AS4000
Wireless Local Loop System
DA Central Terminal
Commissioning Unit
Operators Manual

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Notice

1. This manual is subject to revision.

2.

3. Right of modification reserved.

4. This manual is supplied without liability for errors or omissions.

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6. This equipment is conditioned by the requirement that no modifications are made to the equipment unless the changes or modifications are expressly approved by the Airspan Communications Corporation

7. Prerequisite skills: Personnel installing, commissioning, and maintaining the Airspan products must have a basic knowledge of telephony and radio communications, and have experience in installing, commissioning and maintaining telecommunications products. Airspan provides a range of comprehensive training courses specifically aimed at providing operators/users of Airspan products with the prerequisite skills to install, commission and or maintain the product. The courses are tailored to provide the level of training required by the operator/user.

8. AS4000 and AS8100 are brands of Airspan Networks Inc

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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.

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 Airspan to ensure that the product is disposed of in conformance with the relevant regulatory requirements

CE

The CE 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.

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INTRODUCTION

1. Purpose of Document

This document describes the operation of the Airspan AS4000 DA Central Terminal Commissioning Unit

2. Prerequisite skills

This manual is intended for use by persons familiar with the Airspan product having attended the Airspan CT training course prior to performing the procedures in this practice.

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DA COMMISSIONING UNIT

1. Introduction

The DA Commissioning Unit (DACU) is used during system commissioning and routine maintenance. The Unit can be used to commission the AS4000DA Central Terminal.

2. DACU Components

Component
DACU
RF Coupler
50 Ohm Termination
RF Connecting Lead
Power Connecting Lead
RS232 Modem Shelf Interface Cable
RJ11 to 9 way Connection Adapter
PC Interface Cable 9way-25way
PC Interface Cable 9way-9way

3. Architecture Overview

The Commissioning Unit architecture as depicted in Figure 1. Components comprise:

i. Commissioning Unit

ii. Cables and couplers to allow the Commissioning Unit to be connected to the RF sub-system.

iii. Cables to allow the Commissioning Unit to be connected to each Modem Shelf (to support communications to each Shelf Controller).

iv. Associated system firmware upgrades required to support AGC operation in cards such as the Shelf Controller.

4. Principles of Operation

The Commissioning Unit acquires a full low rate RF downlink / uplink through RF cabling coupled into the CT transmit / receive antenna ports. Knowledge of the path loss between the Commissioning Unit and RF antenna port allows the Commissioning Engineer to adjust RF receive level as required using AS8100 Sitespan.

The Commissioning Unit scans and acquires a CDMA link to allow a specific RF channel to be quickly adjusted during commissioning (or re-checked by a visiting maintenance engineer)

