

**KENWOOD**

# TS-850 series

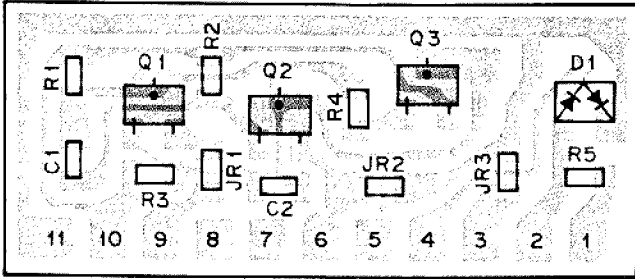
## **Service Manual** Schematic

KENWOOD CORPORATION

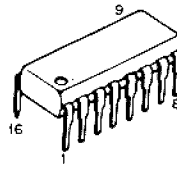


# TS-850S PC BOARD VIEWS

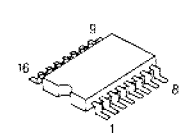
### DC-DC (X59-1100-00) Component side view



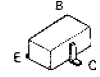
SN74LS145N



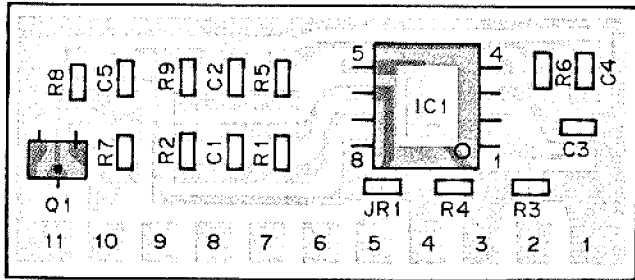
TC4538BF



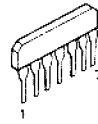
- 2SA1162(Y)
- 2SC2712(Y)
- 2SC2714(Y)
- 2SD1757K
- DTA124EK
- DTA144EK
- DTA143TK
- DTC124EK
- DTC114EK
- DTC143TK



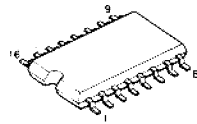
### FM MIC (X59-3000-03) Component side view



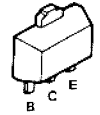
μPC1037HA



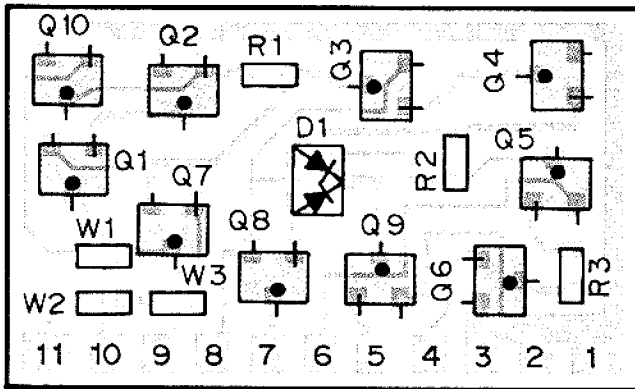
TC9174F



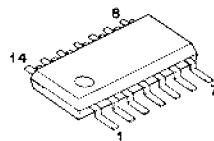
- 2SA1213(Y)
- 2SC2954(QK)



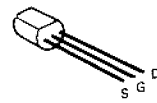
### AIP SW (X59-3900-00) Component side view



NJM2902M



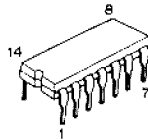
2SK125-5



2SD1624S



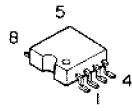
TC4011BP



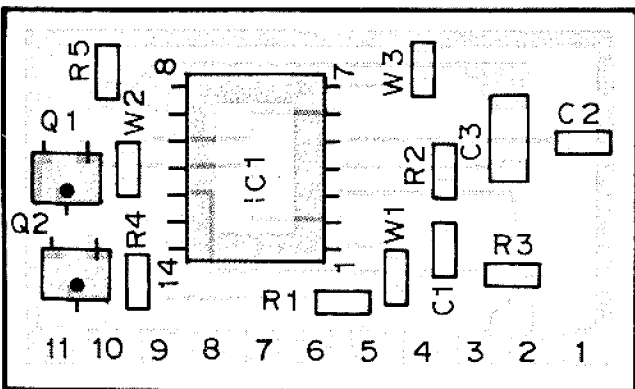
2SK208(GR)  
2SK520(K44)



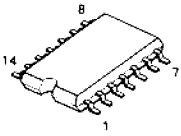
NJM4558M



### NB2 (X59-3910-00) Component side view



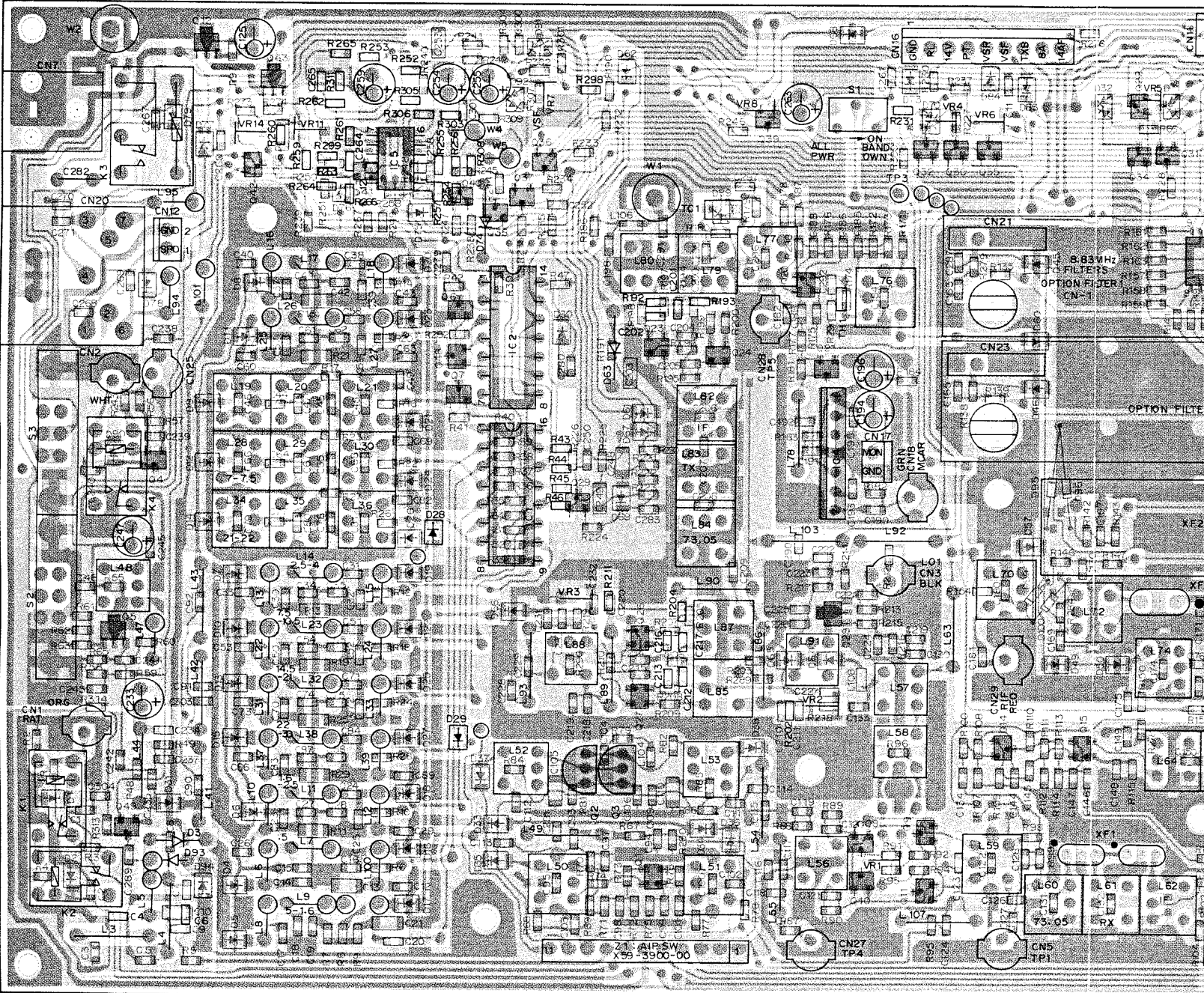
TC4011BF  
TC4066BF



3SK131(M)



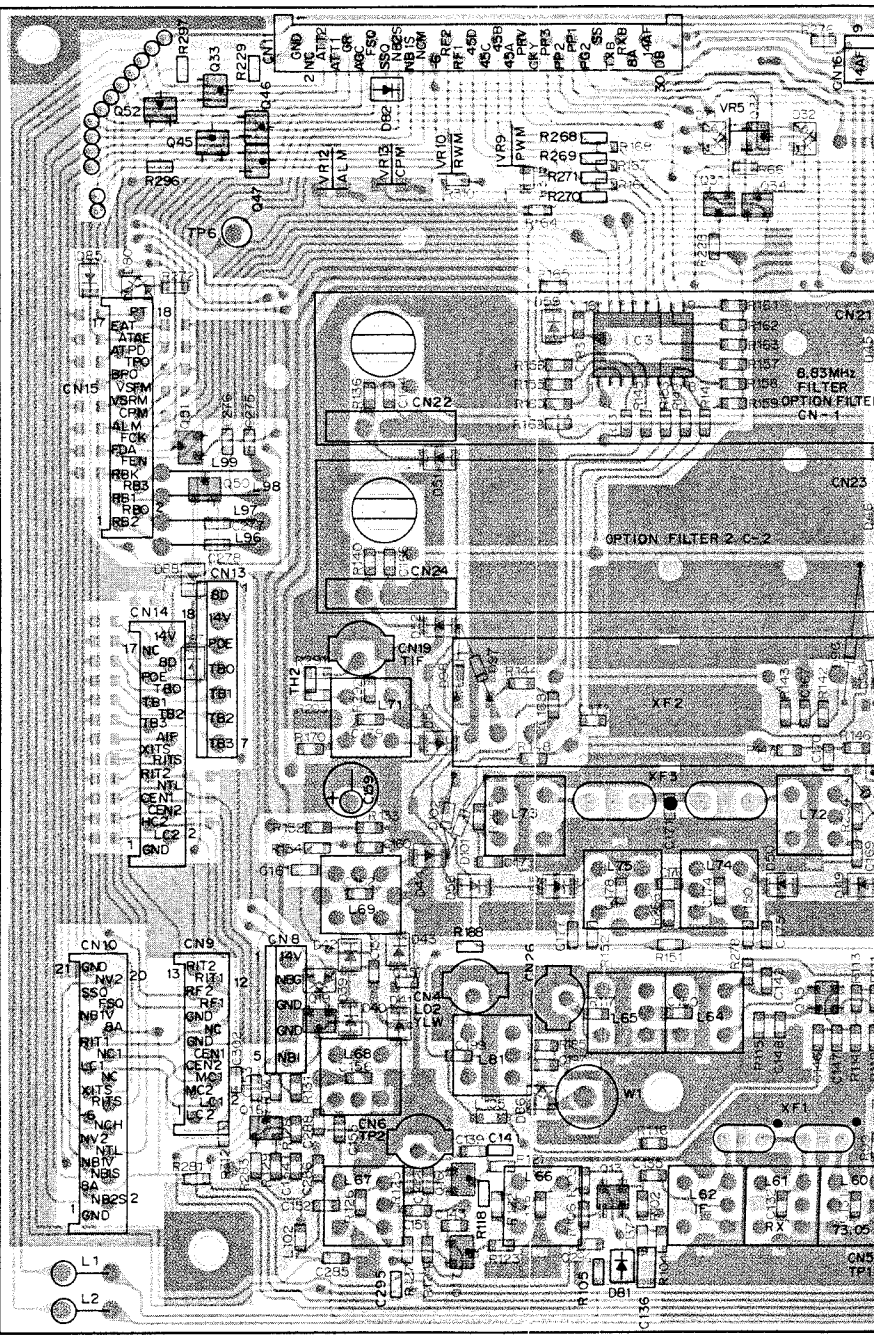
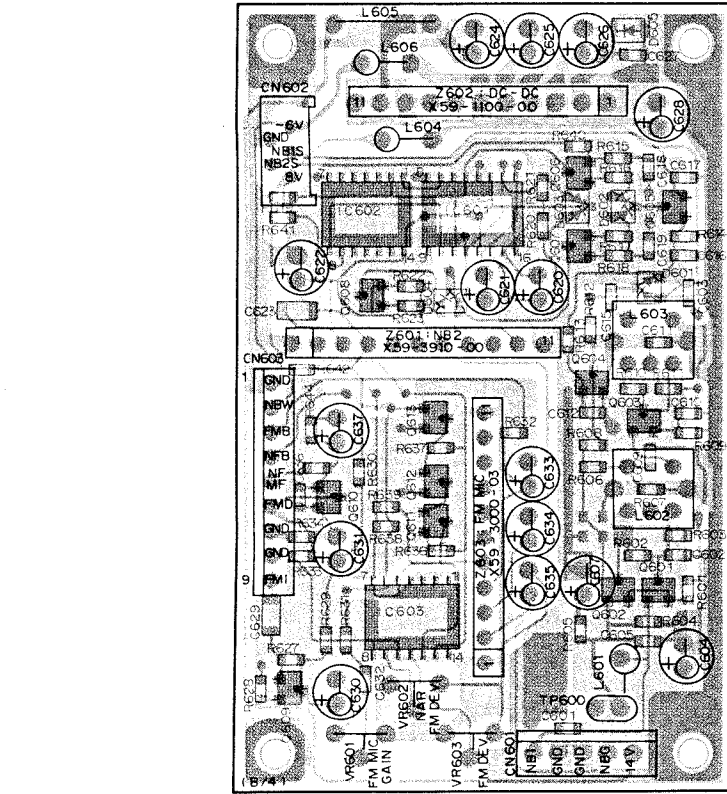
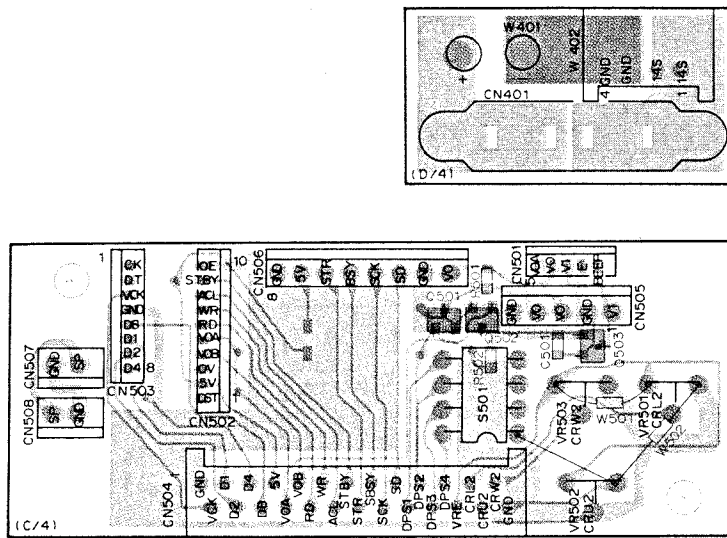
A B C D E F  
RF UNIT (X44-3120-00) Component side view







# RF UNIT (X44-3120-00) Foil side view

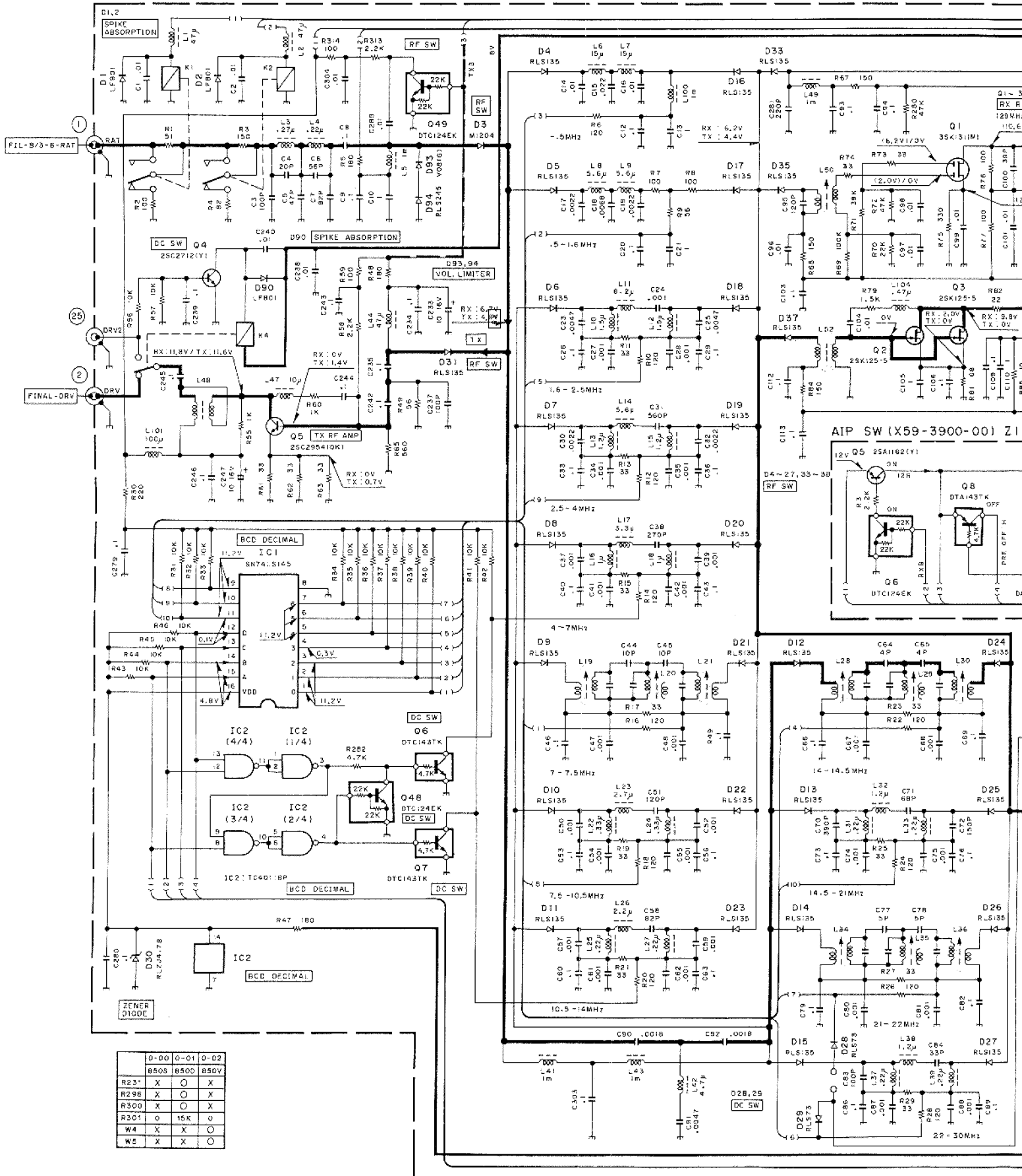




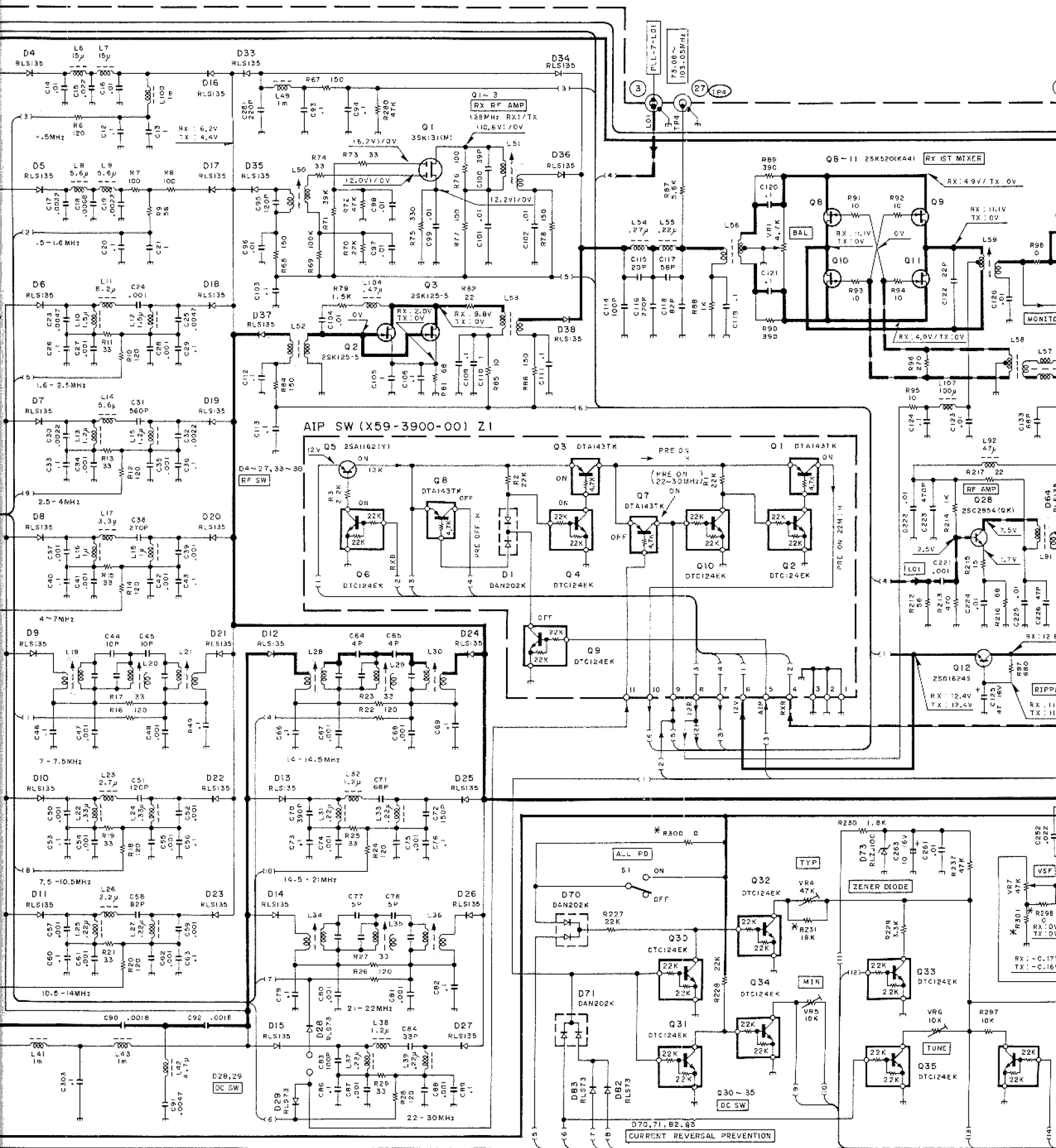
# TS-850S CIRCUIT DIAGRAM

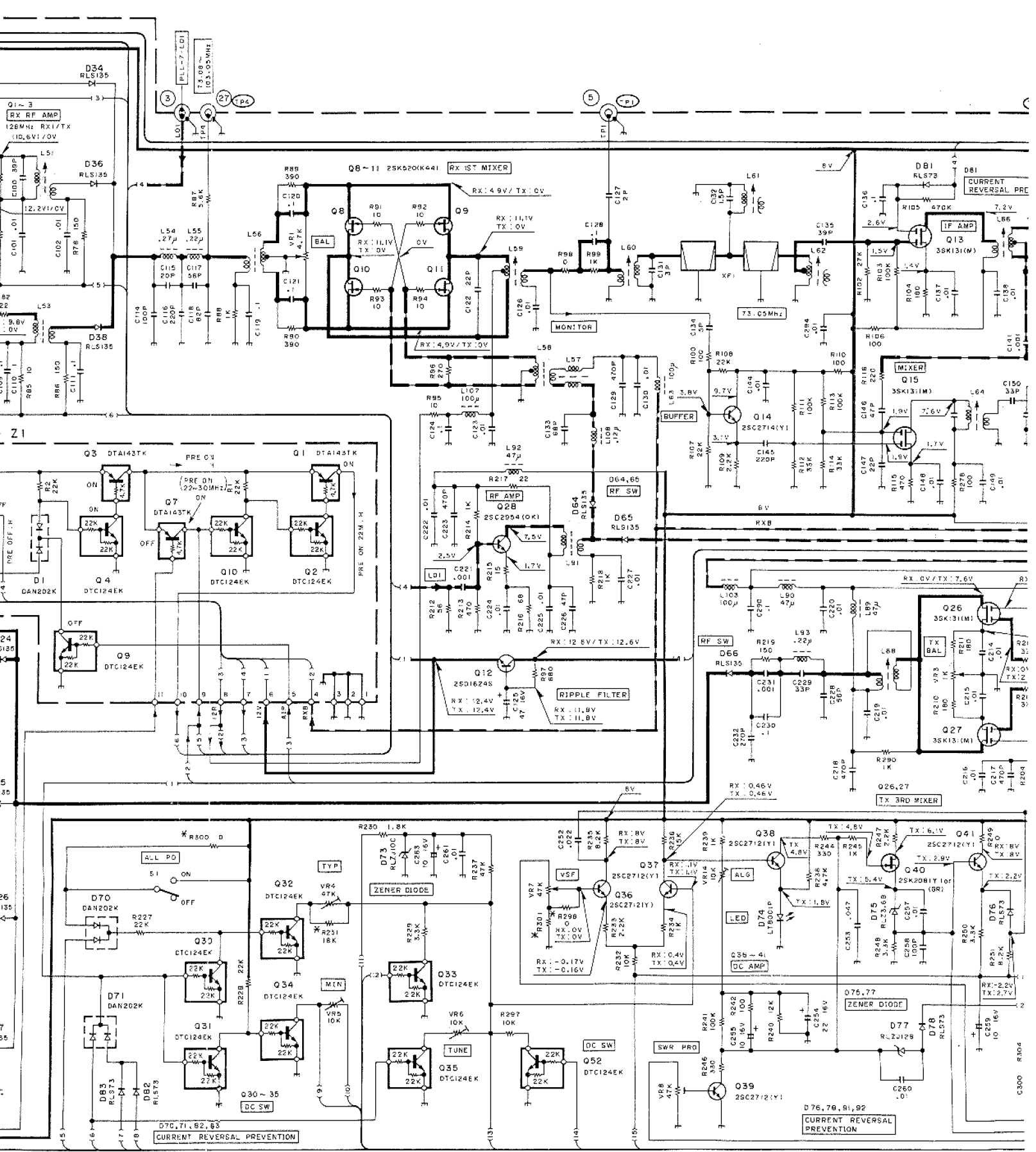
## RF UNIT (X44-3120-00)

RF UNIT (X44-3120-00) (A/4)



	0-00	0-01	0-02
R23*	X	○	X
R29*	X	○	X
R30*	X	○	X
R301	○	15K	○
W4	X	X	○
W5	X	X	○





Q1-3  
RX RF AMP  
128MHz RX1/TX  
(10,6V/0V)

PLL-7 LOI  
73.08 MHz  
103.00 MHz

Q8-11 25K520K441  
RX 1ST MIXER  
RX: 4.9V/TX: 0V

Q9  
RX: 11.1V  
TX: 0V

Q10  
RX: 4.9V/TX: 0V

Q12  
25016245  
RX: 12.4V  
TX: 12.4V

Q12  
25016245  
RX: 1.9V  
TX: 11.8V

Q12  
25016245  
RX: 0.46V  
TX: 0.46V

73.05MHz

DB1 RL573  
DB1  
CURRENT REVERSAL PRE

Q13  
35K131(M)  
IF AMP

Q15  
35K131(M)  
MIXER

Q26  
35K131(M)  
TX BAL

Q27  
35K131(M)  
TX 3RD MIXER

Q37  
25C2712(Y)  
RX: 1.1V  
TX: 1.1V

Q36  
25C2712(Y)  
RX: 0.4V  
TX: 0.4V

Q38  
25C2712(Y)  
TX: 4.8V

Q40  
25C2712(Y)  
TX: 2.9V

Q41  
25C2712(Y)  
TX: 6.1V

Q42  
25C2712(Y)  
TX: 1.8V

Q3 DTA143TK  
PRE ON

Q7 DTA143TK  
PRE ON 22-30MHz

Q1 DTA143TK  
PRE ON 22M 1.4

Q4 DTC124EK

Q10 DTC124EK

Q2 DTC124EK

Q9 DTC124EK

Q11 DTC124EK

Q13 DTC124EK

Q14 DTC124EK

Q15 DTC124EK

Q16 DTC124EK

Q17 DTC124EK

Q18 DTC124EK

Q19 DTC124EK

Q20 DTC124EK

Q21 DTC124EK

Q22 DTC124EK

Q23 DTC124EK

Q24 DTC124EK

Q25 DTC124EK

Q26 DTC124EK

Q27 DTC124EK

Q28 DTC124EK

Q29 DTC124EK

Q30 DTC124EK

Q31 DTC124EK

Q32 DTC124EK

Q33 DTC124EK

Q34 DTC124EK

Q35 DTC124EK

Q36 DTC124EK

Q37 DTC124EK

Q38 DTC124EK

Q39 DTC124EK

Q40 DTC124EK

Q41 DTC124EK

Q42 DTC124EK

Q43 DTC124EK

Q44 DTC124EK

Q45 DTC124EK

Q46 DTC124EK

Q47 DTC124EK

Q48 DTC124EK

Q49 DTC124EK

Q50 DTC124EK

Q51 DTC124EK

Q52 DTC124EK

Q53 DTC124EK

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Q55 DTC124EK

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Q101 DTC124EK

Q102 DTC124EK

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Q105 DTC124EK

Q106 DTC124EK

Q107 DTC124EK

Q108 DTC124EK

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Q112 DTC124EK

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Q160 DTC124EK

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Q163 DTC124EK

Q164 DTC124EK

Q165 DTC124EK

Q166 DTC124EK

Q167 DTC124EK

Q168 DTC124EK

Q169 DTC124EK

Q170 DTC124EK

Q171 DTC124EK

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Q220 DTC124EK

Q221 DTC124EK

Q222 DTC124EK

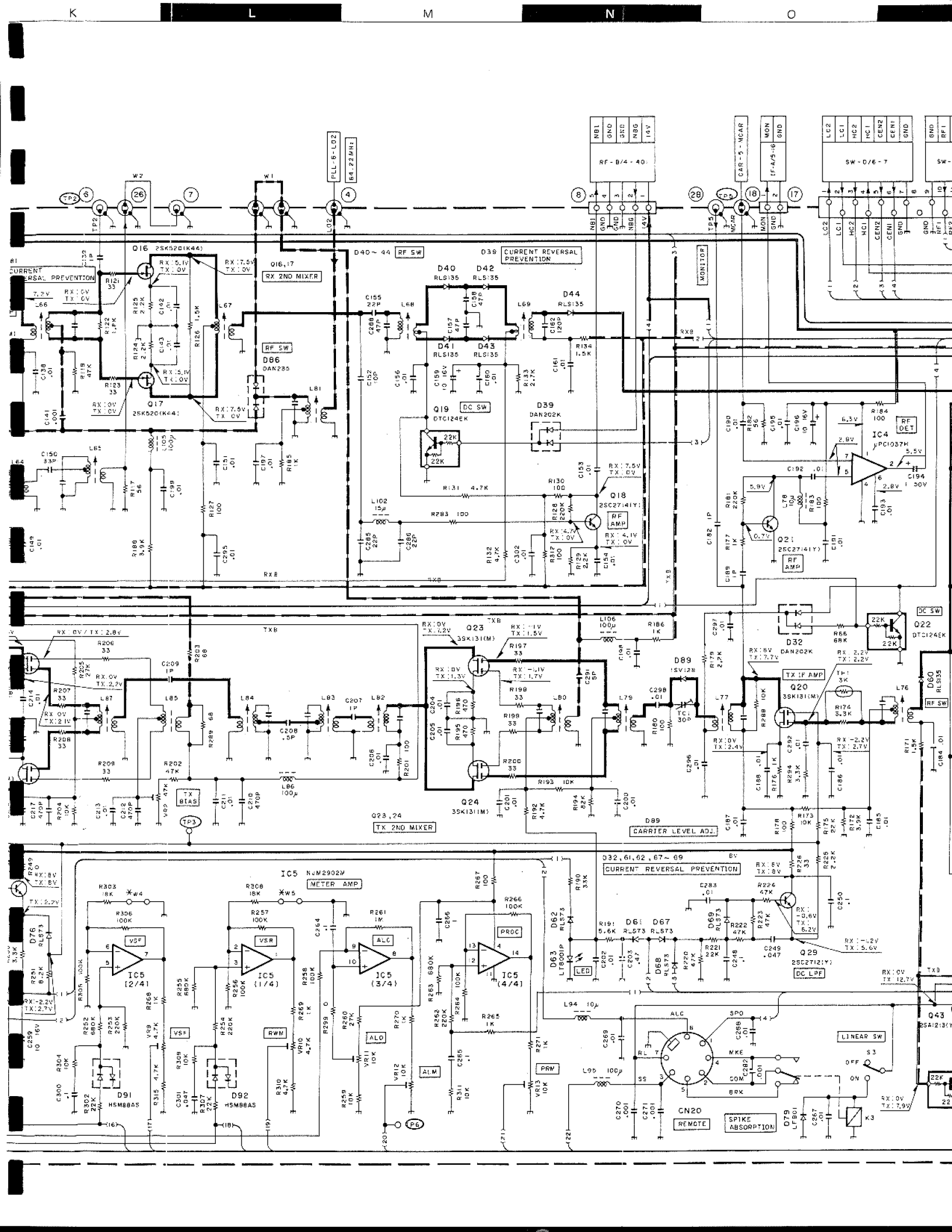
Q223 DTC124EK

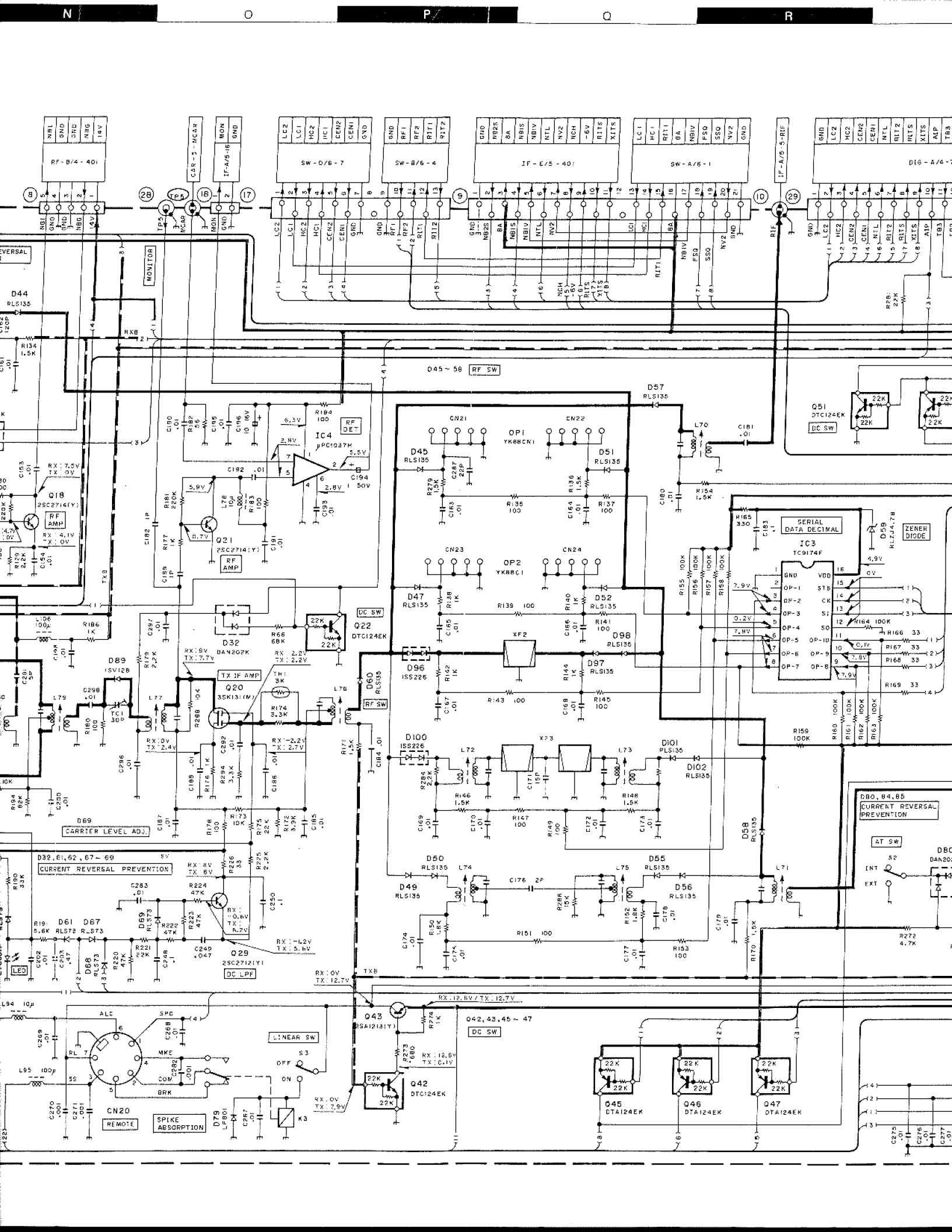
Q224 DTC124EK

Q225 DTC124EK

Q226 DTC124EK









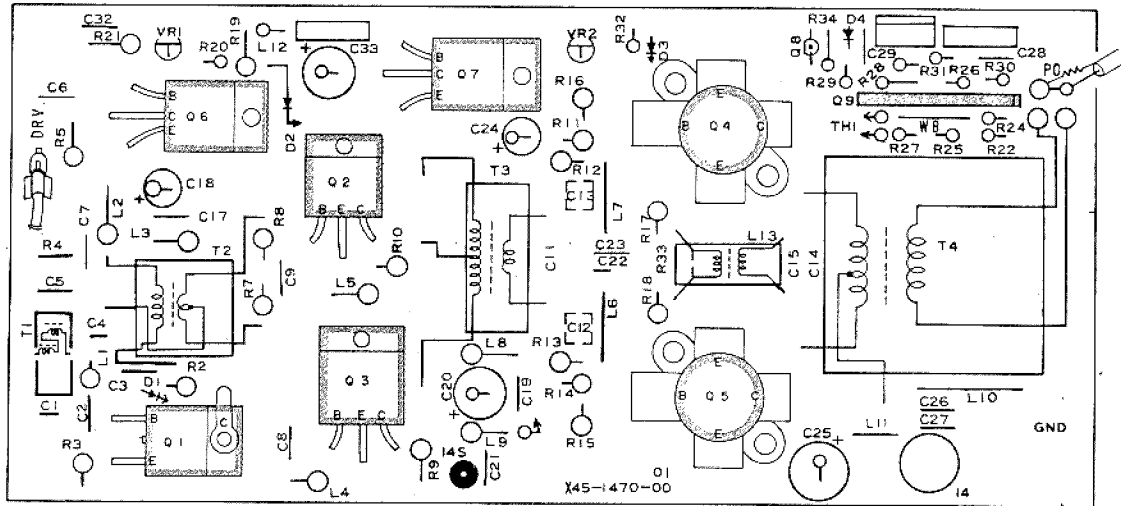




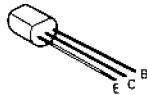


# TS-850S CIRCUIT DIAGRAM / PC BOARD VIEW

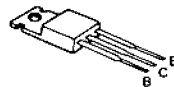
## FINAL UNIT (X45-1470-02) Component side view



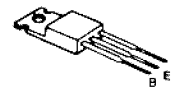
2SC1815(Y)



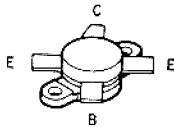
2SC2075



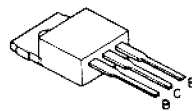
2SC2509



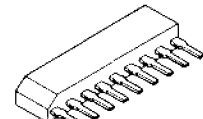
2SC2879



2SD1406(Y)

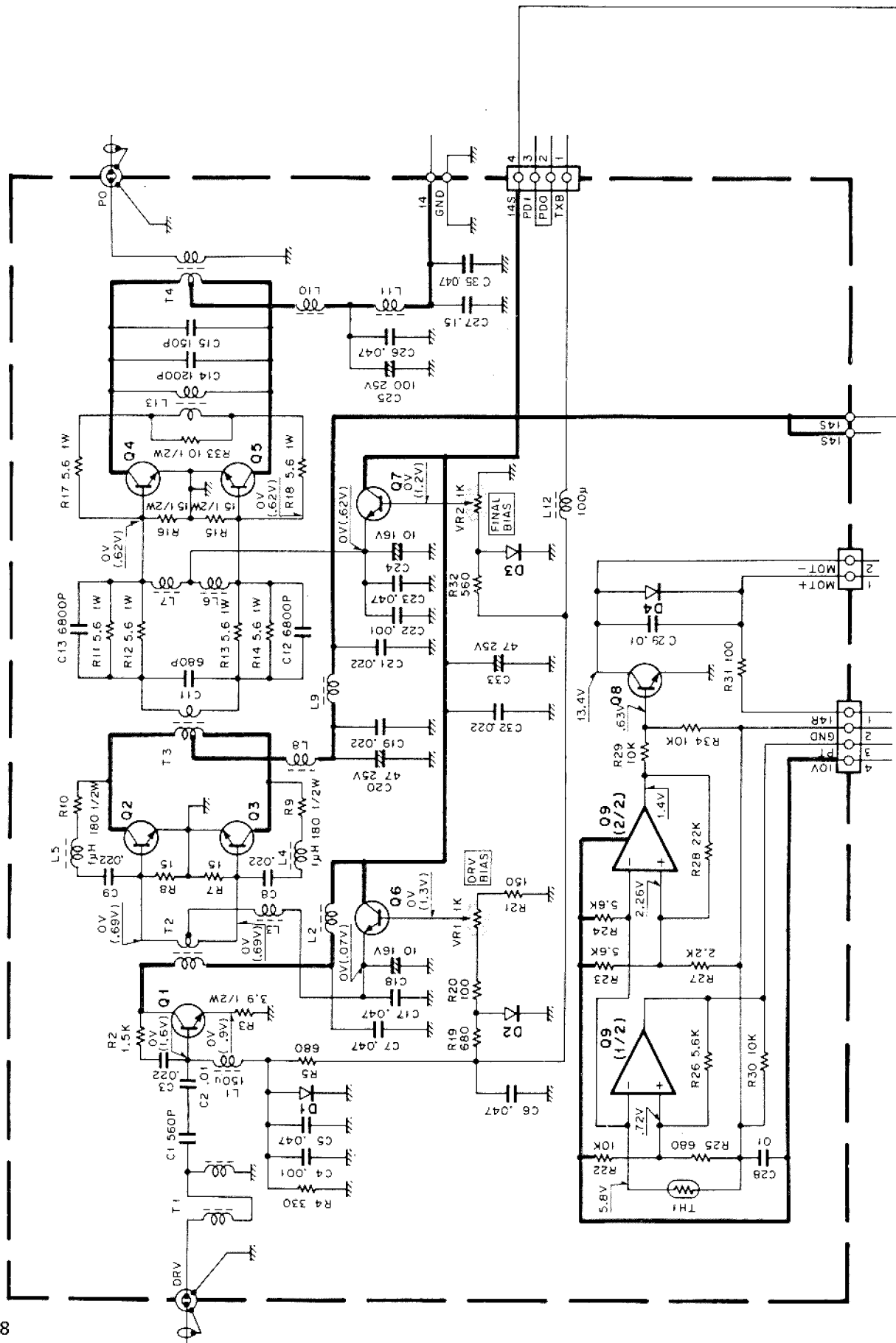


AN6551



FINAL UNIT (X45-1470-02)

