Integrated RDS tuner 70FT980/00R

Service
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Service Manual

FT 980

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Safety regulations required that the set be restored to its orginal condition and that parts which are identical with those specified be used.

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Subject to modification

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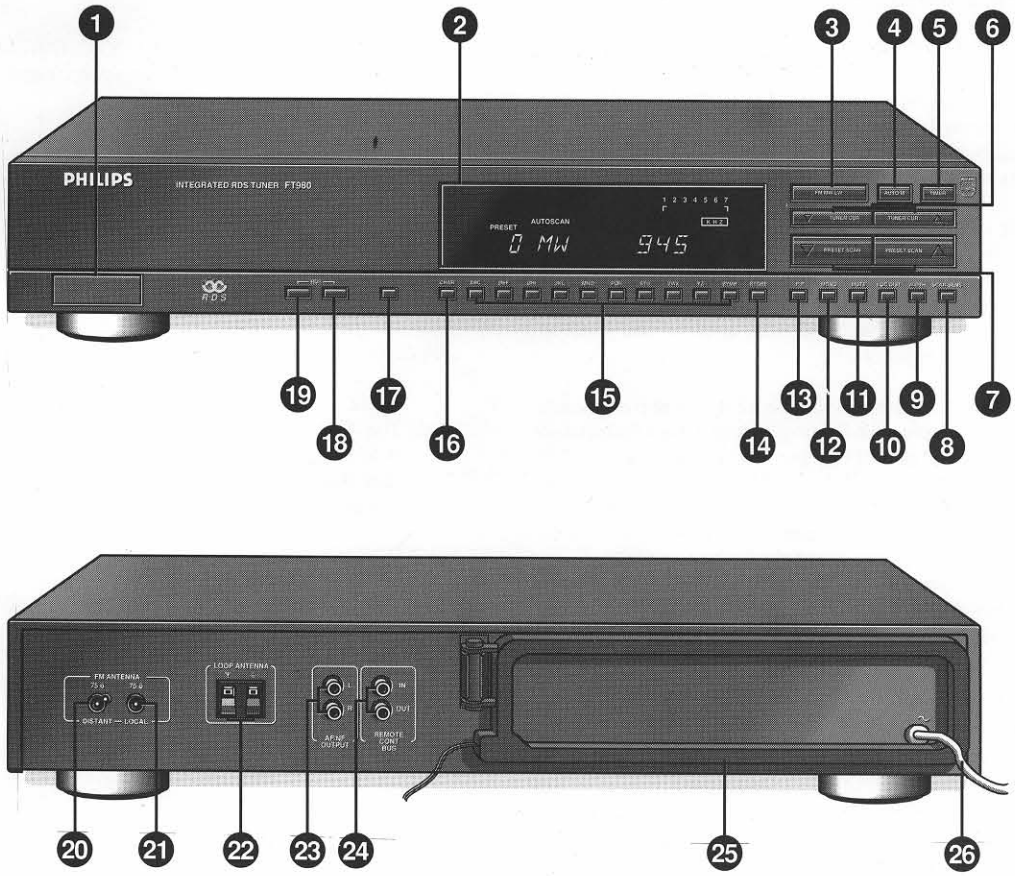
SPECIFICATION		Nominal value	Typical value
General			
Mains voltage		: 220 V-240 V ~	: 220 V-240 V ~
Mains frequency		: 50-60 Hz	: 50-60 Hz
Dimensoins (W x H x D)		: 420 x 67/86x334	: 420 x 67/86x334
Tuner: FM section			
Tuning range		: 87.5 MHz to 108 MHz	: 87.5 MHz to 108 MHz
Aerial inputs		: 75 Ω coaxial LOCAL/DX	: 75 Ω coaxial
Frequency response		: 30-12500 Hz +0.5 dB -2 dB	: 10-15000 Hz +1.5 dB
Sensitivity	mono	: 1.2 µV 26 dB S/N at 98 MHz, 75 Ω	: 0.8 µV at 98 MHz, 75 Ω
	stereo	: 50 µV 50 dB S/N Δf=75 kHz	: 35 µV 50 dB S/N Δf=75 kHz
	width / narrow	: > 56 dB / > 76 dB	: > 65 dB / > 86 dB
	IF - AM	: 100 dB - 50 dB	: 120 dB - 55 dB
	pilot tone 19 kHz / 38 kHz:	> 55 dB / > 60 dB	: > 60 dB / > 80 dB
	image frequency	: 80 dB (at 98 MHz)	: 86 dB
ation (1 kHz) D		: 40 dB	: 50 dB / 44 dB width / narrow
	mono width / narrow	: 0.1% / 0.25%	: 0.08% / 0.15%
	stereo width / narrow	: 0.3% / 0.7%	: 0.15% / 0.4%
	mono	: 84 dB IEC bewertet	: 86 dB
	stereo	: 77 dB IEC bewertet	: 78 dB
		: 295 mV at Δf = 22.5kHz	: 370 mV
ction			
	MW	: 528 kHz - 1605 kHz	: 528 kHz - 1605 kHz
	LW	: 150 kHz - 283 kHz	: 150 kHz - 283 kHz
	MW (1 MHz)	: 2.3 mV/m 26 dB S/N (Loop-Ant.)	: 1.8 mV/m 26 dB S/N
	LW (261 kHz)	: 5.8 mV/m	: 5.2 mV/m
		: 26 dB for 9 kHz off resonance	: 30 dB for 9 kHz off resonance
	IF	: 47 dB	: 55 dB
		: 350 mV	: 400 mV
section			
		: EEPROM	: EEPROM
	FM / MW / LW	: 50 kHz / 25 kHz / 9kHz / 1 kHz (Auto / Man.)	: 50 kHz / 25 kHz / 9kHz / 1 kHz (Auto / Man.)
	FM / MW / LW	: 59 / 59 / 59 random / sequentill	: 59 / 59 / 59 random / sequentill

Selectivity
Suppression
Channel sepa
Distortion T.H
Signal/noise ratio
Output
Tuner: AM s
Wave ranges
Sensitivity
Selectivity
Suppression
Output
Tuner: Digita
Memory
Tuning steps
Presets



FRONT PANEL

① **ON/OFF button** - press in to switch the unit on; press again to switch off

② **display showing:**
LW (Long Wave), MW (Medium Wave) or FM - the selected waveband
AUTOSCAN - automatic tuning mode
AUTOSCAN HIGH - automatic tuning at increased sensitivity
TUNED - when a station is found and correctly tuned to
STEREO or MONO - FM stereo or mono reception
STORE - when the memory has been opened to store a preferred station
The tuned frequency in 'MHz' (for FM) or 'kHz' (for MW and LW)
1 to 59 - the number of the selected preset station
The name of the station. If you have tuned to a transmitter with RDS signal, the name given by the station will appear automatically. For the other transmitters you can program a name yourself.
DISTANT or LOCAL - the selected aerial
MUTING - during silent tuning
TIMER - the timer program is activated
⌐¬ - the bandwidth
1› to 7› - the signal strength
DIMMER - you can now adjust the display brightness

③ **waveband buttons** - to select LW, MW or FM band

④ **AUTO/MAN button** - to select automatic or manual tuning *and* to adjust the display brightness

⑤ **TIMER button** - to program 3 stations for use with an external timer

⑥ **TUNER △ ▽ buttons** - press △ to tune towards the higher end of the selected band and press ▽ to tune towards the lower end of the selected band

⑦ **PRESET SCAN/CURSOR △ ▽ buttons** - to call up preset stations in ascending △ or descending order ▽ *and* to move the cursor when programming a name

⑧ **SCAN.SENS button** - to select a higher tuning sensitivity when tuning automatically to FM transmitters

⑨ **WIDTH button** - to select the bandwidth (wide or narrow) for FM stations

⑩ **LOC/DIST button** - to select the aerial connected to the socket LOCAL or to the socket DISTANT

⑪ **MUTE button** - for silent tuning

⑫ **MONO button** - for mono reception

⑬ **F/P button** - to enter directly the tuning frequency

⑭ **STORE button** - for opening the memory to store a preferred station *and* to enter a name into the memory

⑮ **figure/alphabet buttons:**
figures - 0 to 9
letters - A to Z
symbols - /, +, <, -, >, ✱
space - ␣

⑯ **CHAR. button** - for opening the memory to program a name

⑰ **-/--** - to switch between 1- and 2-digit number entry

⑱ **RDS DISPLAY button** - to select between the name and the frequency of a station

⑲ **RDS AF button** - to display the alternative frequencies of the tuned station

BACK PANEL

⑳ **FM-ANTENNA DISTANT** - socket for connection of:
- a roof-mounted FM aerial with an impedance of 75 ohms
- the supplied wire aerial (to the centre pin)

㉑ **FM-ANTENNA LOCAL** - socket for connection of:
- the Community or Cable Antenna System, impedance 75 ohms

㉒ **LOOP ANTENNA** - terminals for connection of:
- the MW/LW loop aerial
- an external AM aerial, Y for the aerial wire and ⏚ for the ground wire

㉓ **AF/NF OUTPUT** - output sockets for connecting the tuner to an amplifier

㉔ **REMOTE CONTROL** - RC-5 remote control input/output sockets

㉕ **loop aerial** - for MW/LW reception

㉖ **mains lead**

SERVICE TEST PROGRAMME.

SWITCHING ON THE TEST PROGRAMME.

The microprocesser contains a testprogramme. The tuner can be brought in the test mode by simultaneously pressing the keys DISPLAY and AF while switching on the set. The display now shows the version of the software.

TESTFUNCTIONS.

CLEAR DISPLAY: by pressing the MONO key, all segments and labels of the display are extinguished. The display remains in this state until another test function button is pressed.

FULL DISPLAY: By pressing the FP button all labels and segments of the display are lighting up and remain illuminated until another test function is activated.

TEST DISPLAY: Pressing the key MUTE activates a special display test consisting of the consecutive display of various brightness levels, symbols, figures and letters. After completion of this sequential programme, the display shows again the software alphanumeric data.

OPTION TEST: By pressing the LOCAL/DISTANT key, the displa will show the selected diode option: EUR, EUR LW USA.

SOFTWARE VERSION: By pressing any key, except MONO, FP MUTE and LOCAL/DISTANT, SCAI SENS the display shows the version of the software. (VER 3–XX).

Each of the above functions can be interrupted by activating anothe test function key.

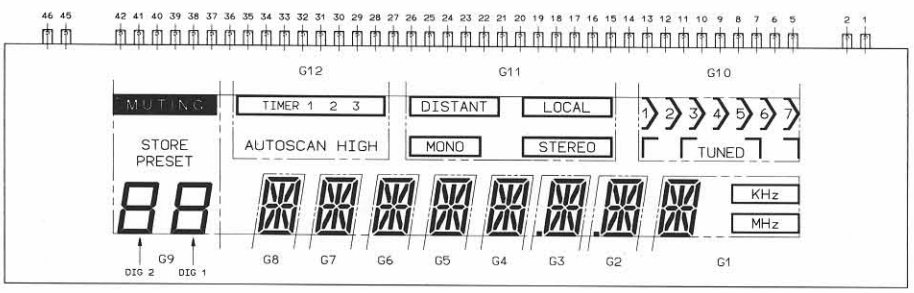
LEAVING THE TEST MODE: By switching off and on, or by pressing the button SCAN SENS.

Note: The test programme will not start if the microprocesser i defective, or if a few other basic conditions are not met. There fore, it is recommended that you first check the supply voltage the clock signal and the reset pulse in case of a defect.

TEST PORTS: Microprocesser IC: pin 43: RDS-Synchronisation With RDS voltage=5V/ without RDS=0V.
Microprocesser IC: pin 42: RDS-Valid block.
When a valid block is read: 5V/ otherwise 0V.
Microprocesser IC: pin 3: EEPROM-write.
During EEPROM-writing: 5V/ otherwise 0V.

µC-PIN	DISPLAY-PIN	
	1	FILAMENT 1
	2	FILAMENT 1
	3	NO PIN
	4	//
20	5	S 1
19	6	S 2
18	7	S 3
17	8	S 4
37	9	S 5
36	10	S 6
35	11	S 7
34	12	S 8
33	13	S 9
16	14	G 1
15	15	G 2
14	16	G 3
13	17	G 4
22	18	G 5
23	19	G 6
	20	N C
	21	N C
	22	N C
	23	N C
	24	N C
	25	N C
	26	N C
	27	N C

µC-PIN	DISPLAY-PIN	
24	28	G 7
25	29	G 8
26	30	G 9
27	31	G 10
28	32	G 11
29	33	G 12
32	34	S 10
31	35	S 11
30	36	S 12
09	37	S 13
08	38	S 14
07	39	S 15
06	40	S 16
11	41	S 17
10	42	S 18
	43	NO PIN
	44	NO PIN
	45	FILAMENT 2
	46	FILAMENT 2



	G12 PIN33	G11 PIN32	G10 PIN31	G9 PIN30	G8 PIN29	G7 PIN28	G6 PIN19	G5 PIN18	G4 PIN17	G3 PIN16	G2 PIN15	G1 PIN14
S 1 PIN 5	AUTO SCAN		FIELD INTENSITY 1	DIG 1a	a	a	a	a	a	a	a	a
S 2 PIN 6	HIGH		2	1b	b	b	b	b	b	b	b	b
S 3 PIN 7	TIMER +FRAME		3	1c	c	c	c	c	c	c	c	c
S 4 PIN 8	1 (TIMER)		4	1d	d	d	d	d	d	d	d	d
S 5 PIN 9	2 (TIMER)		5	1e	e	e	e	e	e	e	e	e
S 6 PIN 10	3 (TIMER)		6	1f	f	f	f	f	f	f	f	f
S 7 PIN 11			7	1g	g	g	g	g	g	g	g	g
S 8 PIN 12		STEREO	NARROW	PRESET						DP (DECIMAL POINT)	DP (DECIMAL POINT)	MHz
S 9 PIN 13				DIG 2a	h	h	h	h	h	h	h	h
S 10 PIN 34				2b	j	j	j	j	j	j	j	j
S 11 PIN 35				2c	k	k	k	k	k	k	k	k
S 12 PIN 36				2d	m	m	m	m	m	m	m	m
S 13 PIN 37				2e	n	n	n	n	n	n	n	n
S 14 PIN 38				2f	p	p	p	p	p	p	p	p
S 15 PIN 39				2g	r	r	r	r	r	r	r	r
S 16 PIN 40		MONO	WIDE	STORE								KHz
S 17 PIN 41		LOCAL	TUNED	MUTING								
S 18 PIN 42		DISTANT	1 2 3 4 5 6 7									

ELECTRICAL ADJUSTMENTS AND CHECKS

General

- For the HF adjustments, the injected signals should be kept as small as possible.
- Connect the frame aerial in case AM is used.
- The AM IF amplifier is adjusted with a wobbulator signal of approx 600 kHz having a sweep of 250 kHz at a rhythm of 50 Hz.

Measuring equipment used

- Power-supply equipment
- Oszilloscope
- DC voltmeter
- AC millivoltmeter
- Distortion meter

ELUCIDATIONS

[1] Place the top of the response curve in the centre of the screen by displacing the wobbulating frequency.

[2] Adjust for maximum height and symmetry.

[3] Adjust for minimum THD distortion on the distortion meter.

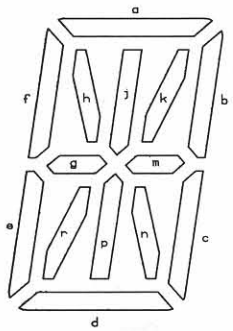
[4] Before adjustment turn the potentiometer to its extreme clockwise position.

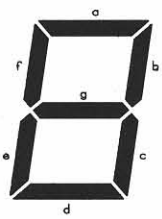
[5] Before adjustment turn the potentiometer to its extreme counterclockwise position.

[6] Adjust the left and the right channel to the same minimum level.

⬡ Measuring point

◯ Trimming element





SERVICING HINTS

1. ESD

All ICs and many other semi-conductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically.
When repairing, make sure that you are connected with the same potential as the mass of the set via a wrist wrap with resistance. Keep components and tools also at this potential. See Service Information A86 - 1000 for this.

2. Display DP 601

The outputs of the display drivers are not protected against external overvoltages! When testing the display with external voltages. you should interrupt the connections with IC 601.

3. Warning

If the set is connected to mains voltage, there is a risk of shock-hazard voltages after the set is decased.

4. FM IF offset

The ceramic resonators (F2 - F6) have different intermediate frequencies as a result of tolerances. Dependent on the IF, a jumper has to be closed or a jumper has to be opened. B0 - B3 (see table). The resonators have been provided with a colour code.

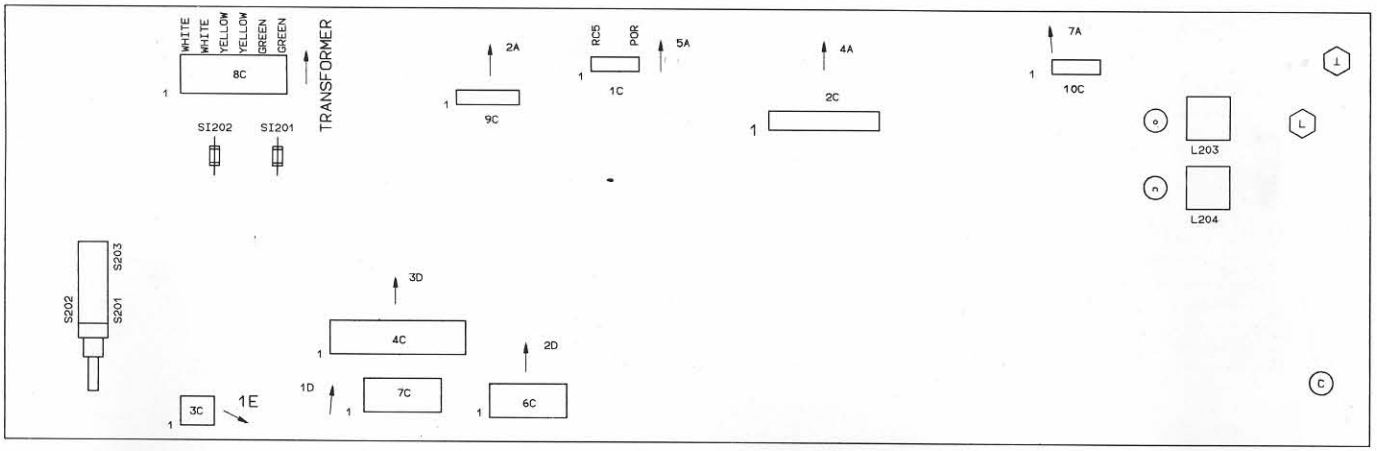
5. Ceramic resonators F2 - F6

When replacing one of the ceramic resonators, take care that the colour codes of all three resonators are the same.

