off diodes V35*a*, V36*a* and V36*b* and releasing the grid of the Miller valve to permit the run-down. A diode, V38*a*, is incorporated to catch the anode of the Miller valve at +260V, and thus to prevent the leading edge of the switching waveform from causing a positive pip.

5. The 'stop scan' pulse, which is applied through diode V33*b* to the grid of V32*b*, causes the switching valve to revert to the stable condition. The fall in the anode potential of V32*b* then causes the Miller valve to be cut off, and initiates the flyback. The cathode waveform of V34*a*, which is at a potential of about +40V during the sweep, is used in the selection of signals to be fed to the Y-plates and the grid of the display tube.

6. One plate of the display tube is fed direct from the anode of the Miller valve with a negative-going sawtooth that should have an amplitude of about 100V for the A-scan and about 80V for the B-scan. The other plate is fed from the anode of V39 with a positive-going sawtooth of amplitude 80V for the A-scan and 60V for the B-scan (see fig. 6.7). The grid potential of V39 can be adjusted with RV12, which therefore acts as an X-shift control. Capacitor C71 in the coupling network between V37 and V39 should be adjusted until the sweep output of V39 is linear.

7. The scaling waveform for speeding the trace between the digit blocks in orders is generated in the Y-plate deflection circuit (fig. 6.4). It is applied through C69 to the junction of diodes V36*a* and V36*b*, which act as a diode 'pump'. Between pulses, C69 discharges towards -10V through V36*b*: during the positive scaling pulses it draws charge through V36*a* from the Miller capacitor, C68, in proportion to its capacitance and to the amplitude of the pulse. As the grid potential of the Miller valve varies only within narrow limits, the extent of charge sharing, and hence the scaling intervals on the trace, are practically constant throughout the sweep period.

### Engineer's Display

8. The timebase circuit for the engineer's tube with the timebase coarse control at HALF WORD is identical with that for the programmer's tube. The full circuit is shown in fig. 6.2. Resistor RV5 is a preset control of sweep amplitude for the half-word display, resistor RV6 controlling the X-shift.

9. When the timebase coarse control, SW3, is in operative positions other than HALF WORD, the 'stop scan' trigger is produced automatically after a preset sweep interval. The positive sawtooth at the anode of V21 is caught by diode V20*a*, giving a pull-up of about 5.5V at the grid of V16*b*, the signal at this point being DC-restored to -10V by MR19. The result is a triangular pulse at the cathode of V16*b*, which is fed through diode V15*b* to trigger V14 and stop the scan. Notice that RV6, which controls the mean grid potential and hence the anode potential of V21, acts in this application as a sweep-amplitude control as well as an X-shift control. The amplitude of the sawtooth at the anode of V19 should be about 160V, and that at the anode of V21 about 130V (fig. 6.7).

### Expanded Timebase

10. When the coarse timebase control is in operative positions other than HALF WORD, panel controls can be used to expand a selected portion of the scan by a factor of