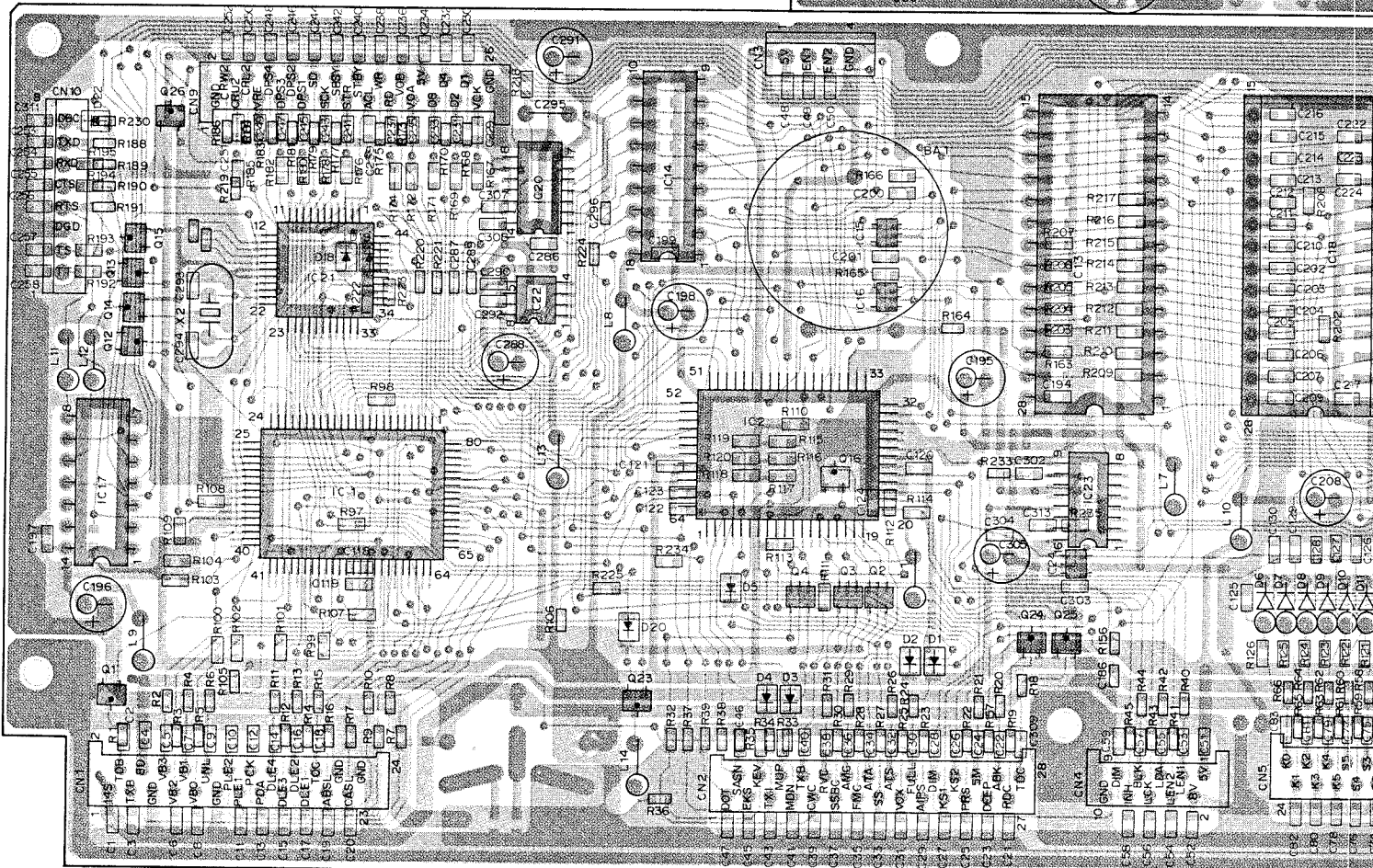
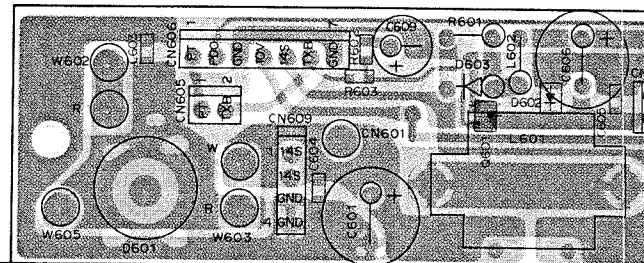
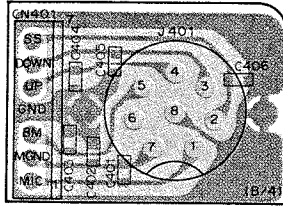
FINAL UNIT (X45-1470-02)



- Q1 : 2SC2075
- Q2,3 : 2SC2509
- Q4,5 : 2SC2879\*J
- O6,7 : 2SD1406(Y)
- O8 : 2SC1815(Y)
- O9 : AN6551
- D1 : KB-365
- D2,3 : SV-03YS
- D4 : IS1555 or IN4448

**DIGITAL UNIT (X46-308X-XX) Component side view**

0-11 : K,K2,P,P2 0-21 : M,M2 0-22 : M3,M4 0-71 : X,X2 2-71 : E,E2 2-72 : E3,E4

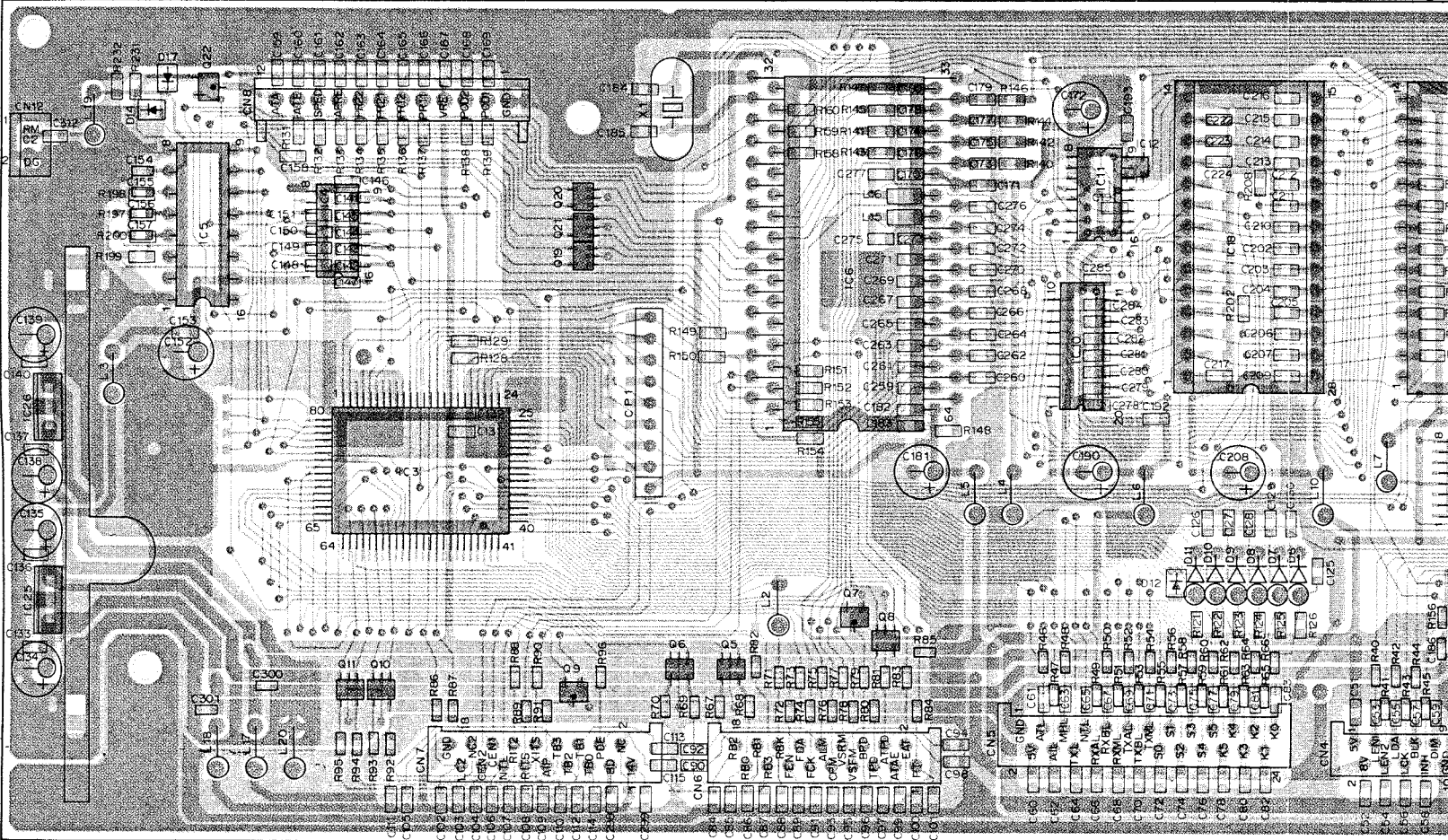
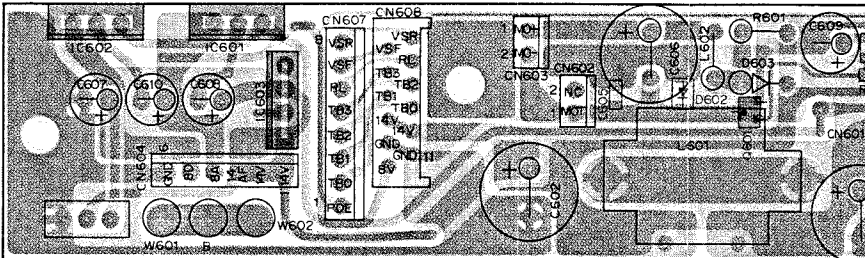
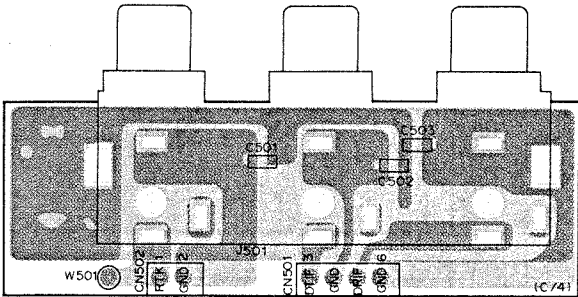






**DIGITAL UNIT (X46-308X-XX) Foil side view**

0-11 : K,K2,P,P2 0-21 : M,M2 0-22 : M3,M4 0-71 : X,X2 2-71 : E,E2 2-72 : E3,E4







# 50S CIRCUIT DIAGRAM

DBC
TXD
RXD
CTS
RTS
DGD
TS
TT

FIL-C/3-9

10

GND
CRW2
CRU2
CRL2
VRE
DPS4
DPS3
DPS2
DPS1
SD
SCK
SBSY
STR
STBY
ACL
WR
RD
VOB
VCA
SY
DB
D4
D2
D1
YCK
GND

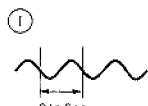
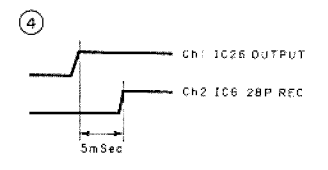
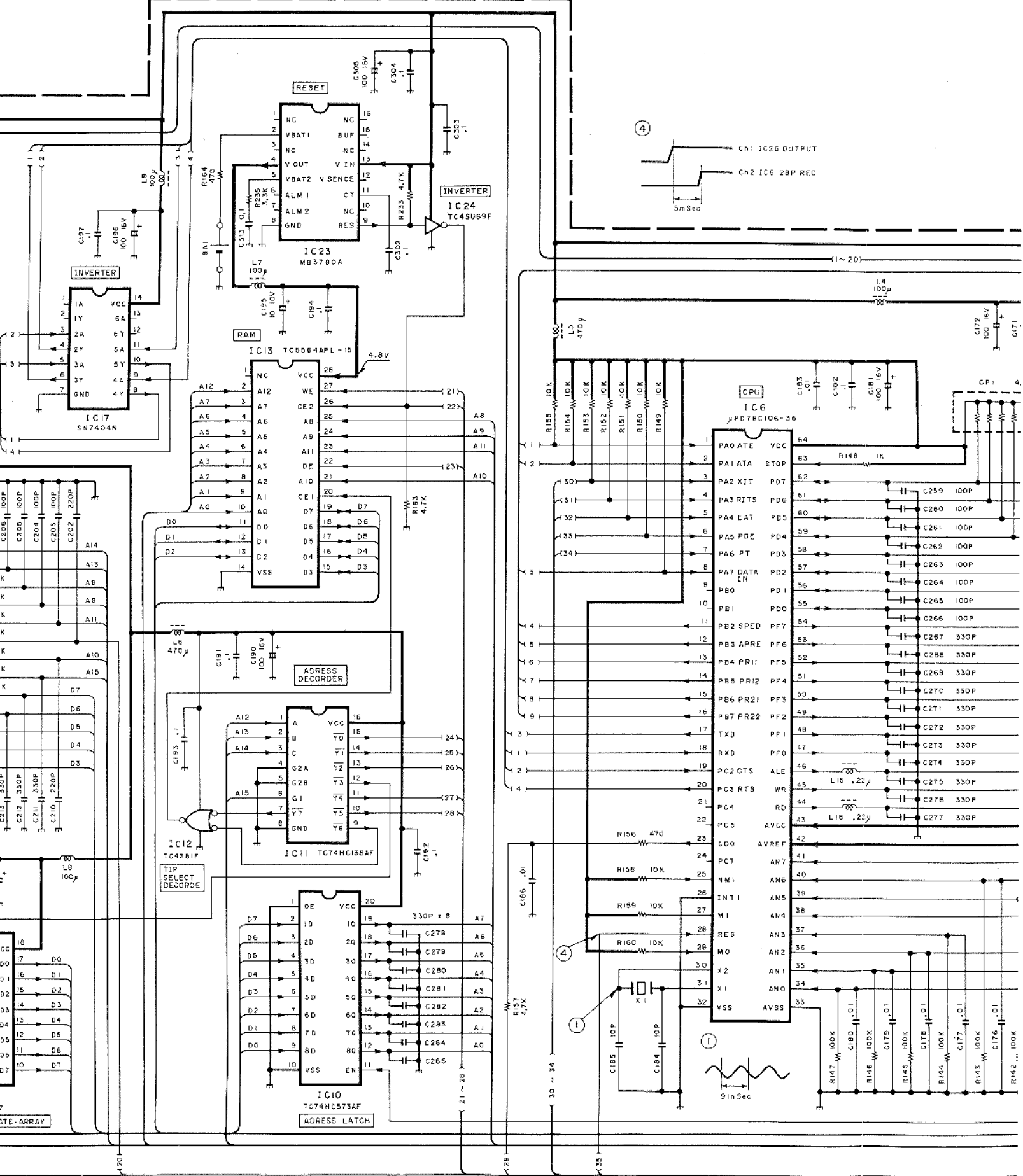
RF-C/4-504

16

DIGIT



DIGITAL UNIT (X46-308X-XX)(A/4)(1/2)

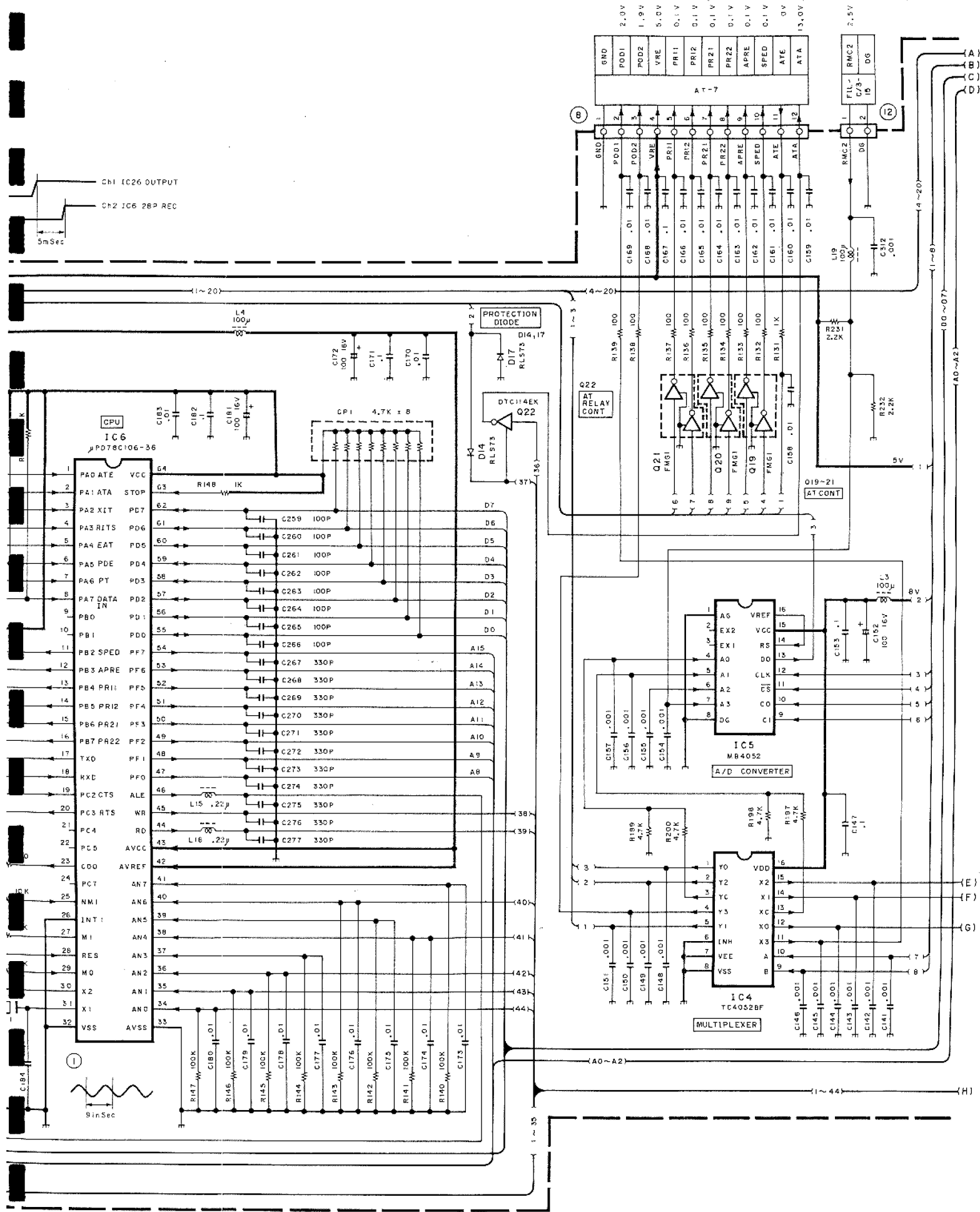


**CPU**  
IC6  
PD78C106-36

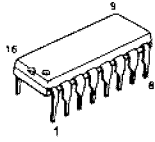
1	PA0	ATE	VCC	64
2	PA1	ATA	STOP	63
3	PA2	XIT	POT	62
4	PA3	RIT5	PD6	61
5	PA4	EAT	PD5	60
6	PA5	PDE	PD4	59
7	PA6	PT	PD3	58
8	PA7	DATA IN	PD2	57
9	PB0	PD1	56	
10	PB1	PD0	55	
11	PB2	SPED	FF7	54
12	PB3	APRE	PF6	53
13	PB4	PR11	PF5	52
14	PB5	PR12	PF4	51
15	PB6	PR21	PF3	50
16	PB7	PR22	PF2	49
17	TXD	PF1	48	
18	RXD	PF0	47	
19	PC2	CTS	ALE	46
20	PC3	RTS	WR	45
21	PC4	RD	44	
22	PC5	AVCC	43	
23	CD0	AVREF	42	
24	PC7	AN7	41	
25	NM1	AN6	40	
26	INT1	AN5	39	
27	M1	AN4	38	
28	RES	AN3	37	
29	MO	AN2	36	
30	X2	AN1	35	
31	X1	AN0	34	
32	VSS	AVSS	33	

# DIGITAL UNIT (X46-308X-XX)

0-11 : K,K2,P,P2 0-21 : M,M2 0-22 : M3,M4 0-71 : X,X2 2-71 : E,E2 2-72 : E3,E4



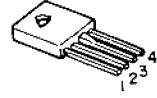
MB4052



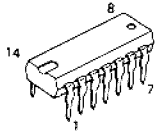
2SC2712(Y)  
DTA143EK  
DTC114EK  
DTC143EK



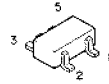
LA5010



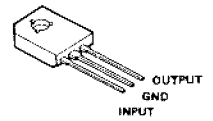
SN7404N



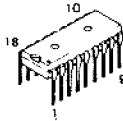
TC4S81F  
TC4S584F  
TC4SU69F  
FMG1



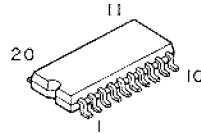
AN78N08



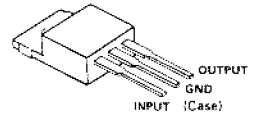
LZ92K37



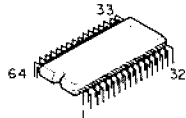
TC74HC573AF



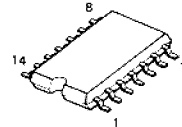
μPC7805H  
μPC7808H



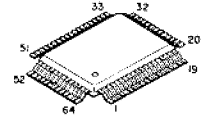
μPD78C10G-36



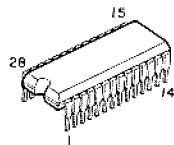
TC4011BF



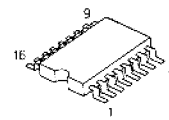
CXD1095Q



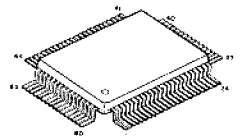
TC5564APL-15



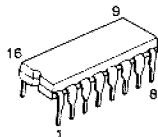
TC74HC138AF



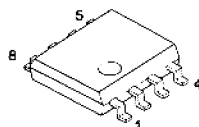
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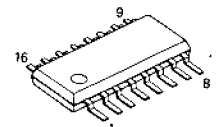
TC4052BF



CAT35C102KI



MB3780A

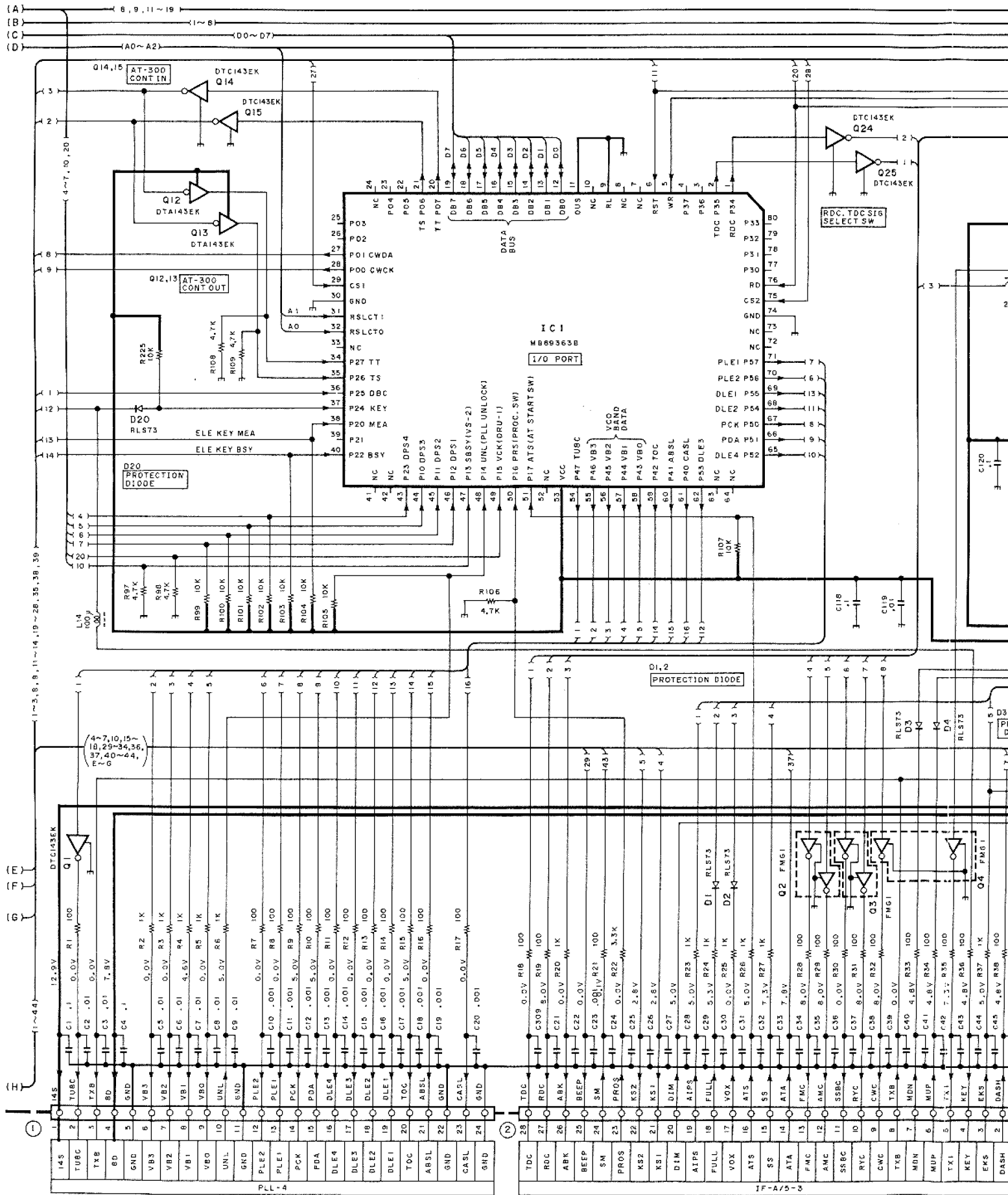


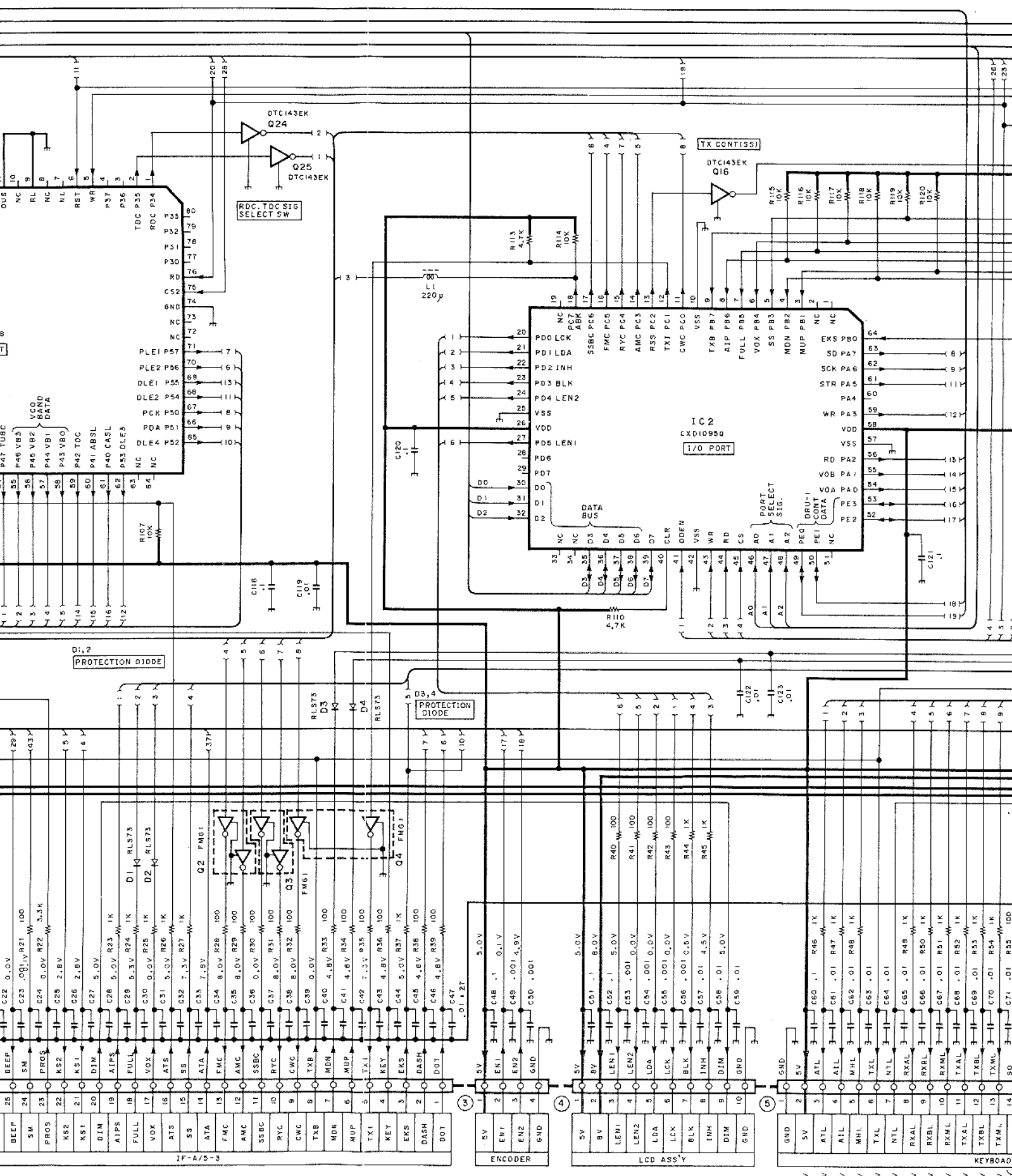


# DIGITAL UNIT (X46-308X-XX)

0-11 : K,K2,P,P2 0-21 : M,M2 0-22 : M3,M4 0-71 : X,X2 2-71 : E,E2 2-72 : E3,E4

DIGITAL UNIT (X46-308X-XX)(A/4)(2/2)



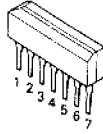




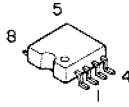


# TS-850S PC BOARD VIEWS

TA7302P



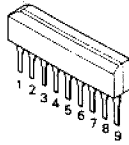
NJM2904M  
NJM4558M



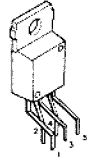
2SA1162(Y)  
2SC2712(Y)  
2SC3324(G)  
2SD1757K  
DTA124EK  
DTC114EK  
DTC124EK  
DTC114TK



TA7324P



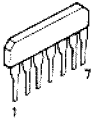
$\mu$ PC2002V



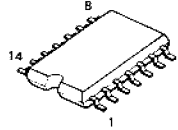
2SK210(GR)



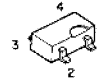
$\mu$ PC1037HA



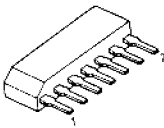
TC4011BF  
TC4001BF  
TC4066BF  
TC4069UBF



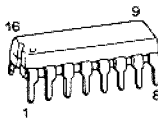
3SK131(M)



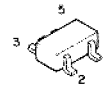
AN612



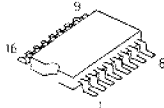
MC3357P



FMA1  
FMC2  
FMG2



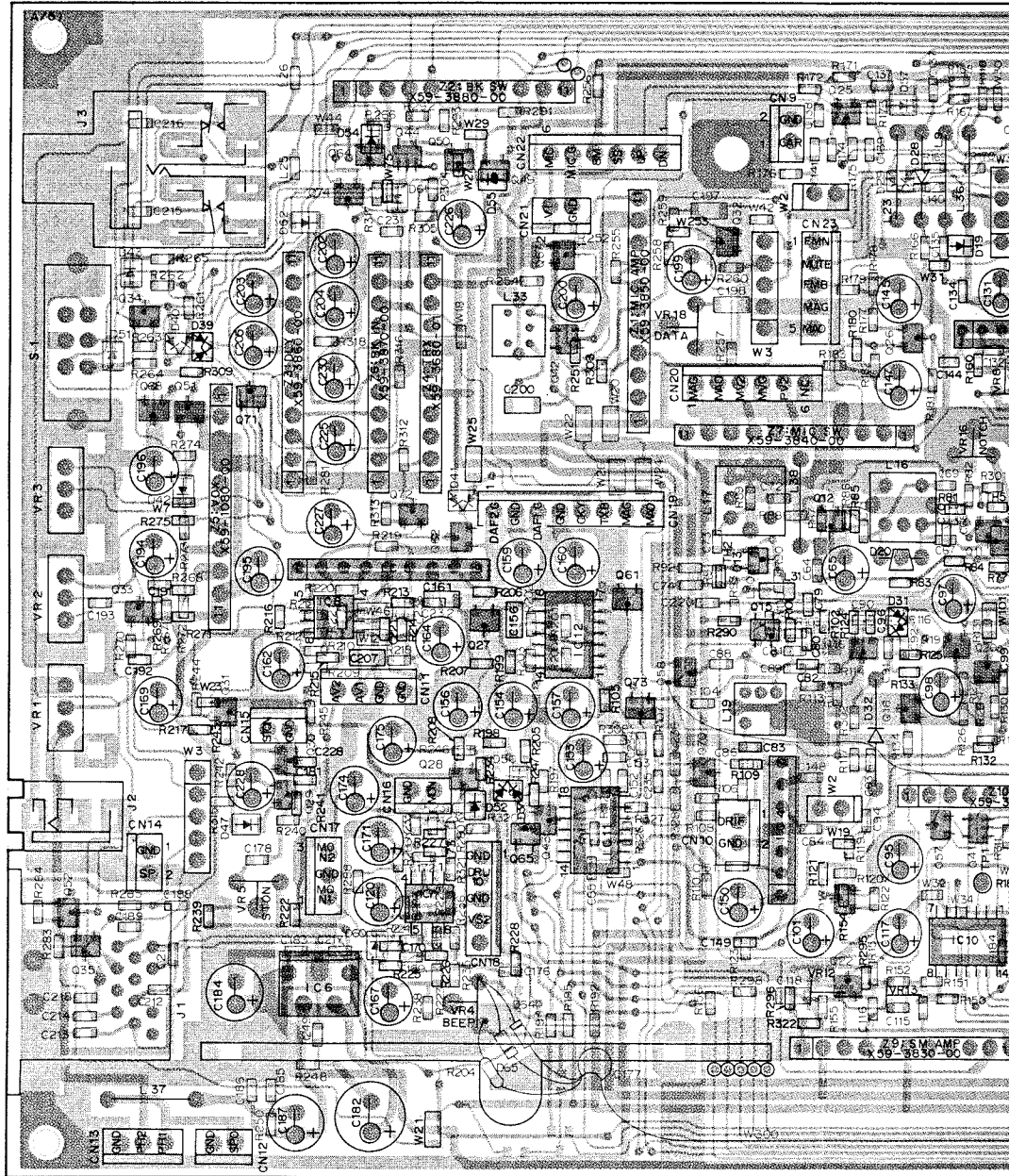
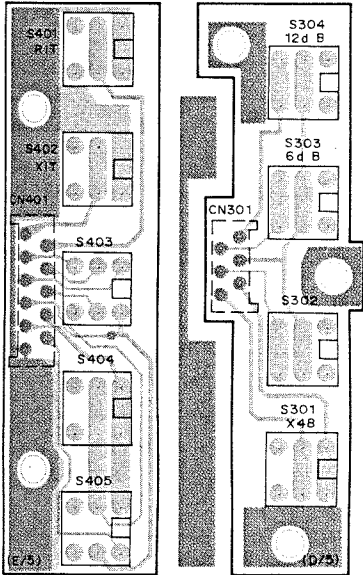
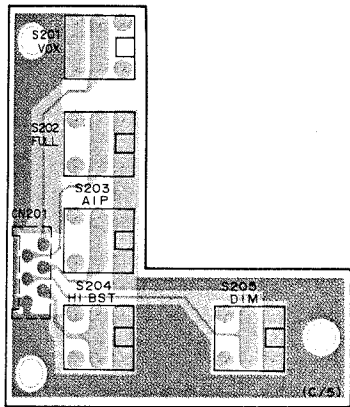
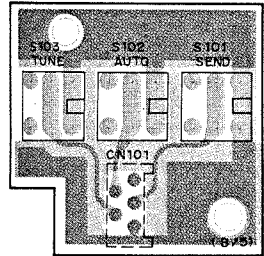
TC453813BF



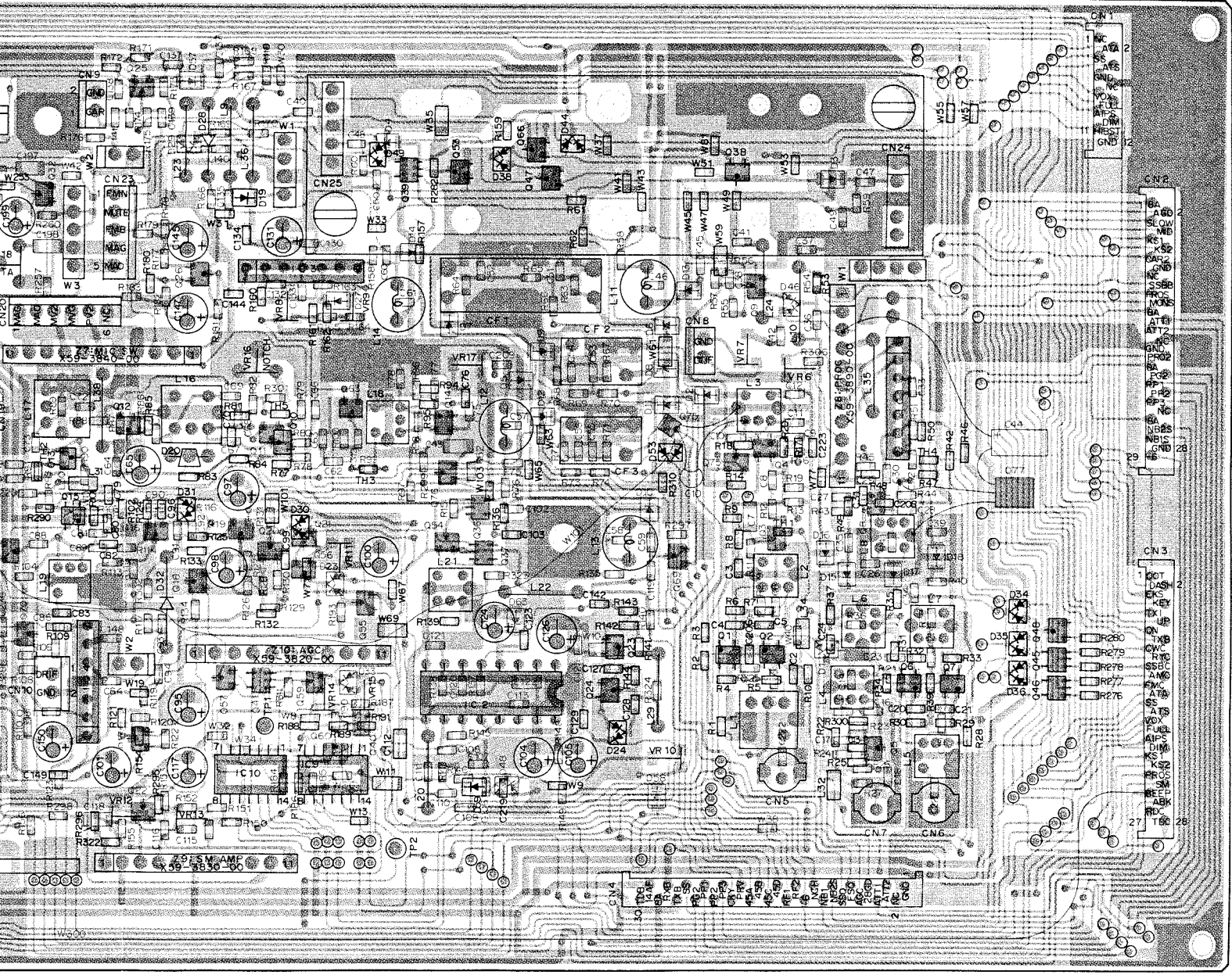
2SA1213(Y)



