Operational Description

The overall theory of operation for the PM-300 is provided on this page. Detailed theory of operation is outlined in the technical manual for each major sub-assembly.

The left and right audio signal is fed to the audio input board where one can select 0, 50 us or 75 us pre-emphasis and is then fed into an audio peak limiter to minimize over modulation. The left and right channels are fed into the optional digital stereo coder with stereo separation in excess of 65 dB and a SNR of more than 80 dB.

The composite stereo signal and the SCA subcarriers are just amplified or attenuated by the correct modulation depth adjustment. The mono input signal is filtered by a 7 th order elliptic filter with a very flat response (20Hz to 15kHz with _ 0.25 dB) and an optimum out of band attenuation (>50 dB for frequencies higher than 19 kHz). Before the VCO stage, an adjustable and bypassable deviation limiter prevents the FM carrier from an excessive modulation depth and adjacent channel interference according to FCC standards. The VCO is controlled by a digital PLL circuit with a high stability quartz reference to obtain a very stable synthetized oscillation, the frequency setting is customizeable using on board dip-switches (the minimum step size is 10 kHz). Furthermore, an automatic locking circuit enables the output modulated signal only when the internal PLL is locked properly, in order to avoid unwanted emissions.

The output of the VCO is fed into the pre-amplifier/driver stage using a 30W MOSFET amplifier. This board is basically composed of four amplification WIDE BAND stages. The pre-amplifier / driver board is equipped with an initial 5-6 seconds delay to avoid accidental out of band emissions in the initial PLL locking period.

The next stage is the 300 watt amplifier, using Philips MOS transistors which are Class C rated at 80% efficiency (typical) 300 W Output Power with 22 dB gain. An output LP filter ensures a pure RF spectrum, compatible with the most stringent international requirements.

The PM 300 transmitter power supply is composed of a switching power supply to power supply the mosfet amplifier and the equipment power supply board which is capable of _12 VDC (6A max) and +24 VDC (10A max) to power supply the Protection and control boards, meter stage, modulator board, 30 watt pre-amplifier/driver stage and all optional boards present .

The transmitter has three main protections:

1) VSWR protectio**n:** When the output reflected power becomes greater than a preset value (normally 30W), the output power reduces to maintain the reflected power below the preset value. When the protection is active the front panel “VSWR” led lights on.

2) PWR LIMIT protection: When the output forward power becomes greater than a preset value (normally 300W), e.g. because of a high driving power, the amplifier gain reduces to maintain a stable output power level (+/-2%). When the protection is active the front panel “PWR LIM” led lights on.

3) Temperature protection: When the heat sink temperature becomes higher than 70°C the output power decreases to a preset value (normally 40W). When the protection is active the front panel “OVERHEAT” led lights on.