



WinLink™ 1000

High Capacity Carrier Class Radio System

Installation and Operation Manual

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***WinLink™ 1000***

***Point-to-Point Wireless Product  
Family***

***Version 12 . 1***

# WinLink 1000

## Point-to-Point Wireless TDM/IP

### Installation and Operation Manual

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For further information contact RADWIN at the address below or contact your local distributor.

**RADWIN Corporate Headquarters**

27 Habarzel Street, Tel Aviv, 69710, Israel

Tel: +972.3.766.2900

Fax: +972.3.766.2902

Email: [info@radwin.com](mailto:info@radwin.com)

**Email Contacts:**

General inquiries: [info@radwin.com](mailto:info@radwin.com)

Sales: [sales@radwin.com](mailto:sales@radwin.com)

Technical support: [support@radwin.com](mailto:support@radwin.com)

Partner Program: [partners@radwin.com](mailto:partners@radwin.com)

**RADWIN US**

900 Corporate Drive, Mahwah, NJ 07430, USA  
Tel: 1.800.444.7234 (ext. 341)  
Tel: +1.201.529.1100 (ext. 341)  
Fax: +1.201.529.5777  
Email: [infousa@radwin.com](mailto:infousa@radwin.com)

**RADWIN India**  
P-13, Basement 2, Malviya Nagar, New Delhi 110017, India  
Tel 1: +91.11.2667.1510  
Tel 2: +91.98.10303549  
Email: [sales@radwin-india.com](mailto:sales@radwin-india.com)

## FCC – User Information

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This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications to this equipment not expressly approved by the party responsible for compliance (RADWIN) could void the user's authority to operate the equipment.



**It is the responsibility of the installer to ensure that when using the outdoor antenna kits in the United States (or where FCC rules apply), only**

those antennas certified with the product are used. The use of any antenna other than those certified with the product is expressly forbidden in accordance to FCC rules CFR47 part 15.204.

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Outdoor units and antennas should be installed **ONLY** by experienced installation professionals who are familiar with local building and safety codes and, wherever applicable, are licensed by the appropriate government regulatory authorities. Failure to do so may void the WinLink-1000 warranty and may expose the end user or the service provider to legal and financial liabilities. RADWIN and its resellers or distributors are not liable for injury, damage or violation of regulations associated with the installation of outdoor units or antennas.

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## FCC Notation for Indoor Units IDU-E and IDU-C Concerning all models and configurations

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference.
- (2) This device must accept any interference received, including interference that may cause undesired operation.

# Quick Start Guide

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Installation of WinLink 1000 should be carried out only by a qualified technician. If you are familiar with WinLink 1000, use this guide to prepare the units for operation. If you are not familiar with WinLink 1000, please read the Installation and operation Manual carefully.

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## 1. Equipment Required

The following is a list of equipment required for installing a WinLink 1000 link:

- RJ-45 crimp tool (if pre-assembled cable is not used)
  - Drill (for wall mounting only)
  - IDU and ODU grounding cables
  - O-PoE 10AWG grounding cable
  - 13 mm (½") spanner/wrench
  - ODU to IDU cable if not ordered (outdoor class, CAT-5e, 4 twisted pairs)
  - ODU to O-PoE both cables (ETH and PoE) if not ordered (outdoor class, CAT-5e, 4 twisted pairs)
  - Cable ties
  - Laptop running Windows 2000 or Windows XP.
- 
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## 2. Before the Installation

1. Verify that all equipment and tools are available.
2. Install the WinLink 1000 software on the laptop; the installation takes several minutes.

The software installation leaves the WinLink 1000 Manager icon on the desktop.

3. BRS systems only – Activate the link.

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### 3. Installing the WinLink 1000 Units

**\* To install the ODU:**

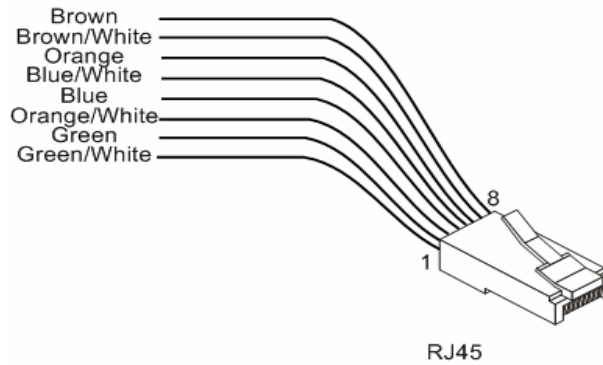
1. At site A, route the ODU cable from the ODU location (on the roof) to the IDU location (inside the building). The maximum length is 100m.
2. Mount the ODU unit to the mast or wall, using the mounting kit and mounting instructions.

**Note**

*Do not tightly secure the ODU until the alignment process is complete. When installing the ODU is important to check that there are no direct obstructions in front of the ODU between the two link sites.*

3. Verify that the ODU mounting brackets are connected to ground.
4. Connect the ODU chassis ground to ground.
5. Connect the RJ-45 connectors to both ends of the cable using the pinout table and diagram below:

IDU RJ-45	Wire Color	Function	ODU RJ-45
1 twisted	White/Green	Ethernet (RxN)	1
2 pair	Green	Ethernet (RxT)	2
3 twisted	White/Orange	Ethernet (TxT)	3
6 pair	Orange	Ethernet (TxN)	6
4 twisted	Blue	Power (+)	4
5 pair	White/Blue	Power (+)	5
7 twisted	White/Brown	Power (-)	7
8 pair	Brown	Power (-)	8



6. Secure the ODU and ground cables to the mast or brackets using cable ties.

7. Repeat the procedure at site B.

**\* To align the ODU:**

1. Connect power to the site A IDU.

After approximately 20 seconds the ODU beeper starts beeping. This is normal.

2. Verify normal operation of the IDU by the LED indications on the front panel.

Indicator	Color	Status
PWR	Green	ON
IDU-E	Orange Green	ON for short duration during startup ON during normal operation
ODU	Green	ON shows normal operation
AIR I/F	Orange Green	ON for short duration during startup ON shows normal operation
SERVICE	Green	ON shows normal operation OFF when Service is configured for Ethernet only

**Caution** Do not stand in front of a live outdoor unit, see Appendix H

3. Align the site A ODU in the direction of the site B ODU.

4. Connect power to the site B IDU.

After approximately 20 seconds the ODU beeper starts beeping.  
This is normal.

- Verify normal operation of the IDU by the LED indications on the panel.

Indicator	Color	Status
PWR	Green	ON IDU-C only
IDU	Orange Green	ON for short duration during startup ON during normal operation
ODU	Green	ON shows normal operation
AIR I/F	Orange Green	ON for short duration during startup ON shows normal operation
SERVICE	Green	ON shows normal operation OFF when Service is configured for Ethernet only

- Make an azimuth sweep with the site B ODU of 180 degrees so that the site A ODU position is learned by the site B ODU.
- Turn the site B ODU slowly back towards the site A direction, listening to the beep sequence until optimal alignment is achieved.

Best Signal so far	
Signal quality increased	
No change in signal	
Signal quality decreased	
No air link	
HSS fault	

**Note** *Three beeps and a pause is the best signal*  
*Two beeps and a pause, signal quality increased*  
*One beep and pause is no signal change*  
*Any other signal detects no signal between ODUs.*

- Secure the site B ODU to the mast/wall.
- At site A, adjust the ODU slowly while listening to the beeper sequence until the best signal is attained.
- Secure the site A ODU to the mast/wall.



11. Monitor the link quality for about 15 minutes to verify stability.
12. Connect the management station to one of the two IDUs in the link.
13. Double-click the WinLink 1000 Manager icon to start the application.
14. Click the **Installation** button to open the installation wizard and follow the installation steps.

After selection of the radio channel and the link rate (as determined in the Link Budget Calculator utility), verify that the link quality bar in the WinLink 1000 manager is within the green range for TDM service and within the yellow range for Ethernet service.

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**Note**

*Achieve the best possible link quality values. In case of radio link loss, verify the ODU alignment, or change the radio channel in both sides of the link. When the radio link resumes, continue the installation process.*

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**\* To install the Outdoor PoE (O-PoE):**

15. Route the ODU cable from the ODU location (on the roof) to the O-PoE location (also on the roof). The maximum combined length of the ODU to Outdoor PoE cable and the O-PoE to user hub/router (or any other compatible device) cable is 100m.
16. Mount the O-PoE unit to the mast or wall, using the mounting kit and mounting instructions.
17. Verify that the O-PoE mounting brackets are connected to ground.
18. Connect the O-PoE chassis to ground.
19. Route the O-PoE AC cable along the mast or wall to a protected/shielded AC outlet.



**Only UL Listed parts and components will be used for installation. Use UL Listed devices having an environmental rating equal to or better than the enclosure rating to close all unfilled openings**

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## 4. Connecting the Power

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Before connecting any cable, the protective earth terminals of the AC/DC adapter must be connected to the protective ground conductor of the mains power cord. If you are using an extension cord (power cable) make sure it is grounded as well.

Any interruption of the protective (grounding) conductor (inside or outside the instrument) or disconnecting of the protective earth terminal can make this unit dangerous. Intentional interruption is prohibited.

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### Connecting Power to an IDU-E

Power is supplied to the WinLink 1000 via an external AC/DC converter, which receives power from 100–240 VAC source and converts it to –48 VDC.

**\* To connect power to the IDU-E:**

1. At site A, connect the 2-pin connector of the AC/DC converter to the 2-pin DC power connector on the IDU rear panel.
2. Connect the AC/DC converter 3-prong plug to a mains outlet.  
The unit turns on automatically upon connection to the mains. The green PWR indicator turns on, and the IDU indicator blinks orange for approximately 40 seconds during startup. See *Normal Indicators* section in Chapter 3.
3. After approximately 20 seconds the ODU starts beeping. The beeps continue until the ODUs are aligned and the link set up.
4. Wait for approximately one minute, then repeat for Site B.

### Connecting Power to an IDU-C

AC power is supplied to the WinLink 1000 through a standard 3-prong plug.

AC power should be supplied via a 1.5m (5 ft) standard power cable terminated by a standard 3-prong socket. A cable is provided with the unit.

\* **To connect AC power to an IDU-C:**

1. Connect the power cable socket to the power connector on the WinLink 1000 front panel.
2. Connect the power cable plug to the mains outlet.

The unit will be turned on automatically upon connection to the mains.

\* **To connect DC power to an IDU-C**

A special IEC 60320 adapter for -48 VDC or -24 VDC power connection is supplied with the unit.

## Connecting Power to an O-PoE

AC power is supplied to the O-PoE via a 3m (10 ft) 3-prong AC cable attached to the unit (pigtail). The AC cable is provided with no termination.

\* **To connect AC power to an O-PoE:**

Connect the power cable to a protected/shielded AC mains outlet. The unit will be turned on automatically upon connection to the mains.



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To maintain Overvoltage (Installation) Category II, install a suitable surge suppressor device in the branch circuit to limit expected transients to Overvoltage Category II values.

The limits are based on IEC60664 and are also located in Table 2H of UL60950 (for mains  $\leq 150\text{V}$ , the transient rating is 1500V for  $150\text{V} < \text{mains} \leq 300\text{V}$ , the transient rating is 2500V; and for  $300\text{V} < \text{mains} \leq 600\text{V}$ , the transient rating is 4000V).

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## 5. Connecting the User Equipment

\* **To connect user equipment to the IDU:**

1. Connect the user equipment (such as PBX) to the IDU RJ-45 port designated **Trunk**:
  - On the rear panel of the IDU-E

- On the front panel of the IDU-C
2. Connect user hub/router or any other compatible device to the IDU RJ-45 port designated **LAN**.
    - On the rear panel of the IDU-E
    - On the front panel of the IDU-C
- \* To connect user equipment to the O-PoE:**
1. Connect user hub/router or any other compatible device to the port designated ETH via an outdoor shielded CAT-5e cable. To connect directly to PC LAN port, refer to [Appendix A](#).

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**Note**

- *IDU-C has an integrated LAN switch that provides two 10/100BaseT ports. The Integrated LAN switch does not support spanning tree.*
  - *The two LAN ports can be connected to two separate LAN segments.*
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**Caution**

Do not connect both LAN ports to the same LAN segment, a loop will be created that will flood the network.

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**Caution**

For O-PoE only UL Listed parts and components are used for installation. Use UL listed devices having an environmental rating equal to or better than the enclosure rating to close all unfilled openings.

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## Appendix E. Antenna Characteristics

## Appendix F. Hub Site Synchronization

## Appendix G. BRS Installation Procedure

# Chapter 1

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## Introduction

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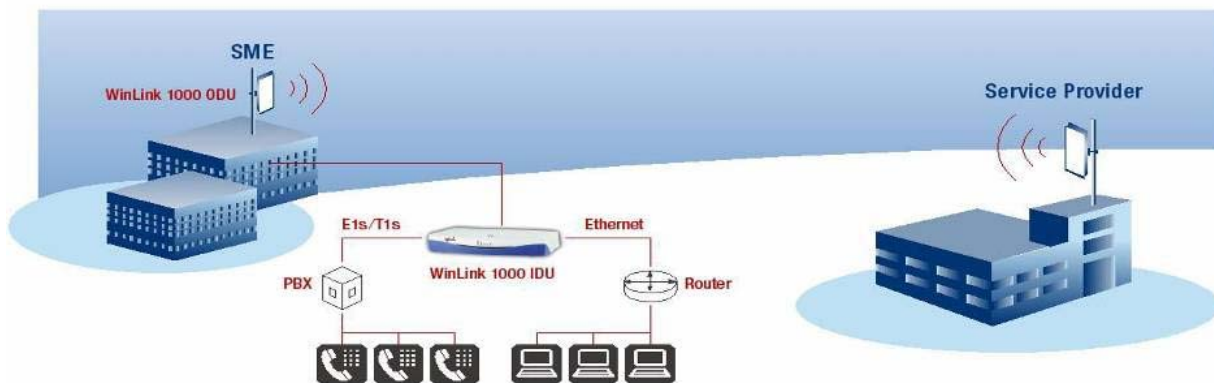
### 1.1 Overview

WinLink 1000 is a carrier-class, high capacity, Point-to-Point broadband wireless transmission system. WinLink 1000 combines legacy TDM and Ethernet services over 2.3 to 2.7 and 4.0 to 5.9 GHz bands, and is suitable for deployment in FCC, ETSI, CSA-regulated countries, and other regions. The system provides up to 48 Mbps wireless link and supports ranges of up to 80 km (50 miles) with an external antenna.

The screens shown in this manual are for version 1.700. For WinLink 1000 systems with earlier ODU hardware versions contact technical support, [support@radwin.com](mailto:support@radwin.com), for the relevant manual.

### Application

*Figure 1-1* illustrates a typical point-to-point application of two WinLink 1000 units.



*Figure 1-1. Typical Application*



## Versions

WinLink 1000 is available in several different frequency ranges, with versions for ETSI and FCC regulations;

- F23, 2.300–2.400 GHz
- F24, 2.400–2.4835 GHz
- F25, 2.496–2.690 GHz
- F49, 4.940–4.990 GHz
- F53, 5.250–5.350 GHz
- F54, 5.470–5.725 GHz
- F58, 5.725–5.850 GHz
- F59, 5.865–5.935 GHz

Several special systems are also available;

- WL1000–AIND, All Indoor unit, F58/FCC with 4T1 support. WL1000–AIND integrates the ODU and the IDU–C into a single 19" IDU–C box.
- WL1000–ACCESS, Ethernet only units powered over the Ethernet via PoE unit. Available in F23, F24, or F58 frequency ranges.
- WL1000–ACCESS–CL, ODU is equipped with special hardware for the collocation of several units, using Hub Site Synchronization (HSS).

## Features

### Wireless Link

WinLink 1000 delivers up to 48 Mbps air rate for Ethernet and E1/T1 traffic. The system supports a variety of spectrum bands and can be configured to operate in any channel in the band with a carrier step resolution of 5, 10, or 20 MHz (2.x GHz versions support TDM at 10 or 20 MHz only).

WinLink 1000 operation complies with ETSI, CSA, CN, UK, and the FCC 47CFR Part 15 and subpart C and E requirements.

WinLink 1000 employs Time Division Duplex (TDD) transmission. This technology simplifies the installation and configuration procedure. There is no need to plan and to allocate separate channels for the uplink and downlink data streams.

Operation over 2.4 GHz and 5.x GHz bands is not affected by harsh weather conditions, such as fog, heavy rain etc.

### **LAN Interface**

The WinLink 1000 LAN port provides 10/100BaseT interfaces with autonegotiation and transparent VLAN support. Traffic handling is provided by a MAC-level self-learning bridge.

## TDM Interface

The WinLink 1000 TDM interface accepts E1 or T1 traffic, supporting the following:

- Unframed operation (E1 and T1)
- AMI and B8ZS zero suppression (T1).

## Advanced Encryption System

WinLink 1000 (version 1.500 and above) ensures user's data security with one of the most sophisticated commercially available combined encryption and authentication techniques, CCM/AES. This technique combines message authentication (preventing antispoofing and replay protection) with commercial encryption, and complies with the IEEE 802.11i (phase iii) security recommendations.

CCM/AES uses a symmetric 128-bit encryption key (EK), and a nonce, and provides both message encryption and authenticating signature. The nonce mechanism enables the receiver to remember already received genuine messages and reject all replayed messages.

Initial encryption and authentication is based on a user-defined master key (Link Password). While standard Wireless LAN encrypts only the Ethernet Payload, WinLink 1000 encrypts both the source and destination MAC addresses.

## Management

WinLink 1000 has full local and remote management capabilities. The user-friendly SNMP-based management tool provides full end-to-end configuration, event log and performance monitoring capabilities.

Alternatively each site can be configured or monitored via a Telnet terminal.

## Diagnostics and Performance Monitoring

WinLink 1000 supports activating local and remote loopbacks on E1/T1 links.

WinLink 1000 constantly monitors the data transmission process, evaluates received signal strength, and signal quality. It also monitors received traffic and frame rate (FPS) for local and remote units.

## Automatic Channel Select

Some versions of WinLink 1000 have the Automatic Channel Select feature, which operates via a Dynamic Frequency Selection (DFS) mechanism. This enables coexistence with any radar system that may be active in the area. WinLink 1000 performs channel monitoring and selects the channel with the lowest interference for the transmission. WinLink 1000 operation complies with ETSI requirements where the ETSI version has been purchased.

## Adaptive Modulation

WinLink 1000 changes modulation automatically depending on channel characteristics in order to guarantee continuation of service. The adaptive modulation enables the user to maximize Ethernet throughput without degradation of the TDM service quality. When Ethernet only service is used, the adaptive modulation enables improving the Ethernet performance in case of air performance degradation (periodical interference or RSS changes).

In case of interference at one site, there is no need to use a lower modulation at the other site (as in previous versions). In such a case the actual rate changes automatically only at the problematic site, while the second side of the link maintains the highest possible rate (Asymmetric).

Adaptive modulation can be selected in both Installation and Configuration wizards.

## Transmit Power Control

The Transmit Power Control (TPC) function, provides the capability of defining the transmit power in order to comply with the ETSI standard requirement of 30 dB maximum. See [Table 4-1](#) for full details of transmit power control.

## Alarm Connector

The IDU-C has eight external alarm inputs and outputs in the form of dry-contact relays. The Alarm interface is located on the front panel of the IDU-C. The user enables or disables each of the alarms and configures the text that appears in the alarm trap. The ODU sends the alarm within less than a second from actual alarm trigger.

The alarm connector is available as an ordering option for the IDU-E.

### **Link Compatibility**

WinLink 1000 indicates the version compatibility via software traps. As new hardware is added to existing networks compatibility issues may arise. Trap messages indicate the problem and suggest upgrades as appropriate.

### **Optional External Antenna**

WinLink 1000 supports configuration of an external antenna. In this configuration, the outdoor unit is supplied with an N-type connector that connects through a coax cable to the external antenna.

An external antenna can extend the range of the link, and in some cases, may help to reduce environmental interferences. Various external antennas are available for the WinLink 1000 operating frequencies.

For example, an optional flat panel 28 dBi external antenna increases the operation range of WinLink 1000 up to 80 km (50 miles).

### **Hub Site Synchronization**

When several WinLink 1000 units are collocated at a common hub site interference may occur from one unit to another. WinLink 1000 ODU units are supplied with special hardware for the collocation of up to eight units.

Using a method called Hub Site Synchronization (HSS) an external cable is connected to all collocated WinLink 1000 ODUs, this cable carries pulses sent to each ODU, which synchronize their transmission with each other. (See [Appendix F](#) for more details).

### **E1 Trunk Redundancy**

IDU-R units have a secondary E1 input which may be connected to external equipment other than the ODU. This provides backup in the event of failure of either the air interface link of the WinLink 1000, or the secondary E1 link.

The user configures which of the two links is the main link and which is the backup link.

## 1.2 Physical Description

WinLink 1000 system may consist of an Outdoor Unit (ODU) and an Indoor Unit, which may be an IDU-E or an IDU-C.; an All Indoor Unit, AIND; or an all outdoor unit O-PoE, housed in a weather proof enclosure.

*Figure 1-2* shows the IDU-E, IDU-C carrier class unit, and an ODU with integrated antenna.



*Figure 1-2. WinLink 1000 Units*



*Figure 1-3. WinLink 1000 O-PoE Unit*

### IDU-E

The front panel of the IDU-E includes five LEDs, which display the status of E1 /T1 traffic, wireless link, self-test results, the ODU-to-IDU

link, and power status. For a detailed description of the front panel LEDs, see [Chapter 3](#).

The rear panel of the IDU includes the connectors for power, WAN, LAN, E1/T1, and the ODU. The wiring specifications are detailed in [Appendix A](#). The rear panel LEDs are described in [Chapter 3](#).

## IDU-C

The IDU-C front panel includes four LEDs that display the status of E1/T1 and, wireless link, self-test results, and ODU-to-IDU link. For a detailed description of the front panel LEDs, see [Chapter 3](#).

## ODU

ODU includes a power connector, which receives -48 VDC, and RJ-45 for Ethernet traffic from the IDU. The ODU is attached to a mast using a special mounting kit, which is supplied with the unit.

