/01R/02R/05R/19R

Service
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Service Manual

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GB 4822 727 18885

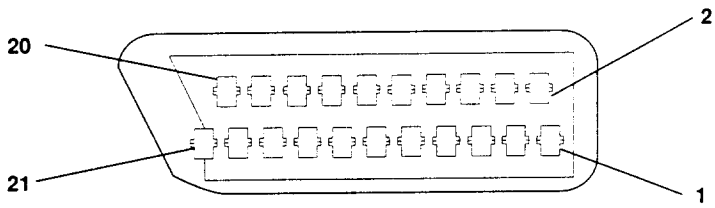
2.1 STU 801

Technical Data

Number of Programmes	60
Receiving Frequency	950-1750MHz
LNC Output Voltage	Horiz. 17.2v, Vert. 12.6v
Input Impedance	75 Ohms
I.F. Frequency	479.5MHz
I.F. Bandwidth	27MHz
Input Level	-62 to -25 dBm 75Ω
Image Rejection	50dB (typically)
Input Connector	Type F Female
Threshold	6.5dB C/N (typically)
Video De-emphasis	CCIR 405-1
Video Output Level	1v p-p
Video Output Impedance	75 Ohms
Video Frequency Response	50Hz to 4.8MHz +/-3dB
Video Output Connector	SCART
Baseband Output Level	1v p-p
Baseband Modes	Filtered or Flat
(PAL/MAC)	(Software Switched)
Baseband Frequency Response (MAC)	DC to 10.5MHz

Energy Dispersion Removal	Greater than 40dB
Audio Modes	Main Mono (Tunable) Stereo Pairs (Tunable) Individual Channels (Tunable)
Main Mono Subcarrier	5.0 to 10.0MHz tunable
Preset Stereo Subcarriers	7.02 & 7.20MHz PANDA 1 7.38 & 7.56MHz PANDA 1 7.74 & 7.92MHz PANDA 1 8.10 & 8.28MHz PANDA 1 All tunable from 5.0 to 10.0MHz
Audio Frequency Response	50Hz to 16kHz +/-3dB
Audio Output Level	0dBm/600 Ohms
Audio Band width	150kHz
Audio Output Connector	SCART and PHONO's
U.H.F. Modulator	CCIR CH30 to 39 with test signal, Preset to channel 38
Operating voltage	195-265V ~ 50Hz
Power Consumption	35 Watts (typically)
Dimensions	H 58mm, W 360mm, D 200mm
Weight	1.8kg

Scart Connections



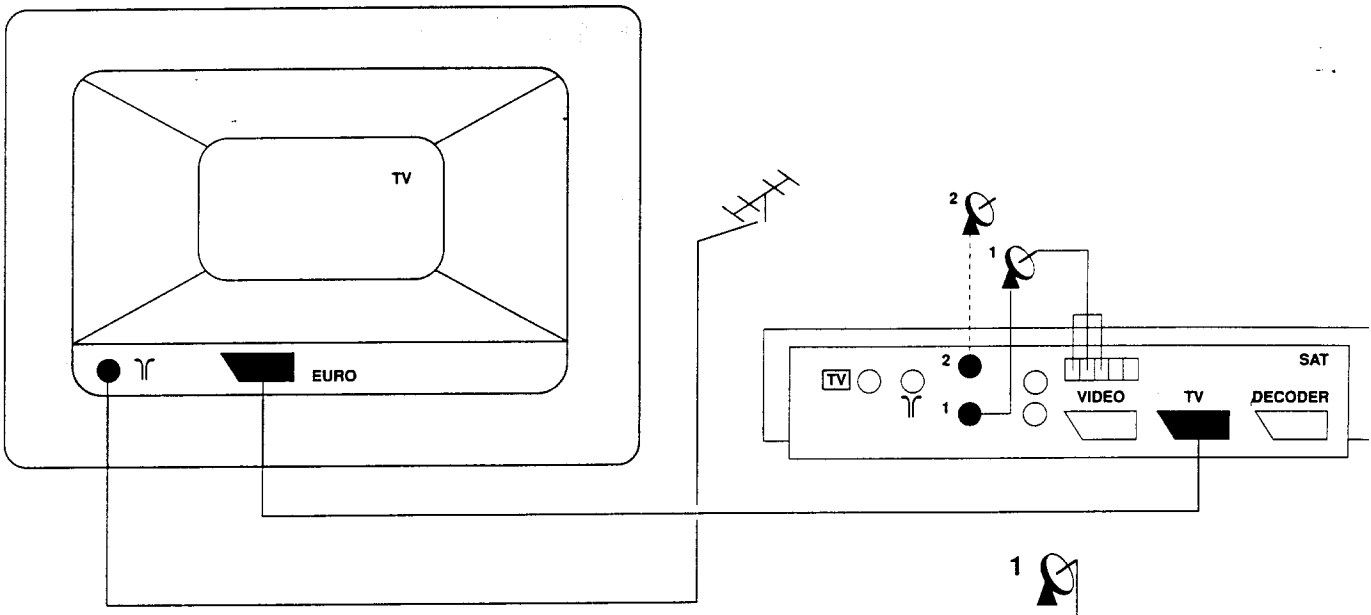
Socket viewed from rear panel

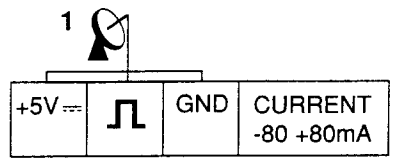
	DECODER SCART	TV SCART	VCR SCART
1.	Audio Out RH (Decoder 1)	Audio Out RH	Audio Out RH
2.	Audio In RH (Decoder 1)	-	Audio In RH
3.	Audio Out LH (Decoder 1)	Audio Out LH	Audio Out LH
4.	Audio Earth (Decoder 1)	Audio Earth	Audio Earth
5.	Blue Earth	Blue Earth	-
6.	Audio In LH (Decoder 1)	-	Audio In LH
7.	Blue In	Blue Out	-
8.	Decoder 1 Status	CVBS Status	CVBS Status
9.	Green Earth	Green Earth	-
10.	Decoder 2 Baseband Out	-	-
11.	Green In	Green Out	-
13.	Red Earth	Red Earth	-
14.	Decoder 2 Input	-	-
15.	Red In	Red Out	-
16.	RGB Status	RGB Status	-
17.	Decoder Earth	Video Earth	Video Earth
18.	Decoder 2 Status	RGB Status Earth	-
19.	Decoder 1 Baseband Out	Video Out	Video Out
20.	Decoder 1 Input		Video In
21.	Casing Socket Earth	Casing Socket Earth	Casing Socket Earth

All other pins are not implemented.

NOTE: *The RGB pins on the DECODER and TV SCART sockets are simply linked together to allow the future use of a MAC decoder. See the Installation diagrams for more details concerning the connection of a VCR and decoder.*

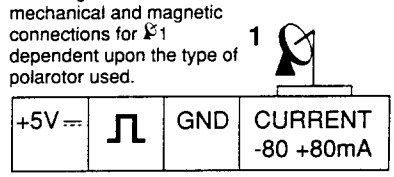
Connections To A TV Only





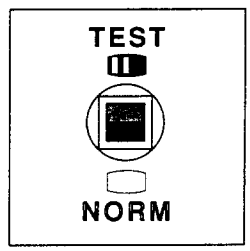
Version 01R/02R/19R only

This diagram shows both the mechanical and magnetic connections for 1 dependent upon the type of polarotor used.

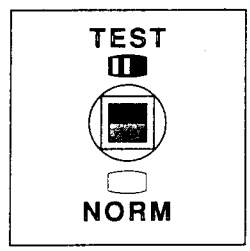


LNC 1

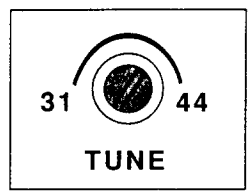
1. Screw the cables from the dish Aerials into the sockets marked 1 and 2 on the rear panel of the receiver. Be careful to only finger tighten the nut.
2. Plug the TV aerial into the socket marked on the receiver.
3. Connect a coaxial cable from the socket marked TV on the receiver to the aerial socket of the TV.
4. Once all connections have been made, switch on the TV. If a picture does not appear, move the TEST/ NORM switch, (located on the receiver rear panel), to the TEST position in order to obtain the test signal. If the two vertical test signal bars do not appear, tune the receiver to the same frequency as the TV using the Channel Adjustment Screw on the receiver rear panel.
5. Tuning is described in greater detail further in the 'Operating Instructions' section of this manual.



TEST/NORM switch in TEST position

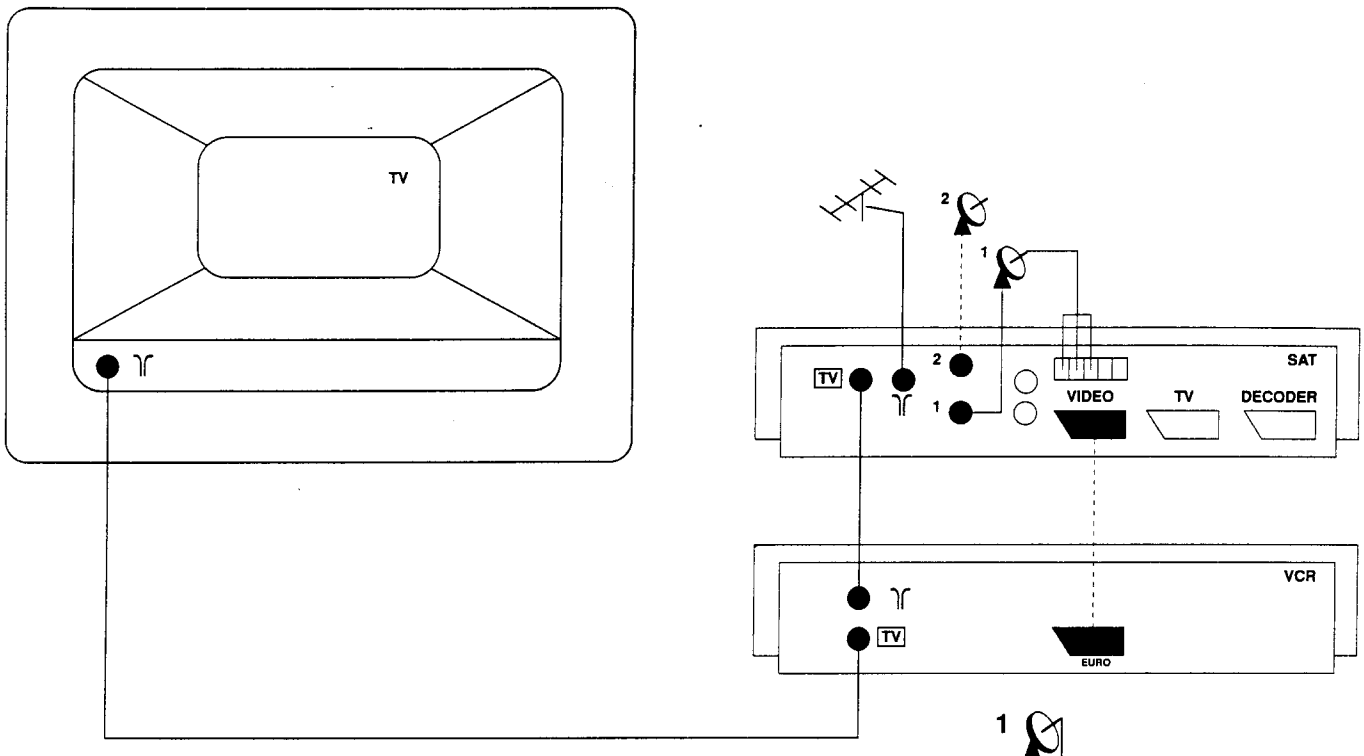


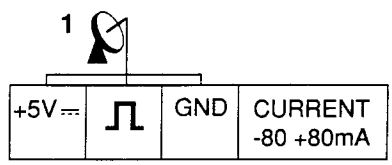
TEST/NORM switch in NORM position



The Channel Adjustment Screw

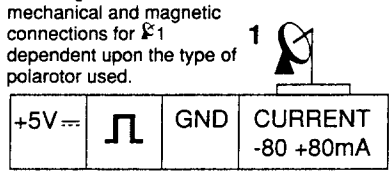
Connection To A TV/VCR





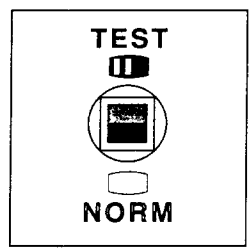
Version 01R/02R/19R only

This diagram shows both the mechanical and magnetic connections for 1 dependent upon the type of polarotor used.

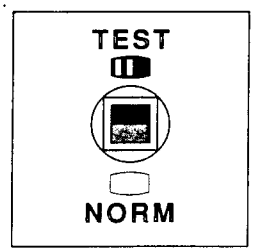


LNC 1

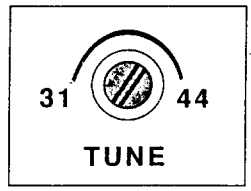
1. Screw the cables from the dish Aerials into the sockets marked 1 and 2 on the rear panel of the receiver. Be careful to only finger tighten the nut.
2. Plug the TV aerial into the socket marked on the receiver.
3. Connect a coaxial cable from the socket marked TV/ VCR on the receiver to the aerial socket of the VCR.
4. Connect a coaxial cable from the TV socket of the VCR to the aerial socket of the TV.
5. Once all connections have been made, switch on the TV. If a picture does not appear, move the TEST/ NORM switch, (located on the receiver rear panel), to the TEST position in order to obtain the test signal. If the two vertical test signal bars do not appear, tune the receiver to the same frequency as the TV/VCR using the Channel Adjustment Screw on the receiver rear panel.
6. Tuning is described in greater detail further in the 'Operating Instructions' section of this manual.



TEST/NORM switch in TEST position

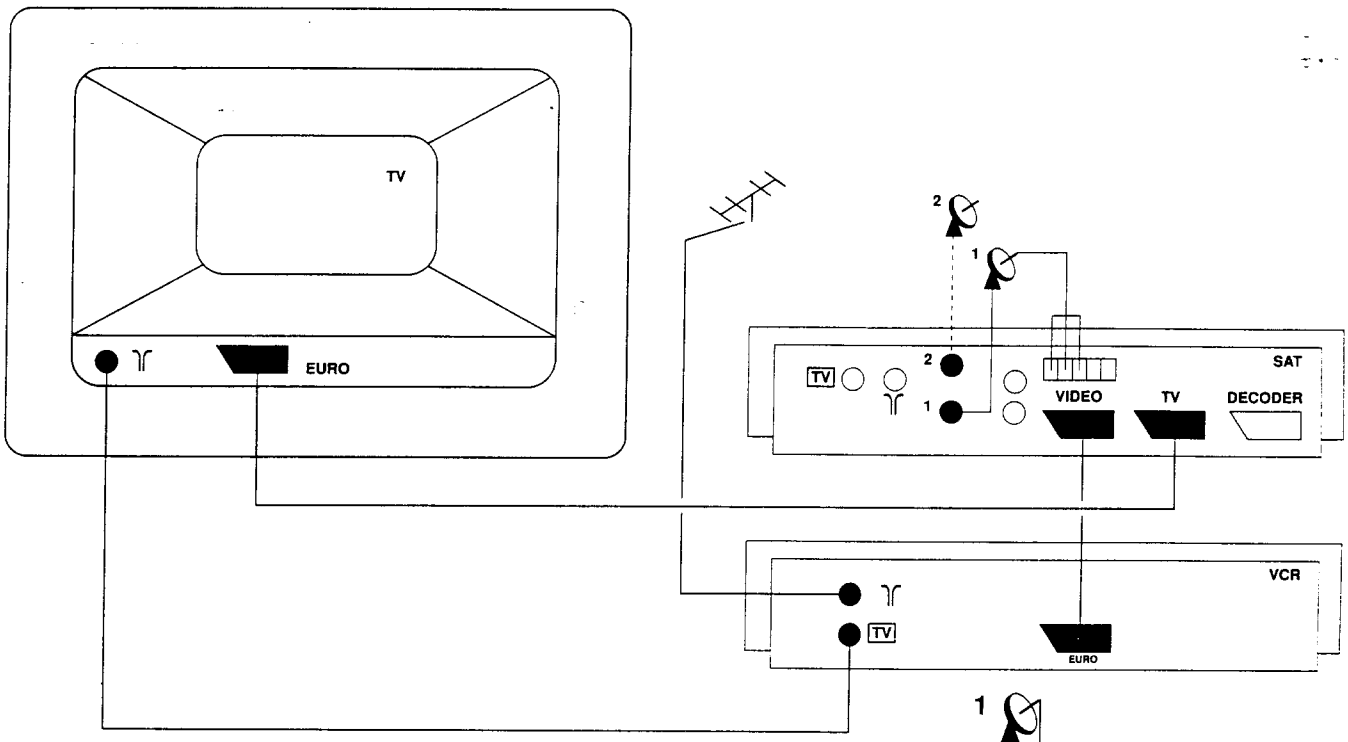


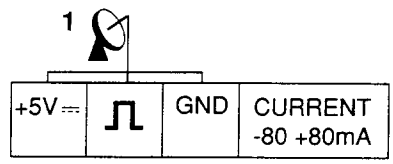
TEST/NORM switch in NORM position



The Channel Adjustment Screw

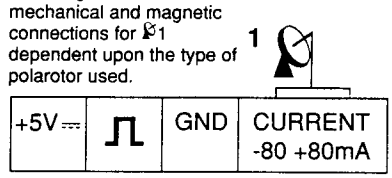
Connection To A TV/VCR Using SCART





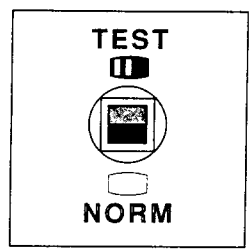
Version 01R/02R/19R only

This diagram shows both the mechanical and magnetic connections for 1 dependent upon the type of polarotor used.

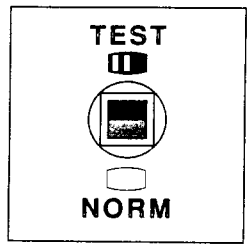


LNC 1

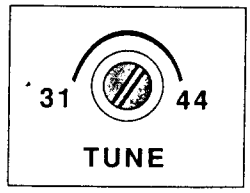
1. Screw the cables from the dish Aerials into the sockets marked 1 and 2 on the rear panel of the receiver. Be careful to only finger tighten the nut.
2. Plug the TV aerial into the socket marked on the receiver.
3. Connect a coaxial cable from the socket marked TV/ VCR on the receiver to the aerial socket of the VCR.
4. Connect a coaxial cable from the TV socket of the VCR to the aerial socket of the TV.
5. Connect the SCART leads from the VCR SCART socket on the receiver to the VCR, then connect the lead from the TV SCART socket on the receiver to the TV.
6. Once all connections have been made, switch on the TV. If a picture does not appear, move the TEST/ NORM switch, (located on the receiver rear panel), to the TEST position in order to obtain the test signal. If the two vertical test signal bars do not appear, tune the receiver to the same frequency as the TV/VCR using the Channel Adjustment Screw on the receiver rear panel.
7. Tuning is described in greater detail further in the Operating Instructions section of this manual.



TEST/NORM switch in TEST position



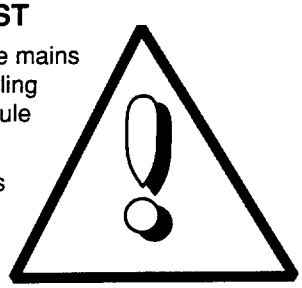
TEST/NORM switch in NORM position



The Channel Adjustment Screw

General Precautions

REMEMBER: SAFETY FIRST



Always disconnect the unit from the mains supply before removing or re-installing any component, circuit board, module or any part of the assembly.

Before switching the unit on always confirm that the voltage rating on the back of the unit matches the voltage for your country.

Do not spray any chemicals on or near the unit.

Faulty components must be replaced with the correct value and rated component by a competent engineer. Failure to do so could invalidate safety approvals.

***CAUTION**: Wrong substitution of electrolytic capacitors may result in an explosion hazard.*

Servicing of Small Chip Parts

General Cautions On Handling and Storage

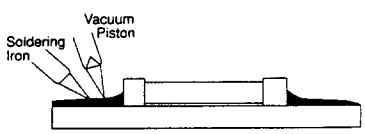
Oxidization on the chip's terminals results in poor soldering. Do not handle them with bare hands.
For storage, avoid the following places where oxidization will occur, and their capacitance and resistance will deteriorate:

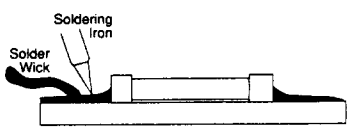
1. In areas with sulphur or chlorine gas.
2. Directly sunlit places
3. High temperature/high humidity places

Rough handling of circuit boards containing Surface Mounted Devices (SMD's) can cause damage to the components as well as the circuit boards. Circuit boards containing SMD's should never be bent or flexed. Different circuit board materials expand and contract at different rates when heated or cooled and the components and/or solder connections can be damaged by the stress. Never rub or scrape chip components as this may cause the value of the component to change. Similarly, do not slide the circuit board across any surface.

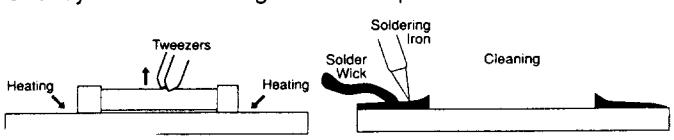
Removal of a Chip

Heat the solder (for 2-3 seconds) at each terminal of the chip. You can remove small components with the soldering iron using a little force in horizontal direction while removing solder with braid.

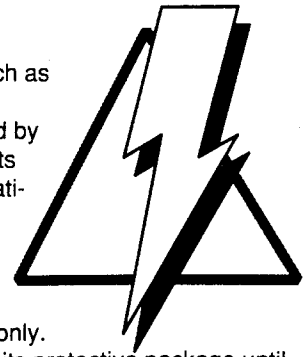




Holding the chip with a pair of tweezers take it off gently using the soldering iron's heat applied on each terminal.
The printed board has to be free from excess solder, so that it is ready for the mounting of new components.



Handling Electrostatic Sensitive Devices

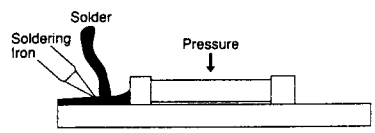


Many semi-conductor devices, such as integrated circuits and field effect transistors, can be easily damaged by static electricity. These components are commonly known as electrostatically sensitive (ES) devices. The following precautions should be observed when handling ES devices.
Use a grounded tip soldering iron only.
Do not remove an ES device from its protective package until you are ready to fit it, and touch the protective material to chassis or the assembly in which the device is to be installed.
Use anti-static type solder removal devices.
Discharge any electrostatic charge on your body by touching a known earth prior to handling the device. Preferably use an earthed bench mat or ground mat together with a wrist strap, which should be removed before applying power to avoid potential shock hazards.
After removing an electrical assembly fitted with ES devices, place it on a conductive surface to prevent electrostatic charge build up.

The printed circuit board has to be free from excess solder, so that it is ready for the mounting of new components.

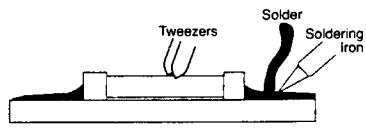
Caution on Removal

When handling the soldering iron, use suitable pressure and be careful.
When removing the chip, do not use undue force with the pair of tweezers.
The soldering iron in use (approx, 30W), is best if provided with a thermal control (soldering temperature about 225 to 250°C).
The chip, once removed, should never be used again.



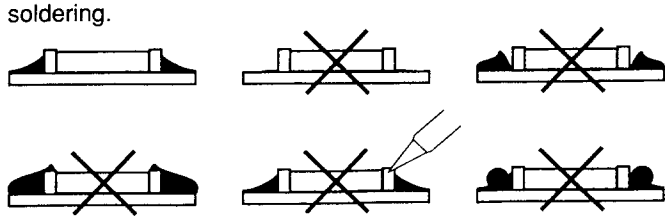
Attachment of a chip

Temporarily solder one terminal of the chip on the copper foil surface.
Holding one end of the chip with a pair of tweezers, completely solder both terminals, one after the other.



Caution on Attachment

When soldering the chip terminals, do not touch them directly with the soldering iron. The soldering must be as quick as possible, being careful not to hurt the terminals and the body itself.
Keep the chip's body in contact with the printed board when soldering.



Mechanical Instructions

(Always disconnect the unit from the mains supply before dismantling)

1. Case Removal

- Remove the 5 top cover screws (A) on Figs. 1 and 2.
- Hold both sides of the cover and slide it towards the rear panel of the unit to remove.

Fig 1. ■ *(Version 01R/02R/19R only)*

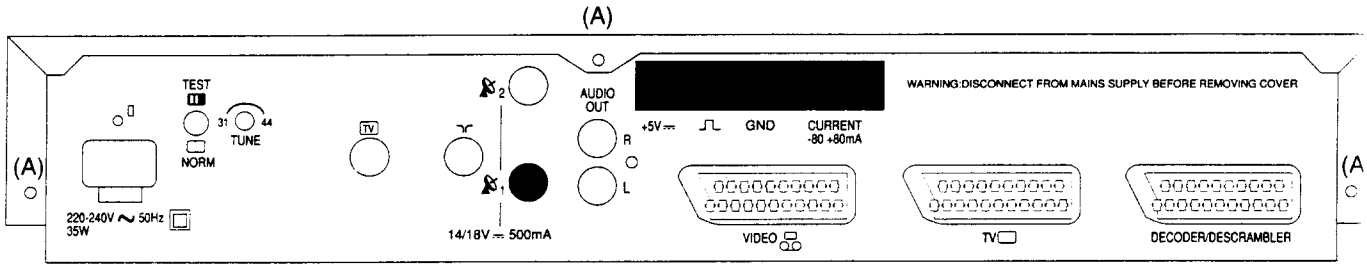
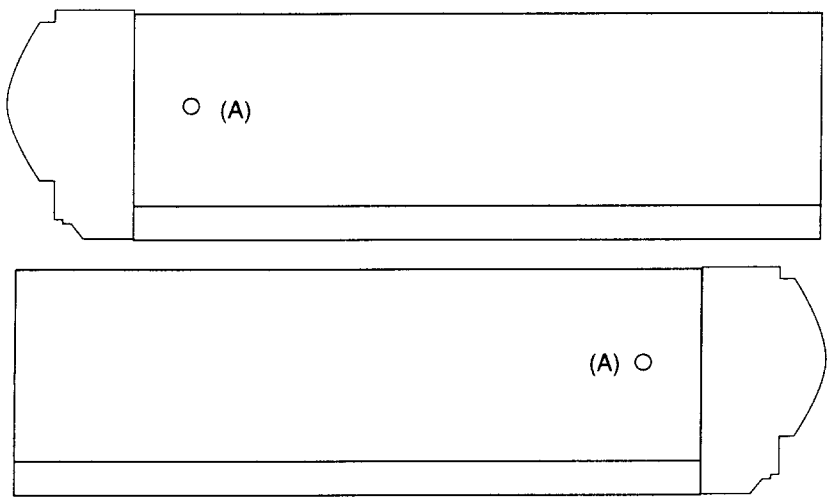


Fig 2.



Mechanical Parts List

Description	Service Code
Case cover	4822 432 10922
Case base (/05R only)	4822 432 10924
Case base (/01R/02R/19R)	4822 432 10921
Front panel (/05R only)	4822 432 10925
Front panel (/01R/02R/19R)	4822 432 10923
Mains lead (except UK)	4822 321 10773
UK Mains lead (/05R only)	4822 321 10774
Push Rivet	4822 535 30141
Stand-off Pillar (G) (/05R) only)	4822 462 10511
Stand-off Support (H)	4822 462 10513

2. Front panel removal

- Once the cover is removed the front panel is easily removed by gently prising the 2 lugs (x) outwards in Fig 3.

