



# Nightingale Monitoring System

## MPC – ILD User's Guide

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Nightingale Monitoring System MPC – ILD User's Guide  
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of a physician.

Before using any Zoe Medical monitoring device, be sure to read carefully and  
understand all manuals provided with the device.

All Zoe Medical monitoring devices are intended for use only by qualified  
medical personnel.

## **User Assistance**

If you have a question or need help with the Nightingale MPC – ILD application, please contact Zoe Medical Technical Support:

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For the latest information about answers to frequently asked questions, please consult our web site:

[www.zoemedical.com](http://www.zoemedical.com)

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## General Information

This User's Guide provides healthcare professionals the information required for safe and effective use of the Nightingale MPC – ILD (Multi-Patient Console – Intelligent Large Display mode) application.

For the sake of brevity, the term ILD is sometimes used in this document to refer to the Nightingale MPC – ILD application.

The ILD is a software application that runs on a Windows PC, and is part of the Zoe Medical Nightingale Monitoring System. The ILD serves as a secondary monitoring station for the Nightingale PPM3 bedside monitor, allowing you to view the PPM3 screen in a separate location and on a larger display.

The Nightingale PPM3 (Personal Patient Monitor) is a small, lightweight patient monitor designed to acquire physiological waveforms and parameters.

For the sake of brevity, the term PPM3 is sometimes used in this document to refer to the Nightingale PPM3.

Before using the ILD, be sure to read carefully and understand all sections of this User's Guide. Failure to read and understand the instructions may lead to misuse of the ILD, which could result in harm to the patients.

### Typographical Conventions in this User's Guide

This guide contains warnings, cautions, and notes to help call your attention to the most important safety and operational aspects of the system. To help identify these items when they occur in the text, they are shown using the following typographical conventions:

**WARNING – Statements that call attention to the possibility of injury, death, or other serious adverse reactions associated with the use or misuse of the device.**

**CAUTION – Statements that call attention to the possibility of a problem with the device associated with its use or misuse. Such problems include device malfunction, device failure, damage to the device or damage to other property.**

**Note – Statements that provide supplemental information.**

## Indications for Use

The Zoe Medical Nightingale Monitoring System is indicated for use in adult & pediatric patient populations.

The Zoe Medical Nightingale Monitoring System facilitates the monitoring of:

- ECG
- Impedance respiration
- Non-Invasive blood pressure
- Invasive blood pressure
- Body temperature
- Functional arterial oxygen saturation (SpO<sub>2</sub>)
- End-tidal & inspired CO<sub>2</sub>

The Zoe Medical Nightingale Monitoring System is a prescription device intended to be used by healthcare professionals in all areas of a healthcare facility.

**WARNING – Waveforms displayed on the MPC – ILD screen may be delayed by several seconds from the time they are displayed on the PPM3. Do not use waveforms displayed on the MPC for time-sensitive procedures such as catheter placement.**

# 1. Overview

This chapter provides an overview of the ILD, including a diagram showing how the ILD fits into the Nightingale Monitoring System, and a description of how this User's Guide relates to other Nightingale Monitoring System documents. This chapter also provides a basic overview of the ILD user interface, setup, and a list of the ILD's main features.

## 1.1. System Diagram

The main components of the Nightingale Monitoring System are shown in the following diagram:

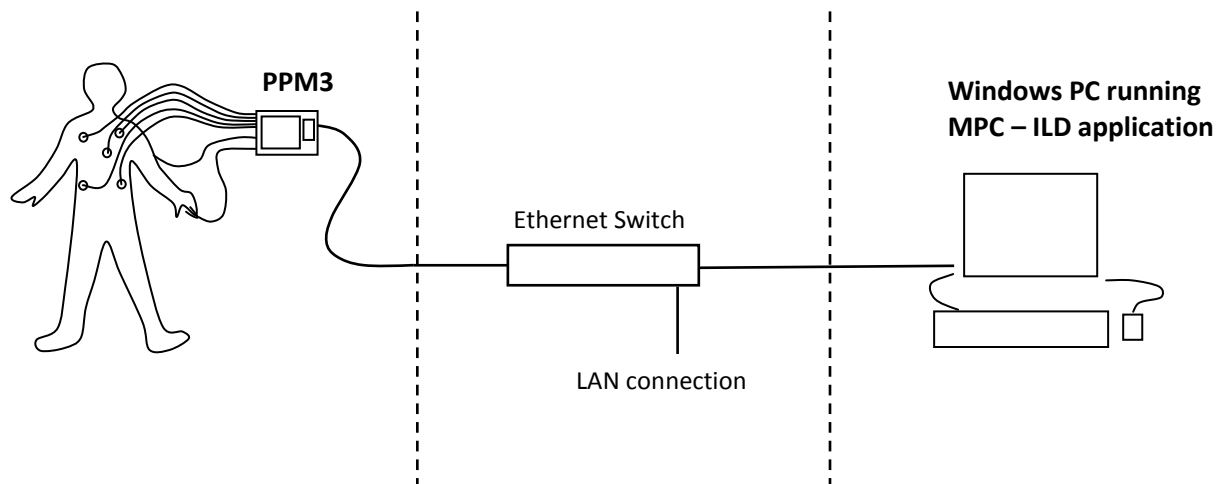


Figure 1. Nightingale Monitoring System

The PPM3 component serves as the bedside patient monitor. The Nightingale PPM3 monitor is connected to the PC running the ILD application over an Ethernet LAN.

## 1.2. Scope of this User's Guide

This User's Guide provides healthcare professionals the information required for the safe and effective use of the ILD.

For information about how to use the PPM3, please consult the Nightingale PPM3 User's Guide.



