



DATREND
Systems Inc.

vPad-mTTM

**medTester Emulator App
for vPad Safety Analyzers**

Operating Manual

vPad-mT™
medTester Emulator App
for vPad Safety Analyzers
Operating Manual

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vPad-mT OPERATORS MANUAL

1 Overview

vPad-mT™ is a software application (App) which may be installed on the vPad tablet, for use with vPad-ES™ or vPad-353™ electrical safety analyzers, and which may be used to automate preventative maintenance (PM) inspections, performance testing and other types of service performed on medical equipment. vPad-mT is one component of a suite of Apps that enables a bidirectional interface between the vPad platform and a Computerized Maintenance Management Software (CMMS) system.

1.1 CMMS and Checklists

A CMMS program is a software application which is used for managing equipment inventory, service activities and technical personnel. EQ2 HEMS, Four Rivers® TMS, MediMizer, AIMS® and St. Croix Systems are examples of enterprise-level CMMS which are specifically designed for use in management of medical and other equipment in a clinical setting.

CMMS systems enable automation of equipment inspection and maintenance tasks through computer-generated **Checklists**. A Checklist may include inspection check points and tests which are specific to a type of device, and which are performed in a specific order according to device or manufacturer requirements.

Some CMMS systems can export their Checklist procedures to a legacy biomedical testing device which is known as the "**medTester**". The vPad-mT App enables medTester Checklists and equipment information provided by the CMMS to be used with the vPad system, enabling vPad safety analyzers to emulate behaviour and testing features of the medTester in executing a maintenance Checklist.

1.2 vPad Automation Suite

vPad-mT is one component of a suite of Apps for CMMS-driven equipment maintenance and inspection. The Apps work together to provide a "closed loop" automation solution which starts with CMMS preventive maintenance schedules and/or work orders, proceeds through testing and inspection performed with the vPad platform, and ends with the return of vPad test results to the CMMS; which then enables work orders to be closed. The vPad automation solution is "plug-and-play", requiring little if any changes to a CMMS currently working with a legacy medTester or possibly with other vintage test

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equipment.

Apps comprising the vPad automation suite are:



CMX™ is a software application for Microsoft® Windows® which is used as a bridge between some CMMS programs and Datrend products such as vPad-ES and vPad-353. CMX verifies medTester export files and equipment information generated by the CMMS, so that the CMMS files contain no data errors that could cause problems when used on the vPad platform. CMX is also used to transfer medTester export files, or "**MTEXPORT**" files, and equipment information to the Android tablet via USB flash drive, Bluetooth or DropBox.

More information on CMX may be found in ***MN-083 6100-048 CMX Operator's Manual***. Note this and other operator manuals for the vPad automation suite are provided on the Android tablet, and may be viewed with the **Datrend Docs App**



which is on the Home screen.

Note that CMX is not required for use with vPad-AIMS, or other web based CMMS programs that communicate via API calls.

vPad-mT



The purpose of vPad-mT is to enable the user to browse or search medTester Checklists and equipment ID's which have been provided to the Android tablet through the CMX software, normally as part of a scheduled PM program. When an ID or a Checklist is selected, vPad-mT converts the Checklist from medTester to vPad format and then passes the Checklist to the vPad-Check App for execution. From a user's point of view, the automatic transition from vPad-mT to vPad-Check is seamless so that the two Apps appear to work as a single program.

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vPad-Check



With vPad-Check™, the user will perform the medTester Checklist which has been prepared by vPad-mT.

As is done with a medTester, the user will step through the maintenance procedure on the vPad one step at a time, pausing to read instructions, inspect items, and enter data as required by the procedure. Electrical safety tests and device-specific performance tests may also be executed during the procedure. At the end of the Checklist, a Test Record is saved and an inspection label may be optionally printed, which is then applied to the equipment under service. Execution then returns automatically to the main menu of vPad-mT, enabling the user to select another equipment ID or Checklist.

More information on this App may be found in ***MN-084 6100-049 vPad-Check Operator's Manual*** on the tablet.

Note that vPad-Check is not in control of the contents of the Checklist when running from vPad-mT. The Checklists are provided by the CMMS vendor, and the Autosequences are a component of vPad-mT.

vPad-AS



One or more steps of a medTester Checklist may require electrical safety testing, and if so, such testing is handled by the vPad-AS™ App which is called automatically when needed by vPad-Check.

For compatibility with CMMS and medTesters currently in use, vPad-AS has pre-defined AutoSequence setups that match the factory-default safety tests "A1" through "A17" of the legacy medTester. If necessary, the settings of a vPad safety test can be temporarily modified at Checklist runtime. Alternatively, any required changes to the factory default tests "A1" to "A17" can be made with the test editor of the vPad-AS App and then saved by that App for later use. More information on this App may be found in ***MN-079 6100-045 vPad-AS Operator's Manual*** on the tablet.

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vPad-NFPA



Similar to vPad-AS, the vPad-NFPA™ App provides electrical safety testing automation, following the NFPA99-2012 requirements instead of the AAMI or IEC60601 Standards.

For compatibility with CMMS and medTesters currently in use, vPad-NFPA has pre-defined AutoSequence setups that match the factory-default safety tests "A1" through "A17" of the legacy medTester. If necessary, the settings of a vPad safety test can be temporarily modified at Checklist runtime. Alternatively, any required changes to the factory default tests "A1" to "A17" can be made with the test editor of the vPad-NFPA App and then saved by that App for later use. More information on this App may be found in ***MN-100a 6100-084 vPad-NFPA Operators Manual*** on the tablet.

vPad-XPORT



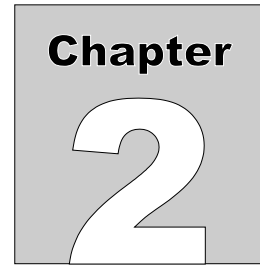
vPad-XPORT™ converts vPad Test Record files to medTester Upload Format (MUP or XML), an encoded format which is compatible with CMMS that currently interface with the medTester. vPad-XPORT can be used to transfer the converted files from the tablet to the CMMS computer, either by USB flash drive, Bluetooth transfer, or via DropBox. MUP or XML files transferred from vPad may be imported by the CMMS and, depending on CMMS capabilities, work orders and inventory status may be updated accordingly.

More information on this App may be found in ***MN-086 6100-053 vPad-XPORT Operator's Manual*** on the tablet.

vPad-AIMS



vPad-AIMS™ communicates directly with the AIMS CMMS to get the necessary files to create the PM schedules and to update workorders and equipment information. Communication is accomplished via an Internet connection to the AIMS database.



2 Installation

The vPad-mT App is normally pre-installed on the vPad tablet, but the icon for the App may not have been placed on the Home screen  .

Go to the Apps screen by pressing the Apps icon  in the upper right corner of the Home screen. Find the vPad-Check icon and press and hold the icon for a few seconds. You will then be able drag and drop the icon onto the Home screen.

In order to use the App it will need to be activated. When the App is started for the first time, the activation screen will be presented. Enter the activation code provided by your dealer to allow the App to run.

In the event that vPad-mT is not on the tablet, contact your dealer and an installation package for the app will be provided via download.

In order to use vPad-mT, vPad-Check and vPad-AS/NFPA Apps must also be installed and activated.

3 Operation

This chapter covers operation of the vPad-mT App and Checklist execution.

3.1 Startup

Press the vPad-mT icon  to start the App. A splash screen will display the product name and the software version.



Figure 1 - vPad-mT startup screen.

As the splash screen is displayed, the App will "connect" to the Analyzer Base Unit of the vPad-ESTM or vPad-353TM and cause it to perform a number of internal self-tests. The AC supply which powers the Analyzer Base Unit is also tested. Normally, all tests will complete successfully and the Checklist selection screen will then be displayed.

