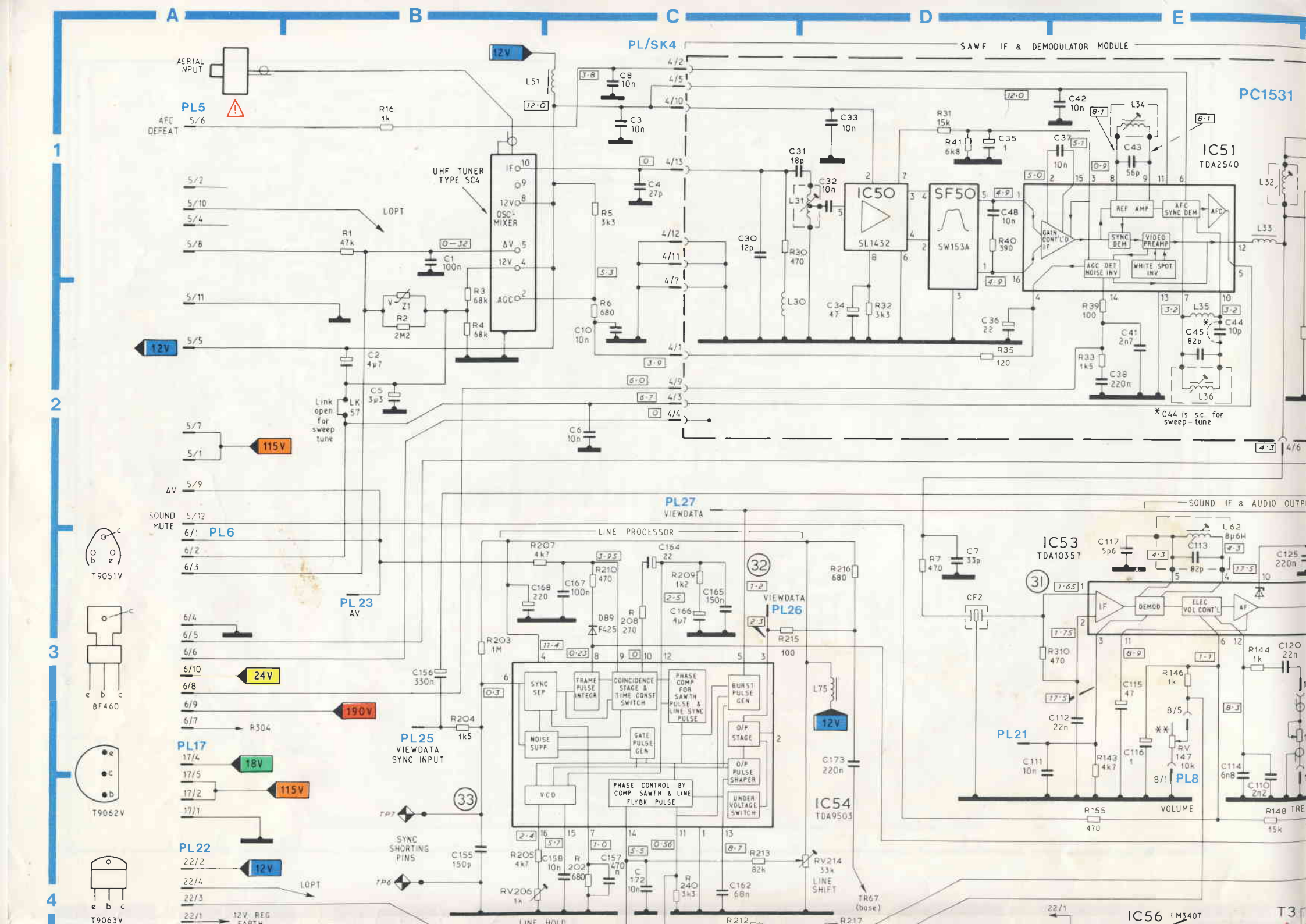
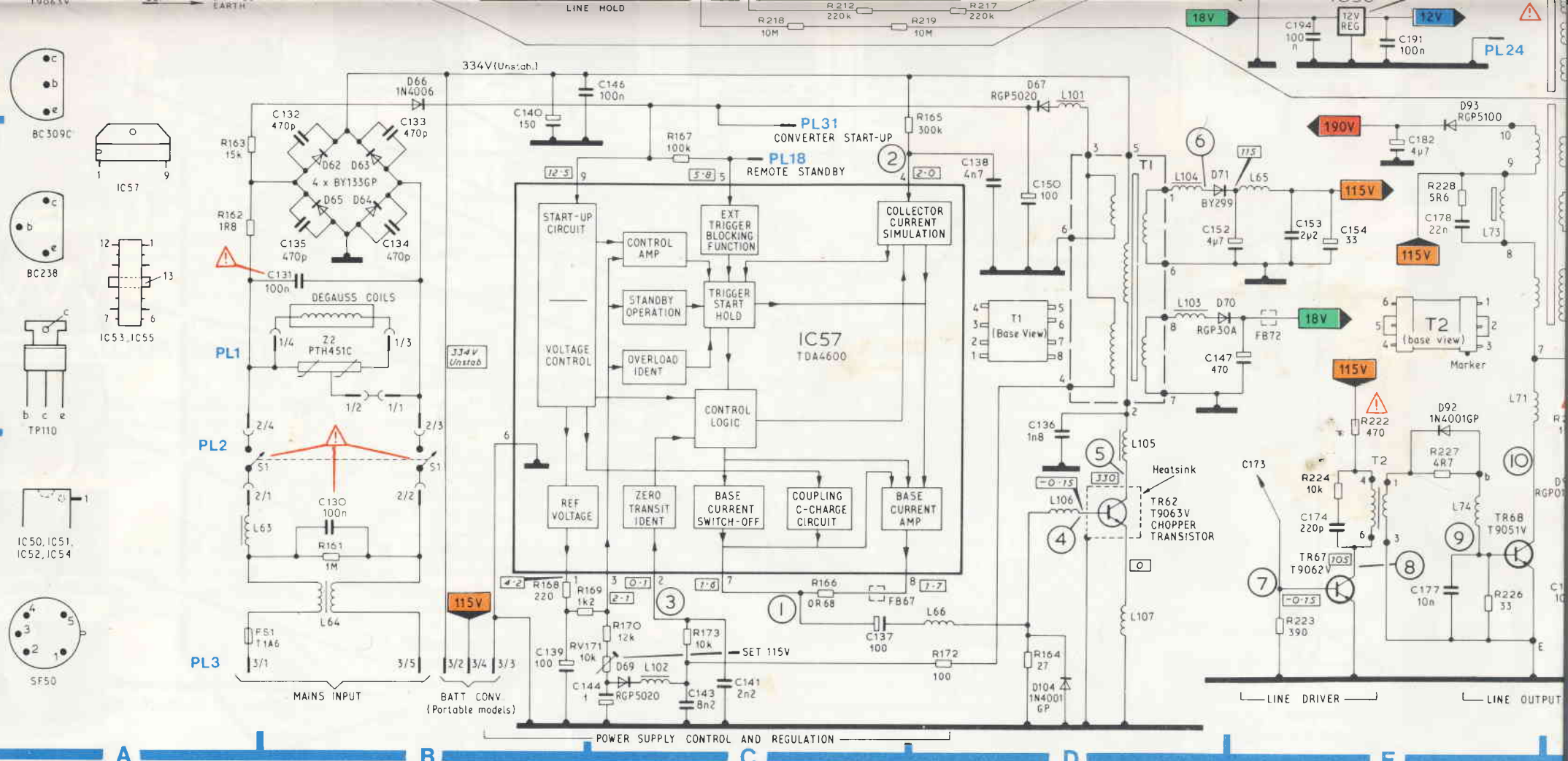

A
B
C
D
E
1
2
3
4
PL/SK4
SAWF IF & DEMODULATOR MODULE
PC1531
AERIAL INPUT
PL5
AFC DEFEAT
R16 1k
12V
L51
C8 10n
C3 10n
UHF TUNER TYPE SC4
IF
12Vo
OSC-MIXER
ΔV
12V
AGC
LOPT
R1 47k
C1 100n
R3 68k
R4 68k
Z1
R2 2M2
R5 3k3
R6 680
C10 10n
C4 27p
C2 4μ7
C5 3μ3
Link open for sweep tune
LK 57
C6 10n
115V
ΔV
SOUND MUTE
PL6
PL 23
ΔV
C33 10n
C31 18p
C32 10n
L31
IC50
SL1432
SF50
SW153A
R30 470
L30
C30 12p
C34 47
R32 3k3
R31 15k
R41 6k8
C35 1
C42 10n
C37 10n
L34
C43 56p
IC51
TDA2540
REF AMP
AFC SYNC DEM
AFC
GAIN CONT'L'D IF
SYNC DEM
VIDEO PREAMP
AGC DET NOISE INV
WHITE SPOT INV
C48 10n
R40 390
R39 100
C41 2n7
R33 1k5
C38 220n
R35 120
C36 22
L35
C45 82p
C44 10p
L36
L32
L33
*C44 is sc for sweep-tune
PL27
VIEWDATA
LINE PROCESSOR
R207 4k7
C164 22
R210 470
C168 220
C167 100n
R209 1k2
C165 150n
C166 4μ7
D89 F425
R 208 270
R203 1M
C156 330n
R204 1k5
PL25
VIEWDATA SYNC INPUT
SYNC SEP
FRAME PULSE INTEGR
COINCIDENCE STAGE & TIME CONST SWITCH
PHASE COMP FOR SAWTH PULSE & LINE SYNC PULSE
BURST PULSE GEN
NOISE SUPP
GATE PULSE GEN
O/P STAGE
O/P PULSE SHAPER
VCO
PHASE CONTROL BY COMP SAWTH & LINE FLYBK PULSE
UNDER VOLTAGE SWITCH
SYNC SHORTING PINS
TP7
TP6
C155 150p
R205 4k7
C158 10n
R 202 680
C157 470n
C 172 10n
R 240 3k3
C162 68n
RV206 1k
LINE HOLD
R213 82k
RV214 33k
LINE SHIFT
TR67 (base)
R212
R217
VIEWDATA
PL26
R215 100
R216 680
L75
12V
C173 220n
IC54
TDA9503
SOUND IF & AUDIO OUTP
IC53
TDA1035T
C117 5p6
C113 82p
L62 8μ6H
C125 220n
R7 470
C7 33p
CF2
IF
DEMOD
ELEC VOL CONT'L
AF
R310 470
C115 47
C112 22n
C111 10n
R143 4k7
C116 1
RV 147 10k
PL21
PL8
VOLUME
R155 470
R144 1k
C120 22n
C114 6n8
C110 2n2
R148 15k
TRE
IC56 LM340T
T3
T9051V
BF460
T9062V
T9063V
PL17
17/4 18V
17/5 115V
17/2 190V
17/1
R304
PL22
22/2 12V
22/4 LOPT
22/3
22/1 12V REG EARTH
24V
190V