### 1.3. ILD User Interface

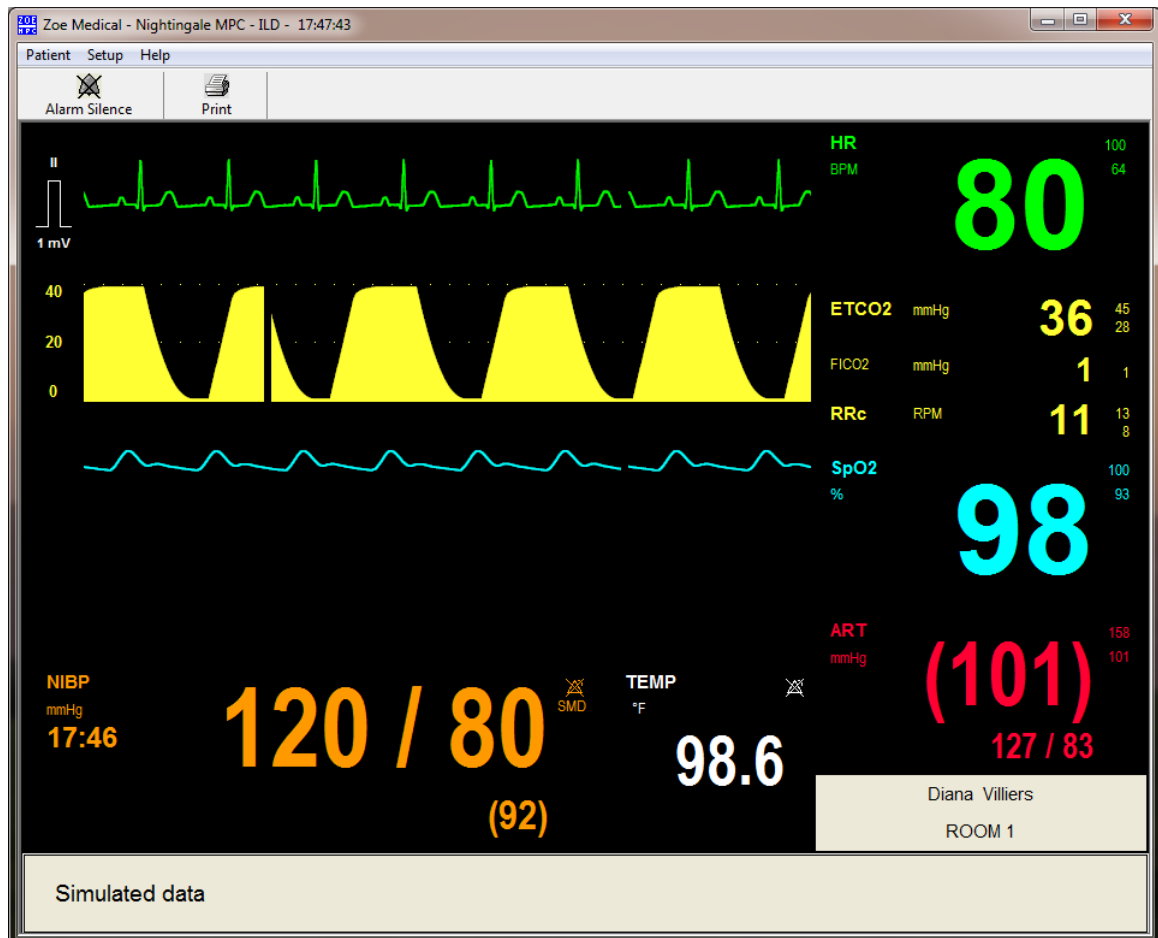


Figure 2. ILD Main Screen

The ILD is a standard Windows application. The ILD user interface makes use of a keyboard and mouse (for input) and a display screen and speaker (for output).

The ILD Main Screen contains a top level menu, a waveform display area, parameter display areas, a patient name area, and a message area.

**WARNING – Waveforms displayed on the MPC – ILD screen may be delayed by several seconds from the time they are displayed on the PPM3. Do not use waveforms displayed on the MPC for time-sensitive procedures such as catheter placement.**

CAUTION – Since the ILD is a software application, it can be closed or minimized. In either case, the ILD is no longer able to serve as a secondary monitor for the PPM3.

CAUTION – Since the ILD runs on a standard Windows PC, if the audio output of the PC is turned down or turned off, the ability of the ILD application to serve as secondary audio alarm monitor will be compromised.

## 1.4. ILD Setup

The top level menu on the ILD provide access to settings that you can use to control the ILD display, and to establish communications with a connected PPM3 monitor.

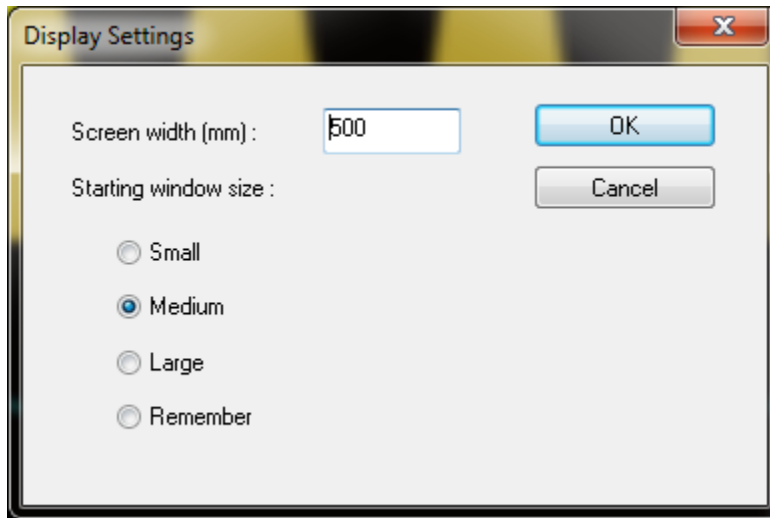


Figure 2. ILD Display Settings Dialog Box

The Display Settings Dialog Box provides settings related to how the ILD appears on your computer monitor.

Since computer screens have a range of physical display sizes, if you want the waveform sweep speeds to be accurate, you need to enter the actual width of your screen (in mm).

You can select whether the ILD should draw in a small, medium, or large (full screen) window. You can also change the size of the ILD window by dragging the window boundaries. If you select Remember, the ILD will be drawn using whatever position and dimensions it had when last closed.

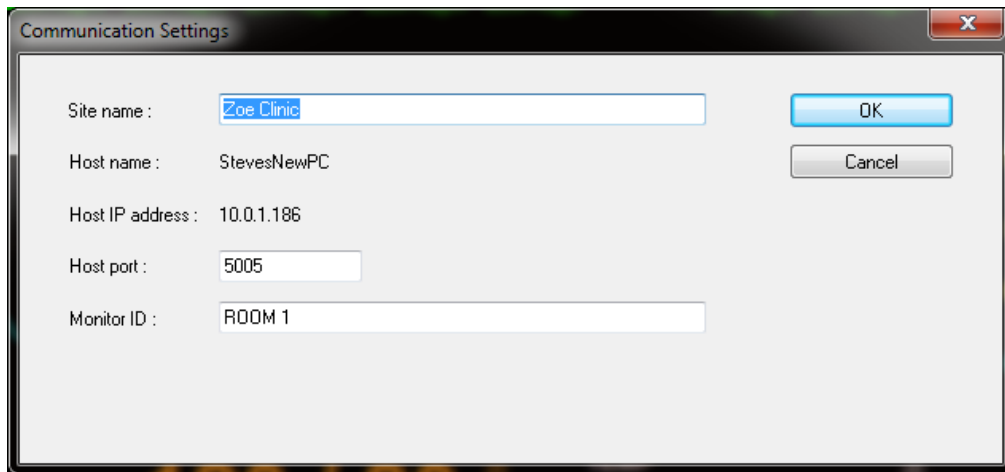


Figure 2. ILD Communications Settings Dialog Box

The Communications Settings Dialog Box provides settings needed to connect a PPM3 to the ILD. The Site Name can be anything you choose (this shows up in the footer of hard copy reports you may print).

The Host port needs to be one that is open (not blocked) on the PC where you are running the ILD. It also needs to match the Host Port setting on the PPM3's Setup / Administrator / Communications menu.

The Monitor likewise needs to match the Monitor ID setting value on the PPM3's Setup / Administrator / Communications menu.

## 1.5. Main Features of the ILD

The ILD provides a rich set of features to help you monitor the vital signs of patients, respond to alarm conditions, and print reports. The following list identifies the main tasks you will encounter in daily use. For each of these tasks, you can find detailed information in the corresponding chapter of this User's Guide:

- Admitting a Patient
- Changing Patient Information
- Changing Parameter Settings
- Changing Waveform Settings
- Managing Alarms
- Printing Reports



## 2. Admitting a Patient

You can bring up the Patient Information Dialog Box by clicking on the patient name area of the primary view.

Note – You can also bring up the Patient Information Dialog Box via the "Patient", "Admit/Edit" menu selections.

Figure 3. Patient Information Dialog Box

In order to admit a patient, you need to supply at least the patient ID.

Note – In order to provide the highest possible quality of patient record, you should consider entering all the information requested by the Patient Information Dialog Box.

