General Information

Combination Television & Video Cassette Recorder

Matrix

Item	See Model	Book
Deck Sensor PCB	Philips Michelle (MM1)	Video 5
Head Amp PCB	Philips Michelle (MM1)	Video 5
Deck Exploded Parts	Philips Turbo	Video 5
Deck Alignment	Philips Turbo	Video 5
Deck Adjustments	Philips Turbo	Video 5

Service Test Programme

Notes

WARNING: Chassis connections!
When reassembling the machine make sure that the ground connections between the picture tube and picture tube panel and between the picture tube panel and the metal screen are fitted.

Carrying out Measurements
When making measurements on semi-conductors with an oscilloscope, ensure that the test probe is set to 10:1 dividing factor. Further, please note that, if the previous measurement is made on AC input, the coupling capacitor in the oscilloscope will be charged. Discharge via the item being checked can damage components.

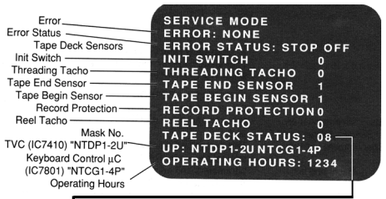
Measured Values and Oscillograms
The measured values given in the circuit diagrams and oscillograms are approximates!

Introduction
The video recorder software contains a service test programme carrying out the following functions:
- Checking the tape drive functions
- Checking the sensors in the drive mechanism
- Operating hours meter
- Indication of the software versions

The service test programme must not be called up from the following operating modes:
- station search
- install
- setting the clock and cassette length

During the service test programme, the VCR remains fully operational for all tape drive functions.

1. Calling up the Service Test Programme
Press the ■ (“STOP”) button on the remote control and then the ▶ button on the video recorder and hold them down for at least 5 seconds. The monitor will then show the following values for example.



Code	Tape Deck Position
05...09	Eject
64...66	Stop /Stop threaded out
D4...D8	Play position
ED...EF	Play reverse

2. Terminating the Service Test Programme:
Press the “Standby” button or disconnect the recorder from the mains.

3. Error Code and Error Status
The last error code that occurred is stored in the EEPROM and is saved even if the VCR is disconnected from the mains. To erase this error code, press the “CL” button on the remote control while in the service mode.

4. Monitoring the Tape Deck Functions
If one of the following faults appears, the recorder tries to move the cassette compartment to the “EJECT” position.

4.1 Threading-in and Threading-out Duration
The signal from the threading tacho generator (FTA) which monitors the revolutions of the threading motor is taken as a reference for the threading in and out duration.

4.2 No Rotation of the Reels
The signals sensed to check the rotation are the tacho pulses from the left (WTL) and the right (WTR) reel.

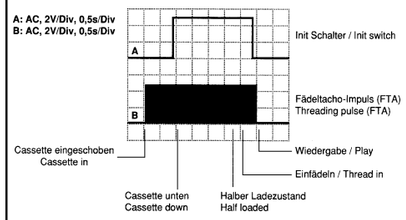
4.3 No Rotation of the Headwheel Motor
The PG/FG signal is used for monitoring the headwheel motor. It is derived from the e.m.f. of the non-current-carrying coil of the head-wheel motor and indicates the position of the headwheel.

4.4 Error of the Capstan Motor
For monitoring the capstan motor the capstan tacho signal (FG) is used.

5. Checking the Tape Deck Sensors and the Tape Deck Position
For checking the tape deck sensors (Init switch, threading tacho, tape beginning, tape end, record protection, reel tacho) the operating positions are indicated on the monitor by means of one digit. The indicated value changes with each operation of a sensor.

The code for the tape deck status (see table) indicates the position of the cassette compartment and the threading roller units.

6. Tape Deck Position and Functioning of the Init Switch
The diagram shows the functioning of the Init switch dependent on the tape deck position. For this, the number of the threading tacho pulses (FTA) is important. These signals are generated by the threading tacho generator (butterfly sensor) which is mechanically connected with the threading motor.



7. Operating Hours Meter
The operating hours meter indicates the number of hours the headwheel has been rotating.

8. Erasing the EEPROM
Disconnect the mains plug.
Press and hold the ▶▶, ◀◀ and ▼ buttons and reconnect the mains plug.
This erases and initializes the EEPROM. The station memory and the internal processor RAM are erased (with the exception of tape deck parameters and options).
A newly fitted EEPROM will automatically be erased and initialized.
Attention: When erasing or replacing the EEPROM the video recorder must be realigned (see Adjustments).

Adjustment Procedures

1.Power Chassis (PCPS)
Test Equipment/Aids: Digital voltmeter, Colour Generator

Alignment
1. 110V, R3344 (110A ADJ)

Preparation
Set contrast and brightness to minimum
Digital voltmeter: L5361

Alignment Procedure
Adjust the voltage to 11 0V +1 V with R3344 (110A ADJ).

Alignment
2. Focus adjustment **FOCUS**

Preparation
Feed in a crosshatch pattern signal.

Alignment Procedure
Adjust the focus control (FOCUS) on the line transformer to obtain the sharpest crosshatch pattern possible.

Alignment
3. Vertical height
R3522 (V-lin), R3523 (V-amp), R3524 (V shift)

Preparation
Feed in a FuBK test pattern.

Alignment Procedure
With the adjustment controls R3523 (V-amp), R3522 (V-lin) and R3524 (V-shift) adjust the picture to obtain a round circle with half a square of the pattern being visible at the top and at the bottom of the circle.

2. Tube PCB

Test Equipment / Aids: Digital voltmeter, Colour Generator

Alignment
1. Black level, SCREEN, R3509 (RED Cut off), R3564 (GREEN-Cut off), R3573 (BLUE-Cut off)

Preparation
Let the set warm up (for approx. 15 minutes after switching on) and carry out the following adjustments:

- Contrast control “minimum”/brightness control “50%”
- Screen grid adjustment control (SCREEN) “left stop”
- R3561, R3579 “center position”

Feed in a black raster test pattern.
Digital voltmeter: .....T7501, collector
Adjust to 120V with R3509 (RED-Cutoff).

Digital voltmeter: .....T7561, collector
Adjust to 120V with R3564 (GREEN-Cutoff).

Digital voltmeter: .....T7571, collector
Adjust to 120V with R3573 (BLUE-Cutoff).

Alignment Procedure
Increase the brightness with the screen adjustment control(SCREEN) on the line transformer until the beam of the gun that first emits light is visible. Turn the control in the reverse direction until the light is no longer visible. Repeat this brightness ajdustment for the two other guns with the respective controls R3509 (RED Cutoff), R3564 (GREEN-Cutoff) and R3573 (BLUE-Cutoff).

Alignment
2.White balance,
3561 (GREEN-Gain), R3579 (BLUE-Gain)

Preparation
Feed in a grey scale pattern.

Alignment Procedure
Set R3561 (GREEN-Gain) and R3579 (BLUE-Gain) SO that no discolouration is visible in the grey scale.

3. Signal Chassis (PCMB)

3.1 Signal Chassis- TV Signal Electronics (TV)

Test Equipment / Aids: Digital voltmeter, Colour Generator

Alignment
1. Vision demodulator circuit, L5704 (AFC)

Preparation
Connect tuner 1701-(5) and GND.
Connect colour generator 38.9MHz, 35mVm,S to tuner 1701-(17).
Digital voltmeter ..connection R3714/R3715.

Alignment Procedure
Adjust voltage to 2.5V ± 0.2V with L5704 (AFC).

Alignment
2. Delayed AGC voltage, R371 2 (AGC)

Preparation
Turn R3712 fully counter clockwise.
Feed in a white raster without audio modulation (UHF range, channel 24, aerial input 67dBIIV) into the warmed up set.
Digital voltmeter .....tuner 1701-(5).

