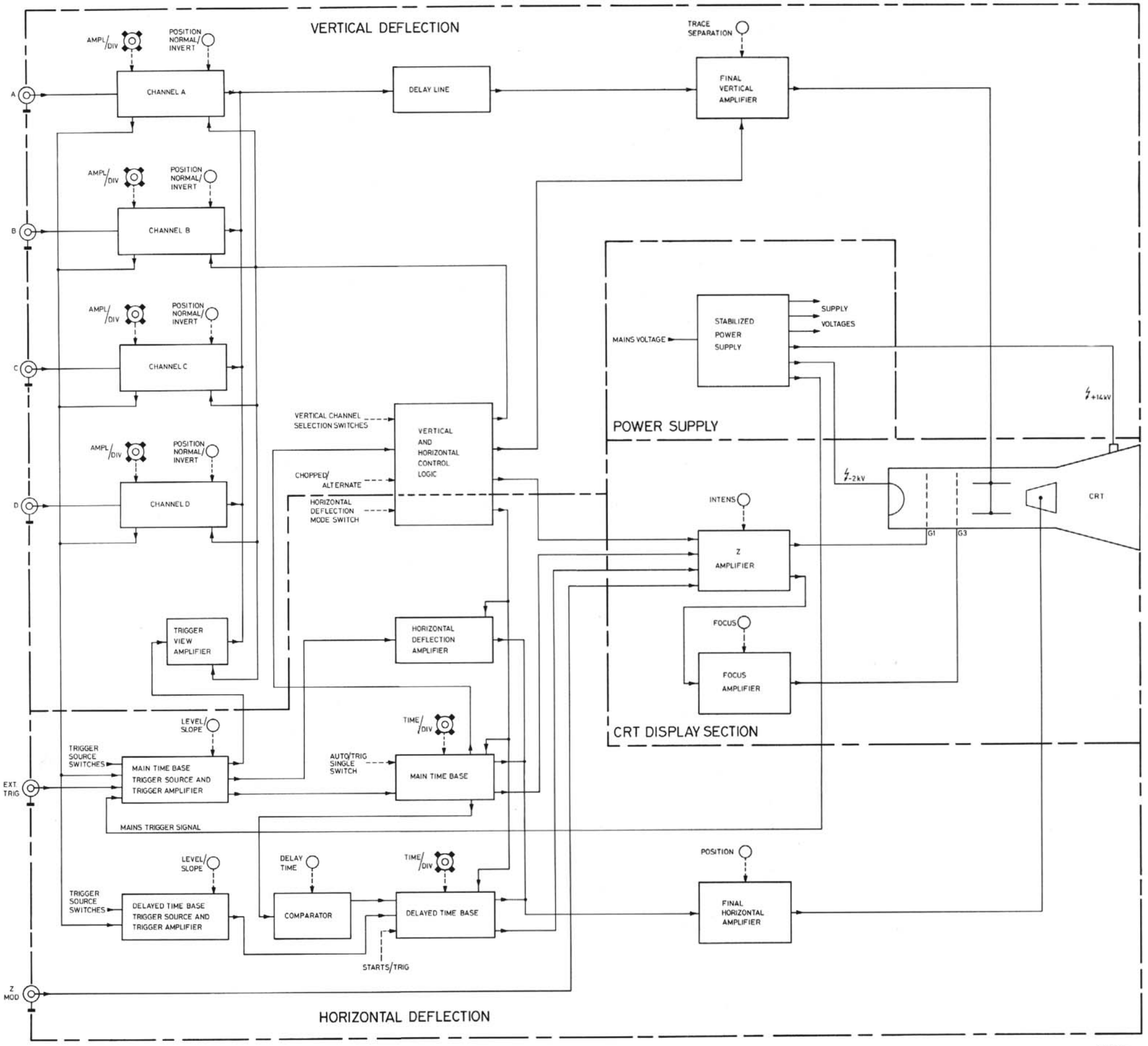


Fig. 1.13 PM3264 block diagram
Abb. 1.13 PM3264 Blockschaltbild
Fig. 1.13 PM3264 Schéma synoptique

CRT cathode regulation

To prevent sensitivity variations of the c.r.t., the cathode voltage is regulated. Variations of the a.c. supply voltage are applied via C2028 to an amplifier consisting of V2026, V2024 and V2023; d.c. variations are applied via R2051. The collector voltage of V2023 compensates for the voltage variations of the power supply and the rectifier. Consequently, the cathode voltage remains independent of the cathode current.