If you want to admit a patient quickly, or if you need to admit a patient before all the actual patient information is available, you can press the "Auto ID" button. This will create an automatic ID for the patient (based on a combination of the monitor ID and the current date and time). You can change the name, ID, and other fields when the actual patient information becomes available. The data that was stored under the automatic patient ID will continue to be associated with the actual patient ID after you enter it.

## 3. Changing Patient Data

If you ever need to change any of the information you entered at the time when a patient was admitted, you can bring up the Patient Information Dialog Box again to make the changes.

When you have entered the changes you wanted to make, click OK, or to exit without making any changes to the patient information, click Cancel. If you change the patient ID, the data that was stored under the original patient ID will continue to be associated with the new patient ID.

<b>Patient Data Settings</b>		
<b>Setting name</b>	<b>Default value</b>	<b>Possible values</b>
Last	<BLANK>	any text string (39 characters maximum)
First	<BLANK>	any text string (39 characters maximum)
M.I.	<BLANK>	any text string (1 characters maximum)
Patient ID	<BLANK>	any text string (39 characters maximum) but may not include the following characters (since they are not legal Windows file names, and the Patient ID is used to create folder and file names): \\ / : * ? " < >
Type	Adult	Adult, Pediatric
Patient sex	Male	Male, Female
Height	<BLANK>	any numeric text string (38 characters maximum), must be within 0 – 157 in (or 0 – 400 cm when Height units are set to cm)
Weight	<BLANK>	any numeric text string (38 characters maximum), must be within 0 – 1100 lb (or 0 – 500 kg when Weight units are set to kg)



## 4. Changing Parameter Settings

When a PPM3 monitor is connected to the ILD, the parameter settings come from the monitor. You can use the ILD application to change parameter settings, and these changes will be reflected at the PPM3 monitor. Likewise, changes to parameter settings made at the monitor will be reflected at the ILD. To change parameter settings, click on one of the parameter numeric display areas. The ILD will display the Setup Parameters Dialog Box.

The screenshot shows the 'Setup Parameters' dialog box for 'ROOM 1' and user 'Diana Villiers'. The dialog is organized into a table-like structure with columns for 'Alarms On', 'Lower Limit', 'Current Value', and 'Upper Limit'. Parameters include HR, RR, SpO2, NIBPs, NIBPm, NIBPd, TEMP, ETCO2, FICO2, RRc, ET02, FI02, ETISO, FIISO, ETN20, FIN20, ARTs, ARTm, and ARTd. Each parameter has a checkbox for 'Alarms On', numeric input fields for limits and current value, and a unit. Some parameters have an 'Auto' button. On the right side, there are additional settings like 'HR Source' (set to AUTO), 'Pulse Tone' (set to OFF), 'RESP Enabled' (checkbox), 'SpO2 Alarm Acknowledge', 'NIBP Initial Inflation Pressure' (160 mmHg), 'NIBP Interval' (OFF Minutes), 'ETCO2 Enabled' (checkbox), 'Apnea Time' (20 Seconds), 'CO2 Alarm Acknowledge', 'Gas Monitoring Enabled' (checkbox), 'IBP Channels' (1), and 'ART Format' (MEAN). At the top right are 'OK' and 'Cancel' buttons. A button labeled 'Auto Set All Limits' is located above the main parameter table.

Parameter	Alarms On	Lower Limit	Current Value	Upper Limit	Unit	Auto
HR	<input checked="" type="checkbox"/>	64	80	100	BPM	<input type="button" value="Auto"/>
RR	<input checked="" type="checkbox"/>	8	11	13	RPM	<input type="button" value="Auto"/>
SpO2	<input checked="" type="checkbox"/>	93	98	100	%	<input type="button" value="Auto"/>
NIBPs	<input type="checkbox"/>	90		180	mmHg	<input type="button" value="Auto"/>
NIBPm	<input type="checkbox"/>	75		110	mmHg	<input type="button" value="Auto"/>
NIBPd	<input type="checkbox"/>	55		100	mmHg	<input type="button" value="Auto"/>
TEMP	<input type="checkbox"/>	97.0	98.6	102.0	°F	<input type="button" value="Auto"/>
ETCO2	<input checked="" type="checkbox"/>	28	36	45	mmHg	<input type="button" value="Auto"/>
FICO2	<input checked="" type="checkbox"/>		1	1	mmHg	<input type="button" value="Auto"/>
RRc	<input checked="" type="checkbox"/>	8	11	13	RPM	<input type="button" value="Auto"/>
ET02	<input type="checkbox"/>					
FI02	<input type="checkbox"/>					
ETISO	<input type="checkbox"/>					
FIISO	<input type="checkbox"/>					
ETN20	<input type="checkbox"/>					
FIN20	<input type="checkbox"/>					
ARTs	<input checked="" type="checkbox"/>	90	127	180	mmHg	<input type="button" value="Auto"/>
ARTm	<input checked="" type="checkbox"/>	75	101	110	mmHg	<input type="button" value="Auto"/>
ARTd	<input checked="" type="checkbox"/>	55	83	100	mmHg	<input type="button" value="Auto"/>

Figure 4. Setup Parameters Dialog Box

The Setup Parameters Dialog Box allows you to change the alarm limits for all the monitored parameters. It also allows you to specify whether or not to disable alarms for a given parameter.

Note – For a discussion of how the alarm limits and the alarms enabled/disabled settings affect the alarm behavior of the system, please refer to the Managing Alarms chapter.

The Auto Set All Limits button, along with the individual Auto buttons, provides a quick way of setting alarm limits. When you press the Auto button for a given parameter, the ILD automatically computes alarm limits based on the current value (if it has a current value that is numeric). When you press the Auto Set All Limits button, the ILD automatically computes alarm limits for all the parameters that have numeric values, just as if you hit the Auto button for each parameter separately. The rules the ILD uses for computing the alarm limits automatically are as follows:

Parameter	Lower limit adjustment	Upper limit adjustment
HR/PR, RR, ETCO <sub>2</sub> , RRc, NBP <sub>s</sub> , NBP <sub>m</sub> , NBP <sub>d</sub> , P1 <sub>s</sub> , P1 <sub>m</sub> , P1 <sub>d</sub> , P2 <sub>s</sub> ,	Changed to 80% of the current parameter value (or the nearest allowable value given alarm limit rules)	Changed to 125% of the current parameter value (or the nearest allowable value given alarm limit rules)
FICO <sub>2</sub>	N/R	Same as above
SpO <sub>2</sub>	Changed to 95% of the current parameter value (or the nearest allowable value given alarm limit rules)	Set to 100%
Temp	Same as above	Changed to 105% of the current parameter value (or the nearest allowable value given alarm limit rules)

**WARNING – Be sure to verify that the alarm limits are set to appropriate values before exiting the Setup Parameters dialog box, especially if you are using the automatic limit setting feature.**

The HR Source control tells the monitor which signal to use to compute the HR. When AUTO is selected, the monitor will use whichever signal is available, in the following order of priority: ECG, SpO2, NIBP, ART.

The Pulse Tone Source control tells the monitor whether or not to generate an audible tone for each beat that is detected during monitoring.

The RESP Enabled checkbox allows you to enable or disable the respiration rate computation based on impedance. This control is automatically disabled when ETCO2 is enabled, since the CO2 signal takes priority over the impedance signal.

