Installation Overview

Installation of the µLink is described under the following four main headings:

a. Installing the Outdoor Unit (OU) and Integral Antenna.
b. Installing the Indoor Unit (IU).
c. Installing the IU/OU Interconnection Cable.
d. System Commissioning.

Appendix A at the end of this chapter supplements the installation procedure. It provides connector pin details for the external connectors of the IU and OUs.

Antenna Installation

Follow these steps to install the Antenna.

Step	Action
1.	Secure the C-shaped mounting bracket to the Antenna using the two securing screws and bolts (see Figure 6).
2.	Position the antenna in the required position on the pole. Note the orientation of the antenna.
3.	Secure the antenna to the pole by tightening the mounting bracket securing nuts (two nuts on either end of the pole clamp).

CAUTION
ENSURE THAT THE POLE IS EARTHED FOR LIGHTNING PROTECTION ACCORDING TO STANDARD LOCAL PRACTICES.

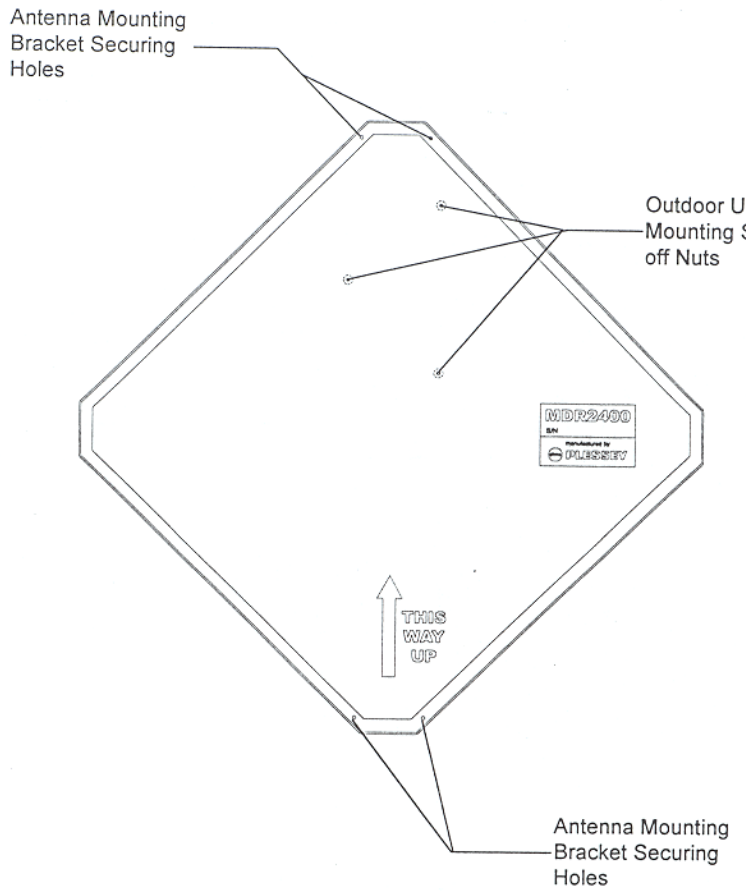


Figure 6. µLink Antenna.

Outdoor Unit Installation

Follow these steps to mount the OU onto the Antenna. See Figure 6 and Figure 7.

Step	Action
1.	Loosen the three OU securing stand-off nuts located on the Antenna (see Figure 6).
2.	Position the OU on the stand-off nuts through the three (3) key hole slots on the OU (see Figure 7).
3.	Tighten the securing stand-off nuts.

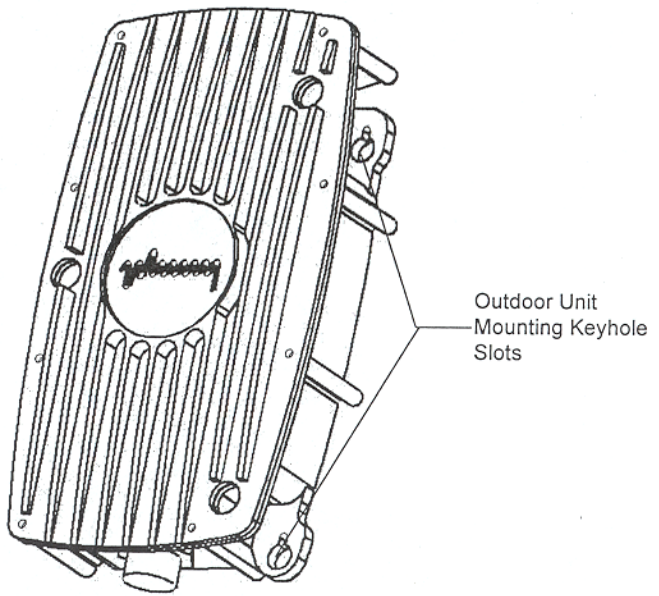


Figure 7. µLink Outdoor Unit.

