

A NEW APPROACH

The Model 430A Solid State Sweeper represents a new generation of broadband microwave sweepers with innovative features and excellent performance. Weinschel Engineering — with over 25 years experience in designing and manufacturing microwave instruments and components — acquired a highly respected sweeper design and supporting expertise when it entered the sweeper field. Weinschel Engineering felt that significant improvements could be made to sweeper designs, and therefore embarked on an entirely new approach to produce the most advanced microwave sweeper available. The results were the Model 430A Broadband Sweeper and the Model 4310A/K Multiband Sweeper System.

Weinschel Engineering pioneered special features in the Model 430A Solid State Sweepers — automatic compensation for sweep delay of YIG tuned RF sources; an automatic tuning supply bandwidth control circuit; a single knob output power control with automatic adjustment of the leveling loop gain; and an external detector auto-polarity circuit for the RF power leveling loop.

These features have found wide acceptance in the industry, and other sweeper manufacturers have followed the Weinschel Engineering leadership.



FEATURES

- BROADBAND RF UNITS PROVIDE COMPLETE FREQUENCY COVERAGE IN 5 BANDS FROM 0.01 TO 18 GHz
- SOLID STATE PLUG-IN RF UNITS AND MAINFRAME
- RF UNITS AVAILABLE IN THREE RF POWER RANGES:
 - LOW POWER — LOW COST/PERFORMANCE
 - HIGH POWER — 10 mW MINIMUM LEVELED TO 18 GHz
 - SUPER POWER — LEVELED RF COMPARABLE TO BWO TUBE SWEEPERS
- 0.5% FREQUENCY ACCURACY AT SWEEP SPEEDS UP TO 10 MILLISEC
- NUMEROUS SWEEPING MODES —
 - REPETITIVE CW
 - SYMMETRICAL REMOTE CONTROL
- SYMMETRICAL SWEEPING FROM 0 TO 100% OF BAND AT CALIBRATED SETTING OR WITH CONTINUOUS CONTROL
- INTERNAL LEVELING AVAILABLE OVER ALL FREQUENCY RANGES
- REMOTE DIGITAL FREQUENCY AND ANALOG AMPLITUDE PROGRAMMING OPTION
- RF ON/OFF SWITCH AT OUTPUT FOR ABSOLUTE ZERO RF POWER WHEN NEEDED
- UNIQUE AUTOMATIC FUNCTIONS
 - YIG LAG COMPENSATION NETWORK AUTOMATICALLY MAINTAINS FREQUENCY ACCURACY AT HIGHEST SWEEP SPEED
 - LOW RESIDUAL FM MAINTAINED AT ALL SWEEP SPEEDS
 - CONSTANT LEVELED RF OUTPUT REGARDLESS OF SWEEP SPEED
- SINGLE KNOB RF POWER LEVEL CONTROL, AUTOMATIC ADJUSTMENT OF LEVELING LOOP GAIN
- INPUT POLARITY FOR EXTERNAL LEVELING SELECTED AUTOMATICALLY
- SAME UNITS USED IN MULTIBAND SYSTEM FOR PART OR ALL OF 0.01 TO 12.4 GHz RANGE
- CONTINUOUS RF LEVEL CONTROL COVERING 103 dB RANGE WITH MANUAL STEP ATTENUATOR OPTION

A NEW SWEEPER

DESCRIPTION

The Model 430A Microwave Sweeper with its plug-in versatility and wide choice of plug-in RF Units is suitable for most any test or measurement application requiring swept frequencies over the 0.01 to 18 GHz range.

The plug-in RF Units for the Model 430A are available in three basic series — standard units offering low RF power at a low price; high power units providing at least 10 mW leveled power over all bands to 18 GHz; and super-power units which produce RF power comparable to that previously available only from backward-wave-oscillator sweepers. This newest series of RF Units is described on page 10.

This Sweeper is a compact and lightweight instrument which uses all solid state components, including the oscillator source. Its portability makes it convenient for field applications.

Performance features of the Model 430A are superior frequency accuracy even at the highest sweep rate, high FM rates for RF phase lock applications, symmetrical sweep widths of 0 to 100% of the band, and automatic operations which are manually performed on competitive sweepers.

A complete Model 430A Sweeper System consists of the Mainframe and a single Model 430A series RF Unit. The RF Units, which contain all frequency related circuits, cover in five continuous bands the entire 0.01 to 18 GHz range. Units covering bands 1 to 2 and 1.7 to 4.3 GHz are also available. External leveling capability is standard on all RF Units. Those RF Units covering the 0.01 to 2 GHz frequency range are supplied with internal leveling capability as a standard feature. Internal leveling is available on all other RF Units as an option. In addition, all RF Units are available with a combination of internal leveling and a 0 - 90 dB Precision Step Attenuator for applications requiring control of the RF output power over a large dynamic range.

Each RF Unit is furnished with a high-resolution, 14-inch frequency scale which easily and accurately attaches to the Mainframe whenever that RF Unit is installed.

The Model 430A Sweeper is compatible with all Weinschel measuring instruments and systems.

VERSATILITY

The front panel plug-in arrangement of the Model 430A Sweeper permits maximum freedom in configuring the frequency range and performance best suited to any application. Using the same mainframe, a plug-in RF Unit can be quickly interchanged for another RF Unit having a different frequency range, that provides manual attenuation control of its RF output, or that has a higher output RF power capability.

AUTOMATIC YIG LAG COMPENSATION

The Weinschel Model 430A sweeper has a YIG lag compensation circuit which generates a correction signal for an inherent "sweep delay". This delay shows up as a right shift on the oscilloscope display with increased sweep speeds. This YIG lag compensation circuit allows the Model

430A to maintain its frequency accuracy of 0.5% at the highest sweep rate, 10 msec/sweep, as well as at fixed frequencies. This performance was not possible with prior competitive sweepers.