FM-IF program

	Jumper				
IF (MHz)	B 3	B 2	B 1	B 0	Filter color
10.6500	0	1	0	0	Black
10.6750	0	1	1	0	Blue
10.7000	1	0	0	0	Red
10.7225	1	0	1	0	Orange
10.7500	1	1	0	0	White

0 = jumper open 1 = jumper closed



SK... WAVE RANGE SWITCH	SIGNAL	TO	DISPLAY TUNE IN	REMARKS DETUNE	ADJUST	OSCILLOSCOPE OR A.C. METER	D.C. METER INDICATOR

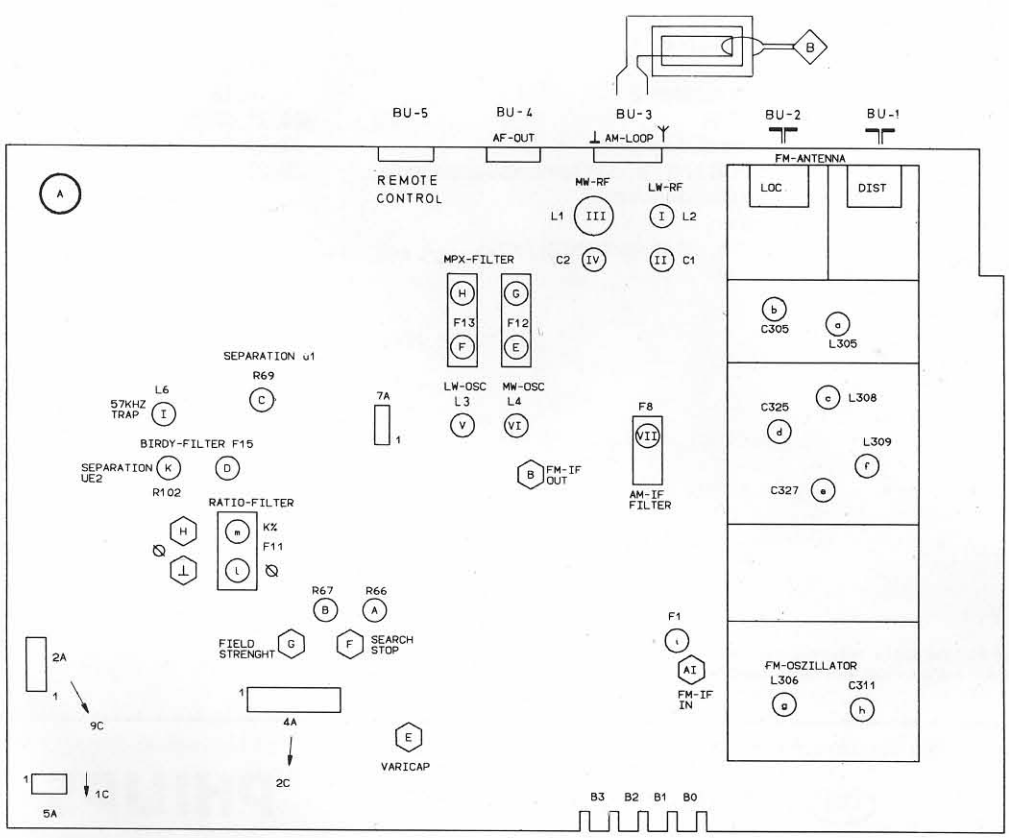
AM-RF (Oscillator)

MW			Display 531 kHz		VI L 4		E 1,1 V =
LW			Display 153 kHz		V L 3		E 1,8 V =

AM-RF-IF

MW	1449 kHz 1 kHz mod. m=30 %	B	Display 1449 kHz		IV C 2 VII F 8	BU-4 max. ~	
	558 kHz 1 kHz mod. m=30 %		Display 558 kHz		III L 1		
LW	261 kHz 1 kHz mod. m=30 %		Display 261 kHz		II C 1		
	162 kHz 1 kHz mod. m=30 %		Display 162 kHz		I L 2		

‡ Repeat -Herhalen -Répéter -Wiederholen -Ricomminciare -Repetera -Gentage -Gjentagelse -Toista



SK... WAVE RANGE SWITCH	SIGNAL	TO	DISPLAY TUNE IN	REMARKS DETUNE	ADJUST	OSCILLOSCOPE OR A.C. METER	D.C. METER INDICATOR
FM-IF/TH.D.							
FM Distant Stereo	10,7 MHz	AI			i F 1	B 1 max.~ + sym.	
	108 MHz Δ f= 75 kHz 1 mV	BU-1 (A) DX	Display 108,0o MHz		l F 11		H 0V ± 8 mV
					m F 11	BU-4 min. distortion 3	
FM-RF (Oscillator)							
FM Distant			Display 108,0o MHz		h C311		E 8,5 V =
			Display 87,5o MHz		g L 306		E 2,5 V=
FM-RF							
FM Distant	106 MHz 1 kHz mod. Δf=75 kHz	BU-1 (A) DX	Display 106,0o MHz		b C 305 d C 325 e C 327	BU-4 max. ~	
	88 MHz 1 kHz mod. Δf=75 kHz		Display 88,0o MHz		a L 305 c L 308 f L 309		
FM -FIELDSTRENGTH IND -SEARCH STOP							
FM Distant	98 MHz 1 mV	BU-1 (A) DX	98.0o MHz		B R 67		G 1.5 V +0.05 V
	98 MHz 15 µV				A R 66		F 0.7 V +0.05 V

‡ Repeat -Herhalen -Répéter -Wiederholen -Ricomminciare -Repetera -Gentage -Gjentagelse -Toista

SK... WAVE RANGE SWITCH	SIGNAL	TO	DISPLAY TUNE IN	REMARKS DETUNE	ADJUST	OSCILLOSCOPE OR A.C. METER	D.C. METER INDICATOR

FM -STEREO DECODER CROSSTALK

FM Distant Stereo Width: narrow	106 MHz L mod. 1kHz	BU-1 (A) DX	106.0o MHz		C R 69 4	BU-4-R min. ~ 6	
	106 MHz R mod. 1kHz					BU-4-L min. ~ 6	
FM Distant Stereo Width: wide	106 MHz L mod. 1kHz				K R 102 5	BU-4-R min. ~ 6	
	106 MHz R mod. 1kHz					BU-4-L min. ~ 6	

57 kHz WAVE TRAP

FM Distant Stereo Mute off	57 kHz approx. 50 mV	H			I L 6	M min. ~	

ADJACENT CHANNAL FILTER

FM Distant Stereo Mute off	114 kHz approx. 100 mV	H			D F 15	M min. ~	

FM -PILOT -FILTERS

FM Distant Stereo Mute off	19 kHz approx. 100 mV	H			E F 12 F F 13	BU-4 min ~ 19 kHz	
	38 kHz approx. 100 mV				G F 12 H F 13	BU-4 min ~ 38 kHz	

RDS -DEMODULATOR

FM Distant	56.4 kHz (50 Hz) approx. 4 mV	K			o L 203	L max. ~	
	57.7 kHZ (50 Hz) approx. 4 mV				n L 204		

RDS DESCRIPTION

RDS = RADIO DATA SYSTEM. The RDS signal accompanies the program and is an additional information for FM broadcasting stations.

The most important informations are.

PI CODE = program identification. This is an uniform 16 Bit code for all stations broadcasting the same program e. g. all NDR 2 stations.
Example: Germany FR = D Area coverage: traffic area B = B Program: NDR 2 = 33 => EX Code DB 21

D				B				2				1			
1				5				9				13			
1	1	0	1	1	0	1	1	0	0	1	0	0	0	0	1

Bit
1....4 country code e. g. "D" for Germany
"A" for Azstria
"4" for Switzerland

5....8 area code e. g. similar to the VF area code

9....16 program index e. g. "57" for "HR 3"

TP CODE = traffic program
= traffic program code. This information indicates whether the adjusted program broadcasts trsffic announcements.

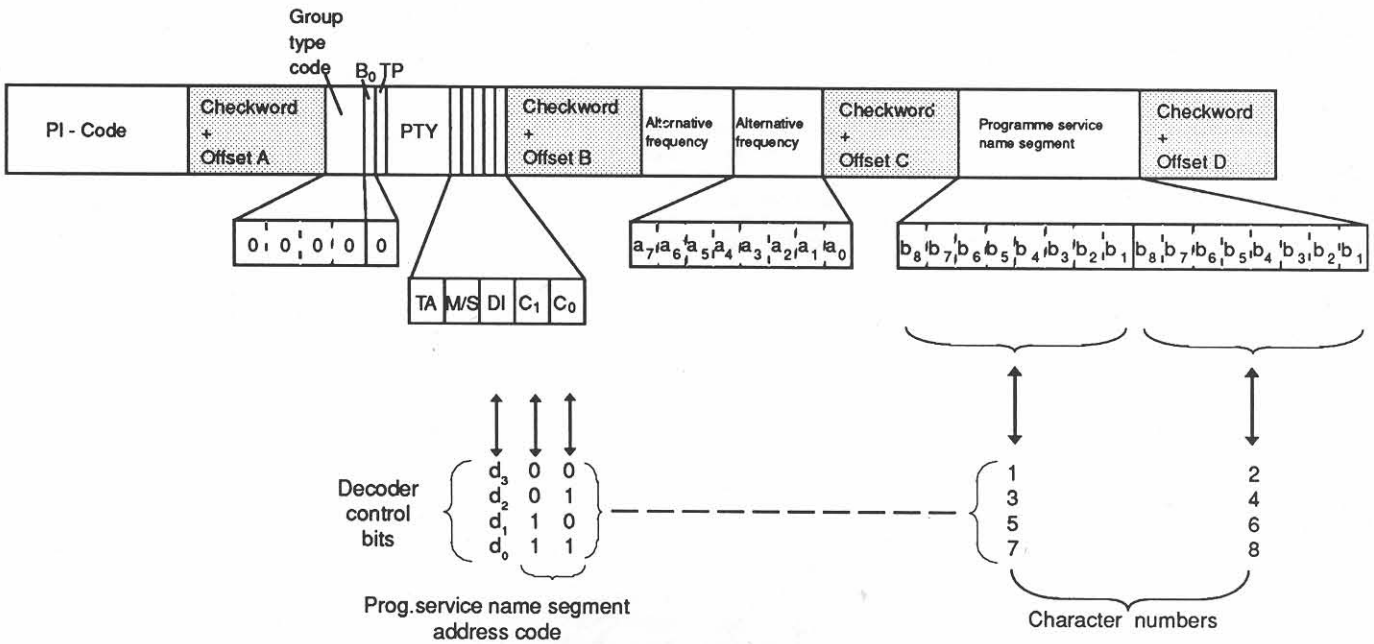
TA CODE = traffic announement
= traffic announement code. Is broadcasted during traffic announcements.

PS CODE = program service name. Transmission of the program name into clear code by 8 addressed ASCII signs.

AF CODE = alternative frequencies. Each station is broadcasting a number of alternative frequencies which can be used in case of need, e. g. failure of transmitter.

DATA FRAME:
The data are transmitted serially, without start and stop bits. For a later decoding, recognition of errors and correction of errors, a check word of 10 bits is adhered to each data word of 16 bits. This data word of 26 bits is named "block". Four "blocks" are forming one "group". The total information is composed of a file of groups. The combination of the single groups can be tuned to special program aims. Thereby the repetition rates of the sigle informations are different.

WAY OF MODULATION
The digital signal is bi-phase coded and band limited by an exactly defined filter before it AM modulates a supressed 57 kHz carrier. This way of modulation corresponds toa 2 phase PSK modulation with a phase shift of ± 90 degrees.



RDS DEMODULATOR:
Although the technical resources for the demodulation are considerable higher than e. g. for an VF-decoder, the actual expense of component parts and the waste of alignment is nearly comparable due to a specially developed IC. During the development of the IC 203 (LA 2231) it was considered to bring the alignment time to a minimum. This was succeeded so far, that the real demodulator needs no alignment. A big problem of the RDS demodulation is the low deviation of the actually 1,2 kHz, against the VF deviation of 3,5 kHz and the useful deviation of 20-75 kHz. It is possible that the program of stations which are far away and therefore recieved with a low field strength can be haerd with a statisfying quality, but the RDS signal can, however, disappear in the background noise and it is no more possible to demodulate it. The RDS demodulation is also complicated at the appearance of disturbances caused by multipath reception (multipath disturbances).
The RDS signal is taken from the signal path of the modulation. In order to avoid disturbances caused by the useful modulation, they must be separated. This is essebtially done by two single circuits which are decoupled by OP2 in IC 202 and are shifted by -600 Hz/+700 Hz to the carrier frequency of 57 kHz. This filtering effect is support by OP1 wired up for an active high-pass. As the RDS signal is a PSK modulation, the total information is included in the phase relationship of the zero passages. IC 203 supplies a demodulated RDS signal, composed of the RDS clock (pin 18) with 1187,5 Hz and the RDS data signal (pin 17). Both signals will be passed to the microcomputer (IC 201) for the further software processing.

T1	5322 130 44647	BC368
T2	4822 130 42121	2SK30
T3	4822 130 44196	BC548C
T6+T8	4822 130 44197	BC558B
T11	4822 130 40937	BC548B
T12	4822 130 40937	BC548B
T15	4822 130 44197	BC558B
T16	4822 130 40937	BC548B
T17	4822 130 40937	BC548B
T18	4822 130 60163	2SC1047C
T19	4822 130 60163	2SC1047C
T21	4822 130 40937	BC548B
T22	4822 130 41124	BC560B
T23	4822 130 41096	BC550C
T24	4822 130 40937	BC548B
T141	4822 130 40902	BF240
T142	4822 130 40937	BC548B
T143	4822 130 44197	BC558B
T144	4822 130 40902	BF240
T145	4822 130 44197	BC558B
T146	4822 130 40902	BF240
T147	4822 130 40902	BF240
T201	4822 130 40937	BC548B
T202	4822 130 40937	BC548B
T203	4822 130 44197	BC558B
T204	4822 130 40937	BC548B
T205	4822 130 44197	BC558B
T206	4822 130 40937	BC548B
T207	4822 130 40937	BC548B
T210	4822 130 40937	BC548B
T301	4822 130 61298	2SK544E
T302	4822 130 41817	BF982-I
T303	4822 130 40902	BF240
T304	4822 130 61298	2SK544E
T305	4822 130 40902	BF240
T306	5322 130 42626	BF440

R35	4822 116 53666	SAF.RES. 47 OHM 5%
R66	4822 100 20694	100K LIN.
R67	4822 100 20694	100K LIN.
R69	4822 100 20694	100K LIN.
R102	4822 100 20694	100K LIN.
R141	4822 116 82473	SAF.RES. 33 OHM 5%
R153	4822 116 82473	SAF.RES. 33 OHM 5%
R158	4822 116 82473	SAF.RES. 33 OHM 5%
R163	4822 116 82473	SAF.RES. 33 OHM 5%
R167	4822 116 82473	SAF.RES. 33 OHM 5%
R172	4822 116 82473	SAF.RES. 33 OHM 5%
R176	4822 116 82473	SAF.RES. 33 OHM 5%
R181	4822 116 53666	SAF.RES. 47 OHM 5%
R182	4822 116 53666	SAF.RES. 47 OHM 5%
R323	4822 116 53666	SAF.RES. 47 OHM 5%
R327	4822 116 53666	SAF.RES. 47 OHM 5%
R332	4822 111 30511	SAF.RES. 12 OHM 5%

F1	4822 157 62292	FILTER
F2+F6	4822 157 62297	FM-IF 10.7MHZ
F8	4822 242 72289	AM-IF 450KHZ
F11	4822 157 62302	FILTER 335
F12	4822 156 11104	19KHZ PILOT FILTER
F13	4822 156 11104	19KHZ PILOT FILTER
F15	4822 214 51727	LPF
L1	4822 156 11094	MW-RF
L2	4822 156 11095	LW-RF
L3	4822 156 11091	LW-OSC.
L4	4822 156 11089	MW-OSC.
L5	4822 157 53632	CHOKE 39MH
L6	4822 157 62293	COIL
L10	4822 157 53628	2.2UH 10%
L202	4822 157 62309	100UH
L203	4822 157 62294	7X7
L204	4822 157 62294	7X7
L301	4822 157 62299	3.3UH 10%
L302	4822 157 62299	3.3UH 10%
L303	4822 157 62299	3.3UH 10%
L304	4822 157 62299	3.3UH 10%
L305	4822 156 11099	FM-RF
L306	4822 156 11096	FM-OSC.
L307	4822 157 60206	CHOKE
L308	4822 156 11098	FM-RF
L309	4822 156 11097	FM-RF
L311	4822 157 53631	1.5UH 5%
L312	4822 157 53628	COIL 2.2UH
L601	4822 157 62301	100UH 10%
P301	4822 526 10406	FERRITE CORE
P302	4822 526 10406	FERRITE CORE
Q1	4822 242 72294	7.2MHZ
Q2	4822 242 72295	456KHZ (STEREO-DEC)
Q201	4822 242 73603	8MHZ
Q202	4822 242 73604	456KHZ
Q601	4822 242 73605	CRYSTAL 640KHZ

C1	4822 125 50332	7.5-50PF LW-RF
C2	4822 125 50329	4.5-20PF MW-RF
C12	4822 122 33562	36PF N150 2%
C13	4822 122 33562	36PF N150 2%
C22	4822 122 33568	68PF N750 2%
C23	4822 122 33567	4.7PF 0.25PF N750
C24	4822 122 33564	150PF N150 2%
C26	4822 122 33572	390PF N1500 2%
C45	4822 126 10809	100PF N750 2%
C46	4822 126 10809	100PF N750 2%
C62	4822 122 33569	180PF N750 2%
C66	4822 122 33569	180PF N750 2%
C105	4822 126 10808	220PF N750 2%
C106	4822 126 10811	180PF N750 5%
C108	4822 126 10809	100PF N750 2%
C122	4822 126 10808	220PF N750 2%
C123	4822 126 10808	220PF N750 2%
C305	4822 125 50329	4.5-20PF FM-RF
C311	4822 125 50386	3-10PF FM-OSC.
C312	4822 126 10813	1.8PF 0.25PF N150
C316	4822 122 33559	10PF N150 2%
C322	4822 122 33559	10PF N150 2%
C325	4822 125 50329	4.5-20PF FM-RF
C327	4822 125 50329	4.5-20PF FM-RF
C332	4822 122 33564	150PF N150 2%
C334	4822 122 33557	4.7PF 0.25PF N150

D1	5322 130 34052	1N4151
D2	5322 130 34052	1N4151
D3+D6	4822 130 81002	SVC321
D7+D9	5322 130 34052	1N4151
D12+D20	5322 130 34052	1N4151
D136	5322 130 34052	1N4151
D141+D144	4822 130 30971	BA243
D200	5322 130 34052	1N4151
D201	5322 130 34052	1N4151
D202	4822 130 82109	9.1C 0.5W
D203	4822 130 31353	BAT42/43
D209+D217	5322 130 34052	1N4151
D218+D221	4822 130 31353	BAT42/43
D222	4822 130 31438	1N4001
D223	4822 130 81005	5.1C 0.5W
D224	4822 130 82108	ZPY24
D225+229	4822 130 31438	1N4001
D230	4822 130 31353	BAT42/43
D231	5322 130 34052	1N4151
D232	5322 130 34052	1N4151
D233	4822 130 31438	1N4001
D234	5322 130 34052	1N4151
D300+D302	4822 130 34189	BAV20
D303+D306	4822 130 80638	BA282
D307	4822 130 81003	KV1310
D308	4822 130 81003	KV1310
D309	4822 130 81003	KV1310
D310	4822 130 34189	BAV20
D311	4822 130 81003	KV1310
D601	4822 130 82109	9.1C 0.5W

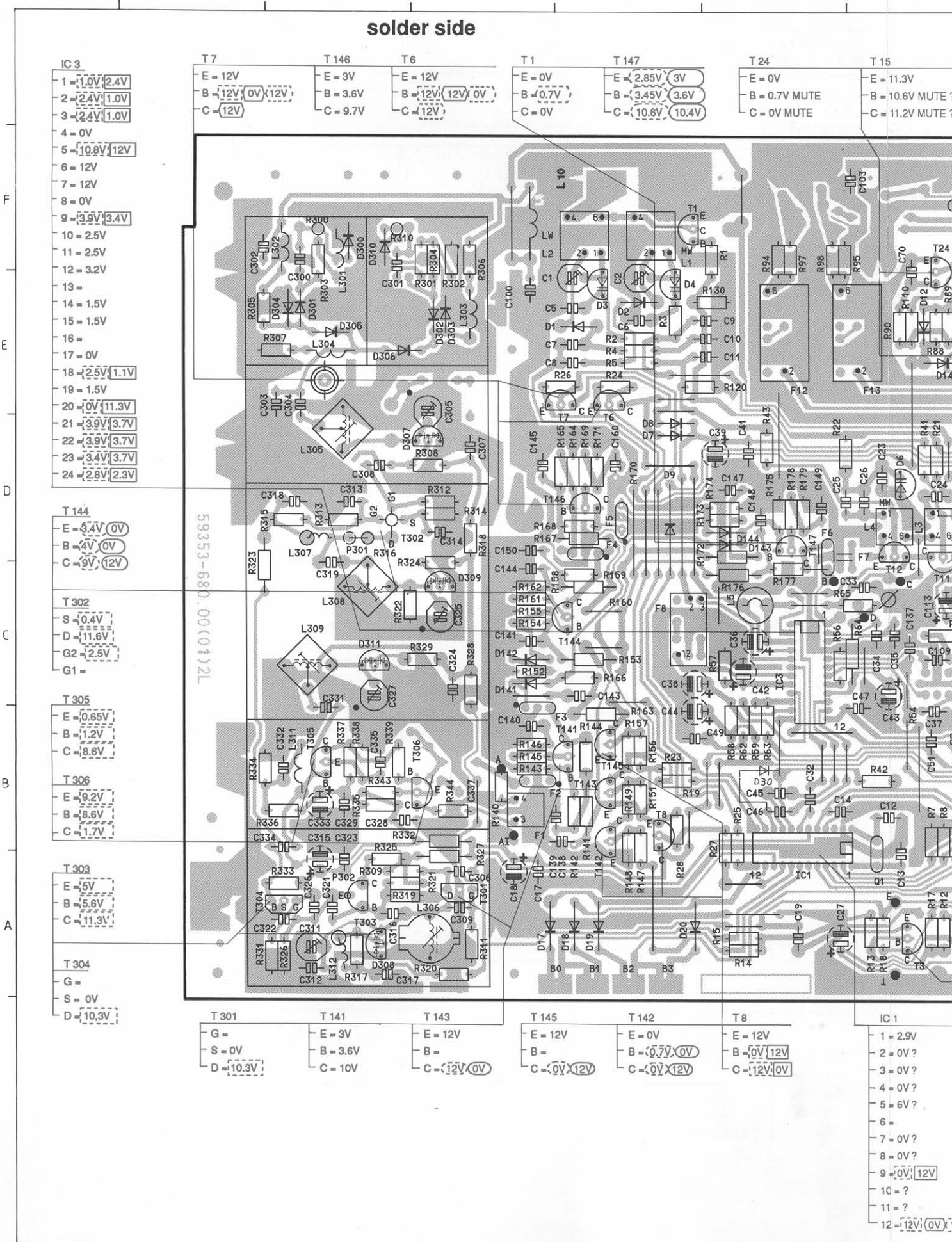
IC1	4822 209 73435	LC7217
IC2	4822 209 73434	LA3401
IC3	4822 209 71785	LA1266
IC4	5322 130 42221	7812
IC5	4822 209 61801	TA7061BP
IC201	4822 209 62432	MC68HC11A8
IC202	4822 209 62435	RC4560
IC203	4822 209 62433	LA2231 DIP/24S
IC204	4822 209 80891	MC78M05CT
IC205	4822 209 71898	M51957A
IC601	4822 209 62434	UPD7537 ACU-221

