

The IFR 4000 is a compact, lightweight and weatherproof unit designed for testing ILS, VOR, Marker Beacon and VHF/UHF Communications avionics systems.



- **Accurate measurement of VHF/UHF transmitter, frequency, output power, modulation (AM and FM and receiver sensitivity)**
- **Generation of ARINC 596 Selective Calling Tones**
- **Accurate measurement of VHF/UHF antenna and or feeder SWR (Standing Wave Ratio)**
- **Simulation of Localizer and Glideslope (CAT I, II and III) Signals with variable DDM settings**
- **Swept Localizer DDM for coupled Auto Pilot testing (Simultaneous Localizer, Glideslope and Marker signals)**
- **Simulation of VOR beacon with variable bearing**
- **Simulation of Marker Beacon, Selectable Airways (Z), Outer and Middle Marker Tones**
- **Guided Test capability cuts down total test time**
- **5.7 inch LCD Display with user adjustable backlight and contrast**
- **Internal battery allows eight hours operation before recharge**

The IFR 4000 verifies the operation and installation of ILS, VOR and Marker Beacon receivers and VHF AM/FM and UHF AM transceivers.

The IFR 4000, with its lightweight size (under 8 lbs.), long run time battery (8 hrs) and ergonomic design, will provide the user with the most portable navigational communications ramp test set on the market today. Cockpit and bench use testing can be easily interchanged. The menu driven functionality and guided test capability make this instrument extremely easy to use. Combine these benefits with the outstanding price and the user has an instrument that delivers total value.

The IFR 4000 is designed to provide test support for ramp or bench environments by utilizing the supplied trimode antenna for over the air measurements or direct connection to the units RF I/O port.

VOR provides signal generation over the VOR band of 108.00 to 117.95 MHz with 30 Hz reference phase and 9960 Hz (sub-carrier frequency modulated with 30 Hz variable phase) amplitude modulated at 30% per tone. VOR bearing selection is provided in pre-set steps of 30 degrees and variable steps of 0.1 degrees.

Localizer provides signal generation over the Localizer band of 108.10 to 111.95 MHz with 90 Hz and 150 Hz tones, amplitude modulated at 20% per tone. Variable and fixed DDM control is provided.

Glideslope provides signal generation over the Glideslope band of 329.15 to 335.00 MHz with 90 Hz and 150 Hz tones, amplitude modulated at 40% per tone. Variable and fixed DDM control is provided.

Marker Beacon provides 75 MHz signal generation, amplitude modulated at 95% with selectable 400, 1300 and 3000 Hz tones.

ILS provides simultaneous Localizer (with swept DDM), Glideslope and Marker Beacon signals.

COMM VHF AM provides signal generation and monitoring of transmitter power and modulation depth over the range of 118.0000 to 156.0000 MHz. A 1020 Hz tone, amplitude modulated at 30% is also provided. Frequency control is provided in 8.33 kHz / 25 kHz channel steps or 1 kHz variable steps.

COMM VHF FM provides signal generation and monitoring of transmitter power and FM deviation over the range of 156.0000 to 174.0000 MHz.

A 1020 Hz tone, frequency modulated at 5 kHz deviation, is also provided. Frequency control is provided in 25 kHz channel steps or 1 kHz variable steps.

COMM UHF provides signal generation and monitoring of transmitter power and modulation depth over the range of 225.00 to 400.00 MHz. A 1020 Hz tone, amplitude modulated at 30%, is also provided. Frequency control is provided in 25 kHz channel steps or 1 kHz variable steps.

SWR provides selected CW frequency, SWR measurement or swept SWR measurement over a 75.00 to 400.00 MHz range.

SELCAL (Selective Calling) provides selectable consecutive tone pulse pairs, which may be sent continuously or as a burst, for testing SELCAL decoders.

FREQUENCY COUNTER provides external frequency measurement over the RF I/O port and ANT port from 10 to 400 MHz and over the AUX port from 1 to 10 MHz.

SPECIFICATION

- NOTE: A 15 minute warm-up period is required for all specifications.
 NOTE: Audio distortion characteristics are measured in a 20 Hz to 15 kHz post detection bandwidth.
 NOTE: Specifications are subject to change without notice.

