

WinLink™ 1000



Broadband Wireless Transmission System

User Manual and Installation Guide

Version 1.795.1

WinLink™ 1000

User Manual and Installation Guide

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FCC – User Information

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 (WinLink™ 1000) could void the user's authority to operate the equipment.

WARNING:

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.

The installer should configure the output power level of antennas, according to country regulations and per antenna type.

Note:

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.

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.
-

Canadian Emission Requirements for Indoor Units

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

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Chapter 1

Introduction

RADWIN's WinLink™1000 family of wireless broadband products deliver carrier-class performance at the most competitive price.

WinLink™1000 products pack legacy TDM and Ethernet services over the 2.3 - 2.7 GHz and 4.9 - 5.95 GHz spectrum bands, and comply with worldwide standards and regulations (including FCC and ETSI).

RADWIN's carrier-class WinLink™ 1000 products meet the stringent performance and quality demands of cellular carriers and service providers. Delivering high capacity connectivity of up to 48 Mbps at distances of up to 80 Km/50 miles, the WinLink™ 1000 products offer an unmatched combination of robustness and reliability at an affordable price.

Key Applications

RADWIN's WinLink™ 1000 systems are ideally suited to meet the needs of cellular carriers, service providers and private networks (such as private and public enterprises, government, educational and financial institutions).

The WinLink™1000 systems power a range of applications, among them:

- Cellular Backhaul
- Broadband Access
- Private Network Connectivity
- Video Surveillance

Cellular Backhaul

WinLink™ 1000 products enable cellular carriers to expand their networks in both urban and rural areas quickly and cost-effectively.

WinLink™ 1000 systems are ideally suited for a broad range of cellular backhaul deployment scenarios; they empower carriers to expand their presence into remote and low ARPU areas, provide enhanced overlay coverage in urban spots, and can serve as a temporary or backup backhaul solution.



Figure 1-1: Typical Cellular Backhaul Application

Broadband Access

With WinLink™ 1000, service providers can expand their service footprint rapidly and affordably, and provide high-capacity services that match the ever-growing demand for high-quality, high-speed broadband.

WinLink™ 1000 is the ideal solution for last mile access, and also powers WiFi backhaul and WMAX backhaul applications.

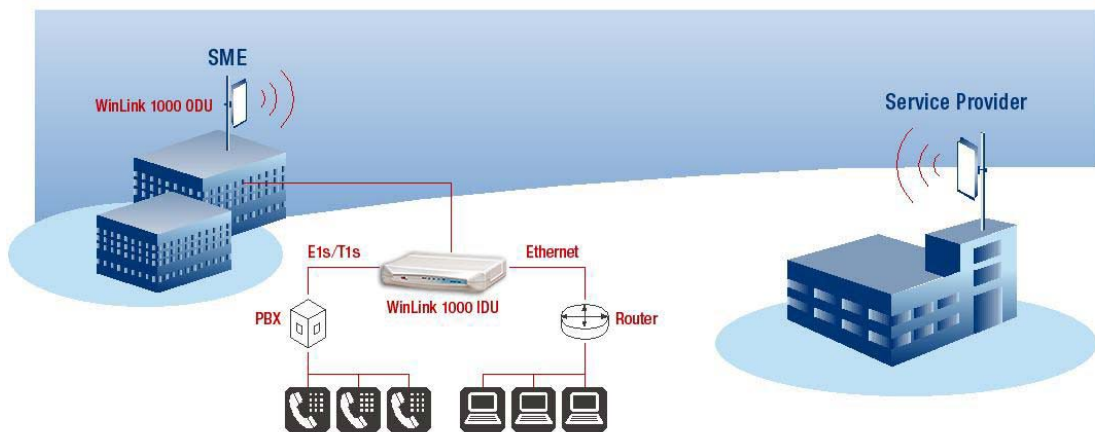


Figure 1-2: Typical Broadband Access Application

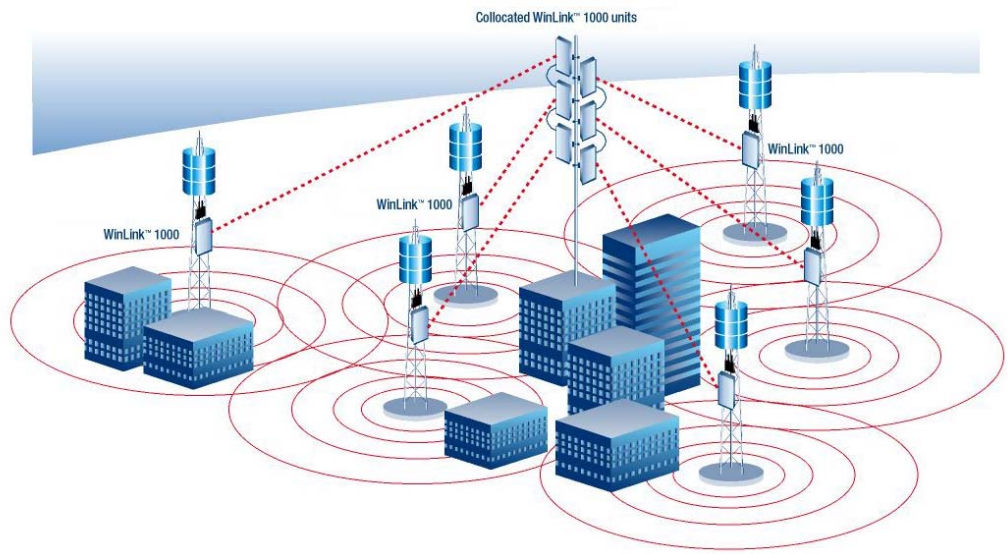


Figure 1-3: Typical WiFi Backhaul Application

Private Networks

WinLink™ 1000 is the perfect solution for private networks such as enterprises, education, government and utility organizations that want to own and control their networks and eliminate the high recurring charges for leased lines/cable. RADWIN's cost-effective solution enables organizations of all types to connect geographically dispersed buildings at ranges of up to 80 Km/50 miles.

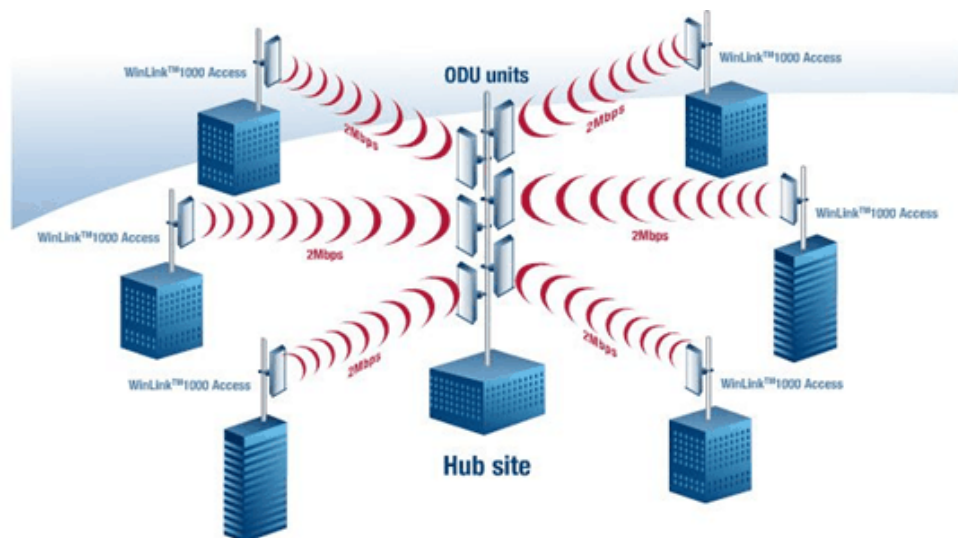


Figure 1-4: Multi Point-to-Point Enterprise Connectivity

Video Surveillance

RADWIN's WinLink™ 1000 wireless broadband systems allow organizations and system integrators to deploy video cameras virtually anywhere while eliminating the costs and installation hassles of wire-based systems. Reliable, robust and affordable, the WinLink™ 1000 systems support a variety of transmission topologies such as Ring, Star and Daisy Chain to provide surveillance coverage of the most challenging environments.

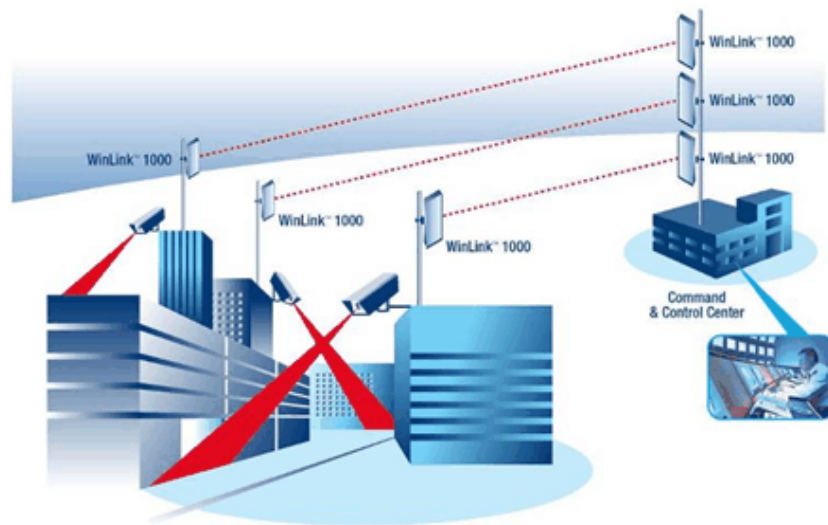


Figure 1-5: Multi Point-to-Point Video Surveillance Deployment

WinLink™ 1000 Key Features

The following represents some of the outstanding features that WinLink™ 1000 provides:

TDM + Ethernet in one Solution

WinLink™ 1000 systems deliver carrier-class TDM + Ethernet over one platform, making them ideal for a range of backhaul and access applications.

Simple Installation

WinLink™ 1000 systems are extremely simple to install and maintain, and are typically up and running in less than an hour.

Advanced Air Interface

The WinLink™ 1000 system design incorporates an exceptionally robust air interface based on patented technologies. The unique air

interface protocol of WinLink™ 1000 is designed to ensure non-stop, high quality transmission, even when encountering interference and harsh conditions.

Automatic Adaptive Rate

Automatic Adaptive Rate is a method of dynamically adapting the transmitted rate by changing both the signal modulation and coding. Automatic Adaptive optimizes the data throughput according to interference conditions, to optimize data throughput while maintaining service quality.

Unique Multi Point-to-Point Deployment

RADWIN's WinLink™ 1000 products can be installed in a unique multi point-to-point architecture. Multiple units are deployed in one hub site location, from where they provide a dedicated, high-capacity connection to each remote site.

This unique concept builds on RADWIN's Hub Site Synchronization (HSS) feature, which synchronizes the transmission of collocated WinLink™ 1000 units, thus virtually reducing mutual interference commonly experienced with collocated TDD radios.

Enhanced Air Interface Security

WinLink™ 1000's AES 128-bit key encryption provides enhanced air interface security.

Advanced Management and Performance Monitoring

The WinLink™ 1000 Manager software 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.

How to Use this Manual

This manual (WinLink User Manual and Installation Guide version 1.770) contains instructions for both setting up and managing the WinLink™ 1000 system. The following topics are covered:

- WinLink™ 1000 Hardware Installation
- WinLink™ 1000 Manager Software Installation
- Controlling and Monitoring the System Using the WinLink™ 1000 Manager
- Troubleshooting

It is recommended that you first read the Overview in the next chapter as this provides an understanding of the various parts of the system and how the system works.

Chapter 2

Overview

WinLink™ 1000 System Components

WinLink™ 1000 point-to-point solution is made up of a number of key components.

Typically, each side of the link comprises an Indoor Unit (IDU), an Outdoor Unit (ODU) and an antenna. A CAT5e cable from the IDU to the ODU provides both Ethernet and Power. The link is managed via the WinLink™ 1000 Manager application.

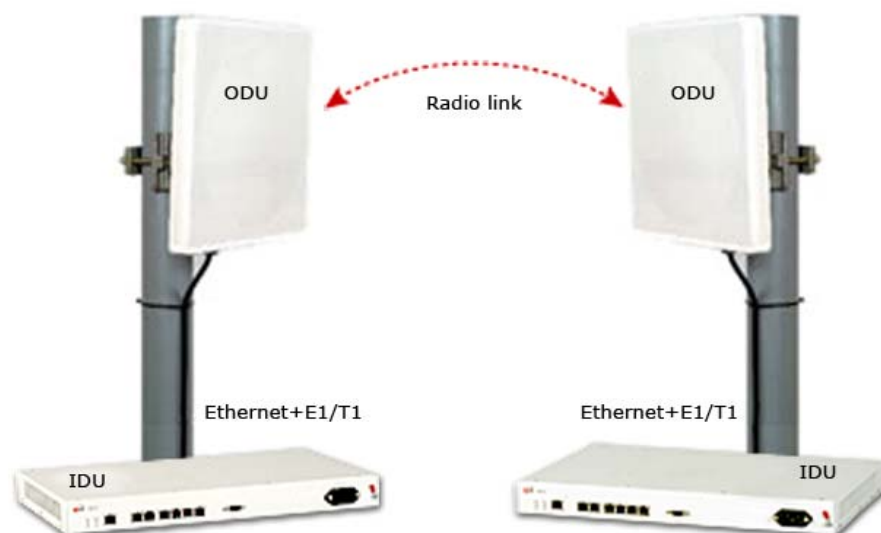


Figure 2-1: Example of Link Architecture

The Indoor Unit (IDU)

The IDU provides TDM and Ethernet ports to connect to the link. It also provides power to the ODU. The IDU is available in four configurations:

IDU-E

A compact, half 19 inch wide, 1U plastic unit, providing up to two Ethernet ports and up to two E1/T1 interfaces.



Figure 2-2: IDU-E Front Panel



Figure 2-3: IDU-E Back Panel

IDU-C

A 19 inch, 1U metal unit, providing two Ethernet ports, 4x E1/T1 interfaces, and dry contact connector alarm.



Figure 2-4: IDU-C Front Panel

IDU-R

A compact, half 19 inch, 1U plastic unit for 1 x T1/E1 backup, providing in addition 2 Ethernet ports and an external alarms interface. IDU-R is an indoor unit used for automatic backup of leased lines. IDU-R monitors the status of leased lines, and in the event of a connection failure automatically switches to the radio link. The user configures which of the two links is the main link and which is the backup link. IDU-R operates with all WinLink™ 1000 outdoor units.



Figure 2-5: IDU-R Front Panel



Figure 2-6: IDU-R Back Panel

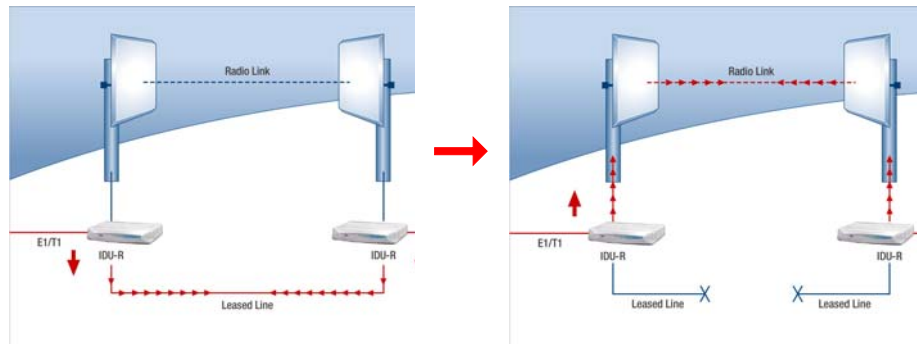


Figure 2-7: Backup link for E1/T1 connections

Power Over Ethernet Units

Power over Ethernet units provide Ethernet services only.

Power over Ethernet (PoE)

An extremely compact device, the Power Over Ethernet (PoE) provides Ethernet only services through one Ethernet port.



Figure 2-8: PoE

Note:

The PoE can only be connected to ODU's that are PoE enabled, or that are High End or Access ODU's.

PoE8

A 19 inch, 1U metal unit providing 8 Ethernet ports enabling connection to collocated Ethernet applications.



Figure 2-9 PoE8

O-PoE

Similar to the PoE, with weatherproof casing and sealed connectors that enables outdoor connectivity (a special mounting kit is supplied for attachment to a mast).



Figure 2-10: O-PoE Unit

The Outdoor Unit (ODU)

The ODU is the radio transceiver of the WinLink system and is the main component of the system. The ODU connects to an antenna that enables radio communication and can be mounted on a pole or wall. The ODU connects to the IDU via a CAT5e cable.

ODUs are available in different frequencies and regulations in the ranges: 2.3-2.7GHz, 4.9-5.95GHz.

The ODU comes in two different form factors depending on the type of antenna:

- **ODU with integrated 1ft flat panel antenna.** This unit contains both the ODU and antenna as a single unit housed in a weatherproof casing.
- **ODU with a connector for an external antenna.** The unit is fitted with an N-type connector. An external antenna can extend the range of the link, and in some cases, may help to reduce environmental interferences.

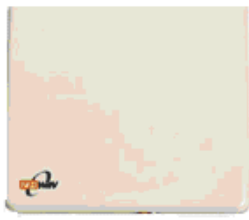
Various external antennas are available for the WinLink™ 1000 operating frequencies.



ODU with integrated antenna



Figure 2-11: ODU with integrated antenna



External 1ft flat antenna for 5.xGHz Band 4.5° Linear



Parabolic 32.5Bi for 5.xGHz Band 4.5° Linear



Grid 24dBi for 2.4GHz Band 8° Linear

Figure 2-12: Typically used External Antennas

There are three series of ODU:

- WinLink™ 1000 Access
- WinLink™ 1000
- WinLink™ 1000 High End

The following table shows the differences between the systems:

Table 2-1:ODU Series Typical Characteristics

| | WinLink™ 1000 Access | WinLink™ 1000 | WinLink™ 1000 High End |
|-------------------------|-----------------------------|----------------------|-------------------------------|
| Max Ethernet Throughput | 2Mbps | 18Mbps | 18Mbps |
| Max. Range | 20Km | 80Km | 80Km |
| Supported IDU devices | PoE | PoE and IDU | PoE and IDU |
| Services | Ethernet | Ethernet and TDM | Ethernet and TDM |
| HSS | + | - | + |
| Tx PW | 18 dBm | 18 dBm | 23 dBm |

WinLink™ 1000 Manager

The WinLink™ 1000 Manager is an SNMP based element and link management application which manages a complete link via a single IP address. It identifies the IP Address, Subnet Mask, and Trap Destination for each Site and also monitors the Radio Interface – RSS [dBm] and Ethernet Service – Rx Rate and Tx Rate. The Manager software facilitates the Link installation and Link configuration between the ODU units. The intuitive, easy-to-use Manager has a graphical MS-Windows interface, and can be utilized locally and remotely.

WinLink™ 1000 Manager provides:

- Planning tools such as a *Link Budget calculator* for calculating the expected performance of the WinLink wireless link and the possible configurations for a specific link range.
- Installation Wizard
- On-line monitoring of air interface quality allowing the administrator to monitor the service and status of each link.
- On-line monitoring of equipment alarms and QoS
- Local and remote loopback testing
- Configuration settings
- On-line user manual and help files
- Over-the-air software upgrades

The WinLink™ 1000 Manager can easily be integrated with any NMS system.

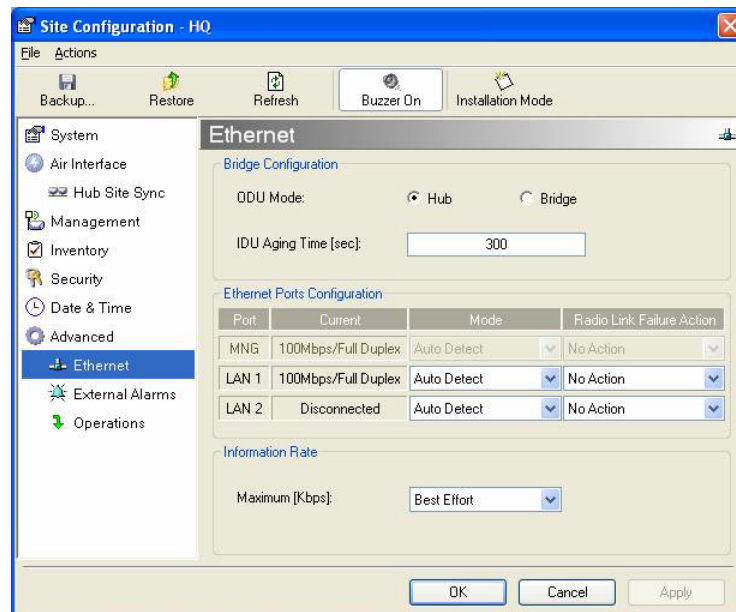


Figure 2-13: WinLink™ 1000 Manager screen

(All Indoor Unit) AIND

The AIND - All Indoor unit offers a single enclosure for Radio and Multiplexer modules. It enables outdoor placement of only a passive element.



Figure 2-14: AIND - "All Indoor" unit connected to antenna

Technical Specifications

Air Interface

WinLink is available in several different frequency band ranges that comply with ETSI, FCC and IC regulations.