The SpO2 Alarm Acknowledge button allows you to silence SpO2 alarms. In particular, it acknowledges the "Check Sensor" alarm that occurs when the SpO2 probe is removed from the finger. Normally this alarm, when silenced, would start sounding again after the silence period expires. Pressing the SpO2 Alarm Acknowledge button will silence the alarm and prevent it from sounding again, until it is re-enabled by sensing a finger in the probe.

The NBP Start button provides a way for you to start an NBP measurement for a patient remotely. It has the same effect as pressing the NBP Start Stop key on the monitor when no measurement is in progress. The NBP Stop button provides a way for you to stop an NBP measurement remotely. It has the same effect as pressing the NBP Start Stop key on the monitor when a measurement is in progress.

The NBP initial inflation pressure control allows you to specify the pressure to which the NBP cuff will be inflated at the beginning of an NBP measurement. The monitor inflates the cuff to this pressure the first time it takes a measurement on a patient. Once the monitor has made a valid measurement, it will use the computed systolic pressure from that measurement when inflating the cuff for subsequent measurements. This setting may be helpful if the monitor is having difficulty obtaining blood pressure readings on patients whose systolic pressure may be greater than 200 mmHg.

The NBP Interval control allows you to set up the monitor to take NBP measurements automatically at set time intervals. The monitor will begin taking measurements the next time the minute value is a multiple of the setting. For example, if you select to have measurements every 5 minutes, and you do this at 9:12, automatic measurements will begin at 9:15, then repeat at 9:20, 9:25, 9:30, and so on. To take the monitor out of interval mode, change the setting to OFF.

Note – For a full discussion of how the NBP measurements work, please refer to the Nightingale PPM3 User's Manual.

The ETCO2 Enabled checkbox allows you to enable or disable the monitoring of ETCO2 and related parameters.

When ETCO2 is Enabled, the ETCO2-related controls are also enabled. The Apnea Time setting allows you to specify how many seconds may elapse between detected breaths before the monitor sounds the low EtCO2 alarm.

The CO2 Alarm Acknowledge button allows you to silence CO2 alarms. In particular, it acknowledges the "Check Sensor" alarm that occurs when the CO2 sensor is disconnected from the patient. Normally this alarm, when silenced, would start sounding again after the silence period expires. Pressing the CO2 Alarm Acknowledge button will silence the alarm and prevent it from sounding again, until it is re-enabled by reconnecting the sensor to the patient.

Note – The Gas Monitoring Enabled checkbox is reserved for future use. The ILD is not currently cleared for monitoring anesthetic gases.

The IBP Channels setting allows you effectively to enable or disable monitoring of invasive blood pressure (this setting only appears if the PPM3 has IBP installed).

When the setting is set to 1, the alarm settings related to IBP are enabled, and the P1 Format control is also enabled. The P1 Format control affects the way the P1 related parameters are displayed on the ILD Main Screen.

When you have entered the changes you wanted to make, press OK. If you press Cancel, the dialog box will disappear and the settings will keep the values they had when you first brought up the dialog box.

All of the settings in the Setup Parameters dialog box can also be changed at the PPM3 monitor. When a PPM3 monitor is connected, the changes you make at either the ILD or at the monitor are copied at the other end, so that both the monitor and the ILD are operating with the same setting values.

<b>Parameter Settings</b>		
<b>Setting name</b>	<b>Default value</b>	<b>Possible values</b>
HR upper alarm limit	120 bpm	20 to 300 bpm
HR lower alarm limit	50 bpm	15 to 295 bpm
HR alarms on	Yes	Yes, No
RR upper alarm limit	20 bpm	6 to 120 bpm
RR lower alarm limit	5 bpm	5 to 119 bpm
RR alarms on	No	Yes, No
SpO <sub>2</sub> upper alarm limit	100%	51-100%
SpO <sub>2</sub> lower alarm limit	90%	50-99%
SpO <sub>2</sub> alarms on	Yes	Yes, No
NBPs upper alarm limit	180 mmHg	35 to 250 mmHg
NBPs lower alarm limit	90 mmHg	30 to 245 mmHg
NBPs alarms on	No	Yes, No
NBPm upper alarm limit	110 mmHg	25 to 230 mmHg
NBPm lower alarm limit	75 mmHg	20 to 225 mmHg
NBPm alarms on	No	Yes, No
NBPd upper alarm limit	100 mmHg	15 to 210 mmHg
NBPd lower alarm limit	55 mmHg	10 to 205 mmHg
NBPd alarms on	No	Yes, No
TEMP upper alarm limit (Note: depends on user setting for TEMP units)	39.0 C 102.0 F	32.1 to 42.0 degrees C 89.7 to 107.6 degrees F
TEMP lower alarm limit (Note: depends on user setting for TEMP units)	36.0 C 97.0 F	32.0 to 41.9 degrees C 89.6 to 107.5 degrees F
TEMP alarms on	No	Yes, No
ETCO <sub>2</sub> upper alarm limit	45 mmHg	5 to 150 mmHg
ETCO <sub>2</sub> lower alarm limit	35 mmHg	0 to 145 mmHg
ETCO <sub>2</sub> alarms on	No	Yes, No
RRC upper alarm limit	20 bpm	6 to 120 bpm
RRC lower alarm limit	5 bpm	5 to 119 bpm
RRC alarms on	No	Yes, No
FICO <sub>2</sub> upper alarm limit	2 mmHg	0 to 98 mmHg
FICO <sub>2</sub> alarms on	No	Yes, No

# Changing Parameter Settings

Setting name	Default value	Possible values
P1s upper alarm limit	180 mmHg	-5 to 250 mmHg
P1s lower alarm limit	90 mmHg	-10 to 245 mmHg
P1s alarms on	No	Yes, No
P1m upper alarm limit	110 mmHg	-5 to 230 mmHg
P1m lower alarm limit	75 mmHg	-10 to 225 mmHg
P1m alarms on	No	Yes, No
P1d upper alarm limit	100 mmHg	-5 to 210 mmHg
P1d lower alarm limit	55 mmHg	-10 to 205 mmHg
P1d alarms on	No	Yes, No
HR Source	AUTO	AUTO, ECG, SpO2, NIBP, ART
Pulse Tone	OFF	OFF, ON
RESP Enabled	No	No, Yes
NBP initial inflation pressure	160 mmHg	100 to 270 mmHg in steps of 10 mmHg
NBP Interval	OFF	OFF, 1, 2, 3, 5, 10, 15, 30, 60, 120 minutes
NBP Format	SYS/DIA	SYS/DIA, MEAN
ETCO2 Enabled	No	No, Yes
Apnea Time	20 seconds	5 – 30 seconds, increments of 5
IBP Channels	NONE	NONE, 1
P1 Format	SYS/DIA	SYS/DIA, MEAN

## 5. Changing Waveform Settings

When a PPM3 monitor is connected to the ILD, the waveform settings come from the monitor. You can use the ILD application to change waveform settings, and these changes will be reflected at the PPM3 monitor. Likewise, changes to waveform settings made at the monitor will be reflected at the ILD. To change waveform settings, click on one of the waveform display area. The ILD will display the Setup Waveforms Dialog Box.

