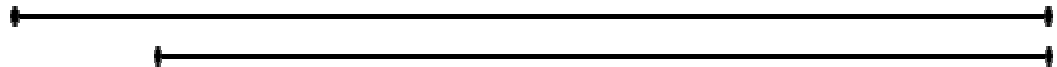




i-PORT III Installation Manual



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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 the read zone
- A central computer system as basis for control and monitoring

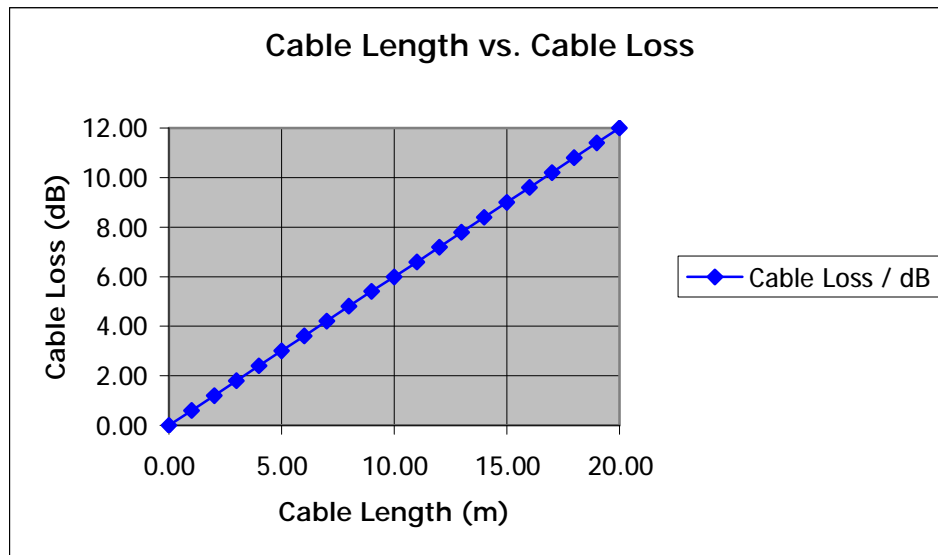
2.0 INSTALLATION AND START-UP

2.1 Installation and Start-Up

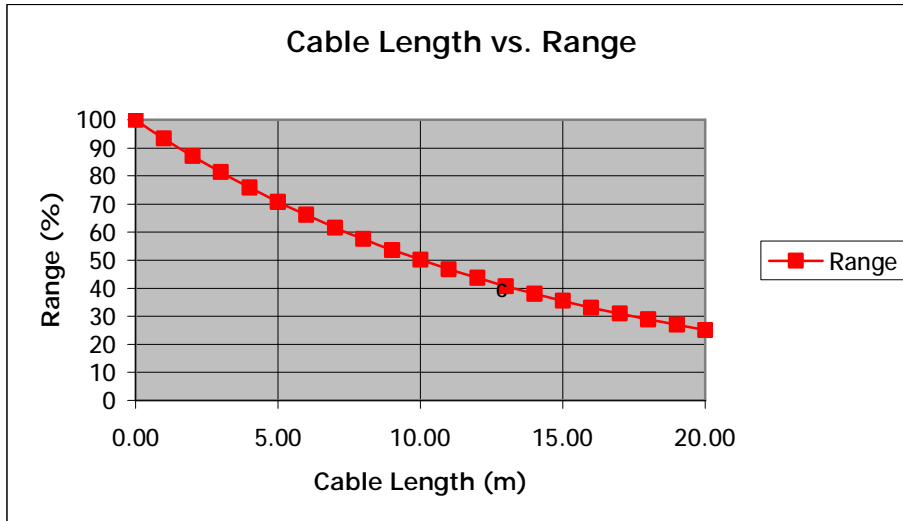
Before installation, the installer shall have a thorough knowledge of the application. The read locations need to be defined; whether the object is moving or stationary needs to be determined. If the objects in question are moving objects, their speed is important for determining the scan interval. The read locations need to be sufficiently spaced. A general rule of thumb is that the distance between two i-PORTs should be at least double the read range of the i-PORTs (or double the distance required) to prevent interference between the i-PORTs.

Mounting Site:

The i-PORT should be mounted as close as possible to the read location as lengthy antenna cables reduce the range of the system. For example, a typical 10-meter RG58 coaxial cable causes a loss of 6 dB of RF power. This in turn means a reduction by 50% in output power and range (see diagrams).