IF UNIT (X48-3080-00) Component side view

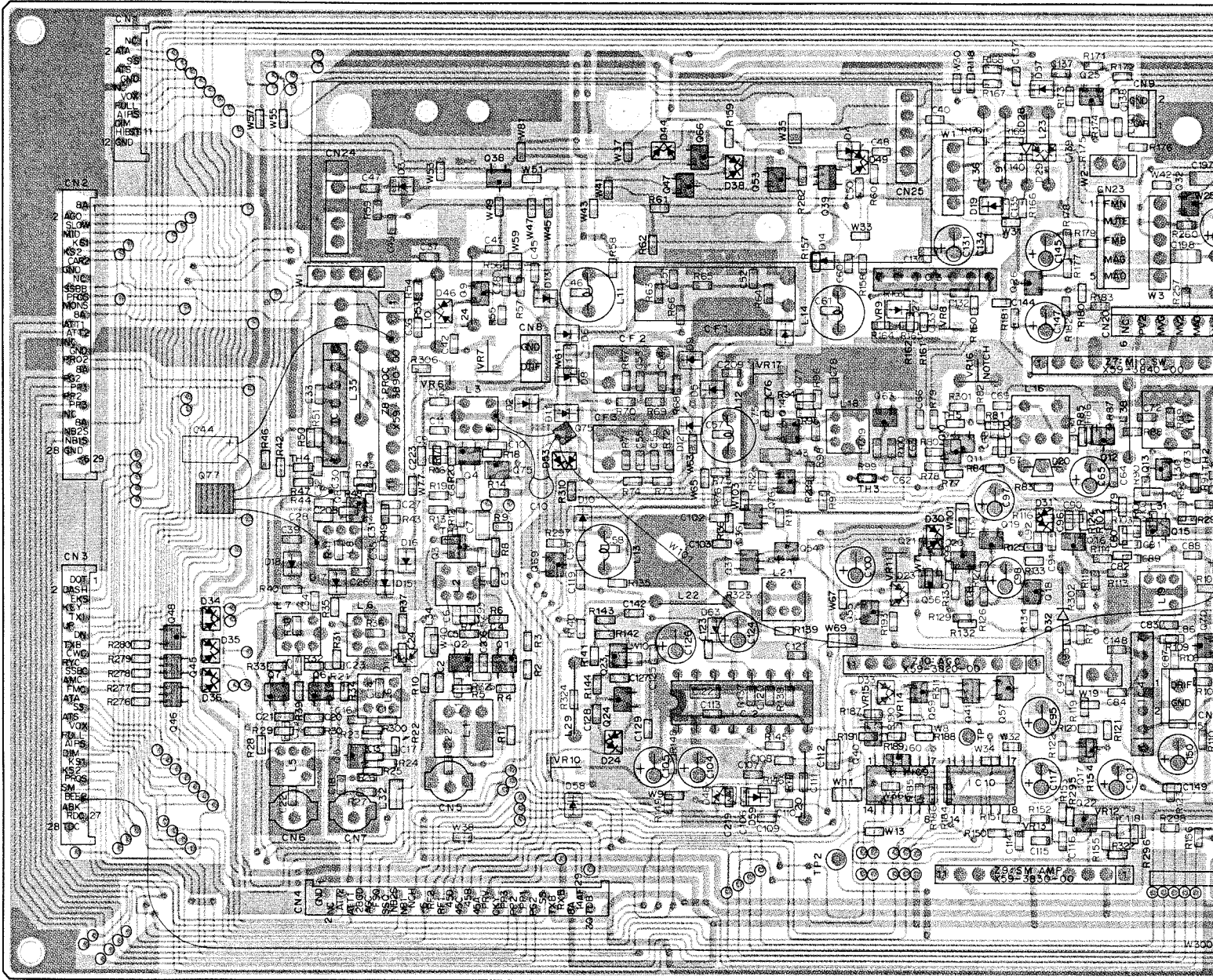


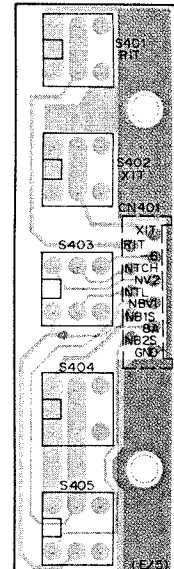
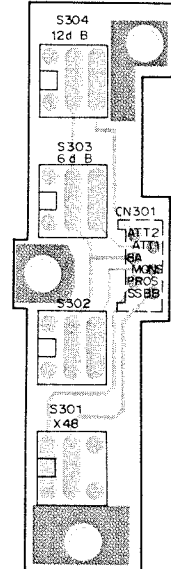
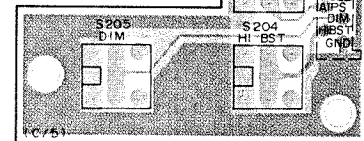
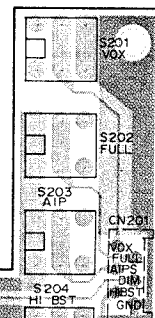
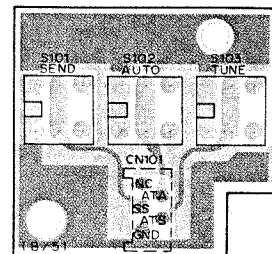
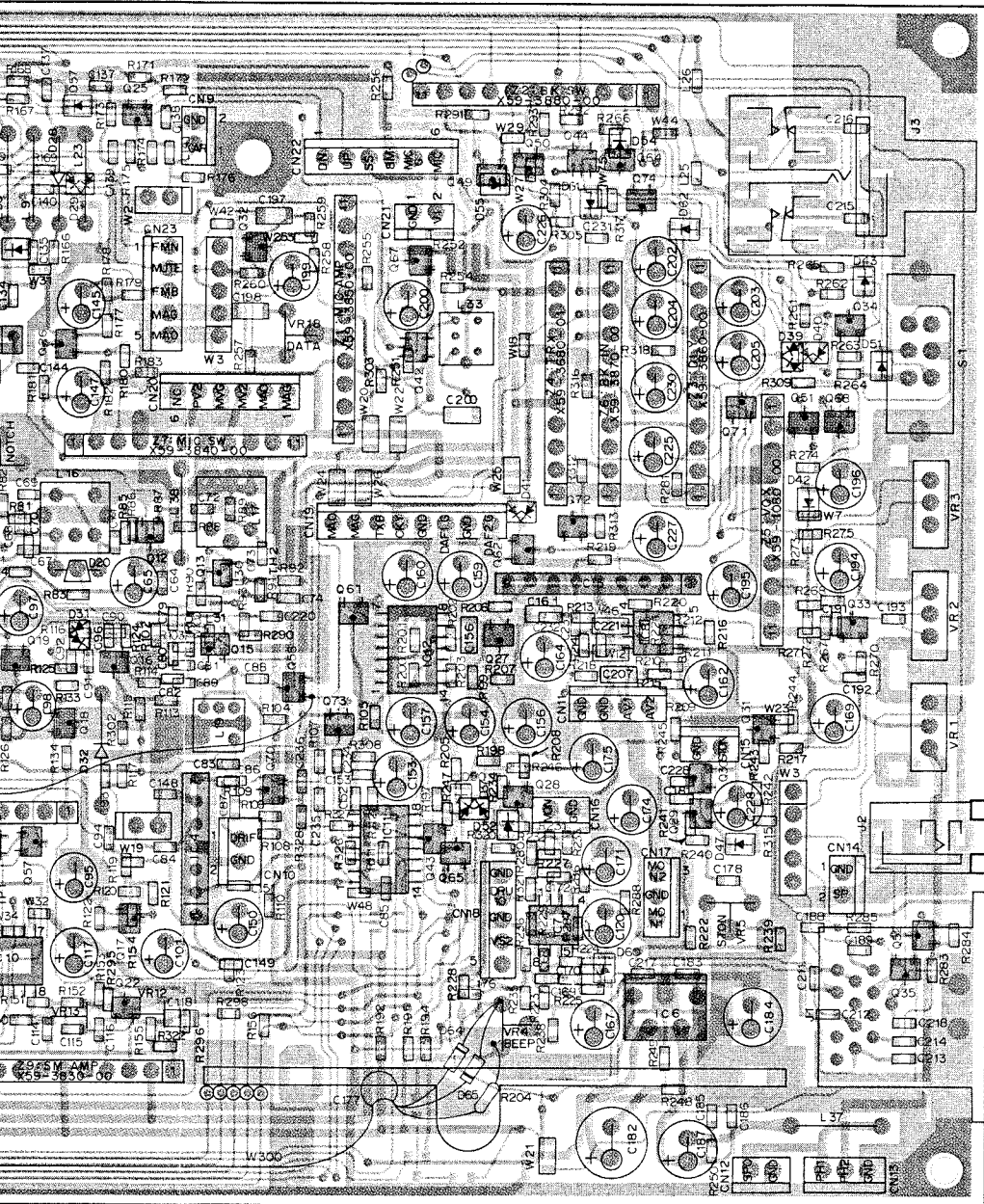




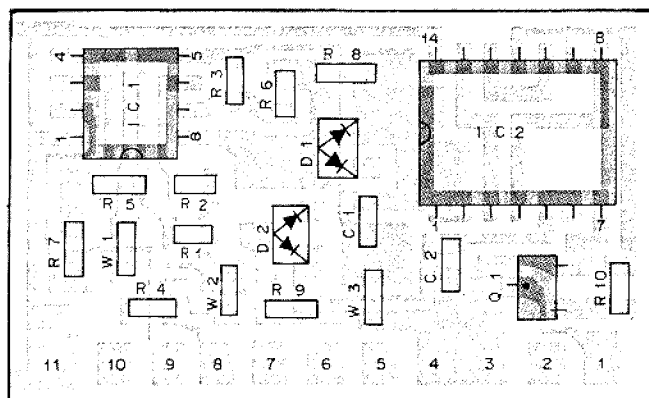


IF UNIT (X48-3080-00) Foil side view

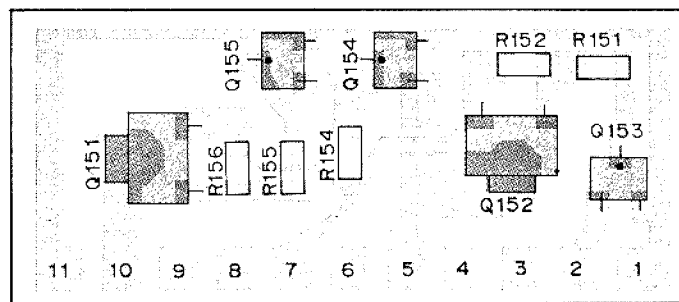




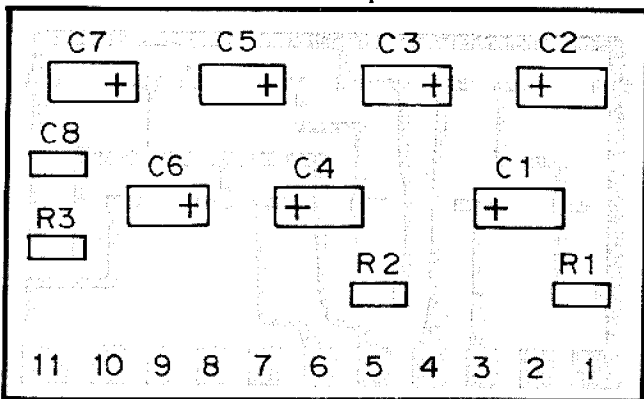
VOX (X59-1080-00) Component side view



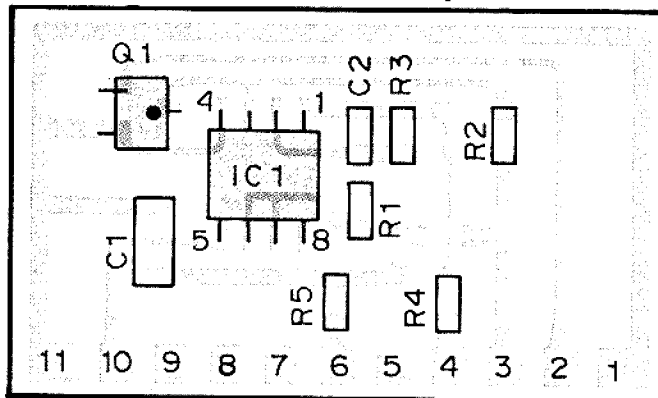
TRX (X59-3680-01) Component side view



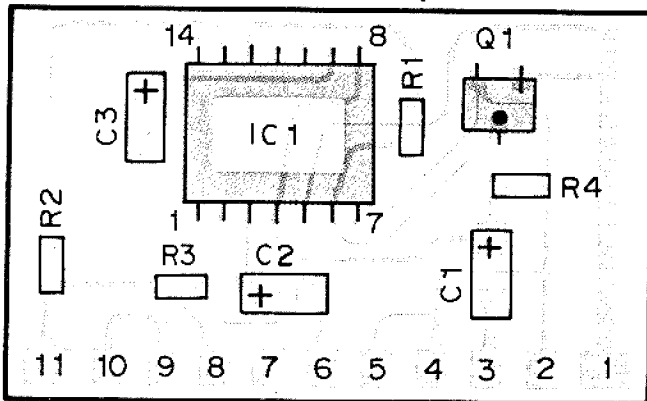
AGC (X59-3820-00) Component side view



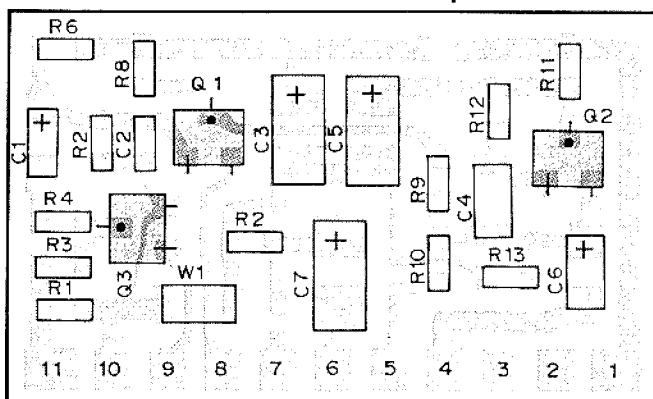
SM AMP (X59-3830-00) Component side view



MIC SW (X59-3840-00) Component side view

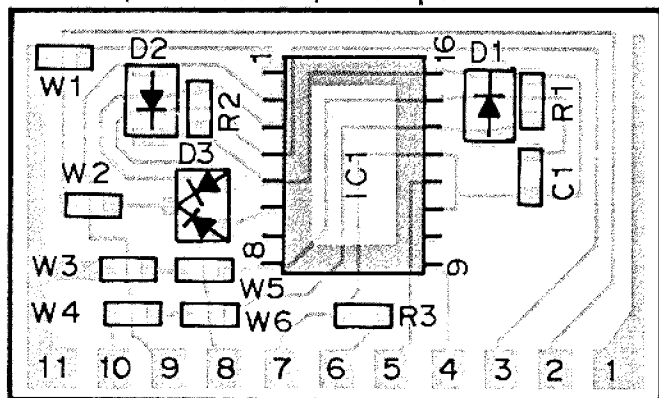


MIC AMP (X59-3850-00) Component side view

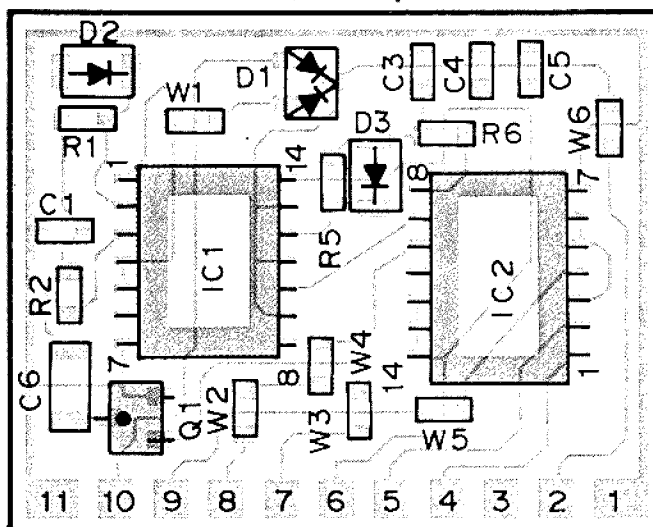


# PC BOARD VIEWS TS-850S

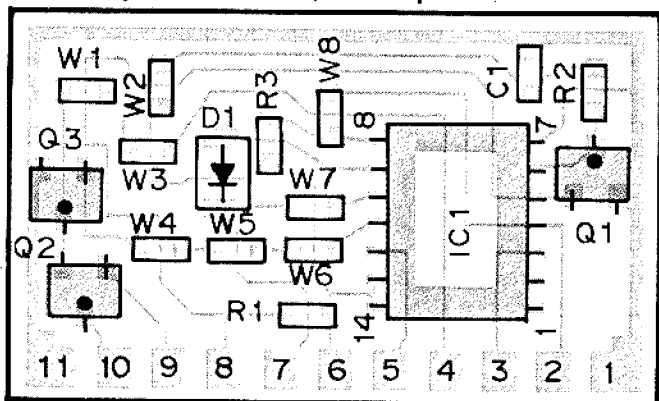
DELAY (X59-3860-00) Component side view



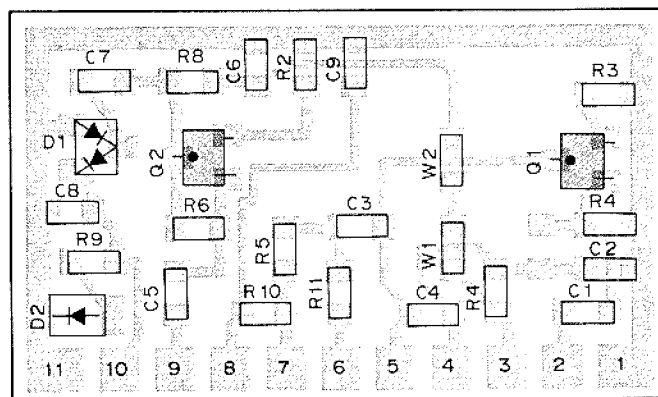
BK IN (X59-3870-00) Component side view



BK SW (X59-3880-00) Component side view



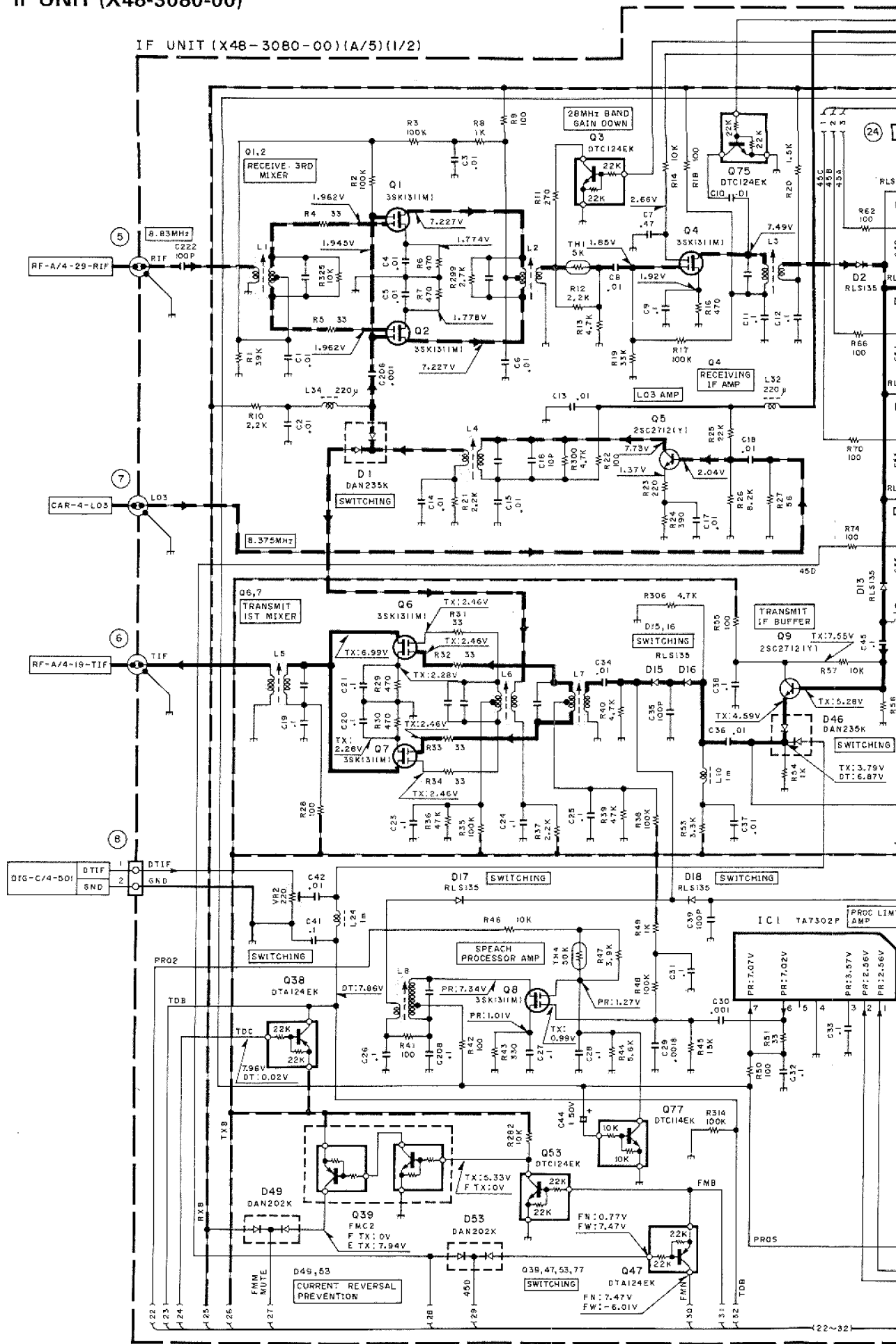
PROC AMP (X59-3890-00) Component side view

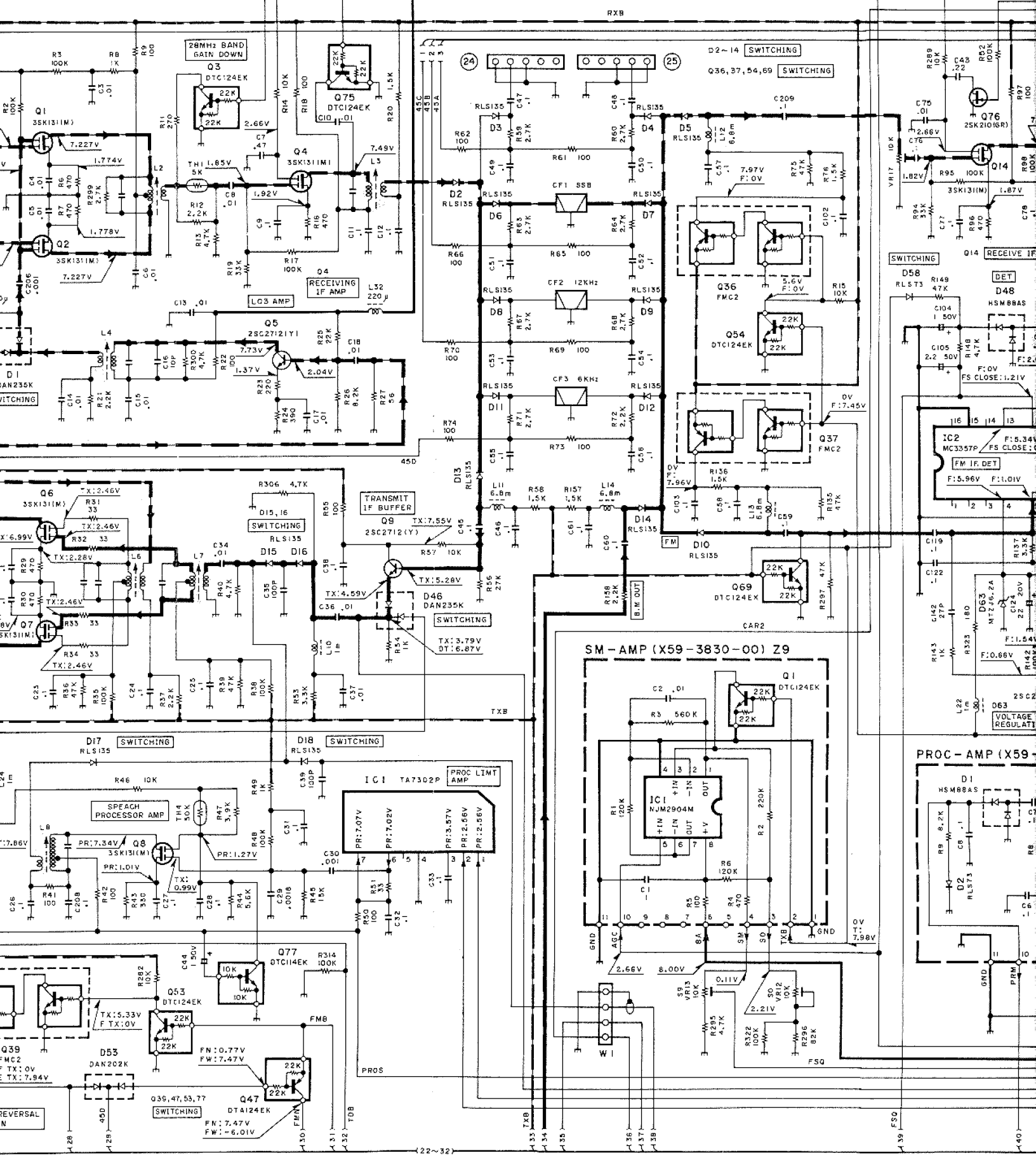


# TS-850S CIRCUIT DIAGRAM

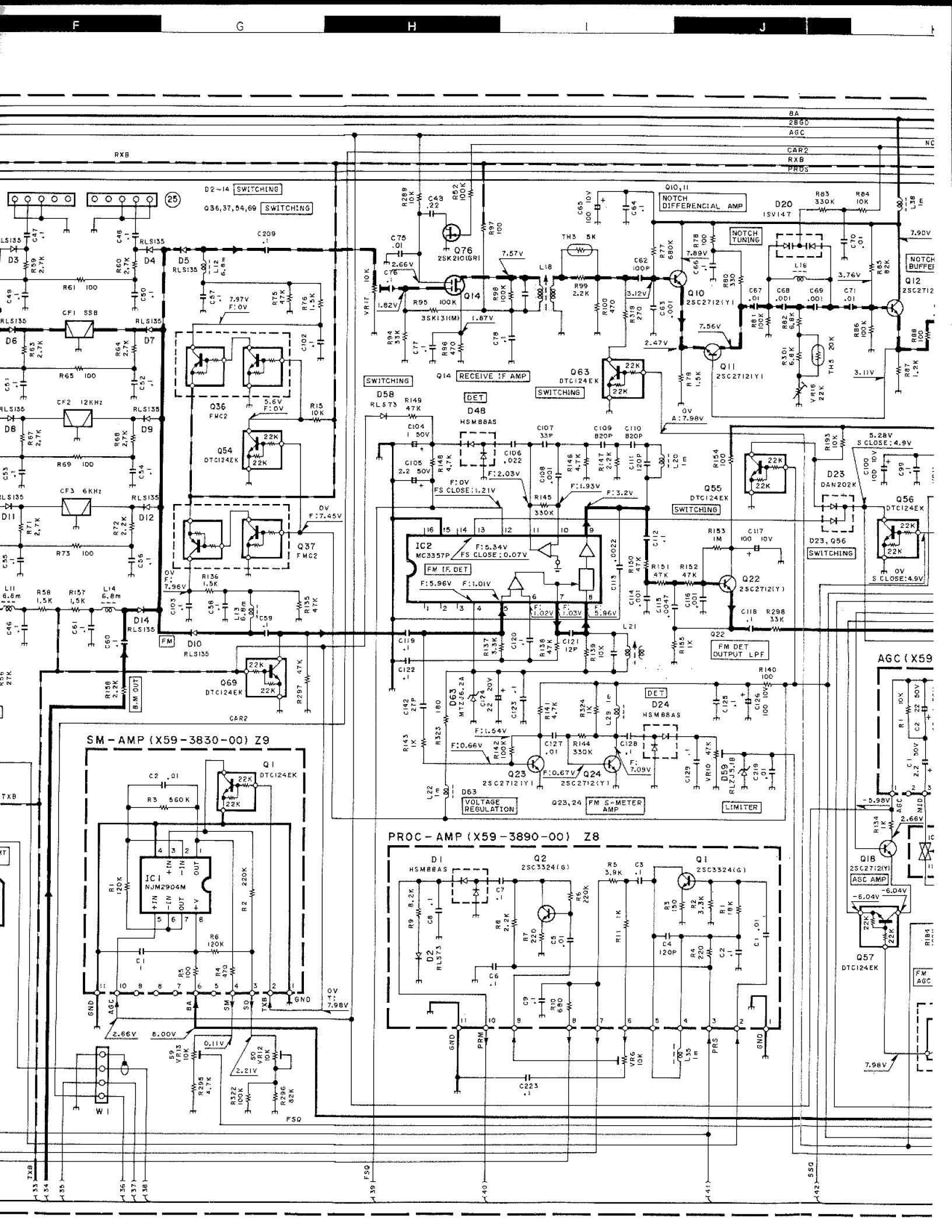
## IF UNIT (X48-3080-00)

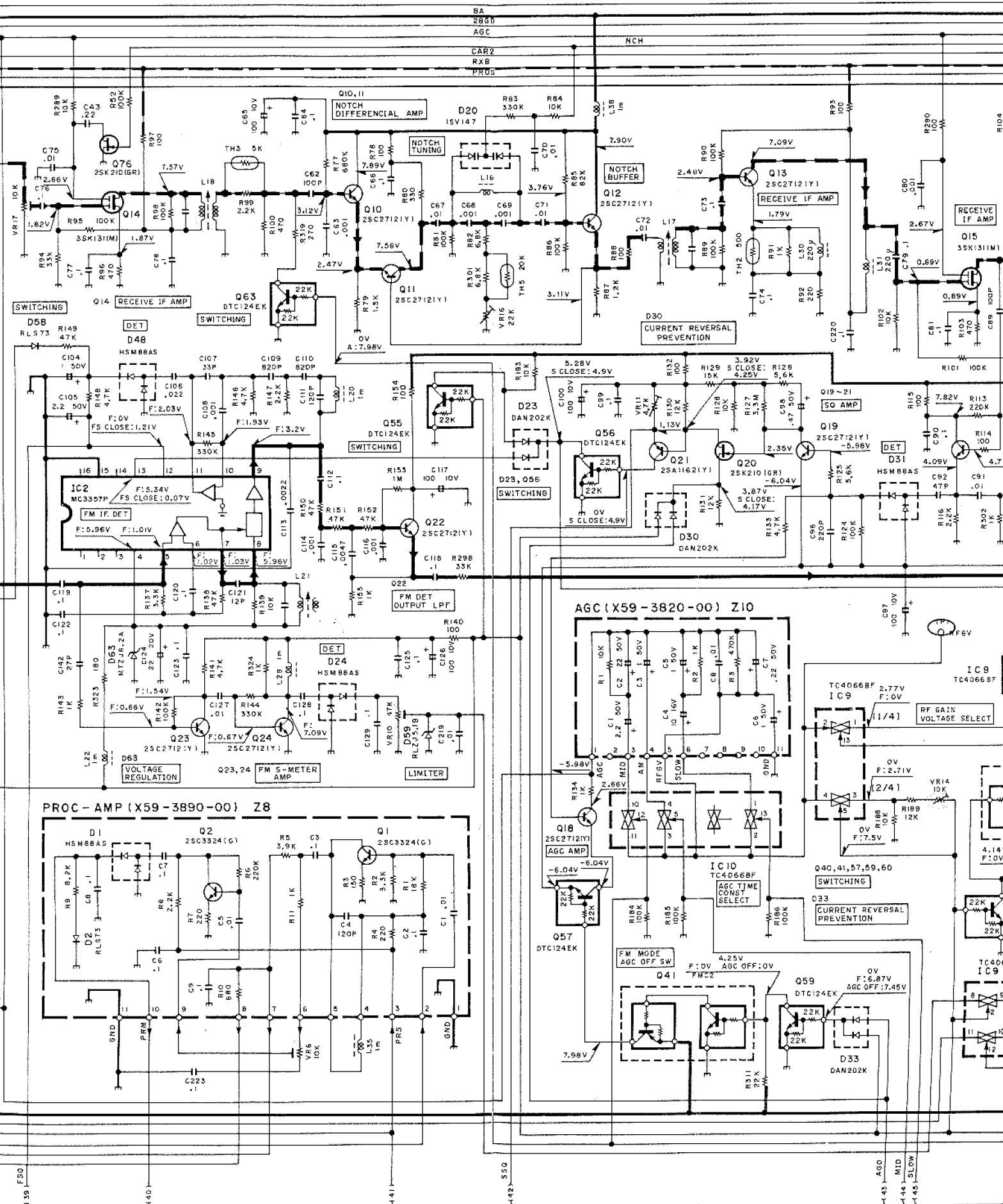
IF UNIT (X48-3080-00) (A/5) (1/2)



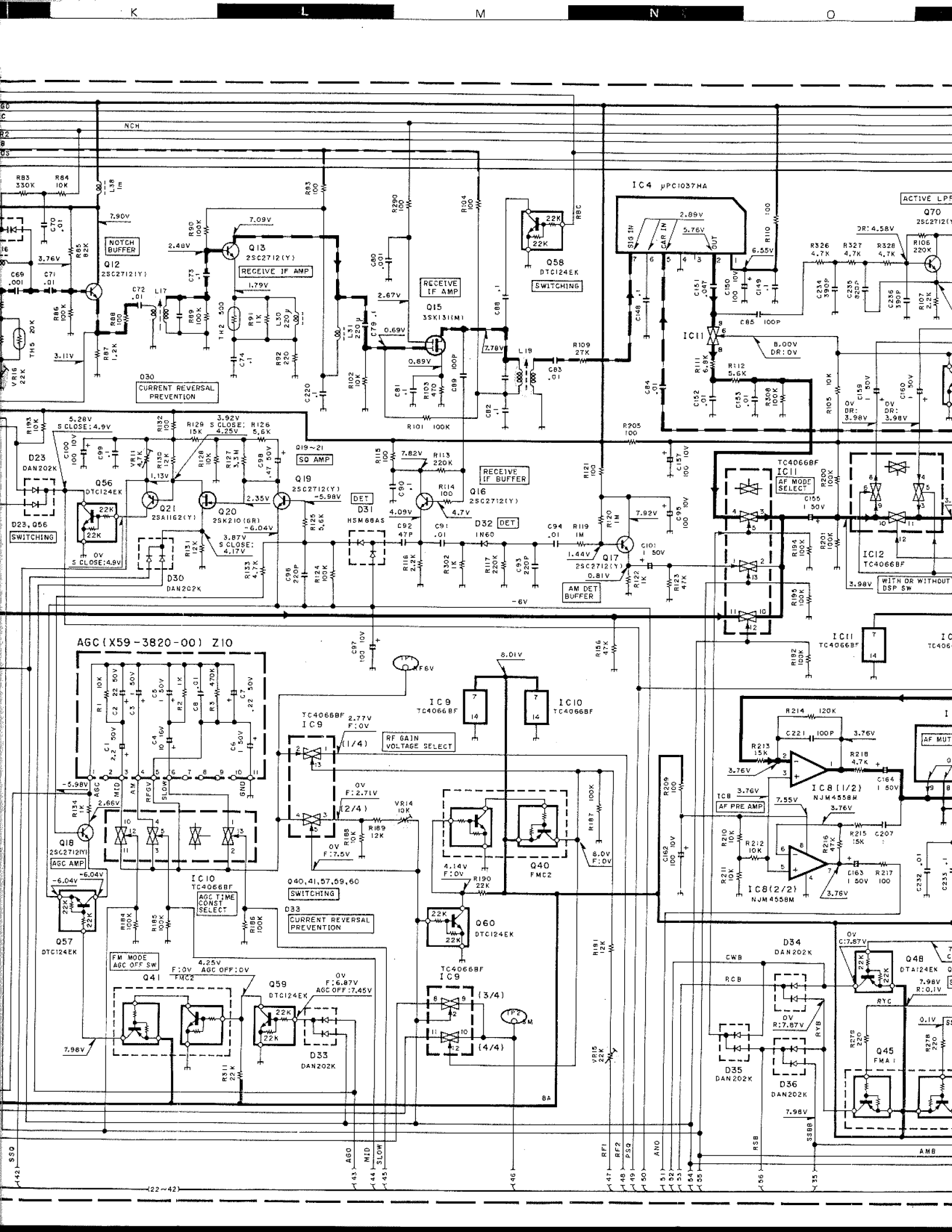


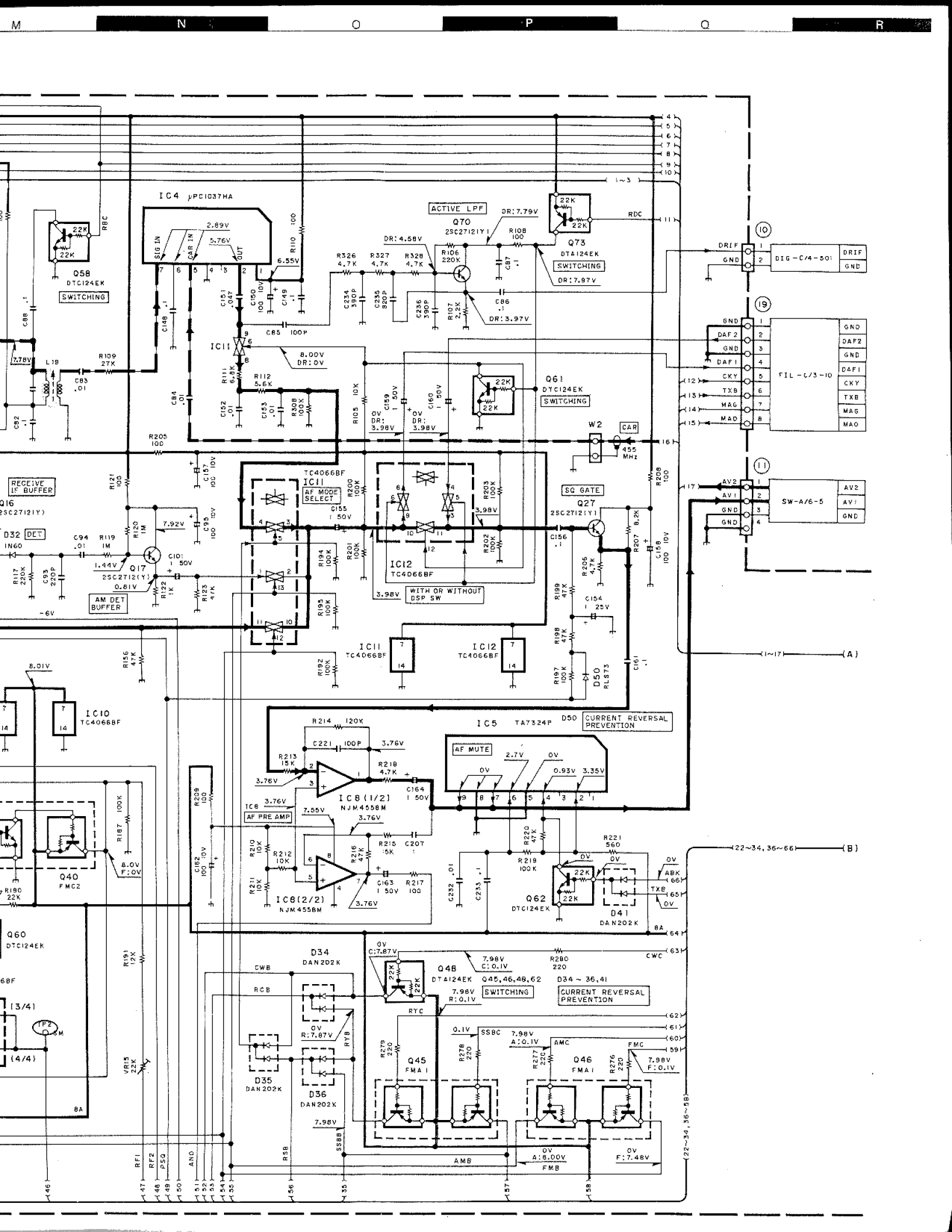






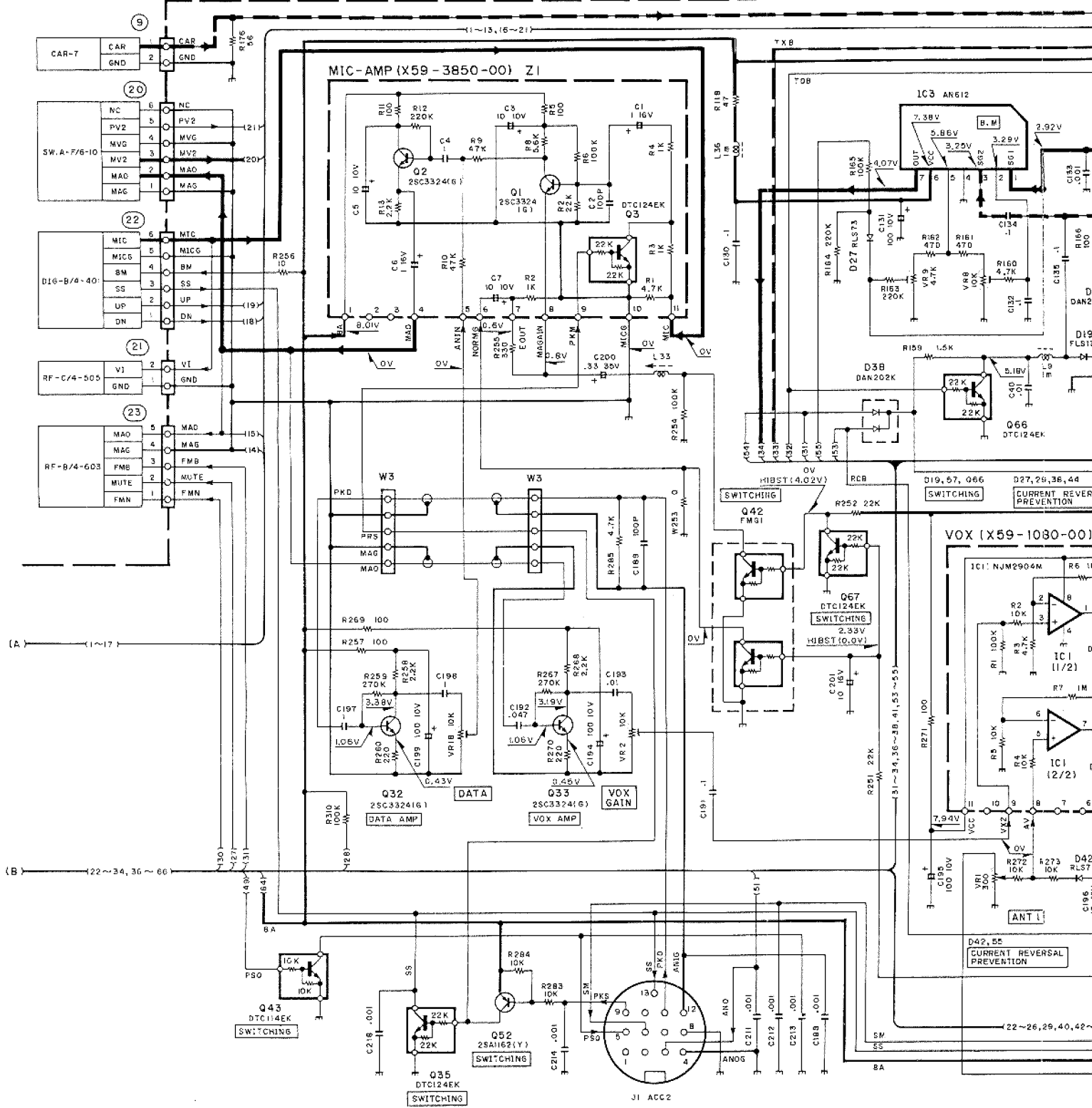


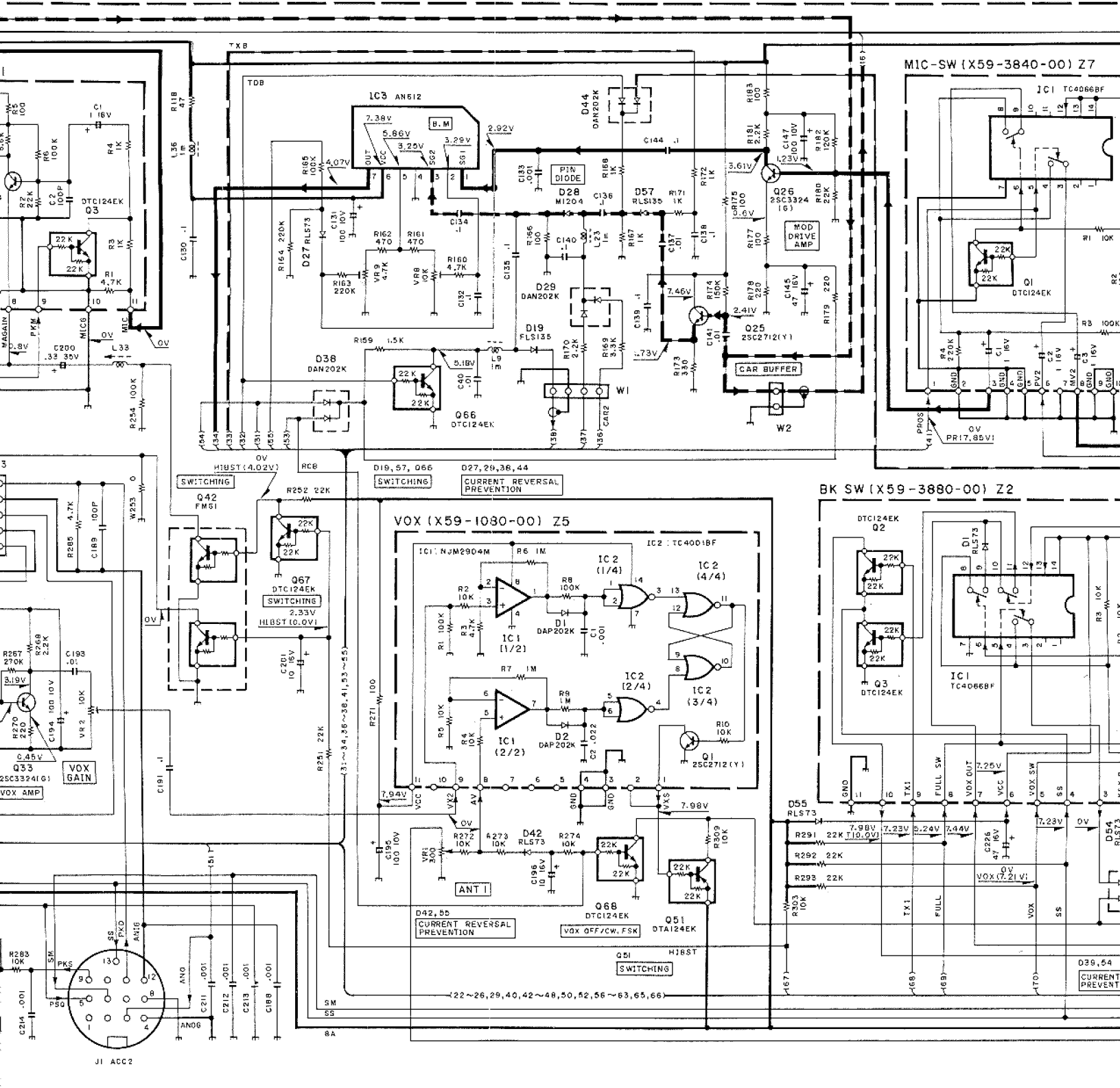




IF UNIT (X48-3080-00)