GRID REFERENCES

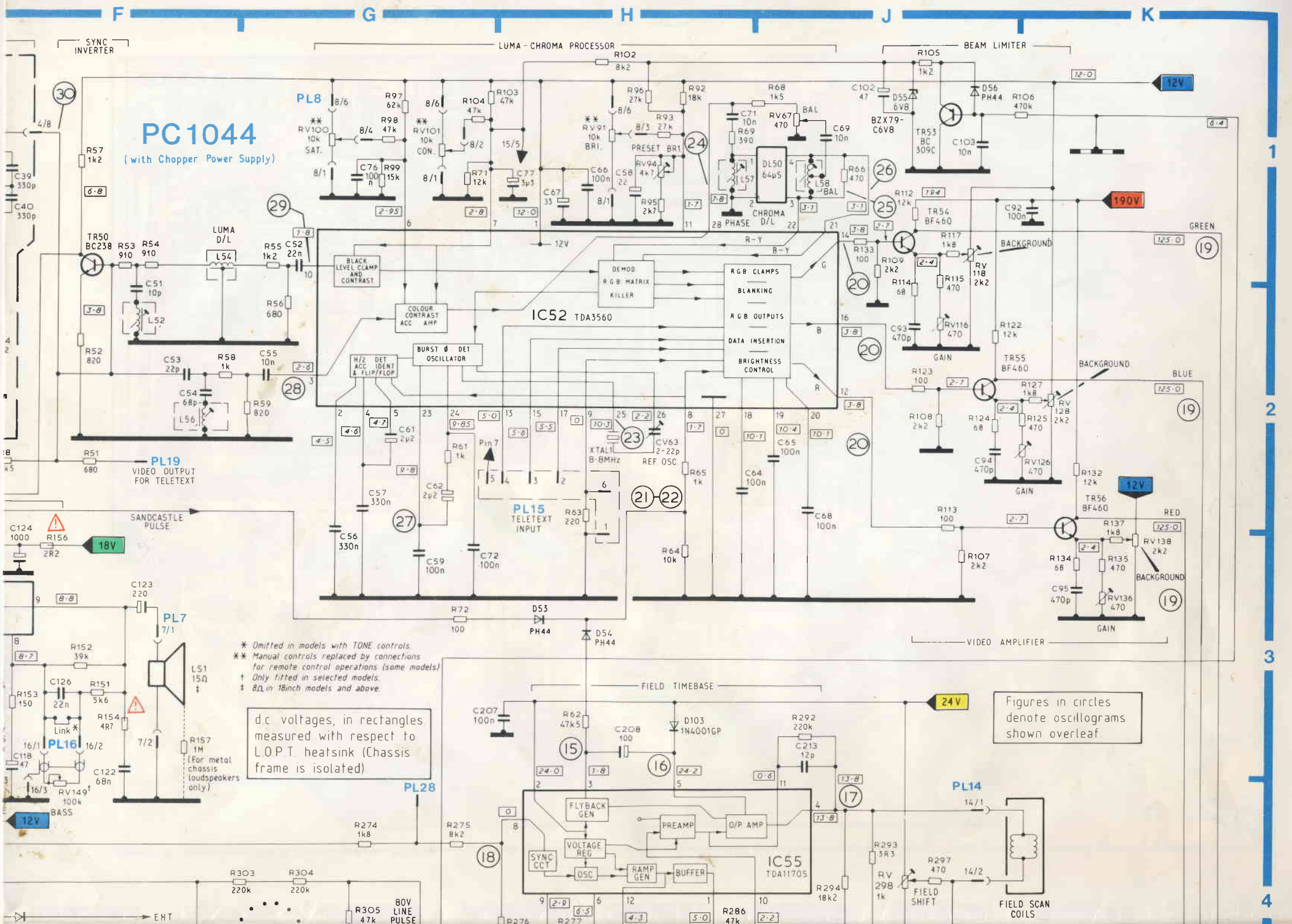
The circuit diagram location is followed by the printed panel location shown overleaf.

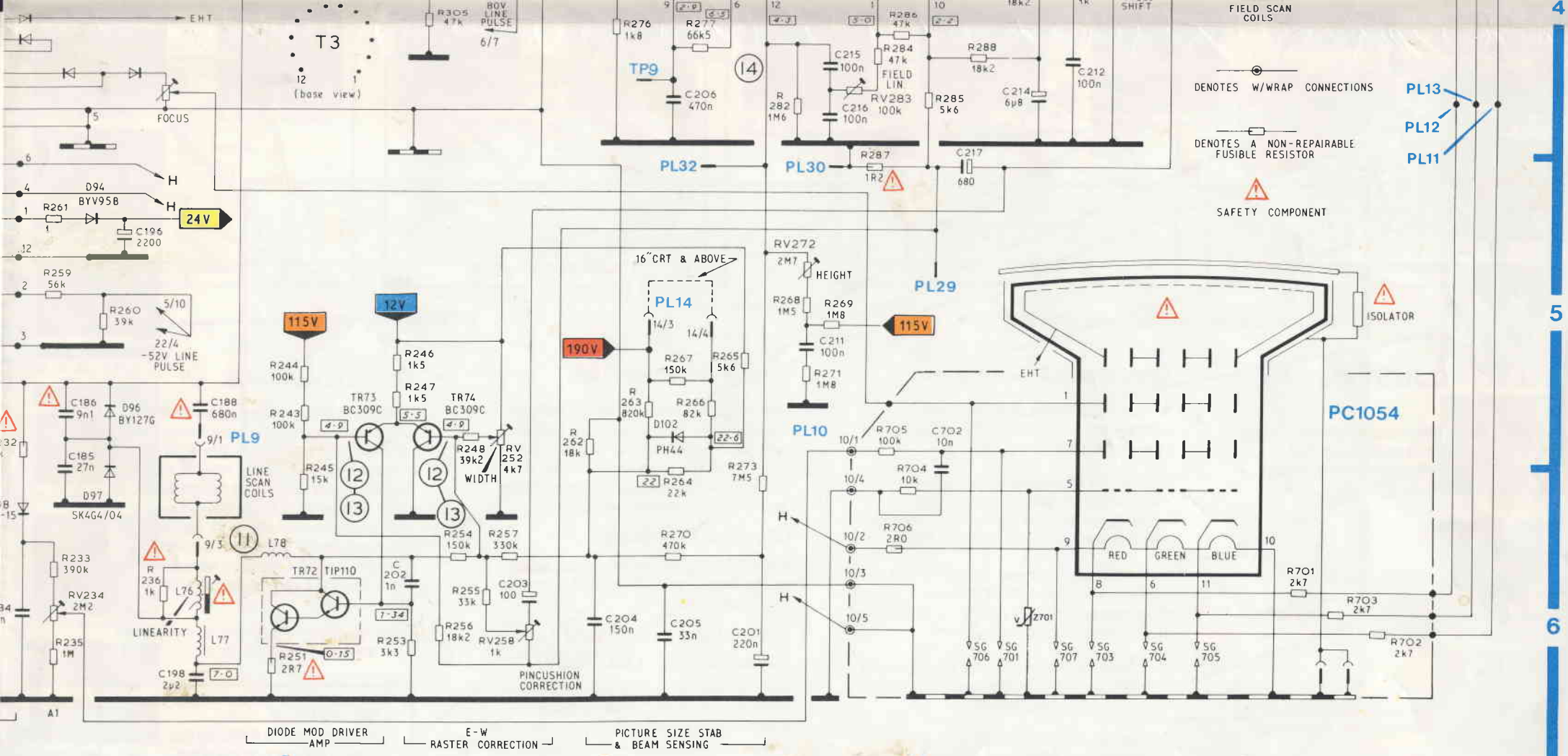
PC1531

C30 ... C1,*A2*
C31 ... D1,*A2*
C32 ... D1,*A1*
C33 ... D1,*A1*
C34 ... D2,*A1*
C35 ... D1,*A1*
C36 ... D2,*B1*
C37 ... E1,*A1*
C38 ... E2,*A1*
C39 ... F1,*A2*
C40 ... F1,*B2*
C41 ... E2,*B1*
C42 ... E1,*B2*
C43 ... E1,*B1*
C44 ... E2,*B2*
C45 ... E2,*B2*
C48 ... D1,*A1*
IC50 ... D1,*A1*
IC51 ... E1,*B1*
L30 ... C2,*A2*
L31 ... D1,*A2*
L32 ... E1,*B2*
L33 ... E1,*B2*
L34 ... E1,*B1*
L35 ... E2,*B1*
L36 ... E2,*B2*
R30 ... D1,*A2*
R31 ... D1,*A1*
R32 ... D2,*A1*
R33 ... E2,*A1*
R34 ... F2,*A2*
R35 ... D2,*B1*
R39 ... E2,*B1*
R40 ... D1,*A1*
R41 ... D1,*B1*
SF50 ... D1,*A1*
SK4 ... C1,*B2*

