TECHNOLOGY SOLUTIONS UK LTD
part of HID

USER GUIDE:
1119 UHF RFID READER FOR THE MOTOROLA MC55/65/67

TERMS & CONDITIONS

CONTENT

History

Version	Date	Modifications
1.0	05/04/2011	Document Creation
1.1	23/11/2011	Modified 'ticks' and 'crosses' images
1.2	01/10/2013	Updated software development section to include ASCII 2.x and notes on firmware

INTRODUCTION

Technology Solutions' 1119 UHF Reader provides the Motorola MC55/65 with UHF Radio Frequency Identification (RFID) functionality. The unit attaches as a snap on to the MC55/65. The mechanical design of the unit allows it to be quickly and easily removed.

The 1119 UHF reader is powered from its own internal battery and draws minimal power from the MC55/65. It is used with UHF transponders including the EPCGlobal Class 1 Generation 2 transponders.

PARTS OF THE 1119 UHF READER

MC55/65 mating connector

Fixing clip latch

Status LED

Battery cover

Antenna located on back of unit

Battery cover release

Battery cover release

ActiveSync / Charge connector
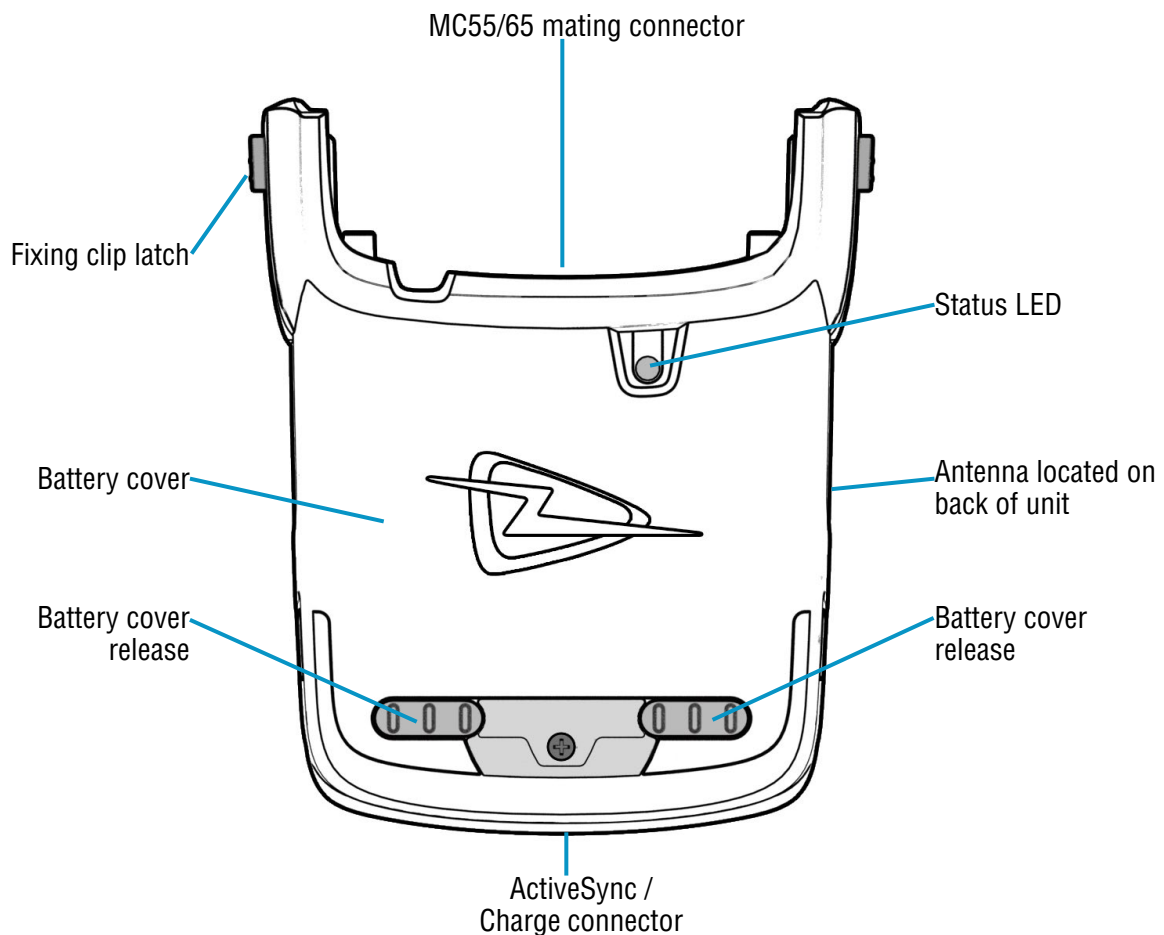
FIGURE 1: Parts of the 1119 UHF Reader

ATTACHING TO AN MC55/65

1) Align the slots on the side of the terminal with the guides on the fixing clips of the 1119 UHF Reader.

2) Slide the 1119 UHF Reader on to the terminal ensuring the alignment pillar aligns with the holes in the bottom of the terminal. The 1119 will click as it attaches.

3) Slide the fixing clip latch up to lock the 1119 UHF Reader on to the terminal.

