

# TK-3230

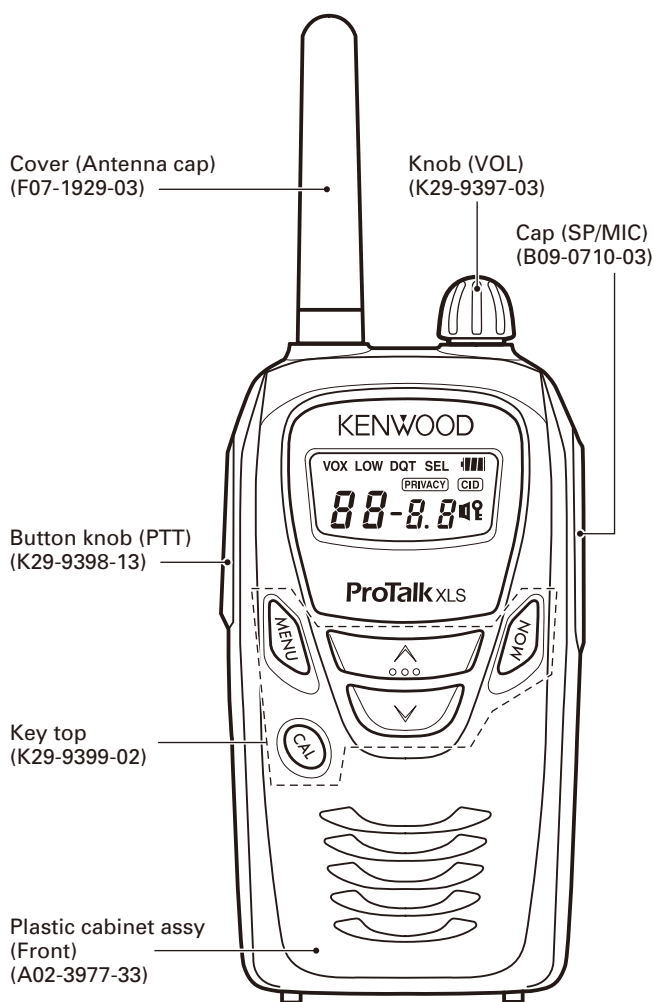
## SERVICE MANUAL

### SUPPLEMENT

This service manual describes the information in the BRS 6 channel models.

This service manual applies to products with A9403511 or subsequent serial numbers.

Refer to the TK-3230 service manual (B51-8792-00) for any information which has not been covered in this TK-3230 service manual.



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# GENERAL

## INTRODUCTION

### SCOPE OF THIS MANUAL

This manual is intended for use by experienced technicians familiar with similar types of commercial grade communications equipment. It contains all required service information for the equipment and is current as of the publication date. Changes which may occur after publication are covered by either Service Bulletins or Manual Revisions. These are issued as required.

### ORDERING REPLACEMENT PARTS

When ordering replacement parts or equipment information, the full part identification number should be included. This applies to all parts : components, kits, or chassis. If the part number is not known, include the chassis or kit number of which it is a part, and a sufficient description of the required component for proper identification.

## PERSONAL SAFETY

The following precautions are recommended for personal safety:

- DO NOT transmit until all RF connectors are verified secure and any open connectors are properly terminated.
- SHUT OFF and DO NOT operate this equipment near electrical blasting caps or in an explosive atmosphere.
- This equipment should be serviced by a qualified technician only.

## SERVICE

This transceiver is designed for easy servicing. Refer to the schematic diagrams, printed circuit board views, and alignment procedures contained within.

## NOTE

You must use KPG-108D version 2.00 or later for this transceiver. KPG-108D versions earlier than version 2.00 will not work properly.

## GENERAL

## UHF Frequency Selection Table

Channel setup No.	Frequency (MHz)	Channel setup No.	Frequency (MHz)
01	464.50000	33	464.56250
02	464.55000	34	466.03750
03	467.76250	35	466.06250
04	467.81250	36	466.08750
05	467.85000	37	466.11250
06	467.87500	38	466.13750
07	467.90000	39	466.16250
08	467.92500	40	466.18750
09	461.03750	41	466.21250
10	461.06250	42	466.23750
11	461.08750	43	466.26250
12	461.11250	44	466.28750
13	461.13750	45	466.31250
14	461.16250	46	466.33750
15	461.18750	47	466.36250
16	461.21250	48	467.78750
17	461.23750	49	467.83750
18	461.26250	50	467.86250
19	461.28750	51	467.88750
20	461.31250	52	467.91250
21	461.33750	53	469.48750
22	461.36250	54	469.51250
23	462.76250	55	469.53750
24	462.78750	56	469.56250
25	462.81250	57	462.18750
26	462.83750	58	462.46250
27	462.86250	59	462.48750
28	462.88750	60	462.51250
29	462.91250	61	467.18750
30	464.48750	62	467.46250
31	464.51250	63	467.48750
32	464.53750	64	467.51250

User can select channel frequency from above.

## 6 Channels (Default)

Channel No.	Receive frequency (MHz)	Transmit frequency (MHz)
1	(02) 464.55000	(02) 464.55000
2	(08) 467.92500	(08) 467.92500
3	(09) 461.03750	(09) 461.03750
4	(10) 461.06250	(10) 461.06250
5	(11) 461.08750	(11) 461.08750
6	(12) 461.11250	(12) 461.11250

All channel are Narrow bandwidth, RF power output 1.5W with QT67.0Hz encode/decode.

## 16 Channels (Default)

Channel No.	Receive frequency (MHz)	Transmit frequency (MHz)
1	(02) 464.55000	(02) 464.55000
2	(08) 467.92500	(08) 467.92500
3	(09) 461.03750	(09) 461.03750
4	(10) 461.06250	(10) 461.06250
5	(11) 461.08750	(11) 461.08750
6	(12) 461.11250	(12) 461.11250
7	(13) 461.13750	(13) 461.13750
8	(14) 461.16250	(14) 461.16250
9	(01) 464.50000	(01) 464.50000
10	(03) 467.76250	(03) 467.76250
11	(04) 467.81250	(04) 467.81250
12	(05) 467.85000	(05) 467.85000
13	(06) 467.87500	(06) 467.87500
14	(07) 467.90000	(07) 467.90000
15	(15) 461.18750	(15) 461.18750
16	(16) 461.21250	(16) 461.21250

All channel are Narrow bandwidth, RF power output 1.5W with QT67.0Hz encode/decode.

## REALIGNMENT

### 1. Clone Mode

#### 1-1. Outline

“Clone Mode” copies the transceiver data to another transceiver.

The dealer can copy the transceiver data to another transceiver even without the use of a personal computer.

#### 1-2. Example

The transceiver can copy the programming data to one or more transceivers via RF communication.

The clone source and clone target/s must be in Clone mode.

#### 1-3. Operation

- To switch the clone target/s to Clone mode, press and hold the [PTT] and [MONI] keys while turning the transceiver power ON.
- Keep holding [PTT] and [MONI] keys for 1 second. Transceiver sound key on tone and enters Clone mode with “**FL 00**” display.
- Wait for 2 seconds. Transceiver displays “**F 9- 1**”.
- Select a channel table number using [UP] (increment channel table) and [DOWN] (decrement channel table) keys.
- To switch the clone source to Clone mode, press and hold the [PTT] and [MONI] keys while turning the transceiver power ON.
- Keep holding [PTT] and [MONI] keys for 1 second. Transceiver sound key on tone and enters Clone mode with “**FL 00**” display.
- Wait for 2 seconds. Transceiver displays “**F 9- 1**”.
- Select the same channel table number as the clone target/s.
- Press [PTT] on the clone source to begin data transmission. When the clone target starts to receive data, the LED will light green.  
When the clone source finishes sending data, a “confirmation” tone will sound with “**Er d**” displayed. If data transmission fails while cloning, an “error” tone will sound from the Target unit with “**Er r**” displayed.
- If the cloning fails, no data will be available in the Target unit when it is returned to User mode.
- When the cloning is successful, the Target unit’s “Scan”, “Key Lock” and “Super Lock” functions will return to their default values (Scan = OFF, Key Lock = OFF, Super Lock = OFF).
- After clone has completed, it is necessary for the Target unit to set its required ID Type of ID List for FleetSync. This can be done by using unit’s ID List Setting Mode.

#### Note:

- The dealer can clone data to two or more transceivers by repeating the above procedures.
- If the transceiver’s Clone Mode is configured as “Disabled”, the transceiver cannot enter Clone mode.
- The table shown below will cover the frequencies used for wireless cloning.
- A unit cannot be a “Source Unit” if it is unprogrammed. If [PTT] is pressed, an “error” tone will sound.
- Once a unit is set to be the Source, it cannot be a target

after the data has been transmitted. This protects the data in the Source unit.

- If the Target unit is cloned unsuccessfully, “error” tone will sound with “**Er r**” display.
- After 4 seconds, Target unit returns to display “**F 9- X X**”. “xx” means the last selected channel table number.
- The Source unit and Target unit must be of the same model type and destination in order for Clone to operate.
- It is not possible to read/write setup data from the clone source/target when it is in Clone mode. But it will trigger to go to cloning mode (TX) when try to read/write.
- Electronic interface may cause a failure in data transfer during Wireless Clone, such as when waveforms or electromagnetics are being performed at the workbench.
- Clone mode can be used ONLY by the authorized service personnel.
- The Clone mode setting must be configured as “Disable” before being delivered to the end-user.
- When wireless Clone mode is used, the environment must ensure that the radio wave does not leak to outside.
- The transmit output power is automatically set to Low in Clone mode.
- Battery saver function is automatically set to off in Clone mode.

Channel setup No.	Frequency (MHz)	Channel setup No.	Frequency (MHz)
01	464.50000	29	462.91250
02	464.55000	30	464.48750
03	467.76250	31	464.51250
04	467.81250	32	464.53750
05	467.85000	33	464.56250
06	467.87500	34	466.03750
07	467.90000	35	466.06250
08	467.92500	36	466.08750
09	461.03750	37	466.11250
10	461.06250	38	466.13750
11	461.08750	39	466.16250
12	461.11250	40	466.18750
13	461.13750	41	466.21250
14	461.16250	42	466.23750
15	461.18750	43	466.26250
16	461.21250	44	466.28750
17	461.23750	45	466.31250
18	461.26250	46	466.33750
19	461.28750	47	466.36250
20	461.31250	48	467.78750
21	461.33750	49	467.83750
22	461.36250	50	467.86250
23	462.76250	51	467.88750
24	462.78750	52	467.91250
25	462.81250	53	469.48750
26	462.83750	54	469.51250
27	462.86250	55	469.53750
28	462.88750	56	469.56250

User can select channel frequency from above.

**Table 1 Cloning frequency table**

# REALIGNMENT

## 1-4. Compatibility of Clone Function

When Clone is executed between the following transceivers, the Clone operation is as follows.

Source transceiver \ Target transceiver		S/No. 904xxxxx			S/No. 90700001~A9400500			S/No. A9403511~		
		BRS 2CH	BRS 16CH	LMR	BRS 2CH	BRS 16CH	LMR	BRS 6CH	BRS 16CH	LMR
S/No. 904xxxxx	BRS 2CH	YES	NO	NO	YES	NO	NO	YES (*1)	NO	NO
	BRS 16CH	NO	YES	NO	NO	YES	NO	NO	YES	NO
	LMR	NO	NO	YES	YES (*2)	YES	YES	YES (*2)	YES	YES
S/No. 90700001~ A9400500	BRS 2CH	YES	NO	NO	YES	NO	NO	YES (*1)	NO	NO
	BRS 16CH	NO	YES	NO	NO	YES	NO	NO	YES	NO
	LMR	NO	NO	YES	YES (*2)	YES	YES	YES (*2)	YES	YES
S/No. A9403511~	BRS 6CH	NO	NO	NO	NO	NO	NO	YES	NO	NO
	BRS 16CH	NO	NO	NO	NO	NO	NO	NO	YES	NO
	LMR	NO	NO	YES	YES (*2)	YES	YES	YES (*2)	YES	YES

YES: Cloning is possible

NO: Cloning is not possible

YES (\*1): Only CH1 and CH2 can be copied from BRS 2 channel models.

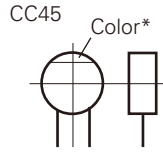
YES (\*2): BRS transceiver is changed to actual LMR transceiver. (Clone from BRS to LMR is not available.)

