



Photo is TK-3130.

30K : TK-3130 (K type)
 31K : TK-3131 (K type)
 A : TK-3131 (A type)

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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 this publication date. Changes which may occur after publication are covered by either Service Bulletins or Manual Revisions, which 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, and 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.

PERSONNEL SAFETY

The following precautions are recommended for personnel safety :

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

SERVICE

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

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Destination	Number of CH	Frequency No. / Frequency / Color	Factory default CH setting	RF power output
K	2 channel	1 464.5000MHz Brown	CH1 : 464.5500MHz / QT OFF Color : Yellow CH2 : 467.9250MHz / QT OFF Color : Blue Star	1W / 500mW
		2 464.5500MHz Yellow		
		3 467.7625MHz J		
		4 467.8125MHz K		
		5 467.8500MHz Silver Star		
		6 467.8750MHz Gold Star		
		7 467.9000MHz Red Star		
		8 467.9250MHz Blue Star		

All channels are Narrow band width. User can select channel frequency from above.

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Destination	Number of CH	Frequency No. / Frequency / Color				RF power output	
		Bank A		Bank B			
		RX/TX		RX	TX		
K	15 channel	CH1 : 462.5625MHz		CH1 : 462.5625MHz	462.5625MHz	1W / 500mW	
		CH2 : 462.5875MHz		CH2 : 462.5875MHz	462.5875MHz		
		CH3 : 462.6125MHz		CH3 : 462.6125MHz	462.6125MHz		
		CH4 : 462.6375MHz		CH4 : 462.6375MHz	462.6375MHz		
		CH5 : 462.6625MHz		CH5 : 462.6625MHz	462.6625MHz		
		CH6 : 462.6875MHz		CH6 : 462.6875MHz	462.6875MHz		
		CH7 : 462.7125MHz		CH7 : 462.7125MHz	462.7125MHz		
		CH8 : 462.5750MHz	White	CH8 : 462.5750MHz	467.5750MHz		White
		CH9 : 462.6250MHz	Black	CH9 : 462.6250MHz	467.6250MHz		Black
		CH10 : 462.6750MHz	Orange	CH10 : 462.6750MHz	467.6750MHz		Orange
		CH11 : 462.5500MHz		CH11 : 462.5500MHz	467.5500MHz		
		CH12 : 462.6000MHz		CH12 : 462.6000MHz	467.6000MHz		
		CH13 : 462.6500MHz		CH13 : 462.6500MHz	467.6500MHz		
		CH14 : 462.7000MHz		CH14 : 462.7000MHz	467.7000MHz		
		CH15 : 462.7250MHz		CH15 : 462.7250MHz	467.7250MHz		

All channels are Wide band width. Factory default setting is Bank A.

GENERAL

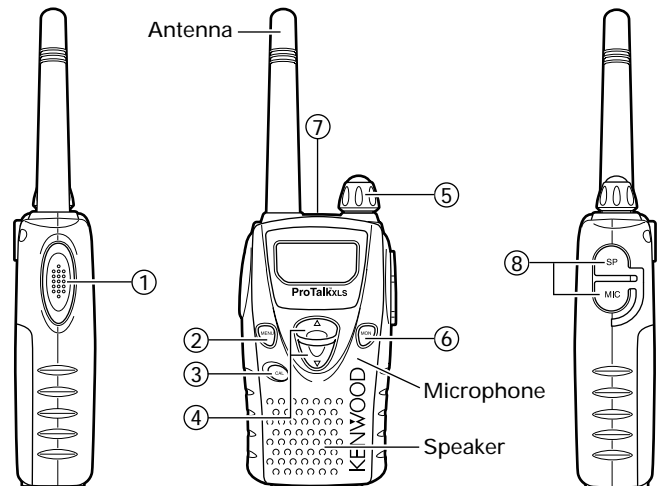
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Destination	Number of CH	Frequency No. / Frequency / Color	RF power output
A	14 channel	CH1 : 467.5125MHz CH2 : 467.5250MHz CH3 : 467.5375MHz CH4 : 467.5500MHz CH5 : 467.5625MHz CH6 : 467.5750MHz CH7 : 467.5875MHz CH8 : 467.6000MHz CH9 : 467.6125MHz CH10 : 467.6250MHz CH11 : 467.6375MHz CH12 : 467.6500MHz CH13 : 467.6625MHz CH14 : 467.6750MHz	1W / 500mW

All channels are Narrow band width.

GETTING ACQUAINTED

- ① PTT (Push to Talk) switch
Press and hold, then speak into the microphone to transmit.
- ② MENU key
Press to perform various functions. Press and hold while switching the power ON to enter Setting Mode.
- ③ CAL key
Press before making a call, to alert the other party members.
- ④ Δ/∇ keys
Press to change the operating channel, to select a menu in Setting Mode, and to perform other functions.
- ⑤ Power switch/Volume control
Turn clockwise to switch the power ON and counter-clockwise to switch the power OFF. Rotate to adjust the volume.
- ⑥ MON key
Press to monitor the current channel for activity.
- ⑦ LED indicator
Indicates the transceiver status.
- ⑧ SP/MIC jacks
Lift the covers and insert the accessory's plugs here.



CIRCUIT DESCRIPTION

Frequency Configuration

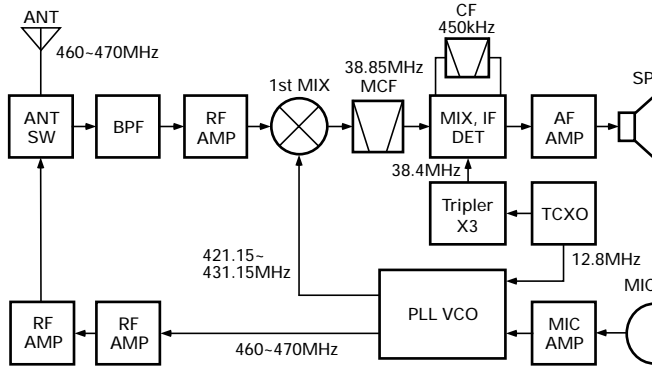


Fig. 1 Frequency configuration

Reception method	Double super heterodyne	
	1st IF frequency	38.85MHz
	2nd IF frequency	450kHz
Transmission method	VCO direct oscillation amplification	
Modulation	Variable reactance phase modulation	

Table 1 Basic configuration

Receiver System

Front End

The high-frequency signal from the antenna passes through a low-pass filter and a high-frequency switch (D12, L25 and D13) which switches between transmission and reception, and goes to the BPF (L42) to remove unwanted signals. The resulting signal is amplified by high-frequency amplifier (Q18) and goes to the first mixer (Q19).

First Mixer

The signal that reaches Q19 is mixed with the first local signal from the VCO to produce a first IF signal (38.85MHz).
 (Receive frequency – First local frequency
 = First IF frequency = 38.85MHz)

The first IF signal passes through MCF: XF1 (monolithic crystal filter) to remove unwanted signals.

The first IF signal is amplified by IF amplifier (Q20) and goes to IF IC (IC2).

Item	Rating
Nominal center frequency (fo)	38.85MHz
Pass bandwidth	±5.0kHz or more at 3dB
Attenuation bandwidth	±18.5kHz or less at 35dB
Ripple	1.0dB or less
Insertion loss	4.0dB or less
Guaranteed attenuation	70dB or more at fo-900kHz
Terminating impedance	610Ω±10% / 3.0pF±0.5pF

Table 2 MCF (L71-0586-05) : TX-RX unit (B/2) XF1

Item	Rating
Nominal center frequency (fo)	450kHz
6dB bandwidth	±6.0kHz or more
50dB bandwidth	±12.5kHz or less
Ripple (at 450kHz±4kHz)	2dB or less
Guaranteed attenuation (at 450kHz±100kHz)	35dB or more
Insertion loss	6dB or less
I/O matching impedance	2.0kΩ

Table 3 Ceramic filter (L72-0958-05) : TX-RX unit (B/2) CF1

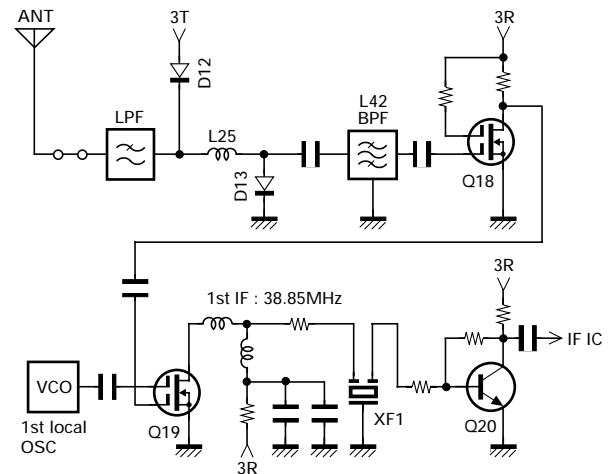


Fig. 3 Receiver circuit

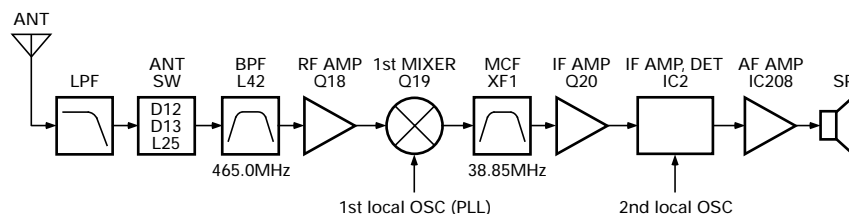


Fig. 2 Receiver section configuration

CIRCUIT DESCRIPTION

■ IF Amplifier

The IF circuit is integrated in the FM IC (IC2). The IF IC contains local input, mixer, limiter amplifier, FM DET, and low-frequency amplifier.

The IF signal coming from the IF amplifier (Q20) goes to the IF IC mixer and is mixed with the second local signal (38.4MHz) to produce a second IF signal. (38.85MHz – 38.4MHz = 450kHz)

The tripled PLL reference oscillation (12.8MHz x 3) is used for the second local signal.

The second IF signal passes through ceramic filter (CF1) to remove unwanted signals.

The second IF signal passing through the ceramic filter passes through the limiter amplifier consisting six differential amplifiers and is detected.

The FM detection is quadrature detection method. The phase of the output signal from the limiter amplifier is shifted by 90 degrees by a quad coil (L36) and compared with the original waveform to produce detection output.

■ Squelch Circuit

A squelch circuit is provided to prevent no-signal noise or weak signals from outputting to a speaker during transmission.

■ AF Circuit

The FM IC output passes through the base band IC (IC205), mute (Q213), and amplifier (IC207). After go to AF power amplifier IC (IC208). This IC have BTL amplifier function and electrical Volume. At internal speaker, BTL amplified. At external speaker, IC switch off the 1 channel amplifier by connectors information.

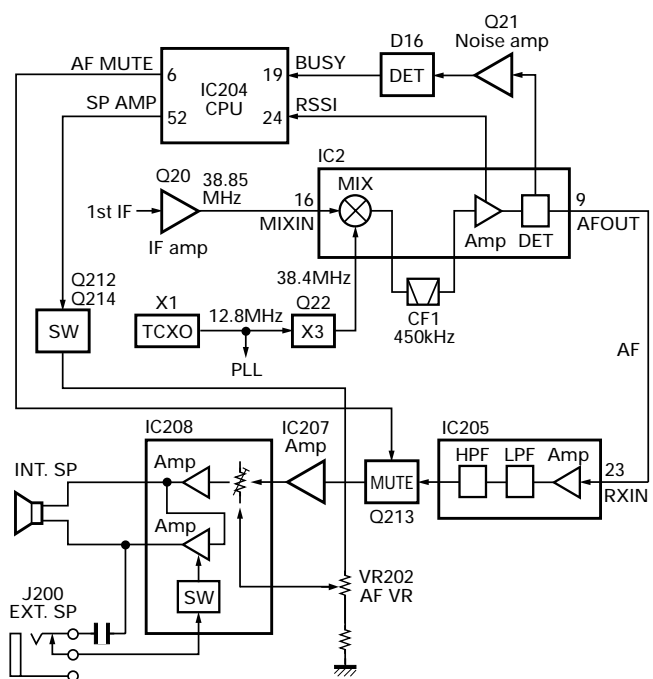


Fig. 4 IF amplifier, squelch and AF amplifier circuits

Transmitter System

■ Microphone Amplifier Circuit

The audio signal from the microphone passes through the MIC amplifier (IC207). Then, the signal goes through the base band IC (IC205) that has the 6dB/oct pre-emphasis circuit, band-pass filter (300 to 3kHz), amplifier, and limiter. The distortion components outside the audio band are removed by the splatter filter.

■ Modulation Circuit

The MIC amplifier (IC207) output passes through VR201 for modulation adjustment and goes to the modulation input of the VCO circuit for variable reactance phase modulation.

■ Transmission Output Circuit

The VCO output is amplified by a high-frequency amplifier (Q7~Q10), passes through a high-frequency antenna switch, passes through a low-pass filter and goes to the antenna.

The transmission output is about 1W with 3.8V DC supply at battery terminal.

■ Low-Pass Filter Circuit

A three-stage Chebyshev type low-pass filter is located between the antenna and transmit/receive switching circuit. It removes harmonic components contained in the transmission output.

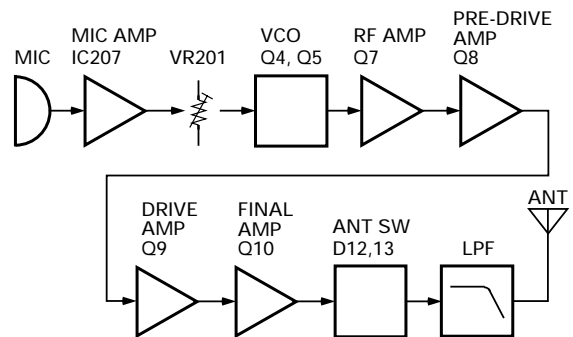


Fig. 5 Transmitter section configuration

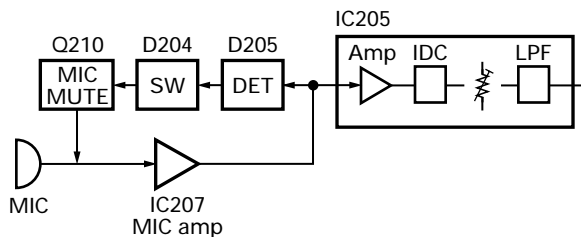


Fig. 6 Microphone amplifier circuit

CIRCUIT DESCRIPTION

PLL System

■ VCO Circuit

The VCO is housed in a shield case.

The VCO circuit consists of a transistor (Q4), a variable capacity diode (D4) for frequency control, a variable capacity diode (D8) for modulation, transmit/receive frequency shift diode (D17), control transistor (Q2), variable capacitor (TC1) for PLL lock voltage control, and oscillator buffer amplifier (Q5).

In receive mode, the shift signal T/R goes low, Q2 turns off, and the shift diode (D17) not contact. Q4 produces the first local frequency for reception.

(Receive channel frequency – 38.85MHz)

In transmit mode, the shift signal T/R goes high, Q2 turns on and D17 does conducts. Q4 produces about 460~470 MHz and the VCO frequency equals the transmit channel frequency.

The 3.0V circuit voltage is produced by ripple removing filter circuit Q3.

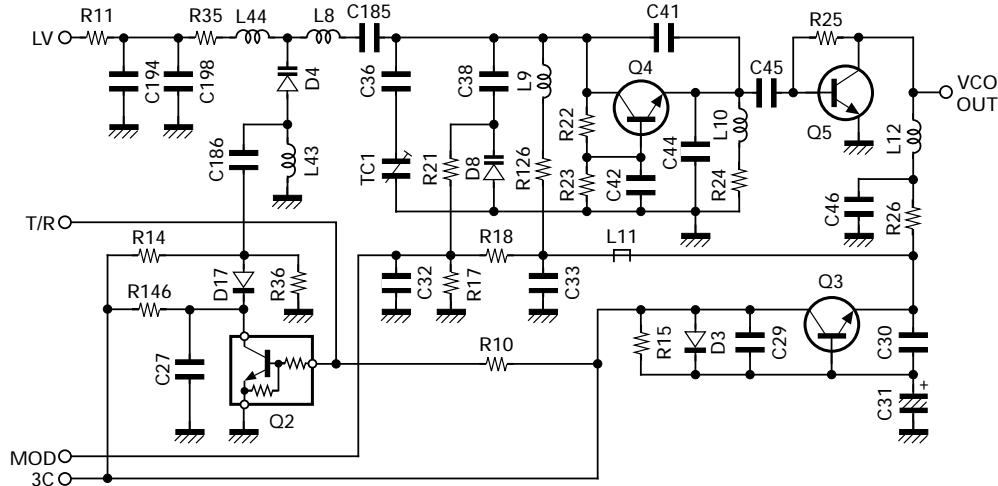


Fig. 7 VCO circuit

■ PLL Circuit

Frequency data is sent to the PLL IC (IC1) from the CPU (IC204) as serial data when the power turns on, when the channel is changed, or when transmission begins. It sets the variable divider in the PLL IC.