Frequency Bands and Channel Bandwidth

Table 2-2: Configurable Transmission Options

| | | | | | |
|--|---|---------|---------|------------------|--|
| Frequency Bands | Max Transmit Power (Configurable) | | | Max Antenna Gain | |
| 5.740-5.835 GHz | 30 dBm | | | 32 dBi | |
| 5.470-5.725 GHz | 4 dBm | | | 22 dBi | |
| 5.250-5.350 GHz | 3 dBm | | | 22 dBi | |
| 2.499-2.687 GHz | 24 dBm | | | 22 dBi | |
| 2.513-2.679 GHz | 24 dBm | | | 17 dBi | |
| 2.412-2.462 GHz | 27 dBm | | | 15 dBi | |
| Channel Bandwidth | 5MHz, 10MHz and 20MHz (5MHz Resolution) | | | | |
| Duplex Technique | TDD (Time Division Duplex) | | | | |
| Sensitivity (dBm) @BER <10e-11 (20MHz) | -87 | -84 -80 | -79 -73 | -66 -62 | |
| Rate (Mbps) | 9 | 12 18 | 24 36 | 48 54 | |
| Modulation@OFDM (Adaptive) | BPSK | QPSK | 16QAM | 64QAM | |

Rates and Services Supported

WinLink systems offer a variety of channel bandwidths, maximum throughput and supported services.

Table 2-3: Rates and Services Supported

| | | | |
|--------------------|--------------------|-------------------------|--------------------|
| Channel Bandwidth | 5 MHz | 10 MHz | 20 MHz |
| Maximum Throughput | 5.4 Mbps | 9.9 Mbps | 18 Mbps |
| Supported Services | 1 E1/T1 + Ethernet | 2E1s or 4T1s + Ethernet | 4 E1/T1 + Ethernet |
| Ethernet Latency | 8 msec | 6 msec | 3 msec |

NOTE

Before each installation you must use the Link Budget Calculator (Link Budget Calculator) to locate the supported rates and services for your particular product.

Regulations

WinLink operation complies with the radio and environmental regulations listed in the following tables:

Table 2-4: Radio Regulations

| | |
|-----------|---|
| FCC 47CFR | part 15 subparts B&C and E, part 27 and part 90 |
| IC | RSS-210 |
| ETSI | EN 300 328 and EN 301 893 |
| UK | VNS 2107 |
| Australia | AS/NZS 4771 |
| India | WPC |

Table 2-5: Environmental Regulations

| | |
|---------------|--|
| Safety | EN 60950, IEC 60950, UL 60950, CAN-CSA C22.2 60950 |
| EMC | EN 300 386, EN 301 489, EN 55022, EN 61000, EN 55024, AS/NZS CISPR 22, CAN/CSA-CEI/IEC CISPR 22-02, FCC 47CFR class B part 15 sub-part B |
| Environmental | IEC 60721 class 4M5 IP67 |

Ethernet Services

The WinLink LAN port provides 10/100BaseT interfaces with auto-negotiation and transparent VLAN support. Traffic handling is provided by a MAC level self-learning bridge. Ethernet services include:

- 1 or 2 Ethernet interfaces in the indoor units
- 10/100BaseT with auto-negotiation (IEEE 802.3)
- Layer 2 Ethernet bridge
- Self-learning of up to 2047 MAC addresses (IEEE 802.1Q)
- Support of 1+1 applications (HUB/Bridge selectable mode)
- Up to 18 Mbps symmetrical net throughput
- VLAN transparent
- Latency < 3msec

- Retry mechanism for loss-less connection (Fast ARQ)

TDM (E1/T1) Services

The WinLink TDM interface accepts E1 or T1 traffic, supporting unframed operation (E1 and T1) and AMI and B8ZS zero suppression (T1). TDM services include:

- 1 to 4 E1/T1 interfaces in the indoor units
- Standard E1/T1, compliant with ITU-T standards
- Unframed E1/T1
- BER < 1×10^{-11} @ sensitivity threshold
- Accurate clock recovery mechanism (<50 PPB)
- One way delay < 8msec
- Advanced clock configurations

Technical Specification Summary

Table 2-6: Technical Specification Summary

| | | |
|----------------------|--|---|
| Air Interface | Technology | OFDM |
| | <i>Duplexing Method</i> | Time Division Duplex (TDD) |
| | <i>Capacity</i> | Configurable up to 54 Mbps |
| | <i>Modulation</i> | OFDM - BPSK, QPSK, 16QAM, 64QAM |
| | <i>Channel Resolution</i> | 5/10/20 MHz (ETSI systems do not support 5/10) (BRS systems Single and Double only) |
| | <i>Transmitter Power</i> | Specification is different per product, for further details refer to the Link Budget Calculator |
| | <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]</i> | 2.3-2.7GHz, 4.9-6GHz. |
| Antennas | (See Antenna Characteristics in Antenna) | |
| LAN Interface | <i>PHY</i> | Up to 2 × 10/100BaseT, auto-sensing |
| | <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 for IDU 1800 bytes max for POE |
| | <i>Connector</i> | RJ-45 |
| E1 Interface | <i>Data Rate</i> | Unframed (transparent) 2.048 Mbps |
| | <i>Line Code</i> | HDB3 |
| | <i>Connector</i> | RJ-45 |
| | <i>No. of Ports</i> | IDU-E: 1 or 2 IDU-C: 4 |
| T1 Interface | <i>Data Rate</i> | Unframed (transparent) 1.544 Mbps |
| | <i>Line Code</i> | AMI, B8ZS |
| | <i>Connector</i> | RJ-45 |
| | <i>No. Of Ports</i> | IDU-E: 1 or 2 IDU-C: 4 |

| | | | |
|------------------------|-----------------------------------|---|-----------------|
| Air Interface | Technology | OFDM | |
| Indicators | <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 | |
| Power | <i>Source</i> | <p>IDU-E: 100–240 VAC via external AC/DC converter IDU-C: 100–240 VAC via AC cable -20 to –60 VDC</p> <p>O-PoE: 100–240 VAC via attached (pigtail) AC cable</p> <p>PoE-8: 100–240 VAC via AC cable -20 to –60 VDC Max</p> <p>Note: Both AC and DC power sources can be connected simultaneously but only one source will supply the power</p> | |
| | <i>Power Received by the ODU</i> | -42 to -60 VDC | |
| | <i>Power Consumption</i> | ODU plus IDU-E or IDU-E-AL or IDU-R – 10W max ODU plus IDU-C – 14W max AIND – 14 max O-PoE plus ODU – 25W max PoE-8 plus 8 ODU units – 60W max | |
| | <i>Connector</i> | IDU-E 2-pin IDU-C AC – 3-pin IEC connector DC – 3-pin terminal block | |
| Alarm Connector | <i>Connector</i> | DB-9 female for IDU-C/AIND/PoE-8 DB-25 female for IDU-E-AL/IDU-R | |
| | <i>Electrical Characteristics</i> | Dry Contact, 30V/2A Max input current, 0.01A at 0.5W (R=5K) | |
| Sync Connector | <i>Connector</i> | RJ-11 for AIND | |
| Physical | <i>Outdoor Unit</i> | ODU with integrated antenna | |
| | <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 |

| | | | |
|----------------------|--|---------------------------|-------------------------|
| Air Interface | Technology | OFDM | |
| | Indoor Unit | IDU-E | IDU-C/AIND/PoE-8 |
| | <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) |
| Environment | Outdoor Unit | | |
| | <i>Enclosure</i> | All-weather case | |
| | <i>Temperature</i> | -35 to 60°C/-31 to 140°F | |
| | Indoor Unit (IDU-E, IDU-E-AL, IDU-R, and IDU-C) | | |
| | <i>Temperature</i> | -0 to 50°C/32 to 122°F | |
| | <i>Relative Humidity</i> | Up to 90%, non-condensing | |
| | Indoor Unit (PoE-8) | | |
| | <i>Temperature</i> | -0 to 45°C/32 to 113°F | |
| | <i>Relative Humidity</i> | Up to 90%, non-condensing | |
| | All Indoor Unit (AIND) | | |
| | <i>Enclosure</i> | IDU-C indoor unit | |
| | <i>Temperature</i> | -35 to 60°C/-31 to 140°F | |

Installation and Setup

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

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.

Package Contents

The WinLink 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

IDU-C Package containing:

- IDU-C

- For AC model, 110/240 VAC with IEC 60320 socket cable
- For DC model, 3-prong terminal block connector (green)
- 19" mounting kit
- Spare RJ-45 connector

PoE-8 Package Containing:

- PoE-8
- 110/240 VAC with IEC 60320 socket cable
- 3-prong terminal block connector (green)
- 19" mounting kit
- Spare RJ-45 connector

External antenna (if ordered)

- 1m RF 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

Additional Equipment Required

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

- RJ-45 crimp tool (if pre-assembled ODU/IDU cable is not used)
- Drill (for wall mounting only)
- IDU and ODU 10AWG grounding cables
- O-PoE 10AWG grounding cable
- 13 mm (1/2") spanner/wrench
- ODU to IDU cable if not ordered (outdoor class, CAT-5e, 4 twisted pairs 24AWG)
- ODU to O-PoE both cables (ETH and PoE) if not ordered (outdoor class, CAT-5e, 4 twisted pairs 24AWG)
- Cable ties
- Laptop running Windows 2000 or Windows XP.

Installation Sequence

The following steps are required to install the WinLink system:

1. Install the management program on the network management station/laptop. See *Installing the WinLink Management Software*, page 3-24.
2. Mount the ODU at each site (and antenna if external antenna is used). See *Mounting the ODU*, page 3-25.
3. Connect the ODU to the IDU at both sites. See page 3-27.
4. Connecting the Ground to the IDU, IDU-C, PoE-8, page 3-28.
5. Connect the power. See *Connecting Power to an IDU*, page 3-29, and *Connecting Power to an O-PoE*, page 3-29
6. Align the ODU/antennas. See page 3-30.
7. Run the Installation wizard from the management program. See 3-31.
8. Connect user equipment to the local and remote IDUs. See page 3-35.

The following diagram illustrates a typical installation of WinLink™ 1000 with an external antenna.

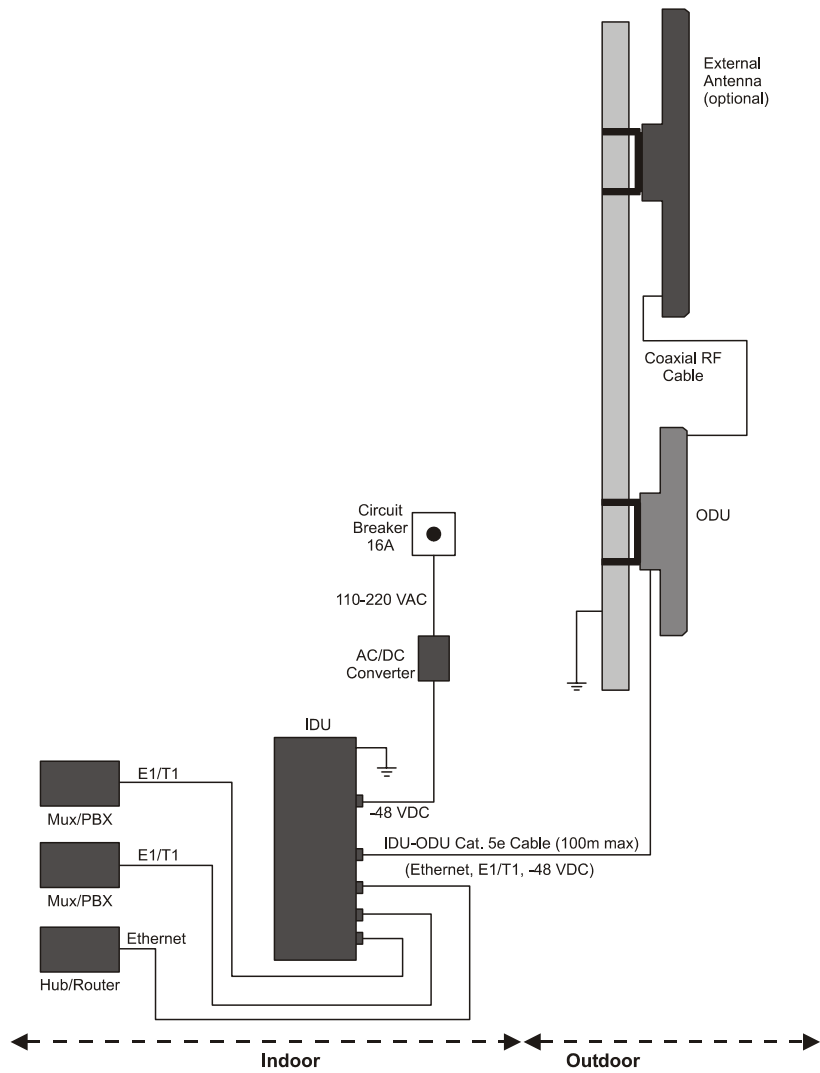


Figure 3-1: Typical Installation Diagram (with external antenna)

The installation steps are detailed in the following sections.

Installing the WinLink Management Software

Minimum Requirements

The WinLink 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 management program:

1. Insert the CD-ROM into your CD-ROM drive.

The WinLink™ 1000 Installation screen appears:



2. Choose Install WinLink™ 1000 Manager and 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.

Mounting the ODU

The ODU is the transceiver element of the WinLink system. The ODU can be mounted on a mast or a wall. In both installations, the supplied mounting kit is used to secure the ODU.

Mast and Wall Installation describes the mast/wall installation instructions.

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



Warning

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:

1. Verify that the ODU mounting brackets are properly grounded.
2. Mount the ODU onto the mast or wall. Ensure that the unit is oriented so that the cable connectors are at the bottom. **(If they are on top, water may penetrate into the unit causing damage.)** Refer to Mast and Wall Installation for the ODU or 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 Wiring Specifications for the connector pin-out.
5. Screw in the cable glands to ensure hermetic sealing of the ODU.
6. Secure the cable to the mast or brackets using UV-rated cable ties.
7. 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.

Connecting the ODU to the IDU

The ODU-IDU cable conducts all the user traffic between the IDU and the ODU. 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 or PoE-8, the maximum length for two legs of the O-PoE or PoE-8 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 24AWG shielded cable. Wiring specifications are given in
Wiring Specifications.

To connect the ODU to the IDU

1. Route the cable from the ODU to the IDU.
2. Secure the cable along its path.
3. Connect the ODU-IDU cable to the RJ-45 connector on the IDU.

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



Figure 3-2: Typical IDU-E Rear Panel



Figure 3-3: IDU-R Rear Panel



Figure 3-4: Typical IDU-C Front Panel



Figure 3-5: AIND All Indoor Radio Unit



Figure 3-6: PoE-8 Unit



Figure 3-7: O-PoE Unit

Note:

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

IDU-R Installation

Installation of an IDU-R unit differs from other IDU models in one respect: At the rear of the IDU-R (see Figure 2-6 above) there are two jacks labeled "Trunks". For each IDU-R, the E1 cable from outside should be plugged into one of the trunks, and the E1 cable to the other

station should be plugged into the second trunk, as in the left hand side of Figure 2-7 above.

Apart from the above difference, the link installation including the remaining part of the IDU installation and connection to the ODU proceeds as described as above.

Connecting the Ground to the IDU

Connect an 18AWG grounding cable to the grounding terminal of the device. The device should be permanently connected to the ground.

Connecting Power to an IDU

AC power is supplied to the WinLink™ 1000 IDU through a standard IEC 60320 connector.

AC power should be supplied via a 1.5m (5 ft) standard power cable terminated by a IEC 60320 socket. A cable is provided with the unit.

To connect AC power to an IDU:

Connect the power cable socket to the power connector on the WinLink front panel.

- 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

A special 3-prong socket for DC 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 wire 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.



Warning

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 ≤ 150V, the transient rating is 1500V;

for $150V < \text{mains} \leq 300V$, the transient rating is 2500V;
for $300V < \text{mains} \leq 600V$, the transient rating is 4000V).

Aligning Antennas with the Beeper



Perform the antenna alignment using the ODU's audible tone. The tone is not suitable for aligning the All Indoor Units (AIND). To align an AIND system, see AIND Alignment.

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

*** To align the ODUs using the alignment tone:**

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

Do not stand in front of a live ODU.

Provided that Site A detects the signal from Site B, the ODU starts beeping 20 seconds after power up, and continues beeping until the ODUs are aligned, and the installation is complete.

2. Verify normal operation of the IDU by the LED indications on the front panel. See IDU Front Panel Indicators.
3. Direct the antenna of site B in the direction of the site A. This is simplified if a previous site survey has been completed and azimuths are known.
4. Make an azimuth sweep of 180 degrees with the site A ODU so that the strongest signal from site B can be detected.
5. Slowly turning the site A ODU back towards the position of Site B, listen to the tone until the best signal is reached. See the following figure for audible signal variations.



Figure 3-8: 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.

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

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
 Hub Site Synchronization..*

*** To install the link:**

1. Verify that there is IP connectivity between the management station/laptop and the IDU, and that the WinLink™ 1000 Manager application is running.
2. With BRS systems you need to activate the link at both sites, see BRS Installation Procedure for method. Once the link is activated, continue installation from this point.

3. In the toolbar, click the Link Installation button. The Link Installation button is only accessible if antennas are aligned. Align antennas if this box is "grayed out".

The Installation wizard opens:

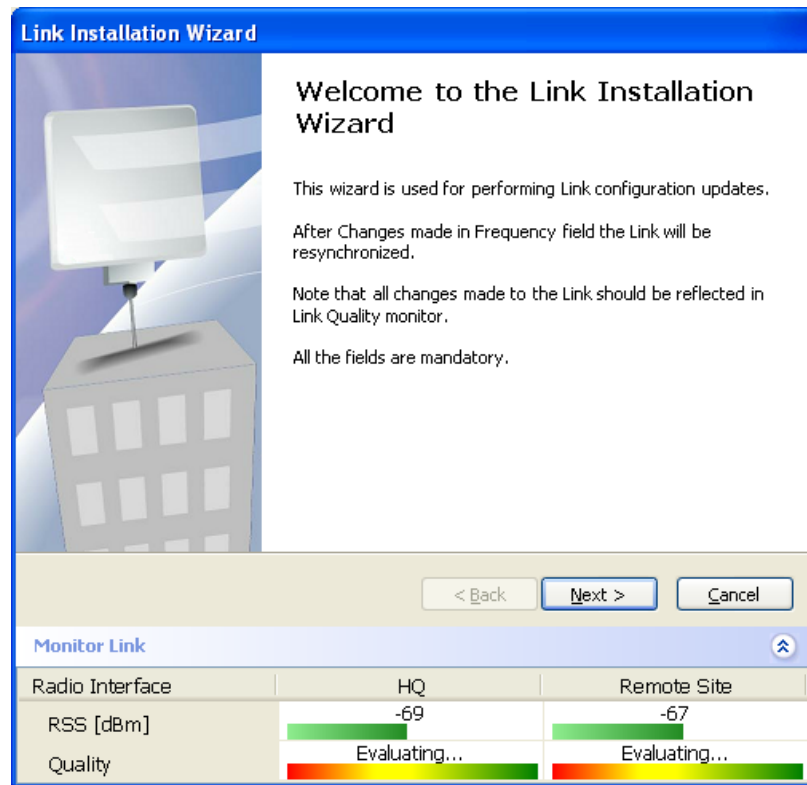


Figure 3-9: Link Installation Wizard

4. Click Next to proceed with the installation procedure.

The system dialog box opens:

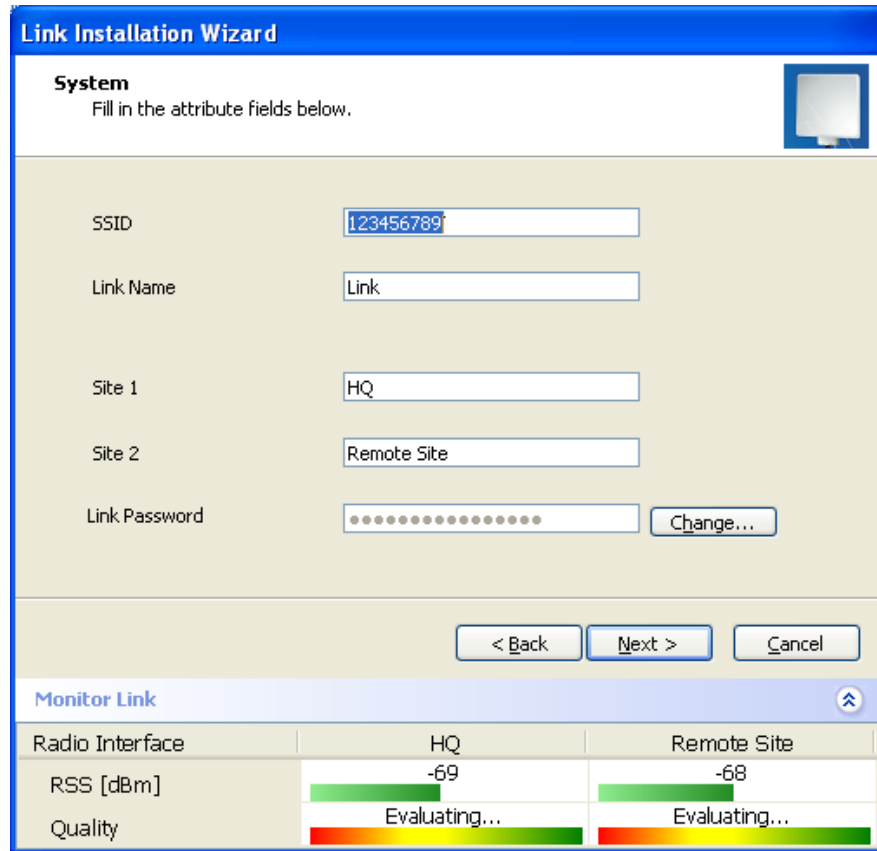


Figure 3-10: Installation Wizard, System dialog box

5. Enter a SSID (System ID – must unique for each link in the area). 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.

