

Option 6 Avionics Signal Generator

2030, 2031, 2032, 2040, 2041, 2042,
2050, 2051, 2052, NAV-750C

Setting the standard in avionics testing.
Option provides accurate ILS, VOR, ADF,
marker beacon and SELCAL signals for
testing avionics receivers



- **Accurate ILS and VOR RF waveforms**
- **Wide frequency coverage**
- **SELCAL calling tones**
- **Internal ILS and VOR waveform generators**
- **0.0001 DDM resolution**
- **0.01% bearing resolution**
- **Marker beacon**
- **Optional pulse modulation**
- **Automatic direction finder testing**
- **Comprehensive memory facilities**

The IFR family of Avionics Signal Generators provides internal generation of waveforms suitable for testing Instrument Landing Systems (ILS), VHF Omni-directional Radio Range (VOR) systems, Marker Beacons and SELCAL radio receivers. Avionics parameters are presented in the same form as described in the ICAO standards. The family offers an ideal single instrument solution for the testing of avionics receivers and airfield alarm monitors. The use of Direct Digital Synthesis techniques ensures excellent accuracy and stable performance under all operating conditions.

Option 6 is available for all 2030, 2031, 2032, 2040, 2041, 2042, 2050, 2051 and 2052 signal generators have become the solution of choice for testing avionics receivers. It offers a range of high performance signal generators for the testing of ILS, VOR and aircraft communications systems. For bench testing of navigation receivers the 2030 series provides exceptional accuracy, allowing even high performance receivers used for airfield alarm monitors to be tested with confidence. The 2040 series signal generators offer the same high levels of performance with the added advantage of exceptionally low carrier phase noise to allow the rigorous testing of the receiver selectivity and intermodulation, an important factor in today's crowded spectrum for a safety critical industry.

The 2050 series has the same performance as the 2030 series but with the additional benefit of being able to provide digitally modulated carriers.

All models can be supplied with a fast pulse modulator and the 2030 series can be supplied with an internal pulse generator to aid radar testing. A further option for 2030 series is a DME option which allows the signal generator to provide Gaussian shaped double pulse for DME testing.

ILS

In ILS mode, the Sum of Depth of Modulation (SDM) of the 90 Hz and 150 Hz tones can be entered to a resolution of 0.1% AM depth. The Difference in Depth of Modulation (DDM) is entered to a resolution of 0.01% depth for a DDM up to 20% and 0.1% for higher DDM settings. A choice of which tone is dominant is available to the user.

The 30 Hz repetition frequency of the ILS waveform can be adjusted in 0.1 Hz steps. For 0% DDM, additional modulation signals can be added to the ILS waveform.

Changing between localizer and glide-slope operation is accomplished with a single key stroke.

Marker Beacons

In the Marker Beacon mode, signals are generated simulating the outer, middle and inner marker beacons. A single key press selects which marker beacon is simulated. Carrier frequency, modulation depth and modulation

frequency can be varied from the default settings. Using the normal calling tones menu enables pulsed marker beacon modulation signals to be generated.

VOR

In VOR mode, the AM depth of the subcarrier and 30 Hz tone can be independently set and the relative phase of the 30 Hz tone and the modulation tone on the subcarrier is set by directly entering the bearing information in degrees. The VOR repetition rate of 30 Hz can be adjusted in 0.1 Hz steps. For a fixed bearing, additional modulation can be applied to simulate voice/identity signal. A To/From Beacon key provides a rapid means of reversing a bearing entry and accounting for different bearing conventions.

SELCAL

SELCAL selective calling tone signals are used on the radios providing communication between the aircraft operator and the flight crew. The Avionics Signal Generator provides facilities for generating the SELCAL codes and the modulation signals to test the radio receiver.

Simple Operation

Major parameters can be adjusted by keyboard entry of data, using the UP/DOWN keys or using the rotary control. The use of a large screen dot matrix display ensures clear and unambiguous readout of the avionics parameters.

Instrument settings can be stored in nonvolatile memories. A sequence of test settings can be stored and, using the external trigger facility, the currently recalled memory can be incremented to step through the stored test sequence.

The power up sequence of the generator can be defined such that it always switches on in avionics mode.

Specification

Specifications are as 2030, 2031, 2032, 2040, 2041, 2042, 2050, 2051 or 2052 with the following additions

ILS Mode

Tone Frequencies

90 Hz, 150 Hz nominal. Tone frequency may be changed by varying the ILS repetition rate of 30 Hz in 0.1 Hz steps. Tone frequencies maintain 3:1 and 5:1 relationships with the ILS rate.

