Specifications for Model 1500, Dual Wavemeter

Frequency Range: 2.0 to 26.5 GHz (1.0–10.0 GHz, option 015, contact factory).

Frequency Markers:
- **Width:** 5 MHz, nominal.
- **Amplitude:** -0.5 to -2.0 dB, typical.

Insertion Loss: 2.5 dB, typical.

Limiting Level: +10 dBm.

VSWR: 2:1.

Impedance: 50Ω, nominal.

Maximum Input Power: +30 dBm.

Connectors (Control Unit):
- **Front Panel:** RF Head, 8-pin, locking receptacle, female (DIN 45326).
- **Rear Panel:** External Trigger In (BNC), GPIB (IEEE 488.2), AC MAINS (IEC 320) w/integral Fuse and AC MAINS switch.

Connectors (RF Head): RF IN & OUT (Super SMA, female). 5-foot cable with 8-pin, locking plug, male (DIN 45326)

Frequency:
- **Accuracy:** ±0.1% ±10 MHz.
- **Resolution:** 1 MHz.

Operating Modes:
- **Tune F_1:** Tunes F_1 Marker only. Display shows F_1 frequency.
- **Tune F_2:** Tunes F_2 Marker only. Display shows F_2 frequency.
- **Tune F_{VAR}:** Tunes between preset F_1 and F_2 Markers. Displays current tuned frequency.
- **Fast, Slow:** Selects the tuning velocity of the Tune Knob. Fast = 50 MHz/step; Slow = 1 MHz/step (128 steps/revolution).
- **Display F_1:** Displays F_1 Marker frequency preset.
- **Display F_2:** Displays F_2 Marker frequency preset.
- **Display ΔF / F_{VAR}:** Display shows either ΔF: (F_2 minus F_1), the frequency difference between the two presets (F_1, F_2 Markers are displayed); or, F_{VAR}: the tuned frequency marker between F_1 and F_2 presets (single F_{VAR} marker displayed).
- **RESET/LOCAL:** Resets instrument to 'turn-on' default and selects local control (terminates GPIB operation).
- **External Trigger:** Rear panel BNC connector, 1 kΩ impedance, negative edge TTL or sweep compatible. Trigger switches between F_1 and F_2 or F_2 and F_1.

GPIB [Complies with IEEE Std 488.2-1992]:
- **Programmable Functions:** Display F_1, ΔF, F_{VAR}, F_2; Tune F_1, F_2, F_{VAR}.

Display:
- **Frequency:** 5-digit, 0.5 in. high LED.
- **LED Status Indicators:** F_1, ΔF / F_{VAR}, and F_2 frequency display; F_1, F_{VAR}, and F_2 Tune mode; Fast, Slow Tune velocity, MAINS on/off; REMOTE.

Operating Temperature: 0°C to 50°C.

Chassis:
- **Weight:** 6.0 lbs. (2.7 kg.)
- **Dimensions (HxWxD):** 3.5 in. x 8.375 in. x 13.1 in.

RF Head (HxWxD): 2.3 in. x 3.0 in. x 3.0 in. w/ SMA connectors and 5-foot cable with connector.

Power: 90–264 VAC MAINS (auto-sensing), 47–63 Hz, 60W, 1.6 A'T' fuse (5 x 20 mm).

Documentation: One (1) Operating Manual.

CE

Pendulum Instruments, Inc.
incorporating XL Microwave

ISO 9001 CERTIFIED

 1500 Rev 0407

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MODEL 1500

Dual Wavemeter

Characterize YIG and VCO Oscillators

Characterizing YIG and VCO oscillators has always been a tedious and time-consuming process and trying to identify and measure discontinuities while sweeping the oscillator is difficult at best. Now, with the Model 1500 Dual Wavemeter from Pendulum Instruments, Inc. (formally XL Microwave), the process has become simple, quick and accurate. In seconds, the Model 1500's tunable markers can be set to visually determine an oscillator's frequency and power range, as well as identifying frequency discontinuities (dips, jumps, spurs, holes, etc.) …*and it does all this in Real-Time!*

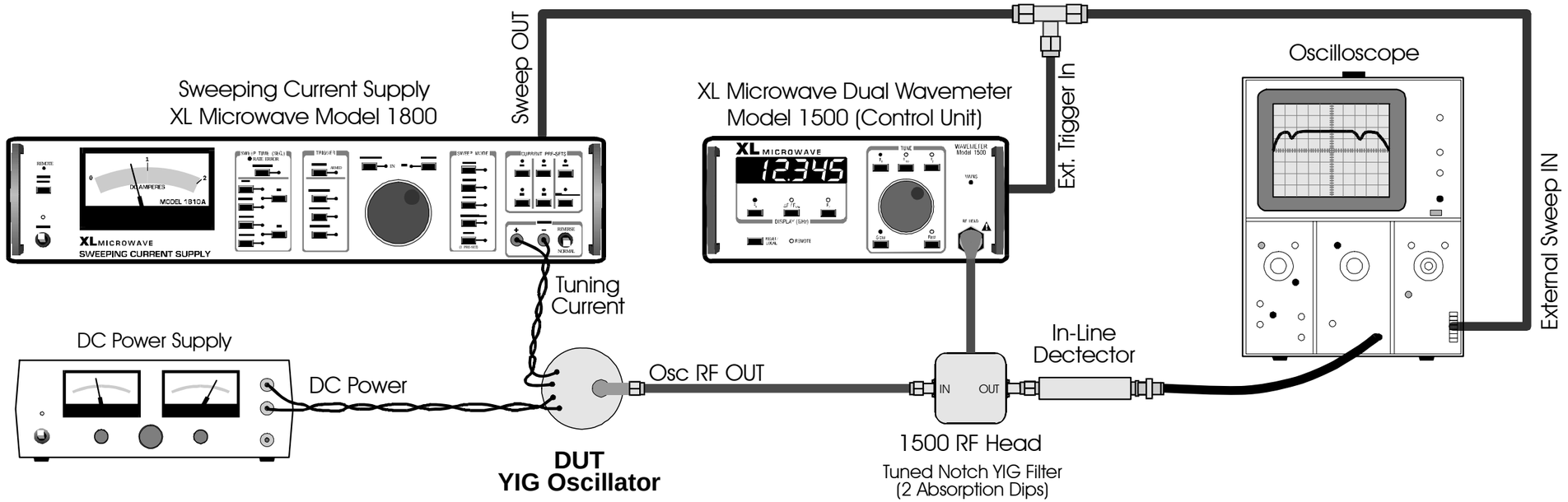
Fast, handy, and far more convenient and than using tuned cavities or computer/spectrum analyzer bus systems, the Model 1500, along with a Sweeping Power Supply, is all you'll need to accurately verify specifications of YIG or VCO oscillators. The Dual Wavemeter is an invaluable tool in Production, Repair, and Design functions and accelerates 'Design-to-Release' and production verification times.

