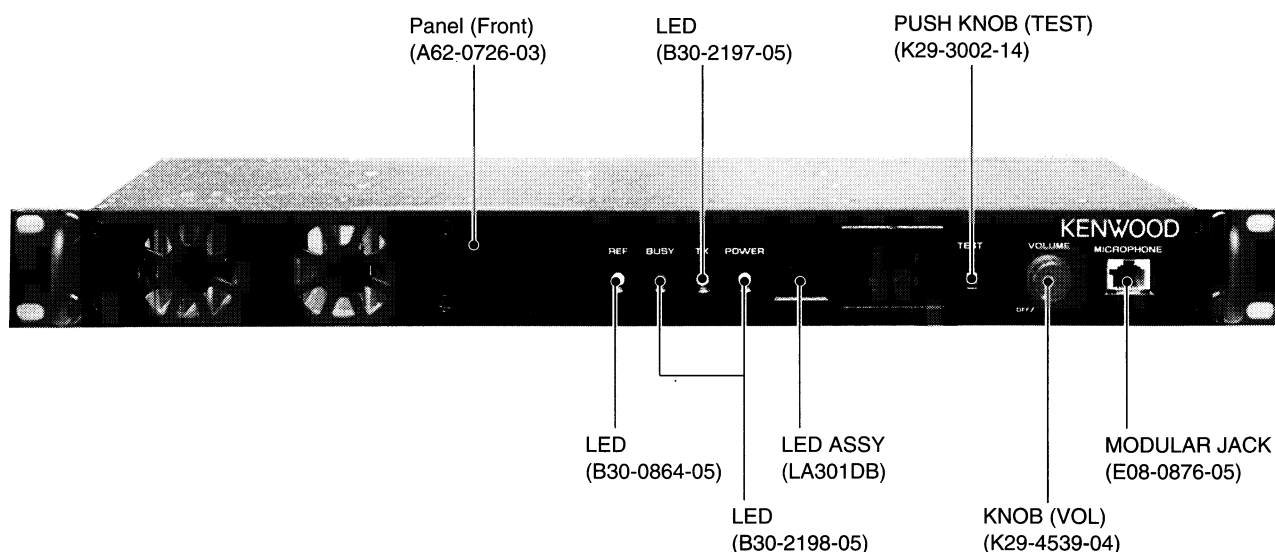


TKR-740

SERVICE MANUAL

KENWOOD

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GENERAL / SYSTEM SET-UP

INTRODUCTION

SCOPE OF THIS MANUAL

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

ORDERING REPLACEMENT PARTS

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

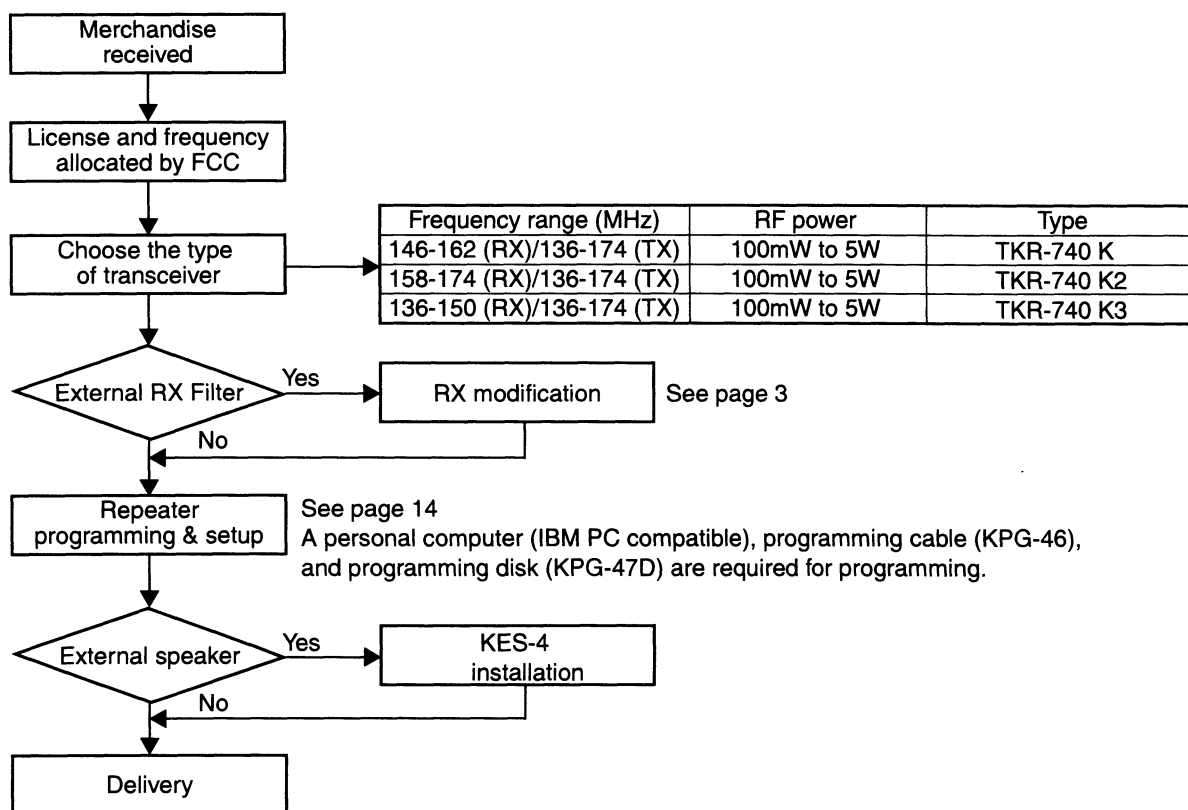
PERSONNEL SAFETY

The following precautions are recommended for personnel safety:

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

SERVICE

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

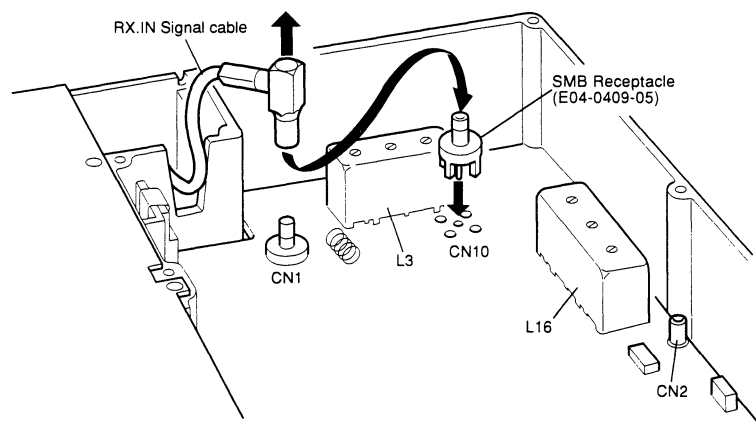
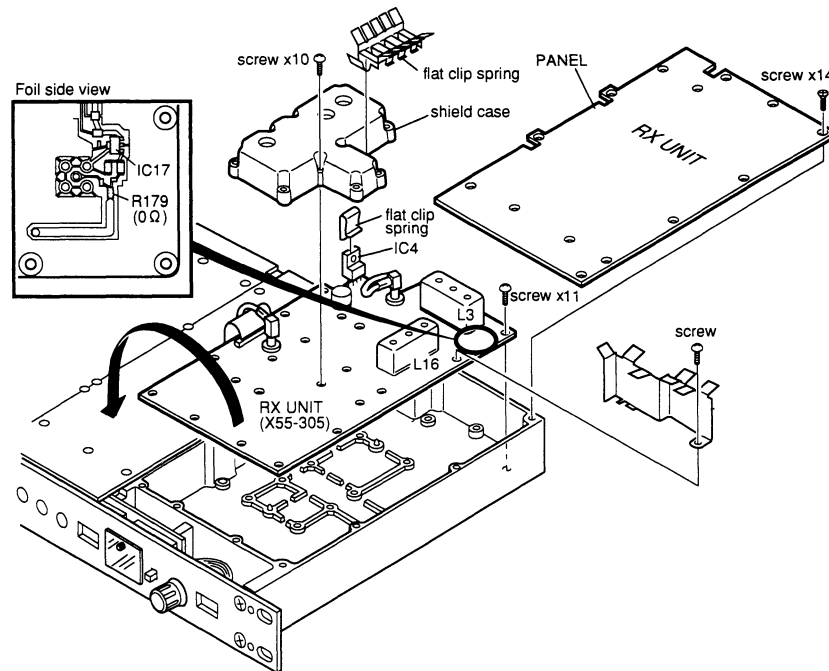


INSTALLATION

RX MODIFICATION FOR EXTERNAL PRESELECTOR FILTER

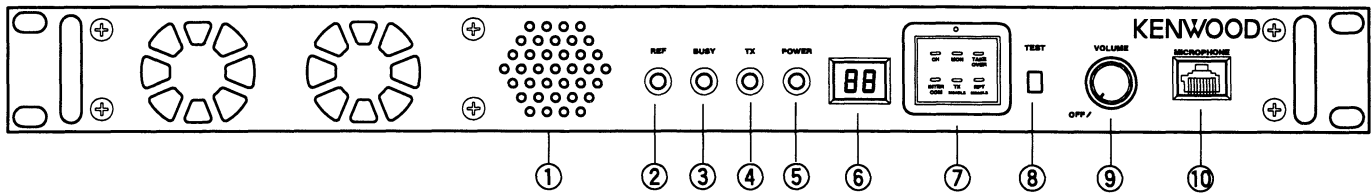
This model may be modified to use an external pre-selector filter.

- ① Remove the RX cover panel.
- ② Remove the flat clip spring from IC4 and L16
- ③ Remove the 11 screws from the RX unit and the 10 screws from the shield case.
- ④ Remove the jumper (R179) from the reverse side of the RX unit.
- ⑤ Insert an SMB receptacle (E04-0409-05) at CN10. Solder the 5 leads in place.
- ⑥ Replace the screws on the RX unit and shield case, and the flat clip spring on IC4 and L16.
- ⑦ Move the RX IN signal cable (from the back panel) from CN1 to CN10.
- ⑧ Connect a tracking generator signal to RX IN, then use a spectrum analyzer to read the output at CN2 while adjusting L16 for the proper response.
- ⑨ Next, adjust IF , squelch , and RSSI.
- ⑩ Replace the RX cover panel.



OPERATING FEATURES

1. Front Panel



① Speaker

② REF (reference) indicator

Lights red when using an external reference oscillator. Lights green when using the internal oscillator..

③ BUSY indicator

Lights green when receiving. Flashes when receiving data from the KPG-47D or when the receiver PLL is unlocked.

④ TX (transmit) indicator

Lights red when transmitting. Flashes when transmitting data to the KPG-47D (during programming) or when the transmit PLL is unlocked.

⑤ POWER indicator

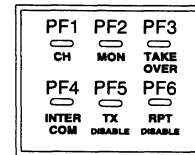
Lights green when DC power is applied to the TKR-740.

⑥ Display

Two 7-segment digits display the channel number or status.

⑦ Programmable Function keys

Press these keys to activate their programmable functions.



PF 1 Key	Default: CH (CH UP)
PF 2 Key	Default: MON (MONITOR ON/OFF)
PF 3 Key	Default: TAKE OVER (TAKE OVER ON/OFF)
PF 4 Key	Default: INTERCOM (INTERCOM ON/OFF)
PF 5 Key	Default: TX DISABLE (TX Disable/Enable)
PF 6 Key	Default: RPT DISABLE (Repeat Disable/Enable)

⑧ TEST switch

Press to transmit an unmodulated signal with no local microphone connected. If an external modulation signal source is connected to the **CONTROL I/O** jack, the RF signal is modulated with this signal source.

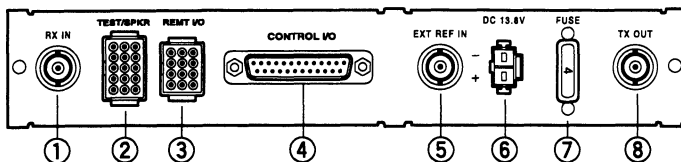
⑨ VOLUME control

Turn clockwise until a click sounds, to unmute the volume. Rotate to adjust the volume. Turn counterclockwise fully to mute the volume.

⑩ MICROPHONE jack

Connect a microphone to 8-pin modular jack.

2. Rear Panel



① RX IN jack

Connect an RX antenna or a duplexer to this BNC receptacle.

② TEST/SPKR jack

Test input/output jack. Connect an external speaker to this jack.

③ REMT I/O jack

Connect an external remote controller to this jack.

④ CONTROL I/O jack

Connect an external programming device or an external repeater controller to this DB-25 interface port.

⑤ EXT REF IN jack

Connect a high-stability external frequency reference oscillator (10MHz, -10dBm or higher) to this BNC receptacle (optional).

⑥ DC 13.8V jack

Connect a 13.8 V DC power supply to this jack.

⑦ FUSE

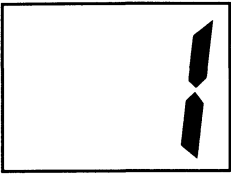
Insert a 4 A blade fuse into this fuse holder.

⑧ TX OUT jack

Connect a TX antenna or a duplexer to this BNC receptacle.

OPERATING FEATURES

3. Two 7-segment LED Displays



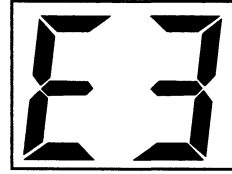
- Channel display (1-32): while operating normally in User Mode



- "E2" displayed when the channel data is not written.



- "PC" displayed while in PC Mode.



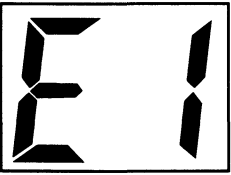
- "E3" displayed when PLL is unlocked .
Receiver PLL unlocked = flashing BUSY LED.
Transmitter PLL unlocked = flashing TX LED.
Internal 19.2MHz reference unlocked = flashing decimal point .



- "PG" displayed while in Firmware Programming Mode
2 decimal points displayed = 115,200 bps
1 decimal point displayed = 57,600 bps
No decimal = 38,400 bps



- "E4" displayed when PTT is attempted on a channel number that has no frequency data programmed.



- "E1" displayed when FPU data is not written.



- "SC" displayed while in scan mode
when the displayed channel is contained in scan sequence, the right side decimal point is displayed.
When the displayed channel is the priority channel, the left side decimal point is displayed.

OPERATING FEATURES

4. Programmable Functions

TKR-740 contains many Programmable Functions tabled below.

Programmable Function	Description
Channel 1-32	Directly select Channel 1 to 32, respectively.
Channel Down	The channel decrements by one.
Channel Up	The channel increments by one.
AUX Out 1-6 Off	AUX Out 1 to 6 ports become deactivated, respectively.
AUX I/O 1-7 Off	AUX I/O 1 to 7 ports become deactivated, respectively.
AUX Out 1-6 On	AUX Out 1 to 6 ports become activated, respectively.
AUX I/O 1-7 On	AUX I/O 1 to 7 ports become activated, respectively.
AUX Out 1-6 On/Off	AUX Out 1 to 6 ports are toggled between its active and inactive states, respectively.
AUX I/O 1-7 On/Off	AUX I/O 1 to 7 ports are toggled between its active and inactive states, respectively.
Repeat Enable	Enables repeater operation.
Repeat Disable	Disables repeater operation.
Repeat Disable/Enable	Toggles between disabling and enabling repeater operation.
TX Enable	The transmitter is enabled (normal).
TX Disable	The transmitter is inhibited.
TX Disable/Enable	Toggles between transmitter enabled (normal) and transmitter inhibited.
Remote TX Enable	The Remote PTT is enabled.
Remote TX Disable	The Remote PTT is disabled.
Remote TX Disable/Enable	The Remote PTT is toggled between disabled and enabled.
Local TX Enable	The local mic's PTT is enabled.
Local TX Disable	The local mic's PTT is disabled.
Local TX Disable/Enable	The local mic's PTT is toggled between disabled and enabled.
Scan Off	Inhibits scanning.
Scan On	Starts scanning.
Scan On/Off	Scanning is toggled between being enabled or inhibited.
Intercom On	The Intercom feature is enabled.
Intercom Off	The Intercom feature is disabled.
Intercom On/Off	The Intercom feature is toggled between enabled and disabled.
Voting Tone Off	Inhibits the Voting Pilot Tone.
Voting Tone On	Enables the Voting Pilot Tone.
Voting Tone On/Off	Toggles between enabling and inhibiting the Voting Pilot Tone.
Take Over	Toggles between enabling and disabling remote wireline control.
QT/DQT Encode Enable	Enables the QT/DQT encode operation.
QT/DQT Encode Disable	Disables the QT/DQT encode operation.
QT/DQT Encode Disable/Enable	Toggles between disabling and enabling the QT/DQT decode operation.
QT/DQT Decode Enable	Enables the QT/DQT decode operation.
QT/DQT Decode Disable	Disables the QT/DQT decode operation.
QT/DQT Decode Disable/Enable	Toggles between disabling and enabling the QT/DQT decode operation.
Test Tone Off	The Test Tone is inhibited.
Test Tone On	The Test Tone is enabled.
Test Tone On/Off	Toggles between enabling and inhibiting the Test Tone.
Squelch Off	The Squelch unmutes.
Squelch On	The Squelch mutes.
Squelch On/Off	The receiver's squelch toggles between muted and unmuted.
Squelch Momentary	The squelch momentarily unmutes.
Monitor Off	The QT/DQT decoder is enabled.
Monitor On	The QT/DQT decoder is disabled.
Monitor On/Off	The QT/DQT decoder is toggled between enable and disable.

OPERATING FEATURES

Programmable Function	Description
Monitor Momentary	The QT/DQT decoder is momentarily disabled.
CW ID On	The CW ID is transmitted.
CW Message 1-8 On	The CW Message 1 to 8 is transmitted, respectively.
TOT Enable	The Time Out Timer is enabled.
TOT Disable	The Time Out Timer is disabled.
TOT Disable/Enable	The Time Out Time is toggled between enabled and disabled.
Hold Time Enable	The parameter of Repeat Hold Time is enabled.
Hold Time Disable	The parameter of Repeat Hold Time is disabled.
Hold Time Disable/Enable	The parameter of Repeat Hold Time is toggled between disabled and enabled.
Scrambler Off	Disables an installed optional voice scrambler board.
Scrambler On	Enables an installed optional voice scrambler board.
Scrambler On/Off	Toggles between enabling and disabling an installed optional voice scrambler board.
Digital Pager PTT	Accepts the external paging encoder's PTT on AUX Input 2.
Digital Pager Data	Accepts the external paging encoder's digital signal on AUX Input 3.
Reset	Resets to default condition set up by FPU.
None	No function.

- The following Programmable Functions are output functions used to tell the condition of the TKR-740 to an external device.
- The output functions can be assigned to only AUX Outputs as follows.

Programmable Function	Description
COR(Carrier Operate Relay)	This function becomes valid if an RF carrier is present.
TOR(Tone Operate Relay)	This function becomes valid if an RF carrier and specified QT/DQT are present.
TXS(TX Sense)	This function becomes valid when the transmitter is keyed.
RX Unlock	This alarm function becomes valid if the RX PLL circuitry becomes unlocked.
TX Unlock	This alarm function becomes valid if the TX PLL circuitry become unlocked.
Exciter Temperature	This alarm function becomes valid if the temperature of transmitter's exciter exceeds approximately 203°F (95°C) while transmitting.
Power Supply Upper Limit	This alarm function becomes valid if the DC power supply voltage exceeds the preset point. The preset point is selected in the range of 13.9V to 15.9V.
Power Supply Lower Limit	This alarm function becomes valid if the DC power supply voltage becomes less than the preset point. The preset point is selected in the range of 11.7V to 13.8V.
Exciter Power Upper Limit	This alarm function becomes valid if the transmitter's RF Power output exceeds the preset point in High power range. The preset point is selected in the range of 5W to 7W.
Exciter Power Lower Limit	This alarm function becomes valid if the transmitter's RF Power output becomes less than the preset point in High power range. The preset point is selected in the range of 1W to 4W.
RX Signal Detect (Above)	This function becomes valid if the receive signal strength exceeds the preset point. The preset point is selected in the range of -120dBm to -80dBm.
RX Signal Detect (Below)	This function becomes valid if the receive signal strength becomes less than the preset point. The preset point is selected in the range of -120dBm to -80dBm.
Selectable	AUX Outputs which are set up as Selectable appear in the available Function List for the AUX Input Functions and Key Assignment. This allows AUX Inputs and PF Keys to be used to control AUX Outputs.

OPERATING FEATURES

5. Trigger Assignment

The Programmable Functions described above can be assigned to PF Keys, AUX Input, and Start Up according to following table. In the last column of the table, when the Programmable Functions is assigned to any PF Keys, it

expresses that the LED in the PF Key turns on either conditions. 'O' expresses that the trigger is available the Programmable Function. 'X' expresses that the trigger is not available the Programmable Function.

Function \ Trigger	PF Keys	AUX Input	Start Up	Condition of LED on
Channel 1-32, Up/Down	O	O	O	Do not turn on
AUX Out 1-6(I/O 1-7) Off	X	O	O	-
AUX Out 1-6(I/O 1-7) On	X	O	O	-
AUX Out 1-6(I/O 1-7) On/Off	O	O	X	Turns on in ON status
Repeat Enable	X	O	O	-
Repeat Disable	X	O	O	-
Repeat Disable/Enable	O	O	X	Turns on in Disable status
TX Enable	X	O	O	-
TX Disable	X	O	O	-
TX Disable/Enable	O	O	X	Turns on in Disable status
Remote TX Enable	X	O	O	-
Remote TX Disable	X	O	O	-
Remote TX Disable/Enable	O	O	X	Turns on in Disable status
Local TX Enable	X	O	O	-
Local TX Disable	X	O	O	-
Local TX Disable/Enable	O	O	X	Turns on in Disable status
Scan Off	X	O	O	-
Scan On	X	O	O	-
Scan On/Off	O	O	X	Turns on in ON status
Intercom On	X	O	O	-
Intercom Off	X	O	O	-
Intercom On/Off	O	O	X	Turns on in ON status
Voting Off	X	O	O	-
Voting On	X	O	O	-
Voting On/Off	O	O	X	Turns on in ON status
Take Over	O	X	X	Turns on in ON status
QT/DQT Encode Enable	X	O	O	-
QT/DQT Encode Disable	X	O	O	-
QT/DQT Encode Disable/Enable	O	O	X	Turns on in Disable status
QT/DQT Decode Enable	X	O	O	-
QT/DQT Decode Disable	X	O	O	-
QT/DQT Decode Disable/Enable	O	O	X	Turns on in Disable status
Test Tone Off	X	O	O	-
Test Tone On	X	O	O	-
Test Tone On/Off	O	O	X	Turns on in ON status
Squelch Off	X	O	O	-
Squelch On	X	O	O	-
Squelch On/Off	O	O	X	Turns on in OFF status
Squelch Momentary	O	X	X	Turns on in OFF status
Monitor Off	X	O	O	-

OPERATING FEATURES

Function	Trigger			Condition of LED on
	PF Keys	AUX Input	Start Up	
Monitor On	X	O	O	-
Monitor On/Off	O	O	X	Turns on in ON status
Monitor Momentary	O	X	X	Turns on in ON status
CW ID On	O	O	O	Turns on while transmitting
CW Message 1-8 On	O	O	O	Turns on while transmitting
TOT Enable	X	O	O	-
TOT Disable	X	O	O	-
TOT Disable/Enable	O	O	X	Turns on in Disable status
Hold Time Enable	X	O	O	-
Hold Time Disable	X	O	O	-
Hold Time Disable/Enable	O	O	X	Turns on in Disable status
Scrambler Off	X	O	O	-
Scrambler On	X	O	O	-
Scrambler On/Off	O	O	X	Turns on in ON status
Reset	O	O	X	Do not turn on
None	O	O	O	Do not turn on

OPERATING FEATURES

6. Simplex/Duplex Operation

The Simplex/Duplex function is used to specify whether the channel is used as simplex (receiver muted during transmit) or duplex (receiver unmuted during transmit). The channel has same TX/RX frequency and can operate only in Simplex mode.

7. Repeater/Base Station Operation

The Repeat function is used to specify whether the channel is used as a repeater or as a base station. A repeater simultaneously and automatically re-transmits its received audio; a duplex base station has independent simultaneous transmit and receive paths; a simplex base station are mutually exclusive transmit and receive paths.

8. Signalling Feature

8.1 Multiple QT/DQT

The TKR-740 can function as a multiple-QT/DQT decode/encode unit for operation as a community repeater or multiple-QT/DQT base station. 16 Multi Tables can be created, each Multi Table consisting of 16 decode / encode combinations and can be assigned on a per-channel basis.

The Multi Table function enables the TKR-740 to decode any one of the 16 QT/DQTs pre-programmed into the selected Multi Table. When receiving a signal (repeater operation), the repeater uses the QT/DQT encode which corresponds to the decoded QT/DQT as set in the Multi Table. In the Multi Table, signalling pair of "No.1" (first column) is defined as "Primary". A receiving signalling (if it is contained within No.1 to No.16) is defined as "Current".

8.2 Encode Tone in Multiple

When Local mic PTT, Remote PTT or Ext. PTT is active while the repeater is in use or the duplex-base station is receiving, the encode signalling is determined according to Encode Tone in Multiple function. The simplex-base station always transmits the "Primary" encode QT/DQT.

Current : When any PTT as described above is active while the repeater is in use or the duplex-base station is receiving, the "paired" encode QT/DQT associated with receiving QT/DQT is transmitted. When any PTT is active while the repeater or the duplex-base station is in idle period, the "Primary" encode QT/DQT is transmitted.

Primary : When any PTT (provided that the Priority of any PTT is higher than the Priority of Repeat PTT) is active while the repeater is in use, the encode QT/DQT changes "paired" encode QT/DQT to "Primary" while continuing to transmit. When any PTT is active while the repeater is in idle period, the "Primary" encode QT/DQT is transmitted. In the base station, the "Primary" encode QT/DQT is always transmitted regardless of the receiver status.

8.3 QT Reverse Burst Time

During repeat with QT tones, the repeater re-transmits a phase-shifted burst of the QT tone ("reverse burst") when it detects the radio using the repeater has un-keyed and also

sent a reverse QT burst (squellch-tail elimination). This mutes a receiving radio's speaker audio before its receiver circuit shuts off causes squellch tail noise in the speaker audio. The TKR-740 can select the time between 140 to 200 ms that the QT reverse burst is sent. Typically this time should not have to be adjusted from the default value. The transmission of the QT reverse burst can be also inhibited if the QT Reverse Burst function is set to "No".

8.4 DQT Turn Off Code Time

During repeat with DQT codes, the repeater re-transmits a specific turn-off code when it detects the radio using the repeater has un-keyed and also sent the turn-off code (squellch-tail elimination). This mutes a receiving radio's speaker audio before its receiver circuit shuts off and causes squellch tail noise in the speaker audio. The TKR-740 can select the time between 140 to 200 ms that the DQT turn-off code is sent. Typically this time should not have to be adjusted from the default value.

8.5 Off Hook Decode

The TKR-740 is able to decode QT/DQT regardless whether the local microphone is in the on- or off-hook condition. When the Off Hook Decode function is enabled, the TKR-740 is capable of QT/DQT decode even though the microphone is in the off-hook condition (or a local microphone is not installed).

9. Scan Feature

9.1 Scan Operation

Providing that the TKR-740 contains two or more non-priority ADD channel or one or more non-priority ADD channel and Priority channel, it starts scanning once the Scan On function is executed and displays "SC" on the 7-seg LED. Scanning stops temporarily if any following conditions become valid.

- 1) if a RF carrier and a valid QT/DQT is present. The receiving channel number is displayed and the received audio is heard from a speaker.
- 2) if a RF carrier is present, providing that the Monitor On function is executed.
- 3) if the Squellch Off function is executed. Scanning stops on the channel being scanned when Squellch Off is executed, the channel number is displayed and the received audio is heard from a speaker.
- 4) if a local microphone's hook is in off hook status, providing that the Off Hook Scan function is set to Disable. Scanning stops on the Revert channel, but the audio is not heard until a valid signal is received.

When the received call is ended, scanning automatically resumes after the period set in Dropout Delay Time function has expired. When the Scan Off function is executed, the TKR-740 inhibits scanning and displays the selected channel.

9.2 Scan Sequence

- 1) Normal Scan : When no Priority channel is set, scanning of ADD channels is done in ascending order.
- 2) Single Priority Scan : The Priority channel is set as either a

OPERATING FEATURES

fixed channel or a selected channel. When Priority channel is set, Priority channel and non Priority channel is scanned by turns. When scanning stops on the non Priority channel, calls from the Priority channel is still checked at set intervals while scanning is stopped. This operation is called Look Back and the interval period is selected by the Look Back Time function.

9.3 Revert Channel

The Revert channel is a channel that used to transmit during scanning. The time from the end of transmission on Revert channel to the time scanning automatically resumes is set in Dwell Time function. The Revert channel types are Last Called, Last Used, Selected + Talkback, Priority, Priority plus Talkback, and Selected.

- 1) Last Called : The TKR-740 reverts to the channel upon which a call was last received even if scanning has resumed (power on default = selected channel).
- 2) Last Used (with Talkback) : The TKR-740 reverts to the channel that was last transmitted on (power on default = selected channel). However, if a call is received on a channel other than the last transmit channel and PTT is pressed before scanning resumes, the transceiver "talks back" on the current receive channel.
- 3) Selected+Talkback : The TKR-740 reverts to the channel set by the Channel 'X' functions or Channel Select function prior to scan initiation. However, if a call is received on a channel other than the selected channel and PTT is pressed before scanning resumes, the transceiver "talks back" on the current receive channel.
- 4) Priority : The TKR-740 always reverts to the Priority channel.
- 5) Priority+Talkback : The TKR-740 always reverts to the Priority channel. However, if a call is received on a channel other than the Priority channel and PTT is pressed before scanning resumes, the transceiver "talks back" on the current receive channel.
- 6) Selected : The transceiver reverts to the channel set by the function prior to scan initiation.

10. CW ID and Message

The TKR-740 contains internal automatic station identifiers. The CW ID (Morse code) is set and transmitted on a per-channel basis. The CW ID is transmitted when the interval period is reached (TX Interval Time function), the channel is changed (CW ID on Channel Change function) or CW ID On function is executed. When CW ID is activated by any functions described above, it is actually sent after the total time of TX Delay Time (not applied to CW ID On function) and CW Modulation Delay Time has expired. TX Delay Time is a period from CW ID is activated to the transmitter is keyed. CW Modulation Delay is a period from the transmitter is keyed to the CW ID tone is sent. The CW ID tone is routed to the Remote Receive Audio (Remote RA) port if the Send CW ID to Remote RA function is set to Yes, consequently the console can monitor the CW ID tone.

The TKR-740 contains 8 message banks for CW Message. CW Message 1 to 8 is transmitted on the current channel when the CW Message 1 to 8 On function is activated, respectively.

11. PTT Priority

A number of keying sources can be used to cause the TKR-740 to transmit. The transmit audio path is switched according to their keying sources and when PTTs is simultaneously activated, the transmit audio path related to the PTT with higher priority is given priority. These are Local Mic PTT, External PTT, Remote PTT, Repeat PTT and Digital Pager PTT. However, since Digital Pager PTT is considered lowest of priority, it is not selected in the order of priority.

12. Intercom Operation

The repeater has an Intercom feature which allows wireline communication between the dispatcher at the remote site and the servicing technician at the repeater. To use this feature, Intercom On/Off (mandatory), TX Disable/Enable, Local TX Disable/Enable and Remote TX Disable/Enable functions must be optionally assigned to a PF Key or an Aux Input.

When Intercom On function is executed and a PTT is activated, an intercom operation becomes valid and a transmitter is also keyed. To use the Intercom without keying the transmitter, enable the TX Disable function (PF Key or Aux Input). To use the Intercom with a local mic's PTT without keying the transmitter, enable the Local TX Disable function. To use the Intercom with the wireline remote site's PTT without keying the transmitter, enable the Remote TX Disable function.

The audio routing during Intercom operation is determined by the Intercom Remote/Local function.

- 1) Remote : Audio from the Remote TA port will be heard on the local speaker while a Remote PTT is pressed, regardless of whether receiver audio is present.
- 2) Local : Audio from the local Mic will be routed to the Remote RA port on the rear panel regardless of whether receiver audio is present. This local Mic audio will be heard at the remote.
- 3) Remote/Local : Audio from the remote and the local Mic audio will be heard from the local speaker and from the remote respectively, regardless of whether receiver audio is present.

13. Voting Pilot Tone

The TKR-740 contains an internal Voting Pilot Tone Generator to be used with a voting comparator shelf. The Voting Pilot Tone is sent from a remote receiver to a voting comparator during idle periods. This continuous tone is used to confirm that the phone line is intact as well as establish a reference amplitude for the audio which will be present once the remote receiver is unquelled by a received signal. The Voting Pilot Tone is a single-frequency sine wave and is turned On and Off by toggling Voting Tone On/Off functions. When any Voting Pilot Tone is selected, the selected Voting Pilot Tone is automatically output to RA and Remote RA ports.

OPERATING FEATURES

14. Digital Pager

The TKR-740 can be used as a digital paging transmitter by using the Digital Pager inputs on the rear panel. These inputs accept the logical 0 or 1 (0 V or 5 V) from the external paging encoder, producing a +4.5 kHz carrier shift in response to a 0 and a -4.5 kHz in response to a 1. If Digital Paging Input function is enabled, the TKR-740 accepts the external encoder's digital signal on AUX In 3 and its PTT on AUX In 2 (active low).

15. Time Out Timer

The Time Out Timer function determines the period of time users can continuously transmit. When the selected period expires, the transmission is inhibited.

16. Repeat Hold Time

The Repeat Hold Timer (hang timer) function is used to prevent the repeater from being repeatedly keyed and unkeyed in response to short message traffic. When a mobile transceiver unkeys, the repeater's Hold Timer allows the repeater to continue transmitting for a brief period while waiting for a responding end user. If no valid QT/DQT is detected within the Hold Timer period, the transmitter is allowed to unkey. This function determines the period of time that the transmitter is allowed to remain keyed after the loss of a valid QT/DQT received signal.

17. Take Over

Take Over function is used to disable the remote wireline control of the repeater. When Take Over function is enable, the AUX Inputs and outputs, remote audio inputs and outputs, External PTT, External Monitor, Remote PTT and TXD2/RXD2 serial data lines are disabled. All AUX Input functions assigned to any AUX Input remain in current state. However Remote PTT, External PTT and External Monitor become a "Off" state.

18. Test Tone

The Test Tone is a single-frequency audio sine wave and is turned On and Off by toggling Test Tone On/Off functions. The transmitter can be modulated without a local mic by using the test tone. When Test Tone On function is executed and any PTT is activated, the TKR-740 transmits the test tone with mic mute and also routes the test tone to Remote RA port.

19. AUX Input and Output

There are 7 programmable AUX I/O Ports 1-7(pins 6-12) on the rear 12 pin REMT I/O connector and 3 programmable AUX Input Ports 1-3 (pins 4-6) and 6 programmable AUX Output ports (pins 20-25) on the rear 25 pin D-Sub connector. The 7 programmable AUX I/O pins are primarily intended for remote control interfaces. Each AUX I/O Port can be set for AUX Input, AUX Output or remote Channel Select types.

The AUX Input port can be set execute a single input function or a set of up to three functions when the port is activated. If the port type for an AUX I/O Ports 1-7 is set for "AUX Input", it will also appear AUX Input window for function programming. The input logic is fixed as active low.

The AUX Output port can be set execute a single output function. If the port type for an AUX I/O Ports 1-7 is set for "AUX Output" it will also appear AUX Output window for function programming. The Output logic of AUX Output can be set as either active High or active Low by the Logic Type function. Active High outputs a High (5V) when the programmed condition becomes valid; active Low outputs a Low (0V) when the condition becomes valid.

20. Channel Select

AUX I/O Ports 1-5 (1 or all 5) can each be set for "Channel Select" providing up to 32 channel selection capability. These are 1 to 5 bit Binary Coded Decimal (BCD) inputs. AUX I/O 1 is a least significant bit. When all of AUX I/O ports 1-5 is set to Channel Select, "11111" input (LSB on the right side) signifies the Channel 1 and "11110" input signifies the Channel 2. When the Channel Select function is set to any AUX I/O Ports, The Channel 'X' function (Channel Up, Channel Down, Channel 1, etc.) can not be set to the AUX Input ports, but can be set to the PF Keys. Normally the channel control is controlled by the Channel Select function. If the Take Over function is executed, the channel control is disabled to be controlled by the Channel Select and enabled to be controlled by the PF Keys.

21. Start Up

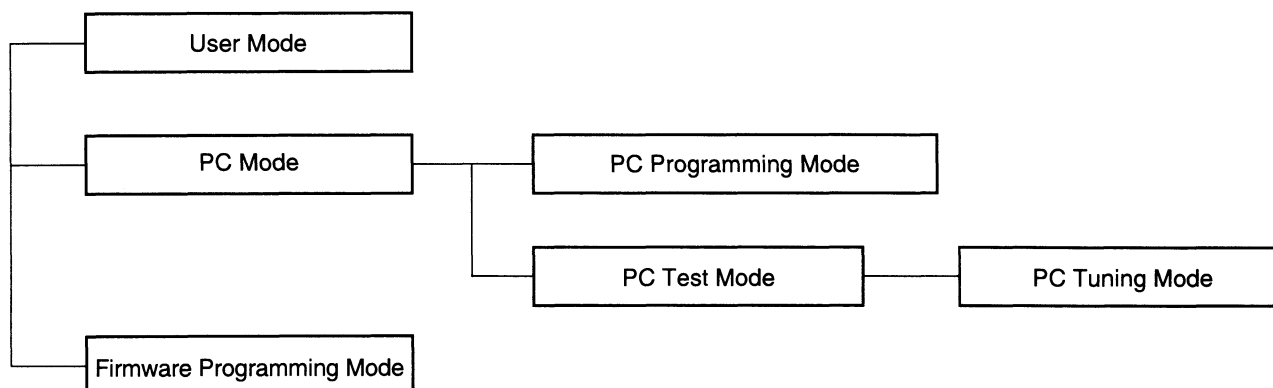
When the TKR-740 is first turned on or is reset, up to 3 functions pre-programmed into the Start Up function are executed in sequence.

22. Optional Board

The TKR-740 can be installed as a optional scrambler board. Scrambler codes between 1 and 16 are available per channel. If the scrambler board is not to be used (although it is installed), set the parameter to "Off". When any Scrambler code is set up and Scrambler On function is executed, the scrambler board is activated.

REALIGNMENT

1. Modes



Mode	Function
User Mode	Use this mode for normal operation.
PC Mode	Use this mode to make various settings by means of the FPU through the RS-232C port.
PC Programming Mode	Use to read and write frequency data and other features to and from the Repeater.
PC Test Mode	Use to check the Repeater using the PC. This feature is included in the FPU.
Firmware Programming Mode	Use when changing the Firmware program of the flash memory.

2. How to Enter Each Mode

Mode	Operation
User Mode	Power ON.
PC Mode	Received commands from PC.
Firmware Programming Mode	[PF1] key + Power ON (one second).

REALIGNMENT

3. PC Mode

3-1. Preface

The TKR-740 repeater is programmed by using a personal computer, programming interface and KPG-47D software. (Version 2.00 or later)

3-2. Connection procedure

1. Connect the TKR-740 to the personal computer with the interface cable.
2. When power is applied, the user mode is entered immediately. When the PC sends a command, the repeater enters the PC mode and displays "PC" on the 7-segment LED. When data is being transmitted to the PC from the repeater, the TX LED flashes. The BUSY LED flashes when data from the PC is being received by the repeater.

Notes:

- The data stored in the personal computer must match the model type, when it is written into the flash memory.
- Change the TKR-740 to PC mode, then attach the interface cable.

3-3. KPG-46 description (PC programming interface cable : Option)

The KPG-46 is required to interface the TKR-740 to the computer. It has a circuit in its D-subconnector (25-pin) case that converts the RS-232C logic level to the TTL level. The KPG-46 connects the MICROPHONE connector of the TKR-740 to the computer's RS-232C serial port.

3-4. Programming software description

The KPG-47D programming disk is supplied in 3-1/2" disk format. The software on the disk allows a user to program TKR-740 repeater via the programming interface cable (KPG-46).

3-5. Programming with IBM PC

Data can be programmed into the flash memory in RS-232C format via the MICROPHONE connector.

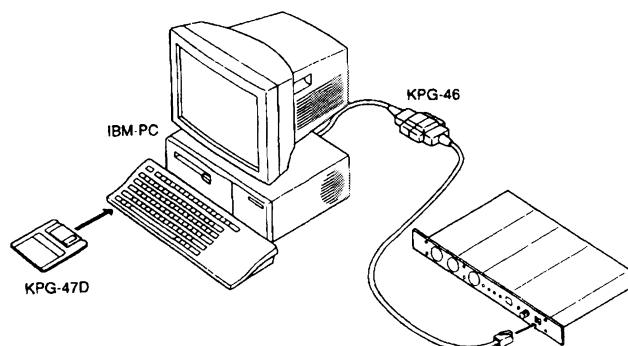


Fig.1

4. Firmware Programming Mode

4-1. Preface

The TKR-740 uses flash memory to allow it to be easily upgraded when new features are released in the future.

4-2. Connection procedure

Connect the TKR-740 to the personal computer (IBM PC or compatible) with the interface cable (KPG-46). (Connection is the same as in the PC Mode.)

Notes:

You can only program firmware from the 8-pin microphone connector on the front panel. Using the 25-pin logic interface on the rear panel will not work.

4-3. Programming

1. Start up the programming software (KPG-47D), select "firmware program" in the "Program" item, and press the Return key on the personal computer. This starts up the firmware programmer.
2. The top screen is displayed. Press any key to advance to the next screen.
3. Set the communications speed (normally, 115200 bps) and communications port in the Setup item.
4. Set the firmware to be updated by File select (=F1).
5. Turn the TKR-740 power ON with the [PF 1] key held down. Hold the key down for one second until the 7-segment display changes to "P.G.". When "P.G." appears, release your finger from the key.
6. Check the connection between the TKR-740 and the personal computer, and make sure that the TKR-740 is in the Program Mode.
7. Press F10 on the personal computer. A window opens on the display to indicate progress of writing.
8. If writing ends successfully, the TX LED on the TKR-740 lights.
9. If you want to continue programming other TKR-740s, repeat steps 3 to 6.

Notes:

- To start the Firmware Programmer from KPG-47D, the Fpro path must be set up by KPG-47D Setup.
- This mode cannot be entered if the Firmware Program mode is set to Disable in the Programming software (KPG-47D).

4-4. Function

If you press the [PF 1] key (front panel), both decimal point on the 7-segment display will disappear. The writing speed is 38400 bps (low-speed mode). If you press the [PF 1] key again, the right hand decimal points will light. The writing speed is 57600 bps (middle-speed mode).

Notes:

Normally, write in the high-speed mode (115200 bps).

APPLICATION NOTE

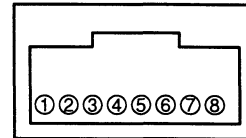
1. External I/O Connector Description

1.1. MICROPHONE jack

Connector	No.	Terminal Name	Description
MICROPHONE	1	NC	No Connection
	2	+B	Power Source; 13.8V $\pm$ 15% / 0.75A maximum
	3	GND	GND *1
	4	PTT (PC serial data from radio)	PC Read/Write, PC Tuning, Firmware programming
	5	MIG	MIC Ground *1
	6	MIC	MIC input (600 Ω) *1
	7	HOOK (PC serial data to radio)	PC Read/Write, PC Tuning, Firmware programming
	8	NC	No Connection

Notes:

*1 Pin 5 (MIG) is used for MIC audio ground only. Electrical grounds such as PTT current return must use Pin 3 (GND).



MICROPHONE jack (Viewed from Front Panel)

1.2. TEST/SPKR jack

Connector	No.	Terminal Name	Description	I/O	Level
TEST / SPKR	1	B+(AUX)	Un-switched B+ 1A maximum *1	O	13.8V
	2	B+(AUX)	Un-switched B+ 1A maximum *1	O	13.8V
	3	NC	No Connection		
	4	GND	GND		
	5	GND	GND		
	6	SPG (Speaker Ground)	GND *2		
	7	RD (RX Data output)	RX Detector audio output (non-squelched) (Receive @ 1kHz Modulation, 60% Deviation)	O	80mV
	8	RSSI	RSSI voltage check (See Reference Table)	O	0 to 5V
	9	SPI (Internal Speaker Input)	Internal Speaker Input *2	I	
	10	TXCV	TX VCO lock voltage check (See Reference Table)	O	1.0 to 4.5V
	11	RXCV	RX VCO lock voltage check (See Reference Table)	O	1.0 to 4.5V
	12	SPO	External Speaker Output (4W/4 Ω) *2	O	
	13	VC	Voltage check of Power Source (Impedance: 10k Ω)	O	13.8V
	14	FWD	Voltage check of Forward power (See Reference Table)	O	0 to 5V
	15	EXT REF	External reference check (INT; 5V EXT; 0V)	O	0 or 5V

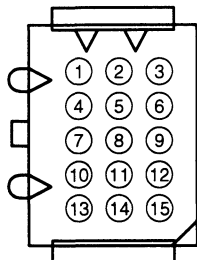
Notes:

*1 This source can be used to power external equipment to a maximum 1A on each line (max 2A total).