The TCXO (X1) produce a 12.8MHz reference frequency. It is divided to produce a 12.5kHz PLL comparison frequency in the PLL IC.

The VCO input is divided by the divide ratio set by the divider in the PLL IC to generate 12.5kHz. It is compared with the reference comparison frequency by the phase comparator to detect a phase difference.

The charge pump circuit in the PLL IC converts it to a control voltage that can drive the VCO directly.

The control voltage passes through a loop filter which passes low frequency and is applied to the VCO control pin to control the oscillator frequency. The loop filter removes unwanted harmonics and noise contained in the output from the phase comparator and determines PLL response and synchronizing characteristics by the amplitude and phase characteristics (Fig. 8).

■ Unlock Detection Circuit

If the PLL cannot be synchronized for some reason or other when switching the channel or changing between transmission and reception, the PLL IC outputs a low unlock detection signal. This signal goes to the CPU to inhibit transmission when the PLL is unlocked.

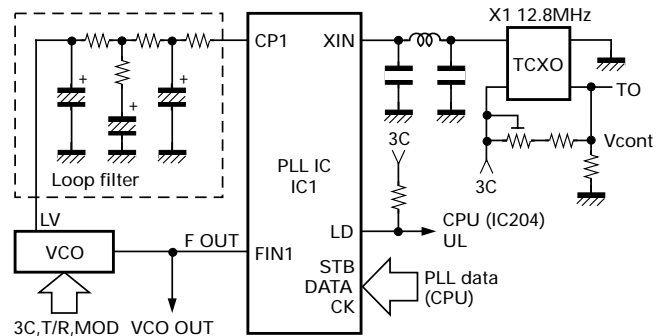


Fig. 8 PLL circuit

CIRCUIT DESCRIPTION

Control System

Reset Circuit

When a battery voltage is dropped, IC201 is detected low voltage, and this detected signal input to IC204 for stop the CPU function. IC200 is detected the reset voltage.

Battery Voltage Detection Circuit

The unit detects a low battery voltage and display the BATT indicator on the LCD. The battery voltage is divided and applied to the analog value input pin (BATT) of the CPU, and converted to a digital signal.

Power Supply Circuit

The power supply voltage is maintained to 3.0V by the series regulator (IC213). It is used as CPU power 3M. The 3C, 3R and 3T voltages are regulated by the IC209.

The B (battery voltage) is supplied to the RF final transistor Q10.

The transmission power 3T is supplied to the transmission output circuit when the CPU turns Q219 on only in transmit mode. 3T is junction to VR2 to generate PA gate (Q10) for power alignment.

The reception power 3R is provided to the receive and IF circuits when the CPU turns Q220 on only in receive mode.

The transmission/reception power 3C is supplied to the VCO and PLL circuits when the CPU turns Q218 on in transmit and receive modes.

If no signal is received for 10 seconds, the CPU enters the power save mode, and turns common power 3C and reception power 3R on for one cycle and off for three cycles according to the signals from the CPU to save the battery power.

QT/DQT

Encode (Transmit)

QT/DQT signal is generated by CPU (IC204). Output signal (IC204 pin 40 (TO)) goes to TCXO modulation and VCO modulation (Through the VR200).

Decode (Receive)

Detected AF signal go to IC206. Function of IC206 is LPF for sub-audible frequency. This signal goes to IC204 pin 20 (TI). IC204 is detected the QT or DQT.

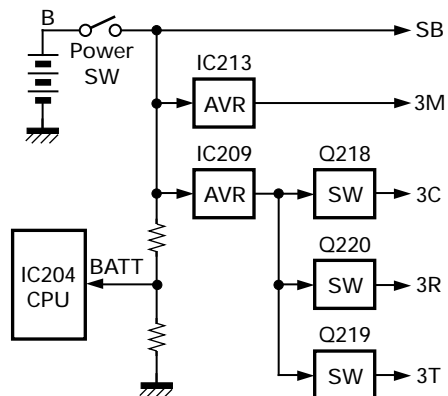


Fig. 9 Reset, battery voltage detection and power supply circuits

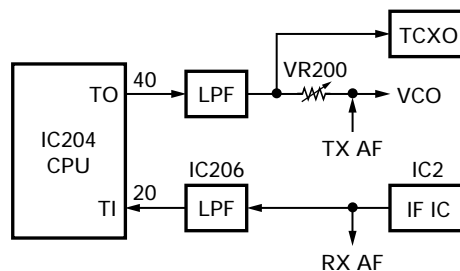


Fig. 10 QT/DQT circuit

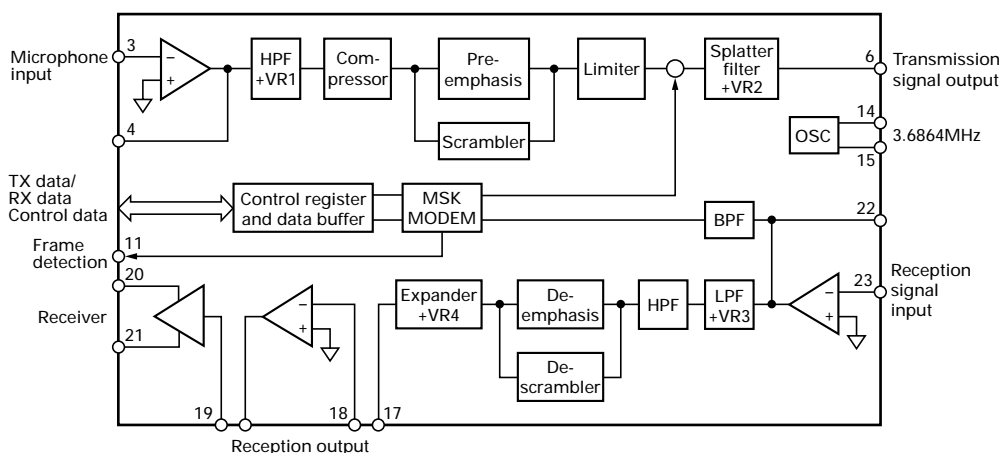


Fig. 11 AK2368 (IC205) block diagram

SEMICONDUCTOR DATA

CPU : MN101C54AKA (TX-RX UNIT (A/2) IC204)

■ Terminal function

Pin No.	Port Name	I/O	Function
1~3	V1~V3	I	LCD Voltage
4,5	NC	I	NC
6	AF MUTE	O	RXsignal AF Mute L : Mute
7	SEL	I	
8	SHIFT	O	Clock Frequency shift
9	VSS	I	GND
10	OSC2	O	Clock oscillation out
11	OSC1	I	Clock oscillation in
12	MMOD	I	GND
13	XI	I	NC
14	XO	O	NC
15	VDD	I	Power supply
16	RST	I	Reset L : Reset
17	VREF+	I	GND
18	UL	I	PLL Unlock L : Unlock
19	BUSY	I	RX Busy Detect
20	TI	I	QT/DQT signal
21	BIAS	I	NC
22	BATT	I	Battery Voltage
23	VOX	I	VOX Level
24	RSSI	I	RX Carrier Level
25	VIB	O	Vibrator Control H : On
26	VREF-	I	GND
27	VDD	I	Power supply
28	TXD	O	to FPU Data
29	RXD	I	from FPU Data
30	TDATA	O	MSK TX Data
31	DIR	O	IC205 Control
32	SCLK	O	IC205 Clock
33	DI/O	I/O	IC205 Data
34	APC	O	TX Power H/L H : Low power
35	BEEP	O	Beep
36	PABC	O	Final SW
37	3CC	O	3C SW L : On
38	3RC	O	3R SW L : On
39	3TC	O	3T SW L : On
40	TO	O	TX QT/DQT out

Pin No.	Port Name	I/O	Function
41	BATT L	I	Battery Low
42	TCLK	O	MSK TX Clock
43	RDF	I	Detect MSK Data
44	VDD	I	Power Supply
45	PTT	I	PTT L : Press
46	MONI	I	MONITOR key L : Press
47	CALL	I	CALL key L : Press
48	UP	I	UP key L : Press
49	MODE	I	MODE key L : Press
50	DOWN	I	DOWN key L : Press
51	MICMUTE	O	MIC Mute H : Mute
52	SP AMP	O	AF AMP on/off H : On
53	PCLK	O	PLL IC Clock
54	PDATA	O	PLL IC Data
55	PEN	O	PLL IC Enable
56	ECLK	O	EEPROM Clock
57	EDATA	I/O	EEPROM Data
58	BACKLIT	O	LCD Lamp on/off H : On
59	RLED	O	Red LED on/off H : On
60	GLED	O	Green LED on/off H : On
61,62	NC	O	NC
63~76	SEG13~SEG0	O	LCD
77~79	COM0~COM2	O	LCD
80	NC	O	NC

FET : 2SK3078 (Q9)

■ Absolute Maximum Ratings (Ta=25°C)

Item	Vbss	Vgss	Id	Pch	Tch	Tstg
Rating	15V	5V	0.5A	3W Tc=25°C	150°C	-45~+150°C

FET : NE5510279A (Q10)

■ Absolute Maximum Ratings (Ta=25°C)

Item	Vbss	Vgss	Id	Pch	Tch	Tstg
Rating	8.5V	6.0V	1.0A	2.4W Tc=25°C	125°C	-55~+125°C

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DESCRIPTION OF COMPONENTS

TX-RX UNIT (X57-6460-XX)

Ref. No.	Part Name	Description
IC1	IC	Phase locked loop system
IC2	IC	IF system
IC200	IC	Voltage detect
IC201	IC	Reset switch
IC203	IC	EEPROM
IC204	IC	CPU
IC205	IC	Base band
IC206	IC	Active filter
IC207	IC	MIC amplifier / Limiter
IC208	IC	Audio power amplifier
IC209	IC	Voltage regulator (3V)
IC213	IC	Voltage regulator (3V)
IC214	IC	Divider
Q1	Transistor	RF amplifier
Q2	Transistor	DC switch (T/R)
Q3	Transistor	Ripple filter
Q4	Transistor	VCO
Q5	Transistor	RF buffer amplifier
Q6,7	Transistor	RF amplifier
Q8	Transistor	TX pre-drive
Q9	FET	TX drive
Q10	FET	TX final
Q11	Transistor	Temperature protection switch
Q13	FET	DC switch
Q14	Transistor	DC switch (HI/LO)
Q18	FET	RF amplifier
Q19	FET	Mixer
Q20	Transistor	IF amplifier
Q21	Transistor	Noise amplifier
Q22	Transistor	Tripler
Q200	Transistor	DC switch (Backlight)

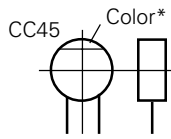
Ref. No.	Part Name	Description
Q201	Transistor	DC switch (Busy)
Q202	Transistor	DC switch (TX)
Q210	Transistor	MIC mute / AGC
Q212	Transistor	DC switch
Q213	FET	Audio mute switch
Q214	Transistor	AF amplifier power supply
Q216	FET	Vibration switch
Q217	FET	VOX switch
Q218	Transistor	DC switch (3C)
Q219	Transistor	DC switch (3T)
Q220	Transistor	DC switch (3R)
Q221	Transistor	Beat shift switch
D1	Diode	Unlock detect
D3	Diode	Current steering
D4	Variable capacitance diode	Frequency control
D8	Variable capacitance diode	TX modulation
D9,10	Diode	RF switch
D12,13	Diode	Antenna switch
D16	Diode	Noise detect
D17	Diode	Current steering
D200	LED	LCD backlight
D201	LED	TX / BUSY
D202	Diode	AF detect
D204	Diode	MIC mute / AGC switch
D205	Diode	AGC detect
D208	Diode	Surge absorption
D209	Diode	Reverse protection
D210	Zener Diode	Voltage protection

PARTS LIST

CAPACITORS

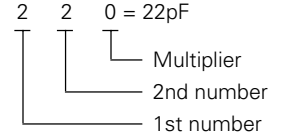
CC 45 TH 1H 220 J
 1 2 3 4 5 6

- 1 = Type ... ceramic, electrolytic, etc.
- 2 = Shape ... round, square, ect.
- 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	3150	4000	5000	6300	8000	-

• Chip capacitors

(EX) C C 7 3 F S L 1 H 0 0 0 J
 1 2 3 4 5 6 7

(Chip) (CH, RH, UJ, SL)

(EX) C K 7 3 F F 1 H 0 0 0 Z
 1 2 3 4 5 6 7

(Chip) (B, F)

Refer to the table above.

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

Dimension (Chip capacitors)

Dimension 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

RESISTORS

• Chip resistor (Carbon)

(EX) R D 7 3 E B 2 B 0 0 0 J
 1 2 3 4 5 6 7

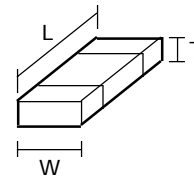
(Chip) (B, F)

• Carbon resistor (Normal type)

(EX) R D 1 4 B B 2 C 0 0 0 J
 1 2 3 4 5 6 7

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

Dimension



Dimension (Chip resistor)

Dimension 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

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		

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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-3130/3131

TX-RX UNIT (X57-6460-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination
TK-3130/3131					
1	3A	*	A02-3661-13	CABINET ASSY (REAR)	
2	1A	*	A02-3663-03	CABINET ASSY (FRONT)	30K
2	1A	*	A02-3705-03	CABINET ASSY (FRONT)	31K
2	1A	*	A02-3706-03	CABINET ASSY (FRONT)	A
5	3B	*	B09-0627-03	CAP (P-JACK)	
6	1B	*	B11-1285-03	ILLUMINATION GUIDE (LCD)	
7	1B	*	B38-0866-05	LCD	
8	3A	*	B41-1841-04	CAUTION LABEL (FCC SAR)	30K,31K
9	1D	*	B46-0773-10	WARRANTY CARD	30K
9	1D	*	B46-0774-00	WARRANTY CARD	31K
10	1D	*	B62-1486-00	INSTRUCTION MANUAL	30K
10	1D	*	B62-1590-00	INSTRUCTION MANUAL	31K
11	1F	*	B62-1591-00	INSTRUCTION MANUAL	A
12	3A	*	B72-1970-04	MODEL NAME PLATE	30K
12	3A	*	B72-2062-04	MODEL NAME PLATE	31K
12	3A	*	B72-2063-04	MODEL NAME PLATE	A
13	1B	*	E29-1194-04	INTER CONNECTOR (LCD)	
14	1A	*	E37-0810-15	PARALLEL CORD (SP)	
16	3A	*	F07-1855-02	COVER (BATT)	
17	2A	*	G11-4192-04	SHEET	
18	3B	*	G11-4193-04	SHEET	
19	2A	*	G13-1751-04	CUSHION	
20	2A	*	G13-1934-04	CUSHION	
21	3B	*	G53-1521-04	PACKING (P-JACK)	
22	2D,2F	*	H12-3110-05	PACKING FIXTURE	
23	2C	*	H12-3111-03	PACKING FIXTURE	30K,31K
24	1D,1E	*	H25-2345-04	PROTECTION BAG	
25	3C	*	H52-1817-02	ITEM CARTON CASE	30K
25	3C	*	H52-1897-02	ITEM CARTON CASE	31K
26	3F	*	H52-1898-02	ITEM CARTON CASE	A
27	1B	*	J21-8427-14	HARDWARE FIXTURE (LCD)	
28	1D,1F	*	J29-0691-04	HOOK ASSY	
29	2A	*	J30-1212-04	SPACER (MIC)	
31	1A	*	K29-9136-12	KEY TOP	
32	2A	*	K29-9137-13	BUTTON KNOB (PTT)	
33	3B	*	K29-9138-03	KNOB (VOL)	
A	3B		N14-0583-04	CIRCULAR NUT (VOL)	
B	2A		N39-2030-46	PAN HEAD MACHINE SCREW	
C	3A		N80-2006-45	PAN HEAD TAPTITE SCREW	
D	3B		N80-2012-45	PAN HEAD TAPTITE SCREW	
E	2B		N82-2005-46	BINDING HEAD TAPTITE SCREW	
F	2A		N82-2008-45	BINDING HEAD TAPTITE SCREW	
35	1A		T07-0362-05	SPEAKER	
36	2A	*	T42-0335-05	MOTOR	
37	2B	*	T90-1004-05	ANTENNA	
39	1C	*	W08-0937-05	AC ADAPTER (120V AC)	30K,31K
40	1C	*	W08-0938-15	CHARGER	30K,31K

