

TACAN/DME Mode Specifications

SIGNAL GENERATOR

A 5-minute warm-up period is required for all specifications.

Output Frequency

Reply Frequency

Range 962 to 1213 MHz
Accuracy ± 10 kHz

% Variable Channel Selection 1 to 126 (X & Y)

Preset Channel Selection

% Preset 1 (DoD)

T/R Mode 17X, 18X

A/A Mode 17X, 17Y

Inverse A/A Mode 80X, 80Y

% Preset 2 (AN/ASM-663)

5X, 5Y, 47X, 47Y, 89X, 89Y

Preset 3 (AN/ARM-184) No Preset

Preset 4 (2650/2655)

18X, 18Y, 47X, 47Y, 100X, 100Y, 123X, 123Y

Output Level

Antenna Port

Range -67 to -5 dBm (T/R Norm, T/R Inv, A/A Beacon, A/A Inv)
-67 to -2 dBm (T/R Rng Only, A/A Rng Only)

Resolution 0.5 dB

Accuracy ± 2 dB

Distance to UUT antenna 6 to 250 ft. with supplied antenna

RF I/O Port

Range -115 to -50 dBm (T/R Norm, T/R Inv, A/A Beacon, A/A Inv)
-115 to -47 dBm (T/R Rng Only, A/A Rng Only)

Resolution 0.5 dB

Accuracy -95 dBm to -50 dBm ± 1 dB

Accuracy -115 dBm to <-95 dBm ± 2 dB

Reply Pulse Spacing

P1 to P2 $12 \mu\text{s} \pm 0.1 \mu\text{s}$ (T/R X Channel)
@ 50% peak

P1 to P2 $30 \mu\text{s} \pm 0.1 \mu\text{s}$ (T/R Y Channel)
@ 50% peak

Reply Pulse Width

P1/P2 $3.5 \mu\text{s} \pm 0.5 \mu\text{s}$

Echo Reply

Control On/Off

Position 30 nmi ± 1 nmi

Amplitude -11 dB ± 1 dB relative to reply level

Reply Pulse Rise and Fall Times

All Pulses

Rise Time $2.0 \mu\text{s} \pm 0.25 \mu\text{s}$ (10% to 90%)

Fall Time $2.5 \mu\text{s} \pm 0.25 \mu\text{s}$ (90% to 10%)

Reply Delay

T/R X Channel

Fixed Reply Delay $50 \mu\text{s} \pm 100$ ns

T/R Y Channel

Fixed Reply Delay $56 \mu\text{s} \pm 100$ ns

% A/A X Channel

Fixed Reply Delay $62 \mu\text{s} \pm 100$ ns

% A/A Y Channel

Fixed Reply Delay $74 \mu\text{s} \pm 100$ ns

Variable Range Delay

X and Y Channel

Range 0 to 450.00 nmi

Resolution 0.01 nmi

Accuracy ± 0.01 nmi

Preset Range Delay

X and Y Channel

Preset 1 (DoD) Range

0, 3, 10, 30, 100, 200, 300, 400 nmi

Preset 2 (AN/ASM-663) Range

0, 10, 150, 297 nmi

Preset 3 (AN/ARM-184) Range

0, 50, 100, 150, 200, 250, 300, 350,

400 nmi

Preset 4 (2650/2655) Range

0, 5, 125, 283 nmi

Resolution

0.01 nmi

Accuracy ± 0.01 nmi

Variable Range Rate

X and Y Channel

Range 0 to 6500 kts

Resolution 1 kts

Accuracy $\pm 0.01\%$ typical, tested to $\pm 0.5\%$

Preset Range Rate

X and Y Channel

Preset 1 (DoD) Rate

0, 250 kts (1000 kts in A/A modes)

Preset 2 (AN/ASM-663) Rate

No Rate

Preset 3 (AN/ARM-184) Rate

0, 2400 kts

Preset 4 (2650/2655) Rate

No Rate

Resolution

1 kts

Accuracy $\pm 0.01\%$ typical, tested to $\pm 0.5\%$

Squitter

% PRF
T/R(X) & T/R(Y) NORM, INVERSE, RNG ONLY
 2700 Hz
A/A RNG ONLY, BEACON, INVERSE
 1350 Hz
Accuracy ± 2%
Distribution Per MIL STD 291C and ARINC 568

