

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.

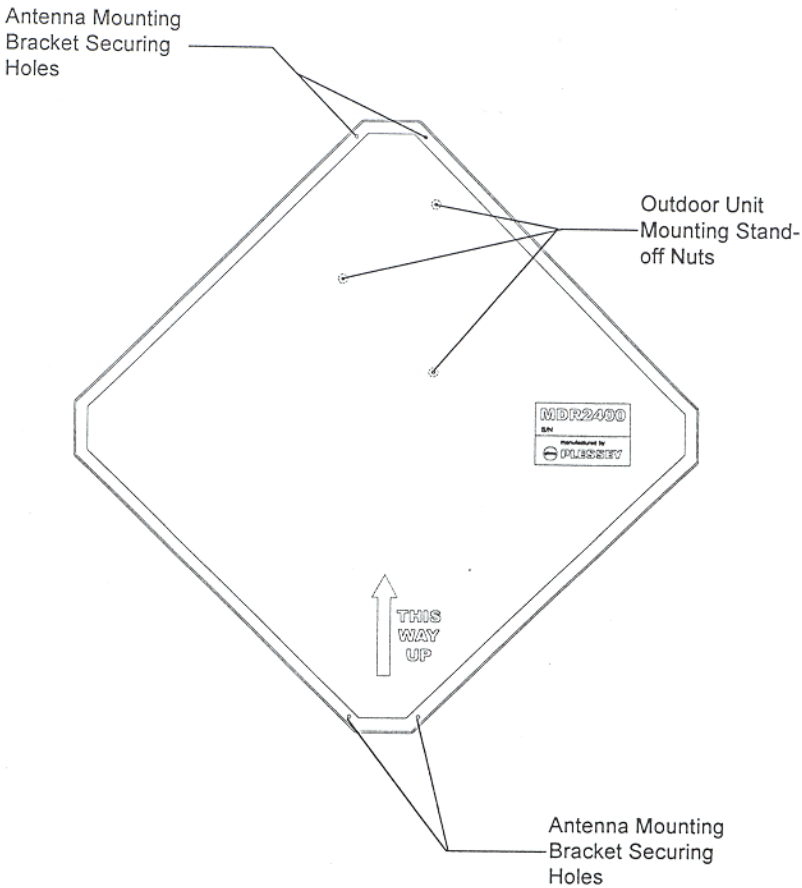


Figure 6. μLink Antenna.



**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. |

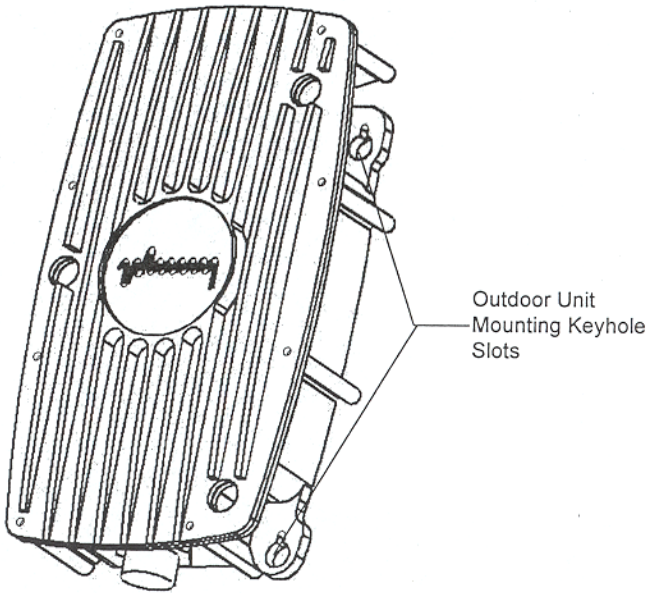


Figure 7. μLink Outdoor Unit.