The ODU can be used with an integrated antenna, as illustrated in [Figure 1-2](#), or with an external antenna. If an external antenna is to be used, then the ODU is supplied fitted with an N-type connector.

## O-PoE

O-PoE includes an AC power cable with no termination which can be connected to 100-220VAC outlet. The designated PoE connector is connected to an ODU via a shielded CAT-5e twisted pair cable and delivers Ethernet traffic with 48VDC power towards the ODU. The designated ETH connector is connected via a shielded CAT-5e twisted pair cable which receives and delivers Ethernet traffic. The wiring specification for the twisted pair cable is detailed in [Appendix A](#)

The O-PoE is attached to a mast using a special mounting kit, which is supplied with the unit.

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**Note** *To connect the ETH port from O-PoE to a PC, a crossed LAN cable must be used. See [Appendix A](#).*

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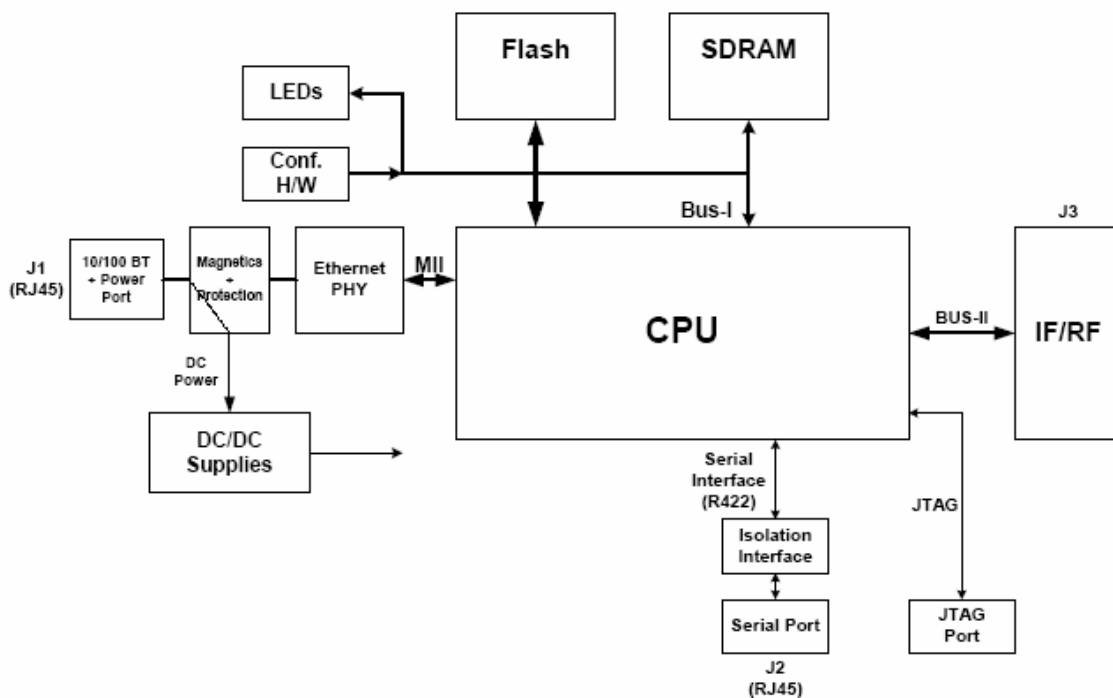
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## 1.3 Functional Description

WinLink 1000 system comprises of the following units:

- **Outdoor Unit (ODU):** An enclosed aluminum frame with a front sealed plastic cover, containing an integrated transceiver with an antenna, RF module, modem and standard interfaces. The ODU stores all the configuration parameters of the WinLink 1000 system. *Figure 1-3* shows the ODU block diagram.
- **Indoor Unit (IDU-E or IDU-C):** The interface unit between the ODU and the user. It converts 100-240 VAC to -48VDC, and sends it on to the ODU. The IDU does not store any configuration data. Therefore, there is no need for additional configuration of the WinLink 1000 system when replacing an IDU.
- **Outdoor PoE (O-PoE):** An enclosed aluminum frame with a front sealed aluminum cover, containing a 110-220VAC to 48VDC switching power supply and an interface interconnecting an un-powered Ethernet infrastructure to ODU.



*Figure 1-3. ODU Block Diagram*



## 1.4 Technical Specifications

<b>Air Interface</b>	<i>Technology</i>	OFDM
	<i>Duplexing Method</i>	Time Division Duplex (TDD)
	<i>Capacity</i>	Configurable up to 48 Mbps
	<i>Modulation</i>	OFDM – BPSK, QPSK, 16QAM, 64QAM
	<i>Channel Resolution</i>	5/10/20 MHz  (BRS systems Single and Double only)
	<i>Transmitter Power</i>	Specification is different per product, for further details refer to the <a href="#">Link Budget Calculator</a>
	<i>Range</i>	Up to 41 km (25.5 miles) Up to 80 km (50 miles) with an external antenna  ACCESS versions up to 20 km.
	<i>Frequency Bands [GHz] and Standards</i>	2.300–2.483      FCC, ETSI 2.496–2.690      FCC part 27 (BRS) 4.940–4.990      FCC 5.150–5.350      FCC 5.470–5.725      ETSI 5.725–5.850      FCC
	<b>Antennas</b>	(See Antenna Characteristics in <a href="#">Appendix E</a> )
	<b>LAN Interface</b>	<i>PHY</i>
<i>Framing/Coding</i>		IEEE 802.3/U
<i>Bridging</i>		Self-learning, up to 2048 MAC addresses
<i>Line Impedance</i>		100Ω
<i>VLAN Support</i>		Transparent
<i>Frame Size</i>		1536 bytes max
<i>Connector</i>		RJ-45
<b>E1 Interface</b>	<i>Data Rate</i>	Unframed (transparent) 2.048 MHz (Specification may be different per ordering)

		option)
	<i>Line Interface</i>	HDB3
	<i>Connector</i>	RJ-45
	<i>No. of Ports</i>	IDU-E: 1 or 2 IDU-C: 4
<b>T1 Interface</b>	<i>Data Rate</i>	Unframed (transparent) 1.544 MHz (Specification may be different per ordering option)
	<i>Zero Suppression</i>	AMI, B8ZS
	<i>Connector</i>	RJ-45
	<i>No. Of Ports</i>	IDU-E: 1 or 2 IDU-C: 4
<b>Indicators</b>	<i>PWR (green)</i>	Power status (IDU-E only)
	<i>IDU (green)</i>	IDU-C status
	<i>ODU (green/red)</i>	ODU-to-IDU link status
	<i>LINK (green/red)</i>	Link status
	<i>SERVICE (green/red)</i>	E1 /T1 signal status
<b>Power</b>	<i>Source</i>	IDU-E: 100-240 VAC via external AC/DC converter IDU-C: 100-240 VAC via AC cable -48 VDC (-42 to -60 VDC) 24 VDC  O-PoE: 100-240 VAC via attached (pigtail) AC cable
	<i>Power Received by the ODU</i>	-48 VDC
	<i>Power Consumption</i>	ODU plus IDU-E - 10W max ODU plus IDU-C - 14W max
	<i>Connector</i>	IDU-E 2-pin IDU-C AC - 3-pin IEC connector DC - 3-pin terminal block

<b>Alarm Connector</b>	<i>Connector</i> <i>Electrical Characteristics</i>	DB-9 female Dry Contact, 30V/2A Max input current, 0.01A at 0.5W (R=5K)
<b>Physical</b>	<b><i>Outdoor Unit (ODU and O-PoE)</i></b>	<b><i>ODU with integrated antenna</i></b>
	<i>Height</i>	24.5 cm / 9.3 in      30.5 cm / 12 in
	<i>Width</i>	13.5 cm / 5.13 in      30.5 cm / 12 in
	<i>Depth</i>	4.0 cm / 1.57 in      5.8 cm / 2.3 in
	<i>Weight</i>	1.0 kg / 2.2 lb      1.5 kg / 3.3 lb
	<b><i>Indoor Unit</i></b>	<b>IDU-E      IDU-C / AIND</b>
	<i>Height</i>	4.5 cm (1.7 in) 1U      4.5 cm (1.7 in) 1U
	<i>Width</i>	23.5 cm (9.3 in)      29 cm (11.5 in)
	<i>Depth</i>	16.5 cm (6.7 in)      43 cm (17.7 in)
	<i>Weight</i>	0.5 kg (1.1 lb)      1.5 kg (3.3 lb)
<b>Environment</b>	<b>Outdoor Unit (ODU and O-PoE)</b>	
	<i>Enclosure</i>	All-weather case
	<i>Temperature</i>	-35 to 60°C/-31 to 140°F
	<b><i>Indoor Unit (IDU-E and IDU-C)</i></b>	
	<i>Temperature</i>	-0 to 50°C/32 to 122°F
	<i>Relative Humidity</i>	Up to 90%, non-condensing
	<b><i>All Indoor Unit (AIND)</i></b>	
	<i>Enclosure</i>	IDU-C indoor unit
	<i>Temperature</i>	-35 to 60°C/-31 to 140°F

# Chapter 2

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## Installation and Setup

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### 2.1 Introduction

This section describes the installation, alignment, and setup procedures for a WinLink 1000 system.

After installing the hardware and establishing a link, refer to [Chapter 3](#) for operation instructions and [Chapter 4](#) for configuration instructions.

In case a problem is encountered, refer to [Chapter 5](#) for test and diagnostic instructions.



---

**Internal settings, adjustment, maintenance, and repairs may be performed only by a skilled technician who is aware of the hazards involved.**

**Always observe standard safety precautions during installation, operation, and maintenance of this product.**

---

### 2.2 Site Requirements and Prerequisites

For the IDU units, allow at least 90 cm (36 in) of frontal clearance for operating and maintenance accessibility. Allow at least 10 cm (4 in) clearance at the rear of the unit for signal lines and interface cables.

The ambient operating temperature should be -45 to 60°C/-49 to 140°F (ODU), or -5 to 45°C/23 to 113°F (IDU) at a relative humidity of up to 90%, non-condensing.

### 2.3 Package Contents

The WinLink 1000 packages include the following items:

ODU package containing:

- ODU
- Mast/Wall mounting kit plus mounting instructions
- CD-ROM [WinLink 1000 Manager, Installation and Operation Manual, and Link Budget Calculator]
- Self adhesive label showing the MAC address and the alternative community string KEY. Keep this label safe.
- Spare RJ-45 connector

IDU-E or IDU-R package containing:

- IDU-E or IDU-R
- AC/DC Converter
- IDU wall-mounting drilling template
- Self adhesive label showing the IDU LED operation
- Spare RJ-45 connector

Or

IDU-C Package Containing:

- IDU-C
- For AC model, 110/240 VAC with 3-prong connector cable
- For DC model, 3-pin terminal block connector (green)
- 19" mounting kit
- Spare RJ-45 connector

External antenna (if ordered)

- 1 m connecting cable
- Mounting kit

ODU/IDU cable at length ordered (optional)

O-PoE package contains:

- O-PoE
- Mast/Wall mounting kit plus mounting instructions
- Spare RJ-45 connector

---

## 2.4 Additional Equipment Required

The following is a list of the equipment required for installing the WinLink 1000 hardware.

- RJ-45 crimp tool (if pre-assembled ODU/IDU cable is not used)
- Drill (for wall mounting only)
- IDU and ODU grounding cables
- O-PoE 10AWG grounding cable
- 13 mm (½") spanner/wrench
- Cable ties
- Laptop running Windows 2000 or Windows XP.

## 2.5 Installation Sequence

The WinLink 1000 system installation is achieved by following the steps listed below. Each step is detailed in the following sections of this manual:

1. Mounting ODUs at both sites of the link.
2. Assembling the ODU cable and connecting ODU to IDU or O-PoE at both sites.
3. Connecting the power.
4. Aligning the ODUs.
5. Installing the management program on the network management station.
6. Running the Installation wizard from the management program.
7. Connecting user equipment to the local and remote IDUs.

*Figure 2-1* illustrates a typical installation of WinLink 1000 with an external antenna.

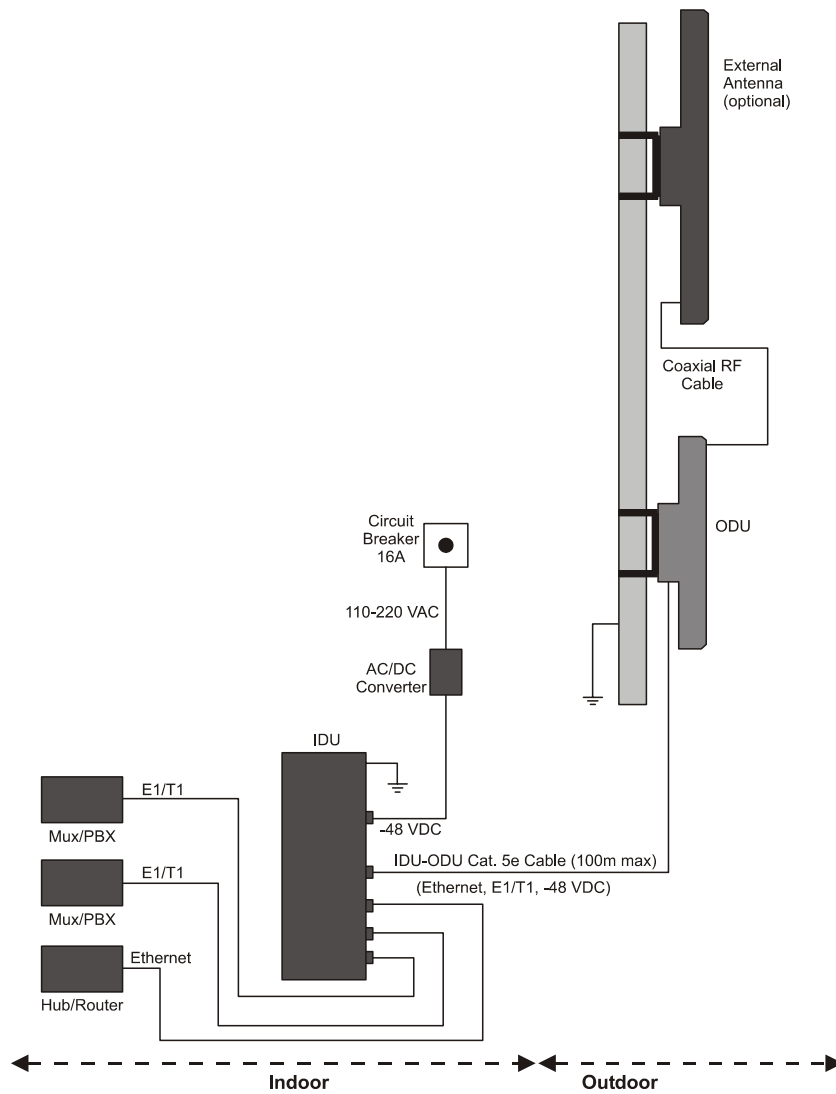


Figure 2-1. Typical Installation Diagram

## 2.6 Mounting the ODU or O-PoE

The ODU is the transmitting and receiving element of the WinLink 1000 system. The ODU or O-PoE can be mounted on a mast or a wall. In both installations, the supplied mounting kit is used to secure the ODU. [Appendix B](#) describes the mast/wall installation instructions.

A WinLink 1000 link operates in pairs of two ODUs with the same configuration. Both ODUs must be installed, and the antennas aligned for maximum throughput.



Prior to connecting cables to the ODU, the protective earth terminal (screw) of the ODU must be connected to an external protective ground



conductor or to a grounded mast. For grounding the O–PoE, connect the grounding cable from the dedicated earth terminal (screw at the side of the enclosure) to an external protective ground conductor or to a grounded mast.

Only a qualified person using the proper safety equipment should climb the antenna mast. Only trained professional installers should be used when installing or dismantling ODUs and masts.

---

**\* To mount the ODU or O–PoE:**

1. Verify that the ODU or O–PoE mounting brackets are properly grounded.
2. Mount the ODU or O–PoE unit onto the mast or wall. Refer to [Appendix B](#) for the ODU and O–PoE mounting instructions.
3. Connect the ground cable to the chassis point on the ODU.
4. Attach the ODU–IDU cable to the ODU RJ–45 connector. If making own ODU–IDU cable, refer to [Appendix A](#) for the connector pinout.
5. Secure the cable to the mast or brackets using UV–rated cable ties.
6. Repeat the procedure at the remote site.

---

**Note** *Do not tightly secure the ODU to its mounting brackets until the alignment process of the antenna is complete.  
When installing the ODU, check that there are no direct obstructions in front of the ODU or interference from man–made obstacles.*

---

**Caution** For O–PoE UL Listed parts and components must be used for installation. Use UL listed devices having an environmental rating equal to or better than the enclosure rating to close all unfilled openings.

---

## 2.7 Connecting the ODU or O-PoE to the IDU

The ODU-IDU cable conducts all the user traffic between the IDU and the ODU or O-PoE. The ODU-IDU cable also provides -48 VDC supply and Ethernet to the ODU. The maximum length for one leg of the ODU-IDU cable is 100m (328 ft) in accordance with 10/100BaseT standards. When using an O-PoE the maximum length for two legs of the O-PoE cable is 100m (328 ft) in accordance with 10/100BaseT standards.

The ODU-IDU cable is supplied pre-assembled with RJ-45 connectors, at the length specified when ordering. If the ODU-IDU cable was not ordered, use Cat. 5e shielded cable. Wiring specifications are given in [Appendix A](#).

### \* To connect the ODU or O-PoE to the IDU

1. ODU: Route the cable from the ODU to the IDU.  
O-PoE: Route the cable from ODU to O-PoE along the mast or wall
2. Secure the cable along its path.
3. ODU: Connect the ODU-IDU cable to the RJ-45 connector on the IDU designated ODU or WAN.  
O-PoE: Connect the ODU-IDU cable to the RJ-45 connector on the O-PoE designated PoE.

The figures below illustrate typical IDU panels. You may have differences in your panels depending on the hardware ordered.



*Figure 2-2. Typical IDU-E Rear Panel*



*Figure 2-3. IDU-2E1-AL Rear Panel*



Figure 2-4. Typical IDU-C Front Panel



Figure 2-5. WinLink 1000-AIND All Indoor Radio Unit



Figure 2-6. WinLink 1000 O-PoE

---

**Note** Panels may be fitted with different connector combinations than shown, depending on the model ordered.

---

## 2.8 WinLink 1000 Management Software

### Minimum Requirements

The WinLink 1000 management application is distributed on CD-ROM as an executable file. The application has the following PC requirements:

- Memory: 128 MB RAM
- Disk: 1 GB free hard disk space
- Processor: Pentium 3 or higher
- Network: 10/100BaseT NIC

- Graphics: Card and monitor that support 1024×768 screen resolution with 16 bit color
- Operating system: Windows 2000/XP
- Microsoft Explorer 5.01 or later.

## Installing the Software

- \* **To install the WinLink 1000 management program:**
  1. Insert the CD-ROM into your CD-ROM drive.
  2. The autorun feature starts to install the software automatically. If the installation does not start automatically, run setup.exe.
  3. Follow the on-screen instructions of the installation wizard to complete setup of the WinLink 1000 Management program in the desired location.

Any PC running the WinLink 1000 management application can be used to configure WinLink 1000 units.

---

## 2.9 Connecting the Power

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Before connecting any cable, the protective earth terminals of the AC/DC adapter must be connected to the protective ground conductor of the mains power cord. If you are using an extension cord (power cable) make sure it is grounded as well.

Any interruption of the protective (grounding) conductor (inside or outside the instrument) or disconnecting of the protective earth terminal can make this unit dangerous. Intentional interruption is prohibited.

---

### Connecting Power to an IDU-E

Power is supplied to the WinLink 1000 IDU-E via an external AC/DC converter, which receives power from a 100–240 VAC source and converts it to –48 VDC.

- \* **To connect power to the IDU-E:**
  1. At site A, connect the 2-pin connector of the AC/DC converter to the 2-pin DC power connector on the IDU-E rear panel.

2. Connect the AC/DC converter 3-prong plug to a mains outlet.

The unit turns on automatically upon connection to the mains. The green PWR indicator turns on, and the IDU indicator blinks orange for approximately 40 seconds during startup. See *Normal Indicators* section in Chapter 3.

After approximately 20 seconds the ODU starts beeping. The beeps continue until the ODUs are aligned and the link set up.

3. Wait for approximately one minute, then repeat for Site B.

## Connecting Power to an IDU-C

AC power is supplied to the WinLink 1000 IDU-C through a standard 3-prong plug.

AC power should be supplied via a 1.5m (5 ft) standard power cable terminated by a standard 3-prong socket. A cable is provided with the unit.

### \* To connect AC power to an IDU-C:

1. Connect the power cable socket to the power connector on the WinLink 1000 front panel.
2. Connect the power cable plug to the mains outlet.

The unit turns on automatically upon connection to the mains.

### \* To connect DC power to an IDU-C

A special IEC 60320 adapter for -48 VDC power connection is supplied with the unit.

## Connecting Power to an O-PoE

AC power is supplied to the O-PoE via a 3m (10 ft) 3-prong AC cable attached to the unit (pigtail). The AC cable is provided with no termination.

### \* To connect AC power to an O-PoE:

Connect the power cable to a protected/shielded AC mains outlet. The AC mains outlet should be provided with circuit breaker rated 5A according to the local national electrical code. The unit will be turned on automatically upon connection to the mains.



---

To maintain Overvoltage (Installation) Category II, install a suitable surge suppressor device in the branch circuit to limit expected transients to Overvoltage Category II values.

The limits are based on IEC60664 and are also located in Table 2H of UL60950 (for mains  $\leq 150\text{V}$ , the transient rating is 1500V; for  $150\text{V} < \text{mains} \leq 300\text{V}$ , the transient rating is 2500V; for  $300\text{V} < \text{mains} \leq 600\text{V}$ , the transient rating is 4000V).

---

---

## 2.10 Aligning ODUs with the Beeper

Perform the WinLink 1000 ODU alignment using the beepers located inside the ODUs. The beeper facility is not suitable for aligning the All Indoor Units (AIND). To align an AIND system see [Appendix D](#).

