

T-47N Multi-Function Test Set Datasheet

DESCRIPTION

The T-47N Test Set provides unsurpassed reliability and ruggedness from over 45 years of experience and proven results with U.S. and foreign militaries. The Test Set capabilities allow test and analysis of the following systems: Transponders (Modes 1, 2, 3A, C, S, and 4 IFF), TACAN (Tactical Air Navigation), DME (Distance Measuring Equipment), Interrogator (Modes 1, 2, 3A, C, and 4), and TCAS (Traffic Alert and Collision Avoidance Systems). Code of the Day (MODE 4) memory permits full Interrogator and Transponder tests in actual environments, ensuring compliance.

New Feature*

The T-47N provides test capability for Mode S Elementary and Enhanced Surveillance. The T-47N can receive and display information contained in Mode S DF 17 Extended Squitter (ADS-B).





P/N: T-47NC 90000061 P/N: T-47NH 90000062 NSN T-47NH: 6625-01-482-4577 DoD AIMSPO Certified

TRANSPONDER

- Fully Tests MODES 1, 2, 3A, C, and 4 (IFF), and MODE S transponders
- Direct Connect or Over the Air measurements providing unequaled versatility
- "Code of The Day" loaded by KIR and stored in Test Set memory
- Accurate displayed results provide meaningful troubleshooting information

The T-47N Test Set performs the following transponder tests based on the capabilities of the Unit-Under-Test:

- Mode 4A/4B Verifies valid Mode 4A/4B bit and tests to verify valid and invalid properties
- Mode 1 and 2 Verifies Modes 1 (4 digits) and 2 code and reply efficiency
- MC Mode C decoded altitude and reply efficiency
- M3A Verifies 3A reply code, IDENT/EMERG capabilities and reply efficiency
- MA and MC ALL CALL Mode S Address and reply efficiency
- MA and MC Only
- Mode S Surveillance ID (DF5) Mode S Address, flight status (Air, Ground, Alert, SPI) and reply efficiency
- Mode S Surveillance Altitude (DF4) Mode S altitude, flight status, reply efficiency, and Mode S/Mode C altitude compare
- Mode S Surveillance Short (DF0) Mode S address in octal and hex, decoded tail number, flight status, and reply efficiency
- Mode S Comm Identification (UF5/DF21) Flight ID Number, flight status and reply efficiency
- Mode S Comm Altitude (UF4/DF20) Mode S altitude, flight status, altitude compare, and reply efficiency
- Mode S Comm C decoded tail number, flight status, and reply efficiency
- Undesired replies (UF11) Checks for no reply to incorrect Mode S interrogation address
- Squitter Pass/Fail indication of correct squitter period
- Max True Airspeed Decodes transponder programmable maximum airspeed setting
- Power, Receiver, Sensitivity and Frequency Displays measured power in dB and watts, frequency, and sensitivity. Pass/Fail indication
- Data and framing pulse measurements are monitored and displayed if out of tolerance.
- SLS (Side Lobe Suppression Test)
- Mode S Enhanced Surveillance parameters including Selected Altitude (BDS4); Roll Angle, True Track Angle, Ground Speed, Track Angle Rate, and True Airspeed (BDS5); Magnetic Heading, Indicated Airspeed, Mach #, Barometric Altitude Rate, and Inertial Vertical Velocity (BDS6)
- Receives and decodes 1090 MHz ADS-B data including squitter type (airborne position, surface position, aircraft ident/category, and airborne velocity), lat/long, N/S velocity, E/W velocity, Flight I.D., Mode S address, altitude (GNSS or barometric), and air speed

INTERROGATOR

- Fully tests Mode's 1, 2, 3A, C, and 4 (IFF)
- Built in KIV-6 bay for ease of use when testing Interrogators, no need to carry the KIT
- Easy to use menus and setup features
- Direct Connect and Antenna-to-Antenna capabilities
- Manual and Automatic test modes
- Measures the received pulses and displays pulse width and separation
- Adjustable range and preset velocity