Use is prohibited with the fuse beyond 6A strictly.

*2 Connect SPI and SPO by using the 15pin I/O plug when using the internal speaker. (INT-SP: 0.25W/32 Ω)

When using an external speaker, remove the jumper lead from the connector and attach the speaker cable to SPO (pin 12) and SPG (pin 6).



**TEST / SPKR jack
(Viewed from Back Panel)**

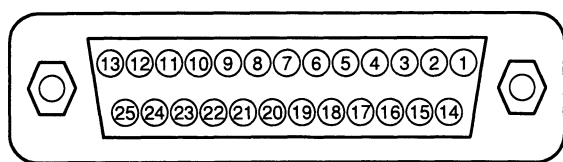
VOLTAGE REFERENCE TABLE (approximate +VDC)

TKR-740K	
RSSI (@ -100dBm)	2.5V
FWD (@ 5W)	1.2V
TXCV	1.4V @ 136.0MHz
	4.5V @ 154.9MHz
	1.8V @ 155.0MHz
	4.5V @ 174.0MHz
RXCV	1.8V @ 147.0MHz
	4.5V @ 153.9MHz
	1.8V @ 154.0MHz
	4.5V @ 162.0MHz

APPLICATION NOTE

1.3. CONTROL I/O jack

Connector	No.	Terminal Name	Description	I/O	Level
CONTROL I/O	1	NC	No Connection		
	2	RXD2 (PC serial data to radio)	PC Read/Write, PC Tuning, Remote *1	I	RS-232C Level
	3	TXD2 (PC serial data from radio)	PC Read/Write, PC Tuning, Remote *1	O	RS-232C Level
	4	AUXI 1	Programmable Function input 1 *2	I	0 or 5V
	5	AUXI 2	Programmable Function input 2 *2	I	0 or 5V
	6	AUXI 3	Programmable Function input 3 *2	I	0 or 5V
	7	DG (Digital Ground)	GND (for Digital ground only)		
	8	TD (TX Data input)	TX Signalling data input *3	I	0.5Vpp
	9	TA (TX Audio input)	TX Audio input *3	I	140mVrms
	10	RD (RX Data output)	RX Signalling data output *3	O	80mVrms
	11	RA (RX Audio output)	RX Audio output *3	O	400mVrms
	12	RXG (RX Ground)	GND (for RA, RD ground only)		
	13	SPM (Speaker Mute)	Mute input; "Mute: Low"	I	0 or 5V
	14	NC	No Connection		
	15	EXT MON (Monitor SW)	External Monitor input; "Active: Low" *5	I	0 or 5V
	16	EXT PTT (Same as Test SW)	External PTT input "ON: 0V OFF: 5V" *3	I	0 or 5V
	17	SC (Squelch Control)	Squelch status output; "Busy: Low"	O	0 or 5V
	18	NC	No Connection		
	19	TXG (TX Ground)	GND (for TA,TD ground only) *3		
	20	AUXO 1	Programmable Function output 1 *4	O	0 or 5V
	21	AUXO 2	Programmable Function output 2 *4	O	0 or 5V
	22	AUXO 3	Programmable Function output 3 *4	O	0 or 5V
	23	AUXO 4	Programmable Function output 4 *4	O	0 or 5V
	24	AUXO 5	Programmable Function output 5 *4	O	0 or 5V
	25	AUXO 6	Programmable Function output 6 *4	O	0 or 5V



**CONTROL I/O (25pin D-SUB) jack
(Viewed from Back Panel)**

Notes:

*1 Serial data communications with a PC can be done through either front panel 8-pin modular microphone jack or the rear panel 25-pin D-SUB interface connector. Firmware can only be written through the 8-pin modular microphone jack.

Mode	8pin Modular	25pin D-sub
FPU Read/Write	Yes	Yes
FPU Tuning mode	Yes	Yes
Firmware programming	Yes	No
Serial Remote	No	Yes
Real time Monitor	No	Yes

Serial Data transmission method

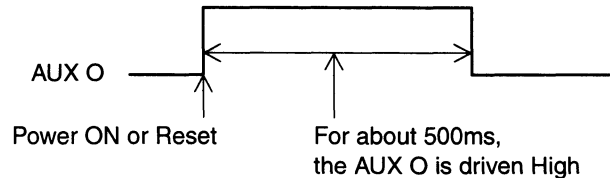
- Full duplex communication
- Asynchronous system (start-stop asynchronous)
- Non-parity check
- Start bit: 1bit, Stop bit: 2bit
- Data: 8bit, LSB output
- Baud rate: 9600bps
- Hardware flow control line not used

*2 All AUX I terminals (Section 1.3, 1.4), including any AUX I/O programmed as "AUX Input" with the KGP-47D are Active-Low logic.

APPLICATION NOTE

- *3 TD ; TX Data input-transmit signalling (QT / DQT / LTR) input. (Impedance 600Ω)
 TA ; TX Audio input-transmit audio input. (Impedance 600Ω)
 RD ; Receiver detector output non-squelched, non-de-emphasized detector audio output (80mVrms/4.7kΩ)
 RA ; Receiver Audio output-with de-emphasis, filtering and squelched, line level only (not for driving a speaker). (400mVrms/ 4.7 kΩ)
 PTT ; Press-to-Talk-external transmit key line.
 TXG ; TX Ground-common ground.

- *4 The output logic level of all AUX O terminals (Section 1.3, 1.4), including any AUX I/O programmed as "AUX Output" with the KGP-47D may be selected as either Active-High or Active-Low. Note: If Active-Low is selected in KGP-47D, the AUX Output port will be driven temporarily High for about 500ms immediately after a forced reset or when power is first applied. External equipment must have appropriate de-bounce.



- *5 EXT MON is the same as EXT MON on the REMT I/O (Section 1.4).

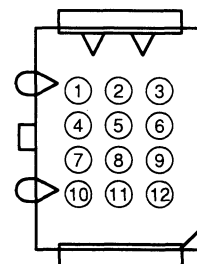
1.4. REMT I/O jack

Connector	No.	Terminal Name	Description	I/O	Level
REMT I/O	1	Remote RA (RX Audio output)	Audio output, line level *1	O	400mVrms
	2	Remote TA (TX Audio input)	Audio input, line level *1	I	140mVrms
	3	Remote PTT	Remote PTT input (Active-Low) *1	I	0 or 5V
	4	EXT MON	External Monitor input (Active-Low)	I	0 or 5V
	5	GND	Ground		
	6	AUX I/O 1	External Ch 1 or programmable Function *2 *3	I/O	0 or 5V
	7	AUX I/O 2	External Ch 2 or programmable Function *2 *3	I/O	0 or 5V
	8	AUX I/O 3	External Ch 3 or programmable Function *2 *3	I/O	0 or 5V
	9	AUX I/O 4	External Ch 4 or programmable Function *2 *3	I/O	0 or 5V
	10	AUX I/O 5	External Ch 5 or programmable Function *2 *3	I/O	0 or 5V
	11	AUX I/O 6	Programmable Function *2 *4	I/O	0 or 5V
	12	AUX I/O 7	Programmable Function *2 *4	I/O	0 or 5V

Notes:

- *1 Remote RA ; Receiver Audio output with de-emphasis to Remote Terminal.(400mVrms/ 4.7 kΩ Load)
 Remote TA ; Transmit audio signal input from Remote terminal.(Impedance 600Ω)
 Remote PTT ; Press-to-Talk for Remote Terminal transmit key.
 *2 AUX I/O 1-5 can be programmed for AUX Input, AUX Output or (BCD) Channel Select.
 AUX I/O 6-7 can be programmed for either AUX Input or AUX Output.
 *3 AUX I/O 1-5: Provides 1 of 32 channel selection via 5 bit Binary Coded Decimal (BCD) on REMT I/O connector.

Select channel	No.	10	9	8	7	6	pin
1		1	1	1	1	1	
2		1	1	1	1	0	
3		1	1	1	0	1	
4		1	1	1	0	0	
...		...					
29		0	0	0	1	1	
30		0	0	0	1	0	
31		0	0	0	0	1	
32		0	0	0	0	0	



REMT I/O jack (Viewed from Back Panel)

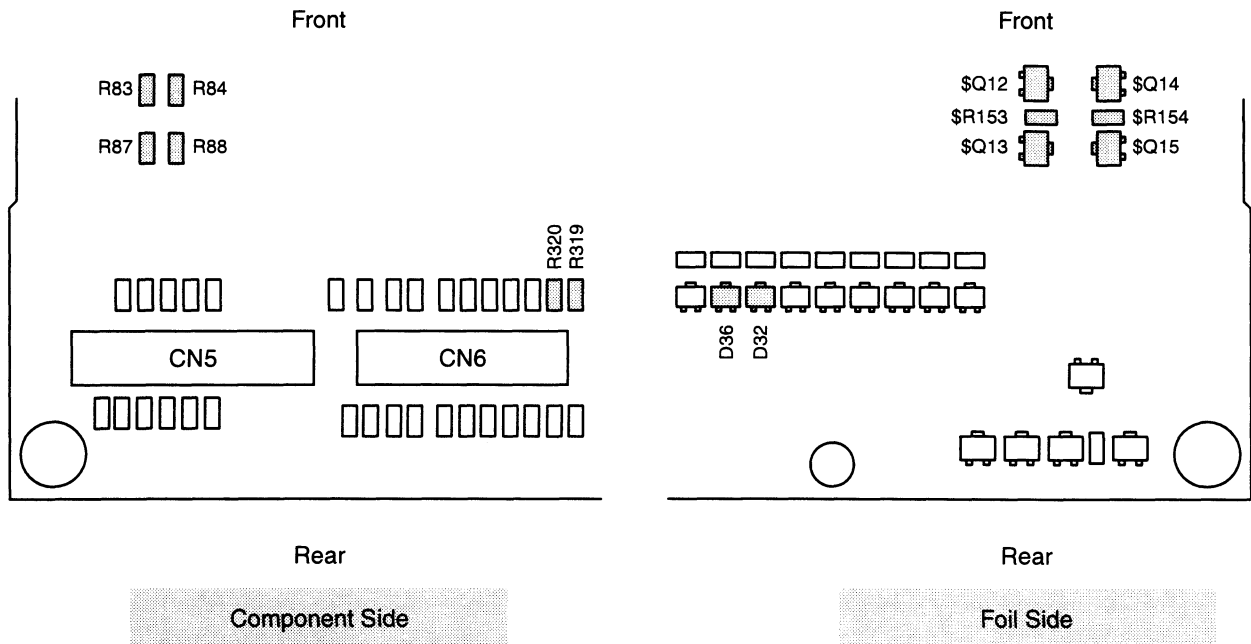
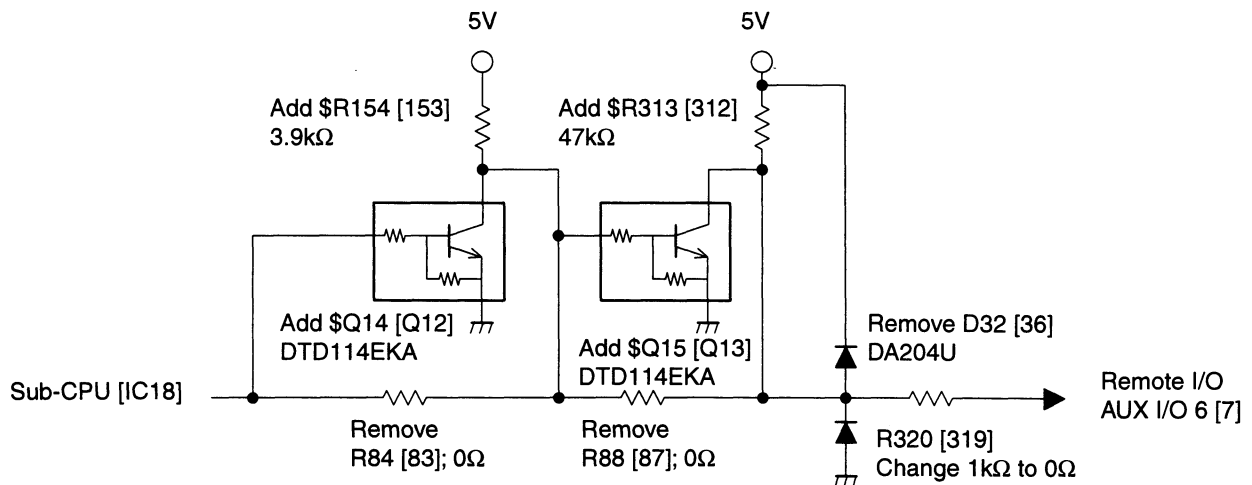
APPLICATION NOTE

*4 AUX I/O 6 and 7 can each be modified to sink up to 600mA of open collector current. The following modification should be installed when AUX I/O 6 or 7 is used to control external equipment.

1. Program AUX I/O 6 [7] for "AUX Output" in the KGP-47D.
2. Remove D32, R84 and R88 for AUX I/O 6 [D36, R83 and R87 for AUX I/O 7] on the component side of control unit PCB (see diagram below).
3. Install \$Q14, \$Q15 and \$R154 for AUX I/O 6 [\$Q12, \$Q13 and \$R153 for AUX I/O 7] on foil side of control unit PCB (see diagram below).

\$Q12,13,14,15 DTD114EKA
\$R153,154 3.9k Ω (RK73GB1J392J) chip resistor

4. Change R320 for AUX I/O 6 [R319 for AUX I/O 7] from 1k Ω (RK73GB1J102J) to 0 Ω (R92-1252-05).
By making this modification, AUX I/O 6 and 7 can now sink up to 600mA each.



Components having those reference numbers marked as "\$" are not used in this transceiver, although they are described in this service manual for other application purpose.

APPLICATION NOTE

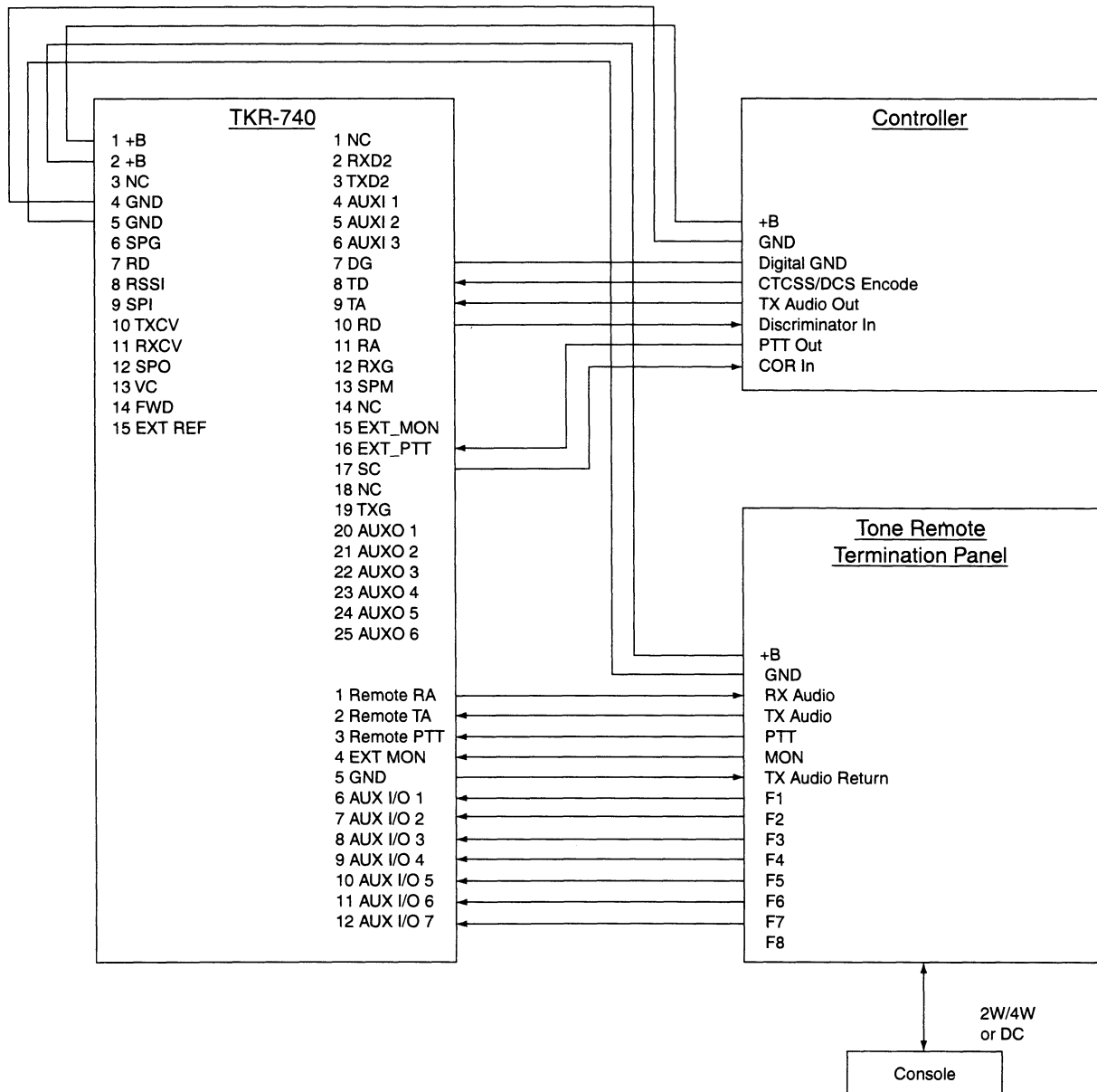
1.5 Connection to External Equipment

	No	Terminal	Remote Termination(VEGA)	Model 38-MAX (ZETRON)	Raider (TRIDENT)
CONTROL I/O	1	NC			
	2	RXD2			
	3	TXD2			
	4	AUXI 1	(F1 to F8 optionally)		
	5	AUXI 2	(F1 to F8 optionally)		
	6	AUXI 3	(F1 to F8 optionally)		
	7	DG		PTT Common	
	8	TD		CTCSS/DCS Encode	TX Data Output
	9	TA		TX Audio	TX Audio Output
	10	RD		Discriminator	RX Discriminator Input
	11	RA			
	12	RXG		RX Ground	
	13	SPM			
	14	NC			
	15	EXT MON			
	16	EXT PTT		PTT No	TX PTT Output
	17	SC		COR	
	18	NC			
	19	TXG		TX Ground	
	20	AUXO 1			
	21	AUXO 2			
	22	AUXO 3			
	23	AUXO 4			
	24	AUXO 5			
	25	AUXO 6			
REMT I/O	1	Remote RA	RX Audio output		
	2	Remote TA	TX Audio input		
	3	Remote PTT	PTT		
	4	EXT MON	MON		
	5	GND	(TX return)		
	6	AUX I/O 1	(F1 to F8 optionally)		
	7	AUX I/O 2	(F1 to F8 optionally)		
	8	AUX I/O 3	(F1 to F8 optionally)		
	9	AUX I/O 4	(F1 to F8 optionally)		
	10	AUX I/O 5	(F1 to F8 optionally)		
	11	AUX I/O 6	(F1 to F8 optionally)		
	12	AUX I/O 7	(F1 to F8 optionally)		
TEST/SPKR	1	B+(AUX)		B+	Power
	2	B+(AUX)	B+		
	3	NC			
	4	GND		GND	Ground
	5	GND	GND		
	6	SPG			
	7	RD			
	8	RSSI			
	9	SPI			
	10	TXCV			
	11	RXCV			
	12	SPO			
	13	VC			
	14	FWD			
	15	EXT REF			

TKR-740

APPLICATION NOTE

1.6 Controller and Remote Termination Panel Inter connection Diagram



2. TKR-740 Programming Settings with External Equipment

2.1. LTR Logic Controllers

- 1) Program the RX/TX channel frequency but do not set QT/ DQT tone/codes..
- 2) Edit the channel data by pressing [F10].
Set: Simplex = "No"; Repeat = "No"; this will override the TKR-740 internal conventional repeater controller function.
- 3) Select Time Out Timer = OFF.
<Edit>→<Optional features>→Time Out Timer "OFF".
- 4) Connect the 25-pin D-sub on TKR-740 to the interface port on LTR controller with a cable.
Layout of 25-pin D-Sub connector is compatible with TKR-740 and TKR-830.
The cable for TKR-830 can be use for TKR-740.
- 5) Adjust a LTR controller (RX data, RPT audio, TX data, etc) according its installation manual.

APPLICATION NOTE

2.2. Intercom Function

The Intercom function allows two communications between a dispatcher at a remote console and the TKR-740 unit at a site via the remote termination unit-to-console audio link. This function operates in repeater or base station mode.

- 1) Connect the 12-pin Remote I/O Connector on TKR-740 to the interface port on Remote Termination unit with a cable.
- 2) Select PTT Priority if desired: Local Mic PTT, Ext. PTT (ext. controller), Remote PTT (remote termination unit), Repeat PTT (TKR-740 internal controller repeat PTT). This allows for example the Remote PTT can take precedent over the Ext. PTT and front panel Local Mic PTT.

<Edit>→<Optional features>→<PTT Priority...>

- 3) Select the audio routing during Intercom operation (Remote, Local or Remote/Local)

<Edit>→<Optional features>→<Intercom Remote/Local>

Remote: Remote TA, transmit audio out from the remote term. unit will be heard in the front panel speaker when the Remote PTT is active even if receiver audio is present. Audio from the Remote TA port will also be transmitted over the air (see 5; TX Disable).

Local: Front panel Local Mic audio will be routed to the Remote RA port (audio input to the remote term. unit) even if receiver audio is present. Audio from the Local Mic will be transmitted over the air (see 5; TX Disable).

Remote/Local:

Remote TA, transmit audio out from the termination unit will be heard in the front panel speaker. Front panel mic audio will be routed to the Remote RA audio input to the remote termination unit, even if receiver audio is present. All audio will be transmitted over the air (see 5 TX Disable). Transmit Audio priority is dependent on the PTT Priority setting.

- 4) Program a front panel PF key or AUX Input to set Intercom ON/OFF.

<Edit>→<Key assignment>→<Intercom ON/OFF>

<Edit>→<Optional features>→<AUX I/O Ports...>→<AUX Input Functions (12-pin & 25-pin)...>→<Intercom On/Off>

- 5) To inhibit Intercom audio from being transmitted over the air, program a front PF key and/or AUX Input to disable transmit during Intercom.

To use the Intercom with Local Mic PTT without keying the transmitter, enable the Local TX Disable function at PF key or AUX Input. This must be manually activated by the Local Mic user.

<Edit>→<Key assignment>→<TX Disable/Enable>

To use the Intercom with Remote PTT without keying the transmitter, enable the Remote TX Disable function at PF key or AUX Input. If a PF key is programmed the Local Mic user must activate this during Intercom operation. If an AUX Input is programmed, a "function" or "auxiliary" function switch on the remote console must be used to activate the

AUX Input (prog. for Remote TX Disable) during Intercom operation.

<Edit>→<Optional features>→<AUX I/O Ports...>→<AUX Input Functions (12-pin & 25-pin)...>→<TX Disable/Enable>

2.3. Setting for Voting system

- 1) The Voting Tone is output from the RA port of the 25-pin D-sub and interfaced with the audio link of the systems voting Comparator unit. This link may be a dedicated telco line or an RF link such as a point-to-point microwave or conventional analog FM link. (Note: The voting tone will also be output through the Remote RA audio port. If Intercom operation is activated then Local Mic audio will be outputted. Do not use the Remote RA port for the voting output when Intercom operate).

- 2) Program the voting tone frequency by pressing PF2 or space bar.

<Edit>→<Optional features>→<Voting tone>→<"1950">

Note: Set to "Disable" for non-voter system use.

- 3) A front panel key can be programmed for a Voting Tone On/Off function for service and test purposes.

<Edit>→<Key assignment>→<PF key>→<Voting Tone ON/OFF>

2.4. Digital Paging systems

The TKR-740 can be used as a continuous-duty paging transmitter. It has a direct carrier frequency shift input for bi-level type paging protocols such as POCSAG (note this is not for quad-level formats such as Motorola Flex).

1. Program the Digital Paging Input as "Enable":

<Edit>→<Optional features>→<Digital Paging Input>→<Enable>

When this function is set to "Enable", AUX Input 2 is automatically assigned as the "Digital Pager PTT" and AUX Input 3 is automatically assigned "Digital Pager Data".

Digital Pager Data Input level (AUX Input 3):

+5.30V > High > +4.0V

-0.30V < Low < +1.00V

Digital Pager PTT Input (AUX Input 2): Active Low

Baud Rate: Less than 2400 bps

Frequency Shift Polarity:

High: -4.5 kHz ±0.5 kHz shift

Low: +4.5 kHz ±0.5 kHz shift

Adjust the Digital Pager Deviation at 137 digit in FPU for 4.5kHz shift.(0 digit; 0 kHz 255 digit; 8.4kHz)

Caution ;Pin5(AUX Input 2) on the 25-pin D-Sub connector corresponds to a RS-232C CTS. when Digital Paging Input is "Enable" and the 25-pin D-Sub on TKR-740 is connected to the serial port on PC with a 25-pin D-Sub straight cable, note that TKR-740 is likely to transmit.

3. Internal I/O Terminal Description

The TKR-740 has internal connection terminals for adding internal option boards such as voice encryption /scramblers boards, ANI encoders and tone encoders (two-tone, burst, 5-6 tone, etc.).

APPLICATION NOTE

3.1. Internal I/O Terminal Description

Terminal Name	Description	I/O	Level
B	Power Source	O	13.8V
GND	GND		
TXI	TX audio output to optional board	O	35mVrms @ 3kHz Deviation
TXO	TX audio input from optional board	I	
RXI	RX audio output to optional board	O	200mVrms @ 1kHz Mod 60% Dev
RXO	RX audio input from optional board	I	
DETI	Discriminator output to optional board	O	170mVrms @ 1kHz Mod 60% Dev
DETO	Discriminator input from optional board	I	
ANI	TX ANI input	I	15mVrms input
PTTI	PTT output to optional board	O	Mic PTT ON ; 0V OFF ; 5V
PTTO	PTT input from optional board	I	
TESTI	Ext.PTT output to optional board	O	Ex PTT or TEST SW ON ; 0V OFF ; 5V
TESTO	Ext.PTT input from optional board	I	
RPTTI	Remote PTT output to optional board	O	Remote PTT ON ; 0V OFF ; 5V
RPTTO	Remote PTT input from optional board	I	
OPTION	Enable/Disable scrambler board	O	Scrambler ON ; 5V Scrambler OFF(normally) ; 0V
CODE1	Scrambler code setting	O	0V or 5V
CODE2	Scrambler code setting	O	0V or 5V
CODE3	Scrambler code setting	O	0V or 5V
CODE4	Scrambler code setting	O	0V or 5V

3.2. Connection to Optional Boards

Terminal Name	SC20-460(Transcrypt)	CDEU-1(Cimarron)	ID-12(CSC)
B	+V	+B	Power Supply
GND	GND	GND	GND
TXI	TXIN *1		
TXO	TXOUT *1		
RAI	RXOUT *2	SIDE TONE*4	
RAO	RXIN *2		
DETI	(RXOUT) *3		
DETO	(RXIN) *3	DATA IN	
ANI		DATA OUT	AUDIO OUT
PTTI		PTT *5	PTTIN *5
PTTO	PTT	KEY *5	PTTOUT *5
TESTI		(PTT) *6	(PTTIN) *6
TESTO	(PTT) *6	(KEY) *6	(PTTOUT) *6
RPTTI		(PTT) *7	(PTTIN) *7
RPTTO	(PTT) *7	(KEY) *7	(PTTOUT) *7
OPTION	SCRAMBLE		
CODE1	Binary 1		
CODE2	Binary 2		
CODE3	Binary 4		
CODE4	Binary 8		
AUX I/O		EMER *8	
AUX I/O		CH BUSY *9	
SPM		MUTE *10	

APPLICATION NOTE

Notes:

- *1 Remove R117.
- *2 Remove R118.
Note: RAI and RAO (de-emphasized squelch controlled audio) should be used for the receive audio in/out for an encryption or scrambler board.
- *3 Remove R120
Note: When DETI and DETO are used, (bypasses de-emphasized squelch controlled audio) the TKR-740 can not decode QT/DQT because the scrambler board will not pass sub-audible tones. If the scrambler board modification is need due to use of RAI and RAO, refer to Its manufacturer's Installation manual.
- *4 If ANI side tone is to be output from an external speaker, connect the ANI board side tone output line to terminal RAI. If side tone output is to output from the front panel local speaker, connect the board side tone output line to IC45, pin 2 (IC45 device: LA4422).
- *5 Remove R115.
- *6 When using an EXT PTT, connect the PTT wires of option board to TESTI/TESTO terminal.
Remove R116.
- *7 When using a Remote PTT, connect PTT wires of option board to RPTTI/RPTTO terminal..
Remove R114.
- *8 An external switch may be connected to an AUX I (I/O) if an emergency function is required.
- *9 Some ANI boards have a "channel busy" input line. Use an AUX (I/O) programmed as Carrier Operated Relay or Tone Operated Relay (COR or TOR) output may be used (alternative: use the Squelch Control (SC) line on the 25 Pin D-sub).
- *10 Some ANI boards have a "speaker mute" output line. Use the SPM line on the 25 Pin D-sub.

4. FPU Setting For Optional Board

Voice scrambler

- 1) Select each item to enable for scrambler unit.
 <model>→<TKR-740>→<146-162>→<Voice Scrambler>→"OK"
- 2) Select the channel(s) which will use scramble mode and then press [F10].
 Select a voice scrambler code address (1-of-16, 4 bit BCD) if necessary.
- 3) Assign the "Scrambler On/Off" function to front panel any PF key or AUX Input.
 <Edit>→<Key Assignment>→[PF 2]→"Scrambler On/Off"
 <Edit>→<Optional features>→<AUX I/O ports...>→<AUX Input Functions(12-pin & 25-pin...>→<AUX In>

The scrambler function is primarily designed for TKR-740 base station operation. However if used in repeater operation, be aware that the repeated audio operation differ between the RAI/RAO and DETI/DETO terminals. When RAI/RAO are used, de-scrambled (clear) audio will be heard from the local speaker and scrambled audio will be transmitted over the air; RAI/RAO are the preferred scrambler receiver audio connection terminals. When DETI/DETO are used, de-scrambled (clear) audio will be heard from both the local speaker and transmitted over the air. Since the repeated audio should leave the repeater scrambled (in most applications), it is recommended to use the RAI and RAO.

CIRCUIT DESCRIPTION

1.Outline

The TKR-740 is a VHF repeater operating in the 136-174MHz frequency range. It has the following features:

- High-performance model with enhanced features.
- 32 channel radio with 16 QT / DQT.
- Remote functions for use by base stations.
- Fine frequency steps using Direct Digital Synthesizer (DDS).
- Signaling decoding and AF processing using Digital Signal Processor (DSP).

2.Transmitter Unit

The transmitter unit (X56-304 A/3) consists of the following circuits: (1) internal/external reference circuit, (2) transmitter reference PLL circuit, (3) transmitter DDS circuit, (4) transmitter main PLL circuit, (5) driver circuit, (6) modulation level adjustment circuit, and (7) other circuits.

2.1 Internal/external reference circuit

The internal/external reference circuit switches between the internal $\pm 1.0\text{ppm}/20\text{MHz}$ TCXO (X101) and the 10MHz external reference automatically. If there is no external reference signal applied to the unit, the internal TCXO is used as the reference frequency. When an external reference (10MHz/-10dBm or higher) is applied, the external reference is automatically used as the reference frequency. The circuit consists of Q102, Q106, XF210, Q109, D101, D103, Q15, X101, Q205, D205, Q206, IC204, Q110, Q114, Q112, Q113, Q108, XF211, and Q115.

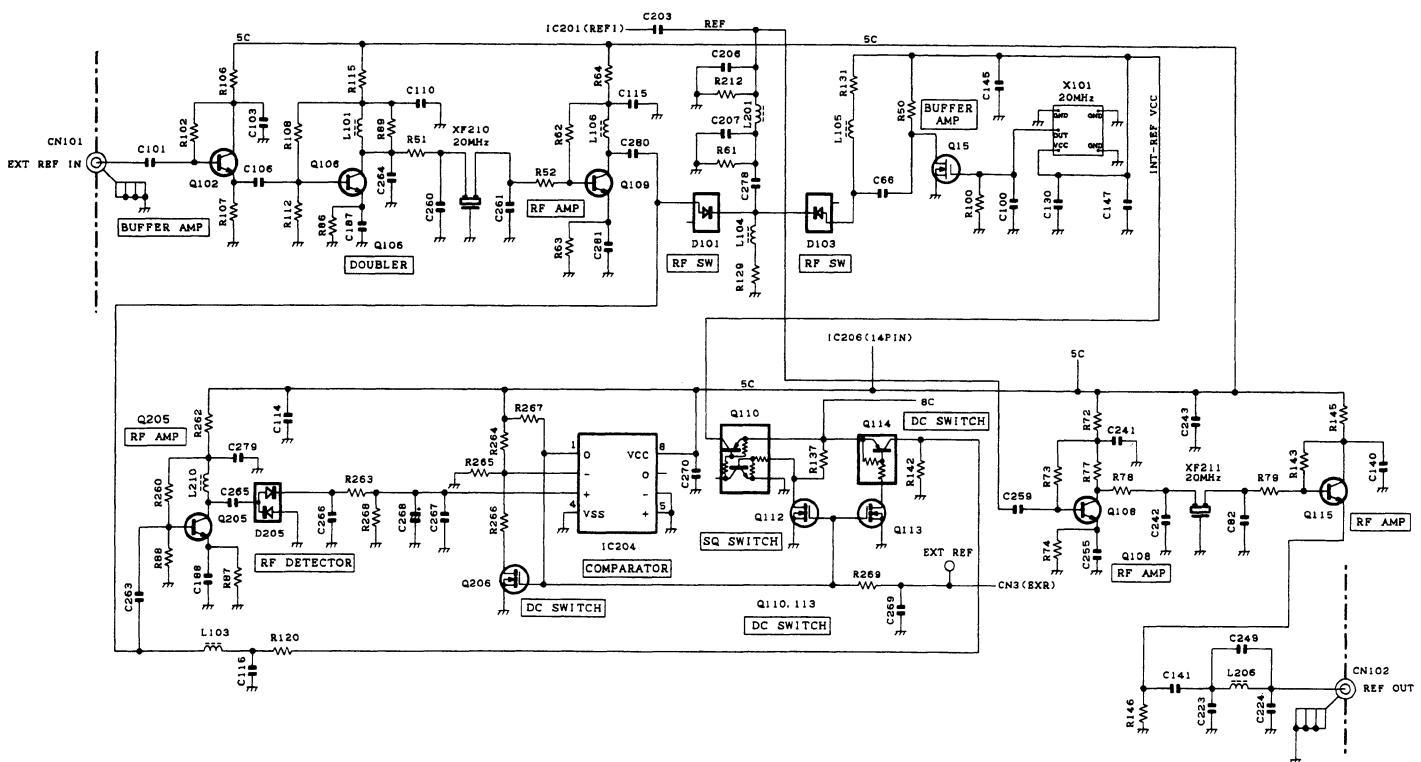


Fig.1 Internal/external reference circuit

2.2 Transmitter reference PLL circuit

The transmitter reference PLL circuit generates the reference frequency signal (19.2MHz) for the transmitter DDS and modulates the low-frequency components of QT and DQT. This circuit consists of IC201, X201, Q201, and Q202. The VCO consists of Q201, X201, D203, D201, and D202.

The signal generated by the VCO is fed to buffer amplifier Q202 and unwanted harmonics are removed with an LPF. The resulting signal goes to the PLL IC (IC201), and its phase is

compared with that of the reference frequency using the comparison frequency of 200 kHz. The phase difference signal is converted to a DC voltage by a lag-lead type loop filter. The capacitance of D201 and D204 are varied by the DC voltage to keep the VCO oscillator frequency at 19.2MHz. The 19.2MHz oscillator signal is fed to Q241 and used as the reference frequency signal for the transmitter DDS.

CIRCUIT DESCRIPTION

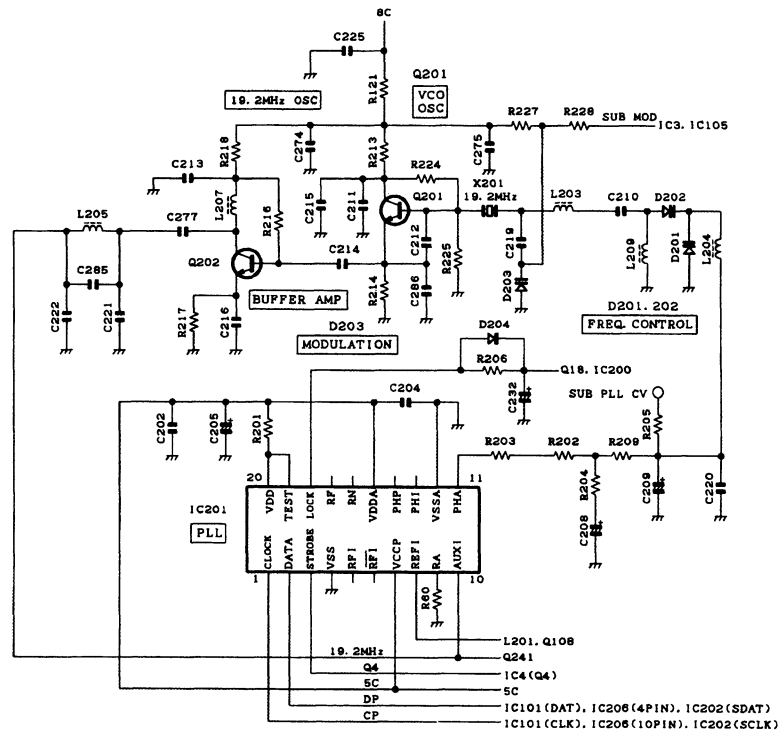


Fig.2 Transmitter reference PLL circuit

2.3 Transmitter DDS circuit

The transmitter DDS circuit produces the reference frequency signal (4.5 MHz) for the transmitter main PLL and modulates the low-frequency components of digital pager modulation. This circuit consists of Q241, IC202, IC107, Q207, Q240, and Q242. The 19.2MHz signal coming from the transmitter sub PLL is amplified by Q241 and fed to IC202. IC202 produces the 4.5MHz reference frequency signal for the transmitter main PLL based on the 19.2MHz signal. Since the comparison frequency of the transmitter main PLL is 100 kHz, the PLL frequency step is 100 kHz. However, fine

frequency steps, such as 2.5kHz and 1.25kHz, can be used because the DDS output frequency is variable. IC202 performs binary FSK modulation. Digital pager modulation is implemented by applying low-range modulation to DDS and high-range modulation to the transmitter main PLL. There is a two-stage Butterworth filter (cutoff frequency: 3.2kHz) consisting of IC102 in the high-range modulation line. The IC102 shift input is delayed by IC107 and IC207 to maintain phase balance between the low and high ranges. (See the level adjustment circuit description.)

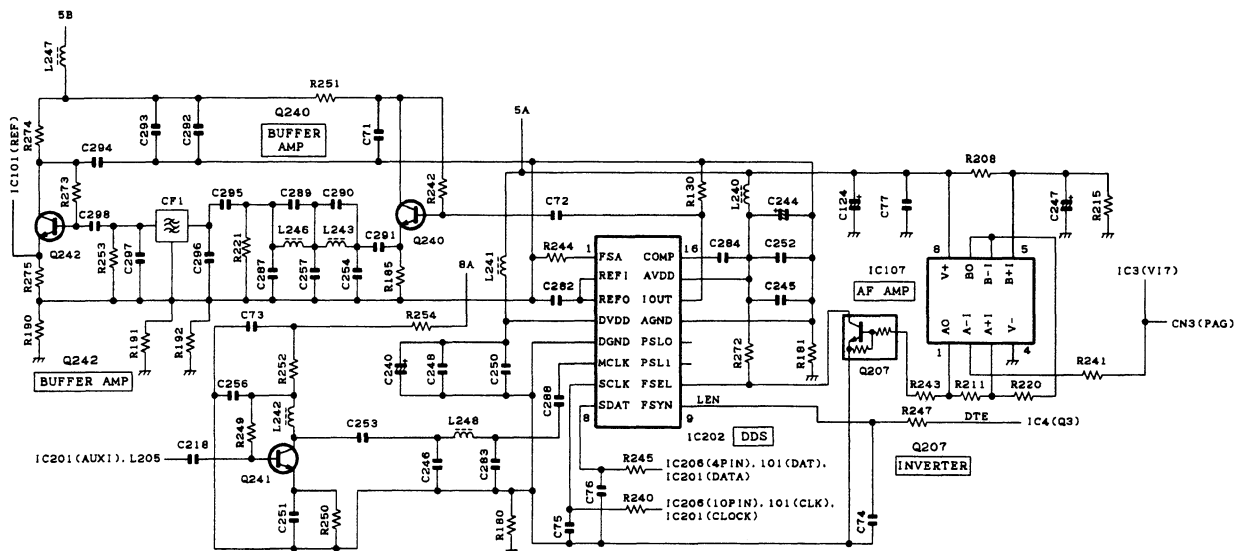


Fig.3 Transmitter DDS circuit

CIRCUIT DESCRIPTION

2.4 Transmitter main PLL circuit

The transmitter main PLL circuit produces the transmitter frequency signal and consists of VCO (Q1 and Q2) and a single-chip PLL IC (IC101). Transmit frequencies from 136.000 MHz to 154.995 MHz are derived from VCO Q1. Transmit frequencies from 155.000 MHz to 174.000 MHz are derived from VCO Q2.

IC101 divides the VCO oscillator signal and the transmitter PLL reference signal (4.5 MHz) and its phase is compared

with the 100kHz comparison frequency. The phase difference signal is converted to a DC signal with a lag-lead type loop filter. The DC signal is applied to varicap D1, D3, D2, D4 to lock the VCO oscillator frequency with the desired oscillator frequency. At the same time, the DC signal passes through the IC109 operational amplifier and buffer amplifier, and is output as a voltage signal (CVT) for monitoring the transmitter main PLL lock voltage.

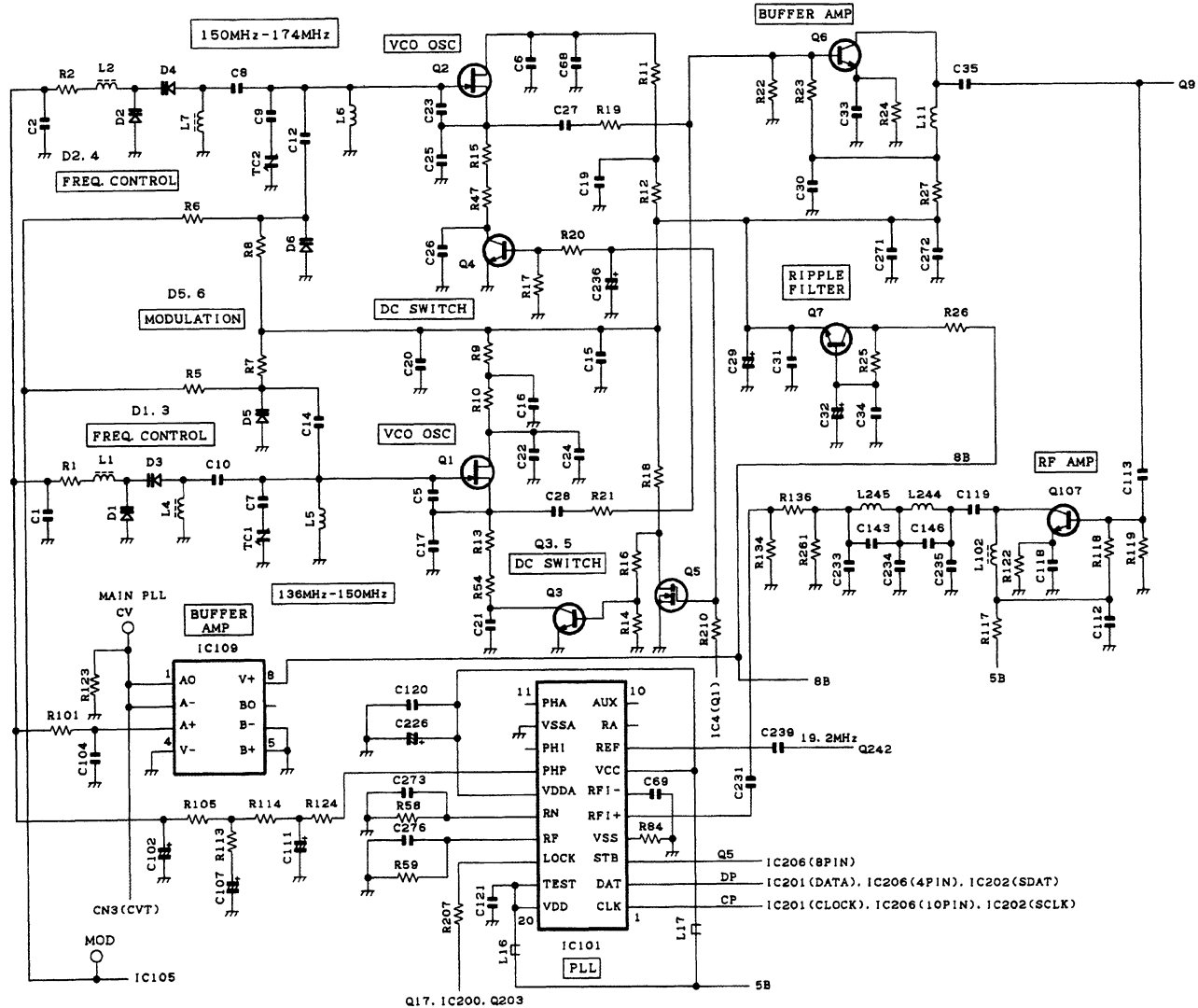


Fig.4 Transmitter main PLL circuit

2.5 Driver circuit

The Driver circuit amplifies the transmitter frequency signal to the level required for input to the final unit (X56-304 B/3). This circuit consists of RF amplifier Q9, RF switch D7, RF amplifier Q13, RF amplifier Q14, and switches Q203, Q8, Q12, and Q11.

