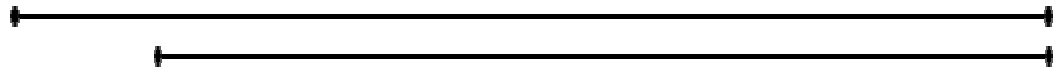




# i-PORT III Installation Manual



IDENTEC SOLUTIONS, Inc.  
Suite 102, 1860 Dayton Street  
Kelowna, British Columbia  
Canada V1Y 7W6

Tel: (250) 860-6567  
Fax: (250) 860-6541  
[www.identecsolutions.com](http://www.identecsolutions.com)



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# Radio Frequency Compliance Statement

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

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

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**

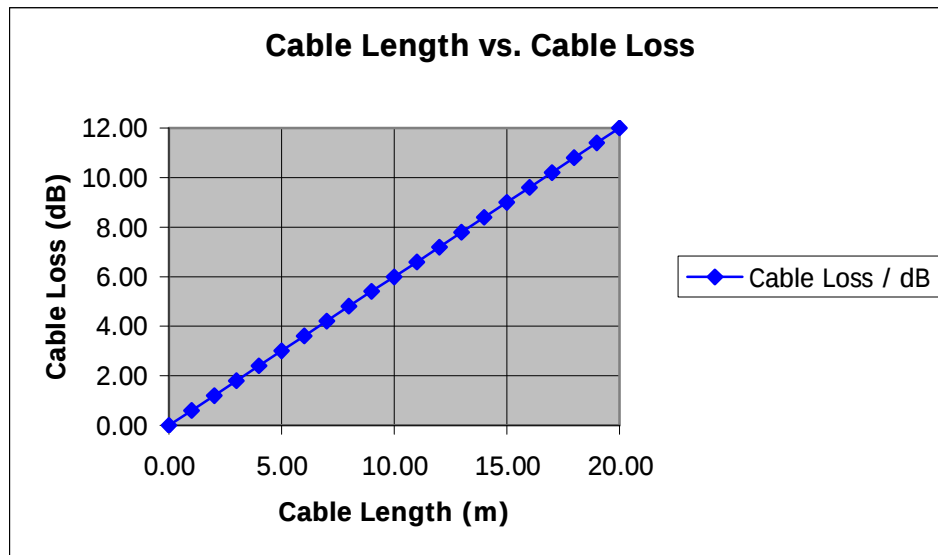
## 2.0 INSTALLATION AND START-UP

### 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.

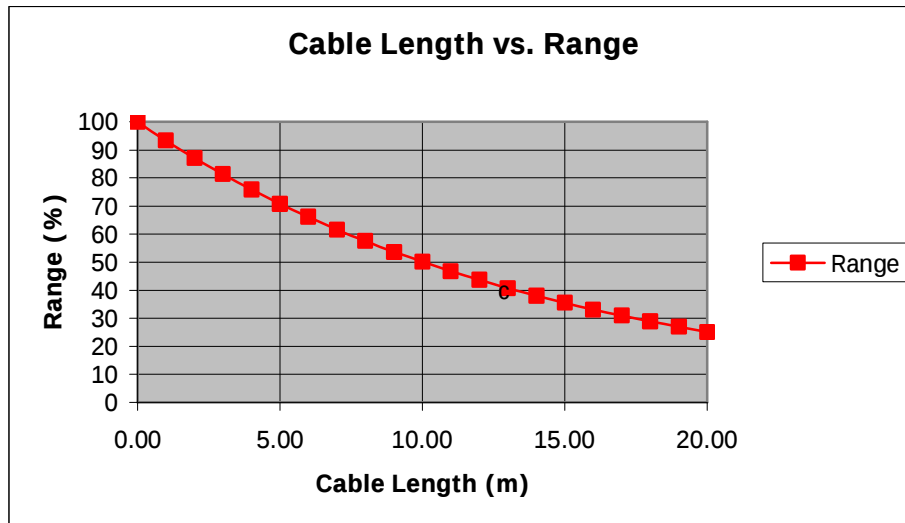
#### Mounting Site:

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.

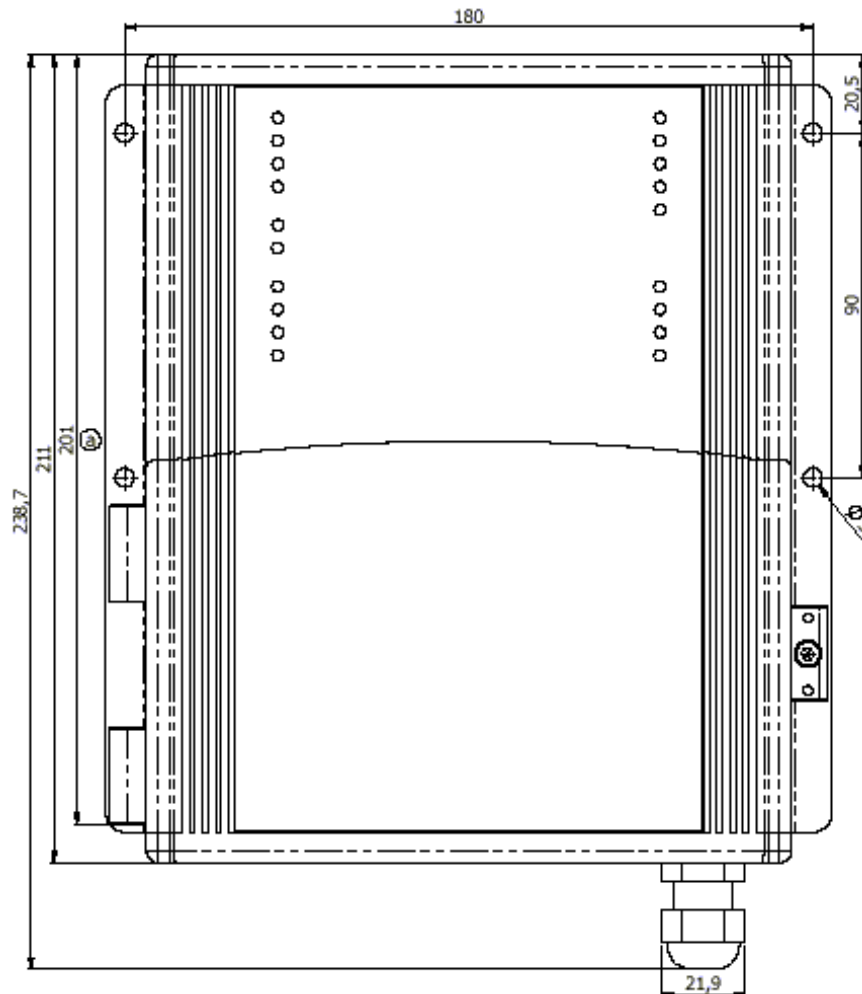
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In the diagram above, the relative range is displayed as a function of the cable length. Relative, because the range is dependent on the environment of the system. Under ideal conditions (free field, high-sensitivity tags, high-sensitivity i-PORT, 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.

