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March 20, 2003

Subject: response to the TCB's LEDR400S questions

Question 1: Updated the test specification to reflect the other frequencies that are approved.
The attached file reflects this.

Question 2: Ultratech will answer this question about the attenuator.

Question 3:

The final RF amplifying device is Q703, shown on schematic sheet 11 at grid 4F. This is a Mitsubishi MGF0911A GaAs FET. The source of the FET is grounded. An active bias control loop regulates the DC voltage on the Drain to +10VDC for all operating conditions. One section of Op-Amp U707 (sheet 11, grid 5F) senses the drain voltage on pin 12 and compares it to regulated 10 volts on pin 13. The op-amp output on pin 14 provides bias to the gate terminal with a nominal value of -2VDC. Drain current flows from the "+11.75V_KEY" source through 0.83 Ohms and choke L718 to the Drain. Nominal drain current is 2.1 Amps. Being a very linear class-A amplifier, these conditions are maintained over all output power levels whenever the TX keyline is asserted. When the TX keyline is non-asserted the "+11.75V_KEY" source is turned off by Q704 (sheet 11, grid 6B)

Question 4:

Transmit Frequency is determined by a frequency synthesizer consisting of Synthesizer Controller U710 (Sheet 10, grid 7C); Voltage Controlled Oscillator (VCO) U705 (Sheet 10, grid 5C); Temperature Compensated Crystal Oscillator (TCXO) Y601 (Sheet 9, grid 5D); and associated circuitry.

Frequency Stability is determined by Y601 which has 1.5 part-per-million frequency stability.

Spurious radiation is limited by the LC lowpass filter following the final RF amplifier. This filter consists of C823, L720, C824, L721, and C825 shown on sheet 11 at grids 3F and 4F.

Transmit modulation is accomplished and controlled at the I.F. within QAM Modulator U501 shown on sheet 8 at grid 2G. U501 is a Broadcom BCM3033 QAM Modulator under full software control including modulation type and data rate.

RF power is controlled by an active Transmit Gain Control (TGC) loop. The feedback and control portion of the TGC loop consists of a directional coupler to sample the output power (sheet 11, grid 3E); Detector CR700 (sheet 11, grid 3E); Op-Amp U707 (sheet 11, grid 3D); A-to-D Converter U106 (sheet 4, grid 7C); Microcontroller U101 (sheet 2, grid 4E), a D-to-A converter inside Demodulator U500 (sheet 8, grid 8G); Op-Amp U715 (sheet 10, grid 2C); DC amplifier Q702 (sheet 10, grid 3C); and PIN Diode Attenuator CR701 (sheet 10, grid 2E). The loop is under full software control with U101 providing the "brainpower".

Questions 3 & 4 are answered by the RF design engineer.

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If you have any queries, please do not hesitate to contact me at 585 242-8440:

Yours truly,

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