All YIG tuned RF sources have a "sweep delay" characteristic which alters the dynamic relationship between tuning current and magnetic field by permitting the flow of eddy currents in the pole pieces of the RF circuit. Consequently, when using YIG tuned sources in sweepers, a severe degradation in frequency accuracy occurs normally as sweep speed increases. This degradation is most noticeable at faster sweep speeds.

AUTOMATIC TUNING SUPPLY BANDWIDTH CONTROL

RF Units used in the Weinschel Sweeper have a circuit which monitors the input signal to the tuning supply and automatically sets the supply bandwidth to provide the lowest Peak Residual FM, while still providing the proper relationship between input and output.

The tuning supply of an RF Unit generates the proper tuning current for YIG sources, or the proper tuning voltage for varactor sources, as a function of an input voltage that can be DC or a very rapidly changing sawtooth waveform. The tuning supply must have a bandwidth wide enough to maintain the correct input/output relationship for all input frequencies.

However, like in a high fidelity amplifier, the noise at the output of the tuning supply is directly related to the bandwidth, and this noise, to a large degree, determines the Peak Residual FM on the RF output.

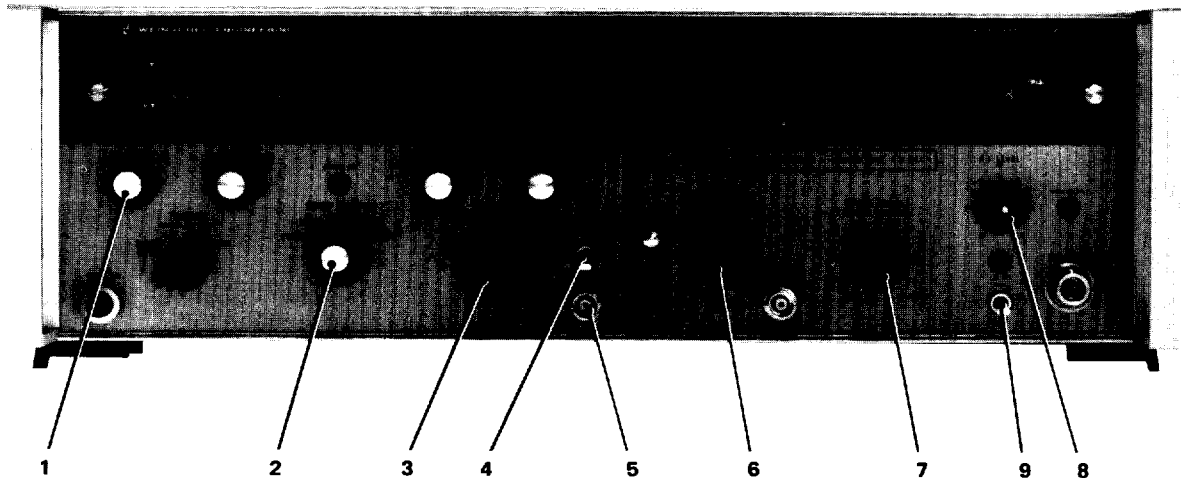
Until the Model 430A series, all microwave sweepers had some form of a two position, manually controlled bandwidth switch. This allowed an inexperienced operator to incorrectly set the switch to the narrow band position while sweeping at normal sweep speeds causing the system to malfunction.

EXTERNAL DETECTOR AUTO-POLARITY

The Model 430A is the first sweeper to use an automatic detector polarity control circuit in its RF power leveling loop system. This circuit eliminates operator oversight of the detecting crystal or meter polarity and performs the selection function automatically.

Most microwave sweep oscillators have provisions for leveling the RF output power with an external directional coupler and a crystal detector, or a power meter, in a closed loop feedback circuit to provide leveled power and good equivalent source VSWR directly at the test port. Since both positive and negative output crystal detectors and power meters are commonly available, a polarity switch is essential in this type of system to select the proper feedback phase to maintain loop stability. Microwave sweepers prior to the Model 430A had a manual polarity switch for selecting the proper phase. This switch, if improperly set, renders the leveling circuit inoperative and causes symptoms usually associated with other system problems.

