

Service Manual

T51

Issue 1.0

DiVA T51 AM/FM Tuner



ARCAM

Contents List

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T51 Tuner Circuit Description

Power Supply

Mains voltage selection is made by placing a fuse, of appropriate value, in the 115V or 230V position. The single secondary is rectified and regulated and supplies four regulators.

Z7 is always powered when the mains is connected and keeps the preset memory of the micro controller intact. The high-value capacitor (C84) will keep this data safe, for a limited time, in case of mains power failure.

Z5 provides the main 12V supply rail for the RF and audio circuits. This is always connected, except for the supply to the FM front end, which is disabled by Q2 when the unit is turned 'off'.

Z4 powers the LED back light on the display PCB.

Z6 is the 5V digital supply for the micro controller.

FM Tuner & IF

The FM aerial input is mixed in the front end FE1 which provides a 10.7MHz IF output. This is filtered and amplified by ceramic filters CF1 & CF2 and the circuit based around Q9 & Q10. A third filter CF3 can be put in circuit by fitting jumpers JP1 & JP2 across pins 2 & 4 and 1 & 3 of SK6 respectively. This effectively narrows the IF band to improve selectivity. Transistors Q17 and Q21 are part of the AGC circuit. The position of the jumper link JP7 to either SK10 or SK11 determines from which point the AGC circuit is triggered. The default is for the jumper to be fitted to SK10 which minimizes cross modulation and prevents the IF amp becoming saturated.

The LA1266 (Z9) demodulates the IF at pin 1 into an audio output at pin 12. The quadrature coil is a double-tuned device for best distortion performance.

When a station is tuned correctly the 'On Tune' signal goes low and drives a green LED on the display PCB. This signal is also used by the auto-stop detection and muting circuits.

AM Tuner & IF

The LA1266 (Z9) contains the AM RF amplifier, oscillator and mixer circuitry.

Switching between FM and AM modes is controlled by the 'FM' signal from the micro controller which disables the AM circuitry of Z9 and switches the path of the audio signal through Z8.

MW/LW switching is performed by switching transistors Q12, Q14 & Q15.

Each band has its own oscillator and aerial tuning coils, tuned by a varicap diode all contained within the AM module L5.

The 450kHz IF signal is filtered by coil and ceramic filter combination T5.

Birdie Filter

The 'Birdie Filter' (L2) is a four pole low pass filter, flat to about 53kHz, then with a very steep roll off from then on.. This is designed to reduce co-channel interference in FM Stereo and cut down on irritating 'birdie' noises.

Stereo Decoder

Stereo decoding is performed by LA3401 (Z8). The 38kHz reference signal is accurately created by ceramic resonator X3 and does not require adjustment.

Stereo separation is adjusted for maximum by preset RV1. This IC also contains FM/AM audio switching and muting functions.

Audio Filters & Output

The left and right channel audio outputs from Z8 are filtered by the de-emphasis network of R1, C1 etc. The correct de-emphasis network is selected by the position of jumpers JP3 & JP4 on the pins of SK8. C2 & C102 (220pF) are selected for 50us and C3 & C103 (560pF) for 75us de-emphasis.

The final filter, based on Z3, is a two-pole low-pass circuit with a cut-off frequency of around 20kHz. Also included is a 19kHz notch filter, L1 & C4, that removes most of the residual pilot tone.

Muting

When the power switch is turned off Q5 is switched off, enabling the mute circuitry of the stereo decoder (Z8) via diode D9. This removes the need for output muting transistors and eliminates switching clicks and pops. At switch-on the mute is enabled while C21 is charged via Z8.

In normal use the mute inside Z8 is enabled in three other ways:

The AMUTE signal from the micro controller is active at power-on and for a short time when a preset is changed. When the band is changed the output is muted by charging C52.

The audio output must be muted whenever the tuner is in stereo mode and is also off-tune. This is to eliminate noise during tuning and is provided by Q8 and the MONO and OFF TUNE control signals.

In Mono mode this mute is disabled so that weak stations can be heard, despite the noise.

Micro controller

Control of the DiVA T51 tuner is performed by a single micro controller Z10, LA7230. This also provides keypad input and drives a LCD directly.

At power-on a matrix of diodes is scanned to set-up the controller for the correct options:

D7 selects the correct frequency ranges.

D10 enables the use of Auto tuning as well as manual tuning.

D8 allows the Auto-tuning mode to use the 'IF Count' method of searching.

The position of jumpers JP 5 & JP6 fitted to SK9 are used to disable or enable LW and also whether the AM band steps are 9 kHz (UK) or 10 kHz (USA).

Z10 provides control signal outputs for the following functions:

MONO - To defeat the stereo decoder

AMUTE - Turns on the mute circuit when a button is pressed & during tuning.

FM, MW & LW - Only one output active low at any one time. Used to switch on specific parts of the RF circuitry as appropriate.

The micro controller includes a Phase-Locked-Loop (PLL) circuit which compares the tuner local oscillator signals (FMIN & AMIN) with a reference frequency. Based on this information and the required tuned frequency the controller varies the tuning voltage to the FM and AM front ends.

The tuning voltages (FMVt & AMVt) have to be filtered from the PLL by the circuitry around Q7 & Q13.

Display PCB

The display PCB holds the keypad, LCD display, LED back light module and On-Tune indicator.

The remote control receiver consists of the receiver RX1 and the PIC micro controller, Z1, which is used to decode the incoming remote control codes from RC5 format to Sanyo type commands. This is because the Sanyo micro controller, Z10, can only respond to Sanyo remote control commands.

Jumper Settings

Jumper	Option 1	Option 2
JP1	Best sensitivity	Best sound
JP2	Best sensitivity	Best sound
JP3	De-emphasis 50uS	De-emphasis 75uS
JP4	De-emphasis 50uS	De-emphasis 75uS
JP5	LW & MW	MW only
JP6	AM spacing 9KHz	AM spacing 10KHz
JP7	Less X-MOD	Less De-sense

USA / Rest of the World

If the T51 is transferred from or to the USA the following jumper settings will require changing.

