AS8100 Sitespan Wireless Fixed Access System Management

Release Description

605-0000-428
Issue 1.1 Date 25/8/98

Airspan Communications Corporation

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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 ACC 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.

User Response Form

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Document Rating	Excellent	Good	Average	Below Average	Poor
Accuracy / Completeness	❑	❑	❑	❑	❑
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Figures	❑	❑	❑	❑	❑
Table of Contents/Index	❑	❑	❑	❑	❑

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Abbreviations

AC	Alternating Current
AGC	Automatic Gain Control
CPE	Customer Premises Equipment
CRU	Customer Radio Unit
CT	Central Terminal
DC	Direct Current
DMM	Digital Multi Meter
DRS	Digital Radio System
ISDN	Integrated Services Digital Network
ITU-T	International Telecommunications Union -Telecommunications
LD	Loop Disconnect
LED	Light Emitting Diode
MF	Multi-Frequency
NTU	Network Termination Unit
PC	Power Control
PSU	Power Supply Unit
RF	Radio Frequency
ST	Subscriber Terminal
Rx	Receive
Tx	Transmit
VDU	Video Display Unit
VF	Voice Frequency

Related Documentation

605-0000-427	**AS81000 Sitespan User G**
	Fixed Assignment
605-0000-430	System Overview
605-0000-431	System Operations and Maintenance Manual
605-0000-432	Central Terminal - Equipment Rack Installation & Commissioning
605-0000-433	Central Terminal - Antenna/Feeder Installation & Commissioning
605-0000-434	Hardware Overview
605-0000-435	Material Return and Repair
605-0000-436	Subscriber Terminal Installation & Commissioning
605-0000-437	D128 Terminal Converter
	Demand Assignment
605-0000-450	System Overview
605-0000-451	System Operations and Maintenance Manual
605-0000-452	Central Terminal - Equipment Rack Installation & Commissioning
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INTRODUCTION

1. Executive Summary

The AS8100 Sitespan management system is designed as a configuration, alarm, test and performance manager for Airspan's Wireless Access Systems. Flexibility and scalability ensures that the system is capable of being deployed in broad range of scenarios.

The following sections present an overview of the structure, properties and potential of the Sitespan product as both an integrated access management solution and as a single-seat high-performance craft interface device.

2. Prerequisite skills

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

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SYSTEM REQUIREMENTS

1. Minimum Hardware Requirements

Capacity to manage 16 shelves.

Operating System	Microsoft Windows NT Workstation or Server version 4.0 or greater
Platform	IBM Compatible Pentium PC 166 MHz CDROM
Communications	Digi-Board 16 port
RAM	32 Mbytes
Hard Disk	1 Gbyte
Display	17” 1024x768 Colour
Modem (if Required)	Hayes Compatible 9.6kb/s or better.

These are *minimum* specifications.

2. Operating System Requirements

Sitespan requires Windows NT Version 4.0 Workstation or Server. In addition, Remote Access Server (RAS) should be installed though it should be noted that the service does not have to be running in order for Sitespan to operate on a stand-alone system.

To verify that RAS is installed, click Start, Settings, Control Panel, Network and view the Services tab. If Remote Access Service is listed, RAS is installed. If it is not listed then click ADD and select it from the list. The Windows installation CD will be required.

Windows NT V4.0 Server is required if multiple, simultaneous dial-up connections are to be supported.

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SYSTEM INSTALLATION

1. Operating System Installation

Please refer to Microsoft's "Basics and Installation" documentation that comes with the software.

2. Digi-Board Installation

To manage large numbers of modem shelves additional serial communication ports may be required. The Digi-Board PC/'XEM can provide these.

Install the PC card and driver software following the manufacturer instructions. Under Windows NT 4.0, drivers for Digi products are provided on the Microsoft Windows NT V4.0 installation CDROM. It is important to ensure that you are logged on with Administrative rights when installing new hardware.