DME/TACAN

- Covers entire frequency range for Channels 1 126, X and Y
- Ground to Air (G/A), Air to Air (A/A), and Air to Air Beacon (A/A BCN) Modes
- Numerous Heading, Bearing, and Range Selections available
- Accurate Power and Frequency measuring capability
- Adjustable Reply Rate in 25% increments

TCAS (Traffic Collision Avoidance System)

The ability to test TCAS I, II, and Traffic Alert Systems is standard. The T-47N can simulate both ATCRBS and MODE S intruders, utilizing an easy to navigate menu and setup procedures. With preset parameters, the Test Set will automatically simulate an inbound or outbound course allowing the operator to observe an intruder on their TCAS display and determining correct RA (Resolution Advisory), and TA (Traffic Alert) warnings.

The following features are either preprogrammed or adjustable depending on the operator's needs:

- Fully Automated built in TCAS Intruder effectively tests TCAS I, TCAS II, and Traffic Alert Systems
- Simulates both ATCRBS and MODE S Intruder types
- Automatic MODE C altitude acquired (with transponder on and operating)
- Antenna-to-Antenna Operation permitting complete system verification tests
- Manually adjustable offset allowing ascending or descending intercept scenarios
- Simple On Screen prompts for easy setup
- Start/Stop feature allows flexibility in testing for correct bearing information

ADDITIONAL FEATURES

- Two Models Available, Case Mounted Antenna (NC) or Hand Held Antenna (NH)
- Diagnostic Self-Test
- Large, easy to read LCD display
- Pass and Fail Criteria based on stored parameters
- Microprocessor control results in easy-to-use operation that requires a minimal amount of training
- Displays failed criteria
- Download and save data to a PC through the RS-232 port
- Rugged and reliable case provides exceptional protection from the elements and rough usage



PRODUCT SPECIFICATIONS

Transponder Mode Specification*

Test Set Transmitter:

Output Frequency	1030 MHz ± 10 kHz
Output Power	.7 dBm ± 2 dBm Antenna
	-42 dBm ± 2dBm Direct Connect
Modes	1, 2, 3A, C, 4 (IFF), S
Antenna Beam Width	15° to $60^{\circ} \pm 10^{\circ}$ (variable by distance from UUT)
	distance from OOT)

Test Set Receiver:

Frequency

Power

Sensitivity

Measurement Range45 to -87 dBm Direct Connect
-49 to -81 dBm Antenna
Measurement Accuracy ± 2 dB Direct Connect
± 3 dB Antenna

Reply Efficiency

Measurement Range......0 to 100% Measurement Accuracy......2%

TACAN Mode Specification*

Test Set Transmitter:

Frequency Range Frequency Accuracy Power Out	± 10 kHz
Bearing Accuracy Range Accuracy Velocity Accuracy Antenna Beam Width	. ± 0.5 nmi. typical, ± 1.0 nmi. max. . ± 3%

Reply Rate	.Adjustable to 25%, 50%, 75% and
	100% Rates
Freq Measurement	.±500 kHz Direct Connect A/A
PWR Measurement	.±3 dBm Direct Connect A/A

Interrogator/TCAS Mode Specification*

Test Set Transmitter:

Output Frequency	1090 MHz ± 10 kHz
Output Power	7 dBm ± 2 dBm Antenna (TCAS)
	-42 dBm ± 2 dBm Direct Connect (TCAS)
Modes	1, 2, 3A, C, 4 (IFF), S
Antenna Beam Width	$60^{\circ} \pm 10^{\circ}$ typical

Test Set Receiver:

Frequency

Measurement Range..... 1029.7 to 1030.3 MHz Measurement Accuracy........ \pm 200 kHz

Power

Measurement Range47 to 64 dBm
Measurement Accuracy ± 2 dB Direct Connect
± 3 dB Antenna-to-Antenna

Sensitivity

Measurement Range	-45 to -87 dBm Direct Connect
	-55 to -87 dBm Antenna
Measurement Accuracy	. ± 2 dB Direct Connect
	± 3 dB Antenna

