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DigiVance Theory of Operation

System Operation

DigiVance is a RF transport system designed to extend the coverage of a base station into buildings and other areas where location and construction prevent direct coverage. The system, consists of two or three modules, Digital Host Unit (DHU), Digital Remote Unit (DRU) and optional Digital Expansion Unit (DEU). To provide coverage, two RF paths must be established, the Forward or Base Station to Remote path and the Reverse of Remote to Base Station path. In the Forward path the DHU down-converts the Base Station RF spectrum to baseband, digitizes the Baseband spectrum, and transports the digitized spectrum over fiber optic cables. At the destination DRU, fiber optic receivers recover the digitized baseband spectrum. The digitized spectrum is converted to analog and upconverted to the original Base Station RF frequencies. The Base Station Forward spectrum is then amplified and supplied to an external coverage antenna.

In the Reverse path the process is similar. In the DRU, signals from user handsets are recovered by the external remote antenna, downconverted to baseband, digitized, and transported to the base station over fiber optic cables. At the DHU, fiber optic receivers recover the digitized baseband signals. The digitized spectrum is converted to analog, upconverted to the original Handset RF frequencies, and supplied to the Base Station.

Note: The DigiVance system is a solid state design and does not require manual tuning or a tune-up procedure.

Digital Host Unit

The DHU interfaces directly with the base station, either directly or via an over the air repeater. The DHU provides connections for six individually selectable bi-directional Fiber Optic ports, which provide optical connectivity for up to six remote ports. In the Forward path, after conversion to a digitized spectrum, the forward spectrum is copied, and separately provided to each enabled optical port. In the reverse direction, Fiber optic receivers separately receive the digitized spectrum from all enabled remote ports. The individual digitized spectrums are then digitally added to provide a composite digitized spectrum that is the sum of the individual spectrums. The DHU also contains fault detection circuitry that detects both local and remote faults, shuts down transmission when severe faults exit, and reports faults to the operator.



Digital Remote Unit

As previously described, the DRU receives a digitized spectrum from the base station via the DHU, converts the digitized spectrum to the original Base Station RF frequencies, and provides the RF spectrum to an external antenna. In the Reverse direction, the Digital Remote Unit receives RF from any active user handsets, converts the RF spectrum to a digitized spectrum, and transports the digitized spectrum to the DHU on fiber optic cables. The DRU contains fault detection circuits that detect critical faults, disable RF output when critical faults are present, and transports fault information to the Digital Host Unit.

Digital Expansion Unit.

The DEU is an optional part of the system, and is not required for system operation. The DEU functions as a digital line extender, allowing longer fiber optic cable runs. In addition, the DEU provides up to six additional individually selectable system ports. In the forward path, the extra ports are provided copies of the digitized forward spectrum. In the reverse path, the individual port spectrums are digitally combined to form a composite spectrum.