	
$tcpCO_2$	40 mmHg (5.3 kPa)	
CO_2		Simulated squarewave and
$ETCO_2$	40 mmHg (6.0 kPa)	
$IMCO_2$	0 mmHg (0.0 kPa)	
AWRR	25 rpm	
Temperature	40°C (104°F)	Numeric only

Parameter Settings Transfer

Parameter modules which are labeled on the front with a s
upper right hand corner can be transported from one rack
from one HP system to another) and still keep their param

Note—There are a few modules that may or may not be ma
that **DO** transfer parameter settings. They are: M1006A, M
#CO1, M1029A, M1006B, M1032A, M1012A Any other mo
"T" does not transfer parameter settings.

The settings (such as alarm limits) are stored inside the m
could even unplug a satellite rack full of these modules fro
and plug it into another monitor without losing the parame
This behavior permits fast and easy transport, and is calle
Settings Transfer".

Note—The settings that are stored in each module are deta
relevant module chapters of this guide.

For Parameter Settings Transfer to work on your monitor,
ON in a special Service Mode, either by your biomedical e
department or the HP service engineer.

After making changes to parameter settings, wait about 10
the new settings are stored in the relevant module before
module.

After plugging in a module, wait about 10 seconds to let th
the settings before opening the Task Window.

After switching on the system or going into Monitor mode
mode, the first 30 seconds are used to store settings from
the modules. Modules plugged in after this initial 30 secon
capable of keeping their settings.

You can change parameter settings *either*:

- in the parameter Task Window,

or

- by resetting all parameter settings to their default val
  changing Configuration Sets or operating modes.

You can find more information about Parameter Settings T
each of the parameter chapters, in particular Chapter 17, *"*
Module Section", and Chapter 15, *"Temperature Module Se*

If Parameter Settings Transfer for your monitor is set OFF,
settings are NOT transferred with your modules.

Parameter Settings Transfer Messages

The following messages related to Parameter Settings Tran
appear on the display:

Message	Condition	Action r
(Parameter name) no settings transfer capability	The indicated parameter module is not a *T* module.	Insert a m a *T* on the
(Parameter name) check settings"	No settings are stored in the module, or the settings are incorrectly stored.	Enter the Task Win the settin settings a automatic when you Window.
Check Patient Category and (parameter name) settings	The patient category stored with the settings in the module is different from that of the monitor.	*Either* ch patient ca monitor o paramete
(Parameter name) unable to store settings in module	The parameter module was removed before the settings could be stored, or there is a malfunction in the module. (This message can appear with Settings Transfer On or Off.)	Press Sil re-insert t check/adj settings i paramete Window. Window module about 10 you remo same mes replace th

Message	Condition	Action rec
(Parameter name) reading settings from plug-in module"	A parameter key has been pressed while parameter settings are being taken from the indicated module.	Wait for th disappear b pressing the that parame
(Pressure label) check zero and transducer level"	A pressure module has been plugged-in with the transducer connected. Zero and calibration values will be taken from the module.	If the transd not been re zeroed and or if you a a new meas the zero and procedures.

Other Pa

This chapter describes the Other Patients functio
the following sections:

- Overview. . . . . .
- HP Viridia Patient Care System . . . . . .
- Using HP Viridia Patient Care System with an Arrh
  4-8

Overview

If you are connected to an HP Viridia patient care system th
Patients function allows you to put your bed into groups, se
receive alarms between beds in the groups and view data fr
beds in your group.

If you require information about the automatic alarm Other
function, see the next section.

If you have an arrhythmia computer attached to your monit
Central Station equipped with arrhythmia channels, refer to
HP Viridia Patient Care System with an Arrhythmia Compu
4-8.

HP Viridia Patient Care System

The HP Viridia patient care system is a network which tran
information. If your system is connected to such a networ
information to other systems or central stations, and recei
from them.

One aspect of this information transmission capability is c
Patients.

The Other Patients setup, based on nursing care assignmer
to view data from another bed in your group or the "ALL" g

If your monitoring system is connected to the network, yo
waves transmitted to the central station*. Only the primary
displayed on the main screen at the central station. Each C
screen of any device connected to the network starts with
wave.

If you have ECG turned on, it is always selected as the prir
is not turned on you can select a primary wave in the Syste
Window under Monitor Setup.

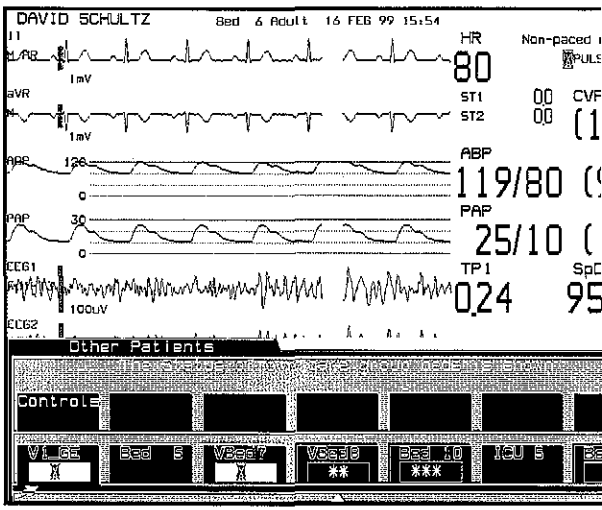
* If EASI 12-Lead ECG is configured ON only 5 waves can
to the central station.

The Other Patients Selection Window

The softkeys in the Other Patients Selection Window conta
labels of the beds currently available for viewing on your n
Pressing a softkey leads you into the Other Bed Task Wind
particular bed. This task window contains detailed patient
including alarms and INOPs.

If your bed is configured to receive alarms and the beds in
Patients group are configured to transmit alarms, the softk
Other Patients Selection Window contain alarm informatic
bed label. Alarm severity is indicated in the second line of
label by ** for a yellow alarm and by *** for a red alarm. A
softkey will have a red or a yellow frame if a bed is in alar

The frame around the softkey for a bed in alarm will blink u
alarm is silenced by that bed. If the alarms on a bed in your
Patients Selection Window are suspended, the 🔕 symbol w
the respective softkey.



Automatic Alarm Other Patients

Incoming Alarm

If your bed is configured to receive alarms, you receive alar
beds in your Other Patients group which are configured to
alarms. If such a bed in your group goes into alarm, it can b

- A totally new alarm.
- A new alarm situation on a bed which is already in ala

There are two ways your monitor can react:

- If it is in Main Screen it reverts automatically to Othe
mode and enters the Alarm Bed Task Window.
- If it is in a Selection or Task window the message Oth
alarm is displayed in the status line.

In both cases you will hear the Other Patients prompt tone
two double beeps.

The Alarm Bed Task Window shows the bed label of the ot
alarm, the primary wave, up to 10 numerics of the paramet
monitored, INOP and ALARM messages in a rotating field.
parameter numeric will be blinking.

If the alarm at the other bed has been silenced, the messag
appears below the wave. If your monitor is configured to r
alarms the Alarm Bed Task Window remains on the displa
monitor is configured not to receive silenced alarms the A
Window is removed from the display.

An arrow next to the bed label in the Task Window means
one or more other beds in the Other Patients group with a
unacknowledged alarm. (See next page).

Multiple Incoming Alarms

If there are one or more beds with unacknowledged alarm
by an actual displayed alarm, there is an arrow in front of
The unacknowledged alarms are stacked and the beds are
sequence as the alarms arrived. If alarms arrive simultaneo
viewed with the lowest bed number first. Each bed in alar
automatically displayed for 5 seconds. When all the alarm
displayed, the last bed stays on the display and the softkey
Show Next Wave and Clear Alarm Bed become active

When you have viewed the primary wave for that patient y
the softkey Show Next Wave to view the next waveform

An arrow next to the bed number signifies that there are o
beds with unacknowledged alarms in the Other Patients gr

Press the softkey Clear Alarm Bed . This:

- Acknowledges the alarm of the bed in your own Alar
  Patients Task Window and automatically displays th
  bed from the alarm stack.

- If there is no arrow next to the bed number, it autom
  you out of the automatic alarm display.

Note—When an alarm has been acknowledged. the ackno
longer appears in your Other Bed Alarm stack. It is NOT re

the alarm stack viewed by other monitors in the Other Pati
No arrow next to a bed number means: **either** there are no
alarms **or** all the existing alarms have been acknowledged.

Configuring the Other Patients Controls

With the Other Patients Controls you can place your own b
eight groups: A, B, C, D, E, F, G or the ALL group, based on
assignments within a unit.