Alignment pillar
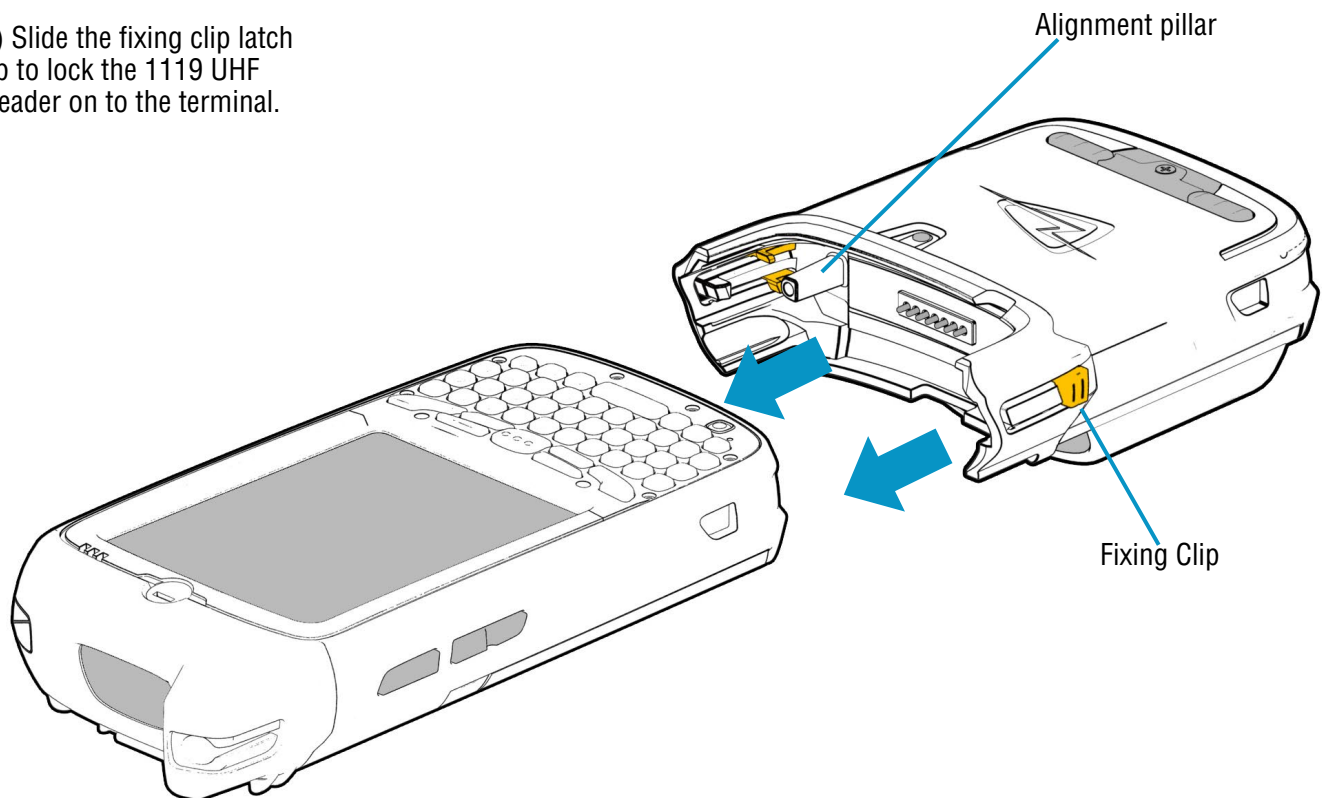
Fixing Clip

FIGURE 2: Attaching to an MC55/65

DETACHING FROM AN MC55/65

1) Make sure the fixing clip latches have been moved down.

2) Pull the 1119 reader off the terminal.
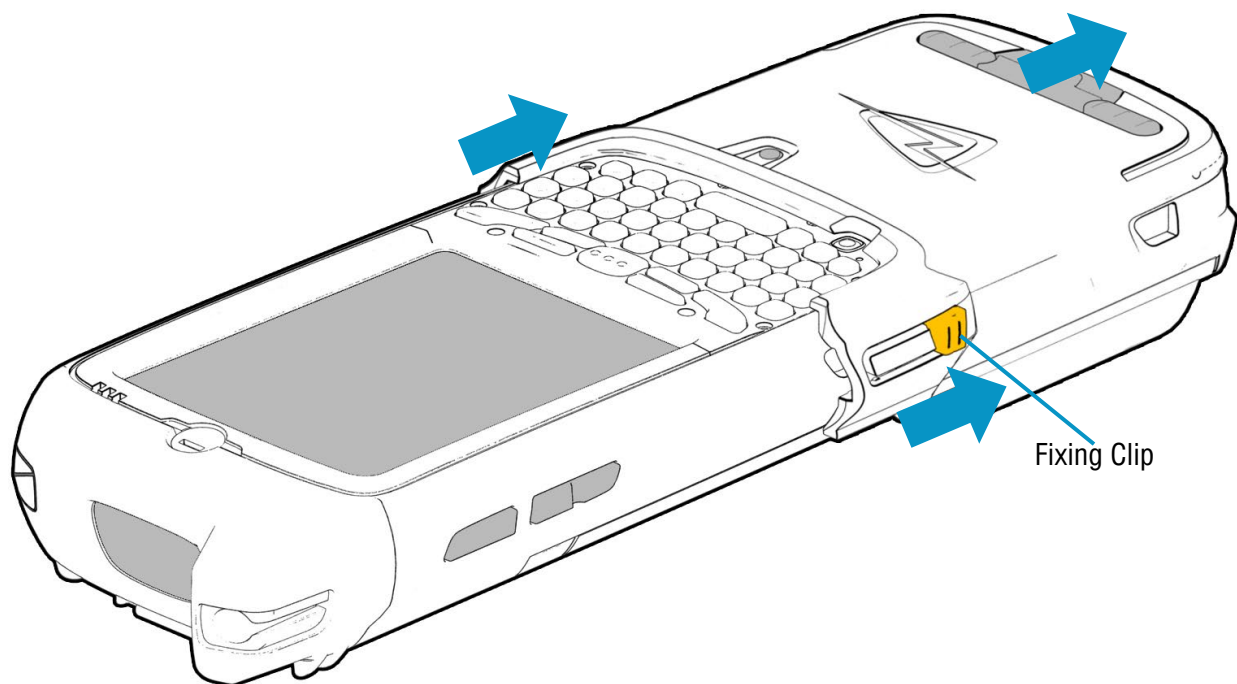
FIGURE 3: Detaching from an MC55/65