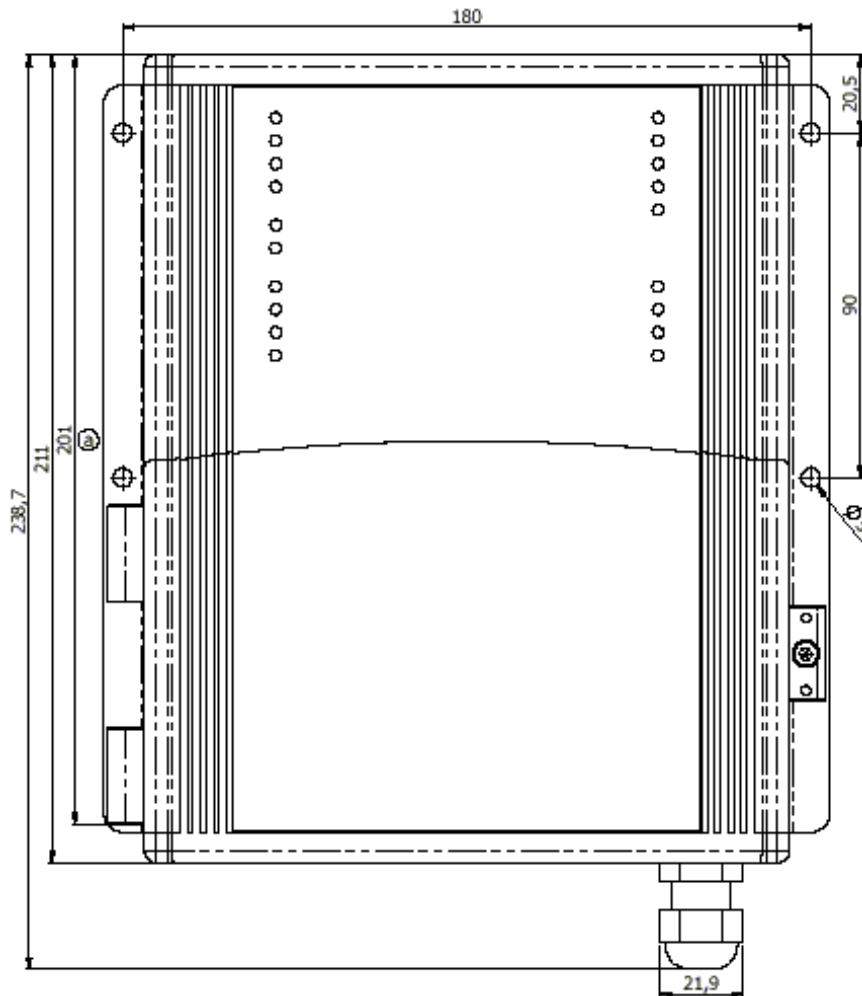
Cable loss as a function of cable length is displayed in the above diagram. The values are based on an RG58 coaxial cable at a frequency of 900 MHz.



In the diagram above, the relative range is displayed as a function of the cable length. Relative, because the range is dependent on the environment of the system. Under ideal conditions (free field, high-sensitivity tags, high-sensitivity i-PORT, maximum output power), ranges of up to 100 meters can be achieved. But if 20 meters of RG58 antenna cabling are used, the cable loss of approximately 12 dB, will reduce the maximum range to just one-quarter (25 meters)!

NOTE: The range losses as displayed in the diagram are independent of the original range. If the range is 30 meters (free field, low-sensitivity tags, low-sensitivity i-PORT, maximum output power) and 10 meters of RG58 antenna cabling are used, the range is reduced by 50%.

Mounting the i-PORT



Use the four mounting holes (diameter 5 mm) to attach the i-PORT. The amount of space required to mount the i-PORT is 200mm x 250mm x 60mm (L x H x W). The i-PORT has a mass of approximately 2 kg. A 3mm hex wrench is required to open the i-PORT access door.

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-throughs with the blind plugs. These feed-throughs are intended for RG58 (antenna), Ethernet or serial cables. Enclosure rating IP64 is thus achieved. If a higher enclosure rating is required, the i-PORT must be placed in an additional housing.

After mounting the i-PORT, the antennas need to be installed and connected to the appropriate antenna connectors.

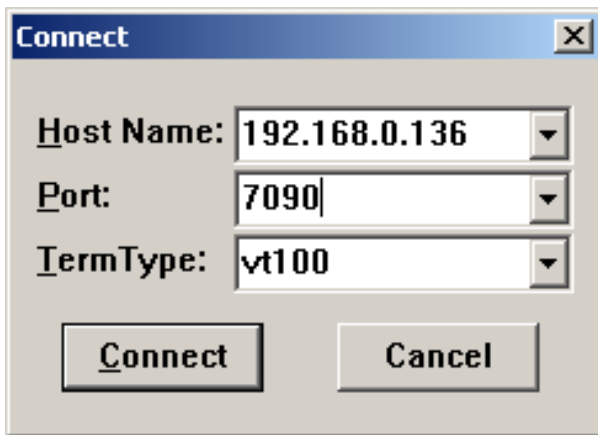
Alignment of Antennas:

Align the antennas with the tags or the objects to be monitored. Linearly polarized antennas must have the same polarization as the tags, either horizontal or vertical. Circular polarized antennas are not dependent on the polarization of the tags.

Based on the Orientation Diagram, an initial estimate of the read zone is possible. First set the send range of the i-PORT. To do this, use the i-PORT's blink mode (Note: Inhibit Time must be set to "0"). With a test tag (with LED) in hand, walk off the read zone. As long as the tag blinks, you are still within the zone. Reduce the i-Q Tx Power parameter as required until the read zone has reached the desired size.

System Test:

You can use the debug port to test the system and the range. Connect the i-PORT via crossover network cable directly to a laptop computer. Create a Telnet connection by dialing up on the debug port (Default IP-Address: 192.168.2.244, Port: 7090). Under "Start" and "Execute", type in "Telnet". This terminal program will then be started.



Enter the IP-Address of the i-PORT, in order to connect with the i-PORT debug port. Debug information will then be displayed on the monitor. The debug port must be activated (see Debug Config).

```

Telnet - 192.168.2.244
Welcome to i-PORT Debug Port
IDENTEC SOLUTIONS
-----

-- Debug Tag List --
RTCTime : 8:07:14
Tags in list: 2
ID      P(A1) P(A2) P(A3) P(A4) S R DATA
0000206925 -23 -21 ----- 0 0 no data.
0000206916 -16 -12 ----- 0 0 no data.

-- Debug Tag List --
RTCTime : 8:07:19
Tags in list: 2
ID      P(A1) P(A2) P(A3) P(A4) S R DATA
0000206925 -24 -21 ----- 0 0 no data.
0000206916 -16 -12 ----- 0 0 no data.

-- Debug Tag List --
RTCTime : 8:07:24
Tags in list: 2
ID      P(A1) P(A2) P(A3) P(A4) S R DATA
0000206925 -24 -21 ----- 0 0 no data.
0000206916 -16 -12 ----- 0 0 no data.

-- Debug Tag List --
RTCTime : 8:07:29
Tags in list: 2
ID      P(A1) P(A2) P(A3) P(A4) S R DATA
0000206925 -24 -21 ----- 0 0 no data.
0000206916 -16 -12 ----- 0 0 no data.