The transmitter signal level input to Q13 is about 0 dBm (1 milliwatt). Since it is amplified by about 15 dB by Q13, and also amplified by about 13 dB by Q14, the output from Q14 becomes about 630 milliwatts. After being attenuated by attenuators R257, R258, and R259, the net output is +22 dBm (160 milliwatts) at drive output connector CN1.

CIRCUIT DESCRIPTION

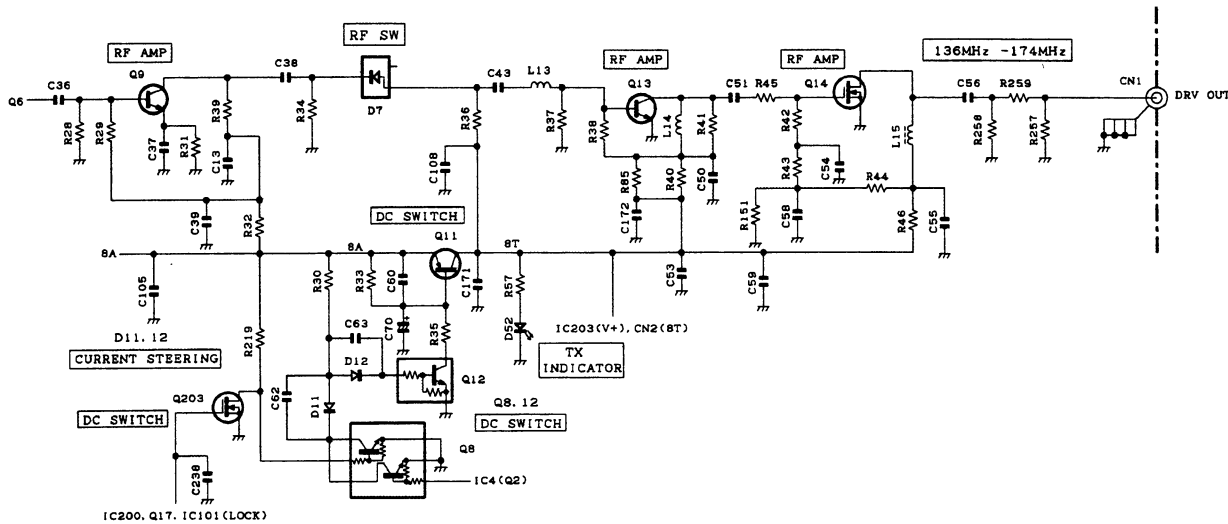


Fig.5 Driver circuit

2.6 Modulation level adjustment circuit

The level adjustment circuit adjusts the modulation signal level to provide the required level of modulation and adjusts the transmitter output power. This circuit consists of IC105, IC3, IC100, IC102, IC203, Q208, and Q21. IC3 is an electronic volume control IC. The signaling frequency change adjustment, signaling modulation balance adjustment, digital pager modulation waveform balance adjustment, maximum AF Dev. change, and the reference voltage setting for transmitter power adjustment are performed according to data from the CPU

using the FPU. IC105 is a modulation signal summing amplifier (A/2) and a signaling signal amplitude fine-adjustment amplifier (B/2). IC102 is a splatter filter for digital pager modulation and has a two-stage Butterworth filter with a cutoff frequency of 3.2kHz. IC203 is a DC amplifier that amplifies the transmitter power reference voltage generated by IC3. Q21 outputs 5 V to the final unit as an H/L signal when the transmitter power mode is "LOW" and outputs 0 V when the transmitter power mode is "HIGH".

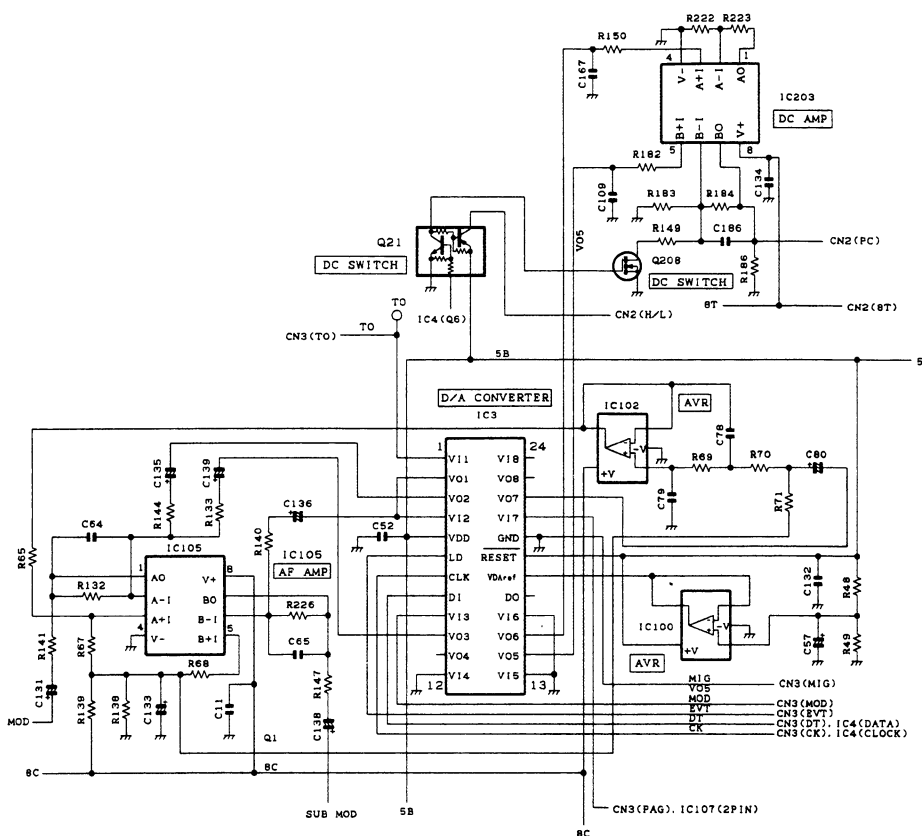


Fig.6 Modulation level adjustment circuit

CIRCUIT DESCRIPTION

2.7 Other circuits

In addition, IC106 is an EEPROM. The transmitter adjustment data adjusted for each unit is written into the EEPROM. If the unit is installed in another set, it is not necessary to adjust it again from the beginning, but only fine-adjustment is necessary for each unit.

IC1, IC2, IC103, IC108, IC205, and IC110 are three-pin AVR ICs. Each circuit contains its own power regulator IC to maintain isolation between circuits.

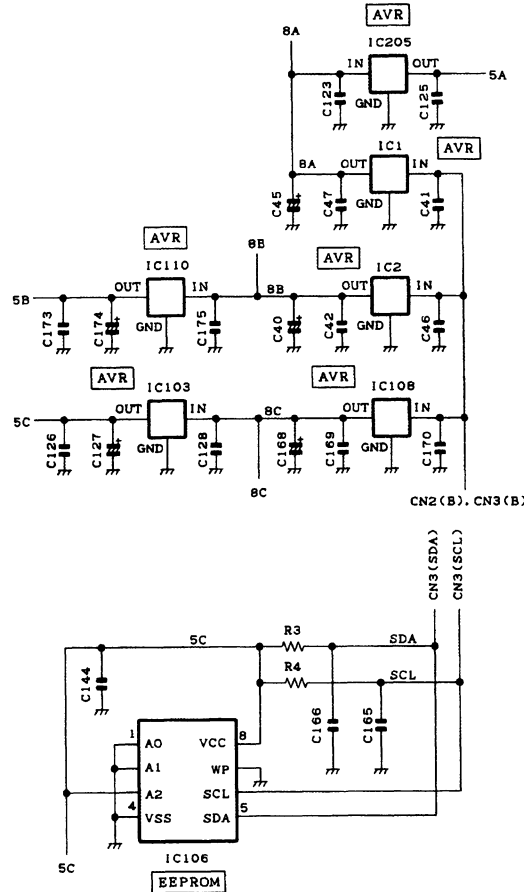


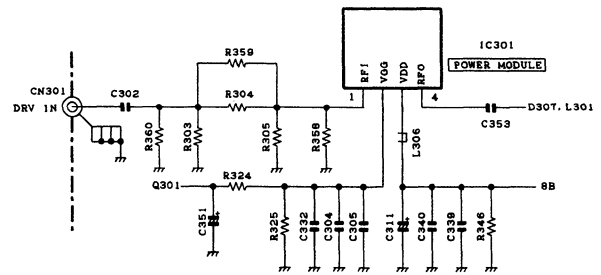
Fig.7 Other circuits

3. Final Unit

The RF final amplifier unit (X56-304 B/3) amplifies transmitter power to a specified level. This unit consists of the following circuits: (1) Transmitter power module, (2) harmonic filter circuit, (3) forward/reflected power detector circuit, (4) APC circuit, (5) high temperature detector circuit, (6) common mode spurious filter circuit and (7) AVR circuit.

3.1 Transmitter power module

The power module IC301 uses a low power module M68776 to improve its efficiency. The driver output of the transmitter unit passes through an attenuator and enters power module IC301 on its pin 1. Power module IC301 amplifies the RF power according to the voltage at the amplification control pin 2 (VGG) and outputs it on pin (RFO).



CIRCUIT DESCRIPTION

3.4 APC circuit

The APC circuit consists of differential amplifier IC302 (B/2), DC amplifier Q301, analog switch IC304, and switching transistors Q312, Q304, and Q313. The high-power/low-power detector values are switched by analog switch IC304. The power setting range in the high-power mode is 1 to 5 W; the power setting range in the low-power mode is 100 milliwatts to about 1 W.

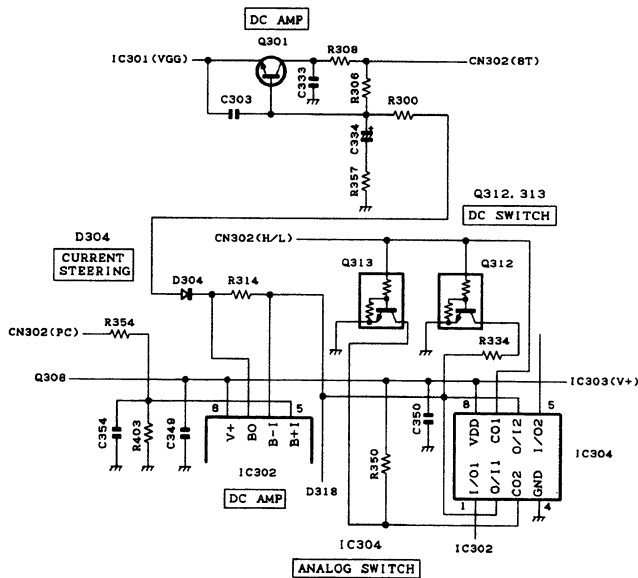


Fig.11 APC circuit

3.5 High temperature detector circuit

The high temperature detector circuit consists of thermal switch TS301 and switching transistor Q302. This circuit disables the transmitter power amplifier to protect the circuits when the final unit temperature is too high (95 °C or higher) and the circuit cannot be operated safely.

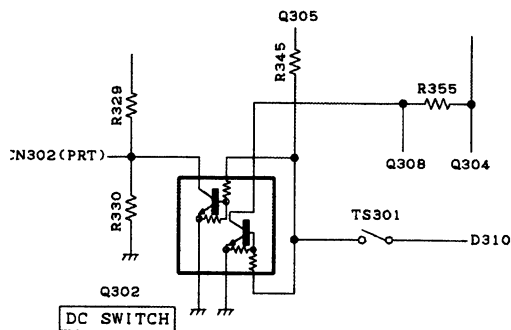


Fig.12 High temperature detector circuit

3.6 Common mode spurious filter circuit

The TKR-740 has a filter L304 at the DC power line inlet in the final unit to reduce common mode radiation from the power cable.

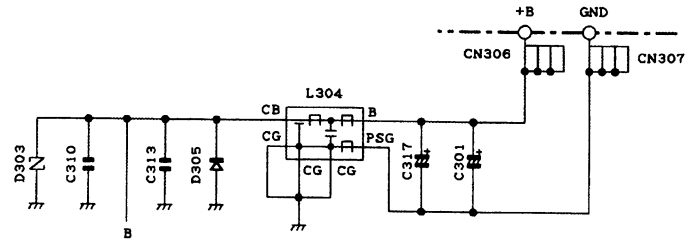


Fig.13 Common mode spurious filter circuit

3.7 AVR circuit

The AVR circuit provides the power supply voltage required to operate power module IC301. This circuit consists of Q306, Q307, D312, Q309, Q310, Q305, and D317. For continuous-duty operation, there are two large-current AVRs with discrete outputs for the power module using low-heat-resistant power transistor 2SB951A to prevent concentration of heat. The 8V AVR is controlled by 8T, and a time constant is set at the beginning of output to start the transmitter power amplifier smoothly and prevent RF splatter.

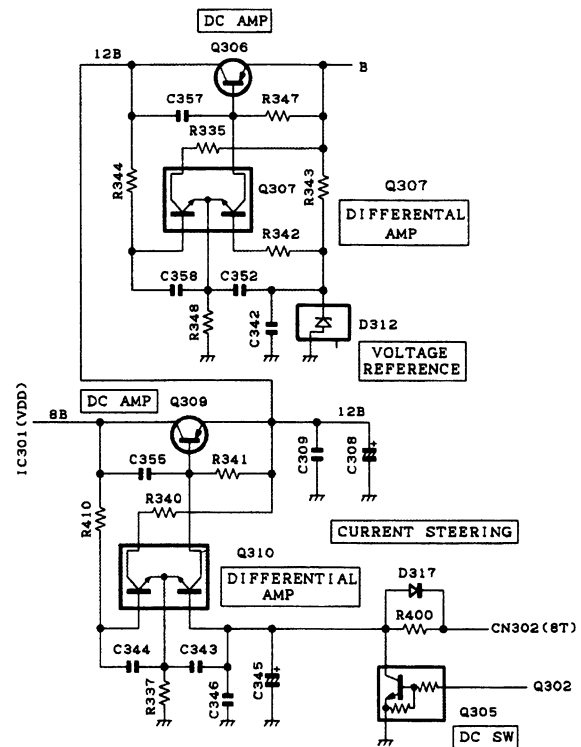


Fig.14 AVR circuit

CIRCUIT DESCRIPTION

4.Receiver Unit

The receiver unit (X55-305) consists of the following circuits:
 (1) front-end circuit, (2) narrow IF circuit, (3) wide IF circuit, (4) receiver main PLL circuit, (5) receiver DDS circuit, (6) baseband circuit, and (7) other circuits.

4.1 Front-end circuit

The front-end circuit consists of BPF L3, RF amplifier IC17, BPF L16, mixer DBM A1, and IF switch D10. The helical BPF covers frequency ranges 146.000 to 162.000 MHz (K1), 158.000 to 174.000 MHz (K2), and 136.000 to 150.000 MHz (K3), with a passband of 3.0 MHz.

BPF L16 attenuates the unwanted out-of-band RF components produced by RF amplifier IC17 and sends only

the desired signal to mixer DBM A1. Mixer DBM A1 mixes the first local oscillator signal generated by the first local crystal oscillator with the receive signal coming from the helical BPF L16 to produce the first IF signal (44.85MHz). The first IF signal is fed to the narrow IF or wide IF circuit (depending on programming) by switch D10.

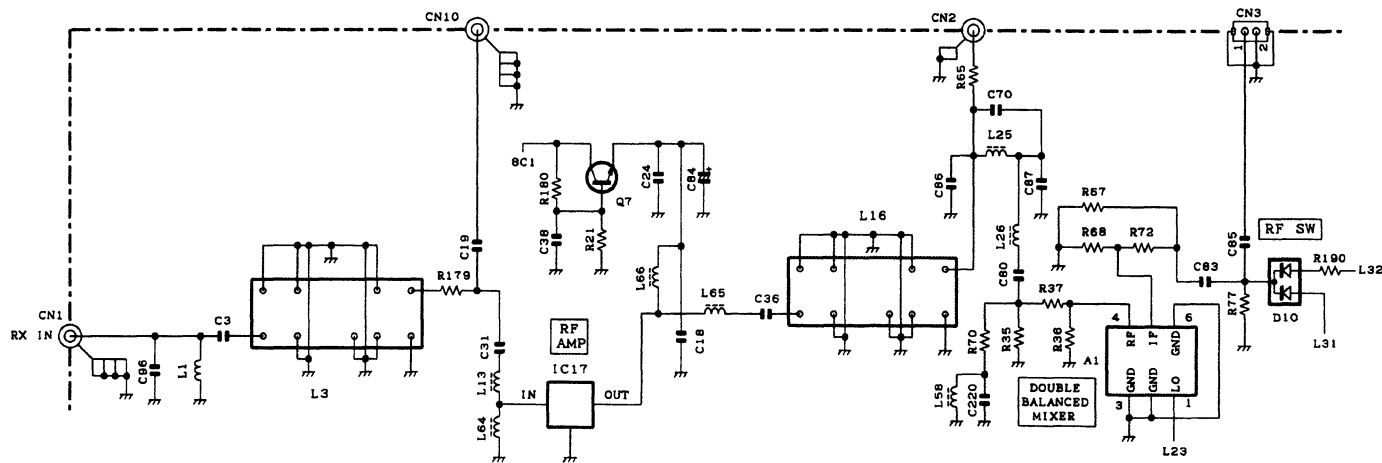


Fig.15 Front-end circuit

CIRCUIT DESCRIPTION

4.2 Narrow IF circuit

The narrow IF circuit consists of two-pole MCF XF2, four-pole MCF XF4, IF amplifier Q25, IF amplifier Q32, FM detector IC7, crystal oscillator X1 and ceramic filters CF1, CF3. The unwanted components of the signal are removed by two-pole MCF XF2 and four-pole MCF XF4, and the resulting signal is amplified by IF amplifiers Q32. The FM IC IC7 produces the second IF signal (450 kHz), ceramic filters CF1 and CF3 remove unwanted components and an IF amplifier amplifies the signal, and the quadrature detector circuit FM-detects the signal to produce a baseband signal and outputting it to pin 15.

The baseband signal passes through analog switch IC18, inversion amplifier IC15 (B/2), AF amplifier IC11 (A/2 and B/2), and goes to the Y0 input of multiplexer IC9 and the V2

input of electronic volume control IC9. The level of the signal that enters V2 of the electronic volume control IC is adjusted, the signal passes through the hysteresis circuit AF switch Q34, goes to IC7 noise filter input (pin 17), and high-frequency components are selected by an HPF consisting of an external RC network. The signal is noise-detected and compared, and the noise squelch signal (N-DET) is fed to DC switch Q36. The signal strength analog voltage (RSSI) from the two second IF amplifiers in IC7 is compared with the reference voltage set by electronic volume control V4 by the internal RSSI comparator, and the RSSI squelch signal (C-DET) is output from pin 20 of IC7. C-DET enters DC switch Q37 and is ANDed with the N-DET by DC switch Q38. A squelch signal (SC) is output from connector CN6.

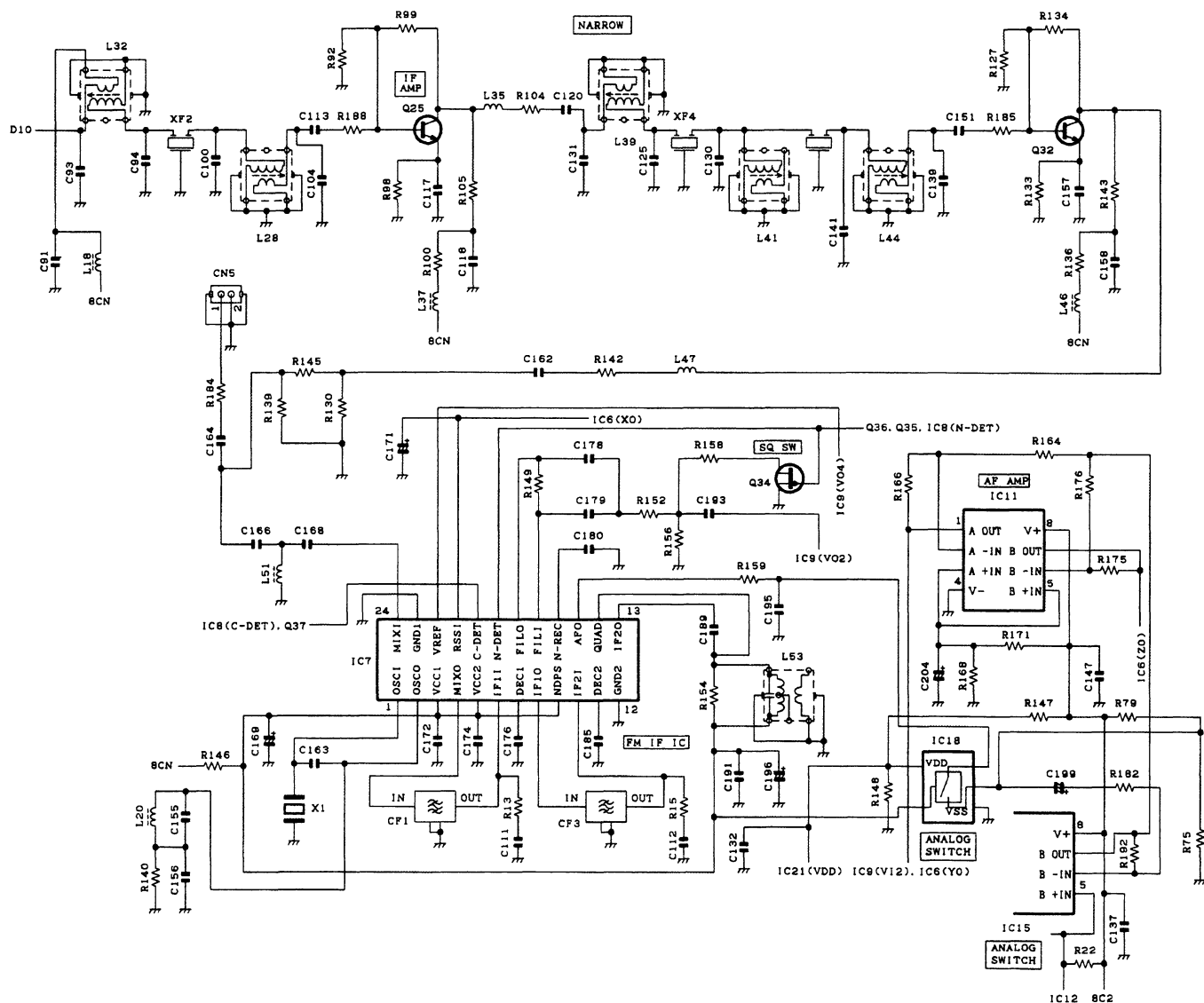


Fig.16 Narrow IF circuit

4.3 Wide IF circuit

The wide IF circuit consists of two-pole MCF XF1, four-pole MCF XF3, IF amplifier Q24, IF amplifier Q31, FM detector IC IC8, crystal oscillator X2, ceramic filter CF2, CF4. The unwanted components of the signal are removed by two-pole MCF XF1 and four-pole MCF XF3 and the resulting signal is amplified by IF amplifiers Q24 and Q31. The second IF signal (450 kHz) is produced by FM detector IC IC8. Unwanted components of the second IF signal are removed by ceramic filter CF2, CF4, and the resulting signal is amplified by the built-in IF amplifier and FM-detected by the quadrature detection circuit to generate a baseband signal. This signal is output from pin 15. It then passes through analog switch IC21, invert amplifier IC15 (A/2) and AF amplifier IC12 (A/2) and goes to the Y1 input of multiplexer IC and the V1 input of electronic volume control IC9.

The level of the signal that enters V1 of the electronic volume control IC is adjusted, the signal passes through AF switch Q35, goes to IC8 noise filter input (pin 17), and high-frequency components are selected by an HPF consisting of an external RC network. The signal is noise-detected and the compared noise squelch signal (N-DET) is fed to DC switch Q36. The signal strength analog voltage (RSSI) from the two second IF amplifiers in IC8 is compared with the reference voltage set by electronic volume control V3 by the internal RSSI comparator, and the RSSI squelch signal (C-DET) is output from pin 20 of IC8. C-DET enters DC switch Q37 and is ANDed with the N-DET by DC switch Q38 and output as a squelch signal (SC).

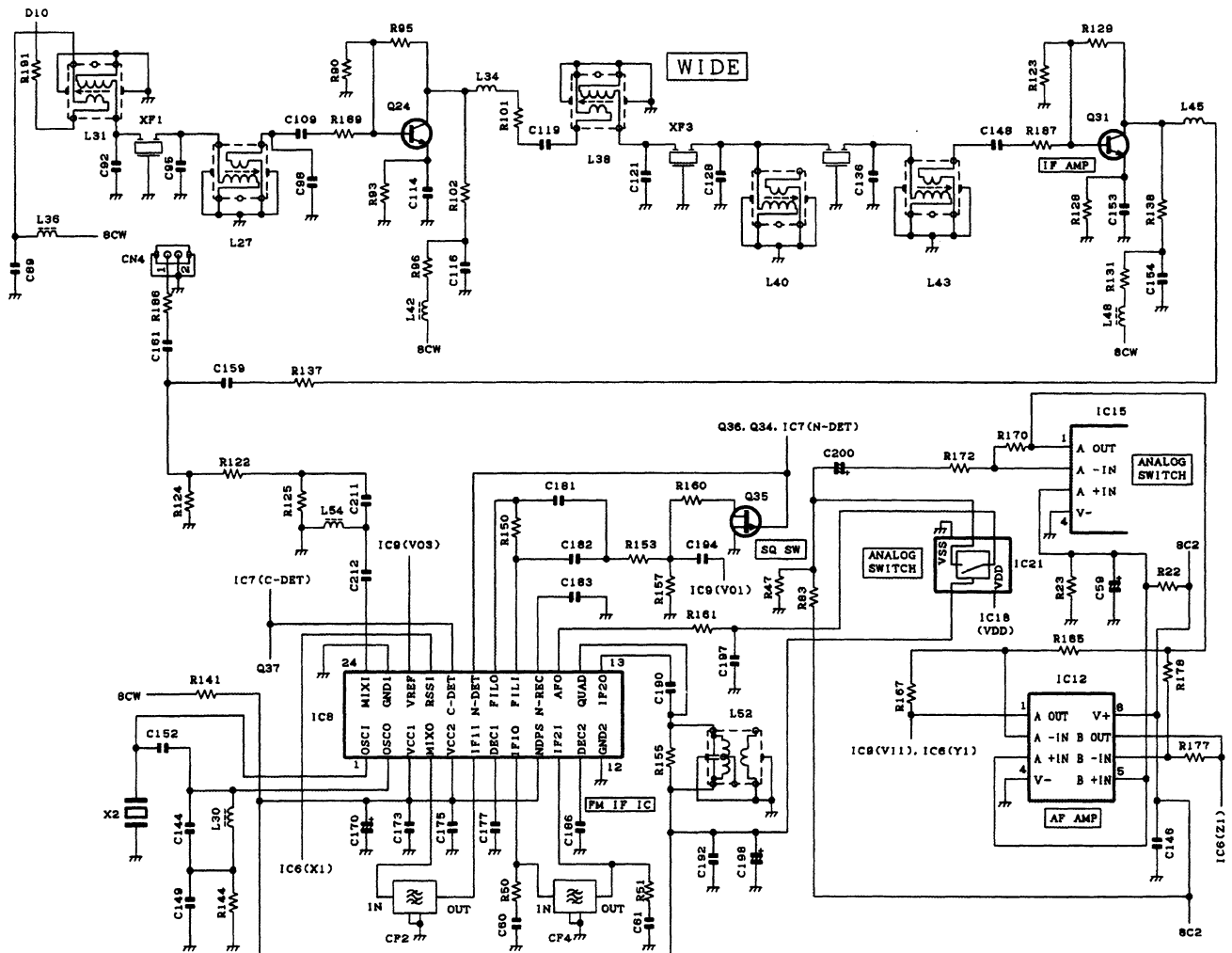


Fig.17 Wide IF circuit

CIRCUIT DESCRIPTION

4.4 Receiver main PLL circuit

The receiver main PLL circuit consists of VCO (Q8, Q9) and a single-chip PLL IC IC1, buffer amplifier Q14, RF amplifier Q3, Q1, Q5, and Q6. The first local oscillator is an upper heterodyne local oscillator, and the VCO oscillator frequency is 198.850 to 206.850 MHz (K1), 202.850 to 218.850 MHz (K2),

and 180.850 MHz to 194.850 MHz (K3). In addition, the two VCOs cover two bands: the Q8 VCO covers the lower band and the Q9 VCO covers the upper band. PLL IC1 compares the 4.5MHz signal from the receiver DDS circuit and the VCO signal with the 100kHz comparison frequency.

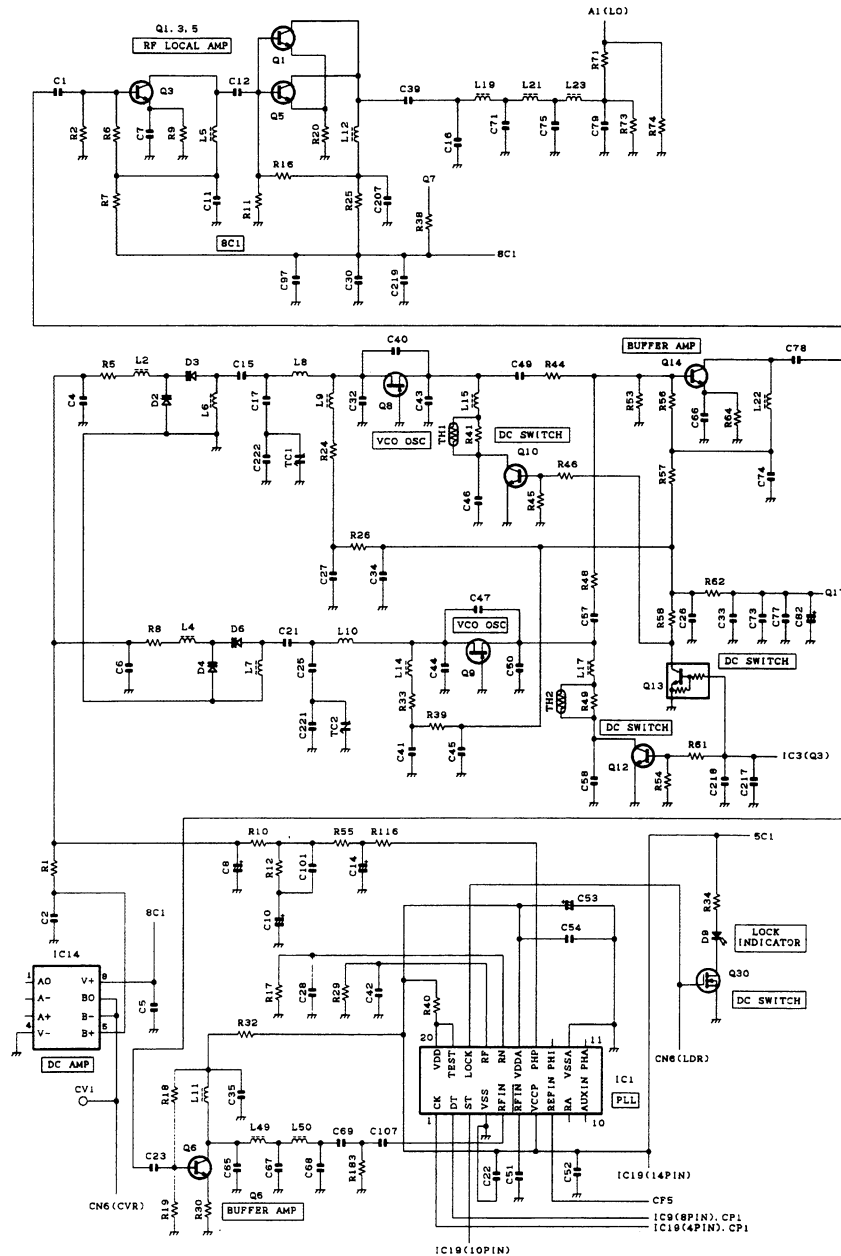


Fig.18 Receiver main PLL circuit

CIRCUIT DESCRIPTION

4.5 Receiver DDS circuit

The receiver DDS circuit varies the reference frequency of the receiver main PLL to implement fine frequency steps which cannot be achieved by a single-loop PLL. This circuit comprises IC20, Q33, Q39, and CF5. The output frequency is used as the reference frequency for the receiver main PLL.

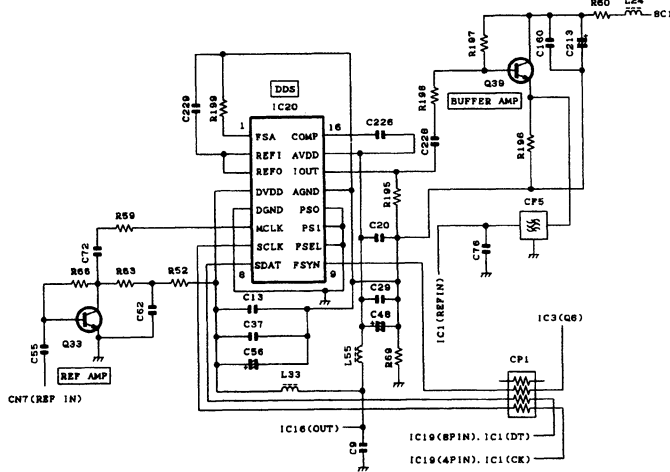


Fig.19 Receiver DDS circuit

4.6 Baseband circuit

The baseband signal circuit consists of HPF Q26, LPF Q28, D11, and Q29. The baseband signals detected by the narrow FM and wide FM detector circuits are de-emphasized by LPF Q28. The sub-audible components of the signal are removed by HPF Q26, and the resulting signal is switched with a squelch signal by D11 and Q29, and output as an RA signal from CN6.

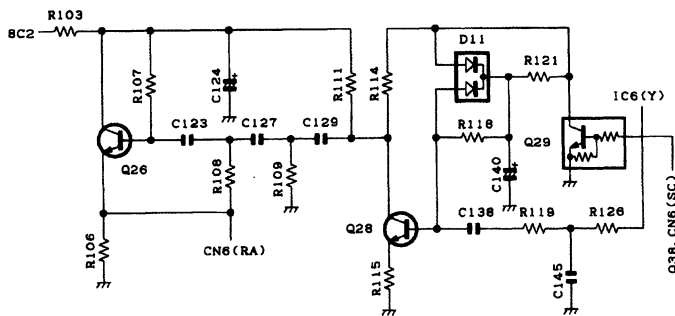


Fig.20 Baseband circuit

4.7 Other circuits

In addition, the receiver circuit contains an EEPROM (IC10) as in the transmitter circuit. Adjustment data for each unit and the last channel data are written into the EEPROM. IC2, IC4, IC13, and IC16 are three-pin AVR ICs. Q17 is a ripple filter for the power supplied to the first local oscillator VCO. IC3 is a shift register. Q16, Q18, Q19, Q20, and Q22 are switching transistors.

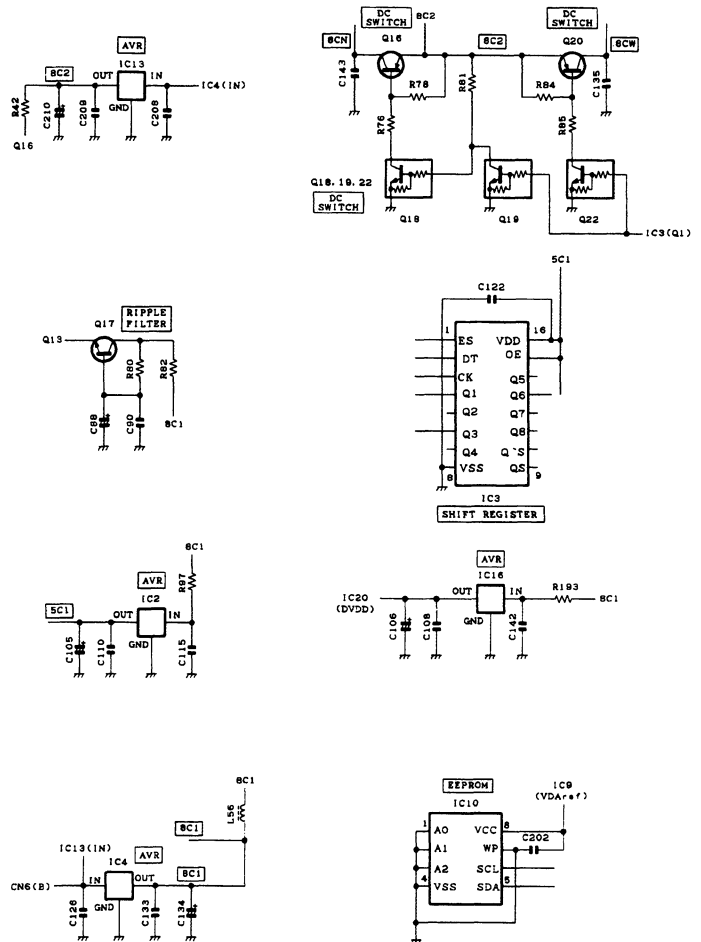


Fig.21 Other circuits

CIRCUIT DESCRIPTION

5. Control Circuit

The control unit (X53-388) consists of the following circuits:
 (1) main CPU, (2) sub CPU, (3) DSP circuit, (4) AF PA circuit,
 (5) display circuit, (6) baseband circuit, (7) Microphone AGC
 circuit, (8) RS-232C circuit, and (9) power supply circuit.

5.1 Main CPU

The main CPU (IC17) is a 16-bit single-chip microcomputer containing a 128k ROM and a 5k RAM. This CPU controls the sub CPU, the flash ROM, and the DSP, encodes high-speed and low-speed data, controls the transmitter unit, the receiver unit, the control unit, and the display circuit and sends data to or from an external device.

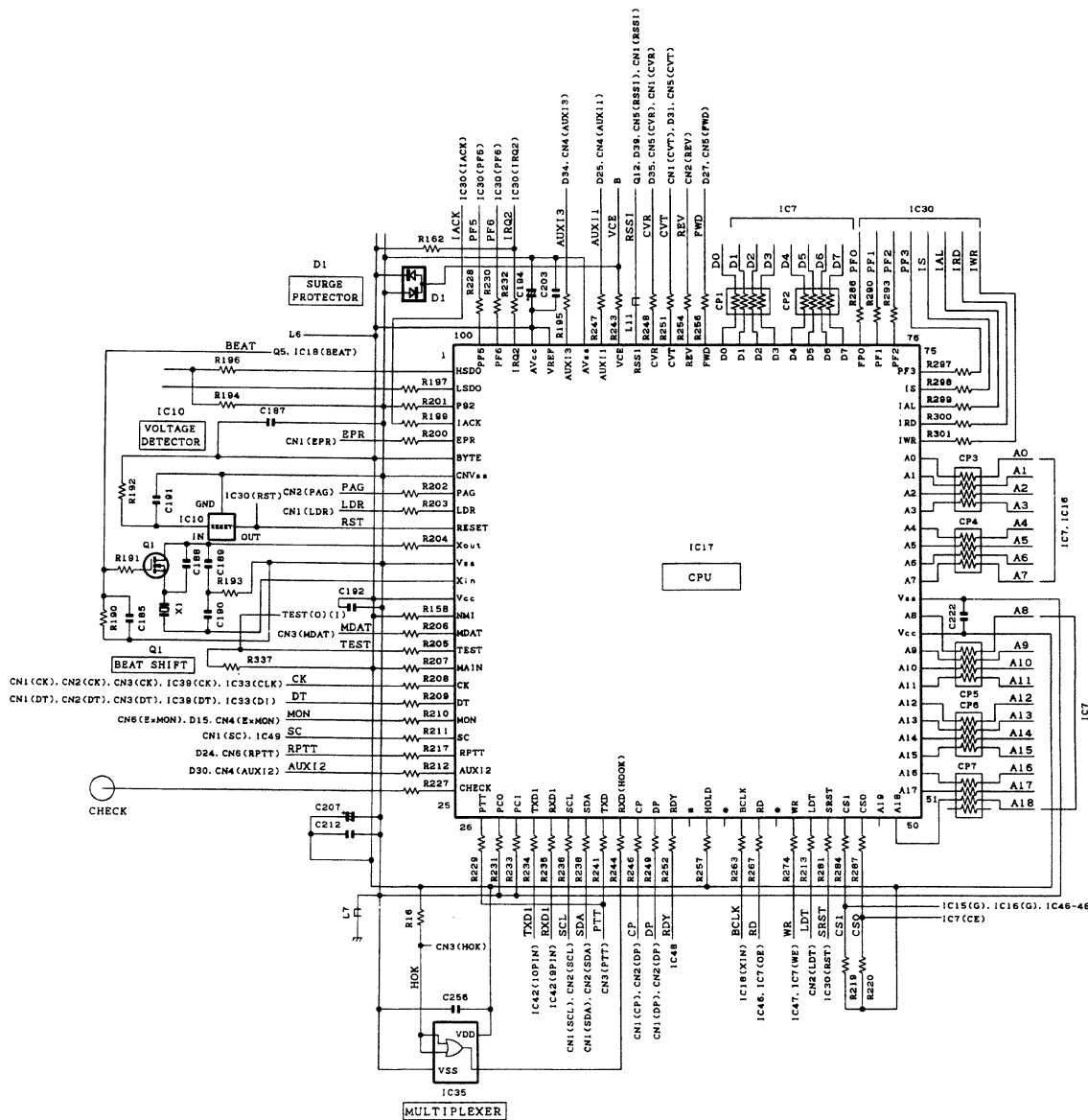


Fig.22 Main CPU

CIRCUIT DESCRIPTION

5.2 Sub CPU

The sub CPU (IC18) is of the same type as the main CPU, but is programmed so that it operates as the sub CPU by connecting its pin 18 to GND (pin 18 of the main CPU is connected to Vdd.). The sub CPU functions as an I/O expander, and controls the flash ROM, DSP, and extended I/O. IC15 and IC16 are data bus buffer ICs.