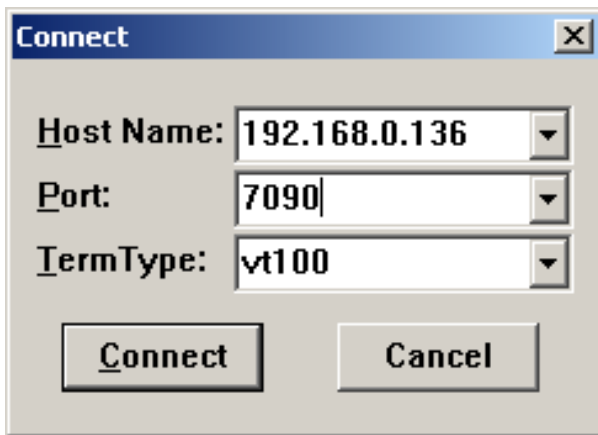
**Alignment of Antennas:**

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. |

No. Tags in List

Tag-ID

Field Strength Antenna 1

Field Strength Antenna 2

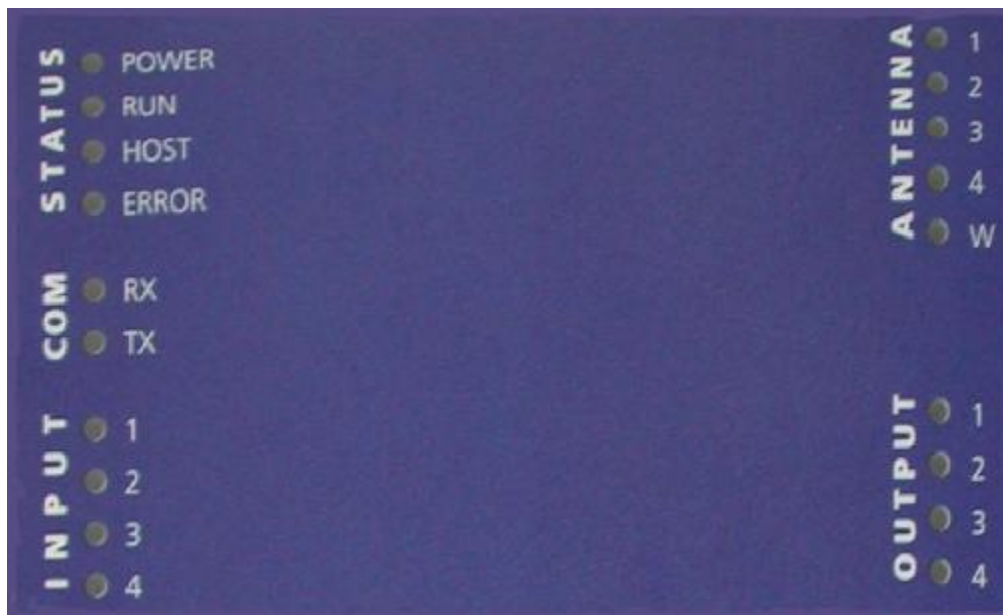
Session Setup (inactive)

Read data (inactive)

Data (inactive)

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:

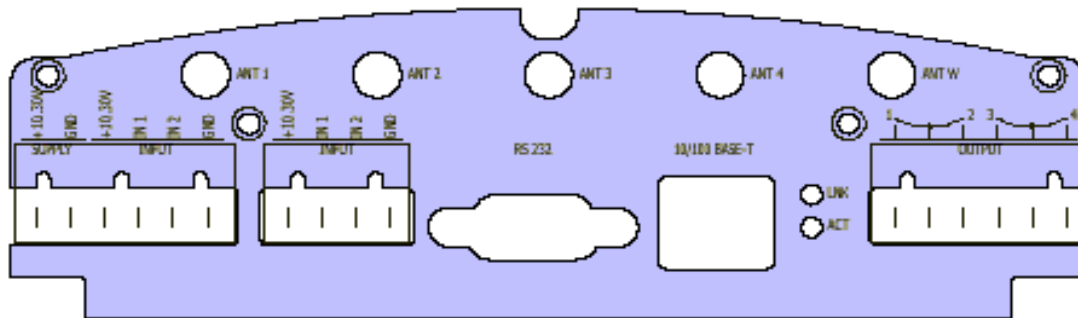
- a) **1-4:** Light when there is activity at corresponding Antennas 1-4
  - Green: Antenna is sending
  - Red: Antenna is receiving (Orange to red, depending on the strength of the signal)
- b) **W:** Lights when there is activity at the Wake-up Antenna

### 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)

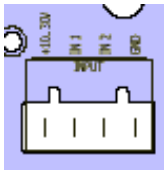
**Terminal Block 1:**      +10-30V      Connection for power supply (10-30V DC)      Supply  
                                  GND              Connection for power supply (GND)      Supply



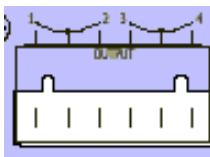
**Terminal Block 2:**      Functionality has not been implemented at this time.



