

# TS-570D TS-570D

## CIRCUIT DESCRIPTION

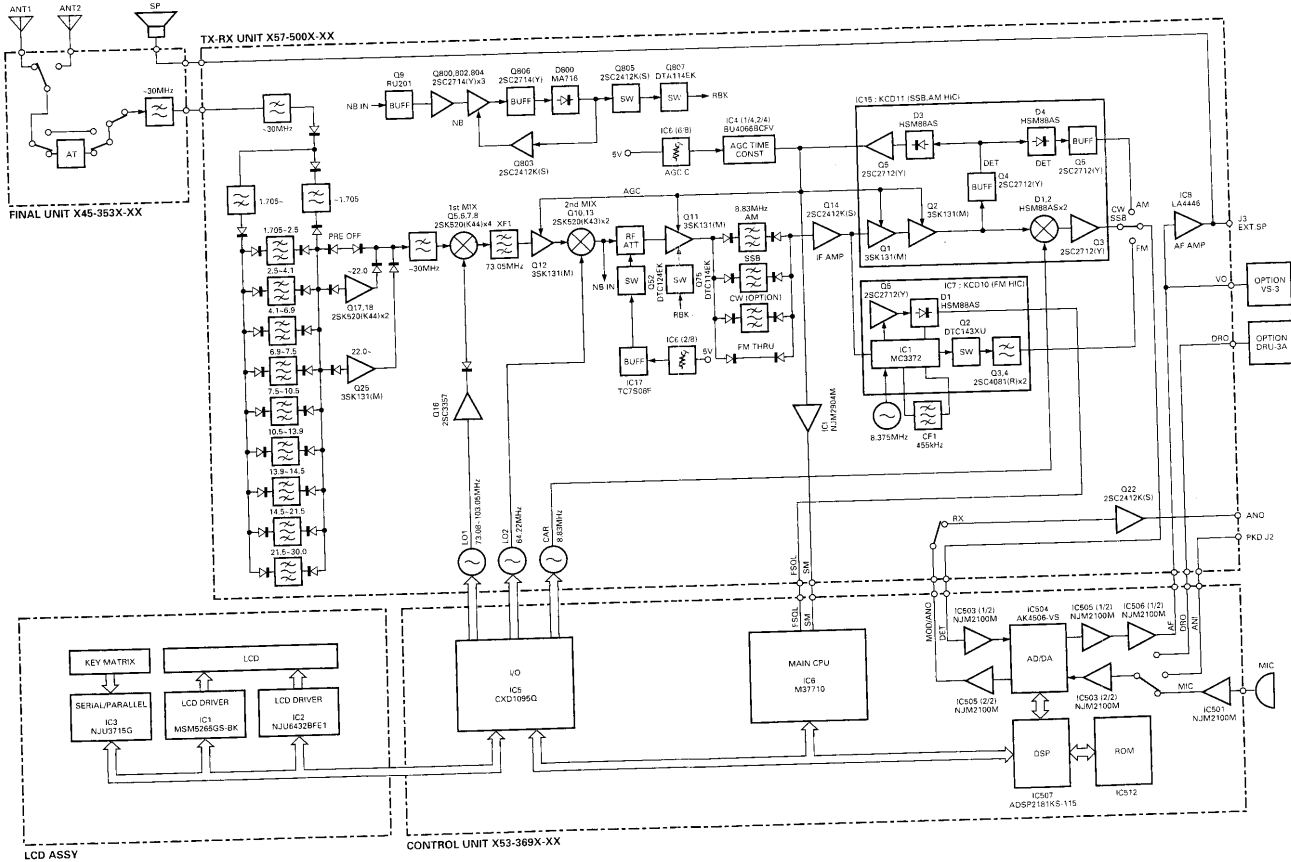


Fig. 5 Receiver section block diagram





# TS-570D

## CIRCUIT DESCRIPTION

### Various Control Circuits by the Digital-to-Analog Converter

The circuits whose signal level was varied directly with a volume control or adjusted with a semi-fixed volume can be controlled by a microcomputer by using an eight-channel digital-to-analog converter.

The digital-to-analog converter (M62363FP) is a ladder-type variable attenuator having independent eight-channel inputs. It is used to output an output voltage by entering a fixed voltage or used as a volume by entering the control signal directly. The table below lists controls in each channel.

Ch No.	Input pin No.	Output pin No.	Signal name	Control	Output destination
1	1	2	POC	Reference voltage or power control	IC16 ALC circuit differential input
2	4	3	IFATT1	21.5 to 30MHz IF gain reduction	IC17 AND gate
3	9	10	NC	Not used	
4	12	11	PRO	Reflected wave protection adjustment	IC16 protection input
5	13	14	TGC	Gain correction between bands and during power control	IC5 operational amplifier
6	16	15	AGC	AGC reference voltage adjustment	AGC circuit
7	21	22	ALC	ALC reference voltage adjustment	IC5 operational amplifier
8	24	23	CAR	CAR level adjustment	IC2 balanced modulator

Table 4 Digital-to-analog converter control

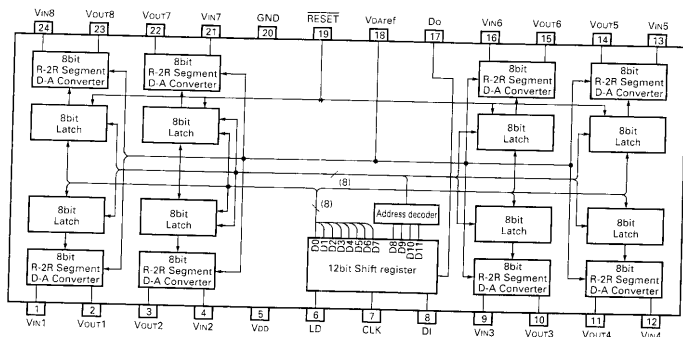


Fig. 13 M62363FP block diagram

# TS-570D

## CIRCUIT DESCRIPTION

### Digital Control

#### Overview

The TS-570D digital control circuit has multiple chips centered around the main CPU (IC6: M377010EFB), and consists of an electronic keyer microcomputer (IC3: UPD75004GB-746), an extended I/O (IC5: CXD10950) and DSP (IC507: ADSP2181KS-115). A block diagram of digital control is shown below.

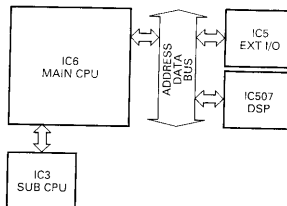


Fig. 14 Digital control section block diagram

#### Address Control Circuit

The main CPU operates in the single-chip mode using the internal ROM and RAM. It transfers data from or to the extended I/O and DSP through external address and data buses.

#### Encoder Circuit

The main encoder is a magnetic rotary encoder, and the MULTI and RIT encoders are contact-type rotary encoders.

The encoder pulses are read and processed directly by the main CPU.

#### System Reset and RAM Backup

The voltage monitor circuit (Q5, Q8, D6, R8) monitors the power supply voltage. If the voltage drops, the circuit outputs a low signal to the INT0 port of the main CPU to stop operation. At the same time, D6 switches the RAM backup power to a lithium battery.

If the power supply voltage becomes normal, a high signal is input to the INT0 port, the main CPU is initialized by the reset signal generation IC (IC4: PST9121NR) after the time constant set by C12 and C13, and the operation resumes.

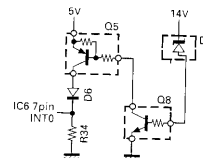


Fig. 15 Reset, backup circuits

#### Analog Signal Input

The main CPU incorporates a four-channel analog-to-digital (A/D) converter and a multiplexer (IC7 and IC8: TC4052BF) for entering 16-channel analog signals. Incoming analog signals are converted to digital values by the main CPU, which are used as digital data.

#### Display

The TS-570D uses a positive LCD and a semi-transparent display. The LCD is lighted with half a duty by the LCD driver.

#### PLL and DDS Data

The TS-570D has two PLLs and two DDSs in the PLL unit of the TX-RX unit. The main CPU sends data to the PLL ICs and DDS ICs according to the displayed frequency. The PLL ICs output unlock (UNL) signals. If one of the PLLs unlocks, the display shows that the PLL is unlocked.

#### AT Control

The AT controlled by entering amplitude difference data (AMD) and phase difference data (PHD) to the main CPU, controlling the serial/parallel converter in the final unit, and changing the C capacity. The main CPU stores the serial/parallel converter data in each band, and whenever the frequency changes, the CPU outputs the data automatically to optimize antenna matching. The details of control of AMD terminal input and PMD terminal input are given below.

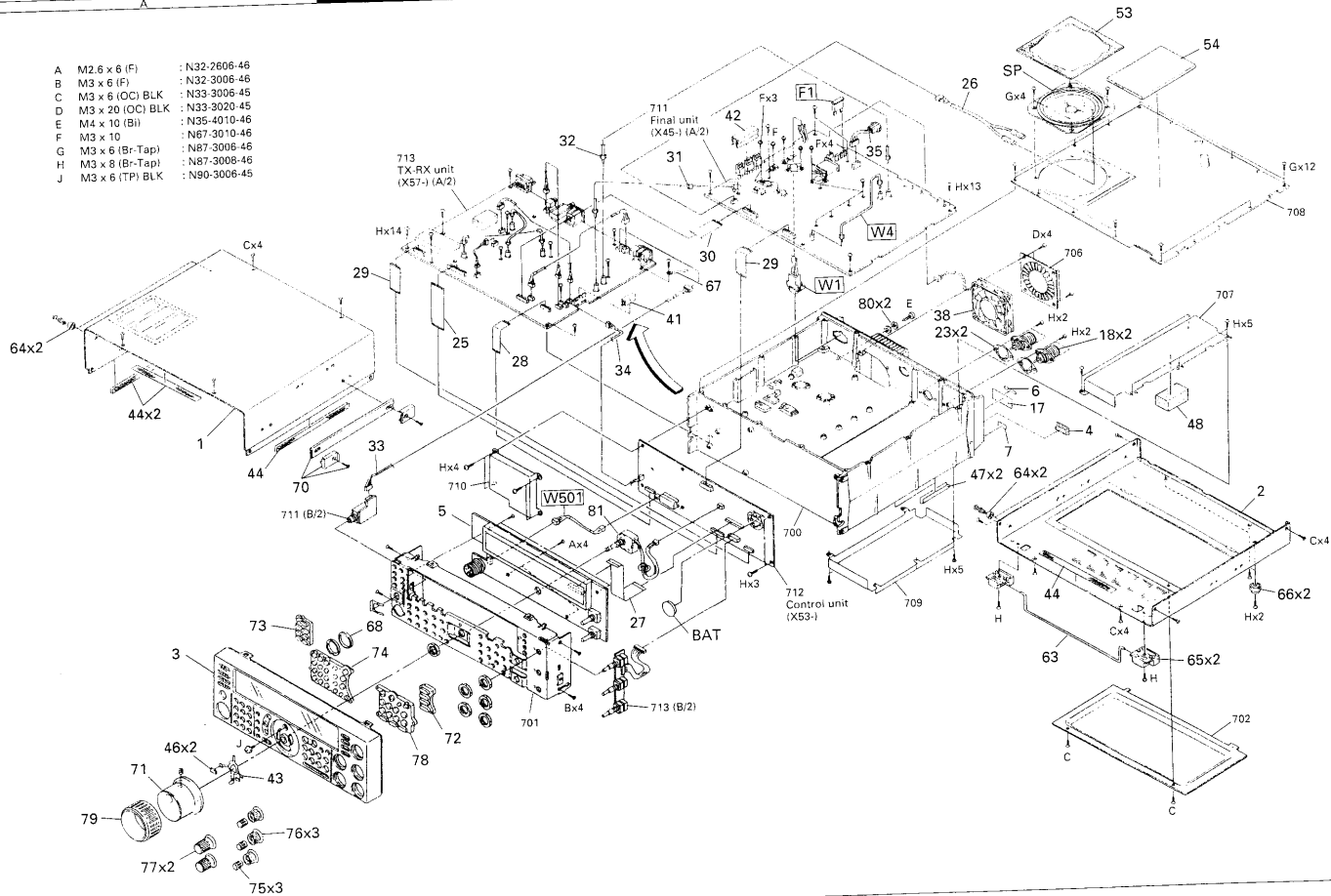
When AMD input is low, the CO count decreases.  
When AMD input is high, the CO count increases.  
When PMD input is low, the CI count decreases.  
When PMD input is high, the CI count increases.



# TS-570D TS-570D

## EXPLODED VIEW

- |   |                  |               |
|---|------------------|---------------|
| A | M2.6 x 6 (F)     | : N32-2606-46 |
| B | M3 x 6 (F)       | : N32-3006-46 |
| C | M3 x 6 (OC) BLK  | : N33-3006-45 |
| D | M3 x 20 (OC) BLK | : N33-3020-45 |
| E | M4 x 10 (BI)     | : N35-4010-46 |
| F | M3 x 10          | : N67-3010-46 |
| G | M3 x 6 (Br-Tap)  | : N87-3006-46 |
| H | M3 x 8 (Br-Tap)  | : N87-3008-46 |
| J | M3 x 6 (TP) BLK  | : N90-3006-45 |



Parts with the exploded numbers larger than 700 are not supplied.

# PACKING

## TS-570D

## TS-570D

# ADJUSTMENT

### Required Test Equipment

#### 1. DC Voltmeter (DC V.M)

- 1) Input resistance : More than  $1M\Omega$
  - 2) Voltage range : 1.5 to 1000V AC/DC
- Note :** A high-precision multimeter may be used. However, accurate readings can not be obtained for high-impedance circuits.

#### 2. DC Ammeter

- 1) Current range : 100mA, 1.5A, 15A, high-precision ammeter may be used.

#### 3. RF VTVM (RF V.M)

- 1) Input impedance :  $1M\Omega$  and less than  $3pF$ , min.
- 2) Voltage range : 10mV to 300V
- 3) Frequency range : 10kHz to 500MHz

#### 4. AF Voltmeter (AF V.M)

- 1) Frequency range : 50Hz to 10kHz
- 2) Input resistance :  $1M\Omega$  or greater
- 3) Voltage range : 10mV to 30V

#### 5. AF Generator (AG)

- 1) Frequency range : 200Hz to 5kHz
- 2) Output : 1mV or less to 1V, low distortion

#### 6. AF Dummy Load (DM. SP)

- 1) Impedance :  $8\Omega$
- 2) Dissipation : 3W or greater

#### 7. Oscilloscope

Requires high sensitivity, and external synchronization capability (150MHz or greater).

#### 8. Sweep Generator (Sweep G.)

- 1) Center frequency : 50kHz to 90MHz
- 2) Frequency deviation : Maximum  $\pm 35kHz$
- 3) Output voltage : 100mV or greater

#### 9. Standard Signal Generator (SSG)

- 1) Frequency range : 50kHz to 50MHz
  - 2) Output :  $-133dBm/0.05\mu V$  to  $7dBm/500mV$
  - 3) Output impedance :  $50\Omega$
  - 4) AM and FM modulation can be possible
- Note :** Generator must be frequency stable.

