

SIM-701 Monopulse Antenna Simulator

The SIM-701 is a Monopulse Antenna Simulator providing Target Simulation and Sum and Difference ERP Measurements for Interrogator Testing



- **IFF-701Ti accessory RS-232 controlled**
- **Simulates interrogator monopulse antenna characteristics to provide target simulation**
- **Interrogator direct connect testing**
- **Sum and Difference ERP measurement to 6 kW peak**
- **Azimuth synchronization interface**
- **Platform specific interface cable kit**
- **KIT-TSEC1A/1C interface**
- **Battery and line power**
- **CE compliant**

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

The SIM-701 is an organizational level/1st line, portable battery operated Monopulse Antenna Simulator Accessory designed for use with the IFF-701Ti Transponder/Interrogator Test Set.

SIM-701

The SIM-701 allows direct connect testing of the interrogator set, providing the Sum and Difference reply signals with the correct amplitude and phase relationship required to satisfy the interrogator reply evaluator, thereby providing target simulation.

The SIM-701 may be used to simulate off boresight targets to test off boresight azimuth angle processing capability of the interrogator receiver and reply evaluator.

Optional azimuth synchronization interfaces are available for testing monopulse interrogators that utilize SYNCHRO, MIL STD 1553B or ACP/ARP azimuth angle information formats. A blanking pulse interface is also provided to allow primary radar sector illumination control.

The SIM-701 provides simultaneous monitoring of Sum and Difference ERP's for verifying correct ISLS operation.

The SIM-701 is environmentally packaged to operate in all weather conditions.

OPERATION

SIM-701 Control Menu (IFF-701Ti)

The SIM-701 control menu on the IFF-701Ti is used to select the operational parameters of the SIM-701.

The DIFF LVL field is used to select the Difference Channel RF level with respect to the Sum Channel RF level. By selecting specific difference channel levels, off boresight replies with specific azimuth offsets may be simulated. The Sum Channel RF level is controlled in the IFF-701Ti reply screens.

The DIFF PHASE field is used to select the Difference Channel RF carrier phase, with respect to the Sum Channel RF carrier phase. The selections are +90° or -90°. The selected phase is used to simulate which side off boresight the reply is seen on. Phase selection may also be automatically controlled, with the phase changing at the simulated boresight point of the reply.

The AZIMUTH SYNC field is used to select the type of azimuth angle information to be used for synchronizing reply azimuth angles. The SIM-701

may be optioned with four types of azimuth synchronization interface:

1. 1553B #1 to 16. This option provides a MIL STD 1553B data bus interface. Multiple numbered selections are possible, each with specific 1553 data word interpretations for azimuth angle information.
2. SYNCHRO. This option provides a 3 wire synchro interface allowing the extraction of azimuth angle information.
3. BLANKING. This option provides a blanking pulse interface to the primary radar.
4. ACP/ARP Pulses. This option provides an interface with the APX-114 (4500) interrogator allowing the extraction of azimuth angle information.

With 1553B, SYNCHRO or ACP/ARP selected, reply azimuth angle and reply width may be selected in degrees.

With BLANKING selected, reply azimuth angle and width are determined by the sector illumination settings of the primary radar. The difference channel RF reply level is reduced by maximum attenuation available with respect to the sum channel during the blanking period simulating on boresight replies.

The SCAN RATE field displays the azimuth blanking or azimuth angle rate.

