COMPANY CONFIDENTIAL

105

TYPE 105 ~~OSCILLOSCOPE~~ SQUARE WAVE GEN

FACTORY CALIBRATION PROCEDURE

RECOMMENDED EQUIPMENT:

a) Tektronix type 540 series scope. Type CA and K or L preamplifier.
b) 180 time mark generator.
c) 93 Ω cable and 2 93 Ω terminating resistors.
d) DC voltmeter calibrated to 1% accuracy. 20,000 Ω/volt

PRELIMINARY INSPECTION: MDX 3 Fuse

Check for unsoldered joints, rosin joints, loose hardward, and wires not properly dressed for clearance.

Preset all meter adjustments to ccw

1. CHECK RESISTANCE TO GROUND OF TRANSFORMER AND ALL SUPPLIES.

Both supplies should measure about 100 KΩ to ground and 4.5 KΩ between them. Connect 93 Ω cable and attenuators to output of 105. Install Tektronix number 157-020 type 6CB6 tubes in V1 and V2 sockets. Install aged 6CB6's in V9 and V13 sockets.

2. ZERO SET METER (Power off) short terms of meter together

Adjust meter for zero reading by turning screw in front of meter case.

3. SET -150 ADJ.

Turn instrument on and allow to warm up with output AMPLITUDE turned to mid-range. Set RANGE to 10 kcs and FREQUENCY to mid-range. Turn SYNC input knob ccw. Connect voltmeter from A (Black wire with purple and brown tracer) to A-150. (Black wire with green and brown tracer). Adjust -150 ADJ. pot. Normally the range of adjustment is from 145 to 175 v.

4. SET -175 V ADJ.

Connect a voltmeter from A (Black wire with purple and brown tracer) to ground. Turn OUTPUT AMPLITUDE control to minimum and adjust ADJ. -175 volt control for 6 volts on the meter. (check to see that it goes below 4 volts. If it won't, the usual cause is either V18 or V19 or both) Turn the OUTPUT AMPLITUDE pot to maximum (Usually over 200 v) and bridge the OUTPUT AMPLITUDE pot with a 1/2 watt resistor to bring the maximum voltage to -175. (The 6 volt reading on the low end may be from 5 to 7 volts if necessary for the -175 to be exact. Make sure that the line voltage is 117 volts for making this adjustment.)

ON + going slope

5. CHECK RIPPLE AND REGULATION

Connect the input of the scope to the -175 and -150 volt leads alternately and check for regulation from 105 to 125 volts at maximum and minimum output. The ripple should not exceed 60 millivolts on either supply and they will normally regulate below 100 line volts. The regulation of the -175 volt supply is not as good as the -150 and may vary about 5 volts from high line to low line.

6. SET METER ADJ.

Connect a voltmeter from pins 1 and 2 to pin 7 on V11 and set METER ADJ. pot for 65 volts.

7. SET M.V. SCREEN V. ADJ.

Center the FREQUENCY and SYMMETRY controls. Connect a voltmeter from pins 2 or 7 to pin 6 on V1 or V2. Set the screen voltage for 80 volts by MV SCREEN V. ADJ. pot. (Short C1.1 to remove effect of symmetry control)

8. CALIBRATE FREQUENCY RANGES AND CHECK SYMMETRY.

Connect the 180 to the SYNC INPUT of the 105 and to one input of the CA preamp. With both ~~93 Ω~~ 50Ω terminations on the ends of the ~~93 Ω~~ 50Ω cable and connected to the 105 output, connect the other end to the other channel of the CA preamp. Switch the CA to alternate operation and trigger the scope on AC. Turn the output of the 105 to maximum and switch RANGE to 100 cycles. Apply 5 millisecond markers and turn FREQUENCY knob until there is just slightly more than one half cycle per marker. Advance the SYNC INPUT AMPLITUDE control until the 105 locks in at exactly one half cycle per marker. Adjust the 100 cps pot on the rear right hand side of the 105 for full scale meter deflection. Retard the SYNC INPUT AMPLITUDE and position the meter to full scale again with the FREQUENCY knob. Check the symmetry of the square wave. It must be symmetrical with the SYMMETRY control between 9:00 and 3:00 o'clock. For the remaining ranges use the following settings: Check symmetry on each range.

RANGE	180	MARKERS 1/2 CYCLE	SCOPE TIME/CM
100 cps	5 msec	1	2 msec
250 cps	1 millisec	2	500 µsec
1 kc	500 µsec	1	200 µsec
2.5 kc	100 µsec	2	50 µsec
10 kc	50 µsec	1	20 µsec
25 kc	10 µsec	2	5 µsec
100 kc	5 µsec	1	2 µsec
250 kc	1 µsec	2	.5 µsec
1 MC	1 µsec	1 marker/cycle	.5 µsec

On 1 MC range C11 and C12 must be set for symmetry and frequency coverage.

9. CHECK FREQUENCY CONTROL COVERAGE

Turn FREQUENCY control to maximum cw and switch through all RANGE positions. The meter should go to the right hand pin on all ranges. Turn the FREQUENCY control to the CCW end and switch through all RANGE positions. The meter should indicate below 2.30 on all ranges. This is read on the ~~25~~ 10 range on all ranges. (If the meter readings on the 1 MC range do not make coverage, readjust C11 and C12.)

10. CHECK WAVEFORM AT 1 MC AND ADJUST L2

With the ~~93 Ω~~ 50Ω cable terminated on both ends connected to the output, turn the output to maximum and adjust L2 to the point where it just begins to spike the lower corner of the square wave. The rise time should be ~~24 µsec~~ or less. It is preferable to use a "K" or an "L" for this check. ~ 17 nsec

11. CHECK OUTPUT AT 1 MC.

Remove the termination from the 105 end of the ~~93 Ω~~ 50Ω cable and check to see that the output is more than ~~15~~ 11 volts at maximum output amplitude. (It is advisable to turn the amplitude down while changing the cable and terminator as it is possible to get an unpleasant jolt from the output.)

CHECK METER LINEARITY.

With the 105 on the 10 kc range, sync at 5 kc with 100 µsec markers from the 180 and note where the meter reads. Error must be less than 3% of full scale reading. 500 KC 1 µs

13. CHECK SYNC INPUT SENSITIVITY

Apply 0.5 volts from the scope calibrator to the SYNC INPUT and see that the 105 will sync at this voltage. (Switch the 105 to the calibrator freq.)

14. CHECK SYNC OUTPUT AT 10 KC

Set the 105 to 10 kcs and with the SYMMETRY pot centered, check the SYNC OUTPUT for an amplitude of not less than 5 volts of positive going waveform.