Reply Efficiency

Range 0 to 100%
Resolution 1% increments
Accuracy ± 0.5%

% Ident Tone Pulse Pair

T/R(X) & T/R(Y) Modes Selection
Selectable four letter code or tone

Frequency 1350 Hz
Accuracy ± 2 Hz
Equalizer pulse pair Spacing from Ident pair 100 µs ± 10 µs

% Ident Tone Single Pulse

A/A(X) & A/A(Y) Modes Selection
Selectable four letter code or tone

Frequency 1350 Hz
Accuracy ± 2 Hz

Inverse Mode

A/A(X), A/A(Y), T/R(X), T/R(Y)
Active Low North Reference Trigger Sync Output

% A/A Mode Interrogation

P1 to P2 12 µs ± 0.1 µs (A/A X Channel)
 @ 50% peak
P1 to P2 24 µs ± 0.1 µs (A/A Y Channel)
 @ 50% peak
Interrogation Rate 150 PPS, ± 5 Hz

% 15/135 HZ Bearing Signal

Modulation Levels

15 Hz	21% ± 2.5%
135 Hz	21% ± 2.5%

Frequency 15/135 Hz
Phase Accuracy <± 0.3°
Distortion <2.5%

% Bearing

Variable 0 to 359.5° in 0.5° increments
Accuracy ± 0.1°

Preset

Preset 1 (DoD) Range
 0°, 45°, 90°, 135°, 180°, 225°, 270°, 315°
Preset 2 (AN/ASM-663) Range
 0°, 45°, 180°, 225°
Preset 3 (AN/ARM-184) Range
 0°, 90°, 180°, 337.5°
Preset 4 (2650/2655) Range
 90°, 230°, 320°

Interrogation Pulse Decoding

Must Reply nominal code pair spacing
 < ± 0.5 µs
Must Not Reply nominal code pair spacing
 > ± 1.0 µs

% MRB T/R(X)

Group 12 pairs of pulses
Pulse Spacing 12 µs ± 0.1 µs
Pulse Pair Spacing 12 µs ± 0.1 µs

% MRB T/R(Y)

Group 13 single pulses
Pulse Spacing 30 µs ± 0.1 µs

% MRB A/A Beacon (X & Y)

Group 10 single pulses
Pulse Spacing 30 µs ± 0.1 µs

% ARB T/R(X)

Group 6 pairs of pulses
Pulse Spacing 12 µs ± 0.1 µs
Pulse Pair Spacing 24 µs ± 0.1 µs

% ARB T/R(Y)

Group 13 single pulses
Pulse Spacing 15 µs ± 0.1 µs

UUT MEASUREMENTS

ERP

Range +47 to +66.1 dBm
Resolution 0.1 dB
Accuracy ±2 dB

Direct Connection Peak Pulse Power

Range +4 7 to +66.1 dBm
Resolution 0.1 dB
Accuracy ± 1 dB

Frequency

Range 1025.00 to 1150.00 MHz
Resolution 10 kHz
Accuracy ± 20 kHz

Interrogation Pulse Width

P1 and P2 Pulse Widths

Range	2.00 to 5.00 μ s
Resolution	1 ns
Accuracy	\pm 50 ns

% Interrogation Pulse Spacing

P1 to P2 Spacing	10 to 14 μ s (T/R X and A/A X Channel)
P1 to P2 Spacing	22 to 26 μ s (A/A Y Channel)
P1 to P2 Spacing	34 to 38 μ s (T/R Y Channel)
Resolution	10 ns
Accuracy	\pm 20 ns

Interrogation PRF

Range	1 to 300 Hz
Resolution	1 Hz
Accuracy	\pm 2 Hz

% A/A Reply Delay

A/A(X)	62 μ s (-2 +4 μ s accept)
A/A(Y)	74 μ s (-2 +4 μ s accept)
Resolution	10 ns
Accuracy	\pm 100 ns

Transponder Mode Specifications

SIGNAL GENERATOR

RF Output Frequency

Interrogation Frequency	1030 MHz
Accuracy	\pm 10 kHz

RF Output Level

Antenna Port

(MTL + 6 dB typical, automatically controlled for a MTL range of -83 to -68 dBm)