The Other Patients Controls Task Window allows you to c
Receive alarms configuration for your bed.

Note—When a bed is assigned to the ALL group, alarms can
from and sent to beds in group A-G as well as the other be
group. When a bed is assigned to any group in A-G, alarms
from and sent to any bed in the same group and also to be
group.

Note—The bed will automatically be assigned to the ALL g
connection to the HP Viridia Network is interrupted (for e
HP Viridia Network cable at the back of the monitor is dis
the central station is switched off) and the monitor comes
different branch.

Note—Any changes made to Other Patients settings will be
to three hours after the monitor is switched off.

Using HP Viridia Patient Care System with an Arrhyt Computer

Note—The HP Viridia CMS and 26/24 Series Monitors perfo on the patient's ECG waveform. This includes triggering al asystole, bradycardia, ventricular fibrillation and tachycard Enhanced arrythmia monitoring is available when the Virid 24 Series Monitor is connected to one of HP's arrhythmia s the HP Viridia Network Interface (see below).

If your monitor is connected via the HP Viridia patient care arrhythmia computer (HP 78720A), or you have a Central S arrhythmia channels such as the HP 78560A or HP2300, or M3150A/M3153A Viridia Information Center, you are able t delayed arrhythmia wave. Using the HP 78720A or the M31 the arrhythmia monitoring for your monitor must be turne the computer display. Using the HP 78560A or HP M2300, t done from the Central Station or from the monitor itself.

Arrhythmia monitoring is most easily assigned in SELECT central station or arrhythmia computer, or from the ARRH MENU at the monitor. The ARRHYTHMIA MENU enables y

- Set up arrhythmia monitoring on a patient (not availa 78720A).
- Tabulate trends and review trend data (M2300 only).
- Review and edit alarms (not available for HP 78720A)

When arrhythmia ia assigned, the monitor automatically go mode. You cannot change the mode back to "Non-Paced" n arrhythmia is unassigned.

Note—The screens that can be seen on the monitor via the ARRHYTHMIA MENU are all similar to screens on the arrh computer or central station. For further information on usi arrhythmia monitoring function, refer to the operating guid arrhythmia computer or central station.

If arrhythmia monitoring for your system is on, the heartra
screen is that calculated by the arrhythmia computer. Alar
from the arrhythmia computer are also displayed. Within t
channel, arrhythmia information is displayed on the rhythr
beat status of the patient. In the "Delayed ArrhWave" Task
delayed ECG arrhythmia waveform displays a beat label w
complex.

See the following table for information on beat labels.

Beat Label	Meaning
A	Artifact beat
N	Normal beat
S	Superventricular beat
V	Ventricular ectopic beat
M	Missing beat
?	Questionable beat
P	Paced beat
'	Pace pulse (tick mark)
L	Learning ECG pattern
U	Unknown, since pace learning is inc

If arrhythmia is assigned, and an arrhythmia alarm occurs,
Validation Task Window will appear automatically on the
unless you turn it off under Trends/Calcs.

Arrhythmia Alarms on the HP 78560A and HP 78720 Ar Computers

Alarm	Minimum Condition Requir Alarm
ASYSTOLE (***)	No QRS for 4 consecutive se absence of V fib or chaotic si
VENT FIB/TACH (***)|	Fibrillatory waveform detect consecutive seconds.
HR BRADY XXX < BBB (***)	Heart rate < lower HR limit s whichever is lower.
VENT TACHY (***)	Either VENT RHYTHM with heartrate > tachy HR limit or > tachy run limit with rate fo tachy HR limit. Tachy run limit is adjustable using the Change Limits disp HR limit is adjustable from 8 bpm using the Change Limits
VENT RHYTHM (**)	Dominant rhythm of adjacen < = 120
PAIR VPBs (**)	Two consecutive VPBs betw VPBs
PACER NON-CAPT/PACER NOT-CAPTURE (**)	Missed beat with pace pulse patient
MISSED BEAT(S) (**)	Beat omitted with HR < 120 for 1 second with HR >120

Alarm	Minimum Condition Req Alarm
R-on-T VPBs (**)	For HR < 100, a VPB with I 1/3 second and< 1/3 of the interval followed by a com pause, or 2 such Vs withou compensatory pause in 5 n > 100, 1/3 R-R interval is to detection.
VENT BIGEMINY (**)	Dominant rhythm of SV, V,
VENT TRIGEMINY (**)	Dominant rhythm of SV, S
MULTIFORM VPBs (**)	The occurrence of two diff VPBs within last 300 beats the last 60 beats.
HR XXX >UUU (**)	Heartrate >UUU, where U adjustable bedside high ala heartrate of XXX is the hig measured since the alarm
HR XXX < LLL(**)	HR < LLL, where LLL is th bedside low heartrate limit of XXX is the lowest heart since the alarm was detect
IRREGULAR (HR) (**)	Irregular SV rhythm

Arrhythmia Alarms on the HP 78560A Arrhythmia Com

Alarm	Minimum Condition Required
RUN VPBs > X (**)	Run of more than X VPB's, wher adjustable from 2 to 9 using the Limits display.
PACER NON-FUNCT (**)	Missed beat without pace pulse patient
VPBs > XX/min (**)	More than XX VPBs per minute, adjustable from 1 to 30 using the Limit display.

Arrhythmia Alarms on the HP 78720 Arrhythmia Comp

Alarm	Minimum Condition Requiring
EXTREME TACHY	Heartrate >Tachy limit
RUN VPBs >9 (**)	Run of VPB's > 9 and heartrate < set for VENT TACHY
RUN VPB's 3-9 (**)	Run of 3-9 VPB's
PACER NOT PACE (**)	Missed beat without pace pulse patient
VPB's > 23/min (**)	More than 23 VPB's/minute
VPB's > 11/min (**)	More than 11 VPB's/minute
VPB's > 5/min (**)	More than 5 VPB's/minute

Arrhythmia Alarms on the HP 3150A/3153A Arrhythmi

Message	Minimum Condition Requiri
*** ASYSTOLE	No QRS for 4 consecutive sec
*** V-FIB/TACH	Fibrillatory wave for 4 consec
*** V-TACH	Consecutive PVCs >/= V-Tach HR > V-Tach HR limit
*** TACHY yyy > xxx	Heart Rate (yyy) greater than Tachy limit (xxx)
*** BRADY yyy < xxx	Heart Rate (yyy) less than the Brady limit (xxx)
** NON-SUSTAIN VT	A run of Vs having a ventricul HR limit, but lasting for less t Run limit
** VENT RHYTHM	A dominant rhythm of adjace rhythm limit and ventricular H limit
** RUN PVCs	Run of PVCs greater than 2
** PAIR PVCs	Two consecutive PVCs betwe
** PACER NOT CAPT	No QRS for 1.75 x the average with Pace Pulse (paced patie
** PACER NOT PACE	No QRS and Pace Pulse for 1. average R-R interval (paced p
** PAUSE	No beat detected for 1.75 x av interval for HR <120, or no be with HR >120
** SVT	Run of SVPBs >/= SVT Run li SVT Heart Rate greater than t limit

Message	Minimum Condition Requiring
** R-ON-T PVCs	For HR <100, a PVC with R-R int the average interval followed by compensatory pause of 1.25 x av interval or 2 such Vs without a compensatory pause occurring v of each other. (When HR >100, 1 interval is too short for detectio
** VENT BIGEMINY	A dominant rhythm of N, V, N, V (N=supraventricular beat, V=ver beat)
** VENT TRIGEMINY	A dominant rhythm of N, N, V, N (N=supraventricular beat, V=ver beat)
** PVCs > xxx/MIN	PVCs within one minute exceed /min limit (xxx)
** MULTIFORM PVCs	The occurrence of two differentl Vs, each occurring at least twice last 300 beats as well as each oc least once within the last 60 bea
** HR yyy > xxx	Heart Rate (yyy) greater than th limit (xxx)
** HR yyy < xxx	Heart Rate (yyy) lower than the limit (xxx)
** IRREGULAR HR	Consistently irregular rhythm (i intervals)

Extended Overview (Viridia CMS only)

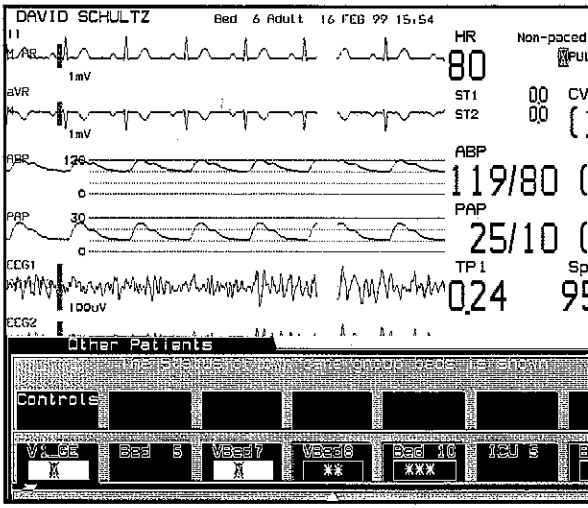
Note—The Extended Overview feature is optional and requ
M1272A Inter-HP Viridia Network Gateway.