Additional com ports provided by Digi hardware appear to the operating system in addition to any ports already present within the PC system. It is strongly recommended however that the new ports are assigned com designations from port 11 onwards, This will assist with the physical port identification on the external hardware.

3. Sitespan Software Installation Instructions

Sitespan Version 2.5 is supplied on five 3.5" floppy disks and utilises the standard Windows setup wizard. Ensure that you are logged on with Administrative rights before commencing the installation.

1. To install Sitespan, simply insert disk 1 into the floppy disk drive and run setup.exe (Click Start, Run and then enter a:\setup.exe). This will guide you through the installation process automatically suggesting default locations and user names. Programs will be added to the Start menu (on Windows NT4) and signalling files copied into the C:\sigfiles directory.
2. Insert the correct floppy disks when requested. During the installation, the user is provided with information regarding Windows NT Remote Access Service (RAS). It is important that this Windows NT component is installed in order for Sitespan to operate correctly. The final operation after Setup has completed is to run a batch file that locates the "DLL" files in their respective locations.

3. Click Start, Run and then enter:

C:\Program Files\Sitespan.V25\instdll.bat

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4. Click OK. Files are copied from the installation directory to the correct Windows directories during this process.

5. Remove the Sitespan floppy disks and store safely.

6. This completes the installation procedure.

Note: The set-up routine will automatically add the Sitespan application files to the "Start, Programmes" list if the installation is made to the C: drive. An error may be reported if the files are installed to any other drive though this only affects the installation into the Start, Programmes menu.

4. Running the Software

On stand-alone systems where both Server and Client applications are to be run on the same PC platform, Sitespan can be started. This can be achieved by selecting the relevant application from the following path: Start, Programmes, Sitespan V2.5.

It is important to note that the Server Name prompted when creating a new server in Client is utilised on this type of installation. This name refers to the computer identification name entered during Window's NT Networking set-up. Please refer to the appropriate documentation for further information.

5. Connections to the Equipment

The following table gives the pin to pin connections for the cable:

25-way female D-type (DB25) plug PC	25-way male D-type (DB25) plug Airspan Shelf	9-way male D-type (DB9) plug LS120 Shelf
Pin 2	Pin 3	Pin 3
Pin 3	Pin 2	Pin 2
Pin 7	Pin 7	Pin 7

Multiple RS232 connections can be handled by the computer system by the addition of serial ports. AIRSPAN recommend the use of Digi® Board products for this purpose as they are supported directly by Microsoft Windows NT. An example of the connections required is illustrated below.