Range	-67 to -2 dBm at antenna port
Resolution	0.5 dB
Accuracy	\pm 2 dB
Distance to UUT antenna	6 to 200 ft with supplied antenna

RF I/O Port

(MTL + 6 dB typical, automatically controlled)

Range	-115 to -47 dBm
Resolution	0.5 dB
Accuracy	-95 to -47 dBm, \pm 1 dB
Accuracy	-115 to <-95 dBm, \pm 2 dB

ATCRBS/SIF/Mode S Interrogation Pulse Spacing

Mode 1

P1 to P2	2.00 μ s \pm 25 ns
P1 to P3	3.00 μ s \pm 25 ns

Mode 2

P1 to P2	2.00 μ s \pm 25 ns
P1 to P3	5.00 μ s \pm 25 ns

Mode 3A

P1 to P2	2.00 μ s \pm 25 ns
P1 to P3	8.00 μ s \pm 25 ns

Mode C

P1 to P2	2.00 μ s \pm 25 ns
P1 to P3	21.00 μ s \pm 25 ns

MODE S

P1 to P2	2.00 μ s \pm 25 ns
P1 to P6	3.50 μ s \pm 25 ns
P1 to SPR	4.75 μ s \pm 25 ns
P5 to SPR	0.40 μ s \pm 50 ns

Intermode Interrogation Pulse Spacing

MODE A

P1 to P3	8.00 μ s \pm 25 ns
P1 to P4	10.00 μ s \pm 25 ns

MODE C

P1 to P3	21.00 μ s \pm 25 ns
P1 to P4	23.00 μ s \pm 25 ns

Interrogation Pulse Widths

Mode A,C,S, Intermode

P1,P2,P3	0.80 μ s \pm 50 ns
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Mode S

P6 (Short DPSK Block)	16.25 μ s \pm 50 ns
P6 (Long DPSK Block)	30.25 μ s \pm 50 ns
P5	0.80 μ s \pm 50 ns

Intermode

P4 (Short)	0.80 μ s \pm 50 ns
P4 (Long)	1.60 μ s \pm 50 ns

Interrogation Pulse Rise and Fall Times

All Modes

Rise Time	50 to 100 ns
Fall Time	50 to 200 ns

Phase Modulation

All Modes

Transition Time	< 80 ns
Phase Shift	180° \pm 10°

SLS Levels

SLS Level (P2)
 -9 dB, -1 to +0 dB relative to P1 level
 0 dB, -0 to +1 dB relative to P1 level
 Off

MODE S

SLS Level (P5)
 -12 dB, -1 to +0 dB relative to P6 level
 +3 dB, -0 to +1 dB relative to P6 level
 Off

Note: SLS level is automatically controlled in the SLS LEVEL test.

Interrogation Test Signals

Mode S

PRF 50 Hz \pm 5 Hz

ATCRBS/SIF

PRF 235 Hz \pm 5 Hz

UUT MEASUREMENTS

ERP (@ 1090 MHz)

Range + 45.5 to + 59 dBm (35.5 to 800 watts)
Resolution 0.1 dB
Accuracy \pm 2 dB

Direct Connection Peak Pulse Power (@ 1090 MHz)

Range + 46.5 to + 59 dBm (45 to 800 watts)
Resolution 0.1 dB
Accuracy \pm 1 dB

Transmitter Frequency

Range 1087.000 to 1093.000 MHz
Resolution 10 kHz
Accuracy \pm 50 kHz

Receiver Sensitivity, Radiated MTL

Range -67 to -79 dBm into 0 dBi antenna
Resolution 0.1 dB
Accuracy \pm 2 dB, typical