To speed up the installation time, alignment of a WinLink 1000 Link can be performed by two teams simultaneously, at site A and at site B.

**\* To align the ODUs via ODU Beeper:**

1. Verify that power is connected to the IDUs at both sites.



---

**Do not stand in front of a live ODU.**

---

2. The ODU starts beeping 20 seconds after power up, and continues beeping until the ODUs are aligned, and the installation is complete.
3. Verify normal operation of the IDU by the LED indications on the front panel. (See [Normal Indications](#).)
4. Coarsely align the site B ODU in the direction of the site A ODU.
5. Make an azimuth sweep of 180 degrees with the site A ODU. So that the strongest signal from site B can be learnt.

6. Slowly turning the site A ODU back towards the position of Site B, listen to the beeps until the best signal is reached. See



7. Figure 2–7 for the beeper signals.



Figure 2–7. Beeper Sequence for ODU Alignment

**Note**

*Three beeps and a pause is the best signal*  
*Two beeps and a pause, signal quality increased*  
*One beep and pause is no signal change*  
*Any other signal detects no signal between ODUs.*

8. Secure the site A ODU to the mast/wall.
9. At site B, adjust the ODU slowly whilst listening to the beeper sequence until the best signal is attained.
10. Secure the site B ODU to the mast/wall.
11. Monitor the link quality for about 15 minutes to verify stability.

## 2.11 Starting the WinLink 1000 Manager Software

**\* To start the WinLink 1000 Manager:**

1. Connect the management station to the LAN.
2. Double-click the WinLink 1000 Manager icon on the desktop, or click **Start > Programs > WinLink 1000 Manager**.

The Login dialog box appears.



Figure 2–8. Login Screen

3. Select the Connection Mode for the IP Address:
  - Local Mode:  
Select Local Connection (Broadcast), if user is connected directly to the IDU LAN port.
  - Network Mode  
Enter IP address (of the ODU)  
Default address: 10.0.0.120  
The Subnet mask is 255.0.0.0. Versions 1.700 and up, any valid subnet mask may be used.

---

**Note** *The actual IP address is defined during link configuration (see [Defining the Management Addresses](#)).*

---

4. Enter the password  
Default password – **admin** (see the section on [Changing the Management Password](#))
5. Click the Read only check box if entering the system as a Read only user.
6. If you are a user with Read-Write permission, click **Options** to enter the community options.

WinLink 1000 is protected with Community passwords. A user may be defined with read-only permission or with read-write permission. See the section [Changing Community Values](#) for more detail.





Figure 2-9. Login Screen with Community Options Visible

- If using the system for the first time, leave the default community passwords, **netman** for read-write, and **public** for read-only.
- If community values have previously been defined, enter them in the read-only or read-write communities.
- If you are a user with read-only permission, click the Read Only Mode check box.

The WinLink 1000 Manager main screen is displayed (see [Figure 2-10](#)).

**Note**

---

*With BRS systems the link must be activated at both sites when installing for the first time. A red Inactive Link box appears in the center of the Manager screen. Activation is performed later.*

---

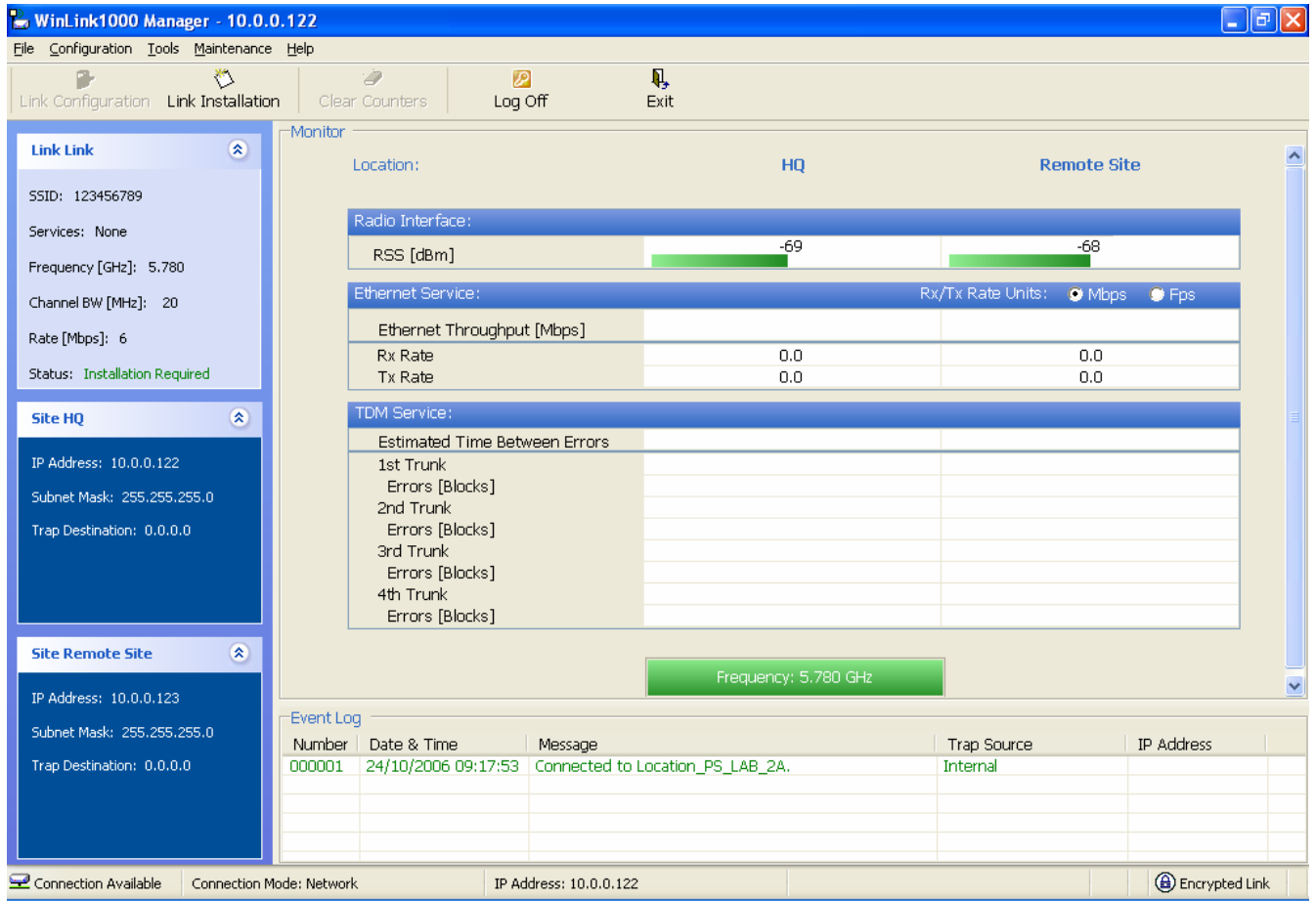


Figure 2–10. WinLink 1000 Manager Main Screen

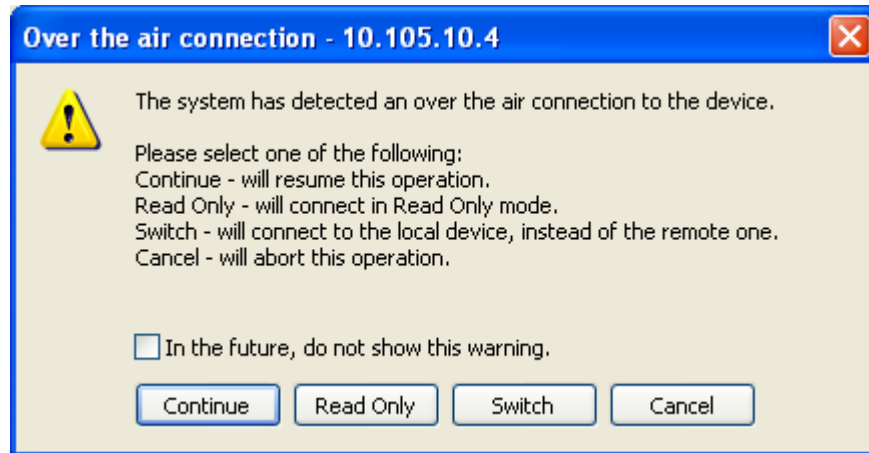
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## 2.12 Over the Air Connection indication

During the login the Manager reports on over the air connection.

**Note** *Over the Air connection to remote unit is not recommended*

- Select the relevant option for your login requirements.



*Figure 2-11. Over the Air Connection*

---

## 2.13 Installing the Link

During the installation procedure, the definition of all parameters is automatically applied to both sides of the link.

**Note**

*For HSS screens see [Appendix F](#).*

**\* To install the link:**

1. Verify that the management station is properly connected to the same LAN as the IDU, and the WinLink 1000 Manager application is running.
2. With BRS systems you need to activate the link at both sites, see [Appendix G](#) for method. Once the link is activated, continue installation from this point.
3. In the toolbar, click the **Link Installation** button.

The Installation wizard opens, (see [Figure 2-12](#)).

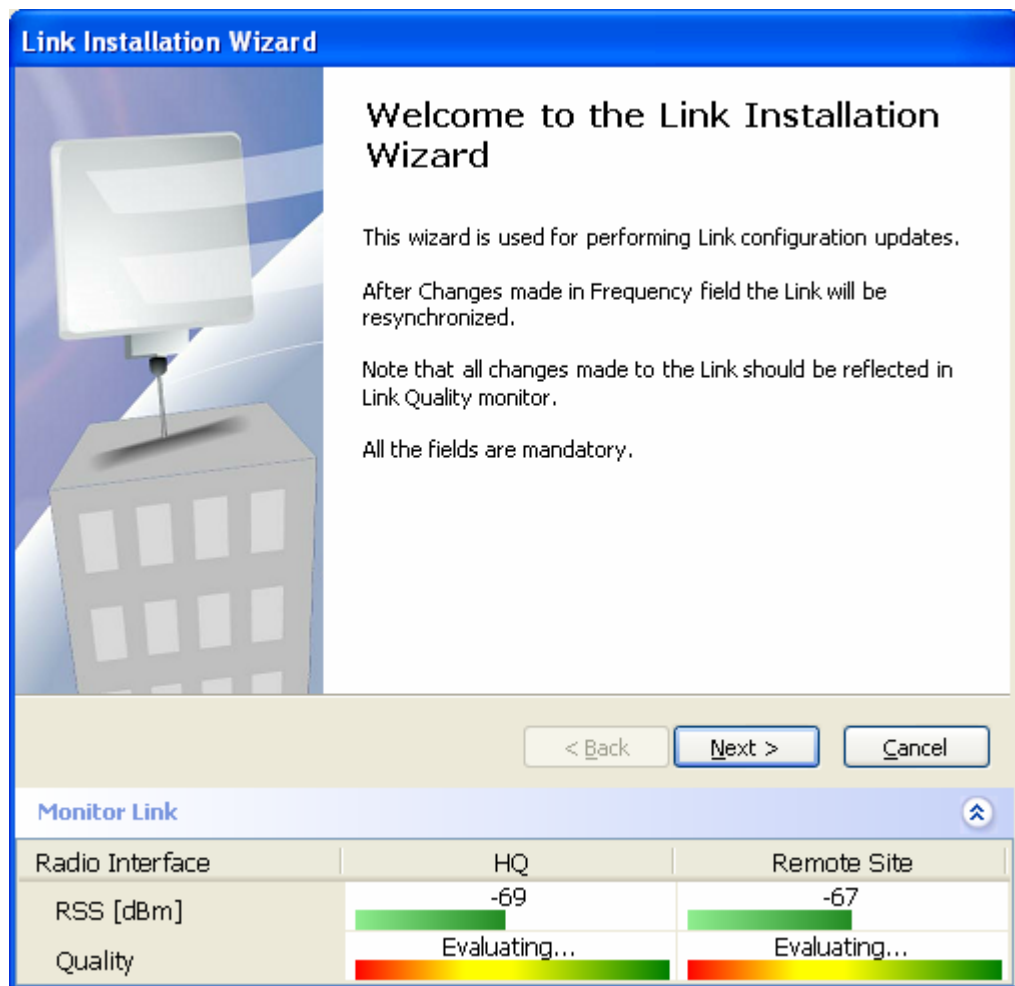


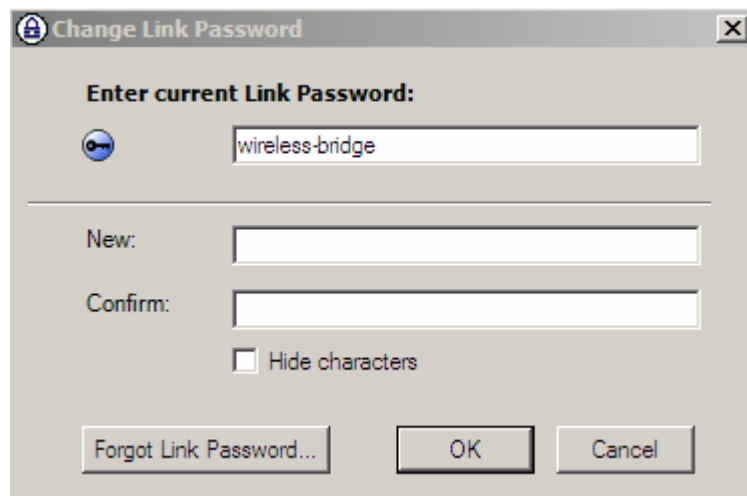
Figure 2-12. Link Installation Wizard

4. Click **Next** to proceed with the installation procedure.  
A message box is displayed.
5. On the first installation the default link password must be changed.  
Click **OK** in the message box.  
The Change Link Password dialog box opens.

---

**Note** Use the *Hide Characters* check box for maximum security.

---



*Figure 2-13. Change Link Password dialog box*

6. Enter the default link password **wireless-bridge**.
7. Enter a new password.
8. Retype the new password in the confirm field.
9. Click **OK**.
10. Click **Yes** when asked if you want to change the link password.
11. Click **OK** at the successful message.

The system dialog box opens (see [Figure 2-14](#))

Radio Interface	HQ	Remote Site
RSS [dBm]	-69	-68
Quality	Evaluating...	Evaluating...

Figure 2-14. Installation Wizard, System dialog box

12. Enter a SSID (System ID). The SSID must include at least eight alphanumeric characters. Up to 24 characters are allowed.

**Note** Both sides of a link must have the same SSID number for data transmission to take place.

13. Enter a Link Name for the link identification.

14. Enter a name for site 1.

15. Enter a name for site 2.

16. Enter the Link Password (version 1.400 and after). See [Changing the Link Password](#) for details on the Link Password.

**Note** If the Link Password is incorrect a link is established but configuration cannot be performed and no services are available. A new link password may be obtained from Technical Support or use the

*alternative password supplied with the product. See [Changing the Link Password](#) for more details.*

---

17. Click **Next**.

The default link with a rate of 9 Mbps is evaluated.

The *Channel Setting* dialog box appears. This dialog box may be different according to the version that you have purchased.

## Selecting Channels

WinLink 1000 later than version 1.300 have a feature called Automatic Channel Select, which allows you to define several alternative frequency channels if interference is detected on the channel in use.

- For WinLink 1000 with the Automatic Channel Select feature see [WinLink 1000 with Automatic Channel Select](#) (applies to versions after 1.300).
- For WinLink 1000 5.4 GHz ETSI version see [WinLink 1000 5.4 GHz ETSI](#) Version.

### WinLink 1000 with Automatic Channel Select

Automatic Channel Select (ACS) gives WinLink 1000 the ability to change frequency channels automatically if interference is detected on the current operating channel.

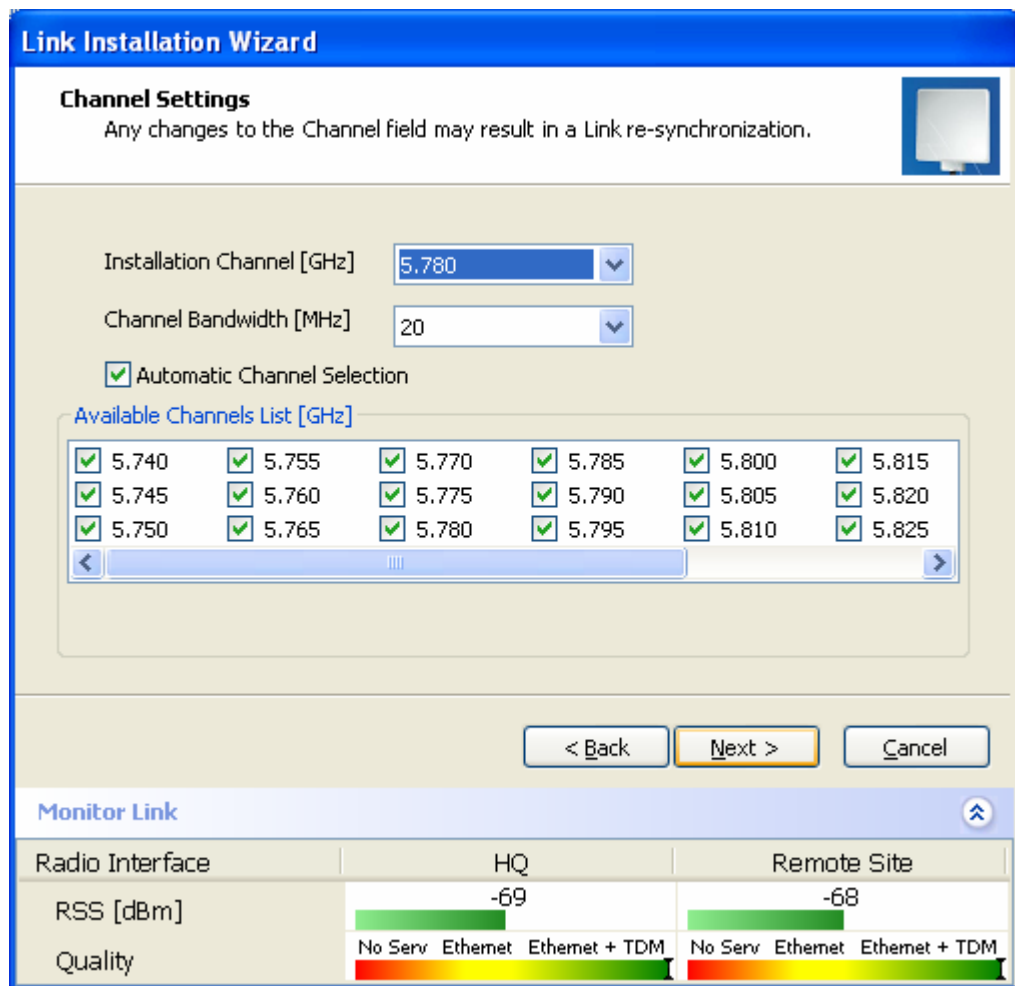


Figure 2-15. Channel Select dialog box – Automatic Channel Select

1. Select the main frequency from the Installation Channel menu.
2. Select the required Channel Bandwidth 5, 10, or 20 MHz. Default is 20 MHz.

When changing the channel bandwidth WinLink 1000 repeats evaluation of the link.

**Note**

*ACS is disabled if 5 or 10 MHz channel bandwidth are selected.  
F2.x GHz versions with TDM services operate at 10 or 20 MHz steps only.*

*Ethernet Only also supports 5 MHz bandwidth.*

3. Click the check box if Automatic Channel Selection is required.
4. Click the check boxes in the Available Channels List of all the allowable channels that can be automatically selected.



Selecting a new channel causes the system quality to change. The quality bar shows the adjustment until the system finds the best quality link.

5. If you are not satisfied with the channel that is selected automatically, click Reselect Channel.

A new channel is selected from one of the Available Channels that has been defined.

6. Click **Next**.

The Evaluating Rate box appears. When the optimum rate for the link is selected the Service Parameters dialog box opens.

### WinLink 1000 5.4 GHz ETSI Version

In accordance with ETSI, if WinLink 1000 detects Radar interference it changes the frequency channel automatically. This feature is termed Dynamic Frequency Selection (DFS). In this version, the Automatic Channel Selection is selected by default and a minimum of two channels must be defined as available.

1. Select the main frequency from the Operating Channel menu.
2. Select the Bandwidth required.

---

**Note** *Automatic Channel Selection is selected by default.*

---

3. Click at least two check boxes in the Available Channels List of all the allowable channels that can be automatically selected.

---

**Note** *Installation will not continue until at least two channels are defined.*

---

Selecting a new channel causes the system quality to change. The quality bar shows the adjustment until the system finds the best quality link.

Any channel selected is evaluated for 60 seconds; therefore this selection process may take a few minutes.

4. If you are not satisfied with the channel that is selected automatically, click Reselect Channel.

A new channel will be selected from one of the Available Channels that has been defined.

5. Click **Next**.

The Evaluating Rate box appears. The optimum rate for the link is selected.

The Service Parameters dialog box opens.

## WinLink 1000 BRS Version

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**Note**

*Both sites in a BRS Link must be configured identically. Any changes to the frequency settings cause the link to re-synchronize. A short loss of service will occur during re-synchronization.*

---

**\* To Configure BRS Channel Settings**

1. Set the Band Plan.
2. Select the Bandwidth required,  
Single Band  
Double Band
3. Select the Frequency from the pull-down menu.
4. Click Next. The system is re-synchronized to the changes.