3.7.3. Graticule illumination circuit

The graticule of the C.R.T. can be illuminated by means of the bulbs E1 and E2. The intensity can be varied with the aid of ILLUM potentiometer R21 which controls the collector current (i.e. the current through the bulbs) of transistor V2046. The illumination circuit is not short-circuit proof.

3.7.4. Calibration voltage and current generator

The calibration unit is a square-wave generator consisting of an operational amplifier D1901 with feed-back. The oscillator frequency is determined by resistor R1909 and capacitor C1903. Capacitor C1902 keeps point 3 of the IC constantly equal to the average output voltage. Consequently, the generator is independent of fluctuations in the supply voltage. The square-wave amplitude is determined by zener diode V1901.
Potentiometer R1906 allows accurate adjustment of the output voltage and output current.
This output voltage is fed to socket X1 and the output current flows through current loop X2. This is the front panel CAL terminal.
The calibrator output signal can be used for probe compensation and/or checking the vertical deflection accuracy.

3.8. POWER SUPPLY

3.8.1. Input circuit

The power supply input circuit is matched to the 115V or 230 V range with selector-switch S33 which is located at the power supply unit at the rear side.
The mains voltage is rectified with the diode bridge V1801 and C1802, C1803, which form a voltage doubler in the 115V position of S33, and a standard bridge rectifier circuit in the 230V position of S1801.
The voltage across the series circuit of C1802 and C1803 is 250V to 400V for both mains voltage ranges.

3.8.2. Switching circuit

The unregulated DC voltage is applied in the form of pulses to a resonance circuit consisting of the primary coil of the convertor transformer T1801, combined with C1807 and C1808, via switching transistor V1806. The sine-wave voltage (approx. 800Vp-p) across the primary coil of T1801 is kept constant by regulating the duty cycle of the base current of V1806.
The primary coil of L1806 which is in series with the switching transistor, limits the current through this transistor.
The energy stored in L1806 is fed-back to the mains rectifier circuit, during the cut-off time of V1806, via diode V1811.
V1808 and V1809 eliminate the dissipation during the switching period from transistor V1806; instead of this, these losses are dissipated in R1814 and R1816.
V1807 improves the base drive for V1806.

3.8.3. Regulator circuit

The regulator circuit itself consists of integrated circuit D1801 (type TDA 1060), the output (p. 15) of which supplies a square wave current with variable duty-cycle to the base of V1812.
The collector signal of V1812 is applied to the switching transistor via transformer L1803.

The regulator circuit is controlled by:
- Feed back voltage (p. 3)
  This is the regulator control voltage and is taken from the rectifier circuit in the feedback winding of T1801.
  This control voltage depends on the setting of R1826 (V out).
- Over-voltage protection (p. 13)
  This voltage is also derived from the mains voltage and inhibits the regulator output at too high mains voltages (the trip-level on p. 13 is 600 mV).
- Current limit (p. 11)
  The voltage drop across the current-sense resistor R1811 controls the regulator circuit in case of overload.
- Frequency (p. 7)
  The resistance between p. 7 and ground determines the convertor frequency.
  R1827 (Freq.) has been adjusted to obtain a frequency of 20 kHz.
  The resonance frequency of C1807, 1808 and the primary coil of T1801 is wide enough to tolerate this.

Under normal working conditions the power supply voltages for the regulator circuit are delivered by the rectifier connected to the feedback winding of T1801.
V1804 is then conducting so that V1803 does not deliver current.

3.8.4. Switching-on and switching-on protection

When switching on the instrument, no supply voltages are available in the regulator circuit, from T1801.
At this moment V1804 is not conducting, so that V1803 is fully conducting, and the regulator circuit gets current via R1804 and R1806.
As soon as the converter circuit is working V1804 becomes conducting and V1803 goes non-conducting.

If the instrument is switched-on and no convertor voltage would appear (due to possible defect) the PTC resistor R1806 will warm up, reducing the current through V1803 to a safe low value.

3.8.5. Output circuits

The output rectifiers are of the coil-input types delivering the mean value of the sine-wave transformer voltage across the output capacitor. Apart from the d.c. voltage the converter transformer delivers also:
- 6,3 V for the c.r.t. heater
- 0–1 kV –1,5 kV for the focus and high tension circuits
- 120 V for the additional power supply unit (not used in the PM3264).