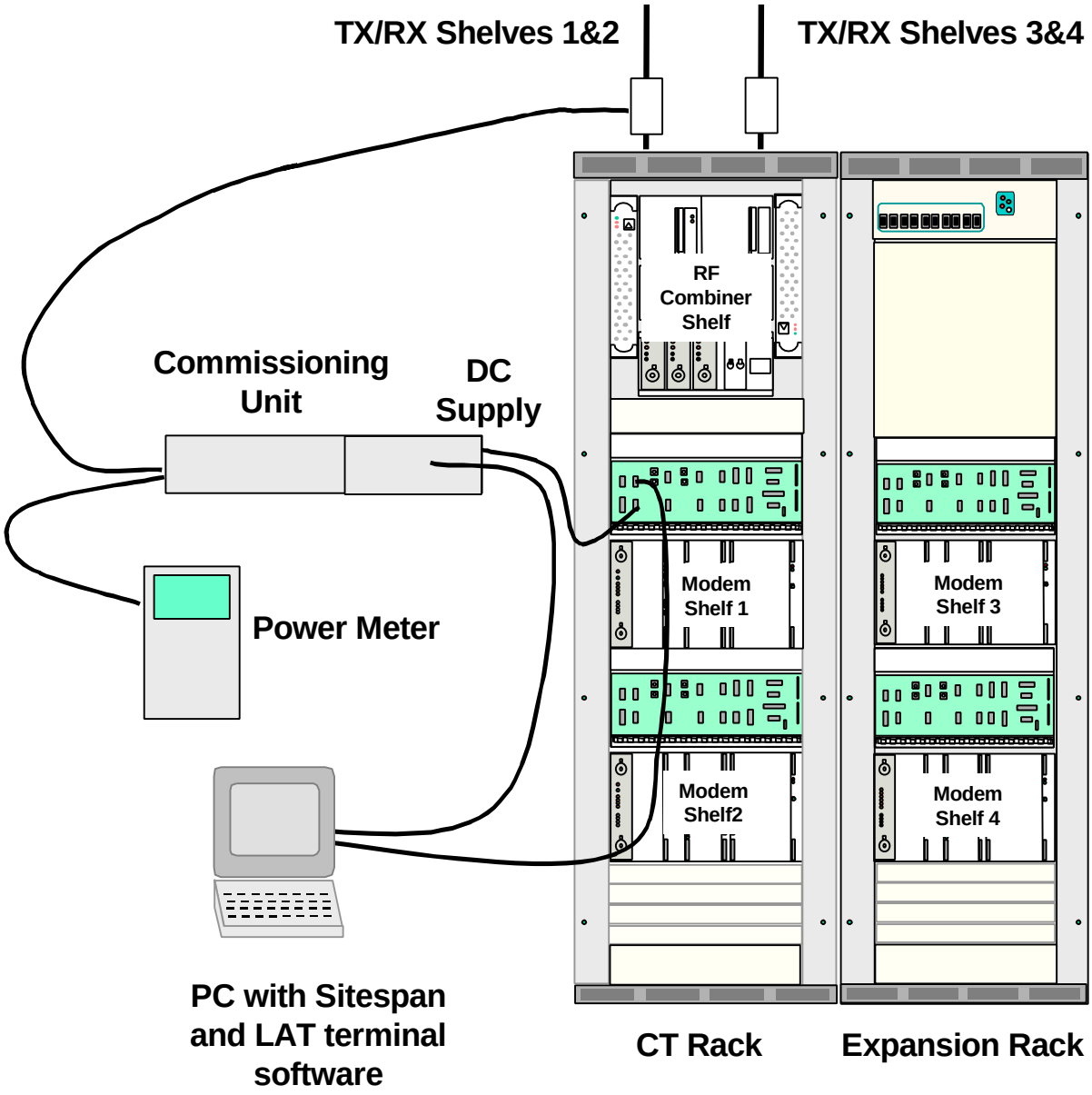
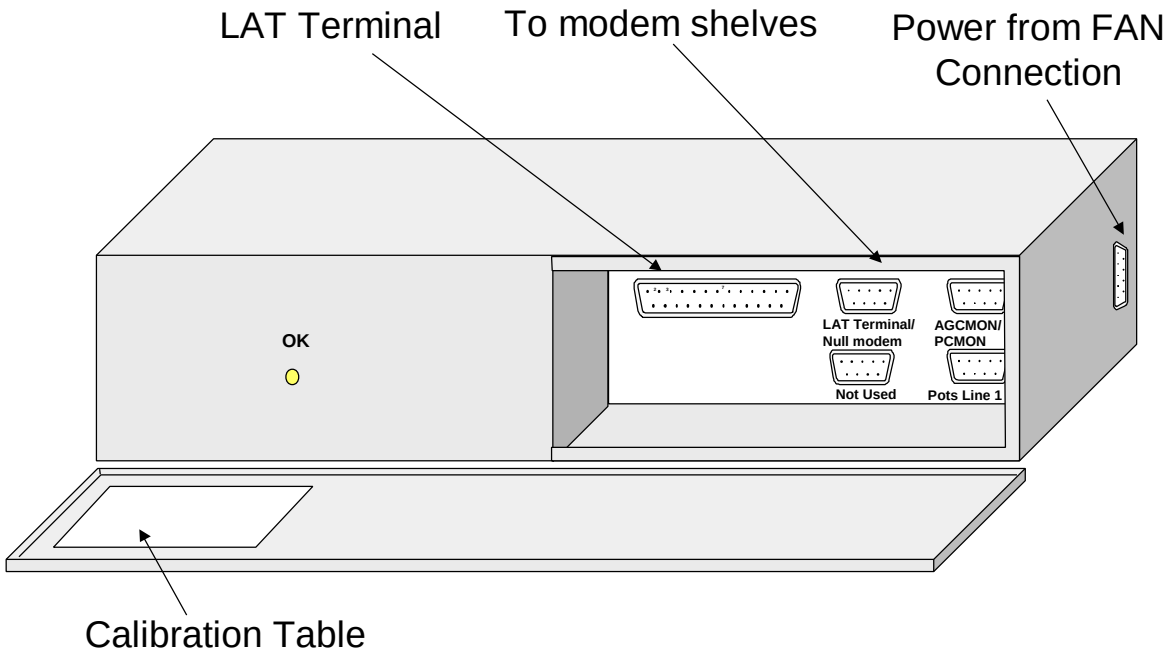