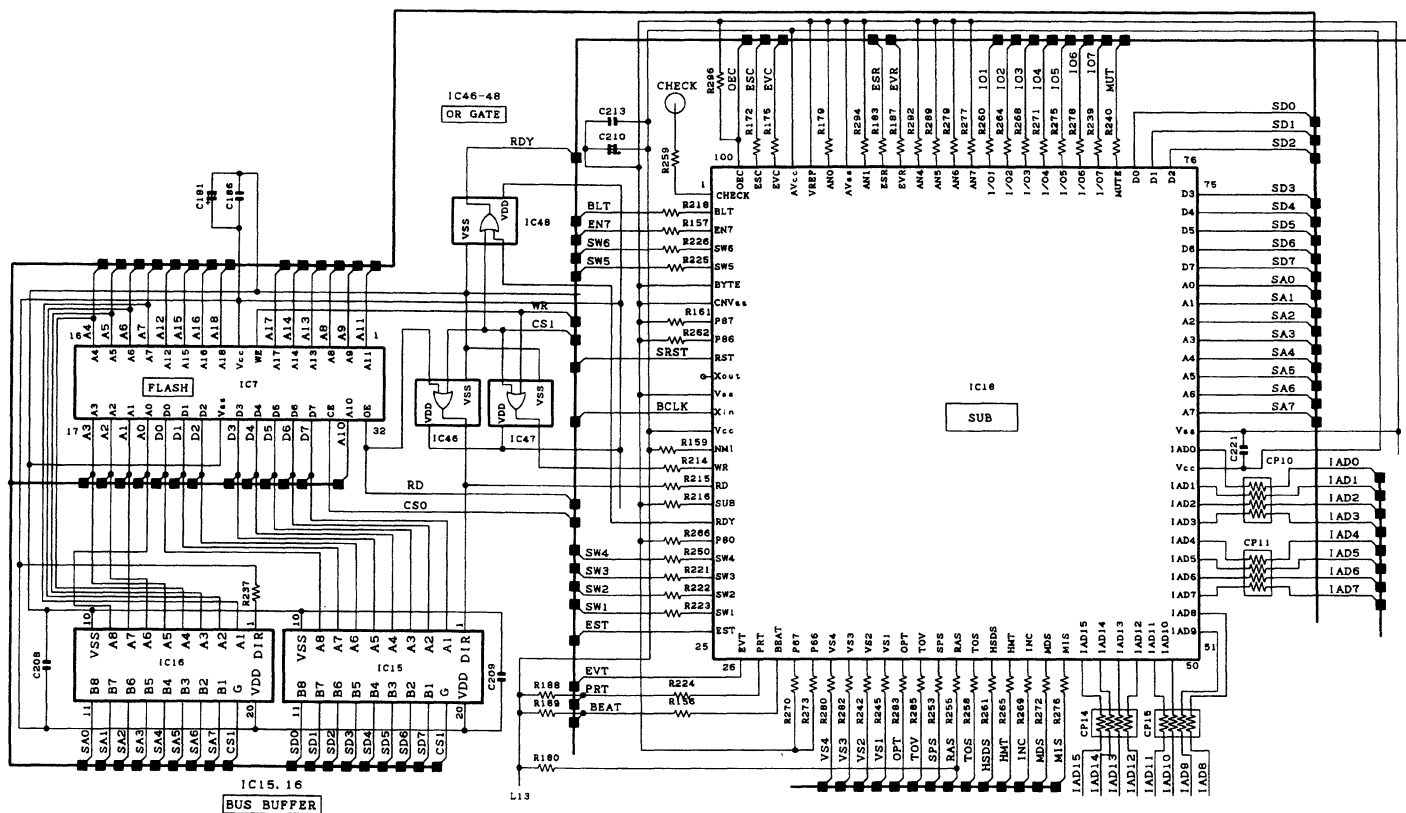


Fig.23 Sub CPU

The transmitter audio signal coming from pin 13 of IC29 is

37

CIRCUIT DESCRIPTION

5.4 AF PA circuit

The AF PA circuit is an AF amplifier for driving speakers to monitor received audio signals. This circuit consists of IC45. The 4W audio output can be provided to an external 4 ohm speaker by supplying power supply voltage through the 15-pin

test connector "SPO, SPG" on the rear panel. The impedance of the internal speaker is adjusted to provide an audio output of about 0.2 W when the internal speaker installed on this model front panel is used.

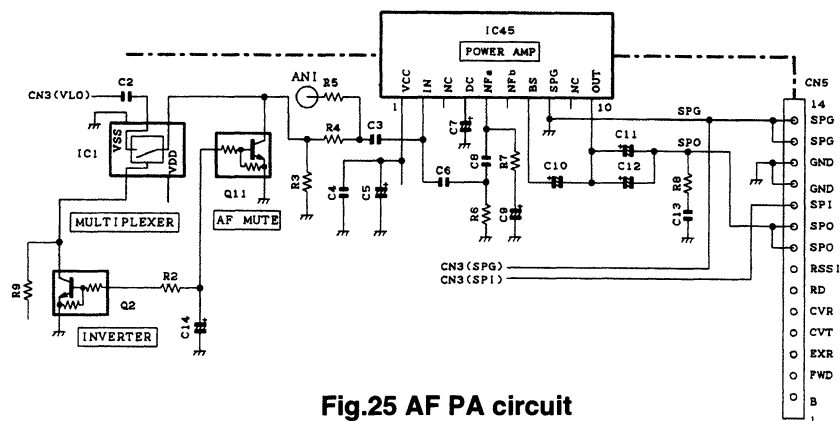


Fig.25 AF PA circuit

5.5 Display circuit

The display circuit contains 7-segment LED D700, D701 (orange: see the operation manual for details of display), D703 (green: circuit power supply), D704 (red: transmit), D705 (green: busy), two-color LED D702 (green: internal; red: external reference state), LEDs in switches S700 to S705, IC700, IC701, IC702 and IC703 to display this model channels

and states. IC700 to IC703 are shift registers which convert serial data from the CPU to parallel data and light LEDs. Q706, Q707, Q708, Q709, and Q710 are switching transistors which control two-color LED D702. IC704, IC705, and IC706 are three-pin AVR ICs which produce power used for the display circuit.

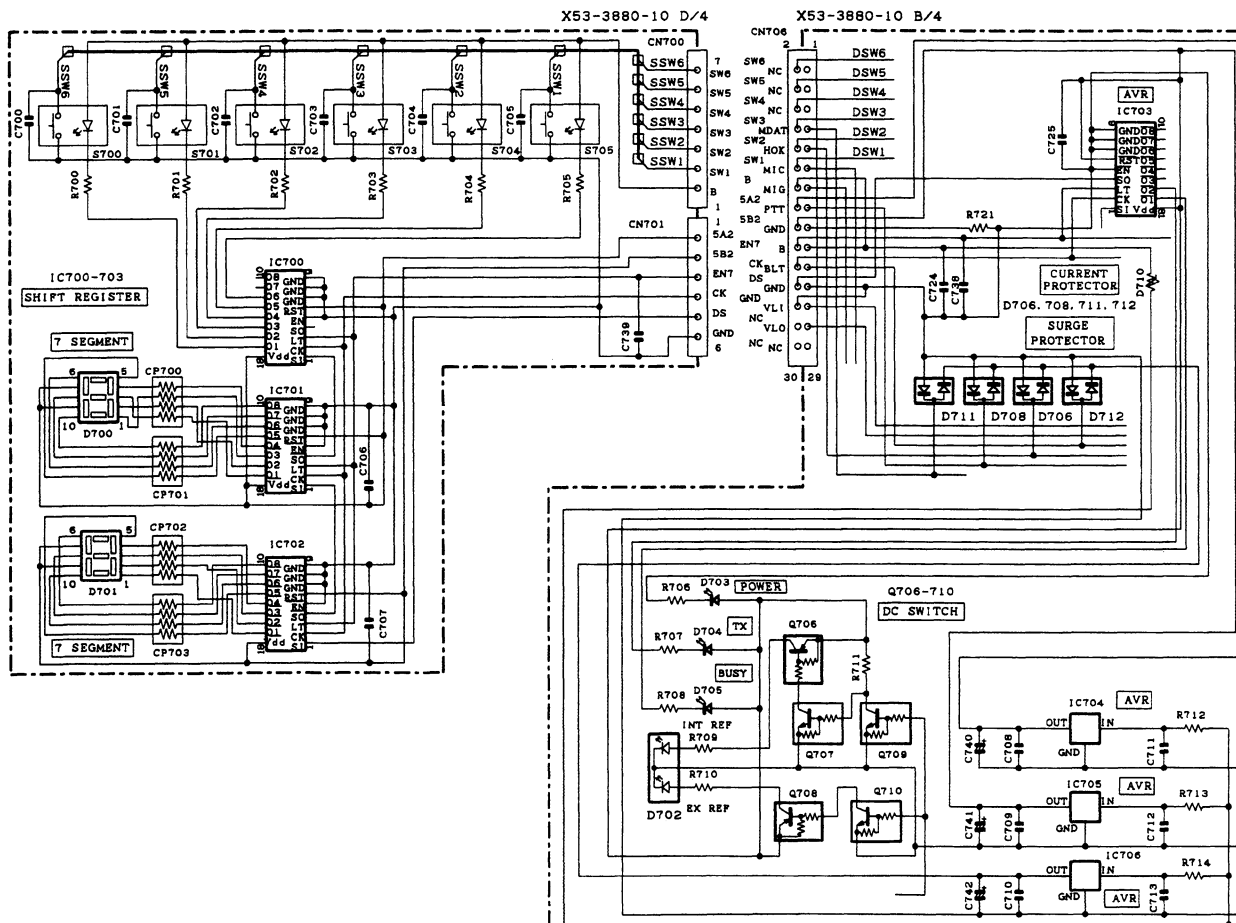


Fig.26 Display circuit

CIRCUIT DESCRIPTION

5.6 Baseband circuit

The baseband circuit switches between the modulation signal to the transmitter unit, demodulation signal from the receiver unit, and remote audio signal and adjusts their levels. This circuit consists of IC12, IC13, IC14, IC29, IC32, IC33, IC36, IC37 and IC40. Modulation inputs include local microphone input, low-speed data (LSD), high-speed data (HSD), external audio input (TA), external data input (TD), and

remote modulation input (RTA), and demodulation outputs include receive audio output (RA), receive data output (RD), and remote receive audio (RRA). The multiplexer (IC14, IC29, IC37) changes signals, the electronic volume control (IC33) adjusts the level, and the operational amplifier (IC12, IC13, IC32, IC36, IC42) amplifies and sums signals.

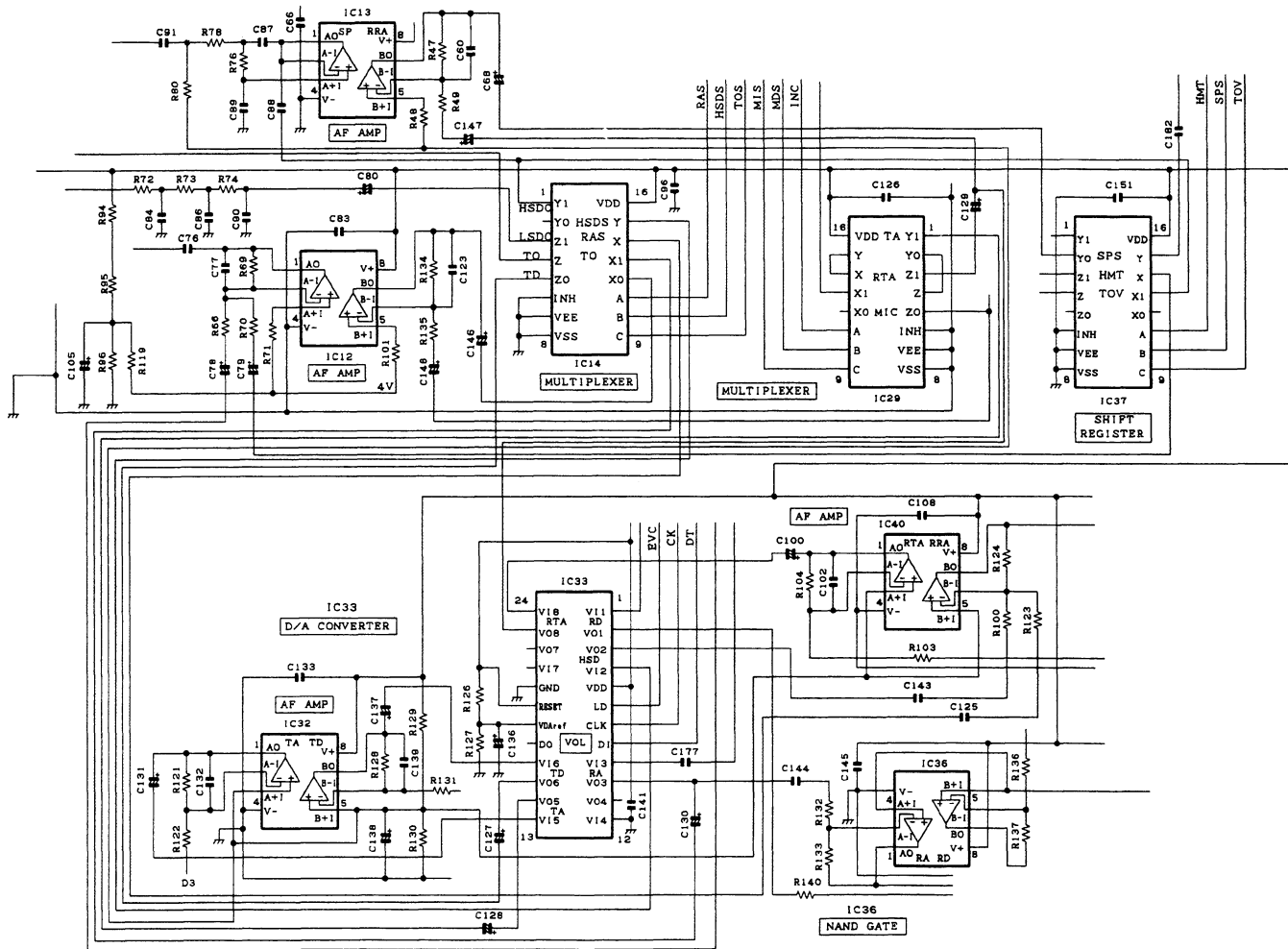


Fig.27 Baseband circuit

CIRCUIT DESCRIPTION

5.7 Microphone AGC circuit

The microphone AGC circuit AGC-amplifies an audio signal coming from a local microphone so that it does not overdrive the modulator. This circuit consists of IC23, D707, D709, Q700, and Q701. The AGC is operated by controlling the + and - levels of amplitude using the current obtained by positive and negative detection of the amplified audio signal.

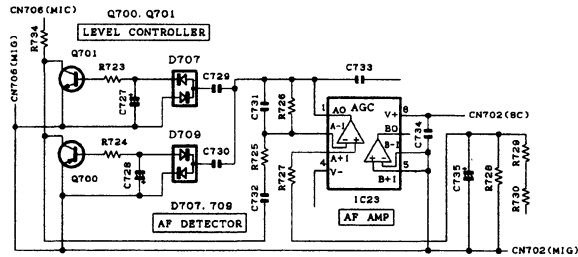


Fig.28 Microphone AGC circuit

5.8 RS-232C circuit

The RS-232C circuit connects the RS-232C serial port of a personal computer directly to this model to perform FPU operation. The FPU operation can also be performed by connecting a programming cable (KPG-46) to the local microphone on the front panel. If the D-sub connector on the rear panel is used, the programming cable is not required. The 232C driver IC (IC42) changes the TTL-232C level. The FPU (KPG-47D) has a new transmitter/receiver circuit monitor function (transmitter: forward power, reflected power display, transmitter main PLL lock voltage; receiver: RSSI display, receive main PLL lock voltage). Data required for this function is also transferred through the RS-232C serial port. The firmware can only be rewritten using the local microphone connector on the front panel.

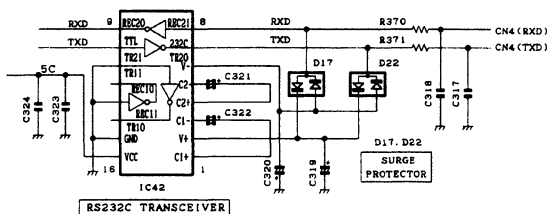


Fig.29 RS-232C circuit

5.9 Power supply circuit

The power supply circuit generates power to operate the CPU, DSP, flash ROM, bi-directional buffer, and baseband circuit. This circuit consists of IC3, IC4, IC5 and IC6.

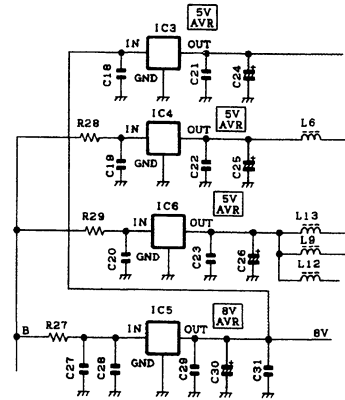


Fig.30 Power supply circuit

SEMICONDUCTOR DATA

IC17 MAIN CPU (30622M4-103GP)

■ Pin function

Pin No.	Port name	I/O	Function
1	HSDO	O	High speed data output
2	LSDO	O	Low speed data output
3	P92	-	Not used
4	IACK	I	DSP IDMA Acknowledge input
5	EPR	O	RX PLL data strobe output
6	BYTE	I	+5V
7	CNVss	I	GND
8	PAG	O	Digital pager signal output
9	LDR	I	RX PLL lock detect input
10	RESET	I	Microcomputer reset input
11	Xout	-	14.745MHz (system clock)
12	Vss	-	GND
13	Xin	-	14.745MHz (system clock)
14	Vcc	-	+5V
15	NMI	-	Not used
16	MDAT	I	Not used
17	TEST	I	Test switch input
18	MAIN	I	Main/Sub CPU select input (H:Sub,L:Main)
19	CK	O	Common data output
20	DT	O	Common clock output
21	MON	I	Monitor switch input
22	SC	I	Squelch control input
23	RPTT	I	Remote PTT input
24	AUXI2	I	Auxiliary input 2
25	CHECK	-	Check port
26	PTT	I	PTT switch input
27,28	PC0,1	-	Not used
29	TXD1	O	Serial interface output 1 (ex. PC)
30	RXD1	I	Serial interface input 1 (ex. PC)
31	SCL	O	Serial EEPROM clock output
32	SDA	I/O	Serial EEPROM data input/output
33	TXD	O	Serial interface output 0 (ex. PC)
34	RXD	I	Serial interface input 0 (ex. PC)
35	CP	O	PLL clock output
36	DP	O	PLL data output
37	RDY	I	CPU ready input
38	ALE	-	Not used
39	HOLD	-	Not used
40	HLDA	-	Not used
41	BCLK	O	Sub CPU clock output
42	RD	O	Flash memory/Sub CPU RD bus
43	BHE	-	Not used
44	WR	O	Flash memory/Sub CPU WR bus
45	LDT	I	TX PLL lock detect input
46	SRST	O	Sub CPU reset output
47	CS1	O	Sub CPU chip select
48	CS0	O	Flash memory chip select
49	A19	O	Not used
50~59	A18~9	O	Flash memory address bus
60	Vcc	-	+5V
61	A8	O	Flash memory address bus
62	Vss	-	GND

Pin No.	Port name	I/O	Function
63~70	A7~0	O	Flash memory/Sub CPU address bus
71	IWR	O	DSP IDMA write output
72	IRD	O	DSP IDMA read output
73	IAL	O	DSP IDMA address latch output
74	IS	O	DSP IDMA select output
75	PF3	O	DSP RX mute control output
76	PF2	-	Not used
77	PF1	O	DSP modulation control output
78	PF0	-	Not used
79~86	D7~0	I/O	Flash memory/Sub CPU data bus
87	AN7	I	Forward power voltage input
88	AN6	I	Reverse power voltage input
89	AN5	I	TX VCO voltage input
90	AN4	I	RX VCO voltage input
91	AN3	I	RSSI level input
92	AN2	I	Power supply voltage input
93	AUXI1	I	Auxiliary input 1
94	Avss	GND	GND
95	AUXI3	I	Auxiliary input 3
96	Vref	I	+5V
97	Avcc	I	GND
98	IRQ2	O	DSP interrupt request output
99	PF6	O	DSP Mic mute control output
100	PF5	O	DSP TX/RX control output

IC18 SUB CPU (30622M4-103GP)

■ Pin function

Pin No.	Port name	I/O	Function
1	P94	-	Check port
2	BLT	-	Not used
3	EN7	O	LED data strobe output
4,5	SW6,5	I	PF6,5 key input
6	BYTE	I	GND
7	CNVss	I	GND
8,9	P87,86	-	Not used
10	RST	I	Microcomputer reset input
11	Xout	-	14.745MHz (system clock)
12	Vss	-	GND
13	Xin	-	14.745MHz (system clock)
14	Vcc	-	+5V
15	NMI	-	Not used
16	WR	I	Write enable input
17	RD	I	Read enable input
18	SUB	I	Main/Sub CPU select input (H:Sub,L:Main)
19	RDY	O	Main CPU ready control output
20	P80	-	Not used
21~24	SW4~1	I	PF4~1key input
25	EST	O	TX shift register data strobe output
26	EVT	O	TX D/A converter IC data strobe output
27	PRT	I	Exciter Temperature detect input
28	BEAT	O	Beat shift control (H:ON,L:OFF)
29,30	P67,P66	-	Not used
31~34	VS4~1	O	Voice scrambler data output 4~1
35	OPT	O	Option board control output (H:OFF,L:ON)

SEMICONDUCTOR DATA

Pin No.	Port name	I/O	Function
36	TOV	O	Take over control output
37	SPS	O	Local speaker output select
38	RAS	O	RA output select
39	TOS	O	TO output select
40	HSDS	O	High speed data output control
41	HMT	O	High speed data mute control
42	INC	-	Not used
43	MDS	O	Modulation select
44	MIS	O	Mic select
45~50	IAD15~10	I/O	DSP IDMA address/data bus
51~59	IAD9~1	I/O	DSP IDMA address/data bus
60	Vcc	-	+5V
61	IAD0	I/O	DSP IDMA address/data bus
62	Vss	-	GND
63~70	A7~0	I	Address bus
71	D7	I/O	Data bus
72~78	D6~0	I/O	Data bus
79	MUTE	O	Local speaker mute control output
80~86	I/O7~1	I/O	Auxiliary input/output 7~1
87~90	AN7~4	-	Not used
91	EVR	O	RX D/A converter IC data strobe output
92	ESR	O	RX shift register data strobe output
93	AN1	-	Not used
94	Avss	-	Not used
95	AN0	-	Not used
96	Vref	-	Not used
97	Avcc	-	Not used
98	EVC	O	Control D/A converter IC data strobe output
99	ESC	O	Control shift register data strobe output
100	OEC	O	Control shift register data output enable

IC30 DSP (ADSP2185BST133)

■ Pin function

Pin No.	Port name	I/O	Function
1,2	IAD3,4	I/O	Internal DMA port / Sub CPU
3	GND	-	GND
4~11	IAD5~12	I/O	Internal DMA port / Sub CPU
12	GND	-	GND
13	CLKIN	I	Clock input / 16.515072MHz
14	XTAL	I	Clock input / 16.515072MHz
15	Vdd	-	Vdd
16	CLKOUT	O	DSP clock output / 33.030144MHz
17	GND	-	GND
18	Vdd	-	Vdd
19	WR	O	Memory Write Enable / NC
20	RD	O	Memory Write Enable / NC
21	BMS	O	Byte memory select / pull up
22	DMS	O	Data memory select / NC
23	PMS	O	Program memory select/NC
24	IOMS	O	Memory select/NC
25	CMS	O	Combined memory select / NC
26	PF4	O	Prog. I/O / CODEC reset
27	PF5	I	Prog. I/O / Main CPU / Mic mute,0:OFF / 1:ON
28	GND	-	GND

Pin No.	Port name	I/O	Function
29	PF6	I	Prog. I/O / Main CPU / TX / Rxcontrol,0:TX / 1:RX
30	IRQ2	I	Interrupt Req./pull up
31	DTO	I/O	SPORT0 / CODEC / CODEC Data
32	TFS0	I/O	SPORT0 / CODEC,Devier / CODEC Data
33	RFS0	I/O	SPORT0 / CODEC,Devier / CODEC Data
34	DRO	I/O	SPORT0 / CODEC / CODEC Data
35	SCLKO	I/O	SPORT0 / CODEC,Devier / CODEC Data
36	Vdd	-	Vdd
37	DT1	I/O	SPORT1 / CODEC
38	TFS1	I/O	SPORT1 / CODEC,Devier
39	RSF1	I/O	SPORT1 / CODEC,Devier
40	DR1	I/O	SPORT1 / CODEC
41	GND	-	GND
42	SCLK1	I/O	SPORT1 / CODEC,Devier
43	ERESSET	-	Emulation / ICE conector
44	RESET	I	Reset IN/Reset IC,ICE conector/DSP reset
45	EMS	-	Emulation / ICE conector
46	EE	-	Emulation / ICE conector
47	ECLK	-	Emulation / ICE conector
48	ELOUT	-	Emulation / ICE conector
49	ELIN	-	Emulation / ICE conector
50	EINT	-	Emulation / ICE conector
51	EBR	-	Emulation / ICE conector
52	BR	I	Bus request / pull up,ICE conector
53	EBG	-	Emulation / ICE conector
54	BG	O	Bus request / ICE conector
55~57	IAD13~15	I/O	Internal DMA port / Sub CPU
58	IACK	O	IDMA Acknowledge / Main CPU
59	Vdd	-	Vdd
60	GND	-	GND
61	IS	I	IDMA Select / pull up, Main CPU
62	IAL	I	IDMA Address Latch / pull up, Main CPU
63	IRD	I	IDMA Read Enable / pull up, Main CPU
64	IWR	I	IDMA Write Enable / pull up, Main CPU
65	D8	I/O	Data I/O / NC
66	GND	-	GND
67	Vdd	-	Vdd
68~70	D9~11	I/O	Data I/O / NC
71	GND	-	GND
72~79	D12~19	I/O	Data I/O / NC
80	GND	-	GND
81~84	D20~23	I/O	Data I/O / NC
85	FL2	O	Output Frag / CODEC MC terminal
86	FL1	O	Output Frag / CODEC MD terminal
87	FL0	O	Output Frag / CODEC ML terminal
88	PF3	I	Prog. I/O / Main CPU / RX mute 0:OFF / 1:ON
89	PF2	I	Mode Select / pull up / HOST mode select
90	Vdd	-	Vdd
91	PWD	I	Power Control/VDD
92	GND	-	GND
93	PF1	I	Mode Select / pull down / HOST mode select
94	PF0	I	Mode Select / pull up / HOST mode select
95	BGH	O	Bus Grant Hung / NC
96	PWDACK	O	Power Control / NC
97	A0	O	Address / NC
98~100	IAD0~2	I/O	Internal DMA port / Sub CPU

DESCRIPTION OF COMPONENTS

CONTROL UNIT (X53-3880-10)

REF.No	Parts name	DESCRIPTION
IC1	IC	MULTIPLEXER
IC3~6	IC	AVR
IC7	IC	FLASH ROM
IC10	IC	VOLTAGE DETECTOR
IC12,13	IC	AF AMP
IC14	IC	MULTIPLEXER
IC15,16	IC	BUS BUFFER
IC17,18	IC	CPU
IC22,23	IC	AF AMP
IC24	IC	COUNTER
IC25	IC	INVERTER
IC27	IC	CODEC
IC29	IC	MULTIPLEXER
IC30	IC	DSP
IC31,32	IC	AF AMP
IC33	IC	D/A CONVERTER
IC34	IC	AF AMP
IC35	IC	MULTIPLEXER
IC36	IC	NAND GATE
IC37	IC	SHIFT REGISTER
IC38	IC	NAND GATE
IC39	IC	SHIFT REGISTER
IC40	IC	AF AMP
IC42	IC	RS232C TRANSCEIVER
IC46~49	IC	OR GATE
IC700~703	IC	SHIFT REGISTER
IC704~706	IC	AVR
Q1,5	FET	BEAT SHIFT
Q2,8~10	TRANSISTOR	INVERTER
Q11	TRANSISTOR	AF MUTE
Q700,701	TRANSISTOR	LEVEL CONTROLLER
Q706~710	TRANSISTOR	DC SWITCH
D1,3~22	DIODE	SURGE PROTECTOR
D24~28		
D30~32		
D34~39		
D700,701	LED ASS'Y	7 SEGMENT
D702	LED	REFERENCE
D703	LED	POWER
D704	LED	TX
D705	LED	BUSY
D706	DIODE	SURGE PROTECTOR
D707	DIODE	AF DETECT
D708	VARISTOR	SURGE PROTECTOR
D709	DIODE	AF DETECTOR
D710	VARISTOR	CURRENT PROTECTOR
D711, 712	DIODE	SURGE PROTECTOR

RX UNIT (X55-3050-XX)

PIN. No	Parts name	DESCRIPTION
A1	DBM	DOUBLE BALANCED MIXER
IC1	IC	PLL
IC2	IC	AVR
IC3	IC	SHIFT REGISTER
IC4	IC	AVR
IC5	IC	DC AMP
IC6	IC	MULTIPLEXER
IC7,8	IC	FM IF IC
IC9	IC	D/A CONVERTER
IC10	IC	EEPROM
IC11,12	IC	AF AMP
IC13	IC	AVR
IC14	IC	DC AMP
IC15	IC	PLL
IC16	IC	AVR
IC17	IC	RF AMP
IC18	IC	ANALOG SWITCH
IC19	IC	INVERTER
IC20	MOS IC	DDS
IC21	IC	ANALOG SWITCH
Q1,3,5	TRANSISTOR	RF LOCAL AMP
Q6	TRANSISTOR	BUFFER AMP
Q7	TRANSISTOR	AVR
Q8,9	FET	VCO OSC
Q10,12,13	TRANSISTOR	DC SWITCH
Q14	TRANSISTOR	BUFFER AMP
Q16	TRANSISTOR	DC SWITCH
Q17	TRANSISTOR	RIPPLE FILTER
Q18~20	TRANSISTOR	DC SWITCH
Q22	TRANSISTOR	DC SWITCH
Q24,25	TRANSISTOR	IF AMP
Q26	TRANSISTOR	ACTIVE FILTER
Q28	TRANSISTOR	SQ AMP
Q29	TRANSISTOR	SQ SWITCH
Q30	FET	DC SWITCH
Q31,32	TRANSISTOR	IF AMP
Q33	TRANSISTOR	REF AMP
Q34,35	FET	SQ SWITCH
Q36~38	TRANSISTOR	SQ SWITCH
Q39	TRANSISTOR	BUFFER AMP
D2~4,6	VARICAP	FREQ. CONTROL
D9	LED	INDICATOR
D10	DIODE	RF SW
D11	DIODE	SQ SW

DESCRIPTION OF COMPONENTS

TX UNIT (X56-3040-10)

PIN. No	Parts name	DESCRIPTION
IC1,2	IC	AVR
IC3	IC	D/A CONVERTER
IC4	IC	SHIFT REGISTER
IC100	IC	AVR
IC101	IC	PLL
IC102,103	IC	AVR
IC105	IC	AF AMP
IC106	IC	EEPROM
IC107	IC	AF AMP
IC108	IC	AVR
IC109	IC	BUFFER AMP
IC110	IC	AVR
IC200	IC	AND GATE
IC201	IC	PLL
IC202	MOS IC	DDS
IC203	IC	DC AMP
IC204	IC	COMPARATOR
IC205	IC	AVR
IC206	IC	INVERTER
IC301	IC	POWER MODULE
IC302	IC	DC AMP
IC303	IC	DC AMP/COMPARATOR
IC304	IC	ANALOG SWITCH
Q1,2	FET	VCO OSC
Q3,4	TRANSISTOR	DC SWITCH
Q5	FET	DC SWITCH
Q6	TRANSISTOR	BUFFER AMP
Q7	TRANSISTOR	RIPPLE FILTER
Q8	TRANSISTOR	DC SWITCH
Q9	TRANSISTOR	RF AMP
Q11,12	TRANSISTOR	DC SWITCH
Q13	TRANSISTOR	RF AMP
Q14	FET	RF AMP
Q15	FET	BUFFER AMP
Q17,18	FET	DC SWITCH
Q21	TRANSISTOR	DC SWITCH
Q102	TRANSISTOR	BUFFER AMP
Q106	TRANSISTOR	DOUBLER
Q107~109	TRANSISTOR	RF AMP
Q110	TRANSISTOR	DC SWITCH
Q112	FET	SQ SWITCH
Q113	FET	DC SWITCH
Q114	TRANSISTOR	DC SWITCH
Q115	TRANSISTOR	RF AMP
Q201	TRANSISTOR	VCO OSC
Q202	TRANSISTOR	BUFFER AMP
Q203	FET	DC SWITCH
Q205	TRANSISTOR	RF AMP
Q206	FET	DC SWITCH
Q207	TRANSISTOR	INVERTER
Q208	FET	DC SWITCH
Q240	TRANSISTOR	BUFFER AMP
Q241	TRANSISTOR	RF AMP

PIN. No	Parts name	DESCRIPTION
Q242	TRANSISTOR	BUFFER AMP
Q301	TRANSISTOR	DC AMP
Q302,304	TRANSISTOR	DC SWITCH
Q305	TRANSISTOR	DC SWITCH
Q306	TRANSISTOR	DC AMP
Q307	TRANSISTOR	DIFFERENTIAL AMP
Q308	TRANSISTOR	DC SWITCH
Q309	TRANSISTOR	DC AMP
Q310	TRANSISTOR	DIFFERENTIAL AMP
Q312,313	TRANSISTOR	DC SWITCH
D1-4	VARICAP	FREQ. CONTROL
D5,6	VARICAP	MODULATION
D7	DIODE	RF SWITCH
D11,12	DIODE	CURRENT STEERING
D50,51	LED	LOCK INDICATOR
D52	LED	TX INDICATOR
D101,103	DIODE	RF SWITCH
D201	VARICAP	FREQ. CONTROL
D202	VARICAP	FREQ. CONTROL
D203	VARICAP	MODULATION
D204	DIODE	CURRENT STEERING
D205	DIODE	RF DETECTOR
D206	VARISTOR	CURRENT PROTECTOR
D303	SURGE ABSORBER	SURGE PROTECTOR
D304	DIODE	CURRENT STEERING
D305	DIODE	REVERSE VOLTAGE PROTECTOR
D306~308	DIODE	RF DETECTOR
D310	VARISTOR	CURRENT PROTECTOR
D312	ZENER DIODE	VOLTAGE REFERENCE
D317,318	DIODE	CURRENT STEERING
D500	VARISTOR	CURRENT PROTECTOR

PARTS LIST

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

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

TKR-740

Ref. No.	Address	New parts	Parts No.	Description	Destination
TKR-740					
1	3A	*	A62-0726-03	PANEL FRONT	
2	3A	*	B10-2590-04	FRONT GLASS	
3	3B	*	B11-1223-04	FILTER PF	
4	3A	*	B11-1225-04	FILTER LED	
5	3B	*	B11-1231-04	FILTER 7 SEG	
6		*	B62-1136-00	INSTRUCTION MANUAL	
7	2C		E30-3343-15	DC CORD	
8			E30-3344-05	DC CORD ACC	
9			E31-3228-05	LEAD WIRE WITH CONNECTOR 15P	
10	2B		E37-0712-05	FLAT CABLE CONT-TX,RX	
11	1B		E37-0713-05	FLAT CABLE TX-FINAL	
12	2D		E37-0715-05	LEAD WIRE WITH CONNECTOR DSUB-25P	
13	3B		E37-0717-05	LEAD WIRE WITH CONNECTOR SP	
14	2C,2D		E37-0718-05	LEAD WIRE WITH CONNECTOR BNC	
15	1B		E37-0719-05	LEAD WIRE WITH CONNECTOR TX-RX	
16	1B		E37-0720-05	LEAD WIRE WITH CONNECTOR TX-FINAL	
17	2D	*	E37-0721-15	LEAD WIRE WITH CONNECTOR 15P ACC	
18	1B		E37-0791-15	LEAD WIRE WITH TERMINAL DC(+)	
19	3B	*	E37-0813-05	LEAD WIRE WITH CONNECTOR 7SEG-DISP	
20	2D	*	E37-0814-05	LEAD WIRE WITH CONNECTOR 12P ACC	
21		*	E59-0410-05	SQUARE PLUG	
22	1D		F06-4027-05	FUSE(BLADE) (4A/32V)	
23	2D		F10-2297-04	SHIELDING PLATE RX	
24	2C	*	F10-2312-04	SHIELDING PLATE RX LOWER	
25	2B,2C		G02-0576-14	FLAT CLIP SPRING	
26	2C		G02-0839-04	FLAT CLIP SPRING	
27	3B		G13-1653-04	CUSHION	
28	3B		G13-1669-04	CUSHION	
29	3B	*	G13-1703-14	CUSHION	
30	3B	*	G13-1728-04	CUSHION	
31	3B	*	G13-1729-04	CUSHION	
32	3B	*	G13-1730-04	CUSHION	
33	3B	*	G13-1754-04	CUSHION	
34			H10-6612-02	POLYSTYRENE FOAMED FIXTURE	
35			H20-1437-03	PROTECTION COVER	
36			H25-0029-04	PROTECTION BAG (60/110/0.07)	
37			H25-0720-04	PROTECTION BAG (200X350)	
38		*	H52-1429-02	ITEM CARTON CASE	
39	1A		J21-8375-04	HARDWARE FIXTURE	
40			K01-0421-05	HANDLE	
41	3A		K29-3002-14	PUSHKNOB (TEST)	
42	3A		K29-4539-04	KNOB (VOL)	
43	3A	*	N08-0543-04	DRESSED SCREW	
44	1D		N09-2292-05	HEXAGON HEAD SCREW	
A	1C		N32-3006-45	FLAT HEAD MACHINE SCREW	
B	3A		N32-4008-45	FLAT HEAD MACHINE SCREW	
C	1B	*	N35-3006-46	BINDING HEAD MACHINE SCREW	
F	1A		N67-2606-46	PAN HEAD SEMS SCREW W	
G	2B		N67-3006-46	PAN HEAD SEMS SCREW W	

Ref. No.	Address	New parts	Parts No.	Description	Destination
D	1A,1B		N87-2606-46	BRAZIER HEAD TAPTITE SCREW	
E	1B,2C		N87-2616-46	BRAZIER HEAD TAPTITE SCREW	
H	1A,2B		N67-3008-45	PAN HEAD SEMS SCREW W	
45	3B		T07-0347-05	SPEAKER	
CONTROL UNIT (X53-3880-10)					
D700,701			LA301DB	LED ASSY	
D702			B30-0864-05	LED(RE/GR)	
D703			B30-2198-05	LED(GR)	
D704			B30-2197-05	LED(RE)	
D705			B30-2198-05	LED(GR)	
C1			CK73GB1E103K	CHIP C 0.010UF K	
C2,3			CK73EB1C105K	CHIP C 1.0UF K	
C4			CK73GB1H102K	CHIP C 1000PF K	
C5			C92-0729-05	ELECTR C 330UF 25WV	
C6			CK73GB1H102K	CHIP C 1000PF K	
C7			C92-0726-05	ELECTR C 47UF 25WV	
C8			CK73GB1H102K	CHIP C 1000PF K	
C9,10			C92-0726-05	ELECTR C 47UF 25WV	
C11,12			C92-0728-05	ELECTR C 470UF 16WV	
C13			CK73FB1E104K	CHIP C 0.10UF K	
C14			C92-0519-05	CHIP-TAN 1.0UF 25WV	
C18			CK73FB1E104K	CHIP C 0.10UF K	
C19,20			CK73EB1C105K	CHIP C 1.0UF K	
C21-23			CK73GB1E103K	CHIP C 0.010UF K	
C24-26			C92-0628-05	CHIP-TAN 10UF 10WV	
C27			CK73GB1H102K	CHIP C 1000PF K	
C28			CK73FB1E104K	CHIP C 0.10UF K	
C29			CK73GB1E103K	CHIP C 0.010UF K	
C30			C92-0628-05	CHIP-TAN 10UF 10WV	
C31			CK73GB1H102K	CHIP C 1000PF K	
C32-46			CC73GCH1H101J	CHIP C 100PF J	
C49-53			CC73GCH1H101J	CHIP C 100PF J	
C54			CK73GB1E103K	CHIP C 0.010UF K	
C55			CC73GCH1H101J	CHIP C 100PF J	
C56			CK73EB1C105K	CHIP C 1.0UF K	
C57,58			CC73GCH1H101J	CHIP C 100PF J	
C59			CK73GB1H562J	CHIP C 5600PF J	
C60			CC73GCH1H101J	CHIP C 100PF J	
C61			CK73FB1E223K	CHIP C 0.022UF K	
C66			CK73GB1E103K	CHIP C 0.010UF K	
C68			C92-0519-05	CHIP-TAN 1.0UF 25WV	
C76			CK73EB1C105K	CHIP C 1.0UF K	
C77			CC73GCH1H101J	CHIP C 100PF J	
C78-80			C92-0628-05	CHIP-TAN 10UF 10WV	
C83			CK73GB1E103K	CHIP C 0.010UF K	
C84			CK73GB1H472K	CHIP C 4700PF K	
C86			CK73GB1H472K	CHIP C 4700PF K	
C87			CK73GB1H152K	CHIP C 1500PF K	
C88			CK73EB1C105K	CHIP C 1.0UF K	
C89			CC73FCH1H751J	CHIP C 750PF J	
C90			CK73GB1E103K	CHIP C 0.010UF K	
C91			CK73EB1C105K	CHIP C 1.0UF K	

TKR-740

PARTS LIST

CONTROL UNIT (X53-3880-10)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
C96			CK73GB1E103K	CHIP C 0.010UF K		C194			C92-0628-05	CHIP-TAN 10UF 10WV	
C100,101			C92-0628-05	CHIP-TAN 10UF 10WV		C200-202			CK73GB1H471K	CHIP C 470PF K	
C102			CC73GCH1H101J	CHIP C 100PF J		C203			CK73GB1E103K	CHIP C 0.010UF K	
C105-107			C92-0628-05	CHIP-TAN 10UF 10WV		C204			CK73GB1H471K	CHIP C 470PF K	
C108			CK73GB1E103K	CHIP C 0.010UF K		C205			CK73GB1E103K	CHIP C 0.010UF K	
C123			CC73GCH1H101J	CHIP C 100PF J		C206			C92-0628-05	CHIP-TAN 10UF 10WV	
C125			CK73EB1C105K	CHIP C 1.0UF K		C207	*		C92-0771-05	ELECTRO C 220UF 6.3WV	
C126			CK73FB1E103K	CHIP C 0.010UF K		C208,209			CK73GB1E103K	CHIP C 0.010UF K	
C127			C92-0628-05	CHIP-TAN 10UF 10WV		C210,211	*		C92-0771-05	ELECTRO C 220UF 6.3WV	
C128-131			C92-0519-05	CHIP-TAN 1.0UF 25WV		C212-214			CK73EB1C105K	CHIP C 1.0UF K	
C132			CC73GCH1H101J	CHIP C 100PF J		C221,222			CK73GB1E103K	CHIP C 0.010UF K	
C133			CK73GB1E103K	CHIP C 0.010UF K		C223,224			CC73GCH1H270J	CHIP C 27PF J	
C134,135			CC73GCH1H101J	CHIP C 100PF J		C225			CC73GCH1H150J	CHIP C 15PF J	
C136			C92-0546-05	CHIP-TAN 68UF 6.3WV		C226,227			CK73GB1E103K	CHIP C 0.010UF K	
C137,138			C92-0628-05	CHIP-TAN 10UF 10WV		C228			CK73GB1H471K	CHIP C 470PF K	
C139			CC73GCH1H330J	CHIP C 33PF J		C229			CK73GB1E103K	CHIP C 0.010UF K	
C140-142			CK73GB1H102K	CHIP C 1000PF K		C231,232			CK73GB1E103K	CHIP C 0.010UF K	
C143,144			CK73EB1C105K	CHIP C 1.0UF K		C256			CK73FB1E103K	CHIP C 0.010UF K	
C145			CK73GB1E103K	CHIP C 0.010UF K		C300-303			CC73GCH1H101J	CHIP C 100PF J	
C146-148			C92-0519-05	CHIP-TAN 1.0UF 25WV		C304-312			CK73GB1H102K	CHIP C 1000PF K	
C149			C92-0628-05	CHIP-TAN 10UF 10WV		C313			CC73GCH1H101J	CHIP C 100PF J	
C150			C92-0519-05	CHIP-TAN 1.0UF 25WV		C315,316			CK73FB1E103K	CHIP C 0.010UF K	
C151			CK73GB1E103K	CHIP C 0.010UF K		C317,318			CC73GCH1H101J	CHIP C 100PF J	
C152			CK73GB1H471K	CHIP C 470PF K		C319-322			C92-0519-05	CHIP-TAN 1.0UF 25WV	
C153			CK73EB1C105K	CHIP C 1.0UF K		C323			CK73GB1H102K	CHIP C 1000PF K	
C154			C92-0628-05	CHIP-TAN 10UF 10WV		C324			CK73FB1E104K	CHIP C 0.10UF K	
C155			CK73EB1C105K	CHIP C 1.0UF K		C325-327			CK73GB1H102K	CHIP C 1000PF K	
C156,157			CK73GB1E103K	CHIP C 0.010UF K		C328-330			CC73GCH1H101J	CHIP C 100PF J	
C158			CK73GB1H102K	CHIP C 1000PF K		C331-337			CK73GB1H102K	CHIP C 1000PF K	
C159			C92-0628-05	CHIP-TAN 10UF 10WV		C700-705			CC73GCH1H101J	CHIP C 100PF J	
C160			CK73EB1C105K	CHIP C 1.0UF K		C706,707			CK73GB1E103K	CHIP C 0.010UF K	
C161,162			C92-0606-05	CHIP-TAN 4.7UF 10WV		C708-710			CK73FB1E104K	CHIP C 0.10UF K	
C164,165			CK73GB1H102K	CHIP C 1000PF K		C711-713			CK73FF1E334Z	CHIP C 0.33UF Z	
C166			C92-0606-05	CHIP-TAN 4.7UF 10WV		C714,715			CK73GB1H102K	CHIP C 1000PF K	
C167			C92-0628-05	CHIP-TAN 10UF 10WV		C716			C92-0628-05	CHIP-TAN 10UF 10WV	
C168			CK73FB1E104K	CHIP C 0.10UF K		C717,718			CC73GCH1H101J	CHIP C 100PF J	
C169,170			C92-0628-05	CHIP-TAN 10UF 10WV		C719			CK73GB1H471K	CHIP C 470PF K	
C171			CK73GB1E103K	CHIP C 0.010UF K		C720-722			CC73GCH1H101J	CHIP C 100PF J	
C172			C92-0628-05	CHIP-TAN 10UF 10WV		C723			CK73GB1H471K	CHIP C 470PF K	
C173			CC73GCH1H181J	CHIP C 180PF J		C724			CC73GCH1H101J	CHIP C 100PF J	
C174			CK73GB1H182K	CHIP C 1800PF K		C725			CK73FB1E104K	CHIP C 0.10UF K	
C175			CK73GB1E103K	CHIP C 0.010UF K		C727,728			C92-0501-05	CHIP-TAN 1.5UF 10WV	
C176			C92-0628-05	CHIP-TAN 10UF 10WV		C729,730			CK73FB1E104K	CHIP C 0.10UF K	
C177			CK73EB1C105K	CHIP C 1.0UF K		C731			CC73GCH1H470J	CHIP C 47PF J	
C178			CC73GCH1H271J	CHIP C 270PF J		C732,733			CK73FB1E104K	CHIP C 0.10UF K	
C179			CK73GB1H272K	CHIP C 2700PF K		C734			CK73FB1E103K	CHIP C 0.010UF K	
C180,181			C92-0628-05	CHIP-TAN 10UF 10WV		C735			C92-0628-05	CHIP-TAN 10UF 10WV	
C182			CK73EB1C105K	CHIP C 1.0UF K		C736,737			CC73GCH1H101J	CHIP C 100PF J	
C183			CK73GB1E103K	CHIP C 0.010UF K		C738,739			CK73GB1H102K	CHIP C 1000PF K	
C184			CC73GCH1H101J	CHIP C 100PF J		C740-742			C92-0628-05	CHIP-TAN 10UF 10WV	
C185-187			CK73GB1E103K	CHIP C 0.010UF K		CN1-3			E40-5736-05	FLAT CABLE CONNECTOR	
C188			CC73GCH1H101J	CHIP C 100PF J		CN4			E40-5960-05	PIN ASSY	
C189,190			CC73GCH1H220J	CHIP C 22PF J		CN5			E40-5701-05	PIN ASSY	
C191			CK73FB1C105K	CHIP C 1.0UF K		CN6	*		E40-5702-05	PIN ASSY	
C192			CK73GB1E103K	CHIP C 0.010UF K		CN700	*		E40-4676-05	PIN ASSY	
C193			CK73FB1E104K	CHIP C 0.10UF K		CN701			E40-5986-05	PIN ASSY	