Jumper	Rest of the World	USA	Action
JP3	50uS	75uS	De-emphasis
JP4	50uS	75uS	De-emphasis
JP6	9KHz	10KHz	AM spacing

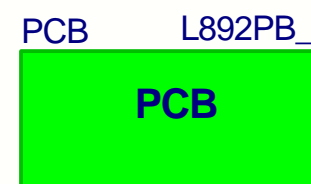
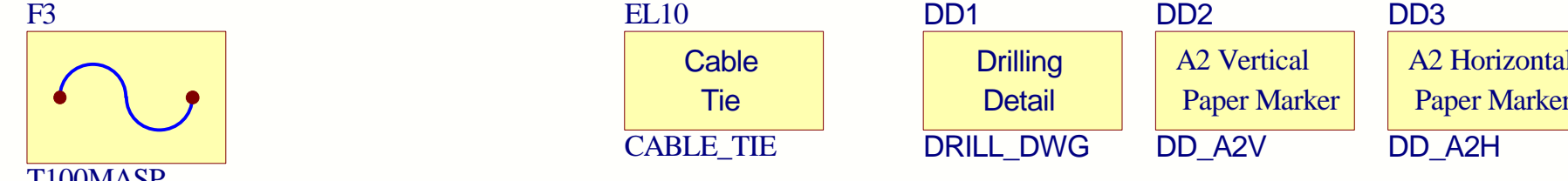
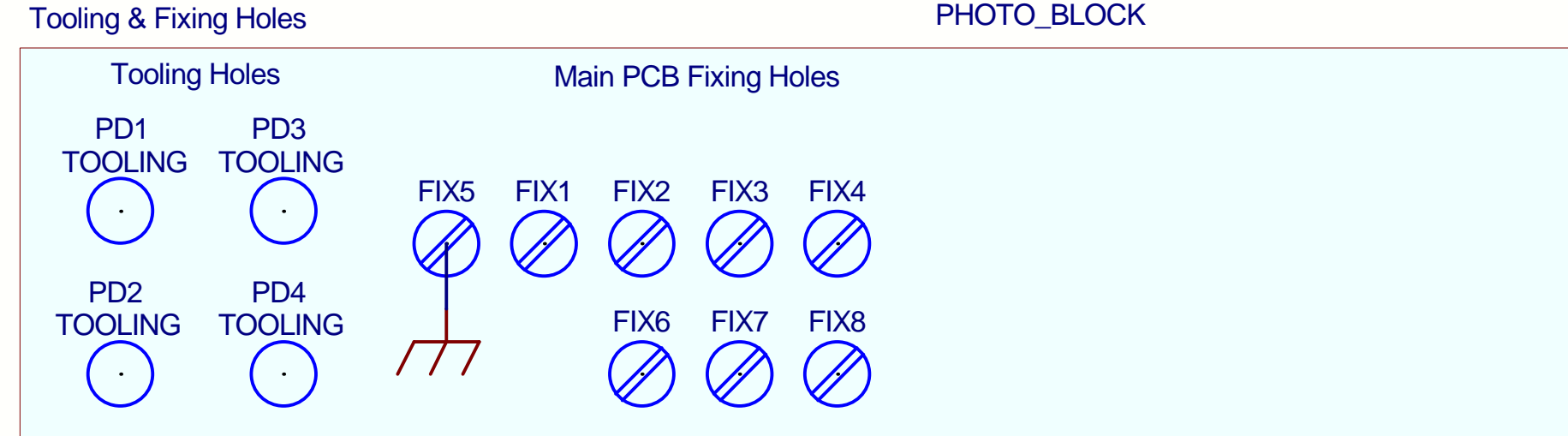
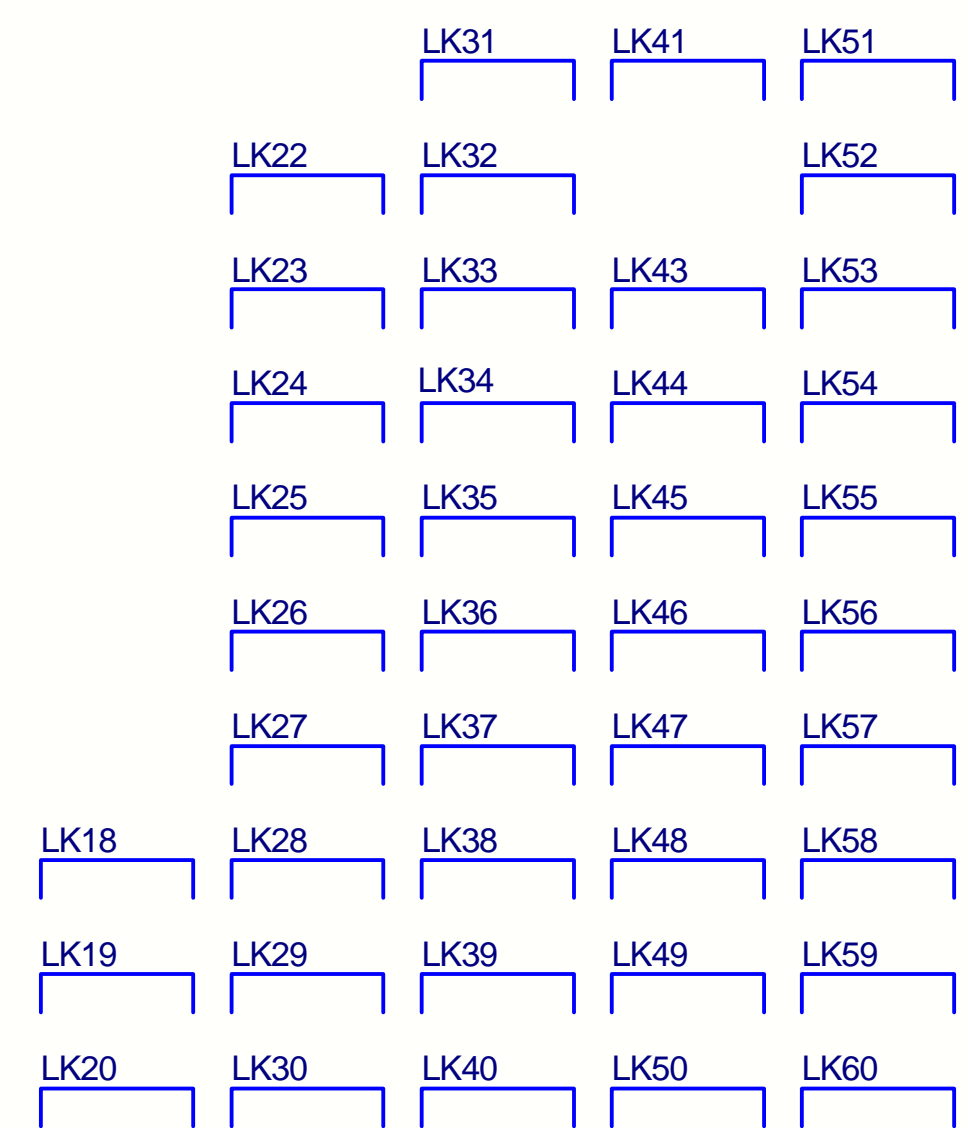
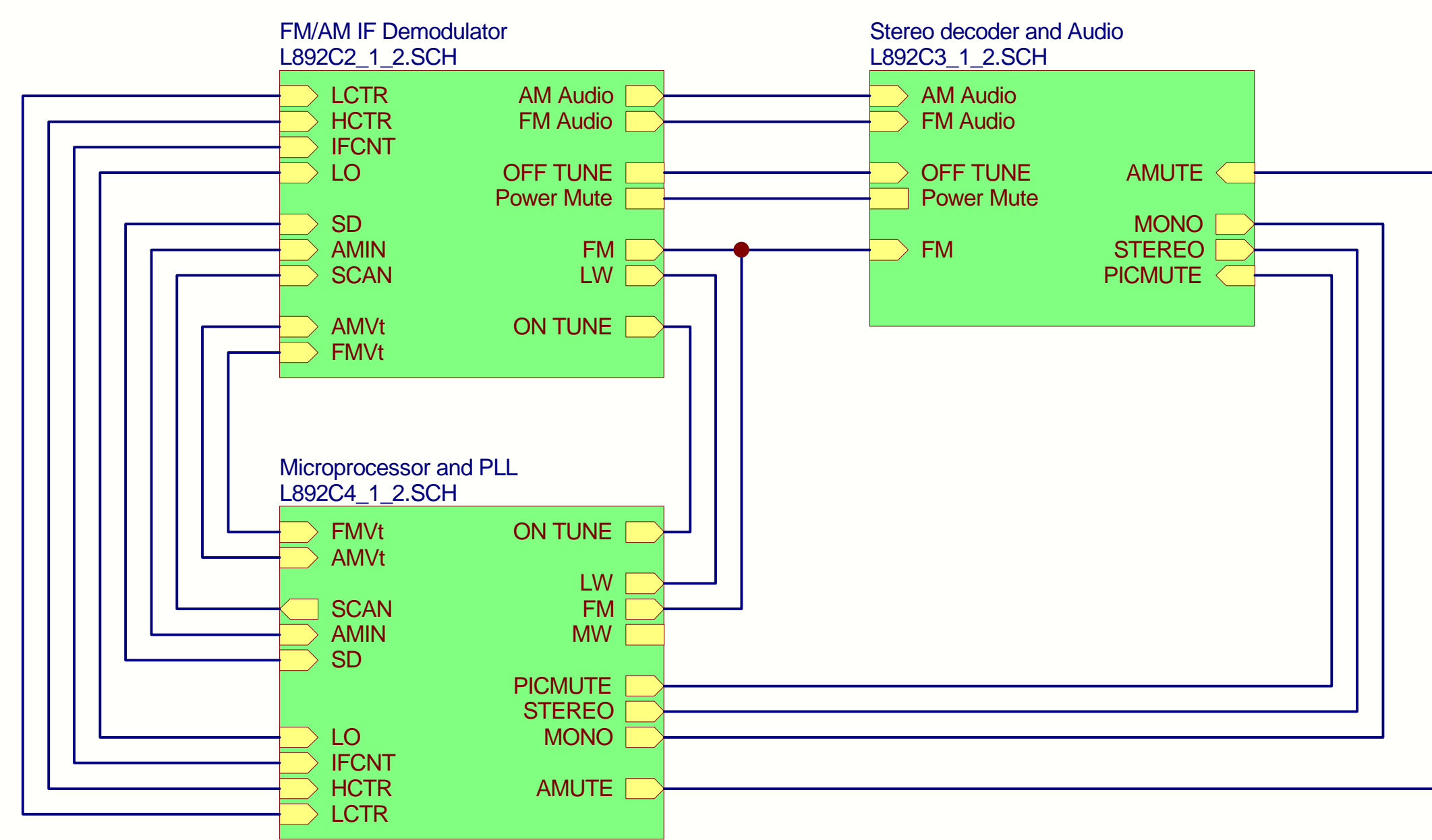
1 2 3 4 5 6 7 8