## PARTS LIST

### CAPACITORS

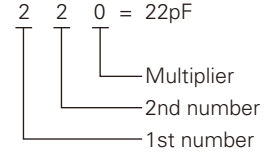
$\frac{CC}{1} \frac{45}{2} \frac{TH}{3} \frac{1H}{4} \frac{220}{5} \frac{J}{6}$

- 1 = Type ... ceramic, electrolytic, etc.
- 2 = Shape ... round, square, etc.
- 3 = Temp. coefficient
- 4 = Voltage rating
- 5 = Value
- 6 = Tolerance



#### • Capacitor value

- 010 = 1pF
- 100 = 10pF
- 101 = 100pF
- 102 = 1000pF = 0.001μF
- 103 = 0.01μF



#### • Temperature coefficient

1st Word	C	L	P	R	S	T	U
Color*	Black	Red	Orange	Yellow	Green	Blue	Violet
ppm/°C	0	-80	-150	-220	-330	-470	-750

2nd Word	G	H	J	K	L
ppm/°C	±30	±60	±120	±250	±500

Example : CC45TH = -470±60ppm/°C

#### • Tolerance (More than 10pF)

Code	C	D	G	J	K	M	X	Z	P	No code
(%)	±0.25	±0.5	±2	±5	±10	±20	+40 -20	+80 -20	+100 -0	More than 10μF : -10~+50 Less than 4.7μF : -10~+75

#### (Less than 10pF)

Code	B	C	D	F	G
(pF)	±0.1	±0.25	±0.5	±1	±2

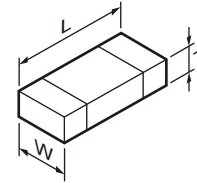
#### • Voltage rating

2nd word \ 1st word	A	B	C	D	E	F	G	H	J	K	V
0	1.0	1.25	1.6	2.0	2.5	3.15	4.0	5.0	6.3	8.0	-
1	10	12.5	16	20	25	31.5	40	50	63	80	35
2	100	125	160	200	250	315	400	500	630	800	-
3	1000	1250	1600	2000	2500	2150	4000	5000	6300	8000	-

#### • Chip capacitors

- (EX)  $\frac{CC}{1} \frac{73}{2} \frac{F}{3} \frac{SL}{4} \frac{1H}{5} \frac{000}{6} \frac{J}{7}$  → Refer to the table above.
- 1 = Type
  - 2 = Shape
  - 3 = Dimension
  - 4 = Temp. coefficient
  - 5 = Voltage rating
  - 6 = Value
  - 7 = Tolerance
- (Chip) (CH, RH, UJ, SL)
- (EX)  $\frac{CK}{1} \frac{73}{2} \frac{F}{3} \frac{F}{4} \frac{1H}{5} \frac{000}{6} \frac{Z}{7}$
- (Chip) (B, F)

#### • Dimension



#### Chip capacitor

Code	L	W	T
Empty	5.6±0.5	5.0±0.5	Less than 2.0
A	4.5±0.5	3.2±0.4	Less than 2.0
B	4.5±0.5	2.0±0.3	Less than 2.0
C	4.5±0.5	1.25±0.2	Less than 1.25
D	3.2±0.4	2.5±0.3	Less than 1.5
E	3.2±0.2	1.6±0.2	Less than 1.25
F	2.0±0.3	1.25±0.2	Less than 1.25
G	1.6±0.2	0.8±0.2	Less than 1.0
H	1.0±0.05	0.5±0.05	0.5±0.05

#### Chip resistor

Code	L	W	T
E	3.2±0.2	1.6±0.2	1.0
F	2.0±0.3	1.25±0.2	1.0
G	1.6±0.2	0.8±0.2	0.5±0.1
H	1.0±0.05	0.5±0.05	0.35±0.05

### RESISTORS

#### • Chip resistor (Carbon)

- (EX)  $\frac{RD}{1} \frac{73}{2} \frac{E}{3} \frac{B}{4} \frac{2B}{5} \frac{000}{6} \frac{J}{7}$
- (Chip) (B, F)

#### • Carbon resistor (Normal type)

- (EX)  $\frac{RD}{1} \frac{14}{2} \frac{B}{3} \frac{B}{4} \frac{2C}{5} \frac{000}{6} \frac{J}{7}$

- 1 = Type
- 2 = Shape
- 3 = Dimension
- 4 = Temp. coefficient
- 5 = Rating wattage
- 6 = Value
- 7 = Tolerance

#### • Rating wattage

Code	Wattage	Code	Wattage	Code	Wattage
1J	1/16W	2C	1/6W	3A	1W
2A	1/10W	2E	1/4W	3D	2W
2B	1/8W	2H	1/2W		

## PARTS LIST

\* New Parts. Δ indicates safety critical components.

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.

L : Scandinavia

Y : PX (Far East, Hawaii)

Y : AAFES (Europe)

K : USA

T : England

X : Australia

P : Canada

E : Europe

M : Other Areas

TK-3230

TX-RX UNIT (X57-7330-11)

Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
<b>TK-3230</b>					
1	3A	*	A02-3975-33	PLASTIC CABINET ASSY(REAR)	
2	1A	*	A02-3977-33	PLASTIC CABINET ASSY(FRONT)	
4	3B		B09-0710-03	CAP (SP/MIC)	
5	1C	*	B62-1976-30	INSTRUCTION MANUAL	
8	2A		E37-1390-05	PARALLEL CORD (SP)	
10	2B		F07-1929-03	COVER (ANTENNA CAP)	
12	2B	*	G10-1378-04	FIBROUS SHEET (ANT)	
16	3D	*	H52-2168-12	ITEM CARTON CASE	K
18	1A		J19-5508-03	HOLDER (PTT)	
19	2C		J29-0736-05	HOOK ASSY ACCESSORY	
21	2B		K29-9397-03	KNOB (VOLUME)	
22	1A		K29-9398-13	BUTTON KNOB (PTT)	
23	2A		K29-9399-02	KEY TOP	
A	2B		N14-0840-05	CIRCULAR NUT	
B	2C		N35-3005-43	BINDING HEAD MACHINE SCREW	BK
C	2A,3A		N80-2006-43	PAN HEAD TAPTITE SCREW	
25	2C		N99-2063-05	SCREW SET ACCESSORY	K
27	2A		T07-0362-25	SPEAKER	
28	2B	*	T90-1068-25	ANTENNA ELEMENT	
30	1D	*	W08-1044-05	AC ADAPTER (120V) ACCESSORY	K
31	2D		W08-0995-15	CHARGER ACCESSORY	K
<b>TX-RX UNIT (X57-7330-11)</b>					
101	2B		B11-1849-03	ILLUMINATION GUIDE (LCD)	
102	1B	*	B38-0925-15	LCD	
D400			B30-2143-05	LED (YG)	
D401			B30-2278-05	LED (RED/YELLOW)	
C1			CC73HCH1H101J	CHIP C 100PF J	
C2			CS77AA1VR33M	CHIP TNTL 0.33UF 35WV	
C3			CK73HB1H471K	CHIP C 470PF K	
C4,5			CC73HCH1H101J	CHIP C 100PF J	
C6			CS77AA1A2R2M	CHIP TNTL 2.2UF 10WV	
C7-9			CC73HCH1H101J	CHIP C 100PF J	
C10			CK73FB0J106K	CHIP C 10UF K	
C11			CS77CA1V0R1M	CHIP TNTL 0.1UF 35WV	
C12			CC73HCH1H470J	CHIP C 47PF J	
C13			CC73HCH1H101J	CHIP C 100PF J	
C14		*	C93-1724-05	CHIP C 4.2PF 50WV	
C15			CC73HCH1H101J	CHIP C 100PF J	
C17			CC73HCH1H101J	CHIP C 100PF J	
C18			CC73HCH1H1R5B	CHIP C 1.5PF B	
C19,20			CK73HB1H471K	CHIP C 470PF K	
C21			CC73HCH1H470J	CHIP C 47PF J	
C22			CK73HB1H471K	CHIP C 470PF K	
C23			CK73HB1C103K	CHIP C 0.010UF K	
C25			CK73HB1H471K	CHIP C 470PF K	
C27			CC73HCH1H150G	CHIP C 15PF G	

Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
C28			CC73HCH1H110G	CHIP C 11PF G	
C29			CC73HCH1H101J	CHIP C 100PF J	
C30			CK73GB1H103K	CHIP C 0.010UF K	
C31,32			CC73HCH1H100D	CHIP C 10PF D	
C33			CC73HCH1H0R5B	CHIP C 0.5PF B	
C34,35			CC73HCH1H100D	CHIP C 10PF D	
C36,37			CC73HCH1H101J	CHIP C 100PF J	
C38			CK73HB1H471K	CHIP C 470PF K	
C39			CC73HCH1H101J	CHIP C 100PF J	
C40			CS77AA0J220M	CHIP TNTL 22UF 6.3WV	
C41			CC73HCH1H050B	CHIP C 5.0PF B	
C43			CC73HCH1H100D	CHIP C 10PF D	
C44			CC73HCH1H050B	CHIP C 5.0PF B	
C45,46			CK73HB1H471K	CHIP C 470PF K	
C47			CK73HB1A104K	CHIP C 0.10UF K	
C48,49			CK73HB1H471K	CHIP C 470PF K	
C50,51			CC73HCH1H030B	CHIP C 3.0PF B	
C52			CC73HCH1H050B	CHIP C 5.0PF B	
C53			CC73HCH1H080B	CHIP C 8.0PF B	
C54			CC73HCH1H050B	CHIP C 5.0PF B	
C55			CC73HCH1H101J	CHIP C 100PF J	
C57,58			CC73HCH1H101J	CHIP C 100PF J	
C59			CC73HCH1H3R5B	CHIP C 3.5PF B	
C60			CC73HCH1H120J	CHIP C 12PF J	
C100			CK73HB1H471K	CHIP C 470PF K	
C101			CC73HCH1H1R5B	CHIP C 1.5PF B	
C111			CK73HB1A104K	CHIP C 0.10UF K	
C112			CK73HB1H471K	CHIP C 470PF K	
C113			CC73HCH1H150J	CHIP C 15PF J	
C114			CC73HCH1H150G	CHIP C 15PF G	
C116			CK73HB1H471K	CHIP C 470PF K	
C117			CC73HCH1H101J	CHIP C 100PF J	
C119,120			CK73HB1H471K	CHIP C 470PF K	
C121			CC73HCH1H270J	CHIP C 27PF J	
C122			CK73HB1A104K	CHIP C 0.10UF K	
C123			CC73HCH1H270J	CHIP C 27PF J	
C124			CK73HB1H471K	CHIP C 470PF K	
C125			CC73GCH1H050B	CHIP C 5.0PF B	
C126			CK73HB1H471K	CHIP C 470PF K	
C127			CK73HB0J105K	CHIP C 1.0UF K	
C128			CC73GCH1H270J	CHIP C 27PF J	
C129			CK73HB1A104K	CHIP C 0.10UF K	
C130			CK73HB1C103K	CHIP C 0.010UF K	
C131			CK73HB1A104K	CHIP C 0.10UF K	
C132			CK73HB1H471K	CHIP C 470PF K	
C133			CC73HCH1H090B	CHIP C 9.0PF B	
C134			CC73GCH1H101J	CHIP C 100PF J	
C136			CK73HB0J105K	CHIP C 1.0UF K	
C137			CK73HB1C103K	CHIP C 0.010UF K	
C138			CK73HB1A104K	CHIP C 0.10UF K	
C200			CK73HB1H182K	CHIP C 1800PF K	
C202			CK73HB1H271K	CHIP C 270PF K	
C203,204			CK73HB1H102K	CHIP C 1000PF K	
C205			CK73HB1A104K	CHIP C 0.10UF K	
C206			CK73HB1H271K	CHIP C 270PF K	