IF UNIT (X48-3080-00) (A/5) (2/2)





TDB

SWITCHING

SWITCHING

CURRENT REVERSAL PREVENTION

VOX (X59-1030-00) Z5

IC1: NJM2904M

IC2: TC4001BF

IC2 (1/4)

IC2 (4/4)

IC1 (1/2)

IC1 (2/2)

IC2 (2/4)

IC2 (3/4)

D1 DAP202K

D2 DAP202K

Q1 25C2712(Y1)

ANT I

D42, 55 DTC124EK

CURRENT REVERSAL PREVENTION

VOX OFF/CW, FSK

Q51 DTA124EK

SWITCHING

Q51 H1B5T

22~26, 29, 40, 42~48, 50, 52, 56~63, 65, 66

MIC-SW (X59-3840-00) Z7

IC1 TC4066BF

Q1 DTC124EK

PR17, 85V

BK SW (X59-3880-00) Z2

IC1 TC4066BF

Q2 DTC124EK

Q3 DTC124EK

Q51 H1B5T

Q51 DTA124EK

Q51 H1B5T

Q51 DTA124EK

Q51 H1B5T

Q51 DTA124EK

Q51 H1B5T

Q51 DTA124EK

Q51 H1B5T

Q51 DTA124EK

Q51 H1B5T

Q51 DTA124EK

Q51 H1B5T

Q51 DTA124EK

Q51 H1B5T

Q51 DTA124EK

Q51 H1B5T

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Q51 H1B5T

Q51 DTA124EK

Q51 H1B5T

Q51 DTA124EK

Q51 H1B5T

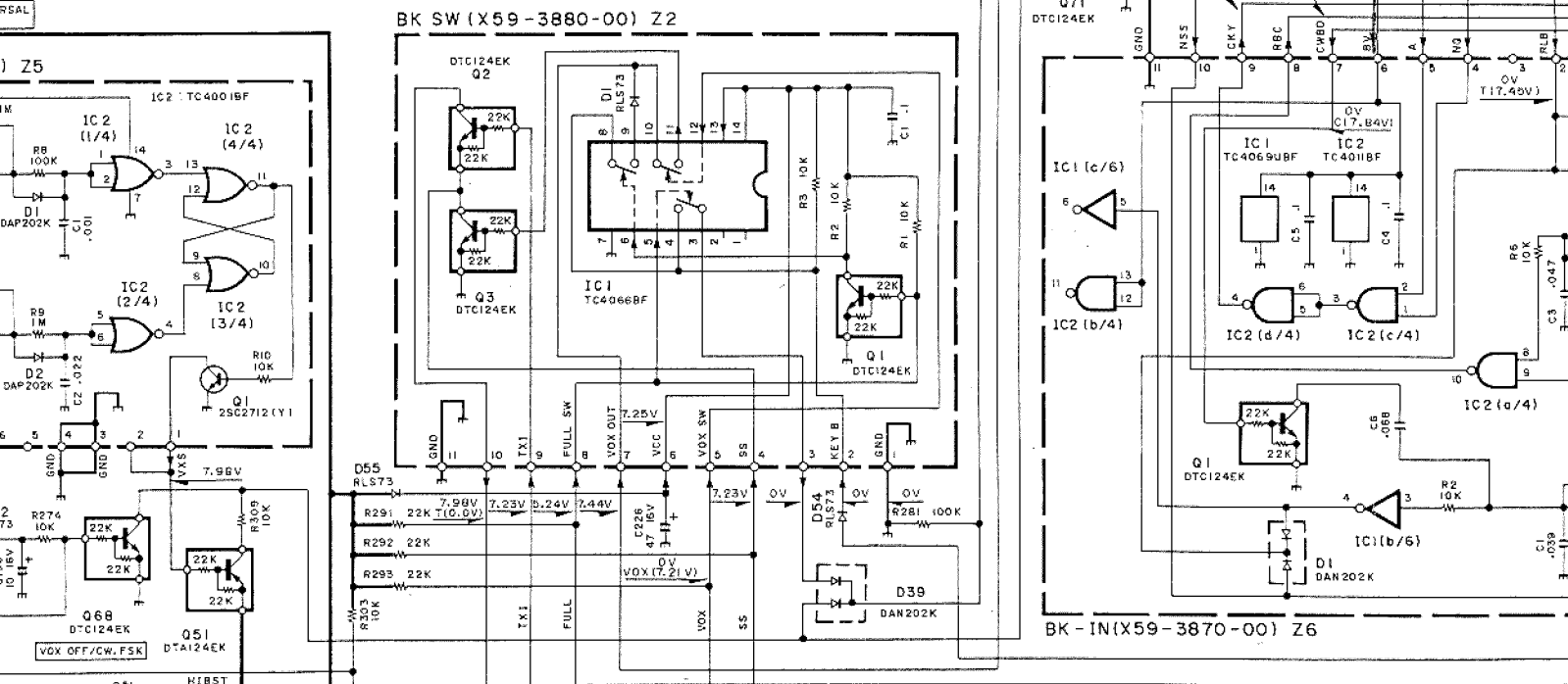
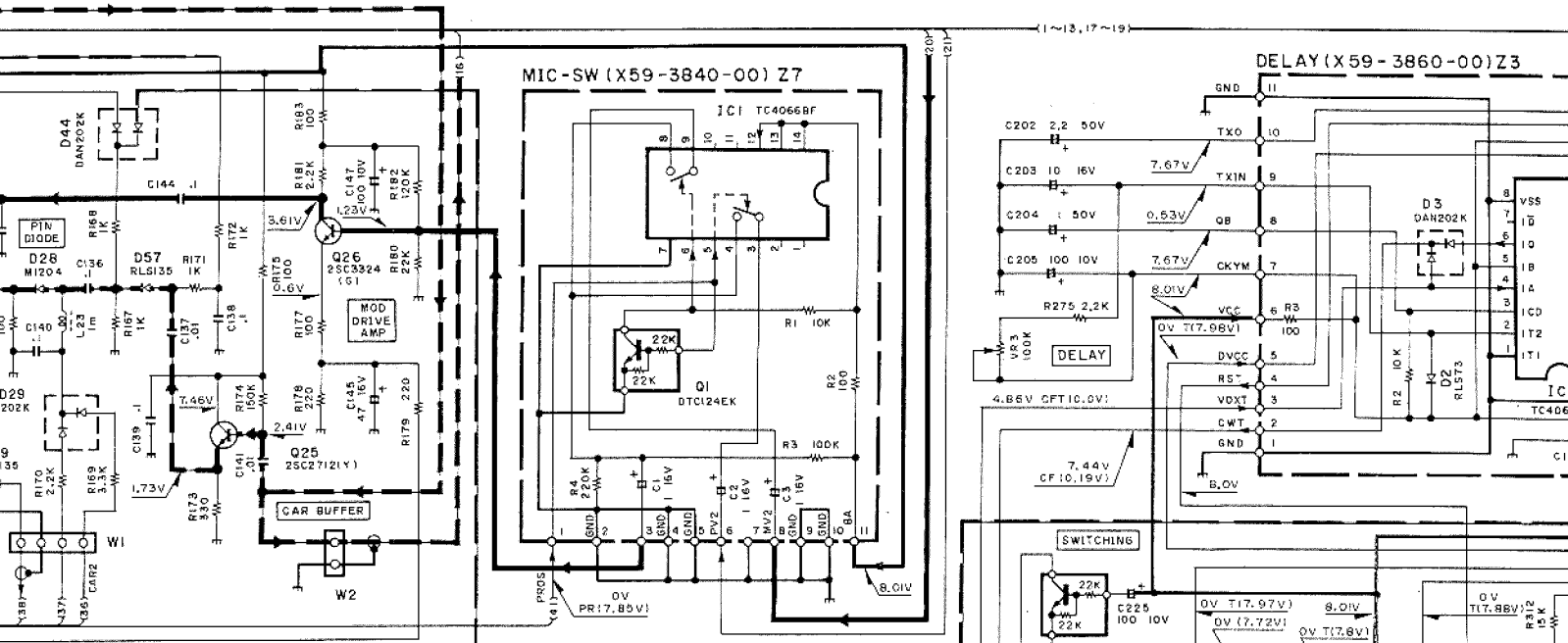
Q51 DTA124EK

Q51 H1B5T

J1 ACC2

Q39, 54

CURRENT PREVENT

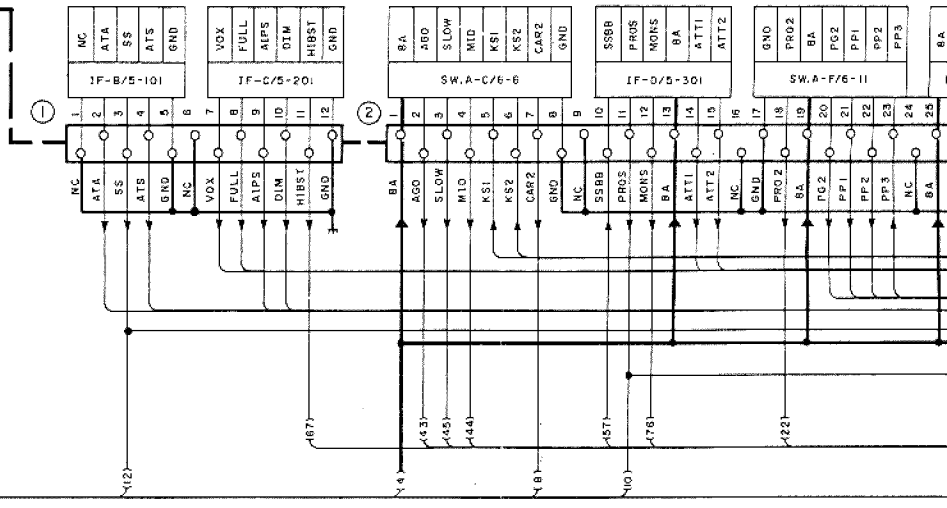
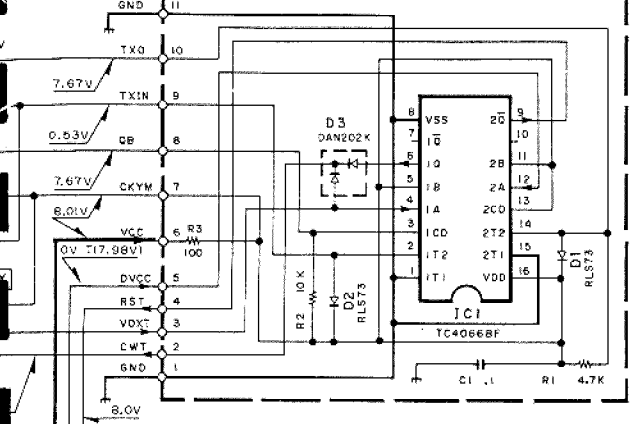


~48,50,52,56~63,65,66) (167) (168) (169) (170) (171) (172) (173) (174) (175) (176) (177) (178) (179) (180) (181) (182) (183) (184) (185) (186) (187) (188) (189) (190) (191) (192) (193) (194) (195) (196) (197) (198) (199) (200)

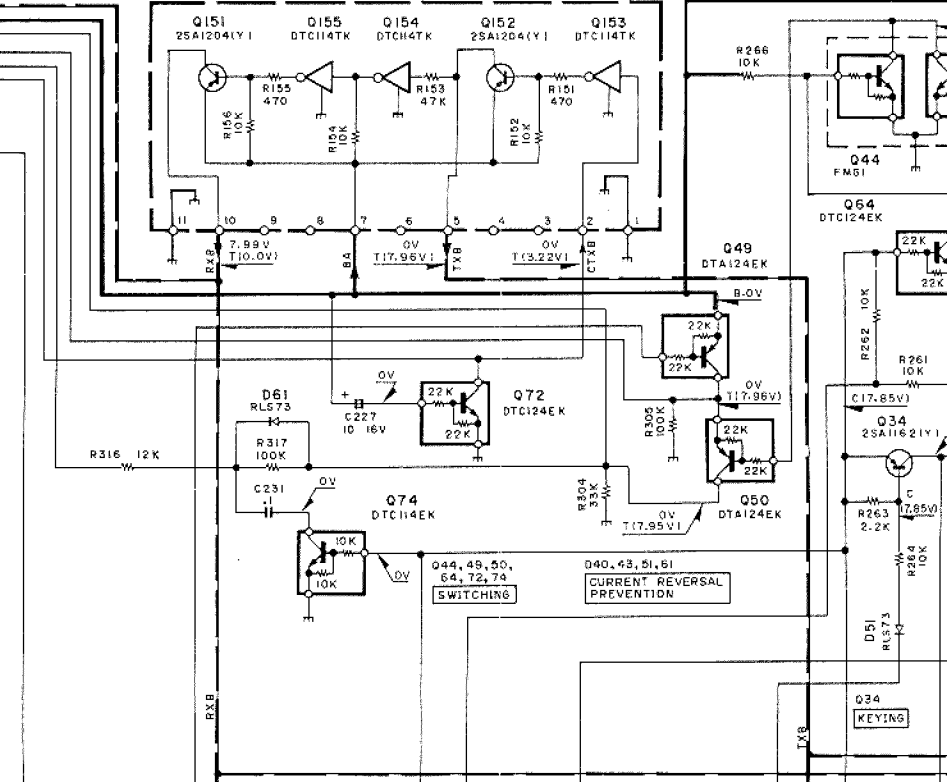
~22~26,29,40,42~48,50,52,56~63,65~70)

D39,54  
CURRENT REVERSAL  
PREVENTION

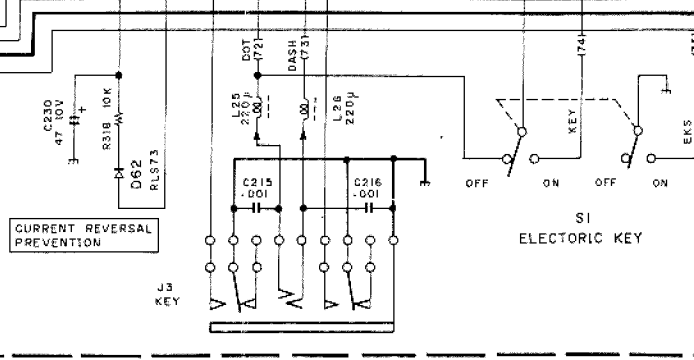
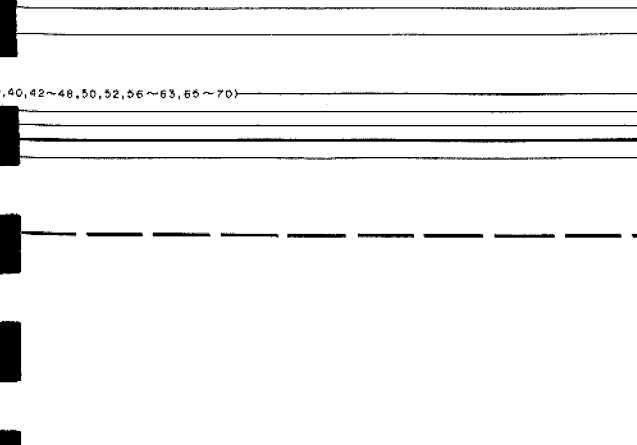
DELAY (X59-3860-00) Z3



TRX (X59-3860-01) Z4



TRX (X59-3870-00) Z6



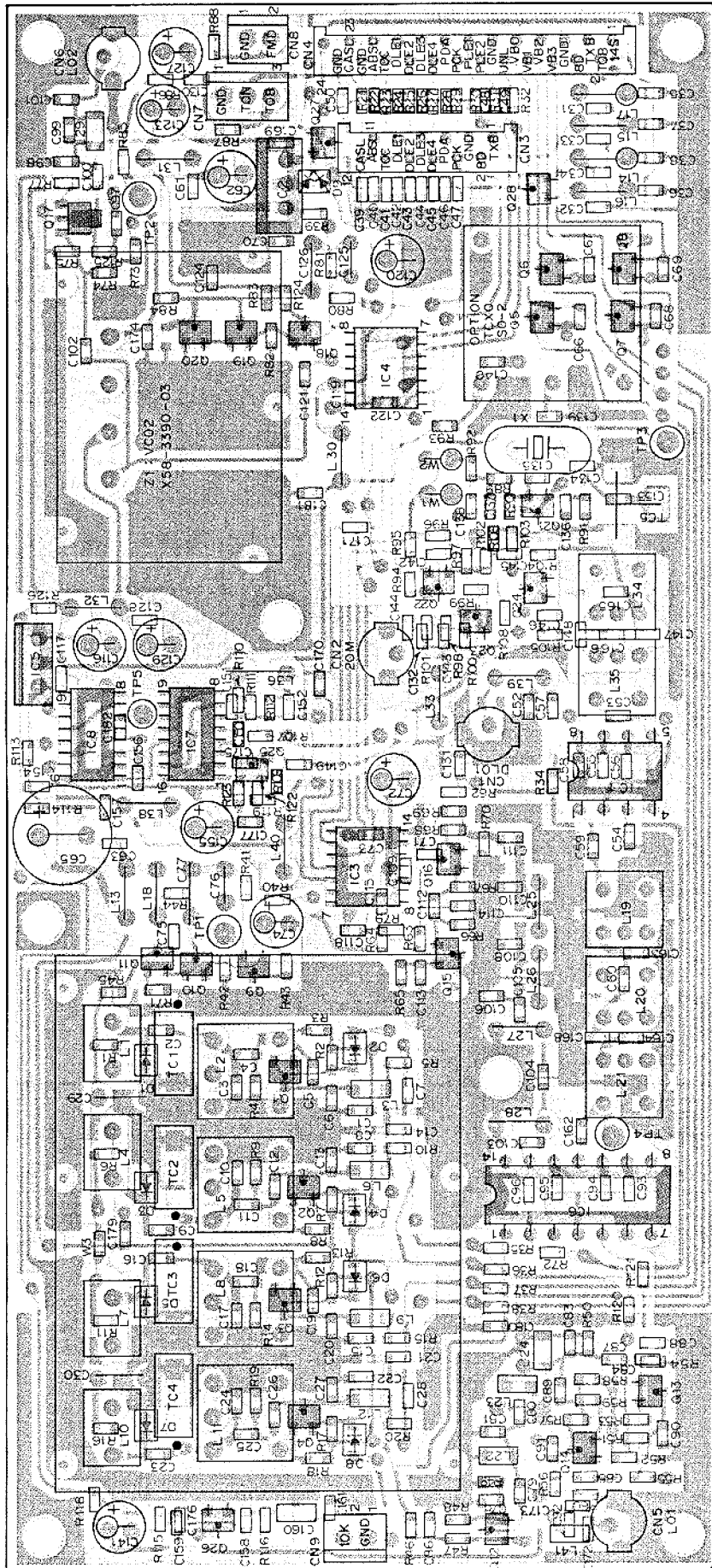




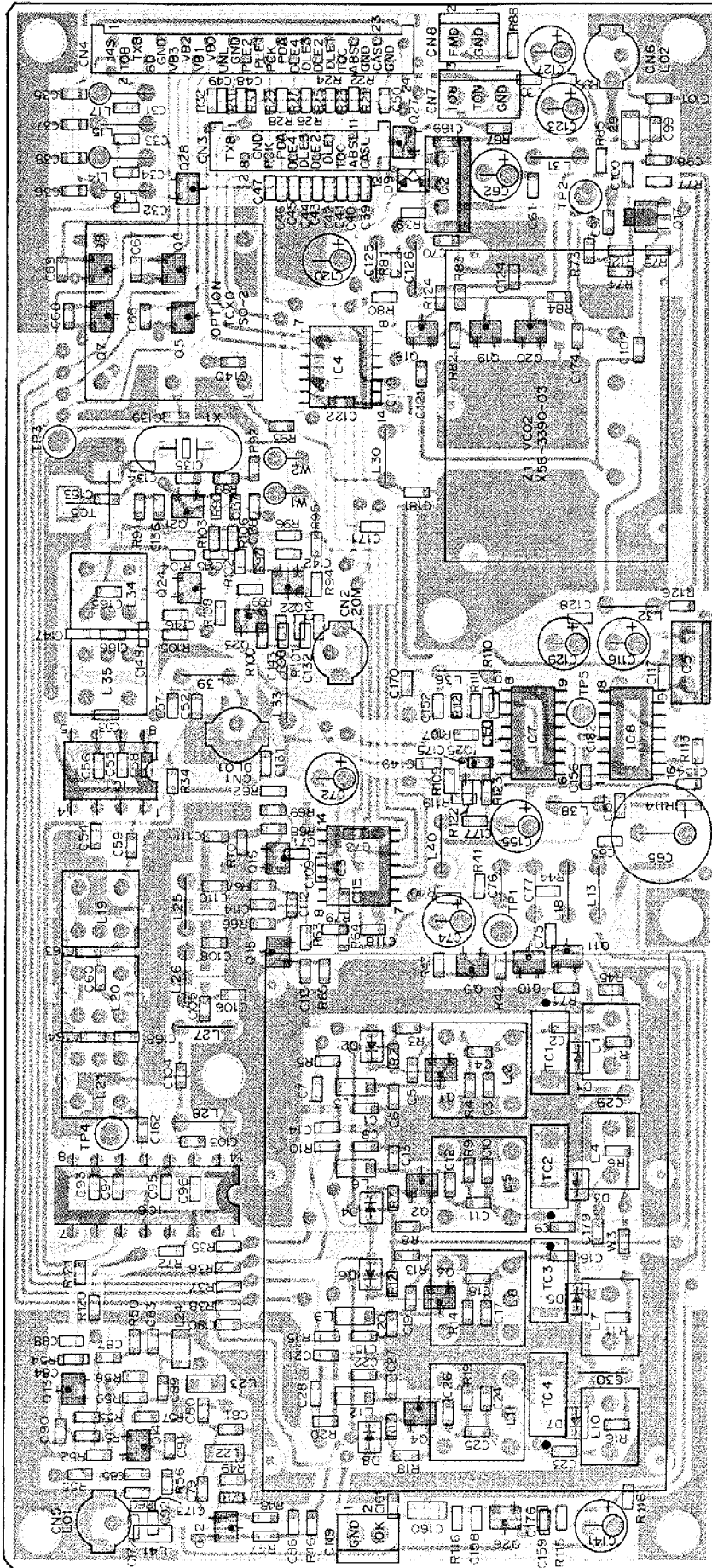


# TS-850S PC BOARD VIEWS

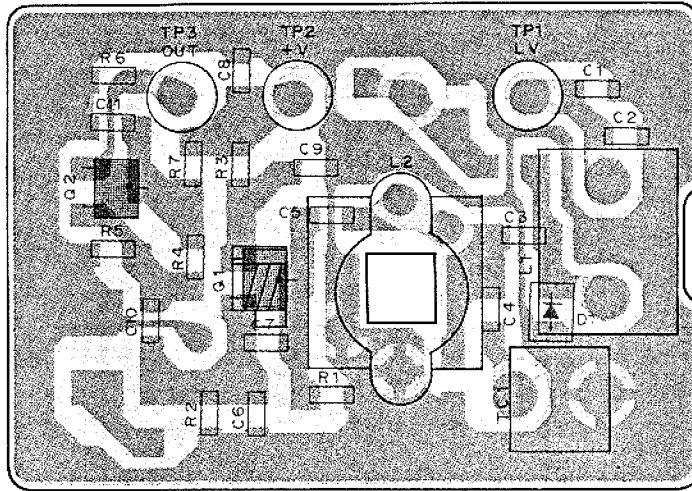
## PLL UNIT (X50-3130-00) Component side view



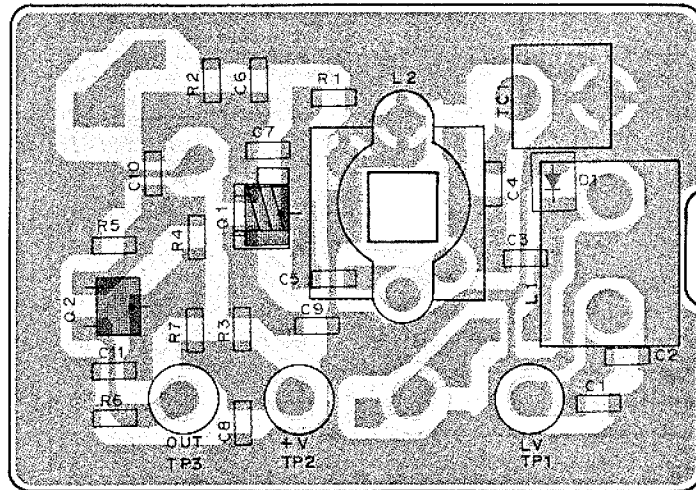
PLL UNIT (X50-3130-00) Foil side view



VCO2 (X58-3390-03) Component side view

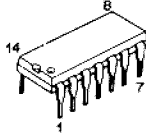


VCO2 (X58-3390-03) Foil side view

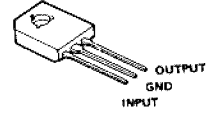


2SC2996(Y)  
2SC2712(Y)  
2SC2714(Y)  
2SC3324(G)  
DTA114EK  
DTC114EK  
DTC114TK

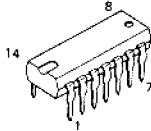
CXD1225M



AN78N05



SN76514N



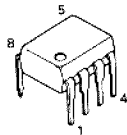
2SK210(GR)



2SC2954(QK)



SN16913P



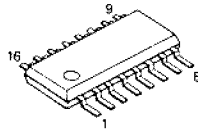
2SK508NV(K52)



TA78DL09P

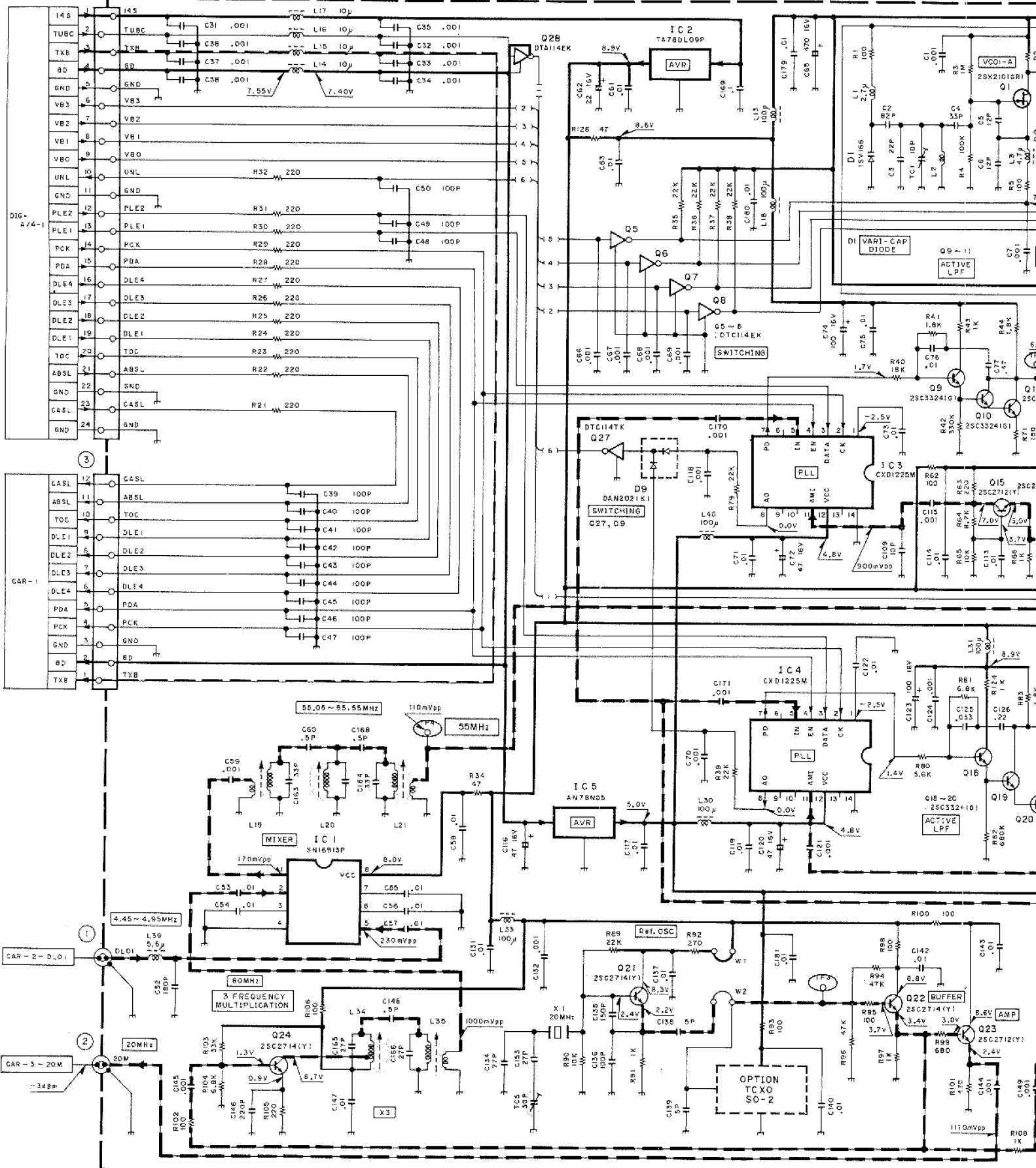


μPD74HC390G



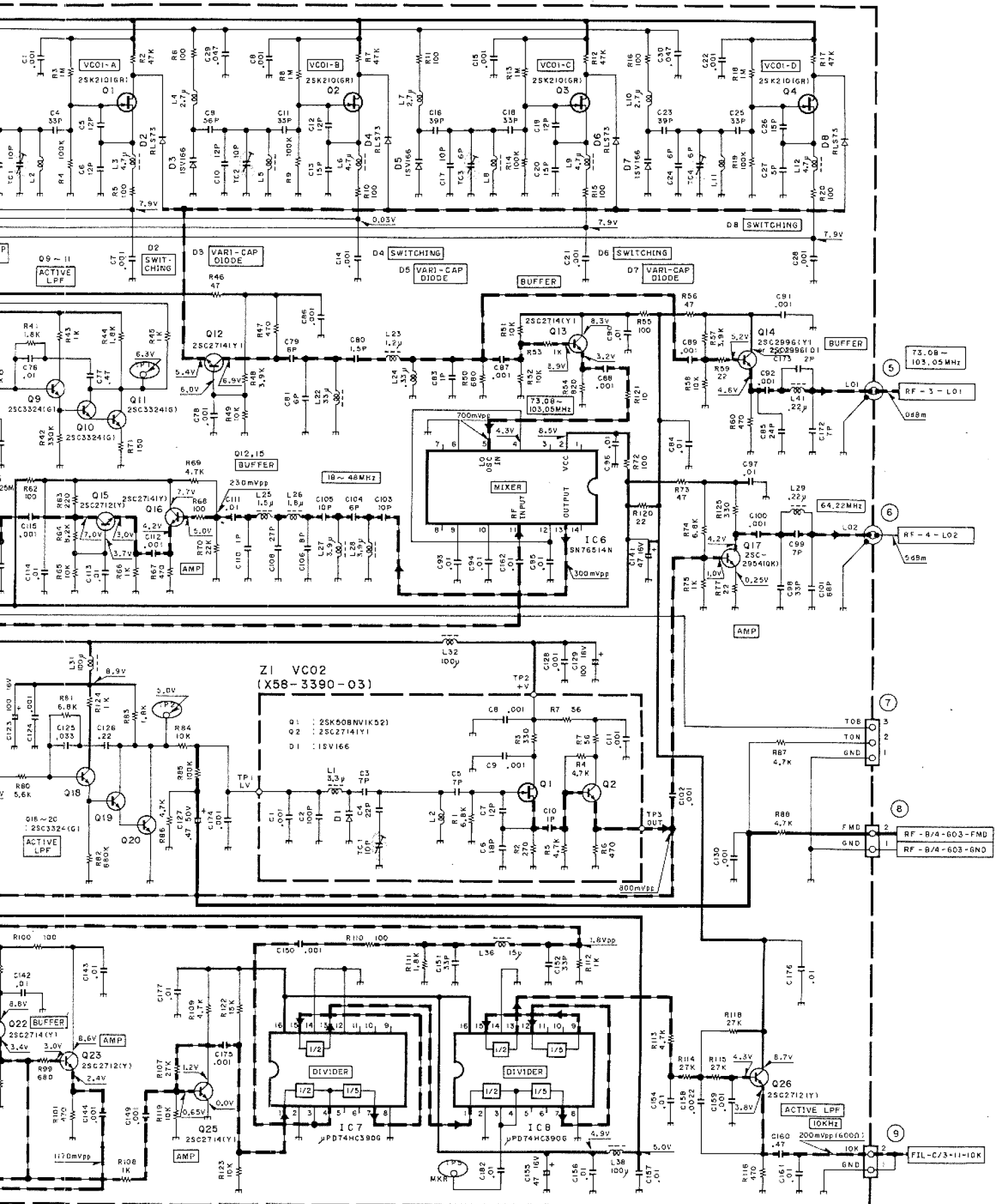
# PLL UNIT (X50-3130-00)

④ PLL UNIT (X50-3130-00)



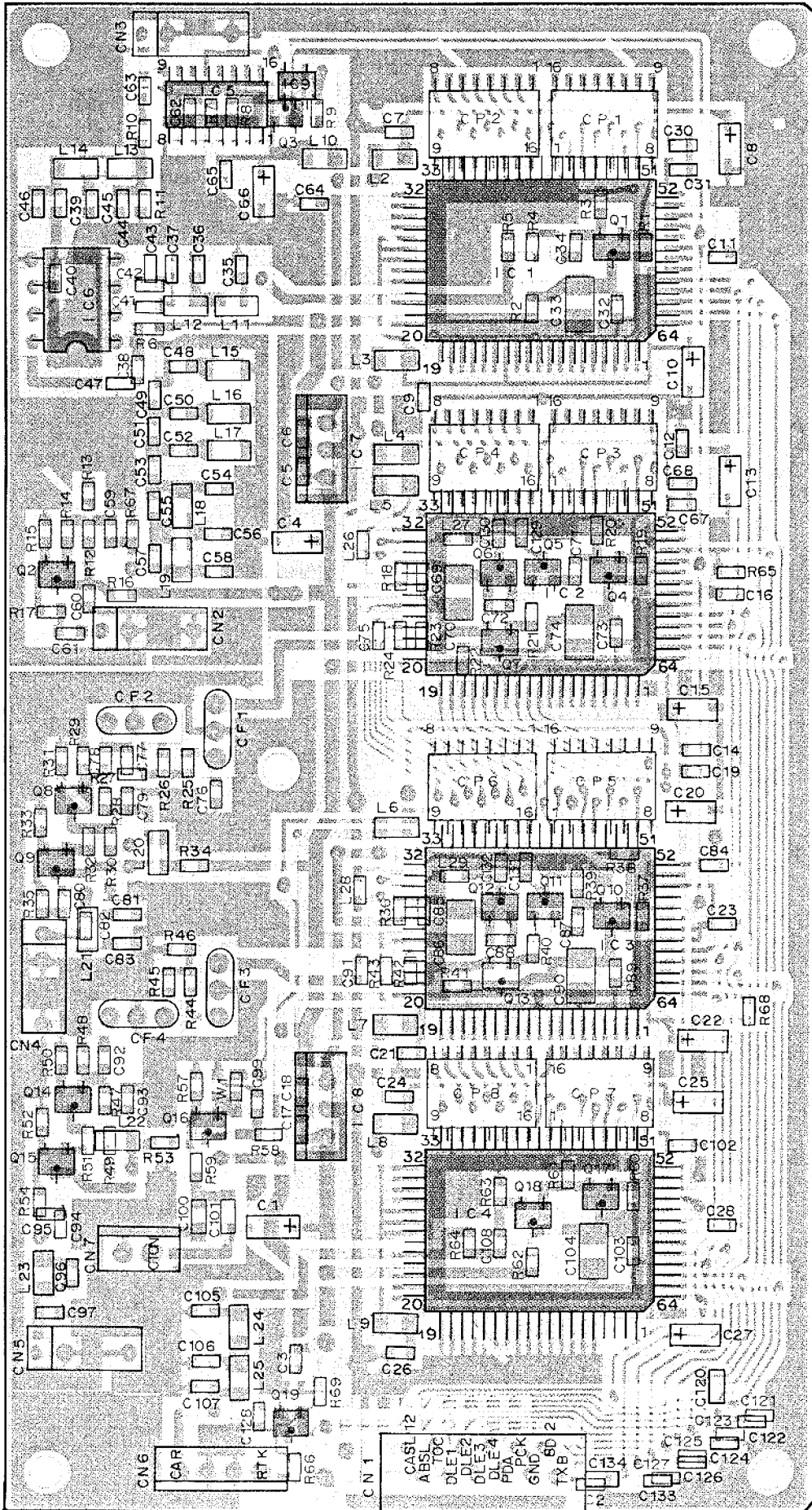


# CIRCUIT DIAGRAM TS-850S

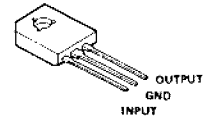




CAR UNIT (X50-3140-00) Foil side view



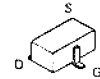
AN78N05



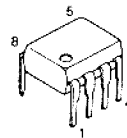
2SC2712(Y)  
DTC114EK



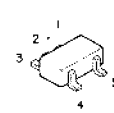
2SK508(K53)



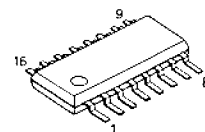
SN16913P



TC7S04F

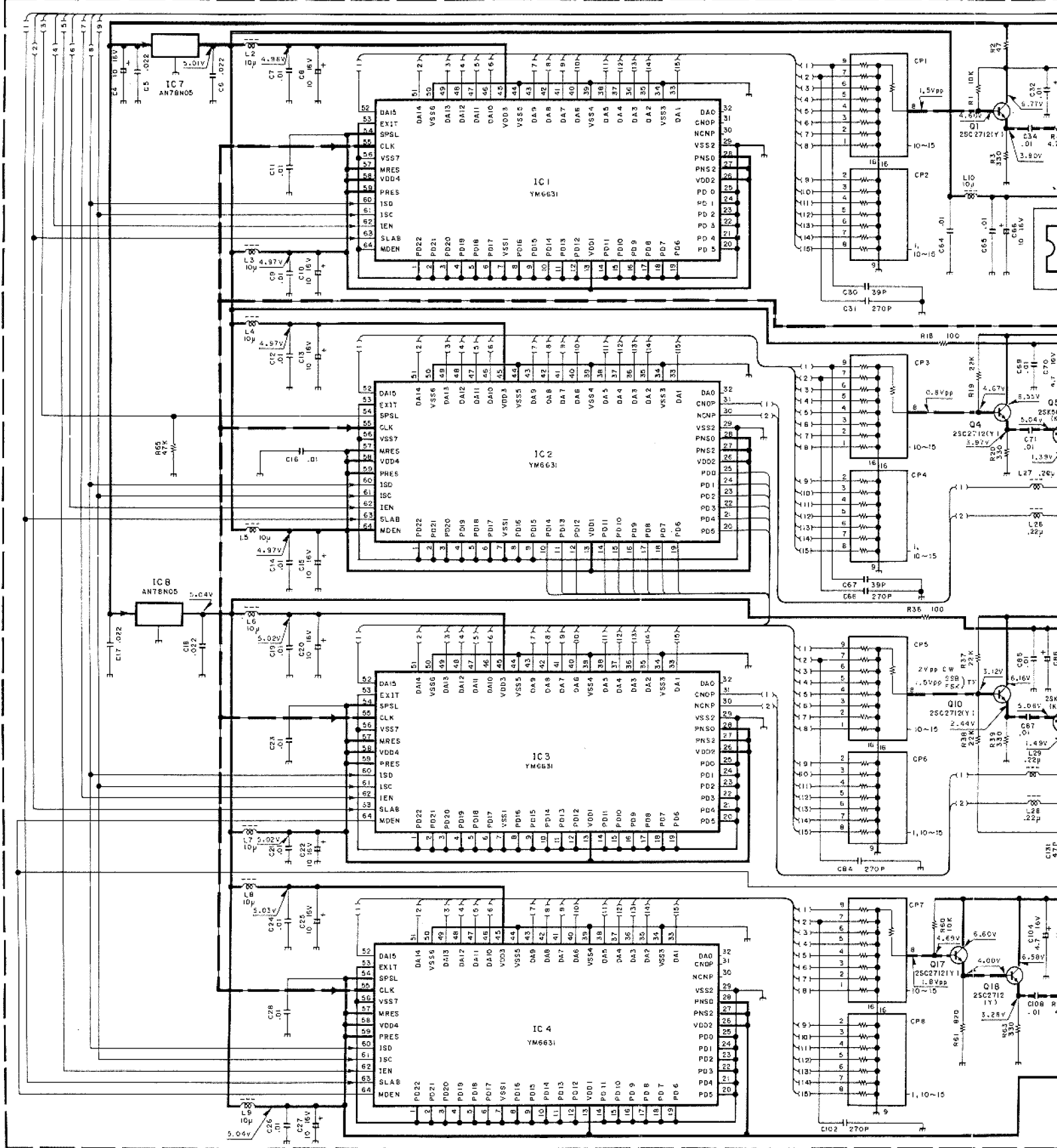


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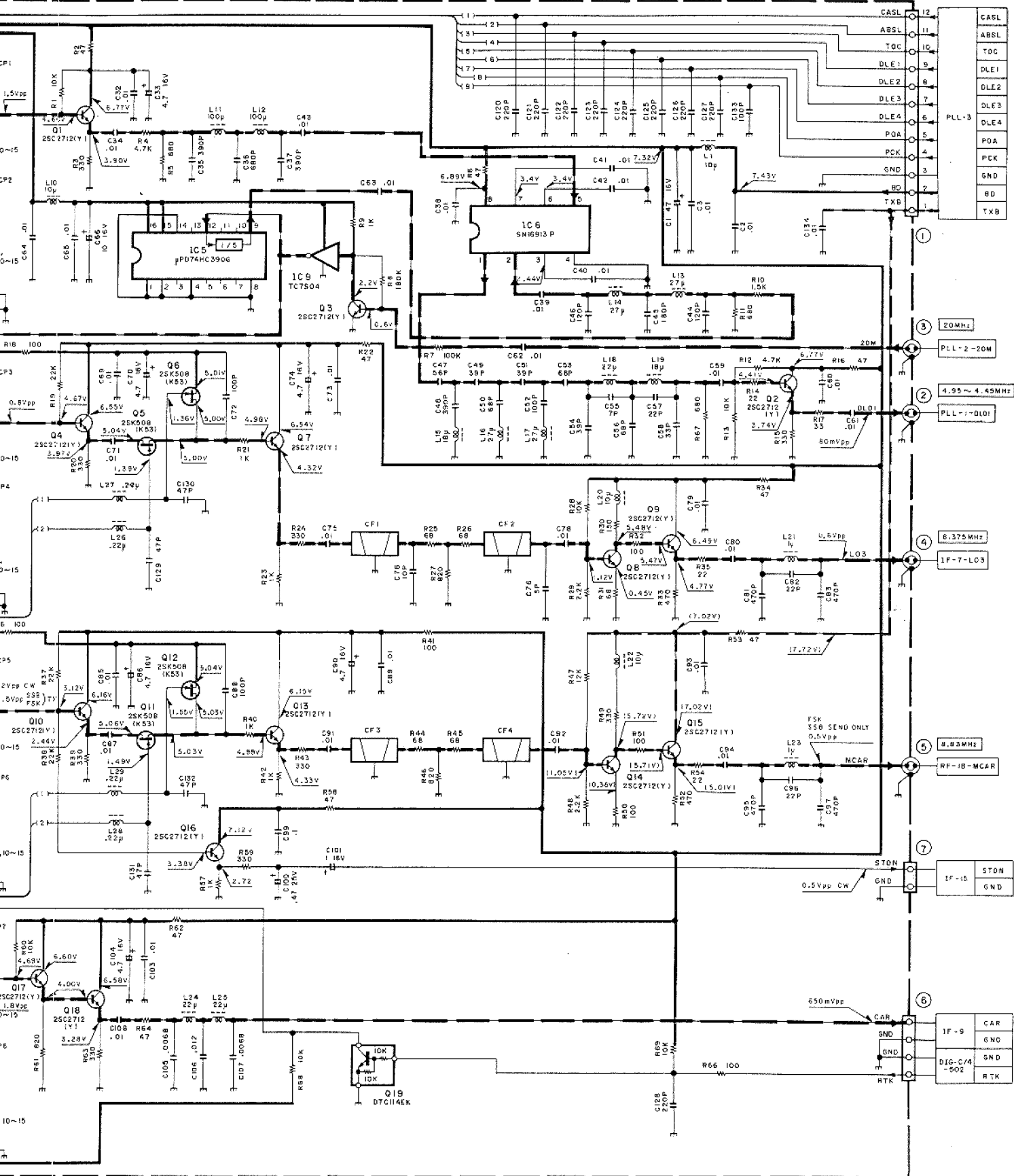