**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:**

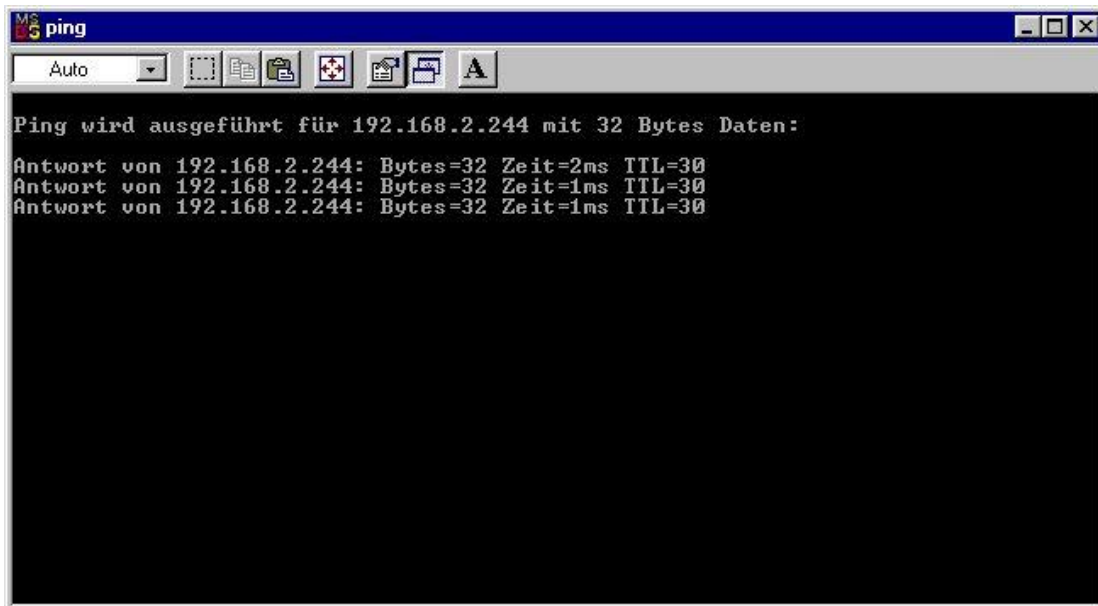
Connect the i-PORT directly to the network connection in your PC, laptop, etc. using a crossover network cable.

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.

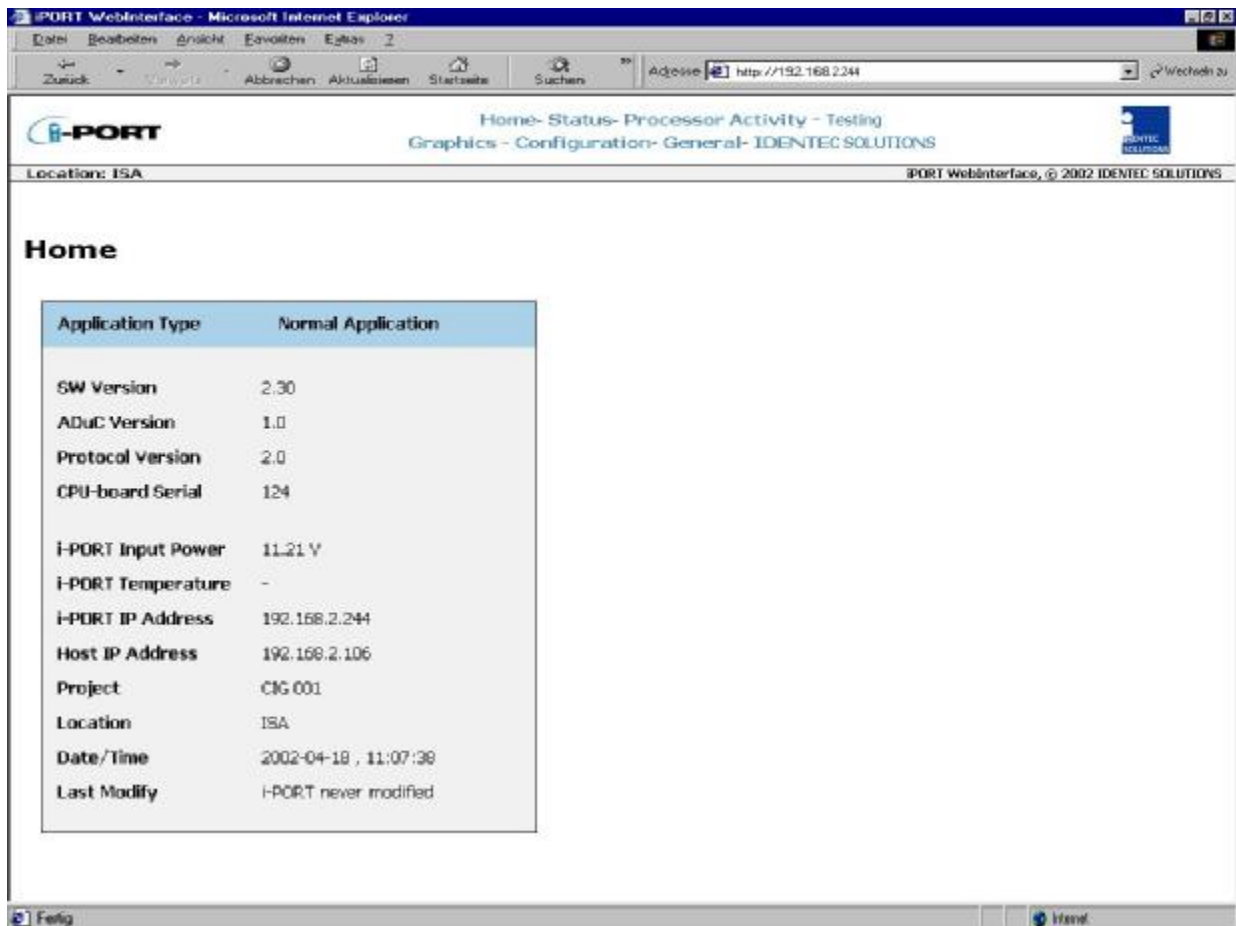
To test the connection to the i-PORT, open a DOS window and type in the command <ping 192.168.2.244>. You should receive a reply from the i-PORT.