Example of Connections from a Sitespan Server Computer Using a 16 Port Digiboard

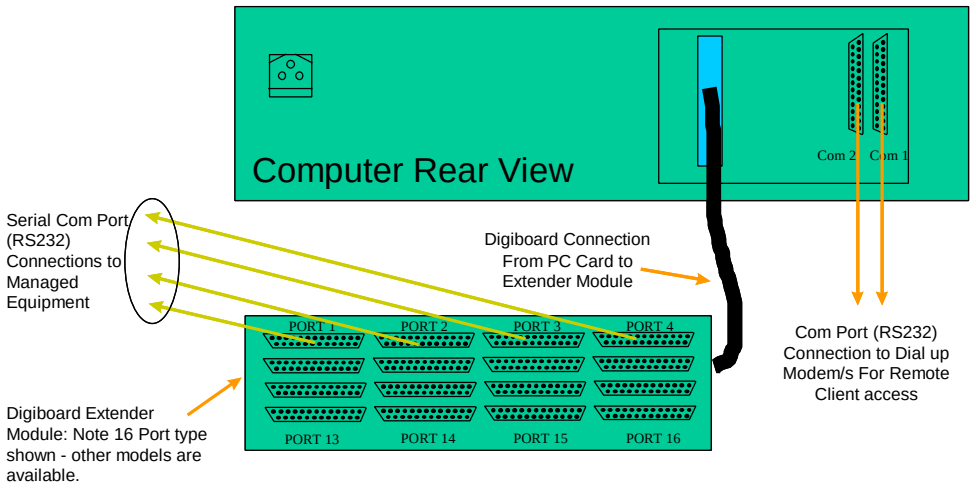

Figure 1: Connection to a 16 port Digi-Board

SYSTEM ARCHITECTURE

Designed to provide alarm and configuration management for Airspan's product range, Sitespan is capable of meeting a wide range of customer's requirements, operating either on a single, stand-alone PC or within a multi-user client-server network. Microsoft Windows NT provides the operating system, which permits this scalability.

Sitespan is built from two core applications: Client and Server. The Server provides communication to and from the managed equipment maintaining an up-to-date object model whilst the Client provides the user interface, communicating only with the Server application. Both applications can run concurrently on a single Pentium PC providing for smaller/single user installations.

The system permits multiple Clients to connect to multiple Servers either by direct network connections or by dial up connections. This enables Sitespan to span a large number of managed elements.

Communications between the Client and Server applications have been optimised in order to enable dial-up connections at speeds as low as 9.6Kbps whilst maintaining as near to real-time operation as possible.

5.1. Fixed Assignment Management

Management connections for Fixed Assignment require a single RS232 Connection for each shelf. A single computer fitted with communication port expansion cards may support multiple shelf connections. This is shown in Figure 2 below:

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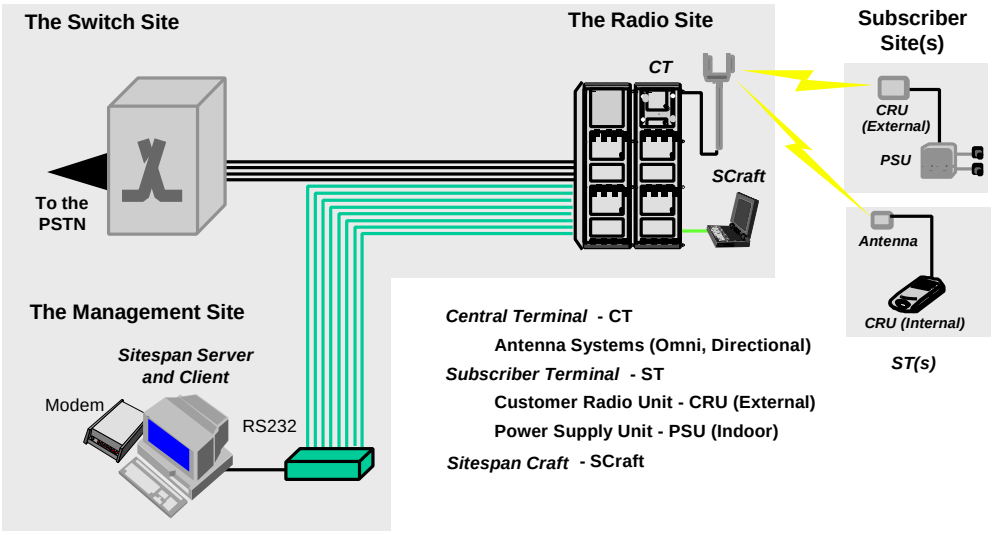

Figure 2: Fixed Assignment Management

5.2. Sitespan Server

The Server application is a multithreaded object-oriented database acting as a real-time repository for managed equipment inventory and status. The user is provided with a single window that displays the number of queued operations and connect time of each connected Client application. All other operations, which are performed in the background, include:

- Monitoring communications to/from the managed equipment
- Maintaining an accurate object model of the static and dynamic attributes of the managed equipment
- Communicating with the managed equipment in its native control language
- Monitoring Client connections
- To provide, where possible, real-time access to the managed equipment
- To maintain a real-time log of all attribute changes

Once configured, the server will continue to manage the equipment even when no Clients are connected.