Ref. No.	Address	New parts	Parts No.	Description	Destination
TX-RX UNIT (X57-6460-XX) -10 : TK-3130/3131 K -31 : TK-3131 A					
D200			B30-2143-05	LED (YG)	
D201		*	B30-2242-05	LED (RG)	
C1			CK73HB1H471K	CHIP C 470PF	K
C2			CC73HCH1H470J	CHIP C 47PF	J
C3,4			CC73HCH1H100D	CHIP C 10PF	D
C5			CK73HB1H102K	CHIP C 1000PF	K
C6			C92-0695-05	CHIP-TAN 10UF	10WV
C7			CC73HCH1H470J	CHIP C 47PF	J
C13			CK73HB1H102K	CHIP C 1000PF	K
C17			C92-0001-05	CHIP C 0.1UF	35WV
C18			C92-0501-05	CHIP-TAN 1.5UF	10WV
C19			C92-0502-05	CHIP-TAN 0.33UF	35WV
C22			CK73HB1H471K	CHIP C 470PF	K
C24			CC73HCH1H090D	CHIP C 9.0PF	D
C25			CC73HCH1H100D	CHIP C 10PF	D
C27			CK73HB1H471K	CHIP C 470PF	K
C29,30			CK73HB1H471K	CHIP C 470PF	K
C31			C92-0712-05	CHIP-TAN 22UF	6.3WV
C32,33			CK73HB1H471K	CHIP C 470PF	K
C35			CC73HCH1H120J	CHIP C 12PF	J
C36			CC73HCH1H070B	CHIP C 7.0PF	B
C38			CC73HCH1H0R5B	CHIP C 0.5PF	B
C41			CC73HCH1H100D	CHIP C 10PF	D
C42			CK73HB1H471K	CHIP C 470PF	K
C44			CC73HCH1H120J	CHIP C 12PF	J
C45			CC73HCH1H0R5B	CHIP C 0.5PF	B
C46			CK73HB1H471K	CHIP C 470PF	K
C47			CC73HCH1H080D	CHIP C 8.0PF	D
C48			CK73HB1H471K	CHIP C 470PF	K
C50,51			CK73HB1H471K	CHIP C 470PF	K
C52			CK73HB1H182K	CHIP C 1800PF	K
C53			CC73GCH1H030C	CHIP C 3.0PF	C
C54,55			CK73HB1H471K	CHIP C 470PF	K
C56			CC73HCH1H040C	CHIP C 4.0PF	C
C57			CK73HB1H471K	CHIP C 470PF	K
C59-61			CK73HB1H471K	CHIP C 470PF	K
C63			CK73HB1A104K	CHIP C 0.10UF	K
C64,65			CC73HCH1H150J	CHIP C 15PF	J
C67			CK73HB1H102K	CHIP C 1000PF	K
C69,70			CK73HB1H102K	CHIP C 1000PF	K
C71			CK73HB1H471K	CHIP C 470PF	K
C73			CK73HB1H471K	CHIP C 470PF	K
C76			CK73HB1H471K	CHIP C 470PF	K
C77			CK73HB1C103K	CHIP C 0.010UF	K
C78			CK73HB1A104K	CHIP C 0.10UF	K
C79			CK73FB1A105K	CHIP C 1.0UF	K
C80			CK73HB1H471K	CHIP C 470PF	K
C87			CC73GCH1H220J	CHIP C 22PF	J
C89			CK73GB1H471K	CHIP C 470PF	K
C91			CK73GB1H471K	CHIP C 470PF	K
C92			CC73GCH1H080D	CHIP C 8.0PF	D
C93			CC73GCH1H471J	CHIP C 470PF	J
C94			CC73HCH1H010C	CHIP C 1.0PF	C

PARTS LIST

TX-RX UNIT (X57-6460-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
C95			CC73GCH1H070B	CHIP C 7.0PF B		C190			CK73HB1H471K	CHIP C 470PF K	
C97			CC73GCH1H150J	CHIP C 15PF J		C191			CK73HB1C103K	CHIP C 0.010UF K	
C99			CC73GCH1H120J	CHIP C 12PF J		C192			CC73HCH1H180J	CHIP C 18PF J	
C100			CC73GCH1H020B	CHIP C 2.0PF B		C193			CK73HB1H471K	CHIP C 470PF K	
C101			CC73GCH1H060B	CHIP C 6.0PF B		C196			CK73HB1H471K	CHIP C 470PF K	
C103			CK73HB1H102K	CHIP C 1000PF K		C200			CK73HB1H102K	CHIP C 1000PF K	
C106			CK73HB1H471K	CHIP C 470PF K		C201			CK73HB1A104K	CHIP C 0.10UF K	
C118			CK73HB1H471K	CHIP C 470PF K		C202			C92-0695-05	CHIP-TAN 10UF 10WV	
C119			CC73HCH1H070D	CHIP C 7.0PF D		C203			CK73HB1H102K	CHIP C 1000PF K	
C120			CK73HB1H471K	CHIP C 470PF K		C205			CK73HB1H102K	CHIP C 1000PF K	
C122,123			CK73HB1H471K	CHIP C 470PF K		C206,207			CK73FB1A105K	CHIP C 1.0UF K	
C128,129			CK73HB1H471K	CHIP C 470PF K		C208,209			CC73HCH1H100D	CHIP C 10PF D	
C130			CK73HB1C103K	CHIP C 0.010UF K		C210			CK73FB1C105K	CHIP C 1.0UF K	
C132			CK73HB1H471K	CHIP C 470PF K		C211			CK73HB1H102K	CHIP C 1000PF K	
C133			CK73HB1C103K	CHIP C 0.010UF K		C212			CK73HB1C103K	CHIP C 0.010UF K	
C134			CK73HB1H102K	CHIP C 1000PF K		C213			CK73FB1E104K	CHIP C 0.10UF K	
C135			CK73HB1C103K	CHIP C 0.010UF K		C214			CK73HB1C103K	CHIP C 0.010UF K	
C136			CC73HCH1H030C	CHIP C 3.0PF C		C215			CK73HB1A473K	CHIP C 0.047UF K	
C137			CC73HCH1H120J	CHIP C 12PF J		C219			C92-0695-05	CHIP-TAN 10UF 10WV	
C138			CC73HCH1H030C	CHIP C 3.0PF C		C220			CK73HB1A473K	CHIP C 0.047UF K	
C140			CC73HCH1H040C	CHIP C 4.0PF C		C222			C92-0587-05	CHIP-TAN 2.2UF 4WV	
C143			CK73HB1H102K	CHIP C 1000PF K		C223			CK73HB1A104K	CHIP C 0.10UF K	
C144			CK73HB1C103K	CHIP C 0.010UF K		C224			C92-0519-05	CHIP-TAN 1.0UF 25WV	
C145			CK73HB1H102K	CHIP C 1000PF K		C225			CK73HB1E472K	CHIP C 4700PF K	
C146			CK73HB1C103K	CHIP C 0.010UF K		C227			C92-0519-05	CHIP-TAN 1.0UF 25WV	
C147			CK73HB1H182K	CHIP C 1800PF K		C228			CK73HB1A104K	CHIP C 0.10UF K	
C148			CC73HCH1H270J	CHIP C 27PF J		C229			C92-0695-05	CHIP-TAN 10UF 10WV	
C150			CK73HB1A104K	CHIP C 0.10UF K		C231			CK73HB1A104K	CHIP C 0.10UF K	
C151			CK73HB1H182K	CHIP C 1800PF K		C232			CK73HB1A473K	CHIP C 0.047UF K	
C153-155			CK73HB1H471K	CHIP C 470PF K		C233			CK73HB1C223K	CHIP C 0.022UF K	
C156			CK73HB1H182K	CHIP C 1800PF K		C234			C92-0519-05	CHIP-TAN 1.0UF 25WV	
C157			CK73HB1H102K	CHIP C 1000PF K		C235			CK73HB1H222K	CHIP C 2200PF K	
C158			CK73HB1A333K	CHIP C 0.033UF K		C236			CK73HB1C223K	CHIP C 0.022UF K	
C159			CK73HB1H102K	CHIP C 1000PF K		C237			CK73HB1H561K	CHIP C 560PF K	
C160			CK73HB1A473K	CHIP C 0.047UF K		C238			CK73HB1A104K	CHIP C 0.10UF K	
C161			CK73FB1E224K	CHIP C 0.22UF K		C240			CK73HB1A104K	CHIP C 0.10UF K	
C162			CK73HB1H102K	CHIP C 1000PF K		C241			CK73HB1H392K	CHIP C 3900PF K	
C163			C92-0695-05	CHIP-TAN 10UF 10WV		C242			CK73HB1A104K	CHIP C 0.10UF K	
C164			CK73HB1H102K	CHIP C 1000PF K		C243			CK73HB1H102K	CHIP C 1000PF K	
C165			CK73HB1H471K	CHIP C 470PF K		C244			CK73HB1H392K	CHIP C 3900PF K	
C166			CC73HCH1H470J	CHIP C 47PF J		C245			CK73HB1H332K	CHIP C 3300PF K	
C169			CK73HB1H331K	CHIP C 330PF K		C246			C92-0519-05	CHIP-TAN 1.0UF 25WV	
C170			CK73GB1H183K	CHIP C 0.018UF K		C247			CK73HB1H222K	CHIP C 2200PF K	
C171			CC73HCH1H150J	CHIP C 15PF J		C248			CK73HB1C103K	CHIP C 0.010UF K	
C172			CK73HB1C103K	CHIP C 0.010UF K		C249			CK73HB1C223K	CHIP C 0.022UF K	
C173			CC73HCH1H680J	CHIP C 68PF J		C250			CK73HB1A104K	CHIP C 0.10UF K	
C174			CC73HCH1H330J	CHIP C 33PF J		C253			CK73GB1C104K	CHIP C 0.10UF K	
C175			CC73HCH1H121J	CHIP C 120PF J		C254,255			C92-0695-05	CHIP-TAN 10UF 10WV	
C176			CC73HCH1H330J	CHIP C 33PF J		C256			CK73HB1H102K	CHIP C 1000PF K	
C177			CC73HCH1H680J	CHIP C 68PF J		C257			CK73HB1A104K	CHIP C 0.10UF K	
C178			CK73HB1H102K	CHIP C 1000PF K		C258			CK73HB1H102K	CHIP C 1000PF K	
C179			CK73FB1A105K	CHIP C 1.0UF K		C259			C92-0695-05	CHIP-TAN 10UF 10WV	
C180			CK73HB1H102K	CHIP C 1000PF K		C260			CK73GB1C104K	CHIP C 0.10UF K	
C181			C92-0695-05	CHIP-TAN 10UF 10WV		C262			C92-0665-05	TANTAL 100UF 6.3WV	
C182			CK73HB1H102K	CHIP C 1000PF K		C263			CK73HB1H102K	CHIP C 1000PF K	
C183			C92-0695-05	CHIP-TAN 10UF 10WV		C264			C92-0695-05	CHIP-TAN 10UF 10WV	
C185			CC73HCH1H100B	CHIP C 10PF B		C265			CK73HB1H102K	CHIP C 1000PF K	
C186			CK73HB1H471K	CHIP C 470PF K		C266			CK73HB1A104K	CHIP C 0.10UF K	
C187			CC73HCH1H220J	CHIP C 22PF J		C268			CK73HB1A104K	CHIP C 0.10UF K	
C189			CK73GB1H471K	CHIP C 470PF K		C269			C92-0695-05	CHIP-TAN 10UF 10WV	

30K : TK-3130K

31K : TK-3131K

A : TK-3131A

PARTS LIST

TX-RX UNIT (X57-6460-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
C270			CK73HB1C123K	CHIP C 0.012UF K		R1			RK73HB1J472J	CHIP R 4.7K J 1/16W	
C271			CK73FB1A105K	CHIP C 1.0UF K		R2			RK73HB1J273J	CHIP R 27K J 1/16W	
C272,273			CK73HB1H102K	CHIP C 1000PF K		R3			RK73HB1J100J	CHIP R 10 J 1/16W	
C274			CK73HB1A104K	CHIP C 0.10UF K		R4			RK73HB1J563J	CHIP R 56K J 1/16W	
C275			CC73HCH1H470J	CHIP C 47PF J		R5,6			R92-1368-05	CHIP R 0 OHM	
C278			CK73FB1A105K	CHIP C 1.0UF K		R7			RK73HB1J101J	CHIP R 100 J 1/16W	
C279			CK73HB1A104K	CHIP C 0.10UF K		R8			RK73HB1J472J	CHIP R 4.7K J 1/16W	
C280			CK73HB1A473K	CHIP C 0.047UF K		R9			RK73HB1J101J	CHIP R 100 J 1/16W	
C282			CK73HB1C103K	CHIP C 0.010UF K		R10,11			RK73HB1J103J	CHIP R 10K J 1/16W	
C285			CK73HB1H471K	CHIP C 470PF K		R12			RK73HB1J470J	CHIP R 47 J 1/16W	
C287,288			CK73FB1C105K	CHIP C 1.0UF K		R13			RK73HB1J563J	CHIP R 56K J 1/16W	
C289			CC73HCH1H030C	CHIP C 3.0PF C		R14			RK73HB1J102J	CHIP R 1.0K J 1/16W	
C290,291			CK73HB1H102K	CHIP C 1000PF K		R15			RK73HB1J472J	CHIP R 4.7K J 1/16W	
C292,293			CC73HCH1H101J	CHIP C 100PF J		R16			RK73HB1J100J	CHIP R 10 J 1/16W	
TC1			C05-0383-05	CERAMIC TRIMMER CAP (6P)		R17			RK73HB1J473J	CHIP R 47K J 1/16W	
CN1		*	E40-6213-05	PIN ASSY		R18			RK73HB1J104J	CHIP R 100K J 1/16W	
CN202		*	E40-6214-05	PIN ASSY SOCKET		R20			RK73HB1J103J	CHIP R 10K J 1/16W	
J200	2B		E11-0457-05	PHONE JACK (2.5D/3.5D)		R21			RK73HB1J473J	CHIP R 47K J 1/16W	
F200			F53-0217-05	FUSE (3A)		R22			RK73HB1J562J	CHIP R 5.6K J 1/16W	
CF1			L72-0958-05	CERAMIC FILTER (450KHZ)		R23			RK73HB1J682J	CHIP R 6.8K J 1/16W	
L1		*	L40-1001-86	SMALL FIXED INDUCTOR (10U)		R24			RK73GB1J221J	CHIP R 220 J 1/16W	
L2			L92-0140-05	FERRITE CHIP		R25			RK73HB1J683J	CHIP R 68K J 1/16W	
L8			L40-1085-54	SMALL FIXED INDUCTOR (100NH)		R26			RK73HB1J101J	CHIP R 100 J 1/16W	
L9,10		*	L40-1001-86	SMALL FIXED INDUCTOR (10U)		R27			RK73HB1J183J	CHIP R 18K J 1/16W	
L11			L92-0140-05	FERRITE CHIP		R28			RK73HB1J153J	CHIP R 15K J 1/16W	
L12			L40-1875-92	SMALL FIXED INDUCTOR (18NH)		R29			R92-1368-05	CHIP R 0 OHM	
L14-16			L40-2275-92	SMALL FIXED INDUCTOR (22NH)		R30			RK73HB1J821J	CHIP R 820 J 1/16W	
L19			L40-1075-92	SMALL FIXED INDUCTOR (10NH)		R31			RK73HB1J221J	CHIP R 220 J 1/16W	
L20			L92-0149-05	FERRITE CHIP		R32			RK73HB1J332J	CHIP R 3.3K J 1/16W	
L22			L92-0149-05	FERRITE CHIP		R33			RK73HB1J103J	CHIP R 10K J 1/16W	
L23			L34-4568-05	AIR-CORE COIL		R34			RK73HB1J332J	CHIP R 3.3K J 1/16W	
L25-27			L34-4563-05	AIR-CORE COIL		R35			RK73HB1J470J	CHIP R 47 J 1/16W	
L28			L34-4572-05	AIR-CORE COIL		R36			RK73HB1J102J	CHIP R 1.0K J 1/16W	
L30			L40-4775-92	SMALL FIXED INDUCTOR (47NH)		R39			RK73HB1J392J	CHIP R 3.9K J 1/16W	
L32			L40-2775-92	SMALL FIXED INDUCTOR (27NH)		R40			RK73HB1J470J	CHIP R 47 J 1/16W	
L34			L40-3385-85	SMALL FIXED INDUCTOR (0.33U)		R42			RK73HB1J821J	CHIP R 820 J 1/16W	
L35			L40-4785-85	SMALL FIXED INDUCTOR (0.47U)		R45			RK73HB1J5R6J	CHIP R 5.6 J 1/16W	
L36			L34-4554-05	COIL		R51			RK73HB1J104J	CHIP R 100K J 1/16W	
L38			L40-5681-86	SMALL FIXED INDUCTOR (0.56U)		R56,57			RK73HB1J221J	CHIP R 220 J 1/16W	
L39			L40-4781-86	SMALL FIXED INDUCTOR (0.47U)		R58			RK73HB1J391J	CHIP R 390 J 1/16W	
L40,41			L40-2285-92	SMALL FIXED INDUCTOR (220NH)		R59			RK73HB1J100J	CHIP R 10 J 1/16W	
L42		*	L79-1807-05	FILTER (465.0MHZ)		R60			RK73HB1J101J	CHIP R 100 J 1/16W	
L43			L40-2275-54	SMALL FIXED INDUCTOR (22NH)		R61			RK73HB1J222J	CHIP R 2.2K J 1/16W	
L44		*	L40-1001-86	SMALL FIXED INDUCTOR (10U)		R62			RK73HB1J123J	CHIP R 12K J 1/16W	
L45		*	L40-3967-98	SMALL FIXED INDUCTOR (3.9NH)		R63			RK73HB1J102J	CHIP R 1.0K J 1/16W	
L48			L40-1091-37	SMALL FIXED INDUCTOR (1.000UH)		R64			RK73HB1J123J	CHIP R 12K J 1/16W	
L49			L40-4775-92	SMALL FIXED INDUCTOR (47NH)		R82,83			RK73HB1J564J	CHIP R 560K J 1/16W	
L50			L40-5663-92	SMALL FIXED INDUCTOR (5.6NH)		R84			R92-1368-05	CHIP R 0 OHM	
L51			L40-1875-92	SMALL FIXED INDUCTOR (18NH)		R86			RK73HB1J184J	CHIP R 180K J 1/16W	
L55			L40-6865-92	SMALL FIXED INDUCTOR (6.8NH)		R87			RK73HB1J104J	CHIP R 100K J 1/16W	
L56			L40-1085-92	SMALL FIXED INDUCTOR (100NH)		R89			RK73HB1J101J	CHIP R 100 J 1/16W	
L57			L92-0149-05	FERRITE CHIP		R91			R92-1368-05	CHIP R 0 OHM	
L58		*	L79-1807-05	FILTER (465.0MHZ)		R92			RK73HB1J100J	CHIP R 10 J 1/16W	
L59			L40-2285-54	SMALL FIXED INDUCTOR (220NH)		R94			RK73HB1J472J	CHIP R 4.7K J 1/16W	
L201			L92-0140-05	FERRITE CHIP		R95			RK73HB1J102J	CHIP R 1.0K J 1/16W	
L202,203			L92-0138-05	FERRITE CHIP		R96			RK73HB1J181J	CHIP R 180 J 1/16W	
X1			L77-1792-05	TCXO (12.8MHZ)		R98			RK73HB1J470J	CHIP R 47 J 1/16W	
X201			L77-1633-05	CRYSTAL RESONATOR (7.3728M)		R99,100			RK73HB1J561J	CHIP R 560 J 1/16W	
XF1			L71-0586-05	MCF (38.85MHZ)		R103			RK73HB1J334J	CHIP R 330K J 1/16W	
						R104			RK73HB1J101J	CHIP R 100 J 1/16W	