Indoor Unit Installation

Follow these steps to install the IU. See Figure 8.

Step	Action
1.	Install the Data Interface module into the IU by sliding it in until the male connector on the module mates firmly with the female connector inside the IU.
2.	Secure the Data Interface module to the IU with the two (2) x M4 screws provided.
3.	Slide the IU into the 19" rack and secure to the rack using four (4) x M3 screws. Note that if the unit is to be table mounted, first fit the four (4) x rubber feet to each corner on the base of the IU.
4.	Earth the IU by connecting the earth cable or strap between the station earth and the earth stud on the IU rear panel.
5.	Observing the polarity of the supply, wire up the supplied power connector cable plug and connect it to the facility DC supply (21 to 56 V) through a minimum 10 A circuit breaker. Secure the connector screws to the unit. Check the supply voltage using the Multimeter. OR Connect the AC power cable from the station power source to the AC power connector on the rear panel of the IU.

Step	Action
6.	Make-off the 120Ω (E1)/100Ω (T1) - factory set tributary input and output connections and connect to the RJ-12 connector on the rear panel of the IU. Alternatively, connect the 75Ω (factory set) coaxial tributary connection to the BNC input and output connectors on the IU rear panel as required. See Appendix A at the end of this chapter for the pin details of the relevant tributary connector type.
7.	Connect the 15-pin D-type Auxiliary I/O Connector (alarm interfaces) on the rear panel of the IU to the appropriate Krone block or other distribution rack (for further connection to appropriate supervisory equipment as required). See Appendix A at the end of this chapter for pin details.
8.	Connect the Serial Data interface cable to the Wayside connector on the IU rear panel.

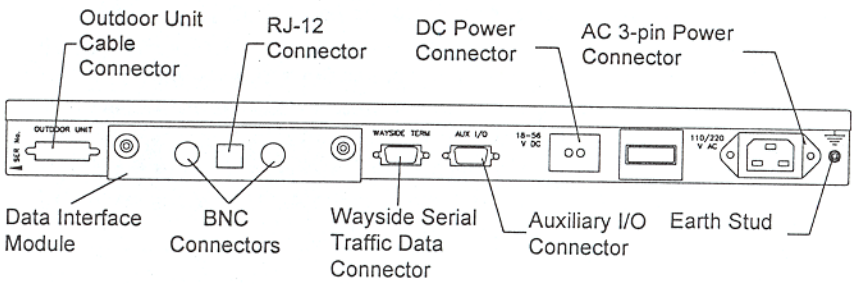


Figure 8. Indoor Unit Rear Panel.

Interconnection Cable Installation

Follow these steps to install the IU / OU interconnection cable.

CAUTIONS

DO NOT EXCEED THE RECOMMENDED BENDING RADIUS OF THE CABLE, IE. 10 cm.

DO NOT OVER TIGHTEN THE CABLE STRAPS ON THE CABLE AND DO NOT FASTEN THE ACTUAL STRAP LOCKING MECHANISM OF THE CABLE STRAP ONTO THE CABLE.

Step	Action
1.	Connect the interconnection cable to the connector on the base of the Outdoor Unit (see Figure 9).
2.	Using cable ties or straps, secure the cable to the pole at regular intervals.
3.	Connect the other end of the interconnection cable to the Outdoor Unit connector on the IU rear panel (see Figure 8).
4.	Tighten the Outdoor Unit connector securing screws on the IU rear panel.

