WinLink™ 1000 Family

High Capacity Carrier Class Radio System
for 2.4GHz, 4.9GHz and 5.XGHz Bands

Installation and Operation Manual

WinLink™1000

Point-to-Point Wireless Product Family

Revision 8.22

WinLink1000

Point-to-Point Wireless TDM/IP Revision 8.0
Installation and Operation Manual

Notice

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

International Headquarters RADWIN Ltd.	U.S. Headquarters RADWIN Inc.
32 Habarzel Street	900 Corporate Drive
Tel Aviv 69710 Israel	Mahwah, NJ 07430 USA
Tel: 972-54-766-00-44	Tel: 1.800.444.7234 (ext. 341)
Fax: 972-3-7662918	Fax: (201) 529-5777
E-mail: support@radwin.com	E-mail: support-usa@radwin.com

FCC-15 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 (RADWIN) 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.

⚠️ **Warning**

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.

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, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

Quick Start Guide

Installation of WinLink 1000 should be carried out only by a qualified technician. If you are familiar with WinLink 1000, use this guide to prepare the units for operation.

1.   Installing WinLink 1000 Units

ODU Package Contents:

- ODU

- Mast/Wall mounting kit

- WinLink 1000 Management software installation CD

- Mounting instructions

- Spare RJ-45 connector

- ODU to IDU cable at length ordered (optional)

IDU-E Package Contents:

- IDU-E

- 110V/240V adaptor

- IDU wall-mounting drilling template

- Spare RJ-45 connector

(Optional) IDU-C or AIND Package Contents:

- IDU-C or AIND

- For IDU-C AC model, 110v/240 VAC with 3-prong connector cable

- For DC model, -48 VDC with 3-pin terminal block connector (green)

- IDU standard 1-U, 19" carrier rack

- Spare RJ-45 connector

Equipment Required:

- RJ-45 crimp tool (If pre-assembled cable is not used)

- Drill (for wall mounting only)

- IDU and ODU grounding cable

- 13 mm or 1/2″ socket spanner

- ODU to IDU cable if not ordered (Outdoor class, CAT–5e, 4 twisted pairs)

- Cable ties

- Laptop running Windows 2000 or Windows XP

Before the installation

1. Install the WinLink 1000 software on the laptop.

2. Verify that all equipment and tools are available.

Performing Installation

➔ **To install the ODU:**

1. At site **A**, route the ODU cable from the ODU location (on the roof) to the IDU location (inside the building). The maximum length is 100m.

2. Mount the ODU unit to the mast or wall, using the mounting kit.

3. Connect the RJ–45 connectors to both ends of the cable, use the pinout table and diagram below:

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

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

5. Repeat the procedure at site **B**.

➔ **To align the ODU:**

1. Connect power to the IDU.

⚠ **Do not stand in front of a live outdoor unit.**

Warning The antenna used for this transmitter must be installed to provide a separation distance of at least 364 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

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

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

4. Alternating between each site, turn each ODU slowly listening to the buzzer beep sequence until optimal alignment is achieved.

5. Secure the site **A** and site **B** ODUs to the mast/wall.

6. Monitor the link quality for about 15 minutes to verify stability.

7. Connect the management station to one of the two IDUs in the link.

8. Start the WINLink Manager application.

9. Open the installation wizard and follow the installation steps.

10. After selection of the radio channel and the link rate, verify that the link quality bar in the WinLink manager is within the green range for TDM service and within the yellow range for Ethernet service.

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

Connecting User Equipment

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

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

2. Connect user hub/router or any other compatible device to the IDU RJ-45 port designated **LAN**:
   - On the rear panel of the IDU-E.

▪ On the front panel of the IDU-C, AIND.

Note   *IDU-C has an integrated LAN switch that provide 2 port of 10/100BaseT.*
The Integrated LAN switch is not support spanning tree.
The two LAN ports can be connected to 2 separated LAN segments but
connection of both LAN ports to the same LAN segment will create a loop
that fluid the network. Therefore, this configuration is prohibited.

2.   Operating WinLink 1000

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

Normal Indications

Upon turning on WinLink 1000, the PWR LED in the front panel lights to
indicate that WinLink 1000 is on. The table below shows the correct
status of the indicators after power-up.

Indicator	Color	Status
PWR	Green	On (only on IDU-E)
IDU	Orange Green	Blinks for short duration during startup Blinking slowly shows normal operation
ODU	Green	Blinking slowly shows normal operation
AIR I/F	Orange Green	Blinks for short duration during startup Blinking slowly shows normal operation
SERVICE	Green	Blinking slowly shows normal operation OFF when SERVICE selected is Ethernet only

Troubleshooting

If the WinLink 1000 is not operational, determine the cause and solution from the table below.

Led	Status	Remedy
PWR	Off	For the IDU-E, check that AC adapter is connected to the IDU and the AC power outlet.
IDU	Orange	Check that the IDU/ODU cable is properly wired and connected.
ODU	Red	Check that the IDU/ODU cable is properly wired and connected.
AIR I/F	Orange	Complete the installation procedure from the management software.
	Red	Check the ODU Antenna alignment. Check that the radio configuration of both site A and site B units are the same (channel and SSID).
SVC.	Off	Check the TDM service configuration in the NMS.
	Orange	Check that the system is not in loopback mode. Check the site B IDU ports and cables and site B external equipment.
	Red	Check the site A IDU ports, cables and external equipment.

Contents

Chapter 1

Introduction

1.1 Overview

WinLink1000 is a carrier-class, high capacity, Point-to-Point broadband wireless transmission system. WinLink1000 combines legacy TDM and Ethernet services over 2.3, 2.4, 4.9 and 5.x GHz license-exempt bands and is suitable for deployment in FCC, ESTI, and CSA-regulated countries. The system provides up to 48 Mbps wireless link and supports ranges of up to 80 km (50 miles) with an external antenna.

The screens shown in this manual are for version 1.600, for WinLink1000 systems with earlier ODU hardware versions contact technical support, support@radwin.com, for the relevant manual.

Application

Figure 1-1 illustrates a typical point-to-point application of two WinLink1000 units.
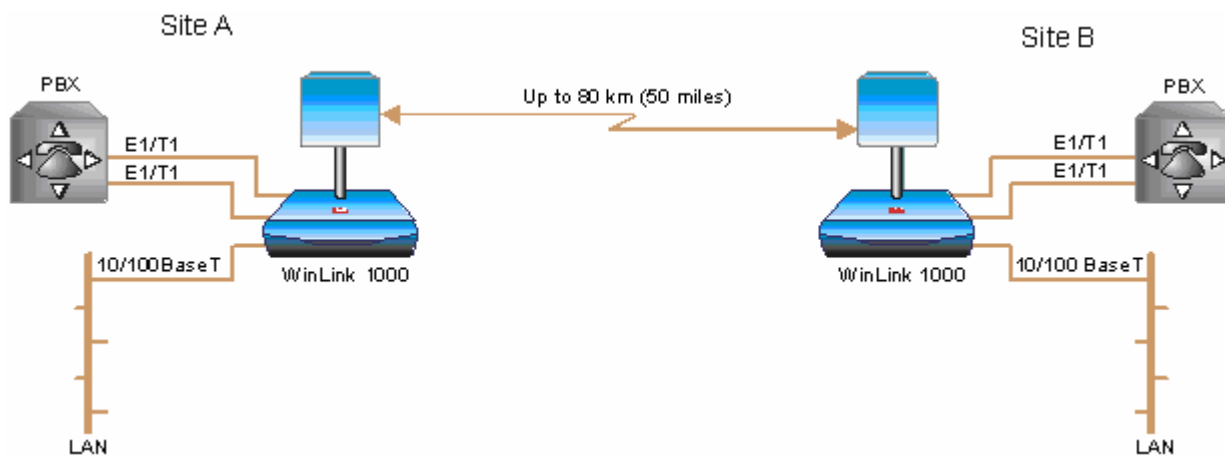
Figure 1-1. Typical Application

Versions

WinLink1000 is available for operation in several different frequency ranges, with versions for ETSI and FCC regulations. *Table 1-1* shows all the available options.

- F23, 2.300–2.400 GHz

- F24, 2.400–2.4835 GHz

- F49, 4.940–4.990 GHz

- F53, 5.250–5.350 GHz

- F54, 5.470–5.725 GHz

- F58, 5.725–5.850 GHz

- F53HP, high-power version, supports a dynamic range of 12 dB transmit power

- F54E, limited transmit power as specified by the ETSI standard

- F54-HG, high-gain version for the ETSI regulated markets, to be used with
  28 dBi external antenna only

- F54HP, high-power version, supports high transmit power up to 18 dBm.

- AIND, All indoor unit. Available with IDU options 4E1 or 4T1 as main PCB, and ODU options F58/FCC or F24/FCC.
  WL1000-AIND integrates the ODU and the IDU-C into a single 19" IDU-C box.

Table 1-1. Ordering Options

WL1000-ODU/F23/HP/EXT
WL1000-ODU/F24/ETSI/EXT
WL1000-ODU/F24/ETSI-IL/EXT
WL1000-ODU/F24/ETSI-IL/LG/EXT
WL1000-ODU/F24/ETSI-LG/EXT
WL1000-ODU/F24/FCC/EXT
WL1000-ODU/F24/FCC/INT

WL1000-ODU/F24/HP/EXT
WL1000-ODU/F49/FCC/EXT
WL1000-ODU/F53/ETSI/EXT
WL1000-ODU/F53/FCC/EXT
WL1000-ODU/F53/FCC/INT
WL1000-ODU/F53/HP/EXT
WL1000-ODU/F53/HP/INT
WL1000-ODU/F54/ETSI/EXT
WL1000-ODU/F54/ETSI/INT
WL1000-ODU/F54/ETSI-HG/EXT
WL1000-ODU/F54/ETSI-LG/EXT
WL1000-ODU/F54/HP/EXT
WL1000-ODU/F54/HP/INT

Features

Wireless Link

WinLink1000 delivers up to 48 Mbps data rate for Ethernet and E1/T1 traffic. The system supports a variety of spectrum bands and can be configured to operate in any channel in the band with a carrier step resolution of 5 MHz.

WinLink1000 operation complies with ETSI, CSA and the FCC 47CFR Part 15 and subpart C and E requirements.

WinLink1000 employs Time Division Duplex (TDD) transmission. This technology simplifies the installation and configuration procedure. There is no need to plan and to allocate separate channels for the uplink and downlink data streams.
Operation over 2.4 GHz and 5.x GHz bands is not affected by harsh weather conditions, such as fog, heavy rain etc.

LAN Interface

The WinLink1000 LAN port provides 10/100BaseT interfaces with autonegotiation and transparent VLAN support. Traffic handling is provided by a MAC-level self-learning bridge.

TDM Interface

The WinLink1000 TDM interface accepts E1 or T1 traffic, supporting the following:

- Unframed operation (E1 and T1)

- AMI and B8ZS zero suppression (T1).

Advanced Encryption System

WinLink1000 (version 1.500 and above) ensures user's data security with one of the most sophisticated commercially available combined encryption and authentication techniques, CCM/AES. This technique combines message authentication (preventing antispoofing and replay protection) with commercial encryption, and complies with the IEEE 802.11i (phase iii) security recommendations.

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

Initial encryption and authentication is based on a user-defined master key (Link Password). While standard Wireless LAN encrypts only the Ethernet Payload, WinLink1000 encrypts both the source and destination MAC addresses.

Management

WinLink1000 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.

Diagnostics and Performance Monitoring

WinLink1000 supports activating local and remote loopbacks on E1/T1 links.

WinLink1000 constantly monitors the data transmission process, evaluates received signal strength, and signal quality. It also monitors received traffic and frame rate (FPS) for local and remote units.

Automatic Channel Select

Some versions of WinLink1000 have the Automatic Channel Select feature, which operates via a Dynamic Frequency Selection (DFS) mechanism. This enables coexistence with any radar system that may be active in the area. WinLink1000 performs channel monitoring and selects the channel with the lowest interference for the transmission. WinLink1000 operation complies with ETSI requirements where the ETSI version has been purchased.