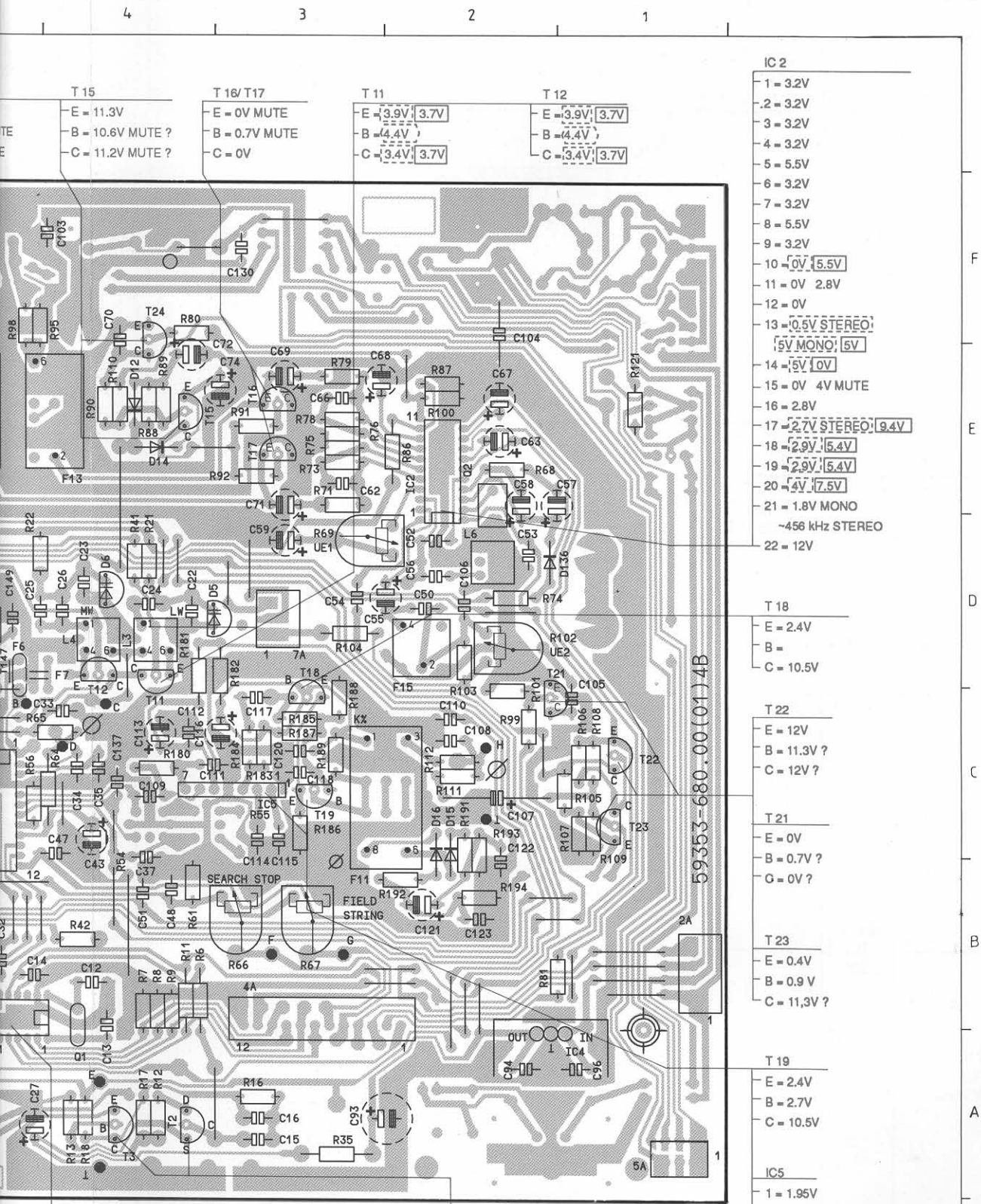
Miscellaneous

LA1	4822 134 40915	LAMP 5V 60MA AND CAP
DP6014	822 130 90837	DISPLAY
SI201	4822 253 30017	FUSE 500MA/T
SI202	4822 070 32001	FUSE 200MA/T

RF + IF PANEL

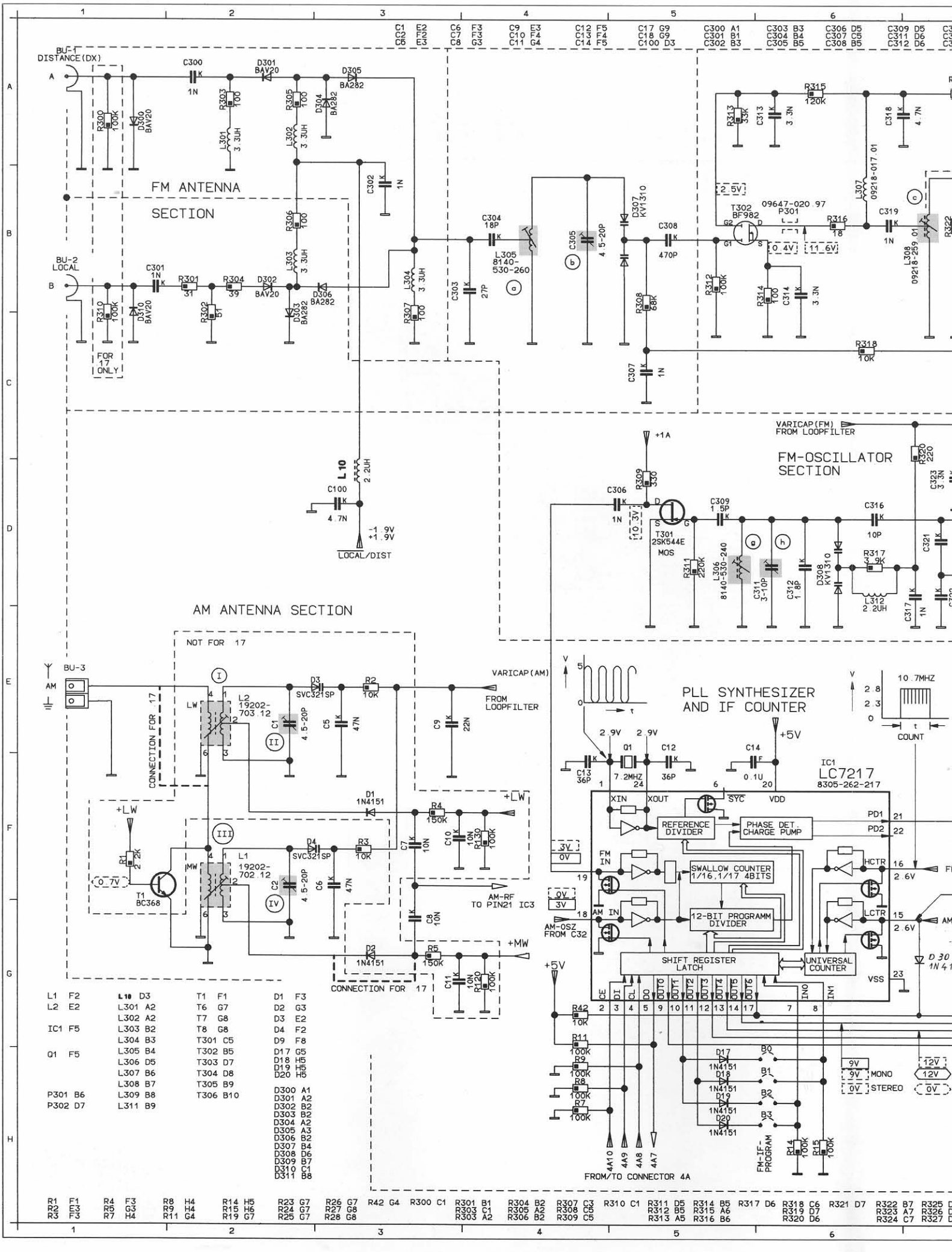
solder side





2A	B1	C 337	B7	R 097	F5
4A	B3	D 001	E7	R 098	F5
5A	A1	D 002	E6	R 099	C2
6A	F5	D 003	E6	R 100	E2
7A	D3	D 004	E6	R 101	C2
8A	F1	D 005	D4	R 102	D2
9A	F1	D 006	D4	R 103	D2
C 001	E7	D 007	D6	R 104	D3
C 002	E6	D 008	D6	R 105	C1
C 005	E7	D 009	D6	R 106	C1
C 006	E6	D 012	E4	R 107	C1
C 007	E7	D 014	E4	R 108	C1
C 008	E7	D 015	C2	R 109	C1
C 009	E6	D 016	C2	R 110	E4
C 010	E6	D 017	A7	R 111	C2
C 011	E6	D 018	A7	R 112	C2
C 012	B4	D 019	A6	R 120	E6
C 013	A4	D 020	A6	R 121	E1
C 014	B5	D 021	E1	R 126	E1
C 015	A3	D 022	E1	R 127	E1
C 016	A3	D 023	E1	R 128	E1
C 017	A7	D 024	B2	R 130	E6
C 018	A7	D 029	A2	R 130	F4
C 019	A5	D 031	F1	R 140	B7
C 022	D4	D 032	F1	R 141	B6
C 023	D4	D 033	F1	R 142	B7
C 024	D4	D 034	F2	R 143	B7
C 025	D5	D 040	F1	R 144	B6
C 026	D4	D 050	F1	R 145	B7
C 027	A5	D 136	D2	R 146	B7
C 032	B5	D 141	C5	R 147	B6
C 033	C5	D 142	C5	R 148	B6
C 034	C4	D 143	D5	R 149	B6
C 035	C4	D 144	D5	R 151	B6
C 036	C5	D 300	F8	R 152	C5
C 037	B4	D 301	E8	R 153	C6
C 038	C6	D 302	E7	R 154	C5
C 039	D6	D 303	E7	R 155	C5
C 041	D5	D 304	E9	R 156	B6
C 042	C5	D 305	E8	R 157	B6
C 043	C4	D 306	E8	R 158	C6
C 044	B6	D 307	D8	R 159	C6
C 045	B5	D 308	A8	R 160	C6
C 046	B5	D 309	C5	R 161	C5
C 047	C4	D 310	F8	R 162	C5
C 048	B4	D 311	C8	R 163	B6
C 049	B6	F 001	B7	R 164	D7
C 050	D2	F 002	B7	R 165	D7
C 051	B4	F 003	B7	R 166	C5
C 052	D2	F 004	D6	R 166	C6
C 053	D2	F 005	D6	R 167	D7
C 054	D3	F 006	D5	R 168	D7
C 055	D3	F 007	C5	R 169	D6
C 056	D2	F 008	C6	R 170	D6
C 057	E2	F 009	C4	R 171	D6
C 058	E2	F 010	C4	R 172	D5
C 059	D3	F 011	C3	R 173	D5
C 062	E3	F 012	E5	R 174	D5
C 063	E2	F 013	E4	R 175	C5
C 066	E3	F 015	D2	R 177	C5
C 067	E2	IC 001	A5	R 178	D5
C 068	E3	IC 002	E2	R 179	D5
C 069	E3	IC 003	C5	R 180	C4
C 070	F4	IC 004	A2	R 181	D4
C 071	E3	IC 005	C3	R 182	D4
C 072	E4	IC 006	A2	R 183	C3
C 074	E4	L 001	F6	R 184	C3
C 093	A3	L 002	F7	R 185	C3
C 094	A2	L 003	D4	R 186	C3
C 096	A1	L 004	D4	R 187	C3
C 100	E7	L 005	C5	R 188	C3
C 101	E1	L 006	D2	R 189	C3
C 102	D1	L 006	F7	R 191	C2
C 103	F5	L 301	F8	R 192	B2
C 104	F2	L 302	F9	R 193	C2
C 105	C1	L 303	E7	R 194	B2
C 106	D2	L 305	D8	R 300	F8
C 107	C2	L 305	E8	R 301	F8
C 108	C2	L 306	A8	R 302	F7
C 109	C4	L 307	D8	R 303	F8
C 110	C2	L 308	D8	R 304	E9
C 111	C4	L 309	C8	R 305	E9
C 112	C4	L 312	A8	R 306	E7
C 113	C4	L 331	B8	R 307	E9
C 114	C3	P 301	D8	R 308	D8
C 115	C3	Q 001	A4	R 309	A8
C 116	C4	R 001	F6	R 310	F8
C 117	C3	R 002	E6	R 311	A7
C 118	C3	R 003	E6	R 312	D7
C 120	C3	R 004	E6	R 313	D8
C 121	B2	R 005	E6	R 314	D7
C 122	B2	R 006	B4	R 315	D9
C 123	B2	R 007	B4	R 317	A8
C 125	A1	R 008	B4	R 318	D7
C 126	A2	R 009	B4	R 319	A8
C 130	F3	R 011	B4	R 320	A7
C 131	F1	R 012	A4	R 321	A8
C 132	F1	R 013	A4	R 322	C8
C 133	F1	R 014	A5	R 323	D9
C 134	F1	R 015	A5	R 324	C8
C 135	F2	R 016	A3	R 325	A8
C 137	A4	R 017	A4	R 326	A9
C 138	B7	R 018	A4	R 327	A7
C 139	B7	R 019	A6	R 328	C5
C 140	B7	R 021	D4	R 329	C8
C 141	C5	R 022	D5	R 331	A9
C 143	C6	R 023	B6	R 332	B8
C 144	C5	R 024	E6	R 333	A9
C 145	D7	R 025	B5	R 334	B9
C 147	D5	R 026	E7	R 335	B8
C 148	D5	R 027	B5	R 336	B9
C 149	D5	R 028	B6	R 337	B8
C 150	D7	R 035	A3	R 338	B8
C 160	D6	R 041	D4	R 339	B8
C 300	F8	R 042	B4	R 341	B8
C 301	F8	R 043	D5	R 342	B7
C 302	F9	R 054	C4	R 343	B8
C 303	E9	R 055	C3	R 344	B7
C 304	E8	R 056	C5	T 001	F6
C 305	E8	R 057	C5	T 002	A4
C 306	A7	R 058	B5	T 003	A4
C 307	D7	R 059	B5	T 006	E6
C 308	D8	R 061	B4	T 007	E7
C 309	A7	R 062	B5	T 008	B6
C 310	E8	R 063	B5	T 011	C4
C 311	A8	R 064	C5	T 012	D4
C 312	A8	R 065	C5	T 015	E4
C 313	D8	R 066	B3	T 016	E3
C 314	D7	R 067	B3	T 017	C3
C 316	A8	R 068	E2	T 018	C3
C 316	A8	R 069	D3	T 019	C3
C 317	A8	R 071	E3	T 021	C2
C 318	D9	R 073	E3	T 022	C1
C 319	C8	R 074	D2	T 023	C1
C 320	D7	R 075	E3	T 024	F4
C 321	A8	R 076	E3	T 025	E1
C 322	A9	R 078	E3	T 114	C5
C 323	A8	R 079	E3	T 141	B7
C 324	C5	R 080	F4	T 142	B6
C 325	C5	R 081	B2	T 143	B6
C 326	A8	R 084	B1	T 145	B6
C 327	C8	R 086	E3	T 146	D7
C 328	B8	R 087	E2	T 147	D5
C 329	B8	R 088	E4	T 301	A7
C 331	C8	R 089	E4	T 302	D8
C 332	B9	R 090	E4	T 303	A8
C 333	B8	R 091	E3	T 304	A9
C 334	B9	R 092	E3	T 305	B8
C 335	B8	R 094	F5	T 306	B8
C 336	B7	R 095	F5		

RF + IF CIRCUIT DIAGRAM 1



L1 F2
L2 E2

IC1 F5

Q1 F5

P301 B6
P302 D7

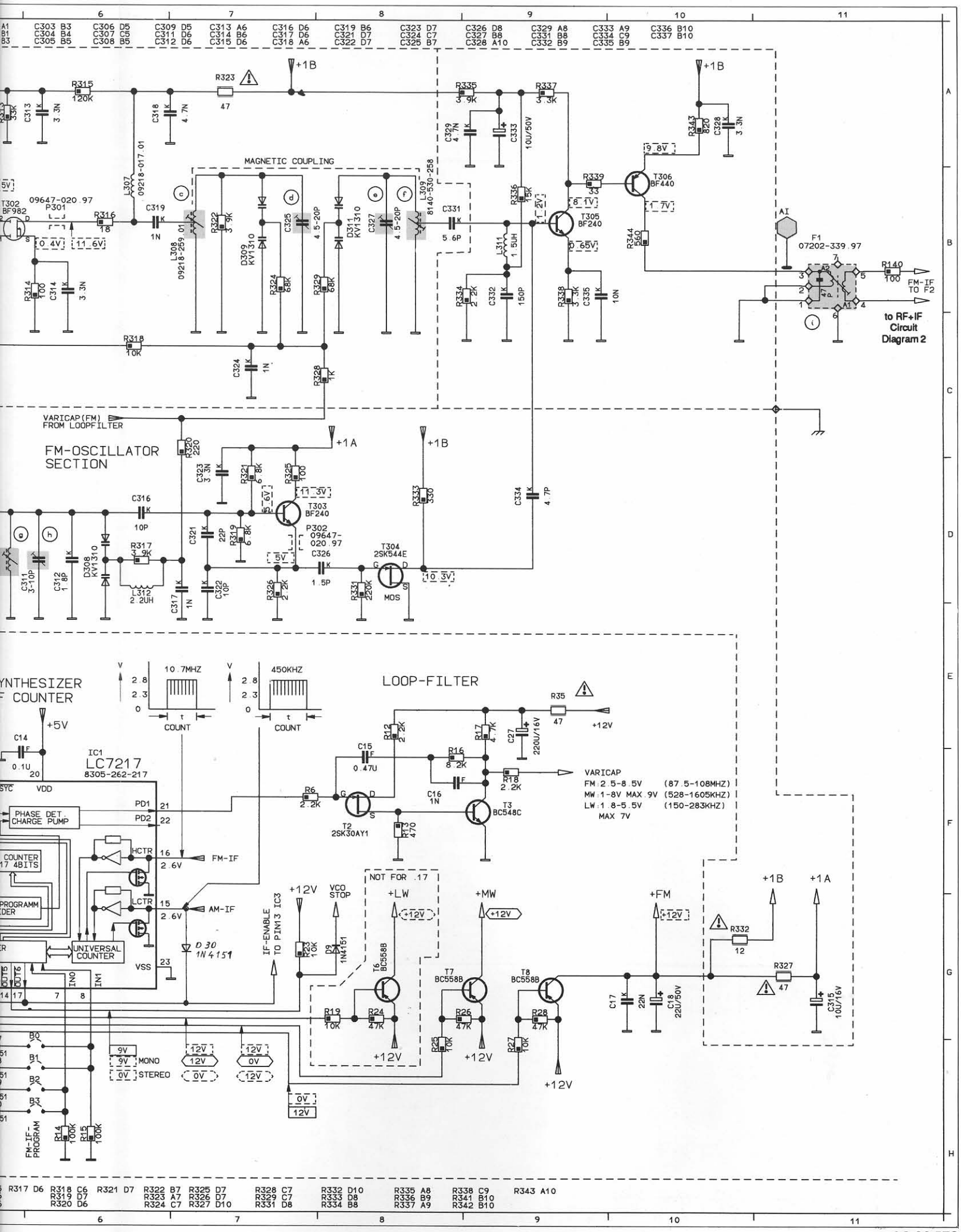
L10 D3
L301 A2
L302 A2
L303 B2
L304 B3
L305 B4
L306 D5
L307 B6
L308 B7
L309 B8
L311 B9