D

C

B

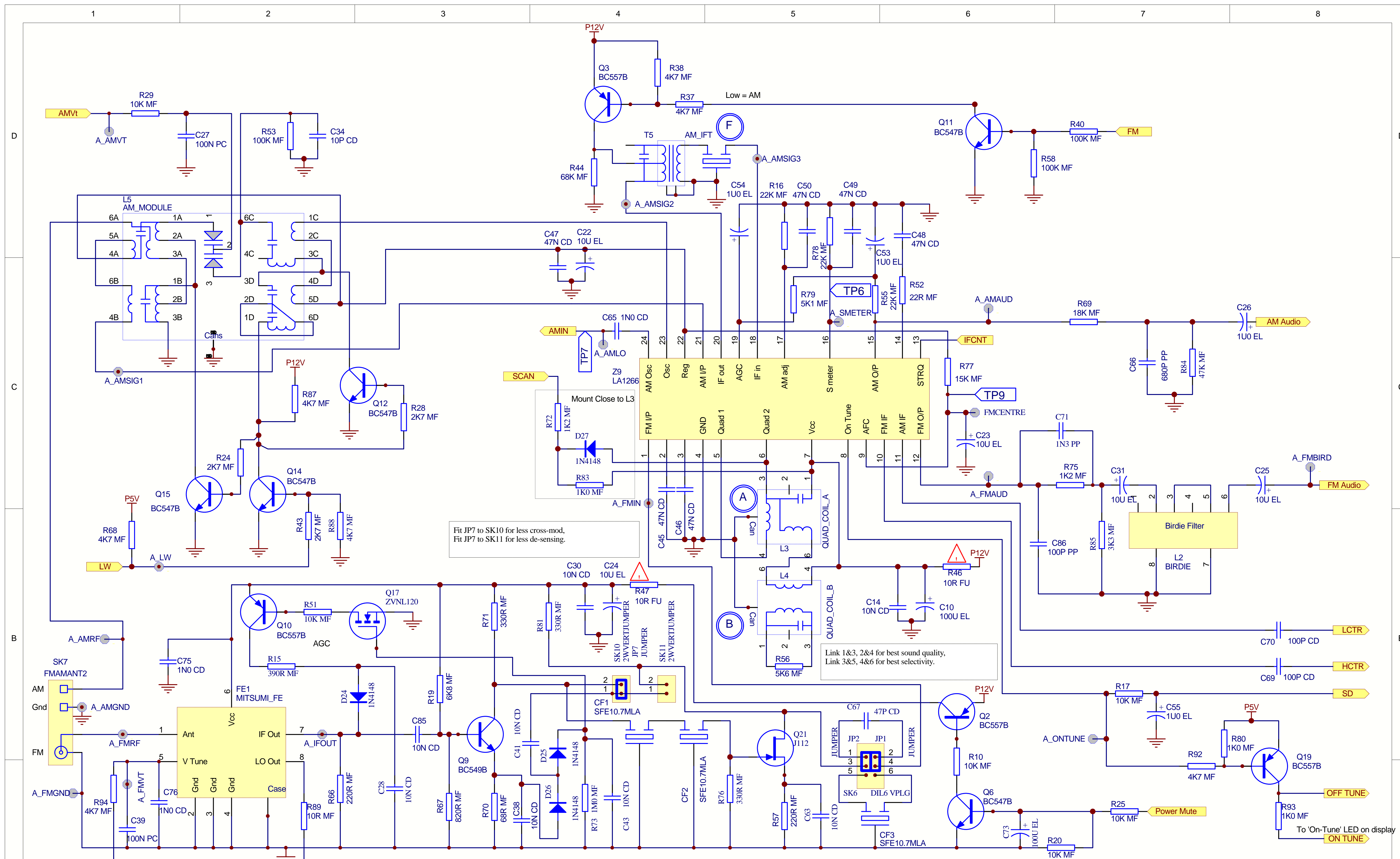
A



Kit Mask
Exclude 'NF' parts from kit mask, i.e. Not Fitted. This applies to R4 and R104

