

TKR-720/N/A

SERVICE MANUAL

SUPPLEMENT

This service manual is the same as the service manuals for TKR-720 (K,M,K2,M2) destinations and for TKR-720N (M,M2), TKR-720A (M,M2) destinations except that this manual contains new items for TKR-720N (K,K2) destinations.

Use it together with the previous service manuals (B51-8088-00 and B51-8088-10).

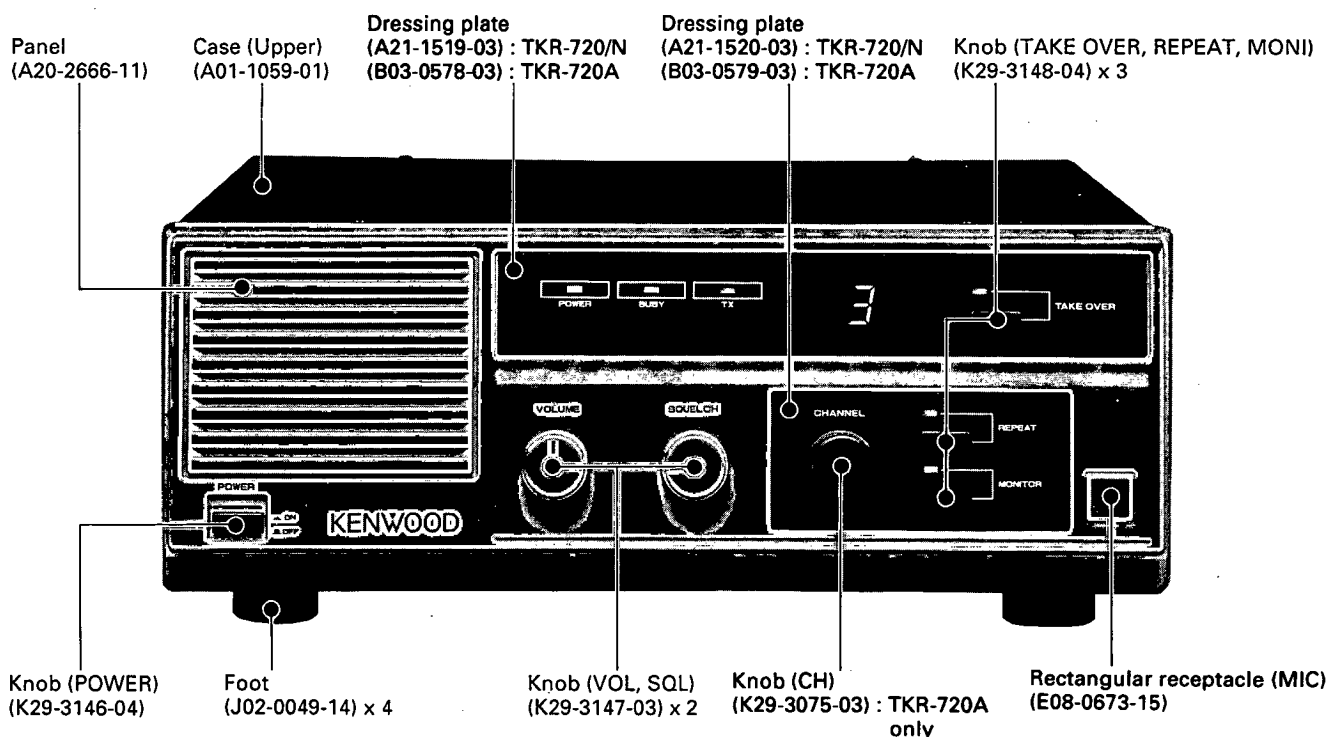


Photo is TKR-720A type.

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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 informations 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.

PERSONNEL SAFETY

The following precautions are recommended for personnel safety :

- DO NOT transmit if someone is within two feet (0.6 meter) of the antenna.
- 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.
- All equipment should be properly grounded before power-up for safe operation.
- This equipment should be serviced by a qualified technician only.
- Be careful against electric hazard, for the commercial power supply is being applied to the internal circuitry of the radio even when the Power switch is OFF.

FCC COMPLIANCE AND TYPE NUMBERS

Type acceptance number	Frequency range	Compliance
ALHTKR-720-1	150 to 174MHz	Part 22, 74 and 90
ALHTKR-720N-1	150 to 174MHz	Part 22, 74 and 90
ALHTKR-720N-2	136 to 150MHz	Part 22, 74 and 90

1. POWER-UP

To push on the radio. The POWER indicator will illuminate to indicate power is ON.

2. TO RECEIVE

Operation	Procedure
1. Disable QT If so programmed.	Push on MONITOR switch.
2. Unsquench radio	Turn SQUELCH control counter-clockwise until noise is heard.
3. Set VOLUME control	Adjust VOLUME control for a normal listening level.
4. Set SQUELCH control	Advance SQUELCH control clockwise until noise just stops.
The radio will now receive all traffic on the selected channel.	
5. Enable QT If so programmed.	Press the MONITOR switch to OFF.
You will now hear messages for your system only.	

3. TO TRANSMIT (In case a microphone is connected)

Operation	Procedure
1. Disable QT	Depress MONITOR switch on front panel or microphone.
2. LISTEN	DO NOT TRANSMIT if channel is in use.
3. Key transmitter	Press and hold the microphone PTT switch. The Red LED on the front panel will glow indicating the transmitter is ON.
4. Transmit message	Hold microphone at about 2 inches distance and speak at a normal voice level. Keep transmissions brief.
5. Receive reply	Release the microphone PTT switch.
6. Enable QT at end of the conversation If so programmed.	Depress MONITOR to the out position.

4. DURING OPERATION OF REPEATER

Operation	Procedure
1. Enable repeat	Press the REPEAT switch to ON.
2. Start of repeat	When a signal including the object tone signal (provided that it has been programmed) is input and if its level is higher than the preset squelch level, a signal modulated by the set tone signal (provided that it has been programmed) and received audio signal is transmitted.
3. End of repeat	When the received signal disappears, the transmission is stopped after the set period of time. There indicator lights while the signal is transmitted.
4. Disable repeat	Press the REPEAT switch again to OFF.

GENERAL / SYSTEM SET-UP

PRE-INSTALLATION CONSIDERATIONS

1. UNPACKING

Unpack the radio from its shipping container and check for accessory items. If any item is missing, please contact KENWOOD immediately.

2. LICENSING REQUIREMENTS

Federal regulations require a station license for each radio installation (mobile or base) be obtained by the equipment owner. The licensee is responsible for ensuring transmitter power, frequency, and deviation are within the limits permitted by the station license.

Transmitter adjustments may be performed only by a licensed technician holding an FCC first, second or general class commercial radiotelephone operator's license. There is no license required to install or operate the radio.

3. PRE-INSTALLATION CHECKOUT

3-1. Introduction

Each radio is adjusted and tested before shipment. However, it is recommended that receiver and transmitter operation be checked for proper operation before installation.

3-2. Testing

The radio should be tested complete with all cabling and accessories as they will be connected in the final installation. Transmitter frequency, deviation, and power output should be checked, as should receiver sensitivity, squelch operation, and audio output. QT equipment operation should be verified.

4. PLANNING THE INSTALLATION

4-1. General

Inspect the vehicle and determine how and where the radio antenna and accessories will be mounted.

Plan cable runs for protection against pinching or crushing wiring, and radio installation to prevent overheating.

4-2. Antenna

When an outdoor antenna is to be installed, select an unobstructed position with good visibility.

The VSWR of the antenna should be no more than 2.

Select a coaxial cable with as small loss as possible, and its length should be as short as possible.

4-3. Radio

Install the radio on a rack using rack-mount brackets, or on a flat surface that can withstand its weight. Do not install the radio in a place subject to direct sunlight or near heating equipment. Avoid wet place, and install it in a well-ventilated place.

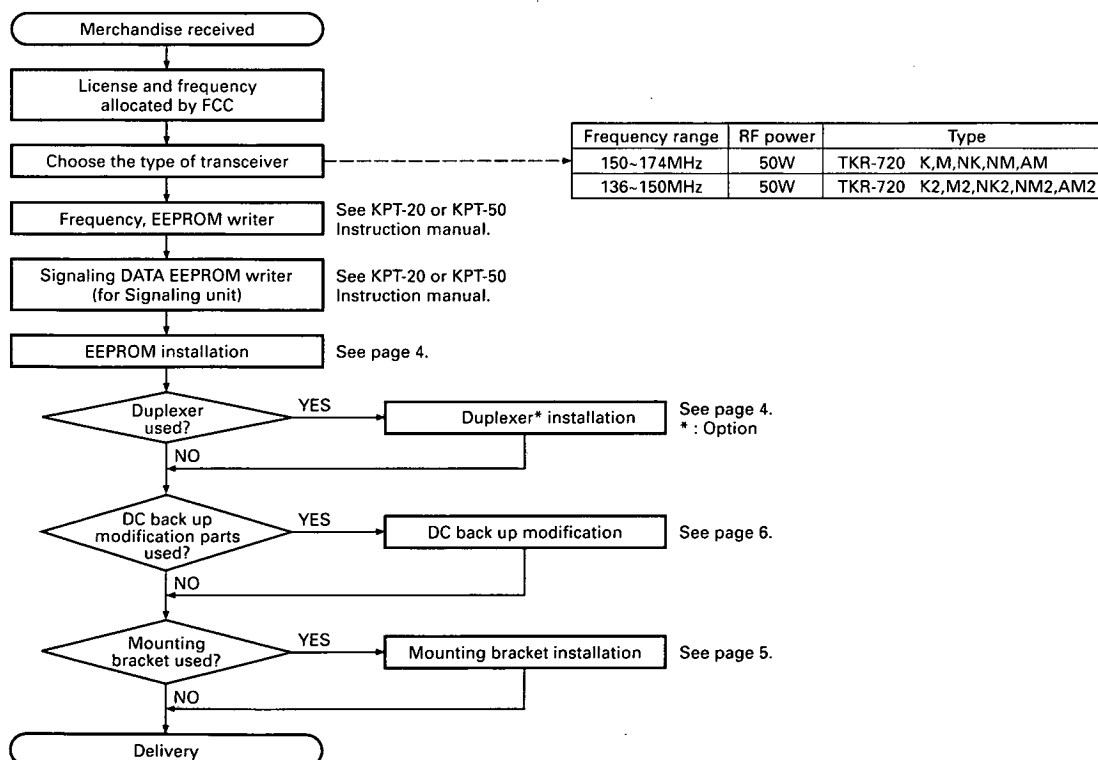
4-4. AC power supply

This unit has been designed for use exclusively with commercial AC power supply. As the rated current for transmission output attains about 2A, connect the unit to a wall outlet that can handle this current with margin.

SERVICE

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

Preparation : Prepare an EEPROM writer, KPT-20 or KPT-50.

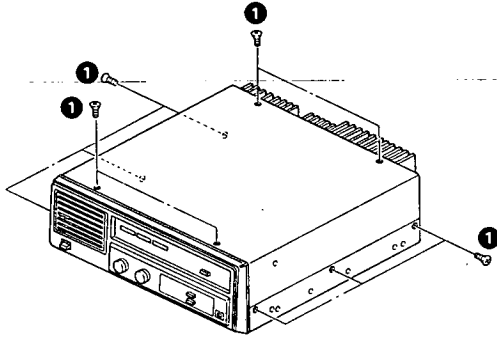


INSTALLATION

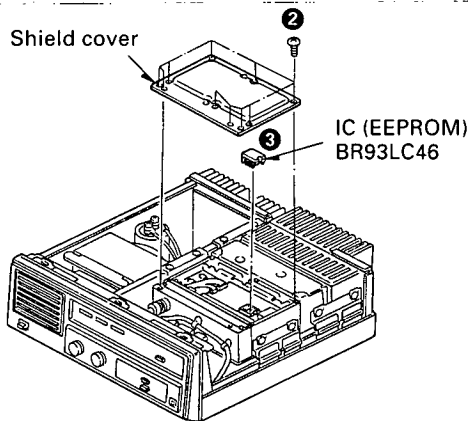
Installing the EEPROM of Signaling Unit

Note : EEPROM is inserted into the Signaling unit of the TKR-720. Install it after writing the data using the ROM writer (KPT-20 or KPT-50).

1. Remove the 10 screws (1) holding the upper case to remove the upper case.



2. Remove the 11 screws (2) holding the shield cover to remove the shield cover.
3. Insert the EEPROM (3) on which the data has been written into the IC socket (IC10) on the Signaling unit.

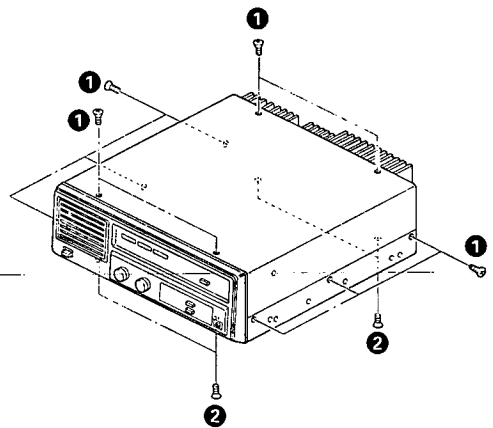


Installing the Duplexer

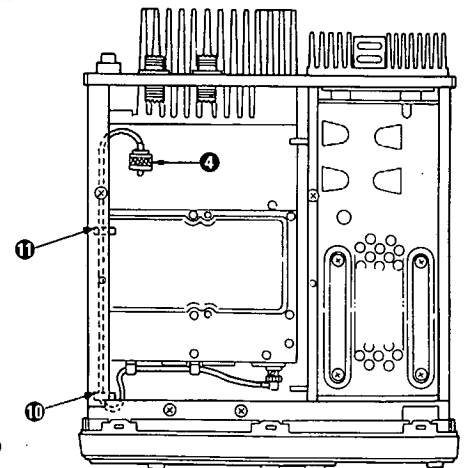
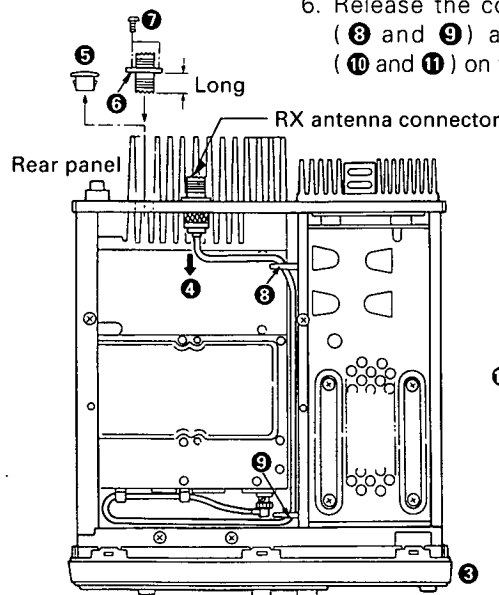
Note : When installing the duplexer in the TKR-720, use the either of the following products ;

1. CELWAVE (USA), 144 to 174MHz (PD633-6A)
2. Installation kit (KCT-11) : option
 - Installing fitting : J21-4339-03 1pc
 - M-M conversion receptacle : E04-0183-05 1pc
 - Lead with connector : E37-0120-08 3pc
 - Truss screw (M4 x 2) : N09-0704-05 6pc
 - Tapping screw (M3 x 8) : N87-3008-46 2pc

1. Remove the 10 screws (1) holding the upper case to remove the upper case.
2. Remove the 4 screws (2) holding the lower case to remove the lower case.

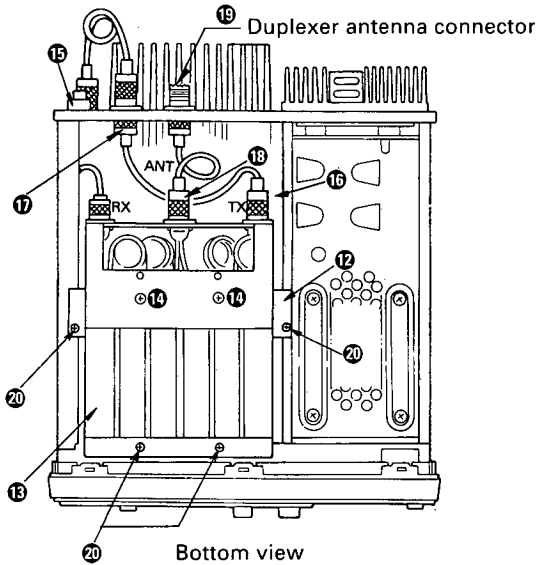


3. After removing the upper and lower cases, turn the set upside down, as shown in the figure (3).
4. Remove the coaxial cables (4) connected to the RX antenna connectors.
5. Remove the bushing (5) in the hole in the rear panel, insert the M-type receptacle (6) into the hole (longer side facing in), and secure it with two tap-tight screws (7).
6. Release the coaxial cable (4) from the wire bands (8 and 9) and secure it with the wire bands (10 and 11) on the opposite side.

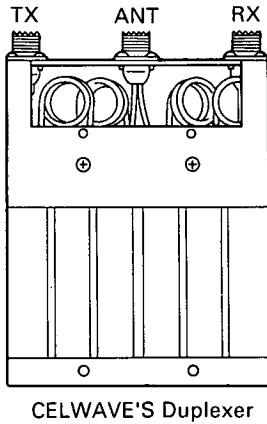


INSTALLATION

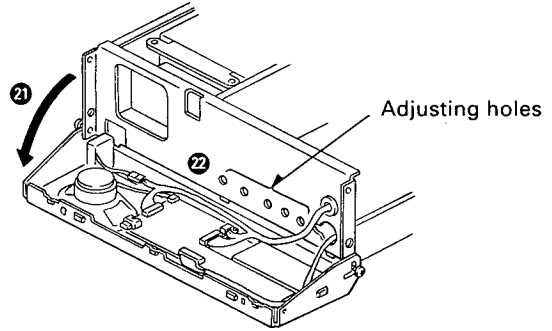
- Secure the installation fitting (12) supplied with the KCT-11 to the duplexer (18) with two screws (14), and put it in position in the TKR-720 without securing it.
- Connect the coaxial cable (4) to the RX connector of the duplexer. Connect the coaxial cables supplied with the KCT-11 to the TX ANT (15) and duplexer TX connector (16) via the M-type receptacle (17). Connect another cable to the duplexer ANT connector (18) and TKR-720 duplexer antenna connector (19).
- After connecting the coaxial cables, secure the duplexer (18) to the TKR-720 with four screws (20).



Note : The input/output connectors of the duplexer manufacture by CELWAVE are located as shown in the figure. Pay attention when connecting the connectors.



Note : When making adjustments after installing the duplexer, remove the front panel and hold down the sub-panel (21), then perform adjustments from the adjusting holes (22).

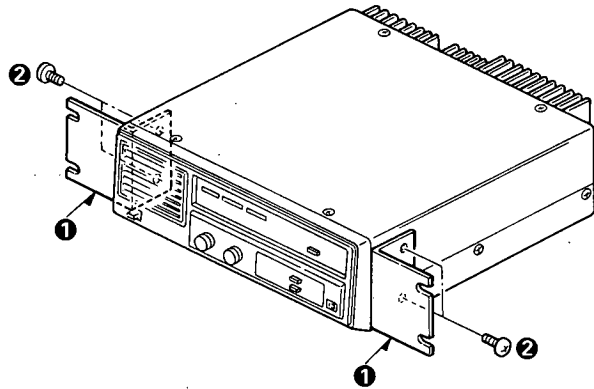


Attaching the Rack-mount Brackets (for EIA racks)

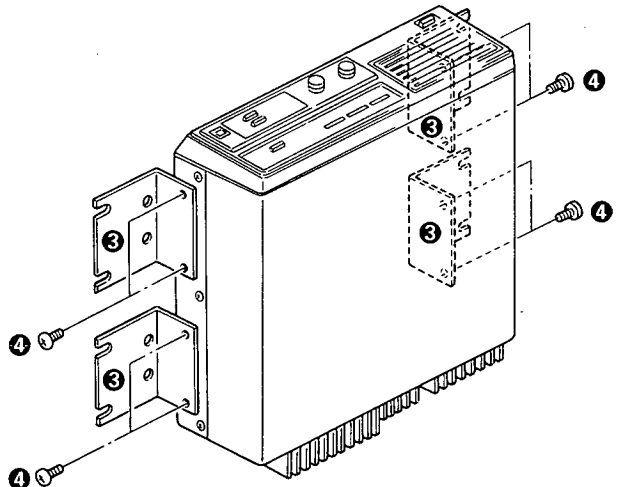
The brackets and screws are optional.

- Brackets : J21-4250-04 (Common for left and right)
- Screw : N09-0704-05 (Use 2 screws per bracket)

- Attach the 2 brackets (1) using 4 screws (2).



- When the TKR-720 is to be mounted vertically; Attach 4 brackets (3), using 8 screws (4), to the sides of the bottom panel.



CONVERSION

Signaling Wait Mode Setting Method

• What is the signaling wait mode?

The KPT-20 or KPT-50 can write signaling codes into channels 1 to 16. The codes written in up to eight channels can be used at a time, and the codes written in channels 1 to 8 are effective. One or more signaling codes to be waited for in the repeater mode can be selected. They can be changed by W4 of the Signaling unit (X52-3140-10).

• Wait mode setting method

Ref. No.	Function	Mode	Setting
W4	Decode change in repeater mode	Short	Two or more codes
		Open	One code

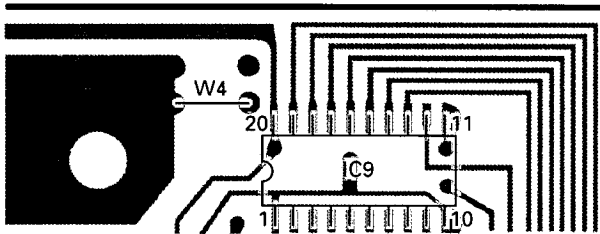
Factory setting : Short

W4 part No. : E31-1448-05

If the signaling wait is one code (W4 : open), the TKR-720/N uses the code written in channel 1, and the TKR-720A uses the signaling code in the displayed channel. If several codes are waited for (W4 : short), the multiple signaling codes written in channels 1 to 8 can be waited for.

Note : This function is available in serial No. 504XXXXX or later, and IC8 (27C256QJESB) or later.

SIGNALING UNIT (X52-3140-10)

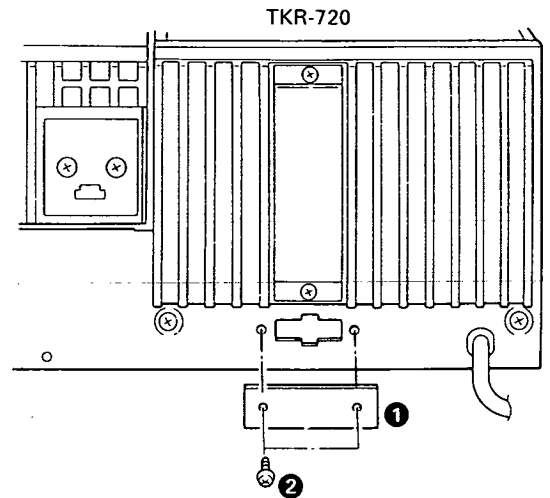


Modification of the DC Switching Circuit (For Backup during a Power Failure) : Excluding TKR-720A

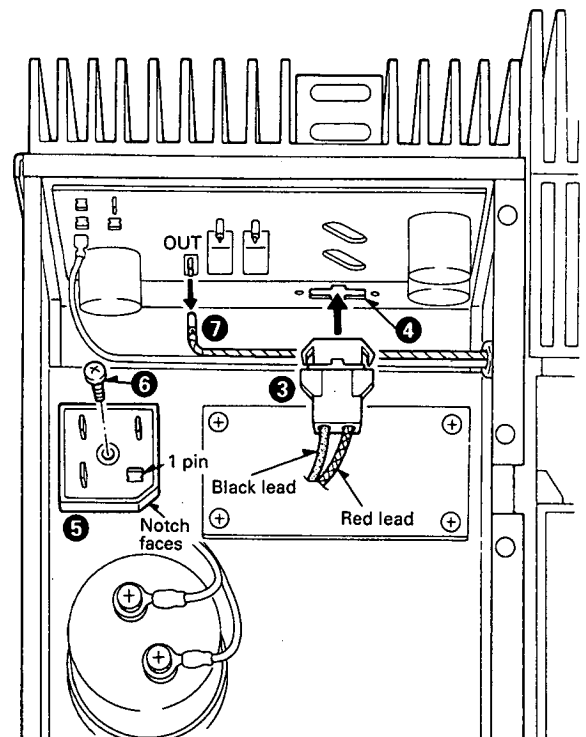
The following parts (optional) are required for the circuit modification.

Diode (S25VB20)	1 pc.
DC cable (E30-2076-15)	1 pc.
Connector with lead wires (E31-3389-15)	1 pc.
Connector with lead wires (E31-3455-15)	1 pc.
Screw (N87-4014-46)	1 pc.

1. From the cover (❶) attached to the rear panel, remove the 2 screws (❷) and take off the cover.

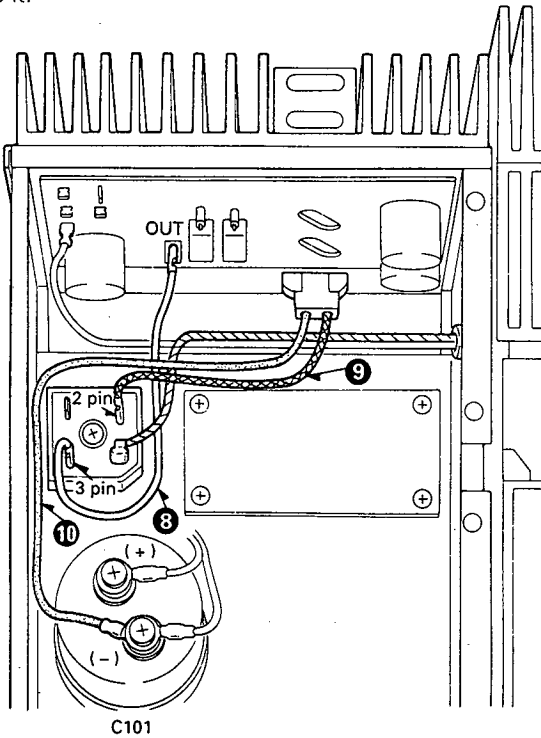


2. Insert the connector with lead wires (❸) into the hole on the rear panel (❹) (so that the red lead is on the right).
3. Place the diode (❺) so that its notch faces the direction shown in the illustration, and attach it using a screw (❻).
4. Disconnect the connector (❼) from the OUT terminal of the AVR unit, and connect its lead wire to pin 1 of the diode (❺).

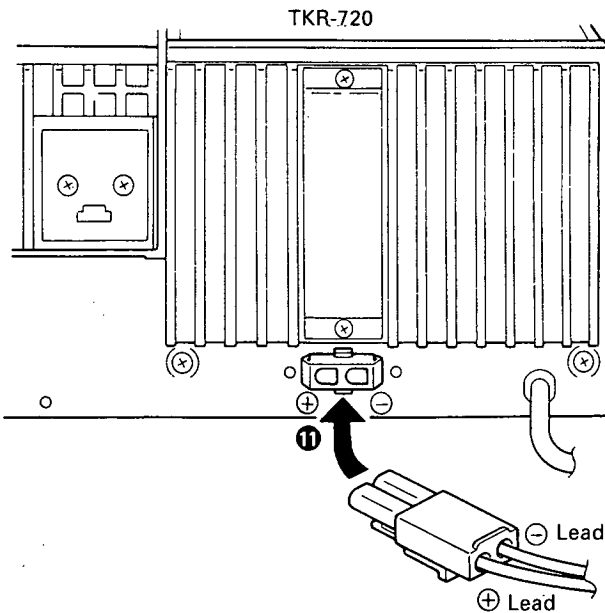


CONVERSION / DISASSEMBLY FOR REPAIR

5. Connect the optional connector with lead wires (8) to the OUT terminal of the AVR unit and to pin 3 of the diode.
6. Connect the red lead (9) of the optional connector with lead wires to pin 2 of the diode, and its black lead (10) to the negative (-) terminal of chemical capacitor C101. Do not disconnect the lead wire which has been connected to the C101 negative terminal, but connect the black lead to it.

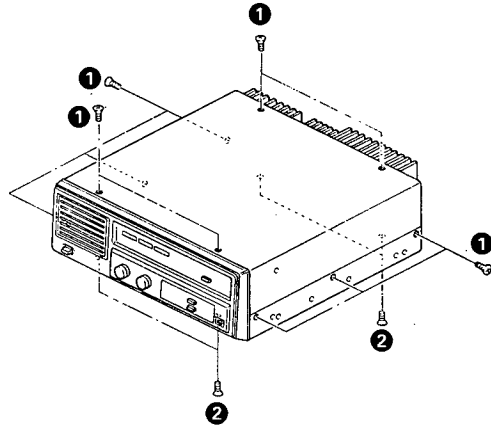


7. Connect the optional DC cable to the connector on the rear panel (11).



How to Remove the Case

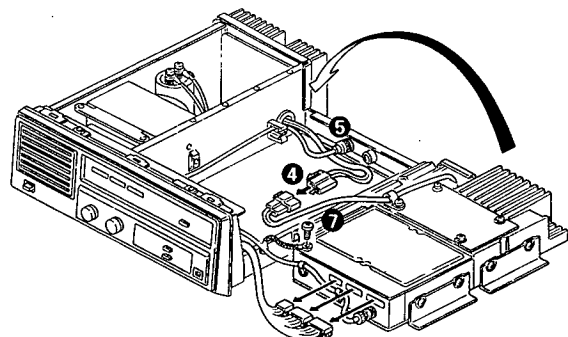
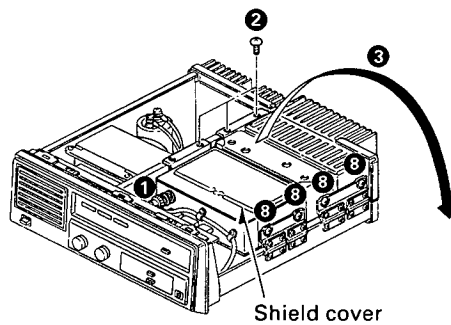
1. Remove the 10 screws (1) holding the upper case to remove the upper case.
2. Remove the 4 screws (2) holding the lower case to remove the lower case.



