



L-HR1 Library Handheld Inventory Reader

User's Guide

Revision 1.2

TAGSYS
July 2003

Publishing Information

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Read This First

Welcome to the TAGSYS Library System. This guide is designed to help you get up and running quickly using this high-quality Radio Frequency Identification (RFID) system. It describes all you need to know about how to install and use the TAGSYS system and its associated applications.

It provides a step-by-step guide for the following procedures:

- Installation of the L-HR1 Library Handheld Inventory Reader
- Configuring the product for use within your library system
- Using the product with your computer system

This guide is designed for all TAGSYS partners and for TAGSYS Expert Network customers implementing a low-cost and high-performance RFID solution.

This document does not assume any previous knowledge of Radio Frequency Identification (RFID) technology.

Conventions

Symbol	Meaning
	CAUTION: A note that advises users that a specific action could result in the loss of data or damage the hardware. WARNING: A note that advises users that a specific action may result in physical harm.
	A note that provides additional information that helps the user perform a task or obtain the best performance from the product.

Abbreviations and Acronyms

AFI	Application Family Identifier
AON	All Or None
API	Application Programming Interface
ASK	Amplitude Shift Keying
CPU	Central Processing Unit
CRC	Cyclic Redundancy Check
DLL	Dynamic-Link Library
DPU	Digital Processing Unit
DSFID	Data Storage Format Identifier
DSP	Digital Signal Processor
EAS	Electronic Article Surveillance
ETX	End of Text

HPI	Host Port Interface
I/O	Input/Output
IFD	Interface Device
LED	Light Emitting Diode
LSb	Least Significant Bit
LSB	Least Significant Byte
MSb	Most Significant Bit
MSB	Most Significant Byte
OS	Operating System
PC	Personal Computer
PCB	Printed Circuit Board
RAM	Random Access Memory
RF	Radio Frequency
RFID	Radio Frequency IDentification
RFU	Reserved for Future Use
RPU	Radio Processing Unit
RTC	Real Time Clock
SAM	Security Access Module
STX	Start of Text
TTF	Tag Talks First
TTL	Transistor-Transistor Logic
TTY	TeleTYpe
UID	Unique Identifier

Glossary

Anti-Collision Tag capability making it readable while other tags are present in the RF field.

Antenna An aerial that receives and/or transmits radio frequency signals. Aerials are manufactured in a variety of forms, shapes and sizes.

Baud A unit of measure of data transmission speed representing the number of signal changes per second.

BNC Connector Cylindrical metal connector with a copper core that is located at the tip of a coaxial cable, and is used to connect cables together. It attaches by pushing and twisting the outer cylinder on to two locking pins.

Coupler See Reader.

Data Storage Format Identifier Identifies the structure of the data stored in the smart label.

Digital Signal Processor This part of the Radio Processing Unit (RPU) performs real-time smart label decoding and manages the Medio L200 configuration.

Dynamic-Link Library Executable routines that are stored as separate files with DLL extensions and executed only when needed by the program.

Host Port Interface Interface used to access the DSP memory.

IEC Connector Three-pin connector used on sockets that carry mains electricity to the computer. All PCs use a male IEC connector and mains lead with a female IEC connector.

Interrogation Pulse A signal transmitted by the coupler to activate the smart label's transponder.

Monitoring Port Parallel Port granting access to the HPI. It communicates directly with the Radio Processing Unit

Multi-Read See Anti-Collision

Nibble Half a byte (4 bits)

Packaged Reader A reader in its casing.

Phase Shift Difference of phase between the 13.56 MHz field emitted by two antennas. This feature is dedicated to rotating field applications and three-dimensional volume smart label detection.

Protocol A set of rules governing a particular function, such as the flow of data/information in a communication system (communication between a smart label and a reader or a reader and a PC or host computer).

Radio Frequency Identification System (RFID) An automatic identification and data capture system comprising one or more readers and one or more smart labels in which data transfer is achieved by means of suitable modulated inductive or radiating electromagnetic carriers.

Radio Processing Unit This unit controls the main features of the Medio L200, such as the RF channels, the multiplexer and the smart label decoding.

Reader Electronic system for the communication between smart labels and host computers.

Reader Talks First Chip protocol for exchanges between the reader and the chip, whereby the chip waits for a command from the reader to which it responds.

RS-232 Electronic Industries Association (EIA) standard for serial interfaces between computers and peripherals which defines the function, the electrical characteristics and the timing of signals.

RS-485 Electronic Industries Association (EIA) standard for multipoint, differential data transmission. It allows multiple nodes to communicate bi-directionally over 1 or 2 twisted pairs.

Smart Label Small, flexible, injectable tag from the 13.56 MHz TAGSYS product line. A smart label is made of a chip connected to an etched antenna.

Tag See Smart Label.

Tag Talks First Chip protocol for exchanges between the reader and the chip, whereby the tag sends information continuously, without waiting for a specific command from the reader.

Transceiver A combined transmitter and receiver.

Transponder A combined receiver/transmitter that automatically transmits a signal when a 'trigger' is received by it. The trigger is often a pulse, called an interrogation pulse.

If you need assistance

Please contact your nearest TAGSYS sales representative or the TAGSYS welcome desk at:

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Contact for Comments

We welcome your feedback to help us provide high quality documentation.

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Quality Issues

TAGSYS implements stringent quality controls at all stages of its manufacturing process. However, should you find a defect with this product, please notify your customer service representative using the dedicated Product Return Form.

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1 For Your Safety

1.1 General Use

The L-HR1 Library Handheld Inventory Reader is designed to be rugged and reliable and to provide years of trouble-free service. Please observe the following general tips:

- Take care not to scratch the device. Keep the device clean. When working with the device, use only TAGSYS-approved accessories.
- This device is not waterproof and should not be exposed to rain or moisture. Under extreme conditions, water may enter the circuitry. In general, treat the device as you would a pocket calculator or other small electronic instrument.
- Take care not to drop the device or subject it to any strong impact.
- Protect the device from extreme temperatures. For example, do not leave the device on the dashboard of a car or truck on a hot day or on a day when temperatures are below freezing, and keep it away from heaters and other heat sources.
- Do not store or use the device in any location that is extremely dusty, damp, or wet.
- Use a soft, damp cloth to clean the device. If the surface of the device becomes soiled, clean it with a soft cloth moistened with a diluted window-cleaning solution.

1.2 Electrical Considerations

The device comes with a NiMH battery which is recharged each time you connect the device to the battery charger.

Please note the following considerations about the batteries in the device:

- If the battery becomes low in the course of normal use, a warning light will appear describing the low battery condition. If this alert appears, back up the data; then recharge the unit. This helps prevent the accidental loss of data.
- If the device does not turn on when you press the ON/OFF button, you should recharge the unit immediately.
- There are no serviceable parts inside the device, so do not attempt to open the unit.



CAUTION: To replace the batteries, return the unit to TagSys using the form provided at the end of this document.

1.3 Battery Information

The device is powered by a rechargeable battery.

1.3.1 Charging and Discharging the Battery

- A new battery must go through three complete charge/discharge cycles before obtaining full performance.
- The battery can be charged and discharged hundreds of times but it will eventually wear out. When the operating time is noticeably shorter than normal, it is time to procure a new battery.

- Use only TAGSYS-approved batteries and battery chargers.
- When a charger is not in use, disconnect it from the power source. Do not leave the battery connected to a charger for longer than one week, since overcharging may shorten its life. If left unused, a fully-charged battery will discharge itself over time.
- For good operation times, discharge the NiMH battery from time to time by leaving your device switched on until it turns off itself. Do not attempt to discharge the battery by any other means.
- Extreme temperature will affect the ability of your battery to charge. Allow the battery to cool down or warm up before switching on the device.
- When the battery is running out of power, a warning light is displayed.
- Charge batteries within an ambient temperature range of 0 °C to 40 °C (32 °F to 104 °F). Ambient temperature during charging affects charging efficiency. Charging efficiency is best within a temperature range of 10 °C to 30 °C (50 °F to 86 °F).

