

Errata

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HP References in this Manual

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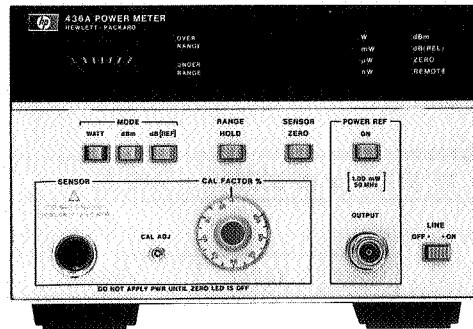
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Externally Leveling the HP 8340B/41B Synthesized Sweepers



EXTERNALLY LEVELING THE HP 8340B/41B

The output power of the HP 8340B/41B may be externally leveled. A typical setup for external leveling uses either a power splitter or a directional coupler to sample a portion of the RF output signal. This sampled signal is detected to produce a dc voltage proportional to the RF output level. This voltage is compared to a reference voltage in the ALC circuit inside the HP 8340B/41B to reduce the power level variations over the frequency range. Directional couplers are usually not as broadband as a power splitter which has a flat frequency response over a very wide frequency range. The advantage of a directional coupler is that it does not have as great a main line loss as the 6 dB loss incurred when using the power splitter; therefore, a higher maximum leveled power output may be obtained.