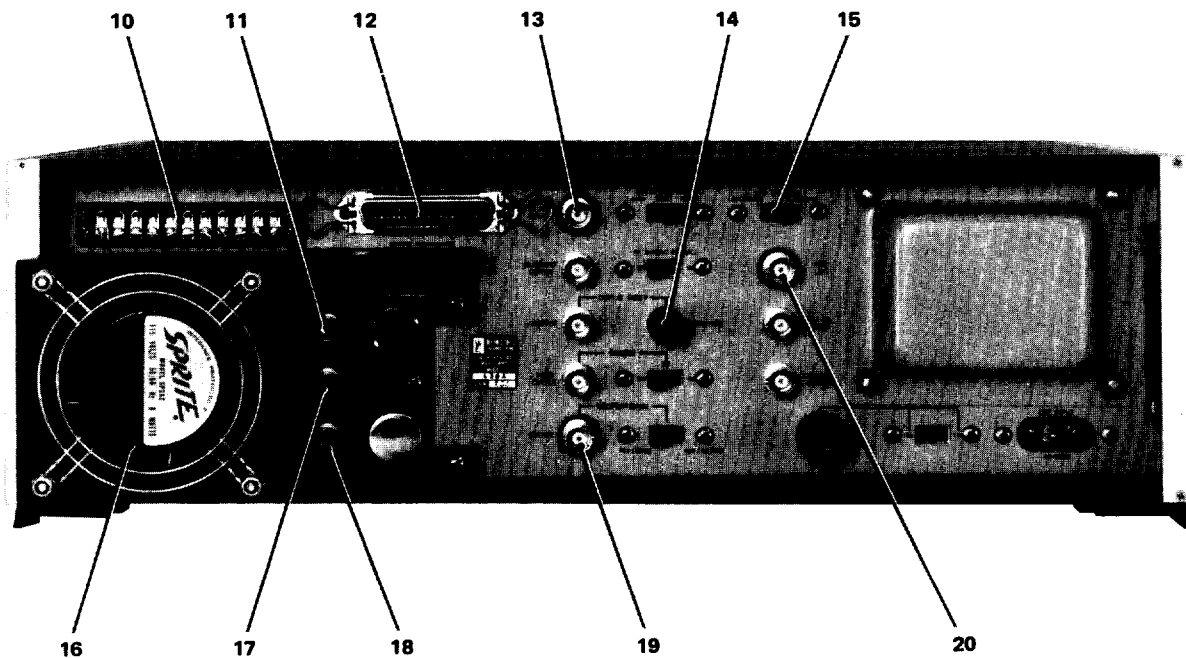
FRONT FUNCTIONS



- 1 **F1-F2 AND M1-M2 CONTROLS**, in F1-F2 sweep mode, set lower and upper limits of swept frequency band and selection of lower and upper frequency markers, respectively. In M1-M2 sweep mode, these controls reverse functions.
- 2 **SWEEP FUNCTION** selects any one of three sweep modes, a CW mode, or an external sweep mode.
- 3 **SWEEP TIME CONTROL** selects sweep speed of swept frequency band. Four calibrated speeds from 10 msec/sweep to 100 sec/sweep and a vernier are provided.
- 4 **INTERNAL 1 kHz SQUARE WAVE** provides internal square wave modulation on the RF output; frequency adjustable from 950 to 1050 Hz.
- 5 **SWEEP OUTPUT** connector provides a linear ramp voltage concurrently with the RF sweep output for driving the horizontal axis of oscilloscopes or recorders. This X-axis signal remains independent of sweep width and rate.
- 6 **LEVELER MODE** pushbuttons permit selecting un-leveled, externally leveled, or internally leveled (optional) RF output power. RF Units with internal leveled output contain directional coupler and detector.
- 7 **SYMMETRICAL SWEEP WIDTH** (each RF Unit) selects one of nine calibrated sweep widths directly in MHz or GHz, from 0.25% to 100% of band. A vernier provides continuously variable control from 0% to 100% of band.
- 8 **RF POWER LEVEL CONTROL** sets the output power, in either the leveled or unleveled mode, for the entire band. A lamp indicates when RF power is unleveled.
- 9 **RF ON/OFF** switch (each RF Unit) disables the RF source of the plug-in unit in the off position, thus providing zero RF output power. An RF ON lamp indicates when the unit is supplying RF output power.

REAR FUNCTIONS

- 10 **REMOTE ANALOG FREQUENCY PROGRAMMING** can be achieved through this terminal strip by either a remote 1K ohm potentiometer or analog voltage.
- 11 **AM INPUT** connector for amplitude modulation or remote analog RF power level programming.
- 12 **REMOTE PROGRAMMING** connector accepts remote digital inputs for frequency programming that provides 1000 point frequency resolution per band. See Option 01.
- 13 **EXTERNAL SWEEP INPUT** accepts an externally generated analog voltage between 0 and +10 volts. The M1 control, when in the EXT/M1 mode, provides a convenient input offset control.
- 14 **SWEEP DISPLAY AMPLITUDE CONTROL** allows horizontal sweep signal amplitude to be adjusted to meet any oscilloscope or X-Y recorder requirement.
- 15 **FREQUENCY MARKERS** in the symmetrical sweep mode can be either calibrated or relative to the sweep width. The width of the relative marker is maintained proportional to whatever sweep width is selected. These markers are sharp, bright markers ideal for very narrow band sweeping.
- 16 **COOLING SYSTEM** (each RF Unit) draws internally generated heat to a large finned heat sink on the rear of the RF Unit, where it is dissipated by the use of a small fan forcing air through the fins of the sink. No air or dust is forced through the inside of any RF Unit.
- 17 **FM INPUT** connector (each RF Unit) permits frequency modulation or phase locking signals to be applied to the system.
- 18 **PULSE INPUT** connector accepts DTL or TTL levels for high speed pulse modulation; less than 50 nsec rise and fall time. See Option 03.
- 19 **PROPORTIONAL OUTPUT** connector provides a direct coupled voltage proportional to instantaneous frequency, either 0 to +10 volts per band operation or 40 volts per octave.
- 20 **PEN LIFT** connector provides a signal just prior to the start of the sweep output to control the pen of the X-Y recorder. This signal ends at the completion of the sweep.



EXTRA PERFORMANCE

SINGLE LEVEL CONTROL WITH AUTOMATIC LOOP GAIN ADJUSTMENT

Closed loop power leveling circuits must maintain a high loop gain at all power level settings and frequencies within the required bandwidth for optimum leveler performance. However, if the loop gain is too high, the loop will oscillate; if the loop gain is too low, leveling will not occur.

A non-linearized power leveling loop has a typical gain variation of greater than 100:1 from maximum to minimum power level settings. Thus, it was necessary to use the panel Gain Control to optimize the leveling each time the RF power level was changed.

The Model 430A sweeper is the first with a power leveling circuit to employ piece-wise linear approximation to maintain automatically an optimum loop gain for any power level within the dynamic range of the leveler. This eliminates the need for manual gain readjustment each time the output power level is changed.

A gain adjustment is provided, however, on the front panel for matching a particular power meter to the System in the external power meter leveling mode. This gain control is only in the circuit when using a power meter and is adjusted only once for a particular meter.

RF OUTPUT POWER

A significant feature of the Model 430A Sweeper is its wide choice of RF output power levels available through its series of RF Units. The three basic series are:

- Standard Units - minimum leveled RF output power ranges from 15 mW at 1 GHz to 4 mW at 18 GHz.
- High Power Units - minimum leveled RF output power is 10 mW to 18 GHz.
- Super Power Units - minimum leveled RF output power ranges from 30 mW at 1 GHz to 20 mW at 18 GHz.

The Standard and High Power Units are described on page 8. Details on the Super Power RF Units are on page 10.

