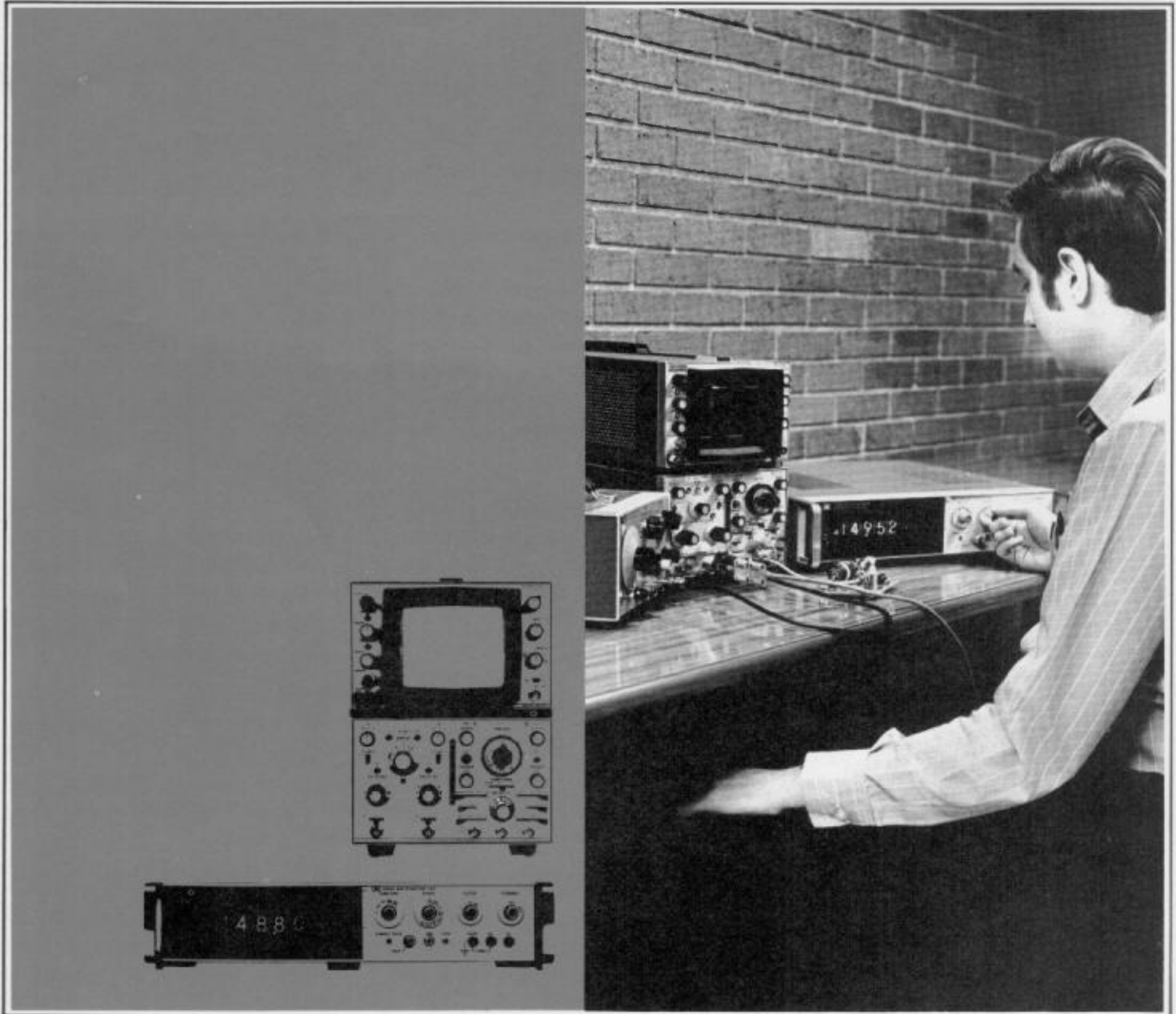


LOW FREQUENCY PULSE AMPLITUDE MEASUREMENTS

using the 3480 DVM and the 180A Oscilloscope



LOW FREQUENCY PULSE AMPLITUDE MEASUREMENTS



Low frequency square wave amplitude measurements being made using the 3480A Multifunction Digital Voltmeter and the 180A Oscilloscope.

The amplitude and flatness of low frequency pulses and square waves may be measured with 4 digit resolution and $\pm 0.02\%$ accuracy using the combination of the HP 3480A/B Multifunction Digital Voltmeter and the 180A Oscilloscope. The amplitude of square waves up to 500 Hz may be measured with this equipment. The flatness of a square wave or pulse may be checked by using the delayed trigger from the 180A Oscilloscope to sample the waveform at any given point.

The reading period of the 3480 DVM is slightly less than 1 ms (including response time to a full scale input). The 3480 DVM has five dc voltage ranges (100 mV to 1000 V full scale) with a basic accuracy of $\pm 0.02\%$ at full scale for 90 days, $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$. The 3480 DVM has 4 full digits with a 5th digit for 50% overranging.

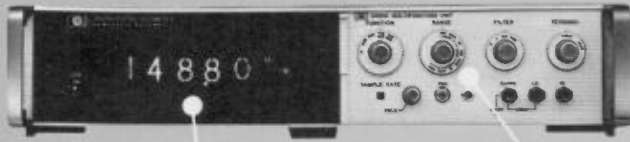
The 180A Oscilloscope with an 1821A Time Base and Delay Generator plug-in acts to supply a delayed trigger to the 3480 DVM and as a display. The delayed trigger occurs at the beginning of the delayed sweep which appears on the oscilloscope screen as an intensity modulated segment (See Figure 1).

By using the DELAY control, the DVM's reading period may be moved along the wave shape as indicated by the delayed segment. The length of the intensity modulated segment may be adjusted to 1 ms using the TIME/DIV control thus giving an exact indication where on the wave shape the DVM is beginning and ending its reading period. A block diagram of this setup is shown in Figure 2. The trigger supplied by the 180A Oscilloscope requires an inverting circuit to be compatible with the input levels of the 3480 DVM (see Figure 3). If a more exact representation of the reading period is required, the print command from the 3480 (pin 48 on the BCD connector) may be simultaneously displayed on the oscilloscope (using a dual channel plug-in).

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INSTRUMENTATION

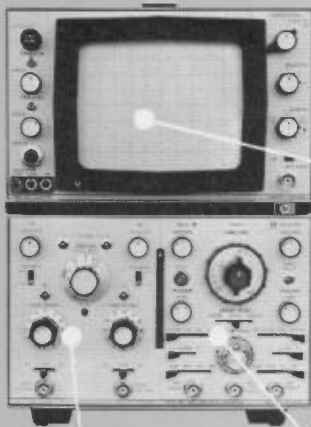
Digital Voltmeter:



3480B (full rack width)
or 3480A (1/2 module)

3484A Multifunction Unit
(3482A DC Range Unit may also be used)

Oscilloscope:



Note: a 140A Oscilloscope with a 1421A Time Base and Delay Generator may also be used for this application.

180A (modular cabinet)
or 180AR (full rack width)

1821A Time Base and Delay Generator

1801A Dual Channel Vertical Amplifier

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