Rhein Tech Laboratories, Inc.
360 Herndon Parkway
Suite 1400
Herndon, VA 20170
http://www.rheintech.com

Client: Identec Solutions, Inc.
Model: i-PORT 3
Report No: 2005011
Standards: FCC 15.245/IC RSS-210
Date: May 11, 2005

APPENDIX H: MANUAL

Please see the following pages.

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Page 36 of 48

i-PORT3 User's Guide
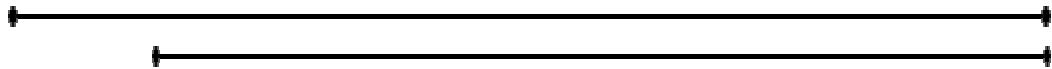
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Radio Frequency Compliance Statement

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

MODEL:	i-PORT 3
FCC ID:	O2E-ILR-IPORT3
CANADA:	Pending
EUROPE:	CE 0678(!)

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.

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.

Table of Contents

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 / 915 MHz)
- Long read and write range of 30 meters (optional up to 100 meters)
- Variable read range from just a few meters up to 100 meters
- Large storage capacity (8 kB 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
- Antenna types for different applications
- A central computer system as basis for control and monitoring

2.0   COMPONENTS

2.1   i-PORT3

i-PORT3 is the next generation of IDENTEC SOLUTIONS' ILR interrogators. It is capable of communicating not only with tags from the i-Q series, but also with tags from the i-D2 series. The communication range is up to 100 meters for i-Q tags and up to 6 meters for i-D tags.

Up to four antennas (plus one extra send antenna) can be connected to i-PORT3; built-in signal strength measurement capability enables the localization of tags using triangulation.

i-PORT3 is delivered complete with standard software, which offers the user a variety of options:

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

i-PORT3 has a Real-Time Operating System (RTOS: Thread X) and an internal Real-Time Clock (RTC), which permit an exact time allocation of the data. Up to 2000 data messages can be stored temporarily.

2.2   Antennas

A variety of antennas can be used, depending on application. The antennas are differentiated by characteristics such as polarization, apex angle, and gain. Optimal fit to the read zone is achieved by the right choice of antenna (characteristics) and the power setting. As the antennas are passive system elements, no tuning is required, which facilitates installation and maintenance.

Please consult with your system provider to discuss which antenna is most suited for your project implementation.
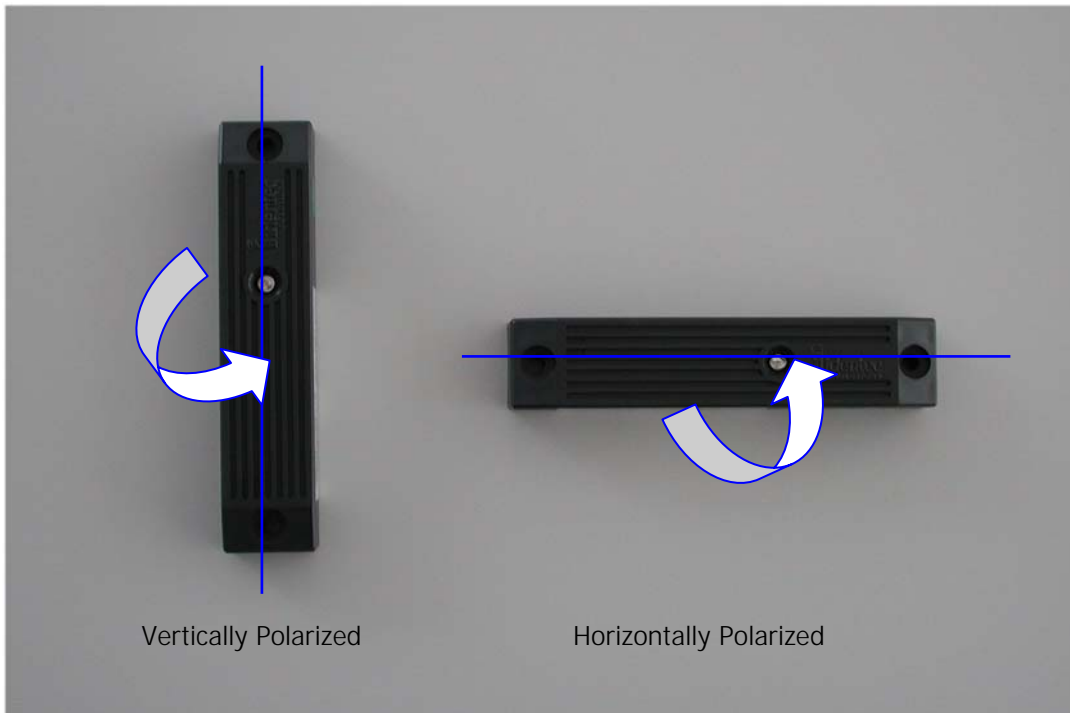
_____

2.3   i-Q Tag

This active tag is particularly suited for:

- Identification
- Tracking and Tracing
- Localization
- Temperature Monitoring

i-Q tags are available in a variety of configurations, i.e. with 8 kByte or 32 kByte of memory, an optional LED for visual recognition, and optional temperature logging function. Furthermore, they are available at 868 MHz for use in Europe, at 915 MHz for use in North America and at both frequencies for transcontinental applications.

Vertically Polarized   Horizontally Polarized

Polarization is dependent on orientation and is rotation symmetrical.

_____

2.4   i-D2 Tag

This active tag is particularly suited for:
- Identification
- Tracking and Tracing
- Localization

i-D tags are available in a variety of configurations. The tags have 64 bytes of memory, an optional LED for visual recognition, and are available in two different housing types (for personnel identification and for industrial applications). The tag transmits a low power signal at 868 MHz and can therefore be used in both Europe and North America.

