



Technology
Solutions (UK) Ltd

USER GUIDE: **1097 *BLUETOOTH*[®]** **UHF RFID AND BARCODE WEARABLE HAND SCANNER**



www.tsl.uk.com

Design • Development • Manufacture

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History

<u>Version</u>	<u>Date</u>	<u>Modifications</u>
1.0	26/03/2010	Document creation
1.1	04/01/2011	Added pairing instructions for MC75A
1.2	16/11/2011	Updated photos and content to reflect new Micro USB charger

INTRODUCTION

Technology Solutions' 1097 UHF Reader provides barcode scanning and Radio Frequency Identification (RFID) functionality. The unit can be used stand alone or paired with a *Bluetooth*[®] host. It is used with UHF transponders including the EPC Global Class 1 Generation 2 transponders.

PARTS OF THE 1097 UHF READER



FIGURE 1: Parts of the 1097 UHF Reader

USING THE UHF READER

BATTERY INSTALLATION OR REMOVAL

The battery is charged using the supplied micro USB lead and therefore is unlikely to need to be changed once installed.

Before the cover can be removed first the battery cover locking screws need to be removed (if fitted). The Battery cover screws are 2 x M2 6mm screws, supplied with the 1097 UHF Reader.

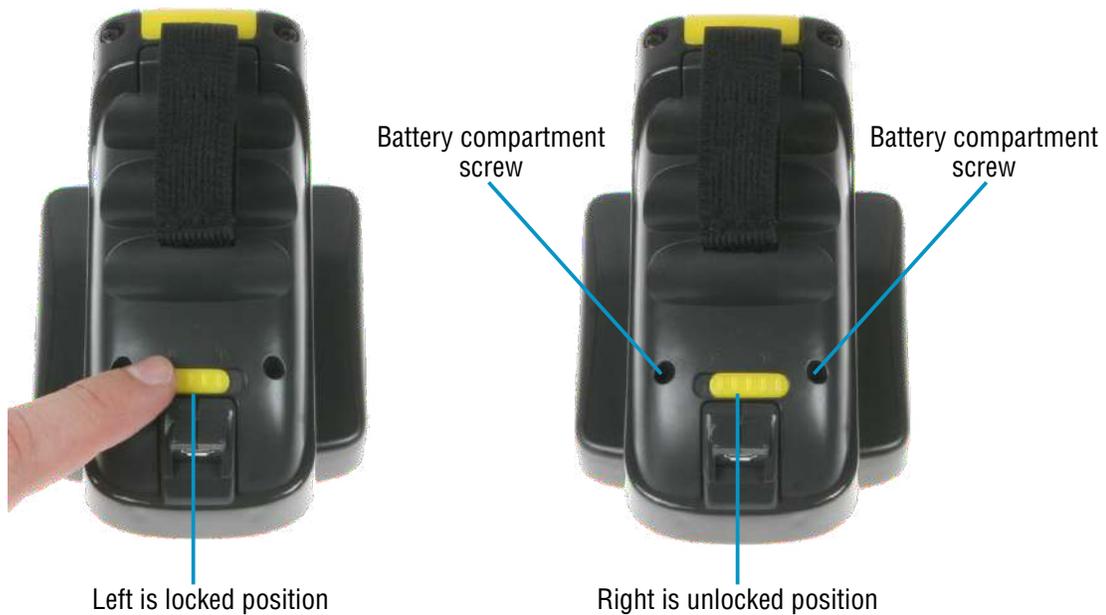


FIGURE 2: Unlock Battery Compartment

The battery compartment has a locking switch. The positions are shown in the diagram below.

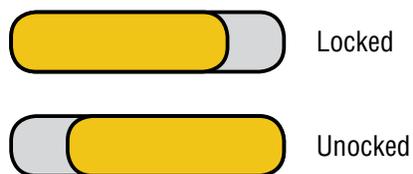


FIGURE 3: Lock Switch Position



FIGURE 4: Slide Battery Cover



FIGURE 5: Remove Battery Cover

The actions to access the battery are:

- Remove locking screws if fitted
- Move the lock switch to the unlocked position
- Slide the cover down in the direction shown
- Lift the cover off



FIGURE 6: Battery Placement

The battery contacts need to be face down at the top of the battery to meet the contacts shown in the left image above.



