i-PORT III User's Guide

Version /NAE, operating under FCC 15.231(a)

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Radio Frequency Compliance Statement

IDENTEC SOLUTIONS AG 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:	OO4-IPORT3-NAE O2E-ILR-IPORT3	O2E-ICARD-NA OO4-ILR-ICARD3	OO4-ILR-ID2 O2E-ILR-ID2NA	OO4-ILR-IQ32T OO4-ILR-IQR
CANADA:		35381032231	3538A12112	35381021756A 35381021825

The user(s) of these products are cautioned to only use accessories and peripherals approved, in advance, by IDENTEC SOLUTIONS. The use of accessories and peripherals, other than those approved by IDENTEC SOLUTIONS 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.

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 received, including interference that may cause undesired operation

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.

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.

Table of Contents

1.0 INTRODUCTION 5

1.1 FUNDAMENTALS 5
1.2 SYSTEM OVERVIEW 5

2.0 I-PORT III 7

2.1 INTRODUCTION 7
2.2 PHYSICAL DESCRIPTION 8
2.3 LED DISPLAYS 9
2.4 CABLE CONNECTIONS AND PLUG ALLOCATION 10
2.5 INTERFACES 12
2.6 PROTOCOLS 13

3.0 CONNECTING TO THE I-PORT 14

3.1 DEFAULT SETTINGS 14
3.2 NETWORK CONNECTION 14
3.3 SERIAL CONNECTION 15

4.0 WEB INTERFACE 19

4.1 HOME 19
4.2 STATUS 20
4.3 PROCESSOR ACTIVITY 20
4.4 CONFIGURATION 21
4.5 GENERAL 26

5.0 VIEWING TAGS 27

5.1 I-LINKS VIEWER INTERFACE 27
5.2 DEBUG INTERFACE 27

6.0 OPERATING RESTRICTIONS 28

6.1 TRIGGERED OPERATION, FCC 15.231 (A) 28

7.0 TECHNICAL SPECIFICATONS 29

8.0 TROUBLESHOOTING 31

9.0 CONTACT INFORMATION 33

APPENDIX A – CONFIGURATION PARAMETERS 34

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 large distances, even in extreme environmental 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 large distances (up to 100 meters). A sophisticated anti-collision handling algorithm enables the interrogator (i-PORT) to record data simultaneously from hundreds of tags within seconds. Connection of the interrogator to a host computer system enables global data accessibility via a variety of software platforms (Internet).

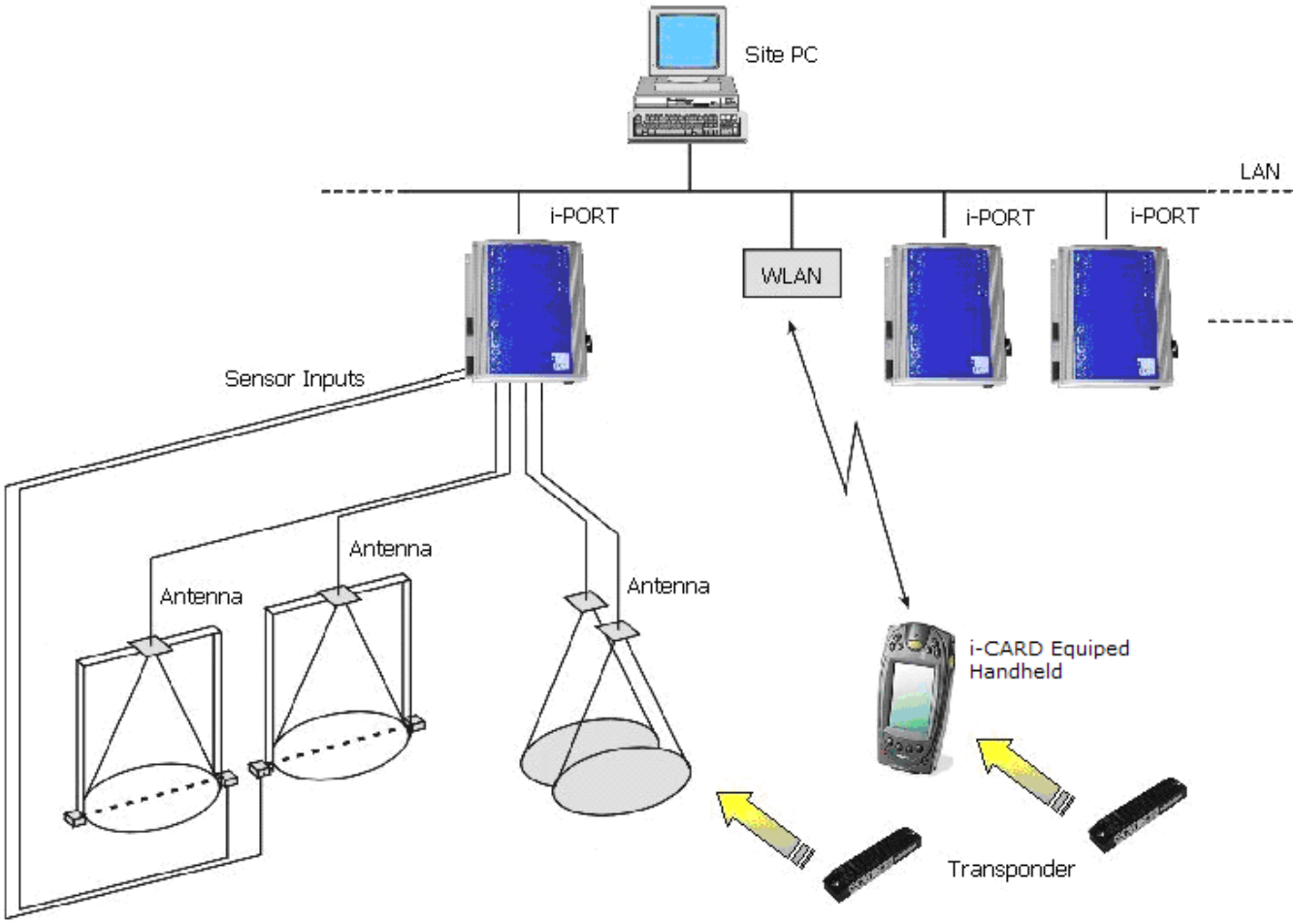
CHARACTERISTICS OF ILR:

- UHF Frequency (868 / 915 MHz)
- Large read and write range of 30 meters (optional up to 100 meters)
- Variable read range from just a few meters up to 100 meters
- Large storage capacity (8 kB; up to 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 (also called readers — i-PORT; fixed-mounted) and handheld devices (mobile), which exchange information with the tags and host computer systems
- Various antenna types/characteristics for different applications
- A central computer system as basis for control and monitoring



ILR System Components:

- Tags from the i-Q and i-D2 series monitor, record and transmit stored data over large distances. The high data transmission rate ensures optimal communication.
- Data can be written to or read from the tags by means of the fixed interrogator (i-PORT) and then transmitted via LAN (or WLAN, modem, etc.) to a host computer network. Application software as well as all IDENTEC SOLUTIONS products can be seamlessly integrated into existing software environments by means of standard interfaces (TCP/IP, FTP, HTTP, etc.)
- Data can also be written to or read from tags at a distance of up to 10 meters by a mobile handheld interrogator. Thanks to the i-CARD, an RFID interrogator in a PC Card format (standard PCMCIA Type II card), a flexible and adaptable, practically hardware independent application is created. The i-CARD can be used in third-party handheld devices from a variety of manufacturers (Symbol, LXE, Latschbacher, Teklogix…)

2.0 i-PORT III

2.1 Introduction

The i-PORT III is the next generation of IDENTEC SOLUTIONS' ILR interrogators. ILR technology allows automated, wireless data collection.