Vertically Polarized   Horizontally Polarized
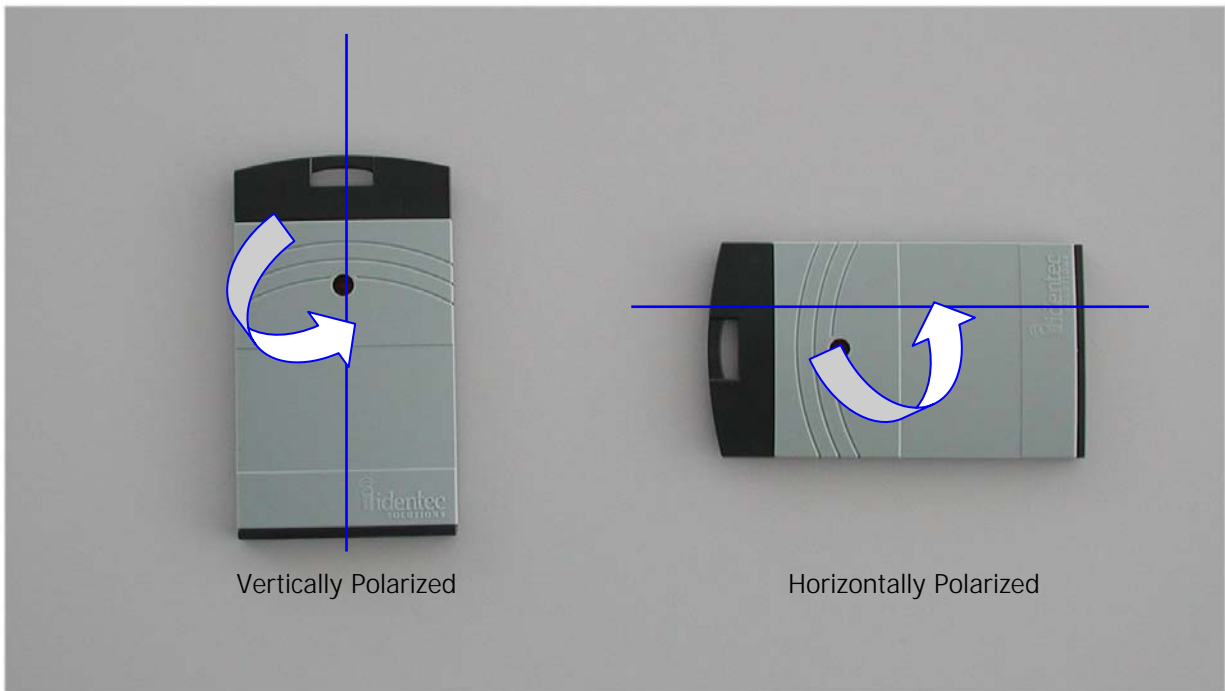
Polarization is dependent on orientation and is rotation symmetrical.

3.0 INSTALLATION AND START-UP

3.1 Installation and Start-Up

Before installation, the user should have 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. 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 synchronize 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. A 10-meter coaxial cable induces a loss of 6 dB. This in turn means a reduction by 50% in output power and range (see diagrams).
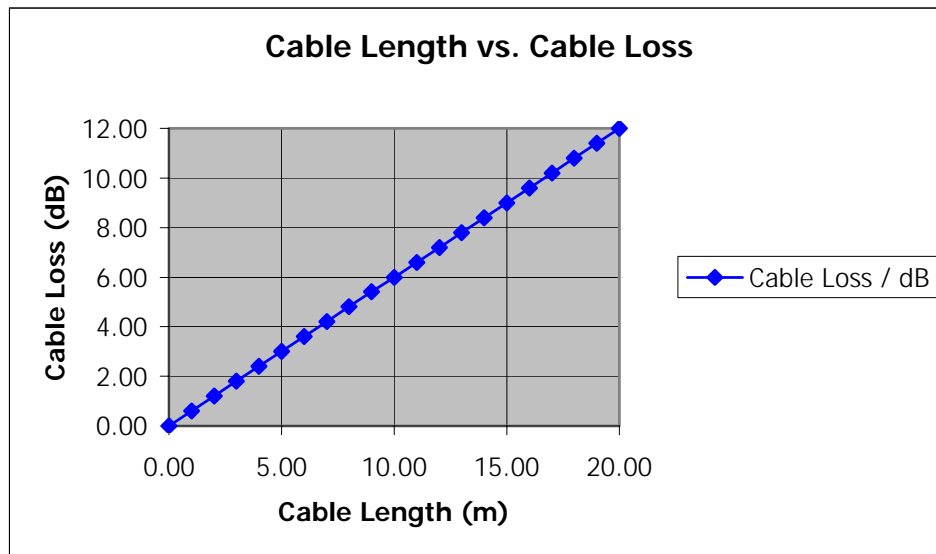
Cable losses as a function of cable length are displayed in the above diagram. The values are based on an RG58 coaxial cable at a frequency of 900 MHz.

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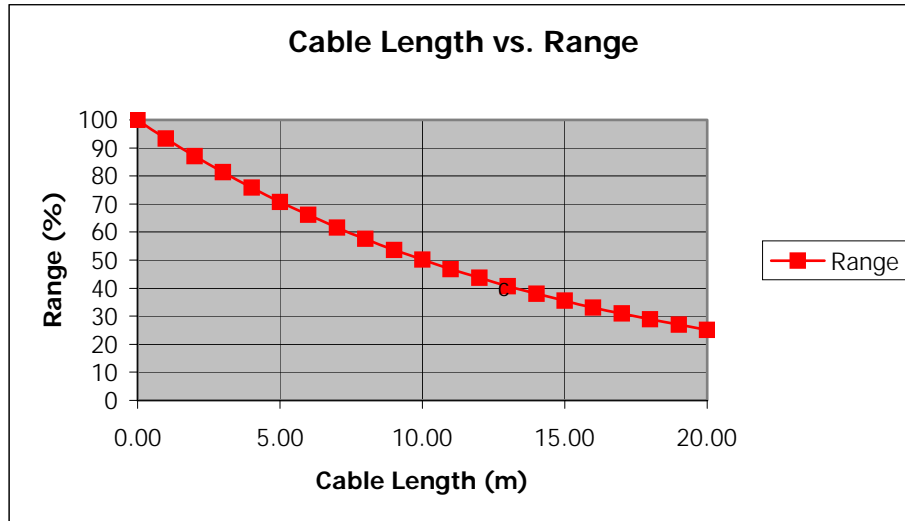
In the diagram above, the **relative** range is displayed as a function of the cable length. Relative because the range is dependent on the environment of the system. Under ideal conditions (free field, high-sensitivity tags, high-sensitivity i-PORT, maximum output power), ranges of up to 100 meters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

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 antenna cabling are used, the range is reduced by 50%.

