

# Avionics

## ATB-7300

Avionics Test Bench

**AEROFLEX**  
A passion for performance.



### CONFIGURABLE PXI PLATFORM FOR AVIONICS TEST

Multi-system test capability in stand-alone instrument or system ATE configurations

#### Standard Features

- Tests ILS / VOR / MKR / ADF and VHF COMM functions, including SELCAL
- Large touch screen color display
- Fully compatible with Aeroflex NAV-2000R and Collins 479S-6A GPIB command sets

#### Optional Features

- 250 KHz to 3 GHz spectrum analyzer with custom analysis tools for avionics RF applications
- 406 MHz COSPAS / SARSAT Beacon (ELT) test
- VHF Comm TX and DME TX analyzer

#### ATB-7300

ATB-7300 Avionics Test Bench is a comprehensive, configurable test platform for avionics system and component test. Applications include R&D, manufacturing, troubleshooting and return to service testing. The ATB-7300 offers unparalleled flexibility for OEMs and repair shops to adapt to their own unique needs.



For the very latest specifications visit [www.aeroflex.com](http://www.aeroflex.com)

## NAV/COMM Generator GUI

General – Each generator resource panel provides control of generator frequency, RF level, RF output and modulation. The GUI help files show the operator how to use each GUI for instrument control. Fly-out tool bars are used to select functional modes.



VHF Gen – Provides control of modulation frequency, modulation depth (up to 3 sources), SELCAL tones, frequency and tone sequences.



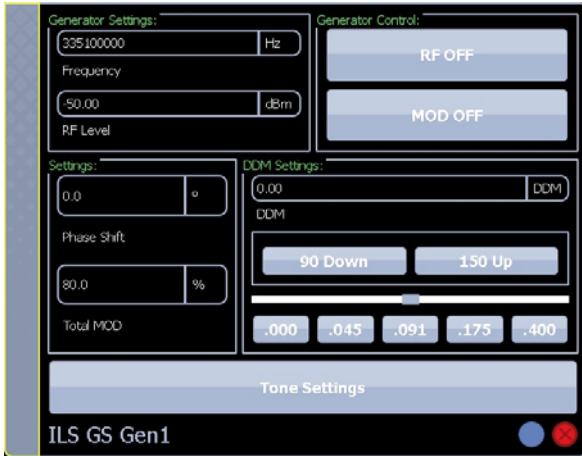
VDB Gen – Allows user to generate and transmit a valid VHF data broadcast data packet from a source data file, compliant with RTCA and ARINC specifications.



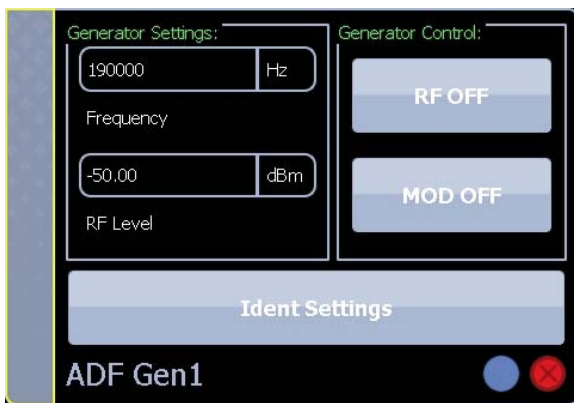
ILS / LOC Gen – Provides control of 90 Hz and 150 Hz tone frequencies, modulation depths, left/right DDM and ident settings, including Morse code.



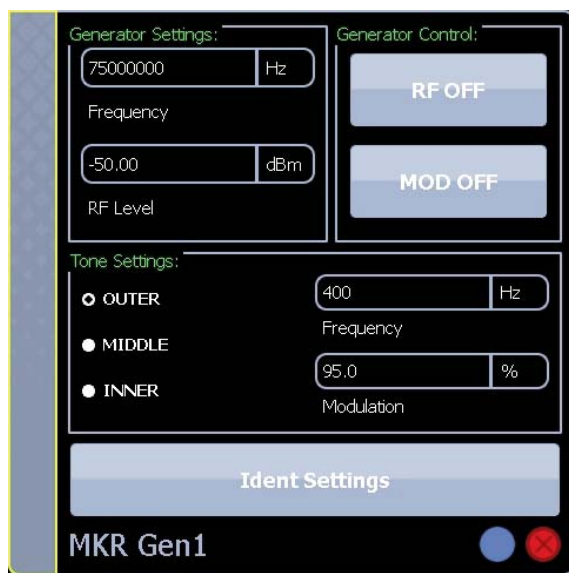
VOR Gen – Provides control of 30 Hz Var / Ref and 9960 Hz tone frequencies, modulation depths, 9960 Hz deviation, VOR bearing, to/from and ident settings.