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Faults in the Base Unit or the AC supply may be detected during the self-test, in which case an alarm message is displayed below the software version number. In the event of a Base Unit fault, the app will automatically exit to the Home screen. In the event of an AC supply fault, in addition to the alarm message the app will display an Alert Dialog, which you must then acknowledge by pressing "OK" (see **Figure 2**). Refer to TABLE 3.1-1 for recommended actions in the event of a startup alarm message.

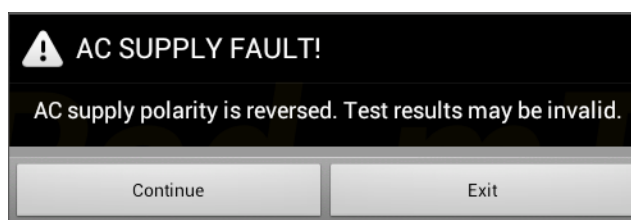


Figure 2 - Alert Dialog: AC supply fault.

TABLE 3.1-1: Startup Alarms and Corrective Actions

Alarm Message	Cause	Actions
ERROR: cannot communicate with Base Unit	App is unable to send messages to one or more instrument systems inside the Base Unit	• Check Base Unit has power • Check Base-to-tablet USB connection • If AC power and USB cables are OK, press and hold RESET button on left side of Base Unit, then try restarting the app • If error persists, contact Datrend Customer Service (see Chapter 4 for contact information)
AC SUPPLY FAULT (polarity reversed)	AC outlet incorrectly wired	• Do not use vPad with incorrect or unsafe AC supply • Connect Base Unit to a different outlet
AC SUPPLY FAULT (ground disconnected)	AC outlet incorrectly wired	• Do not use vPad with incorrect or unsafe AC supply • Connect Base Unit to a different outlet
AC SUPPLY FAULT (ground disconnected)	Isolated power system	• Do not perform leakage testing as results will be invalid • Optionally, vPad may be used to perform tests other than leakage (e.g., voltage, resistance or ECG simulator tests) • If possible, change to grounded power outlet
RMS zero calibration failure	Unable to zero voltmeter	• Press RESET button on left side of Base Unit for 3 seconds, then try restarting app • If problem persists, contact Datrend Customer Service (see Chapter 4 for contact information)

3.2 Main Menu

Following a successful start-up, vPad-mT will display the main menu of the App:



Figure 3 - Main menu of vPad-mT, showing Checklist procedures.

Some Checklists and ID Numbers are supplied as examples with the App and will appear in the scrollable list (ListView) on the left side of the screen, as shown above. Example Checklists include PM procedures for typical medical devices as well as some selected models of specific devices. The listing may be sorted in ascending or descending order by selecting the corresponding radio button at upper right on the screen.

A list of *equipment* may be viewed after selecting the "**List: ID Numbers**" radio button. This menu (*Figure 4*) lists equipment by ID or control number, along with the Checklist procedures corresponding to each ID. This list may be sorted by ID number in ascending or descending order.



Figure 4 - Main menu of vPad-mT, showing equipment ID's.

Example Checklists and ID Numbers respectively shown in *Figure 3* and *Figure 4* come from three example medTester export files (**MTEXPORT.ITM**, **MTEXPORT.LST** and **MTEXPORT.IDN**) which are installed with the App. These "demo" files enable vPad-mT to function and allow you to gain some experience in working with the App. Before using the App to perform actual PM inspections and other maintenance activities at your institution, the demo files will need to be replaced with **MTEXPORT** files from your Computerized Maintenance Management System (CMMS). For further instructions on importing **MTEXPORT** files from your CMMS, refer to Section 3.2.2, 3.2.3 following. Note the date which is shown above the "Update CMMS Files" button corresponds to the system date of **MTEXPORT.IDN** and is intended to represent the currency of data which has been provided by your CMMS.

To start a Checklist procedure, select the "List: Checklists" radio button, press and drag the list view until the desired Checklist is found, then tap on the Checklist. Alternatively, you may start a test by entering all or part of a Checklist name in the "Checklist Search" box and pressing "Search". The search is not case sensitive, and will find the closest match to what has been entered. For instance, entering 'be' would take you to 'Bed/Electric' in the sample list. The contents of the search window can be cleared by touching the "Clear" button.

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To start a test for a particular piece of equipment, select the **"List: ID Numbers"** radio button, then select the equipment from the list or alternatively enter all or part of an equipment ID Number into the "ID Number" search box and press **"Search"**. The search is not case sensitive, and will find the closest match to what has been entered.

If there is an exact match and there is only one occurrence of the ID Number in the list, the user will be taken directly to the Equipment Information screen (*Figure 15*). However, it is possible to have more than one occurrence of an ID Number, representing multiple, different checklists (eg. Annual PM, Biannual PM, Scheduled Battery Replacement). If more than one possibility exists, the ListView screen is shown, with the ID Number highlighted in green. The desired checklist can then be selected by tapping the correct entry.

To return to the Android Home screen, press the  icon on the navigation bar. Note this will only pause the App temporarily and will not actually terminate or close vPad-mT. To fully close the App, press the **"Exit vPad-Check"** button or alternatively the Android "BACK" navigation button



when viewing the main menu.

3.2.1 Search for Checklist or ID

To search for a particular Checklist, tap the "Checklist Search" box of the menu shown in *Figure 3*, enter the first few characters of the Checklist, then press the **"Search"** button. This will move the list to the nearest matching item, which will then appear highlighted in green. If the full name of a Checklist is entered, and an exact match to the entered name is found, then the Checklist will begin execution automatically.

Search for equipment in a similar way, by entering an ID or control number into the "ID Search" box of *Figure 4*. An exact match to the entered ID will cause the Checklist associated with the equipment to be started automatically. If no exact match is found, the list is repositioned to the nearest matching ID.

3.2.2 vPad-mT Settings

vPad-mT provides a number of settings that can be used to enhance the automation of certain processes. The **Settings** icon is in the upper right of the screen and can be either the **Edit Settings** icon, , or the **Run Settings** icon, . In the event **Run Directly** is checked (see below), the **Run Settings** icon will be displayed, otherwise, the **Edit Settings** icon will be displayed. Settings may actually be edited in both modes.

It is possible to use vPad-mT with NFPA or AAMI/IEC Autosequences by selecting the appropriate **Safety Test** radio button.

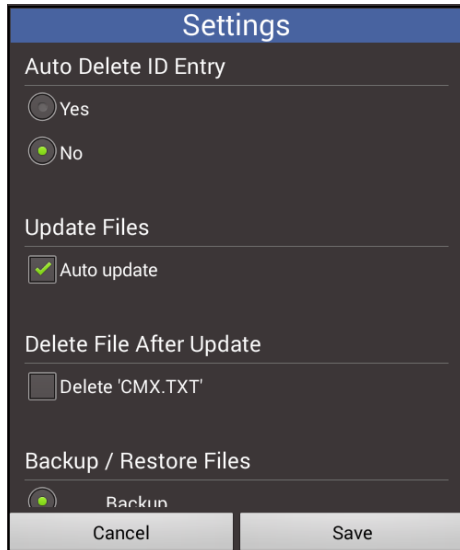


Figure 7. Settings_1

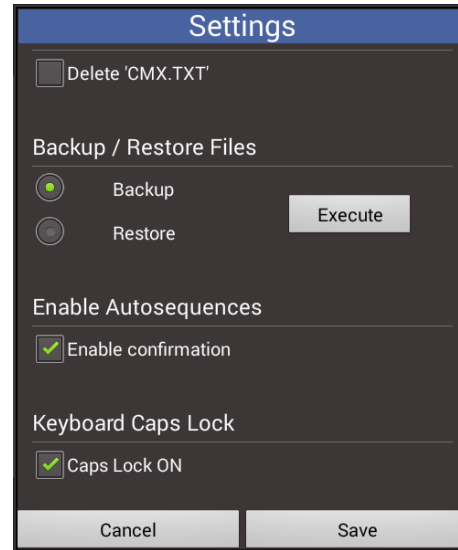


Figure 8. Settings_2

Run Directly will skip over the display of the **Equipment Info** screen and go directly to the Checklist. The equipment database will be searched for the ID number, unless the **Skip Search** box is checked.