The MODE field controls data source. With CONFIG selected, data is derived from the selected configuration file. With DATA selected, the user may enter data manually.

```
** SIM-701 CONTROL MENU **
DIFF LVL= -15dB  DIFF PHASE= -90 deg
RPLY AZIMUTH= 40deg  RPLY WIDTH= 10deg
AZIMUTH SYNC= 1553B #1  MODE=CONFIG
SCAN RATE= --      ACP COUNT= ----
```

```
** SIM-701 CONTROL MENU **
DIFF LVL= -15dB  DIFF PHASE= -90 deg
RPLY AZIMUTH= 180deg  RPLY WIDTH= 10deg
AZIMUTH SYNC= EXT ACP/ARP  MODE=CONFIG
SCAN RATE= 20 spm      ACP COUNT= 4096
```

```
** SIM-701 CONTROL MENU **
DIFF LVL= -15dB  DIFF PHASE= -90 deg
RPLY AZIMUTH= ---  RPLY WIDTH= --deg
AZIMUTH SYNC= BLANKING  MODE=CONFIG
SCAN RATE= --      ACP COUNT= ----
```

```
** SIM-701 CONTROL MENU **
DIFF LVL= -15dB  DIFF PHASE= -90 deg
RPLY AZIMUTH= 240deg  RPLY WIDTH= 10deg
AZIMUTH SYNC= SYNCHRO  MODE=DATA
SCAN RATE= --      ACP COUNT= ----
```

Specification

Test set requires 5 minute warm-up period prior to making measurements.

SIM-701 ELECTRICAL CHARACTERISTICS

RF

Transmit Path Loss (0 dB Attenuation)

28 dB (± 2 dB)

Difference Antennas Output Relative to Sum Antennas (0 dB Attenuation)

± 1.0 dB

TRANSMIT ATTENUATION

Range

0 to 31 dB

Step Size

1.0 dB

ACCURACY

0 to 15 dB ± 0.4 dB ($\pm 3\%$)

16 to 31 dB ± 0.5 dB ($\pm 3\%$)

Difference Antennas Phase Relative to Sum Antennas (0 dB Attenuation, both Channels)

Selection

$\pm 90^\circ$

Accuracy

$\pm 20^\circ$

Phase Error due to Attenuation

$\leq 45^\circ$

Phase Shift Between +90 and -90 Selections

180° ($\pm 10^\circ$)

VSWR (Sum and Difference Ports)

$< 1.25:1$

Receive Path Loss

62 dB (± 2 dB)

Frequency

1030 MHz (± 5.0 MHz)

RF INPUT (SUM + DIFF ANTENNAS)

Peak Power

+46.5 to +67 dBm max (45 W to 5 kW max)

Average Power

30 W max

SIGNAL AND CONTROL

Remote Interface

Comm2 and Comm3 RS-232C (TXD, RXD, CTS DTR and GND supported)

AIRCRAFT AZIMUTH INTERFACES

BLANKING INPUT

High Level (logic 1) input, differential

+2.0 to +7.0 V

Low level (logic 0) input, differential

-2.0 to -7.0 V

Common Mode input voltage

±2.5 V max

BLANKING OUTPUT

High Level (logic 1) output, differential

+3.0 to +5.0 V

Low level (logic 0) output, differential

-3.0 to -5.0 V

Common Mode output voltage

±1.5 V max

ACP/ARP Inputs

5 V TTL

ACP/ARP Outputs

5 V TTL

SYNCHRO INPUTS (S1, S2 AND S3)

Level

11.8 Vrms, L-L (±10%)

Frequency

400 Hz (±10%)

Input Impedance

30 kΩ min

SYNCHRO REFERENCE INPUTS

Level

26 Vrms, (±10%)

Frequency

400 Hz (±10%)

Input Impedance

5 kΩ min

Bus Monitor

MIL-STD-1553B

POWER AND FUSE SPECIFICATIONS

BATTERY OPERATION

Duration

>6 Hours (See Note 1)

AC POWER REQUIREMENTS

Voltage and Frequency

100 to 120 VAC, 60 Hz

220 to 240 VAC, 50 Hz

Maximum Power Consumption

75 W

Mains Supply Fluctuations

≤10% of the nominal voltage

Transient Over-voltage

Installation Category II

+28 Vdc OUTPUT

Voltage

+28.0 Vdc (±4.0 Vdc)

Current

1.25 A maximum

2.0 A maximum Fault Current

+5 Vdc OUTPUT

Voltage

+5.0 Vdc (±0.2 Vdc)