PARTS LIST

TX-RX UNIT (X57-6460-XX)

Ref. No.	Address	New parts	Parts No.	Description	Desti-nation	Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
R105			RK73HB1J153J	CHIP R 15K J 1/16W		R257			R92-1368-05	CHIP R 0 OHM	
R107			RK73HB1J332J	CHIP R 3.3K J 1/16W		R259			RK73HB1J104J	CHIP R 100K J 1/16W	
R108			RK73HB1J472J	CHIP R 4.7K J 1/16W		R260,261			R92-1368-05	CHIP R 0 OHM	
R109			RK73HB1J681J	CHIP R 680 J 1/16W		R262			RK73HB1J153J	CHIP R 15K J 1/16W	
R110			RK73HB1J122J	CHIP R 1.2K J 1/16W		R263			RK73HB1J392J	CHIP R 3.9K J 1/16W	
R111			RK73HB1J334J	CHIP R 330K J 1/16W		R264,265			RK73HB1J104J	CHIP R 100K J 1/16W	
R113			RK73HB1J274J	CHIP R 270K J 1/16W		R266			RK73HB1J562J	CHIP R 5.6K J 1/16W	
R114			RK73HB1J472J	CHIP R 4.7K J 1/16W		R267			RK73HB1J563J	CHIP R 56K J 1/16W	
R115			RK73HB1J151J	CHIP R 150 J 1/16W		R268			R92-1368-05	CHIP R 0 OHM	
R117			RK73HB1J100J	CHIP R 10 J 1/16W		R269			RK73HB1J224J	CHIP R 220K J 1/16W	
R118			RK73HB1J222J	CHIP R 2.2K J 1/16W		R270			RK73HB1J473J	CHIP R 47K J 1/16W	
R119			RK73HB1J334J	CHIP R 330K J 1/16W		R271			RK73HB1J393J	CHIP R 39K J 1/16W	
R120			RK73HB1J101J	CHIP R 100 J 1/16W		R272			RK73HB1J473J	CHIP R 47K J 1/16W	
R126			RK73HB1J470J	CHIP R 47 J 1/16W		R273			RK73HB1J124J	CHIP R 120K J 1/16W	
R129			RK73HB1J393J	CHIP R 39K J 1/16W		R274			RK73HB1J103J	CHIP R 10K J 1/16W	
R135			RK73HB1J104J	CHIP R 100K J 1/16W		R277			RK73HB1J824J	CHIP R 820K J 1/16W	
R138-140			RK73HB1J101J	CHIP R 100 J 1/16W		R280			R92-1368-05	CHIP R 0 OHM	
R141			RK73HB1J154J	CHIP R 150K J 1/16W		R281			RK73HB1J104J	CHIP R 100K J 1/16W	
R142			R92-1368-05	CHIP R 0 OHM		R282			RK73HB1J473J	CHIP R 47K J 1/16W	
R143			RK73GB1J220J	CHIP R 22 J 1/16W		R283			RK73HB1J333J	CHIP R 33K J 1/16W	
R144			RK73GB1J221J	CHIP R 220 J 1/16W		R284			RK73HB1J274J	CHIP R 270K J 1/16W	
R146			RK73HB1J473J	CHIP R 47K J 1/16W		R285			R92-1368-05	CHIP R 0 OHM	
R147			R92-1368-05	CHIP R 0 OHM		R287,288			RK73HB1J104J	CHIP R 100K J 1/16W	
R148			RK73GB1J683J	CHIP R 68K J 1/16W		R289			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R149			RK73GB1J473J	CHIP R 47K J 1/16W		R290			RK73GB1J821J	CHIP R 820 J 1/16W	
R200-202			RK73GB1J181J	CHIP R 180 J 1/16W		R291			RK73HB1J104J	CHIP R 100K J 1/16W	
R203,204			RK73HB1J473J	CHIP R 47K J 1/16W		R292			RK73HB1J103J	CHIP R 10K J 1/16W	
R206-208			RK73HB1J102J	CHIP R 1.0K J 1/16W		R293			RK73HB1J182J	CHIP R 1.8K J 1/16W	
R211			RK73HB1J473J	CHIP R 47K J 1/16W		R294			RK73HB1J471J	CHIP R 470 J 1/16W	
R212			RK73HB1J104J	CHIP R 100K J 1/16W		R295			RK73HB1J331J	CHIP R 330 J 1/16W	
R213			RK73HB1J473J	CHIP R 47K J 1/16W		R296			RK73HB1J103J	CHIP R 10K J 1/16W	
R214,215			RK73HB1J104J	CHIP R 100K J 1/16W		R298			RK73HB1J101J	CHIP R 100 J 1/16W	
R216			RK73HB1J473J	CHIP R 47K J 1/16W		R299			RK73HB1J151J	CHIP R 150 J 1/16W	
R217,218			RK73HB1J104J	CHIP R 100K J 1/16W		R300,301			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R219			RK73HB1J154J	CHIP R 150K J 1/16W		R308			RK73HB1J101J	CHIP R 100 J 1/16W	
R220			RK73HB1J474J	CHIP R 470K J 1/16W		R309			RK73HB1J331J	CHIP R 330 J 1/16W	
R221,222			RK73HB1J102J	CHIP R 1.0K J 1/16W		R311,312			RK73GB1J680J	CHIP R 68 J 1/16W	
R229			RK73HB1J153J	CHIP R 15K J 1/16W		R316			RK73HB1J564J	CHIP R 560K J 1/16W	
R230			RK73HB1J124J	CHIP R 120K J 1/16W		R317			R92-1368-05	CHIP R 0 OHM	
R231			RK73HH1J105D	CHIP R 1.0M D 1/16W		R322			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R232,233			RK73HB1J103J	CHIP R 10K J 1/16W		R324-329			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R234			RK73HB1J124J	CHIP R 120K J 1/16W		R330			RK73HB1J104J	CHIP R 100K J 1/16W	
R235			RK73HB1J104J	CHIP R 100K J 1/16W		R334			RK73HB1J562J	CHIP R 5.6K J 1/16W	
R237			RK73HB1J223J	CHIP R 22K J 1/16W		R336			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R238			RK73HB1J562J	CHIP R 5.6K J 1/16W		R337			RK73HB1J124J	CHIP R 120K J 1/16W	
R239			RK73HB1J103J	CHIP R 10K J 1/16W		R338,339			RK73HB1J101J	CHIP R 100 J 1/16W	
R240			RK73HB1J473J	CHIP R 47K J 1/16W		R340			RK73GB1J152J	CHIP R 1.5K J 1/16W	
R241			RK73HB1J474J	CHIP R 470K J 1/16W		VR1			R12-7491-05	TRIMMING POT. (68K)	
R242			R92-1252-05	CHIP R 0 OHM J 1/16W	30K,31K	VR2			R12-7488-05	TRIMMING POT. (22K)	
R243,244			RK73HB1J473J	CHIP R 47K J 1/16W		VR200			R12-7494-05	TRIMMING POT. (220K)	
R245			RK73HB1J103J	CHIP R 10K J 1/16W		VR201			R12-7490-05	TRIMMING POT. (47K)	
R246			RK73HB1J472J	CHIP R 4.7K J 1/16W		VR202	2B	*	R31-0640-05	VARIABLE RESISTOR	
R247			RK73HB1J473J	CHIP R 47K J 1/16W		S200			S70-0434-05	TACT SWITCH	
R248			RK73HB1J563J	CHIP R 56K J 1/16W		MIC200	1A	*	T91-0631-05	MIC ELEMENT	
R251			RK73HB1J274J	CHIP R 270K J 1/16W		D1			MA2S111	DIODE	
R252			RK73HB1J223J	CHIP R 22K J 1/16W		D3			MA2S111	DIODE	
R253			RK73HB1J103J	CHIP R 10K J 1/16W		D4			MA360	VARIABLE CAPACITANCE DIODE	
R254			RK73HB1J334J	CHIP R 330K J 1/16W		D8			MA360	VARIABLE CAPACITANCE DIODE	
R255			RK73HB1J333J	CHIP R 33K J 1/16W							
R256			RK73HB1J394J	CHIP R 390K J 1/16W							

30K : TK-3130K
 31K : TK-3131K
 A : TK-3131A

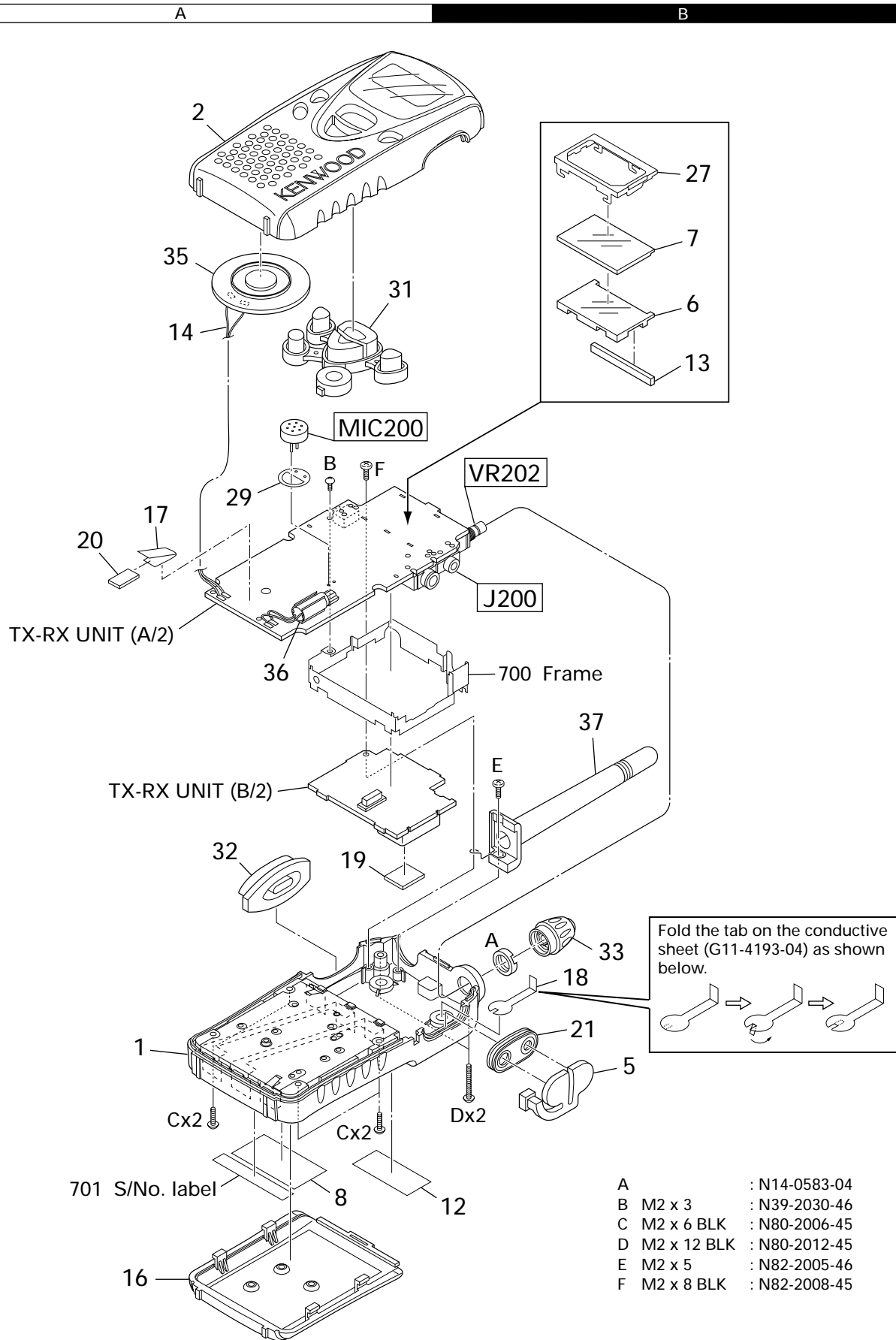
TK-3130/3131

PARTS LIST

TX-RX UNIT (X57-6460-XX)