Alignment Procedure
Adjust voltage to maximum first, and then reduce by approx. 1V with R3712 (AGC).

Alignment
3. Horizontal position, R3204 (H-shift)

Preparation
Feed in FuBK test pattern.

Alignment Procedure
Adjust with R3204 (H-shift) so that the no longer visible edges at the right and left of the picture are symmetric to the screen.

Alignment
3.2 Signal Chassis - Clock (CO)

Test Equipment/Aids: Frequency Counter

Alignment
1. Clock, C2805 (CLOCK ADJUST)

Preparation
Connect IC7801-(7) and IC7801-(64) via a 1 kΩ resistor.
Connect IC7801-(40) and GND.
Frequency counter: .....IC7801-(7)

Alignment Procedure
Adjust frequency to 8192Hz ± 0.003Hz with C2805 (CLOCK ADJUST).

3.3 Signal Chassis - Sequence Control/Deck Electronics (DE)

Test Equipment/Aids: Test Cassette

Alignment
1. Head switching position (GAP)

Preparation & Alignment Procedure
- Load the test cassette and call up the service test programme: Press the STOP button “ ■ ” on the remote control handset and the PLAY button “▶” on the recorder in this order and hold them down for approx. 5s at least.
- Press the PLAY button “ ▶” on the remote control handset and the EJECT button “▲” on the recorder in this order.
- On successful adjustment the video recorder switches to stand-by.
  If the adjustment has not been carried out successfully the video recorder ejects the test cassette. Reason: Test cassette, headwheel or technical defect (eg.µC).

3.4 Signal Chassis - Luminance/ Chrominance (VS)

Test Equipment Aids: Blank Cassette, Oscilloscope with 10:1 Test probe, Frequency Counter, Colour Generator.

Alignment
1. E-E level, R3036 (E-E-LEV)

Preparation
Feed in a 100% white raster to the AV socket.
STOP mode
Oscilloscope: .....T7012, emitter

Alignment Procedure
Adjust voltage to 535mVpp ±10mV with R3036 (E-E-LEV).

Alignment
2. Sync frequency, R3039 (SYNC-FREQ)

Preparation
Make AV recording without input signal.
Frequency counter: .... Head Amplifier MP1, IC7050-(19)

Alignment Procedure
Adjust to 3.8MHz ± 20kHz with R3039 (SYNC-FREQ).

Alignment
3. Frequency deviation R3042 (DEV)

Preparation
Feed in a 100% white raster to the AV socket.
Record this signal
Frequency counter: .... Head Amplifier MP1, IC7050-(19)

Alignment Procedure
Adjust to 4.62MHz ± 20kHz with R3042 (DEV).

Alignment
4. Y-record current R3078 (FM REC-CURR)

Preparation
Make AV recording without input signal.
Oscilloscope: .....Head Amplifier MP1, IC7050 (19)

Alignment Procedure
Adjust to 320mVpp ±5mV with R3078 (FM-REC-CURR).

Alignment
5. Chroma record current, R3079
(PAL-REC-CURR)

Preparation
Connect IC7051-(40) via 150Ω and 22µH to +5V.
Feed in a red raster test pattern with 75% saturation at the AV socket and record the signal.
Oscilloscope: .....Head Amplifier MP1, IC7050-(19)

Alignment Procedure
Adjust the chroma signal to 60mVpp (-14dB of the FM-signal) with R3079 (PAL-REC-CURR).
Remove 150Ω resistor and 22,µH coil.

Alignment
6. Playback level, R3045 (Y-PB-LEV)

Preparation
Play back the white raster test pattern recorded on the machine.
Oscilloscope: .....IN/OUT circuit stage T7513, emitter.

Alignment Procedure
Adjust the playback level to 1Vpp ±40mV with R3045 (Y-PB-LEV)

3.5 Signal Chassis - Standard Sound (AL)

Test Equipment/Aids: Blank Cassette, AF Voltmeter

Alignment
1. Bias (70kHz), R3618 (BIAS)

Preparation
Record any signal.
Measure the voltage drop on R 3600 with AF voltmeter.

Alignment Procedure
Adjust voltage drop on R3600 to 7mV,m, with R3618 (BIAS). Check the frequency response.

Alignment
1.1 Frequency Response

Preparation
- Feed in a CCVS signal via AV socket, contact 20.
- Feed an audio signal of 200mV rms from the AF generator to the AV socket, contact 2 or 6.
- Record the 400Hz and 8kHz signal each for 1 min at least. Afterwards play back these recordings.
- Connect an AF millivoltmeter to the AV socket, contact 1 or 3.

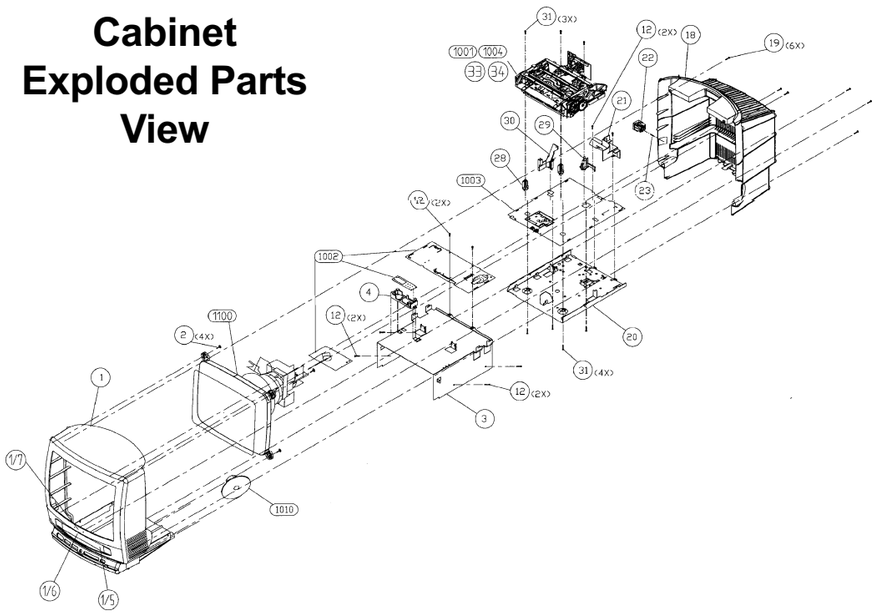
The voltage ratio of 400Hz to 8kHz must not be higher than 1:0.7 or 0.7:1 (±3dB). If the voltage ratio exceeds these limits, the bias must be corrected:
To increase the playback voltage at 8kHz:
Reduce “BIAS”.
To reduce the playback voltage at 8kHz:
Increase “BIAS”.