If the **Auto Update** box is checked, vPad-mT will search for a CMX.TXT file in the USB drive or in the Bluetooth folder. If Dropbox has been installed on the tablet, a **Dropbox** icon  will appear next to the settings icon. Touching the **Dropbox** icon will allow the user to download the CMX.TXT file from the **Dropbox\Datrend Import** folder and place it in the Bluetooth folder. If the CMX.TXT file is found in on the USB or in the Bluetooth folder on the tablet and if **Auto Update** is checked, vPad-mT will immediately update the files for the PM schedules.

If the **Delete CMX.TXT** box is checked, CMX.TXT will be deleted following the update of the PM Schedule and/or equipment database.

vPad-mT's file-update feature is intended to facilitate the import of these files:

MTEXTPORT.ITM
MTEXTPORT.LST
MTEXTPORT.IDN
EQUIPMENT.CSV

from the CMMS to vPad-mT.

At the PC, the **MTEXTPORT** and **EQUIPMENT.CSV** files are obtained from the Computerized Maintenance Management System (CMMS) using the Datrend CMX software. After checking the CMMS

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files for errors, the CMX software can copy the files to a USB flash drive, or alternatively, the CMX software can transmit the files to the Android tablet via Bluetooth. For further instructions, refer to ***MN-083 6100-048 CMX Operator's Manual*** provided on the Android tablet. Note this and other Datrend

manuals may be viewed with the **Datrend Docs App**



which is on the Home screen.

Once the CMX software has copied the CMMS files to a USB flash drive, disconnect the flash drive from the PC then reconnect the drive to the USB "HOST" port of the tablet. Depending on the tablet model, an adaptor cable provided with the tablet may be required for the flash drive connection (***Figure 10***).

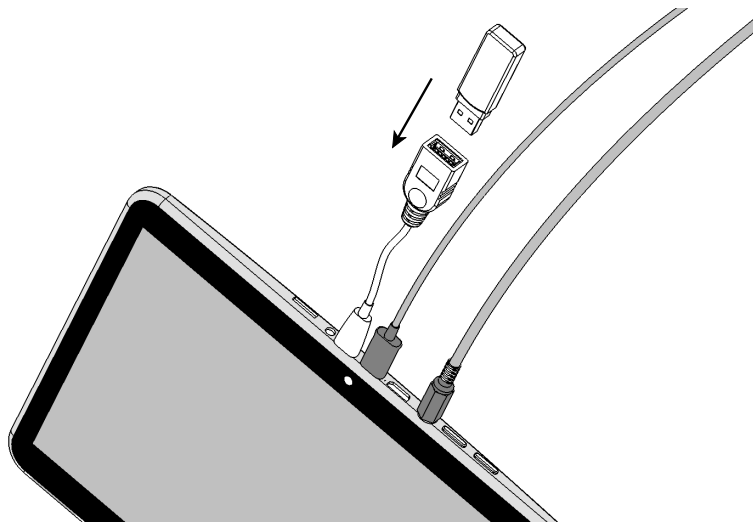


Figure 10 - Connection of USB flash drive to tablet.

Once the CMX software has sent the files by Bluetooth, simply start vPad-mT. vPad-mT will search the Bluetooth transfer directory of the tablet during startup if the **Auto Update** flag is checked, and if one or more of the required files are found, vPad-mT will then import them. Alternately, the update file may be on a USB drive. Do not connect a USB flash drive to the tablet while updating CMMS files via Bluetooth as the App will default to searching the USB drive for the files first.

Note: Files can also be transferred to the tablet's Bluetooth folder using DropBox. Select DropBox as the destination in the CMX vPad Interface tab on the PC. The resulting CMX.TXT file will be placed in the DropBox which has been installed (by the user), in the Datrend Import folder (setup by the user). To download the file to the tablet, select the DropBox icon  next to the Settings icon (upper right).

Follow the instructions on the screen to copy the CMX.TXT file to the tablet's Bluetooth folder. This file will be installed when DropBox is exited. If the original CMX.TXT file is not deleted when prompted, it will be necessary to delete the file from the DropBox\Datrend Import folder and the tablet Bluetooth

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folder before using CMX to create and send the CMX file again. Failure to do so will result in the new CMX file being renamed to CMX(x).TXT (where x can be any number sequentially from 1 up). If the 'first' CMX file is not removed, it will be the file that is automatically loaded each time.

Once the CMMS files are successfully imported, the "MTEXPORT" date shown above the "**Launch vPad-XPORT**" button will be modified accordingly. Note this is the system date of **MTEXPORT.IDN** and is intended to represent the currency of the data which has been provided by the CMMS.

It is also possible to Backup the existing PM Schedule and/or equipment database before it is replaced with a new CMX.TXT file. This provides peace of mind, in case there is a problem with an update. The backed up data can be Restored to the last saved, working version of the files. Simply select **Backup** or **Restore** and run the process by touching the Execute button.

The **Enable Autosequences\Enable Confirmation** setting is particular for MediMizer CMMS. If this option is checked, running one of the 'ADDxxxx' pseudo Control #'s will allow addition of a safety test to the main Checklist (ADDxxxx) and one or more additional Checklists. Contact Datrend for further details.

Auto Delete ID Entry will determine if files, which have been converted and sent to a PC by vPad-XPORT, will be automatically **Deleted**, or marked as **Done**. See **Launch vPad-XPORT** below.

3.2.3 Launch vPad-XPORT

When Checklists are completed, one or more test report will have been created, which need to be sent to the PC for the CMMS program to process. To convert the native text files into CMMS compatible MUP or XML files, touch the "**Launch vPad-XPORT**" button. This will open the vPad-XPORT app, with any new files automatically tagged for transfer according to the current setting in vPad-XPORT (MUP, XML or CSV). **File Transfer** will automatically be opened with the last transfer settings enabled. Press **Execute** to confirm the file transfer with the existing settings.

In the event vPad-mT is launched from another App such as vPad-AIMS or vPad-HEMS, this button may change to **Launch vPad-AIMS** or **Launch vPad-HEMS** respectively (or other Apps as they develop).

Note that **File Transfer** settings are controlled from within **File Transfer**, and are not specific to the App calling it. Changes made will be reflected in **File Transfer** when used in other Apps such as **Record Manager**.

3.2.4 Label Printer Setup

Once a Test Record has been saved at the end of a test, you have the option of printing an inspection label for application to the equipment under service. This "PM label" will include the ID or control number of the equipment, pass/fail status, the test date, the date at which the next inspection or PM becomes due, and a technician ID.

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To configure vPad-mT to work with a connected label printer, press the **"Label Printer Setup"** button on the main menu (*Figure 3* or *Figure 4*). The printer setup menu will then be shown:

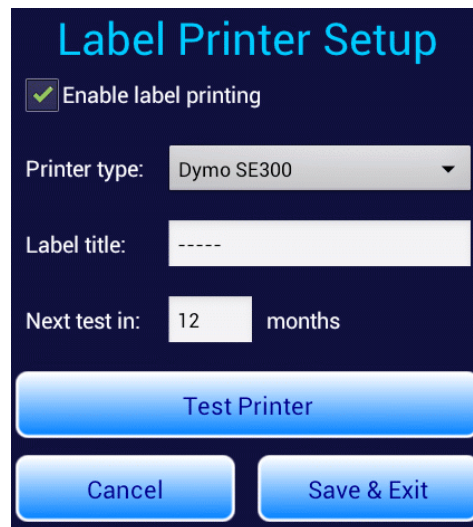


Figure 12 - Printer Setup menu.

The printer setup menu provides the following functions:

Enable label printing

If checked, the technician will be prompted to print a PM inspection label after a Test Record has been saved.