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BATTERY INSTALLATION OR REMOVAL

1) Slide the battery cover locking clips towards each other
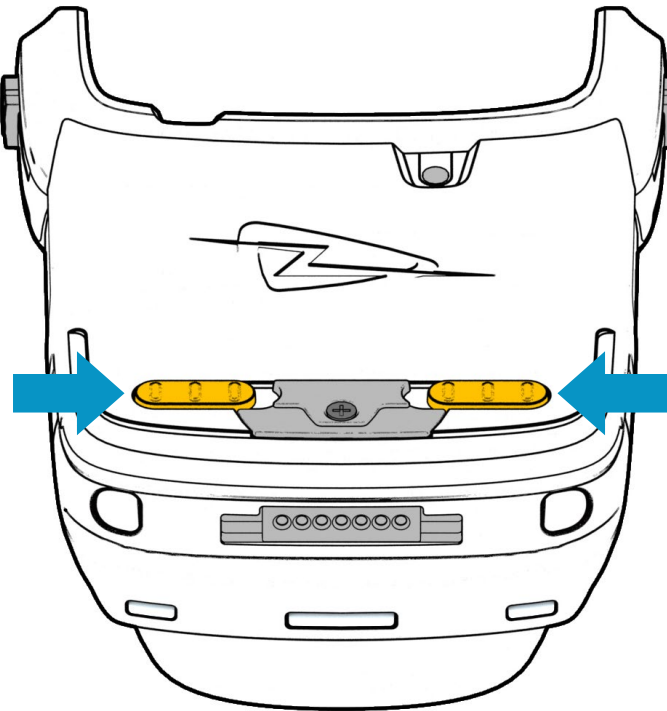
2) Lift the battery cover away from the reader along the edge by the ActiveSync/ Charge connector.
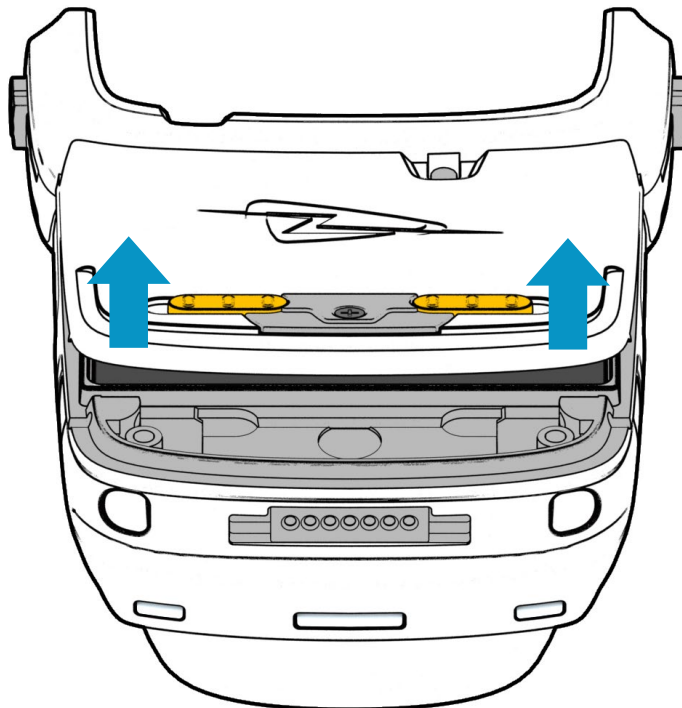
3) Pull the battery cover away from the reader.

FIGURE 4: 1119 UHF Reader Battery access

As an option a battery cover locking plate may be fitted to the battery cover. This is designed to prevent the two battery cover locking clips from being moved. The battery cover locking plate is fixed in place with a single screw and should be removed to allow the battery cover locking clips to be moved and the battery cover removed.