# CAR UNIT (X50-3140-00)

CAR UNIT (X50-3140-00)



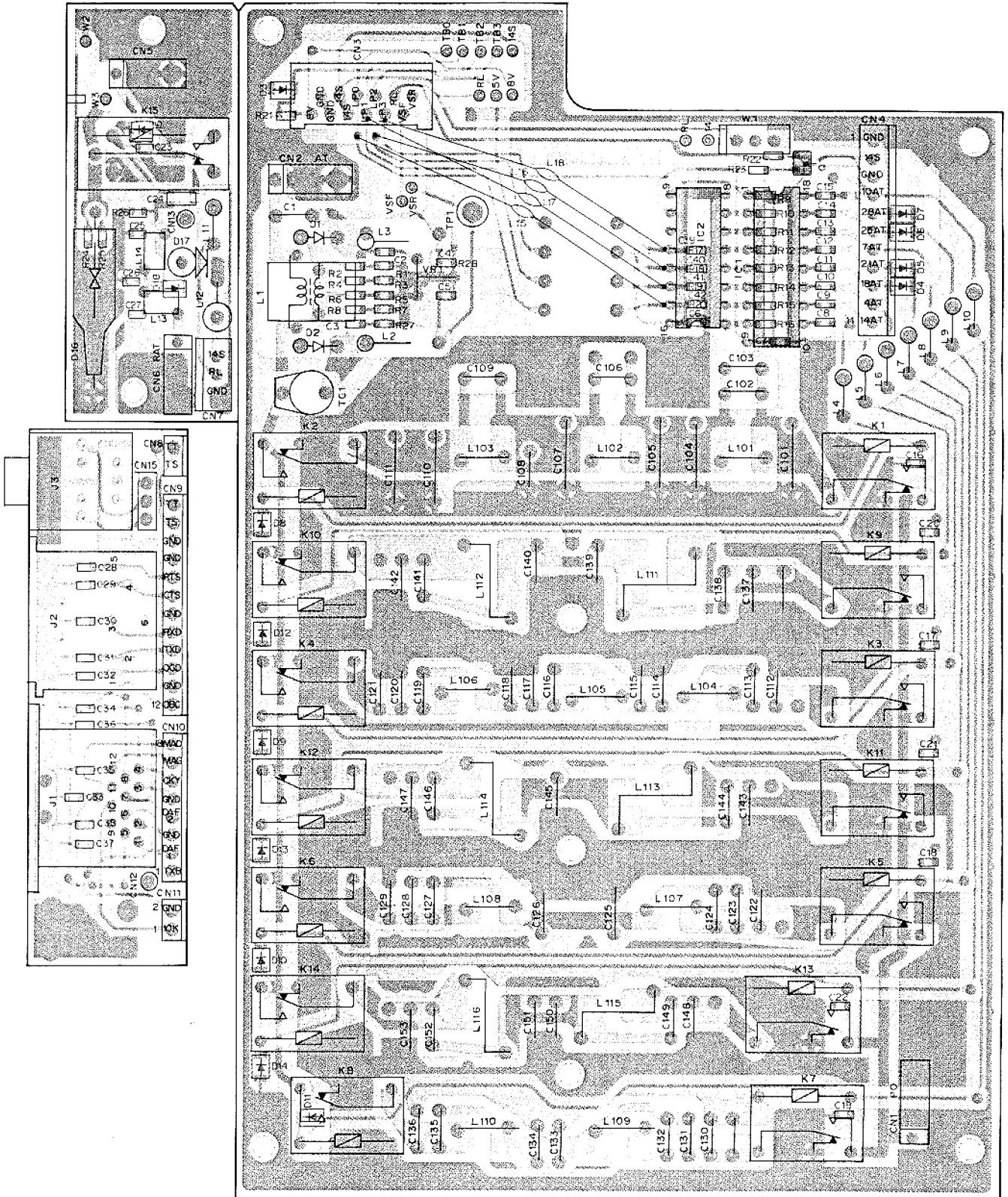
# CIRCUIT DIAGRAM TS-850S





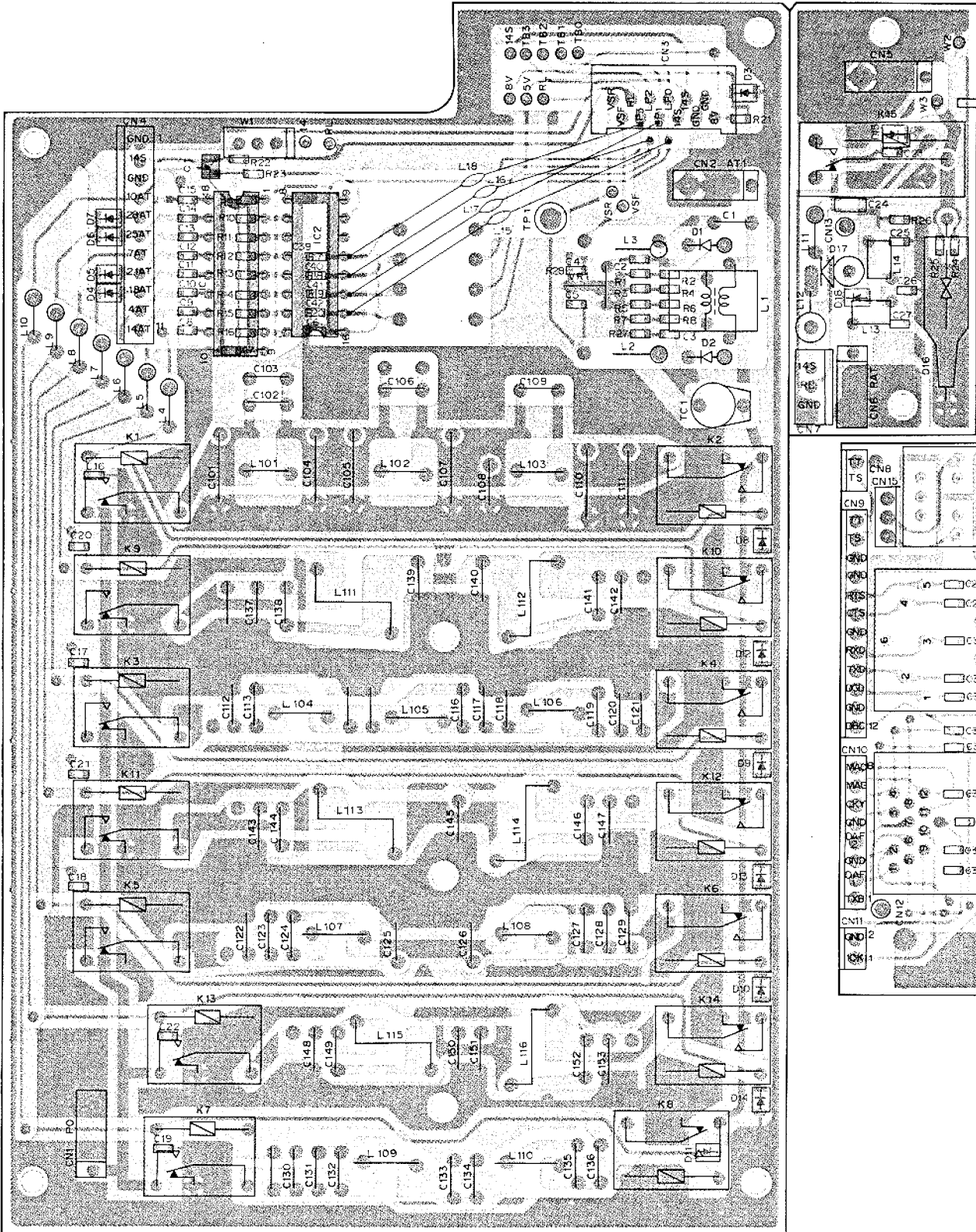
# TS-850S PC BOARD VIEWS

FILTER UNIT (X51-3100-00) Component side view





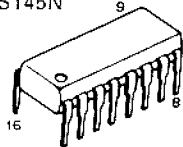
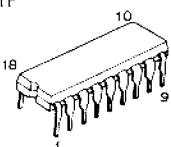
# FILTER UNIT (X51-3100-00) Foil side view



M54581P

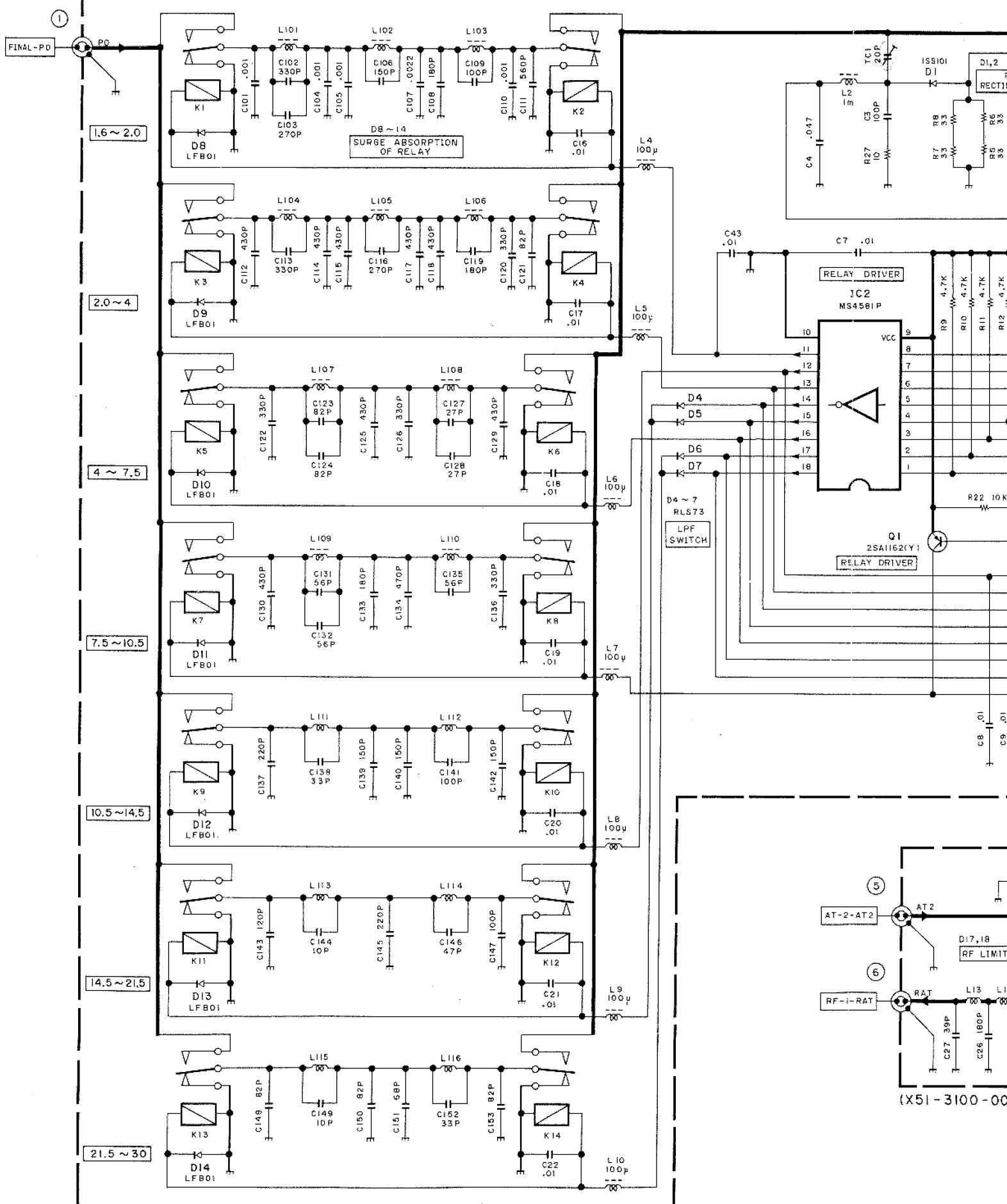
SN74LS145N

2SA1162(Y)



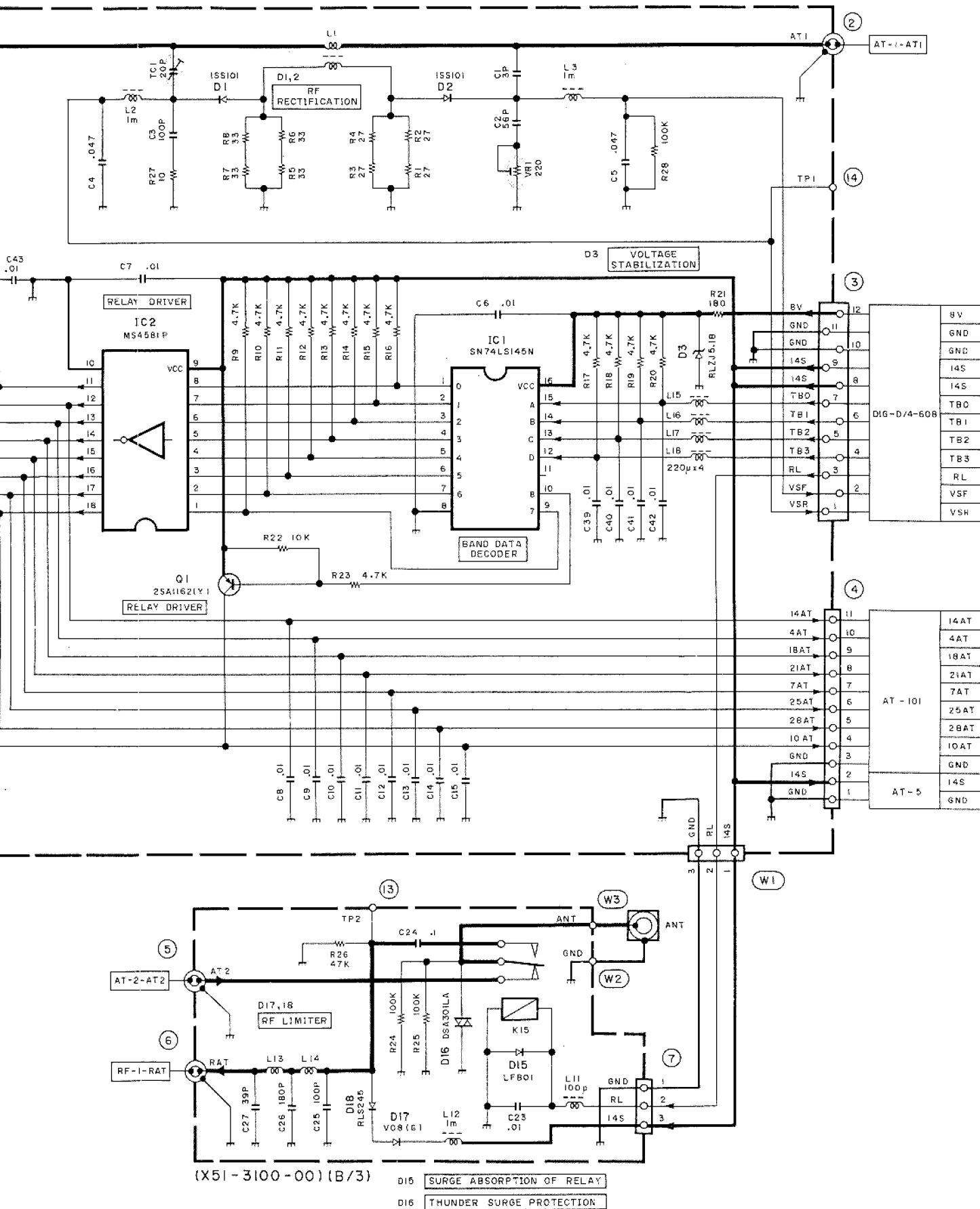
# FILTER UNIT (X51-3100-00)

## FILTER UNIT (X51-3100-00) (A/3)



(X51-3100-00)

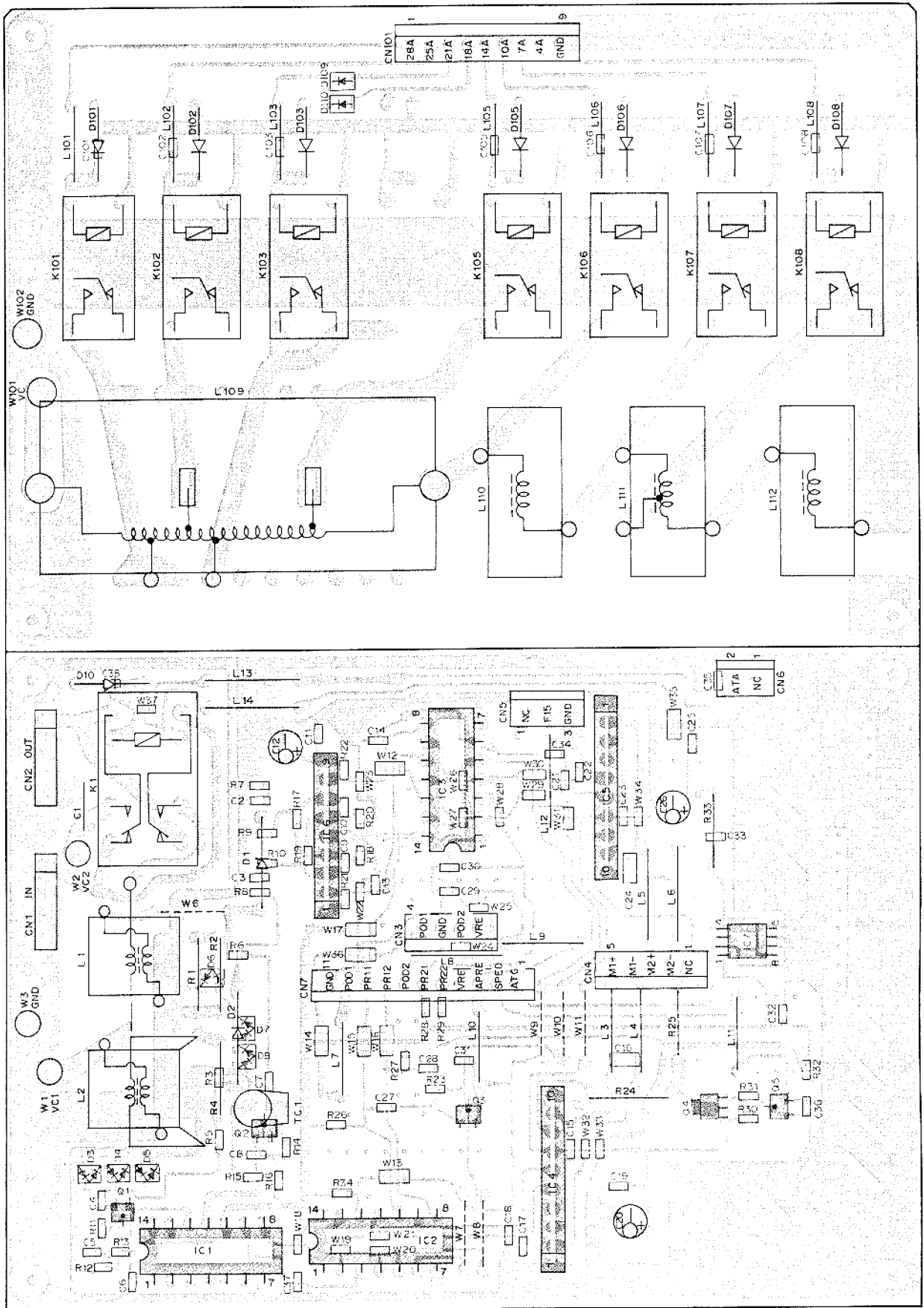
# CIRCUIT DIAGRAM TS-850S



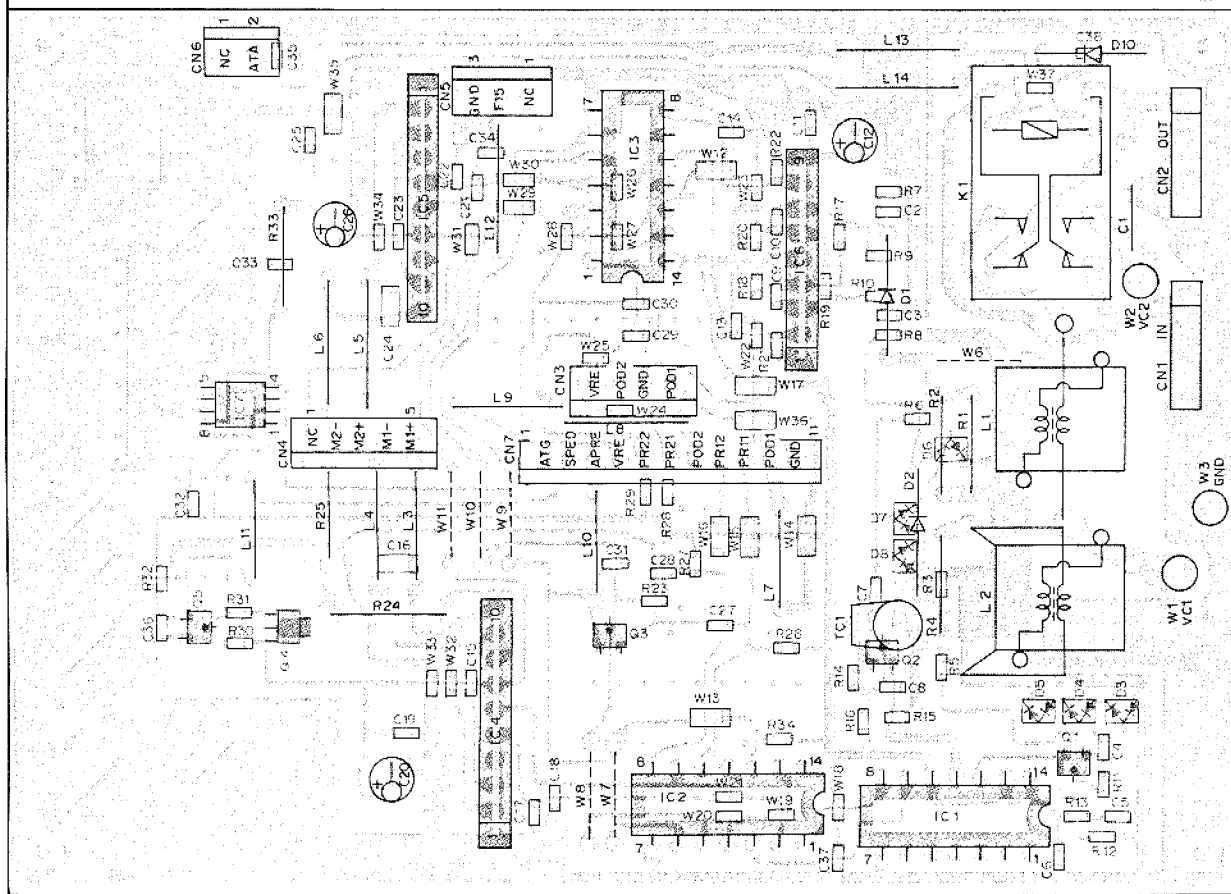
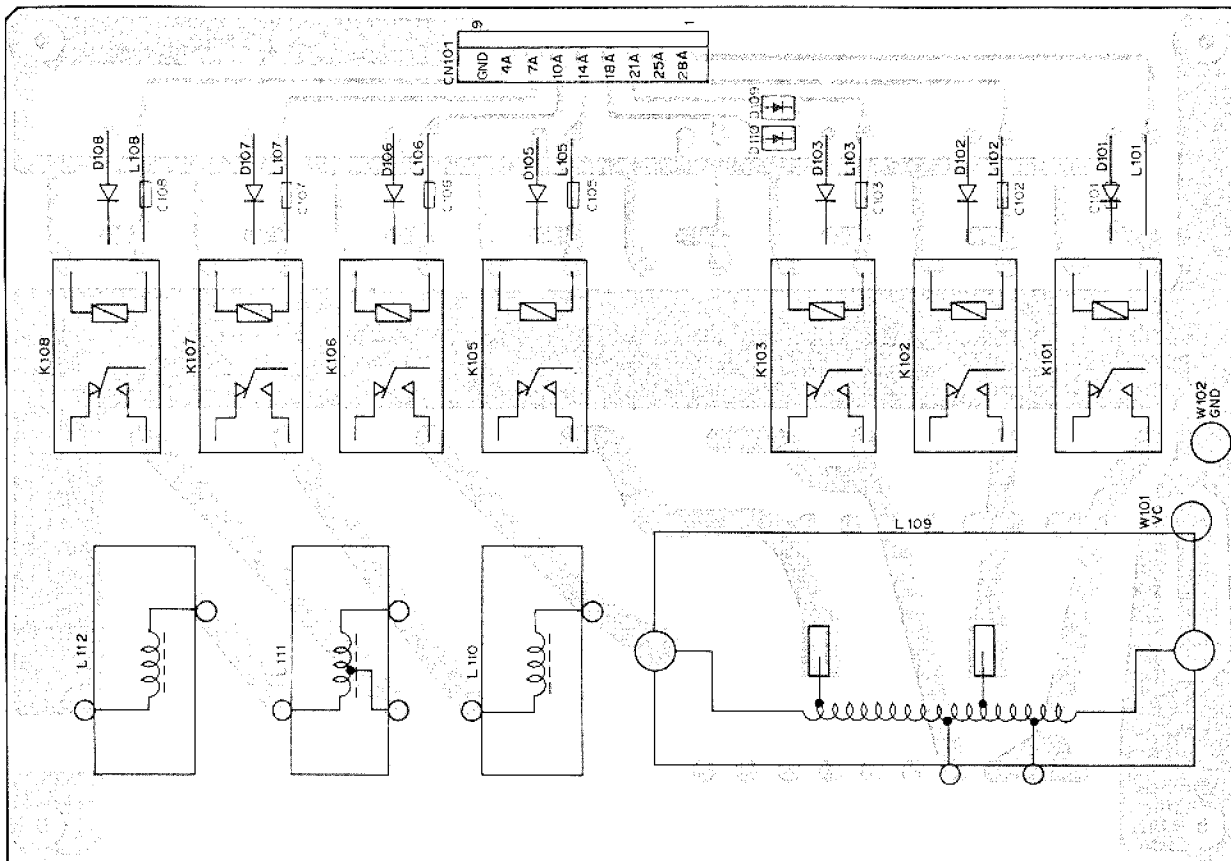
- D15 SURGE ABSORPTION OF RELAY
- D16 THUNDER SURGE PROTECTION

# TS-850S PC BOARD VIEWS

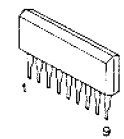
## AT UNIT/AT-850 (X53-3340-00) Component side view



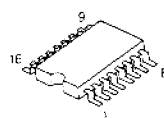
AT UNIT/AT-850 (X53-3340-00) Foil side view



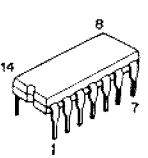
NJM2903S



SN74S74N



TC4066BP



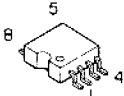
2SA1204(Y)



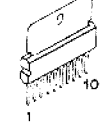
2SC2714(Y)  
DTC114EK



MC78L05M

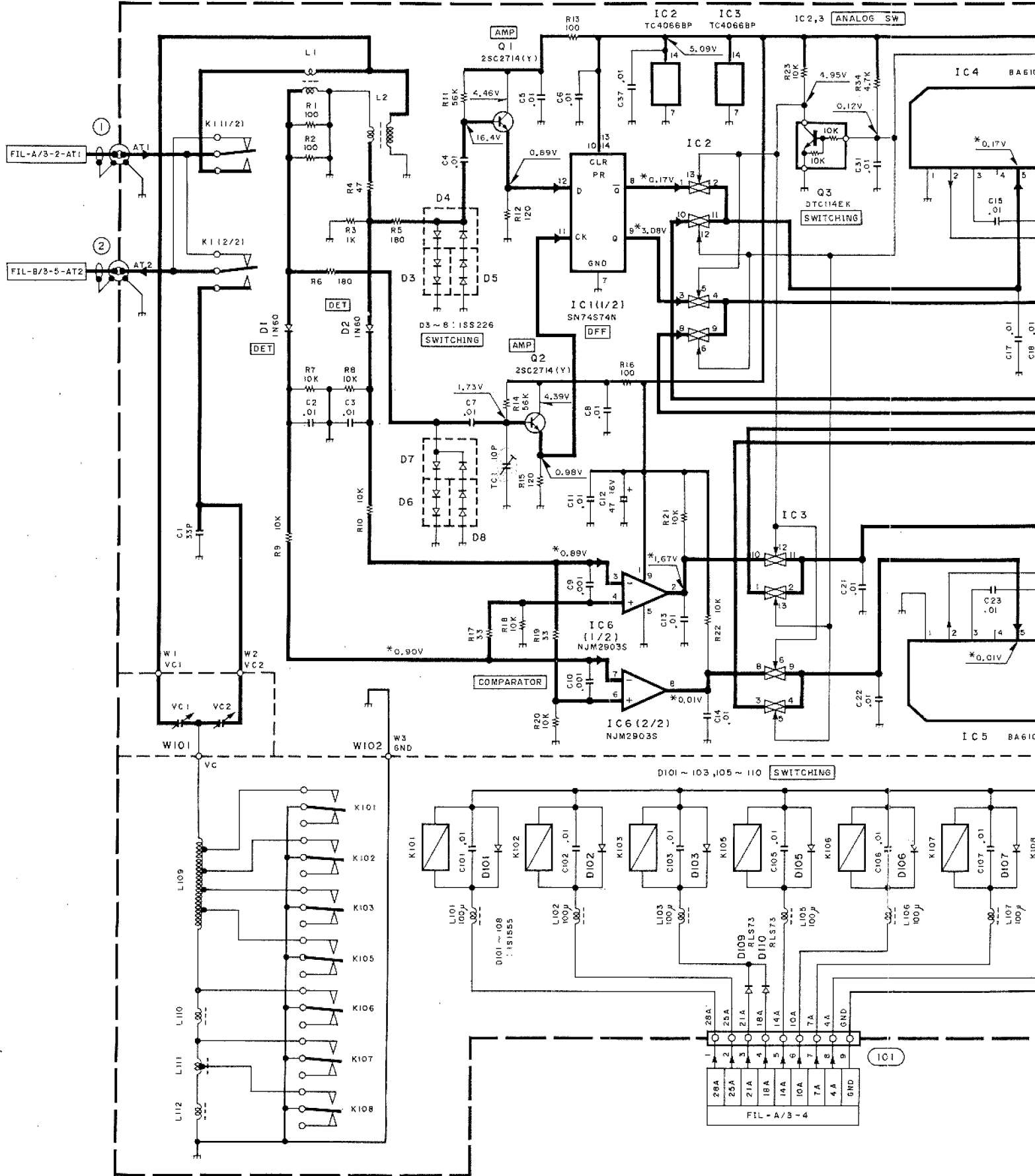


BA6109U2

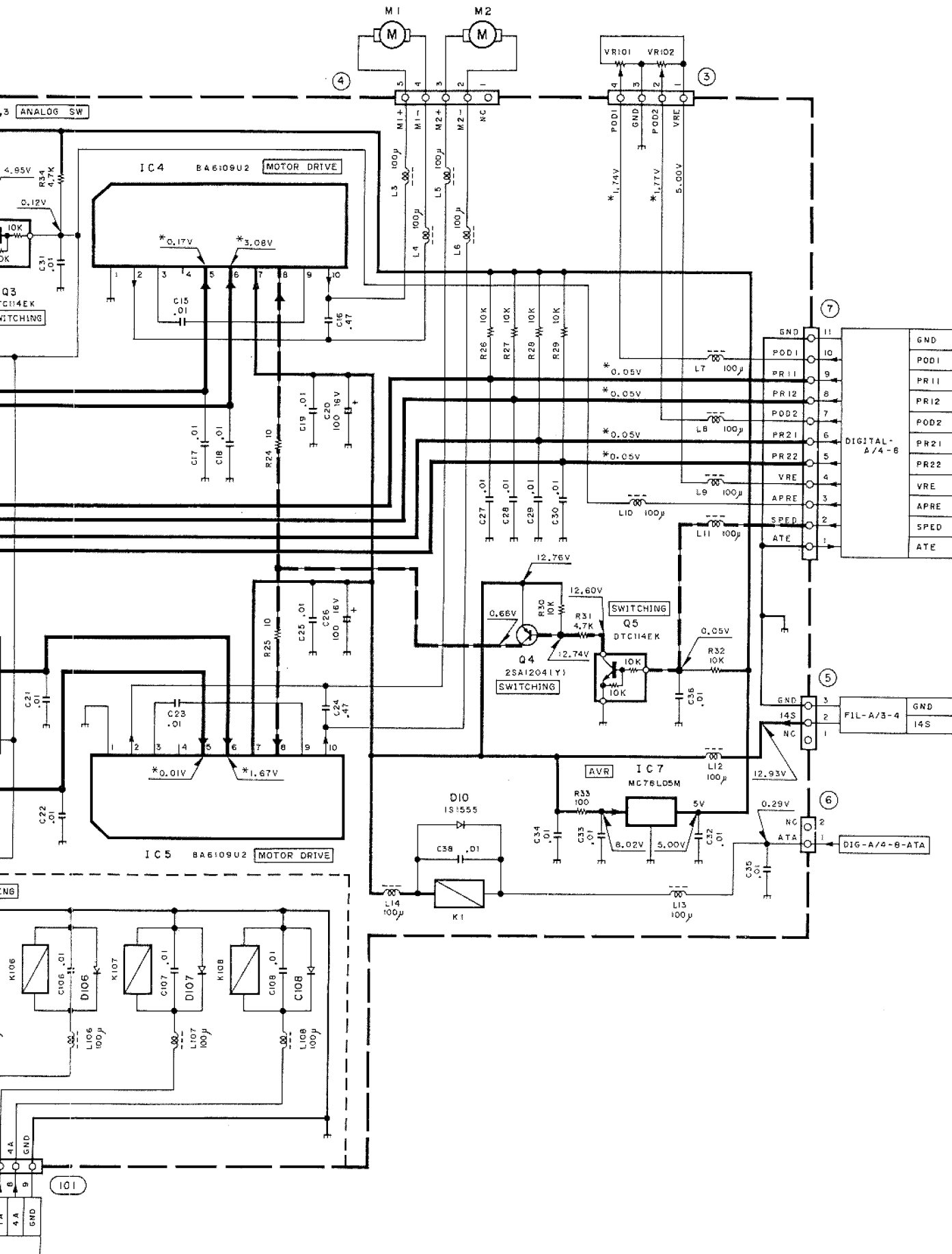


AT UNIT/AT-850 (X53-3340-00) K,P,M,M3,X,E,E3

AT UNIT (X53-3340-00)



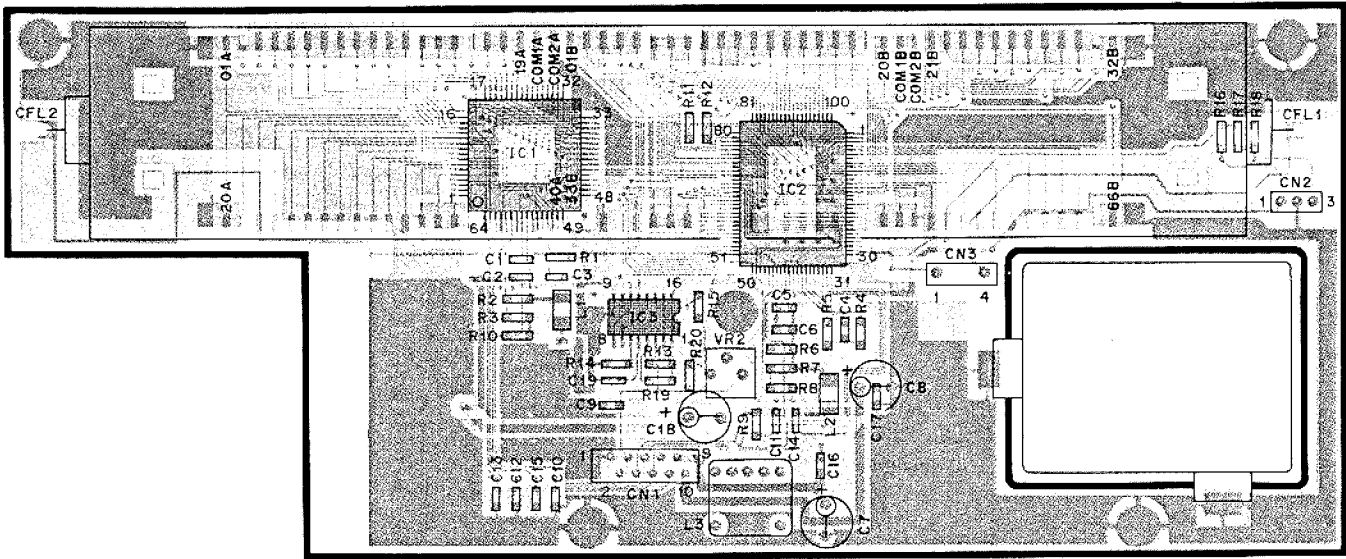
# CIRCUIT DIAGRAM TS-850S



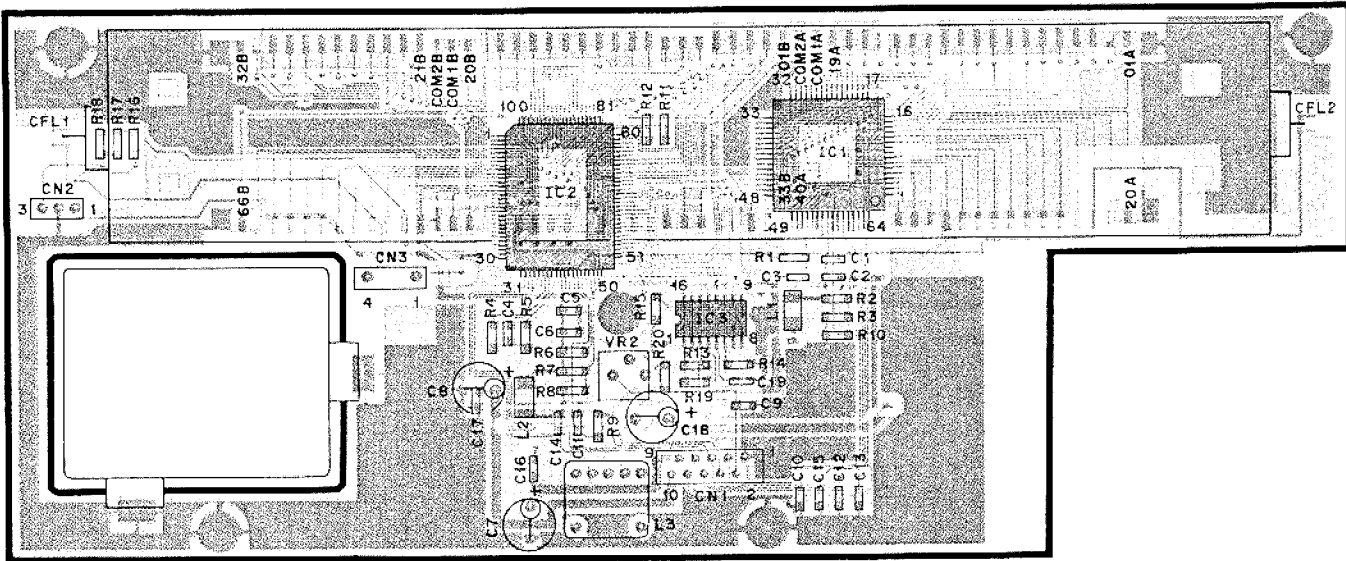




### LCD ASSY (B38-0350-15) Component side view



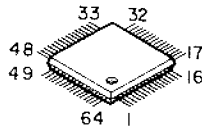
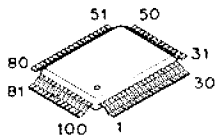
### LCD ASSY (B38-0350-15) Foil side view



