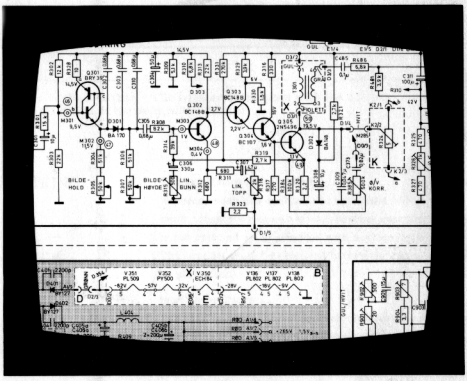
Mars 1972

Tandberg RADIO

Service manual

TANDBERG

COLOR TV 1



TANDBERGS RADIOFABRIKK A/S

Contents

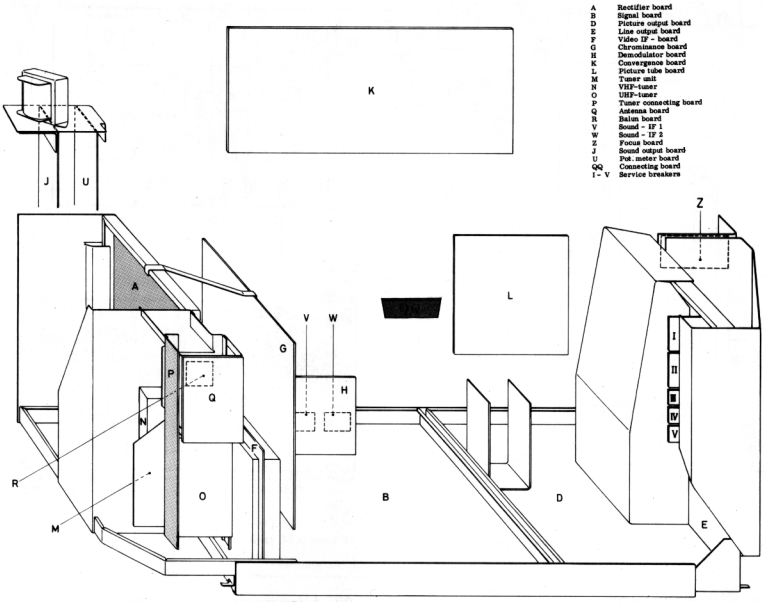


Fig. 1. Location of the various boards. The colours correspond with the colours on the circuit diagrams at the rear of the manual.

1.0 HANDLING OF CHASSIS DURING SERVICING

1.01 Isolating Transformer

The chassis has direct connection to one phase of the mains. An isolating transformer should therefore be used when servicing.

1.02 Warm-Up

Adjustments and measurements should not be carried out until the set has reached operating temperature after approx. 10 minutes warm-up, and the operating voltages have been checked (see paragraph 7.0).

1.03 Rear Cover

Loosen the two screws in the lower corners of the rear cover, and push the retaining clamps upwards. Pull the cover out at the bottom, and lift it free of the knobs at the upper part of the cabinet.

1.04 Main Chassis

The main chassis is mounted on rails at the bottom of the cabinet. A spring on each rail locks the cabinet in position.

Transportation Safety Latch

In some receivers each rail is furnished with a safety latch, consisting of an angular bracket catching a hole in the rail and being attached with screws to the chassis. The bracket must be removed before the chassis can be pulled out.

Service positions:

Bend the springs out and pull the chassis towards the rear until it locks in a position half-way out of the cabinet. If it is necessary to pull the chassis further, the springs must be released once more, and the chassis pulled further back until it locks in the outer position. The supporting string will now hold the chassis in horizontal position. From this position the chassis can be tilted up and fixed in a convenient position for servicing by the hook which can be attached to the frame around the E board. When the chassis is to be put back into the cabinet, it must first be descended to horizontal position before it is pushed forward.

1.05 Convergence Board

The convergence board can be swung up for adjustment and servicing, see chapter 6.11.

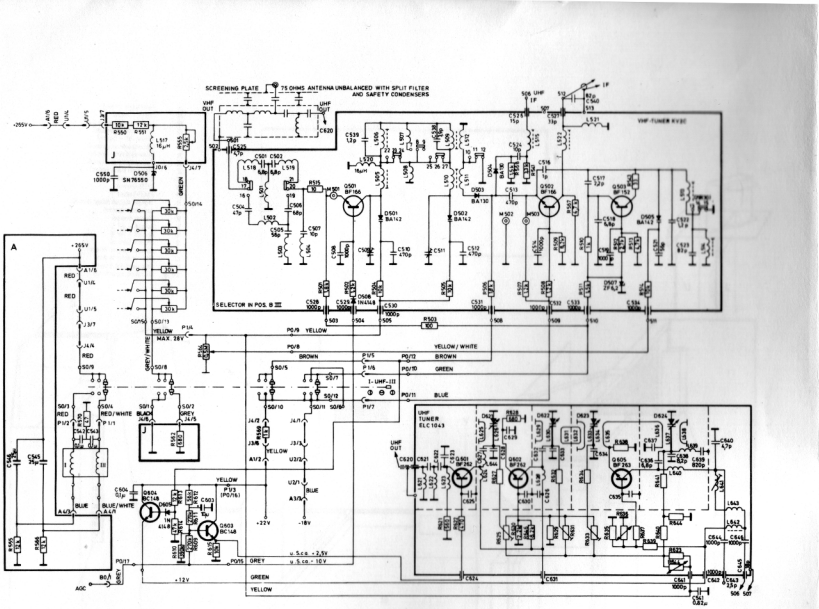


Fig. 2. Schematic for VHF tuner KV2C and UHF tuner ELC 1043

2.0 TUNER UNIT

The tuner unit can be released by loosening the two screws which are accessible from the left side.

2.01 Adjustment of VHF Tuner

Adjustment of some circuits in the VHF tuner is necessary if the tuner has been replaced. Before adjustment is carried out, the video-IF must first be aligned. If sweep generator (Model Telonic SV13 or similar type) and oscilloscope is used, feed a signal from sweep gen. to ant. input, and proceed as follows:

a) Hook the detector probe on M503 and M502 (inside the VHF-shielding can.
b) Adjust the voltage from the varicaps by means of the tuning knob to place the RF band-filter curve in correct position, i.e. sound and picture markers symmetrical with respect to the curve for channel 8.
c) Connect signal from wiring terminal 512 (IF-out) to IF-in on the sweep generator.
d) Adjust potentiometer R564 (board P) to correctly position the oscillator marker on the base line.
e) Connect the oscilloscope to the video detector M 91, board B, sweep the VHF tuner and the IF amplifier simultaneously, and adjust L522 for correct IF curve. Use external AGC (- 10 to -18V) connected to M201 on the IF board.
f) To adjust L515, sweep the UHF tuner from the aerial input and adjust L515 for correct IF curve.

2.02 Alignment of UHF Tuner

If the UHF tuner has been replaced, L641 must be aligned. It is presumed that the VHF tuner and the video IF have first been correctly aligned. The procedure is as follows:

a) Connect the sweep generator to the UHF tuner.
b) Use external AGC (-10 to- 18V) connected to M201 on the IF board.
c) Connect the oscilloscope to the video detector (M 91, board B). The adjustment should be performed on channel 40.
d) By means of a coupling loop close to the link between the VHF tuner and the IF input, inject a marker on 36.5 MHz.
e) Adjust the tuner until the above marker coincides with the band center marker in channel 40 (626 MHz).
f) Adjust L641 for maximum height of the curve, and L 515 (VHF unit) for correct IF curve.

2.03 Replacement of Push-Button Unit

After replacement of push-button unit, ensure that the select buttons and the control knobs are centered in the holes of the front cover. The voltage at terminal 505 on the VHF unit must be checked. This voltage should be 28 V when the tuning knob is in maximum clockwise position. If necessary, adjust the voltage with R555 (board J). If the zener diode D 506 is replaced, the voltage must be checked and if necessary adjusted.

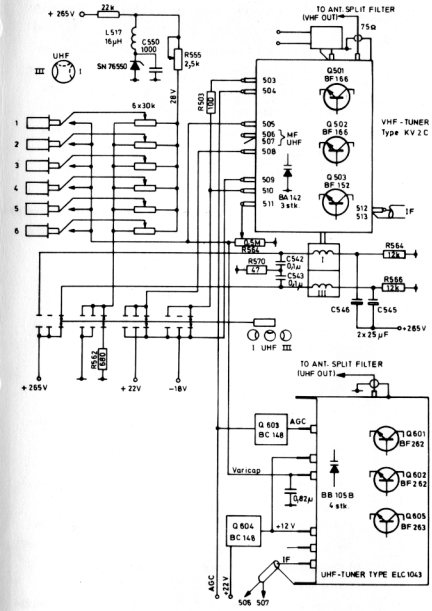


Fig. 3. Block diagram for VHF tuner KV2C and UHF tuner ELC 1043 with push-button unit.

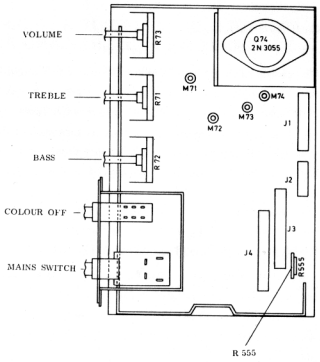
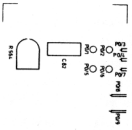


Fig. 4. Sound output board (J), alignment- and test points.



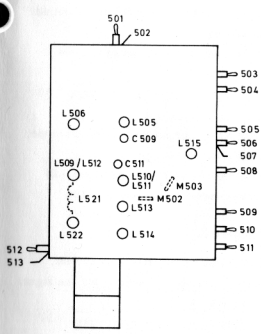


Fig. 5. VHF tuner KV2C, alignment- and test points.