1.3.2 Using the Batteries

Use the battery only for its intended purpose.

Never use any charger or battery that is damaged or worn out.

Leaving the device in hot or cold places, such as a closed car in summer or winter conditions, will reduce the capacity and lifetime of the battery. Always try to keep the device between 15 °C and 25 °C (59 °F and 77 °F). A device with a hot or cold battery may temporarily not work, even when the battery is fully charged. Battery performance is particularly limited in temperatures below the freezing point.

NiMH batteries performance is particularly limited in temperatures below –10 °C (14 °F).



CAUTION: To dispose of the batteries, return the unit to TagSys using the form provided at the end of this document.

1.4 Care and Maintenance

This device is a product of superior design and should be handled with care. The suggestions below will further increase the lifetime of this device.

- Keep the device and all parts and accessories out of the reach of small children.
- Keep the device dry. Precipitation, humidity and liquids contain minerals that will corrode electronic circuits.
- Do not use or store the device in dusty, dirty areas. Its moving parts can be damaged.
- Do not store in hot areas. High temperatures can shorten the life of electronic devices, damage batteries and warp or melt certain plastics.
- Do not store in cold areas. When the device warms up (to its normal temperature), moisture can form inside the device, which may damage electronic circuit boards.
- Do not attempt to open the device. Non-professional handling of the device may damage it.
- Handle the device with care. Shocks may break internal circuit boards.
- Do not clean the device with harsh chemicals, cleaning solvents or strong detergents. Gently wipe the device with a soft cloth slightly dampened in a mild soap-and-water solution.
- Do not paint the device. Paint may clog the device's moving parts and prevent proper operation.

- If the device, battery, charger or any accessory are not working properly, take it to your nearest qualified service facility.

1.5 Important Safety Information

1.5.1 Operating Environment

Follow all special regulations that are applicable in any area and always switch off the device whenever its use is prohibited, or when it may cause interference or danger.

When connecting the device or any accessory to another device, read its user's guide for detailed safety instructions. Do not connect incompatible products.

As with all RF equipment, users are advised that the equipment should only be used in its normal operating position.

1.5.2 Medical Devices

Most modern electronic equipment is shielded from radio-frequency (RF) signals. However, other electronic equipment may not be shielded against the RF signals from your device.

Operation of radio transmitting equipment, including cellular mobile phones, may interfere with the functionality of inadequately protected medical devices. Consult a physician or the manufacturer of the medical device to determine if they are adequately shielded from external RF energy or if you have any questions.

2 Certification

2.1 Occupational Health and Safety Notices

TAGSYS Products have been designed not to exceed the limits given in the European Standard EN 50364 "Limitation of human exposure to electromagnetic fields from devices used in Electronic Article Surveillance (EAS), Radio Frequency Identification (RFID) and similar applications" in conjunction with the European Standard EN 50357 describing how to evaluate the exposure level.

It is the responsibility of the TAGSYS Partner to install the L-HR1 Library Handheld Inventory Reader as described in TAGSYS Product Manuals or TAGSYS Documentation and with the appropriate antennas.

Modification of any TAGSYS Library System is prohibited without the written consent of TAGSYS. Unauthorized modifications may void the conformity of the equipment to safety norm and will void the TAGSYS warranty.

An RF fields survey has been carried out on all the Library System components, in accordance with AS/NZS 2771.1: Radio Frequency Radiation, Part 1. According to this standard the maximum allowable RF exposure levels (non-occupational) at 3 kHz to 300 GHz are 200 $\mu\text{W}/\text{cm}^2$.

2.2 Regulatory Notices

An RFID system typically composed of an RF emission device such as the L-HR1 Library Handheld Inventory Reader is subject to national regulations that may differ by country.

One important item to consider is the maximum permissible magnetic field intensity at a distance of 10 meters from the antenna that must not exceed 42 dB $\mu\text{A}/\text{m}$ in Europe and 38 dB $\mu\text{A}/\text{m}$ in US.

The L-HR1 Library Handheld Inventory Reader meets these limits.



It is the responsibility of the TAGSYS Partner to install the L-HR1 Library Handheld Inventory Reader as described in this Reference Guide or in TAGSYS Documentation.

2.2.1 In Europe (CE and RTTE Directives)

The L-HR1 Library Handheld Inventory Reader complies (CE Declaration of Conformity granted) with the European EMC directive.

The L-HR1 Library Handheld Inventory Reader complies with the requirements of the Telecommunication Terminal Equipment Act (FTEG) and the RTTE Directive 1995/5/EC.

It is the responsibility of the TAGSYS Reseller to install the L-HR1 Library Handheld Inventory Reader as described in this Reference guide or TAGSYS Documentation.

Any modification of the L-HR1 Library Handheld Inventory Reader is prohibited without the written consent of TAGSYS. Unauthorized modifications may void the conformity of the equipment to CE and RTTE Directives and will void the TAGSYS warranty.



If a L-HR1 Library Handheld Inventory Reader is further integrated in a different product, it is the responsibility of the manufacturer of this complementary product to obtain the required approvals for this product.

2.2.2 In USA (FCC Directive)

The L-HR1 Library Handheld Inventory Reader has been designed to comply with Part 15 of the FCC Rules. Furthermore typical configurations based on a Medio S002 have been successfully tested with Part 15 of the FCC rules (FCC ID Number QHKLHBHANDHLDRD1).

L-HR1 Library Handheld Inventory Reader

WARNING TO USERS IN THE UNITED STATES

FEDERAL COMMUNICATIONS COMMISSION (FCC) RADIO

INTERFERENCE STATEMENT 47 CFR Section 15.105(b)

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 receiver.
- Connect the equipment into an outlet on a circuit different to that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

NO UNAUTHORIZED MODIFICATIONS

47 CFR Section 15.21

CAUTION: This equipment may not be modified, altered, or changed in any way without signed written permission from TAGSYS SA. Unauthorized modification may void the equipment authorization from the FCC and will void the TAGSYS warranty.

ANTENNA REQUIREMENT

47 CFR Section 15.203

CAUTION: This equipment must be professionally installed. The installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded. Non-professional installation or installation of the equipment with an improper antenna may void the equipment authorization from the FCC and will void the TAGSYS warranty.

Operation is subject to the following two conditions: (1) The system devices may not cause harmful interference, and (2) The library system devices must accept any interference received, including interference that may cause undesired operation.

2.2.3 In Canada

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

3 Overview

The L-HR1 Library Handheld Inventory Reader is designed to perform a variety of tasks:

- **Inventory:** The L-HR1 is able to read the IDs of all the books on a given shelf or shelving unit for inventory purposes. In this case, the number of books and their IDs are recorded and entered in a database.
- **Search:** The L-HR1 can search for specific books. The ID of a given book is entered in the PDA and when this book is detected by the reader, the reader LED and/or PDA alarm is triggered.
- **Tracking:** The L-HR1 is able to record the location of books on a given shelf or shelving unit.
- **Security:** The L-HR1 is able to manually search items in a bag (same as the security people in the airport).
- **Mobile Check-in/out Station:** The L-HR1 can be used as a portable check in/out station (transaction with the ILS will be made through a wireless connection via the PDA).

3.1 Handheld Inventory Reader Overview

Shelf management of library books has traditionally been performed manually by librarians. The L-HR1 Library Handheld Inventory Reader provides the advantage of locating out-of-place books more rapidly and books can be identified and inventoried quickly.