Current

750 mA

FUSE REQUIREMENTS

F1 and F2, 100 to 120 VAC

1.5 A, 250 V, Type T

F1 and F2, 220 to 240 VAC

0.75 A, 250 V, Type T

ENVIRONMENTAL/MECHANICAL

Weight

16.8 kg (37 lbs.) maximum (No options)

Dimension (with LID)

29.2 cm high x 35.6 cm long x 38.1 cm wide

11.5 in. high x 14 in. long x 15 in. wide

Operating Temperature

0°C to +50°C

Storage Temperature Range

-40°C to +70°C

Relative Humidity

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

Use

Pollution Degree 2

Altitude

≤4000 m (13,124 ft)

NATO Stock Numbers

SIM-701

6625-99-5938-197



Versions and Accessories

When ordering please quote the full ordering number information.

Ordering Numbers

SIM-701-01-110	Blanking Pulse Interface and ACP/ARP Pulse Interface, 110 VAC Operation
SIM-701-01-220	Blanking Pulse Interface and ACP/ARP Pulse Interface, 220 VAC Operation
SIM-701-02-110	SIM-701-01 Configuration with Synchro Interface, 110 VAC Operation
SIM-701-02-220	SIM-701-01 Configuration with Synchro Interface, 220 VAC Operation
SIM-701-03-110	SIM-701-01 Configuration with MIL STD 1553B Interface, 110 VAC Operation
SIM-701-03-220	SIM-701-01 Configuration with MIL STD 1553B Interface, 220 VAC Operation
SIM-701-04-110	SIM-701-01 Configuration with Synchro Interface and MIL STD 1553B Interface, 110 VAC Operation
SIM-701-04-220	SIM-701-01 Configuration with Synchro Interface and MIL STD 1553B Interface, 220 VAC Operation

Accessories (Supplied)

Line Cord

RF Coaxial Cable x 2 TNC-TNC Connects Sum and Difference ports to Interrogator UUT (Length 3ft)

Operation Manual

Crypto/Control Cable Provides Control Interface to IFF-701Ti and provides alternate KIT-TSEC 1A/1C Crypto interface with IFF-701Ti in lieu of KIV-16 Applique Crypto

All IFR Avionics products delivered with Factory Certificate Of Calibration

Note 1

Before recharge at 25°C
+28 V Supply Output and +5 V Outputs Unloaded (No External Load)

CHINA

Tel: [+86] (10) 6467 2716
Fax: [+86] (10) 6467 2821

FRANCE

Tel: [+33] 1 60 79 96 00
Fax: [+33] 1 60 77 69 22

GERMANY

Tel: [+49] (8131) 29260
Fax: [+49] (8131) 2926130

HONG KONG

Tel: [+852] 2832 7988
Fax: [+852] 2834 5364

LATIN AMERICA

Tel: [+1] (972) 899 5150
Fax: [+1] (972) 899 5154

SCANDINAVIA

Tel: [+45] 9614 0045
Fax: [+45] 9614 0047

SPAIN

Tel: [+34] (91) 640 11 34
Fax: [+34] (91) 640 06 40

UNITED KINGDOM

Chandlers Ford
Tel: [+44] (0) 2380 273722
Fax: [+44] (0) 2380 254015
Stevenage
Tel: [+44] (0) 1438 742200
Fax: [+44] (0) 1438 727601

USA

Tel: [+1] (316) 522 4981
Toll Free: [+1] (800) 835 2352 (US only)
Fax: [+1] (316) 522 1360

email info@ifrsys.com

web www.ifrsys.com

As we are always seeking to improve our products, the information in this document gives only a general indication of the product capacity, performance and suitability, none of which shall form part of any contract. We reserve the right to make design changes without notice. All trademarks are acknowledged. Parent company IFR Systems, Inc. © IFR 2002.

Part No. 46891/125

Issue 1
12/2001