Figure 1. DACU Connections to AS4000 DA CT Rack

5. DA Commissioning Unit

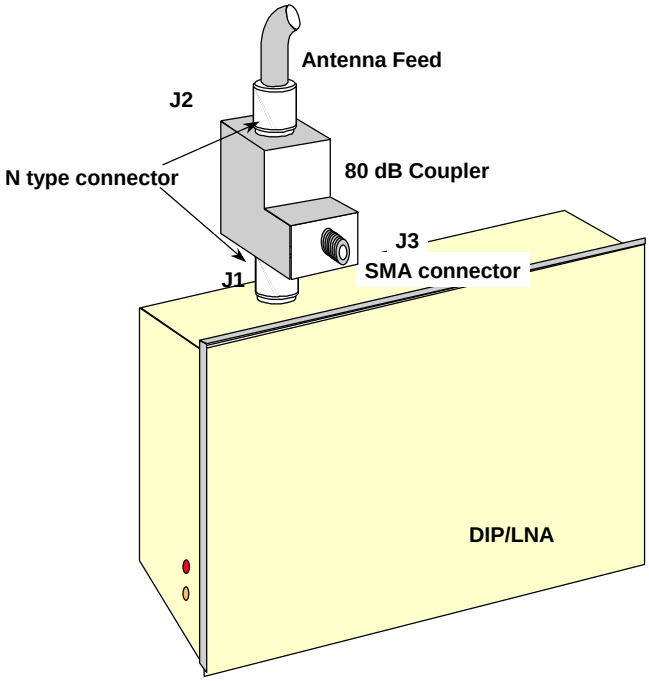
5.1. Mechanical

The Commissioning Unit measures 600mm wide, 300mm deep. 100mm high and can be rack mounted if required.



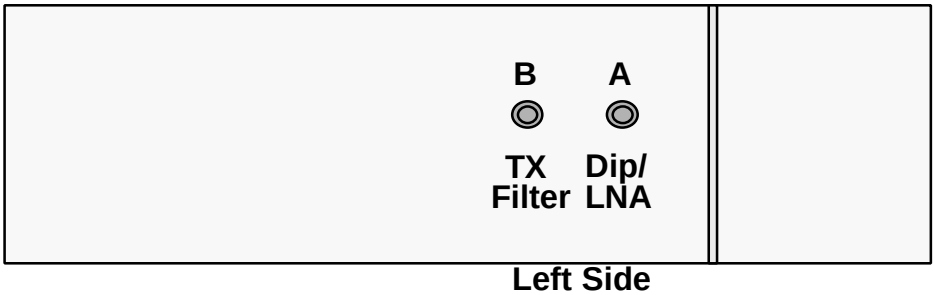
5.2. RF Interconnect

The Commissioning Unit has two RF ports (SMA connectors 50 Ohm impedance) the RF lead is connected to port A and to the RF antenna port using one length of RF cable and one coupler per antenna port. Unused ports are terminated using 50 ohm RF loads. All couplers and cables are marked to show insertion loss.