**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. |

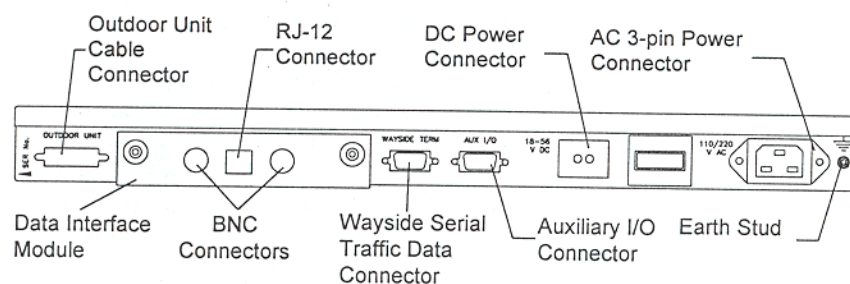


Figure 8. Indoor Unit Rear Panel.

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. |

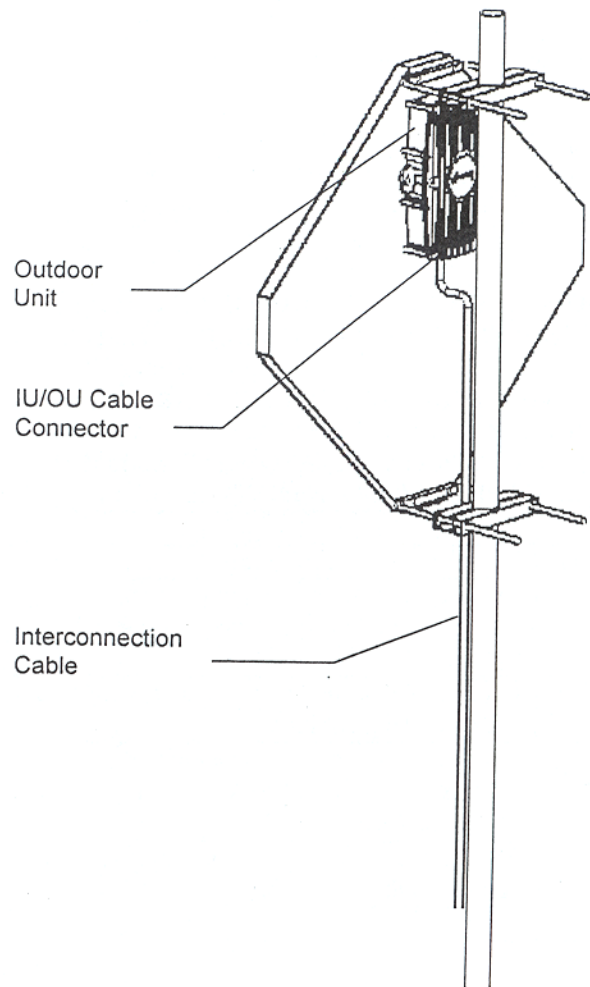


Figure 9. Outdoor Unit Mounted on Antenna.

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

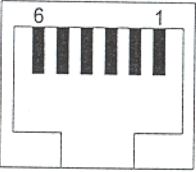
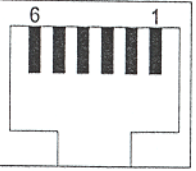
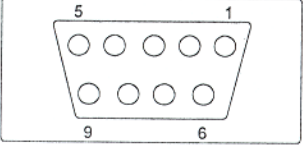
Perform a link error performance test as follows:

- 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.

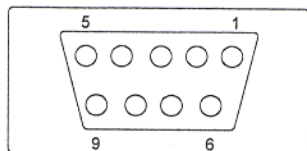
| Table 4. Link Error Performance Check List | | |
|--|----------------------------|-----------------|
| | Description | Setting/Remarks |
| 1. | Transmit Frequency/Channel | |
| 2. | RSSI | |
| 3. | Link Test BER | |
| 4. | LED Status | |