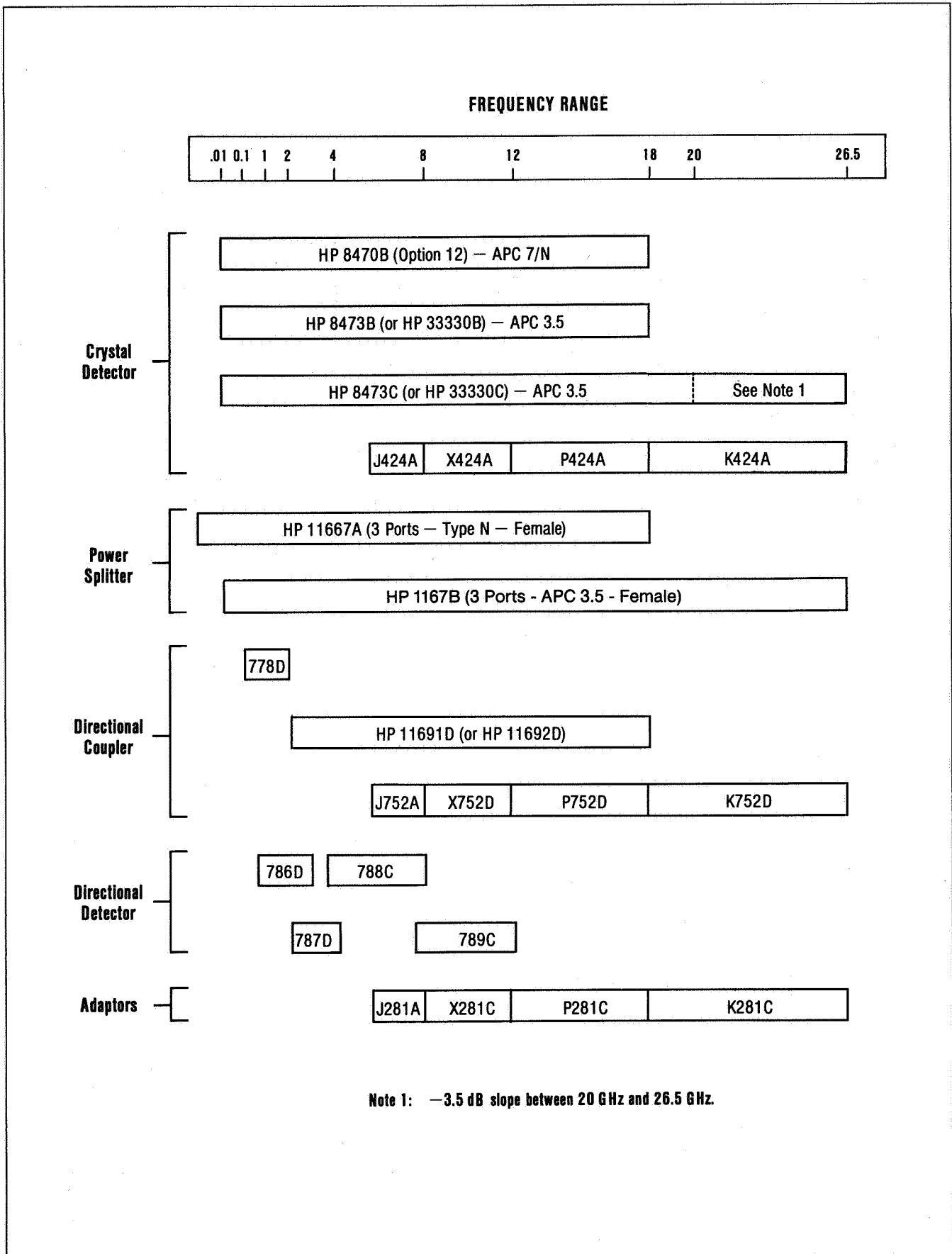
CRYSTAL LEVELING

A listing of crystal detectors, directional detectors, directional couplers, and power splitters that can be