T1 F1
T6 G7
T7 G8
T8 G8
T301 C5
T302 B5
T303 D7
T304 D8
T305 B9
T306 B10

D1 F3
D2 G3
D3 E2
D4 F2
D9 F8
D17 G5
D18 H5
D19 H5
D20 H5

D300 A1
D301 A2
D302 B2
D303 B2
D304 A2
D305 A3
D306 B2
D307 B4
D308 D6
D309 B7
D310 C1
D311 B8

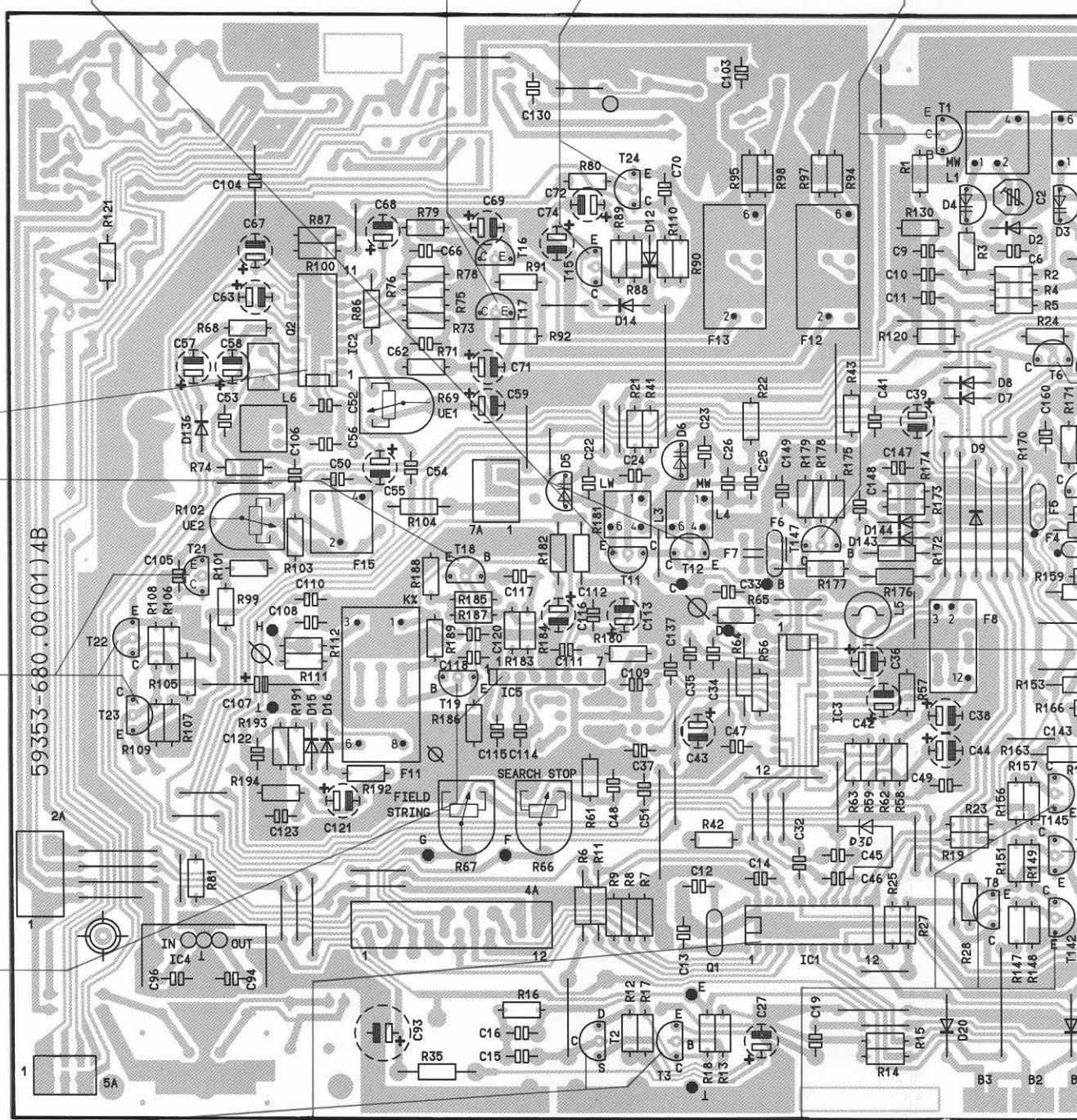
R1 F1
R2 E3
R3 F3
R4 F3
R5 G3
R7 H4
R8 H4
R9 H4
R11 G4
R14 H5
R15 H6
R19 G7
R23 G7
R24 G7
R25 G7
R26 G7
R27 G8
R28 G8
R42 G4
R300 C1
R301 B1
R303 C1
R303 A2
R304 B2
R305 A2
R306 B2
R307 C3
R308 C5
R309 C5
R310 C1
R311 D5
R312 B5
R313 A5
R314 B5
R315 A6
R316 B6
R317 D6
R318 C6
R319 D7
R320 D6
R321 D7
R322 B7
R323 A7
R324 C7
R325
R326
R327


MAGNETIC COUPLING
FM-OSCILLATOR SECTION
VARICAP(FM) FROM LOOPFILTER
LOOP-FILTER
SYNTHESIZER COUNTER
IC1 LC7217 8305-262-217
PHASE DET. CHARGE PUMP
UNIVERSAL COUNTER
10.7MHZ
450KHZ
COUNT
VARICAP
FM:2.5-8.5V (87.5-108MHZ)
MW:1-8V MAX.9V (528-1605KHZ)
LW:1.8-5.5V (150-283KHZ)
MAX 7V
NOT FOR .17
IF-ENABLE TO PIN13 IC3
VCO STOP
+LW
+MW
+FM
MONO
STEREO
FM-IF-PROGRAM
to RF+IF Circuit Diagram 2
FM-IF TO F2

CS 28 572

RF + IF PANEL

component side



IC 2
- 1 = 3.2V
- 2 = 3.2V
- 3 = 3.2V
- 4 = 3.2V
- 5 = 5.5V
- 6 = 3.2V
- 7 = 3.2V
- 8 = 5.5V
- 9 = 3.2V
- 10 = 0V / 5.5V
- 11 = 0V 2.8V
- 12 = 0V
- 13 = 0.5V STEREO / 5V MONO / 5V
- 14 = 5V / 0V
- 15 = 0V 4V MUTE
- 16 = 2.8V
- 17 = 2.7V STEREO / 9.4V
- 18 = 2.9V / 5.4V
- 19 = 2.9V / 5.4V
- 20 = 4V / 7.5V
- 21 = 1.8V MONO ~456 kHz STEREO
- 22 = 12V

T 12
- E = 3.9V / 3.7V
- B = 4.4V
- C = 3.4V / 3.7V

T 11
- E = 3.9V / 3.7V
- B = 4.4V
- C = 3.4V / 3.7V

T 16/ T17
- E = 0V MUTE
- B = 0.7V MUTE
- C = 0V

T 15
- E = 11.3V
- B = 10.6V MUTE ?
- C = 11.2V MUTE ?

T 24
- E = 0V
- B = 0.7V MUTE
- C = 0V MUTE

T 147
- E = 2.85V / 3V
- B = 3.45V / 3.6V
- C = 10.6V / 10.4V

T 18
- E = 2.4V
- B =
- C = 10.5V

T 22
- E = 12V
- B = 11.3V ?
- C = 12V ?

T 21
- E = 0V
- B = 0.7V ?
- C = 0V ?

T 23
- E = 0.4V
- B = 0.9 V
- C = 11,3V ?

T 19
- E = 2.4V
- B = 2.7V
- C = 10.5V

IC5
- 1 = 1.95V
- 2 = 1.92V
- 3 = 8V
- 4 = 0V
- 5 = 11.4V
- 6 = 1.95V
- 7 = 1.95V

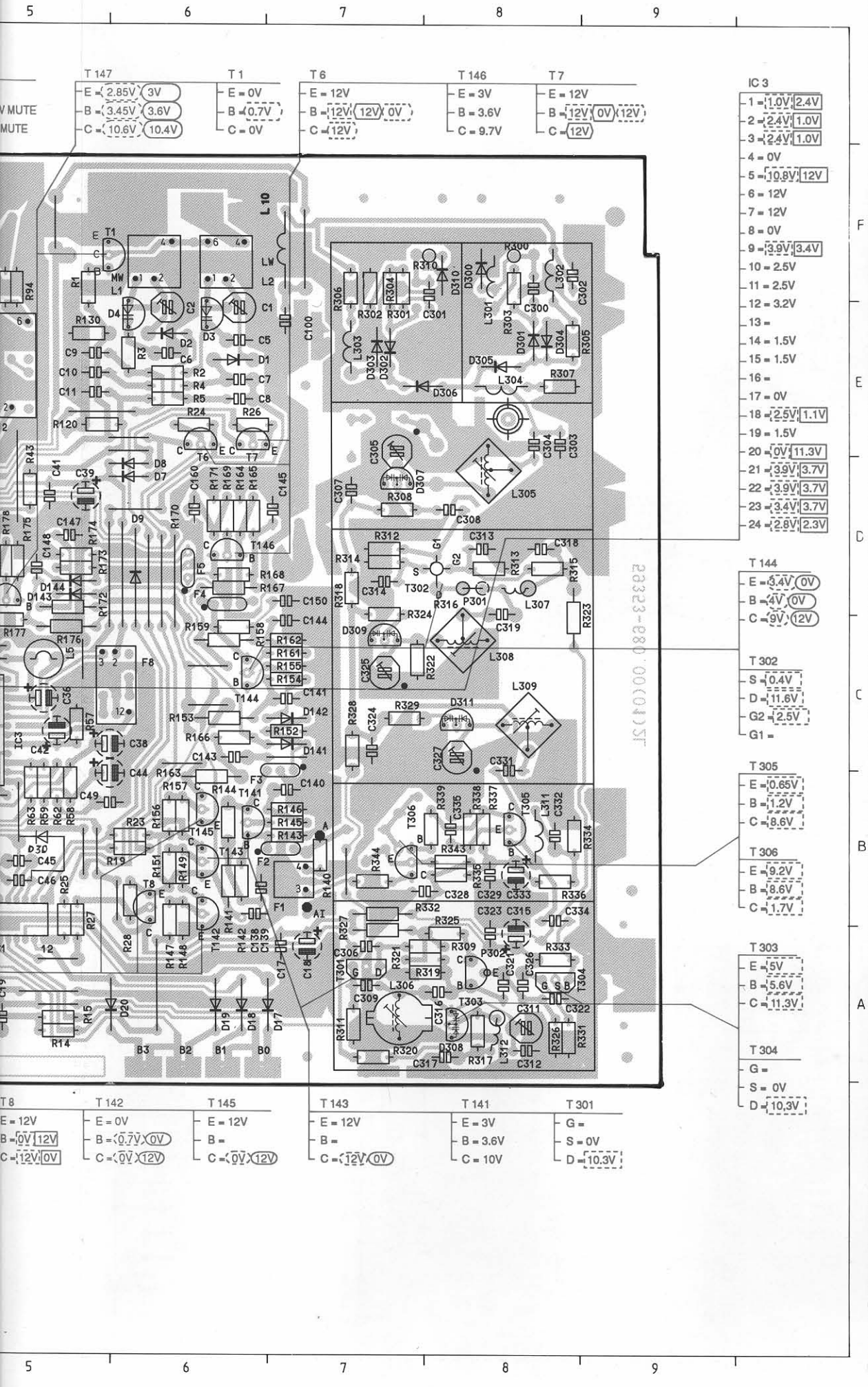
T 2
- S =
- D = 12V ?
- G =

T 3
- E = 0V
- B =
- C = 2.5V-8.5V FM
  1V-8V MW
  1.8V-5.5V LW

IC 1
- 1 = 2.9V
- 2 = 0V ?
- 3 = 0V ?
- 4 = 0V ?
- 5 = 6V ?
- 6 =
- 7 = 0V ?
- 8 = 0V ?
- 9 = 0V / 12V
- 10 = ?
- 11 = ?
- 12 = 12V / 0V / 12V
- 13 = 12V / 12V / 0V
- 14 = 9V / 9V MONO / 0V STEREO
- 15 = 0V
- 16 = 0V
- 17 = 6V ?
- 18 = 0V / 3V
- 19 = 3V / 0V
- 20 = 6V
- 21 =
- 22 =
- 23 = 0V
- 24 = 2.9V

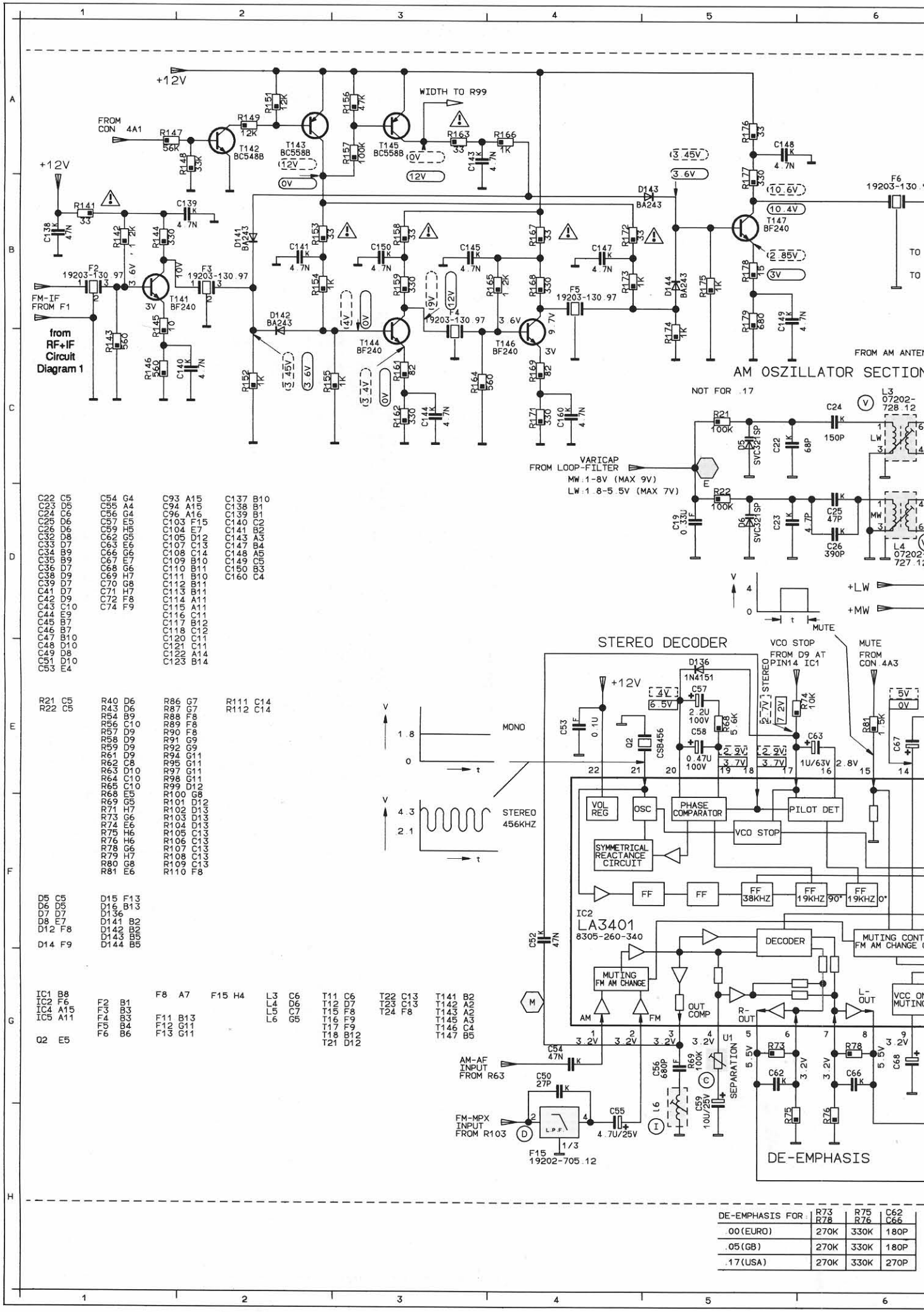
T 8
- E = 12V
- B = 0V / 12V
- C = 12V / 0V