Standard plate

Battery cover locking plate can be fitted instead.
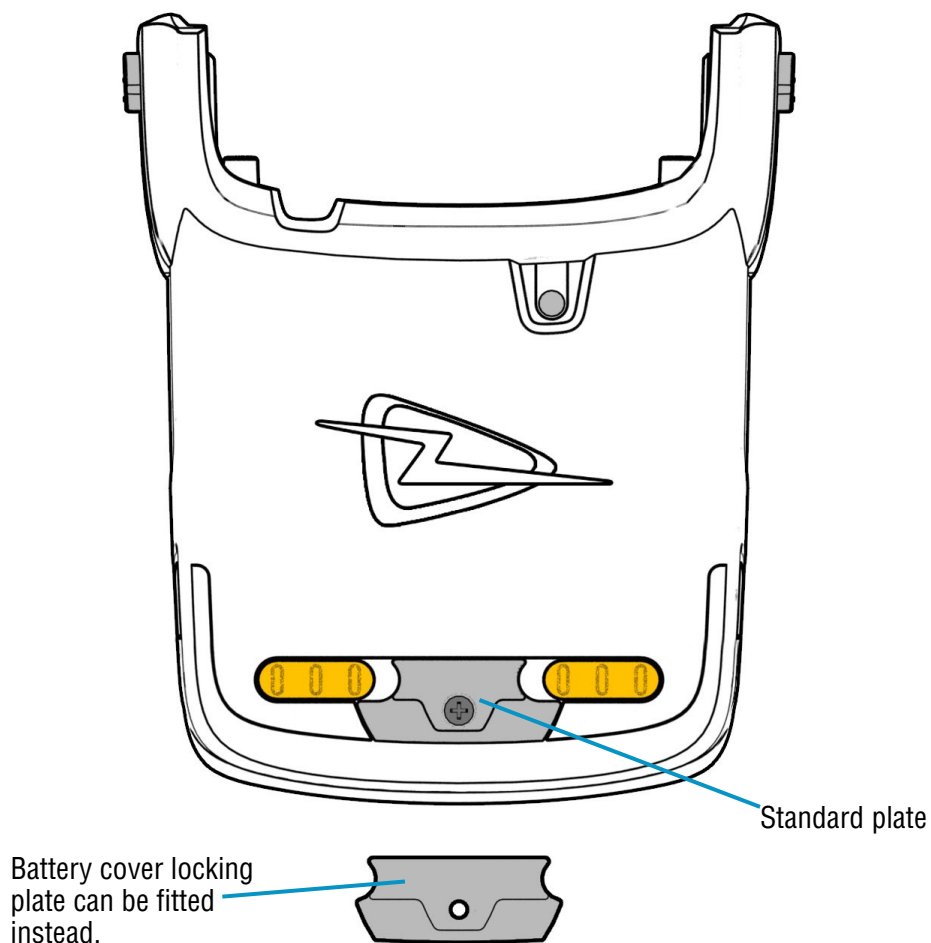
When inserting the battery, ensure the contacts line up with the contacts on the reader. Slide the battery in to place.

Battery contacts must align with reader contacts

Slide battery in
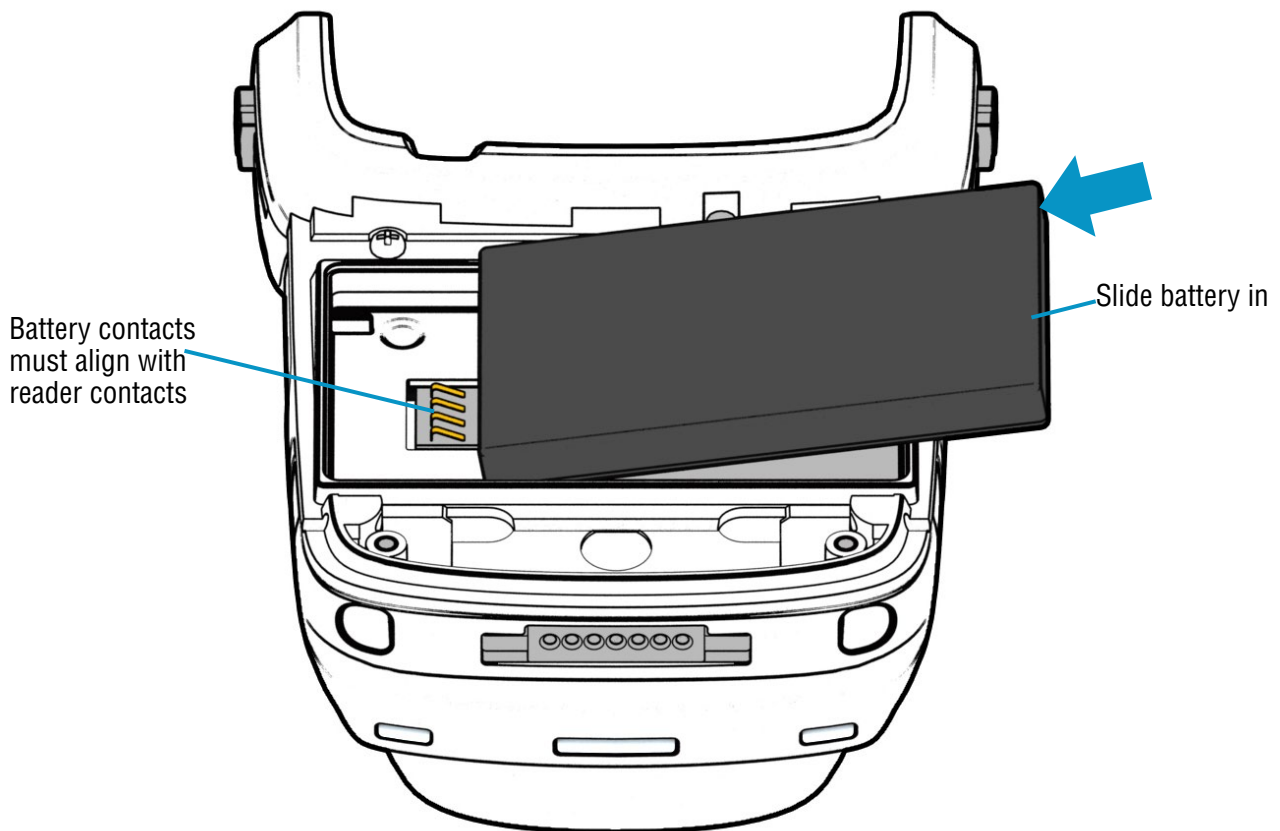
Refit the cover by reversing the removal procedure:

- Push the cover in to the reader at a slight angle. There are some small tabs on the cover which align with the slots in the reader.
- Push the battery cover flat down on to the reader.
- Move the battery cover locking clips apart.
- Refit the battery cover locking plate if required.