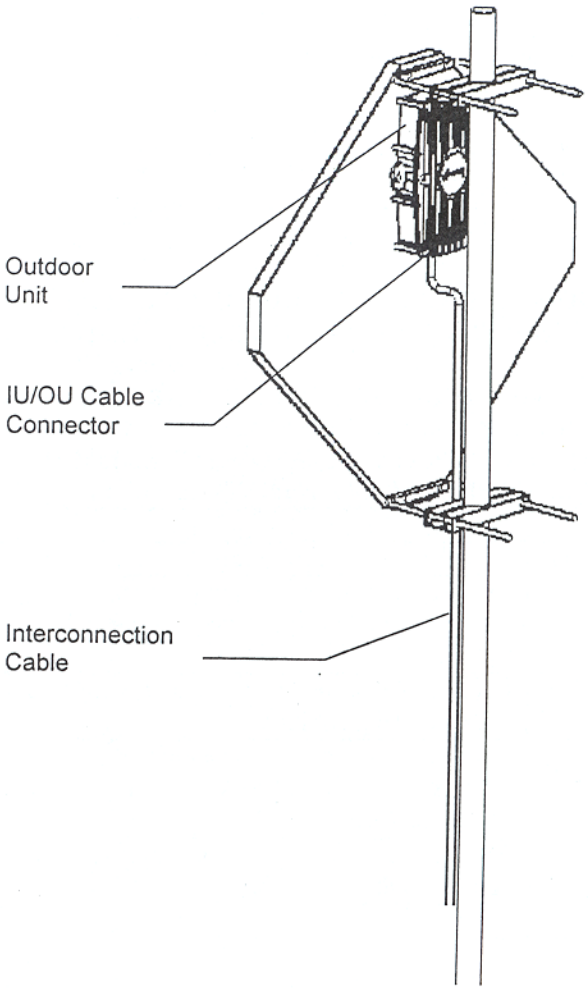


Figure 9. Outdoor Unit Mounted on Antenna.

System Commissioning

After completing the physical installation of the Indoor Unit, Antenna and Outdoor Unit, and the Interconnection Cable, you must commission the System. This describes how to set up the minimum requirements for successful µLink System operation.

Information Required

Before commissioning the system, you should know the proposed frequency band plan (Tx and Rx) for each station, and the PN sequence for the link.

Commissioning Procedure

Setting-up Procedure

Perform the following steps at both stations:

- Locate the far site and point the antenna to the antenna at the far site, as accurately as possible.
- Switch the IU power ON.
- Install and Access the µLink Management Software (refer to Chapter 4 of this manual).
- Configure the radio channel as required.
- Configure the Tx and Rx PN sequences.
- Set the Tx power to maximum.

Beaming-up

1. Check the RSSI and BER levels.
2. Align the antenna until the Maximum RSSI and minimum BER levels are attained.

Set Critical Parameters

1. Reduce the Tx power until an RSSI of between -65 and -70 dBm is obtained. This is important to avoid interference to co-located systems.

Link Error Performance Test

Perform a link error performance test as follows:

1. Run data over the link for a period of 15 hours.
2. Record the RSSI
3. Record the BER
4. Record the LED statuses

Record all results on a check list. See Table 4 for an example.

Table 4. Link Error Performance Check List

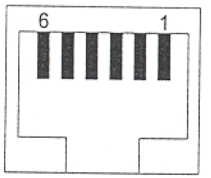
	Description	Setting/Remarks
1.	Transmit Frequency/Channel	
2.	RSSI	
3.	Link Test BER	
4.	LED Status	

Appendix A to Chapter 2:

µLink External Connector Pin Details

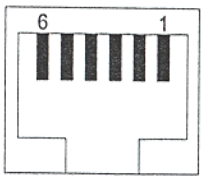
Indoor Unit Connector Pin Details

E1 DATA (IU Rear Panel)
8-pin RJ-12 Female Connector



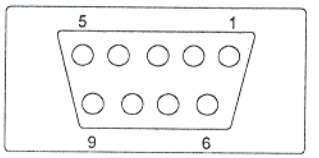
Pin	Details
1	E1 Rx Data (+)
2	Ground
3	E1 Rx Data (-)
4	E1 Tx Data (+)
5	Ground
6	E1 Tx Data (-)

T1 DATA (IU Rear Panel)
8-pin RJ-12 Female Connector



Pin	Details
1	T1 Rx Data (+)
2	Ground
3	T1 Rx Data (-)
4	T1 Tx Data (+)
5	Ground
6	T1 Tx Data (-)

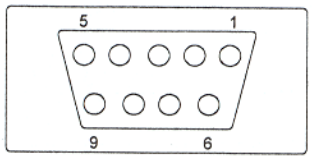
WAYSIDE TERM (IU Rear Panel)
9-pin D-type Female Connector



