

# Avionics

## TCAS-201 TCAS Ramp Test Set



The TCAS-201 simulates the airborne environment necessary for verification/certification of TCAS installations

- Programmable intruder simulation parameters
- Surveillance monitor displays ATCRBS or Mode S interrogations
- 10 selectable programmable scenarios
- Measures interrogator power and frequency
- Built-in self test
- LCD display with automatic backlight
- 1.5 hour battery operation
- Two-year limited warranty

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

*The TCAS-201 allows verification and certification of an aircraft's TCAS installation, performing many of the required tests for Supplemental Type Certification (STC) during initial installation and subsequent routine maintenance.*

*The TCAS-201 includes the capability to monitor TCAS interrogations (displaying decoded information/communication data) and generating ATCRBS or Mode S replies that simulate threat aircraft for bearing accuracy checks.*

*Programming flexibility of the TCAS-201 allows the operator to exercise and generate Traffic Advisory (TA) and Resolution Advisory (RA) alerts. The TCAS-201 is environmentally packaged to operate in all weather conditions and is protected against the shock and vibration encountered during ramp use.*

### Operation

The TCAS-201 uses four basic test functions. Power and frequency, monitor, reply, scenario and one configuration function. Setup is for the gathering and verification of TCAS system data.

The Setup Menu is used to program parameters for Scenario Tests and additional control of test set functions.

The Power and Frequency screen displays interrogator Effective Radiated Power (ERP) and Frequency.

The Surveillance and Broadcast Monitor screen displays the contents of the major interrogation fields incorporated in UF0 and UF16 and verifies the TCAS Broadcast is transmitted in UF16 approximately every ten seconds.

In the ATCRBS Reply Test the TCAS-201 simulates a Mode C transponder with programmable percentage reply, altitude and range parameters.

### Scenario Test

Running the Scenario Test enables the user to simulate an approaching intruder with constant closing rate and constant altitude change rate. Up to 10 user programmed scenarios can be stored and later recalled. Scenario test time and total elapsed test time enable the user to monitor times for TCAS Traffic and Resolution Advisories.

```
** SCENARIO TEST - RUNNING **
INTRUDER TYPE: MODE-S      TIME: 0:23:1:02
RANGE: 3.49 nm             RATE: +540 kt
ALT: 9552 ft               RATE: +1500 fpm
STATUS: RESOLUTION
SURVEILLANCE INTERVAL: 1.00 sec
```

```

** SCENARIO TEST - RUNNING **
INTRUDER TYPE: ATCRBS    TIME: 0:23;1:02
RANGE: 3.95 nm           RATE: +350 kt
ALT: 10,000 ft          RATE: +0 fpm
STATUS: PROXIMITY
W-S SEQUENCE INTERVAL: 1.00 sec

```

### Mode S Reply Test

The Mode S Reply Test can be used to evaluate the ability of the TCAS interrogator to receive, decode and respond to Mode S replies. In this mode the TCAS-201 simulates a Mode S transponder replying with formats DF0, DF11 and DF16. The message fields allow the user to program capability information and various advisories into the replies.

```

** MODE S REPLY TEST - RUNNING **
RANGE: 11.00 nm  ALTITUDE: 8300 ft
VS:0  SL:0  RIa:8  RIr:3  CA:0
ARA:0000  RAC:0  CLI:0  VDS:30
AA:01FF37
SURVEILLANCE INTERVAL: 1.00 sec

```

### Whisper-Shout Monitor

The Whisper-Shout Monitor screen provides information used to verify whisper-shout steps and Side Lobe Suppression (SLS). By conducting several tests from different points around the aircraft, the TCAS coverage (directional and/or omni-directional), whisper-shout sequence operation and interrogation timing may be evaluated.

```

** WHISPER SHOUT MONITOR - RUNNING **
                - MONITOR ONLY -
ATTEN: 0.0 dB    NO SUPP: 1
S1: 0  P2: 0    BOTH: 0
SPACING: 4.3 ms
W-S SEQUENCE INTERVAL: 1.01 sec

```

## SPECIFICATION

### REPLY GENERATOR

#### Output

1090 MHz DCXO controlled ( $\pm 10$  kHz)

#### Level

Set for operation over an antenna to antenna distance of 5 to 500 feet (1.5 to 152.4 meters)

#### Test Antenna

Remote antenna

VSWR <1.5:1, 9.5 gain typical

### OUTPUT TEST SIGNALS

#### Reply Modes

Mode C (with altitude reporting), Mode S (Formats 0, 11, 16)

#### Pulse Spacing

Accuracy  $\pm 50$  ns

#### Pulse Widths

Accuracy  $\pm 50$  ns

## PULSE CHARACTERISTICS

### All Pulses

$\pm 1$  dB relative to  $P_1$

### Percent Reply

Range 0% to 100%

Resolution 10%

Accuracy  $\pm 1\%$

### Range Delay

Range 0.3 to 30 nautical miles

Resolution 50 ns steps

Accuracy  $\pm 0.02$  nautical miles

### Altitude

Range -1000 to +126,000 feet

Resolution 100 feet

### Mode S Address

Selectable

### Reply Delay

ATCRBS 3.0  $\mu$ s ( $\pm 50$  ns)

Mode S 128.0  $\mu$ s ( $\pm 50$  ns)

### Range Rate

Range -1200 to +1200 kts

Resolution 10 kts

Accuracy  $\pm 10\%$

### Altitude Rate

Range -10,000 to +10,000 fpm

Resolution 100 fpm

Accuracy  $\pm 10\%$

### Squitter

Control ON/OFF

Rate 1.0 seconds ( $\pm 10$  ms)

## UUT MEASUREMENTS

### Effective Radiated Power (Mode S Interrogations)

Range +43 to +57 dBm (20 to 500 W)

Accuracy  $\pm 2$  dBm

### Frequency

Range 1029.9 to 1030.1 MHz

Accuracy  $\pm 10$  kHz

Resolution 1 kHz

### Detectable Modes

ATCRBS only All Call (Mode C)

Mode S Downlink (Formats 0, 11, 16)

## GENERAL

### Calibration Interval

1 Year

**Battery Operation**

Duration: 1.5 hours before recharge at 25°C

Automatic shut off after 10 minutes of non-use

**AC Supply**

103.5 to 129 VAC, 207 to 253 VAC, 47.5 to 420 Hz, 45 W (used to recharge battery)

**ENVIRONMENTAL****Temperature**

-20° to +55°C

**Relative Humidity**

≤80% for temperatures up to 31°C, decreasing linearly to 50% at 40°C  
(Non-condensing)

**Altitude**

≤4000 m (13,124 ft.)

**Dimensions**

284 mm wide; 361 mm deep; 279 mm high

11.2 in. wide; 14.2 in. deep; 11 in. high

**Weight**

13.7 kg (30 lbs.)

**Electromagnetic Compatibility**

Complies with the limits in the following standards:

EN 55011 Class B

EN 50082-1

**Safety**

Complies with EN 61010-1 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.

## ***VERSIONS AND ACCESSORIES***

---

*When ordering please quote the full ordering number information.*

### **Ordering**

<b>Numbers</b>	<b>Versions</b>
201-110	TCAS-201 Traffic Alert & Collision Avoidance, 110 VAC operation
201-220	TCAS-201 Traffic Alert & Collision Avoidance, 220 VAC operation

### **Accessories (Supplied)**

Line Cord

RF Coaxial Cable

Antenna Shield

Operation Manual

Operator's Guide

Directional Antenna

Tripod

Omni-Directional Antenna

---

All Aeroflex Avionics products delivered with Factory Certificate Of Calibration