

SD-31

Frequency Synthesizer and Coherent Detector

Description

The Model SD-31 Synthesizer-Detector is a high-output crystal signal generator of precisely known frequency combined with a sensitive, selective detector for RF bridge measurements of AM antenna impedance. Packaged in a single light-weight battery-powered unit, the SD-31 complements bridges such as the General Radio 1606, 916, and the Delta OIB-1.

A frequency synthesizer determines the generator frequency, which can be adjusted in 0.5 KHz steps by means of a front-panel switch from 100.0 KHz to 1999.5 KHz. Frequency accuracy is the same as that of the internal reference oscillator. A front panel fine-frequency control varies the frequency up to +/-0.01 percent. The generator can drive a wide range of load impedance at levels up to 20 volts RMS. It also has a variable low-level output suitable for driving a counter or for receiver frequency calibration.

The SD-31 uses for detection a coherent detector which rejects interfering signals picked up by the antenna. In this arrangement, the generator is modulated at a low frequency, and the SD-31 detector circuit responds only to a signal having that particular modulation. A sensitive and selective receiver connected to the bridge detector output is required; this can be the Model RX-31 Receiver, available as an option with the SD-31, or an external receiver such as the Potomac Model FIM-21 Field Strength Meter. The optional RX-31 Receiver is designed to work with the SD-31 and is automatically tuned to the generator frequency. The SD-31 is powered by a rechargeable battery adequate for 4-8 hours of use between charges. Battery recharging is possible while the unit is operating.



Design Features

- DESIGNED FOR ANTENNA IMPEDANCE MEASUREMENTS WITH RF BRIDGES IN THE PRESENCE OF STRONG INTERFERENCE
- HIGH-LEVEL OSCILLATOR COMPATIBLE WITH GENERAL RADIO 1888 SERIES, 818 SERIES, AND DELTA OIB-1 IMPEDANCE BRIDGES
- FREQUENCY CRYSTAL CONTROLLED, VARIABLE IN 500 Hz STEPS FROM 100.0 kHz TO 1999.5kHz
- VERSATILE - CAN BE USED AS AN RF SIGNAL GENERATOR FOR TROUBLE-SHOOTING ANTENNA SYSTEMS; AS A VARIABLE FREQUENCY OSCILLATOR FOR ANTENNA SITE SURVEY; OR OTHER APPLICATIONS REQUIRING A PRECISE FREQUENCY SOURCE
- SPECIAL COHERENT DETECTOR CIRCUIT REJECTS INTERFERING SIGNALS EXPERIENCED DURING ANTENNA MEASUREMENTS
- RECEIVER FOR DETECTOR CAN BE EXTERNAL OR OPTIONAL BUILT-IN RX-31 RECEIVER
- POWERED BY RECHARGEABLE BATTERIES
- SELF-CONTAINED PORTABLE PACKAGE



Potomac Instruments, inc.

932 Philadelphia Ave./ Silver Spring, MD 20910-4912 / Voice: 1 301.589.2662 / Fax: 1 301.589.2665 / web: www.pi-usa.com



1 OUTPUTS

VAR Output and Control – varies output level at VAR connector for low level applications
 LO Z – high level output for connection to bridge for Z_L less than 180 ohms.
 HI Z – high level output for connection to bridge for Z_L greater than 180 ohms

2 METER FUNCTION SWITCH

BATT – indicates charge level of battery supply.
 LOCK – provides positive indication that output frequency is locked to crystal reference oscillator frequency.
 OUTPUT – indicates relative output of power amplifier.
 NULL SLOW – provides highly damped indication of coherent detector output.
 NULL FAST – provides undamped indication of coherent detector output.

3 AM SWITCH

Selects internal (INT) or external (EXT) Amplitude Modulation of RF output.