RF SIGNAL GENERATOR

OUTPUT FREQUENCY

Marker Beacon Channel	72.0 to 78.0 MHz in 25 kHz steps
Marker Beacon Pre-set	74.5, 75.0 or 75.5 MHz
Marker Beacon Variable	72.0 to 78.0 MHz in 1 kHz steps
VOR Channel	108.0 to 117.95 MHz in 50 kHz steps
VOR Pre-set	108.0, 108.05 or 117.95 MHz
VOR Variable	107.0 to 118.0 MHz in 1 kHz steps
LOC Channel	108.1 to 111.95 MHz in 50 kHz steps
LOC Pre-set	108.1, 108.15 or 110.15 MHz
LOC Variable	107.0 to 113.0 MHz in 50 kHz steps
G/S Channel	329.15 to 335.0 MHz in 50 kHz steps
G/S Pre-set	334.25, 334.55 or 334.70 MHz
G/S Variable	327.0 to 337.0 MHz in 1 kHz steps
Comm VHF AM Channel	118.0 to 156.0 MHz in 25 or 8.33 kHz steps
Comm VHF AM Pre-set	118.0, 137.0 or 156.0 MHz
Comm VHF AM Variable	117.0 to 157.0 MHz in 1 kHz steps
Comm VHF FM Channel	156.0 to 174.0 MHz in 25 kHz steps
Comm VHF FM Pre-set	156.0, 165.0 or 174.0 MHz
Comm VHF FM Variable	155.0 to 175.0 MHz in 1 kHz steps
Comm UHF Channel	225.0 to 400.0 MHz in 25 kHz steps
Comm UHF Pre-set	225.0, 312.0 or 400.0 MHz
Comm UHF Variable	224.0 to 401.0 MHz in 1 kHz steps
SELCAL Channel	118.0 to 156.0 MHz in 25 kHz steps
SELCAL Pre-set	118.0, 137.0 or 156.0 MHz
SELCAL Variable	117.0 to 157.0 MHz in 1 kHz steps

FREQUENCY ACCURACY

Same as time base

OUTPUT LEVEL

ANT CONNECTOR

Single Carrier

+13 to -67 dBm in 0.5 dB steps

Accuracy

±3 dB

Dual Mode - LOC

0 dBm Fixed

Accuracy

± 2.5 dB

Dual Mode - G/S

0 to -80 dBm in 0.5 dB steps

Accuracy

±3 dB

Tri-Mode - Marker

+13 dBm Fixed

Accuracy

±3 dB

Tri-Mode - LOC

-7 dBm Fixed

Accuracy

±2 dB

Tri-Mode - G/S:

-7 to -87 dBm in 0.5 dB steps

Accuracy

±3 dB

RF I/O CONNECTOR

Single Carrier

-12 to -130 dBm in 0.5 dB steps

Accuracy

-12 to -95 dBm

±2 dB

-95.5 to -115 dBm

±2.5 dB

-115.5 to -130 dBm

±3 dB

Dual Mode - LOC

-25 dBm Fixed

Accuracy

±2 dB

Dual Mode - G/S

-25 to -130 dBm in 0.5 dB steps

-12 to -95 dBm

±2.5 dB

-95.5 to -115 dBm

±3 dB

-115.5 to -130 dBm
±3.5 dB

SPECTRAL PURITY

HARMONICS

<-20 dBc

NON-HARMONIC SPURIOUS

<-35 dBc between 75 and 400 MHz

VOR MODE

VOR TONE FREQUENCY ACCURACY

30 Hz Reference	±0.02%
30 Hz Variable	±0.02%
1020 Hz	±0.02%
9960 Hz	±0.02%

AM MODULATION

CAL

30, 1020 and 9960 Hz Tones
30% AM, Each Tone

Accuracy

±2% Modulation

Variable

Range

0% to 45% AM (30 and 9960 Hz Tones)

Accuracy

± (3% Modulation + 3% of setting) at 10 to 40% AM,
Each Tone

Distortion

<2.5 % in CAL Position

FM MODULATION

30 Hz Reference at ±480 Hz Peak Deviation on 9960 Hz Sub-Carrier

Accuracy

±25 Hz Peak Deviation

BEARING

To - From Selectable

Pre-set Bearing

0°, 30°, 60°, 90°, 120°, 150°, 180°, 210°, 240°, 270°, 300° and 330°

Variable Bearing

3600 digitally derived courses in 0.1° increments

Accuracy

±0.1°

LOC MODE

LOC Tone Frequency Accuracy

90 Hz	±0.02%
150 Hz	±0.02%
1020 Hz	±0.02%

MODULATION

CAL

90 and 150 Hz Tones 20% AM Each Tone

1020 Hz Audio Tone 30% AM

Accuracy ±2% Modulation

Variable

Range

0% to 35% AM (90 and 150 Hz Tones)

