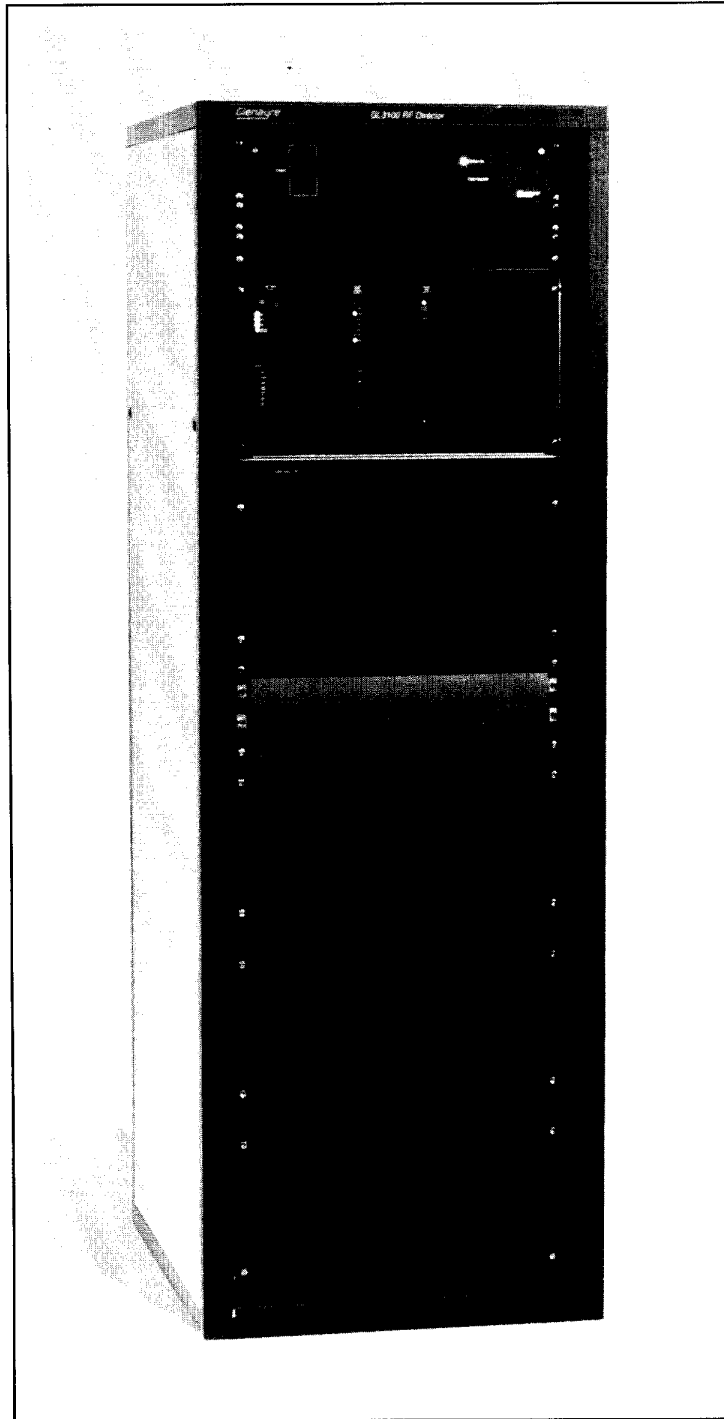

GL3100

RF DIRECTOR



Glenayre®

GLENAYRE'S GL3100 RF DIRECTOR

Glenayre is proud to introduce its powerful new GL31000 RF Director. This crucial component of the NPCS system is based on proven paging system technology, and is a key element in Glenayre's end-to-end solution for NPCS voice and data messaging applications.

The GL3100 RF Director was designed together with the GL-C9000 NPCS Transmitter Controller and GL-R9000 NPCS Acknowledgement Receiver to provide powerful and flexible control and configuration management. The RF Director supports many NPCS functions, including output encoding of InFLEXion™ and ReFLEX™ protocols. The GL3100 RF Director is available in several configurations, so that it can be optimally configured to meet customer requirements for redundancy, system throughput, and network size.

Glenayre's extensive experience with real-time switching, encoding, and control systems in one-way paging systems proved invaluable in the development of this complex and crucial component of the NPCS system. The RF Director's scaleable, parallel processing architecture is the result of years of experience with RF control systems.

The configuration of subchannels in an InFLEXion system can be extremely difficult to optimize, particularly with dynamic movement of the user population. To address this issue, while minimizing co-channel interference, Glenayre has developed an Adaptive Cellular Allocation scheme for the GL3100. Once initialized, this option will automatically adapt to changes in traffic loads throughout the system, without the need for operator intervention. Alternatively, operators can

choose to use a more familiar static subchannel multiplexing scheme (with dynamic slotting), and can even switch from one scheme to another within seconds to compare performance.

Link costs can have a significant impact on system's operating expenses. Recognizing this, the GL3100 carefully controls bandwidth usage, allowing data rates as low as 9,600 bps to sites with little traffic. Algorithms within the GL3100 carefully allocate bandwidth to ensure that the specified data rates are never exceeded.