After mounting the i-PORT, the antennas need to be installed and connected to the designated antenna sockets. If antenna extension cables are required, check these for function or short circuits before you begin with the start-up.
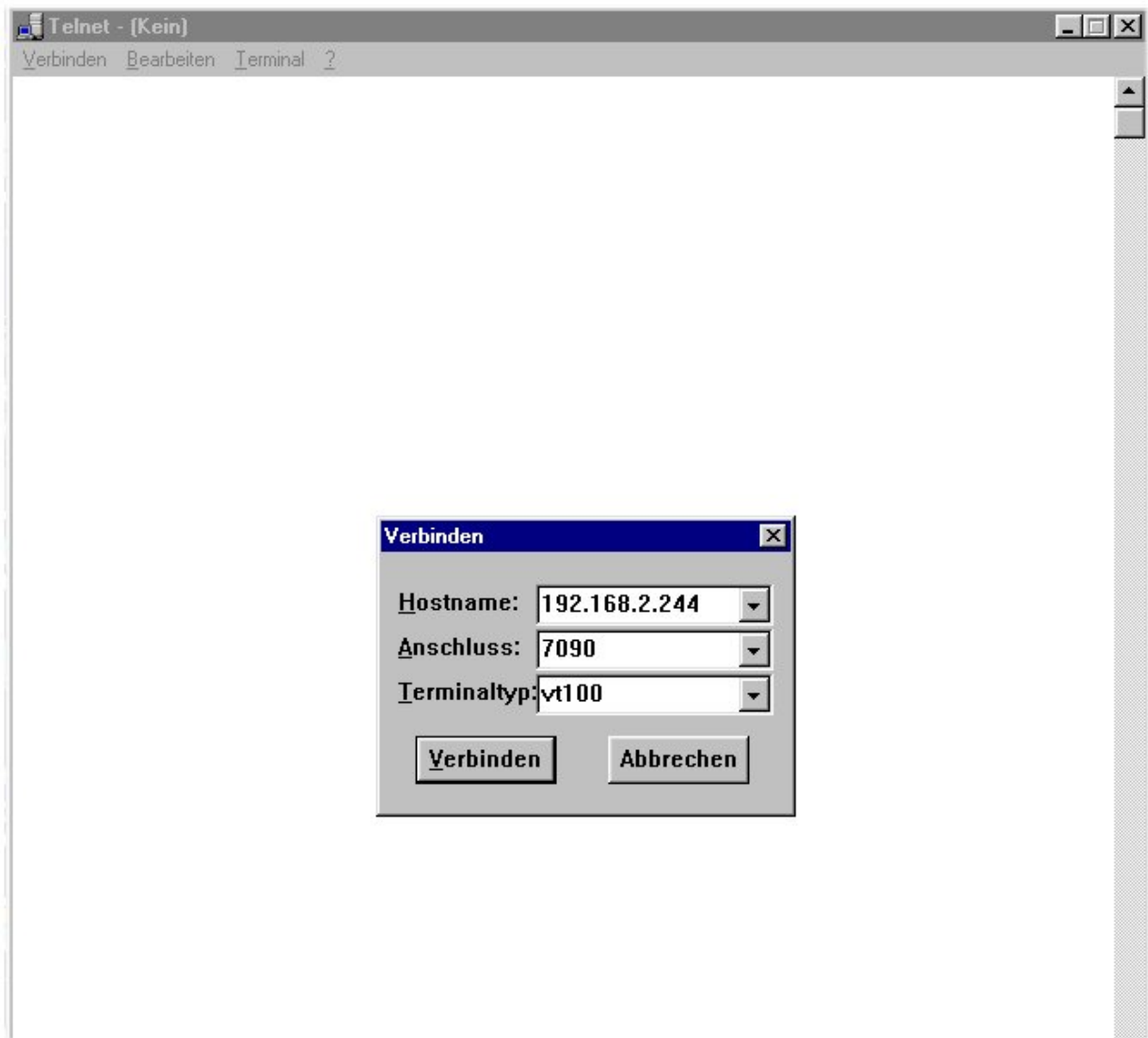
Alignment of Antennas:
Align the antennas with the tags or the objects to be monitored. Linearly polarized antennas must have the same polarization as the tags, either horizontal or vertical. Circular polarized antennas are not dependent on the polarization of the tags.

Based on the Orientation Diagram, an initial rough 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 or i-D Tx Power parameter as much 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 debut port (IP-Address: 192.168.2.244, Port: 7090). Under "Start" and "Execute", type in "Telnet". This terminal program will then be started.

Telnet - [Kein]

Verbinden Bearbeiten Terminal ?

Verbinden

Hostname: 192.168.2.244

Anschluss: 7090

Terminaltyp: vt100

Verbinden Abbrechen

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                                          _ □ ×
Verbinden  Bearbeiten  Terminal  ?
Welcome to i-PORT Debug Port                                    ▲
      IDENTEC SOLUTIONS
--------------------------


-- Debug Tag List --                                              No. Tags in List
RTCTime :  8:07:14
Tags in list:    2
ID              P(A1) P(A2) P(A3) P(A4) S R DATA                  Tag-ID