T 142
- E = 0V
- B = 0.7V / 0V
- C = 0V / 12V



2 A	B 1	C 337	B 7	R 097	F 5
4 A	B 3	D 001	E 7	R 098	F 5
5 A	A 1	D 002	E 6	R 099	C 2
6 A	F 5	D 003	E 6	R 100	E 2
7 A	D 3	D 004	E 6	R 101	C 2
8 A	F 1	D 005	D 4	R 102	D 2
9 A	F 1	D 006	D 4	R 103	D 2
C 001	E 7	D 007	D 6	R 104	D 3
C 002	E 6	D 008	D 6	R 105	C 1
C 005	E 7	D 009	D 6	R 106	C 1
C 006	E 6	D 012	E 4	R 107	C 1
C 007	E 7	D 014	E 4	R 108	C 1
C 008	E 7	D 015	C 2	R 109	C 1
C 009	E 6	D 016	C 2	R 110	E 4
C 010	E 6	D 017	A 7	R 111	C 2
C 011	E 6	D 018	A 7	R 112	C 2
C 012	B 4	D 019	A 6	R 120	E 6
C 013	A 4	D 020	A 6	R 121	E 1
C 014	B 5	D 021	E 1	R 126	E 1
C 015	A 3	D 022	E 1	R 127	E 1
C 016	A 3	D 023	E 1	R 128	E 1
C 017	A 7	D 024	B 2	R 130	E 6
C 018	A 7	D 029	A 2	R 130	F 4
C 019	A 5	D 031	F 1	R 140	B 7
C 022	D 4	D 032	F 1	R 141	B 6
C 023	D 4	D 033	F 1	R 142	B 7
C 024	D 4	D 034	F 2	R 143	B 7
C 025	D 5	D 040	F 1	R 144	B 6
C 026	D 4	D 050	F 1	R 145	B 7
C 027	A 5	D 136	D 2	R 146	B 7
C 032	B 5	D 141	C 5	R 147	B 6
C 033	C 5	D 142	C 5	R 148	B 6
C 034	C 4	D 143	D 5	R 149	B 6
C 035	C 4	D 144	D 5	R 151	B 6
C 036	C 5	D 300	F 8	R 152	C 5
C 037	B 4	D 301	E 8	R 153	C 6
C 038	C 6	D 302	E 8	R 154	C 5
C 039	D 6	D 303	E 7	R 155	C 5
C 041	D 5	D 304	E 9	R 156	B 6
C 042	C 5	D 305	E 8	R 157	B 6
C 043	C 4	D 306	E 8	R 158	C 6
C 044	B 6	D 307	D 8	R 159	C 6
C 045	B 5	D 308	A 8	R 160	C 6
C 046	B 5	D 309	C 5	R 161	C 5
C 047	C 4	D 310	F 8	R 162	C 5
C 048	B 4	D 311	C 8	R 163	B 6
C 049	B 6	F 001	B 7	R 164	D 7
C 050	D 2	F 002	B 7	R 165	D 7
C 051	B 4	F 003	B 7	R 166	C 5
C 052	D 2	F 004	D 6	R 166	C 6
C 053	D 2	F 005	D 6	R 167	D 7
C 054	D 3	F 006	D 5	R 168	D 7
C 055	D 3	F 007	D 5	R 169	D 6
C 056	D 2	F 008	C 6	R 170	D 6
C 057	E 2	F 009	C 4	R 171	D 6
C 058	E 2	F 010	C 4	R 172	D 5
C 059	D 3	F 011	C 3	R 173	D 5
C 062	E 3	F 012	E 5	R 174	D 5
C 063	E 2	F 013	E 4	R 175	D 5
C 066	E 3	F 015	D 2	R 177	C 5
C 067	E 2	IC 001	A 5	R 178	D 5
C 068	E 3	IC 002	E 2	R 179	D 5
C 069	E 3	IC 003	C 5	R 180	C 4
C 070	F 4	IC 004	A 2	R 181	D 4
C 071	E 3	IC 005	C 3	R 182	D 4
C 072	E 4	IC 006	A 2	R 183	C 3
C 074	E 4	L 001	F 6	R 184	C 3
C 093	A 3	L 002	F 7	R 185	C 3
C 094	A 2	L 003	D 4	R 186	C 3
C 096	A 1	L 004	D 4	R 187	C 3
C 100	E 7	L 005	C 5	R 188	C 3
C 101	E 1	L 006	D 2	R 189	C 3
C 102	D 1	L 006	F 7	R 191	C 2
C 103	F 5	L 301	F 8	R 192	B 2
C 104	F 2	L 302	F 9	R 193	C 2
C 105	C 1	L 303	E 7	R 194	B 2
C 106	D 2	L 305	D 8	R 300	F 8
C 107	C 2	L 305	E 8	R 301	F 8
C 108	C 2	L 306	A 8	R 302	F 7
C 109	C 4	L 307	D 8	R 303	F 8
C 110	C 2	L 308	C 8	R 304	F 8
C 111	C 4	L 309	C 8	R 305	E 9
C 112	C 4	L 312	A 8	R 306	F 7
C 113	C 4	L 331	B 8	R 307	E 9
C 114	C 3	P 301	D 8	R 308	D 8
C 115	C 3	Q 001	A 4	R 309	A 8
C 116	C 4	R 001	F 6	R 310	F 8
C 117	C 3	R 002	E 6	R 311	A 7
C 118	C 3	R 003	E 6	R 312	D 7
C 120	C 3	R 004	E 6	R 313	D 8
C 121	B 2	R 005	E 6	R 314	D 7
C 122	B 2	R 006	B 4	R 315	D 9
C 123	B 2	R 007	B 4	R 317	A 8
C 125	A 1	R 008	B 4	R 318	D 7
C 126	A 2	R 009	B 4	R 319	A 8
C 130	F 3	R 011	B 4	R 320	A 7
C 131	F 1	R 012	A 4	R 321	A 8
C 132	F 1	R 013	A 4	R 322	C 8
C 133	F 1	R 014	A 5	R 323	D 9
C 134	F 1	R 015	A 5	R 324	C 8
C 135	F 2	R 016	A 3	R 325	A 8
C 137	C 4	R 017	A 4	R 326	A 9
C 138	B 7	R 018	A 4	R 327	A 7
C 139	B 7	R 019	B 6	R 328	C 5
C 140	B 7	R 021	D 4	R 329	C 8
C 141	C 5	R 022	D 5	R 331	A 9
C 143	C 6	R 023	B 6	R 332	B 8
C 144	C 5	R 024	E 6	R 333	A 9
C 145	D 7	R 025	B 5	R 334	B 9
C 147	D 5	R 026	E 7	R 335	B 8
C 148	D 5	R 027	B 5	R 336	B 9
C 149	D 5	R 028	B 6	R 337	B 8
C 150	D 7	R 035	A 3	R 338	B 8
C 160	D 6	R 041	D 4	R 339	B 8
C 300	F 8	R 042	B 4	R 341	B 8
C 301	F 8	R 043	D 5	R 342	B 7
C 302	F 9	R 054	C 4	R 343	B 8
C 303	E 9	R 055	C 3	R 344	B 7
C 304	E 8	R 056	C 5	T 001	F 6
C 305	E 8	R 057	C 5	T 002	A 4
C 306	A 7	R 058	B 5	T 003	A 4
C 307	D 7	R 059	B 5	T 006	E 6
C 308	D 8	R 061	B 4	T 007	E 7
C 309	A 7	R 062	B 5	T 008	B 6
C 310	E 8	R 063	B 5	T 011	C 4
C 311	A 8	R 064	C 5	T 012	D 4
C 312	A 8	R 065	C 5	T 015	E 4
C 313	D 8	R 066	B 3	T 016	E 3
C 314	D 7	R 067	B 3	T 017	E 3
C 316	A 8	R 068	E 2	T 018	C 3
C 316	A 8	R 069	D 3	T 019	C 3
C 317	A 8	R 071	E 3	T 021	C 2
C 318	D 9	R 073	E 3	T 022	C 1
C 319	C 8	R 074	D 2	T 023	C 1
C 320	D 7	R 075	E 3	T 024	F 4
C 321	A 8	R 076	E 3	T 025	E 1
C 322	A 9	R 078	E 3	T 114	C 5
C 323	A 8	R 079	E 3	T 141	B 7
C 324	C 5	R 080	F 4	T 142	B 6
C 325	C 5	R 081	B 2	T 143	B 6
C 326	A 8	R 084	B 1	T 145	B 6
C 327	C 8	R 085	E 3	T 146	D 7
C 328	B 8	R 087	E 2	T 147	D 5
C 329	B 8	R 088	E 4	T 301	A 7
C 331	C 8	R 089	E 4	T 302	D 8
C 332	B 9	R 090	E 4	T 303	A 8
C 333	B 8	R 091	E 3	T 304	A 9
C 334	B 9	R 092	E 3	T 305	B 8
C 335	B 8	R 094	F 5	T 306	B 8
C 336	B 7	R 095	F 5		

RF + IF CIRCUIT DIAGRAM 2



C22 C5
C23 D5
C24 C6
C25 D6
C26 D6
C32 D8
C33 D7
C34 B9
C35 B9
C36 D7
C38 D9
C39 D7
C41 D7
C42 D9
C43 C10
C44 E9
C45 B7
C46 B7
C47 B10
C48 D10
C49 D8
C51 D10
C53 E4

C54 G4
C55 A4
C56 G4
C57 E5
C59 H5
C62 G5
C63 E6
C66 G6
C67 E7
C68 G6
C69 H7
C70 G8
C71 H7
C72 F8
C74 F9

C93 A15
C94 A15
C96 A16
C103 F15
C104 E7
C105 D12
C107 C13
C108 C14
C109 B10
C110 B11
C111 B10
C112 B11
C113 B11
C114 A11
C115 A11
C116 G11
C117 B12
C118 C12
C120 C11
C121 C11
C122 A14
C123 B14

C137 B10
C138 B1
C139 B1
C140 C2
C141 B2
C143 A3
C147 B4
C148 A5
C149 C5
C150 B3
C160 C4

R21 C5
R22 C5

R40 D6
R43 D6
R54 B9
R56 C10
R57 D9
R58 D9
R59 D9
R61 D9
R62 C8
R63 D10
R64 C10
R65 C10
R68 E5
R69 G5
R71 H7
R73 G6
R74 E6
R75 H6
R76 H6
R78 G6
R79 H7
R80 G8
R81 E6

R86 G7
R87 G7
R88 F8
R89 F8
R90 F8
R91 G9
R92 G9
R94 G11
R95 G11
R97 G11
R98 G11
R99 D12
R100 G8
R101 D12
R102 D13
R103 D13
R104 D13
R105 C13
R106 C13
R107 C13
R108 C13
R109 C13
R110 F8

R111 C14
R112 C14

D5 C5
D6 D5
D7 D7
D8 E7
D12 F8

D14 F9

D15 F13
D16 B13
D136
D141 B2
D142 B2
D143 B5
D144 B5

IC1 B8
IC2 F6
IC4 A15
IC5 A11

Q2 E5

F2 B1
F3 B3
F4 B3
F5 B4
F6 B6

F8 A7

F11 B13
F12 G11
F13 G11

F15 H4

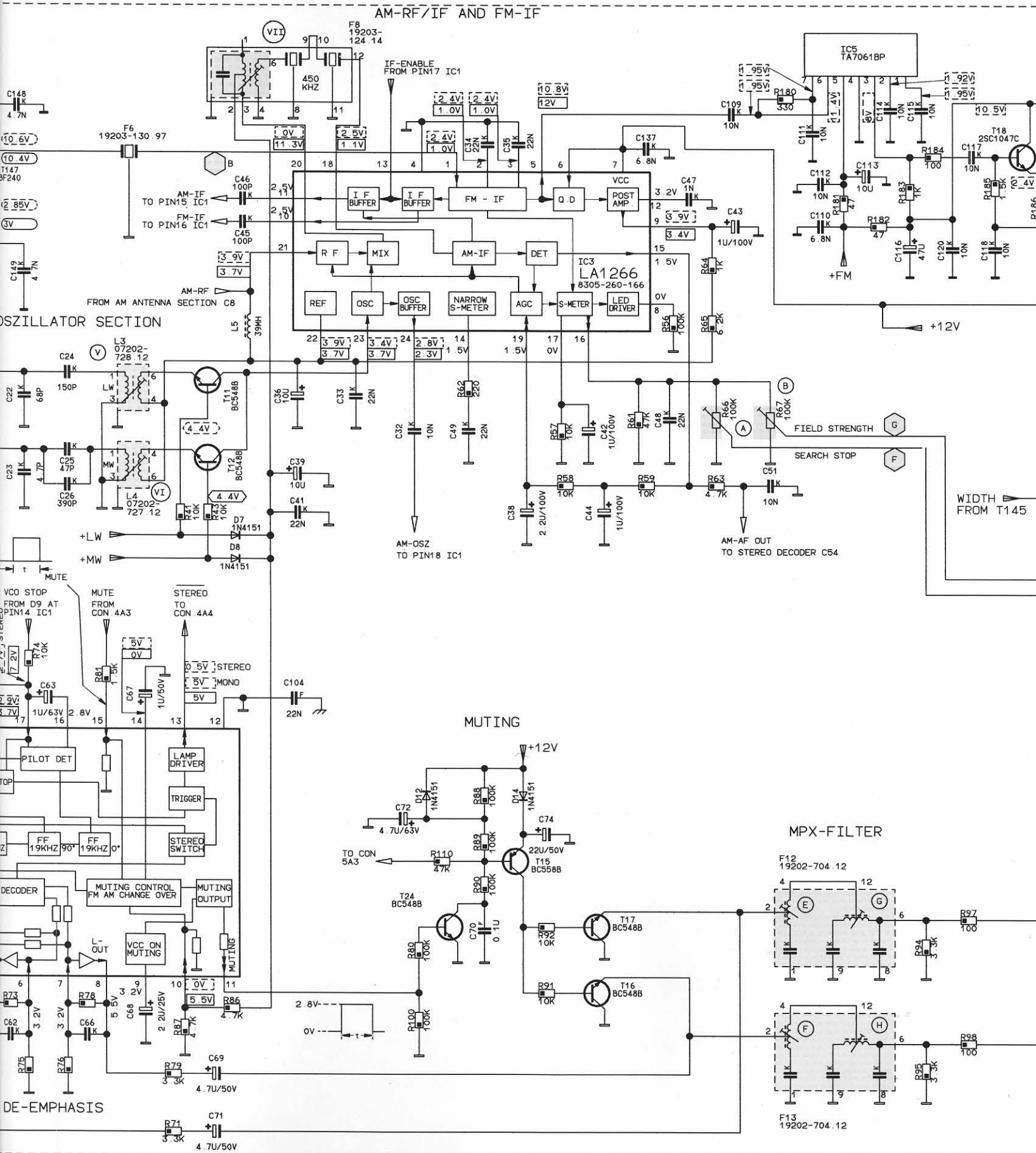
L3 C6
L4 D6
L5 C7
L6 G5

T11 C6
T12 D7
T15 F8
T16 F9
T17 F9
T18 B12
T21 D12

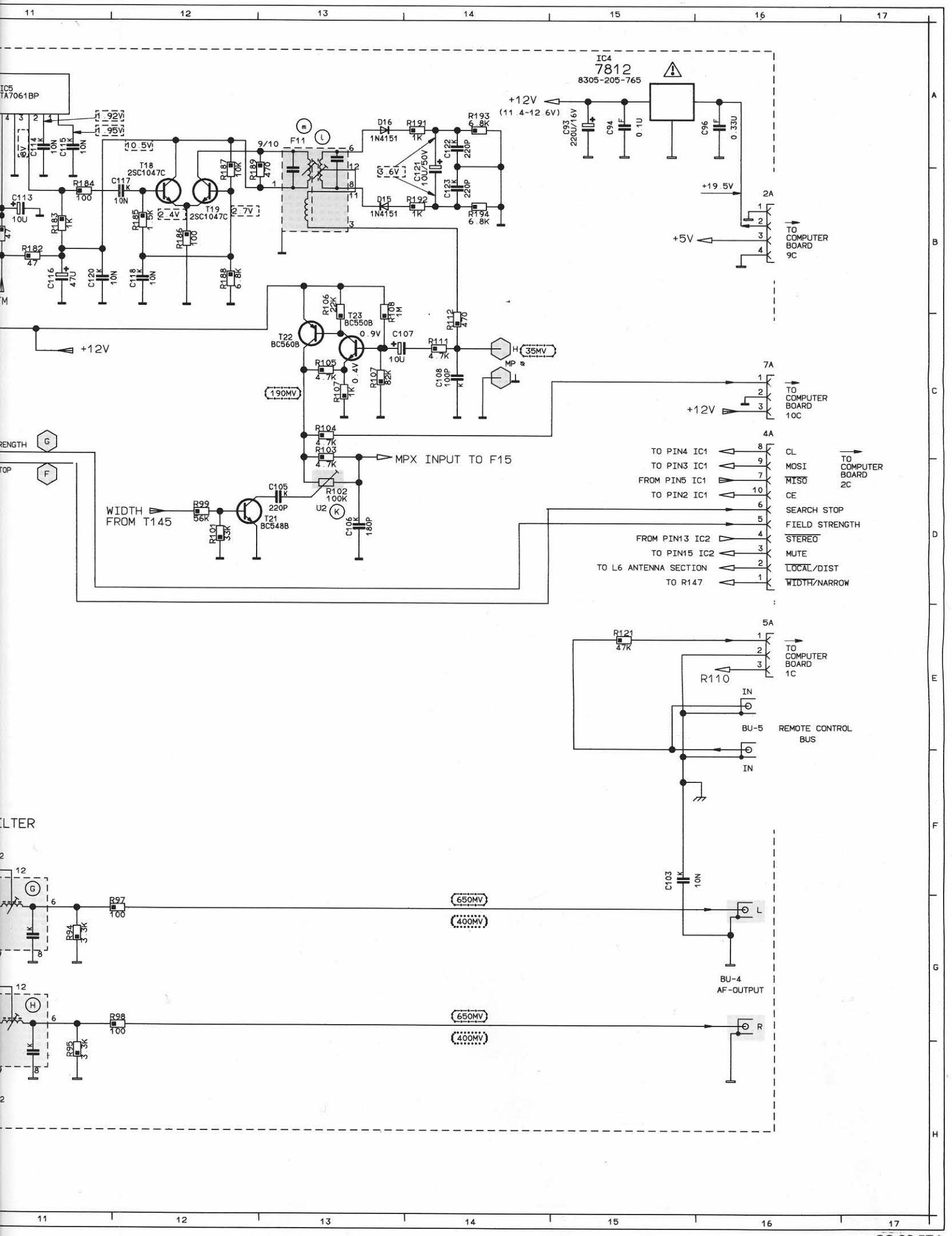
T22 C13
T23 C13
T24 F8

T141 B2
T142 A2
T143 A2
T145 A3
T146 C4
T147 B5

DE-EMPHASIS FOR :	R73 R78	R75 R76	C62 C66
.00(EURO)	270K	330K	180P
.05(GB)	270K	330K	180P
.17(USA)	270K	330K	270P

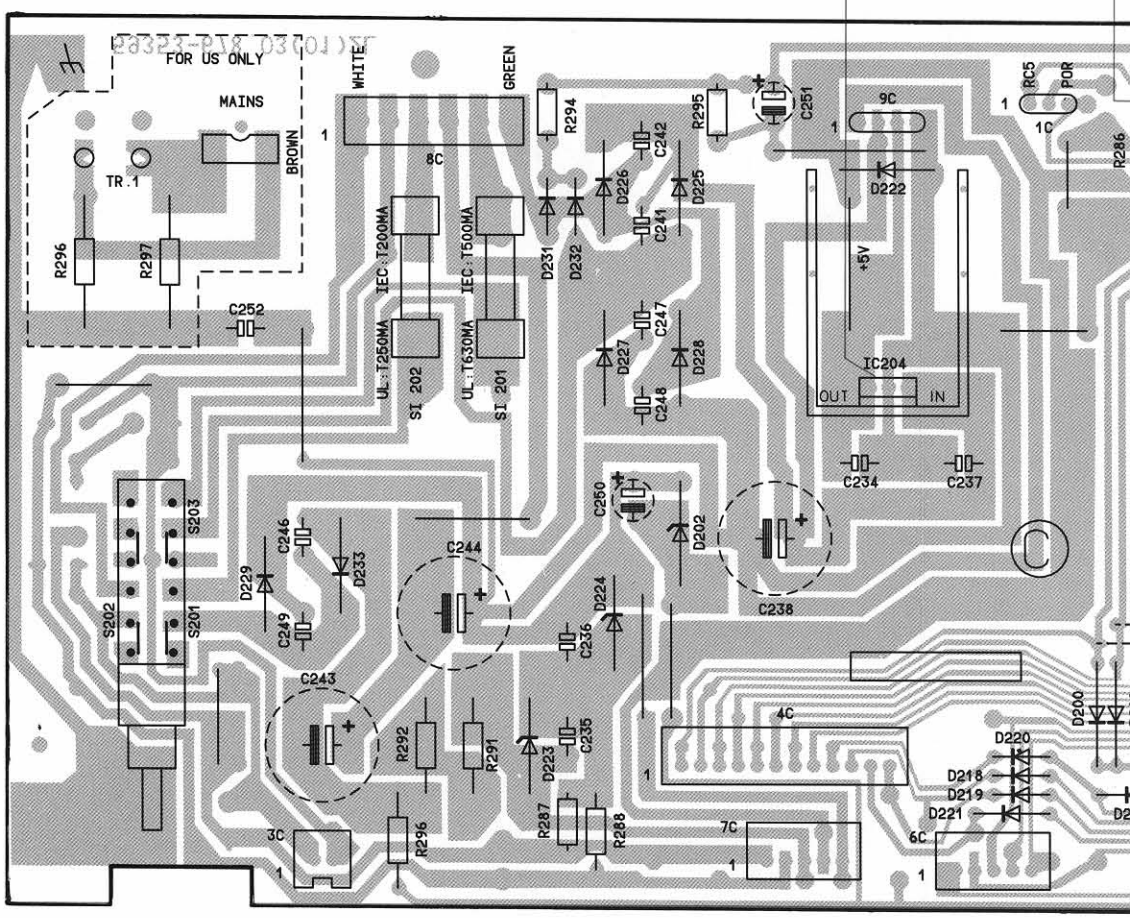


SIS FOR :	R73 R78	R75 R76	C62 C66
0)	270K	330K	180P
	270K	330K	180P
)	270K	330K	270P


IC4
7812
8305-205-765
+12V
(11.4-12.6V)
+19.5V
+5V
TO COMPUTER BOARD 9C
TO COMPUTER BOARD 10C
TO COMPUTER BOARD 2C
TO COMPUTER BOARD 1C
IC5
TA7061BP
10.5V
9/10
F11
T18
2SC1047C
T19
2SC1047C
T22
BC560B
T23
BC550B
0.9V
0.4V
35MV
190MV
MP
MPX INPUT TO F15
WIDTH
FROM T145
T21
BC548B
TO PIN4 IC1
TO PIN3 IC1
FROM PIN5 IC1
TO PIN2 IC1
FROM PIN13 IC2
TO PIN15 IC2
TO L6 ANTENNA SECTION
TO R147
CL
MOSI
MISO
CE
SEARCH STOP
FIELD STRENGTH
STEREO
MUTE
LOCAL/DIST
WIDTH/NARROW
R110
IN
BU-5
REMOTE CONTROL BUS
IN
650MV
460MV
BU-4
AF-OUTPUT
650MV
460MV