```

The result of the scan is displayed on the debug port. Each Tag-ID is listed with the measured signal strength (depending on the number of active antennas).

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:

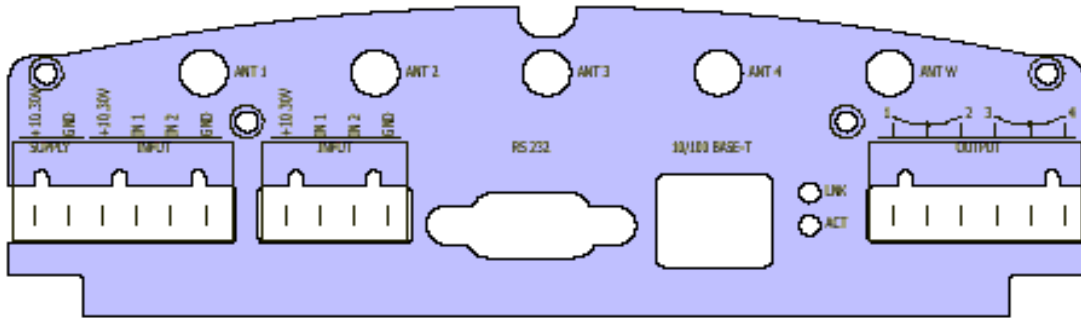
- a) 1-4: Light when there is activity at corresponding Antennas 1-4
 - Green: Antenna is sending
 - Red: Antenna is receiving (Orange to red, depending on the strength of the signal)
- b) W: Lights when there is activity at the Wake-up Antenna

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



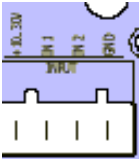
Antenna connectors:

- ANT1-4: SMA sockets, send and receive antennas
- ANT W: SMA socket, send antenna ONLY (WakeUp Antenna, for i-Q tags only)

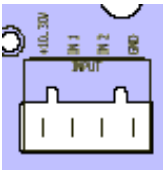
Terminal Block 1: +10-30V Connection for power supply (10-30V DC) Supply
 GND Connection for power supply (GND) Supply



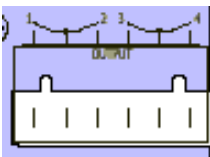
Terminal Block 2: Functionality has not been implemented at this time.



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)

3.0 Software, Configuration

3.1 Standard Settings, IP-Address, Password

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

IP-Address 192.168.2.244
Subnet-Mask: 255.255.255.0

User Name: user
Password: identec

To change the IP-Address, see "Boot Menu (Serial)"

3.2 Configuration, Settings

Direct Connection:

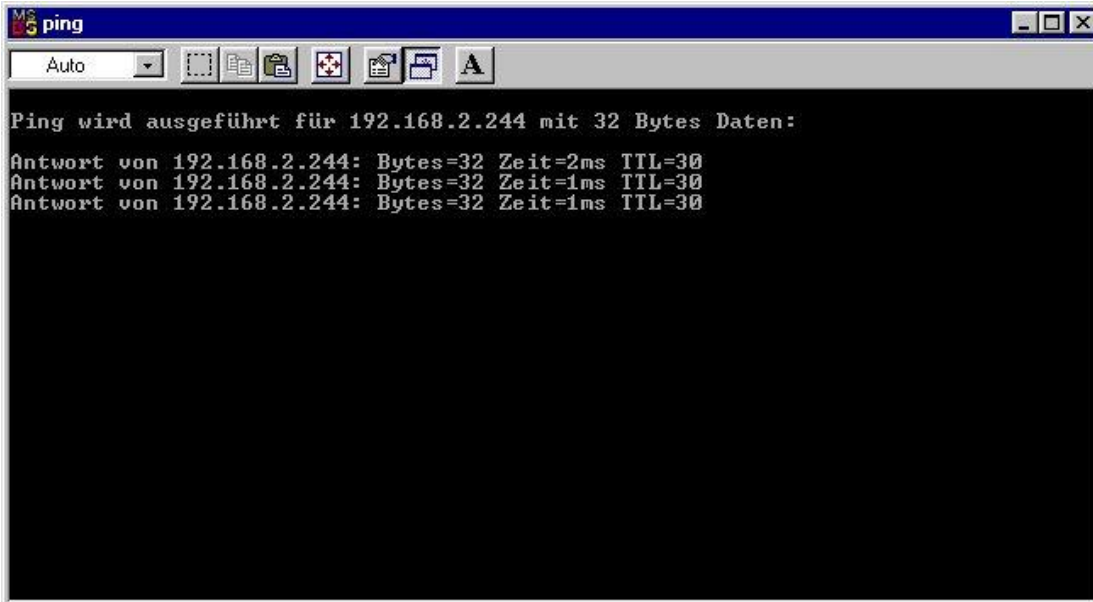
Connect the i-PORT directly to the network connection in your PC, laptop, etc. using a crossover network cable.

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.

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



```
MS-DOS Ping
Auto
Ping wird ausgeführt für 192.168.2.244 mit 32 Bytes Daten:
Antwort von 192.168.2.244: Bytes=32 Zeit=2ms TTL=30
Antwort von 192.168.2.244: Bytes=32 Zeit=1ms TTL=30
Antwort von 192.168.2.244: Bytes=32 Zeit=1ms TTL=30
```

After successfully testing the i-PORT connection, you can start your browser and open the i-PORT web interface. To do this, type in the i-PORT address <http://192.168.2.244>

In doing this, you will get to the Start page for the i-PORT. Several sub-menus are available to you for configuration and for testing purposes.