3 VideoCrypt PCB removal (05R models only)

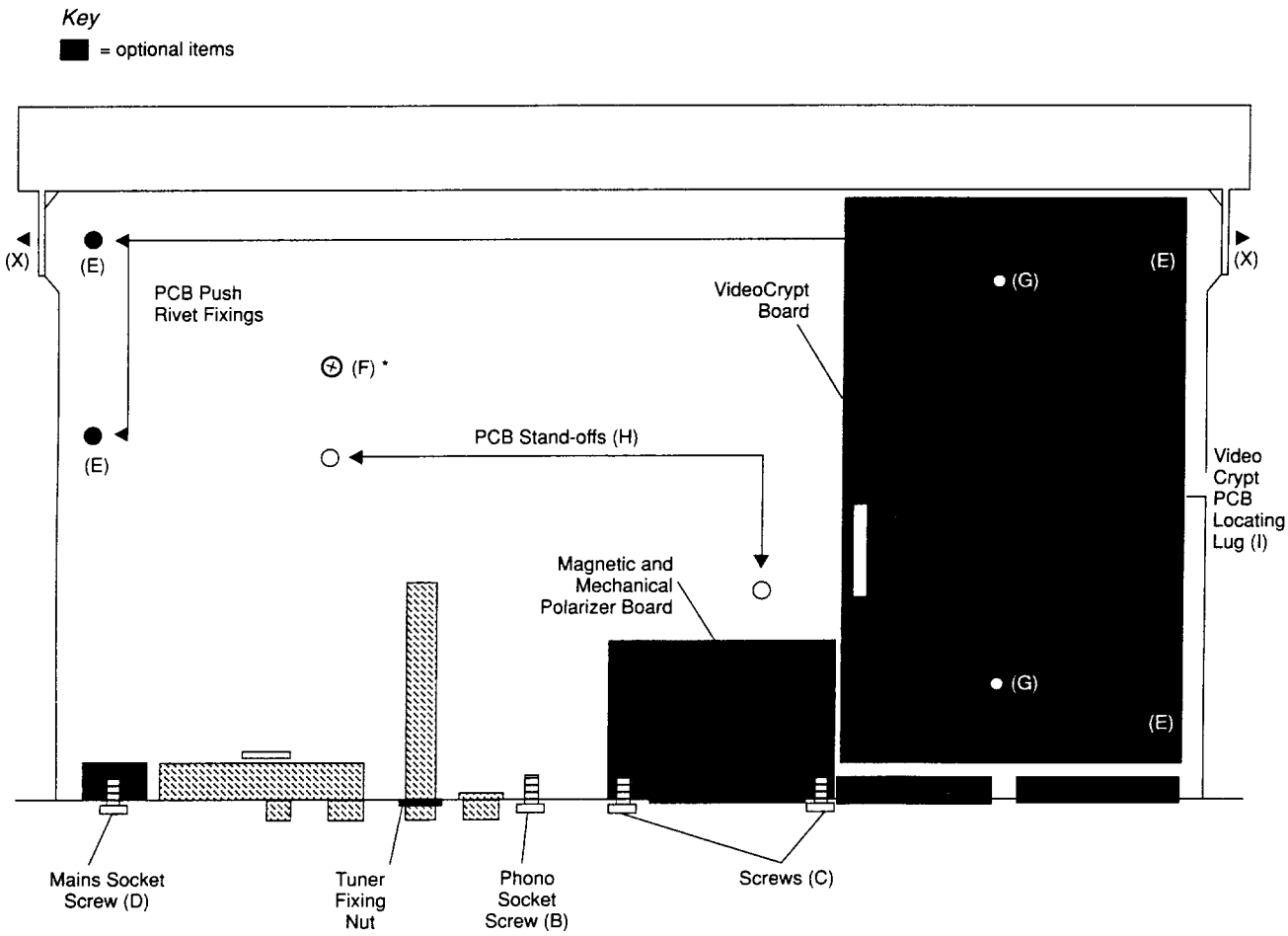
- Comprises the nylon PCB standoff pillar locking spigot (G) whilst easing the VideoCrypt PCB upwards (Fig 3)

- Once both spigots are released, the 10 way socket may be released and the VideoCrypt PCB will slide away from the chassis support lug.

4. Main PCB removal

- Remove the Phono socket screw (B)
- Remove the Polarizer board fixing screws (C)
- Remove the Mains socket fixing screw (D) and J nut.
- Remove the 4 black push rivets (E).
- Compress together the PCB standoff prongs (H) whilst lifting the PCB and carefully slide the PCB away from the rear panel.
- If fitted remove screw (F)*.

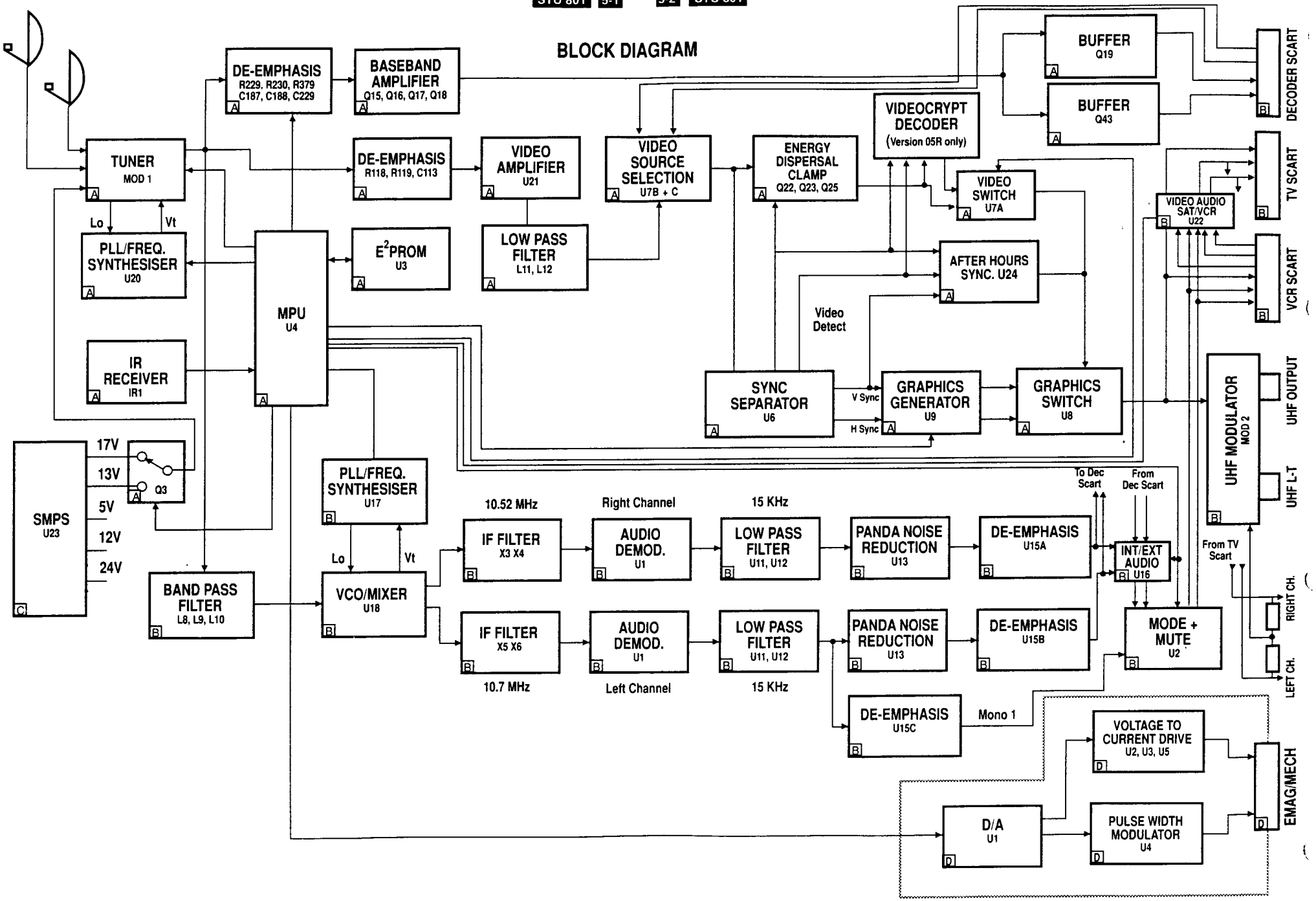
Fig 3



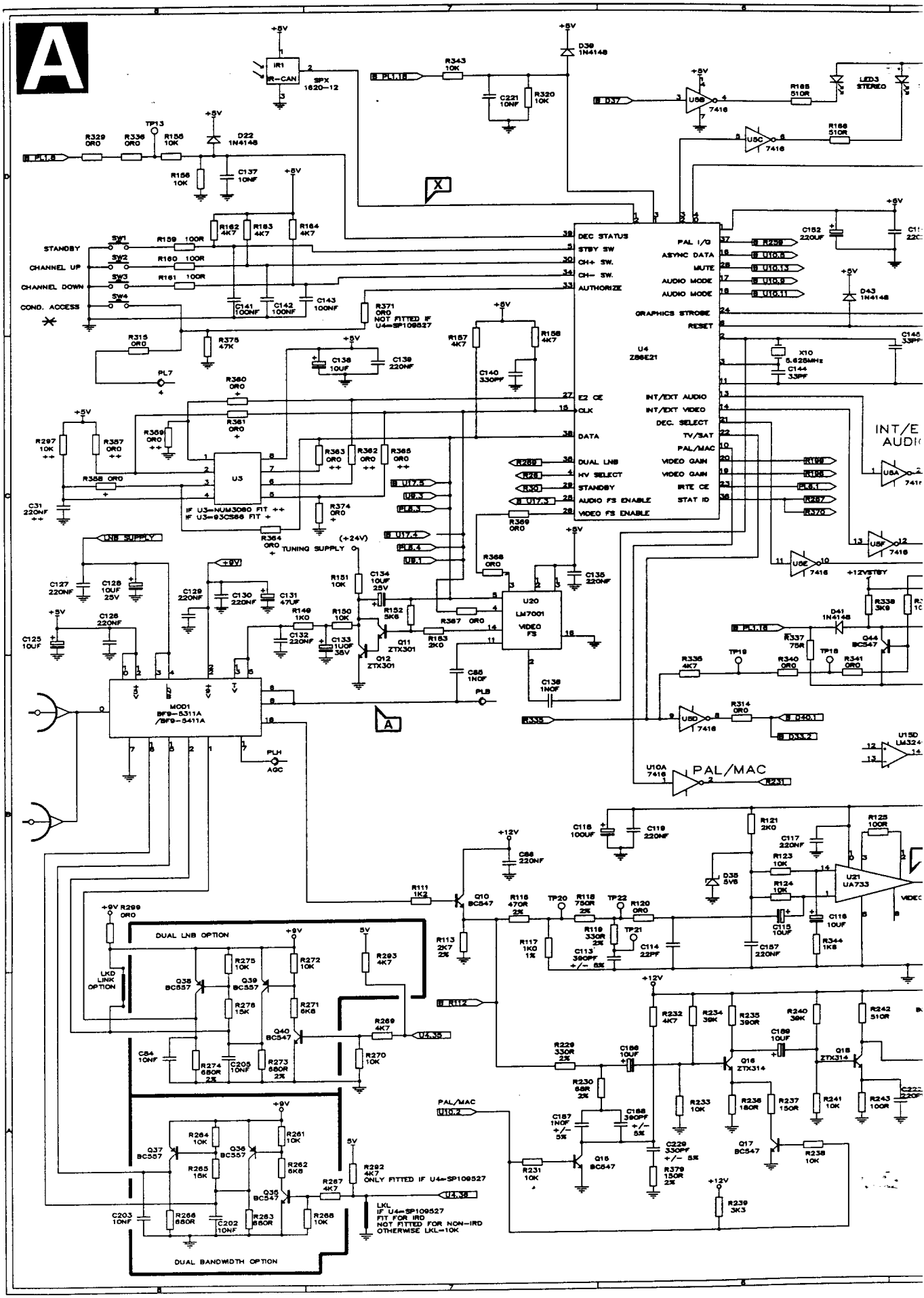
NOTE: *Once removed from the chassis base, the PCB is quite flexible and if handled without reasonable care, serious damage could result.*

IMPORTANT: *All PCB fixings, screws etc must be correctly replaced upon re-assembly. Failure to do so may result in a potential hazard due to reduced creepage/clearance distances etc.*

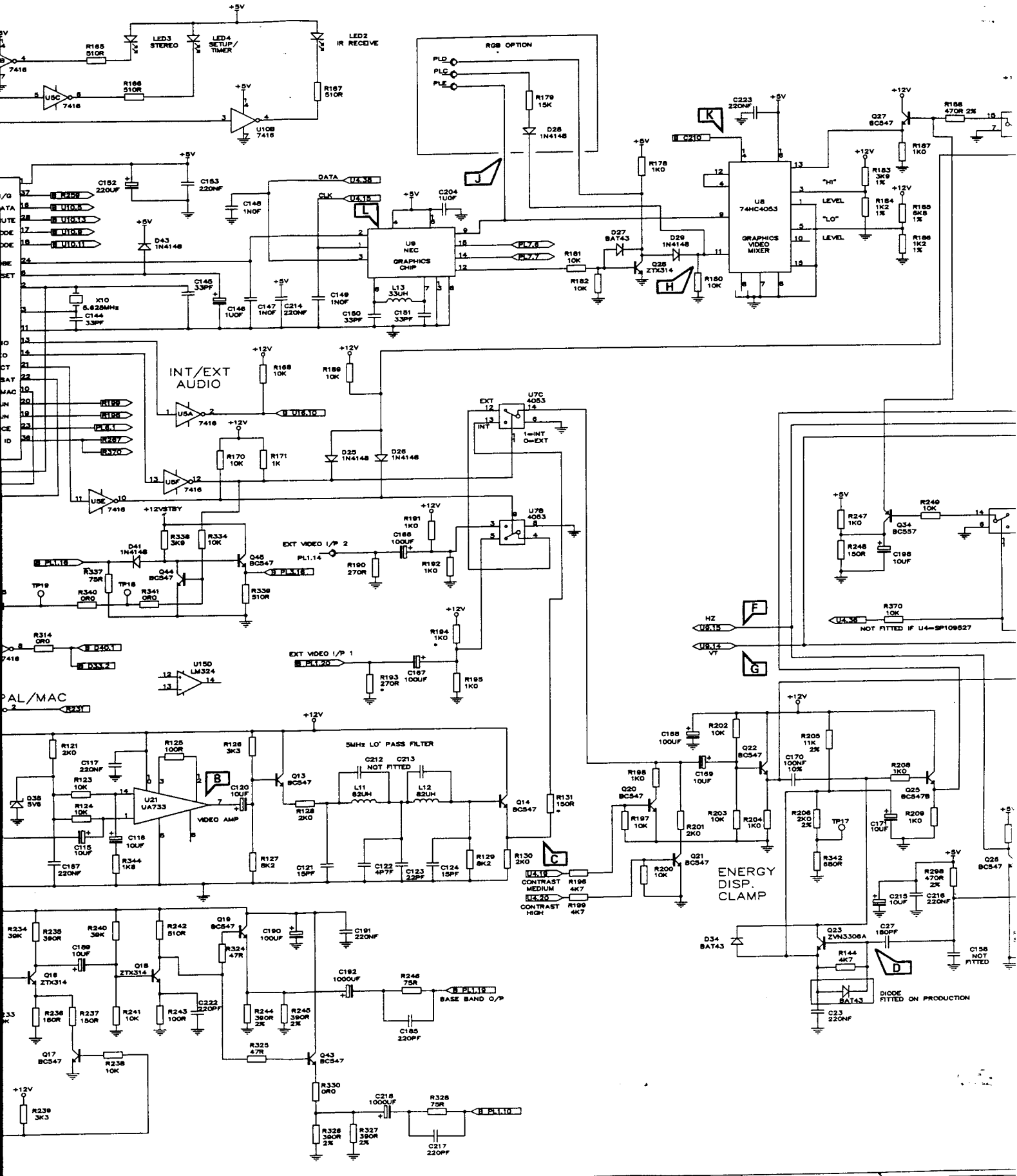
BLOCK DIAGRAM

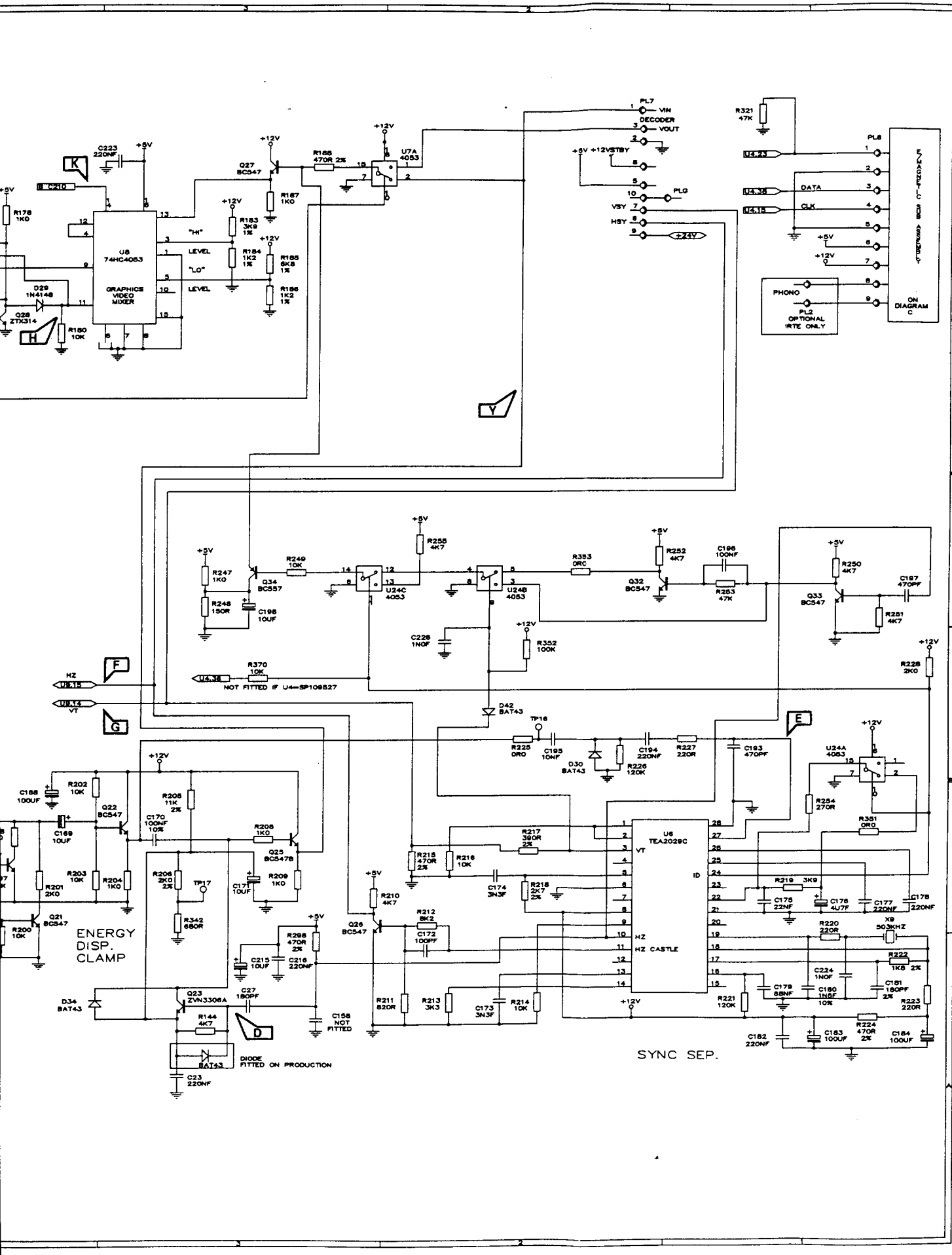


TUNING CONTROL AND VIDEO PROCESSING



✳ version 05 R only


LED3 STEREO
LED4 SETUP/ TIMER
LED2 IR RECEIVE
RGB OPTION
U9 NEC GRAPHICS CHIP
U8 74HC4053 GRAPHICS VIDEO MIXER
INT/EXT AUDIO
U21 UA733
VIDEO AMP
5MHz LO' PASS FILTER
ENERGY DISP. CLAMP
CONTRAST MEDIUM
CONTRAST HIGH
BASE BAND O/P
DIODE FITTED ON PRODUCTION
NOT FITTED IF U4=SP109527
PAL/MAC



C23 A
C27 A
C31 (
C84 A
C85 B
C86 B
C113 B
C114 B
C115 B
C116 B
C117 B
C118 B
C119 B
C120 B
C121 B
C122 B
C123 B
C124 B
C125 C
C126 C
C127 C
C128 C
C129 C
C130 C
C131 C
C132 C
C133 C
C134 C
C135 C
C136 B
C137 D
C138 C
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C140 C
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C142 D
C143 D
C144 C
C145 C
C146 C
C147 C
C148 D
C149 C
C150 C
C151 C
C152 D
C153 D
C157 B
C166 C
C167 B
C168 B
C169 B
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C172 A
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C183 A
C184 A
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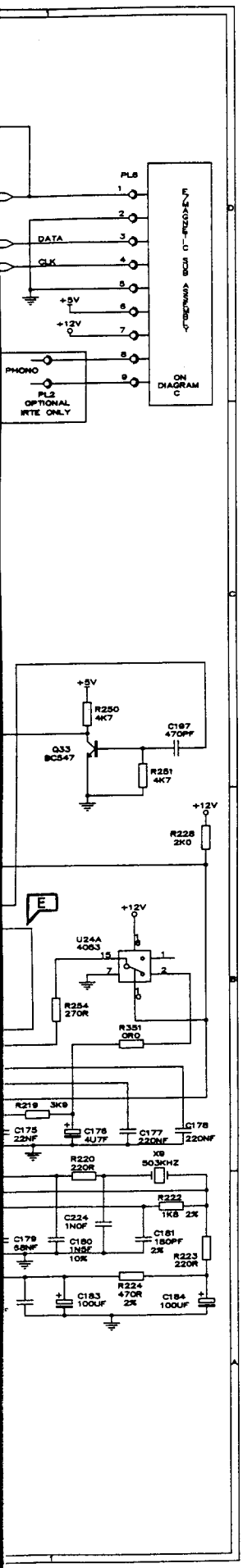
C186 A
C187 A
C188 A
C189 A
C190 A
C191 A
C192 A
C193 B
C194 B
C195 B
C196 C
C197 C



C23	A3	C198	C3	R124	B6	R228	B1	R363	C7
C27	A3	C202	A8	R125	B6	R229	A7	R364	C8
C31	C8	C203	A8	R126	B5	R230	A6	R365	C7
C84	A8	C204	D5	R127	B5	R231	A7	R367	C7
C85	B7	C205	A8	R128	B5	R232	A6	R368	C7
C86	B7	C214	C5	R129	B4	R233	A6	R369	C7
C113	B6	C215	A3	R130	B4	R234	A6	R370	B3
C114	B6	C216	A3	R131	B4	R235	A6	R371	D7
C115	B6	C217	A5	R144	A3	R236	A6	R374	C7
C116	B6	C218	A5	R149	C7	R237	A6	R375	C8
C117	B6	C221	D7	R150	C7	R238	A6	R379	A6
C118	B6	C222	A5	R151	C7	R239	A6	RT165	D6
C119	B6	C223	D3	R152	C7	R240	A6	SW1	D8
C120	B5	C224	A1	R153	C7	R241	A6	SW2	D8
C121	B5	C226	B2	R155	D8	R242	A6	SW3	D8
C122	B5	C229	A6	R156	D8	R243	A6	SW4	D8
C123	B5	D22	D8	R157	C7	R244	A5	U3	C8
C124	B5	D25	C5	R158	C7	R245	A5	U4	C6
C125	C8	D26	C5	R159	D8	R246	A5	U5A	C5
C126	C8	D27	D4	R160	D8	R247	C3	U5B	D6
C127	C8	D28	D4	R161	D8	R248	C3	U5C	D6
C128	C8	D29	D4	R162	D8	R249	C3	U5D	B6
C129	C8	D30	B2	R163	D8	R250	C1	U5E	C6
C130	C8	D34	A4	R164	D8	R251	C1	U5F	C6
C131	C8	D35	B6	R165	D6	R252	C2	U6	B1
C132	C8	D39	D7	R166	D6	R253	C1	U7A	D2
C133	C7	D41	C6	R167	D5	R254	B1	U7B	C4
C134	C7	D42	B2	R168	C5	R255	C2	U7C	C4
C135	C7	D43	D6	R170	C5	R261	A8	U8	D3
C136	B7	IR1	D8	R171	C5	R262	A8	U9	D5
C137	D8	L11	B5	R178	D4	R263	A8	U10A	B6
C138	C7	L12	B5	R179	D4	R264	A8	U10B	D5
C139	C7	L13	C5	R180	C4	R265	A8	U15D	B5
C140	C7	LED2	D5	R181	D4	R266	A8	U20	C7
C141	D8	LED3	D6	R182	C4	R267	A7	U21	B6
C142	D8	LED4	D5	R183	D3	R268	A7	U24A	B1
C143	D7	LKD	A8	R184	D3	R269	A7	U24B	C2
C144	C6	LKL	A7	R185	D3	R270	A7	U24C	C3
C145	C5	MOD1	B8	R186	D3	R271	A8	X9	A1
C146	C5	PL6	D1	R187	D3	R272	B8	X10	C6
C147	C5	PL7	D2	R188	D3	R273	A8		
C148	D5	Q10	B7	R189	C5	R274	A8		
C149	C5	Q11	C7	R190	C5	R275	B8		
C150	C5	Q12	B7	R191	C5	R276	A8		
C151	C5	Q13	B5	R192	C5	R292	A7		
C152	D6	Q14	B4	R193	B5	R293	B7		
C153	D5	Q15	A7	R194	B5	R297	C8		
C157	B6	Q16	A6	R195	B5	R298	A3		
C166	C5	Q17	A6	R196	B4	R299	B8		
C167	B5	Q18	A6	R197	B4	R314	B6		
C168	B4	Q19	A5	R198	B4	R315	C8		
C169	B4	Q20	B4	R199	A4	R320	D7		
C170	B3	Q21	B4	R200	A4	R321	D1		
C171	B3	Q22	B3	R201	B4	R324	A5		
C172	A2	Q23	A3	R202	B4	R325	A5		
C173	A2	Q25	B3	R203	B4	R326	A5		
C174	B2	Q26	B3	R204	B3	R327	A5		
C175	B1	Q27	D3	R205	B3	R328	A5		
C176	B1	Q28	D4	R206	B3	R329	D8		
C177	B1	Q32	C2	R207	A7	R330	A5		
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C179	A1	Q34	C3	R209	B3	R335	B6		
C180	A1	Q35	A8	R210	B3	R336	D8		
C181	A1	Q36	A8	R211	A2	R337	B6		
C182	A1	Q37	A8	R212	B2	R338	C6		
C183	A1	Q38	A8	R213	A2	R339	B5		
C184	A1	Q39	A8	R214	A2	R340	B6		
C185	A5	Q40	A8	R215	B2	R341	B6		
C186	A6	Q43	A5	R216	B2	R342	B3		
C187	A7	Q44	C6	R217	B2	R343	D7		
C188	A6	Q45	C5	R218	B2	R344	B6		
C189	A6	R111	B7	R219	B1	R351	B1		
C190	A5	R113	B7	R220	A1	R352	B2		
C191	A5	R116	B7	R221	A1	R353	C2		
C192	A5	R117	B7	R222	A1	R357	C8		
C193	B1	R118	B7	R223	A1	R358	C8		
C194	B2	R119	B6	R224	A1	R359	C8		
C195	B2	R120	B6	R225	B2	R360	C8		
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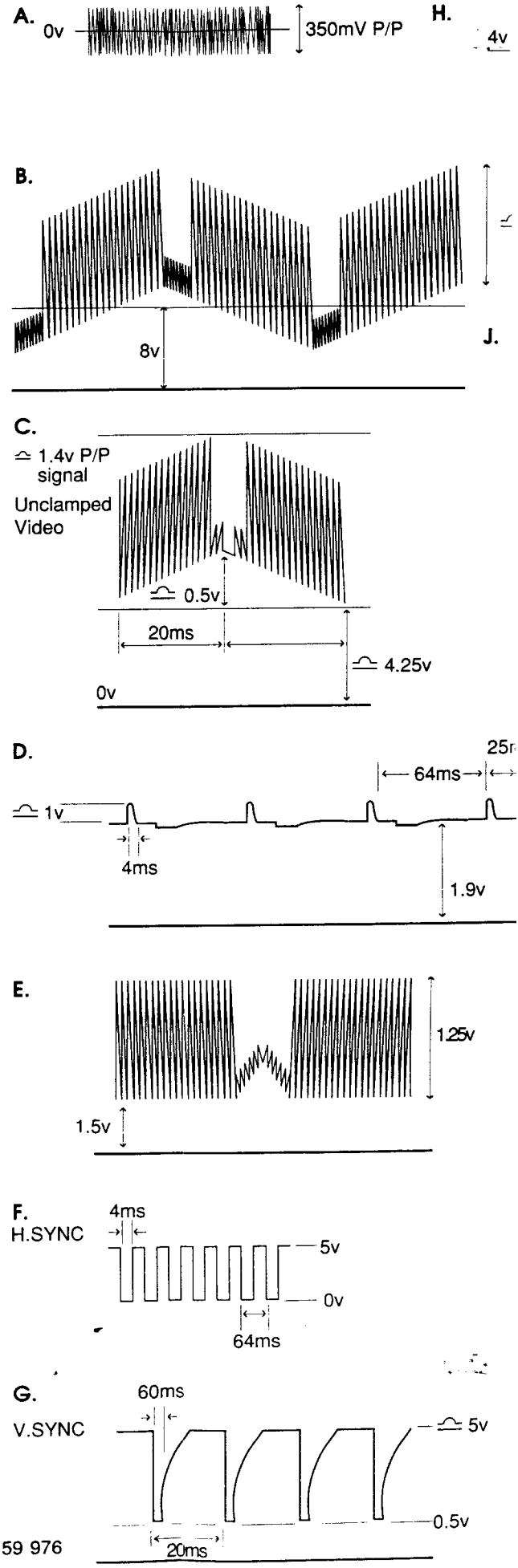
C197	C1	R123	B6	R227	B1	R362	C7		