Ensure the battery is fully charged before first use.

CAUTION: RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE.
Dispose of used batteries according to local regulations.

CHARGE AND ACTIVESYNC CONNECTION

The 1119 reader is designed to fit into a standard MC55/65 desktop charge cradle or cradle cup. When docked into a cradle the 1119 internal battery is charged. Power is also passed through the 1119 so that the host terminal can charge at the same time.

When docked and an external USB host is connected, the USB connection from the host terminal is disconnected from the UHF RFID reader and passed straight through to the connector on the bottom of the 1119. This allows an ActiveSync connection to the host terminal but prevents simultaneous ActiveSync and UHF RFID operation. Only ActiveSync connections (external host) are possible. There is no support of USB connection where the terminal is the host (for example USB memory sticks) through the 1119.

READING TRANSPONDERS

ANTENNA LOCATION AND READ DIRECTION

RFID transponders can be read when they are in range of the antenna. The antenna is located on the back of the 1119 UHF Reader.

Antenna located behind this cover.
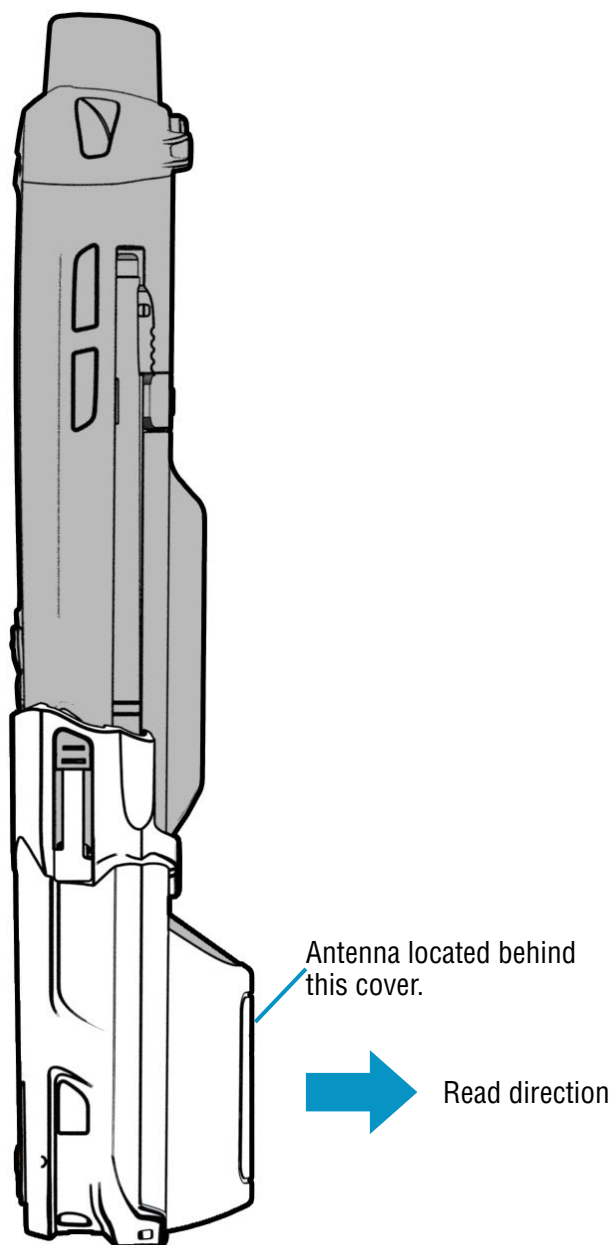
Read direction

