

Avionics

IFF-45TS MK XIIA/TACAN Bench Test Set



Optional controller shown

A leading edge RF signal generator designed for Mode 5 engineering and manufacturing applications

The IFF-45TS is an RF signal generator that provides support for transponder, interrogator, TACAN and ADS-B beacon testing. The IFF-45TS was designed primarily for ATE/remote operation. Using the supplied Aeroflex Graphical User Interface (GUI) or integration into an ATE utilizing the extensive command set, the IFF-45TS provides RF signal generation and parametric measurement of the device being tested. Being well suited for bench/lab or over-the-air testing, the IFF-45TS can be utilized in typical applications including:

- Support for engineering development of MK XIIA equipment including Mode 5, ADS-B beacons and TACAN interrogators
- Manufacturing ATE for MK XIIA equipment including Mode 5 and TACAN interrogators
- Support for DO-260B, AIMS 03-1000A and DO-181D certification testing (Note: some limitations)
- Over-the-air platform testing of MK XIIA equipment including Mode 5, ADS-B beacons and TACAN interrogators
- Test ranges of up to 3 km with appropriate antennas
- Ramp testing of installed equipment performance
- Data logging capability for ADS-B testing, using supplied GUI or data transfer via the communication interface to your application
- Separate tabs in the ADS-B GUI allow display of real time or previously logged squitter data in engineering format

The IFF-45TS is the centerpiece in the Aeroflex IFF-7300S Automated Test System, which is our recommended solution for transponder/interrogator, TACAN and crypto appliqué testing requirements.

Features of the IFF-45TS include:

- MKXIIA AIMS certified for Level 1 and Level 2
- Accommodates DOD AIMS 04-900A Option A (KIV-78) and Option B (KIV-77)
- Dual I/O for diversity testing of transponders or SUM/DIFFERENCE on interrogators
- Separate connections for direct or over-the-air testing
- Software defined radio design allows waveform flexibility and future growth potential
- Dual signal generator design allows coordinated signal production for interference and echo testing
- Remote interfaces consist of RS-232, Ethernet and GPIB
- Aeroflex GUI allows easy access to test features
- Industry wide use in development and end item testing of transponders and interrogators

Contact Aeroflex for additional information regarding the IFF-45TS or IFF-7300S testing capabilities. Please visit our website www.aeroflex.com.

For the very latest specifications visit www.aeroflex.com

GENERAL SPECIFICATIONS

USER INTERFACE

Interfaces Supported

IEEE-488, RS232 and Ethernet (VXI-11)
PC Windows based GUI provided.

MODES OF OPERATION

Transponder Testing 1, 2, 3/A, C, S, 4, 5
Interrogator Testing 1, 2, 3/A, C, S, 4, 5
DME/TACAN Testing G/A, INV G/A, BG/A, BA/A, A/A, INV A/A
ADS-B Transponder Out, GCIB Decode

SIGNAL GENERATOR

Frequency Range

955 to 1223 MHz, 10 KHz resolution

Output Amplitude

Direct Port 0.0 dBm to -110.0 dBm
(into 50 Ω) in 0.1 dB increments

Accuracy @ 25° ± 5° C
0.0 dBm to -80.0 dbm ±0.5 dB
<-80.0 dBm to -100 dBm ±[0.5 dB + 0.05 dB per dB
below -80 dBm]¹
<-100.0 dBm ±[1.5 dB + 0.35 dB per dB
below -100 dBm]²

Accuracy over full temp
0.0 dBm to -80.0 dbm ±1.0 dB
<-80.0 dBm to -100 dBm ±[1.0 dB + 0.10 dB per dB
below -80 dBm]²
<-100.0 dBm ±[3.0 dB + 0.70 dB per dB
below -100 dBm]²

Antenna Port +30.0 dBm to -60.0 dBm (into
50 Ω) in 0.1 dB increments

Accuracy @ 25° ± 5° C
Power ≥ -30.0 dBm ±1.0 dB
Power < -30.0 dBm ±[1.0 dB + 0.033 dB per dB
below -30 dBm]²

Accuracy over full temp
Power ≥ -30.0 dBm ±2.0 dB
Power < -30.0 dBm ±[2.0 dB + 0.066 dB per dB
below -30 dBm]²

Pulse Formats

Transponder/Interrogator 1, 2, 3/A, C, S
Secure Modes 4, 5

Modes 3/A, C, S comply with RTCA/DO-181C; Modes 1, 2, 4, 5
comply with DOD AIMS 03-1000A

DME/TACAN G/A, A/A, INVERSE G/A,
INVERSE A/A, BEACON G/A,
BEACON A/A

Pulse Position Deviations

XPDR ±1 μs
INT Non-Mode 5 ±1 μs
NT Mode5 ±0.25 μs
Accuracy [XPDR/INT] ±10 ns
TACAN* ±12.0 μs
Accuracy [TACAN] ±50 ns

