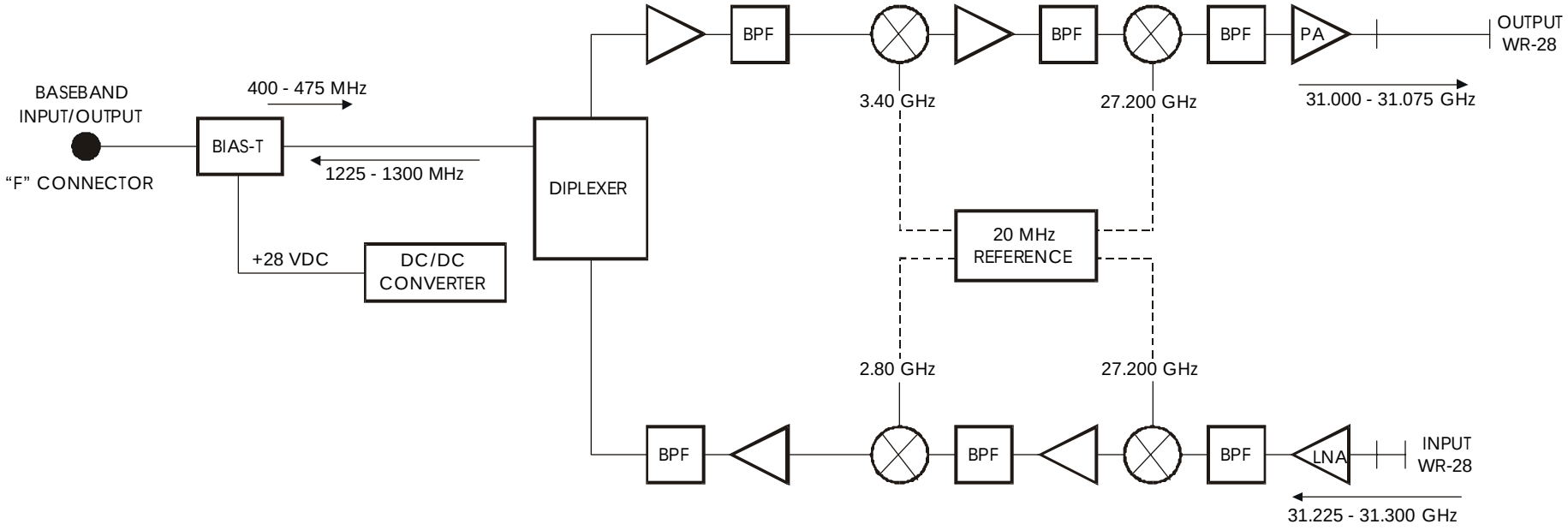

BLOCK DIAGRAM, OTRU
US BAND B

Telaxis COMMUNICATIONS

General Description
RT (OTRU)

The OTRU (Outdoor Transmitter Receiver Unit) is part of an LMDS (Local Multipoint Distribution System) networking system. The OTRU provides a wireless interface between the HUB RF equipment and the subscriber. Within the OTRU, a frequency translation from the transmitted and received RF to the baseband intermediate frequencies, is accomplished through the use of local oscillators and mixers. The baseband frequencies are passed to and from a modem, located inside the subscriber's premises, through a coax connection.

The frequency translation is accomplished using two CRO's (coaxial resonating oscillators). The CRO's are phase locked to a 20 MHz crystal reference, which provides a stability of 20 ppm over temperature and time for 17 years. Using a common reference, ensures frequency coherence between the transmitter and receiver paths inside the OTRU. The 20 ppm stability of the 20 MHz reference, satisfies the stability requirement for the radio system. The CRO's are multiplied in frequency to generate the required local oscillator frequency. Two frequency conversions are needed, on both the transmitter and receiver paths, to produce the proper RF and IF, respectively.

Due to the nonlinear nature of mixer and multiplier components, spurious signals are generated in the form of harmonics and mixing products of the fundamental and intermediate frequencies. The proper selection of mixing components, which naturally reject these products, reduces the level of unwanted signals. One or more bandpass filters are used after each mixer and multiplication stage. The filters are designed to pass the wanted signals but reject unwanted spurious. Making use of the frequency limitations, on both active and passive components, help attenuate some of the harmonics and mixing products. The OTRU was designed to utilize the cutoff frequency of WR-28 waveguide to significantly reject critical mixing products and frequency images at the RF output.

Although the OTRU does have voltage variable attenuators for temperature compensation, it does not posses automatic gain control circuitry. The maximum TX output power is limited by the finite output power of the last amplifier stage. The typical saturated output power transmitted from the OTRU is 24 dBm or 0.251 W. As an added safety measure, the OTRU will turn off the transmitter if for any reason the local oscillators lose phase lock with the crystal reference.