

ScanPal 2

Portable Data Collection Terminal

User manual



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ScanPal 2

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1. Introduction

The *ScanPal2 Portable Terminal* is a compact portable terminal, light and very high performance, designed for daily intensive use.

It is powered by two AAA LR03 replaceable batteries or one Ni-MH rechargeable battery and is equipped with a rich set of development tools, including an *application generator* (under Windows), a "*BASIC*" compiler and a "*C*" compiler.

It is provided with an FSTN technology LCD graphics screen, with a resolution of 128x64 pixels, equipped with backlighting and a contrast control enabling it to be read perfectly, whatever the ambient lighting.

Its Laser or CCD scanner and its integrated RS-232 and IrDA communication ports make the *ScanPal2 Portable Terminal* ideal for inventory, stock control, document monitoring, shop floor management, asset tracking, warehousing and distribution operations.

2. General characteristics

The basic characteristics of the *ScanPal 2 Portable Terminal* are given below.

2.1. Electrical characteristics

- *Main battery* two AAA LR03 replaceable batteries or one Ni-MH rechargeable battery
- *Backup battery* 3.0 V, 7.0 mAh rechargeable lithium battery, for the static random access memory (SRAM) and the calendar
- *Stand-alone operation* over 100 hours and over 80,000 reads (CPU in low-speed mode and 1 read every 5 seconds)

2.2. Environment

- *Humidity (operating)* non-condensing from 10% to 90%
- *Humidity (storage)* non-condensing from 5% to 95%
- *Temperature (operating)* from -20 °C to +60 °C
- *Temperature (storage)* from -30 °C to +70 °C
- *EMC regulations* FCC class A, CE and C-Tick approved
(EMC: Electromagnetic compatibility) (FCC: Federal Communications Commission)
- *Shock resistance* 1.2 m drop on to concrete

2.3. Physical characteristics

- *Dimensions* 145 mm (L) x 63 mm (W) x 33.5 mm (H)
- *Weight* 180 g (including battery)
- *Colour* dark grey
- *Material* ABS (Acrylonitrile Butadiene Styrene)

2.4. CPU

- Toshiba 16-bit CMOS microprocessor
- Dual clock with low-speed mode capability for saving the batteries (for further information on the *Speed* setting, refer to section 5.3)

2.5. Memory

- *Program*..... 1 MB Flash ROM, flash memory used for saving the program, character sets, constants, etc.
- *Data* 1 MB SRAM, static random access memory

2.6. Scanner

The *ScanPal2 Portable Terminal* can be equipped with a Laser or long range CCD scanner. Their characteristics are as follows:

ScanPal 2L (Laser)

- *Light source* visible laser diode operating at 670 ± 15 nm
- *Scan rate*..... 36 ± 3 scans / second
- *Scan angle* 42° nominal
- *Minimum print contrast*..... 20% dark/light absolute reflection at 670 nm
- *Depth of field* 5 cm - 95 cm, depending on the bar code resolution

ScanPal 2C (CCD)

- *Resolution*..... 0.10 mm - 1 mm
- *Depth of field* 20 cm
- *Field width*..... 45 mm - 124 mm
- *Scan rate*..... 100 scans / second
- *Ambient light rejection*..... 1200 lux (direct lighting from the sun)
2500 lux (fluorescent lighting)

2.7. Screen

- FSTN technology LCD graphics screen, with a resolution of 128x64 pixels and LED backlighting.

2.8. Keypad

- 21 rubber keys, consisting of alphanumeric keys, arrow keys, function keys and a key for triggering the scanner.

2.9. Indicator

- *Buzzer*..... audible indicator, programmable from 1 KHz to 4 KHz, low-power transducer type
- *LED*..... dual-colour (green and red) programmable LED

2.10. Communication

Three types of communication are possible: standard RS232, infrared and screen/keyboard.

