

ATB-7300

Navigation/Communication Test System

COBHAM

Data Sheet

Cobham AvComm



CONFIGURABLE PXI PLATFORM FOR AVIONICS TEST

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

Standard Features

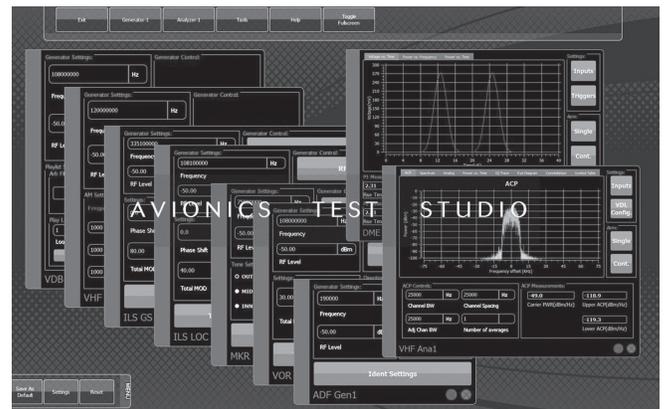
- Tests ILS, VOR, MKR, ADF, VDB, and VHF COMM functions, including SELCAL
- Large touch-screen color display
- Compatible with Aeroflex NAV-2000R and Collins 479S-6A GPIB command sets

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

The ATB-7300 Navigation/Communication Test System 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.



IQCreator®

With IQCreator, the user can create any arbitrary waveform required. This is ideal for creating signals related to new avionics protocols. IQCreator can also be used to create signals which include noise, interference, or other flaws to support advanced testing. See the Aeroflex Application Note on this topic for more information.

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.



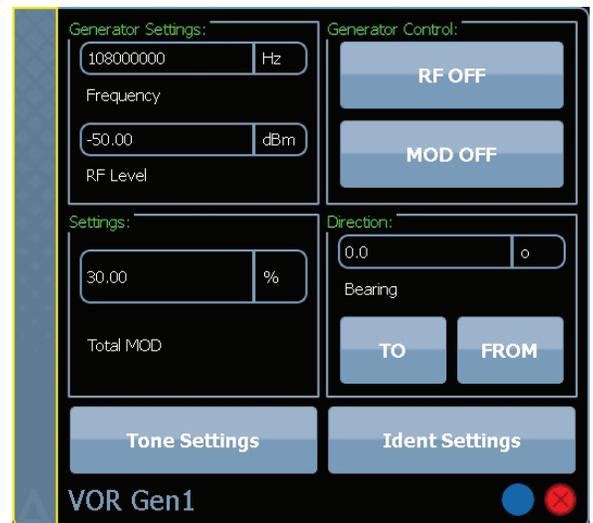
VHF Gen - Provides control of modulation frequency, modulation depth (up to 3 sources), SELCAL tones, frequency and tone sequences.



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



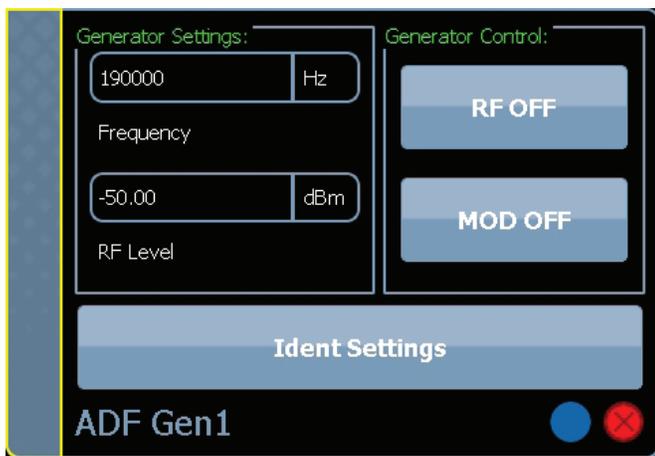
VDB Gen - Allows user to generate and transmit a valid VHF data broadcast data packet from a source data file, compliant with RTCA and ARINC specifications.