PCS 59 976

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C202	A8	R125	B6	R229	A7	R364	C8
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C204	D5	R127	B5	R231	A7	R367	C7
C205	A8	R128	B5	R232	A6	R368	C7
C214	C5	R129	B4	R233	A6	R369	C7
C215	A3	R130	B4	R234	A6	R370	B3
C216	A3	R131	B4	R235	A6	R371	D7
C217	A5	R144	A3	R236	A6	R374	C7
C218	A5	R149	C7	R237	A6	R375	C8
C221	D7	R150	C7	R238	A6	R379	A6
C222	A5	R151	C7	R239	A6	RT165	D6
C223	D3	R152	C7	R240	A6	SW1	D8
C224	A1	R153	C7	R241	A6	SW2	D8
C226	B2	R155	D8	R242	A6	SW3	D8
C229	A6	R156	D8	R243	A6	SW4	D8
D22	D8	R157	C7	R244	A5	U3	C8
D25	C5	R158	C7	R245	A5	U4	C6
D26	C5	R159	D8	R246	A5	U5A	C5
D27	D4	R160	D8	R247	C3	U5B	D6
D28	D4	R161	D8	R248	C3	U5C	D6
D29	D4	R162	D8	R249	C3	U5D	B6
D30	B2	R163	D8	R250	C1	U5E	C6
D34	A4	R164	D8	R251	C1	U5F	C6
D35	B6	R165	D6	R252	C2	U6	B1
D39	D7	R166	D6	R253	C1	U7A	D2
D41	C6	R167	D5	R254	B1	U7B	C4
D42	B2	R168	C5	R255	C2	U7C	C4
D43	D6	R170	C5	R261	A8	U8	D3
IR1	D8	R171	C5	R262	A8	U9	D5
L11	B5	R178	D4	R263	A8	U10A	B6
L12	B5	R179	D4	R264	A8	U10B	D5
L13	C5	R180	C4	R265	A8	U15D	B5
LED2	D5	R181	D4	R266	A8	U20	C7
LED3	D6	R182	C4	R267	A7	U21	B6
LED4	D5	R183	D3	R268	A7	U24A	B1
LKD	A8	R184	D3	R269	A7	U24B	C2
LKL	A7	R185	D3	R270	A7	U24C	C3
MOD1	B8	R186	D3	R271	A8	X9	A1
PL6	D1	R187	D3	R272	B8	X10	C6
PL7	D2	R188	D3	R273	A8		
Q10	B7	R189	C5	R274	A8		
Q11	C7	R190	C5	R275	B8		
Q12	B7	R191	C5	R276	A8		
Q13	B5	R192	C5	R292	A7		
Q14	B4	R193	B5	R293	B7		
Q15	A7	R194	B5	R297	C8		
Q16	A6	R195	B5	R298	A3		
Q17	A6	R196	B4	R299	B8		
Q18	A6	R197	B4	R314	B6		
Q19	A5	R198	B4	R315	C8		
Q20	B4	R199	A4	R320	D7		
Q21	B4	R200	A4	R321	D1		
Q22	B3	R201	B4	R324	A5		
Q23	A3	R202	B4	R325	A5		
Q25	B3	R203	B4	R326	A5		
Q26	B3	R204	B3	R327	A5		
Q27	D3	R205	B3	R328	A5		
Q28	D4	R206	B3	R329	D8		
Q32	C2	R207	A7	R330	A5		
Q33	C1	R208	B3	R334	C5		
Q34	C3	R209	B3	R335	B6		
Q35	A8	R210	B3	R336	D8		
Q36	A8	R211	A2	R337	B6		
Q37	A8	R212	B2	R338	C6		
Q38	A8	R213	A2	R339	B5		
Q39	A8	R214	A2	R340	B6		
Q40	A8	R215	B2	R341	B6		
Q43	A5	R216	B2	R342	B3		
Q44	C6	R217	B2	R343	D7		
Q45	C5	R218	B2	R344	B6		
R111	B7	R219	B1	R351	B1		
R113	B7	R220	A1	R352	B2		
R116	B7	R221	A1	R353	C2		
R117	B7	R222	A1	R357	C8		
R118	B7	R223	A1	R358	C8		
R119	B6	R224	A1	R359	C8		
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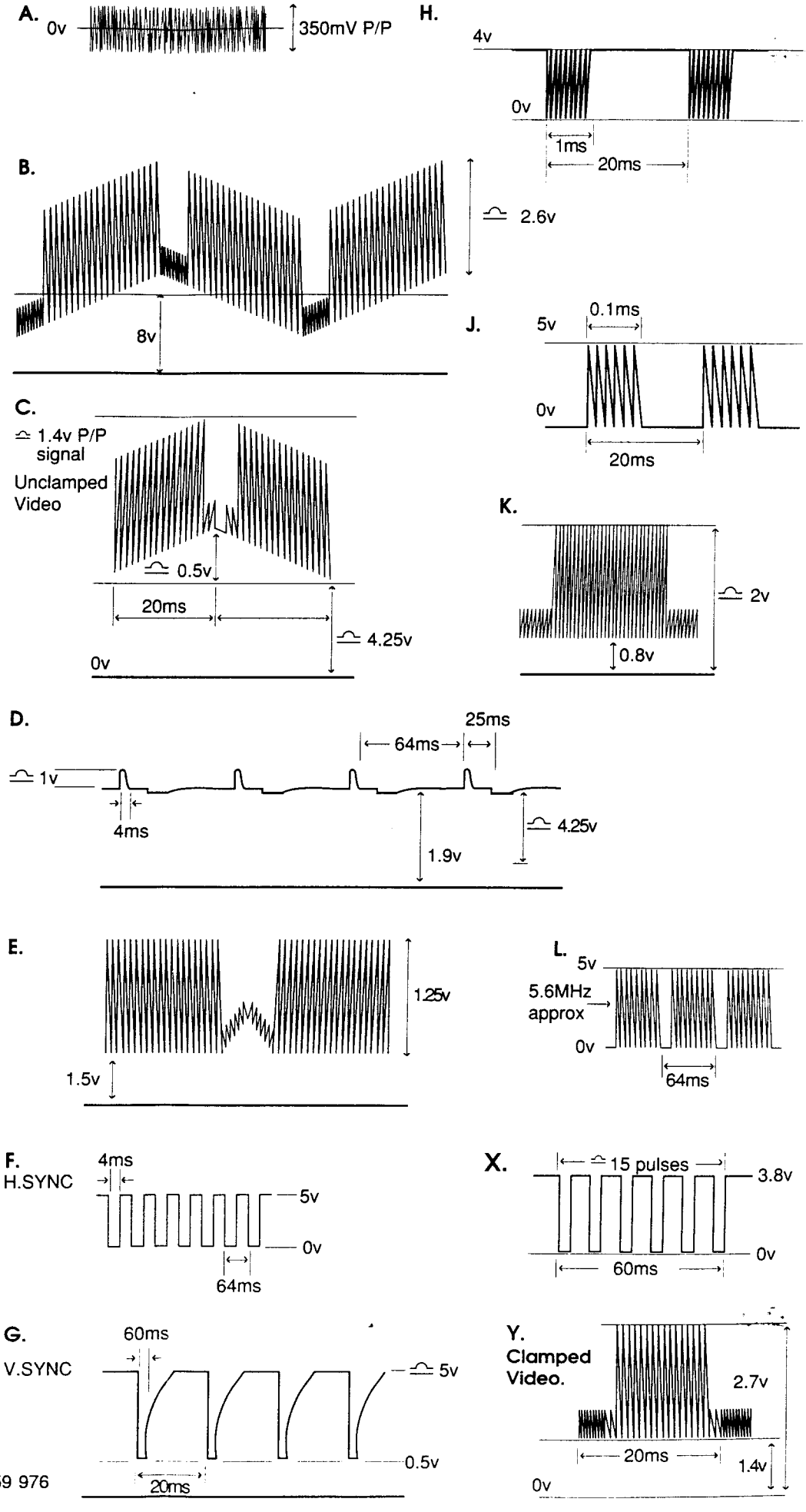
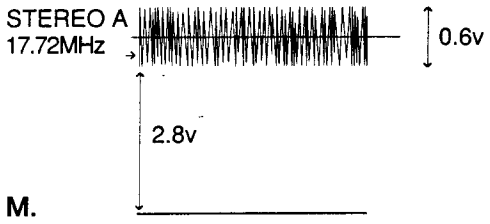
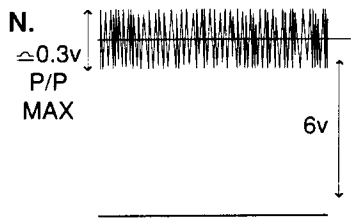
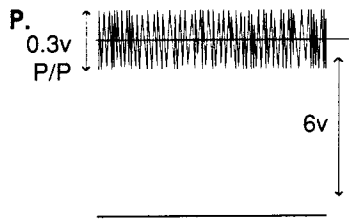
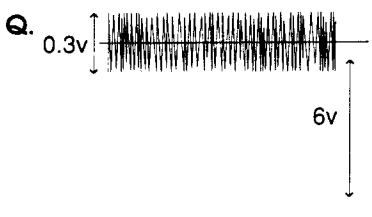
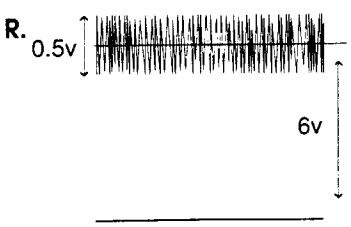


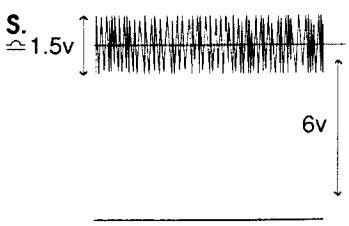

STEREO A
17.72MHz
0.6v
2.8v
M.

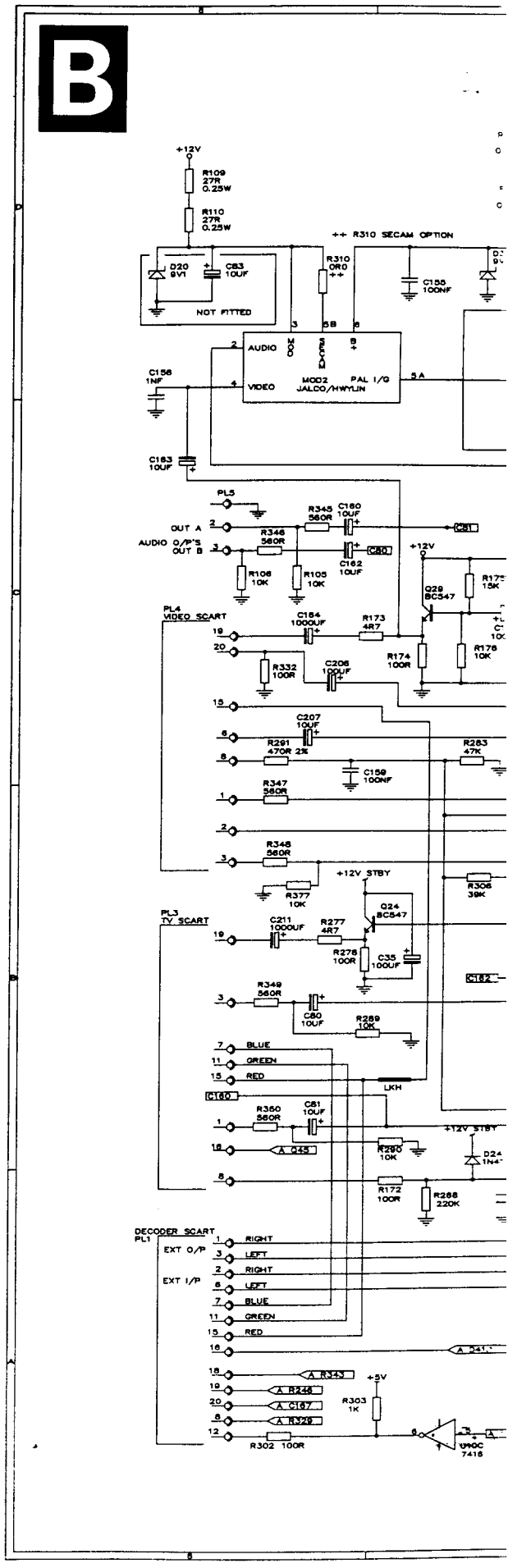

N.
≙0.3v
P/P
MAX
6v


P.
0.3v
P/P
6v

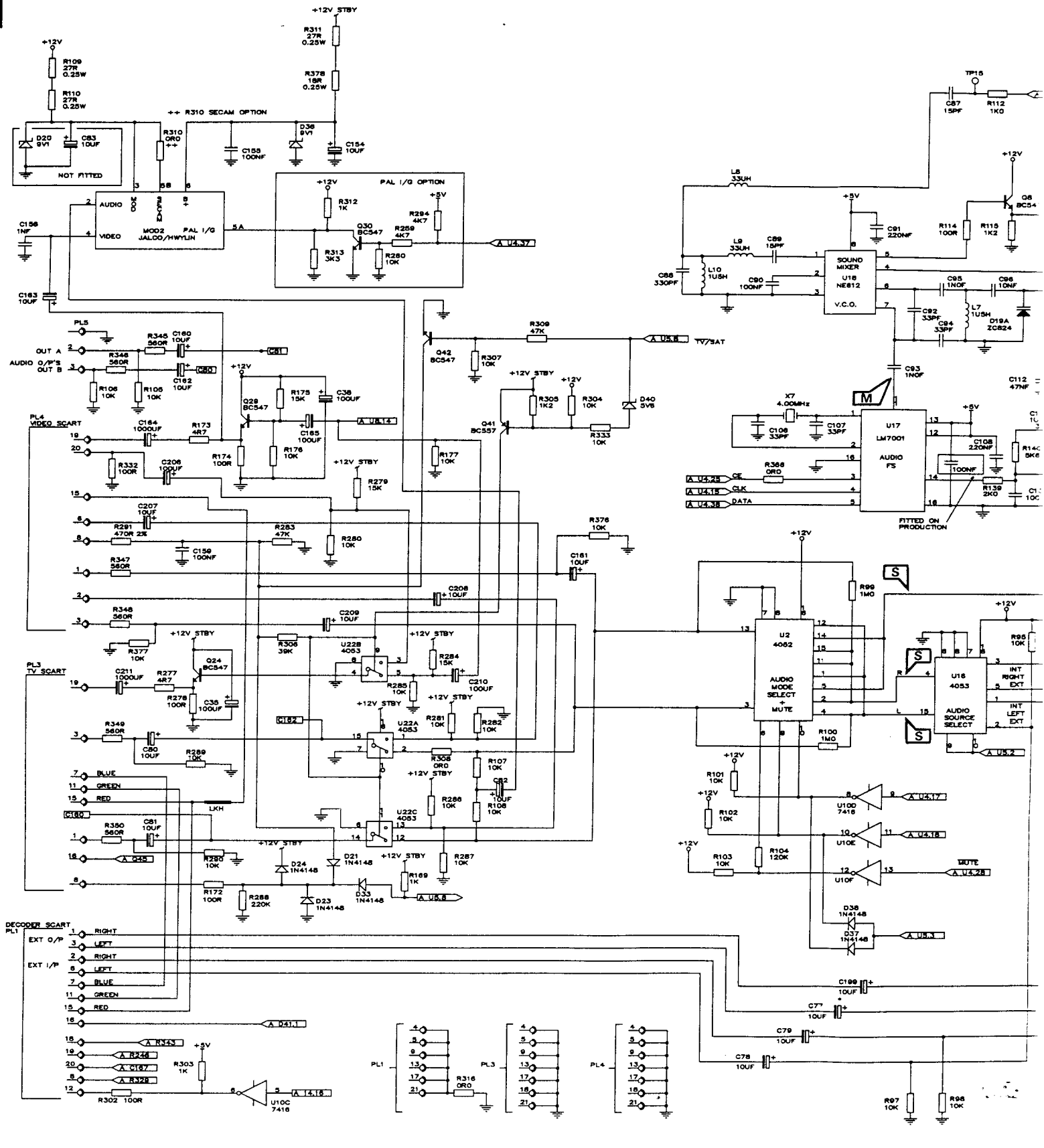

Q.
0.3v
6v

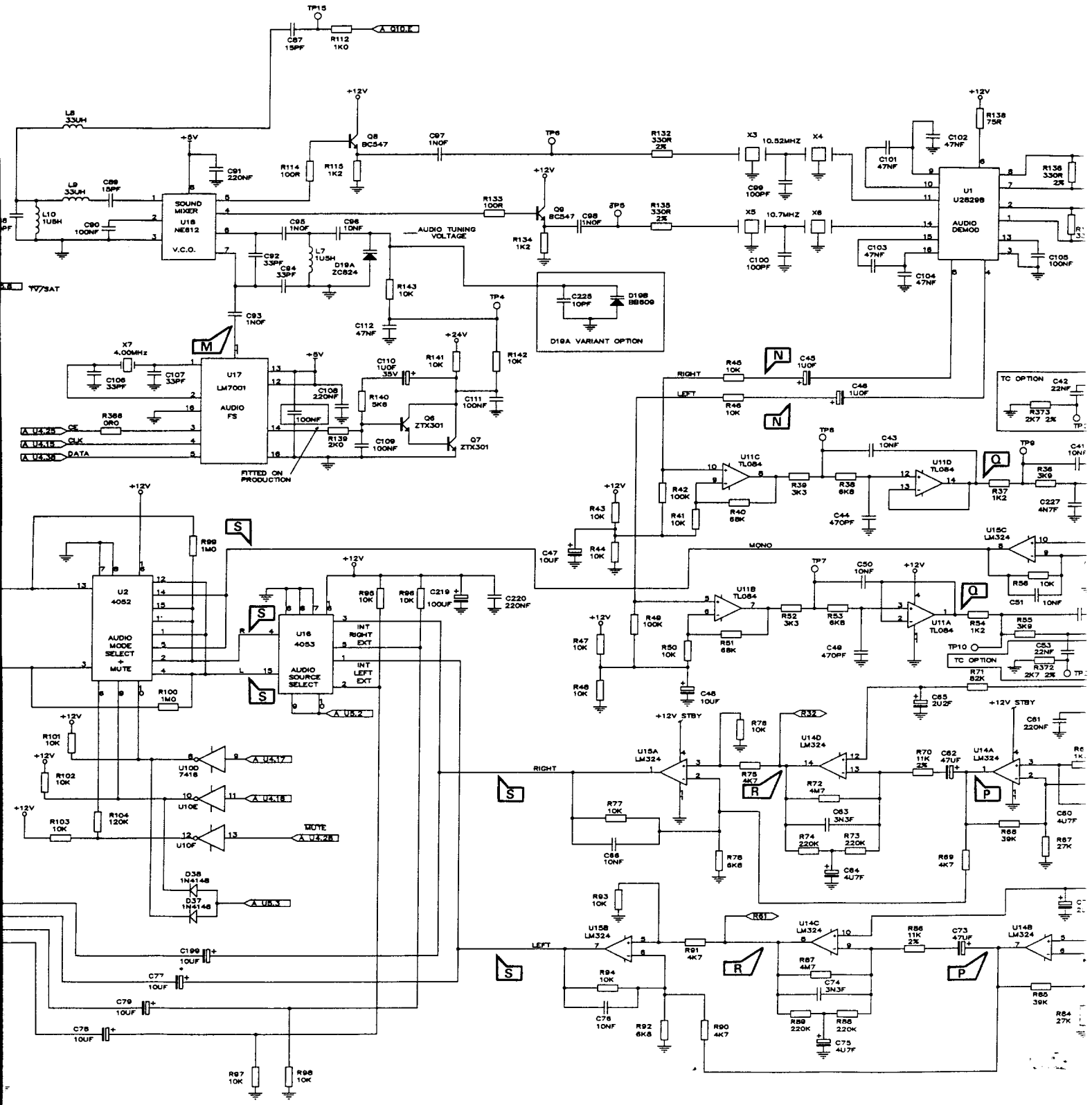

R.
0.5v
6v

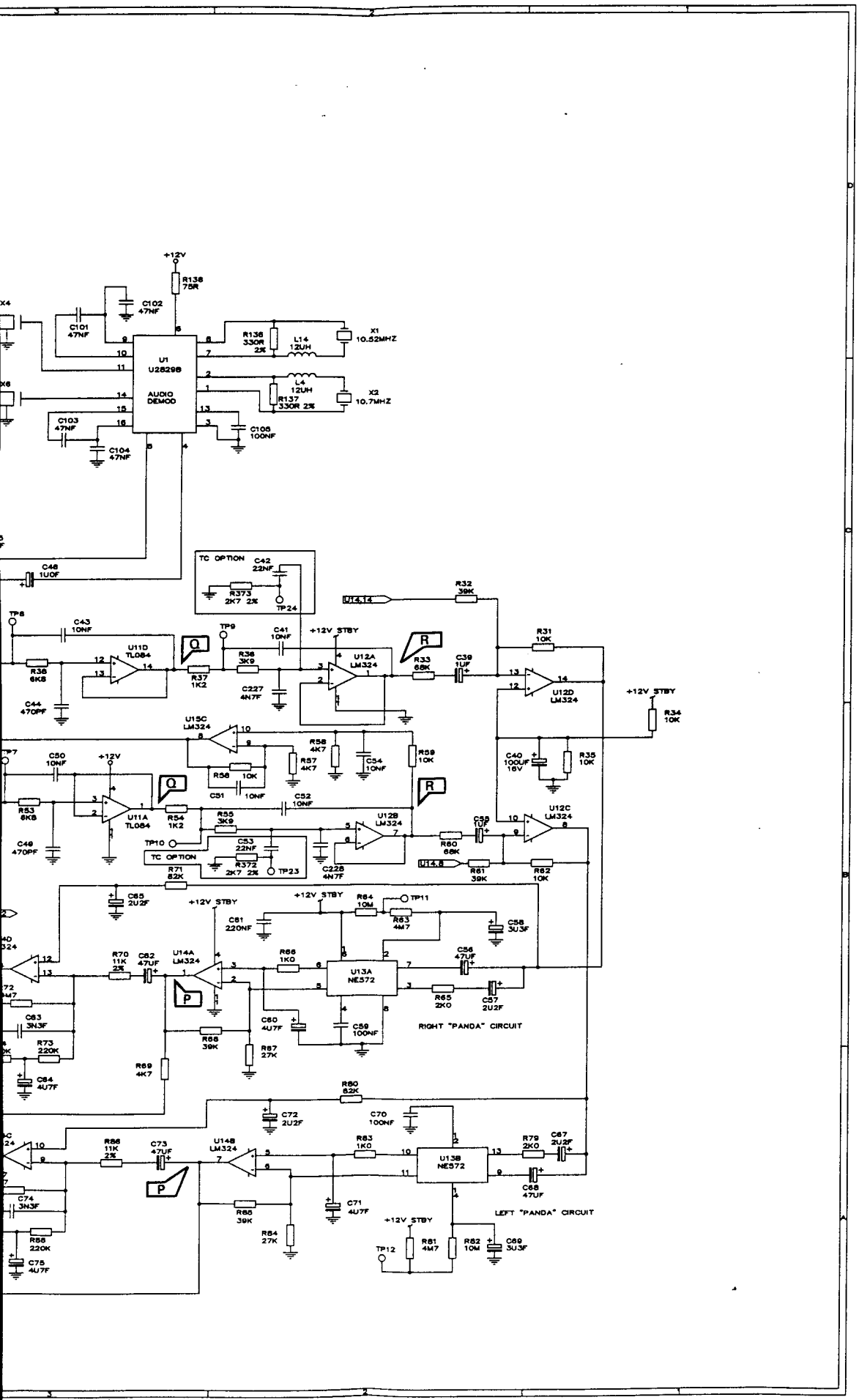

S.
≙1.5v
6v


B
+12V
R109 27R 0.25W
R110 27R 0.25W
++ R310 SECAM OPTION
D20 9V1
C83 10UF
NOT FITTED
R310 ORO ++
C155 100NF
AUDIO
VIDEO
MOD2 PAL I/G JALCO/HWYLIN
C156 1NF
C183 10UF
PL5
OUT A
AUDIO O/P'S
OUT B
R345 560R
R346 560R
C160 10UF
C162 10UF
C81
C80
R108 10K
R105 10K
Q29 BC547
PL4 VIDEO SCART
C184 1000UF
R173 4R7
R174 100R
R176 10K
R332 100R
C208 100UF
C207 10UF
R291 470R 2%
R283 47K
C159 100NF
R347 560R
R348 560R
+12V STBY
R377 10K
R306 39K
PL3 TV SCART
C211 1000UF
R277 4R7
Q24 BC547
R278 100R
C35 100UF
C162
R349 560R
C80 10UF
R289 10K
BLUE
GREEN
RED
LKH
C160
R350 560R
C81 10UF
R280 10K
D24 1N4
R172 100R
R288 220K
DECODER SCART PL1
EXT O/P
EXT I/P
RIGHT
LEFT
A R343
A R246
A C167
A R329
R303 1K
+5V
R302 100R