Pin	Details
2	Tx
3	Rx
5	Ground
1, 4, 6, 7, 8, 9	Not Used

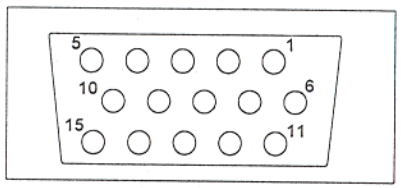
Indoor Unit Connector Pin Details

MONITOR (IU Front Panel)
9-pin D-type Female Connector



Pin	Details
2	Tx
3	Rx
5	Ground
1, 4, 6, 7, 8, 9	Not Used

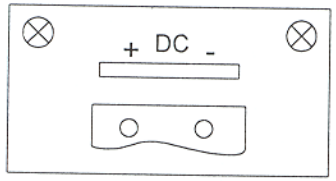
AUX I/O (IU Rear Panel)
15-pin High Density D-type Female Connector



Pin	Details
1	Relay 1 Common
2	Relay 1 N.O
3	Relay 1 N.O
4	Relay 1 N.C
5	Relay 1 N.C
6	Relay 1 Common
7	Relay 2 Common
8	Relay 2 Common
9	Relay 2 N.O
10	Relay 2 N.O
11	Relay 2 N.C
12	TTL Input 1
13	TTL Input 1 Return
14	TTL Input 2
15	TTL Input 2 Return

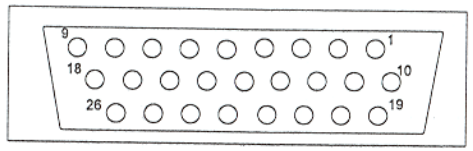
Indoor Unit Connector Pin Details

DC (IU Rear Panel)
2-pin Wieland Polarised 8213 Type



Pin	Description
+	Positive
-	Negative

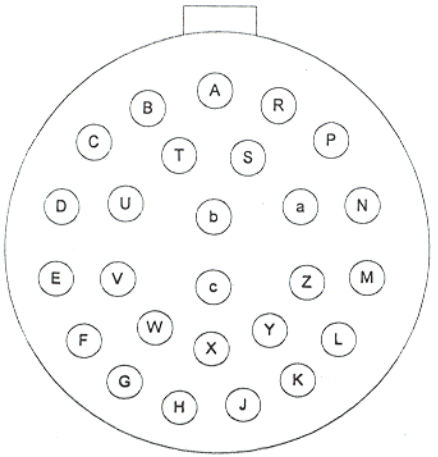
OUTDOOR UNIT (IU Rear Panel)
26-pin High Density D-type Female Connector



Pin	Details
1	Tx Data -
2	Tx Data +
3	Rx Cntrl -
4	Rx Cntrl +
5	Rx Clk -
6	Rx Clk +
7	Tx Clk -
8	Tx Clk +
9	Rx Data -
10	Tx Cntrl +
11	GND
12	GND
13	GND
14	GND
15	GND
16	GND
17	GND
18	GND
19	Tx Cntrl -
20 - 22	+ PSU
23- 25	- PSU
26	Rx Data +

Outdoor Unit Connector Pin Details

CABLE CONNECTOR (OU Base)



Pin	Details
A	24V
B	24V
C	TXC-
D	TXC+
E	TXDCLK-
F	RXDCLK+
G	TXDCLK+
H	N/C
J	RXDCLK+
K	RXD+
L	RXC-
M	RXD-
N	RXC+
P	TXD-
R	TXD+
S	GND
T	GND
U	GND
V	GND
W	GND
X	GND
Y	GND
Z	GND
a	GND
b	GND
c	GND

Chapter 3: Operational Information

Introduction to Chapter 3

Chapter 3 provides the user with a description and the location of all controls, indicators and connectors located on the front and rear panels of the µLink Indoor Unit (IU).

Indoor Unit (IU) Controls, Indicators and Connectors

Front Panel

Figure 10 shows all items on the IU Front Panel. Table 5 describes the items shown in the illustration.

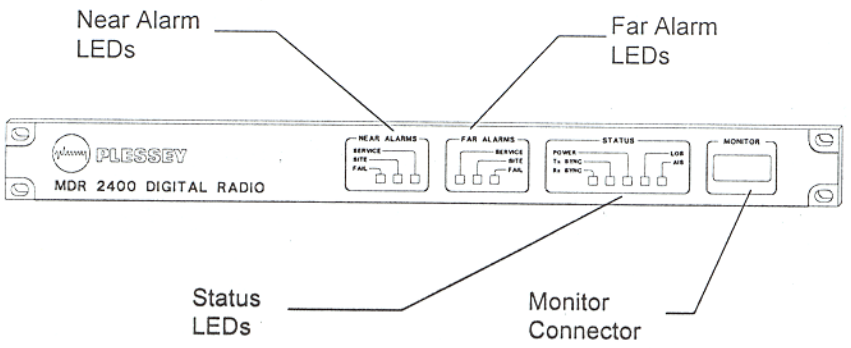


Figure 10. IU Front Panel Controls, Indicators and Connectors.