PARTS LIST

CONTROL UNIT (X53-3880-10)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
CN702			E40-5761-05	FLAT CABLE CONNECTOR		R96			RK73GB1J124J	CHIP R 120K J 1/16W	
CN703			E40-5538-05	PIN ASSY		R100			RK73GB1J273J	CHIP R 27K J 1/16W	
CN705			E40-5701-05	PIN ASSY		R101			RK73GB1J473J	CHIP R 47K J 1/16W	
CN706			E40-5960-05	PIN ASSY		R103			RK73GB1J104J	CHIP R 100K J 1/16W	
J700			E08-0876-05	MODULAR JACK		R104			RK73GB1J333J	CHIP R 33K J 1/16W	
L1-5			L92-0140-05	FERRITE CHIP		R105			RK73GB1J223J	CHIP R 22K J 1/16W	
L6			L40-1005-48	SMALL FIXED INDUCTOR(10UH/8)		R106			RK73GB1J224J	CHIP R 220K J 1/16W	
L7			L92-0140-05	FERRITE CHIP		R107,108			RK73GB1J223J	CHIP R 22K J 1/16W	
L9			L40-1005-48	SMALL FIXED INDUCTOR(10UH/8)		R109			RK73GB1J473J	CHIP R 47K J 1/16W	
L10,11			L92-0140-05	FERRITE CHIP		R110			RK73GB1J334J	CHIP R 330K J 1/16W	
L12,13			L40-1005-48	SMALL FIXED INDUCTOR(10UH/8)		R114-120			R92-0670-05	CHIP R 0 OHM	
X1			L78-0431-05	RESONATOR (14.7456M/8*2.)		R121			RK73GB1J333J	CHIP R 33K J 1/16W	
X2			L77-1799-05	CRYSTAL RESONATOR(16.515MHZ/2P)		R122			RK73GB1J104J	CHIP R 100K J 1/16W	
CP1-7			R90-0724-05	MULTI-COMP 1K X4		R123			RK73GB1J103J	CHIP R 10K J 1/16W	
CP10,11			R90-1016-05	MULTI-COMP 470 X4		R124			RK73GB1J273J	CHIP R 27K J 1/16W	
CP14,15			R90-1016-05	MULTI-COMP 470 X4		R125			RK73GB1J102J	CHIP R 1.0K J 1/16W	
CP700-703			R90-1016-05	MULTI-COMP 470 X4		R126			RK73GB1J103J	CHIP R 10K J 1/16W	
R1			RK73GB1J101J	CHIP R 100 J 1/16W		R127			RK73GB1J123J	CHIP R 12K J 1/16W	
R2			RK73GB1J103J	CHIP R 10K J 1/16W		R128			RK73GB1J224J	CHIP R 220K J 1/16W	
R3			RK73GB1J473J	CHIP R 47K J 1/16W		R129			RK73GB1J104J	CHIP R 100K J 1/16W	
R4,5			RK73GB1J103J	CHIP R 10K J 1/16W		R130			RK73GB1J124J	CHIP R 120K J 1/16W	
R6			RK73GB1J105J	CHIP R 1.0M J 1/16W		R131			RK73GB1J223J	CHIP R 22K J 1/16W	
R7			RK73GB1J471J	CHIP R 470 J 1/16W		R132			RK73GB1J103J	CHIP R 10K J 1/16W	
R8			RK73FB2A2R2J	CHIP R 2.2 J 1/10W		R133			RK73GB1J273J	CHIP R 27K J 1/16W	
R9			RK73GB1J473J	CHIP R 47K J 1/16W		R134			RK73GB1J104J	CHIP R 100K J 1/16W	
R10			R92-1252-05	CHIP R 0 OHM		R135			RK73GB1J273J	CHIP R 27K J 1/16W	
R16			RK73GB1J473J	CHIP R 47K J 1/16W		R136,137			RK73GB1J103J	CHIP R 10K J 1/16W	
R27-29			R92-0685-05	CHIP R 22 J 1/2W		R138			RK73GB1J104J	CHIP R 100K J 1/16W	
R30,31			RK73GB1J102J	CHIP R 1.0K J 1/16W		R139			RK73GB1J124J	CHIP R 120K J 1/16W	
R32			RK73GB1J104J	CHIP R 100K J 1/16W		R140			R92-0670-05	CHIP R 0 OHM	
R33,34			RK73GB1J102J	CHIP R 1.0K J 1/16W		R141,142			RK73GB1J101J	CHIP R 100 J 1/16W	
R35			RK73GB1J333J	CHIP R 3.3K J 1/16W		R143,144			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R36,37			RK73GB1J102J	CHIP R 1.0K J 1/16W		R145-148			RK73GB1J122J	CHIP R 1.2K J 1/16W	
R38			RK73GB1J183J	CHIP R 18K J 1/16W		R149-152			RK73GB1J473J	CHIP R 47K J 1/16W	
R39			RK73GB1J472J	CHIP R 4.7K J 1/16W		R153,154			RK73GB1J122J	CHIP R 1.2K J 1/16W	
R40-43			RK73GB1J102J	CHIP R 1.0K J 1/16W		R155-157			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R44			RK73GB1J332J	CHIP R 3.3K J 1/16W		R158,159			RK73GB1J473J	CHIP R 47K J 1/16W	
R45			RK73GB1J333J	CHIP R 33K J 1/16W		R160			RK73GB1J101J	CHIP R 100 J 1/16W	
R46			RK73GB1J683J	CHIP R 68K J 1/16W		R161,162			RK73GB1J473J	CHIP R 47K J 1/16W	
R47			RK73GB1J104J	CHIP R 100K J 1/16W		R164			RK73GB1J104J	CHIP R 100K J 1/16W	
R48			RK73GB1J473J	CHIP R 47K J 1/16W		R165			RK73GB1J124J	CHIP R 120K J 1/16W	
R49			RK73GB1J183J	CHIP R 18K J 1/16W		R166-168			RK73GB1J223J	CHIP R 22K J 1/16W	
R66			RK73GB1J104J	CHIP R 100K J 1/16W		R169			RK73GB1J103J	CHIP R 10K J 1/16W	
R69			RK73GB1J104J	CHIP R 100K J 1/16W		R171			RK73GB1J154J	CHIP R 150K J 1/16W	
R70			RK73GB1J563J	CHIP R 56K J 1/16W		R172			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R71			RK73GB1J474J	CHIP R 470K J 1/16W		R173			RK73GB1J223J	CHIP R 22K J 1/16W	
R72-74			RK73GB1J222J	CHIP R 2.2K J 1/16W		R174			RK73GB1J473J	CHIP R 47K J 1/16W	
R76			RK73GB1J473J	CHIP R 47K J 1/16W		R175			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R78			RK73GB1J473J	CHIP R 47K J 1/16W		R176			RK73GB1J104J	CHIP R 100K J 1/16W	
R80			RK73GB1J474J	CHIP R 470K J 1/16W		R177-180			RK73GB1J473J	CHIP R 47K J 1/16W	
R83,84			R92-1252-05	CHIP R 0 OHM		R181			RK73GB1J103J	CHIP R 10K J 1/16W	
R86			R92-0670-05	CHIP R 0 OHM		R182			RK73GB1J473J	CHIP R 47K J 1/16W	
R87,88			R92-1252-05	CHIP R 0 OHM		R183			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R90-93			R92-0670-05	CHIP R 0 OHM		R184			RK73GB1J223J	CHIP R 22K J 1/16W	
R94			R92-1252-05	CHIP R 0 OHM		R185,186			RK73GB1J473J	CHIP R 47K J 1/16W	
R95			RK73GB1J104J	CHIP R 100K J 1/16W		R187			RK73GB1J102J	CHIP R 1.0K J 1/16W	

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CONTROL UNIT (X53-3880-10)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
R188			RK73GB1J473J	CHIP R 47K J 1/16W		R280			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R189			RK73GB1J472J	CHIP R 4.7K J 1/16W		R281			RK73GB1J101J	CHIP R 100 J 1/16W	
R190			RK73GB1J473J	CHIP R 47K J 1/16W		R282,283			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R191			RK73GB1J472J	CHIP R 4.7K J 1/16W		R284			RK73GB1J101J	CHIP R 100 J 1/16W	
R192			RK73GB1J103J	CHIP R 10K J 1/16W		R285			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R193			R92-0670-05	CHIP R 0 OHM		R286,287			RK73GB1J101J	CHIP R 100 J 1/16W	
R194			RK73GB1J183J	CHIP R 18K J 1/16W		R288,289			RK73GB1J473J	CHIP R 47K J 1/16W	
R195			RK73GB1J102J	CHIP R 1.0K J 1/16W		R290			RK73GB1J101J	CHIP R 100 J 1/16W	
R196			RK73GB1J473J	CHIP R 47K J 1/16W		R291			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R197			R92-1252-05	CHIP R 0 OHM		R292			RK73GB1J473J	CHIP R 47K J 1/16W	
R199			RK73GB1J101J	CHIP R 100 J 1/16W		R293			RK73GB1J101J	CHIP R 100 J 1/16W	
R200			RK73GB1J471J	CHIP R 470 J 1/16W		R294-296			RK73GB1J473J	CHIP R 47K J 1/16W	
R201			RK73GB1J473J	CHIP R 47K J 1/16W		R297-301			RK73GB1J101J	CHIP R 100 J 1/16W	
R202,203			RK73GB1J102J	CHIP R 1.0K J 1/16W		R302-305			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R204			R92-1252-05	CHIP R 0 OHM		R306			RK73GB1J103J	CHIP R 10K J 1/16W	
R205,206			RK73GB1J102J	CHIP R 1.0K J 1/16W		R307			RK73GB1J473J	CHIP R 47K J 1/16W	
R207			RK73GB1J473J	CHIP R 47K J 1/16W		R312-318			RK73GB1J473J	CHIP R 47K J 1/16W	
R208,209			R92-1252-05	CHIP R 0 OHM		R319-328			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R210-215			RK73GB1J102J	CHIP R 1.0K J 1/16W		R329			RK73GB1J101J	CHIP R 100 J 1/16W	
R216			RK73GB1J473J	CHIP R 47K J 1/16W		R331			RK73GB1J473J	CHIP R 47K J 1/16W	
R217,218			RK73GB1J102J	CHIP R 1.0K J 1/16W		R334			RK73GB1J392J	CHIP R 3.9K J 1/16W	
R219,220			RK73GB1J473J	CHIP R 47K J 1/16W		R335-342			RK73GB1J473J	CHIP R 47K J 1/16W	
R221-227			RK73GB1J102J	CHIP R 1.0K J 1/16W		R343			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R228			RK73GB1J101J	CHIP R 100 J 1/16W		R344			R92-0670-05	CHIP R 0 OHM	
R229			R92-1252-05	CHIP R 0 OHM		R345			RK73GB1J473J	CHIP R 47K J 1/16W	
R230			RK73GB1J101J	CHIP R 100 J 1/16W		R346-348			RK73GB1J101J	CHIP R 100 J 1/16W	
R231			RK73GB1J102J	CHIP R 1.0K J 1/16W		R349-351			RK73GB1J473J	CHIP R 47K J 1/16W	
R232			RK73GB1J101J	CHIP R 100 J 1/16W		R352			RK73GB1J101J	CHIP R 100 J 1/16W	
R233-236			RK73GB1J102J	CHIP R 1.0K J 1/16W		R353-357			RK73GB1J473J	CHIP R 47K J 1/16W	
R237			RK73GB1J473J	CHIP R 47K J 1/16W		R358-372			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R238-240			RK73GB1J102J	CHIP R 1.0K J 1/16W		R700-705			RK73FB2A472J	CHIP R 4.7K J 1/10W	
R241			RK73GB1J472J	CHIP R 4.7K J 1/16W		R706			RK73FB2A221J	CHIP R 220 J 1/10W	
R242-252			RK73GB1J102J	CHIP R 1.0K J 1/16W		R707			RK73FB2A331J	CHIP R 330 J 1/10W	
R253			RK73GB1J101J	CHIP R 100 J 1/16W		R708,709			RK73FB2A221J	CHIP R 220 J 1/10W	
R254			RK73GB1J102J	CHIP R 1.0K J 1/16W		R710			RK73FB2A331J	CHIP R 330 J 1/10W	
R255			RK73GB1J101J	CHIP R 100 J 1/16W		R711			RK73FB2A472J	CHIP R 4.7K J 1/10W	
R256			RK73GB1J102J	CHIP R 1.0K J 1/16W		R712			R92-1213-05	CHIP R 100 J 1/2W	
R257			RK73GB1J473J	CHIP R 47K J 1/16W		R713			R92-0686-05	CHIP R 33 J 1/2W	
R258			RK73GB1J101J	CHIP R 100 J 1/16W		R714			R92-1213-05	CHIP R 100 J 1/2W	
R259,260			RK73GB1J102J	CHIP R 1.0K J 1/16W		R715			R92-1279-05	CHIP R 33 J 1W	
R261			RK73GB1J101J	CHIP R 100 J 1/16W		R716			RK73GB1J683J	CHIP R 68K J 1/16W	
R262			RK73GB1J473J	CHIP R 47K J 1/16W		R717,718			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R263,264			RK73GB1J102J	CHIP R 1.0K J 1/16W		R719			RK73GB1J681J	CHIP R 680 J 1/16W	
R265			RK73GB1J101J	CHIP R 100 J 1/16W		R720			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R266			RK73GB1J473J	CHIP R 47K J 1/16W		R721			R92-0670-05	CHIP R 0 OHM	
R267,268			RK73GB1J102J	CHIP R 1.0K J 1/16W		R722,723			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R269			RK73GB1J101J	CHIP R 100 J 1/16W		R724			RK73GB1J682J	CHIP R 6.8K J 1/16W	
R270			RK73GB1J473J	CHIP R 47K J 1/16W		R725			RK73GB1J103J	CHIP R 10K J 1/16W	
R271			RK73GB1J102J	CHIP R 1.0K J 1/16W		R726			RK73GB1J224J	CHIP R 220K J 1/16W	
R272			RK73GB1J101J	CHIP R 100 J 1/16W		R727			RK73GB1J103J	CHIP R 10K J 1/16W	
R273			RK73GB1J473J	CHIP R 47K J 1/16W		R728			RK73GB1J154J	CHIP R 150K J 1/16W	
R274,275			RK73GB1J102J	CHIP R 1.0K J 1/16W		R729			RK73GB1J104J	CHIP R 100K J 1/16W	
R276			RK73GB1J101J	CHIP R 100 J 1/16W		R730			RK73GB1J103J	CHIP R 10K J 1/16W	
R277			RK73GB1J473J	CHIP R 47K J 1/16W		R731,732			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R278			RK73GB1J102J	CHIP R 1.0K J 1/16W		R733			RK73GB1J682J	CHIP R 6.8K J 1/16W	
R279			RK73GB1J473J	CHIP R 47K J 1/16W		R734			RK73GB1J103J	CHIP R 10K J 1/16W	

PARTS LIST

CONTROL UNIT (X53-3880-10)

RX UNIT (X55-3050-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
VR700 VR701			R12-6423-05 R05-3442-05	TRIMMING POT.(10K/12) POTENTIOMETER(10K)		Q11 Q12 Q700 Q701 Q706			DTC363EK DTC114EUA 2SA1586(Y,GR) 2SC4116(Y) DTA114EUA	DIGITAL TRANSISTOR DIGITAL TRANSISTOR TRANSISTOR TRANSISTOR DIGITAL TRANSISTOR	
S700-705 S706			S70-0410-15 S40-2441-15	TACT SWITCH PUSH SWITCH		Q707 Q708 Q709,710			DTC144EUA DTA114EUA DTC144EUA	DIGITAL TRANSISTOR DIGITAL TRANSISTOR DIGITAL TRANSISTOR	
D1 D3-22 D24-28 D30-32 D34-39			DA204U DA204U DA204U DA204U DA204U	DIODE DIODE DIODE DIODE DIODE		RX UNIT (X55-3050-XX) -10:K, -11:K2, -12:K3					
D706 D707 D708 D709 D710			DA204U HSM88AS DA204U HSM88AS MINISMD C075-02	DIODE DIODE DIODE DIODE VARISTOR		D9 C1 C2,3 C4-6 C7 C8			B30-2130-05 CC73GCH1H050C CK73GB1H102K CK73GB1H103K CK73GB1H102K C92-0002-05	LED(YG/8) CHIP C 5.0PF C CHIP C 1000PF K CHIP C 0.010UF K CHIP C 1000PF K CHIP-TAN 0.22UF 35WV	
D711,712			DA204U	DIODE		C9 C10 C11 C12 C13			CK73FB1C105K C92-0545-05 CK73GB1H102K CC73GCH1H470J CK73GB1H102K	CHIP C 1.0UF K CHIP-TAN 2.2UF 6.3WV CHIP C 1000PF K CHIP C 47PF J CHIP C 1000PF K	
IC1 IC3 IC4 IC5 IC6			TC7S66FU NJM78L05UA TA7805F NJM78L08UA TA7805F	IC(ANALOG SWITCH) IC(VOLTAGE REGULATOR/ +5V) IC IC(VOLTAGE REGULATOR/ +8V) IC		C14 C15 C16 C17 C18-20			C92-0001-05 * CC73FCH1H150G CC73GCH1H150J CC73FCH1H470J CK73GB1H102K	CHIP-C 0.1UF 35WV CHIP C 15PF G CHIP C 15PF J CHIP C 47PF J CHIP C 1000PF K	
IC7 IC10 IC12,13 IC14 IC15,16			AT29C020-90TI RH5VL42C NJM4558E BU4053BCF TC74VHC245FT	IC IC(REGULATOR) IC(OP AMP X2) IC(ANALOG SW) IC		C21 C22 C23 C24 C25			* CC73FCH1H120G CK73GB1H102K CC73GCH1H040C CK73GB1H103K CC73FCH1H470J	CHIP C 12PF G CHIP C 1000PF K CHIP C 4.0PF C CHIP C 0.010UF K CHIP C 47PF J	
IC17,18 IC22,23 IC24 IC25 IC27			* 30622M4-103GP NJM4558E TC74HC4040AF TC7S04F * PCM3000E	MPU IC(OP AMP X2) IC(BINARY COUNTER) IC(2CH NAND GATE) IC		C26 C27 C28 C29 C30,31			CK73GB1H102K CK73GB1H103K CK73FB1E104K CK73GB1H103K CK73GB1H102K	CHIP C 1000PF K CHIP C 0.010UF K CHIP C 0.10UF K CHIP C 0.010UF K CHIP C 1000PF K	
IC29 IC30 IC31,32 IC33 IC34			BU4053BCF * ADSP2185BST133 NJM4558E M62364FP NJM4558E	IC(ANALOG SW) IC(DSP MICROCOMPUTER) IC(OP AMP X2) IC(D/A CONVERTER) IC(OP AMP X2)		C32 C32 C33 C34-36 C37			* CC73FCH1H150G CC73FCH1H180J CC73GCH1H220J CK73GB1H102K CK73GB1H103K	CHIP C 15PF G CHIP C 18PF J CHIP C 22PF J CHIP C 1000PF K CHIP C 0.010UF K	K,K2 K3
IC35 IC36 IC37 IC38 IC39			TC7S32FU NJM4558E BU4053BCF TC7S00FU BU4094BCFV	IC(2INPUT OR GATE) IC(OP AMP X2) IC(ANALOG SW) IC(NAND GATE) IC(8bit SHIFT/STORE REGISTER)		C38 C39 C40 C41 C42			CK73FB1C105K CC73GCH1H390J * CC73FCH1H150G CK73GB1H103K CK73FB1E104K	CHIP C 1.0UF K CHIP C 39PF J CHIP C 15PF G CHIP C 0.010UF K CHIP C 0.10UF K	
IC40 IC42 IC45 IC46-49 IC700-703			NJM4558E ADM232LAR LA4422 TC7S32FU BU2114F	IC(OP AMP X2) IC(RS-232C DRIVERS/RECEIVERS) IC(AF POWER AMP/ 5.8W) IC(2INPUT OR GATE) IC(LED DRIVER)		C43,44 C45,46 C47 C48 C49			* CC73FCH1H150G CK73GB1H102K * CC73FCH1H150G C92-0628-05 CC73GCH1H0R5B	CHIP C 15PF G CHIP C 1000PF K CHIP C 15PF G CHIP-TAN 10UF 10WV CHIP C 0.5PF B	
IC704 IC705 IC706			NJM78L05UA TA78L05F NJM78L05UA	IC(VOLTAGE REGULATOR/ +5V) IC(VOLTAGE REGULATOR/ +5V) IC(VOLTAGE REGULATOR/ +5V)		C50 C51,52 C53 C54 C55			* CC73FCH1H150G CK73GB1H102K C92-0628-05 CK73GB1H102K CK73GB1H103K	CHIP C 15PF G CHIP C 1000PF K CHIP-TAN 10UF 10WV CHIP C 1000PF K CHIP C 0.010UF K	
Q1 Q2 Q5 Q8 Q9			2SK1824 DTC114EUA 2SK1824 DTC144EUA DTC114EUA	FET DIGITAL TRANSISTOR FET DIGITAL TRANSISTOR DIGITAL TRANSISTOR							
Q10			DTC144EUA	DIGITAL TRANSISTOR							

TKR-740

PARTS LIST

RX UNIT (X55-3050-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
C56			C92-0628-05	CHIP-TAN 10UF 10WV		C125			CC73GCH1H030C	CHIP C 3.0PF C	
C57			CC73GCH1H0R5B	CHIP C 0.5PF B		C126			CK73FB1E104K	CHIP C 0.10UF K	
C58			CK73GB1H102K	CHIP C 1000PF K		C127			CK73GB1H562K	CHIP C 5600PF K	
C59			C92-0628-05	CHIP-TAN 10UF 10WV		C128			CC73GCH1H2R5C	CHIP C 2.5PF C	
C60,61			CK73FB1E104K	CHIP C 0.10UF K		C129			CK73GB1C393K	CHIP C 0.039UF K	
C62			CK73GB1H103K	CHIP C 0.010UF K		C130			CC73GCH1H040C	CHIP C 4.0PF C	
C65			CC73GCH1H150J	CHIP C 15PF J		C131			CC73GCH1H680J	CHIP C 68PF J	
C66			CK73GB1H102K	CHIP C 1000PF K		C132			CK73FB1E104K	CHIP C 0.10UF K	
C67			CC73GCH1H270J	CHIP C 27PF J		C133			CK73GB1H103K	CHIP C 0.010UF K	
C68			CC73GCH1H150J	CHIP C 15PF J		C134			C92-0633-05	CHIP-TAN 22UF 10WV	
C69			CK73GB1H102K	CHIP C 1000PF K	K3	C135			CK73GB1H103K	CHIP C 0.010UF K	
C69,70			CK73GB1H102K	CHIP C 1000PF K	K,K2	C136			CC73GCH1H030C	CHIP C 3.0PF C	
C70			CC73GCH1H050C	CHIP C 5.0PF C	K3	C137			CK73GB1H103K	CHIP C 0.010UF K	
C71			CC73GCH1H270J	CHIP C 27PF J		C138			CK73GB1C333K	CHIP C 0.033UF K	
C72			CK73GB1H103K	CHIP C 0.010UF K		C139			CC73GCH1H680J	CHIP C 68PF J	
C73,74			CK73GB1H102K	CHIP C 1000PF K		C140			C92-0001-05	CHIP-C 0.1UF 35WV	
C75			CC73GCH1H270J	CHIP C 27PF J		C141			CC73GCH1H030C	CHIP C 3.0PF C	
C76			CC73GCH1H100D	CHIP C 10PF D		C142			CK73FB1E104K	CHIP C 0.10UF K	
C77			CK73FB1E104K	CHIP C 0.10UF K		C143			CK73GB1H103K	CHIP C 0.010UF K	
C78			CC73GCH1H090D	CHIP C 9.0PF D	K2	C144			CC73GCH1H220J	CHIP C 22PF J	
C78			CC73GCH1H100D	CHIP C 10PF D	K	C145			CK73GB1E223K	CHIP C 0.022UF K	
C78			CC73GCH1H120J	CHIP C 12PF J	K3	C146-148			CK73GB1H103K	CHIP C 0.010UF K	
C79			CC73GCH1H150J	CHIP C 15PF J		C149			CK73GB1H102K	CHIP C 1000PF K	
C80			CC73GCH1H180J	CHIP C 18PF J	K2	C150			C92-0628-05	CHIP-TAN 10UF 10WV	
C80			CC73GCH1H220J	CHIP C 22PF J	K	C151			CK73GB1H103K	CHIP C 0.010UF K	
C80			CC73GCH1H270J	CHIP C 27PF J	K3	C152			CC73GCH1H090D	CHIP C 9.0PF D	
C82			C92-0728-05	ELECTRO C 470UF 16WV		C153			CK73GB1H102K	CHIP C 1000PF K	
C83			CK73GB1H103K	CHIP C 0.010UF K		C154			CK73GB1H103K	CHIP C 0.010UF K	
C84			C92-0589-05	CHIP-TAN 47UF 6.3WV		C155			CC73GCH1H220J	CHIP C 22PF J	
C85			CK73GB1H103K	CHIP C 0.010UF K		C156,157			CK73GB1H102K	CHIP C 1000PF K	
C86,87			CC73GCH1H150J	CHIP C 15PF J	K3	C158,159			CK73GB1H103K	CHIP C 0.010UF K	
C88			C92-0633-05	CHIP-TAN 22UF 10WV		C160			CK73FB1E104K	CHIP C 0.10UF K	
C89-91			CK73GB1H103K	CHIP C 0.010UF K		C161			CK73GB1H102K	CHIP C 1000PF K	
C92			CC73GCH1H040C	CHIP C 4.0PF C		C162			CK73GB1H103K	CHIP C 0.010UF K	
C93			CC73GCH1H680J	CHIP C 68PF J		C163			CC73GCH1H090D	CHIP C 9.0PF D	
C94,95			CC73GCH1H040C	CHIP C 4.0PF C		C164			CK73GB1H102K	CHIP C 1000PF K	
C96			CM73F2H120J	CHIP C 12PF J		C165			C92-0003-05	CHIP-TAN 0.47UF 25WV	
C97			CC73GCH1H220J	CHIP C 22PF J	K3	C166			CC73GCH1H080D	CHIP C 8.0PF D	
C98			CC73GCH1H180J	CHIP C 18PF J		C167			CK73FB1E104K	CHIP C 0.10UF K	
C100			CC73GCH1H040C	CHIP C 4.0PF C		C168			CK73GB1H103K	CHIP C 0.010UF K	
C101			CK73FB1E223K	CHIP C 0.022UF K		C169,170			C92-0628-05	CHIP-TAN 10UF 10WV	
C104			CC73GCH1H680J	CHIP C 68PF J		C171			C92-0003-05	CHIP-TAN 0.47UF 25WV	
C105,106			C92-0589-05	CHIP-TAN 47UF 6.3WV		C172,173			CK73FB1E104K	CHIP C 0.10UF K	
C107			CK73GB1H102K	CHIP C 1000PF K		C174,175			CK73GB1H102K	CHIP C 1000PF K	
C108-110			CK73GB1H103K	CHIP C 0.010UF K		C176,177			CK73FB1E104K	CHIP C 0.10UF K	
C111,112			CK73FB1E104K	CHIP C 0.10UF K		C178,179			CK73GB1H221K	CHIP C 220PF K	
C113			CK73GB1H103K	CHIP C 0.010UF K		C180			CK73FB1E104K	CHIP C 0.10UF K	
C114			CK73GB1H102K	CHIP C 1000PF K		C181,182			CK73GB1H221K	CHIP C 220PF K	
C115			CK73FB1E104K	CHIP C 0.10UF K		C183-186			CK73FB1E104K	CHIP C 0.10UF K	
C116			CK73GB1H103K	CHIP C 0.010UF K		C187,188			CK73GB1H102K	CHIP C 1000PF K	
C117			CK73GB1H102K	CHIP C 1000PF K		C189,190			CC73GCH1H270J	CHIP C 27PF J	
C118-120			CK73GB1H103K	CHIP C 0.010UF K		C191,192			CK73FB1E104K	CHIP C 0.10UF K	
C121			CC73GCH1H030C	CHIP C 3.0PF C		C193			CC73GCH1H680J	CHIP C 68PF J	
C122			CK73FB1E104K	CHIP C 0.10UF K		C194			CC73GCH1H220J	CHIP C 22PF J	
C123			CK73GB1H562K	CHIP C 5600PF K		C195			CK73GB1H102K	CHIP C 1000PF K	
C124			C92-0633-05	CHIP-TAN 22UF 10WV		C196			C92-0628-05	CHIP-TAN 10UF 10WV	

PARTS LIST

RX UNIT (X55-3050-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
C197			CK73GB1H102K	CHIP C 1000PF K		L17,18			L40-1005-34	SMALL FIXED INDUCTOR(10UH/8)	
C198-200			C92-0628-05	CHIP-TAN 10UF 10WV		L19			L40-4775-34	SMALL FIXED INDUCTOR(47NH/8)	
C201,202			CK73FB1E104K	CHIP C 0.10UF K		L20			L40-1095-34	SMALL FIXED INDUCTOR(1UH/8)	
C203			C92-0775-05	CHIP-TAN 47UF 4WV		L21			L40-4775-34	SMALL FIXED INDUCTOR(47NH/8)	
C204			C92-0628-05	CHIP-TAN 10UF 10WV		L22			L40-6875-34	SMALL FIXED INDUCTOR(68NH/8)	
C207			CK73GB1H102K	CHIP C 1000PF K		L23			L40-4775-34	SMALL FIXED INDUCTOR(47NH/8)	
C208			CK73FB1E104K	CHIP C 0.10UF K		L24			L40-1015-34	SMALL FIXED INDUCTOR(100UH/8)	
C209			CK73GB1H103K	CHIP C 0.010UF K		L25			L40-3975-34	SMALL FIXED INDUCTOR(39NH/8)	
C210			C92-0633-05	CHIP-TAN 22UF 10WV		L26			L40-4775-34	SMALL FIXED INDUCTOR(47NH/8)	
C211			CC73GCH1H080D	CHIP C 8.0PF D		L27,28			L34-4527-05	COIL	
C212			CK73GB1H103K	CHIP C 0.010UF K		L30			L40-1095-34	SMALL FIXED INDUCTOR(1UH/8)	
C213			C92-0514-05	CHIP-TAN 2.2UF 10WV		L31,32			L34-4527-05	COIL	
C217			CK73GB1H102K	CHIP C 1000PF K		L33			L40-1015-34	SMALL FIXED INDUCTOR(100UH/8)	
C218			CC73GCH1H220J	CHIP C 22PF J		L34,35			L40-1281-37	SMALL FIXED INDUCTOR(0.120UH/8)	
C219			CC73GCH1H101J	CHIP C 100PF J		L36,37			L40-1005-34	SMALL FIXED INDUCTOR(10UH/8)	
C220			CC73GCH1H180J	CHIP C 18PF J	K2	L38-41			L34-4527-05	COIL	
C220			CC73GCH1H220J	CHIP C 22PF J	K	L42			L40-1005-34	SMALL FIXED INDUCTOR(10UH/8)	
C220			CC73GCH1H270J	CHIP C 27PF J	K3	L43,44			L34-4527-05	COIL	
C221		*	CC73FCH1H040B	CHIP C 4.0PF B	K3	L45			L40-1281-37	SMALL FIXED INDUCTOR(0.120UH/8)	
C221,222		*	CC73FCH1H040B	CHIP C 4.0PF B	K,K2	L46			L40-1005-34	SMALL FIXED INDUCTOR(10UH/8)	
C222			CC73FCH1H020B	CHIP C 2.0PF B	K3	L47			L40-1281-37	SMALL FIXED INDUCTOR(0.120UH/8)	
C226			CK73GB1H103K	CHIP C 0.010UF K		L48			L40-1005-34	SMALL FIXED INDUCTOR(10UH/8)	
C228,229			CK73FB1E104K	CHIP C 0.10UF K		L49,50			L40-4775-34	SMALL FIXED INDUCTOR(47NH/8)	
TC1,2			C05-0393-05	CERAMIC TRIMMER CAP(8P/12)		L51			L40-1095-34	SMALL FIXED INDUCTOR(1UH/8)	
CN1			E04-0409-05	RF COAXIAL RECEPTACLE(SMB)		L52,53			L34-4530-05	COIL	
CN2			E04-0154-05	PIN SOCKET		L54			L40-1095-34	SMALL FIXED INDUCTOR(1UH/8)	
CN3-5			E40-5538-05	PIN ASSY		L55			L40-1015-34	SMALL FIXED INDUCTOR(100UH/8)	
CN6			E40-5736-05	FLAT CABLE CONNECTOR		L56			L40-1075-34	SMALL FIXED INDUCTOR(10NH/8)	
CN7			E04-0409-05	RF COAXIAL RECEPTACLE(SMB)		L58			L40-4775-34	SMALL FIXED INDUCTOR(47NH/8)	
CF1			L72-0956-05	CERAMIC FILTER		L64			L40-1005-34	SMALL FIXED INDUCTOR(10UH/8)	
CF2			L72-0953-05	CERAMIC FILTER		L65			L40-3375-34	SMALL FIXED INDUCTOR(33NH/8)	
CF3			L72-0956-05	CERAMIC FILTER		L66			L40-1885-34	SMALL FIXED INDUCTOR(180NH/8)	
CF4			L72-0953-05	CERAMIC FILTER		X1,2	*		L77-1788-05	CRYSTAL RESONATOR(44.4MHZ/2P)	
CF5		*	L72-0976-05	CERAMIC FILTER		XF1	*		L71-0542-05	MCF (44.85MHZ WIDE)	
						XF2	*		L71-0543-05	MCF (44.85MHZ NARR)	
L1			L34-4523-05	AIR-CORE COIL		XF3	*		L71-0544-05	MCF (44.85MHZ WIDE)	
L2			L40-1005-34	SMALL FIXED INDUCTOR(10UH/8)		XF4	*		L71-0545-05	MCF (44.85MHZ NARR)	
L3		*	L79-1737-05	HELICAL BLOCK	K	CP1			R90-0724-05	MULTI-COMP 1K X4	
L3		*	L79-1738-05	HELICAL BLOCK	K2	R1			RK73GB1J105J	CHIP R 1.0M J 1/16W	
L3		*	L79-1739-05	HELICAL BLOCK	K3	R2			RK73GB1J183J	CHIP R 18K J 1/16W	
L4			L40-1005-34	SMALL FIXED INDUCTOR(10UH/8)		R3,4			RK73GB1J473J	CHIP R 47K J 1/16W	
L5			L40-4775-34	SMALL FIXED INDUCTOR(47NH/8)		R5			R92-1252-05	CHIP R 0 OHM	
L6,7			L40-1005-34	SMALL FIXED INDUCTOR(10UH/8)		R6			RK73GB1J223J	CHIP R 22K J 1/16W	
L8		*	L34-4586-05	AIR-CORE COIL	K	R7			RK73GB1J470J	CHIP R 47 J 1/16W	
L8		*	L34-4598-05	AIR-CORE COIL	K2	R8			R92-1252-05	CHIP R 0 OHM	
L8		*	L34-4599-05	AIR-CORE COIL	K3	R9			RK73GB1J560J	CHIP R 56 J 1/16W	
L9			L40-1005-34	SMALL FIXED INDUCTOR(10UH/8)		R10,11			RK73GB1J102J	CHIP R 1.0K J 1/16W	
L10			L34-4586-05	AIR-CORE COIL	K	R12			RK73GB1J152J	CHIP R 1.5K J 1/16W	
L10			L34-4598-05	AIR-CORE COIL	K2	R13			RK73GB1J182J	CHIP R 1.8K J 1/16W	
L10			L34-4599-05	AIR-CORE COIL	K3	R14			RK73GB1J560J	CHIP R 56 J 1/16W	
L11			L40-1095-34	SMALL FIXED INDUCTOR(1UH/8)		R15			RK73GB1J182J	CHIP R 1.8K J 1/16W	
L12			L40-1085-34	SMALL FIXED INDUCTOR(100NH/8)		R16			RK73GB1J222J	CHIP R 2.2K J 1/16W	
L13			L40-8271-34	SMALL FIXED INDUCTOR(82NH/8)		R17			RK73GB1J102J	CHIP R 1.0K J 1/16W	
L14,15			L40-1005-34	SMALL FIXED INDUCTOR(10UH/8)		R18,19			RK73GB1J103J	CHIP R 10K J 1/16W	
L16		*	L79-1594-05	HELICAL BLOCK	K	R20			RK73FB2A100J	CHIP R 10 J 1/10W	
L16		*	L79-1734-05	HELICAL BLOCK	K2	R21			RK73GB1J561J	CHIP R 560 J 1/16W	
L16		*	L79-1735-05	HELICAL BLOCK	K3						

PARTS LIST

RX UNIT (X55-3050-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
R22			RK73GB1J102J	CHIP R 1.0K J 1/16W		R84			RK73GB1J103J	CHIP R 10K J 1/16W	
R23			RK73GB1J122J	CHIP R 1.2K J 1/16W		R85			RK73GB1J182J	CHIP R 1.8K J 1/16W	
R24			R92-1252-05	CHIP R 0 OHM		R90			RK73GB1J681J	CHIP R 680 J 1/16W	
R25			RK73FB2A100J	CHIP R 10 J 1/10W		R92			RK73GB1J681J	CHIP R 680 J 1/16W	
R26			RK73GB1J101J	CHIP R 100 J 1/16W		R93			RK73GB1J680J	CHIP R 68 J 1/16W	
R27			R92-1252-05	CHIP R 0 OHM	K	R95			RK73GB1J152J	CHIP R 1.5K J 1/16W	
R28			R92-1252-05	CHIP R 0 OHM	K2	R96			RK73GB1J470J	CHIP R 47 J 1/16W	
R29			RK73GB1J473J	CHIP R 47K J 1/16W		R97			RK73FB2A220J	CHIP R 22 J 1/10W	
R30			RK73GB1J101J	CHIP R 100 J 1/16W		R98			RK73GB1J680J	CHIP R 68 J 1/16W	
R31			R92-1252-05	CHIP R 0 OHM	K3	R99			RK73GB1J152J	CHIP R 1.5K J 1/16W	
R32			RK73GB1J101J	CHIP R 100 J 1/16W		R100			RK73GB1J470J	CHIP R 47 J 1/16W	
R33			R92-1252-05	CHIP R 0 OHM		R101			RK73GB1J220J	CHIP R 22 J 1/16W	
R34			RK73GB1J102J	CHIP R 1.0K J 1/16W		R102			RK73GB1J680J	CHIP R 68 J 1/16W	
R35,36			RK73GB1J181J	CHIP R 180 J 1/16W		R103			RK73GB1J101J	CHIP R 100 J 1/16W	
R37			RK73GB1J270J	CHIP R 27 J 1/16W		R104			RK73GB1J220J	CHIP R 22 J 1/16W	
R38			R92-0670-05	CHIP R 0 OHM		R105			RK73GB1J680J	CHIP R 68 J 1/16W	
R39			RK73GB1J101J	CHIP R 100 J 1/16W		R106			RK73GB1J222J	CHIP R 2.2K J 1/16W	
R40			R92-1252-05	CHIP R 0 OHM		R107			RK73GB1J564J	CHIP R 560K J 1/16W	
R41			RK73GB1J271J	CHIP R 270 J 1/16W		R108			RK73GB1J473J	CHIP R 47K J 1/16W	
R42,43			R92-1252-05	CHIP R 0 OHM		R109			RK73GB1J223J	CHIP R 22K J 1/16W	
R44			RK73GB1J470J	CHIP R 47 J 1/16W		R111			RK73GB1J222J	CHIP R 2.2K J 1/16W	
R45			RK73GB1J103J	CHIP R 10K J 1/16W		R114			RK73GB1J394J	CHIP R 390K J 1/16W	
R46			RK73GB1J472J	CHIP R 4.7K J 1/16W		R115,116			RK73GB1J222J	CHIP R 2.2K J 1/16W	
R47			RK73GB1J104J	CHIP R 100K J 1/16W		R118			RK73GB1J104J	CHIP R 100K J 1/16W	
R48			RK73GB1J470J	CHIP R 47 J 1/16W		R119			RK73GB1J393J	CHIP R 39K J 1/16W	
R49			RK73GB1J271J	CHIP R 270 J 1/16W		R120			R92-0679-05	CHIP R 0 OHM	
R50,51			RK73GB1J222J	CHIP R 2.2K J 1/16W		R121			RK73GB1J104J	CHIP R 100K J 1/16W	
R52			RK73GB1J101J	CHIP R 100 J 1/16W		R122			RK73GB1J680J	CHIP R 68 J 1/16W	
R53,54			RK73GB1J103J	CHIP R 10K J 1/16W		R123			RK73GB1J681J	CHIP R 680 J 1/16W	
R55			RK73GB1J222J	CHIP R 2.2K J 1/16W		R124,125			RK73GB1J101J	CHIP R 100 J 1/16W	
R56			RK73GB1J223J	CHIP R 22K J 1/16W		R126			RK73GB1J183J	CHIP R 18K J 1/16W	
R57			RK73GB1J101J	CHIP R 100 J 1/16W		R127			RK73GB1J681J	CHIP R 680 J 1/16W	
R58			RK73GB1J472J	CHIP R 4.7K J 1/16W		R128			RK73GB1J680J	CHIP R 68 J 1/16W	
R59			R92-1252-05	CHIP R 0 OHM		R129			RK73GB1J152J	CHIP R 1.5K J 1/16W	
R60			RK73GB1J101J	CHIP R 100 J 1/16W		R130			RK73GB1J101J	CHIP R 100 J 1/16W	
R61			RK73GB1J472J	CHIP R 4.7K J 1/16W		R131			RK73GB1J470J	CHIP R 47 J 1/16W	
R62			R92-1252-05	CHIP R 0 OHM		R132			RK73GB1J103J	CHIP R 10K J 1/16W	
R63			RK73GB1J471J	CHIP R 470 J 1/16W		R133			RK73GB1J680J	CHIP R 68 J 1/16W	
R64			RK73GB1J101J	CHIP R 100 J 1/16W		R134			RK73GB1J152J	CHIP R 1.5K J 1/16W	
R65			RK73GB1J102J	CHIP R 1.0K J 1/16W		R135			RK73GB1J103J	CHIP R 10K J 1/16W	
R66			RK73GB1J104J	CHIP R 100K J 1/16W		R136			RK73GB1J470J	CHIP R 47 J 1/16W	
R67,68			RK73GB1J821J	CHIP R 820 J 1/16W		R137			RK73GB1J220J	CHIP R 22 J 1/16W	
R69			R92-1252-05	CHIP R 0 OHM		R138			RK73GB1J680J	CHIP R 68 J 1/16W	
R70			RK73GB1J470J	CHIP R 47 J 1/16W		R139			RK73GB1J101J	CHIP R 100 J 1/16W	
R71			RK73FB2A120J	CHIP R 12 J 1/10W		R140			RK73GB1J104J	CHIP R 100K J 1/16W	
R72			RK73GB1J100J	CHIP R 10 J 1/16W		R141			RK73FB2A681J	CHIP R 680 J 1/10W	
R73,74			RK73GB1J471J	CHIP R 470 J 1/16W		R142			RK73GB1J220J	CHIP R 22 J 1/16W	
R75			RK73GB1J104J	CHIP R 100K J 1/16W		R143			RK73GB1J680J	CHIP R 68 J 1/16W	
R76			RK73GB1J182J	CHIP R 1.8K J 1/16W		R144			RK73GB1J104J	CHIP R 100K J 1/16W	
R77			RK73GB1J102J	CHIP R 1.0K J 1/16W		R145			RK73GB1J680J	CHIP R 68 J 1/16W	
R78			RK73GB1J103J	CHIP R 10K J 1/16W		R146			RK73FB2A681J	CHIP R 680 J 1/10W	
R79			RK73GB1J684J	CHIP R 680K J 1/16W		R147			RK73GB1J222J	CHIP R 2.2K J 1/16W	
R80			RK73GB1J122J	CHIP R 1.2K J 1/16W		R148			RK73GB1J562J	CHIP R 5.6K J 1/16W	
R81			RK73GB1J103J	CHIP R 10K J 1/16W		R149,150			RK73GB1J154J	CHIP R 150K J 1/16W	
R82			RK73FB2A220J	CHIP R 22 J 1/10W		R151			RK73GB1J222J	CHIP R 2.2K J 1/16W	
R83			RK73GB1J684J	CHIP R 680K J 1/16W		R152,153			RK73GB1J103J	CHIP R 10K J 1/16W	

