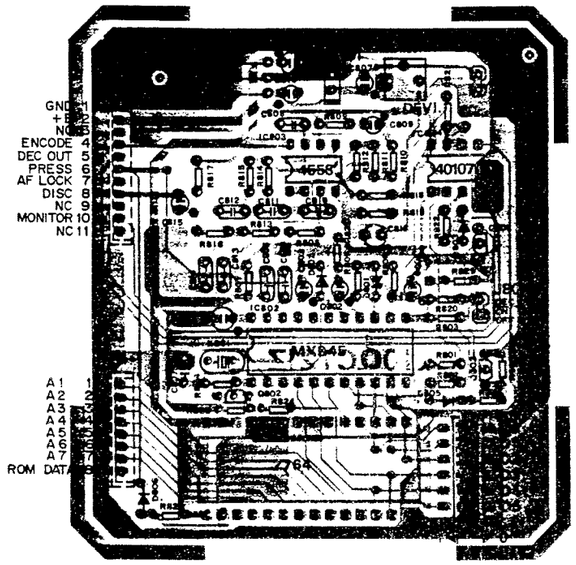


CTCSS TONE FREQUENCY
PROGRAM TABLE
Logic 1 = Vdd, Logic 0 = Vss

No.	EIA SPEC FREQ.	PROGRAM TABLE D5 D4 D3 D2 D1 D0	EP-ROM CODE
1	A 67.0Hz	1 1 1 1 1 1	3F
2	B 71.9	0 1 1 1 1 1	3E
3	C 74.4	1 1 1 1 1 0	1F
4	A 77.0	0 0 1 1 1 1	3C
5	C 79.7	1 1 1 1 0 1	2F
6	B 82.5	0 1 1 1 1 0	1E
7	C 85.4	1 1 1 1 0 0	0F
8	A 88.5	0 0 1 1 1 0	1C
9	C 91.5	1 1 1 0 1 1	37
10	B 94.8	0 1 1 1 0 1	2E
11	- 97.4	1 1 1 0 1 0	17
12	A 100.0	0 0 1 1 0 1	2C
13	B 103.5	0 1 1 1 0 0	0E
14	A 107.2	0 0 1 1 0 0	0C
15	B 110.9	0 1 1 0 1 1	36
16	A 114.8	0 0 1 0 1 1	34
17	B 118.8	0 1 1 0 1 0	16
18	A 123.0	0 0 1 0 1 0	14
19	B 127.3	0 1 1 0 0 1	26
20	A 131.8	0 0 1 0 0 1	24
21	B 136.5	0 1 1 0 0 0	06
22	A 141.3	0 0 1 0 0 0	04
23	B 146.2	0 1 0 1 1 1	3A
24	A 151.4	0 0 0 1 1 1	38
25	B 156.7	0 1 0 1 1 0	1A
26	A 162.2	0 0 0 1 1 0	18
27	B 167.9	0 1 0 1 0 1	2A
28	A 173.8	0 0 0 1 0 1	28
29	B 179.9	0 1 0 1 0 0	0A
30	A 186.2	0 0 0 1 0 0	08
31	B 192.8	0 1 0 0 1 1	32
32	A 203.5	0 0 0 0 1 1	30
33	B 210.7	0 1 0 0 1 0	12
34	A 218.1	0 0 0 0 1 0	10
35	B 225.7	0 1 0 0 0 1	22
36	A 233.6	0 0 0 0 0 1	20
37	B 241.8	0 1 0 0 0 0	02
38	A 250.3	0 0 0 0 0 0	00

※
D802 ISS177 10QCT(A)
D802 DELETE 10QCT(D)

Program for CTCSS/CHANNEL (EP-ROM Address)

Address	00	01	02	03	04	05	06,	07	08	09	0A	0B	0C	0D	0E	0F
Data	1E	2E	3E	4E	5E	6E	7E	8E	9E	10E	11E	12E	13E	14E	15E	16E
	-	-	-													
Address	60	61	62	63												
Data	97E	98E	99E	-												
Address	80	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F
Data	1D	2D	3D	4D	5D	6D	7D	8D	9D	10D	11D	12D	13D	14D	15D	16D
	-	-	-													
Address	D0	D1	D2	D3												
Data	97D	98D	99D	-												

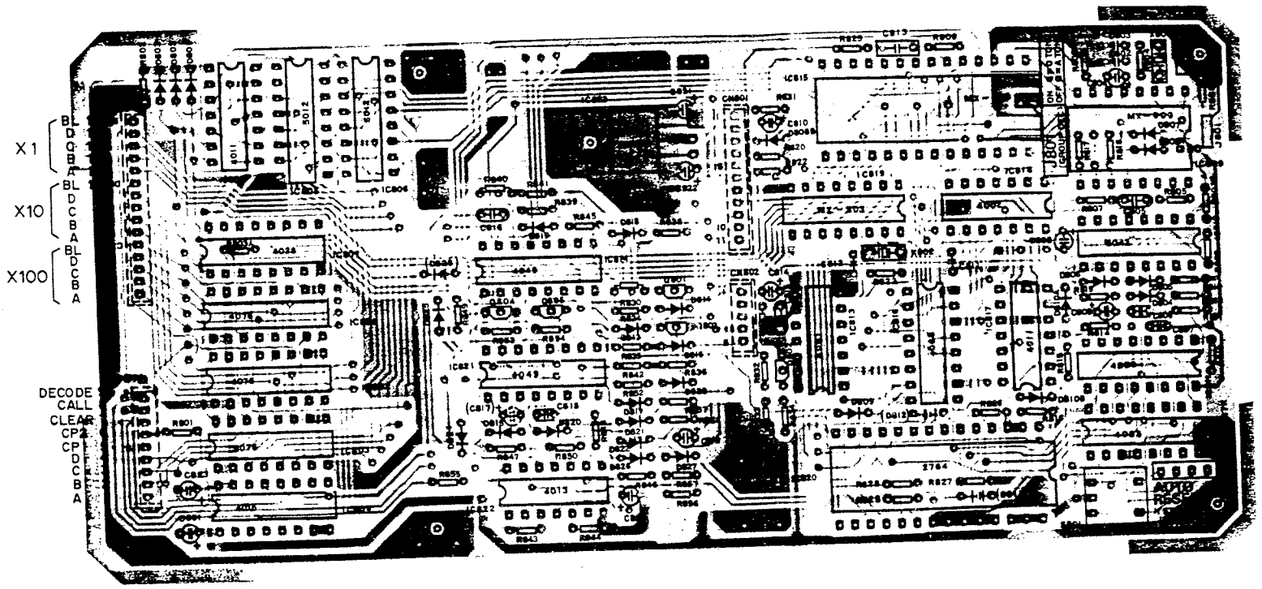
J801 DECODE ON/OFF

ON : DECODE OFF
OFF : DECODE ON

J802 ENCODE ON/OFF

ON : ENCODE OFF
OFF : ENCODE ON

COMPONENTS LAYOUT
FOR
CTCSS UNIT



CN801

GND	1
+B	2
NC	3
NC	4
NC	5
PRESS OUT	6
AF LOCK	7
DISC	8
BUSY	9
MONITOR	10
ALARM	11

CN802

MOD OFF	1
5-TONE MOD	2
RESET	3
CALL	4
PRESS SW	5

COMPONENTS LAYOUT

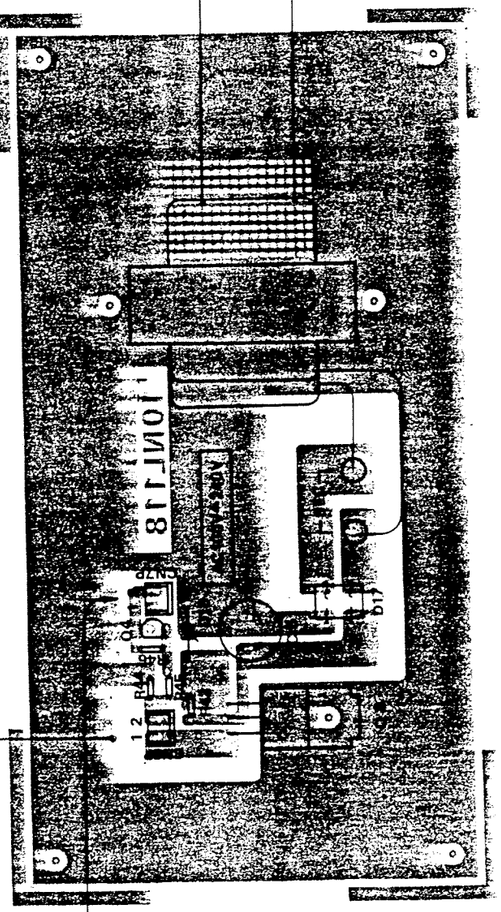
FOR

5-TONE ENC/DEC UNIT

AC INPUT (AC100/200V)

AC FUSE (5A)

NL UNIT

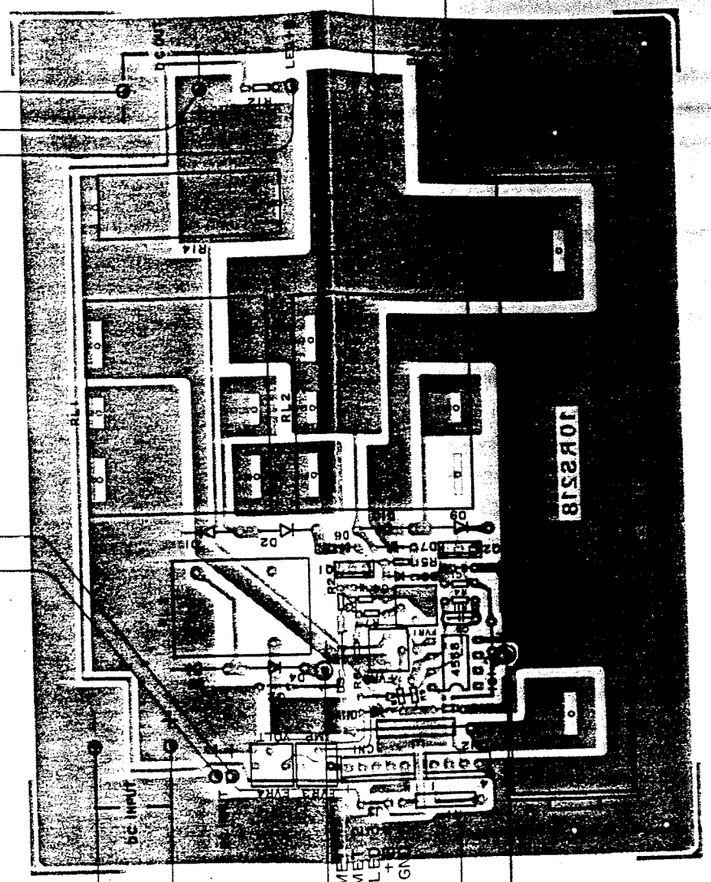


DC OUTPUT
(DC13.6V)

DC FUSE
(15A)

BATT IN/OUT

RELAY CONTROL UNIT



AC INPUT
(AC100/200V)

POW SUPPLY UNIT

KVR-300

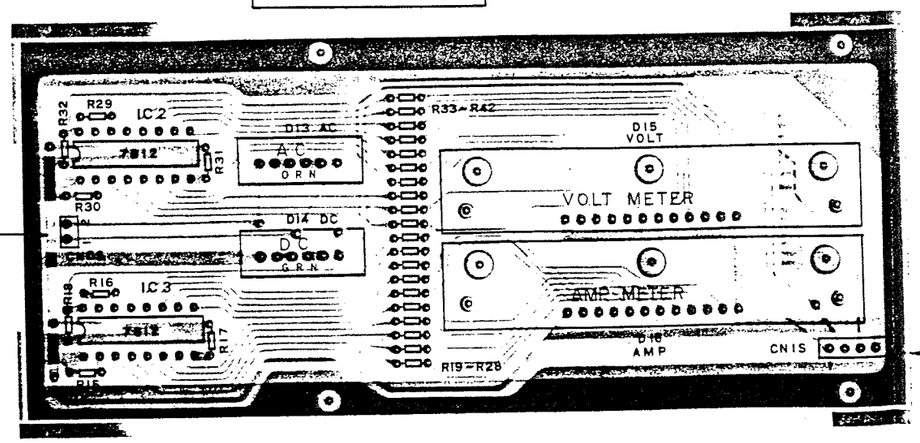
REMOTE SW (+) (−)

DC OUTPUT
(DC13.6V)

