TYPE 321
MOD 799F

This insert is written to supplement the Instruction Manual furnished with this modified instrument. The information given in this insert will supersede that given in the manual.

TYPE 321
MOD 799F

The oscilloscope for which this insert was prepared has been modified to increase its vertical sensitivity by a factor of two, giving a 1--2.5--5 Vertical Attenuator sequence; the .1 SEC/DIV sweep rate has been deleted; and a 1 SEC/DIV rate has been added.

CALIBRATION

This modified instrument should be calibrated as directed in the Instruction Manual except for the following steps:

(9) Probe and VOLTS/DIV. Attenuator Adjustments

Connect the cable of the P6003 Probe to the (Vertical Amplifier) INPUT connector of the Type 321, and set the VOLTS/DIV. control to .005. Compensate the probe according to the instructions presented on page 3-9 and illustrated in Fig. 3-8 (Operating Instructions).

After compensating the probe, connect the probe tip to the OUTPUT connector on the Type 105 (or equivalent) Square-Wave Generator and connect the ground clip to any convenient ground point on the generator. Adjust the Type 105 to supply a 1-kilocycle square wave. Throughout this step, adjust the OUTPUT AMPLITUDE control of the Type 105 as required for about 4 major divisions of vertical deflection.

The VARIABLE control should be in the CALIB. position. Maximum output of the Type 105 will give a deflection of slightly more than 1 division in the 10 position of the VOLTS/DIV. control.

In each of the following VOLTS/DIV. positions, adjust the two capacitors in each position for best square-wave response. C418C, C416C, C414C, C412C and C410C affect the leading edge and corner of the square wave (see Fig. 6-3. C418A, C416A, C414A, C412A and C410A affect the over all level of the square-wave (see Fig. 6-4).

VOLTS/DIV.		ADJUST
.01	(Terminate the 105 with 52Ω termination)	C418A, C418C
.025		C416A, C416C
.05		C414A, C414C
.5	Remove the 52Ω Termination	C412A, C412C
5		C410A, C410C

Fig. 6-5 shows location of the attenuator capacitors.

(10) C508-High Frequency Adjust

Terminate the Type 105 with a 52Ω termination and reset the Type 105 for an output frequency of 100 kc. Set the VOLTS/DIV. control to the .005 position and display 4 major divisions of signal. Set the TIME/DIV. to the 2 μSEC position, and adjust C508 for best square-wave response.

(11) Check Bandwith of Vertical Amplifier

Connect the output cable from the Constant-Amplitude Signal Generator to the INPUT connector of the Type 321. Set up the front panel controls as follows:

TRIGGERING LEVEL	FREE RUN
TIME/DIV.	1 MILLI. SEC
VARIABLE	CALIB.
VOLTS/DIV.	.005
VARIABLE	CALIB.

Set the frequency controls on the Signal Generator for an output frequency of 500 kc, and adjust the amplitude controls for a vertical deflection of exactly 4 major divisions. Position the display on the crt (with the VERTICAL POSITION control) so that the deflection extends over the middle 4 divisions.

Then increase the output frequency of the Signal Generator to 5 megacycles. (Make sure the VOLTS/DIV. and VARIABLE controls are set to .005 and CALIBRATED, respectively.) The deflection should be at least 2.9 major divisions at 5 mc. If not, refer to the Maintenance Section for information concerning the circuit involved.

(13) Slow Sweep Adjust

Set the TIME/DIV. control to the 1 SEC position. Apply 1 second markers from the Time-Mark Generator. Adjust the SLOW SWP. ADJ. (R167) for one marker per division. Recheck steps (12) and (13) as there is interaction between these two controls.

(16) Check Sweep Timing: 1 Second /Div. to 1-Microsecond/Div.

Table 6-1 lists the time markers to be applied for the indicated setting of the TIME/DIV. switch, and the number of markers per division to be observed for each setting. There are no adjustments to be made in this step; this is a check on the accuracy of the components that make up R160 and C160 in the indicated range of sweep rates.