- *RS232*..... transmission speed up to 115,200 bps
- *Infrared* standard 1.0 IrDA or high-speed IR:
 - transmission speed up to 115,200 bps
 - distance, 5 cm to 100 cm
 - maximum angle, 30 °
- *Screen/keyboard* only for data upload

2.11. Programming language

- *Application generator (under Windows)*
- *"BASIC"*
- *"C"*

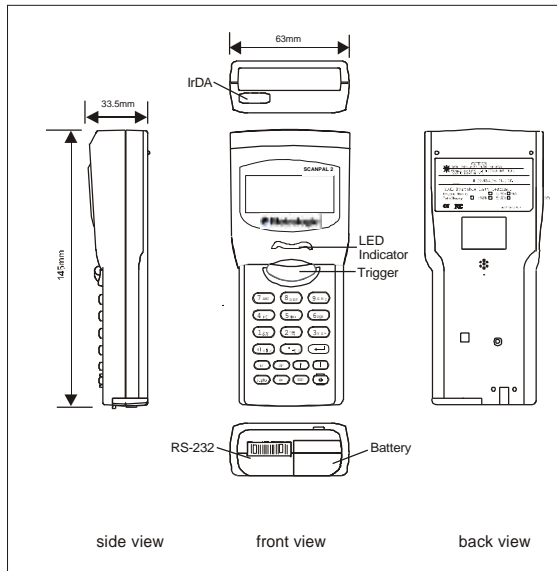
2.12. Accessories

- *Battery charger*
- *Ni-MH rechargeable battery*
- *Screen/keyboard wedge cable*
- *Protective case*
- *High-speed IR transceiver*
- *Download/charger cradle*
- *RS232 cable*
- *Cradle power supply (only for the charger function)*

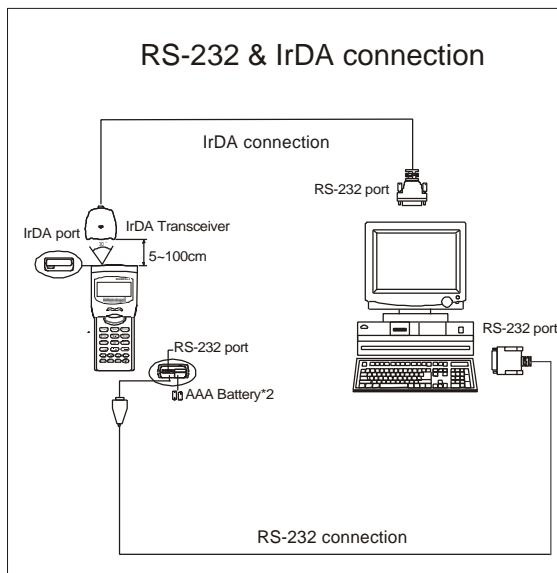
For the references and descriptions, refer to section 7.

3. Hardware configuration

3.1. Front, back and side view



3.2. RS232 and IrDA connection



4. Software organization

The *ScanPal 2 Portable Terminal* software system consists of three modules:

- The *Kernel module*
- The *System (Operating System) module*
- The *Program module*

4.1. Kernel Module

The *Kernel module* forms the heart of the system. It is extremely secure and always protected by the system. Only a failure of the flash memory or incorrect switching off of the power supply, during system restart after a kernel update, can destroy the kernel. The *Kernel module* guarantees that the user can always download his program, even when the operating system has been damaged by the user program.

The *Kernel module* allows the following operations to be performed:

- ***Program Download***
- ***Update Kernel***
- ***Test & Calibrate***
- ***Version***

For further information, refer to section 5.4.

4.2. System Module

The *System module* is the operating system. It allows the following operations to be performed:

- ***Memory***
- ***Settings***
- ***Reader***
- ***Battery***
- ***Test***
- ***Download***
- ***Version***

For further information, refer to section 5.3.

4.3. Program Module

The *Program module* operates on top of the *System module*. The user programs are downloaded into this module.

The user program, downloaded into the *Program module*, is started automatically when the *ScanPal2 Portable Terminal* is powered up.