This handheld RFID reader consists of a long lightweight handle with a flexible end-part (the RFID antenna) that rotates to facilitate the identification of items on all shelves, especially hard-to-reach areas. The unique ergonomics of the TAGSYS Inventory Reader makes it a convenient tool for library staff:

- Items are identified on upper and lower shelves more comfortably.
- Items do not have to be handled one-by-one nor removed from the shelves.

The reader offers optimum reading performance enabling instant data capture when passed alongside the items in a continuous movement. Items are identified regardless of their thickness and proximity to the shelf's edge (any type of shelf, even metallic ones).

The TAGSYS Inventory Reader is connected to a Pocket PC which stores and displays item data. This data is then transferred to the library database via the Pocket PC cradle or through a wireless connection. No modification to the library database is required. All information needed for the library collection management can be downloaded thanks to the unlimited Pocket PC memory. It offers a working autonomy of more than 7 hours.

Thanks to the unrivaled reading speed and the battery autonomy of the TAGSYS Inventory Reader, inventory checks are performed with minimal staff and within a short amount of time. Since inventory-taking is no longer a tedious operation, libraries are now able to perform inventories more often.

This shelf management system basically consists of:

- the L-HR1 Library Handheld Inventory Reader,
- a Personal Digital Assistant (PDA) used to operate the Reader and to communicate with the main library computer system. (The PDA is not included in the TAGSYS scope of supply).

Figure 1: Handheld Inventory Reader Application

3.2 L-HR1 Reader

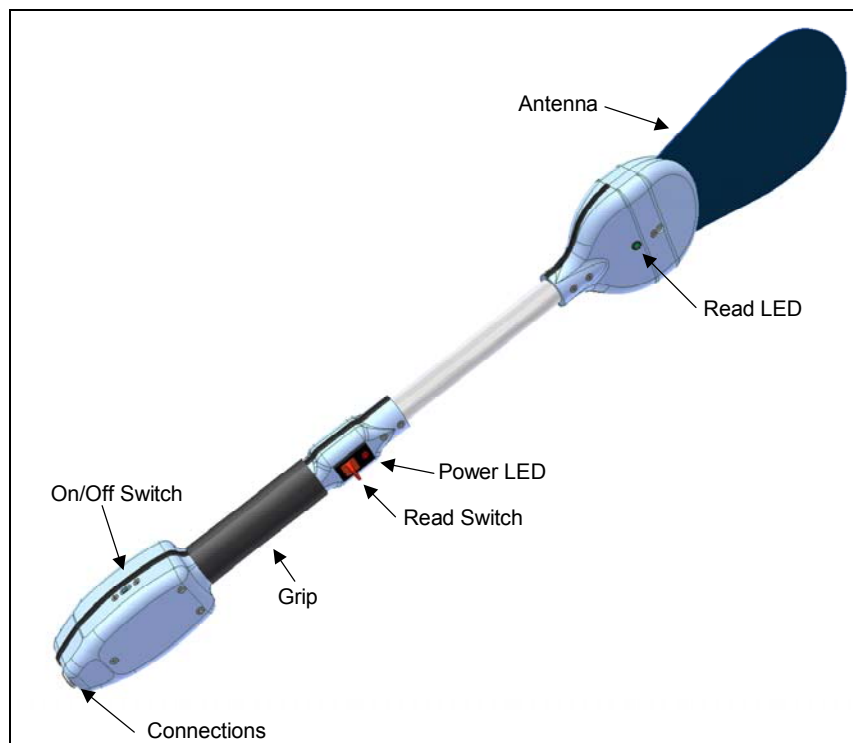
The L-HR1 Reader reads the smart labels that are used to identify books.

The On/Off switch located at the base of the L-HR1 is used to switch the reader on and off.

The Read switch is used start the Read process. The Read switch is a 3-position paddle switch. Press the switch up (towards the Power LED) and the switch is locked in place. Press the switch down, it can be used as a trigger.

The Power LED indicates the status of the internal NiMH batteries. When green, the batteries are correctly charged. When orange, the battery power is low. When red, the batteries must be recharged.

The Read LED switches on (red) when a smart label is detected (read).

Figure 2: Handheld Inventory Reader for Libraries

3.3 Personal Digital Assistant (not included)

The Personal Digital Assistant (PDA) is used for communication between the L-HR1 Reader and the main library computer system. The current model used is the iPAQ manufactured by Compaq.

The PDA is connected to the PC/iPAQ connection plug of the L-HR1 Reader ([Figure 6](#)).

The application software is loaded onto the PDA which provides a user-friendly interface that is both visual and audio.

Figure 3: iPAQ PDA (Example)



3.4 Battery Charger

The battery charger is used to charge the batteries of the L-HR1 Reader. It is connected to the battery charger connection plug of the L-HR1 Reader ([Figure 6](#)).

Figure 4: Battery Charger



Charge batteries within an ambient temperature range of 0 °C to 40 °C (32 °F to 104 °F). Ambient temperature during charging affects charging efficiency. Charging efficiency is best within a temperature range of 10 °C to 30 °C (50 °F to 86 °F).



CAUTION: To replace the batteries, return the unit to TagSys using the form provided at the end of this document.

4 Installation

4.1 Delivery Kit

The items listed in [Table 1](#) are included in the delivery kit.

Table 1: Contents of the Delivery Kit

Quantity	Description
1	L-HR1 Library Handheld Inventory Reader
1	PDA/Reader connection cable
1	PC/Reader connection cable
1	Battery Charger Unit
1	CD-ROM including user documentation, product software and example application

Figure 5: L-HR1 Delivery Kit



4.2 How to Install the Application Software on the PDA

The application software is supplied on the CD-ROM included in the L-HR1 Library Handheld Inventory Reader Delivery Kit.

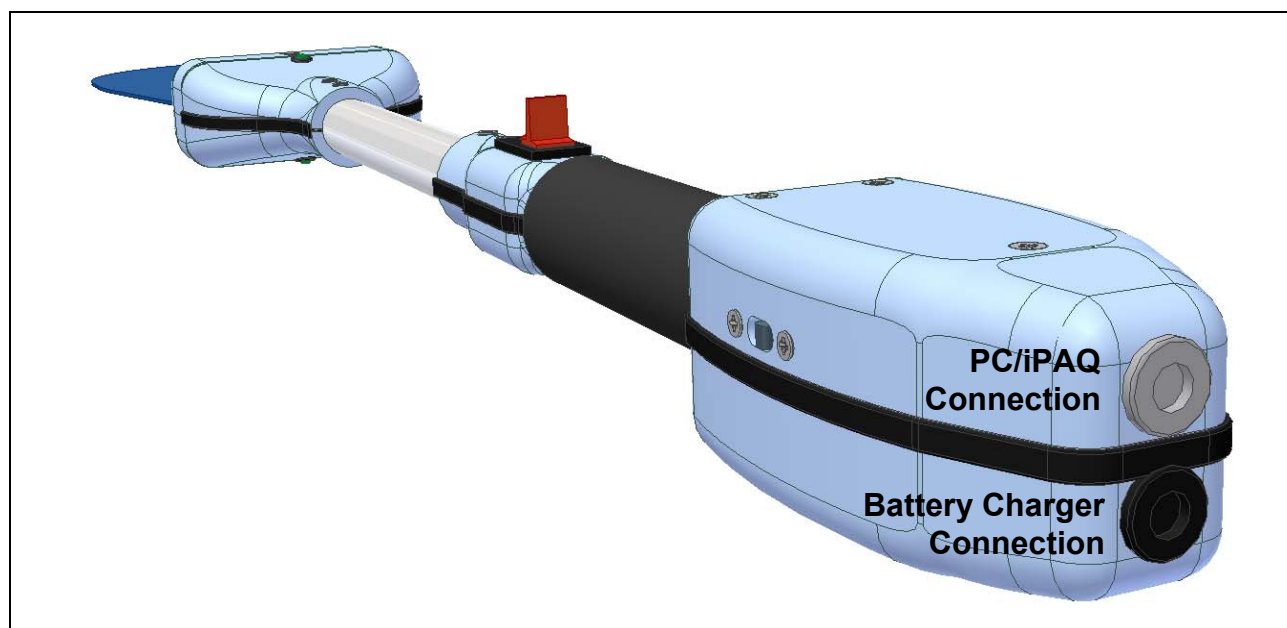
1. Connect the PDA to your PC.
2. On your PC, open the Microsoft ActiveSync application.
3. Open the application ZIP file on the TAGSYS CD-ROM.
4. Copy the files of the ZIP file to a directory on the PDA.

