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March 22, 2008

THEORY OF OPERATION—MIZAR 30

The overall theory of operation for the MIZAR30 is provided on this page. Detailed theory of operation is outlined in the technical manual for each major sub-assembly (synthesizer, power amplifier, etc.)

The audio signals comprised of left and/or right channel audio, and any subcarrier generator audio are fed to the mother board and the coder board. These two boards contain the necessary pre-emphasis and stereo encoding as required for the audio signal employed. The composite audio signal is then fed to a limiter to prevent overmodulation and sent to the voltage controlled oscillator (VCO). The VCO creates a linear FM waveform on the actual RF channel to be transmitted as programmed by the synthesizer. The synthesizer generates the proper frequency for the designated frequency channel and it uses a temperature compensated crystal controlled oscillator to control the carrier frequency to the prescribed FCC frequency tolerance. Once on the correct frequency, the RF driver amplifies the RF signal to a level that can drive the RF power amp. The RF power amp receives the RF signal from the driver and amplifies the signal to 30 watts. At the output of the RF PA, a filter is employed to prevent harmonics from reaching the output connector. Each one of the subassemblies mentioned in this paragraph uses a DC voltage. The DC voltages are generated by the switching power supply that receives its control signal from the controller assembly. The controller assembly provides a user interface and sends the appropriate voltages to the various subassemblies to program the correct mode of operation, the frequency of operation, the output power level, engages the cooling fan, etc. The controller also monitors specific parameters of the subassemblies and displays that information as selected from the front panel.