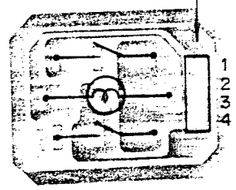
FG (+) (−)

AC INDICATOR

DISPLAY UNIT

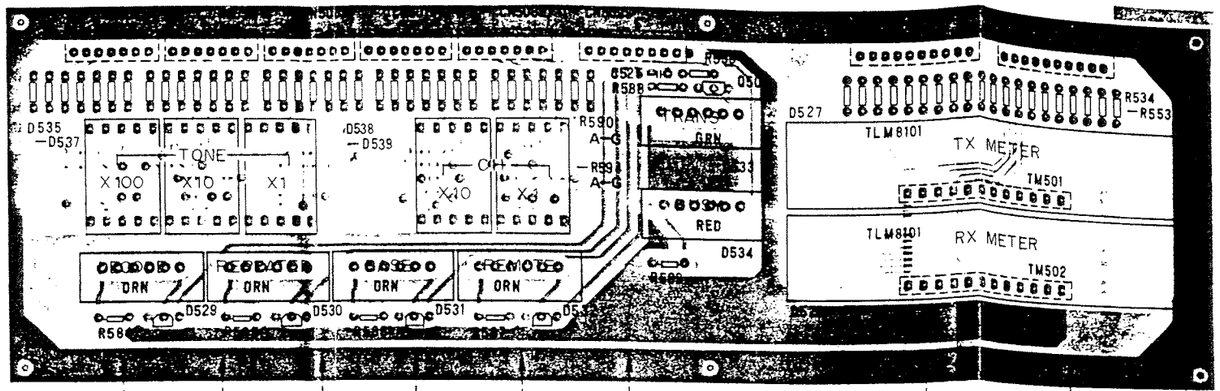


POWER SW



1 LAMP
2 REMOTE SW.
3 POW. SW
4 GND

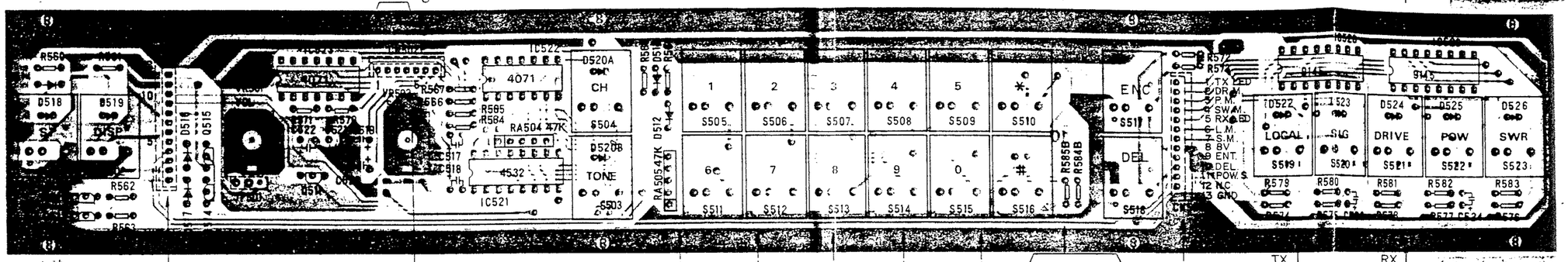
COMPONENTS LAYOUT
FOR
POWER SUPPLY UNIT

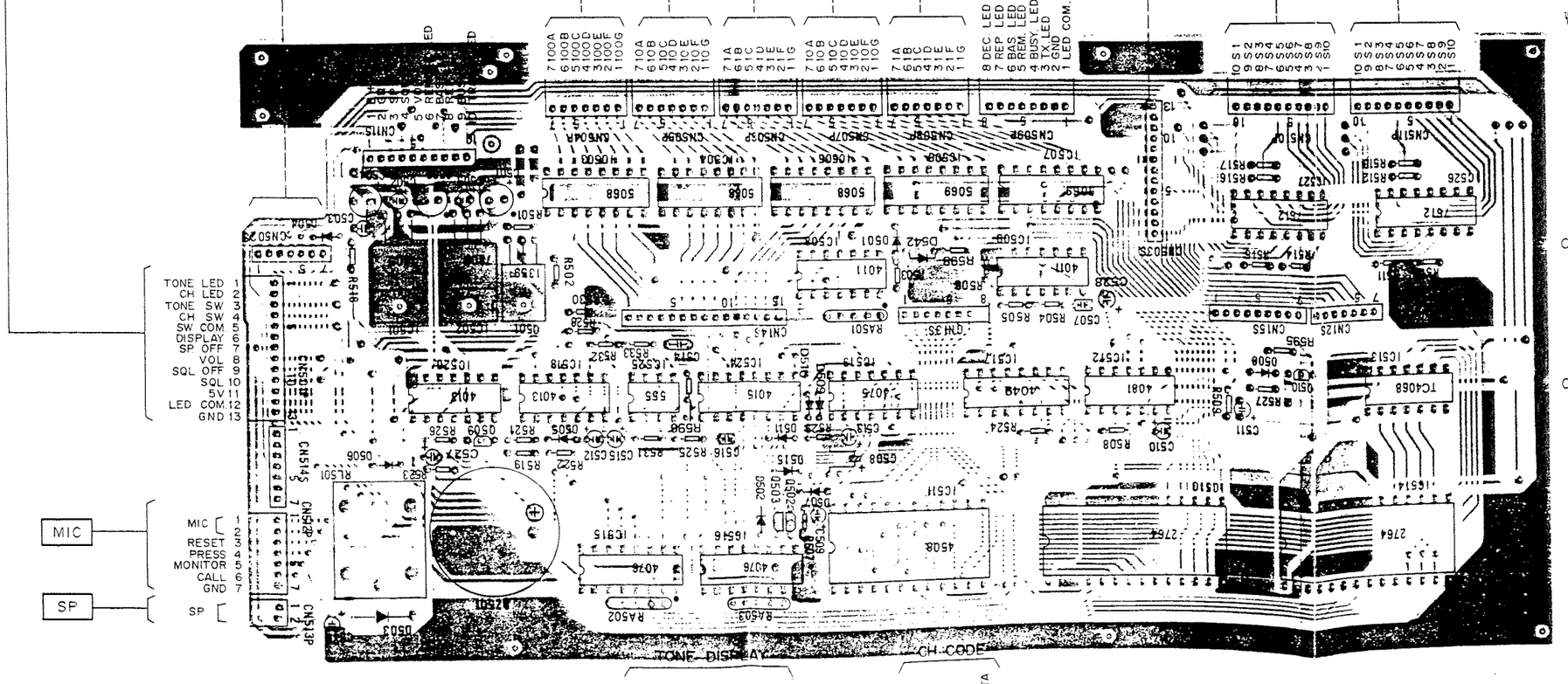


VR502
SQL VOL

BCD

CONTROL

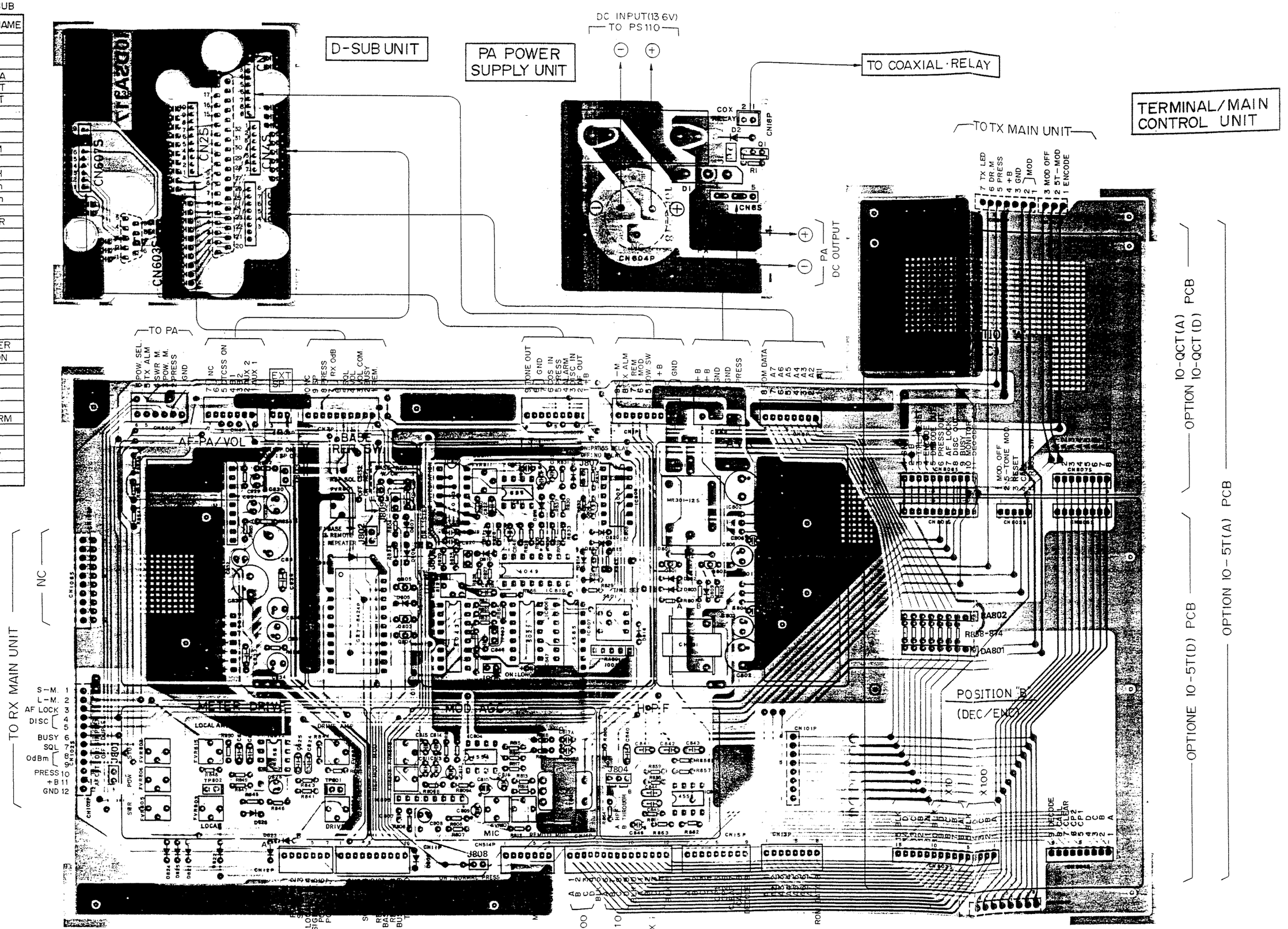




COMPONENTS LAYOUT FOR CONTROL PANEL UNIT

37-PIN D-SUB

No.	SIGNAL NAME
1	CH A5
2	CH A6
3	CH A7
4	ROM DATA
5	TONE OUT
6	DISC OUT
7	GND
8	REMOTE
9	BUSY
10	VOL COM
11	VOLUME
12	SCUELCH
13	RX OdBm
14	RX OdBm
15	PRESS
16	SPEAKER
17	NC
18	GND
19	GND
20	CH A4
21	CH A3
22	CH A2
23	CH A1
24	NC
25	NC
26	S-METER
27	CTCSS ON
28	B1
29	B2
30	AUX 2
31	AUX 1
32	TX ALARM
33	MOD IN
34	MOD IN
35	POW SW
36	B +
37	B +