TABLE 6-1

TIME/DIV.	TIME MARKERS	OBSERVE
1 μsec	1 μsec	1 marker/div
10 μsec	10 μsec	1 marker/div
.1 MILLI SEC	100 μsec	1 marker/div
1 MILLI SEC	1 msec	1 marker/div
2 MILLI SEC	1 msec	2 marker/div
5 MILLI SEC	5 msec	1 marker/div
10 MILLI SEC	10 msec	1 marker/div
.2 SEC	100 msec	2 marker/div
.5 SEC	500 msec	1 marker/div
1 SEC	1 sec	1 marker/div

PARTS LIST CHANGES

Changes in the parts list of this modified instrument are shown below. When ordering replacement parts, specify instrument type, serial number and MOD number. Also include the part number or drawing number, the circit number, and the electrical value of the desired component.

CAPACITORS

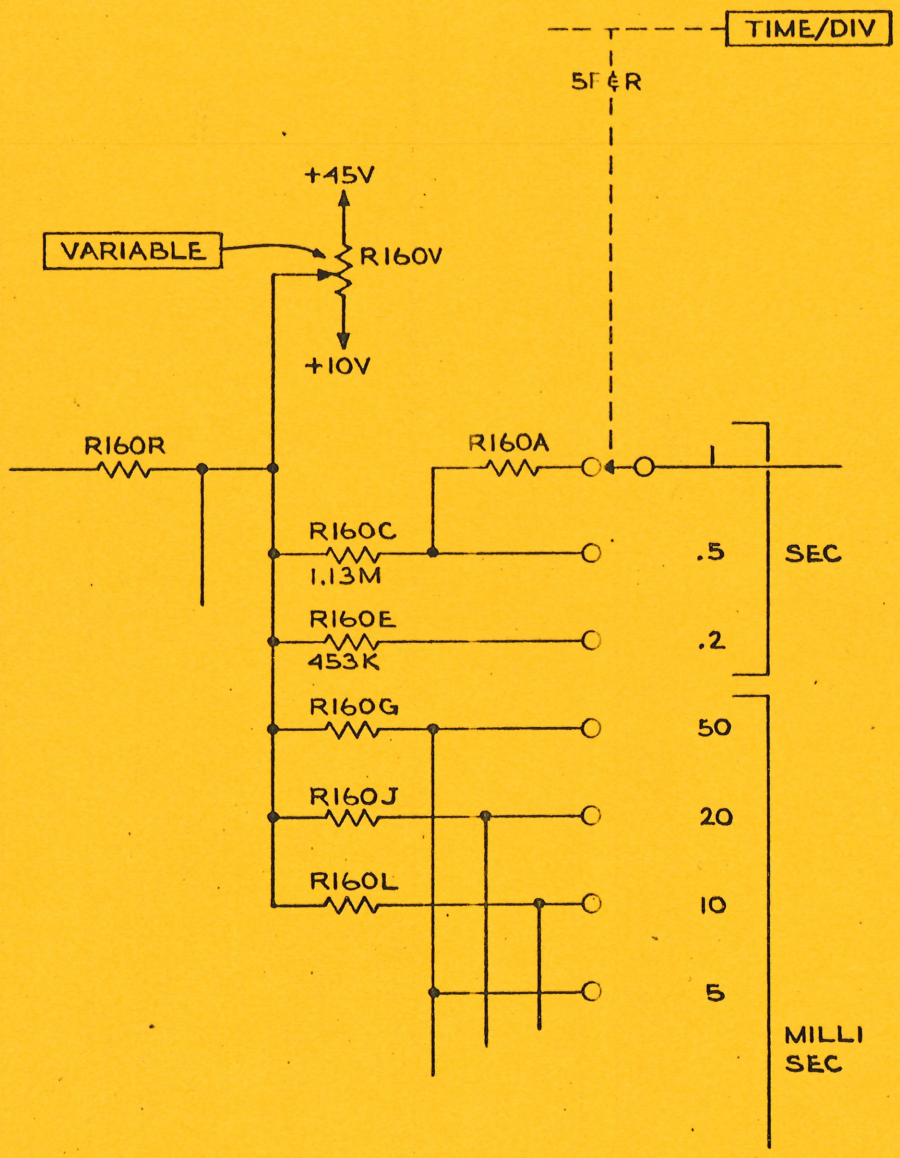
C506-S	Add	281-513	27pf	Cer	500v	20%
C507	Change to	281-605	200pf	Cer	500v	

