Airspan

AS4000
Wireless Local Loop System

Subscriber Terminal
Installation and Commissioning

605-0000-454

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SAFETY INSTRUCTIONS - WARNINGS AND CAUTIONS

SAFETY

1. Read and follow all warning notices and instructions marked on the product or included in this manual

2. Do not allow anything to rest on the power cord and do not locate the product where persons could step or walk on the power cord.

3. When installed in the final configuration, the product must comply with the applicable Safety Standards and regulatory requirements of the country in which it is installed. If necessary, consult with the appropriate regulatory agencies and inspection authorities to ensure compliance.

4. No hazardous RF radiation is emitted from the equipment. Measured at the surface of the CRU radome, when transmitting, the maximum total power radiated from the CRU is 0.01% of the UK National Radiological Protection Board basic restriction per kg. of body part.

WARNING - HAZARDOUS VOLTAGES

On AC installations, hazardous voltages exist. Use caution when verifying or working with AC power. Remove metal jewellery that could come into contact with AC power.

On DC sections, short circuiting the low voltage, low impedance circuits can cause severe arcing that may result in burns or eye damage. Remove rings, watches etc. to avoid shorting DC circuits.

Electro-Static Discharge ESD

Electro-Static Discharge. Many circuits contain devices which are susceptible to damage from high impedance voltage sources. To avoid such risks always follow anti-static procedures where marked.

⚠ **NOTE**

Airspan products do not contain hazardous substances (as defined in UK 'Control of Substances Hazardous to Health Regulations 1989', and the 'Dangerous Substances Regulations 1990'). At the end of any Airspan product's life cycle, the customer should consult with ACC to ensure that the product is disposed of in conformance with the relevant regulatory requirements

C €

The C € Symbol on an Airspan product signifies that it has been certified according to the EMC directive 89/336/EEC. The product fulfils the requirements according to the following standards:

EN50082-1   for Immunity.
EN55022   Group 1 Class A for the Central Terminal Emissions.
EN55022   Group 1 Class B for the Subscriber Terminal Emissions.

⚠ **NOTE**

The Subscriber Terminal 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.

User Response Form

Mail: Airspan Communications Limited　　　　　**Fax:** (44) 01895 467182
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Document Rating	Excellent	Good	Average	Below Average	Poor
Accuracy / Completeness	q	q	q	q	q
Clarity / Organisation	q	q	q	q	q
Figures	q	q	q	q	q
Table of Contents/Index	q	q	q	q	q

The nature of this response is　　　　Addition q　　Deletion q　　Correction q

Please enter details of response below (include precise reference to Section, Page, Paragraph)

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ISSUE CONTROL LIST

Title	Issue	Date	Issue Details
Title Page	Draft 1.3	February 2000	
ICL-001	Draft 1.3	February 2000	
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CHANGE TYPE/DATE	PURPOSE	PAGES AFFECTED
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1.2 July 1999	Wall Mounting Bracket Installation Procedure Changes	DLP-015
1.3dr February 2000	ST V2 Removed Modular added	DLPs Removed and Renumbered

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PREFACE:

Safety Instructions Warnings and Cautions

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Abbreviations

ADPCM   Adaptive Differential Pulse Code Modulation
AC   Access Concentrator
AGC   Automatic Gain Control
CCC   Call Control Channel
CDMA   Code Division Multiple Access
CPE   Customer Premises Equipment
CRU   Customer Radio Unit
CU   Compression Unit
CT   Central Terminal
CTU   Central terminal Tributary Unit (at AC site)
DA   Demand assignment
DC   Direct Current
DMM   Digital Multi Meter
DRS   Digital Radio System
DTU   Demand Assignment Tributary Unit
FA   Fixed Assignment
ISDN   Integrated Services Digital Network
ITU-T   International Telecommunications Union –Telecommunications
LAC   Link Acquisition Channel
LD   Loop Disconnect
MF   Multi-Frequency
MU   Modular Unit (ST)
NTU   Network Termination Unit
PC   Power Control
PCM   Pulse Code Modulation
PSU   Power Supply Unit
PTC   Priority Traffic Channels
RF   Radio Frequency
RU   Residential Unit (ST)
SC   Shelf Controller
SIU   Service Interface Unit
ST   Subscriber Terminal
SU   Sub Unit (ST)
Rx   Receive
Tx   Transmit
TDM   Time Division Multiple Access
TCH   Traffic Channels
TU   Tributary Unit
VDU   Video Display Unit
VF   Voice Frequency
XTU   Switch Tributary Unit

RELATED DOCUMENTATION

605-0000-450	System Overview
605-0000-451	System Operations and Maintenance Manual
605-0000-452	Central Terminal – Installation & Commissioning
605-0000-453	Access Concentrator Installation & Commissioning
605-0000-437	D128 Terminal Converter
605-0000-435	Material Return and Repair
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SECTION 1
GENERAL SYSTEM INFORMATION

INTRODUCTION

1. General

This document describes the installation and commissioning of the ACC AS4000 Subscriber Terminals (ST) Equipment to release 5.0 specifications.

Prerequisite skills. Personnel installing and commissioning the AS4000 STs require a basic knowledge of telephony and radio communications, and experience in installing telecommunications products. ACC provides a range of comprehensive training courses specifically aimed at providing operators/users of AS4000 STs with the prerequisite skills to install, commission and or maintain the product. The courses can be tailored to provide the level of training required by the operator/user.

Intended Audience. This manual is intended for use by persons familiar with the AS4000 ST having attended the ACC ST Installation and Commissioning training course.

2. Fault Reporting.

Faults reported under warranty should be reported to the ACC Help Desk

TELEPHONE: +44 (0) 1527 402800

FAX: +44 (0) 1527 550956

E-Mail: support@airspan.com

3. Safety

Personnel installing the ACC AS4000 product should follow local safety procedures, particularly those requirements relating to working above ground. ACC safety procedures are contained in document W300 0002 001 Rev A.

No hazardous RF radiation is emitted from the equipment. Measured at the surface of the CRU/Antenna radome, when transmitting, the maximum total power radiated from the radome is 0.01% of the UK National Radiological Protection Board basic restriction per kg. of body part. Also at the surface of the radome, the power flux density is approximately one tenth of the investigation level of the UK National Radiological Protection Board.

⚠ **WARNING – HAZARDOUS VOLTAGES**

On AC installations, hazardous voltages exist. Use caution when verifying or working with AC power. Remove metal jewellery that could come into contact with AC power.

On DC sections, short circuiting the low voltage, low impedance circuits can cause severe arcing that may result in burns or eye damage. Remove rings, watches etc. to avoid shorting DC circuits.

4. Overview of ST operation

Traffic channels support either 32, 64, or 128kbit/s services. Each link operates using a master RW code to provide a 160kbit/s channel. These links are then sub-divided using 2nd level RW (overlay) codes that allow the construction of 2 x 80kbit/s or 4 x 40kbit/s smaller links. Hence Traffic Channels (TCH) are composed of either 160kbit/s, 80kbit/s or 40 kbit/s links. The size of the traffic pool is automatically and dynamically sized so channels may be made available as 32, 64, or 128kbit/s on demand. All STs are continually polled, and receive regular downloads of a Free List containing available RWs and their channelisation (i.e. 128kbit/s, 64kbit/s or 32kbit/s) on RW14 (the call control channel). If a phone goes off hook then it waits for a new free list and takes an available RW selected at random from the free list. (Note: if unslotted access is set in the ST class the ST will not wait for a new free list but will acquire based on the last free list it received, this allows for faster acquisition but increases the chance of collisions). If a channel is not available at a required rate the next highest rate is selected. When a user's line goes "off-hook" and it is invited to acquire an uplink, it takes an RW. If contention occurs due to another ST trying to acquire an uplink on the same RW, at the same time then both STs disconnect and attempt to re-acquire.

Net Entry Channels: The ST acquires a downlink on a Net Entry channel and waits to be invited to acquire an uplink. RW15 is allocated for this purpose and additional Net Entry Channels can be used if allocated. After an ST has net entered a demand assigned ST is told to wait in RW15 where it is updated with free lists. Fixed assigned STs are allocated a permanent channel

Free List: The free list allocates the free list at each traffic rate. (160k, 80k, 40k) The way the list is divided depends on the ST population. The free list dynamically allocates new free channel when a channel allocated by the existing free list is used. If for example an allocated 160k channel is used the free list will allocate another one. This reduces the number of incoming calls that can be accommodated.

SUBSCRIBER TERMINAL OVERVIEW

1. Subscriber Terminals

The AS4000 Subscriber Terminal (ST) portfolio includes subscriber terminals for Voice, ISDN and Data. In general, the customer has access to the same range of facilities that are supported by a conventional copper pair.

Telephony: services provided include:

- multi-frequency or loop-disconnect dialling

- subscriber private metering

- intrusion tone

- malicious call interception.

- caller line identification

Note. Line reversal is not supported.

All tones, tone cadences and announcements generated by the Local Exchange are passed transparently over the AS4000 System. Line feed voltage, ringing current and ringing cadence are generated by the ST equipment.

The Customer Premises Equipment is connected to the Line Sockets on the internal Service Interface Unit.

The specific impedance of the NTU allows tests to be performed by the Service Interface Unit to detect any attached CPE.

Data: Services provided include

- RS530 interface, configurable to provide X21 and V35 interfaces

- 25 Way D-type interface

- Data rates of 64 and 128kbit/s

ISDN

- supports a basic rate ISDN, 2B+D (2 x 64kbit/s + 16kbit/s) "S" interface

- RJ45 Interface

2. AS4000 Subscriber Terminals

There is a range of STs available, each supporting different services and numbers of lines See Table 1.

Generic	Subscriber Terminal	Service Interface Unit	Function

		Type	Qty	Construction	
R Series	R1	RU-1	1	Residential Subscriber Unit	One line voice 64kbit/s PCM /32kbit/s ADPCM
	R2	RU-2	1	Residential Subscriber Unit	Two line voice 64kbit/s PCM /32kbit/s ADPCM
S Series	S1	SU-1	1	Sub-Unit	One line voice 64kbit/s PCM /32kbit/s ADPCM
	♣S2	SU-2	1	Sub-Unit	Two line voice 64kbit/s PCM /32kbit/s ADPCM
N Series	N2	MU-V2	1	Modular Unit	Two line voice 64kbit/s PCM /32kbit/s ADPCM
	N4	MU-V4	1	Modular Unit	Four line voice 32kbit/s ADPCM
B Series	B1	MU-I	1	Modular Unit	ISDN (FA Mode)
L Series	L128	MU-D128	1	Modular Unit	One line 128kbit/s data (FA Mode)
	L64	MU-D64	1	Modular Unit	One line 64kbit/s data (FA Mode)
	L2x64	MU-D2x64	1	Modular Unit	Two line 64k bit/s data (FA Mode)
M Series	M2	MU-V2	1	Modular Unit in Modular Enclosure	Two line voice 64kbit/s PCM /32kbit/s ADPCM
	M4	MU-V4	1	Modular Unit in Modular Enclosure	Four line voice 32kbit/s ADPCM
	M4/64	MU-V2	2	Modular Unit in Modular Enclosure	Four line voice 64kbit/s PCM /32kbit/s ADPCM
	M8	MU-V4	2	Modular Unit in Modular Enclosure	Eight line voice 32kbit/s ADPCM
	M8/64	MU-V2	4	Modular Unit in Modular Enclosure	Eight line voice 64kbit/s PCM /32kbit/s ADPCM
	♣M16	MU-V4	4	Modular Unit in Modular Enclosure	Sixteen line voice 32kbit/s ADPCM

Table 1. AS4000 Subscriber Terminals

♣ Future Product release.
General Note: 32kbit/s PCM voice services are available for Subscriber Terminal hosted on Demand Assigned Modem shelves.

3. The Subscriber Terminal – Internal Service Interface Unit

The majority of the electronics is in Service Interface Unit located inside the customer premises, the outdoor radio unit includes only the antenna and a RF front end. The SIU is connected to the outdoor unit by an IF drop cable.
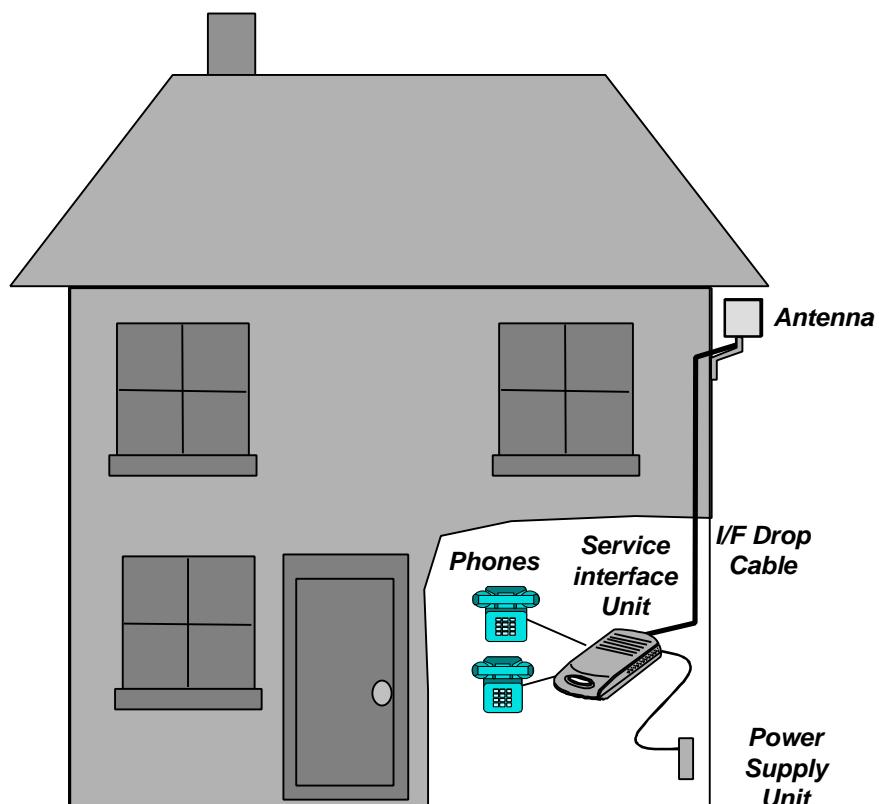
Note The appearance of the Service interface Unit depends on the series (ST- R2 shown)

Figure 1. Subscriber Terminal

The main elements, (see Figure 1) comprise:

- External Antenna

- Internal Service Interface Unit

- IF Drop Cable

- Type 5 PSU (B,L,N series requiring battery back-up) or Type 6 Socket PSU (for R and S series and B,L,N series not requiring battery back-up)

3.1 Antenna

The antenna is a sealed weatherproof unit that is mounted on the outside of the customer's premises. The unit is normally positioned on an outside wall or a mounting that faces the general direction of the CT antenna. The ST should be sited to avoid large obstructions in proximity to and in line of sight from the ST to the Antenna. See the ST installation and commissioning manual for deployment rules.

The Antenna unit contains a flat plate antenna and a Low Noise Amplifier (LNA). It connects to the IF Drop cable using an F type connector. Power for the LNA is provided via the drop cable.

3.2 Antenna Mounting Pole

The antenna is normally pole mounted on a 38mm(1.5") Pole (provided by the service provider). Adjustment of the CRU (in the azimuth plane) is achieved by rotating the antenna around the pole, the optimum positioning being determined by measuring the strength of the incoming signal, usually in the direction of the CT antenna.

3.3 Antenna Mounting Bracket

The antenna Mounting Bracket fixes directly onto the wall of the building and provides adjustment (in the azimuth plane) of the CRU in an arc over 150°, the optimum positioning being determined by measuring the strength of the incoming signal, usually in the direction of the CT antenna.

3.4 IF Drop Cable

The drop cable connects the internal CRU to the Antenna via an environmentally protected F-Type connector that is plugged into the backplate of the Antenna. The IF Drop Cable is 50m or 100m with a 40mm maximum bend radius.

In general, the customer has access to the same range of facilities that are supported by a conventional copper pair. For normal telephony services, these could typically include:

- multi-frequency or loop-disconnect dialling

- subscriber private metering

- intrusion tone

- malicious call interception.

- caller line identification

Note. Line reversal is not supported.

All tones, tone cadences and announcements generated by the Local Exchange are passed transparently over the AS4000 System. Line feed voltage, ringing current and ringing cadence are generated by the ST equipment.

The Customer Premises Equipment is connected to the Line Sockets on the internal Service Interface Unit.

The specific impedance of the NTU allows tests to be performed by the CRU to ascertain whether the NTU is present on a line and if there is any CPE attached.

3.5   Power Supply Units

Two types of PSU are available. The Type 5 PSU for B, L, and N series installations that require battery back-up and the Type 6 PSU for installations that do not require battery back-up.

The, R, S, series Service Interface Units (SIU) use a Type 6 Power Supply Unit(PSU)

3.6   AC Power Supply Unit (Type 5)

The PSU input voltage ranges from 100-240Volts (1 Amp) The AC supply is converted to 13V DC to power the external SIU.

In addition, the PSU contains an internal 12V lead-acid battery which is trickle-charged and which provides a back-up supply for approximately 2.5 hours talk time or 5 hours standby for voice / ISDN. The battery has an operational life of five years.

3.7   Type 6 PSU

The Type 6 is a socket PSU the plugs directly into the AC supply socket. It is supplied with a range of adapters to ensure compatibility with the socket design in the country of deployment
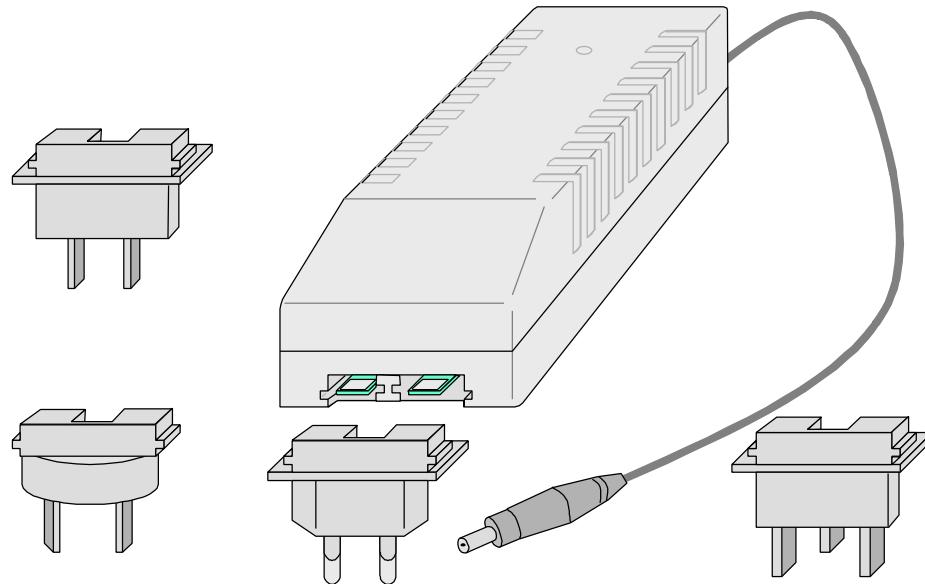
Figure 2. Type 6 PSU

3.8 The R Series Residential Subscriber Terminals

The R series Subscriber Terminals are designed for Voice Telephony and use an external antenna and a plastic injection moulded internal Service Interface Unit. The unit contains a battery compartment. The STs are powered from the AC mains supply with or without backup batteries.

R1 *one voice line*

R2 *two voice lines*

External Components

Antenna / RF

IF Drop Cable

Internal Components

Service Interface Unit

RU-1=*one line*   **RU-2 =** *two lines*

*Type 6
Socket PSU*
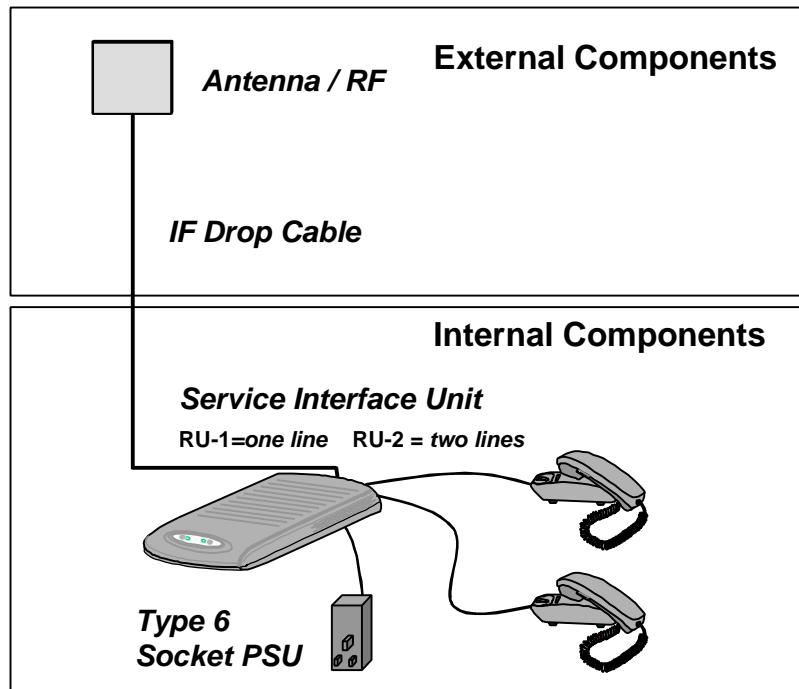
Figure 3. R Series Demand Assigned Subscriber Terminals

The **ST-R1** supports one 32kbit/s ADPCM or 64kbit/s PCM analogue telephony line at the end-users premises. The Service Interface Unit is a RU-1 single line unit. Provisioning is by the AS8100 management system.

The **ST-R2** supports two 32kbit/s ADPCM or 64kbit/s PCM analogue telephony lines at the end-users premises. The Service Interface Unit is a RU-2 two line unit. Provisioning is by the AS8100 management system.
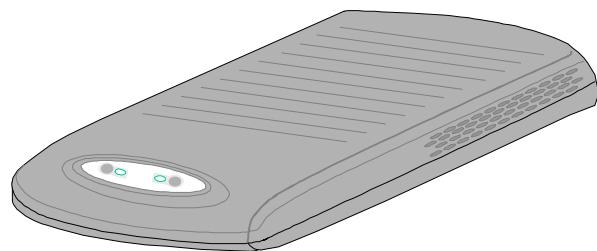
Figure 4. The R Series Service Interface Unit (RU-2 shown)

3.9   The S Series Sub-Unit Subscriber Terminals

The S series Subscriber Terminals are designed for Voice Telephony and use an external antenna and a internal metal box Sub-Unit Service Interface Unit. The unit is designed for use in places where a more robust unit is needed. I.e. Payphones. The STs are powered from the AC mains supply.

S1 *(1 line)*   S2 *(2 lines)*

External Components   *Antenna / RF*

IF Drop Cable

Internal Components

Service Interface Unit
SU-1 (1 line)
SU-2 (2 lines)

Type 6
Socket PSU
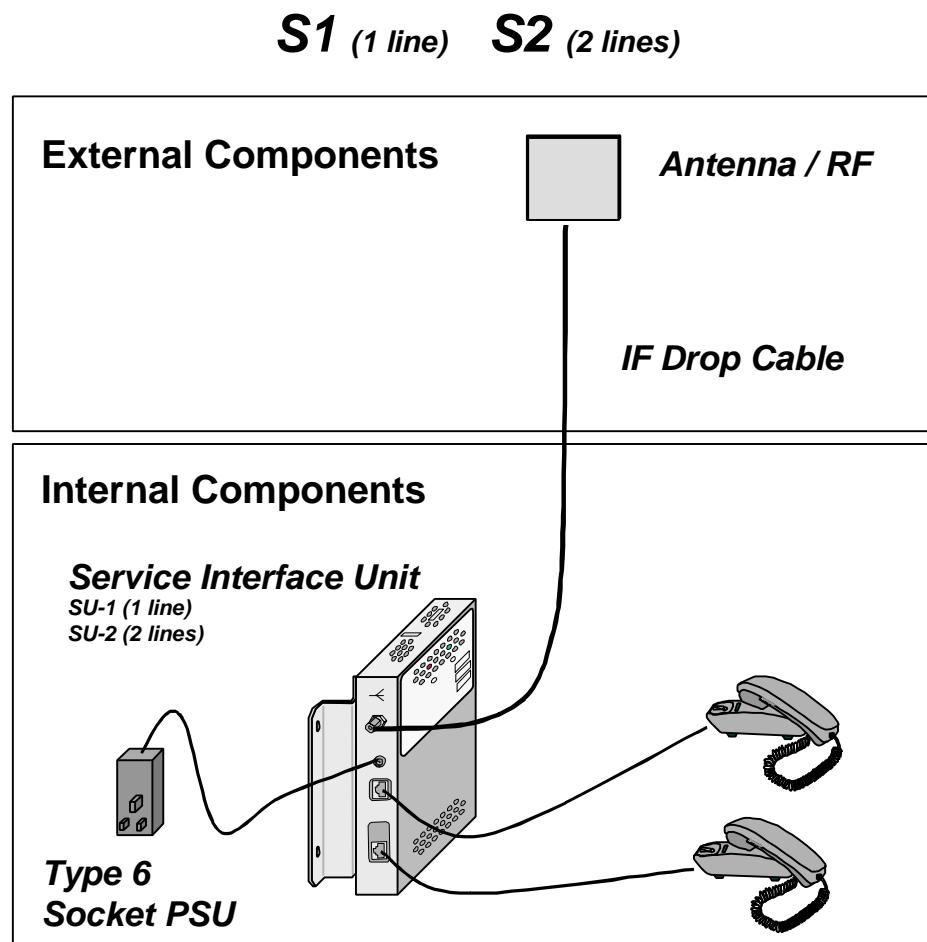
Figure 5. S Series Demand Assigned Subscriber Terminals

The **ST-S1** supports one 32kbit/s ADPCM or 64kbit/s PCM analogue telephony line at the end-users premises. The Service Interface Unit is a SU-1 single line unit. Provisioning is by the AS8100 management system.

The **ST-S2** supports two 32kbit/s ADPCM or 64kbit/s PCM analogue telephony lines at the end-users premises. The Service Interface Unit is a SU-1 two line unit. Provisioning is by the AS8100 management system.
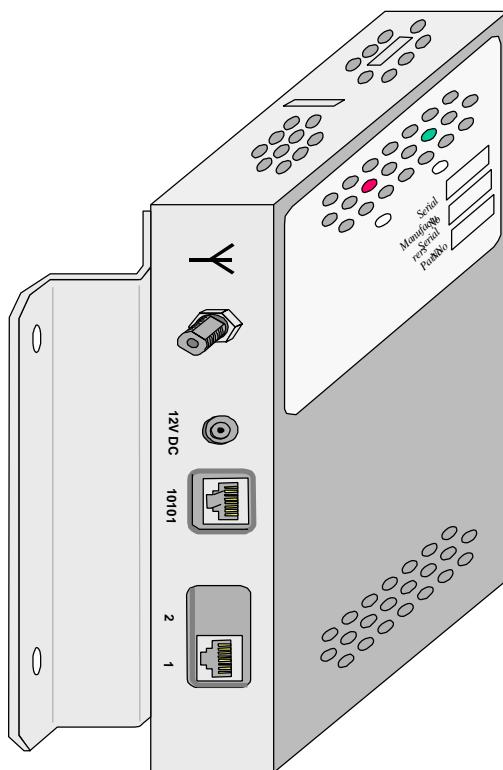
Figure 6. The S Series Service Interface Unit. (SU-2 shown).