AUDIO PROCESSING AND SOURCE SELECTION




TP15
C87 15PF
R112 1K0
A Q10.E
L8 33UH
+12V
Q8 BC547
C97 1N0F
TP6
R132 330R 2%
X3 10.52MHZ X4
C99 100PF
C101 47NF
C102 47NF
R138 75R
+5V
C91 220NF
R114 100R
R115 1K2
L9 33UH
C89 15PF
L10 1U5H
C90 100NF
SOUND MIXER
U18 NE612
V.C.O.
R133 100R
Q9 BC547
C98 1N0F
TP5
R135 330R 2%
X5 10.7MHZ X6
C100 100PF
R134 1K2
U1 U28298
AUDIO DEMOD
R136 330R 2%
C103 47NF
C104 47NF
C105 100NF
C95 1N0F
C96 1N0NF
AUDIO TUNING VOLTAGE
C92 33PF
C94 33PF
L7 1U5H
D19A ZC824
R143 10K
C93 1N0F
C112 47NF
TP4
C228 10PF
D19B BB809
D19A VARIANT OPTION
X7 4.00MHz
C106 33PF
C107 33PF
U17 LM7001
AUDIO FS
+24V
C110 1U0F 35V
R141 10K
R142 10K
C108 220NF
100NF
R140 5K6
Q6 ZTX301
Q7 ZTX301
C111 100NF
R139 2K0
C109 100NF
R366 0R0
A U4.25 OE
A U4.15 CLK
A U4.36 DATA
FITTED ON PRODUCTION
M
N
RIGHT
LEFT
R45 10K
R46 10K
C45 1U0F
C46 1U0F
TC OPTION
C42 22NF
R373 2K7 2%
TP8
C43 10NF
U11C TL084
U11D TL084
R39 3K3
R38 6K8
R42 100K
R41 10K
R40 68K
C44 470PF
R37 1K2
C227 4N7F
TP9
R36 3K9
Q
S
R99 1M0
U2 4052
AUDIO MODE SELECT + MUTE
R100 1M0
U16 4053
AUDIO SOURCE SELECT
INT RIGHT EXT
INT LEFT EXT
A U5.2
R96 10K
R95 10K
C219 100UF
C220 220NF
R43 10K
R44 10K
C47 10UF
MONO
U11B TL084
U11A TL084
R49 100K
R50 10K
R51 68K
R52 3K3
R53 6K8
C49 470PF
R54 1K2
R55 3K9
C53 22NF
R372 2K7 2%
TP10
TC OPTION
R47 10K
R48 10K
C48 10UF
TP7
C50 10NF
R56 10K
C51 10NF
R71 82K
C65 2U2F
+12V STBY
C61 220NF
U15C LM324
U15A LM324
U14D LM324
U14A LM324
R76 10K
R75 4K7
R32
R72 4M7
C63 3N3F
R74 220K
R73 220K
C64 4U7F
R77 10K
C66 10NF
R78 6K8
R70 11K 2%
C62 47UF
R66 39K
R67 27K
R69 4K7
C60 4U7F
P
R
S
R100 1M0
R101 10K
R102 10K
R103 10K
R104 120K
U10D 7416
U10E
U10F
A U4.17
A U4.18
MUTE
A U4.28
D38 1N4148
D37 1N4148
A U5.3
C199 10UF
C77 10UF
C79 10UF
C78 10UF
R97 10K
R98 10K
R93 10K
U15B LM324
U14C LM324
U14B LM324
R91 4K7
R94 10K
C76 10NF
R92 6K8
R90 4K7
R87 4M7
C74 3N3F
R89 220K
R88 220K
C75 4U7F
R86 11K 2%
C73 47UF
R85 39K
R84 27K



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C38	C7	C165	C7	R67	A2
C39	C2	C199	A5	R68	B3
C40	B1	C206	C8	R69	A3
C41	C2	C207	C8	R70	B3
C42	C2	C208	B7	R71	B3
C43	C3	C209	B7	R72	B3
C44	C3	C210	B7	R73	A3
C45	C3	C211	B8	R74	A3
C46	C3	C219	B4	R75	B3
C47	B4	C220	B4	R76	B3
C48	B4	C225	C4	R77	B4
C49	B3	C227	C2	R78	A3
C50	B3	C228	B2	R79	A1
C51	B2	D19A	C5	R80	A2
C52	B2	D19B	C4	R81	A2
C53	B2	D21	B7	R82	A2
C54	B2	D23	A7	R83	A2
C55	B2	D24	B7	R84	A2
C56	B2	D33	A7	R85	A2
C57	B2	D36	D7	R86	A3
C58	B2	D37	A5	R87	A3
C59	B2	D38	A5	R88	A3
C60	B2	D40	C6	R89	A3
C61	B2	L4	C2	R90	A4
C62	B3	L7	C5	R91	A4
C63	B3	L8	D6	R92	A4
C64	A3	L9	C6	R93	A4
C65	B3	L10	C6	R94	A4
C66	A4	L14	D2	R95	B5
C67	A1	LKH	B7	R96	B4
C68	A1	MOD2	D8	R97	A5
C69	A2	PL1	A8, A7	R98	A5
C70	A2	PL3	A6, B8	R99	B5
C71	A2	PL4	A6, C8	R100	B5
C72	A2	PL5	C8	R101	B6
C73	A3	Q6	C5	R102	B6
C74	A3	Q7	C4	R103	B6
C75	A3	Q8	D5	R104	B6
C76	A4	Q9	C4	R105	C8
C77	A5	Q24	B8	R106	C8
C78	A6	Q29	C7	R107	B7
C79	A5	Q30	D7	R108	B7
C80	B8	Q41	C6	R109	D8
C81	B8	Q42	C7	R110	D8
C82	B6	R31	C1	R112	D5
C87	D5	R32	C2	R114	D5
C88	C6	R33	C2	R115	D5
C89	C6	R34	B1	R132	D4
C90	C6	R35	B1	R133	C4
C91	D5	R36	C2	R134	C4
C92	C5	R37	C3	R135	C4
C93	C5	R38	C3	R136	D2
C94	C5	R39	C3	R137	C2
C95	C5	R40	C3	R138	D3
C96	C5	R41	B4	R139	C5
C97	D4	R42	C4	R140	C5
C98	C4	R43	C4	R141	C4
C99	D3	R44	B4	R142	C4
C100	C3	R45	C3	R143	C5
C101	D3	R46	C3	R169	A7
C102	D3	R47	B4	R172	A7
C103	C3	R48	B4	R173	C8
C104	C3	R49	B4	R174	C7
C105	C2	R50	B4	R175	C7
C106	C6	R51	B3	R176	C7
C107	C5	R52	B3	R177	C7
C108	C5	R53	B3	R259	D7
C109	C5	R54	B3	R260	C7
C110	C5	R55	B2	R277	B8
C111	C4	R56	B2	R278	B8
C112	C5	R57	B2	R279	C7
C154	D7	R58	B2	R280	C7
C155	D7	R59	B2	R281	B7
C156	D8	R60	B2	R282	B7
C159	C8	R61	B2	R283	C7
C160	C8	R62	B1	R284	B7
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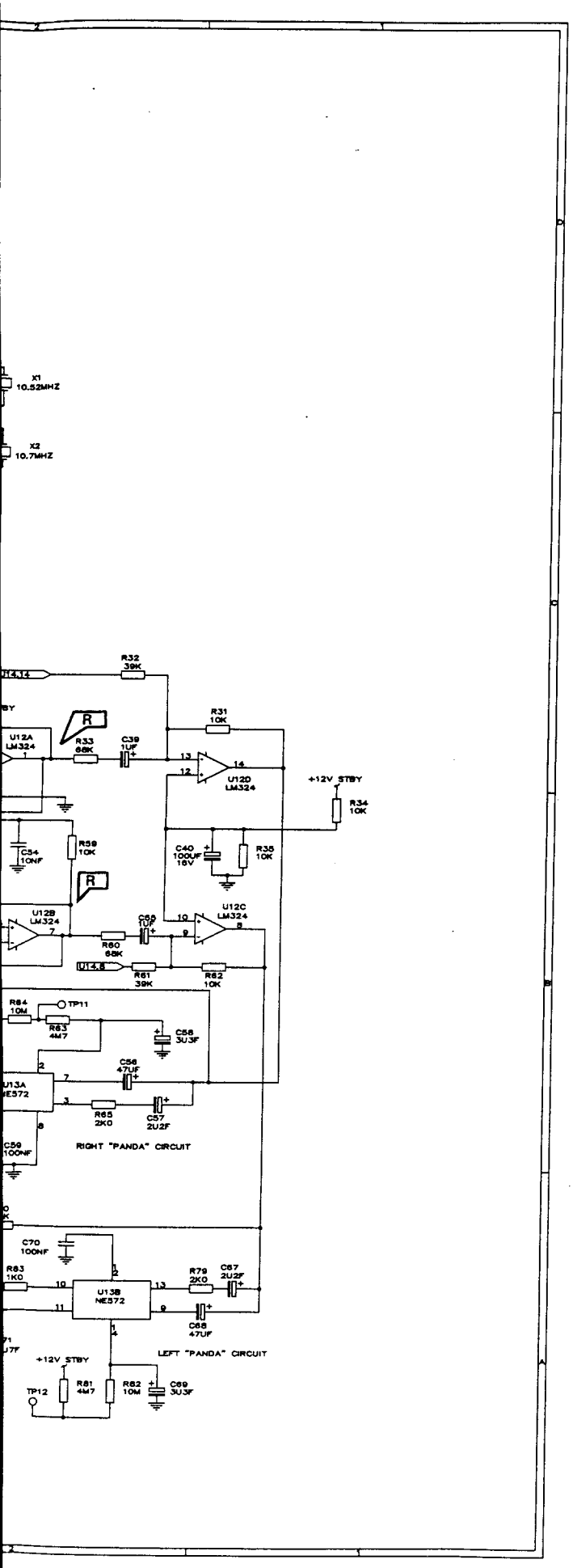

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C38	C7	C165	C7	R67	A2	R289	B8
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C40	B1	C206	C8	R69	A3	R291	C8
C41	C2	C207	C8	R70	B3	R294	D7
C42	C2	C208	B7	R71	B3	R302	A8
C43	C3	C209	B7	R72	B3	R303	A7
C44	C3	C210	B7	R73	A3	R304	C6
C45	C3	C211	B8	R74	A3	R305	C8
C46	C3	C219	B4	R75	B3	R306	B7
C47	B4	C220	B4	R76	B3	R307	C7
C48	B4	C225	C4	R77	B4	R308	B7
C49	B3	C227	C2	R78	A3	R309	C6
C50	B3	C228	B2	R79	A1	R310	D8
C51	B2	D19A	C5	R80	A2	R311	D7
C52	B2	D19B	C4	R81	A2	R312	D7
C53	B2	D21	B7	R82	A2	R313	C7
C54	B2	D23	A7	R83	A2	R316	A7
C55	B2	D24	B7	R84	A2	R332	C8
C56	B2	D33	A7	R85	A2	R333	C6
C57	B2	D36	D7	R86	A3	R345	C8
C58	B2	D37	A5	R87	A3	R346	C8
C59	B2	D38	A5	R88	A3	R347	B8
C60	B2	D40	C6	R89	A3	R348	B8
C61	B2	L4	C2	R90	A4	R349	B8
C62	B3	L7	C5	R91	A4	R350	B8
C63	B3	L8	D6	R92	A4	R366	C6
C64	A3	L9	C6	R93	A4	R372	B2
C65	B3	L10	C6	R94	A4	R373	C2
C66	A4	L14	D2	R95	B5	R376	C6
C67	A1	LKH	B7	R96	B4	R377	B8
C68	A1	MOD2	D8	R97	A5	R378	D7
C69	A2	PL1	A8, A7	R98	A5	U1	C3
C70	A2	PL3	A6, B8	R99	B5	U2	B5
C71	A2	PL4	A6, C8	R100	B5	U10C	A7
C72	A2	PL5	C8	R101	B6	U10D	B5
C73	A3	Q6	C5	R102	B6	U10E	B5
C74	A3	Q7	C4	R103	B6	U10F	B5
C75	A3	Q8	D5	R104	B6	U11A	B3
C76	A4	Q9	C4	R105	C8	U11B	B3
C77	A5	Q24	B8	R106	C8	U11C	C3
C78	A6	Q29	C7	R107	B7	U11D	C3
C79	A5	Q30	D7	R108	B7	U12A	C2
C80	B8	Q41	C6	R109	D8	U12B	B2
C81	B8	Q42	C7	R110	D8	U12C	B1
C82	B6	R31	C1	R112	D5	U12D	C1
C87	D5	R32	C2	R114	D5	U13A	B2
C88	C6	R33	C2	R115	D5	U13B	A2
C89	C6	R34	B1	R132	D4	U14A	B3
C90	C6	R35	B1	R133	C4	U14B	A2
C91	D5	R36	C2	R134	C4	U14C	A3
C92	C5	R37	C3	R135	C4	U14D	B3
C93	C5	R38	C3	R136	D2	U15A	B4
C94	C5	R39	C3	R137	C2	U15B	A4
C95	C5	R40	C3	R138	D3	U15C	B2
C96	C5	R41	B4	R139	C5	U16	B5
C97	D4	R42	C4	R140	C5	U17	C5
C98	C4	R43	C4	R141	C4	U18	C5
C99	D3	R44	B4	R142	C4	U22A	B7
C100	C3	R45	C3	R143	C5	U22B	B7
C101	D3	R46	C3	R169	A7	U22C	B7
C102	D3	R47	B4	R172	A7	X1	D2
C103	C3	R48	B4	R173	C8	X2	C2
C104	C3	R49	B4	R174	C7	X3	D3
C105	C2	R50	B4	R175	C7	X4	D3
C106	C6	R51	B3	R176	C7	X5	C3
C107	C5	R52	B3	R177	C7	X6	C3
C108	C5	R53	B3	R259	D7	X7	C5
C109	C5	R54	B3	R260	C7		
C110	C5	R55	B2	R277	B8		
C111	C4	R56	B2	R278	B8		
C112	C5	R57	B2	R279	C7		
C154	D7	R58	B2	R280	C7		
C155	D7	R59	B2	R281	B7		
C156	D8	R60	B2	R282	B7		
C159	C8	R61	B2	R283	C7		
C160	C8	R62	B1	R284	B7		
C161	B6	R63	B2	R285	B7		
C162	C8	R64	B2	R286	B7		
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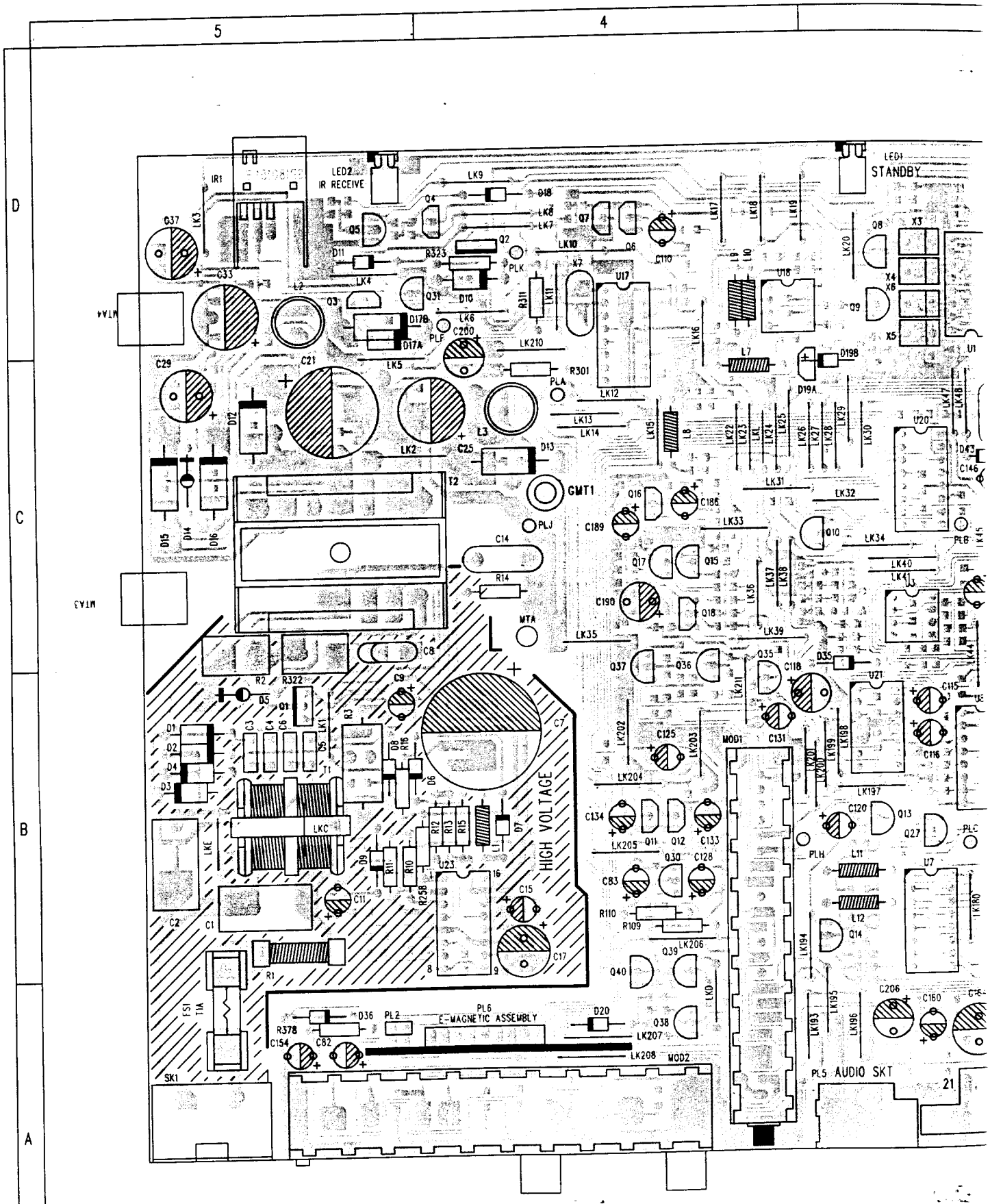
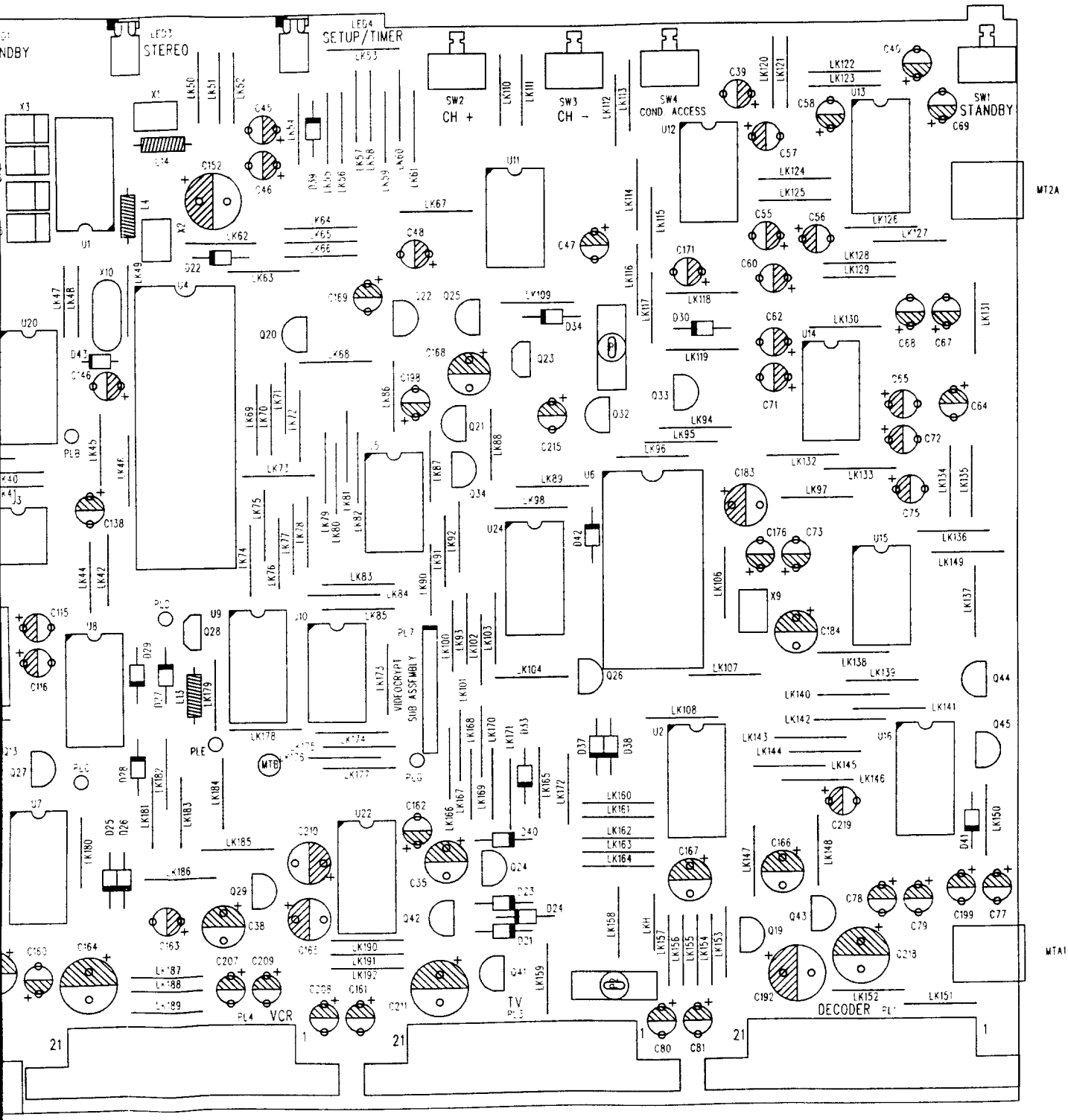
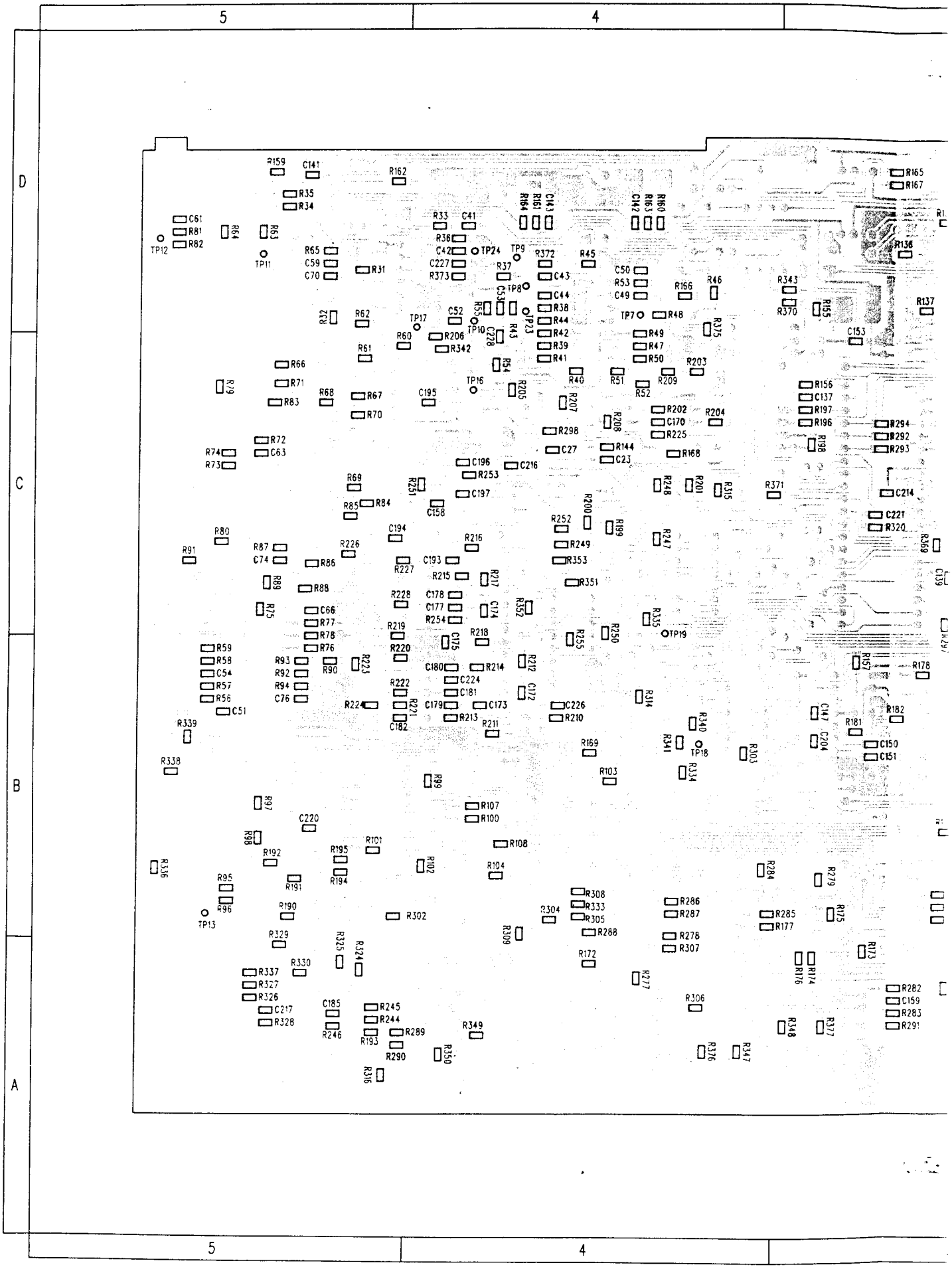
MAIN BOARD - Component Side

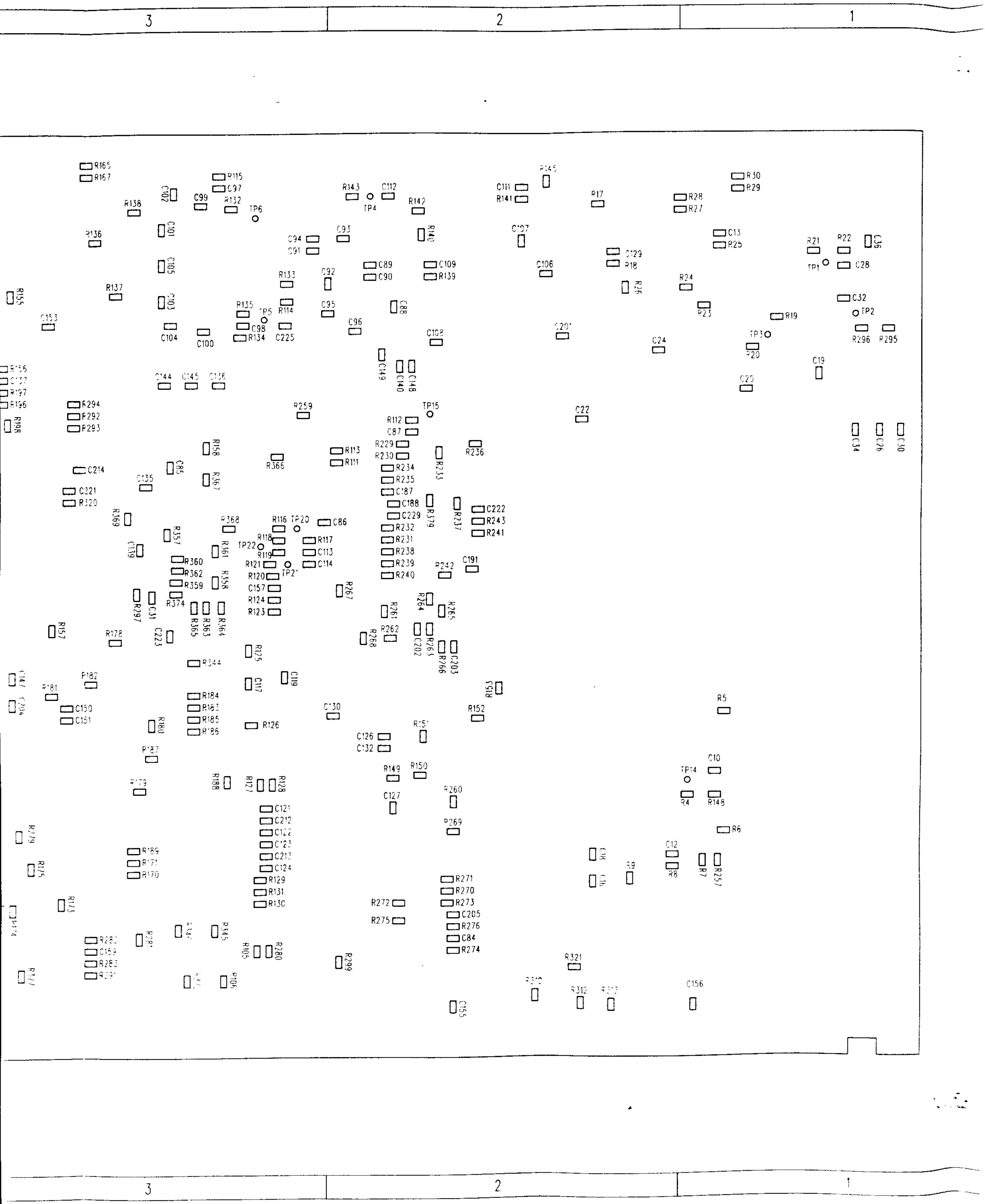



3
2
1
LED4
SETUP/TIMER
LED3
STEREO
SW2
CH +
SW3
CH -
SW4
COND. ACCESS
SW1
STANDBY
MT2A
MTA1
VCR
TV
DECODER
VIDEOCRYPT
SUB ASSEMBLY
21
1