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:

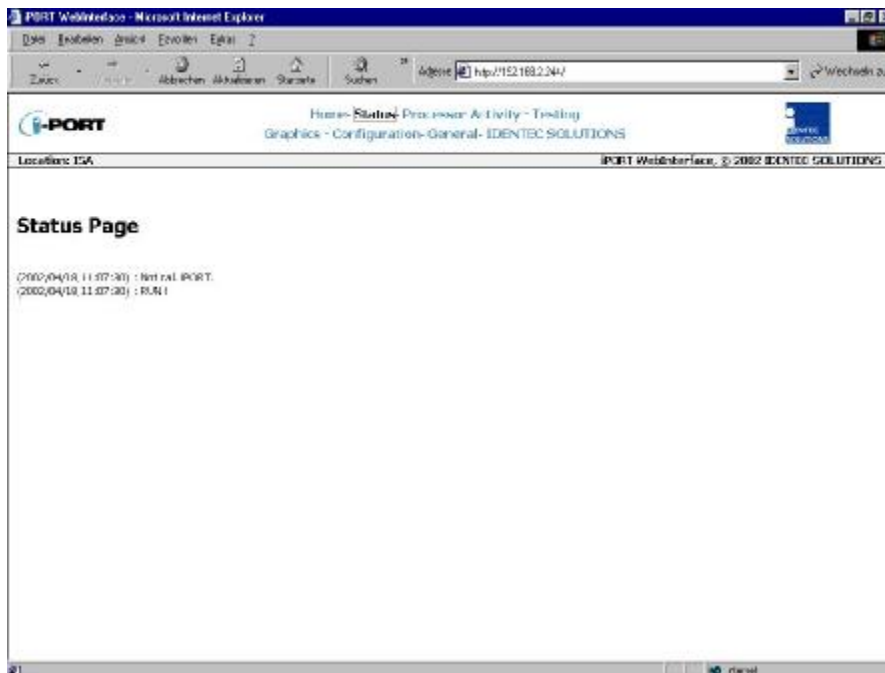


| Application Type   | Normal Application    |
|--------------------|-----------------------|
| SW Version         | 2.30                  |
| ADuC Version       | 1.0                   |
| Protocol Version   | 2.0                   |
| CPU-board Serial   | 124                   |
| i-PORT Input Power | 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.

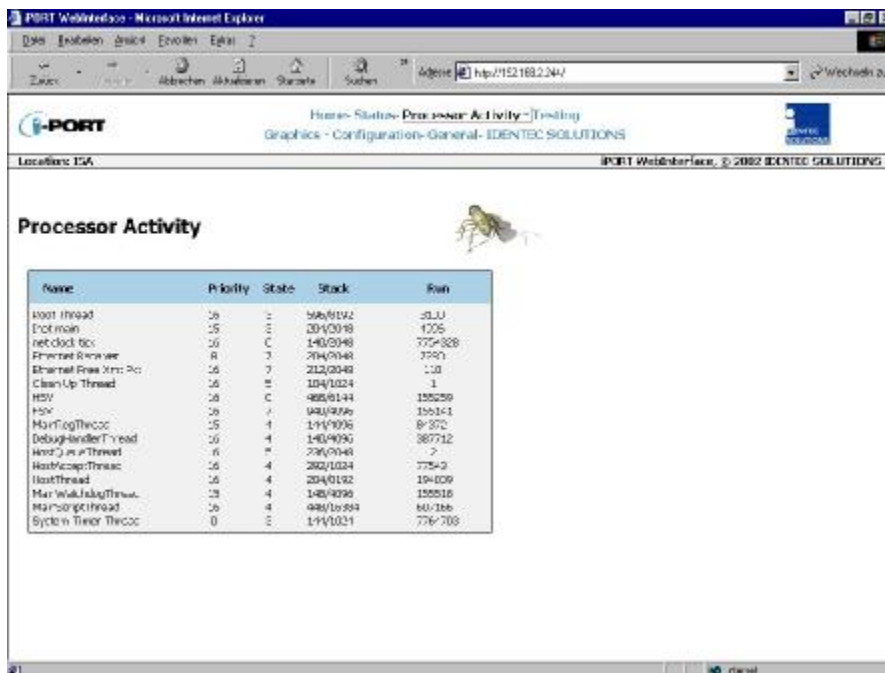
In the top line you can see an overview of all the menus. Click here to get to any of the other menus.