6. Enter a Link Name for the link identification.
7. Enter a name for site 1 (the site to which your laptop is connected).
8. Enter a name for site 2 (remote site).
9. Optionally enter a new Link Password (version 1.400 and after). See Changing the Link Password, page 7-115 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.

10. 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.

Changing the Link Password

The default password is Wireless-Bridge. Optionally, you can change the link password as explained here.

*** To change the Link password:**

1. Click the Change button in the System dialog box.

The Change Link Password dialog box opens.

Note:

Use the Hide Characters check box for maximum security.

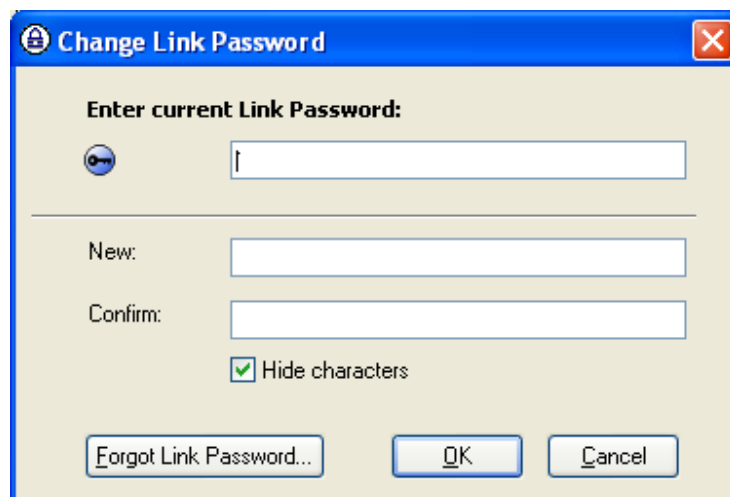


Figure 3-11: Change Link Password dialog box

2. Enter the default link password wireless-bridge.
3. Enter a new password.
4. Retype the new password in the confirm field.
5. Click OK.
6. Click Yes when asked if you want to change the link password.
7. Click OK at the successful message.

Note:

Restoring Factory Defaults returns the Link Password to wireless-bridge.

Connecting the User Equipment

The IDU is a standalone desktop, wall-mounted, or rack-installed unit. The following figure illustrates a typical front panel of the IDU:



Figure 3-12: Typical Front Panel of IDU-C

*** 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
Wiring Specifications, 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
Wiring Specifications for the connector pinout.

Note:

Use a straight cable for router connection.

Do not connect two LAN ports to the same LAN, or flooding may occur.

Selecting Channels

WinLink systems 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.

Note: For the ETSI version, skip to page 3-37; for the BRS version, skip to page 3-38.

WinLink™ 1000 with Automatic Channel Select

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

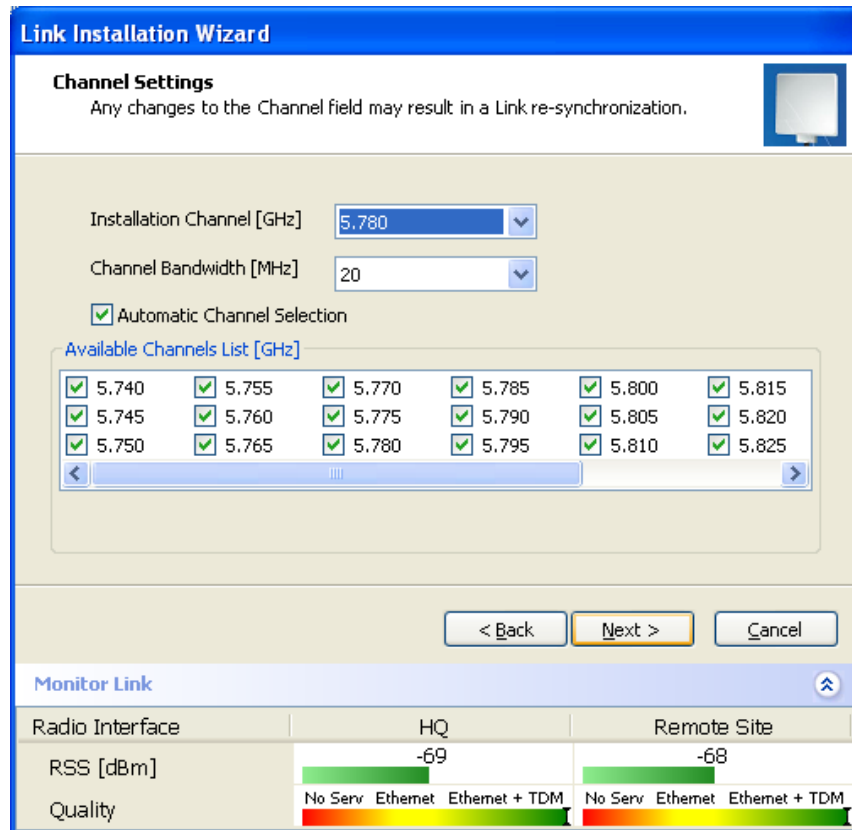


Figure 3-13: Channel Select dialog box - Automatic Channel Select

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, the WinLink Manager repeats evaluation of the link.

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.

| | Quality | Service |
|--------------|---------|--------------------------------------|
| 0.1% – 0.4% | 80-99% | TDM + Ethernet |
| 0.4% – 2.0% | 77- 56% | Ethernet |
| 2.0% – 50.0% | 44 - 2% | Antenna Alignment or replace Channel |

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. Skip to page 3-40 to set the Service parameters.

Note:

Any changes to the frequency settings cause the link to re-synchronize. A short loss of service will occur during re-synchronization.

WinLink 5.4 GHz ETSI Version

In accordance with ETSI, if WinLink 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. Proceed to page 3-40.

WinLink™ BRS Version

Note:

Both sites in a BRS Link must be configured identically.

*** To Configure BRS Channel Settings**

1. Set the Band Plan.
2. Select the Bandwidth required,
Single Band (5 MHz)
Double Band (10 MHz)
Quad Band (20MHz)
3. Select the Frequency from the pull-down menu.
4. Click Next. The system is re-synchronized to the changes.

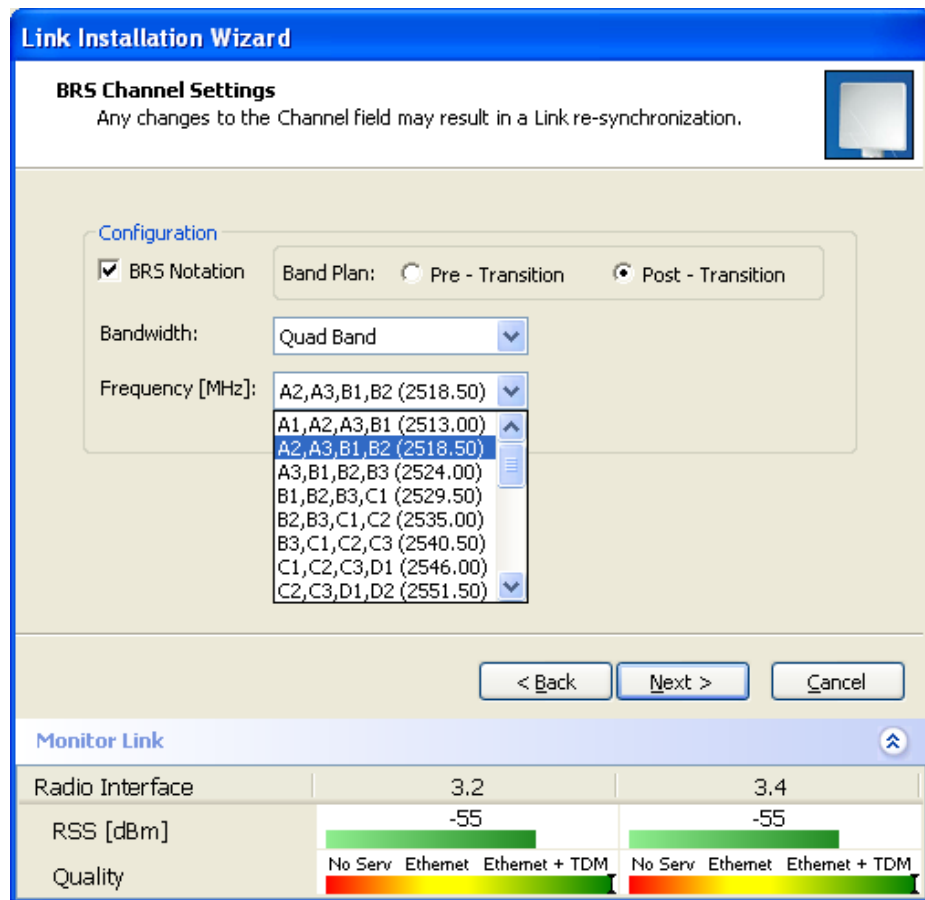


Figure 3-14: BRS Channel Settings Post-Transition

Selecting the Service Parameters

You define the type of service required, Ethernet Only or Ethernet with TDM in the Services screen as shown below. Notice that the Distance between the sites automatically appears in the Distance box (from Version 1.600).

Note:

WinLink ACCESS versions are Ethernet Only.

Link Installation Wizard

Services
Select the Services and Rate from the lists below.

Service Configuration | TDM Jitter Buffer

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 | 1.770_b710_Sep 9 2007 | 1.770_b710_Sep 9 2007 |

< Back | Next > | Cancel

Monitor Link

| Radio Interface | HQ | Remote Site |
|-----------------|-----|-------------|
| RSS [dBm] | -61 | -63 |

Figure 3-15: Installation Wizard, Service dialog box

*** To select the services and rates:**

1. In the Services box, select a service:
 - Ethernet Only
 - Ethernet + E1/T1.

The available bandwidth depends on the number of E1/T1 ports selected.

2. In the Rate box, select the required transmission rate.
If Adaptive is selected (refer to page 1-5 for information about Automatic Adaptive Rate), WinLink 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.
3. Click the Evaluate button. The optimum transmission rate for the selected services is evaluated. Table 3-1: Rates per Bandwidth shows the rates used by WinLink.
4. Click **Next**.

If TDM services were selected, then the TDM parameters dialog box appears, (see *Figure 3-16: TDM Parameters dialog box*).

Note:

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

If Ethernet Only was selected, then the Finish screen appears (see *Figure 3-19: Installation Wizard, Finish Screen*) showing a summary of the link configuration, the alignment is complete.

Table 3-1: 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 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 in the following table.

Table 3-2: 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 |
| 4 | Internal | Recover | Recover | Recover |
| 5 | Recover | Internal | Recover | Recover |

Transparent/Transparent

WinLink 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.

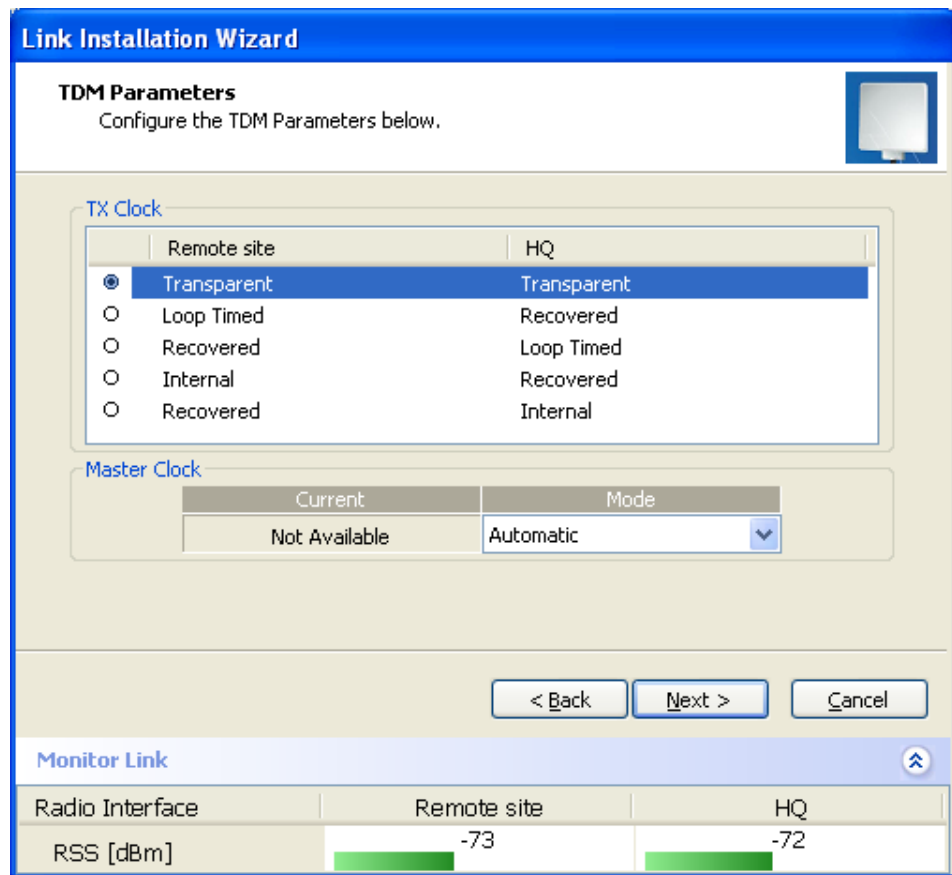


Figure 3-16: TDM Parameters dialog box

Note:

This dialog box is available with IDU-E and IDU-C units; it is activated after TDM service is 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 (for IDU-R only)

IDU-R units have two E1 trunk lines, one for WinLink 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.

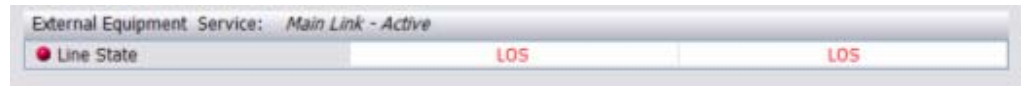


Figure 3-17: External Equipment Status

To use the Backup Mode

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

Figure 3-18 shows the TDM Backup Service screen.

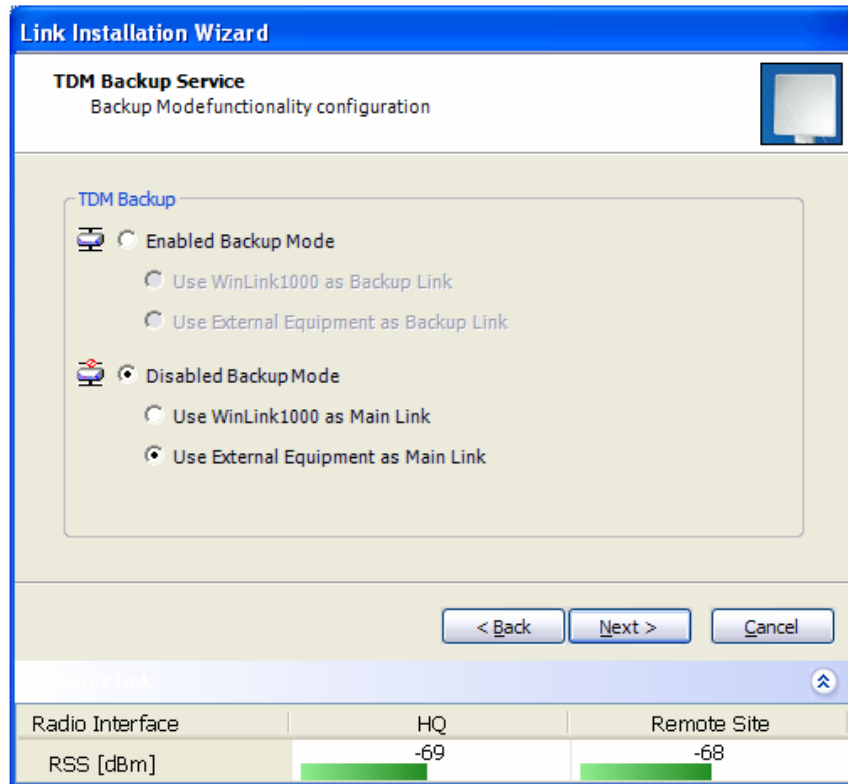


Figure 3-18: TDM Backup Service, IDU-R units only

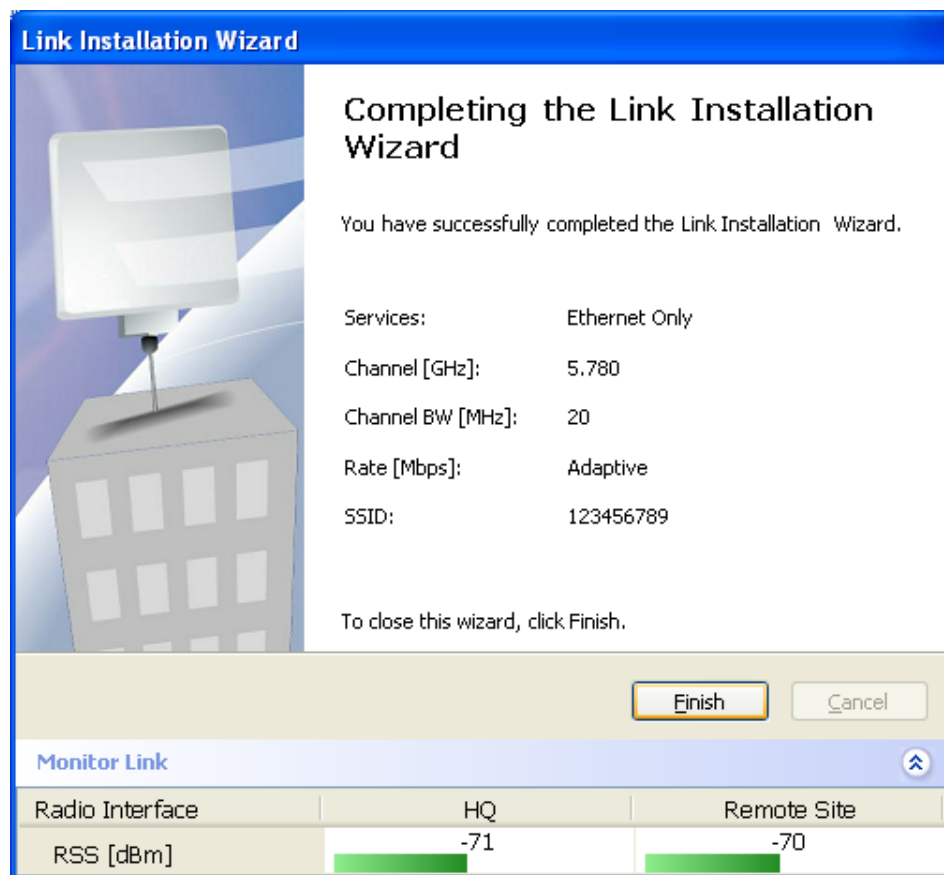


Figure 3-19: Installation Wizard, Finish Screen

3. Click **Finish** to complete the installation wizard.

Verify that the Radio Signal Strength (RSS) is according to expected results as determined by the Link Budget Calculator.

Verify that the Radio Signal Strength (RSS) numerical value is relative to the expected results that were determined by the Link Budget Calculator.

Chapter 4

Getting Started

This section provides the following information for WinLink:

- Turning the system on and off
- Starting the WinLink™ Manager software
- Controls and indicators
- Normal Indications
- Default settings
- Technical Specifications

Turning On WinLink

* **To turn on WinLink:**

- Connect the AC/DC converter to the IDU power connector and to the mains. See Connecting Power to an IDU 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.

Controls and Indicators

WinLink 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 must be configured to its operational requirements, or diagnostic tests are performed.

IDU Front Panel Indicators

The front panel of the IDU-C and IDU-E includes a series of LED indicators that show the operating status of the unit.

The following figure shows the IDU-E front panel:



Figure 4-1: IDU-E Front Panel

The following table describes the indicators:

Table 4-1: Front Panel LEDs

| Name | Color | Function |
|---------|--------|--|
| PWR | Green | ON –Power supply is ON (IDU-E only) |
| IDU | Green | ON – IDU operational |
| | Green | ON – During power-up only With Ethernet only |
| | Orange | ON - During power-up only With TDM |
| 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 mode 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 |

ODU/LAN Indicators

The ODU/LAN and TDM connectors (IDU-E rear panel, IDU-C front panel) have LED indicators that show the operating status. The following tables describe the indicators.

Table 4-2: ODU/LAN LEDs

| Name | Color | Function | Location |
|------|--------|--|--------------------|
| LINK | Green | On – Good Ethernet link integrity | ODU/LAN connectors |
| ACT | Orange | Blinks according to the Ethernet traffic | ODU/LAN connectors |

IDU Back Panel Indicators

Table 4-3: TDM Traffic Indicators

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

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

Table 4-4: WinLink Indicators at Startup

| Indicator | Color | Status |
|--------------------|--------|---|
| PWR | Green | ON (IDU-E only) |
| IDU | | |
| With Ethernet only | Green | ON for short duration during startup |
| With TDM only | Orange | ON for short duration during startup |
| | Green | For normal operation after successfully connecting the ODU to the IDU. |
| ODU | Green | ON shows normal operation |
| LINK | Orange | ON for short duration during startup |
| | Green | 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.

ODU Indicators

| Color | Function | Location |
|--------|---|--------------------|
| Green | Blinking – Good Ethernet link integrity | IDU/LAN connectors |
| Orange | On - during power on self test | IDU/LAN connectors |

Default Settings

[Table 4-5](#) lists the default settings of the WinLink configuration parameters.

Table 4-5: Default Settings

| Parameter | Default Value |
|----------------------------|---|
| ODU IP Address | 10.0.0.120 |
| Subnet Mask | 255.0.0.0 |
| Manager Login password | Admin |
| SSID | – |
| Link Password | Wireless-bridge |
| Rate | Adaptive |
| Services | Ethernet |
| Ethernet Configuration | Auto Detect |
| Radio Link Failure Actions | No action |
| Bridge | Non PoE systems: Hub Mode, Aging time = 300 sec PoE systems: Bridge Mode |
| Community values | Read-write – netman Read-only – public |

Starting the WinLink 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.