3.10   The N Series Subscriber Terminals

The N series Subscriber Terminals are designed for Voice Telephony and use an external antenna and an internal Modular Service Interface Unit. The STs are powered from the AC mains supply.
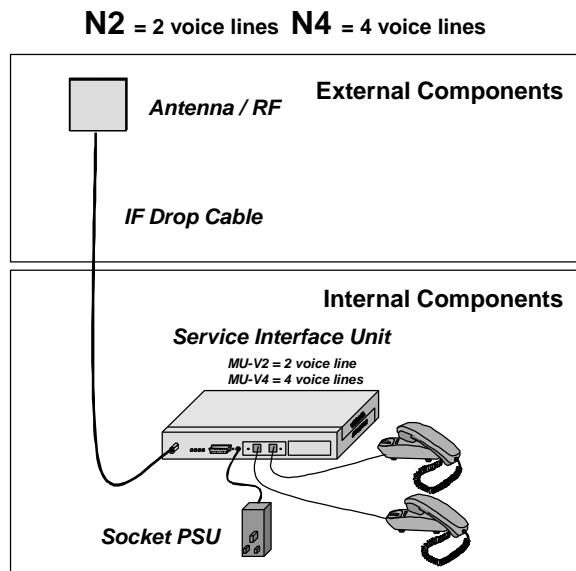
Figure 7. N Series Demand Assigned Subscriber Terminals

The **ST-N2** supports one 32kbit/s ADPCM or 64kbit/s PCM analogue telephony line at the end-users premises. The Service Interface Unit is a MU-V2 with a two line module. Provisioning is by the AS8100 management system.

The **ST-N4** supports four 32kbit/s ADPCM analogue telephony lines at the end-users premises. The Service Interface Unit is a MU-V4 equipped with 2 x two line modules. Provisioning is by the AS8100 management system.
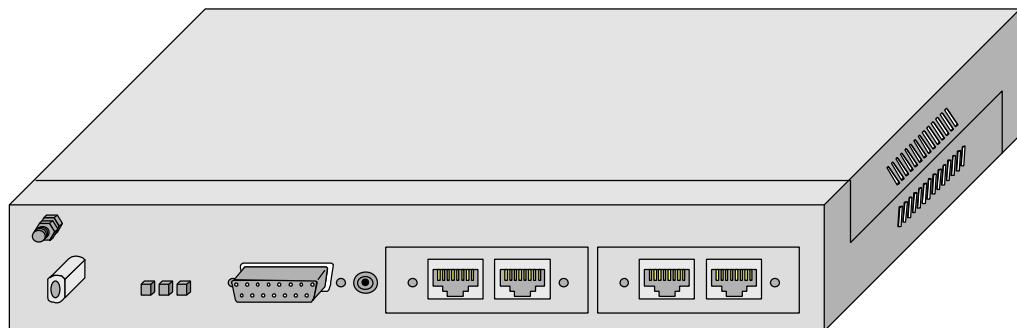
Figure 8. The N Series Service Interface Unit. (MU-V4 shown).

3.11   The B Series Subscriber Terminals

The N series Subscriber Terminals are designed for ISDN and use an external antenna and an internal Modular Service Interface Unit. The STs are powered from the AC mains supply.
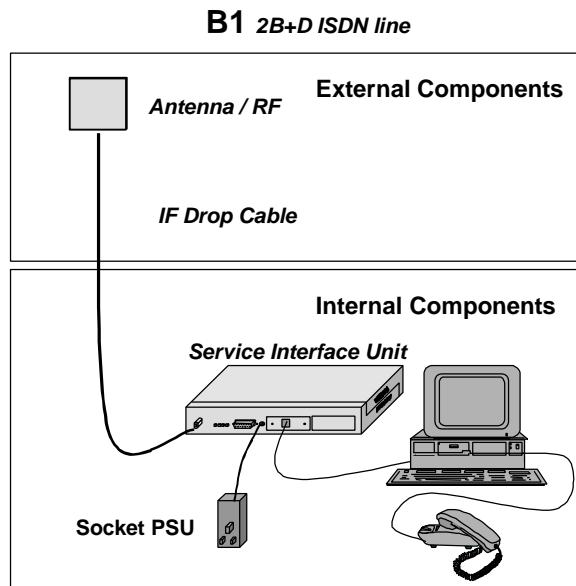
Figure 9. B Series Demand Assigned Subscriber Terminals

The **ST-B1** supports a basic rate ISDN, 2B+D (2 x 64kbit/s + 16kbit/s) "S" interface, and operates in Fixed Assigned mode. The Service Interface Unit is a MU-I with a RJ45 S bus interface.
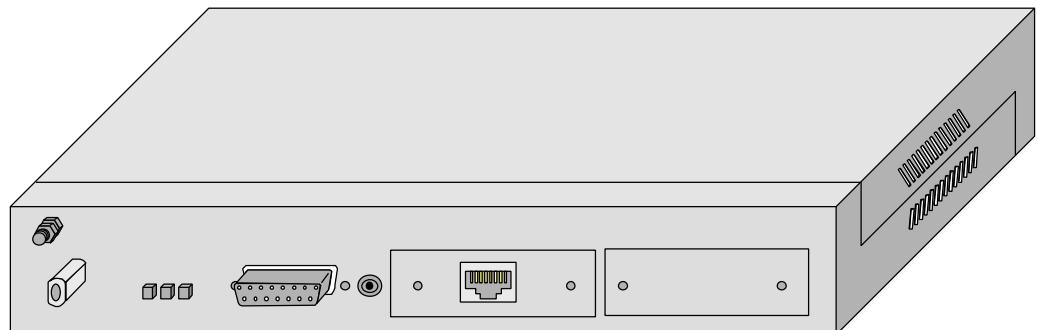
Figure 10. The B Series Service Interface Unit. (MU-I shown).

3.12   The L Series Subscriber Terminals

The L series Subscriber Terminals are designed for Data and use an external antenna and an internal Modular Service Interface Unit. The STs are powered from the AC mains supply.
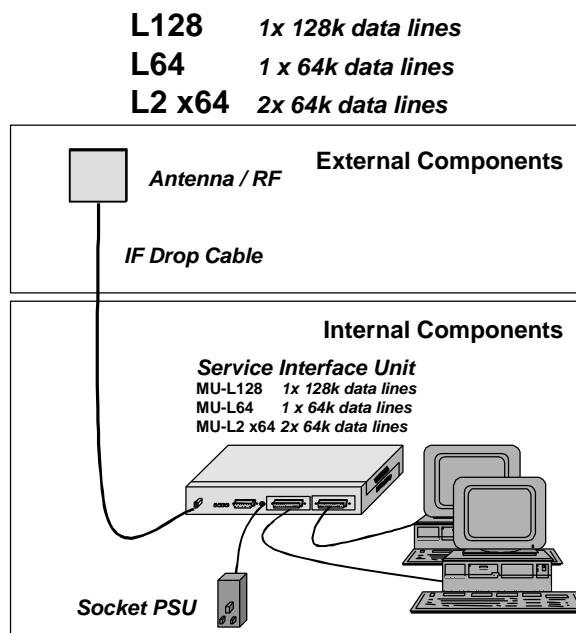
Figure 11. L Series Demand Assigned Subscriber Terminals

The **ST-L128** supports a 128kbit/s serial data transmission operates in Fixed Assigned mode. The Service Interface Unit is a MU-D128 with a RS530 25 way D-Type socket interface.

The **ST-L64** supports a 64kbit/s serial data transmission operates in Fixed Assigned mode. The Service Interface Unit is a MU-D64 with a RS530 25 way D-Type socket interface.

The **ST-2xL64** supports two 64kbit/s serial data transmissions and operates in Fixed Assigned mode. The Service Interface Unit is MU-D2x64 with 2x RS530 25 way D-Type socket interfaces.
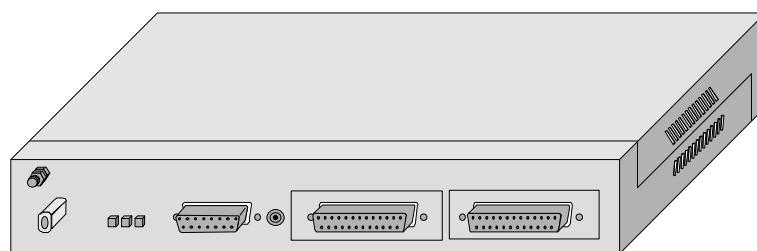
Figure 12. The L Series Service Interface Unit. (MU-D2x64 shown).

3.13   The M Series Subscriber Terminals

The M series Subscriber Terminals are designed for telephony although it is feasible to accommodate ISDN or data modules within the enclosure. External antennas connect via IF drop cables to internal Modular Service Interface Units. The modular units are housed in a Modular Enclosure.
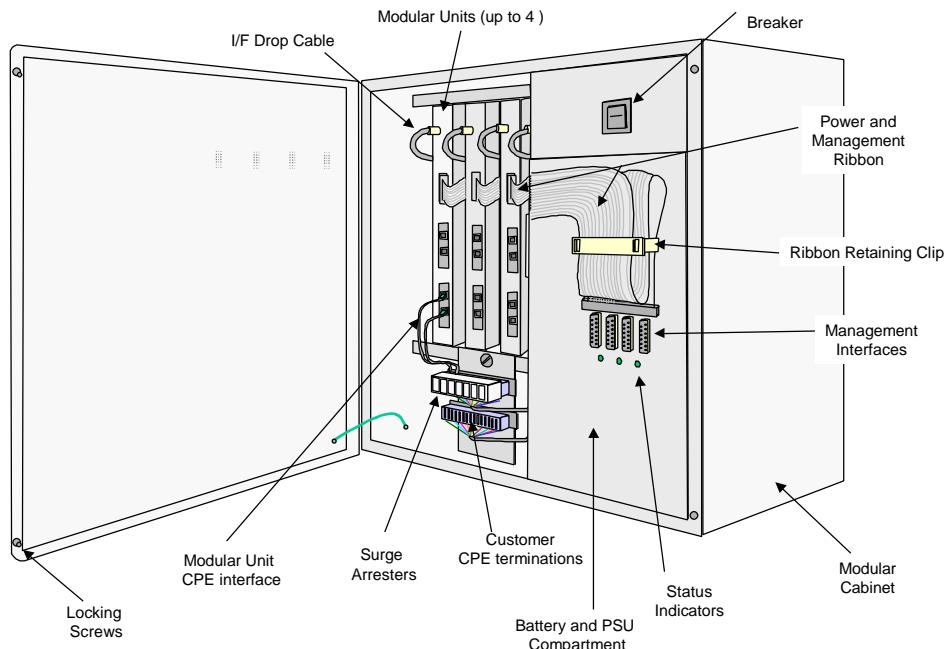
Figure 13. The M Series Enclosure with Modular Service Interface Units Fitted.

The M Series Modular Enclosure is a stainless steel Enclosure with a hinged door for access to the equipment. It may be wall or plinth mounted. In environmentally harsh conditions the enclosure is designed to fit inside a 600mm x 600mm IP66 environmental enclosure. Cable entry is via gland nuts and the door is secured by quarter turn fasteners. The Modular Enclosure can accommodate up to four Modular Service Interface Units (B, L or N series). The Modular Enclosure is powered from an AC supply and contains a PSU with provision for battery back-up and lightning protection. The battery backup maintains the unit operational for six hours in the event of a mains failure. (assumes two lines of hook on two separate Modular Units other lines on standby).

Modular systems are:

Subscriber Terminal	Service Interface Unit	Number of SIUs	Antennas	Function
M2	MU-V2	1	1	Two line voice 64kbit/s PCM 32kbit/s ADPCM
M4	MU-V4	1	1	Four line voice 32kbit/s ADPCM
M4/64	MU-V2	2	2	Four line voice 64kbit/s PCM 32kbit/s ADPCM
M8	MU-V4	2	2	Eight line voice 64kbit/s PCM 32kbit/s ADPCM
M8/64	MU-V2	4	4	Eight line voice 64kbit/s PCM 32kbit/s ADPCM
M16	MU-V4	4	4	Sixteen line voice 32kbit/s ADPCM

SPECIFICATIONS

1. B, L M and N Series Subscriber Terminals

Physical

Size: Antenna without brackets: 218mm W x 218mm H x 68mm D
          Subscriber Interface Unit   400mm W x 180mm H. x 330mm D
          PSU: 65mm W x 40mm H x 100mm D

Weight Antenna without brackets:
        Subscriber Interface Unit
        PSU:

Environmental Antenna

Operating Temperature: -30° to +50°C
Relative Humidity: 0 to 100% non – condensing
Storage Temperature: -30° to 70°C
Wind Gusts: 200 km/hr
Ice Accumulation of Density: 900 kg/m: 10mm (complete equip. coverage)

2. R Series Subscriber Terminals

Physical

Size: Antenna without brackets: 218mm W x 218mm H x 68mm D
          Subscriber Interface Unit   275mm W x 40mm H. x 190mm D
          PSU: 65mm W x 40mm H x 100mm D

Weight Antenna without brackets:
        Subscriber Interface Unit
        PSU:

Environmental Antenna

Operating Temperature: -30° to +50°C
Relative Humidity: 0 to 100% non – condensing
Storage Temperature: -30° to 70°C
Wind Gusts: 200 km/hr
Ice Accumulation of Density: 900 kg/m: 10mm (complete equip. coverage)

3. S Series Subscriber Terminals

Physical

Size: Antenna without brackets: 218mm W x 218mm H x 68mm D
          Subscriber Interface Unit   190mm W x 60mm H. x 185mm D
          PSU: 65mm W x 40mm H x 100mm D

Weight Antenna without brackets:
        Subscriber Interface Unit
        PSU:

Environmental Antenna

Operating Temperature:	-30° to +50°C
Relative Humidity:	0 to 100% non – condensing
Storage Temperature:	-30° to 70°C
Wind Gusts:	200 km/hr

Ice Accumulation of Density: 900 kg/m: 10mm (complete equip. coverage)

4. Power Supply Unit Type 5

AC Input Voltage: Range,	100VAC to 240VAC. (+6% –10%)
Frequency:	45 to 65 Hz.
AC Input:	1 Amp.
Nominal Output Voltage:	13V DC ±1V
Output	2.0Amp Max
Overload Protection Fuse:	2.0 Amp.
Power Consumption:	15 Watts
Insulation:	Class II
Battery	12V3.5AH

  a)   Panasonic   LCR 12V3.4P (L 134mm x W 67mm x H 60mm)
  b)   Sonnenschein A512 3,5 S   12V 3.5AH (L 134mm x W 67mm x H 60m)

Operating Temperature:	-5° to +45°C
Relative Humidity:	0 to 100% non – condensing
Storage Temperature:	-33° to 70°C

5. Power Supply Unit Type 6

AC Input Voltage: Range,	100VAC to 240VAC.
Frequency:	47 to 63 Hz.
AC Input:	0.7 Amp.
Nominal Output Voltage:	12V DC
Power Consumption:	15 Watts
Overload Protection Fuse:	2.0 Amp.

6. Modular Enclosure

Physical

Size:	Antenna without brackets:	218mm W x 218mm H x 68mm D
	Enclosure	550mm W x 500mm H. x 310mm D

Weight Antenna without brackets:

Enclosure	23Kg
Battery:	17.5Kg

PSU

AC Input Voltage: Range,	85VAC to 265VAC or 102-330 V DC
Frequency:	(AC) 47 to 63 Hz.

AC Input: 4 Amp.
Nominal Output Voltage: 16.5V DC
Overload Protection Fuse: 5.0 Amp.
Environmental Antenna
Operating Temperature: -30° to +50°C
Relative Humidity: 0 to 100% non – condensing
Storage Temperature: -30° to 70°C
Wind Gusts: 200 km/hr
Ice Accumulation of Density: 900 kg/m: 10mm (complete equip. coverage)

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REQUIRED TOOLS AND EQUIPMENT.

1. Required Tools

The following lists of tools and equipment are required to successfully install and test the ST equipment.

ITEM	DESCRIPTION	MODEL	SIZE
01	Combination Spanner		13mm
02	Ratchet and Socket		17mm
03	Spirit Level		18 inch.
04	Screwdriver	Pozidrive	No 1 x 75mm
05	Screwdriver	Pozidrive	No 2 x 199mm
06	Screwdriver	Pozidrive	No 3 x 150mm
07	Screwdriver	Flat Blade	3mm x 100mm
08	Hammer	Ball Pein	1lb
10	Drill/driver	Cordless – with depth gauge	Hilti
11	Drill Bit	Masonry	6mm
12	Drill Bit	Masonry	10mm
13	Ladder – Triple	Fully Extended 7 metre minimum	
14	Cable Stripping Tool	RS Standard Cable Stripper 547-442	
15	Auto Trim Termination Tool	RS Auto Trim Termination Tool 197-952	
16	Crimp tool	Amphenol 531-CR596R	

Table 2. Required Tools

2. Required Equipment

The table below shows the required equipment.

ITEM	DESCRIPTION	MODEL
01	Digital Multimeter	Fluke 77 or similar
02	Test Telephone	*Note 1
03	Compass	
04	CRU Generic Test Cable (ST-V2 CRU only). 2 adapters are provided per CT rack installation.	ACC 454-0000-182

Table 3. Required Equipment.

Note 1: The system needs to be connected to a network switch to fully commission the Subscriber Terminals.

Installers may not be familiar with the local environment and topographical conditions, it is necessary to provide each installer with a map of the local area. A compass for use when determining the exact bearing of the CT location is also necessary.

INSTALLATION PROCESS.

1. Delivery Inspection

Upon taking delivery of the equipment consignment, check that the consignment agrees in all particulars with the consignment delivery documentation (number of boxes, descriptions, contents of boxes, etc.). Any discrepancy or damage must be reported immediately to ACC (+44 (0) 1527 402800) for further instructions. In case of severe damage, do not accept the consignment from the carrier.

2. Unpacking Inspection

The contents of each box must be checked against the relevant part lists provided with the box, for the correct part numbers and quantities, and for damage. Any shortage or damaged items must be reported immediately to ACC for further instructions at the address given in Material Return and Repair Procedure (605-0000-435) or:

ACC Help Desk

TELEPHONE: +44 (0) 1527 402800

FAX: +44 (0) 1527 550956

E-Mail: support@airspan.com

Dispose of all unnecessary packaging in a safe manner according to the customer's requirements.

Note: It is recommended that one package carton of each type be retained should it be required to return any faulty or damaged items for repair.

Use the flow charts to guide the installation Processes

3. R series Telephony Installation and Commissioning

Chart 1. R series Installation and Commissioning

R series Installation Check List.

Check site meets site selection criteria	q
Position and fix Antenna mounting bracket	q
Install Antenna	q
Fix Interface Unit to wall (unless free standing required)	q
Install power unit Type 6	q
Run drop cable	q
Plug connector into Antenna	q
Terminate the F-type drop cable connector at interface unit	q
Connect batteries (if required)	q
Program Interface Unit	q
Pan Antenna	q
Measure and record RSSI voltage on test form	q
Functional tests record result on test form	q
Clear and tidy site	q

4. S series Telephony Installation and Commissioning

Chart 2. S series Installation and Commissioning

4.1   S series Installation Check List.

Check site meets site selection criteria	q
Position and fix Antenna mounting bracket	q
Install Antenna	q
Fix Interface Unit to wall	q
Install power unit Type 6	q
Run drop cable	q
Plug connector into Antenna	q
Terminate the F-type drop cable connector at interface unit	q
Programme Interface Unit	q
Pan Antenna	q
Measure and record RSSI voltage on test form	q
Functional tests record result on test form	q
Clear and tidy site	q

5. B Series Installation and Commissioning

Chart 3. B Series Installation and Commissioning

5.1   B Series Installation Check List.

Check site meets site selection criteria	q
Position and fix Antenna mounting bracket	q
Install Antenna	q
Fix Interface Unit to wall (unless free standing required)	q
Install power unit Type 5/6	q
Run drop cable	q
Plug connector into Antenna	q
Terminate the F-type drop cable connector at interface unit	q
Programme Interface Unit	q
Pan Antenna	q
Measure and record RSSI voltage on test form	q
Functional tests record result on test form	q
Clear and tidy site	q

6. L Series Installation and Commissioning

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┌─────────────────────────────────────────────────────────┐
│         L Series Installation and Commissioning          │
└─────────────────────────────────────────────────────────┘

        Installation                    Commissioning

┌─────────────────────┐         ┌─────────────────────────┐
│  Preparatory tasks   │         │    System Turn-up        │
│  DLP- 001            │         │    DLP- 010              │
└─────────────────────┘         └─────────────────────────┘

┌─────────────────────┐         ┌─────────────────────────┐
│ Antenna  Installation│         │   Program the SIU        │
│                      │         │ Using STMON for windows  │
│ Wall Mount  DLP- 002 │         │   DLP- 010               │
│ Pole Mount DLP- 003  │         └─────────────────────────┘
└─────────────────────┘

┌─────────────────────┐         ┌─────────────────────────┐
│ Drop Cable Installation│       │   Antenna Panning        │
│ DLP- 004             │         │   And Test Measurements  │
│                      │         │   DLP- 010               │
└─────────────────────┘         └─────────────────────────┘

┌─────────────────────┐         ┌─────────────────────────┐
│  SIU Installation    │         │   Functional Tests       │
│  DLP- 008            │         │   DLP- 014               │
└─────────────────────┘         └─────────────────────────┘

                                        ( END )
```

Chart 4. L Series Installation and Commissioning

6.1   L Series Installation Check List.

Check site meets site selection criteria	q
Position and fix Antenna mounting bracket	q
Install Antenna	q
Fix Interface Unit to wall (unless free standing required)	q
Install power unit Type 5/6	q
Run drop cable	q
Plug connector into Antenna	q
Terminate the F-type drop cable connector at interface unit	q
Programme Interface Unit	q
Pan Antenna	q
Measure and record RSSI voltage on test form	q
Functional tests record result on test form	q
Clear and tidy site	q

7. N Series Installation and Commissioning

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┌──────────────────────────────────────────────────────┐
│          N Series Installation and Commissioning       │
└──────────────────────────────────────────────────────┘

        Installation                    Commissioning

   ┌──────────────────┐          ┌──────────────────┐
   │ Preparatory tasks │          │  System Turn-up   │
   │     DLP- 001      │          │     DLP- 010      │
   └──────────────────┘          └──────────────────┘

   ┌──────────────────┐          ┌──────────────────┐
   │ Antenna  Installation │      │  Program the SIU   │
   │                   │          │ Using STMON for Windows │
   │ Wall Mount  DLP- 002 │       │     DLP- 010      │
   │ Pole Mount DLP- 003 │        └──────────────────┘
   └──────────────────┘

   ┌──────────────────┐          ┌──────────────────┐
   │ Drop Cable Installation │    │  Antenna Panning   │
   │     DLP- 004      │          │ And Test Measurements │
   └──────────────────┘          │     DLP- 010      │
                                 └──────────────────┘

   ┌──────────────────┐          ┌──────────────────┐
   │  SIU Installation │          │  Functional Tests  │
   │     DLP- 008      │          │     DLP- 012      │
   └──────────────────┘          └──────────────────┘

                                      (  END  )
```

Chart 5. N Series Installation and Commissioning

N Series Installation Check List.

Check site meets site selection criteria	q
Position and fix Antenna mounting bracket	q
Install Antenna	q
Fix Interface Unit to wall (unless free standing required)	q
Install power unit Type 5/6	q
Run drop cable	q
Plug connector into Antenna	q
Terminate the F-type drop cable connector at interface unit	q
Programme Interface Unit	q
Pan Antenna	q
Measure and record RSSI voltage on test form	q
Functional tests record result on test form	q
Clear and tidy site	q

8. M Series: Installation and Commissioning

```
┌─────────────────────────────────────────────────┐
│      M Series Installation and Commissioning      │
└─────────────────────────────────────────────────┘

        Installation              Commissioning

   ┌──────────────────┐      ┌──────────────────┐
   │ Preparatory tasks │      │  System Turn-up   │
   │    DLP- 001       │      │    DLP- 011       │
   └──────────────────┘      └──────────────────┘

   ┌──────────────────┐      ┌──────────────────┐
   │Antenna  Installation│    │  Program the SIU  │
   │                   │      │Using STMON for Windows│
   │Wall Mount  DLP- 002│     │    DLP- 011       │
   │Pole Mount DLP- 003 │     └──────────────────┘
   └──────────────────┘

   ┌──────────────────┐      ┌──────────────────┐
   │Drop Cable Installation│  │  Antenna Panning  │
   │    DLP- 004       │      │And Test Measurements│
   └──────────────────┘      │    DLP- 011       │
                             └──────────────────┘
   ┌──────────────────┐
   │Enclosure Installation│   ┌──────────────────┐
   │    DLP- 009       │      │ Functional Tests  │
   └──────────────────┘      │    DLP- 012       │
                             └──────────────────┘
   ┌──────────────────┐
   │Battery  Installation│          ( END )
   │    DLP- 009       │
   └──────────────────┘
```

8.1   M series Installation Check List.

Check site meets site selection criteria	q
Position and fix Antenna mounting bracket	q
Install Antenna(s)	q
Install Modular Enclosure	q
Install Interface Units	q
Install power Supply	q
Run drop cables	q
Plug connectors into Antennas	q
Terminate the F-type drop cable connectors at interface units	q
Connect batteries (if required)	q
Programme Interface Units	q
Pan Antennas	q
Measure and RSSI voltage on test form	q
Functional tests record result on test form	q
Clear and tidy site	q

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SECTION 2
INSTALLING R, S, N, L, B SERIES COMMON COMPONENTS

PREPARATORY TASKS.

1. Site Readiness

Task 1 involves verifying that your site is ready for the installation of the ST Equipment.

Check access to the building before unloading or unpacking the equipment.

2. Site Selection

The following factors should be taken into account to determine the installation position for the Antenna:

a) The Antenna should be installed as high as possible on the wall facing in the direction of the CT. Mounting height should normally be 5-7 metres above ground level.

b) Inspect the suitability of the wall structure for the installation position of the Antenna mounting.

c) Typical acceptable structures are:-

- Secure brick walls

- Concrete cladding covered Building Blocks

- Metal / Wooden pole, with suitable bracket.

d) For efficient and reliable service it is suggested that the external mounting location of the Antenna be chosen such that once 'panned' for optimum signal level it observes the following criteria:-

- Avoid aligning the Antenna directly toward an obstruction within a distance of 15 metres from the Antenna installation point.

- Avoid obstructions such as adjacent walls or overhanging roof eaves, within 15° in the horizontal plane and 30° in the vertical plane (see Figure 14).

- Ensure adequate clearance is allowed for 'panning' the Antenna.

- The Antenna is capable of being 'panned' with at least 15° of adjustment either side of the direction of the CT Antenna.

- Note: Trees exceeding a distance of 50 metres from the Antenna are considered ineffective to the units' performance.

These guidelines should not be violated during the Antenna panning process described in DLP-010/011.
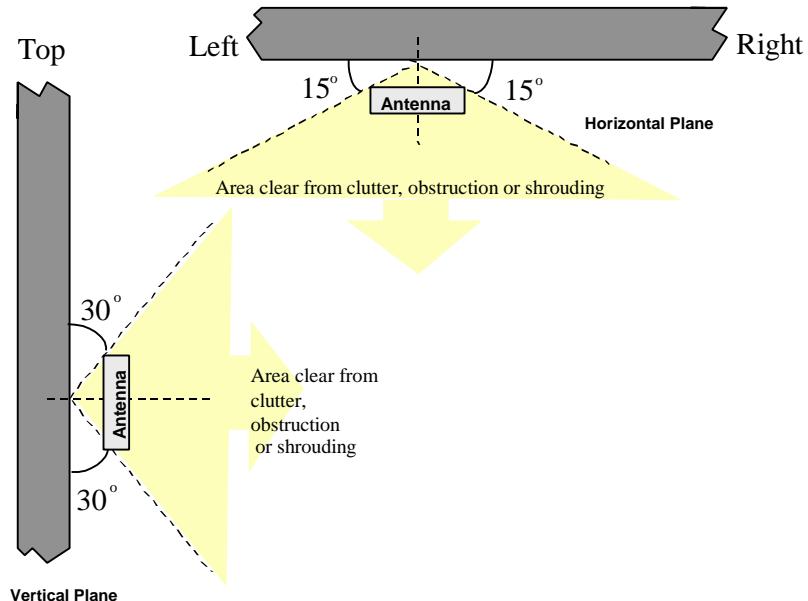
Figure 14. Antenna Positioning

Check how the drop cable is to enter the site and the internal drop cable run from the Antenna to the internal Service Interface Unit.