FIGURE 5: Antenna location and read direction

ANTENNA LOCATION AND READ DIRECTION

For best results the reader should be held so that the transponders are behind the reader as shown in Figure 6. Avoid covering or partly covering the antenna with your hand.
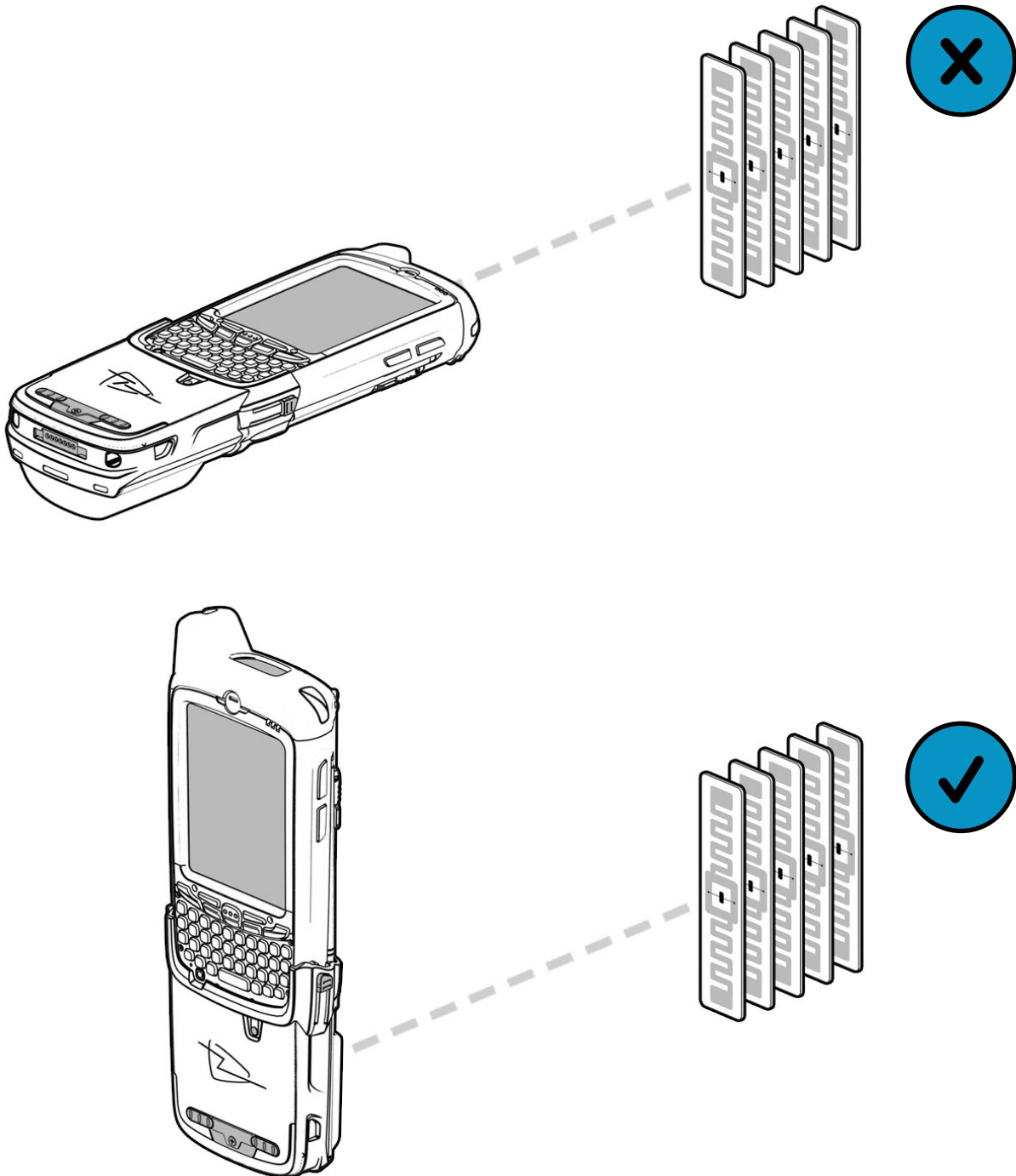
FIGURE 6: Correct read orientation

TRANSPONDER ORIENTATION

The 1119 UHF RFID reader has a circularly polarised antenna. This means that the alignment of the transponder relative to the reader is unimportant. In many cases a transponder will only be sensitive along two of its three axes. Read and write performance will be poor along its insensitive axis. Figure 7 shows the correct and incorrect orientations for a typical transponder relative to the 1119 UHF RFID reader.
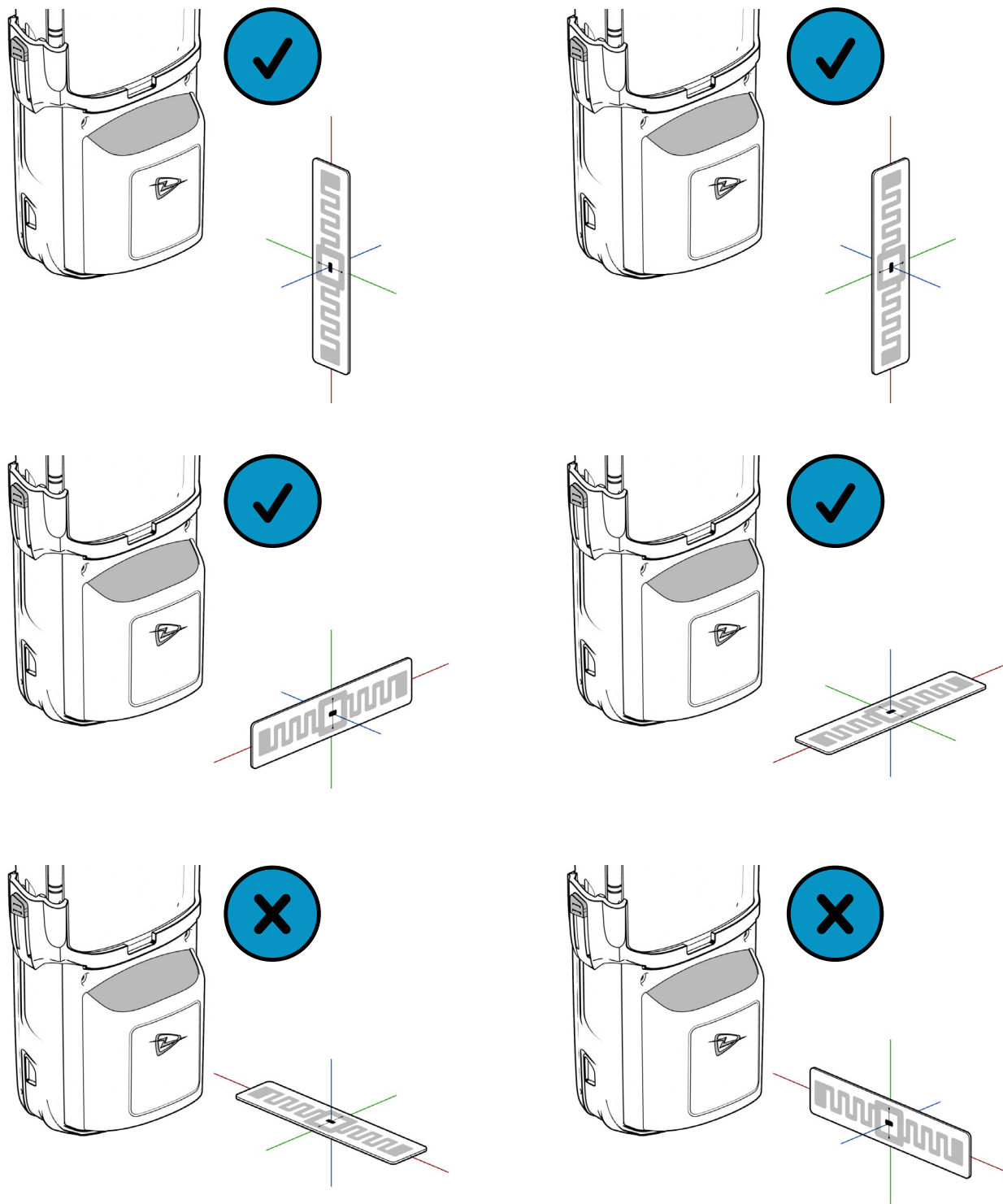
FIGURE 7: Correct transponder orientation
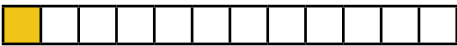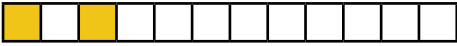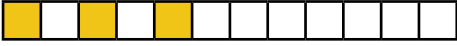
READ AND WRITE RANGE