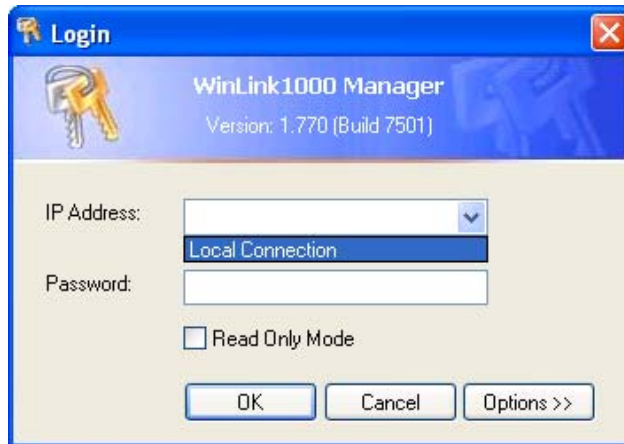


Figure 4-2: Login Screen

3. For IP Address do one of the following:
 - Type an IP address for the ODU (for Network mode), OR
 - Click Local Connection (if you are connected directly to the IDU LAN port).

The default IP address for the ODU is 10.0.0.120. The Subnet mask is 255.0.0.0. For Versions 1.700 and greater, any valid subnet mask may be used.

4. Enter the password

Note:

The actual IP address is defined during link configuration (see Defining the Management Addresses).

Default password – **admin** (see the section on Changing the Management Password)

5. 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 4-3: 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 were previously defined, enter them under Community in the Read-Only or Read-Write boxes.
- 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 4-4](#)).

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.

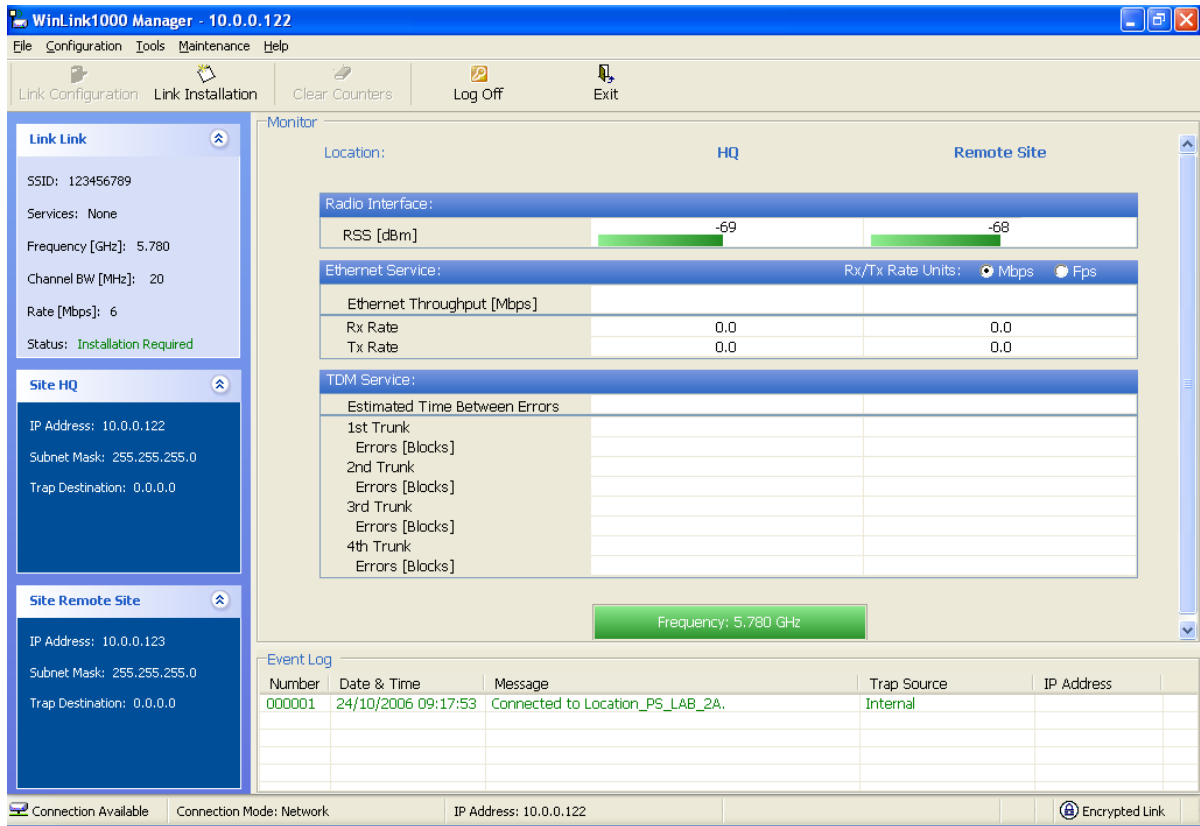


Figure 4-4: WinLink™ 1000 Manager Main Screen

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.

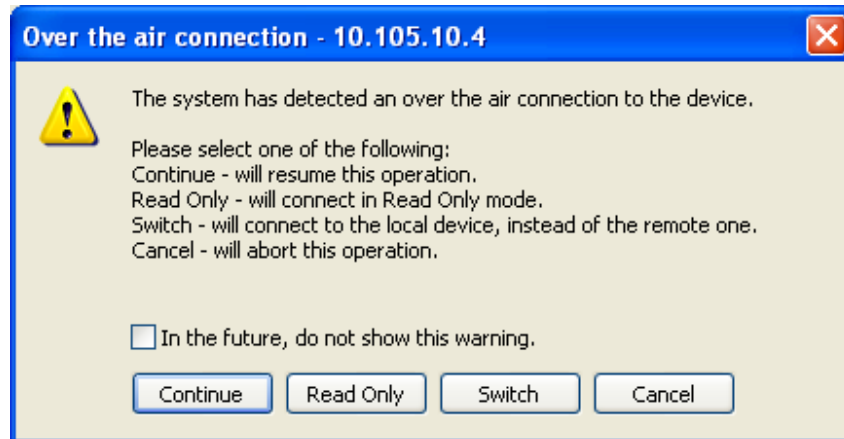


Figure 4-5: Over the Air Connection

Managing WinLink

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 4-6](#)).

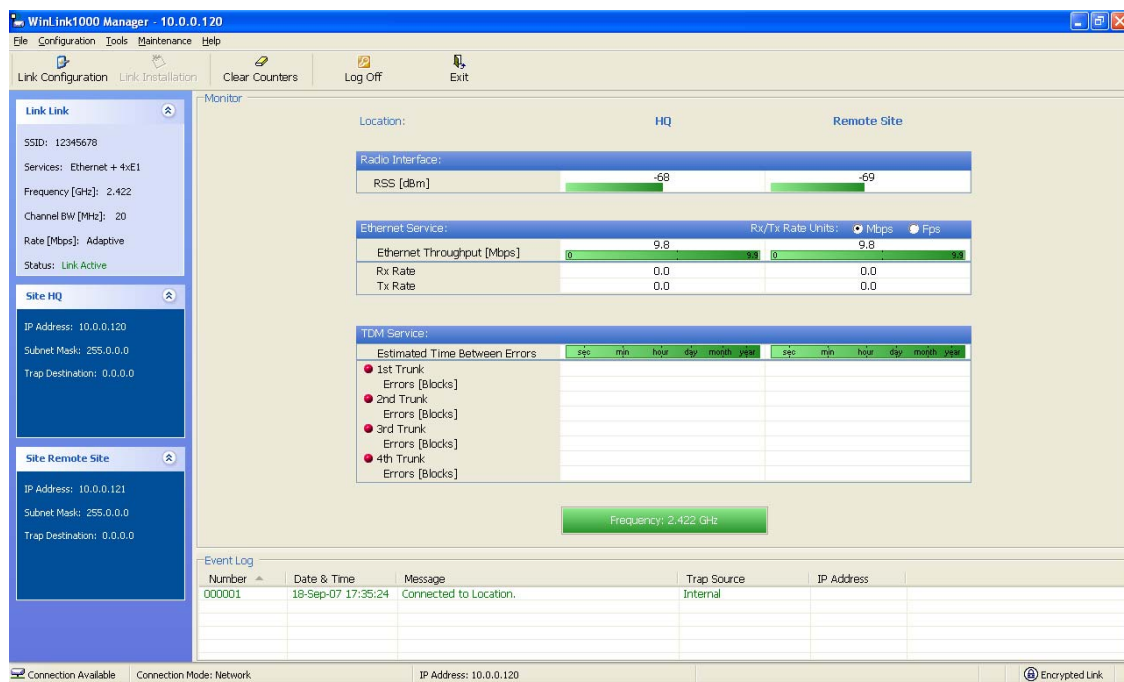


Figure 4-6: Main Screen, Wireless Link is Active

The WinLink™ 1000 Manager Main screen consists of the following elements:

Toolbar buttons

| | |
|---------------------------|---|
| Link Configuration | Changes configuration parameters of operating wireless link; assigns text files for storing alarms, statistics and configuration data |
| Link Installation | Performs preliminary configuration of the system This button is disabled once a link is defined. |
| Clear Counters | Clears error counters (available with TDM only) |
| Log off | Logs off WinLink™ 1000 Manager |
| Exit | Exits WinLink™ 1000 Manager |

Menu bar

| | |
|----------------------|---|
| File | Log off, and exit |
| Configuration | Use for link configuration, individual site configuration or link installation |
| Tools | Accesses Performance Monitoring Report, Active Alarms, Change password, Event log handling, Set Preferences |
| Maintenance | Provides the following functions: Clear counters, Loopbacks, System Reset. |
| Help | Provides WinLink™ Manager Help, Link Budget Calculator, Get Link Information About WinLink |

Link details pane

- Summarizes information on the radio frequency, IP address, type of TDM service, number of assigned E1 or T1 timeslots, and IP details of the local and remote WinLink 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 (Net symmetrical Throughput "Full-Duplex") that can be supported currently, (see *Figure 4-7*).
The scale on the bar varies depending on the link distance and air interface quality.
- 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 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 icons:

- Connectivity icon showing how the device is connected to the Ethernet.
- Network connection 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

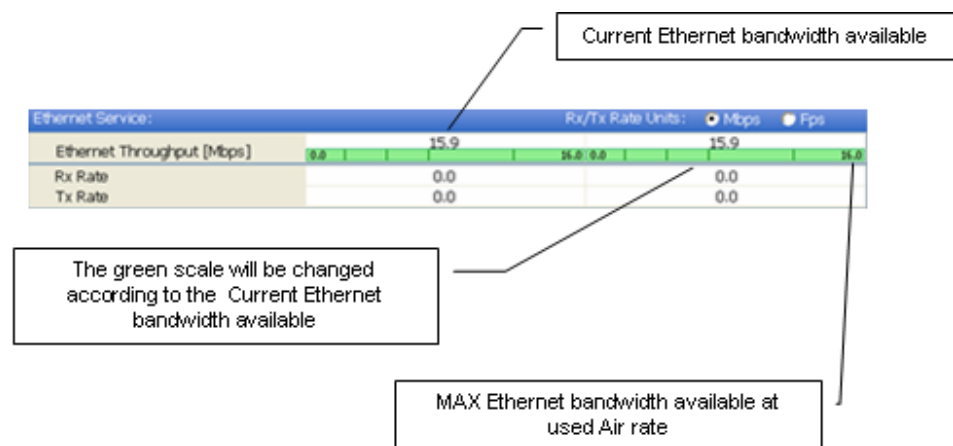


Figure 4-7: Ethernet Bandwidth Indication

*** To change link configuration parameters:**

1. In the Main menu, click Configure Link.

The Configure Link wizard appears. See Link Configuration Wizard 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.

Turning Off WinLink

*** To turn off WinLink:**

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

Chapter 5

Configuring the Link

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

The following parameters are configured via the Site 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.

For HSS screens see
Hub Site Synchronization.

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

Link Configuration Wizard

Configuring System Parameters

* **To change general parameters:**

1. In the Main menu, click the **Link Configuration** button.

The Configuration wizard opens:

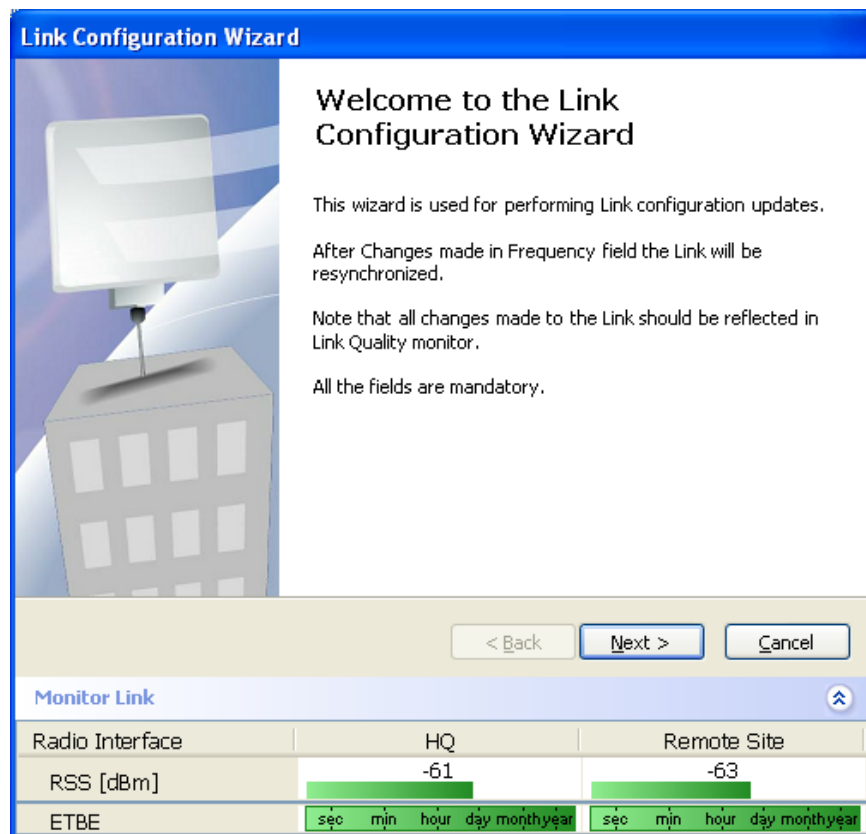


Figure 5-1: Configuration Link Wizard

2. Click **Next**.

The Link Configuration dialog box appears:

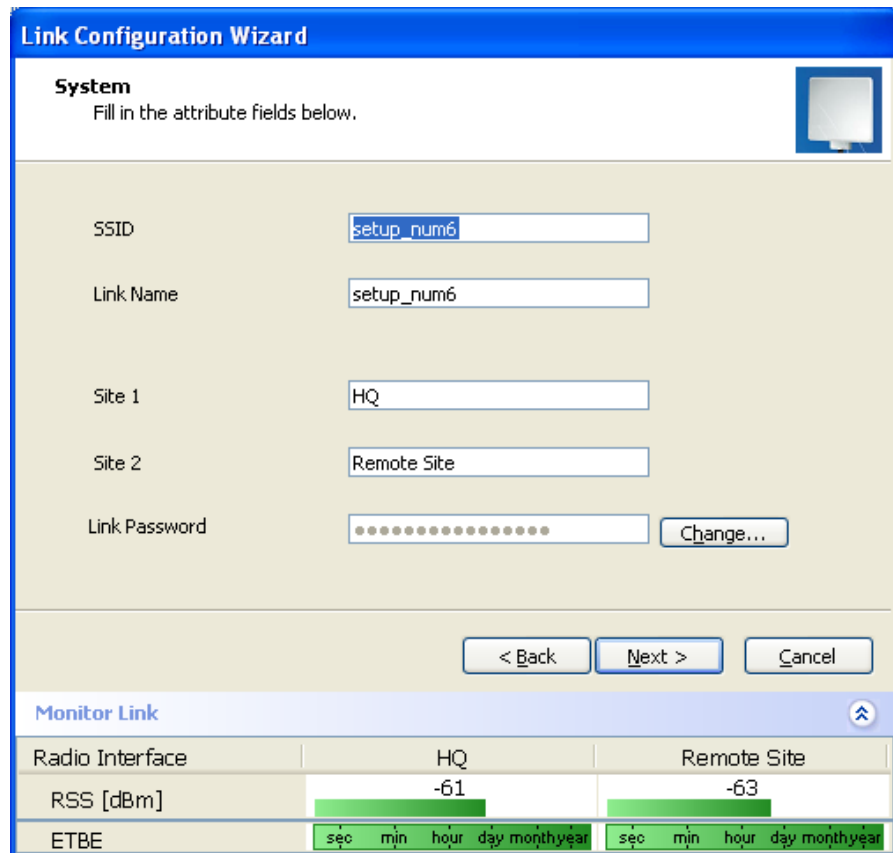


Figure 5-2: Link Configuration, System dialog box

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

The Channel Settings dialog box appears.

Selecting Channels: Automatic Channel Select

You are required to define the operating frequency channel. Newer versions have a feature called Automatic Channel Select (ACS). This allows you to define several allowable frequency channels to which you can change if interference is detected on the channel in use. ACS performs channel monitoring and selects the channel with the lowest interference for the transmission.

Automatic Channel Select enables coexistence with any radar system that may be active in the area.

Note: For the ETSI version, skip to page 5-62; for the BRS version, skip to page 5-64.

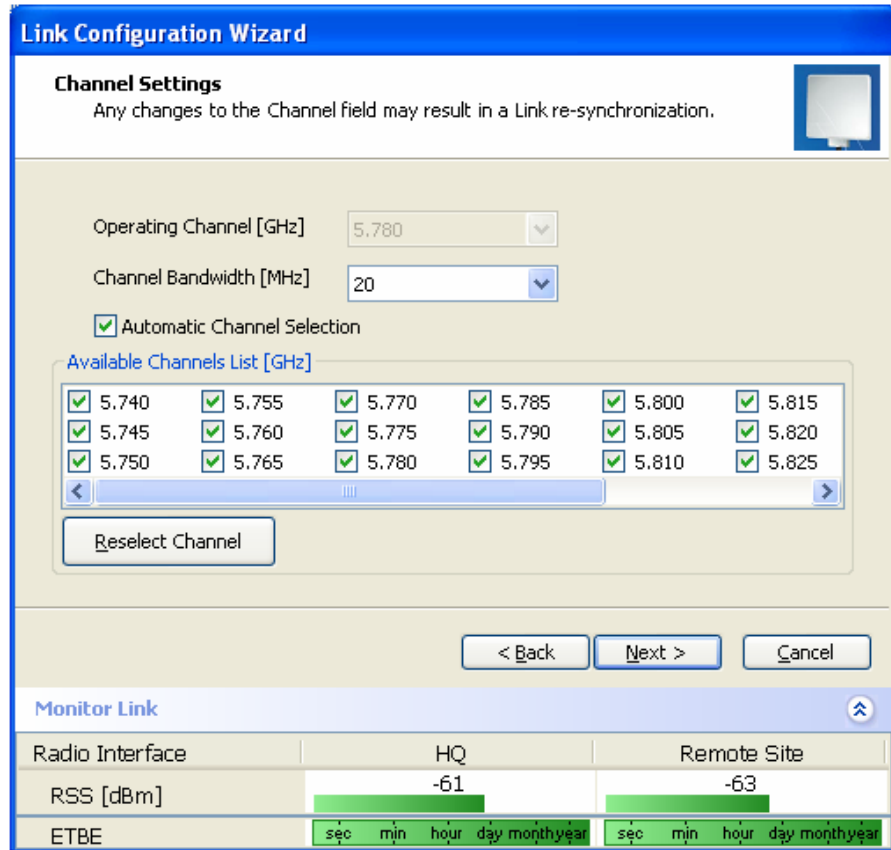


Figure 5-3: Channel Select dialog box - Automatic Channel Select

* **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.
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 scans the selected channels looking for radio frequency activity. Once it determines which of the channels is free of RF signal activity, it locks onto it. If you require a different channel than the one selected, you must first remove the

operating channel that the ODU finds most free of RF signal activity from the available channel list.

6. Click **Next**.

The Rate Select box appears.

Note: If you have the standard version, proceed to Configuring Service Parameters, page 5-65. For the ETSI version, proceed to the next section; for the BRS version, skip to page 5-64.

The 5.4 GHz ETSI Version

In accordance with ETSI, unlicensed wireless data equipment is not allowed to interrupt radar services. Therefore, if the ETSI Version detects Radar activity, 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™ 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.