C1	B5	C198	C2	PL2	A5	U5	C2
C2	B5	C199	B1	PL3	A2	U6	C2
C3	B5	C200	D4	PL4	A3	U7	B3
C4	B5	C206	A3	PL5	A3	U8	B3
C5	B5	C207	A3	PL6	A4	U9	B3
C6	B5	C208	A2	PL7	B2	U10	B2
C7	B4	C209	A3	Q1	B5	U11	D2
C8	C5	C210	B3	Q2	D4	U12	D2
C9	B5	C211	A2	Q3	D5	U13	D1
C11	B5	C215	C2	Q4	D4	U14	C1
C14	C4	C218	A1	Q5	D5	U15	B1
C15	B4	C219	B1	Q6	D4	U16	B1
C17	B4	D1	B5	Q7	D4	U17	D4
C21	C5	D2	B5	Q8	D3	U18	D4
C25	C4	D3	B5	Q9	D3	U20	C3
C29	C5	D4	B5	Q10	C3	U21	B3
C33	D5	D5	B5	Q11	B4	U22	B2
C35	B2	D6	B5	Q12	B4	U23	B4
C37	D5	D7	B4	Q13	B3	U24	C2
C38	A3	D8	B5	Q14	B3	X1	D3
C39	D1	D9	B5	Q15	C4	X2	D3
C40	D1	D10	D4	Q16	C4	X3	D3
C45	D3	D11	D5	Q17	C4	X4	D3
C46	D3	D12	C5	Q18	C4	X5	D3
C47	C2	D13	C4	Q19	A1	X6	D3
C48	C2	D14	C5	Q20	C3	X7	D4
C55	C1	D15	C5	Q21	C2	X9	B1
C56	C1	D16	C5	Q22	C2	X10	C3
C57	D1	D17A	D5	Q23	C2		
C58	D1	D17B	D5	Q24	B2		
C60	C1	D18	D4	Q25	C2		
C62	C1	D19A	C3	Q26	B2		
C64	C1	D19B	C3	Q27	B3		
C65	C1	D20	A4	Q28	B3		
C67	C1	D21	A2	Q29	B3		
C68	C1	D22	C3	Q30	B4		
C69	D1	D23	B2	Q31	D5		
C71	C1	D24	A2	Q32	C2		
C72	C1	D25	B3	Q33	C2		
C73	C1	D26	B3	Q34	C2		
C75	C1	D27	B3	Q35	B4		
C77	B1	D28	B3	Q36	B4		
C78	B1	D29	B3	Q37	B4		
C79	B1	D30	C2	Q38	A4		
C80	A2	D33	B2	Q39	B4		
C81	A2	D34	C2	Q40	B4		
C82	A5	D35	B3	Q41	A2		
C83	B4	D36	A5	Q42	A2		
C110	D4	D37	B2	Q43	A1		
C115	B3	D38	B2	Q44	B1		
C116	B3	D39	D2	Q45	B1		
C118	B4	D40	B2	R1	B5		
C120	B3	D41	B1	R2	C5		
C125	B4	D42	C2	R3	B5		
C128	B4	D43	C3	R10	B5		
C131	B4	FS1	A5	R11	B5		
C133	B4	GMT	C4	R12	B4		
C134	B4	IR1	D5	R13	B4		
C138	C3	L1	B4	R14	C4		
C146	C3	L2	D5	R15	B4		
C152	D3	L3	C4	R16	B5		
C154	A5	L4	D3	R109	B4		
C160	A3	L7	C4	R110	B4		
C161	A2	L8	C4	R258	B5		
C162	B2	L9	D4	R301	C4		
C163	A3	L10	D4	R311	D4		
C164	A3	L11	B3	R322	C5		
C165	A3	L12	B3	R323	D4		
C166	B1	L13	B3	R378	A5		
C167	B2	L14	D3	SK1	A5		
C168	C2	LED1	D3	SW1	D1		
C169	C2	LED2	D5	SW2	D2		
C171	C2	LED3	D3	SW3	D2		
C176	C1	LED4	D3	SW4	D2		
C183	C1	LKC	B5	T1A	A5		
C184	B1	LKD	A4	T2	C5		
C186	C4	LKE	B5	U1	D3		
C189	C4	LKH	A2	U2	B2		
C190	C4	MOD1	B4	U3	C3		
C192	A1	MOD2	A4	U4	C3		

MAIN BOARD - Copper Side




3
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R165
R167
R115
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C99
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R138
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R143
C112
TP4
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C111
R141
R145
R17
R28
R27
R30
R29
R136
C101
C94
C91
C93
R140
C107
C13
R25
C129
R18
R21
R22
C36
TP1
C28
C105
C89
C90
C109
R139
C106
R133
C92
R24
R26
R155
R137
C103
R135
TP5
R114
C95
C88
C32
R23
R19
TP2
C153
C98
R134
C225
C96
C108
C201
C24
TP3
R20
R296
R295
C104
C100
C149
C140
C148
C19
C144
C145
C136
C23
R294
R292
R293
R259
TP15
R112
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C22
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R158
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R111
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R233
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R235
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R237
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R241
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R368
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R357
R118
R232
TP22
R117
R231
C139
R161
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C113
R238
R360
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C114
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R242
C191
R362
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TP21
R240
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R264
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R297
C31
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R364
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R257
R9
R175
R189
R171
R170
R271
R270
R273
R272
R275
C205
R276
C84
R274
R173
R345
R105
R280
R299
R321
C156
R312
R106
C155
3
2
1

D

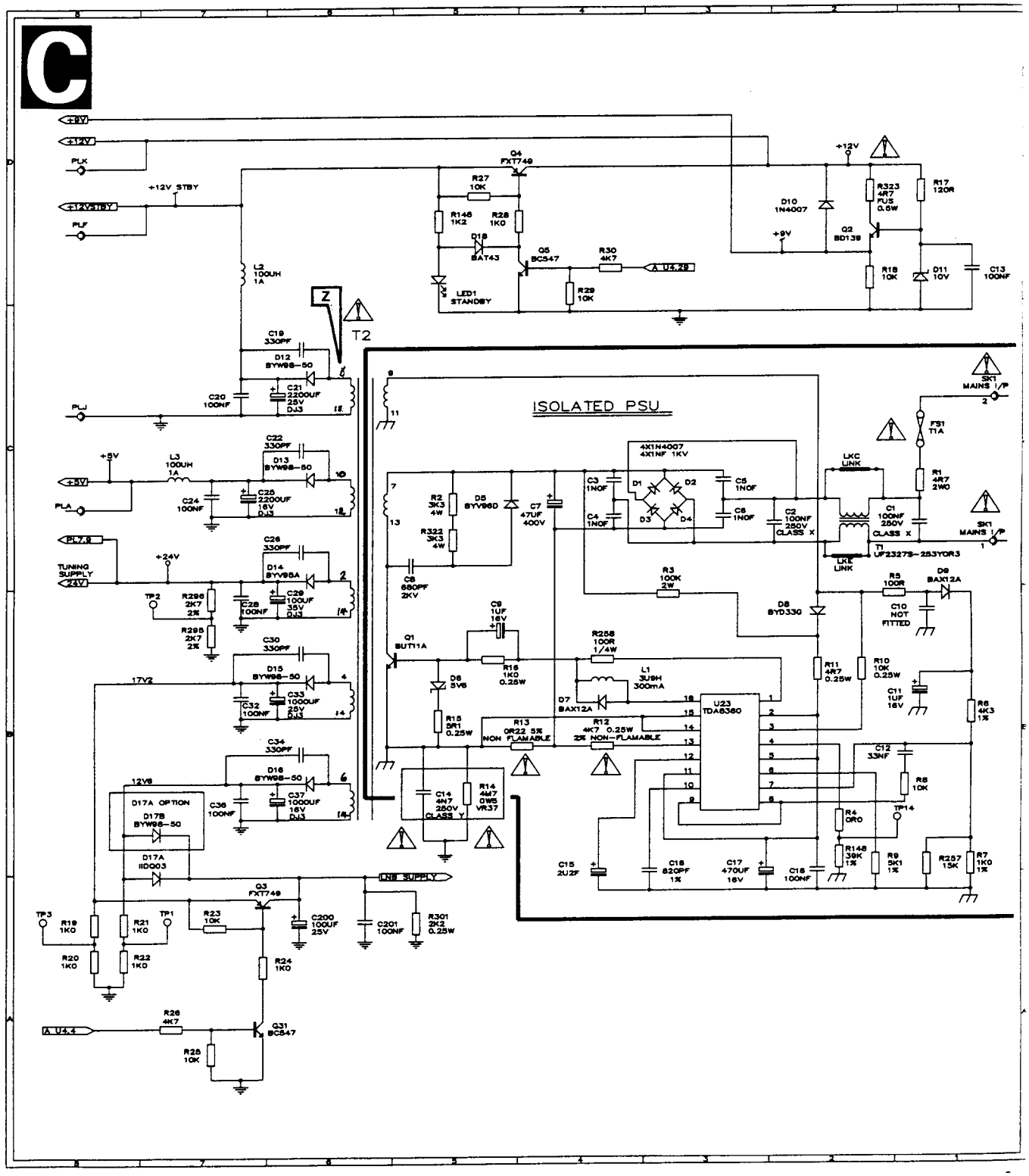
C

B

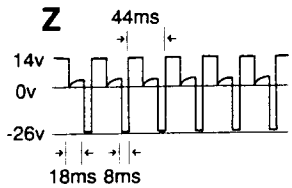
A

C10	B1	C140	C2	R34	D5	R116	C3	R200	C4	R282	A3	R373	D4		
C12	B2	C141	D5	R35	D5	R117	C3	R201	C4	R283	A3	R374	C3		
C13	D1	C142	D4	R36	D4	R118	C3	R202	C4	R284	B4	R375	D4		
C16	B2	C143	D4	R37	D4	R119	C3	R203	C4	R285	B4	R376	A4		
C18	B2	C144	C3	R38	D4	R120	C3	R204	C4	R286	B4	R377	A3		
C19	C1	C145	C3	R39	C4	R121	C3	R205	C4	R287	B4	R379	C2		
C20	C1	C147	B3	R40	C4	R123	B3	R206	C4	R288	B4	T15	C2		
C22	C2	C148	C2	R41	C4	R124	C3	R207	C4	R289	A5	TP1	D1		
C23	C4	C149	C2	R42	D4	R125	B3	R208	C4	R290	A5	TP2	D1		
C24	C2	C150	B3	R43	D4	R126	B3	R209	C4	R291	A3	TP3	C1		
C26	C1	C151	B3	R44	D4	R127	B3	R210	B4	R292	C3	TP4	D2		
C27	C4	C153	C3	R45	D4	R128	B3	R211	B4	R293	C3	TP5	D3		
C28	D1	C155	A2	R46	D4	R129	B3	R212	B4	R294	C3	TP6	D3		
C30	C1	C156	A1	R47	C4	R130	A3	R213	B4	R295	C1	TP7	D4		
C31	C3	C157	C3	R48	D4	R131	B3	R214	B4	R296	C1	TP8	D4		
C32	D1	C158	C4	R49	D4	R132	D3	R215	C4	R297	C3	TP9	D4		
C34	C1	C159	A3	R50	C4	R133	D3	R216	C4	R298	C4	TP10	D4		
C36	D1	C170	C4	R51	C4	R134	C3	R217	C4	R299	A2	TP11	D5		
C41	D4	C172	B4	R52	C4	R135	D3	R218	B4	R302	B5	TP12	D5		
C42	D4	C173	B4	R53	D4	R136	D3	R219	B5	R303	B4	TP13	B5		
C43	D4	C174	C4	R54	C4	R137	D3	R220	B5	R304	B4	TP14	B1		
C44	D4	C175	B4	R55	D4	R138	D3	R221	B5	R305	B4	TP16	C4		
C49	D4	C177	C4	R56	B5	R139	D2	R222	B5	R306	A4	TP17	D4		
C50	D4	C178	C4	R57	B5	R140	D2	R223	B5	R307	A4	TP18	B4		
C51	B5	C179	B4	R58	B5	R141	D2	R224	B5	R308	B4	TP19	B4		
C52	D4	C180	B4	R59	B5	R142	D2	R225	C4	R309	B4	TP20	C3		
C53	D4	C181	B4	R60	C5	R143	D2	R226	C5	R310	A2	TP21	C3		
C54	B5	C182	B5	R61	C5	R144	C4	R227	C5	R312	A2	TP22	C3		
C59	D5	C185	A5	R62	D5	R145	D2	R228	C5	R313	A2	TP23	D4		
C61	D5	C187	C2	R63	D5	R148	B1	R229	C2	R314	B4	TP24	D4		
C63	C5	C188	C2	R64	D5	R149	B2	R230	C2	R315	C4				
C66	C5	C191	C2	R65	D5	R150	B2	R231	C2	R316	A5				
C70	D5	C193	C4	R66	C5	R151	B2	R232	C2	R320	C3				
C74	C5	C194	C5	R67	C5	R152	B2	R233	C2	R321	A2				
C76	B5	C195	C4	R68	C5	R153	B2	R234	C2	R324	A5				
C84	A2	C196	C4	R69	C5	R155	D3	R235	C2	R325	A5				
C85	C3	C197	C4	R70	C5	R156	C3	R236	C2	R326	A5				
C86	C3	C201	C2	R71	C5	R157	B3	R237	C2	R327	A5				
C87	C2	C202	B2	R72	C5	R158	C3	R238	C2	R328	A5				
C88	D2	C203	B2	R73	C5	R159	D5	R239	C2	R329	A5				
C89	D2	C204	B3	R74	C5	R160	D4	R240	C2	R330	A5				
C90	D2	C205	A2	R75	C5	R161	D4	R241	C2	R332	A3				
C91	D3	C212	B3	R76	B5	R162	D5	R242	C2	R333	B4				
C92	D3	C213	B3	R77	C5	R163	D4	R243	C2	R334	B4				
C93	D2	C214	C3	R78	B5	R164	D4	R244	A5	R335	C4				
C94	D3	C216	C4	R79	C5	R165	D3	R245	A5	R336	B5				
C95	D3	C217	A5	R80	C5	R166	D4	R246	A5	R337	A5				
C96	C2	C220	B5	R81	D5	R167	D3	R247	C4	R338	B5				
C97	D3	C221	C3	R82	D5	R168	C4	R248	C4	R339	B5				
C98	C3	C222	C2	R83	C5	R169	B4	R249	C4	R340	B4				
C99	D3	C223	B3	R84	C5	R170	B3	R250	C4	R341	B4				
C100	C3	C224	B4	R85	C5	R171	B3	R251	C4	R342	C4				
C101	D3	C225	C3	R86	C5	R172	A4	R252	C4	R343	C2				
C102	D3	C226	B4	R87	C5	R173	A3	R253	C4	R344	B3				
C103	D3	C227	D4	R88	C5	R174	A3	R254	C4	R345	A3				
C104	C3	C228	C4	R89	C5	R175	B3	R255	B4	R346	A3				
C105	D3	C229	C2	R90	B5	R176	A3	R257	B1	R347	A4				
C106	D2	R4	B1	R91	C5	R177	B4	R259	C3	R348	A3				
C107	D2	R5	B1	R92	B5	R178	B3	R260	B2	R349	A4				
C108	C2	R6	B1	R93	B5	R179	B3	R261	B2	R350	A4				
C109	D2	R7	B1	R94	B5	R180	B3	R262	B2	R351	C4				
C111	D2	R8	B2	R95	B5	R181	B3	R263	B2	R352	C4				
C112	D2	R9	B2	R96	B5	R182	B3	R264	C2	R353	C4				
C113	C3	R17	D2	R97	B5	R183	B3	R265	B2	R357	C3				
C114	C3	R18	D2	R98	B5	R184	B3	R266	B2	R358	C3				
C117	B3	R19	D1	R99	B4	R185	B3	R267	C2	R359	C3				
C119	B3	R20	C1	R100	B4	R186	B3	R268	B2	R360	C3				
C121	B3	R21	D1	R101	B5	R187	B3	R269	B2	R361	C3				
C122	B3	R22	D1	R102	B4	R188	B3	R270	A2	R362	C3				
C123	B3	R23	D1	R103	B4	R189	B3	R271	B2	R363	B3				
C124	B3	R24	D1	R104	B4	R190	B5	R272	A2	R364	B3				
C126	B2	R25	D1	R105	A3	R191	B5	R273	A2	R365	B3				
C127	B2	R26	D2	R106	A3	R192	B5	R274	A2	R366	C3				
C129	D2	R27	D1	R107	B4	R193	A5	R275	A2	R367	C3				
C130	B2	R28	D1	R108	B4	R194	B5	R276	A2	R368	C3				
C132	B2	R29	D1	R111	C2	R195	B5	R277	A4	R369	C3				
C135	C3	R30	D1	R112	C2	R196	C3	R278	B4	R370	D3				
C136	C3	R31	D5	R113	C2	R197	C3	R279	B3	R371	C4				
C137	C3	R32	D5	R114	D3	R198	C3	R280	A3	R372	D4				
C139	C3	R33	D4	R115	D3	R199	C4	R281	A3	R373	D4				

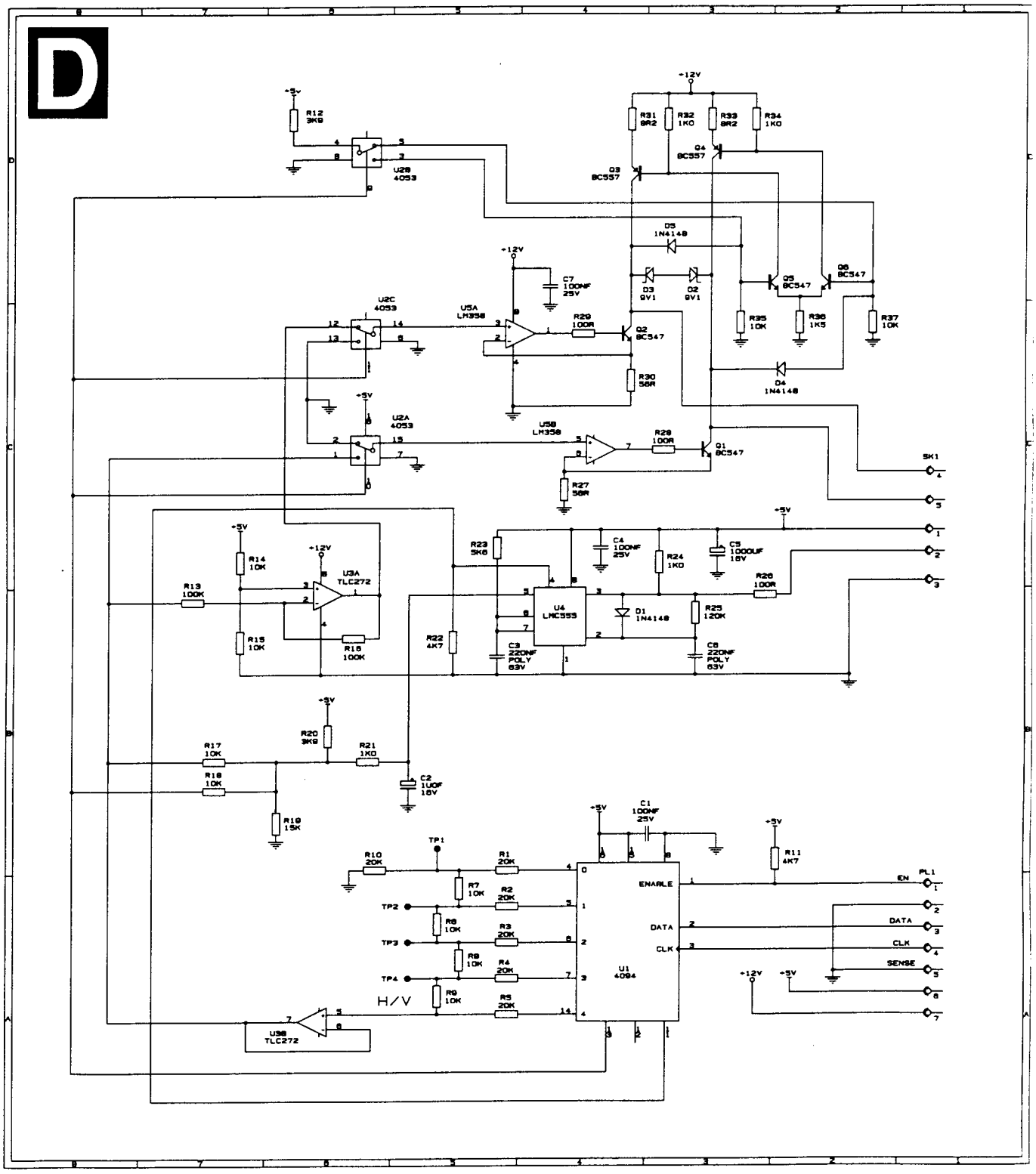
POWER SUPPLY



C1	C1	Q1	B5
C2	C2	Q2	D2
C3	C4	Q3	A7
C4	C4	Q4	D5
C5	C3	Q5	D4
C6	C3	Q31	A7
C7	C4	R1	C1
C8	C5	R2	C5
C9	B5	R3	B3
C11	B1	R4	B2
C12	B1	R5	B1
C13	D1	R6	B1
C14	B5	R7	B1
C15	B4	R8	B1
C16	B3	R9	B2
C17	B3	R10	B2
C18	B2	R11	B2
C19	C6	R12	B4
C20	C7	R13	B4
C21	C6	R14	B5
C22	C6	R15	B5
C24	C7	R16	B5
C25	C7	R17	D1
C26	C6	R18	D2
C28	B7	R19	A8
C29	B6	R20	A8
C30	B6	R21	A8
C32	B7	R22	A8
C33	B6	R23	A7
C34	B6	R24	A7
C36	B7	R25	A7
C37	B6	R26	A7
C200	A6	R27	D5
C201	A6	R28	D5
D1	C3	R29	D4
D2	C3	R30	D4
D3	C3	R145	D5
D4	C3	R148	B2
D5	C5	R257	B1
D6	B5	R258	B4
D7	B4	R295	B7
D8	B2	R296	B7
D9	B1	R301	A5
D10	D2	R322	C5
D11	D1	R323	D2
D12	C6	SK1	C1
D13	C6	T1	C2
D14	C6	T2	C6
D15	B6	U23	B3
D16	B6		
D17A	B7		
D17B	B7		
D18	D5		
FS1	C1		
L1	B4		
L2	D7		
L3	C7		
LED1	D5		
LKC	C2		
LKE	C2		

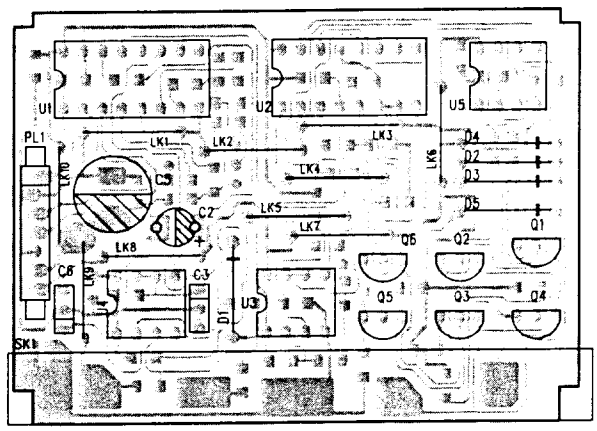


POLARIZER CONTROL (version /01 /02 /19 only)

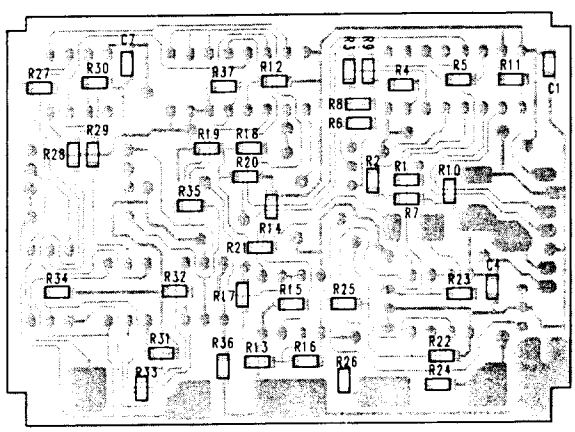


C1	B3
C2	B5
C3	B5
C4	C4
C5	C3
C6	B3
C7	D4
D1	B4
D2	D3
D3	D3
D4	C2
D5	D3
PL1	A1
Q1	C3
Q2	C4
Q3	D4
Q4	D3
Q5	D2
Q6	D2
R1	B5
R2	A5
R3	A5
R4	A5
R5	A5
R6	A5
R7	A5
R8	A5
R9	A5
R10	B6
R11	B2
R12	D6
R13	B7
R14	C7
R15	B7
R16	B6
R17	B7
R18	B7
R19	B6
R20	B6
R21	B6
R22	B5
R23	C5
R24	C3
R25	B3
R26	B3
R27	C4
R28	C3
R29	C4
R30	C4
R31	D4
R32	D3
R33	D3
R34	D3
R35	C3
R36	C2
R37	C2
SK1	C1
U1	A4
U2A	C6
U2B	D6
U2C	C6
U3A	C6
U3B	A6
U4	B4
U5A	C5
U5B	C4

POLARIZER BOARD
COMPONENT SIDE



POLARIZER BOARD
COPPER SIDE



Circuit Description

The Tuner

The desired channel is selected via the handset with the microprocessor generating the on-screen menu and supplying tuning data to the frequency synthesiser. The frequency synthesiser controls the local oscillator frequency which is mixed with the incoming signal. The desired signal is selected by an IF stage centred at 479.5 MHz and having a bandwidth of approximately 27 MHz. Finally the FM signal is demodulated to give the required composite baseband signal.

Circuit Description

Frequency synthesis is performed by U20 which receives and stores data selecting the required channel in the form of a 10 bit serial word from the Micro Computer Unit (MCU). Data contained within the 10 bit word is used to generate an internal frequency reference derived from the 5.625 MHz clock input on pin 2 and also sets a divider which divides down the prescaler input on pin 11. The actual local oscillator frequency is divided by 128 and fed to the prescaled output of the tuner (pin 6) and, via C85, to pin 11 of U20. A phase comparator within U20 compares the prescaled output with the internal reference and generates pulses whose width represents the amplitude of the phase difference and whose polarity represents leading or lagging phase error. The phase error pulses appear on pin 14 of U20 and are integrated by Q11, Q12, C134 and R151, together with R150 and C133. The resulting tuning voltage is then fed to pin 13 of the tuner and hence, to the internal voltage controlled local oscillator. The resulting closed loop control drives the local oscillator frequency so that the phase error is small and hence local oscillator frequency is as requested by the MCU.

Video Section

The baseband signal from pin 18 of the tuner is coupled to the baseband amplifier, video amplifier and audio section via an emitter follower (Q10 and R113).

Baseband Amplifier

Q16 and Q18 form a two stage amplifier, the output of which is separately buffered to pin 10 and pin 19 of PL1. The buffered outputs have an output impedance of 75 Ohms. For each programme the incoming signal format, PAL or MAC, can be selected via the installation menu. With PAL selected the response of the amplifier is modified by the de-emphasis filter, R230, C187 and C188, which is switched in by Q15. In addition insertion loss is compensated for by Q17 switching R237 in parallel with R236 and hence increasing the gain of the first stage. With MAC selected the amplifier PAL response is modified by R229 and C379 to give MAC de-emphasis.