Frequency Accuracy

As frequency standard

Tone Suppression

Either tone can be suppressed

Additional Modulation

Available for 0% DDM from an internal or external modulation source

Sum of Depth of Modulation (SDM)

SDM Range

0 to 99.9% in 0.1% steps representing the arithmetic sum of each tone depth

SDM Selection

By keyboard entry of data and variation by UP/DOWN keys or rotary control

RF Accuracy of SDM

$\pm 2\%$ of SDM setting for carrier frequencies up to 400 MHz (from 100 MHz to 400 MHz with Option 12)

At 40% SDM accuracy is $\pm 0.8\%$ depth

At 80% SDM accuracy is $\pm 1.6\%$ depth

Difference in Depth of Modulation (DDM)

DDM Range

0 to 20% in 0.01% steps

20 to 99.9% in 0.1% steps

DDM Selection

By keyboard entry of depth in %, mA or index and variation by UP/DOWN keys or rotary control

RF Accuracy of DDM

± 0.02 of DDM setting ± 0.0003 DDM (0.03% depth)

At 0 DDM (on course) accuracy is ± 0.0003 DDM (0.03% depth)

At 0.155 DDM accuracy is ± 0.0034 DDM (0.34% depth)

LF Output

Available from the LF Output connector

LF Accuracy of DDM

Equivalent to ± 0.0003 DDM ± 0.005 of setting

At 0 DDM (on course) accuracy is ± 0.0003 DDM

Marker Beacon Mode

Provides default carrier of 75 MHz, 95% AM depth and a modulation frequency of 400 Hz, 1.3 kHz or 3 kHz corresponding to Outer, Middle and Inner Markers. Carrier frequencies, AM depth and modulation frequency can be adjusted from the default values.

VOR Mode

Selection

By keyboard entry of depth and variable by UP/DOWN keys and rotary control

Bearing Control

Relative phase of 30 Hz tone and subcarrier modulation adjustable from 0° to 359.9° in 0.01° steps by entering VOR bearing. Bearing can be entered as TO or FROM the beacon.

Bearing Accuracy

$\pm 0.05^\circ$

Additional modulation

Available on 0° bearing from an internal or external modulation source

AM Depth Accuracy

$\pm 3\%$ of setting $\pm 0.5\%$ for carrier frequencies up to 400 MHz (from 100 MHz to 400 MHz with Option 12)

Frequency

The VOR repetition frequency of 30 Hz may be varied in 0.1 Hz steps. The subcarrier frequency and deviation maintain a fixed relationship with the VOR repetition rate

Frequency Accuracy

As frequency standard

9.96 kHz subcarrier

AM Range

0 to 49.9% depth in 0.1% steps

Modulation

Frequency modulated by a 30 Hz tone with settable deviations of 420 Hz, 450 Hz, 480 Hz, 510 Hz and 540 Hz

30 Hz Tone

AM Range

0 to 49.9% depth in 0.1% steps

Arithmetic sum of 30 Hz tone and sub carrier limited to 99.8%

ADF Mode

(Does not apply with Option 12 fitted)

Provides default carrier of 190 kHz with 30% AM depth at 1 kHz rate. Carrier frequency, AM depth, modulation rate and RF level can be varied from the default values.

SELCAL Mode

Provides a facility for modulating the RF carrier with sequential calling tones defined by the SELCAL protocol. Allows the entry of two character pairs to define the SELCAL code generated to open the audio path of aircraft radios. Default tone duration and gap are 1 s and 250 ms respectively and can be varied from nominal values.

Versions and Accessories

For the full Signal Generator performance specifications please refer to the 2030/40/50 signal generator datasheets. When ordering please quote the full ordering number information.

The NAV-750C is functionally identical to 2030 1.35 GHz Signal Generator fitted with Option 1 and 6.

Option 6 Avionics Signal Generator

Ordering Numbers

To order an avionics signal generator specify which model is required and order with Option 1 and Option 6 fitted.

Versions

2030	10 kHz to 1.35 GHz Signal Generator
2031	10 kHz to 2.7 GHz Signal Generator
2032	10 kHz to 5.4 GHz Signal Generator
2040	10 kHz to 1.35 GHz Low Noise Signal Generator
2041	10 kHz to 2.7 GHz Low Noise Signal Generator
2042	10 kHz to 5.4 GHz Low Noise Signal Generator
2050	10 kHz to 1.35 GHz Digital and Vector Signal Generator
2051	10 kHz to 2.7 GHz Digital and Vector Signal Generator
2052	10 kHz to 5.4 GHz Digital and Vector Signal Generator

Option 001	Second Internal Modulation Oscillator
Option 006	Avionics (must be ordered with Option 001)

Supplied with

AC Power Lead and Operating Manual

Other Options

Option 002	Pulse Modulation
Option 008	RF Profile and complex sweep
Option 009	Internal Pulse Generator (cannot be used with Option 005) only available on 2030, 2031, 2032
Option 010	DME avionics (only available on 2030, 2031, 2032)
Option 012	Electronic Attenuator (not available on 2032, 2042, 2052, 2052T, not available with Options 03 or 010)
Option 105	Modifies the pulse modulation Option for slower rise time (order with Option 002)
Option 112	External modulation inputs (2) 600 Ω impedance
NAV-750C	VOR/LOC/GS/COMM/MKR Bench Test Equipment

CHINA

Tel: [+86] (10) 6467 2823
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

SPAIN

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

UNITED KINGDOM

Tel: [+44] (0) 1438 742200
Toll Free: [+44] (0800) 282 388 (UK only)
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***

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