* Indicates Standard Condition Values as outlined in Maintenance Manual

DME Mode Specification*

Test Set Transmitter:

Frequency Range	
Frequency Accuracy	± 10 kHz
Power Out	0 ± 2 dBm Antenna
	-50 / ± 2dBm Direct Connect
Range Accuracy	. ± 0.5 nmi. typical, ± 1.0 nmi. max.
Velocity Accuracy	.±3%
Antenna Beam Width	60° ± 10° typical
Reply Rate	Adjustable to 25%, 50%, 75% and
	100% Rates
Freq Measurement	.±500 kHz Direct Connect A/A

PWR Measurement......±3 dBm Direct Connect A/A



Physical Characteristics*

Packaging/CaseSize	
0126	37 x 23.5 x 21.5 cm
Weight	
	10.9 kg
Operating Temperature	28° to +55° C
Battery Type	.Lead-Acid
Battery Life	.8 Hours at 20% Duty Cycle
Battery Charger	.Included and built-in
Power requirements	
	12 to 40 VDC
Antenna Configuration	Permanently Case Mountable (T-47NC)
Ŭ	Provisions for Case mounting on T-47NH
	Tripod Mounted (T-47NH)
	Hand-Held (T-47NH)
Colors	

* Indicates Standard Condition Values as outlined in Maintenance Manual

Accessories

Standard

- Standard 2-year warranty
- Built-In KIV-6 module Bay
- KIR/KIT Cable
- Operational and Maintenance Manual
- Direct Connect Cable
- Neck Strap
- AC/DC Power Cord
- Antenna Handle (NH Only)
- Calibrated Directional Antenna
- Antenna Extension Cable (NH Only)

Options

- 5 and 10 Year Warranty Options
- Maintenance and Calibration Plans



NOTICE

This commodity it is intended for is subject to the International Traffic in Arms Regulations and may not be exported or transferred to a foreign party, either in their original form or after being incorporated into other end-items, without the prior written consent of the U.S. Department of State

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Multi-Function Test Set

P/N: 90 000 120

Tel-Instrument Electronics Corp **One Branca Road** East Rutherford, NJ 07073 201-933-1600

Description

The TR-420 is the next generation in ground support test equipment. Based on entirely new up-to-date technology and digital architecture; the TR-420 is a leap forward in precision testing of the following systems:

- Transponder: Modes 1, 2, 3/A, C, 4 Mode S, EHS \geq (Enhanced Surveillance) and Mode 5
- \geq Interrogator: Modes 1, 2, 3/A, C, 4, Mode S, Mode 5, TCAS & ETCAS, Shipboard Processor
- ADS-B (Automatic Dependent Surveillance Broadcast) TX \geq & RX
- TACAN (A/A, G/A and A/A Beacon) \triangleright
- \triangleright Built in powered KIV-78 Bay
- ≻ Long Life Lithium Battery for extended operations
- Available Accessory Package Option \triangleright



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The TR-420 Multi-Function Test Set provides unsurpassed reliability and ruggedness designed by an established and well recognized company with 50 years in the design and manufacture of aviation ground support and bench test equipment.



The TR-420's large 6.0 in. color LCD (NVG compatible) screen and surrounding soft-keys and keyboard provides easy and quick access to a multiple of test screens menus, and display options affording single man operation, instant results, and a host of pre-programmed and manually variable parameters to meet the most demanding requirement's for testing of airborne avionic and communication equipment.

General Specifications		
Packaging	MIL-PRF-28800F, Class 1	
Size	14.5 x 9.4 x 6.5 inches	
Weight	18 lbs. (operating)	
-	24 lbs (accessories and Lid)	
Operating	Temperature -40° to +55° C	
Battery Type		
Battery Charger	Built-in	
Power requirements	115 VAC, 50 to 400 Hz/12 to 40 VDC	

eatures

The TR-420 is designed in a compact, waterproof and durable case. Instant one button GO/NO test can be performed based on stored parameters. The user also has the capability to manually select and vary parameters individualized for each system. All accessories are neatly stored in the Test Set cover and the battery charger is included.