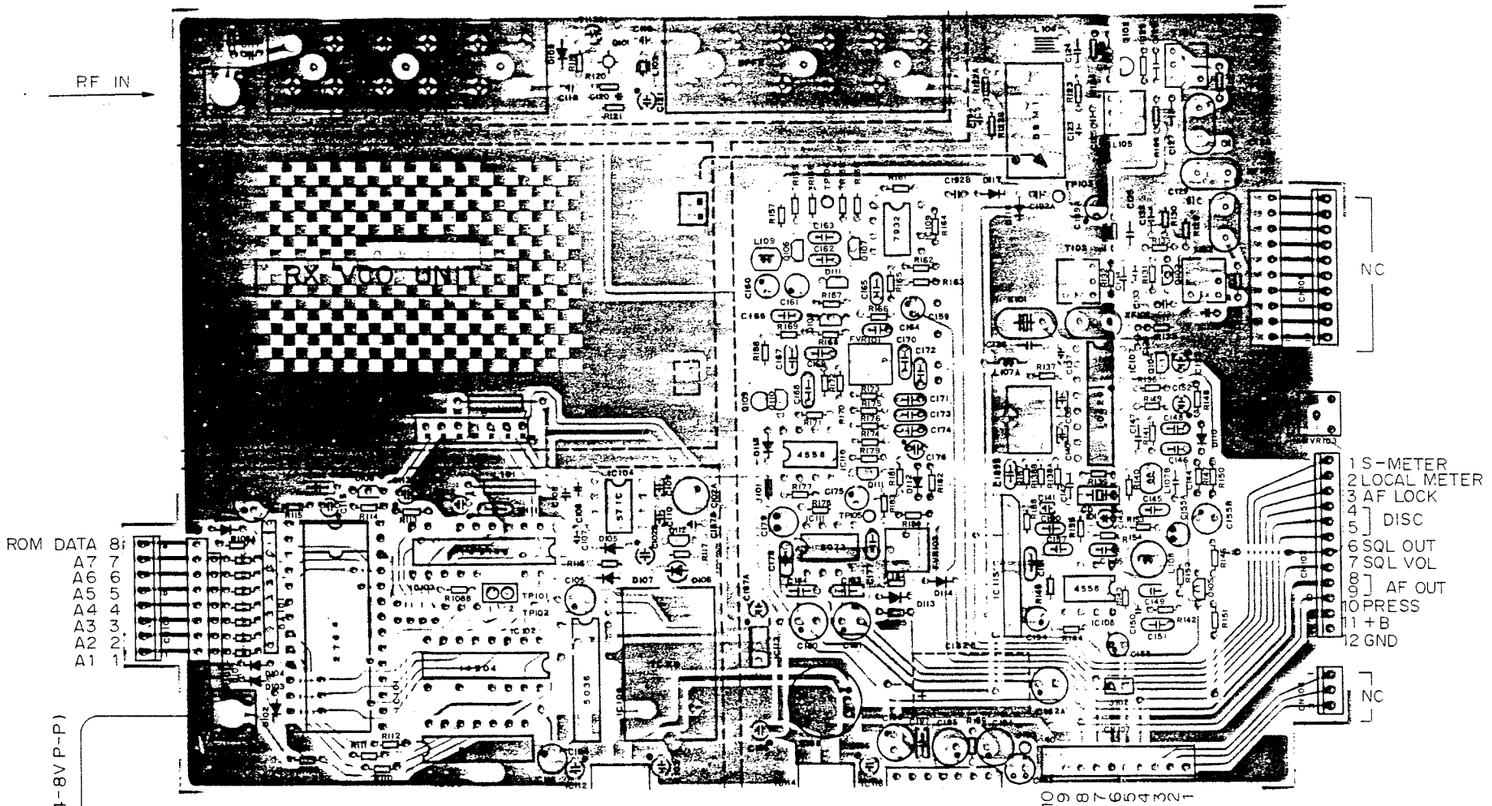


COMPONENTS LAYOUT

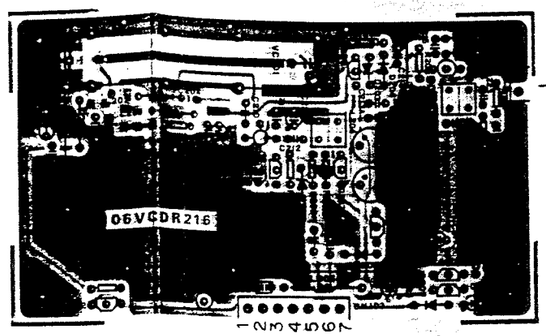
FOR

TERMINAL/MAIN CONTROL UNIT

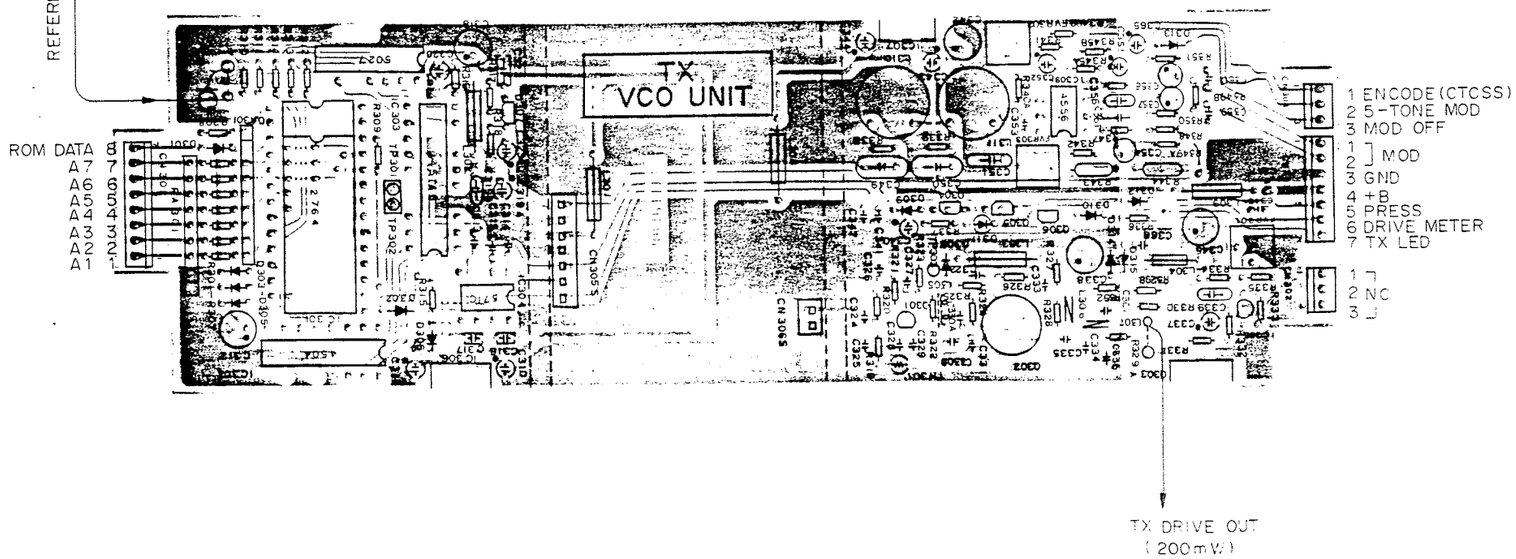
RX MAIN UNIT



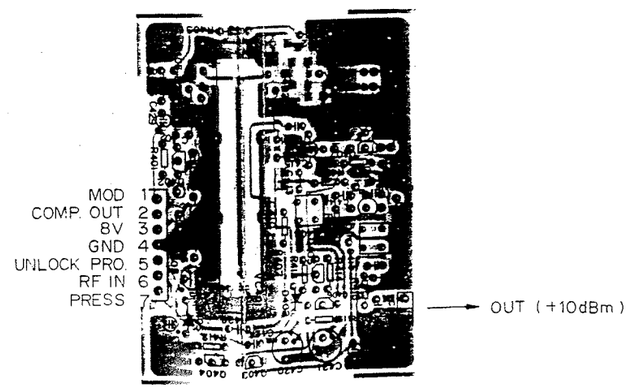
RX VCO UNIT



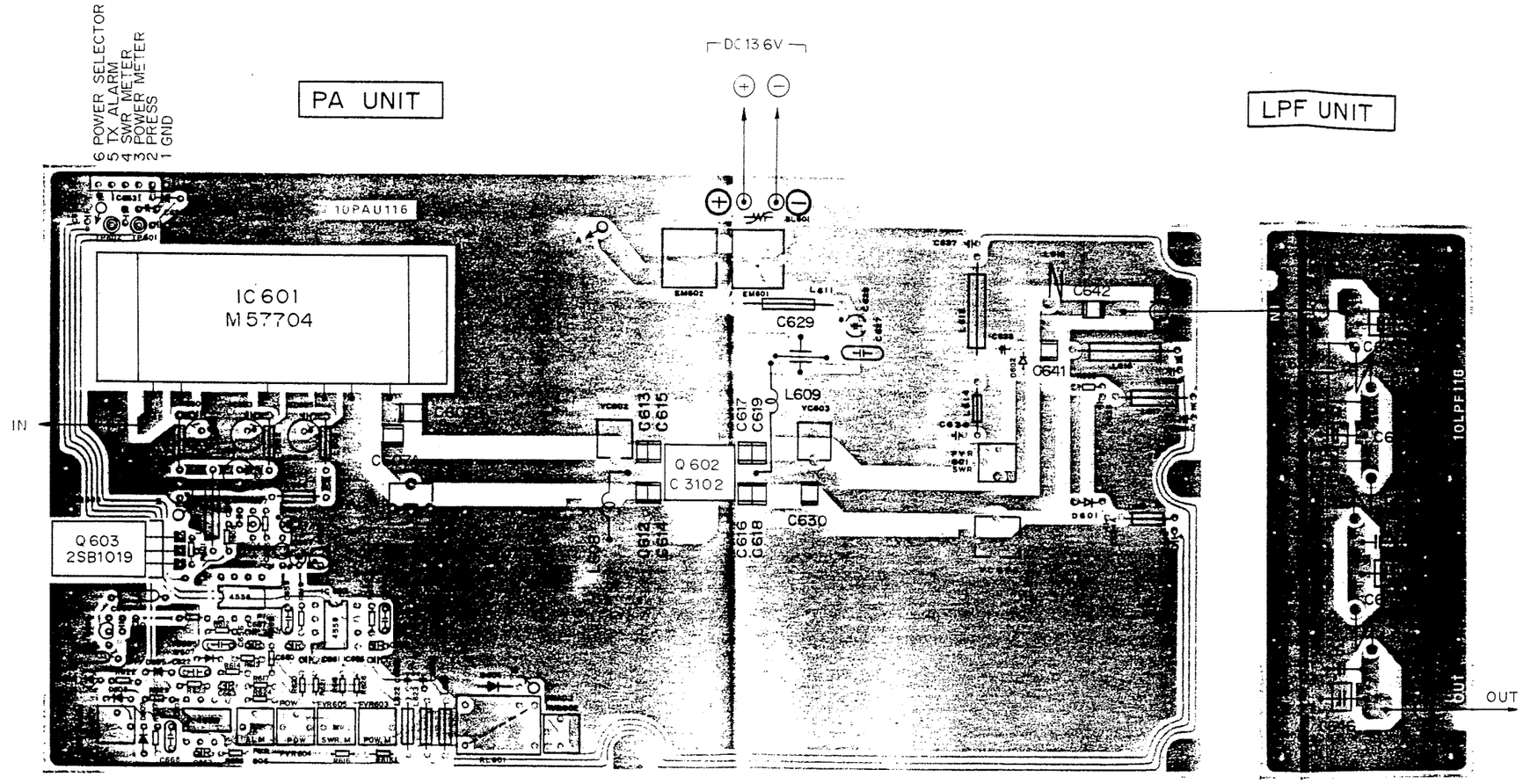
TX MAIN UNIT



TX VCO UNIT



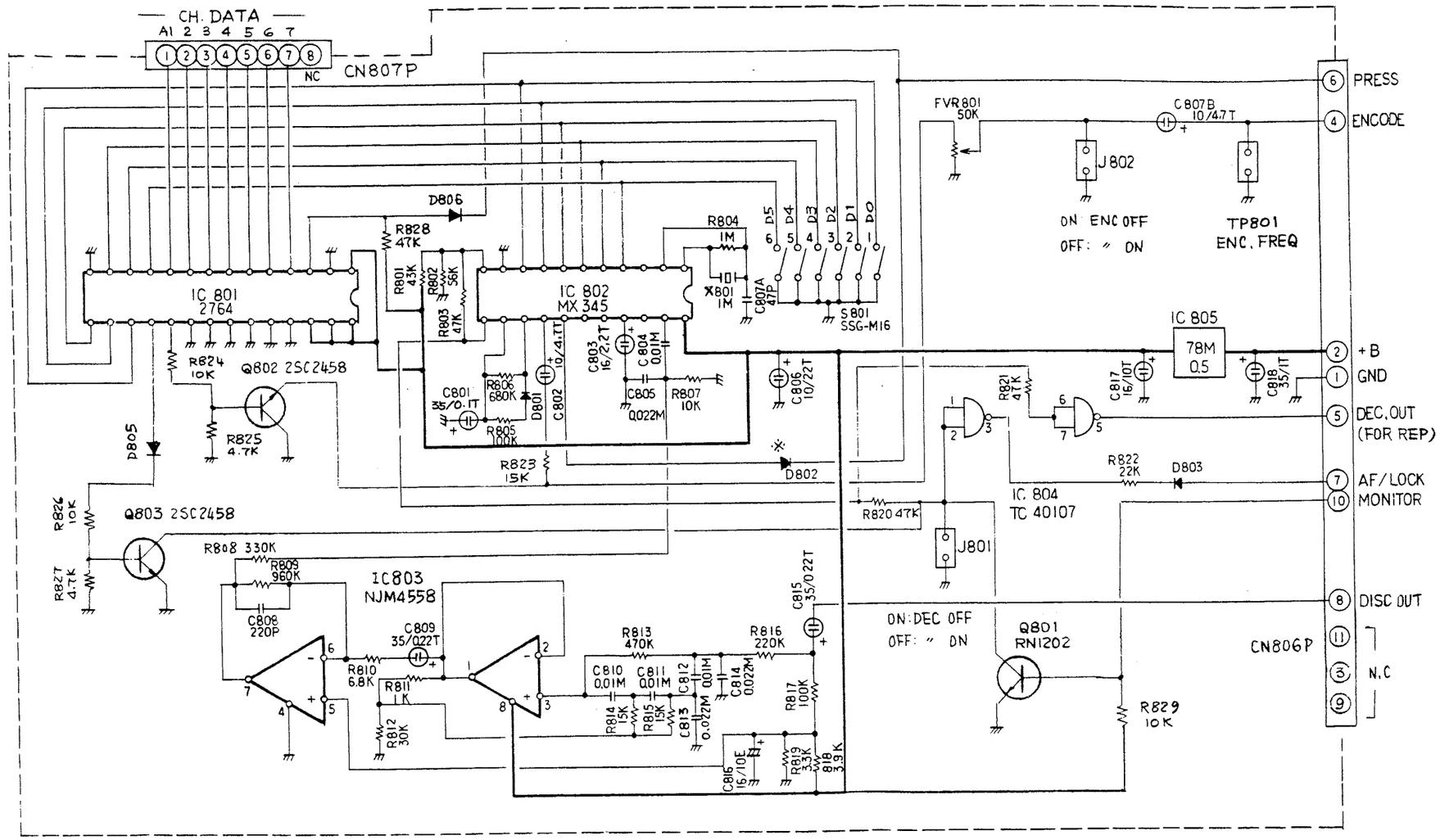
COMPONENTS LAYOUT
FOR
UHF TX/RX UNIT



COMPONENT LAYOUT

FOR

UHF PA UNIT



CTCSS TONE FREQUENCY
PROGRAM TABLE

Logic 1 = Vdd, Logic 0 = Vss

No.	EIA SPEC FREQ.	PROGRAM TABLE D5 D4 D3 D2 D1 D0	EP-ROM CODE
1	A 67.0Hz	1 1 1 1 1 1	3F
2	B 71.9	0 1 1 1 1 1	3E
3	C 74.4	1 1 1 1 1 0	1F
4	A 77.0	0 0 1 1 1 1	3C
5	C 79.7	1 1 1 1 0 1	2F
6	B 82.5	0 1 1 1 1 0	1E
7	C 85.4	1 1 1 1 0 0	0F
8	A 88.5	0 0 1 1 1 0	1C
9	C 91.5	1 1 1 0 1 1	37
10	B 94.8	0 1 1 1 0 1	2E
11	- 97.4	1 1 1 0 1 0	17
12	A 100.0	0 0 1 1 0 1	2C
13	B 103.5	0 1 1 1 0 0	0E
14	A 107.2	0 0 1 1 0 0	0C
15	B 110.9	0 1 1 0 1 1	36
16	A 114.8	0 0 1 0 1 1	34
17	B 118.8	0 1 1 0 1 0	16
18	A 123.0	0 0 1 0 1 0	14
19	*B 127.3	0 1 1 0 0 1	26
20	A 131.8	0 0 1 0 0 1	24
21	B 136.5	0 1 1 0 0 0	06
22	A 141.3	0 0 1 0 0 0	04
23	B 146.2	0 1 0 1 1 1	3A
24	A 151.4	0 0 0 1 1 1	38
25	B 156.7	0 1 0 1 1 0	1A
26	A 162.2	0 0 0 1 1 0	18
27	B 167.9	0 1 0 1 0 1	2A
28	A 173.8	0 0 0 1 0 1	28
29	B 179.9	0 1 0 1 0 0	0A
30	A 186.2	0 0 0 1 0 0	08
31	B 192.8	0 1 0 0 1 1	32
32	A 203.5	0 0 0 0 1 1	30
33	B 210.7	0 1 0 0 1 0	12
34	A 218.1	0 0 0 0 1 0	10
35	B 225.7	0 1 0 0 0 1	22
36	A 233.6	0 0 0 0 0 1	20
37	B 241.8	0 1 0 0 0 0	02
38	A 250.3	0 0 0 0 0 0	00

Program for CTCSS/CHANNEL (EP-ROM Address)

Address	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