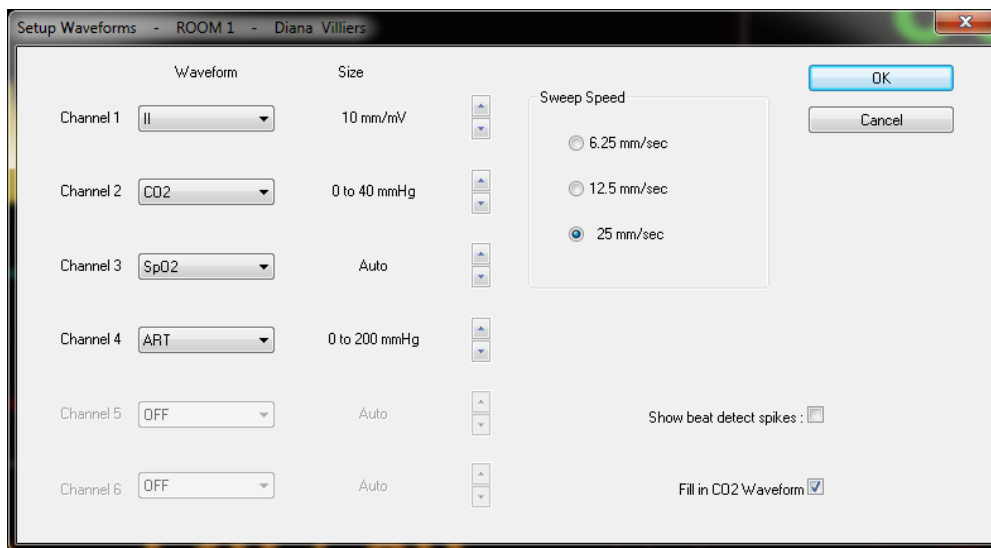


Figure 5. Setup Waveforms Dialog Box

The Setup Waveforms dialog box allows you to choose which physiological waveform to display. You can also choose the size for the ECG, CO2, and IBP waveforms (the others are scaled automatically to fit the display). The Setup Waveforms dialog box allows you to set the sweep speed for the erase bar, to specify whether or not you want to see beat detect spikes in the waveforms (to indicate where the monitor has detected a beat), and whether or not to draw the CO2 waveform as a curved line or with the area under the curve filled in.

When you have entered the changes you wanted to make, press OK. If you press Cancel, the dialog box will disappear and the settings will keep the values they had when you first brought up the dialog box.

All of the settings in the Setup Waveforms dialog box can also be changed at the PPM3 monitor. When a PPM3 monitor is connected, the changes you make at either the ILD or at the monitor are copied at the other end, so that both the monitor and the ILD are operating with the same setting values. The one exception is the Fill in CO2 Waveform setting, which can be set independently at the PPM3 and at the ILD.

<b>Waveform Settings</b>		
<b>Setting name</b>	<b>Default value</b>	<b>Possible values</b>
Channel 1 Waveform	ECGII	I, II, III, V, aVL, aVR, aVF
Channel 2 Waveform	RESP	I, II, III, V, aVL, aVR, aVF, RESP, CO2, SpO2, OFF
Channel 3 Waveform	SpO2	I, II, III, V, aVL, aVR, aVF, RESP, CO2, SpO2, OFF
Channel 4 Waveform	P1	I, II, III, V, aVL, aVR, aVF, RESP, CO2, SpO2, P1, OFF
Channel 5 Waveform	OFF	OFF
Channel 6 Waveform	OFF	OFF
ECG I Waveform Size	10 mm/mV	2.5, 5, 10, 15, 20 mm/mv
ECG II Waveform Size	10 mm/mV	2.5, 5, 10, 15, 20 mm/mv
ECG III Waveform Size	10 mm/mV	2.5, 5, 10, 15, 20 mm/mv
ECG V Waveform Size	10 mm/mV	2.5, 5, 10, 15, 20 mm/mv
ECG aVL Waveform Size	10 mm/mV	2.5, 5, 10, 15, 20 mm/mv
ECG aVR Waveform Size	10 mm/mV	2.5, 5, 10, 15, 20 mm/mv
ECG aVF Waveform Size	10 mm/mV	2.5, 5, 10, 15, 20 mm/mv
CO2 Waveform Size	0 to 40 mmHg	0 to 20 mmHg, 0 to 40, 0 to 60, 0 to 80 mmHg
P1 Waveform Size	0 to 200 mmHg	-10 to 20, -10 to 60, 0 to 150, 0 to 200, 0 to 250, 0 to 300 mmHg
Sweep Speed	25 mm/sec	6.25, 12.5, 25, 50 mm/sec
Show beat detect spikes	No	No, Yes
Fill in CO2 Waveform	Yes	No, Yes



## 6. Managing Alarms

You can configure the Nightingale Monitoring System to sound an alarm when a patient's physiological parameter goes beyond a predetermined limit. For example, you can configure the system to sound an alarm when the patient's heart rate goes above 120 bpm or goes below 50 bpm. Alarm monitoring can be individually configured for each physiological parameter.

In the Nightingale Monitoring System, when the monitor and ILD are connected, they use the same alarm monitoring settings. If a setting is changed at either the monitor or the ILD, then the setting is updated at both the monitor and the ILD. This is also true for alarm silencing. For example, if you silence an alarm at the monitor, it is also silenced at the ILD.

## 6.1. Alarm Basics

### 6.1.1. What the Alarm Tones Mean

If you hear a...	It represents...
Five higher-pitch tones (three quick, pause, two more) repeated every 8 seconds	A "high grade" alarm indicating an immediately life-threatening condition (e.g. asystole or ventricular fibrillation)
Three medium-pitch tones repeated every 15 seconds	A "medium grade" alarm indicating a physiological condition that may be serious (e.g. parameter limit violations)
A single lower-pitch tone repeated every 20 seconds	A "low grade" alarm indicating a technical condition (e.g. lead off)


### 6.1.2. What the Alarm Colors Mean

If you see a...	And ...	It represents...
Red background parameter box and message area	Flashing color – twice per second	A "high grade" alarm is currently active and has not been acknowledged
	Solid color with alarm silence symbol to the left of the message area	A "high grade" alarm is currently active but has already been silenced
Yellow background parameter box and message area	Flashing color – once every 2 seconds	A "medium grade" alarm is currently active and has not been acknowledged
	Solid color with alarm silence symbol to the left of the message area	A "medium grade" alarm is currently active but has already been silenced
Cyan background parameter box and message area	Solid color	A "low grade" alarm is currently active and has not been acknowledged
	Solid color with alarm silence symbol to the left of the message area	A "low grade" alarm is currently active but has already been silenced

Since several parameters could be alarming at the same time, the alarm tone and color will reflect the highest grade alarm condition that is currently active on the PPM3. Refer to the tables in Section 7.2 Alarm Conditions to see how different alarm conditions are categorized by grade.

The term "silenced" in this table means that someone has taken some action in response to the alarm. To see what these actions are, please refer to the section on "How to Silence Alarms".

## 6.1.3. What the Icons Mean

Icon	Icon Name	Description
	Alarms Silenced	A crossed-bell indicates that audio alarm annunciation has been paused (new alarms that may happen while in this state will be annunciated, and will terminate the alarm paused state)

## 6.1.4. How to Silence Alarms

You can silence an alarm for a monitor by pressing the "Alarm Silence" button on the ILD tool bar.