DRAWING TITLE T51 Tuner										
A & R Cambridge Ltd. Pembroke Avenue Denny Industrial Centre Waterbeach Cambridge CB5 9PB	Circuit Diagram									
	Notes:					00_1078	CL	12/09/00	R93 WAS 220R NOW 1K0	1.2
						00-1044	CL	17/7/00	PRODUCTION RELEASE	1
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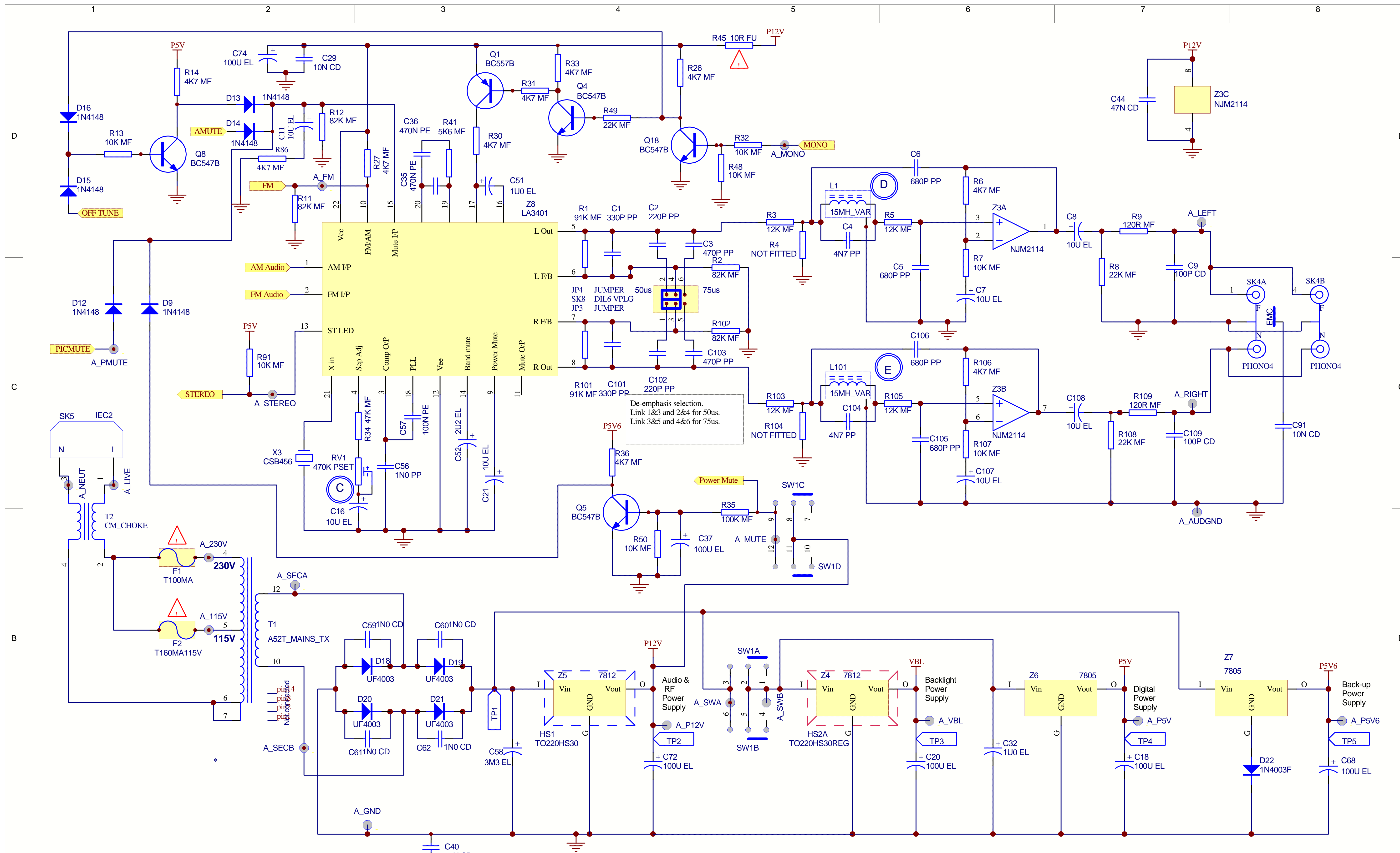
1 2 3 4 5 6 7 8



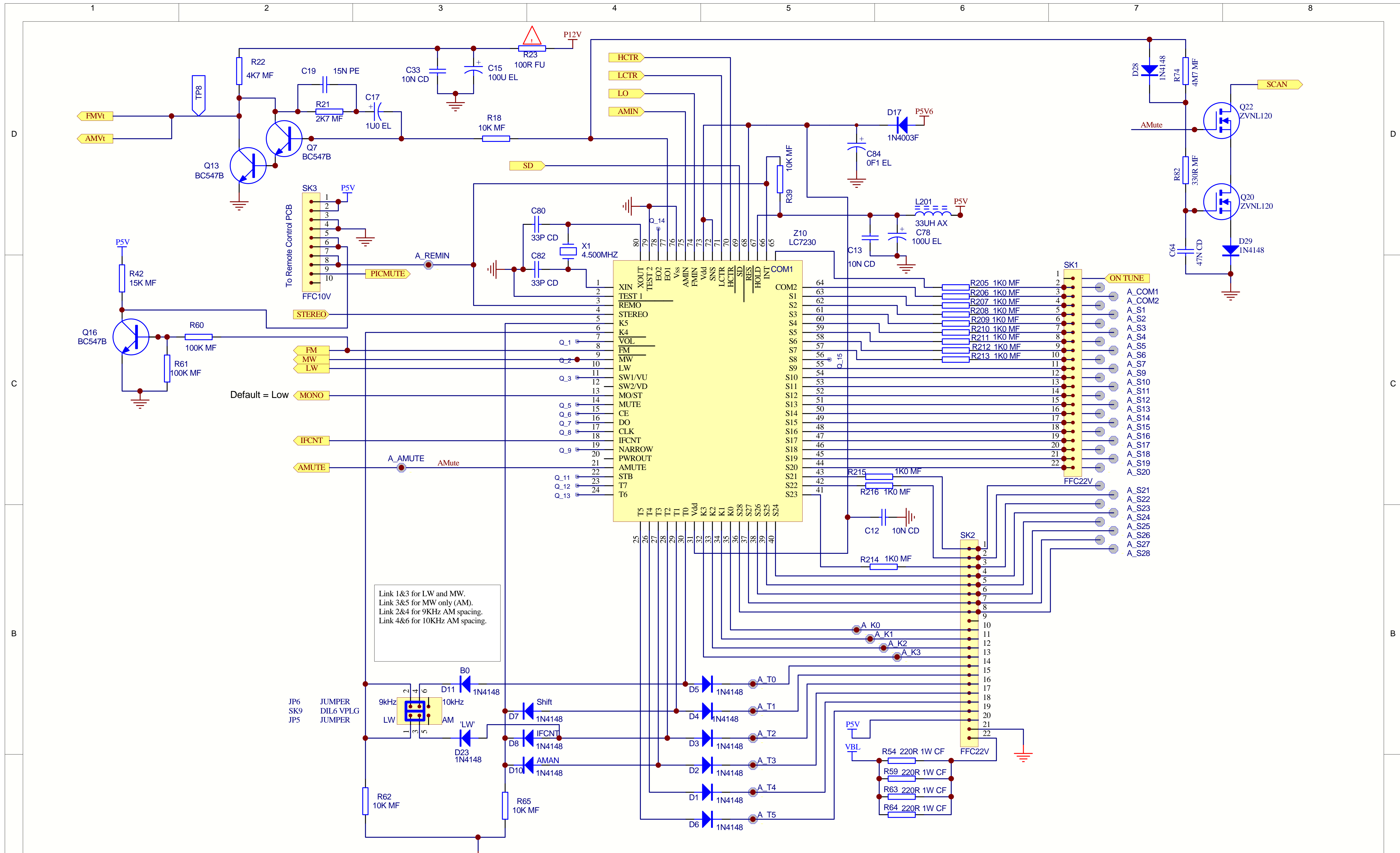
Fit JP7 to SK10 for less cross-mod.
Fit JP7 to SK11 for less de-sensing.