FIGURE 7: Replace Cover

Once the battery is installed the actions to replace the cover are:

- Align the cover using the indents in the cover to the pips on the case
- Push the case down into position
- Slide the case back up in the direction shown
- Move the lock switch to the locked position
- Screw in the battery cover locking screws if required

CHARGING AND MICRO USB CONNECTION

The 1097 UHF Reader kit is supplied with a micro USB lead for charging and synchronisation. A USB PSU is also supplied for independent charging of the 1097 UHF Reader. The Micro USB connector is inserted into the 1097 UHF Reader as shown below.



FIGURE 8: Attaching a Micro USB Cable

BUTTON OPERATION

The 1097 UHF Reader has two distinct operations which can be initiated from a button click: to scan for UHF transponders OR to scan for a barcode. Which operation is performed depends on the way in which the button is pressed; a Primary or Secondary button action.

PRIMARY BUTTON CLICK AND HOLD

- UHF Transponder Read



The primary button click is a standard button action:

- To initiate a primary button click press and hold the trigger button.
- To terminate a primary button click release the trigger button.

In the default configuration the 1097 UHF Reader scans for UHF transponders as the primary function. The 1097 UHF Reader will continue to scan for UHF transponders while the button is pressed. It will stop scanning once the button is released (and the current operation completes).

SECONDARY BUTTON DOUBLE CLICK AND HOLD

- Barcode Scan



The secondary button click is a single click quickly followed by a second press (press-release-press).

- To initiate a secondary button click press then release then press and hold the trigger button.
- To terminate a secondary button click release the trigger button.

In the default configuration the 1097 UHF Reader scans for barcodes as the secondary function. The 1097 UHF Reader will continue to scan for a barcode while the button is pressed. It will stop scanning when any of the following conditions are met:

- A barcode is scanned.
- The button is released.
- The barcode engine times out.

READING TRANSPONDERS

RFID transponders can be read when they are in range of the antenna. The antenna is located on the reverse of the 1097 UHF Reader. The range at which a transponder can be read depends on the transponder type and size.



FIGURE 9: Antenna location and read direction

STATUS LED

The status LEDs on the top of the 1097 UHF Reader provides an indication of the operating status of the 1097 UHF Reader.

LED	Status
Blue flashing	The reader is awake but there is no <i>Bluetooth</i> [®] connection
Blue constant	The reader is awake and the reader is connected to a host over <i>Bluetooth</i> [®]
Green Flash	The reader has successfully read a tag or barcode in standalone mode or has been commanded to alert the user (typically after a tag or barcode read, accompanied by a beep and vibrate).
Orange slow flash	The reader is charging
Orange rapid flash	The is a charge error / battery fault
Orange constant	The reader is fully charged
All off	The reader is off and not charging

BLUETOOTH® CONNECTION

- Default *Bluetooth*® Name: 1097-xxxxxx (device serial number)
- Default *Bluetooth*® PIN: 0000

The 1097 UHF Reader uses the *Bluetooth*® virtual serial port profile. Most *Bluetooth*® hosts / stacks support connecting to this profile and present the connection to the host operating system as a standard serial port. Once the 1097 UHF Reader is paired and the 1097 UHF Reader is awake opening the serial port establishes the *Bluetooth*® connection. Closing the serial port closes the connection.

DISCOVER, PAIR AND CONNECT TO MC70

To use a 1097 UHF Reader with a Motorola terminal you need to associate the 1097 *Bluetooth*® Reader with a virtual serial port. This serial port is then used to communicate with the 1097 UHF Reader. The association is made using BTE Explorer which can be launched from programs under the start menu or from the home screen as shown below.

The screen shots are taken from an MC70 running Windows Mobile 5 but the process is similar on MC75s, MC55s and on Windows Mobile 6.



FIGURE 10: Create Connection

First launch BTE Explorer either from the start menu under programs or from the shortcut on the today screen. In this example wizard mode is used. The actions required are to discover and pair to the 1097 UHF Reader and then associate that connection with a serial port.