Extended Overview enables you to review the status of pa
another HP Viridia Network - either in another care unit or
larger than 24 beds. The Extended Overview Task Window
display of one wave, cascaded into two 4-second segments
parameter numerics including arrhythmia if available, and
messages.

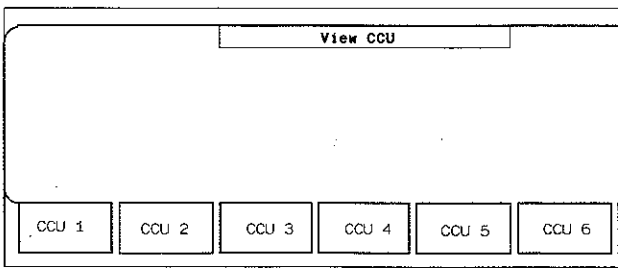
Extended Other Patients can be in use at a maximum of ei
each HP Viridia Network simultaneously. When the maxim
exceeded, the message "CANNOT DISPLAY WAVES AND
OTHER BED DISPLAY LIMIT EXCEEDED" is displayed.

To View an Extended Other Patients Bed

1. Press **Other Patients**.
2. Depending on your monitor's configuration, select a g (in the following display labeled **View CCU**) to bri labels in another unit or **other Beds** for bed labels larger than 24 beds.



3. Select the bed, using **More Beds** if necessary.



The Extended Overview Task Window will be displa

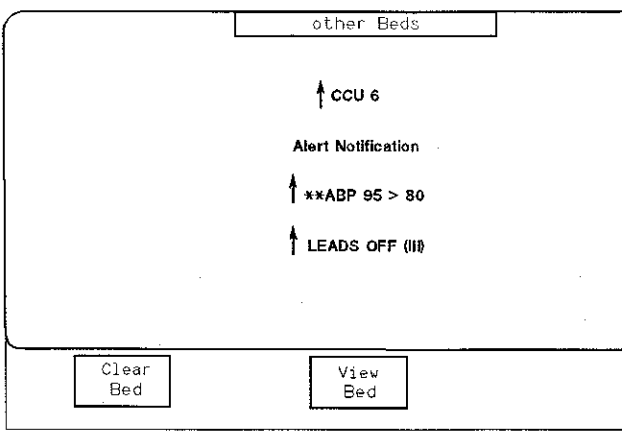
Note that only beds available on the other HP Viridia be selected.

4. To view another bed in the group, select the appropr label.
   To select any bed not in the group, press **Other Patie**

Alert Notification

Alert Notification provides automatic notification of Alarm from other extended Other Patients beds within a single u 24 beds. With one keypress at the bedside, you can view th waves and numerics. If more than one bed is in alarm, a 5- Notification window is provided for each bed in turn. Alert not provided between care units.

The operation of receive/send alarm choices and group sel unchanged for Alert Notification. Alarms cannot be reset i Notification.



To view an Alarming Bed from Alert Notification

1. Select **View Bed** to display waves
2. When done, select **Clear Bed** to return to the Mair view next bed's Alert Notification (if more than one Notification, ↑ preceding bed name).

A maximum of 4 beds can be viewed on each HP Viridia N time. When the maximum use is exceeded, the message "C DISPLAY WAVES AND VITAL SIGNS, OTHER BED DISPL EXCEEDED" is displayed for 5 seconds.

Note—If the gateway is configured to provide Alert Notifica
gateway is inoperational, the message "SDN comm error - i
gateway failed" will be displayed in the message area of the
display. The Alert Notification display is removed if Silenc
pressed on the source bedside monitor or Silence on the
station. All ***-star, **-star and hard INOP alerts will gener
notification.

Alarm Fun

This chapter provides general information on alar
and what to do if an alarm occurs. It includes the
sections:

- Alarm Display. . . . . .
- Alarm Setup . . . . . .

Alarm Display

The alarm messages are displayed across the top of the scr
you switch the power on, the system alarm capability is swi
This is indicated by an ALARMS SUSPENDED or ALARMS
or 3 MIN message at the top right corner of the screen, depe
alarm suspended mode which is configured on the monitor.
Suspend symbol (🔔) on the control panel is also illuminat

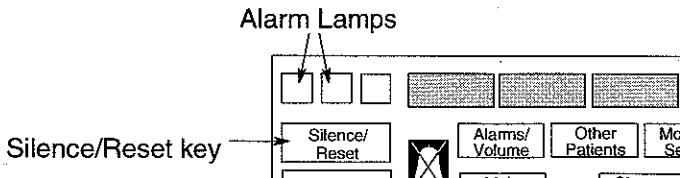
Note—When you switch the monitor on, a loudspeaker test
for approximately 3 seconds. If there is no sound, please ch
volume settings.

If there is more than one red alarm, yellow alarm or INOP n
will see an up arrow (↑) next to the message. The message
displayed in rotation every 2 seconds. If your patient has m
alarm, you can see a list of all these active alarms in the Ala
Task Window. To access this Task Window press **Alarms/V**
Alarms followed by **Alarm Messages**.

Warning

Alarms and INOPs are not active in the configuration modes, but are active in monitoring and demo modes.

Alarm Functions on the Control Panel



Alarm Lamps

Red and yellow alarm lamps on the control panel signify th
the cause of the alarm. One of these lamps is always lit in t
alarm sound. In the case of more than one alarm, the highe
alarm lamp is always lit.

What the 🔔 Symbol Means

When the alarm capability is suspended by using the **Susp**
softkey, or the [Suspend] hardkey, the 🔔 sign on the con
illuminated. If, however, you have turned the individual pa
off one by one, the 🔔 sign on the control panel is not illum
appears next to the individual parameter numerics on the

Suspending Alarms

There are four alarms-off modes available. You configure
want at installation of your system. The four modes are:

1. ALARMS SUSPND 1 MIN
2. ALARMS SUSPND 2 MIN
3. ALARMS SUSPND 3 MIN
4. ALARMS SUSPENDED

ALARMS SUSPENDED 1, 2, 3 MIN

In these modes the alarm capability can be switched off, b
automatically switched on after 1, 2 or 3 minutes (unless y
switched it on manually beforehand with the **SwitchOn Al**
in the Alarms Selection Window, or the [Suspend] hardk

ALARMS SUSPENDED

In this mode the alarm capability is switched off permaner
switched on manually when required (using the **SwitchOn**
softkey in the Alarms Selection Window, or the [Suspend

Note—We recommend that you have your system configur
SUSPND 1,2 or 3 MIN for Intensive Care use, and ALARMS
for Operating Room use.

If all the alarms have been turned off using the **Suspend A**
or the [Suspend] hardkey, they can all be turned back on
SwitchOn Alarms softkey or the [Suspend] hardkey.

While the alarms are suspended (permanently or for 1, 2 or
INOP messages continue to be displayed but alarm messag
alarm tones are not active. The nurse call relay is inactive.

Suspended Alarms during Arrhythmia Monitoring

Notes—

- While Arrhythmia is assigned, the central Arrhythmia
takes over the ECG/HR alarms.
- Suspending Alarms switches off all alarms, including
alarms.
- If Arrhytmia is assigned and alarms are suspended, th
alarms are switched off. The **ON/OFF** Softkey in the
and ECG Adjust Alarms Task Windows will not be av
(inactive softkey). The ECG/HR alarm **ON/OFF** capa
only be reactivated by switching the main Alarms on,
unassigning Arrhythmia.

Silencing and Resetting Alarms

If an alarm occurs you can silence it by pressing the **Silenc**
key. This will silence ALL alarms that are occuring at that r
alarm messages numeric will continue to blink.

You can configure your system on installation to have all la
non-latching alarms or to have visual alarms latching and a
non-latching. You can also configure the alarm reminder fu
on or off.