PARTS LIST

RX UNIT (X55-3050-XX)

TX UNIT (X56-3040-10)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
R154,155			RK73GB1J223J	CHIP R 22K J 1/16W		IC20		*	AD9835BRU	MOS IC	
R156,157			RK73GB1J332J	CHIP R 3.3K J 1/16W		IC21			TC7S66FU	IC(ANALOG SWITCH)	
R158			RK73GB1J472J	CHIP R 4.7K J 1/16W		Q1			2SC3357	TRANSISTOR	
R159			RK73GB1J272J	CHIP R 2.7K J 1/16W		Q3			2SC3120	TRANSISTOR	
R160			RK73GB1J472J	CHIP R 4.7K J 1/16W		Q5			2SC3357	TRANSISTOR	
						Q6			2SC4215(Y)	TRANSISTOR	
R161			RK73GB1J272J	CHIP R 2.7K J 1/16W		Q7			2SC2873(Y)	TRANSISTOR	
R162			RK73GB1J152J	CHIP R 1.5K J 1/16W		Q8,9			2SK508NV(K53)	FET	
R163			RK73GB1J102J	CHIP R 1.0K J 1/16W		Q10			2SC3722K(S)	TRANSISTOR	
R164,165			RK73GB1J473J	CHIP R 47K J 1/16W		Q12			2SC3722K(S)	TRANSISTOR	
R166			RK73GB1J474J	CHIP R 470K J 1/16W		Q13			DTC114EUA	DIGITAL TRANSISTOR	
						Q14			2SC4215(Y)	TRANSISTOR	
R167			RK73GB1J224J	CHIP R 220K J 1/16W		Q16			2SB1386(R)	TRANSISTOR	
R168			RK73GB1J122J	CHIP R 1.2K J 1/16W		Q17			2SC3722K(S)	TRANSISTOR	
R169			RK73GB1J103J	CHIP R 10K J 1/16W		Q18,19			DTC114EUA	DIGITAL TRANSISTOR	
R170			RK73GB1J104J	CHIP R 100K J 1/16W		Q20			2SB1386(R)	TRANSISTOR	
R171			RK73GB1J102J	CHIP R 1.0K J 1/16W		Q22			DTC114EUA	DIGITAL TRANSISTOR	
						Q24,25			2SC3357	TRANSISTOR	
R172			RK73GB1J104J	CHIP R 100K J 1/16W		Q26			2SC4081(R)	TRANSISTOR	
R173,174			RK73GB1J103J	CHIP R 10K J 1/16W		Q28			2SC4081(R)	TRANSISTOR	
R175			RK73GB1J224J	CHIP R 220K J 1/16W		Q29			DTC114EUA	DIGITAL TRANSISTOR	
R176-178			RK73GB1J104J	CHIP R 100K J 1/16W		Q30			2SK1824	FET	
R179			R92-0670-05	CHIP R 0 OHM		Q31,32			2SC3357	TRANSISTOR	
						Q33			2SC4081(R)	TRANSISTOR	
R180			RK73GB1J331J	CHIP R 330 J 1/16W		Q34,35			2SJ106(GR)	FET	
R181			RK73GB1J102J	CHIP R 1.0K J 1/16W		Q36-38			DTC114EUA	DIGITAL TRANSISTOR	
R182			RK73GB1J104J	CHIP R 100K J 1/16W		Q39			2SC4081(R)	TRANSISTOR	
R183			RK73GB1J560J	CHIP R 56 J 1/16W		TH1,2			157-302-65801	THERMISTOR	
R184			RK73GB1J102J	CHIP R 1.0K J 1/16W		A1		*	W02-1968-05	DBM	
						A1		*	W02-1982-05	DBM	
R185			R92-1252-05	CHIP R 0 OHM		TX UNIT (X56-3040-10)					
R186			RK73GB1J102J	CHIP R 1.0K J 1/16W		D50,51			B30-2130-05	LED(YG)	
R187-191			R92-1252-05	CHIP R 0 OHM		D52			B30-2048-05	LED	
R192			RK73GB1J104J	CHIP R 100K J 1/16W		C1,2			CK73GB1H102K	CHIP C 1000PF K	
R193			RK73FB2A220J	CHIP R 22 J 1/10W		C3,4			CK73GB1H471K	CHIP C 470PF K	
						C5		*	CC73FCH1H080B	CHIP C 8.0PF B	
R195			RK73GB1J331J	CHIP R 330 J 1/16W		C6			CK73GB1H102K	CHIP C 1000PF K	
R196			RK73GB1J221J	CHIP R 220 J 1/16W		C7		*	CC73FCH1H120G	CHIP C 12PF G	
R197			RK73GB1J153J	CHIP R 15K J 1/16W							
R198			RK73GB1J102J	CHIP R 1.0K J 1/16W		C8			CC73FCH1H470J	CHIP C 47PF J	
R199			RK73GB1J392J	CHIP R 3.9K J 1/16W		C9		*	CC73FCH1H120G	CHIP C 12PF G	
						C10			CC73FCH1H560J	CHIP C 56PF J	
D2-4			1SV283	VARIABLE CAPACITANCE DIODE		C11			CK73GB1H103K	CHIP C 0.010UF K	
D6			1SV283	VARIABLE CAPACITANCE DIODE		C12			CC73GCH1H010B	CHIP C 1.0PF B	
D10			DAN235K	DIODE		C13			CK73GB1H102K	CHIP C 1000PF K	
D11			DAN202U	DIODE		C14			CC73GCH1H010B	CHIP C 1.0PF B	
IC1			SA7025DK	IC(PLL SYSTEM)		C15,16			CK73GB1H102K	CHIP C 1000PF K	
IC2			NJM78L05UA	IC(VOLTAGE REGULATOR/ +5V)		C17		*	CC73FCH1H100B	CHIP C 10PF B	
IC3			BU4094BCFV	IC(8bit SHIFT/STORE REGISTER)		C19-22			CK73GB1H102K	CHIP C 1000PF K	
IC4			TA7808S	IC(REGULATOR)		C23		*	CC73FCH1H080B	CHIP C 8.0PF B	
IC5			NJM2904E	IC(OP AMP X2)		C24			CK73GB1H103K	CHIP C 0.010UF K	
IC6			BU4053BCF	IC(ANALOG SW)		C25		*	CC73FCH1H080B	CHIP C 8.0PF B	
IC7,8			TA31137FN	IC(IF IC)		C26			CK73GB1H102K	CHIP C 1000PF K	
IC9			M62364FP	IC(D/A CONVERTER)		C27,28			CC73GCH1H010B	CHIP C 1.0PF B	
IC10			AT2408N10S12.5	IC(8kbit SERIAL EEPROM)							
IC11,12			NJM4558E	IC(OP AMP X2)		C29			C92-0728-05	ELECTROLYTIC CAP	
IC13			NJM78L08UA	IC(VOLTAGE REGULATOR/ +8V)							
IC14			NJM2904E	IC(OP AMP X2)							
IC15			NJM4558E	IC(OP AMP X2)							
IC16			NJM78L05UA	IC(VOLTAGE REGULATOR/ +5V)							
IC17		*	AM1	IC							
IC18			TC7S66FU	IC(ANALOG SWITCH)							
IC19			TC74HC14AF	IC(SCHMITT INVERTER)							

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PARTS LIST

TX UNIT (X56-3040-10)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
C30			CK73GB1H102K	CHIP C 1000PF K		C125,126			CK73GB1H103K	CHIP C 0.010UF K	
C31			CK73GB1H103K	CHIP C 0.010UF K		C127			C92-0589-05	CHIP-TAN 47UF 6.3WV	
C32			C92-0633-05	CHIP-TAN 22UF 10WV		C128			CK73FB1E104K	CHIP C 0.10UF K	
C33			CK73GB1H102K	CHIP C 1000PF K		C130			CK73GB1H103K	CHIP C 0.010UF K	
C34			CK73GB1H103K	CHIP C 0.010UF K		C131			C92-0628-05	CHIP-TAN 10UF 10WV	
C35,36			CC73GCH1H100D	CHIP C 10PF D		C132			CK73GB1H102K	CHIP C 1000PF K	
C37			CK73GB1H102K	CHIP C 1000PF K		C133			C92-0628-05	CHIP-TAN 10UF 10WV	
C38			CC73GCH1H470J	CHIP C 47PF J		C134			CK73GB1H102K	CHIP C 1000PF K	
C39			CK73GB1H471K	CHIP C 470PF K		C135,136			C92-0628-05	CHIP-TAN 10UF 10WV	
C40			C92-0633-05	CHIP-TAN 22UF 10WV		C138			C92-0628-05	CHIP-TAN 10UF 10WV	
C41			CK73FB1E104K	CHIP C 0.10UF K		C139			C92-0004-05	CHIP-TAN 1.0UF 16WV	
C42			CK73GB1H103K	CHIP C 0.010UF K		C140			CK73GB1H103K	CHIP C 0.010UF K	
C43			CK73GB1H471K	CHIP C 470PF K		C141			CK73GB1H102K	CHIP C 1000PF K	
C45			C92-0633-05	CHIP-TAN 22UF 10WV		C143			CC73GCH1H050C	CHIP C 5.0PF C	
C46			CK73FB1E104K	CHIP C 0.10UF K		C144			CK73GB1H102K	CHIP C 1000PF K	
C47			CK73GB1H103K	CHIP C 0.010UF K		C145			CK73GB1H103K	CHIP C 0.010UF K	
C50,51			CK73GB1H471K	CHIP C 470PF K		C146			CC73GCH1H050C	CHIP C 5.0PF C	
C52			CK73GB1H102K	CHIP C 1000PF K		C147			CK73FB1E104K	CHIP C 0.10UF K	
C53-55			CK73GB1H471K	CHIP C 470PF K		C165,166			CC73GCH1H101J	CHIP C 100PF J	
C56			CC73GCH1H471J	CHIP C 470PF J		C167			CK73GB1H102K	CHIP C 1000PF K	
C57			C92-0560-05	CHIP-TAN 10UF 6.3WV		C168			C92-0633-05	CHIP-TAN 22UF 10WV	
C58,59			CK73GB1H102K	CHIP C 1000PF K		C169			CK73GB1H103K	CHIP C 0.010UF K	
C60			CK73GB1H471K	CHIP C 470PF K		C170			CK73FB1E104K	CHIP C 0.10UF K	
C61			CK73GB1H102K	CHIP C 1000PF K		C171,172			CK73GB1H102K	CHIP C 1000PF K	
C62,63			CK73GB1H471K	CHIP C 470PF K		C173			CK73GB1H103K	CHIP C 0.010UF K	
C64,65			CC73GCH1H101J	CHIP C 100PF J		C174			C92-0589-05	CHIP-TAN 47UF 6.3WV	
C66			CK73GB1H102K	CHIP C 1000PF K		C175			CK73FB1E104K	CHIP C 0.10UF K	
C68			CK73GB1H103K	CHIP C 0.010UF K		C186			CK73GB1C104K	CHIP C 0.10UF K	
C69			CK73GB1H102K	CHIP C 1000PF K		C187,188			CK73GB1H102K	CHIP C 1000PF K	
C70			C92-0606-05	CHIP-TAN 4.7UF 10WV		C202-204			CK73GB1H103K	CHIP C 0.010UF K	
C71-73			CK73GB1H103K	CHIP C 0.010UF K		C205			C92-0633-05	CHIP-TAN 22UF 10WV	
C74-76			CC73GCH1H470J	CHIP C 47PF J		C206,207			CC73GCH1H271J	CHIP C 270PF J	
C77			CK73GB1H103K	CHIP C 0.010UF K		C208			C92-0628-05	CHIP-TAN 10UF 10WV	
C78			CK73GB1H152K	CHIP C 1500PF K		C209			C92-0519-05	CHIP-TAN 1.0UF 25WV	
C79			CC73FCH1H751J	CHIP C 750PF J		C210			CC73GCH1H820J	CHIP C 82PF J	
C80			C92-0628-05	CHIP-TAN 10UF 10WV		C211			CK73GB1H102K	CHIP C 1000PF K	
C82			CC73GCH1H100D	CHIP C 10PF D		C212			CC73GCH1H151J	CHIP C 150PF J	
C100			CC73GCH1H070D	CHIP C 7.0PF D		C213			CK73GB1H103K	CHIP C 0.010UF K	
C101			CK73GB1H103K	CHIP C 0.010UF K		C214			CC73GCH1H100D	CHIP C 10PF D	
C102			C92-0001-05	CHIP-C 0.1UF 35WV		C215,216			CK73GB1H103K	CHIP C 0.010UF K	
C103,104			CK73GB1H103K	CHIP C 0.010UF K		C218			CC73GCH1H100D	CHIP C 10PF D	
C105			CK73GB1H102K	CHIP C 1000PF K		C219			CC73GCH1H101J	CHIP C 100PF J	
C106			CK73GB1H471K	CHIP C 470PF K		C220			CK73GB1H103K	CHIP C 0.010UF K	
C107			C92-0606-05	CHIP-TAN 4.7UF 10WV		C221-224			CC73GCH1H271J	CHIP C 270PF J	
C108,109			CK73GB1H102K	CHIP C 1000PF K		C225			CK73GB1H102K	CHIP C 1000PF K	
C110			CK73GB1H103K	CHIP C 0.010UF K		C226			C92-0628-05	CHIP-TAN 10UF 10WV	
C111			C92-0003-05	CHIP-TAN 0.47UF 25WV		C231			CK73GB1H471K	CHIP C 470PF K	
C112			CK73GB1H102K	CHIP C 1000PF K		C232			C92-0004-05	CHIP-TAN 1.0UF 16WV	
C113			CC73GCH1H100D	CHIP C 10PF D		C233			CC73GCH1H180J	CHIP C 18PF J	
C114-116			CK73GB1H103K	CHIP C 0.010UF K		C234			CC73GCH1H390J	CHIP C 39PF J	
C118			CK73GB1H102K	CHIP C 1000PF K		C235			CC73GCH1H180J	CHIP C 18PF J	
C119			CC73GCH1H101J	CHIP C 100PF J		C236			C92-0512-05	CHIP-TAN 1.0UF 16WV	
C120			CK73GB1H102K	CHIP C 1000PF K		C237-239			CK73GB1H102K	CHIP C 1000PF K	
C121			CK73FB1E104K	CHIP C 0.10UF K		C240			C92-0628-05	CHIP-TAN 10UF 10WV	
C123			CK73FB1E104K	CHIP C 0.10UF K		C241			CK73GB1H102K	CHIP C 1000PF K	
C124			C92-0589-05	CHIP-TAN 47UF 6.3WV		C242			CC73GCH1H100D	CHIP C 10PF D	

PARTS LIST

TX UNIT (X56-3040-10)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
C243			CK73GB1H102K	CHIP C 1000PF K		C315			C93-0566-05	CHIP C 33PF J	
C244			C92-0628-05	CHIP-TAN 10UF 10WV		C316			C93-0562-05	CHIP C 15PF J	
C245			CK73GB1H103K	CHIP C 0.010UF K		C317			C92-0729-05	ELECTRO C 330UF 25WV	
C246			CC73GCH1H271J	CHIP C 270PF J		C318			CK73GB1H102K	CHIP C 1000PF K	
C247			C92-0004-05	CHIP-TAN 1.0UF 16WV		C319-322			CK73GB1H471K	CHIP C 470PF K	
C248			CK73GB1H102K	CHIP C 1000PF K		C323-328			CK73GB1H102K	CHIP C 1000PF K	
C249			CC73GCH1H330J	CHIP C 33PF J		C329			CK73GB1H103K	CHIP C 0.010UF K	
C250			CK73GB1H103K	CHIP C 0.010UF K		C330,331			CK73GB1H102K	CHIP C 1000PF K	
C251-253			CK73GB1H102K	CHIP C 1000PF K		C332,333			CK73FB1E104K	CHIP C 0.10UF K	
C254			CC73GCH1H101J	CHIP C 100PF J		C334			C92-0003-05	CHIP-TAN 0.47UF 25WV	
C255,256			CK73GB1H102K	CHIP C 1000PF K		C335			CK73GB1H102K	CHIP C 1000PF K	
C257			CK73GCH1H221J	CHIP C 220PF J		C336,337			C93-0553-05	CHIP C 3.0PF C	
C258,259			CK73GB1H103K	CHIP C 0.010UF K		C338			C93-0555-05	CHIP C 5.0PF C	
C260,261			CC73GCH1H100D	CHIP C 10PF D		C339			CK73GB1H102K	CHIP C 1000PF K	
C262			CK73GB1H103K	CHIP C 0.010UF K		C340			CK73FB1E104K	CHIP C 0.10UF K	
C263			CC73GCH1H220J	CHIP C 22PF J		C341-344			CK73GB1H102K	CHIP C 1000PF K	
C264			CC73GCH1H560J	CHIP C 56PF J		C345			C92-0504-05	CHIP-TAN 0.68UF 20WV	
C265			CK73GB1C104K	CHIP C 0.10UF K		C346			CK73FB1E104K	CHIP C 0.10UF K	
C266,267			CK73GB1E223K	CHIP C 0.022UF K		C348-350			CK73GB1H102K	CHIP C 1000PF K	
C268			C92-0628-05	CHIP-TAN 10UF 10WV		C351			C92-0606-05	CHIP-TAN 4.7UF 10WV	
C269,270			CK73GB1H103K	CHIP C 0.010UF K		C352			CK73GB1H102K	CHIP C 1000PF K	
C271			CK73GB1H471K	CHIP C 470PF K		C353			C93-0603-05	CHIP C 1000PF K	
C272			CC73GCH1H470J	CHIP C 47PF J		C354			CK73GB1H102K	CHIP C 1000PF K	
C273,274			CK73FB1E104K	CHIP C 0.10UF K		C355			CK73FB1E104K	CHIP C 0.10UF K	
C275			CK73GB1H102K	CHIP C 1000PF K		C357			CK73FB1E104K	CHIP C 0.10UF K	
C276			CK73FB1E104K	CHIP C 0.10UF K		C358			CK73GB1H102K	CHIP C 1000PF K	
C277			CC73GCH1H560J	CHIP C 56PF J		C414			C93-0560-05	CHIP C 10PF D	
C278-281			CK73GB1H102K	CHIP C 1000PF K		TC1,2			C05-0393-05	CERAMIC TRIMMER CAP(8P/12)	
C282			CK73GB1H103K	CHIP C 0.010UF K		CN1			E04-0409-05	RF COAXIAL RECEPTACLE(SMB)	
C283			CC73GCH1H271J	CHIP C 270PF J		CN2			E40-5758-05	FLAT CABLE CONNECTOR	
C284			CK73GB1H103K	CHIP C 0.010UF K		CN3			E40-5736-05	FLAT CABLE CONNECTOR	
C285			CC73GCH1H330J	CHIP C 33PF J		CN101,102			E04-0409-05	RF COAXIAL RECEPTACLE(SMB)	
C286			CC73GCH1H151J	CHIP C 150PF J		CN103,104			E40-5538-05	PIN ASSY	
C287			CC73GCH1H101J	CHIP C 100PF J		CN301			E04-0408-05	RF COAXIAL RECEPTACLE(SMB)	
C288			CK73GB1H102K	CHIP C 1000PF K		CN302			E40-5758-05	FLAT CABLE CONNECTOR	
C289			CC73GCH1H220J	CHIP C 22PF J		CN304,305			E40-5538-05	PIN ASSY	
C290			CC73GCH1H100D	CHIP C 10PF D		CN306,307			E23-0902-05	TERMINAL	
C291			CK73GB1H102K	CHIP C 1000PF K		CN308			E04-0408-05	RF COAXIAL RECEPTACLE(SMB)	
C292			CK73GB1H103K	CHIP C 0.010UF K		CN502			E40-5783-05	PIN ASSY	
C293			CK73GB1H102K	CHIP C 1000PF K		J402			J13-0071-05	FUSE HOLDER	
C294			CK73GB1H103K	CHIP C 0.010UF K		CF1		*	L72-0976-05	CERAMIC FILTER	
C295			CC73GCH1H221J	CHIP C 220PF J		L1,2		*	L40-1005-34	SMALL FIXED INDUCTOR(10UH/8)	
C296,297			CC73GCH1H100D	CHIP C 10PF D		L4		*	L40-1005-34	SMALL FIXED INDUCTOR(10UH/8)	
C298			CK73GB1H102K	CHIP C 1000PF K		L5		*	L34-4601-05	AIR-CORE COIL	
C301			C92-0729-05	ELECTRO C 330UF 25WV		L6		*	L34-4600-05	AIR-CORE COIL	
C302,303			CK73GB1H102K	CHIP C 1000PF K		L7			L40-1005-34	SMALL FIXED INDUCTOR(10UH/8)	
C304			CK73GB1H471K	CHIP C 470PF K		L11			L40-1081-36	SMALL FIXED INDUCTOR(100NH/160)	
C305			CK73GB1H103K	CHIP C 0.010UF K		L13			L40-1071-36	SMALL FIXED INDUCTOR(10NH/8)	
C306			CC73GCH1H0R5B	CHIP C 0.5PF B		L14			L40-4771-36	SMALL FIXED INDUCTOR(47NH/1608)	
C307			C93-0561-05	CHIP C 12PF J		L15			L40-1085-54	SMALL FIXED INDUCTOR(100NH/201)	
C308			C92-0729-05	ELECTRO C 330UF 25WV		L16			L92-0140-05	FERRITE CHIP	
C309			CK73GB1H103K	CHIP C 0.010UF K		L17			L92-0138-05	FERRITE CHIP	
C310			CK73FB1E104K	CHIP C 0.10UF K		L101			L40-1095-34	SMALL FIXED INDUCTOR(1UH/8)	
C311			C92-0040-05	CHIP-ELE 47UF 16WV		L102			L40-4785-34	SMALL FIXED INDUCTOR(470NH/8)	
C312			C93-0566-05	CHIP C 33PF J		L103-105			L40-1015-34	SMALL FIXED INDUCTOR(100UH/8)	
C313,314			CK73GB1H102K	CHIP C 1000PF K							

PARTS LIST

TX UNIT (X56-3040-10)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
L106			L40-1095-34	SMALL FIXED INDUCTOR(1UH/8)		R41			RK73GB1J152J	CHIP R 1.5K J 1/16W	
L201			L40-4785-34	SMALL FIXED INDUCTOR(470NH/8)		R42			RK73GB1J470J	CHIP R 47 J 1/16W	
L203			L40-1595-34	SMALL FIXED INDUCTOR(1.5UH/8)		R43			RK73GB1J102J	CHIP R 1.0K J 1/16W	
L204			L40-1015-34	SMALL FIXED INDUCTOR(100UH/8)		R44			RK73GB1J393J	CHIP R 39K J 1/16W	
L205,206			L40-4785-34	SMALL FIXED INDUCTOR(470NH/8)		R45			R92-1252-05	CHIP R 0 OHM	
L207			L40-1095-34	SMALL FIXED INDUCTOR(1UH/8)		R46			R92-0699-05	CHIP R 10 J 1/2W	
L209,210			L40-1015-34	SMALL FIXED INDUCTOR(100UH/8)		R47			R92-1252-05	CHIP R 0 OHM	
L240,241			L40-1015-34	SMALL FIXED INDUCTOR(100UH/8)		R48			RK73GB1J103J	CHIP R 10K J 1/16W	
L242,243			L40-1005-34	SMALL FIXED INDUCTOR(10UH/8)		R49			RK73GB1J123J	CHIP R 12K J 1/16W	
L244,245			L40-4771-36	SMALL FIXED INDUCTOR(47NH/1608)		R50			RK73GB1J471J	CHIP R 470 J 1/16W	
L246			L40-1005-34	SMALL FIXED INDUCTOR(10UH/8)		R51,52			RK73GB1J331J	CHIP R 330 J 1/16W	
L247			L40-1015-34	SMALL FIXED INDUCTOR(100UH/8)		R54			R92-1252-05	CHIP R 0 OHM	
L248			L40-4785-34	SMALL FIXED INDUCTOR(470NH/8)		R55,56			RK73GB1J102J	CHIP R 1.0K J 1/16W	
L301-303			L34-4520-05	AIR-CORE COIL		R57			RK73GB1J471J	CHIP R 470 J 1/16W	
L304			L79-0558-05	FILTER		R58,59			RK73GB1J683J	CHIP R 68K J 1/16W	
L305			L34-4523-05	AIR-CORE COIL		R60			RK73GB1J224J	CHIP R 220K J 1/16W	
L306			L92-0179-05	FERRITE CHIP		R61			RK73GB1J471J	CHIP R 470 J 1/16W	
X101			L77-1735-05	TCXO (20MHZ/5P)		R62			RK73GB1J104J	CHIP R 100K J 1/16W	
X201			L77-1748-05	CRYSTAL RESONATOR		R63			RK73GB1J101J	CHIP R 100 J 1/16W	
XF210,211			L71-0529-05	MCF (20MHZ 2K/3P)		R64			RK73GB1J471J	CHIP R 470 J 1/16W	
R1,2			RK73GB1J221J	CHIP R 220 J 1/16W		R65			RK73GB1J474J	CHIP R 470K J 1/16W	
R3,4			RK73GB1J473J	CHIP R 47K J 1/16W		R67			RK73GB1J124J	CHIP R 120K J 1/16W	
R5,6			RK73GB1J104J	CHIP R 100K J 1/16W		R68			RK73GB1J224J	CHIP R 220K J 1/16W	
R7			RK73GB1J333J	CHIP R 33K J 1/16W		R69,70			RK73GB1J473J	CHIP R 47K J 1/16W	
R8			RK73GB1J273J	CHIP R 27K J 1/16W		R71			RK73GB1J474J	CHIP R 470K J 1/16W	
R9			RK73GB1J101J	CHIP R 100 J 1/16W		R72			RK73GB1J101J	CHIP R 100 J 1/16W	
R10,11			R92-1252-05	CHIP R 0 OHM		R73			RK73GB1J104J	CHIP R 100K J 1/16W	
R12			RK73GB1J101J	CHIP R 100 J 1/16W		R74			RK73GB1J221J	CHIP R 220 J 1/16W	
R13			RK73GB1J471J	CHIP R 470 J 1/16W		R77			RK73GB1J471J	CHIP R 470 J 1/16W	
R14			RK73GB1J103J	CHIP R 10K J 1/16W		R78,79			RK73GB1J331J	CHIP R 330 J 1/16W	
R15			RK73GB1J471J	CHIP R 470 J 1/16W		R84			R92-1252-05	CHIP R 0 OHM	
R16			RK73GB1J103J	CHIP R 10K J 1/16W		R85-87			RK73GB1J101J	CHIP R 100 J 1/16W	
R17			RK73GB1J473J	CHIP R 47K J 1/16W		R88			RK73GB1J183J	CHIP R 18K J 1/16W	
R18			RK73GB1J103J	CHIP R 10K J 1/16W		R89			RK73GB1J222J	CHIP R 2.2K J 1/16W	
R19			RK73GB1J470J	CHIP R 47 J 1/16W		R100			RK73GB1J103J	CHIP R 10K J 1/16W	
R20			RK73GB1J103J	CHIP R 10K J 1/16W		R101			RK73GB1J105J	CHIP R 1.0M J 1/16W	
R21			RK73GB1J471J	CHIP R 470 J 1/16W		R102			RK73GB1J473J	CHIP R 47K J 1/16W	
R22			RK73GB1J103J	CHIP R 10K J 1/16W		R105,106			RK73GB1J101J	CHIP R 100 J 1/16W	
R23			RK73GB1J183J	CHIP R 18K J 1/16W		R107			RK73GB1J471J	CHIP R 470 J 1/16W	
R24			RK73GB1J101J	CHIP R 100 J 1/16W		R108			RK73GB1J183J	CHIP R 18K J 1/16W	
R25			RK73GB1J472J	CHIP R 4.7K J 1/16W		R109			R92-0670-05	CHIP R 0 OHM	
R26			RK73GB1J220J	CHIP R 22 J 1/16W		R112			RK73GB1J183J	CHIP R 18K J 1/16W	
R27			RK73GB1J101J	CHIP R 100 J 1/16W		R113			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R28			RK73GB1J103J	CHIP R 10K J 1/16W		R114			RK73GB1J222J	CHIP R 2.2K J 1/16W	
R29			RK73GB1J183J	CHIP R 18K J 1/16W		R115			RK73GB1J101J	CHIP R 100 J 1/16W	
R30			RK73GB1J103J	CHIP R 10K J 1/16W		R117			RK73GB1J101J	CHIP R 100 J 1/16W	
R31			RK73GB1J101J	CHIP R 100 J 1/16W		R118			RK73GB1J183J	CHIP R 18K J 1/16W	
R32			RK73GB1J221J	CHIP R 220 J 1/16W		R119			RK73GB1J103J	CHIP R 10K J 1/16W	
R33			RK73GB1J103J	CHIP R 10K J 1/16W		R120			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R34			RK73GB1J222J	CHIP R 2.2K J 1/16W		R121			R92-1252-05	CHIP R 0 OHM	
R35			RK73GB1J182J	CHIP R 1.8K J 1/16W		R122			RK73GB1J101J	CHIP R 100 J 1/16W	
R36			RK73GB1J472J	CHIP R 4.7K J 1/16W		R123			RK73GB1J103J	CHIP R 10K J 1/16W	
R37			RK73GB1J153J	CHIP R 15K J 1/16W		R124			RK73GB1J222J	CHIP R 2.2K J 1/16W	
R38			RK73GB1J183J	CHIP R 18K J 1/16W		R129			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R39			RK73GB1J331J	CHIP R 330 J 1/16W		R130			RK73GB1J331J	CHIP R 330 J 1/16W	
R40			RK73GB1J101J	CHIP R 100 J 1/16W		R131			RK73GB1J102J	CHIP R 1.0K J 1/16W	

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TX UNIT (X56-3040-10)

Ref. No.	Address	New parts	Parts No.	Description	Destination
R132			RK73GB1J124J	CHIP R	
R133			RK73GB1J104J	CHIP R	
R134			RK73GB1J102J	CHIP R	
R137			RK73GB1J103J	CHIP R	
R138			RK73GB1J124J	CHIP R	
R139			RK73GB1J104J	CHIP R	
R140			RK73GB1J393J	CHIP R	
R141			RK73GB1J102J	CHIP R	
R142			RK73GB1J104J	CHIP R	
R143			RK73GB1J473J	CHIP R	
R144			RK73GB1J334J	CHIP R	
R145,146			RK73GB1J101J	CHIP R	
R147			RK73GB1J102J	CHIP R	
R149			RK73GB1J103J	CHIP R	
R150			RK73GB1J472J	CHIP R	
R151			RK73GB1J222J	CHIP R	
R180,181			R92-1252-05	CHIP R	
R182			RK73GB1J472J	CHIP R	
R183			RK73GB1J473J	CHIP R	
R184			RK73GB1J153J	CHIP R	
R185			RK73GB1J101J	CHIP R	
R186			RK73GB1J472J	CHIP R	
R190-192			R92-1252-05	CHIP R	
R201,202			R92-1252-05	CHIP R	
R203			RK73GB1J223J	CHIP R	
R204			RK73GB1J822J	CHIP R	
R205			RK73GB1J473J	CHIP R	
R206,207			RK73GB1J474J	CHIP R	
R207			RK73GB1J474J	CHIP R	
R208			RK73GB1J104J	CHIP R	
R209			RK73GB1J103J	CHIP R	
R210			R92-1252-05	CHIP R	
R211			RK73GB1J474J	CHIP R	
R212			RK73GB1J471J	CHIP R	
R213			RK73GB1J101J	CHIP R	
R214			RK73GB1J821J	CHIP R	
R215			RK73GB1J124J	CHIP R	
R216			RK73GB1J104J	CHIP R	
R217,218			RK73GB1J471J	CHIP R	
R219			RK73GB1J103J	CHIP R	
R220			RK73GB1J473J	CHIP R	
R221			RK73GB1J560J	CHIP R	
R222			RK73GB1J103J	CHIP R	
R223			RK73GB1J153J	CHIP R	
R224			RK73GB1J223J	CHIP R	
R225			RK73GB1J103J	CHIP R	
R226			RK73GB1J124J	CHIP R	
R227			RK73GB1J473J	CHIP R	
R228			RK73GB1J104J	CHIP R	
R240			RK73GB1J101J	CHIP R	
R241,242			RK73GB1J473J	CHIP R	
R243			RK73GB1J103J	CHIP R	
R244			RK73GB1J392J	CHIP R	
R245			RK73GB1J101J	CHIP R	
R247			RK73GB1J101J	CHIP R	
R249			RK73GB1J473J	CHIP R	

Ref. No.	Address	New parts	Parts No.	Description	Destination
R250			RK73GB1J221J	CHIP R	
R251,252			RK73GB1J101J	CHIP R	
R253			RK73GB1J102J	CHIP R	
R254			R92-1252-05	CHIP R	
R257,258			R92-1261-05	CHIP R	
R259			R92-1273-05	CHIP C	
R260			RK73GB1J183J	CHIP R	
R261,262			RK73GB1J101J	CHIP R	
R263			RK73GB1J473J	CHIP R	
R264-266			RK73GB1J273J	CHIP R	
R267			RK73GB1J103J	CHIP R	
R268			RK73GB1J153J	CHIP R	
R269			RK73GB1J102J	CHIP R	
R270,271			R92-1201-05	CHIP R	
R272			RK73GB1J103J	CHIP R	
R273			RK73GB1J473J	CHIP R	
R274			RK73GB1J101J	CHIP R	
R275			RK73GB1J560J	CHIP R	
R300			RK73GB1J101J	CHIP R	
R301			RK73GB1J473J	CHIP R	
R303			RK73FB2A331J	CHIP R	
R304			RK73FB2A820J	CHIP R	
R305			RK73FB2A331J	CHIP R	
R306			RK73GB1J103J	CHIP R	
R308			R92-1252-05	CHIP R	
R310			R92-1201-05	CHIP R	
R311			RK73GB1J473J	CHIP R	
R312			R92-1201-05	CHIP R	
R313			RK73GB1J102J	CHIP R	
R314			RK73GB1J104J	CHIP R	
R315			RK73GB1J102J	CHIP R	
R316,317			RK73GB1J473J	CHIP R	
R318			RK73GB1J472J	CHIP R	
R319			RK73GB1J483J	CHIP R	
R320			RK73GB1J474J	CHIP R	
R321			RK73GB1J472J	CHIP R	
R322			RK73GB1J103J	CHIP R	
R323,324			RK73GB1J472J	CHIP R	
R325			RK73GB1J562J	CHIP R	
R326			RK73GB1J103J	CHIP R	
R327			RK73FB2A331J	CHIP R	
R328			RK73FB2A271J	CHIP R	
R329			RK73GB1J103J	CHIP R	
R330			RK73GB1J153J	CHIP R	
R331			RK73GB1J223J	CHIP R	
R332			RK73GB1J823J	CHIP R	
R333			RK73GB1J473J	CHIP R	
R334			RK73GB1J273J	CHIP R	
R335			RK73GB1J102J	CHIP R	
R337			RK73FB2A272J	CHIP R	
R339			R92-1252-05	CHIP R	
R340			RK73GB1J102J	CHIP R	
R341			RK73GB1J103J	CHIP R	
R342			RK73GB1J472J	CHIP R	
R343			RK73FB2A102J	CHIP R	
R344			RK73GB1J472J	CHIP R	

Ref. No.	Address	New parts	Parts No.	Description	Destination
R345			RK73GB1J473J	CHIP R	
R346			RK73FB2A102J	CHIP R	
R347			RK73GB1J103J	CHIP R	
R348			RK73FB2A292J	CHIP R	
R349			RK73GB1J223J	CHIP R	
R350			RK73GB1J473J	CHIP R	
R354,355			RK73GB1J473J	CHIP R	
R356			RK73GB1J104J	CHIP R	
R357			RK73GB1J102J	CHIP R	
R358			RK73FB2A331J	CHIP R	
R359			RK73FB2A820J	CHIP R	
R360			RK73GB1J103J	CHIP R	
R360			R92-1252-05	CHIP R	
R605			R92-1252-05	CHIP R	
TS301			S79-0401-05	THERMAL SWITCH	
D1-6			1SV283	VARIABLE CAPACITANCE DIODE	
D7			1SV128	DIODE	
D11,12			1SS355	DIODE	
D101			1SV128	DIODE	
D103			1SV128	DIODE	
D201-203			1SV283	VARIABLE CAPACITANCE DIODE	
D204			1SS355	DIODE	
D205			HSM88AS	DIODE	
D206			MINISMDC075-02	VARISTOR	
D303			ERZ-M14DK220M	SURGE ABSORBER	
D304			1SS355	DIODE	
D305			DSM3MA1	DIODE	
D306-308			HSM88AS	DIODE	
D310			MINISMDC075-02	VARISTOR	
D312			02CZ121X,Y	ZENER DIODE	
D317,318			1SS355	DIODE	
D500			MINISMD190	VARISTOR	
IC1			TA7808S	IC(REGULATOR)	
IC2			NJM78L08UA	IC(VOLTAGE REGULATOR/ +8V)	
IC3			MA2364FP	IC(D/A CONVERTER)	
IC4			BU4094BCFV	IC(8bit SHIFT/STORE REGISTER)	
IC100			TA75S01F	IC(OP AMP)	
IC101			SA7025DK	IC(PLL SYSTEM)	
IC102			TA75S01F	IC(OP AMP)	
IC103			NJM78L05UA	IC(VOLTAGE REGULATOR/ +5V)	
IC105			NJM4558E	IC(OP AMP X2)	
IC106			AT2408N10S12.5	IC(8bit SERIAL EEPROM)	
IC107			NJM4558E	IC(OP AMP X2)	
IC108			NJM78L08UA	IC(VOLTAGE REGULATOR/ +8V)	
IC109			NJM2904E	IC(OP AMP X2)	
IC110			NJM78L05UA	IC(VOLTAGE REGULATOR/ +5V)	
IC200			TC4S81F	IC(UNLOCK COMPARETER)	
IC201			SA7025DK	IC(PLL SYSTEM)	
IC202			AD9835BRU	MOS IC	
IC203			NJM2904E	IC(OP AMP X2)	
IC204			NJM2903M	IC(COMPARATOR X2)	
IC205			NJM78L05UA	IC(VOLTAGE REGULATOR/ +5V)	

PARTS LIST

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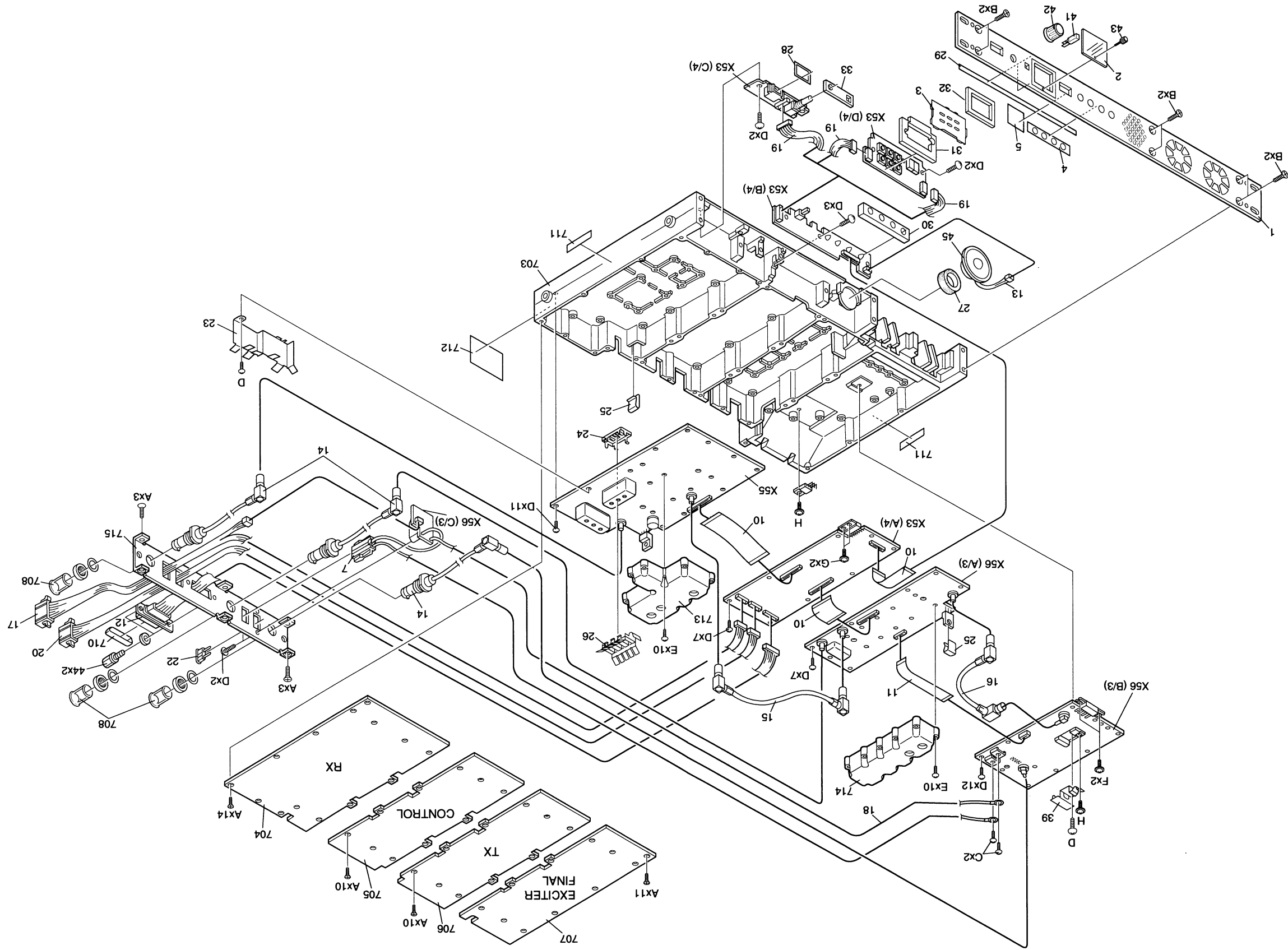
TX UNIT (X56-3040-10)