Before commencing with the installation, confirm with the customer the following:-

- Suitability of the Antenna position.

- Entry point of the Drop Cable to the site.

- Internal cable run from entry point to the Service Interface Unit.

3. Power Availability

Check with the customer the suitability of the Service Interface Unit position – Within 1 metres of the AC Power Point and within 50/100 metres of the Antenna (lengths of drop cable are 50 metres or 100 metres).

INSTALLING THE ANTENNA (WALL MOUNT).

Use this procedure to install the antenna. Before installing the Antenna check that the proposed position meets the site selection guidelines. See DLP 001

The Wall Mounting Kit comprises:

Item	Quantity	Use
Wall mounting Bracket	1	Fixed to Building
Wall Mounting Arm	1	Fixed to Antenna
M8 x 20mm Bolts	2	Pivot connecting Arm and Bracket
M8 Coiled Washer	2	
M8 Plain Washer	2	
M8 x 50mm Coach Bolt	4	Fixing to wood
M8 Plain Washer	4	
M6 Dyna Bolt	4	Fixing to brick/block
M6 x 16mm Bolts	4	Mounting antenna to arm
M6 Coiled Washer	4	
M6 Plain Washer	4	
Cable Tie	3	Securing IF Drop Cable

STEP   PROCEDURE

1. Antenna Positioning and Securing.

1. Confirm the position of the Antenna ensuring that there is no obstruction in front and to either side.

2. When multiple STs are deployed at the same site the recommended minimum spacing between each Antenna is 1 metre.

3. The Antenna mounting bracket should be fixed so that panning can take place in the horizontal plane (i.e. pivots top and bottom). Check that line of sight with CT antenna does not breach the deployment rules. (See DLP 002).

4. **Note:** Leave adequate clearance around the Antenna wall mounting assembly to allow for the full adjustment range when aligning the Antenna.

5. Locate the direction of the CT site using the survey information and decide if the Antenna is to hinge from the left or right to allow panning in the directions of the CT antenna. The same bracket is used for left or right hinge, Rotate the bracket to give the required orientation.

Bracket mounted to allow Panning in the direction of the CT

Right Hinge

Left Hinge

Direction of CT

Direction of CT
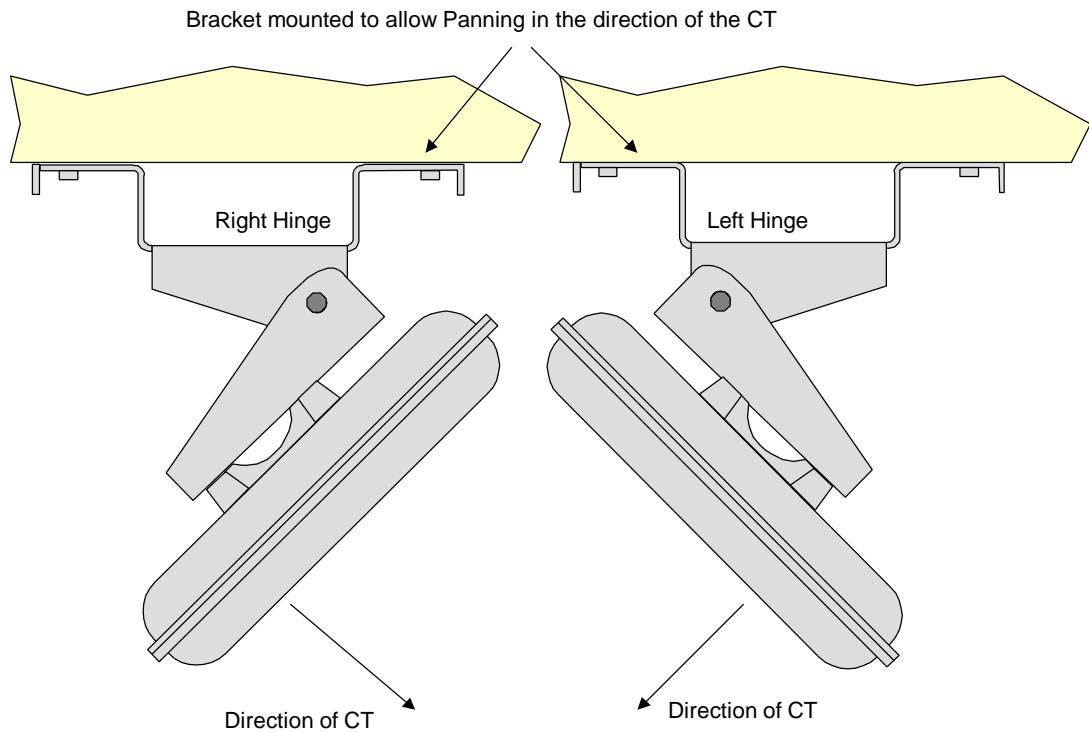
Figure 15 Antenna Bracket Orientation

168mm

125mm

116mm

186mm
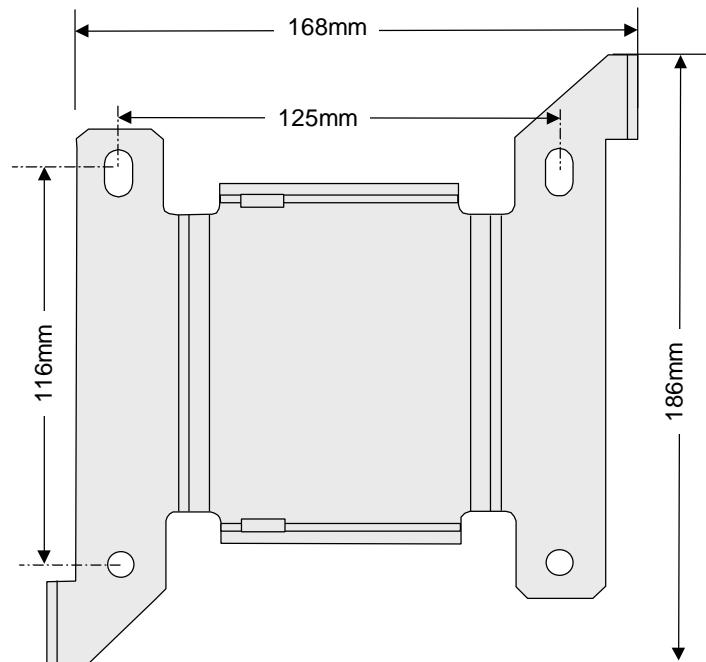
Figure 16. Antenna Wall Bracket Positioning and Securing

Securing Antenna Wall Bracket to wooden structure

1. Using the wall bracket as a template, mark the first hole position.

2. Drill a first hole pilot, 5mm diameter to a depth of 15mm (use a drilling depth gauge), place the mounting bracket on the wall with the pivot hinge set for correct panning. Screw the M8 Coach Bolt provided through the mounting bracket into the hole. Tighten sufficiently to secure the bracket to the wall.

3. Using a spirit level, adjust the position of the wall bracket and mark the remaining 3 holes.

4. Drill the remaining pilot holes, 5mm diameter to a depth of 15mm, then fit the Hex Head M8 Coach Bolts provided through the mounting bracket into the holes.

5. Tighten all the bolts sufficient to ensure a firm fixing to the wall.

Securing Antenna Wall Bracket to brick/block structure

1. Using the wall bracket as a template, mark the first hole position. Where the Antenna is to be mounted to a brick built building, try to ensure that each hole coincides with the middle of a brick and not the mortar course.

2. Drill the first hole, 8mm diameter to a depth of 45mm (use a drilling depth gauge), place the mounting bracket on the wall and then fit the Hex Head M6 Dyna Bolt provided through the mounting bracket into the hole. Tighten sufficiently to secure the bracket to the wall.

3. Using a spirit level, adjust the position of the wall bracket and mark the remaining three holes.

4. Drill the remaining holes, 8mm diameter to a depth of 45mm, then fit the Hex Head M6 Dyna Bolt provided through the mounting bracket into the hole.

5. Tighten all the bolts sufficient to ensure a firm fixing to the wall.

M8 x 70mm Coach Bolt and plain washer
or
M6 x 45mm Dyna-Bolt
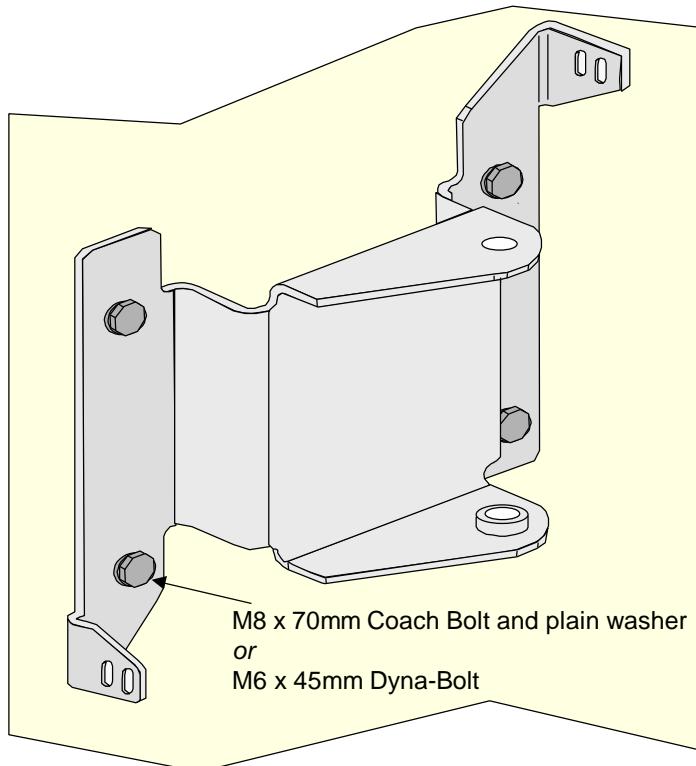
Figure 17. Fixed wall mounting bracket

Assembling Arm and Bracket

1. If the Antenna is to be fed with the T10 cable it is necessary to fit extension adapters between the bracket and the antenna to accommodate the larger bend radius of the cable. Four extension pieces are needed. Screw the extension pieces into the Antenna housing and tighten the adapter to a torque of 4Nm.

Extension Adapters for Bracket mounted antenna when using T10 cable
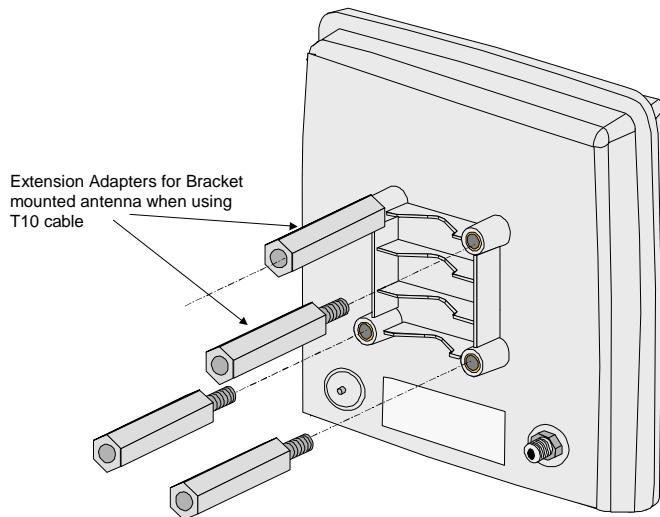
Figure 18. Extension adapters for use with T10 drop cable.

2. Secure the Antenna Radium (with extension if fitted) to the Antenna mounting bracket using four M6*20mm Hex Head Set Screws, 6mm Flat and 6mm Coiled Washers as shown in Figure 17. Tighten the Set Screws to a torque of 4Nm.

3. Join the two halves of the bracket together using a bolt, spring washer, and plain washer to top and bottom pivots.
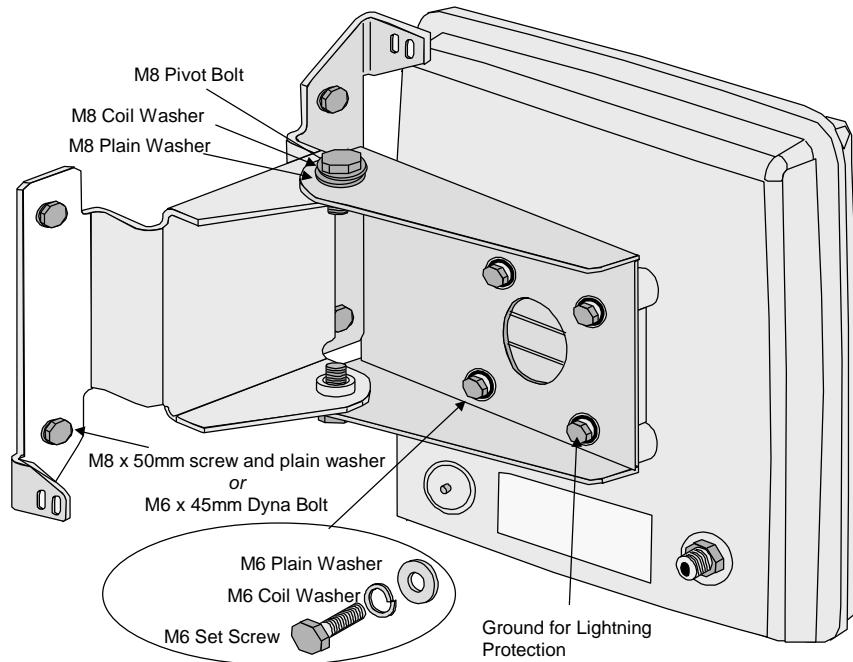
Figure 19. Wall Mounted Antenna (used for T6 cable)

4. Rotate the Antenna to face in the general direction of the CT. At this stage, only finger tighten the pivot bolts.

2. Lightning Protection

1. When the antenna is attached to two / three floor dwellings lightning protection should not be needed. If the Antenna is situated in an exposed position i.e on the top of a multi-storey building the antenna should be grounded.

2. Run a 6mm stranded copper cable from the Antenna to a protection earth point i.e building earth halo or earth provided specifically for lightning protection.

3. Secure the cable to the pole using straps and cleats as required

4. Fit a 6mm lug to the cable at the antenna end. Attach to the pole mount bracket using the lower right M6 set screw as shown in Figure 20.

5. Connect to the earth point in accordance with local practice.

6mm Stranded Copper Cable

Ground for Lightning Protection 6mm Lug

Strap

M6 Lug
M6 Plain Washer
M6 Coil Washer
M6 Set Screw
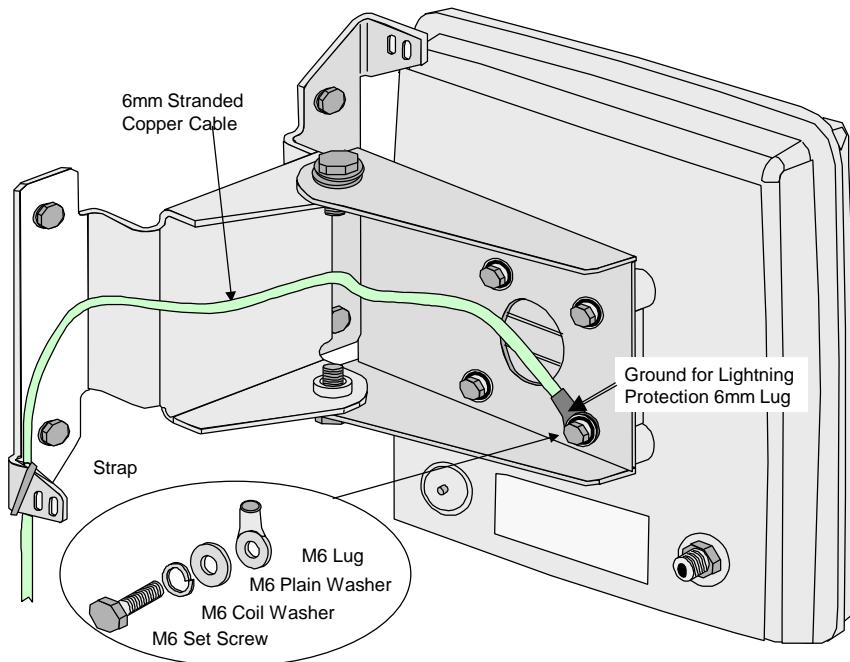
Figure 20. Lightning Protection for Exposed Bracket Mounted Antenna

STOP. THIS PROCEDURE HAS BEEN COMPLETED.

INSTALLING THE ANTENNA (POLE MOUNT).

Use this procedure to install the antenna. The mounting pole is not an Airspan supplied item and the pole should be manufactured to suit local requirements. Before installing the Antenna check that the proposed position meets the site selection guidelines. See DLP 001

The Pole Mounting Kit comprises:

Item	Quantity
Pole Bracket	1
M6 x 50mm Bolts	4
M6 Coiled Washer	4
M6 Plain Washer	4
Cable Tie	3

STEP   **PROCEDURE**

1. Antenna Positioning and Securing.

1. Confirm the position of the Antenna ensuring that there is no obstruction in front and to either side.

2. When multiple STs are deployed at the same site the recommended minimum spacing between each Antenna is 1 metre.

3. The Antenna Mounting Pole should be fixed so that antenna panning can take place in the horizontal plane and check that line of sight with CT antenna does not breach the deployment rules. (see DLP 001). The Antenna Mounting Pole is locally provided and should be 38mm or 1.5" in diameter. The Pole should be fixed according to the pole manufacturers' instructions.

4. **Note:** Leave adequate clearance around the Antenna assembly to allow for the full adjustment range when aligning the Antenna.

5. Secure the Antenna Radium to the mounting pole using the pole bracket secured by four M6*20mm Hex Head Set Screws, 6mm Flat, and 6mm Coiled washers as shown in Figure 21. Tighten the Set Screws to a torque of 4Nm

6. Rotate the Antenna to face in the general direction of the CT. At this stage, only tighten the pivot bolts sufficient to stop the antenna sliding down the pole.
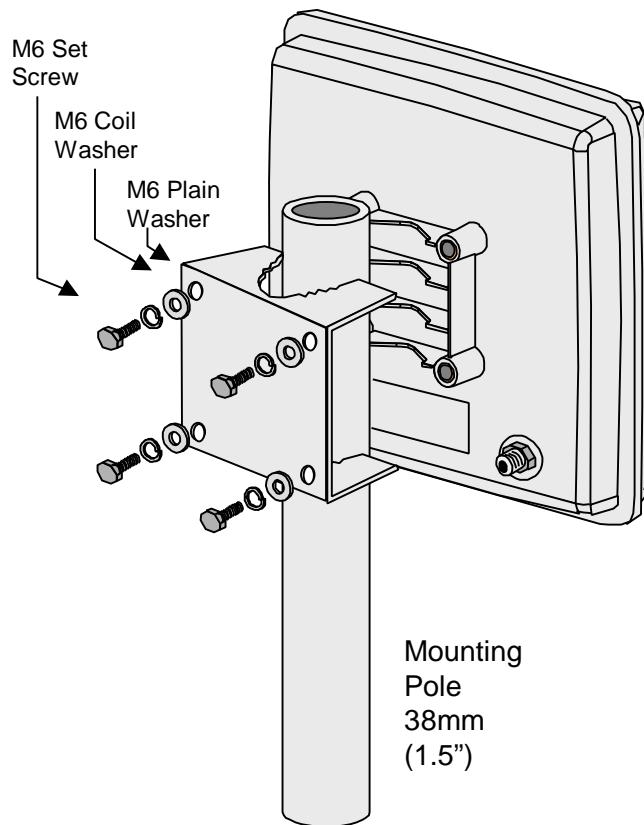
Figure 21. Antenna Pole-mount Positioning and Securing

2. Lightning Protection

1. When the antenna is attached to two / three floor dwellings lightning protection should not be needed. If the Antenna is situated in an exposed position i.e on the top of a multi-storey building the antenna should be grounded.

2. Run a 6mm stranded copper cable from the Antenna to a protection earth point i.e building earth halo or earth provided specifically for lightning protection.

3. Secure the cable to the pole using straps and cleats as required

4. Fit a 6mm lug to the cable at the antenna end. Attach to the pole mount bracket using the lower right M6 set screw as shown in Figure 22

5. Connect to the earth point in accordance with local practice.
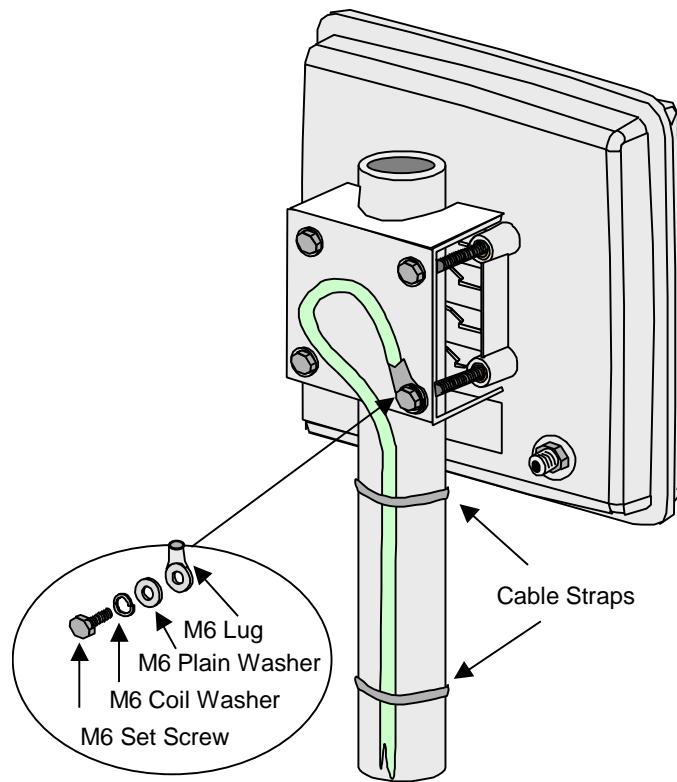
Figure 22 Lightning Protection for Exposed Pole Mounted Antenna

STOP. THIS PROCEDURE HAS BEEN COMPLETED.

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IF DROP CABLE INSTALLATION.

Drop cable is provided in two types T6 and T10. Use this procedure to install the Drop cable.

STEP	PROCEDURE

1. Drop cable installation

1. The Drop Cable is normally provided with one end already terminated with an weather proofed F-Type connector for use at the Antenna. The cable is manufactured in three lengths (25, 50 and 75metres) and an appropriate length should be selected. In some circumstances cable is provided on 300metre drums and both ends of the cable are terminated during installation.

2. If the drop is not pre-terminated and requires an F type terminating at the Antenna end. It is suggested that the F-Type connector is terminated to the free end of the cable before running the cable. See Section 2 of this DLP for Drop cable Termination (Type T6) or 3 Drop cable Termination (Type T10)

3. The cable is installed starting from the Antenna end leaving the free end of the cable to be finally dressed into place and cut to length for neat connection with the power supply unit.

4. Run the drop cable from the Antenna end to the F-Type connector to the Service Interface Unit..

5. The maximum drop cable distance between the Service Interface Unit and the Antenna must not exceed the length of the drop cable (50or 100 metres).

6. The T6 cable has a minimum bend radius of 70mm. The T10 cable has a minimum bend radius of 100 mm

7. Secure the drop cable to the Antenna Mounting Bracket or Pole using straps. Leave sufficient slack to allow for antenna panning at the commissioning stage.

8. Secure along the drop with 7mm cleats as required. Ensure that a drip loop is formed at the point where the cable enters the building to avoid the ingress of water into the building.

9. Plug the F-Type connector into the connector on the rear plate of the Antenna. Important Notice: Care should be taken when screwing the F-Type connector into the connector on the rear plate of the Antenna to ensure that the connector is not over-tightened as over-tightening will strip the thread. Use a torque spanner set to 2.3Nm. See Figure 23 for pole mount and Figure 24 for wall mount.

10. Wrap self amalgamating tape over the joint of the mated connector. When using self amalgamating tape, strip back the interleaving and stretch the tape by between one third and one half. Keep the tape under tension and wrap, overlapping successive layers by 50% until the desired build up of insulation is achieved. Finish the wrapping by holding the tape under the thumb and snap by stretching. The high degree of stretch as described above prevents the inclusion of voids and ensures rapid amalgamation.

11. Run cable end up to the Service Interface Unit. Estimate the length of end required for termination of cable (allow 150mm of conductor for a maintenance re-termination of cable) and cut cable to length.
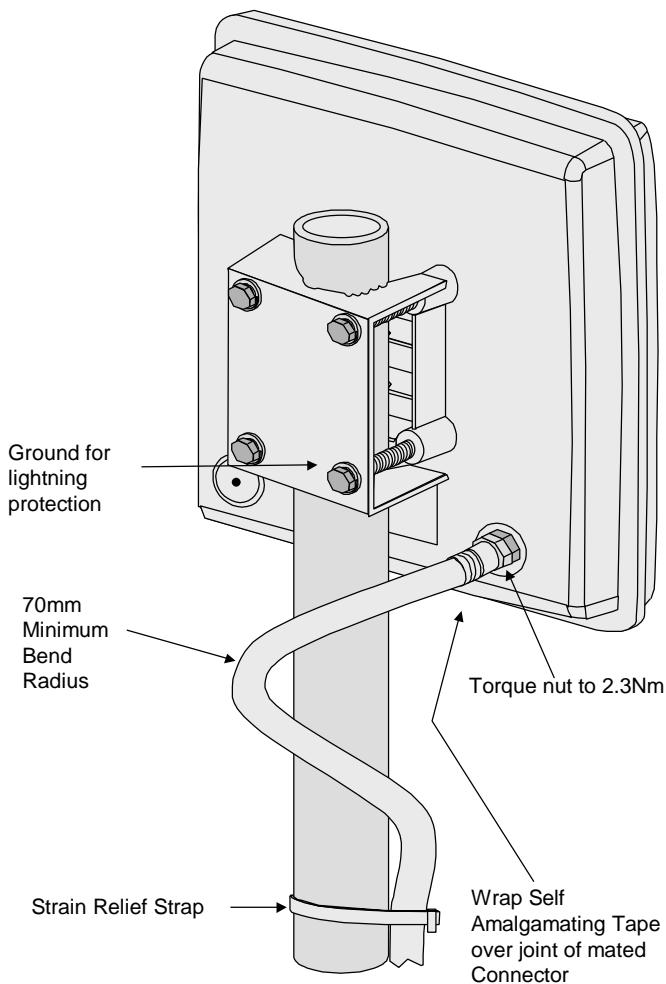
Figure 23. Antenna and Drop Cable fixed to a Mounting Pole

Ensure minimum bend radius (100mm) is not exceeded

Strain Relief Strap.