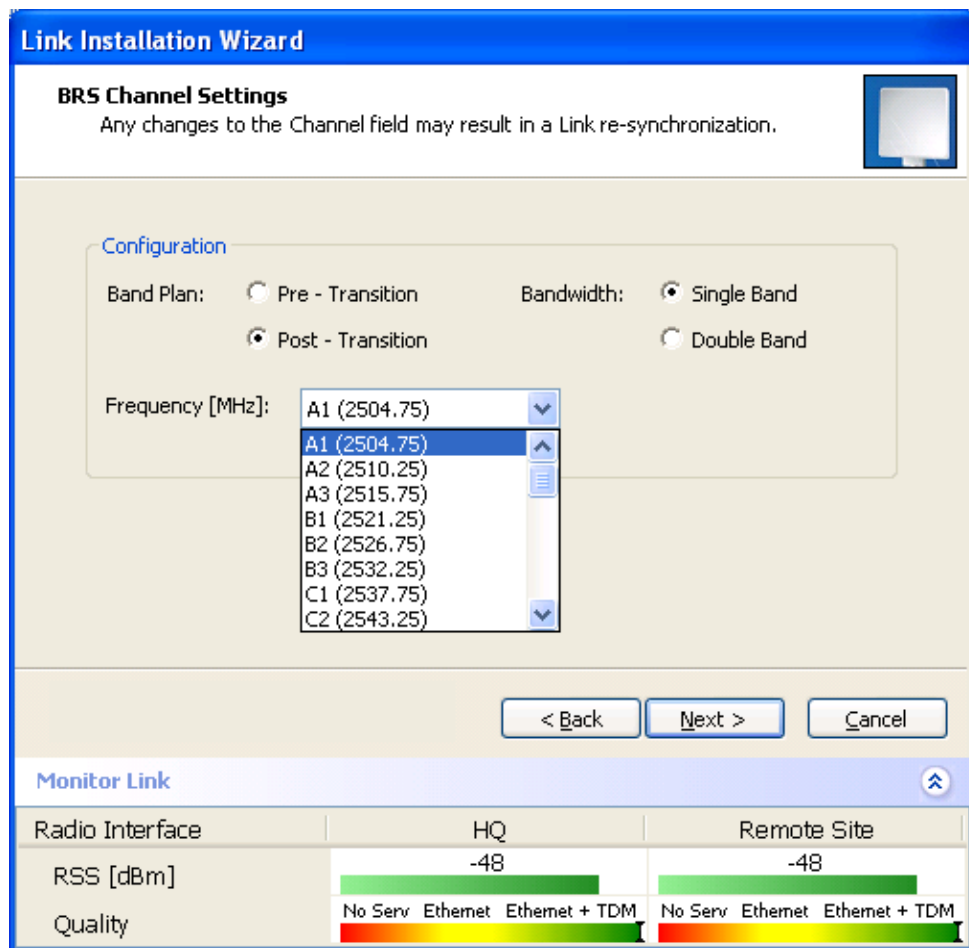


Figure 2-16. BRS Channel Settings Post-Transition

## Selecting the Service Parameters

The user defines the type of service required, Ethernet Only or Ethernet with TDM. The bandwidth remaining available for Ethernet if TDM services are required is shown in the dialog box.

**Note**

*WinLink 1000 ACCESS versions are Ethernet Only.*

**Link Installation Wizard**

**Services**  
Select the Services and Rate from the lists below.

**Service Configuration**

Services: Ethernet + 4xE1

Rate [Mbps]: Adaptive

Distance: 0 Km / 0 Miles

Evaluate

IDU	HQ	Remote Site
Product Type	WL1000-IDUC-4E1	WL1000-IDUC-4E1
HW Version	2	2
SW Version	1.700_b640_Feb 19 2007	1.700_b640_Feb 19 2007

< Back   Next >   Cancel

**Monitor Link**

Radio Interface	HQ	Remote Site
RSS [dBm]	-36	-36
ETBE	sec min hour day monthyear	sec min hour day monthyear

Figure 2-17. Installation Wizard, Services dialog box

- \* To select the services:
  - In the Service dialog box, select one of the following:
    - E1/T1 - E1/T1 data and Ethernet data.  
The Ethernet BW field shows the remaining bandwidth in Mbps available for Ethernet. The available bandwidth depends on the number of E1/T1 ports selected.
    - Ethernet Only
- 5. Select the required transmission rate.  
If Adaptive is selected WinLink 1000 constantly monitors and adjusts the transmission rate to ensure maximum throughput for the link at the highest quality. ACCESS versions are preset to adaptive and the rate selection is disabled.
- 6. Click **Next**.  
If TDM services were selected, then the TDM parameters dialog box appears, (see [Figure 2-18](#)).

7. The optimum transmission rate for the selected services is evaluated. [Table 2-1](#) shows the rates used by WinLink 1000.

**Note**

*ACCESS versions do not have TDM services, they operate at a default rate of 2 Mbps.*

If Ethernet Only was selected, then the Finish screen appears (see [Figure 2-20](#)) showing a summary of the link configuration, the alignment is complete.

*Table 2-1. Rates per Bandwidth*

Modulation/FEC	5 MHz	10 MHz	20 MHz
BPSK / $\frac{3}{4}$	2.25 Mbps	4.5 Mbps	9 Mbps
QPSK / $\frac{1}{2}$	3 Mbps	6 Mbps	12 Mbps
QPSK / $\frac{3}{4}$	4.5 Mbps	9 Mbps	18 Mbps
16QAM / $\frac{1}{2}$	6 Mbps	12 Mbps	24 Mbps
16QAM / $\frac{3}{4}$	9 Mbps	18 Mbps	36 Mbps
64QAM / $\frac{2}{3}$	12 Mbps	24 Mbps	48 Mbps
64QAM / $\frac{3}{4}$	13.5 Mbps	27 Mbps	

## Setting the Clock Configuration

If TDM services are selected then the TDM parameters dialog box appears. (TDM is not relevant in WinLink 1000 ACCESS versions.)

The TDM Parameters dialog box contains five working modes; select the appropriate clock mode according to your application. Choosing one of these modes sets the TDM clock behavior on both sides of the link. The user equipment must be configured as described [Table 2-2](#).

*Table 2-2. TDM Clock Modes*

	Unit clock mode		User equipment side	
	Local Unit	Remote Unit	HQ side	Branch side
1	Transparent	Transparent	Internal/Recover	Internal/Recover
2	Loop Time	Recover	Internal	Recover
3	Recover	Loop Time	Recover	Internal

	Unit clock mode		User equipment side	
	Local Unit	Remote Unit	HQ side	Branch side
4	Internal	Recover	Recover	Recover
5	Recover	Internal	Recover	Recover

**Transparent/Transparent**

WinLink 1000 transparently regenerates the clock from line clock side to Tx clock on the opposite side of the link.

**Loop time/Recover**

The local unit receive clock is the transmit clock on both sides of the link.

**Recover/Loop time**

The remote unit receive clock is the transmit clock on both sides.

**Internal/Recover**

The local unit internal oscillator generates the clock while the remote unit recovers this clock.

**Recover/Internal**

The remote unit internal oscillator generates the clock while the local unit recovers this clock.

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**Note** *The Line code option is used with T1 Systems.*

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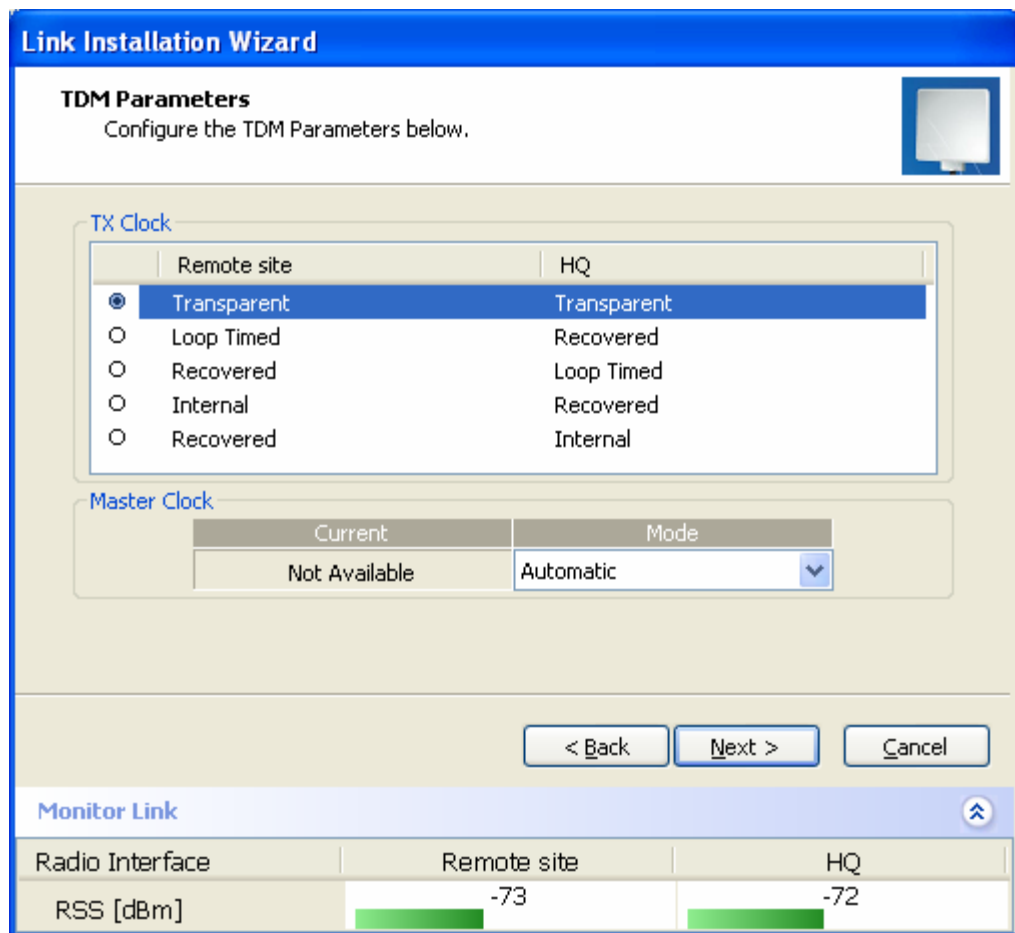


Figure 2-18. TDM Parameters dialog box

**Note** This dialog box is available only with IDU-E units, it is activated after TDM service was chosen in the previous Service dialog box. In Ethernet only services, the TDM dialog box does not appear.

## Setting the T1 Line Code

The T1 line code can be set as B8Zs or AMI in the TDM Parameters dialog box.

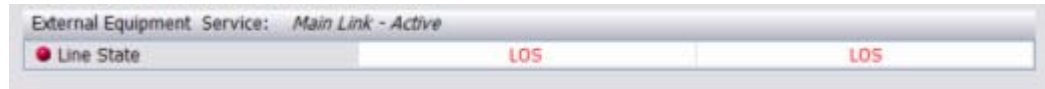
The default is B8ZS.

- \* **To change the line code**
  - In the TDM Parameters dialog box, set the line code to B8ZS or AMI.

## Setting the TDM Backup

IDU-R units have two E1 trunk lines, one for WinLink 1000 air interface via the ODU, and the second external equipment such as a PBX. The TDM backup screen is displayed in IDU-R systems only.

The external equipment status is displayed on the Main screen of the Manager in IDU-R systems.



**\* To use the Backup Mode**

1. Click Enabled Backup Mode.
2. Set which link is backup link; either WinLink 1000 or the external equipment.

The second link becomes the main link.

**\* To disable the Backup mode**

1. Click Disable Backup Link
2. Set which link is the Main Link; either WinLink 1000 or the external equipment.

Figure 2-19 shows the TDM backup screen.

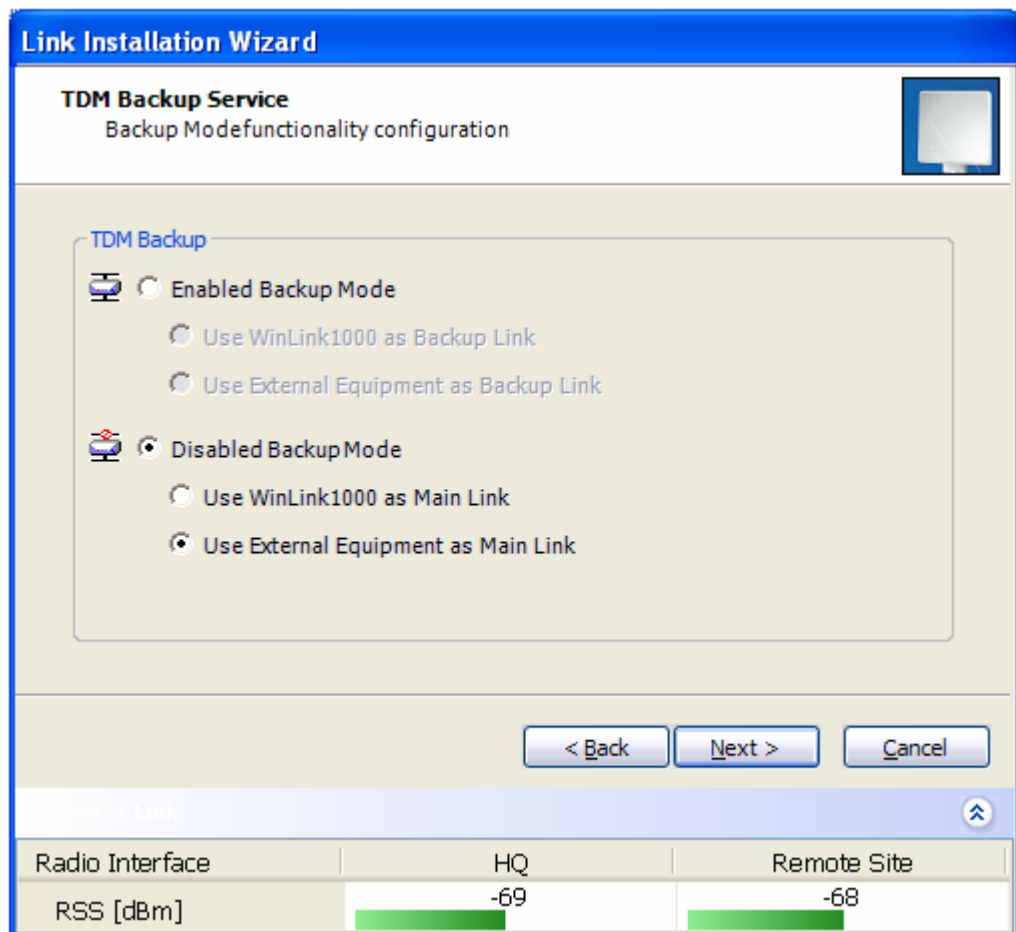


Figure 2-19. TDM Backup, IDU-R units only



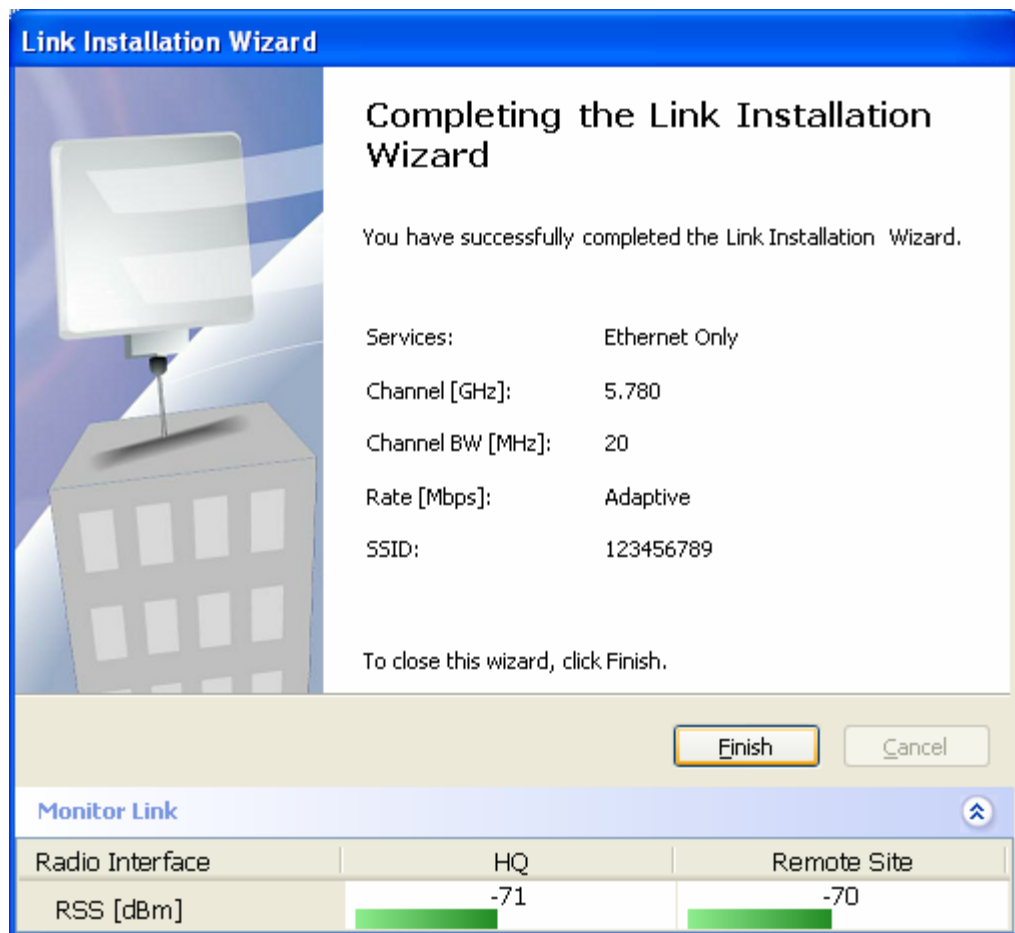


Figure 2–20. Installation Wizard, Finish Screen

3. Click **Finish** to complete the installation wizard.  
When the wireless link is established between the site A and site B units, the Quality bar is within the yellow area for Ethernet only links, or within the green area for Ethernet plus TDM links.
4. Verify that the Radio Signal Strength (RSS) is according to expected results as determined by the Link Budget Calculator.

## 2.14 Connecting the User Equipment

The IDU is a standalone desktop, wall-mounted or rack-installed unit. *Figure 2–2* illustrates a typical rear panel of the IDU.

### \* To connect user equipment to the IDU:

1. Connect user E1/T1 traffic to the IDU panel RJ-45 port designated **TRUNK**. There may be multiple Trunk ports available depending on

unit ordered.

Refer to [Appendix A](#) for the connector pinout.

2. Connect user hub/router or any other compatible device to the IDU panel

RJ-45 port designated **LAN**. There may be multiple LAN ports available for connecting to different LANs depending on the IDU unit ordered.

Refer to [Appendix A](#) for the connector pinout.

---

**Notes** *Use a straight cable for router connection.  
Do not connect two LAN ports to the same LAN, or flooding may occur.*

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# Chapter 3

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## Operation

This section provides the following information for WinLink 1000:

- Operating procedures (turning-on and turning-off)
  - IDU indicators
  - Normal Indications
  - Default settings
  - Managing the WinLink 1000
- 
- 

### 3.1 Turning On WinLink 1000

\* **To turn on WinLink 1000:**

- Connect the AC/DC converter to the IDU power connector and to the mains. See [Chapter 2](#) for full instructions on connecting the power.

The PWR indicator lights up (IDU-E only) and remains lit as long as the IDU is receiving power.

WinLink 1000 requires no operator attention once installed, with the exception of occasional monitoring of front panel indicators and statistics data. Intervention is only required when WinLink 1000 must be configured to its operational requirements, or diagnostic tests are performed.

---

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### 3.2 Controls and Indicators

#### IDU Front Panel Indicators

The front panel of the IDU and IDU-E includes a series of LED indicators that show the operating status of the unit. [Figure 3-1](#) shows

the IDU-E front panel, *Figure 3-2* shows an IDU-C front panel. *Table 3-1*, *Table 3-2*, and *Table 3-3* describe the indicators.



*Figure 3-1. IDU-E Front Panel*



*Figure 3-2. Typical IDU-C Front Panel*



*Figure 3-3. WinLink 1000-AIND All Indoor Radio Unit*

*Table 3-1. Front Panel LEDs*

Name	Color	Function
PWR	Green	ON - Power supply is ON (IDU-E only)
IDU	Green	ON - IDU operational
	Orange	ON - During power-up only
	Red	ON - Failure
ODU	Green	ON - ODU-to-IDU communication link is operating
	Red	ON - ODU-to-IDU communication link is disrupted
LINK	Green	ON - Wireless link is synchronized
	Orange	ON - During installation only
	Red	ON - Wireless link lost synchronization
SERVICE	Green	ON - E1 or T1 line is synchronized
	Orange	ON - Alarm detected at the remote interface ON - Local or Remote loopback
	Red	ON - Alarm detected at the local interface

## WAN/LAN Indicators

The WAN/LAN and TDM connectors (IDU-E rear panel, IDU-C front panel) have LED indicators that show the operating status. *Table 3-2* and *Table 3-3* describe the indicators.

*Table 3-2. WAN/LAN LEDs*

Name	Color	Function	Location
LINK	Green	On - Good Ethernet link integrity	WAN/LAN connectors
ACT	Yellow	Blinks according to the Ethernet traffic	WAN/LAN connectors

*Table 3-3. TDM Traffic Indicators*

Function	Green LED	Red LED
OK	On	Off
AIS	Off	On
LOS	Off	On
Loopback	On	Blinking

## Normal Indications

Upon turning on WinLink 1000, the PWR LED in the IDU-E front panel lights to indicate that WinLink 1000 is on. [Table 3-4](#) shows the correct status of the indicators at power-up.

*Table 3-4. WinLink 1000 Indicators at Startup*

Indicator	Color	Status
PWR	Green	ON (IDU-E only)
IDU	Orange Green	ON for short duration during startup ON during normal operation
ODU	Green	ON shows normal operation
LINK	Orange Green	ON for short duration during startup ON shows normal operation
SERVICE	Green	ON shows normal operation OFF when Service is configured for Ethernet only

If the above LED indications do not appear following initial power turn-on, refer to [Chapter 5](#) for the diagnostic test instructions.

