

## APPENDIX 4

### **A Description of Circuits for Determining & Stabilizing Frequency**

The transmitter frequency is determined and stabilized by using a Frequency Synthesizer IC, LMX2332A (U14 on RF Receiver Board, installed in the Command Unit element of the Base Station).

The LMX2332A employs a digital phase-lock loop technique. This, combined with a high-quality 40 MHz OCXO as Reference Oscillator and a loop filter, provides the tuning voltages for a voltage-controlled oscillator (U12 on RF Receiver Board) which generates a very stable low-noise RF.

### **B Description of Circuits and Devices employed for Suppression of Spurious Radiation, for Limiting Modulation and for Limiting Power**

#### **Supression of Spurious Radiation**

A 5-element Chebychev low-pass filter is employed to attenuate spurious radiation. This filter is placed at the RF output of the transmitter and comprises L4, L5, C29, C30, C31 and C32.

#### **Limiting Modulation**

A Cartesian Lineariser circuit is employed not only to provide linearization, but also to limit modulation.

The I and Q signals from the baseband board and the feedback I and Q signals from the Cartesian loop are fed into Combining Amplifiers (U11A and U11B). A subtraction process is performed in order to generate error signals, which are fed to the I/Q Modulator (UC1), ensuring that the RF signal input to the amplifier stages is at the correct level.

#### **Limiting Power**

For limiting power, the gain of the final power amplifier is held at a relatively constant level by Zener Diode D4 and Thermistor TH1.

D5 maintains a constant bias voltage for the final power amplifier over a drain voltage range of 25 V to 30 V.

TH1 maintains a constant gain for the power amplifier over a temperature range of -30° to +50° C.