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 |

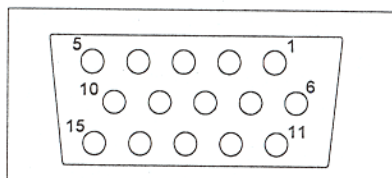
Indoor Unit Connector Pin Details

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 |

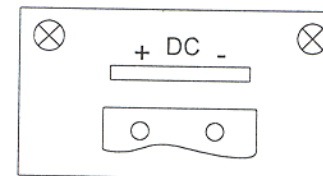
AUX I/O (IU Rear Panel) 15-pin High Density D-type Female Connector



| 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 |

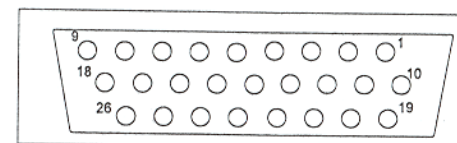
Indoor Unit Connector Pin Details

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



| Pin | Description |
|-----|-------------|
| + | Positive |
| - | Negative |

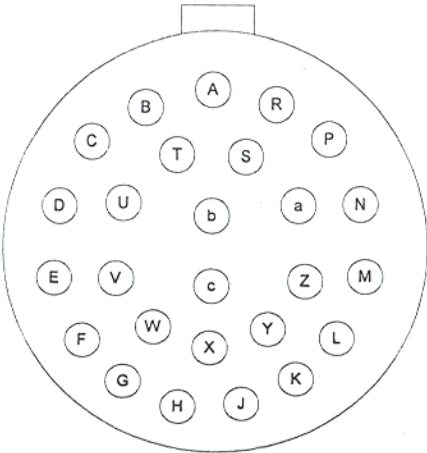
OUTDOOR UNIT (IU Rear Panel) 26-pin High Density D-type Female Connector



| 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.

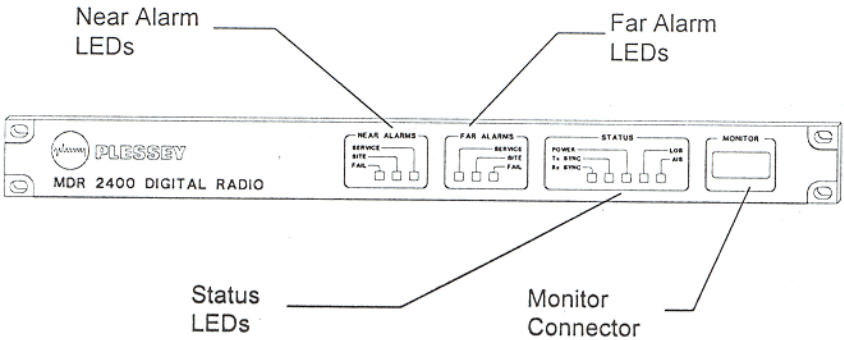


Figure 10. IU Front Panel Controls, Indicators and Connectors.

| 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 | <p>The following status LEDs are located on the IU Front Panel:</p> <ul style="list-style-type: none">a. Power ONb. Tx Syncc. Rx Syncd. Loss of Signal (LOS)e. Alarm Indication Signal (AIS) <p>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.</p> |
| 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.

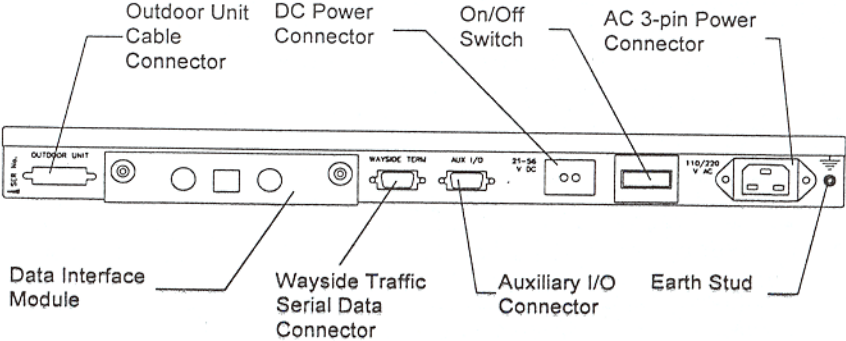


Figure 11. IU Rear Panel Controls, Indicators and Connectors.

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: <ul style="list-style-type: none">• 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). |