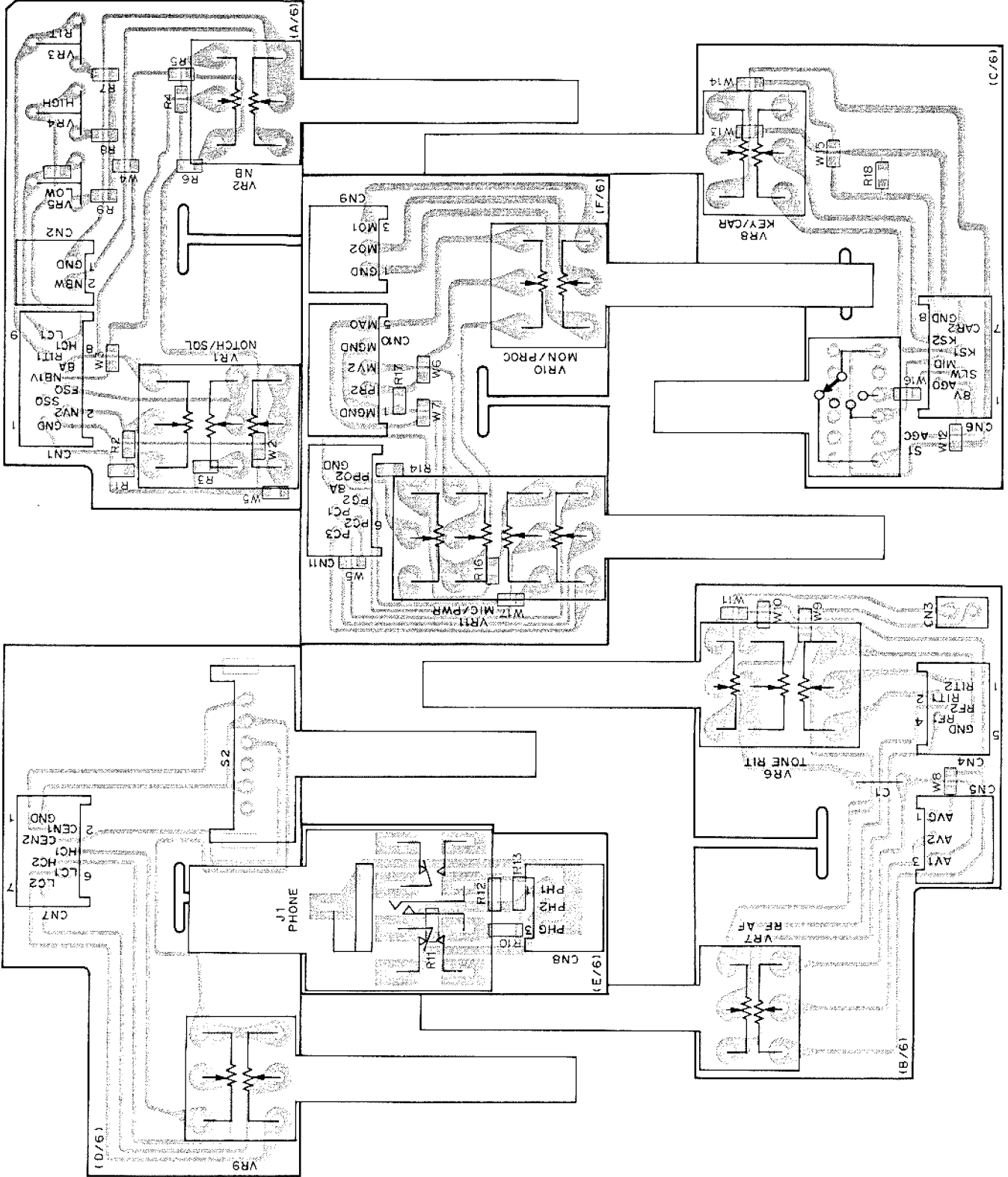
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DTC143EK

MSM5265GS-V1K

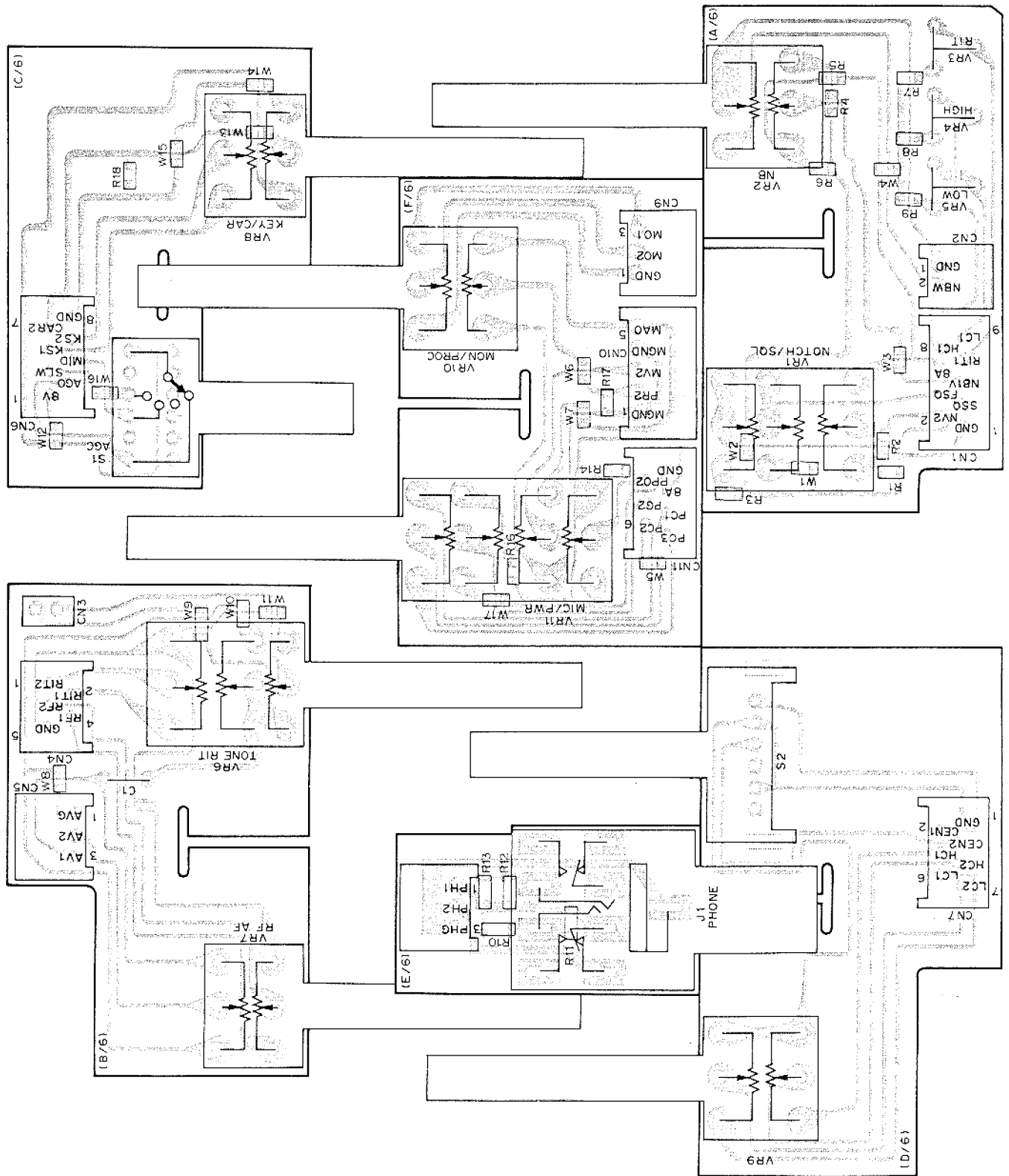
LC7582



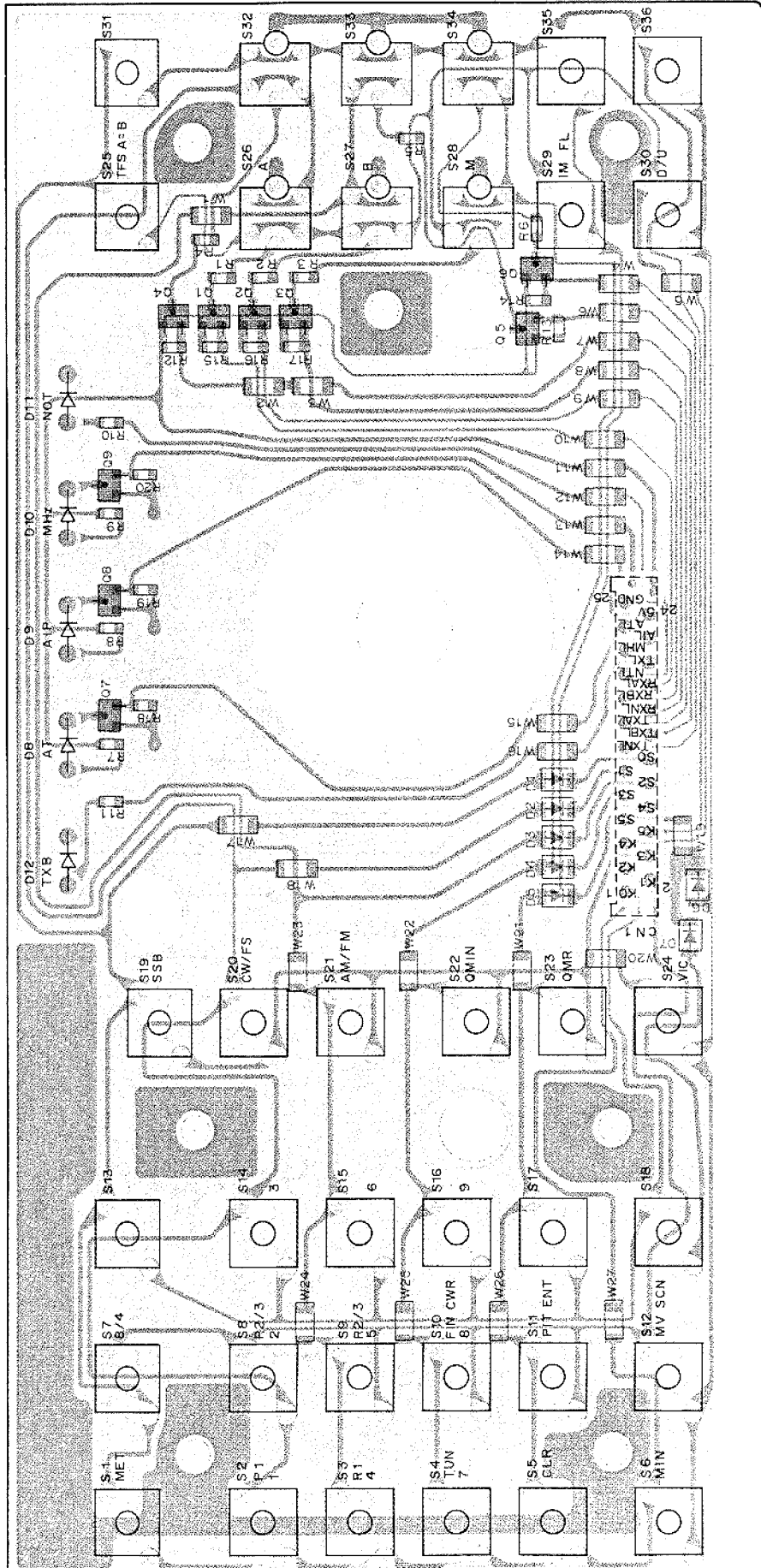
### SWITCH UNIT A (X41-3130-00) Component side view



SWITCH UNIT A (X41-3130-00) Foil side view

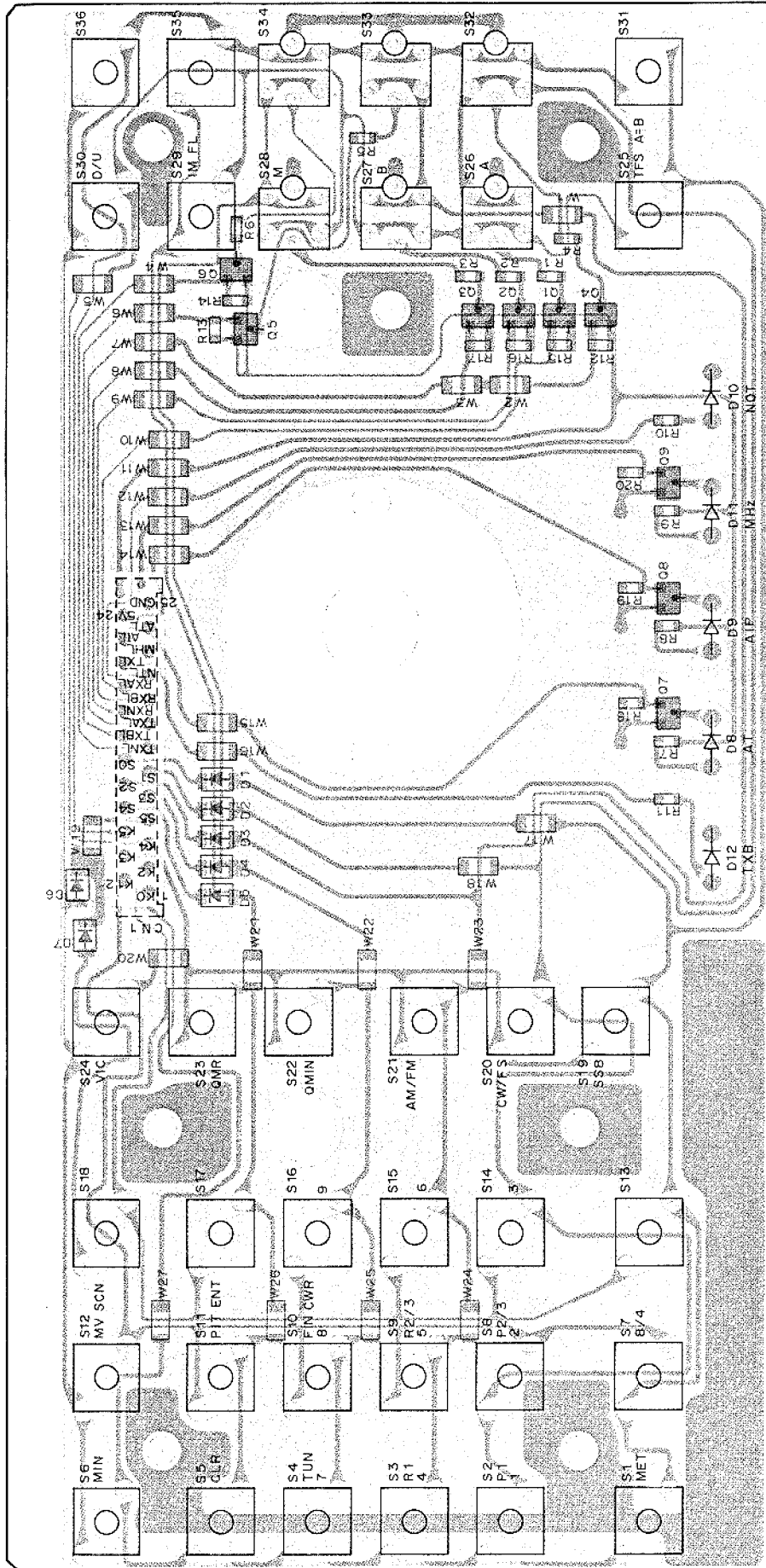


# SWITCH UNIT B (X41-3140-00) Component side view



# PC BOARD VIEWS TS-850S

## SWITCH UNIT B (X41-3140-00) Foil side view



2

3

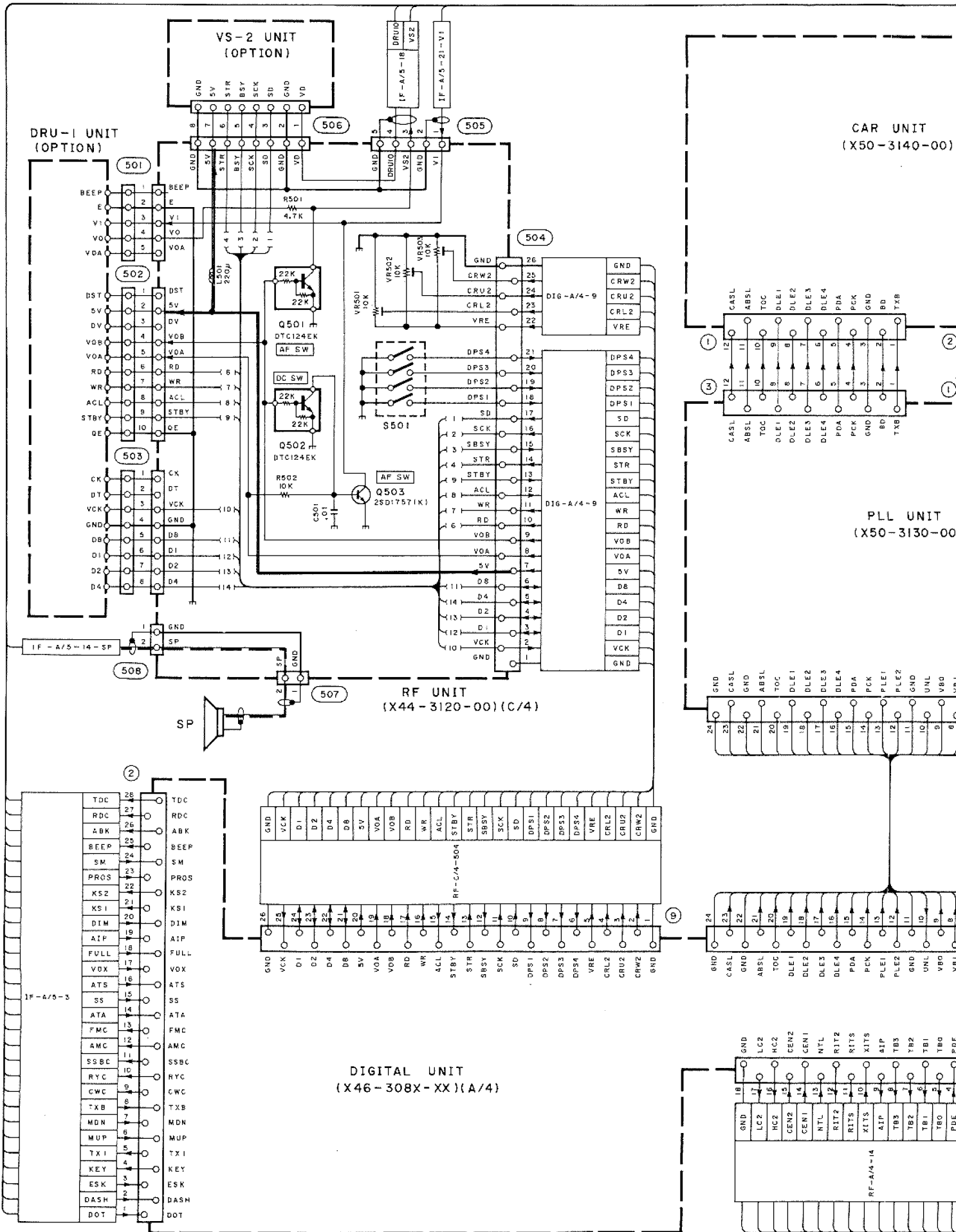
4

5

6

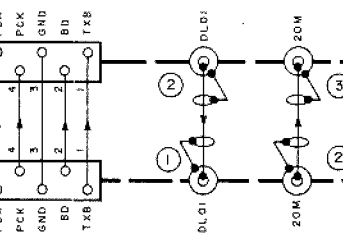
7

# TS-850S SCHEMATIC DIAGRAM

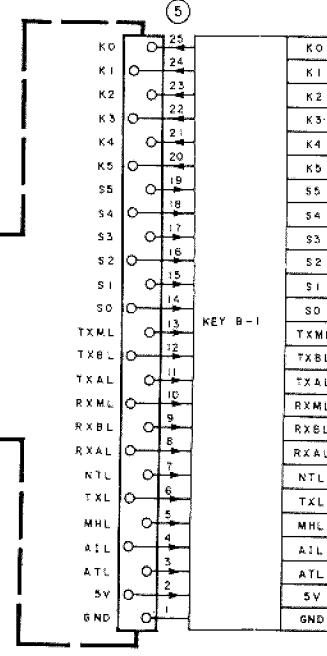
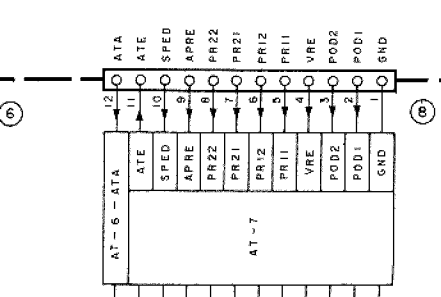
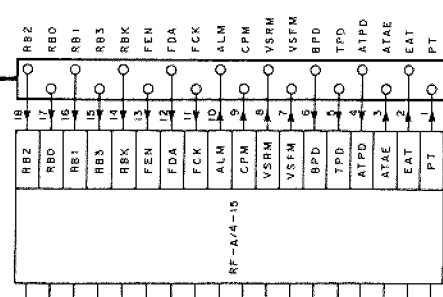
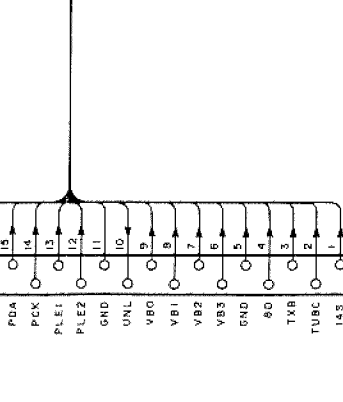
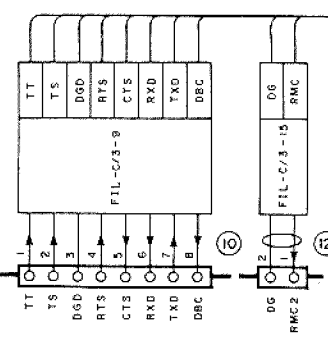
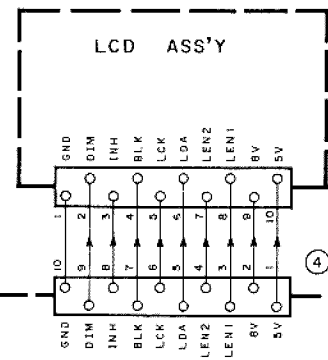
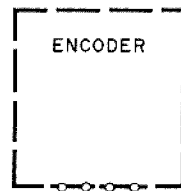
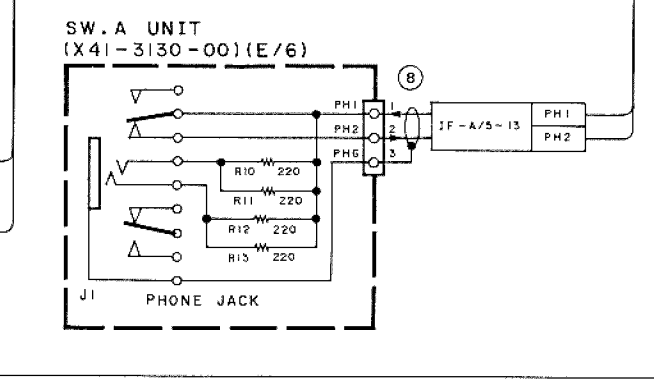
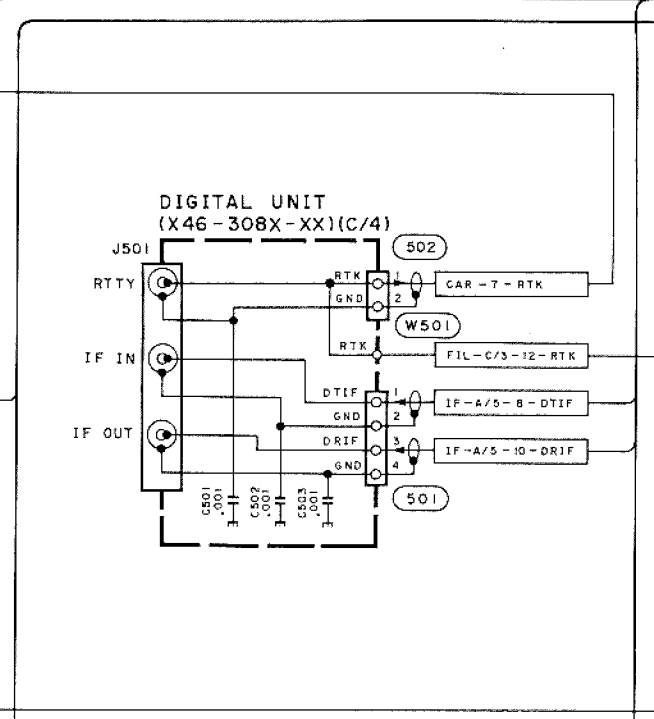
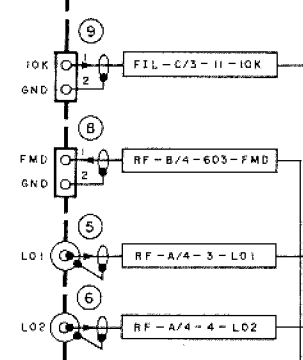
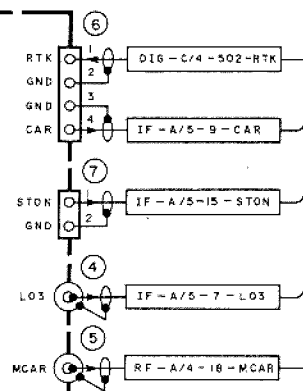
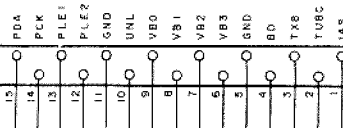


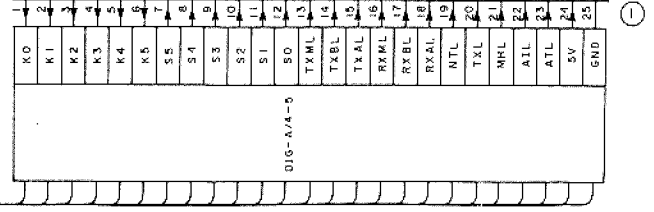
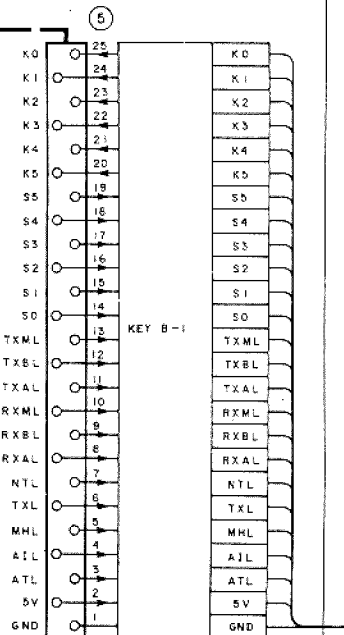
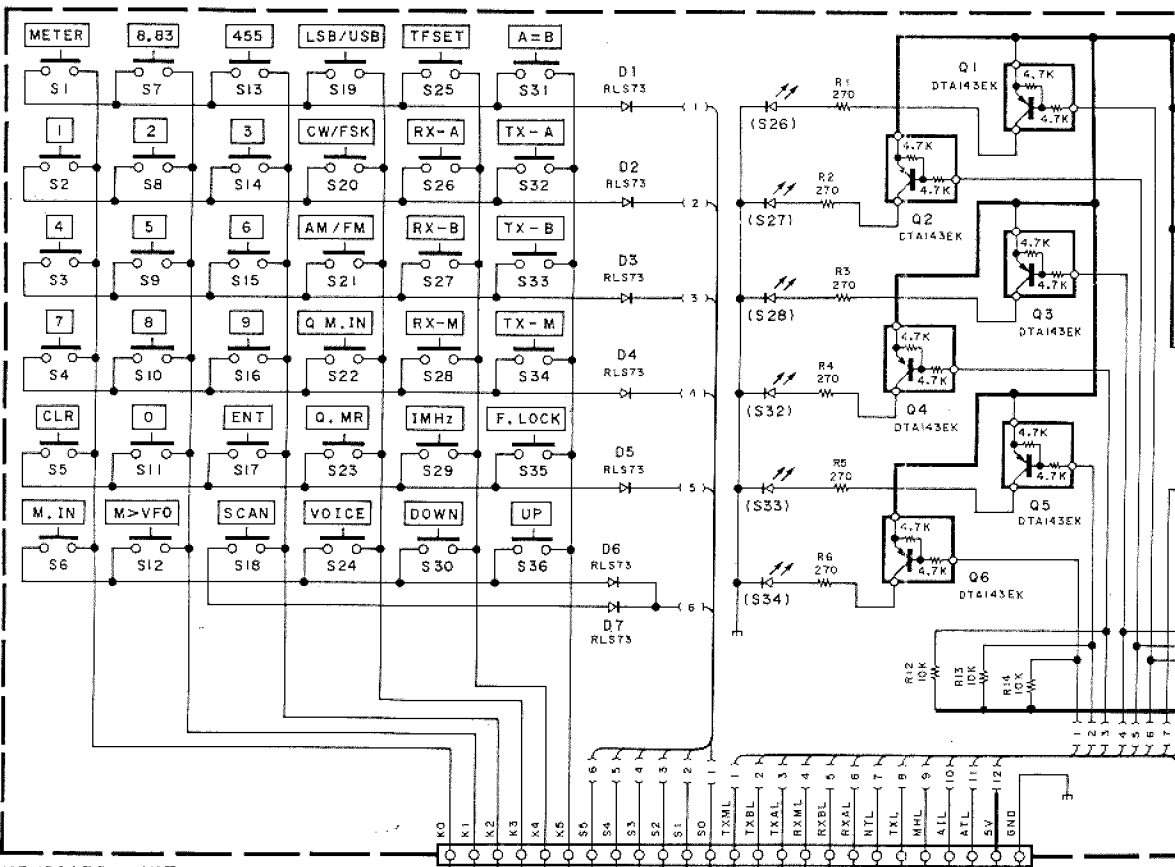
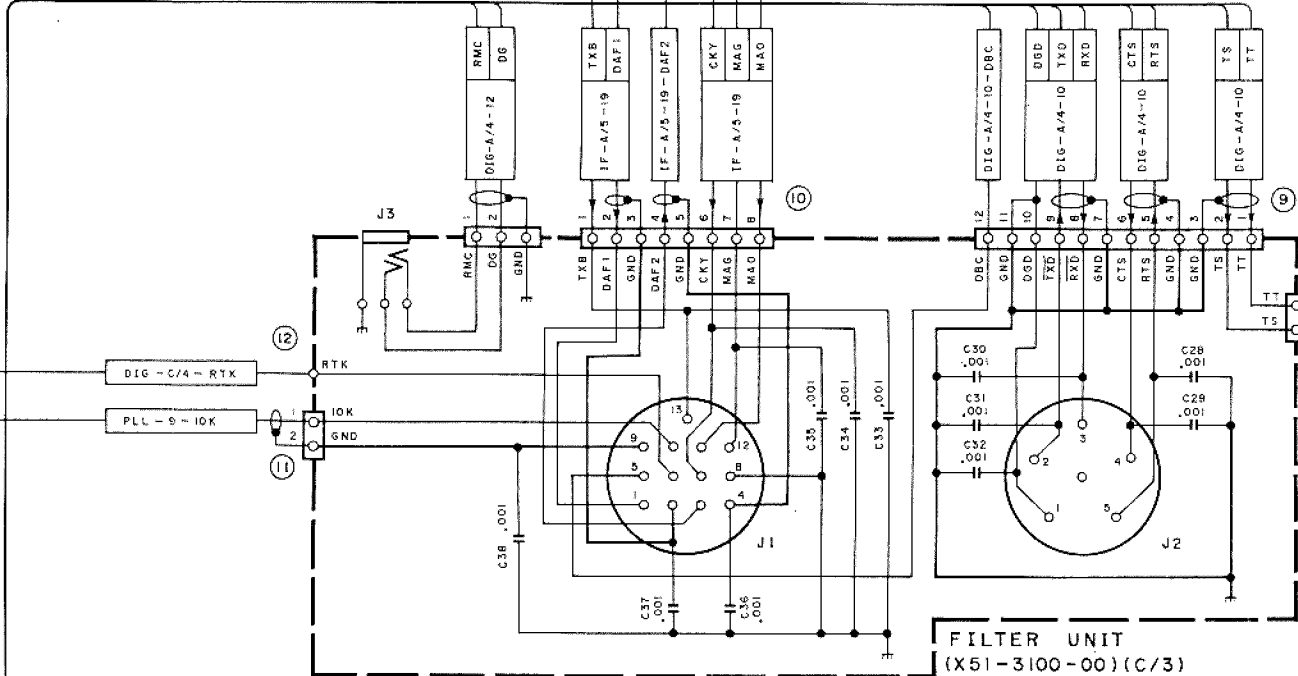


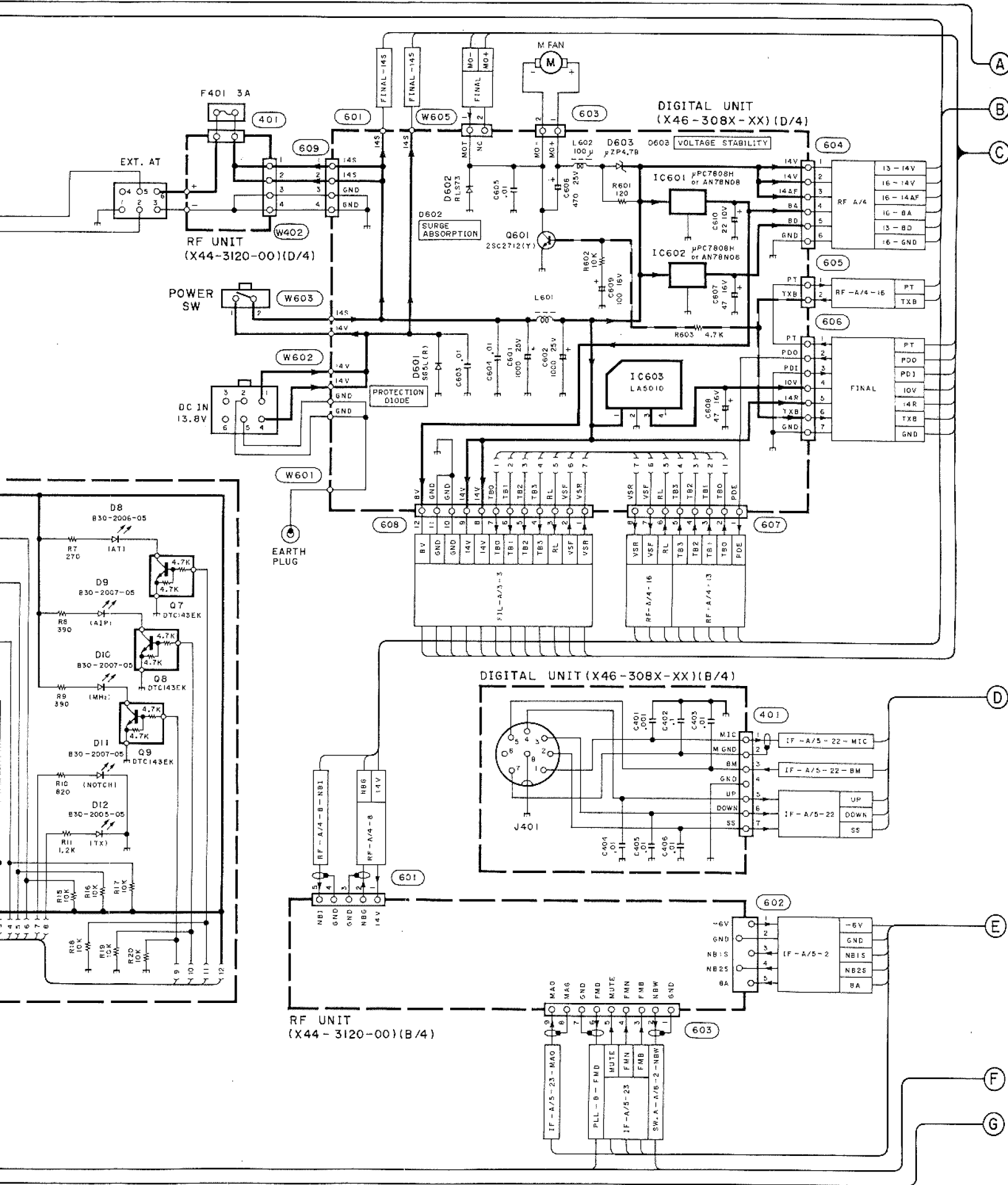
CAR UNIT (X50-3140-00)

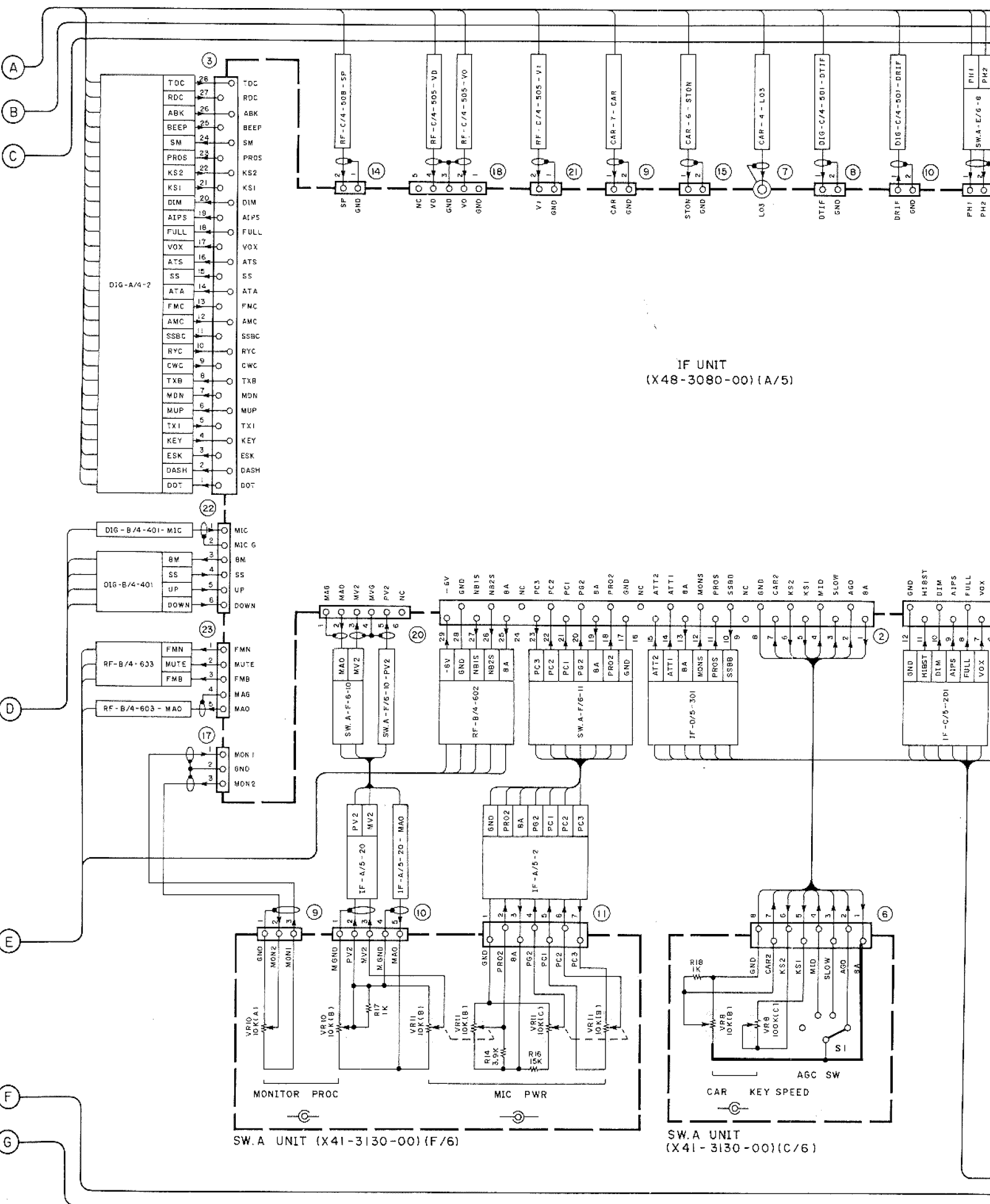


PLL UNIT (X50-3130-00)









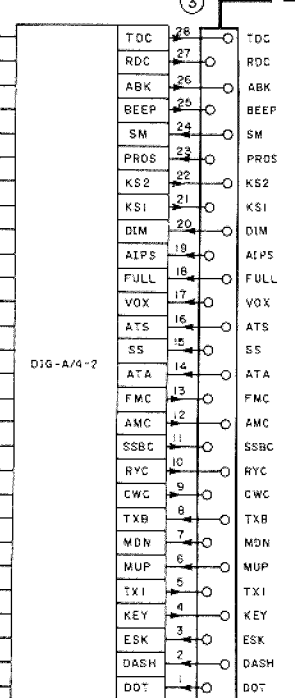
(A)  
(B)  
(C)

(D)

(E)

(F)

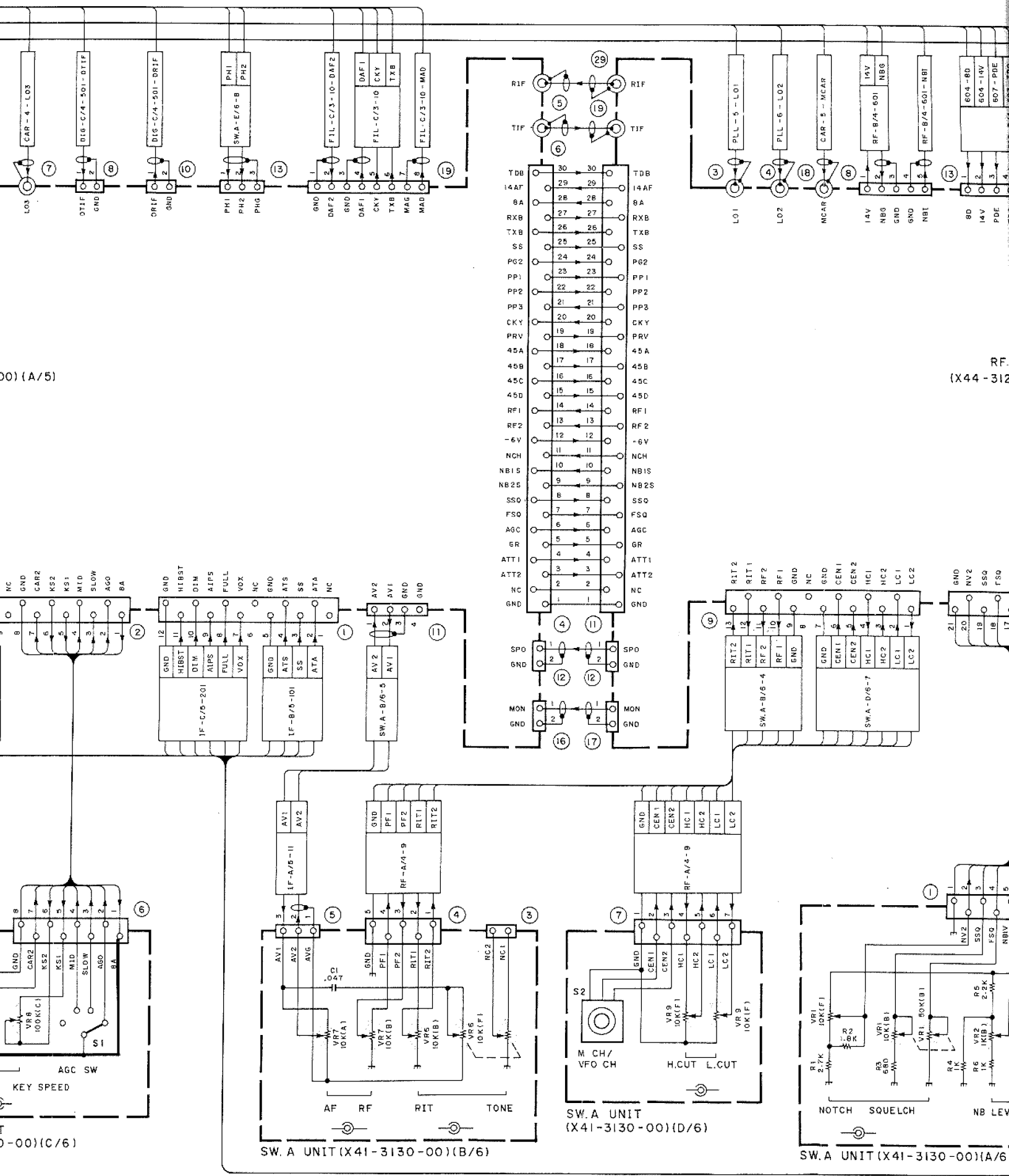
(G)