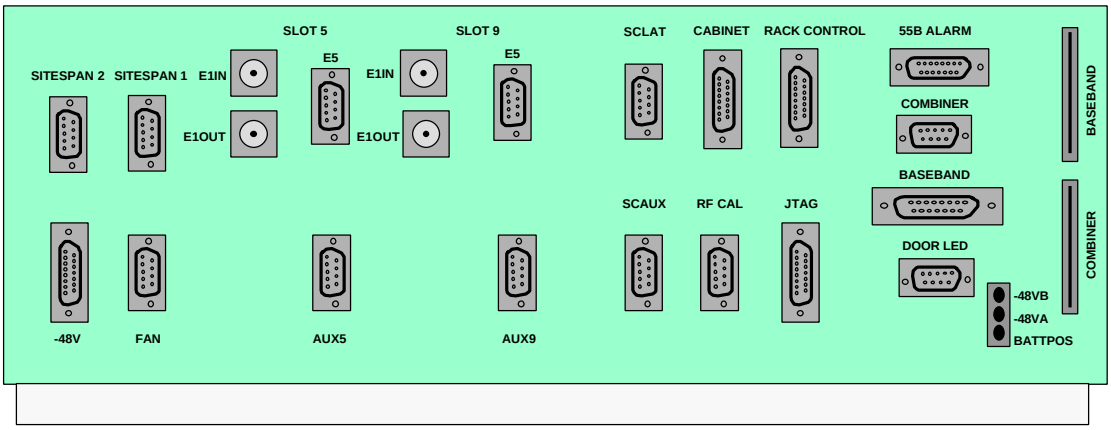
5.3. Power Meter Connections

The Power meter is connected to the transmit port (B) on the DACU



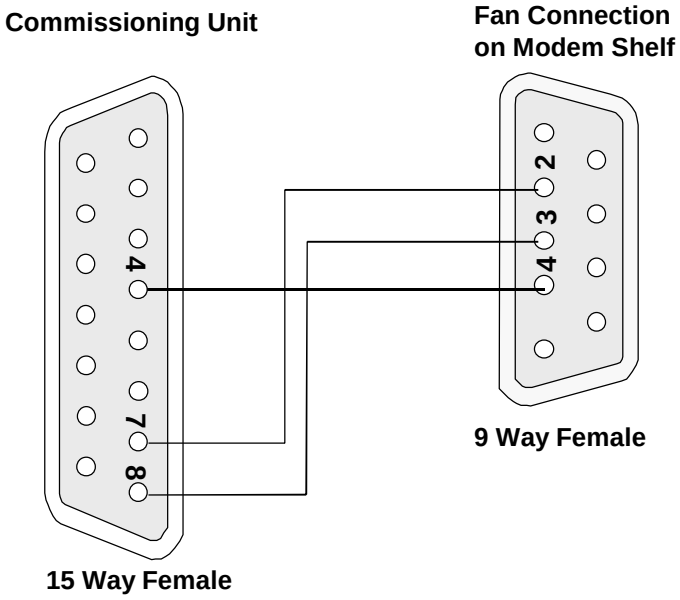
5.4. Shelf Controller Communications

Connect to the management system port of the modem shelf to the Commissioning Unit D-type labelled AGC/PC MON.
A female 25 pin D type connection is presented on the adapter for connection to the LAT Terminal.



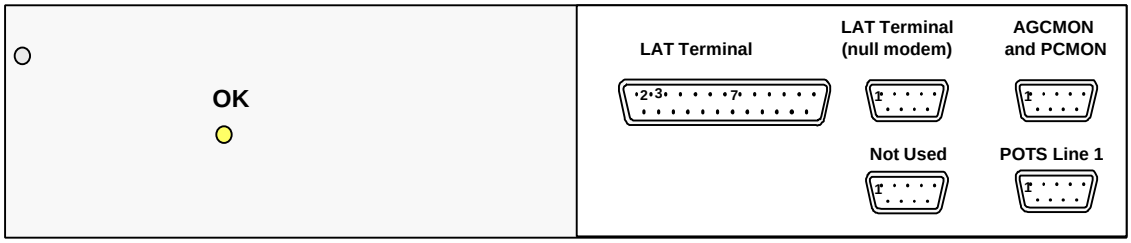
5.5. DC Connections

The DC Supply is connected to a 15 way D-type connector on the right side of the unit. The Battery return is connected to pin 4 and duplicated supplies to Batt-ve(0) to pin 8 and Batt-ve(1) to pin 7 . The DC supply can be obtained from the FAN D-Type connector (P17) on the Modem Shelf connector panel.

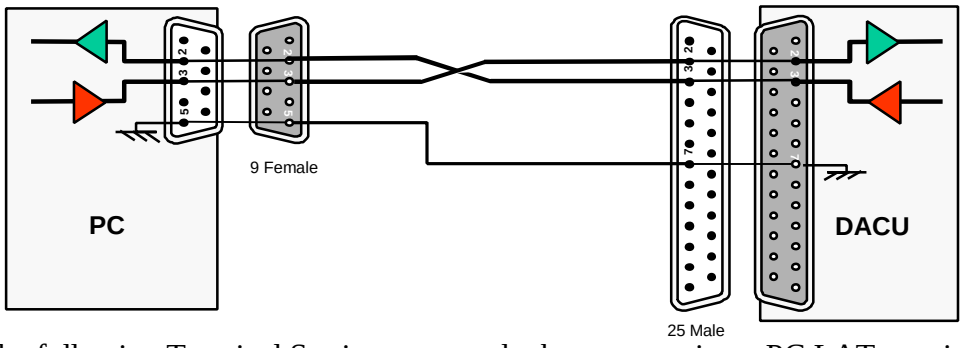


5.6. Connect LAT Terminal

Connect LAT terminal to the terminal Port on the DACU



The connecting lead details are shown below



The following Terminal Settings are used when connecting a PC LAT terminal to a DACU:

Communications
Baud rate = 9600
Data bits = 8
Stop Bits =1
Parity = None
Flow Control = None

Text Transfers
Flow Control = Line at a time
Delay between Lines = 1 sec (10/10)
Block Cursor Word Wrap at Column = 79

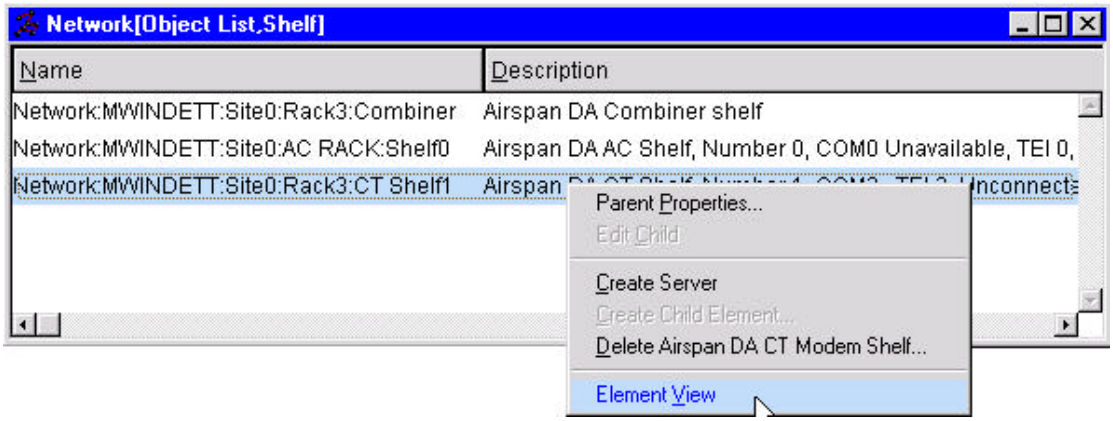
Terminal Preferences
Columns = 80
Cursor =Block with Blink
Buffer Lines = 100

CENTRAL TERMINAL COMMISSIONING USING THE DACU

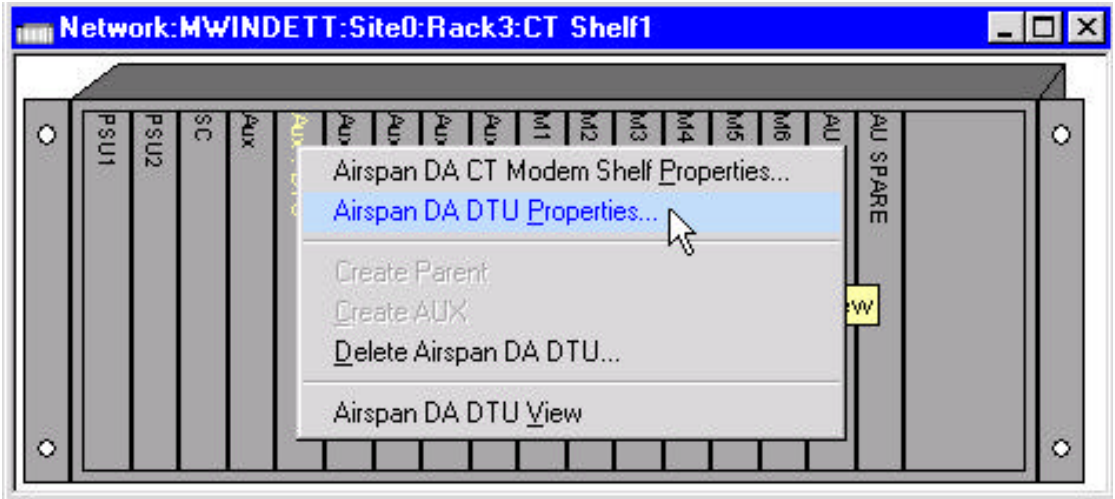
1. Preparation for Commissioning at the Central Terminal

To make it possible for the test DACU to acquire a link the RW Management and Net Entry has to be set via the AS8100 Sitespan as follows:

1. From the *Object List Shelf* view select the modem shelf, click right mouse button and select the 'element view'



2. Select the DTU on the modem shelf and click right mouse button, select Airspan DTU properties



3. In the Edit card state window set max net entry channels to 1, set the number of Free list entries at 160K 80K and 40K to 0.