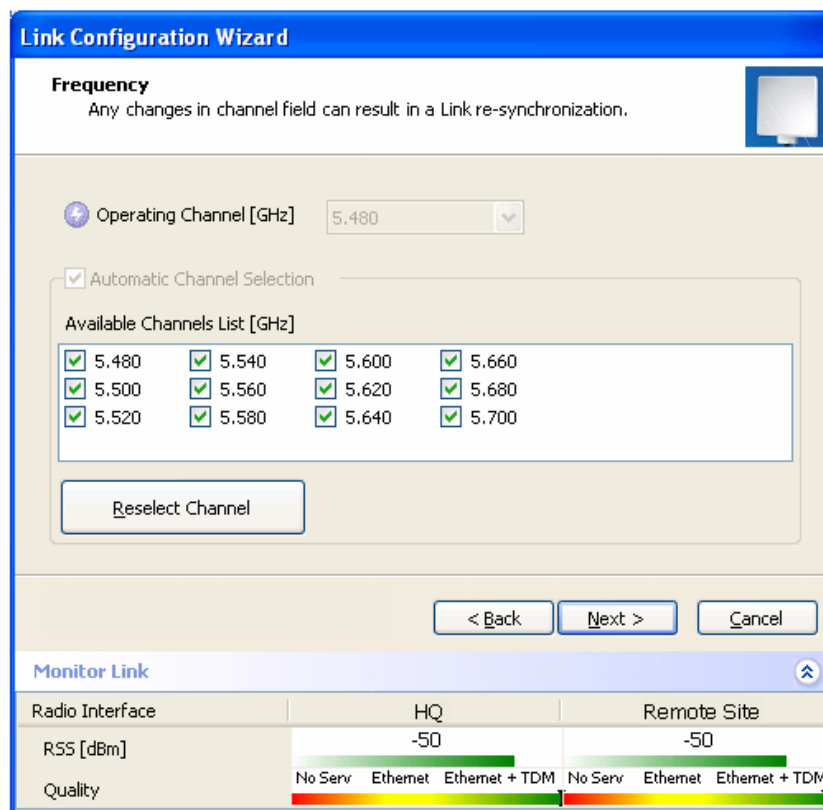



Figure 5-4: Channel Select dialog box (DFS, ETSI requirement)

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 may fluctuate until the system finds the best quality link.

5. Click **Next**.

The Service Parameters dialog box appears. Proceed to page 5-65.

BRS Version: Configuring BRS Channel Settings

Note:

Both sites in a BRS Link must be configured identically.

*** To Configure BRS Channel Settings**

1. Select the Band Plan: Pre-Transition or Post-Transition.
2. Select the Bandwidth required.
 - Single Band (5MHz)
 - Double Band (10MHz)
 - Quad Band (20MHz)
3. Select the Frequency.
4. Click Next. The system is re-synchronized to the changes.

Link Installation Wizard

BRS Channel Settings
Any changes to the Channel field may result in a Link re-synchronization.

Configuration

BRS Notation Band Plan: Pre - Transition Post - Transition

Bandwidth: Quad Band

Frequency [MHz]: A2,A3,B1,B2 (2518.50)

- A1,A2,A3,B1 (2513.00)
- A2,A3,B1,B2 (2518.50)
- A3,B1,B2,B3 (2524.00)
- B1,B2,B3,C1 (2529.50)
- B2,B3,C1,C2 (2535.00)
- B3,C1,C2,C3 (2540.50)
- C1,C2,C3,D1 (2546.00)
- C2,C3,D1,D2 (2551.50)

< Back Next > Cancel

Monitor Link

| Radio Interface | 3.2 | 3.4 |
|-----------------|-------------------------------------|-------------------------------------|
| RSS [dBm] | -55 | -55 |
| Quality | No Serv Ethernet Ethernet + TDM | No Serv Ethernet Ethernet + TDM |

Figure 5-5: BRS Channel Settings Post-Transition

Configuring Service Parameters

You define 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:

ACCESS versions are Ethernet Only.

In the Service Parameters dialog box select the number of E1 connections (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 5-6](#)).
 - Ethernet data only.
2. Select the transmission rate required.
 - Adaptive
 - 9 Mbps
 - 12 Mbps
 - 18 Mps
 - 24 Mbps
 - 36 Mbps
 - 48 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.

For versions 1.6 and greater, distance between the sites is automatically measured.

If TDM services are selected, then the Evaluate icon shows on the screen while 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.

3. Click **Next**.

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

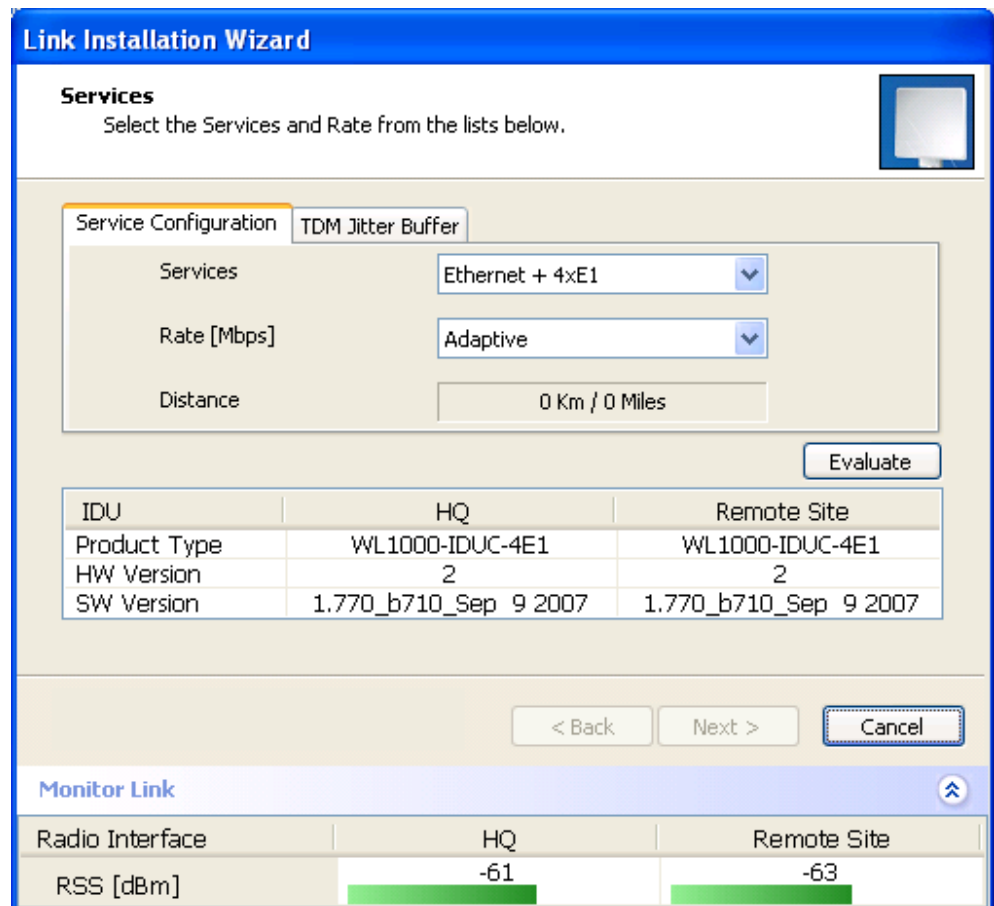


Figure 5-6: Services Dialog Box, E1/T1 Interface

Configuring TDM Operation

Setting the Clock Configuration

The TDM clock feature is enabled for carrier class IDU-C in addition to the hardware version 2 and greater IDU-E with TDM. A TDM dialog box will appear where IDU supports the clocking configuration feature (see [Figure 5-7](#) and [Figure 5-8](#)).

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.

Link Configuration Wizard

TDM Parameters
Configure the TDM Parameters below.

TX Clock

| HQ | Remote Site |
|--|-------------|
| <input checked="" type="radio"/> Transparent | Transparent |
| <input type="radio"/> Loop Timed | Recovered |
| <input type="radio"/> Recovered | Loop Timed |
| <input type="radio"/> Internal | Recovered |
| <input type="radio"/> Recovered | Internal |

Master Clock

| Current | Mode |
|---------------|-----------|
| Not Available | Automatic |

< Back Next > Cancel

Monitor Link

| Radio Interface | HQ | Remote Site |
|-----------------|-----|-------------|
| RSS [dBm] | -61 | -63 |

Figure 5-7: TDM clock dialog box for T1 IDU

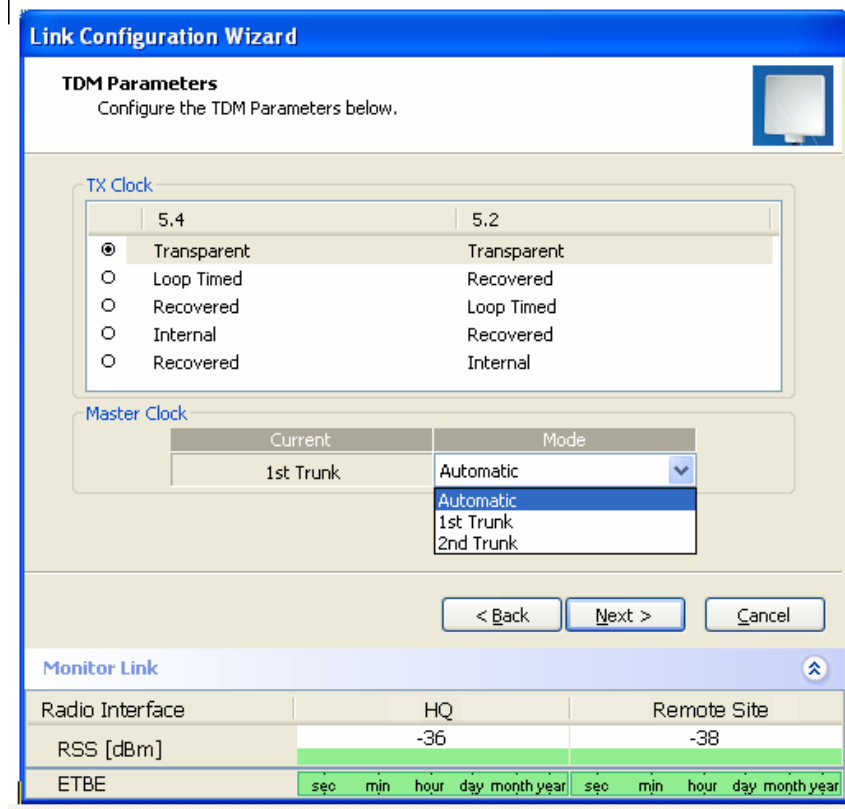


Figure 5-8: TDM clock dialog box for E1 IDU

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 in [Chapter 3](#).

Transparent/Transparent

WinLink™ 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.

Table 5-1: 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 |
| 4 | Internal | Recover | Recover | Recover |
| 5 | Recover | Internal | Recover | Recover |

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.

Note:

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)

The IDU-R units have two E1/T1 trunk lines, one for WinLink™ air interface via the ODU, and the second external is for peripheral equipment- I.E. PBX. The external equipment status is displayed on the Main screen of the Manager in IDU-R systems.

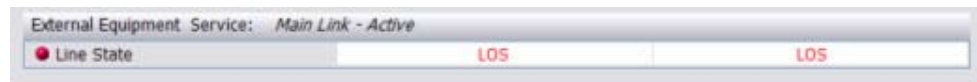


Figure 5-9: IDU-R - External Equipment Status

✱ **To use the Backup Mode**

1. Click Enabled Backup Mode.
2. Set which link is backup link; either the link 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 the link or the external equipment.
3. Click **Next** to continue.

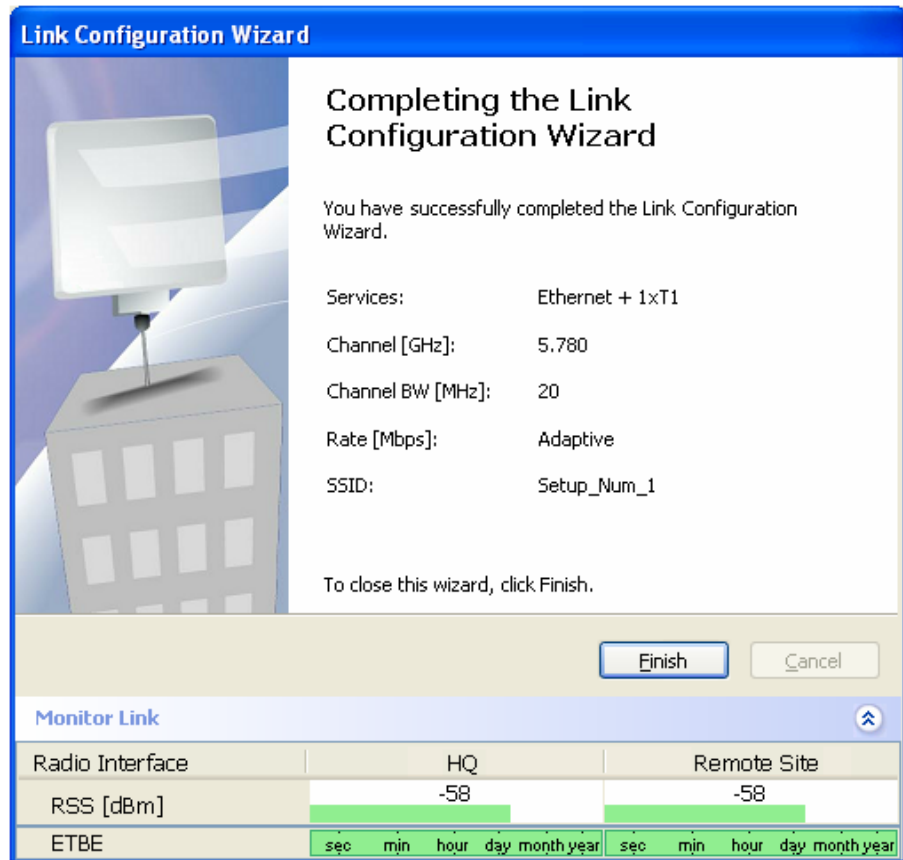


Figure 5-10: Configuration Link, Finish screen

The Finish screen appears, showing a summary of the link configuration (see [Figure 5-10](#)) above.

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

The Main screen is displayed.

Configuring the Site

Editing the Configuration Parameters by Site

You can edit the configuration parameters for each site individually. The following functions are available from either the left side of the dialog box, or the buttons on the top of the dialog box (see [Figure 5-11](#)).

Functions 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. |

Functions 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 alignment tone 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 5-11*)

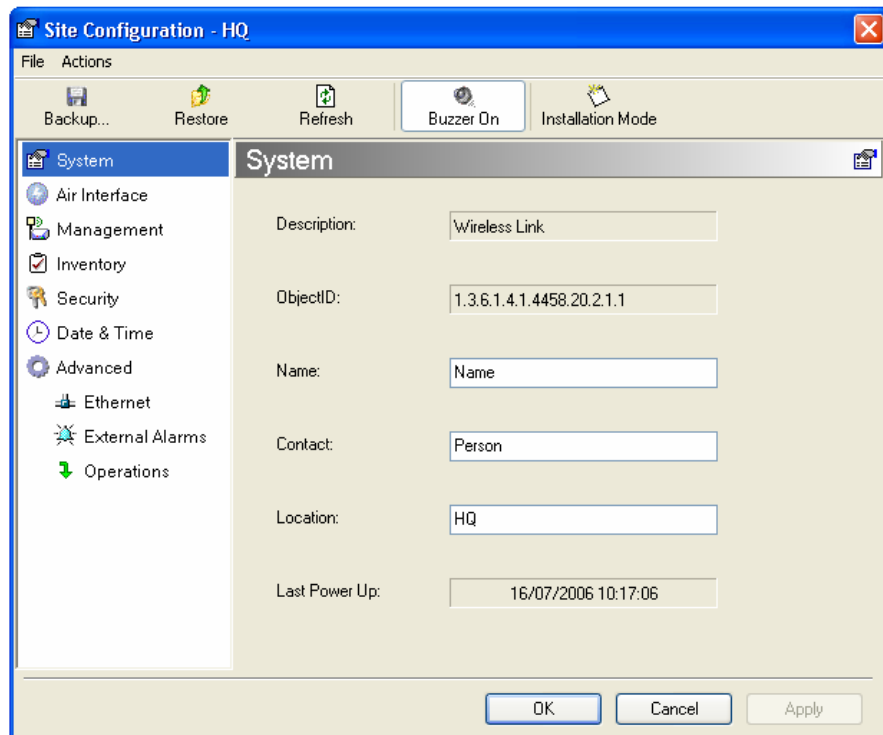


Figure 5-11: Configuration Dialog Box

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

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 5-12*)
4. Select the required Transmit Power Level. For available power limits for each system, see Product Specification Table, page I-160.
5. Click Apply to save the changes.

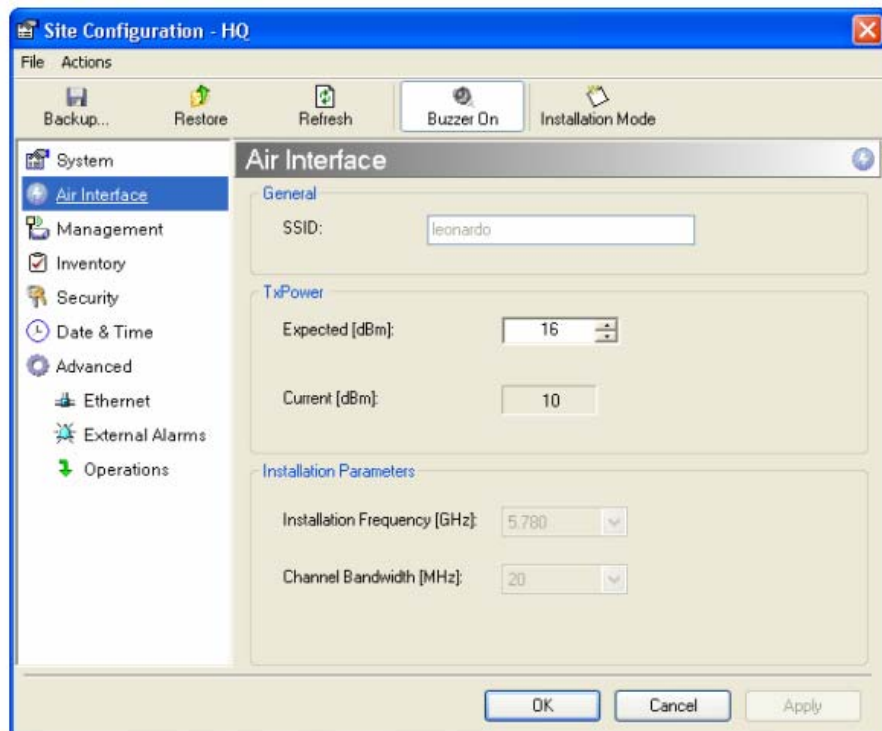


Figure 5-12: Changing the Transmit Power

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:

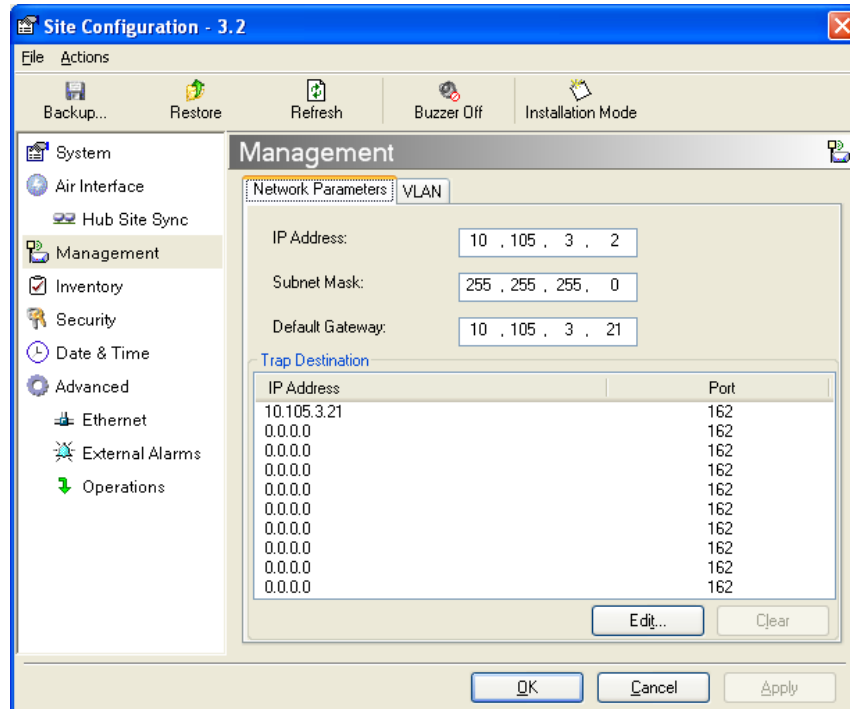


Figure 5-13: Management Addresses - Site Configuration dialog box

3. Select **Management**.
4. Enter the IP address of the ODU in the IP address field.

Note:

If performing configuration from the WinLink™ 1000 Manager, the IP address is entered in the login screen.

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.

Configuring VLAN Settings

VLAN Management enables separation of user traffic from NMS Traffic. The user decides if such a separation is required. Both the HQ and Remote site are configured with VLAN Management.

* **To enable VLAN management:**

1. Click **Configuration** from the main menu.
2. Select which site to configure (HQ or Remote site).
3. Select Management.
4. Open the VLAN tab.
5. Check The Enabled box.
6. Enter a VLAN ID.

After entering the VLAN ID, only packets with the specified VLAN ID are processed by the ODU. This includes all the protocols supported by the ODU (ICMP, SNMP, TELNET and NTP). The VLAN priority is used for the traffic sent from the ODU to the management workstation. VLAN management affects all types of management connections (local, network and over the air).

