

Errata

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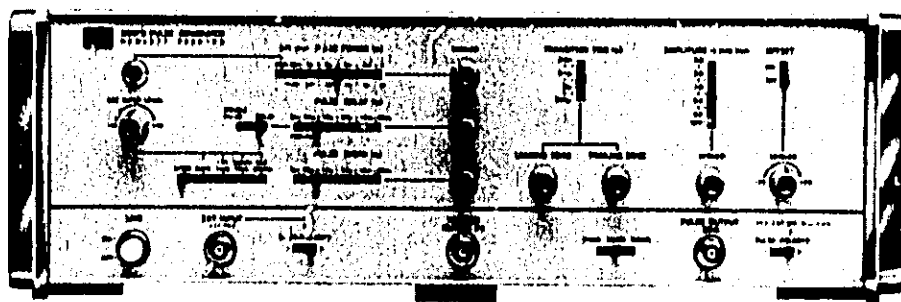
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OPERATING AND SERVICE MANUAL

PULSE GENERATOR 8007 B



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HEWLETT  PACKARD

OPERATING AND SERVICE MANUAL

**MODEL 8007B
PULSE GENERATOR**

This manual corresponds to instruments
with the serial number prefix:

1238G

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P R E F A C E

One copy of this manual is supplied with each instrument. Additional copies may be purchased from the local Hewlett-Packard Sales and Service Office. Specify the instrument model number and serial number.

A 'microfiche' microfilm version of this manual is available under part number 08007-90052.

Reference should be made to the manual change sheets supplied with the manual for errata and technical changes.

Technical changes are indicated by the prefix (the first five characters) of the serial number, which appears on the rear panel of the instrument; the title page carries the serial number prefix of the instrument to which the manual applies directly.

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5	Assembly 5
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Table 1-1. Specifications

PULSE CHARACTERISTICS

(50Ω source and load impedance)

Transition Times: 2ns – 250μs in three ranges. Ranges are common for rise and fall times but independent verniers provide separate control of rise and fall time within each range up to maximum ratios of 1:50 or 50:1.

Linearity: For transition times > 20ns, maximum amplitude deviation from a straight line between the 10% and 90% points is less than 3% of pulse amplitude.

Overshoot and Ringing: < ± 5% of pulse amplitude.

Preshoot: < ± 5% of pulse amplitude.

Pulse Width: < 5ns to 50ms in five ranges. Vernier provides continuous adjustment within ranges.

Width Jitter: < 0.1% on any width setting.

Maximum Duty Cycle: Normal > 50%; complementary 100%.

Amplitude: up to 5V across 50 ohms, 10V across an opt'n circuit.

Attenuator: Four step attenuator reduces output voltage to a minimum range of 0.5V to 0.2V. Vernier provides continuous adjustment within each range. A fifth position of the attenuator reduces the pulse amplitude to zero volts.

Pulse Output: Positive or negative polarity selectable. Normal, complementary or symmetrical to baseline also selectable.

Source Impedance: 50Ω ± 4Ω shunted by 10pF (nominal)

DC Offset: ± 4V across 50Ω load. Independent of amplitude settings, can be switched off.

Pulse Delay: < 30ns to 50ms with respect to trigger output. Five ranges, vernier provides continuous adjustment within ranges.

Delay Jitter: < 0.1% on any delay setting.

REPETITION RATE AND TRIGGER

Repetition Rate: 10 Hz to 100 MHz in five ranges. Vernier provides continuous adjustment within ranges.

Period Jitter: < 0.1% on any repetition rate setting

Double Pulse: Available only up to pulse rate setting of 50MHz, representing an output pulse rate of 100MHz

Trigger Output: Amplitude: > +1V across 50Ω
Width: 4ns ± 2ns.

EXTERNALLY CONTROLLED OPERATION**External Input**

Input Impedance: 50Ω dc-coupled.

Maximum Input: ± 5V.

Trigger Level: Continuously adjustable from +1V to -1V.

Trigger Polarity: Positive or negative slope selectable

Sensitivity: Sine waves, 1V peak-to-peak,
Pulses, ± 0.5V peak.

External Triggering

Repetition Rate: 0 to 100 MHz.

Delay: Approximately 10ns between trigger input and trigger output.

Manual: Front-panel push button for single pulse.

External Pulse Width: Output pulse width determined by width of external input pulse.

Width Trigger: External input pulse applied to the width generator. Pulse width determined by front panel width setting.

Synchronous Gating: Gating signal turns generator "on" First pulse coincident with leading edge of the gate, last pulse is normal width even if gate en.'s during pulse.

GENERAL

Operating temperature range: 0°C to +55°C.

Power Requirements: 115 or 230V ± 10%, -15%, 48 to 440 Hz, 100VA (maximum)

Weight: net 8 kg (17.6lb), shipping 9 kg (19.8lb)

Dimensions: 425 x 140 x 344 mm (16 3/4 x 5 1/2 x 13 3/8 inches).

1-1 INTRODUCTION

1-2 The Hewlett-Packard Model 8007B Pulse Generator is a multipurpose pulse source with front panel controls for transition time, pulse amplitude, repetition rate, pulse delay and pulse width. The output is usually developed across a 50 ohm external impedance and may be either positive or negative. In addition, a symmetrical pulse (in which the positive and negative limits of the pulse amplitude are an equal amount above and below ground potential) or the complement of the pulse may be selected by means of a front panel control. If desired, a dc bias may be introduced to the waveform baseline.

1-3 The pulse generator may be triggered internally with its own repetition rate generator or externally either with an externally generated trigger pulse or manually with a front panel pushbutton.

1-4 Externally applied signals can be used in four ways to control the output pulse pattern.

1. As a gate signal. The output pulse train is generated for as long as the applied signal is present. The repetition rate, pulse width and pulse delay remain under the control of the front panel.

2. As an external trigger. One pulse out for each trigger in. All other parameters remain

under control of front panel. (Also see double pulse description, paragraph 1-15).

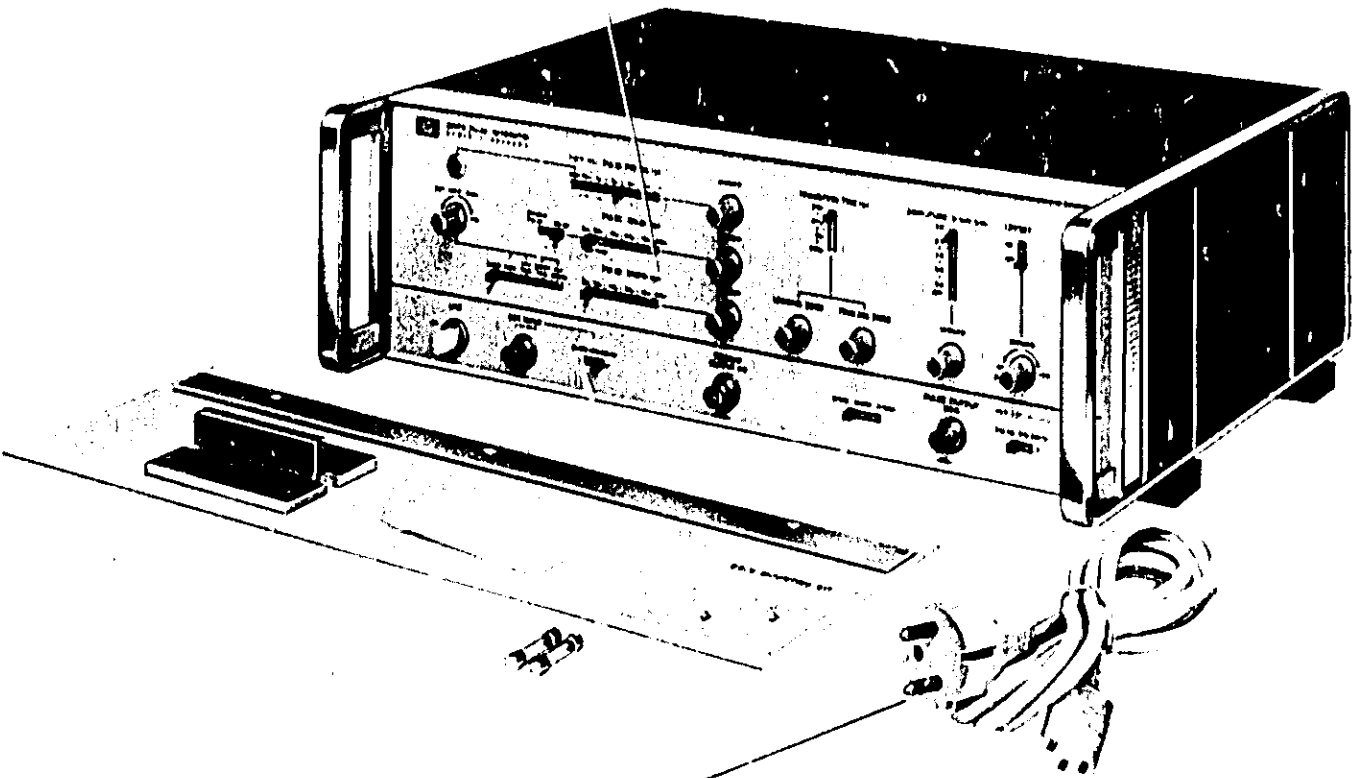
3. As a width trigger. Like the external trigger except that the signal is introduced at the input to the width control circuits. The rep. rate generator can supply a trigger output independent of the pulse output. The pulse delay is fixed at typically 20ns.

4. As an external width trigger. Like the width trigger except that the external width trigger is introduced at the output of the width control circuits. The output pulse width is determined by the width of the incoming trigger.

1-5 By switching to DOUBLE PULSE on the front panel, two pulses can be produced in response to each trigger. The first pulse occurs a fixed interval after the trigger, the second pulse is delayed by an interval selected by front panel controls. Double pulses can be produced in the normal, gate and external trigger modes only.

1-6 AVAILABLE ACCESSORIES

1-7 Electronic test equipment, cables, connectors, adapters and other accessories are available from Hewlett-Packard. For information about specific items, consult the Hewlett-Packard catalog or contact the nearest Sales/Service Office. Addresses are listed at the back of this manual.



The power cable supplied will be ONE of the following:

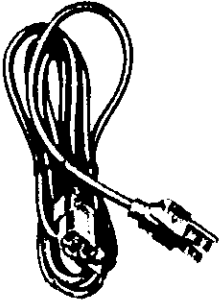


NEMA 8120-1378	SCHUKO 8120-1689	BRITISH STANDARD 8120-1351
		
LINE = BLACK NEUTRAL = WHITE GROUND = YELLOW/GREEN	LINE = BROWN NEUTRAL = BLUE GROUND = YELLOW/GREEN	LINE = BROWN NEUTRAL = BLUE GROUND = YELLOW/GREEN

Figure 2-1. Accessories Delivered

2-1 GENERAL**2-2 Initial Inspection**

2-3 Inspect instrument and accessories for physical damage and if damage is evident refer to paragraph 2-15 for recommended claim procedure and repacking information.

2-4 The 8007B is delivered with the following items:

ITEM	HP STOCK NUMBER
Power Cable (with one of the following plugs) NEMA*	8120-1378
or SCHUKO**	8120-1689
or BS***	8120-1351
Fuses	
0.5 amp (for 230V operation)	2110-0202
1 amp (for 115V operation)	2110-0007
Rack Mounting Kit	5060-8740
Manual	08007-90002
* Used in USA	
** Used in West Germany	
*** Used in UK and (for 230V) in USA	

2-5 Temperature Requirements

2-6 The Model 8007B operates within specifications when the ambient temperature is between 0°C (32°F) and 55°C (131°F). The pulse generator may be stored between -40°C (-40°F) and 75°C (167°F).

2-7 INSTALLATION**2-8 Power Cable**

2-9 The 3-wire power cable supplied with the 8007B when connected to the appropriate power outlet, grounds the instrument cabinet and panels. To preserve this safety feature when operating the instrument from an outlet without a ground connection use an appropriate adapter and connect the ground lead to an external ground.

2-10 Power Source Requirements

2-11 The Model 8007B may be operated from an ac line supply of either 115V or 230V (+10%, -15%) at 48 Hz to 440 Hz. The power dissipation is typically 100VA.

CAUTION

Before applying power to the instrument, check that the power module on the rear panel is set in accordance with local supply conditions.

2-12 To check the power module proceed as follows:

- Slide the safety window to the left.
- Remove the fuse and check its value:
for 230V operation 0.5A,
for 115V operation 1.0A.
- Check that the line selector switch position corresponds to the local supply voltage. If it does not corresponds use a screwdriver to change the switch position.
- Insert the correct fuse into the fuse holder and slide the safety window to the right.
- Connect the power cable to the power module.

2-13 PRELIMINARY CHECKS

2-14 At this point it is convenient to check that

the instrument operates within specifications. Preliminary checks suitable for incoming quality control inspection are described in Section V. If the instrument does not perform satisfactorily, refer to paragraph 2-15.

2-15 CLAIMS AND REPACKAGING

2-16 Claims for Damage

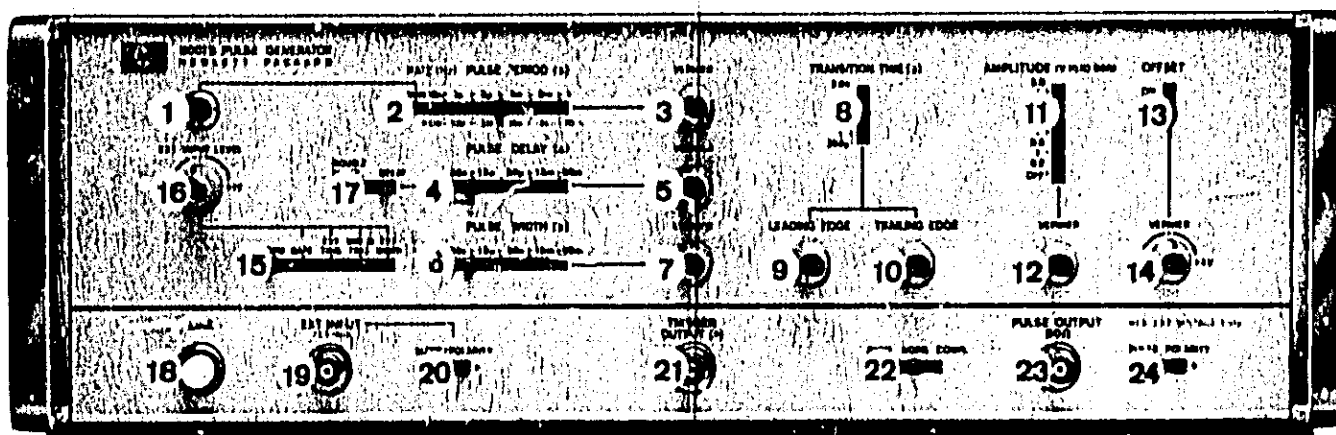
2-17 If physical damage is evident or if the instrument does not meet specifications when received, notify the carrier and the nearest Hewlett-Packard Sales/Service Office. The Sales/Service Office will arrange for repair or

replacement of the unit without waiting for settlement of the claim against the carrier.

2-18 Repackaging for Shipment or Storage

2-19 If the instrument is to be shipped to an Hewlett-Packard Sales/Service Office, attach a tag showing owner, address, model and serial number and the repair required. The original shipping carton and packing material may be re-usable but the Hewlett-Packard Sales/Service Office will also provide information and recommendations on materials to be used if the original packing is not available or re-usable.

OPERATION



1. Push button to generate a single pulse (or two in the double pulse mode) when the PULSE PERIOD switch is in the MAN position.
2. PULSE PERIOD switch: for selecting the range of pulse period.
3. Pulse period VERNIER: for continuous adjustment of the repetition rate within the range selected on the PULSE PERIOD switch. Clockwise rotation increases the pulse period. In the WIDTH TRIG and EXT WIDTH modes the pulse period controls define only the frequency of the trigger output pulses.
4. PULSE DELAY switch: for selecting the range of pulse delay with respect to trigger output in NORM, GATE and EXT TRIG modes. Has no effect in WIDTH TRIG and EXT WIDTH modes.
5. Pulse delay VERNIER: for continuous adjustment of pulse delay within the range selected on the pulse delay switch. Clockwise rotation increases the delay.
6. PULSE WIDTH switch: for selecting the range of pulse width. Has no effect in the EXT WIDTH mode.
7. Pulse width VERNIER: for continuous adjustment of pulse width within the range set on the pulse width switch.
8. TRANSITION TIME switch: for selecting the range of leading and trailing edge transition times.
9. LEADING EDGE vernier: for continuous adjustment of the leading edge transition time within the range selected on the transition time switch.
10. TRAILING EDGE vernier: for continuous adjustment of the trailing edge transition time within the range selected on the transition time switch.
11. AMPLITUDE switch: for selecting the amplitude range of output pulses.
12. Amplitude VERNIER: for continuous adjustment of output pulse amplitude within the range selected on the amplitude switch.
13. OFFSET switch: for enabling/disabling the offset VERNIER.
14. Offset VERNIER: for adjustment of the pulse output baseline between +4 volts and -4 volts when the offset switch is on.
15. Mode switch: selects either the internal mode (NORM) or one of the external modes in which an input signal at EXT INPUT is required.
16. EXT INPUT LEVEL control: determines the level, within a range of +1 volt to -1 volt, at which the signal applied to EXT INPUT will initiate a pulse or gate a pulse train.
17. DOUBLE PULSE -- DELAY switch: in the double pulse position the 8007B delivers two pulses for every trigger output; the first pulse is delayed by a fixed 20 nanoseconds with reference to the trigger output, the second is delayed by an interval determined by the PULSE DELAY controls. The double pulse facility is disabled in the WIDTH TRIG and EXT WIDTH modes.
18. LINE switch: press for on, press for off.
19. EXT INPUT connector: for input of gate signals in the GATE mode and trigger pulses in the EXT TRIG, WIDTH TRIG and EXT WIDTH modes.
20. SLOPE/POLARITY switch: selects the slope (rising or falling) of the input signal which will cause triggering/gating.
21. TRIGGER OUTPUT connector: supplies trigger pulses at a rate determined by the setting of the pulse period controls. Exceptionally in EXT TRIG mode the trigger output rate is the same as the trigger input rate.
22. SYMM NORM COMPL switch: for selecting symmetrical normal or complementary pulse formats.
23. PULSE OUTPUT connector.
24. PULSE POLARITY switch: for selecting the polarity of the output pulse.

Figure 3-1. 8007B Front Panel: Control Identification

3-1 MODES OF OPERATION

3-2 There are five modes of operation in which the 8007B is capable of operating, four of which require an external signal.

3-3 Normal Mode

3-4 In this mode, no external signal is required. Pulse period, pulse delay, pulse width, transition times, amplitude, offset, polarity and format (SYMM, NORM, COMPL), as well as single or double pulse, are all selectable or adjustable with front panel controls. See figures 3-2 to 3-5.

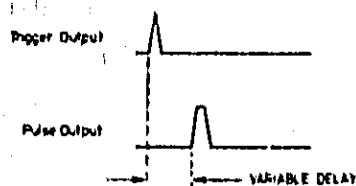


Figure 3-2 Pulse Delay

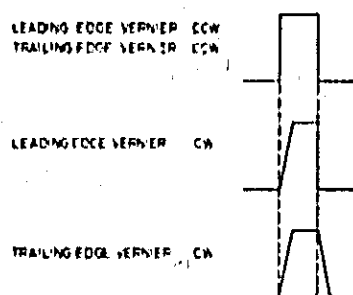


Figure 3-3. Transition Time Verniers

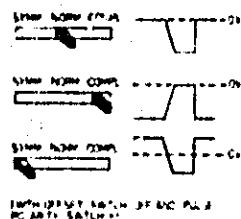


Figure 3-4. SYMM, NORM, COMPL. Switch

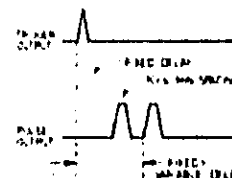


Figure 3-5. Double Pulse

3-5 Gate Mode

3-6 The repetition rate is defined by the pulse period controls but no output occurs until the voltage of the externally applied gate crosses the threshold level set by the EXT INPUT LEVEL in the direction indicated by the setting of the SLOPE/POLARITY switch. See figure 3-6. The last pulse of a train of gated pulses is always of correct width and slope even if the gate ends during the pulse.

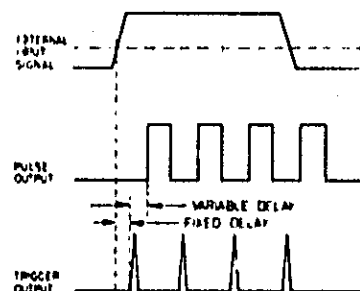


Figure 3-6. Gate Mode Operation

3-7 External Trigger Mode

3-8 The pulse repetition rate and trigger output rate are determined by the frequency of an applied signal. All other output pulse parameters are controllable as in the normal mode. See figure 3-7.

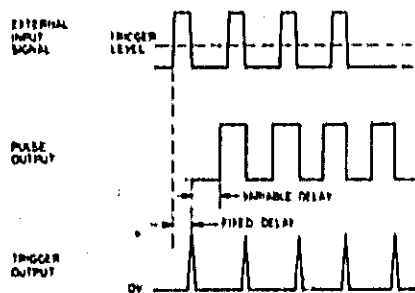


Figure 3-7. External Trigger Operation

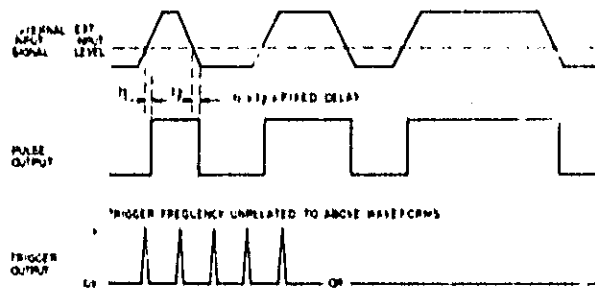


Figure 3-9. External Width Operation.

3-9 Width Trigger Mode

3-10 The pulse repetition rate is determined by the frequency of the externally applied signal. The frequency of the trigger output is independent of the pulse output and can be adjusted with the pulse period controls. The pulse delay is fixed at ≤ 40 nanoseconds with respect to trigger input. All other pulse parameters are controllable as in the normal mode. See figure 3-8.