Recommended Safety Parts

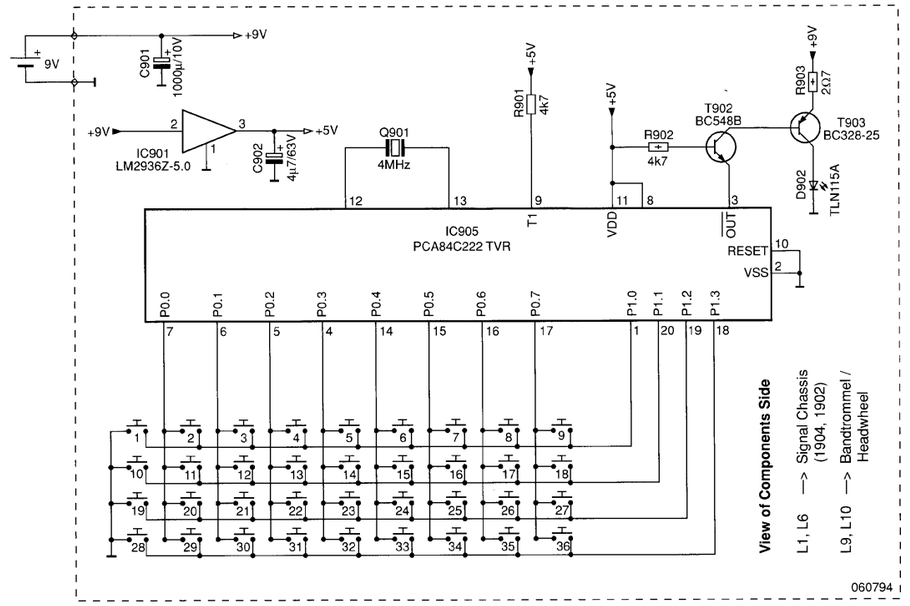
Item	Part No.	Description
24	75988-015.20	MAINS CABLE
24	75988-032.53	MAINS CABLE CPL
1100	75988-018.04	CRT A34EAC01X25
1101	75988-018.05	HOLDER 142mm
1102	75988-018.06	HOLDER 290mm
1105	75988-017.99	DEG ANUBIS S14"
1991	75988-018.02	SOCKET, CRT
1992	75988-018.01	TAPE DRIVE WD-D-P2
0110	75988-018.14	FUSE
1101	75988-000.51	SICHERUNGSHALTER
1925	75988-015.29	STECKVERBINDUNG 6-P
1991	75988-018.02	SOCKEL, BILDROEHRE
C 2311	75988-001.95	KONDENS.100N 250V 20%
C 2312	75988-015.26	KONDENS.400V S 1N
C 2315	75988-015.40	ELKO 150U 385V
C 2317	75988-015.26	KONDENS.400V S 1N
C 2335	75988-015.39	ELKO 1 00U 25V
C 2352	75988-005.91	ELKO 25V 680UF
C 2362	75988-015.47	ELKO 1 00U 1 60V
C 2372	75988-005.91	ELKO 25V 680UF
C 2374	75988-005.91	ELKO 25V 680UF
C 2376	75988-005.91	ELKO 25V 680UF
C 2377	75988-005.91	ELKO 25V 680UF
C 2512	75988-015.51	ELKO 470U 50V
C 2518	75988-015.52	ELKO 1000U 35V
IC 5311	75988-017.21	IC HF 2835 Y
R 3300	75988-001.77	WIDERST.3,9MOHM
R 3301	75988-001.77	WIDERST.3,9MOHM
R 3309	75988-015.70	WIDERST.1MA470V
R 3312	75988-015.72	WIDERST.2,2 OHM 3W
R 3511	75988-015.91	WIDERST.2,7 OHM
R 3516	75988-015.92	WIDERST.1,0 OHM
R 3525	75988-016.03	WIDERST.1,8 OHM
R 3532	75988-015.95	WIDERST.0,47 OHM
R 3552	75988-015.98	WIDERST.2,7K OHM
R 3587	75988-016.11	WIDERST.10K OHM
S 1000	75988-015.19	NETZSCHALTER
SI 1001	75988-017.48	SICHERUNG T 500 MA
SI 1002	75988-017.48	SICHERUNG T 500 MA
SI 1311	75988-015.21	SICHERUNG 1,6AIEC
SI 1331	75988-015.22	SICHERUNGT 1,6A
SI 1351	75988-015.23	SICHERUNG T 3,15 A IEC
SI 1371	75988-015.23	SICHERUNG T 3,15 A IEC
TR 5550	75988-017.30	TRAFO
TR 5580	75988-017.31	TRAFO

END.