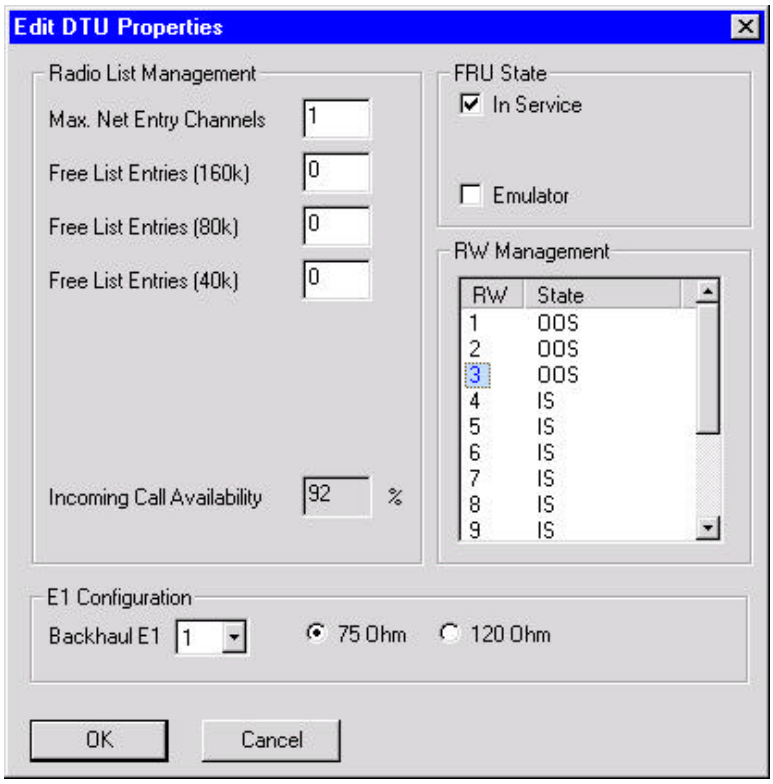
4. In order to acquire a test radio link using an ST, Sitespan must be used to place RW codes 'Out of Service' (OOS) for either 10k or 160k bandwidths. These can be selected from the DTU card properties. The options for each RW code are:

   - IS - The RW is in service
   - OOS - This takes the RW out of service.
   - OOS(10k) - This puts the RW in Test Mode, allocating a 10kbit/s bandwidth.
   - OOS(160k) - This puts the RW in Test Mode, allocating a 160kbit/s bandwidth.

   The DTU card view shows all of the RW codes, and their current state within the system (i.e. OOS or IS).

   IMPORTANT NOTE: *An RW code can only be placed Out of Service if it is currently not in use by the system. Before proceeding, it is important that the DTU card view is checked, to ensure that the RW code is in the desired state.*

5. In the RW management window place the mouse pointer over the IS for RW 1 click left mouse button until OOS is selected. Repeat for RW2 and RW3 to prepare for commissioning. Once RW codes have been reserved for Test links, the ST can be programmed in the usual method, although the RW channels that the 10kbit/s and 160kbit/s links are acquired on, must be the same as the ones set-up in the DTU card properties (i.e. NOT RW 15!).



2. Power Cycle the Rack

The rack should be power cycled.

3. Check DACU Calibration

Each DACU is provided with a calibration table on the cover unit a typical table is shown below. The path loss is equal to the sum of the unit losses and external losses.

Cable Loss dB	Coupler Loss	Unit loss	RX sensitivity	Power meter Reading
1	80	17	-98	-3.68
2	80	17	-99	-2.68
3	80	17	-100	-1.68
4	80	17	-101	-0.68
5	80	17	-102	+0.32

Table 1. DACU Calibration Table

4. Set Rx Sensitivity

1. Type:Acc> **TE 0**
   Acc> **WU C 1 4000d 0 0 0** (where 4000d indicates version 4.13)
   Acc> **WU F A**

2. Program the DACU via the LAT port to the correct frequency, PN code and ID number.

3. Set RW.
   WU I 1 1 1 1
   WU W

   WU I <stid> <pn> **0 1**
   Where <Stid> is in HEX, 17 dec = 11 hex, and pn is 1 in most cases.

