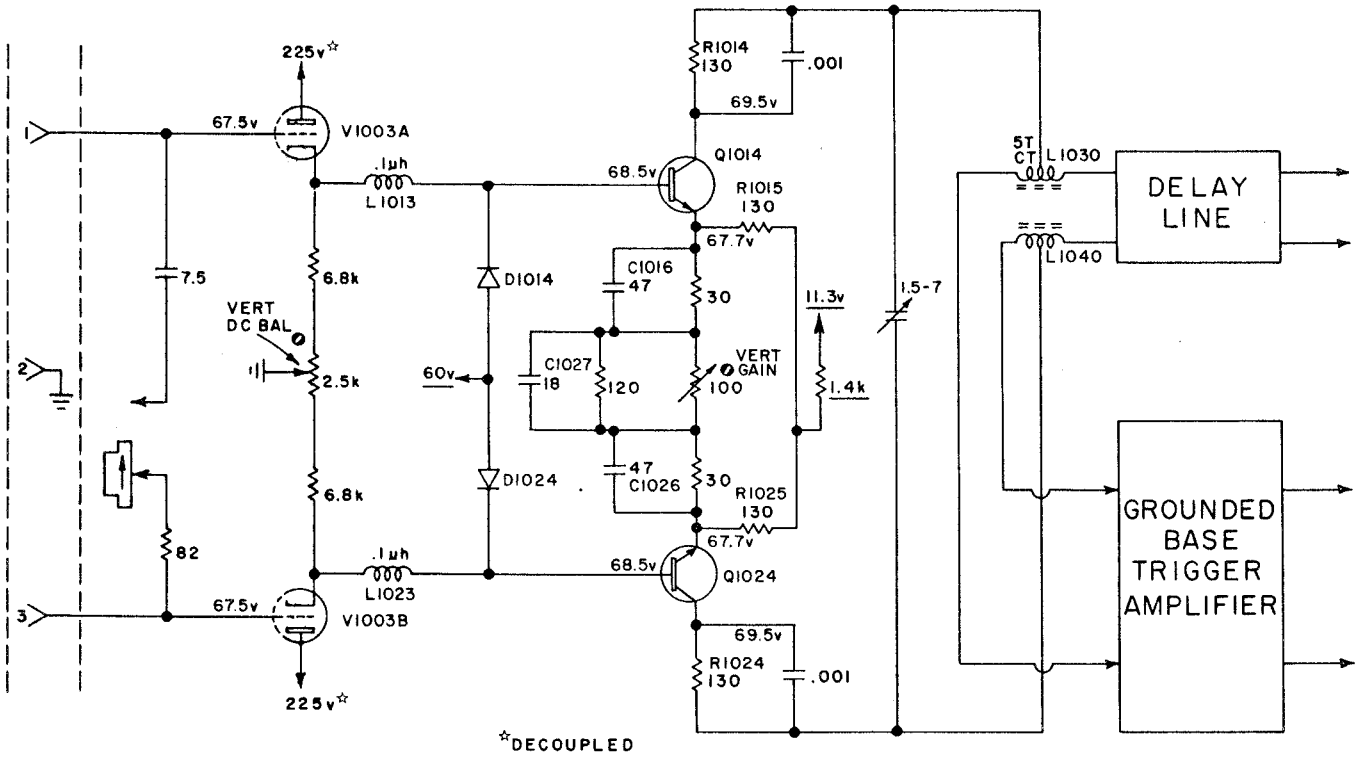
D. Input Amplifier



TYPE 547 VERTICAL AMPLIFIER
INPUT AMPLIFIER

B-547-0038x
3-23-'64 dl

1. The circuit consists of a pair of cathode followers driving an emitter coupled push-pull amplifier.
   a. V1003A and V1003B are halves of a 12AT7.
   b. Q1014 and Q1024 are RCA 2N2475 silicon NPN transistors.
   c. D1014 and D1024 are GE 1N3605 silicon diodes.
2. The input must be compatible with the existing letter series plug-ins, but should not restrict the bandpass of the 1 series plug-ins.
   a. .1 v/cm input sensitivity and 67.5v DC level are compatibility features of all letter plug-ins.

b. Plug-ins like the Type N with high output impedance require high input Z.

(1) Input cathode followers provide the high input Z.

c. The letter series plug-in characteristics were not controlled above 30 mc.

(1) Used with a wide bandpass vertical amplifier like the Type 547 would result in ringing, overshoot, etc.

(2) A 7.5 pf capacitor and 82 ohm resistor are connected between pins 1 and 3 whenever a letter series plug-in is used.

(3) A switch, actuated by the plug-in, connects the R-C to the circuit.

(4) Plug-ins such as the Type 1A1 have a hole in the rear panel so the switch will not be pressed.

3. The cathode followers are not cathode coupled.

4. A VERT DC BAL control corrects for unbalance in the amplifier.

a. If the VERT POSITION control in the plug-in sets the level on pins 1 and 3 the same, the trace should be centered.

b. The VERT DC BAL control has a swing of about 8 cm to assure this DC balance without selecting transistors.

5. The CF is directly coupled to the push-pull amplifier bases.

a. L1013 and L1023 provide high speed peaking.

6. D1014 and D1024 are catching diodes that prevent Q1014 and Q1024 bases from dropping below 60v.

a. If the plug-in is removed when the scope is on (or V1003 is removed from its socket), the diodes catch the bases at 60v, preventing collector-base breakdown.

b. V_{CBO} for a 2N2475 is 15v.

7. Q1014 and Q1024 form an emitter coupled push-pull amplifier.

   a. VERT GAIN is adjusted by varying the coupling between the emitters.

      (1) Increased resistance increases degeneration and decreases gain of the stage.

   b. Emitter tying resistors are bypassed by C1016, C1026 and C1027 to provide HF peaking.

      (1) Degeneration is reduced at higher frequencies by capacitively tying the emitters together.

      (2) This scheme makes this peaking less variable with the gain.

   c. Emitter returns are through R1015, R1025 and through an equivalent 1.4k to 11.3v.

8. The collectors tie through R1014 and R1024 to the center tap of the Tee matching coils L1030 and L1040.

   a. Collector current flows through a rather complex load including the Tee coils, the Delay Line and both Grounded Base Amplifiers.

   b. Total collector resistance value is chosen to provide proper collector load for thermal compensation.*

* Reference story in appendix.