The Model 1500 Dual Wavemeter features:

- Dual, Individual Tunable Frequency Markers
- Real-Time Display
- Broad Range: 2–26.5 GHz (1–10 GHz, optional)
- 1 MHz Resolution
- Synchronization to External Trigger
- Rapid Visual Verification

pendulum
Incorporating XL Microwave

Dual Wavemeter, Model 1500



YIG Oscillator Test Set-up using the Model 1500 Dual Wavemeter with a Pendulum/XL Microwave, Model 1810, Sweeping Current Supply

General Information.
Pendulum's Dual Wavemeter, Model 1500, is a versatile, laboratory type instrument that provides for the setting of two independent frequency marker dips over a wide frequency range of 2.0–26.5 GHz (1–10 GHz, optional). Each marker is independently adjustable, via front panel controls (or GPIB), and displayed on the front panel numerical readout. The single RF Head, connected to the control unit via an integral cable, contains a band reject YIG filter and can be placed remotely from the control unit. Both markers can be viewed on an oscilloscope by taking the signal out from the RF head's SMA OUT jack, through an external in-line detector, to the scope's input. The wide frequency coverage of the Wavemeter provides testing of wide-band YIG oscillators and filters, or VCO oscillators, and allows you to determine frequency and power range, as well as pinpointing frequency discontinuities in these oscillators.

Tuning Mode Operation.
Frequency marker F_1 is selected with the [F_1] push-button located over the TUNE control knob. The TUNE knob tunes the marker frequency, which is read out on the numerical display. The Tune control's tuning velocity can be selected with the two front panel push-buttons (Fast or Slow). The [F_2] marker frequency is set in the same manner as F_1, with the numerical display showing the F_2 marker frequency. Pushing the [F_{VAR}] push-button above the TUNE control knob will allow the operator, using the TUNE knob, to continuously vary a single marker between the preset frequencies F_1 and F_2, starting at the preset F_1 frequency. This variable marker's frequency is shown on the numerical display. If after being in the F_{VAR} mode, one of the Display push-buttons is depressed, and you then re-enter the F_{VAR} mode, you will pick up where you left off, rather than starting at F_1 again.

Display Mode Operation.
Pushing the [F_1] push-button displays the preset marker F_1 frequency, in GHz, on the numerical display. Marker frequency F_2 is displayed in the same manner. Pushing [ΔF / F_{VAR}] push-button will display the frequency difference, in GHz, between the preset marker frequencies F_1 and F_2. Whenever one of the TUNE push-buttons are depressed, the display push-buttons are overridden and the numerical display shows the frequency of the TUNE push-button's current frequency.

LED Status Indicators.
The six LED status indicators in the TUNE and DISPLAY fields, show the mode of operation of these two fields at any given time. The MAINS LED indicates power supply status. The REMOTE LED indicates whether or not the Wavemeter is under manual (LED OFF) or GPIB (LED ON) control.

[REMOTE/LOCAL] Push-button.
The [REMOTE/LOCAL] push-button resets the Wavemeter, or if under GPIB (IEEE-488.2) control, returns the unit to local (manual) control. When switching back from GPIB to local control, the Wavemeter is automatically reset to its last manual condition, clearing all formally preset registers.

Operation.
The Model 1500 Wavemeter consists of a control unit, RF Head and interconnect cable. The RF Head contains a YIG filter (Band Reject type) that generates the markers (absorption dips) when the filter's frequency coincides with the frequency applied to the SMA 'RF IN' connector. The filter's frequency is proportional to the tuning current source from the 1500 control unit. A YIG driver, a voltage-to-current converter within the 1500, drives the filter through the interface cable.

To characterize YIG and VCO oscillators you'll need a DC power supply (oscillator's V_{cc}), an in-line detector, an oscilloscope, cables, and:

- for YIGs: a Sweeping Current Supply and the 1500
- for VCOs: a Sweeping Voltage Supply and the 1500

Pendulum Instruments, Inc. manufactures the industry's only Sweeping Current Supplies, Model 1810A (0–2A) and Model 1810B (±1A), for YIG oscillators. The 1810s are full-featured microprocessor-based supplies that provide manual or GPIB Bus control. See your local Pendulum rep or contact the factory for more information.