4. Write data into ST:

- **WU W**

5. Once the DACU has booted-up, put it into test mode by typing: **TE 0.**

6. Note: A configured DACU cannot maintain its uplink without being registered by the management system. The DACU becomes registered when its ESN is entered into the management system database. A registered ST can acquire the uplink and maintain periodic information exchange with the shelf's SC.
   The 'LK' command forces the DACU 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

7. For testing type in the code relating to the system as set up i.e. **LK 7 1 4 4 0 9**. In the example above the DACU is forced to acquire on RW 7, PN 1, with Uplink and Downlink of 160kbit/s, using RF channel 9 within the RF band.
With the LAT connected to the DACU, ensure that it has booted-up.
Type: **LK F 1 1 1 0 1** to set channel 15 and **LK 1 1 1 1 0 1** to set channel 1 or **LK 2 1 1 1 0 1** to set channel 2.

8. Type **W 426** to monitor link state.

9. The DACU will return with:

Display	Interpretation
D: 0426 0000	No Link
D: 0426 0101	Downlink Acquired
D: 0426 0303	Uplink Acquired (transitory state)
D: 0426 0B0B	Uplink Acquired
D: 0426 0808	* Downlink has failed
D: 0426 0909	* Uplink has failed
***Note:** relate to a link failure	

Table 2 Link States

10. Once the DACU acquires the link, the RX gain can be commissioned. If the link does not acquire, then it will be necessary to change the RX gain through Sitespan. To check if the Link has acquired check the Green LED is illuminated on the Modem Card. The top 4 LEDs show the first modem at the different acquisition rates and the next 4 LEDs show modem 2.

11. Using Sitespan highlight the shelf, and edit ‘parent properties’.

12. Select ‘Airspan DA CT modem shelf’.

13. Adjust the ‘Rx Gain’ by increasing and decreasing the values. **Note:** To start with, set the RX gain to around 2200. (if value is reduced power goes UP). Check the output power of the DACU, and repeat until the output power matches that in the DACU Calibration Table.

14. Record the result. The values of the TX and RX gain must be set into the Sitespan at the AC before the backhaul is connected to the CT, failure to do this results in the TX power and RX sensitvity values being overwritten by the value stored in the Sitespan Server.

15. When the Sitespan connects it configures the OOS and Net Entries but as a precaution it may be prudent to set all lists in the DTU properties to OOS.

16. Power off the DACU.

17. With the LAT connected to the DTU, restore the DTU from test mode by typing **TE 1.**

18. Disconnect the RF cables from the rack and connect the Antenna. The rack is now fully commissioned.

5. Restoring shelf connections

1. Remove the test equipment and connecting cables.

2. Replace the Shelf covers and the protective cap on the coupler.

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ISSUE CONTROL LIST

Title	Issue	Date	Issue Details
Title Page	2.0	March 2000	Update
ICL-001	2.0	March 2000	Update
IXL-001	2.0	March 2000	Update
GSI-001	2.0	March 2000	Update
DLP-001	2.0	March 2000	Update

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Related Documentation

	Demand Assignment
605-0000-450	System Overview
605-0000-451	System Operations and Maintenance Manual
605-0000-452	DA Central Terminal - Equipment Rack Installation & Commissioning
605-0000-453	Access Concentrator - Equipment Rack Installation & Commissioning
605-0000-454	Subscriber Terminal Installation & Commissioning
605-0000-427	AS8100 Sitespan User Guide

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Abbreviations

AC	Access Concentrator
AGC	Automatic Gain Control
CPE	Customer Premises Equipment
CRU	Customer Radio Unit
CT	Central Terminal
DA	Demand Assigned
DACU	Demand Assignment Commissioning Unit
DTU	Demand Assign Tributary Unit
DC	Direct Current
DMM	Digital Multi Meter
ISDN	Integrated Services Digital Network
LAT	Local Access Terminal
LD	Loop Disconnect
LED	Light Emitting Diode
MF	Multi-Frequency
NTU	Network Termination Unit
PC	Power Control
PN	Psuedo Random Noise
PSU	Power Supply Unit
RF	Radio Frequency
SC	Shelf Controller
ST	Subscriber Terminal
Rx	Receive
Tx	Transmit
VF	Voice Frequency

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