Ref. No.	Address	New parts	Parts No.	Description	Destination
R345			RK73GB1J473J	CHIP R	
R346			RK73FB2A102J	CHIP R	
R347			RK73GB1J103J	CHIP R	
R348			RK73FB2A292J	CHIP R	
R349			RK73GB1J223J	CHIP R	
R350			RK73GB1J473J	CHIP R	
R354,355			RK73GB1J473J	CHIP R	
R356			RK73GB1J104J	CHIP R	
R357			RK73GB1J102J	CHIP R	
R358			RK73FB2A331J	CHIP R	
R359			RK73FB2A820J	CHIP R	
R360			RK73GB1J103J	CHIP R	
R605			R92-1252-05	CHIP R	
TS301			S79-0401-05	THERMAL SWITCH	
D1-6			1SV283	VARIABLE CAPACITANCE DIODE	
D7			1SV128	DIODE	
D11,12			1SS355	DIODE	
D101			1SV128	DIODE	
D103			1SV128	DIODE	
D201-203			1SV283	VARIABLE CAPACITANCE DIODE	
D204			1SS355	DIODE	
D205			HSM88AS	DIODE	
D206			MINISMDC075-02	VARISTOR	
D303			ERZ-M14DK220M	SURGE ABSORBER	
D304			1SS355	DIODE	
D305			DSM3MA1	DIODE	
D306-308			HSM88AS	DIODE	
D310			MINISMDC075-02	VARISTOR	
D312			02CZ121X,Y	ZENER DIODE	
D317,318			1SS355	DIODE	
D500			MINISMD190	VARISTOR	
IC1			TA7808S	IC(REGULATOR)	
IC2			NJM78L08UA	IC(VOLTAGE REGULATOR/ +8V)	
IC3			MA2364FP	IC(D/A CONVERTER)	
IC4			BU4094BCFV	IC(8bit SHIFT/STORE REGISTER)	
IC100			TA75S01F	IC(OP AMP)	
IC101			SA7025DK	IC(PLL SYSTEM)	
IC102			TA75S01F	IC(OP AMP)	
IC103			NJM78L05UA	IC(VOLTAGE REGULATOR/ +5V)	
IC105			NJM4558E	IC(OP AMP X2)	
IC106			AT2408N10S12.5	IC(8bit SERIAL EEPROM)	
IC107			NJM4558E	IC(OP AMP X2)	
IC108			NJM78L08UA	IC(VOLTAGE REGULATOR/ +8V)	
IC109			NJM2904E	IC(OP AMP X2)	
IC110			NJM78L05UA	IC(VOLTAGE REGULATOR/ +5V)	
IC200			TC4S81F	IC(UNLOCK COMPARETER)	
IC201			SA7025DK	IC(PLL SYSTEM)	
IC202			AD9835BRU	MOS IC	
IC203			NJM2904E	IC(OP AMP X2)	
IC204			NJM2903M	IC(COMPARATOR X2)	
IC205			NJM78L05UA	IC(VOLTAGE REGULATOR/ +5V)	

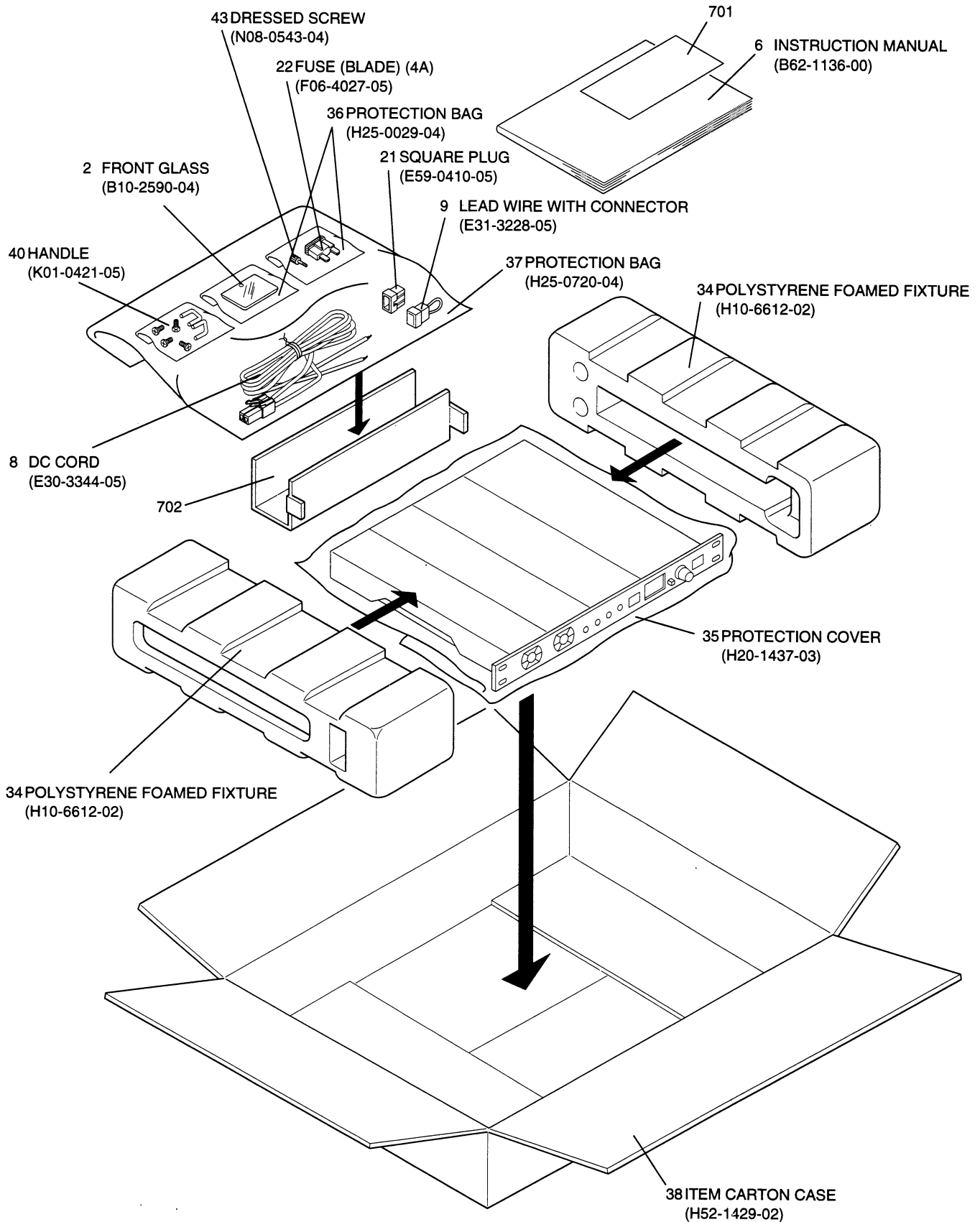
Ref. No.	Address	New parts	Parts No.	Description	Destination
IC206			TC74HC14AF	IC(SCHMITT INVERTER)	
IC207,303			M68776	IC(RF MODULE)	
IC304			TC4W66F	IC	
Q1,2			2SK508NV(K52)	FET	
Q3,4			2SC3722K(S)	TRANSISTOR	
Q5			2SK1824	FET	
Q6			2SC3120	TRANSISTOR	
Q7			2SC3722K(S)	TRANSISTOR	
Q8			IMH5	TRANSISTOR	
Q9			2SC3120	TRANSISTOR	
Q11			2SB1386(R)	TRANSISTOR	
Q12			DTC114EUA	DIGITAL TRANSISTOR	
Q13			2SC3356	TRANSISTOR	
Q14			2SK2596	FET	
Q15			2SK302(Y)	FET	
Q17,18			2SK1824	FET	
Q21			UMC5	TRANSISTOR	
Q102			2SC4215(Y)	TRANSISTOR	
Q106			2SC4215(Y)	TRANSISTOR	
Q107			2SC3120	TRANSISTOR	
Q108,109			2SC4215(Y)	TRANSISTOR	
Q110			UMC5	TRANSISTOR	
Q112,113			2SK1824	FET	
Q114			DTA114EUA	DIGITAL TRANSISTOR	
Q115			2SC4215(Y)	TRANSISTOR	
Q201,202			2SC4215(Y)	TRANSISTOR	
Q203			2SK1824	FET	
Q205			2SC4215(Y)	TRANSISTOR	
Q206			2SK1824	FET	
Q207			DTC114EUA	DIGITAL TRANSISTOR	
Q208			2SK1824	FET	
Q240-242			2SC4215(Y)	TRANSISTOR	
Q301			2SC4081(R)	TRANSISTOR	
Q302			IMH5	TRANSISTOR	
Q304			IMH5	TRANSISTOR	
Q305			DTC114EUA	DIGITAL TRANSISTOR	
Q306			2SB951A(Q)	TRANSISTOR	
Q309			2SB951A(Q)	TRANSISTOR	
Q310			FMW1	TRANSISTOR	
Q312,313			DTC114EUA	DIGITAL TRANSISTOR	
TH301,302			157-503-53006	THERMISTOR	

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EXPLODED VIEW



PACKING



TERMINAL FUNCTION

CONTROL UNIT (X53-3880-10)

CN1

Terminal No.	Terminal name	Terminal function	I/O
1	RA	RX Audio (filtered signal)	I
2	RXG	RX Audio ground	-
3	DET	Detector audio	I
4	DEG	Detector audio ground	-
5	SC	Noise squelch control	I
6	RSSI	RX signal strength indicator	I
7	CK	Common clock	O
8	DT	Common data	O
9	ESR	Shift register strobe	O
10	EVR	Electronic volume strobe	O
11	SCL	RX EEPROM serial clock	O
12	SDA	RX EEPROM serial data	I/O
13	DP	PLL data signal	O
14	CP	PLL clock signal	O
15	EPR	RX main PLL strobe signal	O
16	LDR	RX PLL lock detector	I
17	GND	Ground	-
18	CVR	RX main PLL lock voltage	I
19	NC	No connection	-
20	NC	No connection	-
21	B	Power supply (Vcc)	O
22	B	Power supply (Vcc)	O
23	B	Power supply (Vcc)	O
24	NC	No connection	-
25	NC	No connection	-
26	NC	No connection	-

CN3

Terminal No.	Terminal name	Terminal function	I/O
1	SPI	Local speaker input	O
2	SPG	Local speaker ground	-
3	VLO	AF volume control output	I
4	VL I	AF volume control input	O
5	GND	Ground	-
6	BLT	Mic connector J700 (1pin)	I
7	8C	8V constant voltage	O
8	HOK	Hook-switch	I
9	PTT	Press-to-talk-switch	I
10	EXR	Exit reference indicator	O
11	SW1	Programable switch S705	I
12	SW2	Programable switch S704	I
13	B	Power supply (Vcc)	O
14	B	Power supply (Vcc)	O
15	SW3	Programable switch S703	I
16	SW4	Programable switch S702	I
17	TEST	Test switch	I
18	SW5	Programable switch S701	I
19	SW6	Programable switch S700	I
0	EN7	Shift register enable signal	O
21	MDAT	Mic connector J700 (8pin)	I
22	DT	Serial data for IC703	O
23	CK	Common serial clock	O
24	GND	Ground	-
25	MI	Microphone signal	I
26	MIG	Microphone ground	-

CN2

Terminal No.	Terminal name	Terminal function	I/O
1	MOD	Modulation signal	O
2	TO	Signalling signal	O
3	MIG	Microphone ground	-
4	EVT	TX electronic volume enable signal	O
5	EST	TX shift register enable signal	O
6	DT	Data signal for IC3 & IC4	O
7	CK	Clock signal for IC3 & IC4	O
8	NC	No connection	-
9	NC	No connection	-
10	SDA	RX EEPROM serial data	O
11	SCL	RX EEPROM serial clock	I/O
12	LDT	TX main PLL lock detector	I
13	PRT	High temperature detect	I
14	CP	TX both PLL clock signal	O
15	NC	No connection	-
16	DP	TX both PLL data signal	O
17	EXR	Exit reference detector	I
18	CVT	TX main PLL lock voltage	I
19	REV	Reverse TX power detector	I
20	FWD	Forward TX power detector	I
21	GND	Ground	-
22	PAG	Digital pager signal	O
23	B	Power supply (Vcc)	I
24	B	Power supply (Vcc)	I
25	B	Power supply (Vcc)	I
26	PAB	Power supply for AF PA IC	I

CONTROL UNIT (X53-3880-10)

CN4

Terminal No.	Terminal name	Terminal function	I/O
1	SPM	Speaker mute signal	I
2	AUX06	Auxiliary output 6	O
3	RXG	RX signal ground	-
4	AUX05	Auxiliary output 5	O
5	RA	RX audio (voice)	O
6	AUX04	Auxiliary output 4	O
7	RD	RX data (voice & data)	O
8	AUX03	Auxiliary output 3	O
9	TA	TX audio (voice)	I
10	AUX02	Auxiliary output 2	O
11	TD	TX data (data or signalling)	I
12	AUX01	Auxiliary output 1	O
13	DG	Control line ground	-
14	TXG	TX signal ground	-
15	AUXI3	Auxiliary input 3	I
16	NC	No connection	-
17	AUXI2	Auxiliary input 2	I
18	SC	SQ control	O
19	AUXI1	Auxiliary input 1	I
20	ExPTT	External press-to-talk switch	I
21	TXD	RS-232C output signal (for FPU)	O
22	ExMON	External monitor switch	I
23	RXD	RS-232C input signal (for FPU)	I
24	NC	No connection	-
25	NC	No connection	-
26	NC	No connection	-
27	NC	No connection	-
28	NC	No connection	-
29	NC	No connection	-
30	NC	No connection	-

CN5

Terminal No.	Terminal name	Terminal function	I/O
1	B	Power supply (Vcc)	O
2	FWD	TX forward power detect signal	O
3	EXR	External reference detect signal	O
4	CVT	TX main PLL lock voltage signal	O
5	CVR	RX main PLL lock voltage signal	O
6	RD	RX data (data & voice)	O
7	RSSI	RX signal strength indicator signal	O
8	SPO	External Speaker AF	O
9	SPO	External Speaker AF	O
10	SPI	Internal Speaker AF input	I
11	GND	Ground	-
12	GND	Ground	-
13	SPG	External Speaker ground	-
14	SPG	External Speaker ground	-

CN6

Terminal No.	Terminal name	Terminal function	I/O
1	RRA	Remote RX signal (voice)	O
2	RTA	Remote TX signal (voice)	I
3	RPTT	Remote Press-to-talk switch	I
4	ExMON	External monitor switch	I
5	GND	Ground	-
6	I/O1	Programmable I/O 1	I/O
7	I/O2	Programmable I/O 2	I/O
8	I/O3	Programmable I/O 3	I/O
9	I/O4	Programmable I/O 4	I/O
10	I/O5	Programmable I/O 5	I/O
11	I/O6	Programmable I/O 6	I/O
12	I/O7	Programmable I/O 7	I/O

CN700

Terminal No.	Terminal name	Terminal function	I/O
1	B	Power supply (Vcc)	I
2	SW1	S705 output	O
3	SW2	S704 output	O
4	SW3	S703 output	O
5	SW4	S702 output	O
6	SW5	S701 output	O
7	SW6	S700 output	O

CN701

Terminal No.	Terminal name	Terminal function	I/O
1	5A2	5V constant voltage A	I
2	5B2	5V constant voltage B	I
3	EN7	Enable signal for IC700, 701, 702	I
4	CK	Common Clock for IC700, 701, 702	I
5	DS	Serial data for IC702	I
6	GND	Ground	-

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TERMINAL FUNCTION

CONTROL UNIT (X53-3880-10)

CN702

Terminal No.	Terminal name	Terminal function	I/O
1	SPI	Local speaker input	I
2	SPG	Local speaker ground	-
3	VLO	AF volume control output	O
4	VLI	AF volume control input	I
5	GND	Ground	-
6	BLT	Mic connector J700 (1pin)	O
7	8C	8V constant voltage	I
8	HOK	Hook-switch	O
9	PTT	Press-to-talk-switch	O
10	EXR	External reference indicator	I
11	SW1	Programable switch S705	O
12	SW2	Programable switch S704	O
13	B	Power supply (Vcc)	I
14	B	Power supply (Vcc)	I
15	SW3	Programable switch S703	O
16	SW4	Programable switch S702	O
17	TEST	Test switch	O
18	SW5	Programable switch S701	O
19	SW6	Programable switch S700	O
20	EN7	Shift register enable signal	I
21	MDAT	Mic connector J700 (8pin)	O
22	DT	Serial data for IC703	I
23	CK	Common serial clock	I
24	GND	Ground	-
25	MI	Microphone signal	O
26	MIG	Microphone ground	-

CN703

Terminal No.	Terminal name	Terminal function	I/O
1	SPG	Internal Speaker ground	-
2	SP	Internal Speaker AF output	O

CN705

Terminal No.	Terminal name	Terminal function	I/O
1	VLO	AF signal for VR701	I
2	VLI	AF signal from VR701	O
3	GND	Ground	-
4	BLT	Mic connector J700 (pin1)	-
5	B	Power supply (Vcc)	I
6	GND	Ground	-
7	PTT	Press-to-talk switch	O
8	MIG	Microphone ground	-
9	MIC	Microphone signal	O
10	HOK	Hook signal	O
11	MDAT	Mic connector J700 (pin8)	-
12	NC	No connection	-
13	NC	No connection	-
14	NC	No connection	-

CN706

Terminal No.	Terminal name	Terminal function	I/O
1	NC	No connection	-
2	SW6	Switch S700 signal	I
3	NC	No connection	-
4	SW5	Switch S701 signal	I
5	NC	No connection	-
6	SW4	Switch S702 signal	I
7	MDAT	Mic connector J700 (pin8)	-
8	SW3	Switch S703 signal	I
9	HOK	Hook signal	I
10	SW2	Switch S704 signal	I
11	MIC	Local mic signal	I
12	SW1	Switch S705 signal	I
13	MIG	Local mic ground	-
14	B	Power supply (Vcc)	O
15	PTT	Press to talk switch	I
16	5A2	5V constant voltage A	O
17	GND	Ground	-
18	5B2	5V constant voltage B	O
19	B	Power supply (Vcc)	O
20	EN7	Shift register enable	O
21	BLT	Mic connector J700 (pin1)	-
22	CK	Common clock	O
23	GND	Ground	-
24	DS	Serial data from IC703	O
25	VLI	AF signal for VR701	I
26	GND	Ground	-
27	VLO	AF signal from VR701	O
28	NC	No connection	-
29	NC	No connection	-
30	NC	No connection	-

TERMINAL FUNCTION

TX UNIT (X56-3040-10)
CN1

Terminal No.	Terminal name	Terminal function	I/O
-	DRIV OUT	Drive signal output (coaxial)	O

CN2

Terminal No.	Terminal name	Terminal function	I/O
1	PAB	AFPA power supply (Vcc)	I
2	B	Power supply (Vcc)	I
3	B	Power supply (Vcc)	I
4	B	Power supply (Vcc)	I
5	H/L	High power/Low power control	O
6	FWD	Forward power detect voltage	I
7	REV	Reflected power detect voltage	I
8	PC	TX power control signal	O
9	PRT	High temperature detector signal	I
10	GND	Ground	-
11	8T	TX 8V constant voltage	O
12	AUX	Auxiliary	-

CN3

Terminal No.	Terminal name	Terminal function	I/O
1	MOD	Modulation signal	I
2	TO	Signalling signal	I
3	MIG	Microphone ground	-
4	EVT	TX electronic volume enable signal	I
5	EST	TX shift register enable signal	I
6	DT	Data signal for IC3 & IC4	I
7	CK	Clock signal for IC3 & IC4	I
8	NC	No connection	-
9	NC	No connection	-
10	SDA	RX EEPROM serial data	I
11	SCL	RX EEPROM serial clock	I/O
12	LDT	TX main PLL lock detector	O
13	PRT	High temperature detect	O
14	CP	TX both PLL clock signal	I
15	NC	No connection	-
16	DP	TX both PLL data signal	I
17	EXR	External reference detector	O
18	CVT	TX main PLL lock voltage	O
19	REV	Reverse TX power detector	O
20	FWD	Forward TX power detector	O
21	GND	Ground	-
22	PAG	Digital pager signal	I
23	B	Power supply (Vcc)	O
24	B	Power supply (Vcc)	O
25	B	Power supply (Vcc)	O
26	PAB	Power supply for AF PA IC	O

CN101

Terminal No.	Terminal name	Terminal function	I/O
-	EXT REF	External reference signal input (coaxial)	I

CN102

Terminal No.	Terminal name	Terminal function	I/O
-	REF OUT	RX reference signal output (coaxial)	O

CN103

Terminal No.	Terminal name	Terminal function	I/O
1	GND	Ground	-
2	FB	Fused +B (for cooling FAN)	O

CN104

Terminal No.	Terminal name	Terminal function	I/O
1	GND	Ground	-
2	FB	Fused +B (for cooling FAN)	O

CN301

Terminal No.	Terminal name	Terminal function	I/O
-	DRIV IN	Drive signal input (coaxial)	I

CN302

Terminal No.	Terminal name	Terminal function	I/O
1	PAB	AFPA power supply (Vcc)	O
2	B	Power supply (Vcc)	O
3	B	Power supply (Vcc)	O
4	B	Power supply (Vcc)	O
5	H/L	High power/Low power control	I
6	FWD	Forward power detect voltage	O
7	REV	Reflected power detect voltage	O
8	PC	TX power control signal	I
9	PRT	High temperature detector signal	O
10	GND	Ground	-
11	8T	TX 8V constant voltage	I
12	AUX	Auxiliary	-

CN304

Terminal No.	Terminal name	Terminal function	I/O
1	GND	Ground	-
2	FB	Fused +B (for cooling FAN)	O

CN305

Terminal No.	Terminal name	Terminal function	I/O
1	GND	Ground	-
2	FB	Fused +B (for cooling FAN)	O

CN306

Terminal No.	Terminal name	Terminal function	I/O
-	+B	Power supply input (Vcc)	I

TERMINAL FUNCTION

TX UNIT (X56-3040-10)

CN307

Terminal No.	Terminal name	Terminal function	I/O
-	GND	Power supply ground	-

CN308

Terminal No.	Terminal name	Terminal function	I/O
-	RF OUT	TX power output (coaxial)	I

CN502

Terminal No.	Terminal name	Terminal function	I/O
1	B	Fused +B (for external equipment)	O
2	B	Fused +B (for external equipment)	O
3	NC	No connection	-

RX UNIT (X55-3050-XX)

CN1

Terminal No.	Terminal name	Terminal function	I/O
-	RX IN	Receive signal input (coaxial)	I

CN2

Terminal No.	Terminal name	Terminal function	I/O
-	-	Use for RX helical BPF tuning	O

CN3

Terminal No.	Terminal name	Terminal function	I/O
1	IN	Use for RX MCF tuning	I
2	GND	Use for RX MCF tuning	-

CN4

Terminal No.	Terminal name	Terminal function	I/O
1	OUT	Use for wide band MCF tuning	O
2	GND	Use for wide band MCF tuning	-

CN5

Terminal No.	Terminal name	Terminal function	I/O
1	OUT	Use for narrow band MCF tuning	O
2	GND	Use for narrow band MCF tuning	-

CN6

Terminal No.	Terminal name	Terminal function	I/O
1	RA	RX Audio (filtered signal)	O
2	RXG	RX Audio ground	-
3	DET	Detector audio	O
4	DEG	Detector audio ground	-
5	SC	Noise squelch control	O
6	RSSI	RX signal strength indicator	O
7	CK	Common clock	I
8	DT	Common data	I
9	ESR	Shift register strobe	I
10	EVR	Electronic volume strobe	I
11	SCL	RX EEPROM serial clock	I
12	SDA	RX EEPROM serial data	I/O
13	DP	PLL data signal	I
14	CP	PLL clock signal	I
15	EPR	RX main PLL strobe signal	I
16	LDR	RX PLL lock detector	O
17	GND	Ground	-
18	CVR	RX main PLL lock voltage	O
19	NC	No connection	-
20	NC	No connection	-
21	B	Power supply (Vcc)	I
22	B	Power supply (Vcc)	I
23	B	Power supply (Vcc)	I
24	NC	No connection	-
25	NC	No connection	-
26	NC	No connection	-

CN7

Terminal No.	Terminal name	Terminal function	I/O
-	REF IN	Reference signal input (coaxial)	I

ADJUSTMENT

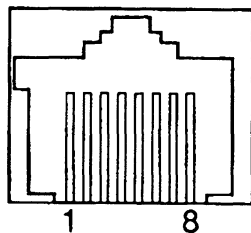
Test Equipment Required for Alignment

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

The Following Parts are Required for Adjustment

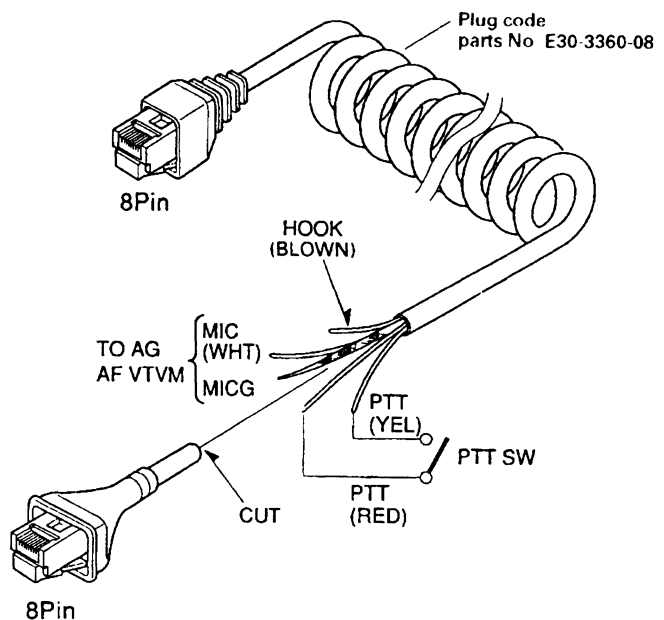
- Test cable for local microphone

MIC connector
front PANEL view



No.	Terminal name & Description
1	NC
2	+B
3	GND
4	PTT/TXD1(PC serial data from radio)
5	MIC G
6	MIC
7	HOOK/RXD1(PC serial data to radio)
8	NC

- The following test cables are recommended

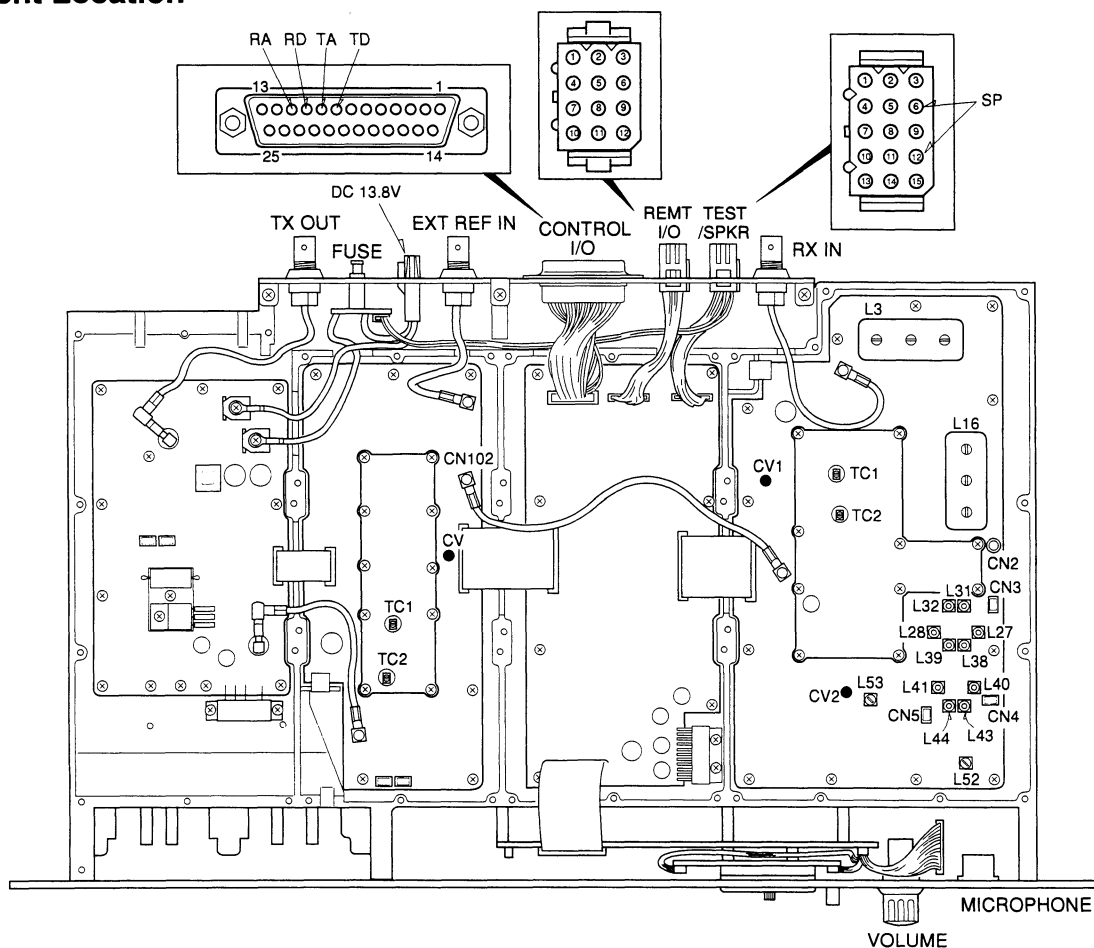


Test cable for Microphone input.

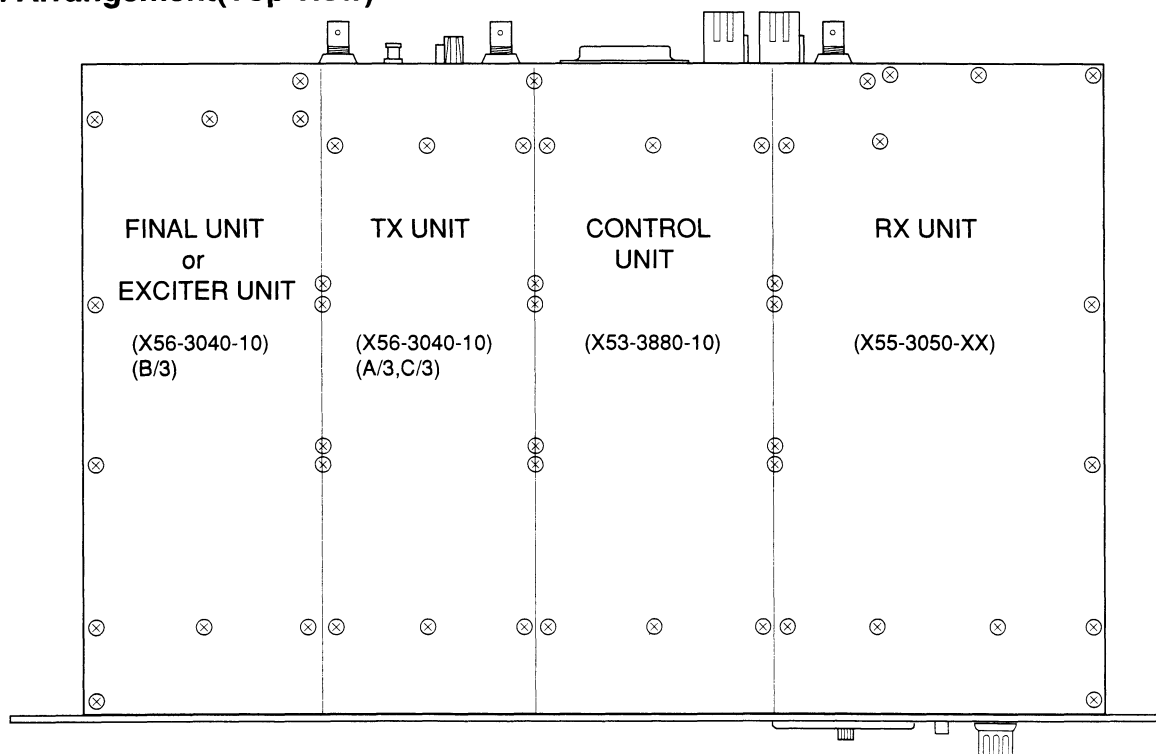
ADJUSTMENT

Adjustment Location

•Top view



Section Arrangement(Top view)



ADJUSTMENT

TEST FREQUENCY LIST

TKR-740 K

* Factory use CH1 to CH16

CH	RX Frequency	TX Frequency	Beat Shift	W/N	Power H/L	VCO	NOTE
1	146.1000	136.0000	No	Wide	H	A Low	VCO A Low
2	150.1000	145.5000	No	Wide	H	A Center	VCO A Center
3	153.9000	154.9500	No	Wide	H	A High	VCO A High
4	154.1000	155.0000	No	Wide	H	B Low	VCO B Low
5	158.1000	164.5000	No	Wide	H	B Center	VCO B Center
6	161.9000	174.0000	No	Wide	H	B High	VCO B High
7	146.1000	136.0000	No	Narrow	L	A Low	VCO A Low
8	150.1000	145.5000	No	Narrow	L	A Center	VCO A Center
9	153.9000	154.9500	No	Narrow	L	A High	VCO A High
10	154.1000	155.0000	No	Narrow	L	B Low	VCO B Low
11	158.1000	164.5000	No	Narrow	L	B Center	VCO B Center
12	161.9000	174.0000	No	Narrow	L	B High	VCO B High
13	150.1000	145.5000	Yes	Wide	H	A Center	For production Beat VCO A Center
14	158.1000	164.5000	Yes	Wide	H	B Center	For production Beat VCO B Center
15	152.5000	155.5000	No	Wide	H	A(Hi)/B(Low)	For production Center TX/RX
16	155.5000	152.5000	No	Wide	H	B(Low)/A(Hi)	For production Center TX/RX
17	152.4000	152.4000	No	Wide	H	A High	Helical (Center) Low edge
18	155.6000	155.6000	No	Wide	H	B Low	Helical (Center) High edge
19	152.4000	152.4000	No	Narrow	L	A High	Helical (Center) Low edge
20	155.6000	155.6000	No	Narrow	L	B Low	Helical (Center) High edge
21	147.6000	147.6000	No	Wide	H	A Low	Helical (Low) High edge
22	147.6000	147.6000	No	Narrow	L	A Low	Helical (Low) High edge
23	160.4000	160.4000	No	Wide	H	B High	Helical (Hi) Low edge
24	160.4000	160.4000	No	Narrow	L	B High	Helical (Hi) Low edge
25	146.1000	136.0000	No	Wide	H	A Low	In band Low edge
26	154.1000	155.0000	No	Wide	H	B Low	In band Center
27	161.9000	174.0000	No	Wide	H	B High	In band High edge
28	153.9750	153.3750	No	Wide	H	B(Low)/A(Hi)	Center LTR+KSI Repeater
29	153.9750	153.3750	No	Narrow	L	B(Low)/A(Hi)	Center LTR+KSI Repeater
30	154.5500	154.5500	No	Wide	H	B Low	For reserve and TX/RX
31	150.1000	158.1000	No	Narrow	L	A(Center)/B(Center)	For reserve and TX/RX
32	158.1000	150.1000	No	Narrow	L	B(Center)/A(Center)	For reserve and TX/RX

TKR-740

ADJUSTMENT

TKR-740 K2

* Factory use CH1 to CH16

CH	RX Frequency	TX Frequency	Beat Shift	W/N	Power H/L	VCO	NOTE
1	158.1000	136.0000	No	Wide	H	A Low	VCO A Low
2	162.1000	145.5000	No	Wide	H	A Center	VCO A Center
3	165.9000	154.9500	No	Wide	H	A High	VCO A High
4	166.1000	155.0000	No	Wide	H	B Low	VCO B Low
5	170.1000	164.5000	No	Wide	H	B Center	VCO B Center
6	173.9000	174.0000	No	Wide	H	B High	VCO B High
7	158.1000	136.0000	No	Narrow	L	A Low	VCO A Low
8	162.1000	145.5000	No	Narrow	L	A Center	VCO A Center
9	165.9000	154.9500	No	Narrow	L	A High	VCO A High
10	166.1000	155.0000	No	Narrow	L	B Low	VCO B Low
11	170.1000	164.5000	No	Narrow	L	B Center	VCO B Center
12	173.9000	174.0000	No	Narrow	L	B High	VCO B High
13	162.1000	145.5000	Yes	Wide	H	A Center	For production Beat VCO A Center
14	170.1000	164.5000	Yes	Wide	H	B Center	For production Beat VCO B Center
15	164.5000	167.5000	No	Wide	H	A(Hi)/B(Low)	For production Center TX/RX
16	167.5000	164.5000	No	Wide	H	B(Low)/A(Hi)	For production Center TX/RX
17	164.4000	152.4000	No	Wide	H	A High	Helical (Center) Low edge
18	167.6000	155.6000	No	Wide	H	B Low	Helical (Center) High edge
19	164.4000	152.4000	No	Narrow	L	A High	Helical (Center) Low edge
20	167.6000	155.6000	No	Narrow	L	B Low	Helical (Center) High edge
21	159.6000	159.6000	No	Wide	H	A Low	Helical (Low) High edge
22	159.6000	159.6000	No	Narrow	L	A Low	Helical (Low) High edge
23	172.4000	172.4000	No	Wide	H	B High	Helical (Hi) Low edge
24	172.4000	172.4000	No	Narrow	L	B High	Helical (Hi) Low edge
25	158.1000	136.0000	No	Wide	H	A Low	In band Low edge
26	166.1000	155.0000	No	Wide	H	B Low	In band Center
27	173.9000	174.0000	No	Wide	H	B High	In band High edge
28	165.9750	165.3750	No	Wide	H	B(Low)/A(Hi)	Center LTR+KSI Repeater
29	165.9750	165.3750	No	Narrow	L	B(Low)/A(Hi)	Center LTR+KSI Repeater
30	166.5500	166.5500	No	Wide	H	B Low	For reserve and TX/RX
31	162.1000	170.1000	No	Narrow	L	A(Center)/B(Center)	For reserve and TX/RX
32	170.1000	162.1000	No	Narrow	L	B(Center)/A(Center)	For reserve and TX/RX

ADJUSTMENT

TKR-740 K3

* Factory use CH1 to CH16

CH	RX Frequency	TX Frequency	Beat Shift	W/N	Power H/L	VCO	NOTE
1	136.1000	136.0000	No	Wide	H	A Low	VCO A Low
2	139.6000	145.5000	No	Wide	H	A Center	VCO A Center
3	142.9000	154.9500	No	Wide	H	A High	VCO A High
4	143.1000	155.0000	No	Wide	H	B Low	VCO B Low
5	146.6000	164.5000	No	Wide	H	B Center	VCO B Center
6	149.9000	174.0000	No	Wide	H	B High	VCO B High
7	136.1000	136.0000	No	Narrow	L	A Low	VCO A Low
8	139.6000	145.5000	No	Narrow	L	A Center	VCO A Center
9	142.9000	154.9500	No	Narrow	L	A High	VCO A High
10	143.1000	155.0000	No	Narrow	L	B Low	VCO B Low
11	146.6000	164.5000	No	Narrow	L	B Center	VCO B Center
12	149.9000	174.0000	No	Narrow	L	B High	VCO B High
13	139.6000	145.5000	Yes	Wide	H	A Center	For production Beat VCO A Center
14	146.6000	164.5000	Yes	Wide	H	B Center	For production Beat VCO B Center
15	141.5000	144.5000	No	Wide	H	A(Hi)/B(Low)	For production Center TX/RX
16	144.5000	141.5000	No	Wide	H	B(Low)/A(Hi)	For production Center TX/RX
17	141.4000	141.4000	No	Wide	H	A High	Helical (Center) Low edge
18	144.6000	144.6000	No	Wide	H	B Low	Helical (Center) High edge
19	141.4000	141.4000	No	Narrow	L	A High	Helical (Center) Low edge
20	144.6000	144.6000	No	Narrow	L	B Low	Helical (Center) High edge
21	137.6000	137.600	No	Wide	H	A Low	Helical (Low) High edge
22	137.6000	137.600	No	Narrow	L	A Low	Helical (Low) High edge
23	148.4000	148.4000	No	Wide	H	B High	Helical (Hi) Low edge
24	148.4000	148.4000	No	Narrow	L	B High	Helical (Hi) Low edge
25	136.1000	136.0000	No	Wide	H	A Low	In band Low edge
26	143.1000	155.0000	No	Wide	H	B Low	In band Center
27	149.9000	174.0000	No	Wide	H	B High	In band High edge
28	142.9750	142.3750	No	Wide	H	B(Low)/A(Hi)	Center LTR+KSI Repeater
29	142.9750	142.3750	No	Narrow	L	B(Low)/A(Hi)	Center LTR+KSI Repeater
30	143.5500	143.5500	No	Wide	H	B Low	For reserve and TX/RX
31	139.6000	146.6000	No	Narrow	L	A(Center)/B(Center)	For reserve and TX/RX
32	146.6000	139.6000	No	Narrow	L	B(Center)/A(Center)	For reserve and TX/RX

TKR-740

ADJUSTMENT

RX UNIT

Item	Condition	Measurement			Adjustment			Specifications/ Remarks
		Test equipment	Unit	Terminal	Unit	Parts	Method	
1. Setting	1) VOL : OFF 2) 13.8V External power supply 3) POWER : ON							
2. RX Lock Voltage	1) CH6 (RX B Hi) 2) CH4 (RX B Lo)	DVM	RX	CV1	RX	TC2	4.5V ADJ Check	±0.1V 1V or more
	3) CH3 (RX A Hi) 4) CH1 (RX A Lo)					TC1	4.5V ADJ Check	±0.1V 1V or more
3. BPF Adjust	Connect the TG to RX IN, then connect CN2 to the spectrum analyzer input.	TG Spectrum Analyzer		RX IN CN2		L3 L16	Center the frequency you are using, then adjust it to look like the wave on page 80.	Refer to page 80
4. MCF Adjust (Wide)	Connect the TG to CN3, then connect CN4 to the spectrum analyzer input. 1) CH4			CN3 CN4		L31 L27 L38 L40 L43	Adjust it to look like the wave on page 80.	Refer to page 80
(Narrow)	Connect the TG to CN3, then connect CN5 to the spectrum analyzer input. 1) CH10			CN3 CN5		L32 L28 L39 L41 L44	Adjust it to look like the wave on page 80.	Refer to page 80
5. Discriminator Adjust (Wide)	Connect the SSG to RX IN 1) CH4 MOD : 1kHz DEV : 3kHz SSG : 501μV (-53dBm) AF : 0.45V/4Ω	SSG AFVM		TEST/SPKR SPO Terminal (pin 12)		L52	Adjust for maximum	
	(Narrow) 1) CH10 MOD : 1kHz DEV : 1.5kHz SSG : 501μV (-53dBm) AF : 0.45V/4Ω					L53		
6. Sensitivity Check (Wide)	1) Connect the SSG to RX IN, then select the channel that the user will use (Wide) MOD : 1kHz DEV : 3kHz SSG : 0.446μV (-114dBm) AF : 0.45V/4Ω	SSG Audio, Analyzer		RX IN TEST/SPKR SPO Terminal (pin 12)			Check	12dB SINAD or more
	(Narrow) 1) Connect the SSG to RX IN, then select the channel that the user will use (Narrow) MOD : 1kHz DEV : 1.5kHz SSG : 0.446μV (-114dBm) AF : 0.45V/4Ω							

ADJUSTMENT

RX UNIT

Item	Condition	Measurement			Adjustment			Specifications/ Remarks
		Test equipment	Unit	Terminal	Unit	Parts	Method	
7. Analog Squelch Adjust (Wide)	1) Connect the SSG to RX IN, then select the channel that the user will use (Wide) MOD : 1kHz DEV : 3kHz SSG : 3dB below to 12dB SINAD level AF : 0.45V/4Ω	SSG Audio, Analyzer VTVM oscilloscope	RX	RX IN TEST/SPKR SPO Terminal (pin 12) 4Ω Load			PC ADJ Adjust to point of opening squelch	
	(Narrow) 1) Connect the SSG to RX IN, then select the channel that the user will use (Narrow) MOD : 1kHz DEV : 1.5kHz SSG : 3dB below to 12dB SINAD level AF : 0.45V/4Ω							
8. RSSI Squelch Adjust (Wide)	1) Connect the SSG to RX IN, then select the channel that the user will use (Wide) MOD : 1kHz DEV : 3kHz SSG : 3dB below to 12dB SINAD level AF : 0.45V/4Ω							
	(Narrow) 1) Connect the SSG to RX IN, then select the channel that the user will use (Narrow) MOD : 1kHz DEV : 1.5kHz SSG : 3dB below to 12dB SINAD level AF : 0.45V/4Ω							
9. RX S/N Check (Wide)	1) Connect the SSG to RX IN, then select the channel that the user will use (Wide) MOD : 1kHz DEV : 3kHz SSG : 501μV (-53dBm) AF : 2.84V/4Ω						Check	-57dB or less
	(Narrow) 1) Connect the SSG to RX IN, then select the channel that the user will use (Narrow) MOD : 1kHz DEV : 1.5kHz SSG : 501μV (-53dBm) AF : 2.84V/4Ω							-55dB or less
10. RD Output Level Adjust (Wide)	1) Connect the SSG to RX IN, then select the channel that the user will use (Wide) MOD : 1kHz DEV : 3kHz SSG : 501μV (-53dBm)	SSG DVM		RX IN CONTROL I/O RD Terminal (pin 10) 600Ω Load			PC ADJ 80mV	±5mV
	(Narrow) 1) Connect the SSG to RX IN, then select the channel that the user will use (Narrow) MOD : 1kHz DEV : 1.5kHz SSG : 501μV (-53dBm)							

