

TYPE 1121
TENTATIVE
F A C T O R Y
C A L I B R A T I O N P R O C E D U R E

RECOMMENDED EQUIPMENT

- a. Oscilloscope, Type 540 series.
K and D preamplifiers.
- b. 105 Square Wave Generator and 107 Fast rise Generator
- c. 190A Constant Output Sine Wave Generator
- d. 93 Ω Output Cable (102-005) Or an amphenol No. 621-685 93 Ω cable terminated with a B93R terminating resistor.
- e. Type B170A 170 Ω attenuator. 2 170 Ω cables, 2 type B170R 170 Ω Termination resistors.
- f. Type B93T10 93 Ω 10:1 "T" pad
- g. Type 161 pulse Generator and Type 126 Power Supply (or type 160)
- h. 10:1 probe
- i. 52 Ω cable, B52R terminating resistor, and 2 B52T10 52 Ω 10:1 T pads.

PRELIMINARY INSPECTION

Check for unsoldered joints, rosin joints, parts protruding from the chassis, and for proper connections on all transistors. The two T12G diodes (D422 from pin 3 of V424 and D452 from Gain Adj. Pot) should have the striped ends to indicated connections. Check resistances of all supplies and transformer primaries to ground. Check turret attenuator mechanical operation. The shock mounted amplifier chassis must float freely on its mounts.

POWER SUPPLY RESISTANCES TO GROUND ARE:

| <u>Supply</u> | <u>Resistance</u> |
|---------------|-------------------|
| -150 | 4k |
| +225 | 10k |
| +150 | 20k |
| +130 | 200k |
| +120 | 200k |
| -12.6 | 2-10 Ω |

The fuse should be a 1.6 amp slo-blo

1. CHECK VOLTAGE, REGULATION, AND RIPPLE OF ALL SUPPLIES

Set the -150 ADJ. for -150 volts. Check the +225, +150, and +130 volt supplies $\pm 2\%$. Check the +120 and -6.3 volt supplies with a 12K load and a #47 pilot light or a Cathode Follower Probe connected to the PROBE POWER jack.

Ripples must not exceed: (use "D" Preamplifier)

| | |
|-------|-------|
| -150 | 0.5mv |
| +225 | 0.5mv |
| +120 | 1.5mv |
| +130 | 1.5mv |
| +150 | 3.0mv |
| -12.6 | 4.0mv |

All supplies must regulate from 105 to 125 line volts. Power consumption is approximately 90 watts. Check the +150 v supply for microphonics. Micro must not exceed 10mv and must not be the ringing type.

2. CHECK HUM, NOISE, MICROPHONICS, JITTER, AND SET OUTPUT DC LEVEL.

Install the bottom and sides of the cabinet for shielding. Short the input of the amplifier and connect the output cable to the OUTPUT connector (red end of the 102-005 cable to the amplifier) of the 121A and the other end to the Scope input.

With the test scope preamp set to AC, position the trace to the center of the graticule. Switch the input to DC coupled and adjust the OUTPUT DC LEVEL to return the trace to the graticule center.

Set the 121A input attenuator to 1X and the "D" unit MILLIVOLT/CM and MILLIVOLT/CM MULTIPLIER switches to 1. The output hum should not exceed 3 mv, noise should not exceed 4 mv, and micro should not exceed 6 mv and must not ring. Micro is checked while rapping lightly on the 121A. Jitter should not exceed 1 mv. Jitter can be caused by tubes, noisy mica plate resistors, or by leaky decoupling capacitors in the plate circuits.

3. SET GAIN

Connect the 105 set to 1kc to the test scope through the B170-A attenuator terminated at the 105 and the Test Scope with B170-R terminating resistors. With the Scope sensitivity set at 0.05v/cm and the B170-A set for 14DB of attenuation, set the 105 Amplitude for 4 cm of deflection. Set the 121A attenuator to the 100X position and change the cable from the test scope to the 121A INPUT. Connect the 121A output cable to the test scope and adjust the amplifier GAIN ADJ. for 4 cm of deflection on the scope.