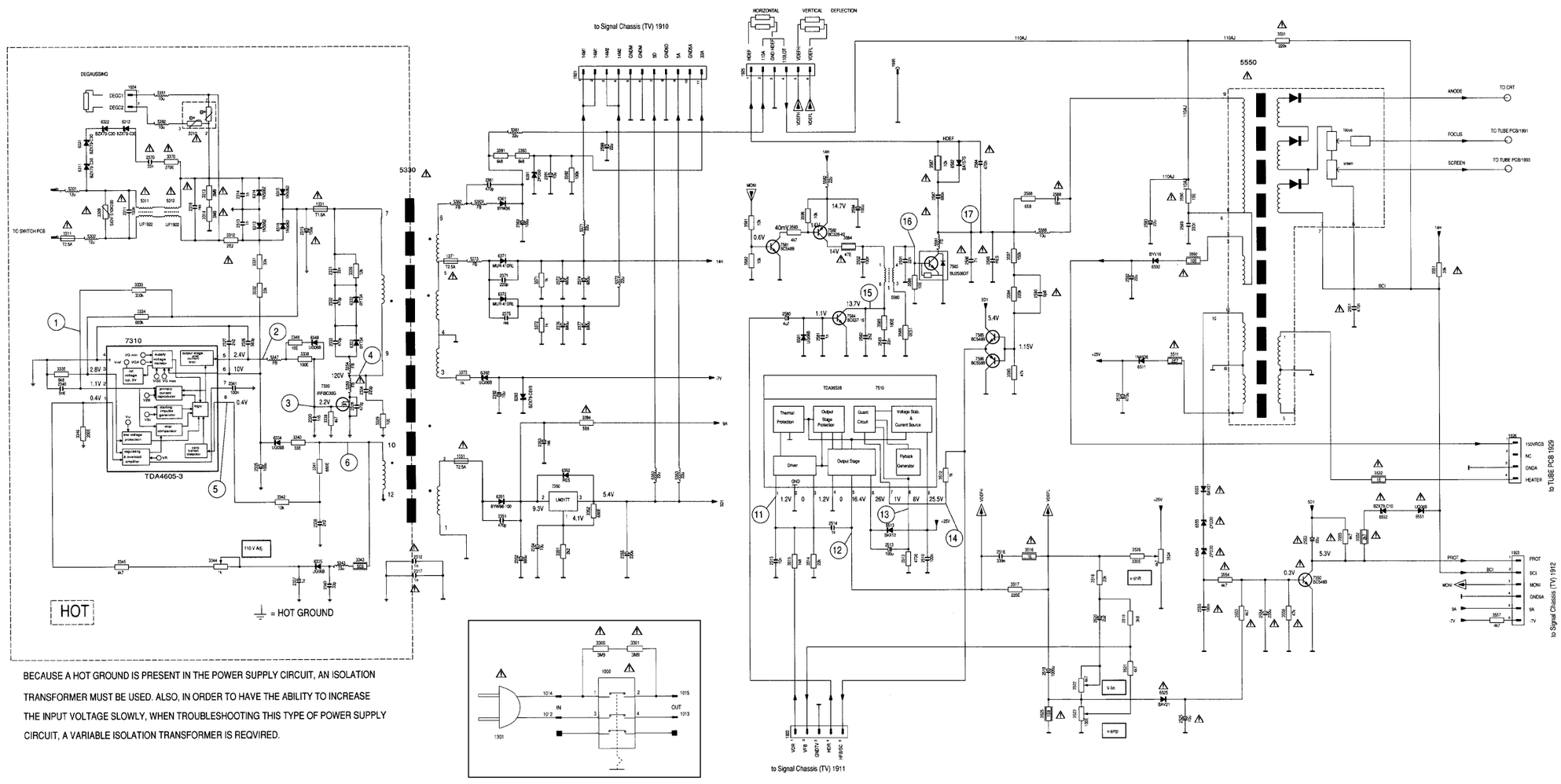
Cabinet Exploded Parts View



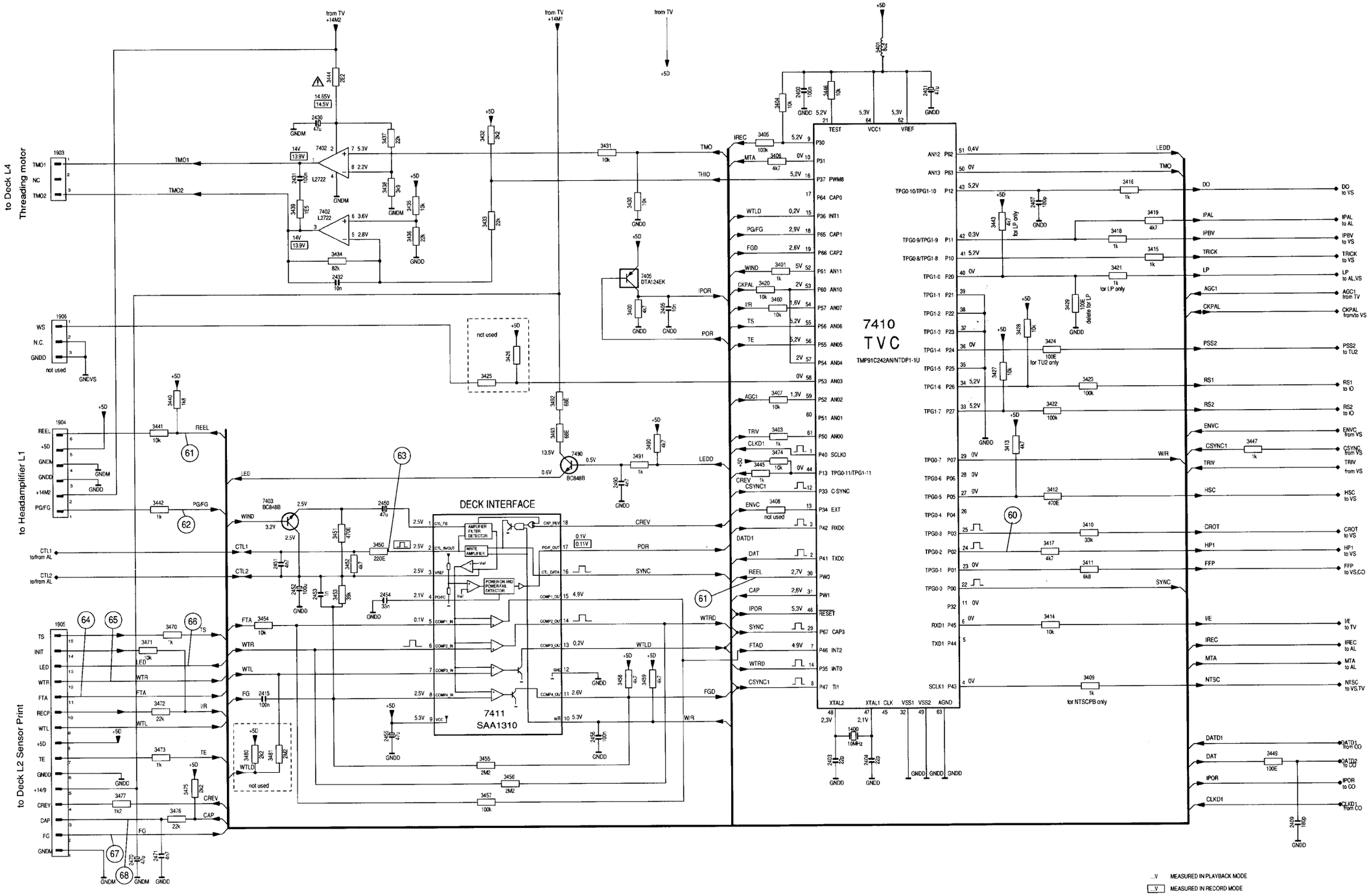
Remote Control Diagram



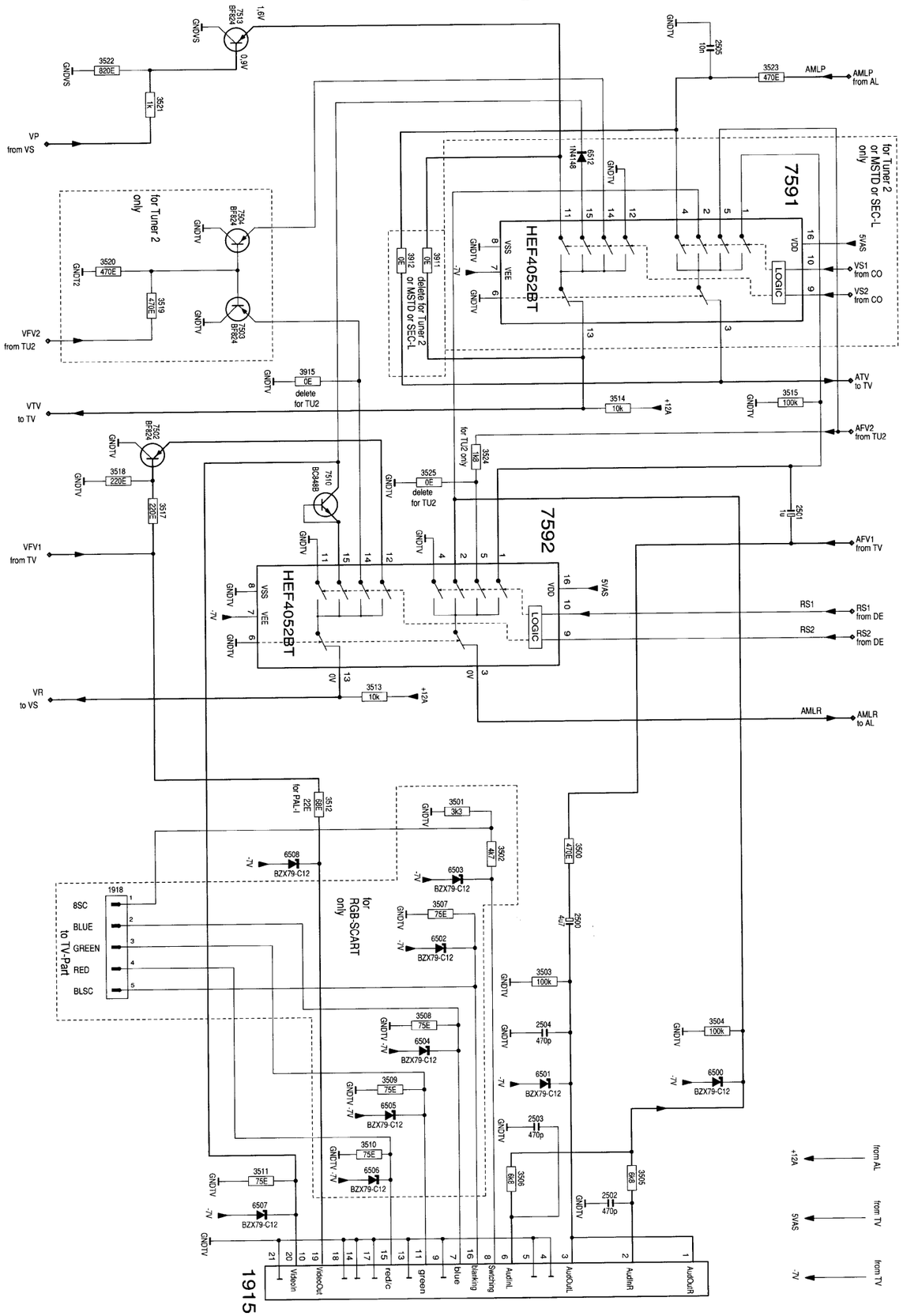
Power Supply PCB Diagram