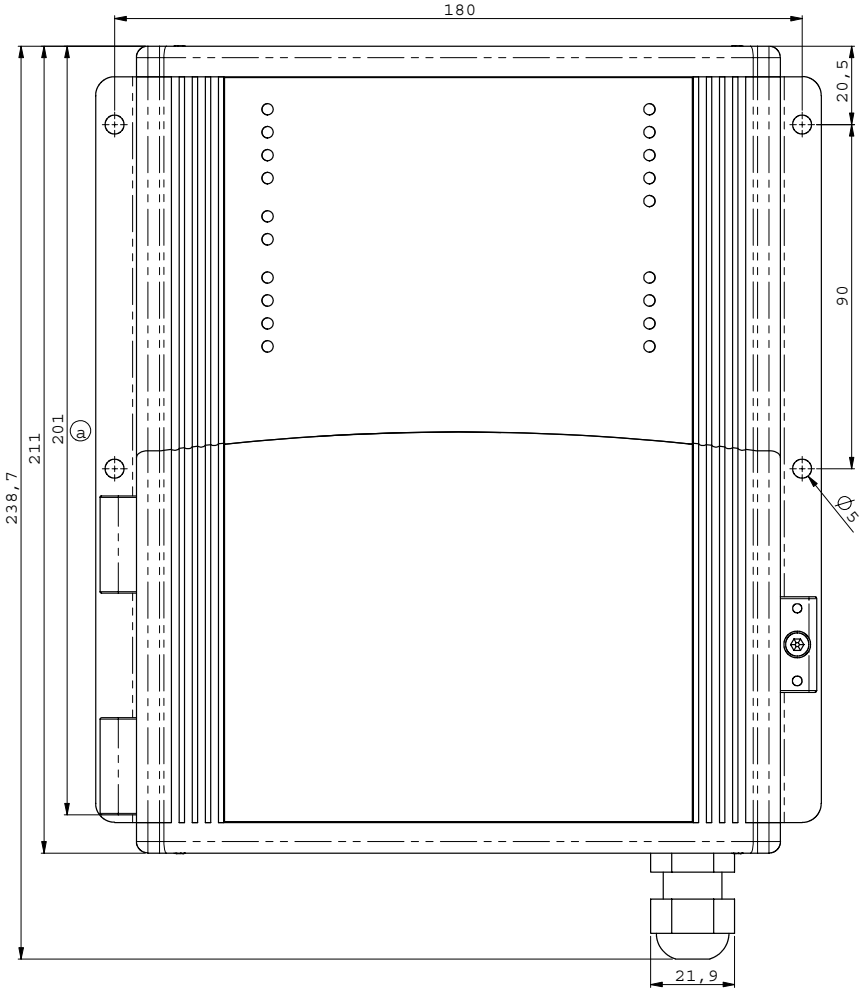
Up to 4 antennas (plus one extra send antenna) can be connected to the i-PORT III.

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

- Communication with ILR tags (i-Q only)
- Simultaneous operation with up to 4 antennas (send/receive), with the option of a fifth antenna (send)
- Communication with host computer systems via Ethernet or RS232 interfaces
- Connection to external devices such as modem or GSM via serial interface (optional)
- Data processing (event messages, in/out, etc.)
- I/O control (4 relays, 4 digital inputs)
- Configuration by means of web-interface (remote maintenance)

The 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 2048 data messages can be stored temporarily.

2.2 Physical Description



The amount of space required to mount the i-PORT is 200 x 250 x 60 mm (B x H x W). The i-PORT weighs approx. 2 kg. A socket wrench (size 3) is required to open the i-PORT.

Use the rubber grommet with hole to feed cables through the housing to the outside (cable diameter 4.75 mm to 6 mm); seal the unused feed-through with the blind plugs. These feed-through are intended for RG58 (antenna), Ethernet or serial cables. For power supply, use the PG fitting [screw joint]. If plugs [jacks, connectors] do not fit through the grommet (i.e. Ethernet), you may cut through the grommet (Note: impermeability!).

Enclosure rating IP64 (total protection from water sprayed from all directions) is thus achieved. If greater enclosure rating is required, the i-PORT must be placed in an additional housing.

2.3 LED Displays

Status LEDs:

POWER: Lights up as soon as power is applied to the i-PORT
RUN: Blinks (every 2 seconds) as soon as the i-PORT has booted (approx. 30 seconds)
HOST: Lights up as soon as a host is connected to the i-PORT
ERROR: Lights up as soon as an error occurs (see section: Troubleshooting)

COM LEDs:

RX: Lights up when the i-PORT receives data on serial interface
TX: Lights up when the i-PORT sends data on serial interface

INPUT LEDs:

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

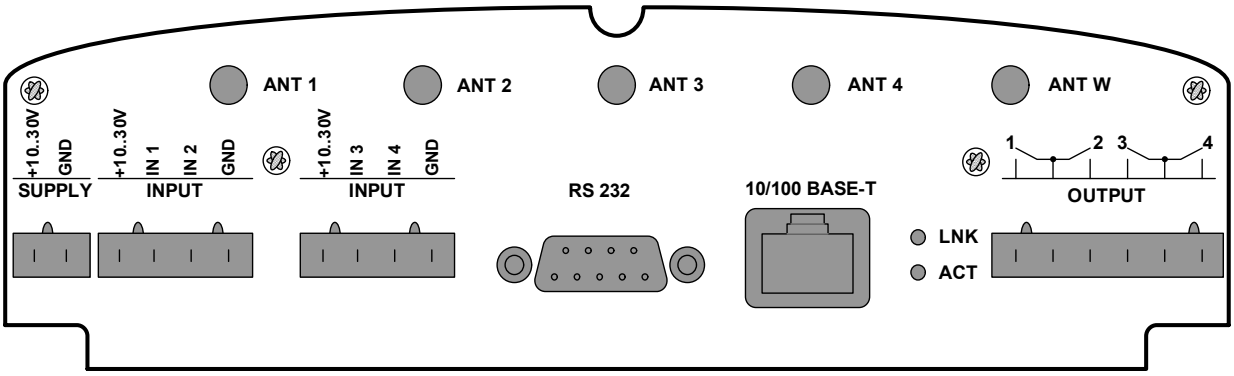
ANTENNA LEDs:

1-4: Light up when there is activity at corresponding Antennas 1-4
Green: Antenna is sending
Red: Antenna is receiving
W: Lights up when there is activity at the Wake-up Antenna

OUTPUT LEDs:

1-4: Light up when the corresponding Outputs 1-4 are set

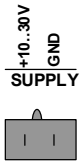
2.4 Cable Connections and Plug Allocation



Antenna jacks:

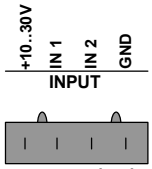
ANT1-4	SMA socket, send and receive antennas	
ANT W	SMA socket, send antenna ONLY (WakeUp Antenna)	

Terminal Block 1:



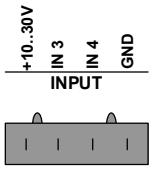
+10..30V	Power Supply (**+10-30V DC, min 2A**)	Supply
GND	Power Supply Ground	Supply

Terminal Block 2:



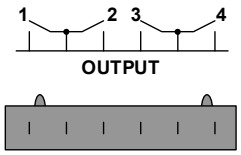
+10..30V	Power supply for optional inputs (**max. 4W**)	Input
IN1	Sensor 1 Connection	Input
IN2	Sensor 2 Connection	Input
GND	Ground connection for optional inputs	Input

Terminal Block 3:



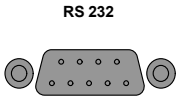
+10..30V	Power supply for optional inputs (**max. 4W**)	Input
IN3	Sensor 3 Connection	Input
IN4	Sensor 4 Connection	Input
GND	Ground connection for optional inputs	Input

Terminal Block 4:



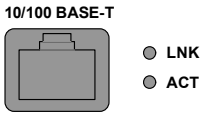
1	Normally open Output 1 (Relay)	Output
COM	Ground from Relays 1 and 2	Output
2	Normally open Output 2 (Relay)	Output
3	Normally open Output 3 (Relay)	Output
COM	Ground from Relays 3 and 4	Output
4	Normally open Output 4 (Relay)	Output

RS-232 Serial Interface (Male):



RS 232	Male DB-9
Communication Speed: up to 115 kb/s	

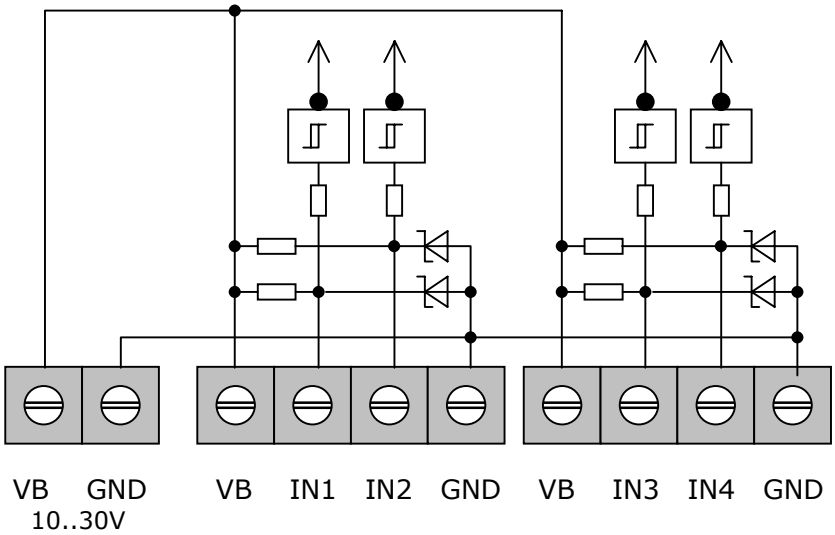
Ethernet interface (10 and 100 Mbit/s)



10/100	RJ-45 Modular Jack
Communication Speed: up to 100 Mbits/s	

2.4.1 Input Connection

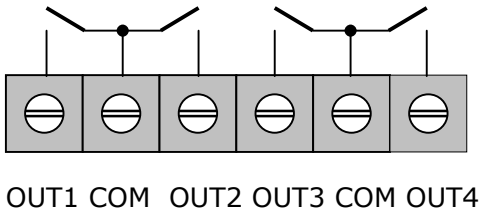
The i-PORT has the ability to use external sensors as triggers, that is, scans or event messages can be activated by events. External sensors such as photo sensors, motion detectors, etc. (with NPN-output) can be used.