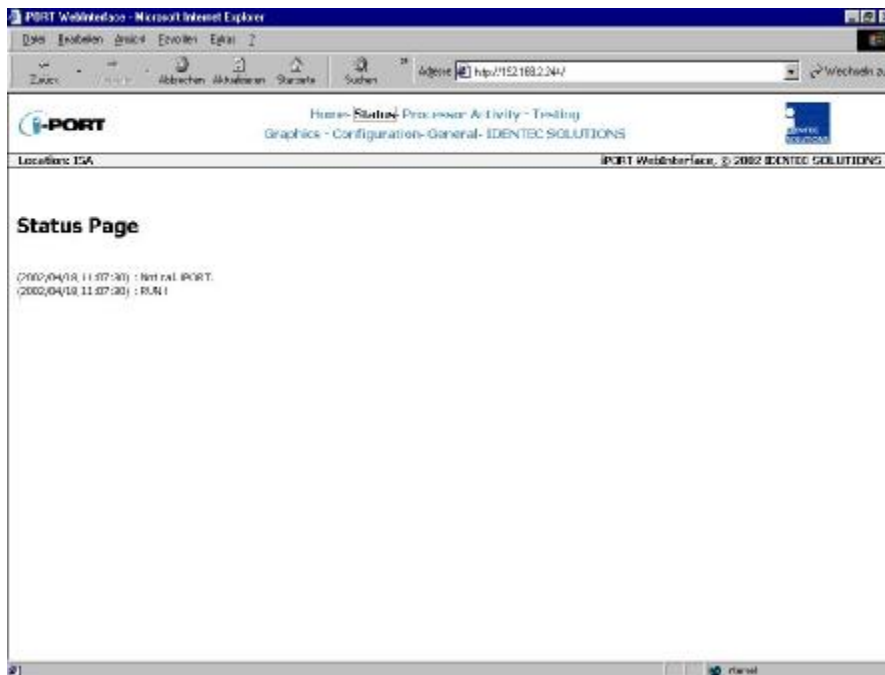
“Home” Menu:

Application Type	Normal Application
SW Version	2.30
ADuC Version	1.0
Protocol Version	2.0
CPU-board Serial	124
i-PORT Input Power	11.21 V
i-PORT Temperature	-
i-PORT IP Address	192.168.2.244
Host IP Address	192.168.2.106
Project	CIG 001
Location	ISA
Date/Time	2002-04-18 , 11:07:38
Last Modify	i-PORT never modified

Information about version numbers, firmware, serial numbers, etc. is contained in this menu.

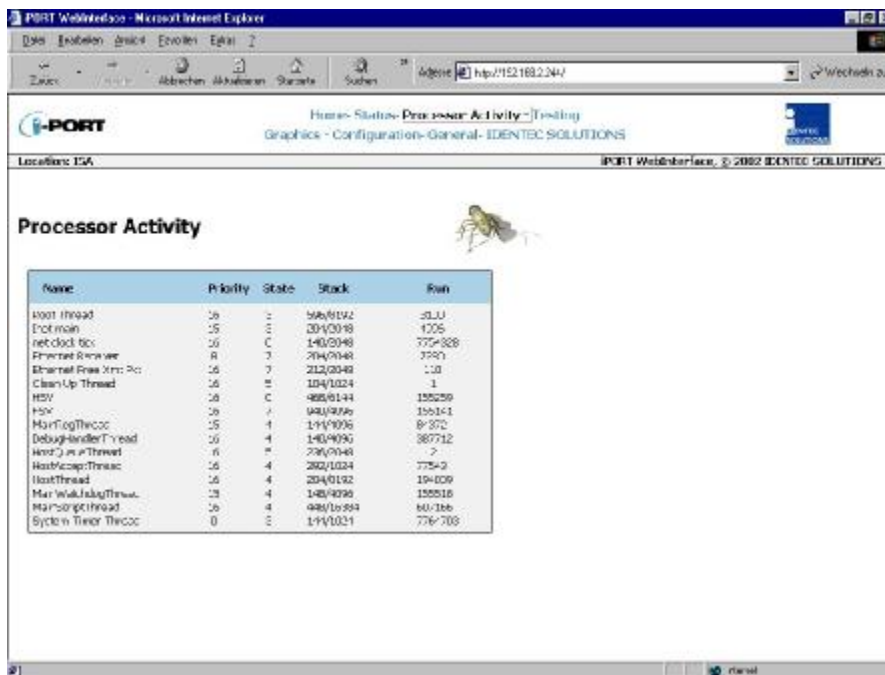
In the top line you can see an overview of all the menus. Click here to get to any of the other menus.

“Status” Menu:



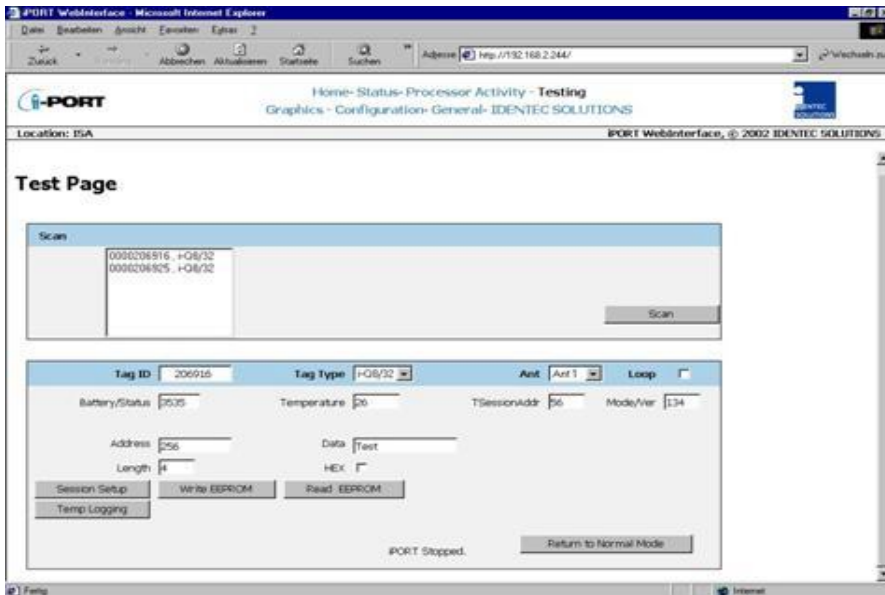
Status information, which may be required in case maintenance is needed, is available in this menu.

“Processor Activity” Menu:



Processor information, which may be required in case maintenance is needed, is available in this menu.

“Testing” Menu:



Several test possibilities are available in this menu. i-PORT operation is put on hold during test mode (operation will resume after leaving test mode). The settings from the Configuration Page (antenna settings, slots, etc.) apply here also.

Miscellaneous Settings:

- Tag Type:** i-Q8/32
- Ant:** Send antenna during test mode (for receive antenna, see Configuration)
- Loop:** Operation takes place in closed-loop action

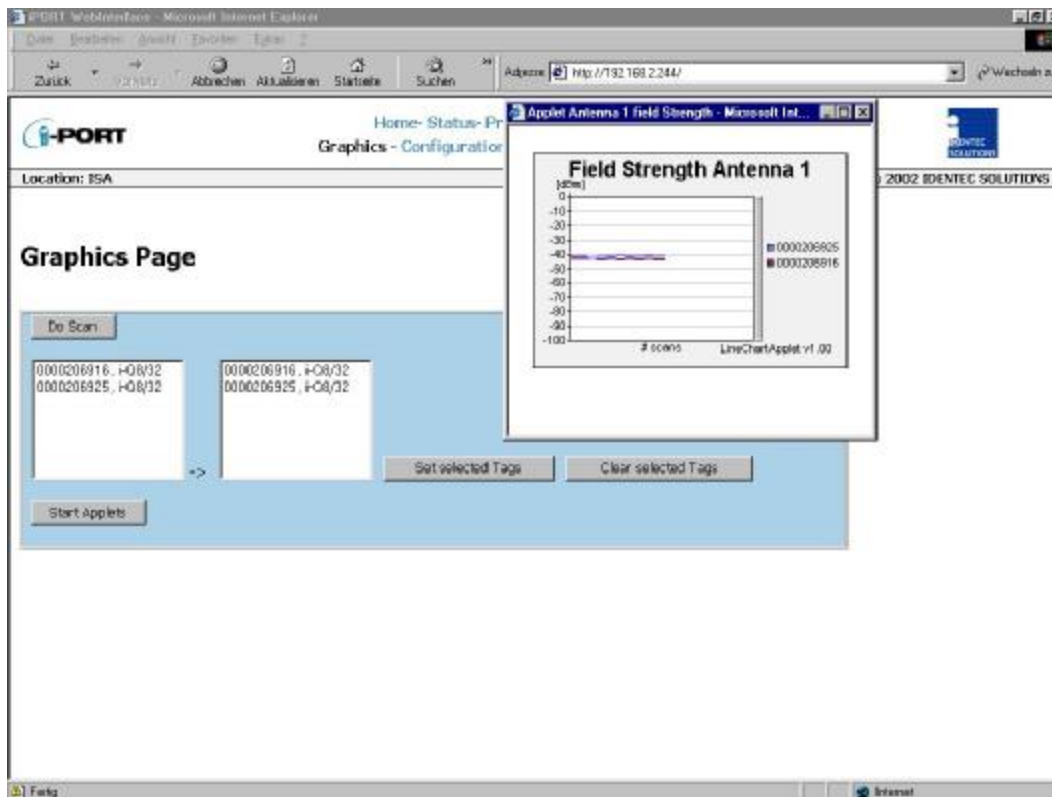
Pressing the **SCAN** button triggers a scan. If tags are located in the zone, a list of these tags will be displayed. Clicking on a tag selects that Tag ID (see “Tag-ID” field). Consequently, data can be exchanged with this tag.

- Session Setup:** This command determines battery voltage (mV), i.e. tag status (tag blinks).
- Write EEPROM:** Data can be written to the tags using this command. Enter the desired address into the “Address” field; enter the data into the “Data” field (*Length* = Amount/No. of Data Items).
- Read EEPROM:** Data can be read from the tags using this command. In the “Address” field, enter the address FOLLOWING WHICH the data should be read.
- Temp. Logging:** Temperature progression of a temperature tag can be displayed using this command. First execute “Session Setup”, and then click on “Temp. Logging”! (Prerequisite: temperature tag; tag must have activated Logger!)

Writable Data Range for Tags (decimal):

Tag Type	Start Address	Stop Address	Start Address	Stop Address
i-Q8	132	8191		
i-Q8T	132	5887	6144	8191
i-Q32T	132	5887	6144	32767

“Graphics” Menu:



With this menu you have the ability to graphically display a tag's field strength. This can be useful for estimating the possible ranges i.e. to set the read zones.

The parameters from the Configuration Page (antennas, output power, scan-interval, etc.) are to be used as settings.

Pressing the **DO SCAN** button triggers a scan. If tags are located in the zone, a list of these tags will be displayed. Clicking on one or more tags transfers those Tag IDs to the next field. Next, click on **SET SELECTED TAGS**.