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### 3.3 Default Settings

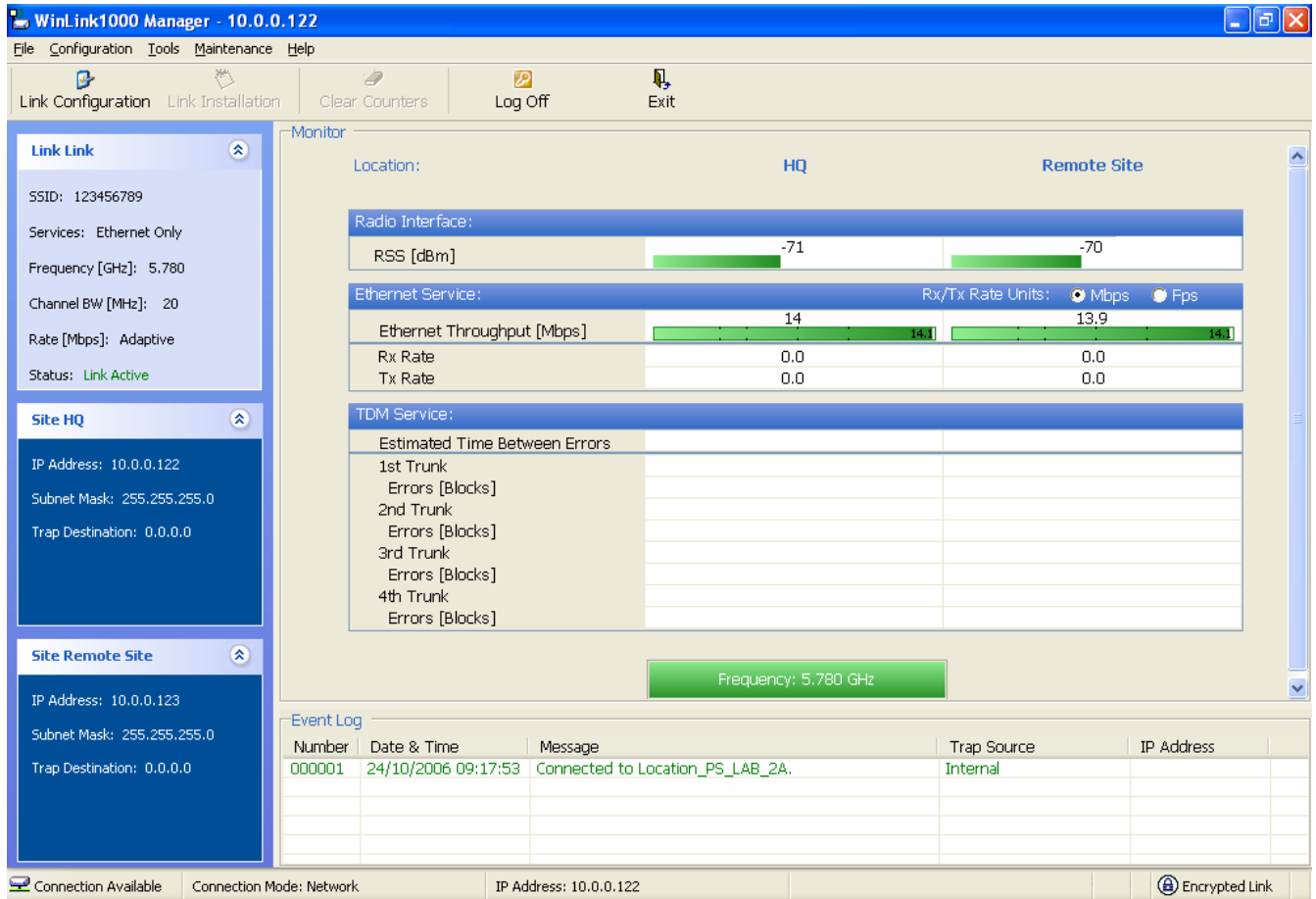
*Table 3-5* lists the default settings of the WinLink 1000 configuration parameters.

*Table 3-5. Default Settings*

Parameter	Default Value
ODU IP Address	10.0.0.120
Subnet Mask	255.0.0.0
SSID	-
Frequency	First Frequency in the range
Rate	Adaptive
Services	Ethernet
Ethernet Configuration	Auto Detect
Bridge	Hub Mode. Aging time = 300 sec
Community values	Read-write - netman Local - public-bru1 Remote - public-bru4097

## 3.4 Managing WinLink 1000

Before starting a management session, make sure that a communication link between local and remote units exists. The Link Status indication bar in the middle of the Main menu must be green and the *Radio Link – Sync* message must appear in the event log (see *Figure 3-4*).



*Figure 3-4. Main Screen, Wireless Link is Active*



The WinLink Manager main screen consists of the following elements:

- **Toolbar** – includes buttons serving for:
  - Changing configuration parameters of operating wireless link; assigning text files for storing alarms, statistics and configuration data (Link Configuration button)
  - Performing preliminary configuration of the system (Link Installation button). This button is disabled once a link is defined.



- Clearing error counters (Clear Counters button)
- Logging off WinLink Manager (Log Off button)
- Exiting WinLink Manager (Exit button)

- Menu bar
  - File Menu – Log off, and exit
  - Configuration – use for link configuration, individual site configuration or link installation
  - Tools – set preferences, event log handling, change password
  - Maintenance – Loopbacks, system reset.
- Link details pane – summarizes information on the radio frequency, IP bandwidth, type of TDM service, number of assigned E1 or T1 timeslots, and IP details of the local and remote WinLink 1000 units.
- Monitor pane – displays the link quality between local and remote devices and the following statistics:
  - Radio signal strength (RSS) in dBm
  - Current Ethernet bandwidth in Mbps. This is not the actual traffic rate, but the maximum capacity that can be supported currently, see *Figure 3-5*.  
The scale on the bar adjusts according the link distance and the link budget.
  - Local/remote receive and transmit traffic rate, in Mbps or Fps (frames per second).
  - TDM status  
The Estimated Time Between Errors bar gives an indication of the TDM quality. The ETBE constantly calculates the expected TDM Error second ratio according to the current air interface conditions.
  - Link Status. Shows the channel frequency. The color of the box indicates the status.  
Green is an active link  
Red is an inactive link  
Magenta shows an authentication or compatibility problem  
Brown shows severe compatibility problem.
- Event log – stores alarms generated by local and remote units.
- Status Bar – displays the following ions:
  - Connectivity icon showing how the device is connected to the Ethernet.

- Network mode to the local unit – using IP of the local unit
- Over the Air connection – using IP address of the remote for over the air connection
- Local mode using broadcast – direct connection to IDU LAN port without IP address. This mode is only recommended when the managed PC is connected directly to the IDU (no network involved) the managed PC must have a static IP configured. (No DHCP)
- Encryption icon showing if the link is encrypted
  -  encrypted link
  -  Link Password Validation failed. The link is encrypted with default keys. Service and configuration is unavailable. Need to change the link password in either site
  - No Encryption – an older release is used. No encryption is available

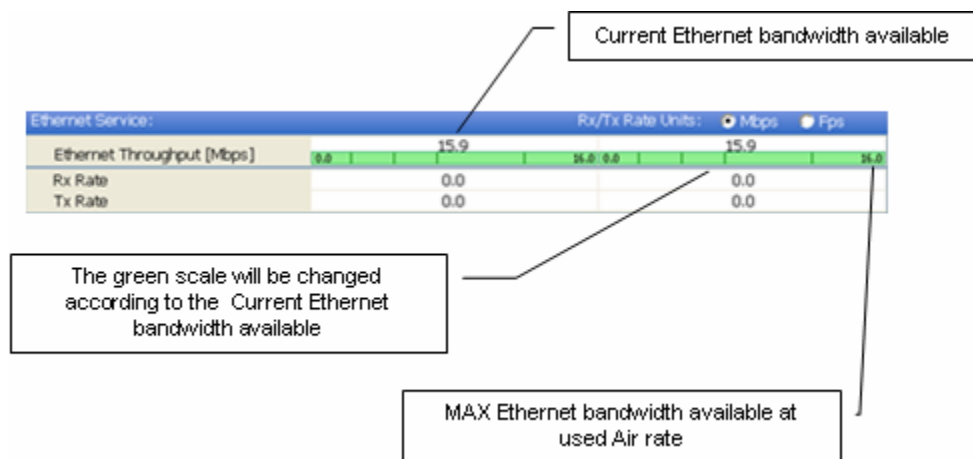


Figure 3-5. Ethernet Bandwidth Indication

\* **To change link configuration parameters:**

1. In the Main menu, click **Configure Link**.  
The Configure Link wizard appears. See [Chapter 4](#) for configuration details.
2. Click **Next**.
3. Continue through the configuration wizard and define the Link name and ID, Channel, Rate and Services.
4. Once you finish changing configuration parameters, click **Finish**.

The system takes a few seconds to activate the link with the new configuration.

---

---

### 3.5 Turning Off WinLink 1000

**\* To turn off WinLink 1000:**

1. Exit the management application.
2. Remove the AC/DC converter power cord from the mains.

# Chapter 4

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## Configuration

This chapter describes configuration procedures, which are performed after the physical installation of the local and remote WinLink 1000 units and the Installation Link wizard has been performed. A second wizard is used to redefine the configuration parameters if necessary. Both sites in the link are defined simultaneously.

The following parameters are configured via the Configuration Wizard:

- System parameters
- Frequency channel
- Air interface rate
- Service parameters
- TDM
- Hub Site Synchronization Settings.

The following parameters are configured via the Configuration dialog box.

- Transmit power
- Management and trap addresses
- Bridge mode
- Ethernet mode
- Community values.

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**Note** For HSS screens see [Appendix F](#).

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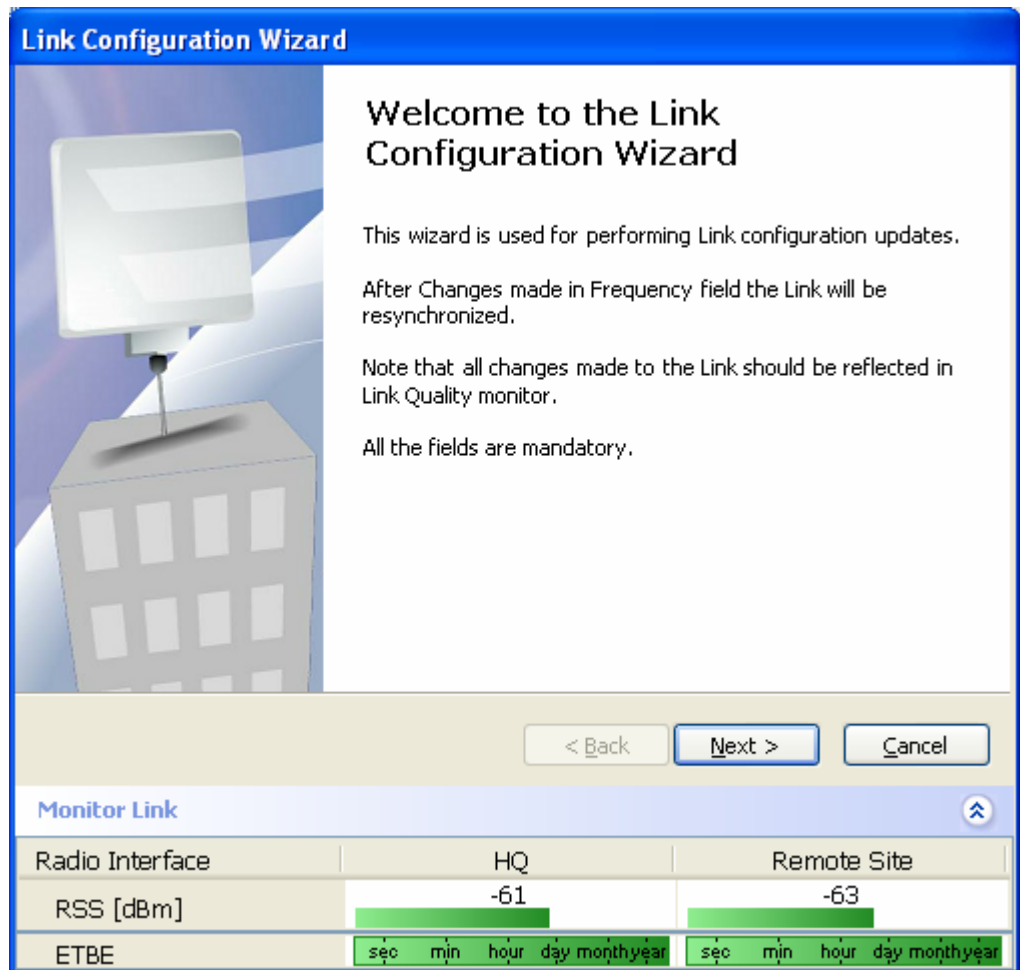
### 4.1 Configuring the System Parameters

After installing the link, the system configuration can be modified.

**Note** All parameter changes are automatically applied to both sides of the link.

---

- \* **To change general parameters:**
  1. In the Main menu, click the **Link Configuration** button.
  2. The Configuration wizard opens (*Figure 4-1*).



*Figure 4-1. Configuration Link Wizard*

3. Click **Next**.
4. The Link Configuration dialog box appears (see *Figure 4-2*).

**System**  
Fill in the attribute fields below.

SSID: setup\_num6

Link Name: setup\_num6

Site 1: HQ

Site 2: Remote Site

Link Password: ..... Change...

< Back   Next >   Cancel

**Monitor Link**

Radio Interface	HQ	Remote Site
RSS [dBm]	-61	-63
ETBE	sec min hour day month year	sec min hour day month year

Figure 4–2. Link Configuration, System dialog box

5. In the System dialog box, enter the new data for the link. All fields with a white background can be edited.

6. Click **Next**.

The Frequency dialog box appears.

## 4.2 Selecting Channels

The user is required to define the operating frequency channel. Newer versions of WinLink 1000 have a feature called Automatic Channel Select. This allows you to define several allowable frequency channels that WinLink 1000 can change to in event that interference is detected on the channel in use.

- For WinLink 1000 with the Automatic Channel Select feature see [WinLink 1000 with Automatic Channel Select](#).

- For WinLink 1000 5.4 GHz ETSI version see *WinLink 1000 5.4 GHz ETSI* Version.
- For WinLink 1000–BRS systems see *WinLink 1000 BRS* Version.

## WinLink 1000 with Automatic Channel Select

Automatic Channel Select enables WinLink 1000 to change frequency channels automatically if interference is detected on the current operating channel.

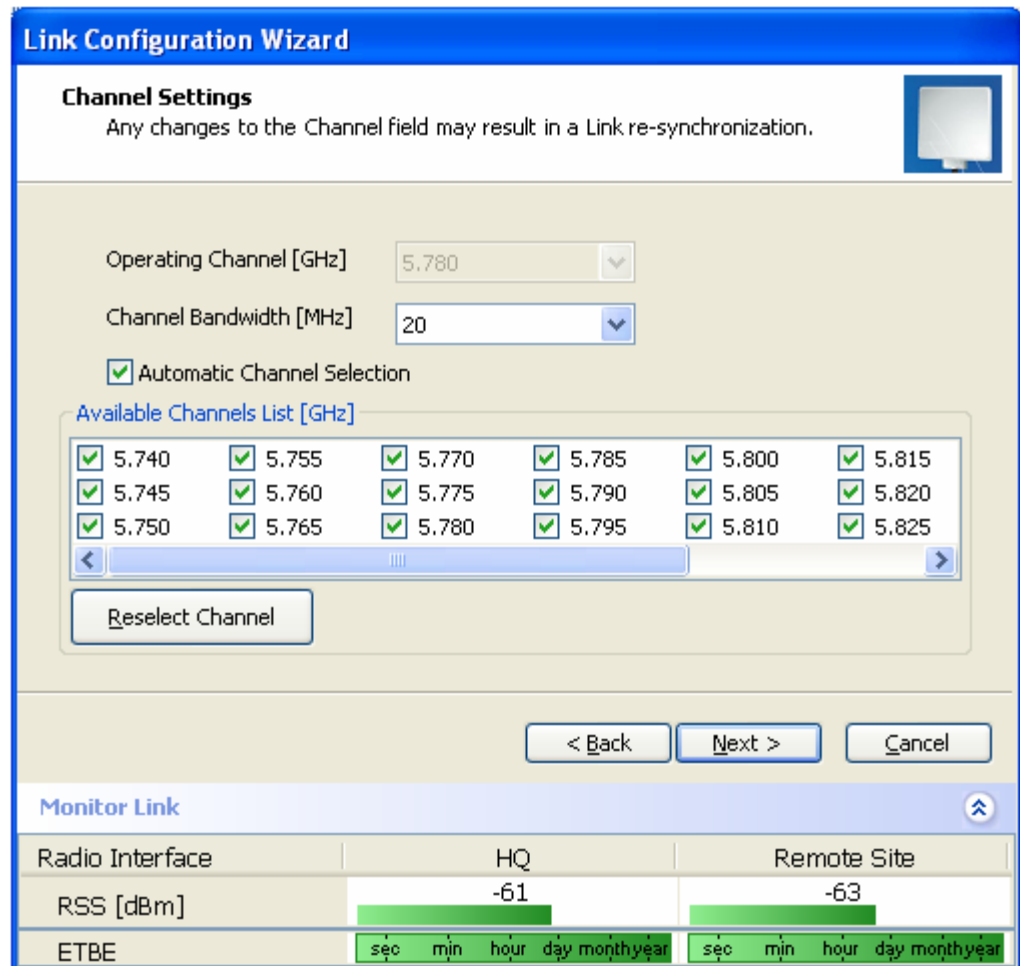


Figure 4–3. Channel Select dialog box – Automatic Channel Select

**\* To define automatic channel selection:**

1. Select the main frequency from the Operating Channel menu.
2. Select the required Bandwidth 5, 10, or 20 MHz.

**Note** *F2.x GHz versions operate at 10 or 20 MHz steps only.*

3. Click the check box if Automatic Channel Selection is required.



4. Click the check boxes in the Available Channels List of all the allowable channels that can be automatically selected.
5. If you are not satisfied with the channel that is selected automatically, click **Reselect Channel**.

A new channel will be selected from one of the Available Channels that have been defined.

---

**Note** *By clicking Reselect Channel, the ODU starts scanning all the channels from the available channels list and looks for radio frequency activity in each of the channels. It tries to select the optimal pure channel. If another channel is required, the operating channel that the ODU finds most pure must be removed from the available channel list.*

---

6. Click **Next**.

The Rate Select box appears.

## WinLink 1000 5.4 GHz ETSI Version

In accordance with ETSI, unlicensed wireless data equipment is not allowed to interrupt radar services. Therefore, if WinLink 1000 detects Radar interference it automatically changes the frequency channel. This feature is termed Dynamic Frequency Selection (DFS). According to the standard, a channel with active Radar is prohibited from use for 30 minutes. Before any transmission, WinLink 1000 probes a channel for Radar signals for a period of 60 seconds.

In the 5.4 GHz ETSI version, the Automatic Channel Selection is selected by default and a minimum of two channels must be defined as available.

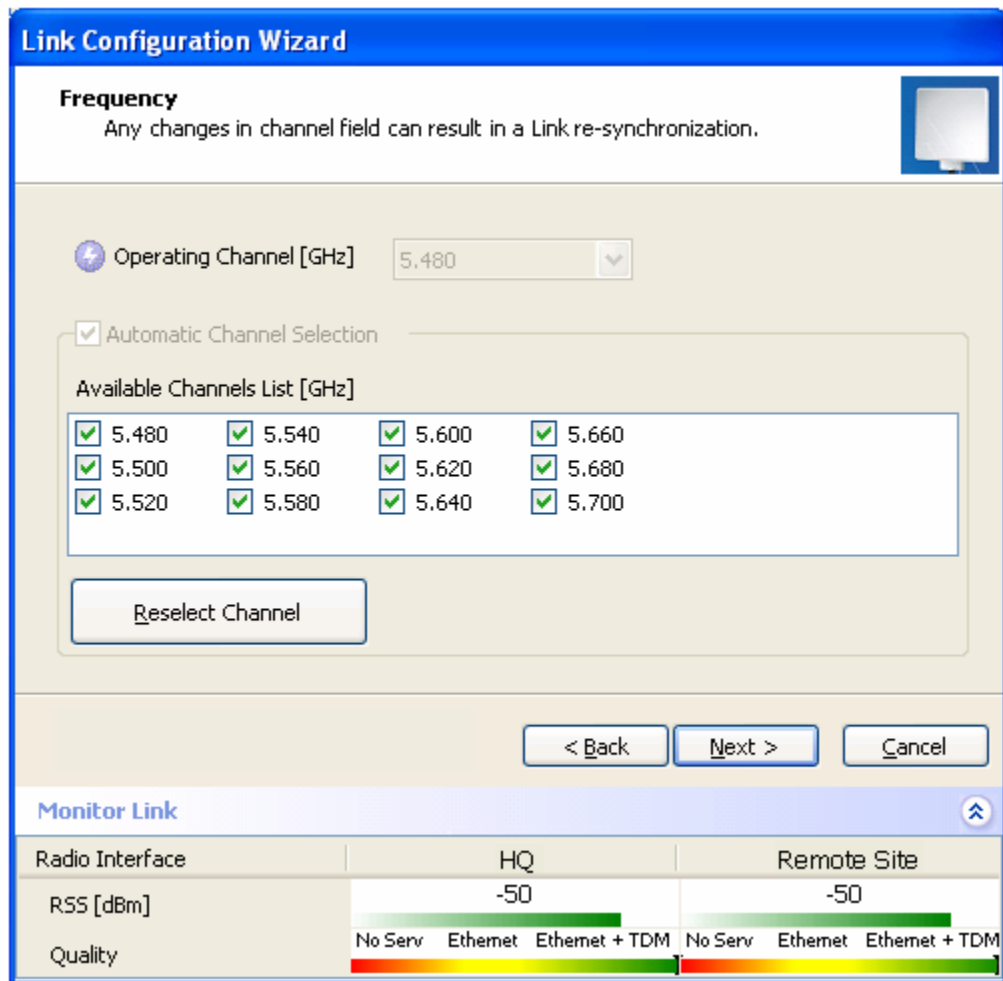



Figure 4–4. Channel Select dialog box (DFS, ETSI requirement)

The  sign on the configuration Wizard and Status bar indicates that the radar detection is on.

**\* To define automatic channel selection in the 5.4 ETSI version**

1. Select the main frequency from the Operating Channel menu.

**Note** *Automatic Channel Selection is selected by default.*

2. Click at least two check boxes in the Available Channels List of all the allowable channels that can be automatically selected.

**Note** *Installation will not continue until at least two channels are defined.*

Selecting a new channel causes the system quality to change. The quality bar shows the adjustment until the system finds the best quality link.

Any channel selected is evaluated for 60 seconds; therefore this selection process may take a few minutes.

