

PC-Display

Wireless Monitoring Software

User Manual



vmed technology

<https://www.vmedtechnology.com>

800-926-9622

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1 Introduction

Vmed Technology's PC-Display software is designed for Microsoft Windows™ computers to allow the Vmed wireless monitors to display and record their monitoring data. The Bluetooth connection established between a Vmed wireless monitor (or *remote*) and the computer allows for a wireless data transfer so that the monitoring device will be out of the way of the clinical procedure.

The PC-Display monitoring screen displays numerical and charted data for up-to-the-moment measurements of the patient's vital signs. Additionally, PC-Display can record this data into a proprietary file format that can then be opened and viewed using Vmed's own Reviewer or Interpreter software.

In order to make use of your Vmed wireless monitor with PC-Display you will first need to initialize the Bluetooth and pair your wireless monitor with your computer. Follow the instructions given in section 2 for this.

2 Initial Connection

In order to connect to your Vmed wireless monitor for the first time you will need to prepare your Windows computer for Bluetooth connectivity. Follow the below procedures in order to allow your computer to communicate with your Vmed wireless monitor.

2.1 Bluetooth Installation and Pairing

NOTE:

Because Windows 10 is now the only operating system supported by Microsoft, this manual assumes that you are using Windows 10. If you are using an earlier version of Windows then refer to the following instructions for installing and pairing a Vmed wireless device here:

https://www.vmedtechnology.com/customers/pdf/Legacy_Windows_Blueetooth.pdf

2.1.1 Bluetooth Adapters

Each Vmed wireless remote monitor is shipped with a USB Bluetooth adapter (sometimes known as a “dongle” or external Bluetooth adapter) in order to facilitate the wireless communication between your computer and the wireless remote device. However, some computers are manufactured with a built-in or internal Bluetooth adapter. Since Windows will only allow Bluetooth communication with one active Bluetooth adapter at any given time then you may need to determine the following.

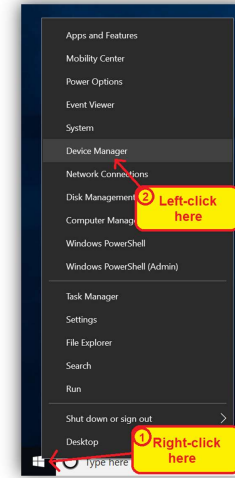


External or Bluetooth USB Adapter (“dongle”)

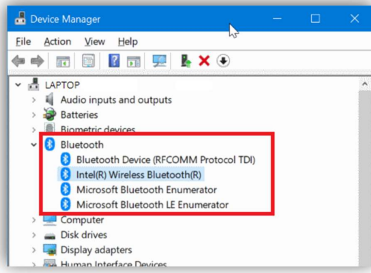
2.1.1.1 Does My Computer Have Built-in Bluetooth?

Use the following steps to determine whether your computer already has internal Bluetooth.

1. Make sure that no USB Bluetooth adapters are currently plugged into your computer. Then right-click your mouse or mousepad on the Windows button (sometimes known as the “Start” button). By default, it is located at the bottom left corner of your screen.



2. A menu of options will appear above it. Select “Device Manager”.
3. A Device Manager window will appear. Look near the top for a category named “Bluetooth”. You may even expand this category to reveal a list of items such as below.



If the Bluetooth category exists in the Device Manager window similar to the above image then you likely do have an internal Bluetooth adapter present in your computer. If not then you do not have that feature. You may then proceed by inserting the USB Bluetooth adapter to your computer and allow time for it to be recognized by Windows and for its device drivers to be automatically installed. You may then skip to section 2.1.2 below.

NOTE:

Bluetooth adapters are interchangeable with each Vmed wireless remote. In fact, you may pair up to 6 Vmed wireless remotes to each computer using a single Bluetooth adapter (either internal or external). Vmed recommends that each monitoring computer have its own Bluetooth adapter.

2.1.1.2 Which adapter should I use?

There are certain advantages and disadvantages to using each type of Bluetooth adapter. If both are available, use the following table to help you decide which one fits your situation best. Keep in mind also that many off-the-shelf USB Bluetooth adapters may work just as well as the one supplied with your Vmed wireless monitor.

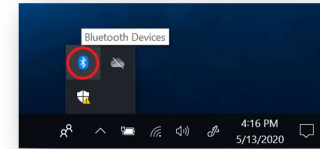
Advantage	Internal Bluetooth	Vmed USB Bluetooth Adapter
Best signal strength ¹		•
Doesn't risk getting bumped into and broken	•	
Guaranteed to work with Vmed monitor ²		•
Easier initial setup ³	•	
Requires less configuration ⁴		•

¹ Vmed USB adapter is rated up to 100 meters while most internal Bluetooth adapters are rated up to 10 meters.
² Some internal Bluetooth adapters are not compatible with Vmed monitors.
³ If an internal Bluetooth adapter is present when the USB adapter is desired then the internal adapter must be disabled prior to setting up the USB adapter.
⁴ See section 2.1.3 for additional configuration for internal Bluetooth adapters

2.1.2 Bluetooth Pairing

In order to connect to each Vmed wireless monitor it must first be paired with that monitoring computer. Follow the below procedure to pair each wireless remote.

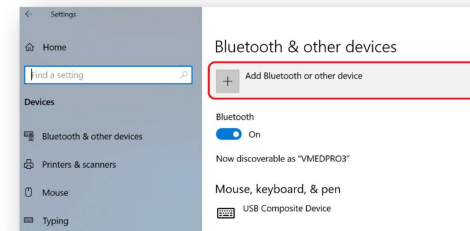
1. Double-click the Bluetooth tray icon to open the Bluetooth Devices window.



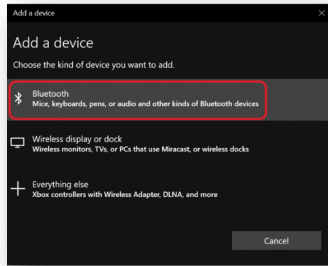
2. Turn on the wireless remote.



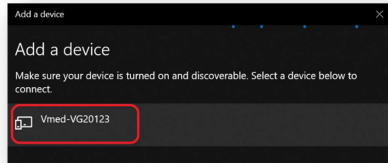
3. Click the "Add Bluetooth or other device" button at the top of the window.



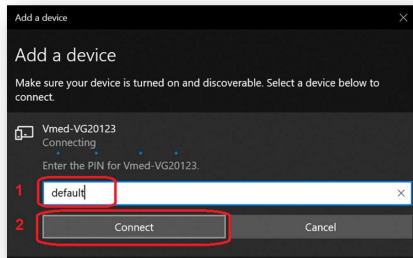
4. Select "Bluetooth" from the "Add a device" window.



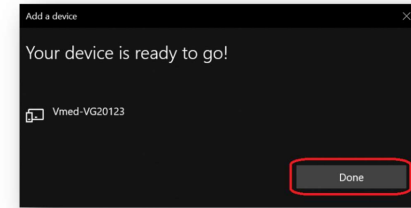
5. Wait for your Vmed wireless device to appear and click it (note that it will be named "Vmed-", followed by its ID number listed on its back label; in this case it is "Vmed-VG20123").



6. When asked for a "PIN" for this remote, enter the word "default", then click "Connect". This PIN is case-sensitive.



7. Once the pairing is finished, click "Done".

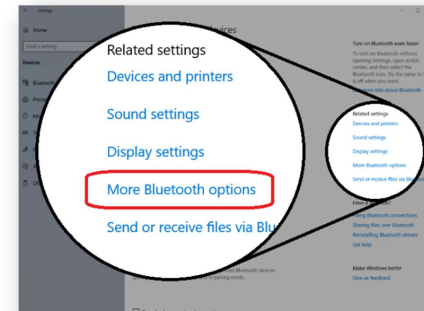


If you are using Internal Bluetooth then continue to section 2.1.3. Otherwise, skip to section 2.2.

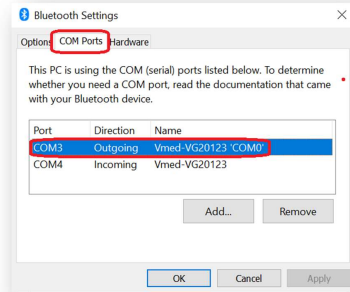
2.1.3 Configuring PC-Display for Internal Bluetooth

Once your Vmed wireless remote has been paired with your computer's internal Bluetooth adapter then you will need to configure PC-Display to know which COM port Windows has assigned to each remote.

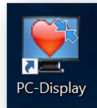
1. From the Bluetooth Devices window click the "More Bluetooth options" link beneath the "Related settings" category to open the Bluetooth Settings window.



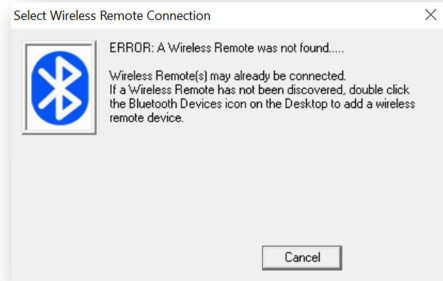
- In the Bluetooth Settings window select the "COM Ports" tab. Then, look for the "Outgoing" line for your newly paired remote (notice the Bluetooth name on the right side). Note the COM port number on the left (in this case, it is COM 3).



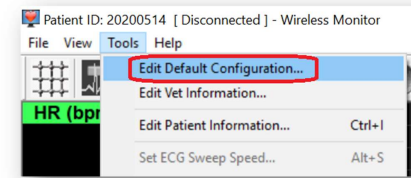
- Double-click the PC-Display desktop icon to open PC-Display.



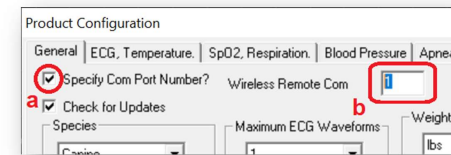
- When the "A Wireless Remote was not found" error appears within PC-Display click "Cancel".