Based on our successful military line of Mode 5 Test Sets the AN/USM-708 and AN/USM-719 Test Sets.

Utilizes the KIV-78 appliqué for Mode 5 Interrogator and Transponder tests (not included).

Ideally suited for any temperature or region due to its self calibrating software.

Built-in battery charger and three (3) front panel replaceable "Lithium-Ion" batteries (included).

TR-420 Test Set

Transponder Mode	Specification	Interrogator/TCAS N	Mode Specification	
	formed in an "AUTO" mode based Node offering individually selected	Transponder testing can be performed in an "AUTO" mode bas on stored criteria or "Manual" Mode offering individually select tests and detailed results.		
Modes Tested:		Modes Tested:	Modes Tested:	
 Mode 1 Mode 2 Mode 3A Mode C Mode S ELS (Elementary 5) EHS (Enhanced SL ADS-B TX and RX Mode 4 Mode 5 EOR (End of Runwatter) *Direct Connect (DC) and hance 	ırveillance) /ay)	 Mode 1 Mode 2 Mode 3A Mode C Mode 5 Mode 5 TCAS ETCAS Shipboard Processon OMNI/TAPER 		
	r neid antenna (Ant) options.			
Transponder Test S	pecifications	Interrogator Test Spe	ecifications	
Test Set Transmitter Output Frequency Output Power	1030 MHz / ±10 KHz -20 to -100 / ±1 dBm (DC) 0 to -100 dBm / ±1 dBm	Output Frequency Output Power (Ant)	1090 MHz / ±10 KHz -20 to -100 / ±1 dBm (DC) 0 to -100 dBm / ±2 dBm	
Interrogation PRF Direct Connect SIF	(Ant) 450 ± 5 Hz	Test Set Receiver Measurement Range Measurement Accuracy	1029.7 to 1030.3 MHz ±200 KHz	
Mode S short word Mode S long word Mode 5	45-50 Hz 13-16 Hz 200-225 Hz	Power Measurement Range Measurement Accuracy	47 to 64 dBm ±2 dB (DC) ±2 dB (Ant-to-Ant)	
Antenna Connect SIF Mode S short word Mode S long word Mode 5	235 ± 5 Hz 45-50 Hz 13-16 Hz 200-225 Hz	Sensitivity Measurement Range Measurement Accuracy	-45 to -87 dBm (DC) -55 to -87 dBm (Ant) ±2 dB (DC)	
		Medsurement Accuracy	$\pm 3 \text{ dB}$ (Ant-to-Ant)	
Test Set Receiver Measurement Range Measurement Accuracy	1086.5 to 1093.5 MHz ±200 KHz			
Power Measurement Range Measurement Accuracy Sensitivity	47 to 64 dBm ±2 dB (DC) ±2 dB (Ant)	Modes Frequency Range Frequency Accuracy Power Out	A/A, G/A, A/A BCN 962 to 1213 MHz, 126 X/Y ± 10 kHz -20 to -100 ±1 dBm (DC)	
Measurement Range	-45 to -87 dBm (DC) -49 to -81 dBm (Ant)	Bearing Accuracy Range Accuracy	0 to -100 dBm ±1 dBm (Ant) ±1° (G/A & A/A BCN) ±0.5 nmi Typical, ±1.0 nmi	
Measurement Accuracy	±2 dB (DC) ±3 dB (Ant)	Velocity Accuracy	±3%	
Reply Efficiency Measurement Range	£3 db (All) 0 to 100%	Direct Connect and Antenna to Ar	ntenna testing capability.	
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East Rutherford, NJ 07073

201-933-1600



TR-100AF TACAN Test Set Datasheet

Description

The TR-100AF TACAN Test Set provides the operator with an easy to use, ruggedly designed ramp test set used for verification of airborne TACAN Transmitter Receivers.