Adaptive Rate Modulation (ARA)

WinLink1000 constantly monitors the link quality to make sure that the maximum throughput is maintained. WinLink1000 automatically re-evaluates the air transmission rate if the link quality reduces due to interference or weather changes. A lower rate may be selected in order to improve the link quality. Once the conditions have improved a faster rate is automatically selected. Each side of the link is monitored and adjusted independently. WinLink1000 selects the highest possible rate to maintain the quality of the services selected.

Transmit Power Control

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

Alarm Connector

The IDU-C has 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. 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.

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

Optional External Antenna

WinLink1000 supports configuration of an external antenna. In this configuration, the outdoor unit is supplied with an N-type connector that connects through a coax cable to the external antenna.

An external antenna can extend the range of the link, and in some cases, may help to reduce environmental interferences. Various external antennas are available for the WinLink1000 operating frequencies.

For example, an optional flat panel 28 dBi external antenna increases the operation range of WinLink1000 up to 80 km (50 miles).

1.2 Physical Description

WinLink1000 system consists of an Outdoor Unit (ODU) and an Indoor Unit (IDU)

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

Figure 1-2. WinLink1000 Units

IDU-E

The front panel of the IDU-E includes five LEDs, which display the status of E1/T1 traffic, wireless link, self-test results, the ODU-to-IDU link, and power status. For a detailed description of the front panel LEDs, see *Chapter 3*.

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

IDU-C

The IDU-C front panel includes four LEDs that display the status of E1/T1and, wireless link, self-test results, and ODU-to-IDU link. For a detailed description of the front panel LEDs, see *Chapter 3*.

ODU

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

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

1.3 Functional Description

WinLink1000 system comprises of the following units:

- **Outdoor Unit (ODU)**: An enclosed aluminum frame with a front sealed plastic cover, containing an integrated transceiver with an antenna, RF module, modem and standard interfaces. The ODU stores all the configuration parameters of the WinLink1000 system. *Figure 1-3* shows the ODU block diagram.

- **Indoor Unit (IDU-E or IDU-C)**: The interface unit between the ODU and the user. It converts 100-240 VAC to -48VDC, and sends it on to the ODU. The IDU does not store any configuration data. Therefore, there is no need for additional configuration of the WinLink1000 system when replacing an IDU.
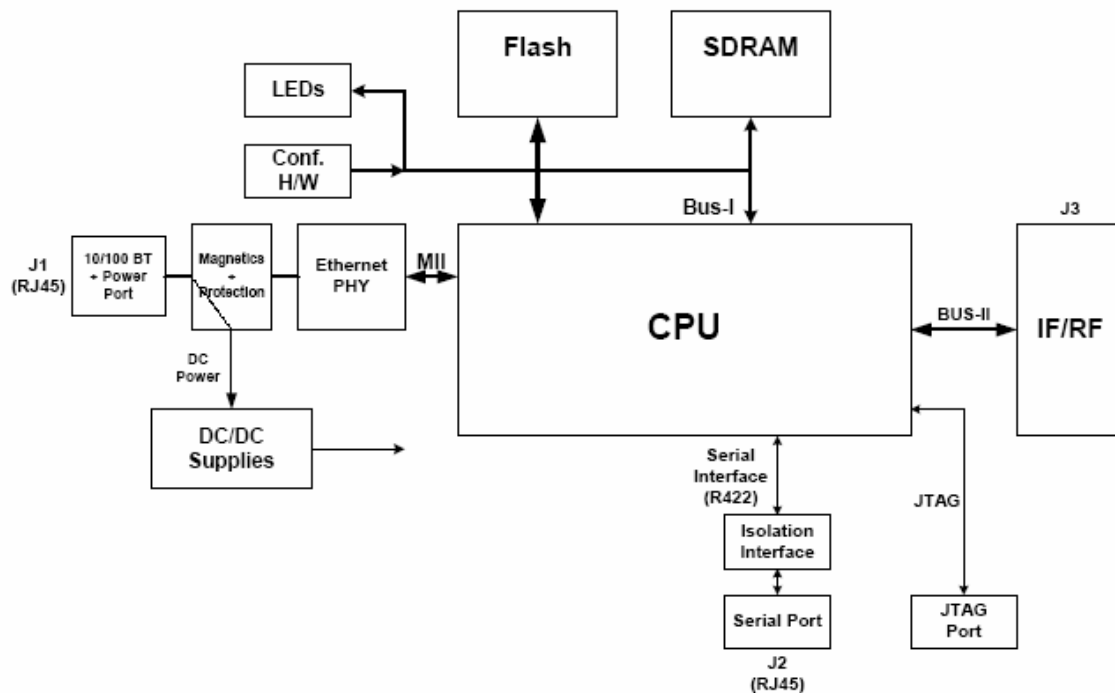
Figure 1-3. ODU Block Diagram

1.4 Technical Specifications

Air Interface

Technology	OFDM
Duplexing Method	Time Division Duplex (TDD)
Capacity	Configurable up to 48 Mbps
Modulation	OFDM – BPSK, QPSK, 16QAM, 64QAM
Channel Resolution	5 MHz
Transmitter Power	Specification is different per product, for further details refer to the *Link Budget Calculator*
Range	Up to 41 km (25.5 miles) Up to 80 km (50 miles) with an external antenna.

Frequency Band [GHz]	2.300–2.483	4.940–4.990	5.150–5.350	5.470–5.725	5.725–5.850
Standard	FCC ETSI	FCC	FCC	ETSI	FCC

Antennas

(See Antenna Characteristics in *Appendix E*)

LAN Interface

PHY	Up to 2 × 10/100BaseT, auto–sensing
Framing/Coding	IEEE 802.3/U
Bridging	Self–learning, up to 2048 MAC addresses
Line Impedance	100Ω
VLAN Support	Transparent
Frame Size	1536 bytes max
Connector	RJ–45

E1 Interface

Data Rate	Unframed (transparent) 2.048 MHz (Specification may be different per ordering option)
Line Interface	HDB3
Connector	RJ–45

	No. of Ports	IDU-E: 1 or 2
		IDU-C: 4
T1 Interface	*Data Rate*	Unframed (transparent) 1.544 MHz (Specification may be different per ordering option)
	Zero Suppression	AMI, B8ZS
	Connector	RJ-45
	No. Of Ports	IDU: 1 or 2
		IDU-E: 4
		AIND: 4
Indicators	*PWR (green)*	Power status (IDU only)
	IDU (green)	IDU-E status
	ODU (green/red)	ODU-to-IDU link status
	AIR I/F (green/red)	Air Interface status
	SERVICE (green/red)	E1/T1 signal status
Power	*Source*	IDU-E: 100-240 VAC via external AC/DC converter
		IDU-C: 100-240 VAC via AC cable
		IDU-C,AIND: -48 VDC (-42 to -60 VDC)
		IDU-C: 24 VDC
	Power Received by the ODU	-48 VDC
	Power Consumption	ODU plus IDU-E – 10W max
		ODU plus IDU-C – 14W max
		AIND – 14W max
	Connector	IDU-E 2-pin
		IDU-C AC – 3-pin IEC connector DC – 3-pin terminal block
Alarm Connector	*Connector*	DB-9 female
	Electrical Characteristics	Dry Contact, 30V/2A
		Max input current, 0.01A at 0.5W (R=5K)

Physical   *Outdoor Unit (ODU)*   With integrated
                                                                antenna

Height	245 mm / 9.3 in	305 mm / 12 in
Width	135 mm / 5.13 in	305 mm / 12 in
Depth	40 mm / 1.57 in	58 mm / 2.3 in
Weight	1.0 kg / 2.2 lb	3.3 kg / 7.2 lb

Indoor Unit	**IDU–E**	**IDU–C and AIND**
Height	44 mm / 1.7 in (1U)	44 mm / 1.7 in (1U)
Width	237 mm / 9.3 in	297 mm / 11.5 in
Depth	170 mm / 6.7 in	450 mm / 17.7 in
Weight	0.58 kg / 1.4 lb	1.58 kg / 3.3 lb

Environment   *Outdoor Unit (ODU)*

Enclosure	All–weather case
Temperature	–35 to 60°C/–31 to 140°F

Indoor Unit

Temperature *IDU–E and IDU–C*	–0 to 50°C/32 to 122°F
Temperature AIND	–35 to 50°C/–31 to 122°F
Humidity	Up to 90%, non–condensing

Chapter 2

Installation and Setup

2.1 Introduction

This section describes the installation, alignment, and setup procedures for a WinLink1000 system.

After installing the hardware and establishing a link, refer to *Chapter 3* for operation instructions and *Chapter 4* for configuration instructions.

In case a problem is encountered, refer to *Chapter 5* for test and diagnostic instructions.

⚠️ **Warning**

Internal settings, adjustment, maintenance, and repairs may be performed only by a skilled technician who is aware of the hazards involved.
Always observe standard safety precautions during installation, operation, and maintenance of this product.

2.2 Site Requirements and Prerequisites

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

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

2.3 Package Contents

The WinLink1000 packages include the following items:

* ODU package contains:

- ODU
- Mast/Wall mounting kit plus mounting instructions
- WinLink1000 Manager installation CD
- Spare RJ-45 connector

- IDU package contains:
  - IDU
  - 110V/220V adapter
  - IDU wall-mounting drilling template
  - Self adhesive label showing the IDU LED operation
  - Spare RJ-45 connector

Or

- IDU-E Package Contains:
  - IDU-E
  - Self adhesive label showing the MAC address and the alternative community string KEY. Keep this label safe.
  - For AC model, 110/240 VAC with 3-pin terminal block connector (green)
  - For DC model, 3-prong connector cable
  - Standard 1-U, 19" carrier rack
  - Spare RJ-45 connector

- External antenna (if ordered)
- ODU/IDU cable at length ordered (optional)
- Technical documentation CD

2.4   Equipment Required

The following is a list of the equipment required for installing the WinLink1000 hardware.

- RJ-45 crimp tool (if pre-assembled ODU/IDU cable is not used)
- Drill (for wall mounting only)
- IDU and ODU grounding cable
- 13 mm (1/2") spanner wrench
- ODU to IDU cable if not ordered (Outdoor class, CAT-5e, 4 twisted pairs)

- Cable ties.

2.5   Installation Sequence

The WinLink1000 system installation is achieved by following the steps listed below:

1. Installing ODUs at both sites of the link.

2. Assembling the ODU cable and connecting ODU to IDU at both sites.

3. Connecting the power.

4. Installing the management program on the network management station.

5. Aligning the ODUs.

6. Use the Link Budget Calculator Application

7. Running the Installation wizard from the management program.

8. Connecting user equipment to the local and remote IDUs.

Figure 2-1 illustrates a typical installation of WinLink1000 with an external antenna.
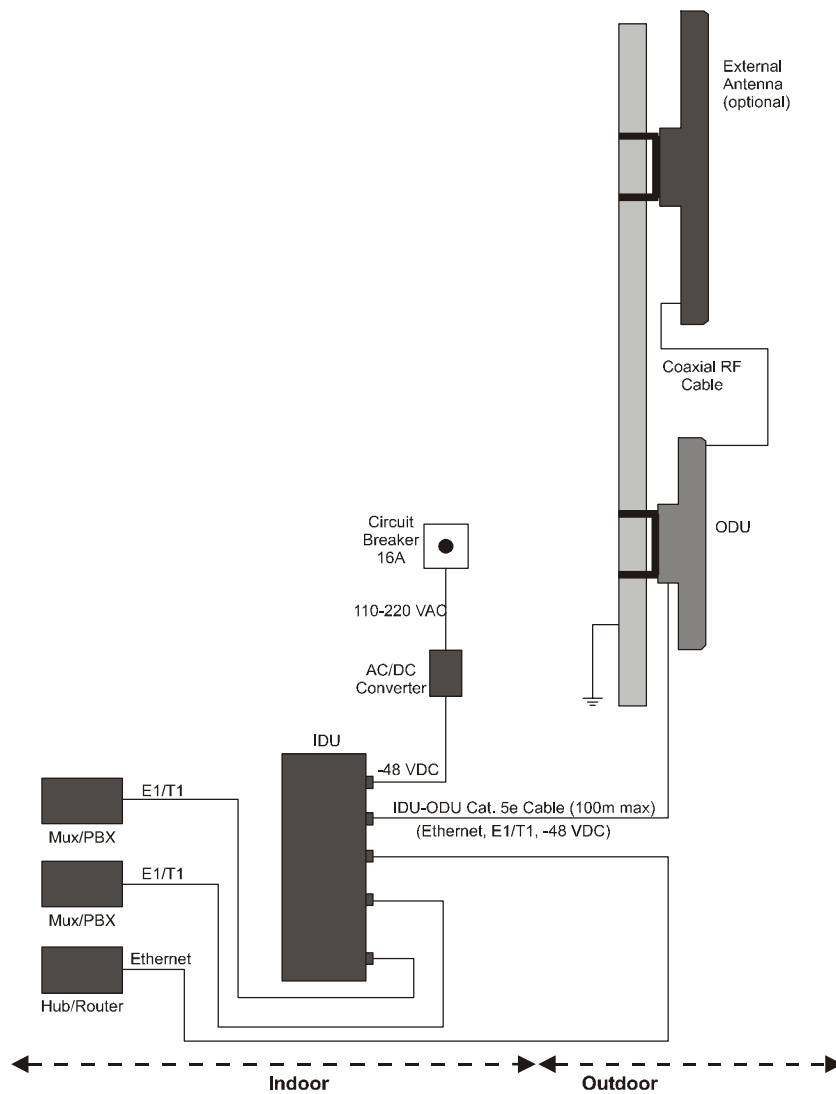
Figure 2-1. Typical Installation Diagram

2.6   Mounting the ODU

The ODU is the transmitting and receiving element of the WinLink1000 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. *Appendix B* describes the mast/wall installation instructions.