PC1044

C1 ... B1,*J2*
C2 ... B2,*H2*
C3 ... C1,*H3*
C4 ... C1,*H3*
C5 ... B2,*H2*
C6 ... C2,*K4*
C7 ... D3,*J4*
C8 ... C1,*J4*
C10 ... C2,*K3*
C51 ... F2,*F1*
C52 ... G1,*F3*
C53 ... F2,*G2*
C54 ... F2,*G2*
C55 ... G2,*F2*
C56 ... G3,*F2*
C57 ... G2,*F2*
C58 ... H1,*F2*
C59 ... G3,*C2*
C61 ... G2,*F2*
C62 ... G2,*C2*
CV63 ... H2,*E2*
C64 ... H2,*E3*
C65 ... J2,*D3*
C66 ... H1,*E2*
C67 ... H1,*G1*
C68 ... J2,*D3*
C69 ... J1,*D3*
C71 ... H1,*D2*
C72 ... G3,*C2*
C76 ... G1,*E1*
C77 ... H1,*E1*
C92 ... K1,*F4*
C93 ... J2,*F5*
C94 ... J2,*D5*
C95 ... K3,*E5*
C102 ... J1,*C1*
C103 ... J1,*C2*
C110 ... E4,*F3*
C111 ... D3,*F2*
C112 ... E3,*F2*
C113 ... E3,*G2*
C114 ... E3,*F3*
C115 ... E3,*F3*
C116 ... E3,*G2*
C117 ... E3,*F2*
C118 ... F3,*G3*
C120 ... E3,*F4*
C122 ... F3,*G3*
C123 ... F3,*G3*
C124 ... F3,*F3*
C125 ... E3,*G3*
C126 ... F3,*G4*
C130 ... B6,*J1*
C131 ... B5,*K5*
C132 ... B5,*K5*
C133 ... B5,*K5*
C134 ... B5,*J6*
C135 ... B5,*K5*
C136 ... D5,*H5*
C137 ... C6,*H5*
C138 ... D5,*J5*
C139 ... B6,*J5*
C140 ... B4,*G7*
C141 ... C6,*J5*
C143 ... C6,*J6*
C144 ... C6,*J5*
C146 ... C4,*H7*
C147 ... E5,*G4*
C150 ... D5,*J5*
C152 ... E5,*G6*
C153 ... E5,*A4*
C154 ... E5,*G6*
C155 ... B4,*B1*
C156 ... B3,*C1*
C157 ... C4,*B1*
C158 ... C4,*B2*
C162 ... C4,*C2*
C164 ... C3,*B2*
C165 ... C3,*C1*
C166 ... C3,*C2*
C167 ... C3,*C2*
C168 ... C3,*B2*
C172 ... C4,*B2*
C173 ... D3,*B1*
C174 ... E6,*A1*
C177 ... E6,*A3*
C178 ... E5,*B6*
C182 ... E5,*C6*
C184 ... F6,*C5*
C185 ... F5,*A3*
C186 ... F5,*B3*
C188 ... F5,*B3*
C191 ... E4,*F2*
C194 ... E4,*G2*
C196 ... F5,*C3*
C198 ... F6,*A5*
C201 ... H6,*E7*
C202 ... G6,*D7*
C203 ... G6,*E7*
C204 ... H6,*D7*
C205 ... H6,*A5*
C206 ... H4,*E6*
C207 ... H3,*F6*
C208 ... H3,*F6*
C211 ... H5,*F7*
C212 ... J4,*F6*
C213 ... J3,*E6*
C214 ... J4,*E7*
C215 ... H4,*F6*
C216 ... H4,*F6*
C217 ... J5,*E6*
CF2 ... D3,*F3*
D53 ... H3,*C3*
D54 ... H3,*D3*
D55 ... J1,*C1*
D56 ... J1,*D1*
D62 ... B5,*K5*
D63 ... B5,*K5*
D64 ... B5,*J6*
D65 ... B5,*K5*
D66 ... B4,*J5*
D67 ... D4,*H5*
D69 ... C6,*J6*
D70 ... E5,*G5*
D71 ... E5,*G6*
D89 ... C3,*C2*
D92 ... E5,*A3*
D93 ... E4,*C6*
D94 ... F5,*C4*
D96 ... F5,*A3*
D97 ... F6,*A4*
D98 ... F6,*C6*
D102 ... H5,*E6*
D103 ... H3,*F6*
D104 ... D6,*H6*
DL50 ... J1,*D2*
FB67 ... C6,*J5*
FB72 ... E5,*G4*
FS1 ... B6,*H1*
IC52 ... H2,*E2*
IC53 ... E3,*G3*
IC54 ... D4,*B2*
IC55 ... J4,*F6*
IC56 ... E4,*F2*
IC57 ... C5,*H5*
L51 ... C1,*J1*
L52 ... F2,*F2*
L54 ... F1,*F1*
L56 ... F2,*G1*
L57 ... H1,*D2*
L58 ... J1,*D3*
L62 ... E3,*G2*
L63 ... B6,*K1*
L64 ... B6,*J1*
L65 ... E5,*G6*
L66 ... D6,*H5*
L71 ... E5,*A3*
L73 ... E5,*C6*
L74 ... E6,*A3*
L75 ... D3,*D1*
L76 ... F6,*B3*
L77 ... F6,*A4*
L78 ... F6,*C7*
L101 ... D4,*H5*
L102 ... C6,*J6*
L103 ... D5,*G5*
L104 ... D5,*G5*
L105 ... D6,*H5*
L106 ... D6,*H6*
L107 ... D6,*H6*
LS1 ... F3,–
PL1 ... A5,*K1*
PL2 ... A6,*K1*
PL3 ... A6,*H1*
PL4 ... C1,*J4*
PL5 ... A1,*J2*
PL6 ... A3,*G2*
PL7 ... F3,*G3*
PL8 ... G1,*D1*
PL9 ... F5,*C3*
PL10 ... H6,*D4*
PL11 ... K4,*E4*
PL12 ... K4,*D4*
PL13 ... K4,*D4*
PL14 ... J4,*E6*
PL15 ... H2,*D3*
PL16 ... F3,*G4*
PL17 ... A3,*G5*
PL18 ... C5,*H6*
PL19 ... F2,*G2*
PL21 ... D3,*G2*
PL22 ... A4,*G1*
PL23 ... B3,*H1*
PL24 ... E4,*F2*
PL25 ... B3,*C1*
PL26 ... C3,*B2*
PL27 ... C2,*C3*
PL28 ... G4,*D4*
PL29 ... J5,*D7*
PL30 ... H5,*F7*
PL31 ... C5,*H5*
PL32 ... H5,*E6*
R1 ... B1,*J2*
R2 ... B2,*H2*
R3 ... B2,*H2*
R4 ... B2,*H2*
R5 ... C1,*J3*
R6 ... C2,*J3*
R7 ... D3,*H4*
R8 ... F2,*G2*
R16 ... B1,*K2*
R51 ... F2,*G2*
R52 ... F2,*F1*
R53 ... F1,*F1*
R54 ... F1,*F1*
R55 ... G1,*F3*
R56 ... G2,*F3*
R57 ... F1,*F1*
R58 ... F2,*F1*
R59 ... G2
R61 ... G2
R62 ... H3,
R63 ... H2,
R64 ... H3
R65 ... H2
R66 ... J1,
RV67 ... J1,
R68 ... J1,
R69 ... H1,
R71 ... G1
R72 ... G3,
RV91 ... H1
R92 ... H1,
R93 ... H1,
RV94 ... H1,
R95 ... H1
R96 ... H1,
R97 ... G1,
R98 ... G1,
R99 ... G1
RV100 ... G1


PC1044
(with Chopper Power Supply)
SYNC INVERTER
LUMA - CHROMA PROCESSOR
BEAM LIMITER
IC52 TDA3560
BLACK LEVEL CLAMP AND CONTRAST
COLOUR CONTRAST ACC AMP
BURST Ø DET OSCILLATOR
H/2 DET ACC IDENT & FLIP/FLOP
DEMOD R-Y B-Y MATRIX KILLER
RGB CLAMPS
BLANKING
RGB OUTPUTS
DATA INSERTION
BRIGHTNESS CONTROL
LUMA D/L
CHROMA D/L
PHASE
PRESET BRI.
BAL
XTAL 8·8MHz
REF OSC
PL8
PL19
VIDEO OUTPUT FOR TELETEXT
PL15
TELETEXT INPUT
SANDCASTLE PULSE
PL7
PL16
PL28
PL14
FIELD TIMEBASE
IC55 TDA1170S
FLYBACK GEN
VOLTAGE REG
SYNC CCT
OSC
RAMP GEN
PREAMP
O/P AMP
BUFFER
FIELD SHIFT
FIELD SCAN COILS
VIDEO AMPLIFIER
TR50 BC238
TR53 BC 309C
TR54 BF460
TR55 BF460
TR56 BF460
BZX79-C6V8
D56 PH44
D53 PH44
D54 PH44
D103 1N4001GP
BACKGROUND
GAIN
GREEN
BLUE
RED
BASS
EHT
80V LINE PULSE
12V
190V
18V
24V
* Omitted in models with TONE controls.
** Manual controls replaced by connections for remote control operations (some models)
† Only fitted in selected models.
‡ 8Ω in 18inch models and above.
d.c voltages, in rectangles measured with respect to L.O.P.T. heatsink (Chassis frame is isolated)
Figures in circles denote oscillograms shown overleaf.



F G H J K

F2	RV101	G1*	R128	K2,E5	R161	B6,J1	R212	C4,B2	R245	G6,D6	R269	H5,F7	R304	G4,D3	XTAL1	H2,E2	SG701	J6,A2
C2	R102	H1,E1	R132	K2,E4	R162	A5,K2	R213	C4,C2	R246	G5,D6	R270	H6,E7	R305	G4,D3			SG703	J6,A1
D4	R103	H1,D1	R133	J1,E3	R163	A5,J5	RV214	D4,C2	R247	G5,D6	R271	H5,F7	R310	E3,F3	Z1	B2,H2	SG704	J6,A2
D3	R104	G1,D1	R134	K3,E4	R164	D6,H6	R215	C3,A2	R248	G5,D6	RV272	H5,E7			Z2	B5,K1	SG705	J6,B1
E2	R105	J1,D1	R135	K3,E4	R165	D4,J5	R216	D3,B2	R251	F6,C7	R273	H6,E7	S1	B6*	Z701	J6,A2	SG706	J6,B2
E2	R106	K1,C1	RV136	K3,E5	R166	C6,J5	R217	D4,B3	RV252	G5,D6	R274	G4,B2					SG707	J6,A1
D2	R107	J3,E3	R137	K2,E4	R167	C5,H5	R218	C4,B1	RV253	G6,D7	R275	G4,E6	T1	D5,H6				
D3	R108	J2,E3	R138	K3,E5	R168	B6,J6	R219	D4,B1	R254	G6,C6	R276	H4,E7	T2	E6,A2				
D2	R109	J1,E3	R143	E3,F2	R169	C6,J5	R222	E5,A1	R255	G6,D6	R277	H4,F7	T3	E4,B5				
D2	R112	J1,F4	R144	E3,F3	R170	C6,J6	R223	E6,A1	R256	G6,D7	R282	H4,F6						
E1	R113	J2,F3	†RV145	F3*	RV171	C6,J6	R224	E6,A1	R257	G6,D6	RV283	H4,F6	TR50	F1,F1				
C3	R114	J2,E4	R146	E3,G1	R172	D6,J6	R226	E6,A3	RV258	G6,D7	R284	H4,F6	TR53	J1,C1				
	R115	J1,F4	R147	E3*	R173	C6,J6	R227	E6,A3	R259	F5,C3	R285	J4,E6	TR54	J1,F4				
D1	RV116	J2,E5	R148	E4,F4	R202	C4,B1	R228	E5,C7	R260	F5,C3	R286	H4,E6	TR55	J2,D4				
D1	R117	J1,F4	†RV149	F4*	R203	B3,B1	R232	F5,B6	R261	F5,C4	R287	H5,E7	TR56	K2,E4				
D1	RV118	J1,F5	R151	F3,G4	R204	B3,B1	R233	F6,C6	R262	G5,B6	R288	J4,E7	TR62	D6,H5				
E1	R122	J2,E4	R152	F3,G4	R205	B4,B2	R234	F6,D6	R263	H5,D6	R292	J3,E6	TR67	E6,A1				
D1	R123	J2,E3	R153	F3,G4	RV206	B4,B2	R235	F6,C5	R264	H6,D6	R293	J4,F7	TR68	E6,A3				
D1	R124	J2,D4	R154	F3,G4	R207	C3,C2	R236	F6,B3	R265	H5,D6	R294	J4,E6	TR72	G6,D7				
D1	R125	K2,D4	R155	E4,H2	R208	C3,B2	R240	C4,B2	R266	H5,E6	R297	J4,F5	TR73	G5,D7				
E1	R126	K2,D5	R156	F3,F3	R209	C3,C2	R243	G5,D6	R267	H5,D6	RV298	J4,F5	TR74	G5,D6				
	R127	K2,D4	R157	F3,**	R210	C3,C2	R244	G5,D7	R268	H5,F7	R303	G4,B4						

PC1054

C702	J5,A2
R701	K6,A1
R702	K6,A2
R703	K6,A1
R704	H6,A2
R705	H5,A1
R706	H6,A1

*Front Controls
†Selected models only
**Adjacent L.S. (when fitted)