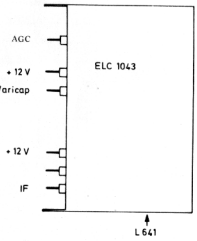


Fig. 6. UHF tuner ELC 1043, alignment- and test points.

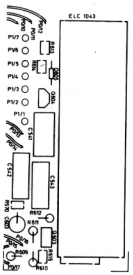


Fig. 7. Tuner connecting board (P), alignment- and test points.

3.0B VIDEO IF, SOUND IF AND DISCRIMINATOR 6 MHz TRAP AND AGC

The receiver is pretuned from the factory and should normally not have to be realigned. If, however, the plug-in IF unit has been replaced, it is recommendable to check the IF curve. Alignment should not be attempted unless a suitable sweep generator is available (such as Telonic Model SV13 or similar). The video IF curve is shown in fig. 9.

3.01B Verification of the IF curve

Connect the sweep generator to the aerial input, and set the signal level somewhere in the range -20 to -50 dBm, corresponding to 22 mV to 0.8 mV across 75 ohms. Connect the oscilloscope to M91 and M92 on board B (M92-chassis).

The sweep repetition frequency should be 50 Hz and synchronized with the time base of the scope. In order to have the AGC under control, connect a negative voltage to M201 and set the voltage between -10 and -15 volts. in order to obtain a detector output voltage of approx. 2.5 V.

3.02B Alignment of the Traps

If it is found necessary to align the traps, proceed as follows:

a) Increase the gain in the RF and IF circuits, by reducing the negative voltage fed to M201, until the trap frequencies can be observed as notches on the IF curves. To obtain this, it is necessary to increase the gain to the point where saturation of some amplifier stages cannot be avoided. The best possible compromise between gain increase and saturation should be attempted.
b) Detune L12 by turning the core until the trap frequency is positioned in the middle of the IF band.
c) Adjust L2 for minimum at 41.5 MHz.
d) Adjust L4 for minimum at 33.5 MHz.
e) Adjust L6 for minimum at 31.5 MHz.
f) Adjust L8 for minimum at 43.0 MHz.
g) Readjust L12 for minimum at 33.5 MHz.
h) Readjust AGC voltage until the detector voltage measured at M91 (board B) is again 2.5 V.

3.03B Alignment of IF-Curve

Verification and alignment of the IF-curve should be performed in the middle of band 3 (channel 8).

a) Adjust L10 for maximum at 36 MHz.
b) Adjust L11 for maximum at 35.5 MHz.
c) Adjust L13 for maximum at 39.5 MHz.
d) If the curve has two peaks or if it has one peak with too flat slopes this can be compensated by L521 and L522 in the VHF channel selector unit. L521 is an air coil and can be slightly adjusted by stretching or compressing the coil. Stretching of the coil gives one peak on the curve, while compression of the coil will give two peaks. L522, which has an iron core, has nearly the same effect as L521.
e) Both coils form only the top of the curve and have very little influence on the slopes.

Other nonsymmetrical distortion of the top of the curve can be taken care of by a minor adjustment of L10. All the remaining IF circuits are printed on the board.

3.04B Noise Inverter

Connect the oscilloscope to B 3/4 (sync. signal output) and adjust L220 for maximum on 34.7 MHz.

3.05B Sound IF

Test points and adjustments, see board B. The selectivity curve for sound IF and discriminator is shown in fig. 10.

a) Connect a FM generator modulated with 400 Hz, deviation $\pm$ 300 kHz, center frequency 6 MHz to the IF input M51 (board F) in series with a resistor of 8.2 kohm. Adjust the signal level to approx. 100 mV.
b) Connect an oscilloscope with diode rectifier in the test lead to the base of Q52, M52, (board B).
c) Align L51, L52 (board F), and L53 (board V) to maximum at 6.0 MHz.

Note: Crystal controlled marker signal must be used to locate 6 MHz on the curve.

3.06B Discriminator

a) Connect the oscilloscope to the discriminator output, M55 and M54 (board B).
   Note: The plug B1 must be pulled out to prevent M54 to remain at -18 V.
b) Reduce the deviation of the signal generator to $\pm$ 50 kHz.
c) Adjust L54 (board W) for the steepest possible slope of the discriminator curve.
d) Increase the deviation to $\pm$ 300 kHz and adjust L55 (board W) for symmetrical curve (see fig. 10).

3.07B AM Suppression

a) Connect an AM generator modulated with 400 Hz, 30% to M51 (board F) via the 8.2 kohm. Set the signal level to approx. 30 mV.
b) Connect the oscilloscope as explained for discriminator alignment.
c) Adjust R64 (board W) to obtain a horizontal line on the oscilloscope.

3.08B 6 MHz Trap

The simplest way of adjusting the trap is to feed a normal, TV signal with sound to the receiver (test pattern with sound).

a) Connect the oscilloscope to M91 (board B) and adjust the tuning knob to obtain a clearly visible sound interference in the picture.

b) Turn the core of L15 fully out, and then screw it slowly in to minimize the voltage superimposed on the sync pulses. The outer minimum is the correct one.

3.09B AGC

a) Feed a normal TV signal to the reciever and connect a DC oscilloscope to M91 and M92. Then adjust R 205 to obtain that the black level of the video signal is at ground potential.

b) Set the input level to -50 dBm i.e. 0.8 mV across 75 ohm.

c) Connect a VTVM between ground and the AGC lead to the channel selector, terminal 504 on the VHF unit.

d) Adjust R215 until the AGC voltage to the tuner starts moving in positive direction from approx. -9 V as the input level is increased above -50 dBm.

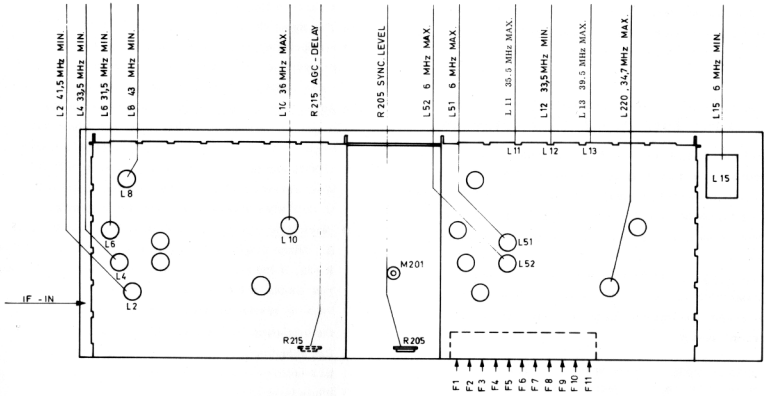


Fig. 8B Video IF board (F) alignment- and test points.

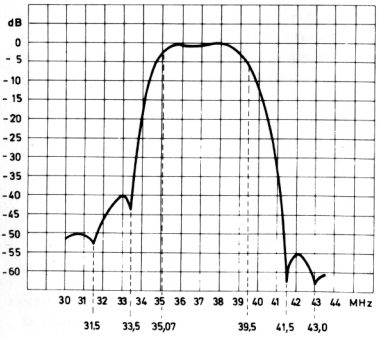


Fig. 9B Video IF-curve.

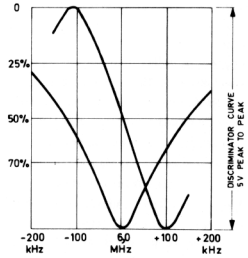


Fig. 10B Selectivity curve for sound IF and discriminator.

4.0 LUMINANCE AMPLIFIER - MATRIX AND RGB AMPLIFIERS

4.01 Test Equipment

a) Oscilloscope, Bandwidth DC to 5 MHz or greater.

The oscilloscope must have a probe with a frequency independent impedance of minimum 10 Mohm in parallel with maximum 10 pF. The oscilloscope must have horizontal and vertical calibration. External triggering of the scope should be used.

b) VTVM with input impedance minimum 10 Mohm.

c) Signal source. The signal must have a grey-tone modulation extending from white to black, with the sync peak at 100%, sync shoulder at 75% and white at 10% of maximum carrier.

A standard test pattern from a transmitter or another suitable signal source can be used.

4.02 Adjustment of Operating Point and Grey-Tones using DC Oscilloscope

a) Set the oscilloscope for 100 µs horizontal sweep and connect the triggering input to the terminal of R 102 which is marked "Triggepuls H" (fig. 11). Set the scope for DC operation with a vertical sensitivity from the test probe to 1 V per division, and connect the probe to M93.

b) The signal. Feed a fully modulated grey-tone signal (from white to black). Set the signal level to approx. - 30 dBm i.e. approx. 15 mV measured across the aerial input plug.

c) External controls. Set the controls for contour, hue of colour and contrast to their centre position. Adjust brightness to obtain correct black level. If the sync level is correctly set, the black level measured at terminal M93 should be at ground potential, irrespective of the setting of contrast control (see paragraph 3.09 a).

d) Adjustment of operating point. Connect the oscilloscope to M140 and adjust R115 to obtain a black level of + 90 V. Perform the same adjustment for M180 by means of R135 and finish with M160/R125. When the black level for all anodes has been set to + 90 V, irrespective of the position of the contrast control, proceed to the black level adjustment.

e) Black level adjustment. Connect the oscilloscope to one of the picture tube grids (M141 M161 or M181). Set the contrast control to minimum, and adjust the brightness control to bring the black level to -140V. Then adjust R488 R489 and R490 (board E) for correct colourless picture in black and dark grey. Then proceed to the adjustment of white level (amplification in RGB stages).

f) White level adjustment. Set the contrast control to approx. 3/4 of maximum contrast and connect DC oscilloscope to the cathode of the picture tube, where the level should be at ground potential during the vertical sweep, and approx. + 60 V during the retrace. Adjust R141, R161 and R181 to maintain the level at nearly ground potential while observing that a colourless picture in white and light grey is obtained.