5.3. Sitespan Client (Equipment View)

The Client application provides the user interface and being Windows NT based, Sitespan utilises drop-down menus, iconic representations, maps and equipment views. Great effort has been taken to minimise the depth of menus to ensure that most operations are accessed by only a few mouse clicks.

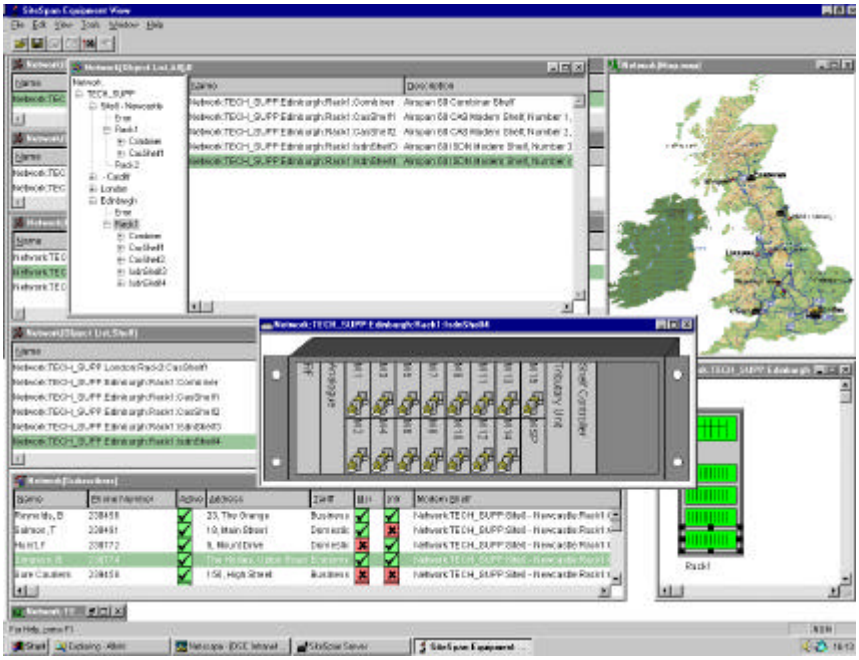

Figure 3: Screen shot showing equipment, map and tree views.

Management of larger networks benefit from the use of hierarchical structures to help reduce clutter and to clarify the display of information. Sitespan's broadest categorisation of object is Server. Each Server manages a collection of Sites of equipment at different geographical locations. A Site is defined to be a collection of Racks of equipment at a given geographical location. In turn, a Rack is defined to be a collection of Shelves, and a Shelf as a collection of Cards.

The graphical representations permit the user to move quickly from view to view i.e. simply double clicking a server produces the Site view which displays the racks and shelves. From this a double click on a shelf provides the shelf and card view. A double click on a card provides the user with configuration and status information for that card. The user can specify all labels used within the hierarchy. This ensures that the system maintains a customised and operator specific feel.

5.3.1. Map and Tree Views

To assist in the representation of the relationship between the managed equipment and its geographical placement, maps may be imported to the system and the Server icons overlaid on them. The graphical file format utilised by the system is Enhanced Meta File (EMF), which was selected due to its small resource requirements under Windows NT. Double-clicking a site icon presents the graphical Site view. Multiple map views may be created and displayed. Each map view requests the user to define location co-ordinates, which are

then used to place the sites on the map. Alternatively, the user may manually place the site icon that will set its co-ordinates accordingly.

As an alternative to the map view (though it may be used in conjunction with it) the Tree view provides a window similar to that used in Windows Explorer. This displays the Network as a tree and all its sub-layers (Sites, Racks, Shelves and Cards) as branches.

In addition to the graphical representations, textual views can be produced including, for example, lists of Server, Site or Card status.

Please refer to the appropriate documentation for further information.