02P1-350-020 582N

THORN EMI

FERGUSON TX

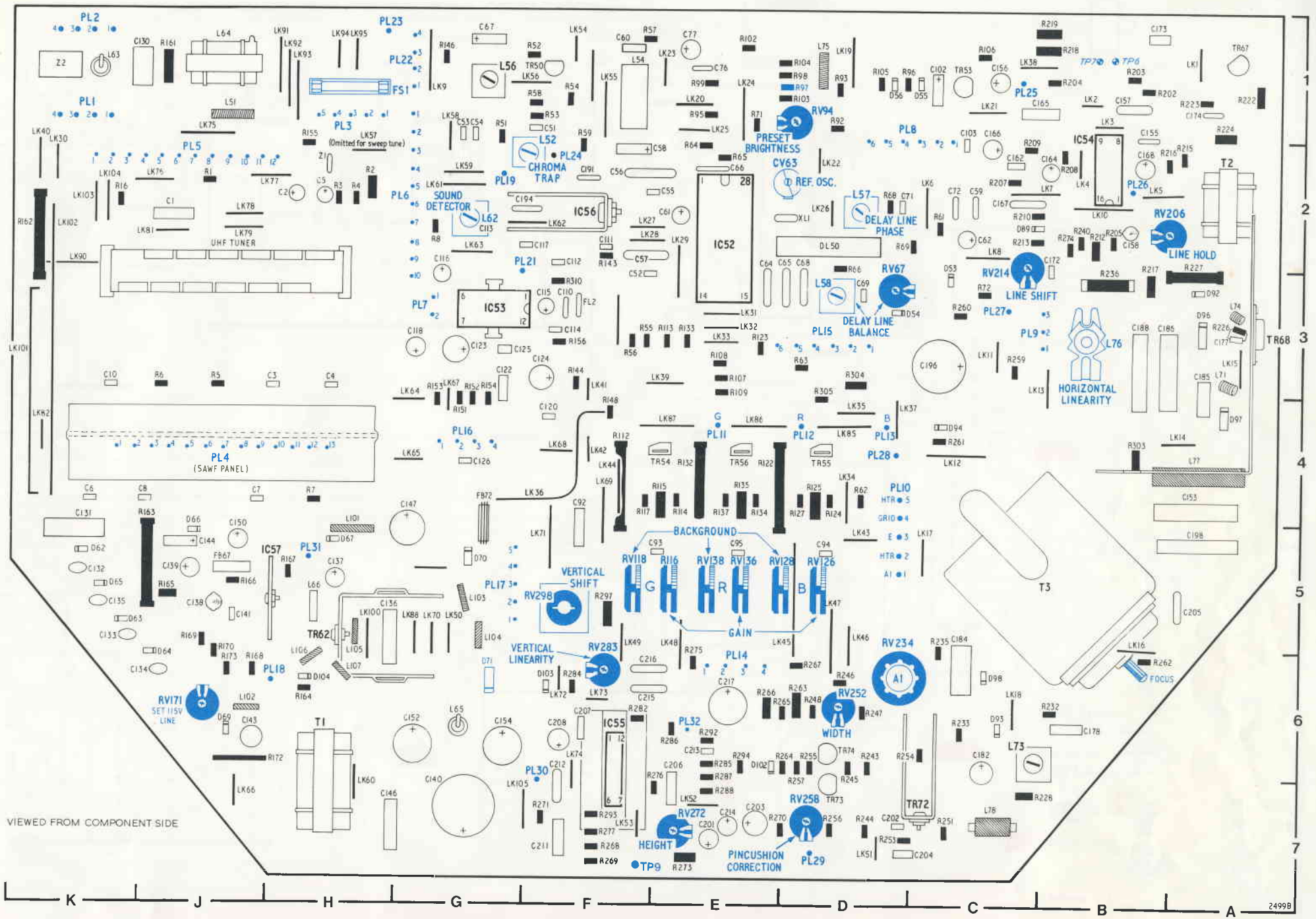
colour television service manual

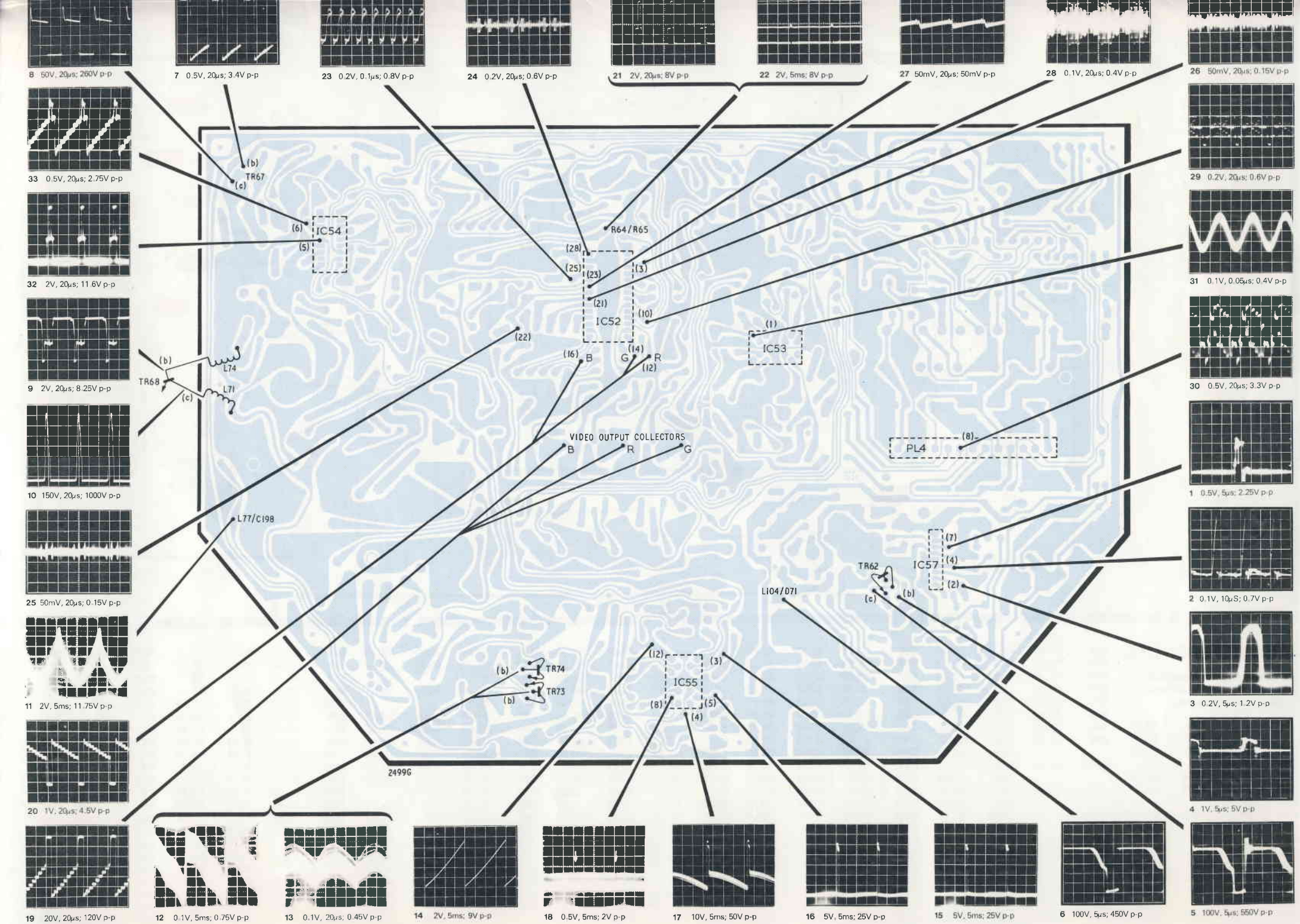
Series 1044

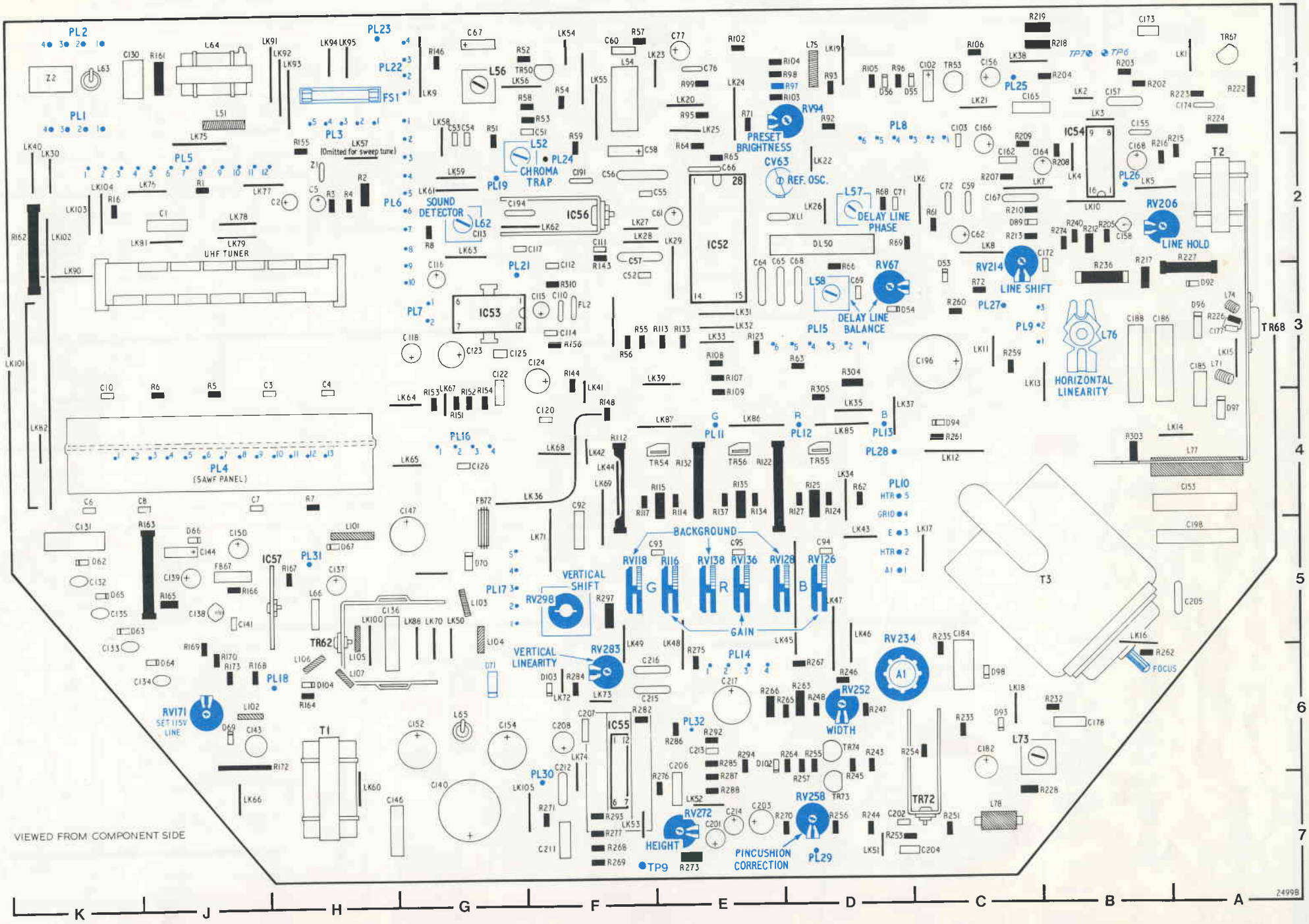
TX9

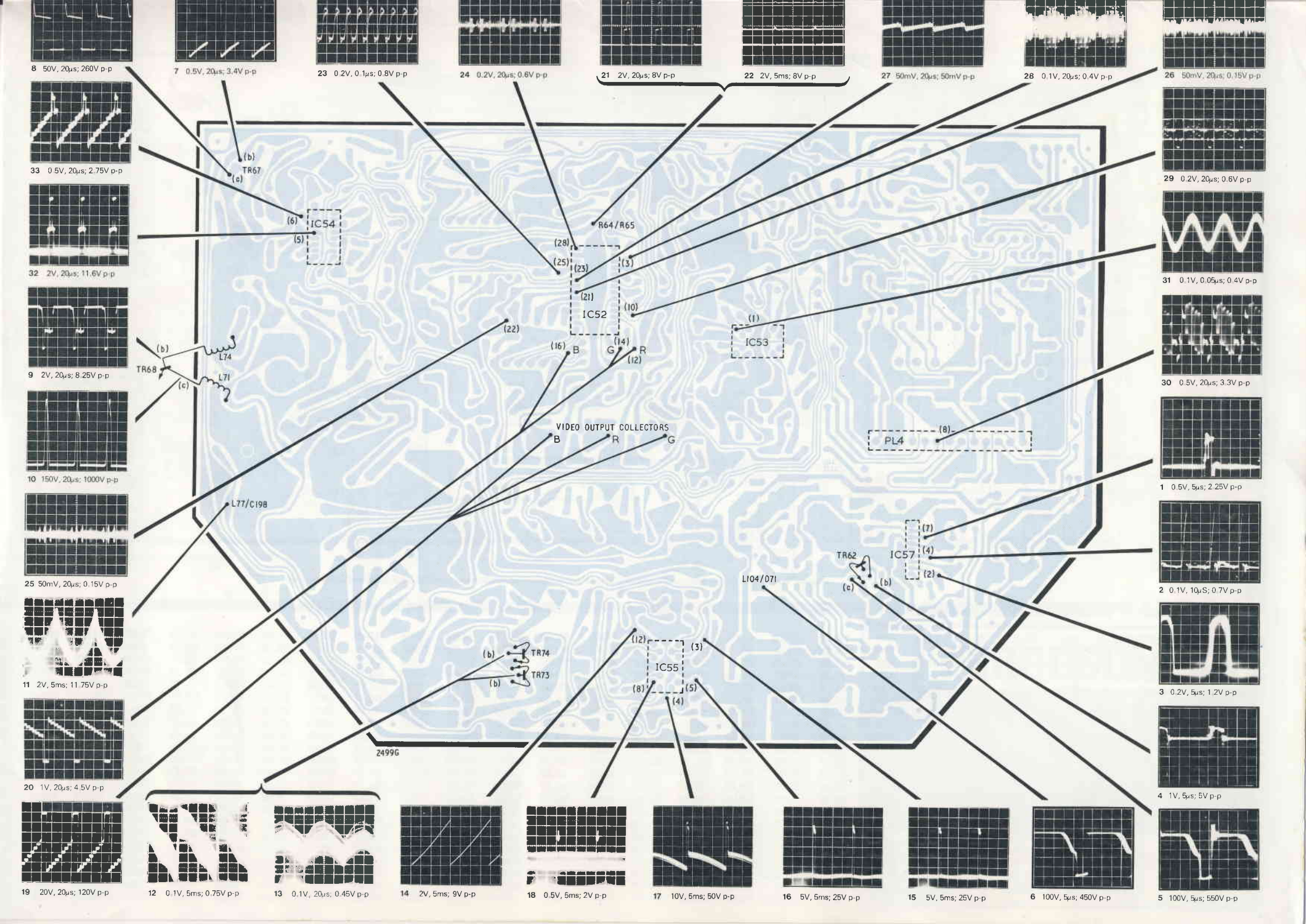
PART TWO

Issue 3 May 1982


PL2
PL1
PL3
PL5
PL6
PL7
PL4
(SAWF PANEL)
PL23
PL22
FS1
(Omitted for sweep tune)
PL19
PL24
PL21
PL16
PL17
PL18
PL31
PL14
PL32
PL30
PL29
PL11
PL12
PL13
PL15
PL10
PL8
PL25
PL26
PL27
PL28
PL9
SOUND DETECTOR
CHROMA TRAP
UHF TUNER
PRESET BRIGHTNESS
REF. OSC.
DELAY LINE PHASE
DELAY LINE BALANCE
LINE SHIFT
LINE HOLD
HORIZONTAL LINEARITY
BACKGROUND
GAIN
VERTICAL SHIFT
VERTICAL LINEARITY
WIDTH
HEIGHT
PINCUSHION CORRECTION
FOCUS
SET 115V LINE
IC52
IC53
IC54
IC55
IC56
IC57
T1
T2
T3
TR62
TR72
TR73
TR74
TP6
TP7
TP9
VIEWED FROM COMPONENT SIDE
2499B


8 60V, 20µs; 260V p-p
7 0.5V, 20µs; 3.4V p-p
23 0.2V, 0.1µs; 0.8V p-p
24 0.2V, 20µs; 0.6V p-p
21 2V, 20µs; 8V p-p
22 2V, 5ms; 8V p-p
27 50mV, 20µs; 50mV p-p
28 0.1V, 20µs; 0.4V p-p
26 50mV, 20µs; 0.15V p-p
33 0.5V, 20µs; 2.75V p-p
29 0.2V, 20µs; 0.6V p-p
32 2V, 20µs; 11.6V p-p
31 0.1V, 0.05µs; 0.4V p-p
9 2V, 20µs; 8.25V p-p
30 0.5V, 20µs; 3.3V p-p
10 150V, 20µs; 1000V p-p
1 0.5V, 5µs; 2.25V p-p
25 50mV, 20µs; 0.15V p-p
2 0.1V, 10µS; 0.7V p-p
11 2V, 5ms; 11.75V p-p
3 0.2V, 5µs; 1.2V p-p
20 1V, 20µs; 4.5V p-p
4 1V, 5µs; 5V p-p
19 20V, 20µs; 120V p-p
12 0.1V, 5ms; 0.75V p-p
13 0.1V, 20µs; 0.45V p-p
14 2V, 5ms; 9V p-p
18 0.5V, 5ms; 2V p-p
17 10V, 5ms; 50V p-p
16 5V, 5ms; 25V p-p
15 5V, 5ms; 25V p-p
6 100V, 5µs; 450V p-p
5 100V, 5µs; 550V p-p
IC54
IC52
IC53
IC55
IC57
PL4
TR67
TR68
TR74
TR73
TR62
L74
L71
L77/C198
L104/D71
R64/R65
VIDEO OUTPUT COLLECTORS
B
G
R
2499G