MAINTAINABILITY

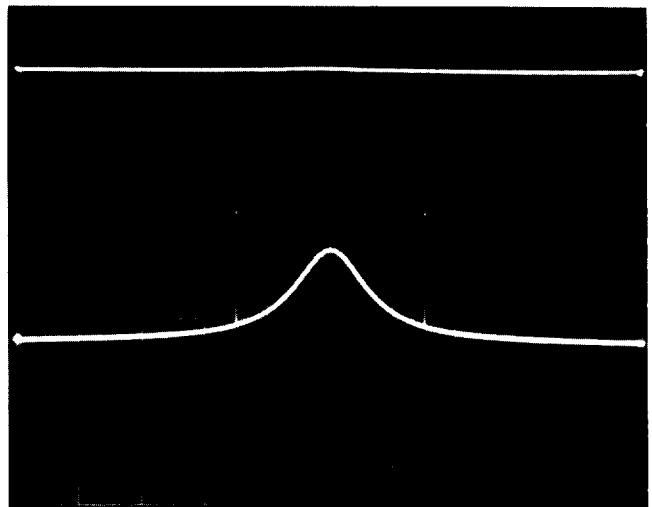
Maintenance and service were given careful consideration during the design and development of the Model 430A Sweeper. Solid state components, modular construction, plug-in printed circuit cards, and conveniently located PC board test points are but a few of these considerations. For ease of calibration, the complete calibration procedure is provided on the inside of the top cover of the Mainframe and of each RF Unit.



*Calibration Procedure
inside Top Cover*

SYMMETRICAL FREQUENCY MARKERS

The frequency markers in the symmetrical sweep mode can be either calibrated or relative to the sweep width. The width of the relative marker is maintained proportional to whichever sweep width is selected. The relative marker mode is normally selected when sharp, bright markers are desired for very narrow band sweeping.



*RF output display shows total sweep width of 5MHz with
markers 750kHz to either side of 3 GHz center frequency.*

DIGITAL FREQUENCY PROGRAMMING

The Mainframe of the Model 430A Microwave Sweeper is available with an option for digital frequency programming. Option 01 provides, through a rear panel connector, remote digital frequency programming with 1000 point resolution. Inputs are 12 Lines for 3 digit BDC (positive or negative logic depending upon jumper position), 1 Line for remote enable, and 1 Line for strobe input which permits storing one 12-bit word in memory.

MAINFRAME

MODEL 430A WITH ANY RF UNIT

SPECIFICATIONS

FREQUENCY

Range: Determined by RF unit installed.
Accuracy: Refer to RF unit specifications.
Linearity: Same as Accuracy of RF unit.
Stability: Determined by RF unit installed.

SWEEP FUNCTIONS

Sweep End Limits: Any two frequencies in band set by F1 and F2 controls. Sweeps in either direction from F1 to F2.

Marker End Limits: Any two frequencies in entire band set by M1 and M2 controls.

Symmetrical Sweep: Center frequency set by either M1 control or an external 10 k-ohm potentiometer. Sweep width adjustable from 0 to 100% of entire band with continuous, uncalibrated control or in nine discrete widths calibrated directly in MHz or GHz, from about 0.25% to 100% of band. Width accuracy is $\pm 3\%$ of sweep width.

External: Direct coupled 10 V for full sweep; positive voltage increases output frequency. Response time: 1 msec for full sweep. Provision for external resistance programming. Input impedance 5 k-ohms.

CW Operation: Continuously variable single frequency controlled by position of M1 marker. Externally controllable with either 10 K-ohm potentiometer or an analog voltage between 0 and +10 volts.

MARKERS

Two independent, adjustable calibrated markers displayed either as dips in RF output or externally as video markers. Constant proportion width marker selectable for sharp, bright marking in narrow-width symmetrical displays.

Accuracy: Same as RF unit frequency accuracy.

Resolution: Better than 0.05% of RF unit bandwidth.

Amplitude: Continuously variable.

Output: Auxiliary video marker; amplitude -5 V. Output impedance 5 K-ohms.

TRIGGERED SWEEP MODES

Automatic: Sweep recurs automatically.

Line: Line frequency triggers sweep.

External: -10 V input initiates sweep.

Single Sweep: Front panel momentary switch starts sweep.

SWEEP RATES

Automatic: Four decade ranges continuously adjustable from 0.01 sec/sweep to 100 sec/sweep. Vernier has 10 to 1 range.

Manual: Three-quarter-turn control for sweep between limits set in either end-limit or symmetrical sweep modes.

Sweep Dwell Time: Delay at start to allow RF power level to stabilize. Also, delayed at end of sweep.

SWEEP OUTPUT

Direct-coupled, constant amplitude sawtooth adjustable from 0 to +10 V peak, concurrent with swept RF output. Sweep lamp lights only during forward sweep.

PROPORTIONAL OUTPUT

Switchable between:

a. Direct-coupled voltage proportional to instantaneous frequency. 0 V at low end and 10 V at high end of band.

b. Direct coupled voltage proportional to instantaneous frequency. 0 V at low end and 40 V/octave at high end of band.

BLANKING

Operation: RF automatically off during retrace to provide base line except when disabled with rear panel switch.

Output: Direct-coupled-5 V pulse; impedance 5 K-ohms.

PEN LIFT OUTPUT

Relay contact closure during forward-trace portion of sweep.

RF OUTPUT

Leveling: With internal leveling, power variation is as indicated for RF unit. With an external directional coupler and detector, the internal feedback amplifier maintains output power variation to within ± 0.05 dB, plus coupler and detector variation. Provision for power meter leveling from + or - meter output. Leveling input impedance is 1K ohms.

Amplitude: RF level controlled from front panel or with external 10 K-ohm potentiometer or an analog input voltage.

RF Level On/Off: Front panel switch permits complete RF cut off. Rear panel binary input permits remote control.

MODULATION

Amplitude Modulation:

Internal: Square wave adjustable from 950 to 1050 Hz with rise time of 10 μ sec maximum. On/off ratio greater than 40 dB.

External: +10 V signal increases RF output to rated level (with RF level control set at minimum). Rise and fall time 1.0 μ sec unlevelled and 2 μ sec levelled. Source impedance, 10 K-ohms.