Printer type

Select from these models:

Dymo SE300, Dymo SE450, Brady TLS PC Link and others

Label title

Enter a "title" (e.g., name of institution or service agency), which will be printed in bold font at the top of the label. This feature may be disabled if the label has a preprinted title.

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Next test in

Typically, a "next test due" date for a given piece of equipment will be provided by the CMMS through the **EQUIPMENT.CSV** file.

In the event the CMMS does not provide an **EQUIPMENT.CSV** file, or if the file exists but it does not specify a "next test due" date for the equipment under service, then the "next test" printer setting will determine the due date by default. In this case, the due date will be derived from the date of the test (i.e., 'today') plus the "next test" interval in months. If the interval is not specified, a default value of 12 months will be used.

Regardless of whether the "next test due" date is determined by the CMMS or by the printer setting, if necessary the due date can be adjusted when the Test Record is saved.

Test Printer

Causes the printer to print a test label.

Save & Exit

Save settings and exit the menu.

Cancel

Exit the menu without changing the settings.

A label printer may be interfaced to the Android tablet by serial connection (RS-232) or by Bluetooth. For instructions on connecting a label printer to the Android tablet, refer to ***MN-084 6100-049 vPad-Check Operator's Manual***.

3.3 Running a Checklist

A test is started by selecting the required Checklist (*Figure 3*) or an equipment ID (*Figure 4*). In the latter case, a Checklist which has been assigned by your CMMS to the equipment will be executed.

vPad-mT begins by translating the medTester Checklist provided by your CMMS to vPad format. You are then prompted to enter information about the equipment under service. If a test is initiated by equipment ID, and if an equipment data file (**EQUIPMENT.CSV**) has been provided by your CMMS, then some or all of the equipment information may be populated automatically by vPad-mT.

After inputting or confirming the equipment information, you will then step through this Checklist procedure one step at a time, pausing to read instructions, inspect items, and enter data as required by the procedure. Electrical safety tests and device-specific performance tests may also be executed during the procedure. At the end of the Checklist, a Test Record is saved and an inspection label may be optionally printed. On completion of the Checklist, you are returned to the main menu from which you started.

This section provides a summary of Checklist execution, beginning with the menu for entry of the equipment information. For additional information on Checklists, refer to ***MN-084 6100-049 vPad-Check Operator's Manual***.

3.3.1 Equipment Information

When a PM inspection or maintenance procedure is started, the first screen shown will be for entering information about the equipment. When starting from the Checklist menu (*Figure 3*, page 9), the equipment information fields will not be populated, although a facility and a technician ID will be shown if this information has been previously input to vPad-mT or to another vPad App such as vPad-ES.

Figure 13 - Equipment Information menu.

Tap on a text field to display the Android keyboard and enter information. If an external keyboard is connected to the tablet, the Android keyboard is not displayed and data entry is then accepted from the external input device. A barcode scanner can also be used for data entry.

If the equipment ID or control number is known, enter it into the "ID Number" field and press ENTER

 on the keyboard (*Figure 14*).

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The screenshot shows the 'Equipment Information' screen in the vPad-mT application. The title bar is blue with 'vPad-mT™' in white. Below the title bar, the screen is divided into a left sidebar and a main content area. The sidebar lists various equipment types: Checklist, Defib Zoll M, Densitometer, Dental Chair, Dental Chair, Dental Disinf, Dental Drill, and Dental Lathe. The main content area has a blue header with 'Equipment Information' in white. Below the header, there's a yellow bar with 'Checklist: Defib Zoll M'. The form contains several input fields: ID Number (populated with 'CN30994'), Serial Number, Manufacturer, Facility, Work Order, Description, Model, and Location. A numeric keypad is visible at the bottom of the screen, with the '1' key highlighted. The status bar at the very bottom shows the time as 6:37 and a battery icon.

Figure 14 - Entering an equipment ID.

Entering an ID causes vPad-mT to check for an equipment data file (**EQUIPMENT.CSV**). If this data file is present, the file is searched for the ID. If the ID is found, the equipment information fields are populated from the file and the keyboard is dismissed automatically (*Figure 15*). In the event that the equipment data is found, confirm the displayed information is correct then press **"Run Test"** to begin the Checklist.

The screenshot shows the 'Equipment Information' screen after a successful search. The title bar is blue with 'vPad-mT™' in white. The sidebar is the same as in Figure 14. The main content area has a blue header with 'Equipment Information' in white. Below the header, there's a yellow bar with 'Checklist: Defib Zoll M'. The form contains several input fields, all of which are now populated with data: ID Number (CN30994), Serial Number (AF12F022934), Manufacturer (ZOLL MEDICAL CORP), Facility (Anytown General Hospital), Technician ID (MEM), Work Order, Description (DEFIBRILLATOR), Model (R SERIES), and Location (MAIN ER AREA). At the bottom of the form, there are three buttons: 'Cancel', 'Search Equipment', and 'Run Test'. The status bar at the very bottom shows the time as 6:38 and a battery icon.

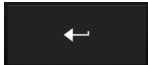
Figure 15 - Successful equipment search after ID entry.

In the event an ID is not found, an error message is displayed and the **"Search Equipment"** button will

then be enabled. You may modify the ID and press **"Search Equipment"** to try again.

Note that the **"Search Equipment"** button remains disabled until you have input an ID. The **"Search Enable"** button will remain disabled after entry of an ID if there is no equipment data file on the tablet.

When starting a procedure by Checklist, it is not mandatory for you to enter an equipment ID before pressing the **"Run Test"** button. However, you cannot save a Test Record until an ID has been input. If you complete a Checklist but have not yet entered an ID, you will be prompted to enter one so that a Record can then be created.

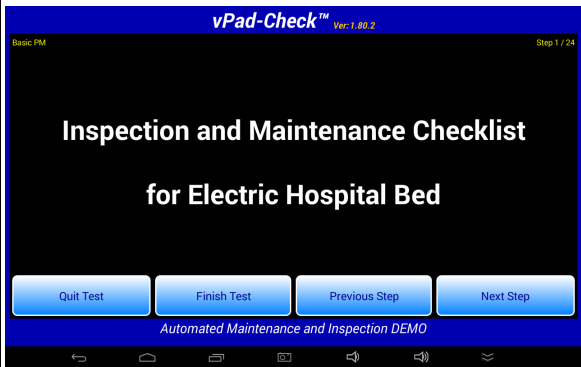
When entering equipment information manually, pressing ENTER  will advance data input to the next text field on the screen. Alternatively, use  to navigate the text fields, or simply tap a field to jump immediately there. When done entering the information, press  to dismiss the keyboard and expose the **"Run Test"**, **"Search Equipment"** and **"Cancel"** buttons at the bottom of the menu.

You may also start a PM inspection or maintenance procedure by selecting an equipment ID from the list of **Figure 4** (page 10). If the **EQUIPMENT.CSV** file is present, vPad-mT will search the file for the ID. If the ID is found and there is only one instance, the information fields on the menu of **Figure 13** will be populated automatically. If there is more than one entry of an ID, the ListView will remain, with the ID highlighted. The desired ID/Checklist combination can then be selected from the list. Confirm the displayed equipment information is correct then press **"Run Test"** to begin the Checklist. Changes made to the equipment information is recorded in the test record, but the changes will not be saved to the equipment database. In the event the ID is not found, or if the **EQUIPMENT.CSV** file is not available, then input the information manually as described above.