7. Enter a Priority number.

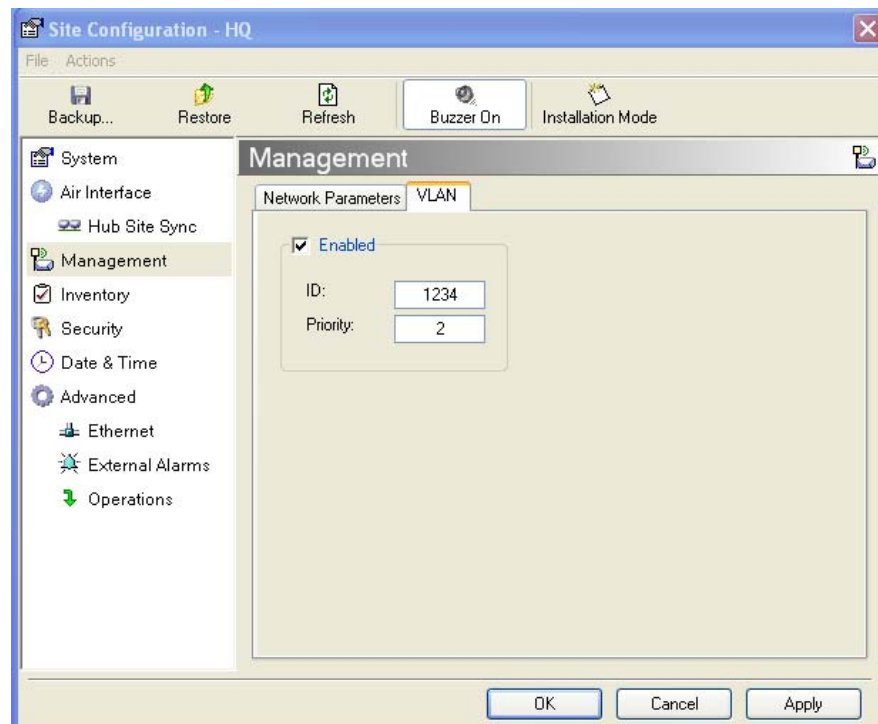


Figure 5-14: Configuring VLAN Settings



Warning

Changing this parameter causes the management application to immediately disconnect. In order to avoid problems, it is recommended to verify the change by setting the VLAN only to one ODU, and only after verifying the VLAN network operation, change the other VLAN setting can be changed.

Troubleshooting:

If the VLAN ID is forgotten or there is no VLAN network connected to the ODU:

- Reset the device.

In the first two minutes both VLAN and no VLAN connections are available.

Setting the 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 server¹. 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 opened².

It can take up to 8 minutes for the NTP to synchronize the ODU date and time.

*** To set 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:

¹Windows XP is configured by default as a server.

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

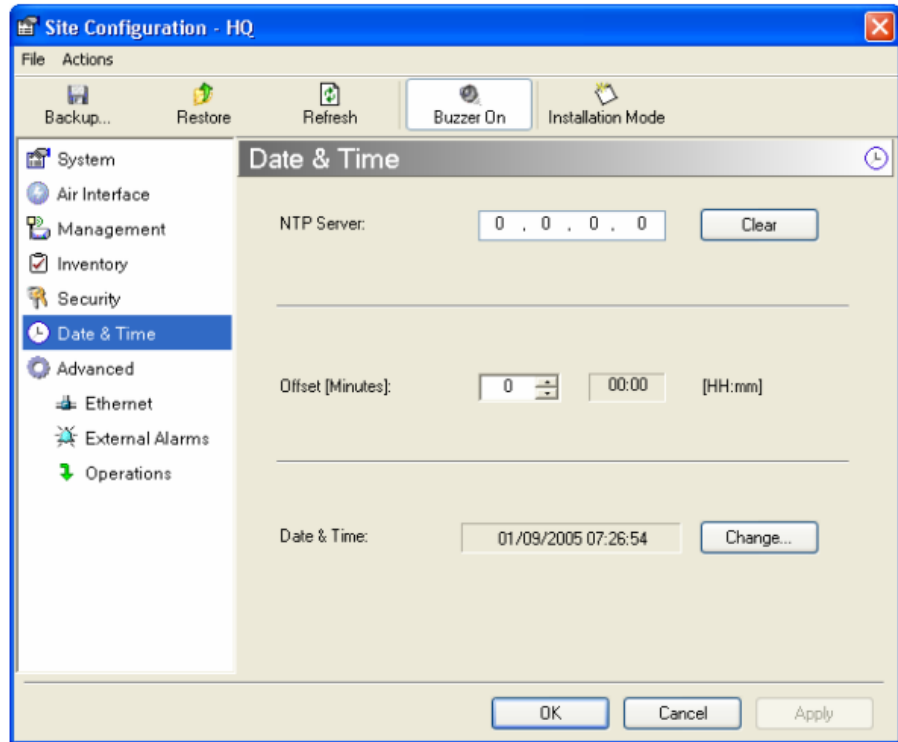


Figure 5-15: NTP Server Address - Site Configuration dialog box

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** and edit the new values.

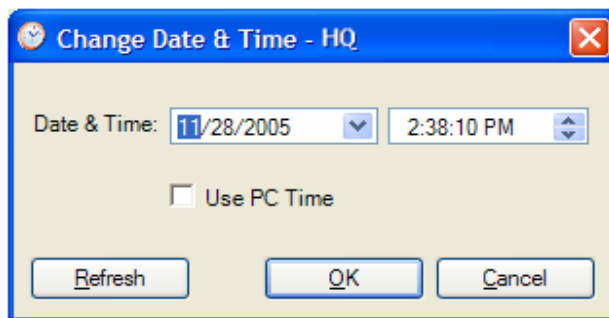


Figure 5-16: Change Date and Time - HQ dialog box

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:

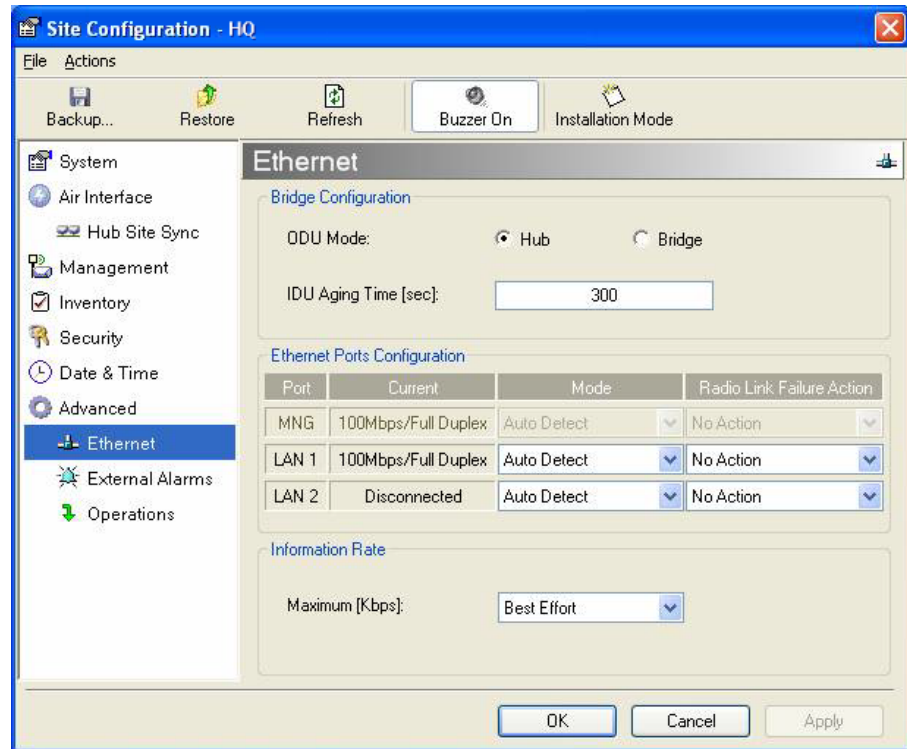


Figure 5-17: Bridge Configuration - Site Configuration dialog box

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.

Note:

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
- 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.

Configuring Ethernet Mode

The Ethernet mode is configurable for line speed (10/100BaseT) and duplex mode (half or full duplex). This mode provides an Auto detect feature where the line speed and duplex mode are detected automatically using auto negotiation. Use the manual configuration when external equipment does not support auto negotiation. The default setting is Auto Detect.

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).
-

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.

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

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

Note:

ACCESS systems have a maximum rate of 2048 kbps.

Configuring the Jitter Buffer

By configuring the Jitter Buffer, the receiver jitter buffer for each site can be enlarged, thereby increasing system resistance to interference (the larger the jitter buffer, the longer the interference period that the system will overcome without TDM BER). You can also decrease the jitter buffer to decrease the system delay.

The jitter buffer can be configured between 2.1 and 16.0 milliseconds.

* **To configure the Jitter Buffer:**

1. In the Main menu click the **Link Configuration** button.
2. Run the Configuration wizard (see *Figure 5-1*).
3. On the Services screen, select the TDM Jitter Buffer tab:

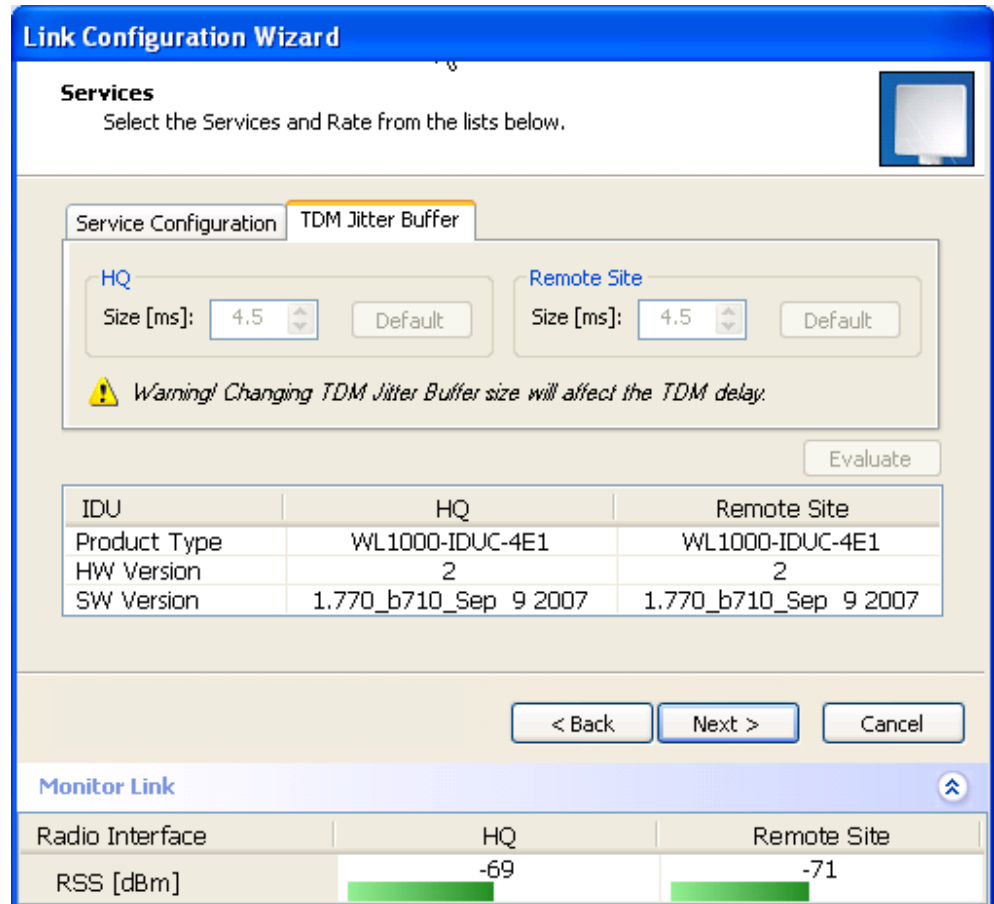


Figure 5-18: Jitter Buffer Configuration

4. Choose the desired values for HQ and Remote Site.
After setting the new value, the user must evaluate the expected quality. During the evaluation the ETBE bar is displayed.
5. Click **Next >** to perform the change or **< Back** to cancel the change.

Caution

Extra caution should be used when decreasing the value, since the service quality might be affected in the case of interference. In cases of asymmetric interference, the jitter buffer can be set to different values per site. In such cases the latency will also be asymmetric.

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 the following as the current community:

- For Read/Write community, use **netman**.
- For Read Only community, use **public**.
- For Trap community, use **public-bru1**.

*** 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.

The screenshot shows a dialog box titled "Change Community - HQ". At the top, there is a section "Enter current Read-Write Community:" with a search icon and a text input field. Below this are three sections, each with a checked checkbox and two text input fields: "Read-Write Community", "Read-Only Community", and "Trap Community". At the bottom of the dialog, there is a "Hide characters" checkbox, a "Forgot Community..." button, and "OK" and "Cancel" buttons.

Figure 5-19: 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 5-20). Then reconfigure the read-write community string.

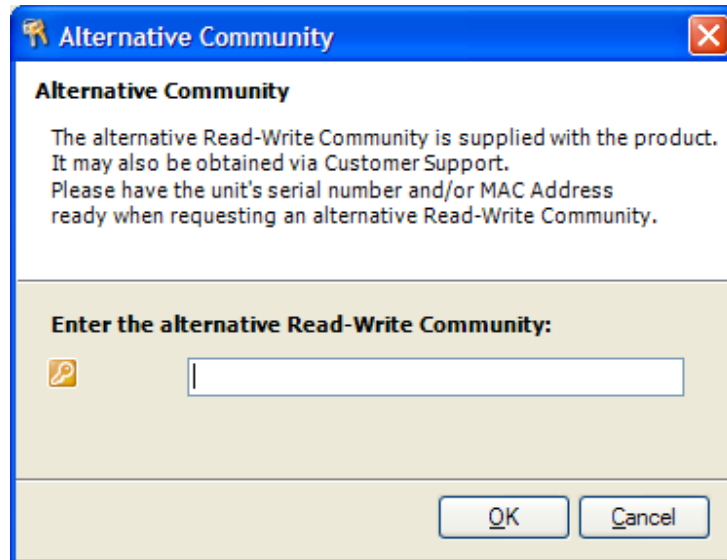


Figure 5-20: Alternative Community Dialog box

Muting the alignment tone

The ODU alignment tone becomes audible as soon as power is supplied, and continues until the ODUs are aligned and the link established.

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

*** To mute the alignment tone:**

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

The tone stops.

*** To restore the alignment tone:**

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. The tone starts.

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 IDU-C Alarm Connector, Wiring Specifications 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**.

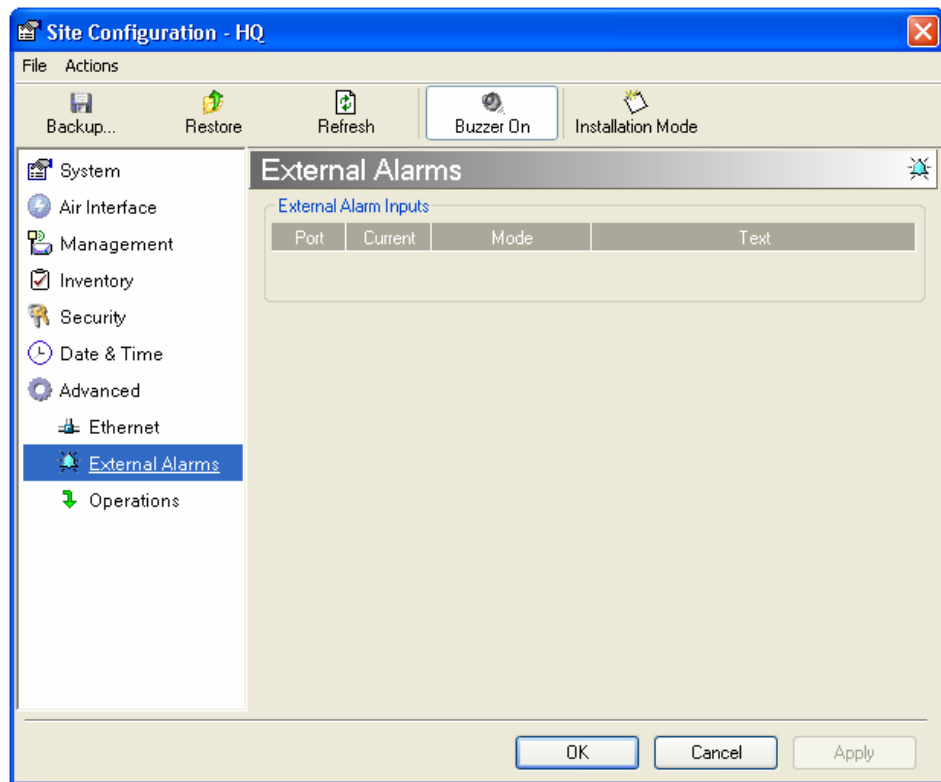


Figure 5-21: External Alarm Configuration

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

Managing Configuration Files

Saving Configuration in a File

The 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**.

Resetting

Note:

Resetting the link causes service disconnection.

In order to maintain the link configuration, reset the remote site first.

- * **To reset the unit:**
 1. From **Maintenance**, reset the remote unit.
 2. From **Maintenance**, reset the local unit.

*** 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.

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 5-22*).

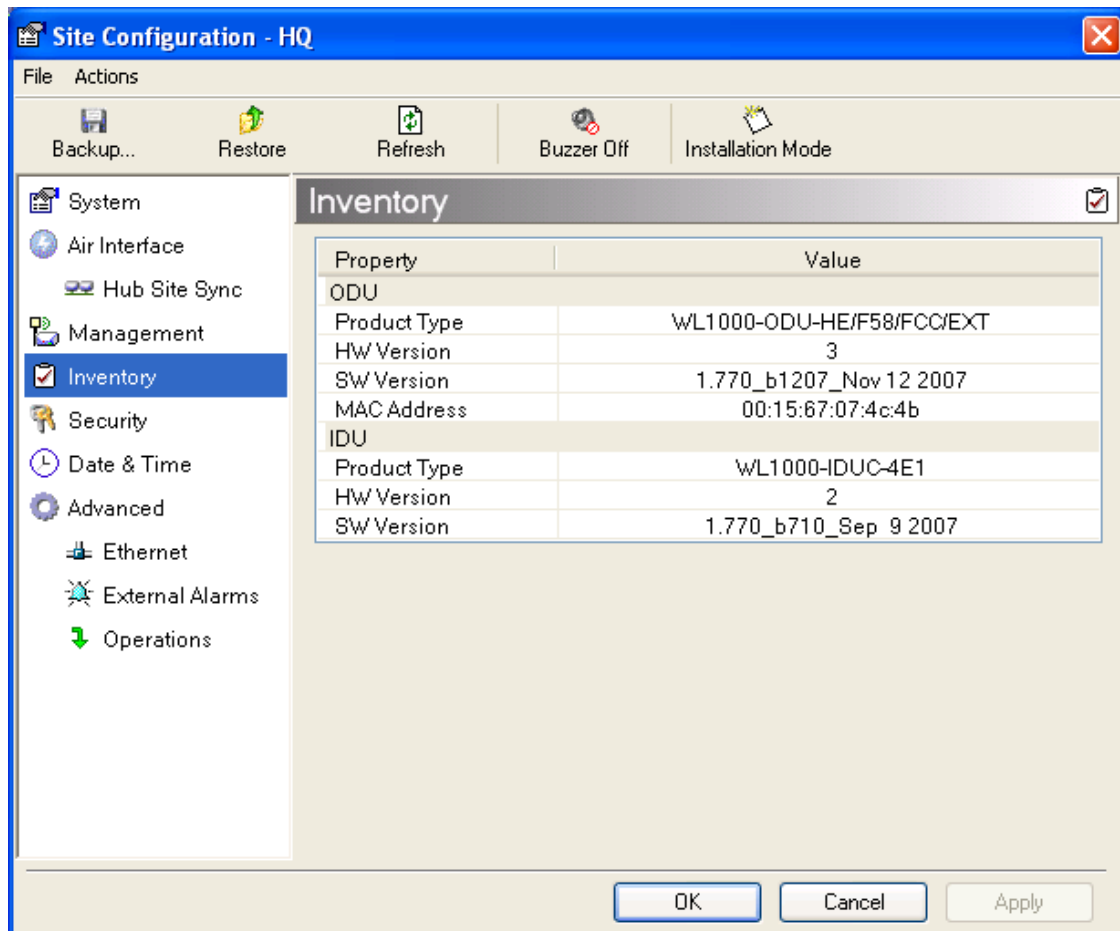


Figure 5-22: Inventory Screen

Configuration via Telnet

A Telnet terminal can be used to configure and monitor the ODU.

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

Table 5-2 depicts the Telnet commands that are supported:

Table 5-2: 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 |
| display PM <interface:AIR,LAN1,LAN2,TDM1,TDM2,TDM3,TDM4> <interval:current,day,month> | Shows the performance monitor tables for each interface according to user defined monitoring intervals |
| 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) |
| set name <new name> | Set the name of the link |
| set location <new location> | Set the name of the location |
| Set contact <new contact> | Set the name of the site manager |
| set Ethernet <>port:MNG,LAN1,LAN2> <mode:AUTO,10H,10F,100H,100F,DIS ABLE> | Set the mode and speed of each ethernet port |

| 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 5-23, below, shows the available Telnet commands via the Help command.

```
Hello admin, welcome to ODU Management CLI!

+-----+
      Software Revision      1.770  Build 1115_August 13 2007
+-----+

admin@10.103.6.1-> help

display inventory
display management
display link
display ethernet
display tdm
display ntp
display PM <interface:AIR,LAN1,LAN2,TDM1,TDM2,TDM3,TDM4>
          <interval:current,day,month>
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 >
set name <new name>
set location <new location>
set contact <new contact>
set Ethernet <port:MNG,LAN1,LAN2>
             <mode:AUTO,10H,10F,100H,100F,DISABLE>
reboot
help

Command "help" finished OK.
```

Figure 5-23: Telnet Management Screen

Link Lock Security Feature

The purpose of Link Lock

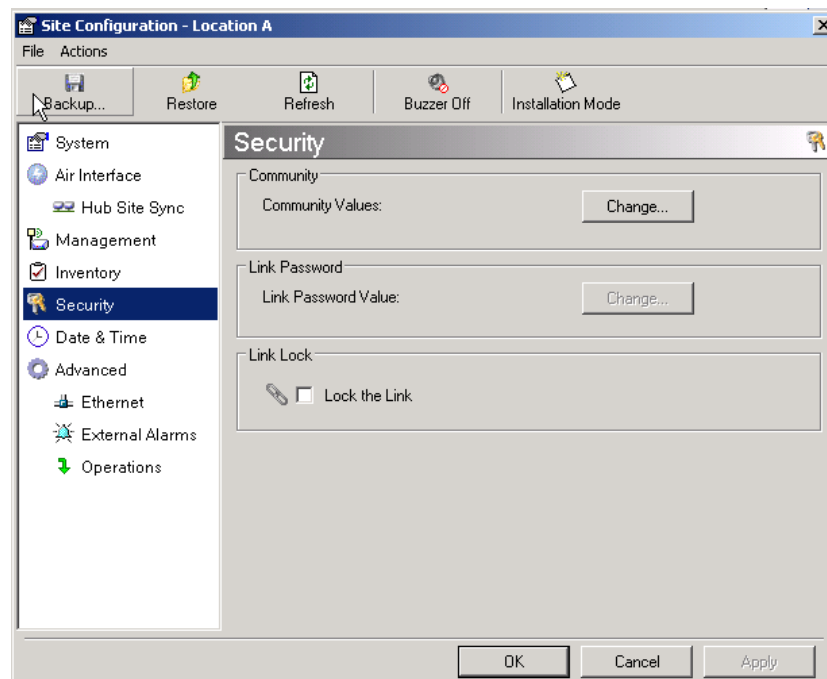
Link Lock is a part of the WinLink security concept intended to meet a form of abuse encountered in the field. It is designed to prevent the situation where a remote ODU can be stolen and used as a "pirate" link to steal services or information. The Link Lock feature actually locks the local ODU to be synchronized ONLY to specific remote ODU. It is a site oriented feature.