- Open the "Tools" menu and select "Edit Default Configuration".



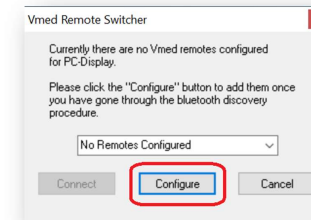
- In the "Product Configuration" window put a check mark in the box next to "Specify Com Port Number?" (a) and then enter a non-zero number in the box that appears to the right of it (b).



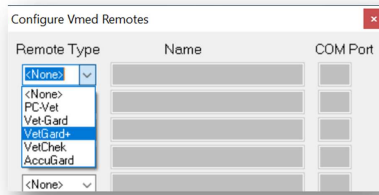
- Click "OK" to the Product Configuration window and then close PC-Display

- Open PC-Display once more.

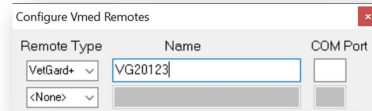
- At the "Vmed Remote Switcher" window click the "Configure" button.



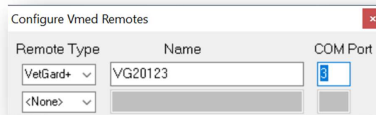
- When the "Configure Vmed Remotes" window appears first select the type of remote that you just paired (in this case it is a "VetGard+").



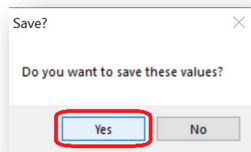
- Enter a name in the box next to it (recommended: the remote's ID).



- Enter the number of the COM port noted in step 2.



- Click "OK" button and "Yes" to save these values.



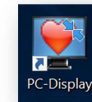
2.2 Wireless Connection

Your Vmed wireless monitor should now be ready for its connection to PC-Display. Follow the below instructions whether you are using internal or external Bluetooth.

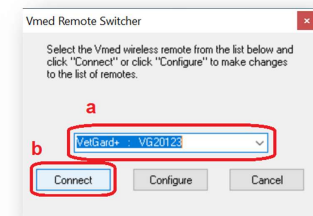
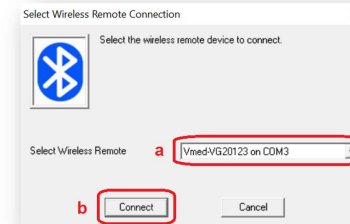
- Verify that your Vmed wireless remote is still turned on - if not then turn it on once more.



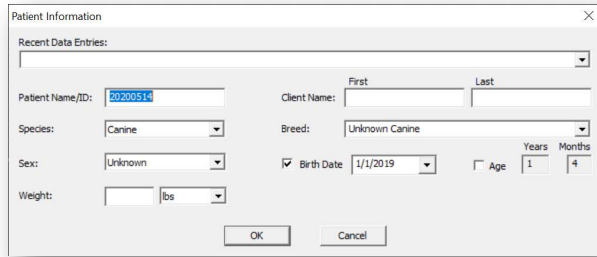
- Open PC-Display if it is not already open by double-clicking its Desktop icon.



- At either the "Select Wireless Remote Connection" or "Vmed Remote Switcher" window make sure that the Vmed remote that you wish to connect to is selected in the drop-down box (a). Then Click the "Connect" button (b).



- At the "Patient Information" window either enter the necessary details of your patient or select a recent patient from the "Recent Data Entries" drop-down box. Then click the "OK" button to initiate the Bluetooth connection.



- Within a few seconds you will see the "Wireless Remote Connected" indicator at the bottom right turn green and waveforms may be traversing the screen.



3 Description of Monitors

Currently Vmed Technology sells 3 wireless monitoring products that are designed to communicate with the PC-Display software. See each of the sections below for more information.

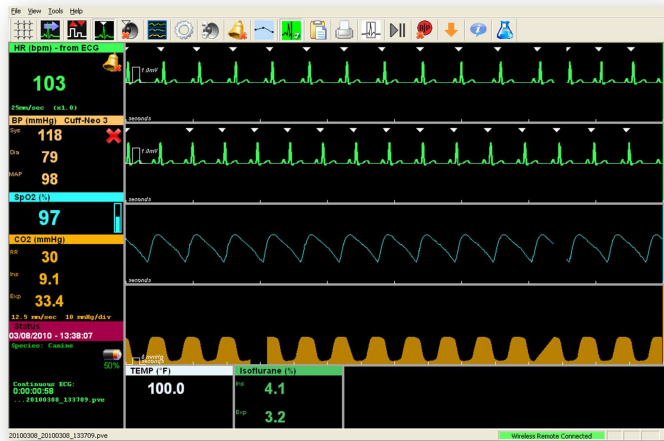
3.1 PC-VetGard+ Wireless Surgical Monitor



The PC-VetGard+ is a multi-parameter surgical monitor capable of monitoring and displaying ECG, heart rate, SpO2, respiration (from ECG or mainstream gas sensors), temperature, non-invasive blood pressure (systolic, diastolic and MAP), CO2, O2 and five anesthetic agents. The PC-VetGard+ is modular, meaning that in addition to the basic unit (which includes ECG, temperature and SpO2) NIBP and gas sensors may be added as well. Digital information, real-time waveforms and trending are displayed through a wireless link on a Windows based computer monitor. This monitoring data may also be recorded for later review.

3.1.1 PC-VetGard+ PC-Display Screen

The screen below represents the display of the most complete PC-VetGard+ including O2 and anesthetic agent information. Several upper toolbar icons are duplicated on the PC-VetGard+ remote's keypad making them accessible from the patients' side.



3.2 PC-VetChek ECG Screening and Recovery Monitor



The PC-VetChek includes ECG leg clips, an ECG chest sensor and a temperature probe. Commands can be activated from the remote's keypad or the PC-Display upper toolbar on the computer. PC-Display toolbar icons and selector buttons on the PC-VetChek are active only if a wireless connection between the PC-VetChek and the computer is established. The PC-VetChek is designed to control some computer and ECG functions from the remote. Some commands, including the print command, can be activated from the remote keypad, however data that must be entered with a keyboard such as clinic and patient information cannot be entered from the remote keypad. The PC-VetChek can track ECG heart rates up to 800 BPM.

Power is supplied by two AA batteries. Batteries will last for about 42 hours of continuous use. Battery life increases markedly by substituting long-life type AA batteries. Rechargeable AA batteries may also be used however a charger is not available through Vmed. Refer to the PC-VetChek user's manual for a complete description and use of the PC-Display software and PC-VetChek hardware.

3.2.1 PC-VetChek PC-Display Screen

The computer screen displays digital heart rate, respiration rate (from ECG) and temperature. Note the “R” wave markers and the respiration waveform. Temperature is available from the temperature probe (included) or from optional ECG and temperature esophageal probes available in three sizes. Several upper toolbar icons are duplicated on the PC-VetChek remote’s keypad allowing control from the patients’ side.



3.3 BP-AccuGard™ Blood Pressure Monitor



The BP-AccuGard is a digital oscillometric blood pressure monitor optimized for small animals. Oscillometric devices measure the oscillation of the vessel wall as the cuff is deflated. The BP-AccuGard uses sophisticated algorithms to calculate the blood pressure measurements from these oscillations based on the pressure in the cuff. While all oscillometric devices have limitations, especially with patient movement and the relatively small size of arteries in small animals, the BP-AccuGard software is successful in significantly reducing motion artifacts, resulting in fast, accurate measurements. Accurate measurements have been obtained on patients as small as 1.5 kg under anesthesia.

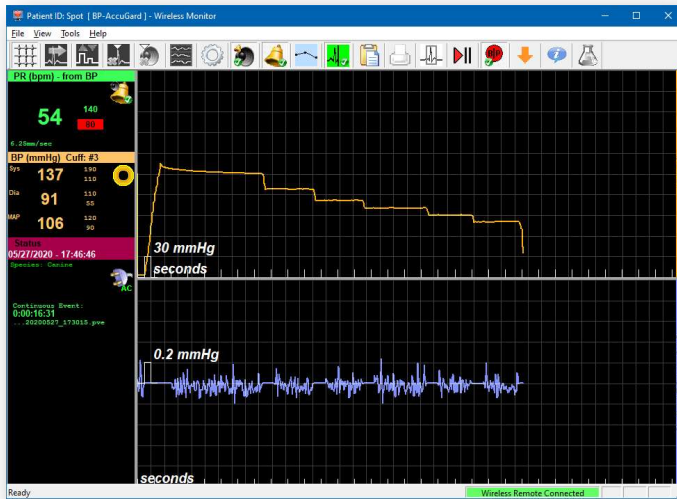
The BP-AccuGard includes manual and automatic modes for diagnostic and surgical applications. In manual mode, the measurement cycle is started each time a measurement is desired. Automatic mode allows repeated measurements taken at user defined intervals. Use as a stand-alone blood pressure monitor or use the PC-Display software to display measurements, real-time blood pressure waveforms and a trend graph on your computer screen.

3.3.1 BP-AccuGard PC-Display Screen

The BP-AccuGard, when linked to PC-Display, displays real time waveforms for the cuff inflation cycle and oscillometric pressure waveforms. Refer to the BP-AccuGard user's manual for a complete description of the PC-Display application screen. Numeric information displayed includes the average measured pulse rate, systolic, diastolic and mean arterial pressures.

NOTE:

Non-applicable toolbar icons are grayed out.



3.3.2 Discontinued Monitors

Vmed has discontinued two older monitors but still supports both. The PC-Vet ECG monitor and the PC-VetGard(1) ECG/SpO2 monitor are no longer manufactured.



PC-Vet

PC-VetGard(1)

Later versions of the PC-Vet ECG monitor are compatible with PC-Display, however earlier versions may require the original application software called "PC-Vet" which has fewer capabilities. Owners of the PC-Vet can return the device to Vmed to be updated and made compatible with PC-Display. The original PC-Vet software can be downloaded from www.vmedtechnology.com (you may need to contact customer support for assistance). The VetGard(1) is fully compatible with PC-Display.

