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EasyRead (DSV3-EP) User's Manual

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Revision History

DATE	AUTHOR	REV	DESCRIPTION OF CHANGE
02/27/2009	Dan Tuck	0A	Initial draft release
3/12/2009	Dan Tuck	0B	General update to add feedback from reviewers
3/16/2009	Dan Tuck	0C-0D	Update Power Button and Tone Indicator sections
6/29/09	J. Hufnagel	0E	Correction to Section 8.

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1   Overview

The EasyRead is a member of Datastrip's DSV3 family of mobile hand-held biometric terminal products designed for a wide-range of identification and ID management applications. The EasyRead is optimized for one-step reading of ePassports; however, it is able to read a wide variety of other optical or smart card based credentials containing biometric data. It is capable of comparing this information with the biometric data collected by its on-board biometrics sensors (fingerprint and cameras). It allows an operator to capture biometrics and to perform quick, remote ID verification or identification while in the field. The terminal can operate totally standalone, or it can coordinate with centralized systems via a rich set of communications interfaces. It is available with remote communications capabilities that include: 802.11/WiFi, Bluetooth, and GSM mobile cellular.

**EasyRead (DSV3-EP)
Mobile Terminal**

Operators can acquire a fingerprint image and remotely perform 1-to-many identifications against a watch list, or perform 1-to-1 comparisons for identity verification. Superior matching accuracy is achieved through AFIS-quality (Automated Fingerprint Identification System) biometric matching algorithms and rugged biometric sensors.

All of the DSV3 family of mobile terminals are rugged and environmentally sealed units that can be used in harsh and hostile environments. They are shock resistant (Mil STD 810 compliant) and can withstand a fall of four feet to a concrete surface. The DSV3 mobile terminals exceed IP 54 specifications for resistance to dust and water.

The DSV3 is an open platform that comes with a powerful software programming SDK (Software Developer Kit) that enables customers and system integrators to readily customize the unit for specific applications and missions. Industry standard interfaces and technologies are used extensively to facilitate the integration with other systems and to expedite the delivery best of breed solutions to the market. This approach allows customers to select the technologies and components that are the most appropriate for their applications and environments.

The flexibility and ruggedness of the EasyRead make it an ideal solution for ID verification and ID management projects in markets and applications such as:

- Homeland Security
- Law Enforcement
- Military Bases and Ships
- Travel & Border Control
- Seaports

- Immigration Control
- Airports
- Transportation
- Financial Institutions
- Schools and Universities

+   **See section 12 for a detailed description of the ePassport reader subsystem and operation.**

2   Unpacking & Inventory

Depending on the number of terminals ordered, your DSV3 units and accessories may be shipped in either a single-pack box or a multi pack-box. Carefully open the shipping box and use the following inventory list to verify the contents.

Shipping Box Inventory:

- DSV3 Mobile Biometric Terminal
- Universal (90-240 VAC input) DC power/charging adapter.
- AC power cord for DC power/charging adapter. (Plug depends on country of destination)
- Documentation: User Manual (on CD), End User License Agreement, and Quick-Start Guide.

+   **Please retain the shipping box in the event you need to return your product for service.**

3   Initial Setup

- Each unit is shipped with a Lithium Polymer battery installed as shown below.
- It is recommended that you fully charge the battery before use to maximize operating time before recharging is required. The EasyRead contains an integrated charging circuit that allows the batteries to be charged inside the unit whenever the unit is properly connected to the AC adapter.
- The unit may be operated when connected via the AC adapter, regardless of the charge state of the internal battery.

EasyRead (DSV3-EP)   **EasyVerify (DSV3-SP)**

+   **Please refer to Section 4.4 "Battery Charging and Replacement", for additional instructions and safety information.**

4   System Overview

The standard DSV3 products come from the factory with a Windows CE .NET, Version 5.00 operating system, software utilities, and some demo and sample applications. When the unit is powered up, a standard Windows CE desktop is presented that allows users to launch demonstration programs. The primary human interface is the touch screen, stylus, QWERTY keypad, and function keys.

EasyRead (DSV3-EP)   EasyVerify (DSV3-SP)

4.1   Powering the Unit ON / OFF and System Startup Sequence

The Power Button is located to the top left of the QWERTY keypad as shown in the diagram above. The power switch has an adjacent tri-color (red/green/yellow) LED, which identifies whether the system is on, charging, or running low on battery power (see section 4.3).

4.1.1   Power ON
- To power on the mobile terminal from the OFF state, press the Power button, and hold it down until one beep is heard (less than one second). When the button is released, a rising tone (mid tone followed by a higher frequency tone) is produced.
- The unit takes approximately 30 seconds to boot up. The display will indicate that the system is booting. During this time, the BIOS is loaded, and diagnostic testing is performed.
- When the unit finishes powering up, the Windows CE.NET desktop will appear on the display.

4.1.2   Power OFF
- To turn off the mobile terminal, press the Power button for 1 to 15 seconds. The system will briefly go into Suspend mode and save the WinCE registry contents to non-volatile memory. The system will then automatically proceed to the OFF state.
- Pressing the Power button for more than 15 seconds commands the unit to perform an emergency shutdown, and any unsaved information may be lost. *An operator should only use the emergency shutdown procedure if the mobile terminal is not responding.*

4.1.3   Suspend Mode
Suspend mode is one of the low power states of the mobile terminal where:
- The USB subsystems are turned off
- The CF card slot is turned off
- The backlight for the LCD and keypad is dimmed
- The processor is put in a low power mode

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There are several ways that the mobile terminal can go into Suspend mode from the Power ON state:
- **Power Button:** The mobile terminal will go into Suspend mode if the operator presses the Power button for less than 1 sec while the unit is in the fully Power ON state. If the Power button is pressed for more than 1 sec, the unit will perform a normal Power Off sequence.
- **Touchscreen**: The touchscreen interface can be used to command the mobile terminal to go to Suspend mode via the Start/Suspend command.
- **Automatic Power Management:** The mobile terminal can be configured to go to Suspend mode automatically (see section 5.3) if the touchscreen or function buttons have not been used for some (user configurable) amount of time.

4.2   Power Button Operations

Listed below is a summary of what the Power button does (mobile terminal status and the resulting audible tone indicators) depending on the state of the mobile terminal.

	State of the Terminal	**Tone Type**
Unit is OFF		
Button pressed	Signals ok to release button	Beep Tone
Button released	The terminal is powered ON	Rising Tone
Unit is ON		
Button pressed	Signals ok to release button	Beep Tone
Button released (0 < x < 1 sec)	The terminal is goes into Suspend mode	None
Button released (1 < x < 15 sec)	The terminal is powered OFF normally	Falling Tone
Button released (x > 15 sec)	The terminal performs an emergency shutdown	Warning Tone
WinCE launched	Signals the launch of the OS	MS Launch Tone
Battery enters an extremely low state	System needs attention	Warning Tone
Unit is in Suspend		
Button pressed	Signals ok to release button	Beep Tone
Button released (0 < x < 1 sec)	The terminal is goes into Resume mode	None
Button released (1 < x < 15 sec)	The terminal is powered OFF normally	Falling Tone
Button released (x > 15 sec)	The terminal performs an emergency shutdown	Warning Tone
Entering OFF state via power management	see section 5.3	Falling Tone

Definitions
- **Beep Tone:** Shorter high frequency tone
- **Rising Tone:** Mid followed by a higher frequency tone
- **Falling Tone:** Mid followed by a lower frequency tone
- **Warning Tone:** Longer low frequency tone
- **MS Launch Tone:** Standard Microsoft WinCE start up tone

4.3   Power Status LED

The table below shows the states for the Power Status LED. The state of the LED depends on the charge state of the battery, and whether or not the AC adaptor is connected.

- If _red_ is included in the LED display sequence, this indicates that the battery charge level is very low or that the battery is charging.
- If _yellow_ is included in the LED display sequence, it indicates that the system is in Suspend mode.
- See section 5.4 for a description of the battery gauge available via WinCE.
- See section 5.3.1 for a description of the available power management states.

External Power Connected?	Battery Charge State	Power Status LED Color	Power Status LED Blink Rate
System Powered OFF			
Yes	No Battery	Green	Very Slow Blink
Yes	Charging	Green / Red	Continuous with Slow Color Blink
Yes	Fully Charged	Green	Very Slow
WinCE Running			
No	OK / Not Low	Green	Slow Blink
No	Low	Red / Green	Continuous with Color Toggle
Yes	No Battery	Green	Solid
Yes	Charging	Green / Red	Continuous with Color Blink
Yes	Fully Charged	Green	Solid
System In Suspend Mode			
No	OK / Not Low	Yellow	Slow Blink
No	Low	Red / Yellow	Continuous with Color Toggle
Yes	No Battery	Yellow	Solid
Yes	Charging	Yellow / Red	Continuous with Color Blink
Yes	Fully Charged	Yellow	Solid

Definitions

- **Solid**: LED is ON continuously.
- **Slow Blink**: LED is ON 50% of the time, blinking every 2.5 seconds (50% duty cycle, 2.5 sec period).
- **Very Slow Blink**: Mostly dark with quick blink approx every 5 seconds (~1% duty cycle, 5 sec period).
- **Continuous with Slow Color Blink**: LED is ON continuously with a 5 sec period, where color 1 is ON for 4.9 sec and color 2 is ON for 0.1 sec.
- **Continuous with Color Blink**: LED is ON continuously, with a 2.5 sec period, where color 1 is ON 2 sec, and color 2 is ON 0.5 sec.
- **Continuous with Color Toggle**: LED is ON continuously, alternating evenly between the two colors (50% Duty Cycle, 2.5 sec Period).

4.4   Battery Charging and Replacement

The terminal uses one 5000 mAH Lithium Polymer battery pack. Under normal operating conditions, the battery does not need to be removed. The terminal has an internal charging circuit that will charge the battery whenever the unit is connected to the external AC power adapter.

If the user does want to replace the battery, it may be replaced when the unit is off, or the battery may be hot swapped when the unit is in Suspend mode. To hot swap the battery, save any work in progress and put the unit into Suspend by tapping the power button (or via the Suspend command on the Start Menu). Turn the quick release (quarter-turn) bails on the battery access cover on the rear of the unit. Remove the old battery and replace it with a charged battery within 30 seconds to prevent the unit from shutting down. Replace the battery-access cover and re-fasten it by tightening the quick release bails.