4.3 Connecting the L-HR1 Reader to the PDA

To connect the L-HR1 Reader to the PDA, perform the following steps:

1. Make sure that the PDA is turned on and is recharged.
2. Make sure that the L-HR1 Reader is turned off.
3. Connect the connection cable to the PDA.
4. Connect the other end of the connection cable to the L-HR1 Reader ([Figure 6](#)).
5. Switch on the L-HR1 Reader.
6. Run the software demo application on the PDA.

Figure 6: L-HR1 Reader Connections



5 Operation

5.1 Reading Books on a Shelf

The L-HR1 Reader is primarily used to read the smart labels in books on library shelves.

1. Verify that the L-HR1 is correctly connected to the PDA and turned on (see [Section 4.3](#), “Connecting the L-HR1 Reader to the PDA”).
2. Start the application on the PDA.
3. Place the antenna of the reader against the spine of the books to be read as shown in [Figure 7](#). Start reading a few centimeters before the books and stop a few centimeters after the books.



For best reading results, it is recommended that a space of 50 mm. (2 in.) be allocated between each side of the shelf and the books.

Figure 7: Optimal Reading Position



CAUTION: Do not bend the antenna at an angle greater than 110°. Do not bend the antenna where it comes out of the plastic reader device.

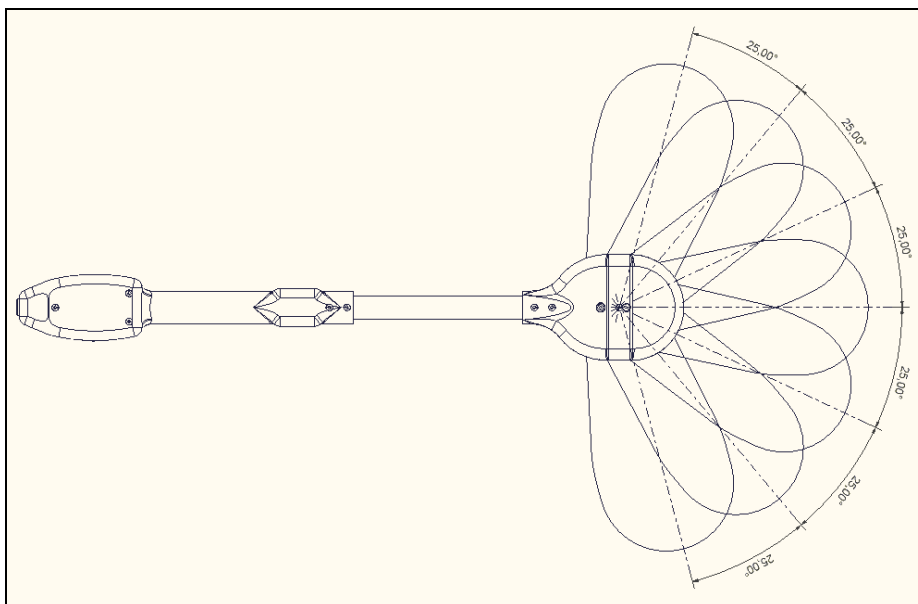
4. Place the bottom edge of the antenna on the shelf and slowly swipe the reader across the book spines. Refer to [Table 2](#) for the optimum reading speed.

It is best to perform this operation twice (once in each direction) in order to verify that the same number of smart labels is detected each time. This will ensure a correct inventory count.

Table 2: Tag Reading Speeds

Book Thickness	Read Speed
Up to 5 mm.	20 mm/s
Between 5 and 10 mm.	50 mm/s
Between 10 and 30 mm.	100 mm/s
Greater than 30 mm.	200 mm/s

The antenna of the unit can be moved for an optimal reading angle.

Figure 8: Optimal Antenna Angle

The IDs of the detected smart labels are displayed on the PDA screen.

Figure 9: PDA Screen (Example)

6 How to Improve Performance

In certain cases when the L-HR1 Reader is installed in a highly metallic environment, its reading performance can be significantly reduced.

In this event, it is strongly recommended changing the location of the L-PS1 Library Programming Station.

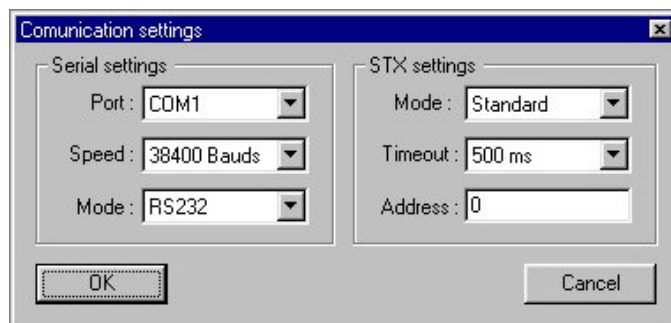
6.1 Verification of L-HR1 Reader Performance

The S002 Explorer software tool is used to verify the reading performance of the L-HR1 Reader.

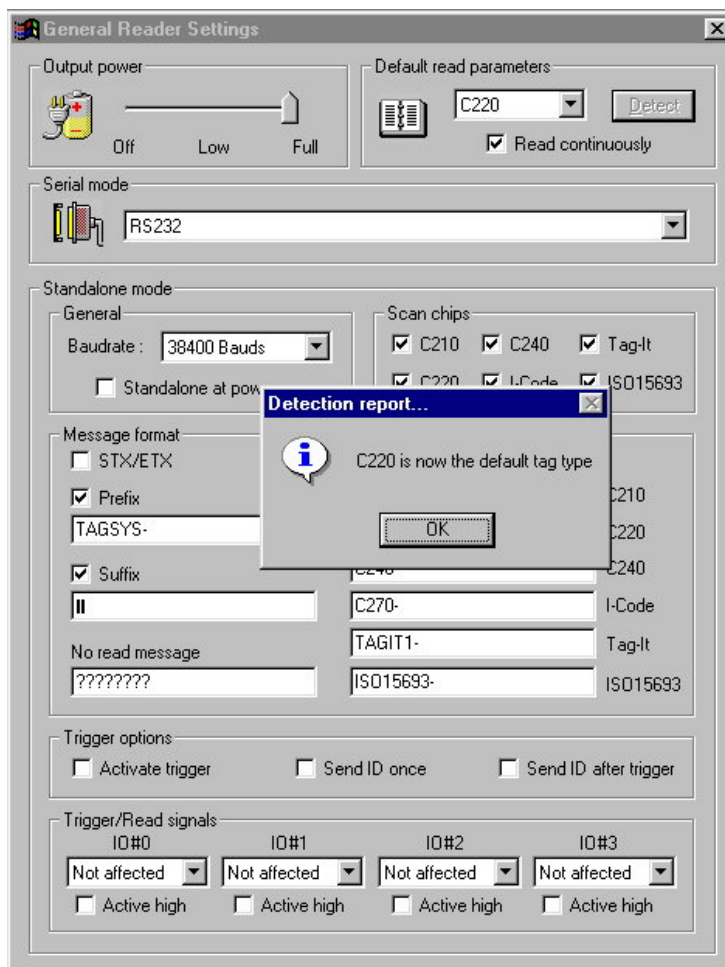
Procedure:

1. Install the S002 Explorer software tool on your PC. (Compatible with Windows® 9x, NT®, 2000 and XP operating systems.)
2. Connect the L-HR1 Reader to the serial port of your PC and switch on the Reader unit.
3. Run the S002 Explorer software tool.
4. If the L-HR1 Reader is not detected (error message), adjust the communication settings for the L-HR1 Reader.
 - a. In the Settings menu, open Communication Settings and select the communication port that is connected to the L-HR1 Reader.