3.8.6. Photocoupler circuit

This circuit delivers a sine-wave voltage (derived from the mains voltage) used for mains triggering or mains deflection.

The photo-coupler V1842 which provides isolation between the mains voltage and the oscilloscope circuits drives the V1843-circuit in saturation, so that the square-wave voltage at the collector of V1843 has the same value for all mains voltages.
With an integration network R1851, 1852, 1853 and C1836, 1837, 1838 the original sine-wave is obtained. Via V1844 and V1846 this signal is applied to the trigger selector (R730) via capacitor C1839.

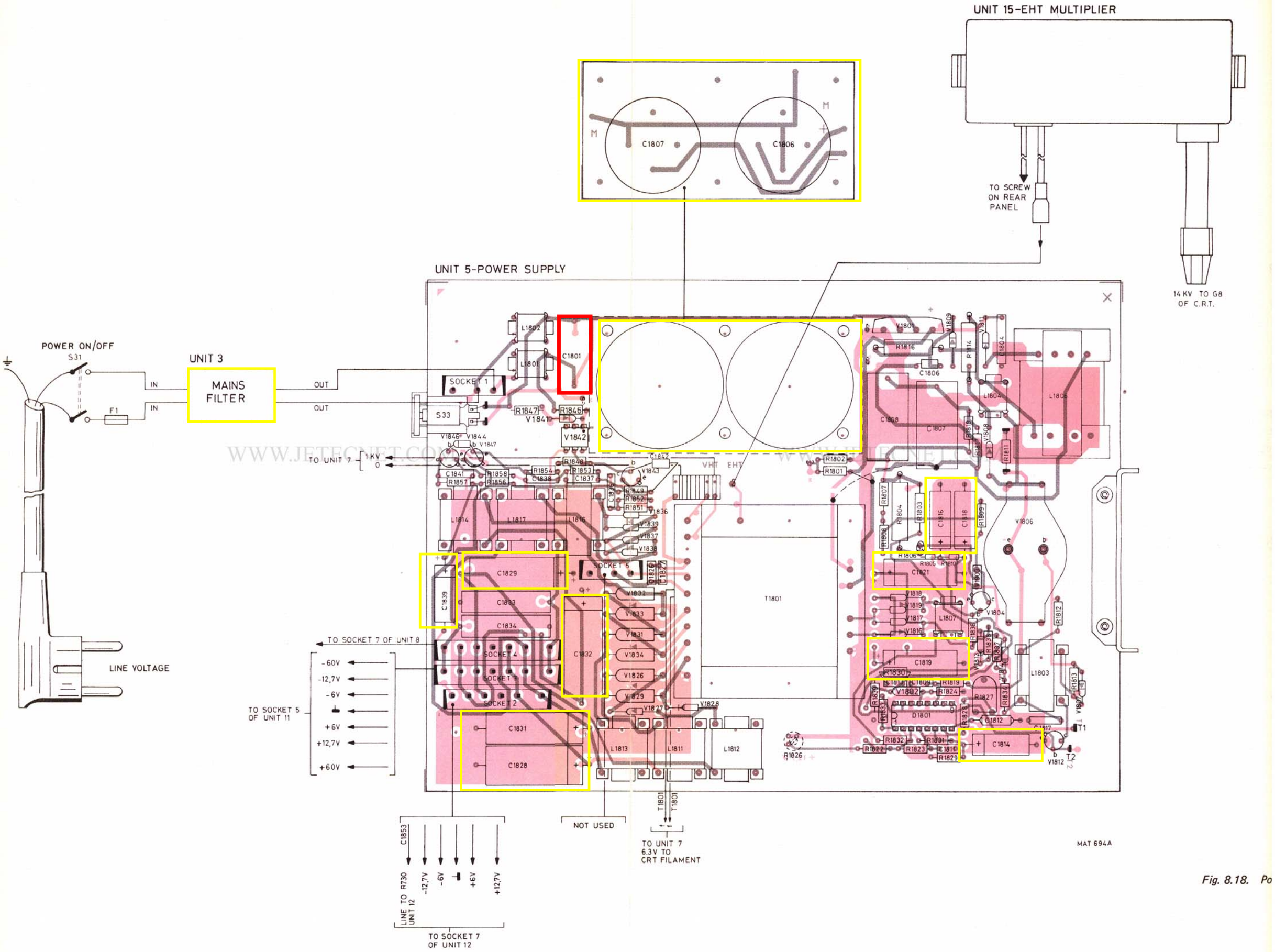
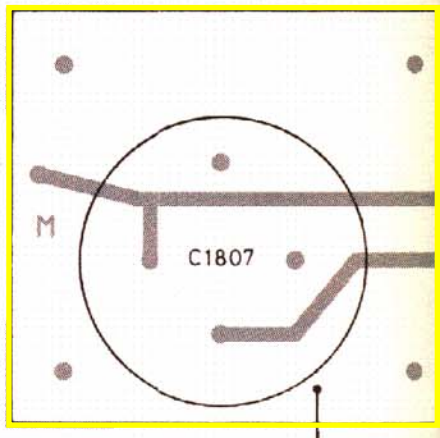