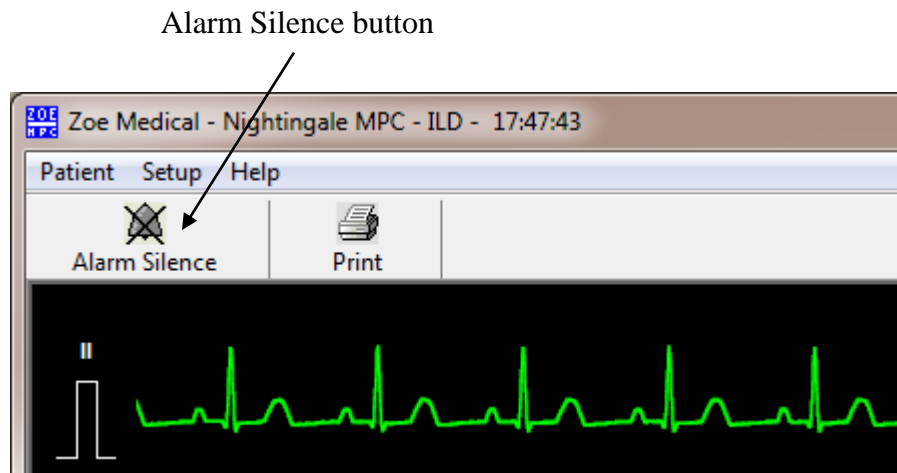


Figure 6. Alarm Silence Button

You can also silence an alarm by doing either of the following:

- Disabling alarms using the Parameter Settings Dialog Box
- If the alarm was a limit violation alarm, by changing the parameter alarm limits such that the current value is no longer out of limits

## 6.2. Alarm Conditions

The tables in this section contain lists of all the conditions the ILD can report for each parameter, along with alarm characteristics of the condition. The first row in each table contains the "normal condition" for the parameter, and the other rows contain the "alarm conditions" for the parameter.

Columns in these tables have the following meaning:

- Condition – the name of the condition
- Display value – the value displayed for the parameter when the condition is true (applies only to physiological parameters)
- Alarm grade – as defined above
- Message – the text of a message displayed in the message area when the condition is true
- Annunciation type – "Persistent" if the alarm will continue to annunciate after the silence time expires, or "One time" if the alarm will not annunciate again (used for discrete measurements such as NIBP)

Note – The delay between alarm annunciation on the PPM3 and remote annunciation on the ILD should be no more than 1 second.

### PPM3 Communication Link Conditions:

Condition	Display Value	Alarm Grade	Message	Annunciation Type
PPM3 link okay	N/A	None	None	Persistent
PPM3 link lost	N/A	Low	Monitor connection lost	Persistent

### PPM3 Battery Conditions:

Condition	Display Value	Alarm Grade	Message	Annunciation Type
Battery okay	N/A	None	None	Persistent
Battery low	N/A	Low	Battery low	One time

## HR Conditions:

Condition	Display Value	Alarm Grade	Message	Annunciation Type
HR within limits	<Number>	None	None	Persistent
HR < LL	<Number>	Medium	HR < LL	Persistent
HR > UL	<Number>	Medium	HR > UL	Persistent
HR Asystole	ASY	High	HR asystole	Persistent
HR Ventricular Fibrillation	VF	High	HR ventricular fibrillation	Persistent
HR Lead-off (after start-up/standby)	<Blank>	None	None	Persistent
HR Lead-off (after leads applied)	<Blank>	Low	HR lead off	One Time
HR Artifact	---	Low	HR artifact	Persistent

Note – When HR is sourced from SpO<sub>2</sub>, the Pulse Rate is labeled in cyan as "HR (SpO<sub>2</sub>)" in the HR parameter box. When HR is sourced from NIBP, the HR is labeled in orange as "HR (NIBP)." When PR is sourced from an ART-labeled IBP, the PR is labeled in red as "HR (ART)."

Condition	Display Value	Alarm Grade	Message	Annunciation Type
HR(SpO <sub>2</sub> ) Bad Probe	---	Low	HR replace sensor	One Time
HR(SpO <sub>2</sub> ) Cannot regulate LED intensity (after start-up/standby)	<Blank>	None	None	Persistent
HR(SpO <sub>2</sub> ) Cannot regulate LED intensity (after finger in probe)	---	Low	HR check sensor placement	Persistent
HR(SpO <sub>2</sub> ) Pulsations Too Weak	---	Low	HR weak signal	Persistent
HR(SpO <sub>2</sub> ) Probe is disconnected (after start-up/standby)	<Blank>	None	None	Persistent
HR(SpO <sub>2</sub> ) Probe is disconnected (after finger in probe)	---	Low	HR unplugged	One Time
HR(SpO <sub>2</sub> ) motion artifact	---	Low	HR artifact	Persistent

## RR Conditions:

Condition	Display Value	Alarm Grade	Message	Annunciation Type
RR within limits	<NUM>	None	None	None
RR < LL	<NUM>	Medium	RR < LL	Persistent
RR > UL	<NUM>	Medium	RR > UL	Persistent
RR > 120 breaths/min	---	Low	RR out of range (too high)	Persistent
Lead-off (after start-up / standby)	<Blank>	None	None	Persistent
Lead-off (after leads applied)	<Blank>	Low	RR lead off	One Time
Resp Artifact	---	Low	RR artifact	Persistent

## SpO<sub>2</sub> Conditions:

Condition	Display Value	Alarm Grade	Message	Annunciation Type
SpO <sub>2</sub> within limits	<NUM>	None	None	None
SpO <sub>2</sub> < LL	<NUM>	Medium	SpO <sub>2</sub> < LL	Persistent
SpO <sub>2</sub> > UL	<NUM>	Medium	SpO <sub>2</sub> > UL	Persistent
SpO <sub>2</sub> Bad Probe	---	Low	SpO <sub>2</sub> replace sensor	One Time
SpO <sub>2</sub> Cannot regulate LED intensity (after start-up/standby)	<Blank>	None	None	Persistent
SpO <sub>2</sub> Cannot regulate LED intensity (after finger in probe)	---	Low	SpO <sub>2</sub> check sensor placement	Persistent
SpO <sub>2</sub> Pulsations Too Weak	---	Low	SpO <sub>2</sub> weak signal	Persistent
SpO <sub>2</sub> Probe is disconnected (after start-up/standby)	<Blank>	None	None	Persistent
SpO <sub>2</sub> Probe is disconnected (after finger in probe)	---	Low	SpO <sub>2</sub> unplugged	One Time
SpO <sub>2</sub> motion artifact	---	Low	SpO <sub>2</sub> artifact	Persistent

## NBP Conditions:

Condition	Display Value	Alarm Grade	Message	Annunciation Type
NBPs within limits	<NUM>	None	None	None
NBPs < LL	<NUM>	Medium	NBPs < LL	One Time
NBPs > UL	<NUM>	Medium	NBPs > UL	One Time
NBPd within limits	<NUM>	None	None	None
NBPd < LL	<NUM>	Medium	NBPd < LL	One Time
NBPd > UL	<NUM>	Medium	NBPd > UL	One Time
NBP Pulsations Too Small	---	Low	NBP weak signal	One Time
NBP Too Much Motion	---	Low	NBP artifact	One Time
NBP Leaky Cuff or Hose	---	Low	NBP cuff leak	One Time
NBP Pinched Hose	---	Medium	NBP blocked hose -- check patient	One Time
NBP Measurement Time-out (2¼ minutes)	---	Low	NBP measurement time exceeded	One Time
NBP Pump or Valve Failure or NBP Safety Timer Expired or Other H/W-related problem	---	Medium	NBP needs service	One Time
NBP Bad Profile Shape	---	Low	NBP cannot measure	One Time