Figure 10: Adjusting Communication Settings



5. In the Settings menu, select General Reader Settings and set the following parameters as listed below.
 - a. Place a book with a Folio 20 smart label on the L-HR1 Reader antenna.
 - b. Set the Output Power selection to Full.
 - c. Select the Read Continuously button in the Default Read Parameters.
 - d. Click on Detect in the Default Read Parameters.
 - e. The 'C220 is now the default tag type' message is displayed.

Figure 11: General Reader Settings

6. In the Commands menu, click C220 and select Default Read.
7. In the Default Read dialog box, click Read.

Figure 12: Default Read Window

8. Using a ruler, measure the distance in which the antenna is able to read a Folio 20 smart label. If this distance is less than 100 mm., you should verify the tuning of the antenna.

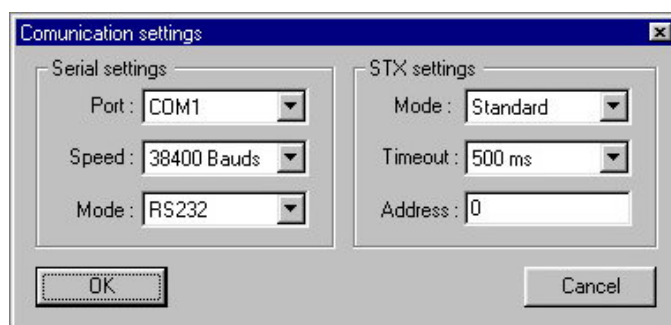
6.2 Upgrading the Firmware

The L-HR1 Reader has the capability to have firmware upgrades. This feature allows you to protect your investment by upgrading your L-HR1 Reader when an enhanced chip-decoding algorithm or new chip drivers become available.

Upgrading the Firmware of the L-HR1 Reader is a straightforward operation.

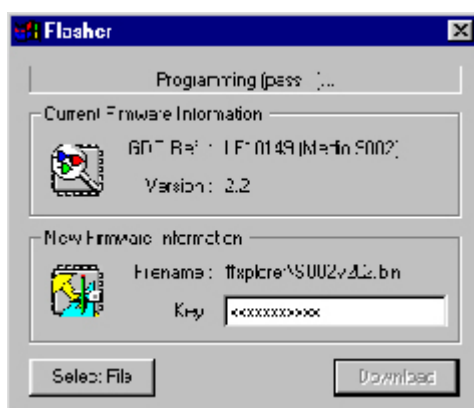
1. Install the S002 Explorer software tool on your PC. (Compatible with Windows® 9x, NT®, 2000 and XP operating systems.)
2. Connect the L-HR1 Reader to the serial port of your PC and switch on the L-HR1 Reader.
3. Run the S002 Explorer software tool.
4. If the L-HR1 Reader is not detected (error message), adjust the communication settings for the L-HR1 Reader.
 - a. In the Settings menu, open Communication Settings and select the communication port that is connected to the L-HR1 Reader.

Figure 13: Adjusting Communication Settings

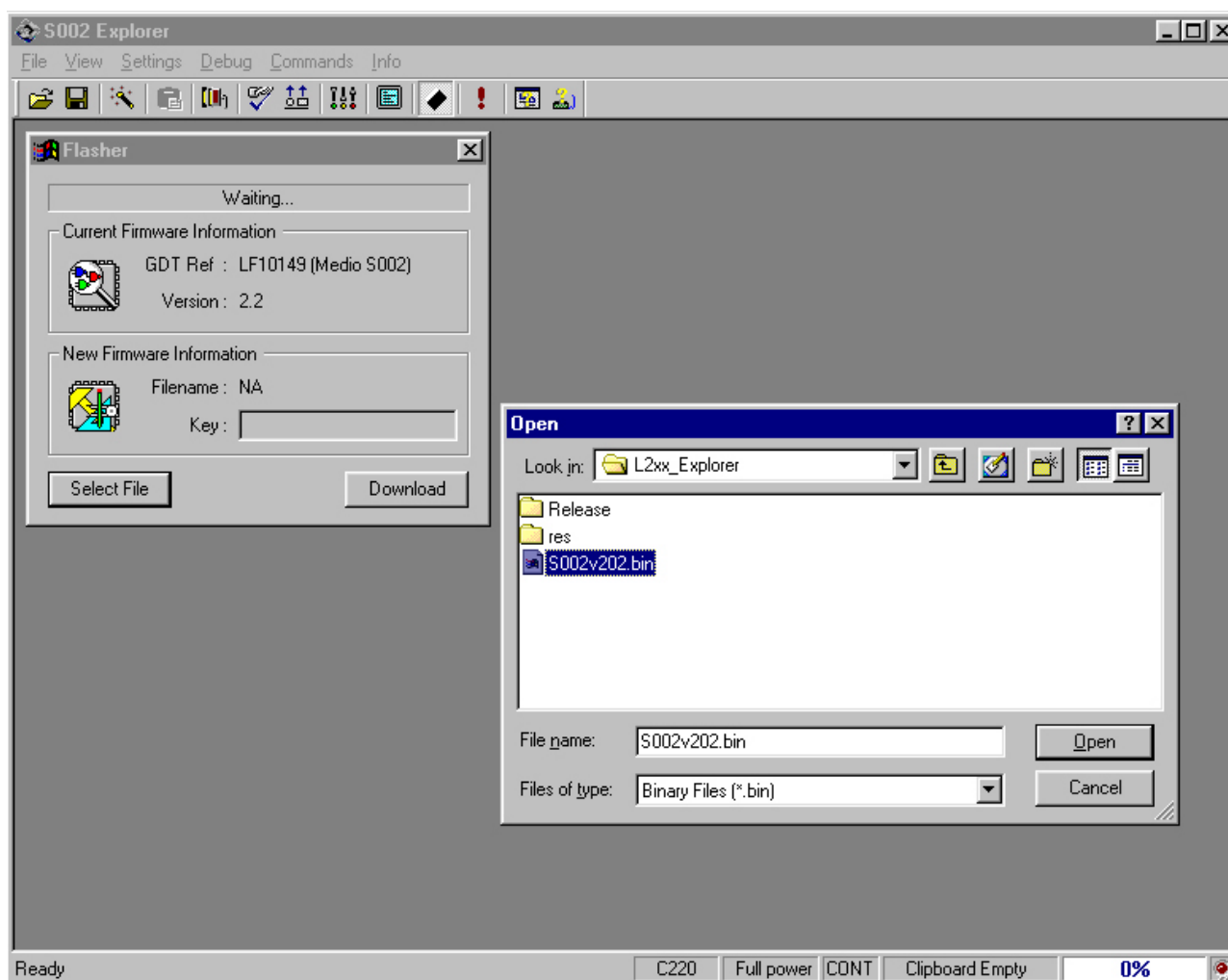


5. In the Info menu, select About S002 Explorer and enter the access key provided with the firmware upgrade and click Enter.