Data	1E	2E	3E	4E	5E	6E	7E	8E	9E	10E	11E	12E	13E	14E	15E	16E
	-	-	-													
Address	60	61	62	63												
Data	97E	98E	99E	-												
Address	80	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F
Data	1D	2D	3D	4D	5D	6D	7D	8D	9D	10D	11D	12D	13D	14D	15D	16D
	-	-	-													
Address	D0	D1	D2	D3												
Data	97D	98D	99D	-												

J801 DECODE ON/OFF

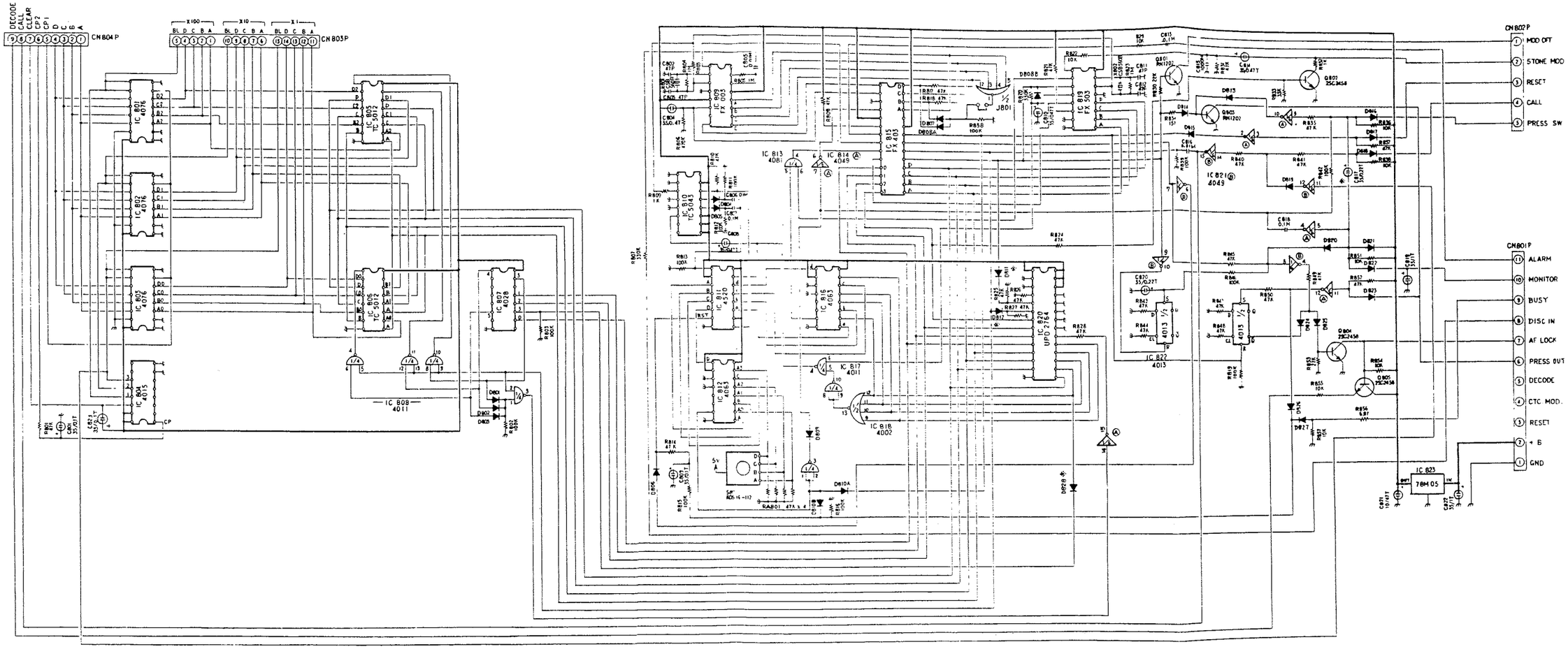
ON : DECODE OFF
OFF : DECODE ON

J802 ENCODE ON/OFF

ON : ENCODE OFF
OFF : ENCODE ON

※
D802 ISS177 10QCT(A)
D802 DELETE 10QCT(D)

CIRCUIT DIAGRAM FOR CTCSS ENC/DEC UNIT



5-TONE CODE PROGRAMMING

Address	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Data	-	D1	D2	D3	D4	D5	OE	-	-	A1	A2	A3	A4	A5	OE	-

D1-D5 : Decode Number

A1-A5 : Answer-Back Number

J801 SETTING ... Group Call Decode Setting

Jumper 'ON' ... '0' as Group Call

Jumper 'OFF' ... 'A' as Group Call

S801 SETTING ... Automatic Audio Reset Setting

Switch 0 position ... Manual Audio Reset

Switch 1-F position ... Each step has 1 second
(1-15 sec can be set)

CIRCUIT DIAGRAM FOR 5-TONE ENC/DEC UNIT

AC INPUT
100-120/200-240V

AC FUSE
F1
5A

JUMPER SELECTOR AC100-120V AC200-240V

POWER SUP. UNIT
KRV-300

AC IN

DC OUT
(+)
(-)
(F.G)

REMOTE

CN5
DC OUT

F2
15A

CN4
BATT. IN/OUT

AR6611 RL1
AR6611 RL2
AR6611 RL3

D1 DS135
D2 DS135
D16 DS135
D9 DS135
D3 DSZ7.5Y
D5 DS135
D4 DS135
D7 DSZ7.5Y
D8 1S1771
D6 1S1771

R1 1W/33Ω
R2 1.5K
R13 40W/3Ω
R14 SHANT
R12 820Ω
R11 220K
C3 1000P
FVR2 10K
R6 10K
R8 4.7K
R9 1.5K
R7 6.8K
FVR1 10K
R10 4.7K
IC1 NJM4558
D12 DSZ6.8Y
FVR3 10K
FVR4 10K

Q1 2SC3419
C4 1000P
R3 3.3K
Q2 2SC3419
R4 3.3K
C1 1000P

CN2P
CN2S
CN7P
CN7S
CN6P
CN6S

10PS RS UNIT
CN1?
CN1?