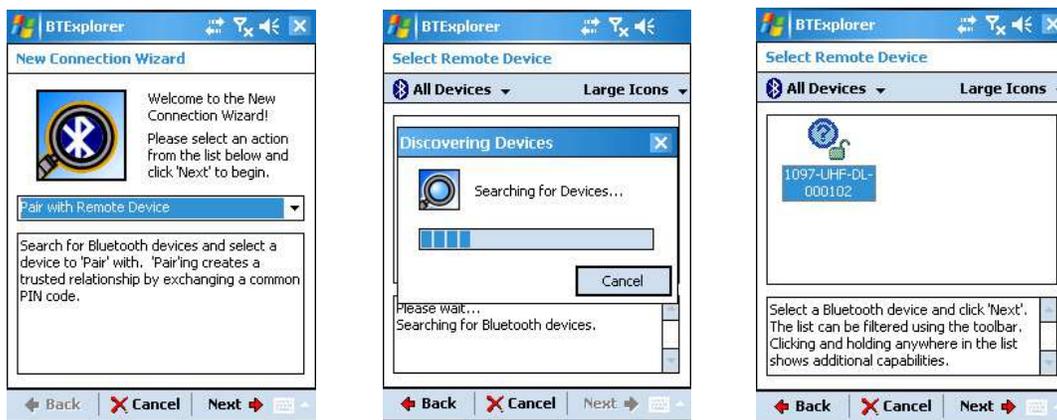


FIGURE 11: Discover Device

First use “New Connection” to “Pair with Remote Device”. If “Discovering Devices” does not start automatically and the required 1097 UHF Reader is not listed in “All Devices” tap and hold in the “All Devices” area to bring up the context menu and select “Discover Devices”. Ensure that the 1097 UHF Reader is awake and ready to connect by pressing the button on the 1097 UHF Reader. This should start the blue LED flashing. The *Bluetooth*® name of the 1097 UHF Reader will match the serial number of the device by default (1097-xxxxxx). Select the required 1097 UHF Reader from the list of all devices.



FIGURE 12: Pair with Device

With the 1097 UHF Reader selected tap “Next” to initiate the pair process. Enter the PIN when prompted (by default this is “0000”) and tap OK, then tap finish to complete the pairing process.



FIGURE 13: Associate Serial Port

Now that the 1097 UHF Reader is discovered and paired it needs to be associated with a serial port. Start the wizard again, tap “New Connection” and this time select “Associate Serial Port” and select the 1097 UHF Reader you paired to in the previous steps.

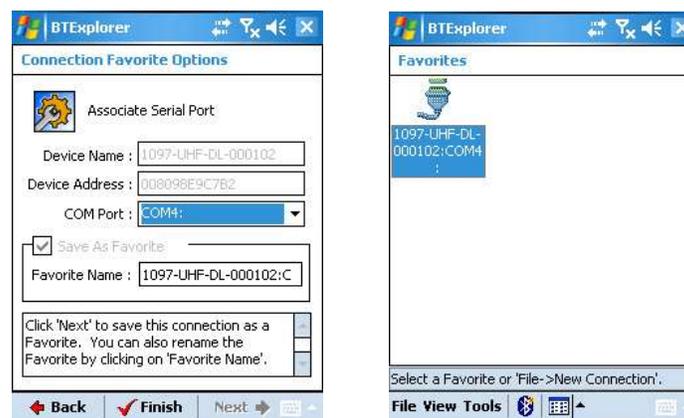


FIGURE 14: Associate Serial Port – Choose Port

You are then able to select which *Bluetooth*® com port to associate with the 1097 UHF Reader. Select an available port from the options available. Tap “Finish” to complete the wizard and the association will appear as a favourite. In the example above if the 1097 UHF Reader with serial number “1097-UHF-DL-000102” is awake (blue LED flashing) then when the terminal opens COM4: a *Bluetooth*® connection will be established with the 1097 UHF Reader. Closing COM4: will close the connection.

DISCOVER, PAIR AND CONNECT TO AN MC75A

The MC75A uses the Microsoft *Bluetooth*® Stack as standard. The process of discovering, pairing and connecting to a virtual serial port remains similar and is described below.

First get to the *Bluetooth®* Settings Window. This can be done from Menu>*Bluetooth®* Settings on the Wireless Manager or from Start>Settings>Connections>*Bluetooth®*.