#### 10. Frequency Counter (f. counter)

- 1) Minimum input voltage : 50mV
- 2) Frequency range : 150MHz or greater

#### 11. Noise Generator (Noise G.)

Must generate ignition noise containing harmonics beyond 30MHz

#### 12. RF Dummy Load

- 1) Impedance :  $150\Omega$  and  $50\Omega$
- 2) Dissipation : 150W or greater

#### 13. Linear Detector

- 1) Frequency range : 30MHz

#### 14. Power Meter

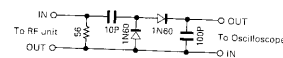
- 1) Impedance :  $50\Omega$
- 2) Dissipation : 300W continuous or greater
- 3) Frequency limits : 60MHz or greater

#### 15. Spectrum Analyzer

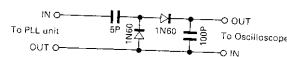
- 1) Frequency range : 100kHz to 110MHz or greater
- 2) Bandwidth : 1kHz to 3MHz

#### 16. Detector

- 1) For adjustment of BPF



- 2) For adjustment of PLL/VCO BPF



#### 17. Directional Coupler

#### 18. Monitor Receiver

R-1000 class

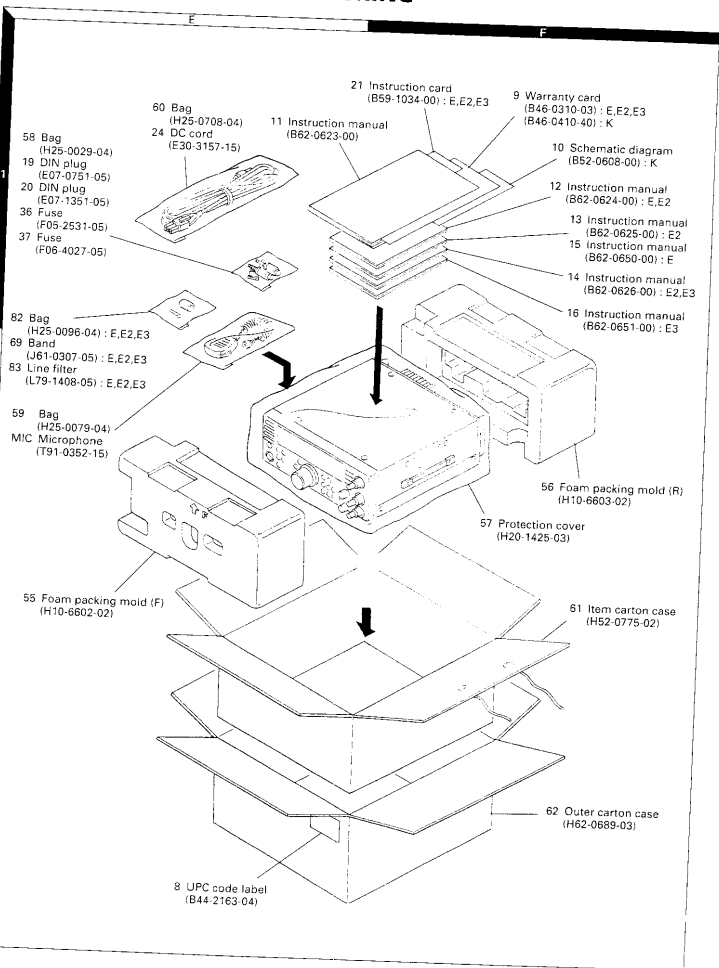
#### 19. Microphone

MC-43S or MC-60S8

#### 20. Tracking Generator

#### 21. Distortion Meter

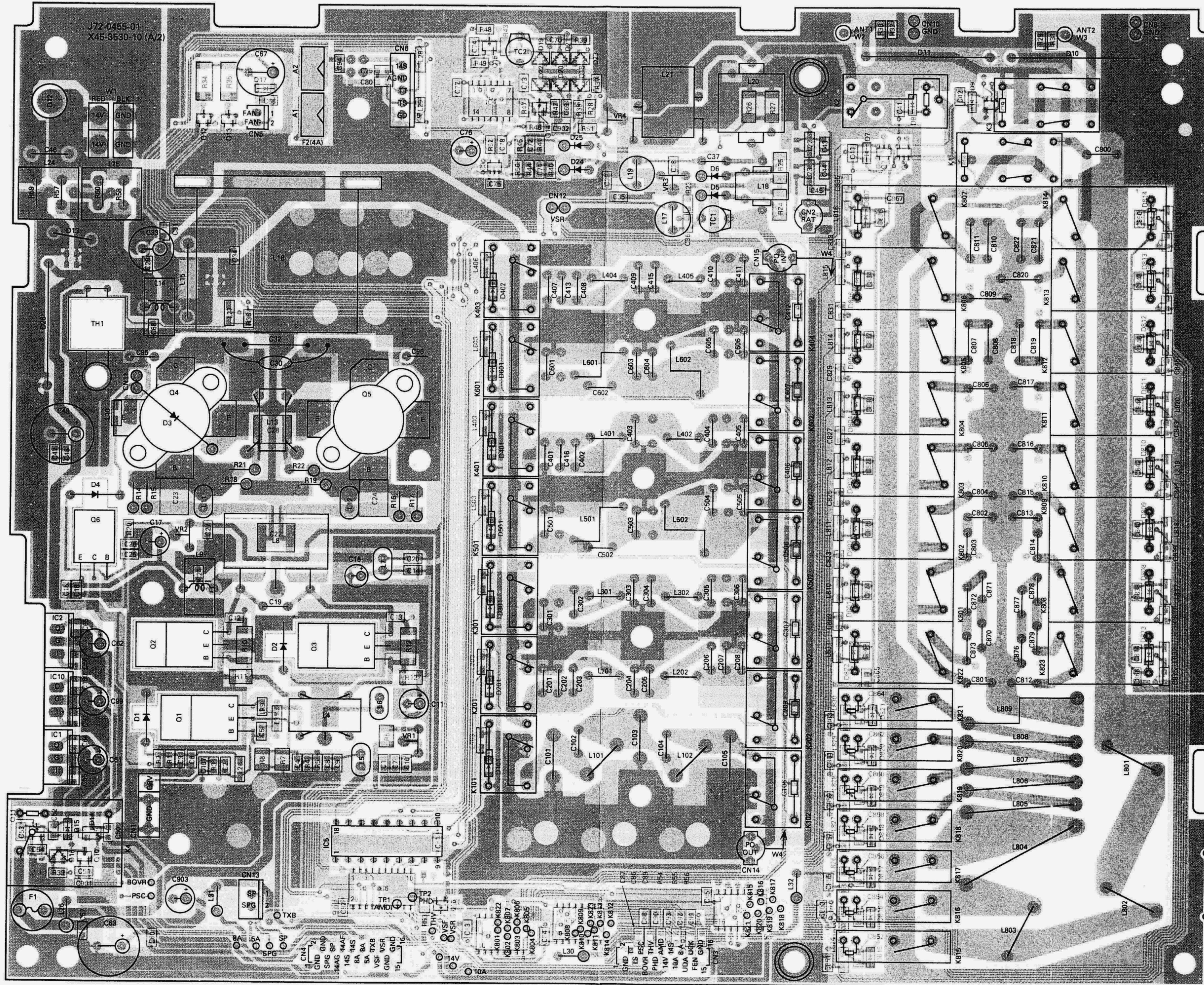
#### 22. Double Signal Pad (50 $\Omega$ )





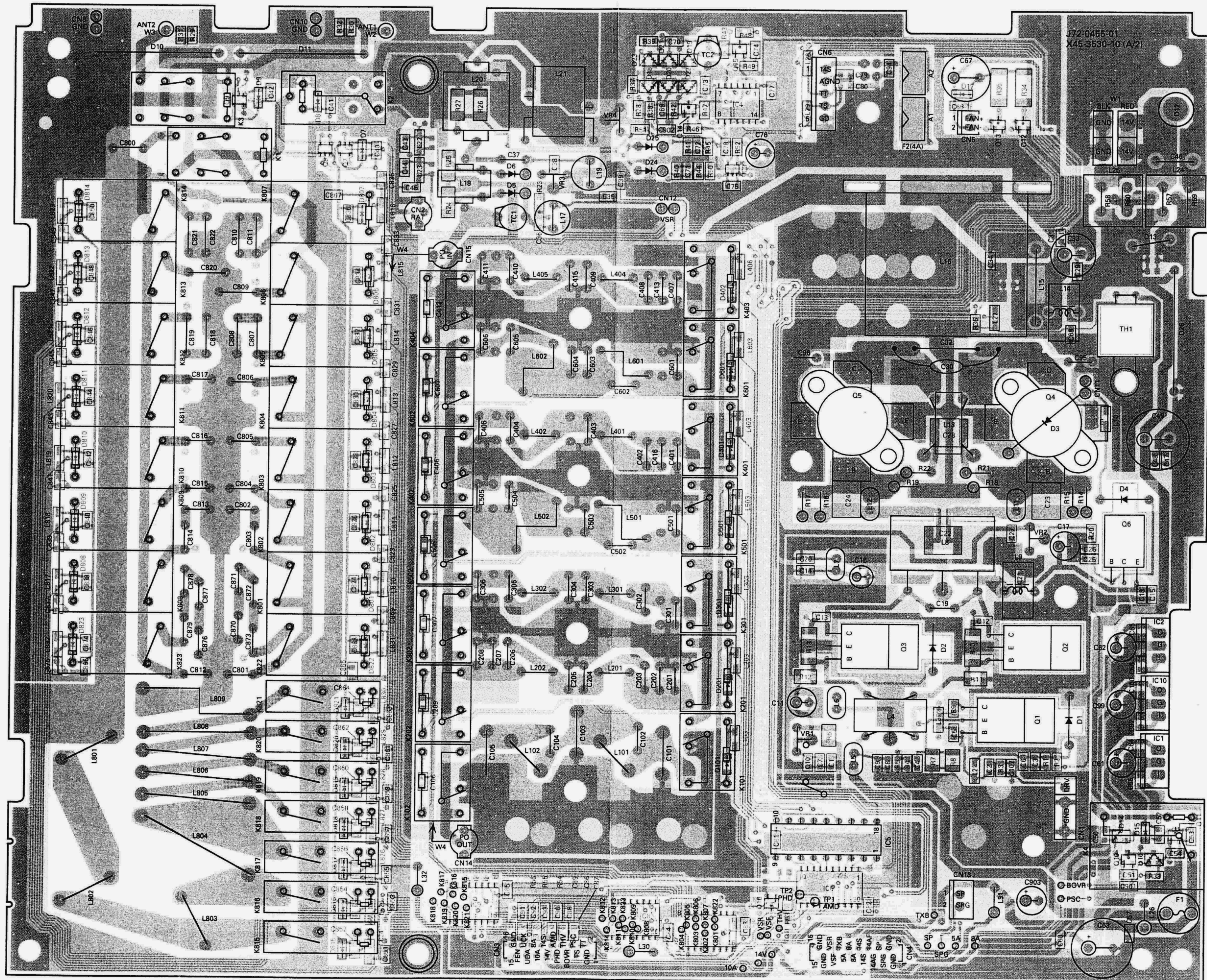
# TS-570D PC BOARD VIEWS

FINAL UNIT (X45-353X-XX) (A/2) Component side view 0-10 : K,M2 2-71 : E,E2,E3





FINAL UNIT (X45-353X-XX) (A/2) Foil side view 0-10 : K,M2 2-71 : E,E2,E3

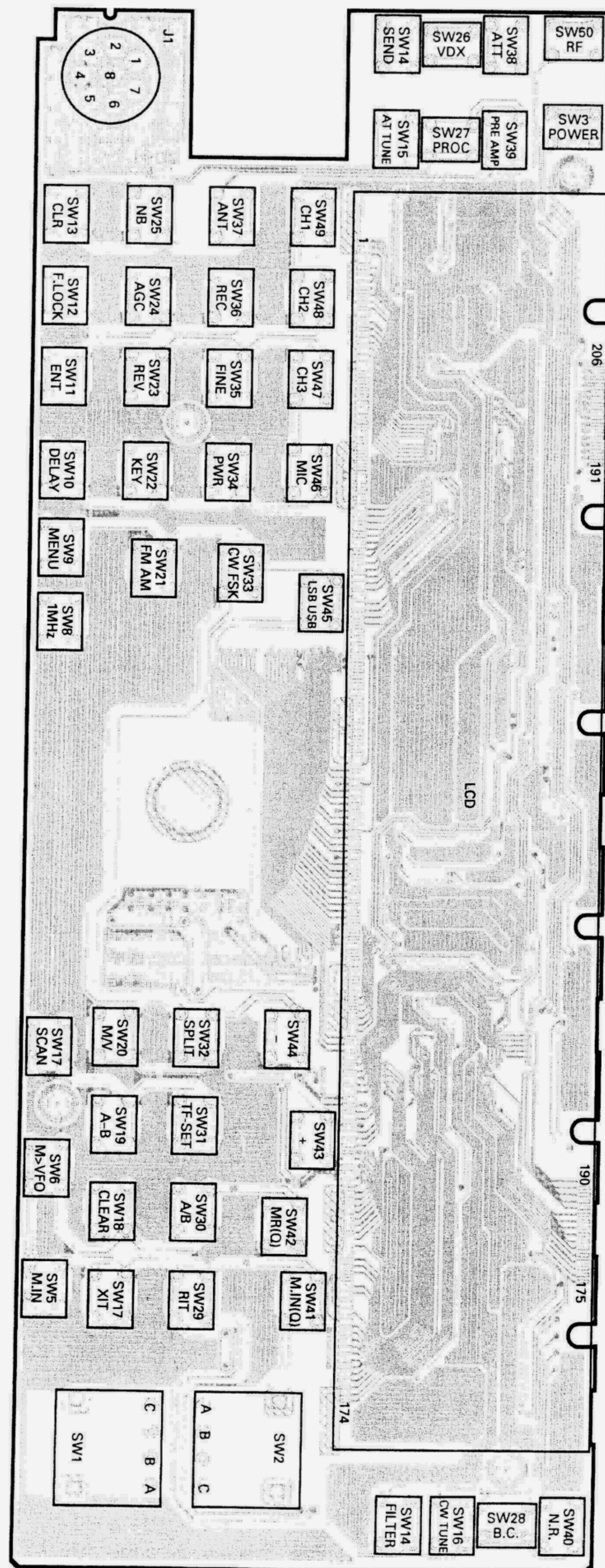


Component side  
 Foil side



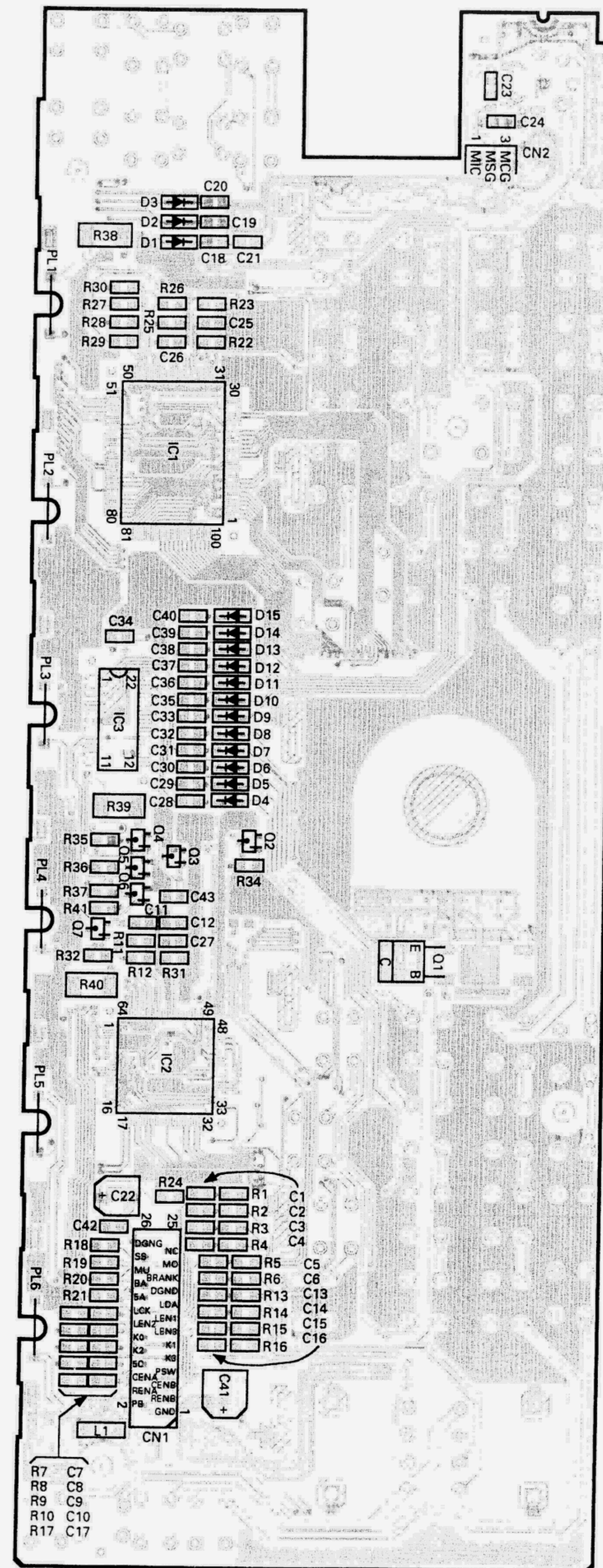
LCD ASSY (B38-0765-05)