0000206925       -23    -21  ----- ----- 0 0 no data.
0000206916       -16    -12  ----- ----- 0 0 no data.
                                                                  Field Strength
-- Debug Tag List --                                              Antenna 1
RTCTime :  8:07:19
Tags in list:    2
ID              P(A1) P(A2) P(A3) P(A4) S R DATA                  Field Strength
                                                                  Antenna 2
0000206925       -24    -21  ----- ----- 0 0 no data.
0000206916       -16    -12  ----- ----- 0 0 no data.
                                                                  Session Setup
-- Debug Tag List --                                              (inactive)
RTCTime :  8:07:24
Tags in list:    2
ID              P(A1) P(A2) P(A3) P(A4) S R DATA                  Read data
                                                                  (inactive)
0000206925       -24    -21  ----- ----- 0 0 no data.
0000206916       -16    -12  ----- ----- 0 0 no data.
                                                                  Data
-- Debug Tag List --                                              (inactive)
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.█
```
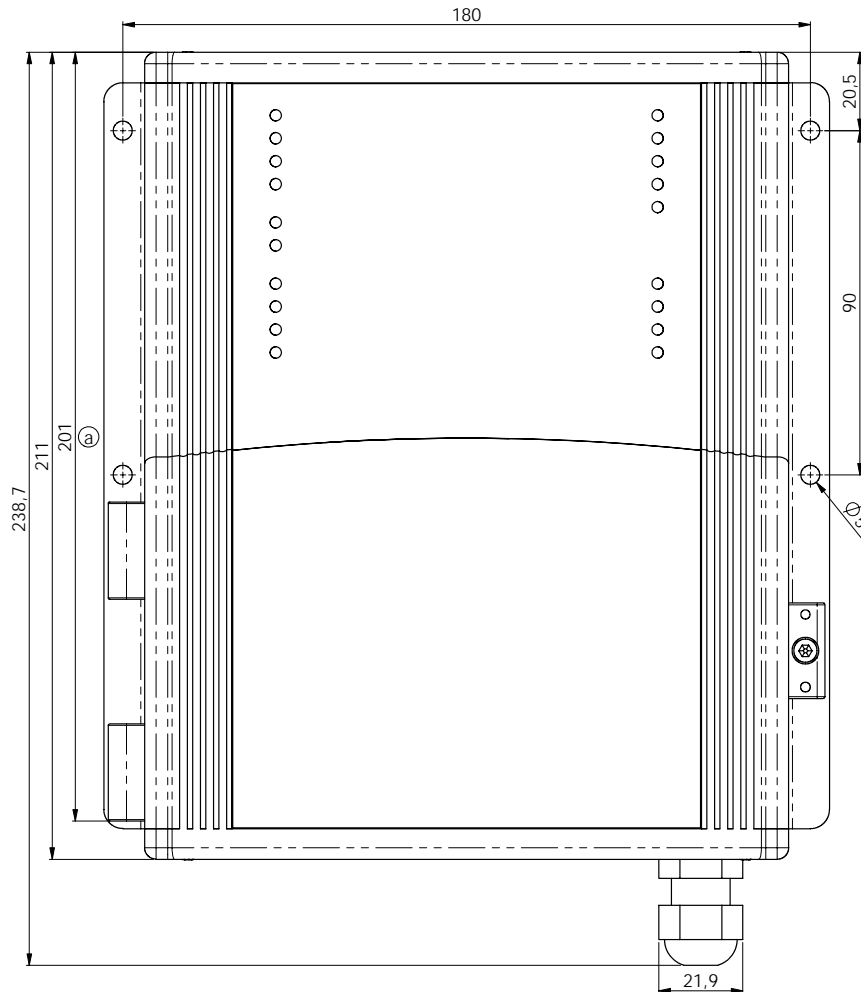
The result of the scan is displayed on the debug port. Each Tag-ID is listed with the measured signal strength (depending on the number of active antennas).

Mounting the i-PORT

Use the four mounting holes (diameter 5 mm) to attach the i-PORT to the side of the housing. 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.

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.

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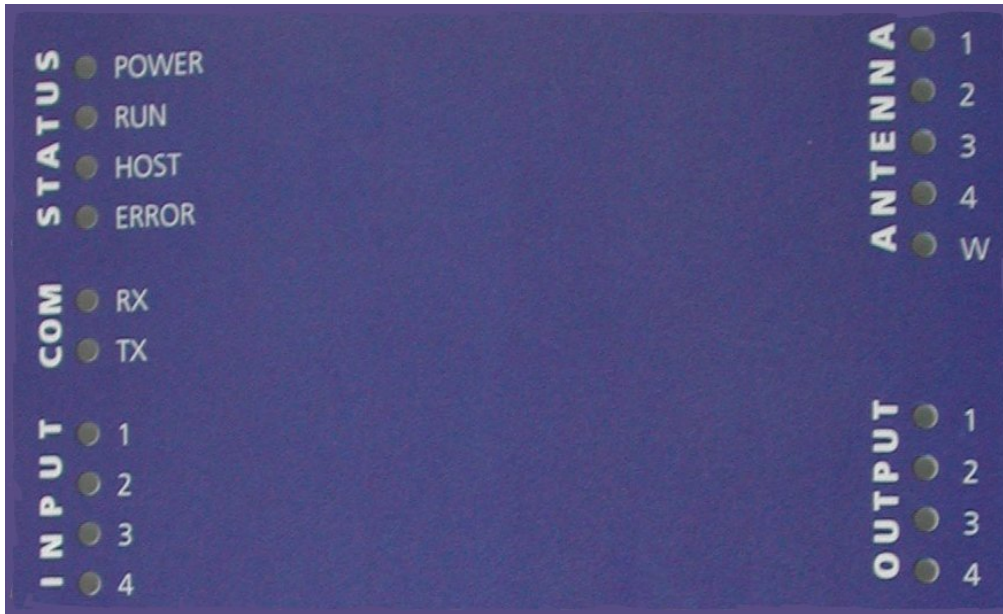
Status LEDs:
a) POWER: Lights up when power is applied to the i-PORT
b) RUN: Blinks (every 2 seconds) as soon as the i-PORT has booted (approx. 10 seconds after power-up)
c) HOST: Lights up when a host is connected to the i-PORT
d) ERROR: Lights up when an error occurs (see section: Troubleshooting)

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

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

ANTENNA LEDs:
a) 1-4:   Light up 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 up when there is activity at the Wake-up Antenna

OUTPUT LEDs:
a) 1-4:   Light up when the corresponding Outputs 1-4 are set

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3.3 Cable Connections and Plug Allocation

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

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

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

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

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

Serial and Ethernet Interface:

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

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4.0 Software, Configuration

