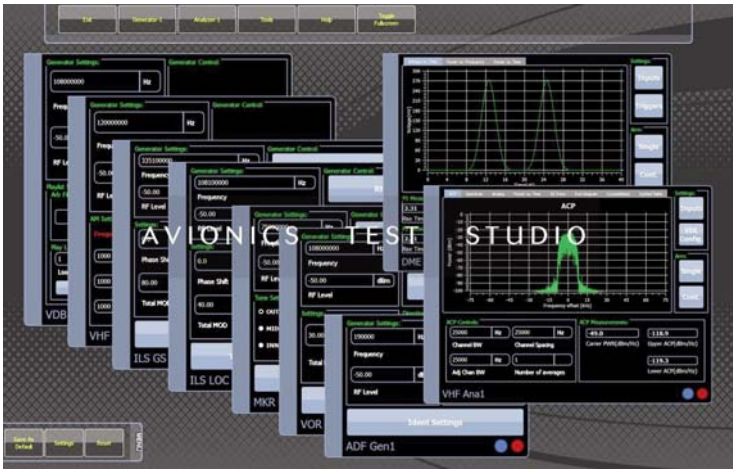
Avionics

Avionics Test Studio®



Avionics Test Studio® is a collection of software defined PXI instruments designed to aid avionics facilities with testing and troubleshooting of avionics electronic units and modules.

- Available Functions: ADF Generator, ILS Generator, VOR Generator, VHF Comm Generator including SELCAL, VDB Generator and MKR Generator.
- Applications: This collection of software tools can be used in product development, prototype, certification, bench and factory ATE test systems, troubleshooting and service.
- Analyzer package currently in development.

Avionics Test Studio® can be used both as a bench top troubleshooting tool and within an ATE environment. All signal parameters can be controlled from the graphical user interface (GUI) as software defined instruments or from your choice of programming language as DLL calls.

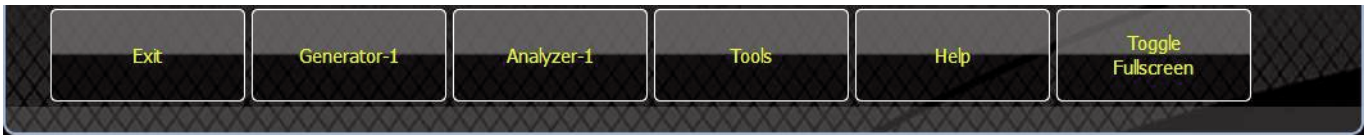
Each GUI and DLL comes with its own help file. The DLL help file includes example code on how to use the DLL in an ATE environment. The GUI help file shows how to use the GUI software defined instrument.

Features:

- Utilizes the Aeroflex 3000 Series PXI cards
- Tests and analyzes traditional NAV/COMM functions as well as the latest airborne datalink protocols, VHF Datalink Mode 2 (ref. ARINC Specification 631-4)
- ANSI C DLL Drivers that can be called from any modern test environment
- Comprehensive help files
- Level accuracy ±0.3 dB typically CW
- Low phase noise typically -143 dBc/Hz at 20 kHz offset
- Software drivers fully compatible with Aeroflex NAV2000R, including Collins 479S-6A GPIB command set

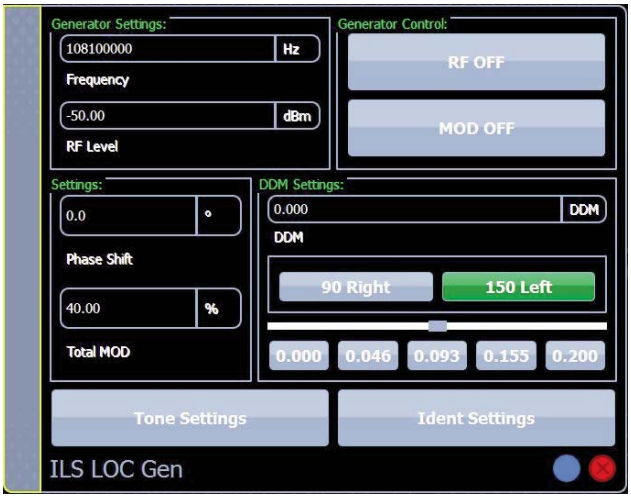
NAV/COMM Generator GUI

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.