EasyRead (DSV3-EP)
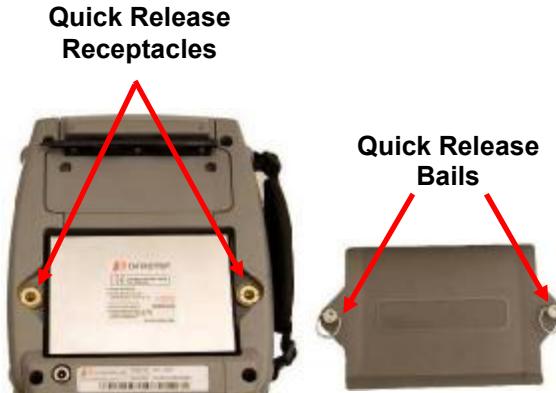
EasyVerify (DSV3-SP)

4.4.1   Battery Capacity and Charging

- The capacity estimates in the following table are for a healthy new battery and are worse case results that reflect continuous use with all power saving options turned off. Actual capacity performance will be much better if the power management features are enabled.
- The battery capacity (hours of use) can be extended significantly by using the power savings options such as: System Idle or Suspend. These power settings are user programmable and details can be found in Section 5.3 Power Management.
- The charge state of the battery can be observed with the integrated battery gauge features (see section 5.4).
- The charge time is approximately the same whether the battery is charged with the unit "ON" or "OFF".
- When a terminal is left on the shelf in the "OFF" state, the battery will maintain its charge for approximately one month.

	EasyRead (DSV3-EP)	EasyVerify (DSV3-SP)
5000 mAH Battery	P	P
Capacity (hours of use)	5 hours	5 hours
Battery Charge Time	4 hours	4 hours

There is also an internal, rechargeable coin cell battery that powers the Real Time Clock for more than 6 months while the unit is off. This battery is automatically recharged by the system, and does not require any operator service.

✚   **CAUTION! Use ONLY approved replacement batteries and power adapters as provided by Datastrip.**

✚   **CAUTION! Battery has a risk of FIRE, EXPLOSION, or BURNS. DO NOT: short-circuit the battery terminals; crush, puncture, disassemble or otherwise damage the battery's case; operate or charge at temperatures above 40º C or store the battery at temperatures above 100º C; incinerate or immerse in water.**

✚   **DISPOSAL: Always consult and obey all international, federal, provincial/state, and local hazardous waste disposal laws. Certain jurisdictions require recycling of this spent product.**

4.5   Keypad and Function Buttons

The terminal includes a backlit extended QWERTY keypad, and two groups of four backlit function buttons that are vertically aligned along the left side and right side of the LCD display. These two groups of function buttons operate identically, and are initially programmed as standard "F1" through "F4" keys (mapped as cursor / arrow keys). The DSV3 SDK allows these buttons to be software defined (controlled by custom software).

The Navigation Button is located in the center of the unit just under the LCD display and above the QWERTY keypad. The Navigation Button is not a mouse control; however, it allows an operator to navigate through menus and select menu items.

4.6   Software Input Panel / Keyboard

In addition to the extended QWERTY keypad, there is also a Virtual Input Keyboard (Software Input Panel) that can be used to enter alpha-numeric information. Tap the **Software Input Panel** icon in the bottom right hand corner of the screen to show or hide the Virtual Input Keyboard / Software Input Panel.

Software Input Panel Icon

4.7   LCD Display & Touch Screen

The LCD is a color-TFT (Thin Film Transistor) active-matrix display, and features white-LED backlighting. There is a resistive touch panel overlay, which should only be operated with the included stylus to help prevent scratching or other damage.

4.8   Fingerprint Sensor

4.8.1   Fingerprint Sensor –NIST FIPS 201/SP 800-76 Compliant

The integrated fingerprint sensor is an 8-bit, grayscale, solid-state, capacitive-touch device that can capture fingerprint bitmap images measuring 256 pixels wide by 360 pixels high at 508 dpi. Images from this sensor can be used for a variety of card holder ID validation purposes, including matching, storage, and extraction of fingerprint minutia templates.

The DSV3 mobile terminals are compliant with fingerprint matching algorithms from a variety of the industry leading vendors such as: Identix, Cogent, Bioscrypt, Motorola, and NEC. However, the Identix algorithm is the only algorithm directly available from Datastrip for the DSV3 terminals at this time.

4.8.2   Fingerprint Sensor Calibration

The fingerprint sensor is factory calibrated and tested on every terminal, however, if recalibration is required for some reason, follow these steps:

- Double tap My Computer and Select *Hard Disk/DSV3*.
- Double tap the **PPCalFt41** utility and press the "*Calibrate*" button to re-calibrate the fingerprint sensor. This process may take up to a minute and then a "green" window with a number "1" should appear to indicate the sensor was successfully calibrated.
- Double tap the **DsVerifyFpCaptureTest** application. In the lower right hand corner select "*UPEK*" and click "*OK*".
- Use the "*Scan*" button to test the fingerprint image quality.

4.8.3   Finger Placement Guidelines

It is important to place the finger properly on the sensing area to enable the device to more quickly capture a good fingerprint image. Listed below are the guidelines for proper finger placement.

- Finger placement icons: These two icons pictorially indicate the correct (green) and incorrect (red) way to align the cuticle of your finger with the points of the finger-placement guide arrows.
- Finger placement guide arrows: These arrows should be used as a guide for alignment of the cuticle part of the finger as described above.

## 4.9   Cleaning the LCD Touch Screen and Fingerprint Sensor

The LCD touch screen and fingerprint sensor require periodic cleaning to remove dirt, oils, grease, dust, and foreign matter.

- Ensure that the terminal power is OFF and unplugged from any external power source.
- Using standard alcohol wipes, gently wipe the surface of the LCD screen and fingerprint sensor until it appears clear.
- Allow the cleaning solvent to dry completely before turning the unit on again.

4.10   I/O Port Access

The top rubber end cap on the unit snaps open to reveal the CFIO, SDIO, and onboard wired I/O ports. To open the top rubber end cap, pull up from the back edge using the two finger indents. The rubber cap is tethered at two points to prevent it from being lost or misplaced. To close the cover, simply press the cover into place.

Shown below is the I/O connector panel located on the top of the unit. It contains one mini-USB host port, one mini-USB client port, one external Compact Flash (CFIO) slot, one Secure Digital module (SDIO) slot, and the Audio Headset jack.
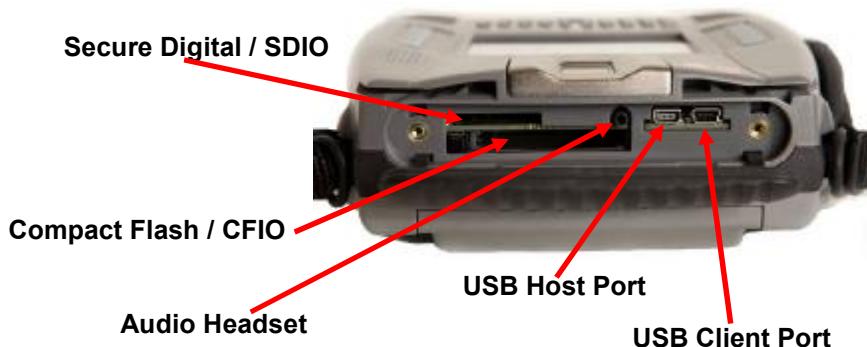
4.10.1   USB Ports

There is one USB Host port and one USB client port on the mobile terminal that are accessible under the rubber I/O port cover. These are USB 2.0 High Speed (480 Mbps) ports; however, they are also backwards compatible with USB 1.1 Full Speed (12 Mbps) and Low Speed (1.5 Mbps). Additional USB ports are available on the Docking Station (see section 12).

The USB Host port is used to connect with USB peripheral devices such as a keyboard, a mouse, or flash memory drives.

The USB Client port enables the mobile terminal to connect and communicate with devices such as PCs and servers using Active Sync (see section 0). The USB Client port on the top of the terminal is disabled when the unit is placed in the docking station. There is an alternate USB Client port available on the docking station for use during this situation.

4.10.2   Compact Flash (CFIO) Slot

The terminal has a Type-I/II Compact Flash slot that is accessible under the rubber I/O port cover. It is compatible with a range of CF memory and peripheral devices.

4.10.3   Secure Digital Memory Card (SDIO) Slot

The terminal has an SD slot that is accessible under the rubber I/O port cover. It is optimized (recessed) for Datastrip's 802.11 peripheral; however, it is a standard SD slot, so a range of SD memory and SDIO peripheral devices may be used.

4.10.4 Audio Headset Jack
The audio headset jack is a 2.5 mm jack that supports stereo headset and microphone. Shown below is the pin out required for an appropriate headset.

4.11 Contactless Smart Card Reader
The EasyRead terminal has an integrated Contactless Smart Card reader subsystem (transceiver and antennas). The terminal is equipped with two separate antennas for reading ePassports, since some countries have placed the contactless smart card chip in the front cover of the ePassport, while other countries have place it in the rear cover. The EasyRead can also be used to read a wide range of other (non-ePassport) ISO 14443 smart card media. Either antenna can be used to read these smart card media; however, the upper antenna is typically more convenient. Place and hold the media to be read against the back of the terminal in the center of the antenna. Once the media is in place, the system will automatically select which antenna to use.

Smart Card Antenna location
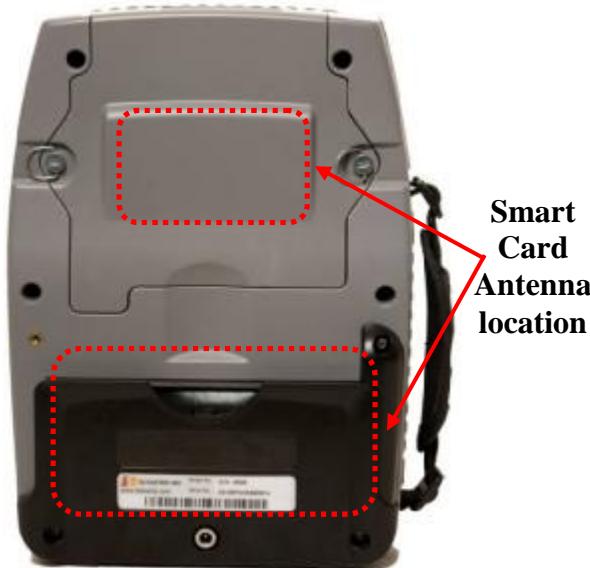
4.12 Optional Peripheral Modules
The terminal can be equipped with a variety of optional peripheral modules and internal optional features. The list of available options differ from one model of the DSV3 terminal to another. Please refer to the datasheet for the specific options available for your terminal. Some of the optional modules include:
- Digital Still Camera
- Iris Camera
- Contact Smart Card Reader
- Point & Shoot Scanner
- PROX Card Reader

Some of the available internal optional features include:
- 802.11
- Bluetooth
- Mobile Wireless: GSM (GPRS/EDGE)
- Global Positioning System (GPS)
- Security Access Module

5   Basic Operation

The following sections describe some of the features and functions that are available on the DSV3 family of products.