## “Status” Menu:



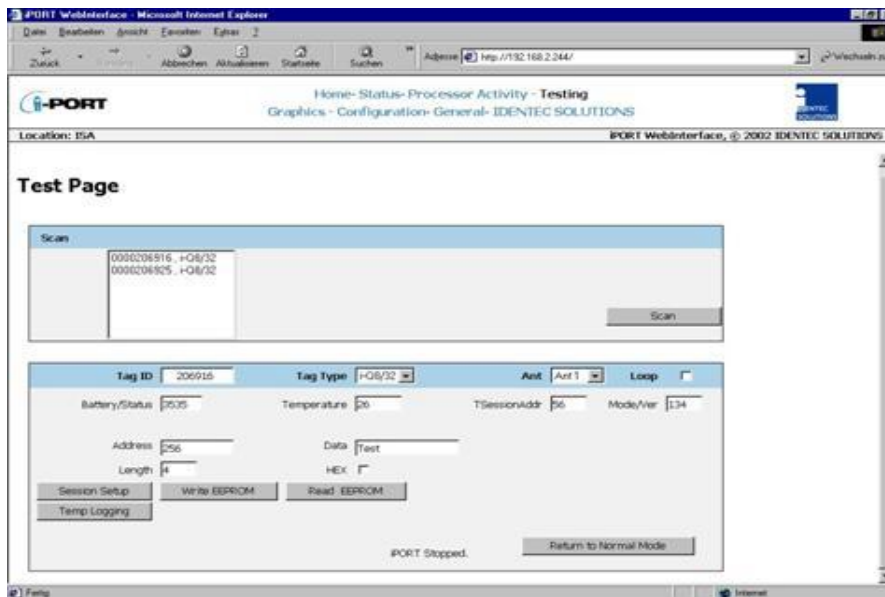
Status information, which may be required in case maintenance is needed, is available in this menu.

## “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).

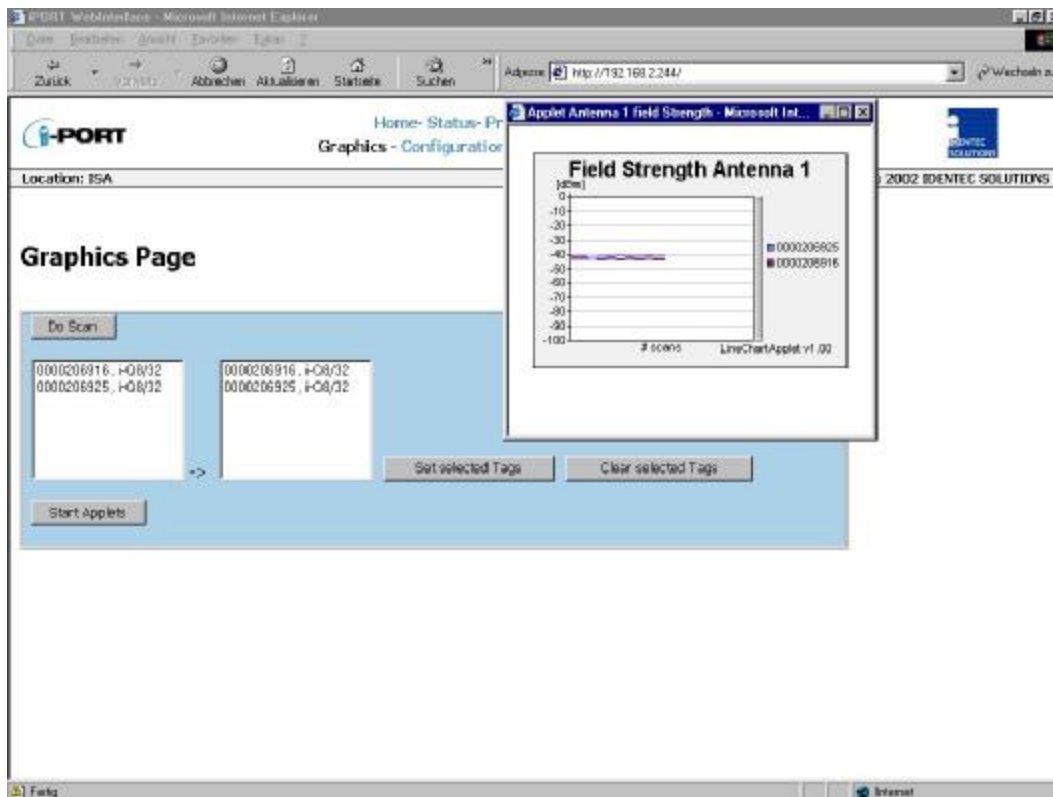
**Read EEPROM:** Data can be read from the tags using this command. In the “Address” field, enter the address FOLLOWING WHICH the data should be read.