Wrap Self Amalgamating Tape over joint of mated Connector
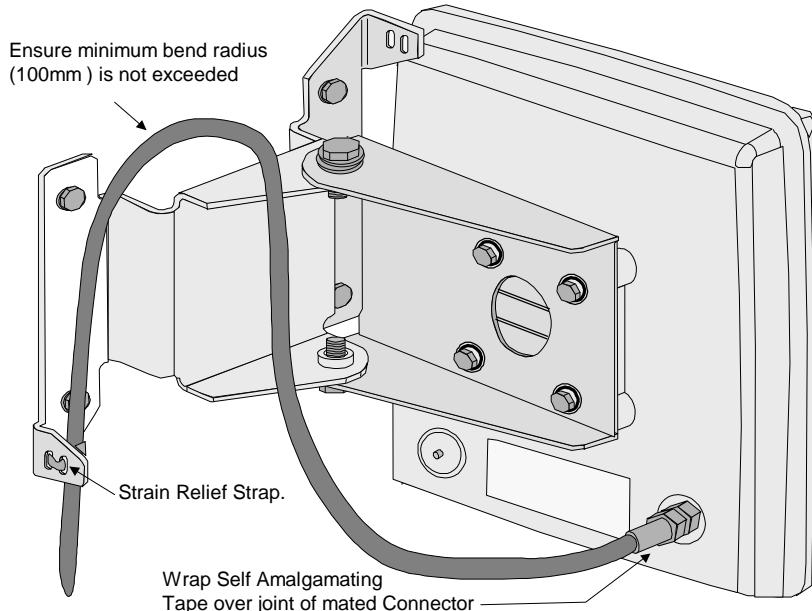
Figure 24. Antenna and Drop Cable fixed to a Wall Mounting Bracket

2. Drop cable Termination (Type T6) at the SIU

1. Strip the Drop Cable using a knife or cable stripping tool to the dimensions shown in Figure 25.

2. Place the connector over the cable end ensuring that the inner sleeve passes between the inner core and screen braid

3. Crimp the connector using the Amphenol 531-CR596R Crimp tool.

6.4mm (1/4")   6.4mm (1/4")

Trim cable to these dimensions

F-Type Connector

12.7mm (1/2")

Note: the inner sleeve passes between the screen braid and core insulator

7/16" HEX

Crimp here using Amphenol 531-CR596R Crimp Tool
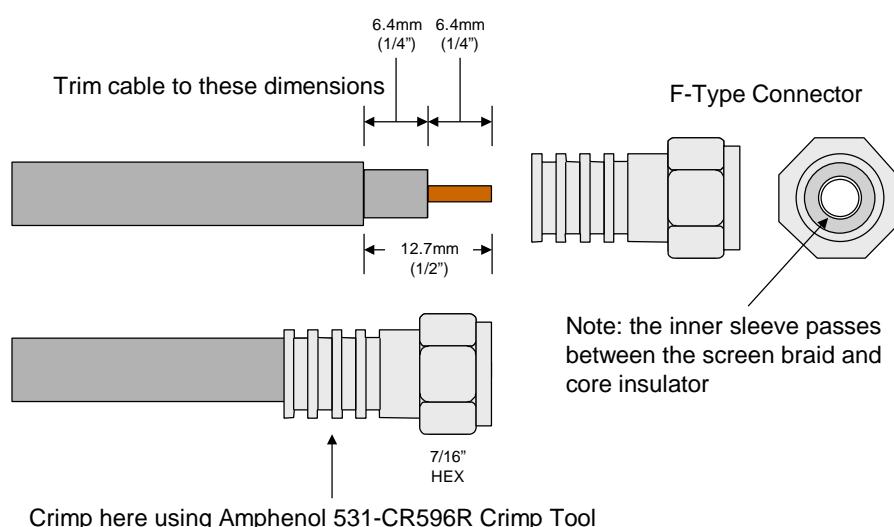
Figure 25. Terminating F-Type Connectors to T6 cable

3. Drop cable Termination Type T10 at the SIU

1. Strip the Drop Cable using a knife or cable stripping tool to the dimensions shown in Figure 26

2. Fold back the braid against the cable sheath.

3. Ensure that the centre conductor is clean of dielectric residue. Push the crimp pin over the end of the centre conductor until the pin bottoms against the dielectric, then crimp the pin to the centre conductor with the 0.96 Hex crimp on the Airspan 212-8000-058 Crimp tool.

4. Insert the cable into the connector ensuring the pin is through the hole of the insulator at the bottom of the nut. Continue inserting the cable into the connector until it bottoms out. Crimp the Connector with the 0.475 Hex crimp to retain the cable.
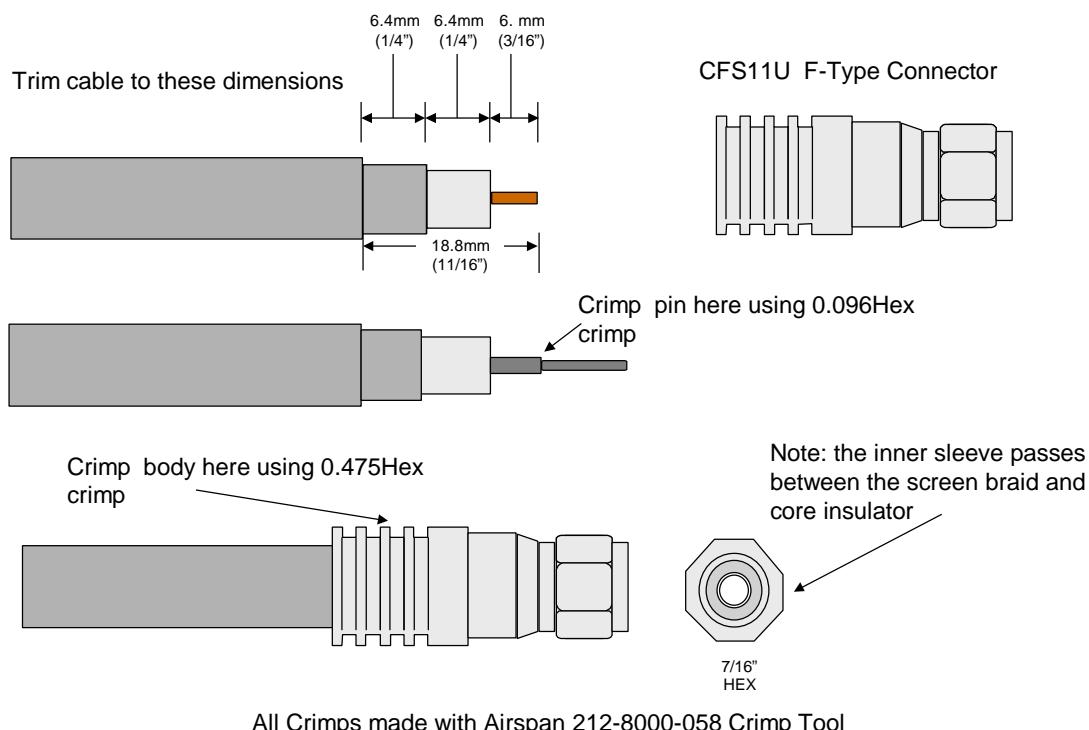
Figure 26. Terminating F-Type Connectors to T10 cable

INSTALLING THE TYPE-5 PSU.

The Type 5 PSU is used with the B, L and N series SIUs when battery backup is required. The Type 5 PSU consists of a PSU and battery charger with standby battery.

STEP	PROCEDURE

1. PSU (Type 5) Positioning and Securing

1. Confirm the position of the Type-5 PSU, allow for adequate ventilation and service access.

2. **Note:** The life of the battery within the Type-5 PSU will be increased in a low temperature, but standby time is improved in a warm environment. Ideally the location should be cool, as the electronics within the unit will keep it warm enough to ensure a good standby period.

3. Install the Type 5 PSU within 2 metres of an AC power point and 1 metre of the SIU.

4. Remove the PSU front cover. Offer the PSU up into position and mark the three fixing positions onto the wall. The PSU should be fitted with the battery at the top and the mains input connector at the bottom. (See Figure 28).

5. Drill the 3 holes, 8mm. Diameter to a depth of 50mm. (use a depth gauge) and then fit the FUB x 50mm Wall Plugs (Part No 128-0000-123) provided.

6. Secure the PSU squarely in position using the No 8 x 50mm screws (Part No 174-0815-002) and cup washers (Part No 192-0080-230) provided.

7. Install the batteries.

Note: Do not connect the batteries until instructed to do so at the commissioning stage.
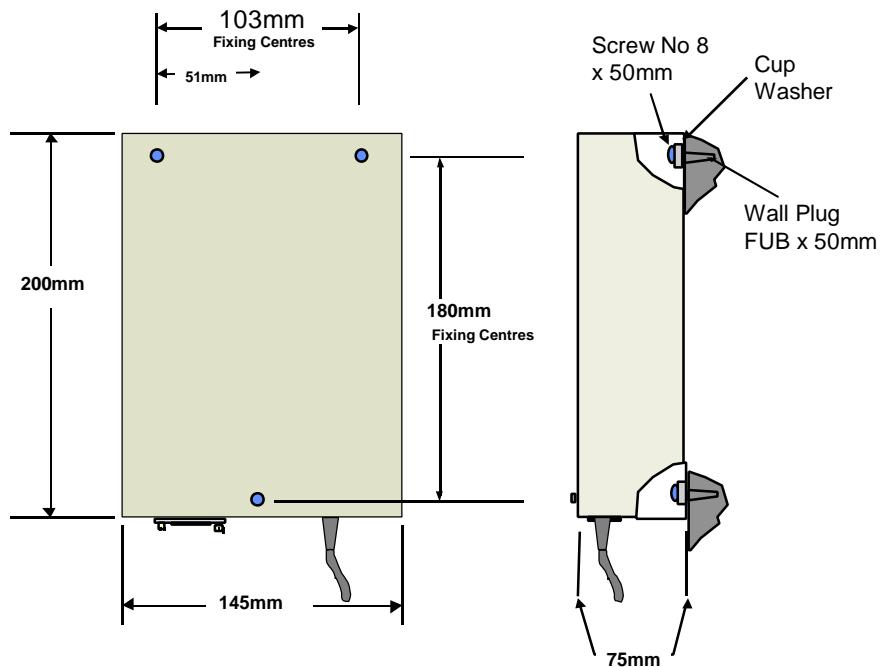
Figure 27. PSU Positioning and Securing
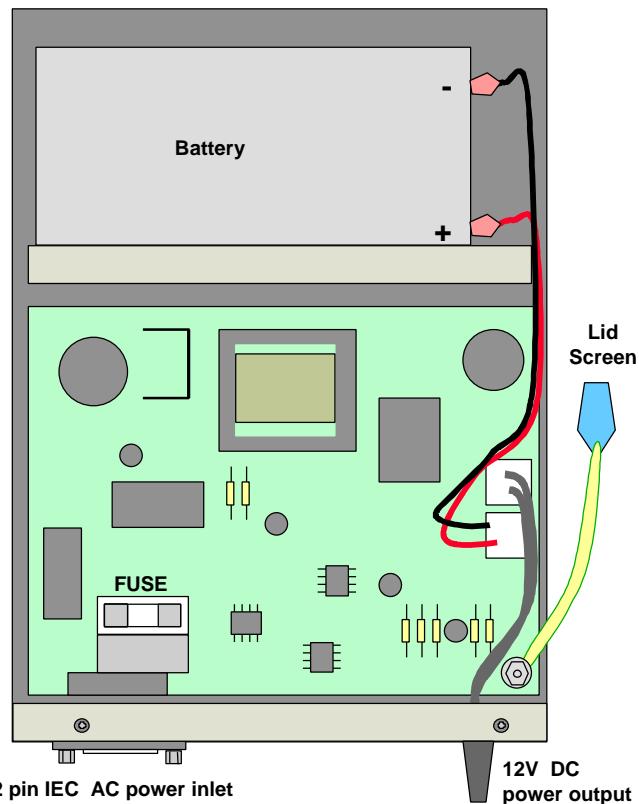
Figure 28. AC Power Supply Unit (Cover Removed).

1.1 AC Power Cord Installation

1. Use a supply cord fitted with a mains plug in accordance with local requirements. Plug the AC supply cord into the IEC connector on the Type-5 PSU and secure with retaining clip.

Note. Do not connect the plug to the supply socket until instructed to by the Commissioning Test Procedure.

CAUTION: Risk of electric shock Disconnect mains before opening

WARNING: Do not Remove Cover
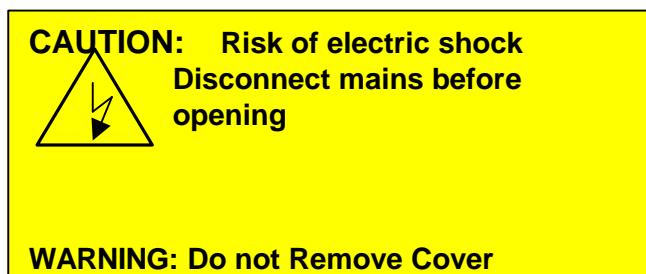
2. If the SIU is not to be commissioned immediately after installation then do not connect battery until commissioning is about to take place. If the unit is to be commissioned at this time. Place the spade connectors onto the battery terminals in the following order:

   a) Black lead to –ve terminal

   b) Red lead to +ve Terminal

3. Connect the screen wire to the lid. Fit the cover to the PSU securing with the two screws at the base of the cover.

1.2 PSU earthing

1. **Note:** The Type-5 PSU is double insulated.

Safety: Battery Handling

Care should be taken when handling lead acid batteries to avoid dropping or short circuiting them. Disposal should be in line with local codes. Batteries may explode if put into a fire. Install the batteries in the PSU first, then connect them taking care to observe correct polarity.
Connect red lead to the +ve terminal and the black lead to the –ve terminal.

1.3 PSU Labelling

If the PSU has been provided with a customer specific logo label, stick the label in the top left hand corner of the front of the case as shown.
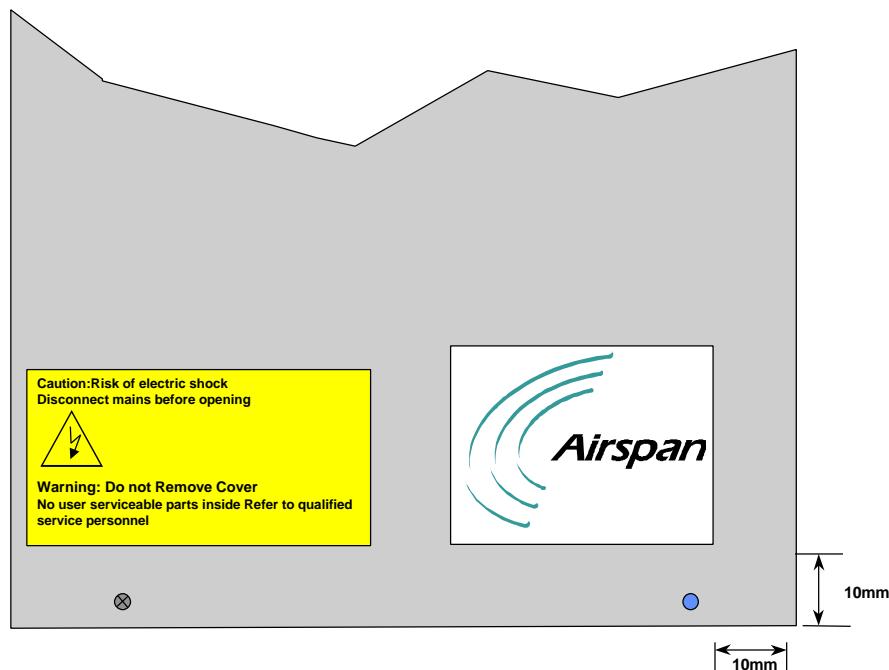
Figure 29. Customer Logo Placement

STOP. THIS PROCEDURE HAS BEEN COMPLETED

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SECTION 3:
INSTALLING THE R SERIES SERVICE INTERFACE UNIT AND PSU.

The R series Service Interface Unit can be used as a free standing desk unit or wall mounted to the customers' preference.
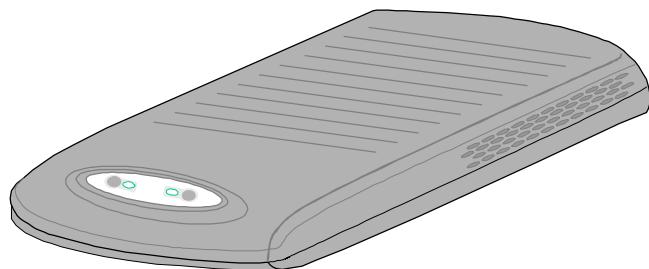
Figure 30 The R series Service Interface Unit

STEP   **PROCEDURE**

2. Installing The R series Service Interface Unit

1. Install the R series Service Interface Unit within 1 metre of an AC power point and 50 metres of the Antenna. (100 metres if using 100m drop cabling).

2. Confirm the position of the Service Interface Unit (allow for adequate ventilation and service access).
    Note: The life of the batteries within the Service Interface Unit will be increased in a low temperature, but standby time is improved in a warm environment. Ideally the location should be cool, as the electronics within the unit will keep it warm enough to ensure a good standby period.

2.1 Wall Mounting the Service Interface Unit

1. The wall mounted unit fits

Figure 31. Service Interface Unit Wall Mounting Bracket

2. Install the Service Interface Unit within 1 metres of an AC power point and 50 metres of the Antenna. (100 metres if using 100m drop cable).

3. Offer the Wall Mounting Bracket up into position and mark the three fixing positions onto the wall. The Wall Mounting Bracket should be fitted with the location lugs pointing upward.
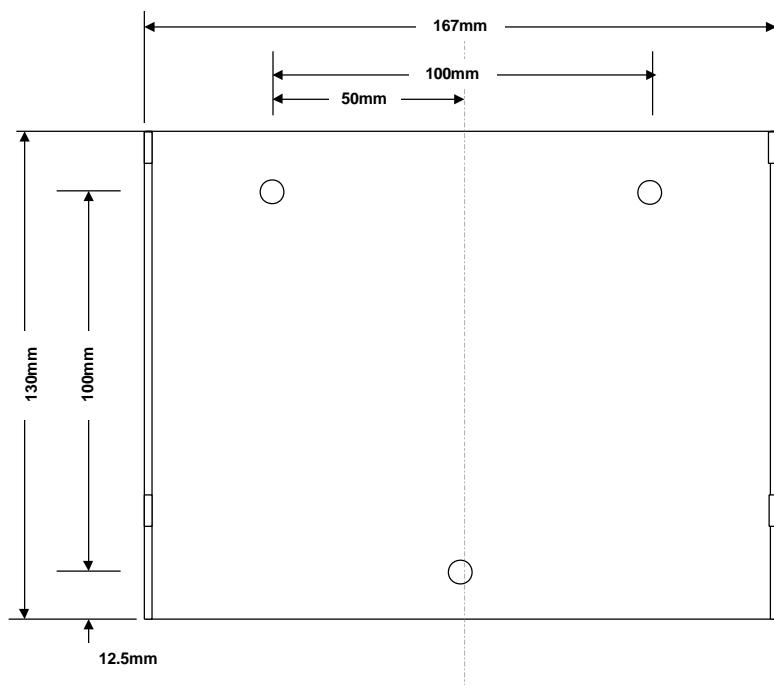
Figure 32. Service Interface Unit Positioning

4. Drill the 3 holes, 8mm. Diameter to a depth of 50mm. (use a depth gauge) and then fit the FUB x 50mm Wall Plugs (Part No 128-0000-123) provided.

5. Secure the Wall Mounting Bracket squarely in position using the No 8 x 50mm screws (Part No 174-0815-002) and cup washers (Part No 192-0080-230) provided.

6. Remove the battery compartment lid by undoing the retention screw. Fit the standby battery as shown in Figure 33. Connect the battery to the spade terminals ensuring the correct polarity. Replace and secure the lid.

Battery Compartment Lid
Retention Screw

Battery
Terminals
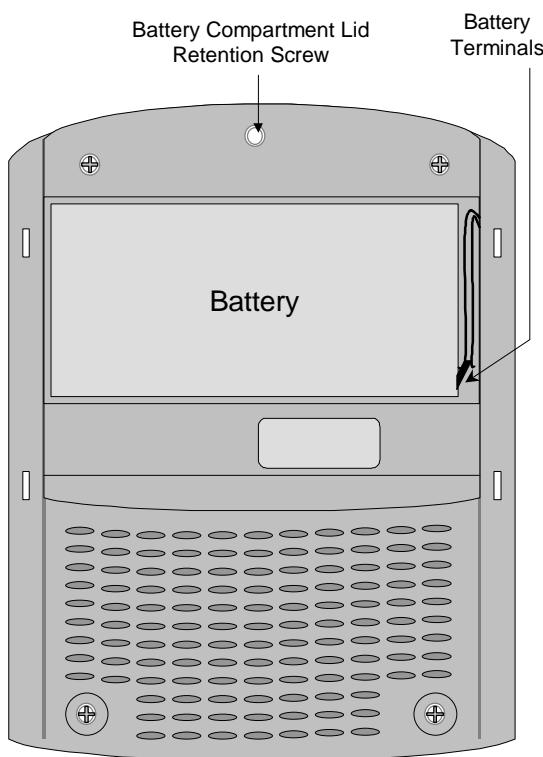
Battery

Figure 33. R Series Service Interface Unit Battery Compartment

7. Attach the Service Interface Unit to the mounting bracket by locating the bracket lugs in the mounting slots cut into the Service Interface Unit. The interface connection panel should be at the bottom. Pull down to lock into position. See Figure 35.

2.2   Connecting the Drop cable and PSU

1. Plug the F-Type connector into the F-Type connector on the Service Interface Unit. Important Notice: Care should be taken when screwing the F-Type connector into the connector on the rear plate of the Antenna to ensure that the

connector is not over-tightened as over-tightening will strip the thread. Use a torque spanner set to 2.3Nm (20in lb).

2. Plug the PSU into the wall socket using the appropriate socket adapter and plug the DC output into the Service Interface Unit.
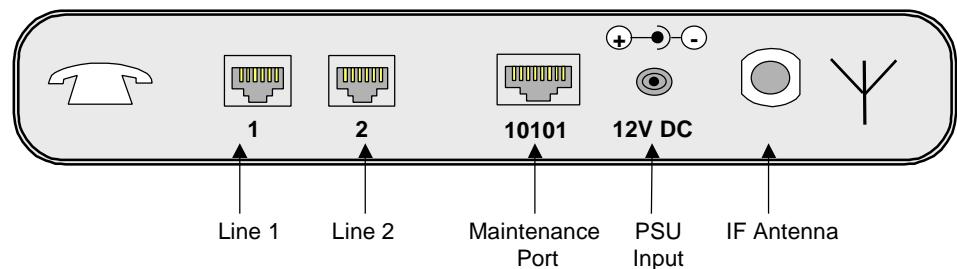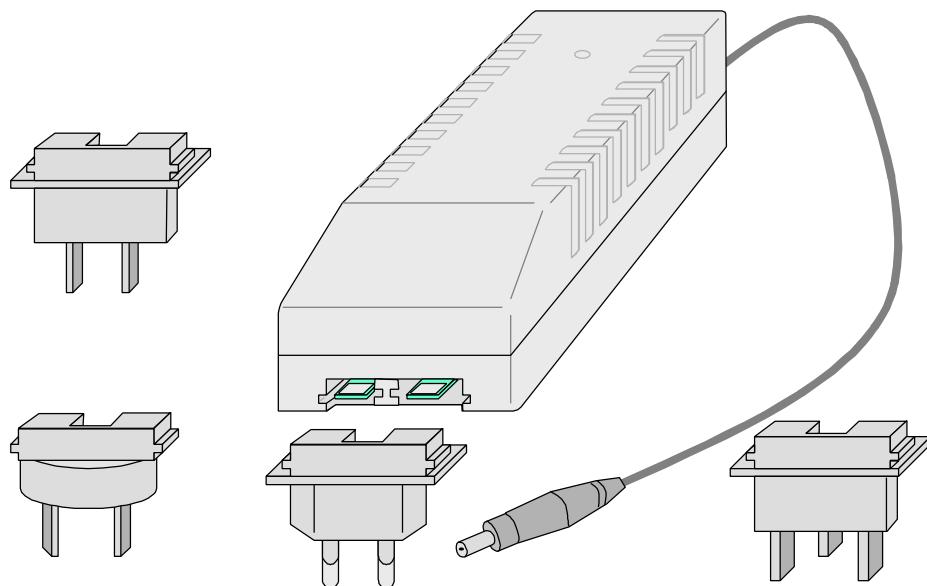
Figure 34. R2 Rear Panel

3. Fit Fair-Rite clip on ferrite cores to all cables connected to the unit. The PSU and Telephone cables should loop round the ferrite core with a single loop. The Drop Cable passes through the Ferrite without a loop. The ferrites should be fitted 2 cm from the connector
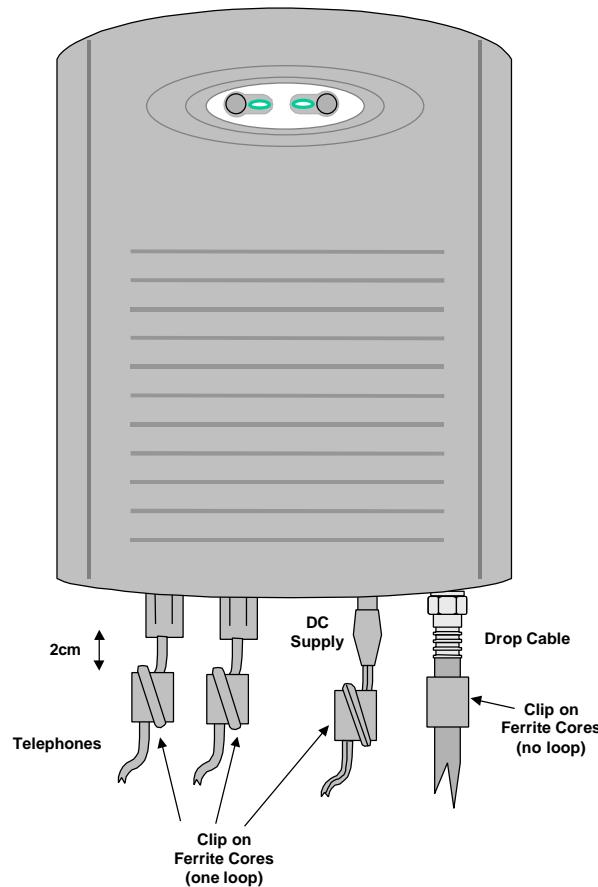
Figure 35. The R Series Service Interface Unit in the Wall Mount position

2.3   Indications and Interfaces

1. The front panel displays the following LED's:

   - **Power:** Indicates power OK

   - **Link:** Illuminated when the link is active.

2. The RJ45 interface is used for the STMON connection and RJ11 for the phone interface
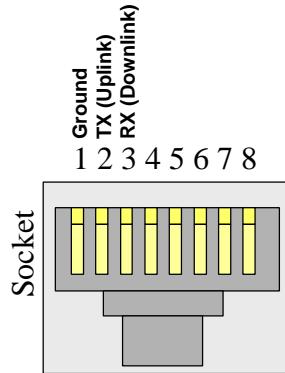
Figure 36. RJ45 Management Port
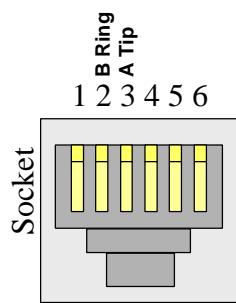
Figure 37. RJ11 Phone port

SECTION 4:
INSTALLING THE SU1/2 SERVICE INTERFACE UNIT.

The S series Service Interface Unit is wall mounted.
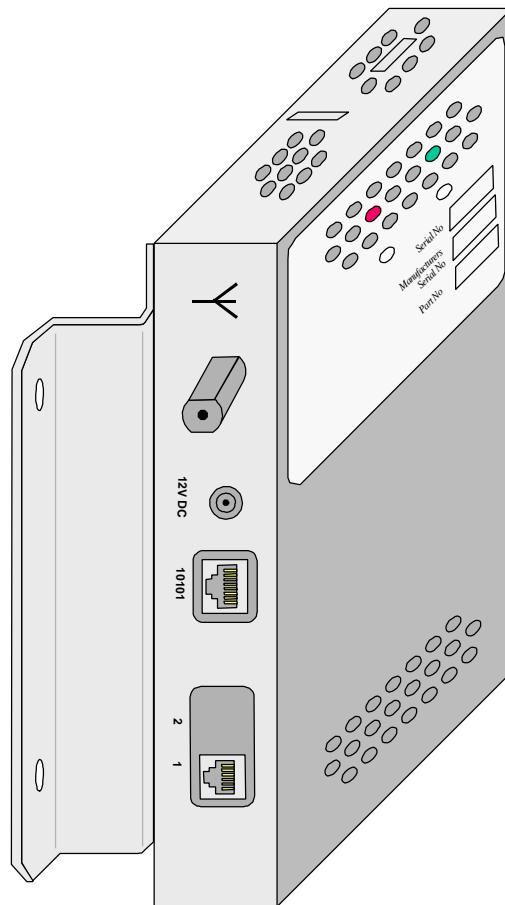
Figure 38. S Series Service Interface Unit

STEP	PROCEDURE

1. Installing The R series Service Interface Unit

1. Install the S series Service Interface Unit within 1 metre of an AC power point and 50 metres of the Antenna. (100 metres if using 100m drop cabling).