Component side view

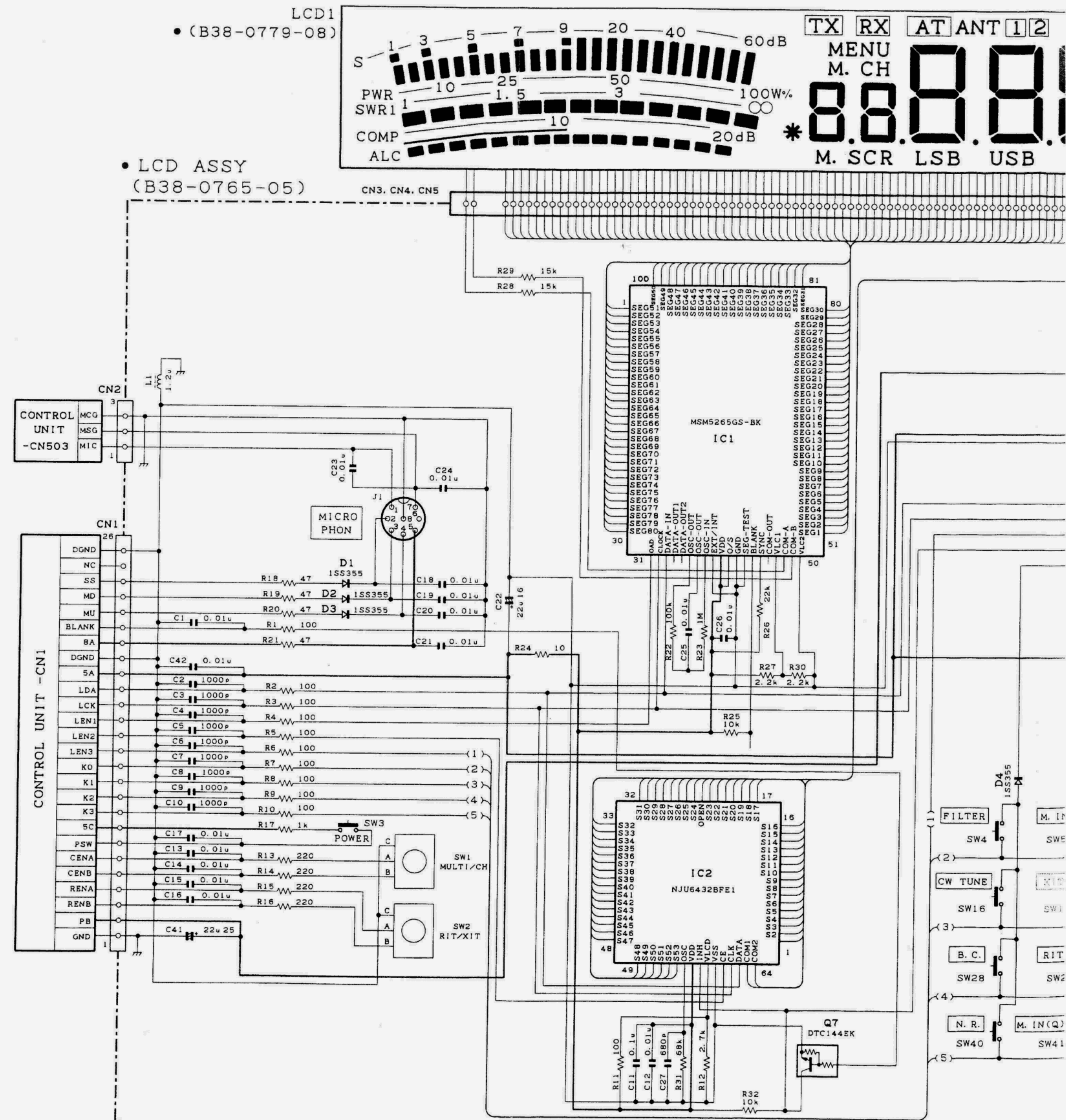


LCD ASSY (B38-0765-05)

Foil side view

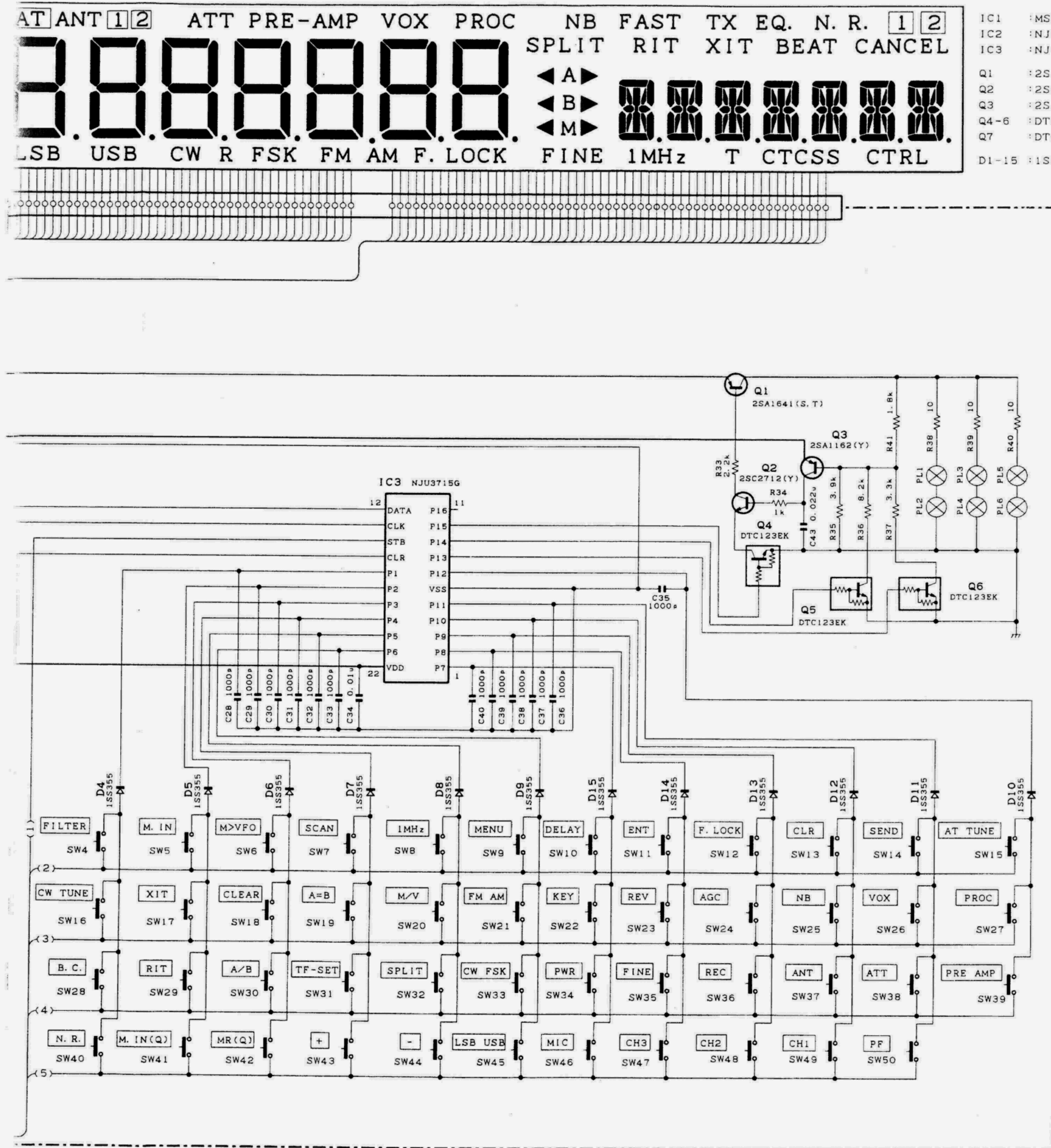


LCD ASSY (B38-0765-05)





# PC BOARD VIEWS / CIRCUIT DIAGRAM TS-570D



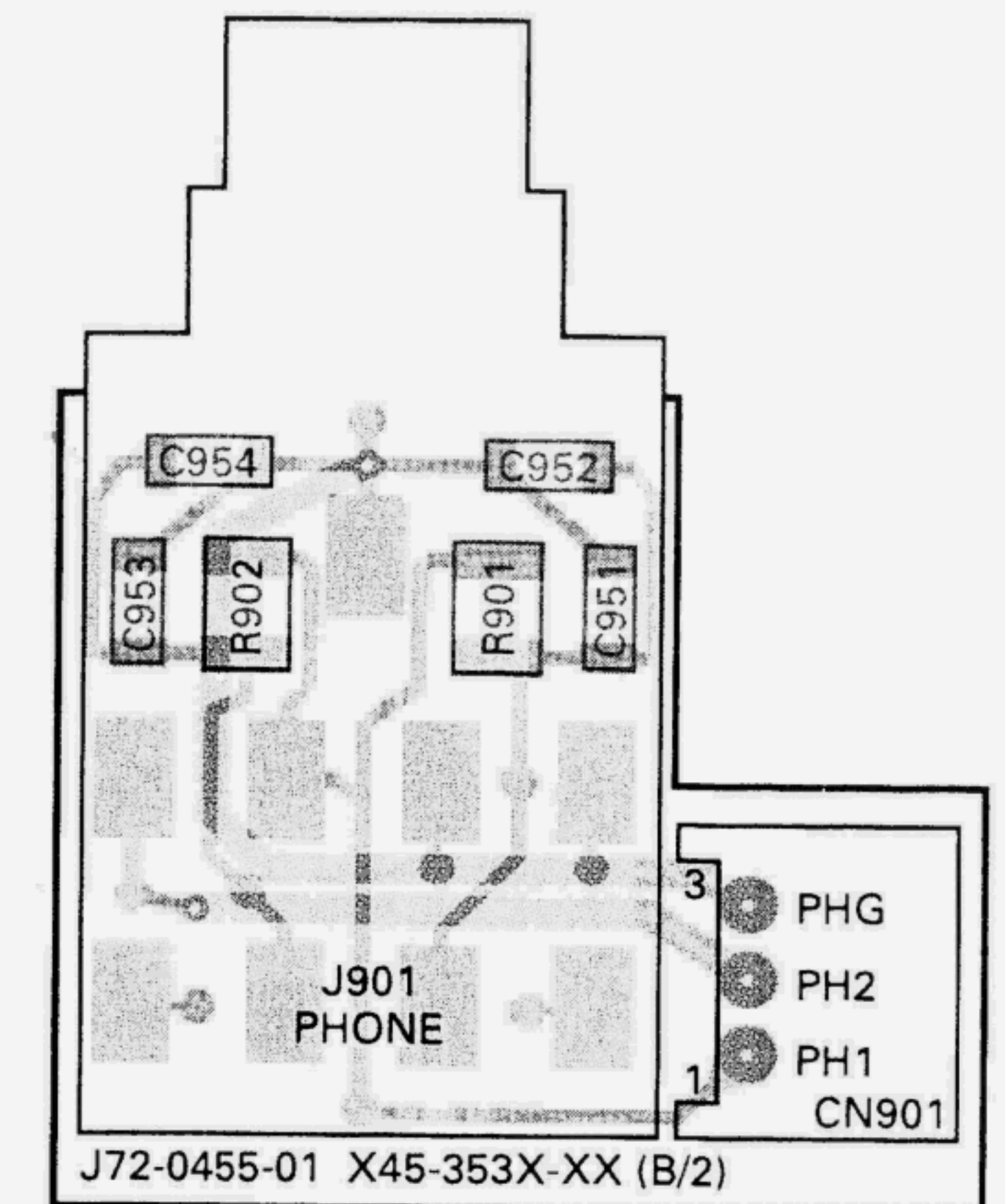
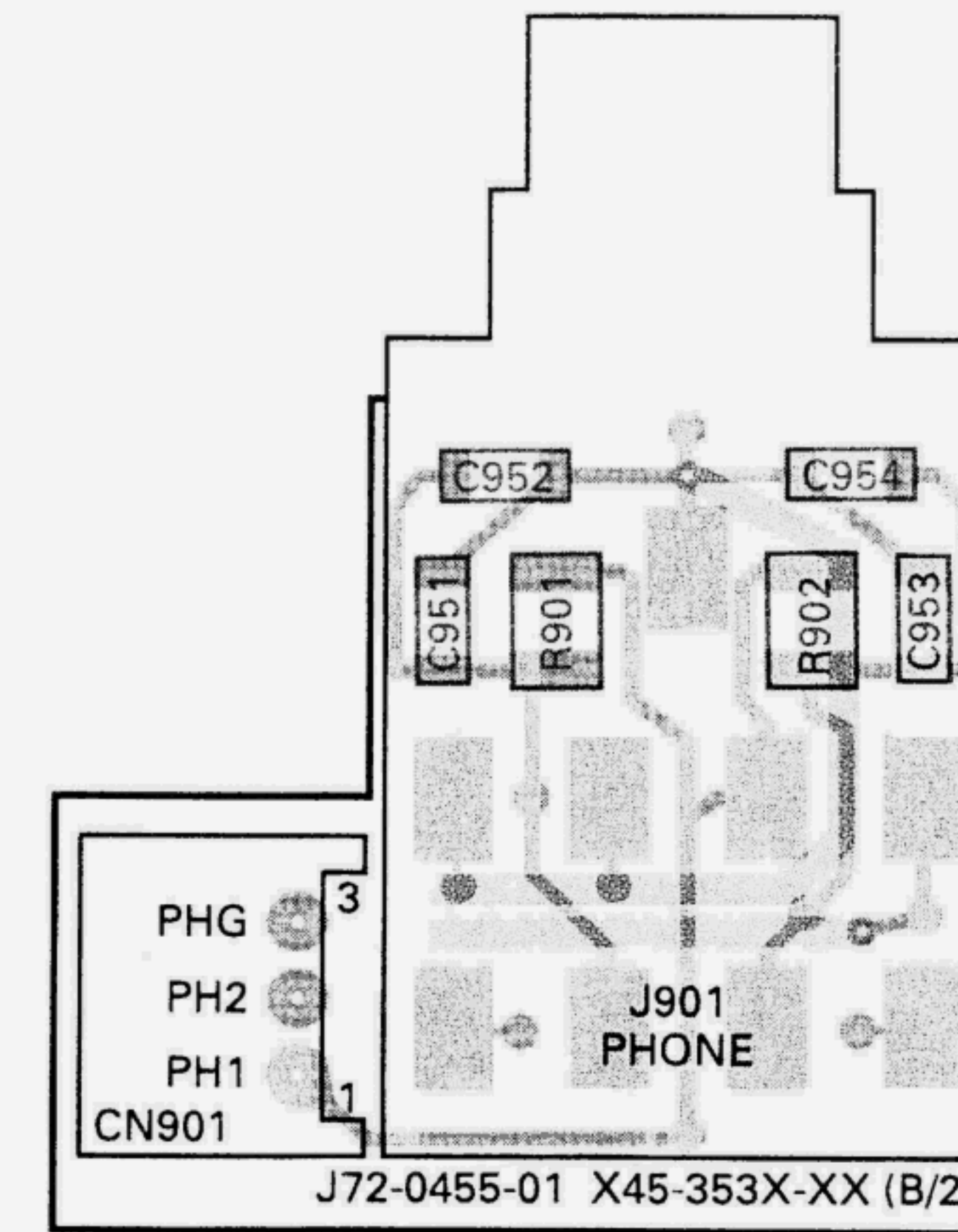
- IC1 : MSM5265GS-BK
- IC2 : NJU6432BFE1
- IC3 : NJU3715G
- Q1 : 2SA1641 (S. T)
- Q2 : 2SC2712 (Y)
- Q3 : 2SA1162 (Y)
- Q4-6 : DTC123EK
- Q7 : DTC144EK
- D1-15 : 1SS3355