Disassembling the Transmitter/Receiver Section

1. How to remove the transmitter/receiver section

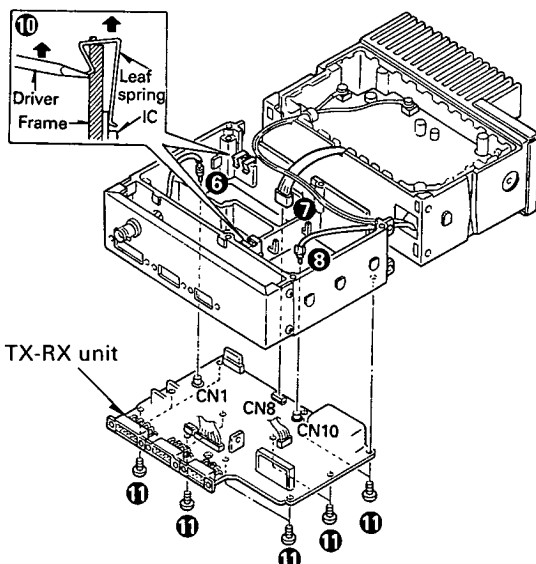
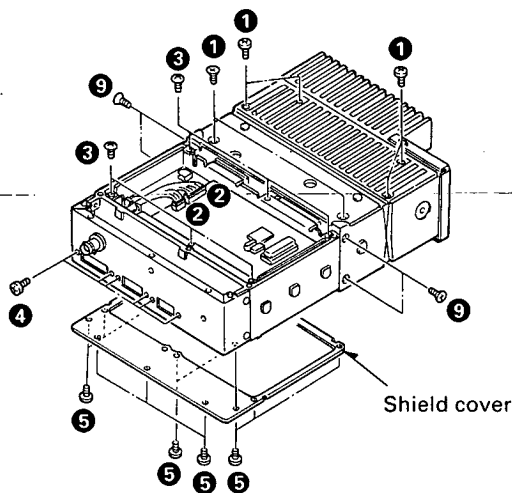
1. Remove the 4 connectors (CN1 to CN4) connected to the panel (Display unit) (1).
2. Remove the 3 screws (2) holding the transmitter/receiver section.
3. While lifting up on the transmitter/receiver section (3), remove the power supply connector (4) and the connector cables (5) connected to the frame, remove the screw (7) securing the transmitter/receiver section, and put the transmitter/receiver section back in place.
4. Remove the 4 screws (8) holding the transmitter/receiver section to the frame to remove the transmitter/receiver section.



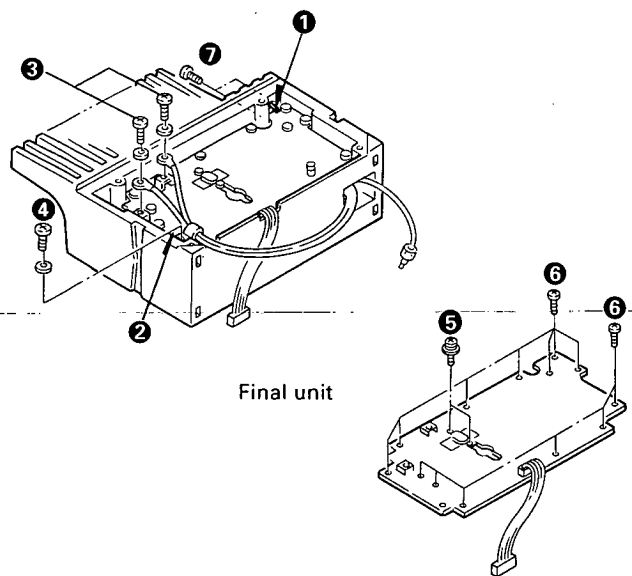
DISASSEMBLY FOR REPAIR

2. How to remove the TX-RX unit

1. Remove the 6 screws (❶) holding the shield cover to remove the shield cover.
2. Remove the 2 connectors (❷) of the Signaling unit and the 6 screws (❸) holding the shield cover to remove the shield cover.
3. Remove the 6 screws (❹) holding the connectors CN2 to CN4.
4. Remove the 11 screws (❺) attached on the bottom of the TX-RX unit to remove the shield cover.
5. Remove the 3 connectors CN1 (❻), CN8 (❼) and CN10 (❽) connected to the TX-RX unit.
6. Remove the 4 screws (❾) connected between the TX-RX unit and Final unit.
7. Remove the leaf spring fixing the two IC's to the frame with a screwdriver, etc. (❿).
8. Remove the 11 screws (⓫) mounting the TX-RX unit to remove the TX-RX unit.

**3. Disassembling the Final ass'y unit****• Final unit (X45-3320-XX) side**

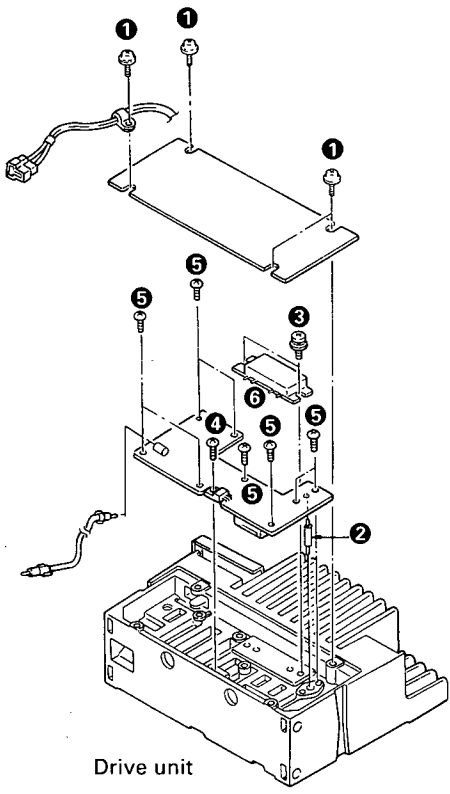
1. Remove the soldered part (❶) of the VHF connector and that (❷) of the lead wire (coaxial cable installed through) from the final unit.
2. Remove the two screws (❸) holding the lead wires of the power connector.
3. Remove the screw (❹) securing the cable holder.
4. Remove the two screws (❺) holding the transistor from the heat sink.
5. Remove the 14 screws (❻) holding the final unit from the heat sink to remove the final unit.
6. Remove the two screws (❼) fixing the VHF connector to remove the connector from the heat sink.

**4. Drive unit (X45-3310-XX) side**

1. Remove the 4 screws (❶) holding the shield cover to remove the shield cover.
2. Remove the soldered part (❷) of the lead wire (coaxial cable installed through) from the drive unit.
3. Remove the two screws (❸) holding the module unit from the heat sink.
4. Remove the screw (❹) holding the transistor from the heat sink.
5. Remove the 8 screws (❺) holding the drive unit from the heat sink to remove the drive unit.

Note: When replacing only the module, remove the screws (❸) and then remove the four soldered parts of the module terminals (❻) to remove the module.

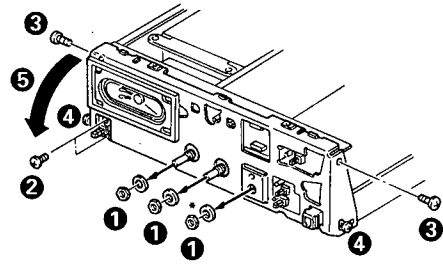
DISASSEMBLY FOR REPAIR



Drive unit

Disassembling the Sub-panel

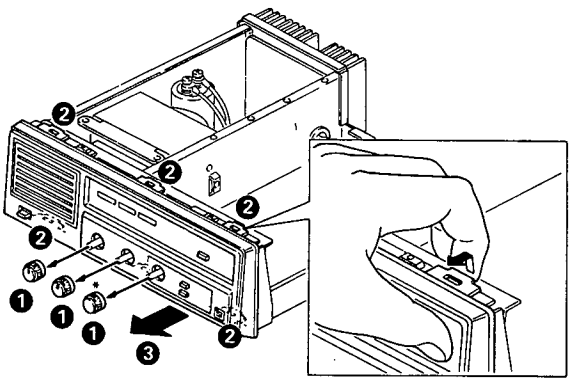
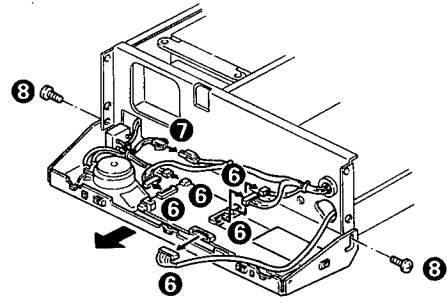
- TKR-720/N
Remove the 2 nuts and 2 washers holding the VOLUME and SQUELCH VRs (1).
TKR-720A
Remove the 3 nuts and 3 washers holding the VOLUME, SQUELCH and CHANNEL VRs (1).
Then remove the 2 screws (2) holding the POWER switch.
- Remove 2 of the screws (3) holding the sub-panel, and loosen the other 2 screws (4), then tilt the sub-panel toward the front (5).
- Remove the 5 connectors (6) connected to the Display unit, and remove the connector (7) connected to the POWER switch.
- Remove the 2 remaining screws (8) holding the sub-panel to remove the sub-panel.



* : TKR-720A only

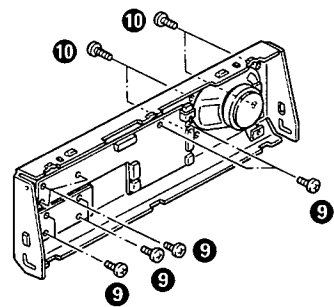
How to Remove the Panel

- Pull off the VOLUME, SQUELCH and CHANNEL knobs (1). CHANNEL knob is TKR-720A only.
- Release the 6 hooks (2) located on the upper and lower section, and holding the sub-panel by pushing them up with your finger. Then remove the sub-panel (3) by pulling it out toward the front.



* : TKR-720A only

- Remove the 9 screws (9) holding Display unit (A/4) and (B/4) to the sub-panel, and remove the Display unit (A/4) and (B/4).
- Remove the 4 screws (10) holding the speaker to the sub-panel to remove the speaker.

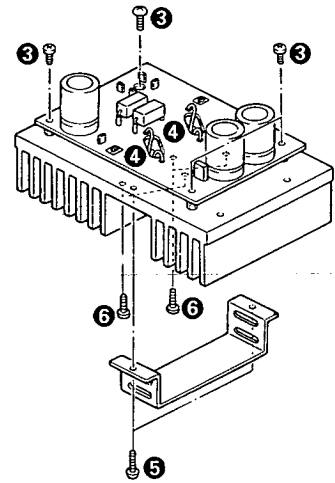
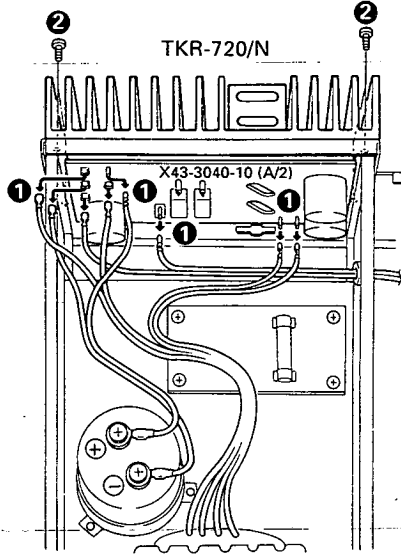


DISASSEMBLY FOR REPAIR

Disassembling the AVR Unit

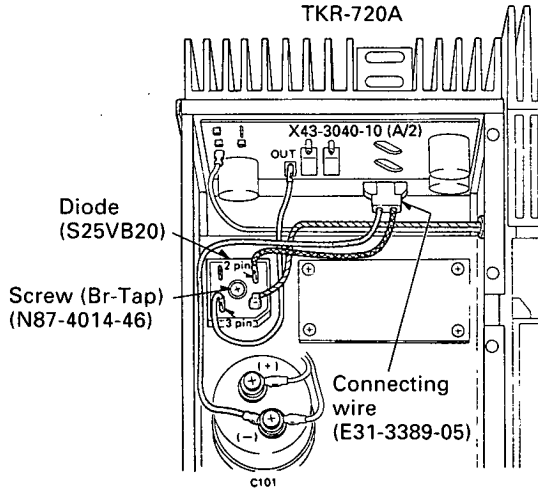
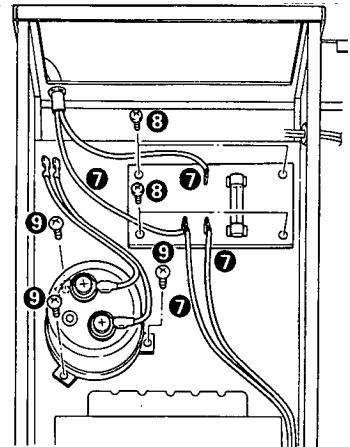
1. How to remove the AVR unit (X43-3040-10) (A/2)

1. Remove the 8 connectors (❶) connected to the AVR unit.
2. Remove the 4 screws (❷) holding the AVR unit to the rear panel, and remove the AVR unit from the rear panel.



3. How to remove the AVR unit (X43-3040-10) (B/2) and the electrolytic capacitor (C101)

1. Remove the 4 wires (❷) holding to the AVR unit.
2. Remove the 4 screws (❸) holding the AVR unit to remove the AVR unit.
3. Remove the 3 screws (❹) holding the electrolytic capacitor (C101).

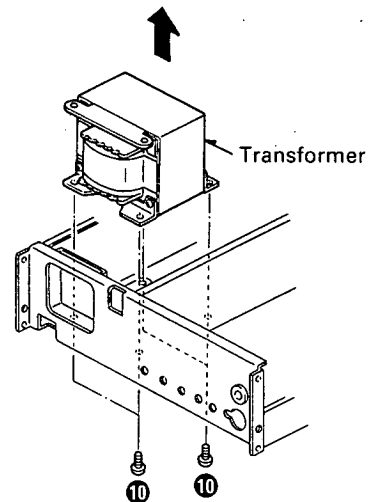


2. Disassembling the AVR unit (X43-3040-10) (A/2)

1. Remove the 4 screws (❸) holding the AVR unit.
2. Desolder the 4 wires (❹) connected to the bases and emitters of transistors Q5 and Q6.
3. Remove the 2 screws (❺) on the radiation cover attached to the heat sink to remove the radiation cover.
4. Remove the 4 screws (❻) of the transistors (Q5 and Q6) attached to the heat sink, and remove the AVR unit (A/2).

4. How to remove the power transformer

1. Remove the 4 screws (❿) holding the power transformer to the bottom plate, and remove the power transformer.



PARTS LIST

* New Parts. Δ indicates safety critical components.
 Parts without **Parts No.** are not supplied.
 Les articles non mentionnes dans le **Parts No.** ne sont pas fournis.
 Teile ohne **Parts No.** werden nicht geliefert.

L : Scandinavia K : USA P : Canada
 Y : PX (Far East, Hawaii) T : England E : Europe
 Y : AAFES (Europe) X : Australia M : Other Areas

TKR-720/N/A

Ref. No.	Address	New parts	Parts No.	Description	Desti-nation	Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
TKR-720/N/A											
1	1A		A01-1059-01	CASE (UPPER)		28	2C		F11-1068-03	SHIELDING COVER (UPPER)	
2	3A		A01-1060-01	CASE (LOWER)		29	2C		F11-1108-03	SHIELDING COVER (TX,RX FRONT)	
4	3A		A20-2666-11	PANEL		30	1C,3C		F11-1109-03	SHIELDING COVER (TX,RX UPP/LOW)	
5	3A		A21-1519-03	DRESSING PLATE	1	32	2C		G02-0570-04	LEAF SPRING	
6	3A		A21-1520-03	DRESSING PLATE (REPEAT,MONI)	1	33	3A		G09-0405-05	SPRING (VOL,SQL,CH)	
7	2A		A22-0758-01	SUB PANEL		34	2A		G13-0895-04	CUSHION (SP)	
8	2B		A22-0759-02	SUB PANEL		35	3B,2A		G13-0912-14	CUSHION (PANEL)	
9	2B		A23-1508-12	REAR PANEL		-			G13-1598-04	CUSHION (SHIELD COVER)	
10	2A		A40-0623-02	BOTTOM PLATE (AVR)		36	3E		H13-0820-04	PACKING FIXTUER	
11	2A		A50-0409-03	SIDE PLATE		38	3F		H52-0072-04	ITEM CARTON BOX	
12	2B		A50-0410-13	SIDE PLATE		39	1E		H10-2649-02	POLYSTYRENE FOAMED FIX (FRONT)	
5	3A		B03-0578-03	DRESSING PLATE	2	40	2F		H10-2650-02	POLYSTYRENE FOAMED FIX (REAR)	
6	3A		B03-0579-03	DRESSING PLATE	2	41	2F		H20-1414-03	PROTECTION COVER	
13	3A		B11-0461-04	FILTER		42	2E		H25-0029-04	PROTECTION BAG (60X110)	
-			B42-3348-04	LABEL (TX)		43	2F		H25-0105-04	PROTECTION BAG (AC CORD)	
-			B42-3349-04	LABEL (RX)		44	3E		H25-0103-04	PROTECTION BAG (DC CORD)	2
-			B42-3394-14	LABEL (COMPLIANCE NO.)	K,NK	45	3A		J02-0049-14	FOOT	
-			B42-3452-04	LABEL (T1.6A 250V)	4	46	2B		J19-1433-05	LEAD HOLDER	
15	1F		B58-1011-00	CAUTION	NM,NM2	47	2D,3D		J21-4243-04	MOUNTING HARDWARE (TX,RX)	
16	2B		B72-0118-14	MODEL NAME PLATE	K	48	1C,2C		J21-4244-04	MOUNTING HARDWARE (TX,RX)	
16	2B		B72-0119-14	MODEL NAME PLATE	K2	50	2A		J21-4246-04	MOUNTING HARDWARE	
16	2B		B72-0140-04	MODEL NAME PLATE	M,NM,AM	51	2D		J21-4245-04	MOUNTING HARDWARE (FINAL UNIT)	
16	2B		B72-0141-04	MODEL NAME PLATE	M2,AM2	52	2B		J42-0442-05	BUSHING (REAR PANEL)	
16	2B		B72-0141-04	MODEL NAME PLATE	NM2	53	1B		J42-0489-05	BUSHING (AC CORD)	
16	2B	*	B72-1501-04	MODEL NAME PLATE	NK	54	2C		J42-0452-05	BUSHING	
16	2B	*	B72-1502-04	MODEL NAME PLATE	NK2	55	2B		J42-0455-05	BUSHING	
17	1A		B41-0659-14	CAUTION LABEL		56	2D,3D		J50-0401-05	HINGE	
18	1F		B46-0470-00	WARRANTY CARD		57	2A,2B		J61-0023-05	WIRE BAND	
19	1F		B62-0066-10	INSTRUCTION MANUAL	3	-			J61-0307-05	WIRE BAND	
C101	1A		C90-2084-05	ELECTRO CAPA (AL) 68000UF 25WV		60	3A		K29-3075-03	KNOB (CH)	2
W11	-		E31-3435-05	CONNECTING WIRE		61	2A		K29-3146-04	KNOB (POWER)	
W12	-		E31-3437-15	CONNECTING WIRE (SP)		62	3A		K29-3147-03	KNOB (VOL,SQL)	
W13	1A		E31-3438-05	CONNECTING WIRE (RED)		63	2B,3B		K29-3148-04	KNOB (TAKE,REPEAT,MONI)	
W14	1A		E31-3439-15	CONNECTING WIRE (BLACK)		T101	1A		L01-8341-05	POWER TRANSFORMER	3
W15	2A		E31-3446-05	CONNECTING WIRE (2P) POWER SW		T101	1A		L01-8347-05	POWER TRANSFORMER	4
20	2B		E04-0183-05	RF COAXIAL RECEPTACLE (M-M)		65	2B		N19-0631-05	FLAT WASHER (LEAD HOLDER)	
21	2C		E04-0172-05	RF COAXIAL RECEPTACLE (BNC)		A	2A,2B		N09-0704-05	SCREW	
22	2C		E31-3469-05	CONNECTING WIRE (1P-1P)		B	2C,2D		N09-2030-05	SCREW	
23	1B		E30-2125-05	AC POWER CORD	3	C	2B,2D		N32-3005-46	FLAT HEAD MACHINE SCREW (HING)	
23	1B		E30-2153-15	AC POWER CORD	4	D	1A,3B		N33-3006-45	OVAL HEAD MACHINE SCREW (CASE)	
P101	2B		E31-3228-05	SHORT PLUG (ACCESSORY)		E	2B,2C		N35-3006-46	BINDING HEAD MACHINE SCREW	
W101	2B		E31-3390-05	CONNECTING WIRE		F	1B		N35-3008-46	BINDING HEAD MACHINE (AVR HEAT)	
W102	-		E31-3474-15	CONNECTING WIRE (9P,5P)		G	1C		N35-2606-41	BINDING HEAD MACHINE (SIGNAL)	
W103	-		E31-3473-15	CONNECTING WIRE (11P)		H	2B,3C		N87-2606-46	BRAZIER HEAD TAPTITE SCREW	
W106	2B		E37-0056-05	CONNECTING CABLE (BNC-M)		I	2A,2D		N87-3008-46	BRAZIER HEAD TAPTITE SCREW	
W107	3C		E31-3341-05	CONNECTING WIRE (CH)	2	J	1A		N87-4006-46	BRAZIER HEAD TAPTITE SCR (C101)	
24	1B,2E		F05-1623-05	FUSE (1.6A)	4	K	3A		N87-4010-46	BRAZIER HEAD TAPTITE SCR (FOOT)	
24	1B,2E		F06-3024-05	FUSE (3A)	3	S101	2A		S40-2450-05	PUSH SWITCH (POWER)	
25	2E		F51-0017-05	FUSE (15A)	2	SP101	3A		T07-0227-25	LOUDSPEAKER	
26	1B		F07-0878-04	COVER (REAR PANEL)	1						
27	1D		F07-0881-04	COVER (HEAT SINK)							

TKR-720 K,K2,M,M2 1 : K,K2,M,M2,NM,NM2,NK,NK2 4 : M,M2,AM,AM2,NM,NM2 7 : K,K2,M,M2,AM,AM2
 TKR-720N K,K2,M,M2 2 : AM,AM2 5 : K,M,AM,NM,NK 8 : NM,NM2,NK,NK2
 TKR-720A M,M2 3 : K,K2,NK,NK2 6 : K2,M2,AM2,NM2,NK2

PARTS LIST

DC BACK UP
AVR UNIT (X43-3040-10)
DRIVE UNIT (X45-3310-XX)
FINAL UNIT (X45-3320-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
DC BACK UP											
76	3E		E30-2076-15	DC CORD (DC BACK UP)	2	C104			CC73FCH1H220J	CHIP C 22PF J	
78	1B		E31-3389-15	CONNECTING WIRE (DC BACK UP)	2	C105			CC73FCH1H560J	CHIP C 56PF J	
W16	-		E31-3455-15	CONNECTING WIRE (DC BACK UP)	2	C106,107			CK73FB1H102K	CHIP C 1000PF K	
S	1A		N87-4014-46	BRAZIER HEAD TAPTITE SCREW	2	C108			CC73FCH1H180J	CHIP C 18PF J	
D101	1B		S25VB20	DIODE (DC BACK UP)	2	C110			CK73FB1H102K	CHIP C 1000PF K	
AVR UNIT (X43-3040-10)											
C1,2			CK73FB1H102K	CHIP C 1000PF K		C111			CK73FB1E473K	CHIP C 0.047UF K	
C3,4			C90-0814-05	ELECTRO 4700UF 25WV		C112			C90-2021-05	ELECTRO 10UF 25WV	
C5			CE04EW1A470M	ELECTRO 47UF 10WV		C113			CK73EB1H102K	CHIP C 1000PF K	
C6,7			CK73FB1H102K	CHIP C 1000PF K		C114			CK73EB1H473K	CHIP C 0.047UF K	
C8-11			CK73EB1H104K	CHIP C 0.10UF K		C115			C90-2021-05	ELECTRO 10UF 25WV	
C12			CK73FB1H102K	CHIP C 1000PF K		C116-118			CK73FB1H102K	CHIP C 1000PF K	
C13			C90-0814-05	ELECTRO 4700UF 25WV		C119			C90-2044-05	ELECTRO 1UF 25WV	
C14-16			CK73FB1H102K	CHIP C 1000PF K		C120			C90-2086-05	ELECTRO 22UF 20WV	5
C17-20			CK73EB1H104K	CHIP C 0.10UF K		CN101			E04-0159-05	RF COAXIAL CABLE RECEPTACLE	
C101,102			C91-1075-05	CERAMIC 470PF		CN102			E40-0608-05	PIN CONNECTOR (6P)	
C103			C91-1098-05	CERAMIC 4700PF AC400V		L101			L40-6872-80	SMALL FIXED INDUCTOR	
CN1,2			E23-0462-05	TERMINAL		L102			L34-0742-05	COIL (5T)	
CN3,4			E23-0611-05	TERMINAL		L103,104			L34-1087-05	COIL (5T)	
CN5-7			E23-0159-05	TERMINAL		R101			RK73FB2A271J	CHIP R 270 J 1/10W	
A3	1B		F01-0965-03	HEAT SINK		R102			RK73FB2A180J	CHIP R 18 J 1/10W	
A5	1B		F07-0849-04	COVER		R103			RK73FB2A180J	CHIP R 18 J 1/10W	
			F20-1106-05	INSULATOR		R103			RK73FB2A330J	CHIP R 33 J 1/10W	6
A9-12	1B		F29-0432-05	INSULATOR		R104			RK73FB2A470J	CHIP R 47 J 1/10W	
A1,2			J13-0055-15	FUSE HOLDER		R105			RK73FB2A152J	CHIP R 1.5K J 1/10W	
A4	1B		J21-4247-04	MOUNTING HARDWARE		R106			RK73FB2A220J	CHIP R 22 J 1/10W	
A6-8	1B		J32-0906-14	BOSS		R107			RK73FB2A470J	CHIP R 47 J 1/10W	
E	1B		N35-3006-46	BINDING HEAD MACHINE SCREW		R108			RK73FB2A152J	CHIP R 1.5K J 1/10W	
I	1B		N87-3008-46	BRAZIER HEAD TAPTITE SCREW		R109			RK73FB2A331J	CHIP R 330 J 1/10W	
L	1B		N35-3012-46	BINDING HEAD MACHINE SCREW		R110			RS14DB3A100J	FL-PROOF RS 10 J 1W	
M	1B		N87-4016-46	BRAZIER HEAD TAPTITE SCREW		R111			RD14BB2E271J	RD 270 J 1/4W	5
R2			RS14AB3A4R7J	FL-PROOF RS 4.7 J 1W		R111			RD14BB2E151J	RD 150 J 1/4W	6
R3-5			RD41FB2B273J	CARBON 27K J 1/8W		R112			RD14BB2E180J	RD 18 J 1/4W	5
R6,7			R92-0619-05	FIXED RESISTOR 0.05 5W		R112			RD14BB2E390J	RD 39 J 1/4W	6
R8			RD41FB2B152J	CARBON 1.5K J 1/8W		R113			RD14BB2E271J	RD 270 J 1/4W	5
R9			RD41FB2B102J	CARBON 1K J 1/8W		R113			RD14BB2E151J	RD 150 J 1/4W	6
R10-12			RD41FB2B391J	CARBON 390 J 1/8W		R114			RK73FB2A102J	CHIP R 1.0K J 1/10W	
R13			RD41FB2B683J	CARBON 68K J 1/8W		D101,102			1SS181	DIODE	
R14			RD41FB2B822J	CARBON 8.2K J 1/8W		IC101			M57719	IC (POWER MODULE/ 150-175MHz)	5
VR1			R12-0440-05	TRIMMING POT. 680		IC101			M57719L-24	IC (POWER MODULE/ 136-150MHz)	6
VR2			R12-8406-05	TRIMMING POT. 1M		Q101			2SC2954	TRANSISTOR	
D1			1B2C1	DIODE		Q102			2SC2538-22-A	TRANSISTOR	
D3	1B		S25VB20	DIODE		Q103			2SB951A(Q)	TRANSISTOR	
D4			1SS181	CHIP DIODE		FINAL UNIT (X45-3320-XX)					
D5			RD7.5E(B2)	CHIP ZENER DIODE		-11 : K,M,AM,NM,NK -12 : K2,M2,AM2,NM2,NK2					
D6			1SS181	CHIP DIODE		C1			CM73F2H220J	CHIP C 22PF J	
Q1-3			2SC2712(Y)	CHIP TRANSISTOR		C2			CM73F2H470J	CHIP C 47PF J	6
Q4			2SB968(Q,R)*J	CHIP TRANSISTOR		C3			CM73F2H240J	CHIP C 24PF J	5
Q5,6	1B		2N5885	TRANSISTOR		C3			CM73F2H270J	CHIP C 27PF J	6
DRIVE UNIT (X45-3310-XX)											
-10 : K,M,AM,NM,NK -11 : K2,M2,AM2,NM2,NK2											
C101			CC73FCH1H680J	CHIP C 68PF J		C5			CM73F2H471J	CHIP C 470PF J	
C102,103			CK73FB1H102K	CHIP C 1000PF K		C7			CM73F2H121J	CHIP C 120PF J	5
						C7			CM73F2H181J	CHIP C 180PF J	6
						C10,11			CM73F2H221J	CHIP C 220PF J	
						C14,15			CM73F2H151J	CHIP C 150PF J	
						C20			CE04EW1E221M	ELECTRO 220UF 25WV	
						C21			C90-2021-05	ELECTRO 10UF 25WV	
						C22			CK73EB1H473K	CHIP C 0.047UF K	