PL2
PL1
PL3
PL5
PL6
PL23
PL22
PL24
PL19
PL21
PL7
PL4
(SAWF PANEL)
PL16
PL31
PL17
PL18
PL32
PL30
PL29
PL11
PL12
PL13
PL28
PL10
PL14
PL15
PL27
PL9
PL25
PL8
PL26
FS1
L56
L52
CHROMA TRAP
L62
SOUND DETECTOR
L64
L51
L75
L54
L57
DELAY LINE PHASE
L58
DELAY LINE BALANCE
L76
HORIZONTAL LINEARITY
L73
L78
UHF TUNER
IC52
IC53
IC54
IC55
IC56
IC57
RV94
PRESET BRIGHTNESS
CV63
REF. OSC.
RV67
RV214
LINE SHIFT
RV206
LINE HOLD
BACKGROUND
RV118
RV116
RV138
RV136
RV128
RV126
GAIN
RV298
VERTICAL SHIFT
RV283
VERTICAL LINEARITY
RV171
SET 115V LINE
RV234
FOCUS
RV252
WIDTH
RV258
PINCUSHION CORRECTION
RV272
HEIGHT
T1
T2
T3
TR62
TR72
TR68
TP6
TP7
TP9
LK38
LK40
LK30
LK101
LK102
LK103
LK104
LK90
LK91
LK92
LK93
LK94
LK95
LK75
LK76
LK77
LK78
LK79
LK81
LK82
LK54
LK55
LK56
LK57
(Omitted for sweep tune)
LK58
LK59
LK61
LK62
LK63
LK64
LK65
LK66
LK67
LK68
LK69
LK71
LK87
LK86
LK85
LK39
LK41
LK42
LK44
LK36
LK100
LK88
LK70
LK50
LK105
LK60
LK74
LK53
LK52
LK51
LK49
LK48
LK45
LK47
LK46
LK43
LK34
LK35
LK37
LK31
LK32
LK33
LK12
LK11
LK13
LK14
LK15
LK16
LK17
LK18
LK2
LK3
LK4
LK5
LK6
LK7
LK8
LK10
LK19
LK20
LK21
LK22
LK23
LK24
LK25
LK26
LK27
LK28
LK29
R219
R218
R106
R102
R104
R98
R97
R103
R105
R96
R102
R203
R204
R202
R223
R222
R224
R209
R208
R207
R210
R213
R240
R212
R205
R158
R236
R217
R227
R260
R259
R261
R304
R305
R303
R188
R186
R226
R185
R153
R152
R154
R151
R144
R148
R312
R132
R122
R115
R117
R114
R135
R137
R134
R125
R127
R124
R62
R123
R108
R107
R109
R63
R55
R113
R133
R56
R310
R143
R111
R69
R66
R68
R72
R61
R64
R65
R99
R95
R92
R93
R71
R58
R53
R54
R59
R52
R51
R146
R8
R1
R2
R3
R4
R5
R6
R7
R10
R16
R162
R155
R169
R170
R173
R168
R166
R165
R167
R164
R172
R297
R284
R275
R267
R246
R266
R263
R248
R247
R235
R232
R233
R228
R254
R251
R244
R256
R270
R271
R293
R277
R268
R269
R273
R292
R286
R294
R285
R287
R288
R276
R282
R264
R255
R257
R245
R243
R262
R198
R153
C67
C77
C76
C99
C66
C69
C71
C72
C59
C62
C61
C64
C65
C68
C55
C56
C57
C52
C58
C191
C194
C117
C111
C112
C113
C114
C115
C110
C116
C118
C123
C125
C124
C122
C120
C126
C92
C93
C95
C94
C147
C131
C150
C144
C139
C132
C135
C133
C134
C138
C141
C137
C136
C152
C154
C140
C146
C143
C208
C212
C206
C207
C213
C216
C215
C217
C214
C203
C201
C202
C204
C211
C209
C210
C205
C153
C173
C174
C155
C157
C156
C165
C166
C168
C164
C162
C167
C172
C158
C196
C184
C178
C182
C183
C185
C186
C187
C188
C189
C190
C192
C193
C195
C197
C198
C199
C200
C201
C202
C203
C204
C205
C206
C207
C208
C209
C210
C211
C212
C213
C214
C215
C216
C217
C218
C219
C220
C221
C222
C223
C224
C225
C226
C227
C228
C229
C230
C231
C232
C233
C234
C235
C236
C237
C238
C239
C240
C241
C242
C243
C244
C245
C246
C247
C248
C249
C250
C251
C252
C253
C254
C255
C256
C257
C258
C259
C260
C261
C262
C263
C264
C265
C266
C267
C268
C269
C270
C271
C272
C273
C274
C275
C276
C277
C278
C279
C280
C281
C282
C283
C284
C285
C286
C287
C288
C289
C290
C291
C292
C293
C294
C295
C296
C297
C298
C299
C300
C301
C302
C303
C304
C305
C306
C307
C308
C309
C310
C311
C312
C313
C314
C315
C316
C317
C318
C319
C320
C321
C322
C323
C324
C325
C326
C327
C328
C329
C330
C331
C332
C333
C334
C335
C336
C337
C338
C339
C340
C341
C342
C343
C344
C345
C346
C347
C348
C349
C350
C351
C352
C353
C354
C355
C356
C357
C358
C359
C360
C361
C362
C363
C364
C365
C366
C367
C368
C369
C370
C371
C372
C373
C374
C375
C376
C377
C378
C379
C380
C381
C382
C383
C384
C385
C386
C387
C388
C389
C390
C391
C392
C393
C394
C395
C396
C397
C398
C399
C400
C401
C402
C403
C404
C405
C406
C407
C408
C409
C410
C411
C412
C413
C414
C415
C416
C417
C418
C419
C420
C421
C422
C423
C424
C425
C426
C427
C428
C429
C430
C431
C432
C433
C434
C435
C436
C437
C438
C439
C440
C441
C442
C443
C444
C445
C446
C447
C448
C449
C450
C451
C452
C453
C454
C455
C456
C457
C458
C459
C460
C461
C462
C463
C464
C465
C466
C467
C468
C469
C470
C471
C472
C473
C474
C475
C476
C477
C478
C479
C480
C481
C482
C483
C484
C485
C486
C487
C488
C489
C490
C491
C492
C493
C494
C495
C496
C497
C498
C499
C500
C501
C502
C503
C504
C505
C506
C507
C508
C509
C510
C511
C512
C513
C514
C515
C516
C517
C518
C519
C520
C521
C522
C523
C524
C525
C526
C527
C528
C529
C530
C531
C532
C533
C534
C535
C536
C537
C538
C539
C540
C541
C542
C543
C544
C545
C546
C547
C548
C549
C550
C551
C552
C553
C554
C555
C556
C557
C558
C559
C560
C561
C562
C563
C564
C565
C566
C567
C568
C569
C570
C571
C572
C573
C574
C575
C576
C577
C578
C579
C580
C581
C582
C583
C584
C585
C586
C587
C588
C589
C590
C591
C592
C593
C594
C595
C596
C597
C598
C599
C600
C601
C602
C603
C604
C605
C606
C607
C608
C609
C610
C611
C612
C613
C614
C615
C616
C617
C618
C619
C620
C621
C622
C623
C624
C625
C626
C627
C628
C629
C630
C631
C632
C633
C634
C635
C636
C637
C638
C639
C640
C641
C642
C643
C644
C645
C646
C647
C648
C649
C650
C651
C652
C653
C654
C655
C656
C657
C658
C659
C660
C661
C662
C663
C664
C665
C666
C667
C668
C669
C670
C671
C672
C673
C674
C675
C676
C677
C678
C679
C680
C681
C682
C683
C684
C685
C686
C687
C688
C689
C690
C691
C692
C693
C694
C695
C696
C697
C698
C699
C700
C701
C702
C703
C704
C705
C706
C707
C708
C709
C710
C711
C712
C713
C714
C715
C716
C717
C718
C719
C720
C721
C722
C723
C724
C725
C726
C727
C728
C729
C730
C731
C732
C733
C734
C735
C736
C737
C738
C739
C740
C741
C742
C743
C744
C745
C746
C747
C748
C749
C750
C751
C752
C753
C754
C755
C756
C757
C758
C759
C760
C761
C762
C763
C764
C765
C766
C767
C768
C769
C770
C771
C772
C773
C774
C775
C776
C777
C778
C779
C780
C781
C782
C783
C784
C785
C786
C787
C788
C789
C790
C791
C792
C793
C794
C795
C796
C797
C798
C799
C800
C801
C802
C803
C804
C805
C806
C807
C808
C809
C810
C811
C812
C813
C814
C815
C816
C817
C818
C819
C820
C821
C822
C823
C824
C825
C826
C827
C828
C829
C830
C831
C832
C833
C834
C835
C836
C837
C838
C839
C840
C841
C842
C843
C844
C845
C846
C847
C848
C849
C850
C851
C852
C853
C854
C855
C856
C857
C858
C859
C860
C861
C862
C863
C864
C865
C866
C867
C868
C869
C870
C871
C872
C873
C874
C875
C876
C877
C878
C879
C880
C881
C882
C883
C884
C885
C886
C887
C888
C889
C890
C891
C892
C893
C894
C895
C896
C897
C898
C899
C900
C901
C902
C903
C904
C905
C906
C907
C908
C909
C910
C911
C912
C913
C914
C915
C916
C917
C918
C919
C920
C921
C922
C923
C924
C925
C926
C927
C928
C929
C930
C931
C932
C933
C934
C935
C936
C937
C938
C939
C940
C941
C942
C943
C944
C945
C946
C947
C948
C949
C950
C951
C952
C953
C954
C955
C956
C957
C958
C959
C960
C961
C962
C963
C964
C965
C966
C967
C968
C969
C970
C971
C972
C973
C974
C975
C976
C977
C978
C979
C980
C981
C982
C983
C984
C985
C986
C987
C988
C989
C990
C991
C992
C993
C994
C995
C996
C997
C998
C999
C1000
C1001
C1002
C1003
C1004
C1005
C1006
C1007
C1008
C1009
C1010
C1011
C1012
C1013
C1014
C1015
C1016
C1017
C1018
C1019
C1020
C1021
C1022
C1023
C1024
C1025
C1026
C1027
C1028
C1029
C1030
C1031
C1032
C1033
C1034
C1035
C1036
C1037
C1038
C1039
C1040
C1041
C1042
C1043
C1044
C1045
C1046
C1047
C1048
C1049
C1050
C1051
C1052
C1053
C1054
C1055
C1056
C1057
C1058
C1059
C1060
C1061
C1062
C1063
C1064
C1065
C1066
C1067
C1068
C1069
C1070
C1071
C1072
C1073
C1074
C1075
C1076
C1077
C1078
C1079
C1080
C1081
C1082
C1083
C1084
C1085
C1086
C1087
C1088
C1089
C1090
C1091
C1092
C1093
C1094
C1095
C1096
C1097
C1098
C1099
C1100
C1101
C1102
C1103
C1104
C1105
C1106
C1107
C1108
C1109
C1110
C1111
C1112
C1113
C1114
C1115
C1116
C1117
C1118
C1119
C1120
C1121
C1122
C1123
C1124
C1125
C1126
C1127
C1128
C1129
C1130
C1131
C1132
C1133
C1134
C1135
C1136
C1137
C1138
C1139
C1140
C1141
C1142
C1143
C1144
C1145
C1146
C1147
C1148
C1149
C1150
C1151
C1152
C1153
C1154
C1155
C1156
C1157
C1158
C1159
C1160
C1161
C1162
C1163
C1164
C1165
C1166
C1167
C1168
C1169
C1170
C1171
C1172
C1173
C1174
C1175
C1176
C1177
C1178
C1179
C1180
C1181
C1182
C1183
C1184
C1185
C1186
C1187
C1188
C1189
C1190
C1191
C1192
C1193
C1194
C1195
C1196
C1197
C1198
C1199
C1200
C1201
C1202
C1203
C1204
C1205
C1206
C1207
C1208
C1209
C1210
C1211
C1212
C1213
C1214
C1215
C1216
C1217
C1218
C1219
C1220
C1221
C1222
C1223
C1224
C1225
C1226
C1227
C1228
C1229
C1230
C1231
C1232
C1233
C1234
C1235
C1236
C1237
C1238
C1239
C1240
C1241
C1242
C1243
C1244
C1245
C1246
C1247
C1248
C1249
C1250
C1251
C1252
C1253
C1254
C1255
C1256
C1257
C1258
C1259
C1260
C1261
C1262
C1263
C1264
C1265
C1266
C1267
C1268
C1269
C1270
C1271
C1272
C1273
C1274
C1275
C1276
C1277
C1278
C1279
C1280
C1281
C1282
C1283
C1284
C1285
C1286
C1287