For questions regarding compatibility, telephone Vmed customer support at 800-296-7763.

4 Operating Instructions

4.1 Patient Information

After first selecting the Vmed wireless remote to connect to, you will be presented with a window called “Patient Information” as shown below. This window allows you to enter in the patient and client information for the patient you are about to monitor so that it will be included in the recorded monitoring data.

However, you are not obligated to enter all of the patient data at the beginning of a connection. You may wish to edit the patient information after connecting to your Vmed remote, but it is best done before that recording ends. To edit the patient information later, either select the “Tools” menu followed by “Edit Patient Information...” or click on the Patient Information button on the upper tool bar (see section 4.4).

If you choose not to enter any data initially then PC-Display will automatically record the “Patient Name/ID” field as a set of numbers corresponding to today’s date. This information may also be edited later in the final recorded episode file through the Vmed Interpreter or Reviewer programs. Vmed recommends at least entering a patient’s name or ID in the “Patient Name” box prior to monitoring in order to make it easier to locate later on.

Additionally, if you have recently monitored a patient and provided patient information to PC-Display then you may be able to find that patient listed in the drop-down list below “Recent Data Entries.” Selecting an item from this list will fill out all of the fields in the Patient Information window according to what was saved for that entry.

Once you click the “OK” button then the wireless connection to your Vmed remote will commence. Therefore, **make sure that your Vmed remote is turned on and in range when you are ready to complete the Patient Information window.**

4.2 Screen Elements

Below is an image of the PC-Display monitoring screen with each area numbered.



The numbers in the previous image correspond to the items listed below. And each sub-section afterward corresponds to these numbers as well.

1. Title Bar
2. Menu Bar
3. Toolbar
4. Parameter Boxes
5. Status Area
6. Waveform Boxes
7. Connection Indicator

4.2.1 Title Bar

The title bar is standard among most windows within the Microsoft Windows operating system. In this case, it not only shows the name of this software, PC-Display, but also shows the text that was entered for the patient's name followed by the type of Vmed wireless remote that is connected.

4.2.2 Menu Bar

The menu bar is also a mainstay of the operating system and allows easy access to multiple functions within the software from one of four top-level menus: File, View, Tools and Help.

4.2.3 Toolbar

The toolbar is a row of buttons at the top of the screen, each with its own individual icon to indicate its purpose. Each button performs a common function within the PC-Display software. More detail on each one is given in section 4.4.

4.2.4 Parameter Boxes

The parameter boxes each display modality specific data, usually numeric, that allows the user to monitor the vital signs of their patient from their Vmed wireless monitor. Each parameter box shows the primary vitals number(s) in addition to the current alarm limits for that value (if Alarm monitoring is enabled).

Some of them, such as the Heart Rate parameter box, also show additional information such as sweep speed and gain of the ECG as well as an icon timed with the heart rate itself. The BP parameter box also shows an animated icon which indicates which stage of the non-invasive blood pressure measurement is currently active (a red 'x' for disabled,

concentric circles for 'measuring' and a stopwatch for the interval between automatic measurements).

Each parameter box also has its own title bar which shows the kind of parameter and its current unit in parenthesis. And, in the case of the HR parameter box, it will show the source of the heart rate value (ECG, SpO2 or NIBP). The BP parameter box will also show the cuff size that is currently selected.

4.2.5 Status Area

The status area shows the current date and time from the computer, the currently selected species and the battery charge indicator of the currently connected wireless remote (the displayed battery charge is only shown in increments of 25%). And, if the monitoring session is currently recording then the status area will also display which kind of recording is active and a running timer since that recording last began (see section 4.6 for more information about recording).

4.2.6 Waveform Boxes

The waveform boxes show a waveform that traces across the screen depicting rapidly changing vital signs values. The three types that PC-Display can show are Lead-II ECG, a plethysmograph (from SpO2) and a capnograph (from CO2; or a simple respiration curve if from ECG), depending upon what is available from the currently connected monitor type. If a BP-AccuGard is connected then it will show both the oscillometric pressure from the cuff as well as the average cuff pressure waveforms. More information about speed and size of waveforms is given in section 4.3.

4.2.7 Connection Indicator

The connection indicator exists to show the wireless connection state of PC-Display. There are two indicators: whether a chosen wireless remote is attempting a connection (a yellow background with "Wireless Remote Connecting") or has already established a connection (a green background with "Wireless Remote Connected"). If neither is displayed then PC-Display is in an idle state with respect to the wireless connection process. In other words, the connection cycle is disabled.

4.3 Sweep and Scale

4.3.1 Sweep Speed

Sweep moves the waveform across the display from left to right at the selected sweep speed (chart speed). Default sweep speed is 25 mm/sec, which is preferred for surgical monitoring. A sweep speed of 50 mm/sec should be used for diagnostic ECGs. Increasing the sweep speed is analogous to zooming in on the horizontal scale.

Time is measured on the horizontal scale with hash marks at the bottom of each waveform box on both the display and print report. These denote each second.

The ECG waveform color is magenta if the signal is "Leads Off" or has poor electrode-patient contact. It is green with good electrode-patient contact, or "Leads On". If the waveform is magenta, an ECG complex may appear; however, a heart rate will not be displayed.

4.3.2 Vertical Scale (Gain)

The vertical scale of the display and the print report measures signal amplitude. When gain is set at 1, the signal amplitude of 1mV has a vertical scale deflection of 10 mm by convention. A 1mV reference mark appears on the display and print report at the left side of each waveform box. Vertical scale deflection increases by a multiple of the gain and the 1mV reference mark also increases proportionately. Therefore, increasing the gain is analogous to zooming in on the vertical scale.





NOTE:








Grid spacing does not change with the gain setting. Use the amplitude reference marker (1mV) to estimate the amplitude of ECG signals on the screen.







4.4 Toolbar Buttons and Functions





The PC-Display Toolbar provides quick, easy access to several common functions within the PC-Display software. The following table will describe each button and its associated function within PC-Display.

	<p>The Grid Enable button is a toggle button that will overlay a wire-frame grid over both the ECG and CO2 waveforms (when connected to a BP-AccuGard this will put a grid over both the cuff and oscillometric waveforms). The height of each rectangle within the grid is directly associated with the vertical scale marker at the bottom left of each waveform box.</p>
	<p>The Sweep Rate cycle button will allow the user to change the sweep rate of the ECG and SpO2 waveforms by cycling through each of the available rates: 25 mm/sec, 50 mm/sec, 100 mm/sec or 200 mm/sec. The current sweep rate will be denoted at the bottom of the ECG parameter box.</p>
	<p>The ECG Gain cycle button will allow the user to change the gain (vertical scale factor) of the ECG waveform by cycling through each of the available gain settings: x0.5, x1.0, x2.0, x3.0 and x4.0. The current ECG gain setting will be denoted in parenthesis at the bottom of the ECG parameter box.</p>
	<p>The R-wave enable button is a toggle button that, if enabled, will place a white inverted triangle (R-wave marker) above each recognized beat in the ECG waveform area. This can be useful for determining whether the monitor is double-counting beats.</p>

	The ECG Tone enable button is a toggle button that will produce a tone whenever a heartbeat is encountered during the monitoring session – from either ECG or SpO2, depending upon which it is set to. It will usually default to the ECG, but if no Leads-On ECG signal exists then it will revert to SpO2 for both the heart rate and beat tone.
	The Waveform Selection button will bring up another window that gives the user the choice of which waveforms to display in the main monitoring screen at that time. For all available remotes it will always include the ECG waveform, but may also give the option for the SpO2, CO2 and O2 waveforms, depending upon what is available with the current remote.
	The Current Configuration button allows quick access to the configuration of the current session. Any values that are modified here will return to the default values upon exiting PC-Display. (see section 5.2)
	The Silence Alarms button is a toggle button whose factory default is to be enabled, meaning that any tripped alarm will sound the alarm tone. When disabled the alarm sound will cease regardless of how many parameters are out of range.
	The Monitor Alarms button is also a toggle button that is enabled by factory default. When enabled, this will show the alarm limits beside each digital value and provide a recorded alarm event and the audible alarm tone if those options are enabled as well. However, even if those options are still enabled, they will not activate if this button is disabled.
	The Trend Graph button, when clicked, will open the Trend Graph window to show the values that are monitored for trends. Each different remote type will show trend information for different parameters, based upon that particular remote type.
	The Record Episode button is a toggle button that is by factory default enabled. When enabled, this button will record a patient episode file. When disabled then no parameters will be recorded unless the Print function is taken. See a later section of this chapter for more details.

	The Patient Information button will allow the user to change the patient information for the current recording session by opening the Patient Information window. This is the same window that appears when connecting to the wireless remote.
	The Print button will allow the user to print either 1 or 2 pages of ECG waveform information along with any patient information that has already been input so far in this monitoring session. Each time this button is pressed it will include one page's worth of ECG waveform prior to the point in time when the button was pressed. See a later section of this chapter for more details. This option is not available for the BP-AccuGard.
	The Review Episode button allows the user to open any of the recorded patient episode files that have been recorded in the current monitoring session directly into the Vmed reviewing software selected within the configuration window.
	The Stop/Start button is a toggle button that by default is disabled (play). When it is clicked/enabled it will freeze the waveforms on the screen (stop) for easier viewing. To disable it again simply click it once more (start). Clicking on this button will not pause any recorded measurements that are in progress – only what is viewed on the screen.
	The BP Measurement button is also a toggle button that is disabled by default. Once clicked to enable, it will initiate the automatic measurement process once a cuff size has been selected from the resulting window. This option is only available for remotes with blood pressure capability (PC-VetGard+ and BP-AccuGard).
	The Marker button allows one to quickly record a vital signs event ("marker" event) if an episode is being recorded.