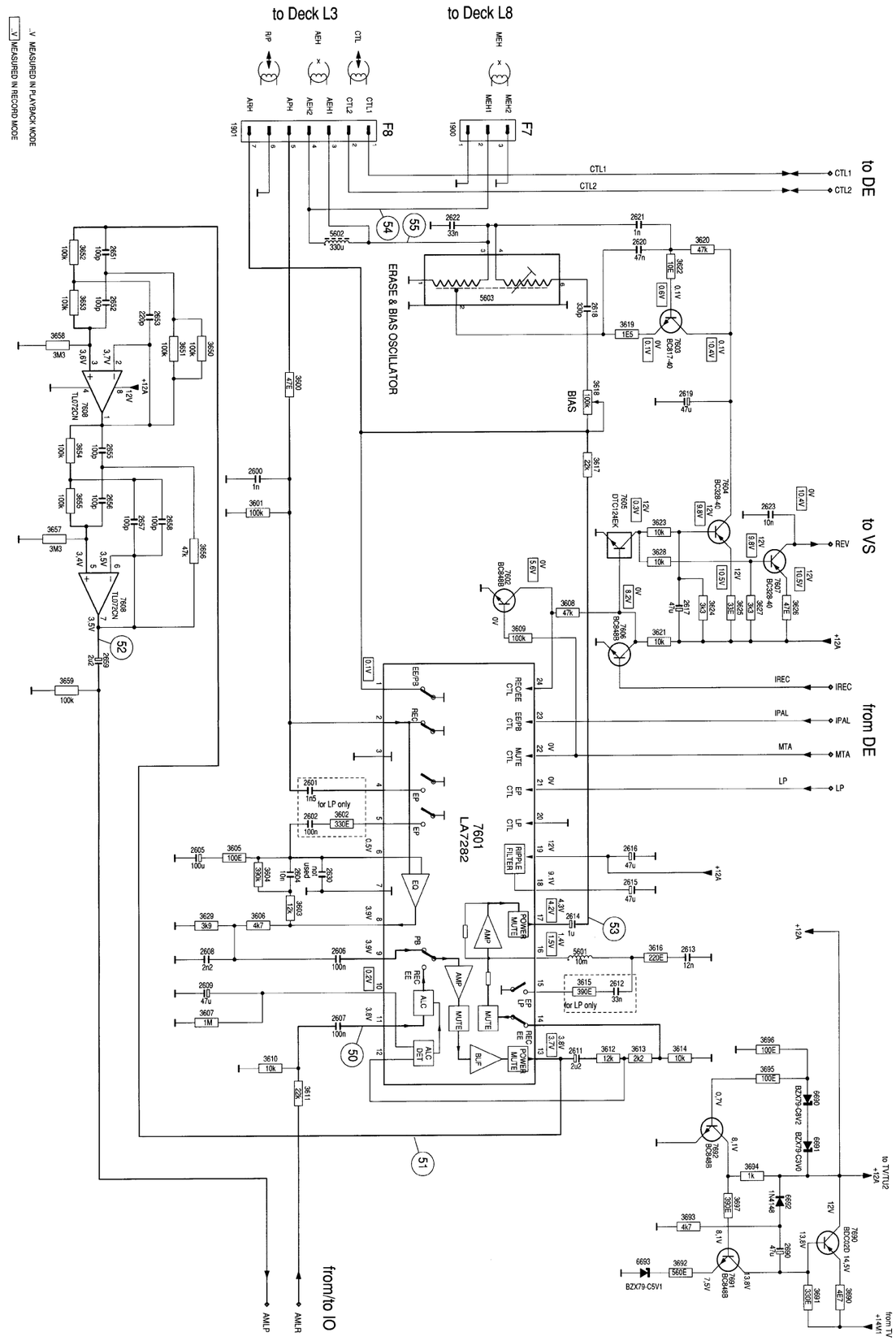
Deck Electronics Diagram



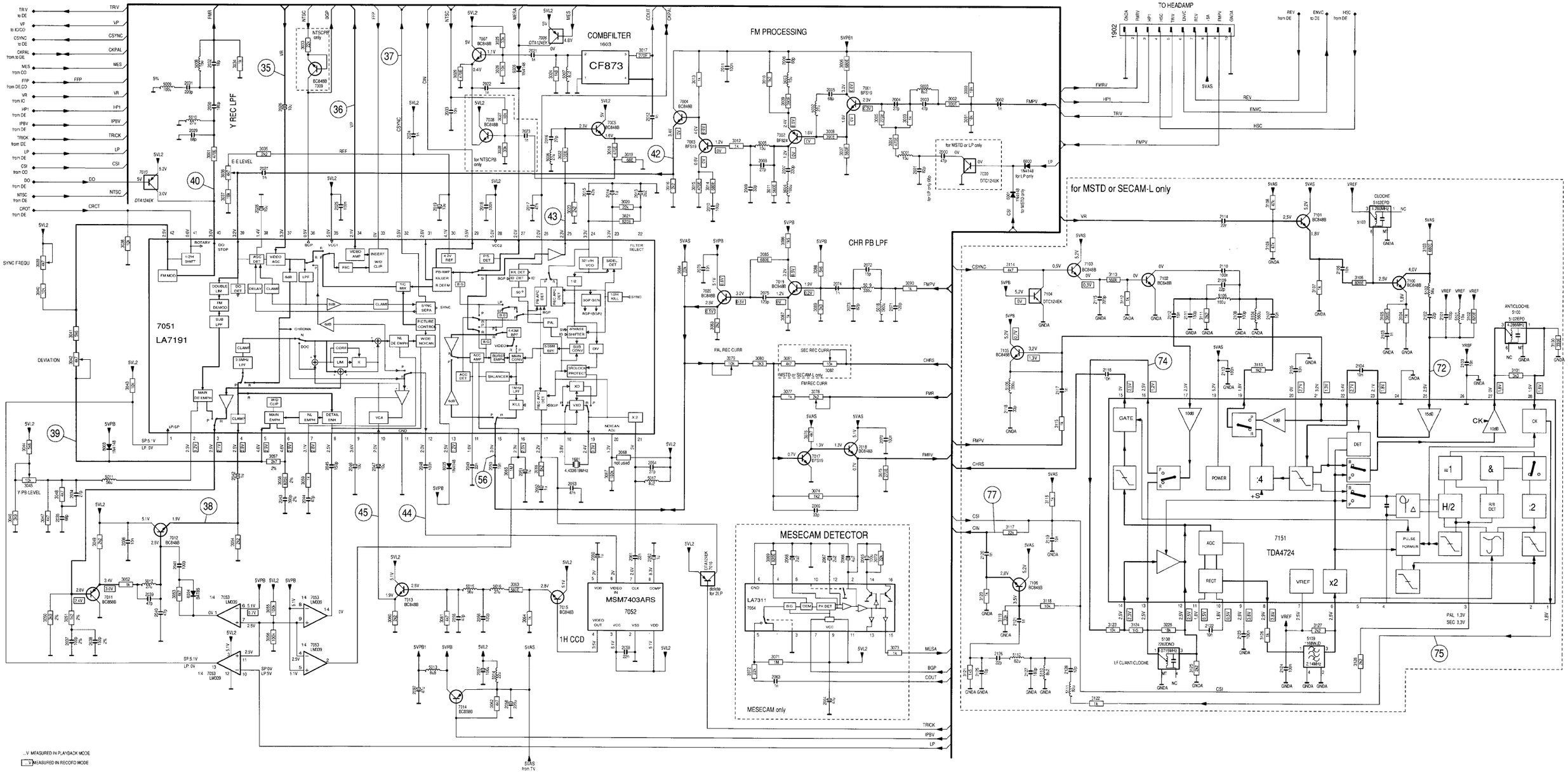
In/Out Scart Diagram



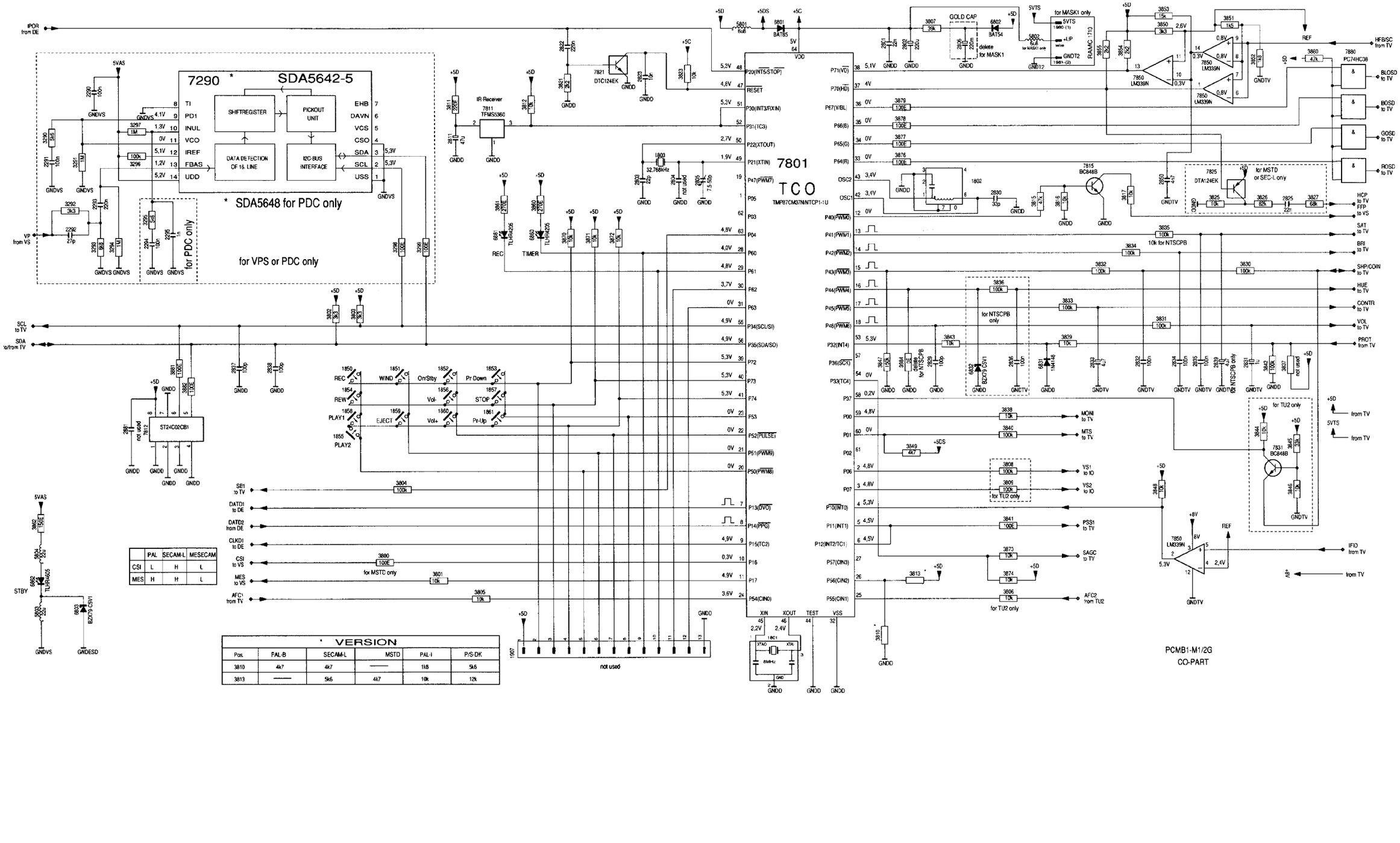
Linear Audio (VCR) Diagram



Linear Chroma (VCR) Diagram