C1288
C1289
C1290
C1291
C1292
C1293
C1294
C1295
C1296
C1297
C1298
C1299
C1300
C1301
C1302
C1303
C1304
C1305
C1306
C1307
C1308
C1309
C1310
C1311
C1312
C1313
C1314
C1315
C1316
C1317
C1318
C1319
C1320
C1321
C1322
C1323
C1324
C1325
C1326
C1327
C1328
C1329
C1330
C1331
C1332
C1333
C1334
C1335
C1336
C1337
C1338
C1339
C1340
C1341
C1342
C1343
C1344
C1345
C1346
C1347
C1348
C1349
C1350
C1351
C1352
C1353
C1354
C1355
C1356
C1357
C1358
C1359
C1360
C1361
C1362
C1363
C1364
C1365
C1366
C1367
C1368
C1369
C1370
C1371
C1372
C1373
C1374
C1375
C1376
C1377
C1378
C1379
C1380
C1381
C1382
C1383
C1384
C1385
C1386
C1387
C1388
C1389
C1390
C1391
C1392
C1393
C1394
C1395
C1396
C1397
C1398
C1399
C1400
C1401
C1402
C1403
C1404
C1405
C1406
C1407
C1408
C1409
C1410
C1411
C1412
C1413
C1414
C1415
C1416
C1417
C1418
C1419
C1420
C1421
C1422
C1423
C1424
C1425
C1426
C1427
C1428
C1429
C1430
C1431
C1432
C1433
C1434
C1435
C1436
C1437
C1438
C1439
C1440
C1441
C1442
C1443
C1444
C1445
C1446
C1447
C1448
C1449
C1450
C1451
C1452
C1453
C1454
C1455
C1456
C1457
C1458
C1459
C1460
C1461
C1462
C1463
C1464
C1465
C1466
C1467
C1468
C1469
C1470
C1471
C1472
C1473
C1474
C1475
C1476
C1477
C1478
C1479
C1480
C1481
C1482
C1483
C1484
C1485
C1486
C1487
C1488
C1489
C1490
C1491
C1492
C1493
C1494
C1495
C1496
C1497
C1498
C1499
C1500
C1501
C1502
C1503
C1504
C1505
C1506
C1507
C1508
C1509
C1510
C1511
C1512
C1513
C1514
C1515
C1516
C1517
C1518
C1519
C1520
C1521
C1522
C1523
C1524
C1525
C1526
C1527
C1528
C1529
C1530
C1531
C1532
C1533
C1534
C1535
C1536
C1537
C1538
C1539
C1540
C1541
C1542
C1543
C1544
C1545
C1546
C1547
C1548
C1549
C1550
C1551
C1552
C1553
C1554
C1555
C1556
C1557
C1558
C1559
C1560
C1561
C1562
C1563
C1564
C1565
C1566
C1567
C1568
C1569
C1570
C1571
C1572
C1573
C1574
C1575
C1576
C1577
C1578
C1579
C1580
C1581
C1582
C1583
C1584
C1585
C1586
C1587
C1588
C1589
C1590
C1591
C1592
C1593
C1594
C1595
C1596
C1597
C1598
C1599
C1600
C1601
C1602
C1603
C1604
C1605
C1606
C1607
C1608
C1609
C1610
C1611
C1612
C1613
C1614
C1615
C1616
C1617
C1618
C1619
C1620
C1621
C1622
C1623
C1624
C1625
C1626
C1627
C1628
C1629
C1630
C1631
C1632
C1633
C1634
C1635
C1636
C1637
C1638
C1639
C1640
C1641
C1642
C1643
C1644
C1645
C1646
C1647
C1648
C1649
C1650
C1651
C1652
C1653
C1654
C1655
C1656
C1657
C1658
C1659
C1660
C1661
C1662
C1663
C1664
C1665
C1666
C1667
C1668
C1669
C1670
C1671
C1672
C1673
C1674
C1675
C1676
C1677
C1678
C1679
C1680
C1681
C1682
C1683
C1684
C1685
C1686
C1687
C1688
C1689
C1690
C1691
C1692
C1693
C1694
C1695
C1696
C1697
C1698
C1699
C1700
C1701
C1702
C1703
C1704
C1705
C1706
C1707
C1708
C1709
C1710
C1711
C1712
C1713
C1714
C1715
C1716
C1717
C1718
C1719
C1720
C1721
C1722
C1723
C1724
C1725
C1726
C1727
C1728
C1729
C1730
C1731
C1732
C1733
C1734
C1735
C1736
C1737
C1738
C1739
C1740
C1741
C1742
C1743
C1744
C1745
C1746
C1747
C1748
C1749
C1750
C1751
C1752
C1753
C1754
C1755
C1756
C1757
C1758
C1759
C1760
C1761
C1762
C1763
C1764
C1765
C1766
C1767
C1768
C1769
C1770
C1771
C1772
C1773
C1774
C1775
C1776
C1777
C1778
C1779
C1780
C1781
C1782
C1783
C1784
C1785
C1786
C1787
C1788
C1789
C1790
C1791
C1792
C1793
C1794
C1795
C1796
C1797
C1798
C1799
C1800
C1801
C1802
C1803
C1804
C1805
C1806
C1807
C1808
C1809
C1810
C1811
C1812
C1813
C1814
C1815
C1816
C1817
C1818
C1819
C1820
C1821
C1822
C1823
C1824
C1825
C1826
C1827
C1828
C1829
C1830
C1831
C1832
C1833
C1834
C1835
C1836
C1837
C1838
C1839
C1840
C1841
C1842
C1843
C1844
C1845
C1846
C1847
C1848
C1849
C1850
C1851
C1852
C1853
C1854
C1855
C1856
C1857
C1858
C1859
C1860
C1861
C1862
C1863
C1864
C1865
C1866
C1867
C1868
C1869
C1870
C1871
C1872
C1873
C1874
C1875
C1876
C1877
C1878
C1879
C1880
C1881
C1882
C1883
C1884
C1885
C1886
C1887
C1888
C1889
C1890
C1891
C1892
C1893
C1894
C1895
C1896
C1897
C1898
C1899
C1900
C1901
C1902
C1903
C1904
C1905
C1906
C1907
C1908
C1909
C1910
C1911
C1912
C1913
C1914
C1915
C1916
C1917
C1918
C1919
C1920
C1921
C1922
C1923
C1924
C1925
C1926
C1927
C1928
C1929
C1930
C1931
C1932
C1933
C1934
C1935
C1936
C1937
C1938
C1939
C1940
C1941
C1942
C1943
C1944
C1945
C1946
C1947
C1948
C1949
C1950
C1951
C1952
C1953
C1954
C1955
C1956
C1957
C1958
C1959
C1960
C1961
C1962
C1963
C1964
C1965
C1966
C1967
C1968
C1969
C1970
C1971
C1972
C1973
C1974
C1975
C1976
C1977
C1978
C1979
C1980
C1981
C1982
C1983
C1984
C1985
C1986
C1987
C1988
C1989
C1990
C1991
C1992
C1993
C1994
C1995
C1996
C1997
C1998
C1999
C2000
C2001
C2002
C2003
C2004
C2005
C2006
C2007
C2008
C2009
C2010
C2011
C2012
C2013
C2014
C2015
C2016
C2017
C2018
C2019
C2020
C2021
C2022
C2023
C2024
C2025
C2026
C2027
C2028
C2029
C2030
C2031
C2032
C2033
C2034
C2035
C2036
C2037
C2038
C2039
C2040
C2041
C2042
C2043
C2044
C2045
C2046
C2047
C2048
C2049
C2050
C2051
C2052
C2053
C2054
C2055
C2056
C2057
C2058
C2059
C2060
C2061
C2062
C2063
C2064
C2065
C2066
C2067
C2068
C2069
C2070
C2071
C2072
C2073
C2074
C2075
C2076
C2077
C2078
C2079
C2080
C2081
C2082
C2083
C2084
C2085
C2086
C2087
C2088
C2089
C2090
C2091
C2092
C2093
C2094
C2095
C2096
C2097
C2098
C2099
C2100
C2101
C2102
C2103
C2104
C2105
C2106
C2107
C2108
C2109
C2110
C2111
C2112
C2113
C2114
C2115
C2116
C2117
C2118
C2119
C2120
C2121
C2122
C2123
C2124
C2125
C2126
C2127
C2128
C2129
C2130
C2131
C2132
C2133
C2134
C2135
C2136
C2137
C2138
C2139
C2140
C2141
C2142
C2143
C2144
C2145
C2146
C2147
C2148
C2149
C2150
C2151
C2152
C2153
C2154
C2155
C2156
C2157
C2158
C2159
C2160
C2161
C2162
C2163
C2164
C2165
C2166
C2167
C2168
C2169
C2170
C2171
C2172
C2173
C2174
C2175
C2176
C2177
C2178
C2179
C2180
C2181
C2182
C2183
C2184
C2185
C2186
C2187
C2188
C2189
C2190
C2191
C2192
C2193
C2194
C2195
C2196
C2197
C2198
C2199
C2200
C2201
C2202
C2203
C2204
C2205
C2206
C2207
C2208
C2209
C2210
C2211
C2212
C2213
C2214
C2215
C2216
C2217
C2218
C2219
C2220
C2221
C2222
C2223
C2224
C2225
C2226
C2227
C2228
C2229
C2230
C2231
C2232
C2233
C2234
C2235
C2236
C2237
C2238
C2239
C2240
C2241
C2242
C2243
C2244
C2245
C2246
C2247
C2248
C2249
C2250
C2251
C2252
C2253
C2254
C2255
C2256
C2257
C2258
C2259
C2260
C2261
C2262
C2263
C2264
C2265
C2266
C2267
C2268
C2269
C2270
C2271
C2272
C2273
C2274
C2275
C2276
C2277
C2278
C2279
C2280
C2281
C2282
C2283
C2284
C2285
C2286
C2287
C2288
C2289
C2290
C2291
C2292
C2293
C2294
C2295
C2296
C2297
C2298
C2299
C2300
C2301
C2302
C2303
C2304
C2305
C2306
C2307
C2308
C2309
C2310
C2311
C2312
C2313
C2314
C2315
C2316
C2317
C2318
C2319
C2320
C2321
C2322
C2323
C2324
C2325
C2326
C2327
C2328
C2329
C2330
C2331
C2332
C2333
C2334
C2335
C2336
C2337
C2338
C2339
C2340
C2341
C2342
C2343
C2344
C2345
C2346
C2347
C2348
C2349
C2350
C2351
C2352
C2353
C2354
C2355
C2356
C2357
C2358
C2359
C2360
C2361
C2362
C2363
C2364
C2365
C2366
C2367
C2368
C2369
C2370
C2371
C2372
C2373
C2374
C2375
C2376
C2377
C2378
C2379
C2380
C2381
C2382
C2383
C2384
C2385
C2386
C2387
C2388
C2389
C2390
C2391
C2392
C2393
C2394
C2395
C2396
C2397
C2398
C2399
C2400
C2401
C2402
C2403
C2404
C2405
C2406
C2407
C2408
C2409
C2410
C2411
C2412
C2413
C2414
C2415
C2416
C2417
C2418
C2419
C2420
C2421
C2422
C2423
C2424
C2425
C2426
C2427
C2428
C2429
C2430
C2431
C2432
C2433
C2434
C2435
C2436
C2437
C2438
C2439
C2440
C2441
C2442
C2443
C2444
C2445
C2446
C2447
C2448
C2449
C2450
C2451
C2452
C2453
C2454
C2455
C2456
C2457
C2458
C2459
C2460
C2461
C2462
C2463
C2464
C2465
C2466
C2467
C2468
C2469
C2470
C2471
C2472
C2473
C2474
C2475
C2476
C2477
C2478
C2479
C2480
C2481
C2482
C2483
C2484
C2485
C2486
C2487
C2488
C2489
C2490
C2491
C2492
C2493
C2494
C2495
C2496
C2497
C2498
C2499
C2500
C2501
C2502
C2503
C2504
C2505
C2506
C2507
C2508
C2509
C2510
C2511
C2512
C2513
C2514
C2515
C2516
C2517
C2518
C2519
C2520
C2521
C2522
C2523
C2524
C2525
C2526
C2527
C2528
C2529
C2530
C2531
C2532
C2533
C2534
C2535
C2536
C2537
C2538
C2539
C2540
C2541
C2542
C2543
C2544
C2545
C2546
C2547
C2548
C2549
C2550
C2551
C2552
C2553
C2554
C2555
C2556
C2557
C2558
C2559
C2560
C2561
C2562
C2563
C2564
C2565
C2566
C2567
C2568
C2569
C2570
C2571
C2572
C2573
C2574
C2575
C2576
C2577
C2578
C2579
C2580
C2581
C2582
C2583
C2584
C2585
C2586
C2587
C2588
C2589
C2590
C2591
C2592
C2593
C2594
C2595
C2596
C2597
C2598
C2599
C2600
C2601
C2602
C2603
C2604
C2605
C2606
C2607
C2608
C2609
C2610
C2611
C2612
C2613
C2614
C2615
C2616
C2617
C2618
C2619
C2620
C2621
C2622
C2623
C2624
C2625
C2626
C2627
C2628
C2629
C2630
C2631