Clicking on **START APPLETS** opens a window for each activated antenna (see "Configuration"). In this window, the field strength progression is graphically displayed for each tag that was selected. After every scan, the measured field strength from the tag signal is entered into the diagram.

This feature allows you to estimate the size of the read zone at the given output power, i.e. to roughly estimate the distance of the tag.

“Configuration” Menu:

Home- Status- Processor Activity - Testing
Graphics - Configuration- General- IDENTEC SOLUTIONS

Location: ISA
iPORT WebInterface, © 2002 IDENTEC SOLUTIONS

iPORT Configuration

iPORT General

PORTType iPORTMainID iPORTSubID iPORTSerDevice

PORTLongitude PORTLatitude

Host Connection

HostIpAddr HostPort HostTimeOut [s]

HostSyncInterval [s] HostSendInterval [s] HostListSize

Debug Config

DebugHostMirror DebugTagList [s] DebugNewTag DebugScanTag

Synchronisation

Neighbours(s) IP Timeout [0.1s]

Scan

Mode Slot Select Num of Scans ScanPause [0.1s]

Blink

Read data

Start Address Num of Bytes Power Boost [dB] Retries

Tag power saving

Mode Duration [s]

Detection

TagType Mode Detection Time [s] InhibitTime [s]

Event message

Event reason

Tag Input 1 Input 2 Input 3

Message content

i-PORT ID Time / Date Tag Status Field Strength

Antenna Settings

	Antenna 1	Antenna 2	Antenna 3	Antenna 4	Antenna W
Enable	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Scan Enable	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			
I-Q TxPower [dBm]	<input type="text" value="0"/>	<input type="text" value="0"/>			
HD TxPower [dBm]	<input type="text" value="0"/>	<input type="text" value="0"/>			
RxThreshold [dBm]	<input type="text" value="-90"/>	<input type="text" value="-90"/>			
Sensitivity	<input type="text" value="High"/>	<input type="text" value="High"/>			
Calibration [dB]	<input type="text" value="0"/>	<input type="text" value="0"/>			

upload config.ini to iPORT

download config.ini from iPORT

i-PORT Configuration:

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

i-PORT Type	"Fix", "mobile VisuMC", and "Client" Enter the i-PORT type. "Fix" runs the I-PORT in host mode (external device must connect to the I-PORT). "Client" runs the I-PORT in client mode (I-PORT connects to external device). "MobileVisuMC" is a special mode for mobile applications and will normally not be used.
i-PORT Main ID	i-PORT identifier for event messages (Area ID). Allows users to attach context-relevant reader identification to the event messages.
i-PORT SubID	i-PORT identifier for event messages (Area SubID)
i-PORT SerDevice	Used to select the type of device connected to the serial port. 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).
i-PORT Longitude	Longitude co-ordinates. Default value to send if no GPS is connected ("Mobile VisuMC" mode).
i-PORT Latitude	Latitude co-ordinates. Default value to send if no GPS is connected ("Mobile VisuMC" mode).

Host Connection:

These are settings used if the i-PORT is to be connected to a host computer ("Client" or "Mobile VisuMC" modes).

Host IPAddr	Host computer IP address
Host Port	Host computer port
Host TimeOut	Connection retry interval if connection to the host is lost ("Client" mode)
Host SyncInterval	Interval for synchronizing i-PORT time (if a GPS device is connected, time is synchronized with GPS time) ("Mobile VisuMC" mode)
Host SendInterval	Interval between retries if a message is not acknowledged by the host
Host ListSize	Tag list is buffered until this value is reached, then sent to the host computer ("Mobile VisuMC" mode)

Debug Config:

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

Debug HostMirror	Output on Debug Port all data that is exchanged on the Host Interface (serial or Ethernet).
Debug TagList	Time after which a tag list is sent to the Debug Port ("0" means no output)
Debug NewTag	Output of newly-recognized tags (Note the Inhibit Time!!)
Debug ScanTag	Output of tag list after sequence execution (see Page 28)

Synchronization:

Settings when several i-PORTs are located in a small space, necessitating synchronization of transmissions to prevent RF interference. After marking the check-box, the IPs of the other i-PORTs can be entered into the designated field.

Neighbour(s) IP	Enter IP addresses of the neighbouring i-PORTs
Timeout	Timeout for synchronization (not implemented at this time)

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" mode not available at this time.
- 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 expected in the zone at one time. The elapsed time per slot in which tags can answer is 1.2 ms.
- Num of Scans** Number of consecutive scans completed when "Input 1" is asserted (falling edge). In "Test Mode", this is also the number of scans.
- Scan Pause** Pause inserted by i-PORT after each sequence (see page 28)

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.

Read data:

Settings for i-PORT to read data from tags (mark off check box)

- Start Address** Address from which i-PORT begins to read data
- Num of Bytes** Number of bytes that are read starting from the Start Address
- Power Boost** Additional output power (in dB) used for data reads
- Retries** Maximum number of attempts to read data. Retries will all be attempted on the antenna with the highest field strength from subject tag on the most recent tag scan.

Tag power saving:

Settings for i-PORT to send tags into Sleep Mode (mark off 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 cannot be communicated with by any reader (i-PORTs or i-CARDs). After this time span has expired, the tags become available again.
- Duration** Duration of the Sleep/Mute mode

Detection:

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

- Tag Type** 3 possibilities: "i-Q", "i-D" and "Both"
 Depends on which tags need to be interrogated.
- Mode** 3 possibilities: "Normal", "Max. Level" and "In/Out"
Normal: A tag is reported as soon as it enters the zone
Max. Level: Tag detection is reported when it is at maximum field strength (see also "Detection Time")
In/Out: Orientation recognition activated (Antenna 1...In, Antenna 2...Out, Antenna 3...In, Antenna 4...Out)
- Detection Time** **Max. Level Mode:** Detection of tag at largest recorded field strength value within the detection time interval
In/Out Mode: Detection of tag and calculation of orientation after detection time interval
- 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. NOTE: This parameter needs careful

consideration if there are likely to be tags stored for long periods in or near the read zone!