PARTS LIST

FINAL UNIT (X45-3320-XX)
SIGNALING UNIT (X52-3140-10)

Ref. No.	Address	New parts	Parts No.	Description	Destination
C23			CK73EB1H102K	CHIP C 1000PF K	
C25			CM73F2H121J	CHIP C 120PF J	5
C25			CM73F2H161J	CHIP C 160PF J	6
C27			CM73F2H471J	CHIP C 470PF J	
C28			CM73F2H101J	CHIP C 100PF J	5
C28			CM73F2H121J	CHIP C 120PF J	6
C29,30			CM73F2H360J	CHIP C 36PF J	5
C29,30			CM73F2H390J	CHIP C 39PF J	6
C31			CM73F2H471J	CHIP C 470PF J	
C32			CM73F2H180J	CHIP C 18PF J	5
C32			CM73F2H220J	CHIP C 22PF J	6
C33			CM73F2H510J	CHIP C 51PF J	6
C33,34			CM73F2H390J	CHIP C 39PF J	5
C34			CM73F2H470J	CHIP C 47PF J	6
C35			CM73F2H180J	CHIP C 18PF J	5
C36			CC73FCH1H0R5C	CHIP C 0.5PF C	
C37			CK73FB1H102K	CHIP C 1000PF K	
C38			CC73FCH1H050C	CHIP C 5PF C	
C39,40			CK73FB1H102K	CHIP C 1000PF K	
C42-44			CK73FB1H102K	CHIP C 1000PF K	
C47-49			CK73FB1H102K	CHIP C 1000PF K	
A1			E29-0468-14	TERMINAL (ANT)	
CN2,3			E23-1116-05	TERMINAL	
CN4			E40-5166-05	PIN CONNECTOR (6P)	
W1			E37-0792-05	CONNECTING WIRE (5P)	
W8			E33-1855-00	FINISHED WIRE SET	
L1			L34-0951-05	COIL (2.5T)	6
L1			L34-1039-05	COIL (1.5T)	5
L2			L39-0421-04	COIL	
L4			L34-0452-05	COIL (6T)	
L6			L92-0110-05	FERRITE BEAD	
L9,10			L34-1139-05	COIL (0.5T)	
L12			L33-0649-05	CHOKO COIL	
L13,14			L34-1232-15	COIL (3.5T)	
L15			L34-1231-15	COIL (1.5T)	
L16			L40-1092-14	SMALL FIXED INDUCTOR	
L18			L34-1231-15	COIL (1.5T)	
L21			L39-0421-04	COIL	
R3			RS14AB3A101J	FL-PROOF RS 100 J 1W	
R5			RS14DB2H151J	FL-PROOF RS 150 J 1/2W	
R6			RS14DB2H181J	FL-PROOF RS 180 J 1/2W	
R7			RK73FB2A561J	CHIP R 560 J 1/10W	
R9			R92-0670-05	CHIP R 0 OHM	
R10			RK73FB2A472J	CHIP R 4.7K J 1/10W	
R11			RK73FB2A101J	CHIP R 100 J 1/10W	
R12			RK73FB2A103J	CHIP R 10K J 1/10W	
R13			RK73FB2A822J	CHIP R 8.2K J 1/10W	
R17			RK73FB2A222J	CHIP R 2.2K J 1/10W	
VR1			R12-3430-05	TRIMMING POT. (10K)	
D1			SG-5L(R)	DIODE	
D2,3			1SS101	DIODE	
D4,5			1SS181	DIODE	
Q2			2SC2694	TRANSISTOR (TX POWER AMP:FINAL)	
Q3,4			2SC3326(A)	TRANSISTOR	

Ref. No.	Address	New parts	Parts No.	Description	Destination
SIGNALING UNIT (X52-3140-10)					
C1			CE04NW1E220M	ELECTRO 22UF 25WV	
C2,3			CK73FB1H103K	CHIP C 0.010UF K	
C4			CE04NW1C470M	ELECTRO 47UF 16WV	
C5			C92-0004-05	ELECTRO 1.0UF 16WV	
C6			CK73FB1H103K	CHIP C 0.010UF K	
C7			CC73FCH1H101J	CHIP C 100PF J	
C8			C92-0011-05	CHIP TAN 10UF 4WV	
C9			CK73EB1E333K	CHIP C 0.033UF K	
C10			CK73FB1H332K	CHIP C 3300PF K	
C11			CK73EB1H683K	CHIP C 0.068UF K	
C12			CK73FB1H152K	CHIP C 1500PF K	
C13			CK73EB1H104K	CHIP C 0.10UF K	
C14,15			CK73FB1H103K	CHIP C 0.010UF K	
C16			C92-0011-05	CHIP TAN 10UF 4WV	
C17			C92-0003-05	CHIP TAN 0.47UF 25WV	
C18,19			CC73FCH1H100D	CHIP C 10PF D	
C20			CK73FB1H183K	CHIP C 0.018UF K	
C21			CK73FB1H102K	CHIP C 1000PF K	
C22			CK73EB1E473K	CHIP C 0.047UF K	
C23			CK73EB1E333K	CHIP C 0.033UF K	
C24,25			C92-0004-05	ELECTRO 1.0UF 16WV	
C26-28			CC73FCH1H101J	CHIP C 100PF J	
C29			CK73FB1H103K	CHIP C 0.010UF K	
C30			C92-0011-05	CHIP TAN 10UF 4WV	
C31			CK73FB1H103K	CHIP C 0.010UF K	
C32			C92-0004-05	ELECTRO 1.0UF 16WV	
C33			CK73EB1H104K	CHIP C 0.10UF K	
C34			C92-0004-05	ELECTRO 1.0UF 16WV	
C35-38			CK73FB1H153K	CHIP C 0.015UF K	
C39			C92-0502-05	ELECTRO 0.33UF 35WV	
C40,41			C92-0004-05	ELECTRO 1.0UF 16WV	
C42			CK73FB1H103K	CHIP C 0.010UF K	
C43-46			CK73FF1E104Z	CHIP C 0.1UF Z	
-			E02-2010-05	IC SOCKET (8P)	
-			E02-2015-05	IC SOCKET (28P)	
CN1			E40-3256-05	PIN CONNECTOR (12P)	
CN2			E40-3248-05	PIN CONNECTOR (4P)	
CN3			E40-3247-05	PIN CONNECTOR (3P)	
TP1,2			E23-0467-05	TERMINAL	
W1,2			E31-1448-05	WIRE	
W4			E31-1448-05	WIRE	
W104			E31-3254-05	CONNECTING WIRE (12P)	
-			E37-0785-05	CONNECTING WIRE (4P)	
X1			L77-1374-05	CRYSTAL RESONATOR (12MHZ)	
CP1			R90-0598-05	MULTI-COMP 10K/20K	
R1			RK73FB2A100J	CHIP R 10 J 1/10W	
R2			RK73FB2A473J	CHIP R 47K J 1/10W	
R3			RK73FB2A102J	CHIP R 1.0K J 1/10W	
R4,5			RK73FB2A473J	CHIP R 47K J 1/10W	
R6,7			RK73FB2A273J	CHIP R 27K J 1/10W	
R8			RK73FB2A684J	CHIP R 680K J 1/10W	
R9			R92-0670-05	CHIP R 0 OHM	
R10			RK73FB2A104J	CHIP R 100K J 1/10W	
R11-13			RK73FB2A683J	CHIP R 68K J 1/10W	
R14			RK73FB2A753J	CHIP R 75K J 1/10W	
R15			RK73FB2A563J	CHIP R 56K J 1/10W	
R16-19			RK73FB2A473J	CHIP R 47K J 1/10W	

TKR-720 K,K2,M,M2 1: K,K2,M,M2,NM,NM2,NK,NK2
TKR-720N K,K2,M,M2 2: AM,AM2
TKR-720A M,M2 3: K,K2,NK,NK2

4: M,M2,AM,AM2,NM,NM2
5: K,M,AM,NM,NK
6: K2,M2,AM2,NM2,NK2

7: K,K2,M,M2,AM,AM2
8: NM,NM2,NK,NK2

PARTS LIST

SIGNALING UNIT (X52-3140-10)
DISPLAY UNIT (X54-3070-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
R20			RK73FB2A123J	CHIP R 12K J 1/10W		C4			CS15E1C010M	TANTAL 1.0UF 16WW	
R21			RK73FB2A153J	CHIP R 15K J 1/10W		C5			CK73FB1H103K	CHIP C 0.010UF K	
R22,23			RK73FB2A103J	CHIP R 10K J 1/10W		C6			CE04NW1E470M	ELECTRO 47UF 25WW	
R24,25			RK73FB2A394J	CHIP R 390K J 1/10W		C7,8			CK73FB1H103K	CHIP C 0.010UF K	
R26			RK73FB2A473J	CHIP R 47K J 1/10W		C9			CE04CW1E220M	ELECTRO 22UF 25WW	
R27-29			RK73FB2A124J	CHIP R 120K J 1/10W		C10			CE04CW1A101M	ELECTRO 100UF 10WW	
R30			RK73FB2A183J	CHIP R 18K J 1/10W		C11			CK73FB1H102K	CHIP C 1000PF K	
R31			RK73FB2A221J	CHIP R 220 J 1/10W		C12			CS15E1C010M	TANTAL 1.0UF 16WW	
R32,33			RK73FB2A393J	CHIP R 39K J 1/10W		C13			CK73FB1H103K	CHIP C 0.010UF K	
R34			RK73FB2A225J	CHIP R 2.2M J 1/10W		C14			CE04CW1E220M	ELECTRO 22UF 25WW	
R35-37			RK73FB2A473J	CHIP R 47K J 1/10W		C15-20			CK73FB1H102K	CHIP C 1000PF K	
R38			R92-0670-05	CHIP R 0 OHM		C21			CS15E1C100M	TANTAL 10UF 16WW	
R39-41			RK73FB2A473J	CHIP R 47K J 1/10W		C22			C92-0004-05	CHIP TAN 1.0UF 16WW	
R42-45			RK73FB2A102J	CHIP R 1.0K J 1/10W		C23			CK73FB1H102K	CHIP C 1000PF K	
R46-50			RK73FB2A473J	CHIP R 47K J 1/10W		C24			C92-0004-05	CHIP TAN 1.0UF 16WW	
R51			RK73FB2A223J	CHIP R 22K J 1/10W		C25			CK73FB1H182K	CHIP C 1800PF K	
R52			RK73FB2A331J	CHIP R 330 J 1/10W		C26-28			CK73FB1H153K	CHIP C 0.015UF K	
R53			RK73FB2A394J	CHIP R 390K J 1/10W		C30			CK73FB1H153K	CHIP C 0.015UF K	
R54			RK73FB2A474J	CHIP R 470K J 1/10W		C31			CK73FB1H102K	CHIP C 1000PF K	
R55			RK73FB2A622J	CHIP R 6.2K J 1/10W		C32			C92-0004-05	CHIP TAN 1.0UF 16WW	
R56			RK73FB2A563J	CHIP R 56K J 1/10W		C33			CK73FB1H102K	CHIP C 1000PF K	
R57			RK73FB2A683J	CHIP R 68K J 1/10W		C34,35			CC73FCH1H101J	CHIP C 100PF J	
R58			RK73FB2A153J	CHIP R 15K J 1/10W		C36-41			CK73FB1H102K	CHIP C 1000PF K	
R59,60			RK73FB2A222J	CHIP R 2.2K J 1/10W		C42			CK73FB1H472K	CHIP C 4700PF K	
R61			RK73FB2A104J	CHIP R 100K J 1/10W		G43,44			CK73FB1H102K	CHIP C 1000PF K	
R62,63			RK73FB2A473J	CHIP R 47K J 1/10W		C45,46			CK73FB1H102K	CHIP C 1000PF K	1
R64			RK73FB2A102J	CHIP R 1.0K J 1/10W		C49			C92-0585-05	CHIP TAN 4.7UF 16WW	
R65			RK73FB2A471J	CHIP R 470 J 1/10W					E40-0218-05	SPACER (LED)	
R66			RK73FB2A473J	CHIP R 47K J 1/10W		CN1			E08-0874-05	RECTANGULAR RECEPTACLE (ROM)	
VR1-5			R12-3099-05	TRIMMING POT. 47K		CN2			E40-3273-05	PIN CONNECTOR (15P)	
D1,2			1SS184	CHIP DIODE		CN3			E40-3271-05	PIN CONNECTOR (13P)	
D3			HSM88AS	CHIP DIODE		CN4			E08-0673-15	RECTANGULAR RECEPTACLE (MIC)	
D4-6			1SS184	CHIP DIODE		CN5			E40-3270-05	PIN CONNECTOR (12P)	
D7			B30-0838-05	LED		CN6			E40-3260-05	PIN CONNECTOR (2P)	
D8			MTZ8.2JB	ZENER DIODE		CN7			E40-3299-05	PIN CONNECTOR (2P)	
IC1			MC78L05M	IC (VOLTAGE REGULATOR/ +5V)		CN8			E40-3273-05	PIN CONNECTOR (15P)	
IC2			M51943BML	IC (SYSTEM RESET)		CN9			E40-3247-05	PIN CONNECTOR (3P)	2
IC3-7			XRA4558F	IC (OP AMP X2) or BA4558F		CN10			E40-5191-05	PIN CONNECTOR (8P)	2
IC8			27C256QJESB	EPROM		CN11,12			E40-5079-05	PIN CONNECTOR (8P)	2
IC9			TC74HC573AF	IC (8 bit LATCH))		CN13			E40-5191-05	PIN CONNECTOR (8P)	2
IC10			BR93LC46	EEPROM		JP2			E33-1854-00	WIRE	
IC11			UPD78310AGF	IC (MICROPROCESSOR)		JP3			E33-1917-05	WIRE	
Q1-7			DTC144EK	DIGITAL TRANSISTOR		JP4			E37-0310-05	WIRE (GREEN)	2
Q8			DTA114EK	DIGITAL TRANSISTOR		W1			E31-3440-05	CONNECTING WIRE	
Q9			2SC3326(A)	CHIP TRANSISTOR		W2			E37-0812-05	CONNECTING WIRE	2
Q10			2SJ106(GR)	CHIP FET		F1			F06-2029-05	FUSE 2A	
DISPLAY UNIT (X54-3070-XX)						X1			L77-1333-05	CRYSTAL RESONATOR (4.195MHZ)	
-12 : K,K2,M,M2,NM,NM2,NK,NK2 -14 : AM,AM2						J4			R92-0670-05	CHIP R 0 OHM	
D1			B30-0855-05	LED (RED)		J7			R92-0670-05	CHIP R 0 OHM	
D2			B30-0856-05	LED (GREEN)		J9			R92-0670-05	CHIP R 0 OHM	
D3			B30-0855-05	LED (RED)		J11,12			R92-0670-05	CHIP R 0 OHM	
D16			B30-0857-05	LED (YELLOW)		J14			R92-0670-05	CHIP R 0 OHM	
D17			B30-0856-05	LED (GREEN)		R1			RK73FB2A331J	CHIP R 330 J 1/10W	
D18			B30-0857-05	LED (YELLOW)		R3,4			RK73FB2A331J	CHIP R 330 J 1/10W	
D22,23			B38-0308-05	LED ASSY	2	R5-8			RK73FB2A102J	CHIP R 1.0K J 1/10W	
C1			CK73FB1H102K	CHIP C 1000PF K		R9			RK73FB2A153J	CHIP R 15K J 1/10W	
C2,3			CC73FCH1H330J	CHIP C 33PF J		R10			RK73FB2A102J	CHIP R 1.0K J 1/10W	

PARTS LIST

DISPLAY UNIT (X54-3070-XX)
TX-RX UNIT (X57-3760-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination
R11			RK73FB2A220J	CHIP R 22 J 1/10W	
R12-15			RK73FB2A223J	CHIP R 22K J 1/10W	
R16			RS14DB3A470J	FL-PROOF RS 47 J 1W	
R17-19			RK73FB2A102J	CHIP R 1.0K J 1/10W	
R20			RK73FB2A223J	CHIP R 22K J 1/10W	
R22			RK73FB2A473J	CHIP R 47K J 1/10W	
R23			R92-0670-05	CHIP R 0 OHM	
R24-28			RK73FB2A102J	CHIP R 1.0K J 1/10W	
R29			R92-0670-05	CHIP R 0 OHM	
R30,31			RK73FB2A473J	CHIP R 47K J 1/10W	
R32			RK73FB2A101J	CHIP R 100 J 1/10W	
R33			RK73FB2A562J	CHIP R 5.6K J 1/10W	
R34			RK73FB2A681J	CHIP R 680 J 1/10W	
R35			R92-0341-05	FIXED RESISTOR 4.7 J 1/4W	
R38,39			RK73FB2A331J	CHIP R 330 J 1/10W	
R40,41			RK73FB2A102J	CHIP R 1.0K J 1/10W	
R42			RK73FB2A681J	CHIP R 680 J 1/10W	
R43,44			RK73FB2A102J	CHIP R 1.0K J 1/10W	
R45			RK73FB2A473J	CHIP R 47K J 1/10W	
R46			RK73FB2A101J	CHIP R 100 J 1/10W	
R47			RK73FB2A103J	CHIP R 10K J 1/10W	
R48,49			RK73FB2A224J	CHIP R 220K J 1/10W	
R50			RK73FB2A394J	CHIP R 390K J 1/10W	
R51			RK73FB2A153J	CHIP R 15K J 1/10W	
R52			RK73FB2A303J	CHIP R 30K J 1/10W	
R53			RK73FB2A224J	CHIP R 220K J 1/10W	
R54			RK73FB2A622J	CHIP R 6.2K J 1/10W	
R55,56			RK73FB2A223J	CHIP R 22K J 1/10W	
R57			RK73FB2A183J	CHIP R 18K J 1/10W	
R58			RK73FB2A681J	CHIP R 680 J 1/10W	
R59			RK73FB2A103J	CHIP R 10K J 1/10W	
R61			RS14DB3A1R0J	FL-PROOF RS 1.0 J 1W	
R62,63			RK73FB2A223J	CHIP R 22K J 1/10W	
R64			RK73FB2A331J	CHIP R 330 J 1/10W	
R65			RK73FB2A102J	CHIP R 1.0K J 1/10W	
R66			RK73FB2A223J	CHIP R 22K J 1/10W	
R67			RK73FB2A102J	CHIP R 1.0K J 1/10W	
R68			RK73FB2A223J	CHIP R 22K J 1/10W	
R69			RK73FB2A102J	CHIP R 1.0K J 1/10W	
R70			RK73FB2A223J	CHIP R 22K J 1/10W	
R71			RK73FB2A102J	CHIP R 1.0K J 1/10W	
R72			RK73FB2A223J	CHIP R 22K J 1/10W	
R73,74			RK73FB2A103J	CHIP R 10K J 1/10W	
R75,76			RK73FB2A104J	CHIP R 100K J 1/10W	
R77-90			RK73FB2A331J	CHIP R 330 J 1/10W	2
R92-94			RK73FB2A473J	CHIP R 47K J 1/10W	
R95			RK73FB2A271J	CHIP R 270 J 1/10W	
R96,97			R92-0670-05	CHIP R 0 OHM	
R99,100			R92-0670-05	CHIP R 0 OHM	
R101			RK73FB2A472J	CHIP R 4.7K	
R102			RK73FB2A392J	CHIP R 3.9K	
VR1			R01-4418-05	POTENTIOMETER (50K) SQL	
VR2			R01-3434-05	POTENTIOMETER (10K) VOL	
S1			W02-0393-05	ENCODER	2
S2-4			S40-2455-05	PUSH SWITCH	
D4-6			1SS184	CHIP DIODE	
D7,8			1SS181	CHIP DIODE	
D10,11			1SS181	CHIP DIODE	

Ref. No.	Address	New parts	Parts No.	Description	Destination
D13			1SS181	CHIP DIODE	
D19			1SS272	CHIP DIODE	
D21			1SS272	CHIP DIODE	1
D24			1SS133	DIODE	
IC1		*	UPD75104GF-J99	IC (MICROPROCESSOR)	
IC2			BR93LC46	IC (1K EEPROM)	
IC3			M51943BML	IC (SYSTEM RESET)	
IC4			AN78N05	IC (VOLTAGE REGULATOR/ +5V)	
IC5,6			UPC4558C	IC (OP AMP X2)	
Q1,2			DTC114EK	DIGITAL TRANSISTOR	
Q3			2SA1162(Y)	CHIP TRANSISTOR	
Q6			2SC3326(A)	CHIP TRANSISTOR	
Q7,8			DTC114EK	DIGITAL TRANSISTOR	
TX-RX UNIT (X57-3760-XX)					
-10 : K,M,AM -11 : K2,M2,AM2 -12 : NM					
-13 : NM2 -14 : NK -15 : NK2					
C1			CE04EW1A101M	ELECTRO 100UF 10WV	
C2-4			CK73FB1H471K	CHIP C 470PF K	
C5-7			CC73FCH1H101J	CHIP C 100PF J	
C8			CK73EB1H473K	CHIP C 0.047UF K	
C9			C92-0004-05	CHIP TAN 1.0UF 16WV	
C10			C92-0001-05	CHIP TAN 0.1UF 35WV	
C11			CE04EW1A101M	ELECTRO 100UF 10WV	
C12			CK73FB1H471K	CHIP C 470PF K	
C13			CE04EW1A101M	ELECTRO 100UF 10WV	
C14			CK73FB1H471K	CHIP C 470PF K	
C15			CE04EW1A101M	ELECTRO 100UF 10WV	
C16,17			CK73FB1H471K	CHIP C 470PF K	
C18-20			CC73FCH1H101J	CHIP C 100PF J	
C21			CK73EB1H473K	CHIP C 0.047UF K	
C22			C92-0004-05	CHIP TAN 1.0UF 16WV	
C23			C92-0001-05	CHIP TAN 0.1UF 35WV	
C24			CK73FB1H103K	CHIP C 0.010UF K	
C26			CK73FB1H103K	CHIP C 0.010UF K	
C27			CE04EW1A101M	ELECTRO 100UF 10WV	
C28-34			CK73FB1H471K	CHIP C 470PF K	
C35			CE04EW1A101M	ELECTRO 100UF 10WV	
C36			CK73FB1H223K	CHIP C 0.022UF K	
C37			CC73FCH1H101J	CHIP C 100PF J	
C38			CE04EW1A101M	ELECTRO 100UF 10WV	
C39			CE04EW1A470M	ELECTRO 47UF 10WV	
C44			CE04EW1A470M	ELECTRO 47UF 10WV	
C57,58			CC73FCH1H101J	CHIP C 100PF J	
C59			CC73FCH1H331J	CHIP C 330PF J	
C60-63			CK73FB1H103K	CHIP C 0.010UF K	
C64			CE04EW1E100M	ELECTRO 10UF 25WV	
C65			CK73FB1H103K	CHIP C 0.010UF K	
C66			C90-2041-05	ELECTRO 10UF 10WV	
C67			C92-0007-05	CHIP TAN 2.2UF 20WV	
C68,69			CS15E0J100M	TANTAL 10UF 6.3WV	
C70			CS15E1C100M	TANTAL 10UF 16WV	
C71			CE04EW1A101M	ELECTRO 100UF 10WV	
C72			CE04EW1A221M	ELECTRO 220UF 10WV	
C73			CK73FB1H103K	CHIP C 0.010UF K	
C74			CS15E1C010M	TANTAL 1.0UF 16WV	
C75			CK73FB1H103K	CHIP C 0.010UF K	
C76			CS15E1C010M	TANTAL 1.0UF 16WV	
C77			CK73FB1H471K	CHIP C 470PF K	

TKR-720 K,K2,M,M2 1 : K,K2,M,M2,NM,NM2,NK,NK2
TKR-720N K,K2,M,M2 2 : AM,AM2
TKR-720A M,M2 3 : K,K2,NK,NK2

4 : M,M2,AM,AM2,NM,NM2
5 : K,M,AM,NM,NK
6 : K2,M2,AM2,NM2,NK2

7 : K,K2,M,M2,AM,AM2
8 : NM,NM2,NK,NK2

PARTS LIST

TX-RX UNIT (X57-3760-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
C78,79			CE04EW1A470M	ELECTRO 47UF 10WV		CF1			L72-0339-05	CERAMIC FILTER (CFV455D)	7
C80			CE04EW1C100M	ELECTRO 10UF 16WV		CF1			L72-0360-05	CERAMIC FILTER (CFV455G)	8
C81			CK73FB1H103K	CHIP C 0.010UF K		L1			L40-2211-81	SMALL FIXED INDUCTOR (220UH)	
C82			CE04EW1A470M	ELECTRO 47UF 10WV		L2			L40-1021-13	SMALL FIXED INDUCTOR (1MH)	
C83			CE04EW1E471M	ELECTRO 470UF 25WV		L3,4			L40-2211-81	SMALL FIXED INDUCTOR (220UH)	
C84			C90-2030-05	ELECTRO 1000UF 10WV		L5			L40-1021-13	SMALL FIXED INDUCTOR (1MH)	
C85			CK73EB1H104K	CHIP C 0.10UF K		L6			L40-2211-81	SMALL FIXED INDUCTOR (220UH)	
C86			C92-0004-05	CHIP TAN 1.0UF 16WV		L11,12			L39-0451-05	COIL	
C87			CE04EW1A470M	ELECTRO 47UF 10WV		L13			L40-4782-14	SMALL FIXED INDUCTOR (0.47UH)	
C88			CK73FB1H103K	CHIP C 0.010UF K		L14			L40-5682-14	SMALL FIXED INDUCTOR (0.56UH)	
C89			CE04EW1A470M	ELECTRO 47UF 10WV		L15			L40-2201-14	SMALL FIXED INDUCTOR (22UH)	
C90			CK73FB1H103K	CHIP C 0.010UF K		L16,17			L34-2160-05	IFT (21.4MHz)	
C91			CE04EW1C100M	ELECTRO 10UF 16WV		L18			L30-0503-05	IFT (455KHz)	
C92			CE04EW1A470M	ELECTRO 47UF 10WV		L19			L15-0016-05	LOW-FREQUENCY CHOKE COIL	
C93-95			CK73FB1H103K	CHIP C 0.010UF K		L20,21			L34-4059-05	COIL	
C96-101			CK73FB1H471K	CHIP C 470PF K		L22,23			L40-4791-14	SMALL FIXED INDUCTOR (4.7UH)	
C102			CC73FRH1H080D	CHIP C 8PF D	5	L24-26			L34-4059-05	COIL	
C102			CC73FRH1H100D	CHIP C 10PF D	6	L27			L33-0649-05	CHOKE COIL	
C103			CC73FRH1H390J	CHIP C 39PF J	5	X1			L77-1348-05	CRYSTAL RESONATOR (20.945MHz)	
C103			CC73FRH1H560J	CHIP C 56PF J	6	XF1			L71-0274-05	MCF (21F15C)	7
C104			CC73FCH1H020C	CHIP C 2.0PF C	5	XF1			L71-0417-05	MCF (21F7.5C)	8
C104			CC73FCH1H1R5C	CHIP C 1.5PF C	6	Z3			L77-1338-15	TCXO (12.8MHz)	
C105			CC73FCH1H0R5C	CHIP C 0.5PF C	6	X6			L77-1688-05	VCXO (12.8MHz)	
C106			CC73FRH1H080D	CHIP C 8PF D	5	X6			L77-1488-15	VCXO (12.8MHz)	
C106			CC73FRH1H090D	CHIP C 9PF D	6						
C107			CC73FRH1H560J	CHIP C 56PF J	5	R1			RK73FB2A332J	CHIP R 3.3K J 1/10W	
C107			CC73FRH1H750J	CHIP C 75PF J	6	R2			RK73FB2A122J	CHIP R 1.2K J 1/10W	
C108			CK73FB1H102K	CHIP C 1000PF K		R3,4			RK73FB2A102J	CHIP R 1.0K J 1/10W	
C109			CC73FRH1H430J	CHIP C 43PF J	5	R5,6			RK73FB2A472J	CHIP R 4.7K J 1/10W	
C109			CC73FRH1H820J	CHIP C 82PF J	6	R7			RK73FB2A221J	CHIP R 220 J 1/10W	
C110			CC73FCH1H020C	CHIP C 2.0PF C	5	R8			RK73FB2A271J	CHIP R 270 J 1/10W	
C110			CC73FCH1H1R5C	CHIP C 1.5PF C	6	R9			RK73FB2A180J	CHIP R 18 J 1/10W	
C111			CC73FCH1H0R5C	CHIP C 0.5PF C	6	R10			RK73FB2A271J	CHIP R 270 J 1/10W	
C112			CC73FRH1H070D	CHIP C 7PF D	5	R11			RK73FB2A332J	CHIP R 3.3K J 1/10W	
C112			CC73FRH1H090D	CHIP C 9PF D	6	R12			RK73FB2A122J	CHIP R 1.2K J 1/10W	
C113			CC73FCH1H020C	CHIP C 2.0PF C	5	R13,14			RK73FB2A102J	CHIP R 1.0K J 1/10W	
C113			CC73FCH1H1R5C	CHIP C 1.5PF C	6	R15,16			RK73FB2A472J	CHIP R 4.7K J 1/10W	
C114			CC73FCH1H010C	CHIP C 1PF C	6	R17			RK73FB2A221J	CHIP R 220 J 1/10W	
C115			CC73FRH1H090D	CHIP C 9PF D	5	R18			RK73FB2A681J	CHIP R 680 J 1/10W	
C115			CC73FRH1H100D	CHIP C 10PF D	6	R19,20			RK73FB2A821J	CHIP R 820 J 1/10W	
C116			CC73FRH1H220J	CHIP C 22PF J	5	R21			RK73FB2A101J	CHIP R 100 J 1/10W	
C116			CC73FRH1H330J	CHIP C 33PF J	6	R22			RK73FB2A103J	CHIP R 10K J 1/10W	
CN1			E04-0171-05	RF COAXIAL CABLE RECEPTACLE		R23			RK73FB2A123J	CHIP R 12K J 1/10W	
CN5			E40-3091-05	PIN CONNECTOR (3P)		R24			RK73FB2A821J	CHIP R 820 J 1/10W	5
CN6			E40-5069-05	PIN CONNECTOR (12P)		R24			RK73FB2A391J	CHIP R 390 J 1/10W	6
CN7			E40-3248-05	PIN CONNECTOR (4P)		R25			RK73FB2A473J	CHIP R 47K J 1/10W	
CN8			E40-3240-05	PIN CONNECTOR (5P)		R26			RK73FB2A563J	CHIP R 56K J 1/10W	5
CN9,10			E04-0154-05	RF COAXIAL CABLE RECEPTACLE		R26			RK73FB2A683J	CHIP R 68K J 1/10W	6
TP1-3			E23-0464-05	TERMINAL		R27			RK73FB2A103J	CHIP R 10K J 1/10W	
W1			E33-1859-00	FINISHED WIRE SET		R34			RK73FB2A330J	CHIP R 33 J 1/10W	
-			E40-5197-05	PIN CONNECTOR (7P)		R35			RK73FB2A182J	CHIP R 1.8K J 1/10W	7
-			E40-5198-05	PIN CONNECTOR (9P)		R35			RK73FB2A122J	CHIP R 1.2K J 1/10W	8
-			E40-5199-05	PIN CONNECTOR (11P)		R36			RK73FB2A100J	CHIP R 10 J 1/10W	
-						R37			RK73FB2A152J	CHIP R 1.5K J 1/10W	
-						R38			RK73FB2A681J	CHIP R 680 J 1/10W	
A1			F10-1366-04	SHIELDING PLATE		R39			RK73FB2A560J	CHIP R 56 J 1/10W	
A2-6			F11-0844-05	SHIELDING COVER		R41			RK73FB2A333J	CHIP R 33K J 1/10W	7
-			G02-0598-04	LEAF SPRING		R41			R92-0670-05	CHIP R 0 OHM	8
U	3C		N87-2608-46	BRAZIER HEAD TAPTE SCREW		R42			RK73FB2A682J	CHIP R 6.8K J 1/10W	
						R43			RK73FB2A683J	CHIP R 68K J 1/10W	