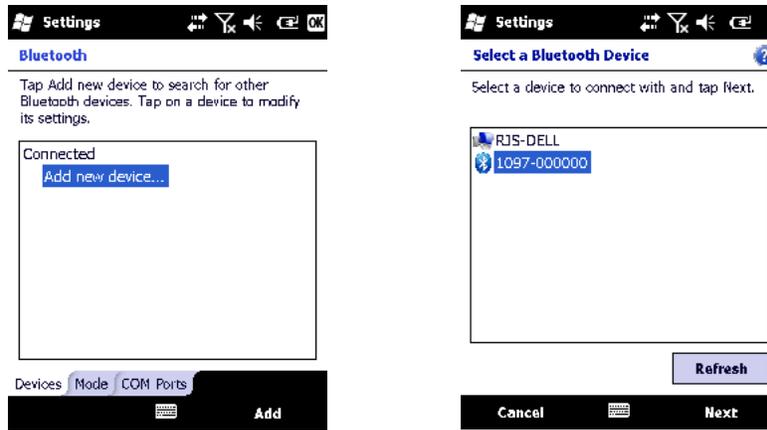


FIGURE 15: Discover Devices

Ensure the 1097 is powered up and waiting for a connection (Blue LED flashing). Tap on 'Add new device...'. A search for *Bluetooth®* devices will start and a list of the discovered devices will be shown. This should include the 1097, identified by its serial number (unless the *Bluetooth®* Friendly Name has been changed). If the 1097 does not appear in the list, make sure it is still powered and waiting for a connection and tap 'Refresh'.

Tap on the 1097 and then tap 'Next' to start the Pairing process.

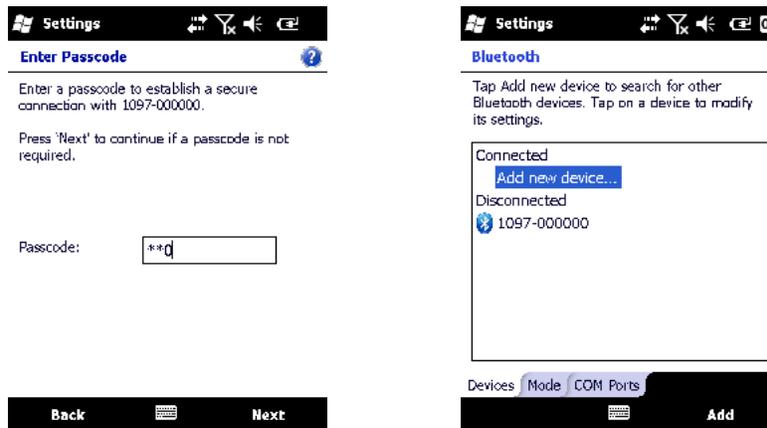


FIGURE 16: Pair with Devices

The next window will prompt for the Passcode (PIN), unless it has been changed this is four zeroes '0000'. Each character appears briefly as it is entered. Once the PIN has been entered tap 'Next' to complete the pairing process. The *Bluetooth®* Settings window reappears with the 1097 now listed as a Disconnected device.



FIGURE 17: Associate Serial Port

Tap on the 1097 and the 'Partnership Settings' window will appear. Tick the Serial Port service and tap 'Save' to return to the 'Bluetooth® Settings' window.