## PARTS LIST

### TX-RX UNIT (X57-7330-11)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
C207			CK73HB1A104K	CHIP C 0.10UF K		C321			CK73HB1H471K	CHIP C 470PF K	
C208			CC73HCH1H680J	CHIP C 68PF J		C322,323			CK73HB1A104K	CHIP C 0.10UF K	
C209			CK73HB1H471K	CHIP C 470PF K		C324			CC73HCH1H180J	CHIP C 18PF J	
C210			CK73FB0J106K	CHIP C 10UF K		C325			CK73GB0J475K	CHIP C 4.7UF K	
C211			CK73HB1A224K	CHIP C 0.22UF K		C326			CK73HB1A104K	CHIP C 0.10UF K	
C212,213			CK73HB1H471K	CHIP C 470PF K		C327			CK73HB1A683K	CHIP C 0.068UF K	
C215-217			CK73HB1C103K	CHIP C 0.010UF K		C328			CK73GB0J475K	CHIP C 4.7UF K	
C218			CK73HB1H471K	CHIP C 470PF K		C329			CC73HCH1H181J	CHIP C 180PF J	
C219			CK73HB1C103K	CHIP C 0.010UF K		C330,331			CK73HB1A473K	CHIP C 0.047UF K	
C220			CC73HCH1H010B	CHIP C 1.0PF B		C332,333			CK73HB1A104K	CHIP C 0.10UF K	
C221			CK73GB1H183K	CHIP C 0.018UF K		C336			CK73HB1A104K	CHIP C 0.10UF K	
C222			CK73HB1H331K	CHIP C 330PF K		C337			CK73FB1A225K	CHIP C 2.2UF K	
C223			CK73HB1C103K	CHIP C 0.010UF K		C338			CK73HB1C103K	CHIP C 0.010UF K	
C224			CC73HCH1H100D	CHIP C 10PF D		C339			C92-0864-05	CHIP TNL 10UF 10WV	
C225			CC73HCH1H150J	CHIP C 15PF J		C340			CK73HB0J105K	CHIP C 1.0UF K	
C226			CC73HCH1H010B	CHIP C 1.0PF B		C341			CK73HB1H471K	CHIP C 470PF K	
C228			CK73HB1C103K	CHIP C 0.010UF K		C342			CK73HB0J105K	CHIP C 1.0UF K	
C229			CC73HCH1H680J	CHIP C 68PF J		C343			CK73HB1A333K	CHIP C 0.033UF K	
C230,231			CK73HB1C103K	CHIP C 0.010UF K		C345			CK73HB1H471K	CHIP C 470PF K	
C232			CC73HCH1H330J	CHIP C 33PF J		C346			CK73HB1A104K	CHIP C 0.10UF K	
C233			CC73HCH1H121J	CHIP C 120PF J		C348			CK73HB1A104K	CHIP C 0.10UF K	
C234			CK73HB1H471K	CHIP C 470PF K		C349			CK73HB1H102K	CHIP C 1000PF K	
C235			CC73HCH1H330J	CHIP C 33PF J		C350			CS77CPOJ100M	CHIP TNL 10UF 6.3WV	
C236			CC73HCH1H240J	CHIP C 24PF J		C351	*		CK73HB1A154K	CHIP C 0.15UF K	
C237			CC73HCH1H680J	CHIP C 68PF J		C353			CK73HB1H102K	CHIP C 1000PF K	
C239			CC73HCH1H030B	CHIP C 3.0PF B		C354			CS77AB20J101M	CHIP TNL 100UF 6.3WV	
C240			CK73HB1C103K	CHIP C 0.010UF K		C358			CC73HCH1H470J	CHIP C 47PF J	
C241,242			CK73HB1H471K	CHIP C 470PF K		C359-361			CC73HCH1H101J	CHIP C 100PF J	
C243			CC73HCH1H470J	CHIP C 47PF J		C363			CK73HB0J105K	CHIP C 1.0UF K	
C244-246			CK73HB1H471K	CHIP C 470PF K		C364	*		CC73HCH1H0R3B	CHIP C 0.3PF B	
C247			CC73HCH1H040B	CHIP C 4.0PF B		C365-367			CC73HCH1H221J	CHIP C 220PF J	
C248			CK73HB1C103K	CHIP C 0.010UF K		C400			CK73HB1H471K	CHIP C 470PF K	
C250,251			CK73HB1H471K	CHIP C 470PF K		C401			CK73HB0J105K	CHIP C 1.0UF K	
C252,253			CC73HCH1H470J	CHIP C 47PF J		C402			CK73HB1H471K	CHIP C 470PF K	
C254			CK73HB1H471K	CHIP C 470PF K		C404			CK73HB1H471K	CHIP C 470PF K	
C255			CC73HCH1H060B	CHIP C 6.0PF B		C405			CK73FB1A105K	CHIP C 1.0UF K	
C257			CC73HCH1H1R5B	CHIP C 1.5PF B		C408			CK73HB1H471K	CHIP C 470PF K	
C258			CC73HCH1H100D	CHIP C 10PF D		C411			CK73HB1H471K	CHIP C 470PF K	
C259			CK73HB1H471K	CHIP C 470PF K		C412			CS77AA1A100M	CHIP TNL 10UF 10WV	
C261			CC73HCH1H100D	CHIP C 10PF D		C413-415			CK73HB1A104K	CHIP C 0.10UF K	
C262			CC73HCH1H010C	CHIP C 1.0PF C		C417			CK73HB1H471K	CHIP C 470PF K	
C264			CC73HCH1H010B	CHIP C 1.0PF B		C418			CK73HB1A104K	CHIP C 0.10UF K	
C267,268			CK73HB1A104K	CHIP C 0.10UF K		C419			CK73FB0J106K	CHIP C 10UF K	
C301			CK73HB1E682K	CHIP C 6800PF K		C420			CC73HCH1H080B	CHIP C 8.0PF B	
C303			CC73HCH1H090B	CHIP C 9.0PF B		C421			CK73HB1H471K	CHIP C 470PF K	
C304			CK73GB1C563K	CHIP C 0.056UF K		C422			CC73HCH1H330J	CHIP C 33PF J	
C306			CK73HB1H681K	CHIP C 680PF K		C423			CC73HCH1H080B	CHIP C 8.0PF B	
C307,308			CK73HB0J105K	CHIP C 1.0UF K		C426			CK73HB1H102K	CHIP C 1000PF K	
C309			CC73HCH1H101J	CHIP C 100PF J		C427			CC73HCH1H330J	CHIP C 33PF J	
C310			CK73HB1C473K	CHIP C 0.047UF K		C428			CC73HCH1H101J	CHIP C 100PF J	
C311			CK73FB0J106K	CHIP C 10UF K		C430			CK73GB1A105K	CHIP C 1.0UF K	
C312			CK73HB1A473K	CHIP C 0.047UF K		C431			CK73HB1C103K	CHIP C 0.010UF K	
C313			CK73FB0J106K	CHIP C 10UF K		C432			CK73HB1C223K	CHIP C 0.022UF K	
C314			CK73HB1H392K	CHIP C 3900PF K		C433			CK73HB1A104K	CHIP C 0.10UF K	
C315			CK73HB1H471K	CHIP C 470PF K		C434			CK73HB1A683K	CHIP C 0.068UF K	
C316			CC73HCH1H221J	CHIP C 220PF J		C437			CK73HB1C103K	CHIP C 0.010UF K	
C317			CK73HB1A473K	CHIP C 0.047UF K		C440			CC73HCH1H101J	CHIP C 100PF J	
C318			CK73HB0J105K	CHIP C 1.0UF K		C442,443			CC73HCH1H101J	CHIP C 100PF J	
C319			CK73HB1H272K	CHIP C 2700PF K		C444			CK73HB1A104K	CHIP C 0.10UF K	
C320			CK73FB0J106K	CHIP C 10UF K		C445			CK73HB1H471K	CHIP C 470PF K	



## PARTS LIST

TX-RX UNIT (X57-7330-11)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
C446			CK73HB0J105K	CHIP C 1.0UF K		L219-222			L34-4563-05	AIR-CORE COIL	
C448			CC73GCH1H101J	CHIP C 100PF J		L300,301			L92-0138-05	CHIP FERRITE	
C449			CC73HCH1H101J	CHIP C 100PF J		L400			L92-0140-05	CHIP FERRITE	
C451			CC73HCH1H101J	CHIP C 100PF J		L401,402			L92-0138-05	CHIP FERRITE	
C453			CC73HCH1H030B	CHIP C 3.0PF B		L403			L92-0140-05	CHIP FERRITE	
C454			CC73HCH1H101J	CHIP C 100PF J		L404-407			L92-0161-05	BEADS CORE	
C455			CK73HB0J105K	CHIP C 1.0UF K		L408			L40-2781-86	SMALL FIXED INDUCTOR (0.27UH)	
C456			CK73HB1A104K	CHIP C 0.10UF K		L409			L40-3363-57	SMALL FIXED INDUCTOR (3.3NH)	
C459			CC73HCH1H050B	CHIP C 5.0PF B		L410			L92-0149-05	CHIP FERRITE	
C460			CK73HB1A104K	CHIP C 0.10UF K		L411			L40-3363-57	SMALL FIXED INDUCTOR (3.3NH)	
C461			CK73HB1H471K	CHIP C 470PF K		L412			L40-2775-57	SMALL FIXED INDUCTOR (27.0NH)	
C464			CK73HB1C103K	CHIP C 0.010UF K		X1		*	L77-3019-05	TCXO	
C465			CK73HB0J105K	CHIP C 1.0UF K		X400		*	L77-3036-05	CRYSTAL RESONATOR (7.3728MHZ)	
C468			CK73HB1A104K	CHIP C 0.10UF K		XF200			L71-0586-05	MCF (38.85MHZ)	
C470			CK73HB1C183K	CHIP C 0.018UF K							
103	1B		E29-1217-05	INTER CONNECTOR (LCD)		CP400-402			RK74HB1J103J	CHIP-COM 10K J 1/16W	
J300			E11-0703-05	PHONE JACK (2.5/3.5)		R1			RK73HB1J103J	CHIP R 10K J 1/16W	
-			F10-3083-04	SHIELDING CASE		R2,3			RK73HB1J102J	CHIP R 1.0K J 1/16W	
F300			F53-0324-05	FUSE (2.5A)		R4			RK73HB1J100J	CHIP R 10 J 1/16W	
104	1B	*	J21-8570-14	MOUNTING HARDWARE (LCD)		R5			RK73HB1J392J	CHIP R 3.9K J 1/16W	
-			J30-1282-14	SPACER		R6			RK73HB1J681J	CHIP R 680 J 1/16W	
CD200			L79-1866-05	TUNING COIL		R7			RK73HB1J473J	CHIP R 47K J 1/16W	
CF200			L72-0958-05	CERAMIC FILTER		R8			RK73HB1J101J	CHIP R 100 J 1/16W	
L1			L92-0140-05	CHIP FERRITE		R9			RK73HB1J563J	CHIP R 56K J 1/16W	
L2			L41-1091-06	SMALL FIXED INDUCTOR (1.0UH)		R10			RK73HB1J000J	CHIP R 0.0 J 1/16W	
L3			L41-6868-14	SMALL FIXED INDUCTOR (6.8NH)		R11			RK73HB1J473J	CHIP R 47K J 1/16W	
L4		*	L41-3372-43	SMALL FIXED INDUCTOR (33NH)		R12			RK73HB1J183J	CHIP R 18K J 1/16W	
L5,6			L41-1091-06	SMALL FIXED INDUCTOR (1.0UH)		R13			RK73HB1J000J	CHIP R 0.0 J 1/16W	
L7			L41-1005-08	SMALL FIXED INDUCTOR (10UH)		R14-16			RK73HB1J101J	CHIP R 100 J 1/16W	
L8			L41-1091-06	SMALL FIXED INDUCTOR (1.0UH)		R17			RK73HB1J563J	CHIP R 56K J 1/16W	
L10			L40-2775-57	SMALL FIXED INDUCTOR (27.0NH)		R20			RK73HB1J470J	CHIP R 47 J 1/16W	
L12			L40-2775-57	SMALL FIXED INDUCTOR (27.0NH)		R21			RK73HB1J152J	CHIP R 1.5K J 1/16W	
L13,14			L40-1275-57	SMALL FIXED INDUCTOR (12.0NH)		R22			RK73HB1J562J	CHIP R 5.6K J 1/16W	
L15,16			L92-0161-05	BEADS CORE		R23			RK73HB1J103J	CHIP R 10K J 1/16W	
L17			L40-1075-57	SMALL FIXED INDUCTOR (10.0NH)		R24			RK73HB1J000J	CHIP R 0.0 J 1/16W	
L101			L40-1575-57	SMALL FIXED INDUCTOR (15.0NH)		R25			RK73HB1J472J	CHIP R 4.7K J 1/16W	
L102			L40-1575-92	SMALL FIXED INDUCTOR (15NH)		R26			RK73HB1J000J	CHIP R 0.0 J 1/16W	
L103			L40-1875-92	SMALL FIXED INDUCTOR (18NH)		R27			RK73GB2A330J	CHIP R 33 J 1/10W	
L104			L92-0149-05	CHIP FERRITE		R29			RK73HB1J333J	CHIP R 33K J 1/16W	
L105			L40-3363-92	SMALL FIXED INDUCTOR (3.3NH)		R30			RK73HB1J104J	CHIP R 100K J 1/16W	
L106			L41-2263-14	SMALL FIXED INDUCTOR (2.2NH)		R31			RK73HB1J101J	CHIP R 100 J 1/16W	
L107			L92-0149-05	CHIP FERRITE		R32			RK73HB1J104J	CHIP R 100K J 1/16W	
L108			L41-2285-43	SMALL FIXED INDUCTOR (220NH)		R34			RK73HB1J221J	CHIP R 220 J 1/16W	
L109			L92-0138-05	CHIP FERRITE		R39			RK73HB1J332J	CHIP R 3.3K J 1/16W	
L111			L34-4568-05	AIR-CORE COIL		R40			RK73HB1J103J	CHIP R 10K J 1/16W	
L112			L92-0161-05	BEADS CORE		R42,43			RK73HB1J103J	CHIP R 10K J 1/16W	
L201			L40-1091-37	SMALL FIXED INDUCTOR (1.000UH)		R44			RK73HB1J471J	CHIP R 470 J 1/16W	
L205			L40-5681-86	SMALL FIXED INDUCTOR (0.56UH)		R50			RK73HB1J000J	CHIP R 0.0 J 1/16W	
L206			L41-4781-06	SMALL FIXED INDUCTOR (470NH)		R100			RK73HB1J332J	CHIP R 3.3K J 1/16W	
L208			L40-2285-92	SMALL FIXED INDUCTOR (220NH)		R107			RK73GB2A393J	CHIP R 39K J 1/10W	
L209			L41-3385-39	SMALL FIXED INDUCTOR (0.33UH)		R112			RK73HB1J153J	CHIP R 15K J 1/16W	
L210			L40-2285-92	SMALL FIXED INDUCTOR (220NH)		R114			RK73HH1J391D	CHIP R 390 D 1/16W	
L211			L40-2785-92	SMALL FIXED INDUCTOR (270NH)		R115			RK73HB1J100J	CHIP R 10 J 1/16W	
L212			L40-1875-57	SMALL FIXED INDUCTOR (18.0NH)		R119			RK73HB1J220J	CHIP R 22 J 1/16W	
L214			L40-2775-57	SMALL FIXED INDUCTOR (27.0NH)		R120			RK73HB1J152J	CHIP R 1.5K J 1/16W	
L215			L40-3975-57	SMALL FIXED INDUCTOR (39.0NH)		R122			RK73HB1J682J	CHIP R 6.8K J 1/16W	
L217			L41-1092-44	SMALL FIXED INDUCTOR (1UH)		R123			RK73HH1J331D	CHIP R 330 D 1/16W	
L218			L79-1807-05	FILTER		R124			RK73GB2A470J	CHIP R 47 J 1/10W	
						R126			RK73HB1J152J	CHIP R 1.5K J 1/16W	
						R128			RK73HB1J000J	CHIP R 0.0 J 1/16W	