Note—Audible alarm indications broadcast over the HP Viri
(SDN) are always treated like visual alarms on the Central
remote systems (even if the bedside monitor is configured

- Latching Alarms - The alarm continues when the alar
is eliminated. Latching alarms can be reset by pressin
Silence/Reset key. Alternatively, all latching alarm
turned off using the **Suspend Alarms** softkey or the
hardkey. Latching alarms for individual parameters c
off in the Adjust Alarms Task Window or the Alarm L
Window.

- Non-latching Alarms - These automatically reset whe condition is eliminated. INOPs are always non-latchi
- Alarm Reminder - This only functions with alarms an (It does not work for arrhythmia alarms.) It affects th lamp, nurse call relay and the recorder, but not the a The alarm reminder and reminder time can be config follows:

Alarm Reminder	Reminder Time
Off	Not Applicable
On	2 **or** 3 mins
Re-alarm	2 **or** 3 mins

If you have acknowledged an alarm by pressing the [key and the alarm condition continues, then the syst according to the following configurations:

Alarm Reminder	Reminder Time	Alarm Behavi
Off	—	No alarm reminder.
On	2 or 3 mins	Alarm reminder tone Alarm lamp No new alarm recording Nurse call relay signals *The alarm tone is reannou duration of 6 seconds ever minutes unless the alarm eliminated.*

Alarm Reminder	Reminder Time	Alarm Behavio
Re-alarm	2 or 3 mins	Full alarm tone Alarm lamp New Alarm Recording Nurse call relay signals *A full alarm tone is reannou* *or 3 minutes. The alarm ton* *continuously until it is silen* *pressing the* Silence/Reset

The alarm reminder clock starts counting from the beginn
every time the Silence/Reset *key is pressed. If an alarm*
acknowledged by pressing the Silence/Reset *key, and du*
next 3 minutes a new alarm (of whatever priority) occurs
silenced, the alarm reminder will sound 3 minutes later f
highest priority alarm. The alarm reminder always funct
highest priority acknowledged alarm. The alarm reminde
sound if there is an active INOP or alarm present. For ma
safety when monitoring patients, you must resolve active
alarms quickly so that the alarm reminder function can o

Even when the alarms are suspended or individually switch
corresponding parameter numeric will blink if an alarm cor
occurs **and** "Maintain Visual Alarms" is set to "Yes" in a spe
Configuration Mode by your biomedical engineering depart

Note—The central stations 78560A, M2350A and M2360A ca
configured to silence and reset the alarms of the bedside m
your system is connected to such a central station you can
alarm at the central station. The central stations 78504A an
silence and reset the alarms of the bedside monitor only if
do so by an HP service engineer or hospital biomedical eng
then permanent and cannot be altered by the user.

Summary of Alarm Behavior

		Non-latching alarms	Latching alarms	Vi N
Silence/Reset has NOT been pressed	Alarm is given	Audible alarm Alarm lamp Alarm message, blinking numerics	Audible alarm Alarm lamp Alarm message, blinking numerics	Au Ala Ala bli
	Alarm situation no longer present	Automatic reset	Audible alarm Alarm lamp Alarm message, blinking numerics	Ala Ala bli Au res
Silence/Reset has been pressed	Alarm situation still present	Audible alarm silenced Alarm lamp off Audible alarm reminder every 3 minutes (if configured) Alarm message, blinking numerics	Audible alarm silenced Alarm lamp off Audible alarm reminder every 3 minutes (if configured) Alarm message, blinking numerics	Au sil Ala Au rer mi co Ala bli
	Alarm situation no longer present	Automatic reset	Automatic reset	Au

Alarm Priorities

- **Red alarms** - Highest priority alarms, displayed in th corner of the display screen. These are marked with t asterisks (***) next to the alarm message, for exampl ***ASYSTOLE.

- **Yellow alarms** - displayed in the top center of the dis There are two types of yellow alarms; continuous yell and short yellow alarms. The continuous yellow alarn associated with preset alarm limits. The short yellow active from the arrhythmia computer.

  Both types of yellow alarms are marked with two aste next to the alarm message, for example, **HR 56<60, tone is shorter with the alarms from the arrhythmia c both the short and continuous yellow alarm, the yello

- **INOPs** - displayed in the top left corner of the displa INOPs also have priority levels, they are as follows:

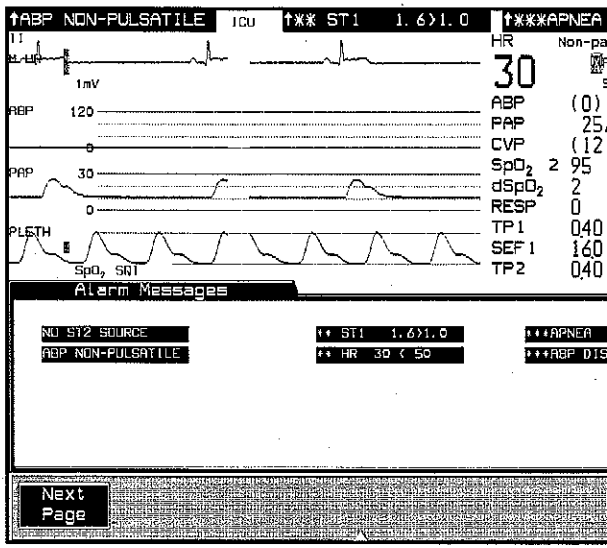
  - Equipment Related INOPs - These are caused by hardware faults, for example, "ABP NO TRANSI will hear an INOP tone. When an equipment-rela have a direct effect on the patient, for example " OVERPRESS" of the noninvasive pressure cuff, i categorized as a severe! INOP. When a severe IN the system alarm capability is switched ON by th not already on. You will hear an INOP tone. Syst cannot be suspended until the cause of the seve been eliminated.

  - Patient Related INOPs - These are usually cause system being unable to process signals properly, "Noisy ECG". You will not hear an INOP tone wi of INOP.

Viewing Alarm Messages

The monitor alarms are arranged in increasing severity acr

1. Press **Alarms/Volume** or **Alarms** hardkey
2. Press **Alarm Messages** in the Alarms Selection Wir



Note—When an alarm occurs, you should always check the condition first.

Audible Alarms

There are four different tones (3 alarm tones and one INOP

- Alarm tones
  red
  yellow continuous
  yellow short
- INOP tone

Individual Parameter Alarms

When you plug in a parameter module and connect the tran adapter cable, the parameter is automatically switched on. and NBP are automatically switched on when you plug in th module.)

Whether the parameter alarms are switched on or off at sta selected for each parameter separately in the special Confi Mode

The parameter alarms can be switched off individually eith parameter Adjust Alarms Task Window or in the Alarm Lim Window. A 🔕 symbol appears next to the numeric of any p which the alarms are switched off. A parameter without an alarm capabilities does not show a 🔕.

If all the alarms have been turned off individually, they mus on individually. There is one exception to this rule, when th set up in Operating Room mode (this applies to all Anesthe and Viridia 26/24 Series Monitors and others using a Config with Unit Type=OR). In this mode all parameter alarms can off with a single key press. This enables you, for example, t switch all alarms off and individually switch on those paran really needed, depending on your monitoring requirements. parameter alarms can be switched off (or on) using Confir Alarm Limits Task Window.

If a parameter alarm is turned off, INOP messages continue displayed but alarm messages, lamps and the alarm tones a The nurse call relay is inactive.

Note—The heart rate derived from a continuously monitore measure of the heart's overall electrical activity. The pulse measure of the heart's mechanical activity, pumping blood body. With the HR/PULSE parameter you can select only o be the active alarm source. If you choose HR, all alarms for not active. If you choose PULSE, all alarms for HR are not a INOPs for both HR and PULSE are displayed regardless of the alarm source.

When an Alarm Occurs

The alarm messages appear across the top of the screen. Y
identify the alarm and act appropriately, according to the
alarm.