Q3 2SD1414
C5 330/100V
R43 4.7K
T1 PT110
D17 IG4B4.
D18 DZ-10Y
R44 390Ω
R45 3.3K
R46 3.3K
Q4 2SC2120

10PS NL UNIT

D13 LT9010D
AC
ORN

D14 LT9010N
DC

D15 VOLT
D16 AMP
R33-R42 1.5K×10
R19-R28 1.5K×10
R32 3.3K
R18 3.3K
IC2 TA7612
IC3 TA7612
R29 22K
R16 22K

10PS ACD UNIT

51 POW. SW
AC283

CIRCUIT DIAGRAM FOR POWER SUPPLY UNIT

CIRCUIT DIAGRAM FOR D-SUB/POW. SUP UNIT

D-SUB UNIT

C1 – C38
1000P x38

TERMINAL UNIT

D-SUB UNIT		TERMINAL UNIT
A5 (1)		(1) D1
A6 (2)		(2) D2
A7 (3)		(3) D3
ROM DATA (4)		(4) D4
TONE OUT (5)		(5) D5
DISC OUT (6)		(6) D6
GND (7)		(7) D7
REMOTE (8)		(8) ROM DATE
		CN 3S
		CN 2S
BUSY (9)		(1) REMOTE
VOL(–) (10)		(2) BUSY
VOL (11)		(3) VR(–)
SQL (12)		(4) VOL
RX 0dB (13) (14)		(5) SQL
PRESS (15)		(6) (7) RX 0DBM
SP (16)		(8) PRESS
NC (17)		(9) SP
GND (18) (19)		(10) NC
A4 (20)		(1) AUX1
A3 (21)		(2) AUX2
A2 (22)		(3) B2
A1 (23)		(4) B1
NC (24)		(5) CTCSS
NC (25)		(6) NC (TONE OUT)
S-METER (26)		(7) NC (DISK OUT)
		CN 4S
		CN 1S
CTCSSON (27)		(1) (2) (–)
B1 (28)		(3) (4) +B
B2 (29)		(5) POW.SW
AUX2 (30)		(6) (7) REMOTE.MOD.IN
AUX1 (31)		(8) TX ALARM
TX ALARM (32)		(9) S-METER
MOD-IN (33) (34)		
POW.SW (35)		
B+ (36)		
B+ (37)		
+B (1)		(1) +B
AF OUT (2)		(2) AF OUT
DISC IN (3)		(3) DISC IN
ALARM IN (4)		(4) ALARM IN
PRESS (5)		(5) PRESS
COS IN (6)		(6) COS IN
GND (7) (8)		(7) (8) GND
TONE OUT (9)		(9) TONE OUT
		CN607S
		CN 6S
		(1) (2) +B
		(3) (4) (–)
		(5) PRESS

REMOTE

ECCE UNA MASSA

ENTRA UNA MASSA

TONO SUBAUDIO

BUSY PER ATTIVAZIONE

TONO SUBAUDIO

MASSA

MODIFICA INTERNA

RELE'

GENERAZIONE TONO SUBAUDIO

TONE PANEL

CSI-32 UNIT

POW.SUP UNIT

F1. 15A

TO POW.SUP

D1 20DL2C

D2 DS135D

J1

Q1 2SC3419

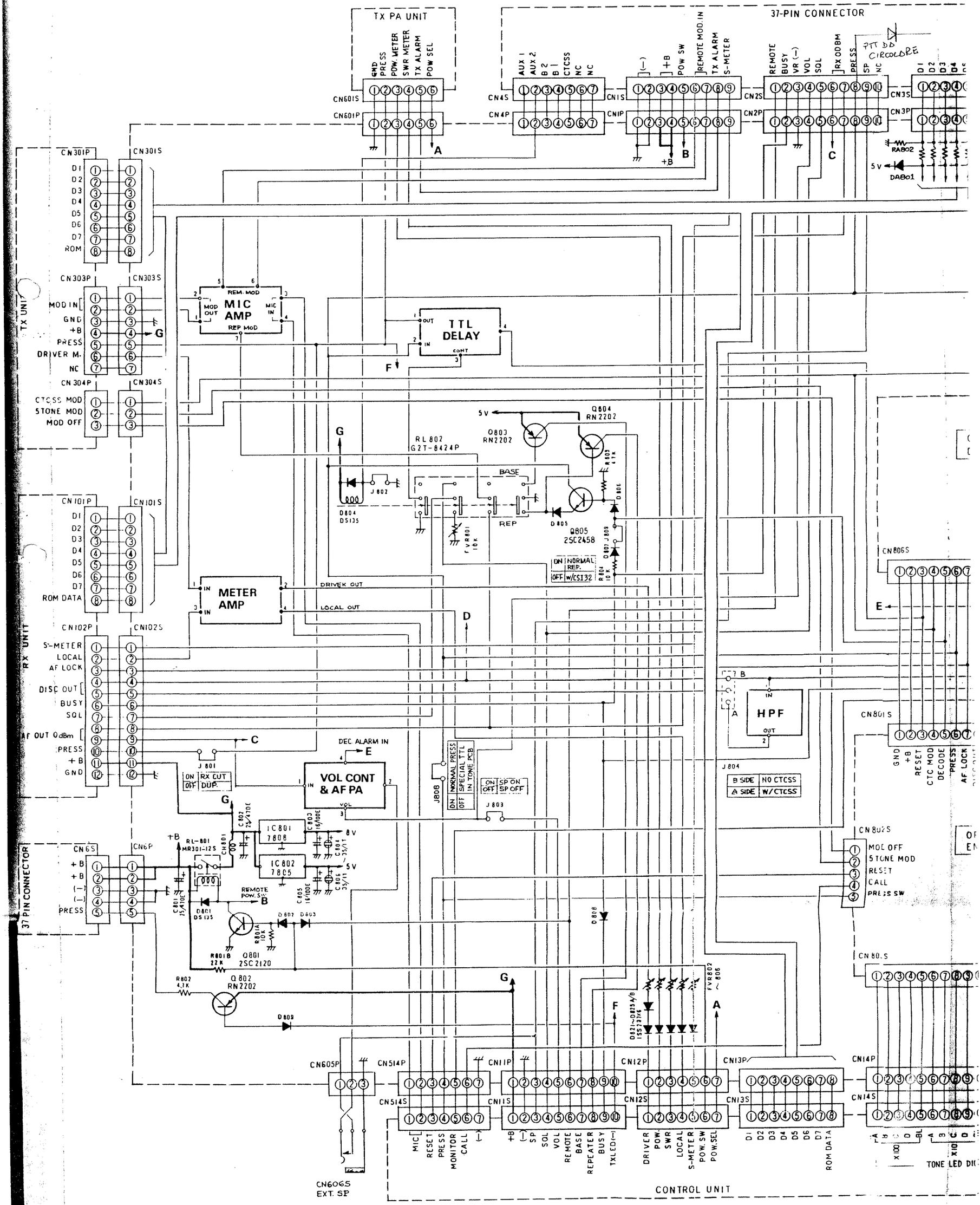
R1 10K

CN 604
R01-2110

CN16P

TO COAXIAL RELAY

TO PAUNIT


TX PA UNIT
GND
PRESS
POW. METER
SWR METER
TX ALARM
POW SEL
CN601S
CN601P
37-PIN CONNECTOR
AUX 1
AUX 2
B 2
B 1
CTCSS
NC
NC
CN4S
CN4P
(-)
+B
POW SW
REMOTE MOD. IN
TX ALARM
S-METER
CN1S
CN1P
REMOTE
BUSY
VR (-)
VOL
SQL
RX 0DBM
PRESS
SP
NC
CN2S
CN2P
CN3S
CN3P
PTT DA CIRCOLARE
RA802
5V
DA801
A
B
C
+B
CN301P
CN301S
D1
D2
D3
D4
D5
D6
D7
ROM
CN303P
CN303S
MOD IN
GND
+B
PRESS
DRIVER M.
NC
G
CN304P
CN304S
CTCSS MOD
STONE MOD
MOD OFF
TX UNIT
REM. MOD
MIC AMP
MOD OUT
MIC IN
REP MOD
TTL DELAY
OUT
IN
CONT
F
5V
Q804
RN2202
Q803
RN2202
RL 802
G2T-8424P
J 802
D804
DS135
BASE
REP
D805
Q805
2SC2458
R803
4.7K
D806
FVR801
10K
R804
10K
D807 J809
ON NORMAL REP.
OFF w/CS132
CN806S
METER AMP
IN
DRIVER OUT
LOCAL OUT
D
HPF
OUT
CN801S
GND
+B
RESET
CTC MOD
DECODE
PRESS
AF LOCK
CN102P
CN102S
S-METER
LOCAL
AF LOCK
DISC OUT
BUSY
SQL
AF OUT 0dBm
PRESS
+B
GND
J 801
ON RX CUT
OFF DUP
DEC ALARM IN
E
VOL CONT & AF PA
VOL
J808
ON NORMAL PRESS
OFF SPECIAL TTL IN TONE PCB
ON OFF SP ON SP OFF
J 803
J804
B SIDE NO CTCSS
A SIDE W/CTCSS
CN802S
MOE OFF
5 TONE MOD
RESET
CALL
PRESS SW
37 PIN CONNECTOR
CN6S
CN6P
+B
+B
(-)
(-)
PRESS
RL-801
MR301-12S
C801
15/410E
D801
DS135
C802
25/470E
IC801
7808
8V
IC802
7805
5V
C803
16/100E
C804
35/11
C805
16/100E
C806
35/11
REMOTE POW. SW
B
R801A
10K
R801B
22K
Q801
2SC2120
D807
D808
R802
4.7K
Q802
RN2202
D809
FVR802 ~ 806
D821~D823 KYB
ISS133K6
CN605P
CN514P
CN11P
CN12P
CN13P
CN14P
CN514S
CN11S
CN12S
CN13S
CN14S
MIC
RESET
PRESS
MONITOR
CALL
+B
(-)
SP
SQL
VOL
REMOTE
BASE
REPEATER
BUSY
TXLED(-)
DRIVER
POW. SWR
LOCAL
S-METER
POW. SW
POW. SEL
D1
D2
D3
D4
D5
D6
D7
ROM DATA
CN6065
EXT. SP
CONTROL UNIT
TONE LED DI

CSI-32 UNIT

+B
AF OUT
DISC IN
ALARM IN
PRESS
COS IN
GND
TONE OUT

CN60P

CN607S

D

ROM DATA

R856 ~ R863 10K×7

OPTIONE TONE
DECODER UNIT

CN887S

CN835S

DISC OUT
BUSY
MONITOR
DEC. ALARM

D1
D2
D3
D4
D5
D6
D7
ROM DATA

OPTIONE TONE
ENC/DEC UNIT

CN804S

CN15P

CN15S

DIGIT

5-TONE CONTROL

TTL & PRESS DELAY

5V

S801

IC 805 TC 5043

IC 806 TC 5027

IC 807 4585

IC 808 4002

IC 809 4013

IC 810 4049

IC 811 555

Q806 7SC2202

Q807 2SC3623

D820

PRESS IN

PRESS OUT

RESET

DELAY TIME

TP803

J805

J806

ON	1STEP TTL
OFF	INTEGRATION TTL

J807

ON	PRESS DELAY
OFF	NO DELAY

PRESS DELAY CONT.

