



# PR ME

**Paging Redundancy over IP MEssaging**



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## **Document Outline**

**The following description outlines a Complete Dual Redundant over IP and Satellite Based Paging Network. The Network however can be broken down into smaller sections which would allow them to be incorporated into existing Paging Networks. For more information please do no hesitate to contact us.**



## Summary Features and Advantages

In addition to Dual Redundancy over Satellite and IP, see the following advantages.

### ***Central Site***

- Utilization of IP Network Infrastructure for Component Interconnection
- Increased flexibility for Hardware location
- True Geographic Redundancy Capability
- Removal of dependence on “legacy” technology
- Web based NCC (Network Control Console) user interface
- Almost no restriction on number and location of NCCs
- NCC becomes platform independent
- Flexibility to add additional Encoder Channels (Unlimited Encoder Channels to handle POCSAG, FLEX™ and ERMES)
- Enhanced Traffic Reporting Statistics
- Big reduction in system complexity
- Network monitoring and control utilizing SNMP
- Handle existing PSTN Telemetry

### ***Base Station***

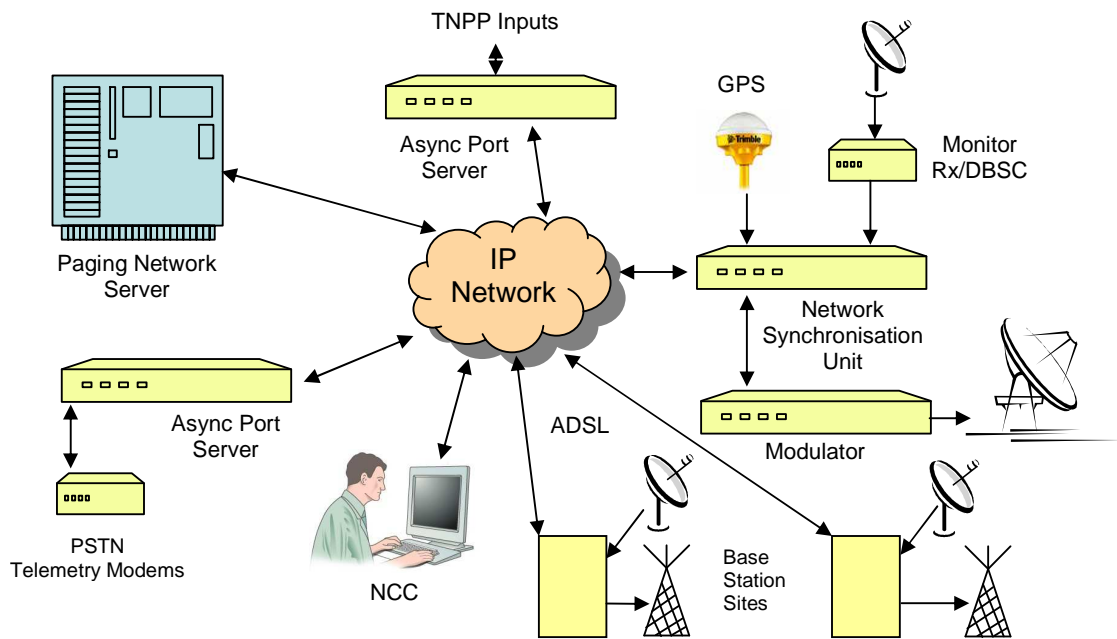
- Backup route for Paging Data on a per site or Network basis
- IP based O&M removes requirement for Central Site PSTN if all sites ADSL enabled
- More responsive O&M
- ADSL or Satellite may be used as primary data feed
- Flexibility of Base Station location i.e. can be sited anywhere with access to broadband



## System Concept

The PRIME System uses common IP based technology in addition to replacing many of the function specific hardware units with a single (duplicated) Central Paging Network Server.