- Identify which monitor is in alarm.
- Check the patient's condition.
- Identify the cause of the alarm.
- Silence the alarm, if necessary.
- When alarm condition is eliminated check that the a

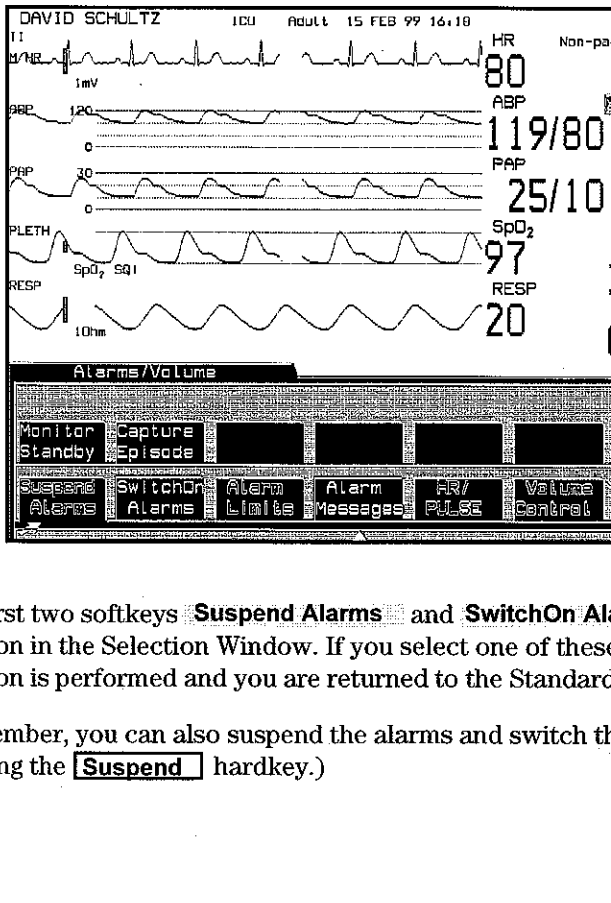
You will find the alarm messages for the individual param
appropriate parameter sections of the Manual.

Alarm Setup

In the Alarm Limits Task Window you are able to review al
limits that have been set for a patient. In this Task Window
to turn off individual parameter alarms and adjust the limit
that if you just want to adjust an alarm limit you do not hav
the individual parameter setups.

Getting into the Alarms Selection Window

Press the hardkey **Alarms/Volume** or **Alarms**.

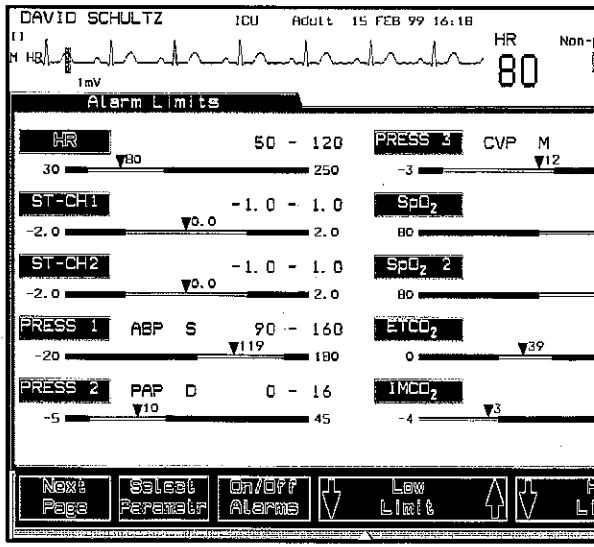


The first two softkeys **Suspend Alarms** and **SwitchOn Al**
function in the Selection Window. If you select one of these
function is performed and you are returned to the Standard

(Remember, you can also suspend the alarms and switch th
by using the **Suspend** hardkey.)

Changing the Alarm Limits

Alarms/Volume –> **Alarm Limits**



1. Press **Select Parametr** to highlight the parameter t adjust.

2. Use the **On/Off Alarms** softkey to switch the paran on or off. When the alarms are turned off, a 🔔 appea parameter alarm limits.

3. Use **Low Limit** and **High Limit** softkeys if adjust the limits.

4. If there are more than 10 alarm bars to review, press **Next Page** softkey, and the remaining alarm bar screen.

5. Stay in the Task Window if you want to adjust more **Main Screen** to return to the Main Screen.

Setting the Volume Control

The QRS and the alarm tone volume can be set independen

1. Press **Alarms/Volume** hardkey.
2. Press **Volume Control** in the Alarms Selection Win

   The QRS and alarm tone are each represented by the triangle which can be filled in. When the triangle is co filled, this represents maximum tone volume.
3. Press the up and down arrow softkeys to fill each tria required amount. If there is no current alarm or INOP alarm tones will sound each time the alarm tone keys so that you can hear the effect of changing the volum
4. Press **Main Screen** to return to the Main Screen.

Note—The QRS tone can be derived from other sources tha as pressure or pleth. See Chapter 14, "ECG and ECG/Respir Section" for more details.

Note—Tone Modulation can also be set to On or Off in this v the **On/Off Tone Mod.** key.

The Nurse Call Relay

Note—The nurse call relay is not available for the Viridia M

The nurse call relay is a paging system which warns the nu occurs on a monitor. It becomes active in one of four situa depending on the way it has been configured:

- Red only alarms
- Red and Yellow alarms
- Red and INOP alarms
- Red and Yellow INOP alarms.

The nurse call relay is not active when the monitor's alarm switched off.

When an alarm has been silenced using the **Silence/Reset** audible 2 **or** 3 minute alarm reminder is configured to be e alarm, the nurse call relay signals will behave as follows:

Alarm Reminder	Reminder Time	Nurse Call Relay Signa
On	2 **or** 3 mins	The nurse call relay signals for a duration of 6 seconds e minutes unless the alarm co eliminated
Re-alarm	2 **or** 3 mins	The nurse call relay signals after 2 or 3 minutes. The ala relay signals run continuous are interrupted by pressing **Silence/Reset** key.

Recording Fun

This chapter contains information on the recordi
made using the HP Viridia CMS and HP Viridia 26
the recorders which can produce them. It include
sections:

- General Recorder Information .....
- Types of Recordings .....
- Delayed Recording .....
- Alarm Recording .....
- Procedure Recordings .....
- Realtime Wave Recordings .....
- Realtime Vital Signs / Blood Recordings ...
- Trended Vital Signs Recordings.....
- Neonatal Event Review Recordings.....
- oxyCRG Recordings .....
- Additional Information.....
- Recording Status Messages .....
- Loading Paper .....

General Recorder Information

Recorders

The following recorders are available for use with the HP V and 26/24 Series Monitors:

Recorder	Model Number
Plug-In	M1116A/B[a]
4-Channel Bedside	M1117A (for Viridia CMS only)
2-Channel Bedside	HP 78574A (for Viridia CMS onl

a. Only the M1116B can be used with the HP Viridia Informat

The Plug-In recorder has 2 channels, and can also be used a location.

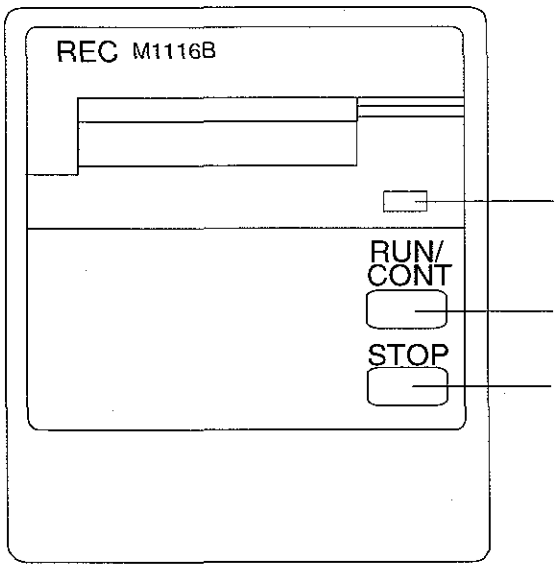
The 4-channel thermal recorder can also be used at a centra

The HP Viridia central recorder records the waves you sele transmission over the HP Viridia patient care system.

This document provides configuration information for the I channel, and central recorders. The controls and indicators In and 4-channel are also described.

For information about the 2-channel bedside and the centra controls, please refer to the relevant operating guide.

