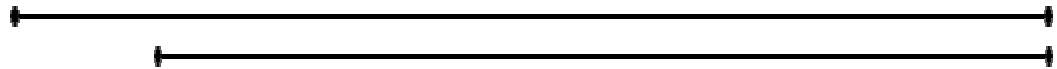




i-PORT III User's Guide



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Radio Frequency Compliance Statement

IDENTEC SOLUTIONS, Inc. is the responsible party for the compliance of the following devices:

MODEL:	i-PORT III	i-CARD	i-D2 TAGS	i-Qxx TAGS
FCC ID:	O2E-ILR-916IP3	O2E-ICARD-NA	OO4-ILR-ID2	OO4-ILR-IQ8T or OO4-ILR-IQR
CANADA:	Pending	35381032231	3538A12112	35381021756A or 35381021825

The user(s) of these products are cautioned to only use accessories and peripherals approved, in advance, by IDENTEC SOLUTIONS, Inc. The use of accessories and peripherals, other than those approved by IDENTEC SOLUTIONS, Inc., or unauthorized changes to approved products, may void the compliance of these products and may result in the loss of the user(s) authority to operate the equipment.

Operation is subject to the following conditions: (1) these devices may not cause harmful interference, and (2) these devices must accept any interference, including interference that may cause undesired operation of the device.

FCC Compliance

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communication. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his/her own expense.

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Industry Canada Compliance

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

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

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (EIRP) is not more than that required for successful communication.

This device has been designed to operate with an antenna having a maximum gain of 8dBi. Antenna having a higher gain is strictly prohibited per regulations of Industry Canada. The required antenna impedance is 50 ohms.

Important Note

To comply with FCC radio frequency exposure compliance requirements, this device must be installed by an IDENTEC SOLUTIONS certified technician. When installing antennas, a 20 centimeter passing distance must be maintained from any body part of the user or nearby persons and the antenna.

The installer of this radio equipment must ensure that the antenna is located or pointed such that it does not emit RF field in excess of Health Canada limits for the general population; consult Safety Code 6, obtainable from Health Canada.

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1.0 Introduction

1.1 Fundamentals

IDENTEC SOLUTIONS' ILR® (Intelligent Long Range®) technology is the next generation of long range RFID (Radio Frequency Identification). The objective is wireless and automated data collection over large distances.

HOW RFID WORKS

Data is transmitted via high frequency radio waves between a tag and an interrogator. Information stored on the tag can be read and modified. Data can be exchanged over long distances, even in the presence of extreme operating conditions such as dust, dirt, paint or oil.

The core element of the system is the active ILR tag, which can communicate large amounts of data (up to 32 kBytes) at a rapid rate of transmission over very long distances (up to 100 meters). A sophisticated anti-collision handling algorithm enables the interrogator (i-PORT) to record data simultaneously from hundreds of these tags within seconds. Connection of the interrogator to a host computer system permits global data accessibility via a variety of software platforms.

CHARACTERISTICS OF ILR:

- **UHF Frequency (868 / 916 MHz)**
- **Long read and write range of up to 100 meters**
- **Variable read range from just a few meters up to 100 meters**
- **Large storage capacity (8 kB or 32 kB)**
- **Temperature monitoring and recording (optional)**
- **Highly visible LED "pick-by-light" (optional)**
- **Long battery lifetime (up to 6 years)**
- **Anti-collision process and multi-tag handling**

1.2 System Overview

IDENTEC SOLUTIONS' ILR-System consists of 4 main components:

- **Active tags (also called transponders) with internal power supply, which are used to identify goods or to store data and histories**
- **Interrogator (i-PORT; fixed-mounted) and handheld devices (mobile), which exchange information with the tags and host computer systems**
- **Patch antenna for definition of read zone**
- **A central computer system as basis for control and monitoring**

2.0 COMPONENTS

2.1 i-PORT III

i-PORT III is the next generation of IDENTEC SOLUTIONS' ILR interrogators. It is capable of communicating with i-Q series tags with a communication range up to 100 meters.



Up to four antennas (plus one extra send antenna) can be connected to i-PORT III. Built-in signal strength measurement capability enables the localization of tags using triangulation.

i-PORT III is delivered complete with standard software, which offers the user a variety of options:

- Communication with ILR i-Q tags
- Simultaneous operation with up to four antennas (receive), with the option of a fifth antenna (send)
- Communication with host computer systems via Ethernet interface
- Data processing (event messages, in/out, etc.)
- Configuration by means of web-interface (remote maintenance)

i-PORT III has a Real-Time Operating System (RTOS: Thread X) and an internal Real-Time Clock (RTC), which permit an exact time allocation of the data. Up to 2000 data messages can be stored temporarily.