Figure 14: Entering the Firmware Key

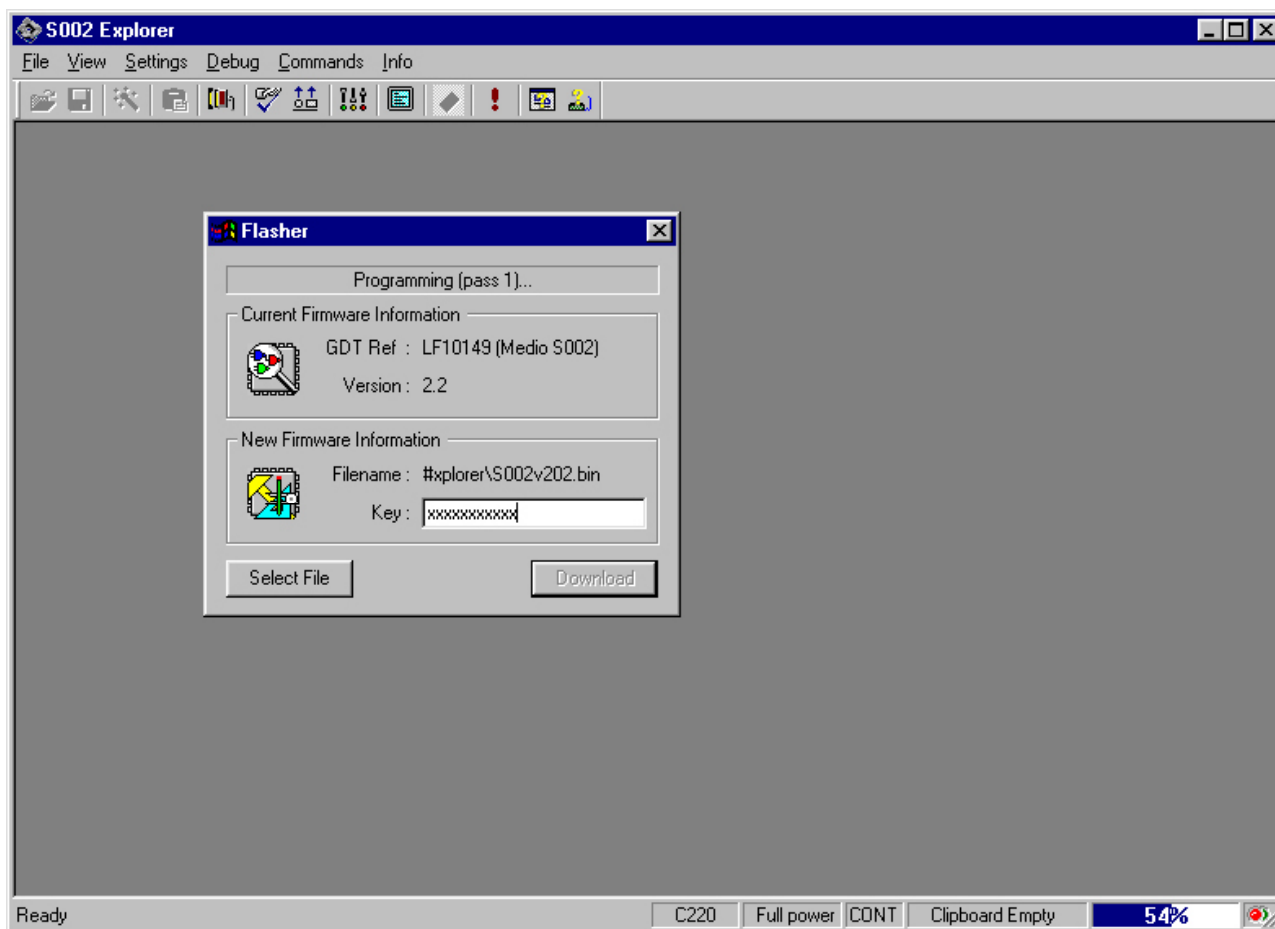


6. In the File menu, select Upgrade Firmware.
 - a. In the Flasher window, click Select File.
 - b. Select the BIN file supplied with the firmware upgrade.
 - c. Enter the firmware key provided with the BIN file.
 - d. Click Download.

Figure 15: Upgrade Firmware Window

7. The Download procedure may take several minutes. A progress bar is displayed.

Figure 16: Entering Firmware Key



8. If the new firmware has been successfully downloaded, a message is displayed. If the final dialog box at the end of the procedure contains an error message, reload the original firmware supplied with the L-HR1 Reader and contact your approved TAGSYS representative.
9. Click OK to reset the L-HR1 Reader.



Always use Firmware upgrades supplied by TAGSYS. If you have any doubt on the origin of the firmware you intend to download; contact your TAGSYS approved reseller. Any attempt to download a Firmware supplied by a third party may lead to permanent damages to the L-HR1 Reader.

Never interrupt the Firmware upgrade procedure while the firmware is being downloaded. This may lead to permanent damages to the L-HR1 Reader.

7 Troubleshooting

7.1 Troubleshooting Procedures

In the event of any problems with the L-HR1 Library Handheld Inventory Reader, please perform the following troubleshooting procedures.

1. Verify that the battery of the L-HR1 Library Handheld Inventory Reader is correctly charged. If the Power LED of the unit is orange or red (or does not light up at all), its battery requires charging.
Connect the L-HR1 to the battery charger and plug the battery charger to the mains supply. The status LED on the battery charger is green when the L-HR1 is fully charged.
2. Verify that the iPAQ cable is correctly connected to the L-HR1 Library Handheld Inventory Reader and that it is not damaged.
3. Verify that the L-HR1 Library Handheld Inventory Reader functions correctly by connecting the unit directly to a PC and running the S002 Explorer software included in the CD-ROM. For more information, refer to [Appendix B: S002 Explorer](#).

In the event that the problem is not solved after performing these three steps, refer to [Section 9, "Warranty Conditions"](#) to return the defective Product to TAGSYS if you are the original buyer. Otherwise, please contact your TAGSYS approved representative.

8 Maintenance

8.1 Servicing the L-HR1 Library Handheld Inventory Reader



CAUTION: The L-HR1 Library Handheld Inventory Reader contains no operator serviceable parts and must only be serviced by qualified personnel.

No regular servicing is required, except for keeping the unit clean.