ILS Glide Slope Gen – Provides control of 90 Hz and 150 Hz tone frequencies, modulation depths, up/down DDM.



ADF Gen – Provides control of modulation frequency, modulation depth and ident settings.



MKR Gen – Provides selection of Outer, Middle and Inner marker beacon tones and control of tone frequencies, modulation depth and ident settings.

## SPECIFICATIONS

### SIGNAL GENERATOR

#### Frequency Range

100 KHz to 3000 MHz

1 Hz resolution

#### RF Level

##### GEN Port

-120 dBm to +10 dBm

0.01 dB increments

##### T/R Port

-30 dBm to -120 dBm

0.01 dB increments

#### Accuracy

##### GEN Port

±1.5 dB (> -110 dBm)

±3.0 dB (<= -110 dBm)

##### T/R Port

±1.5 dB (> -120 dBm)

±3.0 dB (<= -120 dBm)

#### Spurious

##### Phase Noise

-105 dBc/Hz @ 20 kHz offset

##### Harmonics

<-25 dBc

##### Non-Harmonics

<-50 dBc

### ADF GENERATOR

#### Frequency

##### Range

Per signal generator specifications

##### Functional

100.000 kHz to 1.750 MHz

##### Resolution

1 Hz

##### Default

190.000 kHz

#### RF Level

##### GEN Port

-120 dBm to +10 dBm

0.01 dB increments

##### T/R Port

-30 dBm to -120 dBm

0.01 dB increments

##### Default

-50 dBm

#### Modulation

See \*IDENT SPECIFIC DATA\*

## MKR GENERATOR

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### Frequency

#### Range

Per signal generator specifications

#### Functional

75.000 MHz

#### Resolution

1 Hz

#### Default

75.000 MHz

### RF Level

#### GEN Port

-120 dBm to +10 dBm

0.01 dB increments

#### T/R Port

-30 dBm to -120 dBm

0.01 dB increments

#### Default

-50 dBm

### Tone Settings

#### Frequency

##### Range

30 Hz to 7400 Hz

##### Resolution

1 Hz

#### Default

##### Outer

400 Hz

##### Middle

1.300 kHz

##### Inner

3.000 kHz

### % Modulation

#### Range

0-99%

#### Resolution

1%

#### Default

95%

### IDENT

#### OUTER

##### Dot Time

0 ms, fixed

#### Gap Time

##### Range

50 ms to 250 ms

##### Resolution

1 ms

##### Default

125 ms

### Dash Time

#### Range

150 ms to 750 ms

#### Resolution

1 ms

#### Default

375 ms

### MIDDLE

#### Dot Time

125 ms, fixed

#### Gap Time

125 ms, fixed

#### Dash Time

375 ms, fixed

### INNER

#### Dot Time

83 ms, fixed

#### Gap Time

83 ms, fixed

#### Dash Time

0 ms, fixed

## ILS GENERATOR

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### Frequency

#### Range

Per signal generator specifications

#### Functional (GS)

329.150 MHz to 335.000 MHz

#### Functional (LOC)

108.100 MHz to 111.950 MHz

#### Resolution

1 Hz

#### Default (GS)

335.100 MHz

#### Default (LOC)

108.100 MHz

### RF Level

#### GEN Port

-120 dBm to +10 dBm

0.01 dB increments

#### T/R Port

-30 dBm to -120 dBm

0.01 dB increments

#### Default

-50 dBm

### Settings

#### Phase Shift

##### Range

0.0 to 359.9°

##### Resolution

0.1°

##### Default

0.0°

**Total MOD**

Not to exceed 99%

LOC includes 1020 Hz IDENT modulation

See \*IDENT SPECIFIC DATA\*

**DDM Settings****Range****(Glideslope)**

0.000 to 0.800 DDM

**(Localizer)**

0.000 to 0.400 DDM

**Resolution**

0.001 DDM

**Default**

0.000 DDM

**Total System Error****(Glideslope)**

±0.001 DDM from 0.000 to 0.045 DDM

±2% from 0.045 to 0.400 DDM

**(Localizer)**

±0.001 DDM from 0.000 to 0.045 DDM

±2% from 0.045 to 0.200 DDM

**Glideslope and Localizer Tone Settings****Frequency****Range**

90 Hz            72 Hz to 108 Hz

150 Hz          120 Hz to 180 Hz

**Resolution**

1 Hz

**Accuracy**

±0.01%

**Distortion**

<0.40% THD