6. Deployment Scenarios

The system can be used as a single stand-alone PC installation and scale up to a multi-user, multi-server management system depending on the operator's requirements.

For centralised management, the Client *and* Server application may be run on a system located at a centralised network management centre. In order to do this, the management connections to the equipment, RS232 running at 9.6kbps must be transported via a data network. In the simplest of scenarios, this could be achieved using statistical multiplexers connected via dial up modems.

Even with the smallest configuration, the addition of a modem can provide access for an additional Client, which could be utilised for Senior Engineering use, other support organisations or Head Office access. This is shown in the example below where, for simplicity, only two CT 's are shown:

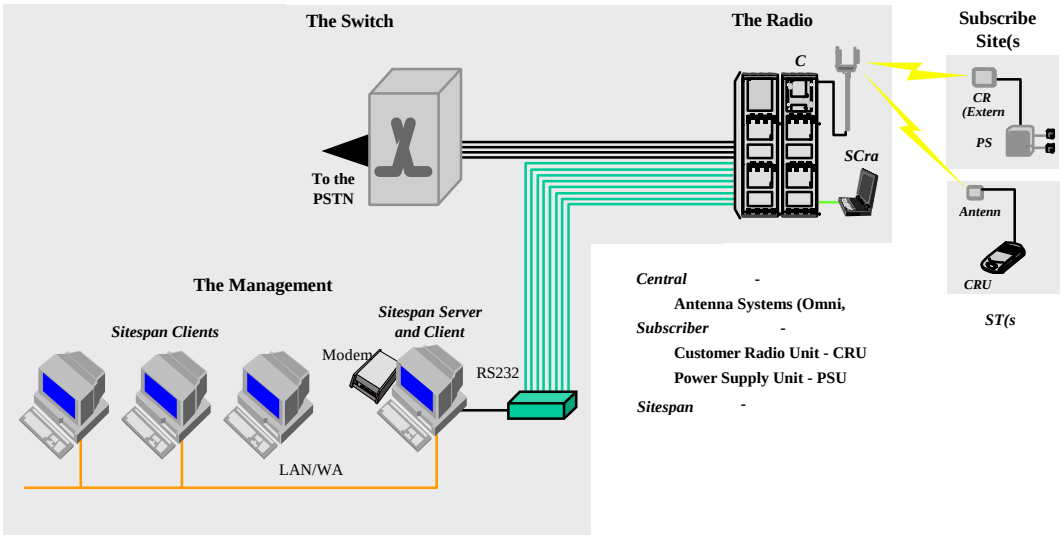

Figure 4: Fixed Network, single Server plus modem

Larger, fixed networks can be catered for where more than one user requires access to the

Larger systems will require multi-user, multi-server implementations. In the example of this scenario, all Clients will be able to view all Servers depending of course on access rights. An example of this scenario is shown below:

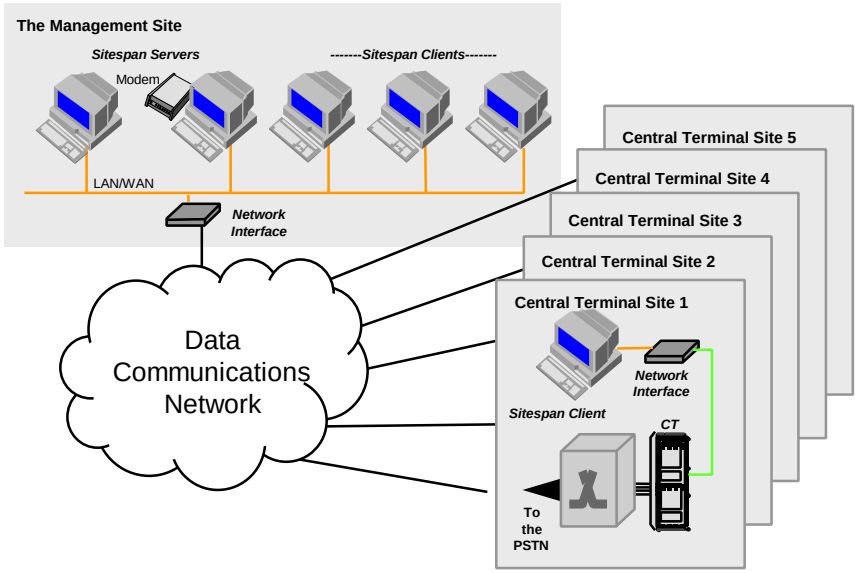

Figure 5: Multiple Centralised Server

In the example shown above, although the Server PC's are shown located at the Network Management Centre (NMC), they could be located remotely at a Central Terminal Site for example. Specific configurations are dependent upon the operator's requirements.

SYSTEM FEATURES

1. Feature Matrix

The table below shows when specific features are incorporated into Sitespan. These are features supported by Sitespan and do not reflect those available within the managed equipment.

Please check with specific equipment documentation in order to ensure that required functions are available.

Feature	***2.5***	***2.6***	***2.7***
Equipment Display	*	*	*
User configurable Object Lists	*	*	*
Tree View	*	*	*
Link to Alarms	*	*	*
Map View	*	*	*
Link to Alarms		*	*
Line Test	*	*	*
Generalised Sub Log			
Multiple User-defined Logging	*	*	*
Print List Views	*	*	*
Database Conversion Utilities	*	*	*
Status Update: Force default poll to 40 sec.	*	*	*
SGF File Editor Utility	*	*	*
ST Loop Back re-connection after link failure	*	*	*
ISDN Support	*	*	*
Line reserve and loop back	*	*	*
Phone list integration with Subscriber database	*	*	*
ST Self Test and Reset	*	*	*
CT Power Control Table	*	*	*
Active Alarm View		*	*
Security - 5 User Configurable Classes			*
Craft Terminal			*
Fixed Assignment Wireless Access System	*	*	*
Version 2	*	*	*
Version 3	*		
Demand Assignment Wireless Access System		*	*

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2. Test Facilities

Sitespan provides the operator with the facility to operate line test and loop-backs on the remote Subscriber Terminals in order to identify fault location. Self-Test of the cards and Subscriber Terminals can be forced and the results viewed. It is also possible to initiate Self-Tests and Reset functions on all managed cards. Please refer to the appropriate documentation for further information.

2.1. Line Tests

2.1.1. CPE

Provides detection of Customer Premises Equipment.

2.1.2. Ringing Trip

Forces the CPE to Ring.

2.1.3. Hazardous Voltage

Tests for any hazardous voltages present on the line.

2.1.4. Earth Leakage

Measure for earth leakage current.

2.1.5. Dial Tone

Verifies Dial tone is present.

2.1.6. Dialled Digit

Verifies correct digit translation

2.1.7. Support for Test Clerk

Enables operator call progress assistance/monitoring

Note: Sitespan provides support for all the above tests in Subscriber Terminals that *also* support these features.

2.2. Loop Back

Used for commissioning and general test, the ability to apply loop-backs is extremely powerful, providing access to individual channels and either towards or away from the network for the implementation of BER tests. Please refer to the appropriate documentation for further information.

3. Configuration Management

Sitespan provides the ability to configure managed equipment centrally for operations ranging from commissioning through to maintenance. All common operations for each piece of equipment are grouped in appropriate dialogues.

Sitespan supports the programming of RF frequencies, RF card levels and RF channel activation. A Subscriber Database (supporting entries for Name, Address, Telephone Number, Tariff, Parent Shelf, Line Activation, Line Resources -line number and card number and supplementary services) provides control mechanisms and relational information for each line.
Please refer to the appropriate documentation for further information.

All cards have an electronic serial number that can be accessed by Sitespan.