5.1   Stylus Usage

A stylus is provided to use with the touch screen for selecting items and entering information (the unit may also be operated with a standard USB mouse). The stylus can be found in the stylus holder on the back of the EasyVerify and the front of the EasyRead. Typical actions to perform with the stylus include:

- *Tap*: Lightly touch the screen once with the stylus to select an object. Tapping is equivalent to clicking an item with the mouse on your personnel computer.
- *Double-Tap*: Lightly touch the screen twice with the stylus to open folders and applications. Double-Tapping is equivalent to Double-clicking an item with the mouse on your personnel computer.
- *Drag:* Hold the stylus on the screen and drag it across the screen to select text and images. Drag within a list to select multiple items.
- *Tap-and-Hold*: Tap and hold the stylus on an item for a short period until a menu displays a list of actions available for that item. Tapping and holding is equivalent to right-clicking al computer mouse button. When you tap and hold, a circle of red dots appears around the stylus to indicate that the menu will soon pop up. Tap the action you want to perform on the pop-up menu that appears.

5.2   Touch Screen Adjustments

The touch screen is calibrated during factory acceptance tests. If you wish to recalibrate these setting to suit your personnel preferences, the following options are available:

- *Calibration*: If your device is not responding properly to your screen taps, you may need to recalibrate your screen. Go to the *Control Panel*, select *Stylus Properties* and under the "*Calibration*" tab, click the "*Recalibrate*" button and follow the on screen instructions. When you are told to "*press enter*" to accept the setting, just tap the screen anywhere, then click the "*OK*" button.
- *Double-Click Sensitivity*: Go to the *Control Panel* and select *Stylus Properties*. Double–tap the checkerboard grid to set the double-tap sensitivity for both speed and physical distance between the taps. Then double tap the icon below the checkerboard to verify your settings. Click the "*OK*" button when done.
- *Brightness and Contrast*: The display brightness and contrast can be adjusted for different operating environment lighting conditions. Go to the *Control Panel*, select *Display* and under the "*Backlight*" tab adjust the slider control then click the "*OK*" button.

5.3   Power Management

The Power Properties for the terminal can be configured and monitored by double clicking the Power icon in the WinCE Control Panel. The *Battery* tab displays the battery gauge / charge status, and the *Schemes* tab allows the user to configure the timeout for each of the Power States defined below.

5.3.1   Power Management States

Clicking the *Schemes* tab allows you to configure when the system enters into the various power management modes available to maximize battery life. An operator can configure the time the system must be idle before entering each of the available power management states.

Note: The times configured for each state are cumulative! For example, the time required for the system to suspend is the sum of the time configured to go to User Idle + the time to go to System Idle + the time to go to Suspend.

The power management states are:

- **Fully On**
    - § Every subsystem in the mobile terminal is on and operational.
- **User Idle**
    - § This state is entered when the touch screen or function keys have not been used for some (user configurable) amount of time.
    - § The backlight is dimmed to save power.
    - § All other internal subsystems are on.
    - § Tap the screen or give the power button a quick tap to wake up the unit to a Fully On condition.
- **System Idle**
    - § This state is entered when no major background software tasks are running and the touch screen or function keys have not been used for some (user configurable) amount of time.
    - § In this state, the backlight is dimmed to save power.
    - § All other internal subsystems are on.
    - § Tap the screen or give the power button a quick tap to wake up the unit to a fully on condition.
- **Suspend**
    - § This state is entered when no major background software tasks are running and the touch screen or function keys have not been used for some (user configurable) amount of time. Suspend mode is indicated by flashing power LED (see section 4.3).
    - § In this state, the LCD is turned off and backlight is turned off.
    - § USB subsystems are turned off.
    - § CF cards are turned off.
    - § The Processor is put in low power mode.
    - § Tap the screen or give the power button a quick tap to wake up the unit to a fully on condition.
- **Fully Off**
    - § Everything in the system is off (except the embedded controller).
    - § Push the power button to start the unit and return to a Fully On state.

5.4   Battery Gauge

A battery gauge is available in the *Control Panel* under *Power Propertie*s. It provides information about the about the battery charge level and charging status. Clicking the *Battery* tab displays the battery gauge. The charge level of the battery (percentage power remaining) is shown at the bottom of the *Power Properties / Battery* tab window.
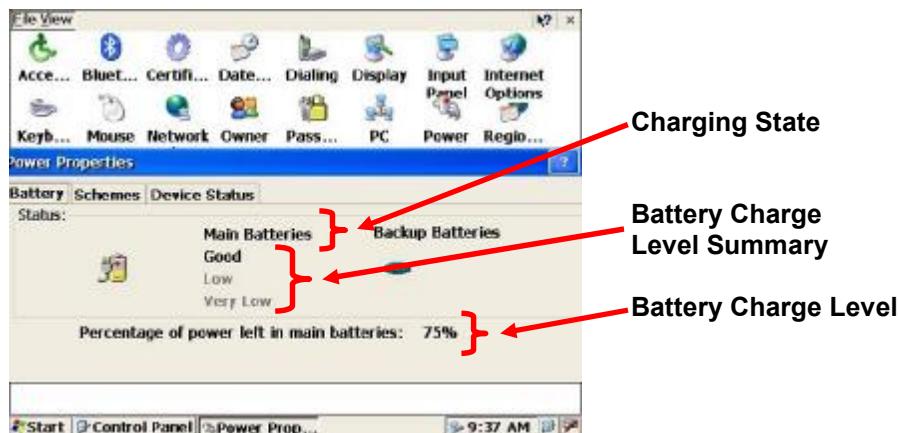
5.4.1 Charging States

The *Power Properties / Battery* tab window also shows that state of the internal battery charger. There are three charging states.

- **Main Battery:** The terminal is operating on battery power and no external AC adapter is connected.
- **External:** External AC adapter is connected and the battery is fully charged.
- **Charging:** External AC adapter is connected and the battery is charging. The unit operates normally while simultaneously charging the battery.

5.4.2 Battery Charge Level States

The charge level state of the battery is also listed in the *Power Properties / Battery* tab window. There are three charge level states. When the battery gauge is "Very Low", the battery should be immediately charged by connecting the unit to an AC adapter or the unit will automatically shut down when the voltage level drops below the minimum threshold.

- **Good:** Battery charge is Good
- **Low:** Battery charge is Low (<10% remaining)
- **Very Low:** Battery charge is Very Low / Critical (4% remaining)

5.4.3 Other Indicators

There are three user warnings that occur when the battery level is "Very Low": See sections 4.2 and 4.3 for the LED and tone indicator states that also provide user feedback regarding battery charge levels and charging states.

- The power LED alternately flashes Red and Green (see section 4.3)
- A warning message pops up "*Main Battery Very Low*". This warning will repeat itself periodically until the condition clears or the unit automatically shuts down.
- An error beep sounds when the battery charge level is critical.

5.5 Creating Desktop Shortcuts

To create desktop shortcuts, locate the application for which you want to create a shortcut. Tap and hold the stylus on the application until the options menu pops up. Select *Copy* and go to the directory where you want to put the shortcut. Tap and hold the stylus until the options menu pops up and select "*Paste Shortcut*".

5.6 Safe Boot Mode

The system provides a mechanism that permits the recovery of lost or damaged operating system files via a "Safe Boot" mode. This mechanism is similar to Microsoft Windows Safe Mode that is available on PCs. If one or more operating system files have been damaged or inadvertently deleted, when the unit is turned on it will automatically boot-up into a smaller, limited function version of Windows CE that will permit the recovery of the files or allow them to be replaced or overwritten. This permits the unit to be repaired, and then subsequently rebooted using the full version of Windows CE. Safe Boot mode can also be accessed on demand by holding down the *F1* key while turning on the power to the unit. A special bitmap will appear indicating that the unit is booting-up in Safe Boot mode.

6 Software Utilities

All of the utilities listed below except "**DsVerify2About**" are located in the *My Device\Hard Disk\DSV3* directory. The "**DsVerify2About**" is a hidden file in the *My Device\Windows* directory. There are additional demonstration programs available as source code for custom software development in the Datastrip MT SDK (sold separately).

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6.1   Software Version Utility (*DatastripDSVerify2About.exe*)

This utility reports the Operating System (OS) Version, the versions of all
Datastrip specific drivers and components, software license settings, the unit
serial number, and the hardware configuration. To run this utility:

- Click *Start\Run*
- Click *Browse* then double tap the *Windows* folder
- Scroll over and double tap the application: **DatastripDsVerify2About.exe**
- Click "*OK*"

This version information can be saved to a file by clicking on the "*Send to File*"
button.

6.2   DsVerify Registry Install Utility (*DsVerifyRegInst.exe*)

This application registers all of the Datastrip specific components of the terminal that are needed to
read/write smart cards, scan documents, operate the fingerprint sensor, and so forth. It is typically run
after a software update to register the components in sequence, and it reports any errors if it does not
succeed. If it finishes successfully, there will be a pop-up message box indicating "*Finished
Registration*". It can take up to a minute or two to complete this process.

Internally, this program calls **regsvrce.ex***e* to register each ActiveX control so that the interface
presented by the ActiveX control will be available for application use. This is usually followed by
RegistrySaver.exe (or Suspend) to make sure that the altered registry is written to flash memory for
future use. When this application is invoked, it queries the user for the specific mobile terminal type
(*DSVII-SC, DSVII-SW, DSVII-PA, DSV3-SP, or DSV3-EP*) and writes the appropriate platform type
information into the registry along with the other registration information.