METER AMP

8V

IC 812 NJM4558

IN DRIVER

OUT

TP801

MIC IN PUT

IN LOCAL

OUT

TP802

MIC AMP

IC 804 NJM4556D

IC 803 M51304L

MOD OUT

MT801 BT600

REMOTE MOD IN

REP MOD IN

H P F

IC 815 NJM4558

IN

OUT

VOL CONT & AF PA

IC 813 AN 5733

IC 814 TA7252

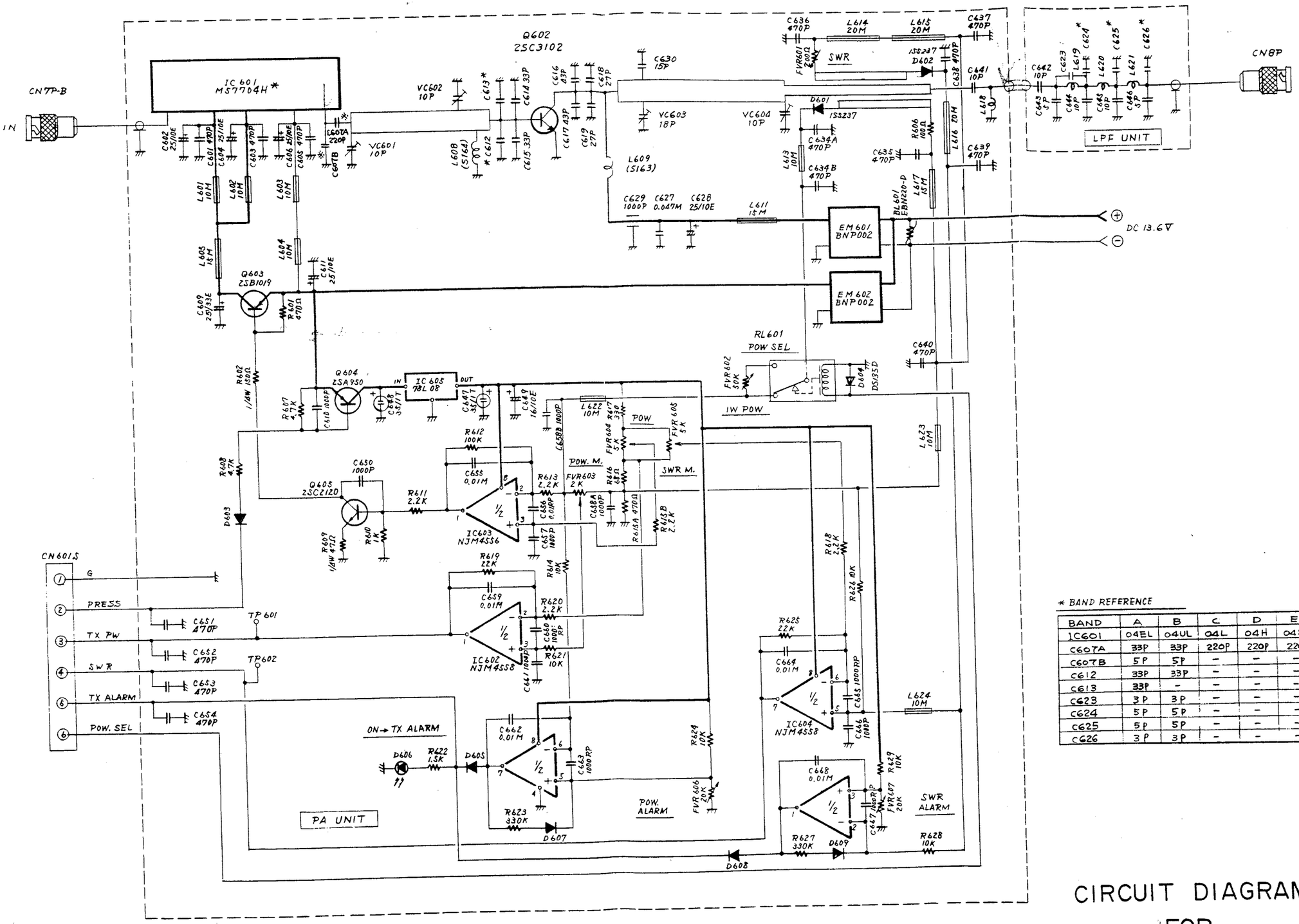
AUDIO OUT

VOL

AUDIO IN

DECODE ARARM IN

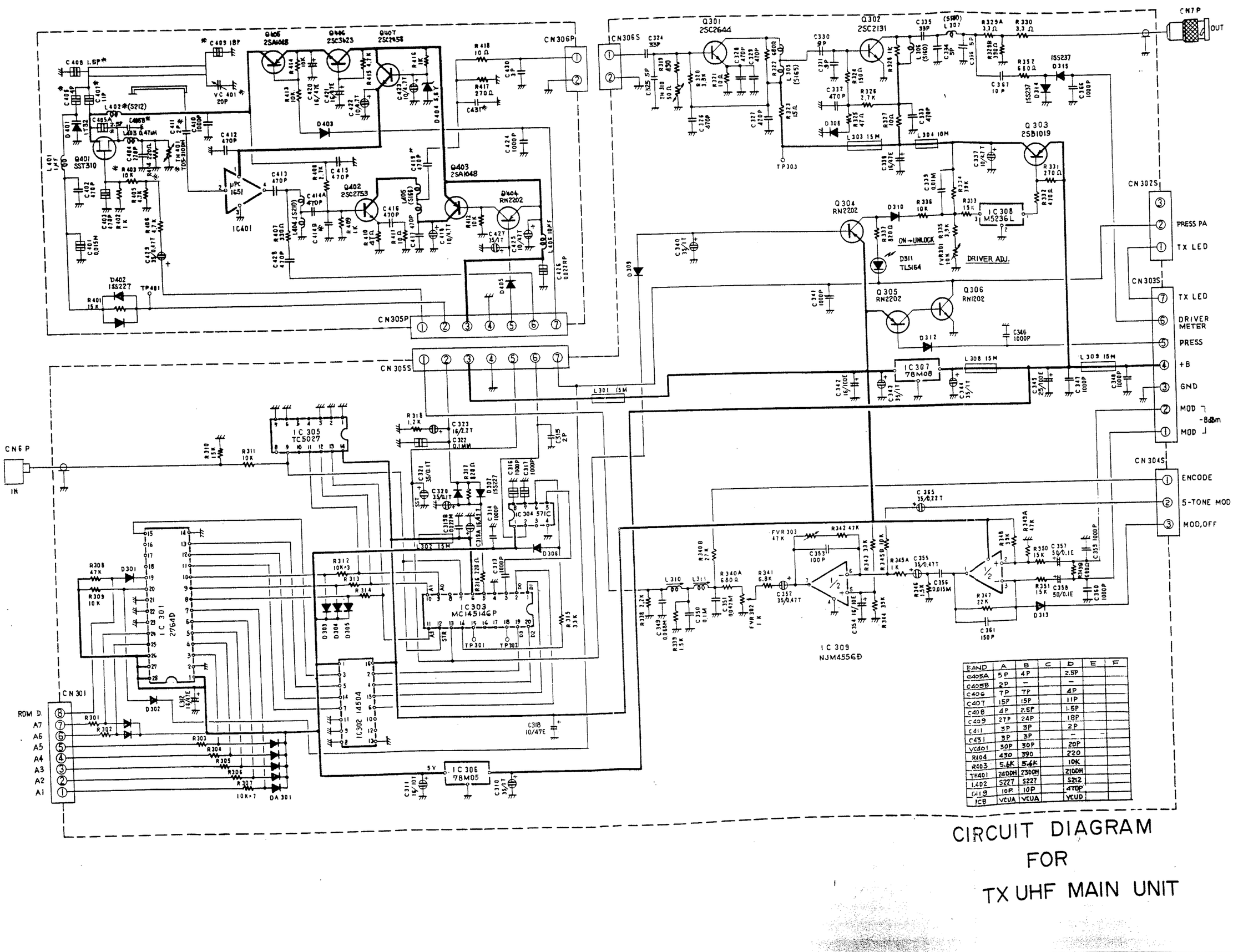
CIRCUIT DIAGRAM FOR TERMINAL CONTROL UNIT



* BAND REFERENCE

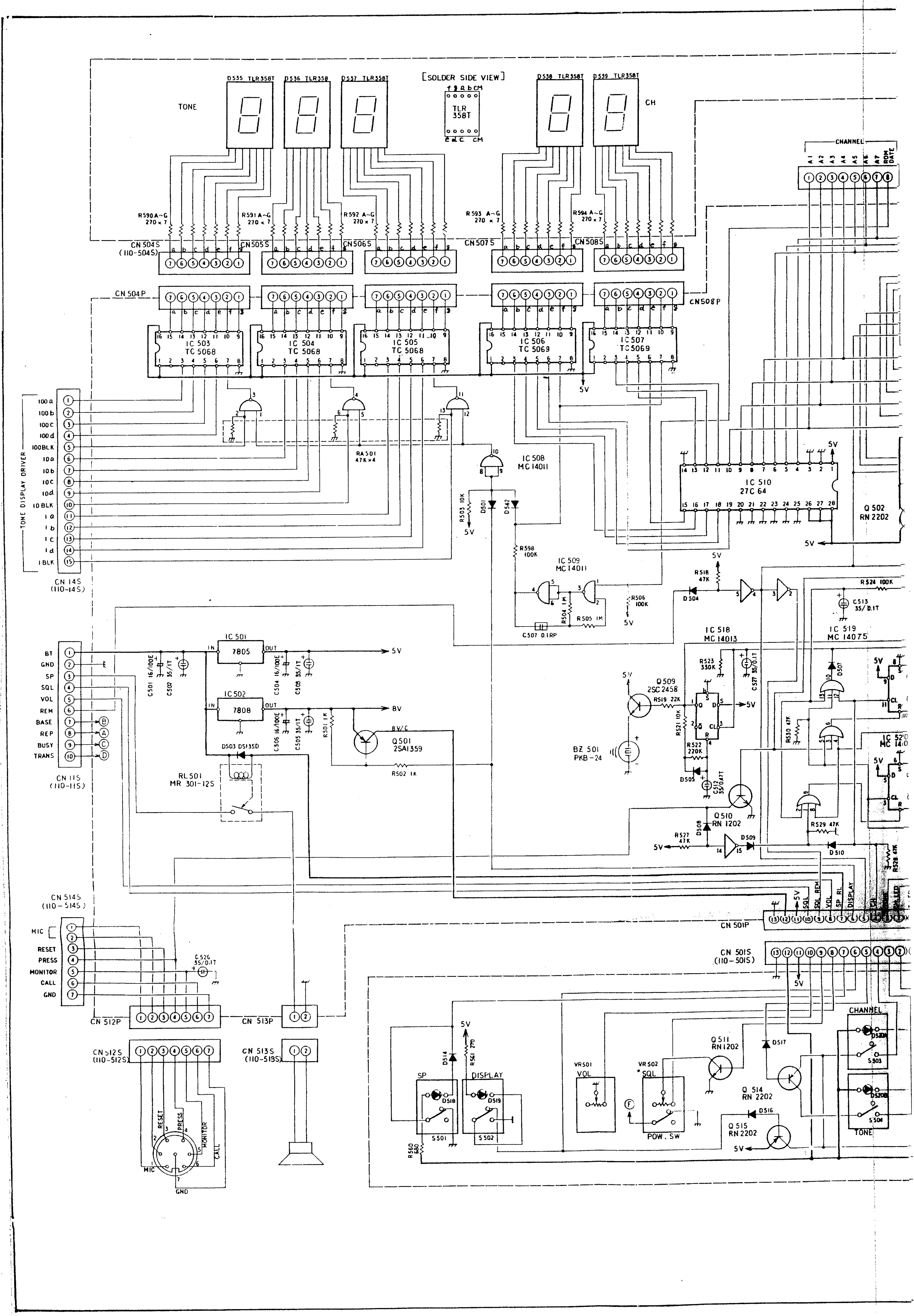
BAND	A	B	C	D	E	F
IC601	04EL	04UL	04L	04H	04SH	04SH
C607A	33P	33P	220P	220P	220P	220P
C607B	5P	5P	–	–	–	–
C612	33P	33P	–	–	–	–
C613	33P	–	–	–	–	–
C623	3P	3P	–	–	–	–
C624	5P	5P	–	–	–	–
C625	5P	5P	–	–	–	–
C626	3P	3P	–	–	–	–