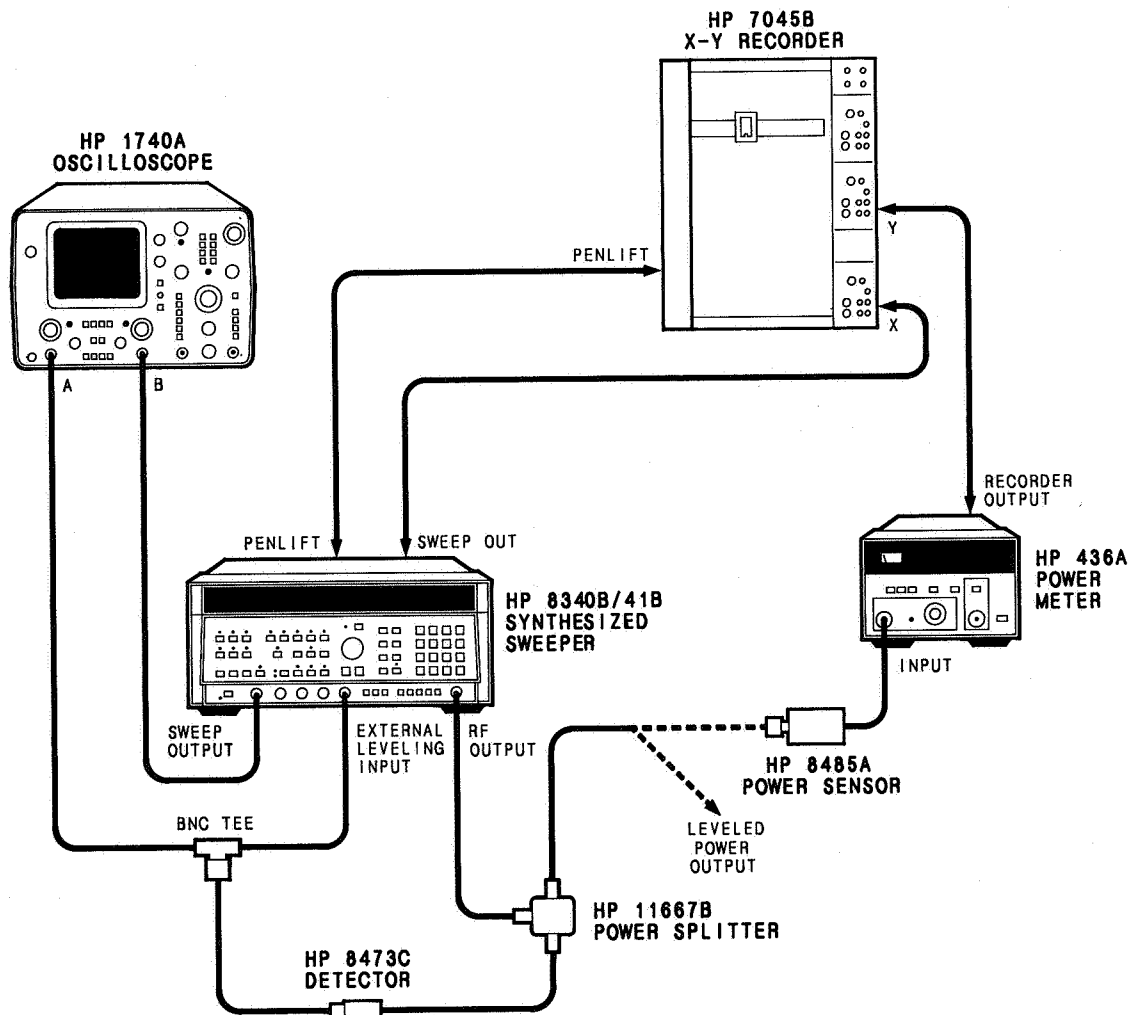
used from 10 MHz to 26.5 GHz is shown in Table 1. Connect the equipment as shown in Figure 1. Then perform the following:

1. Press **[INSTR PRESET]** on the HP 8340B/41B and enter the desired functions. (CW or swept mode) and data (desired CW frequency or sweep limits).
2. If a sweep mode is used, set the frequency to the center of the frequency range by pressing the **[CW]** key and then the appropriate frequency value.
3. Press the **[XTAL]** leveling key, then use the knob on the HP 8340B/41B to adjust the REFERENCE level (shown in the ENTRY DISPLAY) for the desired output power reading on the HP 436A Power Meter. (The power meter is used only for accurate setting of the power level and is not otherwise needed for crystal leveling. If a power meter is not available, the leveled output power may be set by observing the POWER dBm display on the HP 8340B/41B as the REF level is adjusted.

Table 1. Equipment for Crystal Leveling 0.01 to 26.5 GHz



Note 1: —3.5 dB slope between 20 GHz and 26.5 GHz.



The HP 1740A Oscilloscope is placed in A vs B function.

Figure 1. Typical Equipment Setup for Crystal Leveling

The POWER dBm reading, minus the 6 dB of loss from the power splitter, gives a good approximation of the value of the leveled output power.)

When external leveling a 27.8 kHz square wave modulated signal (such as used with HP 8756A/8757A scalar analyzers) the external power meter will read a 3 dB lower power level than the actual level of the pulsed signal. The power indication on the HP 8340B/41B, however, will read the correct pulse power.

NOTE

The crystal output signal must be between 316 μ V and 3.16 V (–70 dBV to +10 dBV). If desired, the voltage may be checked on an oscilloscope using the setup shown in Figure 1.

4. Then return to the sweep mode.

If a plot is required, an HP X-Y recorder can be used. (Refer to the "Operation with X-Y Recorders" section of this manual). The recorder output of the HP 436A or 438A power meter is used to drive the Y input of the recorder. Due to the slow response of the HP 8485A thermocouple sensor, a slow sweep speed must be selected during the plot. A minimum sweep time of 50 seconds for a full 10 MHz to 26.5 GHz (20 GHz with HP 8341B) sweep is recommended.

NOTE

When the HP 8340B/41B is swept over multiple bands, the RF is momentarily turned off at the band switchpoints. This can create a problem if the HP 436A or 438A is in AUTOSCALE, because the drop in RF power will cause the HP 436A or 438A to switch to a new 10 dB range. Since the RECORDER OUTPUT is 0 to 1 V for each 10 dB range, a range change will cause a spike in the X-Y recorder trace. To avoid this, put the HP 436A or 38A power meter in RANGE HOLD.