4. Alarm Handling

Sitespan supports the real-time detection, logging and propagation of equipment alarms. Each Sitespan Server receives or polls for alarms, updates its object model state accordingly and then sends alarm indications to all connected Equipment Views for real-time display. Since all views, whether textual or graphical, are derived from the same object model information, consistency is assured from view to view.

Alarms can be examined in real time by locating the element view to which the alarm belongs, or an alarm history can be displayed, giving the time at which each alarm was logged by the system and its associated inventory. Please refer to the appropriate documentation for further information.

4.1. Alarm Reporting

The equipment monitors the network interface, the CT equipment and the remote subscriber terminal status. Alarm reports will be forwarded to Sitespan to be displayed in either the history, alarm, tree, or active alarm views. The following lists the alarms/events supported.

Events	Description	Comments
FRU Alarms	Failure of a Field Replaceable Unit Detected	A field replaceable unit a failure to the management system if it detected part of its circuit is not functioning (e.g. NVRAM, power supplies out of specification). In addition the Shelf Controller may report a FRU alarm failure on a unit that it fails to communicate with.
CT Power Fail	Central Terminal Equipment power status	The CT rack is a dual-feed design. If one of its power supplies fails, the Sitespan system will report the CT Power failure.

Loss of Comms with ST	Radio monitoring of the remote Subscriber Terminal	Sitespan will generate this alarm if the radio link is lost between the CT and its independent ST (this alarm is triggered when a link is present but later broken because of radio interruption).
Unavailability	No radio link.	Sitespan will generate this alarm if the modem failed to establish a link with the independent ST (this alarm shall pair with the Loss of Comms with ST)
BER > 10^{-3}	Radio link performance parameter	This alarm is generated when the system detects the radio link between the CT and its independent ST has a BER less than 10^{-3}. Under this condition, the unavailability seconds will be incremented.
Loss of Frame Alignment	Network Stability Parameter	This alarm will be generated if the network clock is outside the ITU specification, or data stream is corrupted, or faulty network interface card in the local switch.
AIS Detected	Network Parameter monitoring the 2MB performance	When the local exchange transmits all 1's in its time slots.
Transmission System Clock Failed	Network monitoring	When the CT equipment cannot recover the clock from the incoming data stream, the system will switch over to its internal reference clock and generate the notification
2MB Signal Loss	Network monitoring	When the physical connection between the TU and the local switch is broken.
ST PSU Tamper	ST Equipment monitoring	This indicates that the ST power supply casing has been opened.
Switch over to Battery	ST Equipment monitoring	This indicates that the mains supply to the ST has failed and the unit has automatically switch to battery supplies.
Battery Low	ST Equipment monitoring	This indicates that the battery charge has fallen to below 70% of its capacity.
Ringer Fail	ST Equipment monitoring	The ST ringer will be checked when an incoming call is received.
Loss Comms Alarm	CT Shelf Controller and Sitespan communication channel status	Sitespan will report a failure to establish a communications link with the shelf controller.

5. Performance Monitoring

Performance measurements recorded at the Shelf and Subscriber Terminal can be viewed. Performance alarms received from the equipment are logged and can be selected for output to log files.

The modem view provides up link and down link BER for “Current” and “Previous” reports. The “Current” field is the display of the BER status measured after the last poll cycle and the “Previous” field shows the last reported BER value. If the link is not established or not activated, “NO DATA” will be shown in the “Current” field.

Sitespan supports Radio Link monitoring of the ST transmit power, receiver levels and code phase. This feature is only available when the radio link is fully operational. Previous data will be shown when the link is not established.

ST AGC indicates the ST Automatic Gain Control used. A high AGC value means that the ST receiver is set to low sensitivity. A *typical* setting will be between 1.0 and 1.5V for a deployed ST. A low value means that the ST has high gain and is very sensitive.

ST PC indicates the current ST transmit power requested by the Central Terminal/ A high value here indicates that the ST is transmitting at high power. The value for maximum output is 3.0V.