The range at which a transponder can be read depends on the transponder type, size and location. Generally;

- larger transponders can be read at greater distances
- moving transponders closer to each other reduces read distance
- metal or water nearby reduces read range, unless a mount on metal transponder is used
- write range is between 50% and 90% of the read range for a given transponder.

STATUS LED

The status LED on the front of the 1119 UHF Reader provides an indication of the operating status of the 1119 UHF Reader.

LED colour and pattern	Status
Off	Reader is off
Green	The reader is powered and ready to receive commands.
Amber single flash and pause	The reader battery is less than 33% charged
Amber double flash and pause	The reader battery is between 33% and 66% charged
Amber triple flash and pause	The reader battery is between 66% and fully charged.
Amber continuous	The reader battery is fully charged.
Amber continuous flash	There is a charge error / battery fault

If the reader is powered and ready to receive commands whilst also being charged then the green LED will be on whilst the amber LED is on. This means the flash sequence will be amber and green rather than amber and off.

SOFTWARE

The latest firmware, drivers, user guides, SDKs and examples can all be downloaded from the "Product Downloads" section of the product page. Please note a free registration is required to access this content. http://www.tsl.uk.com/products/1119-uhf-rfid-reader-for-the-motorola-mc55-65/

DRIVER INSTALLATION

Please note the driver is only required for the MC55. The MC65 and MC67 has the driver already installed as part of the operating system. Please see the notes on the product page to ensure that you have the latest version of the OS installed on your terminal for best performance with this product.

The drivers required for the 1119 UHF Reader may be deployed as part of the installation of a custom application. Otherwise they can be deployed by copying 'RFID Reader Driver.CAB' to the host terminal and running it. When prompted, choose 'Device' as the destination to install the drivers to.

RFID Reader Driver.CAB is included on the Explorer Kit and Software Development Kit CDs and can also be downloaded from the product page on the website.

READER DEMONSTRATION

Technology Solutions provide a demonstration application which can be used to explore the functionality of the 1119 UHF Reader and test the read range for a particular transponder. This application and full instructions are available for download from the website.

An example screenshot of the Demonstration software is shown in Figure 8.

FIGURE 8: Demonstration software

SOFTWARE DEVELOPMENT

There are two hardware variants of the 1119 UHF reader please refer to the firmware section of the Product Downloads page for the 1119 UHF reader to identify the hardware version you have and load the most recent firmware into the product.

http://www.tsl.uk.com/products/1119-uhf-rfid-reader-for-the-motorola-mc55-65/

To make full use of the functionality of the 1119 UHF Reader, a customised software application will be required. There are two approaches that can be taken using the simple ASCII protocol or the binary SDK.

V1 hardware can be used with ASCII protocol v1.4 or the UHF RFID SDK.

V2 hardware can be used with ASCII protocol v2.0 and higher or the UHF RFID SDK. There is also a firmware that allows V2 hardware to be downgraded to support ASCII v1.4 if required.

ASCII PROTOCOL V1.4

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.

A simple Motorola Pocket Browser compatible application which uses the ASCII command mode is available for download.

To connect to the 1119 UHF Reader snap on using the ASCII protocol open COM2: at 1115200 baud, 8 data bits, no parity, 1 stop bit and RTS/CTS (hardware) flow control.

ASCII PROTOCOL V2.X (V2 HARDWARE ONLY)

The second generation of ASCII protocol supported by the V2 hardware maintains the simplicity of the original ASCII protocol but adds more structure to make it easier to command from an application. This has enabled TSL to provide SDKs for platforms where the binary protocol is not suitable (e.g. Android / Java). The ASCII 2.x protocol can be used in all but the most advanced scenarios instead of the UHF RFID SDK.

To connect to the 1119 UHF Reader snap on using the ASCII protocol open COM2: at 1115200 baud, 8 data bits, no parity, 1 stop bit and RTS/CTS (hardware) flow control.

Technology Solutions provides an ASCII 2.x SDK for Windows Mobile (and other platforms for other products) as well as sample applications which are available to download from the product page on the website.

UHF RFID SDK

For more advanced applications 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.

TROUBLESHOOTING AND MAINTENANCE

MAINTENANCE

For trouble-free service treat the 1119 UHF Reader in the same way as you would the MC55/65 and observe the following tips when using the 1119 UHF Reader:

- Do not store or use the 1119 UHF Reader in any location that is dusty, damp, or wet.