Pulse Width Deviations

XPDR/INT ±0.5 μs
Accuracy [XPDR/INT] ±10 ns
TACAN ±5.5 μs
Accuracy [TACAN] ±50 ns
Pulse Amplitude
XPDR/INT +5 to -15 dB
TACAN ±5 to -15 dB

Interference Pulse Characteristics (1 or 2 pulses)

Position 1st pulse relative to reference
pulse
Offset range
XPDR -44 μs to 400 μs
INT -1 μs to 400 μs
Accuracy ±10 ns

Interference Pulse Spacing (multiple pulse interference mode)

Range 0 to the end of the 1st pulse
range
Max 2nd pulse position 400 μs - 1st pulse position
Accuracy ±10 ns

Range Delay

Range
DME/TACAN -1 to 400.00 nmi in 0.01 nmi
steps
INT 0 to 400.00 nmi
Accuracy ±0.02 nmi ±0.00003% of
simulated range

Diversity

Timing (either channel) 0 to ±1 μs, ±10 ns accuracy
Amplitude Variation ±20 dB between outputs for
specified accuracy

Echo

DME/TACAN 30 nmi, fixed
Amplitude Variation +5 to -15 dB, relative to PI
Accuracy ±0.25 dB

Channel Signal Assignment

Transponder Test Top/Bottom
Interrogator Test Sum/Difference
TACAN Top/Bottom

Interrogation Generator

Independent/Unique Interrogations 1-12
Fixed Mode
SIF Mode 1-10000 PRF
Mode 5 1-1200 PRF
Mode S 1-2500 PRF
Mode 4 1-3500 PRF
Double/Supermode
Spacing between interrogations
(slaved delay) 0-400 μs
Pair generation rate 1-400 PRF
Supermode interrogations 2 interrogations
Burst Mode
Bursts/trigger 1-1000 or infinite
Interrogations/burst 1-2500
Interrogation rate
(within a burst) 1-2500 PRF
Spacing between burst
sequences 0.1-20 sec
Interlaced Mode
Interlace ratio 1:1 - 1:63
Group rate 1-400 PRF

NOTES

¹Hence, for a power setting of -85 dBm, the accuracy will be
±[0.5 + 0.05*5], or ±0.75 dB, and for a power setting of -95 dBm,
the accuracy will be ±[0.5 + 0.05*15], or ±1.25 dB
2As per example above

* Pulse overlap not allowed

Reply Generator

Independent/Unique Replies Data and Range	1-12 Individually configured
Selectable Modes	1,2,3/A,C,S,4,5
Selectable Efficiency	1-100%

Spectral Purity Residual Level

Harmonics	
Direct	<50 dBc
Antenna	<40 dBc
Spurious (> modulation BW)	<60dBc, 350 - 1800 MHz
Phase Noise	<80 dBc/Hz @ 100 kHz

SIGNAL RECEIVER MEASUREMENTS**Frequency Range**

1020 to 1155 MHz

Input Amplitude

Pulse Power Measurements

25 ±5° C

Direct +30 dBm to +66 dBm:	±0.5 dB
Antenna -40 to +30 dBm:	±1 dB
Resolution:	0.01 dB

-10° to 55° C

Direct +30 dBm to +66 dBm:	±1 dB
Antenna -40 to +30 dBm:	±2 dB
Resolution:	0.01 dB

Pulse to Pulse Spacing

XPDR/INT	
Non-Mode 5	±0.3 μs
Mode 5	±0.0625 μs
Accuracy	±10 ns
TACAN	±0.5 μs
Accuracy	±50 ns

Pulse Width

XPDR/INT	±0.200 μs
Accuracy	±10 ns
TACAN	±0.5 μs
Accuracy	±50 ns

Reply Delay

Accuracy	±20 ns
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Reply Delay Jitter

Accuracy	±20 ns
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Frequency

Accuracy	±50 KHz
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% Reply

Range	0-100% for each interrogation type
Resolution	0.0125% (for sample size = 8000)
Sample Size	1 - 8000 interrogations

SPECIFIC APPLICATION**TACAN/DME****Pulse Width**

Range	(50% to 50%) 3.5 μs to 9.0 μs
Accuracy	±0.1 μs

Ident

Variable	10 sec to 60 sec
Alphanumeric char.	1 to 8 [A to Z]

Bearing

Range	0° to 359.9° in 0.01° steps
Accuracy	±0.05°
Rate	0° to 39° sec in 1° steps

Velocity

Range	0 to 9999 Kts in 1 Kt steps
Accuracy	±0.001%

Squitter

Range	10 to 8000 Hz
Accuracy	10 Hz or 2%, whichever is greater
Distribution	Compliant with ARINC 568 @ 2700 Hz

