system by reseating the piston at the reservoir end of the compressor. Manual resetting is required for the magnetic pickup system.

An unfortunate characteristic of the PISTON SEATED switch is that it is operated by shock waves generated in the compressor firing. Unscheduled firing of the switch will recycle the pressure transducer control system and allow the oscilloscopes to be retriggered on successive compression cycles. In order to prevent this, the system will respond to only the first switch opening that occurs when the compressor is fired.

Circuit Functions

Synchronizing external events to the first pressure pulse in the compressor and controlling the oscilloscope display to be photographed with Polaroid film are the two main functions of the control systems.

Synchronizing

It is necessary to synchronize the spectrograph shutter action and the flashlamp discharge with the peak of the first pressure pulse. Figure 4 shows the typical voltage analog of the pressure pulse and how synchronization is done.

In order to photograph the pressure pulse shown on the oscilloscopes, the time base sweep circuits must be triggered at the proper time to catch the desired display. This is done by using a voltage comparator circuit to monitor the pressure pulse signal. The function of the voltage comparator is to provide a digital one (HIGH) or zero (LOW) output which corresponds to the value of the input signal compared with a reference voltage. The operator selects a point on the expected voltage curve at a level to ensure proper display of the pulse on the oscilloscope trace as shown as V_1 in Figure 4. Voltage level V_1 is used as the reference voltage on one input to the Low Level Comparator (LL Comp). When the pressure signal voltage, applied to the other input to the comparator, rises above the LL Comp reference level, the output of the comparator changes logic state and turns on a gated oscillator circuit. This is shown at t_1 in traces B and C in Figure 4. As the signal voltage falls below the reference level at t_5, the comparator output reverts to its initial state and the oscillator is turned off. Signals from the gated oscillator are used to trigger oscilloscope sweep circuits.

In order to synchronize the spectrograph shutter action with the peak of the pressure pulse, the voltage that will be developed under the given operating conditions must be known. In addition, the total offset travel time of the shutter plate must also be known. Offset travel time is the time required for the shutter plate to travel from its rest position to the point where it just begins to uncover the spectrograph slit. Knowing that time, the operator measures backward on the voltage-time curve from the desired slit

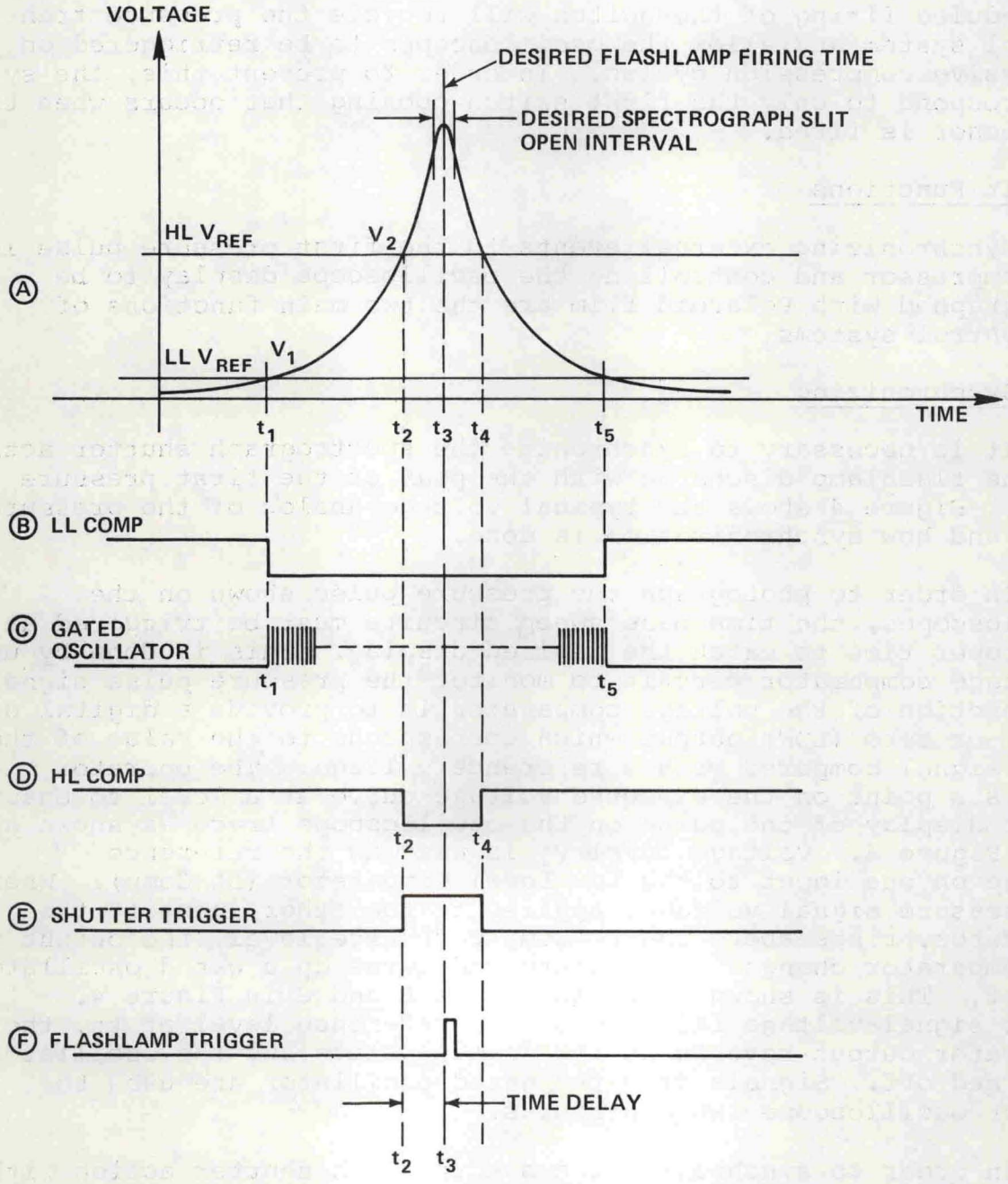

FIG. 4 PRESSURE PULSE LOGIC TIMING DIAGRAM