Highlights:

- Ground to Air (G/A), Air to Air (A/A), and Air to Air Beacon (A/A BCN) Modes
- □ Inverse Mode, North Reference Trigger (NRT) (A/A, G/A)
- T/R(X,Y) Inverse pulses, 15Hz AM mod,2700Hz squitter, 1350Hz Ident+equalizer pulses, (NRT)
- Covers entire frequency range from Channels 1 thru 126 X and Y
- □ Accurate Power and Frequency measuring capability**
- Numerous Heading and Range Selections available
- □ Tel-Instrument Standard 2 year warranty included



P/N 90 000 130 NSN: 6625-01-578-4893RH

The TR-100AF features a large backlit LCD display, combined with easy setup menus and user-friendly controls, make the TR-100AF effortless when conducting quick and accurate tests of airborne TACAN equipment. The Direct Connect feature provides precise measurements of power, frequency, and sensitivity^{**}, no external attenuator is required.

Features

** Denotes A/A Mode Only

- Modes: Ground to Air (G/A), Air to Air (A/A), Air to Air Beacon (A/A BCN), Inverse Mode (A/A, G/A)
- North Reference Trigger at BNC connector on the front (NRT)
- Selectable Bearings from 0 to 359° in 1° increments in Air to Air Beacon (A/A BCN) and Ground to Air (G/A) modes
- Selectable ranges of 0 to 350 nmi. in 1 nmi. increments
- Selectable velocity adjustments of 120 to 1200 knots in 10 knot increments
- Built in diagnostic Self Test
- Battery allows 8 hours of operation before recharge (25% Duty Cycle)
- Built in Battery Charger, 100 to 240 VAC, 50 to 400 Hz
- Rugged and weather resistant case
- Direct Connect Mode and Omni-Antenna interconnects
- Pass/Fail criteria based on stored parameters
- IDENT Morse Code audio transmitted
- Standard 2 year limited warranty

TR-100AF

Specifications

Test Set Transmitter* Frequency Range Frequency Accuracy Power Out Bearing Accuracy Range Accuracy Velocity Accuracy Antenna

<u>Test Set Receiver*</u> Freq Measurement Range Freq Measurement Accuracy Power Freq Measurement Range Power Measurement Accuracy Sensitivity Reply Efficiency Settings Efficiency Accuracy 962 to 1213 MHz ± 10 kHz 2 dBm ±3 dBm (@ Ant Port) ± 1° typical, ± 2° max. ± 0.5 nmi. Typical, ± 1.0 nmi. max. ± 3% Omni-Directional

Selected Frequency \pm 3.5 MHz \pm 200 kHz 47...64dbm \pm 2 db (direct connect) 47...64dbm \pm 3 db (antenna to antenna) < -35 dBm (Ant port) Selectable 25%, 50%, 75% & 100% inc. \pm 1% (A/A)

> * Indicates Standard Condition Values as outlined in Maintenance Manual

Physical

Packaging Size Weight Temperature, Operating Limits Battery Type/Life Battery Charger/Power

Accessories

- AC Power Cord
- Direct Connect Coax
- Omni Antenna
- Operational with Maintenance Manual



Lead Acid / 8 hours at 25% duty cycle

Built-in / 100 to 240 VAC, 50 to 400 Hz

MIL-PRF-28800F

-28°C to +55°C

18 pounds

14.5 x 9.4 x 8 inches

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T-30CM II CAT III NAV Ramp Test Set Datasheet

Description

- Permits ICAO Annex 10 CAT III ILS ramp check certification
- Checks VOR, GS, LOC, MB, Flight Director, and Autopilot
- Dual VOR/LOC/GS frequencies
- Separate and simultaneous MB/ILS
- Dual extended-range variable ILS
- Quick, easy one-man operation from the cockpit
- Lightweight and portable weighs only 18 lbs.
- Built-in NICAD battery and charger
- Two year limited warranty; five & ten year available
- Rugged, reliable, affordable
- Backed by 40 years manufacturing experience
- CE Compliant
- Available non standard VOR/ILS frequencies with local agency approval



PN- 90 000 049 NSN - 6625-01-421-5845

The T-30CM Ramp Test Set is designed for one-man operation of the VOR, MB, GS, LOC, flight director, and autopilot from the cockpit or flight deck. Built into a rugged and durable case, the T-30CM will permit compliance with CAT III periodic ramp check certification in all weather conditions.