C2632
C2633
C2634
C2635
C2636
C2637
C2638
C2639
C2640
C2641
C2642
C2643
C2644
C2645
C2646
C2647
C2648
C2649
C2650
C2651
C2652
C2653
C2654
C2655
C2656
C2657
C2658
C2659
C2660
C2661
C2662
C2663
C2664
C2665
C2666
C2667
C2668
C2669
C2670
C2671
C2672
C2673
C2674
C2675
C2676
C2677
C2678
C2679
C2680
C2681
C2682
C2683
C2684
C2685
C2686
C2687
C2688
C2689
C2690
C2691
C2692
C2693
C2694
C2695
C2696
C2697
C2698
C2699
C2700
C2701
C2702
C2703
C2704
C2705
C2706
C2707
C2708
C2709
C2710
C2711
C2712
C2713
C2714
C2715
C2716
C2717
C2718
C2719
C2720
C2721
C2722
C2723
C2724
C2725
C2726
C2727
C2728
C2729
C2730
C2731
C2732
C2733
C2734
C2735
C2736
C2737
C2738
C2739
C2740
C2741
C2742
C2743
C2744
C2745
C2746
C2747
C2748
C2749
C2750
C2751
C2752
C2753
C2754
C2755
C2756
C2757
C2758
C2759
C2760
C2761
C2762
C2763
C2764
C2765
C2766
C2767
C2768
C2769
C2770
C2771
C2772
C2773
C2774
C2775
C2776
C2777
C2778
C2779
C2780
C2781
C2782
C2783
C2784
C2785
C2786
C2787
C2788
C2789
C2790
C2791
C2792
C2793
C2794
C2795
C2796
C2797
C2798
C2799
C2800
C2801
C2802
C2803
C2804
C2805
C2806
C2807
C2808
C2809
C2810
C2811
C2812
C2813
C2814
C2815
C2816
C2817
C2818
C2819
C2820
C2821
C2822
C2823
C2824
C2825
C2826
C2827
C2828
C2829
C2830
C2831
C2832
C2833
C2834
C2835
C2836
C2837
C2838
C2839
C2840
C2841
C2842
C2843
C2844
C2845
C2846
C2847
C2848
C2849
C2850
C2851
C2852
C2853
C2854
C2855
C2856
C2857
C2858
C2859
C2860
C2861
C2862
C2863
C2864
C2865
C2866
C2867
C2868
C2869
C2870
C2871
C2872
C2873
C2874
C2875
C2876
C2877
C2878
C2879
C2880
C2881
C2882
C2883
C2884
C2885
C2886
C2887
C2888
C2889
C2890
C2891
C2892
C2893
C2894
C2895
C2896
C2897
C2898
C2899
C2900
C2901
C2902
C2903
C2904
C2905
C2906
C2907
C2908
C2909
C2910
C2911
C2912
C2913
C2914
C2915
C2916
C2917
C2918
C2919
C2920
C2921
C2922
C2923
C2924
C2925
C2926
C2927
C2928
C2929
C2930
C2931
C2932
C2933
C2934
C2935
C2936
C2937
C2938
C2939
C2940
C2941
C2942
C2943
C2944
C2945
C2946
C2947
C2948
C2949
C2950
C2951
C2952
C2953
C2954
C2955
C2956
C2957
C2958
C2959
C2960
C2961
C2962
C2963
C2964
C2965
C2966
C2967
C2968
C2969
C2970
C2971
C2972
C2973
C2974
C2975
C2976
C2977
C2978
C2979
C2980
C2981
C2982
C2983
C2984
C2985
C2986
C2987
C2988
C2989
C2990
C2991
C2992
C2993
C2994
C2995
C2996
C2997
C2998
C2999
C3000
C3001
C3002
C3003
C3004
C3005
C3006
C3007
C3008
C3009
C3010
C3011
C3012
C3013
C3014
C3015
C3016
C3017
C3018
C3019
C3020
C3021
C3022
C3023
C3024
C3025
C3026
C3027
C3028
C3029
C3030
C3031
C3032
C3033
C3034
C3035
C3036
C3037
C3038
C3039
C3040
C3041
C3042
C3043
C3044
C3045
C3046
C3047
C3048
C3049
C3050
C3051
C3052
C3053
C3054
C3055
C3056
C3057
C3058
C3059
C3060
C3061
C3062
C3063
C3064
C3065
C3066
C3067
C3068
C3069
C3070
C3071
C3072
C3073
C3074
C3075
C3076
C3077
C3078
C3079
C3080
C3081
C3082
C3083
C3084
C3085
C3086
C3087
C3088
C3089
C3090
C3091
C3092
C3093
C3094
C3095
C3096
C3097
C3098
C3099
C3100
C3101
C3102
C3103
C3104
C3105
C3106
C3107
C3108
C3109
C3110
C3111
C3112
C3113
C3114
C3115
C3116
C3117
C3118
C3119
C3120
C3121
C3122
C3123
C3124
C3125
C3126
C3127
C3128
C3129
C3130
C3131
C3132
C3133
C3134
C3135
C3136
C3137
C3138
C3139
C3140
C3141
C3142
C3143
C3144
C3145
C3146
C3147
C3148
C3149
C3150
C3151
C3152
C3153
C3154
C3155
C3156
C3157
C3158
C3159
C3160
C3161
C3162
C3163
C3164
C3165
C3166
C3167
C3168
C3169
C3170
C3171
C3172
C3173
C3174
C3175
C3176
C3177
C3178
C3179
C3180
C3181
C3182
C3183
C3184
C3185
C3186
C3187
C3188
C3189
C3190
C3191
C3192
C3193
C3194
C3195
C3196
C3197
C3198
C3199
C3200
C3201
C3202
C3203
C3204
C3205
C3206
C3207
C3208
C3209
C3210
C3211
C3212
C3213
C3214
C3215
C3216
C3217
C3218
C3219
C3220
C3221
C3222
C3223
C3224
C3225
C3226
C3227
C3228
C3229
C3230
C3231
C3232
C3233
C3234
C3235
C3236
C3237
C3238
C3239
C3240
C3241
C3242
C3243
C3244
C3245
C3246
C3247
C3248
C3249
C3250
C3251
C3252
C3253
C3254
C3255
C3256
C3257
C3258
C3259
C3260
C3261
C3262
C3263
C3264
C3265
C3266
C3267
C3268
C3269
C3270
C3271
C3272
C3273
C3274
C3275
C3276
C3277
C3278
C3279
C3280
C3281
C3282
C3283
C3284
C3285
C3286
C3287
C3288
C3289
C3290
C3291
C3292
C3293
C3294
C3295
C3296
C3297
C3298
C3299
C3300
C3301
C3302
C3303
C3304
C3305
C3306
C3307
C3308
C3309
C3310
C3311
C3312
C3313
C3314
C3315
C3316
C3317
C3318
C3319
C3320
C3321
C3322
C3323
C3324
C3325
C3326
C3327
C3328
C3329
C3330
C3331
C3332
C3333
C3334
C3335
C3336
C3337
C3338
C3339
C3340
C3341
C3342
C3343
C3344
C3345
C3346
C3347
C3348
C3349
C3350
C3351
C3352
C3353
C3354
C3355
C3356
C3357
C3358
C3359
C3360
C3361
C3362
C3363
C3364
C3365
C3366
C3367
C3368
C3369
C3370
C3371
C3372
C3373
C3374
C3375
C3376
C3377
C3378
C3379
C3380
C3381
C3382
C3383
C3384
C3385
C3386
C3387
C3388
C3389
C3390
C3391
C3392
C3393
C3394
C3395
C3396
C3397
C3398
C3399
C3400
C3401
C3402
C3403
C3404
C3405
C3406
C3407
C3408
C3409
C3410
C3411
C3412
C3413
C3414
C3415
C3416
C3417
C3418
C3419
C3420
C3421
C3422
C3423
C3424
C3425
C3426
C3427
C3428
C3429
C3430
C3431
C3432
C3433
C3434
C3435
C3436
C3437
C3438
C3439
C3440
C3441
C3442
C3443
C3444
C3445
C3446
C3447
C3448
C3449
C3450
C3451
C3452
C3453
C3454
C3455
C3456
C3457
C3458
C3459
C3460
C3461
C3462
C3463
C3464
C3465
C3466
C3467
C3468
C3469
C3470
C3471
C3472
C3473
C3474
C3475
C3476
C3477
C3478
C3479
C3480
C3481
C3482
C3483
C3484
C3485
C3486
C3487
C3488
C3489
C3490
C3491
C3492
C3493
C3494
C3495
C3496
C3497
C3498
C3499
C3500
C3501
C3502
C3503
C3504
C3505
C3506
C3507
C3508
C3509
C3510
C3511
C3512
C3513
C3514
C3515
C3516
C3517
C3518
C3519
C3520
C3521
C3522
C3523
C3524
C3525
C3526
C3527
C3528
C3529
C3530
C3531
C3532
C3533
C3534
C3535
C3536
C3537
C3538
C3539
C3540
C3541
C3542
C3543
C3544
C3545
C3546
C3547
C3548
C3549
C3550
C3551
C3552
C3553
C3554
C3555
C3556
C3557
C3558
C3559
C3560
C3561
C3562
C3563
C3564
C3565
C3566
C3567
C3568
C3569
C3570
C3571
C3572
C3573
C3574
C3575
C3576
C3577
C3578
C3579
C3580
C3581
C3582
C3583
C3584
C3585
C3586
C3587
C3588
C3589
C3590
C3591
C3592
C3593
C3594
C3595
C3596
C3597
C3598
C3599
C3600
C3601
C3602
C3603
C3604
C3605
C3606
C3607
C3608
C3609
C3610
C3611
C3612
C3613
C3614
C3615
C3616
C3617
C3618
C3619
C3620
C3621
C3622
C3623
C3624
C3625
C3626
C3627
C3628
C3629
C3630
C3631
C3632
C3633
C3634
C3635
C3636
C3637
C3638
C3639
C3640
C3641
C3642
C3643
C3644
C3645
C3646
C3647
C3648
C3649
C3650
C3651
C3652
C3653
C3654
C3655
C3656
C3657
C3658
C3659
C3660
C3661
C3662
C3663
C3664
C3665
C3666
C3667
C3668
C3669
C3670
C3671
C3672
C3673
C3674
C3675
C3676
C3677
C3678
C3679
C3680
C3681
C3682
C3683
C3684
C3685
C3686
C3687
C3688
C3689
C3690
C3691
C3692
C3693
C3694
C3695
C3696
C3697
C3698
C3699
C3700
C3701
C3702
C3703
C3704
C3705
C3706
C3707
C3708
C3709
C3710
C3711
C3712
C3713
C3714
C3715
C3716
C3717
C3718
C3719
C3720
C3721
C3722
C3723
C3724
C3725
C3726
C3727
C3728
C3729
C3730
C3731
C3732
C3733
C3734
C3735
C3736
C3737
C3738
C3739
C3740
C3741
C3742
C3743
C3744
C3745
C3746
C3747
C3748
C3749
C3750
C3751
C3752
C3753
C3754
C3755
C3756
C3757
C3758
C3759
C3760
C3761
C3762
C3763
C3764
C3765
C3766
C3767
C3768
C3769
C3770
C3771
C3772
C3773
C3774
C3775
C3776
C3777
C3778
C3779
C3780
C3781
C3782
C3783
C3784
C3785
C3786
C3787
C3788
C3789
C3790
C3791
C3792
C3793
C3794
C3795
C3796
C3797
C3798
C3799
C3800
C3801
C3802
C3803
C3804
C3805
C3806
C3807
C3808
C3809
C3810
C3811
C3812
C3813
C3814
C3815
C3816
C3817
C3818
C3819
C3820
C3821
C3822
C3823
C3824
C3825
C3826
C3827
C3828
C3829
C3830
C3831
C3832
C3833
C3834
C3835
C3836
C3837
C3838
C3839
C3840
C3841
C3842
C3843
C3844
C3845
C3846
C3847
C3848
C3849
C3850
C3851
C3852
C3853
C3854
C3855
C3856
C3857
C3858
C3859
C3860
C3861
C3862
C3863
C3864
C3865
C3866
C3867
C3868
C3869
C3870
C3871
C3872
C3873
C3874
C3875
C3876
C3877
C3878
C3879
C3880
C3881
C3882
C3883
C3884
C3885
C3886
C3887
C3888
C3889
C3890
C3891
C3892
C3893
C3894
C3895
C3896
C3897
C3898
C3899
C3900
C3901
C3902
C3903
C3904
C3905
C3906
C3907
C3908
C3909
C3910
C3911
C3912
C3913
C3914
C3915
C3916
C3917
C3918
C3919
C3920
C3921
C3922
C3923
C3924
C3925
C3926
C3927
C3928
C3929
C3930
C3931
C3932
C3933
C3934
C3935
C3936
C3937
C3938
C3939
C3940
C3941
C3942
C3943
C3944
C3945
C3946
C3947
C3948
C3949
C3950
C3951
C3952
C3953
C3954
C3955
C3956
C3957
C3958
C3959
C3960
C3961
C3962
C3963
C3964
C3965
C3966
C3967
C3968
C3969
C3970
C3971
C3972
C3973
C3974