UNIT 15-EHT MULTIPLIER
TO SCREW ON REAR PANEL
14 KV TO G8 OF C.R.T.
C1807
C1806
UNIT 5-POWER SUPPLY
POWER ON/OFF
S31
F1
LINE VOLTAGE
UNIT 3
MAINS FILTER
IN
IN
OUT
OUT
TO UNIT 7
1 KV
0
SOCKET 1
S33
C1801
L1802
L1801
R1847
R1846
V1841
V1842
V1846
V1844
V1847
R1848
R1854
R1853
C1842
C1841
R1858
R1857
R1856
C1838
C1837
V1843
R1849
R1852
R1851
V1836
V1839
V1837
V1838
L1814
L1817
L1816
VHT
EHT
R1802
R1801
C1829
C1839
C1833
C1834
SOCKET 5
V1832
V1833
V1831
V1834
V1826
V1829
V1827
V1828
C1832
SOCKET 4
SOCKET 3
SOCKET 2
C1831
C1828
L1813
L1811
L1812
T1801
T1801
T1801
TO SOCKET 7 OF UNIT 8
-60V
-12,7V
-6V
+6V
+12,7V
+60V
TO SOCKET 5 OF UNIT 11
C1853
LINE TO R730 UNIT 12
-12,7V
-6V
+6V
+12,7V
TO SOCKET 7 OF UNIT 12
NOT USED
TO UNIT 7
6.3V TO
CRT FILAMENT
T1801
C1806
R1816
R1814
V1807
V1809
V1811
L1804
L1805
C1808
C1807
R1808
R1811
R1807
R1804
R1803
C1816
C1818
R1809
V1806
R1806
R1805
R1810
C1821
V1818
V1819
V1817
V1816
L1807
V1804
R1812
C1819
R1830
R1836
R1838
R1837
R1839
R1833
R1824
R1827
R1834
L1803
R1813
V1802
D1801
R1828
C1812
T1
C1817
R1832
R1831
R1822
R1823
C1814
R1829
V1812
T2
R1826
MAT 694A

Fig. 8.18. Po



UNIT 5-POWER SUPPLY

POWER ON/OFF

S31

F1

IN

IN

UNIT 3

MAINS FILTER

OUT

OUT

LINE VOLTAGE

TO UNIT 7 — 1KV, 0

TO SOCKET 7 OF UNIT 8 — -60V, -12,7V, -6V, +6V, +12,7V, +60V

TO SOCKET 5 OF UNIT 11

L1802, L1801, C1801, SOCKET 1, S33, R1847, V1841, R1846, V1842, V1846, V1844, V1847, C1842, R1848, R1854, R1853, V1843, C1841, R1857, R1858, R1856, C1838, C1837, C1836, R849, R852, R851, V1836, L1814, L1817, L1816, V1839, V1837, V1838, C1829, 220 uF 6V3, SOCKET 5, C1826, C1827, 10uF 16V, C1839, C1833, C1834, 100uF 16V, C1832, V1832, V1833, V1831, V1834, SOCKET 4, SOCKET 3, V1826, V1829, SOCKET 2, V1827, V1828, C1831, 100uF 16V, L1813, L1811, C1828, 220 uF 6V3