PARTS LIST

TX-RX UNIT (X57-3760-XX)
RX PLL : Z1, TX PLL : Z4 (X58-3140-XX)
RX VCO : Z2 (X58-3290-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination
R44			RK73FB2A222J	CHIP R 2.2K J 1/10W	
R45			RK73FB2A221J	CHIP R 220 J 1/10W	
R46			RK73FB2A392J	CHIP R 3.9K J 1/10W	
R47			RK73FB2A222J	CHIP R 2.2K J 1/10W	
R48			RK73FB2A103J	CHIP R 10K J 1/10W	
R49			RK73FB2A182J	CHIP R 1.8K J 1/10W	
R50			RK73FB2A222J	CHIP R 2.2K J 1/10W	
R51-54			RK73FB2A223J	CHIP R 22K J 1/10W	
R55			RK73FB2A221J	CHIP R 220 J 1/10W	
R56			RK73FB2A123J	CHIP R 12K J 1/10W	
R57			RK73FB2A2R2J	CHIP R 2.2 J 1/10W	
R58,59			RK73FB2A223J	CHIP R 22K J 1/10W	
R60			RK73FB2A102J	CHIP R 1.0K J 1/10W	
R61			RK73FB2A104J	CHIP R 100K J 1/10W	
R62			RK73FB2A222J	CHIP R 2.2K J 1/10W	
R63			R92-0670-05	CHIP R 0 OHM	
R64,65			RK73FB2A223J	CHIP R 22K J 1/10W	
R66,67			RK73FB2A471J	CHIP R 470 J 1/10W	
R68,69			RK73FB2A103J	CHIP R 10K J 1/10W	
R70,71			RK73FB2A473J	CHIP R 47K J 1/10W	
R72			RK73FB2A681J	CHIP R 680 J 1/10W	
R73			RK73FB2A101J	CHIP R 100 J 1/10W	5
R73			RK73FB2A470J	CHIP R 47 J 1/10W	6
R74			RK73FB2A562J	CHIP R 5.6K J 1/10W	
R75			RK73FB2A223J	CHIP R 22K J 1/10W	
R76			RK73FB2A332J	CHIP R 3.3K J 1/10W	
R78			RK73FB2A330J	CHIP R 33 J 1/10W	
R79			RK73FB2A102J	CHIP R 1.0K J 1/10W	
VR1			R12-0420-05	TRIMMING POT. (500)	
VR2,3			R12-4408-05	TRIMMING POT. (50K)	
K1			S51-1435-05	RELAY	
D1,2			1SV172	DIODE	
D4			ND487C1T	DBM	
D5-11			1SS184	DIODE	
D12			1SS226	DIODE	
IC1			UPC1242H	IC (AF POWER AMP)	
IC2			MB3756	IC (REGULATOR/OUTPUT SEL)	
IC3			NJM4558D	IC (OP AMP X2)	
IC4			AN78N08	IC (REGULATOR/BV)	
Q1,2			2SC2712(Y)	TRANSISTOR	
Q4,5			2SK125	FET	
Q6			2SK302(GR)	FET	
Q7			2SC2712(Y)	TRANSISTOR	
Q8			DTC114EK	DIGITAL TRANSISTOR	
Q9,10			2SC3326(A)	TRANSISTOR	
Q11-13			DTC114EK	DIGITAL TRANSISTOR	
Q14,15			2SK125	FET	
TH1			112-203-2	THERMISTOR (20K)	
TH2			112-101-2	THERMISTOR (100)	
Z1			X58-3140-10	SUB UNIT (RX PLL)	7
Z1			X58-3140-51	SUB UNIT (RX PLL)	8
Z2			X58-3290-10	SUB UNIT (RX VCO)	5
Z2			X58-3290-11	SUB UNIT (RX VCO)	6
Z4			X58-3140-10	SUB UNIT (TX PLL)	7
Z4			X58-3140-51	SUB UNIT (TX PLL)	8
Z5			X58-3790-10	SUB UNIT (TX VCO)	5
Z5			X58-3790-11	SUB UNIT (TX VCO)	6
Z7			X59-3210-10	MODULE UNIT (MIC AMP)	
Z8			X59-3220-10	MODULE UNIT (IF)	

Ref. No.	Address	New parts	Parts No.	Description	Destination
Z9			X59-3230-10	MODULE UNIT (BPF/VCA)	
RX PLL : Z1, TX PLL : Z4 (X58-3140-XX)					
-10 : K,K2,M,M2,AM,AM2 -51 : NM,NM2,NK,NK2					
C1-7			CK73FB1H102K	CHIP C 1000PF K	
C8			CC73FCH1H080D	CHIP C 8.0PF D	
C9			CK73FB1H102K	CHIP C 1000PF K	
C10			C92-0009-05	CHIP TAN 4.7UF 10WV	
C11,12			CC73FCH1H070D	CHIP C 7.0PF D	
C13,14			CK73FB1H102K	CHIP C 1000PF K	
-			E23-0471-05	TERMINAL	
A1			F11-1092-04	SHIELDING COVER	
L1			L40-2281-80	SMALL FIXED INDUCTOR (220NH)	
R1			RK73FB2A472J	CHIP R 4.7K J 1/10W	
R2			RK73FB2A102J	CHIP R 1.0K J 1/10W	
R3,4			RK73FB2A270J	CHIP R 27 J 1/10W	
R5			RK73FB2A182J	CHIP R 1.8K J 1/10W	
R6-9			RK73FB2A103J	CHIP R 10K J 1/10W	
R10			R92-0670-05	CHIP R 0 OHM	
R11			RK73FB2A103J	CHIP R 10K J 1/10W	
R12			RK73FB2A471J	CHIP R 470 J 1/10W	
R13			R92-0670-05	CHIP R 0 OHM	
R14			RK73FB2A472J	CHIP R 4.7K J 1/10W	
R15			RK73FB2A562J	CHIP R 5.6K J 1/10W	
D1			O2CZ3.0(Z)	CHIP ZENER DIODE (3.0V)	
IC1			MB504F	IC (MODULUS PRE SCALER)	
IC2			JLC1075F	IC (PLL FREQ SYNTHESIZER)	
IC2			JLC1075DW	IC (PLL FREQ SYNTHESIZER)	
Q1			2SC2714(Y)	CHIP TRANSISTOR	
Q2-5			DTC114EK	DIGITAL TRANSISTOR	
RX VCO : Z2 (X58-3290-XX)					
-10 : K,M,AM,NM,NK -11 : K2,M2,AM2,NM2,NK2					
-			B42-2437-04	S/No LABEL	
C1			CK73FB1H102K	CHIP C 1000PF K	
C2			CC73FCH1H220J	CHIP C 22PF J	6
C2			CC73FCH1H270J	CHIP C 27PF J	5
C3			CC73FCH1H121J	CHIP C 120PF J	
C4			CC73FCH1H150J	CHIP C 15PF J	5
C4			CC73FCH1H180J	CHIP C 18PF J	6
C5			CC73FCH1H060D	CHIP C 6PF D	5
C5			CC73FCH1H090D	CHIP C 9PF D	6
C6			CC73FCH1H100D	CHIP C 10PF D	5
C6			CC73FCH1H150J	CHIP C 15PF J	6
C7			CK73FB1H102K	CHIP C 1000PF K	
C8			CC73FCH1H030C	CHIP C 3PF C	
C9			CK73FB1H102K	CHIP C 1000PF K	
C10			CC73FCH1H150J	CHIP C 15PF J	
C11			CC73FCH1H010C	CHIP C 1PF C	5
C11			CC73FCH1H030C	CHIP C 3PF C	6
C12			CC73FCH1H080D	CHIP C 8PF D	
C13			CC73FCH1H050C	CHIP C 5PF C	
C14-17			CK73FB1H102K	CHIP C 1000PF K	
C18			CE04CW1A101M	ELECTRO 100UF 10WV	
C19			CC73FCH1H180J	CHIP C 18PF J	

TKR-720 K,K2,M,M2 1 : K,K2,M,M2,NM,NM2,NK,NK2
TKR-720N K,K2,M,M2 2 : AM,AM2
TKR-720A M,M2 3 : K,K2,NK,NK2

4 : M,M2,AM,AM2,NM,NM2
5 : K,M,AM,NM,NK
6 : K2,M2,AM2,NM2,NK2

7 : K,K2,M,M2,AM,AM2
8 : NM,NM2,NK,NK2

PARTS LIST

RX VCO : Z2 (X58-3290-XX)

TX VCO : Z5 (X58-3790-XX)

MIC AMP : Z7 (X59-3210-10)

Ref. No.	Address	New parts	Parts No.	Description	Desti-nation
C20			CC73FCH1H070D	CHIP C 7PF D	
C21			CC73FCH1H180J	CHIP C 18PF J	
C22			CK73FB1H102K	CHIP C 1000PF K	
TC1			C05-0363-05	TRIMMING CAP (18P)	
A1			F11-1060-04	SHIELDING COVER	
			E23-0603-05	TERMINAL	
L1			L40-1092-81	CHIP INDUCTOR (1UH)	
L2			L34-2309-05	OSCILLATING COIL	5
L2		*	L32-2392-05	OSCILLATING COIL	6
L3,4			L40-1092-81	CHIP INDUCTOR (1UH)	
L5			L40-1881-80	CHIP INDUCTOR (180NH)	
L6			L40-4772-80	CHIP INDUCTOR (47NH)	
R1			RK73FB2A221J	CHIP R 220 J 1/10W	
R2			RK73FB2A104J	CHIP R 100K J 1/10W	
R3,4			RK73FB2A331J	CHIP R 330 J 1/10W	
R5			RK73FB2A101J	CHIP R 100 J 1/10W	
R6			RK73FB2A153J	CHIP R 15K J 1/10W	
R7			RK73FB2A562J	CHIP R 5.6K J 1/10W	
R8			RK73FB2A331J	CHIP R 330 J 1/10W	
R9			RK73FB2A101J	CHIP R 100 J 1/10W	
R10			RK73FB2A183J	CHIP R 18K J 1/10W	
R11			RK73FB2A272J	CHIP R 2.7K J 1/10W	
R12			RK73FB2A392J	CHIP R 3.9K J 1/10W	
R13			RK73FB2A562J	CHIP R 5.6K J 1/10W	
R14			RK73FB2A121J	CHIP R 120 J 1/10W	
R15			RK73FB2A560J	CHIP R 56 J 1/10W	
R16			RK73FB2A101J	CHIP R 100 J 1/10W	
D1			1SV166	VARI-CAP DIODE	
Q1			2SK125	FET	
Q2			2SC2714(Y)	CHIP TRANSISTOR	
Q3,4			2SC3356	CHIP TRANSISTOR	
TX VCO : Z5 (X58-3790-XX)					
-10 : K,M,AM,NM,NK -11 : K2,M2,AM2,NM2,NK2					
C1			CK73FB1H102K	CHIP C 1000PF K	
C2			CC73FCH1H150J	CHIP C 15PF J	6
C2			CC73FCH1H180J	CHIP C 18PF J	6
C3			CC73FCH1H470J	CHIP C 47PF J	5
C3			CC73FCH1H101J	CHIP C 100PF J	5
C4			CC73FCH1H090D	CHIP C 9PF D	5
C4			CC73FCH1H120J	CHIP C 12PF J	6
C5			CC73FCH1H040C	CHIP C 4PF C	5
C5			CC73FCH1H060D	CHIP C 6PF D	6
C6			CC73FCH1H060D	CHIP C 6PF D	5
C6			CC73FCH1H100D	CHIP C 10PF D	6
C7			CK73FB1H102K	CHIP C 1000PF K	
C8			CC73FCH1H030C	CHIP C 3PF C	
C9			CK73FB1H102K	CHIP C 1000PF K	
C10			CC73FCH1H150J	CHIP C 15PF J	
C11			CC73FCH1H010C	CHIP C 1PF C	5
C11			CC73FCH1H030C	CHIP C 3PF C	6
C12			CC73FCH1H080D	CHIP C 8PF D	
C13			CC73FCH1H050C	CHIP C 5PF C	
C14-17			CK73FB1H102K	CHIP C 1000PF K	
C18			CE04CW1A101M	ELECTRO 100UF 10WV	
C19			CK73FB1H102K	CHIP C 1000PF K	
C20			CC73FCH1H010C	CHIP C 1PF C	5
C20			CC73FCH1H1R5B	CHIP C 1.5PF B	6
C21			CK73FB1H103K	CHIP C 0.010UF K	
C22			CK73FB1H102K	CHIP C 1000PF K	
TC1			C05-0353-05	TRIMMING CAP (10PF)	
			E23-0603-05	TERMINAL	
			F11-1060-04	SHIELD CASE	
L1			L40-1092-81	CHIP INDUCTOR (1UH)	
L2			L34-2309-05	COIL (4T)	5
L2			L32-0658-05	COIL (4T)	6
L3,4			L40-1092-81	CHIP INDUCTOR (1UH)	
L5			L40-1881-80	CHIP INDUCTOR (180NH)	
L6			L40-1092-81	CHIP INDUCTOR (1UH)	
R1			RK73FB2A221J	CHIP R 220 J 1/10W	
R2			RK73FB2A104J	CHIP R 100K J 1/10W	
R3			RK73FB2A101J	CHIP R 100 J 1/10W	
R4			RK73FB2A331J	CHIP R 330 J 1/10W	
R5			RK73FB2A101J	CHIP R 100 J 1/10W	
R6			RK73FB2A153J	CHIP R 15K J 1/10W	
R7			RK73FB2A562J	CHIP R 5.6K J 1/10W	
R8			RK73FB2A331J	CHIP R 330 J 1/10W	
R9			RK73FB2A101J	CHIP R 100 J 1/10W	
R10			RK73FB2A183J	CHIP R 18K J 1/10W	
R11			RK73FB2A272J	CHIP R 2.7K J 1/10W	
R12			RK73FB2A392J	CHIP R 3.9K J 1/10W	
R13			RK73FB2A562J	CHIP R 5.6K J 1/10W	
R14			RK73FB2A121J	CHIP R 120 J 1/10W	
R15			RK73FB2A560J	CHIP R 56 J 1/10W	
R16			RK73FB2A101J	CHIP R 100 J 1/10W	
R17			R92-0687-05	CHIP R 0 OHM	
R18,19			RK73FB2A104J	CHIP R 100K J 1/10W	
R20			RK73FB2A101J	CHIP R 100 J 1/10W	
D1			1SV166	VARI-CAP DIODE	
D2			1SV164	VARI-CAP DIODE	
Q1			2SK125	FET	
Q2			2SC2714(Y)	CHIP TRANSISTOR	
Q3,4			2SC3356	CHIP TRANSISTOR	
MIC AMP : Z7 (X59-3210-10)					
C1			CC73FCH1H101J	CHIP C 100PF J	
C2			C92-0004-05	CHIP TAN 1.0UF 16WV	
C3,4			CK73FB1E223K	CHIP C 0.022UF K	
C5			CC73FCH1H330J	CHIP C 33PF J	
C6			C92-0009-05	CHIP TAN 4.7UF 10WV	
C7			C92-0004-05	CHIP TAN 1.0UF 16WV	
C8			CC73FCH1H101J	CHIP C 100PF J	
C9			C92-0004-05	CHIP TAN 1.0UF 16WV	
C10			CK73FB1H123K	CHIP C 0.012UF K	
C11			CK73FB1H222K	CHIP C 2200PF K	
C12			CC73FCH1H330J	CHIP C 33PF J	
C13			C92-0004-05	CHIP TAN 1.0UF 16WV	
C14			CK73FB1H222K	CHIP C 2200PF K	
C15			CK73FB1H392K	CHIP C 3900PF K	
C16			CC73FCH1H221J	CHIP C 220PF J	
C17			CK73FB1H472K	CHIP C 4700PF K	
C18			C92-0004-05	CHIP TAN 1.0UF 16WV	
			E23-0471-05	TERMINAL	
R1			RK73FB2A473J	CHIP R 47K J 1/10W	

PARTS LIST

MIC AMP : Z7 (X59-3210-10)
IF : Z8 (X59-3220-10)
BPF/VCA : Z9 (X59-3230-10)
FINAL UNIT ASSY (X60-3230-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination
R2			RK73FB2A223J	CHIP R 22K J 1/10W	
R3			RK73FB2A561J	CHIP R 560 J 1/10W	
R4			RK73FB2A681J	CHIP R 680 J 1/10W	
R5			RK73FB2A561J	CHIP R 560 J 1/10W	
R6			RK73FB2A104J	CHIP R 100K J 1/10W	
R7			RK73FB2A102J	CHIP R 1.0K J 1/10W	
R8			RK73FB2A333J	CHIP R 33K J 1/10W	
R9			RK73FB2A393J	CHIP R 39K J 1/10W	
R10			RK73FB2A104J	CHIP R 100K J 1/10W	
R11			RK73FB2A683J	CHIP R 68K J 1/10W	
R12			RK73FB2A224J	CHIP R 220K J 1/10W	
R13			RK73FB2A474J	CHIP R 470K J 1/10W	
R14			RK73FB2A123J	CHIP R 12K J 1/10W	
R15			RK73FB2A154J	CHIP R 150K J 1/10W	
R16			RK73FB2A272J	CHIP R 2.7K J 1/10W	
R17			RK73FB2A822J	CHIP R 8.2K J 1/10W	
R18			RK73FB2A103J	CHIP R 10K J 1/10W	
R19,20			RK73FB2A104J	CHIP R 100K J 1/10W	
R21			RK73FB2A103J	CHIP R 10K J 1/10W	
R22			RK73FB2A272J	CHIP R 2.7K J 1/10W	
R23			RK73FB2A393J	CHIP R 39K J 1/10W	
R24			RK73FB2A123J	CHIP R 12K J 1/10W	
R25			RK73FB2A333J	CHIP R 33K J 1/10W	
R26,27			RK73FB2A472J	CHIP R 4.7K J 1/10W	
R28			RK73FB2A683J	CHIP R 68K J 1/10W	
IC1			NJM4560M	IC (OP AMP X2)	
IC2,3			NJM4558M	IC (OP AMP X2)	
Q1			2SC3326(A)	CHIP TRANSISTOR	

IF : Z8 (X59-3220-10)

C1			CK73FB1H102K	CHIP C 1000PF K	
C2			CC73FCH1H220J	CHIP C 22PF J	
C3			CC73FCH1H470J	CHIP C 47PF J	
C4-7			CK73EB1E104K	CHIP C 0.10UF K	
C8			C92-0003-05	CHIP TAN 0.47UF 25WV	
C9,10			CC73FCH1H680J	CHIP C 68PF J	
C11			CK73FB1H332K	CHIP C 3300PF K	
C12			CK73FB1H102K	CHIP C 1000PF K	
C14			C92-0003-05	CHIP TAN 0.47UF 25WV	
C17			CK73FB1E223K	CHIP C 0.022UF K	
C19			CK73FB1H102K	CHIP C 1000PF K	
C20			CC73FCH1H470J	CHIP C 47PF J	
-			E23-0471-05	TERMINAL	
R1			RK73FB2A203J	CHIP R 20K J 1/10W	
R3			RK73FB2A272J	CHIP R 2.7K J 1/10W	
R4			RK73FB2A334J	CHIP R 330K J 1/10W	
R5,6			RK73FB2A153J	CHIP R 15K J 1/10W	
R7			RK73FB2A821J	CHIP R 820 J 1/10W	
R10			RK73FB2A224J	CHIP R 220K J 1/10W	
R13			RK73FB2A392J	CHIP R 3.9K J 1/10W	
R14			RK73FB2A223J	CHIP R 22K J 1/10W	
R15			RK73FB2A821J	CHIP R 820 J 1/10W	
R16			RK73FB2A223J	CHIP R 22K J 1/10W	
D1			DA204K	CHIP DIODE	
IC1			MC3361BD	IC (FM IF SYSTEM)	
Q1			2SC2712(Y)	CHIP TRANSISTOR	

Ref. No.	Address	New parts	Parts No.	Description	Destination
BPF/VCA : Z9 (X59-3230-10)					
C1-4			C93-0502-05	CHIP C 1800PF G	
C5-9			C93-0501-05	CHIP C 680PF G	
C10			CK73FB1H222K	CHIP C 2200PF K	
C11			C92-0004-05	CHIP TAN 1.0UF 16WV	
C12			CK73FB1H472K	CHIP C 4700PF K	
C13			CK73FB1H102K	CHIP C 1000PF K	
C14			C92-0004-05	CHIP TAN 1.0UF 16WV	
-			E23-0471-05	TERMINAL	
R1			RK73FB2A273J	CHIP R 27K J 1/10W	
R2			RK73FB2A822J	CHIP R 8.2K J 1/10W	
R3			RK73FB2A184J	CHIP R 180K J 1/10W	
R4			RK73FB2A224J	CHIP R 220K J 1/10W	
R5			RK73FB2A394J	CHIP R 390K J 1/10W	
R6			RK73FB2A134G	CHIP R 130K G 1/10W	
R7			RK73FB2A105G	CHIP R 1.0M G 1/10W	
R8			RK73FB2A683G	CHIP R 68K G 1/10W	
R9			RK73FB2A105G	CHIP R 1.0M G 1/10W	
R10			RK73FB2A514G	CHIP R 510K G 1/10W	
R11			RK73FB2A105G	CHIP R 1.0M G 1/10W	
R12			RK73FB2A514G	CHIP R 510K G 1/10W	
R13			RK73FB2A303G	CHIP R 30K G 1/10W	
R14,15			RK73FB2A473J	CHIP R 47K J 1/10W	
R16			RK73FB2A472J	CHIP R 4.7K J 1/10W	
R17			RK73FB2A101J	CHIP R 100 J 1/10W	
R18			RK73FB2A183J	CHIP R 18K J 1/10W	
R19			RK73FB2A124J	CHIP R 120K J 1/10W	
R20,21			RK73FB2A223J	CHIP R 22K J 1/10W	
R22			RK73FB2A183J	CHIP R 18K J 1/10W	
R23			R92-0670-05	CHIP R 0 OHM	
IC1,2			NJM4558M	IC (OP AMP X2)	
IC3			M5222FP	IC (OP AMP X2)	
IC4			NJM4558M	IC (OP AMP X2)	

FINAL UNIT ASSY (X60-3230-XX)

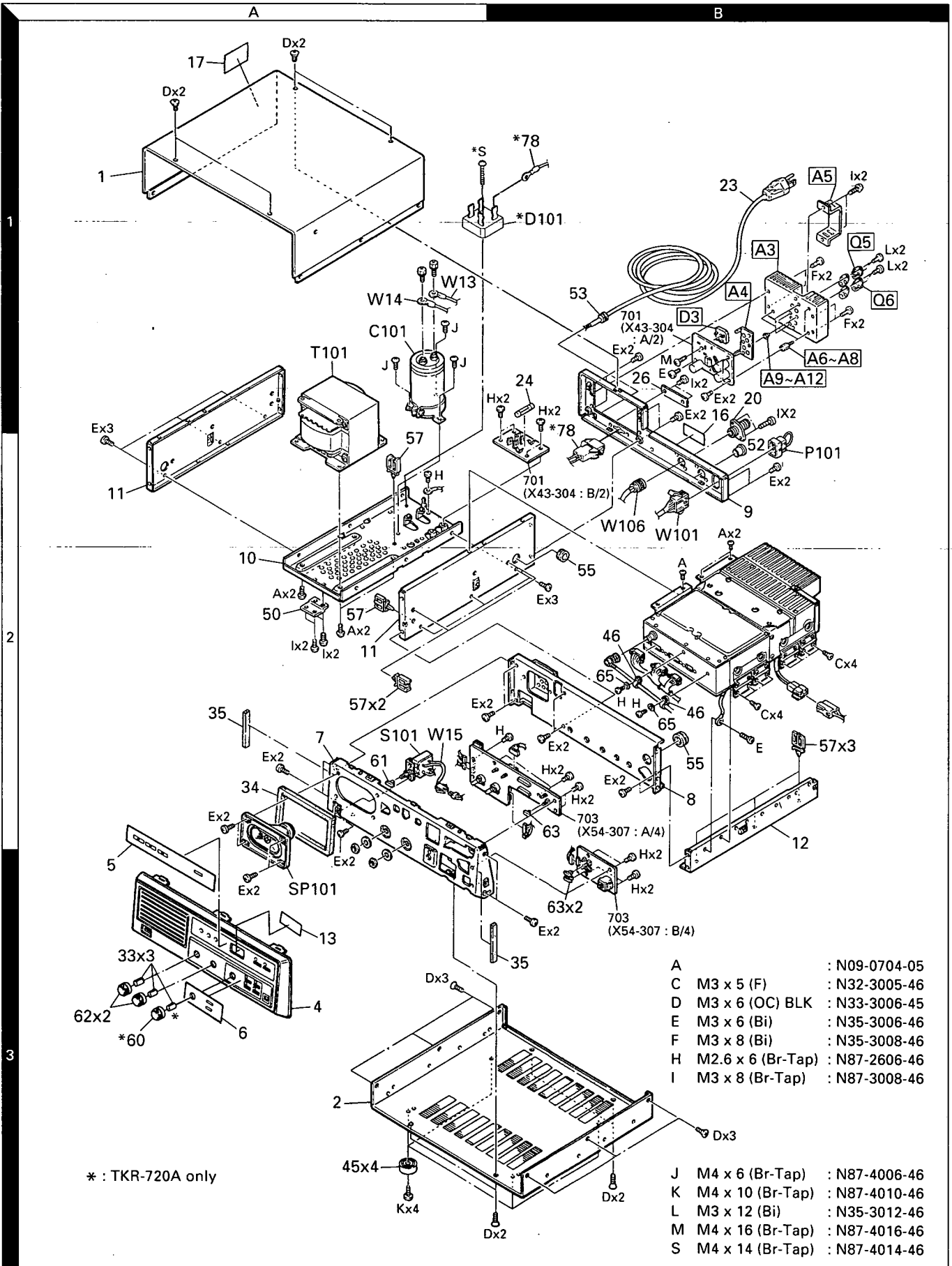
-10 : K,M,AM -11 : K2,M2,AM2
-12 : NM -13 : NM2 -14 : NK -15 : NK2

W18	3C		E31-6028-05	CONNECTING WIRE	
J1	2D		E04-0167-05	RF COAXIAL CABLE RECEPTACLE	
W2	-		E31-3256-05	CONNECTING WIRE	
W6	-		E31-3123-05	CONNECTING WIRE (TX)	
100	3D		E37-0059-15	DC CABLE	
101	2D		F01-0966-21	HEAT SINK	
102	1D		F11-1115-02	SHIELDING COVER	
103	2D		F11-1119-04	SHIELDING COVER	
104	2D		G10-0668-04	FELT	
105	1D		J19-1431-05	LEAD HOLDER	
106	3D		J19-1433-05	LEAD HOLDER	
J	1D		N87-3008-46	SECOND BRAZIERTAP TIGHT SCREW	
N	1D,2D		N67-3010-46	SEMUS SCREW (MODULE TR)	
O	1D		N32-3008-41	FLAT HEAD MACHINE SCREW	
P	1D		N35-3008-41	BINDING HEAD MACHINE SCREW	
R	3D		N90-3008-46	TP HEAD MACHINE SCREW	
V	1D		N35-4006-46	SECOND BRAZIERTAP TIGHT SCREW	
W	1D		N89-3010-45	BINDING HEAD MACHINE SCREW	