6.3   DsVerify Registry Saver Utility (*RegistrySaver.exe*)

This application is used to save the current registry settings to flash memory. This is very useful after
adding applications (or applications components such as ActiveX controls) that require some aspect of the
behavior to be registered. When the terminal is powered-on, the saved registry is read and used as part of
WinCE startup. Datastrip ActiveX components are registered (see **DsVerifyRegInst** application) and
then the registry settings are saved using this application. The registry can also be saved by hitting the
Start/Suspend function; however, this application is provided to save the registry to non-volatile memory
without having to warm-start the unit.

6.4   Fingerprint Capture Utility (*DsVerifyFpCaptureTest.exe*)

This application demonstrates the capabilities of the integrated fingerprint image sensor, and it provides
a means of exercising the fingerprint imaging system. The application has several buttons that allow a
user to *Scan to the Display* or *Scan to File*. Since this application is provided as source code in the
SDK, it is often used as an example for developers to observe how typical application software can
interface to the fingerprint subsystem.

7   Loading Software and Firmware

7.1   Loading DSV3 Software Updates

The **DsVerify2SoftwareUpdate** application permits the user to download software updates from several
source locations are as list below:

- CAB files located on a CF memory card: call *Storage Card*
- CAB files located on a USB flash drive: call *Hard Disk 2*
- CAB files loaded from an FTP server, (requires a username and password to a valid account).

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7.1.1   DSV3 Software Update Procedure: Using a CF Card

<u>NOTE</u>: It is recommended that upgrades be done with the unit operating on the AC adapter to ensure that the unit does not lose power during this procedure.

- Insert the CF Card containing the new CAB file into the external CF slot.
- Power up the DSV3 terminal.
- When the device is finished booting, navigate to *My Device\Hard Disk\DSV3*.
- Double tap the ***DsVerify2SoftwareUpdate*** utility.
- Scroll through the options on the *Server* scroll box and select the *Storage Card* entry (you must scroll down to make selection).
- *Username* and *Password* are not necessary for this procedure
- Select most recent appropriate source file
- Click *Update*
- Click *Reboot* (The registry will be cleared prior to shutdown).
- Power up the unit.
- The DSV3 registration program will automatically open. Select the button for the device that you are registering (*DSV3-SP* or *DSV3-EP*). Select [*OK*] and wait.
- Click *[OK]* in the "*Hurray!*" box when it appears, then close the application window.
- Navigate to *My Device\Hard Disk\DSV3*.
- Double tap the Registry Saver program (***RegistrySaver.exe***) to launch it.
- Double tap the ***PPCalFt41*** utility and press the "*Calibrate*" button to initialize the fingerprint sensor. Once complete, a "green" window with a number "1" should appear to indicate the sensor was successfully calibrated.
- Double tap the ***DsVerifyFpCaptureTest*** application. Look in the lower right hand corner to ensure that the *UPEK* button is selected. You can use the *Scan* function to test the fingerprint image. <u>DO NOT</u> use the *Calibrate* button on this screen since it does not work with the fingerprint sensor in the DSV3.   When done, click "*OK*" to exit the program.

7.1.2   DSV3 Software Update Procedure: Using a USB Flash Drive

To load a software update from a USB flash memory device, follow the procedure from section 7.1.1 with the following changes:

- Insert a USB Flash drive (instead of a CF Card) into the USB Host port on the DSV3 terminal.
- Inside the ***DsVerify2SoftwareUpdate*** utility, select *Hard Disk 2* option from the *Server* scroll box (instead of selecting *Storage Card*).

7.1.3   DSV3 Software Update Procedure: Using an FTP site

NOTE: It is recommended that upgrades be done with the unit operating on the AC adapter.

- Power up the DSV3 terminal.
- When the device is finished booting, navigate to *My Device\Hard Disk\DSV3*.
- Double tap the ***DsVerify2SoftwareUpdate*** utility.
- Scroll through the options on the *Server* scroll box and:
    - § Select *ftp.datastrip.net* if you have access to the Datastrip FTP server
    - § Select *ftpserv2003* if you are using another valid FTP site.
- Enter a valid *Username* and *Password.*
- Click *Connect.*
- Select most recent appropriate source file.
- Click *Download* and wait for message "*Download complete*".
- Click *Update.*
- Click *Reboot.*
- Power up the unit.

- The DSV3 registration program will automatically open. Select the button for the device that you are registering (*DSV3-SP* or *DSV3-EP*). Select [*OK*] and wait.
- Click [*Ok*] in the "*Hurray!*" box when it appears, then close the application window.
- Navigate to *My Device\Hard Disk\DSV3*.
- Double tap the Registry Saver program (**RegistrySaver.exe**) to launch it.
- Double tap the **PPCalFt41** utility and press the "*Calibrate*" button to initialize the fingerprint sensor. Once complete, a "green" window with a number "1" should appear to indicate the sensor was successfully calibrated.
- Double tap the **DsVerifyFpCaptureTest** application. Look in the lower right hand corner to ensure that the *UPEK* button is selected. You can use the *Scan* function to test the fingerprint image. DO NOT use the *Calibrate* button on this screen since it does not work with the fingerprint sensor in the DSV3 product family. When done, click "*OK*" to exit the program.

7.2   Loading Smartcard Firmware Updates

The procedure for updating the smartcard firmware is as follows:

- In the directory *My Device\Hard Disk\DSV3* folder, run the utility **DsVerifyCleanUp** and select the option *Clear SCM Firmware*. Answer "*OK*" to the question "*Are you REALLY sure*".
- Reboot the terminal.
- When the device is finished booting, navigate to the *My Device\Hard Disk\DSV3* folder.
- Open the *DSV3_SCM_Firmware* folder.
- Double tap the utility **FlashIt**
- Tap the button "*Open bin file*" and navigate to *My Device\ Hard Disk\DSV3\DSV3_SCM_Firmware*
- Select the version of firmware that you are changing to and click "*OK*".
- Status should read "*Binary file is valid*".
- Tap the *Download* button.
- Reboot the terminal to complete update.

7.3   Loading Flash Memory Updates

The various flash areas in the DSV3 can be updated by using the utility program **"DSV3FlashUpdate.exe"**, located in the *"\Hard Disk\DSV3"* folder. This application allows these areas of the flash to be updated:

- Embedded Controller
- Splash Screen bitmap
- SafeBoot OS image
- BIOS

The procedure for updating the Flash Memory firmware is as follows:

- Copy the new flash update file that is to be loaded onto the unit onto a Compact Flash card, and insert the card into the mobile terminals.
- Browse to "*My Device\Hard Disk\DSV3*" and run "**DSV3FlashUpdate.exe**".
- Select one of the four buttons displayed as follows:
  - § Update BIOS
  - § Update SafeBoot OS
  - § Update Splash Screen
  - § Update EC

- Hit the *File Selection* button to choose which file to download, or Cancel to abort.
- Using the *File Dialog* box, find, and select the file you wish to download, then hit "*OK*".
- The application will then display the file name and path of the file that was selected, and prompts the user to verify that it is the correct file to use. Select the button labeled "*Yes, Proceed with update*" to begin the flash update process.
- If the Embedded Controller was selected to be updated, a message is displayed noting that after the update, the terminal will power-down. This is normal operation.
- Upon completion of the flash update, a status message box appears indicating the success or failure of the process. If a failure occurs, the reason for the failure is provided.
- With all updates with the exception of the Embedded Controller, the user is then placed back to the main screen of the app (4 update buttons). The user may then update another area, or exit the application.

7.4   Loading Digital Still Camera Firmware Updates

The *DSC Firmware Update Utility* is a "stand-alone" program which can be used to update the firmware in the DSC camera module. The procedure for updating the Digital Still Camera firmware is as follows:

- In the directory *My Device\Hard Disk\DSV3*, run the utility **DSC_Firmware_update.exe**.
- The application displays the current version number of the camera firmware and asks the question, "*Do you want to update the camera firmware?*"
- If you answer "*Yes*", then browse to the directory *My Device\Hard Disk\DSV3\DSV3_DSC_Firmware*, select the latest firmware version, and double-click on it, or select it and hit "*OK*".
- Wait for the camera to update its firmware. Note: After the firmware is updated, the camera illumination LED will blink 10 times.
- Reboot the terminal to activate the new firmware.

8   EasyRead (DSV3-EP) Product Specifications

Physical Characteristics

Dimensions:	170(W) x 229(H) x 75(D) mm, (6.7 x 9.0 x 3.0 in)
Weight:	1.42 Kg (3.1 lbs) with battery

User Interface

Display:	3.7" color LCD, transflective TFT, VGA, 640 (H) x 480 (V), landscape Indoor/Outdoor viewable (backlit)
Touch Screen:	Integrated resistive touch panel
Keypad:	37 key extended QWERTY keypad (backlit)
Function Buttons:	2 x 4 function keypad (backlit)
Navigation Joystick:	5 position: up, down, left, right, enter (backlit)
Power Button:	Recessed (backlit)
Stylus:	Integrated stylus holder Optional tethered stylus

Hardware/Software

Processor:	AMD LX800 Geode (x86), 500 MHz, Integrated FPU
Flash Memory:	256MB, expandable to greater than 1GB
DRAM Memory:	256MB 64-bit DDR, expandable to 1GB
Operating System:	Microsoft® WinCE.Net V5.0

Power Systems & Management

Battery:	5000 mAH Smart Battery, Field Replaceable Rechargeable Li Ion Polymer 7.4 V, Integral Charging and Protection Circuitry
Charging	Integrated internal charger
External DC Power:	11.4 to 19VDC
AC Adapter:	Out:12VDC; In:100-240VAC, 30W, 50-60Hz

I/O, Audio, & Peripherals

Interfaces and Wired I/O:	*Onboard (under top cap)* USB 2.0 Host: mini-A (x1) USB 2.0 Client mini-B (x1) CF Type I/II external interface (x1) SDIO interface (x1) - for 802.11
	via Docking Station USB 2.0 Host: standard A (x2) USB 2.0 Client: standard B (x1) Ethernet: 10/100 RJ45 (x1) RS-232 DB9 (x1)
Audio:	Speaker (750 mW)

Environmental Characteristic

Temperature:	*Operation:* 0° to +40° C (32° to 104° F) *Storage:* -20° to +60° C (-4° to 158° F)
Relative Humidity:	< 90% at +40° C Non-condensing
Drop Resistance:	Exceeds MIL-STD 810F
Weather Resistant:	Ingress Protection: IP54