2. Confirm the position of the Service Interface Unit (allow for adequate ventilation and service access).

3. Offer the Service Interface Unit up into position and mark the four fixing positions onto the wall.
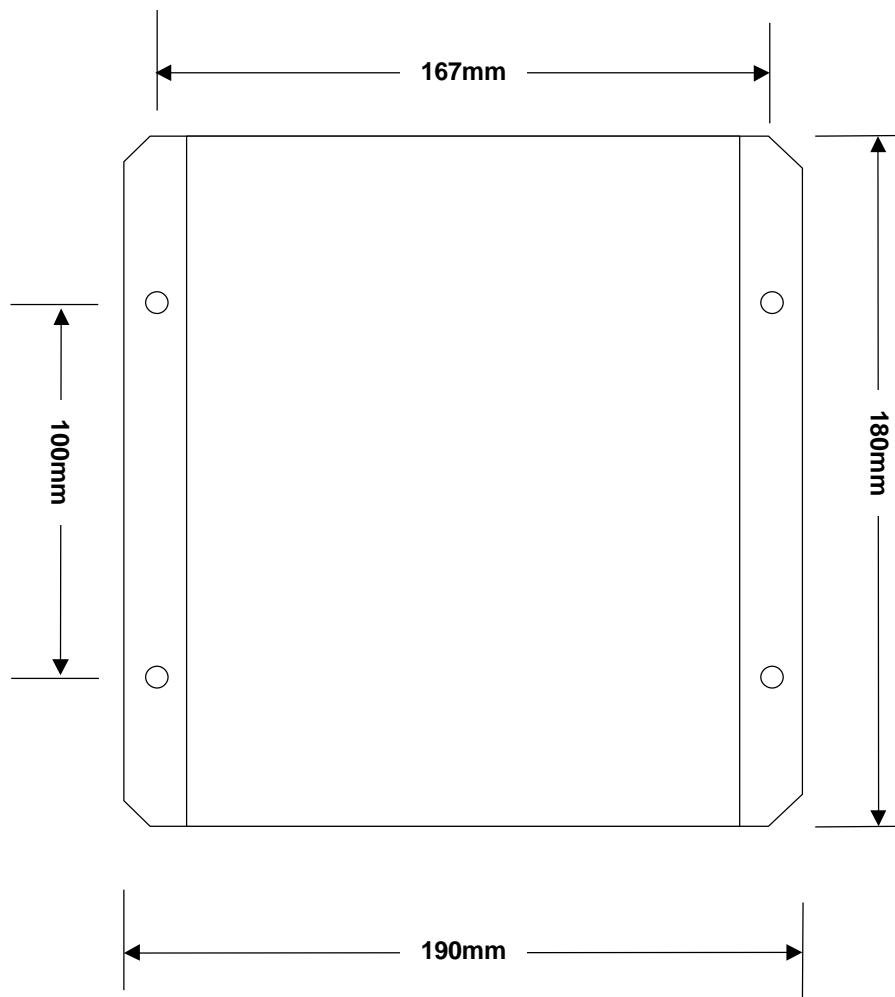
Figure 39 Service Interface Unit Positioning

4. Drill the four holes, 8mm. Diameter to a depth of 50mm. (use a depth gauge) and then fit the FUB x 50mm Wall Plugs (Part No 128-0000-123) provided.

5. Secure the Wall Mounting Bracket squarely in position using the No 8 x 50mm screws (Part No 174-0815-002) and cup washers (Part No 192-0080-230) provided.

1.1   Connecting the Drop cable and PSU

1. Plug the F-Type connector into the F-Type connector on the Service Interface Unit. Important Notice: Care should be taken when screwing the F-Type connector into the connector on the rear plate of the Antenna to ensure that the connector is not over-tightened as over-tightening will strip the thread. Use a torque spanner set to 2.3Nm (20in lb).

2. Plug the PSU into the wall socket using the appropriate socket adapter and plug the DC output into the Service Interface Unit.
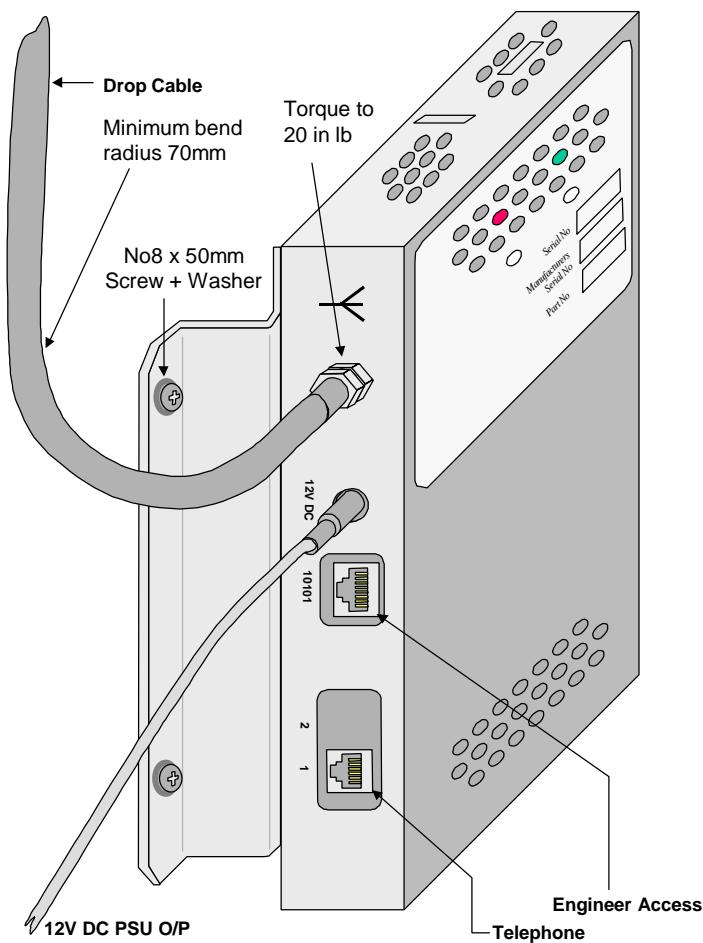
Figure 40. S Series Service Interface Unit (installed)

Indications and Interfaces

1.2 Indications and Interfaces

1. The front panel displays the following LED's:

   - **Power:** Indicates power OK

   - **Link:** Illuminated when the link is active.

2. The RJ45 interface is used for the STMON connection and RJ11 for the phone interface
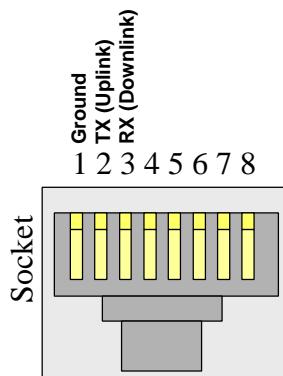
Figure 41. RJ45 Management Port
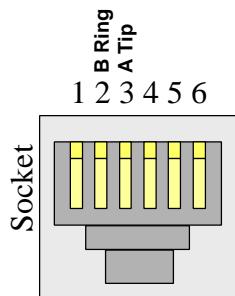
Figure 42. RJ11 Phone port

SECTION 5:
INSTALLING THE B, L & N SERIES SERVICE INTERFACE UNIT

The B, L, & N series Service Interface Units can be used as a free standing desk unit or wall mounted to the customers' preference. These units are also installed in the Modular Enclosure. (See section 6).
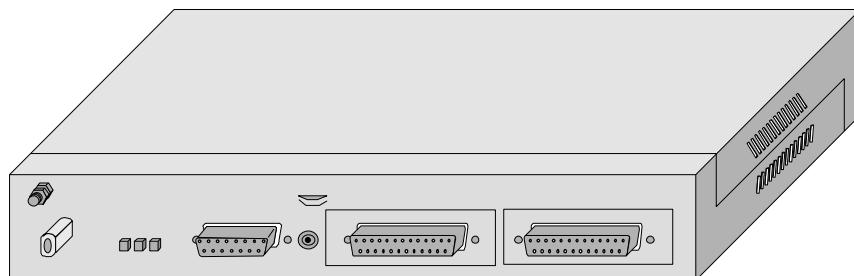
Figure 43. L Series Service Interface Unit
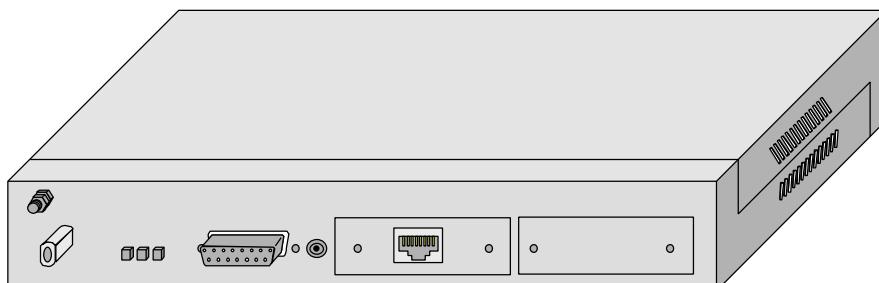
Figure 44. B Series Service Interface Unit
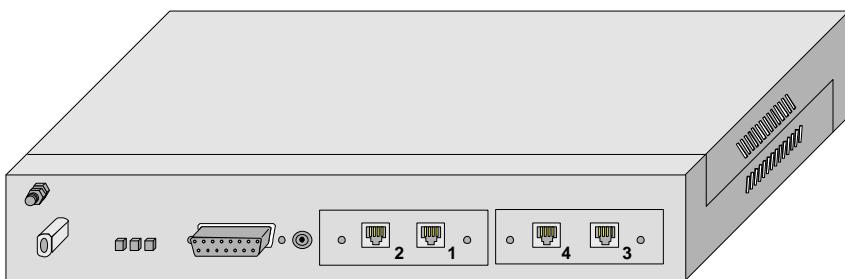
Figure 45. N Series Service Interface Unit

Note: The user ports in Figure 45 number 2,1,4,3 from left to right.

STEP   **PROCEDURE**

2. Installation

1. Install the Service Interface Unit within 1 metre of an AC power point and 50 metres of the Antenna. (100 metres if using 100m drop cabling).

2. Confirm the position of the Service Interface Unit (allow for adequate ventilation and service access). Ensure that the drop cable can be attached without compromising the minimum bend radius.

3. Wall Mounting the Service Interface Unit

1. The wall mounted unit fits
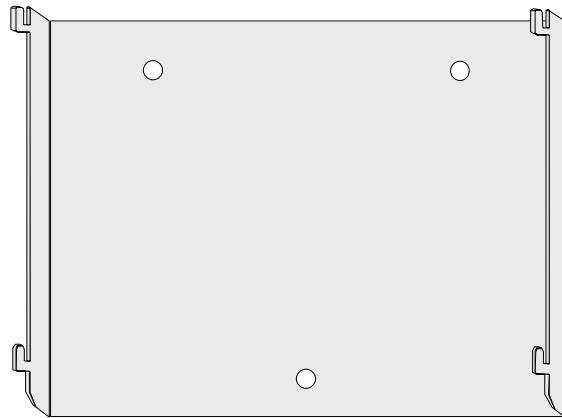
Figure 46. Service Interface Unit Wall Mounting Bracket

2. Install the Service Interface Unit within 1 metres of an AC power point and 50 metres of the Antenna. (100 metres if using 100m drop cable).

3. Offer the Wall Mounting Bracket up into position and mark the three fixing positions onto the wall. The Wall Mounting Bracket should be fitted with the location lugs pointing upward.
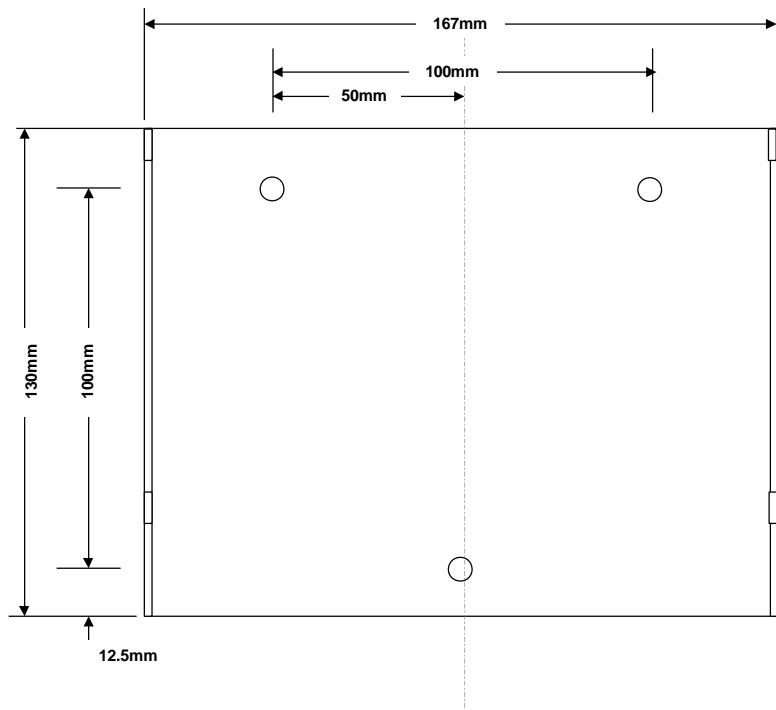
Figure 47. Service Interface Unit Positioning

4.   Drill the 3 holes, 8mm. Diameter to a depth of 50mm. (use a depth gauge) and then fit the FUB x 50mm Wall Plugs (Part No 128-0000-123) provided.

5.   Secure the Wall Mounting Bracket squarely in position using the No 8 x 50mm screws (Part No 174-0815-002) and cup washers (Part No 192-0080-230) provided.

6.   The bracket lugs fit into the mounting slots cut into the Service Interface Unit. The interface connection panel should be at the bottom. Pull down to lock into position. See Figure 35.

7.   Plug the F-Type connector into the F-Type connector on the Service Interface Unit. Important Notice: Care should be taken when screwing the F-Type connector into the connector on the rear plate of the Antenna to ensure that the connector is not over-tightened as over-tightening will strip the thread. Use a torque spanner set to 2.3Nm (20in lb).

8.   Plug the PSU into the wall socket using the appropriate socket adapter. And plug the DC output into the Service Interface Unit.

4. Front Panel Display

1. The front panel displays the following LED's:

- **Power:** Indicates power OK

- **Aux** 1: Not defined at present. Illuminates when activity present on the LAT

- **Link:** Illuminated when the link is active.

5. Interfaces

5.1   Management Port (15 way D-type)
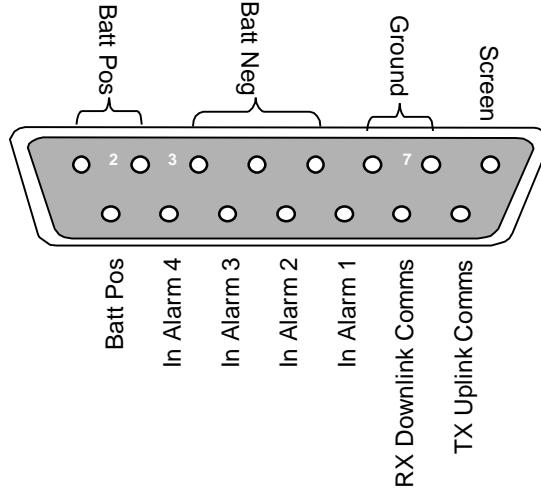
5.2   N Series Customer Interface
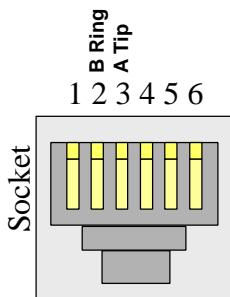
Figure 48. RJ11 Phone port

5.3 B Series Customer Interface (EIA 530)

Pin No	Circuit	CCITT No	Name	Direction
1	Sheild			To DCE
2	BA	103	Transmit Data	From DCE
3	BB	104	Receive Data	To DCE
4	CA/CJ	105/133	Request to Send	From DCE
5	CB	106	Clear to Send	From DCE
6	CC	107	DCE Ready	From DCE
7	AB	102a	Signal Common	
8	CF	109	Receive Line Signal Detect	From DCE
9	DD	115	Receive Signal Element Timing	From DCE
10	CF	109	Receive Line Signal Detect	From DCE
11	DA	113	Transmit Signal Element Timing (DTE Source)	To DCE
12	DB	114	Transmit Signal Element Timing (DCE Source)	From DCE
13	CB	106	Clear to Send	From DCE
14	BA	103	Transmit Data	To DCE
15	DB	114	Transmit Signal Element Timing (DCE Source)	From DCE
16	BB	104	Receive Data	From DCE
17	DD	115	Receive Signal Element Timing (DCE source)	From DCE
18	LL	141	Local Loopback	To DCE
19	CA/CJ	105/133	Request to Send	To DCE
20	CD	108/1,/2	DTE Ready	To DCE
21	RL	140	Remote Loopback	To DCE
22	CE	125	Ring Indicator	From DCE
23	AC	102b	Signal Common	
24	DA	113	Transmit Signal Element Timing (DTE Source)	To DCE
25	TM	142	Test Mode	From DCE

Interconnection of EIA-530 and V35

To provide the interconnection of EIA-530 with V35 wire as shown in Figure 49. Table 4 shows complete interconnection details and should be referred to for non-standard applications.
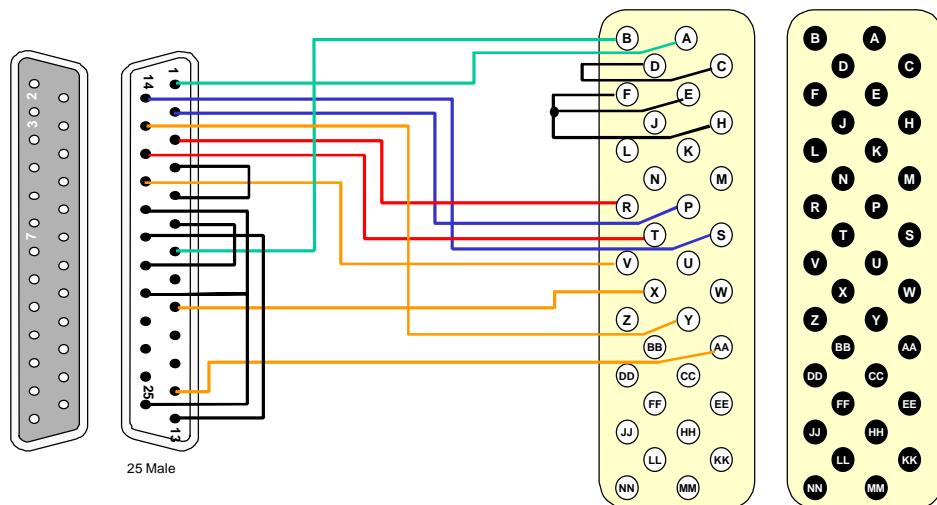
Figure 49. Interconnection of EIA-530 and V35

EIA 530				CCITT V35			
Circuit, Name and Mnemonic			**Pin No**	**Pin No**	**Circuit, Name and Mnemonic**		
Shield			1	A	Shield		
Transmit Data	BA	(A)	2	P	103	(A)	Transmit Data
	BA	(B)	14	S	103	(B)	
Receive Data	BB	(A)	3	R	104	(A)	Receive Data
	BB	(B)	16	T	104	(B)	
Request to Send	CA	(A)	4	C	105	Request to Send	
	CA	(B)	19				
Clear to Send	CB	(B)	13	D	106	Clear to Send	
	CB	(A)	5				
DCE Ready	CC		6	E	107	Data Set Ready	
DTE Ready	CD		20	H	108/1,/2 Data Terminal ready		
				F	109	Data Channel Receive Line Signal Detect	
Signal Common	AB		7	B	102	Signal Common	
Transmit Signal Element	DB	(A)	15	Y	114	(A)	Transmit Signal
Timing (DCE Source)	DB	(B)	12	AA	114	(B)	Element Timing
Receive Signal Element	DD	(A)	17	V	115	(A)	Receive Signal
Timing (DTE Source)	DD	(B)	9	X	115	(B)	Element Timing
Local Loopback	LL		18	L	141	Local Loopback	
Remote Loopback	RL		21	N	140	Remote Loopback	
Test Mode	TM		25	NN	142	Test Indicator	

Table 4. EIA530-V35 Connections

Interconnection of EIA-530 and X21

25 Male

15 Female
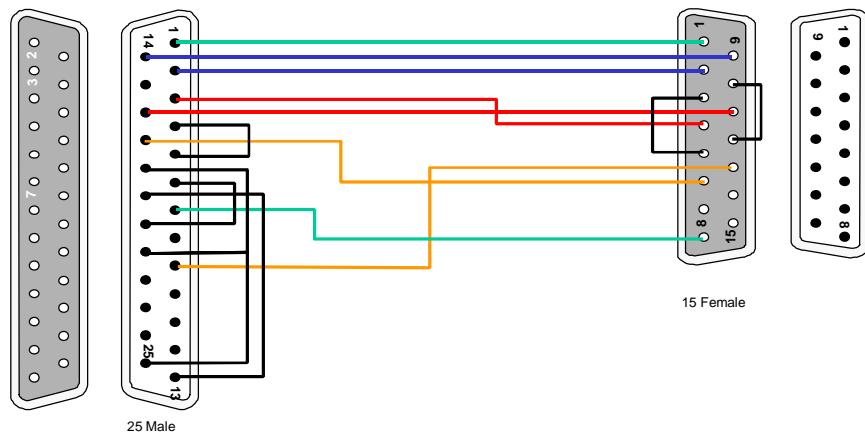
Figure 50. Interconnection of EIA-530 and X21

EIA 530					CCITT X21		
Circuit, Name and Mnemonic			**Pin No**	**Pin No**	**Circuit, Name and Mnemonic**		
Shield			1	1	Shield		
Transmit Data	BA	(A)	2	2	103	(A)	Transmit Data
	BA	(B)	14	9	103	(B)	
Receive Data	BB	(A)	3	4	104	(A)	Receive Data
	BB	(B)	16	11	104	(B)	
Request to Send	CA	(A)	4	3	105	Control +	
	CA	(B)	19	10	105	Control -	
Clear to Send	CB	(B)	13	12	106	Indicator +	
	CB	(A)	5	5	106	Indicator -	
DCE Ready	CC		6				
DTE Ready	CD		20				
Signal Common	AB		7	8	102	Signal Common	
Receive Signal Element	DD	(A)	17	6	115	Clock +	
Timing (DTE Source)	DD	(B)	9	13	115	Clock -	
Local Loopback	LL		18				
Remote Loopback	RL		21				
Test Mode	TM		25				

Interconnection of EIA-530 and RS232RS449, RS 422, RS 485, RS V36

1. For connection of EIA-530 to the above interfaces contact Airspan

5.4   L Series Customer Interface RJ45
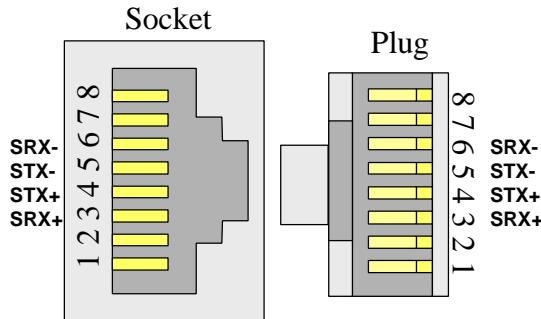
Configuring the S-Bus

1. SIU used with a terminal connected to theRJ45 or a Short S-Bus: Options are either one terminal up to 800m away from the SIU unit, or any number within 150m (total cable length).Extended S-bus: The extension wiring for an ISDN line must *daisy chain* each socket, and the SIU must have it's 100 ohm termination in (factory default).

2. Extended S-Bus. For cabling over 150m. The last socket on the cable must have terminating resistors enabled. The SIU must be set to long cabling with the 100ohm resistor out. The sockets can be ordinary RJ45 data sockets except the last (furthest) RJ45 socket must have 100ohm terminating resistors across 3-6 and 4-5. The polarity should be preserved. In the B1 SIU the 100ohm resistor is switch in or out using the jumpers labeled "P3" & "P7" on the SIU ISDN B1 board (they are located right next to the RJ45 socket). See
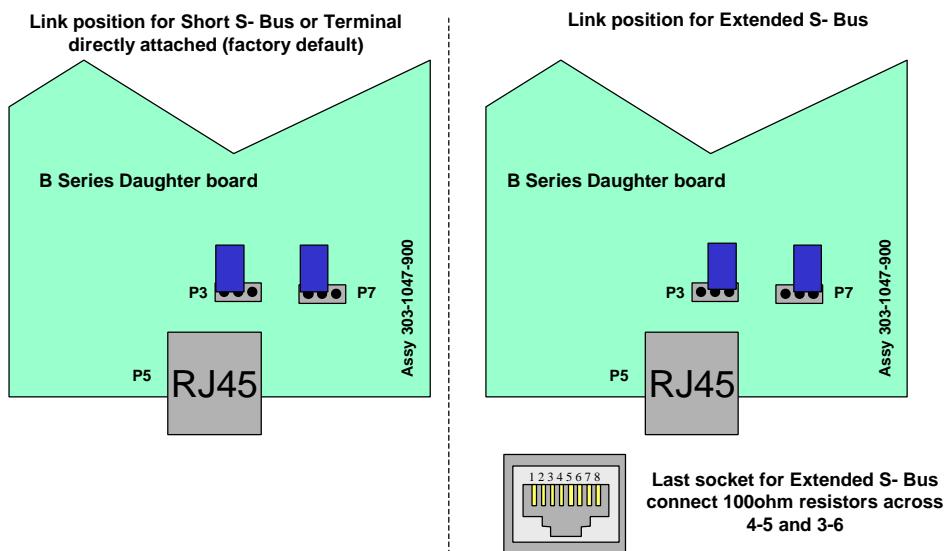
STOP. THIS PROCEDURE HAS BEEN COMPLETED.

SECTION 6: M SERIES INSTALLATION

INSTALLING THE M SERIES MODULE ENCLOSURE.

The M Series Modular Enclosure is a steel enclosure with a hinged door for access to the equipment. It may be wall or plinth mounted.

In environmentally harsh conditions the enclosure is designed to fit inside a 600mm x 600mm IP66 ventilated environmental enclosure.
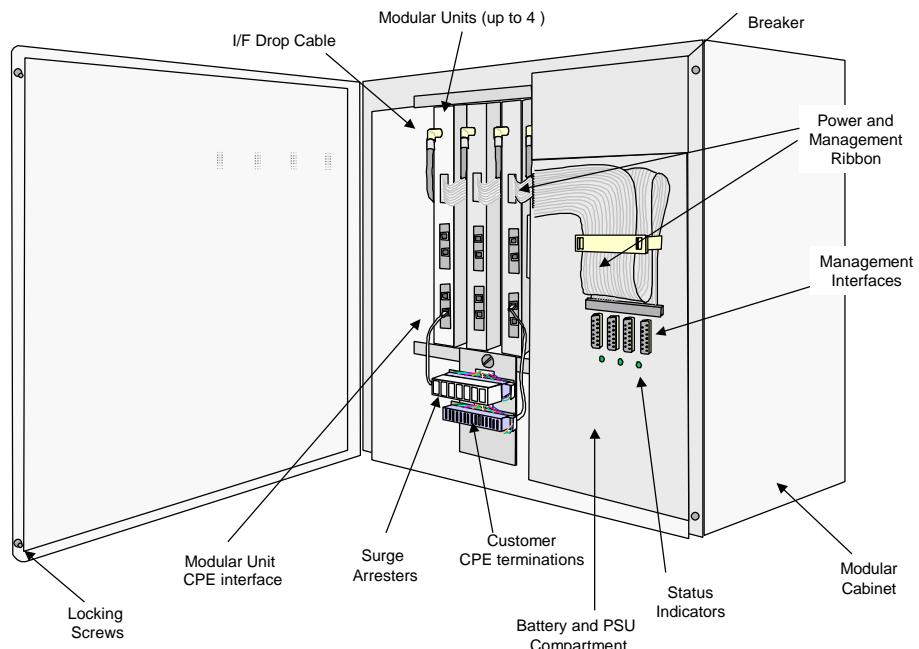
The installation kit consists of:

Part Number	**Description**	**Quantity**	**Use**
454-0010-069	RJ11 Data cables	16	SIU to Krone
403-0010-251	Earth Brackets for SIUs	4	Fix SIU to enclosure
175-8000-003	M3 x 8mmPanhead Screw	5 (1 spare)	Fix Earth Bracket to SIU
192-8000-006	M3 Coil washer	5 (1 spare)	
212-8000-049	90° F-type adapters	4	Fit to SIU F-type
175-8000-024	M8 x 40mm Dyna-bolt	4	Fix Plinth to floor
175-8000-025	M8 x 90mm Dyna-bolt	4	Fix enclosure to wall
175-8000-026	M8 x 70mm Coach Screw	4	Fix enclosure to wood
192-8000-014	M8 Plain Washer	4	Use with Coach Screw
TBA	Universal Bush	4	Use with T10 Dropcable

STEP   **PROCEDURE**

1. Securing Enclosure to Wall

1. Disconnect the power management ribbon from the cover of Battery and PSU compartment. Remove the cover. The cover is secured by two 'quarter turn' fasteners at the side of the lid above and below the fuse holders. Disconnect the Molex connectors to the PCB and the earth connection to the cover. Place cover in a safe place.