TKR-720 K,K2,M,M2 1 : K,K2,M,M2,NM,NM2,NK,NK2
TKR-720N K,K2,M,M2 2 : AM,AM2
TKR-720A M,M2 3 : K,K2,NK,NK2

4 : M,M2,AM,AM2,NM,NM2 7 : K,K2,M,M2,AM,AM2
5 : K,M,AM,NM,NK 8 : NM,NM2,NK,NK2
6 : K2,M2,AM2,NM2,NK2

EXPLODED VIEW

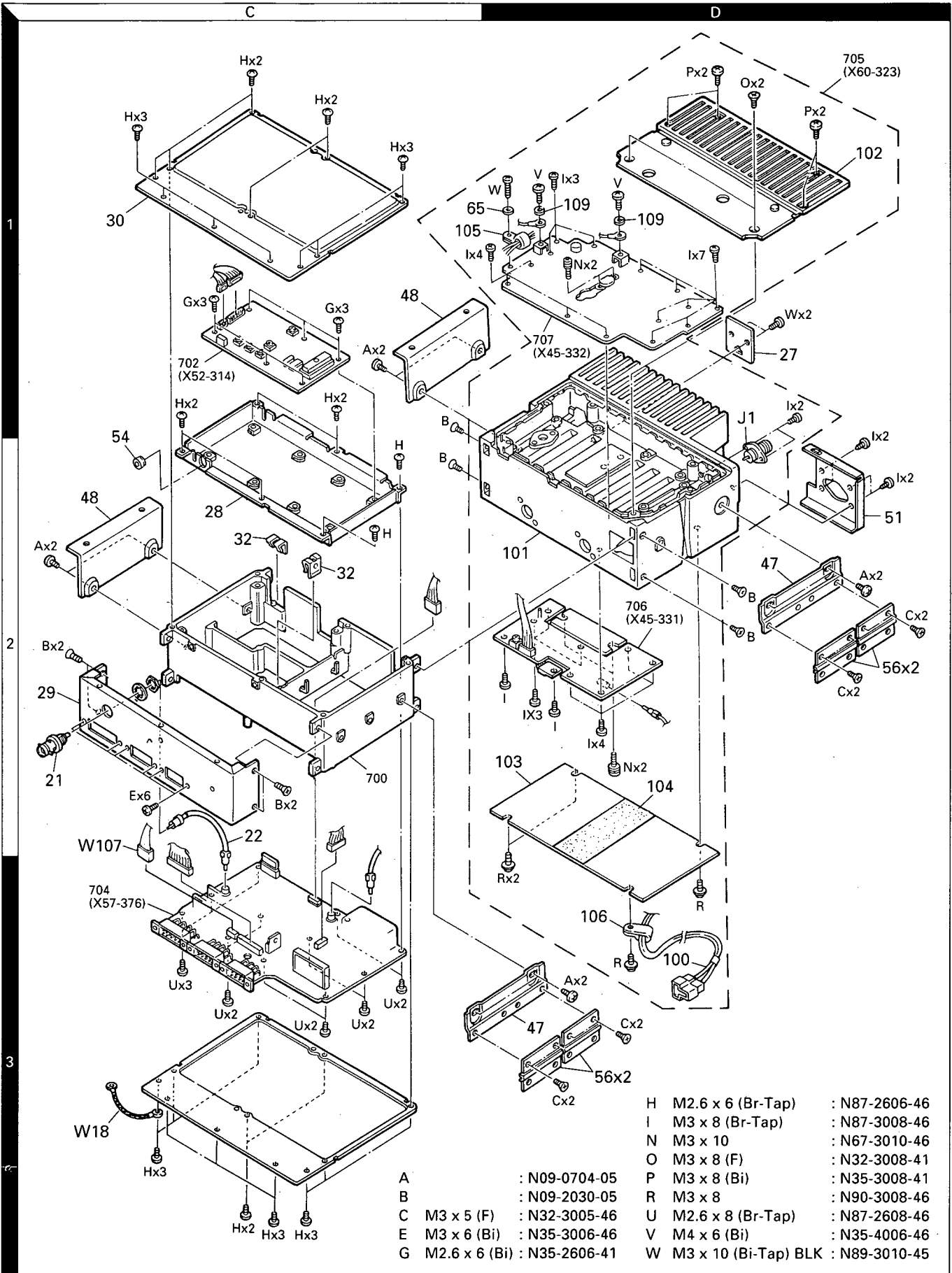


* : TKR-720A only

- | | | |
|---|--------------------|---------------|
| A | : | N09-0704-05 |
| C | M 3 x 5 (F) | : N32-3005-46 |
| D | M 3 x 6 (OC) BLK | : N33-3006-45 |
| E | M 3 x 6 (Bi) | : N35-3006-46 |
| F | M 3 x 8 (Bi) | : N35-3008-46 |
| H | M 2.6 x 6 (Br-Tap) | : N87-2606-46 |
| I | M 3 x 8 (Br-Tap) | : N87-3008-46 |

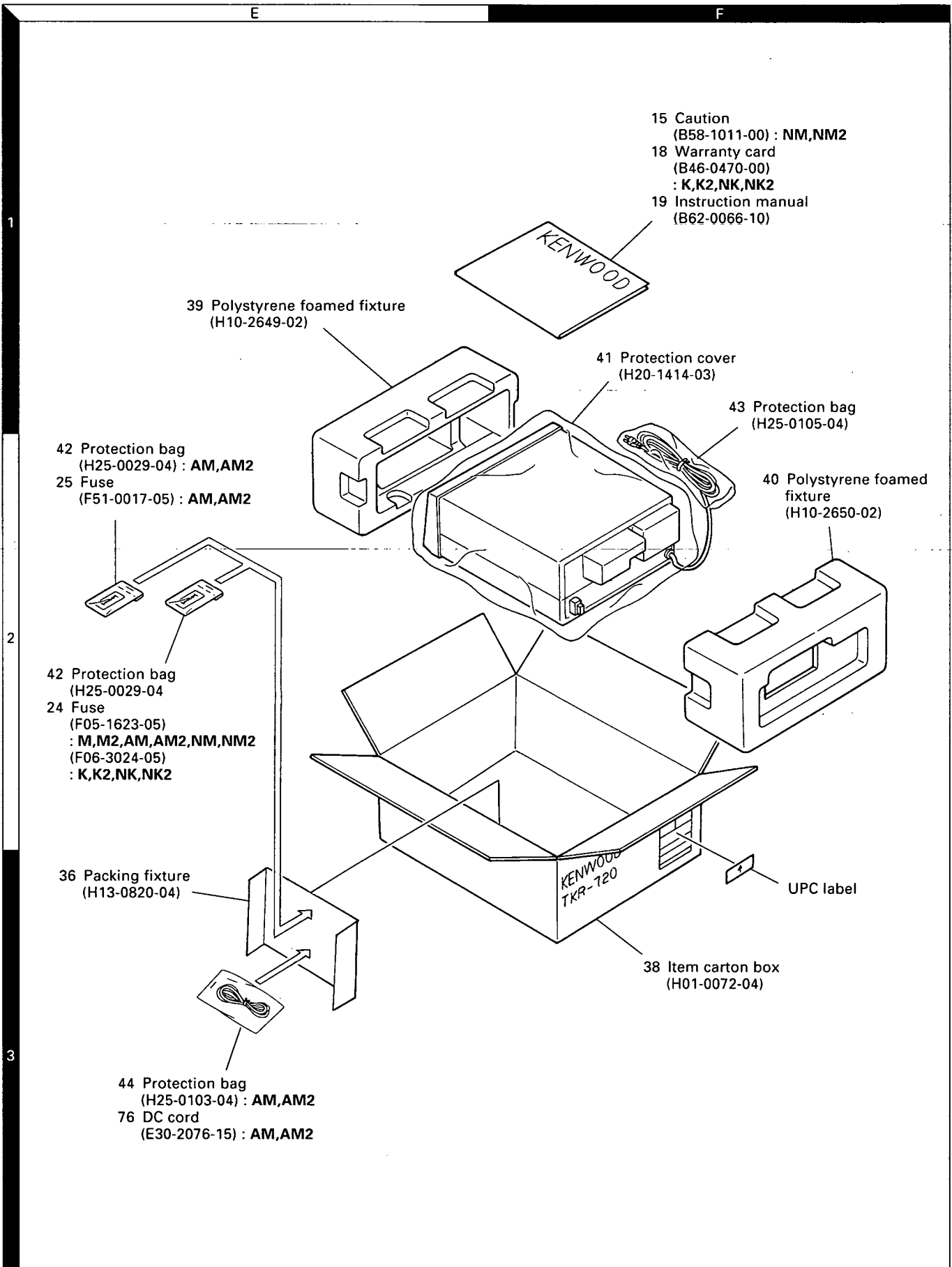
- | | | |
|---|-------------------|---------------|
| J | M 4 x 6 (Br-Tap) | : N87-4006-46 |
| K | M 4 x 10 (Br-Tap) | : N87-4010-46 |
| L | M 3 x 12 (Bi) | : N35-3012-46 |
| M | M 4 x 16 (Br-Tap) | : N87-4016-46 |
| S | M 4 x 14 (Br-Tap) | : N87-4014-46 |

EXPLODED VIEW



A	: N09-0704-05	H	M2.6 x 6 (Br-Tap)	: N87-2606-46
B	: N09-2030-05	I	M3 x 8 (Br-Tap)	: N87-3008-46
C	M3 x 5 (F) : N32-3005-46	N	M3 x 10	: N67-3010-46
E	M3 x 6 (Bi) : N35-3006-46	O	M3 x 8 (F)	: N32-3008-41
G	M2.6 x 6 (Bi) : N35-2606-41	P	M3 x 8 (Bi)	: N35-3008-41
		R	M3 x 8	: N90-3008-46
		U	M2.6 x 8 (Br-Tap)	: N87-2608-46
		V	M4 x 6 (Bi)	: N35-4006-46
		W	M3 x 10 (Bi-Tap) BLK	: N89-3010-45

PACKING



- 15 Caution (B58-1011-00) : NM,NM2
- 18 Warranty card (B46-0470-00) : K,K2,NK,NK2
- 19 Instruction manual (B62-0066-10)

39 Polystyrene foamed fixture (H10-2649-02)

41 Protection cover (H20-1414-03)

43 Protection bag (H25-0105-04)

42 Protection bag (H25-0029-04) : AM,AM2
 25 Fuse (F51-0017-05) : AM,AM2

40 Polystyrene foamed fixture (H10-2650-02)

42 Protection bag (H25-0029-04)
 24 Fuse (F05-1623-05) : M,M2,AM,AM2,NM,NM2
 (F06-3024-05) : K,K2,NK,NK2

36 Packing fixture (H13-0820-04)

UPC label

38 Item carton box (H01-0072-04)

44 Protection bag (H25-0103-04) : AM,AM2
 76 DC cord (E30-2076-15) : AM,AM2

ADJUSTMENT

Test Equipment Required for Alignment

No.	Test Equipment	Major Specifications	
1.	Standard Signal Generator (SSG)	Frequency Range Modulation Output	136 to 174MHz. Frequency modulation and external modulation. 0.1μV to greater than 1mV.
2.	Power Meter	Input Impedance Operation Frequency Measurement Capability	50Ω. 136 to 174MHz or more. Vicinity of 50W.
3.	Deviation Meter	Frequency Range	136 to 174MHz.
4.	Digital Volt Meter	Measuring Range Accuracy	1 to 20V DC. High input impedance for minimum circuit loading.
5.	Oscilloscope		DC through 30MHz.
6.	High Sensitivity Frequency Counter	Frequency Range Frequency Stability	10Hz to 600MHz. 0.2ppm or less.
7.	Ammeter		15A.
8.	AF Volt Meter (AF VTVM)	Frequency Range Voltage Range	50Hz to 10kHz. 3mV to 3V.
9.	Audio Generator (AG)	Frequency Range Output	50Hz to 5kHz or more. 0 to 1V.
10.	Distortion Meter	Capability Input Level	3% or less at 1kHz. 50mV to 10Vrms.
11.	Voltmeter	Measuring Range Input Impedance	10 to 1.5V DC or less. 50kΩ/V or greater.
12.	4Ω Dummy Load		Approx. 4Ω, 3W.

The set has been adjusted for the frequencies shown in the following table. When required, re-adjust them following the adjustment procedure to obtain the frequencies you want in actual operation.

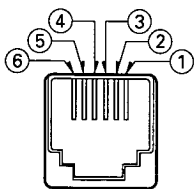
Type	RX freq' (MHz)	TX freq' (MHz)
K,M,NM,AM,NK	173.900	168.900
K2,M2,NM2,AM2,NK2	149.900	144.900

TKR-720 : K,K2,M,M2
TKR-720N : K,K2,M,M2
TKR-720A : M,M2

Signaling

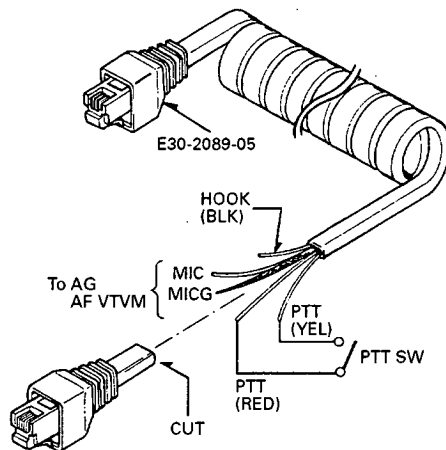
CH	RX		TX	
	QT (Hz)	DQT	QT (Hz)	DQT
1	210.7			023
2	67		77	
3	192.8		179.9	
4	77			754
5	88.5		167.9	
6	100			351

The following test cables are recommended

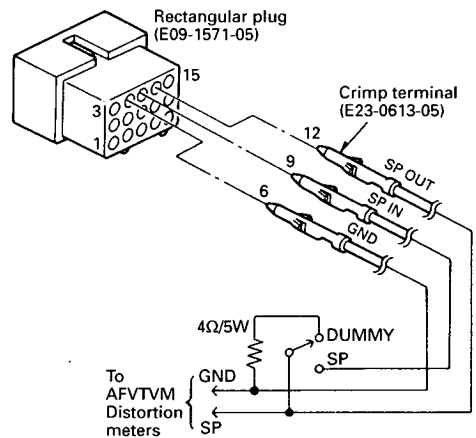


- ① SB
- ② PTTG
- ③ PTT
- ④ MICG
- ⑤ MIC
- ⑥ HOOK

MIC connector front view



Test cable for Microphone input

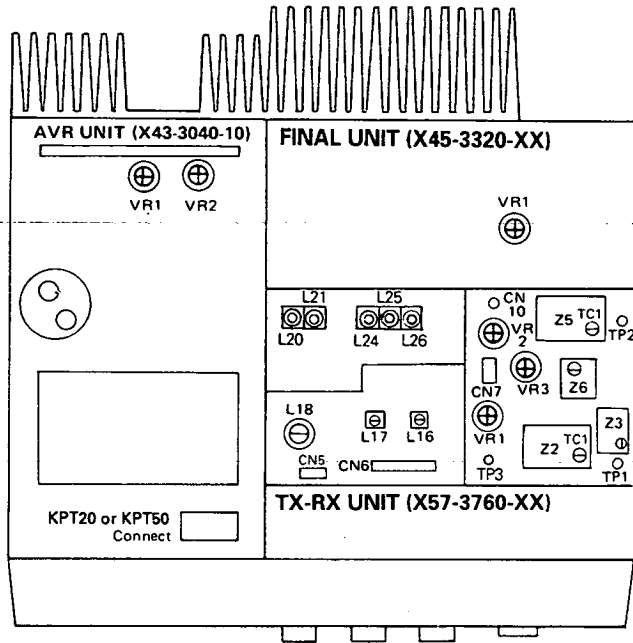


Test cable for Speaker output

ADJUSTMENT

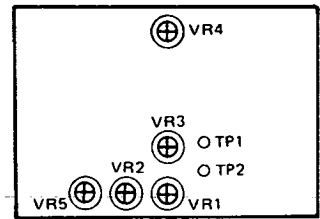
Adjustment location

Top view

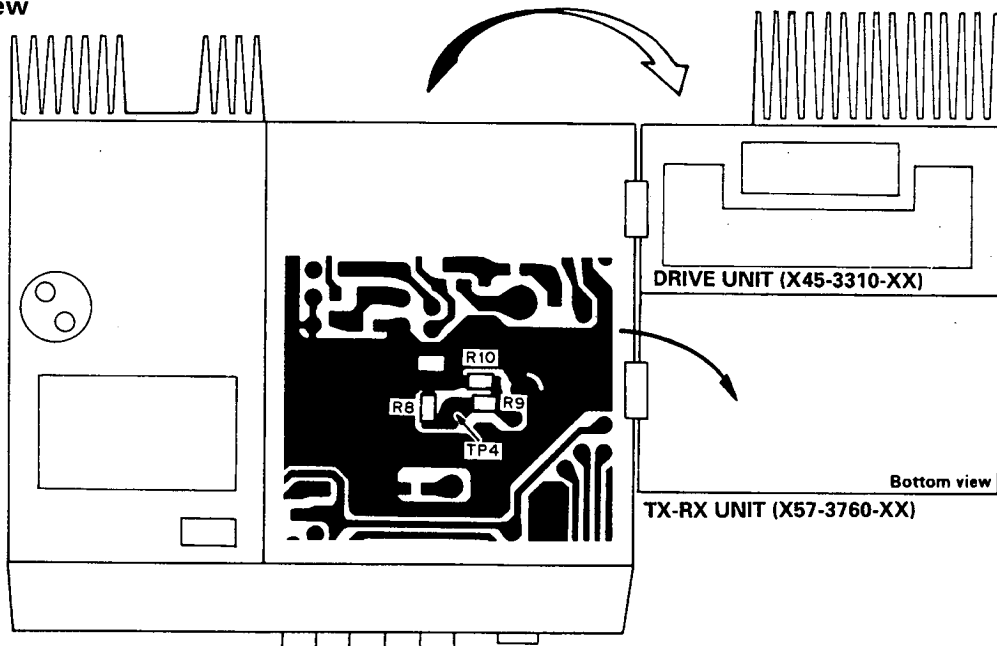


Adjustment points

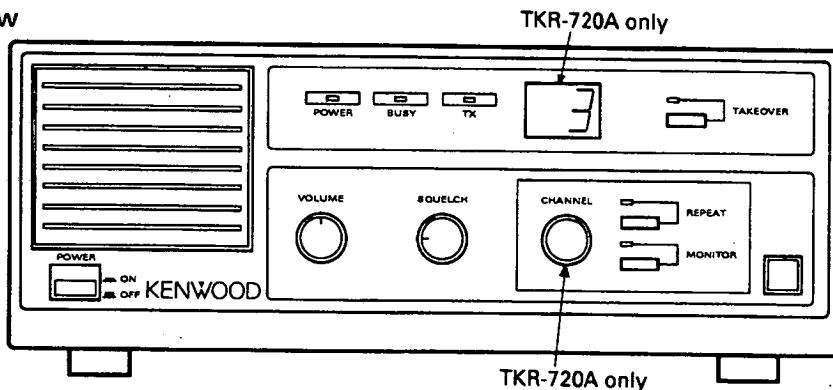
SIGNALING UNIT (X52-3140-10)



Bottom view



Front panel view




ADJUSTMENT

Alignment

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. Setting	1) AC voltage for destination : 120V K,K2,NK,NK2 : 220V M,M2,NM,NM2, AM,AM2 2) Connect to the DC output (OUT terminal) and GND of the AVR unit (*).							
2. Test equipment set-up	1) Function : 0.1Ω resistor Meter : 60A. 60V DC : ON Power : ON SW1 : OFF							
3. Voltage setting	1) Power switch : ON	DVM	AVR	OUT	AVR	VR1	Adjust the load for 10A.	13.6V±0.4V (Verify power indicator lights.)
	2) Vary the load for 2A to 10A draw. (Set to 10A after check)	DVM AF VTVM					Check	13.6V±0.7V DC K,K2,M,M2,NM,NM2, NK,NK 13.6V±1.3V DC AM,AM2 Less than 30mV AC
	3) Power switch : OFF							
4. Protection	1) SW1 : ON VR2 : MAX CW. Power switch : ON	DVM	AVR	OUT	AVR	VR2	0.25V	±0.05V
	2) SW1 : OFF						Check	13.6V±0.4V
5. Setting	1) Write in frequency designed with EEPROM writer. (For frequency writing, set the power of TKR-720 to ON.) 2) Connect the power cable to the rear panel. 3) Final unit VR1 : MAX CCW. 4) TX-RX unit VR1, VR3 : MAX CCW. 5) Power switch : ON							
6. RX PLL lock voltage		DVM	TX-RX	TP1	TX-RX	Z2 (TC1)	4.0V	±0.5V
7. TX PLL lock voltage				TP2		Z5 (TC1)	4.0V	±0.5V

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
8. TCXO frequency adjustment	1) PTT : OFF (RX) Note : TCXO is adjusted precisely at 25°C. If it is readjusted, the frequency stability is changed. Do not touch it normally.	Power meter f. counter	TX-RX	TP4 (Foil side)	TX-RX	Z3	f - 21.4MHz	±100Hz
9. Power adjustment (APC)	1) PTT : ON	Power meter Ammeter	Rear panel	TX ANT	Final	VR1	MAX CW.	58W or more
							MIN	15W or less
							50W	±1W
10. Transmit frequency	1) PTT : ON	Power meter f. counter	Rear panel	TX ANT	TX-RX	Z6	Adjust the transmit frequency.	±200Hz
11. Tone deviation adjustment	1) QT tone frequency being written. Deviation meter filter LPF : 3kHz HPF : OFF De-emphasis : OFF PTT : ON	Power meter Deviation meter	Rear panel	TX ANT	Signaling	VR4	±0.9kHz K,K2,M,M2, AM,AM2 ±0.45kHz NM,NM2,NK,NK2	±100Hz
12. Maximum deviation adjustment	1) Connect AG to the MIC terminal. AG : 1kHz/50mV Deviation meter filter LPF : 20kHz HPF : 50Hz De-emphasis : 750µsec. TX-RX unit VR1 : MAX CW. PTT : ON	AG	Front panel	MIC	TX-RX	VR2	±4.4kHz (±4.9kHz in use of signaling.) K,K2,M,M2, AM,AM2 ±2.2kHz (±2.45kHz in use of signaling.) NM,NM2,NK,NK2 Adjust one more than the other by switching between -P and +P.	±200Hz
13. MIC sensitivity adjustment	1) AG : 1kHz/5mV PTT : ON					VR1	±3.0kHz (±3.9kHz in use of signaling.) K,K2,M,M2, AM,AM2 ±1.5kHz (±1.95kHz in use of signaling.) NM,NM2,NK,NK2	±200Hz
14. DQT waveform correction (For DQT use only)	1) Connect AG to the TX-RX (TP3) and enter a square wave of 100Hz, 2Vp-p. Deviation meter filter : OFF PTT : ON	Power meter Deviation meter Oscilloscope	Rear panel	TX ANT	TX-RX	VR3	Make the demodulation waveform neat.	
		AG	TX-RX	TP3				

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks	
		Test-equipment	Unit	Terminal	Unit	Parts	Method		
15. RX sensitivity adjustment		AF VTVM 4Ω dummy load	Rear panel	EXT.SP	Front panel	VOL.	0.78V/4Ω (Noise)		
	1) SSG output : 500μV/-53dBm MOD : OFF	AF VTVM Distortion meter 4Ω dummy load SSG	Rear panel	EXT.SP RX ANT	TX-RX	L20 L21 L24 L25 L26	Reduce noise level using L20, L21, L24, L25 and L26. Decrease the SSG output so that noise level is always 20 to 30dB lower than 0.45V. Repeat 3 to 4 times.		
	2) SSG output : 500μV/-53dBm MOD : 1kHz DEV : 3kHz K,K2,M,M2,AM,AM2 DEV : 1.5kHz NM,NM2,NK,NK2					L18	Adjust for maximum AF output.		
	3) SSG output : 0.32μV/-117dBm				Front panel	VOL.	0.45V/4Ω		
	4) SSG output : 500μV/-53dBm				Front panel	VOL.	4.0V/4Ω		
						Check	SINAD 12dB or more		
						Check	S/N 45dB or more K,K2,M,M2,AM,AM2 S/N 39dB or more NM,NM2,NK,NK2 Distortion : 5% or less		
16. Squelch	1) SSG output : OFF Rotate SQL VR to a point at which noise disappears.	AF VTVM 4Ω dummy load Oscilloscope	Rear panel	EXT.SP			Check	SQL index angle 8:00~10:00	
	2) SSG output : 0.2μV/-121dBm	SSG		RX ANT				Squelch should open.	
17. Preset squelch adjustment	1) Signaling unit VR1 to VR5 : MAX CCW. SSG output : OFF	SSG	Rear panel	RX ANT			Check	D7 : LED should light.	
					Signaling	VR1	MAX CW.	D7 : LED should go out.	
	2) SSG output : 0.17μV/-124dBm						Rotate VR1 CCW. to a point at which D7 lights.		

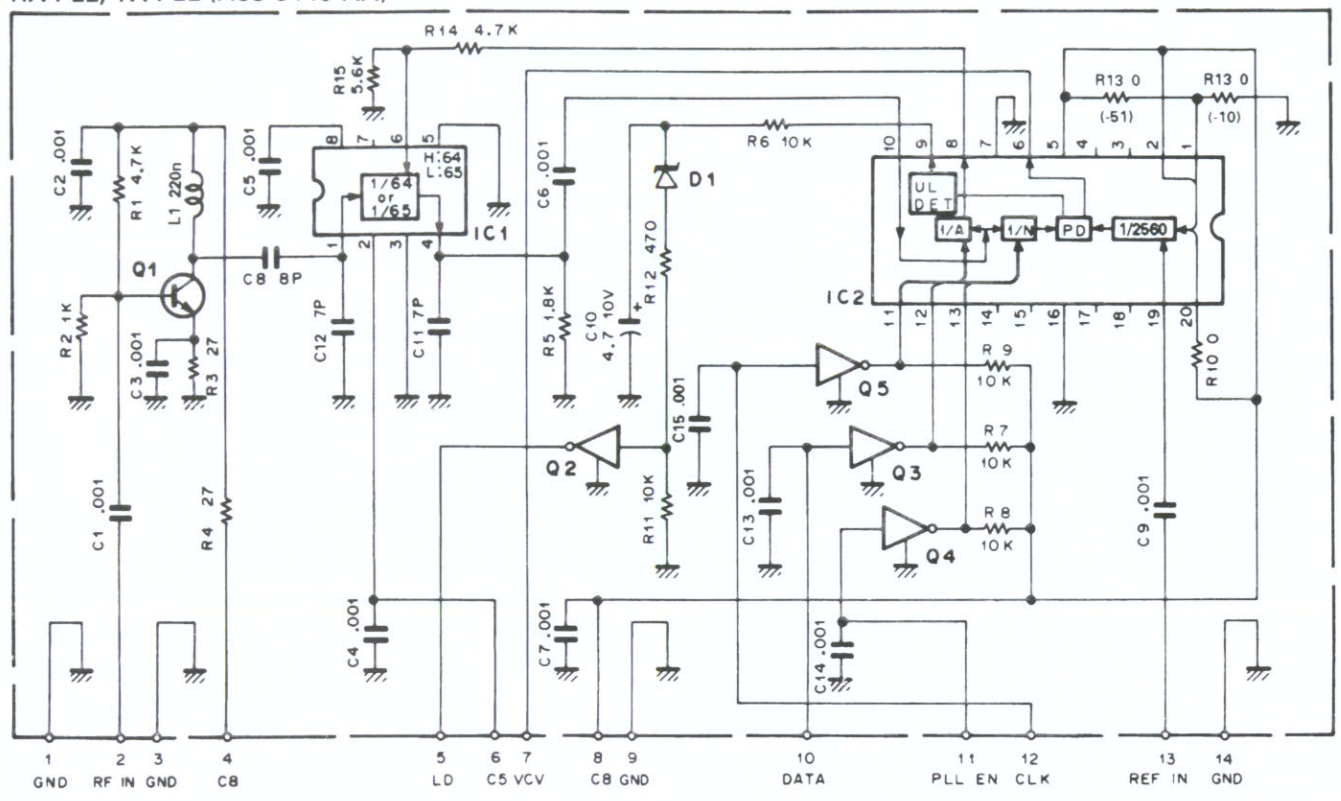
ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
18. Hangup timer adjustment	1) SSG output : 1.58μV/-103dBm The set time can be continuously varied by VR2. 0~5V → 0~5 sec.	DVM	Signaling	TP2	Signaling	VR2	1.0V	±0.1V
	2) SSG output : 500μV/-53dBm REPEAT switch : ON	Power meter SSG	Rear panel	TX ANT RX ANT			Check	TX LED should light. REPEAT LED should light.
	3) SSG output : OFF							TX LED should go out about 1 sec. later after turning SSG OFF.
19. T.O.T	1) The set time can be continuously varied by VR3. 0~0.3V : OFF ~0.5V : 30 sec. ~5V : ~5 min.	DVM	Signaling	TP1	Signaling	VR3	Set it to the target time.	
20. Repeater TX deviation	1) SSG output : 501μV/-53dBm	Power meter Deviation meter SSG	Rear panel	EXT.SP RX ANT	Signaling	VR5	±3.0kHz K,K2,M,M2,AM,AM2 ±1.5kHz NM,NM2,NK,NK2	±100Hz
21. Signaling squelch	1) SSG output : Turn the SSG output so that the SINAD sensitivity becomes 10dB.							
	2) SSG MOD SW : EXT.MOD AG1 : 1kHz AG2 : QT tone frequency							
	3) AG1 : Power switch OFF AG2 output : Adjust the output level of AG2 so that the SSG deviation becomes 0.9kHz K,K2,M,M2,AM,AM2 , 0.45kHz NM,NM2,NK,NK2 .							
	4) AG1 : Power switch ON AG1 output : Adjust the output level of AG1 so that the SSG deviation becomes 3.9kHz K,K2,M,M2,AM,AM2 , 1.95kHz NM,NM2,NK,NK2 . (i.e., QT tone frequency/0.9kHz K,K2,M,M2,AM,AM2 , 0.45kHz NM,NM2,NK,NK2 deviation, +1kHz/3kHz K,K2,M,M2,AM,AM2 , 1.5kHz NM,NM2,NK,NK2 deviation) MONITOR switch : OFF							
		Rear panel	EXT.SP				Check	Open.
22. TAKE OVER	1) TAKE OVER switch : ON						Check	The TAKE OVER LED should light.