3. If you are not satisfied with the channel that is selected automatically, click **Reselect Channel**.

A new channel will be selected from one of the Available Channels that have been defined.

---

**Note** *The reselection process may take a few minutes.*

---

4. Click **Next**.

The maximum rate is selected according to the link conditions

The quality bar shows the adjustment until the system finds the best quality link.

7. Click **Next**.

The Service Parameters dialog box appears.

## WinLink 1000 BRS Version

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**Note**

*Both sites in a BRS Link must be configured identically. Any changes to the frequency settings cause the link to re-synchronize. A short loss of service will occur during re-synchronization.*

---

### \* To Configure BRS Channel Settings

1. Set the Band Plan.
2. Select the Bandwidth required,  
Single Band  
Double Band
3. Select the Frequency from the pull-down menu.
4. Click Next. The system is re-synchronized to the changes.

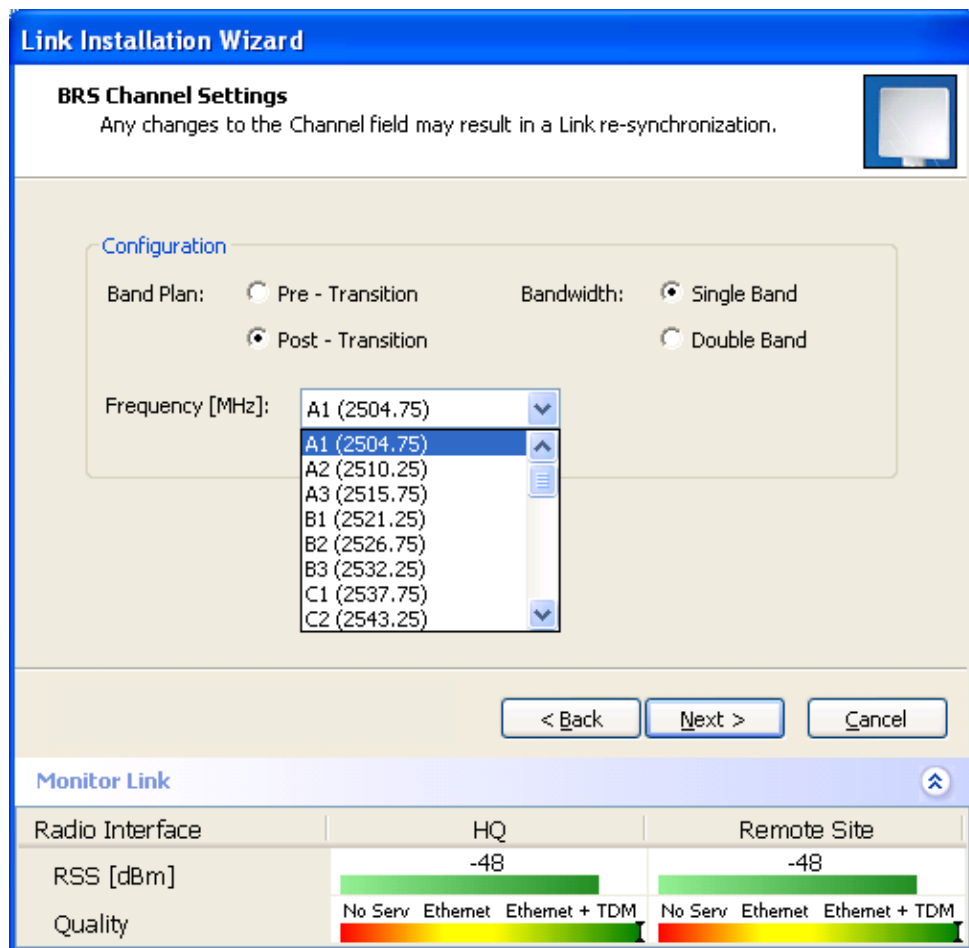


Figure 4-5. BRS Channel Settings Post-Transition

### 4.3 Configuring Service Parameters

The user defines the type of service required, Ethernet Only or Ethernet with TDM. The bandwidth remaining available for Ethernet if TDM services are required is shown in the dialog box.

**Note** *WinLink 1000-ACCESS versions are Ethernet Only.*

In the Service Parameters dialog box select if WinLink 1000 is to provide E1/T1, (x1 or x2 for IDU-E, or x4 for IDU-C). Define the required transmission rate, and the distance between the sites.

**\* To configure E1/T1 and Ethernet services:**

1. In the Service dialog box, select one of the following:
  - Ethernet plus a number of E1/T1 channels (see [Figure 4-6](#)).

- Ethernet data only.
2. Select the transmission rate required.
    - Adaptive
    - 12 Mbps
    - 18 Mps
    - 24 Mbps

The default rate is Adaptive. ACCESS versions only operate in Adaptive mode.

Adaptive Modulation – The system changes modulation automatically depending on channel characteristics in order to guarantee continuation of service. The adaptive modulation enables the user to maximize Ethernet throughput without degradation of the TDM service quality. When Ethernet only service is used, the adaptive modulation enables improving the Ethernet performance in case of air performance degradation (periodical interference or RSS changes).

In event of interference at one site, there is no need to use a lower modulation at the other site (as in previous versions). In such a case the actual rate changes automatically only at the problematic site, while the second side of the link maintains the highest rate possible (Asymmetric).

Adaptive modulation can be changed in both Installation and Configuration wizards.

3. Type in the distance between the sites.

If TDM services are selected, then the Evaluate icon shows on the screen whilst the maximum rate is evaluated.

When evaluation is complete the icon changes and the following message is shown:

Service has been evaluated, click **Next** to continue.

4. Click **Next**.

The TDM Parameters dialog box or the Finish screen appears depending on which services were selected.

**Link Configuration Wizard**

**Services**  
Select the Services and Rate from the lists below.

**Service Configuration**

Services: Ethernet + 4xE1

Rate [Mbps]: Adaptive

Distance: 0 Km / 0 Miles

Evaluate

IDU	HQ	Remote Site
Product Type	WL1000-IDUC-4E1	WL1000-IDUC-4E1
HW Version	2	2
SW Version	1.700_b640_Feb 19 2007	1.700_b640_Feb 19 2007

< Back   Next >   Cancel

**Monitor Link**

Radio Interface	HQ	Remote Site
RSS [dBm]	-36	-36
ETBE	sec min hour day month year	sec min hour day month year

Figure 4-6. Service Parameters Dialog Box, E1/T1 Interface

## 4.4 Configuring TDM Operation

### Setting the Clock Configuration

The TDM clock feature is enabled in all carrier class IDU's in addition to new hardware IDU's. A TDM dialog box will appear where IDU supports the clocking configuration feature (see [Figure 4-7](#) and [Figure 4-8](#)).

A new master clock configuration option is available in the Link Configuration Wizard. The automatic mode selects the clock from the first trunk that is working in normal mode (or is configured to loop-back maintenance). If a specific trunk is selected, this trunk shall be used as the system master regardless of the trunks state. The current master clock trunk is also displayed.

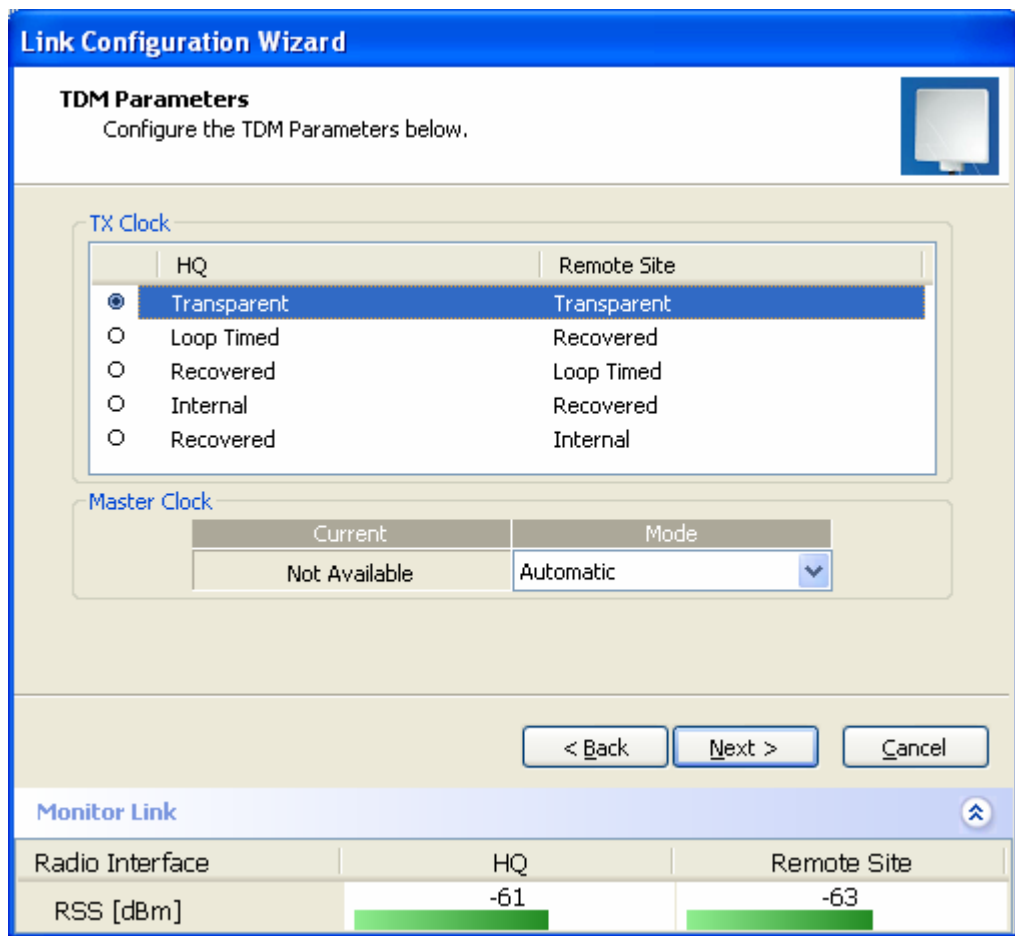


Figure 4-7. TDM clock dialog box for T1 IDU



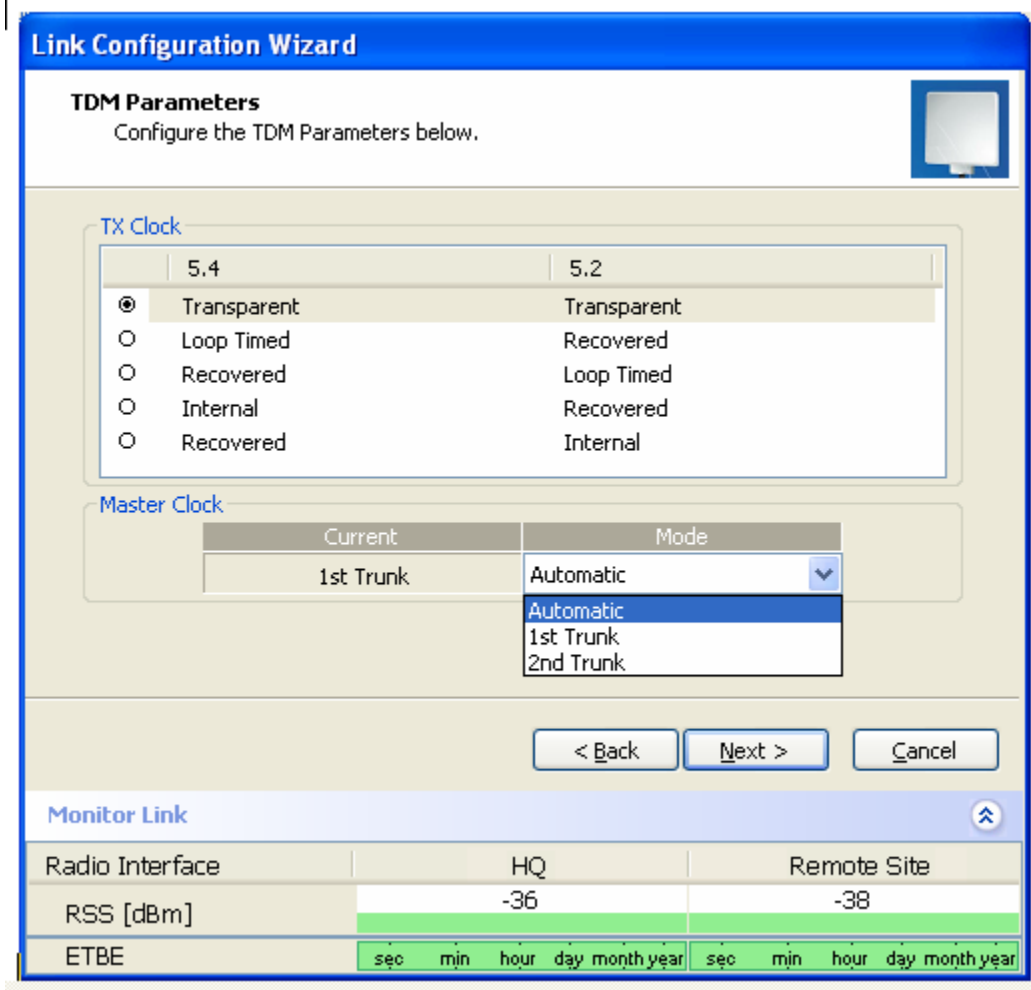


Figure 4–8. TDM clock dialog box for E1 IDU

If TDM services are selected then the TDM parameters dialog box appears.

The TDM Parameters dialog box contains five working modes; select the appropriate clock mode according to your application. Choosing one of these modes sets the TDM clock behavior on both sides of the link. The user equipment must be configured as described [Table 4–1](#).

Table 4–1. TDM Clock Modes

	Unit clock mode		User equipment side	
	Local Unit	Remote Unit	HQ side	Branch side
1	Transparent	Transparent	Internal/Recover	Internal/Recover
2	Loop Time	Recover	Internal	Recover
3	Recover	Loop Time	Recover	Internal

	Unit clock mode		User equipment side	
	Local Unit	Remote Unit	HQ side	Branch side
4	Internal	Recover	Recover	Recover
5	Recover	Internal	Recover	Recover

**Transparent/Transparent**

WinLink 1000 transparently regenerates the clock from line clock side to Tx clock on the opposite side of the link.

**Loop time/Recover**

The local unit receive clock is the transmit clock on both sides of the link.

**Recover/Loop time**

The remote unit receive clock is the transmit clock on both sides.

**Internal/Recover**

The local unit internal oscillator generates the clock while the remote unit recovers this clock.

**Recover/Internal**

The remote unit internal oscillator generates the clock while the local unit recovers this clock.

**Note**

---

*The Line code option is used with T1 Systems.*

---

## Setting the T1 Line Code

The T1 line code can be set as B8Zs or AMI in the TDM Parameters dialog box.

**Note**

The default is B8ZS.

---

*This dialog box is available only when TDM service was selected in the previous Services dialog box.*

---

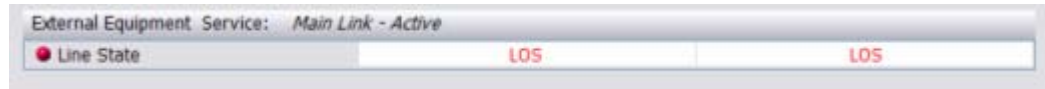
**\* To change the line code**

1. Run the Configuration wizard until you reach the Services dialog box.
2. Verify that T1 services have been selected.
3. Click **Next** to open the TDM Parameters dialog box.
4. Set the line code to B8ZS or AMI as required.
5. Click **Next**.

## Setting the TDM Backup (IDU-R only)

IDU-R units have two E1 trunk lines, one for WinLink 1000 air interface via the ODU, and the second external equipment such as a PBX. The TDM backup screen is displayed in IDU-R systems only.

The external equipment status is displayed on the Main screen of the Manager in IDU-R systems.



**\* To use the Backup Mode**

1. Click Enabled Backup Mode.
2. Set which link is backup link; either WinLink 1000 or the external equipment.

The second link becomes the main link.

3. Click **Next** to continue.

**\* To disable the Backup mode**

1. Click Disable Backup Link
2. Set which link is the Main Link; either WinLink 1000 or the external equipment.
3. Click **Next** to continue.

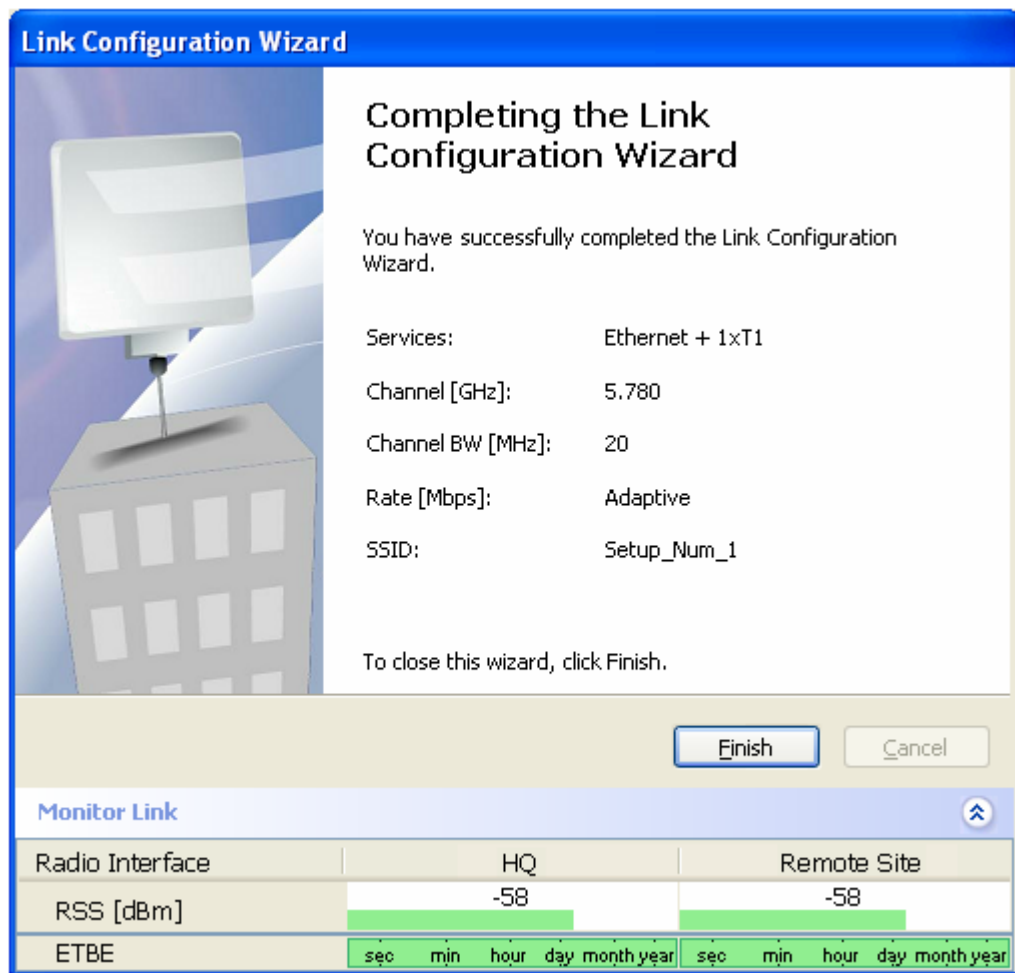


Figure 4-9. Configuration Link, Finish screen

The Finish screen appears, showing a summary of the link configuration (see [Figure 4-9](#)).

- Click **Finish** to complete the configuration wizard.

The Main screen is displayed.

## 4.5 Editing the Configuration Parameters

You can edit the configuration parameters for each site individually without running a wizard.

From the Configuration dialog box, (see [Figure 4-10](#)) the following functions are available by selecting the items on the left of the dialog box:

**System** Edit the contact person and location details. View the system details

- Air Interface** Change the transmit power
- Inventory** View the hardware and software inventory.
- Management** Configure the IP address, Subnet Mask, Default Gateway, and the Trap Destination.
- Security** Change the Community Values and the Link Password
- Date and Time** Set the date and time of the server and of the system.
- Advanced** Configure the Bridge, define the LAN connection and set the external alarm inputs.

From the Configuration dialog box, the following functions are available by clicking the buttons at the top of the dialog box:

- Backup** Save a backup.ini file with the current configuration.
- Restore** Load the backup.ini file created by the backup.
- Installation Mode** Return to Installation Mode for the entire link. Selecting the Mute check box before clicking the Install Mode button mutes the Beeper.
- Mute** Mutes the Beeper at startup. Reactivate the beeper during alignment.