8 50V, 20µs; 260V p-p
7 0.5V, 20µs; 3.4V p-p
23 0.2V, 0.1µs; 0.8V p-p
24 0.2V, 20µs; 0.6V p-p
21 2V, 20µs; 8V p-p
22 2V, 5ms; 8V p-p
27 50mV, 20µs; 50mV p-p
28 0.1V, 20µs; 0.4V p-p
26 50mV, 20µs; 0.15V p-p
33 0.5V, 20µs; 2.75V p-p
29 0.2V, 20µs; 0.6V p-p
32 2V, 20µs; 11.6V p-p
31 0.1V, 0.05µs; 0.4V p-p
9 2V, 20µs; 8.25V p-p
30 0.5V, 20µs; 3.3V p-p
10 150V, 20µs; 1000V p-p
1 0.5V, 5µs; 2.25V p-p
25 50mV, 20µs; 0.15V p-p
2 0.1V, 10µS; 0.7V p-p
11 2V, 5ms; 11.75V p-p
3 0.2V, 5µs; 1.2V p-p
20 1V, 20µs; 4.5V p-p
4 1V, 5µs; 5V p-p
19 20V, 20µs; 120V p-p
12 0.1V, 5ms; 0.75V p-p
13 0.1V, 20µs; 0.45V p-p
14 2V, 5ms; 9V p-p
18 0.5V, 5ms; 2V p-p
17 10V, 5ms; 50V p-p
16 5V, 5ms; 25V p-p
15 5V, 5ms; 25V p-p
6 100V, 5µs; 450V p-p
5 100V, 5µs; 550V p-p
IC54
IC52
IC53
IC55
IC57
PL4
TR67
TR68
TR74
TR73
TR62
L74
L71
L77/C198
L104/071
R64/R65
VIDEO OUTPUT COLLECTORS
B
G
R
2499G