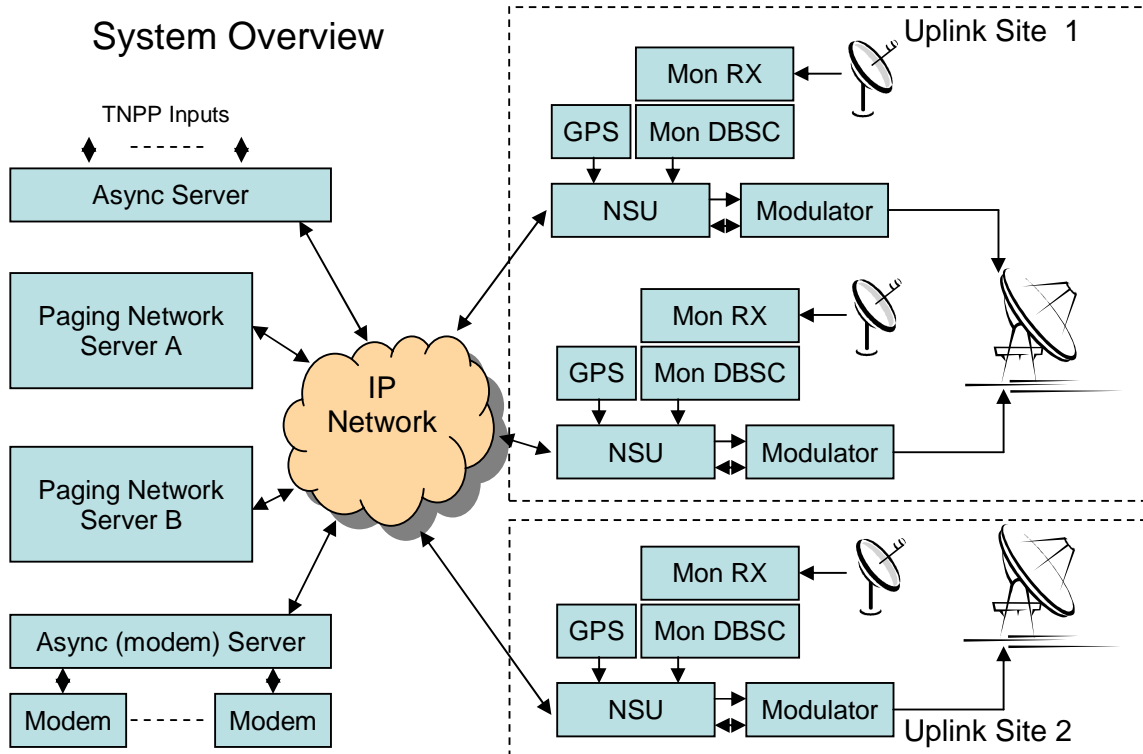
The diagram below shows the Network Overview .





## System Overview

The diagram below shows the System Overview, indicating the major equipment locations and interconnections.





## System Component Descriptions

### ***Paging Network Server (PNS)***

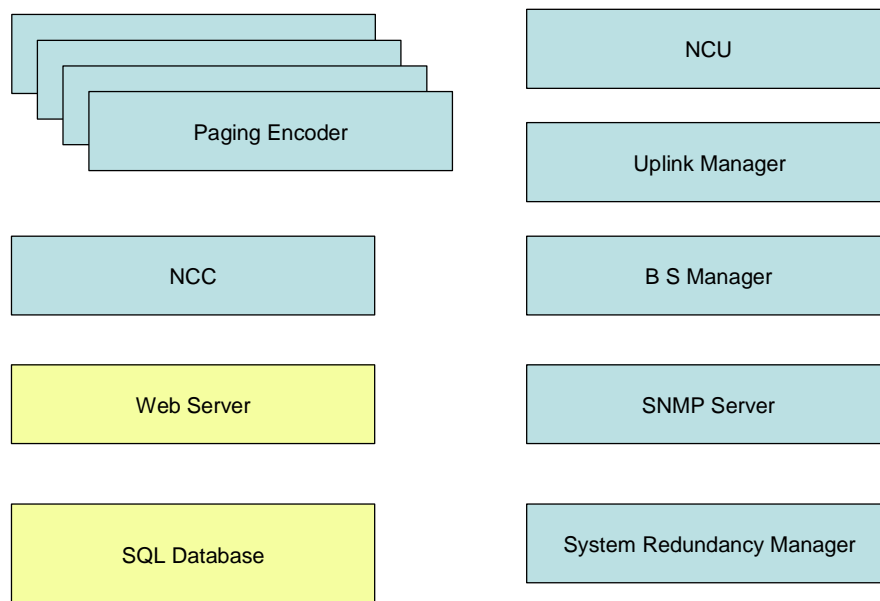
The Paging Network Server is based on a Microsoft Windows Server 2003 and integrates many of the existing Paging Network functions into a single Server System. The Major functional components of the existing Paging Network are implemented as Windows services. The system also runs a Microsoft SQL database server for storage of all network configuration data, log files and statistical data.