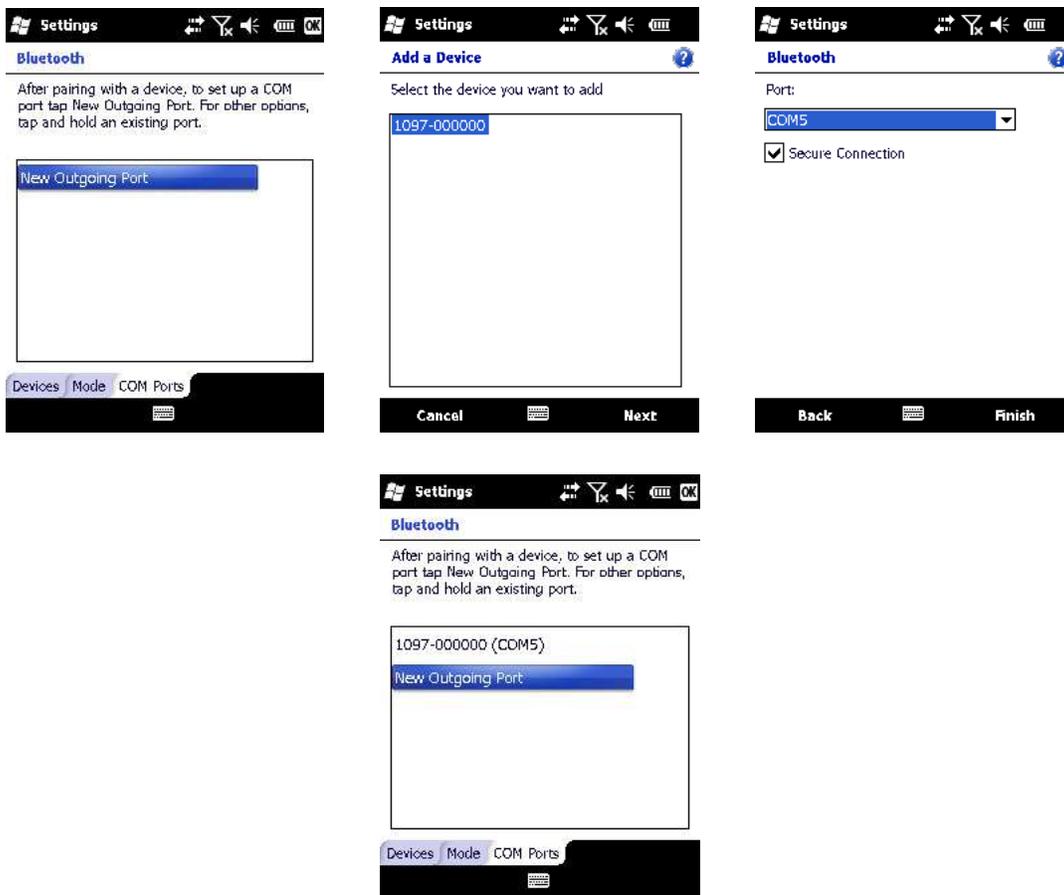


FIGURE 18: Associate serial port - choose port

Tap on the 'COM Ports' tab in the *Bluetooth®* Settings window. Tap 'New Outgoing Port'. The 'Add a Device' window appears. Select the 1097 and tap 'Next'. The windows shows a list of available ports. On the MC75A the two ports reserved for *Bluetooth®* are COM5 and COM9 only. It may be possible to use other ports but there is a risk of causing problems with other applications using serial ports on the MC75A and it is not recommended. Ensure the 'Secure Connection' box is ticked and tap 'Finish'. The *Bluetooth®* Settings window shows the association between the 1097 and the serial port.

The *Bluetooth®* setup is now complete. An application must open the selected COM port to start the *Bluetooth®* connection. It is not possible to open the connection from the *Bluetooth®* Settings window

CONNECT TO DESKTOP PC

To use a 1097 UHF Reader with a desktop computer you need to associate the 1097 *Bluetooth®* Reader with a virtual serial port¹. This serial port is then used to communicate with the 1097 UHF Reader.

The example shown uses the Microsoft *Bluetooth®* stack but a similar process is required for other *Bluetooth®* implementations and editions of Windows.

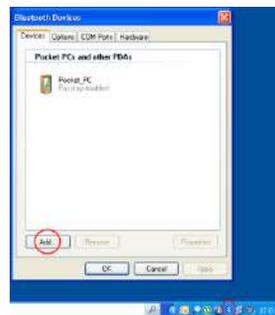


FIGURE 19: Add Device

Either from the *Bluetooth®* icon in the system tray or from the “*Bluetooth®* Devices” control panel “Add” a new device. This will initiate the *Bluetooth®* discovery. Ensure the 1097 UHF Reader is awake by pressing the trigger button (the blue LED will flash).



FIGURE 20: Discover Device

¹ It is possible to discover, pair and connect without a serial port using the Microsoft *Bluetooth®* API if using a Microsoft *Bluetooth®* stack.

Once the 1097 UHF Reader is ready to be discovered (blue LED flashing) check the tick box and initiate the search by clicking “Next”. Once the discovery is complete the 1097 UHF Reader should be listed in the available devices. The *Bluetooth*® name is the serial number of the unit (by default). Select the required 1097 UHF Reader and click “Next” to initiate the pair process.



FIGURE 21: Pair with Device

When prompted enter the device PIN (“0000” by default) and click “Next” to complete the pairing process. Windows will then determine the device is a *Bluetooth*® virtual serial port and allocate an incoming and outgoing COM port. The connection to use is the “Outgoing COM port” as the desktop host will initiate the connection to the 1097 UHF Reader.