T1801, T1801

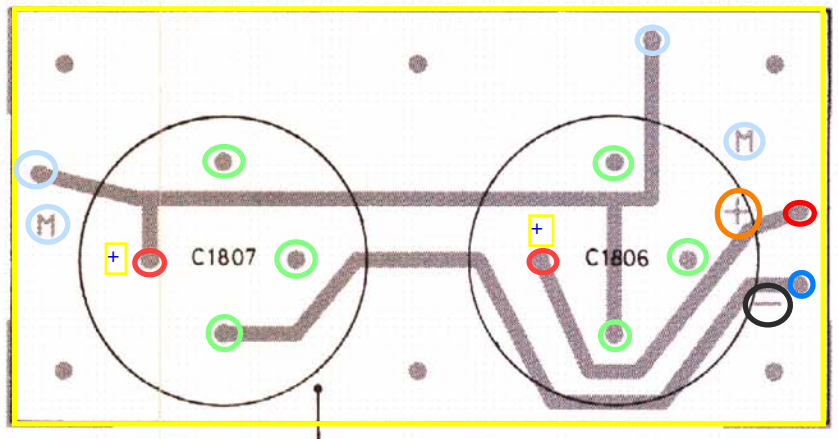
NOT USED

TO UNIT 7 6.3V TO CRT FILAMENT

C1853

LINE TO R730 UNIT 12 — -12,7V, -6V, +6V, +12,7V