The Video Amplifier

De-emphasis is applied to the baseband signal before it is fed to the video amplifier. Video de-emphasis is provided by C113, R118 and R119. After de-emphasis the signal is ac coupled via C115 to the positive input of the video amplifier U21. C116 and C157 provide input decoupling. The output of the amplifier is biased at 5.6V by connecting the differential inputs to the junction of R121 and D35. Amplifier gain is set by the value of R125. After being amplified the video signal is ac coupled via C120 to a low pass filter having a cut off point of MHz. Q13 and Q14 act as input and output buffers respectively.

Energy Dispersal Clamp

The spectrum of satellite transmission is not evenly distributed but concentrated in peaks. Due to this peaking effect interference between channels is possible. In order to smooth out the peaks and to more evenly distribute the transmitted spectrum, a triangular 25Hz wave form is added to the signal which "spreads" the signal within its channel. If this triangular signal is left on the video signal a flickering is observed. Therefore this triangular modulation must be removed. This is done by A.C. coupling the video signal via buffer Q22 and C170 and then clamping the sync bottom to a fixed level (by Q23). Line sync pulses are differentiated by C27 and R144, and then applied to the base of Q23 which clamps the signal to a fixed voltage defined by the resistor chain R205, R206 and R342. D34 clamps negative going noise when no signal is present; this is required when after hours graphics is fitted.

Sync Separator

Both horizontal and vertical sync pulses together with burst gating pulses are generated by U6 from the composite video signal buffered by Q22. Burst gating pulses are shaped and inverted by Q26 and used for timing pulses within the Video Crypt Decoder.

Graphics Generator and Graphics/Video Switch

On-screen graphics data is transmitted serially to the Graphics Generator by the Micro Computer Unit via data, clock and strobe lines. The Graphics Generator (U9) has an on-chip oscillator running at a frequency of approximately 6MHz which is set by the external components between pins 6 and 7. The oscillator together with horizontal and vertical sync pulses generate pixel timing information which is fed to pin 9 and pin 11 of the Graphics/Video Switch (U8). The timing pulses from pin 12 of U9 are inverted by Q28. The diode D27 prevents Q28 from saturating and thus reduces switching time of Q28. The timing pulses on pin 9 and pin 11 of U8 control two analogue gates which are switched at video frequencies. The voltage on pin 11 selects between video or on-screen graphics whilst the voltage on pin 9 selects between black or white level graphics. Black and white levels are set by the voltages of pin 5 and pin 3 respectively. In the absence of a video signal, a composite video signal is generated by the 'After Hours Sync' circuit. This circuit uses the vertical and horizontal sync pulses from the Sync Separator U8 which 'free runs' in the absence of video input. Inverted and non-inverted line sync pulses are switched via U24B which is controlled by vertical sync pulses on pin 9. Inverted line sync pulses emerge from pin 4 during the vertical sync period. The resulting signal is fed to Q27 via the switch U24C and the buffer Q34 when the voltage on U6, pin 24, indicates the absence of a video signal.

NOTE: *that the video signal is always fed to Q27; when the receiver is off station, the tuner noise will be present.*

Audio Section

Mixer and Frequency Synthesis

The Baseband Video Signal from the tuner module on pin 18 is fed to the sound mixer U18 via a bandpass filter so that only audio sub-carriers are allowed through. The sound mixer has an internal oscillator the frequency of which is set by components around pin 6 and 7. The Audio F.S. chip U17 works on the same principle as described in the Video Section, i.e. the Audio F.S. chip is controlled by the M.C.U. and compares the oscillator frequency of the mixer with that required and generates error pulses. These error pulses are integrated by R141 and C110 and the D.C. voltage is transferred to D19 (varicap diode). The D.C. voltage changes the diode capacitance, hence the oscillator frequency changes. The cycle continues until the oscillator frequency matches the chosen frequency. The resulting I.F. signals are then buffered by Q8 and Q9 to provide matching impedance for the next stage.

Audio Demodulator

The outputs from the mixer are fed into a dual channel audio demodulator chip, U1, via bandpass ceramic resonators centred on 10.52 MHz and 10.7 MHz for the left and right channels. This gives the 180 kHz channel spacing required for the Panda Stereo system on the Astra Satellite. The FM demodulator chip U1 uses the phase locked loop principle, the centre frequencies being set by X1, X2 and associated components. Basically, the two PLL's lock on to the incoming signals and outputs voltages proportional to the change in the input frequency. These outputs on pins 4 and 5 are the chosen audio channels.

Audio Frequency Filter

NOTE:- *ONLY right channel is described since both are identical.*

The demodulated signal from U1 is amplified by U11C, which is configured as a non-inverting amplifier with a gain of 7. The audio signal is then fed to two low pass filters connected in series, formed by U11D and U12A, with 3dB points set at 50kHz and 8kHz respectively. The combined response of the filter gives a cut off frequency of 15kHz with attenuation slope of approximately 24dB per octave. The main mono channel is de-emphasised (50µs) by U15C and associated circuitry and fed directly to the audio switch U2. All the stereo channels are fed to the PANDA noise reduction system circuitry.

PANDA* Noise Reduction System

The PANDA noise reduction system is used by Astra for its narrow band FM subcarriers to give superior dynamic range and signal to noise performance. At the time of transmission the signal is compressed according to its level and frequency, therefore, for an F.M. system a smaller bandwidth is required, resulting in less noise being introduced and more sub carriers being able to be fitted into a given channel. At the receiving end the signal must be expanded accordingly in order to reproduce the original signal. The expansion is achieved by using a dual compander chip NE572(U13) for left and right channels. U12 is used as a level converter and has its input biased at mid rail to allow full swing on the output, and forms the input to U13. The expander consists of a variable gain cell (Δ gain), rectifier and current to voltage converter. The input signal is fed to a variable gain cell and rectifier. The output of the rectifier controls the gain so that the output is proportional to the average value of the input. All this is performed by U13. U14 converts the current output from the gain cell within U13 to a voltage, which is then passed through a low pass filter U14 to remove the high frequency content of the signal and then de-emphasised by U15. The output is then fed to the decoder Scart and the audio switch.

Micro Computer Unit (M.C.U.)

The Satellite Receiver is controlled by a micro computer unit based on a Z8621 microprocessor (U4) which performs the following functions:-

a) Detects and decodes the remote control codes

b) Generates the control signals for on-screen graphics

c) Controls the frequency synthesis for video and audio

d) Controls the routing of video and audio signals

e) Other switching functions such as LED indication.

Some user selected data (LNC offset, contrast, polarisation etc) is stored in EEPROM (non-volatile memory U3) and is not lost when the unit is switched off.

Video and Audio Signal Routing.

Connected to pin 8 of the TV Scart socket is the TV/SAT control line. The majority of TV's having a Scart input respond to the state of this line in the following way. If the line is high (5-12 volts approx) the TV takes its input from the TV Scart socket otherwise it takes its input from the TV Tuner. The state of the control line is set by the TV/SAT and Standby buttons on the handset. In addition if a VCR is connected to the VCR socket it also can control the line. The selected TV signal source resulting from various combinations of the three inputs is shown in the table below:-

RECEIVER STATUS	TV SAT SELECTION	VCR SCART PIN 8	PICTURE ON TV
ON	SAT	HI	SAT
ON	SAT	LO	SAT
ON	TV	HI	VCR
ON	TV	LO	TV TUNER
STANDBY	TV (Automatic)	HI	VCR
STANDBY	TV (Automatic)	LO	TV TUNER

The Switch Mode Power Supply (SMPS)

Mains Input and Rectification.

Diodes D1 to D4 rectify the AC mains voltage and together with the smoothing capacitor C7 provide DC input HT for the SMPS.C1, C2 and T1 form a mains filter to minimise the feedback of RFI into the mains supply. C3 to C6 suppress RFI noise generated by the diodes D1 to D4. Asymmetrical mains pollution is reduced by the insertion of R14 and C14 between primary ground and secondary chassis ground. These components are required to satisfy the mains isolation requirements. They are also safety critical components of the correct type.

SMPS Controller U23

Drive to Q1 is provided by two NPN driver transistors within U23. The collector and emitter of each are connected to pins 1, 2, 15 and 16 respectively. When the forward drive transmitter is switched on Q1 base current is limited by R258. When the reverse drive transmitter is switched on, negative base drive voltage is supplied by C9 and limited by the zener D6. L1 limits the rate at which charge is removed from the base thereby ensuring correct storage time. On power-up U23 supply is derived from the rectified mains. Once the SMPS is running U23 is supplied by a separate winding on the primary of the SMPS transformer. This winding also supplies feedback to the input of U23's error amplifier (pin 7) as well as monitoring SMPS transformer core saturation (pin 3). The error amplifier compares the feedback voltage with an internally generated reference voltage. The error amplifier output (pin 8) is directly connected to the pulse width modulator input (pin 9) which controls the switching of the two NPN driver transistors. R8 and C12 are added for stability of the error amplifier.

Audio Switch

The audio source and mode are selected by analogue switches within U16 and U2:- U16 is controlled by the M.C.U. via an Inverting Level Converter, U5A and configured as a double pole double throw switch to route internal or externally fed (from Decoder Scart socket) audio channels to the audio mode select chip U2. U2 is a two channel four way switch controlled by two address lines and an enable line. The control signals come from the M.C.U. via Inverting Level Converter, U10 (5V signals changed to 12V signals).

**The name PANDA and the trademark are the property of Wegener Communications USA.*

Audio Modes

There are 8 Audio Sub-carriers to provide a choice of stereo and mono modes as shown below:-

Mode	Left Freq.	Right Freq.	PANDA
STEREO A	7.02MHz	7.20MHz	ON
STEREO B	7.38MHz	7.56MHz	ON
STEREO C	7.74MHz	7.92MHz	ON
STEREO D	8.10MHz	8.28MHz	ON
STEREO V	5.10MHz	5.18 - 10.18MHz	ON
MONO 1	6.50MHz	6.50 MHz	OFF
MONO 2	7.02MHz	7.02MHz	ON
MONO 3	7.20MHz	7.20MHz	ON
MONO 4	7.38MHz	7.38MHz	ON
MONO 5	7.56MHz	7.56MHz	ON
MONO 6	7.74MHz	7.74MHz	ON
MONO 7	7.92MHz	7.92MHz	ON
MONO 8	8.10MHz	8.10MHz	ON
MONO 9	8.28MHz	8.28MHz	ON
MONO V	5 - 10MHz	ADJUSTABLE	ON / OFF

All specified modes can be used as a base to go into variable Audio Mode. Using Mono 1 as a base means you can tune with Panda off.

U. H. F. Modulator

This is contained in the module MOD 2 and acts as an aerial amplifier for the terrestrial U H F signals. It also contains the U H F modulator for the satellite audio and video signals and a tuning pattern generator. This unit is very similar to those used on video recorders and is tunable over the range of Channel 30 to 39; it is supplied pretuned to Channel 38. This module requires two power supply inputs. One to power the U H F amplifier which is active on Standby (9V on Pin 6) and powers the U H F loop-through facility, the other to supply the modulator (9V on Pin 3) which is switched off during Standby. Both supplies are dropped from the 12V supply, using a zener diode D36 (9V1), R311 and R376 resistors for the U H F amplifier and 2 x 27 ohm resistors (R110, R109) for the modulator. Pin 5A of the modulator is used to select the required sound subcarrier offset of 5.5 MHz (PAL G) or 6.00 MHz (PAL I). The voltage on pin 5A is controlled via Q30 by the micro-processor, (0V = PAL I, 9V = PAL G).

The Electro Magnetic & Mechanical Polariser Options

Both the Electro Magnetic and Mechanical Polarisers are controlled by data supplied by the Micro Computer Unit and stored in U1. Data is in the form of an eight bit word and is stored in U1 via strobe, clock and data lines, (pin 1, 2 &3). U1 and the ladder network; resistors R1 to R10, form a D/A converter having 5 bit resolution. Output of the D/A converter is buffered by U3B.

The Electro Magnetic Option

The output current from pins 5 (+ve) and 4 (-ve) of SK1 varies linearly from -80mA to +80mA with 6 bit resolution. Bit 6 sets pin 13 of U1 and controls the direction of output current via the 3 pole switch U2. U3A inverts and level shifts the control voltage from the ladder network, thus providing an appropriate control voltage for reverse current output. Voltage to current drive is provided by U5A and U5B. The circuit is protected from voltage transients on the output lines by D2 and D3 and short-circuit protection is provided by D5, Q5 and D4, Q6.

The Mechanical Option

Output to the Mechanical Polariser is a pulse width modulated signal derived from U4. The time period, t1 varies linearly between 0.8 to 2.2ms with 6 bit resolution. The resistor network, R17 to R20 sums the output from the D/A converter with the logic level on pin 13 of U1 and sets the biases on the control pin 5 of U4. This modified D/A signal is compared with the voltage on pin 6, derived from the timing components R23 and C3, to define period t1. The combination of timing components R25 and C6 with the modified D/A signal, define period t2. t2 is initiated when the output level at pin 3 decreases. At the end of t2, pin 7 also decreases to discharge C3; consequently the start of the next period is setup. When a channel is selected, the output pulse train is only active for 4 seconds before the microcomputer, (via U1), resets U4. In setup mode, the pulse train is maintained whilst the binary value is changed.

Fault Finding

General Precautions

Switch mode power supply (SMPS) - This section of the main PCB is highlighted by shading printed on the topside and a border line in the solder resist on the underside. **ALL** components/PCB tracks, etc, within this section are connected directly to the AC mains 240v supply. Therefore, it is essential to exercise extreme caution whilst operating the receiver, either partially or fully disassembled. A fully isolated 240v supply should be used for all fault finding operations. Particular care should be taken when connecting any test/measurement equipment to the circuit on the primary side of the SMPS transformer T2. It should be remembered that oscilloscope input ground terminals are connected to the oscilloscope case which, in turn, is usually connected to the supply earth via the power lead. It then follows that, if the earthed scope is connected to the primary SMPS circuit and if the supply is not fully isolated, then a serious short circuit condition would exist. Disconnecting the scope supply earth would prevent this problem. However, this practice should be avoided because it causes the entire oscilloscope case, front panel, controls, etc, to be at 240v mains potential. The point for grounding test equipment on the SMPS primary circuit is on the junction of R13, R14, R15. This is conveniently accessible on PCB topside by connecting to R14 (4M7) end nearest to the SMPS transformer T2. SMPS primary "ground" points are shown on circuit as ⏚. These points are not the same as ⏚, and should not be confused with points which are the true ground/chassis connections on the secondary (mains isolated) side of the mains isolation barrier. Connection of test equipment to any part of the receiver other than SMPS primary section, presents no problem and typical test equipment ground points are tuner, modulator and IR receiver cans.

Quick Diagnosis

Special Software Commands

MENU/2 Installation Menu

Enables global tuning of all 60 channels simultaneously to compensate for the natural frequency variations found with mass produced LNC's. Range is 0-31. Normal (factory) setting is 15. In 1MHz steps. During system installation, this is the first (and usually the only) software parameter adjustment that should be carried out. After optimising the offset to suit the systems LNC, use "STORE" to memorise the offset value and clear the menu from the screen.

MENU/3 Frequency Scan Mode

Enables continuous frequency scan of the entire band for the purpose of locating unknown signals. Pressing "MENU" will stop the sweep and present Menu 1 ready for final adjustments prior to storing.

MENU/1 Modifying Existing Programmes

Enables various adjustments per channel - See "instructions for the user" in this manual for full details.

IMPORTANT: *For Astra channels, there should generally not be any need to change the factory frequency settings in this menu. If channels appear off tune and, providing the menu frequency displayed is correct as per the user instructions, then the LNC offset adjustment should be carried out.*

Set Up 9/6/3/0/1/2 Factory Global Reset

This sequence invoices a subroutine which resets all of the-on screen variable parameters to the original factory settings for all 60 channels. Note: If any "customisation" of any channels has been set up by the user, then these special settings will be lost when this procedure is followed. Parental lock pin is reset to 1234.

"Lost Pin" Reset

1 *Disconnect the mains supply from the receiver.*

2 *Re-apply the mains supply whilst holding the ⏻, ▲ and ▼ keys on the front until the timer LED is extinguished.*

The above sequence is used to reset the parental lock pin number back to the original factory value of 1234. This is useful if the user has customised his pin number then forgotten it. Other menu parameters previously set will not be affected by this procedure.

Quick Diagnosis

Symptom	Possible Cause	Remedy
UNIT DEAD – NO LED's ON	Fuses FS1 O/C	**Check for Faults and Replace FS1**
UNIT DEAD – NO LED's ON. FUSE FS1 OKAY	R3 O/C or Dry Joint	**Replace R3 or Remake Connection**
UNIT DEAD – NO LED's ON FUSE FS1 OK	Check for R1 O/C. Check for R13 Fusible O/C	**Replace R1 Replace R13**
UNIT DEAD – STANDBY LED PULSING ON AND OFF. (SMPS IN OVER CURRENT PROTECT MODE)	S/C on LNC Input. S/C on 5/12/14/18/24 Volt Rails. Any diode D12-16 S/C	**Replace D12 or Remake Connection on PCB**
IN STANDBY MODE, STANDBY LED OFF. UNIT CAN BE BROUGHT OUT OF STANDBY BUT THERE IS NO PICTURE	12V Rail Absent – Check D13 O/C or Dry Joint	**Replace D12 or Remake Connection on PCB**
STANDBY LED ON BUT THE UNIT CANNOT BE BROUGHT OUT OF STANDBY	5V Rail Absent – Check D13 O/C or Dry Joint	**Replace D13 or Remake Connection on PCB**
LED's NORMAL BUT THERE IS NO VIDEO OR AUDIO SIGNAL, I.E. BLANK RASTER – SILENT AUDIO	Tuner 9V Rail Absent. R323 Fusible O/C.	**Locate and Repair the possible S/C on 9V Rail. Replace R323**
UNIT OPERATES BUT V – POLARITY CHANNELS ARE NOT WORKING	LNC O/C Not Switching from 18 volts to 14 volts – Check Q3 S/C 14 volt LNC Rail Absent – Check D16 O/C or Dry Joint	**Replace Q3** **Replace D16 or Remake Connection on PCB**
UNIT OPERATES BUT H – POLARITY CHANNELS ARE NOT WORKING	18 volt LNC Rail Absent – Check D15 O/C or Dry Joint. Check Q3 O/C	**Replace D15 or Remake Connection on PCB** **Replace Q3**
UNIT OPERATES BUT SOME CHANNELS ARE MISSING OR APPEAR ON THE WRONG PROGRAMME NUMBER	User may have changed On-screen Menu Parameters on one or more Channels	**Use Factory Global Reset Sequence to Restore all Software Parameters to Original Status**
ONE OR MORE CHANNELS HAVE BEEN "LOCKED" AND THE USER HAS SET A NEW PIN NUMBER THAT IS UNKNOWN		**Use the Pin Reset Sequence to Restore the Pin to 1234 and Unlock the Channels**

AUDIO FAULTS

Check		Check
Any audio signal on U15 1(R)a 7(L).		
IF OK ▼	**IF NOT ☛**	*Go to Section A1*
Any audio signal on U16 4(R)a 15(L)		
IF OK ▼	**IF NOT ☛**	If pins 9 & 10 are "H" (>9V-INT) and supply on pin 16 (12V) and that pins 6, 7, 8, are 0V. Also check signal on I/P pins 3(R) 1(L)
Audio on U2 13(R) and 3(L)		
IF OK ▼	**IF NOT ☛**	If pin 6 is "LOW" (<3V not muted), also check if pin 9 & 10 "HI" (.9V stereo mode, further check if signal on input pins 11(R)a 4(L)
Audio on U22, 14(R) >15(L)		
IF OK ▼	**IF NOT ☛**	If pins 9, 10, 11 are "LO" also check if supply on pins 16 (12V) and 6, 7, 8, (0V)
Audio on TV scart pins 1(R)a 3(L)	**IF NOT ☛**	Scart Lead Faulty, or, if not using scart, go to UHF

UHF

Audio on pin 2 of the modulator

IF OK ▼

9V supplies on pins 3 and 6 of modulator

IF OK ▼

Modulator or RF lead faulty

IF OK ▼

A1

Audio signal on U12.1(R) and 7(L)

IF OK ▼ **IF NOT ☛** *Go to Section A2*

The fault lies within the "PANDA" expanding circuit which is a multiple closed loop system, hence fault finding is difficult. As both channels are identical and share chips any fault that kills both channels will almost certainly be a faulty chip or supply. Any fault that occurs on one channel only will most likely be tracking or discrete component failure. **This can best be located by comparing the signals on both channels.**

A2

Low Level Noisy audio signal on U1 pin 5(R) and 4(L)

IF OK ▼ **IF NOT ☛** *Go to Section A3*

Follow signal through the amplifier and filter chain until fault found

A3

Audio tuning voltage is okay, approx. 4 to 8V (stereo A) on Q6 or Q7 collector, and changes as audio mode is changed.

* if 0V check for 24V on R141 (10K)

* If >20V check Q6, Q7 and U17

IF OK ▼ **IF NOT ☛** *Go to Section A2*

Check tracking and components between U18 and U1 for faulty chain ie. Q8, X3, X4, X7, L14 (righthand example)

**NOTE: Any fault in the R.L.L. (U17, D19, L7 and most of U18) will result in both channels being dead. Also any fault in the input filter L8, L9, L10 and tracking will have a similar result.*

VIDEO FAULTS

Picture Blank

Check | **Check**

Video U21, 7

IF OK ▼ | **IF NOT ☛** Video Q10 emitter and tuner O/P

Video U7, 13 and 14

IF OK ▼ | **IF NOT ☛** If okay on 13 but not 14, check if switched to external for any reason, i.e. status pins high

Video U7, 2 and 15

IF OK ▼ | **IF NOT ☛** If 2 okay but not 15, check if switched internal decoder. Check VideoCrypt decoder *(if fitted)*

Video U22, 5 and 4

IF OK ▼ | **IF NOT ☛** If okay on pin 5 but not 4, check level of pins 9, 10, 11 – should be "LO" (>3V)

Signal on Pin 19 scart

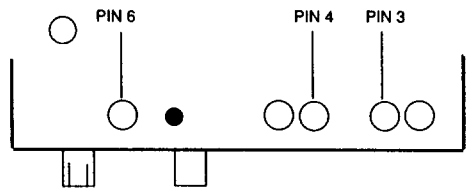
IF OK ▼

Check scart lead (if used), or, ▼

UHF Connection

Check for video pin '4' of the modulator

NOTE: Take care as this is close to the mains I/P side of the circuit



IF OK ▼

Voltage (9V) on pins 3 and 6 modulator | — *NOTE: Ensure out of STANDBY*

IF OK ▼ | **IF NOT ☛** Try adjusting 'TUNE' adjustment screw.

Switch rear panel switch to TEST
Check if test bars appear

IF OK ▼

TUNER FAULTY

Picture Blank with Snow

Usually a sign of LNC faulty or no LNC voltage. It could also be incorrect tuning volts

Check | **Check**

Voltage on LNC connector (14V – 18V)

IF OK | **IF NOT ☛** As the LNC supply can come from 2 sources which are unlikely to go faulty together then no voltage at LNC connector usually signifies a faulty tuner or most likely a broken track.

Test on new LNC feed. If still faulty, go to check tuning volts okay – tuner is faulty | Check for LNC volts on tuner pins 3/4 and on link 210 (by U17) to check if tuner or tracking at fault.

Tuning Voltage Checks

Check voltage on pins 13 or 5 of tuner This is usually in the 8 – 12V range for Astra 1A. Check if this voltage changes when different channels are selected.

If the voltage is 0V, check tuning supply

If the voltage is >22V check Q11, 12 and U20 circuitry.

NOTE: If using UHF connection go to section "UHF Connection" in Picture Blank section.

Operation

The following information assumes that your satellite dish and Receiver have been correctly installed.

Operation is carried out by use of the remote control. When selecting the on-screen graphics menus, it will be necessary to use 2 keys which must be pressed within a timeout period (usually 2 seconds between each key press). This is also true for other multi-key functions.

Switch On

After making all the necessary connections, connect the Receiver, TV and/or VCR to the mains supply and switch on. Select your 'Satellite Receiver number' on your TV or select the A/V input on your TV if you use Euroconnectors. When the mains supply is first connected, the Receiver will be in standby. To bring the Receiver out of standby, press the ◁ or ▷ key or select a programme number, using the remote control. You may also use the + or - buttons on the front of the Receiver.

Switch Off

To 'power down' the Receiver, press the ⏻ key on the remote control or the Receiver. The Receiver will stay in standby mode as long as the mains supply is connected.

NOTE: *Your Receiver may have been installed by looping the TV aerial through the Receiver. If this is the case, the Receiver must always be connected to the mains supply in order to watch terrestrial TV programmes.*

Select a Programme

There are 2 modes of operation, single digit mode and double digit mode. Pressing the -/— key "toggles" between these two modes.
In single digit mode only programmes 0-9 can be directly entered.
In double digit mode, all programmes can be accessed directly by entering the appropriate 2 digits. In this mode programmes 0-9 must be preceded by a 0. It is also possible to browse through all the programmes using the ◁ or ▷ keys. The programme ident will be displayed briefly in the top right-hand corner of the TV screen.

Control Your Philips TV Remotely

At the top left side of your Receiver Remote Control unit is a hidden switch. If you press this in, and continue to hold it down, your Receiver Remote Control can act as a TV Remote Control for Philips TV's. You can then change TV programmes by pressing the programme numbers on the Receiver Remote Control. This function may not work with some older Philips TV sets.

Permanent Programme Ident Display

It is possible to permanently display the programme ident on your TV screen. This feature is selected by pressing the MENU key followed by the 8 key. Repeat MENU, 8 to remove the feature. Audio Mute

To mute the sound press the 🔇 key.

The MUTE symbol will appear.
Press 🔇 again to restore the sound.

Audio Mode

The I-II key is used to cycle through all the audio modes. On certain programmes it is possible to receive multi-language, stereo or radio transmissions, e.g. Sky One also transmits Sky Radio in addition to the Sky One soundtrack. To hear these alternative transmissions, press the I-II key to select the desired mode.

Programme Status

Pressing the (i) key will display the programme ident, audio mode and audio frequency of the programme you are viewing and also the receivers clock (flashing if not set).

The TV/SAT Button

With some TV sets, it may be impossible to select a terrestrial TV programme while the Receiver is switched on. This may happen when you have your Receiver connected to your TV by means of an A/V connector cable.
If this occurs, you should press the TV/SAT button on your Remote Control once. Now you can select and watch terrestrial TV programmes.
To return to satellite programmes, press the TV/SAT button once again.
If you have no problem changing TV channels while your Receiver is switched on, you will not need to use the TV/SAT button.

Change The Sound Volume

If you have a Philips TV, you may be able to control the volume of the sound with your Receiver remote control. This may not be possible with some older Philips TV sets. With most other makes of TV sets, the volume button on your Satellite Receiver Remote Control will have no effect.

Auxiliary Programme

Pressing the 0 key will select an auxiliary programme which is set up to work with an external (MAC) Receiver connected to the DECODER/DESCRAMBLER connector. It must be noted that this is in fact Programme 60 and changing the AV source setting for that programme will affect the function of the 0 key.

On-Screen Display Menus

Certain functions of the Receiver are performed by use of On-Screen Display menus (O.S.D) e.g. timer functions and modifying or adding new programmes. Once in a menu, the MENU and ⏻ keys are used to move forward and backward through the parameters and the ◁ and ▷ keys are used to alter parameters.
Direct entry using the numeric keys is also possible and shall be highlighted as we go through the functions. If you want to cancel alterations in a menu, press the VIEW key and this will remove the menu from your screen and erase any changes.