Keyboard Control Unit (Production Code VN04 to VN06 only)

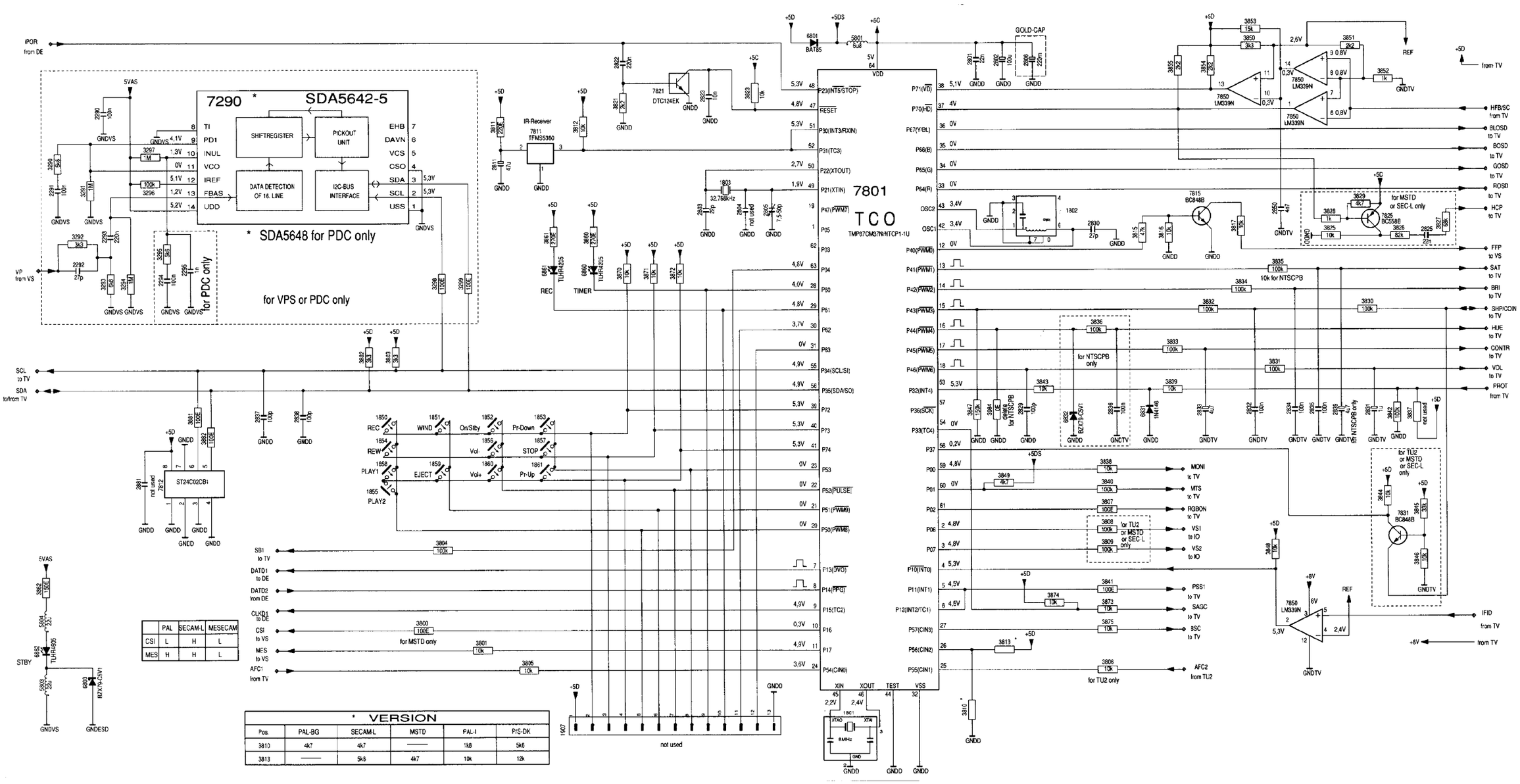


	PAL	SECAM-L	MESECAM
CSI	L	H	L
MES	H	H	L

* VERSION

Pos.	PAL-B	SECAM-L	MSTD	PAL-I	P/S-DK
3810	4k7	4k7	——	1k5	5k6
3813	——	5k6	4k7	10k	12k