The user program pre-loaded into the *Program module* of the *ScanPal2 Portable Terminal* is the *application interpreter*, making it possible to run an application created with the *application generator*. By default, the application loaded is an inventory application allowing the following operations to be performed:

- **Collect data**
- **Upload data**
- **Utilities**

For further information, refer to section 5.2.

4.4. Creating your own program

There are three development tools making it possible to create your own application or program.

- **The application generator**

Requires prior loading, into the *Program module*, of the *application interpreter* making it possible to run an application created with the *application generator*.

For further details, see the *application generator* user manual.

- **The "BASIC" compiler**

Requires prior loading, into the *Program module*, of the *"BASIC" interpreter* making it possible to run a *"BASIC"* program.

- **The "C" compiler**

For further information on the development tools, contact:

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5. Operations

Before any operation, it is advisable to make sure that the replaceable batteries are new, or that the rechargeable battery is correctly charged.

5.1. Operations at the keypad

The *ScanPal2 Portable Terminal* keypad consists of 20 rubber keys and one key for triggering the scanner. The functions of the special keys are as follows:



Enter

Confirms an entry on the keypad.



Back Space

Deletes the characters situated to the left of the cursor.



Space

Inserts the *space* character.



Up

Moves the cursor upwards.



Down

Moves the cursor downwards.



Alphabetic / Numeric toggle



Makes it possible to change alternately from the alphabetic entry mode to the numeric entry mode.





When the terminal is in alphabetic mode, a small icon is displayed on the screen, and each numeric key can be used to insert one of the three letters written on the key. Successive pressing of the key successively displays the three available letters. Releasing the key for one second or pressing another key confirms the letter displayed and inserts it.




Function

This key cannot be used on its own, but in combination with a numeric key (1 to 9), in order to obtain a specific function, depending on the program loaded.

For example, pressing simultaneously on the  and  keys activates the function #1 (up to 9 functions).

Pressing simultaneously on the  and , or  and , keys makes it possible to adjust the screen contrast.

Pressing simultaneously on the  and  keys makes it possible to activate or de-activate the screen backlighting.




Escape

Generally makes it possible to exit the current operation.



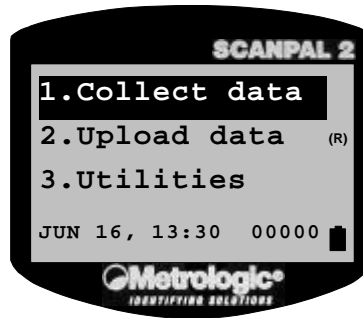
Power On/Off

To avoid pressing this key in error, the power on/off function is activated only when the  key is held in for around 1.5 seconds.

5.2. Program Mode


This is the default operating mode when the *ScanPal 2 Portable Terminal* is powered up. It depends on the user program loaded into the *Program module*.

The *application interpreter* and its inventory application, loaded by default, displays the following main menu:



The counter, located in the bottom right-hand corner of the screen, displays the number of records collected.


1. Collect data


Data collection starts after confirmation of the *Collect data* operation, using the  key.

A new screen displays the following two prompts:

Item:

Qty: 1

The *Item (Article)* prompt expects an item code, read by the scanner or entered on the keypad and confirmed by the  key.

The *Qty (Quantity)* prompt offers, by default, a quantity of 1, which can be modified by entering on the keypad the new quantity desired. This is confirmed using the  key. The data collected are then recorded and the two prompts are displayed again.

Pressing the  key allows a return to the main menu.

2. Upload data

Uploads the data collected, via the selected upload port.

The letter displayed on the screen, at the right of the *Upload Data* line, indicates the selected upload port: RS232 (R) , IR (T), IrDA (I) or Wedge (K).

On the PC (under Windows), to receive the data and create a text file, use the *application generator*, *232_Read.EXE* or *IR_Read.EXE*.

For further information, refer to the *application generator* user manual.