**\* To edit the Configuration Parameters:**

1. Click **Configuration** from the main menu.
2. Select which site to configure.

The Configuration dialog box opens. (See *Figure 4-10*)

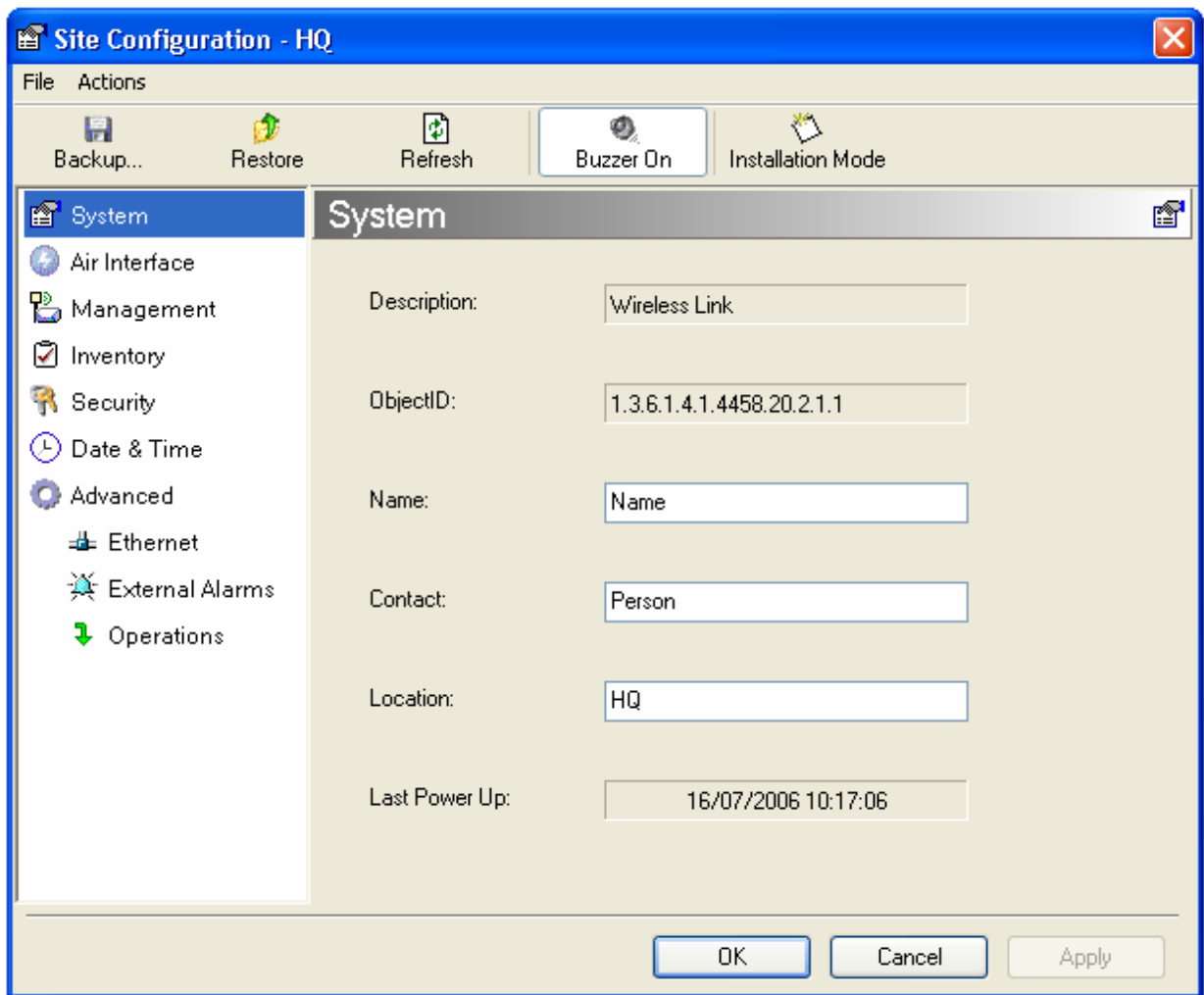


Figure 4-10. Configuration Dialog Box

3. Select the appropriate item in the left hand list to open a dialog box.
4. Click **Apply** to save the changes.

---

## 4.6 Changing the Transmit Power

Each site can have a different transmit power level.

\* **To change the Transmit Power:**

1. Click **Configuration** from the main menu.
2. Select which site to configure.  
The Configuration dialog box opens.
3. Select Air Interface. (See *Figure 4-11*)

4. Select the required Transmit Power Level. Table 4–2 shows the available power limits for each WinLink 1000 system.
5. Click Apply to save the changes.

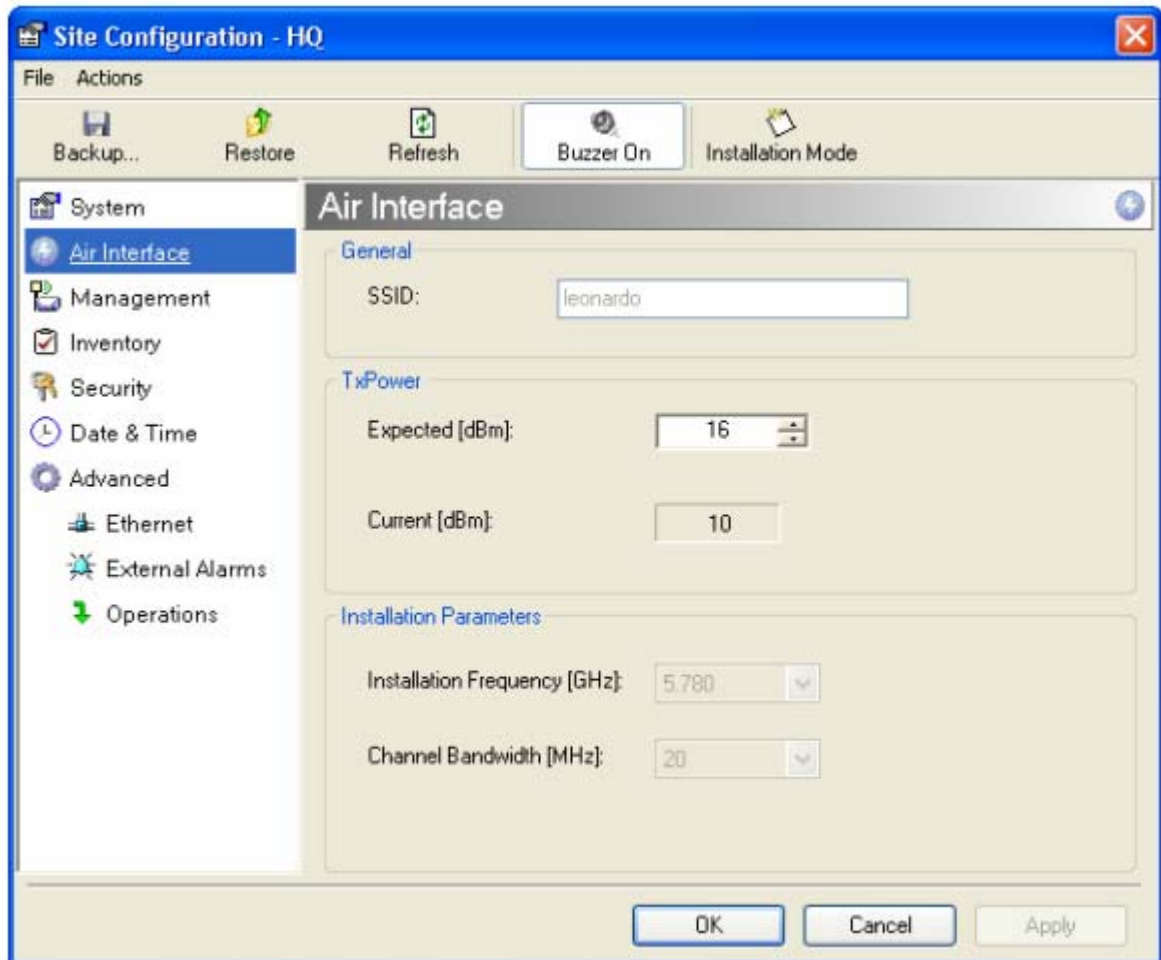


Figure 4–11. Changing the Transmit Power



Table 4-2. Typical Transmit Power Limits

Regulation	Version	Min Tx [dB]	Max Tx [dB]	MaxTx at 36 Mbps [dB]	MaxTx at 48 Mbps [dB]	Power Control
FCC	F58	4	16	14	10	Yes
	F58/EXT	4	16	14	10	Yes
	F49	14	15	15	14	No
	F53	-3	8	8	8	Yes
	F53/EXT	3	3	3	3	No
	F24	18	18	18	18	No
	F53HP	10	16	14	10	Yes
ETSI	F54	2	8	8	8	Yes
	F54/ETSI	2	8	8	8	Yes
	F54- HG/EXT	-3	3	3	3	Yes

## 4.7 Defining the Management Addresses

Each site must be configured separately, first site A then site B.

### \* To define the Management Addresses:

1. Click **Configuration** from the main menu.
2. Select which site to configure.  
The Configuration dialog box opens.
3. Select **Management** (see *Figure 4-12*).
4. Enter the IP address of the ODU in the IP address field.

**Note** *If performing configuration from the WinLink manager, the IP address is entered in the login screen (Figure 2-4)*

5. Enter the Subnet Mask.
6. Enter the Default Gateway.

7. Enter the Trap Destination. This is the IP address of the PC running the management application. The event log will be stored at this address.
8. Click **Apply** to save the changes.

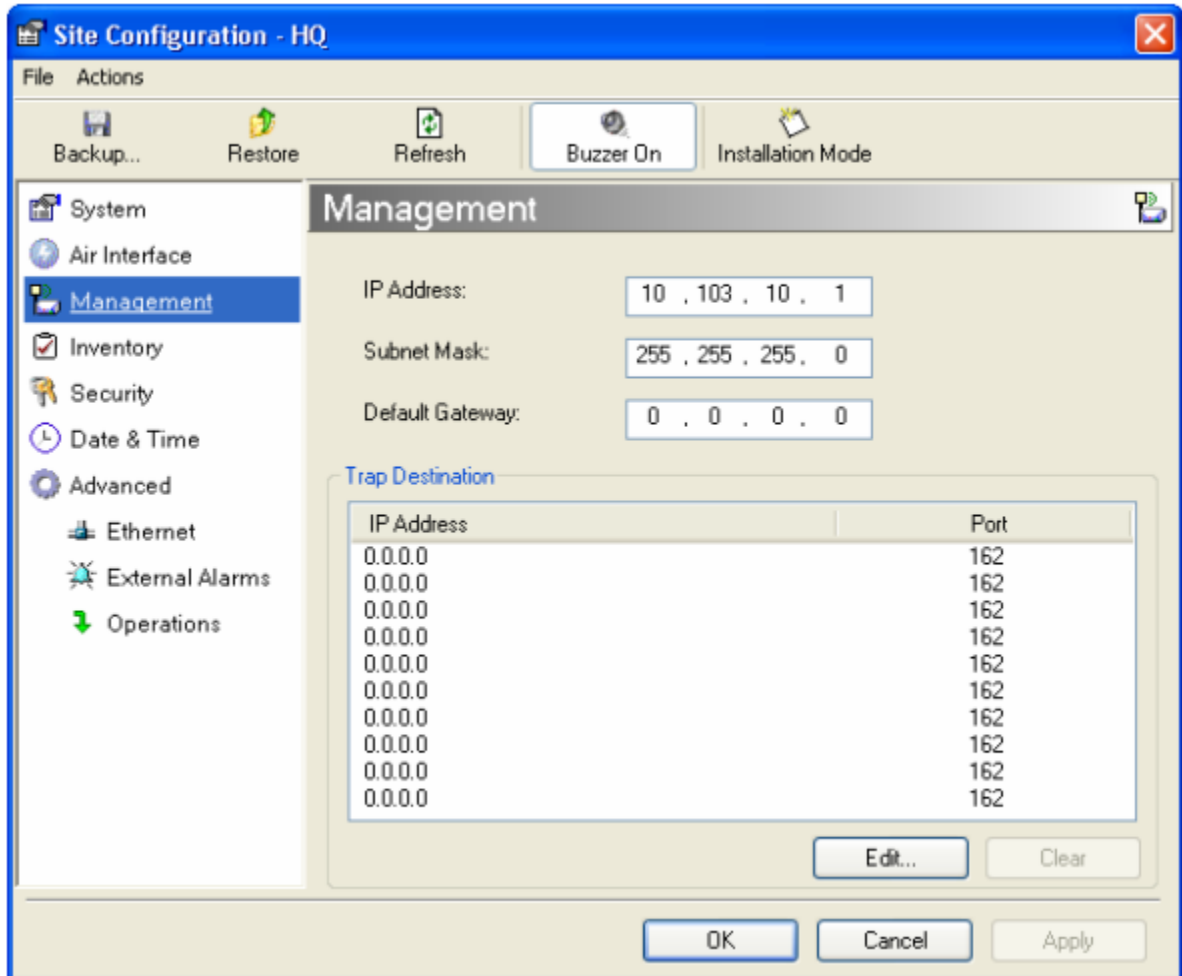


Figure 4-12. Configuration, Management

**Notes** The Installation mode button opens the Link Installation wizard to reinstall the link.  
The Backup and Restore buttons are for saving and restoring the configuration files.

---

---

## 4.8 Setting the Date and Time

### \* To set Date and time

The ODU maintains a date and time value. The date and time value should be synchronized with any Network Time Protocol (NTP) version 3 compatible server<sup>1</sup>. On power-up the ODU configures the initial date and time using an NTP server. If the server IP is not configured or is not reachable, a default time is set. When configuring the NTP server IP, you should also configure the offset from the Universal Coordinated Time (UTC). If there is no server available, you can either set the date and time, or you can set the manager workstation time. Note that manual setting is not recommended since reset, power up, or synchronization with an NTP server will override the setting.

#### *Note*

- *The NTP uses UDP port 123. If a firewall is configured between the ODU and the NTP server this port must be opened<sup>2</sup>.*
- *It can take up to 8 minutes for the NTP to synchronize the ODU date and time.*

1. Click **Configuration** from the main menu.
2. Select which site to configure.  
The Configuration dialog box opens.
3. Select Date & Time (see [Figure 4-13](#)).

---

<sup>1</sup> Windows XP is configured by default as a server.

<sup>2</sup> Windows XP command `w32tm /stripchart /computer:<server IP>` can be use to check the NTP server connectivity

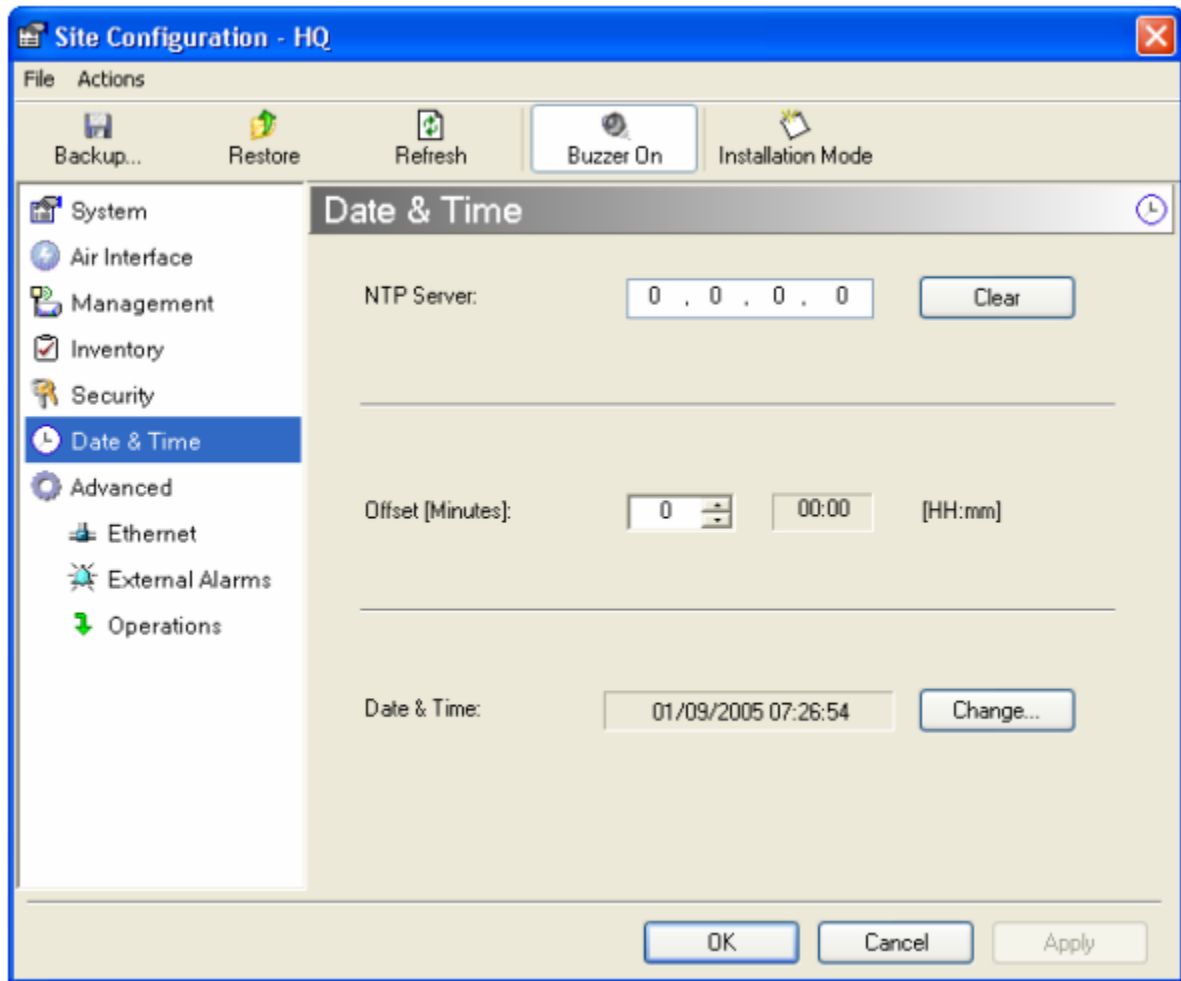


Figure 4-13. Date & Time configuration

4. If entering an address for the NTP Server, click **Clear**, and then enter the new address.
5. Set the Offset value.
6. To manually set the date and time, click **Change** (Figure 4-14) and edit the new values.

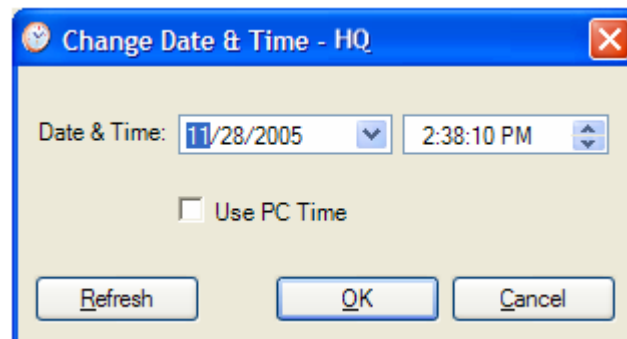
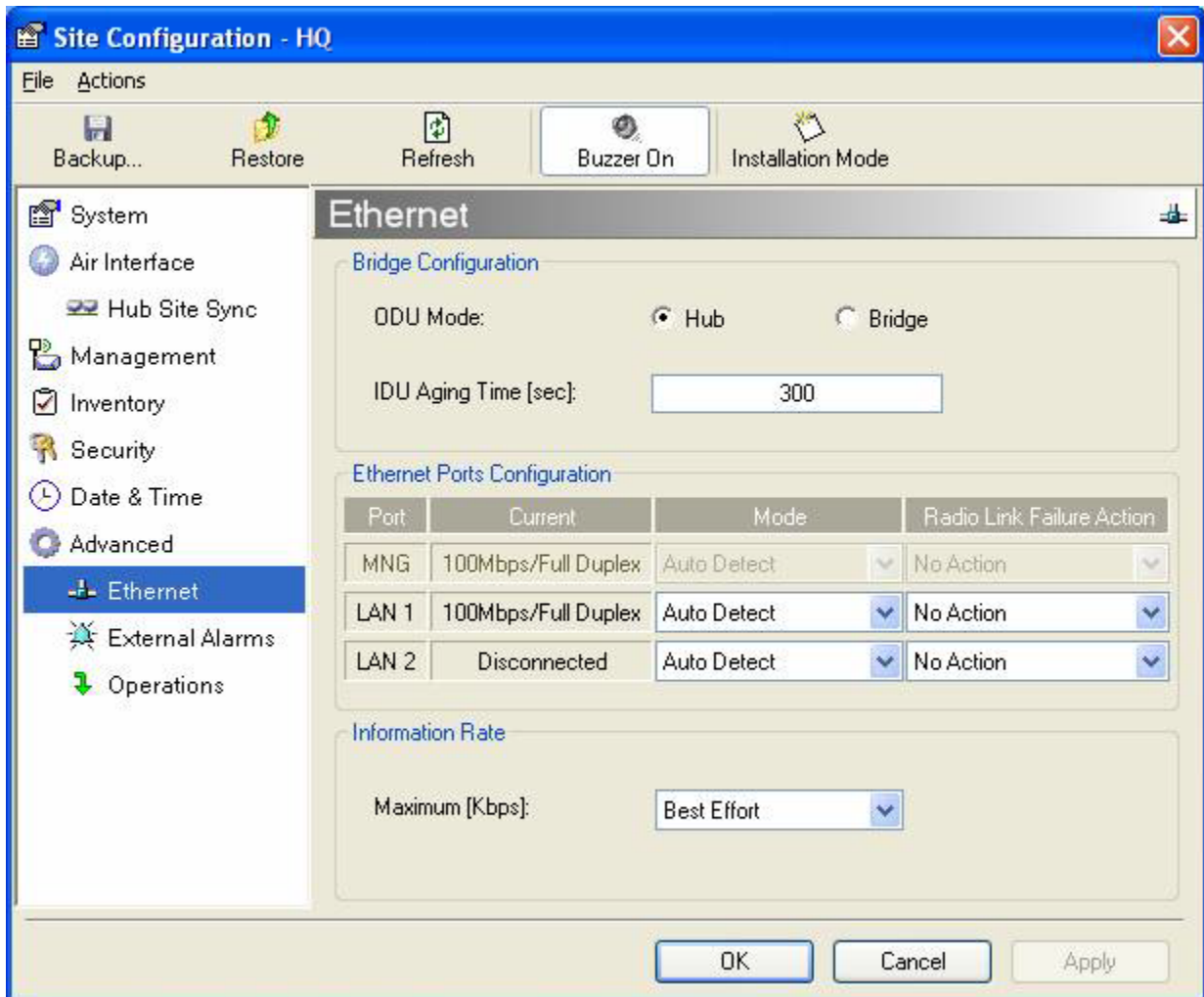


Figure 4-14. Manually changing date and time

## 4.9 Configuring the Bridge

Bridge configuration is required in various network topologies, such as protection (1+1) and ring application. The bridge configuration parameters are located under the Advanced tab of the Configuration dialog box (*Figure 4-15*).



*Figure 4-15. Advanced Configuration–Ethernet*

### ODU Bridge Mode

This parameter controls the ODU mode with two optional values,

- Hub Mode – in Hub mode the ODU transparently forwards the all the packets over the wireless link.
- Bridge Mode – In Bridge mode the ODU performs both learning and aging, the aging time of the ODU is fixed at 300 seconds.

---

**Note** *Changing these modes requires system reset.*

---

## IDU Aging time

This parameter controls the IDU aging time.

The IDU has a 2047 MAC address-learning table. The aging time parameter controls the time each MAC address is dropped from the table.