PC BOARD VIEWS / CIRCUIT DIAGRAM TKR 720/N/A

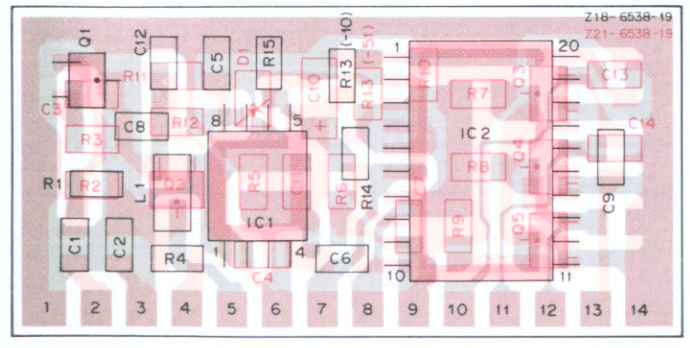
RX PLL : Z1, TX PLL : Z4 (X58-3140-XX) -10 : K,K2,M,M2,AM,AM2 -51 : NM,NM2,NK,NK2

RX PLL, TX PLL (X58-3140-XX)

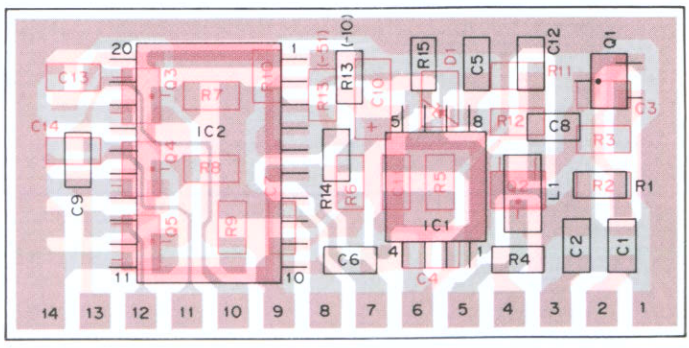


- Q1 : 2SC2714(Y)
- Q2-5 : DTC114EK
- IC1 : MB504F
- IC2 : JLC1075F or JLC1075DW
- D1 : 02CZ3.0(Z)

Component side view



Foil side view

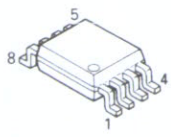


: Component side
 : Foil side

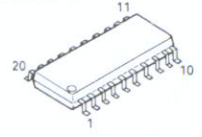
2SC2714
DTC114EK



MB504F



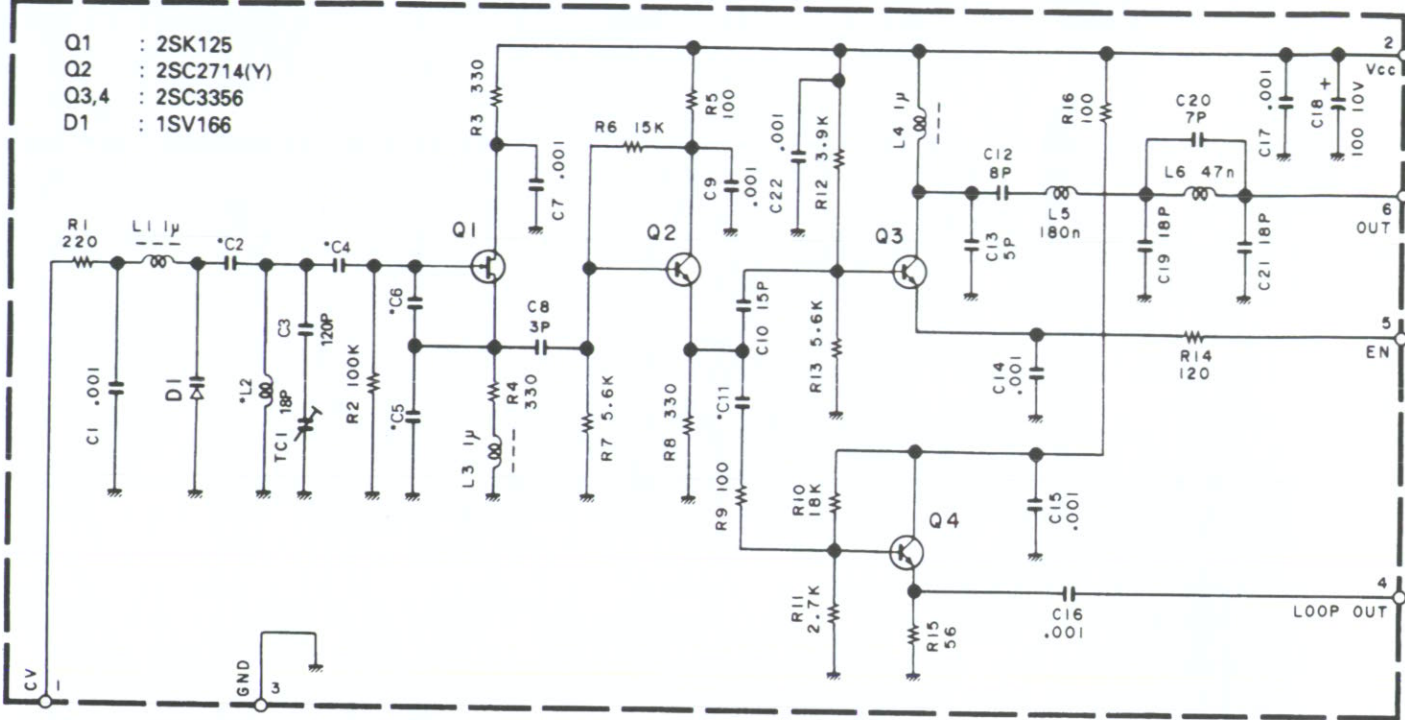
JLC1075DW
JLC1075F



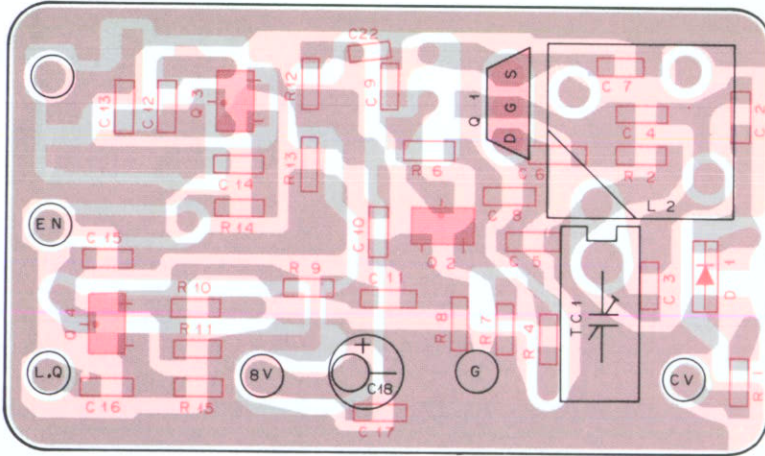
TKR-720/N/A PC BOARD VIEWS / CIRCUIT DIAGRAM

RX VCO : Z2 (X58-3290-XX) -10 : K,M,AM,NM,NK -11 : K2,M2,AM2,NM2,NK2

RX VCO (X58-3290-XX)



Component side view



	C2	C4	C5	C6
-10	27P	15P	6P	10P
-11	22P	18P	9P	15P

	C11	L2
-10	1P	L34-2309-05
-11	3P	L34-2392-05

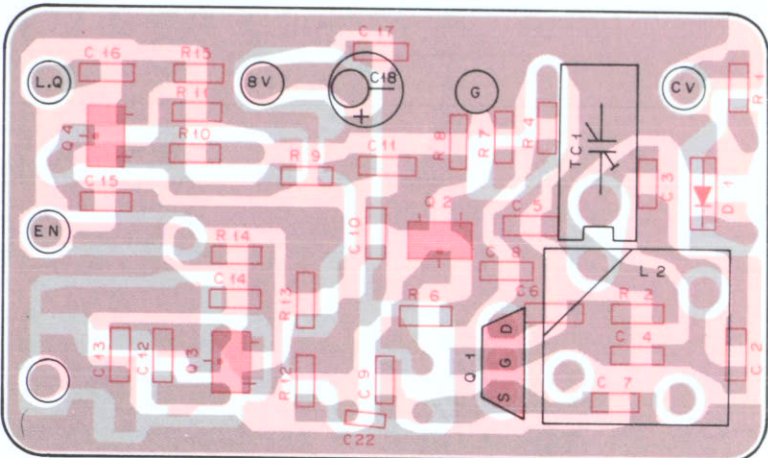
2SC2714
2SC3356



2SK125



Foil side view

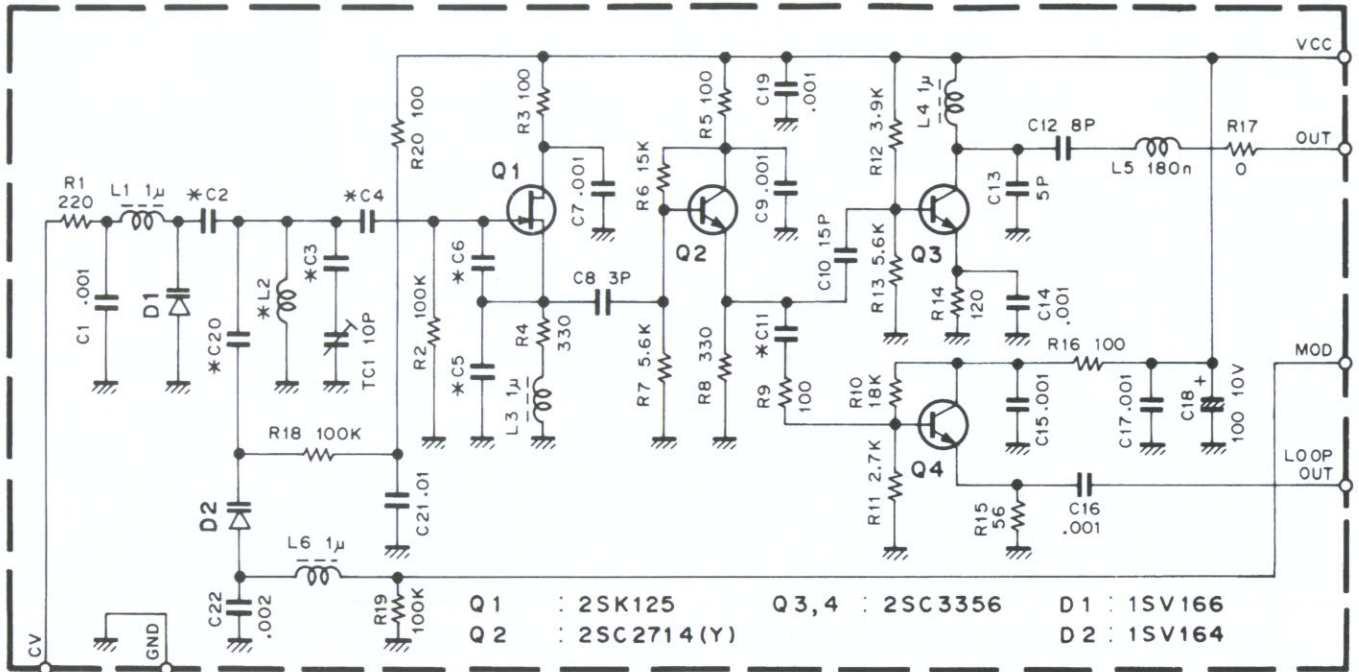


▭ : Component side
▭ : Foil side

PC BOARD VIEWS / CIRCUIT DIAGRAM TKR-720/N/A

TX VCO : Z5 (X58-3790-XX) -10 : K,M,AM,NM,NK -11 : K2,M2,AM2,NM2,NK2

TX VCO (X58-3790-XX)

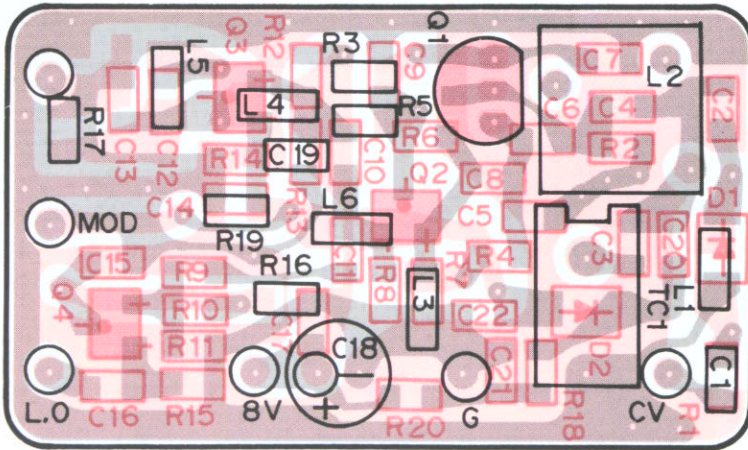


Q1 : 2SK125 Q3, 4 : 2SC3356 D1 : 1SV166
 Q2 : 2SC2714 (Y) D2 : 1SV164

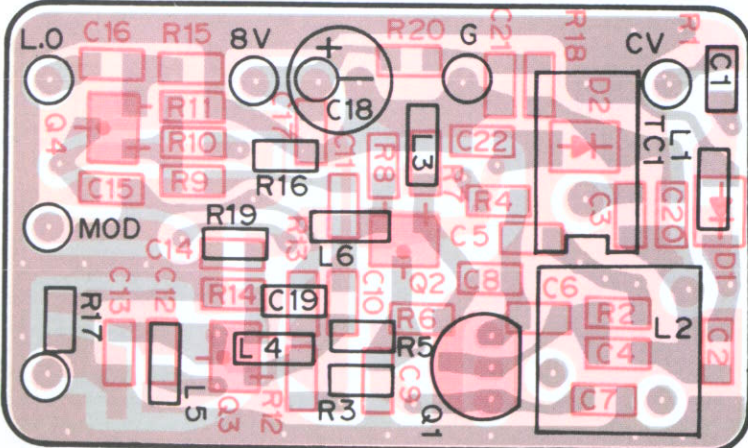
	C2	C3	C4	C5	C6
-10	18P	100P	9P	4P	6P
-11	15P	47P	12P	6P	10P

	C11	C20	L2
-10	1P	1P	L34-2309-05
-11	3P	2P	L34-0658-05

Component side view



Foil side view

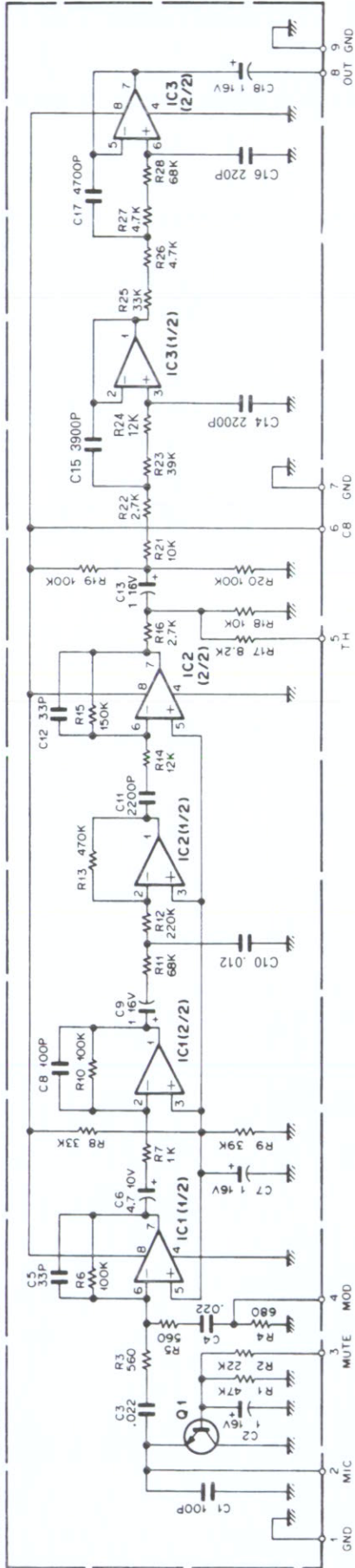


Component side
 Foil side

TKR-720/N/A PC BOARD VIEWS / CIRCUIT DIAGRAM

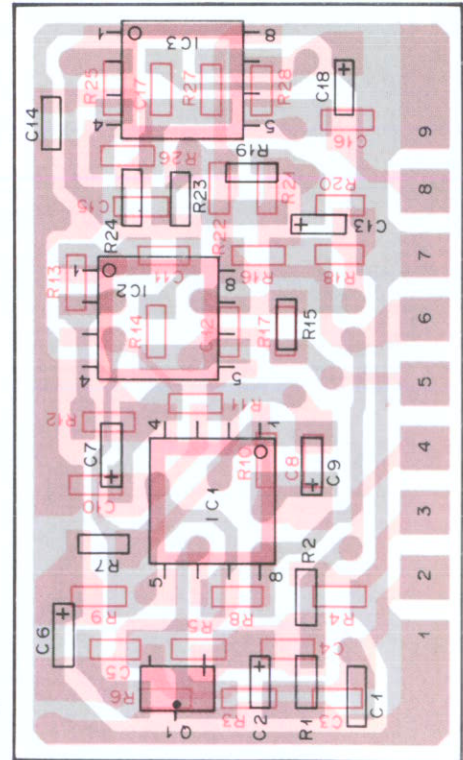
MIC AMP : Z7 (X59-3210-10)

MIC AMP (X59-3210-10)

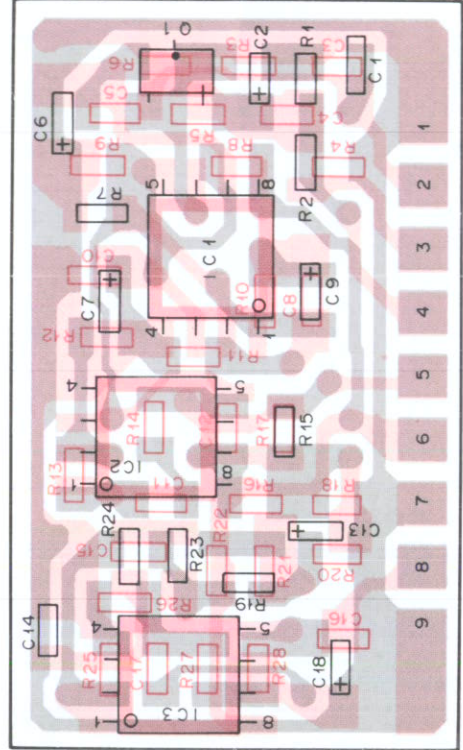


Q1 : 2SC3326(A) IC1 : NJM4560M IC2, 3 : NJM4558M

Component side view



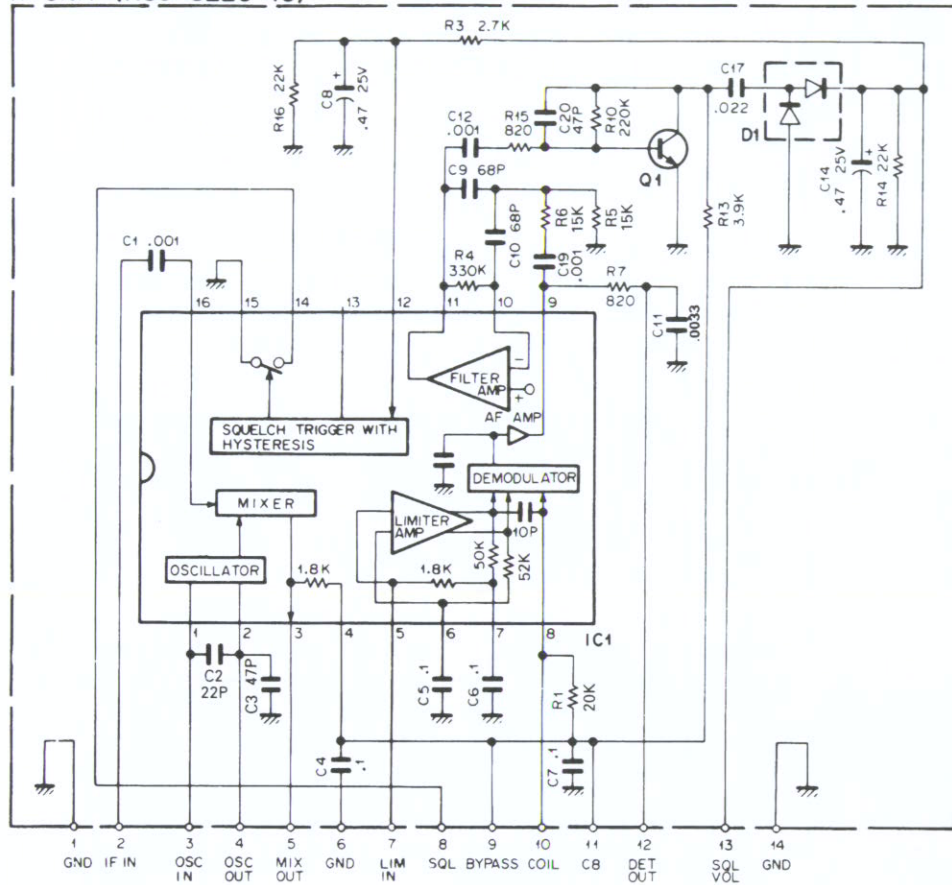
Foil side view



Component side
Foil side

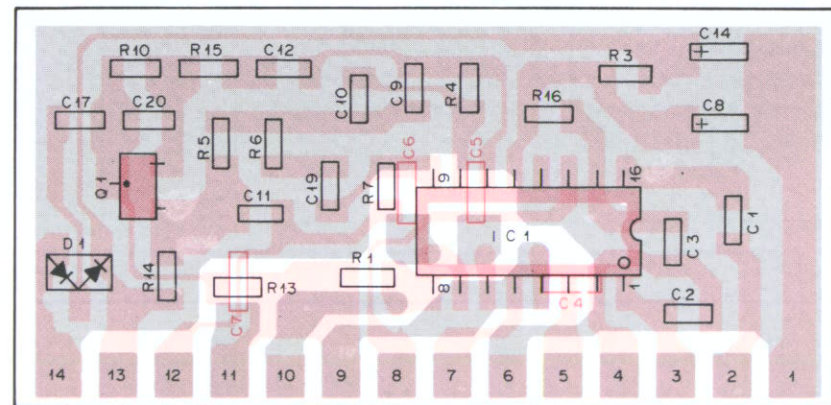
IF : Z8 (X59-3220-10)

IF UNIT (X59-3220-10)

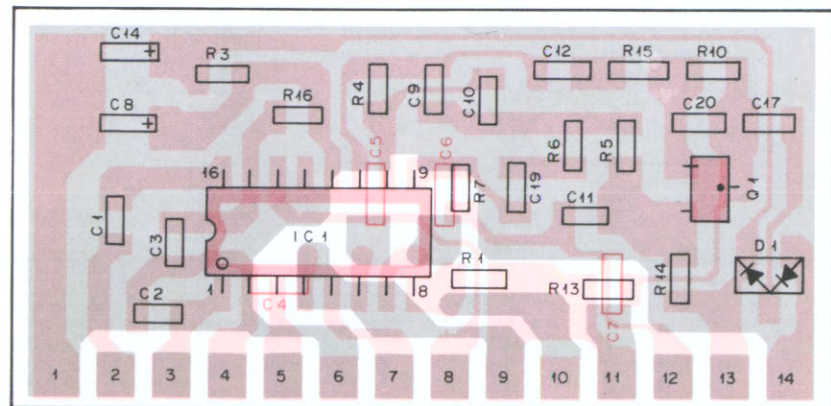


IC1 : MC3361BD
Q1 : 2SC2712(Y)
D1 : DA204K

Component side view



Foil side view

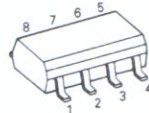


Component side
Foil side

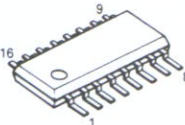
2SC2712
2SC3326



M5222FP
NJM4558M
NJM4560M

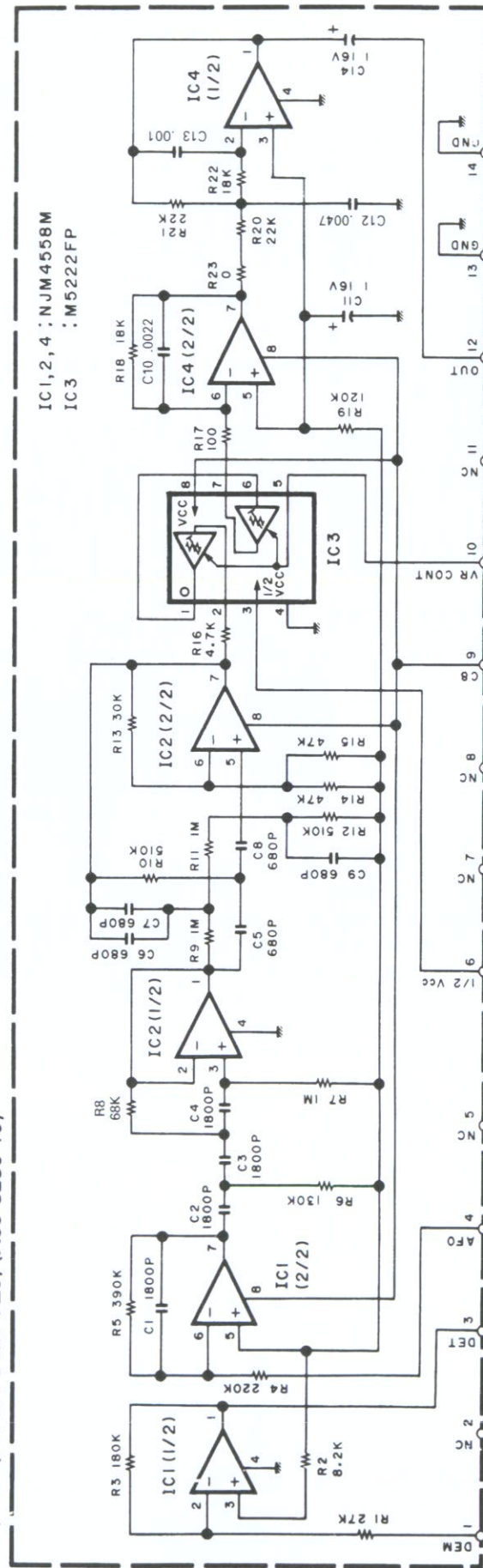


MC3361BD



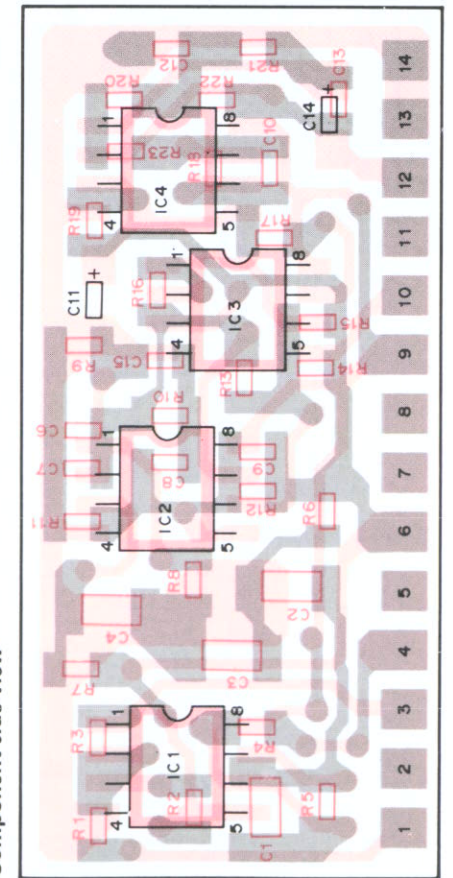
BPF/VCA : Z9 (X59-3230-10)

BPF/VCA (TX-RX UNIT : Z9) (X59-3230-10)