**Modulation**

90 and 150 Hz            Total modulation not to exceed 99%

**Default**

20%

**Overall Accuracy**

±2% of setting for 5% to 90% AM

**Tone Distortion**

0.5% maximum

**VOR GENERATOR****Frequency****Range**

Per signal generator specifications

**Functional**

108.000 MHz to 117.950 MHz

**Resolution**

1 Hz

**Default**

108.00 MHz

**RF Level****GEN Port**

-120 dBm to +10 dBm

0.01 dB increments

**T/R Port**

-30 dBm to -120 dBm

0.01 dB increments

**Default**

-50 dBm

**Settings**

Total MOD            Not to exceed 99%

**Direction****Bearing****Range**

000.0° to 359.9°

**Resolution**

0.1°

**Radial Accuracy**

±0.05°

**Tone Settings****Frequencies**

30 VAR and 30 REF Freq

**Range**

20 Hz to 40 Hz

**Resolution**

1 Hz

**Default**

30 Hz

**9960 Frequency****Range**

9000 Hz to 11000 Hz

**Resolution**

1 Hz

**Default**

9960 Hz

**Frequency Deviation****Range**

240 Hz to 540 Hz

**Resolution**

1 Hz

**Default**

480 Hz

**Accuracy**

±0.01%

**Distortion**

<0.40% THD

**Modulation**

30 VAR and 9960 MOD

**Range**

Total % mod not to exceed 99%

Includes 1020 Hz IDENT modulation

See \*IDENT SPECIFIC DATA\*

**Default**

30%

**Overall Accuracy**

±2% of setting for 5% to 90% AM

**Tone Distortion**

0.5% max

**\*IDENT (ADF, ILS LOC AND VOR)**

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**IDENT Code**

**Valid Characters**

A-Z, 0-9

**Length**

1 to 5 characters

**Default**

IDENT

**Word Rate**

**Range**

1 sec. to 65 sec.

**Default**

10 sec.

**Resolution**

1 sec.

**Frequency**

**Range**

10 Hz to 18000 Hz

**Resolution**

1 Hz

**Default**

1020 Hz

**Accuracy**

±0.01%

**Distortion**

<0.40% THD

**Modulation**

**Range**

Total % MOD not to exceed 99%

**Resolution**

0.01%

**Default**

0.00%

**Overall Accuracy**

±2% of setting for 5% to 90% AM

**Tone Distortion**

0.5% max

**Dot Time**

**Range**

50 ms to 250 ms

**Default**

150 ms

**Resolution**

1 ms

**Gap (Dot/Dash) Time**

**Range**

50 ms to 250 ms

**Default**

150 ms

**Resolution**

1 ms

**Dash Time**

**Range**

150 ms to 750 ms

**Default**

450 ms

**Resolution**

1 ms

**Character Spacing**

**Range**

150 ms to 750 ms

**Default**

450 ms

**Resolution**

1 ms

**VHF DATA BROADCAST (VDB) GENERATOR**

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**Frequency**

**Range**

Per signal generator specifications

**Functional**

108.000 MHz to 117.950 MHz

**Resolution**

1 Hz

**Default**

108.00 MHz

**RF Level**

**GEN Port**

-120 dBm to +10 dBm

0.01 dB increments

**T/R Port**

-30 dBm to -120 dBm

0.01 dB increments

**Default**

-50 dBm

**MODES**

**Single-File**

**File Play Mode**

Continuous or from 1 to 4095 times

**Play-List**

**List Play Mode**

Continuous or from 1 to 4095 times

**List Entries**

1 to 127

**Plays Per Entry**

1 to 4095

**Generate File (VDB Burst)****Input Data**

From a file or array

**Filter ALPHA**

0.0 to 1.0

**Oversample Factor**

2 to 16

**RF Ramp Filter**

Adjustable length cosine response

**Distortion**

&lt;0.40% THD

**FM Mode****Modulation****Rate**

1 kHz to 50 kHz

**Deviation**

30 Hz to 500 kHz

**Resolution**

1 Hz to 1 kHz, 10 Hz above 1 kHz

**Accuracy**

±3.0%

**Single-File Mode****File Play Mode**

Continuous or from 1 to 4095 times

**Play-List Mode****List Play Mode**

Continuous or from 1 to 4095 times

**List Entries**

1 to 127

**Plays Per Entry**

1 to 4095

**SELCAL Mode**

User selectable tone set with programmable tone periods.