## FINAL UNIT (X45-353X-XX) (B/2) : PHONE

0-10 : K,M2 2-71 : E,E2,E3

Component side view

Foil side view

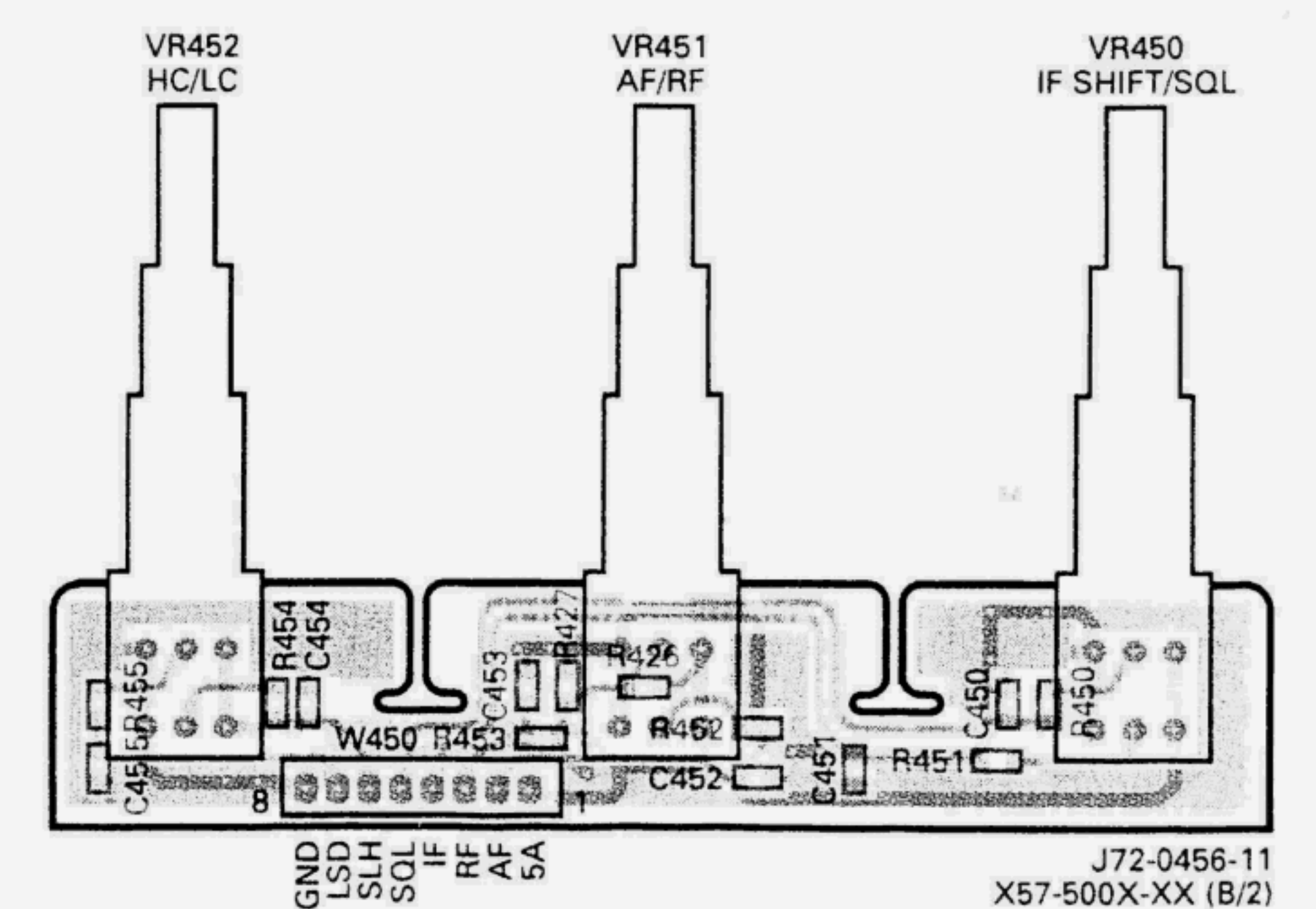
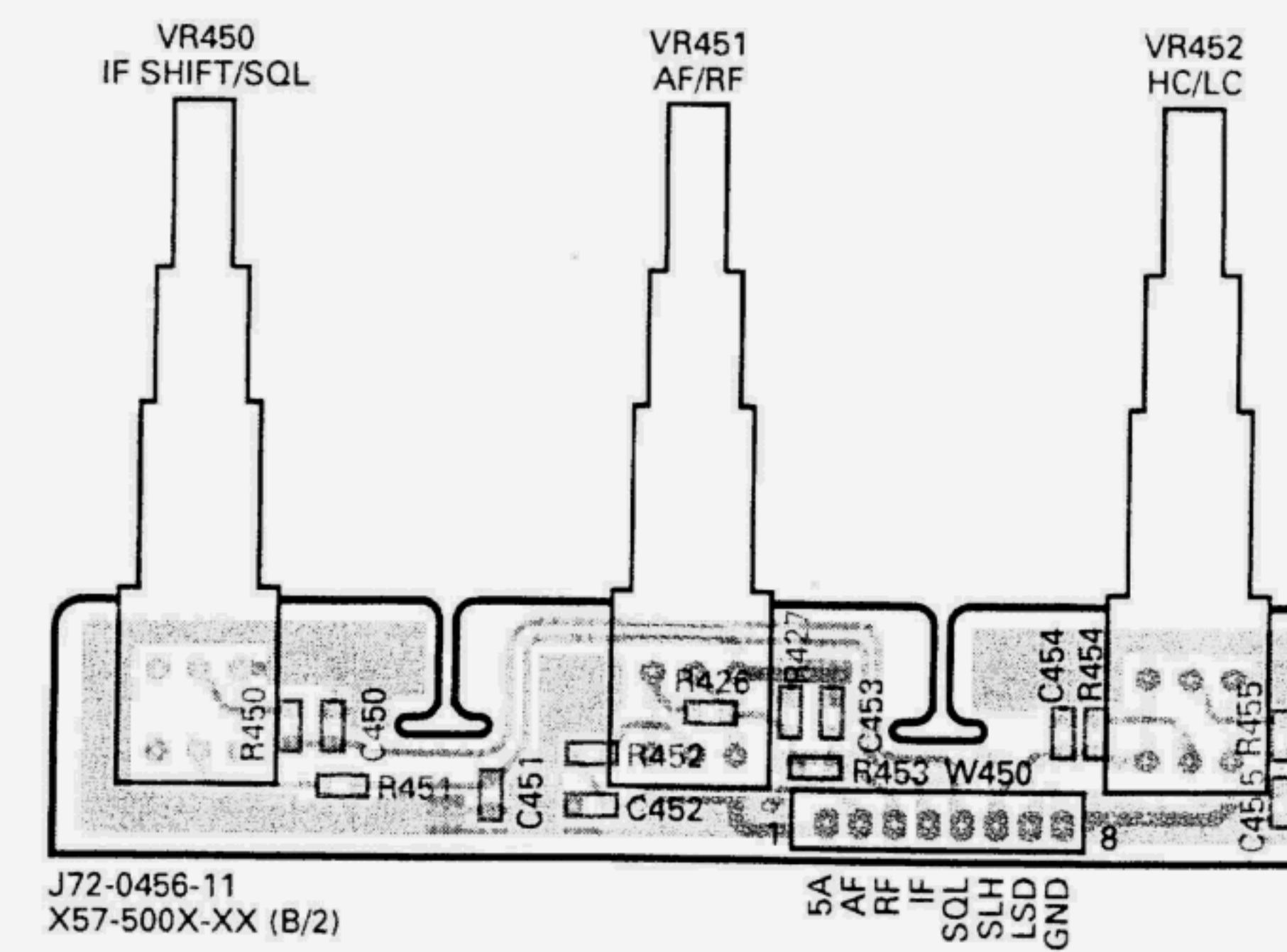


## TX-RX UNIT (X57-500X-XX) (B/2) : VOLUME

0-10 : K,M2 2-71 : E,E2,E3

Component side view

Foil side view

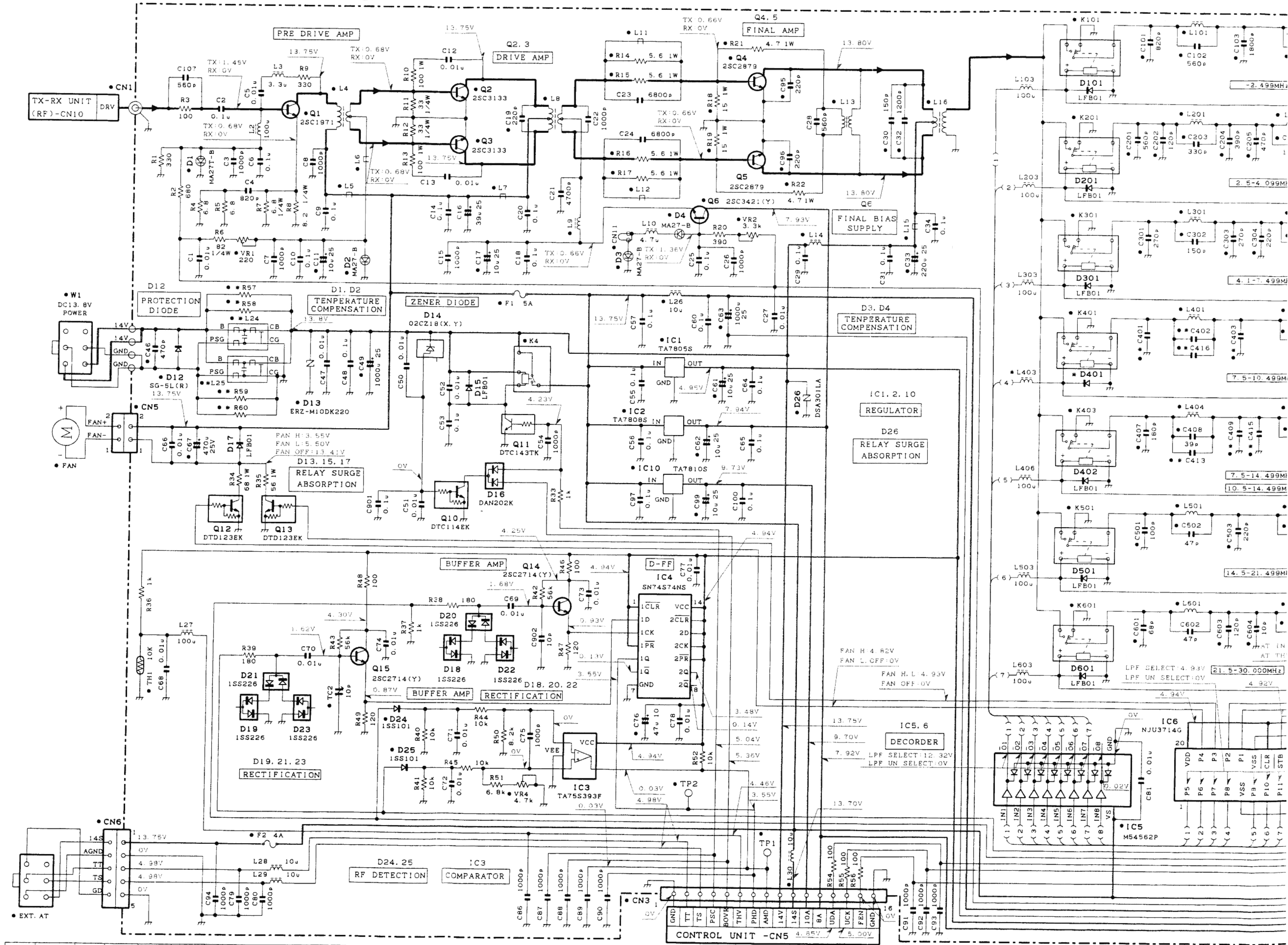


Component side  
 Foil side



FINAL UNIT (X45-353X-XX) 0-10 : K,M2 2-71 : E,E2,E3

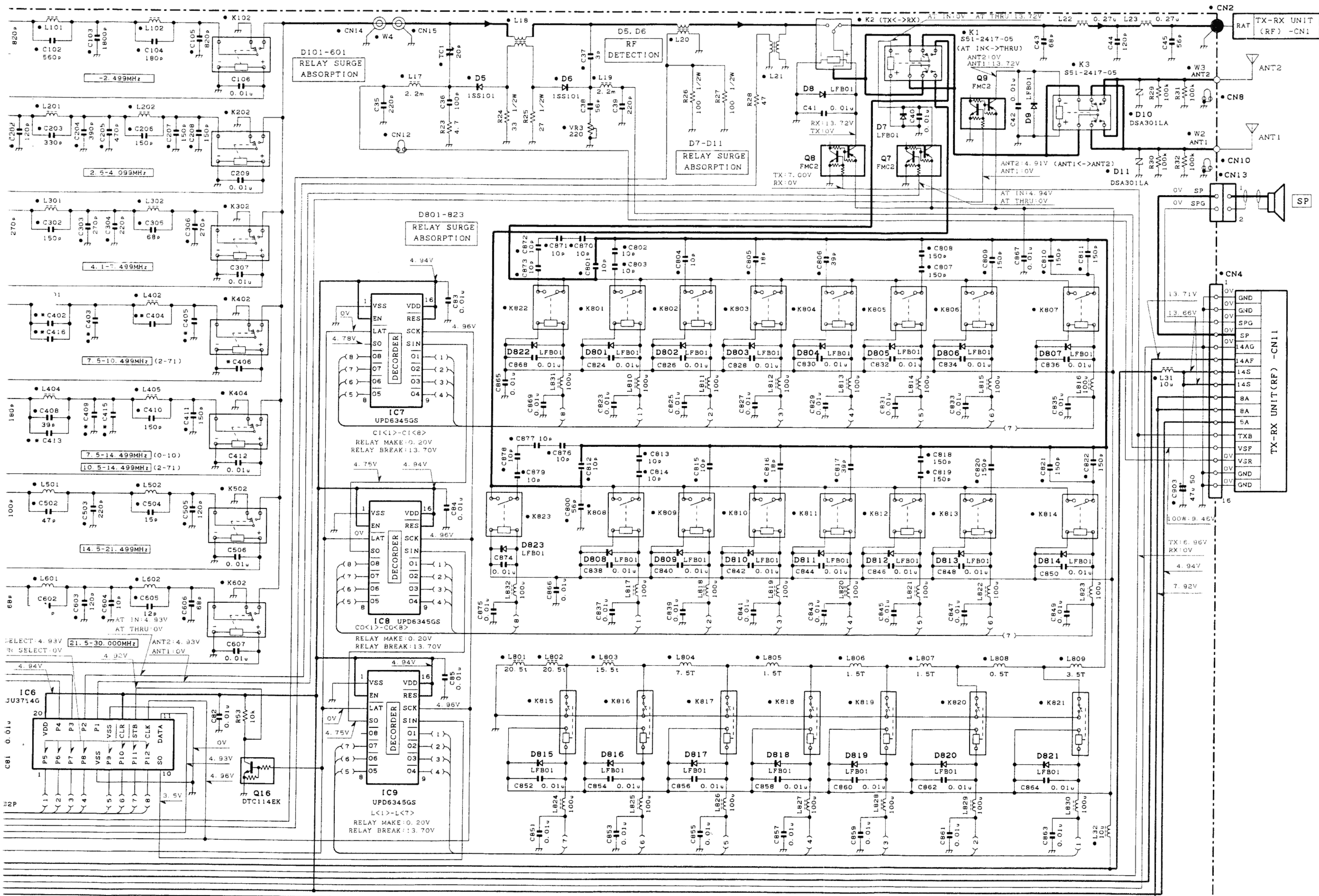
FINAL UNIT (X45-353\*-\*) (A/2)



