

Multisite Multichannel Network Controller

Digital Wireless' Multisite Multichannel Network Controller (MNC™) is a sophisticated radio communications network message router. The MNC™ manages vehicle roaming and encodes/decodes messages between the Host computer and up to nine Redundant Base Station Controllers (RBC™s).



This highly flexible message router is available in several configurations. In its simplest form, the MNC™ easily handles single channel, single site environments.

For more complex radio infrastructures, the MNC™ supports multiple channels and multiple sites. It directs radio communications for multiple channels on different frequencies, multiple sites on the same frequency, or a combination of multiple sites and multiple channels.

The MNC™ can also be programmed to periodically broadcast differential GPS corrections. This configuration includes a stand-alone GPS receiver and antenna.

To prevent destructive interference in an overlapping site, the MNC™ performs transmitter steering based on digital voting. The MNC™ evaluates inbound signal strengths and bit error rates and then keys the appropriate transmitter when needed.

Built-in diagnostics and loop-back tests ensure easy access to the radio infrastructure, including channel, unit, and communication statistics. Users can also configure on-line setup parameters.



How the MNC Works

■ The Host-MNC™ Interface

The Host-MNC™ interface is a simple interface designed for ease of use. The MNC™ translates and forwards every message generated by an MDT, known as an inbound message, to the Host application. To confirm reception of an inbound message, the MNC™ transmits an acknowledgment to the MDT.

For every message destined for a specific mobile data terminal (MDT), or outbound message, the MNC™ always responds to the Host with either a positive or negative acknowledgment. Thus, the Host application is always aware of the message delivery status of every outbound message.

■ Mobile Roaming Table

The mobile roaming table tracks the location of all MDTs in the field. This table updates the base receiver site and time of an MDT's last inbound transmission. It also records the bit error rate (BER), signal strength (SNR) and the channel the MDT most recently used.

■ Features

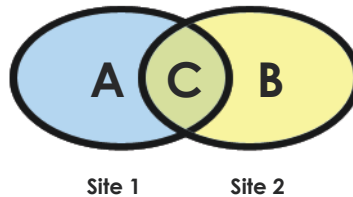
- Menu-driven user friendly interface
- Multiple concurrent channels with or without overlapping coverage system topologies
- Channel and leased line diagnosis
- Transmit timing, transmit matrix and channel related parameters
- Monitors inbound and outbound traffic
- Records channel and mobile statistics
- Tracks the RBC™'s current status
- Switches the RBC™ between data and voice mode

Improved Coverage

■ Frequency Reuse

Frequency reuse allows companies to utilize multisite configurations when independent radio frequencies for each RBC™ are unavailable. In addition to increasing throughput in many systems, frequency reuse also increases coverage in systems with small antennas. With the MNC™'s digital voting and transmitter steering features, even systems with overlapping coverage can employ frequency reuse.

■ Overlapping Coverage



A is covered only by site 1
 B is covered only by site 2
 C is covered by both site 1 and site 2

■ Overlapping Coverage (continued)

Where both sites 1 and 2 are using the same frequency:

- To deliver outbound messages to mobiles located in coverage area A, site 1 is keyed and site 2 is dekeyed.
- To deliver outbound messages to mobiles located in coverage area B, site 1 is dekeyed and site 2 is keyed.
- To deliver outbound messages to mobiles located in coverage area C, transmitter steering and digital voting are applied.

■ Transmitter Steering

The MNC™ incorporates a transmitter controlling scheme to prevent destructive interference in a multisite environment where two transmitters with overlapping coverage are using the same frequency. Transmitter steering uses digital voting to ensure that the two transmitters cannot be turned on at the same time.

■ Digital Voting

The MNC™ performs digital voting to determine which transmitter will send an outbound message to a vehicle in an area of overlapping coverage. Digital voting is based on the bit error rate (BER), the signal strength (SNR), or both. The user sets the thresholds for the BER and SNR and also determines the voting factors of each.

Channel	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6
1	1	0	0	0	0	0
2	0	1	0	0	0	0
3	1	1	0	0	0	0
4	0	0	1	0	0	0
5	0	0	0	1	0	0
6	0	0	0	0	1	0
7	0	0	0	0	0	1
8	0	0	0	0	0	0

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