POWER METER LEVELING

All of the HP 432A/B/C, 435B, 436A, and 438A power meters and their corresponding sensors, thermistor mounts or thermocouples can be used for external leveling of the HP 8340B/41B. Connect the equipment as shown in Figure 2. Equipment recommended for power meter leveling from 10 MHz to 26.5 GHz (20 GHz with HP 8341B) is shown in Table 2.

Proceed as follows:

1. Press [INSTR PRESET] on the HP 8340B/41B, then enter the desired functions (CW or swept mode) and data (desired CW frequency or sweep limits).
2. If a sweep mode is used, set the frequency to the center of the frequency range by pressing the [CW] key and then the appropriate frequency value.

3. Turn off RF, then zero power meter with meter connected to leveling setup. Turn RF on.
4. Adjust the HP 8340B/41B power level to within the proper meter range, reading the power level on HP 436A or 438A power meters.
5. Press [HOLD RANGE] on both power meters.
6. Press [METER] leveling on the HP 8340B/41B.
7. Readjust the power level on the HP 8340B/41B by using the knob to adjust the REF level (shown in the ENTRY DISPLAY).
8. Return the HP 8340B/41B to the sweep mode.

NOTE

This procedure can be shortened by omitting steps 4 and 5 when using either an HP 432A or an HP 435A Analog Display Power Meter. But when an HP 436A Digital Display Power Meter is used, special care is needed to adjust the power level to the desired value. The reason is that the RECORDER OUTPUT signal from the HP 436A used to drive the ALC loop varies from 0 to 1 V for each 10 dB full scale range on the HP 436A. The procedure described above presets the power level in the HP 8340B/41B's INTERNAL leveling mode. Then [HOLD RANGE] is pressed on the power meters to avoid any large variations of the detected power in the ALC loop when the HP 8340B/41B is set to [METER] leveling.

Due to the fact that power meters are heavily filtered to reduce display jitter, the HP 8340B/41B sweep time must be increased to the following recommended values.

HP 438A, 436A, 435B:

More than 50 s for full 10 MHz to 26.5 GHz sweep (20 GHz with HP 8341B).

HP 432A:

Typically 50 s for full 10 MHz to 26.5 GHz sweep (20 GHz with HP 8341B).

If a plot is required, an HP X-Y analog recorder may be used. (Refer to the "Operation with X-Y Recorders" section of this manual). The recorder output of the second power meter is used to drive the Y input of the Recorder. Figure 3 shows a typical output power leveling plot from 10 MHz to 26.5 GHz using a power meter and an HP 8485A power sensor. The output power is 0 dBm at the HP 8340B output connector.