4.03 Adjustment of Operating Point and Grey-Tones using AC coupled Oscilloscope and VTVM

a) Set the oscilloscope as in paragraph 4.02 and connect to M91/M92.

b) The signal should be as in paragraph 4.02b.

c) Set operating controls as in paragraph 4.02 c. For correctly adjusted sync level, the demodulated video signal should be 2.8 V peak-to-peak.

d) Adjustment of operating point. Short-circuit M93 to ground and connect VTVM to M140. Adjust R115 to give + 90V. Adjust the voltage at M180 by means of R135 and the voltage at M160 by means of R125. When correctly adjusted, the 3 anodes should be at +90V when M93 is short-circuited to ground.

e) Black level adjustment. Pull out the service breaker II. Adjust brightness control to centre position. Adjust R 488, R 489 and R 490 (board E) until the lines become just visible on the screen.
Push the service breaker II back in, and turn the the brightness up to correct black level. Perform fine adjustment by means of two of the controls until a colourless picture in dark grey is obtained.

f) White level adjustment.
This is performed as in paragraph 4.02 f, except that a VTVM connected to the cathodes of the picture tubes is used to indicate the beam current limiting. During normal operation the voltage at the cathodes of the picture tube is approx. 1.5V. When the cathode voltages increase beyond this value, the beam current limiting occur.

4.04 Adjustment of 4.43 MHz Trap L93

The adjustment can be accomplished as follows when a colour TV signal is fed to the input:

a) Set the receiver for normal operation and connect an oscilloscope after the 4.43 MHz trap (the junction of R111, R120 and R131)

b) Adjust the trap to obtain minimum signal at 4.43 MHz. The adjustment can be performed without the use of instruments, by observing when the 4.43 MHz interference lines on the screen vanish.

NOTES

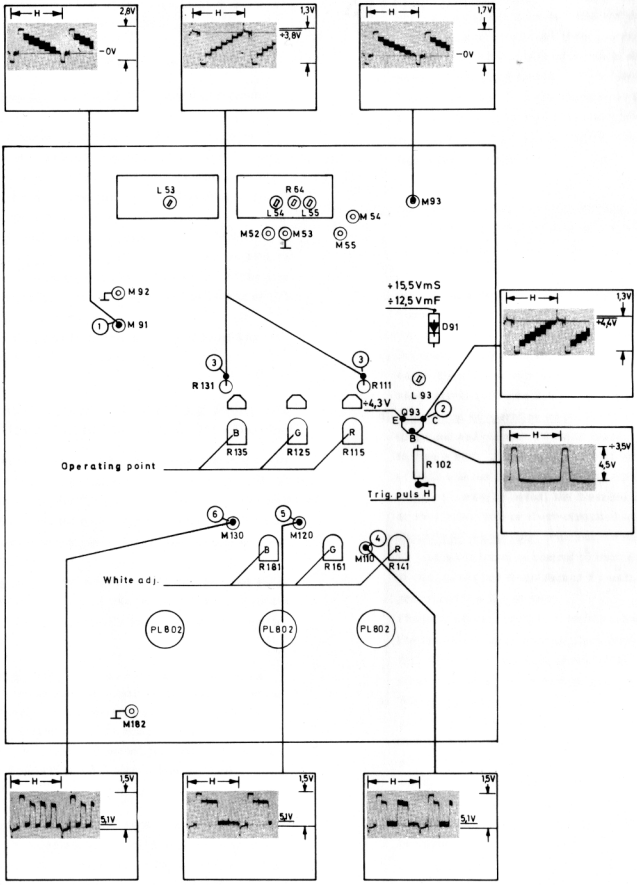


Fig. 11. Signal board (B), alignment- and test points with oscillogrammes for colour signals using a colour bar generator.

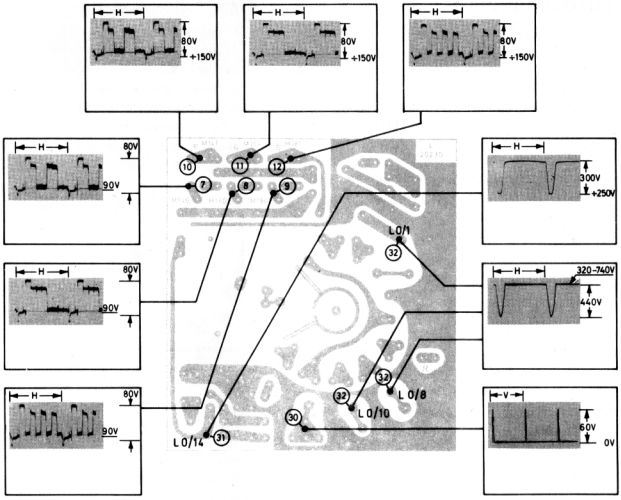


Fig. 12. Picture tube board (L), alignment- and test points with oscillogrammes for colour signals using a colour bar generator.

5.0 COLOUR CIRCUITS

Signal source: PAL Colour signal generator.
Indicator: Oscilloscope with high input impedance
Ri > 10 MΩ shunted with max 10 pF.

5.01 Burst Amplifier and Automatic Chrominance Control (ACC).

a) Feed colour signal to the aerial input.
b) Set contrast- and saturation controls R712 and R711 in their centre positions. (White dot twelve o'clock)
c) Connect oscilloscope to M703.
d) Adjust L801 for minimum amplitude.

5.02 Reference Oscillator

1 FREQUENCY

a) Connect colour signal
b) Strap M801 and M802 (burst amplifier). Strap M875 and M877 (colour threshold detector).
c) Adjust R825 for a nearly stationary picture.
d) Remove the straps.

II AMPLITUDE

a) Connect oscilloscope to M815.
b) Adjust L815 for maximum amplitude.

III PHASE

a) Strap M727 - M728
b) Connect oscilloscope to M130 and set the sweep rate to 10 µs/cm. Then reduce the sweep rate by 20% so that two subsequent lines are visible. The oscilloscope must be set for external triggering of line pulses from R 102
c) Adjust L801 until the double contours disappear from the CRT picture.
d) Remove the strap M727 - M728

5.03 PAL-decoder

a) Connect colour signal.
b) Connect the oscilloscope to M 130, and use the same setting as in 5.02 III b. Adjust L 725 for elimination of double contours on the CRT picture.
c) Unscrew the core in L 801 approximately two turns.
d) Adjust R 730 for elimination of double contours.
e) Repeat 5.02 III PHASE.
f) Repeat 5.03 a) and b).

5.04 PAL Identifying Amplifier

a) Connect colour signal (PAL)
b) Connect oscilloscope to M845.
c) Adjust L845 for maximum amplitude.

5.05 Colour Balance

a) Connect colour signal
b) Set contrast and saturation controls in their centre positions.
c) Connect oscilloscope to M130.
d) Using standard colour bar pattern, adjust R769 to obtain equal colour signal amplitudes. See oscillogram M130 page 10.
e) Connect oscilloscope to M110.
f) Adjust R760 to obtain equal colour signal amplitudes. See oscillogram M110, page 10
g) If rainbow pattern is used, adjust R769 to obtain a signal amplitude of 1.6 Vpp in M130, and adjust R760 to obtain 0.9 Vpp in M110.
Colour signal generators with other patterns can also be used for alignment of the colour circuits if the procedure given in the particular instrument manual is followed.

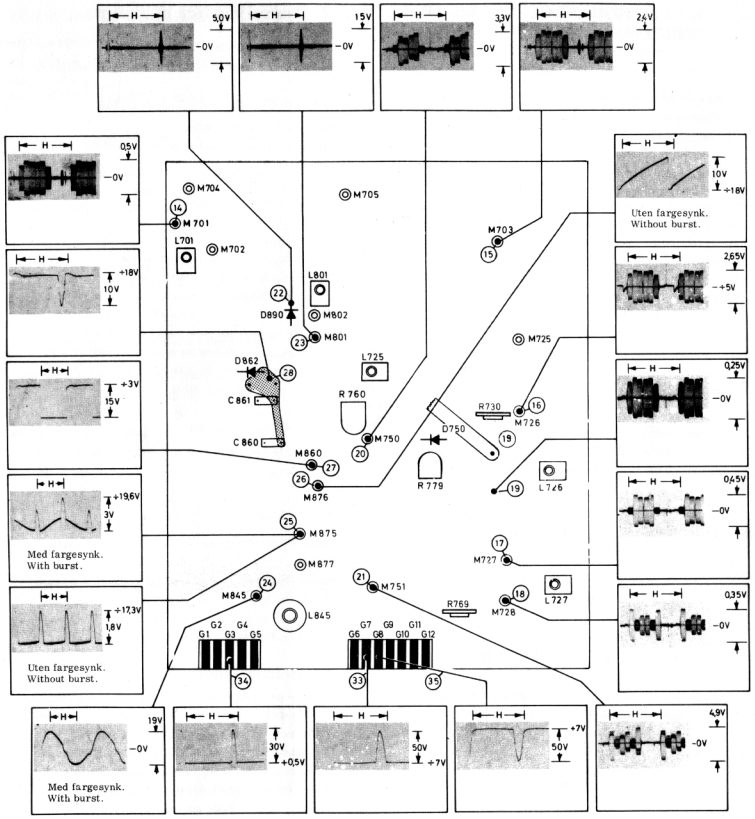


Fig. 13. Chrominance board (G), alignment- and test points with oscillogrammes using colour bar generator.

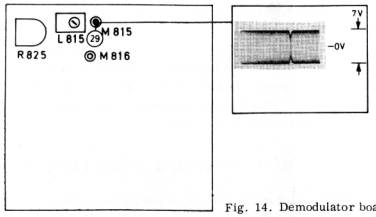


Fig. 14. Demodulator board (H), alignment- and test points with oscillogrammes.