Link 1&3, 2&4 for best sound quality.
Link 3&5, 4&6 for best selectivity.

DRAWING TITLE T51 Tuner Circuit Diagram					
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00_1044	MGM	31/7/00	INITIAL RELEASE		1

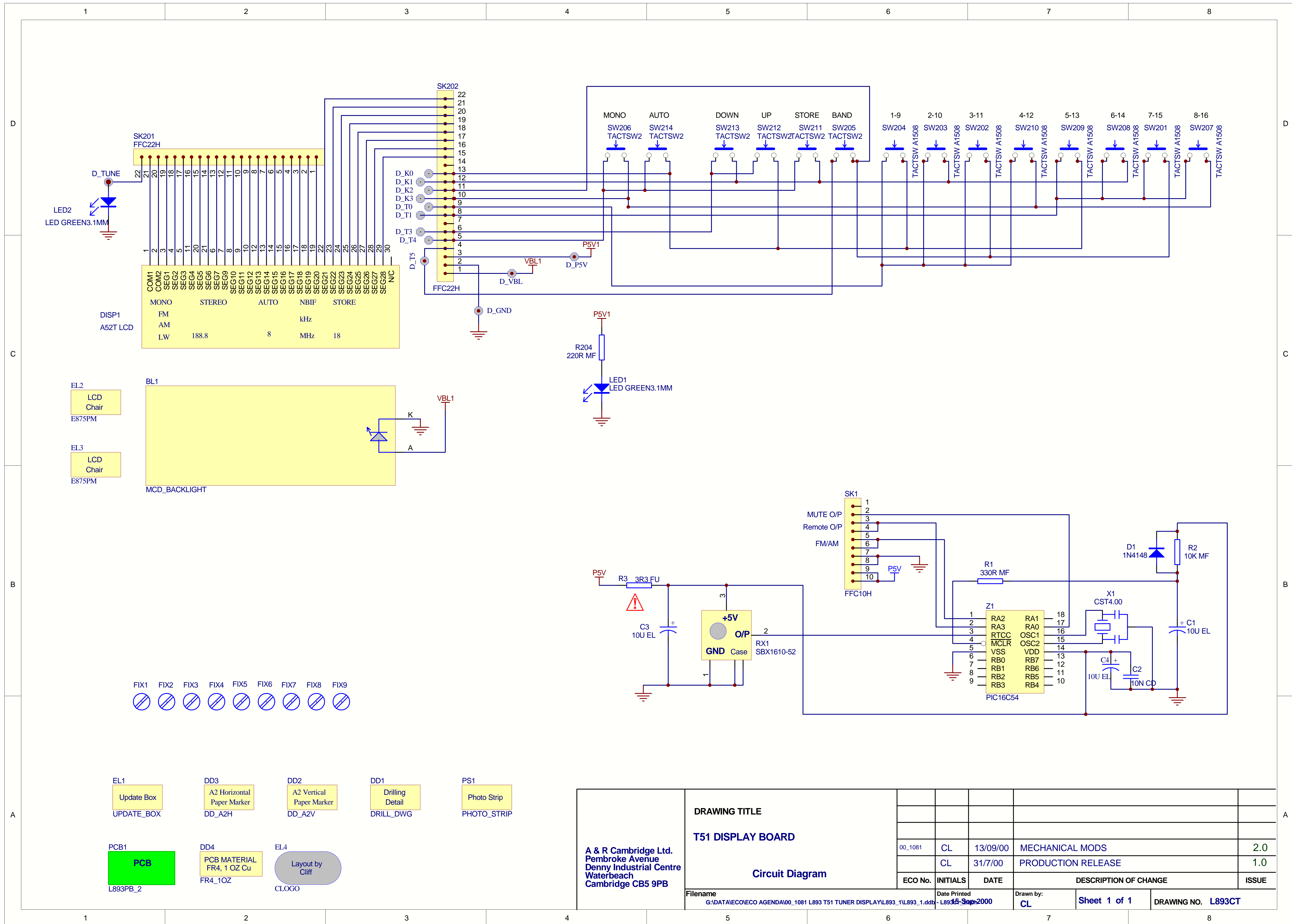


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00-1044	MGM	31/7/00	INITIAL RELEASE	1	
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Link 1&3 for LW and MW.
 Link 3&5 for MW only (AM).
 Link 2&4 for 9KHz AM spacing.
 Link 4&6 for 10KHz AM spacing.