Main Reference Burst

Adjustable Burst (all modes)	+1, +2, -1 or -2
Selectable	On/Off
X Channel	12 pulse pairs
Y Channel	13 single pulses
A/A (all channels)	10 single pulses
Accuracy	±100 ns

Auxiliary Reference Burst

Adjustable Burst (all modes)	+1, +2, -1, or -2
X Channel	6 pulse pairs
Y Channel	13 single pulses
Accuracy	±100 ns

TACAN Modulation

Range	0% to 39% in 1 Hz steps (15 Hz and 135 Hz separately adjustable)
Accuracy	±1%
Distortion	<5% of either tone
A/A Interrogation Rate	0 to 3999 Hz in 1 Hz steps
Reply Efficiency	0 to 100% in 1% steps

Crypto Appliqué Compatibility

KIV-77 - AIMS Type B, Mode 4/5
KIV-78 - AIMS Type A, Mode 4/5
KIV-6 - Mode 4
KIT-1(A/C) / KIR-1(A/C) cables (external power cable)

Built-in Crypto Appliqué Function

Mode 4 Internal Crypto Simulator (standard)
Word A/B, C1 - C16
Mode 5 Internal Crypto Simulator (standard with options 1 and 3)
As defined by the U.S. Navy Mode 5 Program Office

INTERFACE SIGNALS

Analog Signal Ports (programmable output) Programmable Sources Level	2 Various ±1 V into 50 Ω
Trigger Out (front panel) Programmable Source Level	TX timing ref, RX detection 3.3 V logic
Trigger In (front panel) Functions Level	Interrogation Trigger Reply Trigger 3.3 or 5 V logic
Programmable Outputs	15, rear panel, 3.3 V
Programmable Inputs	15, rear panel, 3.3 or 5 V
Suppression Out Amplitude into 2 KΩ Variable Pulse Width 0.25 μs - 300 μs	12 V to 80 V
Suppression In Amplitude Impedance Action	24 V nominal 2 KΩ Inhibits response to incoming signal

GENERAL

Frequency/Time Reference 2.5 ppm composed of 1 ppm/year aging and 1 ppm accuracy over temp	
External Reference Input 10 dBm nominal	
Temp Range -10° C to 55° C	
Warmup (for specified accuracy) 45 minutes	
Size 17.75" wide, 4" high, 21" deep (45 cm x 10 cm x 53 cm)	
Weight 24 lbs (10kg)	
VSWR Direct Antenna	= 1.2:1 over frequency range = 2.5:1 over frequency range

VERSIONS AND ACCESSORIES

Order Number	Description
72438	IFF45TS Transponder Modes 1,2,3/A,4 (Internal Crypto),C,S (Mode 5 capable)
72439	IFF45TS-A Transponder Modes 1,2,3/A,4 (Internal Crypto),C,S
83404	45TSOPT1 IFF Transponder Mode 5
83405	45TSOPT2 Interrogator Modes 1,2,3/A,C,S,4
83406	45TSOPT3 IFF Interrogator Mode 5 (requires option 2)
83407	45TSOPT4 DME/TACAN
91684	45TSOPT5 ADS-B Out

NSN Information:

6625-01-617-2567	IFF-45TS with options 1, 2, 3, 6, 8 and 9
6625-01-611-6485	IFF-45TS with options 2 and 8

Standard Accessories

PC Windows-based GUI
Operation Manual (CD) & Getting Started Manual
AC power cord

Optional Accessories

88631	45TSOPT6 KIV 77 adapter
89879	45TSOPT8 KIT/KIR-1A/C adapter
86075	45TSOPT9 KIV 78/KIV 6 adapter
63975	AC45TS-CNTR Touchscreen monitor/controller
86931	UC-584 Universal Transponder Antenna Coupler

Extended Warranty

84363	Extended standard warranty 36 months with scheduled calibration
84364	Extended standard warranty 60 months with scheduled calibration

EXPORT CONTROL:

This product is controlled for export under the International Traffic in Arms Regulations (ITAR). A license from the U.S. Department of State is required prior to the export of this product from the United States.

EXPORT WARNING:

Aeroflex's military products are controlled for export under the International Traffic in Arms Regulations (ITAR) and may not be sold or proposed or offered for sale to certain countries including: Belarus, Burma, China, Cuba, Haiti, Iran, Liberia, Libya, North Korea, Somalia, Syria, Sudan, and Vietnam. See ITAR 126.1 for complete information.

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Our passion for performance is defined by three attributes represented by these three icons: solution-minded, performance-driven and customer-focused.

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