

WinLink™ 1000



Broadband Wireless Transmission System

User Manual and Installation Guide

Version 1.795.5

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.

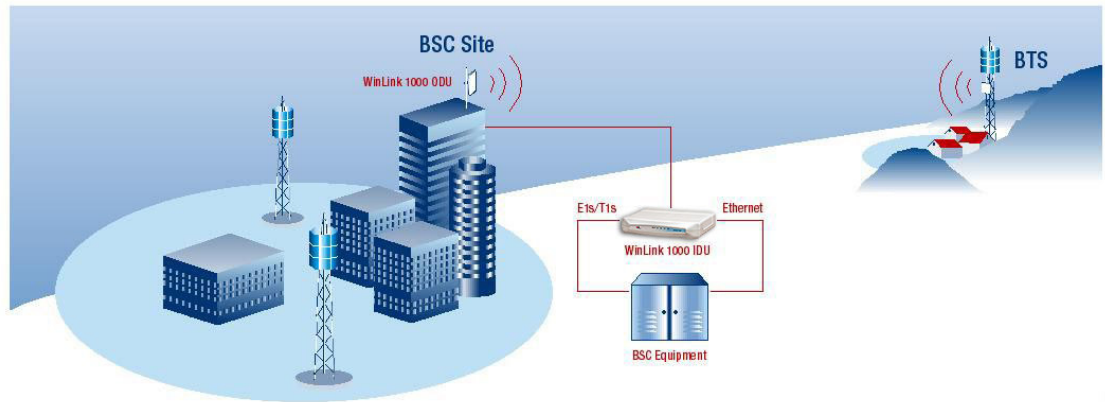


Figure 1-1: Typical Cellular Backhaul Application

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.