2. Separate the Plinth from the Enclosure by removing the four M8 bolts from the front and rear of the Enclosure

3. Remove the Blanking Plugs from the top two fixing holes in the rear of the Enclosure.

4. Using the enclosure as a template, mark the first hole position.
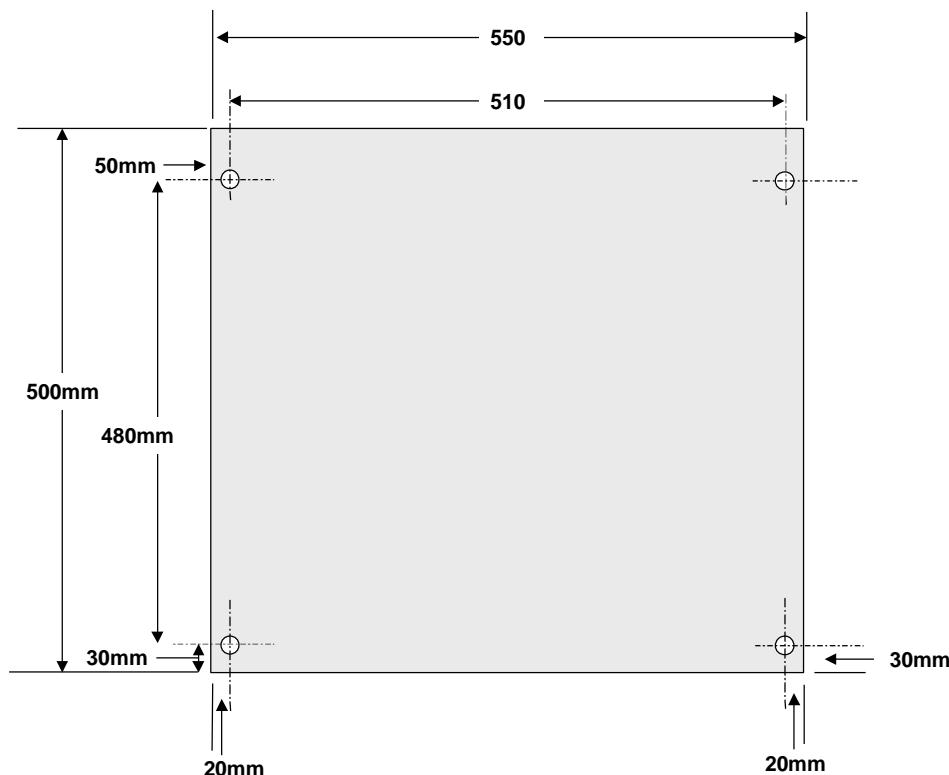
5. Using the Enclosure as a template, mark the first hole position. Where the Enclosure is to be mounted to a brick built building, try to ensure that each hole coincides with the middle of a brick and not the mortar course.

6. Drill the first hole, 10mm diameter to a depth of 75mm (use a drilling depth gauge), place the Enclosure on the wall and then fit the Hex Head M8 x90mm DynaBolt provided through the enclosure into the hole.

7. Using a spirit level, adjust the position of the enclosure and mark the remaining three holes. Remove the enclosure and drill the remaining holes

8. Drill the remaining holes, 10mm diameter to a depth of 70mm, then fit the M8 x 90mm DynaBolt provided through the mounting bracket into the holes.

9. Tighten all the bolts sufficient to ensure a firm fixing to the wall.
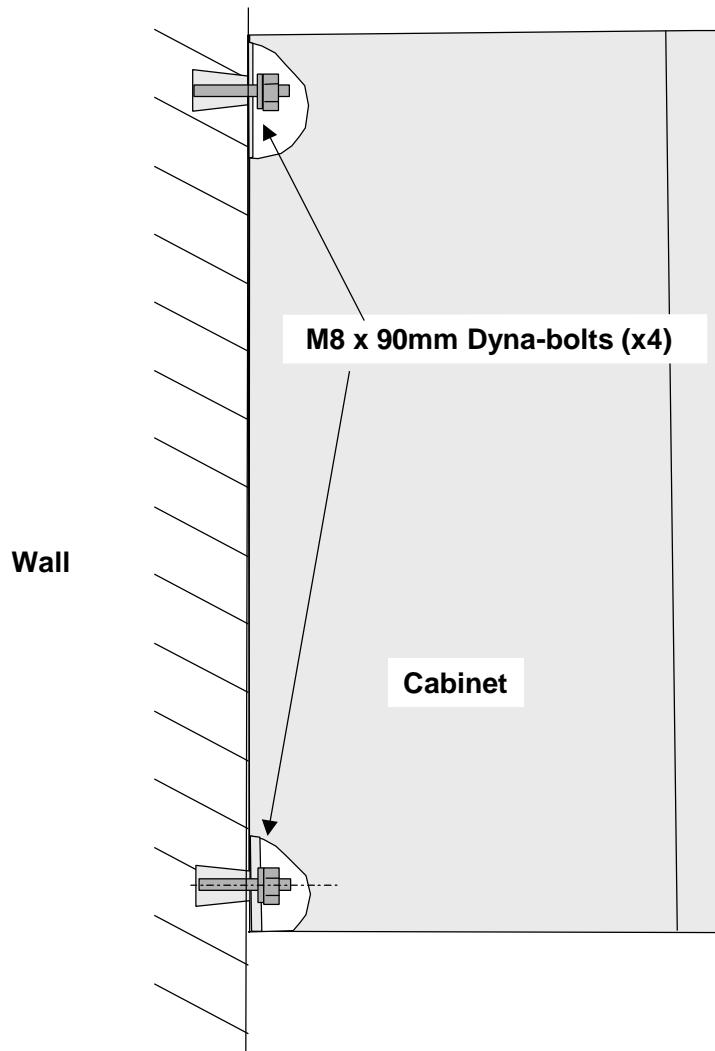
Figure 51. Enclosure (cut away) Fixed To Wall.

2. Securing the Modular Enclosure to a wooden structure

1. Using the Enclosure as a template, mark the first hole position.

2. Drill a first hole pilot, 5mm diameter to a depth of 40mm (use a drilling depth gauge),. Screw the M8 Coach Bolt provided through the enclosure into the hole sufficient to position enclosure on the wall..

3. Using a spirit level, adjust the position of the Modular Enclosure and mark the remaining 3 holes. Remove the Enclosure.

4. Drill the remaining pilot holes, 5mm diameter to a depth of 40mm, then fit the Hex Head M8 Coach Bolts and washers provided through the enclosure into the holes.

5. Tighten all the bolts sufficient to ensure a firm fixing to the wall.

3. Securing Enclosure to Floor

1. Disconnect the power management ribbon from the cover of Battery and PSU compartment. Remove the cover. The cover is secured by two quarter turn fasteners at the side of the lid above and below the fuse holders. Disconnect the Molex connectors to the PCB and the earth connection to the cover. Place cover in a safe place.

2. Separate the Plinth from the Enclosure by removing the four M8 bolts from the front and rear of the Enclosure

3. Using the Plinth as a template, mark positions for the four fixing holes on the floor. Allow sufficient clearance from the wall to allow for cables to pass behind the enclosure.
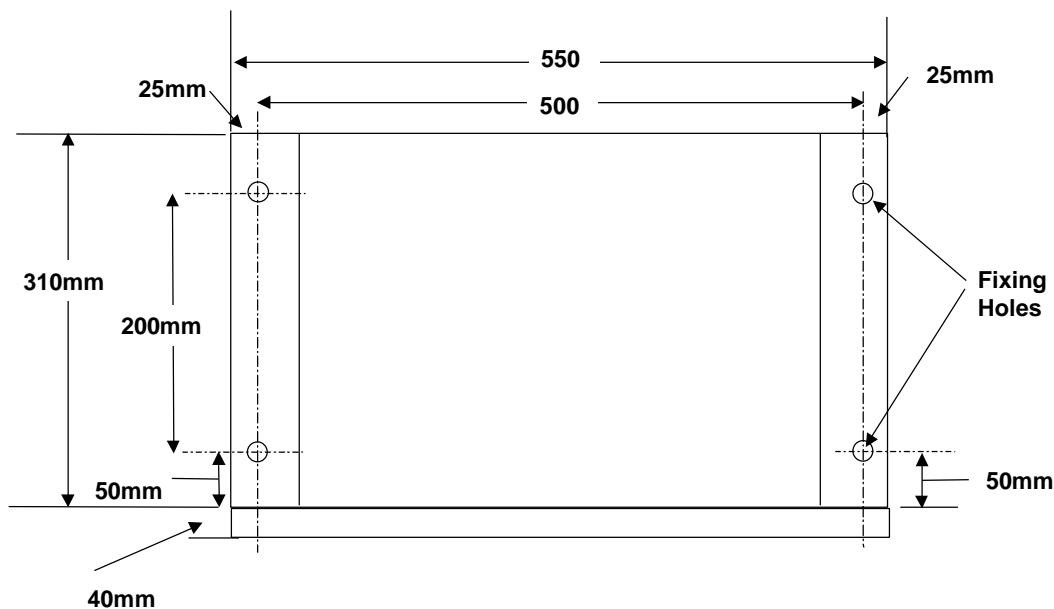
Figure 52 Base of Plinth

4. Drill the four holes, 10mm diameter to a depth of 35mm (use a drilling depth gauge), place the Plinth over the holes and then fit the M8 x 40mm Dyna Bolt through the Plinth into the hole. Tighten sufficiently to secure the plinth to the floor.
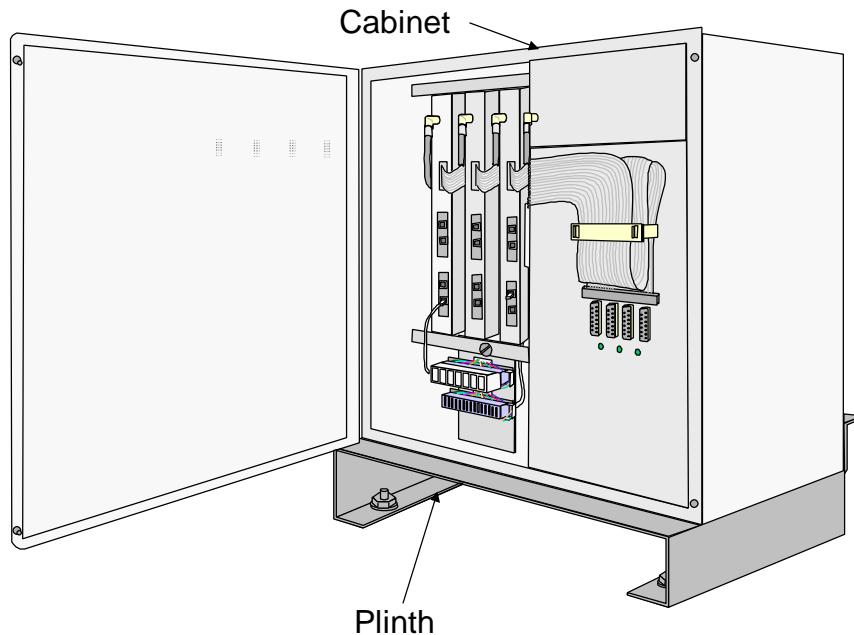
Figure 53. Modular Enclosure with Plinth

5. Tighten all the bolts sufficient to ensure a firm fixing to the Floor.

6. Place enclosure on to the plinth and fix to the plinth using the four M8 bolts and washers provided.

Side View
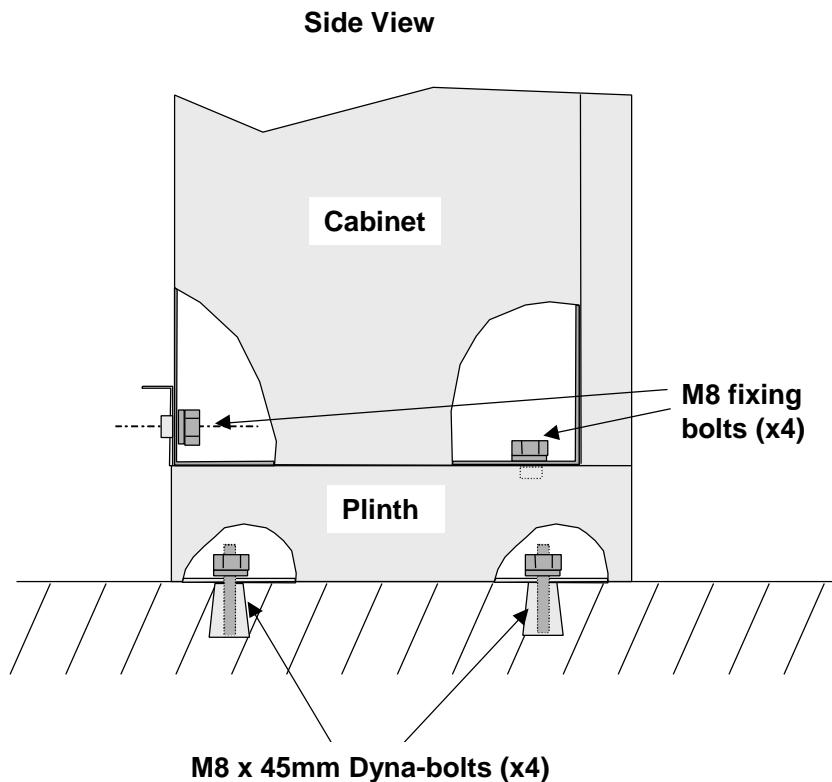
Figure 54. Fixing the Plinth

4. Removal and replacement of the battery compartment cover

1. It is necessary to remove the battery compartment cover to gain access to the battery, PCB and power connections.
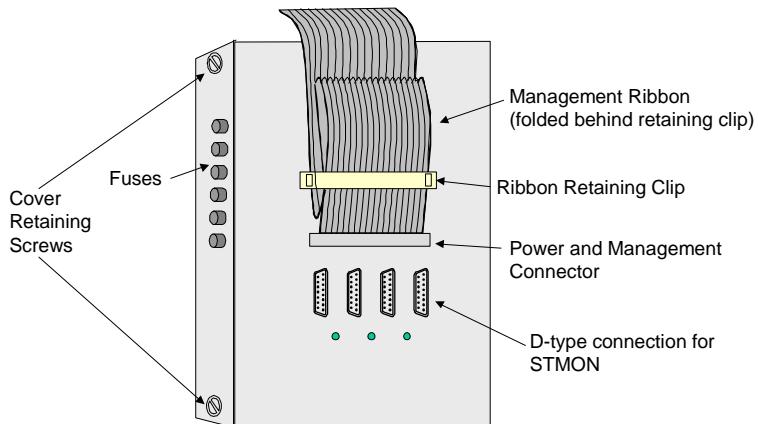
Note: When accessing the battery compartment removal of the ribbon retaining clip allows the cover to be placed on the top of the enclosure without the need for removal of the ribbon

2. To remove the cover release the ribbon from behind the retaining clip by firmly gripping the ends of the clip front and pulling forward. When removed the length of ribbon is sufficient to allow the cover to be placed on top of the enclosure without the need to remove the connector itself.

3. Turn the retaining screws one quarter of a turn to release the cover. Slide the cover to the left to disengage from the battery compartment, pivot out from the bottom ensuring that the PCB components do not touch the Enclosure.

4. To replace the cover, reverse this process, ensuring that no cables are trapped between the panel and the Enclosure.

5. Installing the AC power

1. Remove the battery cover compartment as described above

Base of Battery compartment

AC Cable Inlet   AUX BATT Cable Inlet (if required)

Front
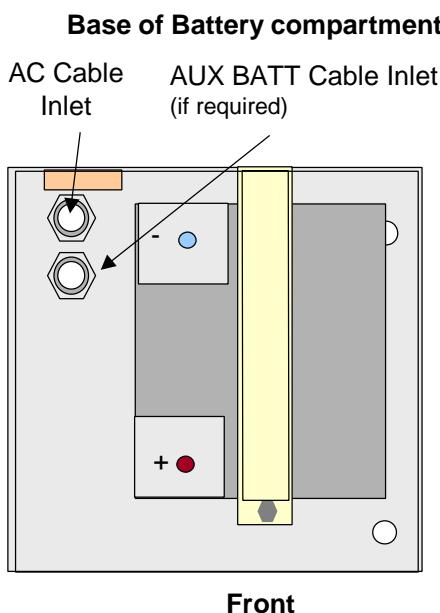
2. Use a supply cord fitted with a mains plug in accordance with local requirements. Terminate the wires on the AC input terminal block.

Function	Colour
Live	Red or Brown
Neutral	Black or Blue
Earth	Green or Green/ Yellow

3. Do not switch on the power until directed to at the commissioning stage.
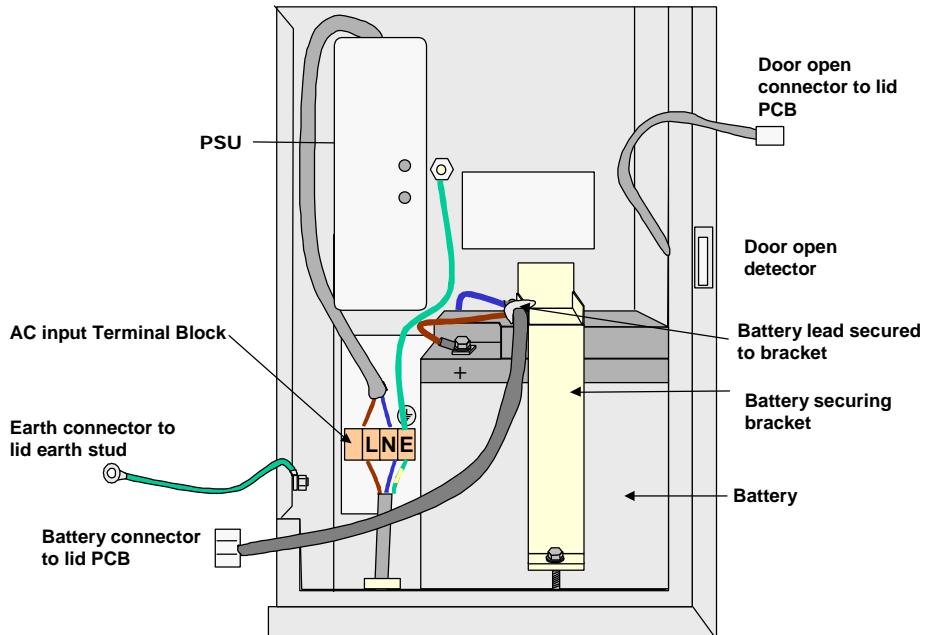
6. Installing the Internal Standby Battery

Safety: Battery Handling

Care should be taken when handling lead acid batteries to avoid dropping or short circuiting them. Disposal should be in line with local codes. Batteries may explode if put into a fire. Connect red/brown lead to the +ve terminal and the black/blue lead to the –ve terminal.

Note :the approved Battery types for this product are:
   Yuasa Battery Co: Model no NPL 3812
   or **Panasonic Model Number LC-X1238 AP**

1. Undo the nut securing the battery retaining strap. Remove the strap.

2. Place the battery in the base of the battery compartment. The negative terminal should be at the rear of the compartment.

3. Replace the retaining strap. Take care not to short the battery terminals with the retaining strap. Ensure that the strap is located in the slot at the rear of the enclosure and the nut is tightened sufficient to secure the battery.

4. Attach the battery connecting cable to the battery. Screw the lug of the blue lead to the negative terminal and the brown lead to the positive terminal.

5. Reconnect earth to the stud on the cover

7. Connections to Enclosure PCB
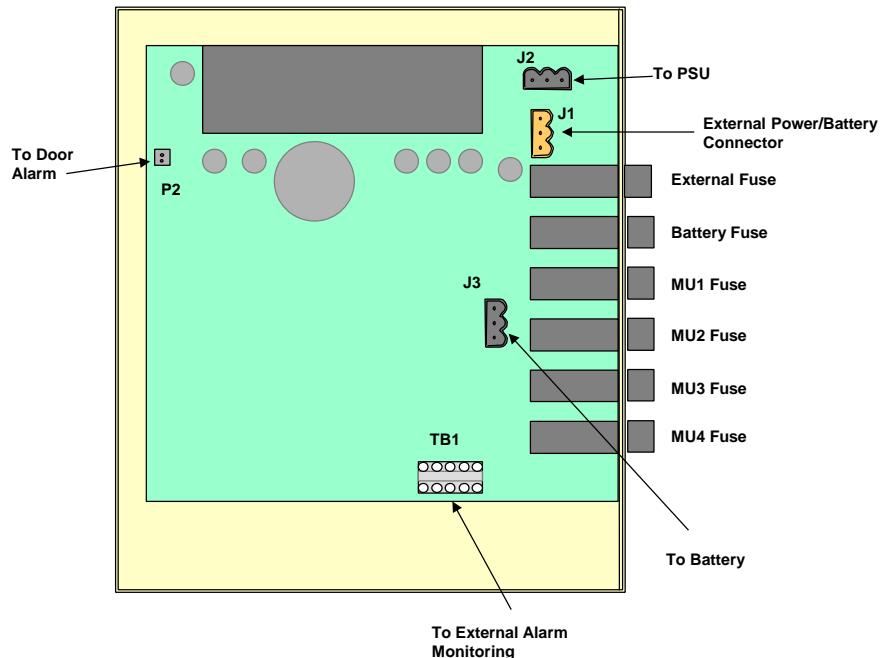
Figure 55. Enclosure PCB

e) PSU

Connect the lead from the PSU to the PCB J2.

f) Standby Battery

Connect the battery to the PCB J3.

g) External Standby Power

The Modular Enclosure can be supplied from an external 12 Volt standby power source if required. Connection to the PCB J1 is via a three pin Molex plug. The connections are shown in Table 5

Pin	Function	
1	No Connection	1 N/C
2	Positive	2 External 12V +ve
3	Negative	3 External 12V -ve

Table 5. External Standby Power Connections

h) External Alarm Monitoring

The customer can connect an external alarm to the modular and monitored at a Sitespan location. The external alarm connects to the TB1 Connection Block. The block should be wired to suit the incoming alarm condition.
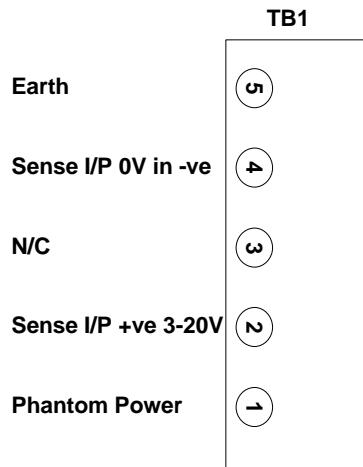
Figure 56. Alarm Connections

i) Open Door Alarm

The door alarm cable is connected to socket P2 on the PCB.

8. Fusing and front panel alarms
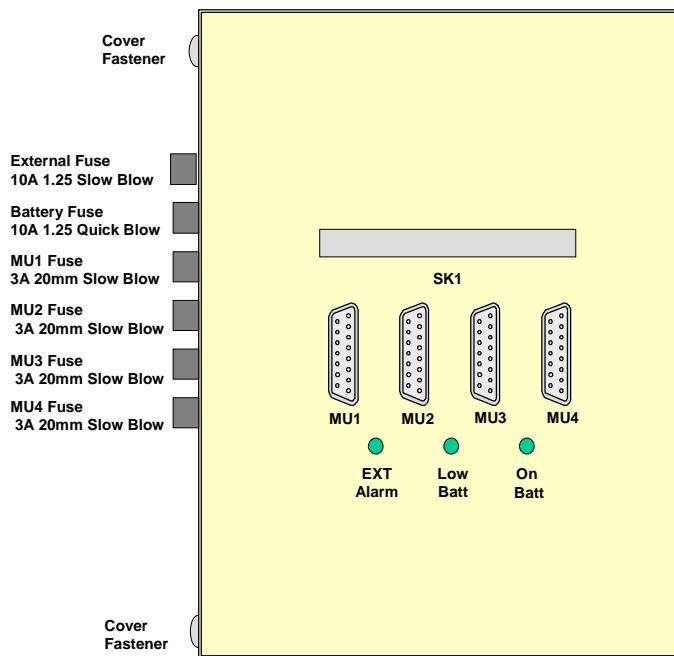
Figure 57. Fusing and front panel alarms

1. The front panel alarms are:

   - Ext: If an external alarm is received the alarm LED is lit and the alarm is sent to the CT/Sitespan.

   - Low Battery When the battery drops below 10.8Volts the alarm LED is lit and the alarm is sent to the CT/Sitespan.

   - On battery. If the main supply fails the battery automatically provides power for the modules the alarm LED is lit and the alarm is sent to the CT/Sitespan.

2. The fuses are rated as shown in the table below

Fuse	Function	Rating	Type	Size
1	External Supply	10 Amp	Slow Blow	1.25in
2	Battery Fuse	10 Amp	Quick Blow	1.25in
3	MU1	3 Amp	Slow Blow	20mm
4	MU2	3 Amp	Slow Blow	20mm
5	MU3	3 Amp	Slow Blow	20mm
6	MU4	3 Amp	Slow Blow	20mm

Table 6. Modular Enclosure Fuses

9. External cable connections to the Modular Enclosure

Sectioned View from top of Modular Enclosure showing base of unit
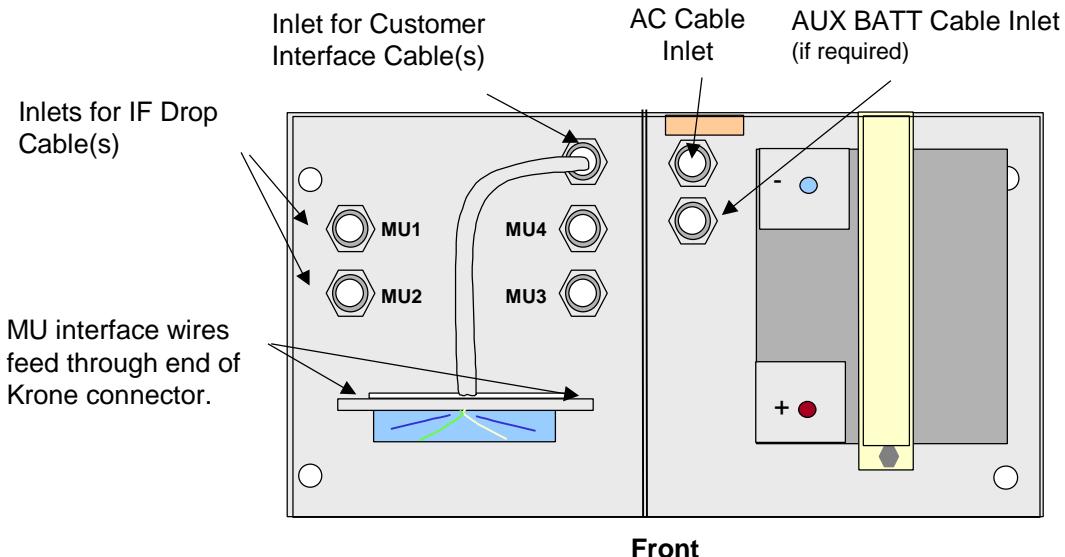
Figure 58.   External cable connections to the Modular Enclosure

1. Cabling to the Krone connectors in the Modular Enclosure is either four 4-pair cables or one 20-pair cable. The cables enter the Modular Enclosure through the base via a cable entry gland.