A Microsoft IIS (Internet Information Services) Active Server Pages Web Server provides the main O&M user interface to the Paging Network System.

Alternative O&M access is provided via an SNMP Server allowing network monitoring and control via an SNMP based Network Management System such as HP Openview. The overall system comprises two such Paging Network Servers to provide redundancy. Since the only connection required is an IP network connection, the Servers can be located at different geographical sites.

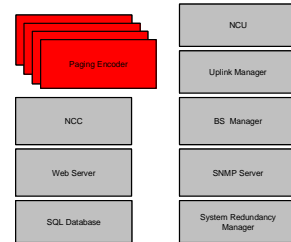
The principle services running on the PNS are described in the following :

Paging Network Server Functions





## Services Implemented on PNS

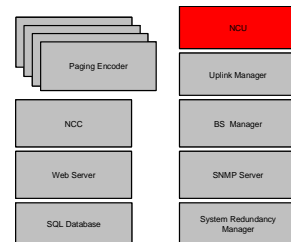


## FLEX™, ERMES and POCSAG Paging Encoders

The FLEX™, ERMES and POCSAG Encoders handle all the encoding functionality.

The Encoder input is TNPP over IP supplied from the TNPP Async. Port Server and the encoded I2 over IP output is passed to the NCU service.

Each FLEX™, ERMES or POCSAG Encoder is implemented as a separate service giving the flexibility to add or remove Encoder Channels as required.

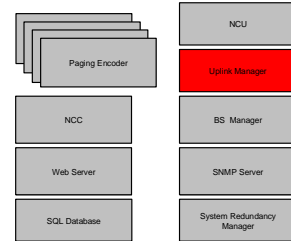


## NCU (Network Control Unit)

The Network Control Unit handles both input and output interfaces for the Paging DataStreams. Each interface to the NCU is IP Based.

The major functions are:

- Aggregation of I2 paging data streams from the Encoder Services
- Paging channel mapping and control
- Distribution of timing and synchronisation data to Base Station Controllers
- Managing FS084 satellite protocol stack
- Distributing Satellite Data Packets to the NSUs via the Uplink Manager Service

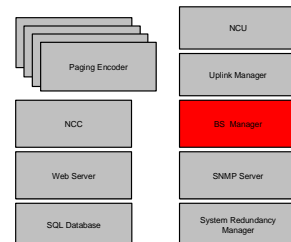


## Uplink Manager

The Uplink Manager is responsible for:

- Distribution of FS084 Satellite Data Stream to all Uplink Sites.
- Monitoring and control of the equipment located at each Uplink Site.

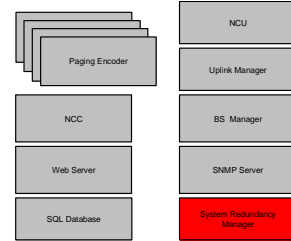
Interfacing to the Uplink Equipment i.e. Modulators, Monitor Receiver & DBSC and GPS Receiver is via the NSU located at each Uplink Site.



## Base Station Manager

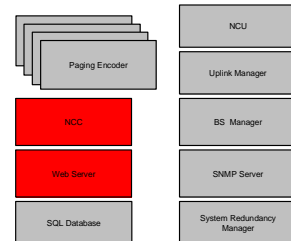
Manages the PSTN or IP connection to all Remote Base Station Controllers. Primary functions are:

- Distribution of FS084 Satellite Data Stream to all Uplink Sites
- Base Station polling & collection of alarm and status data
- Base Station configuration



## System Redundancy Manager

The System Redundancy Manager is responsible for monitoring the end-to-end operation of the Network and operation of all system components and services. The SRM auto-configures the Network to restore service in the event of equipment failures.