2.2 Antennas

Patch antennas can be used with i-PORT III for definition of read zones. Your system installer will select the appropriate mounting height for optimal communication range along with consideration of safety issues.

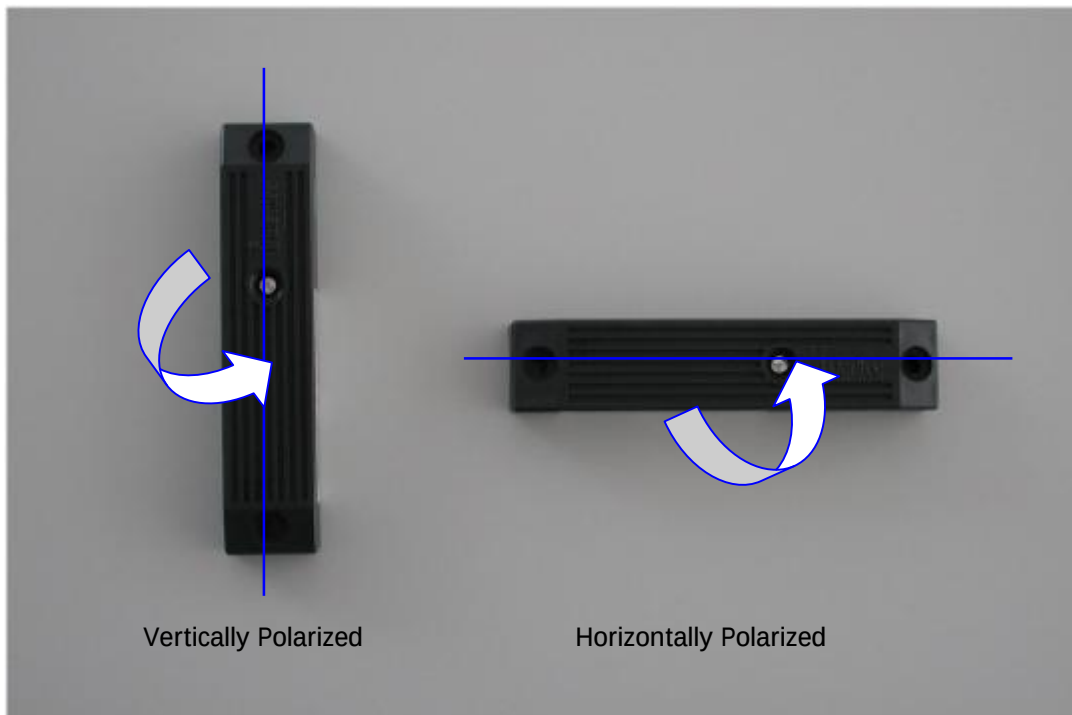
2.3 i-Q Tag



The i-Q series active tag is particularly suited for:

- Identification
- Tracking and Tracing
- Localization
- Temperature Monitoring
- Data carrying

i-Q tags are available in a variety of configurations, i.e. with 8 kByte or 32 kByte of memory, an optional LED for visual recognition, and optional temperature logging function. They are available in two different radio frequencies: 868 MHz for use in Europe, 916 MHz for use in North America or dual frequency for transcontinental applications. The i-Q tags have a two-way communication range of up to 100 meters (300 feet).



Polarization is dependent on orientation and is rotation symmetrical.

2.4 Data communication between i-PORT and Tag:

Data communication between the i-PORT reader and tag always initiates from the reader. First the i-PORT sends out a scan signal, which contains an i-PORT ID and the number of available slots. All tags that are located in the read zone and that receive the signal search out a slot at random and answer in this slot. Each slot has a duration of 1.2 ms. This anti-collision process requires the availability of at least double the number of slots as the maximum number of tags expected; the probability of collisions increases as the slots are utilized. As a result of this scan signal, the i-PORT generates a tag list. Data can now be exchanged (read from or written to) with the tags on this list. Before data is exchanged with the tag, the i-PORT sends a Session Setup signal to this tag in order to prepare the tag for the impending data interrogation. In contrast to the scan, which addresses all the tags, all other commands refer to only one particular tag.