A & R Cambridge Ltd. Pembroke Avenue Denny Industrial Centre Waterbeach Cambridge CB5 9PB	DRAWING TITLE				
	T51 Tuner				
	Circuit Diagram				
	00_1078	CL	12/09/00	R93 WAS 220R NOW 1K0	1.2
	00_1044	MGM	31/7/00	INITIAL RELEASE	1
ECO No.	INITIALS	DATE	DESCRIPTION OF CHANGE	ISSUE	
Filename	Date Printed		Drawn by:	Sheet 4 of 4	DRAWING NO. L892CT
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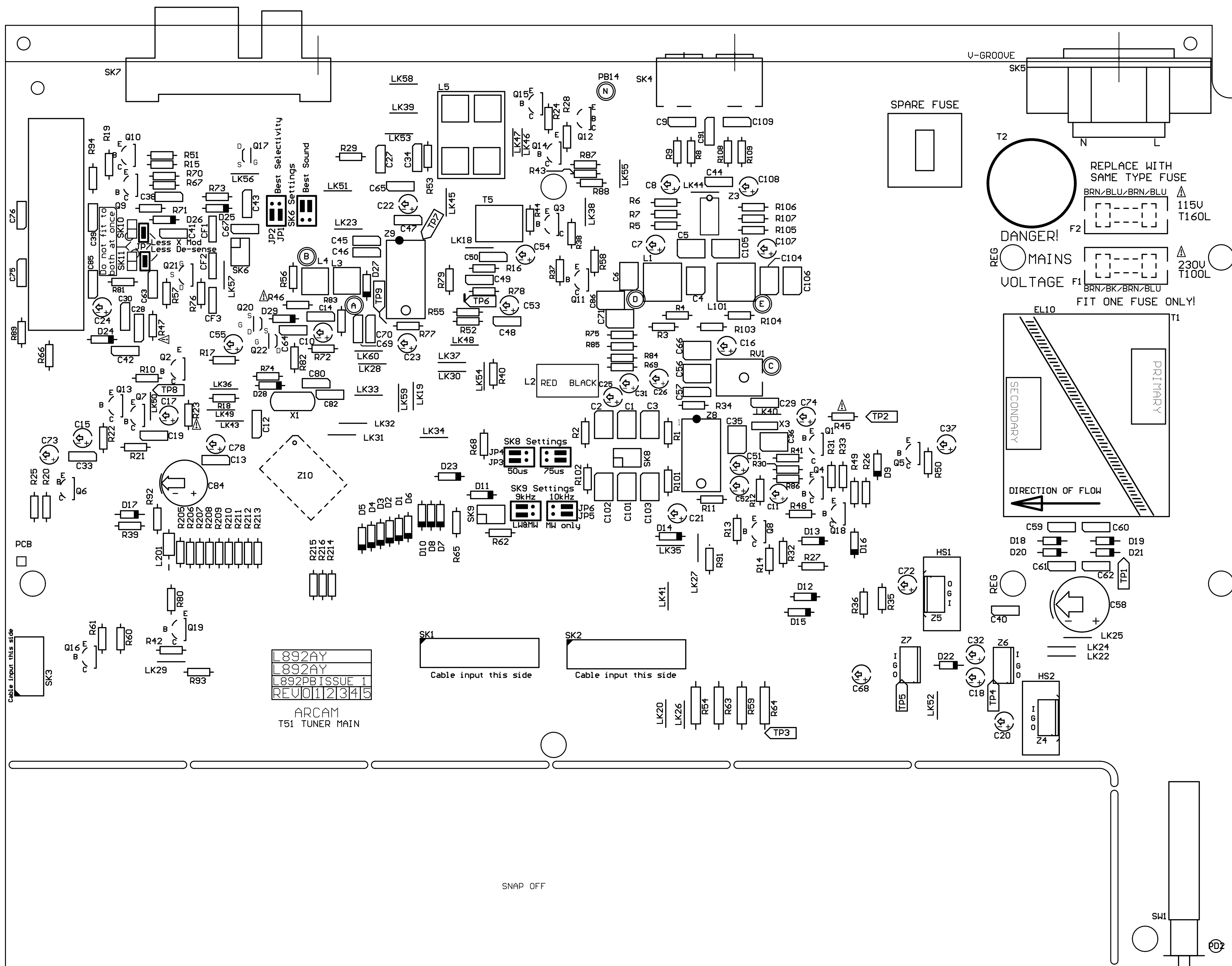
- FIX1
- FIX2
- FIX3
- FIX4
- FIX5
- FIX6
- FIX7
- FIX8
- FIX9

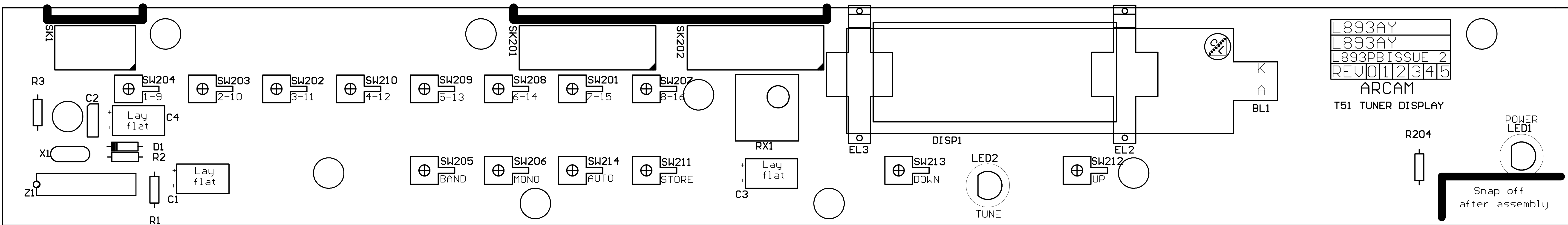
- EL1 Update Box UPDATE_BOX
- DD3 A2 Horizontal Paper Marker DD_A2H
- DD2 A2 Vertical Paper Marker DD_A2V
- DD1 Drilling Detail DRILL_DWG
- PS1 Photo Strip PHOTO_STRIP
- PCB1 PCB L893PB_2
- DD4 PCB MATERIAL FR4, 1 OZ Cu FR4_1OZ
- EL4 Layout by Cliff CLOGO

A & R Cambridge Ltd.
 Pembroke Avenue
 Denny Industrial Centre
 Waterbeach
 Cambridge CB5 9PB

DRAWING TITLE				
T51 DISPLAY BOARD				
Circuit Diagram				
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	CL	31/7/00	PRODUCTION RELEASE	1.0

Date Printed: 15-Sep-2000
 Drawn by: CL
 Sheet 1 of 1
 DRAWING NO. L893CT





L893AY
L893AY
L893PB ISSUE 2
REV 01 2 3 4 5

ARCAM
T51 TUNER DISPLAY

L893PB_2.PCB
Top Overlay
13-Sep-2000



Snap off
after assembly

T51 Main Board L892_1.2

Reference	Description	Part Number
C1	PPRO 330P 5% 63V RA	2D133
C2	PPRO 220P 5% 63V RA	2D122
C3,C4	PPRO 470P 63V 5% RA	2D147N
C5,C6	PPRO 680P 5% 63V RA	2D168
C7,C8	ELST 10U 50V	2N610
C9	CERD 100P 63V	2A110
C10	ELST 100U 25V	2N710
C11	ELST 10U 50V	2N610
C12-C14	CERD 10N 63V -20% +80% RA	2A310
C15	ELST 100U 25V	2N710
C16	ELST 10U 50V	2N610
C17	ELST 1U0 50V	2N510
C18	ELST 100U 25V	2N710
C19	PEST 15N 63V 10%	2K315
C20	ELST 100U 25V	2N710
C21-C25	ELST 10U 50V	2N610
C26	ELST 1U0 50V	2N510
C27	PCRB 100N 100V 5% RA 5mm	2H410
C28-C30	CERD 10N 63V -20% +80% RA	2A310
C31	ELST 10U 50V	2N610
C32	ELST 1U0 50V	2N510
C33	CERD 10N 63V -20% +80% RA	2A310
C34	CERD 10P 63V 20% RA	2A010
C35-C36	PEST 470N 63V 10%	2K447
C37	ELST 100U 25V	2N710
C38	CERD 10N 63V -20% +80% RA	2A310
C39	PCRB 100N 100V 5% RA 5mm	2H410
C40-C41	CERD 10N 63V -20% +80% RA	2A310
C42	CERD 22P 63V 20% RA	2A022
C43	CERD 10N 63V -20% +80% RA	2A310
C44-C50	CERD 47N 63V -20% +80% RA	2A347
C51-C55	ELST 1U0 50V	2N510
C56	PPRO 1N0 5% 63V RA	2D210
C57	PEST 100N 63V 10%	2K410
C58	ELST 3M3 25V	2N833
C59-C63	CERD 1N0 63V	2A210
C64	CERD 47N 63V -20% +80% RA	2A347
C65	CERD 1N0 63V	2A210
C66	PPRO 680P 5% 63V RA	2D168
C67	CERD 47P 63V 20% RA	2A047
C68	ELST 100U 25V	2N710
C69-C70	CERD 100P 63V	2A110
C71	PPRO 1N3 63V 5% RA	2D213N
C72-C74	ELST 100U 25V	2N710
C75,C76	CERD 1N0 63V	2A210
C78	ELST 100U 25V	2N710
C80,C82	CERD 33P 63V 20% RA	2A033
C84	ELCAP 0F1 5V MEMORY BACKUP	2X010
C85	CERD 10N 63V -20% +80% RA	2A310
C86	PPRO 100P 63V 5% RA	2D110N
C91	CERD 10N 63V -20% +80% RA	2A310
C101	PPRO 330P 5% 63V RA	2D133
C102	PPRO 220P 5% 63V RA	2D122
C103,C104	PPRO 470P 63V 5% RA	2D147N
C105,C106	PPRO 680P 5% 63V RA	2D168
C107,C108	ELST 10U 50V	2N610
C109	CERD 100P 63V	2A110
CF1-CF3	CER FILT SFE10.7ML-A RED	7M002
D1-D16	SSDIODE 1N4148 75V	3A4148
D17	RECTIFIER 1N4003F 1A 200V	3B4003F
D18-D21	ULTRAFAST RECTIFIER DIODE UF4003 1A	3B4003F