COMPUTER PANEL

component side



IC 204
- 1 = 19,5V
- 2 = 0V
- 3 = 5V

IC 201
- 1 = 0V
- 2 = 0V
- 3 = EEPROM WRITNG 5V
  OTHERWISE 0V
- 4 = 0V
- 5 = MUTE OF 0V
  MUTE ON 5V
- 6 = 5V
- 7 = RC 5
- 8 = RDS DATA 4,6Vss
- 9 = LOC 5V / DIST. 0V
- 10 = WIDE 0V / NARROW 5V
- 11 = 0V
- 12 =
- 13 = 5V
- 14 = 5V
- 15 = 5V
- 16 = 5V
- 17 =
- 18 =
- 19 =
- 20 = STEREO ON 0,6V
  STEREO OFF 5V
- 21 = 0V
- 22 = 2V
- 23 = 0V
- 24 = 5V
- 25 = 0V
- 26 =
- 27 =
- 28 =
- 29 = 8 MHz
- 30 = 4,6Vss
- 31 = 0V
- 32 = 0V
- 33 = 0V
- 34 = 0V
- 35 = 0V
- 36 = 0V
- 37 = 0V
- 38 = 0V
- 39 = RESI
- 40 = 5V
- 41 = RDS
- 42 = VALI
  OTH
- 43 = WITH
  WITI
- 44 = 5V
- 45 = 0V
- 46 = 0V
- 47 =
- 48 = 5V

5 6 7 8 9 10 11

IC 204
- 1 = 19,5V
- 2 = 0V
- 3 = 5V

T 206
- E = 0V
- B = 0V
- C = 11,5V

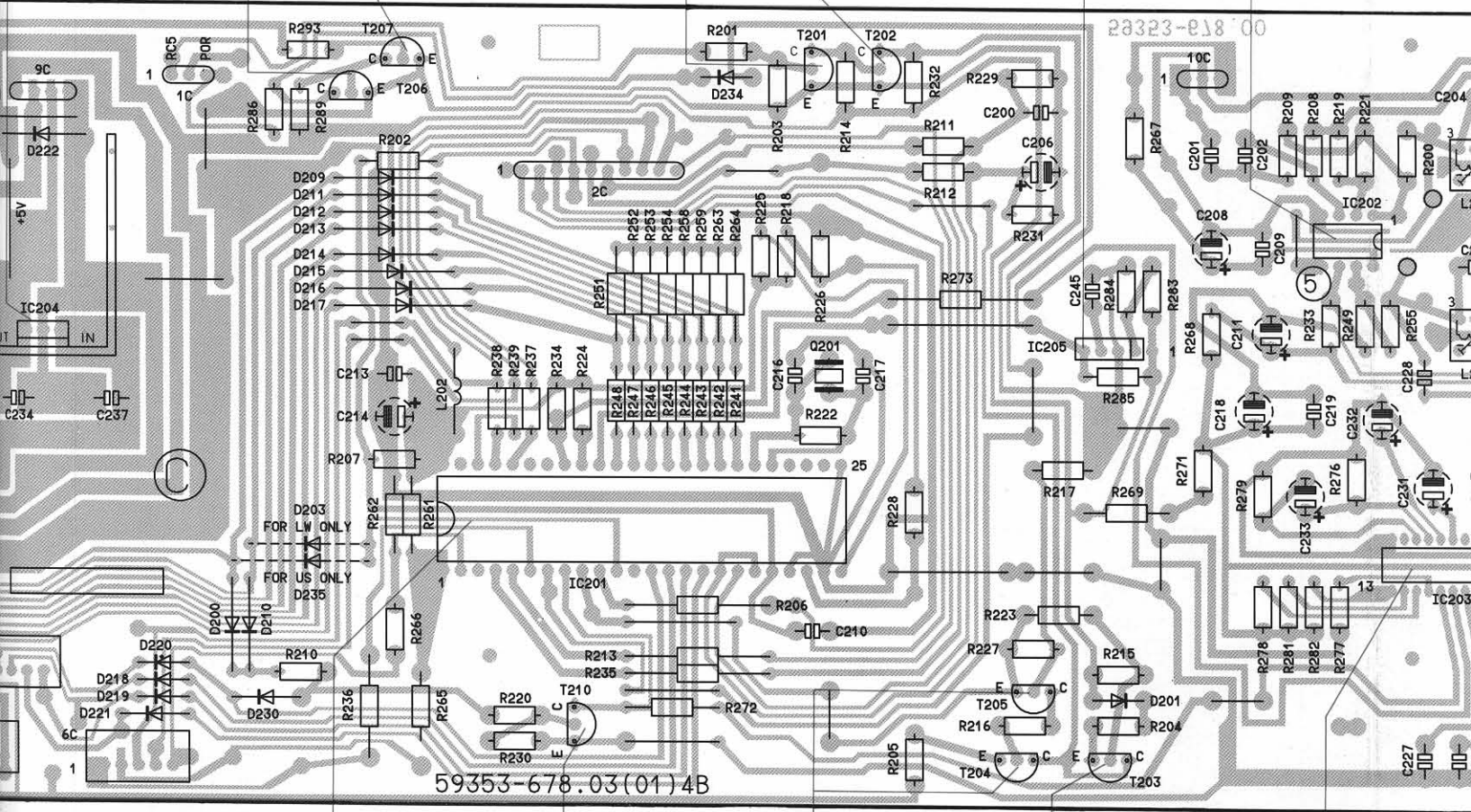
T 207
- E = 0V
- B = 0,7V
- C = 0V

T 201
- E = 0V
- B = RC 5
- C = RC 5

T 202
- E = 0V
- B = RC 5
- C = RC 5

IC 205
- 1 = 5V
- 2 = 1,6V
- 3 = 0V
- 4 = 1,2V
- 5 = RESET

IC 202
- 1 = 4,8V / RDS 6,5mV~
- 2 = 4,8V
- 3 = 4,8V
- 4 = 0V



- 25 = 0V
- 26 =
- 27 =
- 28 =
- 29 = 8 MHz
- 30 = 4,6Vss
- 31 = 0V
- 32 = 0V
- 33 = 0V
- 34 = 0V
- 35 = 0V
- 36 = 0V

- 37 = 0V
- 38 = 0V
- 39 = RESET
- 40 = 5V
- 41 = RDS CLOCK 4,6Vss
- 42 = VALID BLOCK IS READ: 5V
  OTHERWISE: 0V
- 43 = WITH RDS: 5V
  WITHOUT RDS: 0V
- 44 = 5V
- 45 = 0V
- 46 = 0V
- 47 =
- 48 = 5V

T 210
- E = 0V
- B = AT TUNING: 0,7V
- C = AT TUNING: 0V

T 205
- E = LOC 5V / DIST. 0V
- B = LOC 4,3V / DIST. 0V
- C = LOC 5V

T 204
- E =
- B =
- C = LOC -1,8V 7 DIST. 1,8V

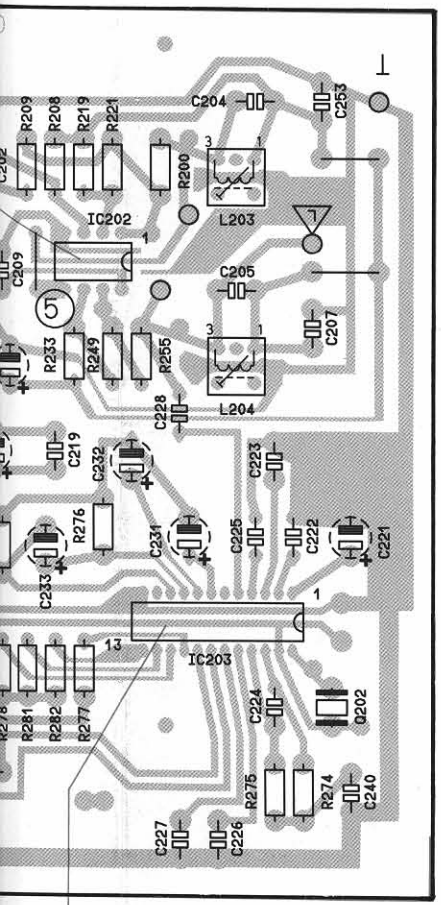
T 203
- E =
- B =
- C = LOC -1,8V 7 DIST. 1,8V

IC 203
- 1 = 1,4V
- 2 = 1,4V
- 3 = 0V
- 4 = 1,5V
- 5 = 2V
- 6 =
- 7 = 3V
- 8 = 0,7V
- 9 = 1,4V
- 10 = 0V
- 11 =
- 12 = 0V

1 C	D 5	D 215	C 6	R 238	B 7
2 C	D 7	D 216	C 6	R 239	B 7
3 C	A 2	D 217	C 6	R 241	C 8
4 C	A 4	D 218	A 5	R 242	C 8
6 C	A 5	D 219	A 5	R 243	C 8
7 C	A 4	D 220	A 5	R 244	C 8
8 C	D 2	D 221	A 5	R 245	C 8
9 C	D 4	D 222	D 4	R 246	B 7
10 C	D 10	D 223	A 3	R 247	B 7
C 200	D 9	D 224	B 3	R 248	B 7
C 201	D 10	D 225	D 4	R 249	C 11
C 202	D 10	D 226	D 3	R 251	C 7
C 204	D 12	D 227	C 3	R 252	C 7
C 205	C 12	D 228	C 4	R 253	C 7
C 206	D 9	D 229	B 2	R 254	C 8
C 207	C 12	D 231	D 3	R 255	C 11
C 208	C 10	D 232	D 3	R 258	C 8
C 209	C 11	D 233	B 2	R 259	C 8
C 210	A 8	D 234	D 8	R 261	B 6
C 211	C 11	D 235	B 6	R 262	B 6
C 212	B 12	IC 201	B 7	R 263	C 8
C 213	C 6	IC 202	C 11	R 264	C 8
C 214	B 6	IC 203	B 11	R 265	A 6
C 216	C 8	IC 204	C 4	R 266	A 6
C 217	C 9	IC 205	C 10	R 267	D 10
C 218	B 10	L 202	B 7	R 268	C 10
C 219	B 11	L 203	D 12	R 269	B 10
C 221	B 12	L 204	C 12	R 271	B 10
C 222	B 12	Q 201	C 8	R 272	A 8
C 223	B 12	Q 202	A 12	R 273	C 9
C 224	A 12	R 200	D 11	R 274	A 12
C 225	B 12	R 201	D 8	R 275	A 12
C 226	A 12	R 202	D 6	R 276	B 11
C 227	A 11	R 203	D 8	R 277	A 11
C 228	C 11	R 204	A 10	R 278	A 11
C 231	B 11	R 205	A 9	R 279	B 10
C 232	B 11	R 206	A 8	R 281	A 11
C 233	B 11	R 207	B 6	R 282	A 11
C 234	B 4	R 208	D 11	R 283	C 10
C 235	A 3	R 209	D 11	R 284	C 10
C 236	B 3	R 211	D 9	R 285	C 10
C 237	B 5	R 212	D 9	R 286	D 6
C 238	B 4	R 213	A 8	R 287	A 3
C 240	A 12	R 214	D 8	R 288	A 3
C 241	D 3	R 215	A 10	R 289	D 6
C 242	D 3	R 216	A 9	R 291	A 3
C 243	A 2	R 217	B 10	R 292	A 2
C 244	B 3	R 218	C 8	R 293	D 6
C 245	C 10	R 219	D 11	R 294	D 3
C 246	B 2	R 221	D 11	R 295	D 4
C 247	C 3	R 222	B 8	R 296	C 1
C 248	C 3	R 223	A 9	R 296	A 2
C 249	B 2	R 224	B 7	R 297	C 1
C 250	B 3	R 225	C 8	S 201	B 1
C 251	D 4	R 226	C 8	S 202	B 1
C 252	C 2	R 227	A 9	S 203	B 1
C 253	D 12	R 228	B 9	SI 201	C 3
D 202	B 4	R 229	D 9	SI 202	C 2
D 203	B 6	R 231	C 9	T 201	D 8
D 205	A 10	R 232	D 9	T 202	D 9
D 209	D 6	R 233	C 11	T 203	A 10
D 211	C 6	R 234	B 7	T 204	A 9
D 212	C 6	R 235	A 8	T 205	A 9
D 213	C 6	R 236	A 6	T 206	D 6
D 214	C 6	R 237	B 7	T 207	D 6

IC 202

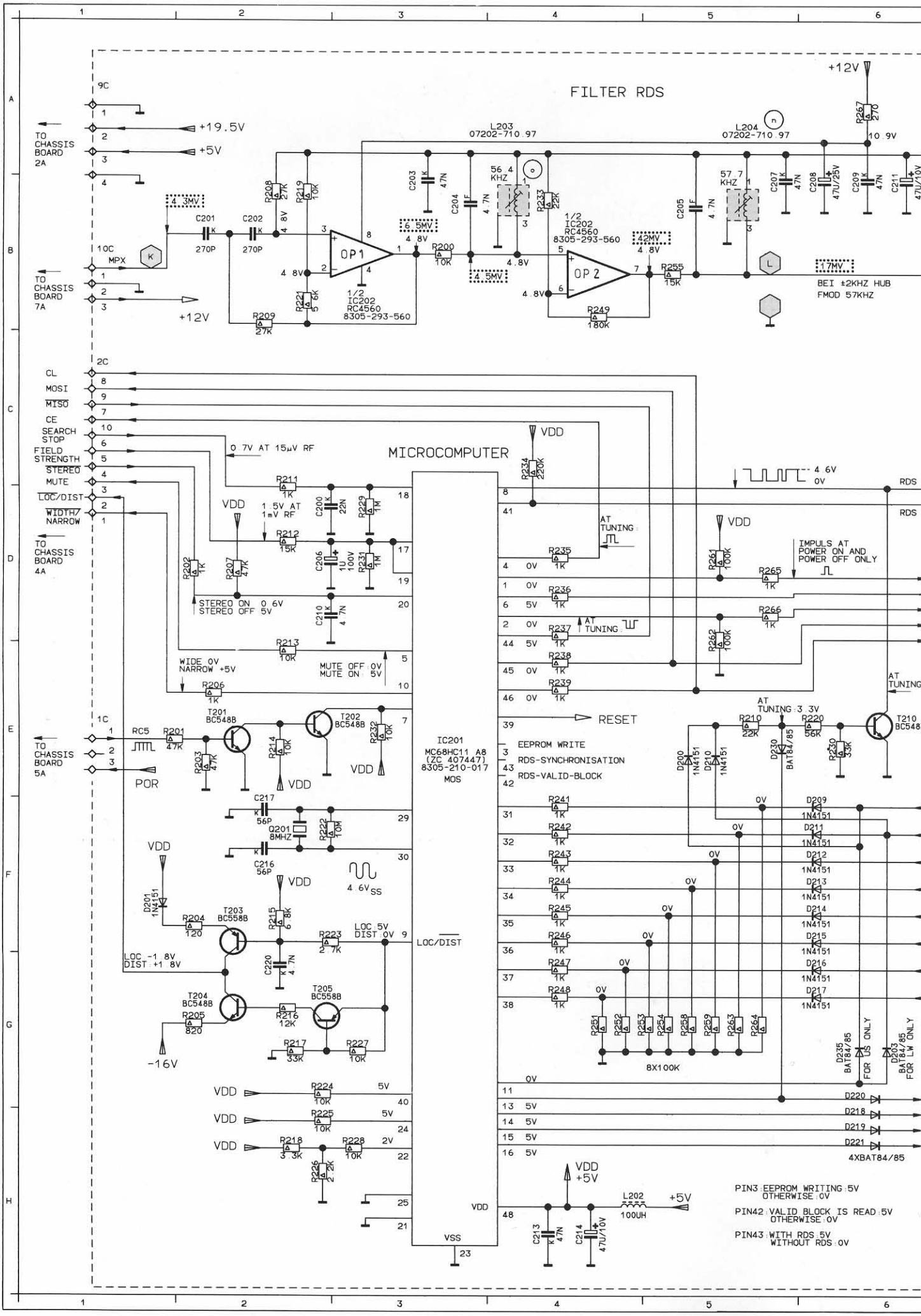
- 1 = 4,8V / RDS 6,5mV~
- 2 = 4,8V
- 3 = 4,8V
- 4 = 0V
- 5 = 4,8V
- 6 = 4,8V
- 7 = 4,8V / RDS 42mV~
- 8 = 10,9V

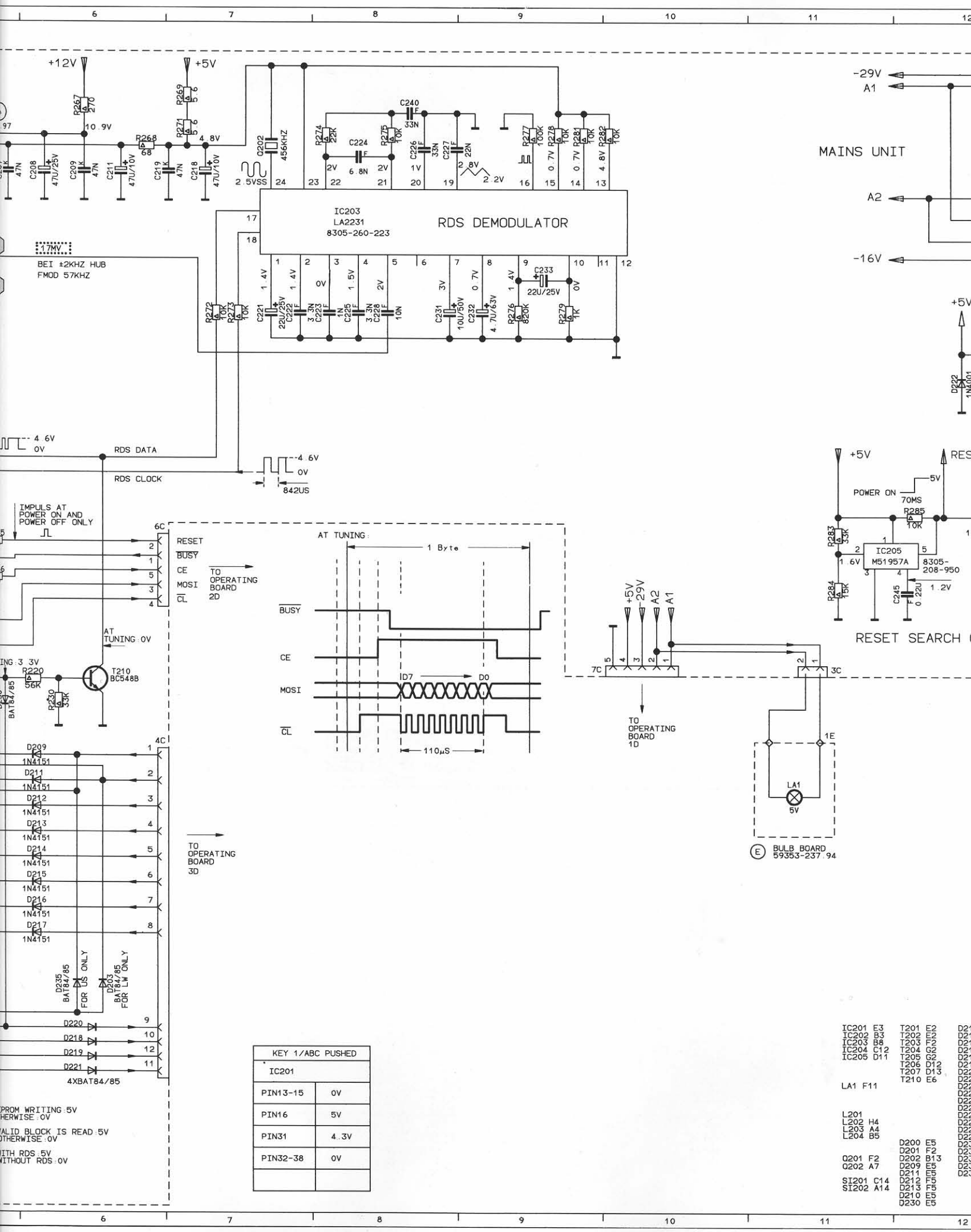


IC 203

- 1 = 1,4V
- 2 = 1,4V
- 3 = 0V
- 4 = 1,5V
- 5 = 2V
- 6 =
- 7 = 3V
- 8 = 0,7V
- 9 = 1,4V
- 10 = 0V
- 11 =
- 12 = 0V
- 13 = 4,8V
- 14 = 0,7V
- 15 = 0,7V
- 16 =
- 17 = RDS DATA
- 18 = RDS CLOCK
- 19 = 0,6Vss
- 20 = 1V
- 21 = 2V
- 22 = 2V
- 23 = 4,8V
- 24 = 2,5Vss / 456KHz