	<p>The Info button allows quick access to version information for PC-Display as well as any connected wireless remote. This button may only be necessary when speaking to a support representative.</p>
	<p>The Gas Selection icon allows the user to select the Primary and Secondary anesthetic agents to monitor if a capable gas sensor is connected to the PC-VetGard+.</p>

It is important to note that some of these Toolbar icons with toggle functionality have either a green check mark or a red 'x' at the base of the icon as shown below.



This is to denote whether the function this icon represents is currently enabled or disabled, respectively. Additionally, the buttons that show they are enabled will usually also have a recessed look to make this concept clearer.

4.5 Alarms and Sounds

PC-Display has several sounds that are useful for monitoring a patient while you are not always looking at the screen. There are primarily 3 different kinds of sounds within PC-Display that help to serve this purpose.

4.5.1 Alarm Tone

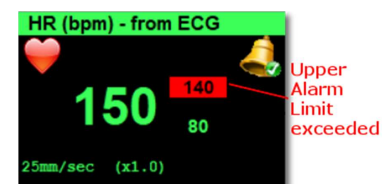
The alarm tone is a continuous sound of two rapidly alternating tones for as long as its function is active. The alarm tone can only be active if the following conditions are met:

1. The Monitor Alarms button is enabled
2. The Silence Alarms button is enabled (disabled would mean that the alarm is silenced)

3. An alarm is tripped (one of the parameters with an alarm limit has exceeded that limit)

If a parameter's alarm limit has been exceeded while the alarms are enabled then for as long as this parameter is out of its normal range the alarm tone will be active (it will continuously sound). However, if the user disables the Silence Alarm button and then re-enables that button then the alarm tone will no longer be active until that parameter changes to another value that is out of range.

Additionally, if a parameter is out of range then the same alarm tone will sound no matter which parameter is out of range. To give the user a visual cue as to which parameter has gone out of range, the numbered alarm limit next to each vital signs parameter will change to black digits on a red background.



4.5.2 Heart Rate Tone

For each remote type that produces a heart rate or pulse rate from ECG or SpO2, PC-Display will provide a heart rate tone consistent with the current heart rate or pulse rate shown. If the remote in use has a "Leads On" ECG signal (green tracing) then the heart rate and its associated tone will come from the ECG measurement. However, in the PC-VetGard(1) and PC-VetGard+ remotes where SpO2 can be used, the pulse rate will default to what is measured from SpO2 and the tone will change accordingly. The heart rate tone can easily be enabled or disabled from the ECG Tone Enable button of the toolbar.

There are two kinds of heart rate tones: from ECG and from SpO2. These tones are different in order to provide the user an audible cue that the heart rate is coming from one source over another. This can be helpful if, for example, the heart rate was coming from ECG and then suddenly switched to SpO2. The user would take note that the most

probable reason is that the ECG is now “Leads Off,” which would prompt the user to investigate and correct this sooner rather than had no audible cue alerted them to this.

4.5.3 Breath Tone

For the PC-VetGard+ with a gas probe connected, PC-Display also provides a breath tone each time the patient takes a breath. This tone is altogether different from the heart rate or alarm tones in order to give the user yet another audible cue to one of the patient’s vital signs – in this case, the respiration rate. This tone will sound only if enabled in the Configuration window under the CO2 tab.

In addition, PC-Display now makes 4 sets of tones available for each monitoring session. Each set is referred to as a profile. Each profile includes two heart rate tones (ECG and SpO2) and a breath tone. These profiles exist for the purpose of differentiating which remote and patient each sound is coming from if more than one remote is being used in the same location or by the same computer.

4.6 Recording Monitoring Information

The default setting for recording information through PC-Display varies with each monitor. In general, “Continuous Recording waveforms; Periodic Vital Signs” is the default setting for the PC-VetGard+, PC-VetGard(1), PC-VetChek and the PC-Vet. Waveforms and vital signs are recorded in this mode. “Periodic Vital Signs” is the default setting for the BP-AccuGard. The “Periodic Vital Signs” mode will record vital signs at the interval selected as well as vital signs when an alarm is tripped or a marker or print command are initiated.

Unless “Auto Save” is checked on the Default Configuration screen, manually pressing the Record Episode button on the “Tools” selection on the PC-Display toolbar will initiate the recording command. Clicking once on this button will place a checkmark in the bottom right corner of the button itself to show that it is enabled. Clicking it again will disable this recording mode and close the episode file that was just recorded.



If “Auto Save” is checked, recording will begin automatically upon connection to the PC-Display and a check mark will appear within the Record Episode button on the upper tool bar.

NOTE:

The Record Episode button should not be disabled until the monitoring episode is complete.



The Review Episode icon is enabled once the Record Episode button has been toggled off. The saved file can be opened by clicking the yellow icon on the remote’s keypad or the PC-Display toolbar and selecting the desired episode.

4.7 Printing

Printing a waveform report can be done from the PC-Display toolbar or the remote’s keypad (if connected to the computer), however only the waveform report will be printed by this method. To obtain a complete print report, the report must be printed from either the Vmed ECG Reviewer or ECG Interpreter program.

TO PRINT A WAVEFORM REPORT

1. *From the remote keypad:* Press the Print key, or...
From the PC-Display upper tool bar: Click the printer icon, or...
From the “File” menu: choose Print.
2. Select “Scale to fit” or “shrink to fit” on the printer setup dialog box.

NOTE:

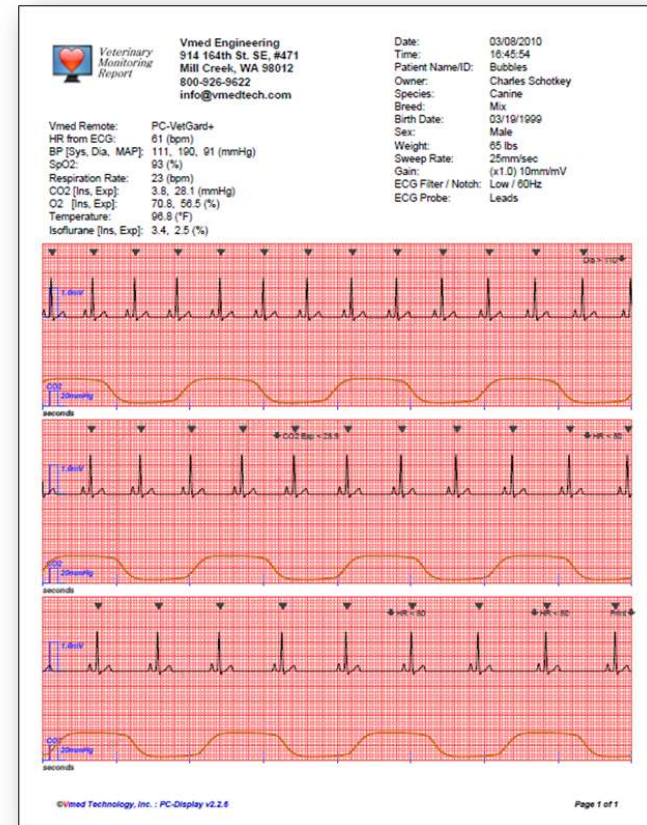
A color printer is required to reproduce the colored grid. Files may also be printed to PDF using a print-to-PDF printer driver.

PC-Display offers 2 choices for printing: 1 page or 2 pages. Each page includes 600 millimeters (200 per line) of ECG waveform data. This means that when the user chooses the Print option, then the printed page will include a waveform of previously recorded data from the time the Print option was chosen. Each page will have the number of seconds of waveform according to the current ECG sweep rate at the time of printing. The following table will describe this further.

Selected Sweep Rate	Waveform Seconds/Page
25 mm/sec	24
50 mm/sec	12
100 mm/sec	6
200 mm/sec	3

Additionally, if using the PC-VetGard+ with CO2 then the printout will also include the CO2 waveform just below the ECG waveform.

An example of a sample waveform print report follows.



Sample print report

4.8 Keyboard Shortcuts

PC-Display has several keystroke combinations that can be used to quickly access certain functions using the computer's keyboard. Most of these keystrokes involve a combination of keys being pressed at the same time. For instance, "Alt + H" denotes that the "Alt" key and the "H" key should be pressed at the same time to achieve the desired results. Likewise, "Ctrl" denotes the "Control" key.

Keystroke	Action	Description
Alt + C	Connect Wireless Remote	Toggles the wireless connection process. This can initiate the process, halt it or disconnect from an already connected remote.
Ctrl + I	Edit Patient Information	Opens the window allowing the user to edit the current patient's name or ID, client name, species, breed, age, sex and weight. If the session is being recorded then this recorded episode will reflect any changed values.
Ctrl + N	New Patient	Opens the window allowing the user to input the next patient's name or ID, client name, species, breed, age, sex and weight. If the current session is already recording this will end it begin a new episode.
Ctrl + P	Print	Opens the print dialog window allowing the user to print the last 30 seconds of the current ECG strip (this same strip will be recorded into an episode as well).
Ctrl + G	Toggle Grid	Enable/Disable the grid behind the ECG waveforms.
Ctrl + M	Toggle R-Wave Marker	Enable/Disable the triangular R-Wave markers that appear above each detected R-Wave of the ECG waveform.
Ctrl + T	Open Trend Graph	Opens the Trend Graph window.
Alt + S	Cycle ECG Sweep Speed	Cycles through the 4 sweep speeds for the ECG and SpO2 waveforms.
Alt + G	Cycle ECG Gain	Cycles through 5 gain settings for the ECG waveform.
Ctrl + E	Edit Current Configuration	Opens the Current Configuration window allowing the user to edit many of the parameters of PC-Display's current session without disconnecting the remote.
Ctrl + Q	Toggle QRS Tone	Enable/Disable the heart rate tone.
Ctrl + A	Toggle Alarm Tones	Enable/Disable the tones made when an alarm limit has been exceeded. This can essentially act as a "silence alarm" feature.
Alt + A	Toggle Alarms	Enable/Disable the alarm limits for all values.
Alt + R	Review Stored Episode	If a complete episode has been recorded in the current session then this will open the "Wireless Remote Review Episode" window.