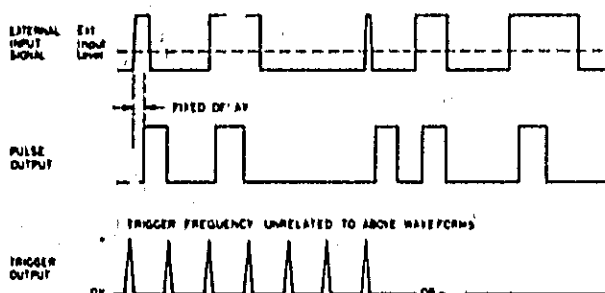


Figure 3-8. Width Trigger Operation

3-11 External Width Mode

3-12 The pulse repetition rate and pulse width are determined by the externally applied signal. The frequency of the trigger output is independent of the pulse output and can be adjusted with the pulse period controls. The pulse delay is fixed at ≤ 40 nanoseconds with respect to trigger input. All other parameters are controllable as in the normal mode. See figure 3-9.

3-13 OPERATIONAL CONSIDERATIONS

3-14 Termination

3-15 To achieve the specified amplitudes and transition times and to minimize reflection, it is most important that the pulse output be terminated by 50 ohms to ground. Even at low repetition rates the pulses contain harmonics in the UHF range.

3-16 Pulse Period, Width and Delay Controls

3-17 The positions of these controls on the front panel helps avoid incompatible settings. Generally, the PULSE PERIOD switch should be the furthest to the right; if all three are in a straight vertical line, the vernier positions are critical. See figure 3-10.

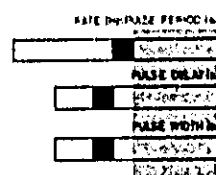


Figure 3-10. Positioning of Rate Delay and Width Controls

3-18 Transition Times Controls

3-19 The "on time" of a pulse should be greater than its rise time, the "off time" greater than the fall time. See figure 3-11.

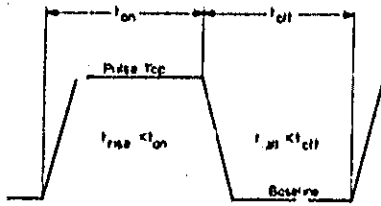


Figure 3-11. Transition Time Limits

3-20 EXTERNAL INPUT CHARACTERISTICS

3-21 The EXT INPUT LEVEL control and the SLOPE/POLARITY switch define the point on the input signal which will cause triggering (or gating). Figure 3-12 illustrates the effects of these controls in the external width mode.

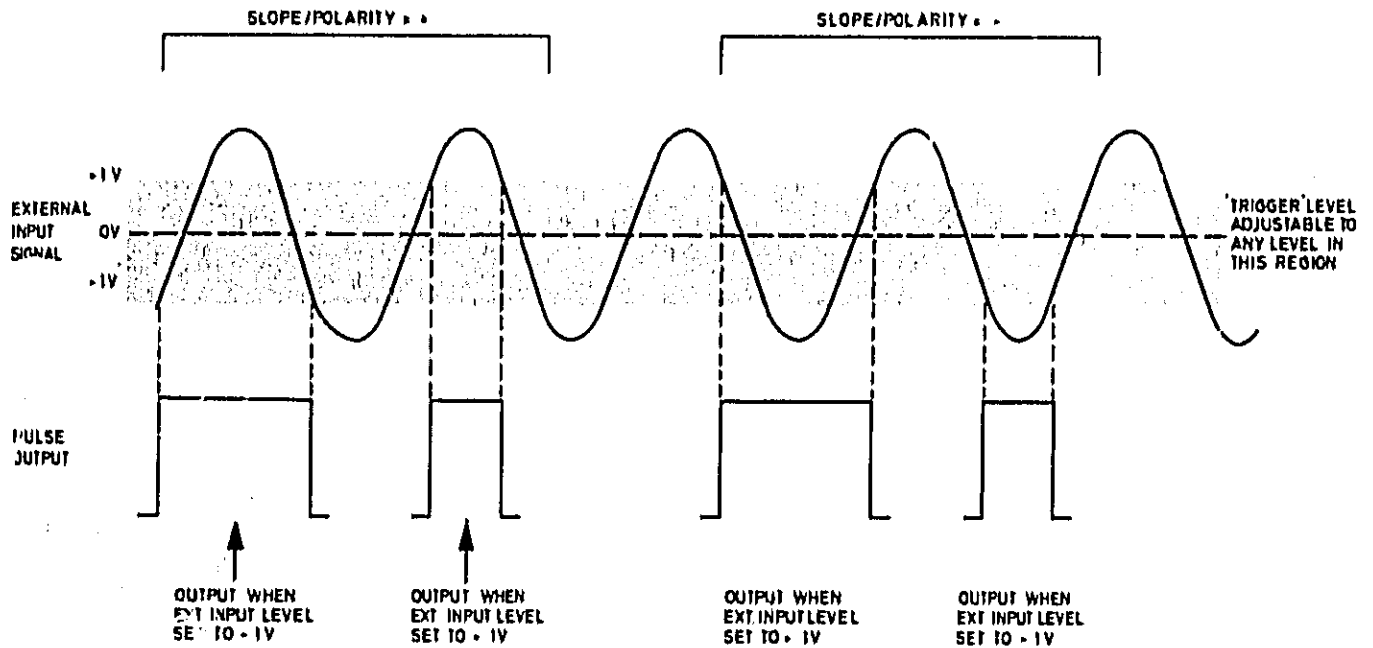


Figure 3-12. External Input Adjustments

THEORY

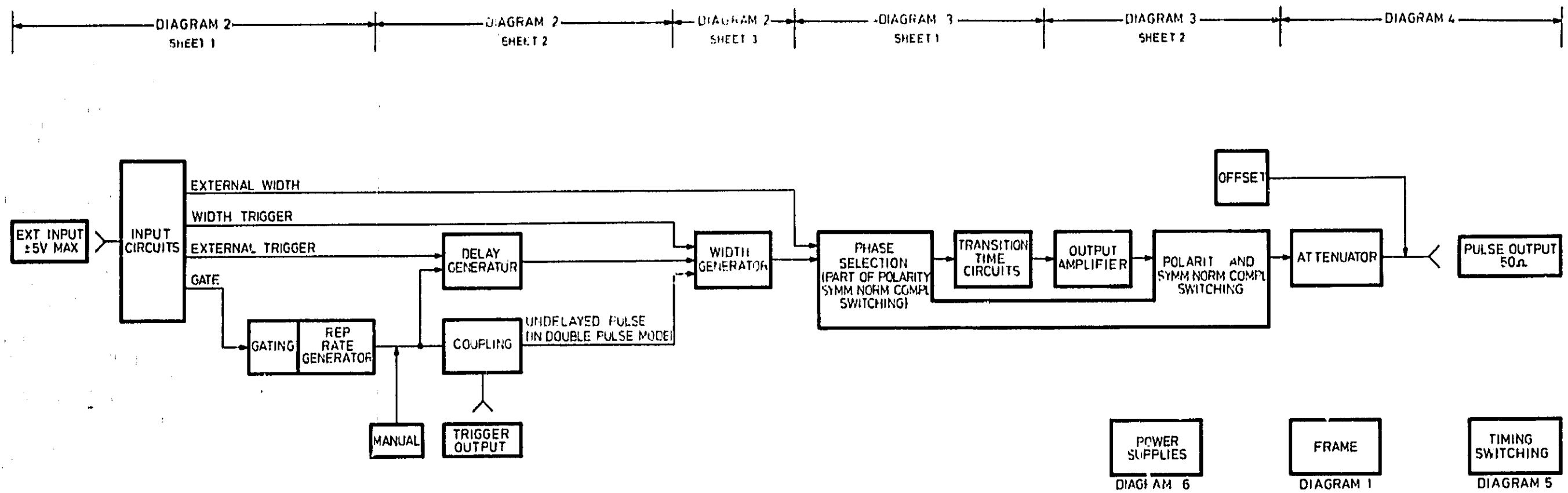


Figure 4-0. Block Diagram

4-1 GENERAL DESCRIPTION

4-2 The basic concept of the 8007B pulse generator is shown in figure 4-0, opposite. The pulse repetition rate is generated either internally by the repetition rate generator or externally by an external trigger. Gating can be effected by using the external trigger to start and stop the repetition rate generator. The delay generator delays, with respect to the trigger output, the output from the rep. rate generator and applies it to the width generator. For each output pulse from the delay generator, the width generator issues a pulse with a width defined by the front panel controls. The output of the width generator is split into two phases, one of which is selected by the pulse polarity and SYMM-NORM-COMPL switching circuits for further processing. The selected phase is integrated by charging and discharging a capacitor by a positive and a negative current source. Current sources are independently variable. The output of the transition time circuits is limited, amplified and, under control of the pulse polarity and SYMM-NORM-COMPL switches, given a dc reference. The signal is then attenuated by a network of resistors selectable under the control of the amplitude range switch and by the amplitude vernier. The dc offset potential is applied to the output or the attenuator and the combined signal is made available at the pulse output connector. In the following description, reference should also be made to the appropriate diagrams in Section 6, as indicated by the block diagram.

4-3 REPETITION RATE GENERATOR

4-4 See figure 4-1. When the Schmitt trigger changes to the "Q2 conducting" state, Q4 conducts thereby discharging C3. C3 discharges to a potential low enough to cut off Q2, at which point the Schmitt trigger switches to the "Q2 cut off" state. Thus, Q4 becomes cut off and C3 starts charging. C3 charges to a potential high enough to make Q2 conduct, at which point the Schmitt trigger changes to the "Q2 conducting" state again.

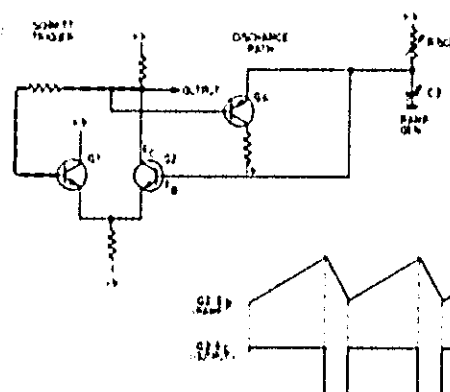


Figure 4-1. Simplified Rep. Rate Generator

4-5 The rep. rate generator runs free in the NORM, WIDTH TRIG and EXT WIDTH modes (Q118 reverse biased). In the GATE and EXT TRIG modes or with the pulse period switch in the MAN position, Q118 is forward biased; this prevents the Schmitt trigger from changing states regardless of the ramp potential.

4-6 Gating

4-7 With Q118 forward biased, the rep. rate generator is disabled. See figure 4-2. Q118 is forward biased when both Q116 and Q117 are cut off. Q117 is cut off by the mode switch being in the GATE or EXT TRIG positions or the PULSE PERIOD switch being in the MAN position. Q116 is cut off when no gate signal is present. A gate signal, applied at EXT INPUT, is processed by the input circuits (see following paragraph) and applied to differential amplifier Q115/Q116 through input switch Q104. The gate signal causes Q116 to conduct, Q118 to be reverse biased and the rep. rate generator to function.

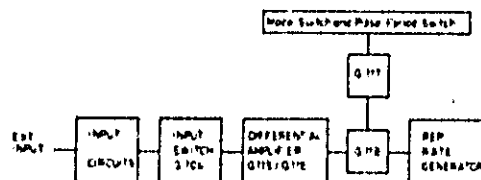


Figure 4-2. Gating Elements

4-8 EXTERNAL SIGNALS

4-9 The external signals are applied to the EXT INPUT connector on the front panel. How a signal is used and where in the instrument it is applied are determined by the modeswitch (Section 6, diagram 2, sheet 1).

4-10 Ext. Input Level and Slope/Polarity

4-11 An external signal, applied to the EXT INPUT connector, is limited to one volt by the diode bridge limiter CR101 through CR104. The one volt maximum signal from the limiter is applied to the differential amplifier Q101/Q102. The EXT INPUT LEVEL control determines the reference level of the differential amplifier. The SLOPE/POLARITY switch selects either the inverting or the non-inverting output by blocking the other output. With the SLOPE/POLARITY switch in the + position, the non-inverting signal is blocked.

4-12 Q103 establishes the required dc level for input to the Input Switches, Q104 through Q107.

4-13 Mode Switch

4-14 The mode switch allows the external signal from Q103 to pass through one or none of the input switches Q104 - Q107.

4-15 PULSE DELAY

4-16 The purpose of the pulse delay generator is to provide pulses which are delayed with respect to the TRIGGER OUTPUT pulse by a controllable interval. The delay is accomplished by triggering a monostable circuit whose output pulse is variable in width and using the trailing edge of the output pulse to produce the delayed pulse.

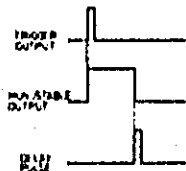


Figure 4-3. Pulse Delay Principle

4-17 The monostable circuit consists of Schmitt trigger Q301, Q302, Q303, ramp generator Q307, C301,

C302 and the ramp discharge path through Q304. With the monostable in its stable state, Q301 is cut off, Q302 and Q304 conduct. A positive pulse on the base of Q301 switches the Schmitt trigger's state, Q302 becomes cut off, the ramp generator starts raising the potential on the base of Q302. When base Q302 reaches the Schmitt trigger switch-over level, Q302 starts conducting again. This puts a negative on the base of Q304 which causes the ramp generator to discharge through Q304. The level to which the ramp discharges is not negative enough to cut off Q302 so the circuit remains stable until Q301 receives another positive pulse.

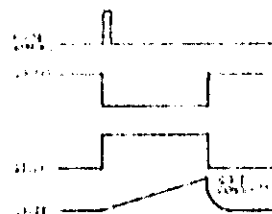


Figure 4-4. Delay Monostable Timing.

4-18 Schmitt trigger A1MC2 produces the delayed pulse in response to the negative going edge of the delay circuit monostable.

4-19 In the WIDTH TRIG and EXT WIDTH modes, the delay generator is not required. The S1.2 part of the mode switch blocks the input and output of the delay circuits through Q204 and Q206 respectively.

4-20 TRIGGER OUTPUT

4-21 Schmitt trigger A1MC1 produces short (~3ns) pulses in response to negative transients from either the rep. rate generator, the external trigger of the manual trigger. The Schmitt trigger output is amplified by differential amplifier Q201/Q202. The complementary outputs are applied to 1) the delay circuits and 2) the OUTPUT TRIGGER and DOUBLE PULSE circuits.

4-22 DOUBLE PULSE

4-23 In the double pulse mode, an undelayed pulse and a delayed pulse are applied to input of the width circuits in response to each trigger. The delayed pulse comes from the delay circuits, the undelayed pulse comes through Q210 from the TRIGGER OUTPUT circuits. Section 6, diagram 2, sheet 3.

4-24 In the WIDTH TRIG and EXT WIDTH modes, Q209 under control of switch S1.3 reverse biases Q210 thereby preventing the undelayed pulse from reaching the width circuits.

4-25 PULSE WIDTH

4-26 The purpose of the pulse width circuit is to produce pulses of variable width in response to delayed and undelayed pulses. The variable width pulses are produced by triggering a monostable circuit.

4-27 The monostable circuit consists of Schmitt trigger Q401, Q402, Q403, ramp generator Q407, C401 C402 and the ramp discharge path through Q404. The monostable functions in exactly the same manner as does the pulse delay monostable (paragraph 4-15). The output is amplified by differential amplifier Q405/Q406 and applied to the input of the phase selection circuit on assembly A2.

4-28 PHASE SELECTION

4-29 Either the output of the width circuit or an external width signal is applied to the differential amplifier Q501, 502. The complementary outputs are amplified by Q503, 504. Diodes CR501 through CR506 and transistors Q505 through Q508, under control of the SYMM, NORM, COMPL. switch and the POLARITY switch, select one of the complementary signals for further processing.

4-30 Phase selection determines whether the leading edge of the output pulse is positive-going or negative-going. The SYMM, NORM, COMPL. and POLARITY switches also control K1 which switches the leading and trailing edge verniers to their appropriate circuits.

4-31 TRANSITION TIME

4-32 Schmitt trigger MC601 produces a clean and stable pulse and pulse complement which are amplified by differential amplifiers Q601/Q602 and Q607/Q608. The positive-going edge of the pulse at collector Q603 (be it leading or trailing edge) is integrated by C607/C608 and the current source in the emitter circuit of Q603. The negative-going edge is integrated by C607/C608 and current source in the emitter circuit of Q605.

4-33 CLIPPING AND LIMITING

4-34 The output of the transition time circuits is clipped by clipping diodes CR605/606. Clipping is adjusted to provide an output from MC701 that contains no step. See figure 4-5. Too little clipping provides too great an input to the limiter MC701, which causes excessive rolloff of the output pulse. See figure 4-6 for a description of rolloff. Too much clipping provides the limiter with too small an input and a step will appear on signals at the output.

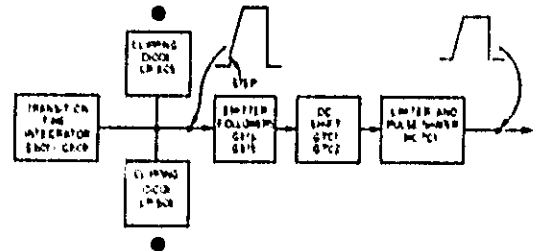


Figure 4-5. Clipping and Limiting

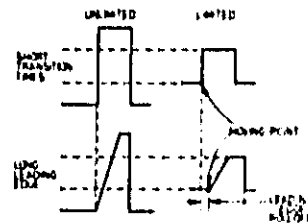


Figure 4-6. Rolloff

4-35 POLARITY

4-36 The POLARITY switch S11.1 and the SYMM, NORM, COMPL. switch S10.1 control the Q715/Q716 collector voltage. A positive collector voltage will make the output pulses positive. See figure 4-7 and paragraph 4-28.

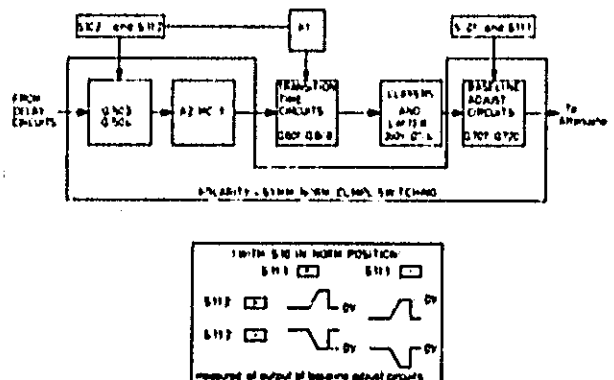


Figure 4-7. Polarity and Format Switching

4-37 BASELINE ADJUST

4-38 The current through Q713 is adjusted so that the most positive level of negative pulses is zero volts. Q716 current is adjusted so that the most negative level of positive pulses is zero volts.

4-39 OFFSET

4-40 Q801 through Q810 provide the offset voltage for the output pulses. See diagram 8, section 6.

MAINTENANCE

5-1 GENERAL

5-2 The maintenance section contains three groups of checking procedures: preliminary checks, performance checks and internal checks and adjustments. If performance of the preliminary checks reveals no malfunctions, the instrument is in reasonable working order.

5-3 The performance checks are designed to assure that the instrument is performing to specifications. See table 1-1. If the performance checks reveal any deviation from the specifications, the internal checks and adjustments may be required.

5-4 REMOVAL OF COVERS AND ASSEMBLIES

5-5 Access to Test Points and Assemblies

5-6 Access to all test points and assemblies is through the removal of the top and bottom covers. These may be removed by releasing the 2 screws in the respective cover and sliding it to the rear.

5-7 Removal of Assemblies

5-8 With reference to diagram 2, section 6, it will be seen that assemblies A1, A2 and A3 are plug-in assemblies secured by screws. The attenuator vernier assembly (A7) is mechanically secured to assembly A4 by 3 screws which can be removed without further dismantling the instrument. To gain access to assemblies A4 and A5 switch contacts, remove the right-hand side frame and remove the assembly securing screws, the assemblies can be removed.

Table 5-1. Test Equipment and Accessories

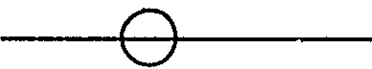

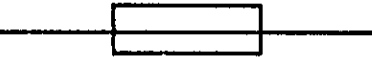




INSTRUMENT	BRIEF SPECIFICATION	RECOMMENDED MODEL
Counter	Frequency range 0 -- 350 MHz with period, ext. time base and ext. start/stop facilities.	HP 5245L with plug-in 5252A
Oscilloscope	Dual-channel, 50 MHz bandwidth, 5mV/div sensitivity, sweep speeds 5nS/div to 2S/div.	HP 180A with plug-ins 1801A, 1821A
Power Supply	+6V at not less than 60mA.	HP 6200 Series
Digital Voltmeter	10V dc range to 4 significant figures. Accuracy $\pm 0.05\% \pm 1$ digit.	HP 3440A with plug-in. 3444A
Ac Voltmeter	Sensitivity 100 μ V to 300V rms.	HP 403B.
Sampling Oscilloscope	Dual-channel, 1 GHz bandwidth, 1mV/div sensitivity, sweep speeds 10pS/div to 2S/div.	HP 140A with plug-ins 1410A, 1424A
Pulse Generator	Rep. rates 3 Hz to 10 MHz, 30nS pulse width, variable amplitude between ± 2 V, fast rise and fall times (5...)	HP 8003A
ACCESSORIES	SYMBOLS USED IN THIS SECTION	RECOMMENDED MODEL
50 Ω feed-through termination		HP 11048B
50 Ω cable assembly with male BNC connectors (4 required)		HP 10120A
20dB Co-axial attenuator		HP 8491A
50 Ω T connector, type GR		HP 10221A
50 Ω Termination, type GR		GR 874 - W50B
50 Ω Cable Assembly with male BNC connector and dual banana plug		HP 11001A
Probe divider 10:1		HP 10214A

Table 5-2. Preliminary Check: Internal Operation

INITIAL CONTROL SETTINGS		TEST SET-UP
PULSE PERIOD 2	$3\mu - .1m$	
VERNIER 3	CCW	
PULSE DELAY 4	$1.5\mu - 50\mu$	
VERNIER 5	CCW	
PULSE WIDTH 6	$1.5\mu - 50\mu$	
VERNIER 7	CCW	
TRANSITION TIME 8	$0.1\mu - 5\mu$	
LEADING EDGE 9	CCW	
TRAILING EDGE 10	CCW	
AMPLITUDE 11	$2.5 - 5$	
VERNIER 12	CW	
OFFSET 13	ON	
VERNIER 14	Mid-range	
Mode selector 15	NORM	
DOUBLE PULSE/D. FLAY 17	DELAY	
SYMM, NORM, COM' L 22	NORM	
PULSE POLARITY 24	+	

The purpose of this preliminary check is to establish whether the instrument produces pulses of approximately the right dimensions in the normal mode.