COMPUTER CIRCUIT DIAGRAM

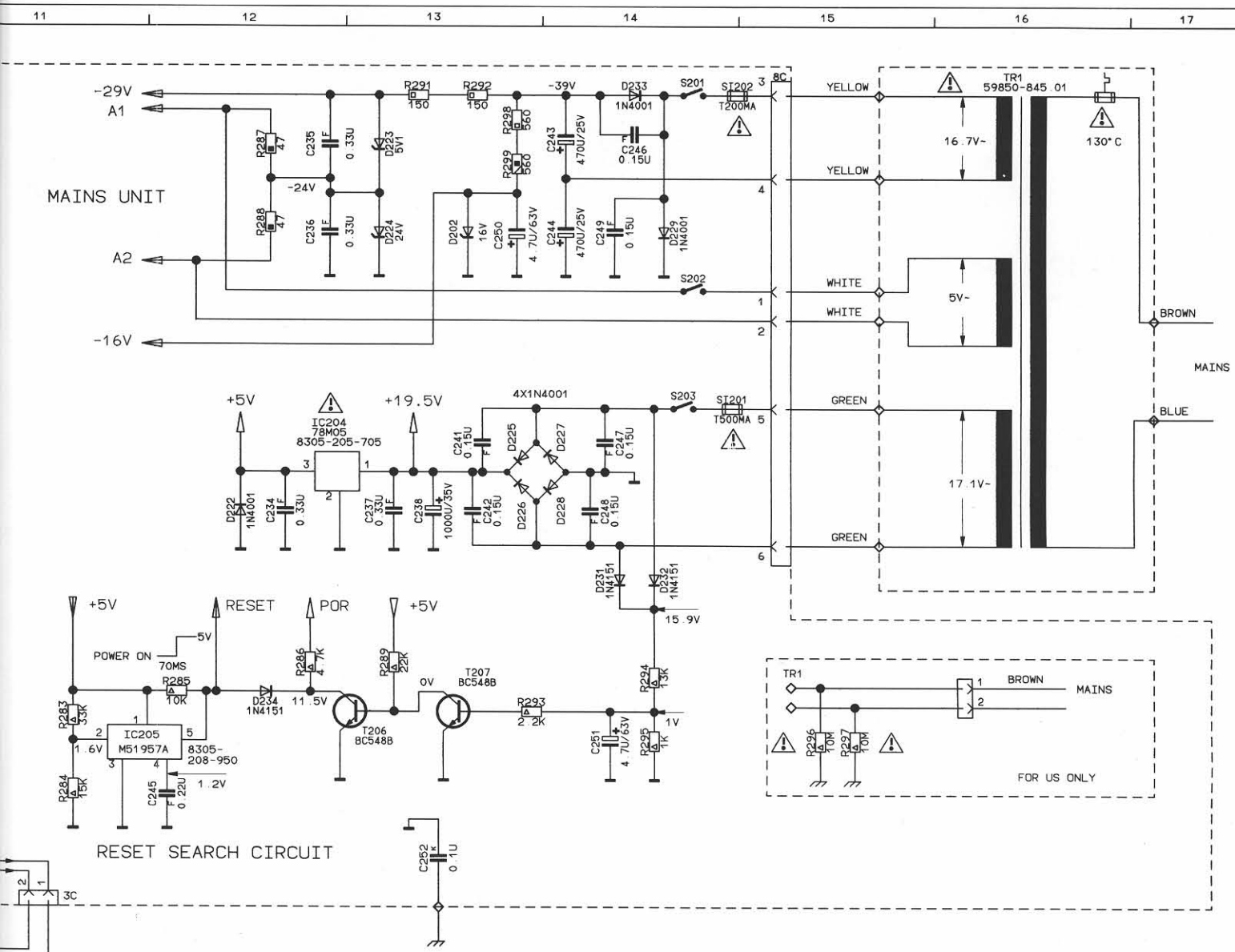


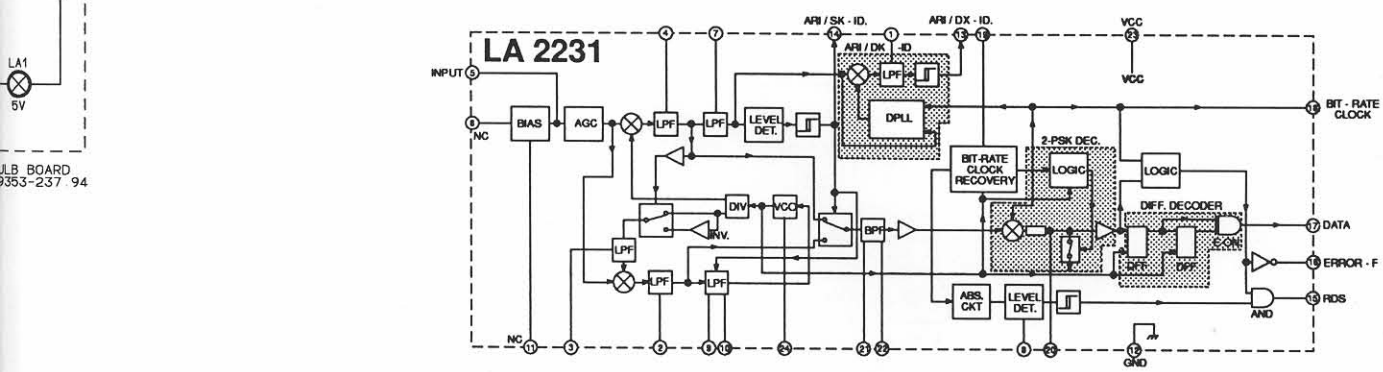


KEY 1/ABC PUSHED	
IC201	
PIN13-15	0V
PIN16	5V
PIN31	4.3V
PIN32-38	0V

IC201 E3
IC202 B3
IC203 B8
IC204 C12
IC205 D11
LA1 F11
L201
L202 H4
L203 A4
L204 B5
Q201 F2
Q202 A7
SI201 C14
SI202 A14

T201 E2
T202 E2
T203 F2
T204 G2
T205 G2
T206 D12
T207 D13
T210 E6
D200 E5
D201 F2
D202 B13
D209 E5
D211 E5
D212 F5
D213 F5
D210 E5
D230 E5





IC201 E3	T201 E2	D214 F5	C200 D3	C223 C7	C246 A14	R200 B3	R225 H2	R252 G4	R278 A9
IC202 B3	T202 E2	D215 F5	C201 B2	C224 B8	C247 C14	R201 E1	R226 H2	R253 G5	R279 C9
IC203 B8	T203 F2	D216 F5	C202 B2	C225 B8	C248 C14	R202 D2	R227 G3	R254 G5	R281 A9
IC204 C12	T204 G2	D217 F5	C203 B3	C226 A8	C249 B14	R203 E2	R228 H3	R255 B5	R282 A10
IC205 D11	T205 G2	D218 G6	C204 B3	C227 A8	C250 B13	R204 C2	R229 D3	R258 G5	R283 D11
	T206 D12	D219 G6	C205 B5	C228 B8	C251 D14	R205 D2	R230 E6	R259 G5	R284 D11
	T207 D13	D220 G6	C206 D2		C252 E13	R206 E2	R231 D3	R260 D5	R285 D12
	T210 E6	D221 G6	C207 B5			R207 D2	R232 E3	R261 D5	R286 D12
LA1 F11		D222 C12	C208 B6	C231 C8		R208 B2	R233 B4	R262	R287 A12
		D223 A13	C209 B6	C232 C8		R209 B2	R235 D4	R263 G5	R288 B12
		D224 B13	C210 D3	C233 C8		R210 E5	R236 D4	R264 G5	R289 D13
L201		D225 C13	C211 B6	C234 C12		R211 D2	R237 D4	R265 D5	R290 A13
L202 H4		D226 C13	C212 A8	C235 A12		R212 D2	R238 E4	R266 D5	R291 A13
L203 A4		D227 C14	C213 H4	C236 B12		R213 E2	R239 E4	R267 A6	R292
L204 B5		D228 C14	C214 H4	C237 C13		R214 E2	R241 E4	R268 A6	R293 D13
	D200 E5	D229 B14	C215	C238 C13		R215 F2	R242 E4	R269 A7	R294 D14
	D201 F2	D231 D14	C216 F2			R216 G2	R243 F4	R271 A7	R295 D14
Q201 F2	D202 B13	D232 D14	C217 F2	C240 A8		R217 G2	R244 F4	R272 C7	R296 D15
Q202 A7	D209 E5	D233 A13	C218 B7	C241 C13		R218 H2	R245 F4	R273 C7	R297 D15
	D211 E5	D234 D12	C219 B6	C242 C13		R219 B2	R246 F4	R274 A8	R298 A13
SI201 C14	D212 F5	D235 G6	C220 G2	C243 A14		R220 E6	R247 F4	R275 A8	R299 A13
SI202 A14	D213 F5		C221 C7	C244 B14		R221 B2	R248 G4	R276 C9	
	D210 E5		C222 C7	C245 E12		R222 F2	R249 C4	R277 A9	
	D230 E5					R223 G2	R251 G4		
						R224 G2			

CR16 0.2W (KSW0204 DIN)
CR37 0.5W (KSW0411 DIN)
SFR16T (MSW0204 DIN)
CR25 0.33W (KSW0207 DIN)
CR52 0.67W (KSW0617 DIN)
SFR25H 0.6W (MSW0207 DIN)

LOW FLAMMABILITY
METAL OXYDE
SAFETY RESISTOR

CAPACITOR

ELECTROLYTIC
CERAMIC
TANTALUM ELECTROLYTIC
MULTILAYER
FOIL
POLYPROPYLEN (KS-KP)

VOLTAGES ARE MEASURED WITH 220V
DC-VOLTAGES ARE MEASURED AGAINST GROUND

AM 999KHZ,1MV 30% MODULATION
FM 1MV RF ,98MHZ, 1KHZ 40KHZ DEVIATION/STEREO
MW
LW
AM AF
FM AF
FM WIDE
FM NARROW
RDS 57KHZ FMOD +/-2KHZ HUB

ATTENTION!
OBSERVE MOS COMPONENTS HANDLING INSTRUCTIONS WHEN SERVICING!

ABSOLUTELY NECESSARY FOR THE SAFETY OF THE SET. THESE COMPONENTS MEET THE SAFETY REQUIREMENTS ACCORDING TO VDE OR IEC. RESP AND MUST BE REPLACED BY PARTS OF SAME SPECIFICATION ONLY