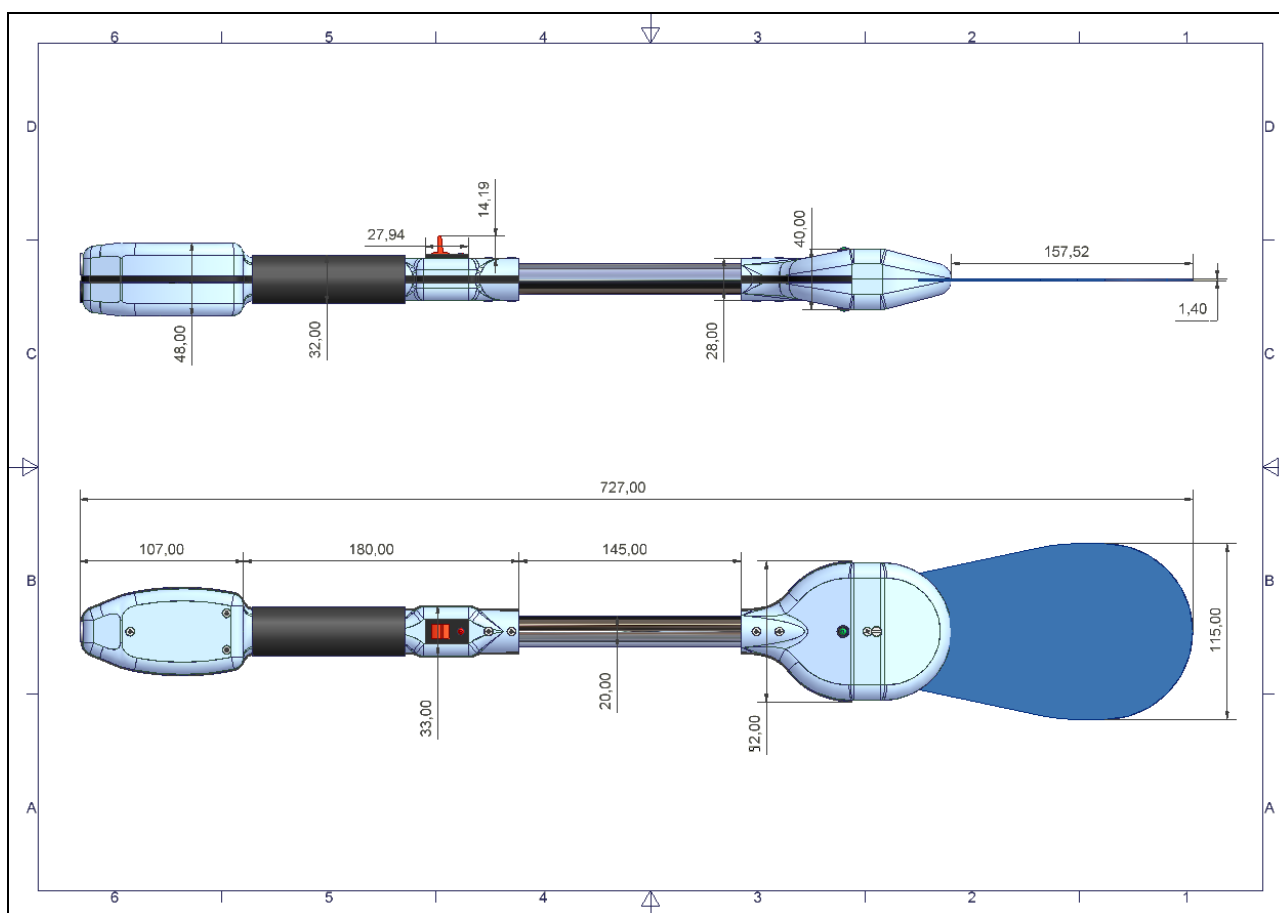
It is recommended that the electronics unit be inspected at least once per year by an approved TAGSYS technical representative.

9 Technical Data

9.1 Mechanical Characteristics

Description	Value
Size (including antenna)	727.11 mm. (28 $\frac{2}{3}$ in.)
Weight	Approx. 540 g. (1.2 lb.)
Recommended Operating Temperature	15 °C to 25 °C (59 °F to 77 °F)
Storage Temperature	-20 °C to +45 °C (-4 °F to 113 °F)

Figure 17: L-HR1 Reader Mechanical Diagram



9.2 Battery Charger Characteristics

Description	Value
Supply Voltage	Primary Secondary
	110 to 240 V 4.8 to 12 V at 600 mA and 50/60 Hz
Recommended Charging Temperature	10 °C to 30 °C (50 °F to 86 °F).

10 Warranty Conditions

10.1 Warranty

TAGSYS warrants that its L-HR1 Library Handheld Inventory Reader shall comply with the functional specifications set forth herein for a period of one year from the date of delivery to the Buyer.

This warranty is valid for the original Buyer of the Product and is not assignable or transferable to any other party.

TAGSYS cannot be responsible in any way for, and disclaims any liability in connection with the operation or performance of:

- any product in which the Product is incorporated;
- any equipment not supplied by TAGSYS which is attached to or used in connection with the Product; or,
- the Product with any equipment.

This warranty only applies to the Product and excludes all other equipment.

Optimal operation and performance of the Product are obtained by using TAGSYS' readers, by applying TAGSYS installation guidelines and by having your installation reviewed by a TAGSYS' technical consultant.

The TAGSYS warranty does not cover the installation, maintenance or service of the Product and is strictly limited to the replacement of Products considered as defective by TAGSYS and returned according to the return procedure defined below; in such case, TAGSYS will, at TAGSYS' option, either replace every defective Product by one new Product or refund the purchase price paid by Buyer to TAGSYS for the defective Product.

10.1.1 Warranty Exclusions

The following conditions are not covered under the warranty:

- Defects or damages resulting from storage of the Product under conditions that do not comply with TAGSYS specifications or normal usage.
- Defects or damages resulting from use of the Product in abnormal conditions (abnormal conditions being defined as any conditions exceeding the ones stated in the product specifications).
- Defects or damages from misuse, accident or neglect.
- Defects from improper testing, operation, maintenance or installation.
- Defects from alteration, modification except modifications or adjustments specifically described in this Product reference guide, adjustment or repair, or any attempt to do any of the foregoing, by anyone other than TAGSYS.
- Any action on the product that prevents TAGSYS to perform an inspection and test of the Product in case of a warranty claim.
- Tampering with or abuse of the Product.
- Any use or incorporation by the Buyer or a third party of TAGSYS' Product into life saving or life support devices or systems, or any related products; TAGSYS expressly excludes any liability for such use.

10.1.2 General Provisions

This warranty sets forth the full extent of TAGSYS responsibility regarding the Product.

In any event, TAGSYS warranty is strictly limited to (at TAGSYS' sole option) the replacement or refund of the Products purchase price to TAGSYS, of Products considered as defective by TAGSYS.

The remedy provided above is in lieu and to the exclusion of all other remedies, obligations or liabilities on the part of TAGSYS for damages, whether in contract, tort or otherwise, and including but not limited to, damages for any defects in the Products or for any injury, damage, or loss resulting from such defects or from any work done in connection therewith or for consequential loss, whether based upon lost goodwill, lost resale profits, impairment of other goods or arising from claims by third parties or otherwise.

TAGSYS disclaims any explicit warranty not provided herein and any implied warranty, guaranty or representation as to performance, quality and absence of hidden defects, and any remedy for breach of contract, which but for this provision, might arise by implication, operation of law, custom of trade or course of dealing, including implied warranties of merchantability and fitness for a particular purpose.

10.1.3 How to Return Defective Products

The Buyer shall notify TAGSYS of the defects within 15 working days after the defects are discovered.

Defective Products must be returned to TAGSYS after assignment by a TAGSYS Quality Department representative of an RMA (Return Material Authorization) number. No Products shall be returned without their proof of purchase and without the acceptance number relating to the return procedure.

All Products shall be returned with a report from the Buyer stating the complete details of the alleged defect.

Call +33 4 91 27 57 36 for return authorization and shipping address.

If returned Products prove to be non-defective, a charge will be applied to cover TAGSYS' analysis cost and shipping costs.

If the warranty does not apply for returned Products (due to age, or application of a warranty exclusion clause), a quote for replacement will be issued, and no replacement will be granted until a valid purchase order is received. If no purchase order is received within 30 days after the date of TAGSYS quote, TAGSYS will return the products and charge the analysis cost and shipping costs.

All replaced Products shall become the property of TAGSYS.

The Product Return Form is included on the following page. This form should accompany any product you need to return to TAGSYS for analysis in the event of a problem.

TAGSYS Product Return Form

Customer Profile:

Company:.....	Contact Name:.....
Address:.....	Contact e-mail:.....
.....	Contact Phone:.....
City & State:.....	Contact Fax:.....
Zip Code:.....	
Country:.....	

Order identification:

Product Name:.....	Invoice Number:.....
Order Number (OEF):.....	Return Quantity:

Reason for return:

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To inform TAGSYS of this return, please email it to:
valerie.guenegan@tagsys.net and to catherine.thouvenin@tagsys.net

Address to ship the product with this document attached:

TAGSYS
180, chemin de Saint Lambert
13821 LA PENNE SUR HUVEAUNE

To inform TAGSYS of this return, please also fax it to your Customer Service Representative
+33 (0) 4 91 27 57 01

Return Procedure:

The product returned will go through stringent quality controls.
A final analysis report will be sent to you as soon as possible.
Please contact the quality representative for further details
+33 (0) 4 91 91 27 57 36

Appendix A: Tag Positioning

10.2 Tag Positioning Diagram

For optimal tag reading performance, it is recommended that tags be positioned on the inside back cover of the books as close to the spine as possible.