Controls and Indicators on the Plug-In Recorder

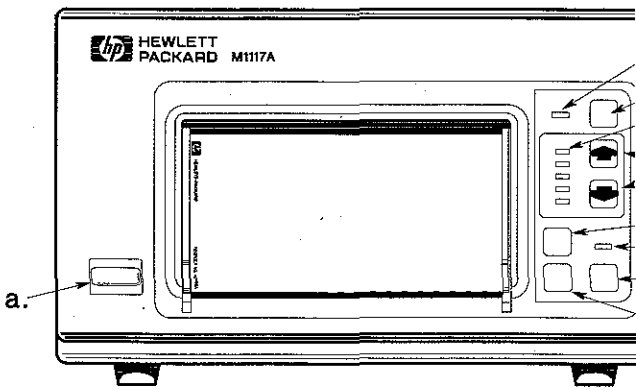


a. Continue light — Flashes if the currently printi continuous

b. RUN/CONT key — Starts a timed delayed record makes a currently printing rec continuous (if possible)

c. STOP key — Stops the currently printing re

Controls and Indicators on the 4-Channel Recorder (Viridia CMS only)



a. Power On/Off key	Switches recorder power on (in (out)
b. Out-of-paper light	Lights when paper is out or rec open
c. TEST key	Initiates a self-test to check that recorder is working properly an test strip
d. Speed selection lights	Lights to indicate current speed
e. Speed selection keys	Selects another printing speed v recorder is running
f. Feed key	Advances papaer until key is rel
g. Continue light	Lights when the currently printi has been made continuous.

h. Cont key	Makes currently printing reco continuous if possible
i. Stop key	Stops the currently printing re

Recorder Capabilities

Plug-In Recorder (M1116A/B)

Can record up to 3 waveforms (if 2 waveforms are overlap

- Makes delayed recordings of any waveforms you sel
- Makes realtime vital signs recordings.
- Makes realtime blood measurement recordings
- Makes trended vital signs recordings
- Makes neonatal event review recordings (M1116B)
- Makes oxyCRG recordings (M1116B)
- Runtime and delay time are configured when the mo installed.
- You can choose layout and speed, except for vital si With oxyCRG recordings, layout cannot be chosen.
- Time annotation is at the beginning of printout.

4-Channel Recorder (M1117A) (CMS only)

- Makes delayed recordings of any waveforms you sel
- Runtime and delay time are configured when the mo installed
- You can choose layout and speed
- Annotation is along the top edge.

Central Recorder (1, 2 or 4 channel recorder)

- Makes delayed recordings of waveforms broadcast o
  Viridia patient care system. (These are waveforms vie
  central station and other monitors in overview mode.

Single channel recorder records only the primary
is monitored, it must be s
the primary wave. It cann
deselected.

Dual channel recorder records the primary and s
wave (if the central statio
channel strips).

See the Central Recorder operating guide for recording spe
and delay time.

Types of Recordings

The monitor produces several different types of recordings recordings are generated automatically by the monitor wh criteria are violated. In addition, you can make the followi chart recordings from the monitor:

- Delayed
- Monitoring Procedure
- Realtime Waves
  Realtime recordings can either be made from a pre-s waves or selected when the recording is initiated.
- Realtime Vital Signs and Blood Analysis (made on a In recorder).
- Trended Vital Signs (made on a M1116A/B Plug-In re
- Neonatal Event Review (made on a M1116B Plug-In
- OxyCRG recordings can be made only on an M1116E recorder.

Note—Depending on the configuration of your monitor, wh **Realtime Record**, either the Select Recording Waves win (where you can choose the waves for a realtime recording Recordings window appears (where you can initiate delay realtime, and vital signs recordings). To switch to the othe **Preset Recordng** or **Select RecWaves**.

Delayed Recording

Definitions

Delayed Recordings - recordings of waveforms that are d time, so that if you see a waveform you want to record, you even if it has passed off the monitor screen. A delayed reco for a preset time and begins with delayed waveform from t recording was initiated.

Delayed recordings are either:

manual recordings	initiated by the user - generally "delayed" recordings
alarm recordings	automatically generated when a

Depending on the model of your monitor a maximum of 4 c can be recorded. The waves are selected in the Delayed/Al Recording Task Window.

The waves recorded on an alarm strip are also chosen from the Delayed/Alarm Task Window. If the parameter in alarm already selected, it will replace the last selected channel.

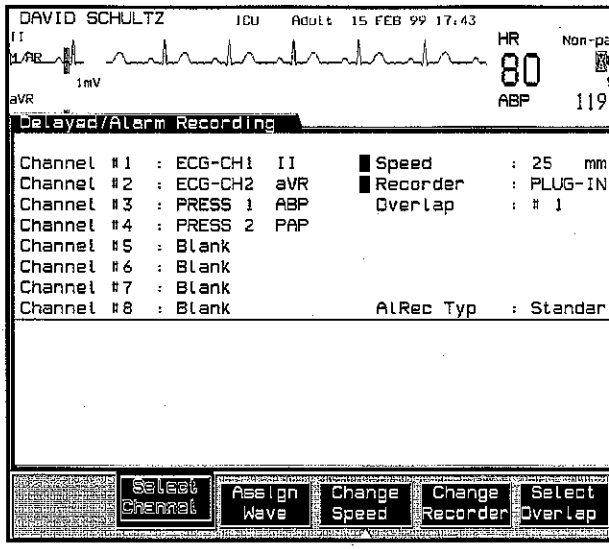
Delay Time - the maximum time between seeing a wavefo screen and still being able to record it. This is configured w monitor is installed. Choices are 10 or 15 seconds for the P recorder.

Runtime - the length of time the recording runs. This is co when the monitor is installed. Choices are 10, 15, 20, 25, or

Configuring Delayed Recordings

For Plug-In and 4-Channel Bedside Recorders

Monitor Setup → **Recordng Setup** → **Delayed & Ala**



1. Select the recorder and layout:
   a. Press **Change Recorder** to select the recorder.
   b. Press **Select Overlap** to select wave layout. '
   in millimeters and the ECG gain required for 1 r
   centimeter on a strip appear below the layout c
   c. Press **Change Speed** to change recorder spe

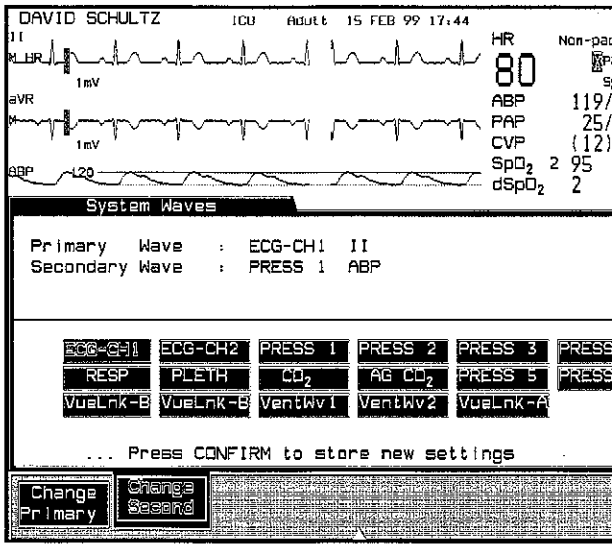
2. Select wave for each channel

   a. Press **Select Channel** to select channel numb
   b. Press **Assign Wave** to select waveform.

3. Press **Change AlRecTyp** to select the type of recc
   or oxyCRG) that will be generated by alarms.

For Central Recorders

Monitor Setup → System Waves .



1. Select the central recorder in the Delayed/Alarm Rec Window (see steps 1-3 for Plug-In and 4-Channel Bed Recorders above).

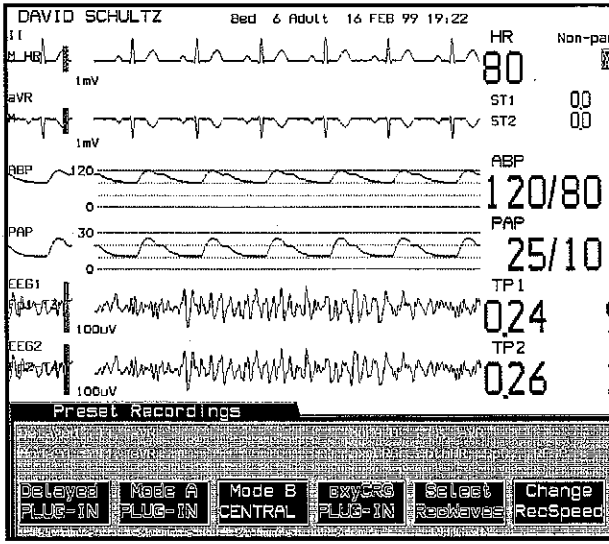
2. Select the waves in the System Waves Task Window
   a. Press **Change Primary** to select the primary w **Change Primary** key does not function if an E available. In this case the primary wave is alway
   b. Press **Change Second** to select secondary wa
   c. Press Confirm to store the selected wave.
   d. Press Main Screen to return to the standard m display.

Making Delayed Recordings

To initiate a delayed recording on any recorder, press Dela

On the Plug-In recorder only, press RUN/CONT.