Receiver Sensitivity, Direct Connection MTL

Range -67 to -79 dBm
Resolution 0.1 dB
Accuracy \pm 2 dB

Reply Delay

ATCRBS/SIF

Range 1.80 to 7.00 μ s
Resolution 10 ns
Accuracy \pm 50 ns

Reply Delay, Mode S and ATCRBS Mode S All -Call

Range 125.00 to 131.00 μ s
Resolution 10 ns
Accuracy \pm 50 ns

Reply Delay Jitter

ATCRBS/SIF

Range 0.00 to 2.30 μ s
Resolution 1 ns
Accuracy \pm 20 ns

Mode S and ATCRBS Mode S All-Call

Range 0.00 to 6.00 μ s
Resolution 1 ns
Accuracy \pm 20 ns

Pulse Spacing

F1 TO F2

Range 19.70 to 21.60 μ s
Resolution 1 ns
Accuracy \pm 20 ns

Mode S Preamble

Range, P1 to P2 0.8 to 1.2 μ s
Range, P1 to P3 3.3 to 3.7 μ s
Range, P1 to P4 4.3 to 4.7 μ s
Resolution 1 ns
Accuracy \pm 20 ns

Pulse Decoder

Modes 1,2,3/A 4096 code & binary equivalent displayed, including X pulse. Ident & Emergency Replies displayed.

Mode C Altitude

Pulse Widths

F1 AND F2

Range 0.25 to 0.75 μ s
Resolution 1 ns
Accuracy \pm 20 ns

Mode S Preamble

Range 0.25 to 0.75 μ s
Resolution 1 ns
Accuracy \pm 20 ns

Pulse Amplitude Variation

Range, Mode S (Relative to P1) +3 to -3 dB
Range, ATCRBS/SIF (Relative to F1) +3 to -3 dB
Resolution 0.1 dB (0.01 dB via RCI)
Accuracy \pm 0.5 dB

DF 11 Squitter Period

Range	0.10 to 4.88 sec
Resolution	10 ms
Accuracy	± 10 ms

Diversity Isolation

Range	0 to >20 dB (Depending on Test Distance)
Test Distance	1.83m (6ft) to 28.96m (95ft)
Resolution	0.1 dB
Accuracy	± 3 dB

TCAS/E-TCAS Mode Specifications

SIGNAL GENERATOR

Output Frequency

Reply Frequency	1090 MHz
Accuracy	± 10 kHz

Output Level (Simulated ERP)

Antenna Port Note 1

Radiated power at 0 dBi UUT antenna

	-68 dBm typical @ 10 Nmi Range, automatically controlled
Range	-67 to -2 dBm at Antenna port
Resolution	0.5 dB
Accuracy	± 2 dB
Distance to UUT antenna	6 to 300 ft with supplied antenna

RF I/O Port

Automatic mode	-68 dBm @ 10 Nmi Range, automatically controlled
Manual mode Range	-115 to -47 dBm
Resolution	0.5 dB
Accuracy	-95 to -47 dBm, ± 1 dB
Accuracy	-115 to <-95 dBm, ± 2 dB

Reply Pulse Spacing

Mode C	
F1 to F2	20.30 µs ± 25 ns
F1 to C1	1.45 µs ± 25 ns
F1 to A1	2.90 µs ± 25 ns
F1 to C2	4.35 µs ± 25 ns
F1 to A2	5.80 µs ± 25 ns
F1 to C4	7.25 µs ± 25 ns
F1 to A4	8.70 µs ± 25 ns
F1 to B1	11.60 µs ± 25 ns
F1 to D1	13.05 µs ± 25 ns
F1 to B2	14.50 µs ± 25 ns
F1 to D2	15.95 µs ± 25 ns
F1 to B4	17.40 µs ± 25 ns
F1 to D4	18.85 µs ± 25 ns

Mode S

P1 to P2	1.00 µs ± 25 ns
P1 to P3	3.50 µs ± 25 ns
P1 to P4	4.50 µs ± 25 ns
P1 to D1	8.00 µs ± 25 ns
D1 to Dn (n=2 to 112)	1.00 µs times (n-1) ± 25 ns

Reply Pulse Widths

Mode C	
All Pulses	0.45 µs ± 50 ns

Mode S

P1 through P4	0.50 µs ± 50 ns
D1 through D112	0.50 µs ± 50 ns, 1 µs chip width

Reply Modes

TCAS I/II Mode C (with altitude reporting)
 TCAS II Mode S formats 0, 11, 16
 E-TCAS Modes formats 0, 4, 5, 11, 16, 20, 21