Figure 18: Tag Positioning Diagram

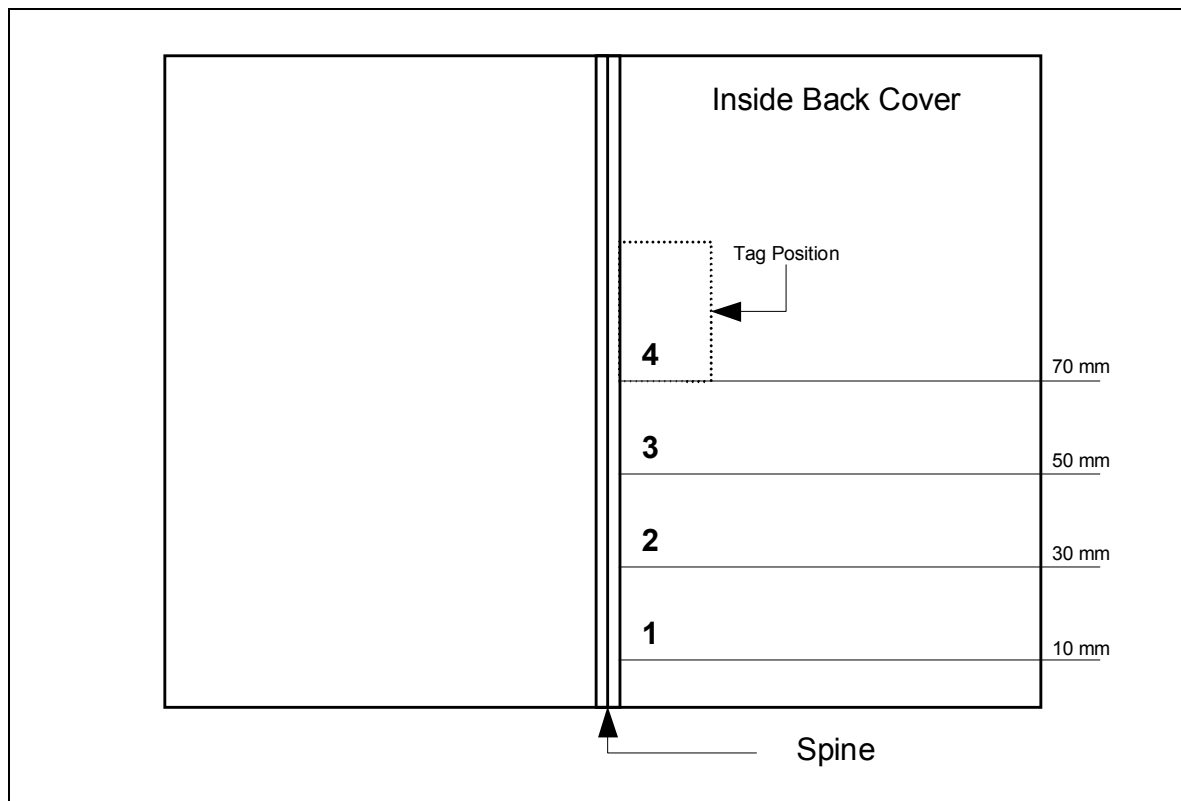


Figure 19: Tag Positioning Diagram



Appendix B: S002 Explorer

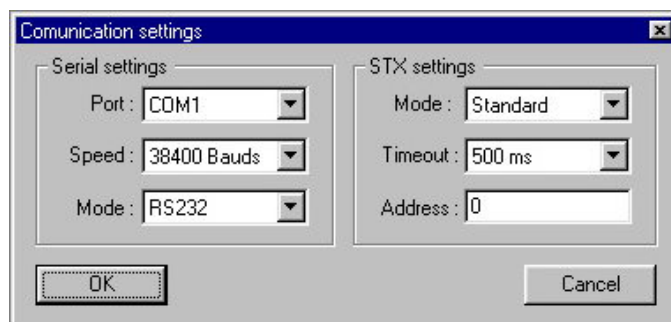
10.3 Verification of L-HR1 Performances

The S002 Explorer software tool is used to verify the reading performances of the L-HR1 Library Handheld Inventory Reader.

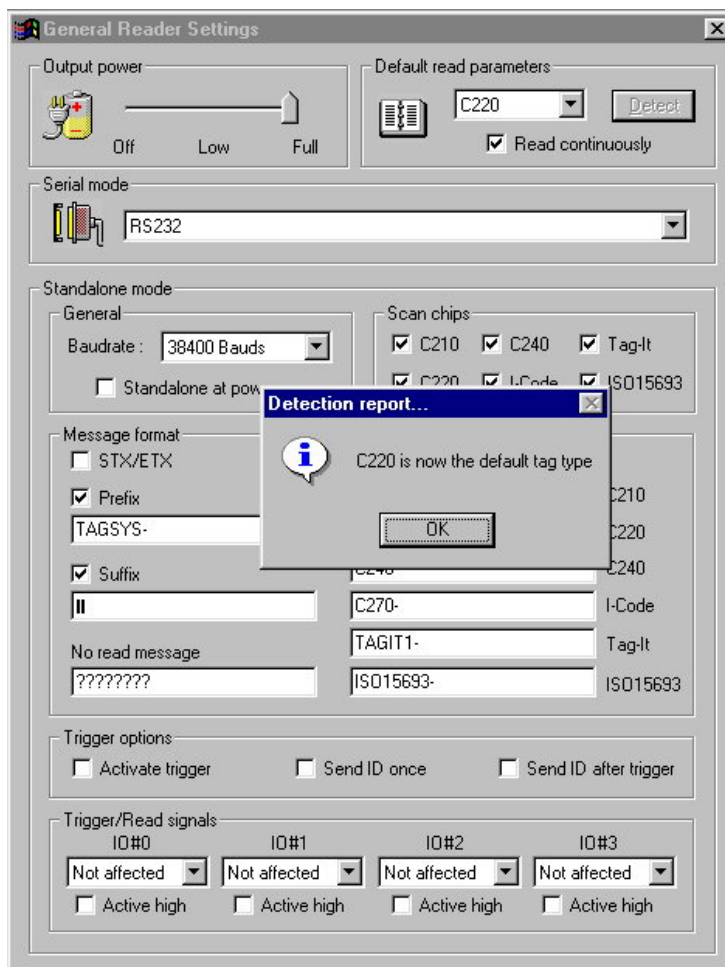
Procedure:

9. Install the S002 Explorer software tool on your PC. (Compatible with Windows™ 9x, NT, 2000 and XP operating systems.)
10. Connect the Library Handheld Inventory Reader to the serial port of your PC and the power supply connected.
11. Run the S002 Explorer software tool.
12. If the Library Handheld Inventory Reader is not detected (error message), adjust the communication settings for the Library Handheld Inventory Reader.
 - a. In the Settings menu, open the Communication Settings submenu.
 - b. Select the communication port that is connected to the Library Handheld Inventory Reader.

Figure 20: Adjusting Communication Settings



13. On the Settings menu, click General Reader Settings and set the following parameters as listed below.
 - a. Place a book with a Folio 20 smart label on the Library Handheld Inventory Reader antenna.
 - b. Set the Output Power selection to Full.
 - c. Check the Read Continuously button in the Default Read Parameters.
 - d. Click on Detect in the Default Read Parameters.
 - e. The 'C220 is now the default tag type' message is displayed.

Figure 21: General Reader Settings

14. On the Commands menu, click C220 and select Default Read.

15. On the Default Read window, click Read.

Figure 22: Default Read Window

16. The Default Read window displays the ID information contained in the Folio 20 smart label.