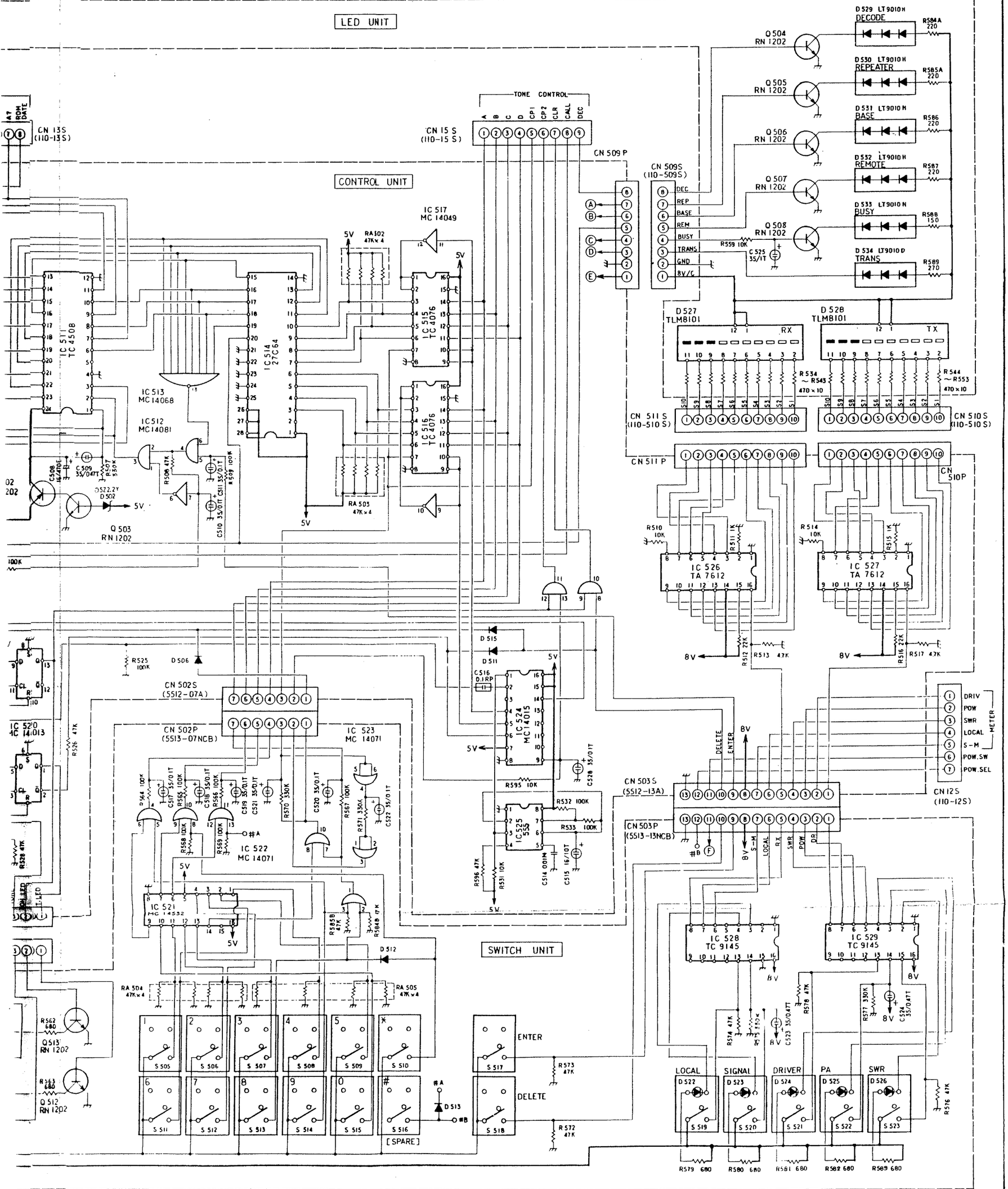
CIRCUIT DIAGRAM FOR UHF PA UNIT



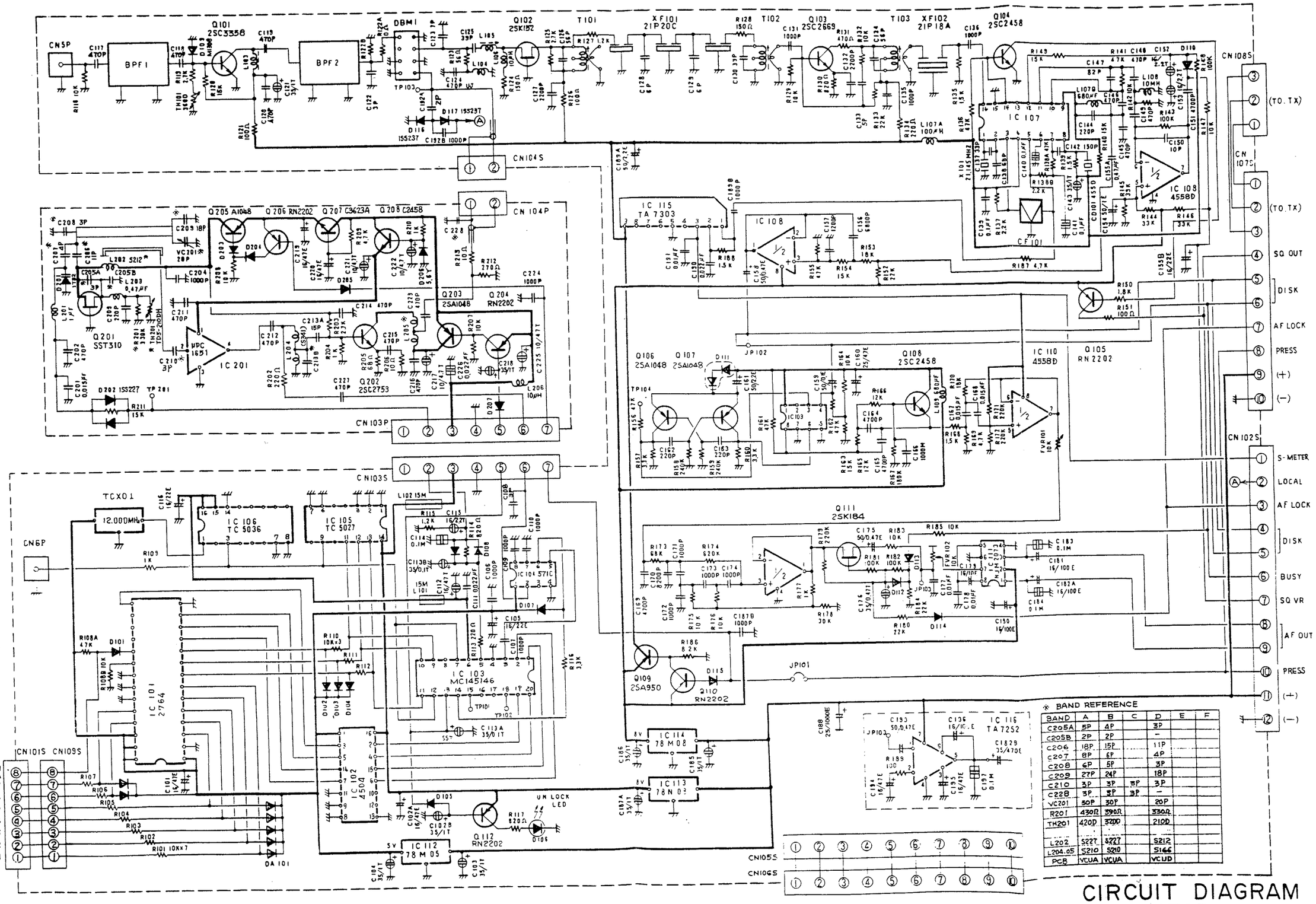
BAND	A	B	C	D	E	F
C405A	5P	4P		2.5P		
C405B	2P	—		—		
C406	7P	7P		4P		
C407	15P	15P		11P		
C408	4P	2.5P		1.5P		
C409	27P	24P		18P		
C411	3P	3P		2P		
C431	3P	3P		—		
VC401	30P	30P		20P		
R404	430	390		220		
R403	5.6K	5.6K		10K		
TH401	240DM	230DM		210DM		
L402	S227	S227		S212		
C419	10P	10P		4TOP		
ICB	VCUA	VCUA		VCUD		

CIRCUIT DIAGRAM FOR TX UHF MAIN UNIT


TONE
D535 TLR358T
D536 TLR358
D537 TLR358T
[SOLDER SIDE VIEW]
TLR 358T
D538 TLR358T
D539 TLR358T
CH
CHANNEL
ROM DATE
R590A~G 270 × 7
R591 A~G 270 × 7
R592 A~G 270 × 7
R593 A~G 270 × 7
R594 A~G 270 × 7
CN 504S (110-504S)
CN505S
CN506S
CN507S
CN508S
CN 504P
CN508P
IC 503 TC 5068
IC 504 TC 5068
IC 505 TC 5068
IC 506 TC 5069
IC 507 TC 5069
RA501 47K × 4
IC 508 MC 14011
IC 510 27C 64
Q 502 RN 2202
TONE DISPLAY DRIVER
100a
100b
100c
100d
100BLK
10a
10b
10c
10d
10 BLK
1a
1b
1c
1d
1 BLK
CN 14S (110-14S)
R503 10K
D501
D542
R598 100K
IC 509 MC 14011
R504 1K
R505 1M
C507 0.1RP
R506 100K
R518 47K
D504
R524 100K
C513 35/0.1T
IC 519 MC 14075
IC 518 MC 14013
R523 330K
C527 35/0.1T
Q 509 2SC 2458
R519 22K
R521 10K
R522 220K
D505
C512 35/0.47T
BZ 501 PKB-24
Q 510 RN 1202
D508
R527 47K
D509
D510
R530 47K
R529 47K
R528 47K
BT
GND
SP
SQL
VOL
REM
BASE
REP
BUSY
TRANS
CN 11S (110-11S)
IC 501 7805
IC 502 7808
C501 16/100E
C502 35/1T
C504 16/100E
C503 35/1T
C506 16/100E
C505 35/1T
R501 1K
8V/C
Q 501 2SA1359
R502 1K
D503 DS135D
RL 501 MR 301-12S
5V
8V
SQL
REM
VOL
SP RL
DISPLAY
CN 501P
CN 501S (110-501S)
CN 514S (110-514S)
MIC
RESET
PRESS
MONITOR
CALL
GND
C526 35/0.1T
CN 512P
CN 513P
CN 512S (110-512S)
CN 513S (110-513S)
SP
DISPLAY
D514
R561 270
D518
D519
S501
S502
R560 680
VR501 VOL
VR 502 SQL
POW. SW
Q 511 RN1202
D517
Q 514 RN 2202
D516
Q 515 RN 2202
CHANNEL
S503
S504
TONE



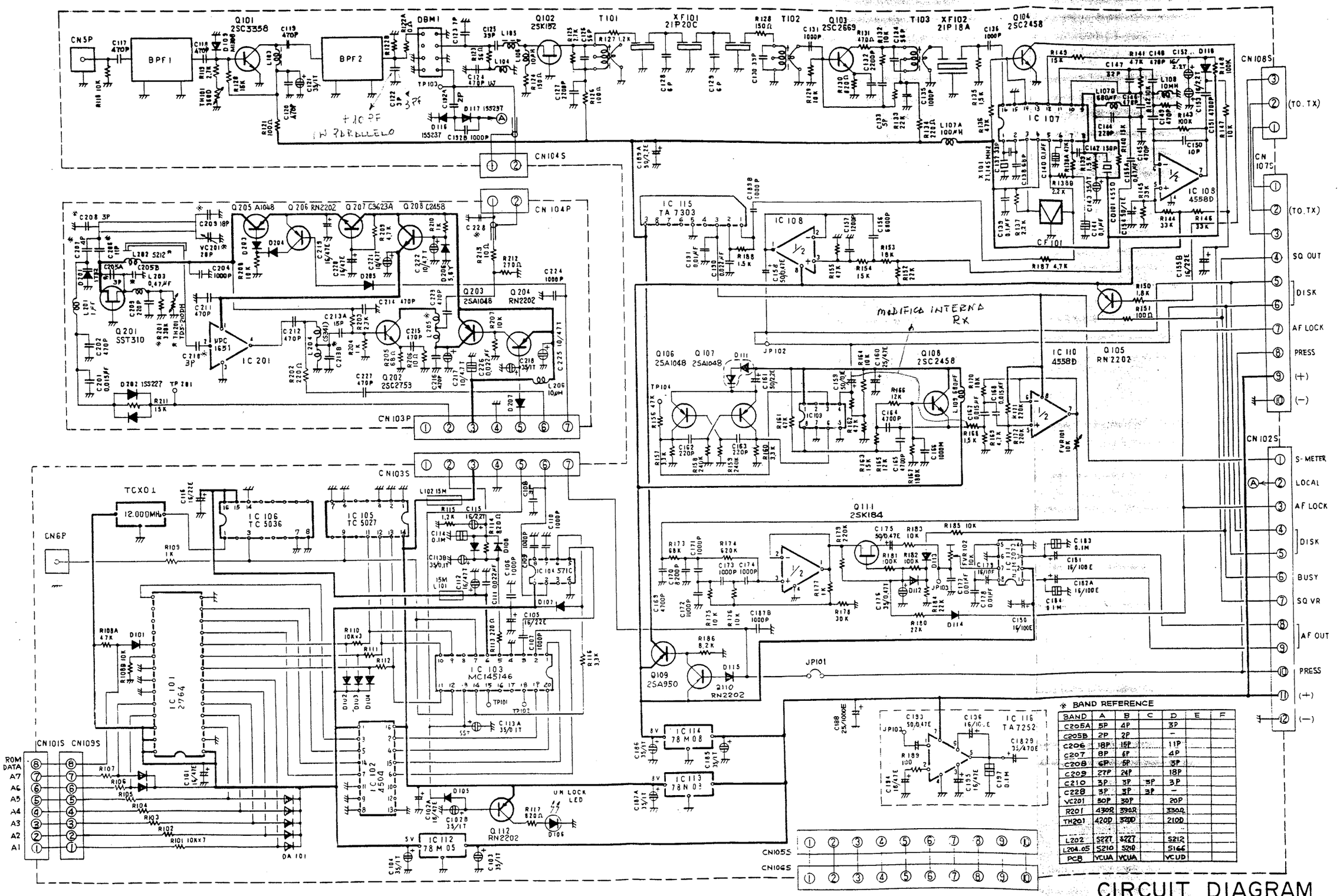
CIRCUIT DIAGRAM FOR CONTROL UNIT



* BAND REFERENCE

BAND	A	B	C	D	E	F
C205A	5P	4P		3P		
C205B	2P	2P		–		
C206	18P	15P		11P		
C207	8P	6P		4P		
C208	6P	5P		3P		
C209	27P	24P		18P		
C210	3P	3P	3P	3P		
C228	3P	3P	3P	–		
VC201	30P	30P		20P		
R201	430Ω	390Ω		330Ω		
TH201	420Ω	360Ω		210Ω		
L202	S22T	S22T		S21Z		
L204.05	S21O	S21O		S16G		
PCB	VCUA	VCUA		VCUD		