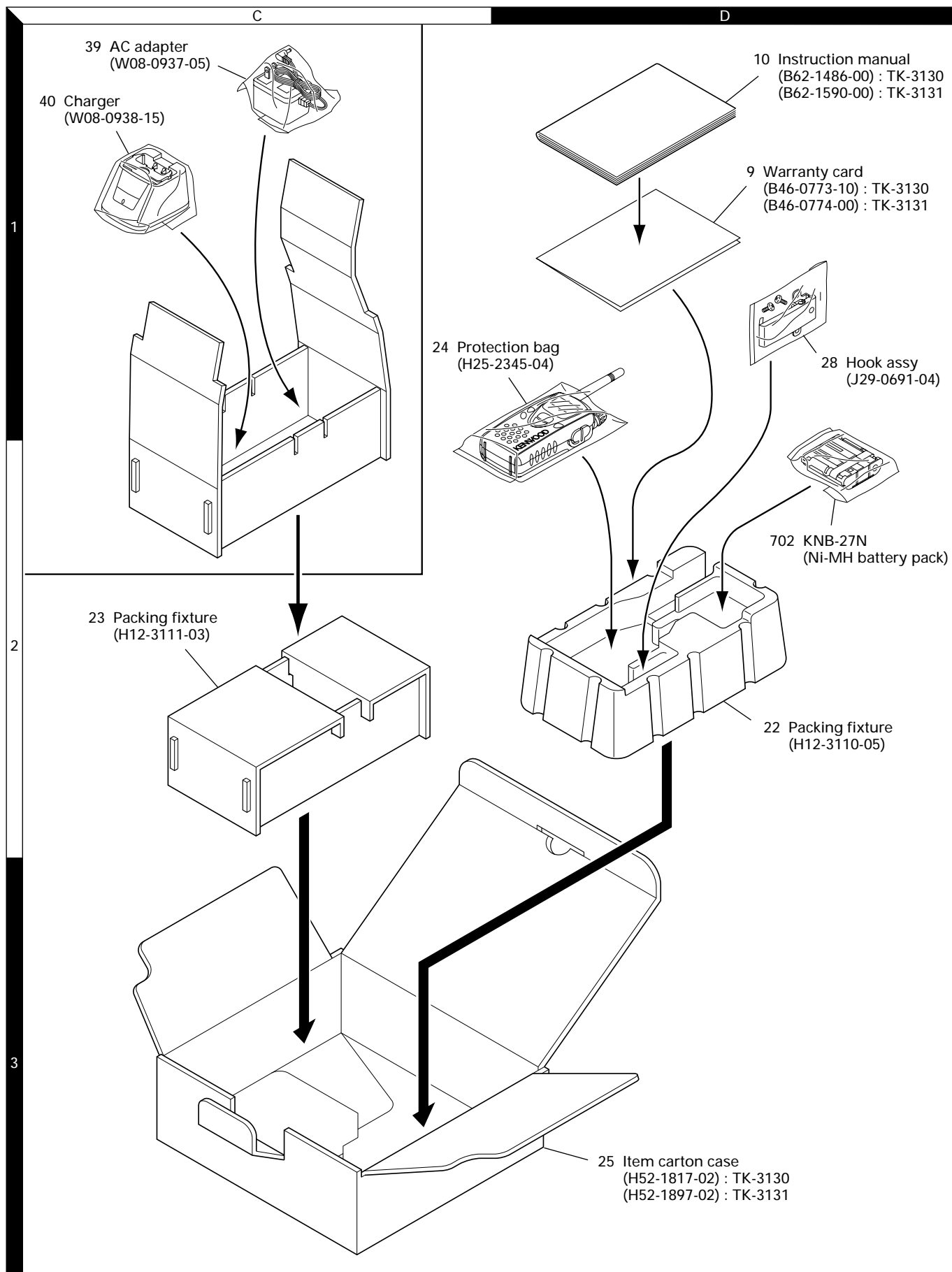
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D9,10			HSC277	DIODE							
D12			HVC131	DIODE							
D13			HSC277	DIODE							
D16			MA742	DIODE							
D17			HSC277	DIODE							
D202			MA742	DIODE							
D204			DAN222	DIODE							
D205			1SS372	DIODE							
D208		*	KDZ3.3V	ZENER DIODE							
D209			1SR154-400	DIODE							
D210			KDZ4.7EV	ZENER DIODE							
IC1			TB31202FN	IC (PHASE LOCKED LOOP SYSTEM)							
IC2			TA31136FN	IC (IF SYSTEM)							
IC200		*	XC61CN2902N	IC (VOLTAGE DETECT)							
IC201		*	XC61CN2702N	IC (RESET SWITCH)							
IC203			24LC08BT-1SN	IC (EEPROM)							
IC204		*	MN101C54AKA	IC (CPU)							
IC205		*	AK2368	IC (BASE BAND)							
IC206			NJM2100V	IC (ACTIVE FILTER)							
IC207			NJM2100V	IC (MIC AMPLIFIER/LIMITER)							
IC208		*	LM4865M	IC (AUDIO POWER AMP)							
IC209		*	TK71530ASCL	IC (VOLTAGE REGULATOR)							
IC213		*	TK71530ASCL	IC (VOLTAGE REGULATOR)							
IC214			TC7W74FU	IC (DIVIDER)							
Q1			2SC5108(Y)	TRANSISTOR							
Q2			DTC114EE	DIGITAL TRANSISTOR							
Q3			2SC4617(S)	TRANSISTOR							
Q4			2SC5066(O)	TRANSISTOR							
Q5-7			2SC5108(Y)	TRANSISTOR							
Q8			2SC4226(R24)	TRANSISTOR							
Q9		*	2SK3078	FET							
Q10		*	NE5510279A	FET							
Q11			DTC114TE	DIGITAL TRANSISTOR							
Q13			2SK1824	FET							
Q14			DTC114TE	DIGITAL TRANSISTOR							
Q18			3SK274	FET							
Q19			3SK320	FET							
Q20			KTC4082	TRANSISTOR							
Q21			2SC4738(GR)	TRANSISTOR							
Q22			KTC4082	TRANSISTOR							
Q200-202			DTC114EE	DIGITAL TRANSISTOR							
Q210			2SC4919	TRANSISTOR							
Q212			DTC114EE	DIGITAL TRANSISTOR							
Q213			2SK1824	FET							
Q214			KTA1298(Y)	TRANSISTOR							
Q216		*	3LN02C	FET							
Q217			2SK1824	FET							
Q218-220			DTA123JE	DIGITAL TRANSISTOR							
Q221			2SK1824	FET							
TH1			157-503-65001	THERMISTOR							

EXPLODED VIEW

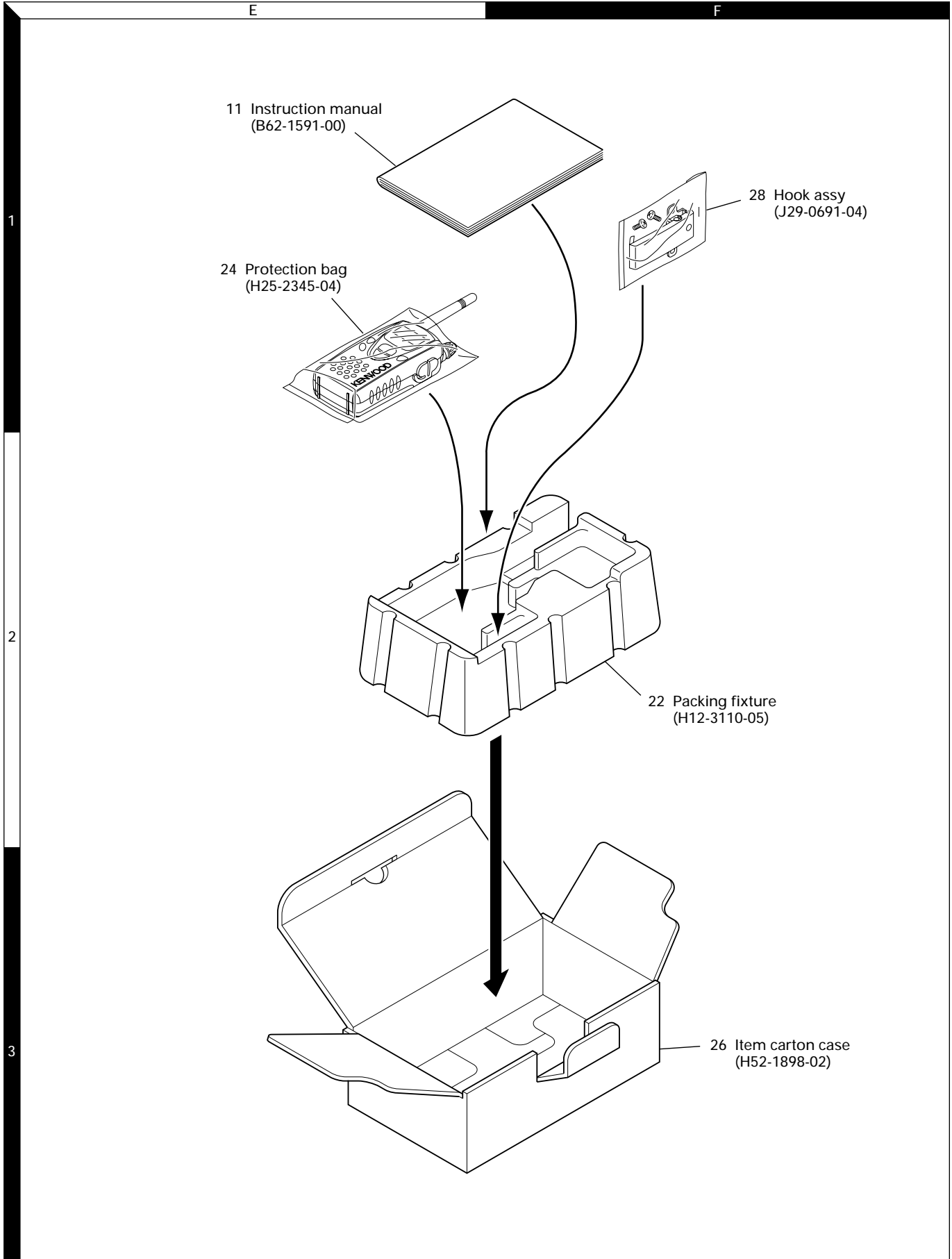


TK-3130/3131

PACKING (TK-3130/3131 K)



PACKING (TK-3131 A)



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 : $1M\Omega$ 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 : $-133\text{dBm}/0.05\mu\text{V}$ to $7\text{dBm}/501\text{mV}$
- 3) Output impedance : 50Ω

11. Dummy Load

- 1) 8Ω , 1W or more

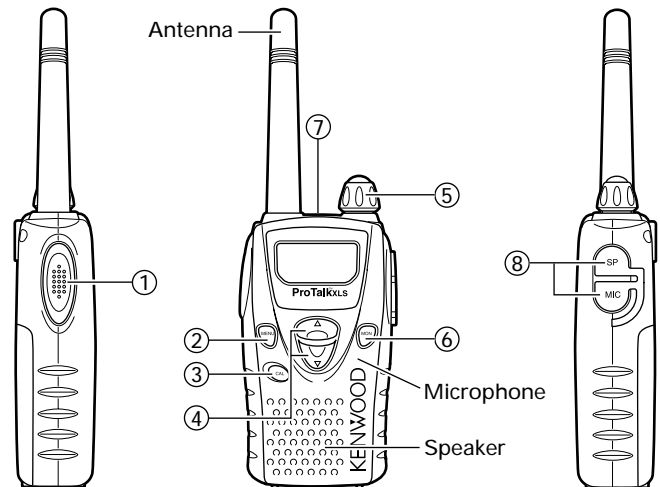
12. AF Generator (AG)

- 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

Switches



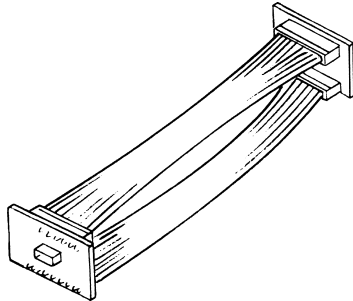
- ① PTT (Push to Talk) switch
- ② MENU key
- ③ CAL key
- ④ Δ/∇ keys
- ⑤ Power switch/Volume control
- ⑥ MON key
- ⑦ LED indicator
- ⑧ SP/MIC jacks

ADJUSTMENT

Jigs

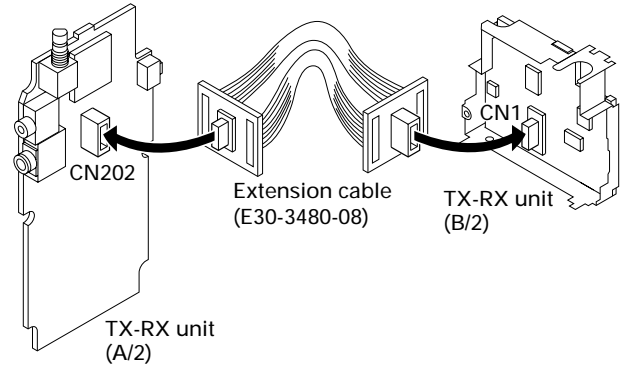
Use jigs for repair or adjustment.

■ Extension cable (E30-3480-08)



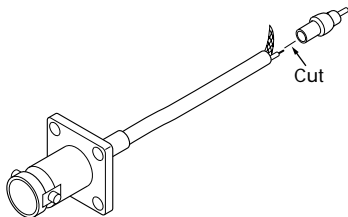
Connecting Jigs

Connect the extension cable as shown in the illustration below.

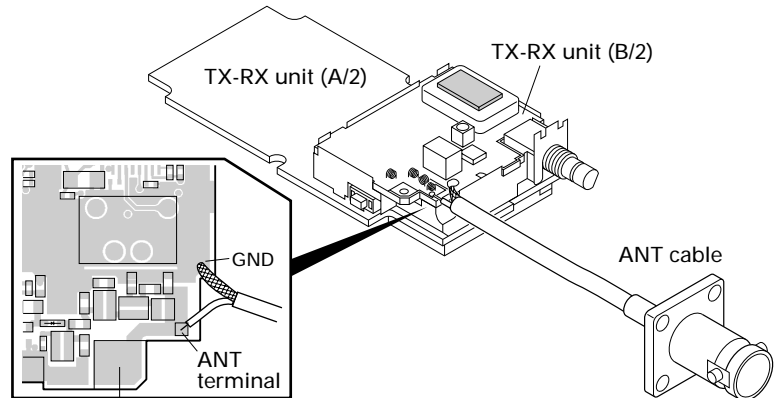


■ ANT cable (E30-3418-05)

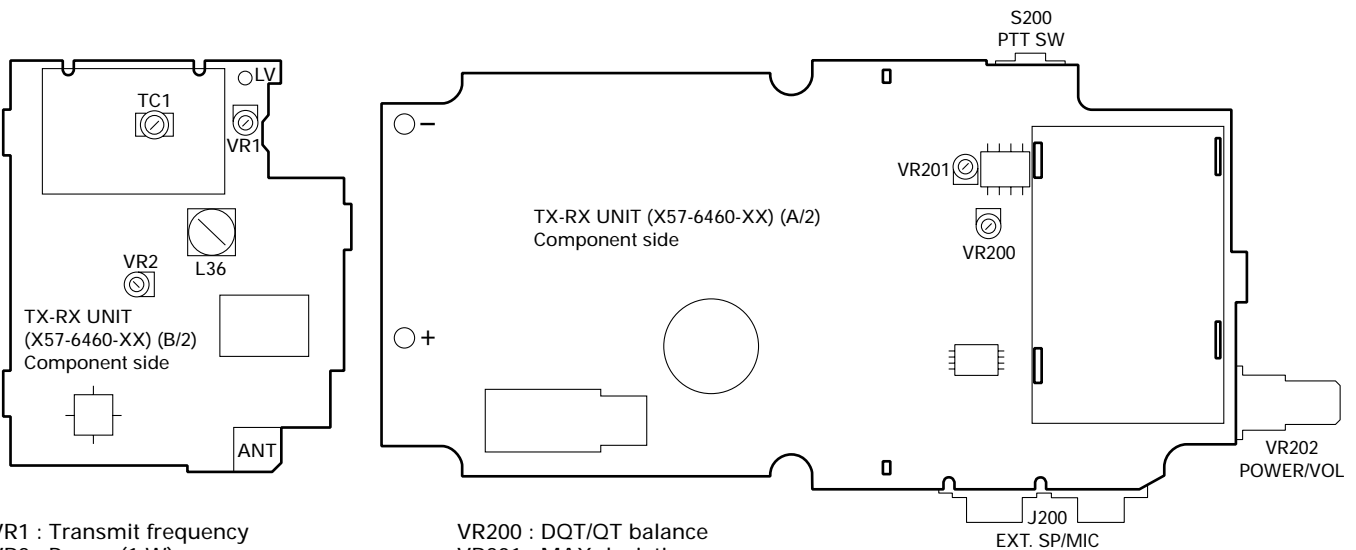
Modify the cable as shown below.



Solder the ANT cable to the ANT terminal on the TX-RX unit (B/2).