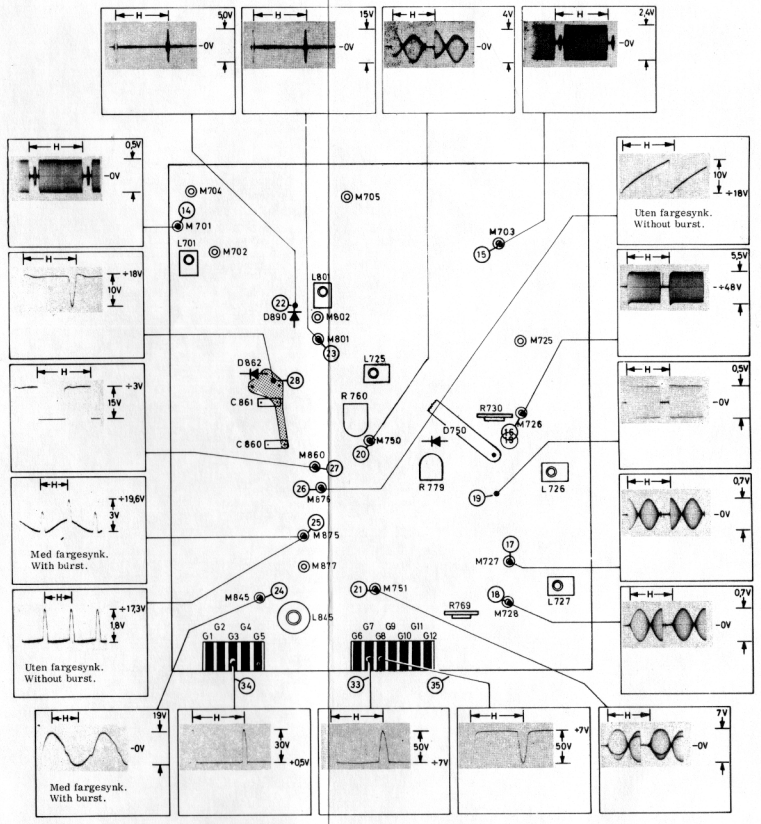


Fig. 15. Chrominance board (G), alignment- and test points with oscillogrammes for colour signals using rainbow signal generator.

6.0 DEFLECTION CIRCUITS, COLOUR PURITY AND CONVERGENCE

All adjustments in these circuits interact more or less. The adjustments should therefore be performed in the sequence given below. Do not switch on the receiver until it has been placed in the position to be used during the adjustments.

Picture geometry, centering and focus are easiest adjusted with an ordinary test pattern on the screen. The convergence adjustment should be carried out with a picture containing narrow horizontal and vertical lines (grid pattern). Because the convergence circuits are frequency dependent, the line frequency of the signal generator must be correct. If not, convergence errors will occur when a picture with correct frequency is later received.

6.01 Mains Voltage

a) Check that the mains voltage selector (board A) is in correct position.
b) The selector should be in a position giving a DC voltage of approx. 265 V at terminal A1/7.

6.02 Demagnetization of the Picture Tube

Satisfactory demagnetization is normally obtained when the receiver is switched on from cold condition.

6.03 EHT Voltage at Zero Brightness

a) Set brightness and contrast potentiometers at minimum.
b) Adjust the EHT voltage to 24.5 kV by means of R361 (board E). This can be done by setting the boost voltage at 945 V. The voltmeter should be connected to one of the terminals of service breakers III IV or V.

6.04 Focus

Set the contrast and brightness controls to the maximum acceptable positions, and adjust focus with potentiometer R366 (board E).

6.05 Picture Height and Linearity

a) Adjust picture height with R307 (board D).
b) Adjust linearity in the upper part of the picture by means of R318 (board D).
c) Adjust linearity in the lower part of picture by means of R315 (board D).

6.06 Horizontal Linearity/Width

Adjust the horizontal linearity with L353 (board E).

6.07 Centre Position of picture

I VERTICAL POSITIONING

a) Adjust R326 (board D) to centre the picture vertically

II CHECKING OF HORIZONTAL OSCILLATOR

a) Short-circuit M283 - M284
b) Set oscillator core L350 to make sides of the picture vertical.
c) Remove s/c M283 - M284.
d) Short-circuit M284 - M285.
e) Set R285 in one of the extreme positions and turn it slowly back until the sides of the picture are vertical. If horizontal synchronization does not fail when R285 is set to one of its extreme positions, switch to another channel for a second. Observe this setting of R285, and repeat the same adjustment, starting from the opposite extreme position. The correct setting of the potentiometer is now half way between the two positions that have been found.
f) Remove the s/c M284 - M285.

III HORIZONTAL POSITIONING

a) Adjust R369 (board E) to centre the picture horizontally.

6.08 Static Convergence

a) Connect the colour generator and set it for a grid pattern.
b) Adjust static convergence with the convergence magnets on the deflection unit (fig. 17), until the colour lines in the grid pattern coincide. The blue gun can be switched off by pulling out the service breaker III.

6.09 Colour Purity

Before attempting adjustment of the colour purity, the receiver must have been switched on for at least 15 minutes with the brightness set well above normal.

a) Pull out the service breakers I III and IV (red screen).
b) Set the brightness control for normal brightness.
c) Loosen the wing nuts holding the deflection coils to the housing. Grip the wing nuts and move the deflection coils forwards or backwards until the red area on the screen becomes as small as possible. Then centre the red area by means of the colour purity magnet on the deflection unit (fig. 18).
d) Move the deflection coils until the entire screen attains an overall red colour. Then tighten the wing nuts.
e) If the colour purity is not satisfactory after this adjustment, repeat the demagnetization of the picture tube. Leave the receiver switched off for minimum 5 minutes. When it is turned on again, the automatic demagnetization will be activated.

6.10 Centre Positioning of the Picture

Recheck the centre position of the picture, and if necessary, repeat adjustment in 6.07.

6.11 Static and Dynamic Convergence

The convergence circuit board can be tilted up for easier access to the adjustment controls. (The retaining spring must be depressed).
Ensure that the board is locked when returned to normal position.

a) Check, and if necessary, adjust static convergence (see paragraph 6.08).

b) All controls for the dynamic convergence adjustment are located on board K which can be swung up for front access. The adjustment should be performed in the sequence indicated on the board. (See fig. 17). If the board has been replaced, or if the controls have otherwise been disturbed, all convergence potmeters should be set to their centre position before adjustment is attempted.

c) Red/green convergence should be adjusted first. Switch off blue gun by pulling out the service breaker III.

d) Because dynamic convergence adjustment to some extent influences the static convergence, the adjustment is facilitated, by not adjusting to the best possible coincidence, but to the best degree of parallellity between the lines. Then finally adjust the static convergence.

e) The direction of blue lateral correction can be altered by interchanging the wires of the blue lateral magnet.

f) Symmetry adjustment of blue vertical lines can be accomplished by loosening the retaining screw for the convergence unit and then turning the convergence unit relative to the deflection unit. This will necessitate repeated adjustment of the convergence circuit.

6.12 Colour Purity

Check and if necessary adjust the colour purity according to paragraph 6.09.

6.13 Line Pattern Adjustment

Adjust R970/L970 (board D) to obtain the straightest possible lines at the top and bottom of the picture, and R385 for best possible sides of the picture (E/W correction).

6.14 Focus

Check, and if necessary adjust focus (R366 board E) according to paragraph 6.04.
When this adjustment procedure has been carried out, push the chassis back into position, and perform a final adjustment of centre position, picture geometry and convergence. Seal the adjustment magnets with lacquer.

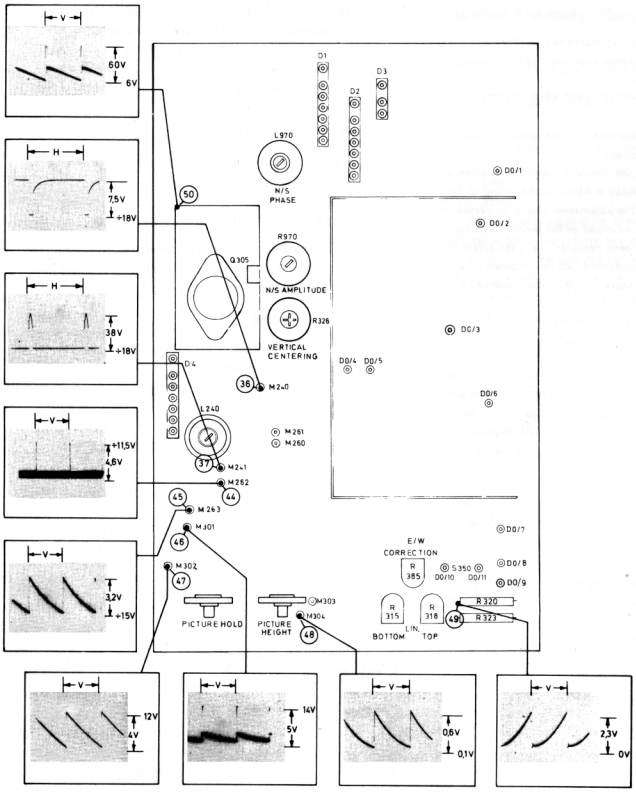
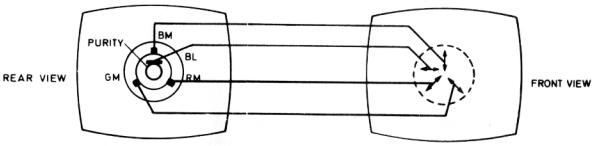


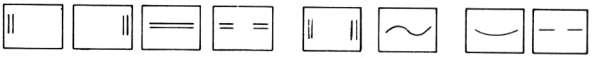
Fig. 16. Picture output board (D), alignment- and test points with oscillogrammes.