A WinLink1000 link operates in pairs of two WinLink1000 systems with the same configuration. Both systems must be installed, and the antennas of the outdoor units must be 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.
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. Assemble the ODU unit onto the mast or wall. Refer to *Appendix B* for the ODU mounting instructions.

3. Connect the ground cable to the chassis point on the ODU.

4. Attach the ODU cable to the RJ-45 connector. Refer to *Appendix A* for the connector pinout.

5. Secure the cables to the mast or brackets using UV-rated cable ties.

6. Repeat the procedure at the remote site.

Note

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

2.7   Connecting the ODU to the IDU

The ODU cable conducts all the user traffic between the IDU and the ODU. The ODU cable also provides -48 VDC supply to the ODU. The maximum length for one leg of the ODU cable is 100m (328 ft) in accordance with10/100BaseT standards.

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

✳ **To connect the ODU to the IDU**

1. Route the cable from the ODU location into the building.

2. Secure the cable along its path.

3. Connect the ODU cable to the RJ–45 connector on the IDU designated ODU or WAN. *Figure 2–2* illustrates a typical IDU rear panel. *Figure 2–3* illustrates a typical IDU–E front panel. There may be differences in the panels of depending on the versions of the IDU.

❋ **To connect the AIND to an external antenna**

1. Connect one side of the coax cable to the N–type connector marked 'RF' on the front of the AIND unit, and the other side to the external antenna mounted on the pole.
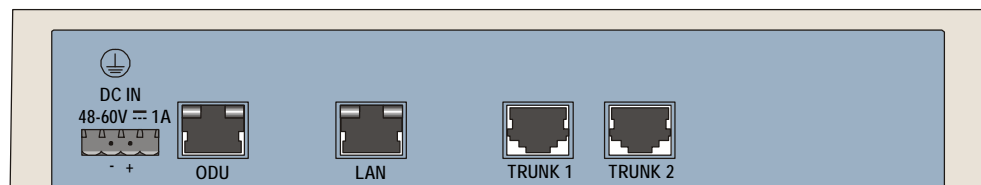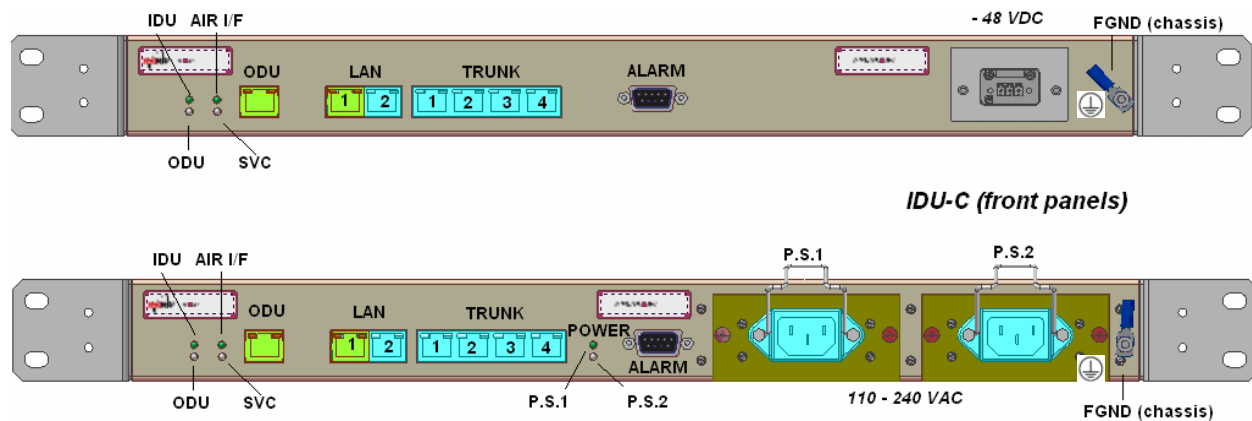
Figure 2–2. Typical IDU Rear Panel

Figure 2–3. Typical IDU–C Front Panels

Figure 2–4. WinLink1000–AIND All Indoor Radio Unit

Note   *The IDU and IDU–C panels may be fitted with different connector combinations depending on the model ordered.*

2.8   Installing WinLink1000 Management Software

The WinLink1000 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.

✴   **To install the WinLink1000 management program:**

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

2. The autorun feature starts to install the software automatically.
   If the installation does not start automatically, run setup.exe.

3. Follow the on-screen instructions of the installation wizard to complete setup of the WinLink1000 Management program in the desired location.

Any PC running the WinLink1000 management application can be used to configure WinLink1000 units.

2.9   Connecting the Power

⚠️
Warning

Before connecting any cable, the protective earth terminals of the AC/DC adapter must be connected to the protective ground conductor of the mains power cord. If you are using an extension cord (power cable) make sure it is grounded as well. Ground the chassis of the IDU-E, IDU-C and the AIND via the protective terminal.

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

Disconnection of the protective earth terminals is allowed only after disconnection of the power and connectors "Trunk-1" to "Trunk-4.

Connecting Power to an IDU

Power is supplied to the WinLink1000 IDU via an external AC/DC converter, which receives power from a 100-240 VAC source and converts it to -48 VDC.

✱   **To connect power to the IDUs:**

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

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

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

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

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

Connecting Power to an IDU-C and AIND

AC power is supplied to the WinLink1000 IDU-C through a standard 3-prong plug.

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

✱ **To connect AC power to an IDU-E:**

1. Connect the power cable socket to the power connector on the WinLink1000 front panel.

2. Connect the power cable plug to the mains outlet.

   The unit turns on automatically upon connection to the mains.

✱ **To connect DC power to an IDU-C and AIND**

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

2.10   Starting the WinLink1000 Manager Software

✱ **To start the WinLink1000 manager:**

1. Connect the management station to the LAN.

2. Double-click the WinLink1000 Manager icon on the desktop, or click **Start** > **Programs** > **WinLink1000 Manager**.

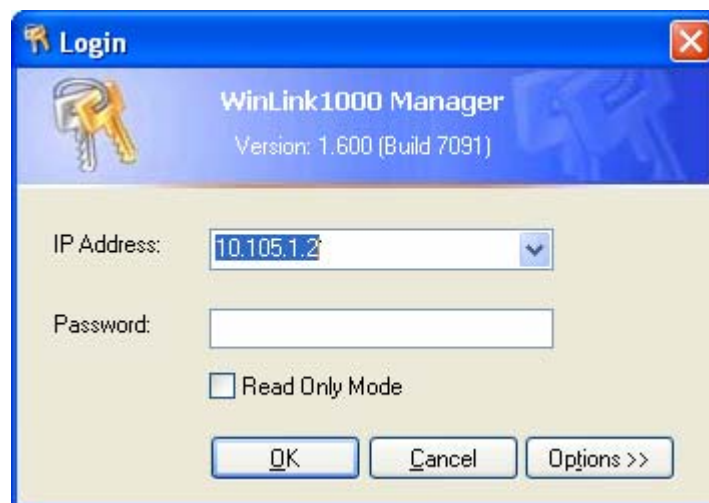   The Login dialog box appears.

Figure 2-5. Login Screen

3. Select the suitable option:
   - Select Local Connection (Broadcast), if user is connected directly to the IDU LAN port.

▪ Enter IP address (of the ODU)
Default address: **10.0.0.120**
The Subnet mask is **255.0.0.0.**

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

4. Enter the password

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

5. Click the Read only check box if entering the system as a Read only user.

6. If you are a user with Read-Write permission, click **Options** to enter the community options.

WinLink1000 is protected with Community passwords. A user may be defined with read-only permission or with read-write permission. See the section *Changing Community Values* for more detail.
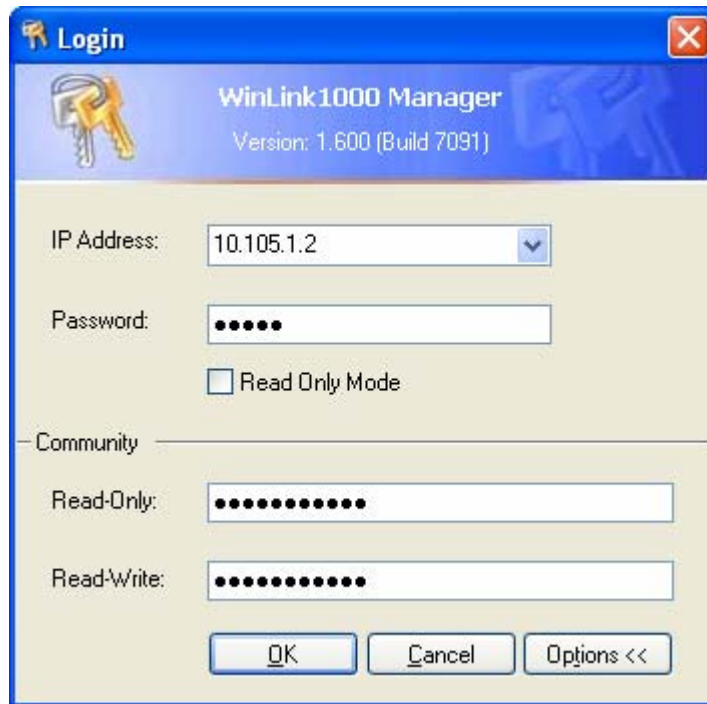

Figure 2-6. Login Screen with Community Options Visible

• If using the system for the first time, enter **netman** (default) in the read only and read-write fields.

• If community values have previously been defined, enter them in the readonly or read-write communities.

- If you are a user with read-only permission, click the Read Only Mode check box.