Frequency Modulation: Direct-coupled wide-band FM input with maximum deviation rate determined by RF unit.

Pulse: Direct-coupled pulse input on rear panel is provided for submicrosecond pulse rise time.

SPURIOUS SIGNALS

See Specifications of Individual RF Unit to be used in Mainframe.

GENERAL

Dimensions: 5-5/8 in. (14.3 cm) high, 16-3/4 in. (42.5 cm) wide, 12-3/4 in. (32.4 cm) deep.

Weight (Mainframe only): Net 25 lbs. (11.4 kg) approx.

Power Input: 115/230 V $\pm 10\%$, 48 - 420 Hz, approximately 100 VA.

Price (Mainframe only): \$1450

OPTION - 01

Digital Remote Frequency Programming

Frequency Resolution: 1000 points (12-line, 3 digit BCD input).

Memory Storage: Any one digital word (frequency) on 12-line input.

RF Enable: 1-line binary for on/off control (standard feature).

Logic: +5 V logic or remote contact closure.

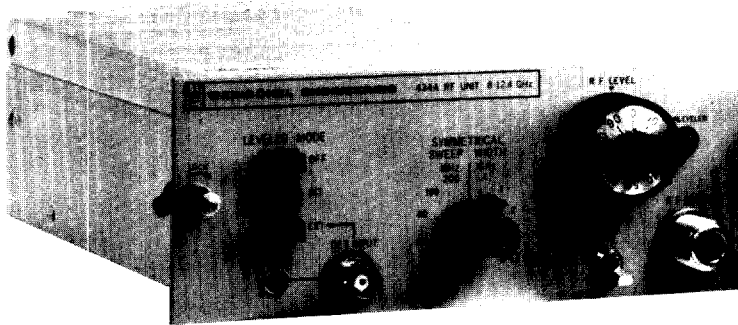
Price: Add \$475

STANDARD AND HIGH POWER RF UNITS

INSTALLED IN MAINFRAME

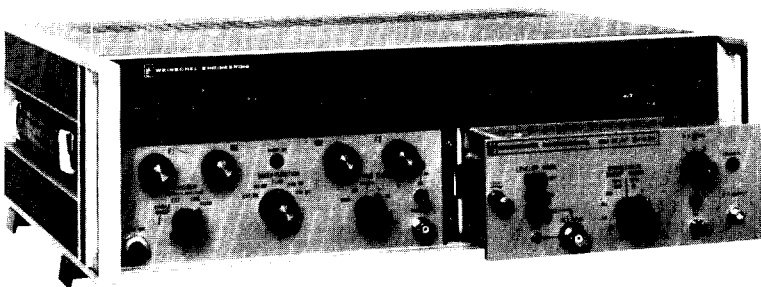
There are three basic series of plug-in RF Units for the Model 430A Mainframe - the Series 430A, 430A-H, and 430AP. The only difference in the three Series of RF Units is the choice of RF output power. Each RF Unit contains a frequency source, its regulated supply, leveling circuits and an optional precision step attenuator providing a 103 dB attenuation range. The frequency sources are either YIG-tuned transistor or gunn diodes or varactor tuned oscillators.

The series of RF Units for the Model 430A cover continuously the 0.01 to 18 GHz range in 5 units.



Octave Band RF Unit Plug-In with Option -B.

The Model 430A series of RF Units have only an external leveling capability. The Model 430A-1 series of RF Units can be leveled internally or externally. Both the Model 430A and 430A-1 series of RF Units have in the RF line an internal PIN diode modulator. Other options available on these RF Units are listed below.



Easy Front Panel Plug-In Exchangeability

RF UNIT OPTIONS

- 1 Internal leveling, includes coupler and detector.
- B Includes 0 - 90 dB manual step attenuator with 13 dB vernier and internal leveling. Attenuator calibrated in 10 dB steps. Total attenuation range is 103 dB.
- H High power output - at least 10 mW across full band. 4.0 to 18 GHz range only.
- R Rear panel RF output connector.
- 03 High speed pulse modulation - less than 50 nsec rise and fall time (1 - 18 GHz). +5 volt input turns on RF and 0 volts turns off RF. DTL and TTL logic compatible.

MODEL NO.
FREQUENCY Range: Accuracy (at 25°C) ¹ (all modes): Linearity ² (as % of Sweep Width): Peak Residual FM: Stability: With Temperature: With 10% Change in Line Voltage: With Full Range (40 dB) Change in Power Level: With 3:1 Load VSWR (All Phases):
RF OUTPUT SIGNAL Minimum Leveled Power (at 25°C) Standard: High Power (Option H): Leveled Power Control Range: Power Variation Internal Leveling: External Leveling ⁴ : Spurious Signal Rejection: Harmonics: Non-Harmonics: Residual AM: Output Connector Type:
MODULATION AM Input: Leveled Mode (Linear): Rise and Fall Time: Frequency Response: Modulation Sensitivity ⁸ : On/Off Ratio: FM Input or Phase Lock: ±2 dB Frequency Response: For ±20 MHz Deviation: For 100% of Band: Modulation Sensitivity (Nominal): Pulse Input ⁹ : Rise/Fall Time:
WEIGHT
PRICES Externally Leveled: Internally Leveled (Option - 1): Internally Leveled with 0 - 90 dB Manual Stepattenuator (Option B) Add: High Power Output (Option H) Add: Rear Panel Output (Option R) Add: High Speed Pulse Modulation, < 50 nsec (Option 03) Add:

NOTES

1. After 10 minutes warmup.
2. For Sweep Widths > 1% of Band.
3. Higher Power Units Available: Contact Factory.
4. Excluding External Directional Detector Variations.
5. At output power levels < 15 mW.