## PARTS LIST

## TX-RX UNIT (X57-7330-11)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
R129,130			RK73HB1J221J	CHIP R 220 J 1/16W		R335			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R131			RK73HB1J471J	CHIP R 470 J 1/16W		R336			RK73HB1J223J	CHIP R 22K J 1/16W	
R133			RK73HB1J000J	CHIP R 0.0 J 1/16W		R338			RK73HB1J153J	CHIP R 15K J 1/16W	
R200			RK73HB1J122J	CHIP R 1.2K J 1/16W		R339			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R201			RK73HB1J272J	CHIP R 2.7K J 1/16W		R340			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R202			RK73HB1J332J	CHIP R 3.3K J 1/16W		R342,343			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R204			RK73HB1J124J	CHIP R 120K J 1/16W		R344,345			RK73HB1J104J	CHIP R 100K J 1/16W	
R205			RK73HB1J332J	CHIP R 3.3K J 1/16W		R346			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R206			RK73HB1J394J	CHIP R 390K J 1/16W		R347			RK73HB1J560J	CHIP R 56 J 1/16W	
R207			RK73HB1J332J	CHIP R 3.3K J 1/16W		R348			RK73HB1J104J	CHIP R 100K J 1/16W	
R208			RK73HB1J000J	CHIP R 0.0 J 1/16W		R349			RK73HB1J105J	CHIP R 1.0M J 1/16W	
R209			RK73HB1J122J	CHIP R 1.2K J 1/16W		R350			RK73HB1J182J	CHIP R 1.8K J 1/16W	
R211			RK73HB1J222J	CHIP R 2.2K J 1/16W		R351			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R212			RK73HB1J101J	CHIP R 100 J 1/16W		R352			RK73HB1J471J	CHIP R 470 J 1/16W	
R213			RK73HB1J564J	CHIP R 560K J 1/16W		R354			RK73HB1J101J	CHIP R 100 J 1/16W	
R214			RK73HB1J334J	CHIP R 330K J 1/16W		R355			RK73HB1J151J	CHIP R 150 J 1/16W	
R215			RK73HB1J561J	CHIP R 560 J 1/16W		R356,357			RK73HB1J331J	CHIP R 330 J 1/16W	
R216			RK73HB1J101J	CHIP R 100 J 1/16W		R358			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R217			RK73HB1J561J	CHIP R 560 J 1/16W		R359			RK73HB1J104J	CHIP R 100K J 1/16W	
R218			RK73HB1J331J	CHIP R 330 J 1/16W		R360,361			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R219			RK73HB1J224J	CHIP R 220K J 1/16W		R363			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R220			RK73HB1J683J	CHIP R 68K J 1/16W		R365			RK73HB1J560J	CHIP R 56 J 1/16W	
R221			RK73HB1J473J	CHIP R 47K J 1/16W		R370			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R222			RK73HB1J224J	CHIP R 220K J 1/16W		R400			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R223			RK73HB1J271J	CHIP R 270 J 1/16W		R401			RK73HB1J181J	CHIP R 180 J 1/16W	
R224			RK73HB1J000J	CHIP R 0.0 J 1/16W		R402,403			RK73HB1J473J	CHIP R 47K J 1/16W	
R226			RK73HB1J560J	CHIP R 56 J 1/16W		R404			RK73HB1J101J	CHIP R 100 J 1/16W	
R227			RK73HB1J124J	CHIP R 120K J 1/16W		R405			RK73HB1J473J	CHIP R 47K J 1/16W	
R228			RK73HB1J104J	CHIP R 100K J 1/16W		R406-408			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R230			RK73HB1J273J	CHIP R 27K J 1/16W		R409			RK73HB1J473J	CHIP R 47K J 1/16W	
R231			RK73HB1J000J	CHIP R 0.0 J 1/16W		R410,411			RK73HB1J101J	CHIP R 100 J 1/16W	
R232,233			RK73HB1J564J	CHIP R 560K J 1/16W		R412			RK73HB1J473J	CHIP R 47K J 1/16W	
R234			RK73HB1J000J	CHIP R 0.0 J 1/16W		R413,414			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R300			RK73HB1J153J	CHIP R 15K J 1/16W		R416			RK73HB1J104D	CHIP R 100K D 1/16W	
R302			RK73HB1J562J	CHIP R 5.6K J 1/16W		R417			RK73HB1J154D	CHIP R 150K D 1/16W	
R303			RK73HB1J104J	CHIP R 100K J 1/16W		R418			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R304			RK73HB1J333J	CHIP R 33K J 1/16W		R419-421			RK73HB1J473J	CHIP R 47K J 1/16W	
R305			RK73HB1J274J	CHIP R 270K J 1/16W		R422,423			RK73HB1J393J	CHIP R 39K J 1/16W	
R306			RK73HB1J154J	CHIP R 150K J 1/16W		R424			RK73HB1J101J	CHIP R 100 J 1/16W	
R307			RK73HB1J000J	CHIP R 0.0 J 1/16W		R425			RK73HB1J393J	CHIP R 39K J 1/16W	
R308			RK73HB1J101J	CHIP R 100 J 1/16W		R428			RK73HB1J101J	CHIP R 100 J 1/16W	
R309,310			RK73HB1J104J	CHIP R 100K J 1/16W		R429,430			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R311			RK73HB1J101J	CHIP R 100 J 1/16W		R431			RK73HB1J103J	CHIP R 10K J 1/16W	
R313			RK73HB1J473J	CHIP R 47K J 1/16W		R433			RK73HB1J473J	CHIP R 47K J 1/16W	
R314			RK73HB1J563J	CHIP R 56K J 1/16W		R434			RK73HB1J103J	CHIP R 10K J 1/16W	
R315,316			RK73HB1J153J	CHIP R 15K J 1/16W		R435			RK73HB1J473J	CHIP R 47K J 1/16W	
R317			RK73HB1J333J	CHIP R 33K J 1/16W		R437			RK73HB1J473J	CHIP R 47K J 1/16W	
R318			RK73HB1J104J	CHIP R 100K J 1/16W		R441			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R319			RK73HB1J823J	CHIP R 82K J 1/16W		R442			RK73HB1J680J	CHIP R 68 J 1/16W	
R321			RK73HB1J223J	CHIP R 22K J 1/16W		R443			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R322			RK73HB1J183J	CHIP R 18K J 1/16W		R444			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R323			RK73HB1J474J	CHIP R 470K J 1/16W		R445			RK73HB1J152J	CHIP R 1.5K J 1/16W	
R324			RK73HB1J153J	CHIP R 15K J 1/16W		R446-450			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R325			RK73HB1J331J	CHIP R 330 J 1/16W		R453			RK73HB1J473J	CHIP R 47K J 1/16W	
R327			RK73HB1J683J	CHIP R 68K J 1/16W		R460			RK73HB1J473J	CHIP R 47K J 1/16W	
R328			RK73HB1J105J	CHIP R 1.0M J 1/16W		R464			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R329,330			RK73HB1J104J	CHIP R 100K J 1/16W		R466			RK73HB1J104J	CHIP R 100K J 1/16W	
R332			RK73HB1J823J	CHIP R 82K J 1/16W		R468-471			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R333			RK73HB1J682J	CHIP R 6.8K J 1/16W		R472			RK73HB1J105J	CHIP R 1.0M J 1/16W	
R334			RK73HB1J473J	CHIP R 47K J 1/16W		R473			RK73HB1J184J	CHIP R 180K J 1/16W	

## PARTS LIST

TX-RX UNIT (X57-7330-11)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
R474			RK73GB2A000J	CHIP R 0.0 J 1/10W		Q408			2SC4919	TRANSISTOR	
R475			RK73HB1J104J	CHIP R 100K J 1/16W		TH101			B57331V2104J	THERMISTOR	
R476			RK73HB1J000J	CHIP R 0.0 J 1/16W		TH102		*	PRF15BC471QB1	THERMISTOR	
R479			RK73HB1J182J	CHIP R 1.8K J 1/16W							
R482			RK73HB1J273J	CHIP R 27K J 1/16W							
R483			RK73HB1J121J	CHIP R 120 J 1/16W							
R484			RK73HB1J000J	CHIP R 0.0 J 1/16W							
R486			RK73HB1J823J	CHIP R 82K J 1/16W							
R487			RK73HB1J154J	CHIP R 150K J 1/16W							
R490			RK73HB1J473J	CHIP R 47K J 1/16W							
R491			RK73HB1J104J	CHIP R 100K J 1/16W							
R492			RK73HB1J223J	CHIP R 22K J 1/16W							
VR300			R32-0735-05	SEMI FIXED VARIABLE RESISTOR							
VR301			R31-0667-05	VARIABLE RESISTOR							
S1			S70-0414-05	TACT SWITCH							
MIC300			T91-0651-15	MIC ELEMENT							
D1		*	RKS151KJ	DIODE							
D2			1SV270-F	VARIABLE CAPACITANCE DIODE							
D3			MA2S111-F	DIODE							
D4			1SV214-F	VARIABLE CAPACITANCE DIODE							
D5			MA2S111-F	DIODE							
D6,7			HSC277	DIODE							
D101			HVC131	DIODE							
D200,201			HSC277	DIODE							
D300			DA221	DIODE							
D301,302			RB706F-40	DIODE							
D303			DAN222	DIODE							
D304			GN1G	DIODE							
D305-308			KDZ3.3V	ZENER DIODE							
IC1			TB31202FNG	MOS-IC							
IC100			BH2219FVM	ANALOGUE IC							
IC200			TA31136FNG	MOS-IC							
IC300			AK2346	MOS-IC							
IC301			NJM2100V-ZB	MOS-IC							
IC302			TK62012F	MOS-IC							
IC303			LM4865M-N	BI-POLAR IC							
IC400			XC61CN2802N	MOS-IC							
IC401			XC61CN2702N	MOS-IC							
IC403		*	D338327AKCXA	MICROCONTROLLER IC							
IC404			BH30FB1WG	MOS-IC							
IC405			TC7W74FU-F	MOS-IC							
IC406			BR24L08FJ-W	ROM IC							
Q1			2SK1824-A	FET							
Q2,3		*	2SC5488A-H	TRANSISTOR							
Q4			2SC4617(S)	TRANSISTOR							
Q5,6			2SC5066-F(O)	TRANSISTOR							
Q101			2SC5092-F	TRANSISTOR							
Q103		*	RQA0004PXQDS	FET							
Q104			RQA0002DNS	FET							
Q200			KRA304E-P	DIGITAL TRANSISTOR							
Q201,202			2SC4082	TRANSISTOR							
Q203			3SK318	FET							
Q204			3SK294-FP	FET							
Q300-302			2SK1824-A	FET							
Q303			2SC4919	TRANSISTOR							
Q400-402			DTC114EE	DIGITAL TRANSISTOR							
Q403			2SC4919	TRANSISTOR							
Q404-406			KRA305E	DIGITAL TRANSISTOR							

## ADJUSTMENT

### Required Test Equipment

#### 1. Stabilized Power Supply

- 1) The supply voltage can be changed between 0V and 10V, and the current is 3A or more
- 2) The standard voltage is 3.8V

#### 2. DC Ammeter

- 1) Class 1 ammeter (17 ranges and other features).
- 2) The full scale can be set to either 300mA or 3A.
- 3) A cable of less internal loss must be used.

