APPENDICES

APPENDIX A : FM/AM-1500 SPECIFICATIONS

A-1 RF SIGNAL GENERATOR

Frequency Range:	100 kHz to 999.9999 MHz in 100 Hz increments.
Frequency Accuracy:	(See TCXO Master Oscillator)
Residual FM:	<50 Hz RMS (typical 30 Hz RMS) (Post detection 50-300 Hz)
RF Output Power:	0 dBm to -128 dBm continuously adjustable into 50Ω. (No range changing)
Accuracy:	±2 dB, -10 to -80 dBm ±2.5 dB, -80 to 128 dBm (-80 to -120 on IEEE version)
Attenuator Dial:	One continuous dial with μV and dBm.
Modulation:	FM: 2 Hz to 30 kHz rate at 0 to ±25 kHz deviation. For external inputs DC to 30 kHz rate. (DC, if generated lock control is in the variable position). Flat to ±2 dB DC to 30 kHz 6 Vp-p ±2 Vp-p produce ±15 kHz deviation AM: 10 Hz to 5 kHz rate at 0-90% 6 kHz to 30 kHz rate at 0-30% 3 Vp-p ±1 Vp-p produces 90% modulation External Mod impedance 600Ω

NOTE

FM_1, FM_2, FM_3 and FM_4 are all FM modulation. SSB, AM_1, and AM_2 are AM modulation. SSB has no function other than AM in the generator mode.

Freq. Shift with Modulation:	When the generator is in the "lock" position, the center frequency is phase-locked to the system clock.

A-1 RF SIGNAL GENERATOR (Cont'd)

Modulation Distortion:	The FM modulation distortion plus noise at ±25 kHz deviation is less than 2% from 200 Hz to 20 kHz.
Generator Freq. Control:	When in the "locked" position, the generator is phase-locked to the master clock. When switched off from the "locked" position, the generator may be varied ±10 kHz. The FM modulation input is DC coupled for this unlocked function. (Internal or external modulation.)
Microphone Input:	Generator can be switched on by an external microphone. It has internal preamp with adjustable level.
SSB Noise:	90 dBc/Hz at ±20 kHz from carrier.
Deviation Accuracy of Processor controlled audio levels:	±5% from 20 Hz to 5 kHz and ±10% from 5 kHz to 20 kHz.
Generator Spurious:	
Harmonics:	>25 dBc
Non Harmonics:	>40 dBc
Typically:	>60 dBc
In-Band, typically:	>70 dBc

A-2 DUPLEX GENERATOR

Freq Range:	±49.99 MHz from receive frequency (as indicated on front panel (LCD) in 10 kHz increments.
Freq Accuracy:	See TXCO Master Oscillator.
Output Level:	
DUPLEX Connector:	0 dBm to -128 dBm continuously adjustable into 50Ω. (No range changing.)

A-4 SPECTRUM ANALYZER

Inputs:	Transmitter:	Transmitter under test when power exceeds 0.1 watt. A 100 watt signal produces a top graticule reading. (marked -30 dBm)
	Antenna Jack:	The log scale is marked for dBm for this input when the antenna attenuator is set for "0". The signal can be attenuated by 20 dB or 40 dB by the antenna attenuator switch.
Log Scale:		Within ±2 dB linearity from -30 dBm to -90 dBm indication. Switchable between 1 dB/DIV and 10 dB/DIV.
Dynamic Range:		70 dB, additional 40 dB selectable by input attenuator.

Modes:

Full Scan:	1 MHz to 1000 MHz; 650 kHz bandwidth
10 MHz/DIV:	Center frequency as selected; 650 kHz bandwidth
5 MHz/DIV:	Center frequency as selected; 650 kHz bandwidth
2 MHz/DIV:	Center frequency as selected; 650 kHz bandwidth
*1 MHz/DIV:	Center frequency as selected; 30 kHz bandwidth
*0.5 MHz/DIV:	Center frequency as selected; 30 kHz bandwidth
*0.2 MHz/DIV:	Center frequency as selected; 30 kHz bandwidth
*0.1 MHz/DIV:	Center frequency as selected; 30 kHz bandwidth
*20 kHz/DIV:	Center frequency as selected; 3 kHz bandwidth
*10 kHz/DIV:	Center frequency as selected; 3 kHz bandwidth
*2 kHz/DIV:	Center frequency as selected; 300 Hz bandwidth
*1 kHz/DIV:	Center frequency as selected; 300 Hz bandwidth

* The receiver is fixed on the center frequency for monitoring while the analyzer scans as specified. On wider scans, the receiver and monitor portion are not usable.

A-5 TRACKING GENERATOR

Frequency Range:	1.0 MHz to 1000 MHz as selected by the frequency control.
Output Level:	Same as RF generator; 0 dBm to -128 dBm.
Sweep Mode:	The oscilloscope is switchable to external vertical input when in the tracking generate mode.

A-6 OSCILLOSCOPE

Display Size:	2" x 2½"
Vertical Bandwidth:	DC to 1 MHz (at 3 dB bandwidth)
External Vertical Input Ranges:	10 MV, 100 MV, 1 V, 10 V per division
Horizontal Sweep Rate:	10 mSec, 1 mSec, 100 µSec, 10 µSec per division

A-7 AUDIO GENERATORS

Operating Modes:	Internal:	Variable frequency generators, one or both.
	External plus Internal:	Any external tone(s) plus either or both internal tones simultaneously.
Frequency Range:	Variable from 2 Hz to 30 kHz.	
Accuracy:	0.01%	
Resolution:	0.1 Hz; 2 Hz to 9999.9 Hz; 1 Hz, 10.000 kHz to 30 kHz.	
Output Level:	Variable from 0 to 2.5 VRMS minimum either tone into 150Ω.	
Distortion:	<2% (10 Hz to 100 Hz) <0.7% typical 100 Hz to 30 kHz Some frequencies have a measured distortion of less than 1.5% as measured on a typical null type distortion analyzer.	

A-7 AUDIO GENERATORS (Cont'd)

Output Distribution:	Each tone selectable OFF or into either AM or FM modulator when not under processor sequence control. Each tone level variable through "Tones Out" jack regardless of selection of "FM", "AM" or "OFF" by the manual switches.
Speaker:	Selectable from receiver or same signal as "Tone Out" jack.

A-8 FREQUENCY ERROR METER MEASUREMENT CAPABILITY

RF Signals

Sensitivity:	Typically 1.5 µV above 1 MHz (sensitivity is reduced below 1 MHz)
Ranges:	±30 Hz, ±100 Hz, ±300 Hz, ±1 kHz, ±3 kHz, ±10 kHz
Resolution:	±1 Hz on the ±30 Hz and ±100 Hz ranges

Demodulated Audio Signals

Ranges:	±3 Hz, ±30 Hz, ±300 Hz as referenced to frequency of Tone Generator #1.
Resolution:	±0.1 Hz on ±3 Hz scale
Frequency Range:	20 Hz to 10 kHz

A-9 DEMODULATED AUDIO FREQUENCY COUNTER

Range:	10 Hz to 20 kHz
Resolution:	1 Hz
Accuracy:	±2 counts

A-10 INTERNAL SINAD METER

Input:	0.5 to 10 VRMS
Frequency:	1 kHz
Range:	0 to 20 dB
Accuracy:	±1.5 dB at 12 dB reading