Keyboard Control Unit (Except Production Code VN04 to VN06)

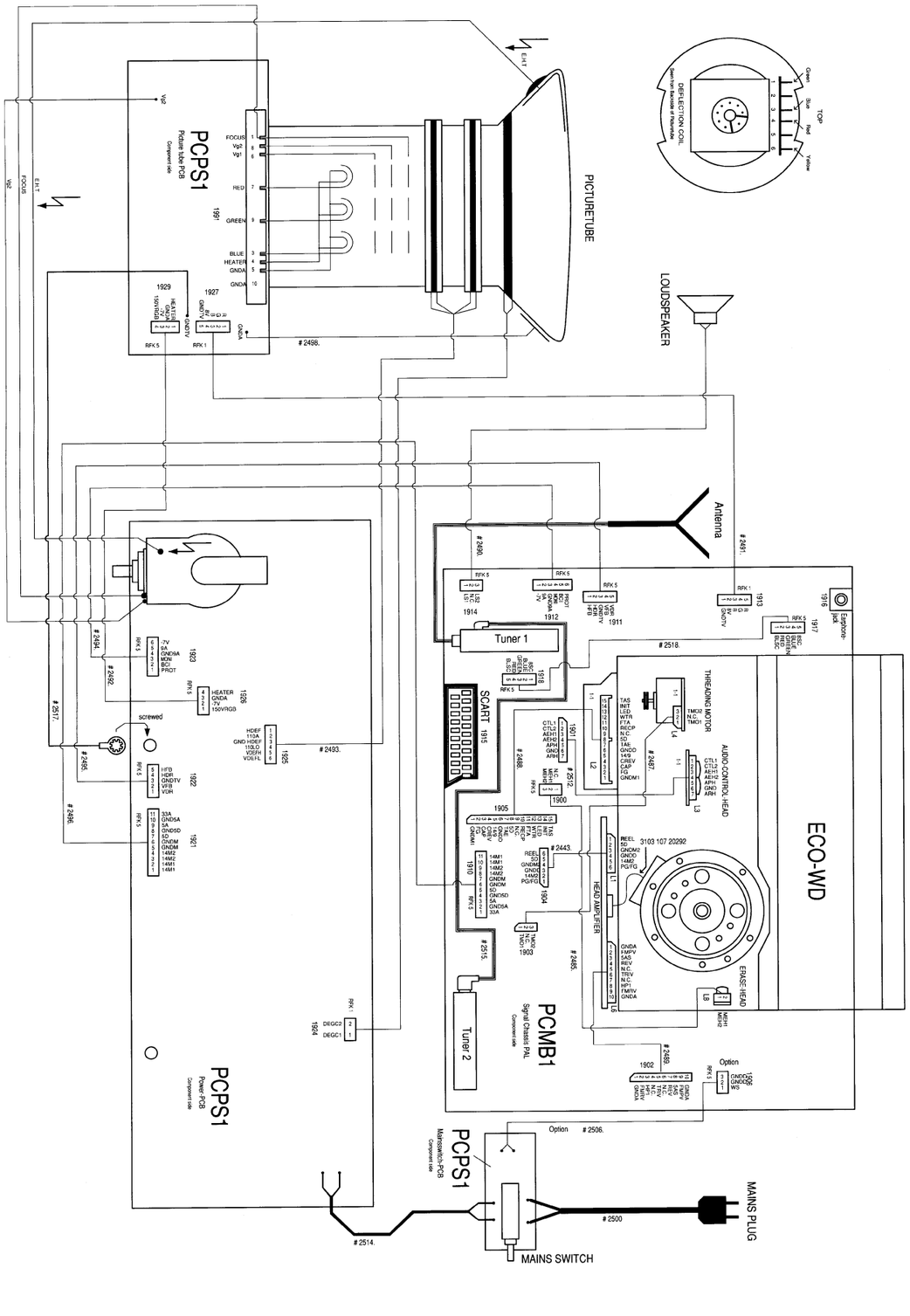


	PAL	SECAM-L	MESECAM
CSI	L	H	L
MES	H	H	L

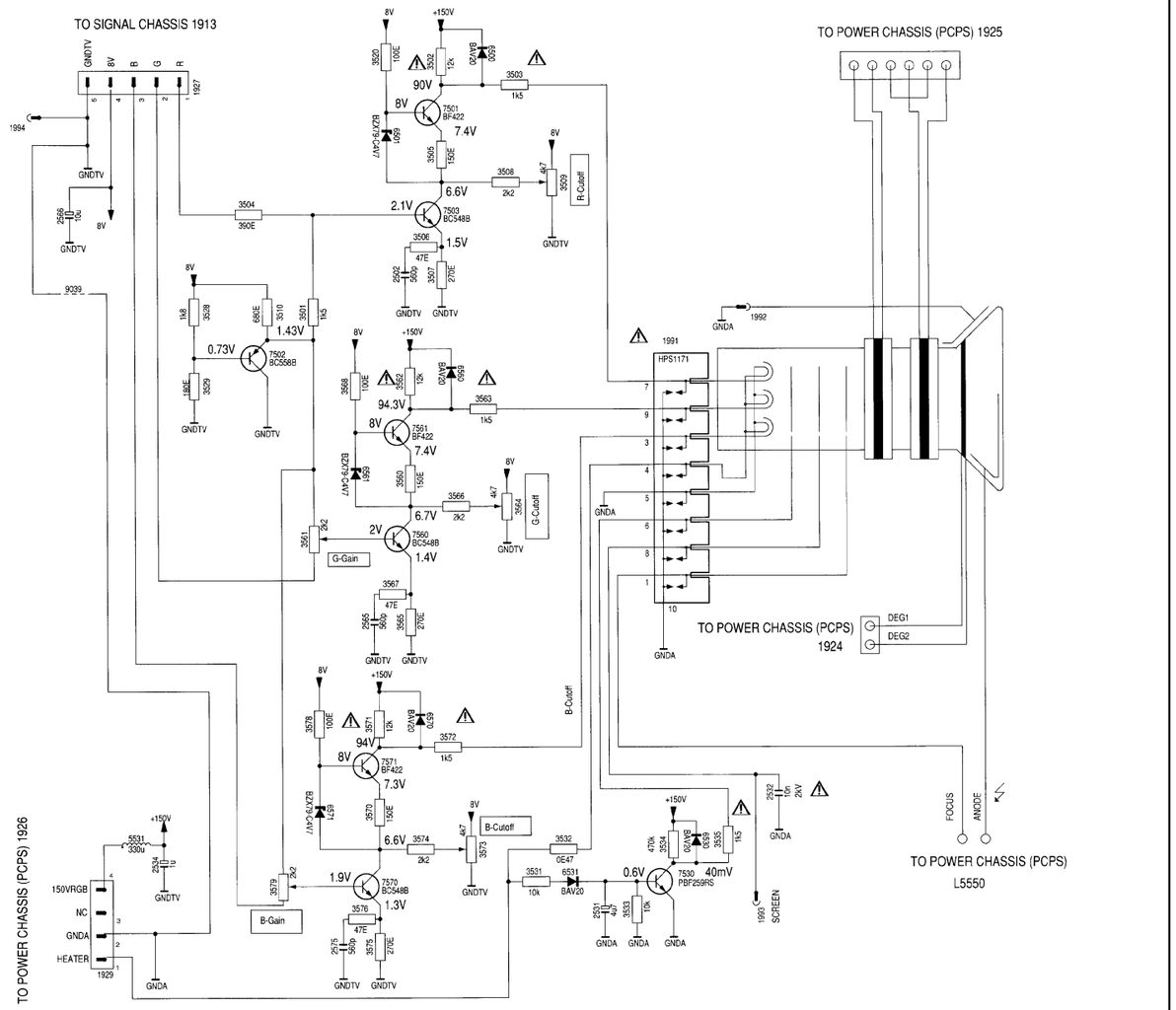
* VERSION

Pos.	PAL-BG	SECAM-L	MSTD	PAL-I	P/S-DK
3810	4k7	4k7	——	1k8	5k6
3813	——	5k6	4k7	10k	12k