0-10	K, M2	C401	C402	C403	C404	C405	C406	C409	C413	C415	C416	D401	K401	K402	L24	L25	L401	L402	L403	R57	R58	R59	R60	T401, 402	D1	MA27T-B	
2-71	E, E2, E3	180p	47p	270p	150p	150p	0.01u	330p	-	-	5p	LFB01	S54-1420-05	S54-1420-05	L79-0558-05	L79-0558-05	L39-1221-05	L39-1220-05	L40-1015-48	R52-2569-05	R92-2569-05	R92-2569-05	R92-2569-05	-	D2-4	MA27-B	
																										D5, 6, 24, 25	1SS101



# CIRCUIT DIAGRAM TS-570D

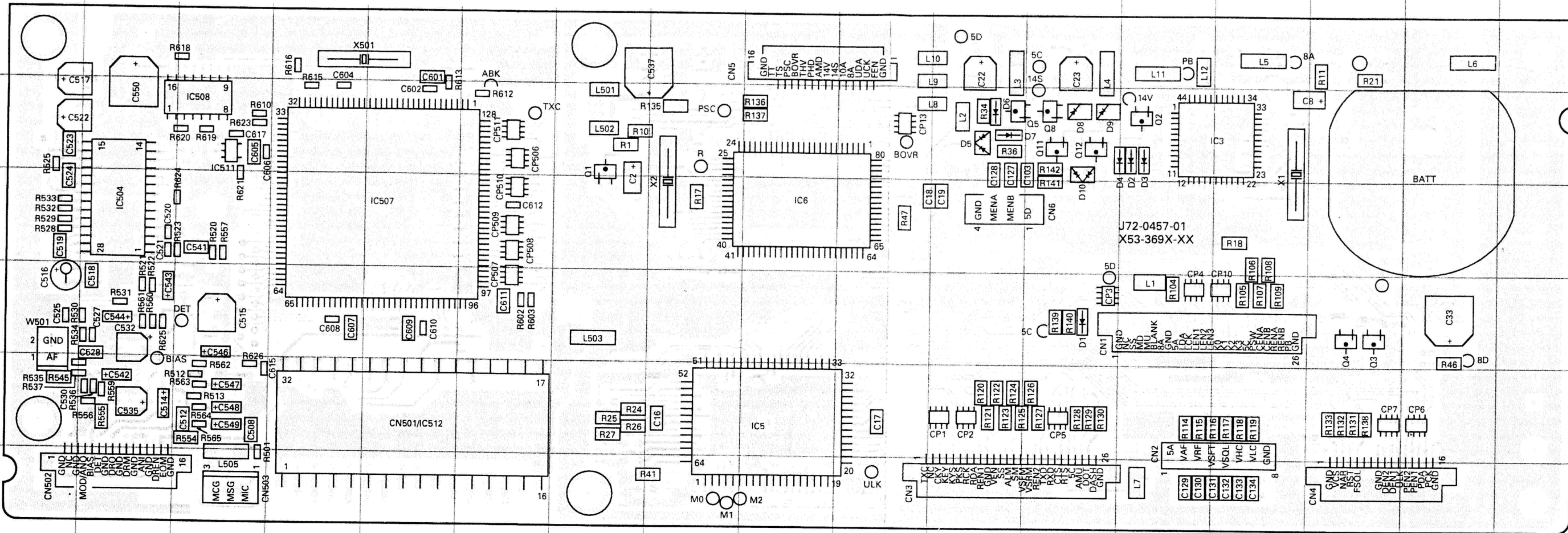


D1	:MA27T-B	D7-9, 15, 17, 101, 201, 301, 401,	D12	:SG-5L(R)	D16	:DAN202K	Q4, 5	:2SC2879	Q11	:DTC143TK	IC1	:TA7805S	IC4	:SN74S74NS	IC7-9	:UPD6345GS	
D2-4	:MA27-B	402, 501, 601, 801-823	:LFB01	D13	:ERZ-M10DK220	D18, 19, 20-23	:1SS226	Q6	:2SC3421(Y)	Q12, 13	:DTC123EK	IC2	:TA7808S	IC5	:M54562P	IC10	:TA7810S
D5, 6, 24, 25	:1SS101	D10, 11, 26	:DSA301LA	D14	:02CZ18(X, Y)	Q1	:2SC1971	Q7-9	:FMC2	Q14, 15	:2SC2714(Y)	IC3	:TA75S393F	IC6	:NJU3714G		
						Q2, 3	:2SC3133	Q10, 16	:DTC114EK								

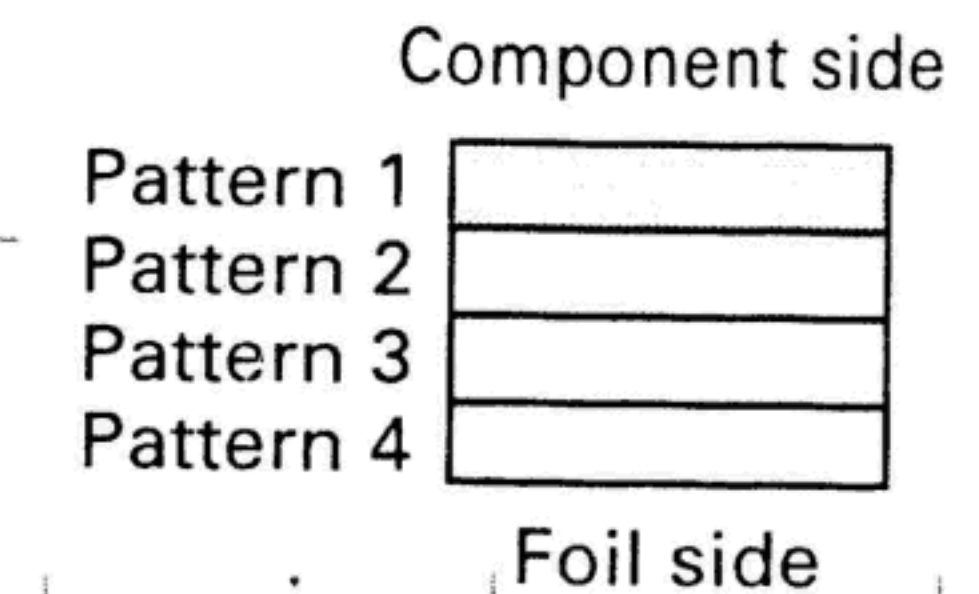


# TS-570D PC BOARD VIEWS

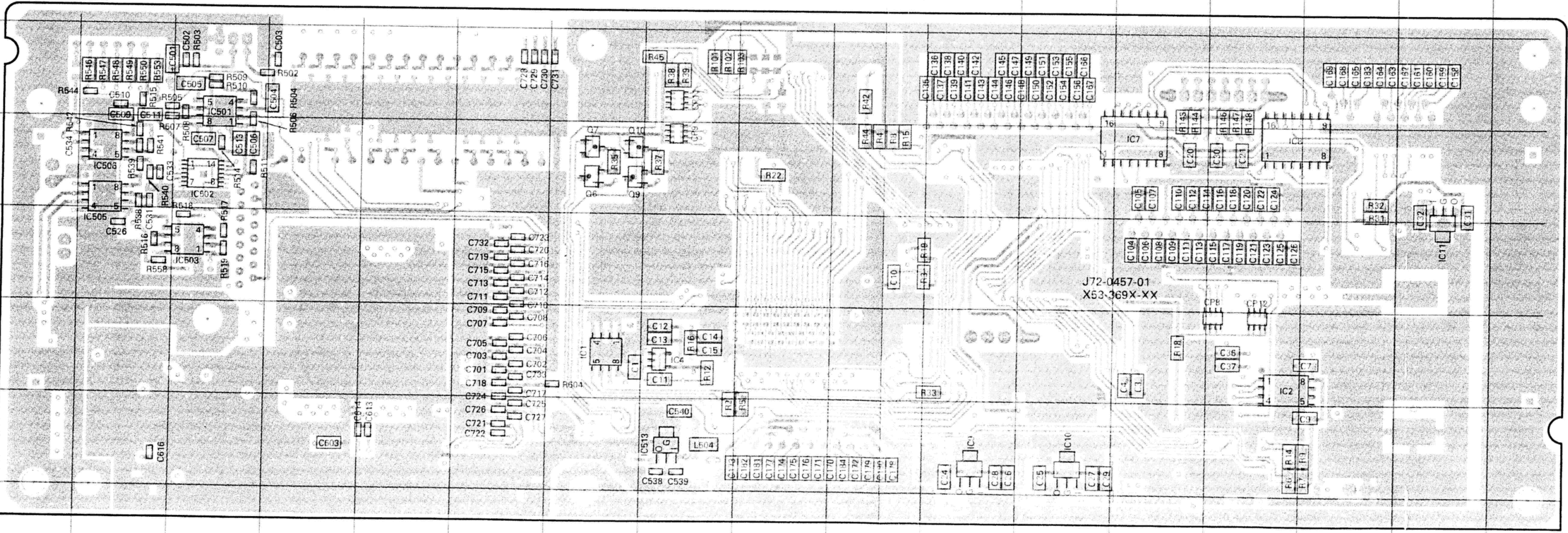
**CONTROL UNIT (X53-369X-XX) Component side view 0-10 : K 0-21 : M2 2-71 : E 2-72 : E2 2-73 : E3**



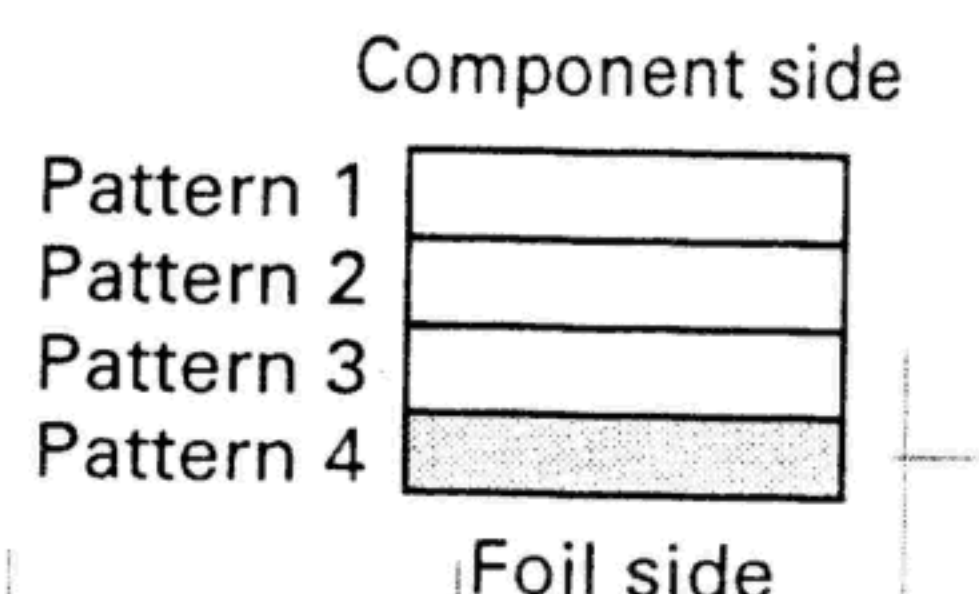
Ref. No.	Address	Ref. No.	Address
IC3	3M	Q8	3L
IC5	6I	Q11	3L
IC6	4I	Q12	3L
IC504	4B	D1	5L
IC507	4E	D2	3M
IC508	3C	D3	3M
IC511	3C	D4	3M
IC512	6E	D5	3K
Q1	3G	D6	3K
Q2	3M	D7	3K
Q3	5O	D8	3L
Q4	5O	D9	3L
Q5	3K	D10	3L



**CONTROL UNIT (X53-369X-XX) Foil side view 0-10 : K 0-21 : M2 2-71 : E 2-72 : E2 2-73 : E3**



Ref. No.	Address	Ref. No.	Address
IC1	12G	IC502	10C
IC2	12N	IC503	11C
IC4	12H	IC505	10B
IC7	10M	IC506	10B
IC8	10N	IC513	13H
IC9	13K	D6	10G
IC10	13L	D7	10G
IC11	11P	D9	10G
IC501	9C	D10	10G



CONT

DTA  
DTA  
DTC  
DTC  
DTC  
DTC  
DTC  
DTC  
DTD

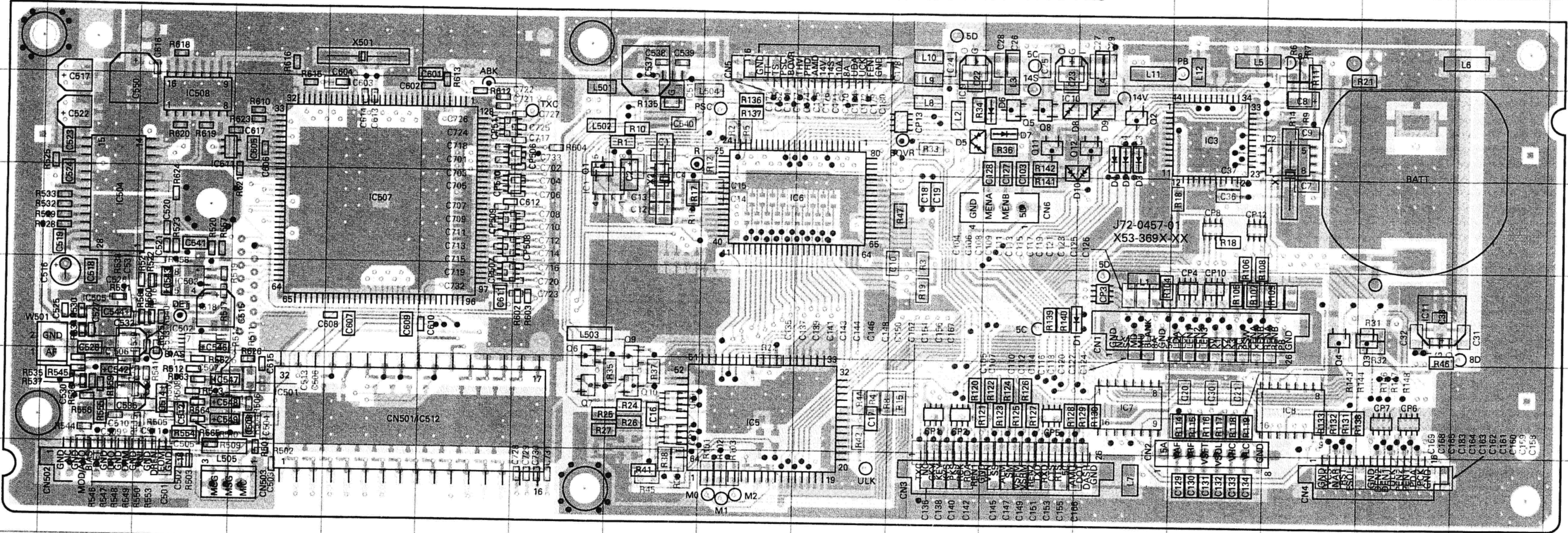
TA71

NJU:

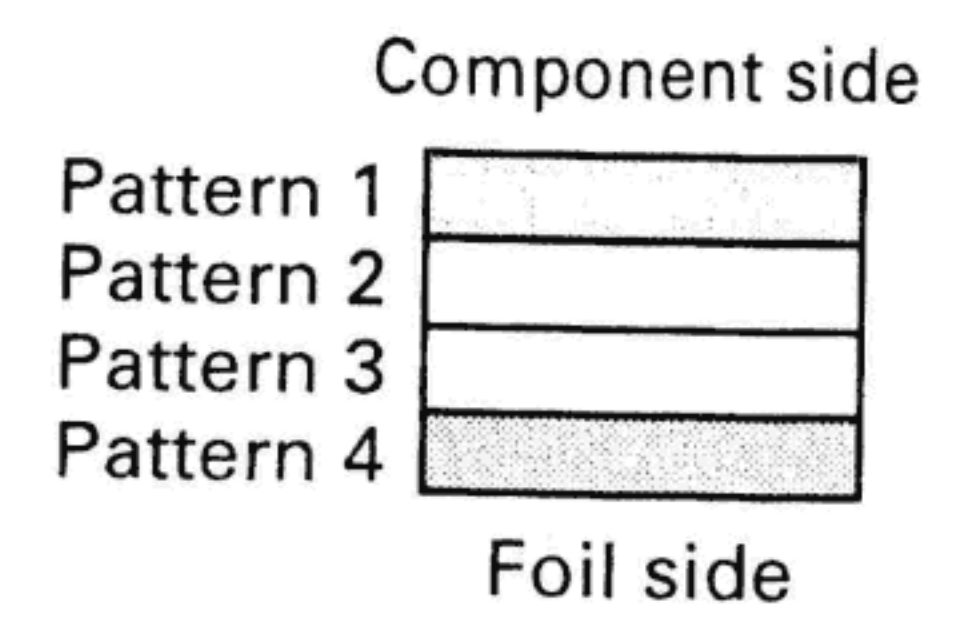
22



CONTROL UNIT (X53-369X-XX) Component side view + Foil side 0-10 : K 0-21 : M2 2-71 : E 2-72 : E2 2-73 : E3



Ref. No.	Address	Ref. No.	Address
IC1	4Z	Q1	3Z
IC2	3AH	Q2	3AF
IC3	3AG	Q3	5AI
IC4	3AA	Q4	5AH
IC5	6AB	Q5	3AE
IC6	4AB	Q6	5Z
IC7	6AF	Q7	6Z
IC8	6AI	Q8	3AE
IC9	2AD	Q9	5AA
IC10	2AE	Q10	10AA
IC11	5AI	Q11	3AE
IC501	6V	Q12	3AF
IC502	5V	D1	5AE
IC503	5V	D2	3AF
IC504	4U	D3	3AF
IC505	5U	D4	3AF
IC506	6U	D5	3AD
IC507	4X	D6	3AE
IC508	3V	D7	3AE
IC511	3V	D8	3AE
IC512	6X	D9	3AF
IC513	3AA	D10	4AE



● Connect 1 and 4

Address
3L
3L
5L
3M
3M
3K
3K
3L
3L
3L

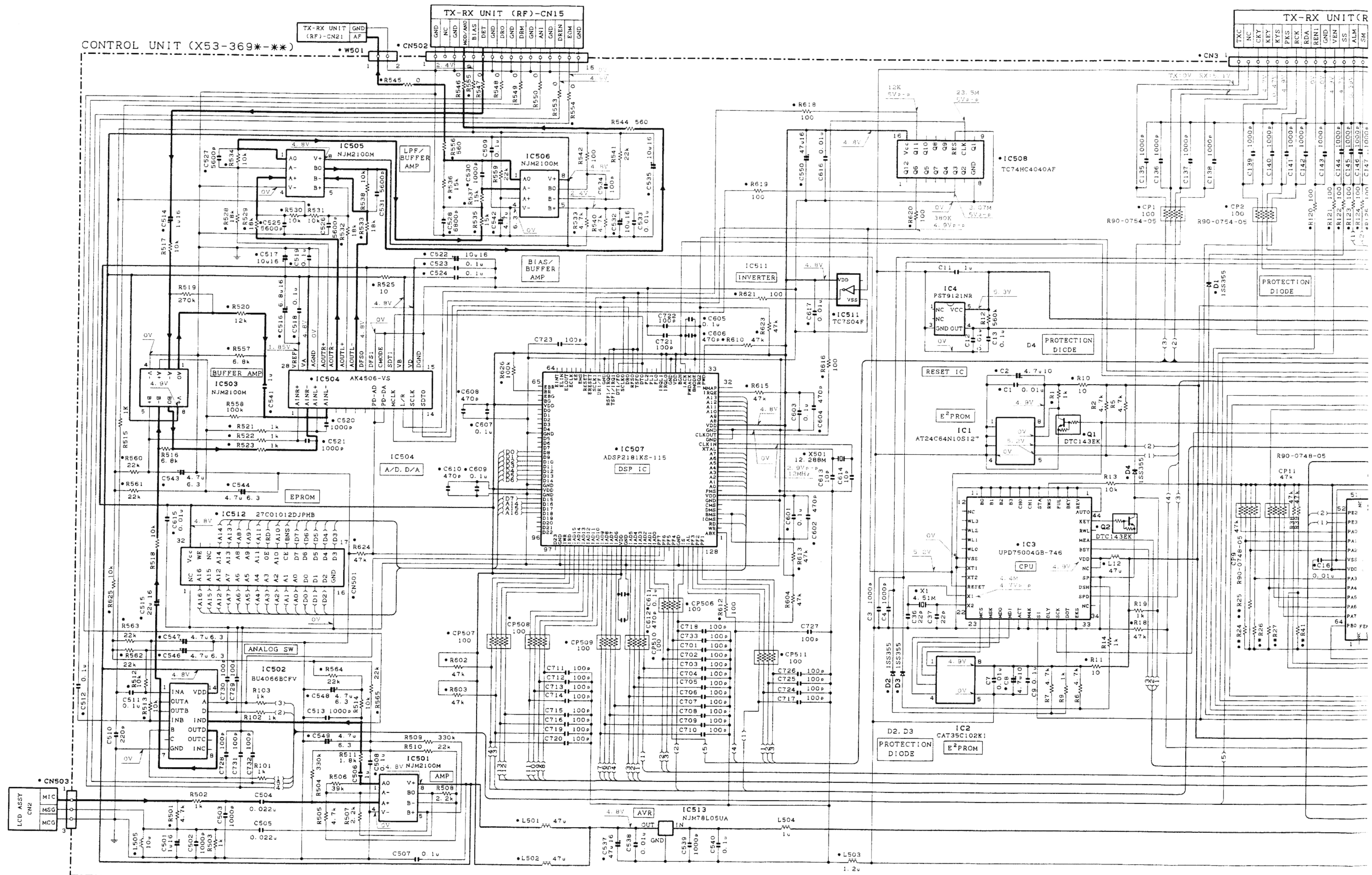
Address
10C
11C
10B
10B
13H
10G
10G
10G
10G

de

DTA114EK DTA124EK DTA143EK DTC114EK DTC123EK DTC124EK DTC143EK DTC143TK DTC144EK DTD123EK	2SA1037K 2SA1162 2SC2412K 2SC2712 2SC2714 2SC3722K 2SD1757K	2SB1188 2SC2954 2SC3357 2SD1624			2SC3133	2SC1971	2SC2879	2SK1875 2SK520	TA7805S TA7808S TA7810S	NJM78L05UA NJM78L06UA NJM78L08UA	FMA5 FMC2 FMG3A	3SK131 3SK184 RU201
TA75S393F	BU4S66 PST9121NR TC7S04F TC7S08F	AT24C64N10SI27 CAT35C102KI NJM2100M NJM2904M UPC1037GR UPC1686G	LA4446	SN76514N	BU4066BCFV NJM2902M SN74S74NS	ADM232LAR TC4052BF TC9174F	TC74HC4040AF	BU2090FS MB86001PF UPD6345GS	M54562P	NJU3714G		
NJU3715G	M62363FP	AK4506-VS NJU3718G	F71022 UPD75004GB-746	CXD1095Q	NJU6432BFE1	M37710EFBJQF *	MSM5265GS-BK	ADSP2181KS-115	27C01012DJPHB			



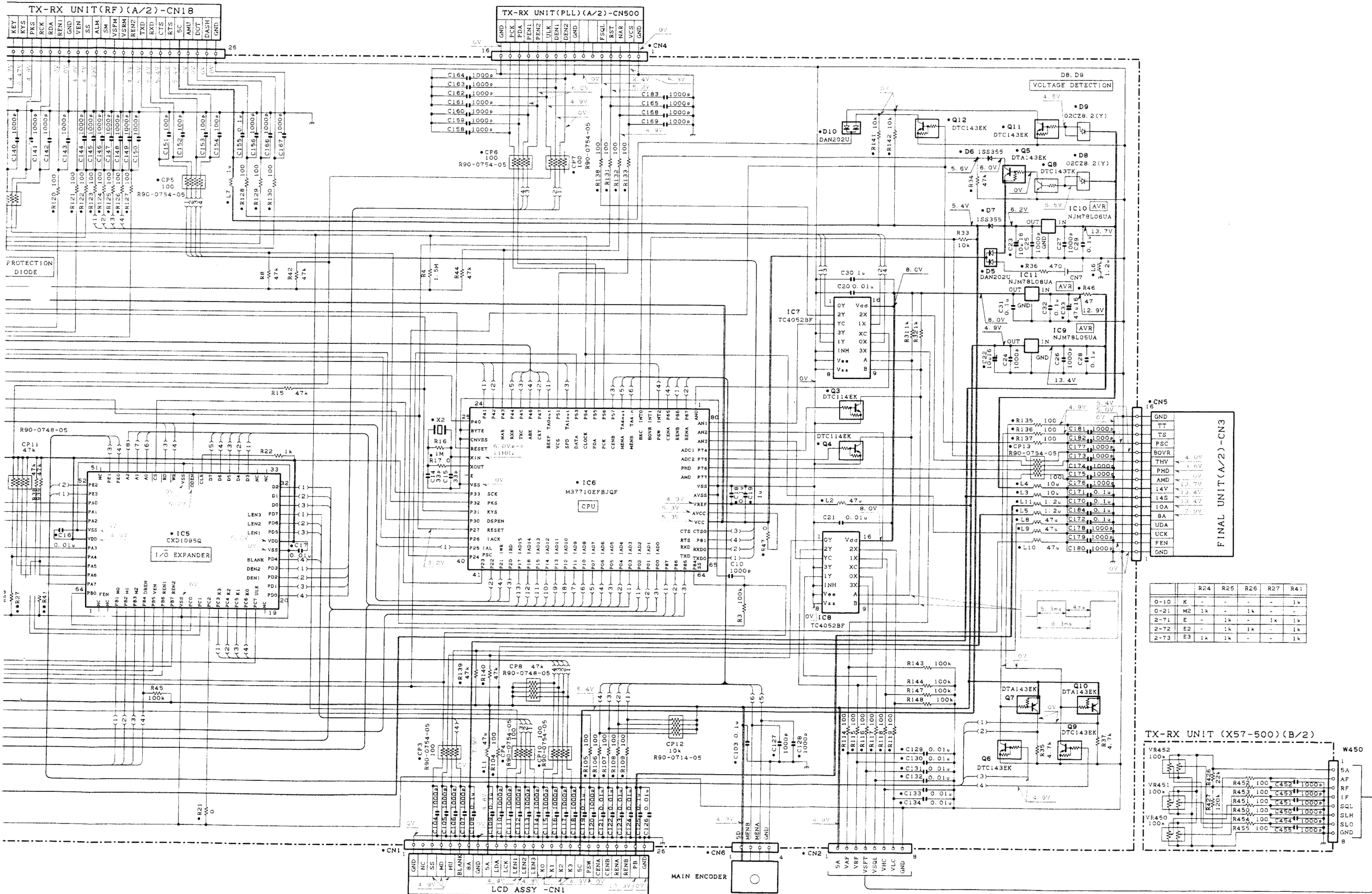
CONTROL UNIT (X53-369X-XX) 0-10 : K 0-21 : M2 2-71 : E 2-72 : E2 2-73 : E3



D1-4.6.7	1SS355	Q1.2.6.9.11.12	DTC143EK	IC1	AT24C64N10S12	IC5	ICXD1095Q	IC10	NJM78L06UA	IC504	AK4506-VS	IC511	TC7504P
D5.10	DAN202U	Q3.4	DTC144EK	IC2	CAT35C102K1	IC6	M37710EPUJP	IC11	NJM78L08UA	IC507	ADSP2181KS-115	IC512	27C01012DJPBH
D8	02CZ8.2(Y)	Q5.7.10	DTA143EK	IC3	UPD75004GB-746	IC7.8	TC4052BF	IC1501.503.505.506	NJM2100M	IC508	TC74HC4040AF		
D9	02CZ9.1(Y)	Q8	DTC143TK	IC4	PST9121NR	IC9.513	NJM78L05UA	IC502	BU4066BCFV				



