



Combination of GR 1157 Scaler and GR 1192 Counter assembled for rack mounting.

**NEW**

The GR 1157-B Scaler, compatible with the GR 1191- and 1192-series Counters, replaces the popular GR 1157-A Scaler. This model includes improvements such as:

- Greater counter resolution at frequencies that only require prescaling by 10, by the addition of a divide-by-10 function to the divide-by-100 function.
- Smaller size, that permits side-by-side combination with the GR 1192 Counter.

The new scaler-counter combination forms a single, standard-rack-width package (GR 1192-Z) that provides an economical way to obtain high-frequency counting up to 500 MHz (Figure 1).

The signal applied to the 1157-B INPUT terminal is fed to an attenuator that reduces its amplitude by a factor of 1 (no reduction), 2, 5, or 10, so the instrument can handle signals from 0.1 to 7.0 volts rms amplitude. In order to indicate the proper attenuator (SENSITIVITY) control setting, the output of the attenuator is rectified, amplified, and applied to a "green-sector" meter. Generous overlaps in range are provided

so that attenuator settings may easily be made to bring the meter reading into the green sector. In order to give a clear indication of the range of proper operation, the upper two-thirds of the meter scale is electronically compressed by the meter amplifier. Thus an actual 7:1 signal range represented by the green sector is compressed into a 3:1 deflection ratio.

The attenuated input signal is amplified and applied to a pulse generator circuit that provides a pulse of 0.5-ns duration, as required by the tunnel-diode binary divider.<sup>1</sup> The binary output, now at one-half the input frequency, is fed to a scale-of-five divider using three integrated-circuit flip-flops in a ring-type configuration. The output of this quinary-divider circuit, now at one-tenth the input frequency, is applied to another integrated-circuit flip-flop for frequency division by two. This signal is finally applied to a second scale-of-five

divider, similar to the first, to obtain a continuous end output at one-hundredth the input frequency at the 100:1 SYNC OUTPUT. In addition, a main output is provided that can be switched from the divided-by-100 output to a divided-by-10 output taken from the high-frequency (first) quinary-circuit output.

When the GR 1157-B is used as a pre-scaler for a counter, the divide-by-10 feature of the prescaler is an advantage since it provides ten times greater frequency resolution in conventional frequency measurements than that provided by the divide-by-100 feature. When the counter's maximum frequency-handling capability is exceeded by the input frequency-divided-by-10 signal, the scaler must be operated in the divide-by-100 mode. Engineering of this product was by J. K. Skilling and B. J. Sargent.

<sup>1</sup>Similar circuitry is described in the *GR Experimenter*, page 13, October 1968 and in *NASA Technical Note D-1337*, "A Tunnel-Diode Counter for Satellite Applications," by E. G. Bush, June 1962.

Complete specifications for the GR 1157-B are available on the catalog page, included as a tear sheet inside the back cover of this issue, removable for insertion in GR Catalog T.

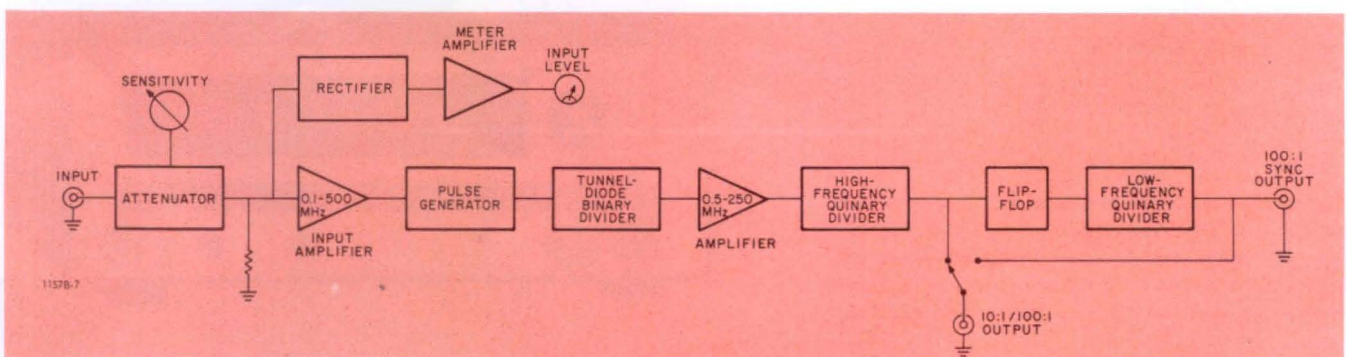


Figure 1. Block diagram of the GR 1157-B.