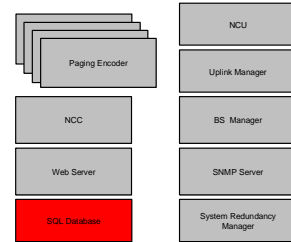


## NCC (Network Control Console) and WEB Server

The NCC is WEB based.

ASP WEB Pages are hosted on an IIS WEB Server which allows Operation and Maintenance of all parts of the Network including:

- Network alarm monitoring
- System redundancy configuration
- Encoder configuration
- Uplink alarm reporting and configuration
- Base Station alarm monitoring
- Base Station configuration
- Log file and statistics reporting

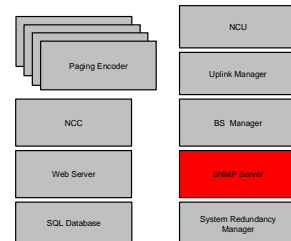


## SQL Database

A duplicated SQL database is used to store all system configuration data for the Encoders, Network System and Remote Sites. In addition the database stores statistical and event log information.

Three ways to access the Database:

1. Via the NCC Web Pages and the IIS WEB Server
2. Via the SNMP Server
3. Via a direct remote SQL connection from another application



## SNMP Manager

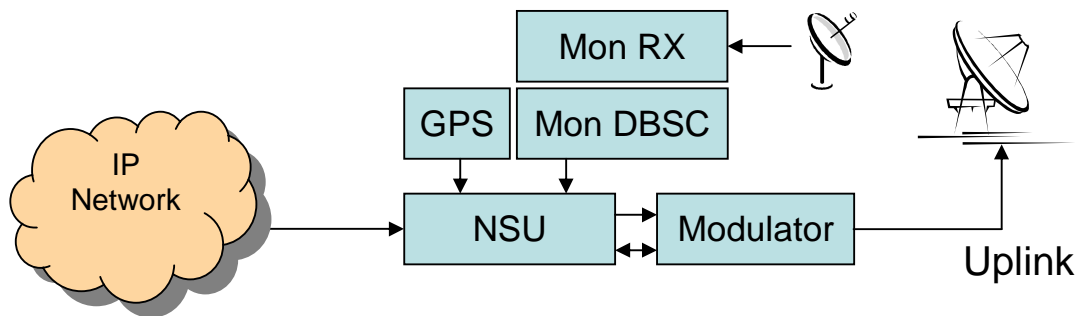
The SNMP Manager allows access to the main SQL database through the SNMP protocol and enables external SNMP based Network Management Systems to manage the Network and Base Station equipment.

All Network and Base Station O&M functions can be made available through the SNMP connection.