**SELCAL Settings****P1 and P2 Codes****Range**

2 characters

**Valid Characters**

A through H, J through M, P through S

**P1 and P2 Tones****Frequencies****Range**

Set from code,

312.6 Hz to 1479.1Hz

**Pulse MOD****Range**

0.00% to 99%

Applies to ALL pulses including test tone

**Resolution**

0.01%

**Default**

90.00%

**Timing****P1 and P2 Time****Range**

0.000 to 2.000 sec.

**Resolution**

0.001 sec.

**Default**

1.000 sec.

**VHF COMM GENERATOR****Frequency****Range**

Per signal generator specifications

**Functional**

116.000 MHz to 156 MHz

**Resolution**

1 Hz

**Default**

120.000 MHz

**RF Level****GEN Port**

-120 dBm to +10 dBm

0.01 dB increments

**T/R Port**

-30 dBm to -120 dBm

0.01 dB increments

**Default**

-50 dBm

**MODES****AM Mode****Modulation****Frequency Range**

(per Tone) 30 Hz to 18 kHz

**Default**

1000 Hz

**Resolution**

1 Hz

**Accuracy**

±1% from 10% to 90%

**Range**

Total % mod not to exceed 99%

**Default (Per Tone)**

30%

**Overall Accuracy**

±2% of setting for 5% to 90% AM

## Gap Time

### Range

0 to 999 ms

### Resolution

1 ms

### Default

200 ms

## Test Tone

### Frequency

#### Range

10 Hz to 18000 Hz

#### Resolution

1 ms

#### Default

1020 Hz

## MOD

### Range

0.00% to 99%,

Applies to ALL pulses including P1 and P2

### Resolution

0.01%

### Default

30.00%

### Enable

ON (Checked) or OFF (Unchecked)

### AM

0 to 99%

±3.0%

### FM

10 to 500 kHz

±3.0%

## DIGITIZER / RECEIVER

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Installed as option ATB-ANL

### Frequency Range

250 kHz to 3000 MHz 1 Hz Resolution

### Frequency Measurement

As per frequency reference

### RF Input Level

ANT Port: +30 dBm

T/R Port: +53 dBm Peak Power, > 50 W one minute duty cycle

### Sensitivity

ANT Port: -100 dBm

T/R Port: -60 dBm

(>10 dB SINAD, FM, 1 kHz Rate, 6 kHz Deviation, 25 kHz BW, 300 Hz to 3.4 kHz AF Filter, Preamp OFF)

#### Residual Responses

< -95 dBm, typically -100 dBm with RF input terminated into 50 ohms and minimum RF and IF attenuation

### Amplitude Measurement

ANT: -100 dBm to +30 dBm

T/R: -60 dBm to +50 dBm

Accuracy: ±1.0 dB

## Modulation Measurement

### AM

0 to 99% ±3.0%

### FM

#### Deviation

100 Hz to 500 kHz

#### Rate

1 kHz to 50 kHz

#### Accuracy

±5%

## ELT (EMERGENCY LOCATOR) ANALYSIS

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Installed as option ATES-ELT.

The instrument will measure the following specified beacon characteristics:

- Carrier frequency
- Carrier power
- Carrier power 1ms before start of burst
- Bit rate
- Start time of transmission (90% power point, relative to returned samples)
- Duration of burst
- Duration of unmodulated carrier
- Modulation phase
- Modulation rise time, fall time
- Modulation symmetry

And will also provide:

- I/Q samples for examining time plots of modulation
- Spectrum from 406.0 to 406.1 MHz for evaluating spurious emissions
- All received bits, either 112 or 144 for short/long formats.
- Return bit fields broken into:
  - Protected data fields 1 and 2, BCH field 1 and 2, non-protected data field (short message has PDF-1, BCH-1, non-protected field; long message has PDF-1, BCH-1, PDF-2, BCH-2)
  - Provide calculated BCH-1, BCH-2 for comparison with received bits. (PDF-1 contains short/long flag and the 15-Hex ID number)
  - Decoded protocol information from the short/long format data, including:
    - Protocol used (e.g. ELT serial user protocol, ELT national location protocol)
    - Country
    - Type of auxiliary radio locator
    - Identification data (e.g. aircraft registration, 24-bit address, call sign, etc, depending on mode)

## DME ANALYZER SPECIFIC DATA

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### Measurements

#### Trigger Type

Software or RF level triggered

#### Sweep Time

0.1 to 10.0 seconds

#### Percent Power

Adjustable within spectrum analysis span

#### Occupied Bandwidth

Measured Width Adjustable within spectrum analysis span

Percent Adjustable from 0% to 100%

#### Rise Time

##### Start Edge Trigger

0% to 100%, Default 10 %

##### Stop Edge Trigger

0% to 100%, Default 90%

##### Resolution

10 ns steps

##### Accuracy

±2% from 1.0  $\mu$ S to 4  $\mu$ S

#### Fall Time

##### Start Edge Trigger

0% to 100%, Default 90 %

##### Stop Edge Trigger

0% to 100%, Default 10%

##### Resolution

10 ns steps

##### Accuracy

±2% from 1.0  $\mu$ S to 4  $\mu$ S

#### Pulse Width

##### Trigger

0% to 100%, Default 50%

##### Range

20 ns to 2000 ns in 10 ns steps

##### Accuracy

±2% from 2.0  $\mu$ S to 5  $\mu$ S

#### Pulse Spacing

##### Trigger

0% to 100%, Default 50%

##### Range

20 ns to 5000 ns in 10 ns steps

##### Accuracy

±2% from 10  $\mu$ S to 40  $\mu$ S

## VHF ANALYZER SPECIFIC DATA

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### Measurements

#### Trigger Type

Software or RF level triggered

#### Sweep Time

0.1 to 10.0 seconds

#### VDL

##### Symbol Clock

10000 Hz to 11000 Hz

##### Oversample Factor

2, 4, 8, 16, 32

##### Sync Pattern

Customizable from 0 (off) to 50 symbols

##### IQ Offset

Enabled or disabled (default)

##### Interpolation

Linear or cubic spline (default)

##### Symbol Power

Range measurable at any symbol in memory

##### EVM

Range configurable from 1 to number of symbols in memory

##### IQ Imbalance

Range configurable from 1 to the number of symbols in memory

##### IQ Offset

Range configurable from 1 to the number of symbols in memory

##### Symbol Decoding

Range to the end of the first detected data burst

#### ACP

##### Channel Spacing

0 Hz to 50000 Hz

##### Channel Bandwidth

1000 Hz to 50000 Hz

##### Number of Channels

Carrier, first lower, first upper

#### Analog Measurements

##### Percent Modulation

##### Number of Sweeps

1 to 20

##### Accuracy

±3%

##### SINAD

##### Number of Sweeps

1 to 20

**Filter Type**

Band-pass filter

C-Message

**Distortion****Number of Sweeps**

1 to 20

**GENERAL**

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**Frequency/Time Reference****Aging**

001 ppm per day

01 ppm per year

Temperature stability typically better than  $\pm 0.01$  ppm

**External Reference Input**

10 dBm nominal

**Temp Range****Operating**

0°C to +50°C

**Storage**

-20°C to +70°C

**Warm-up (For Specified Accuracy)**

10 minutes

**Size**

17.5" (44.5 cm) wide, 8" (20.3 cm) high, 24" (61 cm) deep

**Weight**

60 lbs. (27.2 kg)

**USER INTERFACE**

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GPIB (IEEE-488)

**ORDERING INFORMATION**

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When ordering, please include the Order Number listed below:

**Order**

Number	Description
87961	ATB-7300 Avionics Test Bench

**Standard Accessories**

29972	Power Cord
89304	Operations Manual (CD)
87666	Remote Communications Interface Manual (CD)

**Options**

89377	ATB-ANL OPT01, VHF/DME Signal Analyzer
89376	ATES-ELT OPT02 ELT 406 MHz Analysis

Note: Must order ATB-ANL OPT01 to support the ATES-ELT option.

For the very latest specifications visit [www.aeroflex.com](http://www.aeroflex.com)

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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.