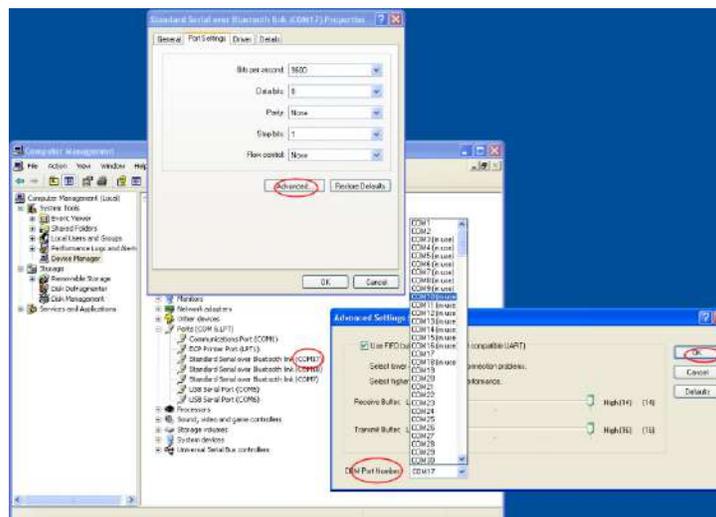


FIGURE 22: Change COM Port

If the COM port allocated to the 1097 UHF Reader is outside the range available to your application you can change the allocated COM port from device manager. It is available under the advanced properties of the COM port.

SOFTWARE

DRIVER INSTALLATION

There are no drivers required for the 1097 UHF Reader. The *Bluetooth*® connection uses the standard *Bluetooth*® virtual serial port profile. Once paired with a host the connection is presented as a serial port on the *Bluetooth*® host device.

Asynchronous messages are sent as ASCII hex where barcode and UHF transponders are scanned from a button press. In this way the 1097 UHF Reader can be used with the TSL SmartWedge applications to enter scanned data into other applications as if it was typed from a keyboard.

The reader also supports a command response interface for general reader configuration, setting up the barcode engine and communication with the UHF reader. This is demonstrated from the demonstration application and supported by the UHF Reader API.

READER DEMONSTRATION

Technology Solutions provide a demonstration application which can be used to explore the functionality of the 1097 UHF Reader and test the read range for a particular transponder. This application and full instructions are available for download from the Technology Solutions website at <http://www.tsl.uk.com/downloads.htm>.

An example screenshot of the Demonstration software is shown in Figure 23.

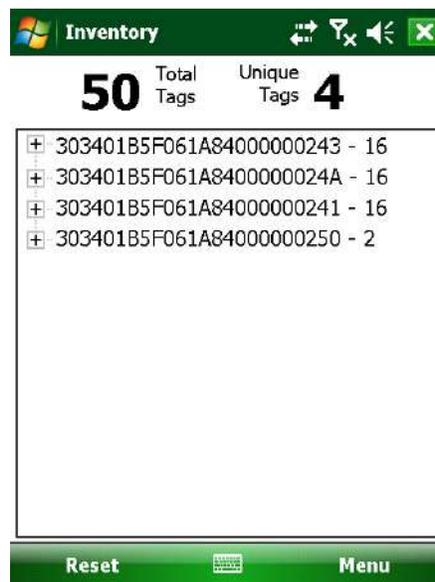


FIGURE 23: Demonstration software

SOFTWARE DEVELOPMENT

To make full use of the functionality of the 1097 UHF Reader, a customised software application will be required. There are two approaches that can be taken:

- For basic applications requiring minimal software development expertise the reader supports an ASCII command mode. Simple, text based commands are sent to the reader and responses are returned as text. This allows straightforward access to RFID tag functions such as inventory, read and write. Details of the ASCII command mode are included on the Explorer Kit CD and are available for download from <http://www.tsl.uk.com/downloads.htm>. A simple Motorola Pocket Browser compatible application which uses the ASCII command mode is included on the Explorer Kit CD.
- For more advanced application requiring full control and configuration of the reader a full managed code API is provided on the Explorer Kit CD. This is supported with the source code for a sample application which demonstrates the use of all the reader functionality.



FIGURE 24: Explorer Kit

TROUBLESHOOTING AND MAINTENANCE

MAINTENANCE

For trouble-free service treat the 1097 UHF Reader in the same way as you would the MC70/75 and observe the following tips when using the 1097 UHF Reader:

- Do not store or use the 1097 UHF Reader in any location that is dusty, damp, or wet.
- Protect the 1097 UHF Reader from temperature extremes. Do not leave it on the dashboard of a car on a hot day, and keep it away from heat sources.