TO SOCKET 7 OF UNIT 12



UNIT 15-EHT MULTIPLIER

TO SCREW ON REAR PANEL

14 KV TO G8 OF C.R.T.

ER SUPPLY

10 uF 16 V

22 uF 25V

22 uF 25V

10 uF 16V

NOT USED

TO UNIT 7
6.3V TO
CRT FILAMENT

MAT 694A

Fig. 8.18. Po

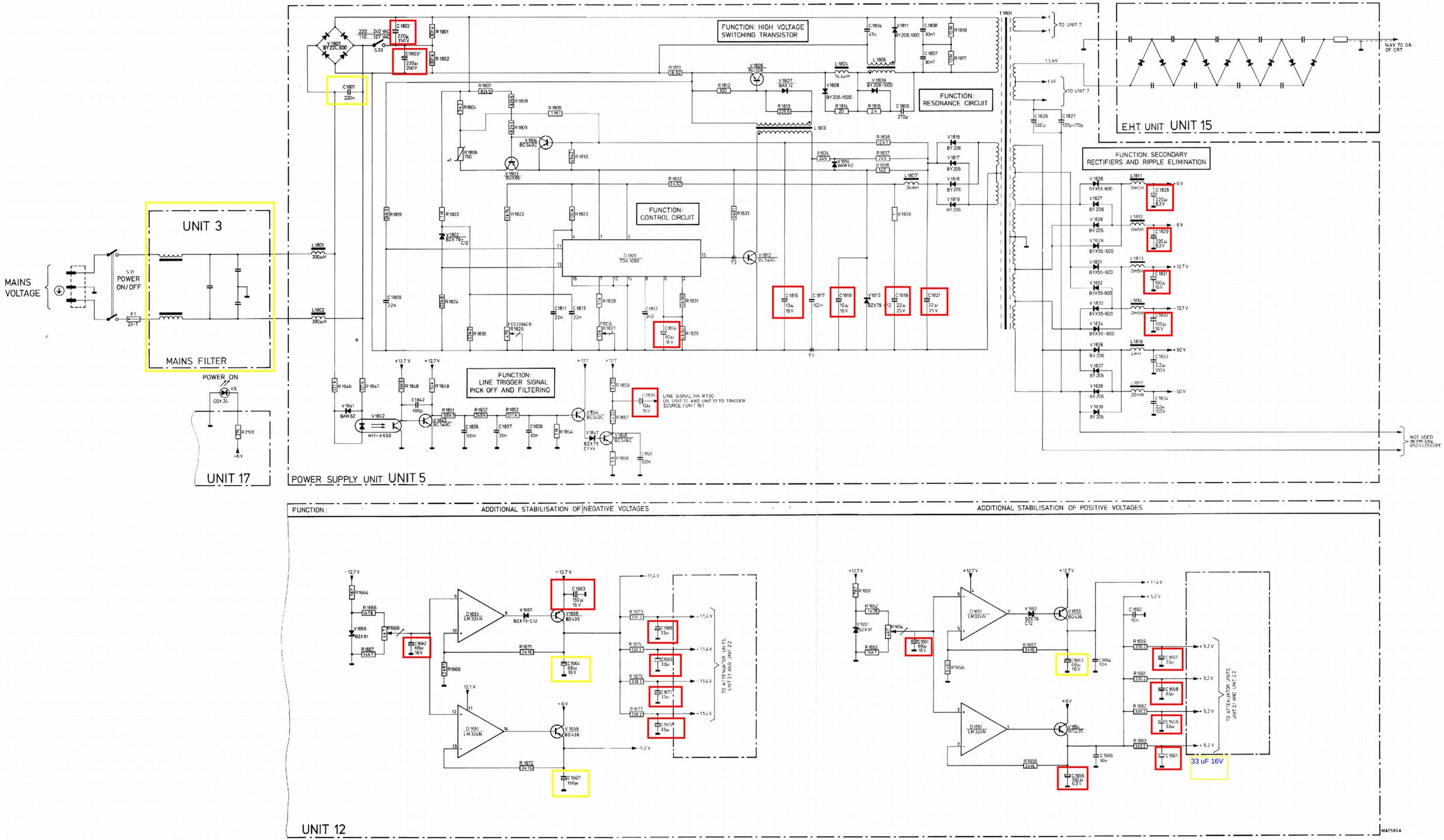
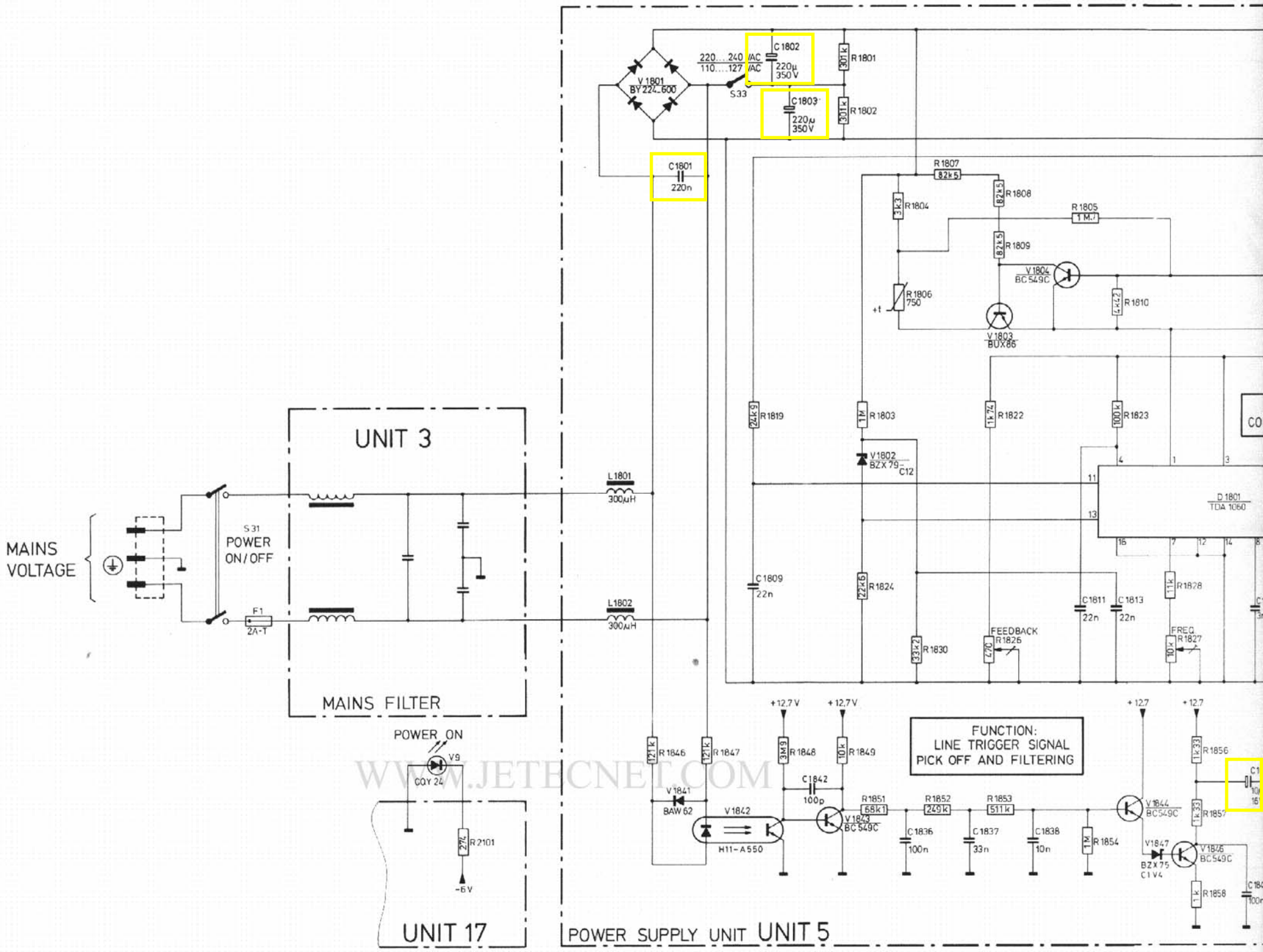
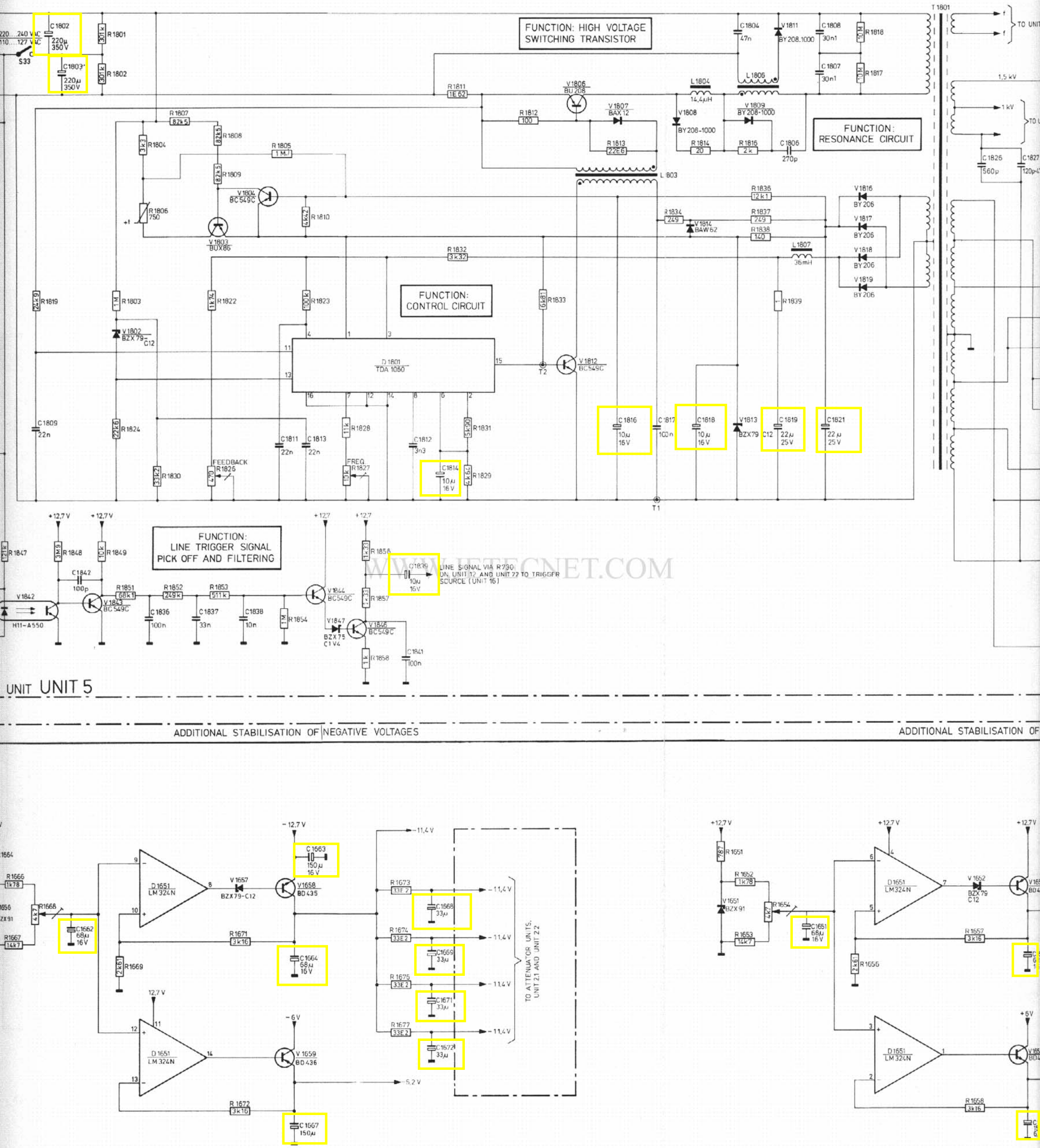