Reply Pulse Amplitudes

ATCRBS	± 1 dB relative to F1
Mode S	± 1 dB relative to P1

Reply Pulse Rise and Fall Times

All Modes	
Rise Time	50 to 100 ns
Fall Time	50 to 200 ns

Percent Reply

Range	0 to 100%
Resolution	10%
Accuracy	± 1%

Range Rate

Range	-1200 to +1200 kts
Resolution	10 kts
Accuracy	10%

Altitude Range

Range	-1000 to 126,000 ft
Resolution, Mode C	100 ft
Resolution, Mode S	25 ft

Altitude Rate

Range	-10,000 to +10,000 fpm
Resolution	100 fpm
Accuracy	10%

Squitter

Control On/Off
 Rate 0.8 to 1.2 seconds, randomly distributed

Receiver

Pulse Spacing

ATCRBS (Mode C All Call)
 S1 to P1 2.0 us
 Accepts < ±200 ns
 Rejects >±1.0 us
 P1 to P3 21.0 us
 Accepts < ±200 ns
 Rejects (<10% Replies) >±1.0 us
 P1 to P4 23.0 us
 Accepts < ±200 ns
 Rejects (<10% Replies) >±1.0 us

Mode S

P1 to P2 2.0 us
 Accepts < ±200 ns
 Rejects (<10% Replies) >±1.0 us
 P1 to SPR 4.75 us
 Accepts < ±200 ns
 Rejects (<10% Replies) >±1.5 us

Suppression

ATCRBS (P2 or S1)
 >0.5 dB above level of P1 <10% Replies

UUT MEASUREMENTS

ERP (@ 1030 MHz)

ATCRBS

Range +43 to +58 dBm (20 to 631 watts)
 Resolution 0.1 dB
 Accuracy ± 2 dB

Mode S

Range +43 to +58 dBm (20 to 631 watts)
 Resolution 0.1 dB
 Accuracy ± 2 dB

Direct Connection Peak Pulse Power (@ 1030 MHz)

ATCRBS

Range +43 to +58 dBm (20 to 631 watts)
 Resolution 0.1 dB
 Accuracy ± 1 dB

MODE S

Range +43 to +58 dBm (20 to 631 watts)
 Resolution 0.1 dB
 Accuracy ± 1 dB

Frequency

Range 1029.900 to 1030.100 MHz
 Resolution 1 kHz
 Accuracy ± 10 kHz

TCAS Broadcast Interval

Range 1.0 to 12.0 sec
 Resolution 0.1 sec
 Accuracy ± 0.2 sec

Misc. Inputs/Outputs Specifications

RF I/O

Type Input/Output
 Impedance 50 Ω typical
 Maximum Input Level 4 kW peak, 10 W average
 VSWR <1.3:1

Antenna

Type Input/Output
 Impedance 50 Ω typical
 Maximum Input Level 10 W peak, 0.5 W average

Video

Type Output
 Impedance 50 Ω typical
 Generate Video Level 0.2 V to 1.5 V peak to peak into 50 Ω
 Receive Video Level Proportional to IF level
 Baseline ±0.5 V referenced to ground

Test Antenna

VSWR <1.5:1
 Gain 6 dB, Typical

Time Base (TCXO)

Temperature Stability ± 1 ppm
 Aging ± 1 ppm per year
 Accuracy ± 1 ppm
 Test Limit ± 0.3 ppm

Battery

Type Li Ion
 Duration > 4 hrs continuous operation
 > 6 hrs, Typical

Input Power (Test Set)

Input Range 11 VDC to 32 VDC
 Power Consumption 55 W Maximum
 16 W Nominal at 18 VDC with charged battery
 Fuse Requirements 5 A, 32 VDC, Type F

Input Power (Supplied External AC to DC Converter)

Input Range 100 to 250 VAC, 1.5 A Max, 47-63 Hz
 Mains Supply Voltage Fluctuations <10% of the nominal voltage
 Transient Over-voltages According to Installation Category II

Environmental

Test Set

Use	Pollution Degree 2
Altitude	≤ 4800 meters
Operating Temp. ^{NOTE 2}	-20°C to 55°C
Storage Temp. ^{NOTE 3}	-30°C to 71°C
Relative Humidity	95% ±5% from 5° to 30°C 75% ±5% from 30° to 40°C 45% ±5% from 40° to 55°C