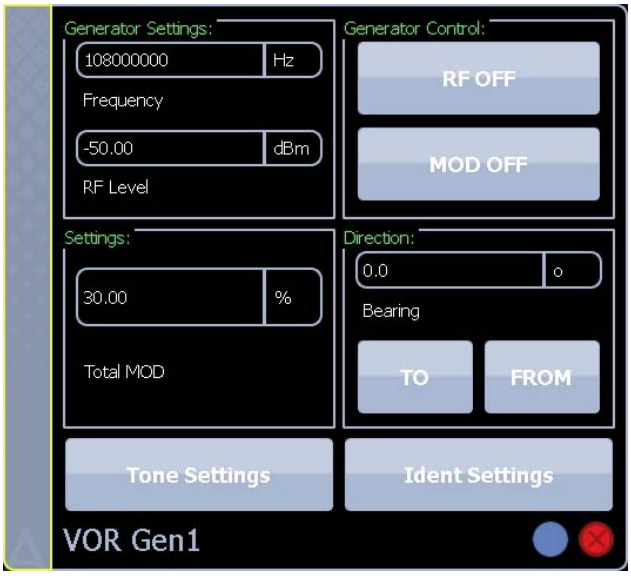


VHF Gen – Provides control of modulation frequency, modulation depth (up to 3 sources), SELCAL tones, frequency and tone sequences.

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.

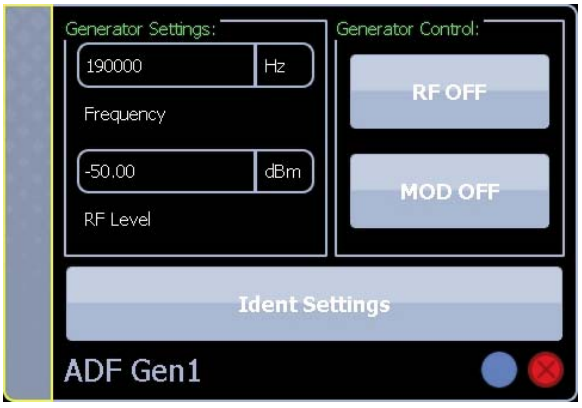


ILS / LOC Gen – Provides control of 90 Hz and 150 Hz tone frequencies, modulation depths, left/right DDM and ident settings, including Morse code.

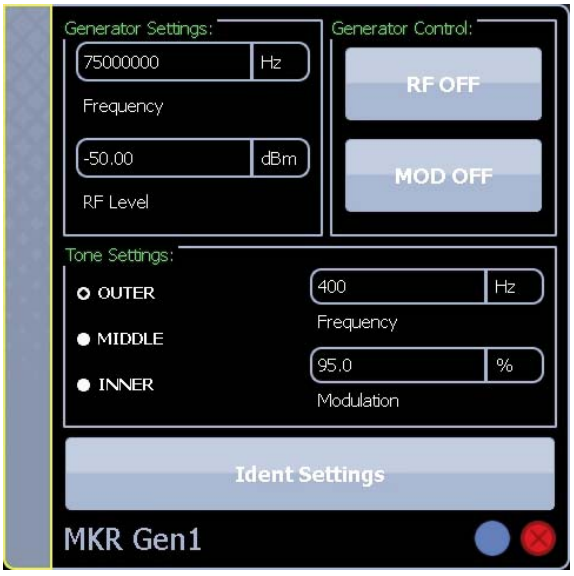


VOR Gen – Provides control of 30 Hz Var / Ref and 9960 Hz tone frequencies, modulation depths, 9960 Hz deviation, VOR bearing, to/from and ident settings.

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

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 kHz

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

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)

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

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

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

Distortion

<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.

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

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

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

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 µS to 4 uS

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 µS to 4 µS

Pulse Width

Trigger

0% to 100%, Default 50%

Range

20 ns to 2000 ns in 10 ns steps

Accuracy

±2% from 2.0 µS to 5 µS

Pulse Spacing

Trigger

0% to 100%, Default 50%

Range

20 ns to 5000 ns in 10 ns steps

Accuracy

±2% from 10 µS to 40 µS

VHF ANALYZER SPECIFIC DATA

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

ORDERING INFORMATION

When ordering, please include the Order Number listed below:

Order Number	Description
SOFTWARE	
90348	ATES-GEN Avionics Test Studio Generator
90349	ATES-ANL Avionics Test Studio Analyzer
90350	ATES-ELT Avionics Test Studio ELT
HARDWARE	
83452	ATEP-3010 PXI RF Synthesizer
83453	ATEP-3011 PXI RF Synthesizer, OCXO
83454	ATEP-3020C PXI RF Digital Signal Generator, 1 MHz to 3 GHz
83457	ATEP-3021C PXI RF Digital Signal Generator, 100 kHz to 3 GHz
83458	ATEP-3025C PXI RF Digital Signal Generator, 1 MHz to 6 GHz
83459	ATEP-3030C PXI Wideband RF Digitizer, 250 kHz to 3 GHz
41481	ATEP-3035C PXI Wideband RF Digitizer, 250 kHz to 6 GHz
83461	ATEP-3065 PXI RF Combiner, 250 MHz to 6 GHz, usable down to 70 MHz

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AEROFLEX
A passion for performance.

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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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