SPECIFICATIONS

431A-1	432A	433A	434A	435A	438A-1	442A
1.0-2.0 GHz	2.0-4.0 GHz	4.0-8.0 GHz	8.0-12.4 GHz	12.4-18.0 GHz	0.01-2.0 GHz	1.7-4.2 GHz
±0.5%	±0.5%	±0.5% ±1% for 433A-H	±0.5%	±0.5%	0.01-1 GHz: ±10 MHz 1-2 GHz: ±0.5% 0.01-2 GHz: ±10 MHz ±1%	±0.5%
±0.5%	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%
< 5 kHz	< 7 kHz	< 10 kHz	< 12 kHz	< 25 kHz	< 5 kHz	< 7 kHz
< 200 kHz/°C < 10 kHz < 1 MHz < ±0.1%	< 400 kHz/°C < 20 kHz < 1 MHz < ±0.1%	< 500 kHz/°C < 3 MHz/°C with Option H < 30 kHz < 1 MHz < 5 MHz with Option H < ±0.1% < ±0.5% with Option H	< 1.4 MHz/°C < 40 kHz < 1 MHz < ±0.05%	< 3 MHz/°C < 60 kHz < 2 MHz < ±0.05%	< 200 kHz/°C < 10 kHz < 1 MHz < ±0.1%	< 400 kHz/°C < 20 kHz < 1 MHz < ±0.1%
15mW ³ -	15mW ³ -	5mW ³ 10mW ³	6mW ³ 10mW ³	4mW ³ 10mW ³	15mW ³ -	15mW ³ -
> 15 dB	> 15 dB	> 15 dB	> 15 dB	> 15 dB	> 15 dB	> 15 dB
±0.5 dB ±0.1 dB	±0.5 dB ±0.1 dB	±0.5 dB ±0.1 dB	±0.7 dB ±0.1 dB	±1 dB ±0.1 dB	±0.5 dB ±0.1 dB	±0.5 dB ±0.1 dB
> 20 dB > 60 dB	> 20 dB > 60 dB	> 18 dB > 20 dB with Option H > 60 dB	> 30 dB > 60 dB	> 30 dB > 60 dB	0.01-1 GHz: > 20 dB ⁵ 1-2 GHz: > 20 dB 0.01-1 GHz: > 40 dB ⁶ 1-2 GHz: > 60 dB	> 20 dB > 60 dB
> 50 dB	> 50 dB	> 50 dB	> 50 dB	> 50 dB	> 50 dB	> 50 dB
N female	N female	N female	N female	WPM ⁷ female	N female	N female
< 2.3 μsec > 150 kHz ≈ 2 dB/volt > 40 dB	< 2.3 μsec > 150 kHz ≈ 2 dB/volt > 40 dB	< 2.3 μsec > 150 kHz ≈ 2 dB/volt > 40 dB	< 2.3 μsec > 150 kHz ≈ 2 dB/volt > 40 dB	< 2.3 μsec > 150 kHz ≈ 2 dB/volt > 40 dB	< 2.3 μsec > 150 kHz ≈ 2 dB/volt > 40 dB	< 2.3 μsec > 150 kHz ≈ 2 dB/volt > 40 dB
DC-100 kHz DC-1 kHz 10 MHz/volt	DC-100 kHz DC-1 kHz 20 MHz/volt	DC-100 kHz DC-1 kHz 40 MHz/volt	DC-100 kHz DC-1 kHz 44 MHz/volt	DC-100 kHz DC-1 kHz 56 MHz/volt	DC-100 kHz DC-1 kHz 10 MHz/volt	DC-100 kHz DC-1 kHz 20 MHz/volt
< 50 nsec	< 50 nsec	< 50 nsec	< 50 nsec	< 50 nsec	Not Applicable	< 50 nsec
7 lbs. (3.2kg)	7 lbs. (3.2kg)	7 lbs. (3.2kg)	7 lbs. (3.2kg)	7 lbs. (3.2kg)	7 lbs. (3.2kg)	7 lbs. (3.2kg)
Not Applicable	\$ 1950	\$ 2700	\$ 2025	\$ 2695	Not Applicable	\$ 2150
\$ 1950	\$ 2225	\$ 3000	\$ 2525	\$ 3145	\$ 2750	\$ 2425
\$ 500	\$ 725	\$ 825	\$ 1100	\$ 1100	\$ 500	\$ 775
Not Applicable	Not Applicable	\$ 200	\$ 300	\$ 400	Not Applicable	Not Applicable
\$ 75	\$ 75	\$ 75	\$ 75	\$ 75	\$ 75	\$ 75
\$ 375	\$ 375	\$375	\$375	\$375	Not Applicable	\$ 375

6. > 25 dB from 10 MHz to 150 MHz.

7. Mates with SMA.

8. Positive going Signal increases RF Output Power.

9. RF Unit must have 03 Option.

Specifications and prices subject to change without notice.