RESISTORS

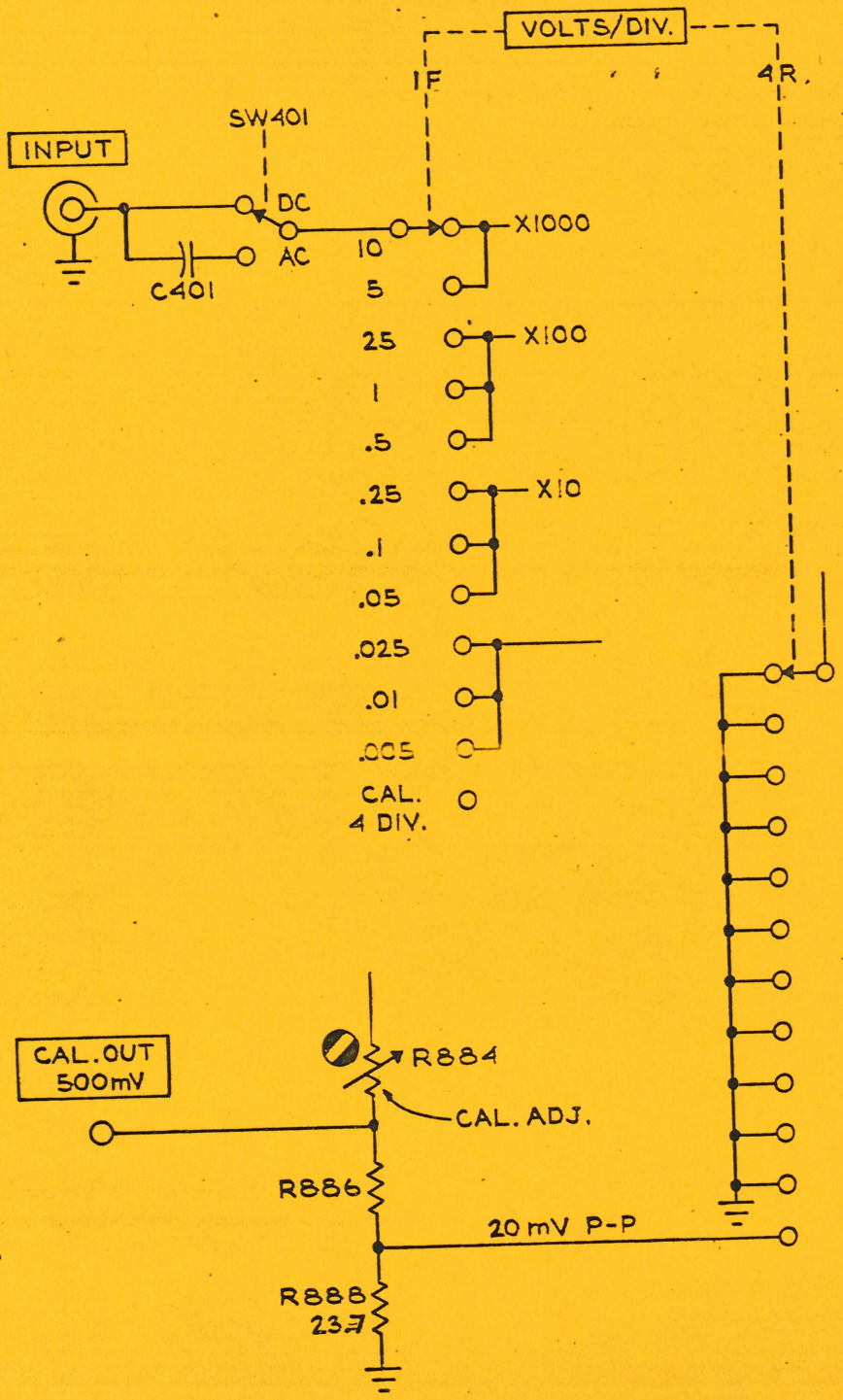
R160C	Change to	318-021	1.13M	Prec	1/8w	1%
R160E	Change to	318-022	453K	Prec	1/8w	1%
R507	Change to	315-121	120Ω	Comp	1/4w	5%
R508	Change to	316-680	68Ω	Comp	1/4w	10%
R888	Change to	323-037	23.7Ω	Prec	1/2w	1%

