

engineering department
INSTRUMENT NOTES

IN-106

AUGUST, 1965



OPERATING THE GENERAL RADIO TYPE 1133-A FREQUENCY
 CONVERTER WITH COUNTERS OF OTHER MAKES



The Type 1133-A Frequency Converter is designed for use with the GR Type 1130-A Digital Time and Frequency Meter and the Type 1153-A Digital Frequency Meter. It can, however, be operated with other 10-Mc counters or as a general-purpose frequency converter with other accessory equipment.

REFERENCE-FREQUENCY INPUT

The converter ordinarily requires a 5-Mc reference-frequency input (supplied by the counter) patched into a rear connector. Other reference-frequency sources can be used, however, as described below.

5 Mc/s

Any source of 5 Mc/s capable of supplying 15 mV or more into a 50-ohm load (e.g. 30 mV behind 50 ohm) can be used to drive the converter. Because of a narrow-band crystal filter in the converter, a lower-frequency source with a strong harmonic at 5 Mc/s can also be used.

100 kc/s, 200 kc/s, 500 kc/s

The Type 1153-P1 Frequency Multiplier, which plugs into the rear of the converter, multiplies a 100-kc reference-frequency input of 1-volt rms or greater (1-volt peak-to-peak for a square wave) to 5 Mc/s to

operate the converter. The multiplier requires a supply voltage of +20 V at 8 mA. It will also operate with other input frequencies which are submultiples of 5 Mc/s, such as 200 kc/s and 500 kc/s.

1 Mc/s

If a 1-Mc signal does not have sufficient 5-Mc harmonic voltage to drive the converter, a fast-switching germanium or silicon diode can be connected in series with the reference-frequency input connector of the converter. Satisfactory diodes are the 1N994 and HHD5000 types. The diode can be conveniently mounted in a Type 874-X Insertion Unit, which can be plugged into the INPUT connector at the rear of the converter. This scheme works well with Beckman Instruments counters.

10 Mc/s (H-P SERIES 524 COUNTERS)

The reference-frequency circuits of the converter can be operated from a 10-Mc source of 100 mV or greater into 50 ohms if the first stage of the converter is rewired as outlined below.

1. Remove instrument from cabinet (see Instruction Manual page 13).
2. Remove shield from 10's Reference Frequency Generator section (remove 10 nuts, see page 14).
3. Clip out C401 and C404 (page 29).

4. Unsolder L401 link lead from input cable lead.
5. Bend the link lead back and solder to unused terminal on L401.

6. Solder a small 0.001- μ F ceramic capacitor between the input cable lead and the link lead. Bend capacitor leads so that they will fit into the compartment in the shield cover without shorting.

7. Replace shield cover.

8. Adjust L401 and L402 for maximum inductance (slug all the way in).

9. Mark back panel, 10-Mc INPUT.

CONNECTING TO THE HEWLETT-PACKARD COUNTER

1. Connect from the STD FREQ OUTPUT connector on the lower front of the Type 524 Counter to the INPUT connector on the rear panel of the converter.

2. Connect from the OUTPUT connector of the converter to the SIGNAL INPUT of the counter (FREQUENCY INPUT if the Type 526-A Video Amplifier is used).

3. Set the counter's FUNCTION SELECTOR to FREQUENCY, TIME UNIT switch to 10 Mc, and FREQUENCY UNIT switch as desired.

SUMMARY

Output Frequency of Reference Source	Means of Connection to Converter	Required Minimum Drive into 50 Ω
100 kc/s	Type 1153-P1 Frequency Multiplier	1-volt rms
200 kc/s		
500 kc/s		
1 Mc/s	series diode	1 volt
5 Mc/s	direct	15 mV
10 Mc/s	circuit modification	100 mV

OUTPUT METER

The converter output-meter calibration is based on the input sensitivity of the Types 1130-A and 1153-A counters. The bottom of the green region corresponds to an output voltage of about 0.3-volt rms and the top

of the green region to about 1 volt. For use with other equipment the region of proper operation must be experimentally determined.

For further information on the converter refer to Operating Instructions Type 1133-A Frequency Converter.

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