TROUBLESHOOTING

Symptoms	Possible cause	Action
Nothing happens when the yellow button is pressed.	If not LEDs are on the battery may be flat.	Charge the 1097 UHF Reader.
	The 1097 UHF Reader may have button actions disabled.	Check the 1097 UHF Reader configuration and restore to defaults if unsure.
The orange LED flashes rapidly when charging.	There is a battery fault.	Replace the battery pack
	The battery pack temperature is outside recommended limits.	Ensure that charging only occurs between 0°C and 45°C.
The host <i>Bluetooth</i> [®] discovery does not find the 1097 UHF Reader.	The 1097 UHF Reader has powered off.	Press the yellow button and ensure the blue LED is flashing.
	The 1097 UHF Reader is out of range.	Move the 1097 UHF Reader closer to the host.
	The <i>Bluetooth</i> [®] friendly name of the 1097 UHF Reader has been changed.	Check the <i>Bluetooth</i> [®] friendly name or restore the 1097 UHF Reader to factory defaults if unsure.
Opening the <i>Bluetooth</i> [®] virtual com port does not connect to the 1097 UHF Reader.	The host has paired to a different <i>Bluetooth</i> [®] device.	Pair to the required 1097 UHF Reader.
	The host <i>Bluetooth</i> [®] function has an error	Warm boot the host. If this does not help, delete the 1097 UHF Reader from the favourites list and re-pair.
<i>Bluetooth</i> [®] pairing fails.	The PIN on the 1097 UHF Reader has been changed	Set the <i>Bluetooth</i> [®] PIN to a known value using the Desktop Configuration software

TECHNICAL SPECIFICATIONS

SUMMARY OF SPECIFICATIONS

The following table summarises the 1097 UHF Reader's intended operating environment and technical hardware specifications:

Symptoms	
Frequency	865 – 928 MHz (antenna dependent)
RF Power	10 - 500 mW (software controlled)
Antenna	Integrated circularly polarised element
Read distance	Up to 2.5m (7 feet) (tag/antenna dependent)
Supported UHF tags	EPC Class 1 Generation 2 (ISO18000-6C)
Physical Characteristics	
Dimensions (maximum):	
without trigger handle	145mm × 88mm × 65mm (5.7"x3.5"x2.6")
with trigger handle fitted	180mm × 88mm × 160mm (7.1"x3.5"x6.3")
Weight	
without handle	325g (11.5 oz)
with optional handle	550g (20 oz)
Enclosure material	GE Lexan Polycarbonate
Colour	Grey/black
Material finish	Sparked surface
Interchangeable handle attachment	Snap-on action with locking screws
Environmental	
Operating Temperature	-20°C to +60°C (14°F to 140°F)
Storage Temperature	-40°C to +60°C (-40°F to 140°F)
Humidity	Up to 90% Relative humidity Non Condensing
Drop specification	1.3m (4.26ft) to concrete, 6 drops per 6 sides over operating temperature; 1.5m (5ft) to concrete, 2 drops per 6 sides at ambient temperature 23°C (73°F)
Sealing	IP54
Electrostatic discharge	+/-12kV air discharge, +/-8kV direct discharge
Construction	RoHS compliant`
Regulatory	
EMI/RFI	TBC TBC
Electrical Safety	TBC

HEALTH AND SAFETY RECOMMENDATIONS

Ergonomic Recommendations

Caution: In order to avoid or minimize the potential risk of ergonomic injury, follow the recommendations below. Consult with your local Health & Safety Manager to ensure that you are adhering to your company's safety programs to prevent employee injury.

- Reduce or eliminate repetitive motion
- Maintain a natural position
- Reduce or eliminate excessive force
- Keep objects that are used frequently within easy reach Perform tasks at correct heights
- Reduce or eliminate vibration
- Reduce or eliminate direct pressure
- Provide adjustable workstations
- Provide adequate clearance
- Provide a suitable working environment
- Improve work procedures.

For vehicle installation and use

An air bag inflates with great force. DO NOT place objects, including either installed or portable wireless equipment, in the area over the air bag or in the air bag deployment area. If in-vehicle wireless equipment is improperly installed and the air bag inflates, serious injury could result.

RF signals may affect improperly installed or inadequately shielded electronic systems in motor vehicles (including safety systems). Check with the manufacturer or its representative regarding your vehicle. You should also consult the manufacturer of any equipment that has been added to your vehicle.