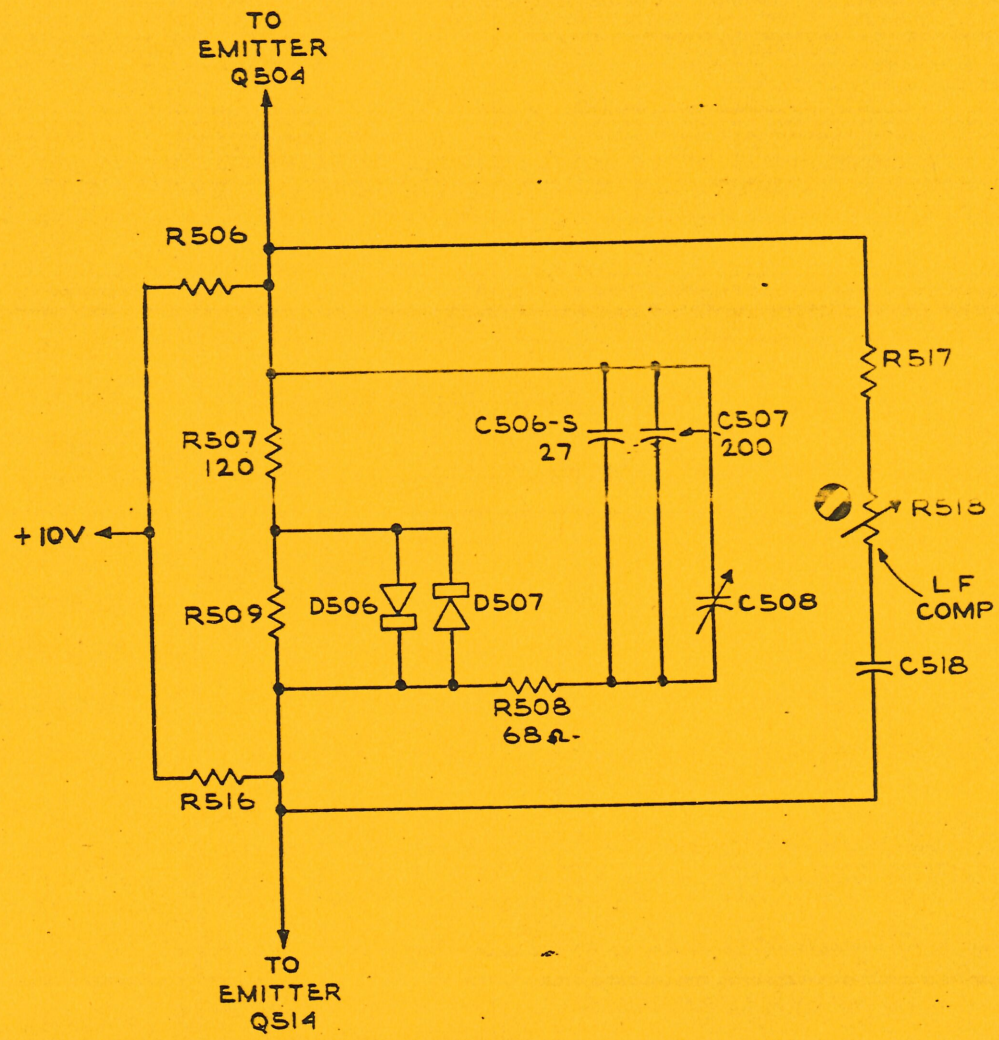
MECHANICAL

PANEL, Front — Change to — Film #2592



PART. TIME/DIV. SWITCH DIAG.





PART. VERT. AMP. & CALIB. DIAG.