STEP INSTRUCTIONS

- 1 Set up the instruments as shown above.

RESULTS

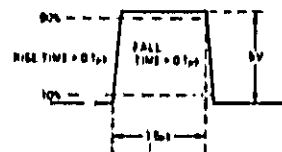
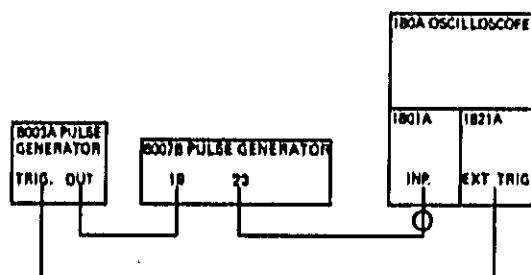


Table 5-3. Preliminary Check: External Operation

INITIAL CONTROL SETTINGS	
PULSE PERIOD 2	$3\mu - .1m$
VERNIER 3	Mid-range
PULSE DELAY 4	$1.5\mu - 50\mu$
VERNIER 5	Mid-range
PULSE WIDTH 6	$1.5\mu - 50\mu$
VERNIER 7	Mid-range
TRANSITION TIME 8	$0.1\mu - 5\mu$
LEADING EDGE 9	CCW
TRAILING EDGE 10	CCW
AMPLITUDE 11	1 - 2.5
VERNIER 12	CW
OFFSET 13	ON
VERNIER 14	Mid-range
Mode selector 15	GATE
EXT. LEVEL 16	+0.5 (approx.)
DOUBLE PULSE/DELAY 17	DELAY
SLOPE/POLARITY 20	+
SYMM. NORM. COMPL. 22	+
PULSE POLARITY 24	NORM



The purpose of this preliminary check is to determine whether the instrument produces pulses of approximately the right dimensions in the four external modes of operation.

STEP INSTRUCTION

- 1 Set up the instruments as shown above.
- 2 Adjust the 8003A to deliver a $200\mu s$ positive pulse.
- 3 Set the 8007B mode selector to EXT. TRIG.
- 4 Set the 8007B mode selector to WIDTH TRIG.
- 5 Set the 8007B mode selector to EXT WIDTH.

RESULTS

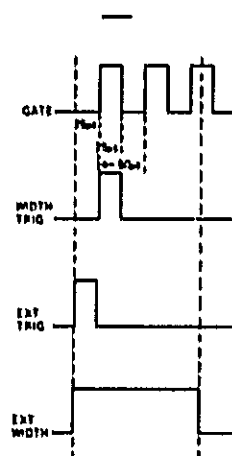


Table 5-4, Preliminary Check; Manual Operation

INITIAL CONTROL SETTINGS

PULSE DELAY 2	MAN
VERNIER 3	Mid-range
PULSE DELAY 4	1.5 μ - 5 μ
VERNIER 5	Mid-range
PULSE WIDTH 6	1.5 μ - 50 μ
VERNIER 7	Mid-range
TRANSITION TIME 8	0.1 μ - 5 μ
LEADING EDGE 9	CCW
TRAILING EDGE 10	CCW
AMPLITUDE 11	1 - 2.5
VERNIER 12	CW
OFFSET 13	ON
VERNIER 14	Mid-range
Mode selector 15	NORM
DOUBLE PULSE/DELAY 17	DELAY
SYMM, NORM, COMPL. 22	NORM
PULSE POLARITY 24	+



STEP INSTRUCTIONS

- 1 Press the 8007B MANUAL push-button 1 ten times.

RESULTS

The counter reads 5.

Note: The 5252A plug-in is a divider that counts every other pulse.

Table 5-5, Performance Check: Transition Times (minimum)

6007B PULSE GENERATOR

140A OSCILLOSCOPE

1424A EXT. TRIG.

1410A

INITIAL CONTROL SETTINGS

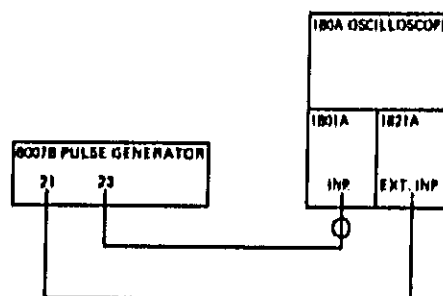
PULSE PERIOD 2	10n - .1μ
VERNIER 3	CW
PULSE DELAY 4	5n - 50n
VERNIER 5	CCW
PULSE WIDTH 6	5n - 50n
VERNIER 7	CW
TRANSITION TIME 8	2n - 0.1μ
LEADING EDGE 9	CCW
TRAILING EDGE 10	CCW
AMPLITUDE 11	2.5 - 5
VERNIER 12	CW
OFFSET 13	OFF
Mode selector 15	NORM
DOUBLE PULSE/DELAY 17	DELAY
SYMM, NORM, COMPL. 22	SYMM
PULSE POLARITY 24	+

STEP	INSTRUCTIONS	RESULTS
1	Adjust the 1424A sensitivity for full screen display, set to EXPAND.	—
2	Vary VERNIER 5 to center the pulse leading edge on the screen. Measure the rise time;	< 2ns
3	Vary VERNIER 5 to center the pulse trailing edge on the screen. Measure the fall time;	< 2ns
4	Set the SYMM, NORM, COMPL. switch to NORM. Measure the rise and fall times for a negative and positive pulse.	< 2ns

Table 5-6. Performance Check: Transition Times (greater than 2ns)

INITIAL CONTROL SETTINGS

PULSE PERIOD 2	.1 μ – 3 μ
VERNIER 3	CW
PULSE DELAY 4	5n – 50n
VERNIER 5	CCW
PULSE WIDTH 6	50n – 1.5 μ
VERNIER 7	CW
TRANSITION TIME 8	2n – 0.1 μ
LEADING EDGE 9	CW
TRAILING EDGE 10	CW
AMPLITUDE 11	2.5 – 5
VERNIER 12	CW
OFFSET 13	OFF
Mode selector 15	NORM
DOUBLE PULSE/DELAY 17	DELAY
SYMM. NORM. COMPL. 22	SYMM
PULSE POLARITY 24	+



Check the transition times with the controls set as shown below. For each setting, center the leading and then the trailing edge on the screen by means of the pulse delay VERNIER 5.

TRANSITION TIME 8	PULSE WIDTH 6 PULSE DELAY 4	PULSE PERIOD 2	LEADING EDGE 9 TRAILING EDGE 10	RESULT
2n – .1 μ	50n – 1.5 μ	.1 μ – 3 μ	CW	> .1 μ s
.1 μ – 5 μ	50n – 1.5 μ	.1 μ – 3 μ	CCW	< .1 μ s
.1 μ – 5 μ	1.5 μ – 50 μ	3 μ – .1m	CW	> 5 μ s
5 μ – 250 μ	1.5 μ – 50 μ	3 μ – .1m	CCW	< 5 μ s
5 μ – 250 μ	50 μ – 1.5m	.1m – 3m	CW	> 250 μ s

Table 5-7. Performance Check: Linearity

5007B PULSE GENERATOR

21 22

140A OSCILLOSCOPE

1424A EXT. TRIG.

1410A

INITIAL CONTROL SETTINGS	
PULSE PERIOD 2	10n - .1μ
VERNIER 3	CW
PULSE DELAY 4	5n - 50n
VERNIER 5	CCW
PULSE WIDTH 6	5n - 50n
VERNIER 7	CW
TRANSITION TIME 8	2n - 0.1μ
LEADING EDGE 9	Mid-range
TRAILING EDGE 10	Mid-range
AMPLITUDE 11	2.5 - 5
VERNIER 12	CW
OFFSET 13	OFF
Mode selector 15	NORM
DOUBLE PULSE/DELAY 17	DELAY
SYMM. NORM. COMPL. 22	SYMM
PULSE POLARITY 24	+

STEP INSTRUCTIONS

- 1) Adjust LEADING EDGE 9 for a rise time of 20ns.
Measure the linearity deviation.
- 2) Adjust TRAILING EDGE 10 for a fall time of 20ns.
Measure the linearity deviation.

RESULTS

Deviation from a straight line between the 10% and 90% points. Should not exceed 5% of the peak voltage.

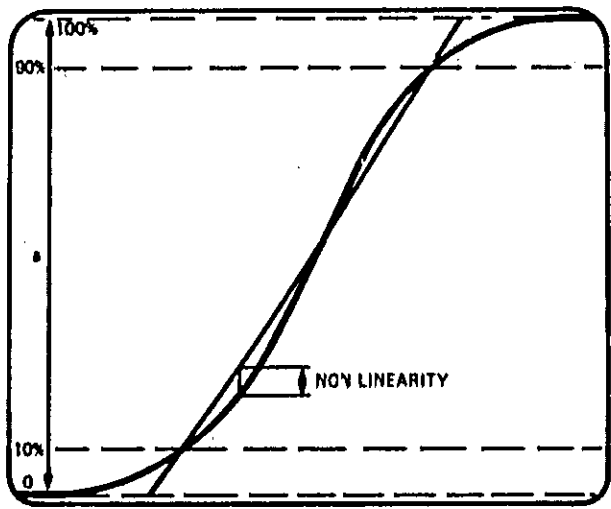
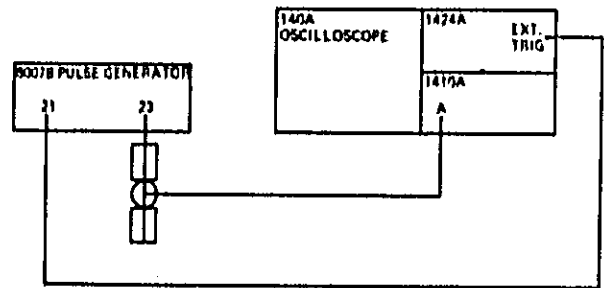


Table 5-8. Performance Check: Preshoot, Overshoot and Ringing

INITIAL CONTROL SETTINGS

PULSE PERIOD 2	10n - .1 μ
VERNIER 3	CW
PULSE DELAY 4	5n - 50n
PULSE WIDTH 5	5n - 50n
VERNIER 6	CCW
VERNIER 7	CW
TRANSITION TIME 8	2n - 0.1 μ
LEADING EDGE 9	CCW
TRAILING EDGE 10	CCW
AMPLITUDE 11	2.5 - 5
VERNIER 12	CW
OFFSET 13	OFF
Mode selector 15	NORM
DOUBLE PULSE/DELAY 17	DELAY
SYMM. COMPL. NORM. 22	SYMM
PULSE POLARITY 24	+



STEP INSTRUCTIONS

- 1 Measure preshoot, overshoot and ringing in turn.
- 2 Switch PULSE POLARITY to (-). Check preshoot, overshoot and ringing of negative pulse.

RESULTS

< 5% of pulse amplitude in each case.

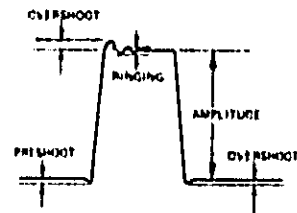
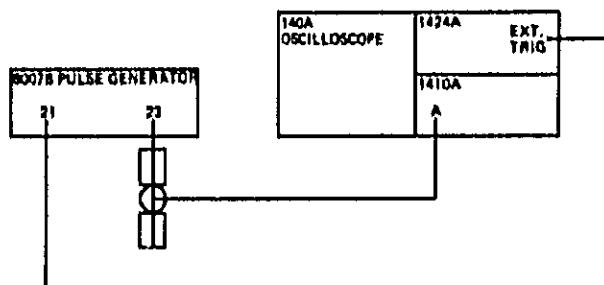


Table 5-9. Performance Check: Pulse Width (less than 50ns)

INITIAL CONTROL SETTINGS	
PULSE PERIOD 2	10n - .1 μ
VERNIER 3	CW
PULSE DELAY 4	5n - 50n
VERNIER 5	CCW
PULSE WIDTH 6	5n - 50n
VERNIER 7	CCW
TRANSITION TIME 8	2n - 0.1 μ
LEADING EDGE 9	CCW
TRAILING EDGE 10	CCW
AMPLITUDE 11	2.5 - 5
VERNIER 12	CW
OFFSET 13	OFF
Mode selector 15	NORM
DOUBLE PULSE/DELAY 17	DELAY
SYMM. NORM. COMPL. 22	SYMM
PULSE POLARITY 24	+



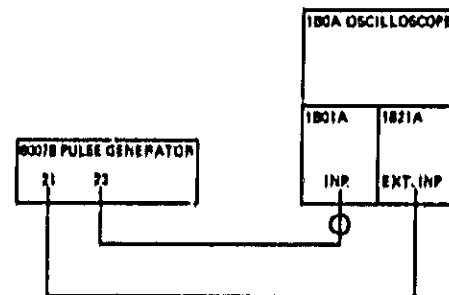
Check the pulse width with the controls set as shown below.

PULSE WIDTH 6	VERNIER 7	PULSE POLARITY 24	RESULTS
5n - 50n	CCW	+ and -	< 5ns
5n - 50n	CW	+ and -	> 50ns
50n - 1.5 μ	CCW	+ and -	< 50ns

Table 5-10, Performance Check : Pulse Width (greater than 50ns)

INITIAL CONTROL SETTINGS

PULSE PERIOD 2	.1 μ - 3 μ
VERNIER 3	CW
PULSE DELAY 4	5n - 50n
VERNIER 5	CCW
PULSE WIDTH 6	50n - 1.5 μ
VERNIER 7	CW
TRANSITION TIME 8	2n - 0.1 μ
LEADING EDGE 9	CCW
TRAILING EDGE 10	CCW
AMPLITUDE 11	1 - 2.5
VERNIER 12	CW
OFFSET 13	OFF
Mode selector 15	NORM
DOUBLE PULSE/DELAY 17	DELAY
SYMM. NORM. COMPL. 22	SYMM
PULSE POLARITY 24	+

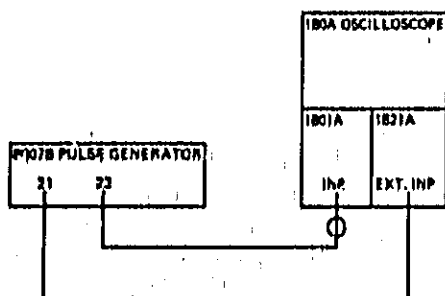


Check the pulse width with the controls set as shown below.

PULSE WIDTH 6	VERNIER 7	PULSE PERIOD 2	RESULTS
50n - 1.5 μ	CW	.1 μ - 3 μ	> 1.5 μ s
1.5 μ - 50 μ	CCW	.1 μ - 3 μ	< 1.5 μ s
1.5 μ - 50 μ	CW	3 μ - .1m	> 50 μ s
50 μ - 1.5m	CCW	3 μ - .1m	< 50 μ
50 μ - 1.5m	CW	.1m - 3m	> 1.5ms
1.5m - 50m	CCW	.1m - 3m	< 1.5ms
1.5m - 50m	CW	3m - .1	> 50ms

Table 5-11. Performance Check: Pulse Width Jitter

INITIAL CONTROL SETTINGS	
PULSE PERIOD 2	1m - 3m
VERNIER 3	CCW
PULSE DELAY 4	5n - 50n
VERNIER 5	CCW
PULSE WIDTH 6	50μ - 1.5m
VERNIER 7	CCW
TRANSITION TIME 8	2n - 0.1μ
LEADING EDGE 9	CCW
TRAILING EDGE 10	CCW
AMPLITUDE 11	1 - 2.5
VERNIER 12	CW
OFFSET 13	OFF
Mode selector 15	NORM
DOUBLE PULSE/DELAY 17	DELAY
SYMM. NORM. COMPL. 22	SYMM
PULSE POLARITY 24	+



STEP	INSTRUCTIONS	RESULT
1	Adjust the pulse width VERNIER 7 for a pulse of 50μs width.	
2	Adjust the 1821A TIME/DIV control and DELAY (DIV) control so that the intensified portion of the main sweep coincides with the trailing edge of the pulse.	
3	Set the 1821A Sweep Display switch to DELAYED and center the trailing edge by adjusting the DELAY (DIV) control.	
4	Set the 180A Magnifier to X5.	Pulse Jitter < 60ns.

Table 5-12. Performance Check: Maximum Duty Cycle

INITIAL CONTROL SETTINGS

PULSE PERIOD 2	$3\mu - 1m$
VERNIER 3	CW
PULSE DELAY 4	$5n - 50n$
VERNIER 5	CCW
PULSE WIDTH 6	$50\mu - 1.5m$
VERNIER 7	CCW
TRANSITION TIME 8	$2n - 0.1\mu$
LEADING EDGE 9	CCW
TRAILING EDGE 10	CCW
AMPLITUDE 11	2.5 - 5
VERNIER 12	CW
OFFSET 13	OFF
Mode selector 15	NORM
DOUBLE PULSE/DELAY 17	DELAY
SYMM. NORM. COMPL. 22	SYMM
PULSE POLARITY 24	+

6007B PULSE GENERATOR

180A OSCILLOSCOPE

21 22

1801A 1821A

INP EXT. INP

STEP INSTRUCTIONS

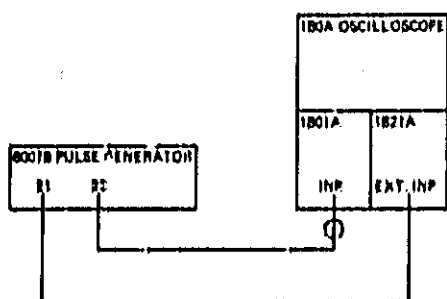
RESULT

- 1 Turn the pulse width VERNIER slowly CW until the pulse period is affected (count down) and calculate the duty cycle at that pulse width.

> 50% "on time"

Table 5-13, Performance Check: Amplitude.

INITIAL CONTROL SETTINGS	
PULSE PERIOD 2	.1m - 3m
VERNIER 3	CCW
PULSE DELAY 4	5n - 50n
VERNIER 5	CCW
PULSE WIDTH 6	50μ - 1.5m
VERNIER 7	CCW
TRANSITION TIME 8	2n - 0.1μ
FADING EDGE 9	CCW
TRAILING EDGE 10	CCW
AMPLITUDE 11	2.5 - 5
VERNIER 12	CW
OFFSET 13	OFF
Mode selector 15	NORM
DOUBLE PULSE/DELAY 17	5n - 50n
SYMM, NORM, COMPL, 22	SYMM
PULSE POLARITY 24	+



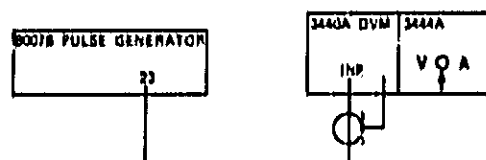
Check the pulse amplitude with the controls set as shown below. Repeat test with the PULSE POLARITY switch 24 set to (-).

AMPLITUDE 11	VERNIER 12	RESULTS
5 - 2.5	CW	>5.0V
5 - 2.5	CCW	<2.5V
2.5 - 1	CW	>2.5V
2.5 - 1	CCW	<1.0V
1 - .5	CW	>1.0V
1 - .5	CCW	<0.5V
.5 - .2	CW	>0.5V
.5 - .2	CCW	<0.2V

Table 5-14. Performance Check: Source Impedance

INITIAL CONTROL SETTINGS

PULSE PERIOD 2	3 μ - .1m
VERNIER 3	Mid-range
PULSE DELAY 4	1.5 μ - 50 μ
VERNIER 5	Mid-range
PULSE WIDTH 6	1.5 μ - 50 μ
VERNIER 7	Mid-range
TRANSITION TIME 8	0.1 μ - 5 μ
LEADING EDGE 9	CCW
TRAILING EDGE 10	CCW
AMPLITUDE 11	2.5 - 5
VERNIER 12	CW
OFFSET 13	ON
Mode selector 15	NORM
DOUBLE PULSE/DELAY 17	DELAY
LINE 18	OFF
SYMM, NORM, COMPL. 22	SYMM
PULSE POLARITY 24	+



STEP INSTRUCTIONS

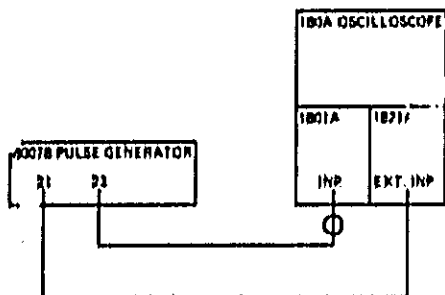
RESULTS

- 1 Check the source impedance with VERNIER 12 CW and then CCW,

50 Ω \pm 4 Ω

Table 5-15, Performance Check: Offset

INITIAL CONTROL SETTINGS	
PULSE PERIOD 2	3 μ - 1m
VERNIER 3	Mid-range
PULSE DELAY 4	1.5 μ - 50 μ
VERNIER 5	Mid-range
PULSE WIDTH 6	1.5 μ - 50 μ
VERNIER 7	Mid-range
TRANSITION TIME 8	.1 μ - 5 μ
LEADING EDGE 9	CCW
TRAILING EDGE 10	CCW
AMPLITUDE 11	OFF
VERNIER 12	CW
OFFSET 13	OFF
VERNIER 14	CW
Mode selector 15	NORM
DOUBLE PULSE/DELAY 17	DELAY
SYMM. NORM. COMPL. 22	SYMM
PULSE POLARITY 24	+

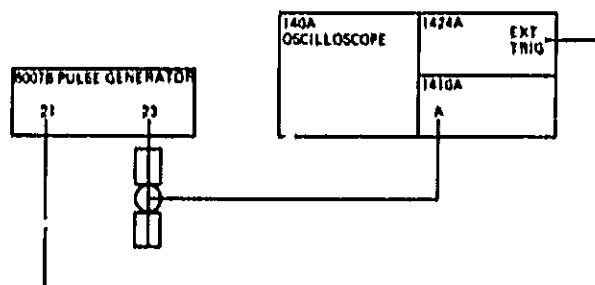


STEP	INSTRUCTIONS	RESULTS
1	Center the oscilloscope trace	—
2	Switch OFFSET 13 on and measure the baseline potential.	> +4V
3	Turn VERNIER 14 CCW and measure the baseline potential.	> -4V
4	Switch the AMPLITUDE selector 11 to 2.5 - 5 and check the baseline potential with VERNIER 14 at both extremities.	> +4V and > -4V

Table 5-16. Performance Check: Pulse Delay (less than 0.5 μ S)

INITIAL CONTROL SETTINGS

PULSE PERIOD 2	.1 μ - 3 μ
VERNIER 3	CW
PULSE DELAY 4	5n - 50n
VERNIER 5	CCW
PULSE WIDTH 6	5n - 50n
VERNIER 7	CW
TRANSITION TIME 8	2n - 0.1 μ
LEADING EDGE 9	CCW
TRAILING EDGE 10	CC
AMPLITUDE 11	2.5 - 5
VERNIER 12	CW
OFFSET 13	OFF
Mode selector 15	NORM
DOUBLE PULSE/DELAY 17	DELAY
SYMM, NORM, COMPL 22	SYMM
PULSE POLARITY 24	+



STEP	INSTRUCTIONS	RESULTS
1	Observe the position of the pulse's leading edge. Regard this position as 30ns from the trigger.	—
2	Turn VERNIER 10 CW	Pulse delay > 75ns
3	Set PULSE DELAY 9 to 50n - 1.5 μ and turn VERNIER 10 CCW,	Pulse delay < 75ns.