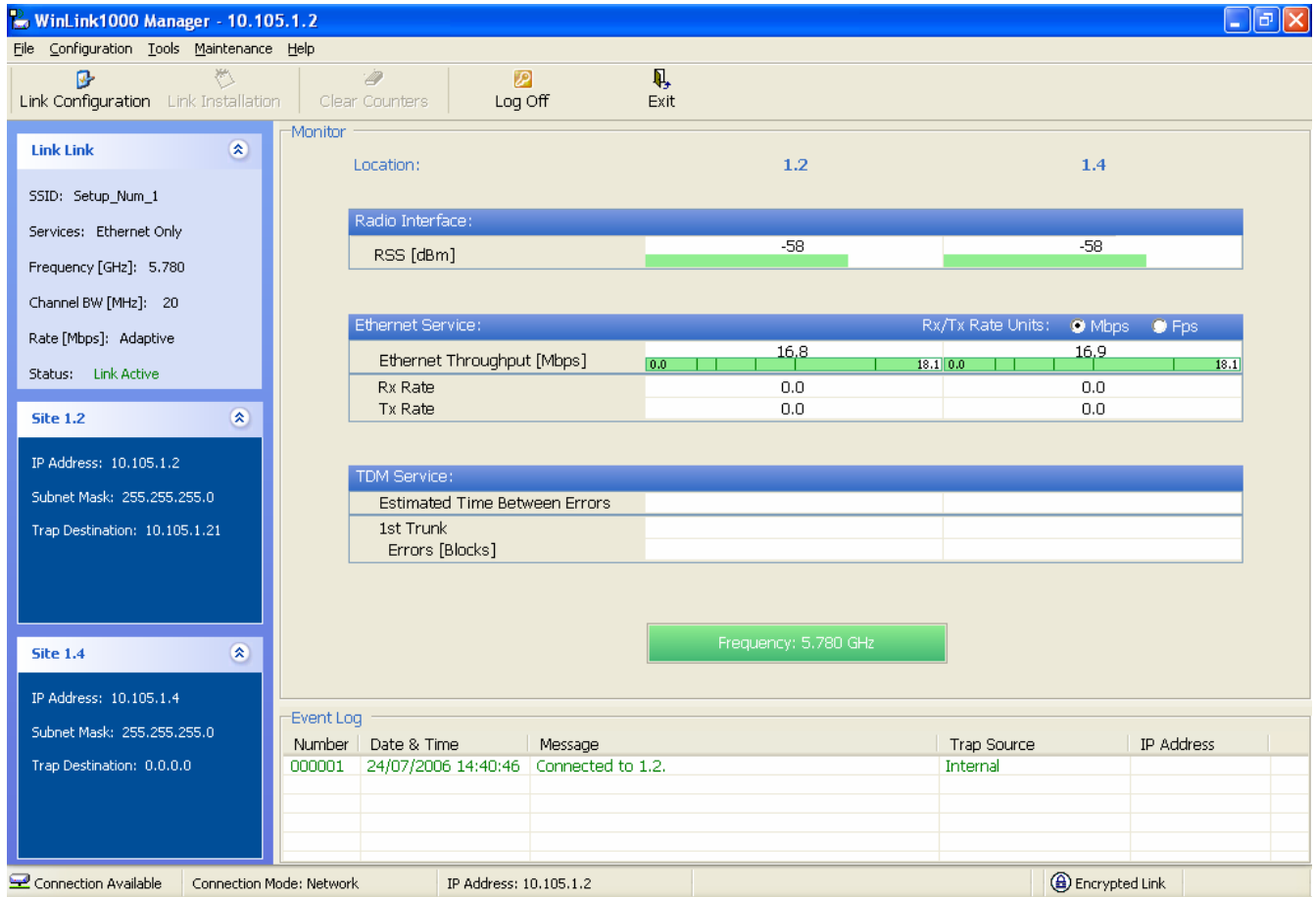   The WinLink1000 Manager main screen is displayed (see Figure 2-7).

Figure 2-7. WinLink1000 Manager Main Screen

2.11 Over the Air Connection indication

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

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

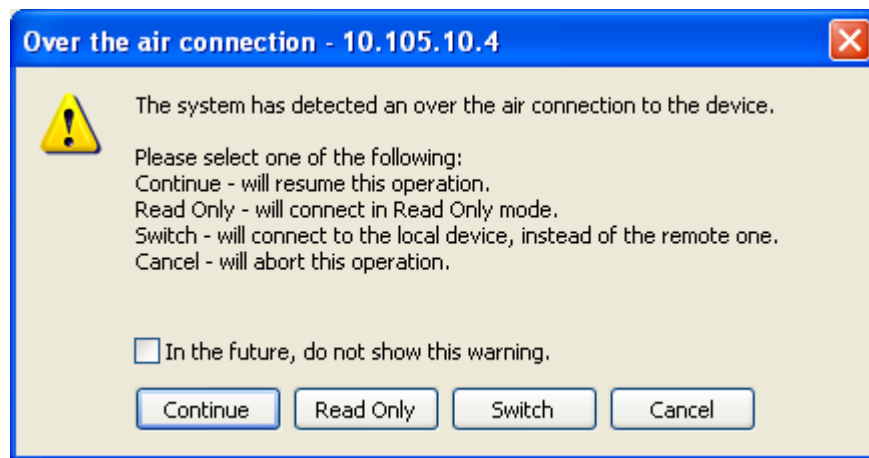- Select the relevant option for your login requirements.

Figure 2-8. Over the Air Connection

2.12   Aligning ODUs with the Beeper

Perform the WinLink1000 ODU alignment using the beepers located inside the ODUs. The beeper facility is not suitable for aligning the All Indoor Units, AIND. To align an AIND system see Appendix D for alternative alignment methods.

To speed up the installation time, alignment of a WinLink1000 ink can be performed by two teams simultaneously, at site A and at site B.

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

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

Warning

Do not stand in front of a live ODU.

2. The ODU starts beeping 20 seconds after power up, and continues beeping until the ODUs are aligned, and the link is established.

3. Verify normal operation of the IDU by the LED indications on the front panel. (See *Normal Indications*.)

4. Coarsely align the site B ODU in the direction of the site A ODU.

5. Make an azimuth sweep of 180 degrees with the site A ODU. So that the strongest signal from site B can be learnt.

6. Slowly turning the site A ODU back towards the position of Site B, listen to the beeps until the best signal is reached. See *Figure 2-9* for the beeper signals.
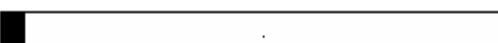
Beeper Sequence ■ =beeper on —— =beeper off	Description
[approx. 1s]	Best Signal so far
	Signal quality increased
	No change in signal
	Signal quality decreased
[approx. 2s]	No air link

Figure 2-9. 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.*

7. Secure the site A ODU to the mast/wall.

8. At site B, adjust the ODU slowly whilst listening to the beeper sequence until the best signal is attained.

9. Secure the site B ODU to the mast/wall.

10. Monitor the link quality for about 15 minutes to verify stability.

2.13 Calculating the Air Interface Rate

The Air Interface rate is the data transmission rate from one site to the other, over the wireless WinLink1000 interface. Use the *Link Budget Calculator Utility* in order to calculate the optimal air interface rate and the expected performance of the link operating at the user's requirements.

The ARA, Adaptive Rate Modulation feature performs this task automatically and ensures that the transmission rate is set to maximum whilst the link quality throughput is maintained.

✱ **To open the Link Budget Calculator Utility**

1. Click **Help** on the Menu Bar.

2. Select Link Budget Calculator.

   The Link Budget Calculator Utility opens. See *Appendix C* for full instructions how to use the Link Budget Calculator Utility.

2.14   Installing the Link

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

✱ **To install the link:**

1. Verify that the management station is properly connected to the same LAN as the IDU, and the WinLink1000 Manager application is running.

2. In the toolbar, click the **Link Installation** button.

   The Installation wizard opens, (see *Figure 2-10*).
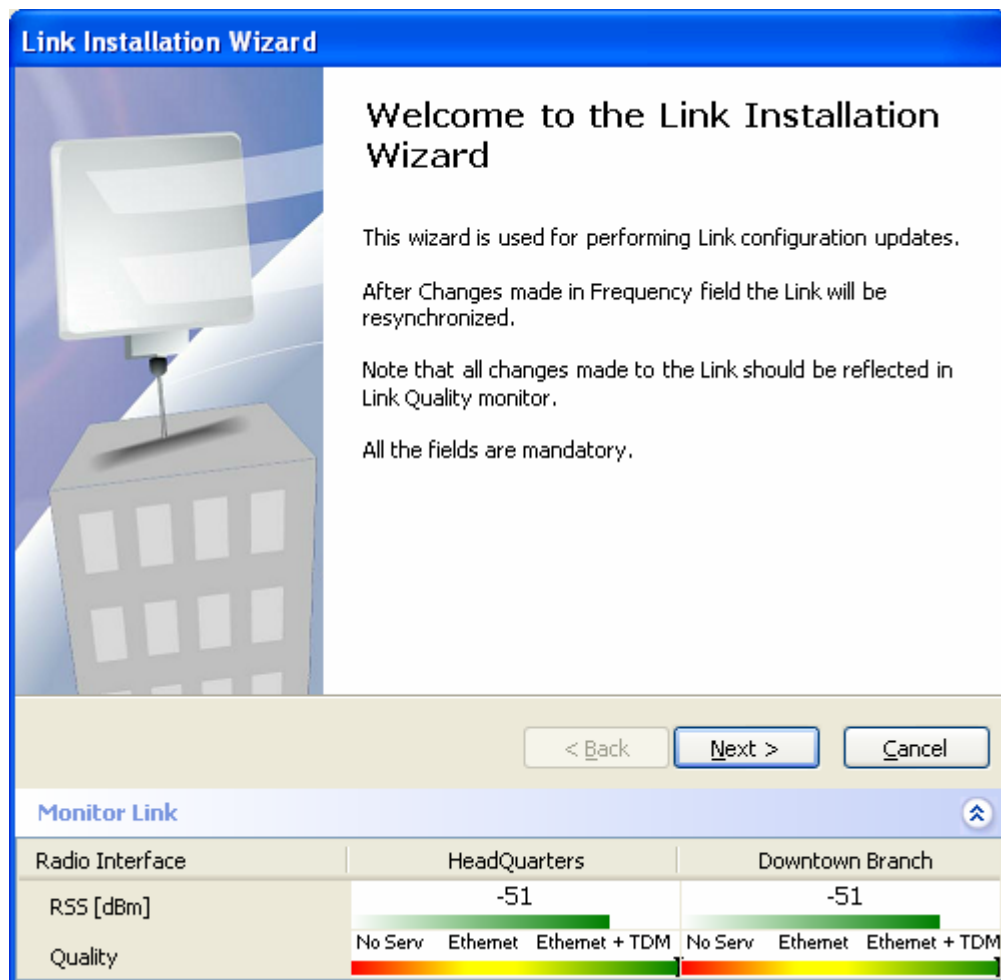

Figure 2-10. Link Installation Wizard

3. Click Next to proceed with the installation procedure.

4. On the first installation the default link password must be changed. Click **Ok** in the message box.

> The Change Link Password dialog box opens.

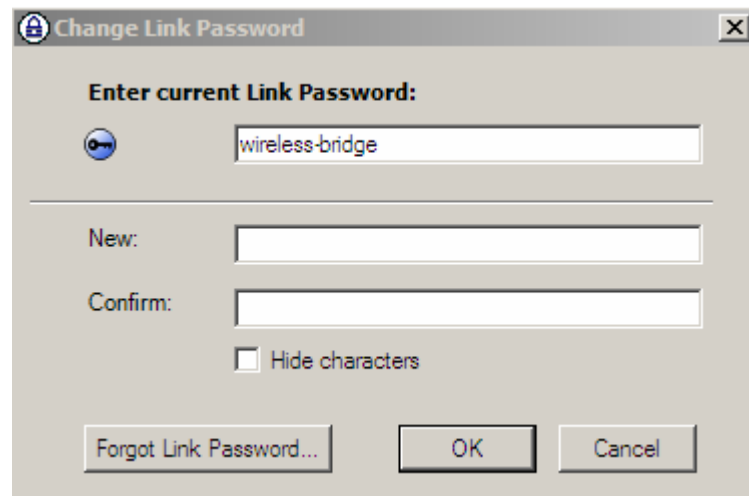*Note*   *Use the Hide Characters check box for maximum security.*

Figure 2–11. Change Link Password dialog box

5. Enter the default link password **wireless–bridge**.

6. Enter a new password.

7. Retype the new password in the confirm field.

8. Click **Ok**.

9. Click **Yes** when asked if you want to change the link password.

10. Click **Ok** at the successful message.

> The system dialog box opens (see *Figure 2–12*)

Figure 2-12. Installation Wizard, System dialog box

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

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

12. Enter a Link Name for the link identification.

13. Enter a name for site 1.

14. Enter a name for site 2.

15. Enter the Link Password (version 1.400 and after). See *Changing the Link Password* for details on the Link Password.