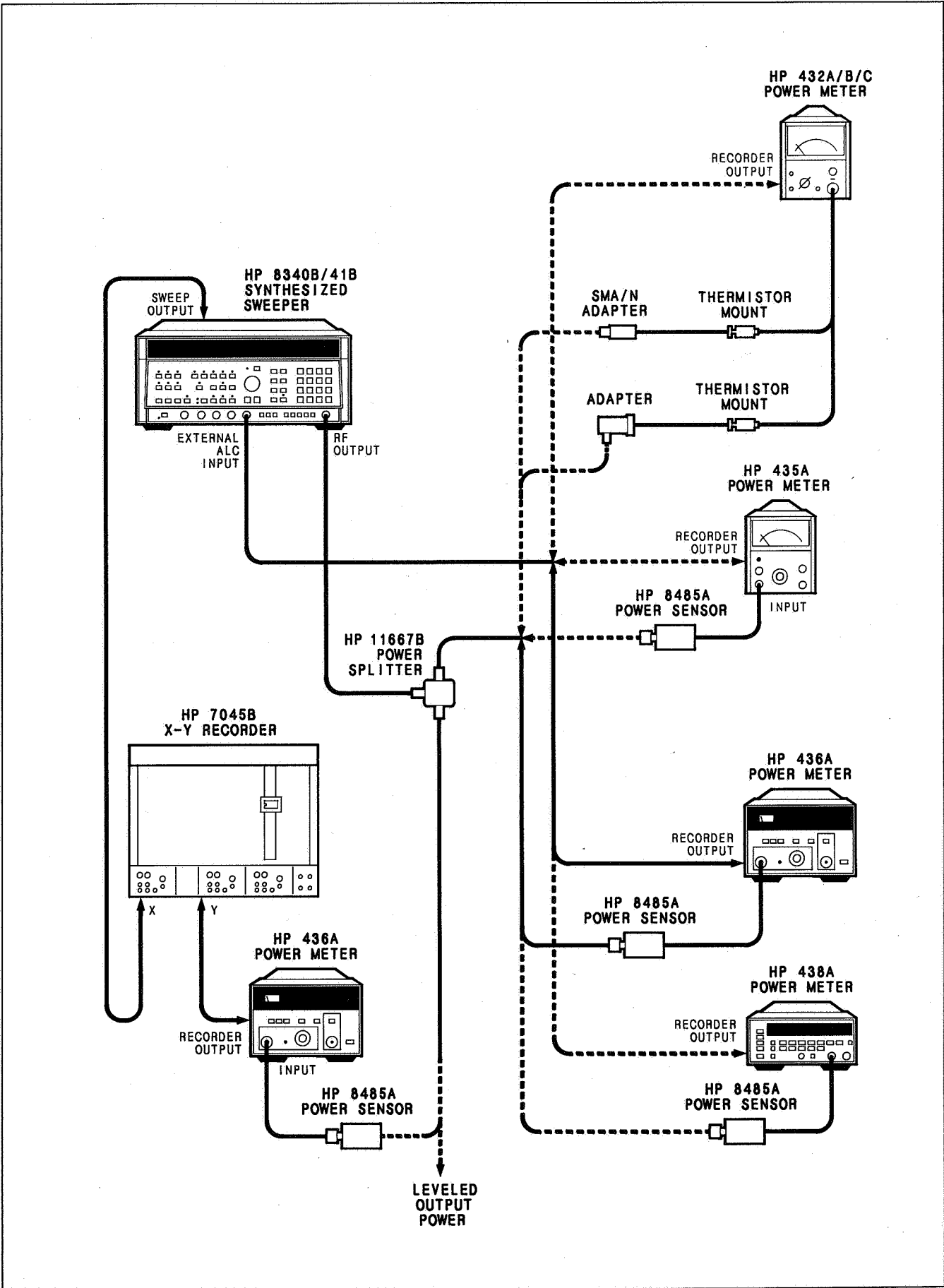
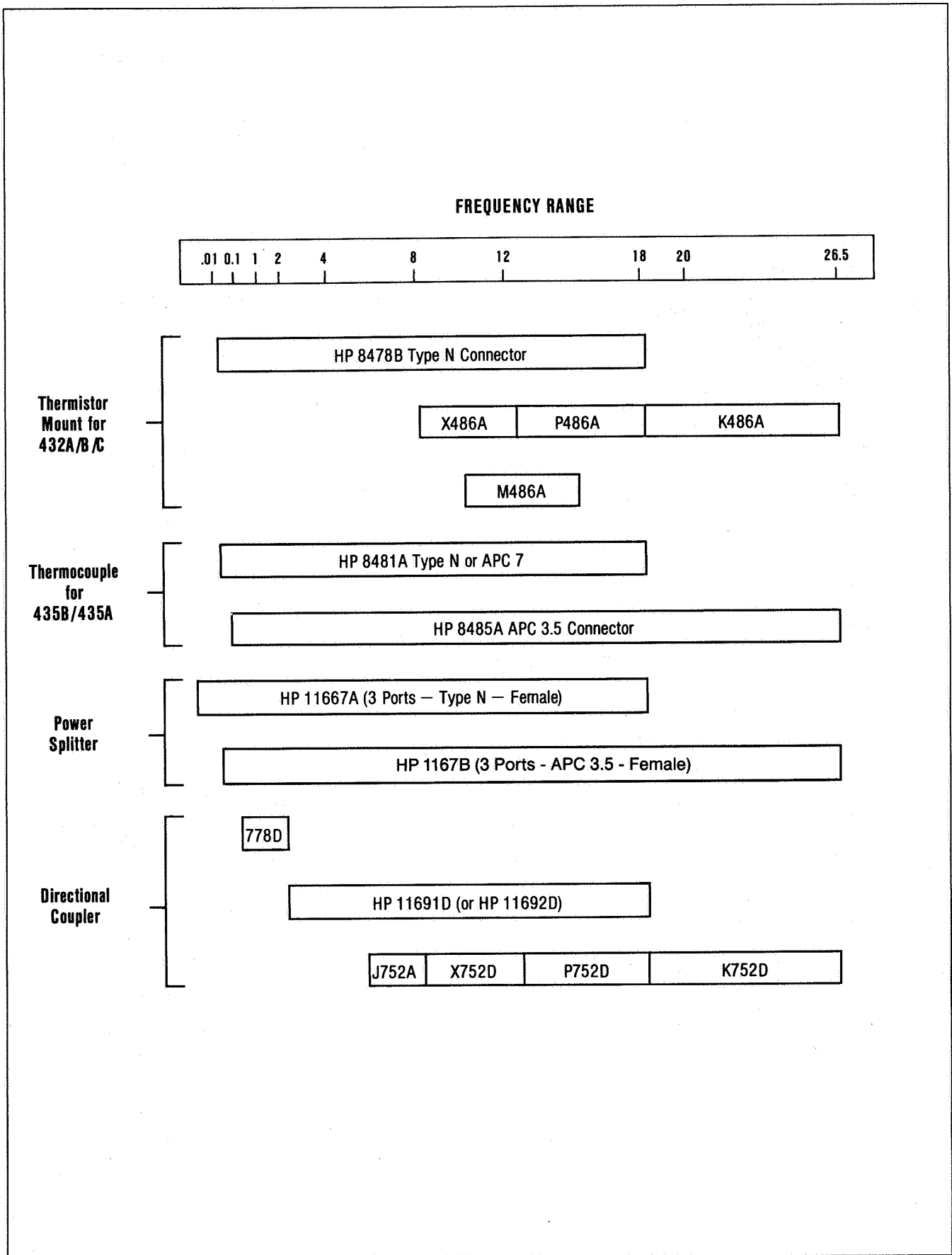