3. Utilities

- **System settings**

- **Set Upload Port**

Defines the data upload port: RS232 (cable or download cradle), IR (high-speed infrared transceiver), standard IrDA infrared or screen/keyboard Wedge.

The letter displayed on the screen, at the right of the *Set Upload Port* line, indicates the selected upload port: RS232 (R), IR (T), IrDA (I) or Wedge (K).

Default value: RS232.

- **Set Download Port**

Defines the port for downloading an application or a file: RS232 (cable or download cradle), IR (high-speed infrared transceiver) or standard IrDA infrared.

The letter displayed on the screen, at the right of the *Set Download Port* line, indicates the selected download port: RS232 (R), IR (T) or IrDA (I).

Default value: RS232.

- **Transmission Speed**

Defines the transmission speed, up to 115,200 bps.

Default value: 115,200 bps.

- **LCD Backlight**

Defines the duration of the backlighting.

Default value: 20 seconds.

- Data Deletion

Defines whether, after an unload, the data are deleted *Manually*, with a request for confirmation, or *Automatically*, with no request for confirmation.

Default value: Manually.

- Record Prompting



Activates (Yes) or de-activates (No) the display of the record number, after confirmation of an entry.

Default value: Yes.

- View Settings

Displays the various settings.

- **Browse Data**

Displays the data collected. The  and  keys allow scrolling, in a loop, of all the data collected.

- **Delete Data**

Deletes the last record or all the records collected.

- **Reading Test**

Tests the read performance of the scanner and displays the bar code read, its length and its type (symbology).

The symbologies enabled by default are as follows:

Code 39

Industrial 2/5

Interleaved 2/5

Codabar

Code 93

Code 128

UPCE without Addon

EAN8

EAN13/UPCA without Addon

The other symbologies can be enabled by the *application generator*.

- **Set Date & Time**

Defines the date and time.

- **Download Program**

Downloads an application (*.ATX) created with the *application generator* into the *ScanPal 2 Portable Terminal*, via the selected download port.

The letter displayed on the screen, at the right of the *Download Program* line, indicates the selected download port: RS232 (R), IR (T) or IrDA (I).

On the PC (under Windows), use the *application generator* or *ATX_Load.EXE*.

For further information, refer to the *application generator* user manual.

- **Memory & Battery**

Displays the size of the data memory (SRAM) in kilobytes, the voltage of the replaceable batteries or the rechargeable battery, and the voltage of the backup battery.

- **Download Lookup**


Downloads a *Lookup File* containing, for example, an item database, into the *ScanPal 2 Portable Terminal*, via the selected download port.

On the PC (under Windows), use the *application generator* or *DLookup.EXE*.

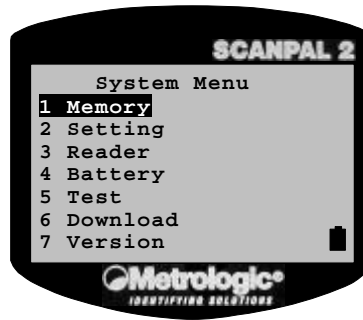
Note: this function is not available if the application loaded does not use a lookup file.

For further information, refer to the *application generator* user manual.

5.3. System Mode

Turn off the *ScanPal2 Portable Terminal*, and then simultaneously press the **7 ABC**, **9 GHI** and  keys to enter *System mode*.

System mode offers the following operations:



1. Memory

- **Size Information**

Displays the size of the data memory (SRAM) and the size of the program memory (Flash ROM), in kilobytes.

- **Initialize**

Initializes the data memory (SRAM).

Note: after an initialization, the data contained in the memory are deleted.

- **Test**

Tests the data memory. For a static random access memory (SRAM) size of 256 KB, the test takes around 15 seconds.

Note: after a test, the data contained in the memory are deleted.

2. Settings

- **Clock**

Defines the date and time.

- **Backlit**

Defines the duration of the backlighting.

Default value: 20 seconds.