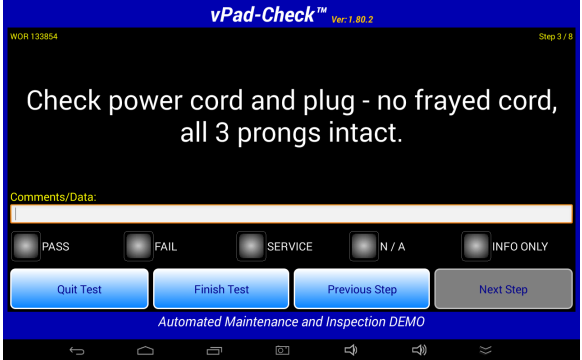
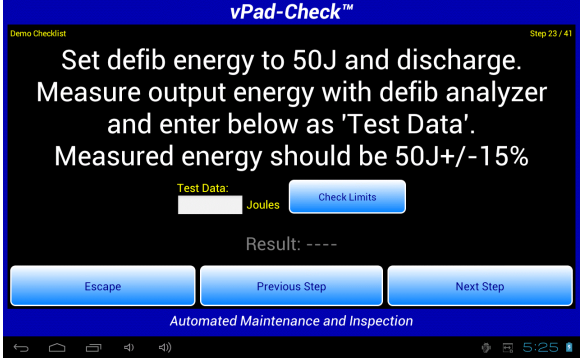
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3.3.2 Checklist Steps

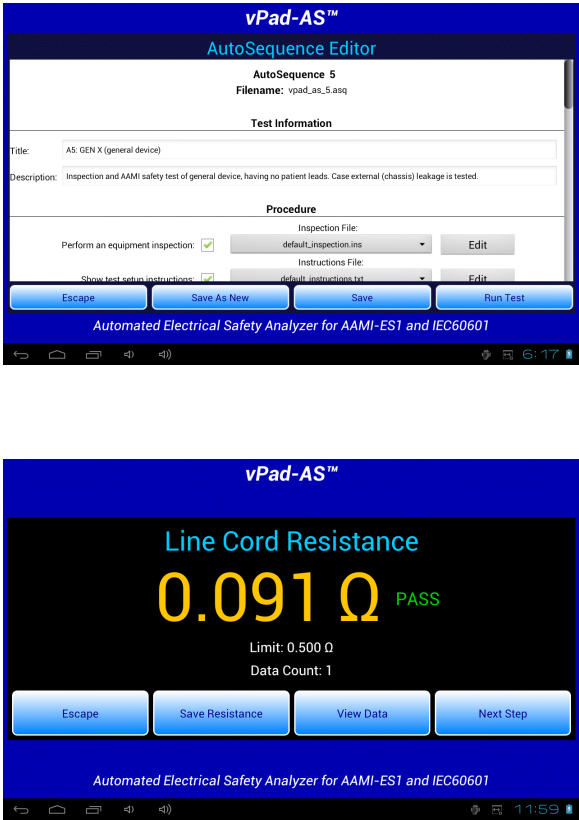
After the equipment information is input, the vPad-Check App is launched to execute the Checklist. The table below summarizes the steps that may be encountered when running a Checklist. For more details on Checklist execution, refer to Chapter 3 of *MN-084 6100-049 vPad-Check Operator's Manual*.

Checklist Step	Example Display	Operation
<i>Prompt screen</i>		Most Checklists include User Prompt screens that provide the user with instructions and/or information on what to do, or may simply be a Header for a test section. Press "Next Step" when ready to continue with the procedure. "Previous Step" may be pressed to step backward through the Checklist. This allows you to review previously-recorded results and make changes if necessary.

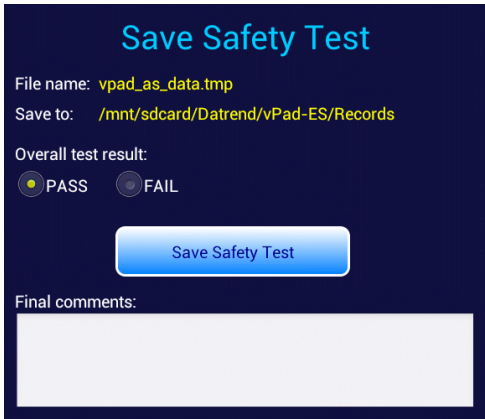
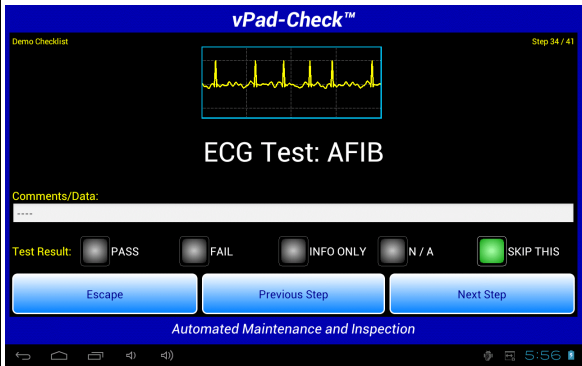
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Checklist Step	Example Display	Operation
<i>Pass-fail with User Data Input</i>		Checklists often include inspection steps that allow you to enter information. Perform the inspection as instructed. To input comments or measurement data, tap the "Comments/Data" box to display the Android keypad. If the unit passes the requirements touch the PASS button to complete the step and move directly to the Next Step. If the unit fails the requirements of the test, touch the FAIL button. Note that it will be necessary to enter the reason the device failed in the Comments/Data box before you can proceed to the Next Step. A minimum of 3 characters must be input to describe the failure. Set the test result to "INFO ONLY" if the entered data is informational and does not relate to equipment acceptability or performance. Set the test result to "N/A" if, for some reason this test step is not applicable to this particular device. You may also "Skip" this test step if, for some reason this test step is not required for this particular device. None of these options will fail the test step, however, each of them will require a reason (minimum of 3 characters) for not selecting PASS or FAIL.
<i>Limit Test</i>		If a Checklist includes an AutoSequence for a specific medical device such as a defibrillator, pacemaker or ESU, you may see one or more Limit Tests. Perform the test or measurement as instructed, then tap "Test Data" to display the Android keypad. Enter the measurement result and press "Check Limits". The entered value is tested against limits specified in the Checklist, and the result will be displayed as "PASS" or "FAIL".

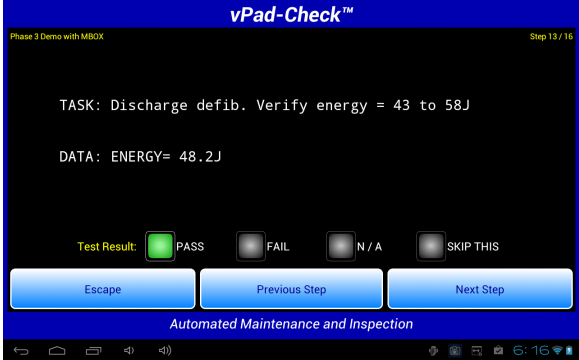
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Checklist Step	Example Display	Operation
<i>Cal Equipment</i>		A Checklist may be able to call vPad-Cal™ (optional app, must be installed on tablet), to include a list of test instrumentation used in the checklist, along with the last calibration date of the test instruments.
<i>Electrical Safety Test</i>		If a Checklist includes an electrical safety test, the test will be performed by the vPad-AS App, which is launched by vPad-Check. When the "AutoSequence Editor" menu is displayed, review the settings of the safety test and make changes if necessary, then press "Run Test". Note that the Editor will be skipped over if the Enable Edit setting has <i>not</i> been checked in the vPad-AS App. Typically, a safety test will begin by displaying some setup instructions. Following the instructions, the safety test will proceed automatically through a number of measurements. Each measurement is compared to a limit which is defined in the Safety AutoSequence setup. The sequence may stop at certain steps and you may be required to respond to prompts or alarms displayed by vPad-AS. Refer to MN-079 (6100-045) vPad-AS Operators Manual for further information on electrical safety testing.

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Checklist Step	Example Display	Operation
		After all measurements of the safety test have been completed, you are presented with a menu for copying the acquired results to the Test Record. The result of the safety test will be shown as "PASS" or "FAIL". Comments on the safety test may be input by tapping the "Final Comments" box. Press the "Save Safety Test" button to leave vPad-AS and return to the Checklist.
<i>ECG Test</i>		A Checklist may include steps that operate the vPad ECG simulator. The waveform produced by the simulator is indicated at the top of the screen. To input comments or measurement data, tap on the "Comments/Data" box to display the Android keypad. Observe the response on the patient monitor under test, then select the appropriate result (pass; fail; etc).