4.1 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)"

4.2 Configuration, Settings

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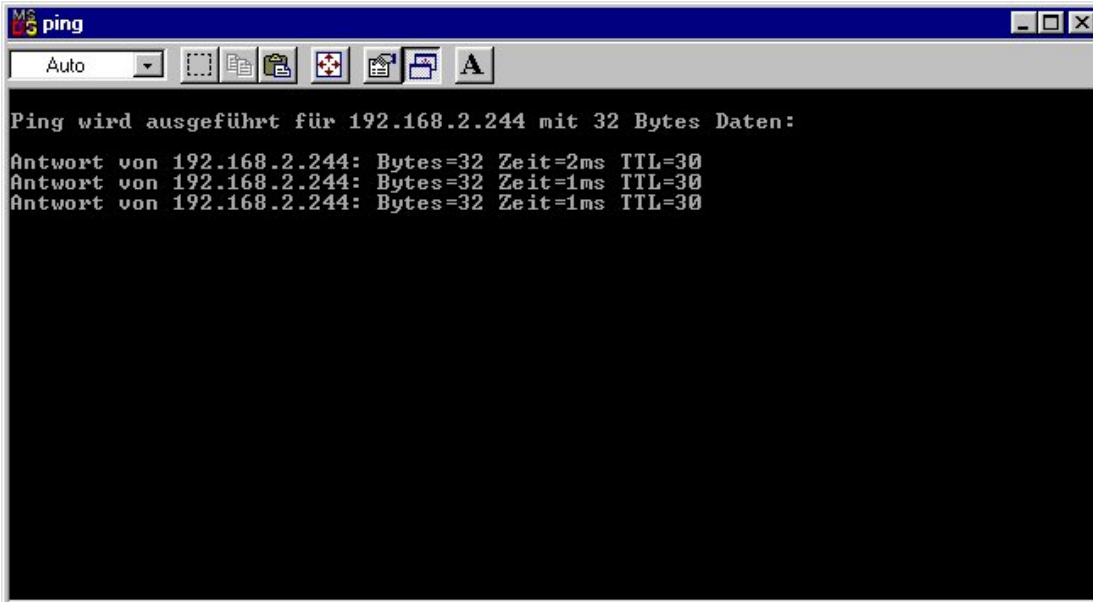
Connect the i-PORT directly to the network connection in your PC, laptop, etc. using a crossover network cable.
Ensure that the PC's IP-Address lies in the same subnet as that of the i-PORT.

Network Connection:

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

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:

Information about version numbers, firmware, serial numbers, etc. is contained in this menu.
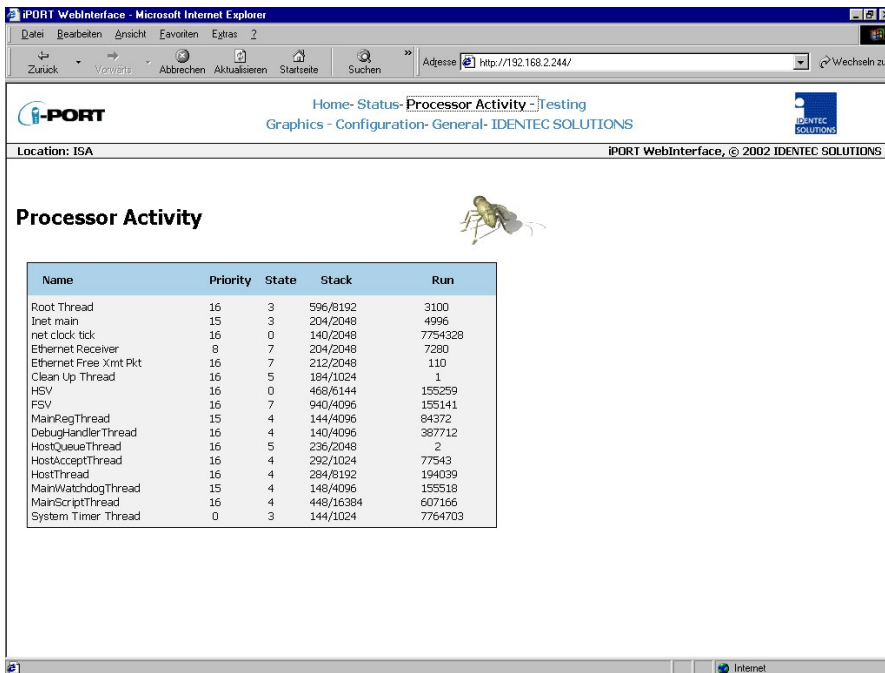
In the top line you can see an overview of all the menus. Click here to get to any of the other menus.

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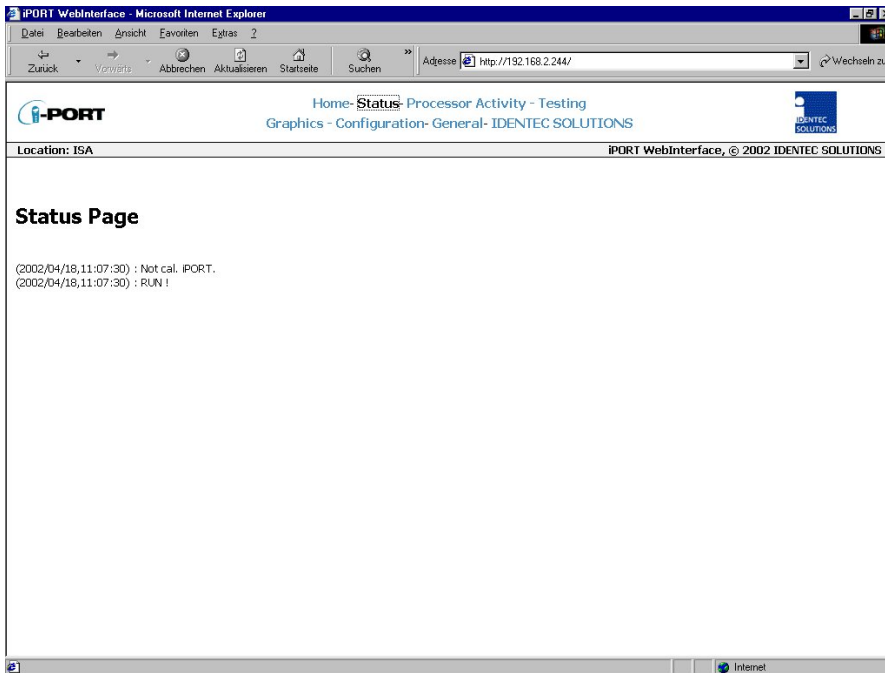
Status information, which may be required in case maintenance is needed, is available in this menu.

"Processor Activity" Menu:

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

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"Configuration" Menu:

For explanation of parameters, see next page.

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

i-PORT Type   2 possibilities: "Fix" and "mobile VisuMC"
Enter the i-PORT type here. Standard type is "Fix", this means that the i-PORT is stationary. Currently only special software "MobileVisuMC" still available.

i-PORT Main ID   i-PORT identifier for event messages (Area ID)
i-PORT SubID   i-PORT identifier for event messages (Area SubID)
i-PORT SerDevice   Used to select the type of device connected to the serial port. This functionality has not been implemented at this time.
i-PORT Longitude   Longitude co-ordinates
i-PORT Latitude   Latitude co-ordinates

Host Connection:
These are settings used if the i-PORT is to be connected to a host computer (currently only "Mobile VisuMC").

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

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

Debug HostMirror Output on Debug Port of all data that is exchanged on the Host Interface (serial or Ethernet).
Debug TagList   Time after which a tag list is outputted on 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. 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

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 has not been implemented 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 located in the zone at one time. The elapsed time per slot in which tags can answer is 1.2 ms.

Num of Scans   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 required for read process
Retries   Number of maximum attempts to read data

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 can no longer be communicated with (also from other i-PORTs). After this time span has expired, the tags become available again.