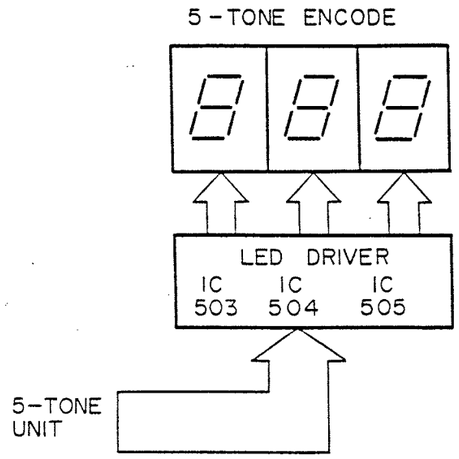
CIRCUIT DIAGRAM FOR RX UHF MAIN UNIT

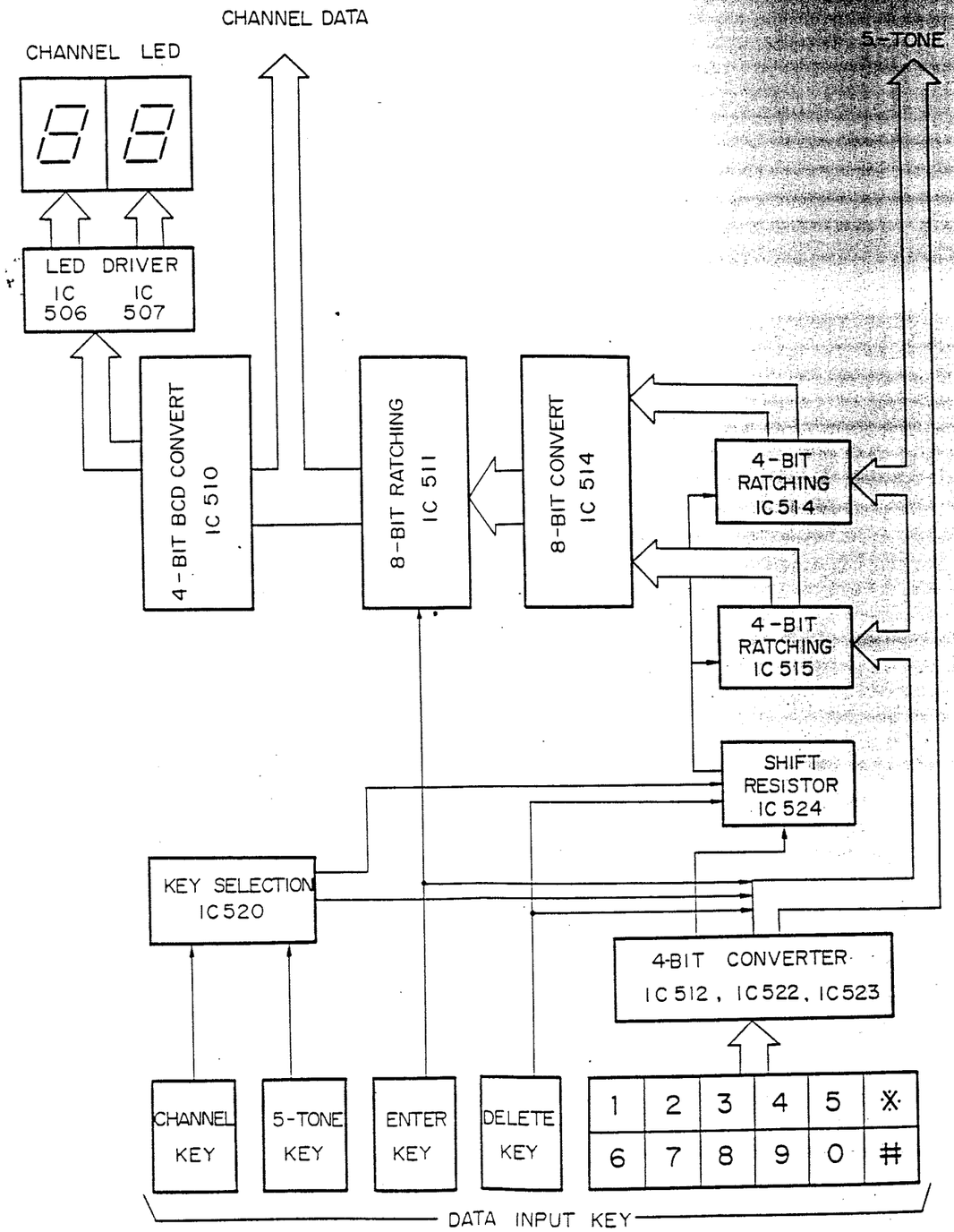


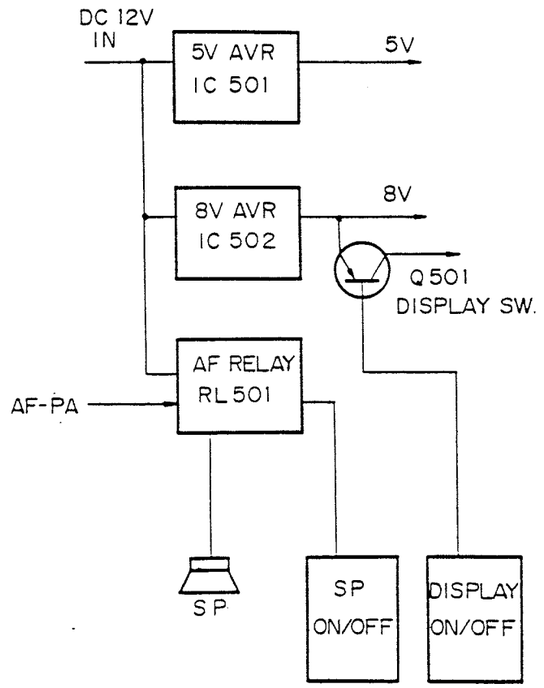
* BAND REFERENCE

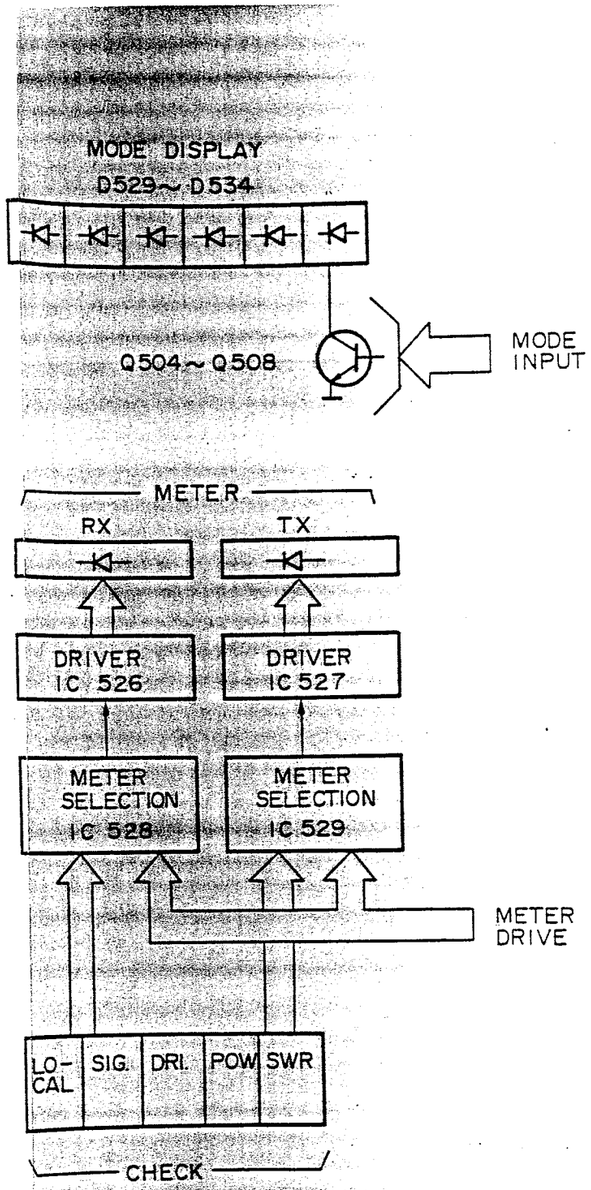
BAND	A	B	C	D	E	F
C205A	5P	4P		3P		
C205B	2P	2P		–		
C206	18P	16P		11P		
C207	8P	6P		4P		
C208	6P	5P		3P		
C209	27P	24P		18P		
C210	3P	3P	3P	3P		
C228	3P	3P	3P	–		
VC201	30P	30P		20P		
R201	430Ω	390Ω		330Ω		
TH201	420Ω	390Ω		210Ω		
L202	S227	S227		S212		
L204.05	S210	S210		S166		
PCB	VCUA	VCUA		VCUD		

CIRCUIT DIAGRAM FOR RX UHF MAIN UNIT

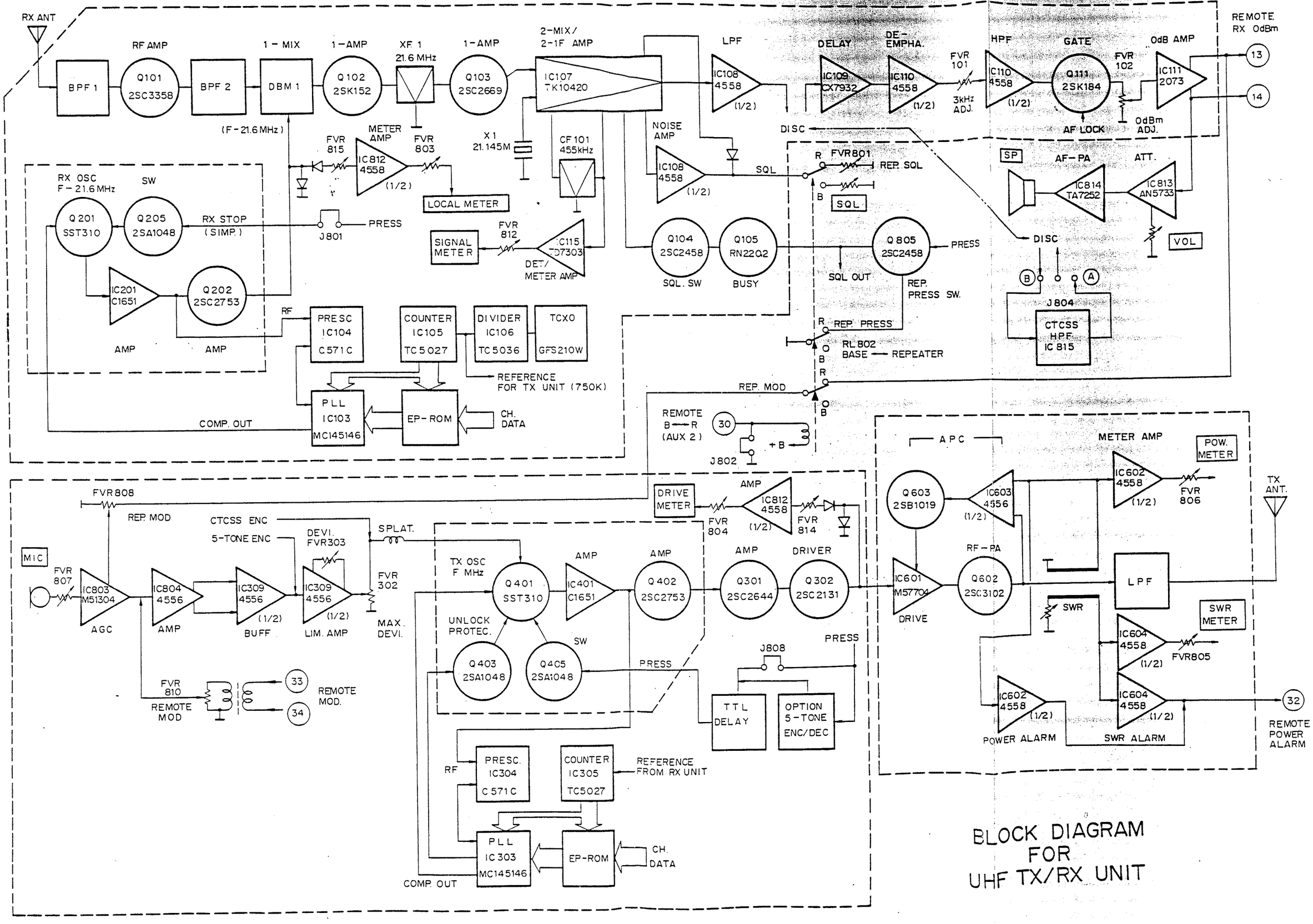








BLOCK DIAGRAM FOR FRONT PANEL UNIT



BLOCK DIAGRAM FOR UHF TX/RX UNIT

OUTLINE DRAWING FOR

UNIT : mm