4 DET GAIN

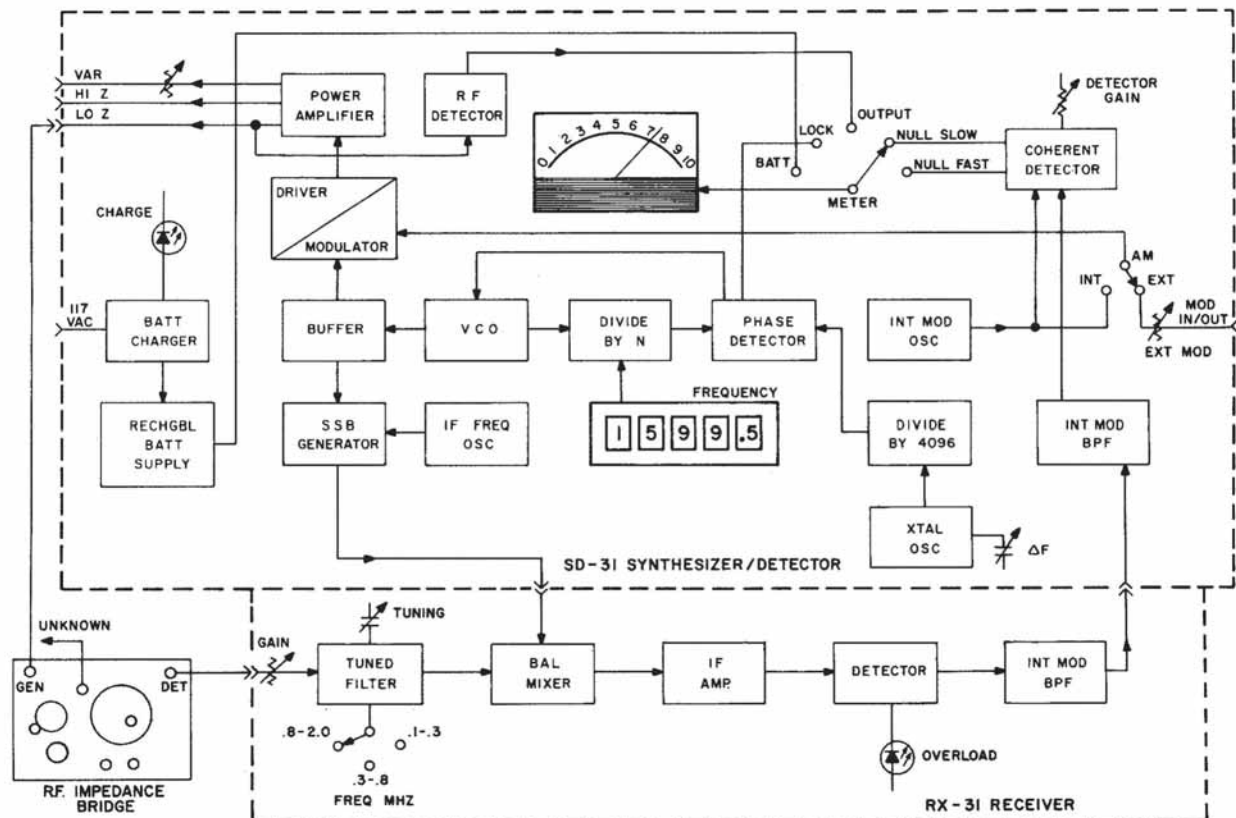
Adjusts gain (sensitivity) of coherent detector.

5 FREQ 100.0 - 1999.5 KHz

Sets synthesizer output frequency within indicated range with separate thumb wheel switches for each digit.

6 ΔF CONTROL

Enables operator to vary synthesizer output frequency slightly above or slightly below the nominal value.



Specifications

FREQUENCY	100.00 -1999.5 kHz switch selected, 500 Hz steps
FREQUENCY ACCURACY	±.005, +200°F to +1000°F
FREQUENCY VERNIER (AF) ADJUSTMENT RANGE	±.01% of frequency approximately
OUTPUT LEVELS	HI Z: 20 V RMS with 1000 ohm load (use for $Z_L > 180$ ohms) } minimum levels with LOZ: 8 V RMS with 50 ohm load (use for $Z_L < 180$ ohms) } fully charged battery VAR: 100 mV RMS approximately with 50 ohm load
AM MODULATION	Internal: 40 Hz (approximately) square wave External: 1.0 mV max. required to produce 50% modulation, 300 Hz - 3 kHz. Input impedance, 1 Megohm
DETECTOR INPUT REQUIREMENT (From External Receiver)	1 V RMS approximately across 100 K ohms for 100% modulation of receiver RF input at 40 Hz.
METERING (Switch Selected)	Battery voltage Phase loop locking Output monitor Detector null, fast or slow response
AC POWER INPUT	105-130 VAC, 50-60 Hz, 15 VA (when charging)
DIMENSIONS	Height - 9½ inches Width -11½ inches Depth - 6½ inches
WEIGHT	12 lbs.
BATTERY OPERATION TIME	8 hours approximately after full charge depending on frequency and load.
BATTERY RECHARGE TIME	16 hours (unit not in operation)

Specifications subject to change without notice.

RX-31 Receiver Option



The RX-31 is designed specifically as an RF interface between an impedance bridge and the SD-31 Coherent Detector. Conveniently mounted in the protective cover of the SD-31, the RX-31 is a single conversion super heterodyne receiver which derives its local oscillator signal and power supply voltage from the SD-31. Receiver circuitry is packaged in an aperture-free, drawn aluminum enclosure which provides excellent RF shielding. IF selectivity is provided by active bandpass filters which limit receiver bandwidth to 100 Hz.

① RF FILTER

Manually tuned in 3 bands: 0.1-0.3 MHz
0.3-0.8 MHz
0.8-2.0 MHz

② GAIN CONTROL

Manual with overload indicator.

③ BRIDGE INPUT

100 kHz-1.9995 MHz, automatically set by SD-31.



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