Adjustment Points



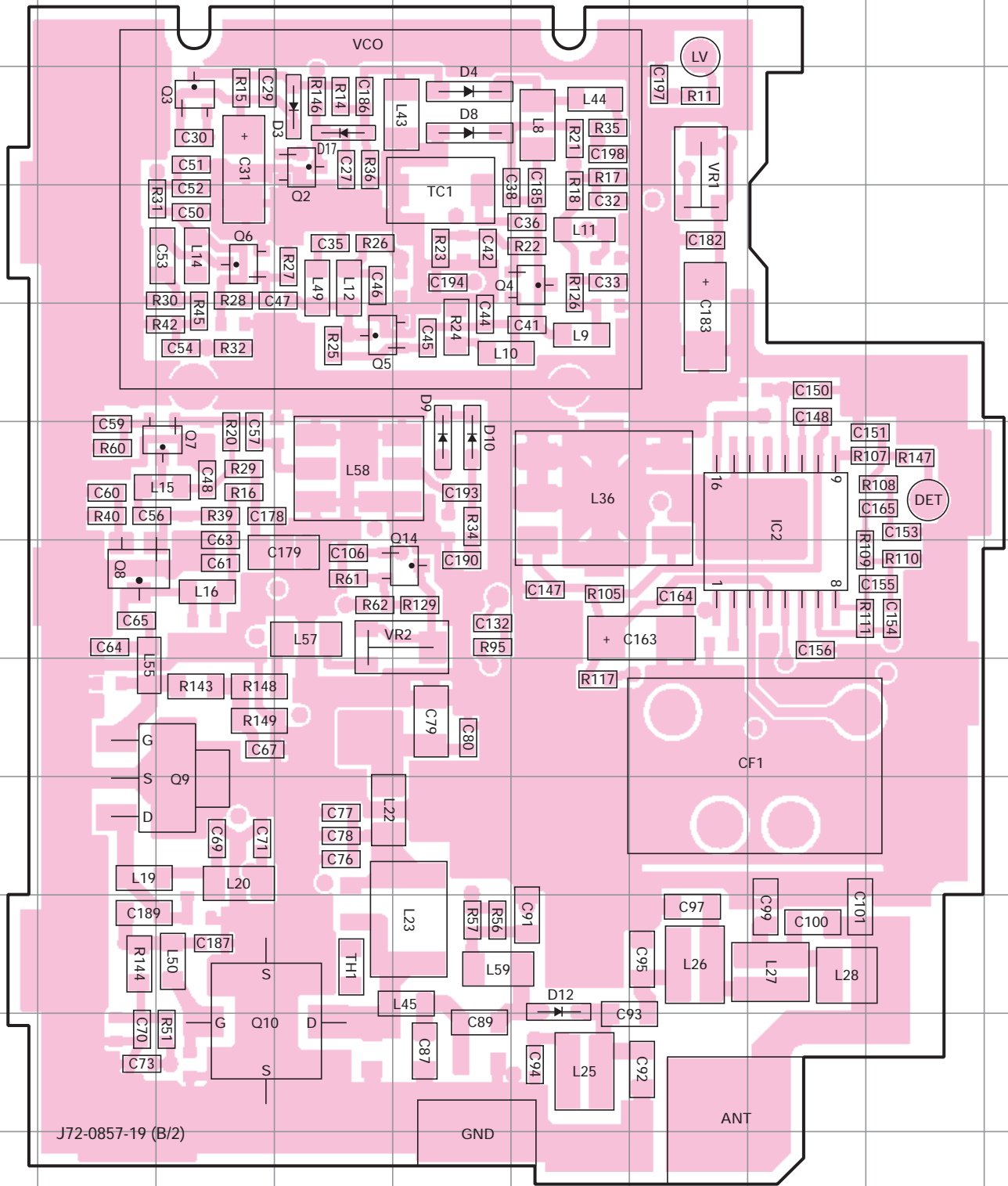
VR1 : Transmit frequency
 VR2 : Power (1 W)
 TC1 : VCO lock voltage (TX 2.5V or less)
 L36 : AF level (Adjust to the MAX)
 LV : VCO lock voltage terminal

VR200 : DQT/QT balance
 VR201 : MAX deviation
 +, - : External power supply terminal (Fasten it with an alligator clip.)

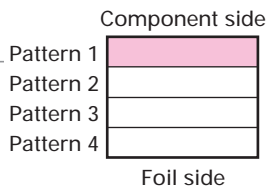
TK-3130/3131 PC BOARD VIEW

TX-RX UNIT (X57-6460-XX) (B/2) Component side view

-10 : TK-3130/3131 K -31 : TK-3131 A



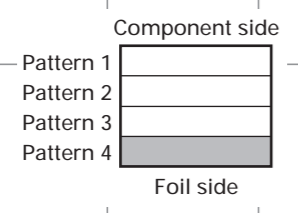
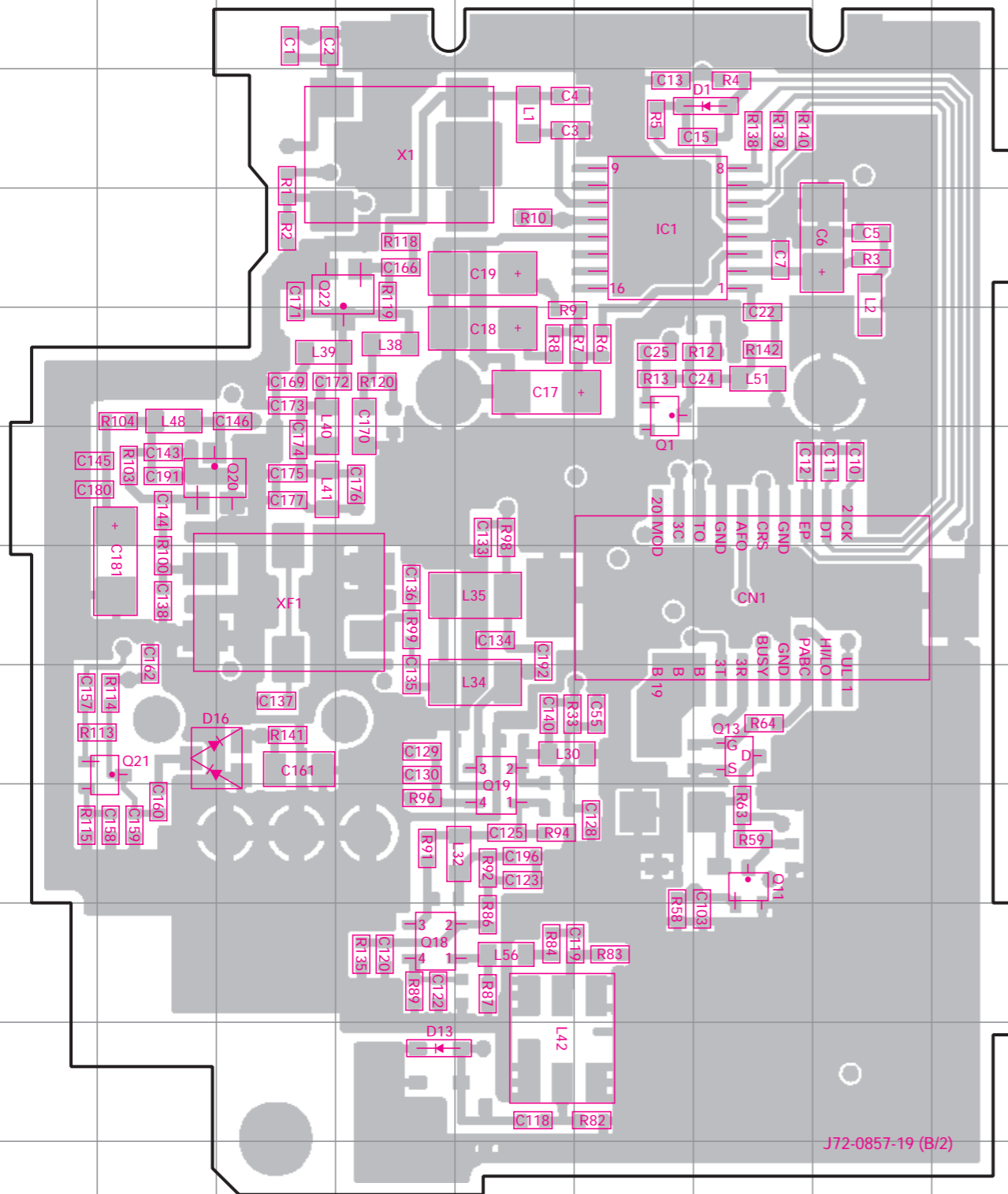
J72-0857-19 (B/2)



Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC2	6H	Q7	6C	D4	3E
Q2	3D	Q8	7B	D8	3E
Q3	3C	Q9	9C	D9	6E
Q4	4F	Q10	11C	D10	6E
Q5	5D	Q14	7E	D12	10F
Q6	4C	D3	3D	D17	3D

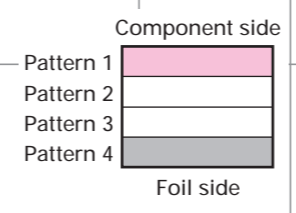
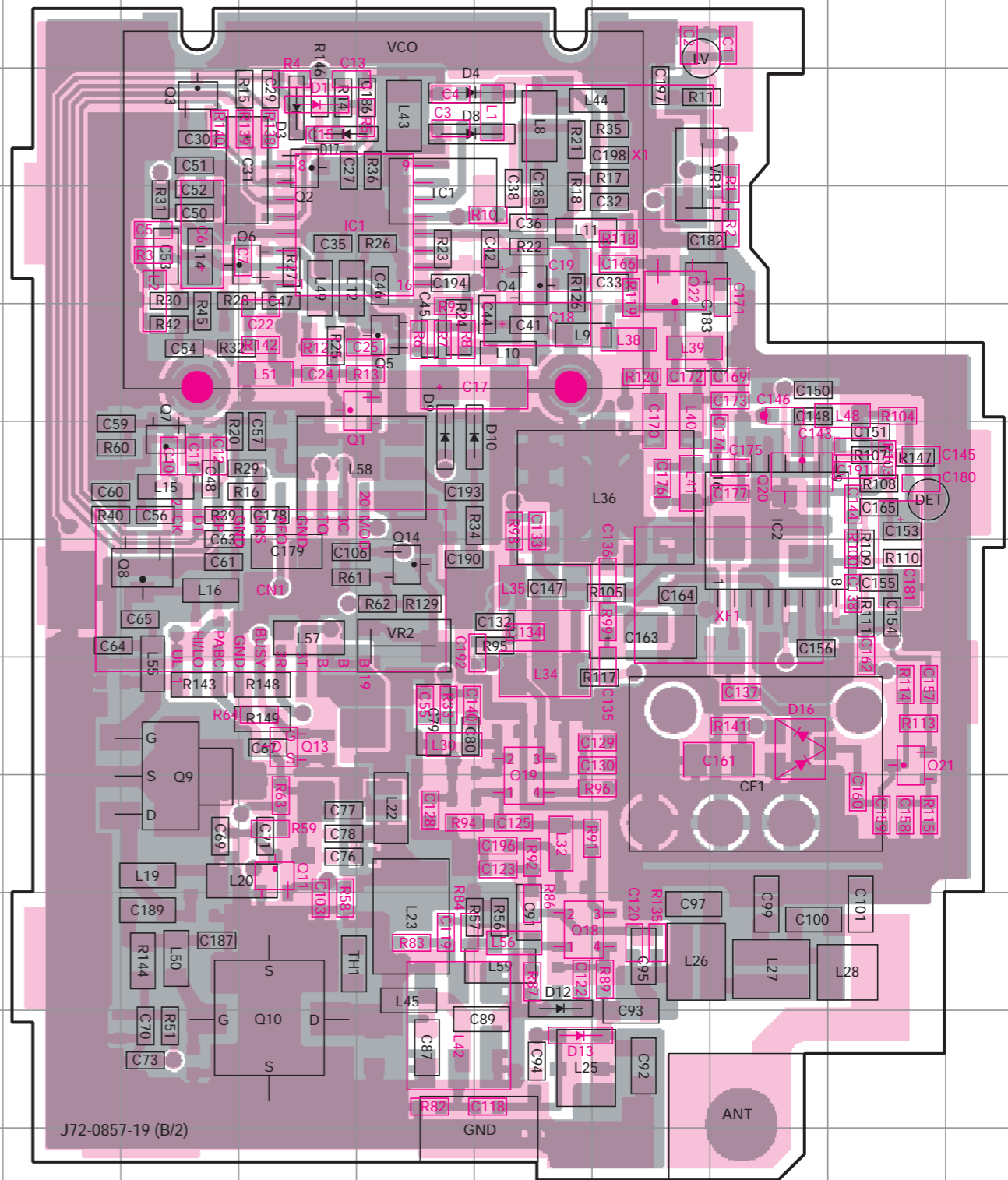
PC BOARD VIEWS TK-3130/3131

TX-RX UNIT (X57-6460-XX) (B/2) Foil side view
-10 : TK-3130/3131 K -31 : TK-3131 A



Ref. No.	Address	Ref. No.	Address
IC1	4F	Q20	6B
Q1	5F	Q21	8B
Q11	9G	Q22	4D
Q13	8G	D1	3G
Q18	10D	D13	11D
Q19	9E	D16	8C

TX-RX UNIT (X57-6460-XX) (B/2) Component side view + Foil side
-10 : TK-3130/3131 K -31 : TK-3131 A

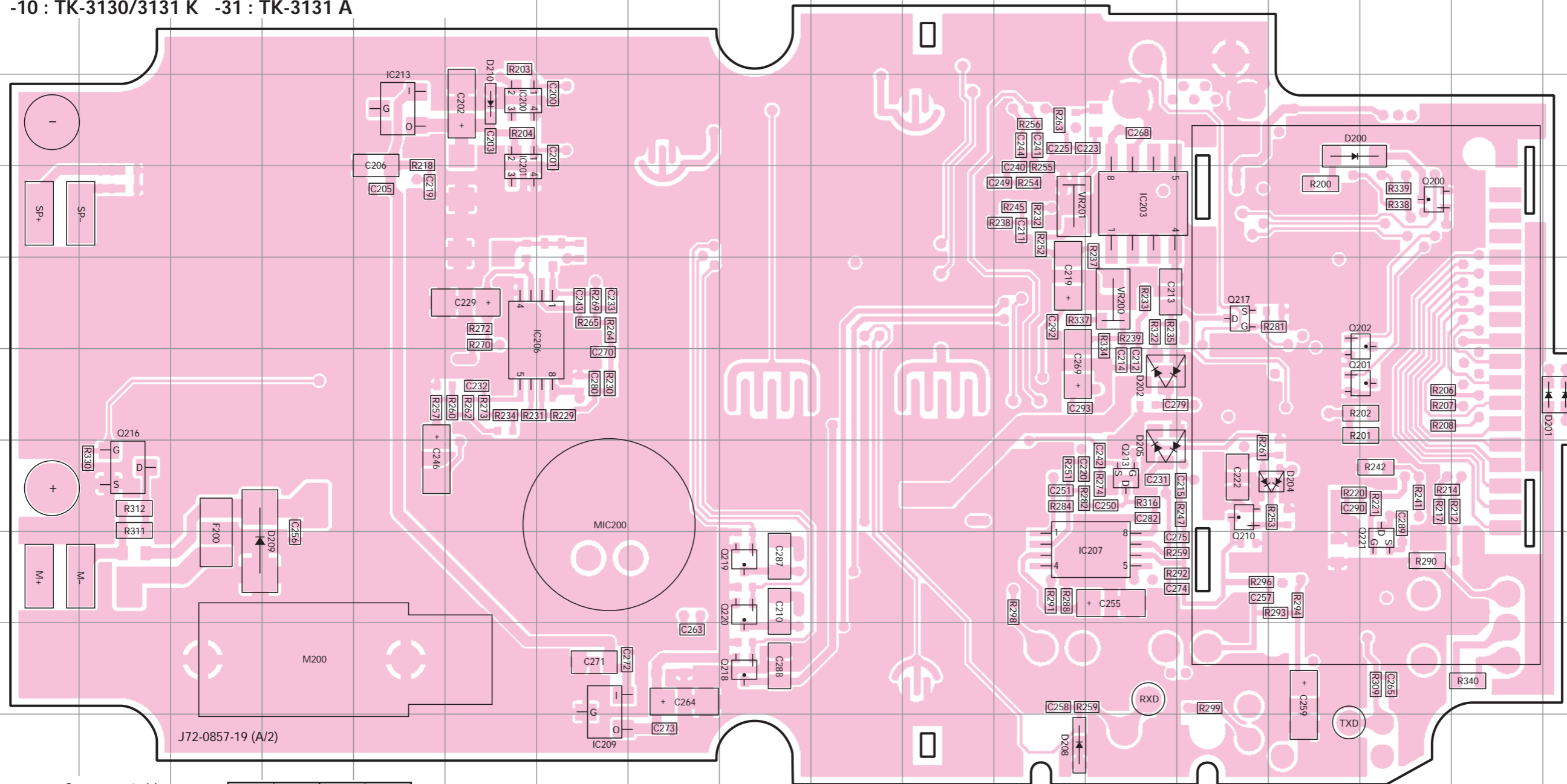


● Connect 1 and 4

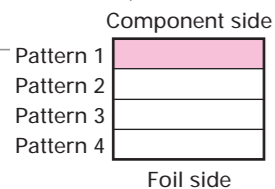
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IC1	4M	Q5	5N	Q11	9M	Q21	8R	D9	6N
IC2	6Q	Q6	4M	Q13	8M	Q22	4P	D10	6O
Q1	5N	Q7	6L	Q14	7N	D1	3M	D12	10O
Q2	3M	Q8	7L	Q18	10O	D3	3M	D13	11O
Q3	3L	Q9	9L	Q19	9O	D4	3N	D16	8Q
Q4	4O	Q10	11M	Q20	6Q	D8	3N	D17	3M

TK-3130/3131 PC BOARD VIEW

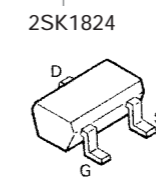
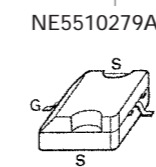
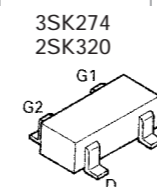
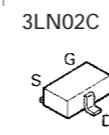
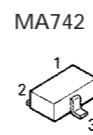
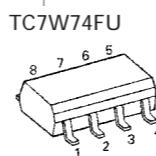
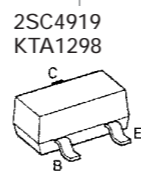
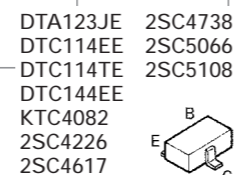
TX-RX UNIT (X57-6460-XX) (A/2) Component side view
 -10 : TK-3130/3131 K -31 : TK-3131 A