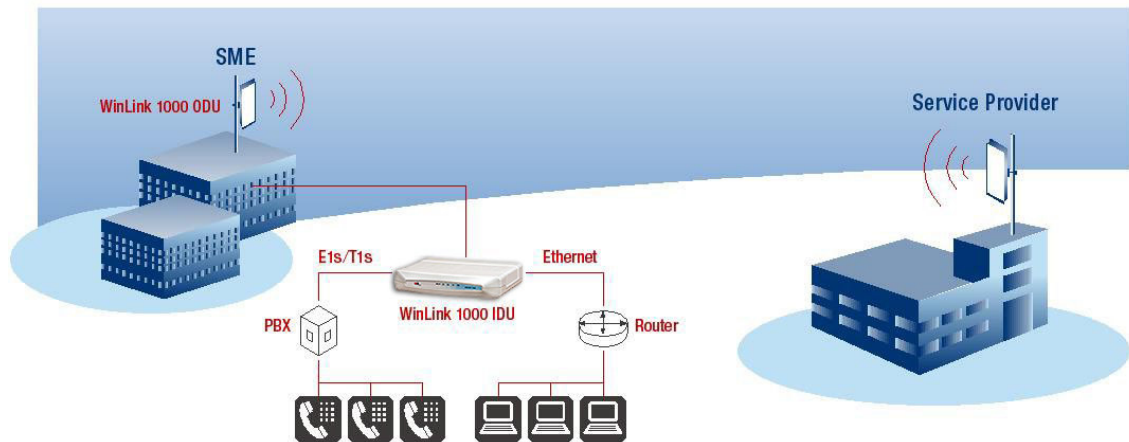


Figure 1-2: Typical Broadband Access Application

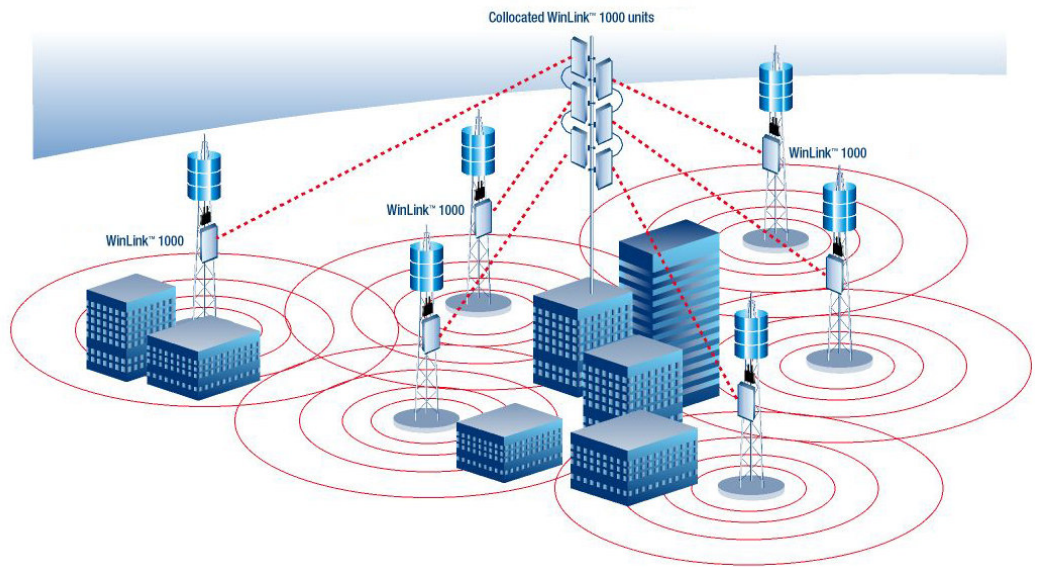


Figure 1-3: Typical WiFi Backhaul Application

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.

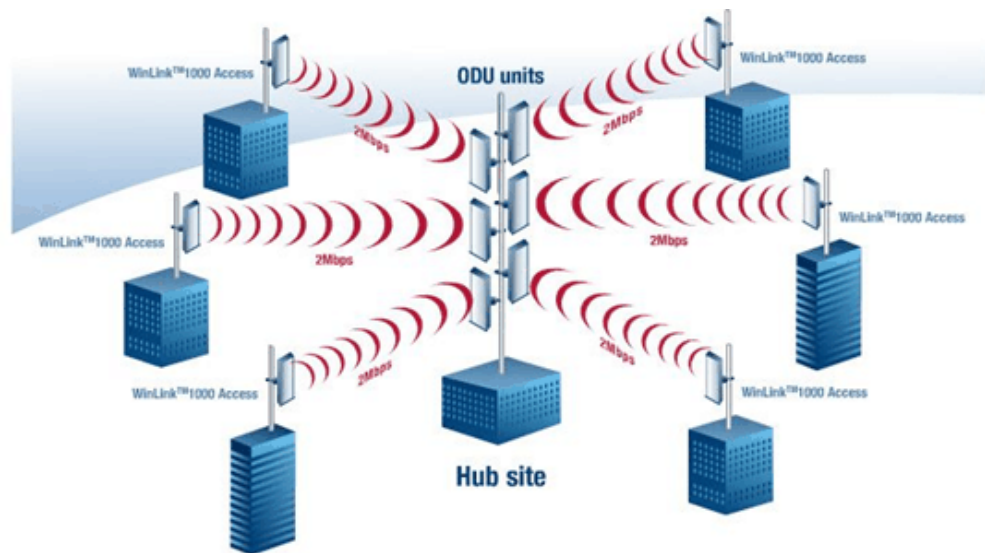


Figure 1-4: Multi Point-to-Point Enterprise Connectivity

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.

