I-1402 Mode 4 Accessory Unit

The I-1402 provides a friendly test solution for Mk10A and Mk12 IFF transponders and interrogators

- ***NATO codified***
- ***Easy to operate***
- ***IEEE-488 GPIB via ATC-1400A***
- ***KIT/KIR crypto simulation***
- ***External KIT/KIR crypto interface***
- ***4096 code & altitude encoder***
- ***Two-year limited warranty***

IFR is a leader in the design, manufacture and marketing of Avionics test systems.

The I-1402 Mode 4 accessory unit is designed to interface with the ATC-1400A Transponder/DME Test Set. The I-1402 provides additional pulse code modulation for testing ATC, Mode 4 transponders extending the ATC-1400A test capability to include Modes 1, 2, 3/A, C & 4. The I-1402 also provides the ATC-1400A with Interrogator test capability for Modes 1, 2, A, C & Mode 4.

Operation

The I-1402 can provide a fixed simulation of a KIT/KIR TSEC-1A/1C cryptographic computer, utilizing the NATO assigned A, B & O Mode 4 test codes. The I-1402 provides the necessary signals to the unit under test to simulate operation in an installed environment, allowing maintenance procedures to be performed without using security classified hardware or encryption keys. The I-1402 may also be interfaced with KIT/KIR TSEC-1A/1C cryptographic computers for live system performance testing.

Interconnect

The I-1402 may be hard mounted to the ATC-1400A using supplied hardware. Electrical interface to the ATC-1400A is via the IFR and AUX buses using two 25 way interconnect cables. A coaxial cable is provided for RF vernier control. Line power is switched through the I-1402 for synchronized power up of both test sets.

Additional Features

- *Mode 4 A, B, O and random codes*
- *Vernier level, controls the ATC-1400A RF level in 0.1 dB steps*
- *ON-OFF control reply, disparity, P2, P3, P4 and P5 pulses*
- *Position control of reply, disparity, P2, P3, and P4 pulses*
- *Rear panel BNC interconnects for control and signal monitoring*
- *Normal, ident, and emergency replies*

Specification

XPDR ATC Test Function

Modes

1, 2, 3/A, B, C and D

Generator Code Output

0000 to 7777 (octal) for Mode A

0000 to 1267 (decimal) Altitude in hundreds of feet for Mode C

Reply Format

IDENT, NORM or EMER

Generator Code Delay

Two setting adjustable from 0 to 12 μs. One calibrated setting of 3 μs following P_3 (CAL) of the interrogation

Level

+3 to +27 V (selectable)

UUT Reply Delay

Measurement taken from P_3 of interrogation to F_1 of the first reply pulse (GPIB)

XPDR Mode 4 Test Function

RF Output Interrogation Pulses

P_2, P_3 and P_4 Pulse

Period

2 μs nominal

Width

0.5 μs (variable 0.2 to 1.95 μs)

P_5 Pulse

Delay

Fixed at 8.0 μs following P_1 (CAL)

Information Pulses

Selectable as either internal or external modulation, by code switch

Amplitude

Variable from -19 to +6 dB in 1 dB steps or OFF

Width

0.5 μs fixed

Delay

Fixed at 8.0 μs following P_1 (cal)

Information Pulses

Selectable as either internal or external modulation, by code switch

Internally Generated CODE

0, A, B or Random format

Interrogation

0.5 μs pulse width fixed: even μs spacing intervals for information pulses, odd μs spacing intervals for anti-interference pulses (Random Format)

Reply

Output to the UUT to provide modulator drive Delay Pulses in lieu of encryption devise. Three pulses at 1.75 μs fixed spacing, 0.45 μs width and +3 to +27 V (internally adjustable)

Double Interrogation

Spacing

92.5 to 399.9 μs in 1 μs steps following P_4 (CAL)

Random Pulse

(ATC-1400A Interface Pulse)(CODE=INT)

Position

Variable from -25.0 to +399.9 μs relative to P_1 in 0.1 μs steps

Amplitude

Variable from -19 to +6 dB in 1 dB steps

Scope Trigger

1.0 μs fixed, positive TTL output

Externally Generated CODE

UUT Reply Delay

Measurements are taken from P_4 (CAL) of interrogation to the first reply pulse of the decoded video.