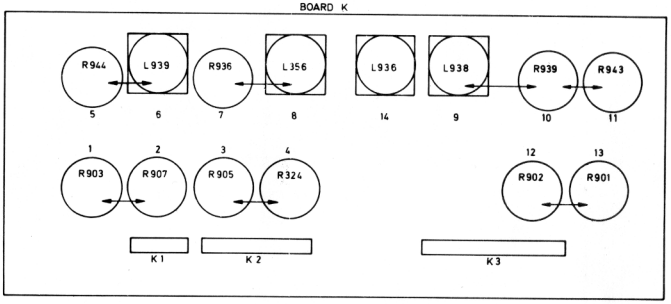
STATIC CONVERGENCE ADJ. CTV 1



BM = BLUE MAGNET
GM = GREEN MAGNET
RM = RED MAGNET
BL = BLUE LATERAL MAGNET

DYNAMIC CONVERGENCE ADJ. CTV 1





A MINOR SYMMETRI ALIGNMENT OF BLUE VERTICAL LINES CAN BE OBTAINED BY LOOSENING THE MOUNTING SCREW FOR THE CONVERGENCE UNIT AND THEN ROTATING THE CONVERGENCE UNIT RELATIVE TO THE DEFLECTION UNIT.
THE ARROWS BETWEEN THE SYMBOLS INDICATE THAT THE ADJUSTMENTS INTERACT STRONGLY.

Fig. 18. Static and dynamic convergence.

7.0 POWER SUPPLY

7.01 Mains Voltage

The mains voltage selector should be set in a position giving as close to 265 V DC as possible at terminal A1/7.

7.02 Adjustment of - 18 V

Measure the voltage at terminal A3/3 and if necessary adjust R422 to obtain minus 18 V.

7.03 Adjustment of 22 V

Measure the voltage at terminal A1/1 and if necessary adjust R426 to obtain + 22 V.

7.04 Fuses

All fuses in the power supply are slow-blow.

F 401 - 4A

F 402 - 2A

F 403 - 1.6A

F 404 - 2A

NOTE: Thermal fuse is located in the line output stage between PL509 and PY500.

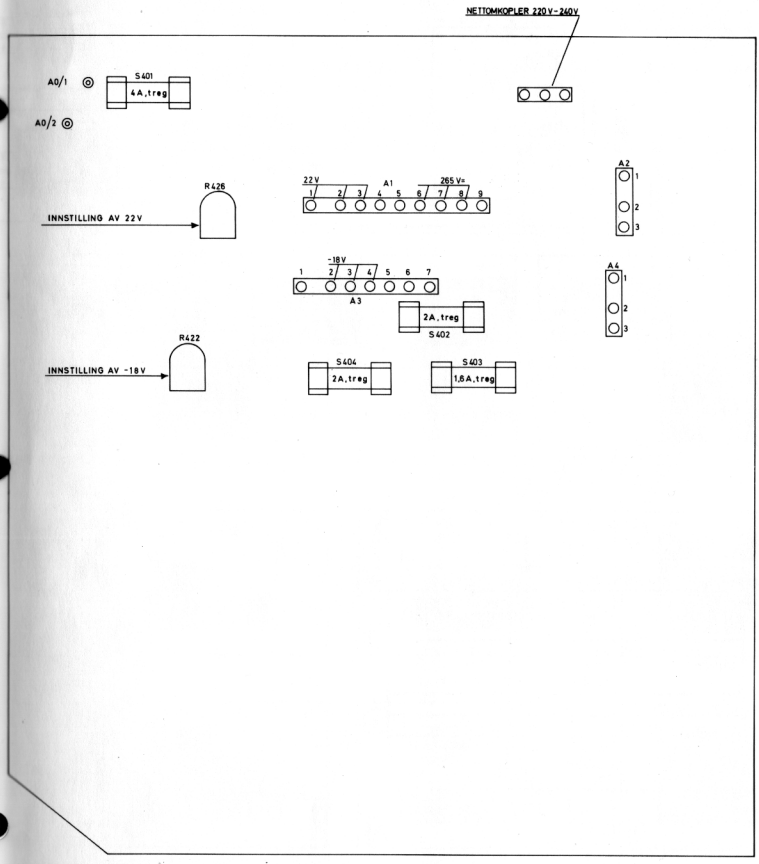


Fig. 19. Rectifier board (A), alignment- and test points.

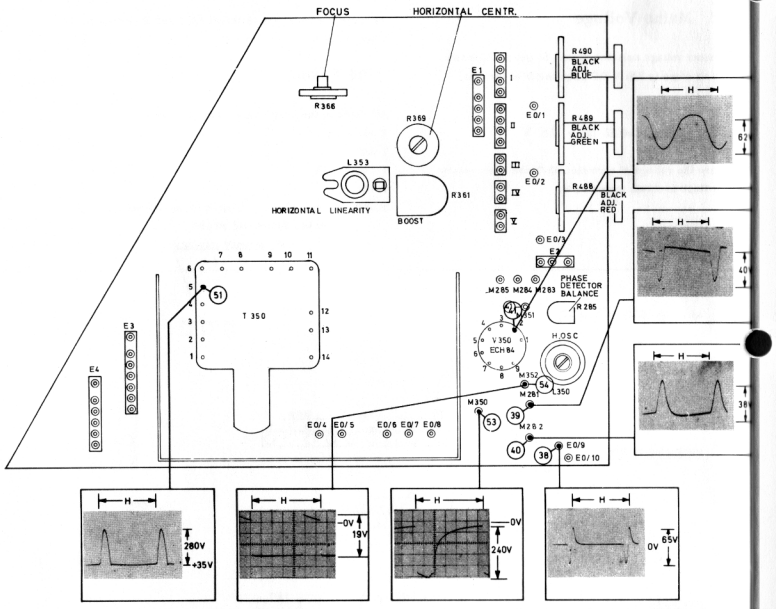


Fig. 17. Line output board (E), alignment- and test points with oscillogrammes.

SERVICE BREAKERS CTV 1

ADJUSTMENT	COLOUR OF THE SCREEN	PULL SERVICE BREAKER NO.
PURITY	RED GREEN BLUE	I + III + IV I + III + V I + IV + V
CONVERGENCE		III
BLACK LEVEL		II
MATRIX	RED GREEN BLUE	III + IV III + V IV + V

8.0 OSCILLOGRAMMER

Følgende oscillogrammer refererer seg til målepunkter i skjemaene, eks. (7).

Oscillogrammene er tatt under følgende målebetingelser:
Driftsvarmt apparat (minimum 15 minutter).

Nettspenning: 220V, 50Hz
Signalnivå : - 30 dBm
Kontrast : Midtstilling
Lys : Normalt
Kontur : Midtstilling
Metning : Normalisert
Fargetone : Midtstilling
Bildebærer : 38,9 MHz

Oscilloscop: Inngangsmotstand Ri ⩾ 10 Mohm, shuntkapasitet Ci ⩽ 10 pF

Signalgenerator: På oscillogrammene er det angitt hvilken type signalgenerator som er benyttet: FB- fargebjelke, RB- regnbue, U- uavhengig av type.

OSCILLOGRAMMES

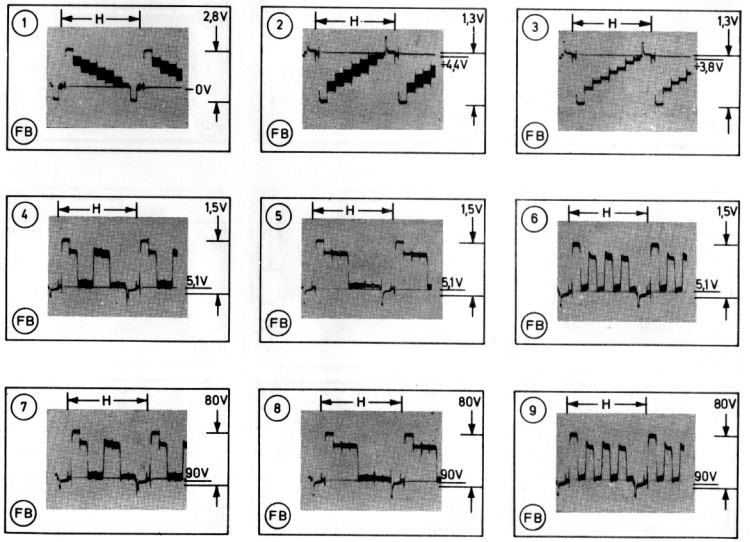
The oscillogrammes are referred to test points indicated in the wiring diagrams by encircled numbers, such as (7).

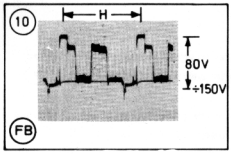
The measurements are made under the following conditions after min. 15 minutes warm up.

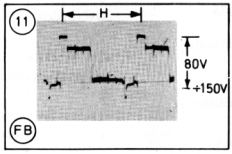
Mains voltage: 220 V/50 Hz.
Signal level : - 30 dBm
Contrast : Centre position
Brightness : Normal
Contour : Centre position
Saturation : Normal
Hue : Centre position
Carrier : 38,9 MHz (English version 39,5 MHz).

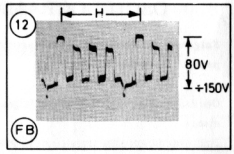
Oscilloscope: Input impedance Ri ⩾ 10 Mohm, input capacity Ci ⩽ 10 pF.

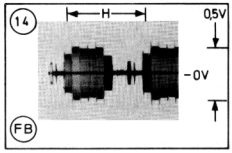
Signal generator: The type of signal generator applied is indicated on the oscillogrammes: FB- Colour bar, RB- rainbow, U- any type.