Note   *It the Link Password is incorrect a link will be established but configuration cannot be performed and no services will be 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.

16. Click **Next**.

The Channel Select dialog box appears. This dialog box relates to the version that you have purchased.

Selecting Channels

Some versions of WinLink1000 have a feature called Automatic Channel Select, which allows you to define several frequency channels that WinLink1000 can select if interference is detected on the channel in use.

- For WinLink1000 without the Automatic Channel Select feature see *WinLink1000 without Automatic Channel* Select (applies to versions up to 1.1.6).

- For WinLink1000 with the Automatic Channel Select feature see *WinLink1000 with Automatic Channel* Select (applies to versions after 1.300).

- For WinLink1000 5.4 GHz ETSI version see *WinLink1000 5.4 GHz ETSI* Version.

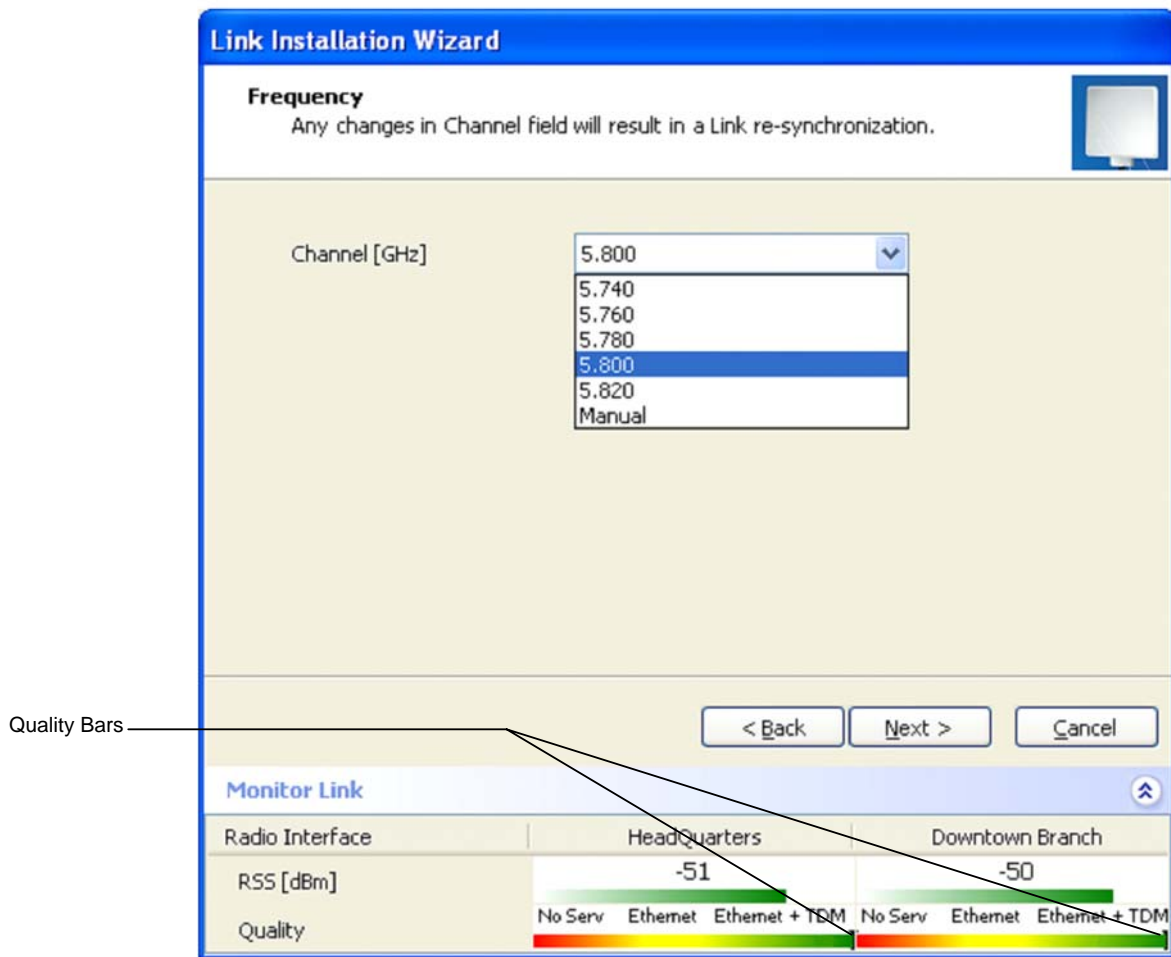### WinLink1000 without Automatic Channel Select

Figure 2-13. Installation Wizard, Channel Select dialog box

1. Select the required operating channel.

    The pull-down list shows the ISM frequencies available.

    The last option, Manual, allows you a user-defined channel within the system frequency band.

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

2. Click **Next.**

    The Rate Select dialog box appears (see *Error! Reference source not found.*)

WinLink1000 with Automatic Channel Select

Automatic Channel Select gives WinLink1000 the ability to change frequency channels automatically if interference is detected on the current operating channel.
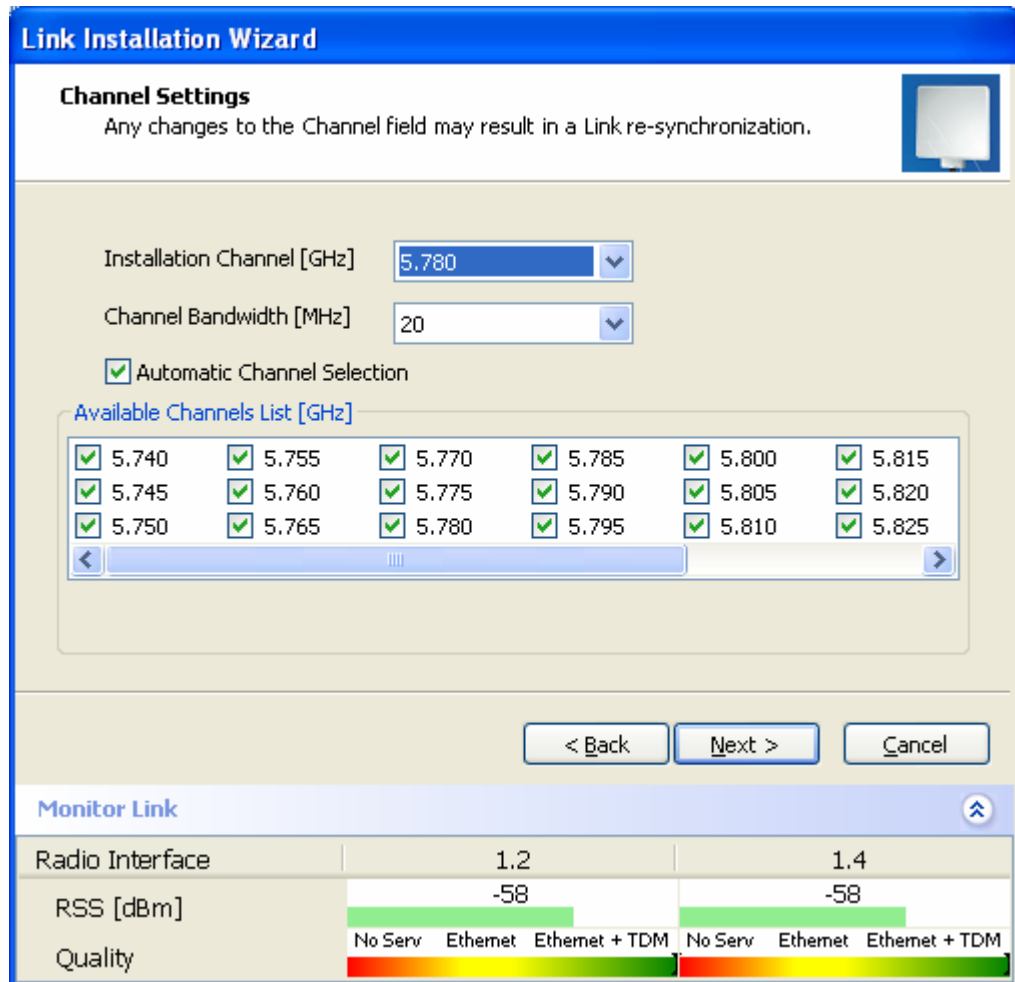

Figure 2–14. Channel Select dialog box – Automatic Channel Select

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

4. Select the required Bandwidth 5,10, or 20 MHz.

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

6. 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.

7. 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.

8. Click **Next.**

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

The Service Parameters dialog box opens.

WinLink1000 5.4 GHz ETSI Version

In accordance with ETSI, if WinLink1000 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 have been defined.

5. Click **Next.**

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

The Service Parameters dialog box opens.

Selecting the Service Parameters

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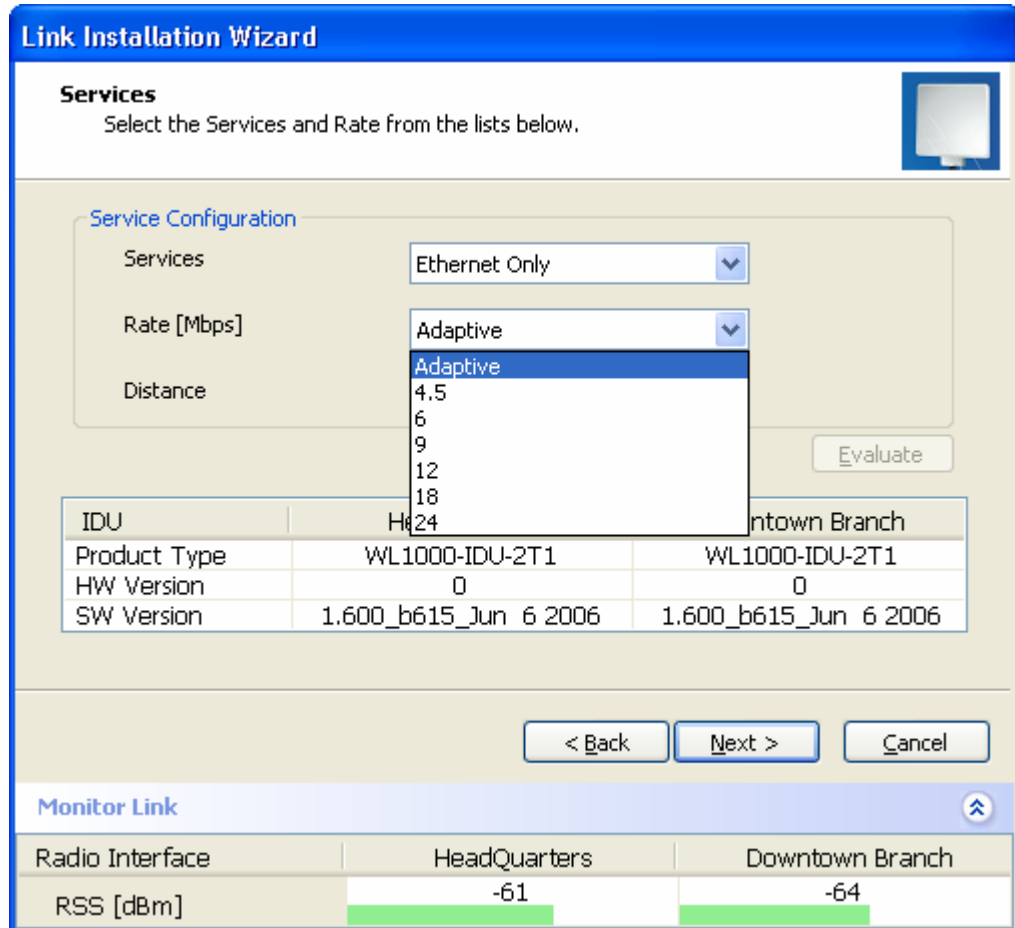

Figure 2-15. Installation Wizard, Services dialog box

✱ **To select the services:**

1. In the Service dialog box, select one of the following:

    ▪ E1/T1 – E1/T1 data and Ethernet data.
       The Ethernet BW field shows the remaining bandwidth in Mbps available for Ethernet. The available bandwidth depends on the number of E1/T1 ports selected.