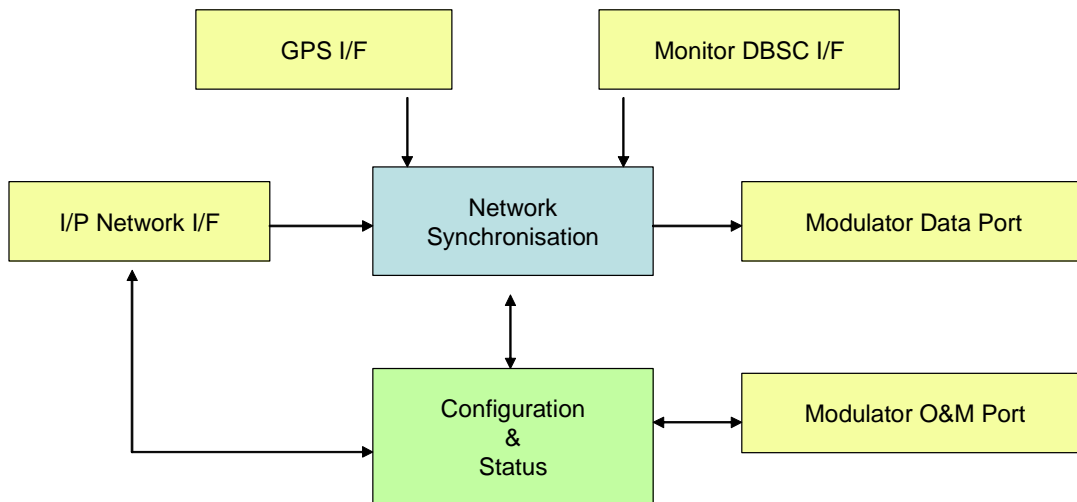


## Network Sync. Unit (NSU)

The NSU (Network Synchronisation Unit) handles the synchronization of the Network and is co-located at the Uplink Sites. Connection to the NSU is via IP and dependence on leased line connections is removed. Each NSU serves one Uplink Modulator and is connected to a GPS Receiver and Monitor Receiver and DBSC.



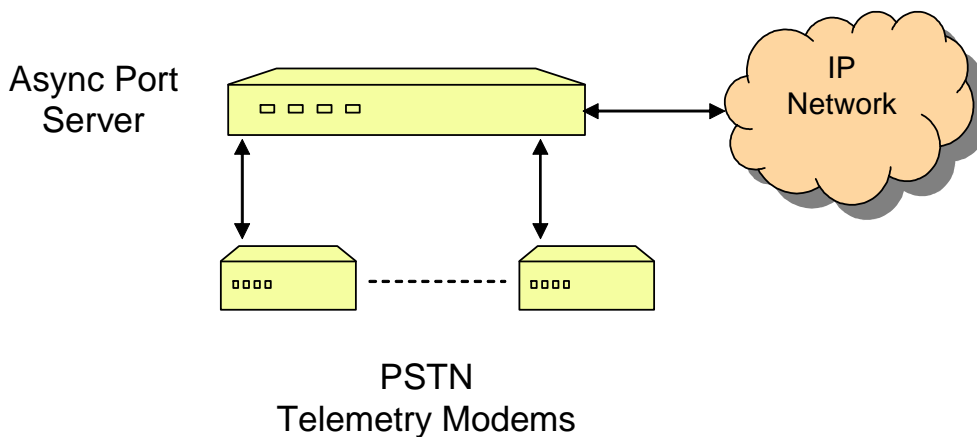
### Network Sync. Unit Functions





## ***Async. Port Server and PSTN Modems***

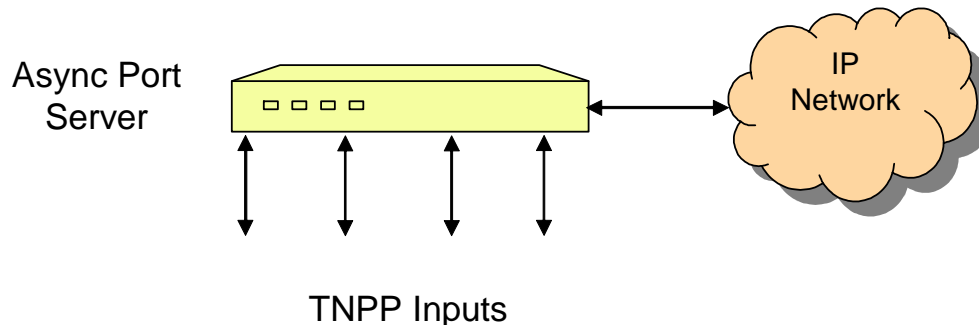
PSTN Base Station O&M is handled by the Base Station Manager service running on the PNS. The Async Port Server is used to interface the Async PSTN Modems to the BS Manager Service in the PNS via IP. Up to 4 modems can be connected to the Port Server for handling incoming and outgoing O&M connections.



## ***Async. Port Server and TNPP Inputs***

The TNPP Async. Port Server is used to interface the asynchronous serial TNPP Paging data inputs from a Paging Switch System to the Encoder Services running in the PNS.

Up to 4 TNPP channels can be connected to each APS.