4. ADJUST LOW FREQUENCY COMPENSATION

Insert 54DB loss with the B170-A. Switch the 121A input attenuator to 1. Set the LF COMP. for level top on the square wave. Set the 105 to 1kc and check the square wave level.

5. CHECK INPUT ATTENUATOR STEPS

| <u>121A</u> | <u>B170-A</u> | <u>SCOPE DEFLECTION</u> |
|-------------|---------------|-------------------------|
| 500X | 0db | 4cm \pm 2% |
| 200X | 8db | " |
| 100X | 14db | " |
| 50X | 20db | " |
| 20X | 28db | " |
| 10X | 34db | " |
| 5X | 40db | " |
| 2X | 48db | " |
| 1X | 54db | " |

6. CHECK ATTENUATOR COMPENSATIONS

Connect a 10X probe from the 121A INPUT to the B107-A output terminating resistor. Set the INPUT ATTENUATOR to 1X, the 105 to 1kc, and the B170-A to 54db. Adjust the 105 OUTPUT for 2-3 cm of deflection.

Adjust the probe compensation for a level square wave.

By following the INPUT ATTENUATOR and B170-A settings listed in step 5, each position of the attenuator can be checked or adjusted. The compensating capacitors are reached through the front panel. The cabinet sides and bottom must be on for this check. The turret attenuator used in the 121A is pre-aligned and usually does not require any adjustments. If V424 is changed a slight adjustment may be needed.

7. CHECK PULSE LINEARITY

Trigger the 161 PULSE GENERATOR with the test scope calibrator. Set the PULSE WIDTH to .01, the PULSE WIDTH MULTIPLIER to 9, and the PULSE POLARITY to POS.

Feed the PULSE OUT to the scope and adjust the PULSE AMPLITUDE for 1 volt out.

Set the 121A input attenuator to 100X and the test scope to 0.5v/cm DC.

Set the test scope sweep speed to 0.1 millisecc/cm.

Connect the 161 output to the 121A input and the 121A output to the test scope.

Check for 2cm of deflection of the pulse in the positive direction. Switch the POLARITY switch to NEG. The pulse should be 2cm $\pm 3\%$ in the negative direction. (Since the 121A is AC coupled, the base line will shift) Remove the "D" unit from the test scope and install a "K" unit.

8. HIGH FREQUENCY ADJUSTMENTS

Connect 2 10:1 "T" pads (B52T10) to the output of the 107. Connect a 52 Ω cable from the "T" pads to a 52 Ω termination at the input of the 121A. With the 121A set to X1, adjust the 107 for 500kc output and the AMPLITUDE for 2.5 to 3 cm of deflection on the test scope. Set the "K" unit to 0.05 v/cm and the test scope sweep at 0.2 μ sec/cm. Adjust L433, L434, L463, and L475 for optimum wave shape. L433 and L463 control leading edge and spike. L434 controls rise time. L475 has most effect on ringing. The cores of all four coils will be well into the coils when properly adjusted.

9. CHECK FREQUENCY RESPONSE

Use a 190A with a B52T10 "T" pad between the output and the 121A. With the test scope at 0.05v/cm, set the 190A to 50kc and adjust the amplitude for 4cm of deflection through the 121A. (1X attenuation) Switch the 190A to 15mc and check that the deflection is not less than 3 cm.

If bandpass is low and all proceeding steps appear normal, trouble is generally due to misalignment of the coils. The 121A will pass up to 17.5 mc at the output connector. The overall bandpass of the 121A, "K" unit and 540 type oscilloscope will be between 16.3 and 16.8 mc. 2.5 db down (3 cm of deflection) at 15 mc is equal to 3 db down at 16.5mc.

NOTES.....

Use RCA 12BY7's for lowest amount of micro in the amplifier.
Use Telefunken 12AX7's for lowest micro in power supply. 6GE8's used in
+150v supply should be checked for micro. (V747) Ground lugs in the
-150v supply should be tight to reduce hum.