- Protect the 1119 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
The Application on the MC55/65 cannot communicate with the 1119 UHF Reader.	The MC55/65 is not firmly seated into the 1119 UHF Reader.	Remove and re-insert the MC55/65 from the 1119 UHF Reader, ensuring it is firmly seated.
	The port has not been opened.	Check that the Application has been configured to use the correct virtual COM port (COM2 by default).
	The port is in use by another application.	Close the other application and try again.
The 1119 UHF Reader does not read a particular transponder	The 1119 UHF Reader has been configured to exclude some transponders based on a mask value.	Correct the mask value.
	The transponder is out of range of the 1119 UHF Reader.	Move the transponder closer to the antenna.
	The transponder has been inventoried into a persistent session.	Wait for the session persistence to expire, use a different session or use a different target flag.
MC55/65 or 1119 battery does not charge	The battery is faulty.	Verify that other batteries charge properly. If so, replace the faulty battery.
	Ambient temperature is too warm.	Move the unit to an area where the ambient temperature is between 0°C and 35°C.
	The MC55/65 is not firmly seated into the 1119 UHF Reader.	Remove and re-insert the MC55/65 from the 1119 UHF Reader, ensuring it is firmly seated.
	The 1119 UHF Reader is not firmly seated into the cradle.	Remove and re-insert the 1119 UHF reader from the cradle, ensuring it is firmly seated.
ActiveSync cannot connect to the MC55/65	ActiveSync is not correctly configured on the PC or the MC55/65.	Detach the 1119 UHF Reader from the MC55/65 and try to ActiveSync directly to the MC55/65. If this does not work then consult the MC55/65 User Guide.
	The MC55/65 is not firmly seated into the 1119 UHF Reader or the 1119 UHF Reader is not firmly seated into the cradle.	Remove and re-insert the MC55/65 from the 1119 UHF Reader, ensuring it is firmly seated. Remove and re-insert the 1119 UHF Reader from the cradle, ensuring it is firmly seated.

TECHNICAL SPECIFICATIONS

SUMMARY OF SPECIFICATIONS

The following table summarises the 1119 UHF Reader's intended operating environment and technical hardware specifications:

UHF RFID reader	
Frequency	865 – 868 MHz (ETSI version) 902 – 928 MHz (FCC version)
RF Power	10 - 800 mW (10 dBm to 29 dBm) (software controlled)
Antenna	Circularly polarised radiating from the back plane of the reader and host terminal
Read distance	More than 2 m (6 feet) (tag dependent)
Supported UHF tags	EPC Class 1 Generation 2 (ISO18000-6C)
Physical Characteristics	
Maximum dimensions (without host terminal)	85 mm(w) × 100 mm (l) × 42 mm(d) – 3.34" x 3.94" x 1.65"
Weight	160 g (5.7 oz)
Enclosure material	GE Lexan Polycarbonate
Colour	Black
Material finish	Sparked surface
Mechanical attachment to hand scanner	Snap-on action with locking slides
Environmental	
Operating Temperature	-10°C to +50°C (14°F to 122°F)
Storage Temperature	-40°C to +60°C (-40°F to 140°F)
Humidity	Up to 90% Relative humidity Non Condensing
Drop specification	1.3 m (4.26 ft) to concrete, 6 drops per 6 sides over operating temperature.
Sealing	IP54
Electrostatic discharge	+/-15 kV air discharge, +/-8 kV direct discharge
Construction	RoHS compliant

REGULATORY INFORMATION

FCC

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions:
1. This device may not cause harmful interference, and
2. This device must accept any interference that may cause undesired operation.

Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

INDUSTRY CANADA

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

Operation is subject to the following two conditions:
1. This device may not cause interference, and
2. This device must accept any interference, including interference that may cause undesired operation of the device.

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 1119 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.

RF Exposure

The reader antenna is designed to direct RF energy away from the user and the reader in the direction shown in Figure 5. To reduce RF exposure and provide best reading performance do not cover the antenna with your hand or other part of your body.

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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The stated express warranties are in lieu of all obligations or liabilities on the part of TSL for damages, including but not limited to, special, indirect or consequential damages arising out of or in connection with the use or performance of the Product or service. TSL's liability for damages to Buyer or others resulting from the use of any Product or service furnished hereunder shall in no way exceed the purchase price of said Product or the fair market value of said service, except in instances of injury to persons or property.

TSL is not responsible for any damages incurred during shipment if the approved shipping container is not used. Shipping the units improperly can possibly void the warranty. If the original shipping container was not kept, contact your local distributor or TSL to have another sent to you.

TSL shall not be responsible for any injury, damage or loss of whatever kind caused directly or indirectly by the goods whether as a result of their manufacture, operation, use or otherwise and the customer shall indemnify TSL from any claim arising from any loss suffered by any third party.

ABOUT

ABOUT TSL®

TECHNOLOGY SOLUTIONS UK LTD
part of **HID**

Technology Solutions UK Ltd (TSL®), part of HID Global, is a leading manufacturer of high performance mobile RFID readers used to identify and track products, assets, data or personnel.

For over two decades, TSL® has delivered innovative data capture solutions to Fortune 500 companies around the world using a global network of distributors and system integrators. Specialist in-house teams design all aspects of the finished products and software ecosystems, including electronics, firmware, application development tools, RF design and injection mould tooling.

TSL® is an ISO 9001:2015 certified company.

ISO 9001: 2015

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ABOUT HID GLOBAL

HID

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