D22	RECTIFIER 1N4003F 1A 200V	3B4003
D23-D29	SSDIODE 1N4148 75V	3A4148
EL10	CABLE TIE PLT2.5	F042
F1	FUSEHOLDER 20mm PCB	8S004
F1	INS COVER PCB FUSEHOLDER	F022
F1	SPARE FUSE 20mm 100mA T	C11106
F2	INS COVER PCB FUSEHOLDER	F022
F2	FUSEHOLDER 20mm PCB	8S004
F3	SPARE FUSEHOLDER	F062
F3	SPARE FUSE 20mm 100mA T	C11106
FE1	TUNER HEAD FM FE417-G02	3007
HS1,HS2	HEATSINK TO220 CLIP 30	F007
JP1-JP7	JUMPER SOCKET 0.1"	8K004
L1	INDUCTOR VAR 15mH CLNS35-05148	7E008
L2	VARIND BIRDIE A257BLR-3670N	7E001
L3	VARIND QUAD M292MEA-2399FKG	7E002
L4	VARIND QUAD M292MEA-2198X	7E003
L5	VARIND AM TUNING BLOCK	7E004
L101	INDUCTOR VAR 15mH CLNS35-05148	7E008
L201	33UH IND 34-48330	7D033
PCB	PRINTED CIRCUIT BOARD	L892PB_1
Q1-Q3	TRANS LF SS P BC557B	4A557
Q4-Q8	TRANS LF SS N BC547B	4A547
Q9	TRANS LF SS N BC549B	4A549
Q10	TRANS LF SS P BC557B	4A557
Q11-Q16	TRANS LF SS N BC547B	4A547
Q17	TRANS MOSFET SW ZVNL120A	4K120
Q18	TRANS LF SS N BC547B	4A547
Q19	TRANS LF SS P BC557B	4A557
Q20	TRANS MOSFET SW ZVNL120A	4K120
Q21	TRANS JFET N J112	4J112
Q22	TRANS MOSFET SW ZVNL120A	4K120
R1	RES MF W4 1% 91K	1H391
R2	RES MF W4 1% 82K	1H382
R3	RES MF W4 1% 12K	1H312
R4	RES MF W4 1% NOT	1H000
R5	RES MF W4 1% 12K	1H312
R6	RES MF W4 1% 4K7	1H247
R7	RES MF W4 1% 10K	1H310
R8	RES MF W4 1% 22K	1H322
R9	RES MF W4 1% 120R	1H112
R10	RES MF W4 1% 10K	1H310
R11,R12	RES MF W4 1% 82K	1H382
R13	RES MF W4 1% 10K	1H310
R14	RES MF W4 1% 4K7	1H247
R15	RES MF W4 1% 390R	1H139
R16	RES MF W4 1% 22K	1H322
R17,R18	RES MF W4 1% 10K	1H310
R19	RES MF W4 1% 6K8	1H268
R20	RES MF W4 1% 10K	1H310
R21	RES MF W4 1% 2K7	1H227
R22	RES MF W4 1% 4K7	1H247
R23	RES MF FU W3 5% 100R NFR25	1G110
R24	RES MF W4 1% 2K7	1H227
R25	RES MF W4 1% 10K	1H310
R26,R27	RES MF W4 1% 4K7	1H247
R28	RES MF W4 1% 2K7	1H227
R29	RES MF W4 1% 10K	1H310
R30,R31	RES MF W4 1% 4K7	1H247

R32	RES MF W4 1% 10K	1H310
R33	RES MF W4 1% 4K7	1H247
R34	RES MF W4 1% 47K	1H347
R35	RES MF W4 1% 100K	1H410
R36-R38	RES MF W4 1% 4K7	1H247
R39	RES MF W4 1% 10K	1H310
R40	RES MF W4 1% 100K	1H410
R41	RES MF W4 1% 5K6	1H256
R42	RES MF W4 1% 15K	1H315
R43	RES MF W4 1% 2K7	1H227
R44	RES MF W4 1% 68K	1H368
R45-R47	RES MF FU W3 5% 10R NFR25	1G010
R48	RES MF W4 1% 10K	1H310
R49	RES MF W4 1% 22K	1H322
R50,R51	RES MF W4 1% 10K	1H310
R52	RES MF W4 1% 22R	1H022
R53	RES MF W4 1% 100K	1H410
R54	RES CF 1W 220R 5%	1E122
R55	RES MF W4 1% 22K	1H322
R56	RES MF W4 1% 5K6	1H256
R57	RES MF W4 1% 220R	1H122
R58	RES MF W4 1% 100K	1H410
R59	RES CF 1W 220R 5%	1E122
R60,R61	RES MF W4 1% 100K	1H410
R62	RES MF W4 1% 10K	1H310
R63,R64	RES CF 1W 220R 5%	1E122
R65	RES MF W4 1% 10K	1H310
R66	RES MF W4 1% 220R	1H122
R67	RES MF W4 820R 1%	1H182
R68	RES MF W4 1% 4K7	1H247
R69	RES MF W4 1% 18K	1H318
R70	RES MF W4 68R 1%	1H068
R71	RES MF W4 1% 330R	1H133
R72	RES MF W4 1% 1K2	1H212
R73	RES MF W4 1% 1M0	1H510
R74	RES MF W4 1% 4M7	1H547
R75	RES MF W4 1% 1K2	1H212
R76	RES MF W4 1% 330R	1H133
R77	RES MF W4 1% 15K	1H315
R78	RES MF W4 1% 22K	1H322
R79	RES MF W4 1% 5K1	1H251
R80	RES MF W4 1% 1K0	1H210
R81	RES MF W4 1% 330R	1H133
R82	RES MF W4 1% 330R	1H133
R83	RES MF W4 1% 1K0	1H210
R84	RES MF W4 1% 47K	1H347
R85	RES MF W4 1% 3K3	1H233
R86-R88	RES MF W4 1% 4K7	1H247
R89	RES MF W4 1% 10R	1H010
R91	RES MF W4 1% 10K	1H310
R92	RES MF W4 1% 4K7	1H247
R93	RES MF W4 1% 1K0	1H210
R94	RES MF W4 1% 4K7	1H247
R101	RES MF W4 1% 91K	1H391
R102	RES MF W4 1% 82K	1H382
R103	RES MF W4 1% 12K	1H312
R104	RES MF W4 1% NOT	1H000
R105	RES MF W4 1% 12K	1H312
R106	RES MF W4 1% 4K7	1H247
R107	RES MF W4 1% 10K	1H310
R108	RES MF W4 1% 22K	1H322
R109	RES MF W4 1% 120R	1H112
R205	RES MF W4 1% 1K0	1H210
R206- R216	RES MF W4 1% 1K0	1H210
RV1	PRES 470K LIN HORIZ	6F447
SK1	22-WAY FFC CONN	8K8022
SK2	22-WAY FFC CONN	8K8022
SK3	10-WAY FFC CONN VERT	8K8010