Contactless Smartcard Reader

Specification:	ISO 14443 A/B
Operating Frequency:	13.56 MHz

Optical Scanner

Scan Area:	124(W) x 42(H) mm, 4.88(W) x 1.65(H) in
Standard Symbologies:	**OCR:** OCR B **2D Codes:** PDF417 **1D Codes:** Code 39, Code 93, Code 128, UPC/EAN/JAN, Hong Kong 2 of 5, Interleaved 2 of 5, NEC 2 of 5, Matrix 2 of 5, Straight 2 of 5, Code 11, Codabar, MSI Plessey, Pharmacode, DataBarTM
Optional Symbologies:	**OCR:** OCR A, MICR **2D Codes:** QR Code, Data Matrix, Aztec Code, Maxicode, Micro QR Code, Codeblock, Composite Code
Illumination:	Near IR and Visible
Software Interface:	HID mode and Virtual Comm mode

Biometric Sensors

Fingerprint Sensor:	FIPS 201 / SP 800-76 Compliant Capacitive solid-state sensor, 8 bit grayscale Resolution: 508 dpi (256 x 360 pixels) Sensor Area: 12.8 x 18.0 mm; ESD: 15 KV
Digital Still Camera: (future option)	3.2 M pixel, 24-bit full color Depth of Field: 0.6 to 5.1 meters Illumination: Preview and Flash Full SDK Support
Iris Camera: (future option)	1.3 M pixel sensor , NIR illuminators, Image Resolution: VGA: 640(W) x 480(H) Full SDK Support

Wireless LAN (optional)

Specification:	IEEE 802.11b/g, 2.4 to 2.5 GHz , DSSS
Security Protocols:	WEP, WPA, WPA2, LEAP, EAP-FAST, EAP-TLS, EAP-TTLS, PEAP 0 (PEAP-MSCHAP),PEAP 1 (PEAP-GTC)
Antenna:	Internal

Bluetooth® Wireless (optional)

Specification:	Bluetooth® Version 1.2 Class 2
Antenna:	Internal

Mobile Wireless (optional)

GSM:	Quad Band GSM: 850/900/1800/1900 MHz EDGE (E-GPRS) multi-slot class 12 (max 236.8 Kbps) GPRS class 12 (max 86 Kbps) Antenna: internal; AT Command Interface

Global Positioning System (optional)

GPS:	16 channel, L1=1575.42 MHz
Protocols:	NMEA-0183, RTCM V2.2, UBX binary
SDK Support:	GPS dedicated AT commands

Security Access Module (optional)

SAM Slots:	0 or 1

PROXIMITY Card Reader (optional)

Frequency:	125 KHz

Docking Station (optional)

Wired I/O:	USB 2.0 Host: standard A (x2) USB 2.0 Client: standard B (x1) Ethernet: 10/100 RJ45 (x1) RS-232 DB9 (x1)
Battery Charging:	Supplies power to charge batteries inside the mobile terminal
Power Input:	12 VAC, 1.7 mm DC power jack
Dimensions:	Footprint: 162(W) x 178(L) mm [6.6"(W) x 7.0"(L)]

9   Regulatory Compliance Statement

The DSV3 products are in conformity with the requirements of the Low Voltage Directive (72/73/EEC) and the EMC directive (89/336/EEC) as amended by (93/68/EEC).

FCC Declaration:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

WARNING: Changes or modification to Datastrip's mobile terminal not expressly approved by the party responsible for assuring compliance could void the user's authority to operate the equipment in a safe or otherwise regulatory compliant manner.

| EasyRead (DSV3-EP) | EasyVerify (DSV3-SP) |

10 Software Demo Applications

10.1   Smart Card Reader & Scanner Demo (SuperViewer.exe)

This application demonstrates the primary features of Datastrip's mobile terminals: reading optical media, reading smart card media, and performing one-to-one fingerprint matching. The **SuperViewer** application only reads and decodes media that contains Datastrip-formatted information payloads.

The following types of smart card media are supported by **SuperViewer**:
- ISO 14443 Contactless Smart Cards
- ISO 7816 Contact Smart Cards *(only supported on units equipped with the optional ISO 7816 contact smart card reader module)*

The following optical symbologies are supported by **SuperViewer** (on units equipped with an optical scanner).
- Datastrip2D and 2DSuperscript Two-Dimensional Barcodes *(not support on DSV3)*
- PDF417
- OCRB
- Linear Barcodes

When **SuperViewer** application is launched, the *Main Screen* is displayed and the unit is ready to scan a document or read a smart card. The application automatically reads and decodes a submitted document and the result is displayed in the Photo, Text, and Fingerprint windows. If the default icon or text is displayed, the document did not contain that type of data.

If a fingerprint was stored on the document, the application will also perform a one-to-one match of a fingerprint stored on the document to the fingerprint captured by the on-board fingerprint sensor. This demonstrates a typical scenario of ID verification (verifying that a card holder is the same person whose fingerprint is stored on the document).

Main Screen

Clicking the Datastrip logo will return the user to the *Main Screen* and will reset the scanner subsystem (if the unit contains an optical scanner subsystem). On the *Main Screen*, a user can perform the following operations:
- Clicking on the '*toolbox'* button will open the *Configuration Screen*.
- Clicking on the *'OK'* or *'X'* will exit the application.
- Clicking on the *Photo, Text,* or *Fingerprint* windows expands that window

Configuration Screen

On the *Configuration* screen, the following operations are available:
- Clicking on the '*FP Settings*' button will open the fingerprint threshold setting screen. Refer to the <u>Fingerprint Settings Screen</u> section below for details**.**
- Clicking on the *'Scan Settings*' button will open the scanner settings screen. Refer to the <u>Scanner Settings Screen</u> section below for details**.**
- Clicking on the '*Timer Settings*' button opens the "*Display Timer Diagnostics*" screen. To use this feature, you must first "*Auto Hide*" the windows task bar by clicking *Start/Taskbar_and_Start_Menu* and checking the *'Auto Hide'* box. In The **SuperViewer** application, check the "*Display Timer Diagnostics*" box and return to the *Main Screen*. The next document scanned will be timed and recorded on the bottom line of the display as (Scan: Find:

Decode: Total). e.g. S:5.3 F:0.1 D:0.6 T:6.0.
- Clicking on the '*Decode Settings*' button will open the *Find Decode Settings* screen. Refer to the Find Decode Settings Screen below for details.
- Clicking on the '*General Settings*' button will open the *General Settings* screen. To use the feature, check the "*Use GUI Buttons*" box, and return to the *Main Screen*. The GUI buttons *"Photo", "Text",* and *"Fingerprint"* will be displayed above the windows.
- Clicking on the "Datastrip" logo button will bring the application back to the *Main Screen*.
- Clicking on the '*Toolbox'* has no effect.
- Clicking on the '*OK'* or '*X'* will exit the application.

Fingerprint Settings Screen

On the *Fingerprint Settings* screen, a user can configure the thresholds used by the fingerprint matching algorithms. Cogent and Identix are the different fingerprint algorithms that can be licensed for use on the DSV3 terminals. A higher number tells the system to require a better match of the fingerprints. Typical threshold values are:
> § Cogent: 1000
> § Identix: Low = 200, High= Not used
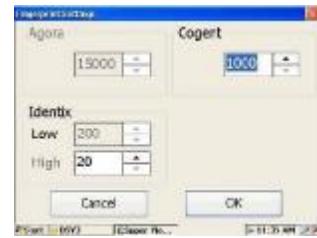
- Clicking on the '*OK'* will save the settings and return the application to the *Configuration* screen.
- Clicking on the '*Cancel'* or the *'X'* will abort any changes to the settings and return the application to the *Configuration* screen.

Scanner Settings Screen

On the *Scanner Settings* screen, a user can configure parameters for the optical scanner. This is only necessary for DSVII mobile terminals equipped with an optical scanner, and does not apply to the DSV3 product family.
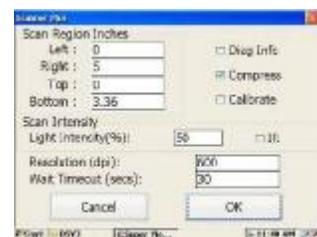
Find Decode Settings Screen

On the *Find Decode Settings* screen, a user configures the type of optical symbology the system will decode. Only one symbology at a time can be selected.
- Select the type of 'symbol' that the unit will Find and Decode from this screen. The choices are *Datastrip, OCRB, PDF417*, or *Barcode*.
  > § *Datastrip*: Datastrip2D and 2DSuperscript two-dimensional barcodes. *(Not supported by DSV3 terminals.)*
  > § *OCRB*: OCRB text
  > § *PDF417*: PDF417 two-dimensional barcode
  > § *Barcode*: a variety of linear (1 dimensional) barcodes
- Clicking on '*OK'* will save the settings and return the application to the *Configuration* screen.
- Clicking on the '*Cancel'* or the *'X'* will abort any changes to the settings and return the application to the *Configuration* screen.

10.2   Digital Still Camera Demo Application (DsVerifyStillCameraTest.exe)

This application is used in conjunction with the optional Digital Still Camera (DSC) hardware module to demonstrate the capabilities of the camera subsystem. The DSC is a currently available option on the EasyVerify (DSV3-SP), but is not yet available on the EasyRead (DSV3-EP).

After starting the application, the LCD displays preview images which are used to align the subject in preparation of taking a snapshot. After aligning the subject in the display, pressing *F1* will turn on the preview illumination (if selected in the settings), and then pressing *F1* a second time will capture and save the target image. If the preview illumination is not configured, pressing *F1* once will capture and save the target image. Digital zoom can be controlled via the "Settings" menu or by using the *F2* and *F3* buttons:

- *F3* = x2 digital zoom
- *F2* = x1 digital zoom

Snapshots taken and stored by the camera may be viewed on the display via the menu selection "*FILE->Display latest Snapshot*". This will display the last snapshot acquired by the camera. The user can then navigate to previous and next snapshots via the "*FILE->Previous Snapshot*" and "*FILE->Next Snapshot*" menu selections. Once the user is done reviewing snapshots, selecting "*FILE->Exit snapshot display mode*" will return the camera to the previewing state.