The input is set by connecting it to Ground. The sensor can be managed from the i-PORT; power is available from the i-PORT's power supply (see below). Maximum resistance across Ground is 560 Ohms, in order to set the input.

2.4.2 Output Connection

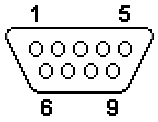
The i-PORT also has the ability to intervene in processes. Lamps, sirens, gates, etc. can be switched using the relays.



The maximum breaking capacity of the potential-free relay contacts is 30W (DC) and 62.5 VA (AC). Contact load is 1A/30VDC and 0.5A/125VAC. The "Out" and "Com" clamps are connected when the relays are switched on.

2.5 Interfaces

2.5.1 Serial Interface RS232:



Pin	Name	Description
1	CD	Carrier Detect
2	RXD	Receive Data
3	TXD	Transmit Data
4	DTR	Data Terminal Ready
5	GND	System Ground
6	DSR	Data Set Ready
7	RTS	Request to Send
8	CTS	Clear to Send
9	RI	Ring Indicator

Rate of transmission: 9.6 kbit/s (Boot dialog, fix)
Rate of transmission: 1.2 to 115.2 kbit/s (Protocol, configurable)

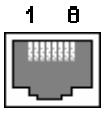
For the communication with a Host-PC (e.g. Serial Host or Boot Dialog) only RXD, TXD and GND is needed. Other contacts are optional in use for modems or GSM-device.

GPS Device:
A standard protocol (GPRMC) has been implemented. All devices (i.e. Garmin GPS 35) that work with this protocol are suitable for operation with the i-PORT.

GSM Device:
It is currently possible to use GSM-Modems from Siemens (TC 35 or MC 35). Full functionality of the i-PORT is available when using these modems because of the implementation of an RAS Server. This means that it is also possible to configure the i-PORT over a browser by dialed-up GSM.

Some modems need a permanent connection between Pin 4 (DTR) and Pin 6 (DSR) to achieve full functionality.

2.5.2 Ethernet Interface:



Pin	Name	Description
1	TX+	Transmit Data +
2	TX-	Transmit Data -
3	RX+	Receive Data +
4	nc	
5	nc	
6	RX-	Receive Data -
7	nc	
8	nc	

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

Ports:

Debug Port	7090	for Debug data
Communication Port	7070	for communication (commands, messages)
Synchronization Port	7070	to synchronize i-PORTs

WLAN:
It is possible to establish a WLAN connection by means of a wireless bridge.

2.6 Protocols

The protocol used by the i-PORT is an ASCII protocol. The same protocol is used on the serial interface as well as on the Ethernet interface (Port 7070). 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".

3.0 Connecting to the i-PORT

3.1 Default Settings

The i-PORT is supplied with the following standard settings:

IP Address: 192.168.2.244
Subnet Mask: 255.255.255.0

User Name: user
Password: identec

3.2 Network Connection

If the i-PORT has an IP address of 192.168.2.244, then the PC you are using to connect to the i-PORT with should have an IP address in the range 192.168.2.xxx.

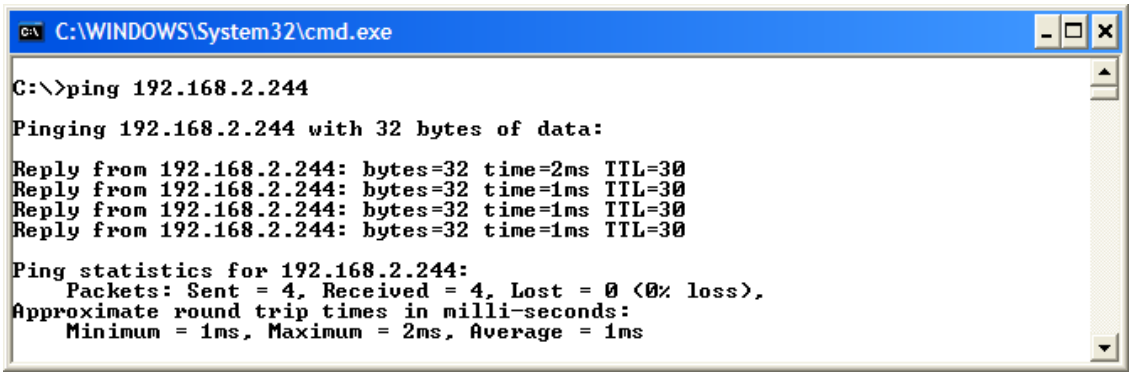
Direct Connection:

Connect the i-PORT directly to the network connection on 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 to the network with a standard patch network cable.

To test the connection to the i-PORT, open a Command Prompt window and type in the command <ping 192.168.2.244>. You should receive a ping response from the i-PORT.

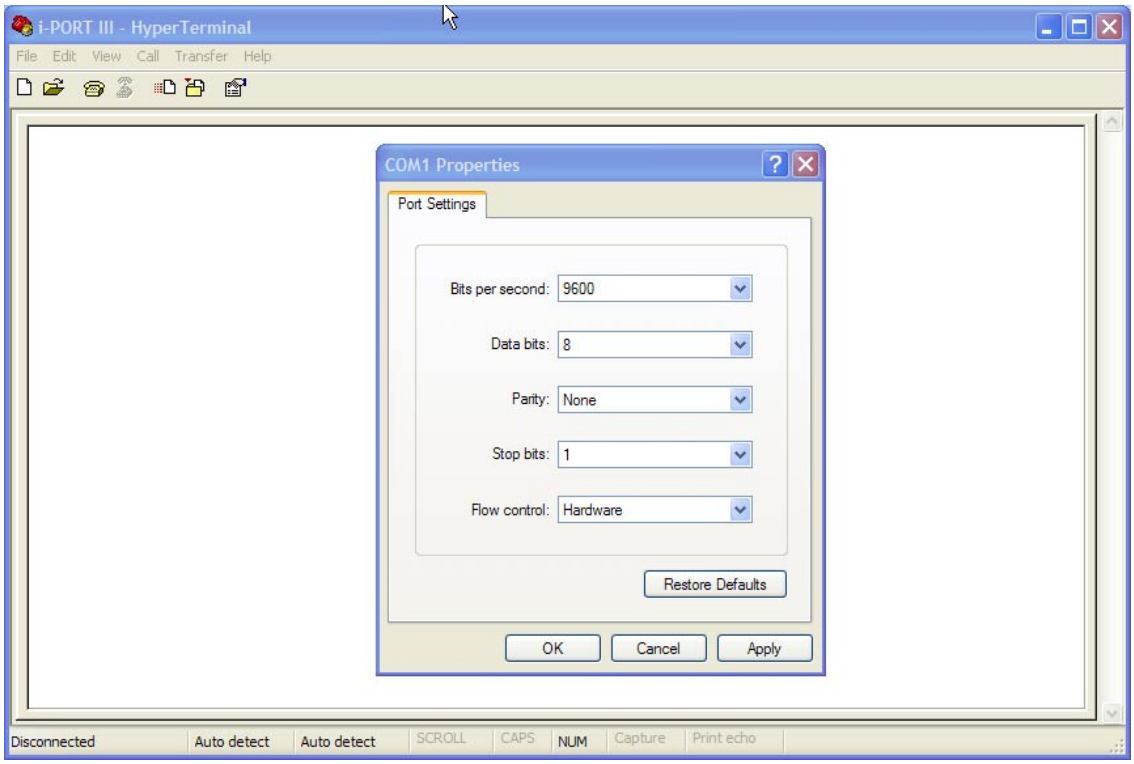


After successfully testing the i-PORT connection, you can start your browser and open the i-PORT web interface. To do this, enter in the i-PORT IP address into the address field of the web browser ex. http://192.168.2.244.