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

- 1) Frequencies of up to 1GHz or so can be measured.
- 2) The sensitivity can be changed to 500MHz or below, and measurements are highly stable and accurate (0.2ppm or so).

#### 4. Power Meter

- 1) Measurable frequency : Up to 600MHz
- 2) Impedance : 50Ω, unbalanced
- 3) Measuring range : Full scale of 3W or so
- 4) A standard cable (5D2W 1m) must be used.

#### 5. RF Voltmeter (RF V.M)

- 1) Measurable frequency : Up to 600MHz or so

#### 6. Linear Detector

- 1) Measurable frequency : Up to 600MHz or so
- 2) Characteristics are flat, and CN is 60dB or more

#### 7. Digital Voltmeter

- 1) Voltage range : FS=10V or so
- 2) Input resistance : 1MΩ or more

#### 8. Oscilloscope

- 1) Measuring range : DC to 30MHz
- 2) Provides highly accurate measurements for 5 to 25MHz.

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

- 1) Measurable frequency : 50Hz to 1MHz
- 2) Maximum sensitivity : 1mV or more

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

- 1) Maximum frequency : 600MHz or more
- 2) Output : -133dBm/0.05μV to 7dBm/501mV
- 3) Output impedance : 50Ω

#### 11. Dummy Load

- 1) 8Ω, 1W or more

#### 12. AF Generator (AG)

- 1) Frequency range : 100Hz to 100kHz
- 2) Output : 0.5mV to 1V

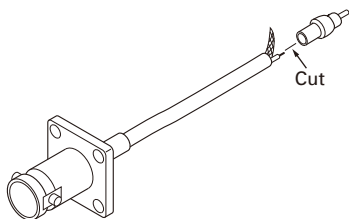
#### 13. Distortion Meter

- 1) Measurable frequency : 30Hz to 100kHz
- 2) Input level : 50mV to 10Vrms

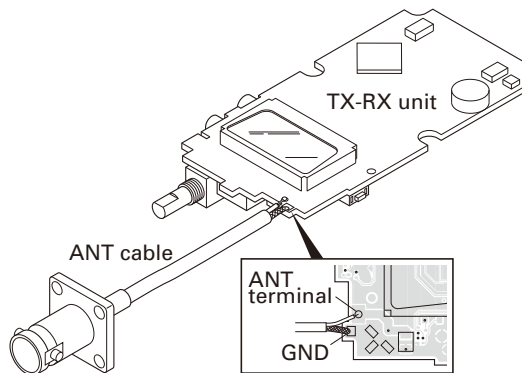
### Service Jig

#### ■ ANT cable (E30-3418-08)

Modify the cable as shown below.

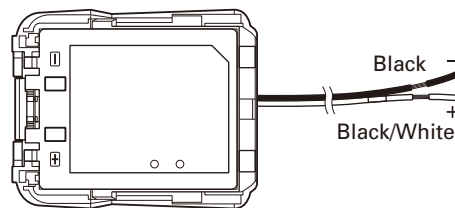


Solder the ANT cable to the ANT terminal on the TX-RX unit.



#### ■ Battery jig (W05-1365-00)

Connect the power cable properly between the battery jig installed in the transceiver and the power supply, and be sure output voltage and the power supply polarity prior to switching the power supply ON, otherwise over voltage and reverse connection may damage the transceiver, or the power supply or both.



**Note:** When using the battery jig, you must measure the voltage at the terminals of the battery jig. Otherwise, a slight voltage drop may occur within the power cable, between the power supply and the battery jig, especially while the transceiver transmits.

### Test Signaling

No.	Receive	Transmit
1	None	None
2	None	100Hz Square Wave
3	QT 67.0Hz	QT 67.0Hz
4	QT 151.4Hz	QT 151.4Hz
5	QT 250.3Hz	QT 250.3Hz
6	DQT D023N	DQT D023N
7	DQT D754I	DQT D754I
8	MSK Code (100-1000)	MSK Code (100-1000)
9	None	MSK (1010...)

## ADJUSTMENT

## Test Frequency

No.	Receive (MHz)	Transmit (MHz)
1 (Low)	460.05000	460.10000
2 (High)	469.95000	469.90000
3	460.00000	460.00000
4	460.20000	460.20000
5	460.40000	460.40000
6	460.60000	460.60000


## Adjustment Frequency List

CH	Receive (MHz)	Transmit (MHz)
Center	465.05000	465.00000
Frequency Shift 6.25kHz	-	460.00625
Frequency Shift 5kHz	-	460.00500

## Common Section

Item	Condition	Measurement			Adjustment			Specifications / Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. Setting	1) Set battery jig Battery terminal: 3.8V							
2. VCO Lock Voltage (Test mode)	1) CH: TX high PTT: ON	Digital voltmeter	TX-RX	LV			Check	2.5V or less
	2) CH: RX high							0.4V or more
	3) CH: RX low							
	4) CH: TX low PTT: ON							

## Transmitter Section

Item	Condition	Measurement			Adjustment			Specifications / Remarks	
		Test-equipment	Unit	Terminal	Unit	Parts	Method		
1. Frequency Adjustment	1) PC tune CH: TX center PTT: ON	f. counter		ANT Jig cable SP/MIC jack		PC key	Adjust to the center frequency.	Within $\pm 100$ Hz	
2. Frequency Shift 6.25kHz	1) PC tune CH: TX 460.00625MHz PTT: ON							Adjust to the desired frequency.	Within $\pm 100$ Hz
3. Frequency Shift 5kHz	1) PC tune CH: TX 460.00500MHz PTT: ON								
4. High Transmit Power	1) PC tune CH: TX center	Power meter DC ammeter					Adjust it to 1.5W	$\pm 0.1$ W Less than 1.6A	
	2) Test mode CH: TX low, high PTT: ON							Check	1.15~1.85W Less than 1.6A
5. Low Transmit Power	1) PC tune CH: TX center PTT: ON					PC key	Adjust it to 0.55W	$\pm 0.1$ W Less than 0.9A	
	2) Test mode CH: TX low, high PTT: ON							Check	300~800mW Less than 0.9A
6. DQT Balance	1) Test mode CH: TX low SIG: TX 100Hz square wave Linear detector filter LPF: 3kHz PTT: ON	Linear detector Oscilloscope			TX-RX	VR300	Adjust the wave- form to square wave.		

## ADJUSTMENT

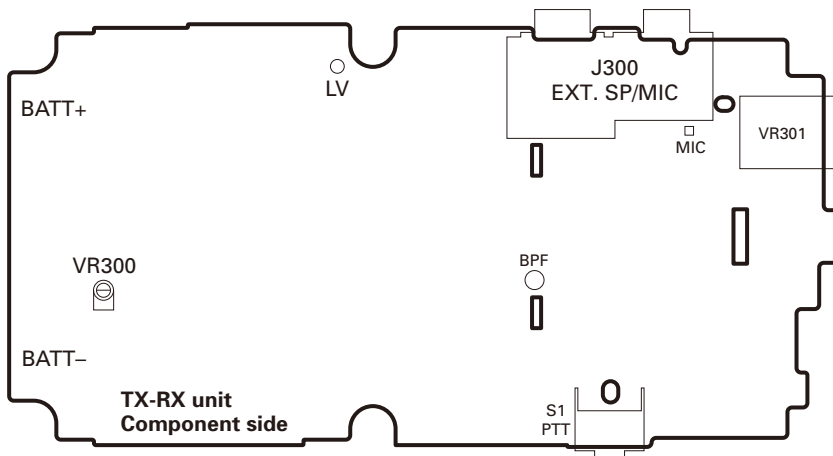
Item	Condition	Measurement			Adjustment			Specifications / Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
7. Maximum Deviation (Wide)  (Narrow)	1) PC tune CH: TX center Linear detector filter LPF: 15kHz AG: 1kHz/150mV PTT: ON	Linear detector AG AF V.M		ANT Jig cable SP/MIC jack		PC key	Adjust it to 4.2kHz. ± peak whichever higher	±0.1kHz
							Adjust it to 2.1kHz. ± peak whichever higher	±0.1kHz
8. MIC Sensitivity (Wide)  (Narrow)	1) Test mode CH: TX low, high Linear detector filter LPF: 15kHz AG: 1kHz/13mV PTT: ON						Check	±2.5~3.8kHz
								±1.1~1.9kHz
9. QT Fine Deviation	1) PC tune CH: TX center (Wide) QT: 151.4Hz Linear detector filter LPF: 3kHz PTT: ON	Linear detector				PC key	Adjust it to 0.75kHz.	±0.05kHz
	2) PC tune CH: TX center (Narrow) QT: 151.4Hz Linear detector filter LPF: 3kHz PTT: ON						Adjust it to 0.35kHz.	±0.05kHz
10. DQT Fine Deviation	1) PC tune CH: TX center (Wide) DQT: 023N Linear detector filter LPF: 3kHz PTT: ON						Adjust it to 0.75kHz.	±0.05kHz
	2) PC tune CH: TX center (Narrow) DQT: 023N Linear detector filter LPF: 3kHz PTT: ON						Adjust it to 0.35kHz.	±0.05kHz
11. MSK Fine Deviation	1) PC tune CH: TX center (Wide) MSK Linear detector filter LPF: 15kHz PTT: ON						Adjust it to 3.0kHz	±0.1kHz
	2) CH: TX center (Narrow) MSK Linear detector filter LPF: 15kHz PTT: ON						Check	±1.0~±2.0kHz
12. VOX Level	1) PC tune AG: 1kHz/40mV	AG				PC key (Start)	Write	
13. Battery Indicator Level	1) PC tune Battery terminal: 3.25V	Digital voltmeter		Battery terminal				

## ADJUSTMENT

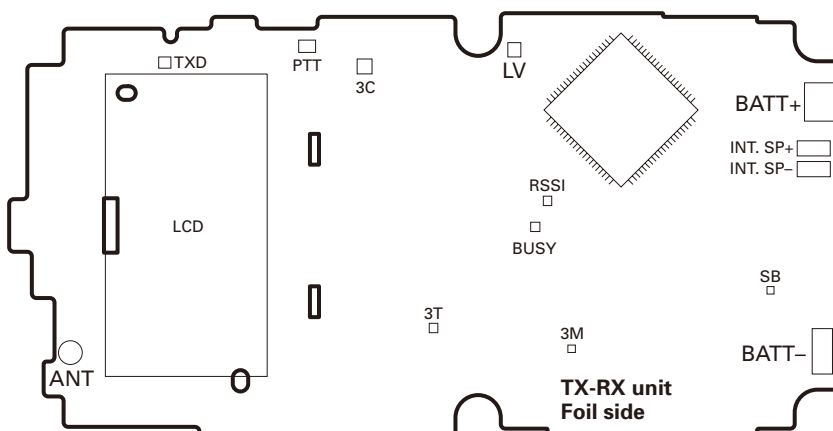
### Receiver Section

Item	Condition	Measurement			Adjustment			Specifications / Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. Sensitivity (Wide)	1) Test mode CH: RX low, high SSG output: -117dBm (0.32μV) SSG MOD: 1kHz SSG DEV: ±3kHz	SSG Oscilloscope AF V.M Distortion meter		ANT Jig cable SP/MIC jack			Check	SINAD: 12dB or more
	(Narrow)							
2. Squelch Level (Open)	1) PC tune CH: RX center (Wide) SSG output: -121dBm (0.22μV) SSH MOD: 1kHz SSG DEV: ±3.0kHz					PC key	Adjust to open the squelch.	
	2) PC tune CH: RX center (Narrow) SSG output: -120dBm (0.2μV) SSH MOD: 1kHz SSG DEV: ±1.5kHz							