Table 5-17, Performance Check: Pulse Delay (more than 50nS)

6007B PULSE GENERATOR

21 23

180A OSCILLOSCOPE

1801A 1821A

INP EXT. INP

INITIAL CONTROL SETTINGS

PULSE PERIOD	2	3μ - .1m
VERNIER	3	CW
PULSE DELAY	4	5n - 50n
VERNIER	5	CCW
PULSE WIDTH	6	5n - 50n
VERNIER	7	CW
TRANSITION TIME	8	2n - .1μ
LEADING EDGE	9	CCW
TRAILING EDGE	10	CCW
AMPLITUDE	11	2.5 - 5
VERNIER	12	CW
OFFSET	13	OFF
Mode selector	15	NORM
DOUBLE PULSE/DELAY	17	DELAY
SYMM, NORM, COMPL.	22	SYMM
PULSE POLARITY	24	+

STEP INSTRUCTIONS

- 1
- Observe the position of the pulse's leading edge. Regard this position as 30ns from the trigger.
- 2,
- Measure the pulse delay with the controls set as shown below.

PULSE DELAY 4	VERNIER 5	PULSE PERIOD 2	PULSE WIDTH 6	RESULTS
50n - 1.5μ	CW	3μ - .1m	1.5μ - 50	> 1.5μs
1.5μ - 50μ	CCW	3μ - .1m	1.5μ - 50μ	< 1.5μs
1.5μ - 50μ	CW	.1m -	50 μ - 1.5m	> 50μs
50μ - 1.5m	CCW	.1m - 3m	50 μ - 1.5m	< 50μs
50μ - 1.5m	CW	.1m - 3m	50 μ - 1.5m	> 1.5ms
1.5m - 50m	CCW	3m - .1	1.5m - 50m	< 1.5ms
1.5m - 50m	CW	3m - .1	1.5m - 50m	> 50ms

Table 5-18. Performance Check: Pulse Delay Jitter

INITIAL CONTROL SETTINGS

PULSE PERIOD	2	.1m - 3m
VERNIER	3	CW
PULSE DELAY	4	50μ - 1.5m
VERNIER	5	CCW
PULSE WIDTH	6	1.5μ - 50μ
VERNIER	7	CW
TRANSITION TIME	8	2n - 0.1μ
LEADING EDGE	9	CCW
TRAILING EDGE	10	CCW
AMPLITUDE	11	1 - 2.5
VERNIER	12	CW
OFFSET	13	OFF
Mode selector	15	NORM
DOUBLE PULSE/DELAY	17	DELAY
SYMM. NORM. COMPL.	22	SYMM
PULSE POLARITY	24	+

80078 PULSE GENERATOR

2122

180A OSCILLOSCOPE

1801A1821A

INPEXT. INP

STEPINSTRUCTIONS

RESULTS

- 1

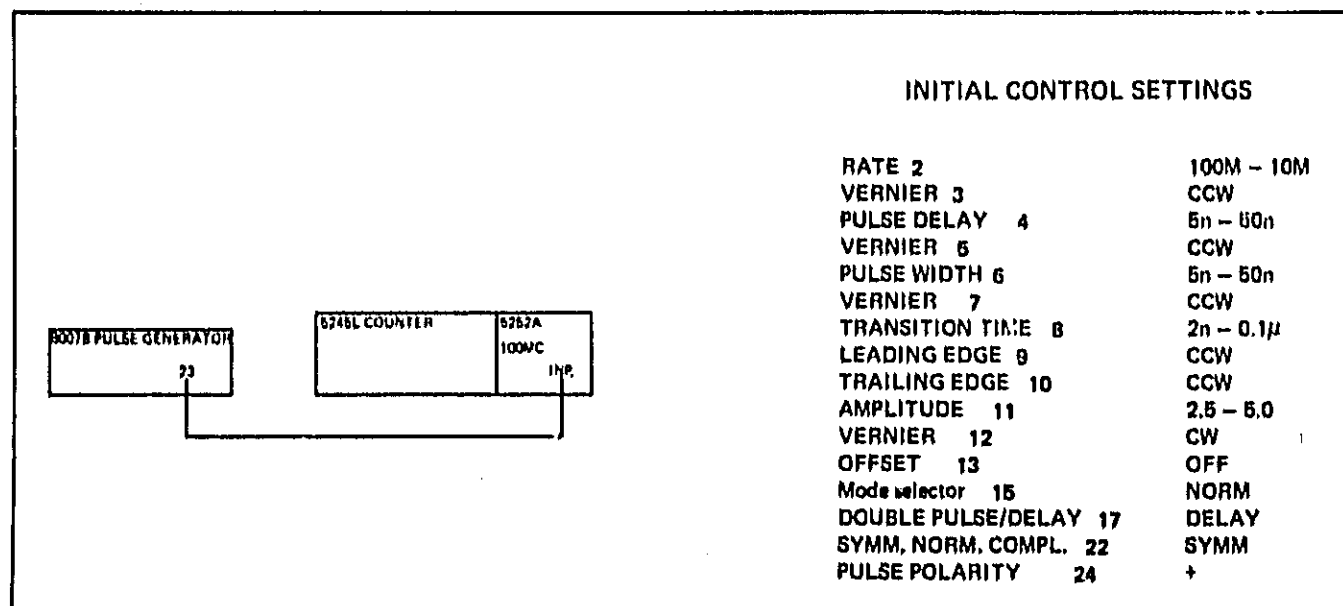
Adjust the distance between the delayed and the undelayed pulse to 50μs by means of VERNIER 5.
- 2

Adjust the 1821A TIME/DIV control and DELAY (DIV) control so that the intensified portion of the main sweep coincides with the leading edge of the delayed pulse.
- 3

Switch the 1821A Sweep Display switch to MIXED and the 180A Magnifier to X5.

Pulse Jitter < 50ns.

Table 5-19, Performance Check: Pulse Period (Rep. Rate)



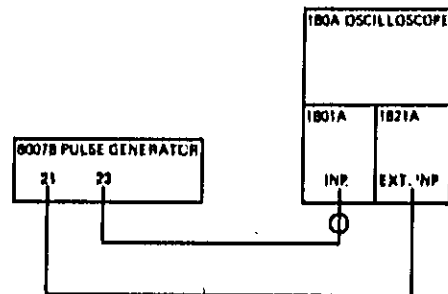
Check the repetition rate with the controls set as shown below.

RATE 2	VERNIER 3	RESULTS
100M - 10M	CCW	> 100MHz
100M - 10M	CW	< 10MHz
10M - 3M	CCW	> 10MHz
10M - 3M	CW	< 3MHz
3M - 10K	CCW	> 3MHz
3M - 10K	CW	< 10 kHz
10K - 3K	CCW	> 10kHz
10K - 3K	CW	< 3kHz
3K - 10	CCW	> 3kHz
3K - 10	CW	< 10 Hz

Table 5-20. Performance Check: Pulse Period Jitter

INITIAL CONTROL SETTINGS

PULSE PERIOD 2	.1m - 3m
VERNIER 3	CCW
PULSE DELAY 4	5n - 50n
VERNIER 5	CCW
PULSE WIDTH 6	1.5μ - 50μ
VERNIER 7	CW
TRANSITION TIME 8	2n - 0.1μ
LEADING EDGE 9	CCW
TRAILING EDGE 10	CCW
AMPLITUDE 11	2.5 - 5.0
VERNIER 12	CW
OFFSET 13	OFF
Mode selector 15	NORM
DOUBLE PULSE/DELAY 17	DELA
SYMM. NORM. COMPL. 22	SYMM.
PULSE POLARITY 24	+



STEP INSTRUCTIONS

RESULT

- 1 Adjust the oscilloscope to display to pulses.
- 2 Adjust the 1821A TIME/DIV control and DELAY (DIV) control so that the intensified portion of the main sweep coincides with the leading edge of the second pulse displayed.
- 3 Set the 1821A Sweep Display switch to DELAYED and center the leading edge by adjusting the DELAY (DIV) control.

Pulse Jitter < 100ns.

Table 5-21, Performance Check: Trigger Output

600V PULSE GENERATOR
21

20dB ATTENUATOR
B461A

140A OSCILLOSCOPE

1424A

1410A

INITIAL CONTROL SETTINGS

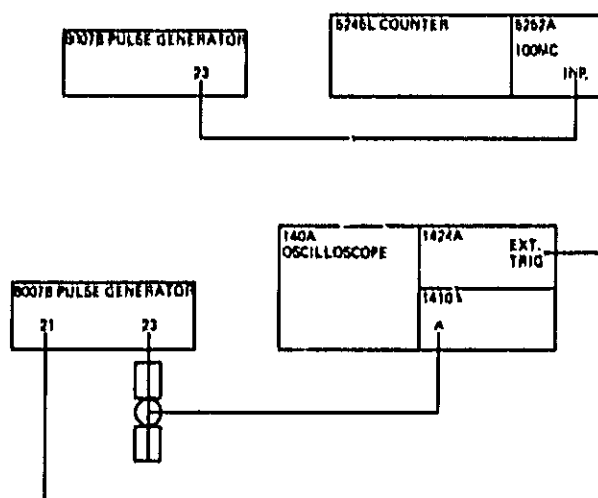
PULSE PERIOD	2	10n - .1μ
VERNIER	3	CW
PULSE DELAY	4	5n - 50n
VERNIER	5	CCW
PULSE WIDTH	6	5n - 50n
VERNIER	7	CCW
TRANSITION TIME	8	2n - 0.1μ
LEADING EDGE	9	CCW
TRAILING EDGE	10	CCW
AMPLITUDE	11	2.5 - 5
VERNIER	12	CW
OFFSET	13	OFF
Mode selector	15	NORM
DOUBLE PULSE/DELAY	17	DELAY
SYMM, NORM, COMPL.	22	SYMM
PULSE POLARITY	24	+

STEP	INSTRUCTIONS	RESULTS
1	Measure trigger amplitude	> 1V
2	Measure trigger width.	4ns ± 2ns

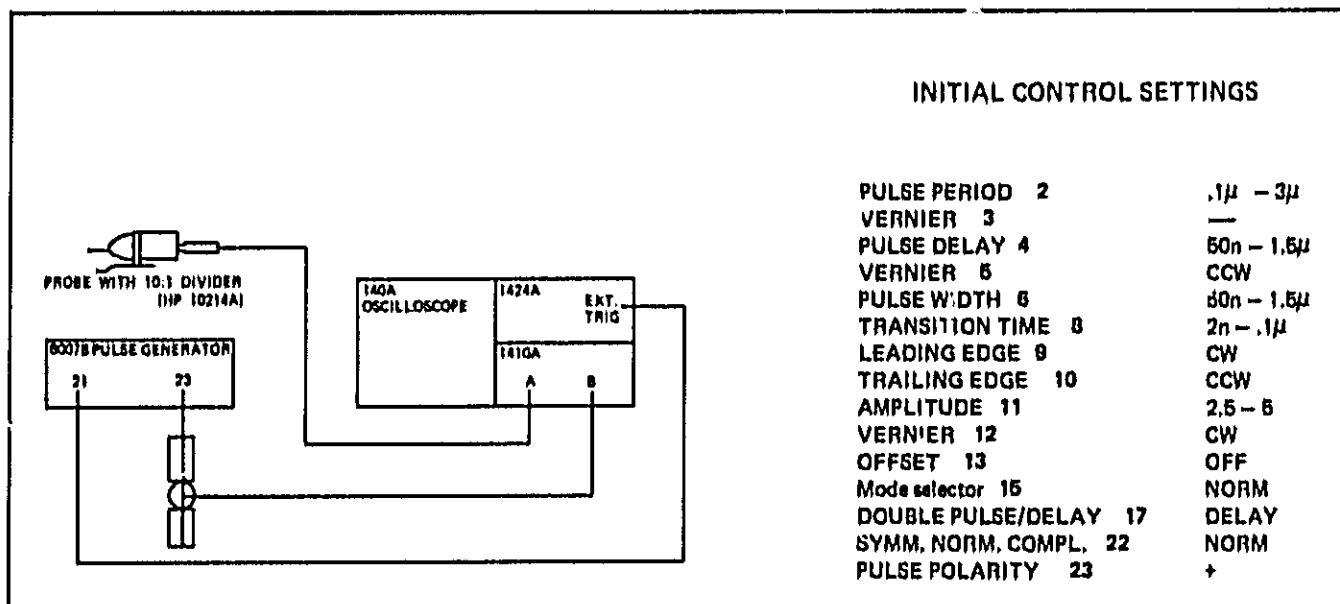
Table 5-22. Internal Checks and Adjustments: Timing Board A1

INITIAL CONTROL SETTINGS

PULSE PERIOD 2	10n - .1μ
VERNIER 3	CCW
PULSE DELAY 4	5n - 50n
VERNIER 5	CCW
PULSE WIDTH 6	5n - 50n
VERNIER 7	CCW
TRANSITION TIME 8	2n - 0.1μ
LEADING EDGE 9	CCW
TRAILING EDGE 10	CCW
AMPLITUDE 11	2.5 - 5
VERNIER 12	CW
OFFSET 13	OFF
Mode selector 15	NORM
DOUBLE PULSE/DELAY 17	DELAY
SYMM. NOIIM, COMPL. 22	SYMM
PULSE POLARITY 24	+



STEP	INSTRUCTIONS	ADJUST	RESULT
1	Connect the equipment as shown in TEST SET-UP 1.		
2	Measure the pulse period:	A1C3	105 MHz
3	Connect the equipment as shown in TEST SET-UP 2.		
4	Turn VERNIER 3 and VERNIER 7 fully CW.		
5	Measure the pulse width:	A1C402	60ns
6	Turn VERNIER 7 fully CCW and VERNIER 5 fully CW		
7	Measure the pulse delay variation:	A1C302	55ns

Table 5–23. Internal Checks and Adjustments: Output Board A2

LIMITERS ADJUSTMENT

1. Adjust VERNIER 3 for a pulse period of 600ns.
2. Adjust VERNIER 7 for a pulse width of 300ns.
3. With probe on 8007B ground, set the channel A trace to the center of the graticule.
4. With probe on test point 1 (see diagram 9 in section 6), adjust oscilloscope for a single pulse.
5. Adjust R639 to clip off the vertical portion of the leading edge. This adjustment should result in a maximum of 10ns rolloff of the leading edge when VERNIER 9 is turned from one extremity to the other. See figure 4-8 for a description of rolloff.
6. Turn leading edge VERNIER 9 CCW and trailing edge VERNIER 10 CW.
7. Adjust R632 to clip off the vertical portion of the trailing edge. This adjustment should result in a maximum of 10ns rolloff of the trailing edge when VERNIER 10 is turned from one extremity to the other.
8. Turn trailing edge VERNIER 10 CCW.
9. Adjust R724 so that the pulse is symmetrical to ground (center of the graticule).

POSITIVE/NEGATIVE BASELINE ADJUST

10. Set AMPLITUDE 11 to off.
11. Turn channel A trace out of view; set channel B trace to center of graticule.
12. Set AMPLITUDE 11 to the 2.5 to 5V position. Set R760 and R765 CW.

13. Adjust R760 so that the baseline of the pulse is centered on the graticule.
14. Switch PULSE POLARITY 24 to (-).
15. Adjust R765 so that the baseline of the pulse is centered on the graticule.

SHOULDER ADJUST

16. Turn both transitiontime VERNIERS 9 and 10 CW.
17. Adjust R732 for maximum sharpness of the pulse corners.



ROLLOFF SYMMETRY ADJUST

18. Turn both transition time **VERNIERS 9 and 10 CCW**.
19. Measure the rolloff of the leading edge by turning **VERNIER 9** from one extreme to the other.
20. Measure the rolloff of the trailing edge by turning **VERNIER 10** from one extreme to the other.
21. Adjust **R724** to increase the smaller of the two measurements (steps 19 and 20) by one half of the difference between the two.
22. Repeat steps 19, 20 and 21 until the leading edge and trailing edge rolloff are equal.

SCHEMATIC

DIAGRAMS

PARTS

LIST

6-1 GENERAL

6-2 This section contains circuit diagrams and component location diagrams for use in repairing the instrument. Included on the circuit diagrams are a number of waveforms to assist the repairman in localizing a fault.

6-3 Also included in this section is parts ordering information. The parts list for an assembly is located on the same page or near the component location diagram for that assembly. To order a replacement part, address an order of inquiry either to your authorized Hewlett-Packard sales representative or to:

CUSTOMER SERVICE
Hewlett-Packard Company
333 Logue Avenue
Mountain View, California 94049

or, in Western Europe, to:

Hewlett-Packard (Schweiz) AG
Rue du Bois-du-Lan 7
1217 Meyrin 2
Geneva

6-4 Specify the following information for each part:

Model and complete serial number of instrument.

Hewlett-Packard stock number of the part.

Circuit reference designator.

Description

6-5 To order a part not listed, give a complete description of the part and include its function and location.

Table 6-1. A guide to the diagrams

Diagram 1	8007B Assembly location and interconnection diagrams Parts List: Frame
Diagram 2 Sheet 1	Assembly A1: Component Layout Parts List Circuit Diagram Part 1
Diagram 2 Sheet 2	Assembly A1: Circuit Diagram Part 2
Diagram 2 Sheet 3	Assembly A1: Circuit Diagram Part 3
Diagram 3 Sheet 1	Assembly A2: Component Layout Parts List Circuit Diagram Part 1
Diagram 3 Sheet 2	Assembly A2: Circuit Diagram Part 2
Diagram 4:	Assemblies A4 and A7: Component Layout Parts List Circuit Diagram
Diagram 5:	Assembly A5: Component Layout Parts List Circuit Diagram
Diagram 6:	Assemblies A3 and A6: Component Layout Parts List Circuit Diagram

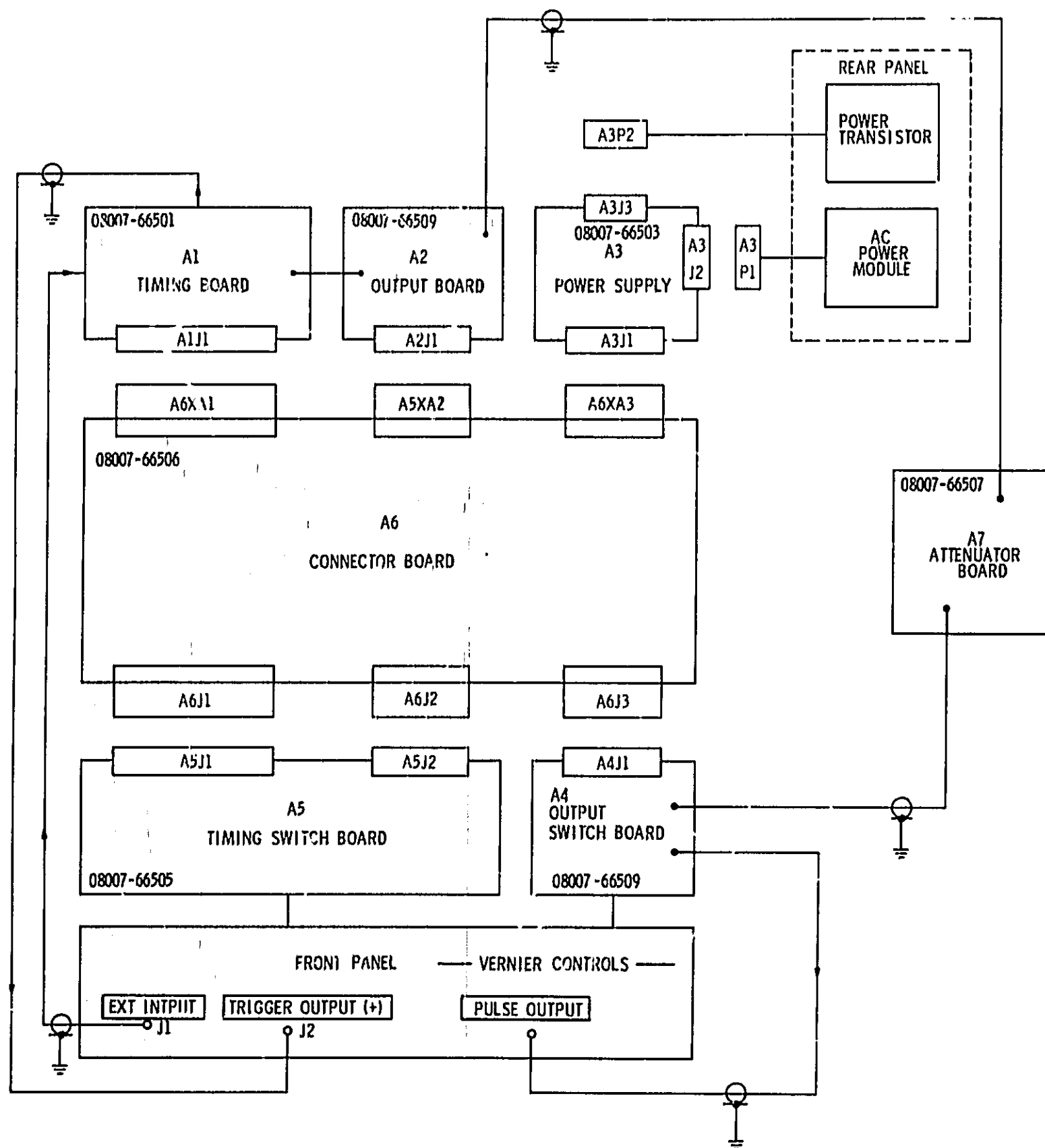
Table 6-2. Reference Designators

A = assembly	F = fuse	P = plug	V = vacuum tube, neon bulb, photocell, etc.
B = motor	FL = filter	Q = transistor	VR = voltage regulator
BT = battery	HR = heater	R = resistor	W = cable
C = capacitor	J = jack	RT = thermistor	X = socket
CP = coupler	K = relay	S = switch	Y = crystal
CR = diode	L = inductor	T = transformer	
DL = delay line	M = meter	TB = terminal board	
DS = lamp	MC = micro-circuit	TP = test point	