A paging system is only as good as its weakest link, and the GL31000 continuously monitors the links to the site networks. It will not only alarm on the loss of a link, but can also be configured to generate an alarm if delays over a particular link exceed a pre-defined limit, to warn of impending overload conditions caused by the data network service provider.

Reverse channel capacity in an NPCS system is a precious resource, and the GL3100 has been carefully designed to utilize it fully. Reverse channels are automatically re-used, through an algorithm whereby pagers whose location are known are scheduled to transmit at the same time if they are sufficiently distant from one-another to prevent interference.

Reliability of key system components such as the RFD is crucial, and Glenayre has engineered the GL3100 for maximum availability. By designing a completely diskless system, a major source of system failure has been completely eliminated. For additional security, redundant configurations are available which completely duplicate all system resources.

Different markets will place different demands on system resources, and these will change over time as the subscriber base grows. The GL3100 has been designed to meet these requirements through the provision of several system configurations and CPU options. Regardless of whether a decentralized or centralized network is desired, Glenayre has a solution. Configurations available in 1996 span the full range from a single CPU system supporting 50 calls per second, up to a massive parallel processing architecture supporting 1,675 calls per second – over 16,000,000 subscribers!

The GL3100 supports WMtp™ (Wireless Messaging Transfer Protocol), the basis for the input switch to RFD communication. As the author of this protocol, Glenayre is uniquely qualified to provide a robust and flexible implementation which will meet all system requirements now and in the future.

FEATURES

- Adaptive cellular allocation minimizes co-channel interference even with mobile user population
- Static subchannel assignment provides familiar planning environment
- Controlled network bandwidth utilization minimizes link costs
- Continuous network link testing monitors system integrity
- Automatic reverse-channel reuse maximizes capacity
- Diskless operation ensures reliability
- Wide range of CPU and memory options match system performance to network size
- Full WMtp™ support

Adaptive Cellular Allocation

- Minimizes co-channel interference to reduce re-try attempts
- Dynamically adapts to mobile user population
- Simplifies network expansion and reconfiguration
- Efficiently handles users in elevated locations (e.g. high-rise buildings), where low C/I ratios can be expected

Static subchannel assignment

- Provides familiar planning environment
- Supports configuration based on standard cellular planning tools
- Supports dynamic time slotting (virtual channels)

Controlled Network Bandwidth utilization

- Network links can be sized to average, rather than peak, loads reducing costs
- Prevents transient overloads of routers or network links

Inherently Reliable System Design

- Diskless environment improves system reliability and eliminates data bottlenecks

- Network based timing for C9000 based systems eliminates need for externally mounted GPS, reducing likelihood of lightning-induced failure
- Optional RFD redundancy further enhances system availability
- Optional site network link redundancy provides automatic recovery in event of failure of a primary link

Continuous network link testing monitors system integrity

- System continuously monitors network performance
- Can alarm on loss of link, or on increase in link delay

Automatic reverse-channel reuse maximizes capacity

- Multiple pagers can be scheduled to respond simultaneously if the system knows they will not interfere
- Provides significant increase in back channel capacity, potentially decreasing infrastructure costs

Multiple CPU and Memory options

- RFD performance can be matched to system requirements, minimizing initial investment

- CPU can be upgraded to keep pace with system growth, ensuring long term viability of initial investment

Full support of Plug and Play Interfaces Maximize Configuration Flexibility

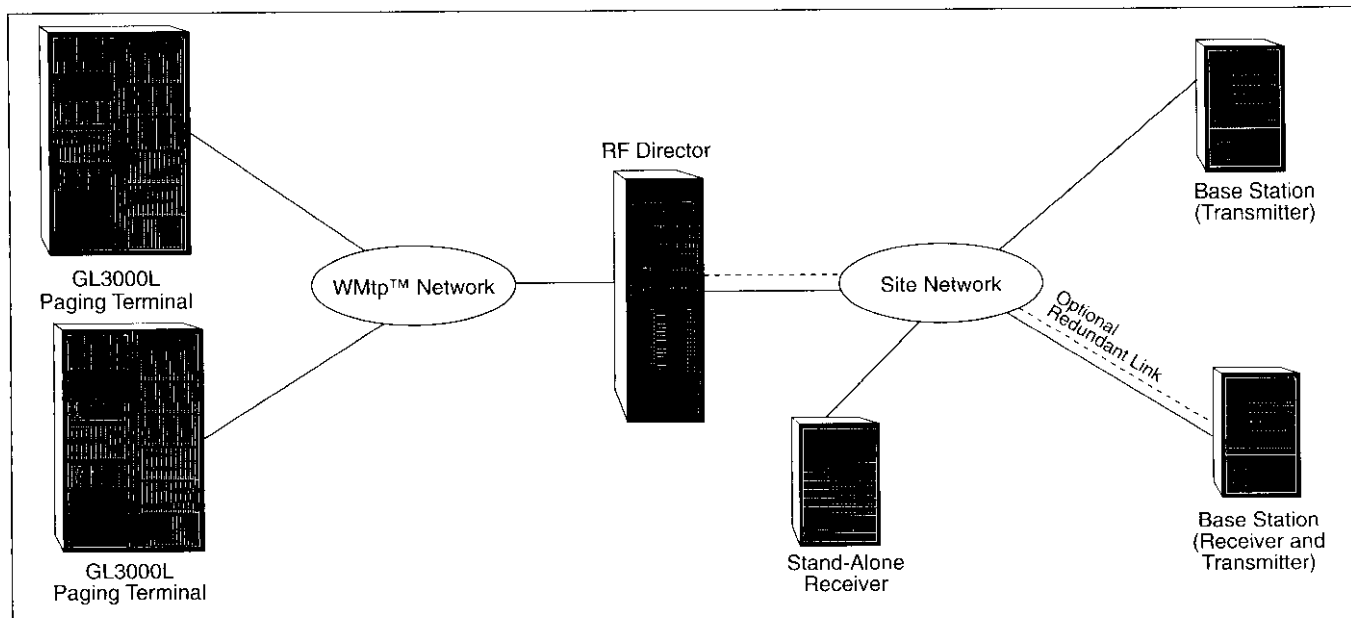
- WMtp™ (Wireless Messaging transfer protocol) for RFD to Paging Terminal communications
- IPP (Inbound Paging Protocol) Plug & Play NPCS Receiver Interface