Delayed recordings can also be initiated from the Preset R Window. Here, the waves pre-selected for a delayed record identified above the Delayed softkey label.



Note—If a delayed recording is configured so that it is pro In recorder or a 4-Channel Bedside Recorder, alarm recor produced on this recorder. If the specified recorder is ino reason, the alarm recording is re-routed to the central rec (Remember that arrhythmia alarms are always recorded a recorder.)

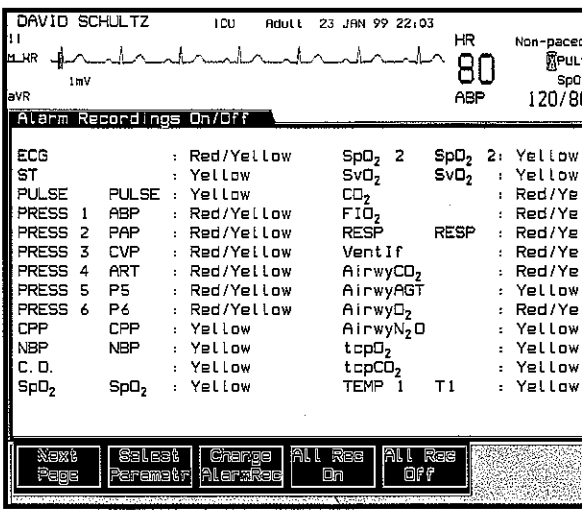
Alarm Recording

Alarm recordings are a type of delayed recording, that is, th
includes waveform information from before the alarm ever
see the change in the patient's condition. When a patient go
alarm condition, an alarm recording is generated automatic
according to the monitor's configuration. You can determir
severity on a parameter-by-parameter basis that will cause
recording to run. You can also enable and disable alarm rec
individual parameters.

With the exception of oxyCRG alarm recordings, alarm reco
a speed of 25 mm/sec regardless of the speed selected in th
and Alarm Task Window. OxyCRG alarm recordings run at
configured oxyCRG speed. If oxyCRG is enabled in your m
configuration, you can select the type of alarm recording (s
oxyCRG); refer to "Configuring Delayed Recordings" on pa

Configuring Alarm Recordings

Monitor Setup → **Recordng Setup** → **AlarmRec On/**



1. Press **Select Parametr** to highlight a parameter to
2. Press **Change AlarmRec** to select the severity (Re Yellow, Off).
3. Press **All Rec On** to enable recordings for all red a conditions.
4. Press **All Rec Off** for no alarm recordings.

Note—If delayed/alarm recordings are being sent to the ce the ECG alarm recording setting is displayed in the Alarm Off Task Window as RED/YELLOW. This setting cannot be unless you choose a bedside recorder (either a Plug-In or 4 bedside).

Note—The AlarmRec On/Off function must be enabled in C Mode.

Alarm Recording Priorities

In a delayed recording, waves are recorded in the order ass
Delayed/Alarm Recording Task Window, and the number o
recorded is determined by the recorder configured for dela
recordings. In alarm recordings, the alarming parameters re
waves in the lower channels. In the default alarm recording
channel contains the first delayed wave, usually ECG. Addi
delayed channels are overwritten by the additional alarmin
starting at the bottom channel, in the following priority:

- Parameter whose alarm status has escalated in the las
and has alarm recording enabled.
- Parameter in red alarm with alarm recording enabled.
- Parameter in yellow alarm with alarm recording enab
- Parameter in red alarm with alarm recording disabled
available).
- Parameter in yellow alarm with alarm recording disab
is available).

Alarm Recording Examples

On the Plug-In (2-channel) recorder with respiration record
disabled, an apnea alarm followed by a Pressure 1 limit ala
produce a strip:

Channel 1 ECG

Channel 2 Pressure 1

provided that P1 has been selected in the Delayed/Alarm Re
Task Window.

For a 4-channel bedside recorder with a standard delayed r
configured as:

Channel 1 ECG

Channel 2 Pressure 1

Channel 3 Pressure 2

Channel 4	Respiration

A yellow CO_2 alarm would produce a recording ordered a

Channel 1	ECG
Channel 2	Pressure 1
Channel 3	Pressure 2
Channel 4	CO_2 alarm

If a red P3 alarm occurred, the recording order would ther

Channel 1	ECG
Channel 2	Pressure 1
Channel 3	P3 alarm
Channel 4	CO_2 alarm

For alarm recordings with oxyCRG (to document neonata
the Neonatal Event capability), the alarm recording items
the following:

Alarm Record Type	oxyCRG
All AlarmRec	Off Change AlarmRec to red for I SpO_2.

In the event of a Brady, Apne and/or Desat alarm the reco
document an eight minute oxyCRG recording (six minutes
event and two minutes following the event).

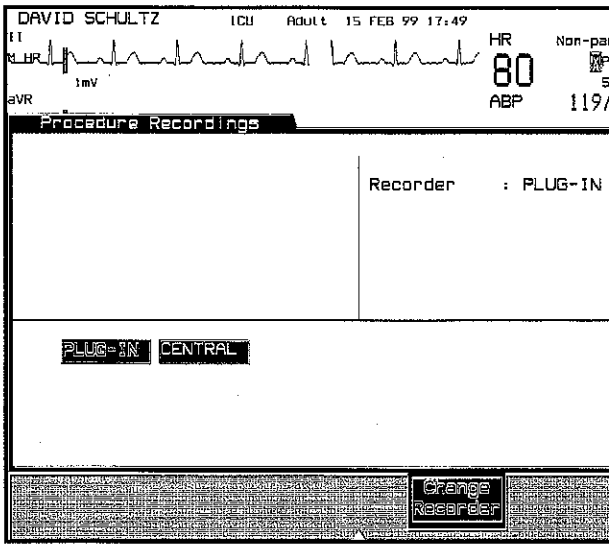
Procedure Recordings

Recordings can be made during cardiac output measureme

Configuring Procedure Recordings

You first select the recorder which will record the curve.

Monitor Setup → Recordng Setup → Procedur Rec



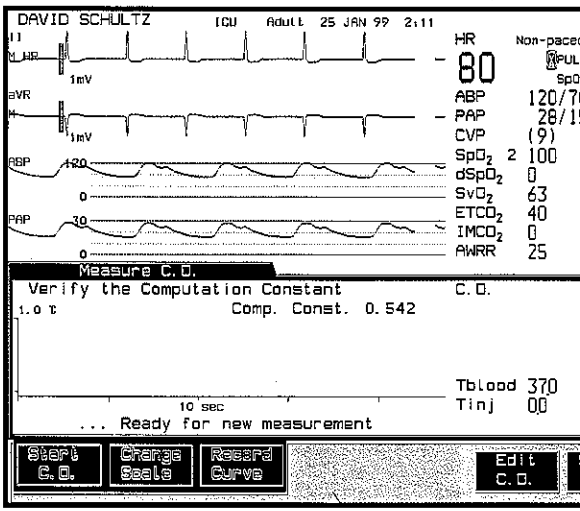
1. Press **Change Recorder** to select the recorder that w the recording.

2. Press **Main Screen** to return to the standard monito

Note—To generate trended vital signs and neonatal event re recorder selection must be set to "PLUG-IN" in the Procedu Recordings task window.

Making Procedure Recordings

Procedures → C.O.



See Cardiac Output Section for details on cardiac output m

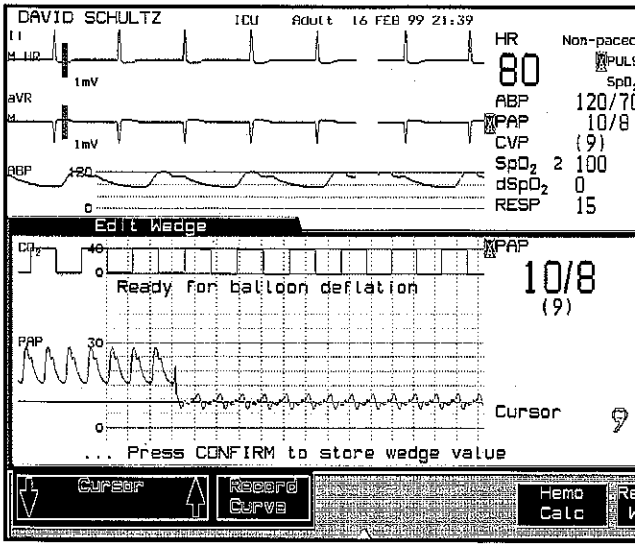
When a cardiac output measurement has been made, the c
Measure C.O. Task Window can be recorded by pressing
Record Curve.