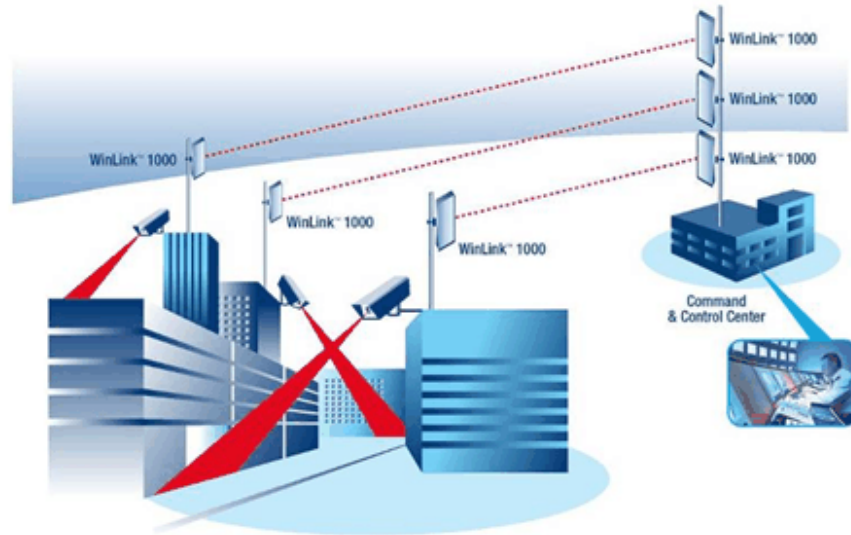


Figure 1-5: Multi Point-to-Point Video Surveillance Deployment

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.

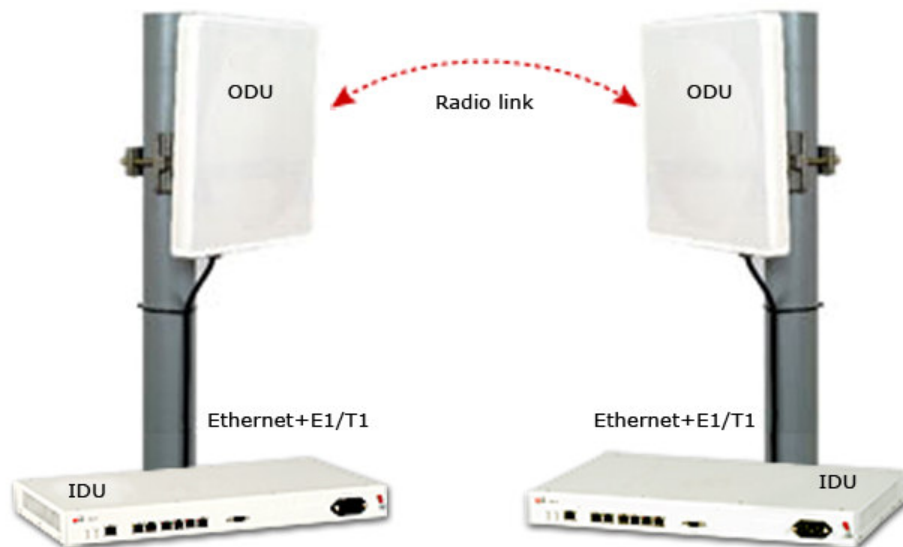


Figure 2-1: Example of Link Architecture

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, 4xE1/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

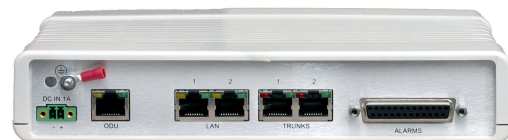


Figure 2-6: IDU-R Back Panel

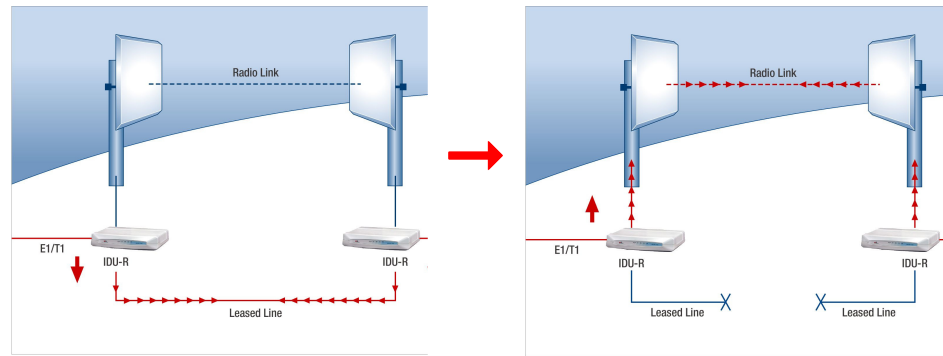


Figure 2-7: Backup link for E1/T1 connections

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.