- **Speed**

Defines the CPU operating speed. Five speeds are available:

Speed	Consumption
<i>Full</i>	39 mA
<i>1/2</i>	22 mA
<i>1/4</i>	12 mA
<i>1/8</i>	7 mA
<i>1/16</i>	5 mA

The consumptions are given for normal operation, with no scanner reading or data transmission.

If the full-speed mode is not necessary, choose the lowest speed, in order to save the batteries.

Default value: Full speed.

- **Auto Off**

Defines the time beyond which power down is automatic, when no operation has been performed during this time period. If this value is equal to zero, the function is de-activated.

Default value: 10 minutes.

- **Power On**

Two possible selections:

Program Resume, which starts the program from the last session used before power down; or *Program Restart*, which restarts the program from the beginning.

Default value: Program Resume.

- **Key Click**

Enables or *Disables* the issuing of a sound when a key is pressed.

Default value: Enable.

3. Reader

Tests the scanner read performance and displays the bar code read, its length, and a letter identifying the code type (symbology).

The symbologies enabled by default are as follows:

Symbology	Identifier
Code 39.....	A
Industrial 2/5	D
Interleaved 2/5.....	E
Codabar.....	G
Code 93.....	H
Code 128.....	I
UPCE without Addon	J
EAN8.....	M
EAN13/UPCA without Addon.....	P

The other symbologies must be enabled by programming.

4. Battery

- **Main**

Displays the voltage of the replaceable batteries or the rechargeable battery.

An icon, representing the battery, is permanently displayed on the screen, thus making it possible to view the charge state. When the battery icon is completely empty, the batteries should be replaced or the rechargeable battery recharged.

- **Backup**

Displays the voltage of the backup battery.

5. Test


- **Buzzer**

Tests the buzzer by means of the emission of different frequencies and durations.

Press the  key to start or stop the test.


- **LCD & LED**

Tests the LCD screen and the dual-colour LED.

Press the  key to start or stop the test.

- **KBD**

Tests the keypad keys.

Pressing a key displays its value on the screen. The  function key must be used in combination with a numeric key (1 to 9).

Press the  key to stop the test.

6. Download

- **RS232**

Downloads a user program (*.SHX) into the *ScanPal2 Portable Terminal*, via the RS232 port (cable or download cradle).

On the PC (under Windows), use *DownLoad.EXE*. The speed can go up to 115,200 bps.

- **IR (High-speed infrared)**

Downloads a user program (*.SHX) into the *ScanPal2 Portable Terminal*, via the high-speed infrared transceiver.

On the PC (under Windows), use *IRLoad.EXE*. The speed can go up to 115,200 bps.

- **IrDA**

Downloads a user program (*.SHX) into the *ScanPal2 Portable Terminal*, via the standard IrDA infrared.

On the PC (under Windows), use *DownLoad.EXE*. The speed can go up to 115,200 bps.

7. Version

Displays the following information:

Hardware version number..... (H/W)

Serial number(S/N)

Manufacturing date (M/D)

Kernel version number..... (KNL)

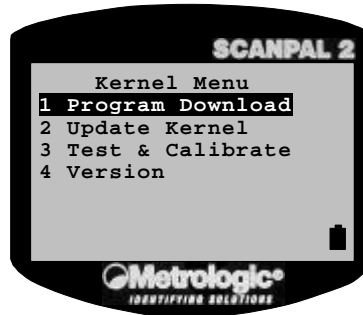
Library version number (LIB)

User program.....(USR)

5.4. Kernel Mode

Turn off the *ScanPal2 Portable Terminal*, and then simultaneously press the **7 ABC**, **9 GHI** and **⏻** keys to enter *System mode*; next turn off the *ScanPal2 Portable Terminal*, and then simultaneously press the **1 STU**, **7 ABC** and **⏻** keys to enter *Kernel mode*.

Kernel mode offers the following operations:



1. Program Download

Downloads a user program (*.SHX) into the *ScanPal2 Portable Terminal*.

The download procedure is identical to that described in *System mode* (refer to section 5.3, *Download*).