Supplied External AC to DC Converter

Use	Indoors
Altitude	< 10,000 meters
Operating Temperature	0° to 40°C
Storage Temperature	-20°C to 71°C

Physical Characteristics

Height	11.2 in. (28.5 cm)
Width	9.1 in. (23.1 cm)
Depth	2.7 in. (6.9 cm)
Weight	8 lbs. (3.6 kg), test set only 34 lbs. (15.4 kg), shipping weight

Supplemental Information

Test Set Certifications

Altitude, operating	MIL-PRF-28800F	Class 2
Altitude, not operating	MIL-PRF-28800F	Class 2
Bench Handling	MIL-PRF-28800F	Class 2
Blowing Dust	MIL-STD-810F	Method 510.4, Procedure I
Drip-proof	MIL-PRF-28800F	Class 2
Explosive Atmosphere	MIL-STD-810F	Method 511.4, Procedure I
Relative Humidity	MIL-PRF-28800F	Class 2
Shock, Functional	MIL-PRF-28800F	Class 2
Vibration Limits	MIL-PRF-28800F	Class 2
Temp, operating ^{NOTE 5}	MIL-PRF-28800F	Class 2
Temp, not operating ^{NOTE 6}	MIL-PRF-28800F	Class 2
Transit Drop	MIL-PRF-28800F	Class 2
Safety Compliance	UL-61010B-1 EN 61010-1 CSA 22.2 No 61010-1	
EMC	EN 61326	

External AC-DC Converter Certifications

Safety Compliance	UL 1950 DS CSA 22.2 No. 234 VDE EN 60 950
EMI/RFI Compliance EMC	FCC Docket 20780 Curve "B" EN 61326

Transit Case Certifications

Drop Test	FED-STD-101C, Method 5007.1 Paragraph 6.3, Procedure A, Level A
Falling Dart Impact	ATA 300, Category I
Vibration, Loose Cargo	FED-STD-101C, Method 5019
Vibration, Sweep	ATA 300, Category I
Simulated Rainfall	MIL-STD-810F, Method 506.4 Procedure II of 4.1.2
FED-STD-101C Immersion	Method 5009.1, Sec 6.7.1 MIL-STD-810F, Method 512.4

NOTES

- ^{NOTE 1} Simulates a 50.5 dBm XPDR ERP at 10 nMi range.
- ^{NOTE 2} Level automatically controlled based on actual distance to UUT antenna
- ^{NOTE 3} Battery charging temperature range: 5°C to 40°C (controlled by internal charger).
- ^{NOTE 4} Li Ion Battery must be removed below -20°C and above 60°C.
- ^{NOTE 5} Temperature range extended to -20°C to 55°C.
- ^{NOTE 6} Temperature range reduced to -30°C to 71°C.

Versions, Options and Accessories

Order Number	Description
72424	IFR 6015 Mode 1,2,3A/C/S Transponder and TACAN/DME Ramp Test Set (specify 110 V or 220 V) NSN: 6625-01-574-2423

83411	6000OPT3 ADS-B 1090 MHz
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Extended Standard Warranties with Calibration for 6015

84373	Extended standard warranty 36 months with scheduled calibration
84374	Extended standard warranty 60 months with scheduled calibration

Standard Accessories

10241	Transit case
62302	Power cord, 110 V
64020	Power cord set, 220 V
62401	TNC/TNC COAX, 72 in.
62402	TNC/TNC COAX, 12 in.
56080	Fuse, 5 Amp, 32 V
91771	Antenna
64749	Antenna shield
64580	Breakout box
67366	Power supply
6100	Getting Started Manual
6097	Operation Manual - CD(AC0825CD)

Optional Accessories

63656	Desk Top Stand (AC0820)
67474	Tripod (AC0826)
6099	Maintenance Manual - CD
82553	Tripod, Dolly, Stand (AC24006)
86931	UC-584 Universal Transponder Antenna Coupler

This product is subject to the Export Administration ("EAR") (15 CFR 730-774) and may not be exported, re-exported or otherwise transferred to a foreign person, or outside the United States without authorization from the U.S. Department of Commerce.

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