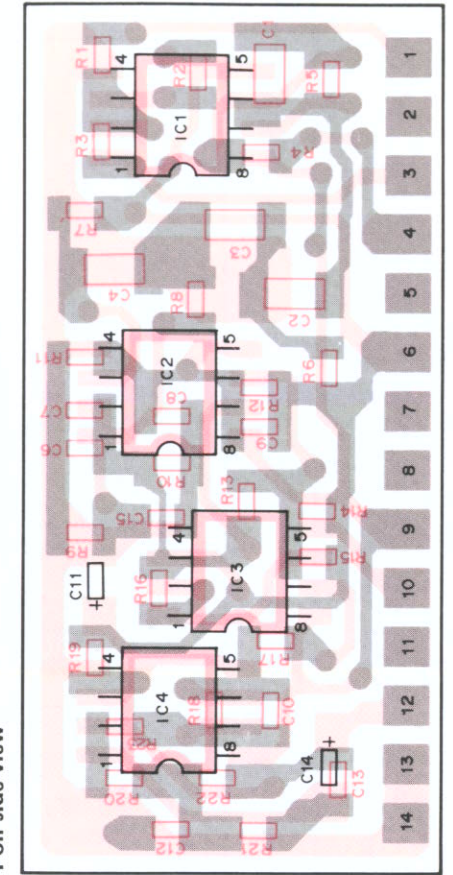


IC1, 2, 4 : NJM4558M
IC3 : M5222FP

Component side view



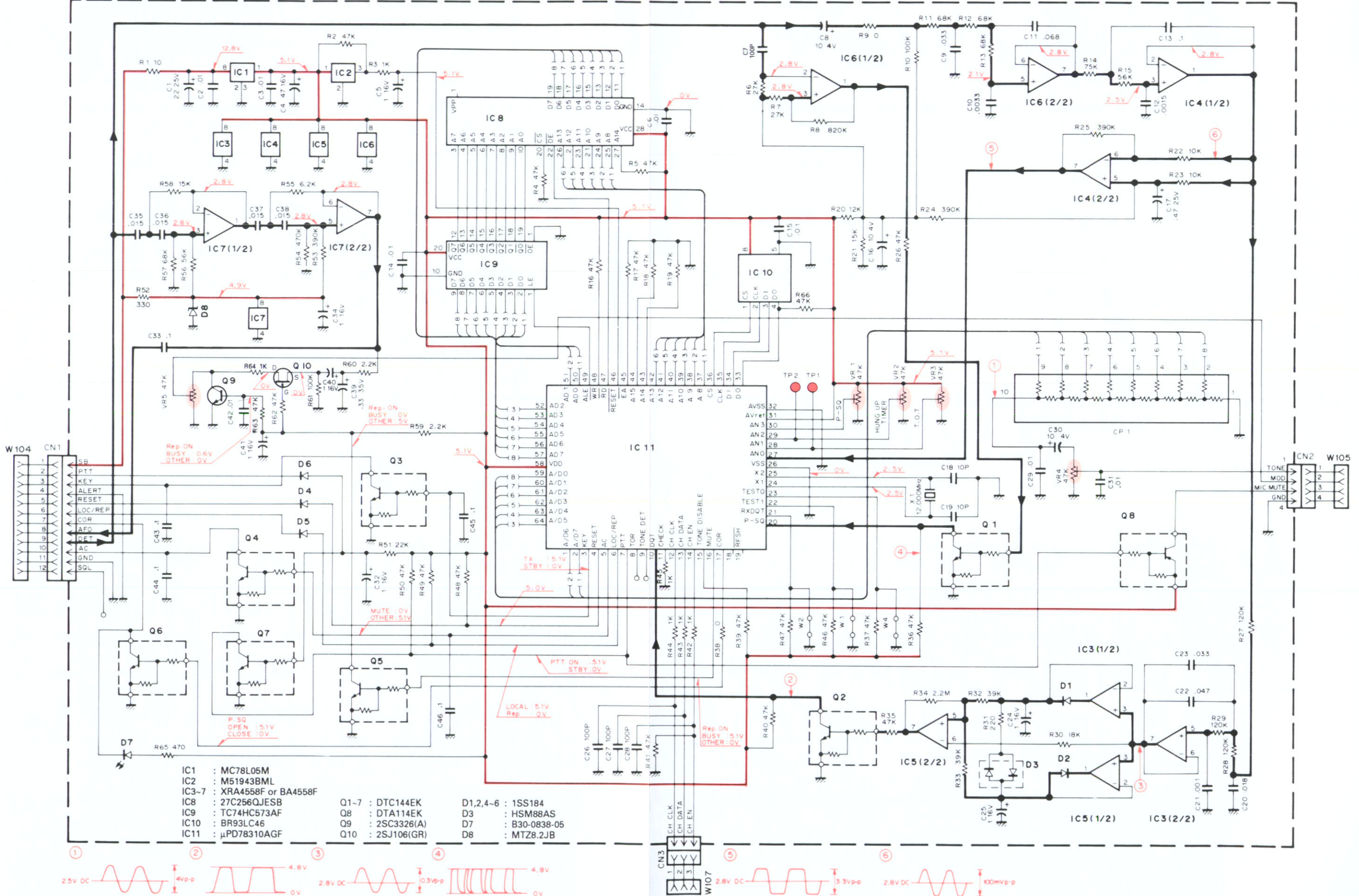
Foil side view



Component side
Foil side

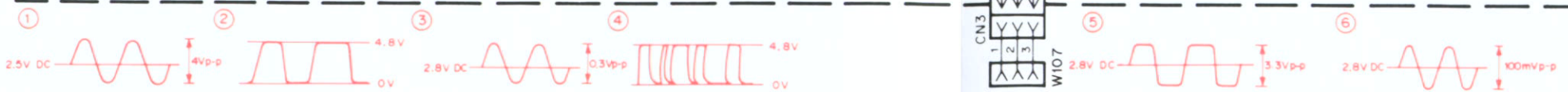
TKR-720/N/A CIRCUIT DIAGRAM

SIGNALING UNIT (X52-3140-10)

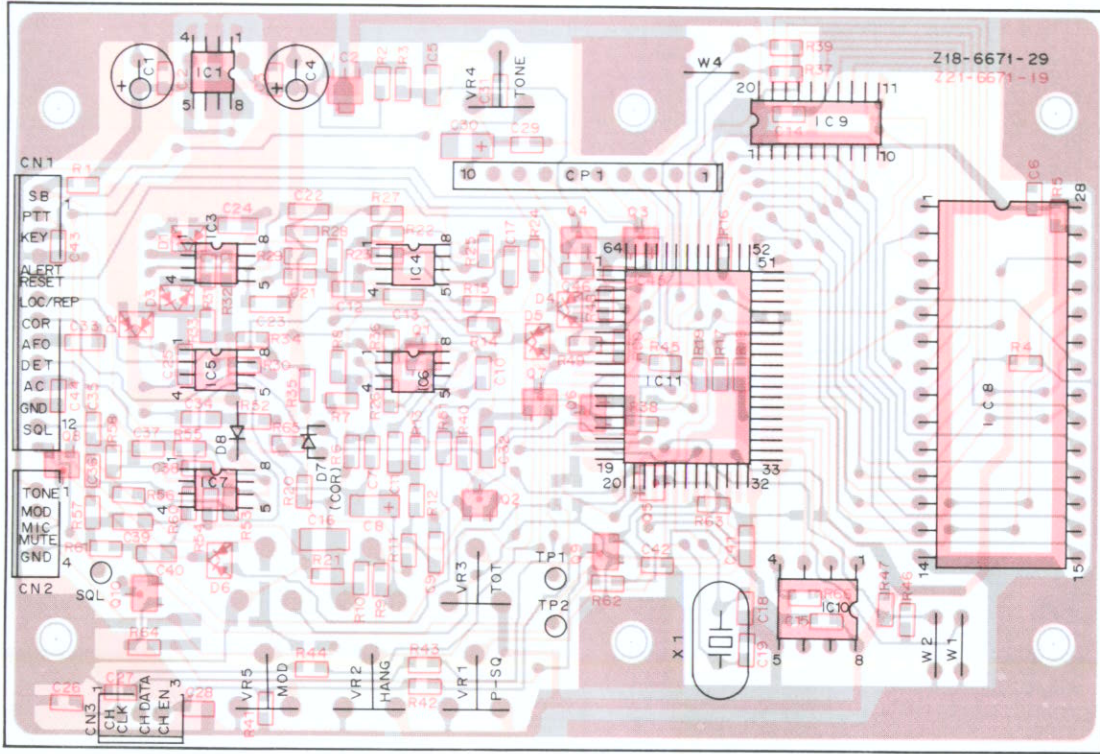


- IC1 : MC78L05M
- IC2 : M51943BML
- IC3-7 : XRA4558F or BA4558F
- IC8 : 27C256QJESB
- IC9 : TC74HC573AF
- IC10 : BR93LC46
- IC11 : µPD78310AGF

- Q1-7 : DTC144EK
- Q8 : DTA114EK
- Q9 : 2SC3326(A)
- Q10 : 2SJ106(GR)
- D1,2,4-6 : 1SS184
- D3 : HSM88AS
- D7 : B30-0838-05
- D8 : MTZ8.2JB



SIGNALING UNIT (X52-3140-10) Component side view



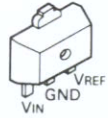
2SC3326
DTA114EK
DTC144EK



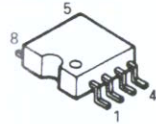
2SJ106



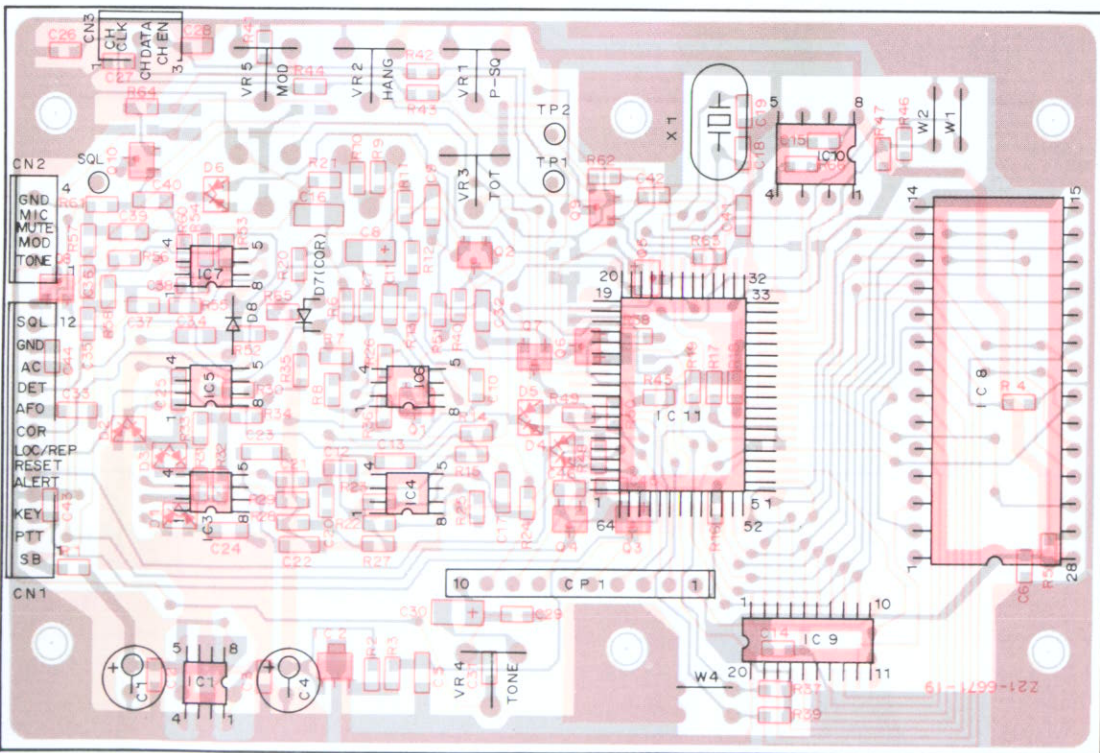
M51943BML



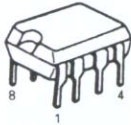
BA4558F
MC78L05M



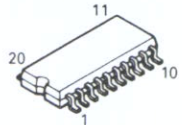
Foil side view



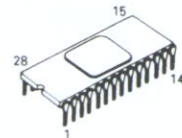
BR93LC46



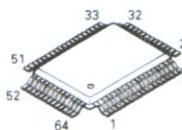
TC74HC573AF



27C256QJESB



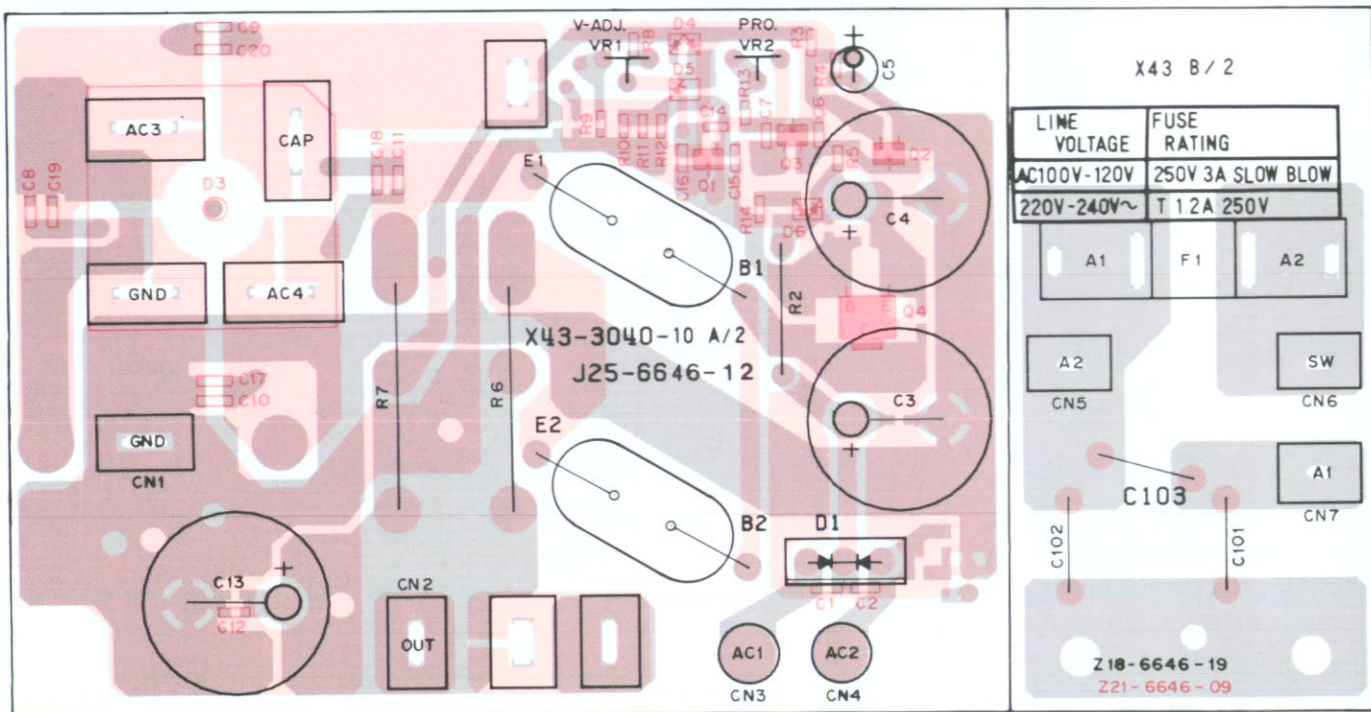
UPD78310AGF



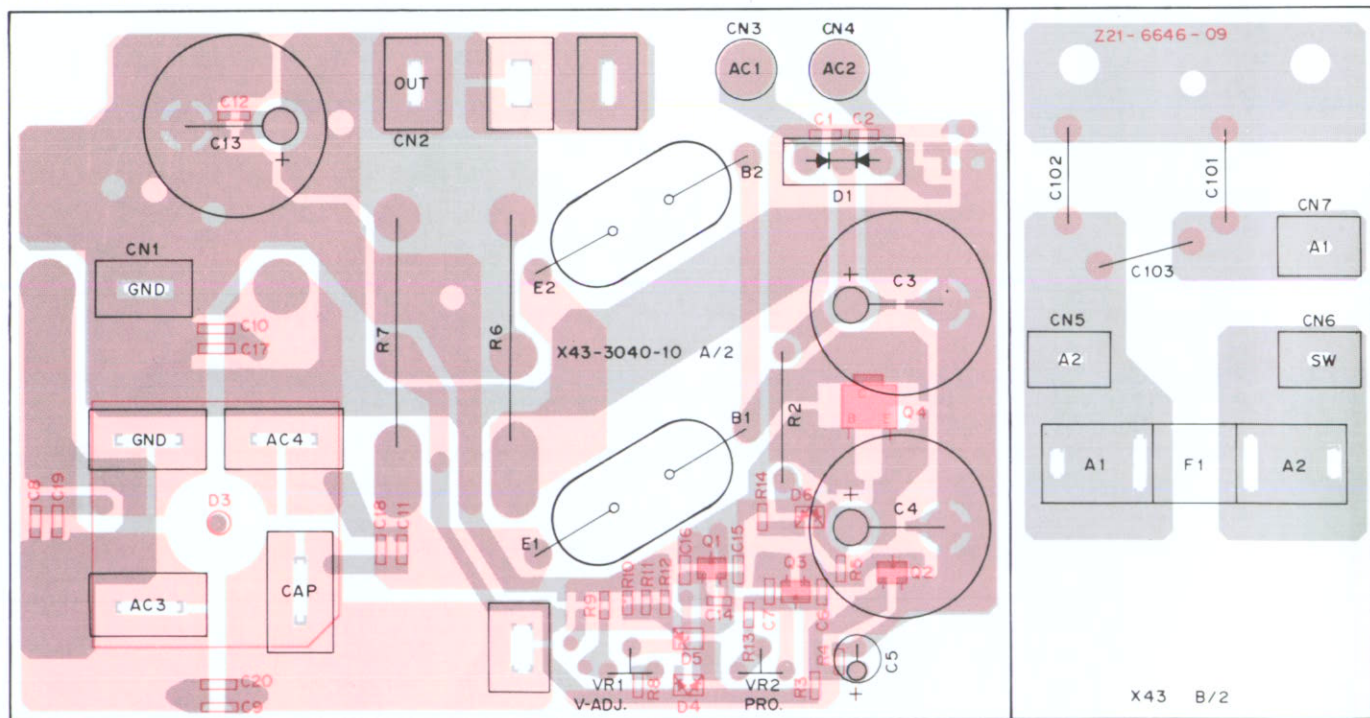
Component side
Foil side

TKR-720/N/A PC BOARD VIEWS

AVR UNIT (X43-3040-10) Component side view



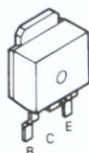
Foil side view



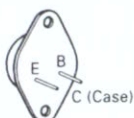
2SC2712
2SC3326



2SB968



2N5885

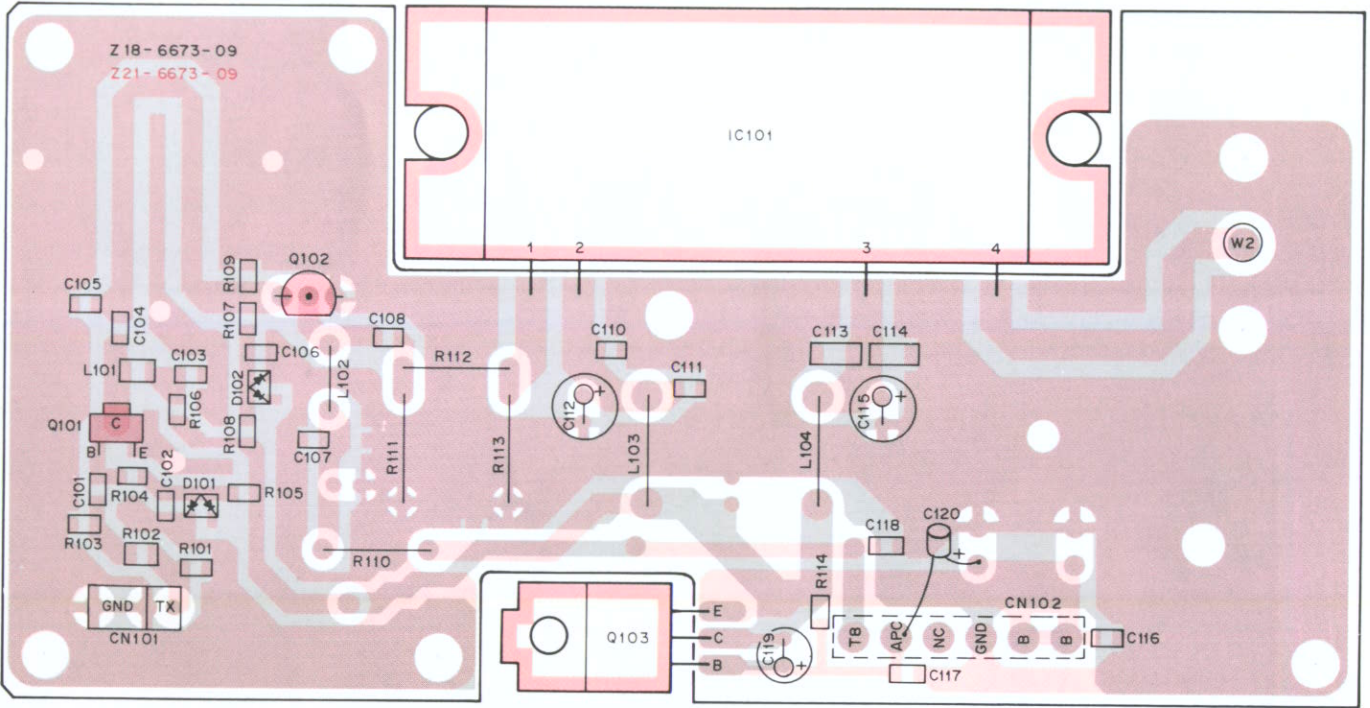


Light blue box : Component side
Dark blue box : Foil side

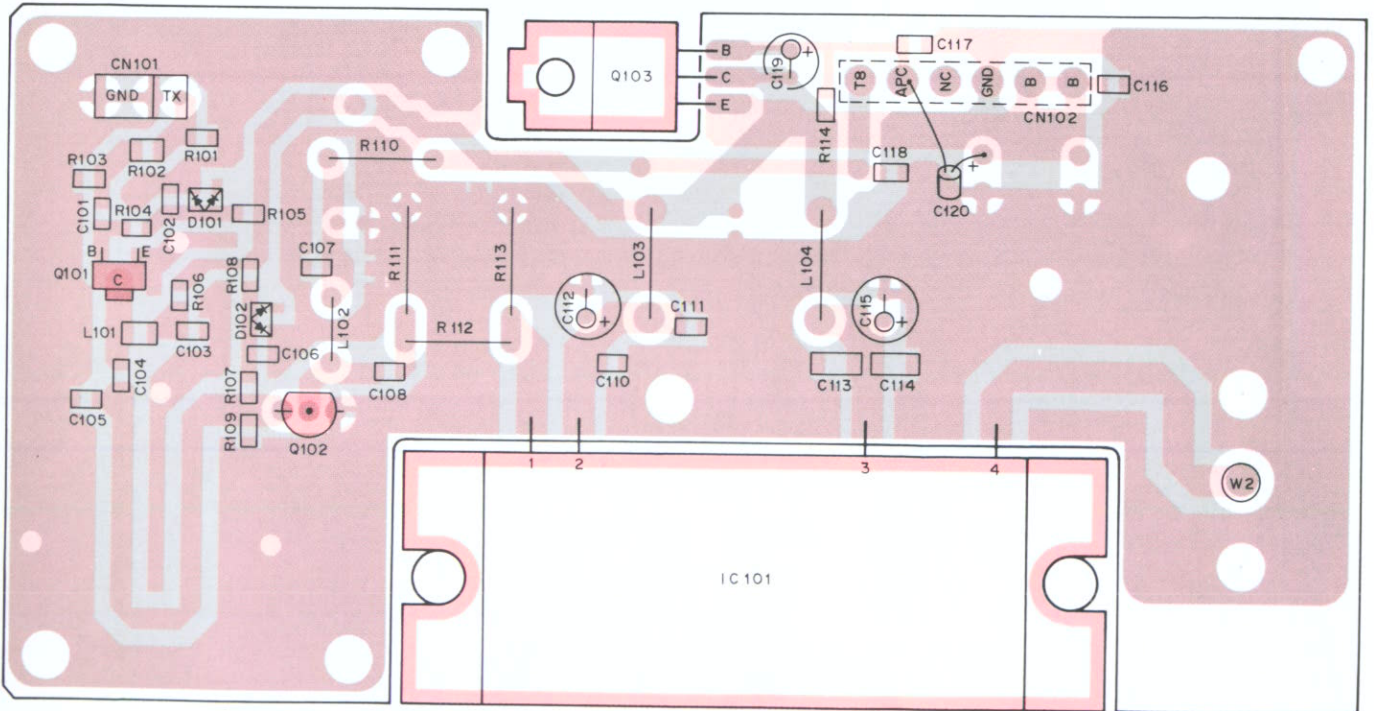
PC BOARD VIEWS TKR-720/N/A

DRIVE UNIT (X45-3310-XX) -10 : K,M,AM,NM,NK -11 : K2,M2,AM2,NM2,NK2

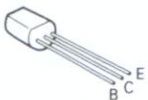
Component side view



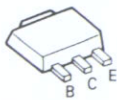
Foil side view



2SC2538-22-A



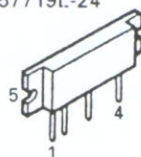
2SC2954



2SB951B



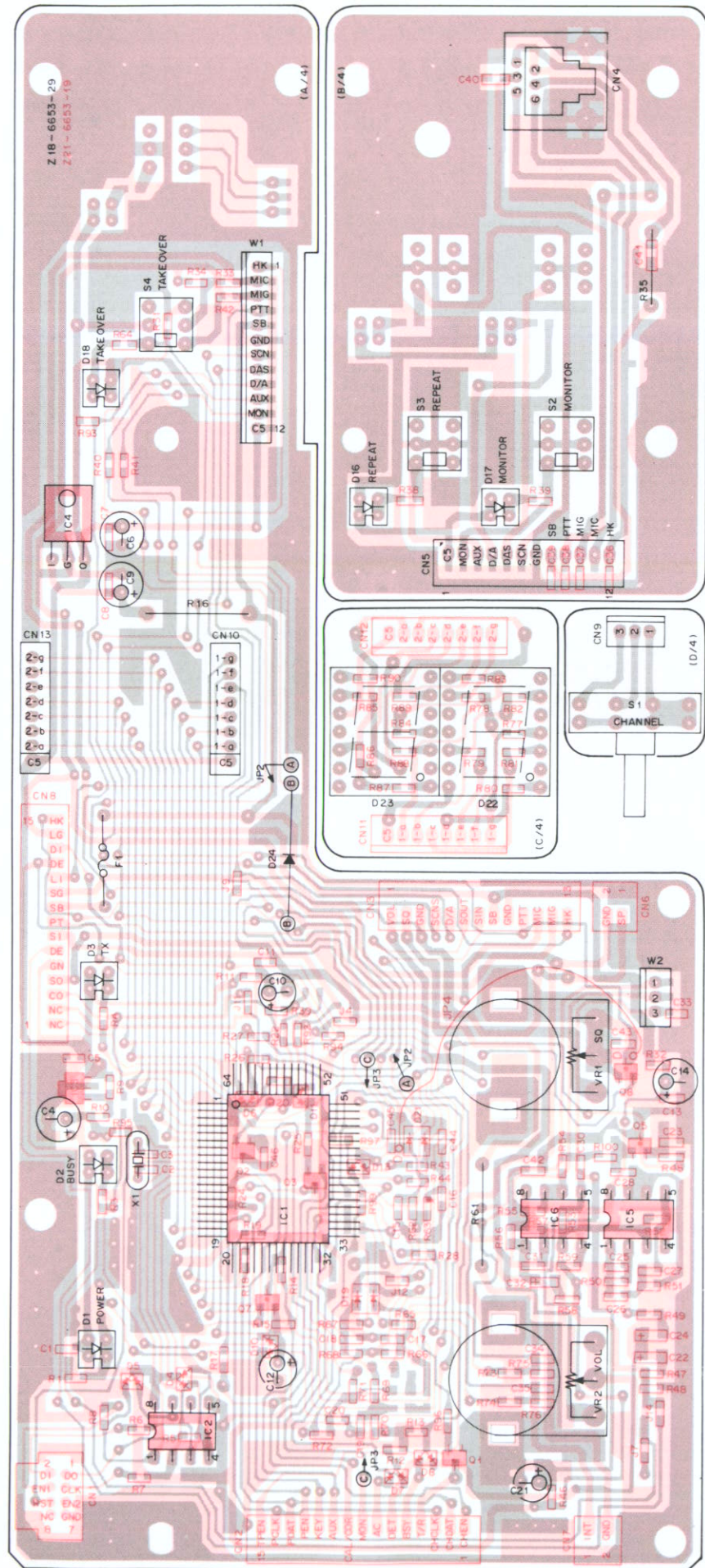
M57719
M57719L-24



Component side
Foil side

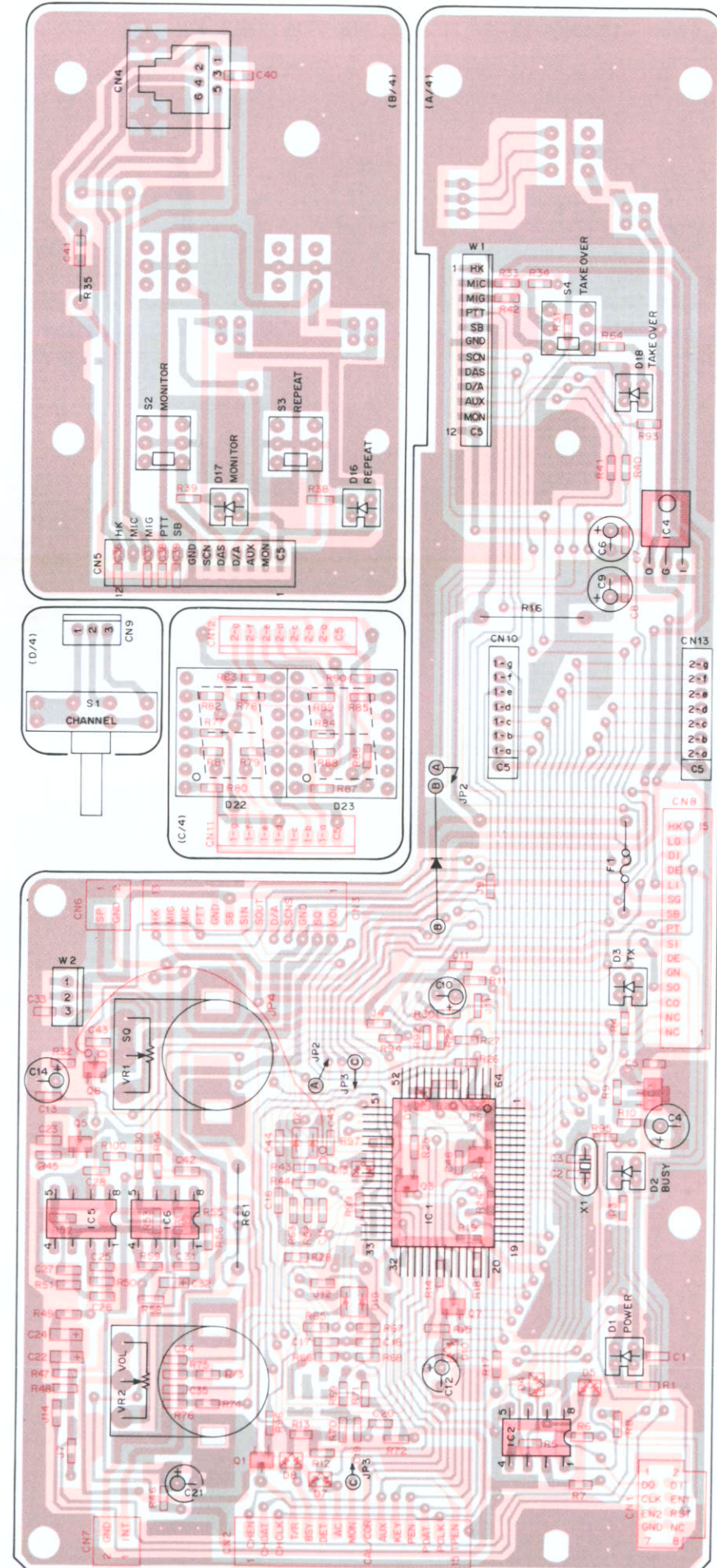
DISPLAY UNIT (X54-3070-XX) Component side view