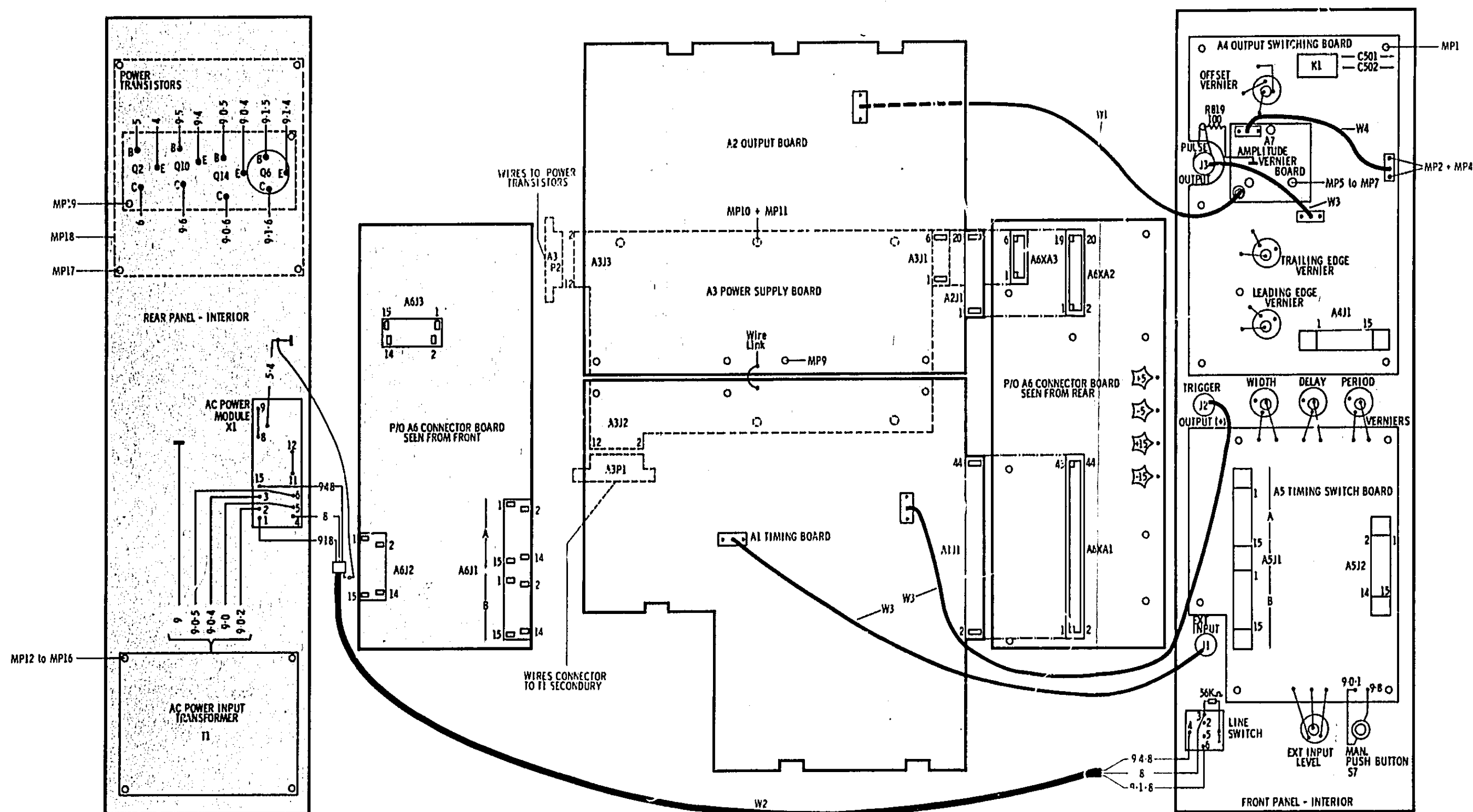
Table 6-3. Circuit Diagram Notes

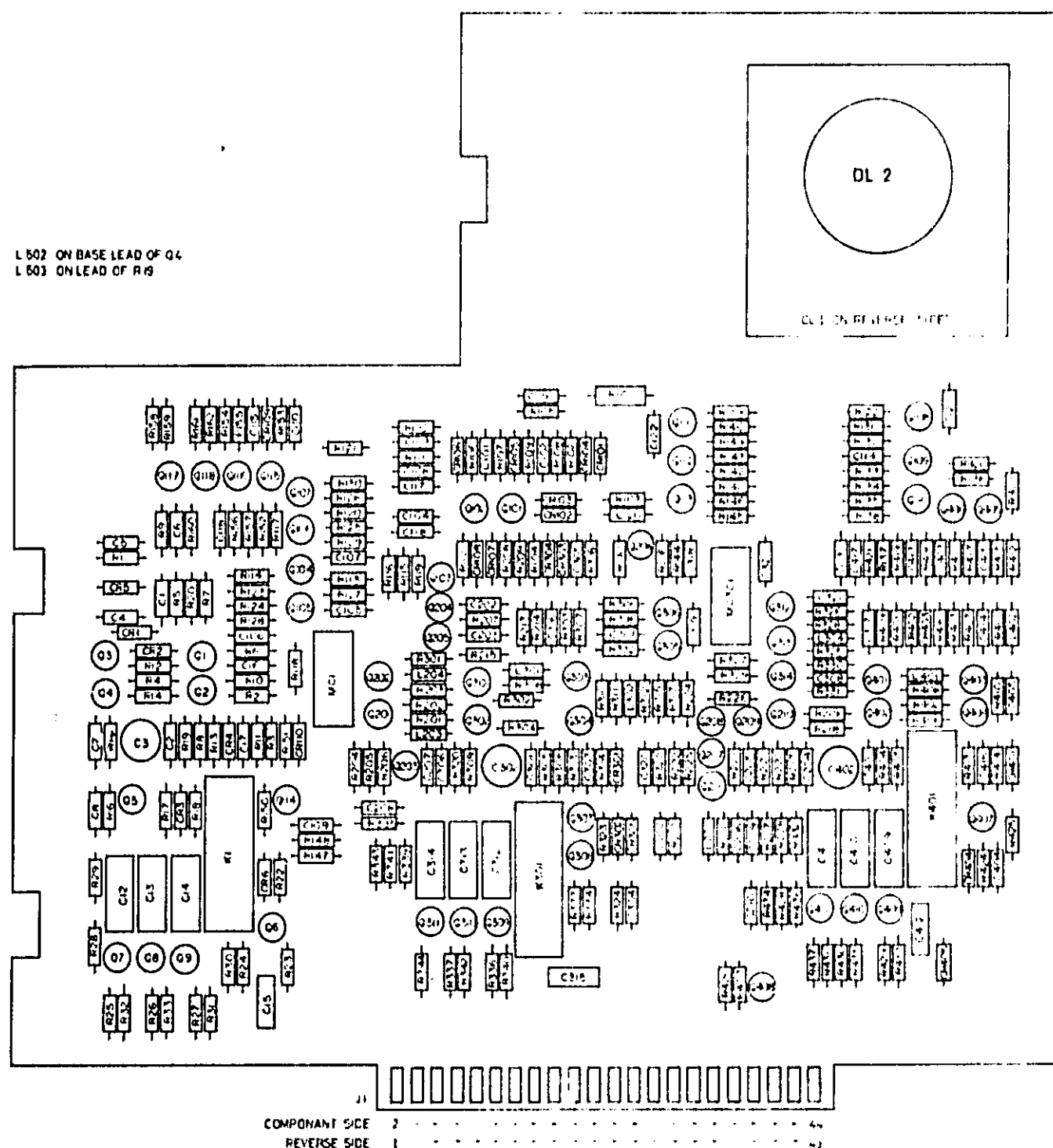
Refer to MIL-STD-15-1 for schematic symbols not listed in this table.	
Unless other indicated: capacitance in microfarads inductance in microhenries resistance in ohms	
	Front panel marking
	Rear panel marking
	Optimum value selected at factory
	Screwdriver adjustment
770	Part of
	Primary signal
	Feedback path
975	Insulated wire, white, violet, green
45	Insulated wire, yellow, green
	Center conductor Screened lead
	Chassis ground
ASSEMBLY AND COMPONENT REFERENCING The pulse generator consists of seven assemblies (A1 to A7) mounted in a frame. Components mounted on the assemblies are prefixed by the appropriate assembly number, thus A2CR2 is diode 2 mounted on A2. Components mounted directly on the frame have no prefix number.	

Waveform test point (with number)	
Voltage test point	
Avalanche (zener) diode	
Color Code	0 - Black 1 - Brown 2 - Red 3 - Orange 4 - Yellow 5 - Green 6 - Blue 7 - Violet 8 - Gray 9 - White
 Edge connector, pin 1	
 Spring contact connector, contact 2	



REFERENCE DESIGNATOR	HP PART NUMBER	DESCRIPTION	CIRCUIT DIAGRAM		COMPONENT LAYOUT
			SHEET NUMBER	GRID REFERENCE	
A1	08007-66501	NO. 1 TIMING			
A2	08007-66509	NO. 2 OUTPUT BOARD			
A3	08007-66503	NO. 3 POWER SUPPLY			
A4	08007-66509	NO. 4 OUTPUT BOARD			
A5	08007-66505	NO. 5 TIMING			
A6	08007-66506	NO. 6 CONNECTOR			
A7	08007-66507	NO. 7 ATTENUATOR			
F1	211C-0007	FUSE 1 AMP			
F2	211C-0202	FUSE 1/4 AMP			
HP1	220C-0103	SCR-MCH 6-50			
HP2	052C-0127	SCR-MCH 7-50			
HP3	218C-0014	SCR-MCH 8-12			
HP4	218C-0017	SCR-MCH 8-12			
HP5	218C-0017	SCR-MCH 8-12			
HP6	218C-0017	SCR-MCH 8-12			
HP7	038C-0008	SPACER RPS 1/4			
HP8	238C-0115	SCR-MCH 8-12			
HP9	238C-0203	SCR-MCH 8-12			
HP10	218C-0017	SCR-MCH 8-12			
HP11	218C-0017	SCR-MCH 8-12			
HP12	218C-0017	SCR-MCH 8-12			
HP13	218C-0017	SCR-MCH 8-12			
HP14	218C-0017	SCR-MCH 8-12			
HP15	1050-0071	WASH RPS 1/2			
HP16	1050-0187	WASH RPS 1/2			
HP17	218C-0121	SCR-MCH 8-12			
HP18	08007-21101	HEAT SINK			
HP19	218C-0125	SCR-MCH 8-12			
HP20	218C-0198	SCR-MCH 8-12			
HP21	08007-04102	SCR-MCH 8-12			
HP22	037C-2048	WASH RPS 1/2			
HP23	08007-04104	SCR-MCH 8-12			
HP24	08007-04105	SCR-MCH 8-12			
HP25	037C-1055	WASH RPS 1/2			
HP26	037C-1055	WASH RPS 1/2			
HP27	037C-1055	WASH RPS 1/2			
HP28	037C-1055	WASH RPS 1/2			
Q2	185A-0072	185A-0072			
Q6	185A-0072	185A-0072			
Q10	185A-0072	185A-0072			
Q14	185A-0072	185A-0072			
R1	0758-0049	R-1 33K 1/2W			
R501	210C-2590	R-501 10K 1/2W			
R502	210C-2590	R-502 10K 1/2W			
R503	210C-2590	R-503 10K 1/2W			
R504	210C-2590	R-504 10K 1/2W			
R505	0698-4292	R-505 10K 1/2W			
R506	210C-3081	R-506 10K 1/2W			
R507	210C-3081	R-507 10K 1/2W			
R508	210C-3081	R-508 10K 1/2W			
S7	3101-0124	SW-P-RTN SPST			
S13	3101-0124	SW-P-RTN SPST			
T1	5080-0947	TRF			
W1	08007-01001	W1 10K 1/2W			
W2	08007-01002	W2 10K 1/2W			
W3	08007-01003	W3 10K 1/2W			





REFERENCE DESIGNATOR	HP PART NUMBER	DESCRIPTION	CIRCUIT DIAGRAM		COMPONENT LAYOUT
			SHEET NUMBER	WIRING REFERENCE	
A1	R420	0750-0124	R-F	51 5E .125u	
A1	R421	0698-4241	R-F	27C 5E .125u	
A1	R422	0698-4242	R-F	30C 5E .125u	
A1	R423	0698-4227	R-F	48 5E .125u	
A1	R424	0698-4237	R-F	100 5E .125u	
A1	R425	0698-1000	R-F	24 5E .125u	
A1	R426	0698-4280	R-F	125K5E .125u	
A1	R427	0698-4802	R-F	10 5E .125u	
A1	R428	0693-1075	R-F	10K5E .25u CC	
A1	R429	0698-4238	R-F	1.5K5E .125u	
A1	R430	0698-4258	R-F	1.5K5E .125u	
A1	R431	0698-4258	R-F	1.5K5E .125u	
A1	R432	0683-1055	R-F	105E .75u LL	
A1	R433	0698-4239	R-F	22C 5E .125u	
A1	R434	0683-1055	R-F	105E .25u CC	
A1	R435	0698-4239	R-F	22C 5E .125u	
A1	R436	0683-1055	R-F	105E .25u CC	
A1	R437	0698-4239	R-F	22C 5E .125u	
A1	R776	0757-066J	R-F	7.5K1E .125u	

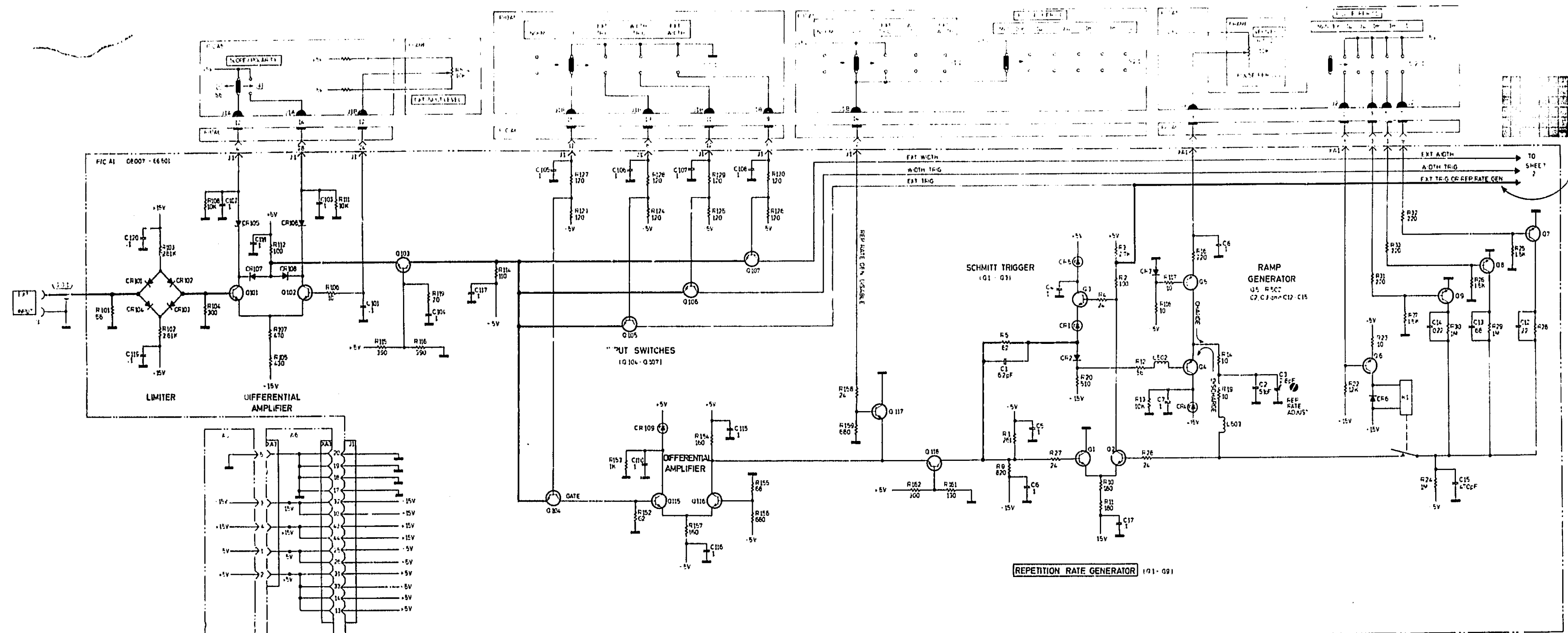
*Test Set-Up for Waveforms Shown

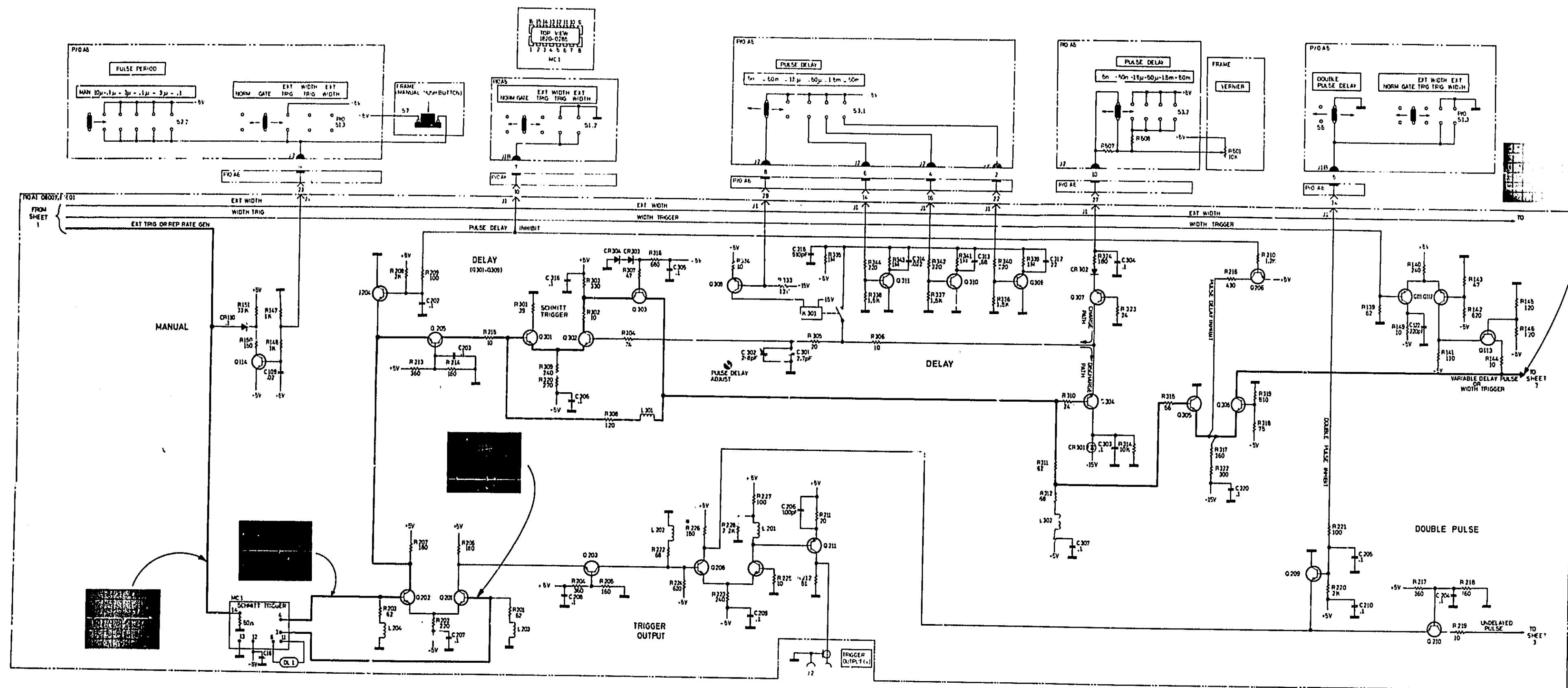
HP 140A with 1410A and 1425A Plug-ins

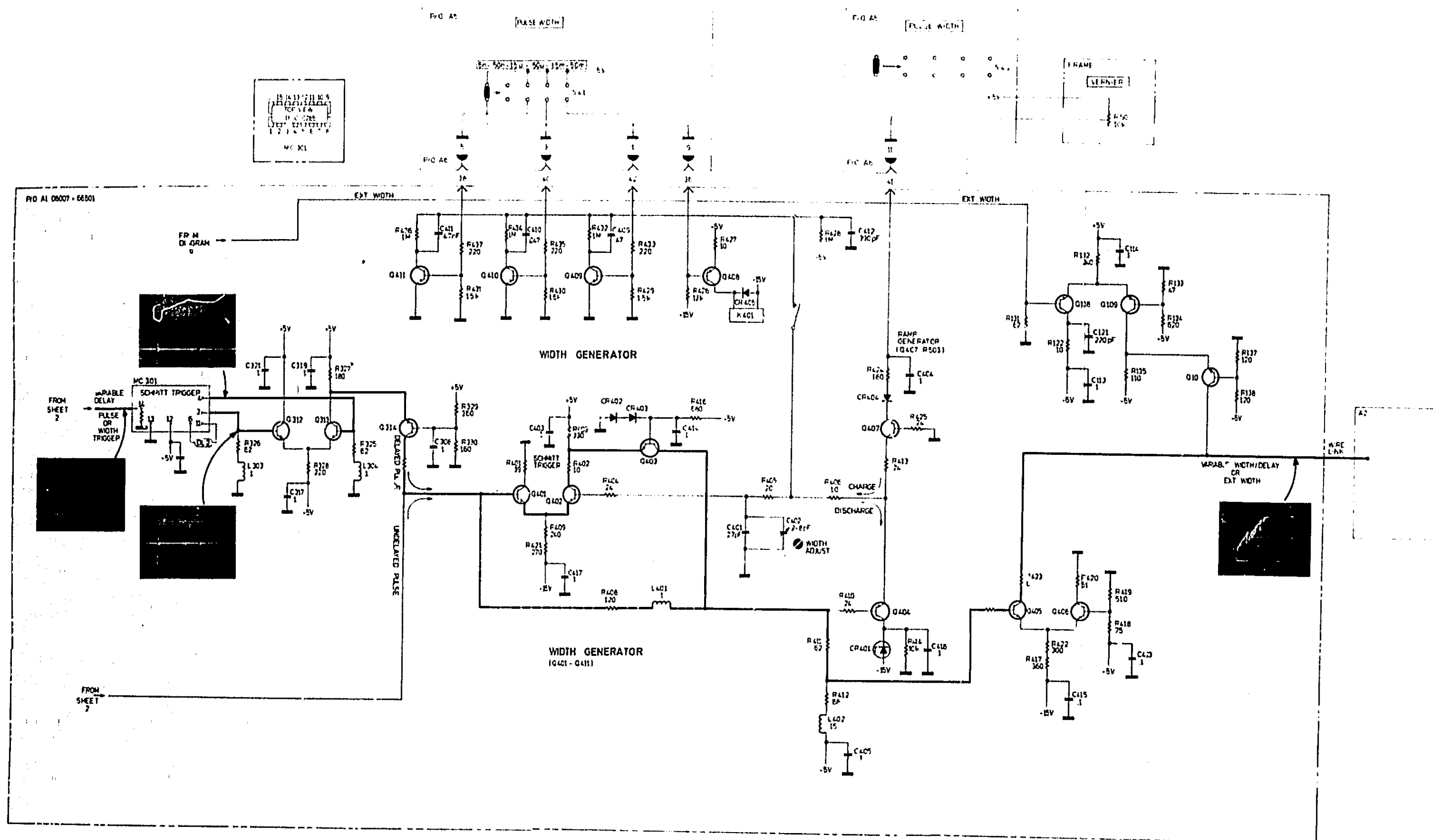
Sweep: 50ns/cm
Sensitivity: 100mV/cm
Probe with 10:1 divider