Power Supply

Use only Motorola-approved cradles, chargers and power supplies with the HF 1097 UHF Reader. Use of an alternative power supply will invalidate any approval given to this device, void the warranty for the product and may be dangerous.

WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT (WEEE)

For EU Customers: All products at the end of their life must be returned to TSL for recycling. For information on how to return product please contact TSL.

WARRANTY

(A) Warranty

TSL's hardware Products are warranted against defects in workmanship and materials for a period of twelve (12) months from the date of shipment, unless otherwise provided by TSL in writing, provided the Product remains unmodified and is operated under normal and proper conditions. Warranty provisions and durations on software, integrated installed systems, Product modified or designed to meet specific customer specifications ("Custom Products"), remanufactured products, and reconditioned or upgraded products, shall be as provided in the applicable Product specification in effect at the time of purchase or in the accompanying software license.

(B) Spare Parts

Spare parts (i.e. parts, components, or subassemblies sold by TSL for use in the service and maintenance of Products) are warranted against defects in workmanship and materials for a period of thirty (30) days from the date of shipment. Spare parts may be new or originate from returned units under the conditions set forth in subsection D below.

(C) Repair of TSL branded hardware

For repairs on TSL branded hardware Products under this Agreement, including repairs covered by warranty, the repair services provided are warranted against defects in workmanship and materials on the repaired component of the Product for a period of thirty (30) days from the shipment date of the repaired Product, or until the end of the original warranty period, whichever is longer. Any such defects shall be notified to TSL in writing within 7 days of the same becoming apparent.

(D) Product Service

Products may be serviced or manufactured with parts, components, or subassemblies that originate from returned products and that have been tested as meeting applicable specifications for equivalent new material and Products. The sole obligation of TSL for defective hardware Products is limited to repair or replacement (at TSL's option) on a "return to base (RTB)" basis with prior TSL authorisation.

Customer is responsible for prompt shipment to TSL and assumes all costs and risks associated with this transportation; return shipment to the Customer will be at TSL's expense. Customer shall be responsible for return shipment charges for product returned where TSL determines there is no defect ("No Defect Found"), or for product returned that TSL determines is not eligible for warranty repair. No charge will be made to Buyer for replacement parts for warranty repairs. TSL is not responsible for any damage to or loss of any software programs, data or removable data storage media, or the restoration or reinstallation of any software programs or data other than the software, if any, installed by TSL during manufacture of the Product.

(E) Original Warranty Period

Except for the warranty applying solely to the repaired component arising from a repair service as provided in Section C above, the aforementioned provisions do not extend the original warranty period of any Product that had either been repaired or replaced by TSL.

(F) Warranty Provisions

The above warranty provisions shall not apply to any Product:

- (i) which has been repaired, tampered with, altered or modified, except by TSL's authorized service personnel;
- (ii) in which the defects or damage to the Product result from normal wear and tear, misuse, negligence, improper storage, water or other liquids, battery leakage, use of parts or accessories not approved or supplied by TSL, or failure to perform operator handling and scheduled maintenance instructions supplied by TSL;
- (iii) which has been subjected to unusual physical or electrical stress, abuse, or accident, or forces or exposure beyond normal use within the specified operational and environmental parameters set forth in the applicable Product specification; nor shall the above warranty provisions apply to any expendable or consumable items, such as batteries, supplied with the Product.

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ABOUT TSL

ABOUT

TSL designs and manufactures both standard and custom embedded, snap on and standalone peripherals for handheld computer terminals. Embedded technologies include:

- RFID - Low Frequency, High Frequency & UHF
- *Bluetooth*[®] wireless technology
- Contact Smartcard
- Fingerprint Biometrics
- 1D and 2D Barcode Scanning
- Magnetic Card Readers
- OCR-B and ePassport

Utilizing class leading Industrial design, TSL develops products from concept through to high volume manufacture for Blue Chip companies around the world. Using the above technologies TSL develops innovative products in a timely and cost effective manner for a broad range of handheld devices.

CONTACT

Address:	Technology Solutions (UK) Limited, Suite C, Loughborough Technology Centre, Epinal Way, Loughborough, Leicestershire, LE11 3GE. United Kingdom.
Telephone:	+44 (0)1509 238248
Fax:	+44 (0)1509 220020
Email:	enquiries@tsl.uk.com
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