Wiring Diagram



Tube Base PCB Diagram
(Production code VN04 to VN06 only)

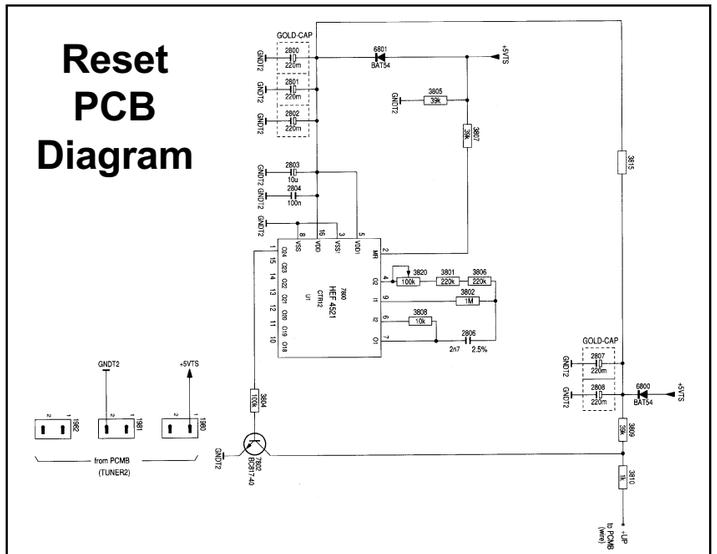


Service Instruction:

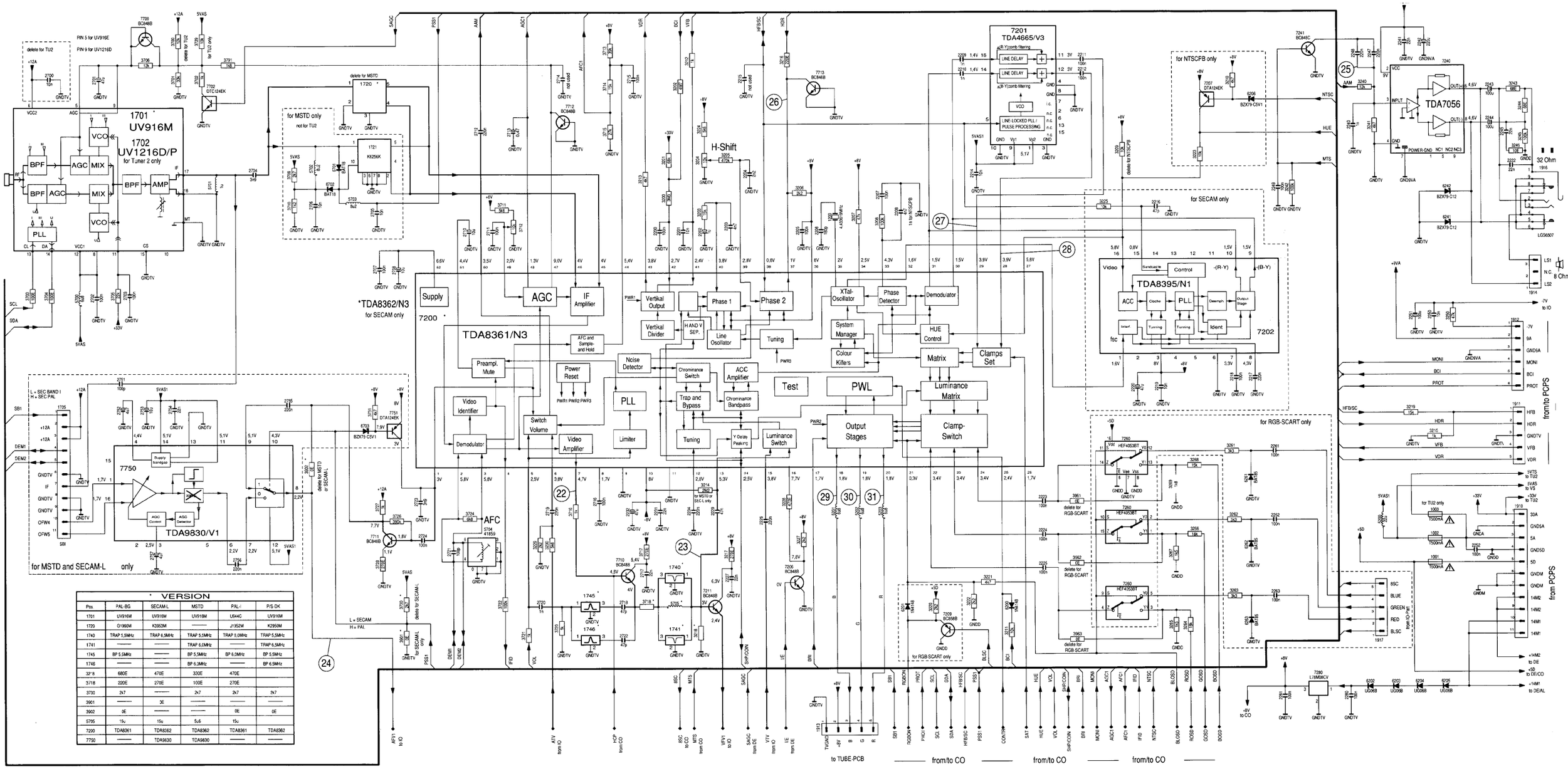
If there is a defect on the RESET Subpanel, it can be removed completely without substitution. Then carry out the following changes on the Signal Chassis:

- Replace the Keyboard Control Computer IC7801 mask no. by a version with mask no. 1 by a version with mask no. 4 “NTCGx-4P”, Part No. 75988-017.83, or higher.
- Insert a gold cap C2806, Part No. 75988-002.14

Reset PCB Diagram



TV Signal Electronics Diagram



* VERSION					
Pos.	PAL-BG	SECAM-L	MSTD	PAL-I	P/S-DK
1701	UV916M	UV916M	UV916M	U644C	UV916M
1720	G1966M	K3953M	———	J1952M	K2950M
1740	TRAP 5,5MHz	TRAP 6,5MHz	TRAP 5,5MHz	TRAP 5,0MHz	TRAP 5,5MHz
1741	———	———	TRAP 6,0MHz	———	TRAP 6,5MHz
1745	BP 5,5MHz	———	BP 5,5MHz	BP 6,0MHz	BP 5,5MHz
1746	———	———	BP 6,0MHz	———	BP 6,5MHz
32*8	680E	470E	330E	470E	
3718	220E	270E	100E	270E	
3730	2x7	———	2x7	2x7	2x7
3901	———	0E	———	———	———
3902	0E	———	———	0E	0E
5705	15u	15u	5u6	15u	———
7200	TDA8361	TDA8362	TDA8362	TDA8361	TDA8362
7750	———	TDA9830	TDA9830	———	———