The recording strip shows the curve and is annotated with
cardiac output value, computation constant, blood and inje
temperatures.

Note—Only the most recent cardiac output curve can be re
a curve before including it in an averaging calculation. Wh
pressed, all the curves are deleted and cannot be recorded

CMS only:

Procedures → Wedge → Edit Wedge

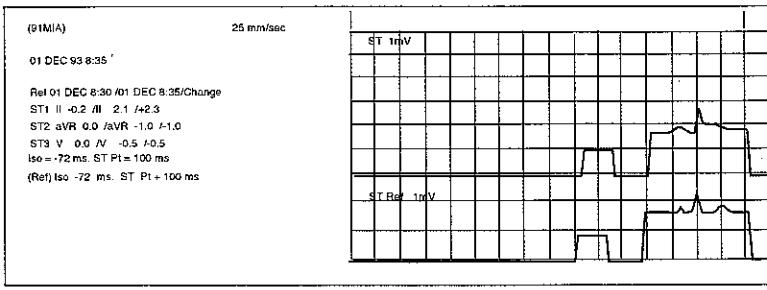


See the Presure Section for details on Pulmonary Artery We
(PAWP) Measurements.
When a PAWP measurement has been performed, the PAW
can be recorded by pressing the **Record Curve** softkey. If
the CO_2 or RESP waveform is also recorded.
The recording strip is also annotated with the date, time, ar
value.

ST Recordings

Recordings of ST waves and their reference waves can be r
bedside or central recorders. They are initiated from the ST
Task Window. An ST recording shows the ST beat(s) from
spot in the upper channel, and the corresponding reference
the lower channel, with the measurement values, net chang
measurement points listed in the annotation.

ST values transferred by the HP M1235A Data Tra
are indicated by a "T" after the time. Because the S
are not transferred, no waveforms will be recorde



Realtime Wave Recordings

Definitions

Realtime Recordings - recordings of waveforms f
of your request.

There are two types of realtime recordings:

Preset Recordings the user presses one of the pre-c
recording keys to initiate record
selected waveforms on a pre-sel
recorder. The waves are identifi
key labels; the recorder name ap
the key label.

Non-Preset Recordings the user selects the waveforms a
immediately prior to making the

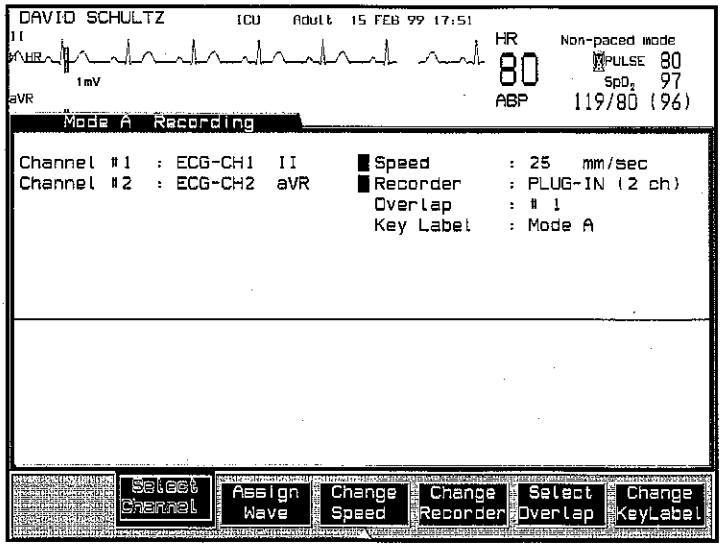
Realtime Recording Mode - a pre-selected set of
will be recorded when one of the pre-configured re
is pressed. Three separate recording modes (A, B, C
configured. The user can choose the waves to be re
positions on the recording strip and the recorder to
Mode B may be reassigned to vital signs/blood reco
Mode C to oxyCRG recordings, depending on the n
configuration. A particular mode might be configur
a specific procedure performed in a unit.

Realtime recordings can be produced on Plug-In, 4
bedside and central recorders.

Remember that realtime recordings are initiated in
Windows: Preset Recordings and Select Recording
depending on the type of realtime recording.

Configuring Preset Recording Modes

Monitor Setup → Recordng Setup → Mode



1. Select the recorder and layout.
   a. Press **Change Recorder** to select the re produce the recordings.
   b. Press **Select Overlap** to change the waves on the recording strip.
   c. Press **Change Speed** to change the

2. Select wave for each channel.
   a. Press **Select Channel** to select requi channel.
   b. Press **Assign Wave** to highlight the selected channel.

3. Press **Change KeyLabel** to give a name to configured.

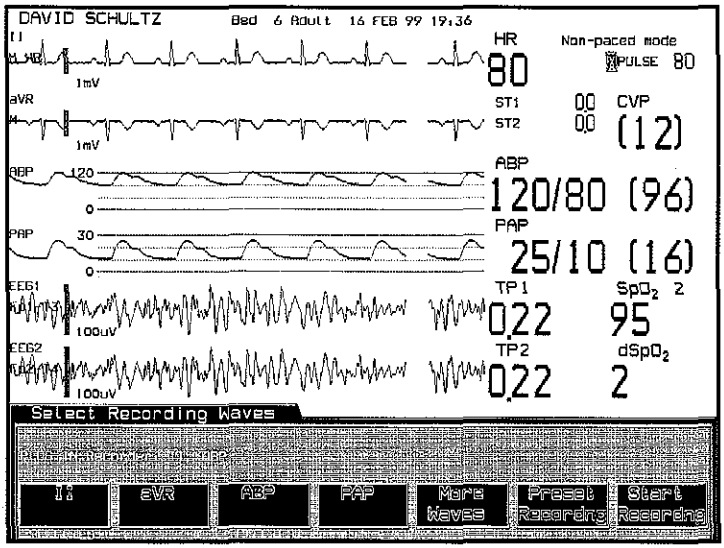
Modes B and C are configured in the same way.

Making Preset Recordings

Realtime Record → Preset Recordng if availal
Mode A , Mode B , or Mode C .

Making Non-Preset Recordings

Realtime Record → Select RecWaves if availal



Select the wave(s) to be recorded.

Selected waves are identified in the window after t
name in the order they were selected. Each wave t
selected is also identified below the key label.

The recording is always continuous, running at 25
overlapped mode.

To stop realtime recordings:
either press Stop Record .

or press STOP on the recorder.

All realtime non-configured recordings must be sto
manually.

Note—**(CMS only):** The number of recording cha
depends on the recorder. If you change from a 4- t
recorder, only the first two waves are recorded.

Note—Non-preset recordings are made on the sam
procedure recordings (selected in the Procedure F
Window). If the power is off for more than 1 minu
recording automatically reverts to the default wav
for Mode A. However, the speed (25 mm/s), waves
overlapped, and continuous runtime do not chang

Note—If a realtime recording is requested during a
recording, it is produced when the alarm recordin
a realtime recording is in progress, and another pa
into alarm, an alarm message appears on the realt
When the realtime recording is finished, the alarm
produced.

Making Calibrated ECG Recordings

If you want your ECG recording to be calibrated, y
the size of the ECG wave, depending on your reco
To select the size, refer to the "Adjusting the Wave
page 14-22. The calibrated ECG wave recording w

If the Recorder is Busy

Realtime: If a delayed recording, or any recordin
monitor, is in progress at the central monitor at th
request, you are alerted with a message on the mo
and the *request* is queued.

When the recorder is free, the recording runs. It c
current waveforms (not the waveforms from the t
recording was requested).

If the recorder is busy with a realtime recording a
another realtime recording from the *same monito*
recording stops and the newly requested recordin

Delayed: If the recorder is busy at the time of you
waveform data and the request are queued.

When the recorder is free, the recording runs. The r
shows the waveforms from the time the recording w
requested.

For Central Recorders, the requests are run and qu
according to the priority for that recorder. See the
guide of the recorder for information. For the M111
Recorder and the HP M1117A Bedside Recorder, th
prints when the recorder is free.

Note—If you are using a monitor connected to a Pat
Information Center PIC (HP 78504 and HP 78508) a
using an HP 78572 recorder, please observe the foll

- Always select a valid waveform. Do **not** selec
the waveform to be recorded in the Select Re
Waves Task Window, as the recorder will not
will give the prompt "Central recorder not av

- For the Monitor connected to the HP Compon
Monitor or other HP central station, realtime
must have at least one non-blank channel to
recording on the central recorder.