Event message:

Settings to determine when an event message is to be sent and what the message will contain:

- Event reason** A tag or an input can serve as a trigger for an event
- Tag** 3 possibilities: "Enter", "Leave" or "Enter or 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** This functionality has not been implemented at this time.
- Message content** Each message can contain up to 4 additional pieces of information. By clicking on 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:

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 transmit
- i-Q TxPower** Power setting for i-Q tags at time of scan (send). Valid entries are -30 to +6 dBm.
- i-D TxPower** Future option. Functionality not available at this time.
- Rx Threshold** Threshold (field strength of tag signal) required for tag recognition. Valid entries are -100 to -20 dBm.
- 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 to net out the actual configuration to a "0dBm" reference level. This facilitates the ability to enter the desired antenna output power for scan transmit power (see example below).

Valid data for each parameter can be obtained from table in Appendix A.

Sequence:

A sequence is defined as successive scans on one or several antennas.

Example: 2 antennas are connected (enabled and scan enabled)
"Scan" command is sent to the i-PORT
Scan is executed on Antenna 1 (Tx), Antennas 1 and 2 receive (Rx)
Scan is executed on Antenna 2 (Tx), Antennas 1 and 2 receive (Rx)
Results of the scan command / sequence are sent back

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 0.13dB/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: $-(\text{Antenna Gain} - \text{Cable Loss} - \text{SMA Connector Loss}) = -(5\text{dB} - 3\text{m} \times 0.6 \text{ dB/m} - 0.2 \text{ dB}) = \underline{-3.0 \text{ dB}}$
- 2) 5dB gain antenna with N-connector on the antenna, 100-meter LMR-400 cable plus 2 - meter RG58 adapter cable: $-(\text{Antenna Gain} - \text{N-connector Loss} - \text{LMR-400 Cable Loss} - \text{N/SMA Adapter Loss} - \text{RG58 Cable Loss} - \text{SMA Connector Loss}) = -(5\text{dB} - 0.2\text{dB} - 100\text{m} \times 0.13\text{dB/m} - 0.4\text{dB} - 2 \times 0.6\text{dB/m} - 0.2\text{dB}) = \underline{+10.0 \text{ dB}}$

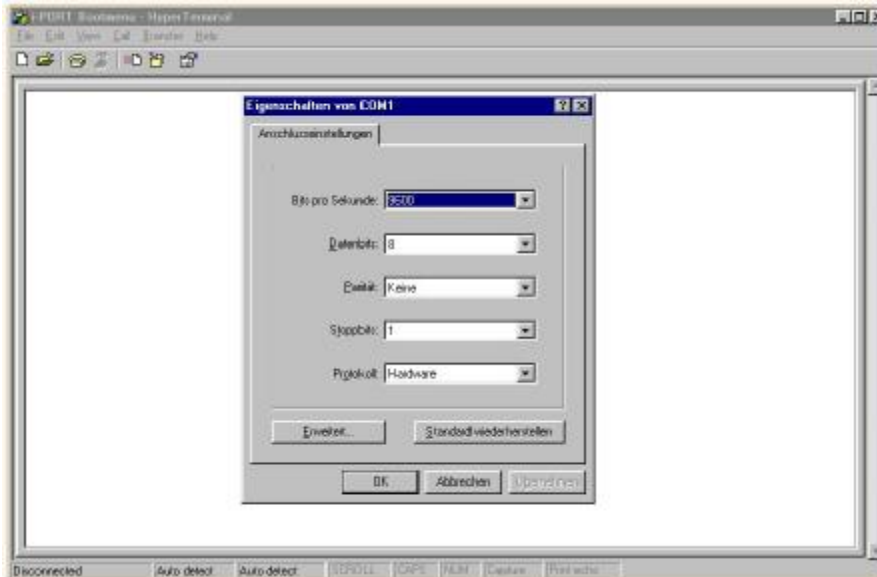
“General” Menu:

The screenshot shows the i-PORT web interface. At the top left is the i-PORT logo. The top navigation bar includes links for Home, Status, Processor Activity, and Testing. Below this is a breadcrumb trail: Graphics - Configuration - General - IDENTEC SOLUTIONS. The top right corner features the IDENTEC SOLUTIONS logo. A status bar at the top indicates 'Location: ISA' and 'iPORT WebInterface, © 2002 IDENTEC SOLUTIONS'. The main content area is titled 'General Settings'. Underneath, there is a section for 'IP Settings' with three input fields: 'IP address' (192.168.2.244), 'Subnet Mask' (255.255.255.0), and 'Gateway' (0.0.0.0). A 'Set&Reboot' button is located to the right of these fields. Below the IP settings is a large empty text area for notes. The browser's taskbar at the bottom shows an 'Internet' icon.