Figure 2. Typical Equipment Setup for Power Meter Leveling

Table 2. Equipment for Power Meter Leveling, 0.01 to 26.5 GHz



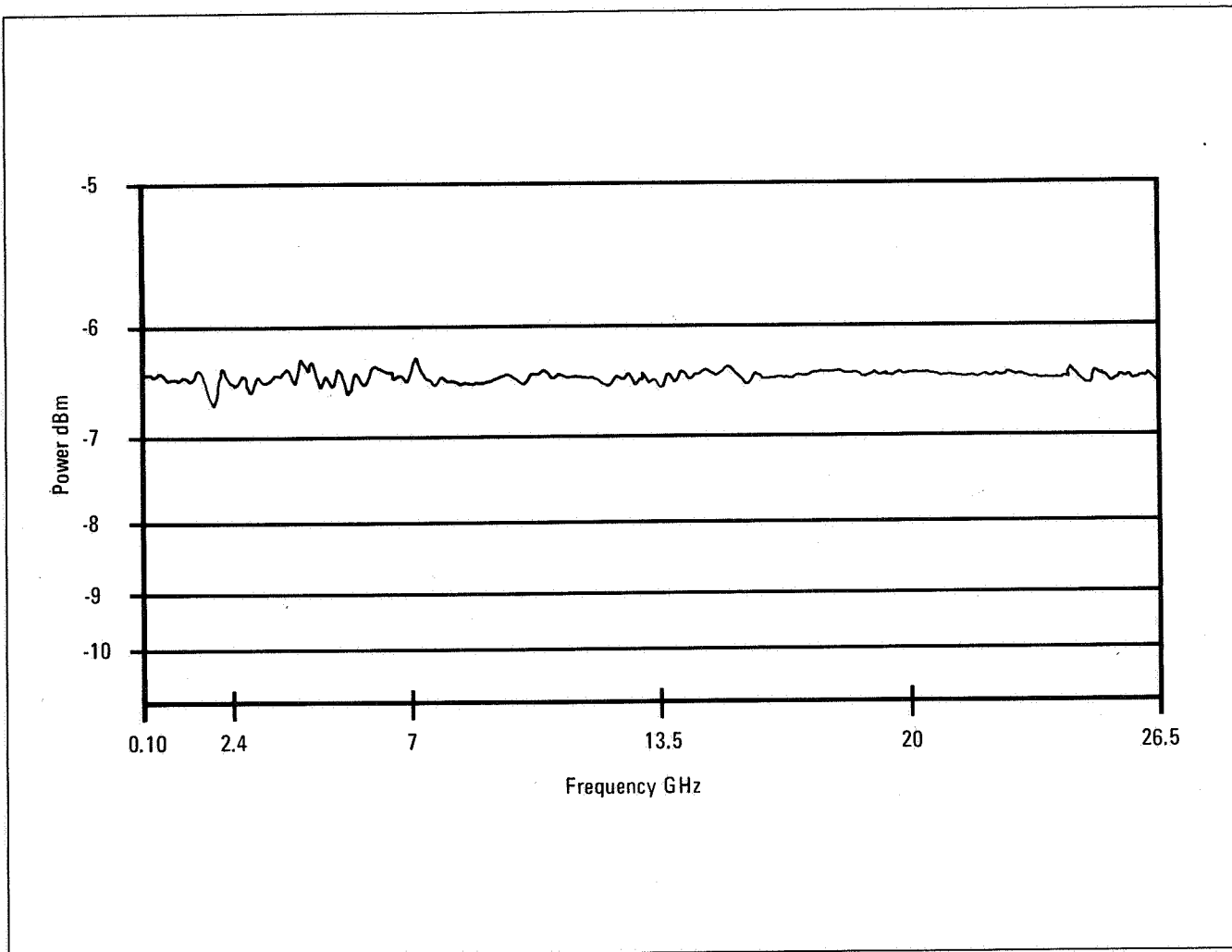


Figure 3. Typical Power Leveling Plot

The POWER dBm display on the HP 8340B/41B is accurate in XTAL or METER modes, whether leveled or not. This is a useful aid in checking for proper operating levels in an external leveling loop. If the POWER dBm display on the HP 8340B/41B goes blank (---), the ALC loop is reducing its output to a very low level where noise or loop stability may be compromised. Adding fixed attenuation via the step keys will cause the ALC loop to operate at a higher level. The ALC level is the POWER dBm level minus the attenuator setting. For example:

POWER dBm level = -35 dBm,
 Attenuator setting = -30 dB
 yields,
 ALC level = -5 dBm

Operating the ALC above -10 dBm is desirable. If the UNLEVELED light comes on, the ALC level is too high and attenuation should be reduced.

The POWER dBm display will attempt to follow power sweep or slope corrections. Since the display is filtered with a slow time constant, it will display on average value with all but very slow sweeps.

SLOPE and POWER SWEEP entries when externally leveled refer to the reference voltage. With a linear detector, RF level will change 1 dB for each 1 dB change in reference voltage. With a square law detector or power meter, RF level will change 0.5 dB for each 1 dB change in reference voltage.



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