    ▪ Ethernet only

2. Select the required transmission rate.
    If Adaptive is selected WinLink1000 constantly monitors and adjusts the transmission rate to ensure maximum throughput for the link at the highest quality.

3. Click **Next**.

> If TDM services were selected, then the TDM parameters dialog box appears, (see *Figure 2-16*).

4. The optimum transmission rate for the selected services is evaluated. Table shows the rates used by WinLink1000.

> If Ethernet only was selected, then the Finish screen appears (see *Figure 2-17*) showing a summary of the link configuration, the alignment is complete.

Table 2-1. Rates per Bandwidth

Modulation/FEC	5 MHz	10 MHz	20 MHz
BPSK / ¾	2.25 Mbps	4.5 Mbps	9 Mbps
QPSK / ½	3 Mbps	6 Mbps	12 Mbps
QPSK / ¾	4.5 Mbps	9 Mbps	18 Mbps
16QAM / ½	6 Mbps	12 Mbps	24 Mbps
16QAM / ¾	9 Mbps	18 Mbps	36 Mbps
64QAM / $^2/_3$	12 Mbps	24 Mbps	48 Mbps
64QAM / ¾	13.5 Mbps	27 Mbps	

Setting the Clock Configuration

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

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

Table 2-2. TDM Clock Modes

	Unit clock mode		User equipment side	
	Local Unit	Remote Unit	HQ side	Branch side
1	Transparent	Transparent	Internal/Recover	Internal/Recover

	Unit clock mode		User equipment side	
	Local Unit	**Remote Unit**	**HQ side**	**Branch side**
2	Loop Time	Recover	Internal	Recover
3	Recover	Loop Time	Recover	Internal
4	Internal	Recover	Recover	Recover
5	Recover	Internal	Recover	Recover

Transparent/Transparent

WinLink1000 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.

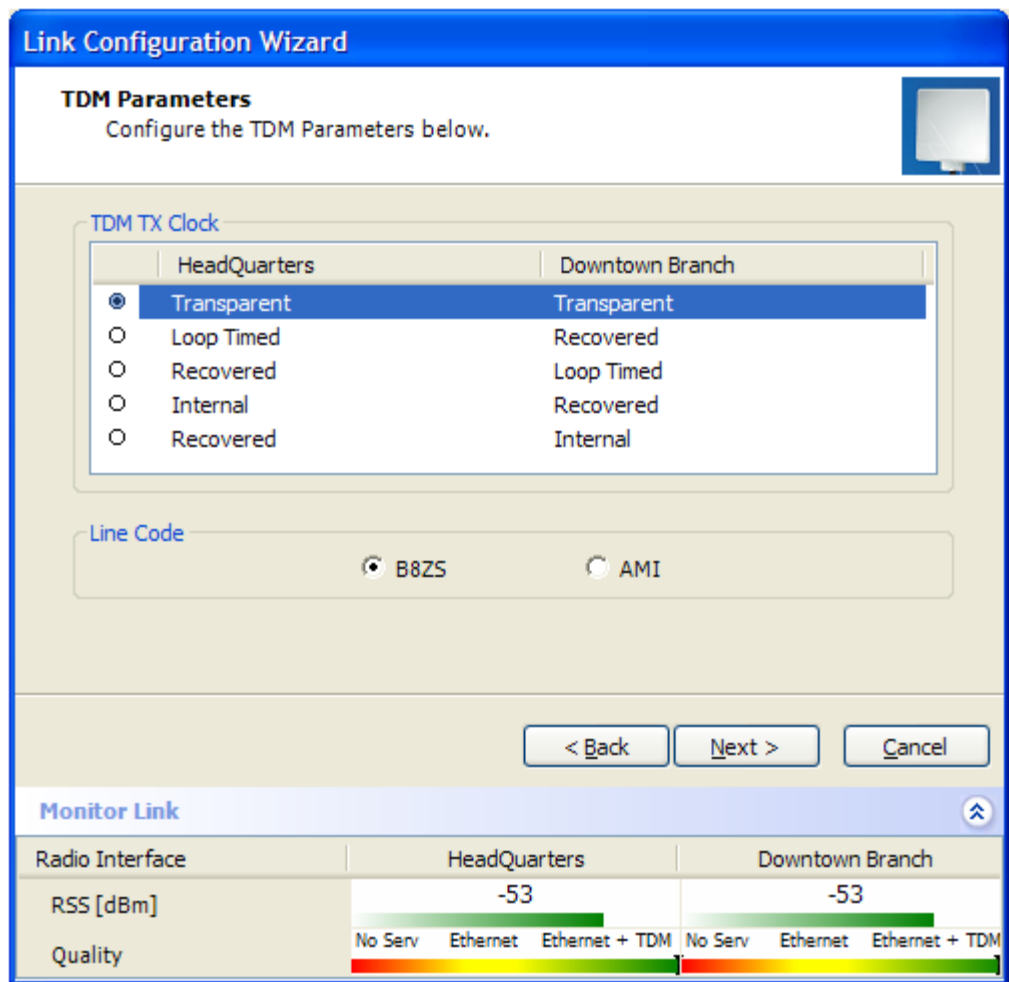*Note*   *The Line code option is used with T1 Systems.*

Figure 2-16. TDM Parameters dialog box

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

Setting the T1 Line Code

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

The default is B8ZS.

✳ **To change the line code**

1. In the TDM Parameters dialog box, set the line code to B8ZS or AMI as required.

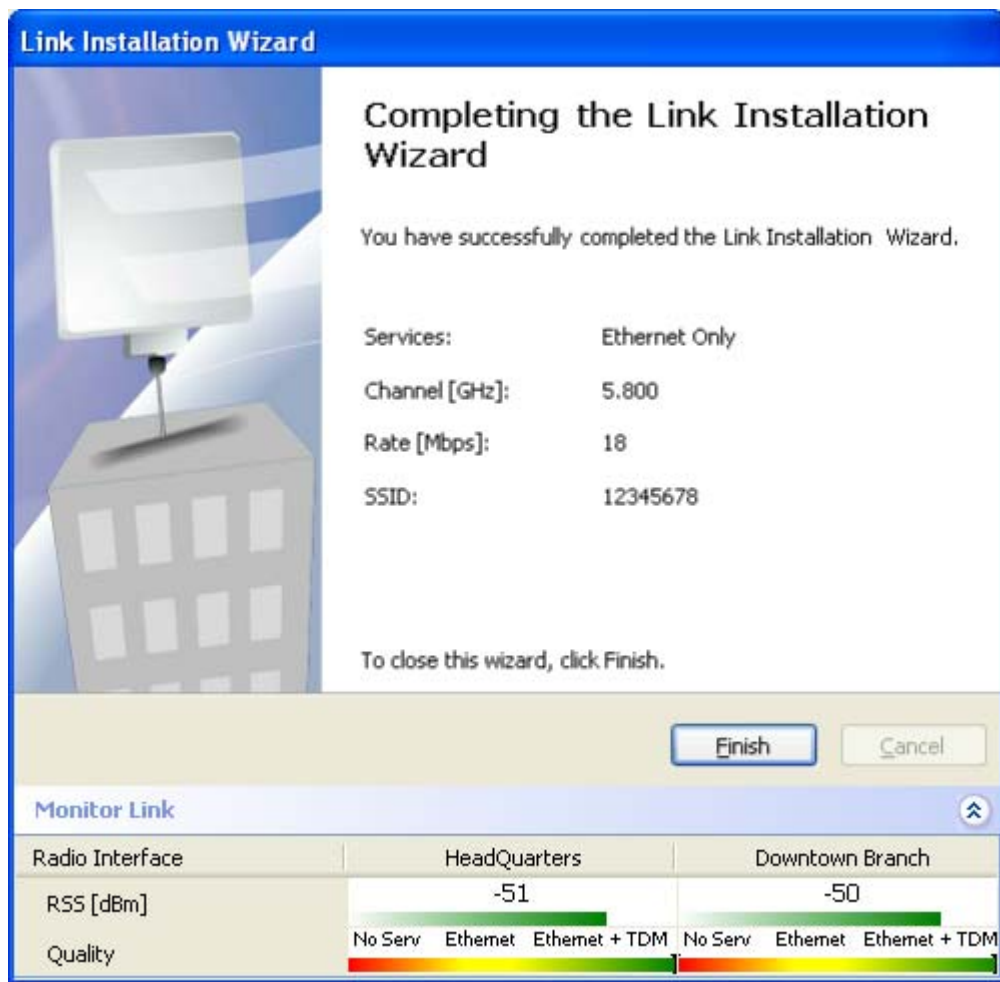2. Click **Next** to show the finish screen.

Figure 2-17. Installation Wizard, Finish Screen

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

When the wireless link is established between the site A and site
B units, the Quality bar is within yellow area for Ethernet only
links, or within the green area for Ethernet plus TDM links.

6. Verify that the radio signal strength (RSS) in the Main menu is
according to expected results as determined by the Link Budget
Calculator.

2.15   Connecting the User Equipment

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

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

1. Connect user E1/T1 traffic to the IDU panel RJ-45 port designated **TRUNK**. There may be multiple Trunk ports available depending on unit ordered.
    Refer to *Appendix A* for the connector pinout.

2. Connect user hub/router or any other compatible device to the IDU panel
    RJ-45 port designated **LAN**. There may be multiple LAN ports available for connecting to different LANs depending on the IDU unit ordered.
    Refer to *Appendix A* for the connector pinout.

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

Chapter 3

Operation

This section provides the following information for WinLink1000:

- Operating procedures (turning-on and turning-off)

- IDU indicators

- Normal Indications

- Default settings

- Managing the WinLink1000

3.1 Turning On WinLink1000

✷ **To turn on WinLink1000:**

- Connect the AC/DC converter to the IDU power connector and to the mains. See *Chapter 2* for full instructions on connecting the power.

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

WinLink1000 requires no operator attention once installed, with the exception of occasional monitoring of front panel indicators and statistics data. Intervention is only required when WinLink1000 must be configured to its operational requirements, or diagnostic tests are performed.

3.2 Controls and Indicators

IDU Front Panel Indicators

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

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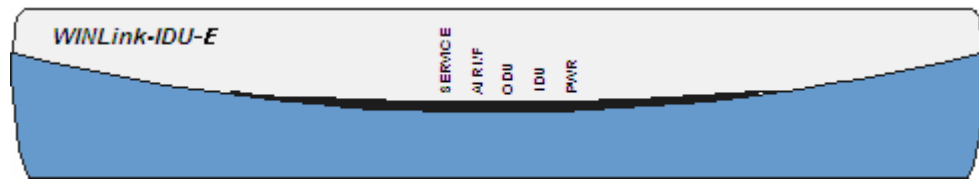Table 3-2*, and *Table 3-3* describe the indicators.
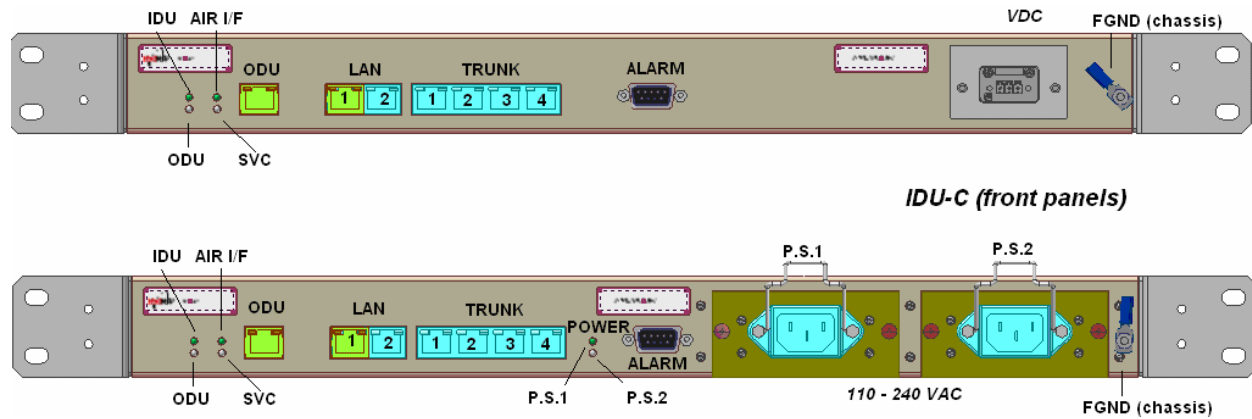

Figure 3-1. IDU-E Front Panel

Figure 3-2. Typical IDU-C Front Panels

Table 3-1. Front Panel LEDs

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

WAN/LAN Indicators

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

Table 3-2. WAN/LAN LEDs

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

Table 3-3. TDM Traffic Indicators

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

Normal Indications

Upon turning on WinLink1000, the PWR LED in the IDU-E front panel lights to indicate that WinLink1000 is on. *Table 3-4* shows the correct status of the indicators at power-up.