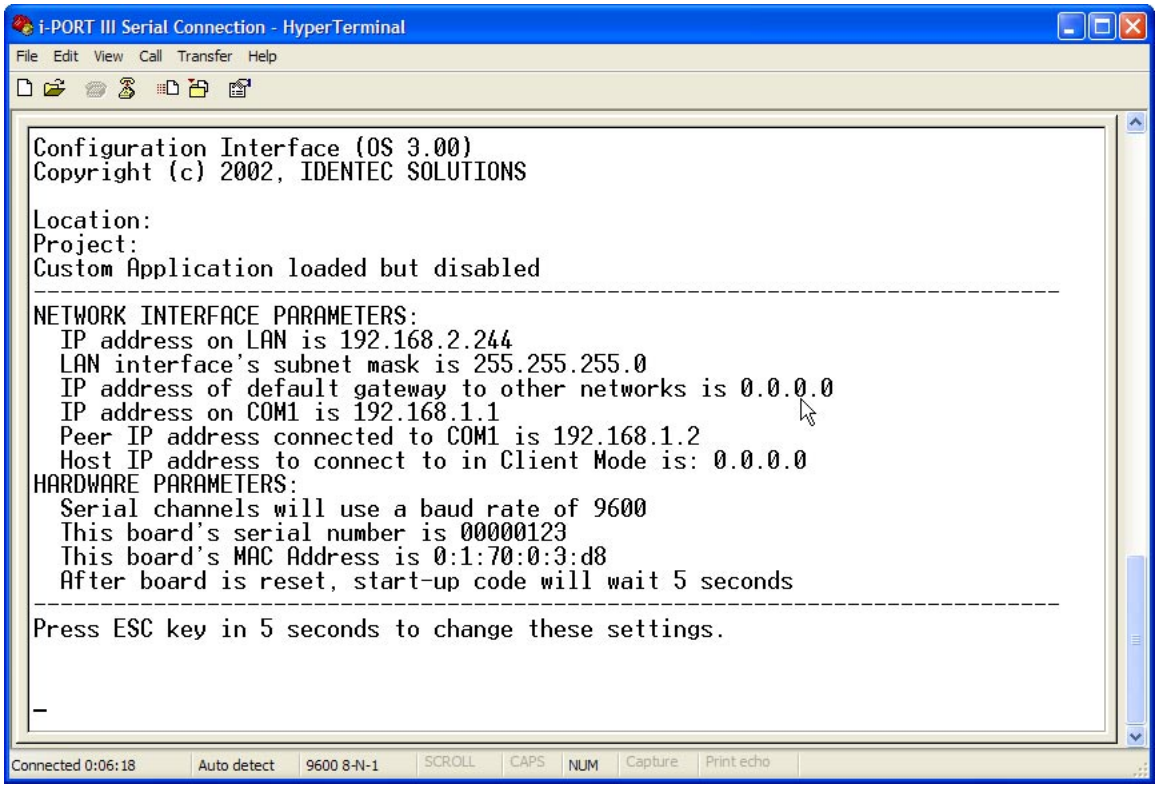
In doing this, you will get to the Home page of the i-PORT. Several sub-menus are available to you for configuration and for testing purposes. Descriptions of the menus and parameters are contained in Section 4.0.

3.3 Serial Connection

It is possible to change basic settings such as IP address, passwords, etc. via the serial interface. To accomplish this, the i-PORT has to be connected via the serial interface to a PC, (with a null-modem serial cable). Next, start a terminal program (HyperTerminal, GanTerm, etc.) with the following settings:



Bits per second:	9600
Data bits:	8
Parity:	None
Stop bits:	1
Protocol:	None



Power off, then power on the i-PORT after there is a connection. Boot information appears on the screen and you must press the ESCAPE key within 5 seconds to change the current settings.

You will be prompted with the following:

Press A to Accept, M to Modify, D to set to Factory Default. By pressing M you will now have the ability to change various standard settings:

```
Configuration Interface (OS 3.00) these settings.
Copyright (c) 2002, IDENTEC SOLUTIONS


Location:
Project:
Custom Application loaded but disabled
-------------------------------------------------------------------------------

NETWORK INTERFACE PARAMETERS:
  IP address on LAN is 192.168.2.244
  LAN interface's subnet mask is 255.255.255.0
  IP address of default gateway to other networks is 0.0.0.0
  IP address on COM1 is 192.168.1.1
  Peer IP address connected to COM1 is 192.168.1.2
  Serial channels will use a baud rate of 9600
  This board's serial number is 00000123
  This board's MAC Address is 0:1:70:0:3:d8
  After board is reset, start-up code will wait 5 seconds
-------------------------------------------------------------------------------

Press ESC key in 5 seconds to change these settings.


Press A to Accept, M to Modify, D to set to Factory Default ?m

For each of the following questions, you can press <Return> to select the value

PROJECT AND LOCATION INFO:

Location[]?
Project[]?

PASSWORD SETTINGS:

Disable Password [N]?
Change Password (Y,N) [N]?

CUSTOM APPLICATION SETTINGS:

Enable Custom Application (Y,N) [N]?

NETWORK INTERFACE PARAMETERS:

Should this target use DHCP to get its IP settings?[N]
IP address[192.168.2.244]?
Subnet mask[255.255.255.0]?
Gateway address[0.0.0.0]?
COM1 PPP IP address[192.168.1.1]?
COM1 PPP Peer IP address[192.168.1.2]?
Host IP address[0.0.0.0]?

HARDWARE PARAMETERS:

Set the baud rate of Serial channels[9600]?

How long (in seconds) should CPU delay before starting up[5]?
-------

Saving the changes in NV memory...Done.-----------------------------
```

3.3.1 Boot Menu Descriptions

PROJECT AND LOCATION INFO:

Location	User Assigned

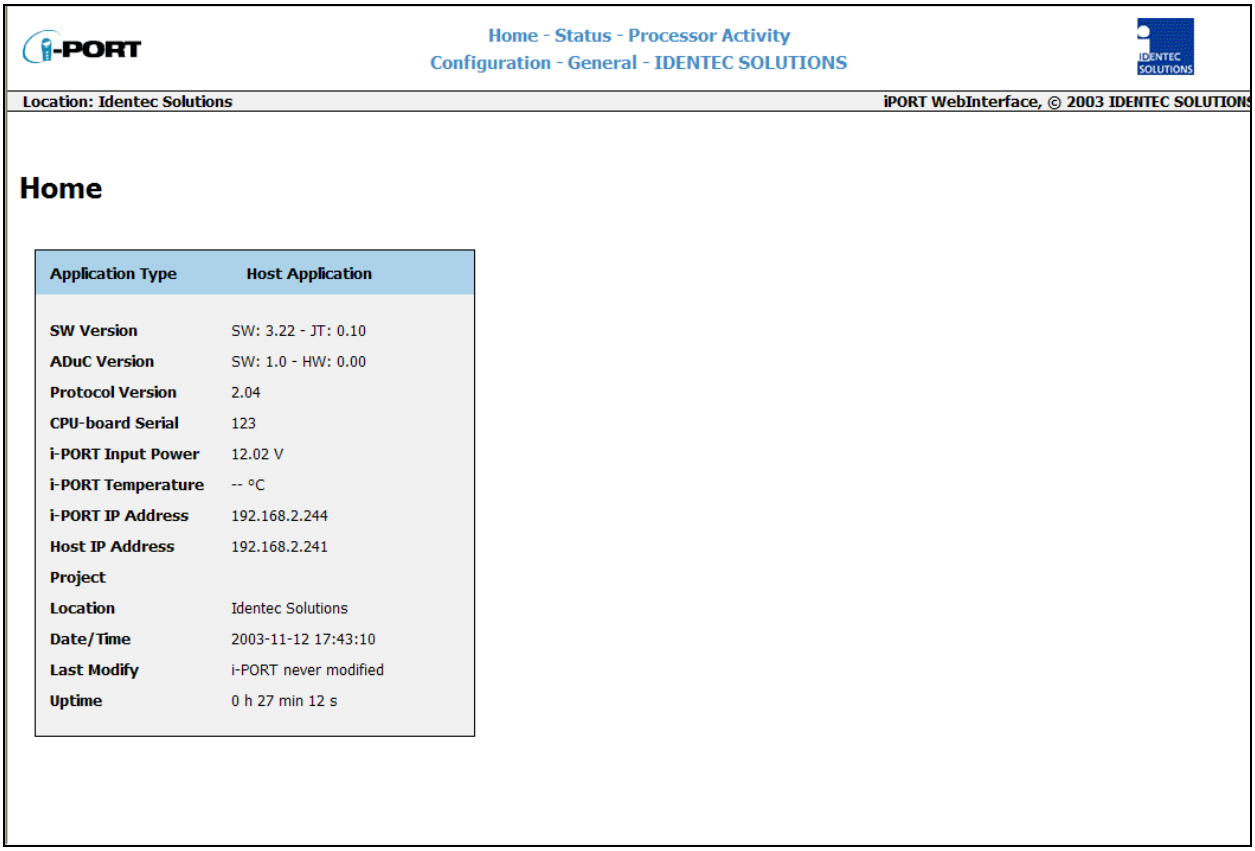
Project	User Assigned
PASSWORD SETTINGS:	
Disable Password	Yes/No
Change Password	Change Password
CUSTOM APPLICATION SETTINGS:	
Enable Custom Application	Yes/No
NETWORK INTERFACE PARAMETERS:	
DHCP Enabled	Yes/No
IP Address	Static IP (if DHCP is Disabled)
Subnet Mask	Subnet mask
Gateway	Gateway IP if needed
Com1 PPP IP	Necessary for Modem
Com1 PPP Peer IP	Necessary for Modem
HARDWARE PARAMETERS:	
Baud Rate	Data transmission 1.2 to 115.2 kbit/s
Boot Delay	Amount of time to access the Boot menu

After the changes have been made and confirmed, the i-PORT will boot up and go into the designated mode. You can write down the new IP address in the designated spot inside the i-PORT door.