-12 : K,K2,M,M2,NM,NM2,NK,NK2 -14 : A2,AM2

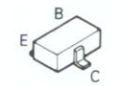


PC BOARD VIEWS TKR-720/N/A

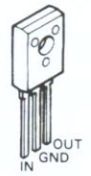
Foil side view



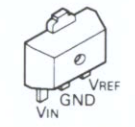
2SA1162
2SC3326
DTC114EK



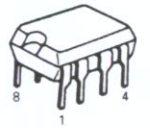
AN78N05



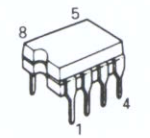
M51943BML



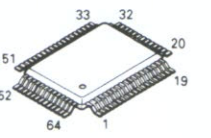
BR93LC46



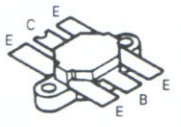
UPC4558C



UPD75104GF-J99



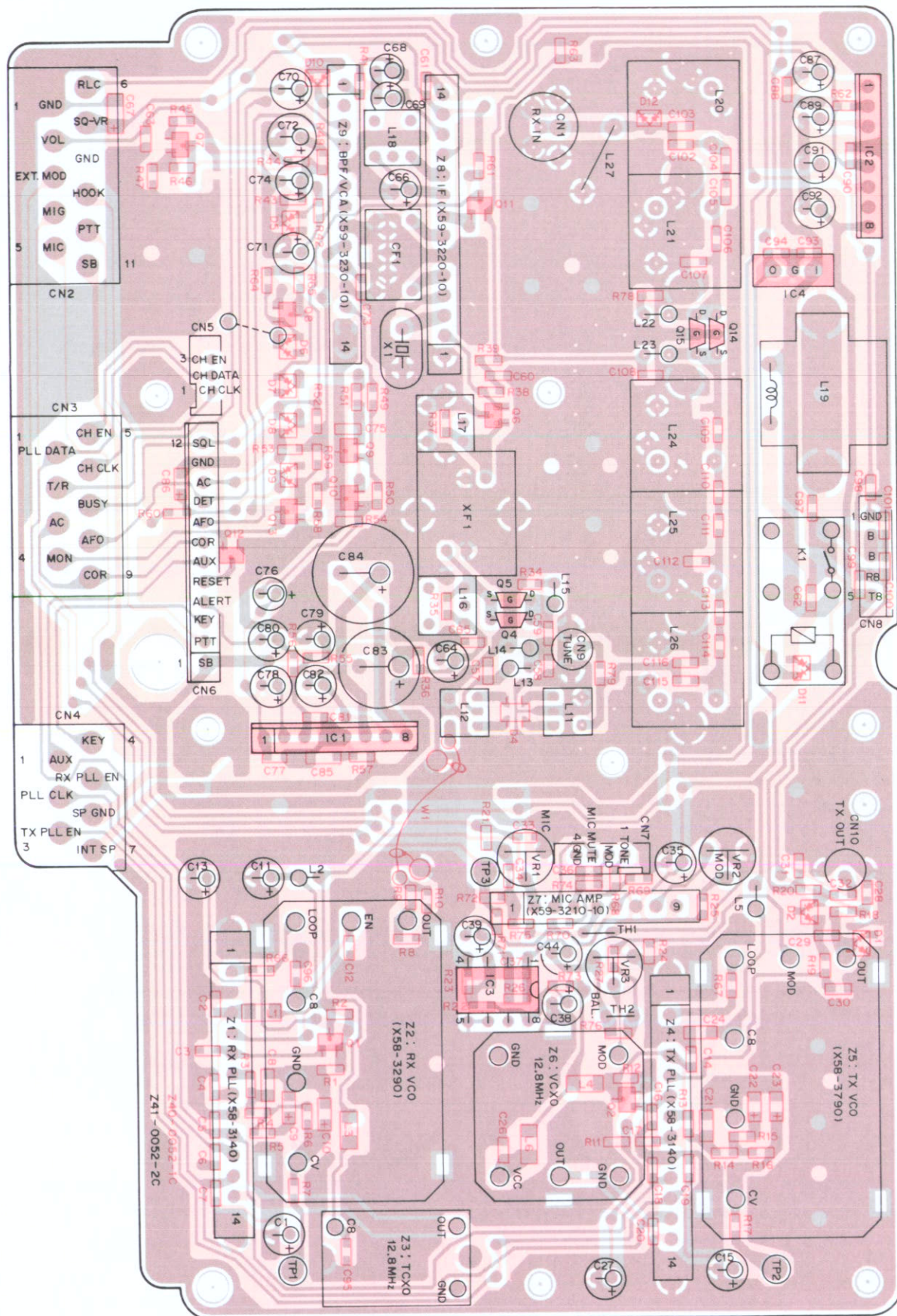
2SC2694



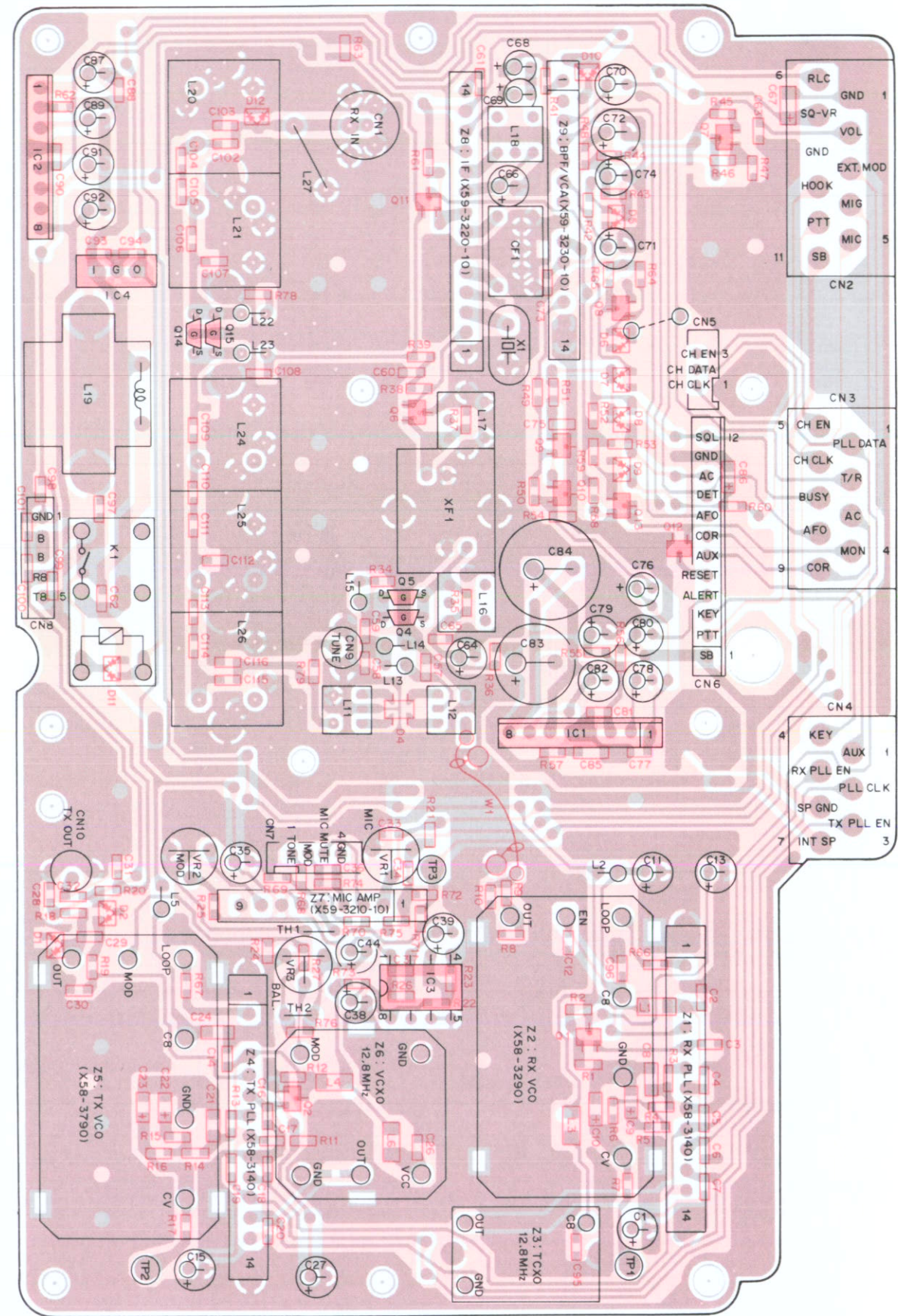
Orange line : Component side
Blue line : Foil side

TKR-720/N/A PC BOARD VIEWS

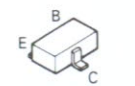
TX-RX UNIT (X57-3760-XX) Component side view
 -10 : K,M,AM -11 : K2,M2,AM2 -12 : NM-13 : NM2 -14 : NK -15 : NK2



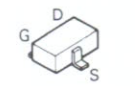
Foil side view



2SC2712
2SC3326
DTC114EK



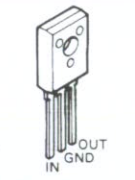
2SK302



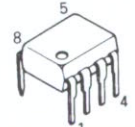
2SK125



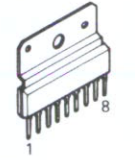
AN78N08



NJM4558D



MB3756
UPC1242H



Component side
Foil side

SCHEMATIC DIAGRAM TKR-720/N/A

X57-3760-XX

-10 (K,M,AM)	C102	C103	C104	C106	C107	C109	C110	C112	C113	C115	C116	R35	R41	XF1	CF1	RX PLL/TX PLL	RX VCO	TX VCO
-11 (K2,M2,AM2)	10P	39P	2P	8P	56P	43P	2P	7P	2P	9P	22P	1.8K	33K	L71-0274-05	L72-0339-05	X58-3140-10	X58-3290-10	X58-3790-11
-12 (NM)	8P	39P	2P	8P	56P	43P	2P	7P	2P	9P	22P	1.2K	0	L71-0417-05	L72-0360-05	X58-3140-51	X58-3290-11	X58-3790-11
-13 (NM2)	10P	56P	1.5P	9P	75P	82P	1.5P	9P	1.5P	10P	33P	1.2K	0	L71-0417-05	L72-0360-05	X58-3140-51	X58-3290-11	X58-3790-11
-14 (NK)	8P	39P	2P	8P	56P	43P	2P	7P	2P	9P	22P	1.2K	0	L71-0417-05	L72-0360-05	X58-3140-10	X58-3290-10	X58-3790-10
-15 (NK2)	10P	56P	1.5P	9P	75P	82P	1.5P	9P	1.5P	10P	33P	1.2K	0	L71-0417-05	L72-0360-05	X58-3140-10	X58-3290-11	X58-3790-11

X60-3230-XX

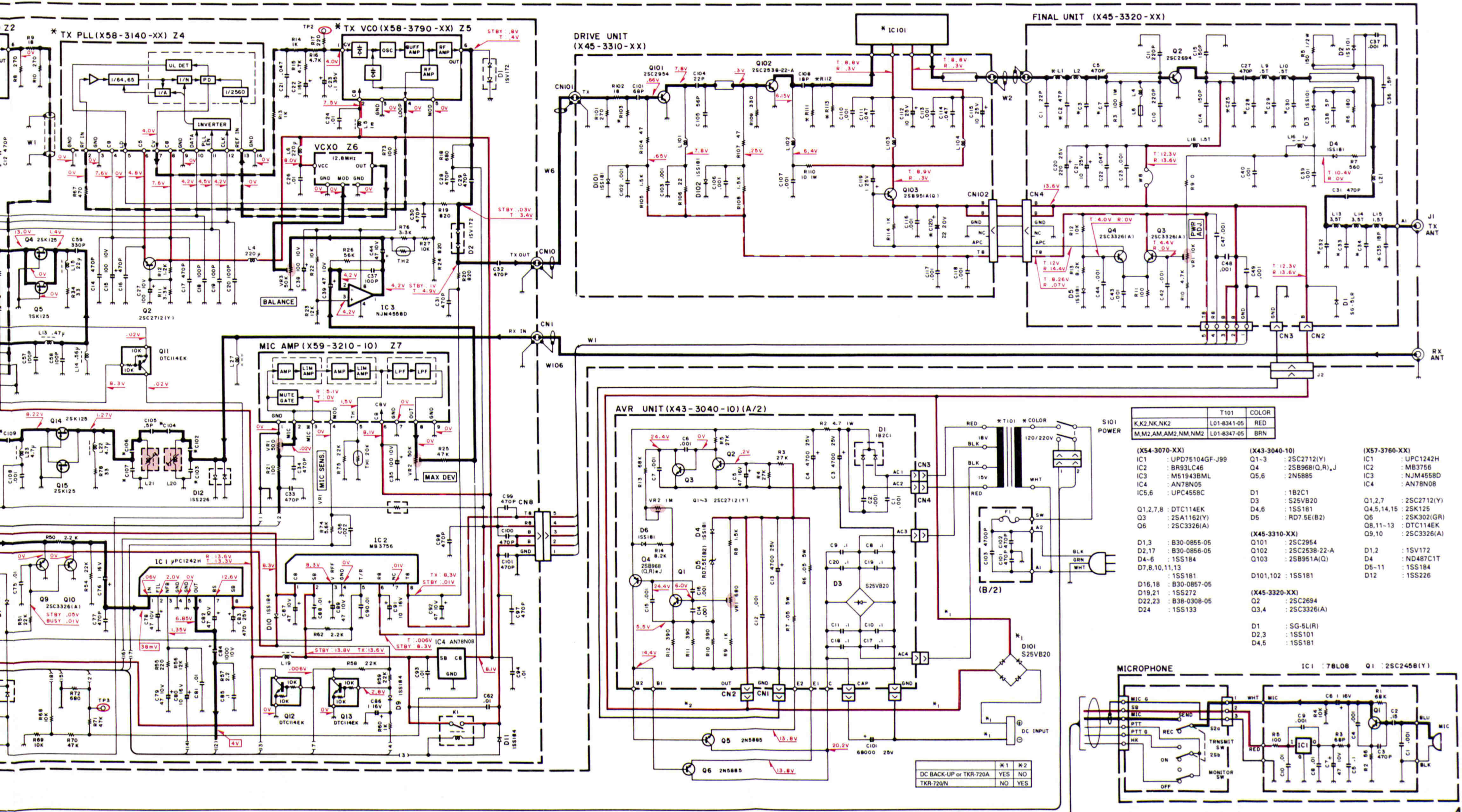
-10 (K,M,AM,NK)	M57719	IC101
-11 (K2,M2,AM2,NK2)	M57719L-24	
-12 (NM)	M57719	
-13 (NM2)	M57719L-24	

X45-3310-XX

-10 (K,M,AM,NM,NK)	C120	R103	R111,113	R112
-11 (K2,M2,AM2,NM2,NK2)	NO	18	270	18
	YES	33	150	39

X45-3320-XX

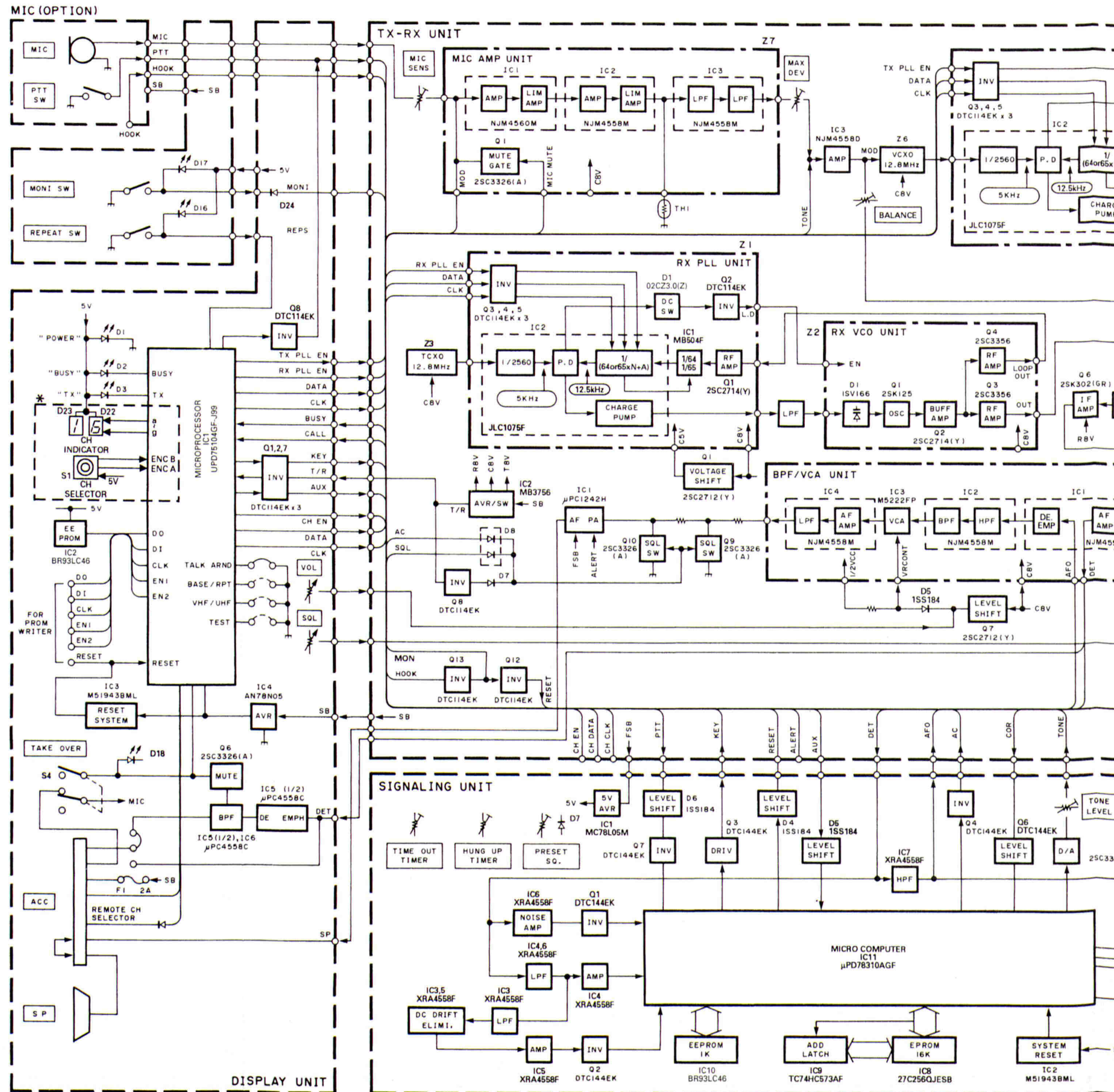
-11 (K,M,AM,NM,NK)	C2	C3	C7	C25	C28	C29,30	C32	C33	C34	C35	L1
-12 (K2,M2,AM2,NM2,NK2)	NO	24P	120P	120P	100P	36P	18P	39P	39P	YES	L34-1039-05
	YES	27P	180P	160P	120P	39P	22P	51P	47P	NO	L34-0951-05



K,K2,NK,NK2	L01-8341-05	RED
M,M2,AM,AM2,NM,NM2	L01-8347-05	BRN

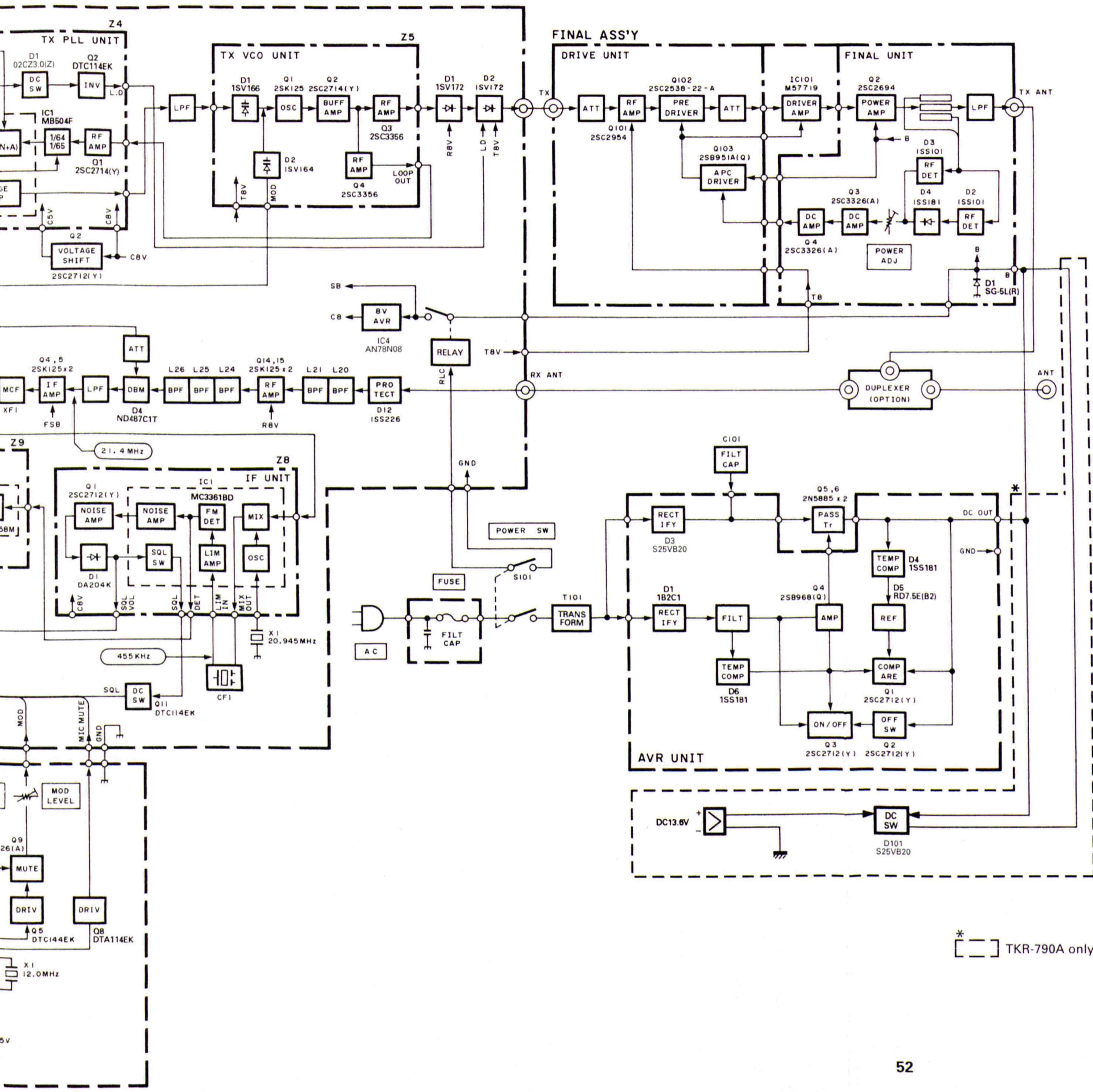
(X54-3070-XX)	(X43-3040-10)	(X57-3760-XX)
IC1: UPD75104GF-J99	Q1-3: 2SC2712(Y)	IC1: UPC1242H
IC2: BR93LC46	Q4: 2SB968(O,R),J	IC2: MB3756
IC3: M51943BML	Q5,6: 2N5885	IC3: NJM4558D
IC4: AN78N05	D1: 1B2C1	IC4: AN78N08
IC5,6: UPC4558C	D3: 1S5V820	Q1,2,7: 2SC2712(Y)
Q1,2,7,8: DTC114EK	D4,6: 1SS181	Q4,5,14,15: 2SK125
Q3: 2SA1162(Y)	D5: RD7.5E(B2)	Q6: 2SK302(GR)
Q6: 2SC3326(A)		Q8,11-13: DTC114EK
		Q9,10: 2SC3326(A)
D16,18: B30-0855-05	(X45-3310-XX)	D1,2: 1SV172
D19,21: 1SS272	Q101: 2SC2954	D4: ND487C1T
D2,17: B30-0856-05	Q102: 2SC2538-22-A	D5-11: 1SS184
D4-6: 1SS184	Q103: 2SB951A(Q)	D12: 1SS226
D7,8,10,11,13: 1SS181		
D16,18: B30-0857-05	(X45-3320-XX)	
D19,21: 1SS272	Q2: 2SC2694	
D2,17: B30-0856-05	Q3,4: 2SC3326(A)	
D4-6: 1SS184		
D7,8,10,11,13: 1SS181		
	D1: SG-5L(R)	
	D2,3: 1SS101	
	D4,5: 1SS181	

DC BACK-UP or TKR-720A YES NO
TKR-720/N NO YES



TKR-720/N/A TKR-720/N/A

GRAM



* [] TKR-790A only

SPECIFICATIONS

GENERAL

Frequency Range	150 to 174MHz : K,M,NM,AM,NK 136 to 150MHz : K2,M2,NM2,AM2,NK2
Number of Channels	1 : TKR-720/N 16 : TKR-720A
Channel Spacing	30kHz : K,K2 30kHz (25kHz) : M,M2,AM,AM2 15kHz : NK,NK2 12.5kHz : NM,NM2
Input Voltage	120/220V AC, 50/60Hz (Modifiable to DC backup)
Power Consumption	230W max.
Duty Cycle	50% at 50W output (100% at 15W output)
Temperature Range	-30°C to +60°C (-22°F to +40°F)
Dimensions	H : 4.72" (120mm) W : 12.99" (330mm) D : 15.08" (383mm)
Weight	28.66lbs (13kg)

RECEIVER (Measurements made per EIA standard EIA-204-C)

RF Input Impedance	50Ω
Sensitivity	
EIA 12dB SINAD	0.35μV
20dB Quieting	0.45μV
Squelch Sensitivity	0.2μV threshold
Modulation Acceptance	±7kHz : TKR-720/A ±3.5kHz : TKR-720N
Selectivity	-85dB : TKR-720/A -75dB : TKR-720N
Intermodulation	-80dB : TKR-720/A -70dB : TKR-720N
Spurious and Image Rejection	-90dB
Audio Power Output	4W at 4Ω less than 5% distortion
Frequency Stability	±0.0005% from -30°C to +60°C

TRANSMITTER (Measurements made per EIA standard EIA-152-B)

RF Power Output	50W adjustable to 15W (Duplexer output)
RF Output Impedance	50Ω
Spurious and Harmonics	-80dB
Modulation	
Direct FM Modulation	F3E, ±5kHz for 100% at 1000Hz : TKR-720/A F3E, ±2.5kHz for 100% at 1000Hz : TKR-720N
FM Noise	-50dB : TKR-720/A -45dB : TKR-720N
Microphone Impedance	Low impedance
Audio Distortion	Less than 3% at 1000Hz
Frequency Stability	±0.00025% from -30°C to +60°C

SIGNALING

Maximum Number of Tone Combination	8
QT Decoder/Encoder	
Decoder/Encoder tone frequency	67.0 to 210.7Hz (in 0.1Hz steps)
Decoder response time	200msec. or less
Squelch tail elimination time	100msec.
Encoder frequency error	±0.05% or less
Sensitivity	SINAD 8dB or less
DQT Decoder/Encoder	
DQT code	23 bits total; a 3-digit octal number (0 to 7 and 12 bits) with error correction (11 bits)
Decoder response time	250msec. or less
Turn-off code transmission time	156msec.
Squelch sensitivity	SINAD 8dB or less
Time-out-timer	Adjustable OFF 30sec. to 5min.
Hangup Timer	Adjustable 0 to 5sec.
Preset Squelch Sensitivity	0.2μV threshold, 12dB SINAD + 10dB or less tight

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