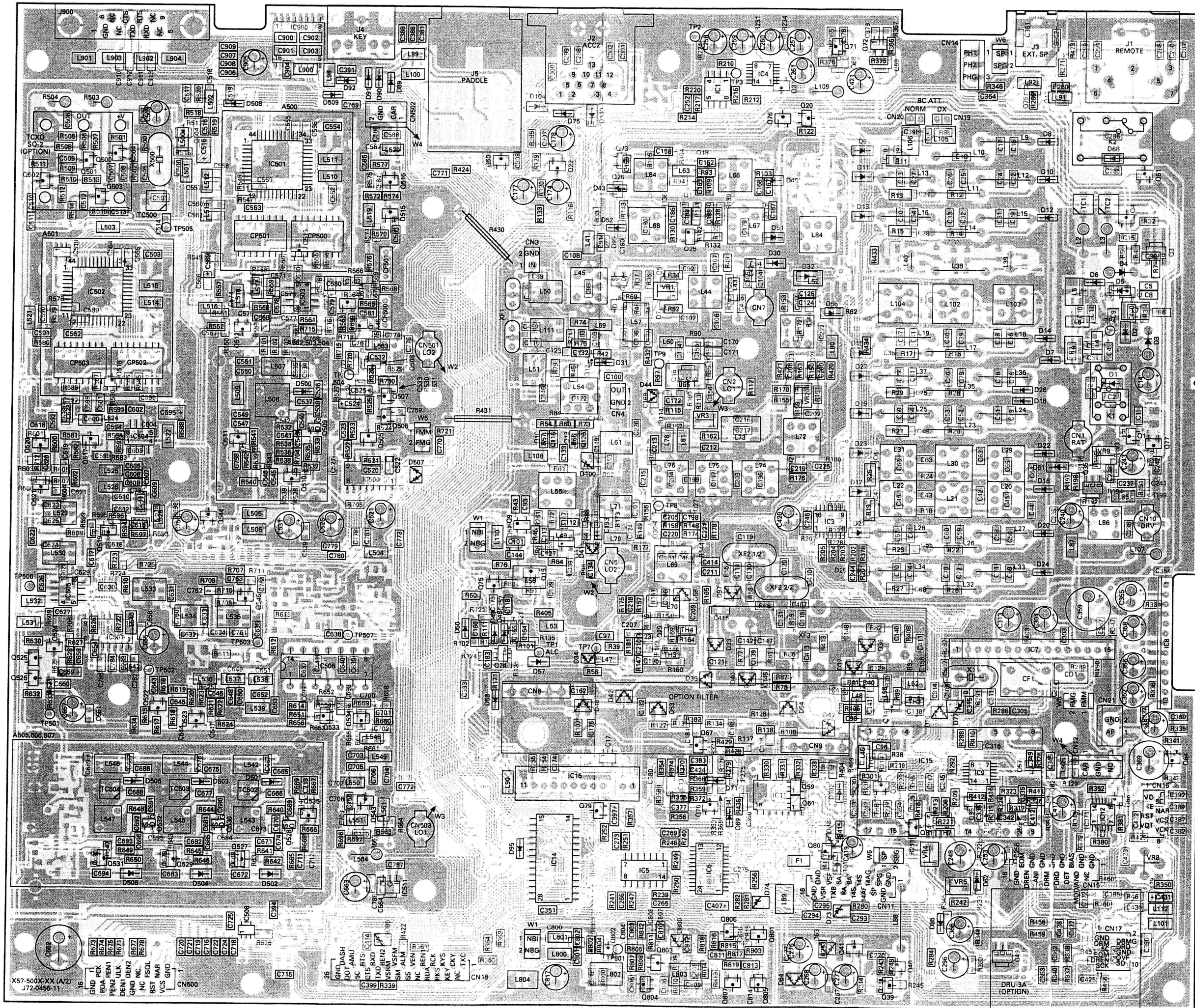
# CIRCUIT DIAGRAM TS-570D





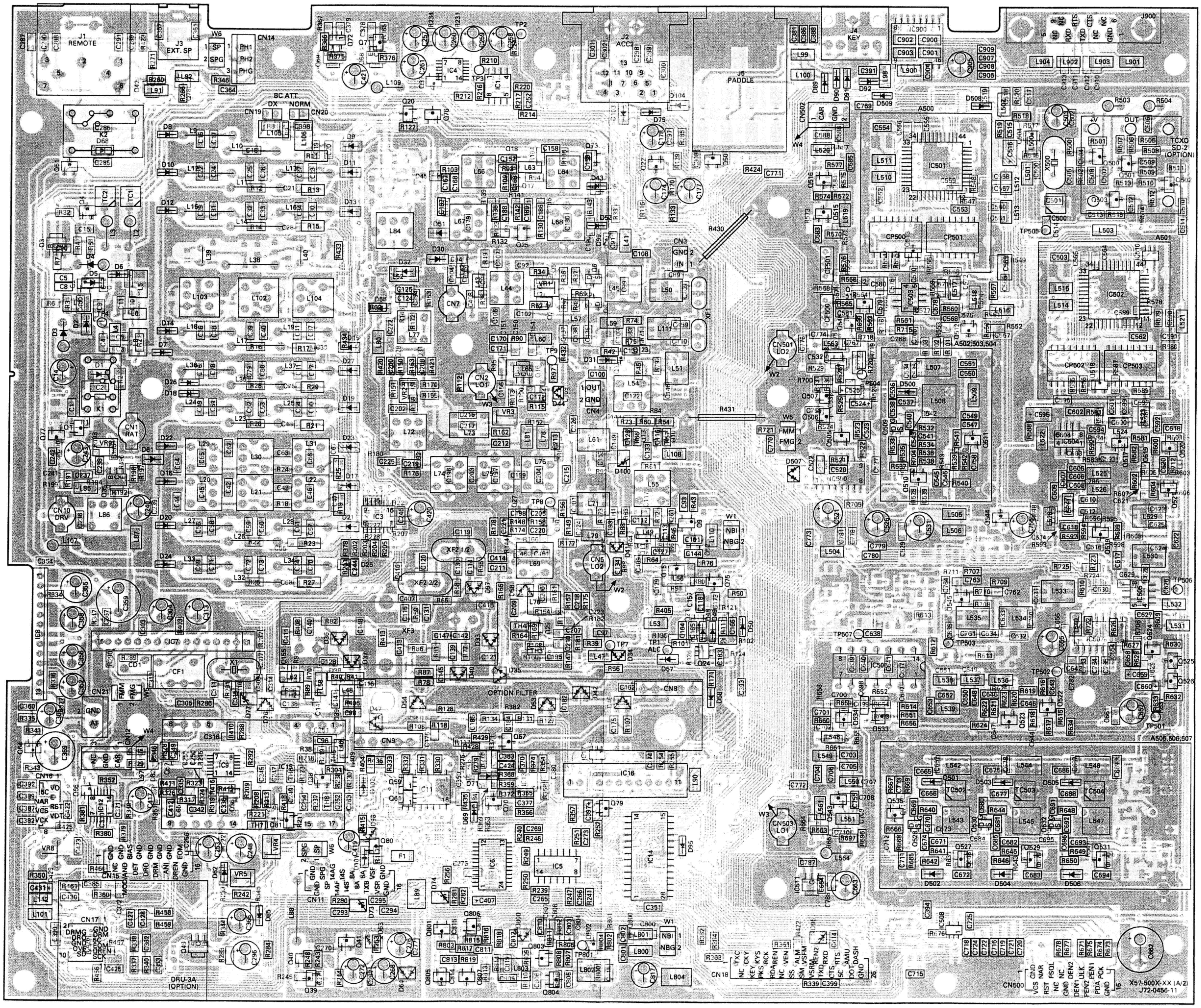
# TS-570D PC BOARD VIEWS

TX-RX UNIT (X57-500X-XX) (A/2) Component side view 0-10 : K,M2 2-71 : E,E2,E3





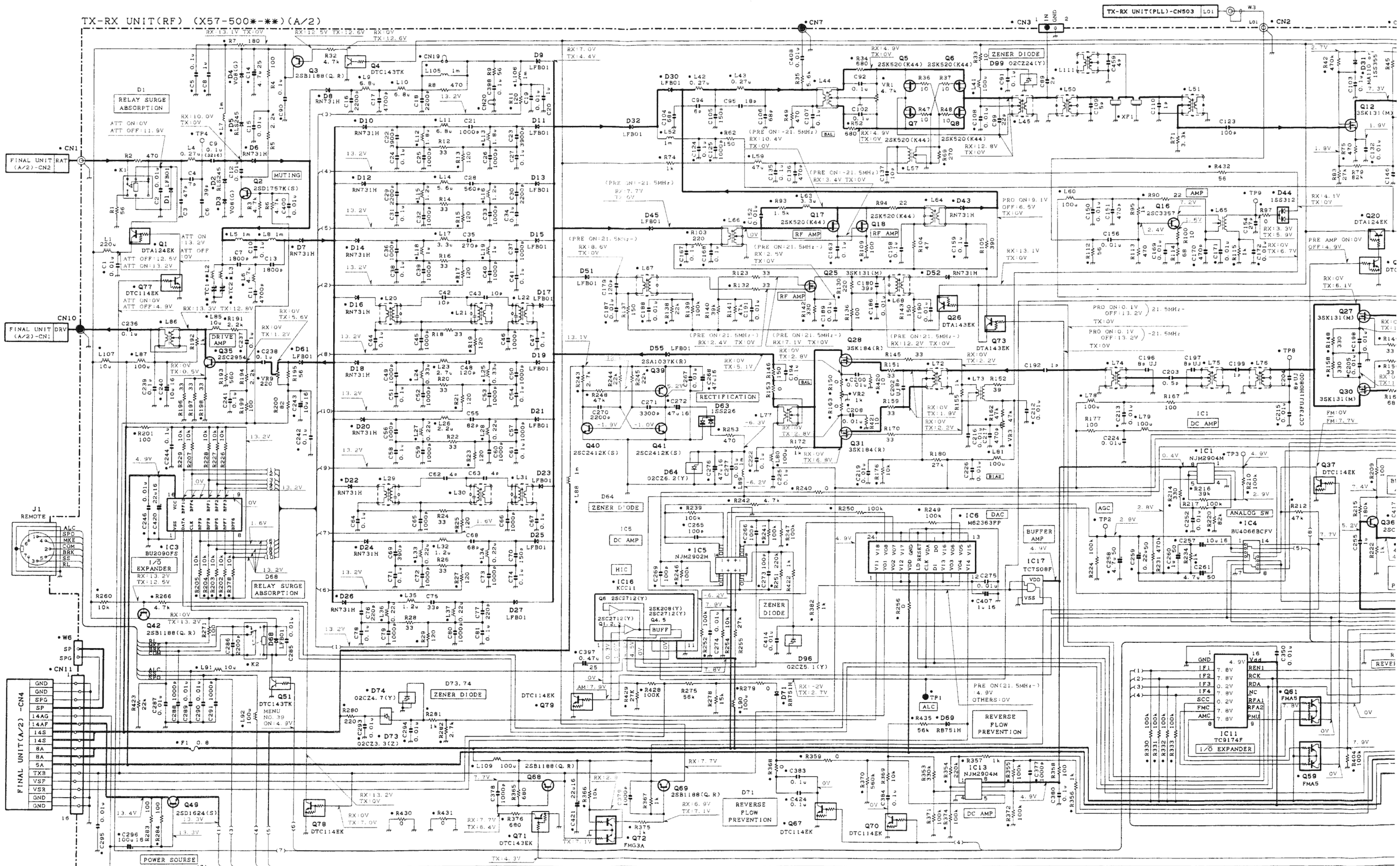
TX-RX UNIT (X57-500X-XX) (A/2) Foil side view 0-10 : K,M2 2-71 : E,E2,E3



X57-500X-XX (A/2)  
J72-0456-11



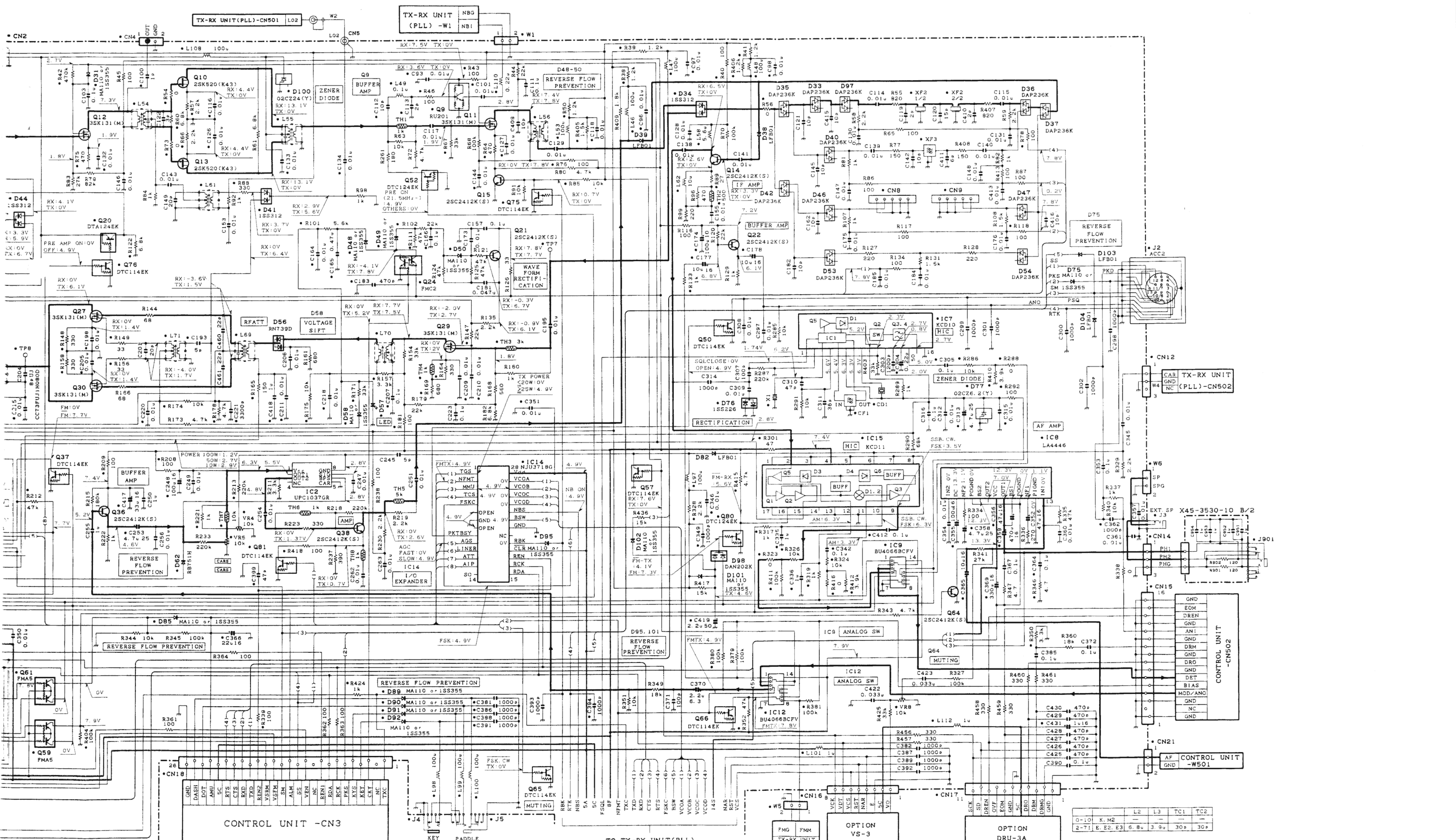
TX-RX UNIT (X57-500X-XX) : RF 0-10 : K,M2 2-71 : E,E2,E3



D1, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 30, 32, 39, 33, 45, 51, 55,	D6-8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 43, 52	D33, 35-37, 40, 42, 46, 47, 53, 54, 97	D62, 69, 71	D74	Q1, 20	Q5-8, 17, 18	Q14, 15, 21, 22, 36, 38, 40, 41, 64
61, 68, 82, 103, 104	D31, 48-50, 58, 75, 85, 89,	D34, 41, 44	D63, 76	D96	Q2	Q9	Q16
D2, 5	90-92, 95, 101, 102	D56	D64, 77	D98	Q3, 42, 68, 69	Q10, 13	Q24
D3, 4		D57	D73	D99, 100	Q4, 51	Q11, 12, 25, 27, 29, 30	Q26, 73



# CIRCUIT DIAGRAM TS-570D



- |                     |             |         |               |         |            |            |              |     |            |      |            |      |           |
|---------------------|-------------|---------|---------------|---------|------------|------------|--------------|-----|------------|------|------------|------|-----------|
| Q28. 31             | : 3SK184(R) | Q39     | : 2SA1037K(R) | Q71     | : DTC143EK | IC1. 13    | : NJM2904M   | IC5 | : NJM2902M | IC11 | : TC9174F  | IC16 | : KCC11   |
| Q35                 | : 2SC2357   | Q49     | : 2SD1624(S)  | Q72     | : FMG3A    | IC2        | : UPC1037GR  | IC6 | : M62363FP | IC14 | : NJU3719G | IC17 | : TC7S08P |
| Q37. 50. 57. 65-67. | : FMC2      | Q52. 90 | : DTC124EK    | Q52. 90 | : DTC124EK | IC3        | : BU2090FS   | IC7 | : KCD10    | IC15 | : KCD11    |      |           |
| Q39                 | : DTA143EK  | Q59. 61 | : FMA5        | Q59. 61 | : FMA5     | IC4. 9. 12 | : BU4066BCFV | IC8 | : LA4446   |      |            |      |           |