2. Update Kernel

Updates the system kernel. Updating the kernel is sometimes necessary in order to improve the system performance, or for some other reason. This function guarantees that the latest version of the kernel is being used. The procedure for updating the kernel (*KSP2-xxx.SHX*) is identical to that for downloading a user program.

Be careful: after updating the kernel, wait until the system has completely restarted before powering down the *ScanPal2 Portable Terminal*.

3. Test & Calibrate

This function is intended solely for performing various tests, diagnostics and calibrations in the factory. Do not use.

4. Version

Displays the following information:

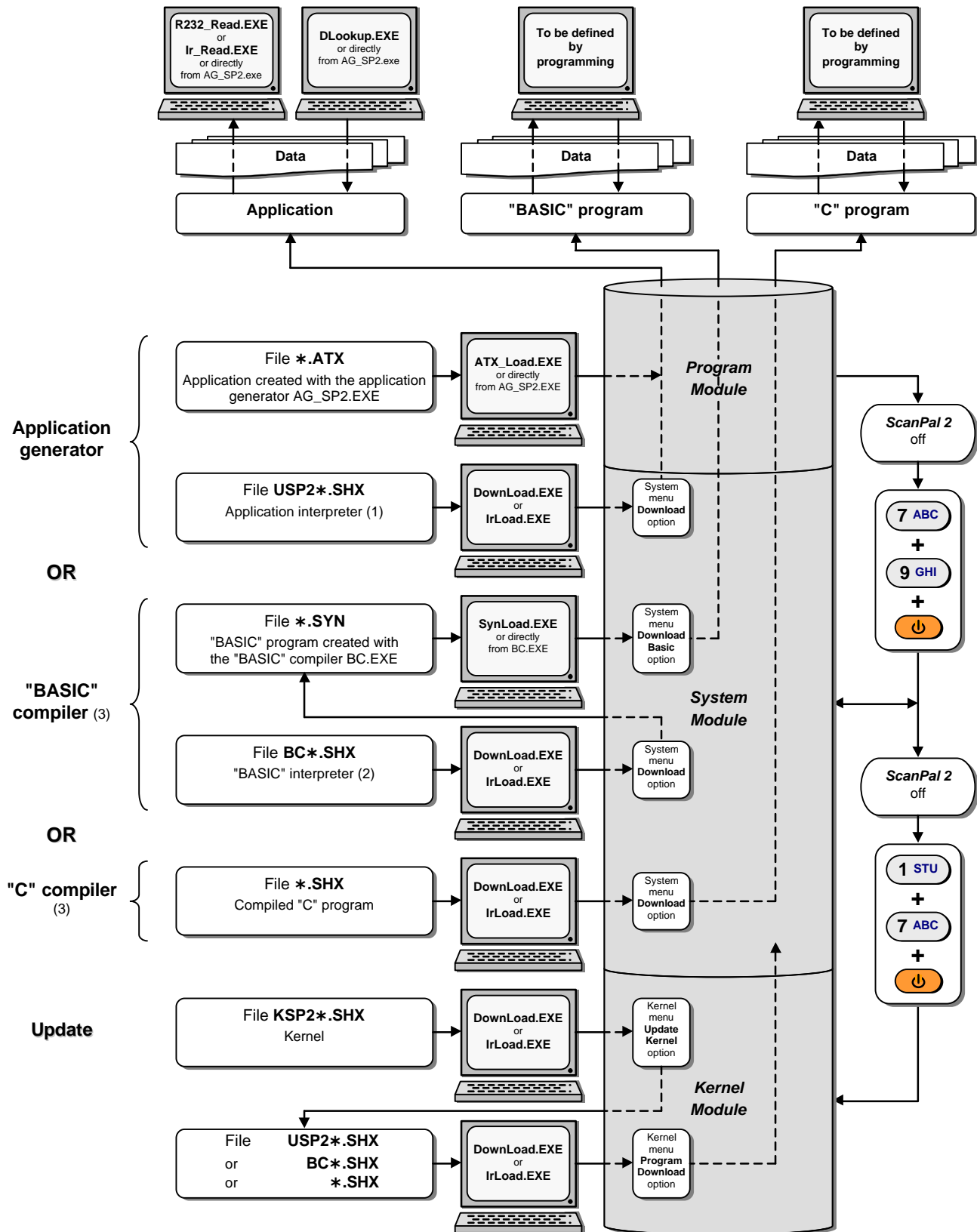
Hardware version number..... (H/W)