Sleep (i-D): The tag cannot be communicated with for the duration of the sleep time. If after the sleep time a renewed sleep signal is received from the same i-PORT, the tag will again go into sleep mode. If no signal is received from the same i-PORT or if a signal is received from a different i-PORT, the tag returns to normal mode.

Mute (i-D): Tags receive a signal, but give no answer for the duration of the "mute". If the tag receives a renewed signal from the same i-PORT, the time will be re-triggered. Otherwise, the tag returns to normal mode, as it likewise does if it receives a signal from a different i-PORT.

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

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 detected when it enters the zone

Max. Level: Tag detection 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

Event message:
Settings to determine when an event message is to be sent and how it should look.

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   3 possibilities: "Rising Edge", "Falling Edge" or "Changing"
                A message is sent when the trigger detects either a rising edge, a
                falling edge, or when changes in the Input occur.

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 send
i-Q TxPower   Power setting for i-Q tags at time of scan (send)
i-D TxPower   Power setting for i-D tags at time of scan (send)
Rx Threshold   Threshold (field strength of tag signal) required for tag recognition
Sensitivity   i-PORT receiver mode; this means that the Rx Threshold reaches −60dBm
                in low sensitivity mode and −90dBm in high sensitivity mode
Calibration   Differences in the various antenna types and cable lengths can be
                adjusted here (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 example for calibration:
Coaxial cable RG58 loss of approximately 6dB for every 10 meters (at 900 MHz), i.e. 0.6
dB/m

1) Antenna 1: 5dB gain, 3-meter coaxial cable
   Antenna 2: 5dB gain, 10-meter coaxial cable
   Calibration parameters
   Antenna 1 = −(Gain Ant1 − Loss Cable 1) = −(5dB − 3m x 0.6 dB/m) = **−3.2 dB**
   Antenna 2 = −(Gain Ant2 − Loss Cable 2) = −(5dB − 10m x 0.6 dB/m) = **+1.0 dB**

2) Antenna 1: 5dB gain, 3-meter coaxial cable
   Antenna 2: 5dB gain, 15-meter coaxial cable
   Calibration parameters

Antenna 1 = −(Gain Ant1 − Loss Cable 1) = −(5dB − 3m x 0.6 dB/m) = **−3.2 dB**
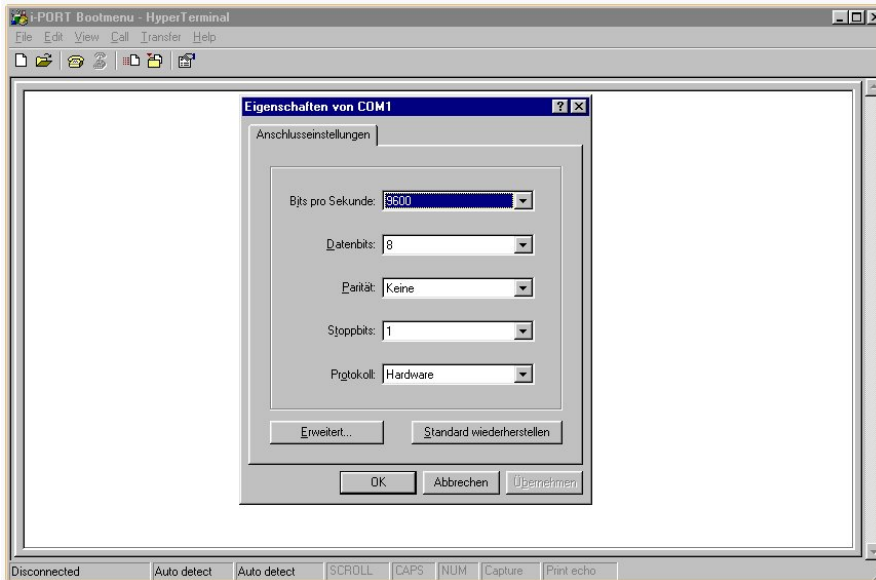Antenna 2 = −(Gain Ant2 − Loss Cable 2) = −(5dB − 15m x 0.6 dB/m) =**+4.0 dB**
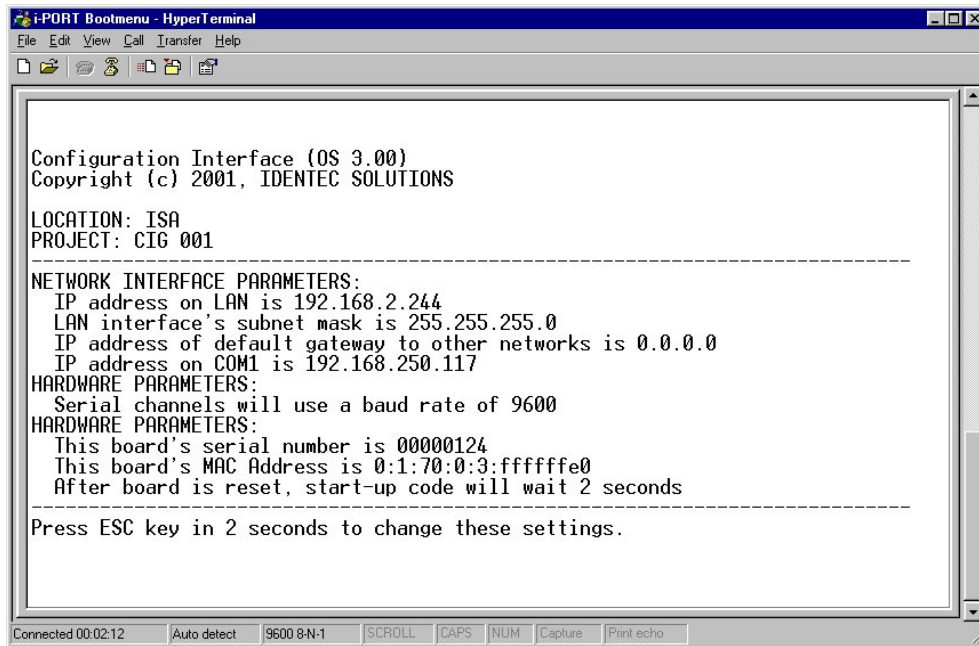
"General" Menu:
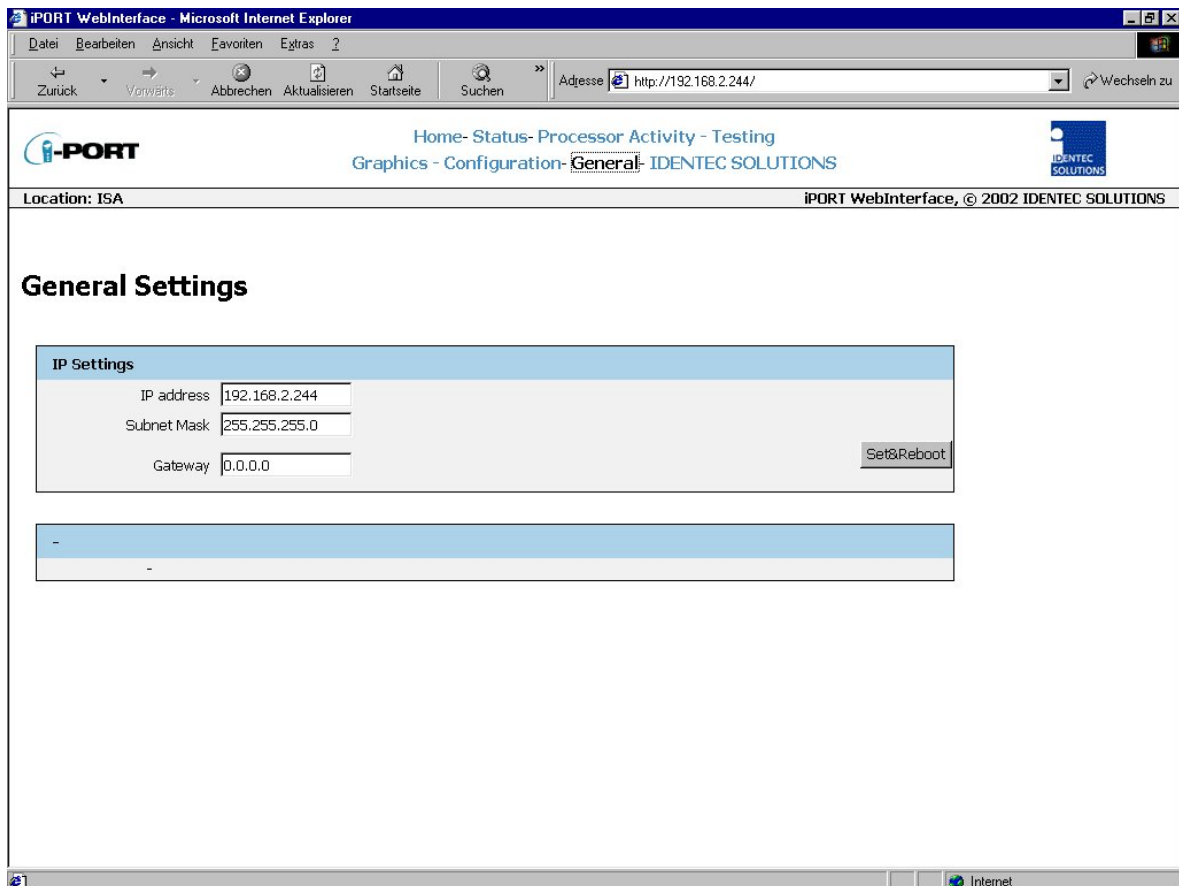
With this menu, you can change the network settings of the i-PORT. Simply enter the new values in the appropriate fields and click on the *SET&REBOOT* button. The i-PORT will then reboot with the new network settings. You can write down the new IP address in the designated spot inside the i-PORT door.
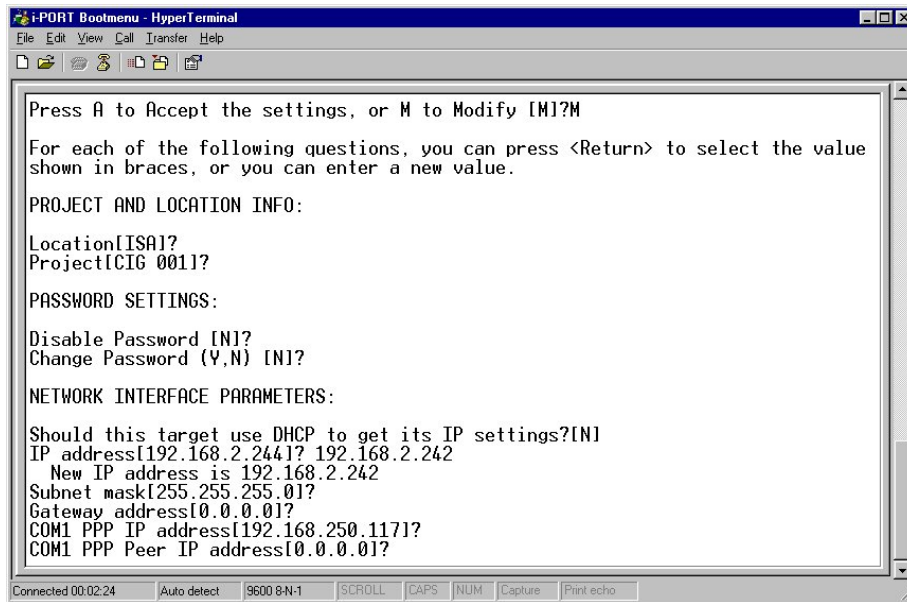
4.3   Boot Menu (Serial)

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