4.0 Web Interface

The following highlights the different menu options:

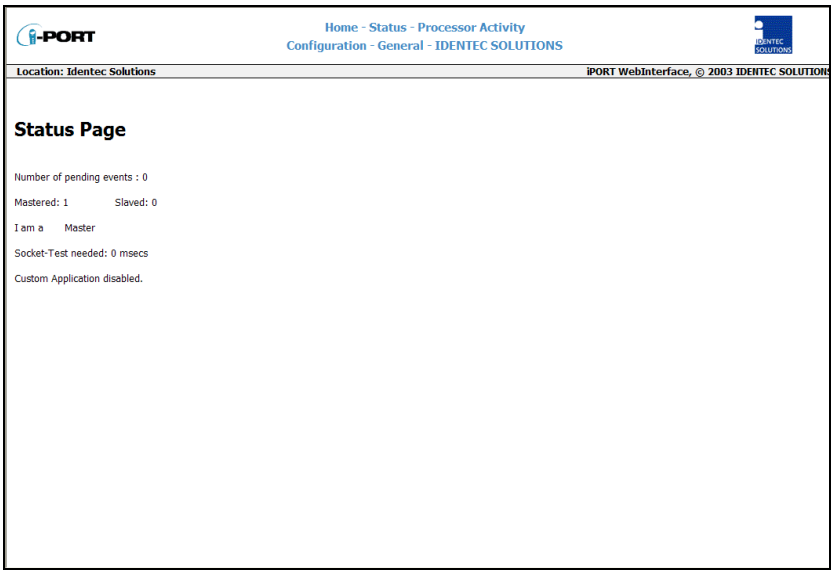
4.1 Home



The Home page displays information about:

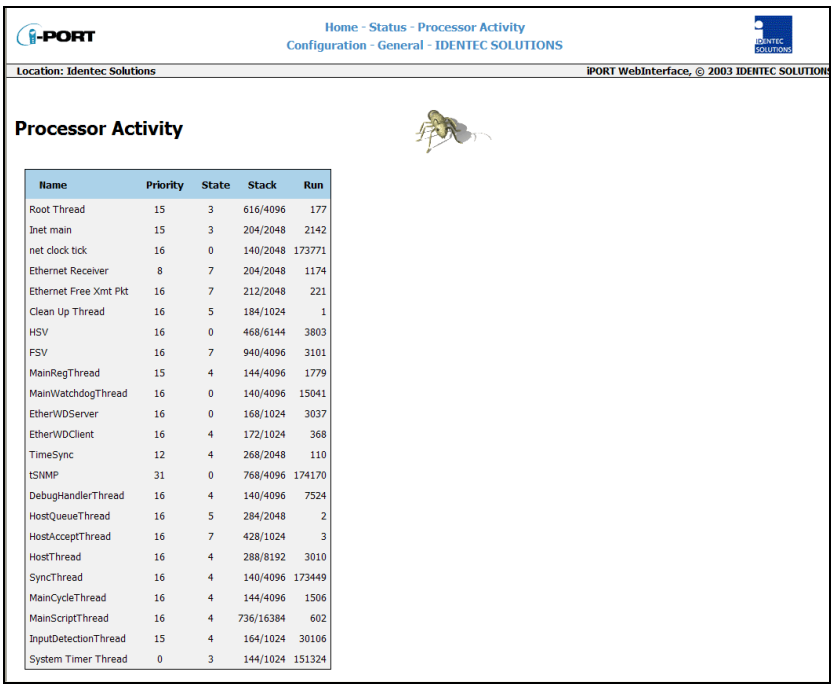
- Application Type: Host or i-LINKS Agent
- Version numbers: Software, Hardware, and Protocol
- CPU-board Serial
- i-PORT Input Power
- i-PORT Temperature
- i-PORT IP Address
- Host IP Address: This will display the IP address of the device that you are using to communicate with the i-PORT.
- Project: Entered by the user on the General Page.
- Location: Entered by the user on the General Page.
- Date/Time: The current date and time that the i-PORT is using (usually in UTC).
- Uptime: The amount of time that the i-PORT has been running since it was powered.

4.2 Status



The Status page contains status information, which may be required in case maintenance is needed, is available on this page.

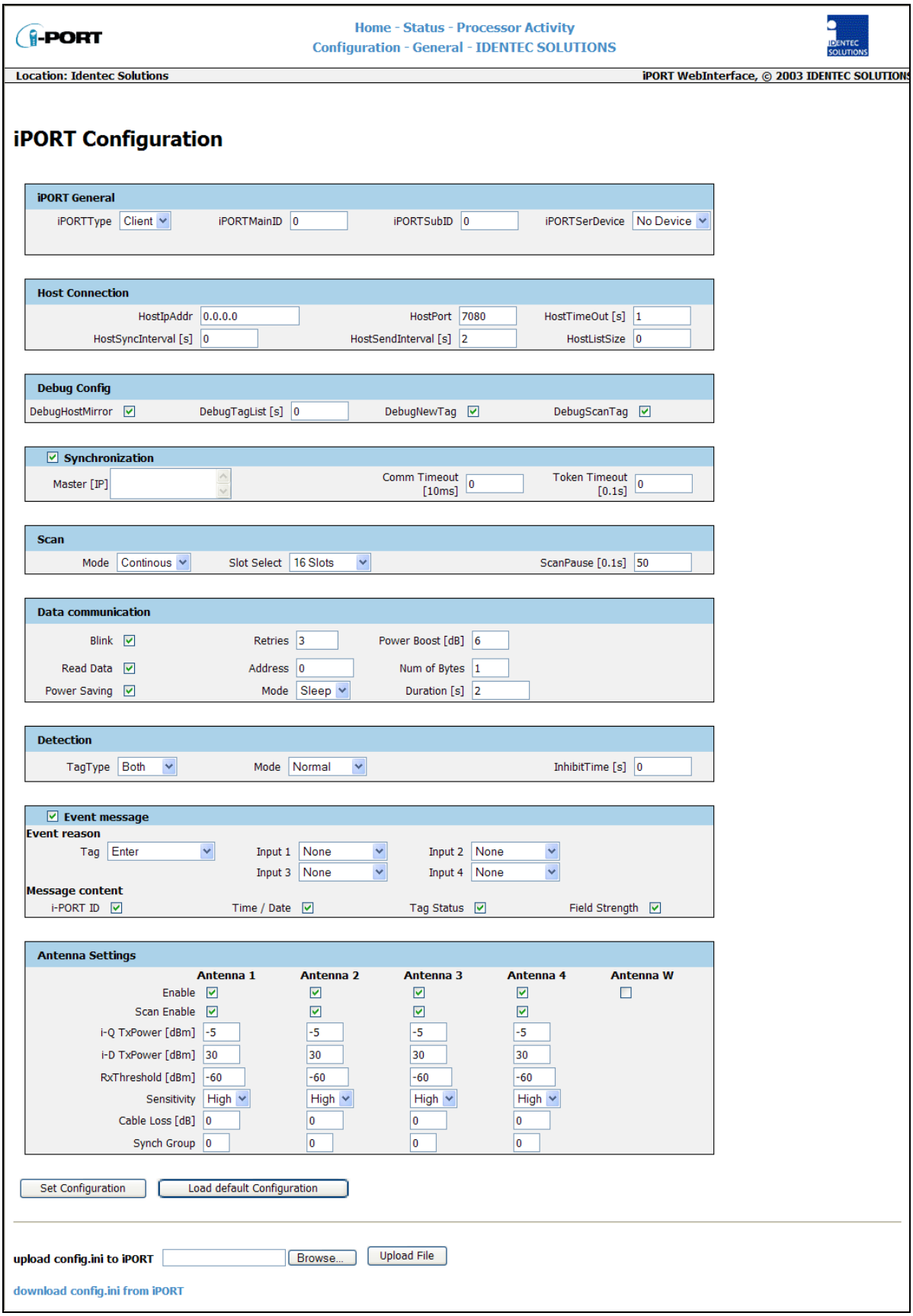
4.3 Processor Activity



Name	Priority	State	Stack	Run
Root Thread	15	3	616/4096	177
Inet main	15	3	204/2048	2142
net clock tick	16	0	140/2048	173771
Ethernet Receiver	8	7	204/2048	1174
Ethernet Free Xmt Pkt	16	7	212/2048	221
Clean Up Thread	16	5	184/1024	1
HSV	16	0	468/6144	3803
FSV	16	7	940/4096	3101
MainRegThread	15	4	144/4096	1779
MainWatchdogThread	16	0	140/4096	15041
EtherWDServer	16	0	168/1024	3037
EtherWDClient	16	4	172/1024	368
TimeSync	12	4	268/2048	110
tSNMP	31	0	768/4096	174170
DebugHandlerThread	16	4	140/4096	7524
HostQueueThread	16	5	284/2048	2
HostAcceptThread	16	7	428/1024	3
HostThread	16	4	288/8192	3010
SyncThread	16	4	140/4096	173449
MainCycleThread	16	4	144/4096	1506
MainScriptThread	16	4	736/16384	602
InputDetectionThread	15	4	164/1024	30106
System Timer Thread	0	3	144/1024	151324

The Processor Activity page displays information about the running threads on the systems. The information on this page may be useful to technical support when trouble-shooting. This page is automatically updated every 5 seconds.