Integrated Network Management Provides Operational Efficiency

- Remote system backup and software download capability over TCP/IP network
- Remote configuration, monitoring and statistics via TCP/IP
- Network management and advanced alarming capability via SNMP and GAP (Glenayre Alarm Protocol)

Optional Router

- Provides option for fully integrated and verified system
- Provides flexibility for operator to utilize other routers to maintain operational consistency, provided they meet performance requirements



NPCS Network Architecture

GL3100 RF DIRECTOR

PARAMETER		SPECIFICATION
PROCESSOR		68060 CPU
Parallel Processing	N/A	POWER-PC 60 3/4 1 to 12 CPU per RFD
Memory	32 - 128 MByte	64 Mbyte - 1 Gbyte per CPU
Removable Media	5 MB PC Flash Card	5 MB PC Flash Card
NV RAM	8 Mbytes	8 Mbytes per CPU
SYSTEM CAPACITY		
Subscriber ¹	500,000	1.4 Million-16.75 Million (1-12 CPU)
Calls per Second ²	35	140 - 1,675 (1-12 CPU)
Transmitter Nodes ³	80	200 - 2,400 (1-12 CPU)
Receiver Nodes	160	400 - 4,800 (1-12 CPU)
Zones	16	32-384 (1-12 CPU)
I/O		
Lan Port	10 Mbit/s Full Duplex 802.3 10Base-T port on rear panel	100 Mbit/s Full Duplex 802.3u-1995 100Base -T port on rear panel (One per CPU)
EIA -234C Interface	DCE port provided on rear panel	DCE port provided on rear panel
Alarm Outputs	Minor, Major, Critical Alarm Contacts	Minor, Major, Critical Alarm Contacts
SOFTWARE		
OTA Protocols	InFLEXion™, ReFLEX25™, others in future	
IP Network Protocols	WMtp™, Receiver IPP, Controller Base Station Protocol, Telnet, SNMP	
Diversity Processing	Macro-diversity for inbound messages from pagers	
POWER		
Voltage	-48 VDC (Main plus Backup)	
Current (Max)	20A - 60A (depending on configuration)	
Power Supply Noise	<32 dBmC	
PHYSICAL		
Size	71 1/2" H x 32" D x 24" W (38U Cabinet; up to three for maximum configuration)	
Weight	350 lb. per cabinet	
ENVIRONMENTAL		
Operating Temperature	10°C to 35°C, gradient <10°C/hour	
Storage Temperature	-40°C to 60°C, gradient <15°C/hour	
Operating Humidity	20% to 80%, non-condensing, gradient<10%/hour	
Storage Humidity	10% to 90%, non-condensing, gradient<10%/hour	
Altitude	-200 to 10,000 feet	
Heat Dissipation	1 -3 kW (depending on configuration)	
OPTIONS		
Redundancy	Includes GSU switch(s) and redundant CPU, NV RAM, Power Cards, and cabinet options	
Parallel Processing	Up to twelve Power-PC processors can be utilized to increase system capacity	
Router	Several router options, supporting Frame Relay over V.35, EIA-530, or T1 interfaces	
Receiver or Controller Nodes	Software feature key enables Receivers in groups of 20, Transmitter Controllers in groups of 10	

- NOTES**
1. Subscribers based on 0.36 BHCR
 2. CPS based on 15-second messages, compression = 3.0 for voice, 80-character message for data
 3. Assuming 50 kbps data rate to transmitter (fully active sub-channel)

Glenayre®

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Glenayre engineering, manufacturing, and customer service are registered to ISO 9001.