An external USB or compact flash storage card can be used for storing snapshots to conserve the embedded non-volatile memory. All captured images are stored in 24-bit color depth (full color) BMP files and are stored in the following folder: depending on the media used:

- Internal non-volatile memory: */Hard Disk/DSV3/My Documents*
- External USB memory: */Storage Card/DSV3/My Documents*
- External CF memory: */Hard Disk2/DSV3/My Documents*

Changes to the camera settings can be made via the "*Settings*" menu selection, and the settings are stored in the registry and restored the next time the application is run. The Digital Still Camera settings include:

Setting	Selections Available	Description of Setting
Brightness	-2.0 F-stops to +2.0 F-stops	Controls the amounts of light during exposure. The larger the F-stop, the more bright the image will appear.
Capture Size	2048 x 1536 (3.2M pixels) 1632 x 1232 (2.0M pixels) 1280 x 1024 (1.3M pixels) 800 x 600 (480K pixels) 640 x 480 (307K pixels)	Used to select the size of the snapshot image to acquire. Values indicate the height and width of the image in pixels.
Contrast	Automatic, OFF, 10% - 100% in increments of 10%	Used to adjust the visual properties of an image that makes an object in an image distinguishable from other objects and the background.
Flash Mode	Automatic, OFF, Always ON	Used to specify the flash (illumination) operation mode..
Flash Intensity Still	25% to 100% in increments of 25%	Controls the intensity of the flash when taking snapshots.
Flash Intensity Preview	25% to 100% in increments of 25%	Controls the intensity of the flash when previewing a scene prior to taking a snapshot.
Flicker Cancellation	OFF, 50 Hz, 60 Hz	Improves image quality when the camera is used in an environment containing fluorescent lighting. Flickering of fluorescent lighting is caused by alternating current reversals occurring 50 to 60 times a second.
Preview Illumination	ON, OFF	Specifies whether or not to use flash illumination during preview mode.
Preview Size	320 x 240, 160 x 120	Used to select the size of the preview image displayed on the DSV3 screen. Values indicate the height and width of the preview image.
Sharpness	Normal, Less Sharp, More Sharp	This setting softens or sharpens areas in the image where an edge changes from one brightness level to another.
White Balance	Automatic, Sunlight, Outdoor shadow, Fluorescent, Tungsten, LED	Controls the process of removing unrealistic color casts, so objects which appear white in the scene being captured are rendered white in the photograph. Specify the setting closest to the environment in which the snapshot is being taken.
Zoom	x1, x2	Used to provide the equivalent of two lenses with different focal lengths. X1 is normal operation, X2 is the "zoomed" mode.

10.3   DsCameraScannerEPTest.exe (Virtual Comm Mode Demo App)

DsCameraScannerEPTest is the preferred software application for demonstrating the optical scanner on the EasyRead (DSV3-EP). It demonstrates the use of the camera scanner control in Virtual Com mode, and it was designed for use with a DSV3 EP configured for Virtual Com mode. For the EasyRead terminal, it is recommended to use this application instead of "**DsCameraScannerPSTest.exe**" (see 10.5) since this application provides more functionality: illumination control, scan window size, and additional document type and length of decoded data.

Virtual Com mode allows more software developer control over the scanner and more significantly, it enables the reading of binary (non printable) data found often in 2D barcodes. This application can be used to scan and decode documents having 1 dimensional bar codes, PDF-417 symbols, and other optional OCRB text and 2D symbologies (see section 12.3). Unprintable characters will be substituted by periods. The source code for this application is provided in the SDK for developer reference.

10.3.1   Operating Instructions
The basic operating instructions for this application are:
- To initiate a manual scanning operation, press *F2* and hold it down until you hear a confirmation beep (signifying that the symbology was scanned and decoded) is heard. The operator must release *F2* key and depress it again to begin another scan.
- The *F3* key will toggle between manual scanning mode as described above and an automatic scanning mode that will retrigger again after a successful read was completed.
- The operator can choose between different illumination sources by using the radio button at the top of the screen.
- The operator can also select the dimensions of the scan window by using the radio buttons in the upper right side of the screen. The 1200 x 680 window should be used for almost all media.
- Once a document has been scanned, the decoded results are displayed in the main window, and other information about the document type / symbology, and the length of the decoded data is shown in the lower right hand side the display.

10.4   DsCameraScannerHIDTest.exe (HID Mode Demo App)

DsCameraScannerHIDTest is an application that demonstrates the use of the HID (Human Interface Device / keyboard emulation) operation / control of the optical scanner in the mobile terminal. It was designed for use with a DSV3 terminal equipped with an optical scanner that is configured to work in HID keyboard emulation mode. It can be used with:
- Point & Shoot Scanner in the EasyVerify (DSV3-SP)
- Camera-Based Scanner in the EasyRead (DSV3-EP)

This application can be used to scan and decode documents having 1 dimensional barcodes, PDF-417 symbols, and other optional OCRB text and 2D symbologies (see section 12.3). The source code for this application is provided in the SDK for developer reference.

10.4.1   Operating Instructions
The basic operating instructions for this application are:
- To initiate a manual scanning operation, press *F2* and hold it down until a confirmation beep (signifying that the symbology was scanned and decoded) is heard. The operator must release *F2* key and depress it again to begin another scan.
- The *F1* key will toggle between manual scanning mode as described above, and automatic scanning mode that will retrigger again every 3 seconds.

10.5   DsCameraScannerPSTest.exe (Virtual Comm Mode Demo App)

DsCameraScannerPSTest is an application that demonstrates the use of the Virtual Com mode of operation of the optical scanner in the mobile terminal. It was designed for use with a DSV3 terminal equipped with an optical scanner that is configured to work in Virtual Comm mode. Virtual Com mode allows more software developer control over the scanner and more significantly, it enables the reading of binary (non printable) data found often in 2D barcodes. It can be used with:

- Point & Shoot Scanner in the EasyVerify (DSV3-SP)
- Camera-Based Scanner in the EasyRead (DSV3-EP)

This application can be used to scan and decode documents having 1-dimensional bar codes, PDF-417 symbols, and other optional OCRB text and 2D symbologies (see section 12.3). Unprintable characters will be substituted by periods. The source code for this application is provided in the SDK for developer reference.

10.5.1   Operating Instructions

The basic operating instructions for this application are:

- To initiate a manual scanning operation, press *F2* and hold it down until a confirmation beep (signifying that the symbology was scanned and decoded) is heard. The operator must release *F2* key, and depress it again to begin another scan.
- The *F3* key will toggle between manual scanning mode as described above, and automatic scanning mode that will retrigger again after a successful read was completed.

10.6 EPassport ICAO Viewer (ICAO Viewer.exe)

The **ICAO Viewer** application is a sample application designed to demonstrate the reading and validation of an ePassport. The data read from the ePassport is displayed on the screen. The application is able to perform access control and data validation security mechanisms such as Passive Authentication (PA), Basic Access Control (BAC), and Active Authentication (AA) as mandated by the ICAO standards body.

The ePassport is first optically scanned by the terminal to read the Machine Readable Zone (MRZ) at the bottom of the data page. The MRZ contains a key that is then used to access the contactless smart card IC embedded in a BAC enabled ePassport. After the terminal reads and decodes the MRZ from the ePassport and then extracts the key, the terminal then uses its smart card reader to read, decode, and validate the information in the ePassport's smart card IC. For DSV3 terminals, the **ICAO Viewer** application (for Virtual Comm mode: see section 12.3) is located in the following directory:

My Device/Hard Disk/DSV3/EPassport_ICAOViewer_VCOM

10.6.1   EPassport Overview

An ePassport contains a standard data page as is found in legacy passport. However, it also contains a an RFID IC that is used to electronically store and retrieve the holder / owner's identification details using contactless media. The transmission of this data is encrypted by "Basic Access Control" (BAC) where the key is comprised of data contained on the document itself.

10.6.2   ePassport Security Mechanisms

The Document Security Object (SOD) is a digital signature of the contents of the ePassport (or MRTD) and is generated by the issuance agency. The SOD is stored within the ePassport and can be authenticated to prove that the document is authentic and unaltered. There are several levels of security mechanisms available:

- **Passive Authentication** (mandatory): Proves that the contents of SOD and stored information are authentic and not changed. It cannot protect against perfect duplications of the IC or IC substitution.
- **Active Authentication** (optional): Prevents copying SOD, authenticates IC, and proves that IC and physical passport belong together. It can ensure that the IC is legitimate and issued by the country claimed.
- **Basic Access Control** (optional): Prevents skimming, eavesdropping, and misuse. The e-Passport cannot be read by an electronic reader until the machine-readable zone is read first.

## 10.6.3   ICAO Viewer Operation

After opening the application, follow the instructions in the dialog box at the bottom of the main screen, and wait for the Scanner and ICAO engine to activate. The initialization is complete when the dialog box reads, "*Please Insert Card (Scan Manual Mode)*". Shown in the adjacent figure is the main screen.

Note that the **ICAO Viewer** application has a tab driven user interface. By selecting various tabs, a user can access different information, or can change various configuration options.

Insert an ePassport to be scanned and decoded. You may need to press "F4" to restart the scanner module if it has time out and powered down. The power down mode is indicated by the status bar at the bottom of the display being colored orange.

After the passport is inserted, an optical scan is initiated. The first operation that is performed is to decode and display the MRZ data. Once this is successfully performed, the unit beeps once and the MRZ data is displayed at the top of the main window.

The next step is to begin reading the smart card IC. A dialog box will display the incremental status, and show a progress bar as the data is being read.

MRZ Data

Progress Bar

Status Dialog Box
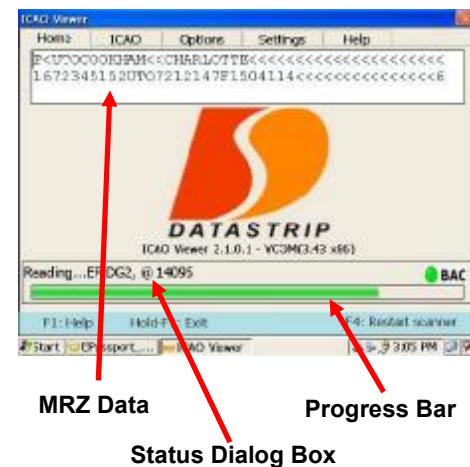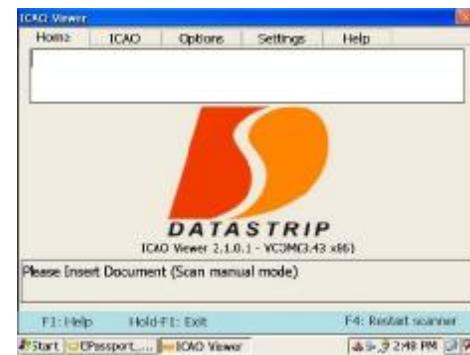
The passport must continue to be held against the reader until all the data from the smart card IC has been completely read. At this point, the dialog box on the Home tab indicates "Read complete", and the systems beeps three time.