## CO<sub>2</sub> Conditions:

Condition	Display Value	Alarm Grade	Message	Annunciation Type
ETCO <sub>2</sub> within limits	<Number>	None	None	Persistent
ETCO <sub>2</sub> < [lower limit]	<Number >	Medium	ETCO <sub>2</sub> < LL	Persistent
ETCO <sub>2</sub> > [upper limit]	<Number >	Medium	ETCO <sub>2</sub> > UL	Persistent
FICO <sub>2</sub> within limits	<Number>	None	None	Persistent
FICO <sub>2</sub> > [upper limit]	<Number >	Medium	FICO <sub>2</sub> > UL	Persistent
CO <sub>2</sub> beyond accuracy range	---	Medium	CO <sub>2</sub> beyond accuracy range	Persistent
RRCO <sub>2</sub> within limits	<Number>	None	None	Persistent
RRCO <sub>2</sub> < [lower limit]	<Number >	Medium	Resp < LL	Persistent
RRCO <sub>2</sub> > [upper limit]	<Number >	Medium	Resp > UL	Persistent
RR out of range (high)	---	Medium	RRc out of range (high)	Persistent
CO <sub>2</sub> Unplugged (after start-up/standby)	<Blank>	None	None	Persistent



CO <sub>2</sub> Unplugged (after line connected)	<Blank>	Low	CO <sub>2</sub> unplugged	One Time
Power up (10 to 30 seconds)	<Blank>	None	CO <sub>2</sub> warming up	Persistent
In Self-Maintenance Mode (auto-zero)	<Blank>	None	CO <sub>2</sub> zeroing	Persistent
ISA sampling line is not connected	<Blank>	None	CO <sub>2</sub> no sampling line	Persistent
IRMA adapter is unplugged or fogged	<Blank>	None	CO <sub>2</sub> check adapter	Persistent
Module is purging the line	<Blank>	None	CO <sub>2</sub> purging line	Persistent
Line is occluded	---	Low	CO <sub>2</sub> occluded line	Persistent
CO <sub>2</sub> module malfunction	---	Low	CO <sub>2</sub> check sensor	Persistent
CO <sub>2</sub> module interface problem	---	Low	CO <sub>2</sub> problem detected	One Time
Calibration in progress	<Blank>	None	CO <sub>2</sub> calibrating	Persistent
Calibration completed – ok	N/A	Alert	CO <sub>2</sub> calibration ok	Alert
Calibration failed – supplied gas is not close to expected value	N/A	Alert	CO <sub>2</sub> cal failed – wrong gas	Alert
Calibration failed – occlusion during known gas sampling	N/A	Alert	CO <sub>2</sub> cal failed	Alert
Calibration failed – filter line unplugged during calibration	N/A	Alert	CO <sub>2</sub> cal failed	Alert

## IBP (P1 or Pressure Label) Conditions:

Condition	Display Value	Alarm Grade	Message	Annunciation Type
Systolic pressure within limits	<Number>	None	None	Persistent
Systolic pressure < LL	<Number >	Medium	P1s < LL	Persistent
Systolic pressure > UL	<Number >	Medium	P1s > UL	Persistent
Mean pressure within limits	<Number>	None	None	Persistent
Mean pressure < LL	<Number >	Medium	P1m < LL	Persistent
Mean pressure > UL	<Number >	Medium	P1m > UL	Persistent
Diastolic pressure within limits	<Number>	None	None	Persistent
Diastolic pressure < LL	<Number >	Medium	P1d < LL	Persistent
Diastolic pressure > UL	<Number >	Medium	P1d > UL	Persistent
Pressure pulse rate within limits	<Number>	None	None	Persistent
Pressure pulse rate < LL	<Number >	Medium	HR < LL	Persistent
Pressure pulse rate > UL	<Number >	Medium	HR > UL	Persistent

Pressure signal out of range (low)	<Number >	Medium	P1 out of range (low)	Persistent
No pulse rate due to static pressure	---	Low	HR weak signal	Persistent
Unplugged (after start-up/standby)	<Blank>	None	None	Persistent
Unplugged (after line connected)	<Blank>	Low	P1 unplugged	One Time
Zero required (when transducer is initially connected)	<Blank>	None	P1 needs zeroing	Persistent
Zero required and 60 seconds has expired.	---	Low	P1 needs zeroing	Persistent
Zero in progress	<Blank>	None	P1 zeroing	Persistent
Zero failed – pulsatile waveform	N/A	Alert	P1 unable to zero - unstable	Alert
Zero failed – out of range	N/A	Alert	P1 unable to zero - out of range	Alert
Calibration required	<Blank>	None	P1 needs calibration	Persistent
Calibration required and 60 seconds has expired.	---	Low	P1 needs calibration	Persistent
Calibration in progress	<Blank>	None	P1 calibrating	Persistent
Calibration failed – pulsatile waveform	N/A	Alert	P1 unable to calibrate - unstable	Alert
Calibration failed – bad cal resistor	---	Low	P1 needs service	Persistent

## Temperature Conditions:

Condition	Display Value	Alarm Grade	Message	Annunciation Type
TEMP within limits	<NUM>	None	None	None
TEMP < LL	<NUM>	Medium	TEMP < LL	Persistent
TEMP > UL	<NUM>	Medium	TEMP > UL	Persistent
Temp > 50 degrees C	---	Low	TEMP out of range	Persistent
TEMP probe disconnected	---	Low	TEMP unplugged	One Time
TEMP bad calibration resistor	---	Low	TEMP needs service	Persistent

## 7. Printing Reports

### 7.1. Strip Report

To print a Strip Report for a patient, press the "Print" button on the ILD tool bar.

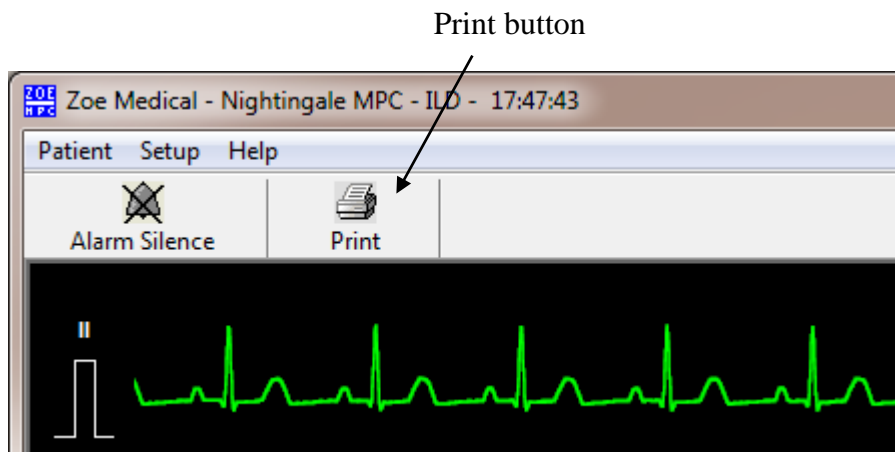


Figure 7. Print button

The Strip Report prints whichever ECG lead is currently the top ECG lead on the ILD display, or lead II if no ECG lead is on the ILD display.

The report shows 35 seconds of data (5 strips of 7 second's worth each) on a single page. The time represented by the data is the 35 seconds previous to the time when you press the button.

A sample Strip Report is shown on the following page.