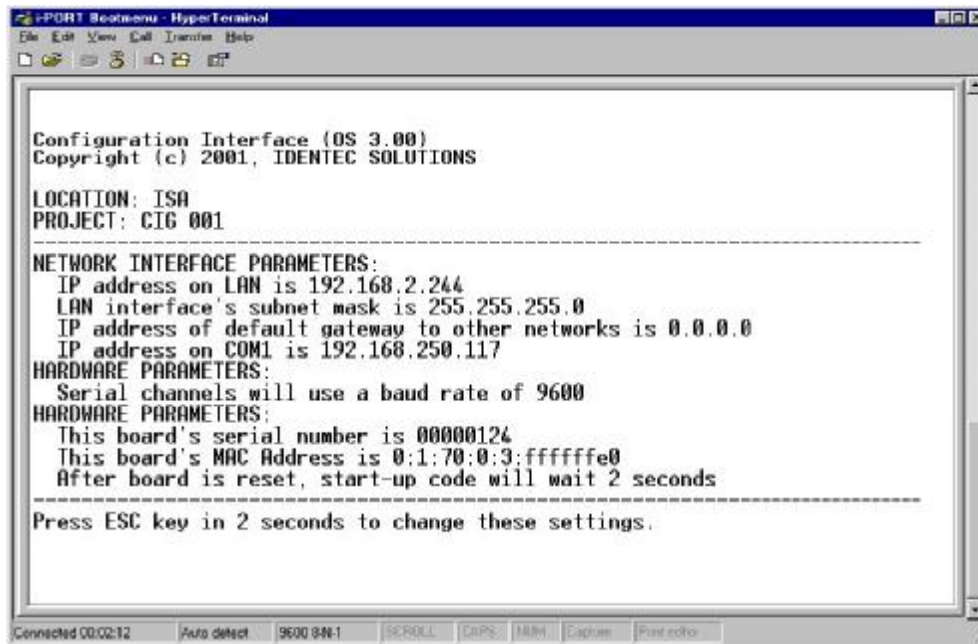
With this menu, you can change the network settings of the i-PORT. Simply enter the new values in the appropriate fields and click on the **SET&REBOOT** button. The i-PORT will then reboot with the new network settings. You can write down the new IP address in the designated spot inside the i-PORT door.

3.3 Boot Menu (Serial)

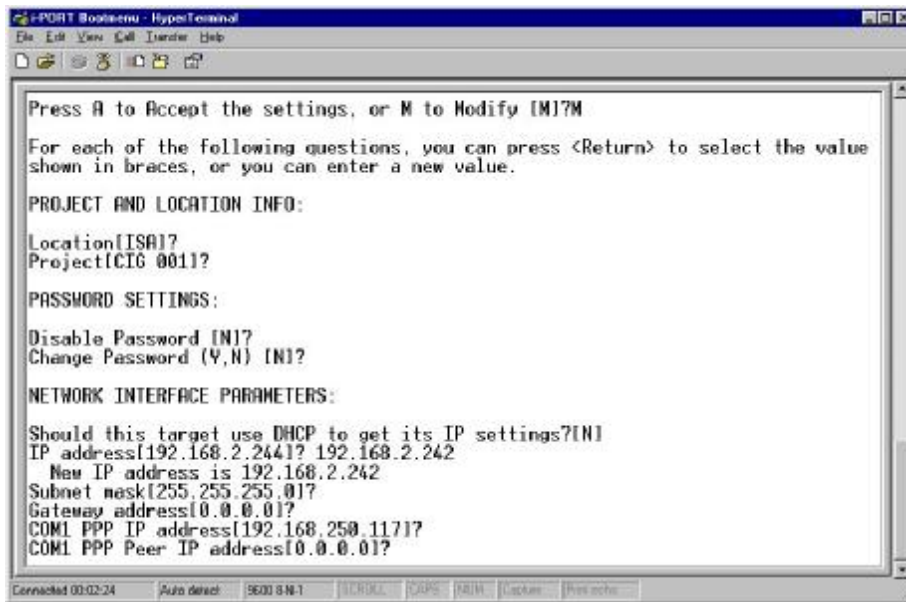
It is possible to change basic settings such as IP address, passwords, etc. via the serial interface. To accomplish this, the i-PORT has to be connected via the serial interface to a PC, (with a null-modem serial cable). Next, you need to start a terminal program (Hyperterminal, GanTerm, etc.) with the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



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



Start up the i-PORT as soon as there is a connection. Boot information appears on the screen and you must press the ESCAPE key within 2 seconds to change the standard settings.



You now have the ability to change various standard settings:

Project and Location Info:	Location Project	Assignment of i-PORT, Mounting Location Assignment of i-PORT, Project
Password Settings:	Password Enable/Disable Username and Password	Password on/off Username/Password
Network Interface Parameters:	DHCP/IP Address Subnet Mask Gateway Com1 PPP IP Com1 PPP Peer IP	DHCP or fixed IP Subnet mask Gateway, if needed Necessary for GSM-Modem Necessary for GSM-Modem
Hardware Parameters:	Baud Rate Boot Delay	Data transmission 1.2 to 57.6 kbit/s Time to display 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.

3.4 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.

3.5 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".

4.0 Troubleshooting

4.1 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	

4.2 Contact

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5.0 Appendix A - Effective Radiated Power Calculation

The following is the licensed limit allowable by the appropriate regulatory bodies for operation of IDENTEC's RFID devices:

i-Q Operation

In North America, the approved frequency is 916.5 MHz. Our equipment is certified to transmit an Effective Radiated Power (ERP) of 50mV/m @ 3m. This equates to transmitting 0.75mW from the antenna, or -1.25 dBm.

To calculate the power being transmitted from the antenna, the following formula may be applied:

Effective Radiated Power (ERP) = [Output Setting] - [Cable/Connector Loss] + [Antenna Gain]

The variables are defined as follows:

[Output Setting] = User defined;

[Cable/Connector Loss] = Variable depending on the type of cable and connectors being used. A typical installation may use RG-58 cable with a loss of 0.2 dBm/ft. Typical connector loss is around 0.2dB per junction;

[Antenna Gain] = 5 dBm for our antenna PN 210270-001.

NOTE: It is the responsibility of the installer to ensure that operation is within the limits of the appropriate regulatory body where the equipment is being used.