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Checklist Step	Example Display	Operation
<i>Remote Control</i>		A Checklist may include steps where an external device, such as a test instrument or a patient simulator, is remotely controlled by the vPad. Remote control steps will require the use of an <i>MBOX Interface</i>, a hardware "smart cable" which is used to connect external devices to the XBUS Port of the vPad. Through the MBOX Interface, a Checklist may send control commands to operate an external test instrument or simulator. Additionally, the MBOX Interface can receive measurement data or test results from an external instrument and return the data to vPad for display by the Checklist, as shown at left. For more information on using MBOX to interface vPad to external devices, refer to <i>MN-084 6100-049 vPad-Check Operator's Manual</i>.

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Checklist Step	Example Display	Operation
Save Test Record		After all inspections, tests and maintenance-related steps of the Checklist have been completed, results recorded during the procedure are displayed. Following this step, a menu for saving a Test Record is shown. If an equipment ID has not been entered at this point, you will be prompted to enter one. The "Next test due date" field shown on this menu is the date at which the equipment becomes due for its <i>next</i> inspection or service. This date may be obtained from the CMMS equipment data file (EQUIPMENT.CSV). If there is no CSV file on the tablet, or if the file does not contain a due date for the specified equipment, then a default date will be derived from settings on the printer setup menu (see Section 3.2.4, page 14). If necessary, the date can be modified by tapping the field to activate the Android keypad. Total time spent servicing the equipment may be input after tapping the "labour time" field. This entry will supplement the Checklist runtime in the Test Record. Test report title and final comments may be entered after tapping the respective field. When ready, press "Create Record" to save the Test Record on the tablet. Files are saved to: <code>mnt/sdcard/Datrend/vPad-Check/Records[†]</code> For more details on use of this menu, refer to <i>MN-084 6100-049 vPad-Check Operator's Manual</i>.

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Checklist Step	Example Display	Operation
<i>Print Inspection Label</i>		After a Test Record is saved, the "Print Label" menu is shown if label printing has been enabled on the printer setup menu (see Section 3.2.4). This menu displays information as it will be printed on the inspection label, for example, the equipment ID, test date and the next test due date. When the printer is ready to print, press the "Print Label" button. Multiple labels may be printed if necessary. When done, press "Exit" to return to the main menu of vPad-mT.

The above table provides some examples of displays that may be shown during Checklist execution, but is intended as a summary only. For complete details and instructions, refer to Chapter 3 of *MN-084 6100-049 vPad-Check Operator's Manual*.



† Note: **sdcard** refers to *internal memory* of the Android tablet.

sdcard is **NOT** a removable "SD Card" memory device, which may be optionally plugged into the external card slot of the tablet.

Any accessory SD Card which may be plugged into the tablet's card slot is referred to as **extsd** in the Android file system.

3.4 medTester Checkitem Translation

A PM or other procedure may be created within a Computerized Maintenance Management System (CMMS) by selecting medTester *checkitems* from a database and combining these items into a list of tasks known as a "Checklist". A medTester checkitem has a *type* that is specified by a single letter which will determine the medTester's function when the checkitem is encountered during execution of the Checklist. The following table lists the defined checkitem types and their corresponding medTester functions.

Checkitem Type	medTester Function
P	PASS/FAIL prompt. Place a message on the LCD display of the medTester and wait until the user presses a "PASS" or "FAIL" button on the medTester's keyboard.
I	Input request. Display a message on the medTester's LCD and wait until the user types a response (alphanumeric text) via the medTester's keyboard.
B	Both PASS/FAIL and data entry. A combination of 'P' and 'I' functions above.
M	Execute an internal hardware function, such as apply power to the medTester's test receptacle or run the medTester's ECG simulator. The particular function performed by the 'M' checkitem depends on the command string associated with the item. This checkitem may also be used to perform timed delays, or communicate with external test instruments via RS-232 serial connection.
A	Launch an internally-stored program which causes the medTester to execute an automated sequence of test measurements, for example, an electrical safety test. These automated tests are called "AutoSequences". The medTester's AutoSequence programs are uniquely identified by corresponding "Axx" reference names which range from "A1" to "A89" inclusive.

vPad Checklists are computer programs comprised of *statements* written in the vPad Programming Language (vPL). When the user selects a Checklist or Equipment ID in vPad-mT, the App reads the medTester Checklist and *translates* it into a temporary instruction file called **medTester.vpl**. This file is then passed to the vPad-Check App which executes the file as described in Section 3.3.2.

This section describes how vPad-mT translates medTester checkitems to statements in the vPad Programming Language. Once you understand how the translation works, you will be able to use your CMMS to maintain existing Checklist procedures or create new procedures that will run successfully on both the legacy medTester platform and the modern vPad platform.

This section assumes some familiarity with the vPad Programming Language or "*vPL*". For more information on vPL, refer to Chapter 4 of *MN-084 6100-049 vPad-Check Operator's Manual*.

3.4.1 "P" Checkitem Translation

The pass/fail or "P" checkitem is the most common checkitem used with a medTester. It causes medTester to place a message on its LCD display and then wait until the user presses a "PASS" or "FAIL" button on the medTester's keyboard.

The "P" checkitem translates to a vPL statement having a "check" keyword which is followed by a message in quotes. The "check" statement causes vPad to display the specified message along with "PASS", "FAIL" and other radio buttons. The "check" statement also causes a Comments/Data field to be displayed on the tablet screen. This allows the user to optionally enter additional information regarding the test.

Here are some example translations for medTester "P" checkitems:

<u>medTester Checkitem</u>	<u>vPL translation</u>
<code>P, Line Cord...inspect</code>	<code>check "Line Cord...inspect"</code>
<code>P, Strain Reliefs...inspect</code>	<code>check "Strain Reliefs...inspect"</code>
<code>P, Circuit Breaker...check operation</code>	<code>check "Circuit Breaker...check operation"</code>

3.4.2 "I" Checkitem Translation

The input or "I" checkitem causes medTester to display a message and then wait for the user to input information via the medTester's keyboard. Since it is not mandatory to enter data when an "I" checkitem is displayed, this checkitem may also be used to prompt the user or provide an instruction.

A limitation of the medTester is that it can only display single-line messages. As a work-around, some medTester users have adopted a convention where a '>' character is placed at the end of an "I" checkitem to indicate "there is more to follow". When a '>' is seen on the medTester LCD, it means the Checklist should be advanced to the next step to read the following line of the message.

The "I" checkitem translates to a vPL statement having a "check" keyword, and a message in quotes. This checkitem is treated the same as the "P" checkitem.

If the Checklist includes a series of consecutive "I" checkitems which are connected by means of '>' characters, these Checkitems will be combined into a single "check" statement.

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Here are some example translations for medTester "I" checkitems:

<u>medTester Checkitem</u>	<u>vPL translation</u>
I, Record software version	check "Record software version"
I, Record fluid level	check "Record fluid level"

Below is an example of how a series of consecutive checkitems in a medTester Checklist would be combined by vPad-mT into a single statement. Sometimes, checkitems in the middle of a series may include a '>' character at the beginning as well as at the end, although these leading '>' are not really required. If any leading '>' are found in a series of consecutive checkitems, they are deleted before the checkitems are joined to form the finished statement.

medTester Checkitems

```
I, SELECT (4) ON THE BIOMED SERVICE MENU >
I, AND CHOOSE OPTION (B). WAIT FOR THE >
I, TEST TO COMPLETE, THEN RECORD RESULT
```

vPL translation

```
check "SELECT (4) ON THE BIOMED SERVICE MENU AND CHOOSE OPTION (B). WAIT FOR THE TEST TO\"+
      " COMPLETE, THEN RECORD RESULT"
```

3.4.3 "B" Checkitem Translation

The "B" checkitem combines "P" and "I" checkitem functions of the medTester, that is, it provides **"Both"** pass/fail and information input.

