

APPENDIX F - SPECIFICATIONS

SIGNAL GENERATOR (REPLY CHARACTERISTICS)

RF Signal

Output Frequency: 1090 MHz (± 10 kHz), DCXO controlled

Level (referenced to P₁/F₁): -67.35 dBm (± 2 dB) at RF I/O Connector
 (19.5 dB Attenuation) manually adjustable
 from nominal in 0.5 dB steps

Attenuation:

Range: 0 to 50 dB (automatically set according to antenna
 separation distance specified in Setup or manually
 set in 0.5 dB steps [Whisper-Shout Monitor])

Accuracy: ± 0.5 dB (0 to 40 dB)

Reply

Reply Modes: C (with or without Altitude Reporting)
 S (Downlink Formats [DF] 0, 16) (Squitter DF11)

Pulse Characteristics (Measured at 50% Amplitude Points)

Spacing:

ATCRBS:

F ₁ to F ₂ :	20.30 μ s (± 50 ns)
F ₁ to C ₁ :	1.45 μ s (± 50 ns)
F ₁ to A ₁ :	2.90 μ s (± 50 ns)
F ₁ to C ₂ :	4.35 μ s (± 50 ns)
F ₁ to A ₂ :	5.80 μ s (± 50 ns)
F ₁ to C ₄ :	7.25 μ s (± 50 ns)
F ₁ to A ₄ :	8.70 μ s (± 50 ns)
F ₁ to B ₁ :	11.60 μ s (± 50 ns)
F ₁ to D ₁ :	13.05 μ s (± 50 ns)
F ₁ to B ₂ :	14.50 μ s (± 50 ns)
F ₁ to D ₂ :	15.95 μ s (± 50 ns)
F ₁ to B ₄ :	17.40 μ s (± 50 ns)
F ₁ to D ₄ :	18.85 μ s (± 50 ns)

Mode S:

P ₁ to P ₂	1.00 μ s (± 50 ns)
P ₁ to P ₃ :	3.50 μ s (± 50 ns)
P ₁ to P ₄ :	4.50 μ s (± 50 ns)
P ₁ to D ₁ :	8.00 μ s (± 50 ns)
D ₁ to D _n (n=2 to 112):	(1.0 μ s times [n-1]) (± 50 ns)

Widths:

ATCRBS:	0.45 μ s (\pm 50 ns)
Mode S:	
P ₁ through P ₄ :	0.50 μ s (\pm 50 ns)
D ₁ through D ₁₁₂ :	0.50 μ s (\pm 50 ns) pulse width in a 1.00 μ s (\pm 50 ns) chip (bit) width (PPM data: first half = "1" second half = "0")

Rise and Fall Times:

Rise Time (All Modes):	50 to 100 ns
Fall Time (All Modes):	50 to 200 ns

Amplitude Levels:

All Pulses:	\pm 1 dB relative to F ₁ (ATCRBS) or P ₁ (Mode S) level
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Displayed Functions

Percent Reply:	0 to 100%
Resolution:	10%
Accuracy:	\pm 1%

Range Delay (selected range plus antenna separation distance):

Range:	0.5 to 30 nmi
Resolution:	50 ns steps
Accuracy:	\pm 0.02 nmi
Range Rate:	-1200 to +1200 kts
Resolution:	10 kts
Accuracy:	\pm 10%
Altitude Range:	-1000 to +126,700 feet
Resolution:	100 feet
Altitude Rate:	-10000 to +10000 fpm
Resolution:	100 fpm
Accuracy:	\pm 10%
Mode S Address:	Selectable
Squitter Control:	ON or OFF
Range:	0.8 to 1.2 sec

UUT MEASUREMENTS (INTERROGATIONS)

Frequency (Mode S) (Average over 30 seconds of operation):

Range:	1029.9 to 1030.1 MHz
Accuracy:	±10 kHz
Resolution:	1 kHz

Power (Mode S) (Average over 30 seconds of operation):

Direct Connection-Peak Pulse Power:

Range:	+46 to +58 dBm (40 to 631 W)
Accuracy:	±1 dB
Resolution:	0.1 dB

Effective Radiated Power (ERP) (Mode S):

Range:	+48 to +56 dBm (63 to 398 W)
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Detectable Modes:

 ATCRBS Only All-Call (Mode C)
 Mode S Uplink Formats 0 and 16

Pulse Spacing:

ATCRBS (Mode C All-Call):

S ₁ to P ₁ :	
Accepts:	2.0 μs (±200 ns)
Rejects:	±1.0 μs
P ₁ to P ₃ :	
Accepts:	21.0 μs (±200 ns)
Rejects:	±1.0 μs
P ₁ to P ₄ :	
Accepts:	23.0 μs (±250 ns)
Rejects:	±1.0 μs

Mode S:

P ₁ to P ₂ :	
Accepts:	2.0 μs (±100 ns)
Rejects:	±1.0 μs
P ₁ to SPR:	
Accepts:	4.75 μs (±100 ns)
Rejects:	±1.0 μs

Simulated Transponder MTL:

 +44.25 dBm (±2 dB) at RF I/O Connector
 (19.5 dB Attenuation) manually adjustable
 from nominal in 0.5 dB steps

ATCRBS Suppression Detection:

Rejects:	P_2 or $S_1 > 0.5$ dB above Level of P_1 (<10% replies)
Accepts:	P_2 or $S_1 > 0.5$ dB below MTL (>90% replies)

TEST ANTENNA

Remote Antenna VSWR:	<1.5:1
Gain:	9.5 dB typically, specified on the antenna
Range:	6 feet (1.83 meters) to 500 feet (152.4 meters)

BATTERY OPERATION

Duration:	1.5 hours before recharge at 25° C
Automatic shutoff:	After 15 minutes of non-use

POWER REQUIREMENTS

Source Voltage and Frequency:	100 to 120 VAC at 60 Hz 220 to 240 VAC at 50 Hz
Power Consumption:	37 W Maximum 34 W Nominal at 115 VAC 26 W Nominal at 230 VAC
Nominal Input Current:	0.4 A at 115 VAC 0.2 A at 230 VAC

FUSE REQUIREMENTS

F1 and F2:	
100 to 120 VAC:	1.0 A, 250 V, Type F
220 to 240 VAC:	0.5 A, 250 V, Type F

SAFETY

This instrument is designed to comply with the requirements of EN61010-1/IEC1010-1, for Class 1 portable equipment and is for use in a pollution degree 2 environment. The equipment is designed to operate from an installation category II supply, to environmental conditions specified in paragraph 1.4 of EN61010-1.

OPERATIONAL ENVIRONMENTAL CONSIDERATIONS

This instrument operates over temperature extremes of -20° to +50° C.