Digivance LRCS

Theory of Operation

The Digivance Long Range Coverage Solution (LRCS) serves as a transport between a FCC approved base station and a remote antenna. The unit does a wide band digitization, fiber optic transport, and reconstruction of the signal. Digivance LRCS has full duplex RF operation plus an optional diversity receive path for signal enhancement. There are several adjustable attenuators to optimize the levels between the base station and the Digivance LRCS. Other features include many alarms that are reported to an external element management system.

The host unit is designed for an indoor environment with some level of climate control such as a wiring closet or a cabinet. It is a metal enclosure that serves as a RFI and EMI shield for the internal circuits and as protection for those circuits. The host has a RF interface to the base station and alarm interfaces to the element management system. It is powered by direct current voltage as an external input. The host is the main controller for frequency locking the remote and for alarm and control element management.

The remote unit is design for outdoor environment with a cabinet to protect it from the elements and uses AC power for the power management. The remote is frequency locked to the host for accurate reconstruction. The power amplifier is a feed forward linear amplifier and the output is protected with an isolator and duplexer.

The forward (downlink) RF is brought in from the base station to the Digivance LRCS by a coaxial cable. The maximum drive level allowed is –10 dBm composite power. The signal is mixed down to a 161.5 MHz IF, filtered, amplified, and mixed to a wide-band base-band. This base-band is digitized by an A/D converter and transported to the remote by fiber optics. The remote system uses the data over the fiber optic path to phase lock to the host. Then the remote reconstructs the wide-band base-band signal with a D/A converter and mixes the signal up to 161.5 MHz IF. This signal is filtered and mixed up again to the RF band, filtered, amplified and sent to the antenna through a duplexer.

The reverse (uplink) comes in from the antenna port and is mixed down to 161.5 MHz IF. Like before, the oscillators are locked to the forward data over the fiber. The down mixing, A/D, laser transport, D/A, and up mixing are the same as the forward link. The signal is mixed to the appropriate RF frequencies and sent to the base station receiver.