Ctrl + R	Toggle Recording	Enable/Disable the recording of patient data to a stored episode.
Alt + P	Stop/Start	Enable/Disable the progression of waveforms on the screen (similar to freezing or unfreezing the current display).
Alt + M	Mark Event	Places an orange triangular mark at that moment on the ECG waveform for later reference. Additionally, if an episode is not already being recorded this will record a brief episode with the mark listed as an event.
Ctrl + H	About PC-Display and Remote	Opens the About window for PC-Display. If a remote is connected at the time then this window will also display the built-in parameters of this remote.
?	View Manual	Opens an online version of the user's manual in a web browser.

5 Configuration

The PC-Display software has two types of configurable settings. The first type is the Default Configuration where all the various options are set. The Default Configuration settings are what determine the settings each time the PC-Display software is opened. The second is the Current Configuration, which is derived from the Default Configuration. However, it is limited to the currently connected Vmed wireless monitor and its available sensors as well as the currently selected patient type. The Current Configuration can be edited while monitoring whereas the Default Configuration can only be edited while not connected to a Vmed wireless remote.

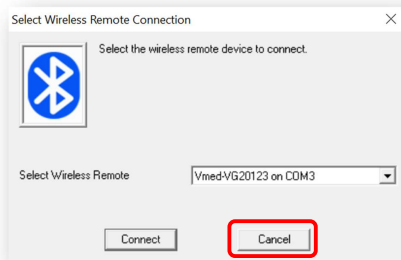
5.1 Default Configuration

The Default Configuration includes many settings for multiple modalities, sensors and patient types. The Default Configuration can only be reached when PC-Display is not already connected or attempting to establish a wireless connection to a remote. To open it, follow the below steps.

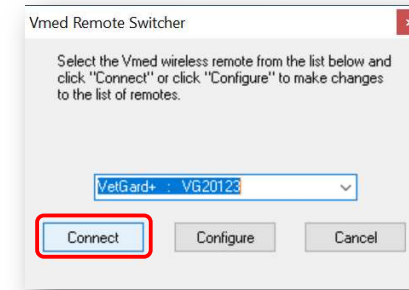
1. Double-click the PC-Display icon on your desktop to open it.



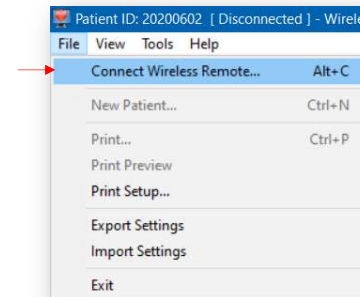
2. Click the "Cancel" button on the "Select Wireless Remote Connection" window and continue to step 4.



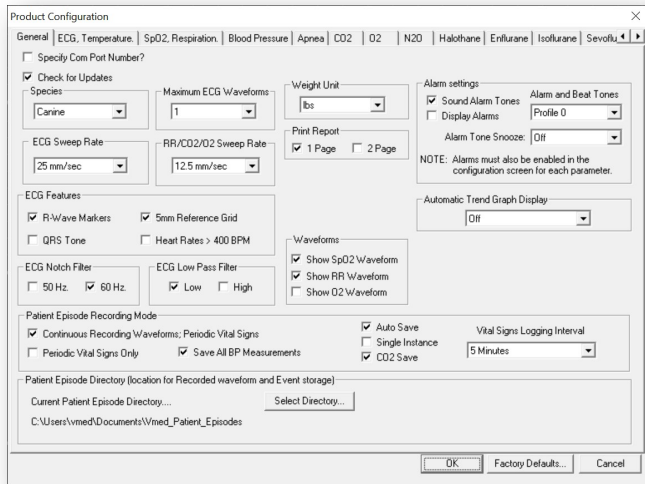
If instead you see the "Vmed Remote Switcher" window then click "Connect" and continue to step 3.








3. Click the "File" menu and confirm that there is no check mark next to the "Connect Wireless Remote..." item. If there is then click this item to disable the wireless connection process.



- Click the “Tools” menu followed by “Edit Default Configuration...” and the Default Configuration window (titled as “Product Configuration”) will open:



Some selections in the Default Configuration menu apply only to certain wireless remote types. Each selection listing below will show which type of wireless remote this feature applies to by including any of the following images next to it.

PC-Vet	
PC-VetGard(1)	
PC-VetGard+	
PC-VetChek	
BP-AccuGard	

Because there are so many different options listed in the Default Configuration, they have been separated into tabs for clarity and focus. Each section below represents one of these tabs. See each one for the individual options listed within them.

5.1.1 General Tab

Specify COM Port Number



The “Specify Com Port Number” box should not be checked in most situations. The appropriate COM port number should be entered here only in situations such as when an internal Bluetooth adapter is used with the monitoring computer (see section 2.1.1). Please call Vmed for support if you are unsure whether you need this option.

FACTORY DEFAULT: UNCHECKED

Check For Updates



If a checkmark is in the box next to “Check for Updates” then PC-Display will periodically check to see if a later version has been released. If an update is available PC-Display present you with the option to download it. There is also an option under the Help menu that will allow you to manually perform this check. *NOTE: Requires an active Internet connection to the computer where PC-Display resides.*

FACTORY DEFAULT: CHECKED

Species



Select the most common species of patient that is seen. This will be the default for each new patient.

FACTORY DEFAULT: CANINE

Maximum ECG Waveforms



Choose the maximum number of continuous Lead II ECG waveforms that you wish to appear on the screen (from 1-4). How many waveforms actually appear is equal to this number minus the number of other waveforms (SpO2, Respiration/CO2, O2) that are also currently available and enabled.

FACTORY DEFAULT: 4

Weight Unit



Set the default unit of weight measurement to appear in the Patient Information screen. The available options are "kgs", "lbs", "g" and "oz".

FACTORY DEFAULT: "LBS"

Print Report



Choose the desired number of pages for the print report. Select two pages to display waveforms on both.

FACTORY DEFAULT: 1 PAGE

Alarm Settings: Sound Alarm Tones



If checked, this will allow the alarm tone to sound whenever an alarm is tripped.

FACTORY DEFAULT: CHECKED

Alarm Settings: Display Alarms



If checked, all the designated alarm limits will be evaluated for an alarm event and the alarm tone (if enabled). If left unchecked, no alarm events will occur or alarm tones will sound.

FACTORY DEFAULT: CHECKED

Alarm Settings: Tone and Background Color Profile



If you are connecting to multiple wireless remotes on the same computer then you can choose individual profiles for the Alarm Beats and Tones to more easily differentiate the sounds and monitoring screens from each remote. Each of the four profiles has a unique sound for each of the following: heart beat from ECG, heart beat from SpO2 and breath tone. This setting will be the default each time PC-Display is started. Additionally, each profile also as a background color for the waveform areas associated with it as well. Profiles 0-3 use the following background colors, respectively: black, navy, forest green and plum. To select a different profile for each remote simply open the Current Configuration window on the PC-Display upper tool bar after this remote has connected to PC-Display.

FACTORY DEFAULT: 0

Alarm Settings: Alarm Tone Snooze



Set an automatic "snooze" on the alarm tone whenever it is silenced so that it will re-enable itself once the preset time has elapsed. The time options are 10 seconds, 30 seconds, 1 minute, 5 minutes, 10 minutes and 30 minutes. To turn off the alarm tones simply click the alarm tone toolbar button once more.

FACTORY DEFAULT: OFF

ECG Sweep Rate



Select the desired sweep rate (Chart speed) as desired. Use a sweep rate of 50 mm/sec for diagnostics and 25 mm/sec for surgery. This applies only to ECG and SpO2 waveforms.

FACTORY DEFAULT: 25 MM/SEC

RR/CO2/O2 Sweep Rate



Select the desired sweep rate for the respiration, CO2 and O2 waveform areas.

FACTORY DEFAULT: 12.5 MM/SEC

Episode Reviewer



Select which Vmed software will open recorded episodes directly from the PC-Display toolbar: ECG Reviewer or ECG Interpreter. This depends upon which is installed. If neither is installed then this option is grayed out or invisible.

FACTORY DEFAULT: ECG REVIEWER

Automatic Trend Graph Display



Choose the time interval of how often the trend graph will display automatically and momentarily throughout the procedure.

FACTORY DEFAULT: OFF

ECG Features: R-Wave Markers



Checking this will display the white inverted triangles that appear above each beat in the ECG waveform area. Markers are helpful in detecting double-counting of beats.

FACTORY DEFAULT: CHECKED

ECG Features: 5mm Reference Grid



Checking this will display a reference grid behind the ECG and respiration/CO2/O2 waveform areas. The vertical scale of each rectangle in this grid is determined by the gain marker to the left of each waveform window, while the horizontal scale of each rectangle is always 5 mm.

FACTORY DEFAULT: UNCHECKED

ECG Features: QRS Tone



Checking this will enable a specific tone to sound according to the heart rate. The tone will be different depending upon whether the heart rate is retrieved from ECG or from SpO2. Each of these tones will be different within each Beat Tone Profile.

FACTORY DEFAULT: CHECKED

ECG Features: Heart Rates > 400 BPM



PC-Display has the ability to calculate heart rates greater than 400 BPM for exotic animals. For veterinary use on canine/feline patients leave the "Heart Rates >400 BPM box unchecked.

FACTORY DEFAULT: UNCHECKED

Waveforms



Select which of the three waveforms (other than ECG) you would prefer to have automatically displayed upon startup. The BP-AccuGard makes use of the RR and O2 waveforms by default and cannot modify these.

FACTORY DEFAULT: SPO2, RR CHECKED; O2 UNCHECKED

ECG Notch Filter



The default ECG notch filter is used to filter AC line interference. For Domestic use (North America) choose 60 Hz. For international use choose 50 Hz.

FACTORY DEFAULT: 60 HZ

ECG Low Pass Filter



Some instances of noise on the ECG signal can be reduced by selecting one of these filter types.