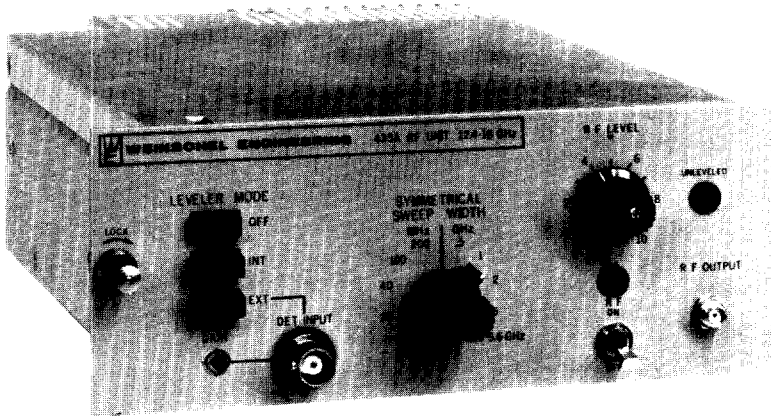
SUPER POWER SPECIFICATIONS 

SUPER POWER RF UNITS INSTALLED IN MAINFRAME

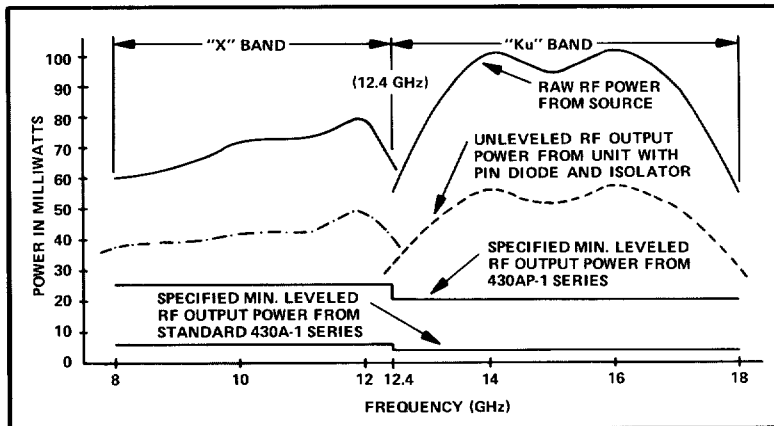
Many swept frequency applications requiring high leveled power available previously only from BWO sweepers can now be handled with a standard Model 430A Solid State Mainframe and the Model 430AP Series Super Power RF Units.

BWO sweepers featuring grid leveling still offer more power at microwave frequencies but cannot be used where high measurement accuracy and frequency stability are required because of their high frequency pulling.

The Model 430AP is a series of plug-in RF Units for this sweeper. They are completely solid state and yet the leveled RF output power from these RF Units is comparable to the leveled power available from diode leveled BWO tube sweepers.



Super Power RF Unit



Output power performance of Super Power X and Ku band solid state RF Units.

The complete line of Model 430AP RF Units provides low equivalent source VSWR and flat power output due to careful design of the internal directional coupler and the wideband leveling loop even for the fastest sweep speeds. The YIG-lag compensation circuit common to the Standard and High Power RF Units is included in this series to achieve the same high frequency accuracy, independent of sweep speed. All the other features of the Standard and High Power Units are also included in Model 430AP RF Units. They fit the same Mainframe.

All options available on the Standard RF Units except Option H are available on these Super Power RF Units.

MODEL NO.
FREQUENCY Range: Accuracy (at 25°C) ¹ (all modes):
Linearity² (as % of Sweep Width): Peak Residual FM: Stability: With Temperature: With 10% Change in Line Voltage: With Full Range (40 dB) Change in Power Level: With 3:1 Load VSWR (All Phases):
RF OUTPUT SIGNAL Minimum Leveled Power (at 25°C): Minimum Unleveled Power (at 25°C): Leveled Power Control Range: Power Variation Internal Leveling: External Leveling ³ : Spurious Signal Rejection: Harmonics: Non-Harmonics: Residual AM: Output Connector Type:
MODULATION AM Input: Leveled Mode (Linear): Rise and Fall Time: Frequency Response: Modulation Sensitivity⁵: On/Off Ratio: FM Input or Phase Lock: ±2 dB Frequency Response: For ±20 MHz Deviation: For 100% of Band: Modulation Sensitivity (Nominal): Pulse Input⁶: Rise/Fall Time:
WEIGHT
PRICES Externally Leveled: Internally Leveled (Option - 1): Internally Leveled with 0 - 90 dB Manual Stepattenuator (Option B) Add: Rear Panel Output (Option R) Add: High Speed Pulse Modulation, < 50 nsec (Option 03) Add:

NOTES:

1. After 10 minutes warmup.
2. For Sweep Widths > 1% of Band.
3. Excluding External Directional Detector Variations.
4. Mates with SMA.

SPECIFICATIONS

438AP-1	431AP-1	432AP	433AP	434AP	435AP
0.01-2.0 GHz	1.0-2.0 GHz	2.0-4.0 GHz	4.0-8.0 GHz	8.0-12.4 GHz	12.4-18.0 GHz
0.01-1 GHz: ± 10 MHz 1-2 GHz: $\pm 0.5\%$ 0.01-2 GHz: ± 10 MHz $\pm 1\%$	$\pm 0.5\%$	$\pm 0.5\%$	$\pm 1\%$	$\pm 0.5\%$	$\pm 0.5\%$
$\pm 0.5\%$	$\pm 0.5\%$	$\pm 0.5\%$	$\pm 1\%$	$\pm 0.5\%$	$\pm 0.5\%$
< 5 kHz	< 5 kHz	< 7 kHz	< 10 kHz	< 12 kHz	< 25 kHz
< 200 kHz/ $^{\circ}$ C < 10 kHz < 1 MHz < $\pm 0.1\%$	< 200 kHz/ $^{\circ}$ C < 10 kHz < 1 MHz < $\pm 0.1\%$	< 400 kHz/ $^{\circ}$ C < 20 kHz < 1 MHz < $\pm 0.1\%$	< 3 MHz/ $^{\circ}$ C < 30 kHz < 5 MHz < $\pm 0.5\%$	< 1.4 MHz/ $^{\circ}$ C < 40 kHz < 1 MHz < $\pm 0.05\%$	< 3 MHz/ $^{\circ}$ C < 60 kHz < 2 MHz < $\pm 0.05\%$
20 mW	30mW	30mW	30mW	25mW	20mW
-	-	38mW	40mW	30mW	27mW
> 15 dB	> 15 dB	> 15 dB	> 15 dB	> 15 dB	> 15 dB
± 0.5 dB ± 0.1 dB	± 0.3 dB ± 0.1 dB	± 0.4 dB ± 0.1 dB	± 0.5 dB ± 0.1 dB	± 0.5 dB ± 0.1 dB	± 0.7 dB ± 0.1 dB
0.01-1 GHz: > 20 dB ⁷ 1-2 GHz: > 20 dB 0.01-1 GHz: > 40 dB ⁸ 1-2 GHz: > 60 dB	> 20 dB > 60 dB	> 20 dB > 60 dB	> 20 dB > 60 dB	> 30 dB > 60 dB	> 30 dB > 60 dB
> 50 dB	> 50 dB	> 50 dB	> 50 dB	> 50 dB	> 50 dB
N female	N female	N female	N female	N female	WPM ⁴ female
< 2.3 μ sec > 150 kHz ≈ 2 dB/Volt > 40 dB	< 2.3 μ sec > 150 kHz ≈ 2 dB/volt > 40 dB	< 2.3 μ sec > 150 kHz ≈ 2 dB/volt > 40 dB	< 2.3 μ sec > 150 kHz ≈ 2 dB/volt > 40 dB	< 2.3 μ sec > 150 kHz ≈ 2 dB/volt > 40 dB	< 2.3 μ sec > 150 kHz ≈ 2 dB/volt > 40 dB
DC-100 kHz DC-1 kHz 10 MHz/Volt	DC-100 kHz DC-1 kHz 10 MHz/volt	DC-100 kHz DC-1 kHz 20 MHz/volt	DC-100 kHz DC-1 kHz 40 MHz/volt	DC-100 kHz DC-1 kHz 44 MHz/volt	DC-100 kHz DC-1 kHz 56 MHz/volt
Not Applicable	< 50 nsec	< 50 nsec	< 50 nsec	< 50 nsec	< 50 nsec
7 lbs. (3.2 kg)	7 lbs. (3.2 kg)	7 lbs. (3.2 kg)	7 lbs. (3.2 kg)	7 lbs. (3.2 kg)	7 lbs. (3.2 kg)
Not Applicable	Not Applicable	\$ 2595	\$3995	\$ 4995	\$ 5595
\$3295	\$ 2745	\$ 2870	\$ 4295	\$ 5495	\$ 6045
\$500	\$ 500	\$ 725	\$ 825	\$ 1100	\$ 1100
\$75	\$ 75	\$ 75	\$ 75	\$ 75	\$ 75
Not Applicable	\$ 375	\$ 375	\$375	\$375	\$375