Table 3-4. WinLink1000 Indicators at Startup

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

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

3.3 Default Settings

Table 3–5 lists the default settings of the WinLink1000 configuration parameters.

Table 3–5. Default Settings

Parameter	Default Value
ODU IP Address	10.0.0.120
Subnet Mask	255.0.0.0
SSID	–
Frequency	First Frequency in the range
Rate	12 Mbps
Services	Ethernet
Ethernet Configuration	Auto Detect
Bridge	Bridge Mode. In certain equipment this may be set to Hub Mode. Aging time = 300 sec
Community values	Read–write – netman Local – public–bru1 Remote – public–bru4097

3.4 Managing WinLink1000

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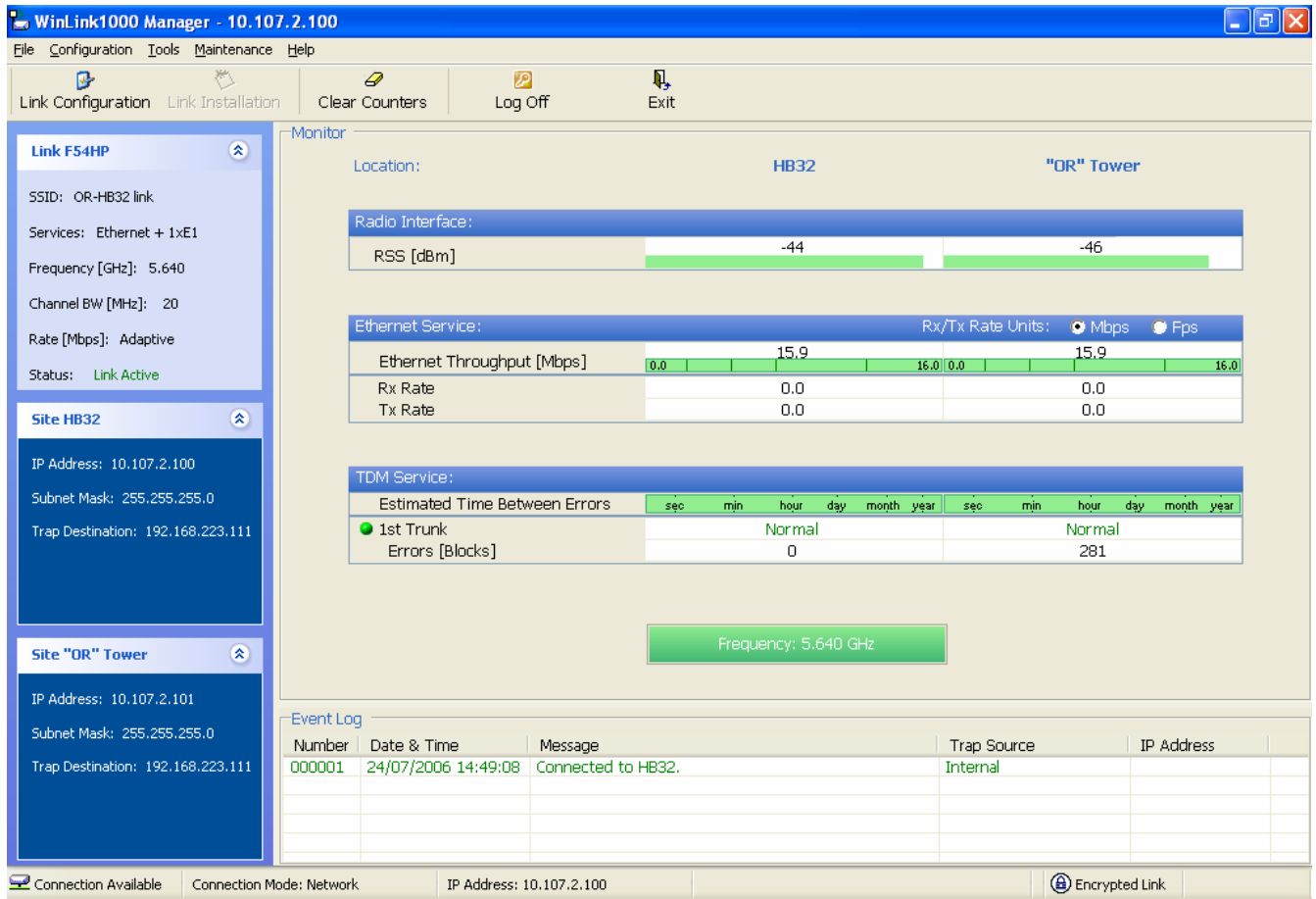

Figure 3–3. Main Screen, Wireless Link is Active

The WinLink Manager main screen consists of the following elements:

- Toolbar – includes buttons serving for:

  ▪ Changing configuration parameters of operating wireless link; assigning text files for storing alarms, statistics and configuration data (Link Configuration button)

  ▪ Performing preliminary configuration of the system (Link Installation button). This button is disabled once a link is defined.

- ▪ Clearing error counters (Clear Counters button)

- ▪ Logging off WinLink Manager (Log Off button)

- ▪ Exiting WinLink Manager (Exit button)

- Menu bar

  - ▪ File Menu – Log off, and exit

  - ▪ Configuration – use for link configuration, individual site configuration or link installation

  - ▪ Tools – set preferences, event log handling, change password

  - ▪ Maintenance – Loopbacks, system reset.

- Link details pane – summarizes information on the radio frequency, IP bandwidth, type of TDM service, number of assigned E1 or T1 timeslots, and IP details of the local and remote WinLink1000 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 traffice rate, but the maximum capacity that can be supported currently, see *Figure 3–4*
    The scale on the bar adjusts according the link distance and the link budget.

  - ▪ Local/remote receive and transmit traffic rate, in Mbps or Fps (frames per second)

  - ▪ TDM status
    The Estimated Time Between Errors bar gives an indication of the TDM quality. The ETBE constantly calculates the expected TDM Error second ratio according to the current air interface conditions.

- Event log – stores alarms generated by local and remote units.

- Status Bar – displays the following ions:

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

    - ▫ Network mode to the local unit – using IP of the local unit

    - ▫ Over the Air connection – using IP address of the remote for over the air connection

□   Local mode using broadcast – direct connection to IDU LAN port without IP address. This mode is only recommended when the managed PC is connected directly to the IDU (no network involved) the managed PC must have a static IP configured. (No DHCP)

▪   Encryption icon showing if the link is encrypted

🔐 encrypted link

🔐 Link Password Validation failed. The link is encrypted with default keys. Service and configuration is unavailable. Need to change the link password in either site

☐ No Encryption – an older release is used. No encryption is available
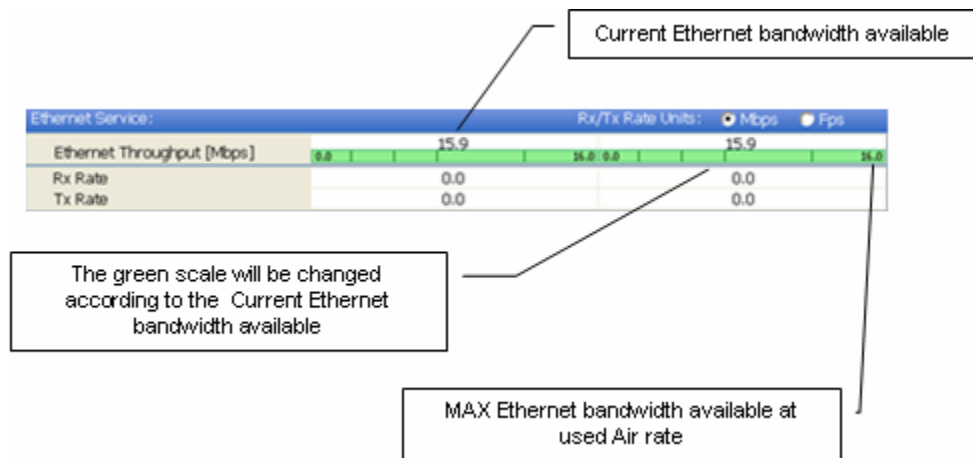
Figure 3-4. Ethernet Bandwidth Indication

✱   **To change link configuration parameters:**

1. In the Main menu, click **Configure Link**.

    The Configure Link wizard appears. See *Chapter 4* for configuration details.

2. Click **Next**.

3. Continue through the configuration wizard and define the Link name and ID, Channel, Rate and Services.

4. Once you finish changing configuration parameters, click **Finish**.

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

3.5 Turning Off WinLink1000

✳ **To turn off WinLink1000:**

1. Exit the management application.

2. Remove the AC/DC converter power cord from the mains.

Chapter 4

Configuration

This chapter describes configuration procedures, which are performed after the physical installation of the local and remote WinLink1000 units and the Installation Link wizard has been performed. A second wizard is used to redefine the configuration parameters if necessary. Both sites in the link are defined simultaneously.

The following parameters are configured via the configuration wizard:

- System parameters
- Frequency channel
- Air interface rate
- Service parameters

The following parameters are configured via the Configuration dialog box.

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

4.1 Configuring the System Parameters

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

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

✳ **To change general parameters:**

1. In the Main menu, click the **Link Configuration** button.
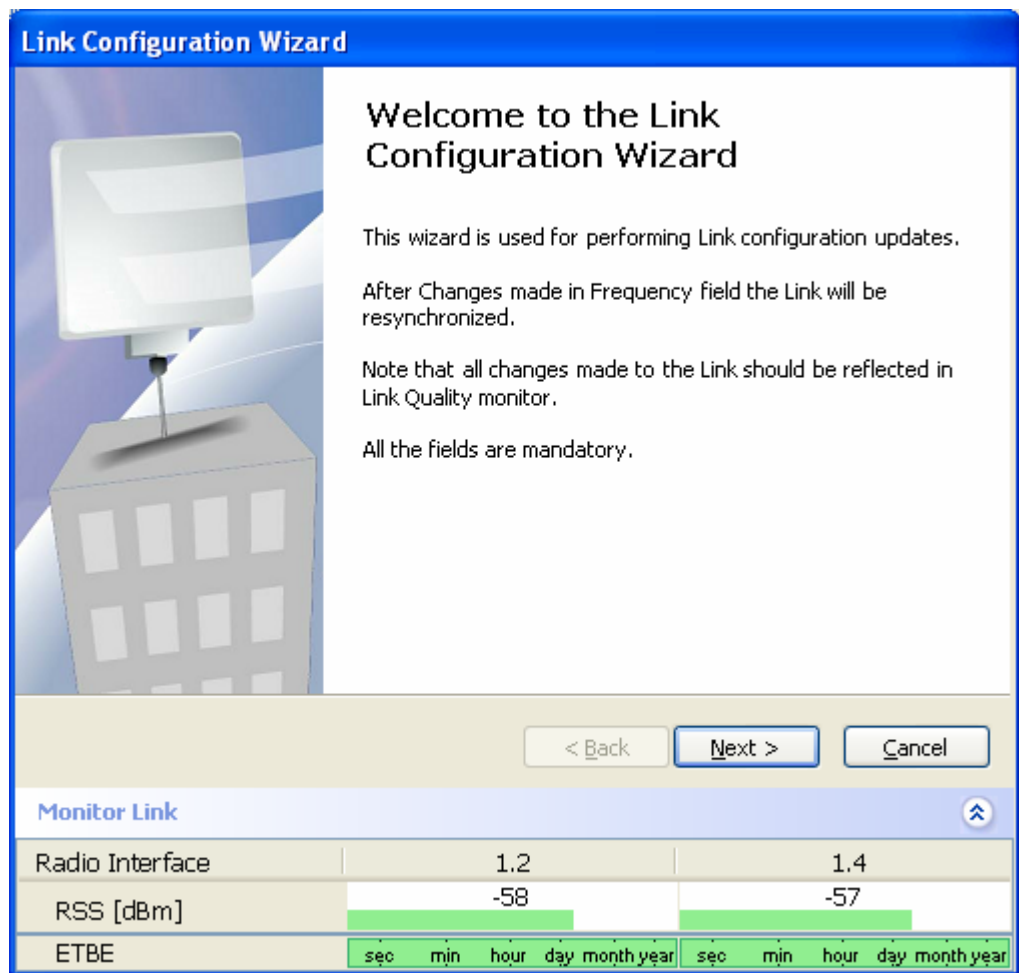2. The Configuration wizard opens (*Figure 4-1*).