2. Remove the Krone mounting panel

3. Strip the cable and pass the wires through the hole in the connector mounting panel to terminate on the top of each Krone block. Details of the cable termination are shown in Figure 59 and Table 7 cables

4. Run the RJ45 cables used to connect the Modular Units to the Krone blocks.
   The cables from modular unit 1 pass through the cable eye at the left hand side of the top Krone block.
   The cables from modular unit 2 pass through the cable eye at the right hand side of the top Krone block.
   The cables from modular unit 3 pass through the cable eye at the left hand side of the bottom Krone block.
   The cables from modular unit 4 pass through the cable eye at the bottom right hand side of the top Krone block.

5.   Terminate the cables on the block as shown in Table 8.
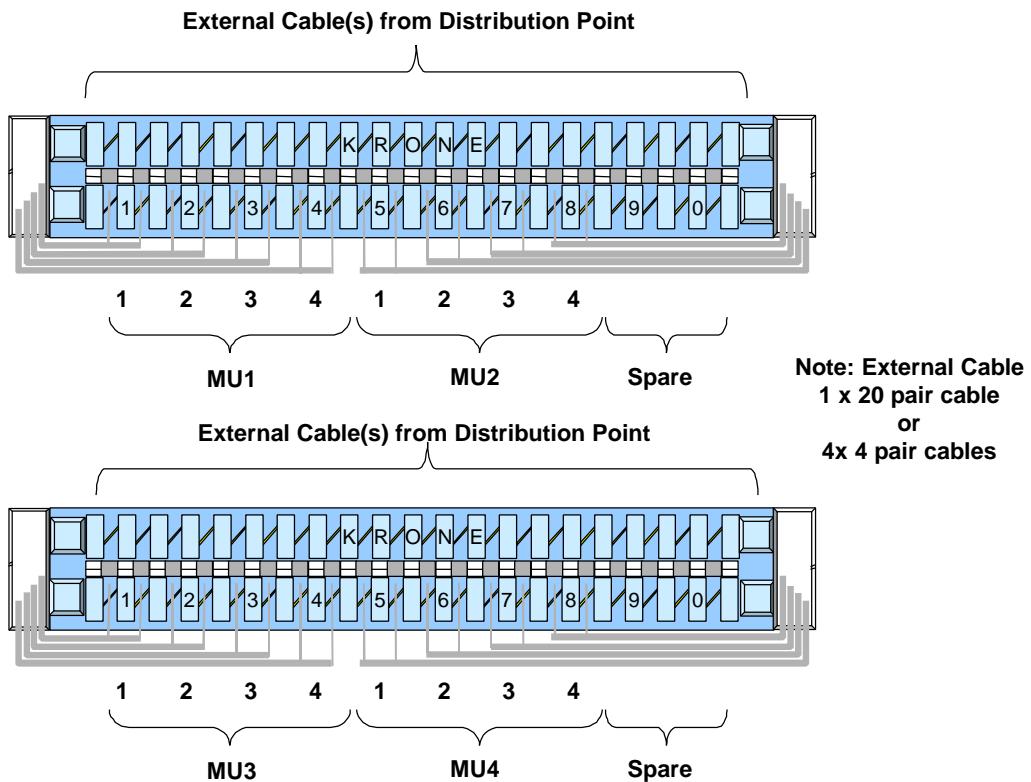
Figure 59. Krone Wiring

External connections to top of Krone Connector						Equipment
Krone		**20 pair Cable**		**4 pair Cable (4 Cables)**		
Block1	**Pair**	**a**	**b**	**a**	**b**	
1	1	White/Blue	Blue/White	(1)White/Blue	Blue	MU1-1
2	2	White/Orange	Orange/White	(1)White/Orange	Orange	MU1-2
3	3	White/Green	Green/White	(1)White/Green	Green	MU1-3
4	4	White/Brown	Brown/White	(1)White/Brown	Brown	MU1-4
5	5	White/Grey	Grey/White	(2)White/Blue	Blue	MU2-1
6	6	Red/Blue	Blue/Red	(2)White/Orange	Orange	MU2-2
7	7	Red/Orange	Orange/Red	(2)White/Green	Green	MU2-3
8	8	Red/Green	Green/Red	(2)White/Brown	Brown	MU2-4
9	9	Red/Brown	Brown/Red	Spare	Spare	Spare
10	10	Red/Grey	Grey/Red	Spare	Spare	Spare
Block 2						
1	11	Black/Blue	Blue/Black	(3)White/Blue	Blue	MU3-1
2	12	Black/Orange	Orange/Black	(3)White/Orange	Orange	MU3-2
3	13	Black/Green	Green/Black	(3)White/Green	Green	MU3-3
4	14	Black/Brown	Brown/Black	(3)White/Brown	Brown	MU3-4
5	15	Black/	Grey/Black	(4)White/Blue	Blue	MU4-1
6	16	Yellow/Blue	Blue/Yellow	(4)White/Orange	Orange	MU4-2
7	17	Yellow/Orange	Orange/Yellow	(4)White/Green	Green	MU4-3
8	18	Yellow/Green	Green/Yellow	(4)White/Brown	Brown	MU4-4
9	19	Yellow/Brown	Brown/Yellow	Spare	Spare	Spare
10	20	Yellow/	Grey/Yellow	Spare	Spare	Spare

**Note: White/Blue means a narrow blue band (marker) on a white background
and Blue/White means a narrow white band (marker) on a blue background etc.**

Table 7. Modular Enclosure External Cable Termination

Krone	**RJ45 Cable**		**MU #-port**	**Krone**	**RJ45 Cable**		**MU #-port**
Block1	**a**	**b**		**Block 2**	**a**	**b**	
	Blue	Green	MU1-1	Pair1	Blue	Green	MU3-1
2	Blue	Green	MU1-2	2	Blue	Green	MU3-2
3	Blue	Green	MU1-3	3	Blue	Green	MU3-3
4	Blue	Green	MU1-4	4	Blue	Green	MU3-4
5	Blue	Green	MU2-1	5	Blue	Green	MU4-1
6	Blue	Green	MU2-2	6	Blue	Green	MU4-2
7	Blue	Green	MU2-3	7	Blue	Green	MU4-3
8	Blue	Green	MU2-4	8	Blue	Green	MU4-4
9			Spare	9			Spare
10			Spare	10			Spare

Table 8. Modular Enclosure MU Cable Termination

10. Installation of the Modular Units

1. Fix the Earthing and Securing Bracket to the Modular Unit using the M3 screw provided with the Bracket.

2. Slide the Modular Unit into the Modular Enclosure using the guides to position the bottom of the unit. When fully inserted secure unit into the enclosure using the knurled fixing screw on the fixing bracket.
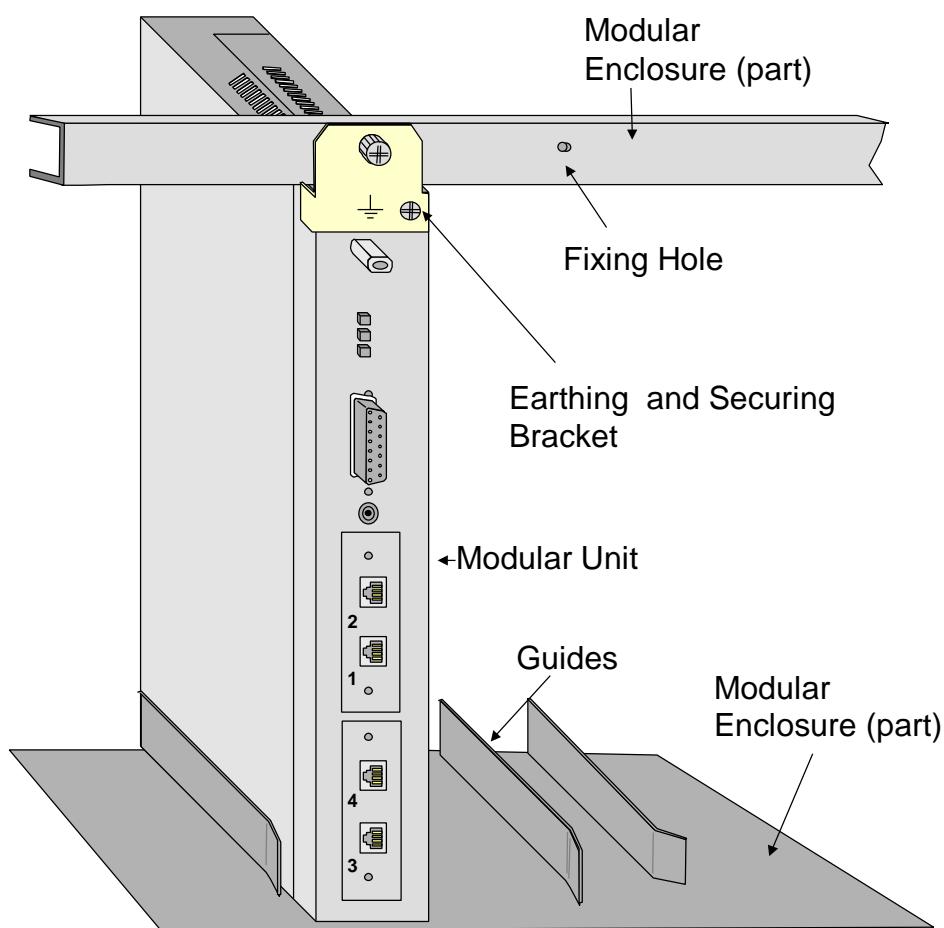
11. IF Drop Cable connections to the Modular Units

1. Bring the drop cables through the cable entry glands at the base of the unit. See Figure 58.

a) Drop cable Termination (Type T6)

1. Strip the Drop Cable using a knife or cable stripping tool to the dimensions shown in Figure 25.

2. Place the connector over the cable end ensuring that the inner sleeve passes between the inner core and screen braid

3. Crimp the connector using the Amphenol 531-CR596R Crimp tool.
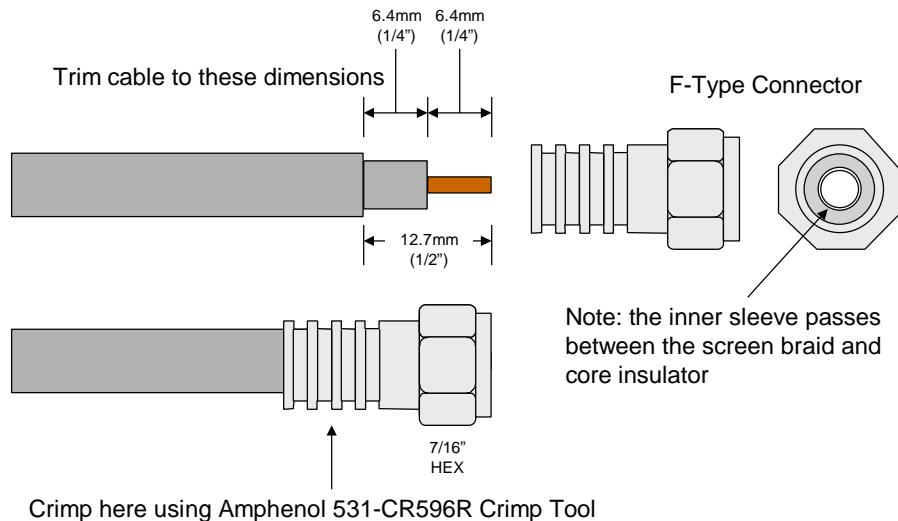
Figure 60. Terminating F-Type Connectors to T6 cable

b) Drop cable Termination (Type T10)

5. Strip the Drop Cable using a knife or cable stripping tool to the dimensions shown in Figure 26

6. Fold back the braid against the cable sheath.

7. Ensure that the centre conductor is clean of dielectric residue. Push the crimp pin over the end of the centre conductor until the pin bottoms against the dielectric, then crimp the pin to the centre conductor with the 0.96 Hex crimp on the Airspan 212-8000-058 Crimp tool.

8. Insert the cable into the connector ensuring the pin is through the hole of the insulator at the bottom of the nut. Continue inserting the cable into the connector until it bottoms out. Crimp the Connector with the 0.475 Hex crimp to retain the cable.
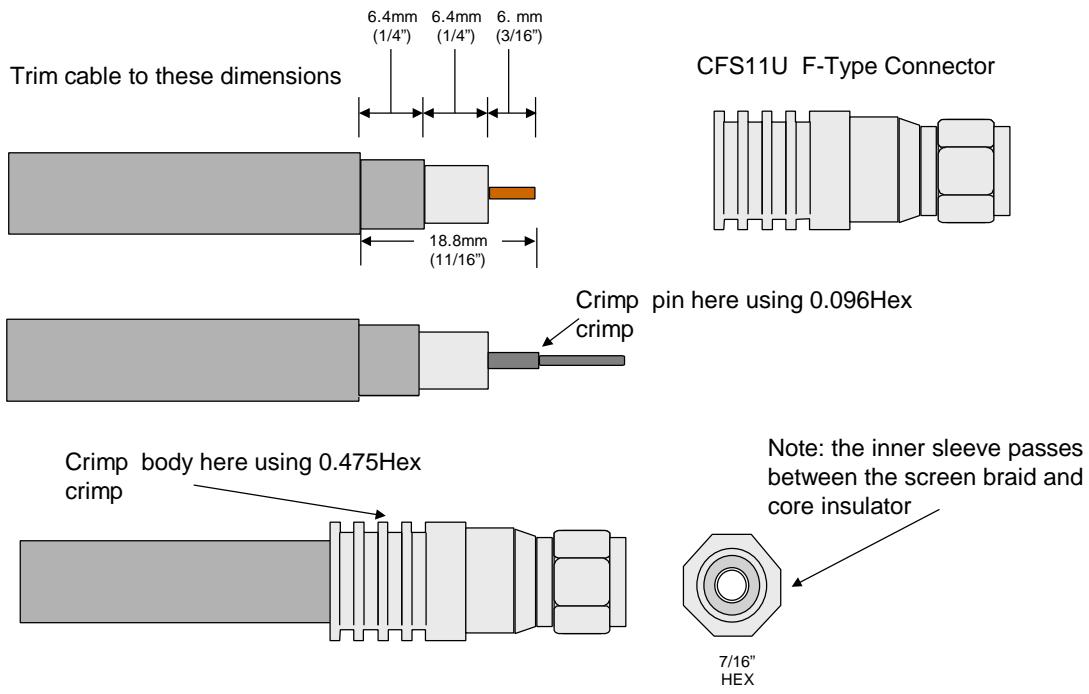
Figure 61. Terminating F-Type Connectors to T10 cable

c) Ribbon Connection to Modular Units

1. The ribbon cables pass down the side of the modular units and connect to the 15 way D-type socket on the front of the unit.

12. Power and Standby Tests

1. Connect the unit to the mains and check that the PSU led is illuminated. This is only visible when the battery compartment cover is removed.

2. The battery should be fully charged (12hrs) before checking the standby facility. It would be expedient to have a fully charged battery placed in the unit to avoid the need to make a return visit to the site for testing.

3. If the battery is charged the *Battery Low* LED should be extinguished and the *On Battery* LED should be extinguished when the unit is being powered by the main supply.

4. Switch off the main supply or remove the external supply fuse.

5. Check that the *On Battery* LED is illuminated.

SECTION 7:COMMISIONING
CONFIGURING SUBSCRIBER TERMINALS USING STMON FOR WINDOWS

The following procedure will have to be completed before placing the AS4000 system into service.

The Service Interface Unit should be programmed prior to commissioning. All results must be entered on the Commissioning Test Result Sheet, see DLP 015.

STEP	PROCEDURE

1.   System Turn-up

1. Ensure that the PSU is connected to the Service Interface Unit and that the PSU is plugged into the AC Supply.

2.   ST Programming Using STMON for Windows

1. For new STs configuration information is sent to the Service Interface Unit instructing it as to which frequencies, PN, and in the case of Fixed Assignment what RW code to use.

2. STMON is a windows based commissioning and monitoring program designed for use with Demand Assignment Subscriber Terminals. It connects to the Subscriber Terminal using a serial cable.

3.   PC Interface

1. STMON for Windows communicates via the PC RS232 com port which connects to the ST to Service Interface Unit. The PC interface cable is terminated as in Figure 62.

Pin 1

Downlink Comms - Yellow or Brown on White

Uplink Comms - Grey or White on Brown

Ground - Black or Blue on Red
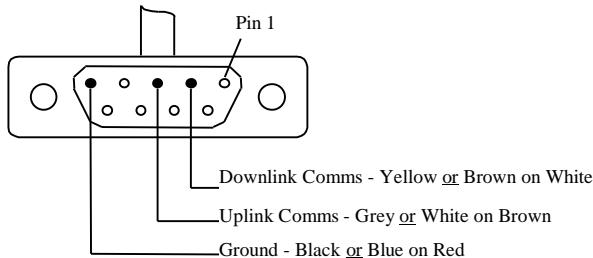
Figure 62. STMON PC Connection

1.1   Subscriber Terminal Interfaces

4.   STMON Interface for R and S Series Subscriber Terminals
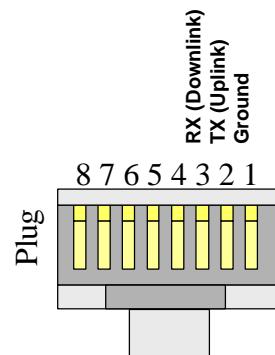
Figure 63. R and S Series RJ45 STMON connections

5.   STMON Interface for B, L, N, and M § series Subscriber Terminals
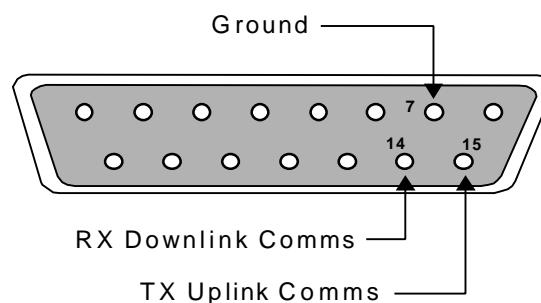
Figure 64. B, L, N, and M series 15 way D-type STMON connections

§ Note: When Using STMON with the Modular Enclosure the interfaces are presented on the front panel of the battery compartment.

13. Setting Up STMON

1. If a security Dongle is needed connect the Dongle to the COM port. When the ST leaves the factory it can be programmed using STMON for Windows without the use of a dongle. If for security reasons it is decided to use a dongle to program the ST then the dongle provided is attached to the parallel port of the PC/Laptop being used. Once an ST has been programmed using a dongle it cannot be re-programmed unless the dongle is attached to the PC. After use with a dongle the ST can only be reset for use without a dongle by returning it to Airspan.

2. Select the *STMON Set UP* tab. Set the com port by clicking *Change Port Number.*
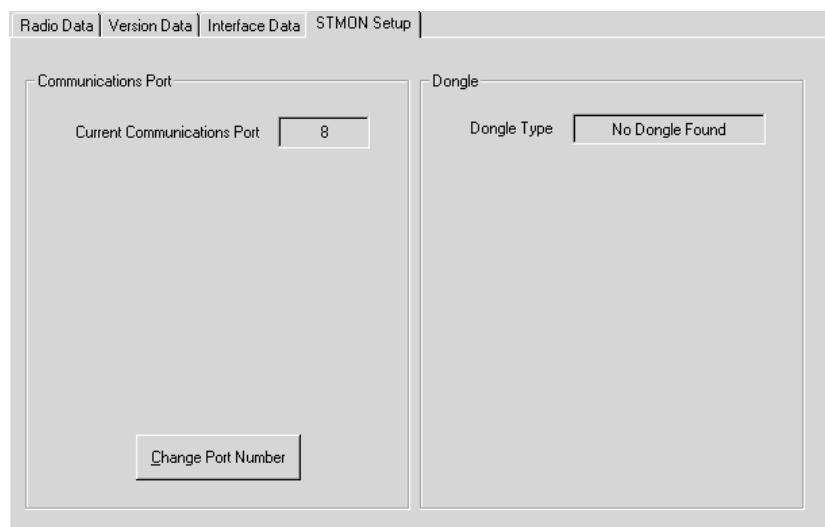
3. Click the mouse on the required Communications Port. If the com port required is greater than Com 4 click *Other* and key in the required com port in the window adjacent to the button.
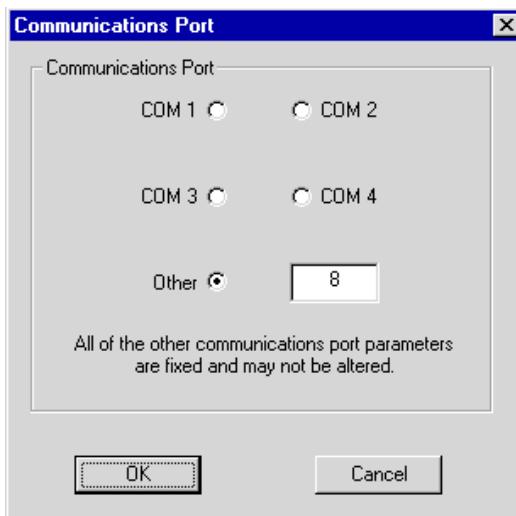
4. Click *OK* to initiate the change

14. Configuring a Subscriber Terminal

1. From the *Radio Data* view select the *Configure ST* tab
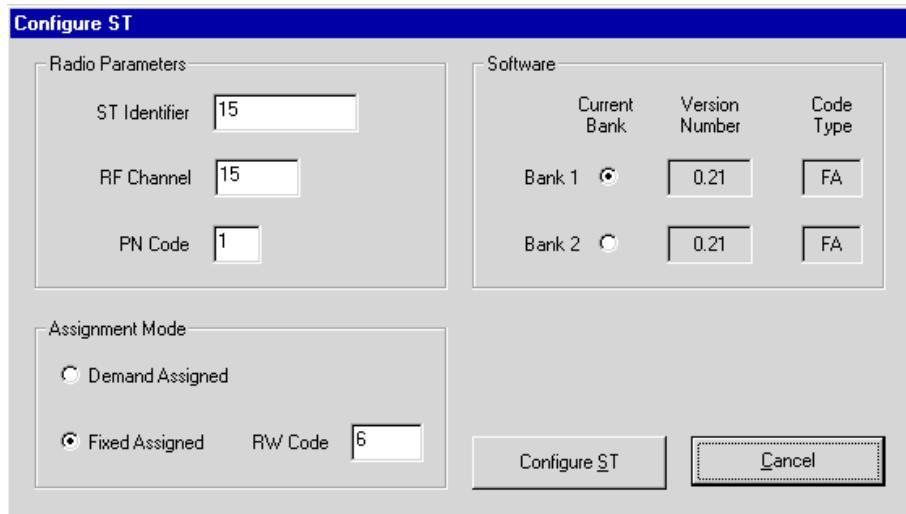
2. Enter the ST ID this number must be unique for all STs sharing the same CT

3. Enter the RF channel number being used. Appendix 1 lists the RF channel codes.

4. Enter the PN code

5. Select the assignment type. If Fixed Assigned is chosen then a RW code must be entered in the box adjacent to the fixed assigned button.

6. Select the software bank to be used

7. Click *Configure ST* to initiate the configuration. *Cancel* leaves the configuration unchanged

8. The ST is configured and the following message is displayed
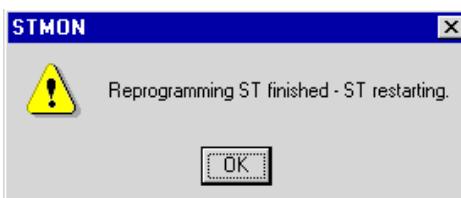
9. If the Subscriber Terminal fails to configure the following screen is displayed after 30 seconds. Check that configuration details are correct and the ST is correctly connected, then re-configure the ST. If the ST fails again replace ST.
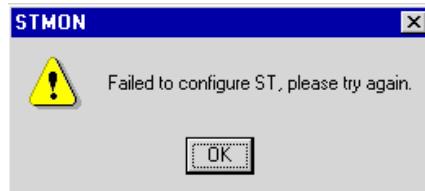
10. If the ST has been previously programmed with a dongle different from the dongle attached, or if no dongle is attached to the PC then the following message is displayed.
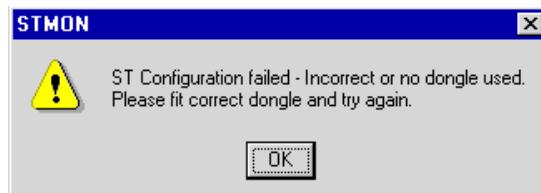
6.   Viewing and Setting the Interface Data for B Series working to a Release 3 Fixed Assigned Shelf

1. Select the *Interface Data* tab. The data relevant to the current ST variant is displayed. Module type, serial number and part number are displayed.

7. Viewing and Setting the Interface Data for L128 working to a Release 3 Fixed Assigned Shelf

1. Select the *Interface Data* tab. The data relevant to the current ST variant is displayed. Module type, serial number and part number are displayed. The field displays if the Data rate, inverted or normal, current clock source and whether loopbacks are applied.

2. To change the configuration Click the left mouse button on the configure button.

3. Set the data rate and interface to conform to the current application. The Interface connections are described in DLP-008.

4. The clock source is crucial to avoid data errors. The clock timing can be triggered of off negative or positive datastreams and the correct inversion ensures compatibility between DCE and DTE.

5. Loopbacks are local loopback towards DTE and Remote Loopback towards DCE
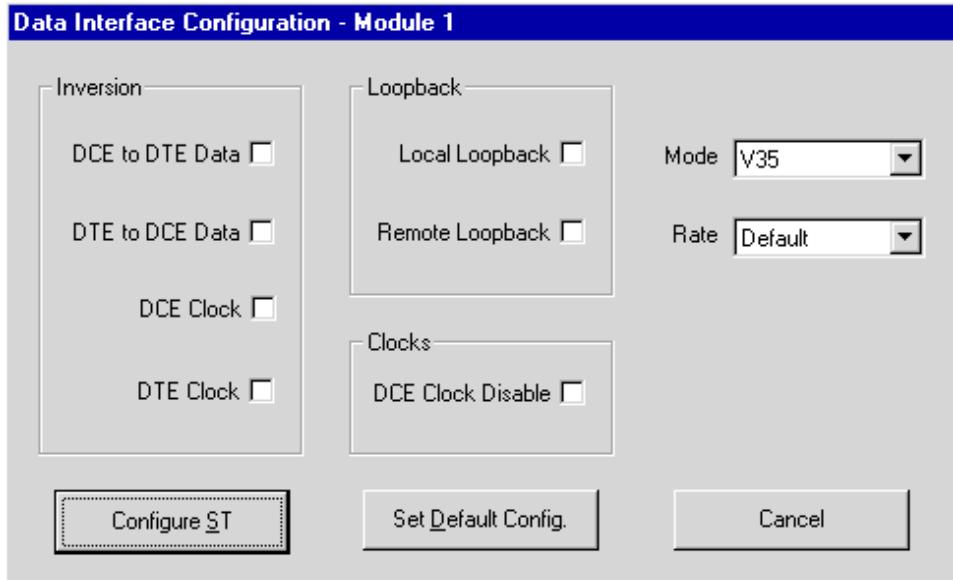
6. To initiate the configuration click the left mouse button on *Configure ST*.