3.0 Using Your RFID Hardware

Now that your RFID system has been professionally installed, setup, and tested, the following section will provide you with user interface diagnostic descriptions and maintenance tips to ensure your RFID system will operate trouble free.

3.1 LED Displays



Status LEDs:

- a) **POWER:** Lights when power is applied to the i-PORT
- b) **RUN:** Blinks (every 2 seconds) as soon as the i-PORT has booted (approx. 10 seconds after power-up)
- c) **HOST:** Lights when a host is connected to the i-PORT
- d) **ERROR:** Lights when an error occurs (see section: Troubleshooting)

COM LEDs:

- a) **RX:** Lights when the i-PORT receives data on serial interface
- b) **TX:** Lights when the i-PORT sends data on serial interface

INPUT LEDs:

- a) **1-4:** Light when Inputs 1-4 are set (Connection to Ground)

NOTE: This functionality has not been implemented at this time.

ANTENNA LEDs:

- a) **1-4:** Light when there is activity at corresponding Antennas 1-4
 - Green: Antenna is sending
 - Red: Antenna is receiving (Orange to red, depending on the strength of the signal)
- b) **W:** Lights when there is activity at the Wake-up Antenna

OUTPUT LEDs:

- a) **1-4:** Light when the corresponding Outputs 1-4 are set

NOTE: This functionality has not been implemented at this time.

Cable Connections and Plug Allocation

Depending on your project requirements, the installer of this device will have wired one or more input and output devices. The following will describe the operation of each terminal block employed on the i-PORT III.



Antenna jacks:

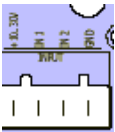
ANT1-4: SMA sockets, send and receive antennas

ANT W: SMA socket, send antenna ONLY (WakeUp Antenna, for i-Q tags only)

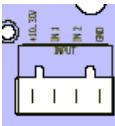
Terminal Block 1: **+10-30V** Connection for power supply (10-30V DC) **Supply**
 GND Connection for power supply (GND) **Supply**



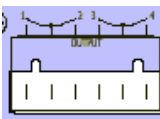
Terminal Block 2: Functionality has not been implemented at this time.



Terminal Block 3: Functionality has not been implemented at this time.



Terminal Block 4: Functionality has not been implemented at this time.



Serial and Ethernet Interface:

RS 232 interface (up to 115 kb/s) (for setup and diagnostics only) and Ethernet interface (10 / 100 Mbit/s)

4.0 Software, Configuration

4.1 IP-Address, Password

The installer of your RFID reader will require an unused IP address for each device installed in your facility. The installer will configure each i-PORT III reader during the installation process. If the i-PORT III should be reset for any reason, the default factory settings are as follows:

IP-Address 192.168.2.244
Subnet-Mask: 255.255.255.0

User Name: user
Password: identec

4.2 Configuration, Settings

Direct Connection:

Connect the i-PORT directly to the network connection in your PC, laptop, etc. using a crossover network cable.
Ensure that the PC's IP-Address lies in the same subnet as that of the i-PORT.

Network Connection:

Connect the i-PORT with a straight network cable to the network.

4.3 Interfaces

Ethernet Interface:

Rate of transmission: 10 / 100 Mbit/s
Protocols: TCP/IP, FTP, Telnet, HTTP, SNMP

Ports: Debugport	7090	for Debug data
Communication Port	7070	for communication (commands, messages)

WLAN:

It is possible to effect a WLAN connection by means of a converter, for example a Client Bridge or Access Point.

4.4 Protocols

The protocol used by the i-PORT is an ASCII protocol. The protocol allows a host computer to take control of the process or of the i-PORT. It is possible to execute scans, to read or write data, to start temperature logs etc. on command.

For more information about the protocol, please refer to the i-PORT "Communication Protocol".