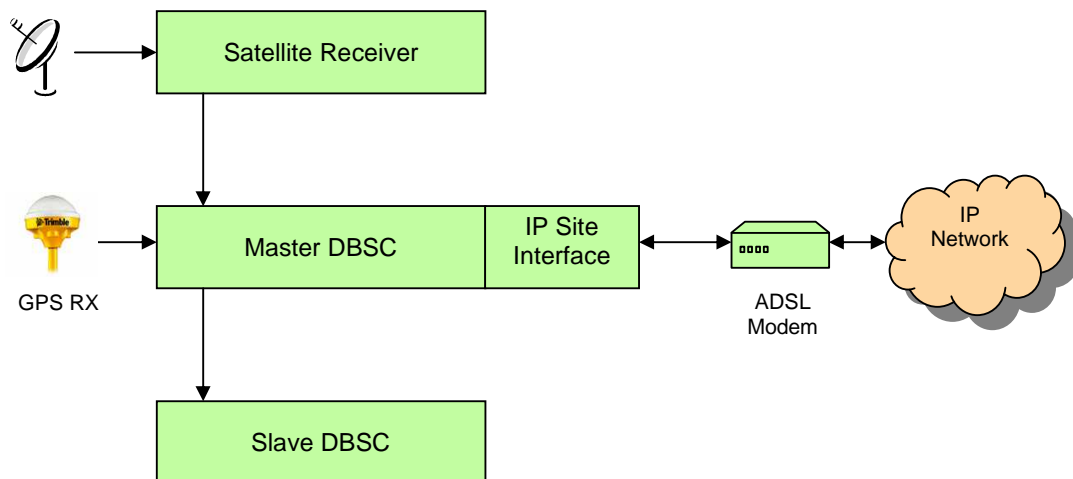


## ***Base Station Equipment***

Where ADSL is available each Base Station can be equipped with additional equipment to allow connection directly to the PNS via IP.

This gives rise to a number of advantages and enhancements:

- Backup of Satellite Paging data feed on a per-site basis (BS equipment failure)
- Backup of Satellite Paging data to all sites (satellite or multiple uplink failure)
- More responsive O&M
- Elimination of PSTN O&M system if all sites ADSL equipped.





## Abbreviations

ADSL	Asymmetrical Digital Subscriber Line
ASP	Application Service Provider
ERMES	European Radio Messaging System
GPS	Global Positioning Systems
IIS	Internet Information Services
IP	Internet Protocol
NCC	Network Control Console
NCU	Network Control Unit
NSU	Network Synchronisation Unit
O & M	Operation & Maintenance
PNS	Paging Network Server
POCSAG	Post Office Code Standards Advisory Group
PRIME	Paging Redundancy over IP Messaging
PSTN	Public Switched Telephone Network
SNMP	Simple Network Management Protocol
SQL	Structured Query Language
TNPP	Telocator Network Paging Protocol



**CBD Communications** was established in 2004, and all our personnel have accumulated many years of experience in the field of Telecommunications. We are all former employees of Ericsson

Ericsson Limited have worked with some of the world's major players in the Telecom's Market. In fact, a number of us were involved in the Design, Manufacture and Implementation of the first European Wide-Area Satellite Paging Network nearly 20 years ago! Other members of our staff are ex-forces personnel with the enviable background in Communications that only the Military can provide.

Since the installation of that first Paging Network, our personnel have provided Sales, Support and Repair facilities for Major Networks in over Fifteen Countries; including a fully-comprehensive "Swap Repair" service for one of Europe's largest Telecommunications Companies.

We have also applied our expertise to other areas of Satellite Communications, becoming involved in the Design, Provision and Support of Networks requiring Point-to-Point Voice and Data Links; our Major Customer in this particular field being a European Government located throughout Africa and Asia.

A number of customers have benefited from our entry into the field of Voice Compression Technology. This allows a provider to substantially reduce Satellite Bandwidth costs but still provide a first-class service to their end-users.

If you believe that Satellite is not the answer to your Communication needs, do not be deterred by our particular experience in that area: many of our solutions to customer requirements have combined more than one method of transmission. For example, we currently have a number of customers utilising Wire-Line Networks or a combination of Satellite and Copper.

We believe that, throughout our various metamorphoses from Compondex to CBD Communications, the people involved in our current venture have firmly kept to their original values of honesty, value for money and a strong desire to provide the best possible service to their customers.

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