The lock can only be set from a live link. It is based on MAC authentication and is site oriented and activated on a per ODU basis. For example, if you lock the remote ODU to the local ODU, you must still lock the local ODU to the remote ODU to ensure complete two way locking.

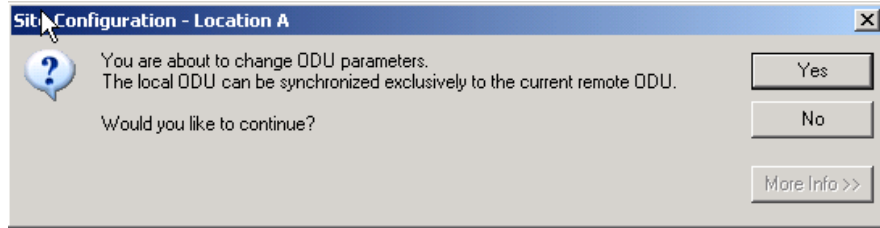
It can only be removed when the link is unsynchronized. In such a case, an alarm is raised by the WinLink™ 1000 Manager.

* **To enable Link Lock:**

1. From the Link Configuration menu, select "**1 Configuration Location A**".
2. Choose the Security tab. The following window is displayed:

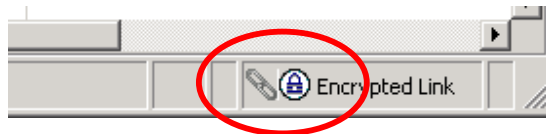


3. Click the Link Lock checkbox and then OK. You are asked to confirm the lock:

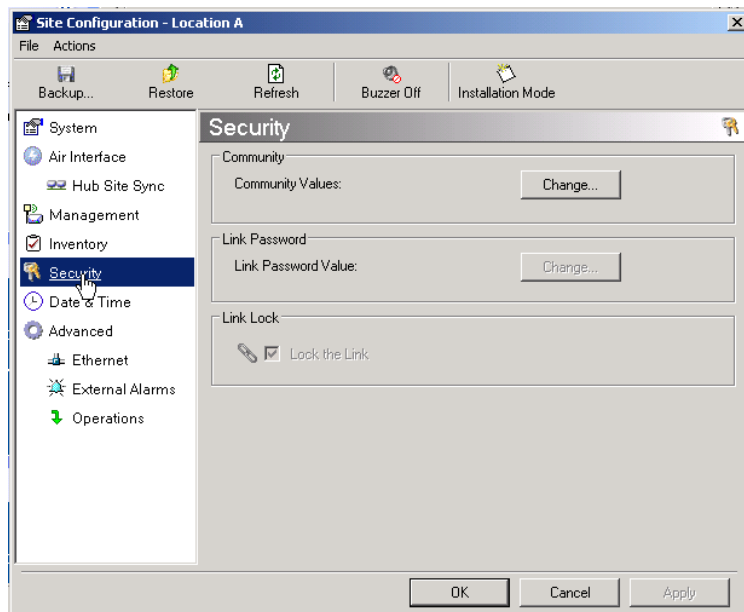


4. Click the Yes button and you are returned to the main window of the WinLink™ 1000 Manager.

Observe that a link icon is now displayed in the status bar on the bottom right of the WinLink™ 1000 Manager window.



The link to the remote unit is now locked. If you repeat steps 1 and 2 above, the Security screen will look like this:



The Link Lock checkbox is now unavailable.

Note:

The Link Lock status will only revert to unlocked as a result of a broken link, for example due to an ODU being switched off at either end of the link.

A simple ODU reset at either end will restore the link to its previous locked or unlocked state.

Monitoring and Testing the Link

The WinLink™ 1000 Manager software enables you to monitor the link, as well as perform Loopback tests. It also provides a handy Link calculator utility for calculating the expected performance of the wireless link and the possible RF and antenna configurations for a specific link range.

Retrieving Link Information (Get Link Information)

The Get Link Information feature collects and writes all link and Manager information (from both sides) into a comprehensive file. The file can be used for diagnostics and should be sent to technical support to speed up assistance.

The following table lists link and system information that can be monitored.

Table 6-1: Get Link Information Data and Description

| Data | Description |
|---------------------|--|
| System Data | General information about the system |
| Link Information | Information about the link properties |
| Event Log | List of recent system events |
| Site Configuration | Data about the site parameters |
| Active Alarms | List of active alarms |
| Performance Monitor | Network performance data over defined time periods |
| Monitor | Detailed event data record |

*** To get link information**

1. On the **Help** menu, choose **Link Information**.

The Get Link Information dialog box appears:

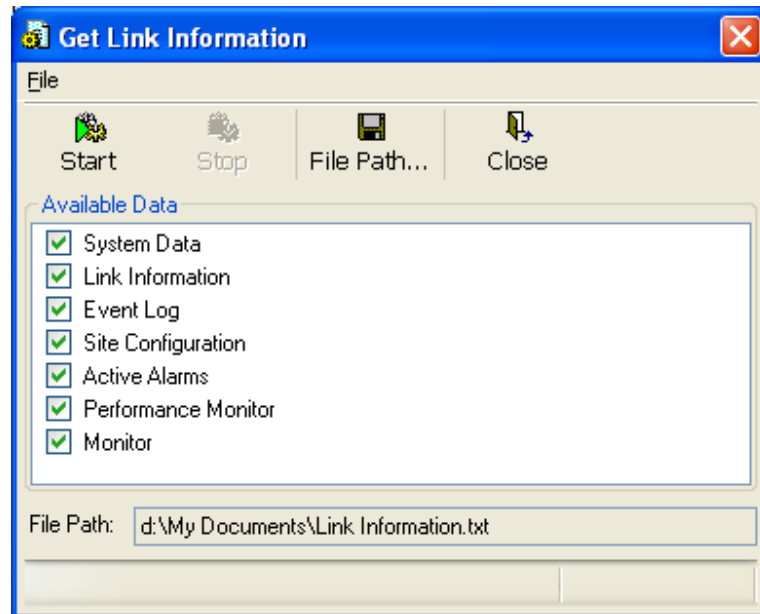


Figure 6-1: Get Link Information Dialog Box

2. Select or deselect the data options. If the file is to be sent to Technical Support leave all options checked.
3. Click **File Path** to specify the folder in which you want to save the file and then click **Start** to save the information.

The file is saved in the specified folder as Link Information.txt

Link Compatibility

Link Compatibility indicates the version compatibility via software traps. As new hardware is added to existing networks compatibility issues may arise. An incompatibility issue is indicated to the user via a change of color of the Link Status box on the Main Menu screen. Trap messages in the Event Log indicate the problems or limitations and suggest upgrades when appropriate.

The following Link Status messages are given:

fullCompatibility - different software versions were detected that are fully compatible. Message indicates that upgrade is available.

restrictedCompatibility - different software versions were detected that operate correctly. However, new features are not supported

softwareUpgradeRequired - different software versions were detected with limited operation. The link will operate as Ethernet only; a full service will not be available. The message is software upgrade required.

versionsIncompatibility - different software versions were detected that are not compatible. User needs to perform local upgrades.

Table 6-2: Link Compatibility Trap Messages

| Link State | Link | Link Status | Site Description | Site | Link Status |
|-------------------------|----------------------------------|--|---------------------------|-------------|--|
| | State text | Color | | Desc. Color | Color |
| fullCompatibility | Active | Green | SW Upgrade Available | Yellow | Green |
| restrictedCompatibility | Active - SW Version mismatch | Magenta (Same as authentication error) | SW Upgrade Recommended | Yellow | Magenta (Same as authentication error) |
| softwareUpgradeRequired | Active – SW Upgrade Required | Brown (Major) | SW Upgrade Required | Yellow | Brown (Major) |
| versionsIncompatibility | Not Active - SW Upgrade Required | Red | Local SW Upgrade Required | Yellow | Red |

Testing the Connection

Testing the connection supports activation of the internal and external loopbacks on the local and remote units.

*** To activate a loopback:**

1. From the Maintenance menu, choose **Set Loopbacks**.

The Loopbacks dialog box appears:

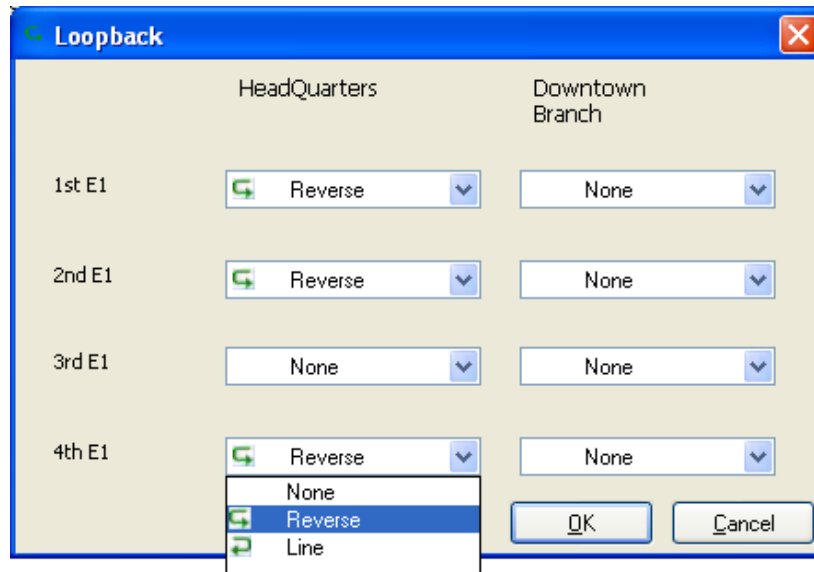


Figure 6-2: Loopback dialog box

2. From the Local or Remote drop-down box, select a loopback that you intend to run, and click **OK**.

A confirmation message appears.

3. Click **OK** to activate a loopback.

This activates selected loopback. A loopback status arrow in the Main menu turns green to indicate an active loopback.

*** To deactivate a loopback:**

- From the From the Local or Remote drop-down box of the Loopbacks dialog box, select **None** and click **OK**.

A loopback is deactivated and the corresponding status arrow in the Main menu becomes dimmed.

Local External Loopback

Local external loopback can be set to an external loopback to test the local E1/T1 port and its connection to the local side user equipment. In this mode, data coming from the local user equipment is looped back to it. This loopback is initiated from a management station connected to the local unit.

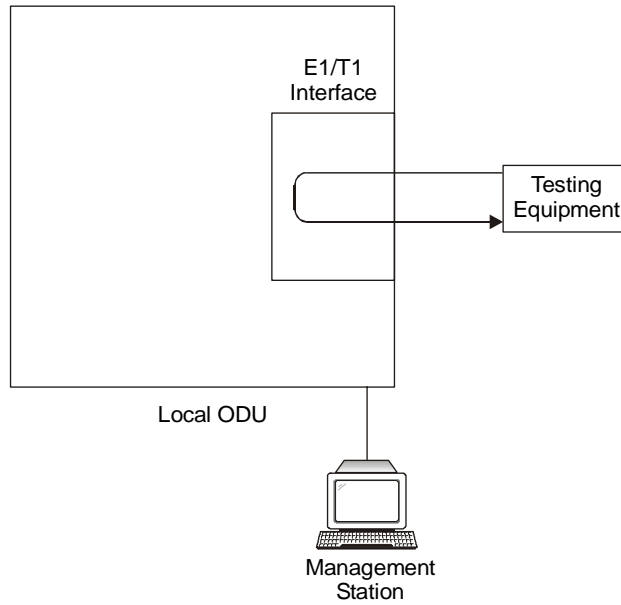


Figure 6-3: Local External Loopback

Remote Internal Loopback

Remote internal loopback can be set to an internal loopback to test connection between the local and remote units, the local E1/T1 port and its connection to the local side user equipment. In this mode, data coming from the local unit is looped back to it. This loopback is initiated in band from a management station connected to the local unit.

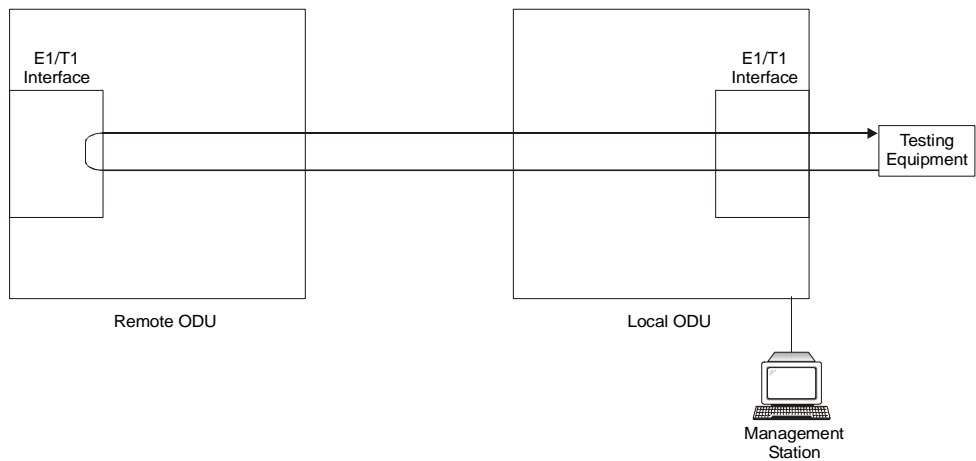


Figure 6-4: Remote Internal Loopback

Remote External Loopback

The remote unit can be set to an external loopback to test the remote E1/T1 port and its connection to the remote side user equipment. In this mode, data coming from the remote user equipment is looped back to it. This loopback is initiated by an in band command sent from a management station connected to the local unit.

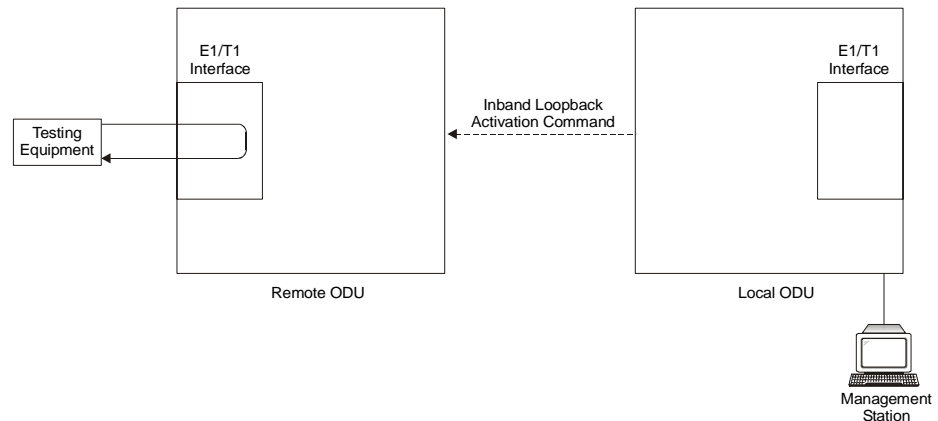


Figure 6-5: Remote External Loopback

Local Internal Loopback

The local unit can be set to close an internal loopback to test connection between the local and remote units, remote E1/T1 port and its connection to the remote side user equipment. In this mode, data coming from the remote user equipment is looped back to it. This loopback is initiated by an in band command sent from a management station connected to the local unit.

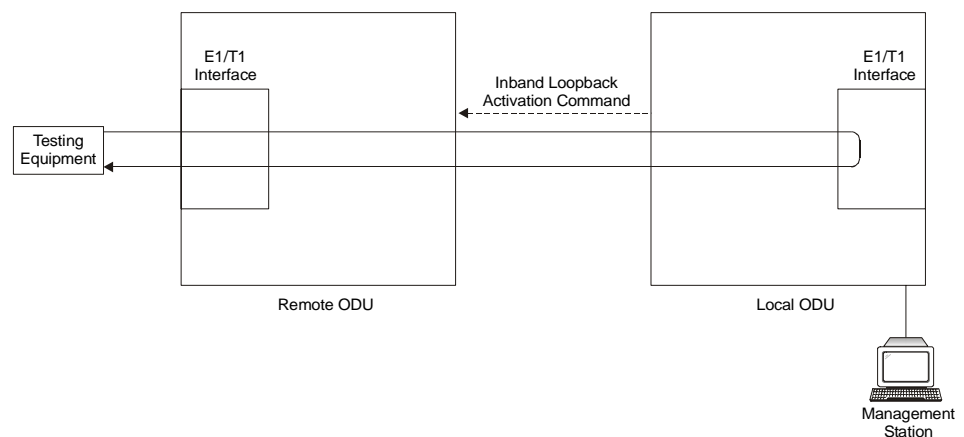


Figure 6-6: Local Internal Loopback

Reinstalling/Realigning the Link

It may be necessary to reinstall the link if the ODUs 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. From the **Configuration** menu, choose a site.
The Configuration dialog box opens.
2. In the Configuration dialog box, click the **Install Mode** button.
A message box asking if you want to enter install mode appears.
3. Click **Yes** to continue.
The system enters Install mode and the alignment tone becomes audible.
4. Realign the ODUs and start the Installation wizard (see Chapter 3).

The Link Budget Calculator

The Link Budget Calculator is part of the WinLink™ 1000 Manager software and is found in the Help menu. This useful utility enables you to calculate the expected performance of the wireless link and the possible configurations for a specific link range including antenna size, cable loss and climate conditions.

The Link Budget Calculator enables you to calculate the expected RSS of the link, and determine the stability of services and their effective throughput as a function of the link range and deployment conditions.

The Link Budget Calculator is found on the Installation CD and from tech support so it can be used prior to installation to define and verify link parameters such as expected RSS, maximum range, and number of E1s/T1s that a link is capable of providing. It enables verification of installation quality and provides calculations that consider “real world” factors such as climate.

The Link Budget Calculator screen appears in the following figure.

| | | |
|-----------------------------|--------------------------|----------------|
| Product | WL1000-ODU/F58/FCC/INT | |
| Channel / RFP / Frequency | 20 MHz | Auto / 5.8 GHz |
| Rate | 9Mb/s | |
| Tx Power | 16 | dBm [4 - 16] |
| Tx Antenna Gain | 22 | dB |
| Rx Antenna Gain | 22 | dB |
| Cable Loss | 0 | dB |
| Fade Margin | 6 | dB |
| Tx Power EIRP | 38 dBm / 6.3 Watt | |
| Min Range | 0.1 Km / 0.1 Miles | |
| Max Range | 46 Km / 28.6 Miles | |
| Expected Performance | | |
| Distance/Climate | 46 Km | Good (C=0.25) |
| Expected RSS / Fade Margin | -81 dBm / 6 dB | |
| Services | Ethernet Only | |
| Ethernet Rate (Full Duplex) | 1.8 Mb/s @ Ethernet Only | |
| Recommended antenna height | 24 Meter / 79 Feet | |
| Calculate | | |

Figure 6-7: WinLink™ 1000 - Link Budget Calculator

Performance Monitoring

Performance Monitoring constantly monitors traffic over the radio link and collects the following statistics data:

- Site 1/Site 2 received traffic rate (in Mbps)
- Site 1/Site 2 received frames rate (in Mbps)
- Radio signal strength (in dBm)
- Error (Blocks).

WinLink™ 1000 monitors the Air interface, ETH ports, and TDM trunks. It does so continuously, even when the WinLink™ 1000 Manager is not connected.

Two types of logs are recorded:

- **Monitor log** that records statistics on traffic rate and radio signal strength.
- **Events log** that records when the rates fall above or below a predefined threshold.

Both the statistics (monitor) log and event log can be saved as TXT files.

The Monitor Log

The Monitor log records performance statistics for predefined intervals. You can save the monitor log to a text file, as well as display the information in an on-screen report.

Saving the Monitor Log

You can save the recorded Monitor log statistics to a text file.