8007B Settings

Pulse Period: < 170ns
Delay: minimum
Width: ~ 100ns
Mode: NORM
SYMM,NORM,COMPL.:NORM
Pulse Polarity: +







REFERENCE DESIGNATOR	HP PART NUMBER	DESCRIPTION	CIRCUIT DIAGRAM		COMPONENT LAYOUT
			SHEET NUMBER	GRID REFERENCE	
A2	R515	0698-4274	R-F	5, 1A5E	.125W
A2	R516	0698-4268	R-F	3, 1A5E	.125W
A2	R517	0698-4271	R-F	5, 1A5E	.125W
A2	R518	0698-4271	R-F	5, 1A5E	.125W
A2	R519	0698-4271	R-F	5, 1A5E	.125W
A2	R520	0698-4271	R-F	5, 1A5E	.125W
A2	R601	0698-4741	R-F	2A5E	.125W F
A2	R602	0698-4741	R-F	270 SE	.125W
A2	R603	0698-4741	R-F	270 SE	.125W
A2	R604	0698-4741	R-F	41 SE	.125W
A2	R605	0698-4746	R-F	41 SE	.125W
A2	R607	U758-0028	R-F	270 SE	.25W
A2	R608	0698-4746	R-F	41 SE	.125W
A2	R609	0698-4802	R-F	10 SE	.125W
A2	R610	0698-4802	R-F	10 SE	.125W
A2	R611	0698-4746	R-F	41 SE	.125W
A2	R612	0698-4746	R-F	41 SE	.125W
A2	R613	0698-4802	R-F	10 SE	.125W
A2	R614	0698-4802	R-F	10 SE	.125W
A2	R615	0698-4746	R-F	41 SE	.125W
A2	R616	0698-4746	R-F	41 SE	.125W
A2	R617	0698-4746	R-F	41 SE	.125W
A2	R618	0698-4746	R-F	41 SE	.125W
A2	R619	0698-4746	R-F	41 SE	.125W
A2	R620	0698-4746	R-F	41 SE	.125W
A2	R621	0698-4746	R-F	41 SE	.125W
A2	R622	0698-4746	R-F	41 SE	.125W
A2	R623	0698-4746	R-F	41 SE	.125W
A2	R624	0698-4746	R-F	41 SE	.125W
A2	R625	0698-4746	R-F	41 SE	.125W
A2	R626	0698-4746	R-F	41 SE	.125W
A2	R627	0698-4746	R-F	41 SE	.125W
A2	R628	0698-4746	R-F	41 SE	.125W
A2	R629	0698-4746	R-F	41 SE	.125W
A2	R630	0698-4746	R-F	41 SE	.125W
A2	R631	0698-4254	R-F	1A5E	.125W F
A2	R632	2100-2749	R-F	2, 2A	.5W
A2	R633	0698-4244	R-F	3, 1A5E	.125W
A2	R634	0698-4250	R-F	400 SE	.125W
A2	R635	U758-0018	R-F	190 SE	.125W
A2	R636	0758-0008	R-F	100 SE	.125W
A2	R637	0698-4250	R-F	400 SE	.125W
A2	R638	0698-4254	R-F	1A5E	.125W F
A2	R639	2100-2749	R-F	2, 2A	.5W
A2	R640	0698-4244	R-F	3, 1A5E	.125W
A2	R641	0698-4254	R-F	1A5E	.125W F
A2	R642	0698-4746	R-F	41 SE	.125W
A2	R643	0698-5702	R-F	30 SE	.125W
A2	R644	0698-5702	R-F	30 SE	.125W
A2	R645	0698-4746	R-F	41 SE	.125W
A2	R646	0698-4254	R-F	1A5E	.125W F
A2	R647	0698-4746	R-F	41 SE	.125W
A2	R648	0698-4227	R-F	88 SE	.125W
A2	R649	0698-4227	R-F	88 SE	.125W
A2	R650	0698-4746	R-F	41 SE	.125W
A2	R651	0698-3800	R-F	24 SE	.125W
A2	R652	0698-3800	R-F	24 SE	.125W
A2	R653	0757-0405	R-F	182 SE	.125W
A2	R701	0698-4744	R-F	20 SE	.125W
A2	R702	0758-0008	R-F	100 SE	.125W
A2	R703	0698-4270	R-F	4, 1A5E	.125W
A2	R704	0698-4746	R-F	41 SE	.125W
A2	R705	0698-4746	R-F	41 SE	.125W
A2	R706	0757-0290	R-F	6, 1A5E	.125W
A2	R707	0757-0279	R-F	3, 1A5E	.125W
A2	R708	0757-0714	R-F	130 SE	.125W
A2	R709	0698-1643	R-F	287 SE	.125W
A2	R710	0698-4746	R-F	41 SE	.125W
A2	R711	0698-5172	R-F	11 SE	.125W
A2	R712	0698-4746	R-F	41 SE	.125W
A2	R713	0698-5172	R-F	11 SE	.125W
A2	R714	0758-0023	R-F	240 SE	.125W
A2	R715	0758-0023	R-F	240 SE	.125W
A2	R716	0698-4746	R-F	41 SE	.125W
A2	R717	0758-0008	R-F	88 SE	.125W
A2	R718	0698-4746	R-F	41 SE	.125W
A2	R719	0698-4746	R-F	41 SE	.125W
A2	R720	0757-0714	R-F	130 SE	.125W
A2	R721	0698-4244	R-F	47C SE	.125W
A2	R722	0698-4241	R-F	2A5E	.125W F
A2	R723	0698-4746	R-F	41 SE	.125W
A2	R724	2100-2742	R-F	10A20E	.5W
A2	R725	0698-4249	R-F	4, 1A5E	.125W
A2	R727	0698-3151	R-F	2, 2A	.5W
A2	R728	0698-4247	R-F	310 SE	.125W
A2	R729	0698-4250	R-F	400 SE	.125W
A2	R730	0698-4081	R-F	1, 9A5E	.125W
A2	R731	0757-0709	R-F	19, 1A5E	.125W
A2	R732	2100-2740	R-F	2, 2A	.5W
A2	R733	0757-0289	R-F	13, 1A5E	.125W
A2	R734	0698-C081	R-F	1, 9A5E	.125W
A2	R735	0698-4276	R-F	10A5E	.125W
A2	R736	0698-4278	R-F	10A5E	.125W
A2	R737	0698-5702	R-F	30 SE	.125W

REFERENCE DESIGNATOR	HP PART NUMBER	DESCRIPTION	CIRCUIT DIAGRAM		COMPONENT LAYOUT
			SHEET NUMBER	GRID REFERENCE	
A2	R738	0698-5702	R-F	10 SE	.125W
A2	R739	0757-0395	R-F	5A, 2 SE	.125W
A2	R740	0757-0495	R-F	5A, 2 SE	.125W
A2	R741	0698-4802	R-F	10 SE	.125W
A2	R742	0698-4802	R-F	10 SE	.125W
A2	R743	0698-5884	R-F	22 SE	.25W F
A2	R744	0698-5884	R-F	22 SE	.25W F
A2	R745	0698-5884	R-F	27 SE	.25W F
A2	R746	0698-5884	R-F	27 SE	.25W F
A2	R747	0698-4802	R-F	10 SE	.125W
A2	R748	0698-4802	R-F	10 SE	.125W
A2	R749	0757-0806	R-F	2A5 SE	.5W
A2	R750	0757-0806	R-F	2A5 SE	.5W
A2	R751	0757-0806	R-F	2A5 SE	.5W
A2	R752	0757-0806	R-F	2A5 SE	.5W
A2	R753	0698-3155	R-F	4, 2A5E	.125W
A2	R754	0757-0812	R-F	432 SE	.5W
A2	R755	0757-0812	R-F	432 SE	.5W
A2	R756	0757-0812	R-F	3A5 SE	.5W
A2	R757	0698-4250	R-F	400 SE	.125W
A2	R758	0698-4276	R-F	8, 2A5E	.125W
A2	R759	2100-2749	R-F	2, 2A	.5W
A2	R760	0698-4746	R-F	2A5 SE	.125W F
A2	R761	0698-4746	R-F	1, 1A5E	.125W
A2	R762	0698-4746	R-F	1, 1A5E	.125W
A2	R763	0698-4746	R-F	1, 1A5E	.125W
A2	R764	0698-4276	R-F	8, 2A5E	.125W
A2	R765	2100-2749	R-F	2, 2A	.5W
A2	R766	0698-4241	R-F	2A5 SE	.125W F
A2	R767	0698-4250	R-F	400 SE	.125W
A2	R801	0698-1643	R-F	42, 2A5E	.125W
A2	R802	0698-1159	R-F	26-1A5E	.125W
A2	R803	0698-0082	R-F	4A4 SE	.125W
A2	R804	0698-0082	R-F	4A4 SE	.125W
A2	R805	0698-3159	R-F	2A, 1A5E	.125W
A2	R806	0757-0417	R-F	5A2 SE	.125W
A2	R807	0757-0240	R-F	1A1E	.125W F
A2	R808	0757-0280	R-F	1A1E	.125W F
A2	R809	0757-0417	R-F	5A2 SE	.125W
A2	R810	0698-1643	R-F	21, 5 SE	.125W
A2	R811	0698-4746	R-F	160 SE	.125W
A2	R812	0698-1643	R-F	21, 5 SE	.125W
A2	R813	0698-4244	R-F	3A0 SE	.125W
A2	R814	0698-1643	R-F	21, 5 SE	.125W
A2	R815	0698-4244	R-F	21, 5 SE	.125W
A2	R816	0698-1643	R-F	21, 5 SE	.125W
A2	R817	0698-4244	R-F	3A0 SE	.125W
A2	R818	0698-4241	R-F	2A5 SE	.125W F

***Test Set-Up for Waveforms Shown**

HP 140A with 1410A and 1425A Plug-Ins

Sweep: 50ns/cm

Sensitivity: 100mV/cm

Probe with 10:1 divider

U307B Settings

Pulse Period: < 170ns

Delay: minimum

Width: ~ 100ns

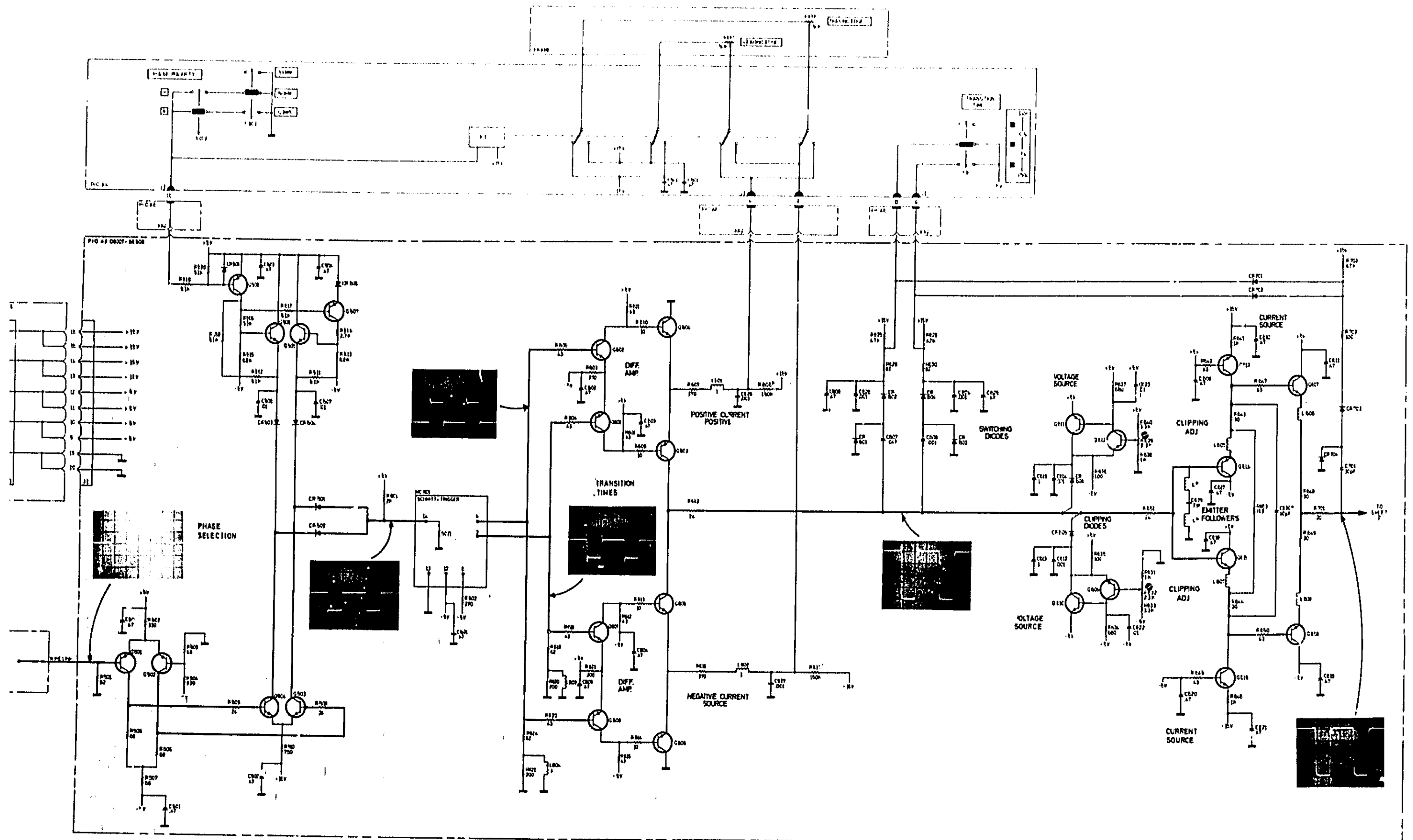
Mode: NORM

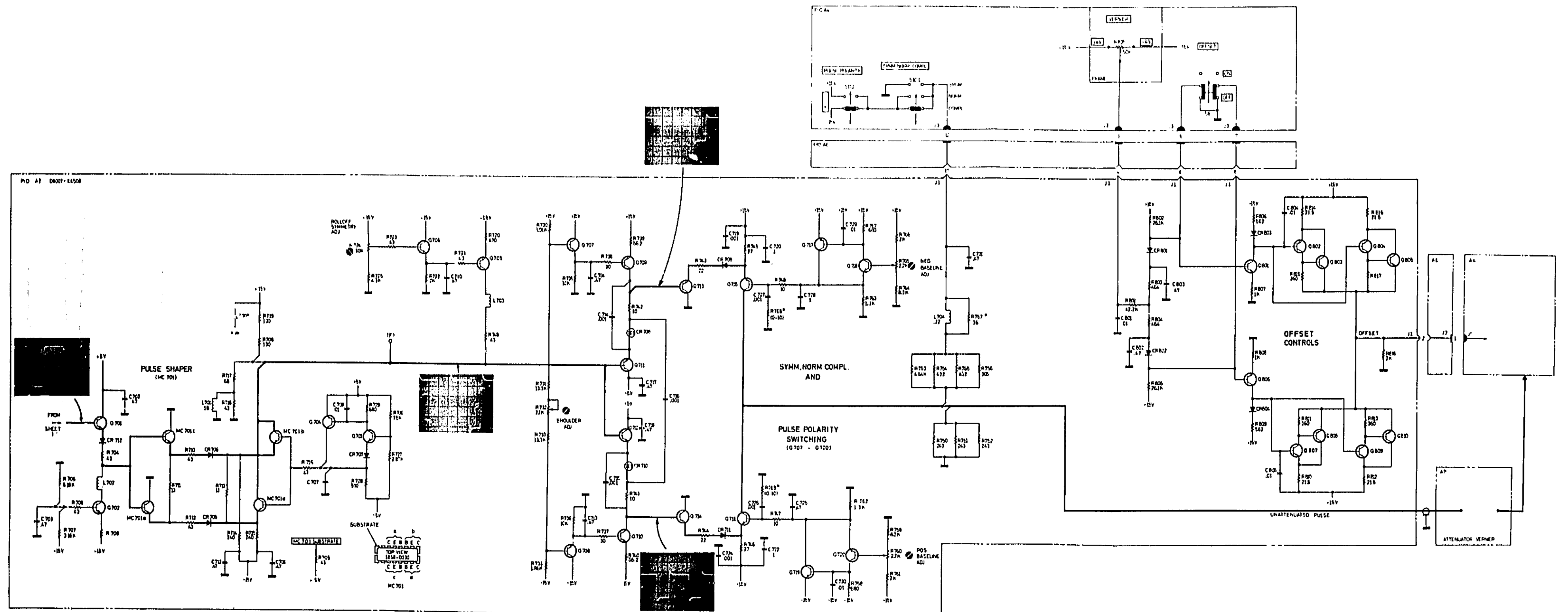
SYMM,NORM,COMPL.:NORM

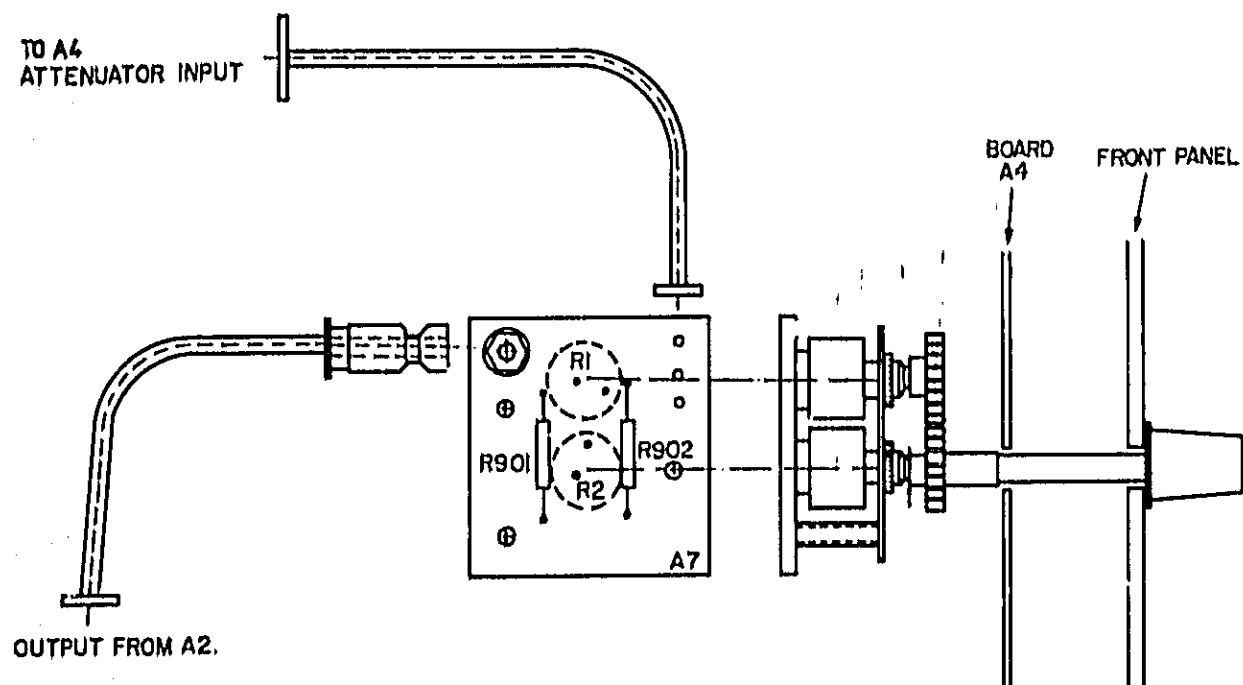
Pulse Polarity: +

**** Test Set-Up same as for waveform 13
except scope sensitivity is 200mV/cm.**

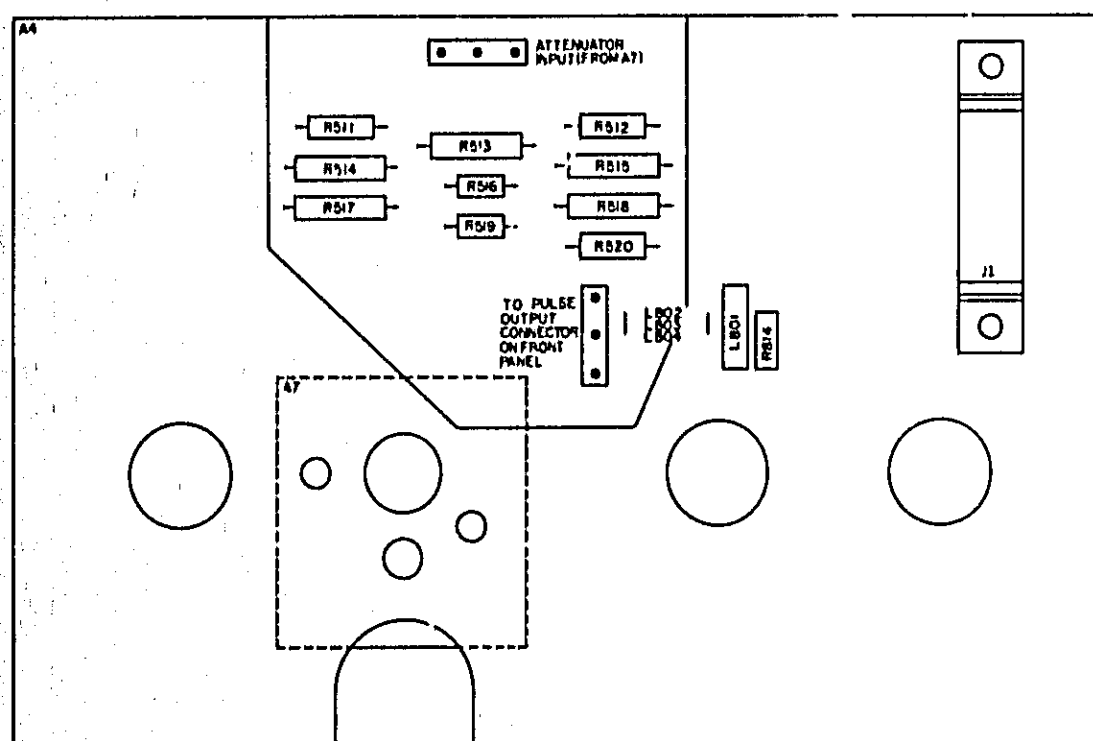
The scope centerline is +0.8V for waveform 14 and at -0.8V for waveform 15.