Accuracy

± (3% Modulation + 3% of setting) at 10 to 30% AM, Each Tone

Distortion

<2.5% in CAL Position

LOC DDM

Fixed

Range

±0, 0.093, 0.155 or 0.200 DDM and Tone Delete

Accuracy

±0.0013 DDM (±1.3 µA)

Variable

±0.4 in 0.001 DDM steps

Accuracy

±0.005 DDM (±5 µA)

Variable Sweep

(Available only in Dual and Tri-Modes)

Range

0 to 30 µA

Sweep Rates

5 to 40 sec

Step Size

5 sec

Accuracy

±0.5 sec/sweep

Phase Shift

0° to 120° in 5° increments (150 Hz phase relative to 90 Hz)

G/S MODE

Tone Frequency Accuracy

90 Hz ±0.02%

150 Hz ±0.02%

MODULATION

CAL

90 and 150 Hz Tones

40% AM , Each Tone

Accuracy

±2% Modulation

Variable

Range

0% to 45% AM (90 and 150 Hz Tones)

Accuracy

± (3% Modulation + 3% of Setting) at 10 to 40% AM, Each Tone

Distortion

<2.5% in CAL Position

G/S DDM**Fixed****Range**

±0, 0.091, 0.175 or 0.400 DDM and Tone Delete

Accuracy

±0.0024 DDM (±2.0 µA)

Variable

±0.8 DDM in 0.001 DDM steps

Accuracy

±0.01 DDM (±10.0 µA)

Phase Shift

0° to 120° in 5° increments (150 Hz phase relative to 90 Hz)

Fixed

±0, 0.091, 0.175 or 0.400 DDM and Tone Delete

Accuracy

±0.0024 DDM (±2.0 µA)

Variable

±0.8 DDM in 0.001 DDM steps

Accuracy

±0.01 DDM (±10.0 µA)

Phase Shift

0° to 120° in 5° increments (150 Hz phase relative to 90 Hz)

MARKER MODE**MARKER TONE FREQUENCY ACCURACY**

400 Hz	±0.02%
1300 Hz	±0.02%
3000 Hz	±0.02%

MODULATION**CAL****Setting**

95% AM

Accuracy

±5% Modulation

Variable

(Single Carrier Only)

Range

0% to 95% AM

Accuracy

± (3% Modulation + 3% of Setting) at 10 to 95% AM

Distortion**Single Carrier**

<2.5% in CAL Position

Tri-Mode

<5% in CAL Position

COMM MODE**COM TONE FREQUENCY ACCURACY**

1020 Hz ±0.02%

MODULATION**CAL****1020 Hz Tone**

30% AM

Accuracy

±2% Modulation

Variable**Range**

0% to 55% AM

Accuracy

± (3% Modulation + 3% of Setting) at 10 to 50% AM

Distortion

<2.5% in CAL Position

SELCAL MODE

(Provides amplitude modulation with SELCAL[SElecive CALLing] Tones)

SELCAL TONE FREQUENCY ACCURACY

± 0.02%

TRANSMIT MODES**Single**

Single Transmission

Continuous

7.5 sec interval (typical)

MODULATION**CAL****Per SELCAL Tone**

40% AM

Accuracy

±2% Modulation

Variable**Range**

0% to 55% AM

Accuracy

± (3% Modulation + 3% of Setting) at 10 to 45% AM

Distortion

<2.5% in CAL Position

EXTERNAL FREQUENCY COUNTER

FREQUENCY RANGE

ANT and RF I/O Connectors

Range

10 to 400 MHz

Resolution

100 Hz

Accuracy

Same as Time Base, ± 1 count

AUX I/O Connector

1 to 10 MHz

Resolution

1 Hz

Accuracy

Same as Time Base, ± 1 count

SENSITIVITY

ANT Connector

> -30 dBm

RF I/O Connector

> 0 dBm

AUX I/O Connector

> 1 Vp-p

POWER METER

FREQUENCY RANGE

118.0 to 400.0 MHz

POWER RANGE

0.1 to 1 W

1 to 10 W

10 to 30 W

10 to 100 W

(External Attenuator required for input power > 30 W)