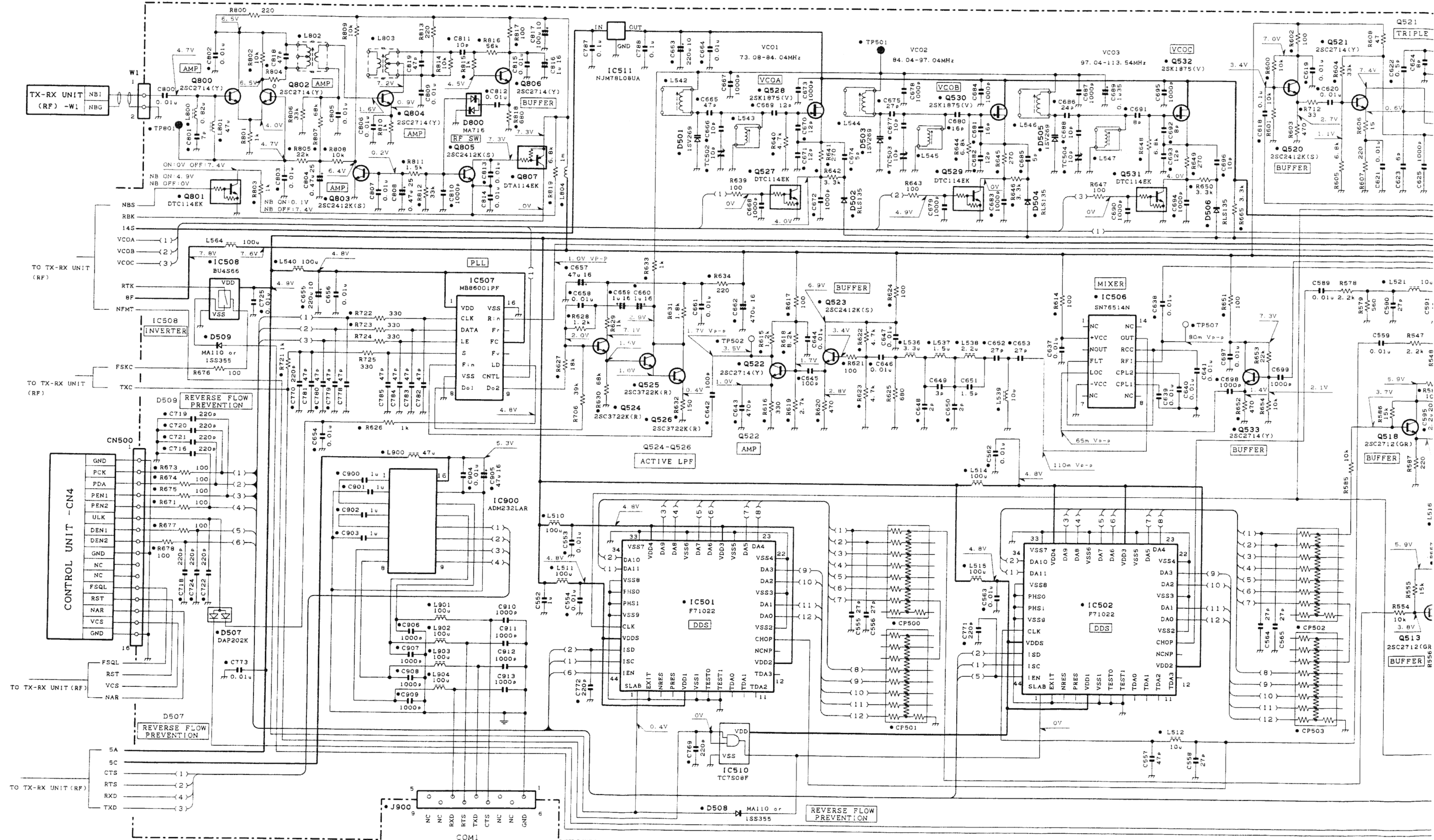
0-10	K. M2	L8	L3	TC1	TC2
2-71	E. E2. E3	6. 8u	3. 9u	30p	30p



# TS-570D CIRCUIT DIAGRAM

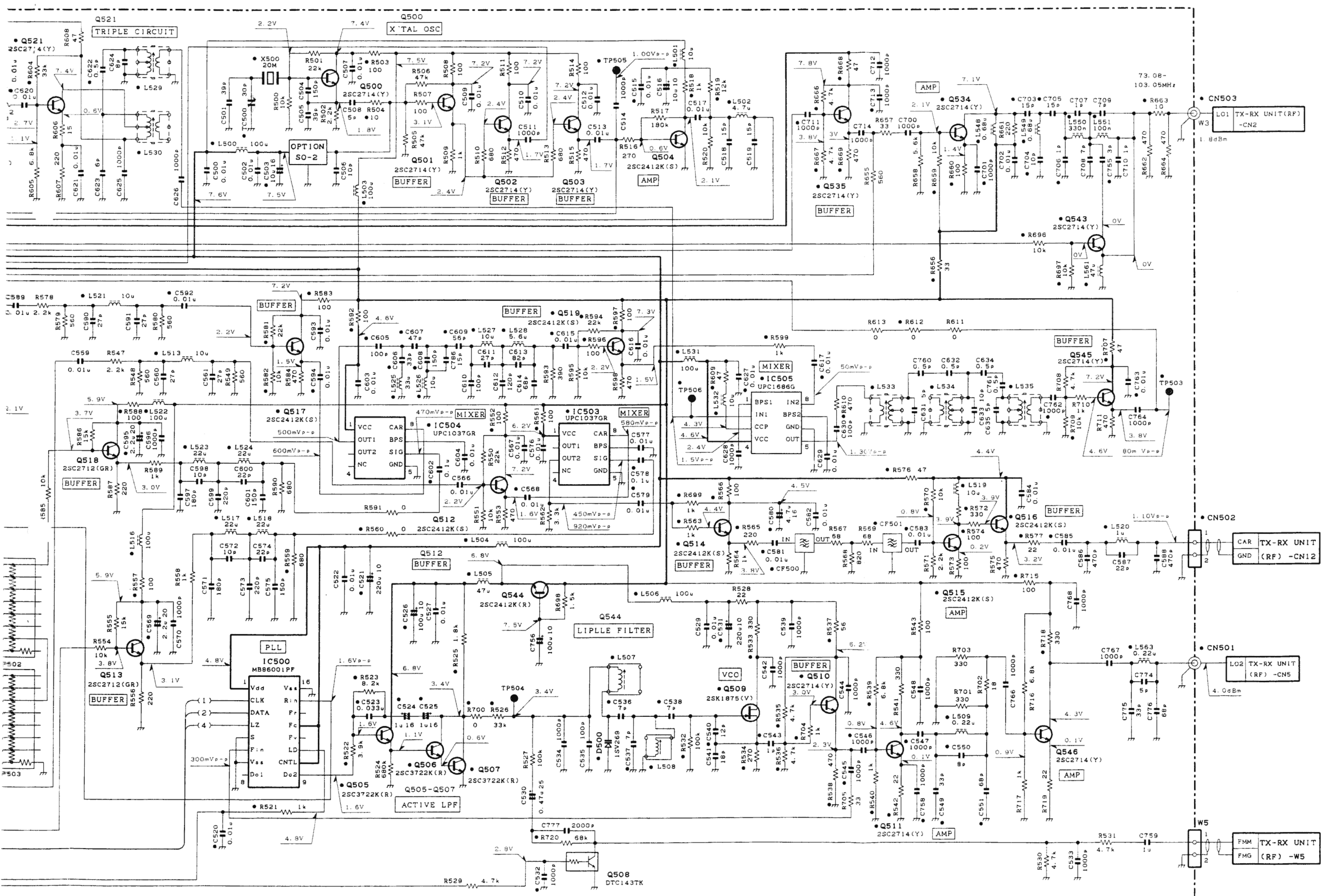
TX-RX UNIT (X57-500X-XX) : PLL 0-10 : K,M2 2-71 : E,E2,E3

TX-RX UNIT (PLL) (X57-500\*-\*) (A/2)



D500, 501, 503, 505	:1SV269	D508, 509	:1SS355 or MA110	Q500-503, 510, 511, 521, 522,	Q504, 512, 514, 515-517,	Q508	:DTC143TK	Q527, 529, 531, 801	:DTC114EK	IC500, 507	:MB86001PF
D502, 504, 506	:RLS135	D800	:MA716	533-535, 543, 545, 546,	519, 520, 523, 803, 805	Q509, 528, 530, 532	:2SK1875(V)	Q544	:2SC2412K(R)	IC501, 502	:F71022
D507	:DAP202K			800, 802, 804, 806	:2SC2714(Y)	Q513, 518	:2SC2712(GR)	Q807	:DTA114EK	IC503, 504	:UPC1037GR



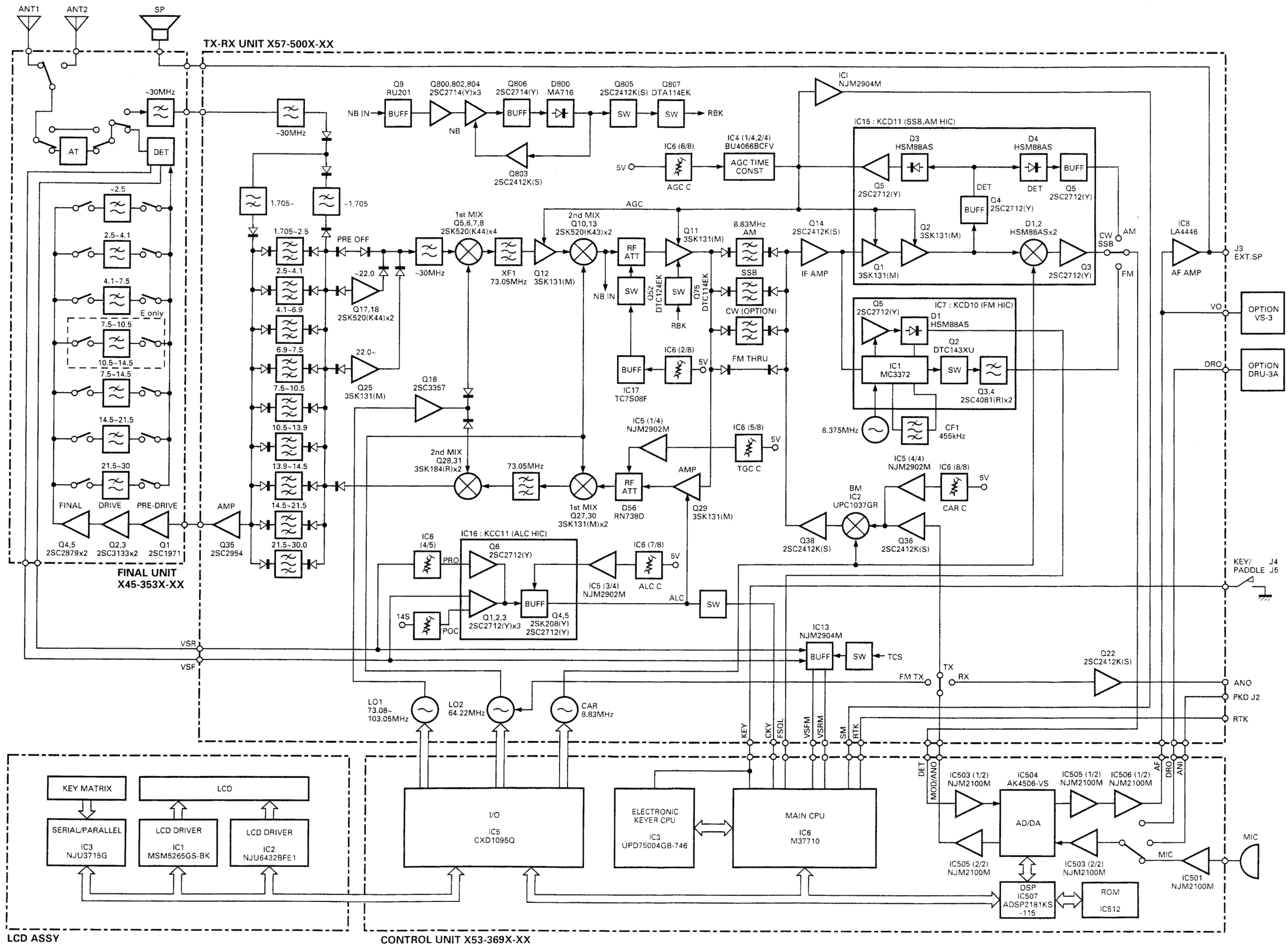


- Q507 : M886001PF
- Q502 : F71022
- Q504 : UPC1037GR
- IC505 : UPC1686G
- IC506 : SN76514N
- IC508 : BU4S66
- IC510 : TC7S08F
- IC511 : NJM78L08UA
- IC900 : ADM232LAR





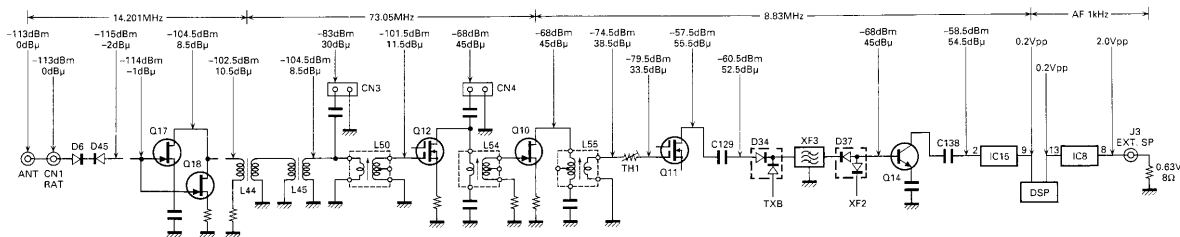
# TS-570D TS-570D BLOCK DIAGRAM



# TS-570D TS-570D

## LEVEL DIAGRAM

### Receiver Section

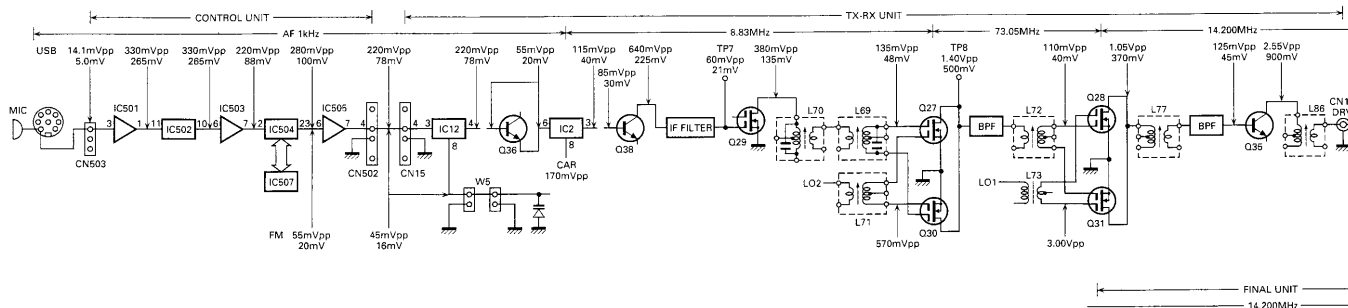


#### Measurement condition

Frequency : 14.200MHz  
 PRE AMP : ON  
 ANT input : -113dBm  
 AF output : 0.63V/BQ, 1kHz

The figures shown are signal generator output required for a constant audio output with a constant AF gain control setting. Set the AF gain control for 0.63V/BQ audio output at -113dBm signal generator input at 14.201MHz. To measure signal generator output connect a 0.01μF capacitor between the signal generator and the check point.

### Transmitter Section



#### Measurement condition

MIC input : 1kHz/5mV  
 PWR : 100W  
 MIC level : ALC zone maximum  
 Audio frequency section is measured by the AF voltmeter or Oscilloscope.  
 Radio frequency section is measured by the RF voltmeter or Oscilloscope.