FACTORY DEFAULT: LOW

Patient Episode Recording Mode: AutoSave



Auto Save is the default setting. A check mark in the “Auto Save” box enables automatic saving of all patient data upon connection to a remote device without manually pressing the green record button on the PC-Display upper tool bar.

Selecting Auto Save enables the default recording mode selection: either “Continuous Waveforms; Periodic Vital Signs” or “Periodic Vital Signs Only”. Continuous Recording mode will save both ECG and/or CO2 waveforms

and vital signs. Selecting Periodic Vital Signs Only will record vital signs and monitoring events without any waveform data.

FACTORY DEFAULT: CHECKED; CONTINUOUS RECORDING mode.

NOTE:

The BP-AccuGard cannot record any waveform data no matter which option is selected.

The following table shows how to manage what is recorded.

<u>Configuration Options</u>			<u>Operation Actions</u>		<u>Data Recorded</u>
Auto Save	Vital Signs Only	Continuous Recording	Record Button	Print Command	
OFF	X	X	OFF	NO	Nothing
OFF	X	X	OFF	YES	24 sec. of ECG waveform and any events during that time, including Print event
OFF	X	X	ON	NO	Waveform(s) and Events
OFF	X	X	ON	YES	24 sec. of ECG waveform and any events during that time, including Print event
ON	ON	OFF	OFF	NO	Nothing
ON	ON	OFF	OFF	YES	24 sec. of ECG waveform and any events during that time, including Print event
ON	ON	OFF	ON	NO	Events Only
ON	ON	OFF	ON	YES	Events Only (without print event)
ON	OFF	ON	OFF	NO	Nothing
ON	OFF	ON	OFF	YES	24 sec. of ECG waveform and any events during that time, including Print event
ON	OFF	ON	ON	NO	Waveform(s) and Events
ON	OFF	ON	ON	YES	24 sec. of ECG waveform and any events during that time, including Print event

Patient Episode Recording Mode: Single Instance



Checking this will make it possible for only one instance of PC-Display to be open at a time on this computer. Selecting Multiple Instances allows multiple wireless remotes to be connected to this computer simultaneously.

FACTORY DEFAULT: UNCHECKED

Patient Episode Recording Mode: CO2 Save



Checking this will allow the CO2 waveform, or capnograph, to be saved in addition to the ECG waveform whenever Continuous Recording is selected.

FACTORY DEFAULT: CHECKED

Patient Episode Recording Mode: Save All BP Measurements



Checking this will cause PC-Display to save the vital signs each time a blood pressure measurement is complete. This will show up as a “vitals” event.

FACTORY DEFAULT: CHECKED

Patient Episode Recording Mode: Vital Signs Logging Interval



This selection determines how often vital signs are automatically recorded to provide a record of the surgery. Intervals of 1, 3, 5, 10 and 15 minutes are possible as long as patient recording is enabled. A time reference stamp is also recorded.

FACTORY DEFAULT: 5 MINUTES

Patient Episode Recording Mode: Patient Episode Directory

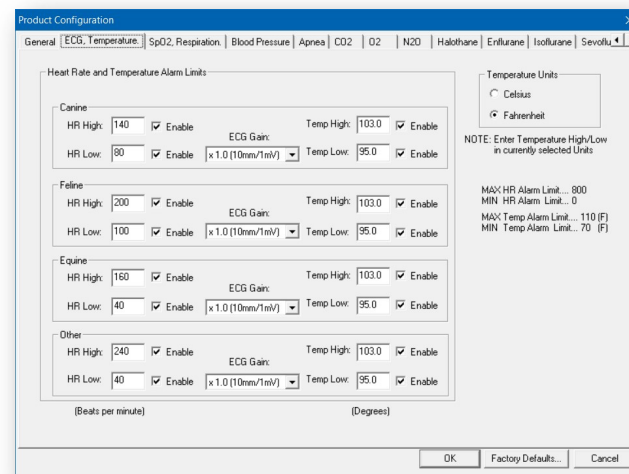


This is the location where your recorded patient data files (referred to as “patient episodes”) are stored by PC-Display. Click the “Select Directory...” button if you wish to change this location.

FACTORY DEFAULT:

<LOCAL USER DIRECTORY>\DOCUMENTS\VMED_PATIENT_EPISODES

5.1.2 ECG, Temperature Tab



Heart Rate and Temperature Alarm Limits



“High” and “Low” limits show the default values at which the alarm will be triggered for both heart rate and temperature. Additionally, each limit can be enabled or disabled individually. Note that the Heart Rate (“HR”) limits

here correspond to the heart rate given by ECG, SpO2 and NIBP. The below table shows the FACTORY DEFAULTS for these values:

Species	HR High	HR Low	Temp* High	Temp* Low
Canine	140	80	103.0	95.0
Feline	200	100	103.0	95.0
Equine	160	40	103.0	95.0
Other	240	40	103.0	95.0

* Temperature values here are shown in Fahrenheit

ECG Gain



The default ECG gain can now be set per species type so that this gain value will automatically be active when a patient of that species is selected for monitoring.

FACTORY DEFAULT: x1.0 (10mm/1mV) [for each species]

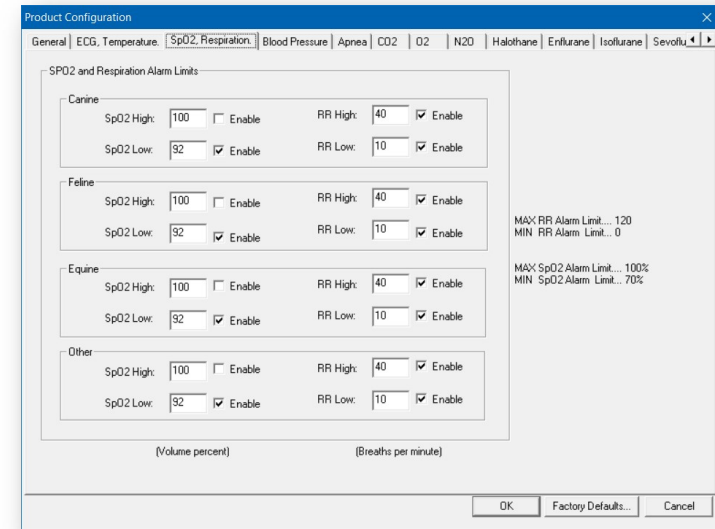
Temperature Units



The default temperature units can be selected here between Fahrenheit and Celsius. Alarm limits will automatically adjust to the temperature scale.

FACTORY DEFAULT: FAHRENHEIT

5.1.3 SpO2, Respiration Tab



SpO2 Alarm Limits



The “High” and “Low” limits here show the default values at which the alarm will be triggered for SpO2 on each species type. Each limit can be enabled or disabled individually. The below table shows the FACTORY DEFAULTS for these values:

Species	SpO2 High	SpO2 Low
Canine	100	92
Feline	100	92
Equine	100	92
Other	100	92

Respiration Alarm Limits



The “High” and “Low” limits here show the default values at which the alarm will be triggered for “RR” (respiration) on each species type. Additionally, each limit can be enabled or disabled individually. The below table shows the FACTORY DEFAULTS for these values:

Species	RR High	RR Low
Canine	120	6
Feline	120	6
Equine	120	6
Other	120	6

5.1.4 Blood Pressure Tab

Blood Pressure Alarm Limits



The “High” and “Low” limits here show the default values at which the alarm will be triggered for the blood pressure values on each species type. Each limit can be enabled or disabled individually. The below table shows the FACTORY DEFAULTS for these values:

Species	Cuff Size	Sys High	Sys Low	Dia High	Dia Low	MAP High	MAP Low
Canine	NEONATE 3	190	80	100	50	120	60
Feline	NEONATE 3	160	80	100	50	120	60
Equine	NEONATE 3	160	80	100	50	120	60
Other	NEONATE 3	160	80	100	50	120	60

Measurement Time Interval



Determines how often blood pressure measurements will be taken automatically. Intervals of 1, 2, 3, 5, 10, 15, 30 and 60 minutes are available.

FACTORY DEFAULT: 5 MINUTES

Initial Cuff Inflation Pressure



This value is the initial cuff pressure peak of the cuff inflation cycle, given in mmHg. This pressure should be 30 mm Hg over the expected systolic pressure.

FACTORY DEFAULT: 160

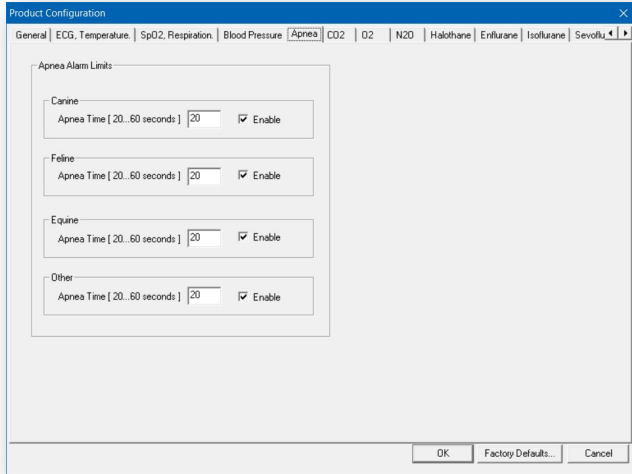
Measurement Complete Tone



This tone is intended to sound at the completion of each blood pressure measurement. It is currently not functional.