Resolution: 25 ns

Accuracy: ±50 ns (GPIB)

Time Decoded Video

Input from optional encryption device used for stable/unstable determination

Radar ATC Test Function

Modes

1, 2, 3/A and C

Range Delay

Variable from 0.00 to 200 NM in 1.0 NM steps

Echo

Enabled by SLS/ECHO Switch on ATC-1400A

Indent

Range delay, 15 NM fixed, RF level is -19 to +6 dB

Reply Codes

0000 to 7777 (octal) for modes 1,2, and 3/A. -0010 to 7777 (decimal) altitude in hundreds of feet for Mode C

F_2 Reply Pulse

20.3 μs from F_1 in CAL

Deviation

±1.95 μs selectable in 0.05 increments from CAL

Width

CAL = 0.45 μs
Variable = 0.20 to 1.95 μs selectable in 0.05 μs increments

Radar Mode 4 Test Function

Range Delay

Variable from 0.00 to 200 NM in 1.0 NM steps

Echo

Enabled by SLS/ECHO Switch on ATC-1400A causes a fixed range delay of 15 NM at selected SLS levels

Level

-19 to +6 dB

Internally Generated CODE

Disparity Delay

Two variable and one calibrated setting (0.5 ms, +TTL)

CAL

5.9 µs following P_1 CAL

Delay 1

-6.1 µs to 17.9 ms following P_1

Delay 2

Variable from 360 to 384 µs following pre-trigger input

Reply

At 0 NM range, output to the UUT to provide modulator drive Delay Pulses in lieu of encryption device. Three pulses at 1.75 µs fixed spacing, 0.45 µs width and +3 to +27 volts (internally adjustable)

Externally Generated CODE

Reply

Input from optional encryption device used to modulate ATC-1400A RF Generator

Level

+2.5 to +15 V

Enable Trigger

1.0 µs, positive TTL output

Delay

0.45 µs after P_4 challenge video

General

Calibration Interval

1 year

AC Supply

100 to 120 VAC, 220 to 240 VAC, 50 Hz to 60 Hz, ≤+10 % of the nominal voltage 43 W maximum
(163 W maximum with ATC-1400A)

AC Output

Line output, fused at 3 A and switched

Environmental

Temperature

5° to 40°C

Relative Humidity

≤80% for temperatures up to 31°C, decreasing linearly to 50% at 40°C

Altitude

≤4000 m (13,124 ft)

Electromagnetic Compatibility

Complies with the limits in the following standards:

EN 55011 Class B

EN50082-1

Safety

Complies with EN 61010-1:1993 for class 1 portable equipment and is for use in a pollution degree 2 environment. The instrument is designed to operate from an installation category 1 or 2 supply.

Dimensions

425 mm wide, 467 mm deep, 89 mm high

16.8 in. wide, 18.4 in. deep, 3.5 in. high

Weight

7.94 kg (17.5 lbs.)

Versions and Accessories

When ordering please quote the full ordering number information.

Ordering Numbers

Versions

1402-110	I-1402 Mode 4 Transponder/Interrogator, 110 VAC operation
1402-220	I-1402 Mode 4 Transponder/Interrogator, 220 VAC operation

Accessories (Supplied)

Line Cord

AUX Bus Interface Cable

IFR Bus Interface Cable

Operation Manual

1 x RF Coaxial Interface Cable

Line Cord from ATC-1400A to I-1402

All IFR Avionics products delivered with Factory Certificate Of Calibration

IFR - "Working together to create solutions for the world of communications."

IFR is a world leader in developing leading edge test and measurement equipment. The priority at IFR is to understand your communications test needs and respond to them. IFR has the flexibility and expertise to create just the right test solution for you. We understand that just as you are the expert in designing wireless products, we are expert in wireless test.

Combining the quality of our test products with their reliability, excellent price/performance ratio and minimal requirements for maintenance, every IFR test system represents an outstanding lifetime value.

IFR - "Working together with our customers to be flexible and innovative in providing effective test solutions for the rapid design, manufacture and maintenance of communications systems."

The added value IFR includes with each and every test set we sell will make you more productive. We offer a two-year standard warranty on all products and we will continue to support your product for five years beyond its final production. Our outstanding Customer Service Department offers calibration, out-of warranty repairs and consulting. Our Sales and Training Departments offer clear and concise product information with realistic performance specifications, technology training and application training. Our experienced engineers will help you develop application software and through continuous improvement programs, upgrades are always available.

IFR will continue to build upon our technology resources with an aggressive commitment that will enable you to excel in some of the world's most dynamic, high growth markets.

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