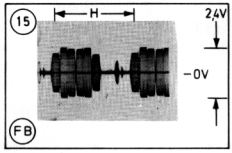


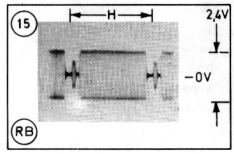


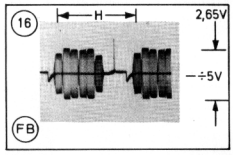


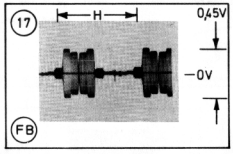


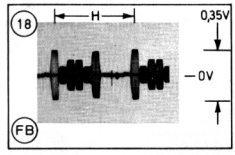


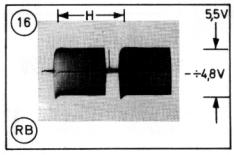


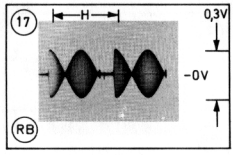


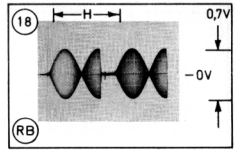


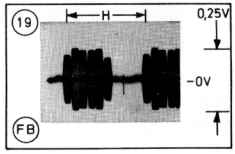


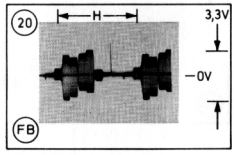


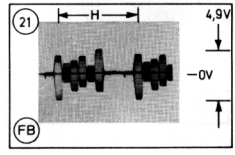


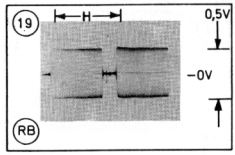


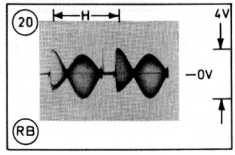


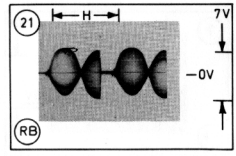


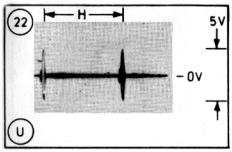


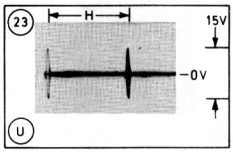


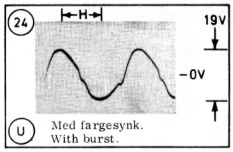


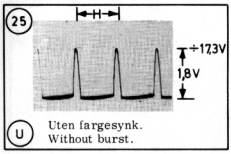


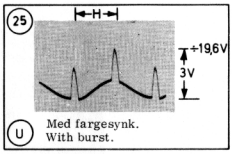


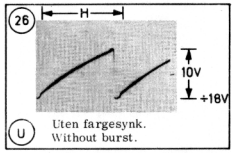


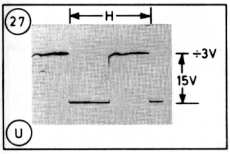


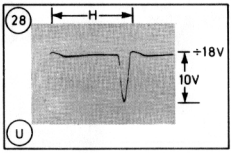


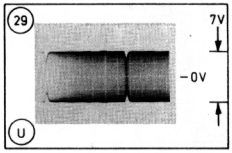


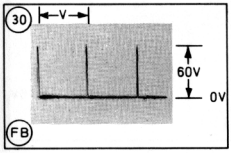


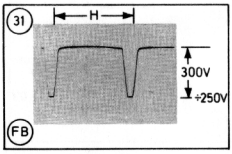


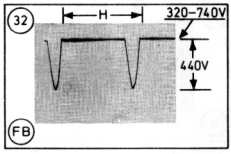


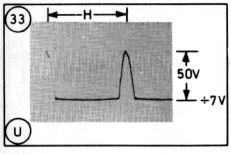


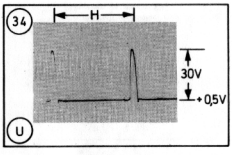


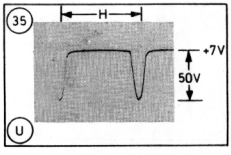


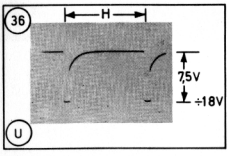


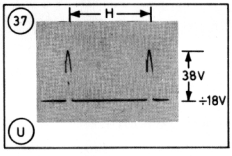


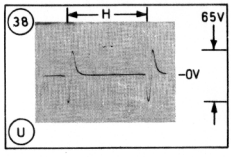


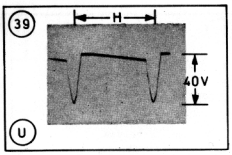


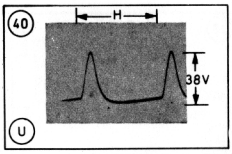


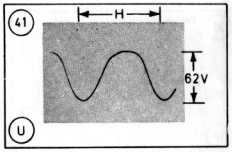


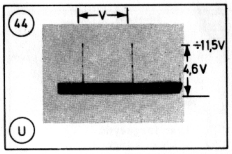


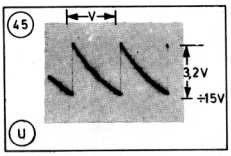


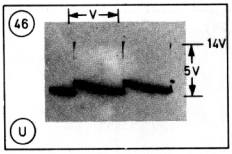


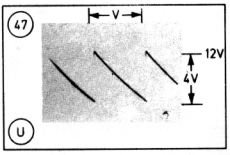


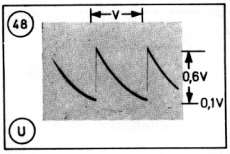


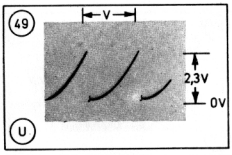


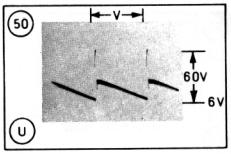


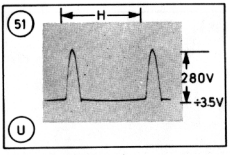


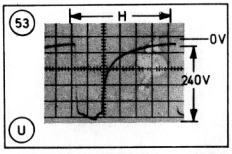


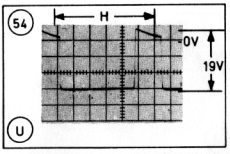












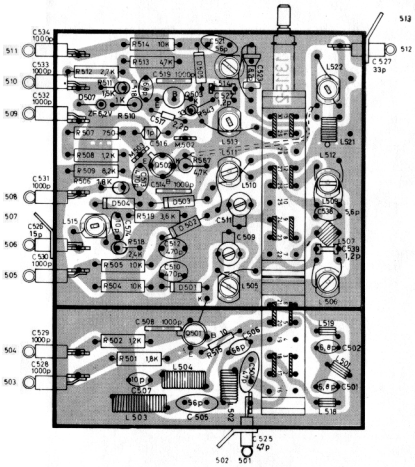


Fig. 20. VHF kanalvelger 2C, platen er sett fra komponentsiden.

Fig. 20. VHF tuner 2C, component side.

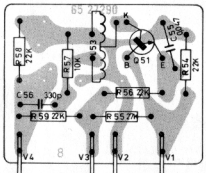


Fig. 21. Lyd MF-plate (plate V) sett fra foliesiden.

Fig. 21. Sound IF board (V), print side.

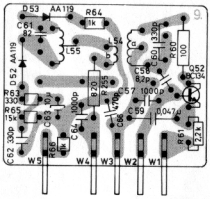


Fig. 22. Lyd MF-plate (plate W) sett fra foliesiden.

Fig. 22. Sound IF board (W), print side.

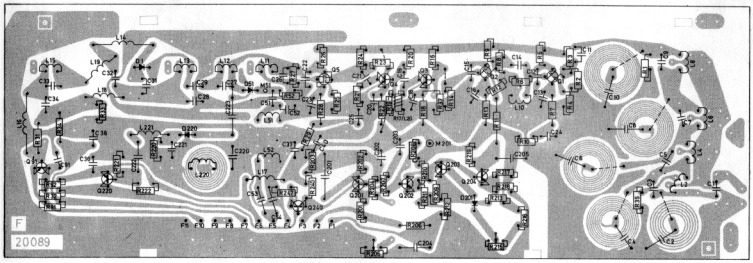


Fig. 23. Video MF-plate (plate F) sett fra foliesiden.

Fig. 23. Video IF board (F), print side.

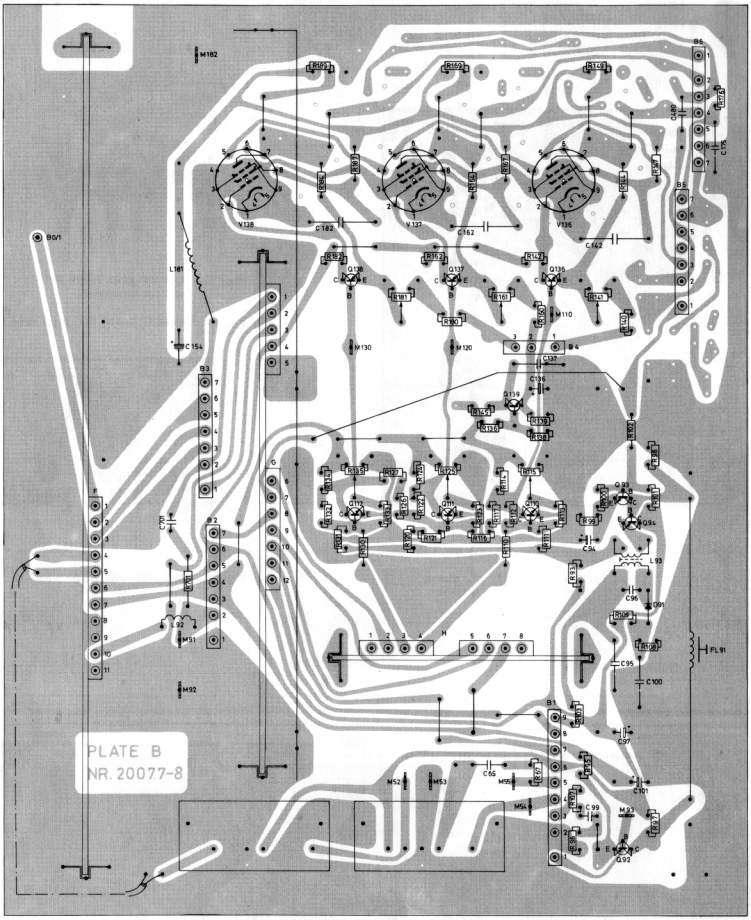


Fig. 24. Signalplate (plate B) sett fra folisiden.