As far as vPad-mT is concerned, a "B" checkitem has the same translation as an "I" checkitem. However, unlike "I" checkitems, the '>' character has no effect on how a "B" checkitem is handled. If a '>' character appears in a "B" checkitem, this character is copied across to the vPL "check" statement without modification.

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Here are some examples:

medTester Checkitem

B, Casters & brakes...check operation

B, Fuses...check value & spare

B, CLEAN/REPLACE FILTERS AS NEEDED

B, CHECK BATTERY > 10 VOLTS

vPL translation

check "Casters & brakes...check operation"

check "Fuses...check value & spare"

check "CLEAN/REPLACE FILTERS AS NEEDED"

check "CHECK BATTERY > 10 VOLTS"

Note that a "B" checkitem may be the last in a series of checkitems that have been joined by the '>' character. Here is an example of how this may be applied:

medTester Checkitems

I, Select (8) on the Biomed Service Menu>
I, and choose Option (A). Wait for the >
I, test to complete. Record the power >
B, level and confirm it is > 500 mW.

vPL translation

check "Select (8) on the Biomed Service Menu and choose Option (A). Wait for the test to\"
" complete. Record the power level and confirm it is > 500 mW."

3.4.4 "M" Checkitem Translation

An "M" checkitem may cause the medTester to perform an internal hardware function. For example, "M" checkitems may be used to control the medTester's test receptacle or select a waveform of the medTester's ECG simulator. Such checkitems are referred to as medTester "internal commands".

In addition to medTester internal commands, the "M" checkitem can also cause a medTester to pause for a specified number of seconds before proceeding with the next step of the Checklist. Such checkitems are referred to as medTester "pause commands".

Lastly, the "M" checkitem may be used to send messages from a medTester to a remote test instrument or a patient simulator through a RS-232 connection. Such checkitems may therefore be used to control a remote device or retrieve test data from a device, and are referred to as "remote commands".

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The following sections explain how vPad-mT translates medTester internal, pause and remote commands to vPad Programming Language.

3.4.4.1 Internal Commands

Some internal hardware functions of the medTester instrument have a correspondence with similar functions provided by the vPad safety analyzer. The medTester internal commands for these functions are translated to vPL as follows:

<u>medTester Checkitem</u>	<u>vPL Translation</u>	<u>Function</u>
M, TRPN	power on	Switch test receptacle ON
M, GTOL	power off	Switch test receptacle OFF
M, EXIT	power off	Switch test receptacle OFF
M, W000	ecgsim 30 input	Set ECG simulator to ASYS
M, W001	ecgsim 1 input	Set ECG simulator to SQR 2Hz
M, W002	ecgsim 3 input	Set ECG simulator to PUL 4sec
M, W003	ecgsim 8 input	Set ECG simulator to SIN 10Hz
M, W004	ecgsim 9 input	Set ECG simulator to SIN 40Hz
M, W005	ecgsim 11 input	Set ECG simulator to SIN 60Hz
M, W006	ecgsim 12 input	Set ECG simulator to SIN 100Hz
M, W007	ecgsim 6 input	Set ECG simulator to SQR 1KHz
M, W008	ecgsim 2 input	Set ECG simulator to TRI 2Hz
M, W009	ecgsim 17 input	Set ECG simulator to CMMR 60Hz
M, W010	ecgsim 19 input	Set ECG simulator to 30 BPM
M, W011	ecgsim 20 input	Set ECG simulator to 60 BPM
M, W012	ecgsim 21 input	Set ECG simulator to 120 BPM
M, W013	ecgsim 23 input	Set ECG simulator to 240 BPM
M, W014	ecgsim 7 input	Set ECG simulator to SIN 0.5Hz
M, W015	ecgsim 26 input	Set ECG simulator to AFIB
M, W016	ecgsim 27 input	Set ECG simulator to SVT
M, W017	ecgsim 27 input	Set ECG simulator to SVT
M, W018	ecgsim 20 input	Set ECG simulator to 60 BPM
M, W019	ecgsim 21 input	Set ECG simulator to 120 BPM
M, W020	ecgsim 29 input	Set ECG simulator to PVC
M, W021	ecgsim 29 input	Set ECG simulator to PVC
M, W022	ecgsim 29 input	Set ECG simulator to PVC
M, W023	ecgsim 29 input	Set ECG simulator to PVC
M, W024	ecgsim 29 input	Set ECG simulator to PVC
M, W025	ecgsim 29 input	Set ECG simulator to PVC
M, W026	ecgsim 29 input	Set ECG simulator to PVC
M, W027	ecgsim 27 input	Set ECG simulator to SVT
M, W028	ecgsim 28 input	Set ECG simulator to VTACH
M, W029	ecgsim 25 input	Set ECG simulator to VFIB
M, W030	ecgsim 30 input	Set ECG simulator to ASYS

Note that with respect to "Wxxx" checkitems, the vPad ECG simulation which most closely matches the original medTester waveform is chosen by vPad-mT.

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Note also that medTester has internal command functions in addition to the ones listed above. These functions are specific to the medTester instrument and have no correspondence in vPad; if found by **CMX** software, they may be modified or eliminated from the CMMS **MTEXPORT** files before the files are transferred to the Android tablet (see Section 1.2, page 1).

3.4.4.2 Pause Commands

medTester pause commands are recognized as "M" checkitems with a specific format. They are translated by vPad-mT according to these rules:

<u>medTester Checkitem</u>	<u>vPL Translation</u>
M , <number>	prompt "Pause <number> seconds..." normal <number>
M , <number><whitespace><comment>	prompt "<number><whitespace><comment>" normal <number>

In the "M" checkitems shown above, <number> is the required delay in seconds and the optional <comment> is a message which is displayed on the medTester LCD while the timer is running.

3.4.4.3 Remote Commands

If an "M" checkitem is not an internal command or a pause command, then the command is treated as a remote command for interfacing with an external test instrument or patient simulator. Remote commands are translated by vPad-mT according to these rules:

<u>medTester Checkitem</u>	<u>vPL Translation</u>
M , <command>	xtest "Remote command:\n<command>" <command><whitespace>5
M , <command><whitespace><number>	xtest "Remote command:\n<command>" <command><whitespace><number>
M , <command><whitespace><comment>	xtest "<comment>" <command><whitespace>5
M , <command><whitespace><number><whitespace><comment>	xtest "<comment>" <command><whitespace><number>

In the "M" checkitems shown above, <command> is a message which is transmitted by the host (medTester or vPad) and which will cause the attached test instrument or patient simulator to perform a specific function. Such commands will be specific to each make and model of test device; refer to technical documentation for the device to obtain the command specifications and

the corresponding device functions which have been implemented.

Parameters which follow a remote **<command>** in a "M" checkitem will cause medTester to wait a specified number of seconds for a response from the remote device, or display a prompt on the LCD, or both wait and display a prompt. Refer to the technical documentation of the medTester for information on application of "M" checkitems for remote control of test devices.

As shown above, vPad-mT translates all remote commands to corresponding **xtest** statements. vPad-mT creates these statements specifically for use with the ***MBOX Interface***. An MBOX Interface is a hardware "smart cable" which is used to connect external devices to the XBUS Port of the vPad. Through the MBOX, the "M" checkitems shown above can send remote control commands to operate an external test instrument or a patient simulator. Additionally, the MBOX can receive measurement data or test results from an external instrument and return the data to vPad for display by the Checklist.

MBOX accessories are available for either cabled or wireless connection to instruments and simulators. For more information on connecting MBOX to external devices, refer to ***MN-084 6100-049 vPad-Check Operator's Manual***.