NOTE: */02R (German) version O.S.D. is shown in brackets.*

Timer functions

The Receiver has a built-in timer facility which allows it to switch on and off at selected times. The primary use of this is to record satellite events, in conjunction with a VCR, whilst the Receiver is unattended.

NOTE: *The Receiver and VCR should have the same start and stop recording times.*

Setting the Clock

Press MENU followed by 4.

The ◕ light on the Receiver will be flashing.
Press ◁ or ▷ to adjust the day.
Press MENU again.
Press ◁ or ▷ to adjust the hour.
Press MENU again.
Press ◁ or ▷ to adjust the minutes.
Press STORE to store your settings.
You may also enter the hours and minutes using the numeric keys on your remote control.
NOTE: *You need to set the clock again after the Receiver has been disconnected from the mains supply.*

Setting the Timer

The Timer menu gives you the facility to preset up to 4 events each up to 14 days in advance. It is selected by pressing the MENU key followed by the 5 key. The ◕ light will be flashing. Again the MENU and keys are used to control the menu. If you have not set the Receiver's clock yet, a message CLOCK NOT SET (UHR NICHT GESTELLT) will be displayed. In this case, follow the procedure SETTING THE CLOCK first before setting the timer.

1. EVENT (Ereignis)
Press ◁ or ▷ to choose an event number
2. PROGRAMME (Programm)
Select the programme you want to record using the ◁ or ▷ keys or the numeric keys on your remote control. The event is disabled when set to OFF (AUS). If a locked programmed is selected, the programme ident will be preceded by an asterisk (*).
3. DAY (Tag)
Allows you to select the day of the event by using the ◁ or ▷ keys.
The current day will be displayed as TODAY (HEUTE) and subsequent days are prefixed 1- or 2- to cover the relevant week.
4. START (Anfang)
Allows you to enter the start time in hours and minutes by direct entry using the numeric keys or with the◁ or ▷ keys.
5. STOP (Ende)
Allows you to enter the stop time.
To exit the menu press either the VIEW or STORE key.
If any recording times conflict with each other, they are detected by the timer and an EVENT OVERLAP (UEBERLAGERUNG) alarm is displayed on the TV screen. This alarm may be ignored by pressing the VIEW key in which case the end of the overlapped event will be lost. The error may be corrected by re-entering the Timer menu and adjusting the start/stop times.
If a locked programme has been stored in the programme option, the message EVENT USES LOCKED PROGRAMME (EREIGNIS FUR GESPERRTES PROG) will appear on screen. This programme will have to be unlocked to enable the event to be recorded.
The timer is activated after the Receiver is switched to standby.
Should a Timer event occur while you are watching a satellite programme, then the ◕ light will flash rapidly for one minute. Press to enable this event. If you ignore the indication, the event will be cancelled.
NOTE: *During a timer event, all remote control commands will be ignored.*

Cancel an Event

Assuming that the event has not yet started:

Switch the Receiver on
Press MENU followed by 5
Select the event you want to cancel using the ◁ or ▷
Press MENU again
Press 0, 0
The event is now set to OFF (AUS).
To disable the timer during a timer event, press the key quickly followed by VIEW.
A message TIMER CANCELLED (UHR ANNULIERT) will be displayed.

Instant Timer/Sleep Timer

The Instant Timer enables you to record transmissions instantaneously and switch off the Receiver at a time you set.

To operate the Instant Timer/Sleep Timer

Press the ⏻ Key

The ◕ light will start to flash.
The current time will be assumed as the start time and the stop time will default to half an hour from the start time.
Use the numeric keys on the remote control to change the stop time.
Press STORE.

The ◕ light will now stay on.
All remote control commands will now be ignored.
The Receiver will go to standby when the stop time has been reached.

Press the ⏻ key again to cancel the Instant Timer/Sleep Timer.
A message SLEEP TIMER CANCELLED (SCHLUMMER ANNULIERT) will be displayed.

The Parental Lock

The parental lock feature of the Receiver allows you to 'lock out' some or all of the satellite programmes. In simple terms, you create a personal identification number (PIN) and allocate it to the programme you wish to lock to prevent unauthorised viewing. Once a programme is locked, it can only be viewed by re-entering the PIN. It is not essential to personalise the PIN, but it is recommended.

Personalising the PIN

Press MENU followed by 7
Enter 1234 (the default setting) using the numeric keys on your remote control.
The Receiver will now ask for your NEW PIN (NEUER CODE)
Enter a new PIN (4 numbers)
The Receiver will ask you to CONFIRM PIN (CODE BESTAETIGEN).
Re-enter your new PIN.
A message CONFIRMED (BESTAETIGUNG) will appear on the screen.
If your NEW PIN (NEUER CODE) and CONFIRM PIN (CODE BESTAETIGEN) were not identical, a message FAILED (FALSCH) will be displayed. It will be necessary to repeat the whole sequence.
DO NOT FORGET YOUR PIN!!!
If you forget your PIN you will have to contact your dealer

Lock a Programme

Press MENU followed by 6
A message TO LOCK ENTER PIN (SPERREN CODE) will appear.
Enter your PIN
A message LOCKED (GESPERRT) will appear.
If you now select a locked programmed, the message PROGRAMME LOCKED ENTER PIN (PROG GESPERRT CODE) will appear.
Enter your PIN.
If the PIN is correct, the programme will be displayed.

Unlock a Programme

Select the programme you want to unlock entering your PIN code
Press MENU followed by 6
A message TO UNLOCK ENTER PIN (FREIGABE CODE) will appear
Enter your PIN
A message UNLOCKED (FREI) will appear, indicating that this programme is now permanently unlocked.

Receiver Lock

To avoid accidental changes or unauthorised reprogramming of your Receiver, you can switch on the Receiver Lock. This disables the Installation menus (MENU 1 and MENU 2) and the frequency scan (MENU 3).
To enable the Receiver Lock, select Programme 0 (AUX) and follow the procedure to lock a programme.
To regain access, follow the procedure to unlock Programme 0 permanently.

VCR record/replay using Euroconnectors

When using a Euroconnector to connect a VCR, the following must be noted.
To record from the satellite Receiver to a VCR, it will be necessary to select AUX or AV on the VCR as the programme to record.
When replaying the VCR through the Satellite Receiver, switch the Satellite Receiver to standby.
NOTE: *This method of replaying is only possible if the TV is also connected using a SCART lead.*

Personalising Your Receiver

Installation Menu

In this menu, you will find a number of general settings for your Receiver. After you have adapted the values to those fitting your installation and connections, you normally do not have to enter this menu any more.
Press MENU followed by 2
The ◕ light will be flashing and a menu like the one shown will appear on your screen.
If you decide not to modify anything or undo your modifications, press VIEW. The MENU and ⏻ keys are used to move forward and backward through the menu, and the ◁ and ▷ are used to alter parameters. When you have finished your modifications, press STORE to store your settings.
The following options are available:

1. CONTRAST
This is the picture contrast setting. Use the◁ or ▷ keys to set the contrast to LOW (Niedr), MEDIUM (Mittl) or HIGH (Hoher). Pressing the STORE key will retain any adjustments made.
2. LNC 1 Offset (ABGLEICH 1)
If the picture is speckly, it may be necessary to adjust the LNC offset. If you still have menu 2 on your screen, press STORE (or VIEW).
Press MENU followed by 1 on your remote control.
The ◕ light on your Receiver will now be flashing.
Check that the frequency for the chosen programme is correct. (See the Satellite Programme Guide in the back of this manual). If necessary, correct the frequency using the ◁ or ▷ keys on your remote control.
Press STORE twice.
Press MENU followed by 2.
Press MENU again to select LNC1 OFFSET (ABGLEICH 1)
Use the ◁ or ▷ key to get a picture as free from sparkles as possible.
To optimise the picture, it is possible to change programmes whilst in this menu by directly entering the programme number using the numeric keys.
Press STORE to store your settings. The same procedure can be followed for satellite input 2, after you have selected a programme preset for this input.
3. LNC 1
Option 1 Allows you to assign any of 3 frequency bands to dish antenna input
1. The bands are allocated as follows:
a. ASTRA (10950 - 11700 MHz, Astra, Eutelsat, Intelsat)
b. DBS (11700 - 12500 MHz, TDF, TVSAT, TELE-X, Olympus)
c. T-COM (12425 - 12675 MHz, Telecom, Kopernikus)

Option 2 Allows you to assign any of 3 types of polariser in use to dish antenna input 1. These 3 types are:
a. VOLT allows voltage switching to select the correct polarisation (H for Horizontal, V for Vertical). This is the default setting for dish input 1.
b. MECH permits either Mechanical or Electro-Magnetic polariser capability.
c. BAND allows dual band LNC switching (e.g. Astra /DBS) in addition to Mechanical or Electro-Magnetic polariser capability.

4. LNC 2
Allows you to assign any of the above mentioned 3 types of polariser in use to dish antenna input 2. Dish antenna input 2 does not have the frequency band selection. The satellite channel frequency indication will be:

a. 10750 - 11700 (for Astra) if you select VOLT or MECH

b. 10750 - 11700 (for low band, Astra) and 11700 12500 (for high band, DBS) if you have selected BAND.

5. H-POL BASIS (Only for MECH or BAND dish input selection)
This option sets the polarity base setting for all the pretuned channels using the horizontal polarisation. Ensure you are on a channel with horizontal polarisation, then use the ◁ and ▷ keys to obtain a picture as free from sparkles as possible, then press the STORE key. Once correctly set, you should not enter this option any more.

6.V-POL BASIS (Only for MECH or BAND dish input selection)
This option operates in a similar manner to the H-pol Base option described above. First choose a channel with vertical polarisation, then enter MENU 2 as before, and use the and ▷ keys.

Modifying Existing Programmes (Menu 1)

The Receiver is capable of storing 60 programmes and comes to you almost completely pre-tuned. If you wish to modify or add new programmes the following section explains the procedures.
Select the programme you wish to modify

Press MENU followed by 1.

The ◕ light will be flashing and the menu shown will appear on your screen. If you decide not to modify anything or undo your modifications, press VIEW.

The MENU and ⏻ keys are used to move forward and backward through the menu, and the and are used to alter parameters. When you have finished your modifications, press STORE twice to enter your settings.
The following 8 options are available, spread over 2 On Screen Menu pages:
NOTE *once the MENU key has been pressed in the DE-CODER option, the second page will automatically appear.*

1. FREQ (Frequency)
The satellite channel frequency can be adjusted and it is possible to directly enter the frequency using the numeric keys. For example, for a programme on the frequency of 11.214GHz, simply press the 1, 1, 2, 1, 4 keys.
NOTE: *If LNC1 is selected the frequencies allowed will be dependent on the number stored in the LNC1 frequency option.*
(See section 'INSTALLATION MENU ', LNC 1)

2. POLARISER (Polarity)
The correct polarity must be assigned to each programme. This receiver can utilise Mechanical and Electro-Magnetic types of polarisers, but if you wish to use a voltage switching

The Electro-Magnetic Polariser

Horizontal and vertical, right hand circular and left hand circular settings are not indicated as such in this menu, but as a value in the range of 0-63.

The Mechanical Polariser

As with the Electro-Magnetic Polariser, the polarity settings of the Mechanical Polariser are indicated by a value in the range of 0-63.

NOTE: *If the changes are made to the H-pol Base or V-pol Base in the LNC Offset menu, all 60 Channels will be reset to the new H-pol or V-pol Base setting. Press VIEW in case you decide not to make any alterations after you have already adapted some parameters.*

3. BASEBAND (Basisband)
The baseband output is used to feed an external decoder. This signal falls into two main categories, PAL or MAC. This option allows you to switch the baseband output, provided by the DECODER/DESCRAMBLER socket, to be either filtered for a PAL decoder or flat for a MAC decoder.

4. AV SOURCE (AV Quelle)
The Audio and Video source can be selected from four options:
INT - internal audio and video. In this mode, any external decoder will be ignored.
AUTO - The default option for most programmes is AUTO so that if a decoder providing the correct control signal is used, this decoder will be selected automatically when selecting this programme.
EXT V - Select this option if your decoder only treats the video of an encrypted programme.
EXT AV- Select this option if your decoder treats both audio and video of an encrypted programme. This option may have to be selected with some decoders that do not function if you have selected AUTO.
NOTE: *If you select EXT V or EXT AV without a decoder fitted, the picture will disappear.*

5. DECODER
This option is dependent on the setting of the AV source above.
If AV-source is AUTO, this question will be ignored.
If AV-source is INT, you can choose between NONE (normally the case) or INT. Only select INT if your receiver is equipped with an internal VideoCrypt decoder with Smart Card reader*.
If AV-source is EXT V or EXT AV, you can now select between EXT 1 or
EXT 2. Only select EXT 2 if you have 2 decoders and the special connector lead connecting them to your Receiver. Consult your dealer for advice about this connector lead.
NOTE: *For Receivers without an internal VideoCrypt decoder. the ⬚* *key on the remote control has no function.*

6. AUDIO
When in the Installation menu, the I-II key or ◁ and ▷ keys can be used to select the sound you want to hear. You may refer to the Satellite Programme Guide in the back of this manual to change or optimise your choice.

8. NAME
The default programme ident can be altered with this option. The ◁ and ▷ keys select alphas or numerics and pressing MENU will move the cursor to the next digit and so on. The ⏻ key will move the cursor back.

9. LNC
Your Receiver has 2 dish antenna inputs, thus allowing you to choose which satellite dish input you wish to use for each programme. If LNC 1 is selected, the satellite channel frequency range displayed in option 1 is dependent on the value assigned to the LNC1 frequency band in Menu 2.
Note: the number displayed does not affect the frequency input range.

10. BAND (BEREICH)
If BAND is selected in the polariser option in Menu 2, then this option will be available. It is intended for use with a dual band LNC.
If LOW (UNTERER) is selected, the lower band of the dual band LNC will be activated (e.g. Astra). The voltage supplied to the LNC will be 14 V.
If HIGH (OBERER) is selected, the higher band of the dual band LNC will be activated (e.g. DBS). The voltage supplied to the LNC will be 18 V.
When all settings are as required, press the STORE key once to store your settings. This will bring the WHICH PROGRAMME (WELCHES PROGRAMM) prompt on screen. Select a programme number you wish to store this information against using the ▲ or ▼ keys or the numeric keys. Press the STORE key again. This will store all the settings for the programme and put the receiver back into normal mode. Programmes 59 and 60 have been designated TEST and AUX respectively and cannot be renamed; consequently the NAME option is not available on these programmes.

Adding New Programmes (frequency scan)

To add new programmes, it will be necessary to first locate them. This can be easily done using the frequency scan mode: Press MENU followed by 3.

The ◕ light will start blinking.
The receiver will scan for programmes on the polarity you were last viewing.
When the receiver finds a signal, the scanning speed will automatically decrease. This allows you the time to stop the scanning by pressing MENU. Automatically, Menu 1 will be displayed to alter other parameters if necessary, and to store the channel found under a new preset number. Continue as described in section "Modifying Existing Programmes (Menu 1)".
Press VIEW to quickly end the scan.
To scan for programmes on another polarity it is necessary to select a preset on this other polarity (see the Satellite Programme Guide). Then press MENU 3 again to re-start the scan.

Other Remote Controls

It is possible to operate your Receiver with a remote control other than the one delivered with the Receiver. Your Receiver is programmed to function as "Satellite 2". The remote control transmits signals in "Satellite 2" codes.
Some multifunctional Philips remote controls have the "SAT" option. If they do not have the choice between "SAT1" and "SAT2", they will transmit SAT1 codes. Since your Satellite Receiver is functioning as SAT2, it will not react to those commands.
But you can change your Receiver from SAT2 to SAT1 and vica versa!

To Change from SAT2 to SAT1:

Disconnect the Receiver from the mains.

Reconnect the Receiver to the mains while holding the ⏻ and the - button on the front of the Receiver simultaneously for several seconds.
Now your Receiver will not react to the commands of its own remote control any more! Use a multifunctional Philips remote control and check if your Receiver reacts correctly. If this is not the case, follow the procedure below.

To Change from SAT1 to SAT2:

Disconnect the Receiver from the mains.

Reconnect the Receiver to the mains while holding the ⏻ and the + button on the front of the Receiver simultaneously for several seconds.
Your Receiver will now resume normal operation with its own remote control.

Spare parts list / Stückliste / Liste

Main board

Various

IR1	4822 212 23802	IR RECEIVER
MOD1	4822 210 10443	2 INPUTS TUNER
MOD1	4822 210 10449	1 INPUT TUNER (05R ONLY)
MOD2	4822 212 23801	PAL I MODULATOR (05R ONLY)
MOD2	4822 212 23823	PAL G MODULATOR
VID1	4822 212 23824	VIDEOCRYPT SUB ASSY (05R ONLY)
T1	4822 148 81195	MAINS FILTER
T2	4822 142 60416	TRANSFORMER
X1	4822 242 80412	CDA10.52MHz
X2	4822 242 80411	CDA10.7MHz
X3	4822 242 80409	SFE 10.52 MJA10A
X4	4822 242 80409	SFE 10.52 MJA10A
X5	4822 242 80408	SFE 10.7 MJA10A
X6	4822 242 80408	SFE 10.7 MJA10A
X7	4822 242 80407	4.000 000 MHz
X9	4822 242 80413	530 KHZ
X10	4822 267 60316	5.625 000 MHZ
PL1	4822 267 60315	DECODER SCART
PL3	4822 267 60315	TV SCART
PL4	4822 267 60315	VCR SCART
PL5	4822 267 31414	DUAL PHONO
PL6	4822 267 51114	7-CIRCUIT WIRE TRAP
SK1	4822 267 31415	MAINS SOCKET
FS1	4822 070 31002	FUSE (T 1A)
	4822 256 30472	FUSE HOLDER
SW1	4822 276 13158	SWITCH
SW2	4822 276 13158	SWITCH
SW3	4822 276 13158	SWITCH
SW4	4822 276 13158	SWITCH
	4822 736 52593	DFU (05R ONLY)
	4822 736 52594	DFU
	4822 218 21039	REMOTE CONTROL

⊣⊢

C1	4822 121 70012	100nF 20% 250V
C2	4822 121 70012	100nF 20% 250V
C3	4822 126 11842	1nF 20% 1KV
C4	4822 126 11842	1nF 20% 1KV
C5	4822 126 11842	1nF 20% 1KV
C6	4822 126 11842	1nF 20% 1KV
C7	4822 124 42294	47µF 10% 400V
C8	4822 126 11843	680pF 10% 2KV
C9	4822 124 42287	1µF 10% 16V
C11	4822 124 42287	1µF 10% 16V
C12	4822 122 31981	33nF +-0,5pF 50V
C13	4822 122 31947	100nF 20% 63V
C14	4822 121 70013	4,7nF 250V
C15	4822 124 42288	2,2µF 10% 16V
C16	4822 122 32765	820pF 10% 63V
C17	4822 124 40198	470µF 20% 16V
C18	4822 122 31947	100nF 20% 63V
C19	5322 122 31842	330pF 5% 63V
C20	4822 122 31947	100nF 20% 63V
C21	4822 124 21511	2200µF 20% 25V
C22	5322 122 31842	330pF 5% 63V
C23	4822 122 32927	220nF
C24	4822 122 31947	100nF 20% 63V
C25	4822 122 31768	180pF 5% 50V
C26	5322 122 31842	330pF 5% 63V
C27	4822 122 31768	180pF 5% 50V
C28	4822 122 31947	100nF 20% 63V
C29	4822 124 42295	100µF 35V
C30	5322 122 31842	330pF 5% 63V
C31	4822 122 32927	220nF
C32	4822 122 31947	100nF 20% 63V
C33	4822 124 40214	1000µF 20% 25V
C34	5322 122 31842	330pF 5% 63V
C35	4822 124 41643	100µF 20% 16V
C36	4822 122 31947	100nF 20% 63V
C37	4822 124 40201	1000µF 20% 16V
C38	4822 124 41643	100µF 20% 16V
C39	4822 124 42287	1µF 10% 16V
C40	4822 124 41643	100µF 20% 16V
C41	4822 122 32442	10nF 50V
C42	4822 122 31797	22nF 10% 63V
C43	4822 122 32442	10nF 50V
C44	4822 122 31727	470pF 5% 63V
C45	4822 124 42287	1µF 10% 16V
C46	4822 124 42287	1µF 10% 16V
C47	4822 124 42292	10µF 10% 16V
C48	4822 124 42292	10µF 10% 16V
C49	4822 122 31727	470pF 5% 63V
C50	4822 122 32442	10nF 50V
C51	4822 122 32442	10nF 50V
C52	4822 122 32442	10nF 50V
C53	4822 122 31797	22nF 10% 63V
C54	4822 122 32442	10nF 50V
C55	4822 124 42287	1µF 10% 16V
C56	4822 124 42293	47µF 10% 16V
C57	4822 124 42288	2,2µF 10% 16V
C58	4822 124 42289	3,3µF 10% 16V
C59	4822 122 31947	100nF 20% 63V
C60	4822 124 42291	4,7µF 10% 16V
C61	4822 122 32927	220nF
C62	4822 124 42293	47µF 10% 16V
C63	5322 122 33446	3,3nF 10% 63V
C64	4822 124 42291	4,7µF 10% 16V
C65	4822 124 42288	2,2µF 10% 16V
C66	4822 122 32442	10nF 50V
C68	4822 124 42293	47µF 10% 16V
C69	4822 124 42289	3,3µF 10% 16V
C70	4822 122 31947	100nF 20% 63V
C71	4822 124 42291	4,7µF 10% 16V
C72	4822 124 42288	2,2µF 10% 16V
C73	4822 124 42293	47µF 10% 16V
C74	5322 122 33446	3,3nF 10% 63V
C75	4822 124 42291	4,7µF 10% 16V
C76	4822 122 32442	10nF 50V
C77	4822 124 42292	10µF 10% 16V
C78	4822 124 42292	10µF 10% 16V
C79	4822 124 42292	10µF 10% 16V
C80	4822 124 42292	10µF 10% 16V
C81	4822 124 42292	10µF 10% 16V
C82	4822 124 42292	10µF 10% 16V
C84	4822 122 32442	10nF 50V
C85	4822 122 31746	1000pF 5% 50V
C86	4822 122 32927	220nF
C87	4822 122 32504	15pF 5% 50V
C88	5322 122 31842	330pF 5% 63V
C89	4822 122 32504	15pF 5% 50V
C90	4822 122 31947	100nF 20% 63V
C91	4822 122 32927	220nF
C92	4822 126 10324	33pF 63V
C93	4822 122 31746	1000pF 5% 50V
C94	4822 126 10324	33pF 63V
C95	4822 122 31746	1000pF 5% 50V
C96	4822 122 32442	10nF 50V
C97	4822 122 31746	1000pF 5% 50V
C98	4822 122 31746	1000pF 5% 50V
C99	4822 122 31765	100pF 5% 50V
C100	4822 122 31765	100pF 5% 50V
C101	4822 122 32542	47nF 10% 63V
C102	4822 122 32542	47nF 10% 63V
C103	4822 122 32542	47nF 10% 63V
C104	4822 122 32542	47nF 10% 63V
C105	4822 122 31947	100nF 20% 63V
C106	4822 126 10324	33pF 63V
C107	4822 126 10324	33pF 63V
C108	4822 122 32927	220nF
C109	4822 122 31947	100nF 20% 63V
C110	4822 124 42308	1µF 10% 35V
C111	4822 122 31947	100nF 20% 63V
C112	4822 122 32542	47nF 10% 63V
C113	4822 122 31771	390pF 5% 50V
C114	4822 122 32482	22pF 5% 63V
C115	4822 124 42292	10µF 10% 16V
C116	4822 124 42292	10µF 10% 16V
C117	4822 122 32927	220nF
C118	4822 124 41643	100µF 20% 16V
C119	4822 122 32927	220nF
C120	4822 124 42292	10µF 10% 16V
C121	4822 122 32504	15pF 5% 50V
C122	4822 122 32082	4,7pF 5% 50V
C123	4822 122 32482	22pF 5% 63V
C124	4822 122 32504	15pF 5% 50V
C125	4822 124 42292	10µF 10% 16V
C126	4822 122 32927	220nF
C127	4822 122 32927	220nF
C128	4822 124 42307	10µF 10% 25V
C129	4822 122 32927	220nF
C130	4822 122 32927	220nF
C131	4822 124 42293	47µF 10% 16V
C132	4822 122 32927	220nF
C133	4822 124 42308	1µF 10% 35V
C134	4822 124 42307	10µF 10% 25V
C135	4822 122 32927	220nF
C136	4822 122 31746	1000pF 5% 50V
C137	4822 122 32442	10nF 50V
C138	4822 124 42292	10µF 10% 16V
C139	4822 122 32927	220nF
C140	5322 122 31842	330pF 5% 63V
C141	4822 122 31947	100nF 20% 63V
C142	4822 122 31947	100nF 20% 63V
C143	4822 122 31947	100nF 20% 63V
C144	4822 122 32482	22pF 5% 63V
C145	4822 122 32482	22pF 5% 63V
C146	4822 124 42287	1µF 10% 16V
C147	4822 122 31746	1000pF 5% 50V
C148	4822 122 31746	1000pF 5% 50V
C149	4822 122 31746	1000pF 5% 50V
C150	4822 126 10324	33pF 63V
C151	4822 126 10324	33pF 63V
C152	4822 124 40196	220µF 20% 16V
C153	4822 122 32927	220nF
C154	4822 124 42292	10µF 10% 16V
C155	4822 122 31947	100nF 20% 63V
C156	4822 122 31768	180pF 5% 50V
C157	4822 122 32927	220nF
C159	4822 122 31947	100nF 20% 63V
C160	4822 124 42292	10µF 10% 16V
C161	4822 124 42292	10µF 10% 16V
C162	4822 124 42292	10µF 10% 16V
C163	4822 124 42292	10µF 10% 16V
C164	4822 124 40201	1000µF 20% 16V
C165	4822 124 41643	100µF 20% 16V
C166	4822 124 41643	100µF 20% 16V
C167	4822 124 41643	100µF 20% 16V
C168	4822 124 41643	100µF 20% 16V

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C169	4822 124 42292	10µF 10% 16V
C170	4822 122 33496	100nF 10% 63V
C171	4822 124 42292	10µF 10% 16V
C172	4822 122 31765	100pF 5% 50V
C173	5322 122 33446	3,3nF 10% 63V
C174	5322 122 33446	3,3nF 10% 63V
C175	4822 122 31797	22nF 10% 63V
C176	4822 124 42291	4,7µF 10% 16V
C177	4822 122 32927	220nF
C178	4822 122 32927	220nF
C179	4822 122 32891	68nF 10% 63V
C180	4822 126 11829	1,5nF 10% 50V
C181	4822 122 31768	180pF 5% 50V
C182	4822 122 32927	220nF
C183	4822 124 41643	100µF 20% 16V
C184	4822 124 41643	100µF 20% 16V
C185	4822 122 31965	220pF 5% 63V
C186	4822 124 42292	10µF 10% 16V
C187	4822 122 31746	1000pF 5% 50V
C188	4822 122 31771	390pF 5% 50V
C189	4822 124 42292	10µF 10% 16V
C190	4822 124 41643	100µF 20% 16V
C191	4822 122 32927	220nF
C192	4822 124 40201	1000µF 20% 16V
C193	4822 122 31727	470pF 5% 63V
C194	4822 122 32927	220nF
C195	4822 122 32442	10nF 50V
C196	4822 122 31947	100nF 20% 63V
C197	4822 122 31727	470pF 5% 63V
C198	4822 124 42292	10µF 10% 16V
C199	4822 124 42292	10µF 10% 16V
C200	4822 124 40207	100µF 20% 25V
C201	4822 122 31947	100nF 20% 63V
C204	4822 126 11831	1000nF 10% 50V
C205	4822 122 32442	10nF 50V
C206	4822 124 41643	100µF 20% 16V
C207	4822 124 42292	10µF 10% 16V
C208	4822 124 42292	10µF 10% 16V
C209	4822 124 42292	10µF 10% 16V
C210	4822 124 41643	100µF 20% 16V
C211	4822 124 40201	1000µF 20% 16V
C214	4822 122 32927	220nF
C215	4822 124 42292	10µF 10% 16V
C216	4822 122 32927	220nF
C217	4822 122 31965	220pF 5% 63V
C218	4822 124 40201	1000µF 20% 16V
C219	4822 124 41643	100µF 20% 16V
C220	4822 122 32927	220nF
C221	4822 122 32442	10nF 50V
C222	4822 122 31965	220pF 5% 63V
C223	4822 122 32927	220nF
C224	4822 122 31746	1000pF 5% 50V
C226	4822 122 31746	1000pF 5% 50V
C227	4822 122 31784	4,7nF 10% 50V
C228	4822 122 31784	4,7nF 10% 50V
C229	5322 122 31842	330pF 5% 63V