**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!)

### Writeable 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 Fix

PORTMainID 0

PORTSubID 0

PORTSerDevice No Device

PORTLongitude 10.00000

PORTLatitude 47.00000

**Host Connection**

HostIpAddr 0.0.0.0

HostPort 7060

HostTimeOut [s] 1

HostSyncInterval [s] 0

HostSendInterval [s] 2

HostListSize 0

**Debug Config**

DebugHostMirror ☒

DebugTagList [s] 0

DebugNewTag ☐

DebugScanTag ☐

☒ **Synchronisation**

Neighbours(s) IP -----

Timeout [0..1s] 0

**Scan**

Mode Host Only

Slot Select 64 Slots

Num of Scans 2

ScanPause [0..1s] 10

☒ **Link**

☒ **Read data**

Start Address 0

Num of Bytes 1

Power Boost [dB] 0

Retries 5

☒ **Tag power saving**

Mode Sleep

Duration [s] 2

**Detection**

TagType F08/32

Mode Normal

Detection Time [s] 0

InhibitTime [s] 10

☒ **Event message**

Event reason

Tag Enter

Input 1 None

Input 2 None

Input 3 None

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] | <span>0</span>                      | <span>0</span>                      |                          |                          |                          |
| HD TxPower [dBm]  | <span>0</span>                      | <span>0</span>                      |                          |                          |                          |
| RxThreshold [dBm] | <span>-90</span>                    | <span>-90</span>                    |                          |                          |                          |
| Sensitivity       | <span>High</span>                   | <span>High</span>                   |                          |                          |                          |
| Calibration [dB]  | <span>0</span>                      | <span>0</span>                      |                          |                          |                          |

Set Configuration

Load default Configuration

upload config.ini to iPORT

Durchsuchen...

Download File

download config.ini from iPORT

Internet

### **i-PORT Configuration:**

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

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>i-PORT Type</b>      | <b>"Fix", "mobile VisuMC", and "Client"</b><br>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.                                                                                                                                                               |
| <b>i-PORT Main ID</b>   | i-PORT identifier for event messages (Area ID). Allows users to attach context-relevant reader identification to the event messages.                                                                                                                                                                                                                                                                                                                                                       |
| <b>i-PORT SubID</b>     | i-PORT identifier for event messages (Area SubID)                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>i-PORT SerDevice</b> | Used to select the type of device connected to the serial port. 4 possibilities: "No Device", "GPS", "Modem", and "Serl Host" (Restart after changes!)<br>"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). <b>i-PORT Longitude</b> Longitude co-ordinates. Default value to send if no GPS is connected ("Mobile VisuMC" mode). |
| <b>i-PORT Latitude</b>  | 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).

|                          |                                                                                                                                  |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| <b>Host IPAddr</b>       | Host computer IP address                                                                                                         |
| <b>Host Port</b>         | Host computer port                                                                                                               |
| <b>Host TimeOut</b>      | Connection retry interval if connection to the host is lost ("Client" mode)                                                      |
| <b>Host SyncInterval</b> | Interval for synchronizing i-PORT time (if a GPS device is connected, time is synchronized with GPS time) ("Mobile VisuMC" mode) |
| <b>Host SendInterval</b> | Interval between retries if a message is not acknowledged by the host                                                            |
| <b>Host ListSize</b>     | 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.

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

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

### **Scan:**

i-PORT settings for the scan process.

|                                                                               |                                                                                                                                                                                                                                                                                                                                                                |
|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Mode:</b>                                                                  | 3 possibilities: "Host Only", "Continuous" and "Input 1"<br>"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.                                                                                          |
| <b>Slot Select</b>                                                            | 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.                                                                                        |
| <b>Num of Scans</b>                                                           | Number of consecutive scans completed when "Input 1" is asserted (falling edge). In "Test Mode", this is also the number of scans.                                                                                                                                                                                                                             |
| <b>Scan Pause</b>                                                             | Pause inserted by i-PORT after each sequence (see page 28)                                                                                                                                                                                                                                                                                                     |
| <b>Blink:</b>                                                                 |                                                                                                                                                                                                                                                                                                                                                                |
| Setting to cause tags entering the zone to blink (dependent on Inhibit Time!) |                                                                                                                                                                                                                                                                                                                                                                |
| <b>Blink</b>                                                                  | 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.                                                                                                                                                                               |
| <b>Read data:</b>                                                             |                                                                                                                                                                                                                                                                                                                                                                |
| Settings for i-PORT to read data from tags (mark off check box)               |                                                                                                                                                                                                                                                                                                                                                                |
| <b>Start Address</b>                                                          | Address from which i-PORT begins to read data                                                                                                                                                                                                                                                                                                                  |
| <b>Num of Bytes</b>                                                           | Number of bytes that are read starting from the Start Address                                                                                                                                                                                                                                                                                                  |
| <b>Power Boost</b>                                                            | Additional output power (in dB) used for data reads                                                                                                                                                                                                                                                                                                            |
| <b>Retries</b>                                                                | 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.                                                                                                                                                                                            |
| <b>Tag power saving:</b>                                                      |                                                                                                                                                                                                                                                                                                                                                                |
| Settings for i-PORT to send tags into Sleep Mode (mark off check box)         |                                                                                                                                                                                                                                                                                                                                                                |
| <b>Mode</b>                                                                   | 3 possibilities: "Sleep", "Mute" or "Both"<br><b>Sleep, Mute, Both (i-Q):</b> 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.                                                         |
| <b>Duration</b>                                                               | Duration of the Sleep/Mute mode                                                                                                                                                                                                                                                                                                                                |
| <b>Detection:</b>                                                             |                                                                                                                                                                                                                                                                                                                                                                |
| i-PORT settings which determine which tag types to interrogate, and how.      |                                                                                                                                                                                                                                                                                                                                                                |
| <b>Tag Type</b>                                                               | 3 possibilities: "i-Q", "i-D" and "Both"<br>Depends on which tags need to be interrogated.                                                                                                                                                                                                                                                                     |
| <b>Mode</b>                                                                   | 3 possibilities: "Normal", "Max. Level" and "In/Out"<br><b>Normal:</b> A tag is reported as soon as it enters the zone<br><b>Max. Level:</b> Tag detection is reported when it is at maximum field strength (see also "Detection Time")<br><b>In/Out:</b> Orientation recognition activated (Antenna 1...In, Antenna 2...Out, Antenna 3...In, Antenna 4...Out) |
| <b>Detection Time</b>                                                         | <b>Max. Level Mode:</b> Detection of tag at largest recorded field strength value within the detection time interval<br><b>In/Out Mode:</b> Detection of tag and calculation of orientation after detection time interval                                                                                                                                      |
| <b>Inhibit Time</b>                                                           | 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:

|                        |                                                                                                                                                                                                                                          |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Event reason</b>    | A tag or an input can serve as a trigger for an event                                                                                                                                                                                    |
| <b>Tag</b>             | 3 possibilities: "Enter", "Leave" or "Enter or Leave"<br>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.                                               |
| <b>Input</b>           | This functionality has not been implemented at this time.                                                                                                                                                                                |
| <b>Message content</b> | 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.

|                     |                                                                                                                                                                                                                                                                             |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Enable</b>       | By marking the check box, the corresponding antenna is activated                                                                                                                                                                                                            |
| <b>Scan Enable</b>  | By marking the check box, the corresponding antenna is also able to transmit                                                                                                                                                                                                |
| <b>i-Q TxPower</b>  | Power setting for i-Q tags at time of scan (send). Valid entries are -30 to +6 dBm.                                                                                                                                                                                         |
| <b>i-D TxPower</b>  | Future option. Functionality not available at this time.                                                                                                                                                                                                                    |
| <b>Rx Threshold</b> | Threshold (field strength of tag signal) required for tag recognition. Valid entries are -100 to -20 dBm.                                                                                                                                                                   |
| <b>Sensitivity</b>  | i-PORT receiver mode; this means that the Rx Threshold reaches -60dBm in low sensitivity mode and -90dBm in high sensitivity mode                                                                                                                                           |
| <b>Cable Loss</b>   | 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 <u>antenna output power</u> 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:  $-(\text{Antenna Gain} - \text{N-connector Loss} - \text{LMR-400 Cable Loss} - \text{N/SMA Adapter Loss} - \text{RG58 Cable Loss} - \text{SMA Connector Loss}) = -(5\text{dB} - 0.2\text{dB} - 100\text{m} \times 0.13\text{dB/m} - 0.4\text{dB} - 2 \times 0.6\text{dB/m} - 0.2\text{dB}) = \underline{+10.0 \text{ dB}}$

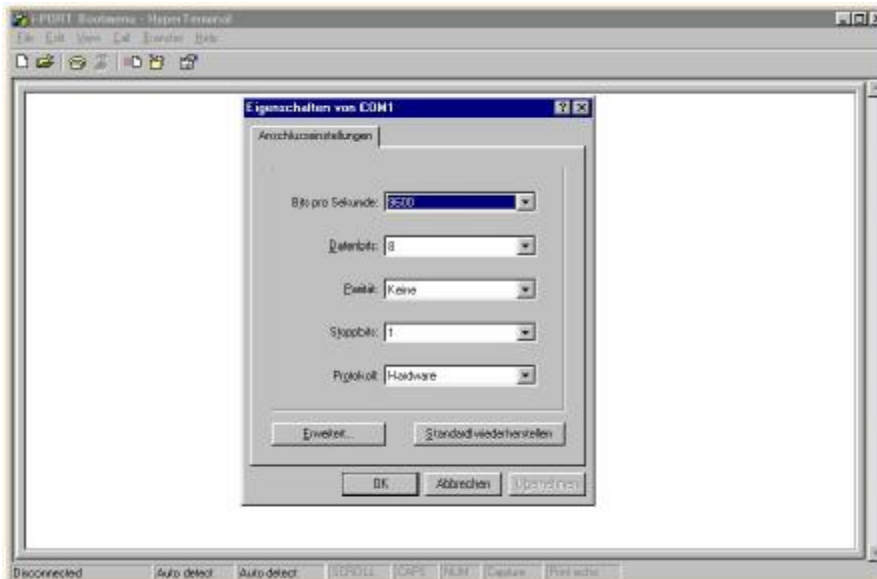
## “General” Menu:

The screenshot shows the i-PORT WebInterface. At the top, there is a navigation bar with the i-PORT logo on the left and the text "Home- Status- Processor Activity - Testing" and "Graphics - Configuration- General- IDENTEC SOLUTIONS" in the center. On the right, there is a small IDENTEC SOLUTIONS logo. Below the navigation bar, a status bar shows "Location: ISA" on the left and "iPORT WebInterface, © 2002 IDENTEC SOLUTIONS" on the right. The main content area is titled "General Settings". Below this title, there is a section labeled "IP Settings" with a blue header. Inside this section, there are three input fields: "IP address" with the value "192.168.2.244", "Subnet Mask" with the value "255.255.255.0", and "Gateway" with the value "0.0.0.0". To the right of these fields is a button labeled "Set&Reboot". Below the IP Settings section, there is a large empty rectangular box. At the bottom of the page, there is a status bar with a small icon on the left and the text "Internet" on the right.