MEASUREMENT POINT

ALIGNMENT POINT

TOP VIEW

BC327
BC548
BC558
C B E

BC368
E C B

LC7217 MOS
LA3401
LA1266
MC68HC11A8 MOS
RC4560 MOS
1

BF240
C E B

2SK544E
G S D

KV1310
A C A

2SC1047C
E C B

BF982
G2
G1
D
S

SVC321SP
C A

2SK30
S G D

78M05
7812
IN 1
2
OUT 3

3 2 1
07202-
19202-
5 4

100ER
10ER 1ER

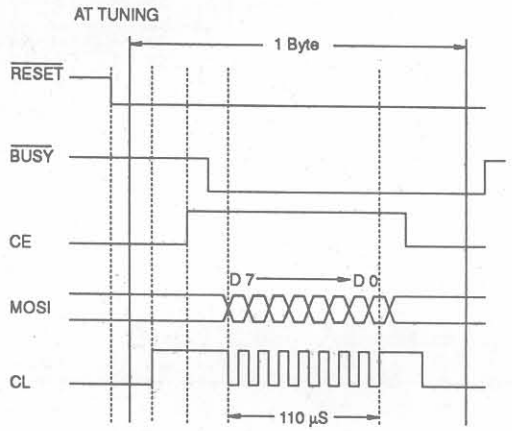
100ER
10ER 1ER

COLOUR CODE FOR FILTERS

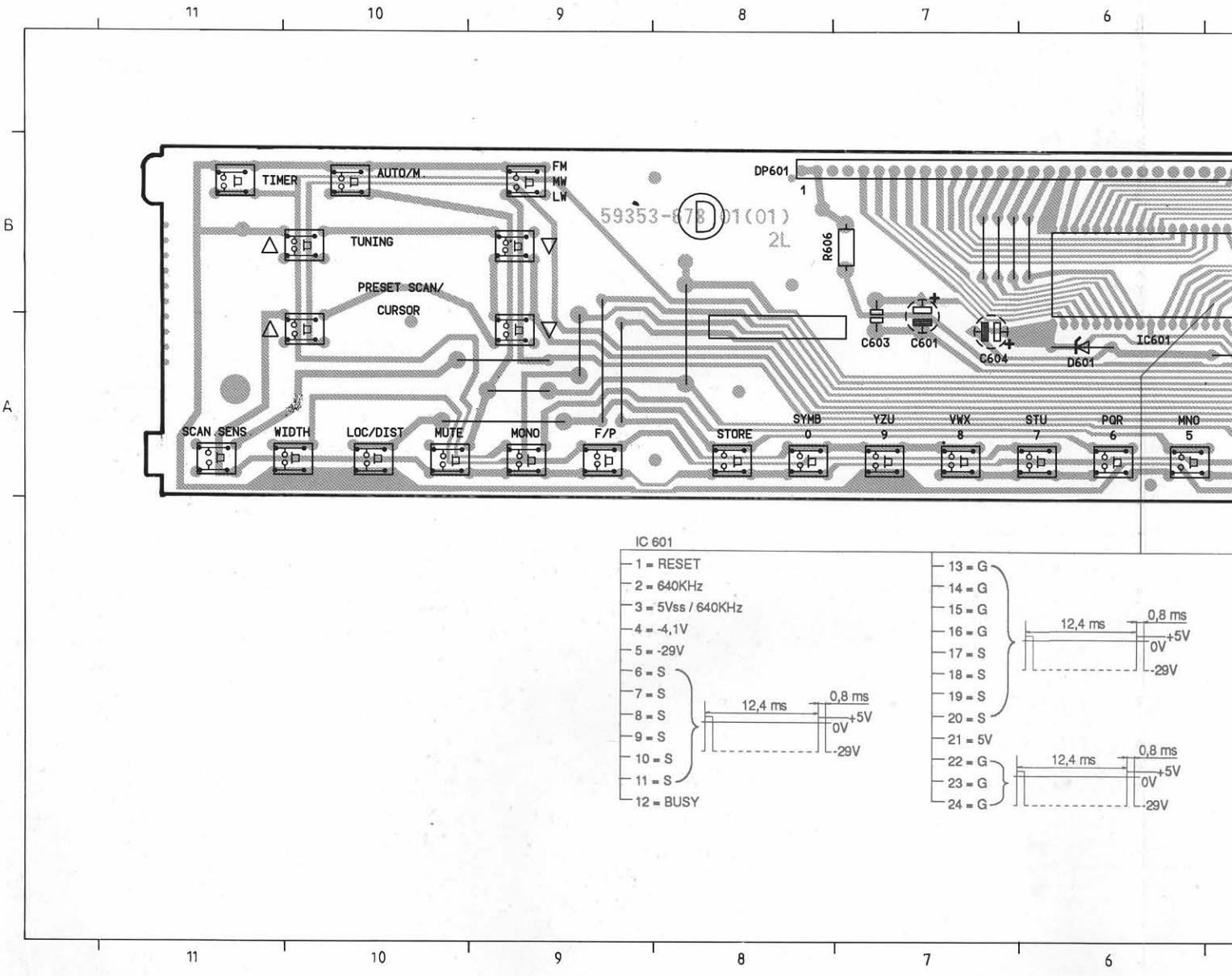
OPERATI

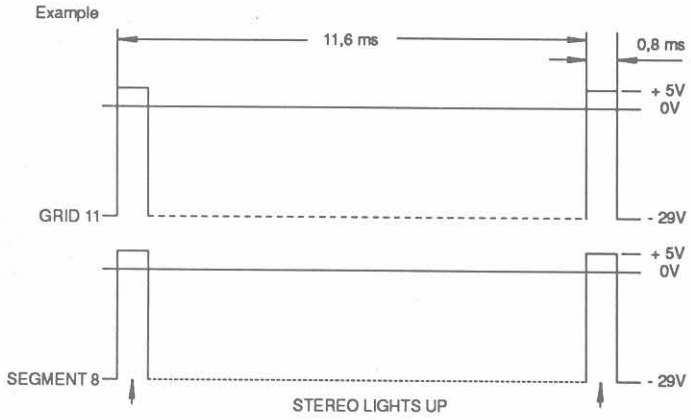
B

A

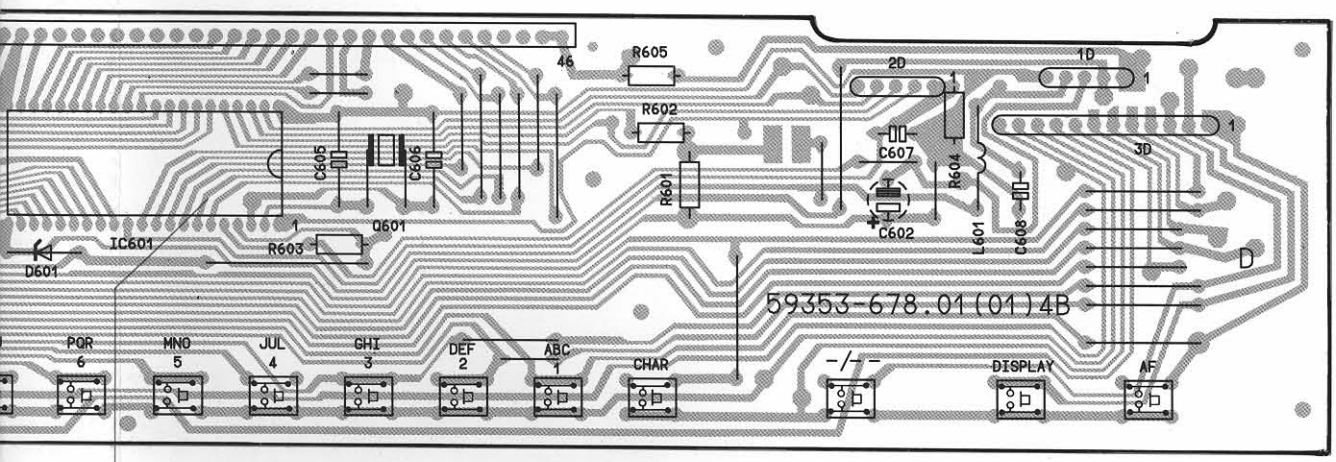


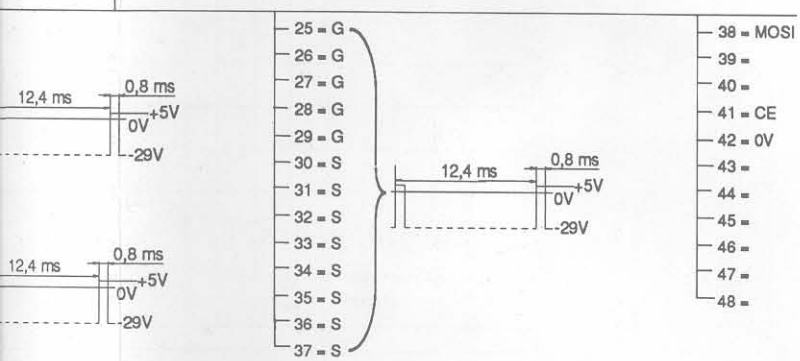
OPERATING PANEL





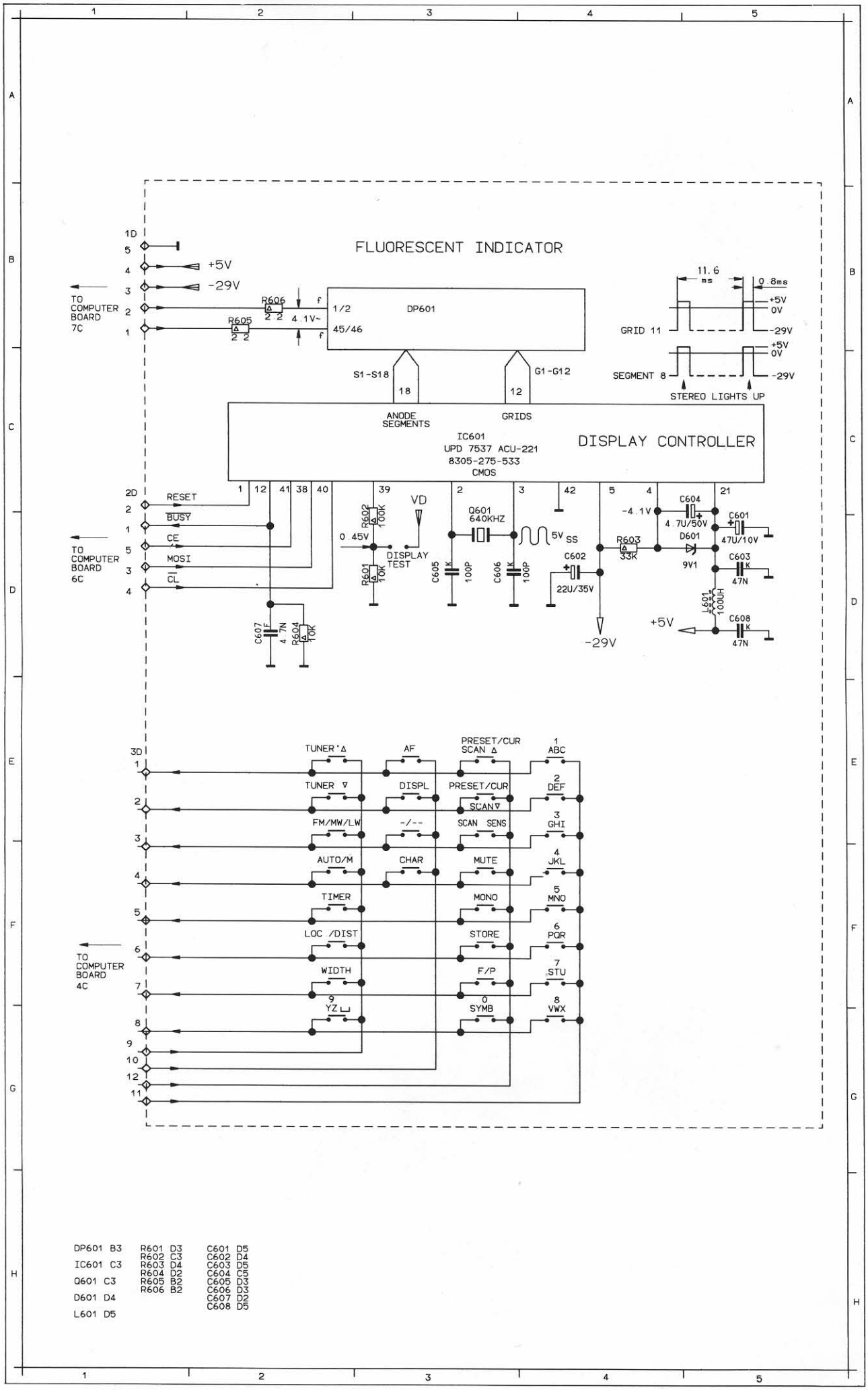
1 D	B 2
2 D	B 2
3 D	B 1
C 601	A 7
C 602	B 2
C 603	A 7
C 604	A 7
C 605	B 5
C 606	B 5
C 607	B 2
C 608	B 2
D 601	A 6
DP 601	B 8
IC 601	B 6
L 601	B 2
Q 601	B 5
R 601	B 3
R 602	B 4
R 603	A 5
R 604	B 2
R 605	B 4
R 606	B 8





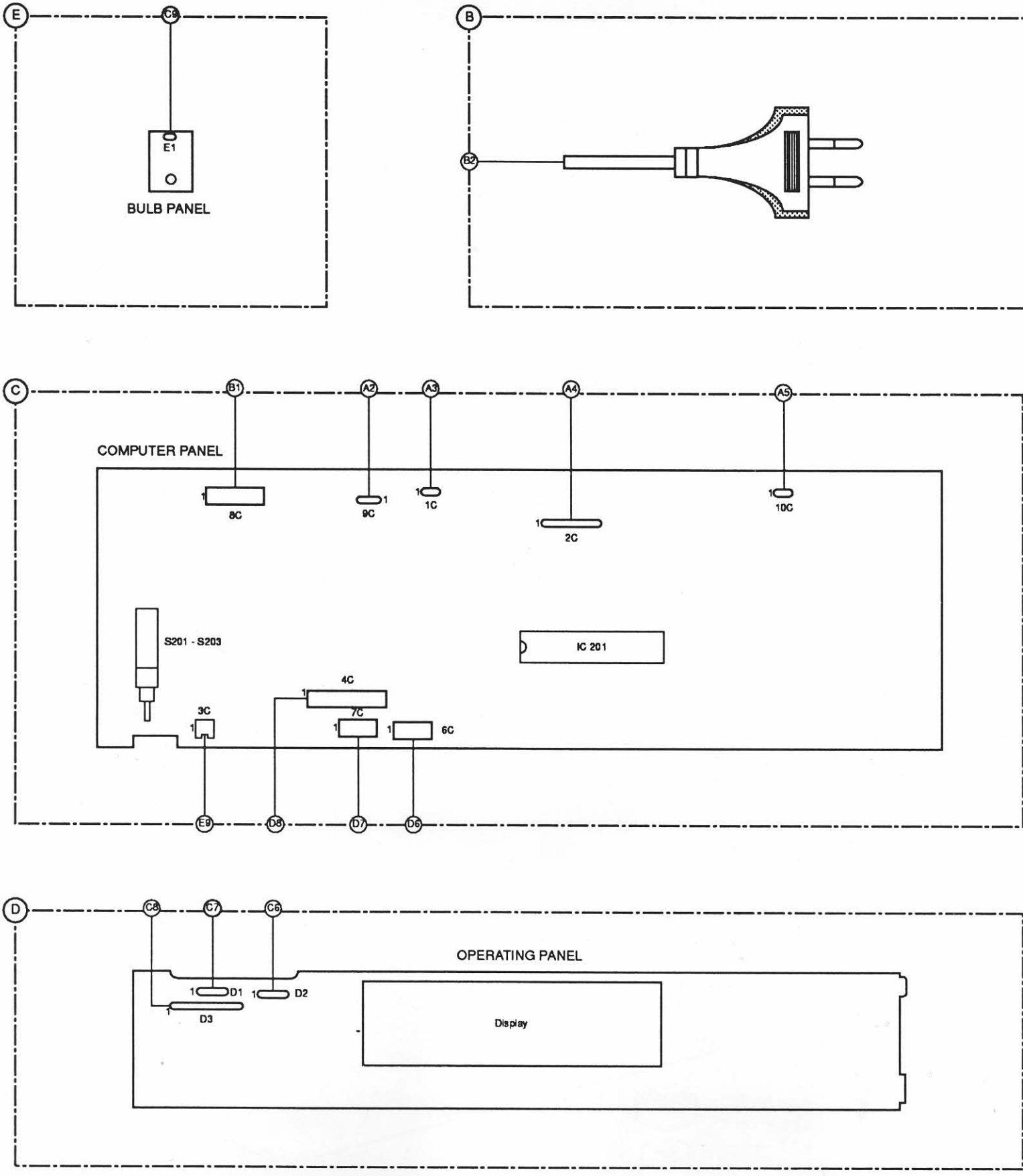
solder side

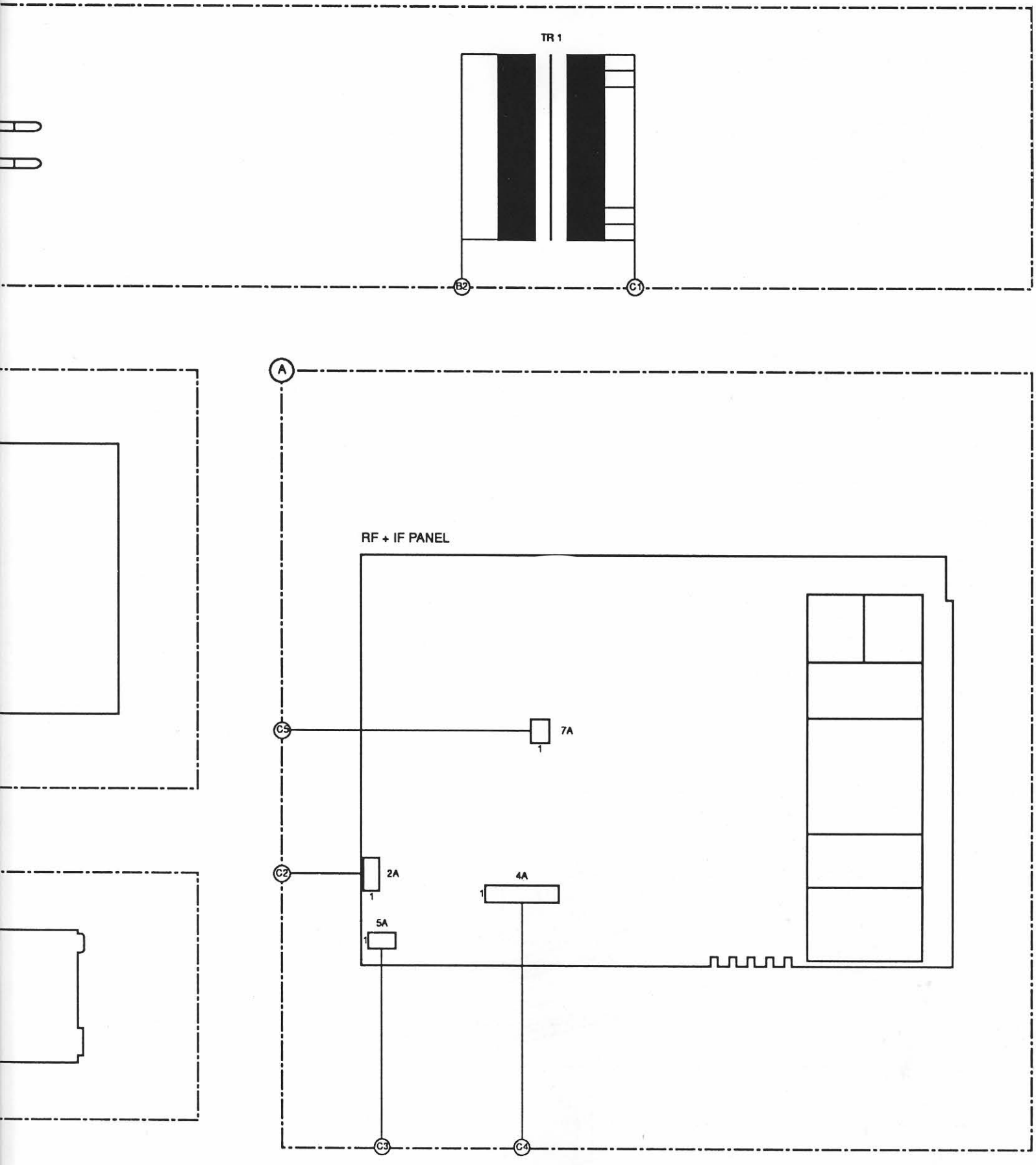
OPERATING CIRCUIT DIAGRAM



DP601 B3	R601 D3	C601 D5
IC601 C3	R602 C3	C602 D4
Q601 C3	R603 D4	C603 D5
D601 D4	R604 D2	C604 C5
L601 D5	R605 B2	C605 D3
	R606 B2	C606 D3
		C607 D2
		C608 D5

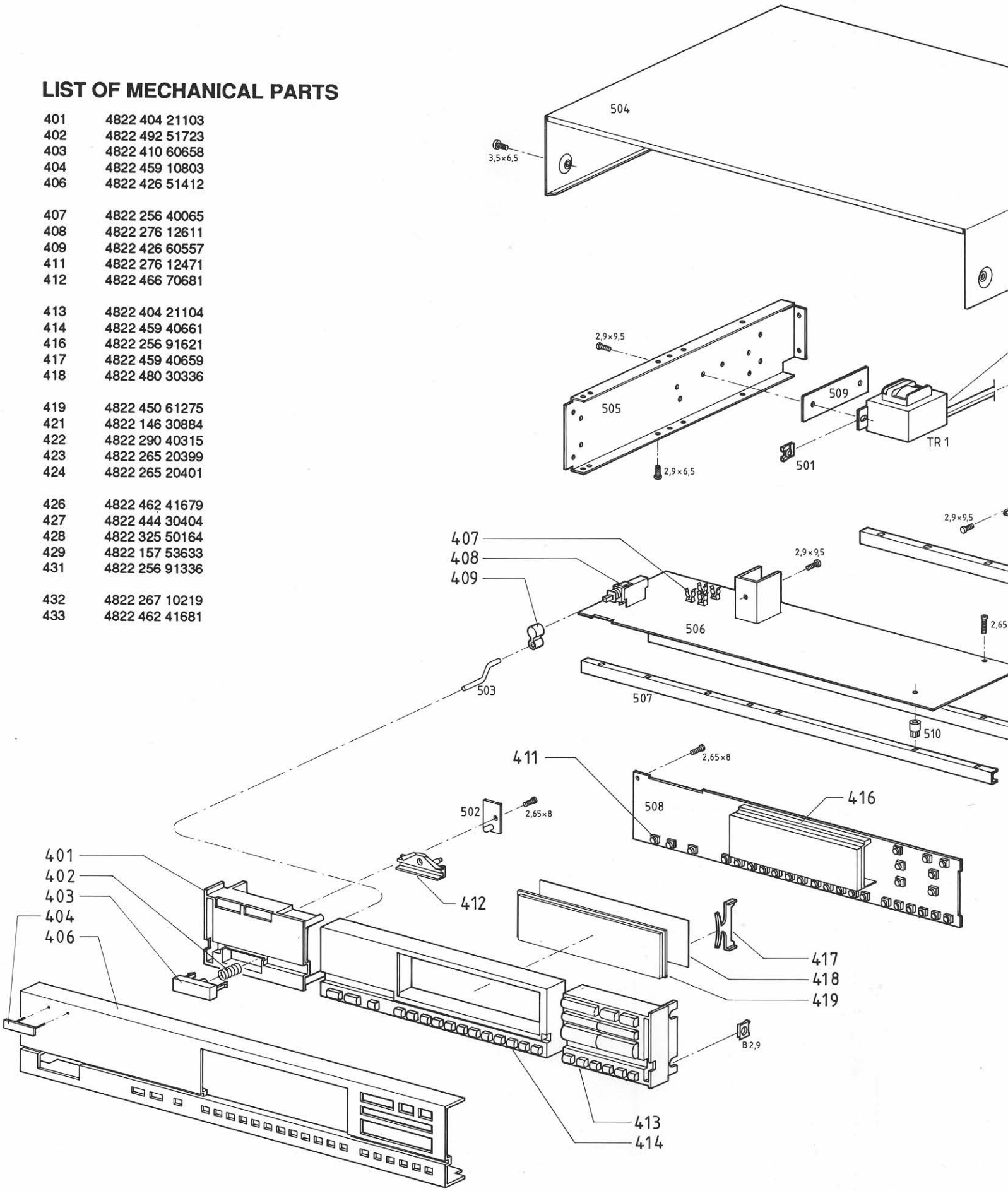
WIRING DIAGRAM

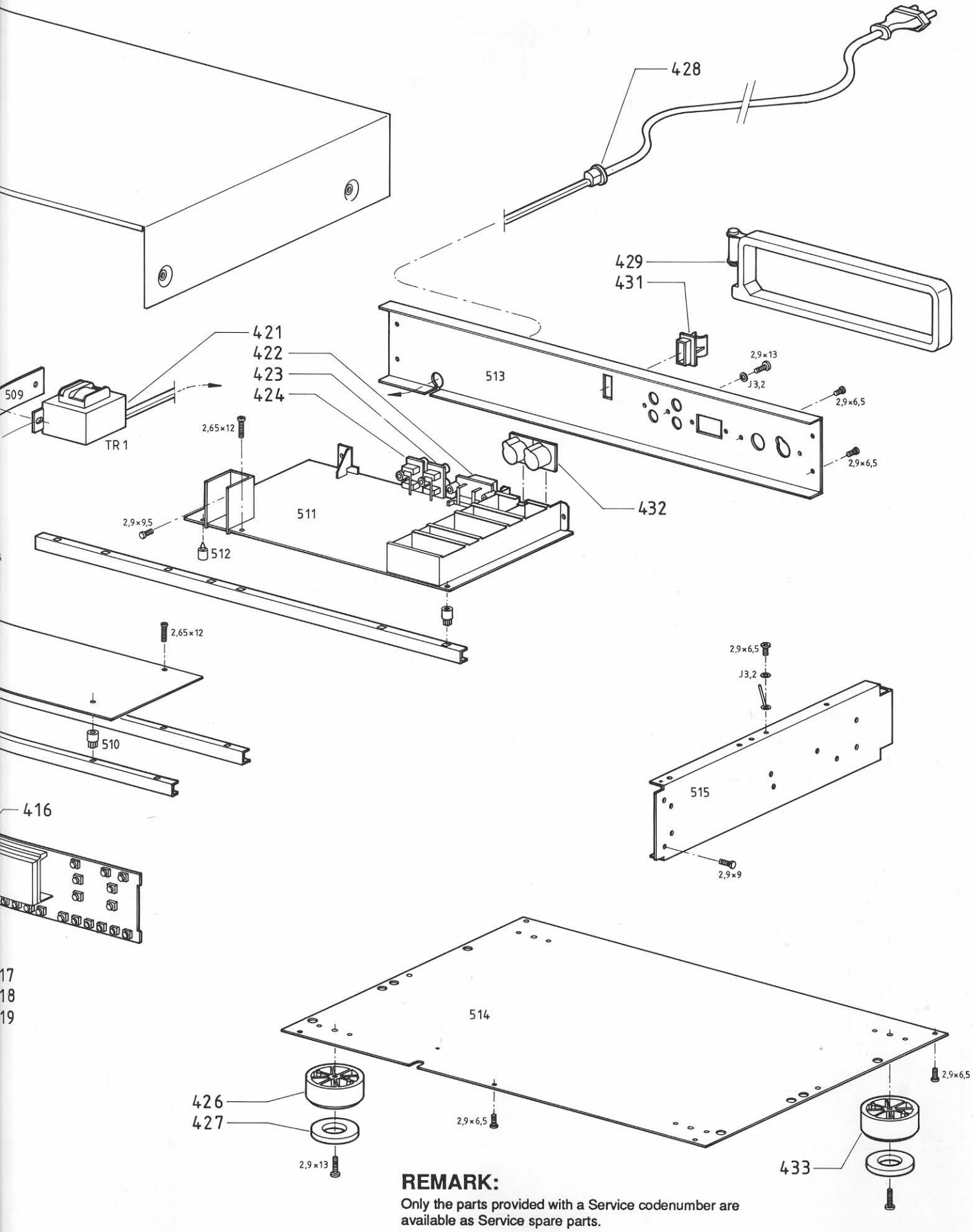



TR 1
B2
C1
A
RF + IF PANEL
C5
7A
1
C2
2A
1
4A
1
5A
1
C3
C4

LIST OF MECHANICAL PARTS

401	4822 404 21103
402	4822 492 51723
403	4822 410 60658
404	4822 459 10803
406	4822 426 51412
407	4822 256 40065
408	4822 276 12611
409	4822 426 60557
411	4822 276 12471
412	4822 466 70681
413	4822 404 21104
414	4822 459 40661
416	4822 256 91621
417	4822 459 40659
418	4822 480 30336
419	4822 450 61275
421	4822 146 30884
422	4822 290 40315
423	4822 265 20399
424	4822 265 20401
426	4822 462 41679
427	4822 444 30404
428	4822 325 50164
429	4822 157 53633
431	4822 256 91336
432	4822 267 10219
433	4822 462 41681





REMARK:

Only the parts provided with a Service codenumber are available as Service spare parts.