

APPENDICES

APPENDIX A – FM/AM-1200S/A SPECIFICATIONS

A-1 RF SIGNAL GENERATOR

Frequency Range:	250 kHz to 999.9999 MHz in 100 Hz increments.
Frequency Accuracy:	± 5 Hz + Master Oscillator (S/Ns thru 4490 for FM/AM-1200S, S/Ns thru 1448 for FM/AM-1200A). See Master Oscillator for FM/AM-1200S S/N 4491 and after (S/N 1449 and after for FM/AM-1200A).
Residual FM:	<100 Hz RMS (300 Hz to 3 kHz Bandwidth)
Harmonics:	2nd Harmonic ≤ -30 dBc 3rd Harmonic ≤ -45 dBc
Non-Harmonics & Spurious (at offset from selected frequency):	± 10 kHz to ± 1.5 MHz: ≤ -30 dBc in band ± 1.5 MHz to band end: ≤ -55 dBc (If image ≤ -35 dB)
RF Output Power:	-127 dBm to -20 dBm (10 dB steps with 11 dB range vernier) into 50 ohms.
RF Output Accuracy:	± 2.5 dB (± 3 dB at frequencies >800 MHz and levels between -120 dBm and -127 dBm for FM/AM-1200S thru S/N 7698 and FM/AM-1200A thru S/N 1676).
Variable Generate:	When in the "locked" position, the generator is phased locked to the master oscillator. When switched from the "locked" position, the generator may be varied ± 10 kHz.
Internal Modulation:	
Deviation Range:	0 to 50 kHz (with 1 kHz tone).
% AM Range:	0 to 90% (with 1 kHz tone).
External Modulation:	
Frequency Response:	FM: 2 Hz to 30 Hz (DC when in variable generate) AM: 10 Hz to 10 kHz (30% maximum modulation above 5 kHz).
Modulation Sensitivity:	FM: .1 VRMS/kHz (-0 to +30%) AM: .01 VRMS/% (-0 to +30%)
Distortion (at 1 kHz sine):	FM: <1% to 20 kHz deviation AM: <10% to 60% modulation
Input Impedance:	10K Ohms nominal

A-2 DUPLEX GENERATOR

Frequency Range: ± 49.99 MHz from receive frequency in 10 kHz steps.
Frequency Resolution: 2.5 kHz
Frequency Accuracy: (See Master Oscillator)
Output Level:
DUPLEX Port: (FM/AM-1200A)
-60 dBm ± 10 dB fixed level into 50 ohm.
(FM/AM-1200S)
DUPLEX HIGH: -15 dBm into 50 ohms ± 10 dB
DUPLEX LOW: -40 dBm into 50 ohms (-25 dB ± 5 dB below
DUPLEX HIGH at the same frequency)
Input Protection: 0.25 WATT (maximum without damage)
T/R Port: (FM/AM-1200A) -80 dBm ± 10 dB fixed level
(FM/AM-1200S) -85 dBm ± 10 dB fixed level

A-3 RECEIVE/MONITOR

Frequency Range: 10 kHz to 999.9999 MHz in 100 Hz increments
Sensitivity: 2 μ V typical (1 MHz to 1000 MHz FM narrow)
Selectivity (at 3 dB):

<u>MODE</u>	<u>RECEIVER</u> <u>BANDWIDTH</u>	<u>AUDIO</u> <u>BANDWIDTH</u>
FM WIDE	200 kHz	80 kHz
FM MID	200 kHz	8 kHz
FM NAR	15 kHz	8 kHz
SSB	6 kHz	8 kHz
AM NAR	6 kHz	8 kHz
AM NORM	15 kHz	8 kHz

Adjacent Channel Rejection:

<u>RECEIVER</u> <u>BANDWIDTH</u>	<u>GREATER THAN</u> <u>40 dB DOWN</u>
200 kHz	± 300 kHz
15 kHz	± 27 kHz
6 kHz	± 15 kHz

Demodulation Output:

Impedance: 600 Ohms
Output Level: (Into an open circuit):
FM: 60 mVRMS/1 kHz (nominal)
AM: 5 mVRMS/% (nominal)

Receiver Antenna

Input Protection: 0.25 WATT (maximum without damage)

A-4 POWER METER

Range: 0 to 15 and 0 to 150 WATTS peak or average responding.

Accuracy: 1 to 600 MHz $\pm 7\%$ of reading of full scale.
600 to 1000 MHz $\pm 20\%$ of reading $\pm 3\%$ of full scale.

Input Power: 50 WATTS continuous
>50 to 150 WATTS, one minute "ON", five minutes "OFF".

A-5 FREQUENCY ERROR METER

RF Accuracy: \pm Master Oscillator
 $\pm 3\%$ of full scale

RF Ranges: ± 10 kHz, ± 3 kHz, ± 1 kHz, ± 300 Hz,
 ± 100 Hz, ± 30 Hz full scale

Audio Counter:

Frequency Range: 10 Hz to 12 kHz

Accuracy: $\pm 0.01\%$ $\pm 3\%$ of full scale

Ranges: ± 300 Hz, ± 30 Hz, ± 3 Hz full scale

A-6 MODULATION METER

FM Deviation:

Accuracy: $\pm 5\%$ of reading,
 $\pm 3\%$ of full scale for a 1 kHz tone.

Ranges: 2 kHz, 6 kHz, 20 kHz, 60 kHz full scale.