Fig. 24. Signal board (B), print side.

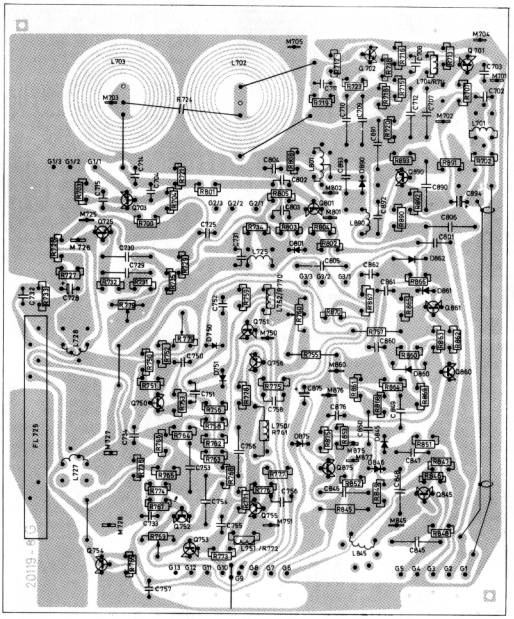


Fig. 25. Krominansplate (plate G) sett fra foliesiden.

Fig. 25. Chrominance board (G), print side.

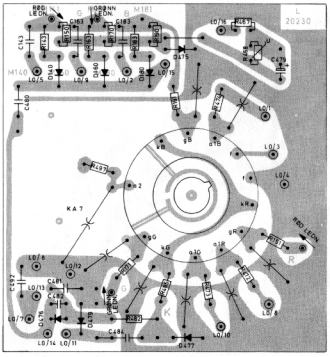


Fig. 26. Bilderørsplate (plate L) sett fra foliesiden.

Fig. 26. Picture tube board (L), print side.

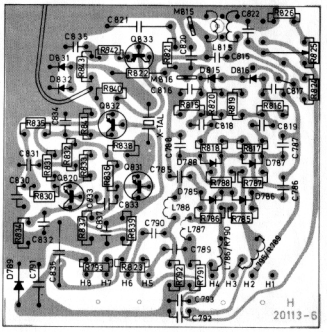


Fig. 27. Demodulatorplate (plate H) sett fra foliesiden.

Fig. 27. Demodulator board (H), print side.

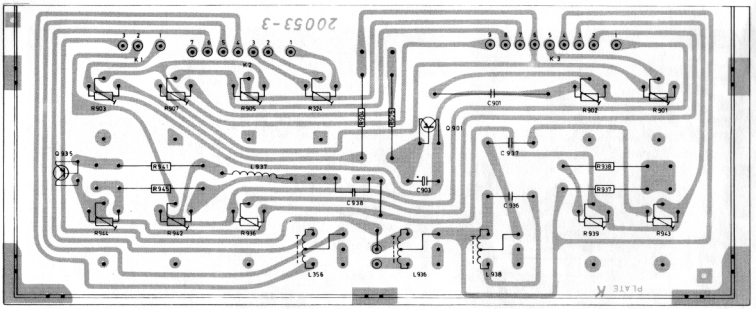


Fig. 28. Konvergensplate (plate K) sett fra foliesiden.

Fig. 28. Convergence board (K), print side.

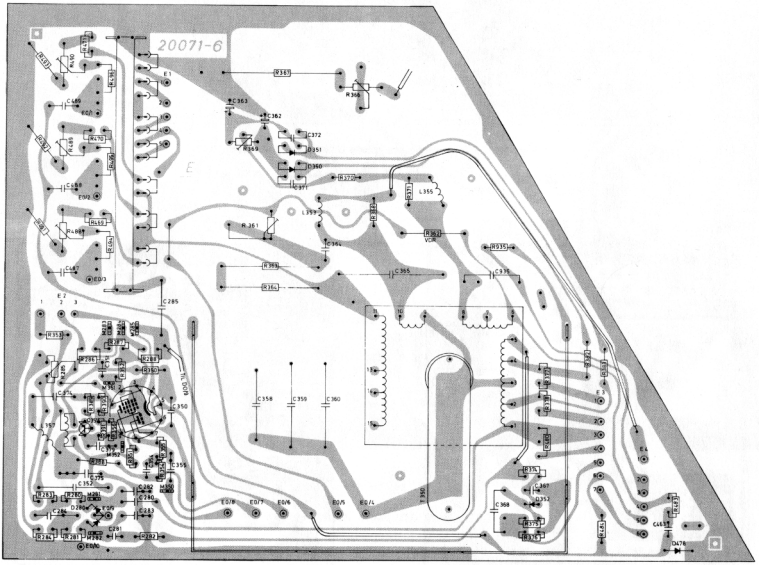


Fig. 29. Linjeutgangsplate (plate E) sett fra foliesiden.

Fig. 29. Line output board (E), print side.

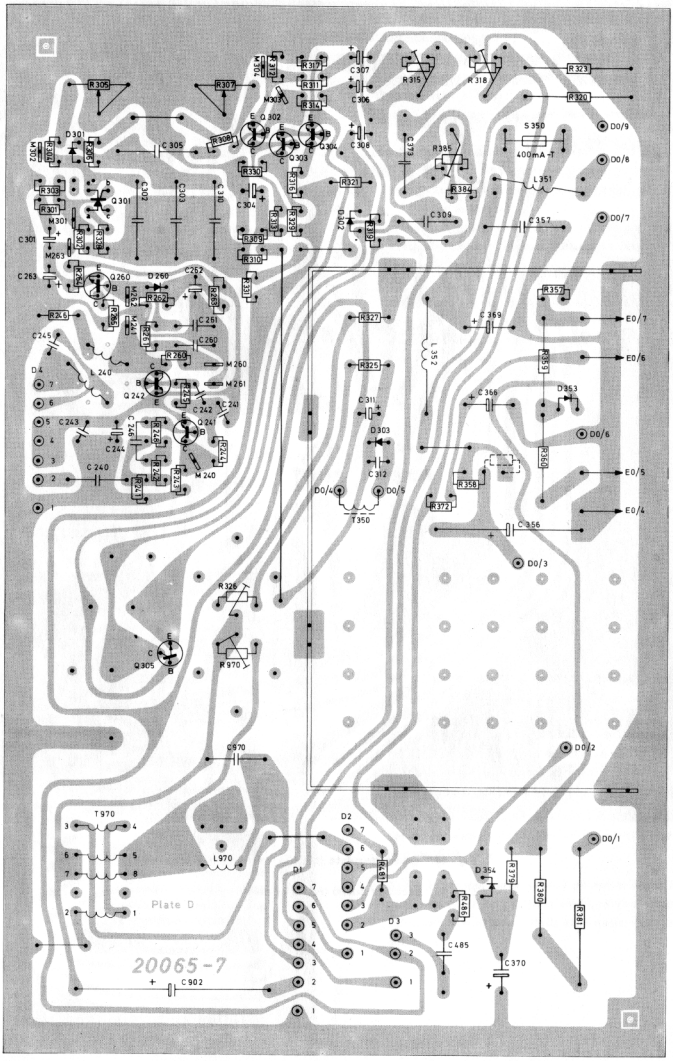


Fig. 30. Bildeutgangsplate (plate D) sett fra foliesiden.

Fig. 30. Picture output board (D), print side.

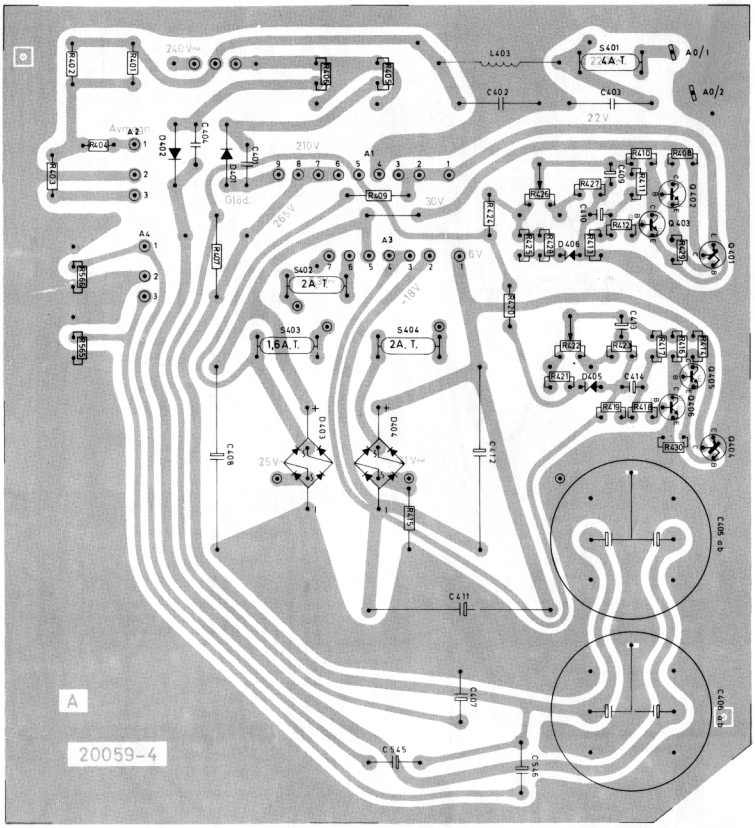


Fig. 31. Likeretterplate (plate A) sett fra foliesiden.

Fig. 31. Rectifier board (A), print side.

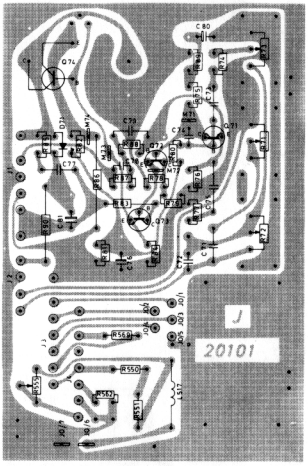


Fig. 32. Lydutgangsplate (plate J) sett fra foliesiden.