St Code Phase indicates the time difference between the transmit and receive clock synchronisation pulses. This figure could be used to calculate the *approximate* distance between the ST and the CT.

6. Transaction Logging

As each Sitespan Server receives alarms/event notifications and polls for changes in status, it updates its object model state accordingly and stores the state changes in a log. When Sitespan Clients request Alarm views for example, an object class filter is applied to the log in order to present the required information. Please refer to the appropriate documentation for further information.

SYSTEM ISSUES

7. Known Problems

The following is a list of known problems, which will be rectified, in future releases of Sitespan.

7.1. Database Translation:

7.1.1. Translation instructions - After step 3 in the translation process, there may be two severs open (one source and one destination server). The instructions may potentially be confusing to the user.

Workaround - After step 3 of the translation process, the source server should be disconnected and deleted from the base directory of the hard drive (on which Sitespan Release 2.5 is installed) before the destination server is started and connected to the Sitespan Translation Client.

7.1.2. Lines not activated. - The translated database contains all subscriber and configuration information. However the Lines are not activated.

Workaround - The lines can be activated on individual basis from the Edit Subscriber menu. This problem shall be resolved in the next issue.

7.2. Sublog Problems.

7.2.1. Delete function in Edit Sublog is misleading. Since it closes a named log file (does not delete the log file). This function should be renamed 'close'.

Workaround - None.

7.2.2. 'Port' drop-down sub-menu in Edit Sublog shows ports 1-4 to be available for sub-logging. However all the communication ports (on the PC and the Digi-board) should allow successful sub-logging.

Workaround – Reserve the PC ports for outputting Sublog information if this facility is required.

7.3. Other Problems

7.3.1. Loop backs do not work from the Sitespan Client connected with the translated database (created using tran1125.exe or tran2425.exe utilities).

Workaround - The loop back on desired ST's may be carried out using either the Sitespan Release 2.5 (without any form of database translation) by creating database for the required ST

for which the loop back is to be applied. Alternatively, conduct loop back in Sitespan Release 2.4 before creating translation database. Note: Sitespan Release 1.12 does not support functional loop backs.

7.3.2. Select Loop Back Type dialogue box retains history of the loop back type selection (from any previously run test). So when a new test is begun it activates this selection by default (e.g. by selecting TU through as path B1, Loop back Position towards the network, Select Loop Back Type may show B2 selection (or any other type which may have been selected on the previous occasion). [Test Reference 8.11.6.5]

Workaround - The user must ensure that the correct loop back type is selected before actual loop back is executed (i.e. before the OK command).

7.3.3. Modem Shelf views do not indicate a loop back condition (absence of colour on the modem card) for ST (s) under test.

Workaround - The ST View indicates loop back condition. The ST View can be activated from the Modem Shelf view.

7.3.4. Common Subscriber View - The default column headings are Airspan specific (e.g. 'Modem shelf', 'modem card' etc.), therefore there should be common name based description approach or have extra columns for LS120 equipment.

Workaround - None.

7.3.5. Tree View - Renaming the 'Network' object in the Tree View to an incorrect name crashes the Sitespan Release 2.5.

Workaround - This object should NOT be renamed to an incorrectly named object.

7.3.6. Installation Guide - During the installation procedure if the read me file stage is bypassed the user cannot (go back) in order to get the information on the RAS set-up or the need to run install batch file. Both of which must be installed in order to complete the Sitespan Release 2.5 installation process.

Workaround - The user must repeat the installation procedure. In future releases the requirement to install RAS and installation batch file must be displayed in a more prominent location (e.g. in 'Set-up Complete' dialogue).

7.3.7. Map View - In Map View (Network Map Object), when a site containing no racks is double clicked, Sitespan Release 2.5 crashes.

Workaround - Do not generate a Network Map of a site object which has no rack i.e. always ensure that the site(s) for which Map View is to be generated contain a rack.