```
Configuration Interface (OS 3.00)
Copyright (c) 2001, IDENTEC SOLUTIONS

LOCATION: ISA
PROJECT: CIG 001
--------------------------------------------------------------------------------
NETWORK INTERFACE PARAMETERS:
    IP address on LAN is 192.168.2.244
    LAN interface's subnet mask is 255.255.255.0
    IP address of default gateway to other networks is 0.0.0.0
    IP address on COM1 is 192.168.250.117
HARDWARE PARAMETERS:
    Serial channels will use a baud rate of 9600
HARDWARE PARAMETERS:
    This board's serial number is 00000124
    This board's MAC Address is 0:1:70:0:3:ffffffe0
    After board is reset, start-up code will wait 2 seconds
--------------------------------------------------------------------------------
Press ESC key in 2 seconds to change these settings.
```

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

_____

```
i-PORT Bootmenu - HyperTerminal
File  Edit  View  Call  Transfer  Help

Press A to Accept the settings, or M to Modify [M]?M

For each of the following questions, you can press <Return> to select the value
shown in braces, or you can enter a new value.

PROJECT AND LOCATION INFO:

Location[ISA]?
Project[CIG 001]?

PASSWORD SETTINGS:

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

NETWORK INTERFACE PARAMETERS:

Should this target use DHCP to get its IP settings?[N]
IP address[192.168.2.244]? 192.168.2.242
   New IP address is 192.168.2.242
Subnet mask[255.255.255.0]?
Gateway address[0.0.0.0]?
COM1 PPP IP address[192.168.250.117]?
COM1 PPP Peer IP address[0.0.0.0]?