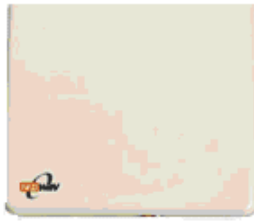
Various external antennas are available for the WinLink™ 1000 operating frequencies.



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	+	-	+

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.

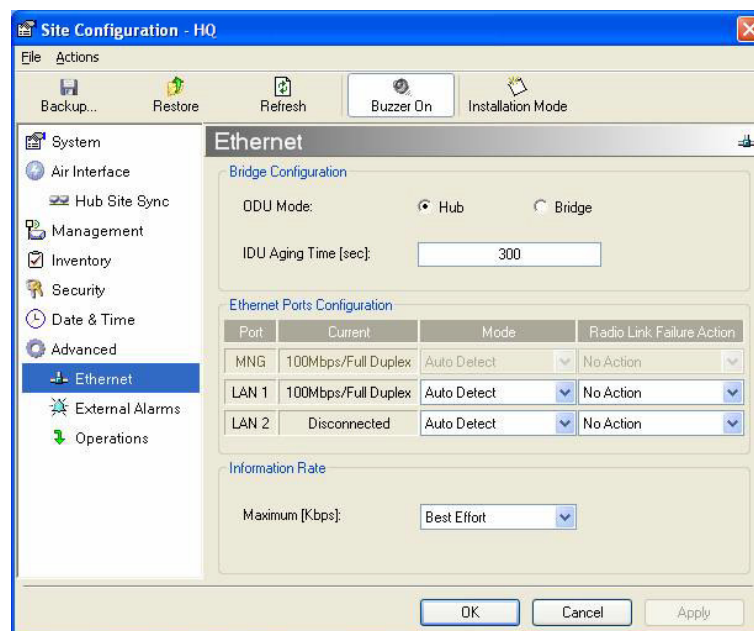


Figure 2-13: WinLink™ 1000 Manager screen

(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	
2.412-2.462 GHz	24 dBm		24 dBi	
4.940-4.990 GHz	25 dBm @ 5 and 10 MHz CBW 21 dBm @ 20 MHz CBW		26 dBi (27 dBi minus 1 dB feeder loss)	
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	Outdoor Unit		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.