8. Viewing and Setting the Interface Data for Subscriber Terminals working to a Demand Assigned Shelf

1. This feature is not currently supported by STMON for windows and the following message is displayed.

No additional information is available for this Subscriber Terminal.

9. R, S, and N series SIU programming using a test telephone.

1. If STMON is unavailable the ST can be programmed using a test telephone. Connect an MF or LD type telephone to the SIU

2. Each SIU is initialised by entering a unique code. These codes are entered using the telephone and should be provided by the RF planning office on a form similar to that shown in Table 9.

Table 9. SIU Programming Information

Mode DA=1	RF 3 digits			PN 1 digit	Identity 9 digits	Check N°. 1 digit	Remote site location
1	0	0	6	1	000000000	7	CRU1

3. Take phone off hook and key # * # using the DTMF keypad

4. Enter Mode by keying 1 for DA or 2 for FA

5. Enter RF code (3 digits)

6. Enter PN code

7. If the ST is to be used in fixed assigned mode enter the RW code (2 digits)

8. Enter the identity (9 digits)

9. Enter check digit The algorithm check number is the sum of the RF, PN, RW(FA only), and identity digits.
    The number entered is the number in the units column of the result -1.
    i.e. if the result of summing the digits was 14 the number entered would be 3
    and if the result of summing the digits was 8 the number entered would be 7

10. Use * to end programming

11. Upon successful installation, the "code accepted" tone is heard in the handset receiver, consisting of 1400 Hz pulses for 1 sec on; 1 sec off, for 5 seconds. For a failed installation, an "incorrect code" tone shall be heard in the handset receiver, which consists of 1400 Hz pulses for less than 1 sec on, and less than 1 sec off, for 5 seconds. If the ST fails to accept the programming code after a second attempt, confirm with the network planning staff that the correct code is being used. Should the ST still fail to accept the code, the ST will need to be replaced.

12. *Power Cycle the SIU. The ST will reset and re-boot itself in accordance with the programming code entered.*

PANNING SUBSCRIBER TERMINALS

The Service Interface Unit should be panned to assure optimum performance of the ST. If problems are encountered, check that the installation guidelines in DLP-001 are not breached. All results must be entered on the Commissioning Test Result Sheet, see DLP 015.

STEP	PROCEDURE

1. Panning Pole Mounted Antenna

1. Place and tighten a tie wrap immediately underneath the pole bracket to prevent the assembly sliding down the pole.

2. Loosen the antenna fixing bolts sufficient to allow the antenna to rotate around the pole.

3. Point the Antenna in the general direction of the Central Terminal Antenna

4. Using the DVM, measure the DC voltage between Ground and Receive Signal Strength Indicator (RSSI) Monitoring on the Antenna (see Figure 65). The voltage measured is a relative indication of the received signal strength; The lower the voltage the weaker the RX signal, and vice versa. A reading of 1.4volts or greater indicates a viable link.

5. Whilst observing the voltage on the DVM, pan the Antenna through the peak point, then pan back to it.

6. Using a 10mm spanner or socket torque the pivot bolts to 12Nm.

7. Place the strain relief strap around the drop cable and pole and strap to the pole ensuring that the 70mm minimum bend radius of the cable is not exceeded.

Turn Antenna to achieve maximum
voltage reading on DVM

Tie Wrap to prevent
assembly sliding
down pole while
panning

Ground for RSSI

Receive Signal
Strength Indicator
(RSSI)

Digital Voltmeter (DVM)

3.23

Ground for
Lightning
Protection

Strain Relief Strap.
Ensure minimum
bend radius (70mm)
is not exceeded
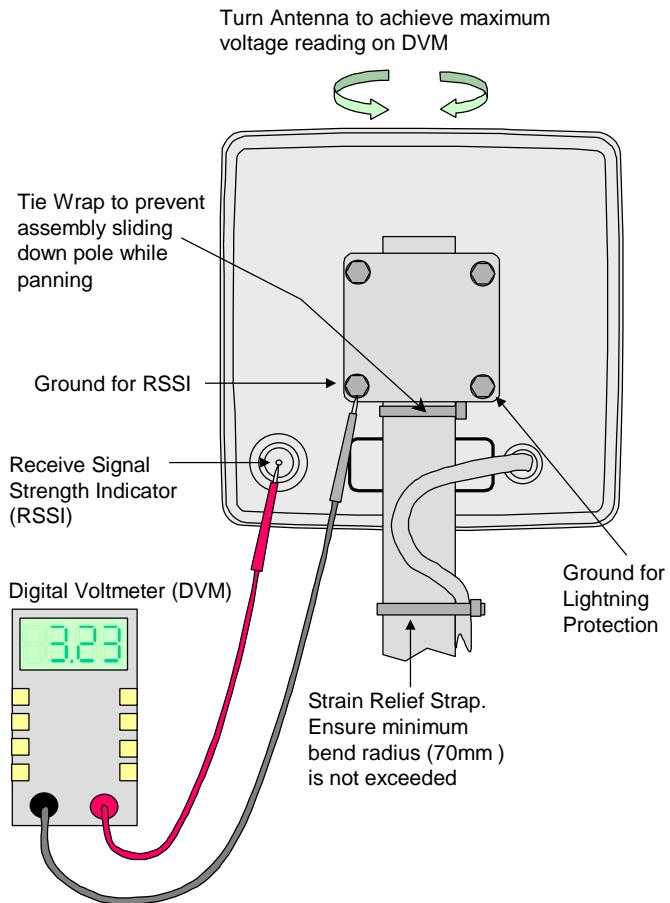
Figure 65. Panning Pole Mount Antenna

2. Panning Bracket Mounted Antenna

1. Loosen the antenna fixing bolts sufficient to allow the antenna to move freely

2. Point the Antenna in the general direction of the Central Terminal Antenna

3. Using the DVM, measure the DC voltage between Ground and the Receive Signal Strength Indicator (RSSI) Monitoring point on the Antenna (see Figure 66). The voltage measured is a relative indication of the received signal strength; The lower the voltage the weaker the RX signal, and vice versa. A reading of 1.4volts or greater indicates a viable link. A more accurate indication of signal strength can be view using STMON connected to the SIU.

4. Whilst observing the voltage on the DVM, pan the Antenna through the peak point, then pan back to it. If there is not sufficient panning range use the other mounting point on the Antenna mounting bracket in order to pan through the peak. Record the peak RSSI voltage in the test form.

5. Using a 13mm spanner or socket torque the pivot bolts to 12Nm.

6. Place the strain relief strap in bracket extensions and around the drop cable ensure that the 70mm minimum bend radius of the cable is not exceeded.
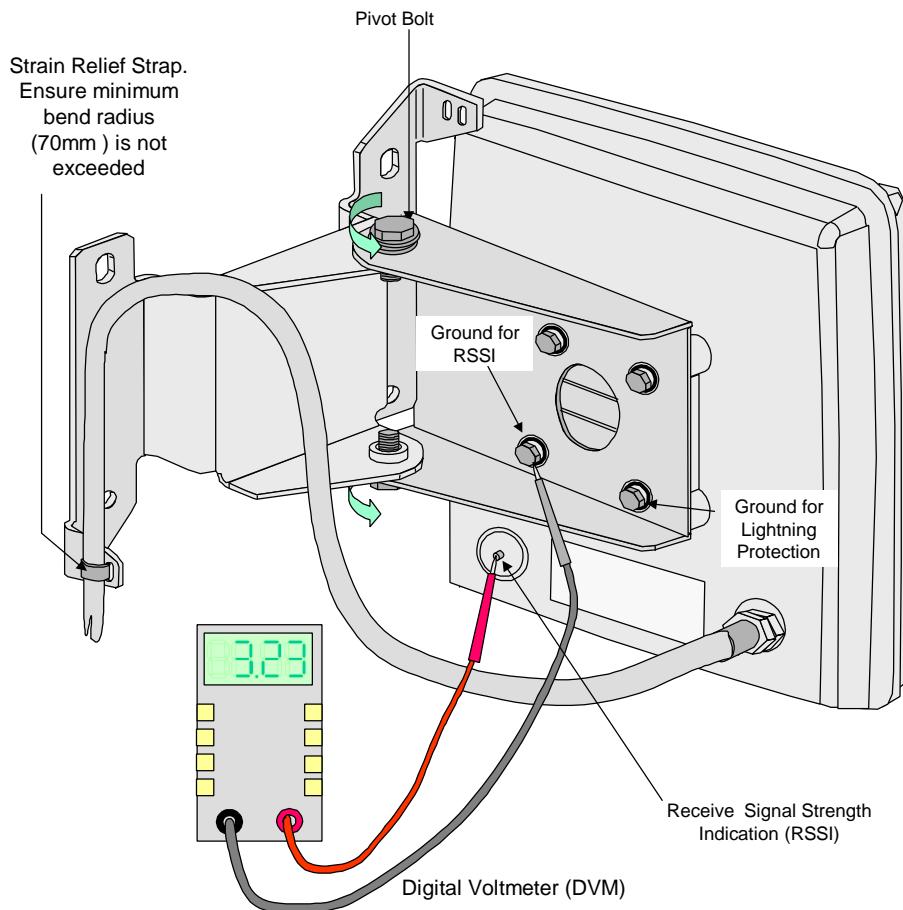
Figure 66. Panning Bracket Mount Antenna

Connect STMON for windows to the Service Interface Unit (SIU) and check that the ST has a warm net entry status if DA or has acquired if FA. Record the Uplink and Downlink Signal Strength and the Uplink Code Phase on the test form.

```
Subscriber Terminal Monitor                                    _ □ ×
File  Log  Help

| Radio Data | Version Data | Interface Data | STMON Setup |

┌─ Configuration ──────────────┐   ┌─ Up Link ─────────────────────┐
│          ST I.D.  [      15]  │   │   Up Link Status  [  Link OK ]│
│  Up Link Overlay Code  [   0] │   │     Up Link Rate  [ 160 Kbs ] │
│         PN Code  [       1]   │   │  Net Entry Status [  Cold ] Log Data ☐│
│         RW Code  [       6]   │   └───────────────────────────────┘
│  RF Channel Number  [   15]   │   ┌─ Down Link ───────────────────┐
│  Down Link Frequency [2253.75 MHz]│ │ Down Link Status [  Link OK ]│
│  Up Link Frequency [2078.75 MHz] Log Data ☐│  Down Link Rate [ 160 Kbs ] Log Data ☐│
└──────────────────────────────┘   └───────────────────────────────┘
┌─ Soft Error Count ───────────┐   ┌─ Rx / Tx Level ───────────────┐
│      Up Link  [       0]      │   │ Up Link Signal Strength [ 2.6 dBm ]│
│    Down Link  [       4] Log Data ☐│ Down Link Signal Strength [ -81.4 dBm ]│
└──────────────────────────────┘   │ Up Link Code Phase [ 23.00 Chip ] Log Data ☐│
                                    └───────────────────────────────┘
        [  Configure ST  ]                      [  Start Log  ]

| Elapsed Time 00:05:40, (day 0) |       | Log Stopped |       | COM 8 | Link OK |
```

FUNCTIONAL TESTS R,S,N & M SERIES VOICE INSTALLATIONS

Telephony tests can only be done after the CT has been connected to a network switch.

STEP	PROCEDURE

1. Using Sitespan set up subscribers at the CT as outlined in the Sitespan user guide 605-0000-428

2. Connect the test telephone to the NTU.

3. **Dial Tone Present.** Lift the telephone handset of VF 1 Off-Hook, and confirm that dial tone is heard in the handset receiver. If a comfort tone has been set check for comfort tone prior to Dial Tone. Record on the Test Result Sheet.

4. **Outgoing call.** Initiate a call from the subscribers' telephone to a test number provided by the CT Office. Ensure that the call can be successfully set up and that line quality is good.

5. **Incoming call.** Initiate a return call from the CT Office to the subscribers' telephone. Ensure that the call can be successfully set up and that line quality is good.

6. **VF 2 Test Calls.** Repeat steps 4 to 6 for VF line 2.

7. End of Subscriber Terminal Commissioning. Ensure all results are recorded in the test form.

   STOP. THIS PROCEDURE HAS BEEN COMPLETED.

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FUNCTIONAL TESTS B SERIES INSTALLATIONS

ISDN tests can only be done after the CT has been connected to a network switch.

STEP	PROCEDURE

This DLP in preparation

STOP. THIS PROCEDURE HAS BEEN COMPLETED.

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FUNCTIONAL TESTS L SERIES INSTALLATIONS

STEP	PROCEDURE

1. BER Test the link

See Appendix 3 for details of setting up BER Tests

STOP. THIS PROCEDURE HAS BEEN COMPLETED.

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TEST RESULTS

All results of testing must be entered on this Test Result Sheet. Please photocopy one for each ST to be commissioned.

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The ST Installation and Commissioning Result Sheet

Customer ID/Ref: .... AC Rack ID:……………………….

CT Rack ID: ....
....

Modem Shelf ID:

ST type …………………………

ST ID: ....

Outdoor Unit No.: ....

Part No.: ....

RF Card Serial No.: ....

Part No.: ....

SIU/ Serial No.: ....
Interface (if applicable)

Part No.: ....

Details and description of RF Path Profile and local environment;

....

....

Details and Position of Antenna

....

....

Details and Position of SIU/ Modular Enclosure

....

....

Test Results	
Uplink Signal Strength	dBm
Downlink Signal Strength	dBm
Uplink Code Phase	Chip

Telephone functionality for R, S and N series installations

(to be completed if connection to switch available)

Function / Test		Result
Line 1	Dial Tone Present	
	Outgoing Call	
	Incoming Call	
Line 2	Dial Tone Present	
	Outgoing Call	
	Incoming Call	

Telephone functionality for B series installations

Function / Test		Result
Line B1	Dial Tone Present	
	Outgoing Call	
	Incoming Call	
Line B2	Dial Tone Present	
	Outgoing Call	
	Incoming Call	

Data functionality for L series installations

Function / Test		Result

Comments

....
...

....
...

....
...

....
...

....
...

Installation Engineer: ....

Date of Installation: ....

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AS4000 SUBSCRIBER TERMINAL ACCEPTANCE FORM.

1. This section includes the ACC and customer copies of the Subscriber Terminal Acceptance Form. Photocopy sufficient forms for commissioning, (1 set per ST).

2. After completion give the customer a copy and retain one for ACC.

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AS4000 SUBSCRIBER TERMINAL ACCEPTANCE FORM

CONTRACT OR CUSTOMER'S REF. NO:

....

ACC COMMUNICATIONS LTD REF .NO:

....

SITE IDENTITY: ....

The Customer accepts that the following equipment has been supplied, installed and tested.

CRU Serial No:... Part No:
....
PSU Serial No:... Part No:
....

Customer Representative

Name: ....

Position: ....

Signature: ....   Date: ....

ACC Representative

Name: ....

Position: ....

Signature: ....   Date: ....

CUSTOMER COPY

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AS4000 SUBSCRIBER TERMINAL ACCEPTANCE FORM

CONTRACT OR CUSTOMER'S REF. NO:

....

ACC COMMUNICATIONS LTD REF. NO:

....

SITE IDENTITY: ....

The Customer accepts that the following equipment has been supplied, installed and tested.

CRU Serial No:... Part No:
....
PSU Serial No:... Part No:
....

Customer Representative

Name: ....

Position: ....

Signature: ....   Date:
....

ACC Representative

Name: ....

Position: ....

Signature: ....   Date:
....

ACC COPY

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RF CODES FOR SIUS WHEN USING STMON FOR WINDOWS

BAND	CHAN NO	UPLINK (MHz)	DOWNLINK (MHz)
2-2.3GHz	1	2029.75	2204.75
	2	2033.25	2208.25
	3	2036.75	2211.75
	4	2040.25	2215.25
	5	2043.75	2218.75
	6	2047.25	2222.25
	7	2050.75	2225.75
	8	2054.25	2229.25
	9	2057.75	2232.75
	10	2061.25	2236.25
	11	2064.75	2239.75
	12	2068.25	2243.25
	13	2071.75	2246.75
	14	2075.25	2250.25
	15	2078.75	2253.75
	16	2082.25	2257.25
	17	2085.75	2260.75
	18	2089.25	2264.25
	19	2092.75	2267.75
	20	2096.25	2271.25
	21	2099.75	2274.75
	22	2103.25	2278.25
	23	2106.75	2281.75
2.3-2.5GHz	30	2308.00	2402.00
	31	2312.00	2406.00
	32	2316.00	2410.00
	33	2320.00	2414.00
	34	2324.00	2418.00
	35	2328.00	2422.00
	36	2332.00	2426.00
	37	2336.00	2430.00
	38	2340.00	2434.00
	39	2344.00	2438.00
	40	2348.00	2442.00
	41	2352.00	2446.00
	42	2356.00	2450.00
	43	2360.00	2454.00
	44	2364.00	2458.00
	45	2368.00	2462.00

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BAND	CHAN NO	UPLINK (MHz)	DOWNLINK (MHz)
	46	2372.00	2466.00
	47	2376.00	2470.00
	48	2380.00	2474.00
	49	2384.00	2478.00
3.4-3.6GHz	54	3411.75	3511.75
	55	3415.25	3515.25
	56	3418.75	3518.75
	57	3422.25	3522.25
	58	3425.75	3525.75
	59	3429.25	3529.25
	60	3432.75	3532.75
	61	3436.25	3536.25
	62	3439.75	3539.75
	63	3443.25	3543.25
	64	3446.75	3546.75
	65	3450.25	3550.25
	66	3453.75	3553.75
	67	3457.25	3557.25
	68	3460.75	3560.75
	69	3464.25	3564.25
	70	3467.75	3567.75
	71	3471.25	3571.25
	72	3474.75	3574.75
	73	3478.25	3578.25
	74	3481.75	3581.75
	75	3485.25	3585.25
	76	3488.75	3588.75
	77	3492.25	3592.25
	78	3495.75	3595.75
1.8-1.9GHz	83	1851.25	1931.25
	84	1853.75	1933.75
	85	1856.25	1936.25
	86	1858.75	1938.75
	87	1861.25	1941.25
	88	1863.75	1943.75
	89	1866.25	1946.25
	90	1868.75	1948.75
	91	1871.25	1951.25
	92	1873.75	1953.75
	93	1876.25	1956.25
	94	1878.75	1958.75
	95	1881.25	1961.25
	96	1883.75	1963.75
	97	1886.25	1966.25
	98	1888.75	1968.75
	99	1891.25	1971.25
	100	1893.75	1973.75
	101	1896.25	1976.25

BAND	CHAN NO	UPLINK (MHz)	DOWNLINK (MHz)
	102	1898.75	1978.75
	103	1901.25	1981.25
	104	1903.75	1983.75
	105	1906.25	1986.25
	106	1908.75	1988.75
2.0-2.3GHz SUNTEL	113	2045.5	2220.5
	114	2049.0	2224.0
	115	2052.5	2227.5
	116	2056.0	2231.0
	117	2059.5	2234.5
	118	2063.0	2238.0
	119	2066.5	2241.5
	120	2070.0	2245.0
	121	2073.5	2248.5
	122	2077.0	2252.0
	123	2080.5	2255.5
	124	2084.0	2259.0
1.8-1.9GHz PA BAND ***** Note Frequencies will not be displayed on STMON screens for 1.8-1.9GHz PA Band Channel Numbers**	128	1852.75 ***	1932.75 ***
	129	1856.25	1936.25
	130	1859.75	1939.75
	131	1863.25	1943.25
	132	1866.75	1946.75
	133	1870.25	1950.25
	134	1873.75	1953.75
	135	1877.25	1957.25
	136	1880.75	1960.75
	137	1884.25	1964.25
	138	1887.75	1967.75
	139	1891.25	1971.25
	140	1894.75	1974.75
	141	1898.25	1978.25
	142	1901.75	1981.75
	143	1905.25	1985.25
	144	1908.75	1988.75

Table 10. RF Codes for SIUs

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# DOWNLOADING SUBSCRIBER TERMINAL SOFTWARE FROM A LAT TERMINAL

This procedure is used when at the Subscriber Terminal to download software. In most circumstances software is downloaded over the radio link using Sitespan.

STEP   **PROCEDURE**

1. Connect LAT Terminal to the ST Service Interface Unit

1. Terminal Access for LAT is via the PC RS232 com port connected to the Service Interface Unit. The PC interface cable is terminated as shown below.


R and S Series Interface — RJ45 Plug

B, L, and N Series Interface — 15way D-type Male

PC Interface — 15way D-type Female
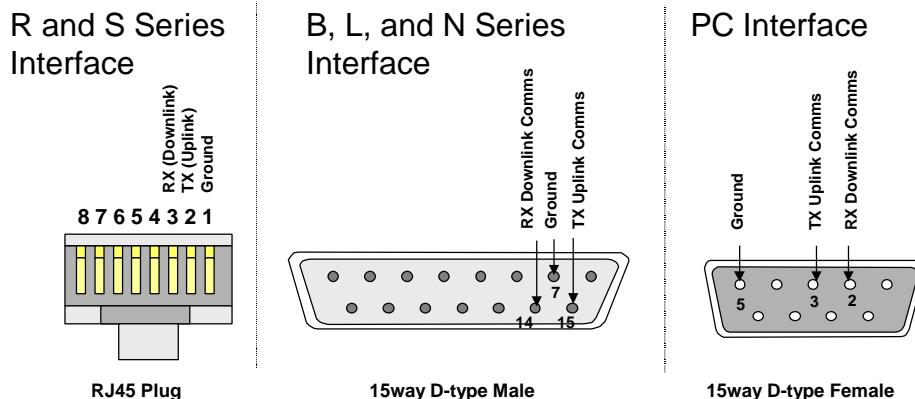
Note: When Using LAT with the Modular Enclosure the interfaces are presented on the front panel of the battery compartment.

2. Downloading ST software via Lat

1. Reboot ST by typing **TW¿**
2. During reboot cause the boot to abort by typing **BA¿**
3. Type **WE_3¿** to turn watchdog Off
4. The reboot information displayed includes 'code to switch to bank 'x'. Where x is either 1 (low bank) or 2 (high bank)
    The software is downloaded to the opposite bank
    If x is 1 type **SI_2¿** to download software into bank 2
    If x is 2 type **SI_1¿** to download software into bank 1.
5. Set text transfer to 'line at a time' and wait for prompt string # # FLASH # #
6. Send text file.

7. Once information is downloaded type **WV_Q¿**
8. To prepare bank for switching type **WV_C 2 10005 0 0 0**

Bank to switch to ⟶   High bank checksum

Version number in HEX   High bank version number
i.e version 1.0005   High word   Low word

| 0001 | 0005 | Low bank checksum
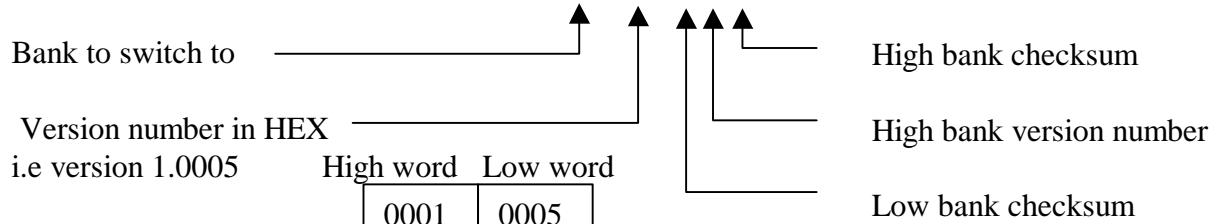
Set to '0' and the correct values are automatically inserted

9. To write changes type **WV_W¿**
10. To reboot type **TW.**

<center>**STOP. THIS PROCEDURE HAS BEEN COMPLETED.**</center>

CREATING A TEST CHANNEL AT THE CENTRAL TERMINAL

The following procedure at the **Central Terminal** will create test channels for test acquisitions. In order to simulate the same process that the ST uses to acquire on a 'live' system, it is necessary to acquire the downlink only at 10kbit/s on the Test Link Acquisition Channel. This link can then be transferred on to the Test Traffic Channel at 160kbit/s with both the downlink and the uplink.

STEP	PROCEDURE

1. Retrieving Channel States

1. At the Central Terminal. Connect LAT cable to DTU card
2. Type:
   TI 39
   TO
   Amongst other messages, DTU returns:
   689973016 RADIOSLV[0x0]: Slot
   States:46660666066606660666066611111111111111111111111111156664
   666
   The first 4 numbers returned indicates the state of RW 1, the next 4 the state of RW 2 and so on. The meaning of the numbers is shown below:

1111:	Idle
0666:	Traffic Channel
5666:	Call control Channel
4666:	Link Acquisition Channel or Net Entry Channel

To create a test channel, an RW must be chosen which is currently idle, which means that it must display all one's.

2. Configuring Test Link Acquisition Channel (TLAC)

1. With LAT connected to the DTU, type:
   EA 39:0/3A:0/3B:7 (The final number, 7, is the RW code that will become the TLAC)

2. Type **ES 2**

3. Configuring Test Traffic Channel (TTC)

1. At the Central terminal connect LAT to the DTU, type: **EA 39:0/3A:0/3B:8** (The final number, 8, is the RW code that will become the TTC)

2. Type **ES 3**

4. Forcing the ST to acquire a link

1. The 'LK' command forces the ST to acquire a link as follows:

	RW Code	PN Code	Up Link Rate *	Down Link Rate*	Overlay code	Frequency channel number within channel plan
LK	8	1	4	4	0	9

* The rate at which the link will acquire is defined as follows:
1:      10kbit/s
2   40kbit/s
3   80kbit/s
4:      160kbit/s

2. With the LAT connected to the ST, ensure that the ST has booted-up, type:
TE 0 Puts ST into test mode
W 426 Watch the link state
LK 7 1 1 0 0 9 Acquire a downlink on TLAC (in this example RW 7, at 10kbit/s channel 9)
LK 8 1 4 4 0 9 Acquire a downlink and uplink on TTC (in this example RW 8 at 160kbit/s channel 9

3. During these commands, the link status 'watch' should return the states as described in paragraph 2. The final state should be '0B0B'

4. The ST now acquires, if the ST fails to acquire the ST is faulty.

5. To take the ST out of test mode, type: **TE 1**.

5. Returning RW codes to system use:

At the Central Terminal With LAT connected to DTU card, type:
EA 39:0/3A:03B:7
To return RW code 7 to system use
ES 0
To return RW code 8 to system use
EA 39:0/3A:0/3B:8
ES 0

STOP. THIS PROCEDURE HAS BEEN COMPLETED.

BER TESTING

During commissioning A BER test can be set-up on the DA system to measure the performance of the RF link. This can be achieved with the following procedures

STEP	PROCEDURE

1. Setting up the BER Tester

1. Remove the 2Mbit/s connection at the AC Port mapped to the link to be tested.
2. Connect the 2Mbit/s cable from the BER tester to the Access Concentrator Port
3. Configure the BER tester as follows:

Interface:	Ternary
Linecode:	HDB3
Frame:	CAS MFM
Through Mode:	Off
Tx Clock Source:	Internal
Pattern:	2^23-1
PRBS Polarity:	Inv
Receive Timeslots:	As per Tx
Tx:	Timeslot set to timeslot allocated to link

1.1 Configuring the DTU card

1. Connect the LAT cable to the DTU card
2. Put DTU into test mode Type: **TE 0**
3. To Enable through-path through DTU Download the following text file: RW7_160k.txt

1.2   **Placing a loopback at the the ST**

1. Connect the LAT cable to the ST

2. Ensure the ST has booted up correctly

3. Put ST into test mode Type: **TE 0**

4. Force ST to acquire on RW 7, with Uplink and Downlink of 160kbit/s, using RF channel 9 within C2 band (F14) **LK 7 1 4 4 0 9**

5. Watches link state. Type **W 426** Wait for the link to acquire. When the link has acquired the ST will return: D: 0426 0B0B

6. Enables Loopback. Type: **MM 40004a h=df**

The BER test can now be run from the Central Terminal.
To take the DTU out of the test mode, using the LAT cable, type: **TE 1**
To return the ST to normal, using the LAT cable, type: **TE 1**

STOP. THIS PROCEDURE HAS BEEN COMPLETED.