4.4 Configuration



i-PORT General

Standard i-PORT settings such as type, external devices etc.

i-PORT Type	2 possibilities: "Host" and "Client" Enter the i-PORT type here.
i-PORT Main ID	i-PORT identifier for event messages (Area ID)
i-PORT SubID	i-PORT identifier for event messages (Area SubID)
i-PORT SerDevice	4 possibilities: "No Device", "GPS", "Modem", and "Serl Host" (Restart after changes!) "No Device" means the serial port is not used. There is an option to connect a GPS device (i.e. Garmin) or a GSM Modem (i.e. Siemens TC35). Furthermore, the i-PORT can be controlled serially (Serl Host).

Host Connection

These are settings used if the i-PORT is to be connected to a host computer (Client Mode).

Host IPAddr	Host computer IP address
Host Port	Host computer port
Host TimeOut	i-PORT timeout
Host SyncInterval	Interval for synchronizing i-PORT time (if a GPS device is connected, time is synchronized with GPS time)
Host SendInterval	Interval for sending messages to host computer
Host ListSize	When this value is reached, the list is sent to the host computer

Debug Config

Settings for the Debug output (Port 7090). If a check-box is selected then that parameter is valid.

Debug HostMirror	Output on Debug Port of all data that is exchanged on the Host Interface (serial or Ethernet).
Debug TagList	The amount of time which a tag list is outputted on the Debug Port ("0" means no output)
Debug NewTag	Output of newly-recognized tags (Note: must be less than the Inhibit Time!)
Debug ScanTag	Output of tag list after sequence execution.

Synchronization

Note: Not implemented with i-LINKS
Settings for when several i-PORTs are located in a small space, necessitating synchronization. After marking the check-box, the IPs of the other i-PORTs can be entered into the designated field.

Master IP	Enter IP addresses of the neighboring i-PORTs
Comm Timeout	Timeout for synchronization (when registering a slave at the master)
Token Timeout	Timeout for synchronization (Timeout for Token signal)

Scan

i-PORT settings for the scan process.

Mode — 3 possibilities: "Host Only", "Continuous" and "Input 1"
"Host Only" means that the i-PORT waits for commands, processes them, and is otherwise inactive. "Continuous" means that the i-PORT performs continuous scans. "Input 1" means that scans are triggered by "Triggerinput 1"

Slot Select — Number of slots in which tags can answer; this is part of the anti-collision process. Set at least double the amount of slots as the maximum number of tags that can be located in the zone at one time. The elapsed time per slot in which tags can answer is 1.2 ms.

Num of Scans — "Input1" Mode: Number of sequences executed by the i-PORT after Input1 again becomes inactive. In "Test Mode", this is also the number of scans.

Scan Pause — Pause inserted by i-PORT after each sequence.

Data communication

i-PORT settings for tag communications (also dependent on the Inhibit Time!)

Data communication – Blink:
Setting to cause tags entering the zone to blink (dependent on Inhibit Time!)

Blink — If this check box is marked off, each newly-recognized tag will blink. If Inhibit Time is activated (>0), it must first elapse for the tag (reentering the zone) to blink again.

Data communication – Read Data:
Settings for i-PORT to read data from tags (mark check box)

Power Boost — Additional output power required for read process

Retries — Number of maximum attempts to read data

Start Address — The tag start address where the i-PORT will begin to read tag data.

Num of Bytes — Number of bytes to read from the tag beginning from the Start Address

Data communication – Power Saving:
Settings for i-PORT to place tags into Sleep Mode (mark check box)

Mode — 3 possibilities: "Sleep", "Mute" or "Both"

Sleep, Mute, Both (i-Q): All 3 settings have the same effect for i-Q tags (sleep). For this duration, the tags can no longer be communicated with (also from other i-PORTs). After this time span has expired, the tags become available again.

Otherwise, the tag returns to normal mode, as it likewise does if it receives a signal from a different i-PORT.

Mute (i-D2): Tags receive a signal, but give no answer for the duration of the "mute". If the tag receives a renewed signal from the same i-PORT, the time will be re-triggered.

Both (i-D2): Combination of Sleep and Mute!

Duration The amount of time to put a tag into Sleep/Mute mode. The maximum sleep time for i-D2 is 6 seconds and 256 seconds for i-Q.

Detection

i-PORT settings which determine which tag types to interrogate and how.

Tag Type
3 Options: "i-Q8/32", "i-D2" and "Both"
Depends on which tags need to be interrogated.
Note: "i-D2" and "Both" are not working in this version operating under FCC 15.231!

Mode
3 Options: "Normal", "Max. Level" and "In/Out"
Normal: Tag is reported when it enters the read zone.
Max. Level: Report the tag with it's largest recorded field strength during the detection time interval.
In/Out: Report the direction tag Orientation recognition activated (Antenna 1…In, Antenna 2…Out, Antenna 3…In, Antenna 4…Out)

Detection Time
Max. Level Mode: The window size used to determine the largest recorded field strength. (Note: must be less than the Inhibit Time)
In/Out Mode: The window size used to determine the tag direction. (Note: must be less than the Inhibit Time)

Inhibit Time
If a previously interrogated tag leaves the zone for longer than the Inhibit Time, it will be recognized as a new tag when it reenters the zone. If the tag reenters the zone before expiration of the Inhibit Time, this time is reset as if the tag had never left the zone

Event message

i-PORT settings to determine when an event message is to be sent and how it should look.

Event message - Event reason:
A tag or an input can serve as a trigger for an event

Tag
3 Options: "Enter", "Leave" or "Enter and Leave"
A message is generated when the tag enters the zone, when it leaves the zone, or both when it enters AND when it leaves the zone.

Input
4 Options: "None", "Rising Edge", "Falling Edge" or "Changing"
A message is sent when the Input detects either a rising edge, a falling edge, or when any change at the Input is detected. Use None if nothing is attached to the Inputs.

Message content
Each message can contain up to 4 additional pieces of information. By marking the check box, the corresponding information is added to the message (in addition to the Tag ID): i-PORT ID, Time/Date, Tag Status and Field Strength.

Antenna settings:

i-PORT settings for the antennas, power outputs, etc.

Enable
By marking the check box, the corresponding antenna is activated

Scan Enable
By marking the check box, the corresponding antenna is also able to send

i-Q TxPower	Power setting for i-Q tags at time of scan (send)
i-D TxPower	Power setting for i-D2 tags at time of scan (send) *Note: This settings have no function in this version operating under FCC 15.231!*
Rx Threshold	Threshold (field strength of tag signal) required for tag recognition
Sensitivity	i-PORT receiver mode; this means that the Rx Threshold reaches –60dBm in low sensitivity mode and –90dBm in high sensitivity mode
Cable Loss	Differences in the various antenna types and cable lengths can be adjusted here (A calculation example is shown below.)
Synch Group	Antennas can be separated in different groups for synchronizing different i-PORTs

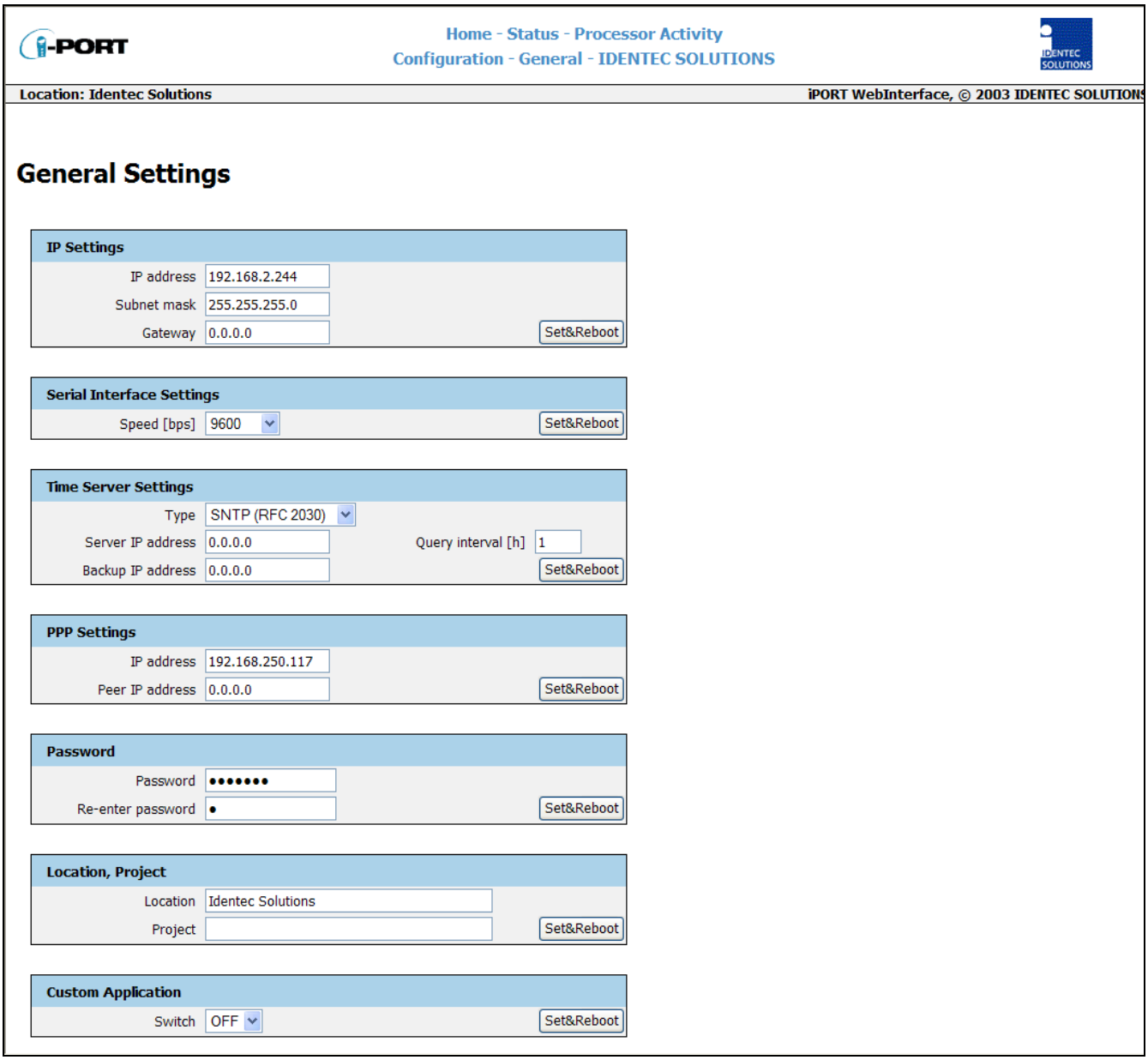
Calculation examples for "Cable Loss" field:
Coaxial cable RG58 has a loss of approximately 0.6dB/m (at 900 MHz). LMR-400 has a loss of approximately 0.06dB/m. Loss across an SMA connector is approximately 0.2dB. Loss across an N-to-SMA adapter (required to connect LMR-400 to the I-PORT) is 0.4dB.