*** To save the monitor log:**

1. From the **Tools** menu, choose **Preferences**.

The Preferences dialog box appears:

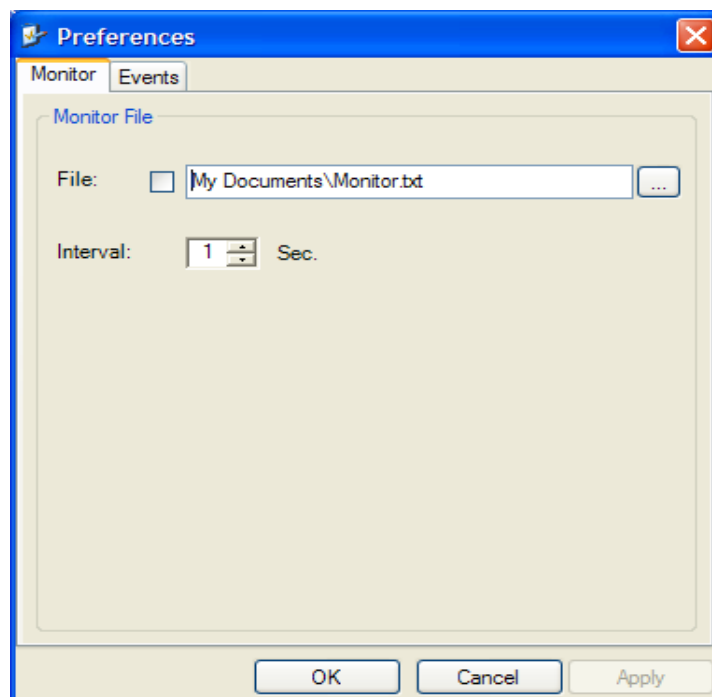



Figure 6-8: Preferences dialog box

2. Click the **Monitor** Tab.
3. Select the file to save.
4. Click the check box to open the file for saving.
5. Click the  button and in the Select File dialog box indicate in which folder and under what name the monitor log file is to be saved.
6. Set the time interval for adding data to the file.
7. Click **OK** to save the file.

Viewing Performance Reports

The Performance Monitor Report displays performance views of each of the interfaces³:

The screenshot shows the 'Performance Monitoring Report' window. On the left, there are three sections: 'Site' with radio buttons for 'HeadQuarters' and 'Downtown Branch'; 'Interface' with checkboxes for 'Air', 'Ethernet', 'Port #1', 'Port #2', 'TDM', '1st Trunk', '2nd Trunk', '3rd Trunk', and '4th Trunk'; and 'Interval' with radio buttons for 'Current', '15 Minutes', and 'Daily'. The main area is a table with the following columns: In..., Date & Time, Min RSL, Max RSL, RSL Thr..., RSL Thr..., Min TSL, Max TSL, TSL Thre..., BBER Thr..., UAS, Raw ES, SES, and BBE. The table contains 24 rows of data, all with green checkmarks in the 'In...' column, indicating successful data collection. The status bar at the bottom reads 'Air Performance Monitor - HeadQuarters - 15 Minutes Report'.

| In... | Date & Time | Min RSL | Max RSL | RSL Thr... | RSL Thr... | Min TSL | Max TSL | TSL Thre... | BBER Thr... | UAS | Raw ES | SES | BBE |
|-------|------------------------|---------|---------|------------|------------|---------|---------|-------------|-------------|-----|--------|-----|-----|
| ✓ | 11/28/2005 5:00:00 PM | -53 | -53 | 0 | 0 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | 0 |
| ✓ | 11/28/2005 4:45:00 PM | -53 | -53 | 0 | 0 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | 0 |
| ✓ | 11/28/2005 4:30:00 PM | -53 | -53 | 0 | 0 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | 0 |
| ✓ | 11/28/2005 4:15:00 PM | -53 | -53 | 0 | 0 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | 0 |
| ✓ | 11/28/2005 4:00:00 PM | -53 | -53 | 0 | 0 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | 0 |
| ✓ | 11/28/2005 3:45:00 PM | -53 | -53 | 0 | 0 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | 0 |
| ✓ | 11/28/2005 3:30:00 PM | -53 | -53 | 0 | 0 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | 0 |
| ✓ | 11/28/2005 3:15:00 PM | -53 | -53 | 0 | 0 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | 0 |
| ✓ | 11/28/2005 3:00:00 PM | -53 | -53 | 0 | 0 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | 0 |
| ✓ | 11/28/2005 2:45:00 PM | -53 | -53 | 0 | 0 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | 0 |
| ✓ | 11/28/2005 2:30:00 PM | -53 | -53 | 0 | 0 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | 0 |
| ✓ | 11/28/2005 2:15:00 PM | -53 | -53 | 0 | 0 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | 0 |
| ✓ | 11/28/2005 2:00:00 PM | -53 | -53 | 0 | 0 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | 0 |
| ✓ | 11/28/2005 1:45:00 PM | -53 | -53 | 0 | 0 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | 0 |
| ✓ | 11/28/2005 1:30:00 PM | -53 | -53 | 0 | 0 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | 0 |
| ✓ | 11/28/2005 1:15:00 PM | -53 | -53 | 0 | 0 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | 0 |
| ✓ | 11/28/2005 1:00:00 PM | -53 | -53 | 0 | 0 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | 0 |
| ✓ | 11/28/2005 12:45:00 PM | -53 | -53 | 0 | 0 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | 0 |
| ✓ | 11/28/2005 12:30:00 PM | -53 | -53 | 0 | 0 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | 0 |
| ✓ | 11/28/2005 12:15:00 PM | -53 | -53 | 0 | 0 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | 0 |
| ✓ | 11/28/2005 12:00:00 PM | -53 | -53 | 0 | 0 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | 0 |
| ✓ | 11/28/2005 11:45:00 AM | -53 | -53 | 0 | 0 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | 0 |
| ✓ | 11/28/2005 11:30:00 AM | -53 | -53 | 0 | 0 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | 0 |
| ✓ | 11/28/2005 11:15:00 AM | -53 | -53 | 0 | 0 | 16 | 16 | 0 | 0 | 0 | 0 | 0 | 0 |

Figure 6-9: Performance Monitoring Report window

Several performance data occurrences are collected for each of the interfaces (ES, SES, and UAS), as well as Specific data per Interface type (e.g., TX and RX bytes for Ethernet). For the Air Interface, user defined thresholds data are collected. Refer to

³ Ethernet performance is not collected in PoE systems.

Table 6-3 and Table 6-4, Performance Monitoring Report Toolbar.

Data is collected and selectively displayed based on three time intervals as selected by the **Interval** radio buttons:

- Current (t=0)
- 15 minutes Intervals
- Daily.

UAS – This parameter counts the time the air link was not providing any service. There are several potential reasons for this situation; one of the sites has a power failure, high interference, maintenance operation, etc.

Radio BBER Threshold – This parameter counts the seconds in which the radio performance is below a user specified threshold. The threshold is measured in percent. The threshold can be set from 0.1% up to 50%.

For links with E1/T1 service the recommended value is 1% (system default). Excellent TDM service is expected below the 1% threshold, meaning that for 1% threshold, the expected BBER value should be 0 if there are no problems during the 15 min interval. If the BBER threshold increases a degraded service might be noticed.

For links with Ethernet only service, 8% threshold is recommended and not 1% meaning that for 8% threshold, the recommended BBER value should be 0 if there are no problems during the 15 min interval. Since the system provides a loss less Ethernet service, there is throughput degradation in case of interference. The degradation is proportional to the BBER.

Radio RSS Threshold - Radio RSS Threshold can also be used to indicate problems in the radio channel. You can verify the RSS according to the link budget calculator during the installation. A value of -5dB from the current RSS is recommended as a threshold.

Table 6-3: Explanation of performance data

| Data type | Reported Value | Explanation |
|-----------------------|------------------------------|--|
| Generic PM Data | UAS – Unavailable Seconds | Seconds in which the interface was out of service. |
| | ES – Error Second | The number of seconds in which there was at least an error block. Note that notation of an error block is different per interface. |
| | SES – Severe Error Second | The number of seconds in which the service quality is low (the actual BBER ratio varies per interface). |
| | BBE – Background Block Error | The number of error block in an interval. |
| | Integrity | A flag indicating that the data is valid. Note that the PM data is not valid if not all the values were stored ⁴ . |
| Air Interface PM Data | Max RSL | The maximum of the receive signal level (measured in dBm). |
| | Min RSL | The minimum of the receive signal level (measured in dBm). |
| | Max TSL | The maximum of the transmit signal level (measured in dBm) ⁵ . |
| | Min TSL | The minimum of the transmit signal level (measured in dBm). |
| | RSL Threshold 1 | This parameter counts the number of seconds in which the RSL is below the specified threshold. |
| | RSL Threshold 2 | This parameter counts the number of seconds in which the RSL is below the specified threshold. |
| | TSL Threshold 1 | This parameter counts the number of seconds in which the RSL is above the specified threshold. |

⁴ Possible reasons are: Clock changes within the interval and Power up reset

⁵ The transmit power is fixed. The value can be changed only by user configuration

| Data type | Reported Value | Explanation |
|----------------------------|-------------------|---|
| | BBER Threshold | The BBER Threshold value counts the number of seconds in which the Background Block Error Ratio (BBER) exceeds the specified threshold. Note, that the system is design for excellent quality of service with BBER of less then 1%. (at 1% BBER expected TDM BER is less than 1E-6. |
| Ethernet Interface PM Data | Received Bytes | The number of Mega bytes received in the specified port within the interval |
| | Transmitted Bytes | The number of Mega bytes transmitted in the specified port within the interval. |

Performance Monitoring Report Toolbar

You can use the toolbar to perform the actions described in the following table:

Table 6-4: Action of the toolbar buttons

| Command Button | Action |
|----------------|--|
| Save | Saves the alarms in CSV or text format for further analysis. |
| Refresh | Reads the alarms from the ODU, and displays the alarms. |
| Site | Selects site for the active alarms. |
| Close | Closes the active alarm window. |

Setting Air Interface Thresholds

You use the Thresholds button on the Monitoring Performance Report toolbar to set the Air Interface Thresholds:

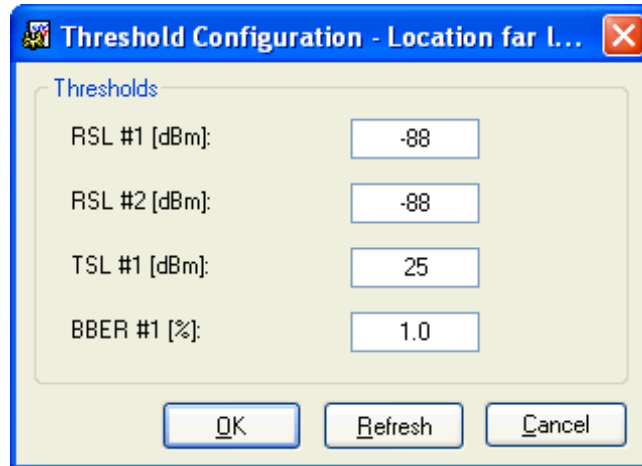


Figure 6-10: Threshold configuration dialog box

The Events Log

The Events log records system failures, loss of synchronization, loss of signal, and other events as described in the following table:

Table 6-5: Alarms and Information Messages

| Message | Description |
|---|--|
| Radio Link – Sync | Radio link is synchronized |
| Radio Link – Out Of Sync | Radio link lost synchronization |
| Link Has Been Reset | ODU was reset due to internal problem |
| TDM Interface – Normal | TDM interface is operating properly |
| TDM Interface – LOS | Loss of Signal is reported by TDM interface |
| TDM Interface – AIS | Alarm Indication Signal is reported by TDM interface |
| TDM Interface – Loopback | A loopback is active on TDM interface |
| Link Resetting | Wireless link reset from the management station. This alarm is caused by automatic reset after link configuration. |
| Local ODU Resetting | The local ODU reset from the management station. |
| Monitor was stopped since no connection to the link | No ODU-to-IDU traffic was detected during the last 20 minutes. |
| TDM Service – Normal | TDM service is operating properly |
| TDM Service – Alarm | Error has been detected on a TDM line |
| Configuration problem detected | The link needs to be reinstalled |
| Channel Scanning in progress | The ODU is scanning the channels for the remote ODU |
| Transmitting on <frequency> GHz | The ODU is transmitting on the frequency channel listed |
| Radar activity was detected in <site>, on channel <frequency> GHz | For DFS versions only. Radar is detected; the channel is prohibited for 30 minutes. |
| Monitoring fo Radar activity on channel <frequency> GHz | For DFS versions only. ODU is looking for Radar activity. |
| Bit Failed indication | Indicates ODU hardware problem. Send error code to Technical Support. |
| Link Status | Indicates incorrect connection or incompatibility between versions. Available in 1.620 versions and above. |
| Site Status | Indicates incorrect connection or operation at the site. Available in 1.620 versions and above. |

The events are displayed in the Events log in the lower part of the WinLink™ 1000 Manager Main menu:

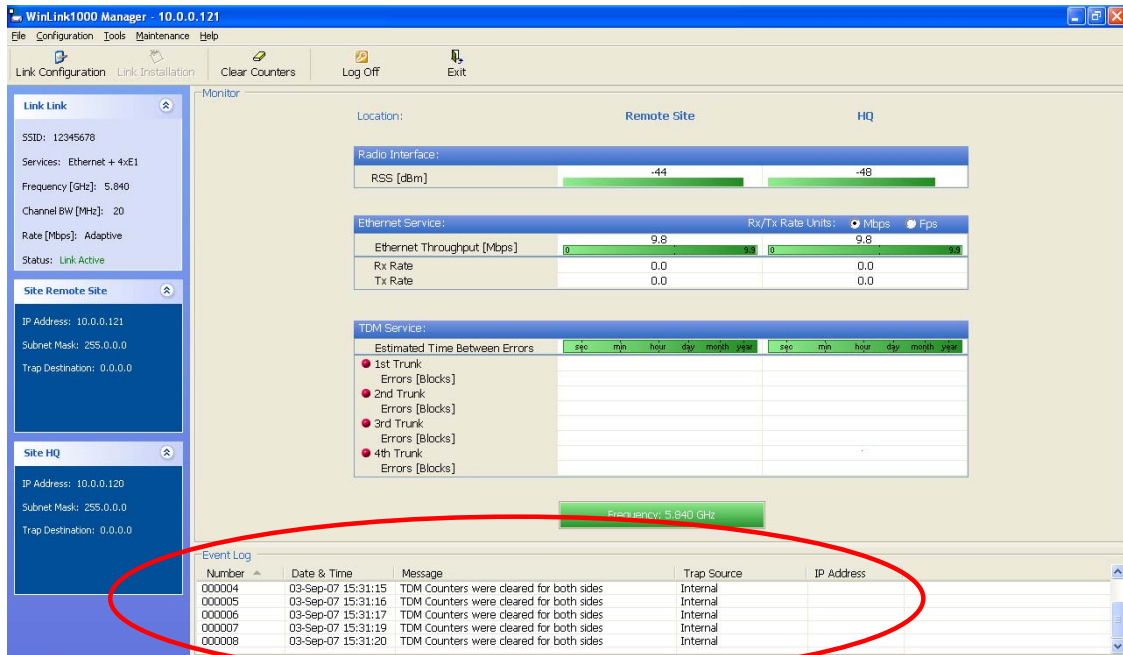


Figure 6-11: Events Log Display

Setting the Events Preferences

You can define a color for the traps to be displayed in the Active Alarms screen, according to the severity of the event. The severity is predefined.

To set the trap color:

1. From the **Tools** menu, choose **Preferences**.
The Preferences dialog box appears.
2. Click the **Events** Tab:

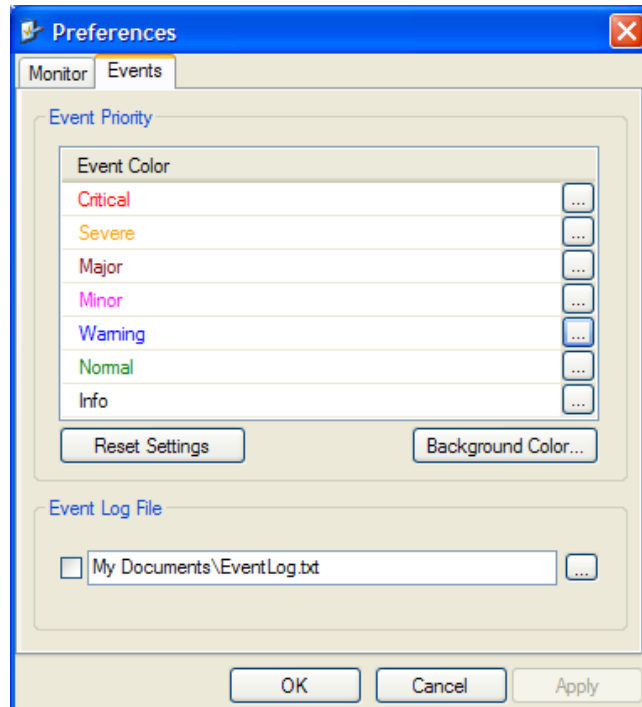



Figure 6-12: Preferences dialog box

3. Select the Event priority type and click on the  button.
A color chart opens.
4. Select the desired color.
5. Repeat for all the trap types.

*** To set the trap background color:**

- Click **Background Color** to change the text background.

*** To reset the trap colors:**


- Click **Reset Settings** to return to the default color settings.

Saving the Events Log

You can save recorded events in an Events log text file. New alarms are automatically added to the text file, as they enter the event log.

*** To save the event log:**

1. From the **Tools** menu, choose **Preferences**.
The Preferences dialog box appears
2. Click the **Events** Tab.
3. Select the file to save.

4. Click the check box to open the file for saving.
5. Click the  button and in the Select File dialog box indicate in which folder and under what name the alarm log file is to be saved, and click **OK**.

Error Detection and Alarms

WinLink™ Error detection and Alarms detect compatibility problems, fault conditions of the radio or user links, and subsequently initiates alarms to alert the user.

Note:

To store the Event Log, first define the IP address, subnet mask, default gateway and trap address of the management PC, (see [Defining the Management Addresses, page 5-74](#) for details).

Alarms (traps) are displayed in the Event Log in the lower panel of the Main Menu screen. The event log may be saved as a TXT file.

The event log includes the following fields:

- Sequential number (ID)
- Date and time stamp
- Message
- Trap source
- IP address of the ODU that initiated alarm.

*** To view summary of saved alarms**

- From the Tools menu, choose **Active Alarm Summary**.

The Active Alarms Summary window opens:

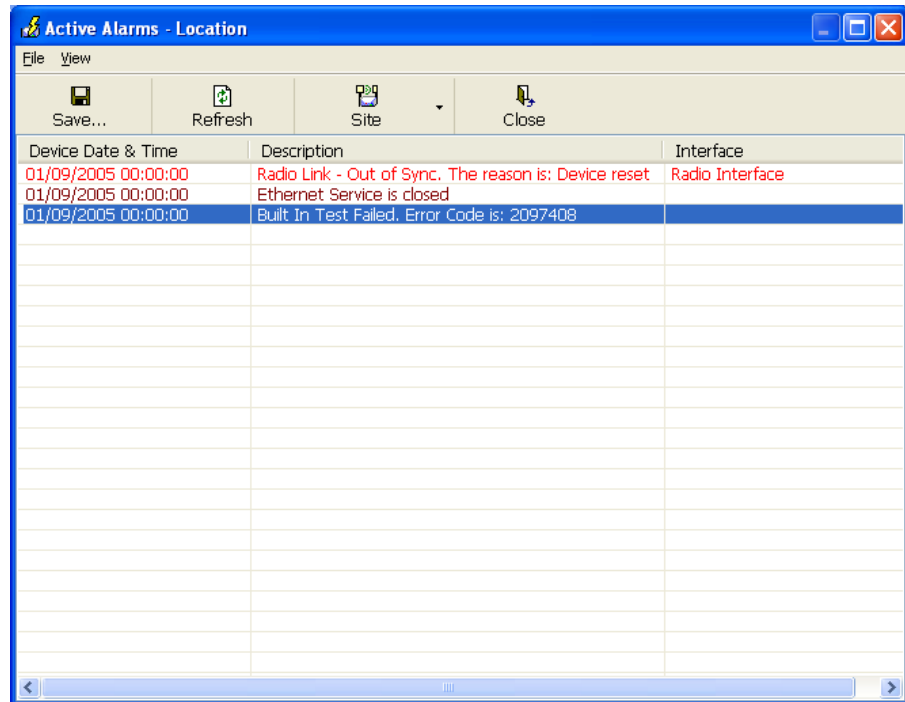


Figure 6-13: Active Alarms Summary

The following table provides an explanation of the command buttons.

Table 6-6: Active Alarms command buttons

| Action | |
|---------|--|
| Save | Saves the alarms in CSV or text format for further analysis. |
| Refresh | Reads the alarms from the ODU, and displays the alarms. |
| Site | Selects site for the active alarms. |
| Close | Closes the active alarm window. |

Remote Power Fail Indication

Remote power fail indication indicates to one side that the other side has had a power failure. The failed site sends a final trap indication about the power loss just before powering off.

A Dying-Gasp circuit identifies the power failure at a minimum interval of 20 milliseconds before the IDU crash, during that interval a message notifying the power failure is sent to the remote end.

Alarm output number 4 indicates link loss due to power failure at the remote end.

Chapter 7

Security

WinLink™ 1000's integrated advanced encryption support provides enhanced air interface security for carriers and private networks by ensuring user data protection with one of the most sophisticated commercially available combined encryption and authentication techniques, CCM/AES. This technique combines message authentication (preventing anti-spoofing 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, the AES encrypts both the source and destination MAC addresses.

Entering and Changing Passwords

There are two passwords necessary to use the WinLink system:

- Management Password required for running the Management software
- Link Password used for encryption purposes. This link password is entered when installing or configuring the link.

Changing the Management Password

*** To change the management password**

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