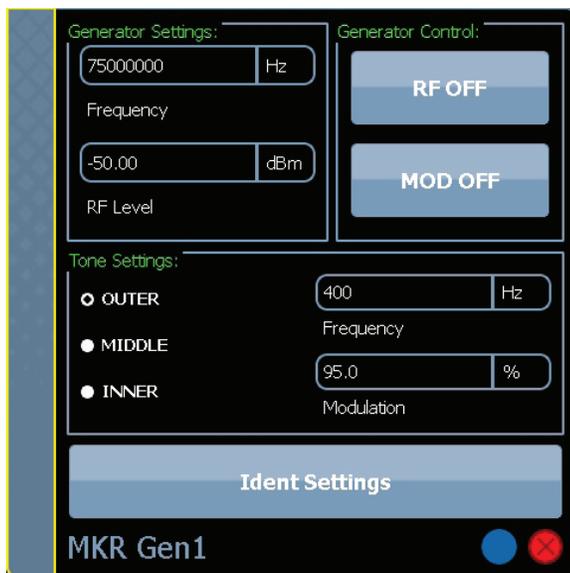
VOR Gen - Provides control of 30 Hz Var/Ref and 9960 Hz tone frequencies, modulation depths, 9960 Hz deviation, VOR bearing, to/from and ident settings.



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.

SPECIFICATION

SIGNAL GENERATOR

<i>Frequency Range</i>	100 kHz to 3000 MHz 1 Hz resolution
<i>RF Level</i>	
<i>GEN Port</i>	-120 dBm to +10 dBm 0.01 dB increments
<i>T/R Port</i>	-30 dBm to -120 dBm 0.01 dB increments
<i>Accuracy</i>	
<i>GEN Port</i>	±1.5 dB (> -110 dBm) ±3.0 dB (<= -110 dBm)
<i>T/R Port</i>	±1.5 dB (> -120 dBm) ±3.0 dB (<= -120 dBm)
<i>Spurious</i>	
<i>Phase Noise</i>	-105 dBc/Hz @ 20 kHz offset
<i>Harmonics</i>	<-25 dBc
<i>Non-Harmonics</i>	<-50 dBc

ADF GENERATOR

<i>Frequency</i>	
<i>Range</i>	Per signal generator specifications
<i>Functional</i>	100.000 kHz to 1.750 MHz
<i>Resolution</i>	1 Hz
<i>Default</i>	190.000 kHz
<i>RF Level</i>	
<i>GEN Port</i>	-120 dBm to +10 dBm 0.01 dB increments
<i>T/R Port</i>	-30 dBm to -120 dBm 0.01 dB increments
<i>Default</i>	-50 dBm
<i>Modulation</i>	See *INDENT SPECIFIC DATA*

MKR GENERATOR

<i>Frequency</i>	
<i>Range</i>	Per signal generator specifications
<i>Functional</i>	75.000 MHz
<i>Resolution</i>	1 Hz
<i>Default</i>	75.000 MHz
<i>RF Level</i>	
<i>GEN Port</i>	-120 dBm to +10 dBm 0.01 dB increments
<i>T/R Port</i>	-30 dBm to -120 dBm 0.01 dB increments
<i>Default</i>	-50 dBm
<i>Tone Settings</i>	
<i>Frequency</i>	
<i>Range</i>	30 Hz to 7400 Hz
<i>Resolution</i>	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
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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 1479.1 Hz
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

<i>Installed as option ATB-ANL</i>	
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 1 ms 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)
 - 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 μs

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 the 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

Frequency/Time Reference

Aging	001 ppm per day 01 ppm per year Temperature stability typically better than ±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)

Safety Compliance

UL 61010-1

CSA C22.2 No. 61010-1

EN 61010-1

EMC

MIL-PRF-28800F

EN 61326-1 Class A

EN 6100-3-2

EN 6100-3-3

USER INTERFACE

GPIB (IEEE-488)

ORDER INFORMATION

When ordering, please include the Order Number listed below:

Order Number	Description
87961	ATB-7300 Nav/Comm Signal Generator
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
88574	Rack Mount Kit, 7000 Series
86170	Transit Case

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



For further information please contact:

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