Fig. 8.19. Z-amplifier, focus unit and auxiliary unit, circuit diagram





UNIT UNIT 5

ADDITIONAL STABILISATION OF NEGATIVE VOLTAGES

ADDITIONAL STABILISATION OF

Fig. 8.19. Z-amplifier, focus unit and

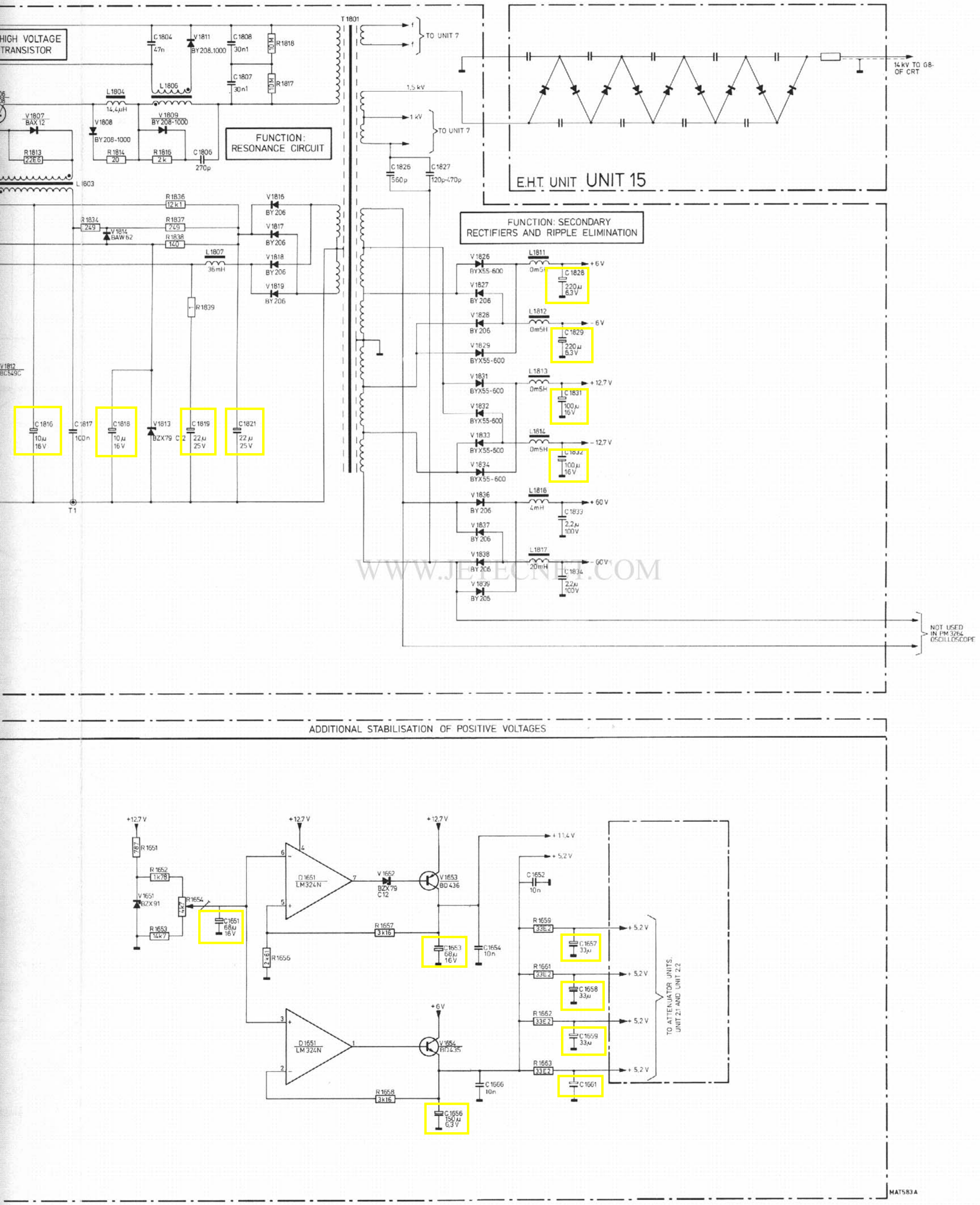


Fig. 8.19. Z-amplifier, focus unit and auxiliary unit, circuit diagram