FACTORY DEFAULT: CHECKED

5.1.5 Apnea Tab

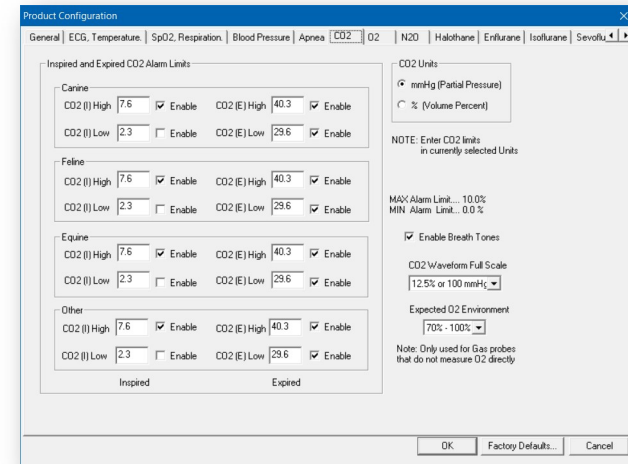


VG

The “High” and “Low” apnea limits show are the default values at which the alarm will be triggered for when breathing stops for the time in seconds on each species type. The range for this time is 20 to 60 seconds. Each limit can be enabled or disabled individually. The below table shows the FACTORY DEFAULTS for these values:

Species	Apnea Time	Enabled
Canine	20 sec	Yes
Feline	20 sec	Yes
Equine	20 sec	Yes
Other	20 sec	Yes

5.1.6 CO2 Tab



CO2 Alarm Limits

VG

The “High” and “Low” limits show the default values at which the alarm will be triggered for CO2 inspired (FiCO2) and expired (ETCO2) values on each species type. Each limit can be enabled or disabled individually. The below table shows the FACTORY DEFAULTS for these values:

Species	Insp. High	Insp. Low	Exp. High	Exp. Low
Canine	7.6	2.3	40.3	28.9
Feline	7.6	2.3	40.3	28.9
Equine	7.6	2.3	40.3	28.9
Other	7.6	2.3	40.3	28.9

CO2 Units

VG

The units shown in the alarm limit boxes are determined by which option is selected either – mmHg (Partial Pressure) or % (Volume Percent). If you

enter numbers in one unit and then select the other then they will be automatically converted for you.

FACTORY DEFAULT: mmHg

Enable Breath Tones



If checked, this option will sound a particular tone each time a patient's breath is detected by the CO2 sensor. This tone will be different according to which sound profile is selected from the General tab.

FACTORY DEFAULT: CHECKED

CO2 Waveform Full Scale



The Full Scale setting will determine the highest values that can be displayed on the CO2 waveform graph (capnograph). For expected expired CO2 values above 40 mmHg (5%) the 100 mmHg (12%) setting should be chosen.

FACTORY DEFAULT: 12.5% or 100 mmHg

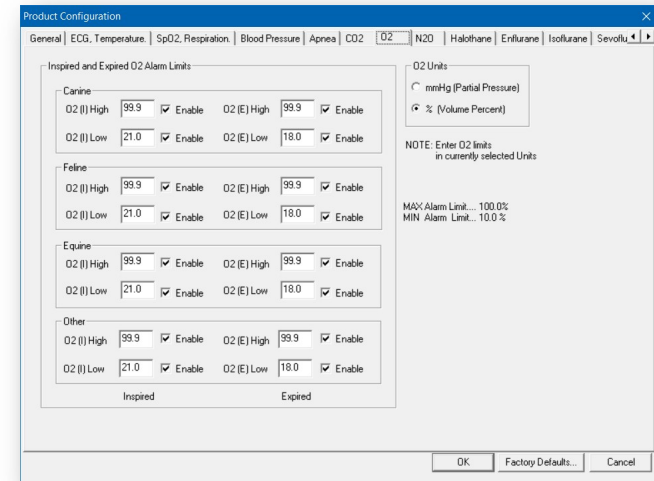
Expected O2 Environment



This setting should only be needed with gas probes that do not measure O2 directly. This will set the expected O2 for the environment so that the gas probe can calculate its measured gas concentrations appropriately.

FACTORY DEFAULT: 70% - 100%

5.1.7 O2 Tab



O2 Units



The units shown in the alarm limit boxes are determined by which option is selected either – mmHg (Partial Pressure) or % (Volume Percent). If you enter numbers in one unit and then select the other then they will be automatically converted for you.

FACTORY DEFAULT: % Volume

O2 Alarm Limits



The “High” and “Low” limits show the default values at which the alarm will be triggered for O2 inspired and expired values on each species type. Each limit can be enabled or disabled individually. The below table shows the FACTORY DEFAULTS for these values (all units are in volume percent, %):

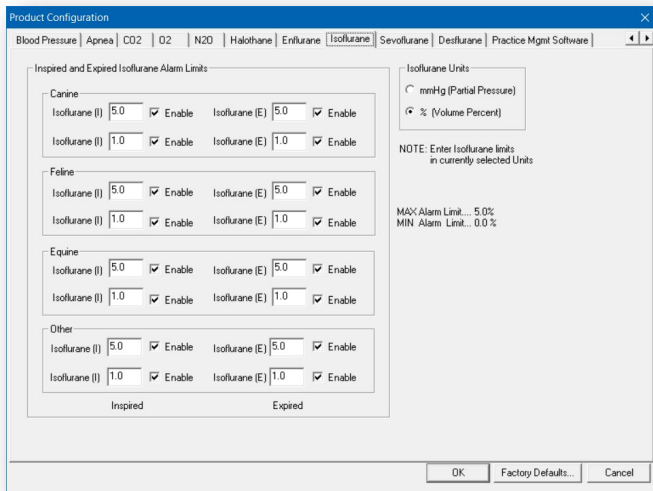
Species	Insp. High	Insp. Low	Exp. High	Exp. Low
Canine	99.9	21.0	99.9	18.0
Feline	99.9	21.0	99.9	18.0
Equine	99.9	21.0	99.9	18.0
Other	99.9	21.0	99.9	18.0

5.1.8 Agent Tabs

This menu allows you to set default inspired (I) and expired (E) alarm limits for the anesthetic agents with which your PC-VetGard+ is equipped. Select the tab that applies to your agent sensor. These values apply to the following gas types: N2O, Halothane, Enflurane, Isoflurane (pictured below), Sevoflurane and Desflurane.

NOTE:

Agent units display in mmHG or percent volume (%). Be sure to check “Enable Display” where it applies.



Agent Units



The units shown in the alarm limit boxes are determined by which option is selected either – mmHg (Partial Pressure) or % (Volume Percent). If you enter numbers in one unit and then select the other then they will be automatically converted for you.

FACTORY DEFAULT: % (Volume Percent)

Agent Alarm Limits



The “High” and “Low” limits show the default values at which the alarm will be triggered for each agent inspired and expired values on each species type. Each limit can be enabled or disabled individually. The below table shows the FACTORY DEFAULTS for these values (units are in volume percent, %):

Agent*	Insp. High	Insp. Low	Exp. High	Exp. Low
N2O	99.9	1.0	99.9	1.0
Halothane	5.0	1.0	5.0	1.0
Enflurane	5.0	1.0	5.0	1.0
Isoflurane	5.0	1.0	5.0	1.0
Sevoflurane	8.0	1.0	8.0	1.0
Desflurane	18.0	1.0	18.0	1.0

* These default values are set the same for all listed species types. Please use professional judgment to determine if these values correspond with current veterinary practice standards for each species type.

5.1.9 Practice Mgmt Software Tab



Select the “Practice Mgmt Software” tab to set PC-Display to interact with certain practice management software.

NOTE:

Currently, PC-Display only interacts with AVImark practice management software. Additional integrations may be added in the future.



Put a checkmark in the box next to “Auto Populate New Patient Information from AVImark” in order to enable the automatic population of the PC-Display patient information fields each time a new patient is selected within PC-Display. FACTORY DEFAULT: UNCHECKED

NOTE:

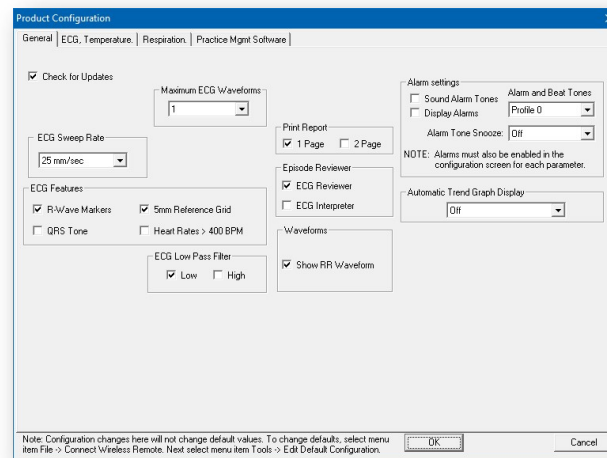
AVImark software must be open and logged in and its COM Object feature enabled for this function to work. Contact Vmed Support for setup assistance.

5.2 Current Configuration

When PC-Display opens it will load all the necessary settings from the defaults given in the Default Configuration. However, once a monitoring session as begun by connecting to a wireless remote you may change many of these settings for the duration of your monitoring session using the Current Configuration.

Once connected to your wireless remote there are 3 ways to open the Current Configuration window.

1. Click the “Current Config” button on the toolbar (see section 4.4)
2. Click the “Tools” menu followed by “Edit Current Configuration...”
3. Type the “Ctrl-E” shortcut on your keyboard



The above image shows an example of the Current Configuration window. In this case a PC-VetChek is connected to PC-Display. Note that only a few of the items that were shown on the General tab of the Default Configuration (see section 5.1) are shown here. Note also that a smaller number of tabs are even shown here as well. This illustrates the point that the Current Configuration will only show the settings that can be modified for the currently connected wireless monitor and selected species type. Therefore, since a PC-VetChek only provides the modalities of ECG, respiration and temperature only those tabs are available for modification.

Additionally, any modifications to the Current Configuration settings do not persist after PC-Display is closed. These changes are meant to be temporary. But if you do wish them to be made permanent then follow these steps.

1. Click the “File” menu and select “Connect Wireless Remote...” (at this point, there should be a check mark by this) and this will toggle off your wireless connection.
2. Click the “Tools” menu and select “Edit Default Configuration...”
3. Click OK to the Default Configuration and close PC-Display

Performing these steps allows you to transfer the temporary settings from the Current Configuration to make them permanent in the Default Configuration.