J72-0857-19 (A/2)

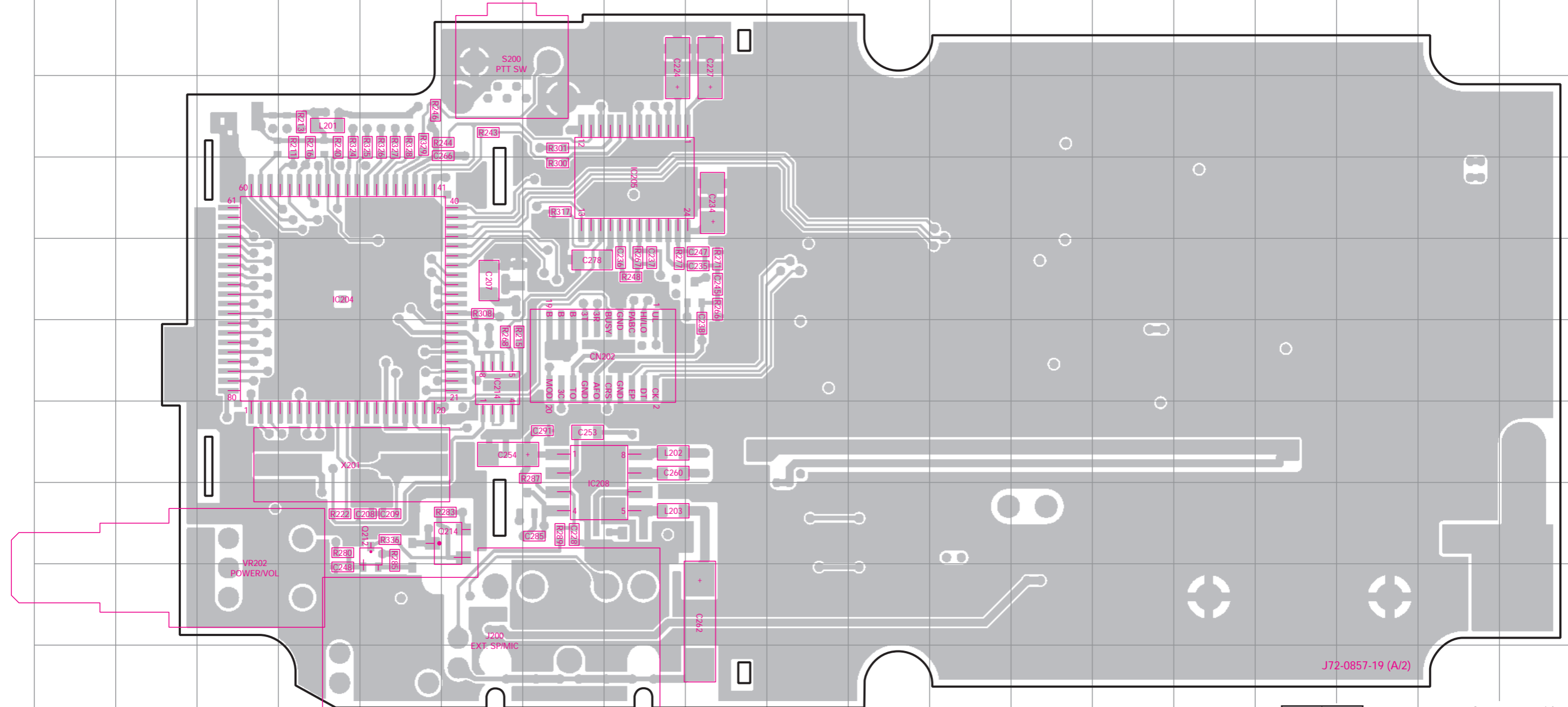


Ref. No.	Address	Ref. No.	Address
IC200	3F	Q217	5N
IC201	4F	Q218	9I
IC203	4M	Q219	8I
IC206	5G	Q220	8I
IC207	8M	Q221	8P
IC209	9G	D200	3O
IC213	3E	D201	6R
Q200	4P	D202	6M
Q201	6P	D204	7O
Q202	5P	D205	7M
Q210	7N	D208	10L
Q213	7M	D209	8C
Q216	7B	D210	3F



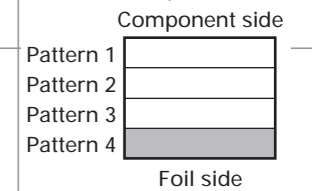
PC BOARD VIEW TK-3130/3131

TX-RX UNIT (X57-6460-XX) (A/2) Foil side view
 -10 : TK-3130/3131 K -31 : TK-3131 A

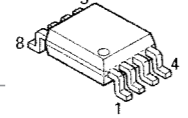


J72-0857-19 (A/2)

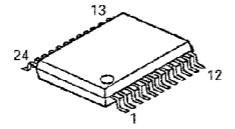
Ref. No.	Address
IC204	5D
IC205	4H
IC208	8G
IC214	6F
Q212	8E
Q214	8F



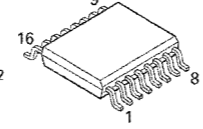
LM4865M
 NJM2100V
 24LC08BT-ISN



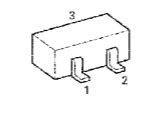
AK2368



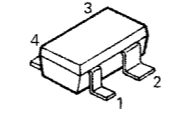
TA31136FN



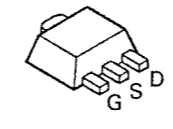
TK71530ASCL



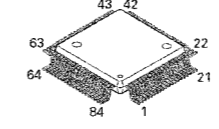
XC61CN2702N
 XC61CN2902N



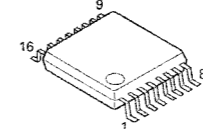
2SK3078



MN101C54AKA



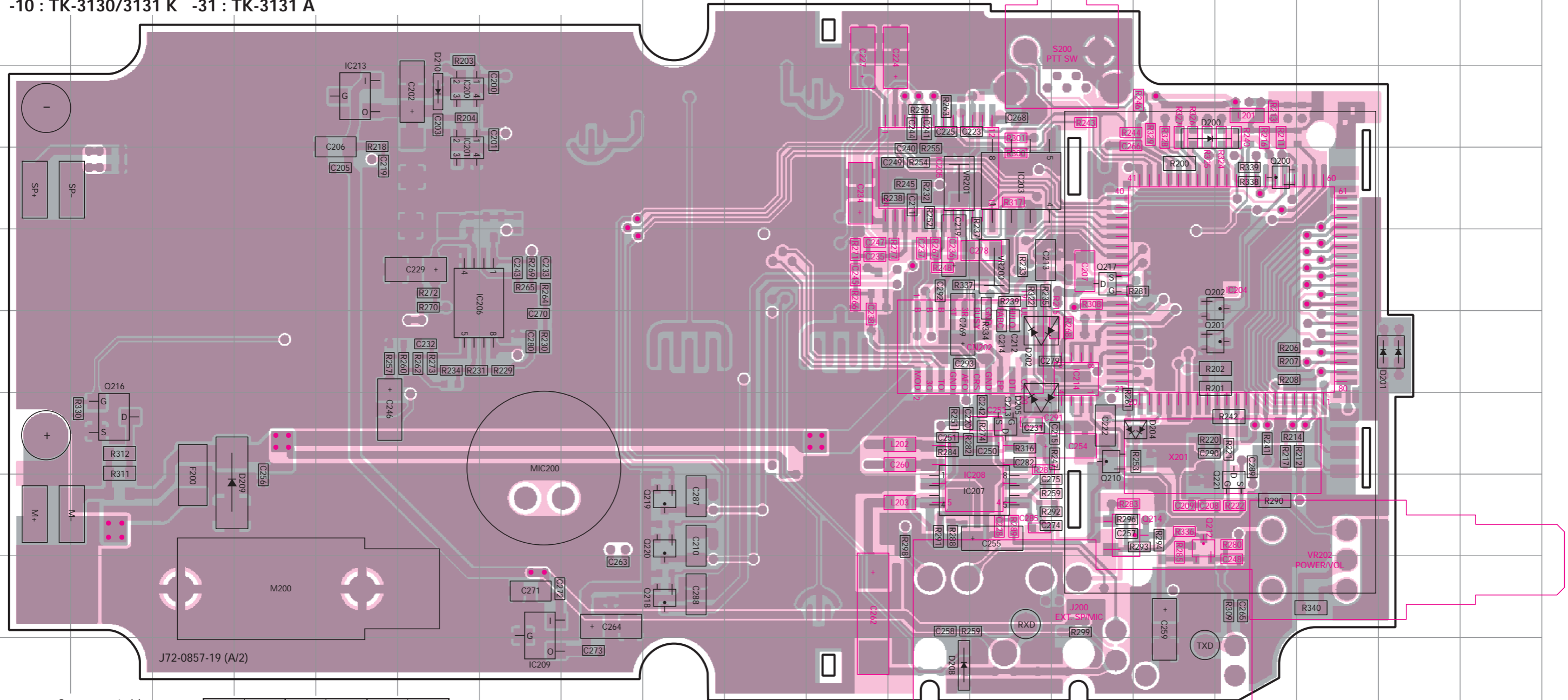
TB31202FN



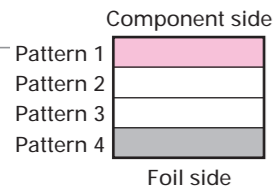
TK-3130/3131 PC BOARD VIEW

TX-RX UNIT (X57-6460-XX) (A/2) Component side view + Foil side

-10 : TK-3130/3131 K -31 : TK-3131 A



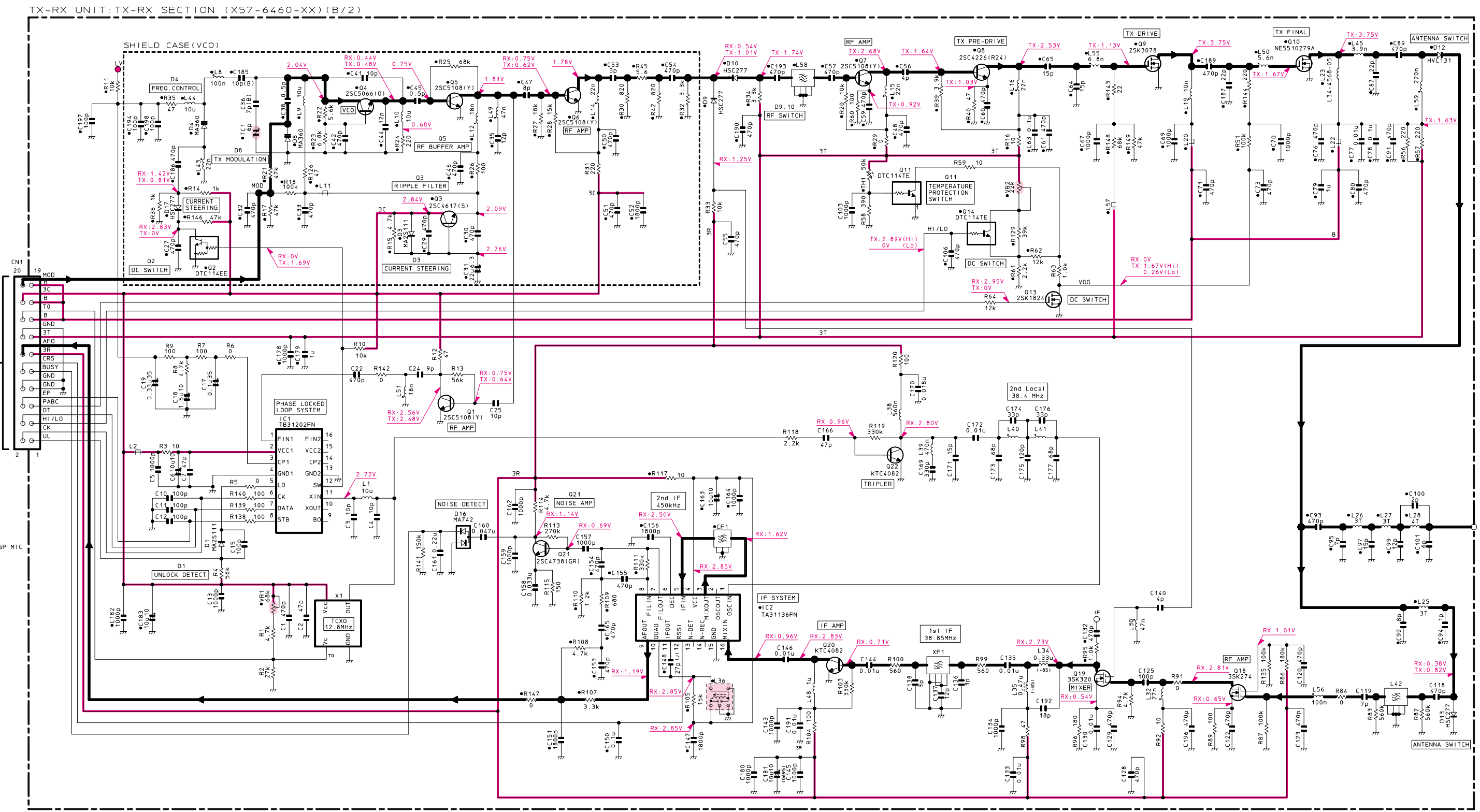
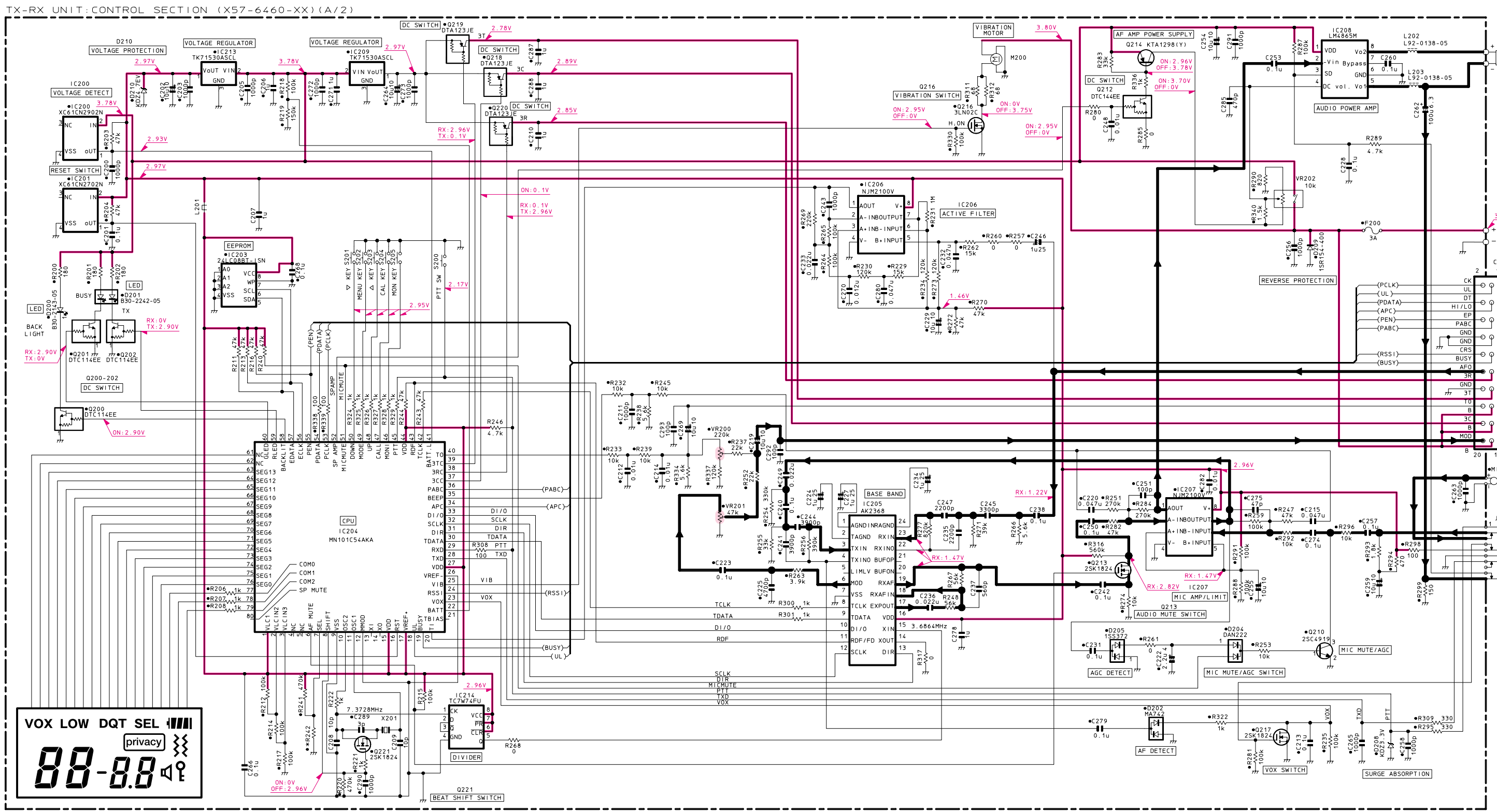
J72-0857-19 (A/2)



● Connect 1 and 4

Ref. No.	Address	Ref. No.	Address	Ref. No.	Address
IC200	3F	Q200	4P	Q220	8I
IC201	4F	Q201	6P	Q221	8P
IC203	4M	Q202	5P	D200	3O
IC204	5P	Q210	7N	D201	6R
IC205	4L	Q212	8O	D202	6M
IC206	5G	Q213	7M	D204	7O
IC207	8M	Q214	8N	D205	7M
IC208	8M	Q216	7B	D208	10L
IC209	9G	Q217	5N	D209	8C
IC213	3E	Q218	9I	D210	3F
IC214	6N	Q219	8I		

Note : Component marked with a dot (●) are parts of pattern 1.