The system will automatically move to the ICAO tab, where the photo and biographical data are displayed.

The operator may now select other tabs as desired or may remove the passport and scan a new one. The scanner may timeout (taskbar turns orange) and stop scanning after two minutes of non-activity following a read. In this case, press F4 to restart the scanner.

Some of the additional information available on the ICAO tab shows the authentication results. This information is available via the Colored Authentication Results Indicators at the bottom right. The table below summarizes the available Passive authentication (PA) and active authentication (AA) results:

**Colored Authentication
Results Indicators**

Authentication LED State	Meaning
AA green:	AA successful
AA red:	AA failed *
AA orange:	AA not performed
PA green:	PA successful
PA red:	PA failed *
PA orange:	PA not performed

Audio Feedback:
- **Successful Passport Read:** Three beeps will be played consecutively upon the successful reading of the electronic content from the presented passport. The user can remove the presented passport when the beeps sound and the contents will be displayed on the screen. This audio feedback indicates that the passport read was completed.
- **Security Requirement not Fulfilled:** A sound (exclamation) is heard in the cases of non-fulfillment of security requirements. Listed below are some possible security requirement issues. Following a scan or read failure, the scan mechanism is initiated to restart the read cycle.
    - § BAC passport presented to the contactless smart card reader without first scanning the MRZ
    - § MRZ mismatch between the scanned passport MRZ and the presented passport
    - § Premature termination of RF coupling between the passport and the reader during read initialization.

Errors and Event Logging: Should any errors be encountered during an ePassport inspection procedure, it is recommended to remove the passport and try again. If the same errors are experienced, the operator may activate event logging from the Settings tab and repeat the inspection procedure. Send the generated textual log found in the Application folder to the Datastrip support team for review.

11   Active Sync

The following subsections describe both wired and wireless methods of establishing ActiveSync communications between the terminal (running WinCE) and a PC/Laptop running Windows XP. Some typical operations you can perform via ActiveSync are:

- Synchronize, backup, and restore information on the mobile terminal
- Add and remove files from the mobile terminal
- Copy data between the mobile terminal and the PC
- Use the connection to debug programs you develop.

11.1   ActiveSync via USB 2.0 Client Port

11.1.1   Hardware/Software Requirements

The following is required to establish an ActiveSync connection via the USB 2.0 Client Port:

USB Client Port

- ActiveSync version 3.8 or later installed on the host PC (Version 4.5 recommended)
- A DSV3 mobile terminal.
- USB 2.0 to Mini B Cable (Datastrip sales code DSVOSCAUSB).
- **Datastrip_MT_USB-Sync_Setup** utility for the PC which is found on the DSV3 User Manual CD.

11.1.2   PC Configuration for USB 2.0 ActiveSync (First Time Only)

- Run the **Datastrip_MT_USB-Sync_Setup** utility found on the User Manual CD.
- After running the Sync setup you will be prompted to connect your DSV3 terminal to the PC. Turn your DSV3 terminal on and connect it to any one of the host PC USB ports using the USB 2.0 to Mini B cable. After the DSV3 terminal has been connected, Windows will notify you that it has "Found New Hardware". You will then be asked "Can Windows Update search for new software?" Answer: "NO, not this time."
- The Wizard will then ask how you want to install software. Answer: Install the software automatically (Recommended).

11.1.3   Establishing a Connection

- Each time you connect the DSV3 terminal to the host PC you will be asked if you would like to set up a Partnership. If you will be using this DSV3 terminal on this PC regularly then answer "*Yes*". If this is a one time use on this PC, answer "*No*". In either case you will be connected and can transfer files between the PC and the DSV3 terminal.

11.1.4   Troubleshooting the Connection

If a connection is not automatically established, check the following:

- The DSV3 will not connect while it is in Suspend mode. Wake the DSV3 from Suspend prior to connecting the USB cable.

11.2   ActiveSync via the Docking Station

Follow the same procedure as described in section 10.2, except that the USB cable is connected to the USB client port on the docking station.

USB Client

12   Using the Optical Scanner & Smart Card Reader

12.1   Reading ePassports

The EasyRead is optimized for one-step reading of electronic passports (ePassports) and standard passports. An ePassport is the same as a traditional passport with the addition of a small integrated circuit (smart card IC) embedded in the cover. All ePassports are indicated by an internationally recognized logo (shown below), printed on the front cover.

ePassport logo

The smart card integrated circuit in an ePassport stores:
- The biographical data visually displayed on the data page of the passport
- The passport holder's photograph stored in digital form
- A unique chip identification number
- A digital signature to protect the stored data from alteration.
- Other optional data as defined by the ICAO standards body.

The EasyRead is equipped with two separate antennas for reading ePassports, since some countries have placed the contactless smart card chip in the front cover of the ePassport, while other countries have place it in the rear cover. Having two antennas ensures that the ePassport smart card IC can be read seamlessly after scanning the MRZ without having to move the document away from the optical scanner.

Smart Card Antenna location
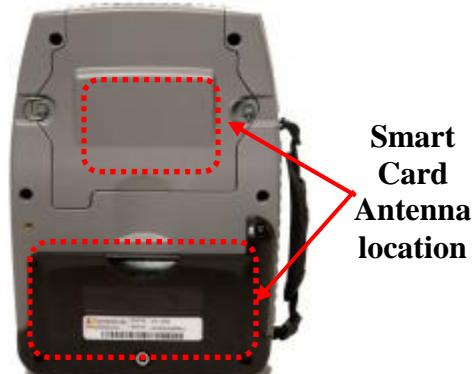
The adjacent figure shows how an ePassport should be placed in the EasyRead. The passport should be opened to the data page, and this page should be placed against the glass platen so it can be optically scanned and decoded by the terminal. Once the document is optically scanned, the system then automatically reads the embedded smart card integrated circuit in the ePassport*.

Place the passport data page against the glass platen so it can be optically scanned.

> ** A software application, such as "ICAO Viewer" should be launched in order to activate a scan and read process*

Shown below are the typical motions for inserting and reading an ePassport. The top sequence of photos shows the normal operation where the operator can continuously see the LCD screen and observe the reading operation. The bottom sequence of photos is shown for clarity.

12.2   Contactless Smart Card Reader

The EasyRead can also be used to read a wide range of other ISO 14443 smart card media. Either antenna can be used to read ISO 14443 smart card media. The system will automatically select which antenna to use. Place and hold the smart card media to be read against the back of the terminal in the center of the antenna. The adjacent figure shows a CR80 sized smart card credential centered against the upper antenna.

Smart Card Antenna locations
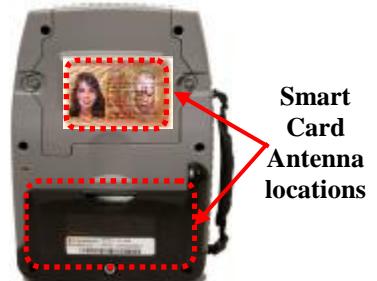
12.3   Optical Scanner

The EasyRead can also be used to read and decode a wide range of other documents containing optical symbology. The terminal contains a 1.2 Megapixel image sensor that provides high resolution scanning (image capture) for decoding numerous optical symbologies. It contains enhanced scanning and decoding algorithms and can decode all standard 1 dimensional and common 2 dimensional barcodes. There is a comprehensive SDK that enables rapid custom application development.

The supported optical symbologies are listed below. The entries marked as optional do not ship standard with the EasyRead (DSV3-EP); however, they are available for purchase.

1D Codes		2D Codes	OCR
Code 39	Matrix 2 of 5	PDF417	OCR B: ICAO 9303 Travel Docs
Code 93	Straight 2 of 5	QR Code (optional)	OCR B generic (optional)
Code 128	Code 11	Data Matrix (optional)	OCR A (optional)
UPC/EAN/JAN	Codabar	Aztec Code (optional)	MICR (optional)
Hong Kong 2 of 5	MSI Plessey	Maxicode (optional)	
Interleaved 2 of 5	Pharmacode	Micro QR Code (optional)	
NEC 2 of 5	DataBarTM	Codeblock (optional)	
		Composite Code (optional)	

12.3.1   Scanning Instructions

To scan a document, you need to be running some scanning software application such as **ICAO Viewer.exe** (for ePassports) or **DsCameraScannerEPTest.exe**. The document or credential to be scanned should then be inserted in the document slot and held against the glass platen. The optical symbology to be read and decoded should be facing the glass platen. The adjacent figure shows the typical placement of a CR80 (i.e. credit card sized) document.

12.3.2   Scanner Software Interface / Operating Mode

The camera scanning control has several settings that affect the behavior of the scanning operation. There are two different modes in which the scanner can be configured:

- USB HID (Human Interface Device) as a keyboard emulation mode
- USB Virtual Com mode with Datastrip control API

When the camera scanner is configured for Virtual Com mode, a rich software API is then available to control the behavior of the device. Virtual Com mode allows more software developer control over the scanner and more significantly, it enables the reading of binary (non printable) data found often in 2D barcodes.

USB HID keyboard emulation mode is a more simplistic approach of using the camera scanner. The main drawback of the HID mode is that it can only decode printable characters. Decoding binary data in this mode is not possible since the binary data contains ASCII like control characters. It also does not allow for full configuration of the scanner, for a more methodic scanning operation, for status checking, or for a watchdog mechanism. To use the scanner in HID mode, a software developer only needs to:

- Invoke some basic initialization / de-initialization methods
- Activate and deactivate a trigger
- Create a focused input window in which the decoded results will be captured and displayed

12.3.2.1   Changing the Operating Mode from Virtual Com Mode to HID Mode

If the scanner is in Virtual Com mode, it can be re-configured for HID mode by using the following steps:

- Launch the **DsCamerScannerEPTest.exe** application
- Copy and cut out the linear bar code below so it can be inserted and scanned by the terminal.
- To initiate a scan operation, press *F2* and hold it down until you hear a confirmation beep (signifying that the barcode was scanned and decoded).
- You will then hear 2 beeps and the scanner will reboot itself after ~8 seconds. You then hear 3 more beeps.
- You should now be in HID keyboard emulation mode with the default settings, (run **DsCamerScannerHIDTest.exe** to verify this.)