### Adjustment Points



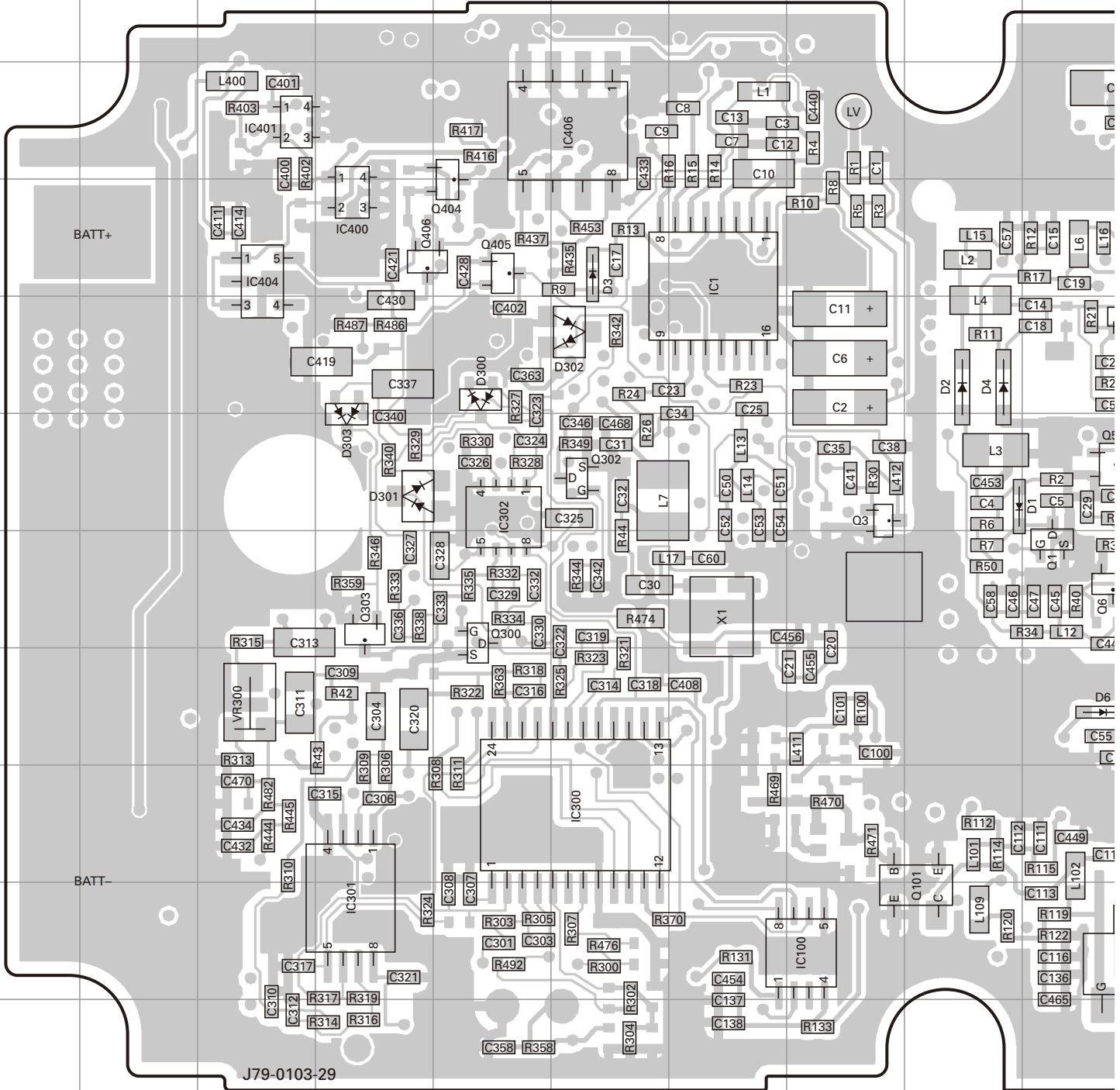
LV: VCO lock voltage measurement  
VR300: DOT balance adjustment



BATT+/-: External power supply  
terminal (Fasten it with an alligator clip)

# TK-3230 PC BOARD

## TX-RX UNIT (X57-7330-11) Component side view (J79-0103-29)

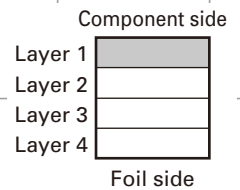
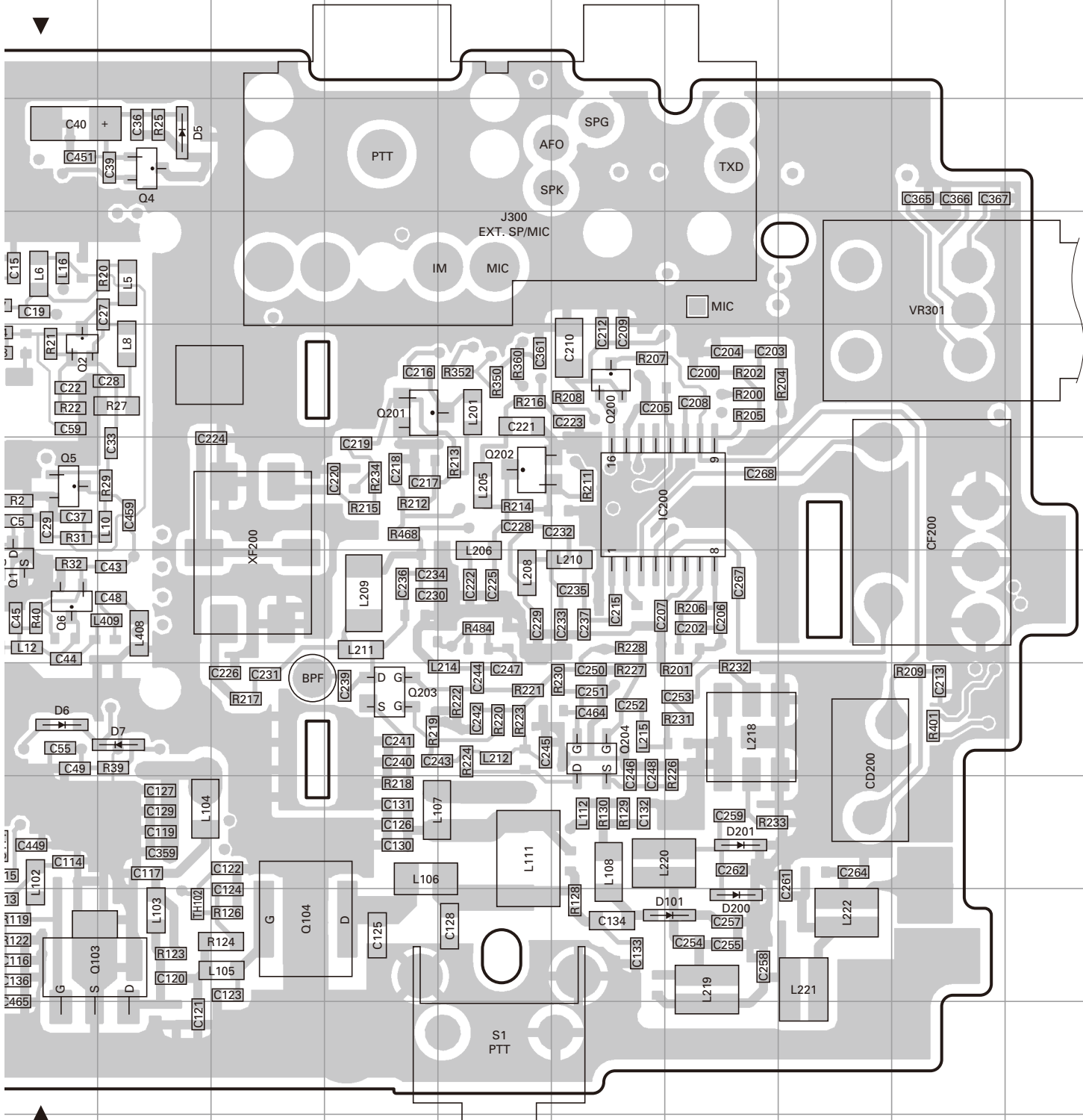


Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC1	4G	IC404	4C	Q101	10J	Q300	7E	D3	4F	D300	5E
IC100	10H	IC406	3F	Q103	10J	Q302	6F	D4	5I	D301	6D
IC200	6O	Q1	7J	Q104	10L	Q303	7D	D5	3K	D302	5F
IC300	9F	Q2	5J	Q200	5O	Q404	4E	D6	8J	D303	6D
IC301	10D	Q3	6H	Q201	5M	Q405	4E	D7	8K		
IC302	6E	Q4	3K	Q202	6N	Q406	4D	D101	10P		
IC400	4D	Q5	6J	Q203	8M	D1	6I	D200	10P		
IC401	3C	Q6	7J	Q204	8O	D2	5I	D201	9P		



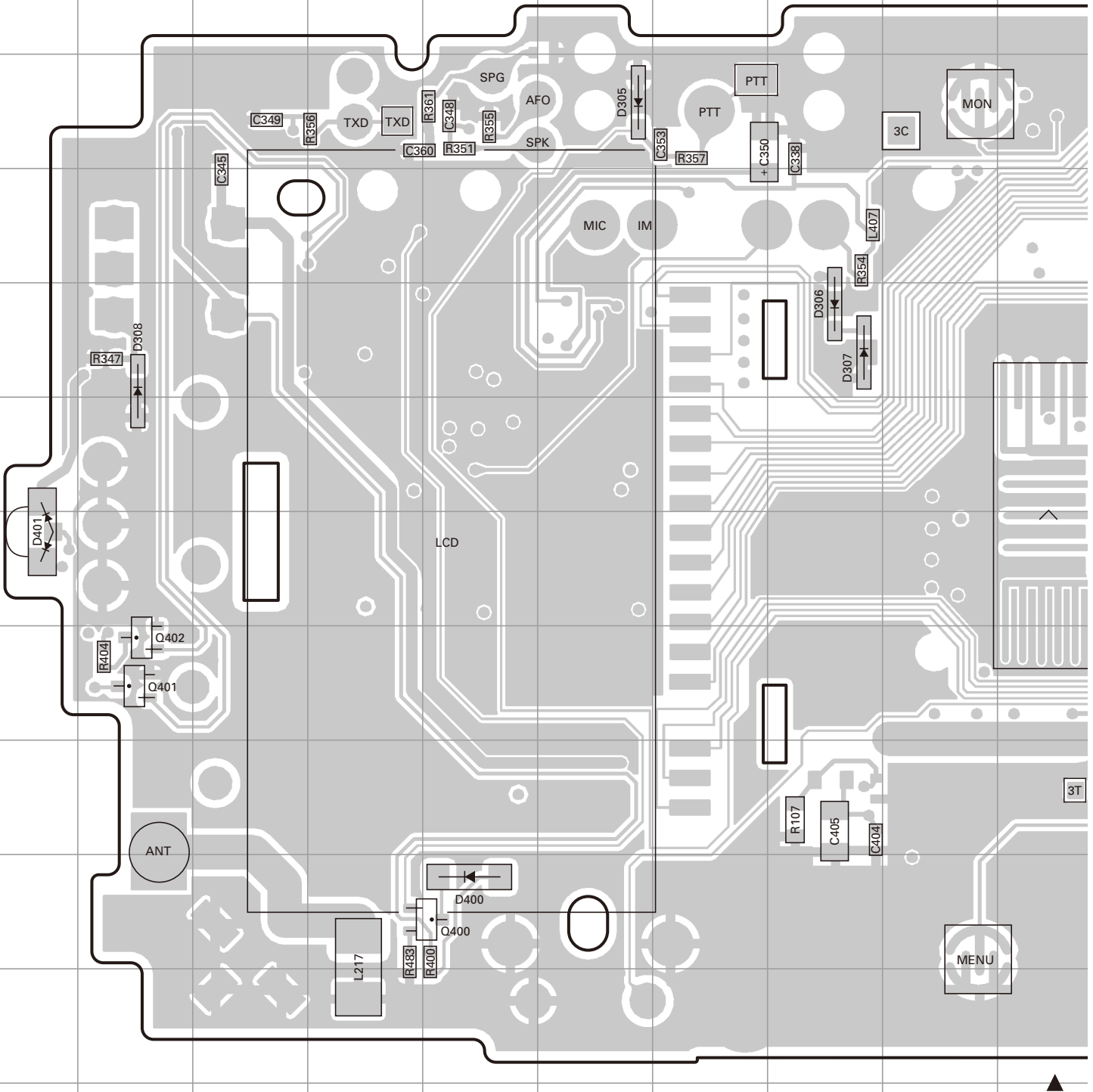
# PC BOARD TK-3230

## TX-RX UNIT (X57-7330-11) Component side view (J79-0103-29)



# TK-3230 PC BOARD

TX-RX UNIT (X57-7330-11) Foil side view (J79-0103-29)