3.4.4.4 MBOX Setup Commands

When power is initially applied to an MBOX "smart cable", the interface defaults to communicating with a remote test device at a serial baud rate of 9600. Other serial communication settings such as inter-character transmission delay and message-terminating character are also set to default values. These default settings are compatible with a wide range of biomedical test instruments, including current devices and legacy equipment from many manufacturers.

For some applications, the default communication settings of the MBOX Interface will need to be modified to suit a particular test device. In these cases, specific "M" checkitems may be inserted near the beginning of a Checklist to cause vPad-mT to configure the MBOX for a given application. After these configuration steps, additional "M" checkitems as described in Section 3.4.4.3 may then be used to control the target instrument or simulator.

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Checkitems for configuring the MBOX Interface are listed below. The user will create one or more of these checkitems in the CMMS database and then add the checkitems to those Checklists that require them.

<u>CMMS Checkitem</u>	<u>MBOX Configuration Function</u>
M, XOPEN	Reset the MBOX Interface to power-on defaults. Although not mandatory, it is recommended that this checkitem be placed near the start of each CMMS Checklist that includes "M" checkitems which remotely control a testing device, even if the device's serial baud rate is 9600.
M, }BR1{	Set baud rate to 2400
M, }BR2{	Set baud rate to 4800
M, }BR3{	Set baud rate to 9600 (default)
M, }BR4{	Set baud rate to 19K2
M, }TD0{	Set transmit inter-character delay to zero (default)
M, }TD1{	Set transmit inter-character delay to 5 msec
M, }TD2{	Set transmit inter-character delay to 10 msec
M, }TD3{	Set transmit inter-character delay to 50 msec
M, }TD4{	Set transmit inter-character delay to 100 msec
M, }TD5{	Set transmit inter-character delay to 250 msec
M, }TD6{	Set transmit inter-character delay to 500 msec
M, }EC0{	Set end-of-command terminator = none
M, }EC1{	Set end-of-command terminator = carriage return (CR, default)
M, }EC2{	Set end-of-command terminator = line-feed (LF)
M, }EC3{	Set end-of-command terminator = CRLF
M, }EC4{	Set end-of-command terminator = LFCR

3.4.5 "A" Checkitem Translation

The "A" checkitem causes medTester to call an internal AutoSequence program during execution of a Checklist. medTester AutoSequences are numbered from "A1" to "A89". Translation of the "A" checkitem to vPL depends on which medTester AutoSequence has been invoked by the checkitem. There are two general cases: electrical safety tests and device performance tests.

3.4.5.1 Electrical Safety AutoSequences

vPad-mT translates "A" checkitems for medTester electrical safety tests "A1" through "A17" to vPL "run" statements that call the vPad-AS app:

<u>medTester Checkitem</u>	<u>vPL translation</u>
A, AUTOSEQUENCE A1	run vPad-AS 1
A, AUTOSEQUENCE A2	run vPad-AS 2
A, AUTOSEQUENCE A3	run vPad-AS 3
A, AUTOSEQUENCE A4	run vPad-AS 4
...	...
A, AUTOSEQUENCE A16	run vPad-AS 16
A, AUTOSEQUENCE A17	run vPad-AS 17

AutoSequences #1 through #17 of vPad-AS are installed with the App and are copies of factory-default AutoSequences A1 through A17 provided with a medTester. If default settings have been modified on a medTester, the vPad-AS App may be used to edit the safety test settings to match the medTester's setup. Refer to **MN-079 (6100-045) vPad-AS Operators Manual** on the tablet.

3.4.5.2 Performance Test AutoSequences

medTester AutoSequences "A20" to "A89" are performance tests for defibrillators, pacemakers, ESUs, and other medical devices. These AutoSequences require the use of external test instruments or analyzers to perform one or more measurements on the device under test.

When an "A" checkitem for AutoSequence "A20" or higher is found in a medTester Checklist, vPad-mT will insert a corresponding "AutoSequence program file" into the Checklist output file **medTester.vp1**. vPad "AutoSequence programs" are designated by filenames ranging from **A20.vp1** to **A89.vp1** and are stored in the AutoSequences folder of the vPad-mT directory. A summary of the factory-default medTester AutoSequences and their corresponding vPad programs is given in the following table.

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Performance Test	medTester		vPad	
	AutoSequence ID's	Test equipment required	AutoSequence Programs	Test equipment required
Trans. Pacemaker	A20 to A29	Impulse 4000	A20.vpl to A29.vpl	Any defib/pacer analyzer
Defibrillator	A30 to A49	Impulse 4000	A30.vpl to A49.vpl	Any defib analyzer
Infusion Pump	A50 to A59	IDA-4 or Infutest 2000	A50.vpl to A59.vpl	Any IV pump analyzer
ESU	A60 to A69	Model 454A	A30.vpl to A49.vpl	Any ESU analyzer
Pulse Oximeter	A70 to A79	CardioSat or Oxitest	A70.vpl to A79.vpl	Any SpO2 simulator
NIBP Monitor	A80 to A89	CuffLink	A80.vpl to A89.vpl	Any NIBP simulator

To allow any make or model of biomedical test equipment to be used, the AutoSequence programs installed with vPad-mT rely on user-input of measurements with **limtst** statements. Because **A20.vpl** to **A89.vpl** are vPL programs, they may be customized just like any other vPad Checklist. Pass/fail limits can be modified to suit various models of defibrillator, pacemaker, ESU and so on. Remote control can be implemented in the AutoSequence programs to automatically acquire test results from external test instruments, using the MBOX Interface and/or other smart cable accessories for vPad. The AutoSequence programs can be modified or new ones written using any text editor. Refer to Chapter 4 of *MN-084 6100-049 vPad-Check Operator's Manual* for more information on programming vPad Checklists using the vPad Programming Language.

Here are some examples of how medTester "A" checkitems for performance tests are translated by vPad-mT:

medTester Checkitem

A, AUTOSEQUENCE A38

A, AUTOSEQUENCE A61

vPL translation

Copy vPL program from:
Datrend/vPad-mT/AutoSequences/A38.vpl

Copy vPL program from:
Datrend/vPad-mT/AutoSequences/A61.vpl

vPad-mT will accept AutoSequence numbers greater than A89 up to A999, provided the corresponding **Axxx text.vpl** program files exist in **Datrend/vPad-mT/AutoSequences**. This enables creation and use of new AutoSequence programs which will supplement the original 70 performance tests A20-A89 provided by the medTester. The **text** in the filename is optional and can be used to describe the contents of the file. The **A###** is the portion of the filename that identifies which AutoSequence is to be used.

3.4.5.3 Inserting vPL Program Code in Checklists

Although the format of a medTester "A" checkitem is typically

A, AUTOSEQUENCE Ann

some CMMS applications will allow users to enter arbitrary text for a "A" checkitem. This provides a way for CMMS users to write vPL program code directly within the CMMS database.

If the command string of an "A" checkitem does not begin with the word "**AUTOSEQUENCE**", vPad-mT simply copies the command text of the checkitem directly to the output **medTester.vpl** program without modification. Here are some examples of how this technique may be used:

<u>CMMS Checkitem</u>	<u>vPL translation</u>
A, prompt "Review service manual"	prompt "Review service manual"
A, ecgsim 20 bpm 3	ecgsim 20 bpm 3
A, limtst "Check battery" V min 7.5	limtst "Check battery" V min 7.5

Chapter
4

4 Upgrades and Maintenance

Software Applications (Apps) may be upgraded from time-to-time to provide enhanced features or improvements. Contact Datrend or your local dealer for information on these upgrades.

In some cases, the changes made to an App may be to correct operational issues that have come to the attention of DSI. These shall generally be referred to as maintenance upgrades. In other cases, the changes may be to improve performance or add features which would enhance the overall functionality of the App. The decision to apply a charge to any upgrade shall be solely at the discretion of DSI.

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vPad-mT OPERATORS MANUAL