Serial number(S/N)

Manufacturing date (M/D)

Kernel version number..... (KNL)

5.5. Overview



6. Troubleshooting guide

- ***The ScanPal 2 Portable Terminal doesn't come on after the  key has been pressed.***

Change the batteries or recharge the battery.

- ***The ScanPal 2 Portable Terminal doesn't come on after the batteries have been changed or the battery recharged.***

Check that the replaceable batteries are correctly installed in their compartment and that the compartment (or the rechargeable battery) is properly engaged in the terminal.

If the problem persists, contact Technical Support.

- ***The battery icon, indicating the charge state, is empty.***

Change the replaceable batteries or recharge the battery.

- ***No transmission between the ScanPal 2 Portable Terminal and the host system (PC or other), via the RS232 port (cable or download cradle).***

Check that the RS232 cable is correctly connected to the host system and to the *ScanPal 2 Portable Terminal* or to the download cradle.

For transmission using the download cradle, check that the *ScanPal 2 Portable Terminal* is correctly inserted in its cradle.

Check that the communication settings of the host system match those of the *ScanPal 2 Portable Terminal*.




- ***No transmission between the ScanPal 2 Portable Terminal and the host system (PC or other), via the high-speed IR transceiver.***

Check that the IR transceiver is correctly connected.

Check that the communication settings of the host system match those of the *ScanPal 2 Portable Terminal*.

Check that the *ScanPal 2 Portable Terminal* is correctly positioned in the IR transceiver read area (a distance of 5 cm to 100 cm, and a maximum angle of 30°).

- ***The keypad doesn't work correctly.***

Turn off the *ScanPal 2 Portable Terminal*, and then simultaneously press the ,  and  keys to enter *System mode*. Select the *Test KBD* option and carry out the keypad key test.

If the problem persists, contact Technical Support.

- ***The scanner doesn't work.***

Check that the symbologies of the codes read are enabled.

Check whether the battery icon, indicating the charge state, is empty. If this is the case, change the replaceable batteries or recharge the battery.

If the problem persists, contact Technical Support.

7. Metrologic references and descriptions

<i>Reference</i>	<i>Description</i>
SCANPAL 2C-B	Basic ScanPal 2 CCD kit, including: - 1 ScanPal 2 CCD portable terminal - 2 AAA batteries - 1 RS232 cable
SCANPAL 2C-E	Advanced ScanPal 2 CCD kit, including: - 1 ScanPal 2 CCD portable terminal - 1 download/charger cradle and its power supply - 1 RS232 cable - 1 rechargeable battery
SCANPAL 2L-B	Basic ScanPal 2 Laser kit, including: - 1 ScanPal 2 Laser portable terminal - 2 AAA batteries - 1 RS232 cable
SCANPAL 2L-E	Advanced ScanPal 2 Laser kit, including: - 1 ScanPal 2 Laser portable terminal - 1 download/charger cradle and its power supply - 1 RS232 cable - 1 rechargeable battery
99-99001	Battery charger (with power supply and 1 rechargeable battery)
99-99002	Ni-MH rechargeable battery
99-99003	Screen/keyboard Wedge cable
99-99004	Protective case
99-99005	High-speed IR transceiver
99-99006	"BASIC" compiler
99-99007	"C" compiler
99-99008	Download/charger cradle (with power supply and 1 rechargeable battery)
99-99009	RS232 cable
99-99010	Cradle power supply (for the charger function only)