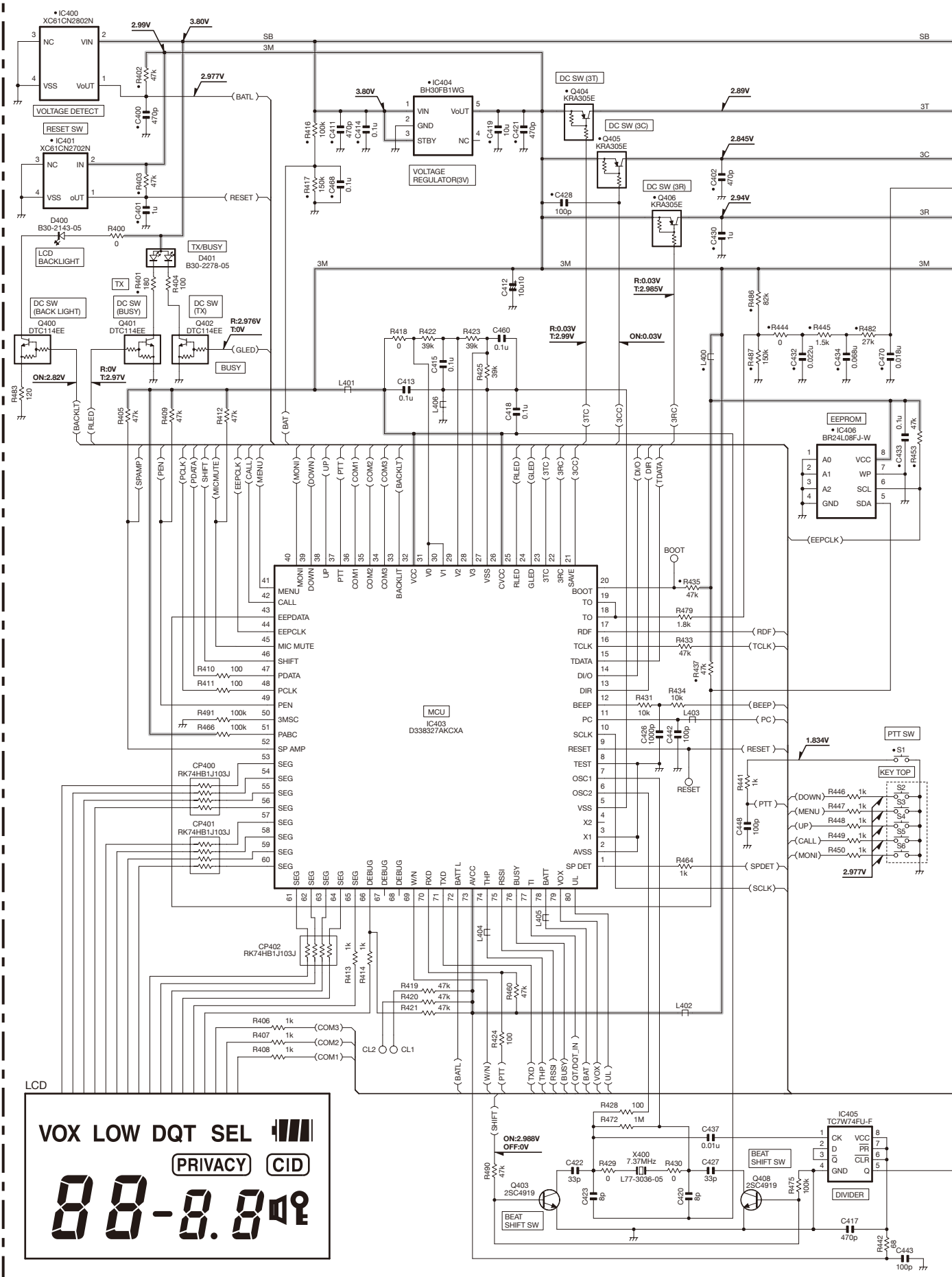


Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC303	9Q	Q402	8B	D307	5H
IC403	4N	Q403	6M	D308	5B
IC405	7M	Q408	6N	D400	10E
Q301	8Q	D304	4Q	D401	7A
Q400	10E	D305	3F		
Q401	8B	D306	5H		



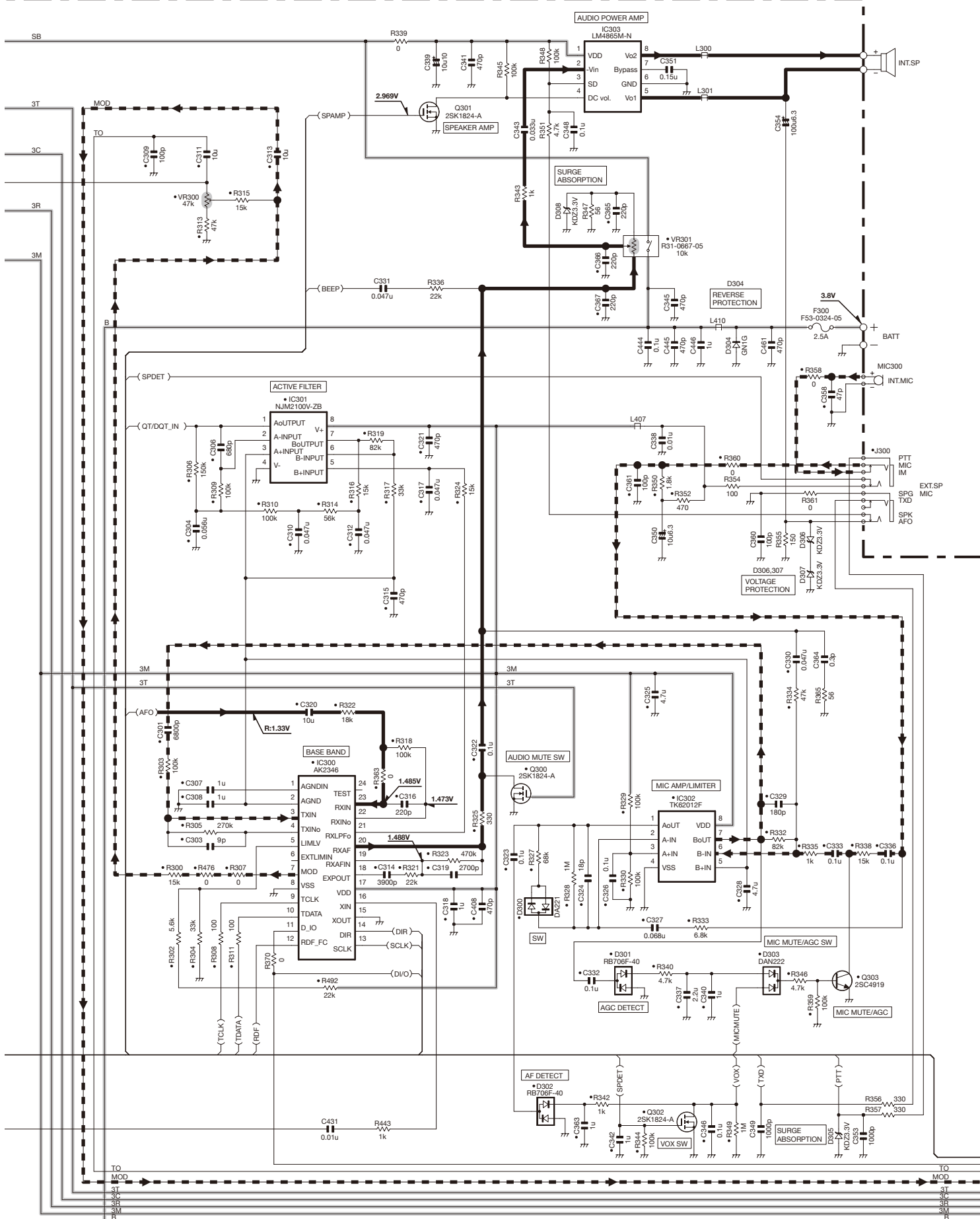
# TK-3230 SCHEMATIC DIAGRAM

TX-RX UNIT (X57-7330-11)



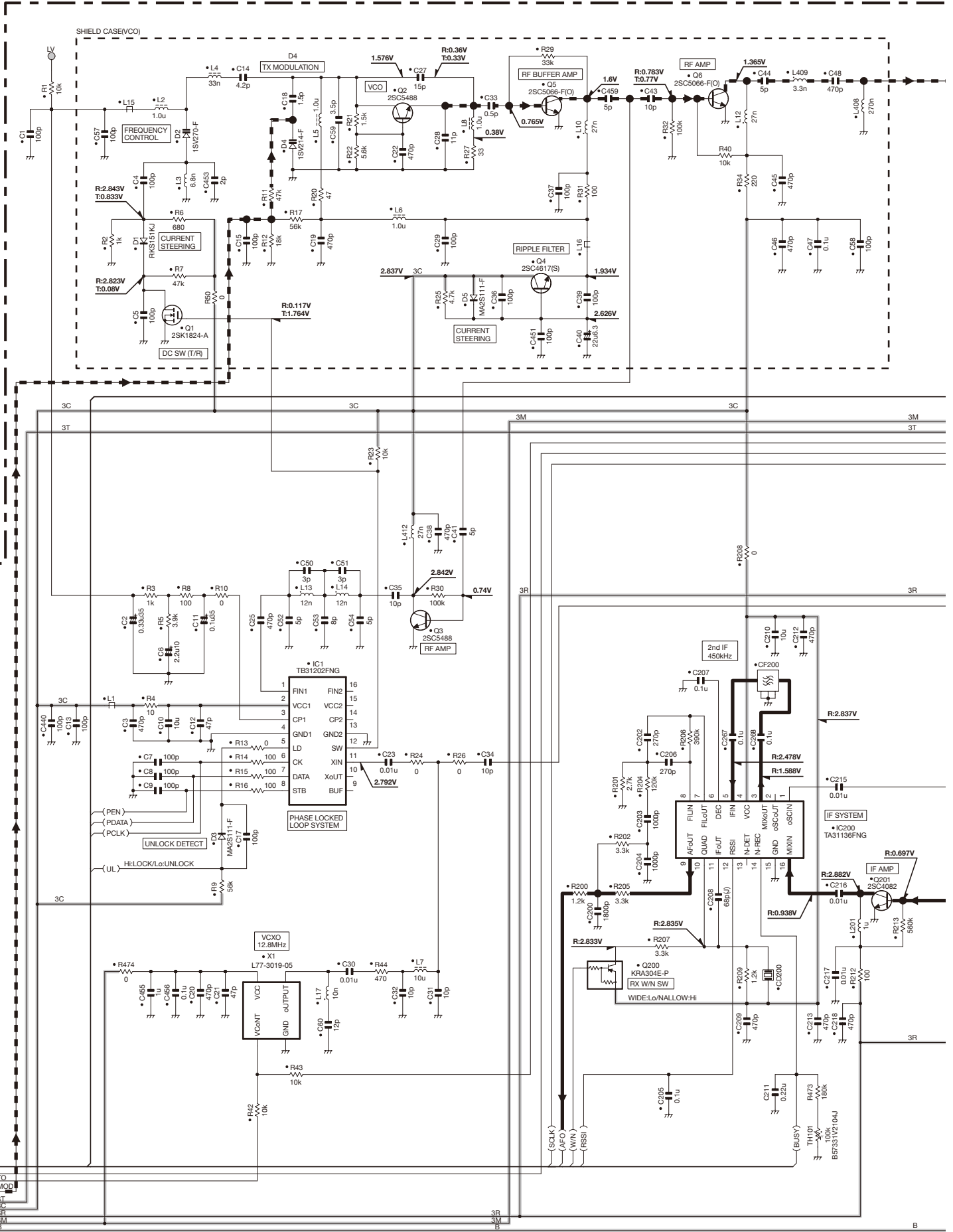
# SCHEMATIC DIAGRAM TK-3230

TX-RX UNIT (X57-7330-11)