SK4	PHONO SKT 4-WAY EMC	8D224
SK5	IEC MAINS 2-PIN PCB	8A014
SK5	COPPER RIVET TCP/D48 BS	HP007
SK6	6-WAY VERT DIL PIN HEADER	8K6306
SK7	FM/AM PCB COAX & CLIPS	8H116
SK8,SK9	6-WAY VERT DIL PIN HEADER	8K6306
SK10,SK1 1	2WAY MOLEX VERT MALE CONNECTOR	8K6201
SW1	SW PUSH 4PCO PBT	A1014
T1	ALPHA 5.2 TUNER MAINS TRANSFORMER	L807TX
T2	Mains common mode choke	7E030
T5	FILTER CERAMIC AM IF	7M008
X1	CRYSTAL 4.500MHz PARALLEL	7X017
X3	CER RESON CSB456 456kHz	7W003
Z3	IC OPAMP DUAL NJM2114D	5B2114
Z4,Z5	IC VREG POS 7812	5D7812
Z6,Z7	IC VREG POS 7805	5D7805
Z8	IC RADIO LA3401	5C3401
Z9	IC RADIO LA1266	5C1266
Z10	IC TUNER LC7230	5C7230

T51 Display Board L893_2

Reference	Description	Part Number
BL1	MCD BACKLIGHT	L802ML
C1	ELST 10U 50V	2N610
C2	CERD 10N 100V 20%	2A310
C3	ELST 10U 50V	2N610
C4	ELST 10U 50V	2N610
D1	SSDIODE 1N4148 75V	3A4148
DISP1	ALPHA 5.2 TUNER LCD	E802MC
EL2	LCD chair support	E875PM
EL3	LCD chair support	E875PM
LED1	LED GREEN 3 1MM SLR- 37MG3F	3D007
LED2	LED GREEN 3 1MM SLR- 37MG3F	3D007
PCB1	PRINTED CIRCUIT BOARD	L893PB_2
R1	RES MF W4 1% 330R	1H133
R2	RES MF W4 1% 10K	1H310
R3	RES MF FU W3 5% 3R3 NFR25	1G833
R204	RES MF W4 1% 220R	1H122
RX1	REMOTE RX SBX1610-52 38KHZ	B2103
SK1	10-WAY FFC CONN HORIZ	8K8110
SK201	22-WAY FFC C ONN HORIZ	8K8122
SK202	22-WAY FFC C ONN HORIZ	8K8122
SW201- 204	TACT SWITCH 2-PIN LOW PROF 9.5mm ACTUATOR SKHVPH	A1508
SW205	TACT SWITCH 2-PIN LOW PROF	A1504
SW206	TACT SWITCH 2-PIN LOW PROF	A1504
SW207- 210	TACT SWITCH 2-PIN LOW PROF 9.5mm ACTUATOR SKHVPH	A1508
SW211- 214	TACT SWITCH 2-PIN LOW PROF	A1504
X1	CER RESON 4.00MHz	7W005
Z1	IC SOCKET 18 PIN 0.3"	8S018
Z1	IC CMOS MICRO PIC16C54XT/P	5H16C54 X

T51 General Assembly Parts List

ITEM	230V	115V	100V	SILVER	BLACK	DESCRIPTION	WHERE USED	QTY
A	L813RC					REMOTE CONTROL		1
B	8H014					COAXIAL AREAL ADAPTER		1
C	8H012					FM AERIAL		1
D	8H015					AM AERIAL LOOP		1
1	E907RP					REAR PANEL		1
2	E814SP					SUB PANEL		1
3	E810CH					CHASSIS		1
7				E828CP	E827CP	COVER PLATE		1
9				E971AY	E988AY	FASCIA ASSEMBLY		1
11	5H16C54X					IC CMOS MICRO PIC16C54XT/P + L809SW		1
12	E870PM					MAINS BUTTON		1
13	E879PM					FOOT		4
16	C11106 100mA AS	C11166 160mAS				MAINS FUSE		2
17	F022					FUSEHOLDER COVER		2
18	WT51U 1A					T51 MOTHER PCB ASSEMBLY L892AY		1
19	WT51U 2A					T51 DISPLAY PCB ASSEMBLY L893AY		1
25	L831CA					22-WAY FLEX-FOIL	DISPLAY PCB	2
26	L819CA					10-WAY FLEXFOIL	REMOTE PCB	1
27	H006					SNAP IN SPACER		1
28	K1004					COPPER ADHESIVE TAPE	CUT FROM ROLL	50MM
30	L807TX	L807TX				TRANSFORMER		1
40	HE6V06B					No. 6 x 6mm SCREW		6
41	HF4V09B					No. 4 x 9mm SCREW		17
42	HA3V10A					M3 x 10mm SCREW		7

T51 General Assembly Parts List

ITEM	230V	115V	100V	SILVER	BLACK	DESCRIPTION	WHERE USED	QTY
43				HA4V06S	HA4V06B	M4 X 6mm SCREW		4
44	HA3V06A					M3 x 6mm SCREW		9
49	E82801					FOAM PAD	INSIDE LID ABOVE FLEX CABLE	2
52	F042					CABLE TIE	TRANSFORMER TO PCB	1
55	E806MI					MAINS INSULATOR		1
57	E807BG					DISPLAY WINDOW GASKET		1
58	F163					DAMPING TAPE		.02RE EL
59	K5408					LIGHT PIPE SLEEVING (6mm)		1
66	F062					FUSE CLIP		2
69	E879SL					CONFIGURATION LABEL		1
70	E859PM					TUNER TACT SWITCH LENS BUTTON		8
71	HL4AF					RED FIBRE WASHER		2