**IF UNIT**  
(X48-3080-00) (A/5)

**SW.A UNIT**  
(X41-3130-00) (F/6)

**AGC SW**  
(X41-3130-00) (C/6)



00) (A/5)

RF (X44-312

00) (C/6)

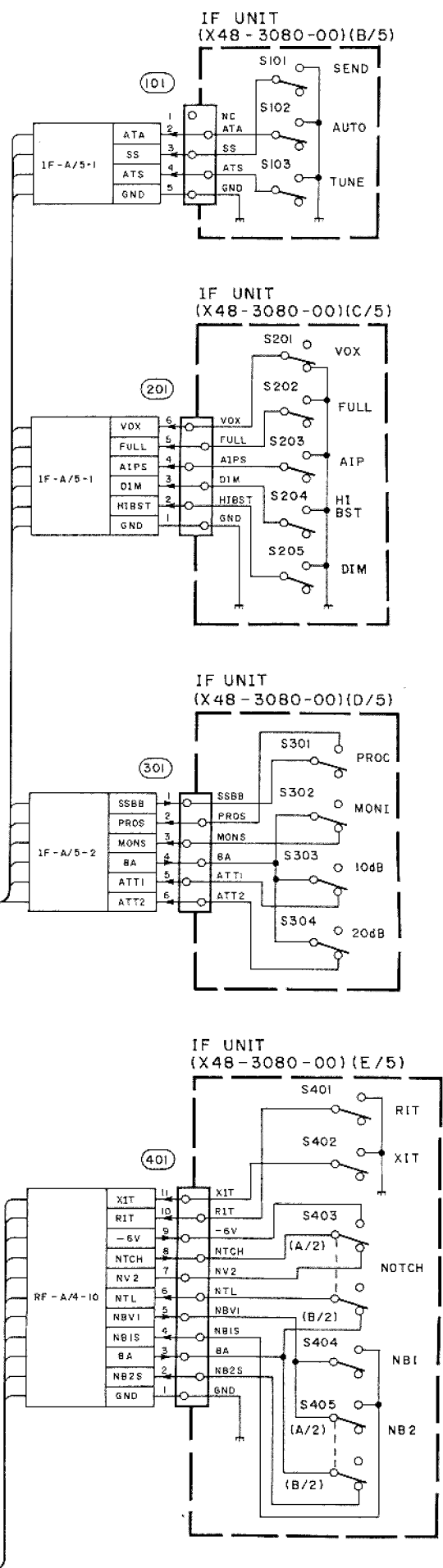
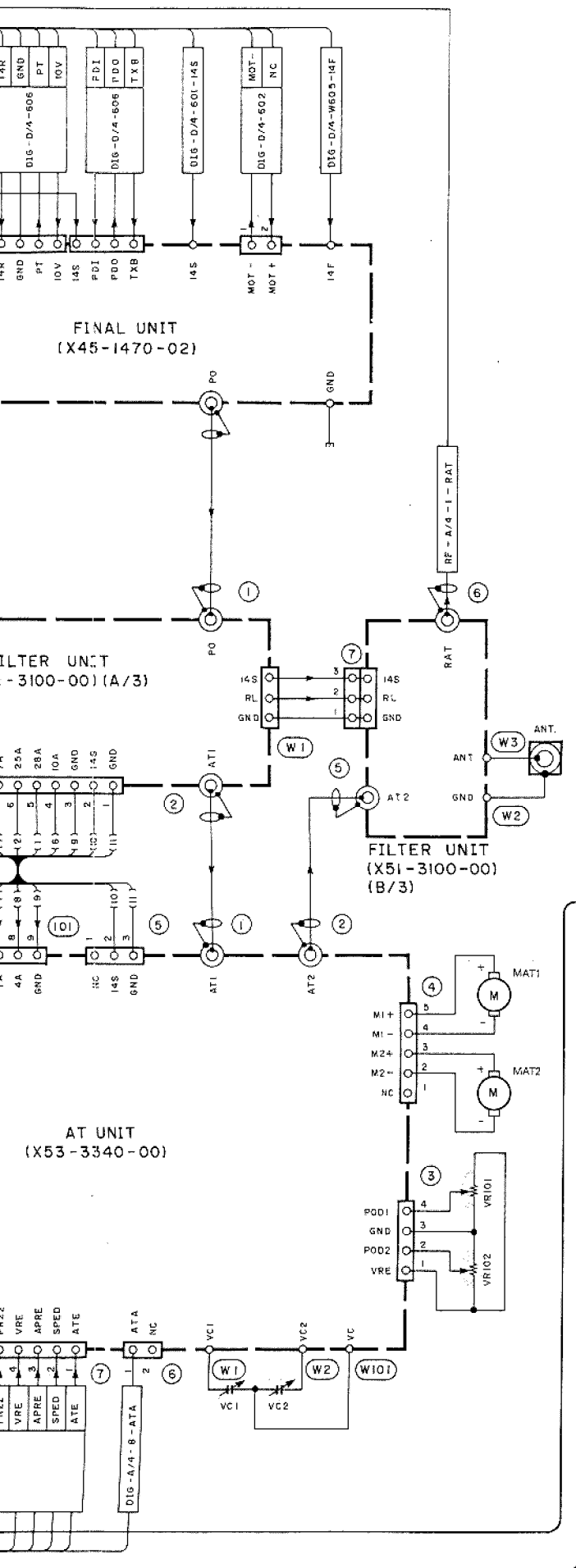
SW. A UNIT (X41-3130-00) (B/6)

SW. A UNIT (X41-3130-00) (D/6)

SW. A UNIT (X41-3130-00) (A/6)

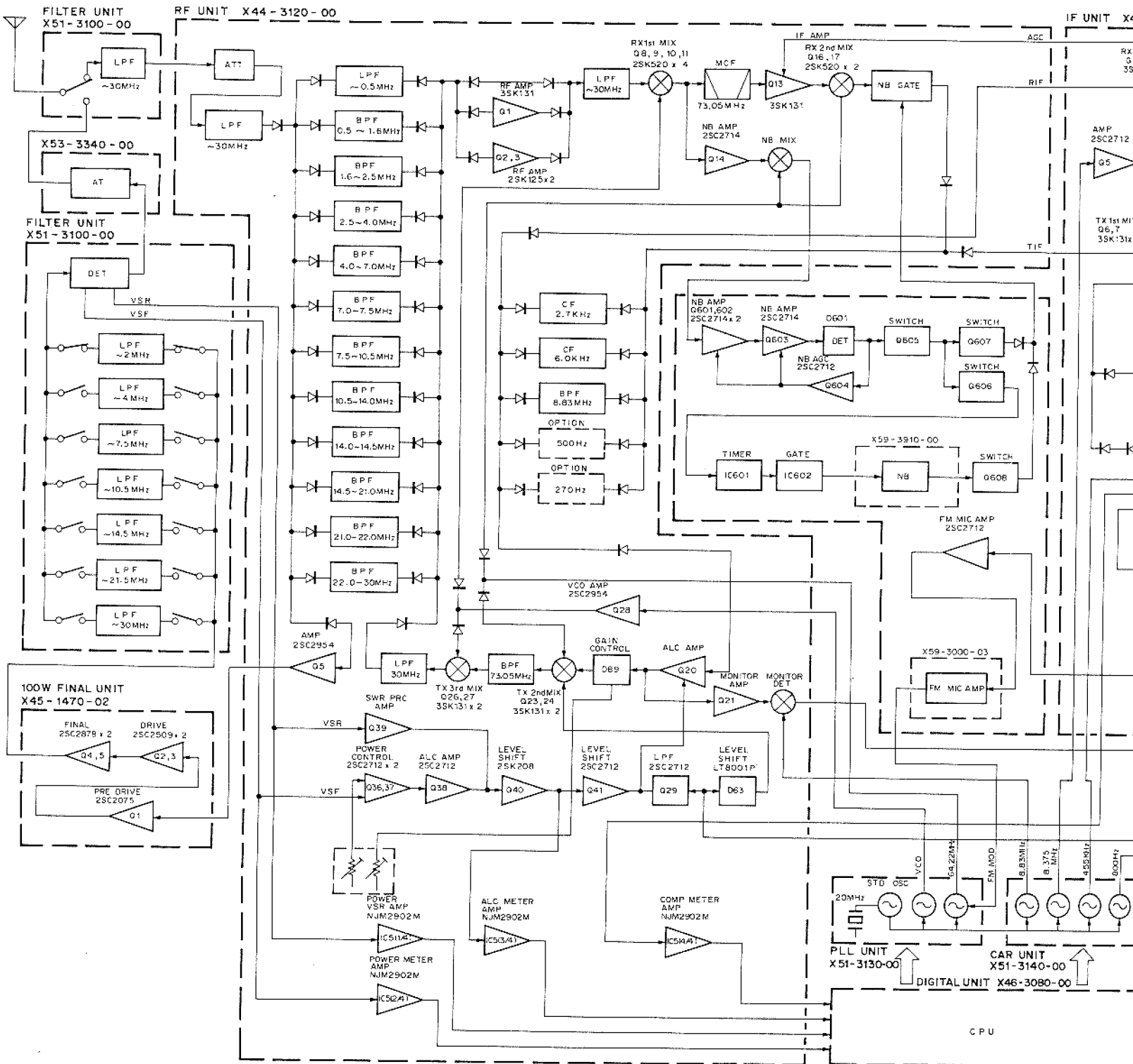


# SCHEMATIC DIAGRAM TS-850S



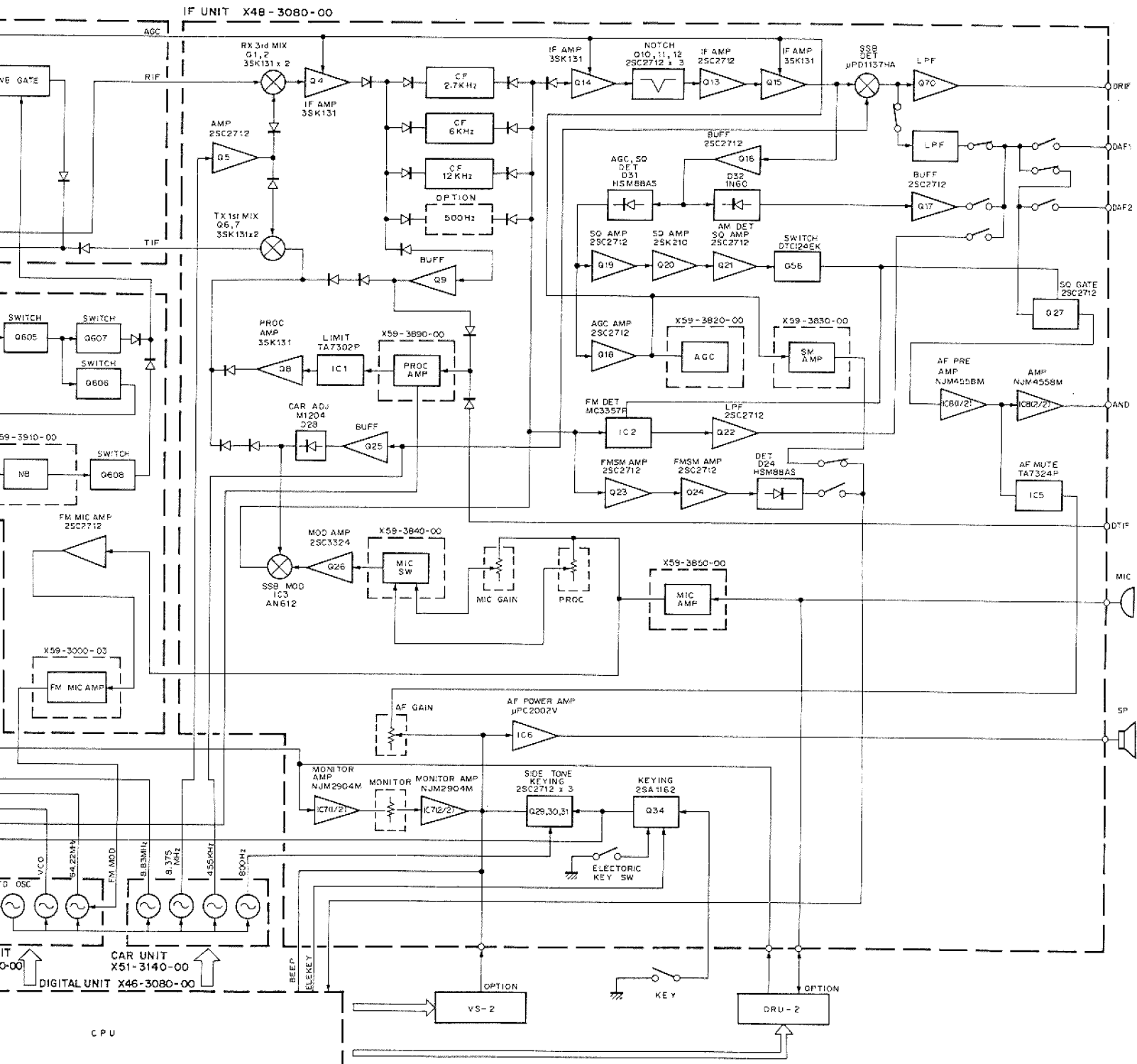


# TS-850S TS- BLOCK DIAGRAM



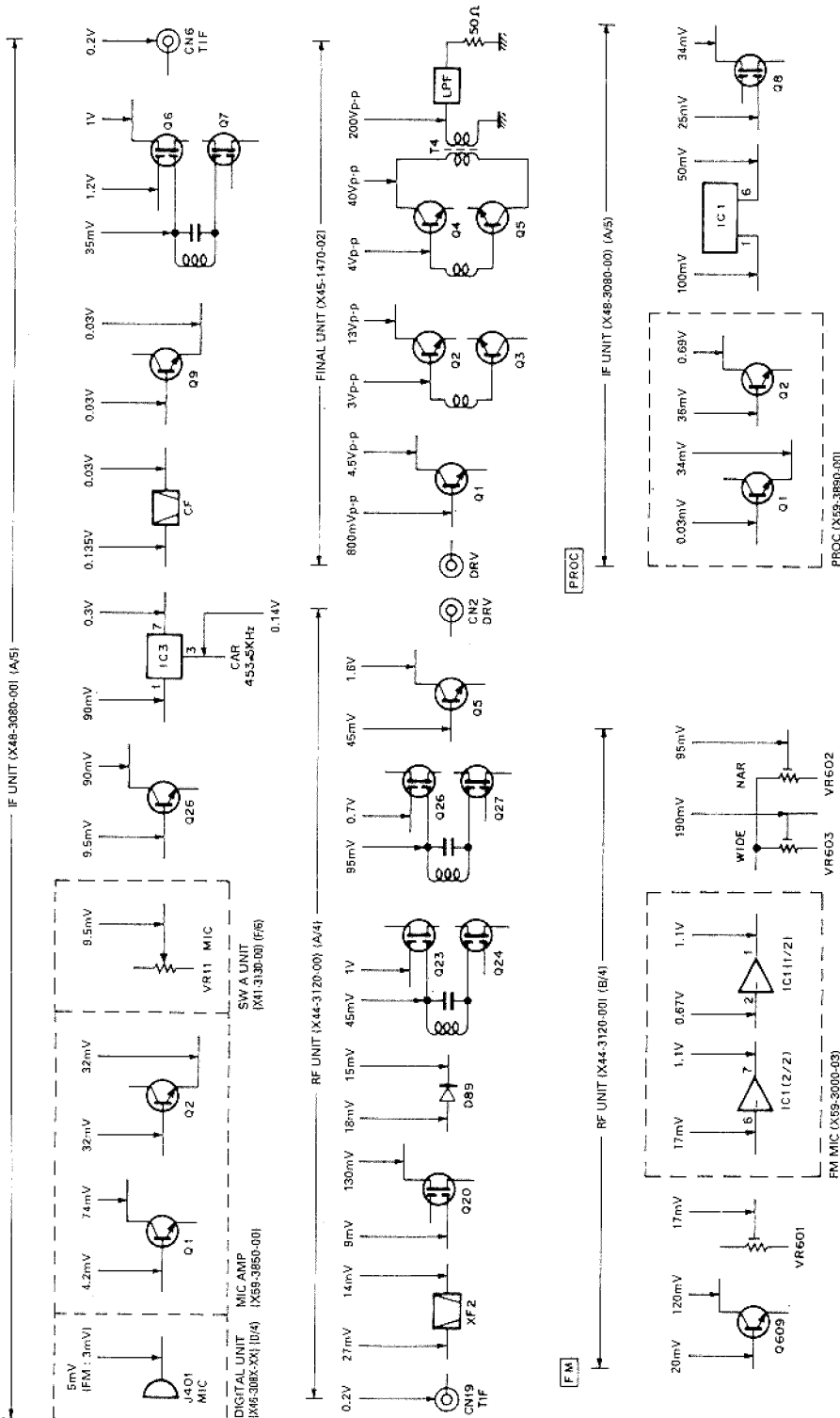
# TS-850S

## BLOCK DIAGRAM



# LEVEL DIAGRAM

## Receiver Section



1. Microphone is 5mV, 1kHz input
2. The low-frequency section is measured with an AF variable voltmeter
3. The high-frequency section is measured with an RF variable voltmeter
4. The outputs are all ALC zone maximum
5. FM wide is 3kHz deviation, narrow is 1.5kHz deviation
6. PROC when 20dB COMP



## DRU-2 (DIGITAL RECORDING UNIT)

### DRU-2 CIRCUIT DESCRIPTION

#### 1. Overview

The DRU-2 is a digital recording and playback unit designed to be installed inside the TS-850 series.

This unit has the following features:

- Recording received audio (for output to the internal speaker) or transmit audio (microphone input)
- Outputting recorded audio to the internal speaker or outputting recorded audio as modulating signals during transmission
- Built-in lithium battery back-up for maintaining DRU-2 contents

#### 2. Operations

##### • Recording received audio (for output to the internal speaker)

A received signal from the VO pin is fed into pin 1 (0Y) of the multiplexer IC1 (TC4052BF). It is then fed into pin 59 (MIC IN) of IC3 (TC8830F) via pin 3 (Y). The signal is amplified approx. 26dB by a mic amplifier in IC3, and output via pin 60 (C1). The signal from pin 60 is fed into pin 63 (C2) and amplified approx. 20dB. The amplified signal is applied to pin 64 (MIC OUT) and pin 65 (ADI).

##### • Recording transmit audio (microphone input)

Microphone input from the VI pin is amplified by Q5, and fed into pin 2 (2Y) of the multiplexer IC1 (TC4052BF). It is then supplied to IC3 (TC8830F) via pin 3 (Y) and recorded in the same way as in recording received sound.

##### • Outputting recorded audio to the internal speaker

D/A convertor output from pin 66 (DAO) of IC3 (TC8830F) is passed through a CR filter, and amplified by Q6. The amplified signal is then fed into pin 13 (X) of the multiplexer IC1 (TC4052BF), and output to the VO pin via pin 14 (1X).

##### • Outputting recorded audio as modulating signals during transmission

When sound recorded in the DRU-2 is played during transmission, the same operations as written above in outputting recorded audio to the internal speaker occur. That is, D/A convertor output from pin 66 (DAO) of IC3 (TC8830F) is passed through a CR filter, amplified by Q6, and fed into pin 13 (X) of the multiplexer IC1 (TC4052BF). The sound, however, is output via pin 11 (3X).

	VOA (pin 10)	VOB (pin 9)	On channel
Output to speaker	H	L	1X (pin 14)
Output during transmission	H	H	3X (pin 11)
Received audio recording	L	L	0Y (pin 1)
Transmit audio recording	L	H	2Y (pin 2)

Table 1 IC1 : TC4052BF operations

### DRU-2 DESCRIPTION OF COMPONENTS ACCESSORY UNIT (X42-3010-01)

Component	Use/Function	Description
IC1	Multiplexer	See DRU-2 circuit description.
IC3	Audio recording and playback	See DRU-2 semiconductor data.
IC4~7	S-RAM	
Q5	AF amplification	Mic input amplification.
Q6	AF amplification	Playback sound amplification.
D1	Reverse current prevention	
D2	Reverse current prevention	Back-up.

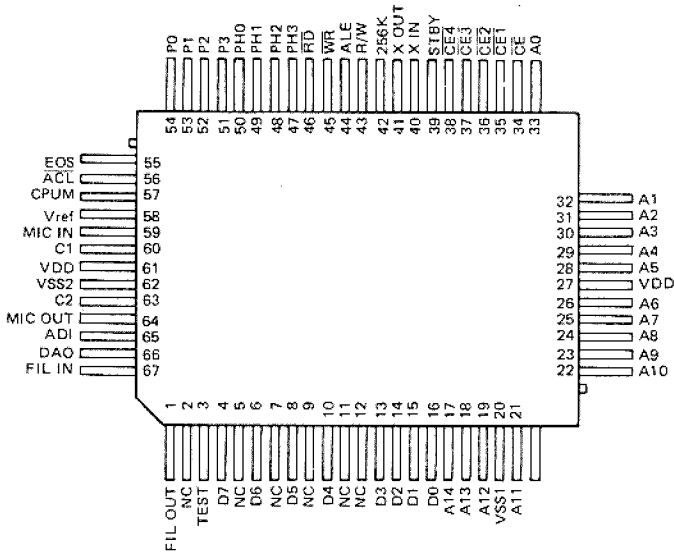
# TS-850S

## DRU-2 (DIGITAL RECORDING UNIT)

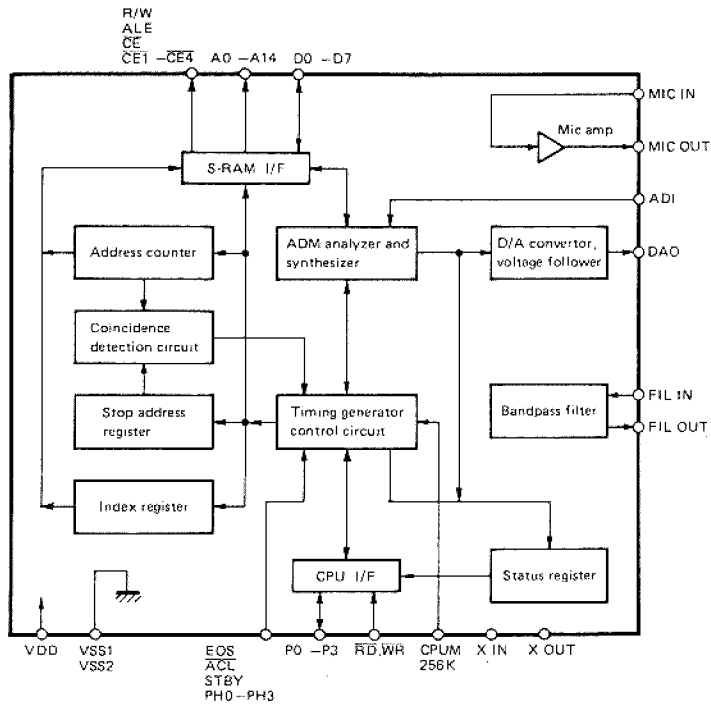
### DRU-2 SEMICONDUCTOR DATA

#### 1. Audio recording and playback : TC8830F (IC3)

##### • Terminal connection diagram



##### • Block diagram



##### • Terminal functions

Pin No.	Pin name	I/O	Function	Pin No.	Pin name	I/O	Function
1	FIL OUT	O	Not used.	41	X OUT	O	512kHz oscillation circuit.
2	NC	-	Not connected.	42	256K	I	64K/256K RAM select, "H" when 256K used.
3	TEST	-	Not used.	43	R/W	O	RAM read/write output.
4	D7	I/O	RAM data I/O.	44	ALE	-	Not used.
5	NC	-	Not connected.	45	WR	I	Write pulse input.
6	D6	I/O	RAM data I/O.	46	RD	I	Read pulse input.
7	NC	-	Not connected.	47-50	PH3~PH0	-	Not used.
8	D5	I/O	RAM data I/O.	51-54	P3~P0	I/O	Data bus.
9	NC	-	Not connected.	55	EOS	-	Not used.
10	D4	I/O	RAM data I/O.	56	ACL	I	Reset signal input.
11,12	NC	-	Not connected.	57	CPUM	I	"H" when CPU control enabled.
13-16	D3~D0	I/O	RAM data I/O.	58	Vref	O	Analog circuit reference voltage output.
17-19	A14~A12	O	RAM address output.	59	MIC IN	I	Mic amp. 1 input.
20	Vss1	-	GND.	60	C1	O	Mic amp. 1 output.
21-26	A11~A6	O	RAM address output.	61	VDD	-	Power supply.
27	VDD	-	Power supply.	62	Vss2	-	GND.
28-33	A5~A0	O	RAM address output.	63	C2	I	Mic amp. 2 input.
34	CE	-	Not used.	64	MIC OUT	O	Mic amp. 2 output.
35-38	CE1~CE4	O	RAM chip enable.	65	ADI	I	Audio analysis circuit input.
39	STBY	I	Minimum current standby when standby input is "H".	66	DAO	O	D/A converter output.
40	X IN	I	512kHz oscillation circuit.	67	FIL IN	I	Not used.

## DRU-2 (DIGITAL RECORDING UNIT)

× New Parts

Parts without Parts No. are not supplied.

Les articles non mentionnés dans le Parts No. ne sont pas fournis.

Telle ohne Parts No. werden nicht geliefert.

### DRU-2 PARTS LIST

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕 向	Re- marks 備考
<b>DRU-2</b>						
		*	B42-3317-04 B62-0145-00	LABEL INSTRUCTION MANUAL		
			G10-0666-04 G10-0679-04 G13-0913-04	NON-WOVEN FABRIC NON-WOVEN FABRIC FORMED PLATE		
			H21-0704-04 H25-0029-04 H25-0710-04	PROTECTION SHEET PROTECTION BAG PROTECTION BAG		
		*	H52-0156-03	ITEM CARTON BOX		
		*	H62-0135-04	OUTER PACKING CASE		
			N87-2606-46	BRAZIER HEAD TAPTITE SCREW		
		*	X42-3010-01	ACCESSORY UNIT		
<b>ACCESSORY UNIT (X42-3010-01)</b>						
C1			CK73FB1H103K	CHIP C 0.010UF K		
C2			CK73FB1H102K	CHIP C 1000PF K		
C3			CK73FF1E154Z	CHIP C 0.15UF Z		
C4	-6		CK73FB1H103K	CHIP C 0.010UF K		
C7			CK73EF1C105Z	CHIP C 1.0UF Z		
C8	-10		CK73FB1H103K	CHIP C 0.010UF K		
C11			CK73FF1E104Z	CHIP C 0.1UF Z		
C15			CK73FF1E104Z	CHIP C 0.1UF Z		
C17			CK73FF1E104Z	CHIP C 0.1UF Z		
C19			CK73FB1H103K	CHIP C 0.010UF K		
C20			CK73FB1H102K	CHIP C 1000PF K		
C21	,22		CC73FSL1H101J	CHIP C 100PF J		
C23			CK73FB1H103K	CHIP C 0.010UF K		
C24			C92-0010-05	CHIP TAN 6.8UF 6.3WV		
C25			CK73EB1H104K	CHIP C 0.10UF K		
C26			CK73FB1H103K	CHIP C 0.010UF K		
C27			CC73FSL1H101J	CHIP C 100PF J		
C28			CK73EB1H104K	CHIP C 0.1UF K		
CN1			E40-5207-05	PIN CONNECTOR		
CN2			E40-5206-05	PIN CONNECTOR		
CN3			E40-5181-05	PIN CONNECTOR		
W1			E31-6005-05	CONNECTING WIRE		
W2			E31-6006-05	CONNECTING WIRE		
W3			E31-6007-05	CONNECTING WIRE		
			F20-0520-04 F20-0521-04	INSULATING BOARD INSULATING BOARD		
X1			L77-1398-05	CRYSTAL RESONATOR 3.579545MHZ		
X2			L78-0050-05	RESONATOR 512KHZ		
R1			RK73FB2A103J	CHIP R 10K J 1/10W		
R2			RK73FB2A392J	CHIP R 3.9K J 1/10W		
R3			RK73FB2A103J	CHIP R 10K J 1/10W		
R4			RK73FB2A105J	CHIP R 1.0M J 1/10W		
R5			RK73FB2A102J	CHIP R 1.0K J 1/10W		
R6			R92-0670-05	CHIP R 0 OHM		
R7			RK73FB2A223J	CHIP R 22K J 1/10W		
R8			RK73FB2A102J	CHIP R 1.0K J 1/10W		

E: Scandinavia & Europe K: USA P: Canada W: Europe

U: PX(Far East, Hawaii) T: England M: Other Areas

UE: AAFES(Europe) X: Australia

⚠ indicates safety critical components.



## DRU-2 (DIGITAL RECORDING UNIT)

× New Parts

Parts without Parts No. are not supplied.

Les articles non mentionnés dans le Parts No. ne sont pas fournis.

Teile ohne Parts No. werden nicht geliefert.

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕 向	Re- marks 備考
R9			RK73FB2A105J	CHIP R 1.0M J 1/10W		
R10			R92-0670-05	CHIP R 0 ΩHM		
R11			RK73FB2A223J	CHIP R 22K J 1/10W		
R12 ,13			RK73FB2A222J	CHIP R 2.2K J 1/10W		
R14			RK73FB2A472J	CHIP R 4.7K J 1/10W		
R18			RK73FB2A105J	CHIP R 1.0M J 1/10W		
R19			RK73FB2A562J	CHIP R 5.6K J 1/10W		
R20			RK73FB2A104J	CHIP R 100K J 1/10W		
R21			RK73FB2A103J	CHIP R 10K J 1/10W		
R22			RK73FB2A102J	CHIP R 1.0K J 1/10W		
R23			RK73FB2A564J	CHIP R 560K J 1/10W		
R24			RK73FB2A683J	CHIP R 68K J 1/10W		
R25			RK73FB2A223J	CHIP R 22K J 1/10W		
R26			RK73FB2A105J	CHIP R 1.0M J 1/10W		
R27			RK73FB2A222J	CHIP R 2.2K J 1/10W		
R28			RK73FB2A224J	CHIP R 220K J 1/10W		
R29 -31			R92-0670-05	CHIP R 0 ΩHM		
R32			RK73FB2A220J	CHIP R 22 J 1/10W		
R33			RK73FB2A394J	CHIP R 390K J 1/10W		
D1 ,2			1SS184	DIODE		
IC1			TC4052BF	IC		
IC2			LR4102N	IC		
IC3			TC8830F	IC		
IC4 -7			HM62256LFP1-12T	IC		
IC4 -7			HM62256LFP-15T	IC		
Q1 ,2			2SC2712(BL)	TRANSISTOR		
Q5 -6			2SC2712(BL)	TRANSISTOR		
			WD9-0326-05	LITHIUM BATTERY		

E: Scandinavia & Europe K: USA P: Canada W: Europe

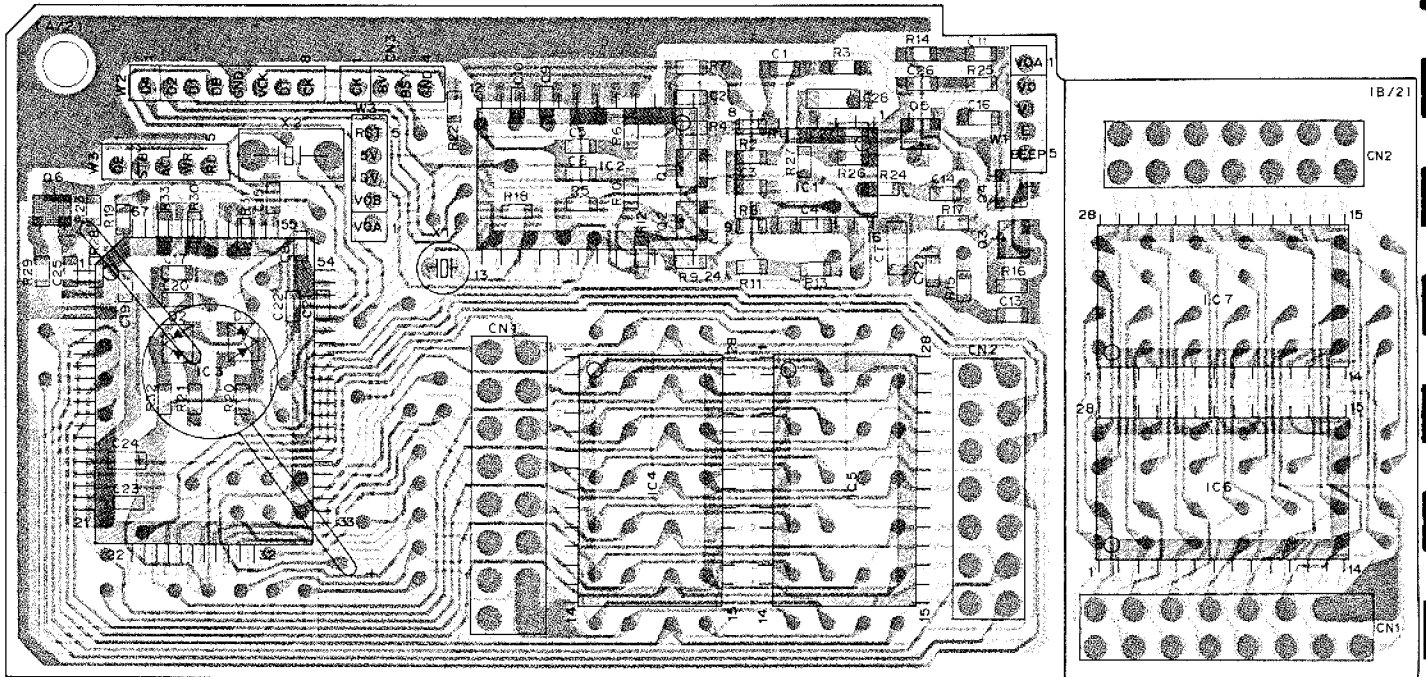
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UE: AAFES(Europe) X: Australia

△ indicates safety critical components.

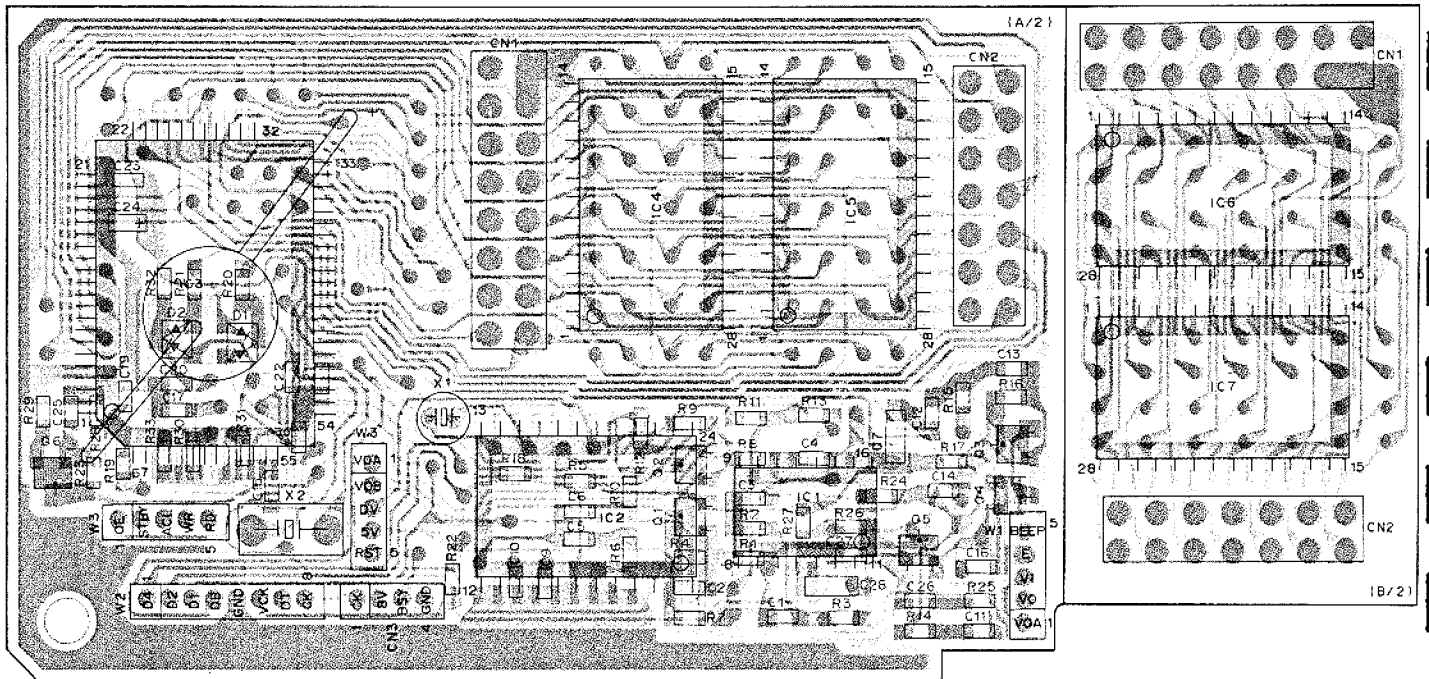
# DRU-2 PC BOARD VIEWS

## ACCESSORY UNIT (X42-3010-01) Component side view



IC1 : TC4052BF IC2 : LR4102N IC3 : TC8830F IC4-7 : HM62256LFPI-12T Q1,2,5,6 : 2SC2712(BL) D1,2 : 1SS184

## ACCESSORY UNIT (X42-3010-01) Foil side view



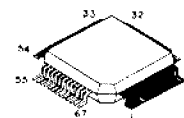
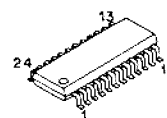
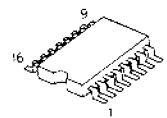
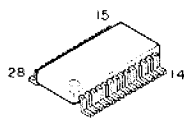
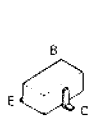
2SC2712(BL)

HM62256LFPI-12T

TC4052BF

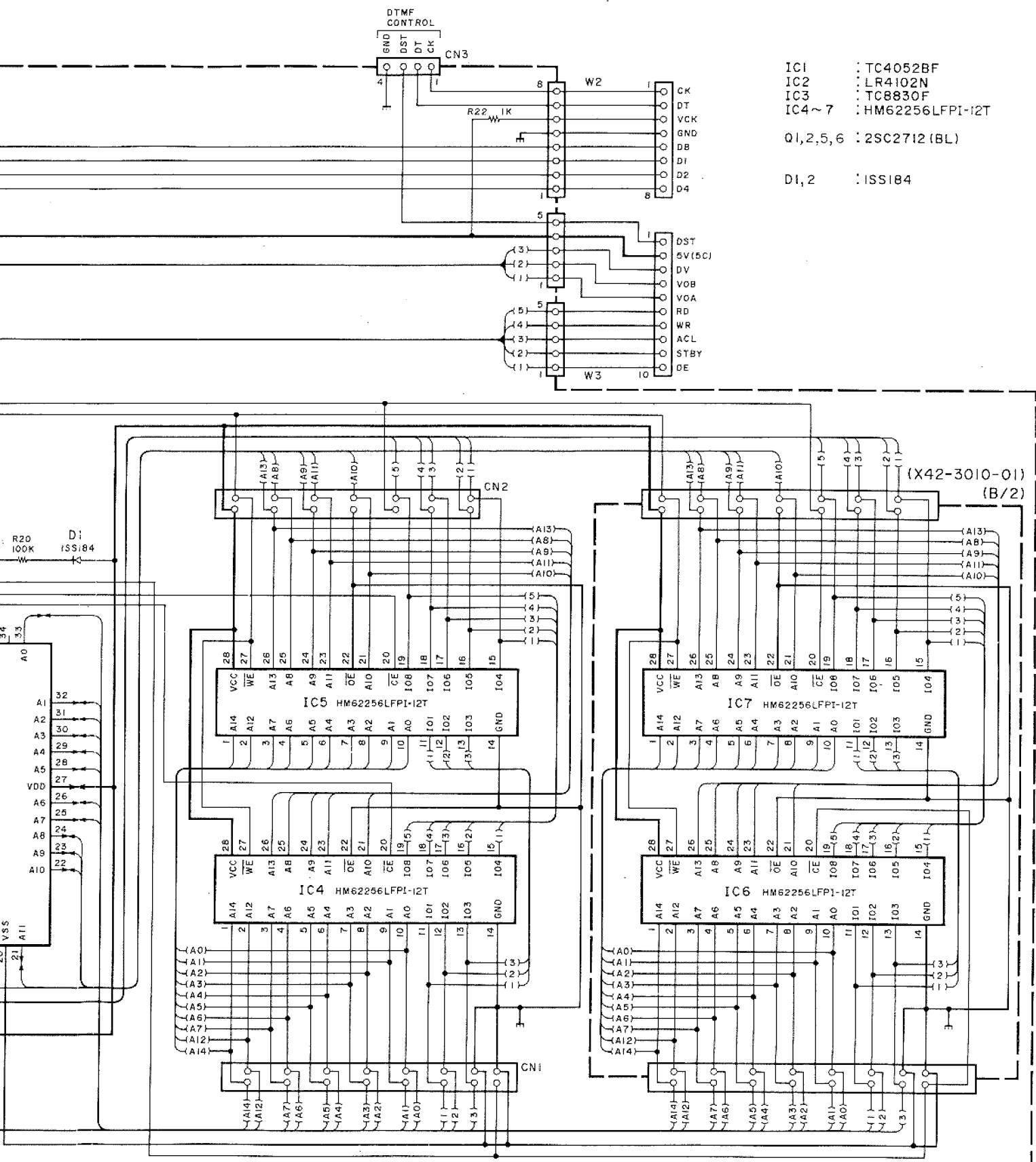
LR4102N

TC8830F





# DRU-2 (DIGITAL RECORDING UNIT) TS-850S



- IC1 : TC4052BF
- IC2 : LR4102N
- IC3 : TC8830F
- IC4~7 : HM62256LFPI-12T
- Q1,2,5,6 : 2SC2712 (BL)
- D1,2 : ISS184

# TS-850S

## PS-52 (DC POWER SUPPLY)

### PS-52 SPECIFICATIONS

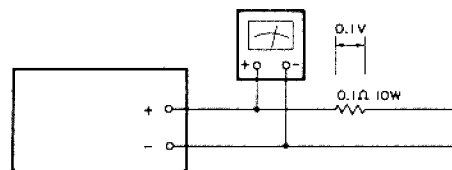
VERSIONS	PS-52		
	U.S.A.	Europe and General markets	U.K. and Oceania
Power requirements	120 VAC $\pm$ 10%, 60 Hz	* 120/220-240 VAC $\pm$ 10%, 50/60 Hz	240 VAC $\pm$ 10%, 50/60 Hz
Output voltage	13.8 VDC (Reference)		
Rated output current	22.5A (25% duty cycle) 16A (50% duty cycle)		
Output voltage regulation	Within $\pm$ 0.7 V (at 120/220-240 VAC $\pm$ 10% variation with 22.5A ) Within $\pm$ 0.7 V (at load current variation from 2 to 22.5A )		
Ripple voltage	Less than 20 mVrms (at 13.8 VDC/ 22.5A )		
Power consumption	Approx. 500 W (at 13.8 VDC/20A)		
Dimensions (W x H x D) Dimensions in [ ] include projections.	180 x 120 x 310 mm [183 x 134 x 343 mm] 6-27/32" x 4-23/32" x 12-7/32" [7-7/32" x 5-9/32" x 13-1/2"]		
Weight	Approx. 7.9 kg (17.4 lbs)		

#### NOTES:

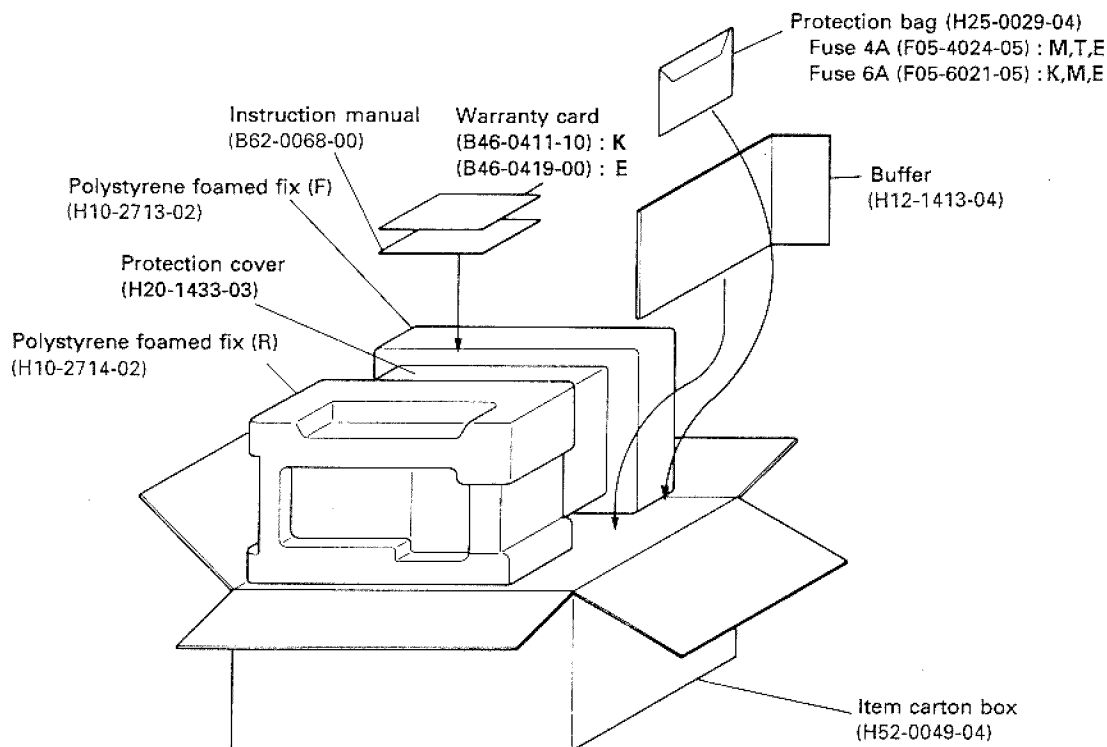
1. Rating are subject to change without notice due to advancements in technology.
2. \*: Switchable. AC voltage is preset to 220-240 VAC at the factory.