Resolution**0.1 to 1 W**

0.01 W

1 to 10 W

0.1 W

10 to 30 W

1 W

10 to 100 W

1 W

Accuracy

$\pm 8\%$ of reading, ± 1 Count, CW Only (without External Attenuator)

DUTY CYCLE

≤ 20 W

Continuous

> 20 to ≤ 30 W

30 sec ON, 3 min OFF, Over Temp Warning

AM METER

Audio Range

50 to 3000 Hz

Percent Modulation Range

10 to 99%

Accuracy

$\pm 10\%$ of reading

Sensitivity**ANT Connector**

> -40 dBm

RF I/O Connector

> -15 dBm

FM METER

Audio Range

50 to 3000 Hz

Deviation Range

1 to 15 kHz

Accuracy

± 1 kHz deviation

Minimum Input Level**ANT Connector**

> -40 dBm

RF I/O Connector

> -15 dBm

SWR METER

Frequency Range

75.0 to 400.0 MHz

Accuracy

SWR $< 3:1$

± 0.3 , $\pm 10\%$ of reading

SWR $> 3:1$

± 0.3 , $\pm 20\%$ of reading

INPUTS/OUTPUTS

RF I/O CONNECTOR**Type**

Input/Output

Impedance

50 Ω Typical

Maximum Input Level

30 W, 30 sec ON, 3 min OFF

VSWR

$< 1.3:1$

ANT CONNECTOR

Type

Input/Output

Impedance

50 Ω Typical

Maximum Input Level

0.5 W

SWR CONNECTOR

Type

Output

Impedance

50 Ω Typical

Maximum Reverse Power

+25 dBm

VSWR

<1.3:1

AUX CONNECTOR

Type

Input/Output

Impedance

800 Ω Typical

Maximum Input Level

5 Vp-p Maximum, 3 Vdc Maximum

TIMEBASE

Temperature Stability

± 1 ppm

Aging

± 1 ppm per year

Accuracy

± 1 ppm when Auto Cal is performed

BATTERY

Type

Li Ion

Duration

>8 hrs continuous operation

INPUT POWER (TEST SET)

Input Range

11 to 32 Vdc

Power Consumption

55 W Maximum

16 W Nominal at 18 Vdc with Charged Battery

Fuse Requirements

5 A, 32 Vdc, Type F

INPUT POWER (EXTERNAL AC TO DC CONVERTER)

Input Range

100 to 250 VAC, 1.5 A Maximum, 47 to 63 Hz

Main Supply Voltage Fluctuations

$\leq 10\%$ of the nominal voltage

Transient Overvoltages

According to Installation Category II

ENVIRONMENTAL (TEST SET)

Use

Outdoors

Altitude

≤ 4800 meters

Operating Temperature

-20° to 55°C (Battery charging temperature range is 5° to 40°C)

Storage Temperature

-30° to 70°C (Li Ion battery must be removed when <-20°C and >60°C)

Relative Humidity

80% from 5°C to <10°C

95% from 10°C to <31°C

75% from 31°C to <40°C

45% from 40°C to 50°C

ENVIRONMENTAL (EXTERNAL AC TO DC CONVERTER)

Use

Indoors

Altitude

$\leq 3,000$ meters

Temperature

5° to 40°C

PHYSICAL CHARACTERISTICS

Dimensions:

Height

11.2 in (28.5 cm)

Width

9.1 in (23.1 cm)

Depth

2.7 in (6.9 cm)

Weight (Test Set Only)

<8 lbs. (3.6 kg)

VERSIONS AND ACCESSORIES

Ordering

Numbers	Versions
4000	IFR 4000 nav/comm ramp test set

Standard Accessories

VHF/UHF Multi-band Antenna
Customized Transit Case
Operators Guide
Operation Manual (Paper and CD)
AC/DC Power Supply
AC Line Cord
TNC (Male) to TNC (Male) Coaxial Cable
TNC Short
Spare Fuse

Optional Accessories

ACXXXX	Bench Stand
ACXXXX	Li Ion Battery
ACXXXX	4000 Maintenance Manual (Paper)
ACXXXX	4000 Maintenance Manual (CD)

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