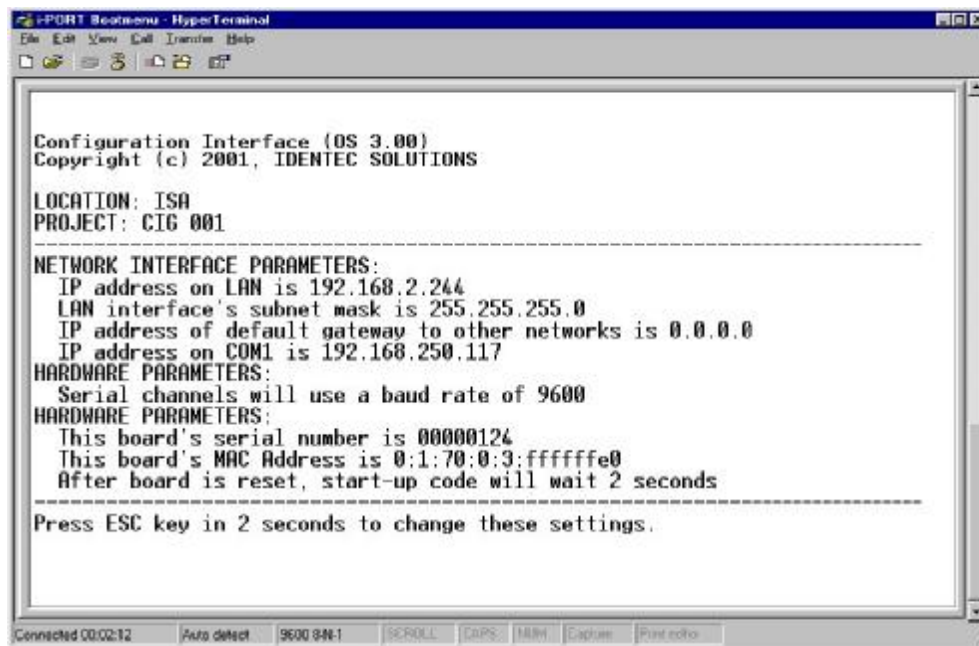
With this menu, you can change the network settings of the i-PORT. Simply enter the new values in the appropriate fields and click on the **SET&REBOOT** button. The i-PORT will then reboot with the new network settings. You can write down the new IP address in the designated spot inside the i-PORT door.

### 3.3 Boot Menu (Serial)

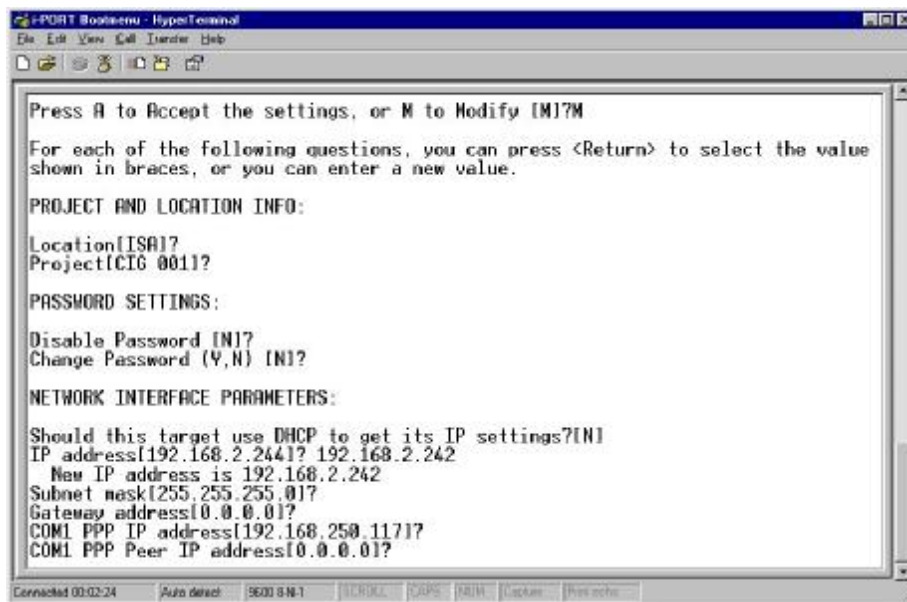
It is possible to change basic settings such as IP address, passwords, etc. via the serial interface. To accomplish this, the i-PORT has to be connected via the serial interface to a PC, (with a null-modem serial cable). Next, you need to start a terminal program (Hyperterminal, GanTerm, etc.) with the 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                | Assignment of i-PORT, Mounting Location |
|                               | Project                 | Assignment of i-PORT, Project           |
| Password Settings:            | Password Enable/Disable | Password on/off                         |
|                               | Username and Password   | Username/Password                       |
| Network Interface Parameters: | DHCP/IP Address         | DHCP or fixed IP                        |
|                               | Subnet Mask             | Subnet mask                             |
|                               | Gateway                 | Gateway, if needed                      |
|                               | Com1 PPP IP             | Necessary for GSM-Modem                 |
|                               | Com1 PPP Peer IP        | Necessary for GSM-Modem                 |
| Hardware Parameters:          | Baud Rate               | Data transmission 1.2 to 57.6 kbit/s    |
|                               | Boot Delay              | 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**

|                           |             |                                               |
|---------------------------|-------------|-----------------------------------------------|
| <b>Ports: Debugport</b>   | <b>7090</b> | <b>for Debug data</b>                         |
| <b>Communication Port</b> | <b>7070</b> | <b>for communication (commands, messages)</b> |

#### **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<br>- Measure the voltage at the terminal blocks | - If no voltage at terminal blocks, check power supply unit<br>- Measure directly at the outlet for a power adaptor<br>- 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<br>- Perform a ping on the IP (see "Configuration, Settings")<br>- 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<br>- 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

### In North America:

**IDENTEC SOLUTIONS Inc.**  
#102 – 1860 Dayton Street  
Kelowna, BC  
V1Y 7W6  
Canada

Tel: (250) 860-6567  
Fax: (250) 860-6541

### In Europe

**IDENTEC SOLUTIONS AG**  
Millennium Park 2  
A-6890 Lustenau  
Austria

Tel.: +43 (0)5577 87387-0  
Fax: +43 (0)5577 87387-15

## 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.