Fig. 32. Sound output board (J), print side.

Remarks to the circuit diagram

The voltages indicated on the diagrams are measured under the following conditions:
Supply voltage: 220 V.
VTVM with input impedance > 10 Mohm.
Contrast control: Centre position.
Brightness: Normal.
uS: Measured without signal (aerial terminals short-circuited).
mS: Measured with black-and-white signal giving satisfactory noise suppression.
mF: Measured with colour signal, giving satisfactory noise suppression.
(): Control voltages varying with operating conditions. Voltages without coding are independent of operating and signal conditions.

Connections between the various boards are indicated by arrows pointing in and out of a dotted line. Terminals with the same designation of the arrowheads are interconnected.

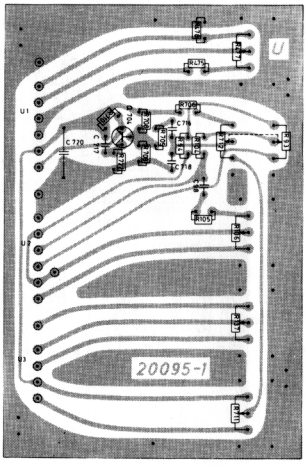


Fig. 33. Potmeterplate (plate U) sett fra foliesiden.

Fig. 33. Potentiometer board (U), print side.

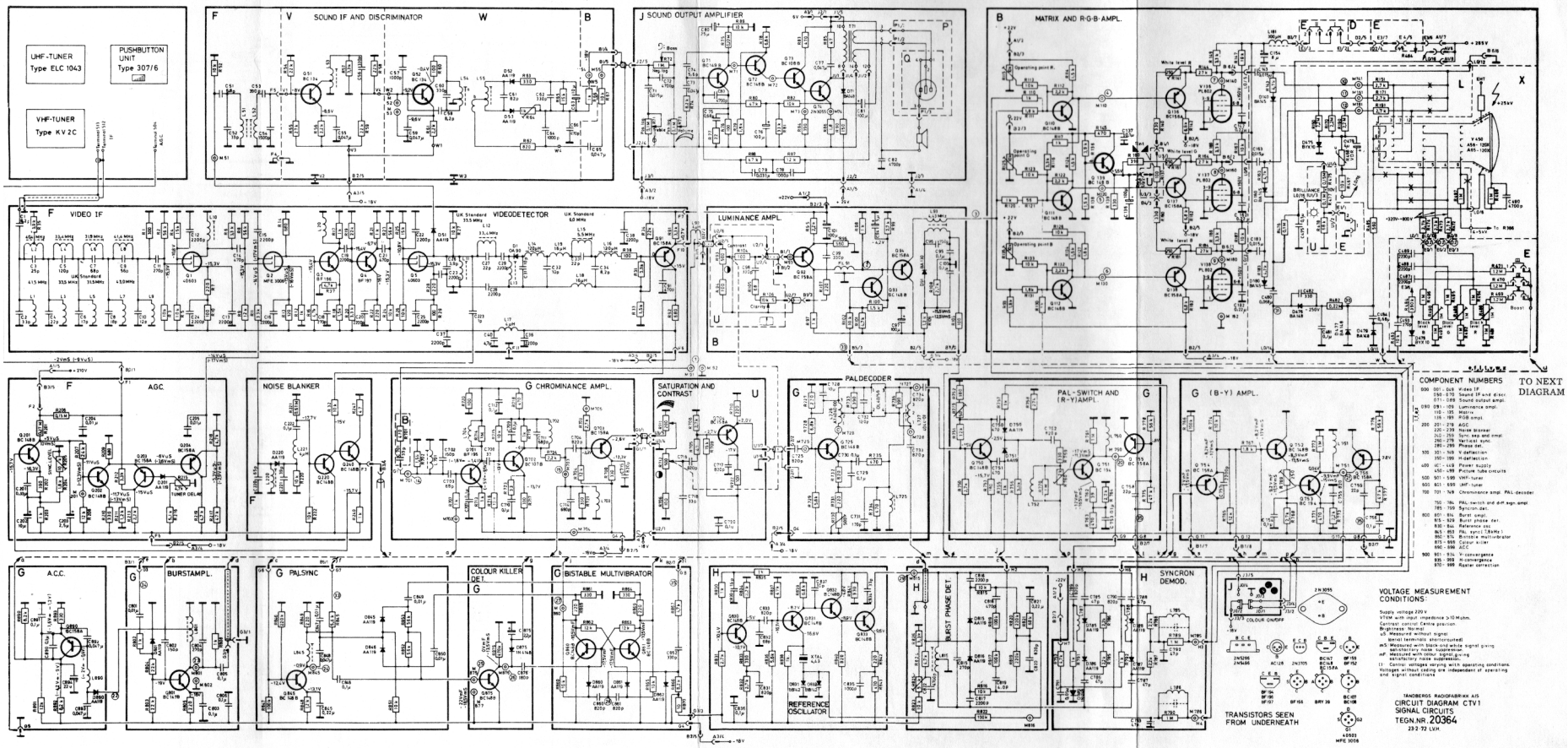
Merknader til skjema

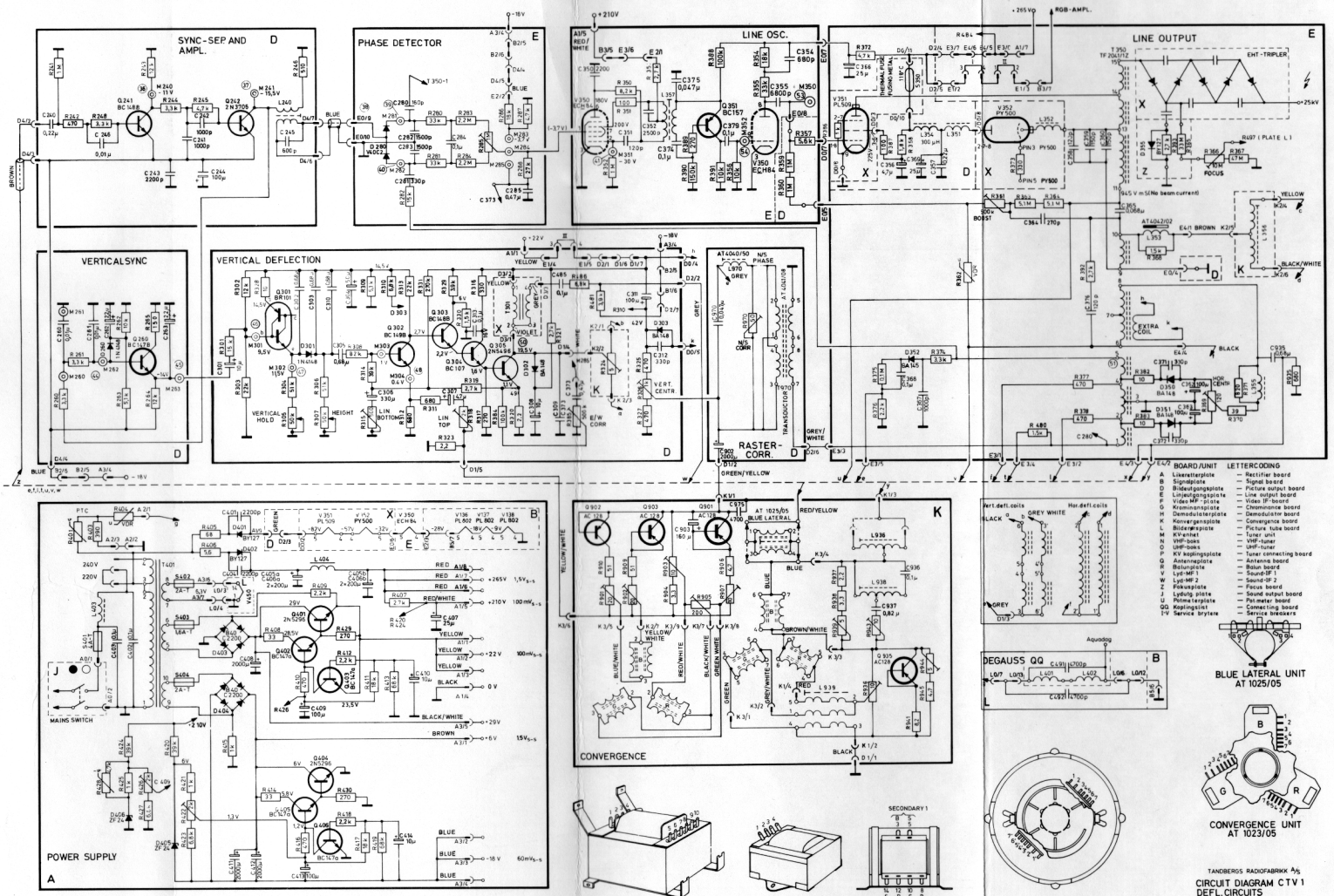
De spenninger som er angitt, er målt under følgende betingelser:

Nettspenning: 220 V.
Rørvoltmeter: Inngangsimpedans minimum 10 Mohm.
Kontrast: Midtstilling.
Lysstyrke: Normal.
uS: Målt uten signal (kortsluttet antenneinngang).
mS: Målt med sort/hvitt signal (støyfritt bilde).
mF: Målt med farvesignal (støyfritt bilde).
( ): Reguleringsspenninger som varierer med driftsforholdene.

Spenninger som er angitt uten merknader er uavhengig av signalforholdene.

Forbindelser mellom de enkelte platene er angitt med piler som peker inn i og ut av en stiplet samlelinje. Piler med samme bokstavhode representerer en forbindelse.





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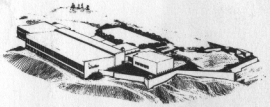

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