Features

VOR

- Allows selection of VOR bearing in 45° steps from 0 -315°
- Manual slewing provides capability for checking fullscale deflection for "sticky" analog meter movement (<u>+</u>10°)
- Permits deletion of the REF 0, VAR 0, 30 and 9960 Hz modulation to check flag operation
- 1020 Hz tone enable switch
- Manual slewing of VOR bearing ± 10° left and right of course

Marker Beacon and ILS

- User selection of inner, middle, and outer marker
- Simultaneous MB and ILS output signals
- Variable and Preset DDM settings
- Variable attenuator to control output

LOC and G/S

- Allows selection of preset DDM deflections of: On Course, one and 2 dots off center
- Full-scale deflection can be tested using manual slewing
- Allows 90 and 150 Hz tones to be deleted
- Simultaneous LOC/GS/MB Mode
- 1020 Hz tone enable switch
- Variable attenuator calibrated in 1 dB steps
- Two preset paired frequencies available

Additional Features

- Rugged Mil-Spec case
- Built in battery and charger
- 115 or 230 VAC operation 40 400 Hz
- Simple to understand front panel and controls that requires minimal training
- Built-In diagnostic Self Test

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T-30CM II

Specifications

VOR Operation

Frequency	108.05 MHz ± 0.0025% 108.00 MHz ± 0.025%
Power	+17/ ± 2 dB
Attenuation	110 dB in 1 dB steps
Modulation	
Audio Frequency	30/9960 Hz
Audio Frequency Accuracy	± 0.01%
AM Depth	30 ± 2%
FM Deviation	480 ± 30 Hz
Distortion	< 5%
Indicator Deflection/Bearing	0-315° /± 0.1° in 45°
	Steps/Variable ±10 º- 15°
Tone	1020 Hz ± 2%

GS Operation

Frequency	334.70 MHz ± 0.0025% 334.55 MHz ± 0.0025%
Power	+11 ±2 dBm
Attenuation	110 dB in 1 dB steps
Modulation	
Audio Frequency	90/150 Hz
Audio Frequency Accuracy	± 0.01%
AM Depth	40% ± 3%
Distortion	< 5%
Phase Accuracy	90 to 150 Hz ± 10°
Indicator Deflection	
On Course	0.0 ± 0.01DDM/0.175 ± .025 DDM
Variable	-0.175 to + 0.175 DDM
Step	Up and Down; 1 & 2 Dots
Delete	90 and/or 150 Hz



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LOC Operation

	400 45 MIL- 0 00050/
Frequency	108.15 MHz ± 0.0025%
	108.10 MHz ± 0.025%
Power	+17 ±2 dB
Attenuation	110 dB in 1 dB steps
Modulation	
Audio Frequency	90/150 Hz
Audio Frequency Accuracy	±0.01%
AM Depth	20 ± 2%
Distortion	< 5%
Phase Accuracy	90 to 1150 Hz ±10°
Indicator Deflection	
On Course	0.0 ± 0.01DDM/0.155 ± .02
	DDM
Variable	-0.155 to +0.155 DDM
Step	Left and Right; 1 & 2 Dots
Tone	1020 Hz ± 2%

MB Operation

Frequency	75.0 MHZ ± 0.005%
Power	+18 ± 2dBm
Attenuation	110 dB in 1 dB steps
Modulation	
Audio Frequency	400/1300/3000 Hz
Audio Frequency Accuracy	± 2%
AM Depth	95 ± 5%
Distortion	< 10%

Physical Characteristics

Size	14.5 x 9.4 x 6.5 in.
NA7 * 17	40.1
Weight	18 lbs.
Power	Internal Battery or external 120/220 VAC 50-400 Hz
Battery	NICAD 8 hrs @ 50% Duty Cycle
Environmental	Storage51° to + 71° C Operating -30° to +55°C

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