5.0 Technical Specifications

5.1 Codes, Parameters

ILR® Parameters	
Compatibility	ILR® i-Q Tags
Read range (adjustable)	ILR® i-Q Tag 100m (300 ft)
Write range (adjustable)	100m (300 ft)
Max. response time (single tag)	< 150 ms
Read rate (ID only)	100 tags/s
Read rate – 128 bit data	35 tags/s
Multi-tag-handling (simultaneous)	Up to 2,000 tags
RF Interface	
Frequency	868 MHz (EU) or 916 MHz (NA) ISM Band
Certification	FCC, Part 15 (US) Industry Canada EN 330 220 (EU)
RF rate of transmission	i-Q 115.2 kbit/s
Number of antennas	5 (4 read/write + 1 wakeup)
Antenna transmitters	1
Antenna receivers	4
Antenna control	Output power: up to 6 dBm — adjustable (50 steps) Sensitivity: up to -85 dBm — adjustable (100 steps) Independent antennas, simultaneous operation (receive)
User Interface	
Ethernet interface	10 Mbit/s / 100 Mbit/s
Protocols	TCP/IP, FTP, Telnet, HTTP, SNMP
Ports	7090 Debug port, 7070 Communication port
Serial interface	RS 232 – Setup and diagnostics only
Status signals	19 status LEDs (for service and installation)
CPU	
Operating system	RTOS (Real Time Operating System) Thread X
Program memory	2 MB Flash 8 MB DRAM
Data memory	128 KB SRAM
Configuration memory	8 KB EEPROM
Time base	Battery-backed Real Time Clock (RTC)
Electrical Data	
Input voltage	10 – 30 VDC
Input power	7.5 W minimum
Standards / safety	CE and EN 330 220
Environmental Conditions	
Operating temperature	0°C to +50°C optional –30°C to +70°C

Storage temperature	-40°C to +80°C
Humidity	90%, non-condensing
Physical Data	
Dimensions	211mm x 190mm x 58mm
Enclosure	Aluminum, anodized
Mass	1.9 kg
Mounting	4 mounting holes, diameter 5mm
Enclosure rating	IP 64

6.0 Troubleshooting

6.1 Troubleshooting

- 1) If the red **Error** LED blinks during the boot process and continues blinking after a restart, contact the IDENTEC SOLUTIONS hotline.
- 2) If the **Error** LED lights up during operation, a system error has occurred (exception). First execute a cold start (interrupt the power supply) and observe the system. If the error occurs again, contact the IDENTEC SOLUTIONS hotline.
- 3) For other problems, follow the procedures as outlined below.

Problem	Possible Cause	Procedure	Solution
No functionality after turning on the power supply	No power - Measure the voltage at the terminal blocks	- If no voltage at terminal blocks, check power supply unit - Measure directly at the outlet for a power adaptor - For a switching power supply, measure voltage at both input and output sides	Change power supply unit, if necessary
No communication between i-PORT and network (PC) i.e. cannot ping i-PORT	Wrong IP address	- Double-check the i-PORT IP address. Default-IP: 192.168.2.244 - Perform a ping on the IP (see "Configuration, Settings") - If this is unsuccessful, connect to the I-PORT via a null modem cable and terminal program, start the Boot menu and check/change the IP	Change the IP address if necessary and try to ping the i-PORT
	i-PORT IP and Host IP are not in the same subnet	- Double-check the subnet mask	Change the subnet mask
	Wrong network cable	- Direct connection i-PORT / Host: cross-over network cable - i-PORT integrated into network: network cable	Possibly change the network cable
	Defective network cable	- Do visual check on cable	Change network cable
Tags are not being recognized	Antennas are not connected	- Check if the antennas are connected correctly	Fasten antenna cables to the designated sites. Use torque wrench, if available, otherwise tighten the SMA plug lightly.
	Antennas are not being triggered	- Check if antenna LEDs light up (LED: ANT1, ANT2, ANT3,	Activate the corresponding antenna

		ANT4, W)	(see "Configuration")
	Antenna is defective	- Do visual check to see if antenna is defective	Change antenna(s) if necessary
	Tag is out of read zone	- Hold a test tag in front of the antenna and check if tag is being recognized (blinks, i.e. Debug port)	If necessary, adjust the output power to the requirements
	Tag is too close to antenna (Note: can manifest if using high power setting and high sensitivity tag setting)	- Move the tag away from the antenna	If necessary, reduce the output power to the requirements
	Tags are stationary in an RF "dead" spot	- Move the tags.	Move the antenna slightly, add additional antennas, or shield or move nearby reflecting surfaces
i-PORT does not scan on various antennas	Antennas are not being triggered	- Check if the antennas in question are activated and scan-enabled (see "Configuration")	Turn on the desired antennas
No messages on Port 7090 (Debug port)	DebugInfo has been turned off (7090)	- Check if Debug port is activated (i.e. which data is being transmitted)	Activate the Debug port ("Configuration")
File download unsuccessful, i.e. i-PORT does not accept the file	No connection with i-PORT	- Check the IP address and the network cable	Change the IP address if required or change the network cable
Internet browser cannot display i-PORT web page	Browser is trying to access Proxy Server	- Deactivate your Internet browser's proxy function	

6.2 Contact

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