FSUSB Keybd Internal

³ 9 9 9 9 4 0

12.3.2.2   Changing the Operating

12.3.2.3   Mode from HID Mode to Virtual Com Mode

If the scanner is in HID mode, it can be re-configured for Virtual Com mode by using the following steps:

- Launch the **DsCamerScannerHIDTest.exe** application
- Copy and cut out the three bar codes shown below so that they can be inserted and scanned by the terminal. Scan each of the bar codes sequentially as described below.
- To initiate a scan operation, press *F2* and hold it down until you hear a confirmation beep (signifying that the barcode was scanned and decoded).
    - § Scan the top barcode. You should hear 3 beeps.
    - § Scan the middle barcode. You should hear 1 beep.
    - § Scan the bottom barcode. You should hear 3 beeps.
- The scanner will reboot itself after ~8 seconds. You should then hear 3 more beeps.
- You should now be in Virtual Com mode with the default settings, (run **DsCamerScannerEPTest.exe** to verify this.)

1. Enter program mode

999999

2. Novram (512) Config
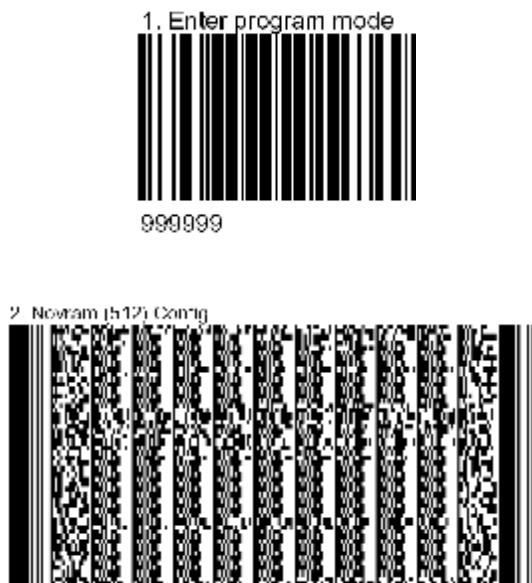
3. Exit program mode

999999

13   Contact Smart Card Reader Peripheral (Optional)

The Contact Smart Card Reader is an optional module available for the EasyRead and EasyVerify terminals. It is a factory installed module that is mounted to the bottom of the terminal. The contact smart card peripheral reads ISO 7816 smart cards.

The docking interface is replicated on the bottom of the peripheral so that the terminal equipped with a contact smart card peripheral may be used with the docking station. Shown below are the terminals configured with contact smart card peripherals.

EasyRead (DSV3-EP)   **EasyVerify (DSV3-SP)**

As shown below, the ISO 7816 contact smart card must be inserted with the card's contacts facing down.

Smart Card Contacts

**Insert with
Card's Contacts
Facing Down**

14   Magstripe Reader Peripheral (Optional)

The Magstripe Reader is an optional module available for the EasyRead and EasyVerify terminals. It is a factory installed module that is mounted to the bottom of the terminal. It is housed in the same peripheral housing as the contact smart card reader (see section 13). The docking interface is replicated on the bottom of the peripheral so that the terminal equipped with a magstripe peripheral may be used with the docking station.

The media or credential being read must have the magnetic stripe facing up to be read properly.

Slide the Mag Stripe Card Through the Reader:
Mag Stripe Facing Upward

15   Docking Station

The docking station is an optional peripheral available for the DSV3 mobile terminals and can be adjusted to for each variant of the mobile terminal. The docking station has the following attributes:

- **Wired I/O Access:** Provides convenient access to the wired I/O ports on the mobile terminal when docked.
    - § USB 2.0 Host: standard A (x2)
    - § USB 2.0 Client: standard B (x1)
    - § Ethernet: 10/100 RJ45 (x1)
    - § RS-232 DB9 (x1)
- **Battery Charging:** Supplies power to charge the batteries inside the mobile terminal
- **Storage:** Provides a convenient place to store the mobile terminal with "grab and go" access.

The docking station mates with the DSV3 terminal via a high density connector located on the bottom of the terminal. There are two guide holes on the terminal (and corresponding guide posts on the docking station) that make it easy to dock and remove the mobile terminal while providing robust and rugged connectivity.

Guide Holes

High Density Connector
for Docking Station
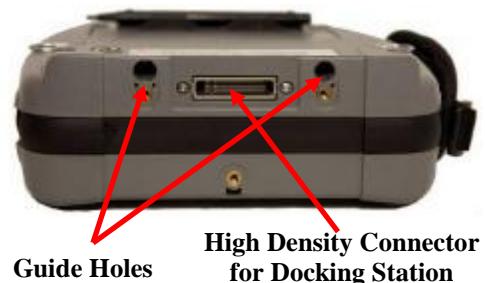
15.1   Adjusting the Docking Station Backrest

The DSV3 docking station has an adjustable backrest. It is important to adjust the backrest correctly to ensure proper operation. There is a forward position (for use with the EasyVerify), and a rear position (for use with the EasyRead). To change the position of the backrest support, remove the 2 Philips-head screws in the plastic backrest support, repositioning the backrest support to the appropriate position, and then re-tighten the screws.

- **Forward Position**: This position should be used for EasyVerify (DSV3-SP).
- **Rear Position**: This position should be used for EasyRead (DSV3-EP)

EasyRead (DSV3-EP)   **EasyVerify (DSV3-SP)**

Once the backrest is installed in the correct forward or rear position, the adjustment plunger may be adjusted to accommodate any installed optional peripherals. The height of the adjustment plunger can be adjusted by pulling it up or pushing it down to best support the specific configuration of the terminal. There are detents in the mechanism to maintain the selected height. Once the plunger height is adjusted, place the mobile terminal in the docking station. The adjustment plunger may need to be retracted (turned counter clockwise) for the unit to fit. With the terminal resting in the docking station, the adjustment plunger should then be extended (turned clockwise) until it just touches the back of the terminal.

To use the optical scanner on the EasyRead (DSV3-EP) while it is docked, the adjustment plunger may be removed as shown in the adjacent picture. The plunger is removed by pulling it upward until is separates from the backrest support.

15.2   Docking Station I/O

The docking station provides access to the wired I/O ports of the DSV3 mobile terminal. Shown below is a photo of the bottom of the docking station depicting the location of each of the I/O connectors. Cables are normally routed through the cable trough in the back of the docking station. There is a cable tie anchor point that can be used to secure the cables.

Cable Routing Trough

Security Cable Loop

RS-232

Ethernet

USB Host (x2)

Cable Tie Anchor Point

USB Client

12V Power Input

16   Troubleshooting

PROBLEM	POSSIBLE REASON AND REMEDY
Unit does not power up	• The battery may be completely discharged (or may not be installed). 　　• Open the battery access cover and verify that the battery is properly installed. 　　• Use the external AC power adapter to operate the unit and to simultaneously charge the battery. • Please refer to Section 4.12 "Battery Charging and Replacement"
The Power Status LED turns red when the power button is held down and the unit does not power up.	• This is an indication that the internal battery is very low, and does not have sufficient charge to run the unit. • Plug in the AC power adapter to charge the battery AS SOON AS POSSIBLE. • Please refer to sections 4.2**Error! Reference source not found.** and 4.3 for Power button, LED indicator, and tone operation.

17   Available Parts, Supplies, and Accessories

The following accessories and replacement parts are available for the DSV3 mobile terminals. Please contact Datastrip or an authorized reseller for a complete list, and for pricing and availability.

	ACCESSORIES / SPARE PARTS
1	**Stylus (standard or tethered)**
2	**Shoulder Strap and D-Ring Connection Points** For applications that require over-shoulder carrying of DSV3 devices. • Ergonomically curved and padded shoulder area, featuring non-slip material on one side. • Wide length adjustment range.
3	**DSV3 USB 2.0 Active Sync Cable** • For ActiveSync connection to an external server via the USB 2.0 Client Port on the DSV3 terminal.
4	**Vehicle Power Charger**
5	**Internal Memory Upgrade: up to 1 GB of RAM**
6	**Internal Memory Upgrade: Larger non-volatile Flash memory modules (> 1GB)**
7	**DS MT SDK (Software Development Kit)** • Provides the software components, samples, and information necessary to develop and deploy large scale, real world applications.

18   Service & Support

Technical support is available through the following contacts:

Home page and Tech Support: www.datastrip.com

For customers located in North and South America:
Address: Datastrip, Inc.
                    1285 Drummers Lane Suite 105
                    Wayne, PA 19087-1572
E-mail: support@datastrip-inc.com
Phone: (610) 594-6130
Fax: (610) 594-6065
Office Hours: 8:30 AM to 5:30 PM EST/EDT

For Customers outside North and South America:
Address: Datastrip Ltd.
                    1, Thame Park Business Centre
                    Wenman Road
                    Thame, Oxfordshire
                    OX9 3XA
E-mail: uksupport@datastrip.com
Phone: +44 (0) 1844 215668
Fax: +44 (0) 1844 215669
Licensing: +44 (0) 1844 215668
Office Hours: 0900 to 1730 GMT/BST.

✚   **To return your Datastrip for service, upgrade or repairs, please contact the tech-support department by e-mail or telephone. An RMA will be issued, and should be clearly marked on the outside of your shipping carton. Please be certain to provide adequate shipping insurance to safeguard the contents. For international shipments, please include a declaration of value, or other relevant legal documents that are required for shipment of this type of equipment.**

✚   **Please use the original shipping carton and packing materials whenever possible.**

✚   **Please ensure you send your package PREPAID or it will not be accepted. Do not ship collect. Datastrip will return all RMA equipment shipping prepaid as well. Failure to follow this requirement will result in delays.**

✚   **For parts, supplies and accessories, place your order through your authorized Datastrip reseller, or by contacting Datastrip Limited or Datastrip, Inc.**

Datastrip thanks you for purchasing our equipment. If you have any comments, suggestions, questions, or concerns, we would like to hear from you.