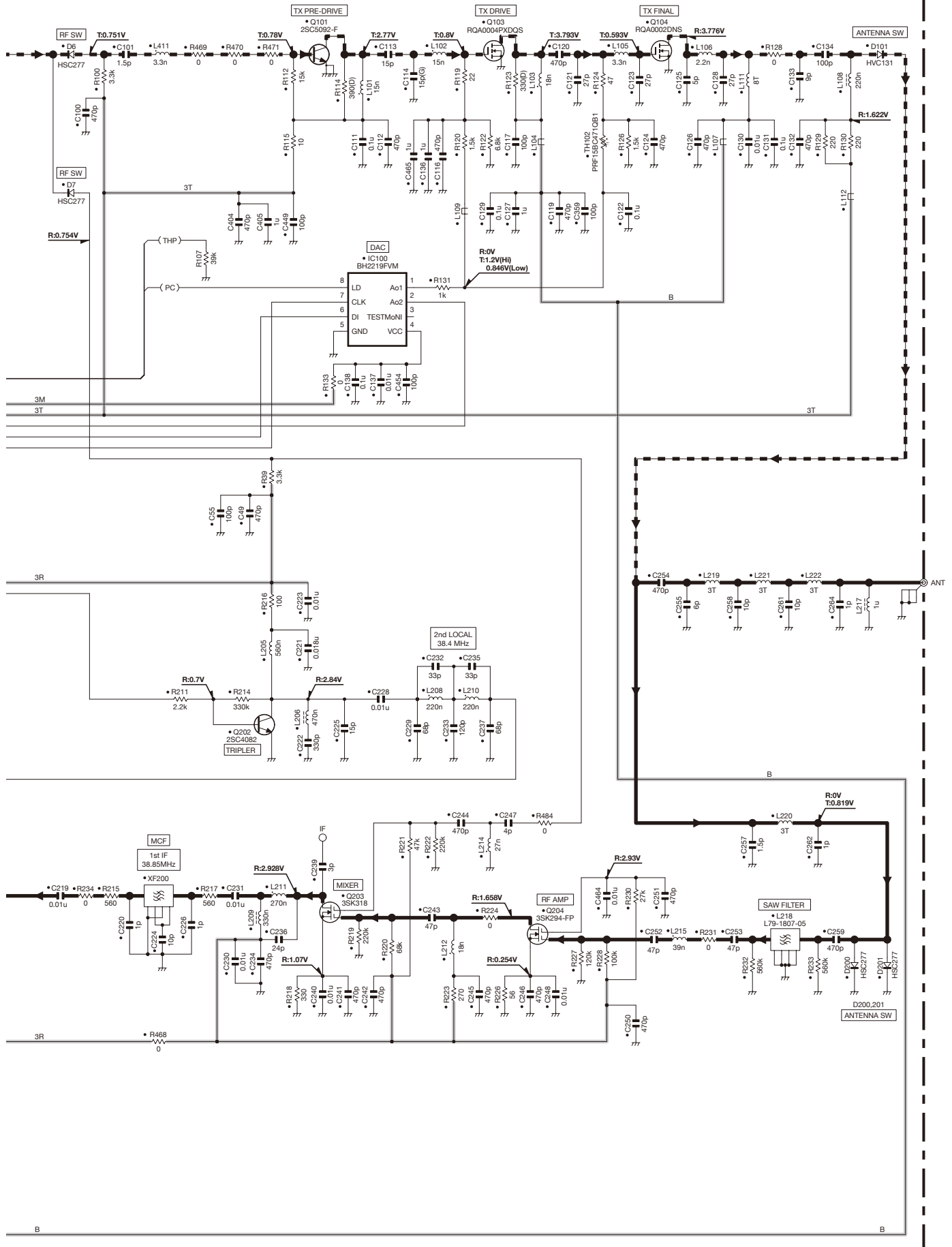
# TK-3230 SCHEMATIC DIAGRAM

TX-RX UNIT (X57-7330-11)



# SCHEMATIC DIAGRAM TK-3230

TX-RX UNIT (X57-7330-11)



Note : The components marked with a dot (•) are parts of layer 1.

# TK-3230

## SPECIFICATIONS

### General

#### Frequency Range

BRS ..... Preset 64CH

LMR ..... 460 to 470MHz

Number of Channels..... 6CH (FPU: 16CH)

PLL Channel Stepping ..... 6.25kHz, 5kHz

Modulation (Wide/Narrow) ..... 16K0F3E/11K0F3E

RF Output Power (High/Low) ..... 1.5W / 500mW

Operating Voltage ..... 3.8V DC (3.4~4.2V)

Battery Life (5-5-90 Duty Cycle)..... Up to 14 hours (at KNB-46L high power)

Operating Temperature Range ..... -10°C to +60°C (+14°F to +140°F)

Frequency Stability ..... ±2.5ppm

Dimensions..... 52 (W) x 103.5 (H) x 28.7 (D) mm (155.5mm (H) included antenna)  
(Projections not included)

Weight ..... Approx. 155g with KNB-46L battery

#### Standard Load

Antenna Impedance ..... 50Ω

MIC Input ..... 2kΩ

AF Output ..... 8Ω

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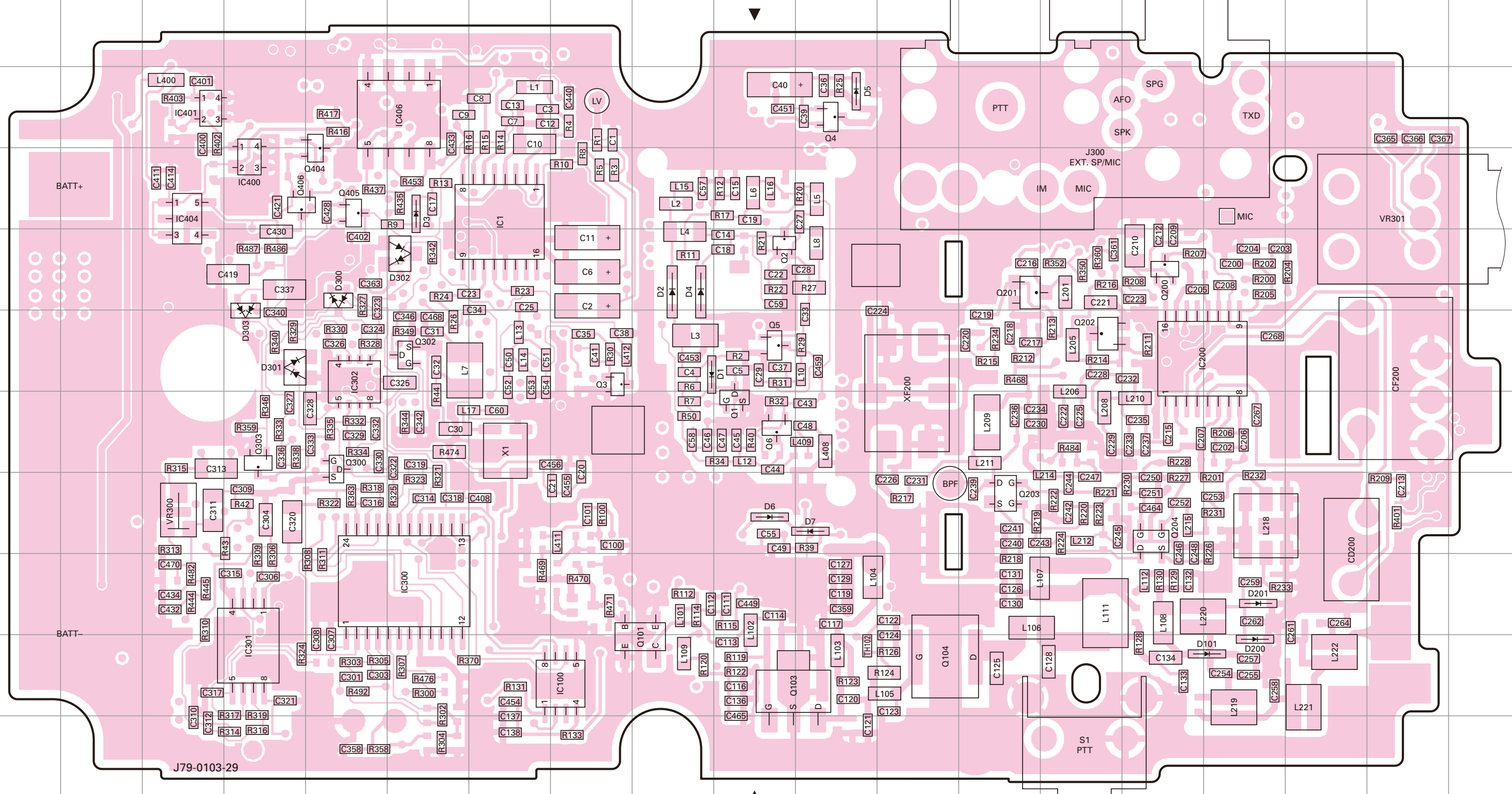


# TK-3230 PC BOARD

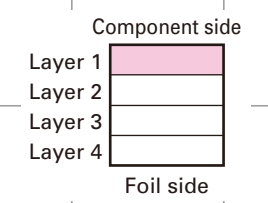
# PC BOARD TK-3230

TX-RX UNIT (X57-7330-11) Component side view (J79-0103-29)

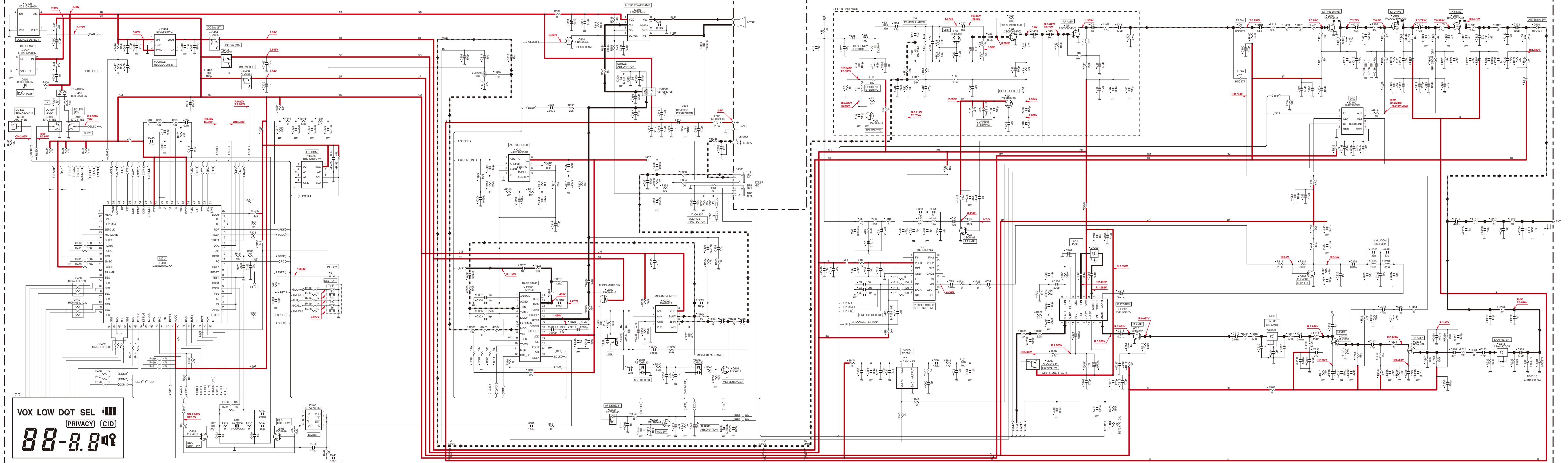
TX-RX UNIT (X57-7330-11) Component side view (J79-0103-29)



Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC1	4G	IC404	4C	Q101	10J	Q300	7E	D3	4F	D300	5E
IC100	10H	IC406	3F	Q103	10J	Q302	6F	D4	5I	D301	6D
IC200	6O	Q1	7J	Q104	10L	Q303	7D	D5	3K	D302	5F
IC300	9F	Q2	5J	Q200	5O	Q404	4E	D6	8J	D303	6D
IC301	10D	Q3	6H	Q201	5M	Q405	4E	D7	8K		
IC302	6E	Q4	3K	Q202	6N	Q406	4D	D101	10P		
IC400	4D	Q5	6J	Q203	8M	D1	6I	D200	10P		
IC401	3C	Q6	7J	Q204	8O	D2	5I	D201	9P		







VOX LOW DQT SEL

88-8.84

PRIVACY CID