Default value is 300 seconds.

---

**Notes** *Any change to these parameters is effective immediately.  
Each side of the link can be configured separately.*

---

The following list details common configurations; both sides are must be configured with the same parameter.

- Standard (Default) Configuration for Ethernet Applications  
Set IDU aging to 300 seconds, ODU set to Bridge mode, *Figure 4-15*.
- Fast aging mode - for rapid network topology changes  
Set IDU aging to one second, ODU set to Hub mode.
- Hub Mode  
The ODU is set to HUB mode. IDU aging is not applicable.
- Ethernet Bridge  
The ODU is set to Bridge mode. The IDU aging is not applicable.

---

---

## 4.10 Configuring Ethernet Mode

The Ethernet mode is configurable for line speed (10/100BaseT) and duplex mode (half or full duplex). WinLink 1000 provides an Auto detect feature where the line speed and duplex mode are detected automatically using autonegotiation. Use the manual configuration when external equipment does not support autonegotiation. The default setting is Auto Detect. (See *Figure 4-15*).

The maximum Ethernet Information Rate can be limited via the pull down menu. The default setting is Best Effort.

---

**Note** *It is not recommended to configure the port that is used for the management connection, since a wrong configuration can cause management disconnection or Ethernet services interruption.*

---

**\* To configure the Ethernet Mode:**

1. From the **Configuration** menu, select the site to reconfigure.  
The Site Configuration dialog box opens.
2. Click **Advanced > Ethernet**.
3. In the Ethernet Ports Configuration pane, use the drop-down menu to select the LAN configuration.
4. Click **Apply** to save the changes.

---

**Note** *It is possible to close the Ethernet service by disconnecting the Ethernet port. The user should be aware that it is possible to close the port and not have any access to the device. If this should occur the workaround is as follows:*

- *Connect the system from the remote site*
  - *Connect via other Ethernet port (IDU-C)*
  - *Power down the equipment and connect immediately after the power up (the fastest way is to enter install mode).*
- 

---

## 4.11 Setting the Maximum Information Rate

The maximum Ethernet throughput of the link can be limited. The default setting is Best Effort, where the highest information rate available for the link conditions and settings is used. (See [Figure 4-15](#))

**\* To set the Ethernet information rate:**

1. From the **Configuration** menu, select the site to reconfigure.  
The Configuration dialog box opens.
2. Click **Advanced > Ethernet**
3. In the Information Rate pane, use the drop-down menu to select the maximum Information Rate.
  - Select **Other** to define the throughput with 8 Kbps resolution
  - Select **Best Effort** for the highest information rate possible for the link conditions and settings.
4. Click **Apply** to save the changes.

**Note**

---

*WinLink 1000-ACCESS systems have a maximum rate of 2048 kbps.*

---

---

---

## 4.12 Changing Community Values

The ODU communicates with the management application using SNMPv1 protocol. The protocol defines three types of communities:

- Read-Only for retrieving information from the ODU
- Read-Write to configure and control the ODU
- Trap used by the ODU to issue traps.

The community string must be entered at login. The user must know the password and the correct community string in order to gain access to the system. A user may have read-only privileges.

It is not possible to manage the ODU if the read-write or the read community values are forgotten. A new community value may be obtained from technical support for the purpose of setting new community; the serial number or the MAC address of the ODU must be supplied.

---

**Note** *The manager application and the ODU use the community strings **public-bru1** for the local unit and **public-bru4097** for the remote unit. These are the factory defaults, but can only be used one time on the first installation.*

---

A new community string must be set when entering the system for the first time. The read-write community and read-only community have a minimum of five alphanumeric characters. (Bru1 and bru4097 are not permitted). Changing the trap community is optional by clicking the check box.

### Editing Community Strings

The community change dialog box is available from the **Configuration > Security** tab. Both read-write and read-only communities must be defined.

On entering for the first time, use **netman** as the current community. The community string must be changed when entering the system for the first time, and the community string **netman** cannot be used again.

\* **To change a community:**

1. From the Configuration dialog box, select the **Security** tab
2. Type the current read-write community (default is **netman**).



3. Select the communities to be changed by clicking the check box.
4. Type the new community and re-type to confirm.
5. Click **OK** to save.

**Change Community - HQ**

Enter current Read-Write Community:

Read-Write Community

New:

Confirm:

Read-Only Community

New:

Confirm:

Trap Community

New:

Confirm:

Hide characters

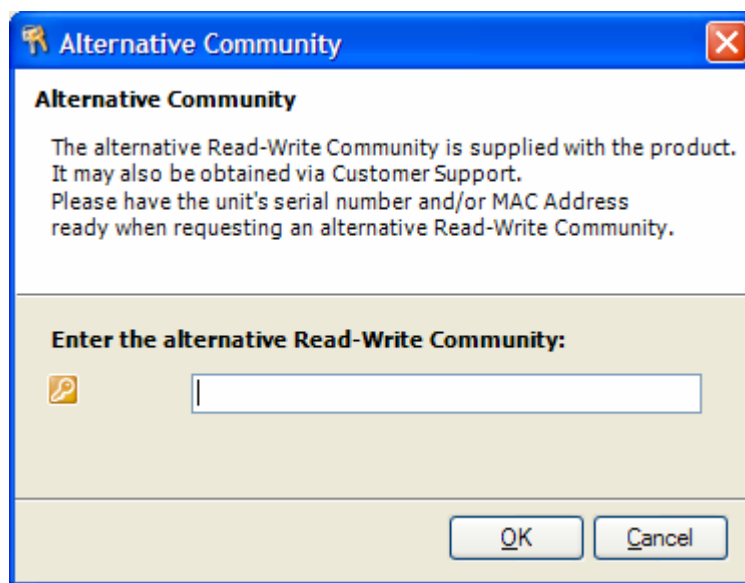
*Figure 4-16. Changing the Community String*

## Forgotten Community string

If the read-write community string is unknown, an alternative community key can be used. The alternative community key is unique per ODU and can be used only in order to change the community strings. The alternative community key is supplied with the product, and it is recommended to keep it safe.

If both the read-write community and the alternative community key are unavailable, then an alternative community key can be obtained from customer support using the ODU serial number or MAC address. The serial number is located on the product, and the MAC address is displayed in the manager inventory tab.

When you have the alternative community key, click the **Forgot Community** button and enter the Alternative Community (*Figure 4-17*). Then reconfigure the read-write community string.



*Figure 4-17. Alternative Community Dialog box*

---

## 4.13 Changing Passwords

There are two passwords necessary to use the WinLink 1000 system. The first is encountered when running the management software, the second, the link Password is used for encryption purposes and is found when installing or configuring the link.

## Changing the Management Password

- \* **To change the management password**
  1. From the Tools menu, select Change Password
  2. The Change Password dialog box appears.
  3. Enter current password, and new password.
  4. Click **OK** to confirm.

## Changing the Link Password

WinLink 1000 Radio Link is encrypted using Advanced Encryption System (AES) using a 128 bit dynamic key. During the installation process a Link Password must be set. An Initial encryption key is generated. Each time a link is established the Encryption key is validated. If the validation failed the link is established but no service or configuration is allowed. In this state the user can change the link password of each of the sites.

- \* **To change the Link Password:**
  1. From the Configuration dialog box, select the **Security** tab
  2. Click **Change** next to the Link Password field box.

The Change Link Password dialog box appears.
  3. Enter the current link password.
  4. Enter the new password.
  5. Enter the new password again in the Confirm box.

## Forgotten the Link Password

In case of a forgotten link password, the user may enter the key password supplied with the product. The key password may be obtained from customer support after validation of the device serial number or MAC address. The user may change the link password of both sides of the link at any time using the Link Configuration Wizard.

\* **To enter the key password:**

1. From the Configuration dialog box, select the **Security** tab.
2. Click **Change** next to the Link Password field box.  
The Change Link Password dialog box appears.
3. Click the **Forgot Link Password** button.  
The Key Link Password dialog box appears.
4. Type the key link password.
5. A new link password may now be set.

---

---

## 4.14 Muting the Beeper

The ODU beeper starts beeping as soon as power is supplied, and continues until the ODUs are aligned and the link established.

It is possible to mute the beeper until the alignment procedure is to be performed.

\* **To mute the beeper:**

1. Click on **Configuration** in the Menu bar and select the relevant site.  
The Configuration dialog box opens.
2. In the Configuration dialog box, click the **Buzzer** button. The button toggles between on and off.
3. The Beeper stops.

\* **To restore the beeper:**

1. Click **Configuration** in the Menu bar and select the relevant site.  
The Configuration dialog box opens.
2. In the Configuration dialog box, click the **Buzzer** button. The button toggles between on and off.
3. The Beeper starts.

---

---

## 4.15 Setting External Alarm Inputs

The IDU-C has two external alarm inputs in the form of dry-contact relays. The Alarm interface is located on the front panel of the IDU-C and is a 9-pin D-type female connector, see [Appendix A](#) for the pinout. The user enables or disables each of the alarms and can configure the text that appears in the alarm trap. The ODU sends the alarm within less than a second from actual alarm trigger.

\* **To set the external alarm inputs:**

1. Open the Site Configuration Alarms configuration by clicking **Configuration > Advanced**.

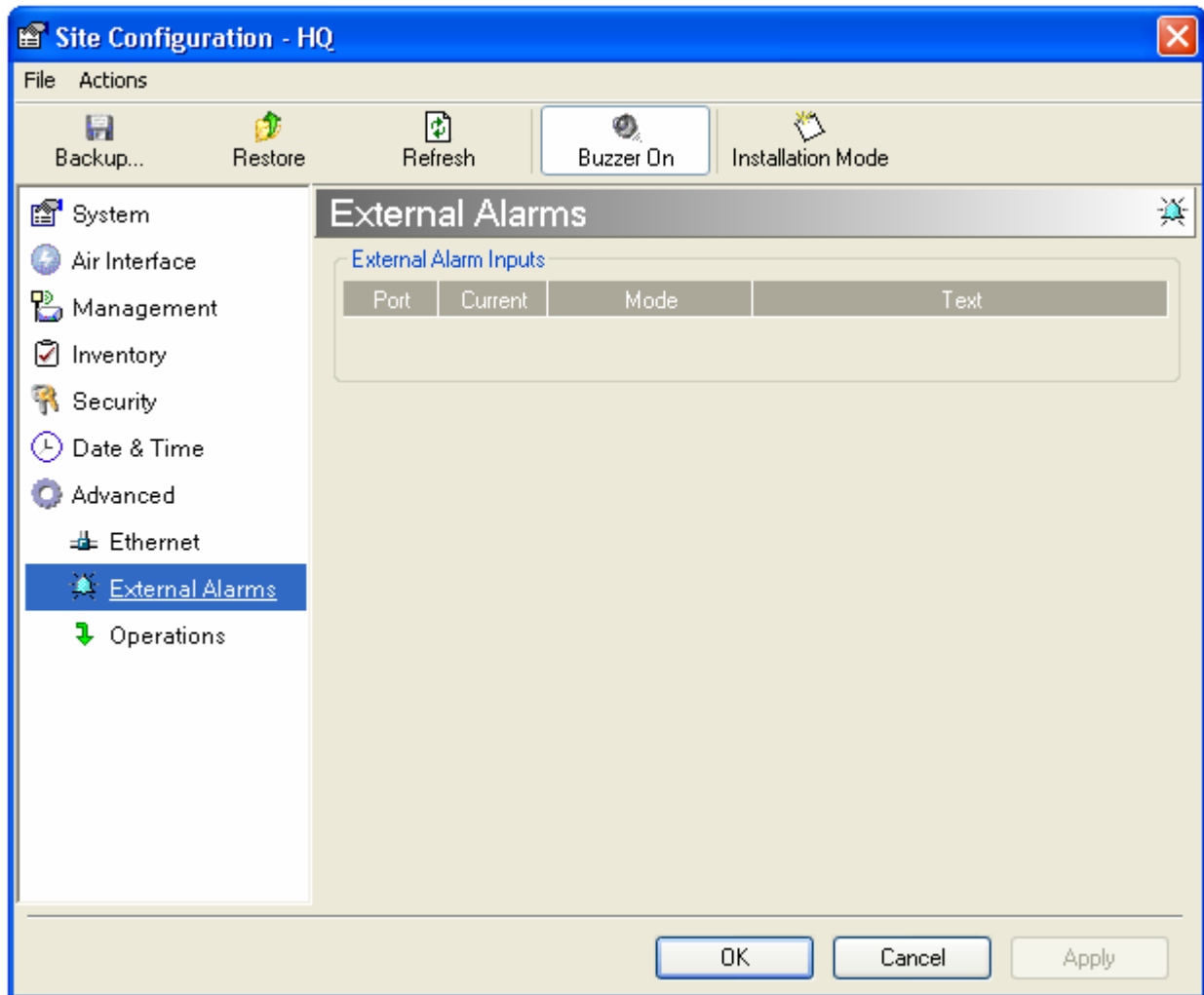


Figure 4-18. External Alarm Configuration

2. Enter a description of the alarms in the fields.
3. Click **Apply** to save.

---

---

## 4.16 Managing Configuration Files

### Saving WinLink 1000 Configuration in a File

WinLink 1000 management software allows you to save configuration parameters of the local and remote units on the management station as an INI file. Each site is saved in a separate INI file.

\* **To save the configuration in a file:**

1. Click **Configuration** from the main menu.

2. Select which site to backup.  
The configuration dialog box opens.
3. Click **Backup**.
4. In the Save As dialog box, indicate in which folder and under what name configuration file is to be saved, and click **Save**.

## Restoring a Configuration File

Configuration files (\*.ini) can be uploaded from the management station. Verified configuration files can be distributed to other units that use the same configuration.

**\* To restore a configuration file:**

1. From the **Configuration** menu, select the site to reconfigure.  
The Configuration dialog box opens.
2. Click **Restore**.
3. From the Open dialog box select \*.ini file to upload and click **OK**.

---

---

## 4.17 Reinstalling the Link

It may be necessary to reinstall the link if the ODUs should need to be realigned.

**Note**

---

*Activating Install Mode causes both sites to go into install mode, causing disruption in service for approximately fifteen seconds.*

---

**\* To reinstall the link:**

1. Click **Configuration** in the Menu bar and select any one of the sites.  
The Configuration dialog box opens.
2. Click the **Install Mode** button in the Configuration dialog box.  
A message box asking if you want to enter install mode appears.
3. Click **Yes** to continue.  
WinLink 1000 enters install mode and the beeper starts beeping.
4. Realign the ODUs and complete the Installation wizard (see *Chapter 2*).

---

---

## 4.18 Resetting WinLink 1000

---

**Note** *Resetting the link causes service disconnection.  
In order to maintain the link configuration, reset the remote WinLink 1000 first.*

---

**\* To reset WinLink 1000:**

1. From **Maintenance**, reset the remote WinLink 1000.
2. From **Maintenance**, reset the local WinLink 1000.

**\* To reset to Factory Defaults**

1. Click **Configuration** in the Menu bar and select any one of the sites.  
The Configuration dialog box opens.
  2. Select **Operations** in the Configuration dialog box.
  3. Click the **Restore Defaults** button.  
A message box asking if you want to restore factory default appears.
  4. Click the check box if you want to keep the current IP settings.
  5. Click **Yes** to continue.
- 
- 

## 4.19 Displaying the Inventory

**\* To view the inventory data**

1. Click **Configuration** from the main menu.
  2. Select which site to configure.  
The configuration dialog box opens.
  3. Select Inventory (*Figure 4-19*).
- 

**Note** *This screen is for viewing purposes only.*

---



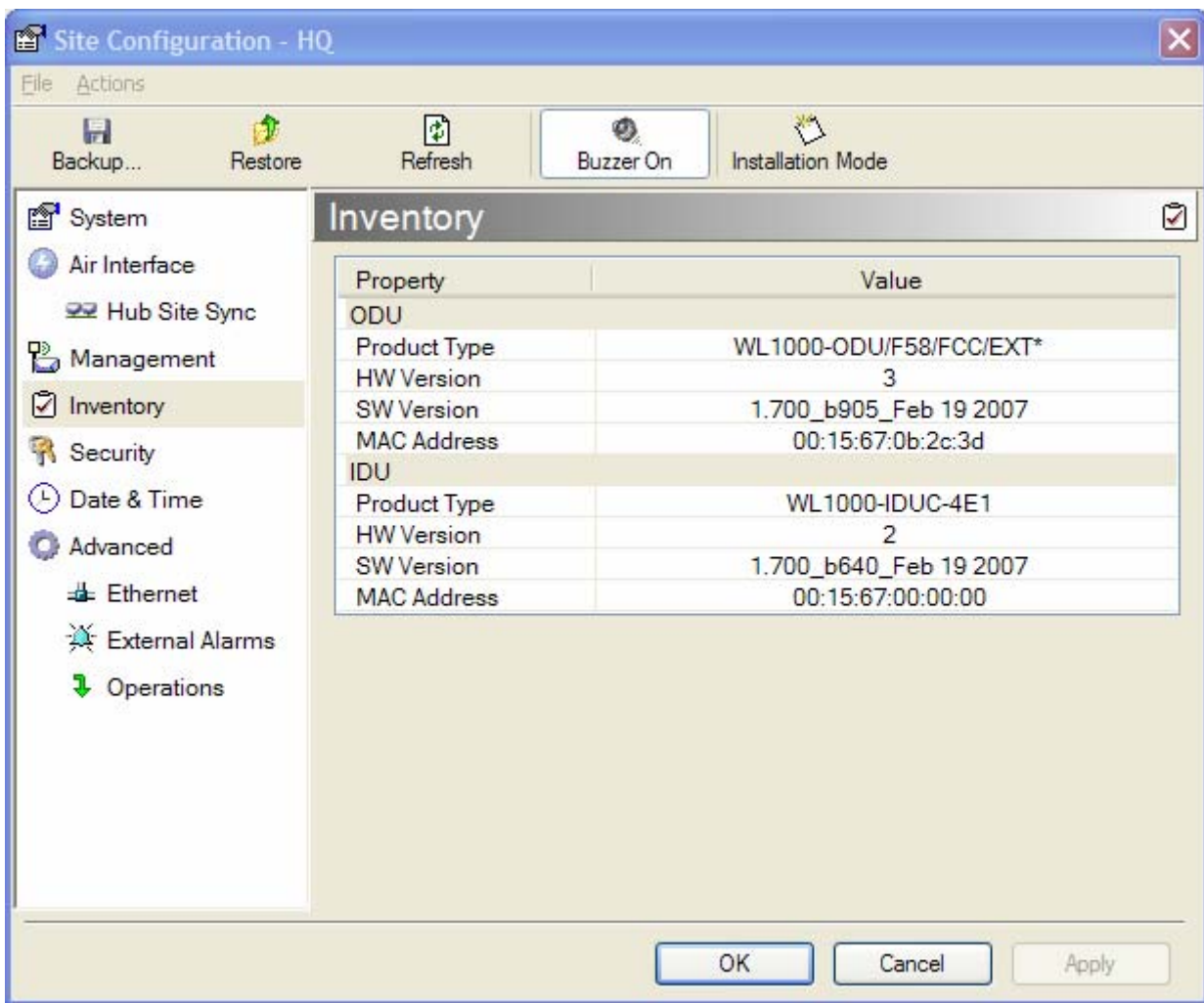


Figure 4-19. Inventory Screen

## 4.20 Configuration via Telnet

A Telnet terminal can be used to configure and monitor the ODU on site. Remote configuration cannot be performed via Telnet.

The login password is identical to the communities' strings; Read allows display only, Read/Write allows display and set commands.

Table 4- depicts the Telnet commands that are supported:

*Table 4-4. Telnet Commands*

Command	Explanation
display inventory	Displays ODU product name, Name, Location, hardware and software revisions, uptime, MAC address, IDU product name, IDU software and hardware revisions
display management	Displays IP, Subnet, Gateway, Traps table
display link	Displays State, SSID, Channel BW, RSS, TSL, Frequency/ACS, DFS, Rate/ARA, Distance
display Ethernet	Displays Bridge Mode, Aging time, Port table (State, Status and action)
display tdm	Displays Clock Mode, Master Clock Mode, Current Clock, Quality[1], TDM table (Line status, Error Blocks)
display ntp	Displays Time, Server and Offset
set ip <ipaddr> <subnetMask> <gateway>	Set the ODU IP address, subnet mask and gateway The user must reset the ODU after the command completion
set trap <index:1-10> <ipaddr> <port:0-65535>	Set a specific trap from the traps table (set trap 3 10.0.0.133 162)
set readpw <oldpasswd> <passwd>	Set the read access password (read community)
set writepw <oldpasswd> <passwd>	Set the read-write access password (read-write community)
set trappw <oldpasswd> <passwd>	Set the trap community string
set buzzer <mode:0=OFF,1 =ON>	Toggle the buzzer mode (0 - off, 1 - on)
set tpc<power:Value between minimal TX power, and maximal TX power>	Set the ODU transmit power. If a wrong value is entered, both min and max values shall be displayed in the error reply
set bridge <mode:0=Bridging OFF,1= Bridging ON >	Set the ODU bridge mode (0 - off, 1 - on)

Command	Explanation
reboot	Reset both the IDU and the ODU. The user shall be prompt that the command will reset the card and that he has to reconnect the telnet session after TBD seconds.
help	Displays the available commands

*Figure 4-20* shows the available Telnet commands via the Help command.

```

Hello admin, welcome to ODU Management CLI!
+-----+
      Software Revision      1.700_b900_Feb 11 2007
+-----+

admin@10.103.6.1-> help
  display inventory
  display management
  display link
  display ethernet
  display tdm
  display ntp
  set ip <ipaddr> <subnetMask> <gateway>
  set trap <index:1-10> <ipaddr> <port:0-65535>
  set readpw <oldpasswd> <passwd>
  set writepw <oldpasswd> <passwd>
  set trappw <oldpasswd> <passwd>
  set buzzer <mode:0=OFF,1 =ON>
  set tpc <power:Value between minimal TX power, and maximal TX power>
  set bridge <mode:0=Bridging OFF,1= Bridging ON >
  reboot
  help
Command "help" finished OK.

```

*Figure 4-20. Telnet Management Screen*