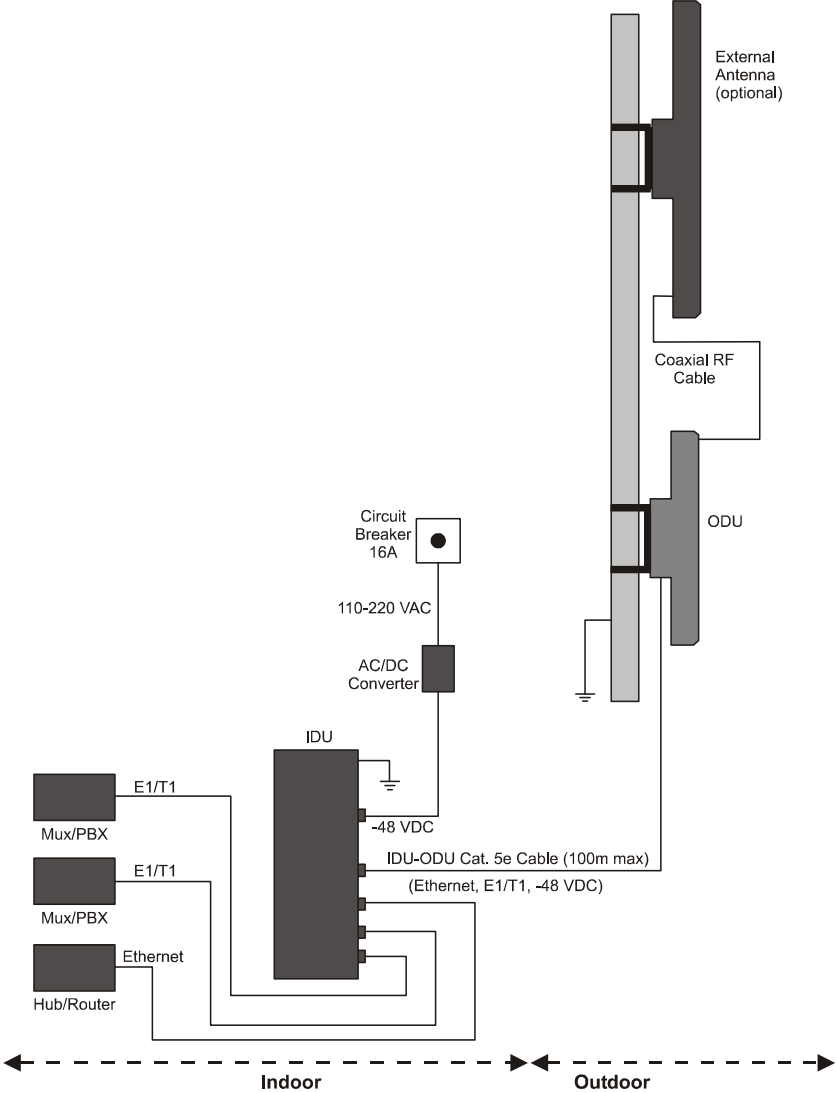


Figure 3-1: Typical Installation Diagram (with external antenna)

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.



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.

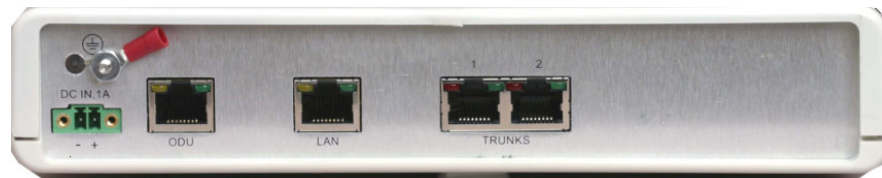


Figure 3-2: Typical IDU-E Rear Panel

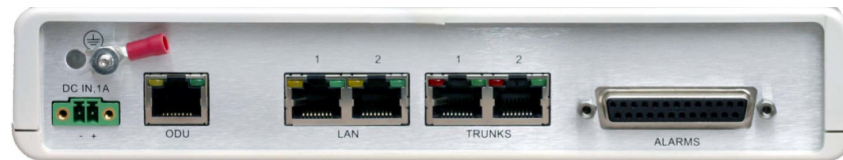


Figure 3-3: IDU-R Rear Panel



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.



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 < mains ≤ 300V, the transient rating is 2500V;
for 300V < mains ≤ 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:

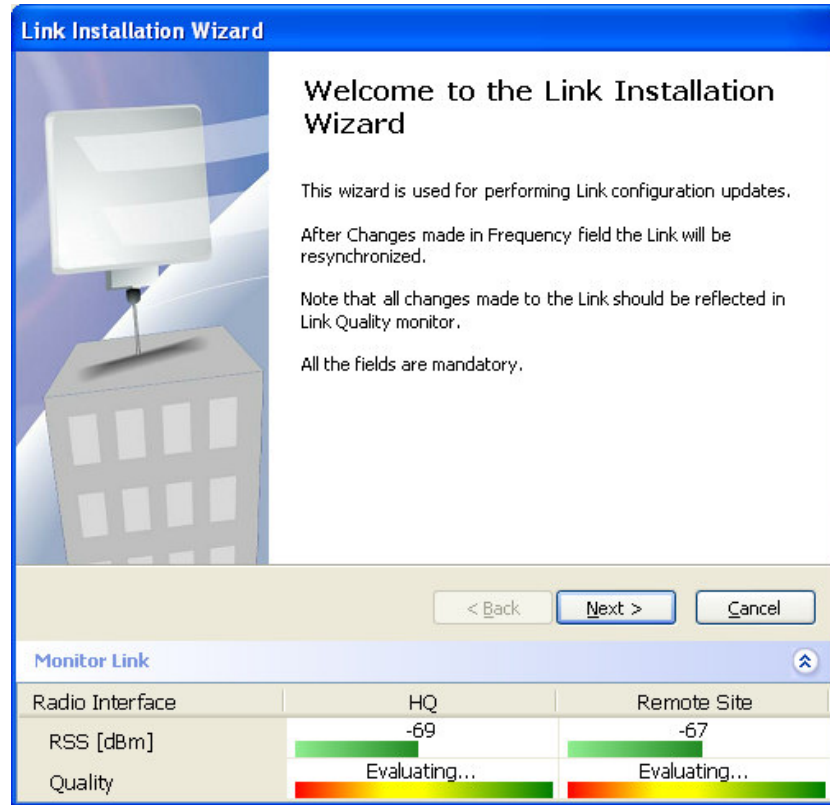


Figure 3-9: Link Installation Wizard

4. Click Next to proceed with the installation procedure.

The system dialog box opens:

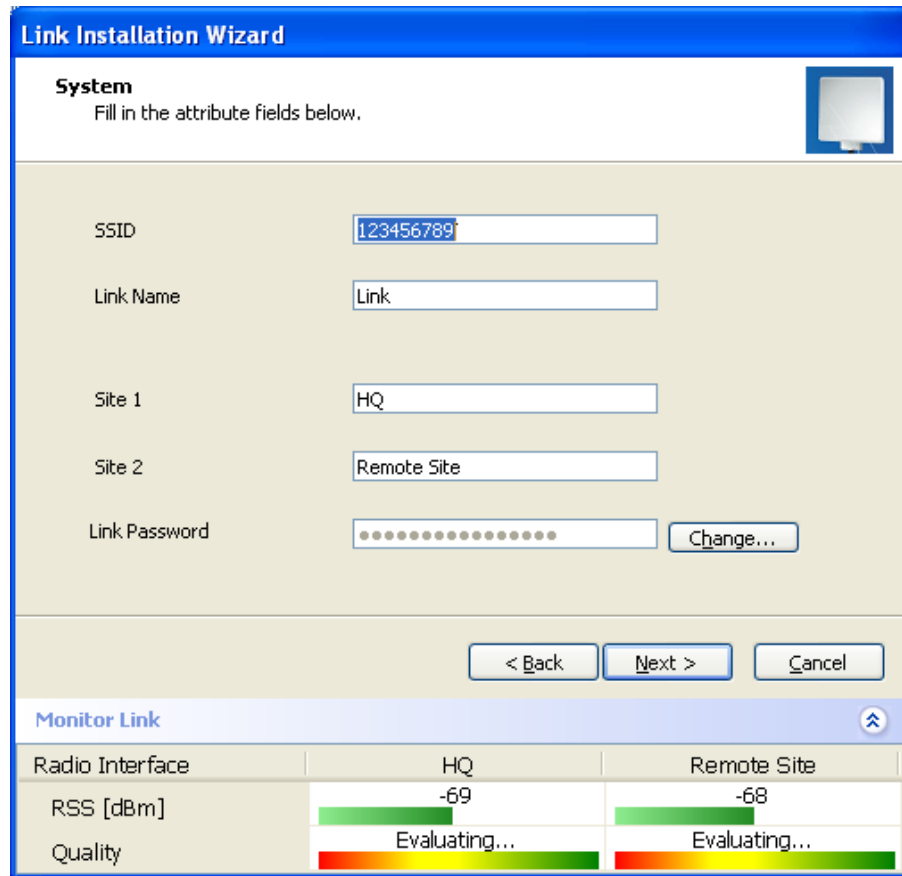


Figure 3-10: Installation Wizard, System dialog box

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.