### PS-52 ADJUSTMENT

1. POWER : OFF
2. Connect the 0.1 $\Omega$  10W resistor to output terminal.
3. POWER switch is turned on, then adjust obtain the proper 0.1V voltage by VR2.



### PS-52 PACKING



## PS-52 (DC POWER SUPPLY)

× New Parts

Parts without Parts No. are not supplied.

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Teile ohne Parts No. werden nicht geliefert.

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕 向	Re- marks 備考
<b>PS-52</b>						
		*	A01-2016-02	CASE(UPPER)		
		*	A01-2017-02	CASE(LOWER)		K, T
		*	A01-2018-02	CASE(LOWER)		M, E
			A23-1505-03	REAR PANEL		T, E
		*	A23-1506-03	REAR PANEL		M
			A23-1510-03	REAR PANEL		K
			A62-0047-03	PANEL ASSY		
			B41-0659-14	CAUTION LABEL		K
			B41-0660-04	CAUTION LABEL		K
			B42-2454-04	SERIAL LABEL		
			B42-3343-04	SERIAL LABEL		
			B42-3346-04	SPEC. LABEL(FUSE)		K
			B42-3355-04	SPEC. LABEL(EARTH)		T, E
			B42-3374-04	SPEC. LABEL		M
		*	B42-3449-04	LABEL		E
			B42-3454-04	LABEL(FUSE, F1)		M, E, T
			B46-0411-10	WARRANTY CARD		K
			B46-0419-00	WARRANTY CARD		E
		*	B62-0068-00	INSTRUCTION MANUAL		
		*	B72-0084-04	MODEL NAME PLATE		K
		*	B72-0085-04	MODEL NAME PLATE		M, E
		*	B72-0086-04	MODEL NAME PLATE		T
C1 -4			CK45F1H103Z	CERAMIC 0.010UF Z		
C5			C90-2085-05	ELECTRO 47000UF 25WV		
C6			CK45F1H473Z	CERAMIC 0.047UF Z		
			E20-0284-05	TERMINAL BOARD		
		*	E30-0585-25	AC POWER CORD		E
			E30-0602-05	AC POWER CORD CORD		T
			E30-2120-05	AC POWER CORD CORD		K, M
			E31-3373-15	LEAD WITH TERMINAL		
			E31-3374-05	LEAD WISH TERMINAL		
			E31-3375-05	LEAD WISH TERMINAL		
			E31-3377-05	LEAD WISH CONNECTOR		
			E31-3379-05	LEAD WISH CONNECTOR		
			E31-3454-05	LEAD WISH TERMINAL		
			F01-0962-13	HEAT SINK		
			F05-4024-05	FUSE(4A)		M, T, E
			F05-6021-05	FUSE(6A) ACSY		M, E
			F09-0421-05	FUSE(6A)		K
MI			F09-0423-15	FAN		
			F20-1005-04	INSULATING BOARD		
			F29-0436-04	INSULATING BUSH(Q1,2)		
		*	H10-2713-02	POLYSTYRENE FOAMED FIXTURE(F)		
		*	H10-2714-02	POLYSTYRENE FOAMED FIXTURE(R)		
			H12-1413-04	BUFFER		
			H20-1433-03	PROTECTION COVER		
			H25-0029-04	PROTECTION BAG(FUSE)		
			H25-0105-04	PROTECTION BAG(AC POW. CORD)		
		*	H52-0049-04	ITEM CARTON BOX		
			J02-0049-14	FOOT(REAR)		
			J02-0423-04	FOOT(FRONT OUTSIDE)		

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Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕 向	Re- marks 備考					
T1 T1 T1		*	J02-0424-04	FOOT(FRONT INSIDE)	K						
			J13-0033-15	FUSE HOLDER							
			J19-0306-05	CORD HOLDER(PANEL)							
			J21-4179-04	MOUNTING HARDWARE(ELECTRO)							
			J21-4328-03	MOUNTING HARDWARE(FAN)							
			*	J42-0024-15			CORD BUSHING	K, M T, E			
				J42-0085-05			CORD BUSHING				
				J61-0307-05			WIRE BAND				
				K29-4636-04			PUSH KNOB(POWER)				
				*			L01-8462-05		POWER TRANSFORMER(240V)	T K M, E	
							L01-8471-05		POWER TRANSFORMER(120V)		
			L01-8475-05				POWER TRANSFORMER(120/230V)				
			S1 S2					N09-0372-04	SCREW(PULLEY)	T, E	
								N09-0754-05	SCREW		
								N09-2033-04	BIND HEAD SCREW(TRANSISTOR)		
N09-2050-05	ROUND HEAD SCREW(EARTH)										
N14-0535-04	HEX. NUT(TRANSISTOR)										
N16-0040-46	SPRING WASHER(DIODE)										
	N19-0642-04				FLAT WASHER(TRANSISTOR)						
	N30-3004-46				ROUND HEAD SCREW(MOTOR MOUNT.)						
	N30-4018-46				ROUND HEAD SCREW(DIODE)						
	N33-3008-41				FLAT HEAD SCREW						
N50-3008-41	BINDING HEAD TAPPING SCREW	M, E									
	N87-3006-46		BRAZIER HEAD TAPTITE SCREW								
	N87-3014-46		BRAZIER HEAD TAPTITE SCREW								
	N87-4008-45		BRAZIER HEAD TAPTITE SCREW								
	N87-4008-46		BRAZIER HEAD TAPTITE SCREW								
S1 S2			N88-3008-46	FLAT HEAD TAPTITE SCREW(POW SW)	M, E						
			S40-1416-05	PUSH SWITCH(POWER)							
Q1 Q2 Q1 ,2			S31-2126-05	SLIDE SWITCH(VOLTAGE SEL.)	M, E						
			S25VB10	DIODE							
			TLR205	LED							
Q1 ,2			2N5885	TRANSISTOR							
			* X43-3030-01	POWER SUPPLY UNIT							
<b>POWER SUPPLY UNIT (X43-3030-01)</b>											
C1 -3 C4 C5 C6 C7			CK45F1H103Z	CERAMIC 0.010UF Z							
			CK45F1H473Z	CERAMIC 0.047UF Z							
			CE04EW1C331M	ELECTRO 330UF 16WV							
			CE04EW1A470M	ELECTRO 47UF 10WV							
			CK45F1H103Z	CERAMIC 0.010UF Z							
			C8 C9 -11 C12 C13 C14					CK45F1H473Z	CERAMIC 0.047UF Z		
								C90-0814-05	ELECTRO 4700UF 25WV		
CW92M1H104K	MYLAR 0.10UF K										
CK45B1H102K	CERAMIC 1000PF K										
C15 ,16			C91-0647-05	CERAMIC 0.01UF P							
			C91-1075-05	CERAMIC 470PF K							
CN1 ,2 CN3 W1		*	E23-0022-04	TERMINAL							
			E23-0462-05	TAB TERMINAL							
			E40-3237-05	MINI-CONNECTOR(2P)							
			E40-0470-05	PIN ASSY(4P)							
			E31-0302-05	JUMPER WIRE							

E: Scandinavia & Europe K: USA P: Canada W: Europe

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## PS-52 (DC POWER SUPPLY)

× New Parts

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Telle ohne Parts No. werden nicht geliefert.

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕向	Re- marks 備考
			F29-0072-05	CONDENSER COVER		
			J13-0055-15	FUSE HOLDER		
			J31-0502-14	COLLAR(PC BOARD)		
			J42-0428-05	BUSHING(PC BOARD)		
R1			RD14BB2C391J	RD 390 J 1/6W		
R2			R92-1202-05	FUSE R 2.2 J 2W		
R3			RS14KB3F121J	FL-PROOF RS 120 J 3W		
R4			RD14BB2C272J	RD 2.7K J 1/6W		
R5			RD14BB2C102J	RD 1.0K J 1/6W		
R6			RD14BB2C473J	RD 47K J 1/6W		
R7 ,8			RS14KB3A1R0J	FL-PROOF RS 1.0 J 1W		
R9			RD14BB2C182J	RD 1.8K J 1/6W		
R10 ,11			RS14KB3A331J	FL-PROOF RS 330 J 1W		
R12			RD14BB2C471J	RD 470 J 1/6W		
R13			RD14BB2C472J	RD 4.7K J 1/6W		
R14			RD14BB2C153J	RD 15K J 1/6W		
R15			RS14KB2H471J	FL-PROOF RS 470 J 1/2W		
R16			RD14BB2C123J	RD 12K J 1/6W		
R17			RD14BB2C822J	RD 8.2K J 1/6W		
R18			RD14BB2C333J	RD 33K J 1/6W		
R19			RD14CB2C392J	RD 3.9K J 1/6W		
R20			RS14KB3A820J	FL-PROOF RS 82 J 1W		
R21			RD14BB2C223J	RD 22K J 1/6W		
R22			RD14BB2C472J	RD 4.7K J 1/6W		
VR1			R12-0094-05	TRIMMING POT.470		
VR2			R12-6012-05	TRIMMING POT.470K		
D1			1S1555	DIODE		
D2 ,3			DSA3A1	DIODE		
D4			UZ9.1BL	ZENER DIODE		
D5			1S1555	DIODE		
D6			UZ9.1BL	ZENER DIODE		
D7			UZ158H	DIODE		
D8			1S1555	DIODE		
Q1			2SA562(Y)	TRANSISTOR		
Q2 ,3			2SC2458(Y)	TRANSISTOR		
Q4			2SB941(Q)	TRANSISTOR		
Q5			2SC2458(Y)	TRANSISTOR		
TH-1			32D27	THERMISTER		
TH-2			5TP41L	THERMISTER		

E: Scandinavia & Europe K: USA P: Canada W: Europe

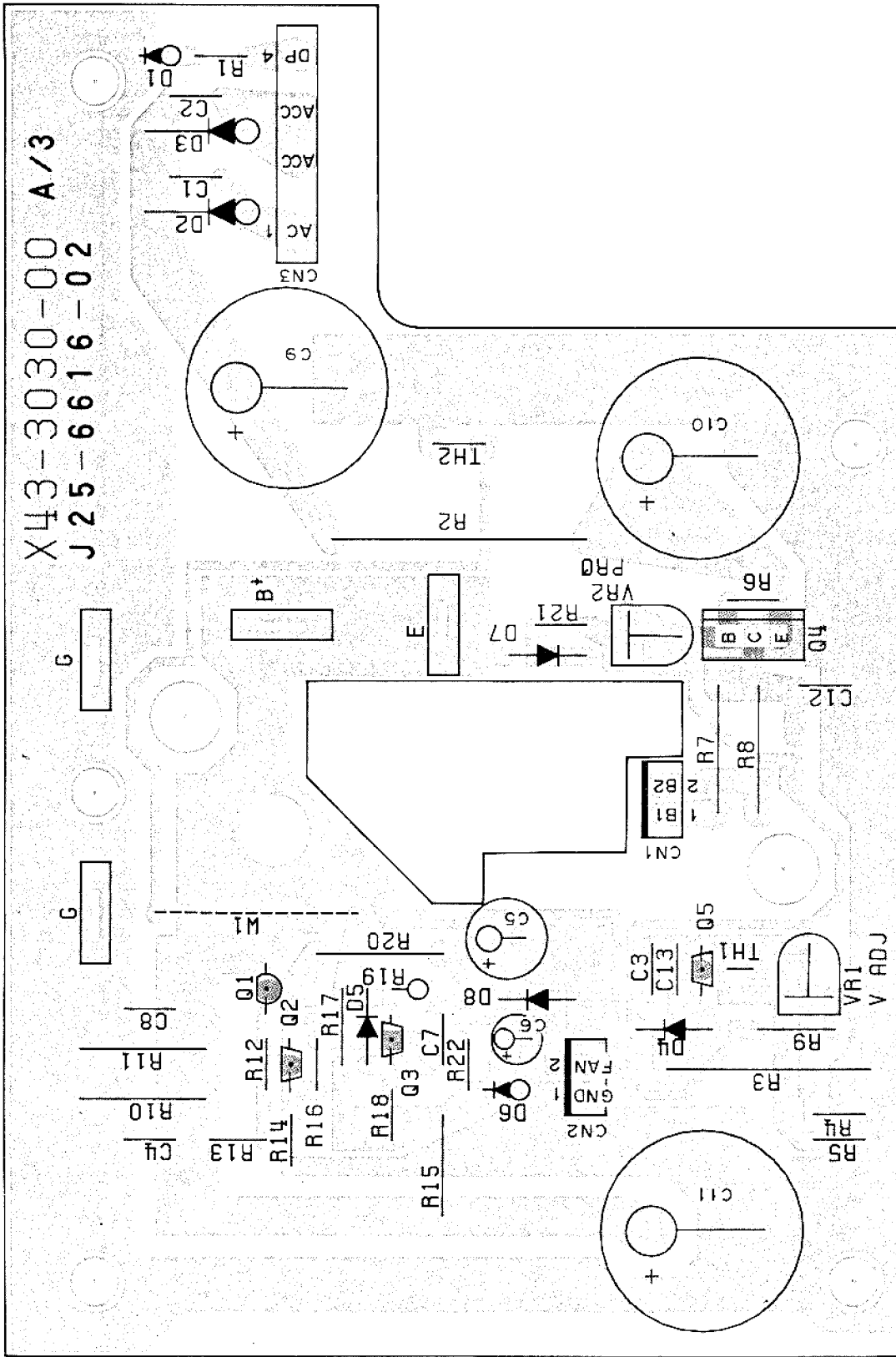
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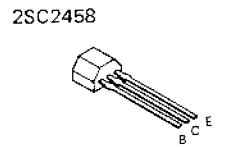
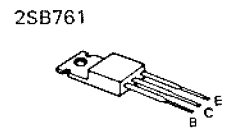
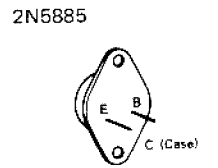
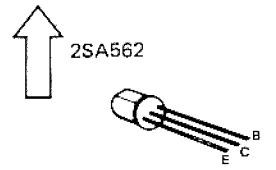
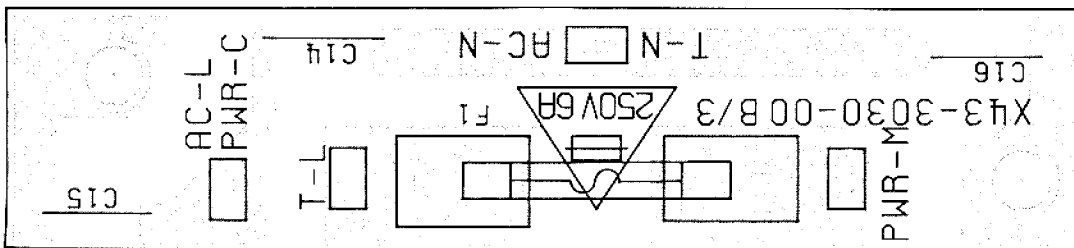
 indicates safety critical components.

# TS-850S

## PS-52 (DC POWER SUPPLY)



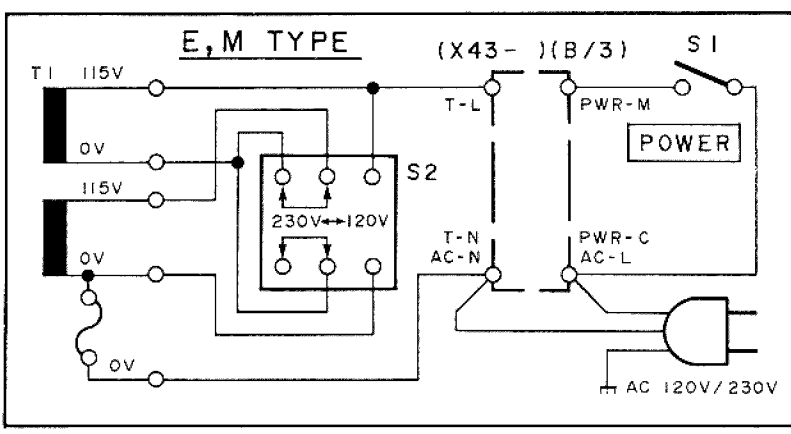
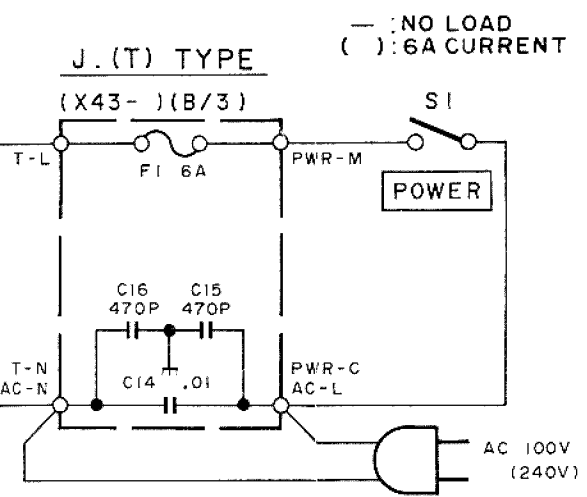
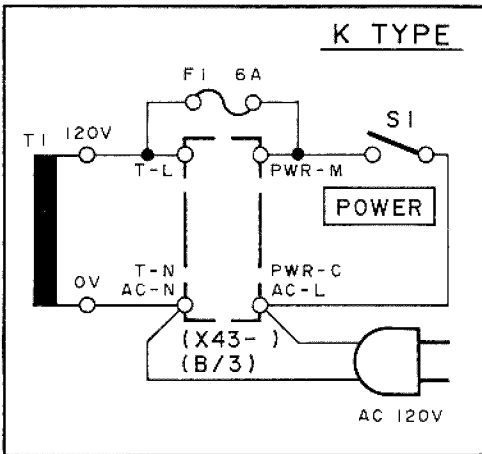
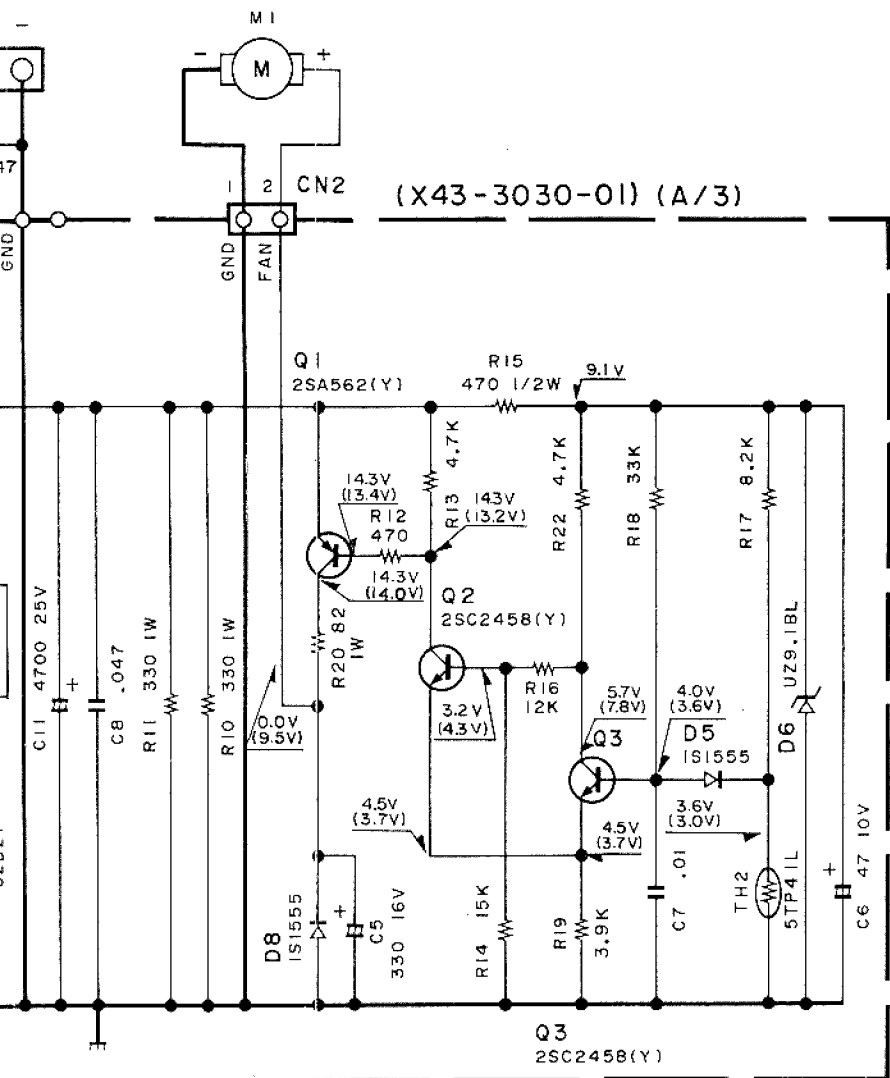
X43-3030-00 A/3  
 J25-6616-02





# S-850S TS-850S

## PS-52 (DC POWER SUPPLY)



## SP-31 (EXTERNAL SPEAKER)

### SP-31 SPECIFICATIONS

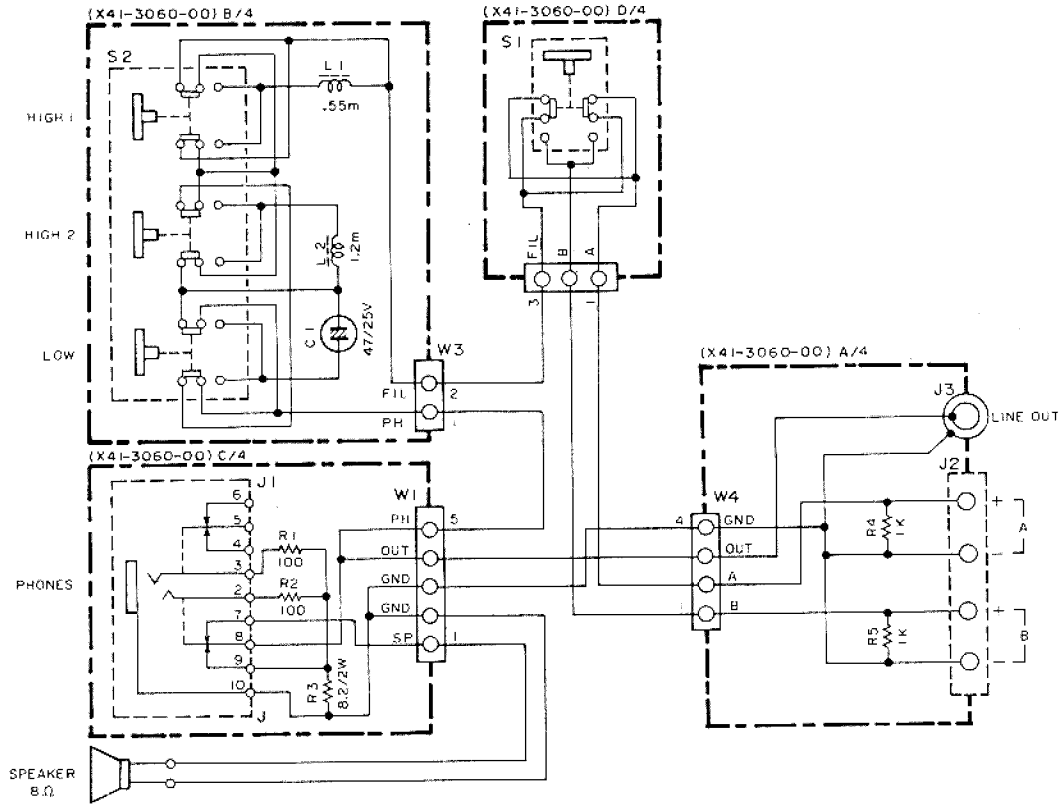
Speaker used:	10 cm dia.
Rated Input:	2 Watts
Impedance:	8 $\Omega$
Frequency response:	160 Hz to 7 kHz
Filter cut-off frequency:	
LOW:	400 Hz, - 3 dB
HIGH 1:	3.0 kHz, - 3 dB
HIGH 2:	1.2 kHz, - 2 dB
HIGH 1 + HIGH 2:	900 Hz, - 3 dB
Filter attenuation:	- 6 dB/oct.
Dimensions:	
W.	180 mm (7-1/16")
H.	120 mm (4-23/32")
D.	310 mm (12-7/32")
Net weight:	2.0 kg (4.4 lbs)

### SP-31 PARTS LIST

Ref. No.	New Parts	Parts No.	Description
<b>SP-31</b>			
		A01-1051-02	Case (upper)
		A01-1052-02	Case (lower)
		A20-2656-03	Panel
		A23-2504-03	Rear panel
		B40-3812-04	Model name plate
		B50-8228-00	Instruction manual
		E14-0101-05	Pin plug (Accessory)
		E30-1711-15	Speaker cord (Accessory)
		G10-0662-04	Felt
		H01-8182-04	Item carton box
		H10-2644-02	Polystyrene foamed fixture
		H10-2645-02	Polystyrene foamed fixture
		H20-1433-03	Protection cover
		H25-0705-04	Portection bag
		J02-0049-14	Foot (rear)
		J02-0423-04	Foot (front outside)
		J02-0424-04	Foot (front inside)
		J19-1325-04	Mounting hardware (panel)
		J21-2788-04	Mounting hardware (speaker)
		J61-0307-05	Wire band
		K29-0758-14	Knob
		N33-3006-41	Round flat screw (case)
		N87-3006-41	Brazier head taptite screw
		N87-4008-41	Brazier head taptite screw
		T07-0225-15	Speaker
		X41-3060-00	Switch unit
<b>SWITCH UNIT (X41-3060-00)</b>			
C1		CE04BW1E470M	Electro 47 $\mu$ F 25WV
J1		E11-0432-05	Phone jack (PHONES)
J2		E20-0459-05	Speaker terminal board (4P)
J3		E13-0167-05	Pin jack (LINE OUT)
W1		E31-3426-05	Lead with connector
L1		L33-0706-05	Choke coil 0.55mH
L2		L33-0705-05	Choke coil 1.2mH
		N09-2048-05	Bind head screw
		N14-0404-04	Flange nut
R1, 2		RD14BB2E101J	RD resistor 100 J 1/4W
R3		RS14KB3D8R2J	RS resistor 8.2 J 2W
R4, 5		RD14BB2E102J	RD resistor 1k J 1/4W
S1		S40-2436-05	Push switch
S2		S42-3405-05	Push switch

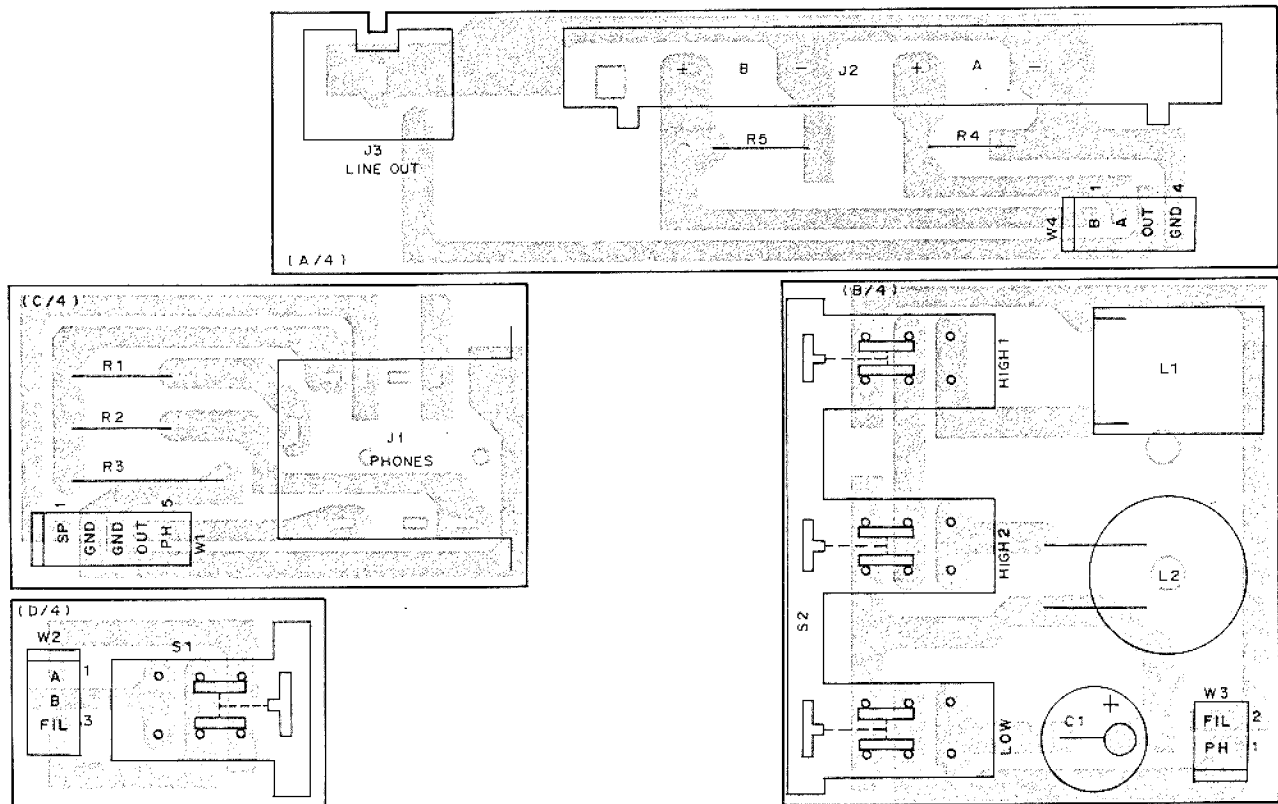
## SP-31 (EXTERNAL SPEAKER)

### SP-31 SCHEMATIC DIAGRAM



### SP-31 PC BOARD VIEW

#### SWITCH UNIT (X41-3060-00) Component side view

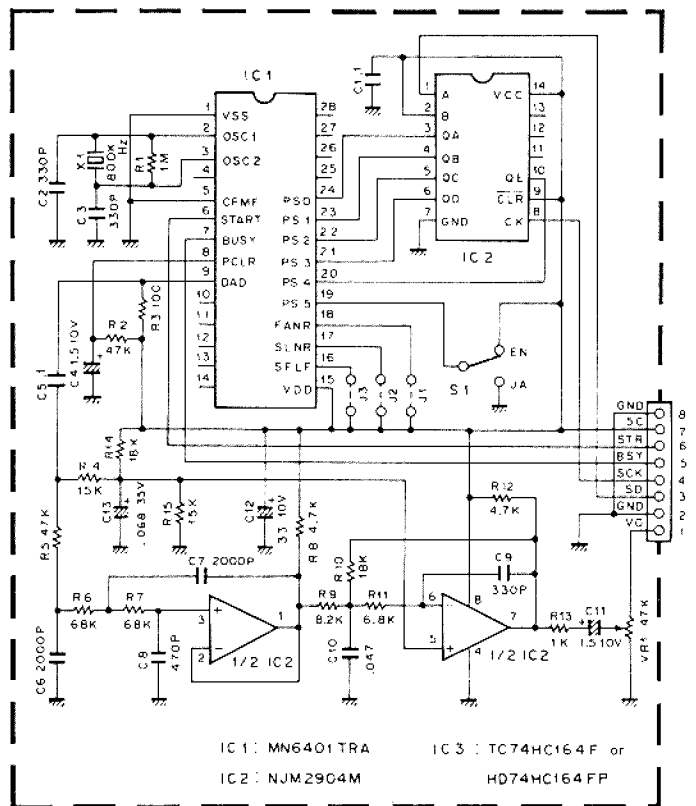


## VS-2 (VOICE SYNTHESIZER)

### VS-2 PARTS LIST

Ref. No.	New Parts	Parts No.	Description
<b>VS-2</b>			
		B50-8095-00	Instruction manual
		G13-0645-04	Cushion Accessory
		H01-8025-03	Item carton box
		H25-0029-04	Protection bag
		N32-2004-41	Flat head screw
		N35-2604-41	Bind head screw
		X42-3000-00	Accessory unit
<b>ACCESSORY UNIT (X42-3000-00)</b>			
C6,7		CC73ECH1H202J	Chip C 2000pF J
C2,3,9		CC73FCH1H331J	Chip C 330pF J
C8		CC73FCH1H471J	Chip C 470pF J
C12		CE04CW1A330M	Electro 33μF 10WV
C1,5		CK73EB1E104K	Chip C 0.1μF K
C10		CK73EB1H473K	Chip C 0.047μF K
C13		C90-0503-05	Chip tan 0.068μF 35WV
C4,11		C92-0501-05	Chip tan 1.5μF 10WV
CN1		E40-5022-05	Pin ass'y (8P)
		J21-4146-04	Mounting hardware
X1		L78-0006-05	Ceramic oscillator
R3		RK73FB2A101J	Chip R 100 J 1/10W
R13		RK73FB2A102J	Chip R 1k J 1/10W
R1		RK73FB2A105J	Chip R 1M J 1/10W
R4,15		RK73FB2A153J	Chip R 15k J 1/10W
R10,14		RK73FB2A183J	Chip R 18k J 1/10W
R8,12		RK73FB2A472J	Chip R 4.7k J 1/10W
R2,5		RK73FB2A473J	Chip R 47k J 1/10W
R11		RK73FB2A682J	Chip R 6.8k J 1/10W
R6,7		RK73FB2A683J	Chip R 68k J 1/10W
R9		RK73FB2A822J	Chip R 8.2k J 1/10W
VR1		R12-3457-05	Trimming pot. 47k
S1		S31-1418-05	Slide switch
IC1		MN6401TRA	IC
IC2		NJM2904M	IC
IC3		TC74HC164FP	IC
IC3		HD74HC164FP	IC

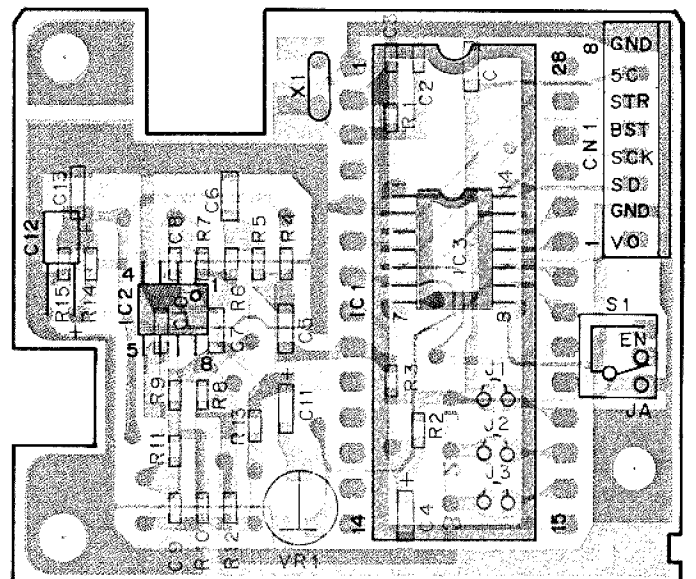
### VS-2 SCHEMATIC DIAGRAM



### VS-2 PC BOARD VIEW

#### ACCESSORY UNIT (X42-3000-00)

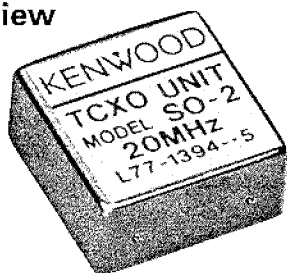
##### Component side view





## SO-2 (TCXO UNIT)

### SO-2 External view



### SO-2 Specifications

Oscillating frequency ..... 20 MHz  
Temperature stability .....  $\pm 5 \times 10^{-7}$  (-10°C to +50°C)  
Frequency stability (Long term) .....  $\pm 1 \times 10^{-6}$ /year  
Output ..... 1 V peak-to-peak (20 k $\Omega$ /5 pF)

### SO-2 Parts list

Ref. No.	New	Parts No.	Description
		B50-8314-08	Instruction manual
		L77-1394-15	TCXO

# SPECIFICATIONS

Specifications	Model	TS-850S
Specifications		
Mode	J3E (LSB, USB), A1A (CW), A3E (AM), F3E (FM), F1A (FSK)	
Memory channels	100	
Antenna impedance	50Ω (With AT-850 antenna tuner 20 to 150Ω)	
Power requirement	12 to 16V DC (13.8V DC reference)	
Grounding	Negative	
Current drain	Receive mode with no input signal	2A
	Transmit mode	20.5A
Operating temperature	-10 to +50°C (+14 to +122°F)	
Frequency stability	Less than ±10 PPM	
Frequency accuracy	Less than ± 10 PPM	
Dimensions (W x H x D) (Projections included)	339 x 135 x 375 mm (13-11/32" x 5-5/16" x 14-3/4")	
Weight	With AT unit	10.9kg (24lbs)
	Without AT unit	9.4kg (20.7lbs)
Frequency range	160m band	1.8 to 2.0 MHz
	80m band	3.5 to 4.0MHz
	40m band	7.0 to 7.3MHz
	30m band	10.1 to 10.15MHz
	20m band	14.0 to 14.35MHz
	17m band	18.068 to 18.168MHz
	15m band	21.0 to 21.45MHz
	12m band	24.89 to 24.99MHz
	10m band	28.0 to 29.7MHz
Output power	1.9 to 24.5MHz	SSB, CW, FSK, FM
		MAX
		MIN
		AM
		MAX
		MIN
	28MHz	SSB, CW, FSK, FM
		MAX
		MIN
		AM
		MAX
		MIN
Modulation	SSB	Balanced modulation
	FM	Reactance modulation
	AM	Low level modulation
Spurious radiation	Less than -60dB	
Carrier suppression (with 1.5kHz reference)	More than 40dB	
Unwanted sideband suppression (with 1.5kHz reference)	More than 40dB	
Maximum frequency deviation (FM)	Less than ±5kHz	
Frequency response (-6dB)	400 to 2600Hz	
XIT variable range	10Hz step	More than ±1.2kHz
	20Hz step	More than ±2.4kHz
Microphone impedance	600Ω	

# SPECIFICATIONS

	Model	TS-850S
<b>Specifications</b>		
Receiver	Circuitry	Triplic conversion superheterodyne
	Frequency range	100kHz to 30MHz
	Intermediate frequency	1st : 73.05MHz, 2nd : 8.83MHz, 3rd : 455kHz
	Sensitivity (at 10dB S + N/N)	SSB, CW, FSK 10kHz to 500kHz
		500kHz to 1.62MHz*
		*1.62MHz to 24.5MHz
		24.5MHz to 30MHz
		AM ( at 10dB S + N/N)
		100kHz to 500kHz
		500kHz to 1.62MHz*
		*1.62MHz to 24.5MHz
		24.5MHz to 30MHz
	FM (at 12dB SINAD)	28MHz to 30MHz
	Selectivity	SSB, CW, FSK -6dB : 2.4kHz, -60dB : 3.8kHz
		AM -6dB : 6kHz, -60dB : 15kHz
		FM -6dB : 12kHz, -60dB : 24kHz
	Image ratio	More than 80dB
	1st IF rejection	More than 80dB
	Notch filter attenuation	More than 40dB
	RIT variable range	10Hz step
		20Hz step
	Squelch	SSB, CW, FSK, AM 100kHz to 500kHz
		500kHz to 1.62MHz*
		*1.62MHz to 30MHz
		FM 28MHz to 30MHz
	Output	1.5W across 8Ω load (10% distortion)
	Output load impedance	8Ω

**Notes**

1. Circuit and ratings are subject to change without notice due to advancements in technology.
2. Remember to keep the transmit output power within the power limitations of your license.
3. \* : the U.S.A. version is 1.705MHz.

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