AM % Modulation:

Accuracy: $\pm 5\%$ of reading
 $\pm 3\%$ of full scale for a 1 kHz tone

Ranges: 60%, 200% full scale

A-7 SINAD/DISTORTION METER

SINAD: 3 to 20 dB at 1 kHz

Accuracy: ± 1 dB at 12 dB SINAD

Distortion Range: 0 to 20% at 1 kHz

Accuracy: $\pm 1\%$ at 10% distortion

Input Level: 0.25 VRMS to 2 VRMS (10 VRMS maximum)

Impedance: 10K Ohm Nominal

A-8 FUNCTION GENERATOR

Functions:	SINE, SQUARE, RAMP, TRIANGLE, DTMF, TONE SEQ and DCS
Tone Accuracy:	
Fixed:	(Same as Master Oscillator)
Variable:	$\pm 0.01\%$
Tone Distortion:	(At 2.5 VRMS output)
Fixed:	$< 0.5\%$
Variable (SINE):	$< 2\%$ (10 Hz to 100 Hz) $< 0.7\%$ typical (100 Hz to 30 Hz)
Tone Output Level:	Variable to 2.5 VRMS minimum, either tone into 150 Ohm load
Frequency Range:(Variable):	10 Hz to 30 kHz in 0.1 Hz increments
DTMF ENCODE:	
Deviation:	3.5 kHz Fixed (± 500 Hz)
Mark Time:	50 mSec Minimum
Space Time:	50 mSec Minimum
DTMF Decode (Optional):	See Digital Voltmeter

A-9 OSCILLOSCOPE

Display Size:	2 inches X 2.5 inches
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:	FM/AM-1200A - 10 mSec, 1 mSec, 100 μ Sec, 10 μ Sec, 1 μ sec per division FM/AM-1200S - 10 mSec, 1 mSec, 100 μ Sec, 10 μ Sec per division

A-10 DIGITAL VOLTMETER/DTMF DECODE (OPTIONAL)

AC Volts:

Frequency Range:	45 Hz to 10 kHz
Voltage Range:	0 to 100 VRMS
Accuracy:	$\pm 10\%$ ± 2 Counts

DC Volts:

Voltage Range:	0 to ± 100 VDC
Accuracy:	$\pm 10\%$ ± 2 Counts

DTMF DECODE:

Deviation:	1 kHz Minimum
Mark Time:	50 mSec Minimum
Space Time:	50 mSec Minimum
Sensitivity:	20 dB FM Quieting

A-11 MASTER OSCILLATOR

Standard TCXO (Thru FM/AM-1200A S/N 1499, thru FM/AM-1200S S/N 5411)

Stability:	0.5 PPM (0.50° C)
Aging:	1 PPM per year

Standard TCXO (FM/AM-1200A S/N 1500 and on, Option 1 thru FM/AM-1200A S/N 1499; FM/AM-1200S S/N 5412 and on, Option 1 thru FM/AM-1200S S/N 5411)

Stability:	0.2 PPM (0.50° C)
Aging:	0.5 PPM per year

Optional Oven Oscillator: (Option 2)

Stability:	0.05 PPM (0.50° C)
Aging:	0.25 PPM per year

A-12 GENERATE AMPLIFIER (OPTIONAL)

Gain: 30 \pm 2 typical, 250 kHz to 1000 MHz
Test Set Output with
Amplifier Installed: Variable to +10 dBm, FM, CW
Variable to +4 dBm, AM

A-13 TRACKING GENERATOR (OPTIONAL)

Frequency Range: 1 MHz to 999.9999 MHz
Output Levels:
TRACK HIGH: -3 dBm (\pm 5 dB)
TRACK MED: -15 dBm (\pm 7 dB)
TRACK LOW: -40 dBm (+5/-10 dB)
Flatness: \pm 1 dB over center 80% of displayed area,
 \pm 5 dB over remaining display.
Tracking Span: 10 kHz to 10 MHz as set by Spectrum Analyzer
scan width.
Output Impedance: 50 ohm nominal.
Spurious: Harmonic and Non-Harmonic are <5 dBc, typically
10 dB. Image (RF+180 MHz) typically 0 dBc.
Dynamic Range: >70 dB
Tracking Range Adjustment: -200 Hz to 1.0 kHz minimum as compared to analyzer
center.

A-14 GENERAL CHARACTERISTICS

Temperature Range: 0 to 50° C

A-15 POWER REQUIREMENTS

Line: 105 to 130/210 to 260 VAC
50 to 400 Hz at 60 WATTS typical.
Ext. DC: 12 to 30 VDC nominal, 3.5 AMPS at 12 V typical,
1.5 AMPS at 28 V typical.

A-16 SPECTRUM ANALYZER (FM/AM-1200S ONLY)

Log Scale: Within ± 2 dB linearity from -30 dBm to -90 dBm indication

Dynamic Range: 70 dB (from display reading of -30 to -100)

Modes:

<u>SCAN WIDTH</u>	<u>BANDWIDTH</u>
1 MHz/DIV	30 kHz
500 kHz/DIV	30 kHz
200 kHz/DIV	30 kHz
100 kHz/DIV	30 kHz
50 kHz/DIV	30 kHz
20 kHz/DIV	3 kHz
10 kHz/DIV	3 kHz
5 kHz/DIV	3 kHz
2 kHz/DIV	300 Hz
1 kHz/DIV	300 Hz