1) 5dB gain antenna, 3-meter "pigtail" RG58 cable: –(Antenna Gain – Cable Loss - SMA Connector Loss) = –(5dB – 3m x 0.6 dB/m – 0.2 dB) = **–3.0 dB**

2) 5dB gain antenna with N-connector on the antenna, 100-meter LMR-400 cable plus 2 -meter RG58 adapter cable: –(Antenna Gain – N-connector Loss – LMR-400 Cable Loss – N/SMA Adapter Loss – RG58 Cable Loss – SMA Connector Loss) = –(5dB – 0.2dB - 100m x 0.06dB/m – 0.4dB – 2 x 0.6dB/m – 0.2dB) = **+3.0 dB**

Valid values for each parameter in the i-PORT Configuration section can be obtained from Appendix A.

4.5 General



With this menu, you can change the network settings of the i-PORT. Simply enter the new values in the appropriate fields and click on the *SET&REBOOT* button. The i-PORT will then reboot with the new network settings. You can write down the new IP address in the designated spot inside the i-PORT door.

5.0 Viewing Tags

5.1 i-LINKS Viewer Interface

i-LINKS Viewer is a GUI for viewing tag reads from i-PORT III while running the i-LINKS Agent. Please refer to the i-LINKS Viewer User Guide for instructions on how to use and setup i-LINKS Viewer.

5.2 Debug Interface

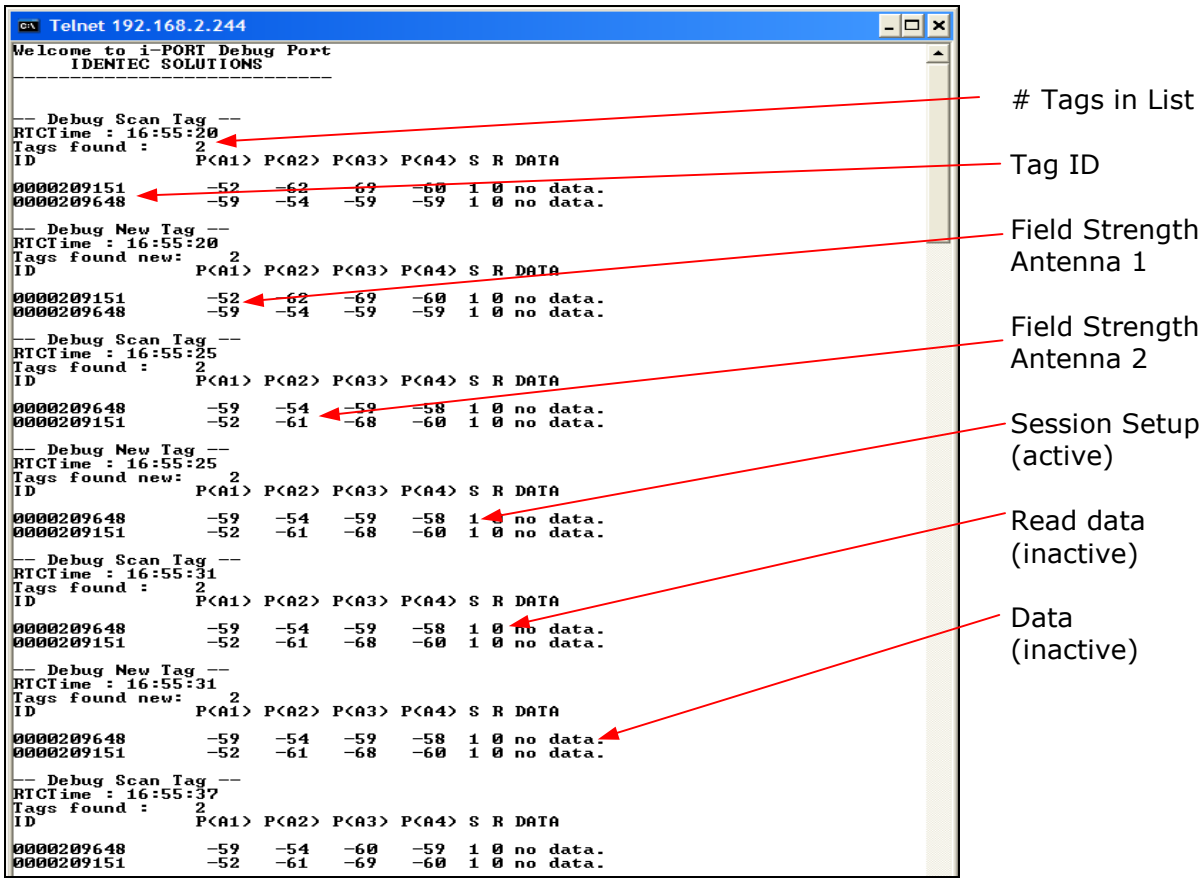
i-PORT III has a debug interface in which you can view tag reads through a terminal window. Typical uses for the debug interface is to test the i-PORT functionality without running the i-LINKS Agent.

Things to Note Prior to Using the Debug Interface

- If the i-PORT is running an Agent make sure to backup your current settings and scripts as these will be lost when using the debug option.
- In order to connect to the debug port of the i-PORT you must set the Custom Application switch to OFF.

5.2.1 Viewing Debug Output

Create a Telnet connection to the debug port (Default IP-Address: 192.168.2.244, Port: 7090). From a command prompt type in "telnet 192.168.2.244 7090". Debug information showing the result of each scan will then be displayed on the monitor.



6.0 Operating Restrictions

6.1 Triggered Operation, FCC 15.231 (a)

If the i-PORT III will be used for triggered operation according to FCC 47 CFR §15.231 (a) the following restrictions have to be obeyed:

- Maximum radiated power must not exceed 3dBm (2mW EIRP), including all cable losses and antenna gain. To calculate this radiated power from the settings of the i-PORT please see paragraph 4.4 above.
- Length of transmission has to be limited to 5 seconds. This can safely be done by reading no more than 4kB of data from a tag.

Please note that this are functions of both the driving software and the setup of the device. In order to avoid any violations of the FCC rules the responsible System Integrator and his trained installation personnel has to implement this in the application software and use the password mechanism built into the i-PORT. This will prevent the user to adjust any settings which are not allowed.

This system is only authorized for professional installation.

Please note that the output power and scan pause can be set in the configuration menu. In order to avoid any violations of the FCC rules the responsible System Integrator and his trained installation personnel has to use the password mechanism built into the i-PORT. This will prevent the user to adjust any settings which are not allowed.

7.0 Technical Specificatons

ILR® Parameters	
Compatibility	ILR® i-Q Tags
	ILR® i-Q Tag
Read range (adjustable)	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 Band
Certification	FCC, part 15 (US) EN 330 220 (EU)
RF rate of transmission	i-Q 115.2 kbit/s, 115.2 kbit/s (Rx)
Number of antennas	5 (4 read/write + 1 wakeup)
Antenna transmitters	5 Output power: up to 3 dBm — adjustable
Antenna receivers	4 Sensitivity: up to -90 dBm — adjustable
Antenna control	Independent antennas, simultaneous operation (receive)
User Interface	
Ethernet interface	10 Mbit/s / 100 Mbit/s
Protocols	TCP/IP: FTP, HTTP, Debug Port 7090, Communication Port 7070 UDP: SNMP, SNTP, Synchronization Port 7080
Serial interface	RS 232
Rate of transmission, serial	1.2 to 115.2 kbit/s
Input control	4 digital inputs for process synchronization Active when grounded, R_{max}=560 Ohm
Output control	4 relay outputs for process control max. breaking capacity: 30W (DC); 62.5VA (AC) max. contact load: 1A at 30VDC, 0.5A at 125VAC
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

8.0 Troubleshooting

1) 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 IDENTEC SOLUTIONS.