Table 5. IU Front Panel: Controls, Indicators and Connectors

Item	Description
Near Alarm LEDs	Used to indicate **Failure**, **Service** and **Site** alarms or status. The LEDs are tri-colour to indicate **No Alarm** (Green), **Existing Alarm** (Red) and **Historic Alarm** (Amber) conditions. Refer to Chapter 5, Maintenance Information for more details about these alarms.
Far Alarm LEDs	As for Near Alarm LEDs.
Status LEDs	The following status LEDs are located on the IU Front Panel: a. **Power ON** b. **Tx Sync** c. **Rx Sync** d. **Loss of Signal (LOS)** e. **Alarm Indication Signal (AIS)** The **Power-ON** LED is red. If LED is ON, it indicates **Power-ON** if OFF, it indicates Power Off. LEDs b to e are tri-coloured to indicate **No Fault** (Green), **Existing Fault** (Red) and **Historic Fault** (Amber) conditions. Refer to Table 6 for more information about the Status LEDs.
Monitor Connector	RS-232 standard 9-pin D-type connector for operation at a nominal 19200 baud. For use with the Craft Terminal.

Table 6. Status LEDs:		
LED	**Status**	**Remarks**
Power On	Off	Power Off
	Red	Power On
Tx Sync	Green	Tx Data Framelock
	Red	Loss of Tx Data Framelock
	Amber	Historic Tx Sync Framelock Loss
Rx Sync	Green	Rx Data Framelock
	Red	Loss of Rx Data Framelock
	Amber	Historic Rx Sync Framelock Loss
LOS	Green	Tx Data Present
	Red	No Tx Data Detected
	Amber	Historic LOS
AIS	Green	AIS Not Present
	Red	AIS Present
	Amber	Historic AIS

Indoor Unit (IU) Controls, Indicators and Connectors

Rear Panel

Figure 11 shows all items on the IU Rear Panel. Table 7 describes the items shown in the illustration.

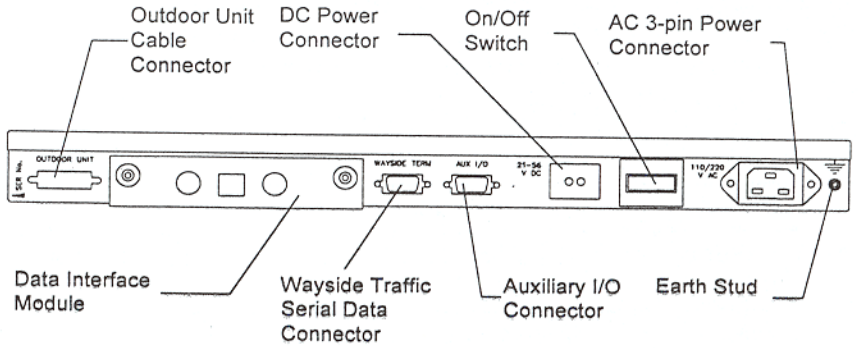


Figure 11. IU Rear Panel Controls, Indicators and Connectors.

Table 7. IU Rear Panel: Controls, Indicators and Connectors	
Item	**Description**
Outdoor Unit Cable Connector	26-pin, High Density D-type female connector for IU/OU interconnection cable.
Wayside Traffic Serial Data Connector	9-pin D-type female connector. Used for Wayside traffic channels.
DC Power Connector	Weiland 2-way chassis mounted connector.
Auxiliary I/O Connector	15-pin, High Density D-type female connector. Used mainly for diagnostics and maintenance purposes. Divided into two main sections: • Plant Alarm Inputs • Equipment Control Relay Outputs.
On/Off Switch	Power switch to switch the IU On or Off.
AC 3-pin Power Connector	Chassis mounted IEC AC Inlet. Accepts 100 VAC to 240 VAC.
Earth Stud	Screw type terminal for earth connection.
Payload Data Interface Connector	The connector types depend on the type of Data Interface module installed. Available options are: **E1** (120Ω/75Ω RJ-12/BNC), **T1** (100Ω/75Ω RJ-12/BNC).