REFERENCE DESIGNATOR	HP PART NUMBER	DESCRIPTION	CIRCUIT DIAGRAM		COMPONENT LAYOUT
			SHEET NUMBER	GRID REFERENCE	
P1	CR001-88507	NO. VERNAST			
A7	CR001-88507	NO. VERNAST			
A2	HP1	1490-08-1			
A7	HP2	01902-77401			
A7	R1	2100-1040			
A7	R2	2100-1040			
A7	R901	CR001-88507			
A7	R902	CR001-88507			



REFERENCE DESIGNATOR	HP PART NUMBER	DESCRIPTION	CIRCUIT DIAGRAM		COMPONENT LAYOUT
			SHEET NUMBER	GRID REFERENCE	
A4	C101	0180-0174			
A4	C102	0180-0174			
A4	J1	50P-0112			
A4	R1	0490-1090			
A4	L501	9140-0118			
A4	L502	9170-0029			
A4	L503	9170-0029			
A4	L504	9170-0029			
A5	HP1	5020-1440			
A6	R511	0757-0801			
A6	R512	0757-0801			
A6	R513	0757-0172			
A6	R514	0757-0795			
A6	R515	0757-0049			
A6	R517	0757-1002			
A6	R518	0757-1002			
A6	R519	0757-0071			
A6	R519	0757-0795			
A6	R520	0698-5965			
A6	R514	0698-5284			
A6	R515	0698-5284			
A6	S8	5040-1107			
A6	S9	5040-1106			
A6	S10	5040-1106			
A6	S11	5040-1106			
A6	S12	5040-1108			

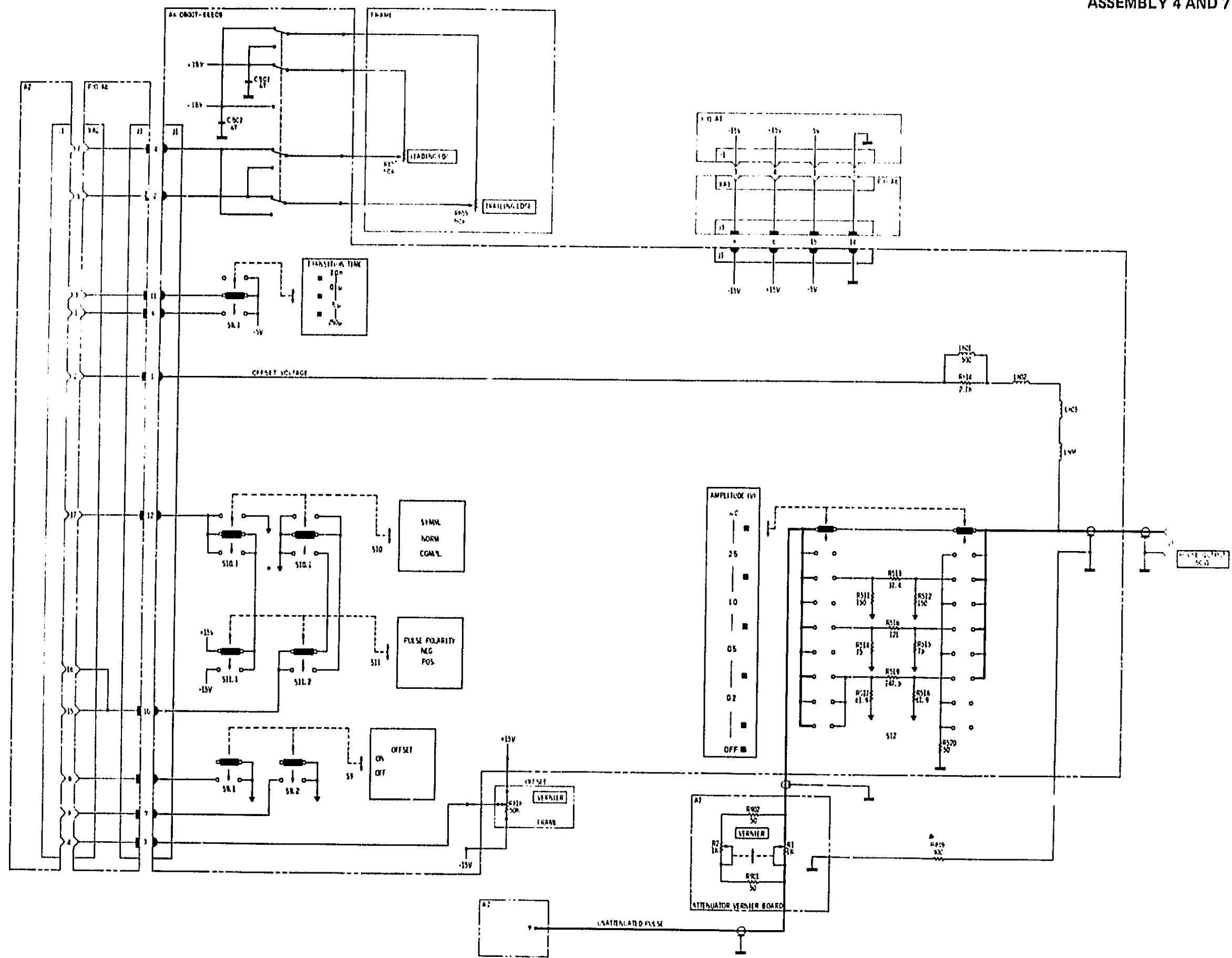
*Test Set-Up for Waveforms Shown

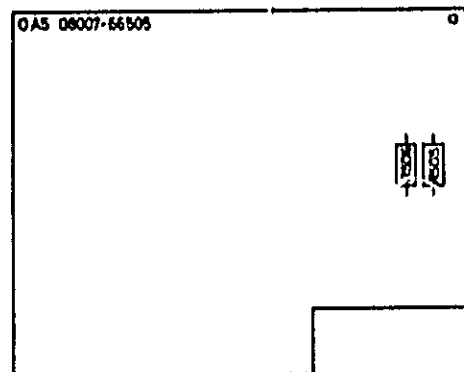
HP 140A with 1410A and 1425A Plug-ins

Sweep: 50ns/cm
Sensitivity: 100mV/cm
Probe with 10:1 divider

8007B Settings

Pulse Period: < 170ns
Delay: minimum
Width: ~ 100ns
Mode: NORM
SYMM,NORM,COMPL.:NORM
Pulse Polarity: +





REFERENCE DESIGNATOR	HP PART NUMBER	DESCRIPTION	CIRCUIT DIAGRAM		COMPONENT LAYOUT
			SHEET NUMBER	GRID REFERENCE	
A5 J1	9040-0111	COMMON CONT			
A5 J2	9040-0112	SPEC CONN 15 PIN			
A5 NP1	9020-3440	SPG BIT			
A5 R505	0898-4251	R-F 750 5% .125W			
A5 R506	0898-4251	R-F 750 5% .125W			
A5 S1	9040-1107	SLIDAY PC SW			
A5 S2	9040-1107	SLIDAY PC SW			
A5 S3	9040-1107	SLIDAY PC SW			
A5 S4	9040-1107	SLIDAY PC SW			
A5 S5	9040-1107	SLIDAY PC SW			
A5 S6	9040-1105	SLIDAY PC SW			

*Test Set-Up for Waveforms Shown

HP 140A with 1410A and 1425A Plug-ins

Sweep: 50ns/cm

Sensitivity: 100mV/cm

Probe with 10:1 divider

8007B Settings

Pulse Period: < 170ns

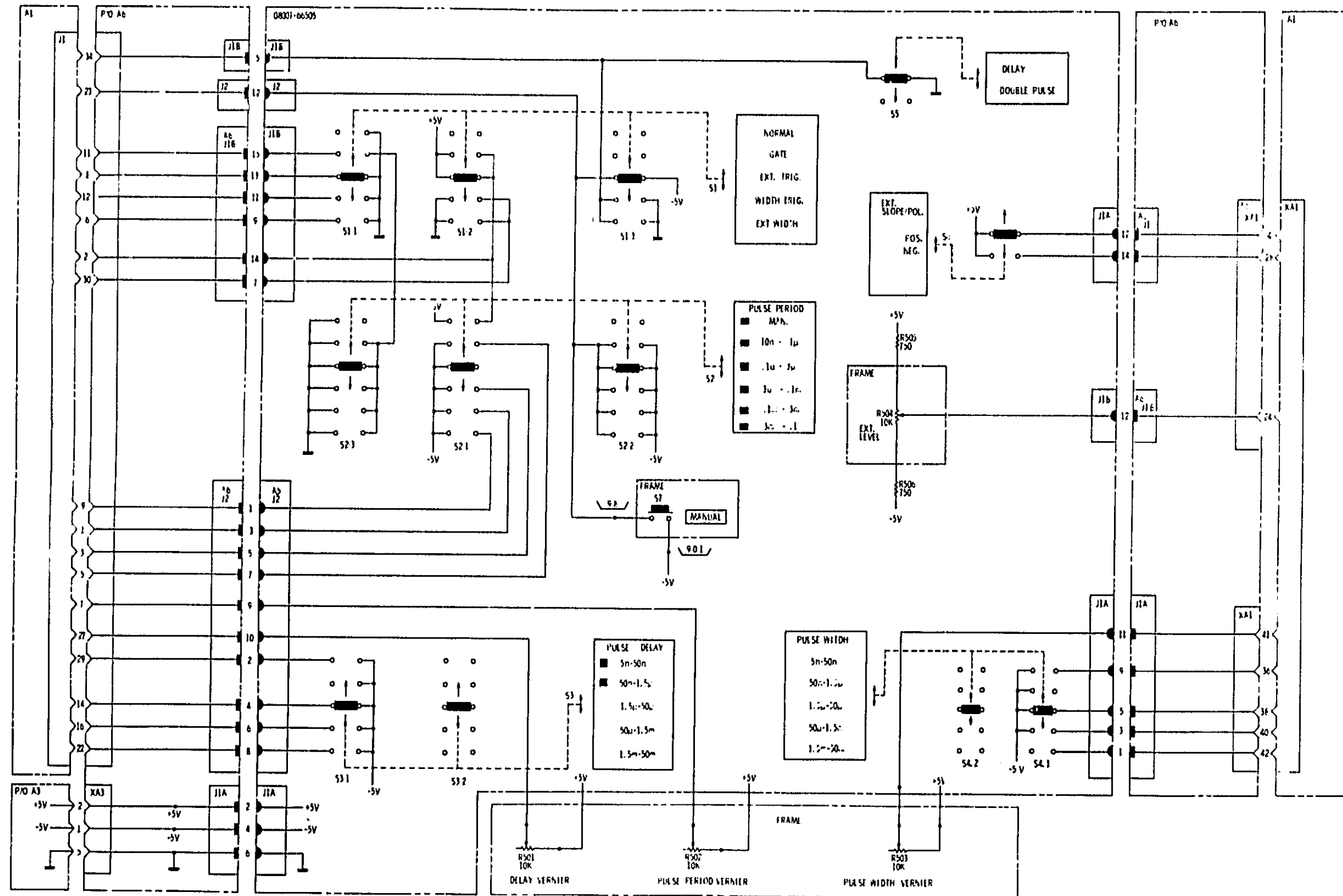
Delay: minimum

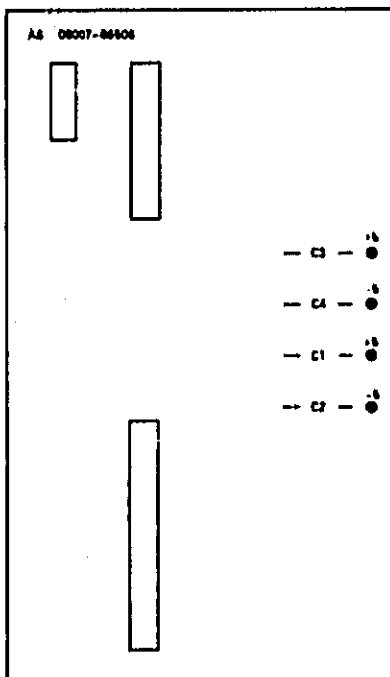
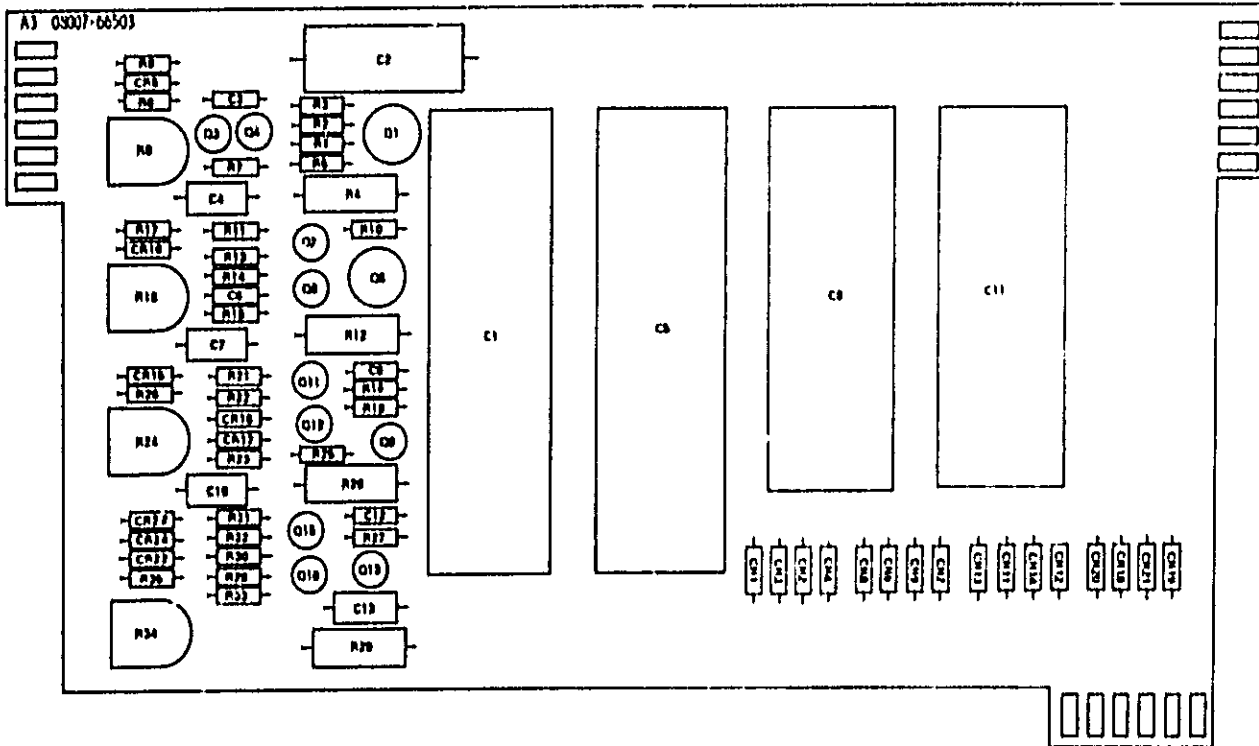
Width: ~ 100ns

Mode: NORM

SYMM.NORM.COMPL.:NORM

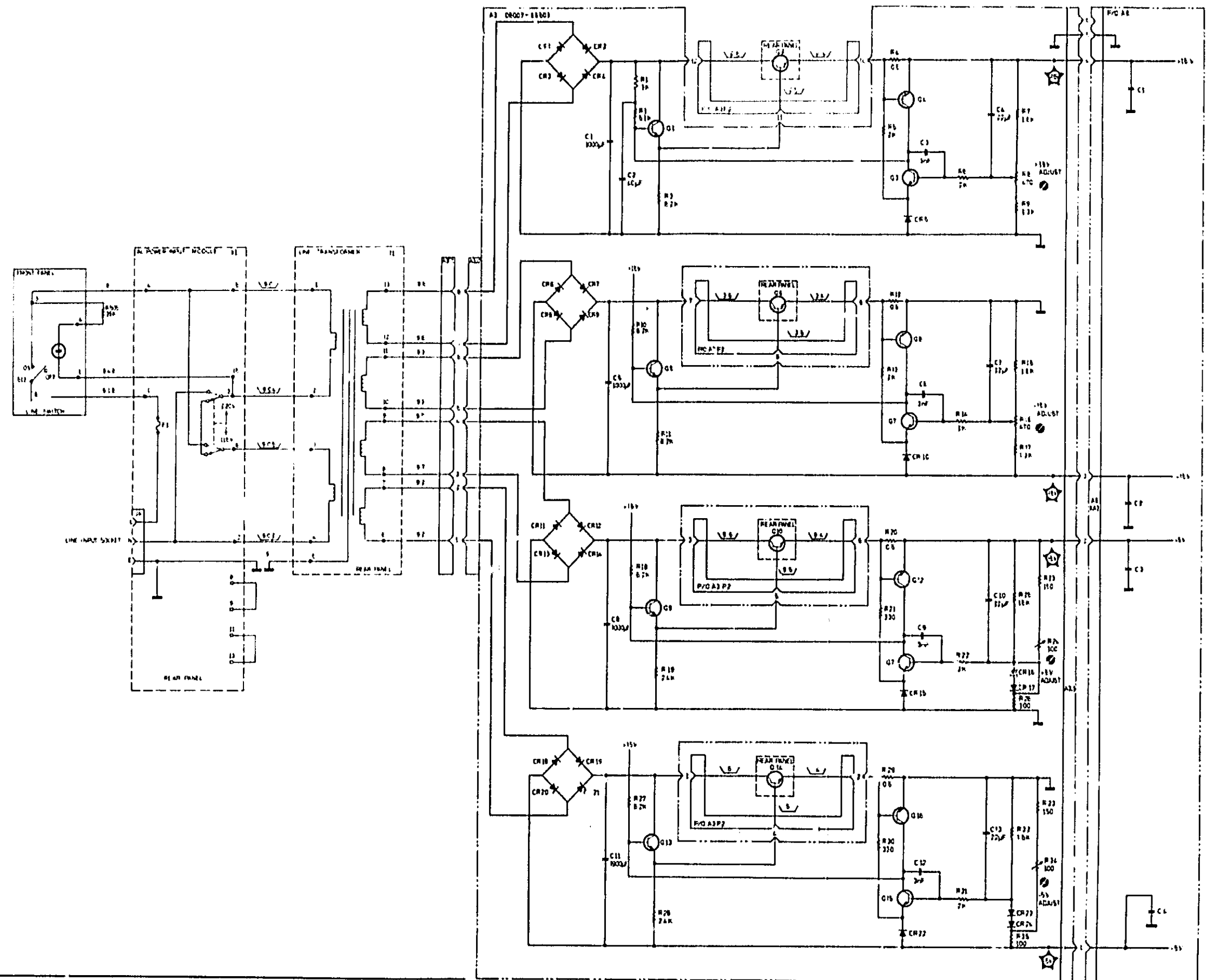
Pulse Polarity: +





REFERENCE DESIGNATOR	HP PART NUMBER	DESCRIPTION	CIRCUIT DIAGRAM		COMPONENT LAYOUT
			SHEET NUMBER	GRID REFERENCE	
A6 C1	018C-1767	C-F 150UF 15V			
A6 C2	018C-1767	C-F 150UF 15V			
A6 C3	018C-0137	C-F 100UF 10V			
A6 C4	018C-0137	C-F 100UF 10V			