R1	4822 101 90208	4Ω 7 2% 2W
R2	4822 101 90209	3k 3 5% 4W
R3	4822 116 83356	100k 2% 2W
R4	4822 051 20008	0Ω 5% 0,1W
R5	4822 051 10101	100Ω 2% 0,25W
R6	4822 051 10432	4k3 2% 0,25W
R7	4822 051 10102	1k 2% 0,25W
R8	4822 051 10103	10k 2% 0,25W
R9	4822 051 10512	5k1 2% 0,25W
R10	4822 050 11003	10k 1% 0,6W
R11	4822 051 10478	4Ω7 5% 0,25W
R12	4822 116 83358	4k 7 5% 0,5W
R13	4822 116 83359	0Ω 22 5% 0,5W
R14	4822 053 21475	4M 7 5% 0,5W
R15	4822 050 25108	5Ω1 1% 0,6W
R16	4822 050 21002	1k 1% 0,6W
R17	4822 051 10121	120Ω 2% 0,25W
R18	4822 051 10103	10k 2% 0,25W
R19	4822 051 10102	1k 2% 0,25W
R20	4822 051 10102	1k 2% 0,25W
R21	4822 051 10102	1k 2% 0,25W
R22	4822 051 10102	1k 2% 0,25W
R23	4822 051 10103	10k 2% 0,25W
R24	4822 051 10102	1k 2% 0,25W
R25	4822 051 10103	10k 2% 0,25W
R26	4822 051 10472	4k7 2% 0,25W
R27	4822 051 10103	10k 2% 0,25W
R28	4822 051 10102	1k 2% 0,25W
R29	4822 051 10103	10k 2% 0,25W
R30	4822 051 10472	4k7 2% 0,25W
R31	4822 051 10103	10k 2% 0,25W
R32	4822 051 10393	39k 2% 0,25W
R33	4822 051 10683	68k 2% 0,25W
R34	4822 051 10103	10k 2% 0,25W
R35	4822 051 10103	10k 2% 0,25W
R36	4822 051 10392	3k9 2% 0,25W
R37	4822 051 10122	1k2 2% 0,25W
R38	4822 051 10682	6k8 2% 0,25W
R39	4822 051 10332	3k3 2% 0,25W
R40	4822 051 10683	68k 2% 0,25W
R41	4822 051 10103	10k 2% 0,25W
R42	4822 051 10104	100k 2% 0,25W
R43	4822 051 10103	10k 2% 0,25W
R44	4822 051 10103	10k 2% 0,25W
R45	4822 051 10103	10k 2% 0,25W
R46	4822 051 10103	10k 2% 0,25W
R47	4822 051 10103	10k 2% 0,25W
R48	4822 051 10103	10k 2% 0,25W
R49	4822 051 10104	100k 2% 0,25W
R50	4822 051 10103	10k 2% 0,25W
R51	4822 051 10683	68k 2% 0,25W
R52	4822 051 10332	3k3 2% 0,25W
R53	4822 051 10682	6k8 2% 0,25W
R54	4822 051 10122	1k2 2% 0,25W
R55	4822 051 10392	3k9 2% 0,25W
R56	4822 051 10103	10k 2% 0,25W
R57	4822 051 10472	4k7 2% 0,25W
R58	4822 051 10472	4k7 2% 0,25W
R59	4822 051 10103	10k 2% 0,25W
R60	4822 051 10683	68k 2% 0,25W
R61	4822 051 10393	39k 2% 0,25W
R62	4822 051 10103	10k 2% 0,25W
R63	4822 051 10475	4M 7 5% 0,25W
R64	4822 051 10106	10M 5% 0,25W
R65	4822 051 10202	2k 2% 0,25W
R66	4822 051 10102	1k 2% 0,25W
R67	4822 051 10273	27k 2% 0,25W
R68	4822 051 10393	39k 2% 0,25W
R69	4822 051 10472	4k7 2% 0,25W
R70	4822 051 10113	11k 2% 0,25W
R71	4822 051 10823	82k 2% 0,25W
R72	4822 051 10475	4M 7 5% 0,25W
R73	4822 051 10224	220k 2% 0,25W
R74	4822 051 10224	220k 2% 0,25W
R75	4822 051 10472	4k7 2% 0,25W
R76	4822 051 10103	10k 2% 0,25W
R77	4822 051 10103	10k 2% 0,25W
R78	4822 051 10682	6k8 2% 0,25W
R79	4822 051 10202	2k 2% 0,25W
R80	4822 051 10823	82k 2% 0,25W
R81	4822 051 10475	4M 7 5% 0,25W
R82	4822 051 10106	10M 5% 0,25W
R83	4822 051 10102	1k 2% 0,25W
R84	4822 051 10273	27k 2% 0,25W
R85	4822 051 10393	39k 2% 0,25W
R86	4822 051 10113	11k 2% 0,25W
R87	4822 051 10475	4M 7 5% 0,25W
R88	4822 051 10224	220k 2% 0,25W
R89	4822 051 10224	220k 2% 0,25W
R90	4822 051 10472	4k7 2% 0,25W
R91	4822 051 10472	4k7 2% 0,25W
R92	4822 051 10682	6k8 2% 0,25W
R93	4822 051 10103	10k 2% 0,25W
R94	4822 051 10103	10k 2% 0,25W
R95	4822 051 10103	10k 2% 0,25W
R96	4822 051 10103	10k 2% 0,25W
R97	4822 051 10103	10k 2% 0,25W
R98	4822 051 10103	10k 2% 0,25W
R99	4822 051 10105	1M 5% 0,25W
R100	4822 051 10105	1M 5% 0,25W
R101	4822 051 10103	10k 2% 0,25W
R102	4822 051 10103	10k 2% 0,25W
R103	4822 051 10103	10k 2% 0,25W
R104	4822 051 10124	120k 2% 0,25W
R105	4822 051 10103	10k 2% 0,25W
R106	4822 051 10103	10k 2% 0,25W
R107	4822 051 10103	10k 2% 0,25W
R108	4822 051 10103	10k 2% 0,25W
R109	4822 050 22709	27Ω 1% 0,6W
R110	4822 050 22709	27Ω 1% 0,6W
R111	4822 051 10122	1k2 2% 0,25W
R112	4822 051 10102	1k 2% 0,25W
R113	4822 051 10272	2k7 2% 0,25W
R114	4822 051 10101	100Ω 2% 0,25W
R115	4822 051 10122	1k2 2% 0,25W
R116	4822 051 10471	470Ω 2% 0,25W
R117	4822 051 10102	1k 2% 0,25W
R118	4822 051 10751	750Ω 2% 0,25W
R119	4822 051 10331	330Ω 2% 0,25W
R120	4822 051 20008	0Ω 5% 0,1W
R121	4822 051 10202	2k 2% 0,25W
R123	4822 051 10103	10k 2% 0,25W
R124	4822 051 10103	10k 2% 0,25W
R125	4822 051 10101	100Ω 2% 0,25W
R126	4822 051 10332	3k3 2% 0,25W
R127	4822 051 10822	8k2 2% 0,25W
R128	4822 051 10202	2k 2% 0,25W
R129	4822 051 10822	8k2 2% 0,25W
R130	4822 051 10202	2k 2% 0,25W
R131	4822 051 10151	150Ω 2% 0,25W
R132	4822 051 10331	330Ω 2% 0,25W
R133	4822 051 10101	100Ω 2% 0,25W
R134	4822 051 10122	1k2 2% 0,25W
R135	4822 051 10331	330Ω 2% 0,25W
R136	4822 051 10331	330Ω 2% 0,25W
R137	4822 051 10331	330Ω 2% 0,25W
R138	4822 051 10751	750Ω 2% 0,25W
R139	4822 051 10202	2k 2% 0,25W
R140	4822 051 10562	5k6 2% 0,25W
R141	4822 051 10103	10k 2% 0,25W
R142	4822 051 10103	10k 2% 0,25W
R143	4822 051 10103	10k 2% 0,25W
R144	4822 051 10472	4k7 2% 0,25W
R145	4822 051 10122	1k2 2% 0,25W
R148	4822 051 10393	39k 2% 0,25W
R149	4822 051 10102	1k 2% 0,25W
R150	4822 051 10103	10k 2% 0,25W
R151	4822 051 10103	10k 2% 0,25W
R152	4822 051 10562	5k6 2% 0,25W
R153	4822 051 10202	2k 2% 0,25W

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R155	4822 051 10103	10k 2% 0,25W
R156	4822 051 10103	10k 2% 0,25W
R157	4822 051 10472	4k7 2% 0,25W
R158	4822 051 10472	4k7 2% 0,25W
R159	4822 051 10101	100Ω 2% 0,25W
R160	4822 051 10101	100Ω 2% 0,25W
R161	4822 051 10101	100Ω 2% 0,25W
R162	4822 051 10472	4k7 2% 0,25W
R163	4822 051 10472	4k7 2% 0,25W
R164	4822 051 10472	4k7 2% 0,25W
R165	4822 051 10511	510Ω 2% 0,25W
R166	4822 051 10511	510Ω 2% 0,25W
R167	4822 051 10511	510Ω 2% 0,25W
R168	4822 051 10103	10k 2% 0,25W
R169	4822 051 10102	1k 2% 0,25W
R170	4822 051 10103	10k 2% 0,25W
R171	4822 051 10102	1k 2% 0,25W
R172	4822 051 10101	100Ω 2% 0,25W
R173	4822 051 10478	4Ω7 5% 0,25W
R174	4822 051 10101	100Ω 2% 0,25W
R175	4822 051 10153	15k 2% 0,25W
R176	4822 051 10103	10k 2% 0,25W
R177	4822 051 10103	10k 2% 0,25W
R178	4822 051 10102	1k 2% 0,25W
R180	4822 051 10103	10k 2% 0,25W
R181	4822 051 10103	10k 2% 0,25W
R182	4822 051 10103	10k 2% 0,25W
R183	4822 051 10103	10k 2% 0,25W
R184	4822 051 10122	1k2 2% 0,25W
R185	4822 051 10682	6k8 2% 0,25W
R186	4822 051 10122	1k2 2% 0,25W
R187	4822 051 10102	1k 2% 0,25W
R188	4822 051 10471	470Ω 2% 0,25W
R189	4822 051 10103	10k 2% 0,25W
R190	4822 051 10271	270Ω 2% 0,25W
R191	4822 051 10102	1k 2% 0,25W
R192	4822 051 10102	1k 2% 0,25W
R193	4822 051 10271	270Ω 2% 0,25W
R194	4822 051 10102	1k 2% 0,25W
R195	4822 051 10102	1k 2% 0,25W
R196	4822 051 10472	4k7 2% 0,25W
R197	4822 051 10103	10k 2% 0,25W
R198	4822 051 10102	1k 2% 0,25W
R199	4822 051 10472	4k7 2% 0,25W
R200	4822 051 10103	10k 2% 0,25W
R201	4822 051 10202	2k 2% 0,25W
R202	4822 051 10103	10k 2% 0,25W
R203	4822 051 10103	10k 2% 0,25W
R204	4822 051 10102	1k 2% 0,25W
R205	4822 051 10113	11k 2% 0,25W
R206	4822 051 10202	2k 2% 0,25W
R207	4822 051 10105	1M 5% 0,25W
R208	4822 051 10102	1k 2% 0,25W
R209	4822 051 10102	1k 2% 0,25W
R210	4822 051 10472	4k7 2% 0,25W
R211	4822 051 10821	820Ω 2% 0,25W
R212	4822 051 10822	8k2 2% 0,25W
R213	4822 051 10332	3k3 2% 0,25W
R214	4822 051 10103	10k 2% 0,25W
R215	4822 051 10471	470Ω 2% 0,25W
R216	4822 051 10103	10k 2% 0,25W
R217	4822 051 10391	390Ω 2% 0,25W
R218	4822 051 10272	2k7 2% 0,25W
R219	4822 051 10392	3k9 2% 0,25W
R220	4822 051 10221	220Ω 2% 0,25W
R221	4822 051 10124	120k 2% 0,25W
R222	4822 051 10182	1k8 2% 0,25W
R223	4822 051 10221	220Ω 2% 0,25W
R224	4822 051 10471	470Ω 2% 0,25W
R225	4822 051 20008	0Ω 5% 0,1W
R226	4822 051 10124	120k 2% 0,25W
R227	4822 051 10221	220Ω 2% 0,25W
R228	4822 051 10202	2k 2% 0,25W
R229	4822 051 10331	330Ω 2% 0,25W
R230	4822 051 10689	68Ω 2% 0,25W
R231	4822 051 10103	10k 2% 0,25W
R232	4822 051 10472	4k7 2% 0,25W
R233	4822 051 10103	10k 2% 0,25W
R234	4822 051 10393	39k 2% 0,25W
R235	4822 051 10391	390Ω 2% 0,25W
R236	4822 051 10181	180Ω 2% 0,25W
R237	4822 051 10151	150Ω 2% 0,25W
R238	4822 051 10103	10k 2% 0,25W
R239	4822 051 10332	3k3 2% 0,25W
R240	4822 051 10393	39k 2% 0,25W
R241	4822 051 10103	10k 2% 0,25W
R242	4822 051 10511	510Ω 2% 0,25W
R243	4822 051 10101	100Ω 2% 0,25W
R244	4822 051 10391	390Ω 2% 0,25W
R245	4822 051 10391	390Ω 2% 0,25W
R246	4822 051 10751	750Ω 2% 0,25W
R247	4822 051 10102	1k 2% 0,25W
R248	4822 051 10151	150Ω 2% 0,25W
R249	4822 051 10103	10k 2% 0,25W
R250	4822 051 10472	4k7 2% 0,25W
R251	4822 051 10472	4k7 2% 0,25W
R252	4822 051 10472	4k7 2% 0,25W
R253	4822 051 10472	4k7 2% 0,25W
R254	4822 051 10271	270Ω 2% 0,25W
R255	4822 051 10472	4k7 2% 0,25W
R257	4822 051 10153	15k 2% 0,25W
R258	4822 050 21001	100Ω 1% 0,6W
R269	4822 051 10472	4k7 2% 0,25W
R270	4822 051 10103	10k 2% 0,25W
R271	4822 051 10682	6k8 2% 0,25W
R272	4822 051 10103	10k 2% 0,25W
R273	4822 051 10681	680Ω 2% 0,25W
R274	4822 051 10681	680Ω 2% 0,25W
R275	4822 051 10103	10k 2% 0,25W
R276	4822 051 10153	15k 2% 0,25W
R277	4822 051 10478	4Ω7 5% 0,25W
R278	4822 051 10101	100Ω 2% 0,25W
R279	4822 051 10153	15k 2% 0,25W
R280	4822 051 10103	10k 2% 0,25W
R281	4822 051 10103	10k 2% 0,25W
R282	4822 051 10103	10k 2% 0,25W
R283	4822 051 10472	4k7 2% 0,25W
R284	4822 051 10153	15k 2% 0,25W
R285	4822 051 10103	10k 2% 0,25W
R286	4822 051 10103	10k 2% 0,25W
R287	4822 051 10103	10k 2% 0,25W
R288	4822 051 10224	220k 2% 0,25W
R289	4822 051 10103	10k 2% 0,25W
R290	4822 051 10103	10k 2% 0,25W
R291	4822 051 10471	470Ω 2% 0,25W
R293	4822 051 10472	4k7 2% 0,25W
R295	4822 051 10272	2k7 2% 0,25W
R296	4822 051 10272	2k7 2% 0,25W
R298	4822 051 10471	470Ω 2% 0,25W
R299	4822 051 20008	0Ω 5% 0,1W
R301	4822 050 22202	2k2 1% 0,6W
R302	4822 051 10101	100Ω 2% 0,25W
R303	4822 051 10102	1k 2% 0,25W
R304	4822 051 10103	10k 2% 0,25W
R305	4822 051 10122	1k2 2% 0,25W
R306	4822 051 10393	39k 2% 0,25W
R307	4822 051 10103	10k 2% 0,25W
R308	4822 051 20008	0Ω 5% 0,1W
R309	4822 051 10472	4k7 2% 0,25W
R311	4822 050 22709	27Ω 1% 0,6W
R314	4822 051 20008	0Ω 5% 0,1W
R315	4822 051 20008	0Ω 5% 0,1W
R316	4822 051 20008	0Ω 5% 0,1W
R320	4822 051 10103	10k 2% 0,25W
R321	4822 051 10472	4k7 2% 0,25W
R322	4822 101 90209	3k 3
R323	4822 116 83357	4Ω 7 2% 0,2W
R324	4822 051 10479	47Ω 2% 0,25W
R325	4822 051 10479	47Ω 2% 0,25W
R326	4822 051 10391	390Ω 2% 0,25W
R327	4822 051 10391	390Ω 2% 0,25W
R328	4822 051 10751	750Ω 2% 0,25W
R329	4822 051 20008	0Ω 5% 0,1W
R330	4822 051 20008	0Ω 5% 0,1W
R332	4822 051 10101	100Ω 2% 0,25W
R333	4822 051 10103	10k 2% 0,25W
R334	4822 051 10103	10k 2% 0,25W
R335	4822 051 10271	270Ω 2% 0,25W
R336	4822 051 20008	0Ω 5% 0,1W
R337	4822 051 10751	750Ω 2% 0,25W
R338	4822 051 10392	3k9 2% 0,25W
R339	4822 051 10511	510Ω 2% 0,25W
R340	4822 051 20008	0Ω 5% 0,1W
R341	4822 051 20008	0Ω 5% 0,1W
R342	4822 051 10511	510Ω 2% 0,25W
R343	4822 051 10103	10k 2% 0,25W
R344	4822 051 10182	1k8 2% 0,25W
R345	4822 051 10561	560Ω 2% 0,25W
R346	4822 051 10561	560Ω 2% 0,25W
R347	4822 051 10561	560Ω 2% 0,25W
R348	4822 051 10561	560Ω 2% 0,25W
R349	4822 051 10561	560Ω 2% 0,25W
R350	4822 051 10561	560Ω 2% 0,25W
R351	4822 051 20008	0Ω 5% 0,1W
R352	4822 051 10104	100k 2% 0,25W
R353	4822 051 20008	0Ω 5% 0,1W
R358	4822 051 20008	0Ω 5% 0,1W
R360	4822 051 20008	0Ω 5% 0,1W
R361	4822 051 20008	0Ω 5% 0,1W
R364	4822 051 20008	0Ω 5% 0,1W
R366	4822 051 20008	0Ω 5% 0,1W
R367	4822 051 20008	0Ω 5% 0,1W
R368	4822 051 20008	0Ω 5% 0,1W
R369	4822 051 20008	0Ω 5% 0,1W
R370	4822 051 10103	10k 2% 0,25W
R371	4822 051 20008	0Ω 5% 0,1W
R372	4822 051 10272	2k7 2% 0,25W
R373	4822 051 10272	2k7 2% 0,25W
R374	4822 051 20008	0Ω 5% 0,1W
R375	4822 051 10472	4k7 2% 0,25W
R376	4822 051 10103	10k 2% 0,25W
R377	4822 051 10103	10k 2% 0,25W
R378	4822 050 21809	18Ω 1% 0,6W
R379	4822 051 10151	150Ω 2% 0,25W
LKL	4822 050 21003	10K00 1% 0,6W
LK210	4822 116 83417	0R47 0.25W 5%

D1	4822 130 30799	1N4007G
D2	4822 130 30799	1N4007G
D3	4822 130 30799	1N4007G
D4	4822 130 30799	1N4007G
D5	4822 130 31348	BYV96D
D6	4822 130 82806	5V6
D7	5322 130 34605	BAX12A
D8	4822 130 42489	BYD33G
D9	5322 130 34605	BAX12A
D10	4822 130 30799	1N4007G

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Polarizer board

D11	4822 130 82786	10V
D12	4822 130 82784	BYW98
D13	4822 130 82784	BYW98
D14	4822 130 41601	BYV95A
D15	4822 130 82784	BYW98
D16	4822 130 82784	BYW98
D17A	5322 130 80408	11DQ06
D18	4822 130 31353	BAT43
D19A	4822 130 82785	ZC824
D21	4822 130 30621	1N4148
D22	4822 130 30621	1N4148
D23	4822 130 30621	1N4148
D24	4822 130 30621	1N4148
D25	4822 130 30621	1N4148
D26	4822 130 30621	1N4148
D27	4822 130 31353	BAT43
D29	4822 130 30621	1N4148
D30	4822 130 31353	BAT43
D33	4822 130 30621	1N4148
D34	4822 130 31353	BAT43
D35	4822 130 82806	5V6
D36	4822 130 62867	9V1
D37	4822 130 30621	1N4148
D38	4822 130 30621	1N4148
D39	4822 130 30621	1N4148
D40	4822 130 82806	5V6
D41	4822 130 30621	1N4148
D42	4822 130 31353	BAT43
D43	4822 130 30621	1N4148
LED1	4822 130 82787	RED LED
LED2	4822 130 82787	RED LED
LED3	4822 130 82787	RED LED
LED4	4822 130 82787	RED LED

U1	4822 209 73756	U2829B
U2	4822 209 10263	HEF4052BP
U3	4822 209 30467	NMC9366N
U3	4822 209 30547	NMC9366N (05R ONLY)
U4	4822 209 30545	µ-P (02R ONLY)
U4	4822 209 30546	µ-P (01R/05R/19R)
U5	5322 209 84035	N7416N
U6	4822 209 30465	TEA2029C
U7	5322 209 10576	HEF4053BD
U8	4822 209 62426	74HC4053
U9	4822 209 30466	PD6144C-501
U10	5322 209 84035	N7416N
U11	4822 209 80747	TL084CNST
U12	4822 209 80587	LM324N
U13	5322 209 73938	NE572N
U14	4822 209 80587	LM324N
U15	4822 209 80587	LM324N
U16	5322 209 10576	HEF4053BD
U17	4822 209 30152	LM7001
U18	4822 209 60452	NE612AN
U20	4822 209 30152	LM7001
U21	4822 209 30464	UA733CN
U22	5322 209 10576	HEF4053BD
U23	4822 209 30468	TDA8380/NI
U24	5322 209 10576	HEF4053BD
Q1	5322 130 42087	BUT11A
Q2	4822 130 40823	BD139
Q3	4822 130 62879	FXT749
Q4	4822 130 62879	FXT749
Q5	4822 130 44257	BC547
Q6	4822 130 62865	ZTX301
Q7	4822 130 62865	ZTX301
Q8	4822 130 44257	BC547
Q9	4822 130 44257	BC547
Q10	4822 130 44257	BC547
Q11	4822 130 62865	ZTX301
Q12	4822 130 62865	ZTX301
Q13	4822 130 44257	BC547
Q14	4822 130 44257	BC547
Q15	4822 130 44257	BC547
Q16	4822 130 62866	ZTX314
Q17	4822 130 44257	BC547
Q18	4822 130 62866	ZTX314
Q19	4822 130 44257	BC547
Q20	4822 130 44257	BC547
Q21	4822 130 44257	BC547
Q22	4822 130 44257	BC547
Q23	4822 130 62866	ZTX314
Q23	4822 130 62883	ZVN3306 (FET)
Q24	4822 130 44257	BC547
Q25	4822 130 40959	BC547B
Q26	4822 130 44257	BC547
Q27	4822 130 44257	BC547
Q28	4822 130 62866	ZTX314
Q29	4822 130 44257	BC547
Q31	4822 130 44257	BC547
Q32	4822 130 44257	BC547
Q33	4822 130 44257	BC547
Q34	4822 130 40855	BC337
Q38	4822 130 40855	BC337
Q39	4822 130 40855	BC337
Q40	4822 130 44257	BC547
Q41	4822 130 40855	BC337
Q42	4822 130 44257	BC547
Q43	4822 130 44257	BC547
Q44	4822 130 44257	BC547
Q45	4822 130 44257	BC547

L1	4822 157 63553	3,9µH
L2	4822 157 63557	100 µH
L3	4822 157 63557	100 µH
L4	4822 157 63554	12 µH
L7	4822 157 63552	1,5µH
L8	4822 157 63555	33 µH
L9	4822 157 63555	33 µH
L10	4822 157 63552	1,5µH
L11	4822 157 63556	82 µH
L12	4822 157 63556	82 µH
L13	4822 157 63555	33 µH
L14	4822 157 63554	12 µH

Various

SK1	4822 267 41042	5-POLE PUSH SOCKET

C1	4822 122 31947	100nF 25V
C2	4822 124 42287	1µF 16V
C3	4822 124 42387	220nF 63V
C4	4822 122 31947	100nF 25V
C5	4822 124 40201	1000µF 16V
C6	4822 124 42387	220nF 63V
C7	4822 124 31947	100nF 25V

R1	4822 051 10203	20kΩ 2% 0,25W
R2	4822 051 10203	20kΩ 2% 0,25W
R3	4822 051 10203	20kΩ 2% 0,25W
R4	4822 051 10203	20kΩ 2% 0,25W
R5	4822 051 10203	20kΩ 2% 0,25W
R6	4822 051 10103	10kΩ 2% 0,25W
R7	4822 051 10103	10kΩ 2% 0,25W
R8	4822 051 10103	10kΩ 2% 0,25W
R9	4822 051 10103	10kΩ 2% 0,25W
R10	4822 051 10203	20kΩ 2% 0,25W
R11	4822 051 10472	4k7 2% 0,25W
R12	4822 051 10392	3k9 2% 0,25W
R13	4822 051 10104	100kΩ 2% 0,25W
R14	4822 051 10103	10kΩ 2% 0,25W
R15	4822 051 10103	10kΩ 2% 0,25W
R16	4822 051 10104	100kΩ 2% 0,25W
R17	4822 051 10103	10kΩ 2% 0,25W
R18	4822 051 10103	10kΩ 2% 0,25W
R19	4822 051 10153	15kΩ 2% 0,25W
R20	4822 051 10392	3k9 2% 0,25W
R21	4822 051 10102	1kΩ 2% 0,25W
R22	4822 051 10472	4k7 2% 0,25W
R23	4822 051 10562	5k6 2% 0,25W
R24	4822 051 10102	1kΩ 2% 0,25W
R25	4822 051 10124	120kΩ 2% 0,25W
R26	4822 051 10101	100Ω 2% 0,25W
R27	4822 051 10569	56Ω 2% 0,25W
R28	4822 051 10101	100Ω 2% 0,25W
R29	4822 051 10101	100Ω 2% 0,25W
R30	4822 051 10569	56Ω 2% 0,25W
R31	4822 051 10828	8Ω2 2% 0,25W
R32	4822 051 10102	1kΩ 2% 0,25W
R33	4822 051 10828	8Ω2 2% 0,25W
R34	4822 051 10102	1kΩ 2% 0,25W
R35	4822 051 10103	10kΩ 2% 0,25W
R36	4822 051 10152	1k5 2% 0,25 W
R37	4822 051 10103	10kΩ 2% 0,25W

D1	4822 130 30621	1N4148
D2	4822 130 62867	9V1
D3	4822 130 62867	9V1
D4	4822 130 30621	1N4148
D5	4822 130 30621	1N4148

U1	5322 209 10421	4094
U2	5322 209 10576	4053
U3	4822 209 31122	TLC272
U4	4822 209 31123	LMC355
U5	4822 209 71285	LM358
Q1	4822 130 44257	BC547
Q2	4822 130 44257	BC547
Q3	4822 130 40855	BC557
Q4	4822 130 40855	BC557
Q5	4822 130 44257	BC547
Q6	4822 130 44257	BC547