2) 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, 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	Change the network cable
	Defective network cable	- Do optical check on cable	Change network cable
	Wrong MAC-address in ARP-cache	- Check ARP-cache	Clear ARP-cache and try to ping the i-PORT again
Tags are not being recognized	Antennas are not connected	- Check if the antennas are fastened 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, ANT4, W)	Activate the corresponding antenna (see "Configuration")

	Antenna is defective	- Do optical check to see if antenna is defective	Change antenna(s) if necessary
	Tag is out of read zone	- Hold the test tag in front of the antenna and check if antenna is being recognized (blinks, i.e. Debug port)	If necessary, adjust the output power to the requirements
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)	Debug Info 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	

9.0 Contact Information

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Appendix A – Configuration Parameters

i-PORT Configuration Descriptions

Key	Value					Description
	min	max	default	unit	type	
i-PORT General						
IportType	0	1	0		enum	0...Host 1...Client
IportMainID	0	65535	0		uint	Main identification number of the i-PORT
IportSubID	0	65535	0		uint	Sub identification number of the i-PORT
IportSerlDevice	0	3	0		enum	Selects the device connected to serial interface 0...no device 1...GPS device 2...Modem 3...Serial Host (Comm. Protocol serial)
IportLongitude	-180.	180.	0.	deg	float	Longitude co-ordinates (east) of the i-Port
IPortLatitude	-90.	90.	0.	deg	float	Latitude co-ordinates (north) of the i-Port
Host Connection						
HostIpAddr	0.0.0.0	255.255.255.255	0.0.0.0		IP	Defines the IP address of the host computer
HostPort	0	65535	6780		uint	Port number of the host computer
HostTimeOut	0	32767	2	sec	uint	Timeout for acknowledge from host –> send it again
HostSyncInterval	0	32767	0	sec	uint	Time interval to synchronise iPort clock with host clock 0...never
HostSendInterval	0	32767	2	sec	uint	Time interval to send messages (only if available) to host OR Send Interval of Events
HostListSize	0	32767	0		uint	Minimum list size to send whole message list to host 0...send interval controlled only by HostSendInterval
Debug Configuration						
DebugHostMirror	0	1	1		bool	0...no debug output 1..."mirrors" the communication to host to debug port
DebugTagList	0	32767	0	sec	uint	Debug output cycle time
DebugNewTag	0	1	0		bool	Sends all new entries of tags in the list to debug port
DebugScanTag	0	1	1		bool	Sends all tags from the last scan to debug port
Time Server						
TimeServerType	0	2	0		uint	0…disable Time server 1…SNTP 2…Daytime
TimeServerPriIP	0.0.0.0	255.255.255.255	0.0.0.0		IP	
TimeServerSecIP	0.0.0.0	255.255.255.255	0.0.0.0		IP	
TimeSyncInterval	1	65535	1		uint	Time interval to synchronise iPort clock with server

Key	Value					Description
	min	max	default	unit	type	
Scan						
ScanMode	0	2	1		enum	0...Host Only no cont. Sequence 1...Continuos Mode 2...Input1 Mode
ScanSlotSelect	0	16	5		uint	2^x Number of Slots
ScanNum	0	32767	1		uint	Number of sequences Input1 mode
ScanPause	0	32767	10	0.1 sec	uint	Pause after a sequence

Blink						
BlinkEnable	0	1	0		bool	1...All new Tags in field BLINK once

Read Data						
ReadEnable	0	1	0		bool	1...Enable read data from tags
ReadAddress	0	32767	256		uint	Start Address to read data
ReadNum	1	32	12		uint	Number of byte to read
ReadBoost	0	20	6	dB	int	Power factor for read operation
ReadRetries	0	60	3		uint	Number of retries

Tag Power Saving						
PowSaveEnable	0	1	0		bool	1...All actual Tags in field Power save
PowSaveMode	0	2	0		enum	0...Sleep 1...Mute (only for i-Dx) 2...Both
PowSaveDuration	0	255	2	sec	uint	How long the Tag should save power

Detection						
DetectTagType	0	2	0		enum	0...i-Qx 1...i-Dx 2...Both *Note: i-Dx does not work in this version!*
DetectMode	0	2	0		enum	0...Normal Detection 1...Maximum Level Detection 2...In/Out
DetectDuration	0	32767	5	sec	uint	Time for Max Level to detect a maximum
DetectInhibit	0	32767	10	sec	uint	How long a tag have to be out of field to be cleared

Event Message						
EventMsgEnable	0	1	0		bool	1...enable Events
EventRnTag	0	2	0		enum	0...When a Tag enters the field 1...When a Tag leaves the field 2...Both
EventRnInput1	0	3	0		enum	0...No Event 1...Rising Edge 2...Falling Edge 3...Change
EventRnInput2	0	3	0		enum	
EventRnInput3	0	3	0		enum	
EventRnInput4	0	3	0		enum	
EventCntIPortID	0	1	0		bool	Send i-PORT ID
EventCntDateTime	0	1	0		bool	Send Date and Timed (UTC)
EventCntTagStat	0	1	0		bool	Send Status of Tag
EventCntFStr	0	1	0		bool	Send Field Strength Info

Key	Value					Description
	min	max	default	unit	type	
Antenna Settings						
Ant1Enable	0	1	1		bool	Enable or disable this antenna 0...disable antenna 1...enable antenna
Ant1ScanEnable	0	1	1		bool	1...antenna is a sending antenna
Ant1TxPowerQ	-30	6	-6	dBm	int	TX Power for i-Qx
Ant1TxPowerD	-30	30	20	dBm	int	TX Power for i-Dx *Note: This command has no effect in this version!*
Ant1RxThreshold	-100	-20	-100	dBm	int	Receive Threshold
Ant1HighSens	0	1	0		bool	0...antenna low sensitive 1...antenna high sensitive
Ant1CableLoss	-20	20	0	dB	int	Calibration factor to cal. antenna and cable
Ant1SynchGroup	0	4	0		enu m	
Ant2Enable	0	1	0		bool	Enable or disable this antenna 0...disable antenna 1...enable antenna
Ant2ScanEnable	0	1	1		bool	1...antenna is a sending antenna
Ant2TxPowerQ	-30	6	-6	dBm	int	TX Power for i-Qx
Ant2TxPowerD	-30	30	20	dBm	int	TX Power for i-Dx *Note: This command has no effect in this version!*
Ant2RxThreshold	-100	-20	-100	dBm	int	Receive Threshold
Ant2HighSens	0	1	0		bool	0...antenna low sensitive 1...antenna high sensitive
Ant2CableLoss	-20	20	0	dB	int	Calibration factor to cal. antenna and cable
Ant2SynchGroup	0	4	0		enu m	
Ant3Enable	0	1	0		bool	Enable or disable this antenna 0...disable antenna 1...enable antenna
Ant3ScanEnable	0	1	1		bool	1...antenna is a sending antenna
Ant3TxPowerQ	-30	6	-6	dBm	int	TX Power for i-Qx
Ant3TxPowerD	-30	30	20	dBm	int	TX Power for i-Dx *Note: This command has no effect in this version!*
Ant3RxThreshold	-100	-20	-100	dBm	int	Receive Threshold
Ant3HighSens	0	1	0		bool	0...antenna low sensitive 1...antenna high sensitive
Ant3CableLoss	-20	20	0	dB	int	Calibration factor to cal. antenna and cable
Ant3SynchGroup	0	4	0		enu m	
Ant4Enable	0	1	0		bool	Enable or disable this antenna 0...disable antenna 1...enable antenna
Ant4ScanEnable	0	1	1		bool	1...antenna is a sending antenna
Ant4TxPowerQ	-30	6	-6	dBm	int	TX Power for i-Qx
Ant4TxPowerD	-30	30	20	dBm	int	TX Power for i-Dx *Note: This command has no effect in this version!*
Ant4RxThreshold	-100	-20	-100	dBm	int	Receive Threshold
Ant4HighSens	0	1	0		bool	0...antenna low sensitive 1...antenna high sensitive
Ant4CableLoss	-20	20	0	dB	int	Calibration factor to cal. antenna and cable
Ant4SynchGroup	0	4	0		enu	

					m	
AntWEnable	0	1	0		bool	Enable or disable this antenna 0...disable antenna 1...enable antenna
AntWScanEnable	0	1	0		bool	1...antenna is a sending antenna
AntWTxPowerQ	-30	6	-6	dBm	int	TX Power for i-Qx
AntWTxPowerD	-30	30	20	dBm	int	TX Power for i-Dx *Note: This command has no effect in this version!*
AntWSynchgroup	0	4	0			

Notes