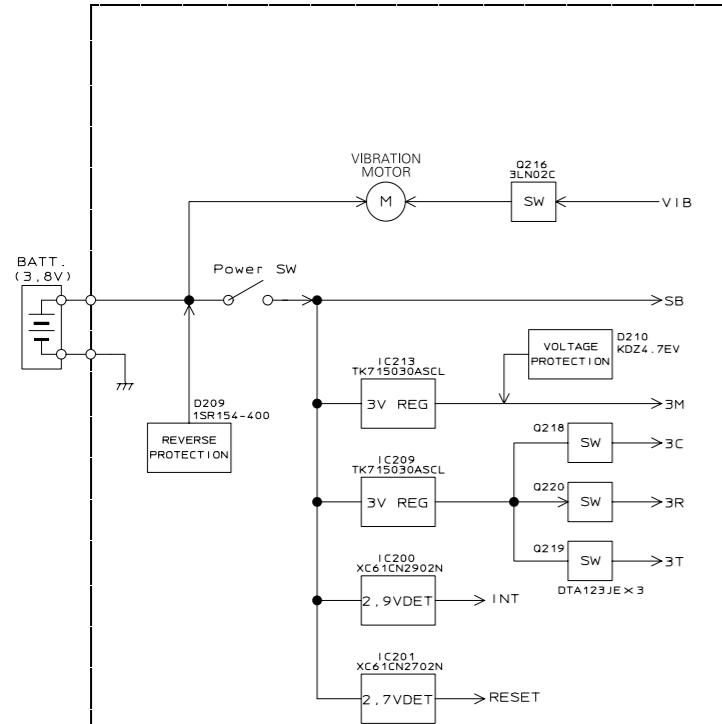
X57-6460-XX	R242	D200	830-2143-05	IC200	XC61CN2902N	Q200-202	DTC114EE
-10 TK-3130/3131	K 0	D201	830-2242-05	IC201	XC61CN2902N	Q210	25C4919
-31 TK-3131	A NO	D202	MA742	IC203	24LC08BT-15N	Q212	DTC144EE
		D204	DAN222	IC204	MN101CS4AKA	Q213, 217, 221	25K1824
		D205	155372	IC205	AK2368	Q214	KTA12981Y1
		D208	4023 3V	IC206, 207	LM100V	Q216	3UN02C
		D209	1SR154-400	IC208	LM485M	Q218-220	DTC123JE
		D210	KD24 7EV	IC209, 213	TK71530ASCL		
				IC214	TC7W74FU		

D1, 3	MA2511	IC1	7831202FN	O1, 5-7	25C51081Y1	O9	35K3078	O19	35K320
D4, 8	MA742	IC2	TA31136FN	O2	DTC114EE	O10	NE5510279A	O20, 22	KTC4082
D9, 10, 13, 17				O3	25C46171S1	O11, 14	DTC114TE	O21	25C473816R1
D12	HVC131			O4	25C5066101	O13	25K1824		
D16	MA742			O8	25C42261R24	O18	35K274		

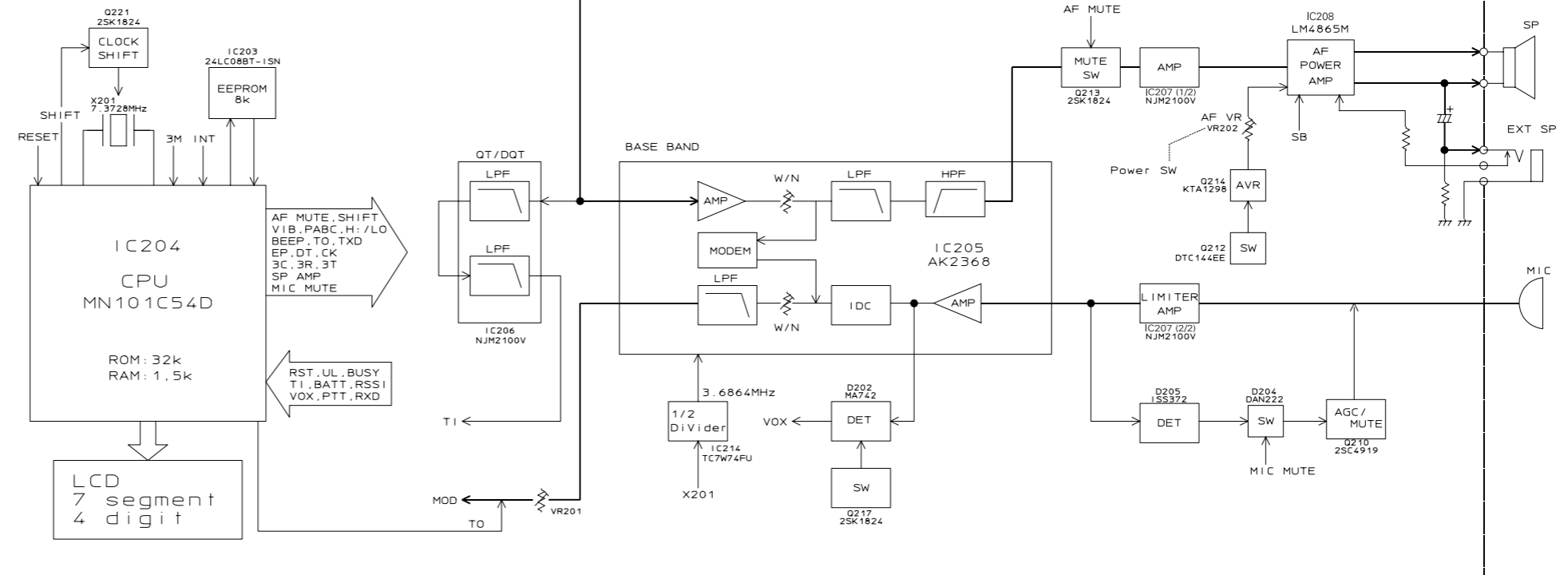
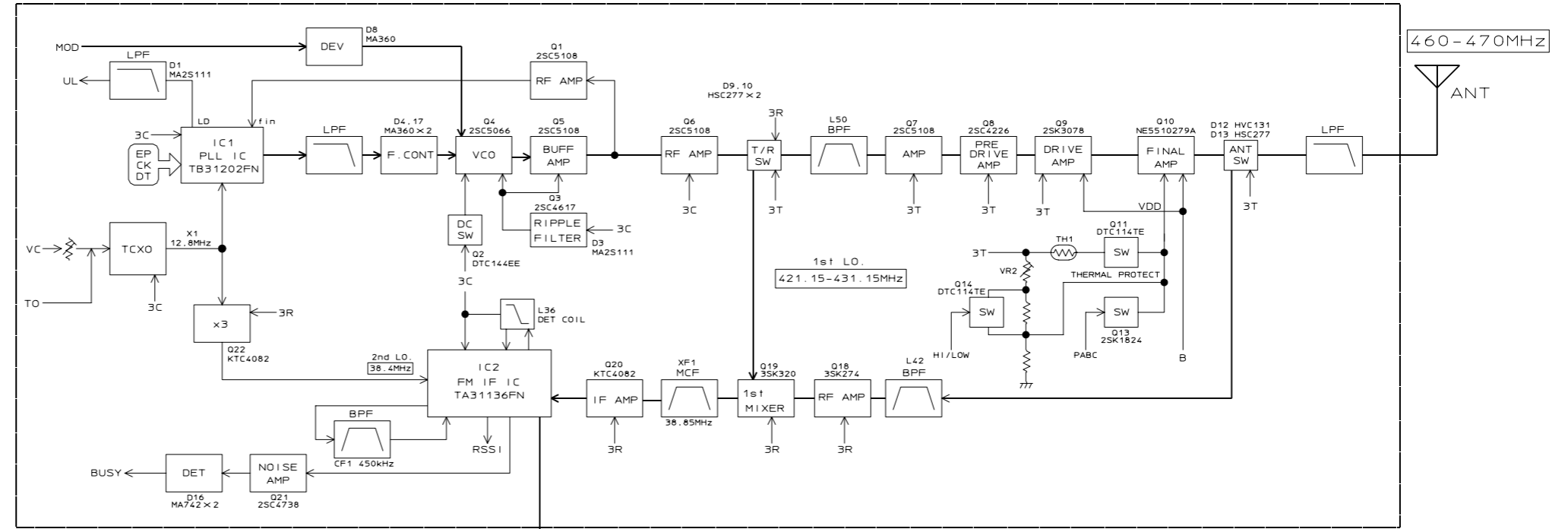
TK-3130/3131 TK-3130/3131

BLOCK DIAGRAM

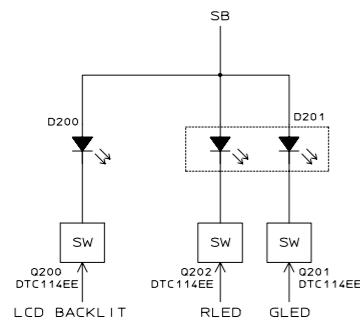
CONTROL : X57-646 (A/2)



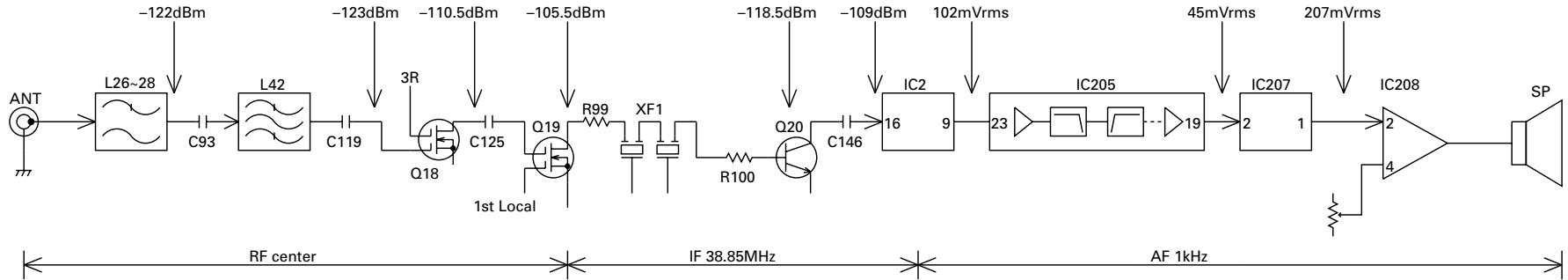
RF : X57-646 (B/2)



- KEY**
- MODE
 - UP
 - DOWN
 - PTT
 - MON I
 - CALL



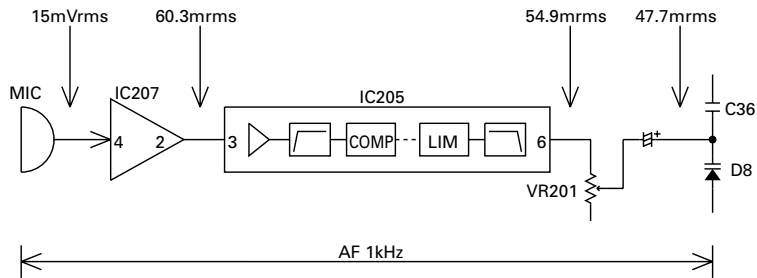
Receiver Section



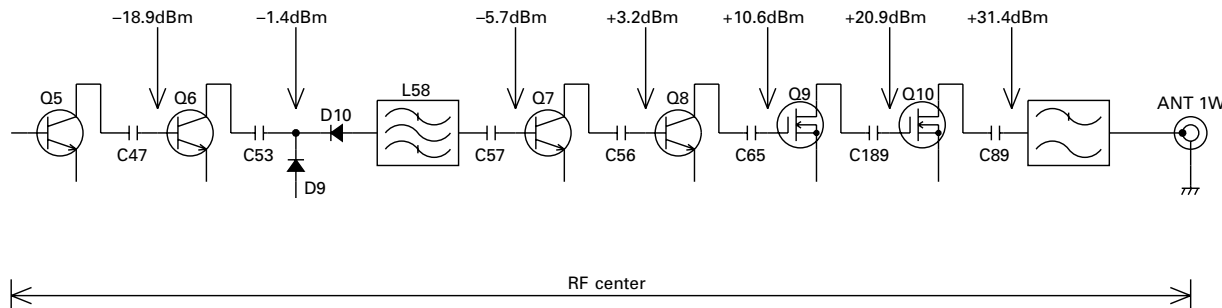
SG output level for obtaining 12dB/SINAD when injected to each point through a 470pF coupling capacitor.

Modulate the AF level with a frequency of 1kHz and deviation of 1.5kHz (Narrow), 3kHz (Wide). Then take the signal from the signal generator output when set to -53dBm and obtain the level shown on an AF VTVM when the AF output has been adjusted to 0.63Vrms with the AF vol.

Transmitter Section



AG is set to the MIC input becomes 3.0kHz DEV. at 1kHz. To make measurements in the AF section, connect the AC level meter. In the RF section, use a 1000pF coupling capacitor.



TK-3130/3131

TERMINAL FUNCTION / KNB-27N (Ni-MH BATTERY PACK)

TERMINAL FUNCTION

■ CN1 and CN202

Pin No.	Pin name	Function
1	UL	PLL unlock line
2	CK	PLL clock line
3	HI/LO	Hi or Lo RF power switching line
4	DT	PLL data line
5	PABC	Control line for TX RF power B
6	EP	Enable for PLL
7	GND	Ground
8	GND	Ground
9	BUSY	Squelch signal output
10	CRS	RSSI signal output
11	3R	RX power supply
12	AFO	RX audio line
13	3T	TX power supply
14	GND	Ground
15	B	+B
16	TO	Tone line
17	B	+B
18	3C	Common power supply
19	B	+B
20	MOD	Modulation line

KNB-27N

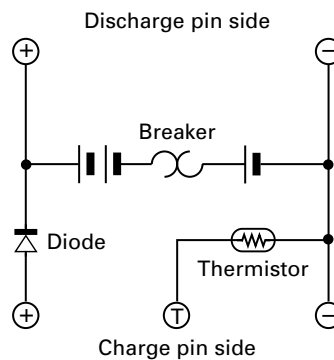
■ External View



■ Specifications

Voltage	3.6V (1.2V x 3)
Charging current	1300mAh
Dimensions	14.2 W x 52.1 H x 46.1 D (mm)
Charger and charging time	KSC-28 (Rapid charger), approximately 150 minutes
Weight	85g

■ Circuit Diagram



SPECIFICATIONS

General

Frequency	Preprogrammed
Number of Channels	
TK-3130	K : 2CH
TK-3131	K : 15CH A : 14CH
Channel Spacing (PLL Channel Stepping)	12.5kHz
Deviation	
TK-3130	K : 2.5kHz
TK-3131	K : 5kHz A : 2.5kHz
RF Output Power (High/Low)	1W / 500mW
Operating Voltage	3.8V DC (3.3~5V)
Battery Life (5-5-90 Duty Cycle)	Up to 10 hours (at KNB-27N high power)
Operating Temperature Range	-10°C to +60°C (+14°F to +140°F)
Frequency Stability	±2.5ppm
Dimensions (W x H x D)	56 (2-13/64) x 117.5 (4-5/8) x 28.75 (1-1/8) mm (inches) (Dimensions without antenna, accessory and optional item)
Weight	
TK-3130/3131	K : Approx. 200g (7.0 oz) with KNB-27N battery and antenna
TK-3131	A : Approx. 190g (6.7 oz) with 3AA batteries and antenna
Standard Load	
Antenna Impedance	50Ω
MIC Input	2kΩ
AF Output	8Ω

TK-3130/3131

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