Connected 00:02:24    Auto detect    9600 8-N-1    SCROLL   CAPS   NUM   Capture   Print echo
```

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 start Boot menu

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

4.4 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.

4.5 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".

5.0   System Description

5.1   Communication System, i-PORT, Tag
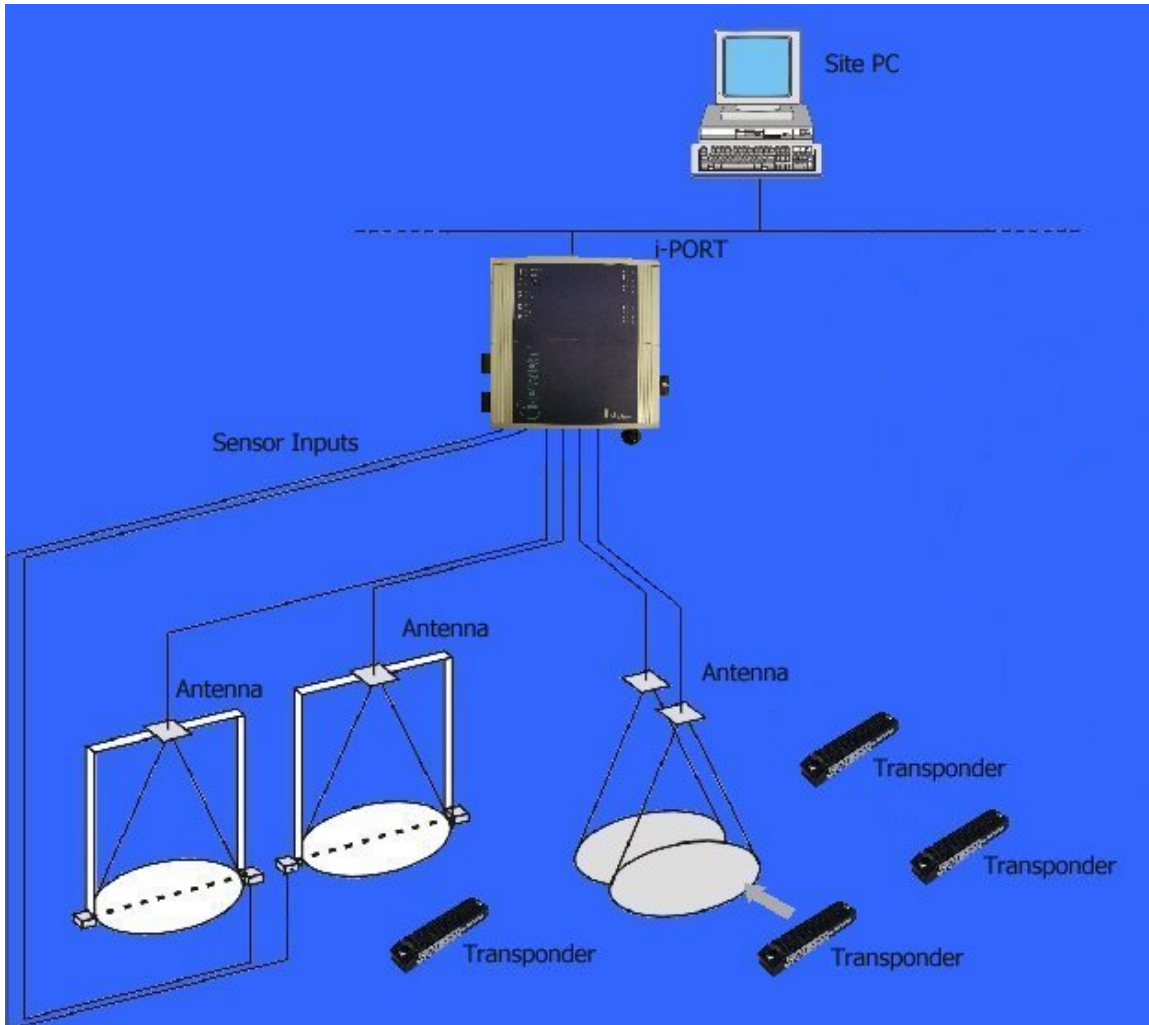
Data communication between i-PORT and Tag:

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

_____

Host Only Mode:

The i-PORT is inactive in "Host Only" mode and waits for commands from the host computer. When the host computer sends a scan command to the i-PORT, the i-PORT executes the scan and sends the results back to the host computer. If data now needs to be read from or written to a tag, the host computer must send the command to do so to the i-PORT. The i-PORT can be operated via the Ethernet interface (Port 7070) or via the serial interface in "Host Only" mode.

Continuous Mode:

In contrast to the "Host Only" mode, the i-PORT scans continuously in "Continuous Mode". The settings to determine which data are to be read and in what intervals are configurable (see "Configuration"). The messages are made available at Port 7070.

Events:

Messages can be generated by tags or through inputs. The content of the messages can also be configured (see "Configuration").

6.0   Technical Specifications

6.1   Codes, Parameters

ILR® Parameters		
Compatibility	ILR® i-Q Tags and ILR® i-D Tags	
	ILR® i-Q Tag	**ILR® i-D Tag**
Read range (adjustable)	100m (300 ft)	6m (18 ft)
Write range (adjustable)	100m (300 ft)	6m (18 ft)
Max. response time (single tag)	< 150 ms	< 10ms
Read rate (ID only)	100 tags/s	
Read rate − 128 bit data	35 tags/s	
Multi-tag-handling (simultaneous)	Up to 2,000 tags	

RF Interface	
Frequency	868 MHz (EU) or 915 MHz (NA) ISM Band
Certification	FCC, Part 15 (US) Industry Canada
RF rate of transmission	EN 330 220 (EU) i-Q 115.2 kbit/s; i-D 38.4 kbit/s (Tx), 115.2 kbit/s (Rx)
Number of antennas	5 (4 read/write + 1 wakeup)
Antenna transmitters	1 Output power: up to 23 dBm — adjustable (50 steps)
Antenna receivers	4 Sensitivity: up to -85 dBm — adjustable (100 steps)
Antenna control	Independent antennas, simultaneous operation (receive)

User Interface	
Ethernet interface	10 Mbit/s / 100 Mbit/s
Protocols	TCP/IP, FTP, Telnet, HTTP, SNMP
Ports	7090 Debug port, 7070 Communication port
Serial interface	RS232 − Setup and diagnostics only
Input control	4 digital inputs for process synchronization Active when grounded, R_{max}=560 Ohm
Output control	4 relay outputs for process control max. breaking capacity: 30W (DC); 62.5VA (AC) max. contact load: 1A at 30VDC, 0.5A at 125VAC
Status signals	19 status LEDs (for service and installation)

CPU	
Operating system	RTOS (Real Time Operating System) Thread X
Program memory	2 MB Flash 8 MB DRAM
Data memory	128 KB SRAM
Configuration memory	8 KB EEPROM
Time base	Battery-backed Real Time Clock (RTC)

Electrical Data	
Input voltage	10 − 30 VDC

Input power	7.5 W minimum
Standards / safety	CE and EN 330 220

Environmental Conditions	
Operating temperature	0°C to +50°C
	optional − 30°C to +70°C
Storage temperature	-40°C to +80°C
Humidity	90%, non-condensing

Physical Data	
Dimensions	211mm x 190mm x 58mm
Enclosure	Aluminum, anodized
Mass	1.9 kg
Mounting	4 mounting holes, diameter 5mm
Enclosure rating	IP 64

7.0   Troubleshooting

7.1   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, 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 optical 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, ANT4, W)	Activate the corresponding antenna (see "Configuration")

	Antenna is defective	- Do optical check to see if antenna is defective	Change antenna(s) if necessary
	Tag is out of read zone	- Hold the test tag in front of the antenna and check if tag is being recognized (blinks, i.e. Debug port)	If necessary, adjust the output power to the requirements
i-PORT does not scan on various antennas	Antennas are not being triggered	- Check if the antennas in question are activated and scan-enabled (see "Configuration")	Turn on the desired antennas
No messages on Port 7090 (Debug port)	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	

7.2 Hotline

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