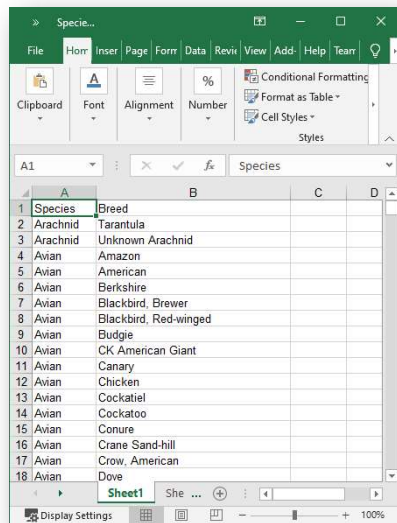
5.3 Custom Species & Breeds

Species and Breeds available in the dropdown menu of the Patient Information window are user customizable using the following procedure (the use of Microsoft Excel is recommended for best results):

NOTE:

The following exercise should be performed from the computer's administrative user account.

1. Verify that your computer has Microsoft Excel installed.
2. Click on the Windows 'File Explorer' icon and navigate to the installation directory for PC-Display. For most users this will be 'C:\Program Files (x86)\Vmed Technology\PC-Display'.
3. Select the file 'Species&Breeds.xls' and then right click the mouse and select "Copy", then right click again in the white space of the window and select "Paste"
4. A file called 'Copy of Species&Breeds.xls' will be created. Right click on this new file and choose 'Rename' then rename the file to 'CustomSpecies&Breeds.xls'.
5. Double-click on "CustomSpecies&Breeds.xls". Excel should open it as shown below:



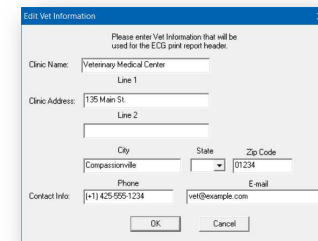
6. The spreadsheet can be edited to add species and breeds as desired. The following restrictions apply:
 - Entry A1 must remain "Species" and B1 "Breed".
 - The total number of characters per spreadsheet line (Species and Breed) must be less than 60
 - There can be no more than 25 different kinds of species
 - There can be no more than 500 breeds per species.
 - There can be no more than 2000 total entries in the spreadsheet.
 - Do not enter data in any columns except A and B
7. Save the edited spreadsheet.
8. Use Excel's "Save As" feature to save the spreadsheet as *tab delimited text*. The saved filename should be "CustomSpecies&Breeds.txt" and it should be stored in the same PC-Display installation directory. This file is read by PC-Display to generate the species and breeds dropdown menus in the patient information dialog.

5.4 Hospital Information

The Hospital or Vet Information stores a business name, address, phone and email address for this business that will be used on the print reports. By default, these are left blank, but if you wish to add yours then follow the below steps. Some fields may be left blank if they do not pertain to your location. For instance, in Canada, "State" would refer to your territory and in other nations it may not be needed at all.

These steps refer to use in the US and & Canada.

1. Click the "Tools" menu on the upper tool bar of the PC-Display and then "Edit Vet Information" and the following window will appear:



Please enter Vet Information that will be used for the CCS print report header:

Clinic Name:

Line 1

Clinic Address:

Line 2

City: State: Zip Code:

Phone: E-mail:

2. Type in your vet/clinic information as above.

NOTE:

Your entries will be remembered each time the program is started and contains text that will be included on all printed reports.

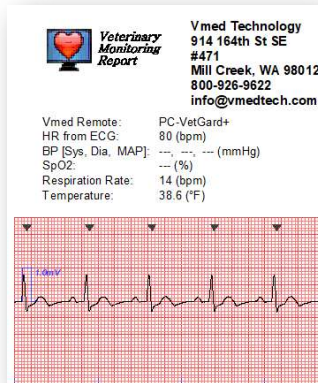
3. Press OK.

NOTE:

Refer to the instructions in section 5.5 if you wish to add your clinic logo to the report heading.

5.5 Hospital Logo in Printed Reports

The default logo provided in the ECG report printout is shown below.

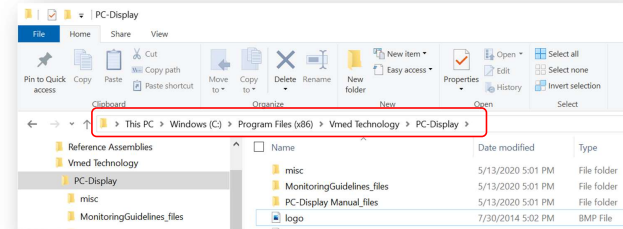


To customize a logo specific to your clinic, perform the following.

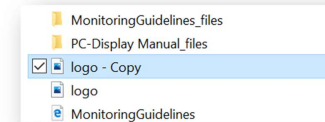
NOTE:

Make sure that you perform this from the computer's administrative user account.

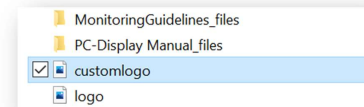
1. Click on the Windows File Explorer icon and navigate to the installation directory for PC-Display. For most users this will be, 'C:\Program Files (x86)\Vmed Technology\PC-Display'. A screen similar to the one below will appear:



2. Select the file 'logo' image file and then right click the mouse and select "Copy", then right click again and select "Paste".



3. A file called 'logo - Copy' will be created. Right click on this new file and choose 'Rename' then rename the file to 'customlogo'.



4. The image in this file will now appear on the printouts from PC-Display. Edit the file to create your own custom logo. The following constraints must be observed.

- The file must be named 'customlogo.bmp'
- Any size image can be used, but it will be stretched or compressed to 1024 by 512 pixels in the printout, so it's best to use those dimensions.
- The image must be in '.bmp' format, 24-bit color. Any photo editor can be used to create a custom logo. Most computers will at least have Windows

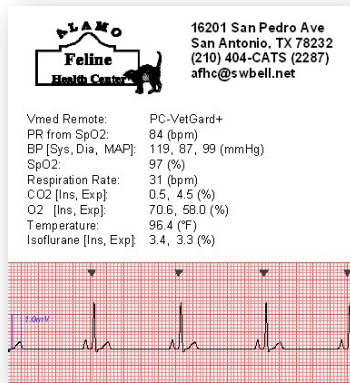
Paint. If you have a logo as part of the header in a Word document it can be cut and then pasted into Windows Paint, resized and then saved.

- Vmed software upgrades will overwrite the original 'logo.bmp' file but will leave the 'customlogo.bmp' file untouched. Software upgrades should not affect the new logo.

NOTE:

The 'Print Preview' function in PC-Display can be used to see how the new logo will look on the printout. An example is shown below.

Sample print report with customized clinic logo:



6 Support and Troubleshooting

6.1 Service and Support

If you purchased directly from Vmed:

Phone: 800-926-9622

Email: info@vmedtech.com

WEB: <https://www.vmedtechnology.com/sales-support/>

6.2 Software Updates

PC-Display can prompt users to check online for software updates if that feature is enabled in the Default Configuration. Access to the Vmed software download site is also available through the help menu. Users may also update all software programs by accessing vmedtechnology.com and navigating to the "Downloads/Support" tab at the top. There is no charge for software updates unless an install CD is required where there is a \$15 charge.

6.3 Troubleshooting PC-Display

Consider the following situations for troubleshooting PC-Display. If you have any further questions then contact Vmed Support.

Situation: *PC-Display does not connect to wireless remote monitor*

Possible Causes:

- Weak batteries in wireless remote
- Improper Bluetooth pairing
- Bluetooth USB adapter not inserted into computer's USB port
- Windows Update may have re-enabled your Internal Bluetooth

Corrective Action:

- Check battery status on remote.
- Re-initiate pairing procedure
- Verify that USB Bluetooth adapter is plugged into computer (if no internal Bluetooth is present)

- If both internal and external Bluetooth adapters are present, disable one and restart the computer (and possibly re-pair remotes)

Situation: *Bluetooth connection has range less than 50ft*

Possible Causes:

- Low Batteries
- Signal must pass through high attenuation barrier such as concrete floor/walls or heavy metal objects
- Using built-in Bluetooth adapter with only 10 m range

Corrective Action:

- Check battery status on remote
- Clear the signal path of obstructions
- Disable computer's built-in Bluetooth and use the Bluetooth device provided with wireless product
- Update PC-Display software

Situation: *PC-Display loses wireless connection with remote*

Possible Causes:

- Wireless device out of range of computer or behind signal attenuator
- Wireless device lost power
- Bluetooth device loose in USB port
- Computer turned off or PC-Display closed

Corrective Action:

- Move toward computer or clear attenuating obstacle
- Cycle wireless device power switch
- Recharge/Replace Batteries
- Check Bluetooth device/USB connection
- Restart PC-Display program
- Update PC-Display software

Situation: *Cannot turn wireless remote device back on*

Possible Causes:

- Batteries are totally discharged
- User is pressing and holding power button

Corrective Action:

- Replace/recharge batteries
- Press and immediately release the power button to turn on

Appendix A Computer Requirements

The following minimum computer requirements refer to a modern Windows 10 computer. While PC-Display may still work fine with earlier Windows operating systems and computers, only Windows 10 with the below minimum requirements is officially supported at this time.

NOTE:

Windows 10 "S Mode" will not allow PC-Display to be installed. The S Mode will have to be disabled first (disabling S Mode cannot be undone).

Computer *Minimum* Requirements

CPU	2.5 GHz (PC desktop, laptop or tablet computer)
MEMORY	4 GB RAM
VIDEO RESOLUTION	1024 x 768
CONNECTIONS	Spare USB port (for external Bluetooth ¹ or installing software ²)
STORAGE	32 GB HD or SSD

¹ Some computers may come with internal Bluetooth which may be compatible with the Vmed wireless monitors, but in the cases where they are not compatible a USB Bluetooth adapter will need to be used.

² If a monitoring computer has no Internet Access then the USB port will need to be used for transporting the latest PC-Display software installer. Internet Access, however, is recommended for technical support purposes.

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