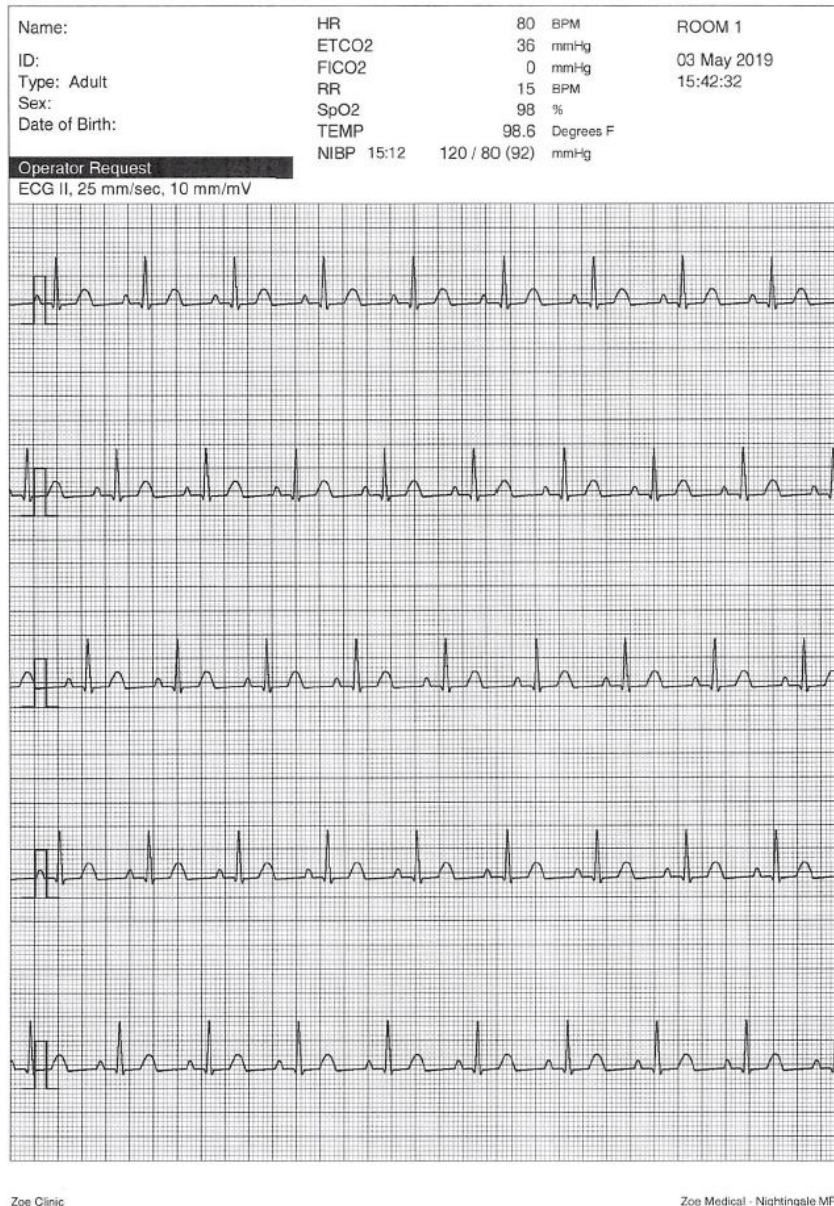


Figure 8. Sample Strip Report

## 7.2. Summary Report

To print a Summary Report for a patient, select "Print Summary Report" from the "Patient" menu.

The summary report combines features of a vital signs report and a trend report. At the top of the summary report is a 7-second strip, which is saved by the monitor automatically when the patient is first admitted. The monitor will save this strip when it has received two minutes' worth of good ECG data (that is, ECG data that is not interrupted by lead off).

The middle part of the summary report shows trend values in a tabular format.

The bottom part of the summary report shows another 7-second strip, which shows the 7 seconds just prior to when you request the summary report.

A sample summary report is shown on the following page.

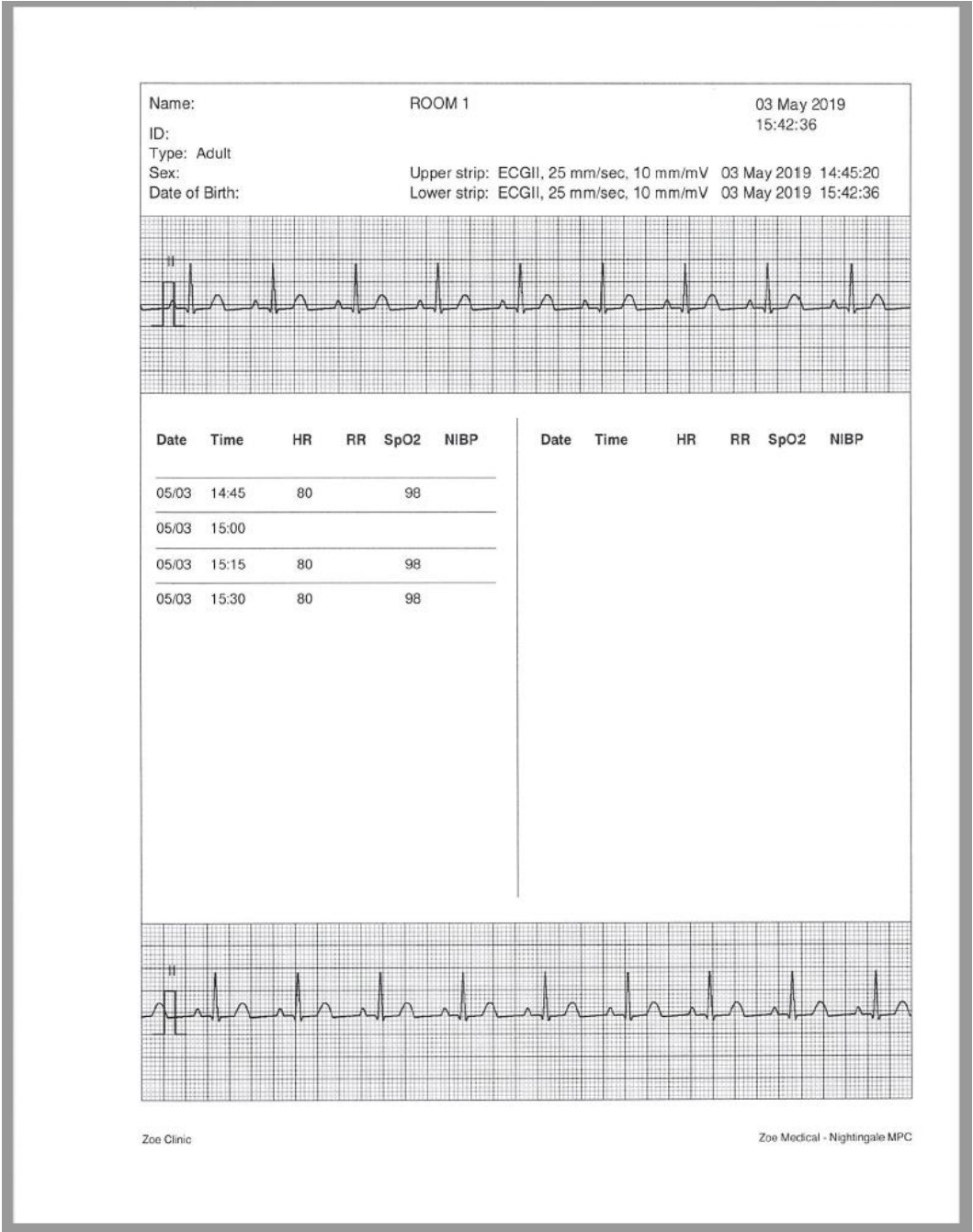


Figure 2. Sample Summary Report