5. Positive going Signal increases RF Output Power.
6. RF Unit must have -03 Option.
7. At output power levels < 15 mW.
8. > 25 dB from 10 MHz to 150 MHz.

Specifications and prices subject to change without notice.

ACCESSORIES

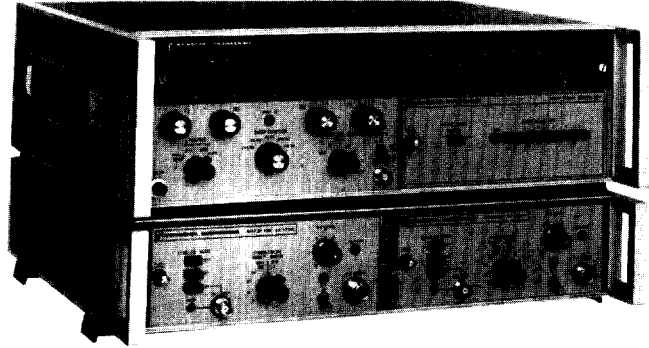
Several inexpensive accessories are available for use with the Model 430A Microwave Sweeper Mainframe to form a manual multiband sweeper system. A manual multiband system does not have an electronically controlled, multiplexed output nor does it permit continuous sweeping between bands. However, this simplified multiband system is ideal for many applications.

A complete manual system consists of a Model 430A Mainframe, a Model 4301A RF Unit Holder with 2 RF Units, and a Model 4302A RF Unit Controller inserted in the RF slot of the Mainframe.

The Model 4302A RF Unit Controller is capable of functioning with up to six RF Units. Such a system requires two additional RF Unit Holders and four more RF Units. The desired band to be swept is manually selected by pushbuttons on the controller.

Model 4306A Storage Unit — This accessory is a convenient storage housing for two RF Units when not in use with the Model 430A Sweeper. It is designed to provide ample protection of RF Units from physical damage.

Model 4308A Utility Drawer — This accessory is for filling unused plug-in slots in a manual or electronically multiplexed multiband system. In addition to improving the appearance of the system, it can serve as a container for small accessory RF components.

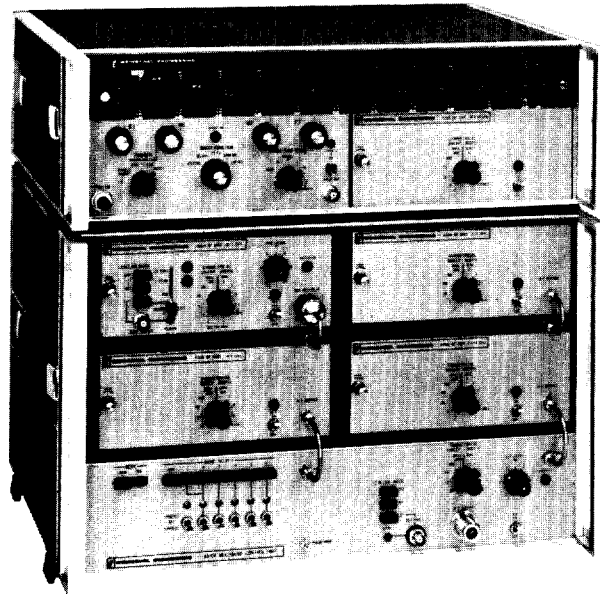


MANUAL MULTIBAND SYSTEM

MULTIPLEXED MULTIBAND SWEEPER SYSTEMS

The Weinschel Model 4310A/K Multiband Sweeper is for measurement and testing applications requiring an electronically multiplexed RF output with continuous sweeping over the 0.01 to 18 GHz frequency range. This system is also available with narrower frequency ranges. The Model 4310A/K offers many features not presently available in competitive sweeper systems - leveling and multiplexing in a single PIN device to achieve greater RF output power; automatic compensation of the sweep delay of YIG tuned RF sources; automatic control of tuning supply bandwidth for minimum incidental FM; and single knob control of the RF power with automatic adjustment of the leveling loop gain. These features and more make this multiband sweeper the most advanced system available.

A separate detailed specification brochure on the Model 4310A/K Multiband Sweeper System is available from Weinschel Engineering. Please write or call to receive this brochure on the most advanced Multiband Sweeper System available.



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