Figure 4–1. Configuration Link Wizard

3. Click **Next**.

4. The Link Configuration dialog box appears (see *Figure 4–2*).

Figure 4-2. Link Configuration, System dialog box

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

6. Click **Next**.

The Frequency dialog box appears.

4.2   Selecting Channels

The user is required to define the operating frequency channel. Newer versions of WinLink1000 have a feature called Automatic Channel Select. This allows you to define several allowable frequency channels that WinLink1000 can change to in event that interference is detected on the channel in use.

• For WinLink1000 without the Automatic Channel Select feature see *WinLink1000 without Automatic Channel Select*.

- For WinLink1000 with the Automatic Channel Select feature see *WinLink1000 with Automatic Channel Select*.

- For WinLink1000 5.4 GHz ETSI version see *WinLink1000 5.4 GHz ETSI Version*.

WinLink1000 without Automatic Channel Select

You must select a pure frequency channel for data transmission. A pure channel is a channel with no interference from existing systems in the installation area. The pure channel is usually found during the site survey stage before installing the system.

Figure 4-3. Installation Wizard, Channel Select dialog box

❋ **To select an available frequency channel:**

1. The pull-down list shows the ISM frequencies available for the WinLink1000 version that you have.

   The Manual option at the end of the list allows you to enter a user-defined channel within the system frequency band.

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

2. Click **Next.**

The Rate Select box appears.

WinLink1000 with Automatic Channel Select

Automatic Channel Select enables WinLink1000 to change frequency channels automatically if interference is detected on the current operating channel.
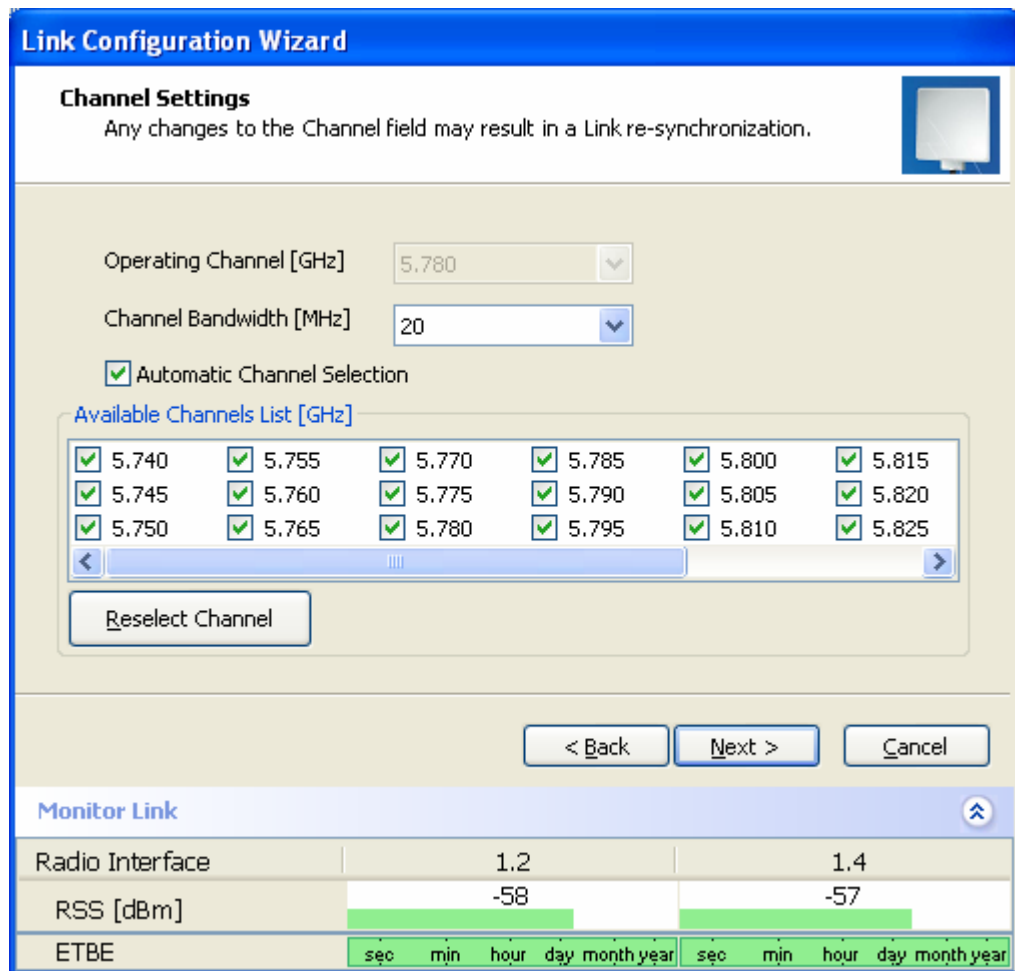

Figure 4-4. Channel Select dialog box – Automatic Channel Select

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

3. Click **Next**.

   The Rate Select box appears.

WinLink1000 5.4 GHz ETSI Version

In accordance with ETSI, unlicensed wireless data equipment is not allowed to interrupt radar services. Therefore, if WinLink1000 detects Radar interference it automatically changes the frequency channel. This feature is termed Dynamic Frequency Selection (DFS). According to the standard, a channel with active Radar is prohibited from use for 30 minutes. Before any transmission, WinLink1000 probes a channel for Radar signals for a period of 60 seconds.

In the 5.4 GHz ETSI version, the Automatic Channel Selection is selected by default and a minimum of two channels must be defined as available.
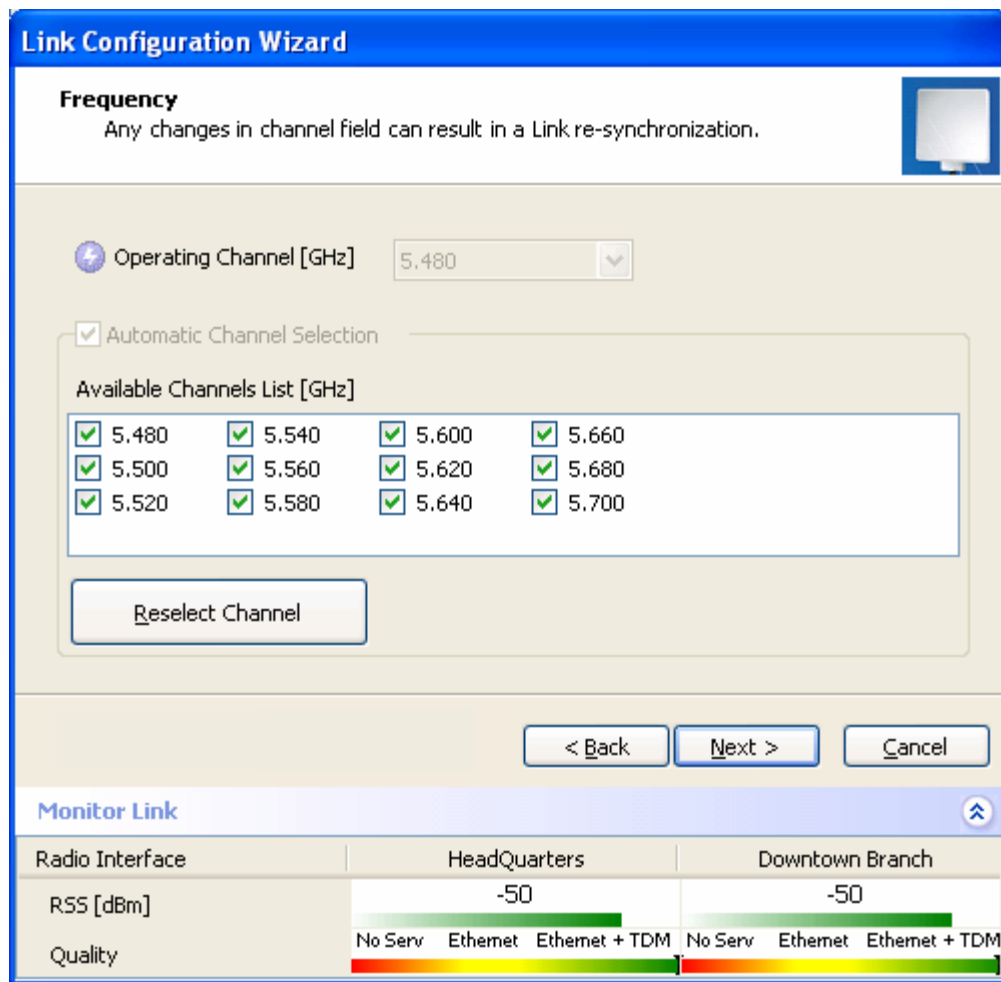
Figure 4–5. Channel Select dialog box (DFS, ETSI requirement)

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

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

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

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

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

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

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

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

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

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

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

4. Click **Next**.

    The maximum rate is selected according to the link conditions

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

6. Click **Next**.

    The Service Parameters dialog box appears.

4.3 Configuring Service Parameters

In the Service Parameters dialog box configure E1/T1,
(x1 or x2 for IDU-E, or x4 for IDU-C) and Ethernet parameters.

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

1. In the Service dialog box, select one of the following:

    ▪ Ethernet plus a number of E1/T1 channels (see *Figure 4-6*).

      If TDM services are selected, then the Evaluate icon shows on the screen whilst the maximum rate is evaluated.
      When evaluation is complete the icon changes and the following message is shown:

      Service has been evaluated, click Next to continue

    ▪ Ethernet data only (see *Figure 4-7*).

      If Ethernet only was selected, then the Finish screen appears (see *Figure 4-12*) showing a summary of the link configuration, the alignment is complete.

2. Click **Next**.

    The TDM parameters dialog box *Figure 4-11* or the Finish screen appears depending on which services were selected.

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

Figure 4-7. Service Parameters Dialog Box, Evaluation Icon

4.4   Editing the Configuration Parameters

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

From the Configuration dialog box, (see *Figure 4-8*) the following functions are available by selecting the items on the left of the dialog box:

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

Air Interface Change the transmit power

Inventory   View the hardware and software inventory.

Management   Configure the IP address, Subnet Mask, Default Gateway, and the Trap Destination.

Security   Change the Community Values and the Link Password

Date and Time Set the date and time of the server and of the system.

Advanced   Configure the Bridge, define the LAN connection and set the external alarm inputs.

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

Backup   Save a backup.ini file with the current configuration.

Restore   Load the backup.ini file created by the backup.

Installation Mode   Return to Installation Mode for the entire link. Selecting the Mute check box before clicking the Install Mode button mutes the Beeper.

Mute   Mutes the Beeper at startup. Reactivate the beeper during alignment.

✱ **To edit the Configuration Parameters:**

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

2. Select which site to configure.

   The Configuration dialog box opens. (See *Figure 4-8*)