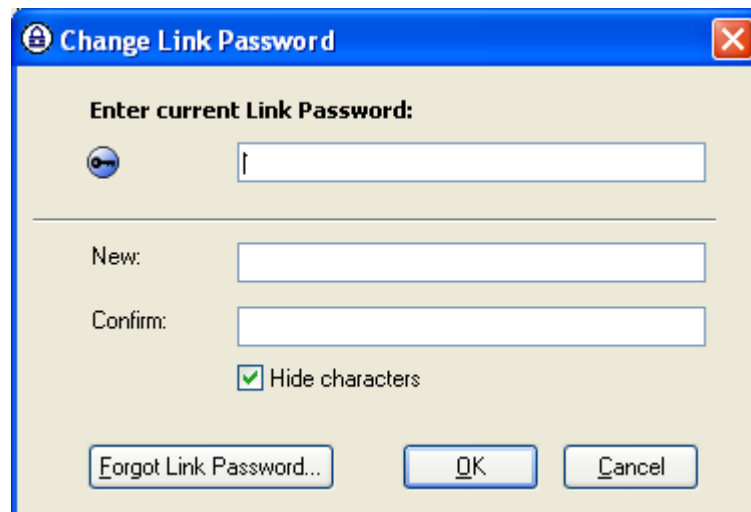


Figure 3-11: Change Link Password dialog box

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.

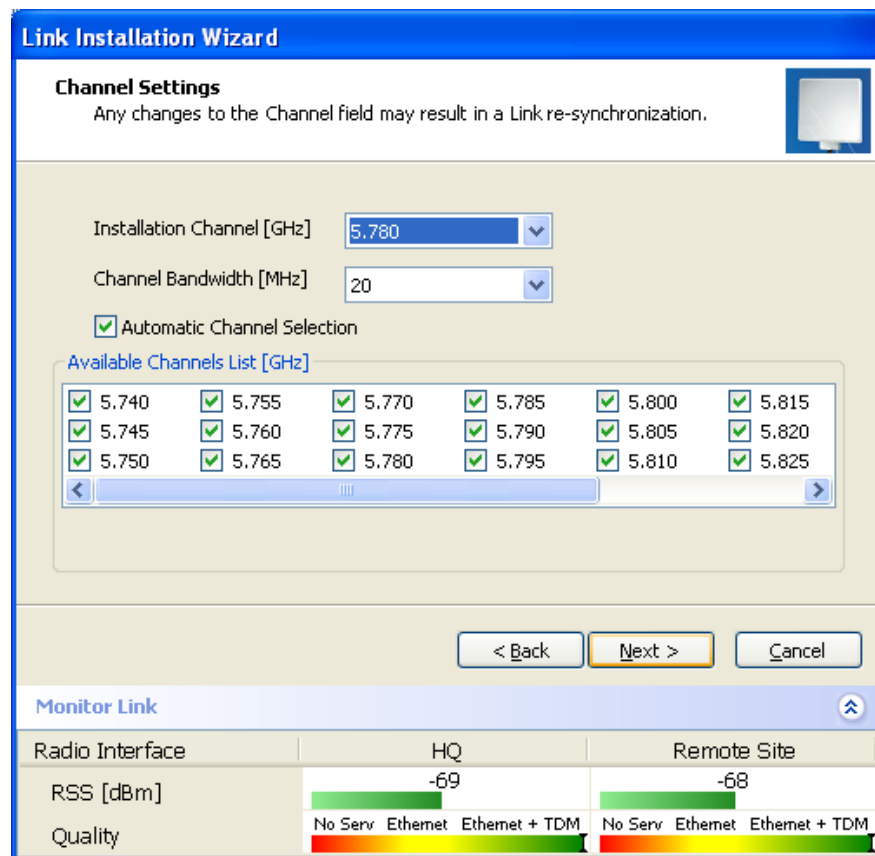


Figure 3-13: Channel Select dialog box - Automatic Channel Select

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.