REFERENCE DESIGNATOR	HP PART NUMBER	DESCRIPTION	CIRCUIT DIAGRAM		COMPONENT LAYOUT
			SHEET NUMBER	GRID REFERENCE	
A3 C1	018C-1766	C-F 100UF 10V			
A3 C2	018C-1766	C-F 100UF 10V			
A3 C3	018C-1766	C-F 100UF 10V			
A3 C4	018C-1766	C-F 100UF 10V			
A3 C5	018C-1766	C-F 100UF 10V			
A3 C6	018C-1766	C-F 100UF 10V			
A3 C7	018C-1766	C-F 100UF 10V			
A3 C8	018C-1766	C-F 100UF 10V			
A3 C9	018C-1766	C-F 100UF 10V			
A3 C10	018C-1766	C-F 100UF 10V			
A3 C11	018C-1766	C-F 100UF 10V			
A3 C12	018C-1766	C-F 100UF 10V			
A3 C13	018C-1766	C-F 100UF 10V			
A3 C14	018C-1766	C-F 100UF 10V			
A3 C15	018C-1766	C-F 100UF 10V			
A3 C16	018C-1766	C-F 100UF 10V			
A3 C17	018C-1766	C-F 100UF 10V			
A3 C18	018C-1766	C-F 100UF 10V			
A3 C19	018C-1766	C-F 100UF 10V			
A3 C20	018C-1766	C-F 100UF 10V			
A3 C21	018C-1766	C-F 100UF 10V			
A3 C22	018C-1766	C-F 100UF 10V			
A3 C23	018C-1766	C-F 100UF 10V			
A3 C24	018C-1766	C-F 100UF 10V			
A3 C25	018C-1766	C-F 100UF 10V			
A3 C26	018C-1766	C-F 100UF 10V			
A3 C27	018C-1766	C-F 100UF 10V			
A3 C28	018C-1766	C-F 100UF 10V			
A3 C29	018C-1766	C-F 100UF 10V			
A3 C30	018C-1766	C-F 100UF 10V			
A3 C31	018C-1766	C-F 100UF 10V			
A3 C32	018C-1766	C-F 100UF 10V			
A3 C33	018C-1766	C-F 100UF 10V			
A3 C34	018C-1766	C-F 100UF 10V			
A3 C35	018C-1766	C-F 100UF 10V			
A3 C36	018C-1766	C-F 100UF 10V			
A3 C37	018C-1766	C-F 100UF 10V			
A3 C38	018C-1766	C-F 100UF 10V			
A3 C39	018C-1766	C-F 100UF 10V			
A3 C40	018C-1766	C-F 100UF 10V			
A3 C41	018C-1766	C-F 100UF 10V			
A3 C42	018C-1766	C-F 100UF 10V			
A3 C43	018C-1766	C-F 100UF 10V			
A3 C44	018C-1766	C-F 100UF 10V			
A3 C45	018C-1766	C-F 100UF 10V			
A3 C46	018C-1766	C-F 100UF 10V			
A3 C47	018C-1766	C-F 100UF 10V			
A3 C48	018C-1766	C-F 100UF 10V			
A3 C49	018C-1766	C-F 100UF 10V			
A3 C50	018C-1766	C-F 100UF 10V			
A3 C51	018C-1766	C-F 100UF 10V			
A3 C52	018C-1766	C-F 100UF 10V			
A3 C53	018C-1766	C-F 100UF 10V			
A3 C54	018C-1766	C-F 100UF 10V			
A3 C55	018C-1766	C-F 100UF 10V			
A3 C56	018C-1766	C-F 100UF 10V			
A3 C57	018C-1766	C-F 100UF 10V			
A3 C58	018C-1766	C-F 100UF 10V			
A3 C59	018C-1766	C-F 100UF 10V			
A3 C60	018C-1766	C-F 100UF 10V			
A3 C61	018C-1766	C-F 100UF 10V			
A3 C62	018C-1766	C-F 100UF 10V			
A3 C63	018C-1766	C-F 100UF 10V			
A3 C64	018C-1766	C-F 100UF 10V			
A3 C65	018C-1766	C-F 100UF 10V			
A3 C66	018C-1766	C-F 100UF 10V			
A3 C67	018C-1766	C-F 100UF 10V			
A3 C68	018C-1766	C-F 100UF 10V			
A3 C69	018C-1766	C-F 100UF 10V			
A3 C70	018C-1766	C-F 100UF 10V			
A3 C71	018C-1766	C-F 100UF 10V			
A3 C72	018C-1766	C-F 100UF 10V			
A3 C73	018C-1766	C-F 100UF 10V			
A3 C74	018C-1766	C-F 100UF 10V			
A3 C75	018C-1766	C-F 100UF 10V			
A3 C76	018C-1766	C-F 100UF 10V			
A3 C77	018C-1766	C-F 100UF 10V			
A3 C78	018C-1766	C-F 100UF 10V			
A3 C79	018C-1766	C-F 100UF 10V			
A3 C80	018C-1766	C-F 100UF 10V			
A3 C81	018C-1766	C-F 100UF 10V			
A3 C82	018C-1766	C-F 100UF 10V			
A3 C83	018C-1766	C-F 100UF 10V			
A3 C84	018C-1766	C-F 100UF 10V			
A3 C85	018C-1766	C-F 100UF 10V			
A3 C86	018C-1766	C-F 100UF 10V			
A3 C87	018C-1766	C-F 100UF 10V			
A3 C88	018C-1766	C-F 100UF 10V			
A3 C89	018C-1766	C-F 100UF 10V			
A3 C90	018C-1766	C-F 100UF 10V			
A3 C91	018C-1766	C-F 100UF 10V			
A3 C92	018C-1766	C-F 100UF 10V			
A3 C93	018C-1766	C-F 100UF 10V			
A3 C94	018C-1766	C-F 100UF 10V			
A3 C95	018C-1766	C-F 100UF 10V			
A3 C96	018C-1766	C-F 100UF 10V			
A3 C97	018C-1766	C-F 100UF 10V			
A3 C98	018C-1766	C-F 100UF 10V			
A3 C99	018C-1766	C-F 100UF 10V			
A3 C100	018C-1766	C-F 100UF 10V			



MANUAL CHANGES

MANUAL CHANGES

Manual for Model Number	8007B
Manual printed on	Oct. 1972
Manual Part Number	08007-90002

Make all ERRATA corrections.

Check the following table for your instrument serial prefix/serial number and make the listed changes to your manual.

► New Item

Serial Prefix or Serial Number	Manual Changes	Serial Prefix or Serial Number	Manual Changes
1612G 00286 to 00295	1		
1612G 00296 to 00305	1, 2		
1612G 00306 to 00345	1-3		
1729G 00346 to 00385	1-4		
1729G 00386 to 00415	1-5		
1729G 00416 onwards	1-6		
1729G 00426 onwards	1-7		
1822G 00476 onwards	1-8		
1822G 00486 onwards	1-9		
1822G 00546 onwards	1-10		
1822G 00581 onwards	1-11		

MODEL 8007B

INDEX OF MANUAL CHANGES

MANUAL CHANGE	FRAME	A1	A2	A3	A4	A5	A6	A7	A8	A9
ERRATA			R716,726, R749							
1	S13, DS1 MP28									
2		R207,C15	HQ604,605 R733							
3										L802,803, L804
4	FL1,MP29 S14,XF1									
-	S13									
6			C608							
7			C22							
8	W2		L501, C711							
9			Q604,606				C1,2			

INDEX OF MANUAL CHANGES

MANUAL CHANGE	FRAME	A1	A2	A3	A4	A5	A6	A7	A8	A9
10		R226,327 R418	C508,R504 R654,655, R757							
11	XF1A,XF1B XF1C,XF1D									

ERRATA

1. Parts List for assembly A2 should include:

R726	0757-0440	R-F 7.5K 1% 1/8W
R749	0698-6746	R-F 43 5% 1/8W

2. Diagram 3, sheet 2: R706 in the Q703 circuit should read R726.
3. Paragraph 1-4, item 2 should refer to the double pulse description in paragraph 1-5; not paragraph 1-15.
4. Paragraph 4-40 should refer to diagram 3, sheet 2 in section 6.
5. Diagram 2 sheet 2: the EXT WIDTH signal at the upper right-hand corner of the pages goes "to sheet 3".
6. Diagram 2 sheet 3: the EXT WIDTH signal at the upper left-hand corner of the page comes "from sheet 2".
7. Diagram 6: a line filter should be added to the primary circuit. The following diagram represents the primary circuit more accurately than as shown in diagram 6.

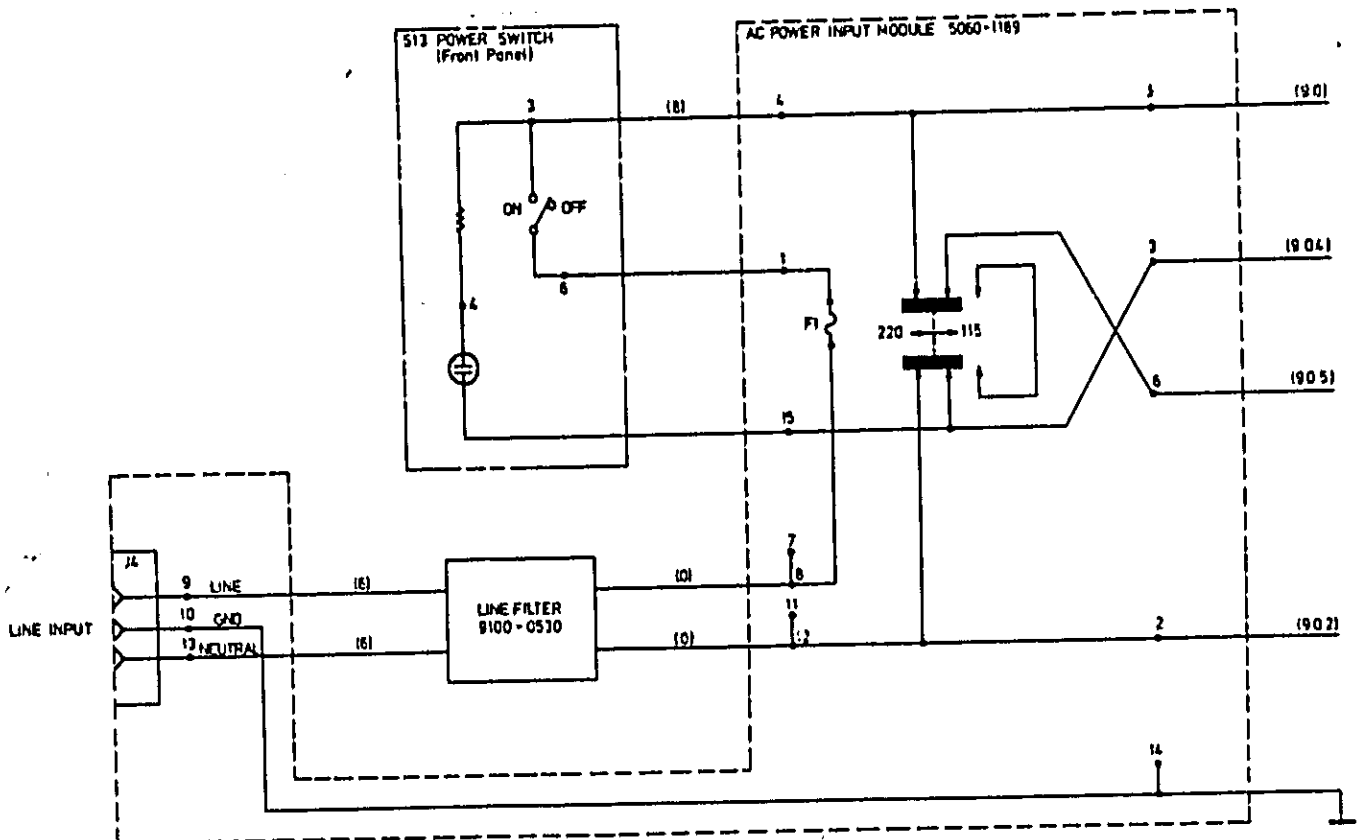


FIGURE FOR ERRATA 7

MODEL 8007B

ERRATA (Cont.)

On Page 5-4

SYMM. NORM. COMPL	22	NORM (NOT +)
PULSE POLARITY	24	+ (NOT NORM)

On Page 5-5

PULSE PERIOD	2	(NOT DELAY)
PULSE DELAY	4	1.5 μ - 50 μ (NOT 1.5 μ - 5 μ)

On Page 5-9

PULSE WIDTH	6	(NOT 5)
VERNIER	5	(NOT 6)

CHANGE 1

Parts list for frame:

Delete

S13	3101-1244	SWITCH PUSHBUTTON
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Add

S13	3101-1720	SWITCH PUSHBUTTON
	0370-0914	BEZEL PUSHBUTTON
	5040-1124	KNOB PUSHBUTTON

DS1	1450-0049	PILOT LIGHT (DS1 is pilot lamp adjacent to LINE switch)
	0510-0097	RETAINER PUSH-ON

	08007-00205	PANEL SUB
	08007-00206	PANEL FRONT

MODEL 8007B

- Page 2-0. Delete rack mounting kit from figure 2-1.
- Page 2-1. Delete rack mounting kit from table in paragraph 2-4.
- Page 2-2. Add paragraphs 2-20, 2-21:
- 2-20 Rack Mounting Kit
- 2-21 A rack mounting kit is available for the 8007B as option 908. The kit will be shipped with the instrument if ordered with the instrument.
- Facing diagram 1. Delete MP28 from the overall parts list.

CHANGE 2

A1R207 is changed to factory select (*)

A1R207	0757-0406	R-F 182	$\pm 1\%$	1/4 W (Preferred)
A1R207	0698-4413	R-F 154	$\pm 1\%$	1/4 W
A1R207	0698-4416	R-F 169	$\pm 1\%$	1/4 W
A1R207	0757-0407	R-F 200	$\pm 1\%$	1/4 W

Change A1C15 0160-2940 C-F 470P $\pm 5\%$ 300V MICA

Delete A2R733 (replaced by wire link)

Add	A2HQ604	1205-0037	HEATSINK
	A2HQ605	1205-0037	HEATSINK

CHANGE 3

Replace A9 L802/3/4 by A9 L802 5081-1973 IN AY

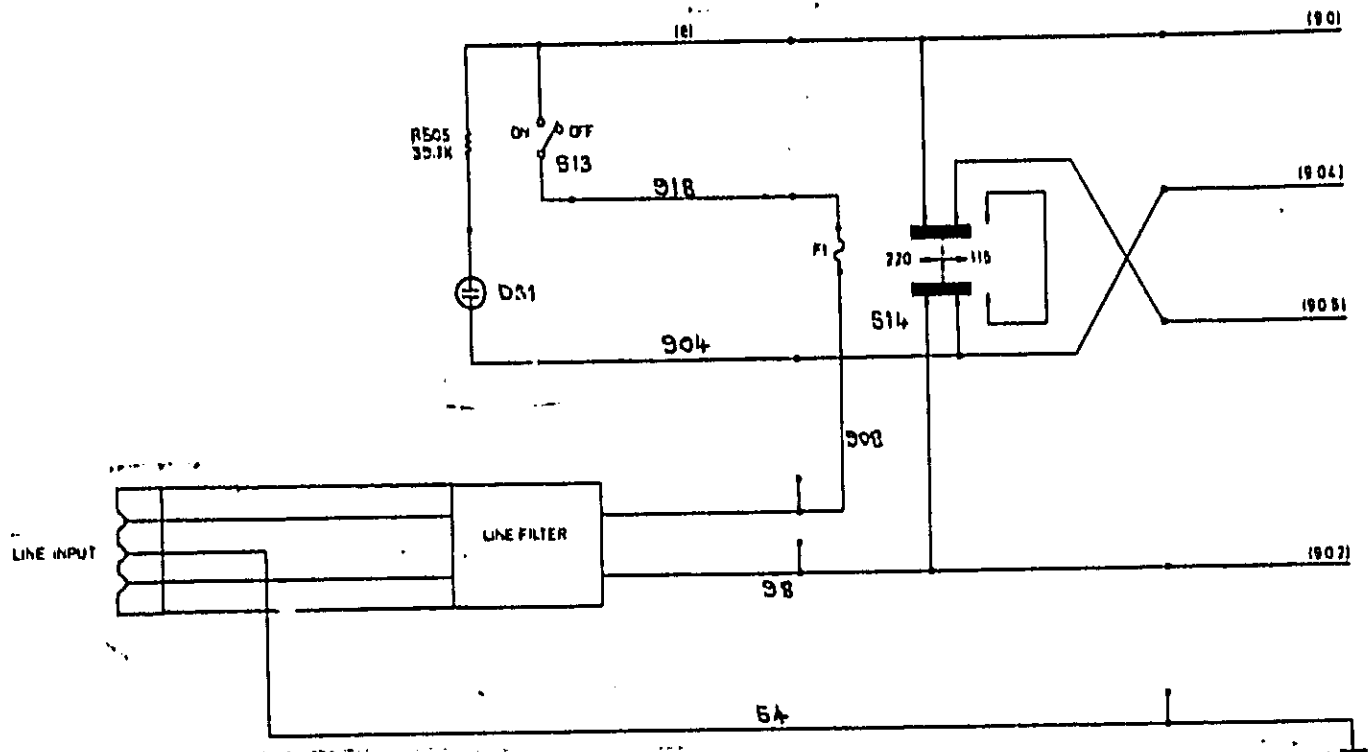
CHANGE 4

In overall parts list, add the following items.

FL1	9135-0035	LINE FILTER
S14	3101-1740	LINE SEL. SWITCH
MP29	08007-60207	PANEL, REAR ASSY
XF1A	2110-0465	CAP FUSE H
XF1B	2110-0467	NUT HEX
XF1C	2110-0470	FUSE HOLDER BODY
XF1D	1400-0090	WASHER NEOPRENE

Change diagram 6 as per attached page 6.

MODEL 8007B



CHANGE 5

Diagram 1. Change the overall replaceable parts list as follows

S13 3101-2216 SW PBTN

CHANGE 6

Diagram 3. Change parts list as follows:

A2C608 0160-3878 C-F 0.001 UF 100V

CHANGE 7

Diagram 3 Sheet 1. Change parts list and schematic A2C22 0160-4209

C-F 0.01 UF 50 V

CHANGE 8

Diagram 3 Sheet 1. Add L501 in Q506 base

Diagram 3 Sheet 2. Add C711* 2.2 PF/ 4.7 PF from Q705 collector to ground.

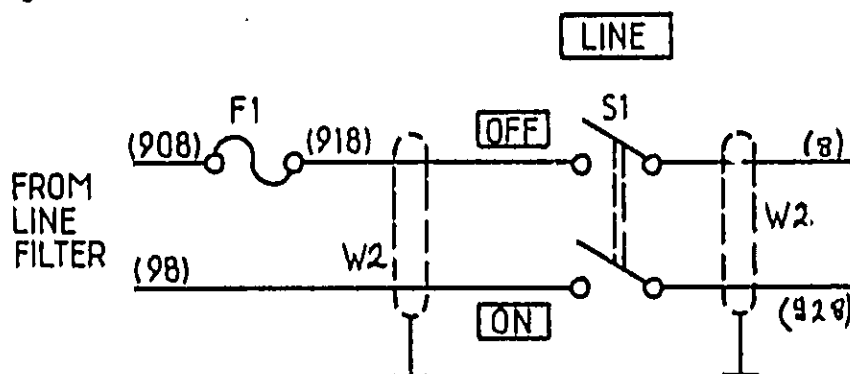
To parts list, add

A2 L501	9170-0029	IND BEAD
A2 C711	0160-3872	C-F 2.2 P
	0160-3873	C-F 4.7 P

Diagrams 1, 6 (See also errata 7, manual change 1, 4, and 5), to parts list, change

W2 08007-61606 CABLE AY POWER

and change LINE ON/OFF switch wiring as follows:



CHANGE 9

On Diagram 3, sheet 1:

Disconnect Q606 collector from ground and connect to CR605 anode.

Disconnect Q604 collector from ground and connect to CR606 cathode.

On Assembly A6 parts list:

Change C1, C2 0180-0098 100 μ F.

MANUAL CHANGE 10

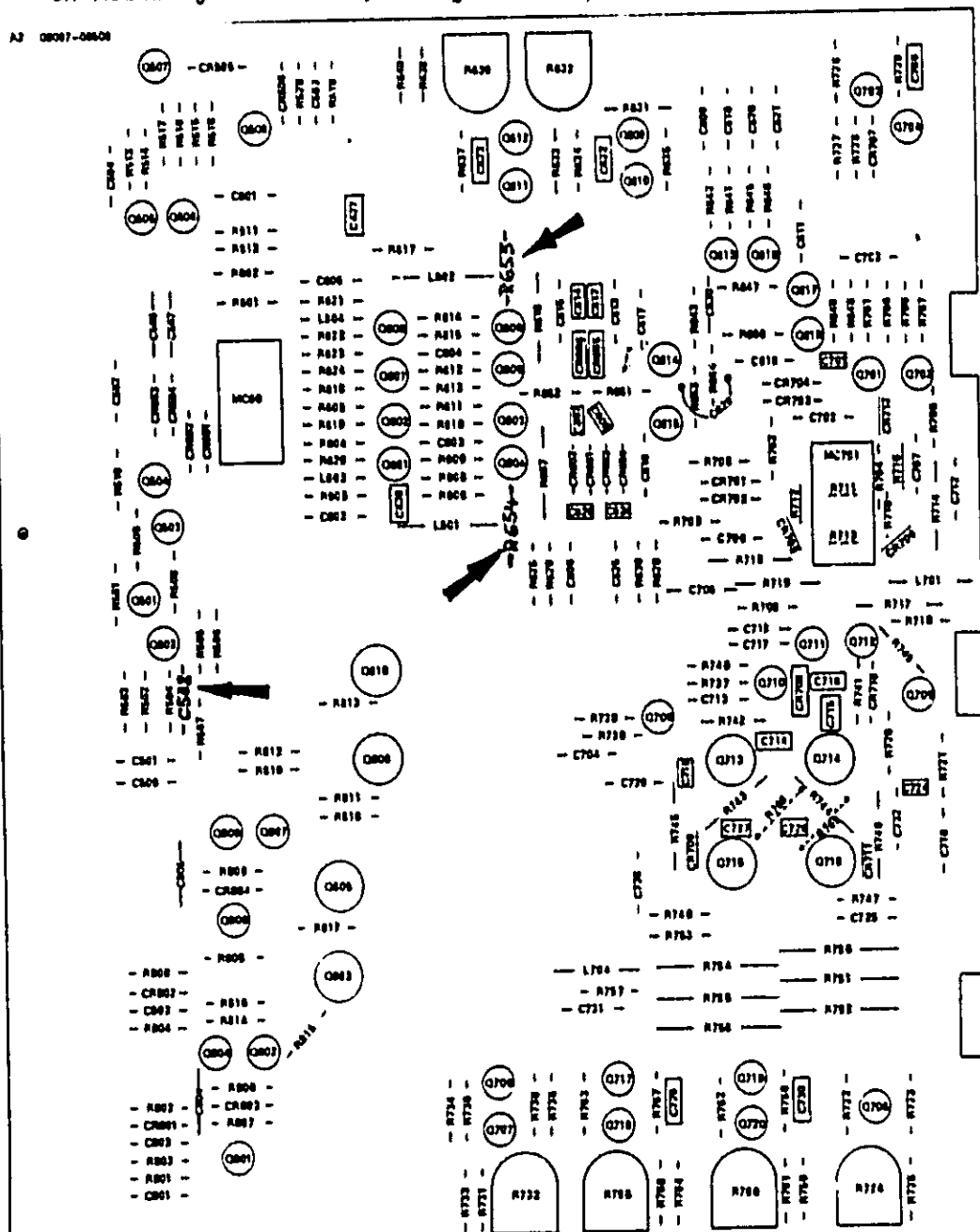
On Assembly Parts List to read :

A1R226,327	0698-4418	R-FXD 205 1%
A1R418	0757-0276	R-FXD 61.9 1%

On Assembly A2 Parts List to read :

A2R504	0698-3178	R-FXD 487 1%
Add : A2C508	0160-0174	C-FXD .47UF 25V
A2R654,655	0698-3113	R-FXD 100 5%
A2R757	0757-0393	R-FXD 47.5 1%

On Assembly 1 Sheet 3, change the Component Layout to read :



MANUAL CHANGE 11

On Diagram 1, change the Table of Frame Parts List (prior change 4) to read :

XF1A	2110-0565	FUSEHOLDER CAP
XF1B	2110-0569	NUT HEX
XF1C	2110-0566	FUSEHOLDER BODY