ADJUSTMENT

RX UNIT

Item	Condition	Measurement			Adjustment			Specifications/ Remarks
		Test equipment	Unit	Terminal	Unit	Parts	Method	
11. RA Output Level Adjust (Wide)	1) Connect the SSG to RX IN, then select the channel that the user will use (Wide) MOD : 1kHz DEV : 3kHz SSG : 501 μ V (-53dBm)	SSG AFVM		RX IN CONTROL I/O RA Terminal (pin 11)			PC ADJ 400mV	± 20 mV
	(Narrow) 2) connect the SSG to RX IN, then select the channel that the user will use (Narrow) MOD : 1kHz DEV : 1.5kHz SSG : 501 μ V (-53dBm)			600 Ω Load				
12. RRA Output Level Adjust (Wide)	1) Connect the SSG to RX IN, then select the channel that the user will use (Wide) MOD : 1kHz DEV : 3kHz SSG : 501 μ V (-53dBm)	SSG AFVM		RX IN REMT I/O Remote RA Terminal (pin 1)			PC ADJ 400mV	± 20 mV
	(Narrow) 2) connect the SSG to RX IN, then select the channel that the user will use (Narrow) MOD : 1kHz DEV : 1.5kHz SSG : 501 μ V (-53dBm)			600 Ω Load				
13. Voting Pilot Tone Adjust (Wide)	1) CH4 (Center Frequency) Voting Pilot Tone : 1950Hz SSG : OFF	AFVM		CONTROL I/O RA Terminal (pin 11)			PC ADJ 400mV	± 20 mV
	(Narrow) 1) CH10 (Center Frequency) Voting Pilot Tone : 1950Hz SSG : OFF							

TX UNIT

Item	Condition	Measurement			Adjustment			Specifications/ Remarks
		Test equipment	Unit	Terminal	Unit	Parts	Method	
14. TX Lock Voltage	1) CH3 (TX A Hi) 2) CH1 (TX A Lo) 3) CH6 (TX B Hi) 4) CH4 (TX B Lo)	DVM	TX A/3	CV	TX A/3	TC1 TC2	4.5V ADJ Check	± 0.1 V 1V or more
							4.5V ADJ Check	± 0.1 V 1V or more
15. RX Ref Check	Connect a frequency counter to CN102, then measure the frequency. 1) CH2	f.counter		CN102			Check	20MHz ± 1 ppm
16. EXT Ref check	• Connect a frequency counter to CN102, then measure the frequency. • Connect a SSG to EXT REF IN. 1) CH2 SSG : 10MHz 70.7mV (-10dBm) MOD : OFF	f.counter SSG					Check	20MHz
	2) frequency=10MHz ± 10 ppm							20MHz ± 10 ppm

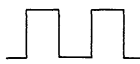
ADJUSTMENT

TX UNIT

Item	Condition	Measurement			Adjustment			Specifications/ Remarks
		Test equipment	Unit	Terminal	Unit	Parts	Method	
17.TX Power (Hi)	Measure the power level at TX OUT. 1) CH1 (Low) 2) CH4 (Center) 3) CH6 (Hi)	Power meter	TX A/3	TX OUT			PC ADJ 5.0W (Shipping power)	±0.1W
18.TX Power (Low)	Measure the power level at TX OUT. 1) CH7 (Low) 2) CH10 (Center) 3) CH12 (Hi)	Power meter		TX OUT			PC ADJ 100mW (Shipping power)	±5mW
19.Max Dev (Wide)	1) CH1 (VCO-A Lo) 2) CH2 (VCO-A Center) 3) CH3 (VCO-A Hi) 4) CH4 (VCO-B Lo) 5) CH5 (VCO-B Center) 6) CH6 (VCO-B Hi) MOD : 1kHz LEVEL: 50mV (Terminal load) LPF : 15kHz HPF : OFF Transmission	MOD ANA AG	TX B/3	Microphone MIC Terminal (pin 6)			PC ADJ 4.2kHz	±0.2kHz
(Narrow)	1) CH7 (VCO-A Lo) 2) CH8 (VCO-A Center) 3) CH9 (VCO-A Hi) 4) CH10 (VCO-B Lo) 5) CH11 (VCO-B Center) 6) CH12 (VCO-B Hi) MOD : 1kHz LEVEL: 50mV (Terminal load) LPF : 15kHz HPF : OFF Transmission						PC ADJ 1.7kHz	±0.1kHz
20.Mic Sensitivity Check (Wide)	1) CH2 (VCO-A Center) 2) CH5 (VCO-B Center) MOD : 1kHz LEVEL : 4.5mV (Terminal load) LPF : 15kHz HPF : OFF Transmission	MOD ANA Oscilloscope	TX B/3	TX OUT Microphone MIC Terminal (pin 6)			Check	3.0kHz±0.25kHz
(Narrow)	1) CH8 (VCO-A Center) 2) CH11 (VCO-B Center) MOD : 1kHz LEVEL : 5.5mV (Terminal load) LPF : 15kHz HPF : OFF Transmission							1.5kHz±0.2kHz

ADJUSTMENT

TX UNIT

Item	Condition	Measurement			Adjustment			Specifications/ Remarks
		Test equipment	Unit	Terminal	Unit	Parts	Method	
21.DQT Balance Adjust (Wide)	1) CH2 (VCO-A Center) 2) CH5 (VCO-B Center) AG.f : 50Hz (square wave) LEVEL : Insert 0.5Vp-p into the CONTROL I/O TD terminal (pin 8) LPF : 3kHz HPF : OFF Transmission	MOD ANA Oscilloscope	TX A/3	TX OUT CONTROL I/O TD Terminal (pin 8)			PC ADJ Make the demodulated waves into square waves.	 Oscilloscope DC range
	(Narrow) 1) CH8 (VCO-A Center) 2) CH11 (VCO-B Center) AG.f : 50Hz (square wave) LEVEL : Insert 0.5Vp-p into the CONTROL I/O TD terminal (pin 8) LPF : 3kHz HPF : OFF Transmission							
22.TD Dev Adjust (Wide)	1) CH2 (VCO-A Center) 2) CH5 (VCO-B Center) AG.f : 100Hz (Sine wave) LEVEL : Insert 0.5Vp-p into the CONTROL I/O TD terminal (pin 8) LPF : 3kHz HPF : OFF Transmission						PC ADJ 0.75kHz	±0.05kHz
	(Narrow) 1) CH8 (VCO-A Center) 2) CH11 (VCO-B Center) AG.f : 100Hz (Sine wave) LEVEL : Insert 0.5Vp-p into the CONTROL I/O TD terminal (pin 8) LPF : 3kHz HPF : OFF Transmission							
23.TA Dev Adjust (Wide)	1) CH4 (Center Frequency) AG.f : 1kHz (Sine wave) LEVEL : Insert 280mV into the CONTROL I/O TA terminal (pin 9) LPF : 15kHz HPF : OFF Transmission			TX OUT CONTROL I/O TA Terminal (pin 9)			PC ADJ 3.0kHz	±0.1kHz
	(Narrow) 1) CH10 (Center Frequency) AG.f : 1kHz (Sine wave) LEVEL : Insert 280mV into the CONTROL I/O TA terminal (pin 9) LPF : 15kHz HPF : OFF Transmission						PC ADJ 1.5kHz	±0.05kHz

ADJUSTMENT

TX UNIT

Item	Condition	Measurement			Adjustment			Specifications/ Remarks
		Test equipment	Unit	Terminal	Unit	Parts	Method	
24.TA Dev Check (Wide)	1) CH2 (VCO-A Center) 2) CH5 (VCO-B Center) AG.f : 1kHz LEVEL : 280mV LPF : 15kHz HPF : OFF Transmission	MOD ANA Oscilloscope	TX A/3	TX OUT CONTROL I/O TA Terminal (pin 9)			Check	3.0kHz±0.1kHz
	(Narrow) 1) CH8 (VCO-A Center) 2) CH11 (VCO-B Center) AG.f : 1kHz LEVEL : 280mV LPF : 15kHz HPF : OFF Transmission							
25.RTA Dev Adjust (Wide)	1) CH4 (Center Frequency) AG.f : 1kHz (Sine wave) LEVEL : Insert 280mV into the REMT I/O Remote TA terminal (pin 2) LPF : 15kHz HPF : OFF Transmission			TX OUT REMT I/O Remote TA Terminal (pin 2)			PC ADJ 3.0kHz	±0.1kHz
	(Narrow) 1) CH10 (Center Frequency) AG.f : 1kHz (Sine wave) LEVEL : Insert 280mV into the REMT I/O Remote TA terminal (pin 2) LPF : 15kHz HPF : OFF Transmission						PC ADJ 1.5kHz	±0.05kHz
26.RTA Dev Check (Wide)	1) CH2 (VCO-A Center) 2) CH5 (VCO-B Center) AG.f : 1kHz (Sine wave) LEVEL : 280mV LPF : 15kHz HPF : OFF Transmission						Check	3.0kHz±0.1kHz
	(Narrow) 1) CH8 (VCO-A Center) 2) CH11 (VCO-B Center) AG.f : 50kHz LEVEL : 280mV LPF : 15kHz HPF : OFF Transmission						Check	1.5kHz±0.05kHz
27.QT Dev Adjust (Wide)	1) CH4 (Center Frequency) QT : 151.4Hz LPF : 3kHz HPF : OFF Detector : p-p/2 Transmission			TX OUT			PC ADJ 0.75kHz	±0.05kHz
	(Narrow) 1) CH10 (Center Frequency) QT : 151.4Hz Transmission						PC ADJ 0.35kHz	±0.05kHz

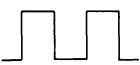
ADJUSTMENT

TX UNIT

Item	Condition	Measurement			Adjustment			Specifications/ Remarks
		Test equipment	Unit	Terminal	Unit	Parts	Method	
28.QT Dev Check (Wide)	1) CH2 (VCO-A Center) 2) CH5 (VCO-B Center) QT : 151.4Hz LPF : 3kHz HPF : OFF Detector : p-p/2 Transmission	MOD ANA Oscilloscope	TX A/3	TX OUT			Check	0.75kHz±0.05kHz
	(Narrow) 1) CH8 (VCO-A Center) 2) CH11 (VCO-B Center) QT : 151.4Hz Transmission							0.35kHz±0.05kHz
29.DQT Dev Adjust (Wide)	1) CH4 (Center Frequency) DQT : 023N LPF : 3kHz HPF : OFF Detector : Peak Hold Transmission						PC ADJ 0.75kHz	±0.05kHz
	(Narrow) 1) CH10 (Center Frequency) DQT : 023N Transmission						PC ADJ 0.35kHz	±0.05kHz
30.DQT Dev Check (Wide)	1) CH2 (VCO-A Center) 2) CH5 (VCO-B Center) DQT : 023N LPF : 3kHz HPF : OFF Detector : Peak Hold Transmission						Check	0.75kHz±0.1kHz
	(Narrow) 1) CH8 (VCO-A Center) 2) CH11 (VCO-B Center) DQT : 023N Transmission							0.35kHz±0.05kHz
31.Test Tone Dev Adjust (Wide)	1) CH4 (Center Frequency) TEST TONE : 1kHz LPF : 15kHz HPF : OFF Transmission						PC ADJ 3kHz	±0.1kHz
	(Narrow) 1) CH10 (Center Frequency) TEST TONE : 1kHz Transmission						PC ADJ 1.5kHz	±0.05kHz
32.CW ID Dev Adjust (Wide)	1) CH4 (Center Frequency) LPF : 15kHz HPF : OFF Transmission						PC ADJ 2kHz	±0.1kHz
	(Narrow) 1) CH10 (Center Frequency) Transmission						PC ADJ 1kHz	±0.05kHz

ADJUSTMENT

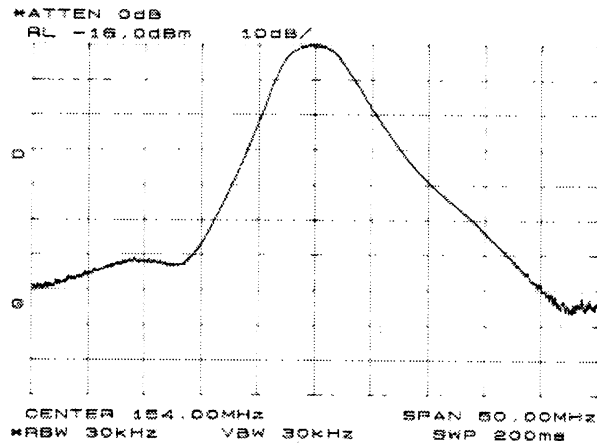
TX UNIT

Item	Condition	Measurement			Adjustment			Specifications/ Remarks
		Test equipment	Unit	Terminal	Unit	Parts	Method	
33.Repeat Gain Level Adjust (Wide)	1) CH4 (Center Frequency) MOD : 1kHz DEV : 1kHz LEVEL : 501 μ V (-53dBm) LPF : 15kHz HPF : OFF Transmission	MOD ANA Oscilloscope	TX A/3	TX OUT			PC ADJ 1kHz	± 0.2 kHz
	(Narrow) 1) CH10 (Center Frequency) MOD : 1kHz DEV : 1kHz LEVEL : 501 μ V (-53dBm) Transmission						PC ADJ 1kHz	± 0.2 kHz
34.Pager Shift Level Writing	1) CH2 (VCO-A Center)						PC ADJ writing	137
35.Pager Waveform Balance Adjust	1) CH2 (VCO-A Center) 2) CH5 (VCO-B Center) LPF : 3kHz HPF : OFF Transmission						Make the demodulated wave square	 Oscilloscope DC range
36.TX S/N Check (Wide)	1) CH2 (VCO-A Center) 2) CH5 (VCO-B Center) No modulation LPF : 3kHz HPF : 300Hz De-emphasis : 750 μ S Transmission			CONTROL I/O TA Terminal (pin 9)			Check	-56dB or less
	(Narrow) 3) CH8 (VCO-A Center) 4) CH11 (VCO-B Center) Transmission							-53dB or less

TKR-740

ADJUSTMENT

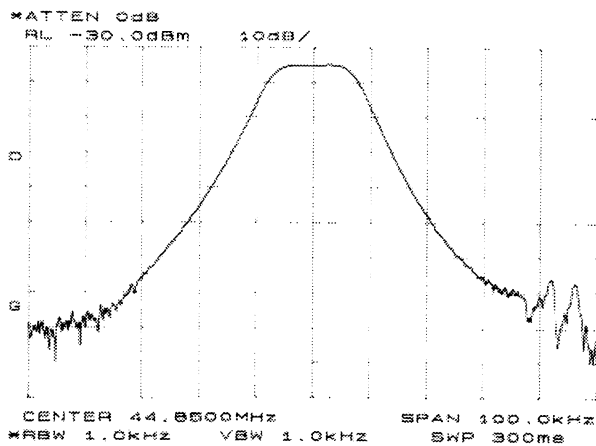
BPF-wave



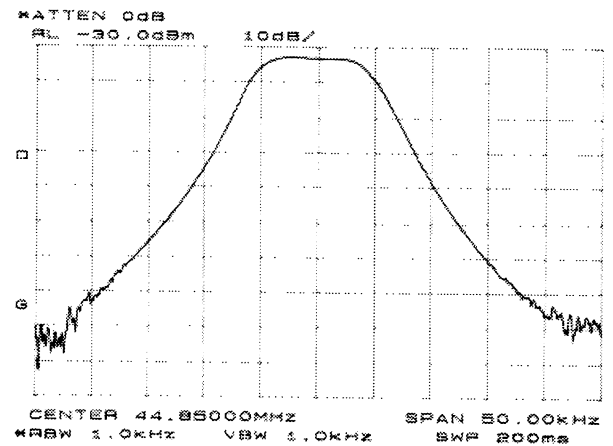
Example :The wave will look like this when using a frequency of 154,000 MHz

MCF-wave

(Wide)

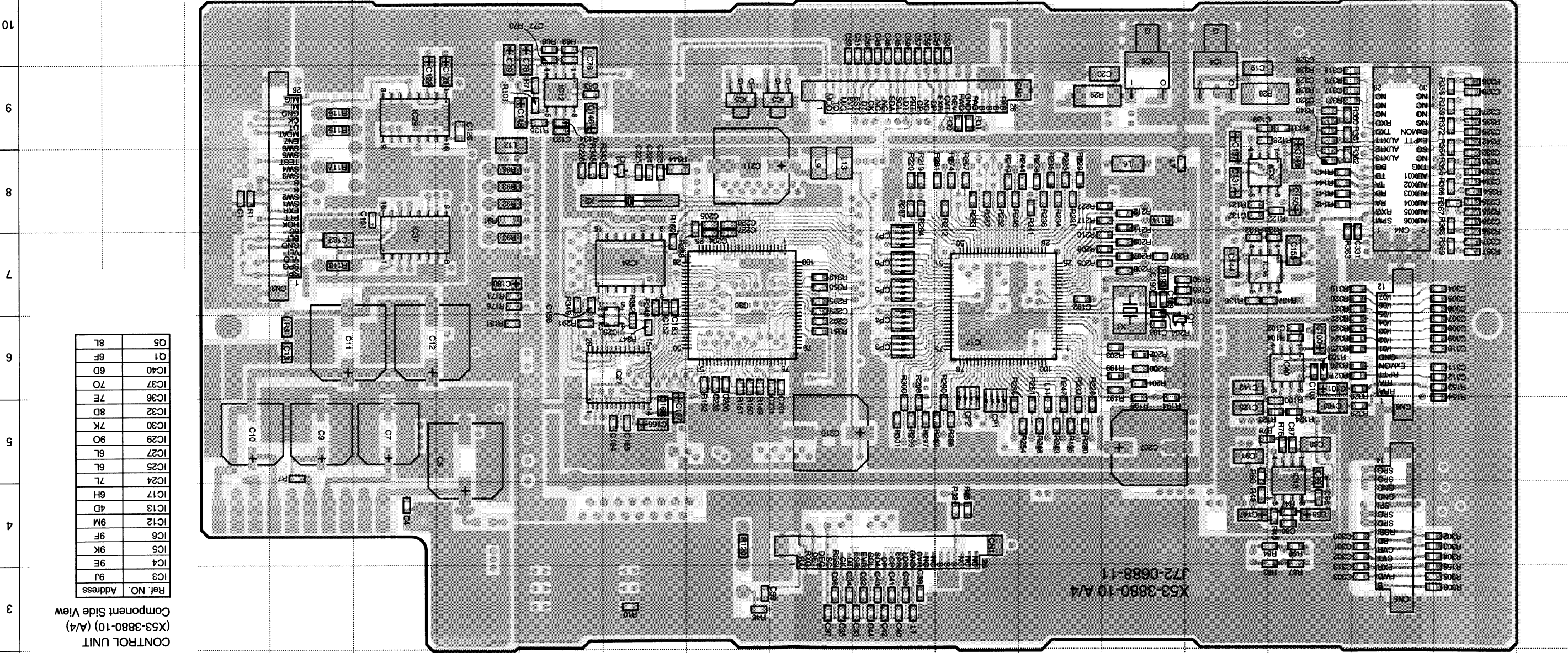


(Narrow)



A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

CONTROL UNIT (X53-3880-10) (A/4) Component Side View



PCB layout of the X53-3880-10 A/4 board. The board is populated with various components including integrated circuits (ICs), capacitors (C), resistors (R), and connectors. A detailed component list is provided at the bottom of the page.

Ref. NO.	Address
IC3	9J
IC4	9E
IC5	9K
IC6	9F
IC12	9M
IC13	4D
IC17	6H
IC24	7L
IC25	6L
IC27	6L
IC29	9O
IC30	7K
IC32	8D
IC36	7E
IC37	7O
IC40	6D
Q1	6F
Q5	8L



5



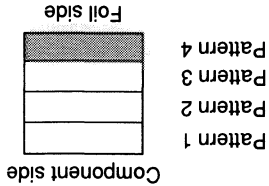
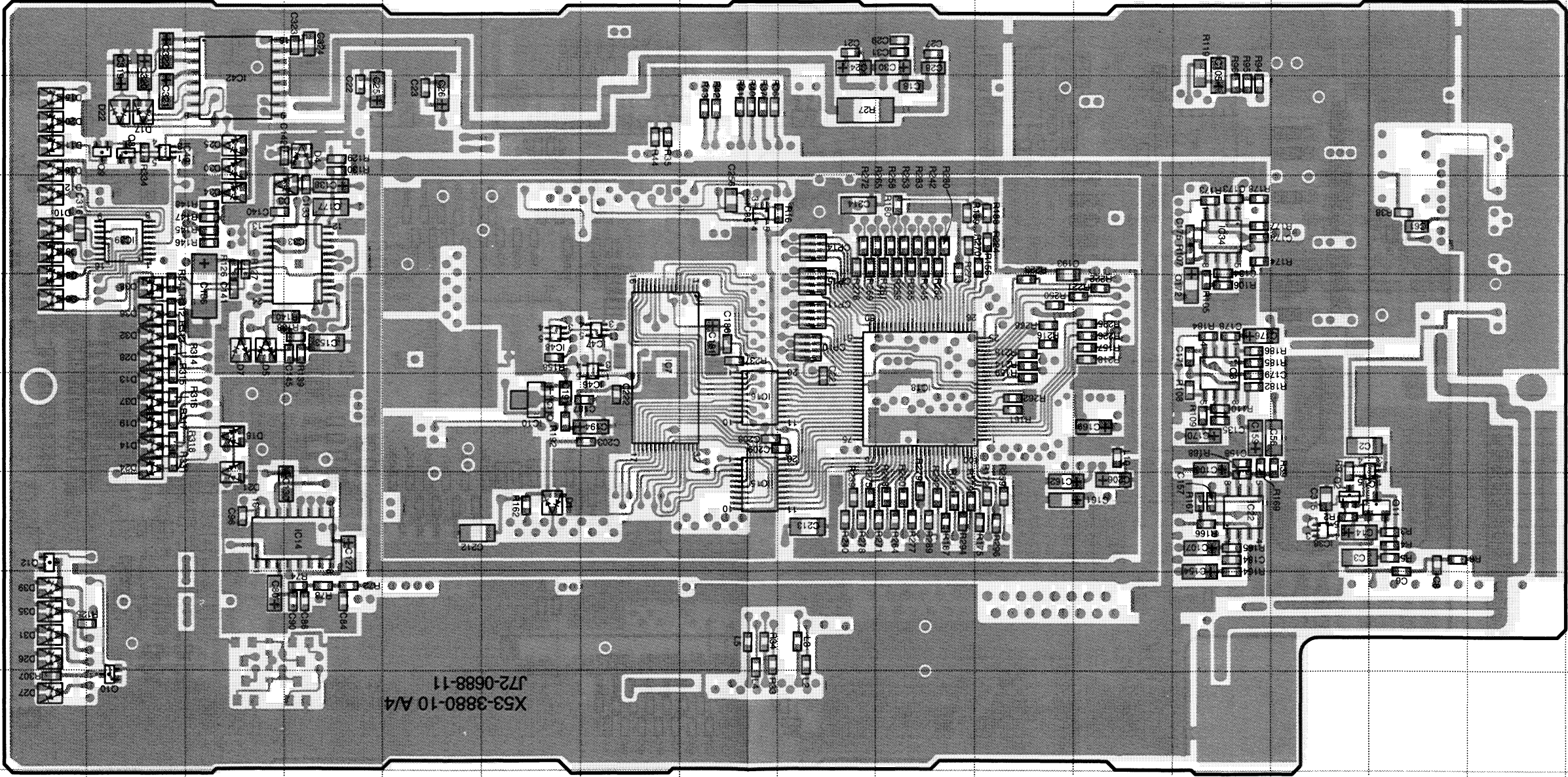
NJM78L08UA	BU4053BCF	NJM4558E
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NJM78L08UA	BU4053BCF	NJM4558E
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TKR-740 PC BOARD VIEW

CONTROL UNIT (X53-3880-10) (A/4) Foil Side View

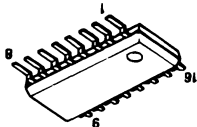
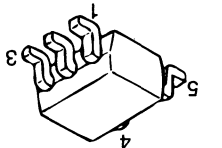


DTIC144EUA
DTIC144EUA
BU4053BCF
BU4094BCFV



2SK1824

TC7S00FU



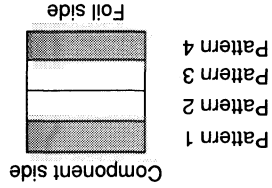
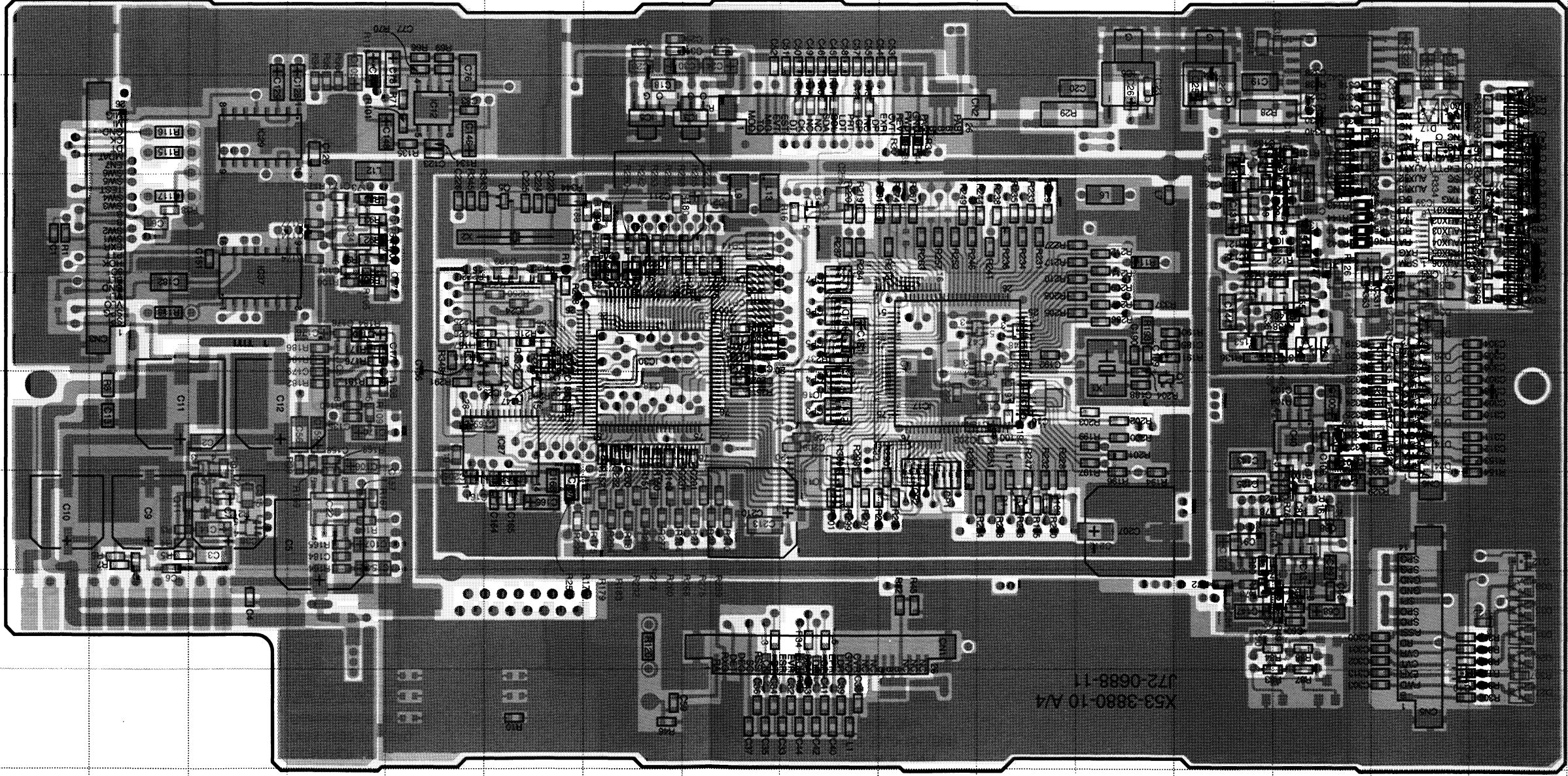
Ref. NO.	Address
IC1	6C
IC7	7K
IC10	6L
IC14	5N
IC15	5J
IC16	6J
IC18	6H
IC22	5E
IC31	7E
IC33	8N
IC34	8E
IC35	8J
IC38	5D
IC39	8P
IC42	9O
IC46	6K
IC47	7K
IC48	7L
IC49	9P
O2	5D
O8	9P
O9	9P
Q10	3P
Q12	5C
D1	5L
D3	8N
D4	9N
D5	7O
D6	7O
D7	7O
D8	7O
D9	8Q
D10	8Q
D11	9Q
D12	8Q
D13	6P
D14	6P
D15	9Q
D16	9Q
D17	9P
D18	6O
D19	6P
D20	9Q
D21	5O
D22	9P
D24	6P
D25	9O
D26	4Q
D27	3Q
D28	7P
D30	9O
D31	4Q
D32	7P
D34	8O
D36	4Q
D37	6P
D38	7P
D39	4Q

CONTROL UNIT (X53-3880-10) (A/4) Foil Side View

PC BOARD VIEW TKR-740

CONTROL UNIT
(X53-3880-10) (A/4)
Component Side
+ Foil Side View

CONTROL UNIT (X53-3880-10) (A/4) Component Side + Foil Side View



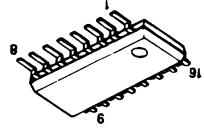
NJM78L05UA



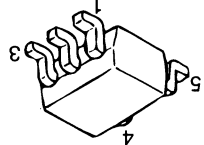
DTC114EUA
DTC144EUA



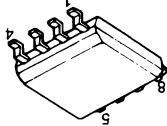
2SK1824



BU4053BCF
BU4094BCFV



TC7S00FU



NJM4558E

Ref. NO.	Address
D28	7C
D30	9D
D31	4B
D32	7C
D34	8D
D35	4B
D36	7C
D37	6C
D38	7C
D39	4B

Ref. NO.	Address
IC1	60
IC3	9J
IC4	9E
IC5	9K
IC6	9F
IC7	7H
IC10	6G
IC12	9M
IC13	4D
IC14	5E
IC15	5I
IC16	6I
IC17	6H
IC18	6K
IC22	5N
IC24	7L
IC25	6L
IC27	6L
IC29	9O
IC30	7K
IC31	7N
IC32	8D
IC33	8E
IC34	8N
IC35	8I
IC36	7E
IC37	7O
IC38	5O
IC39	8C
IC40	6D
IC42	9D
IC46	6H
IC47	7H
IC48	7G
IC49	9C
Q1	6F
Q2	5O
Q5	8L
Q8	9C
Q9	9C
Q10	3C
Q11	5G
Q12	5B
D1	5G
D3	8E
D4	9E
D5	7D
D6	7B
D7	7D
D8	7B
D9	8B
D10	8B
D11	9B
D12	8B
D13	6C
D14	6C
D15	9B
D16	9B
D17	9C
D18	6D
D19	6C
D20	9B
D21	5D
D22	9C
D24	6C
D25	9D
D26	4B
D27	3B

85

86

13

12

11

10

9

8

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6

5

4

3

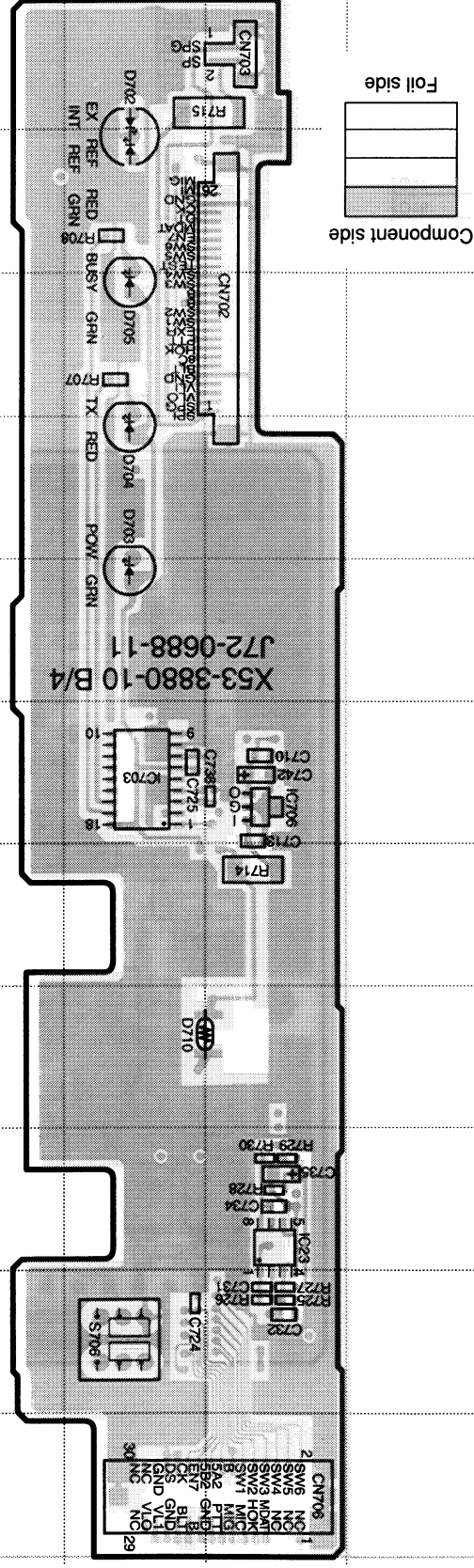
2

1

A B C D E F G H I J K L M N O P Q R S

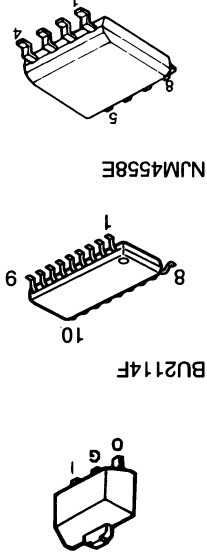
TKR-740 PC BOARD VIEW

CONTROL UNIT (X53-3880-10) (B/4) Component Side View

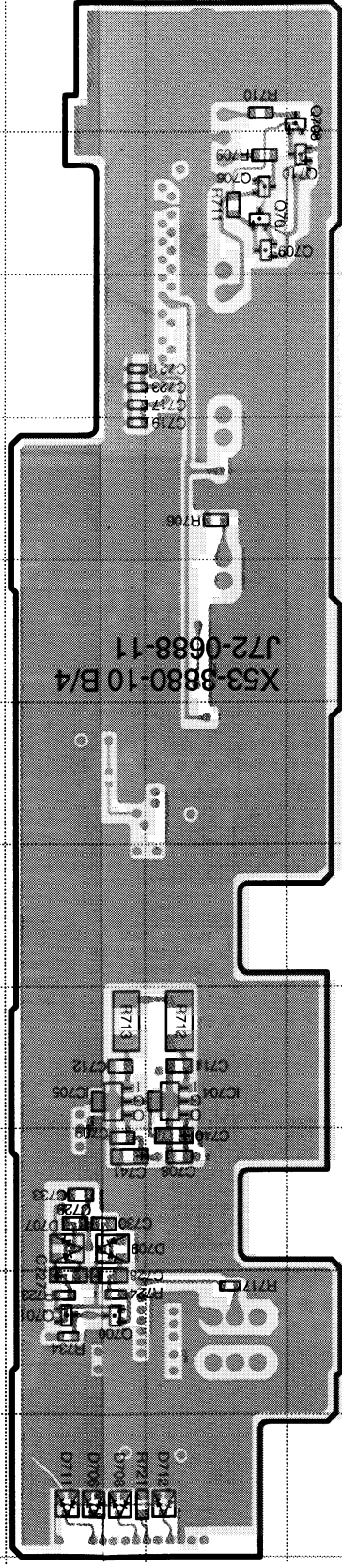


Ref. NO.	Address
IC23	5C
IC703	8D
IC706	8C
D702	12D
D703	9D
D704	10D
D705	11D
D710	6D

CONTROL UNIT
(X53-3880-10) (B/4)

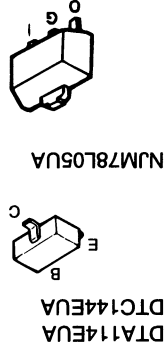


The diagram shows a rectangular component divided into four horizontal layers. The top layer is shaded with a cross-hatch pattern and is labeled 'Foil side' on the left. The bottom layer is white and is labeled 'Component side' on the left. The layers are labeled on the right as 'Pattern 4' (top), 'Pattern 3', 'Pattern 2', and 'Pattern 1' (bottom).



Ref. NO.	Address
IC704	61
IC705	6J
Q700	4J
Q701	4J
Q706	121
Q707	121
Q708	13H
Q709	121
Q710	12H
D706	3J
D707	5J
D708	3J
D709	5J
D711	3J
D712	3I

CONTROL UNIT
(X53-3880-10) (B/4)
=Oil Side View



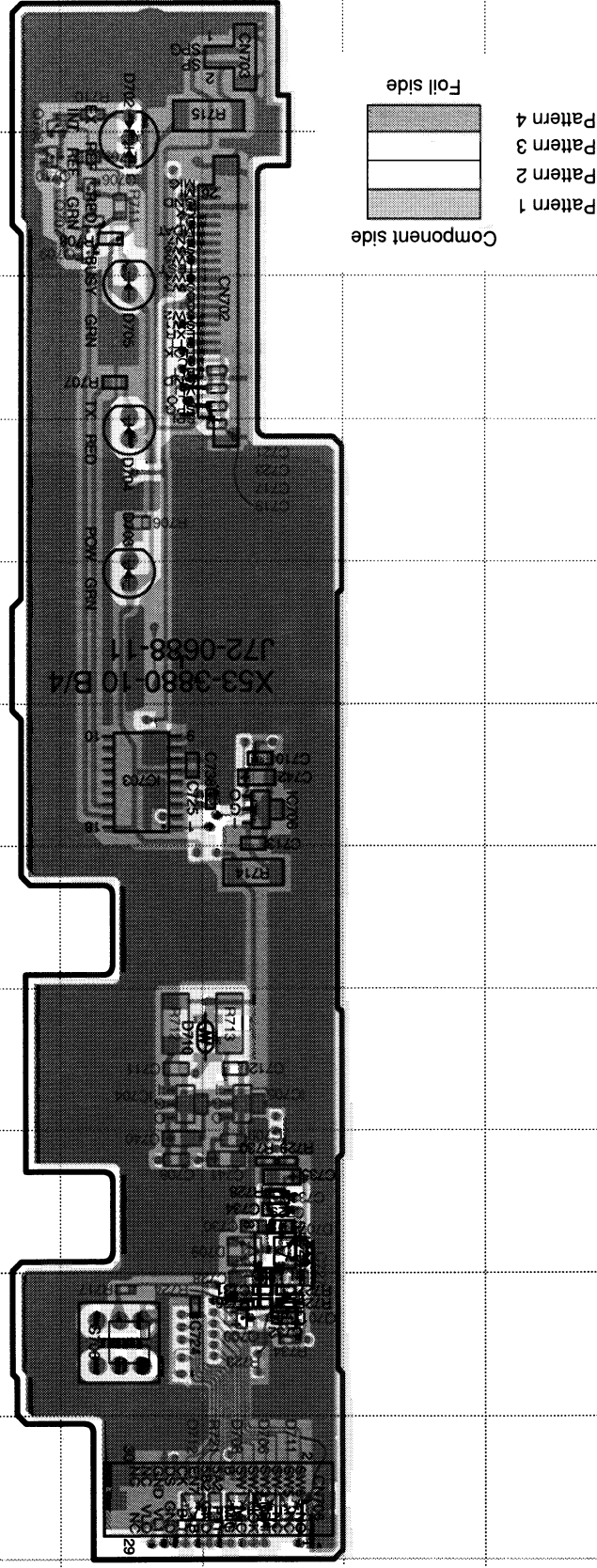
DTA114EUA
DTC144EUA



NJM78L05UA

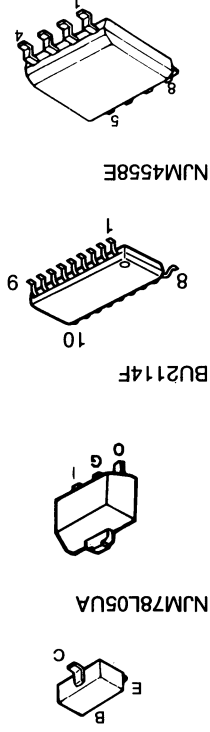
CONTROL UNIT (X53-3880-10) (B/4) Foil Side View

CONTROL UNIT (X53-3880-10) (B/4) Component Side + Foil Side View



Ref. NO.	Address
IC23	50
IC703	8P
IC704	6P
IC705	60
IC706	80
Q700	40
Q701	40
Q706	12P
Q707	12P
Q708	13Q
Q709	12P
Q710	12Q
D702	12P
D703	9P
D704	10P
D705	11P
D706	30
D707	50
D708	30
D709	50
D710	6P
D711	30
D712	3P

CONTROL UNIT
(X53-3880-10) (B/4)
Component Side + Foil Side View

DTA114EUA
DTC144EUA

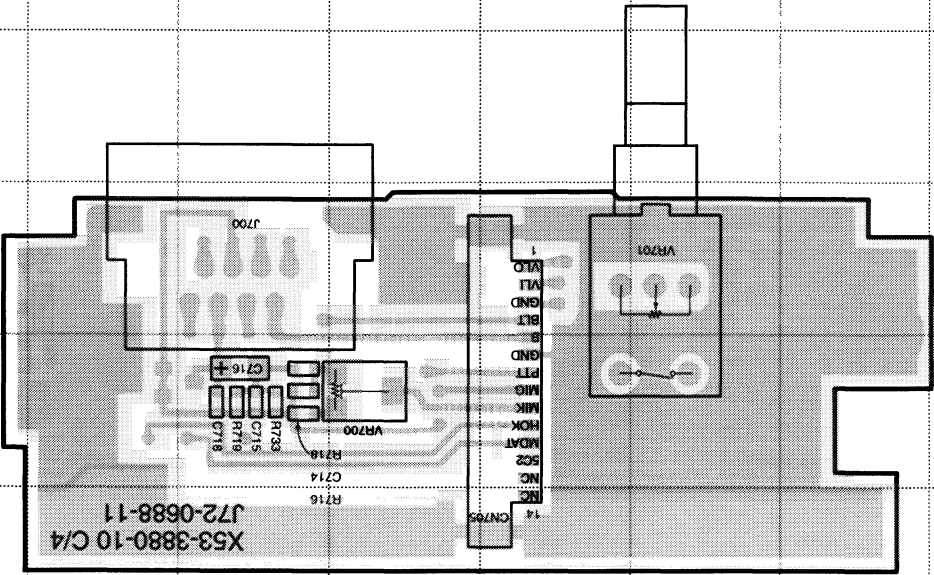
NJM78L05UA

BU2114F

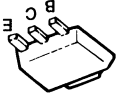
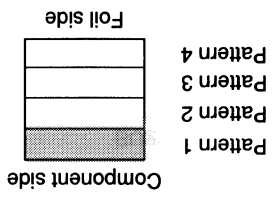
NJM4558E

A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S

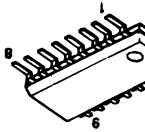
CONTROL UNIT (X53-3880-10) (C/4) Component Side View



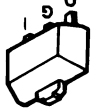
TKR-740 PC BOARD VIEW



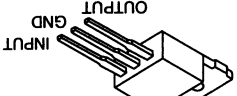
2SC3722K(S)
2SC4215(Y)



BU4094BCFV



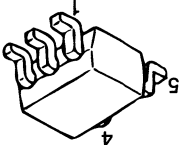
NJM78L05UA



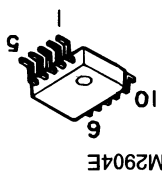
TA7808S



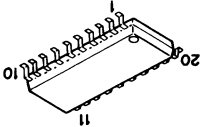
2SK508NV(K52)



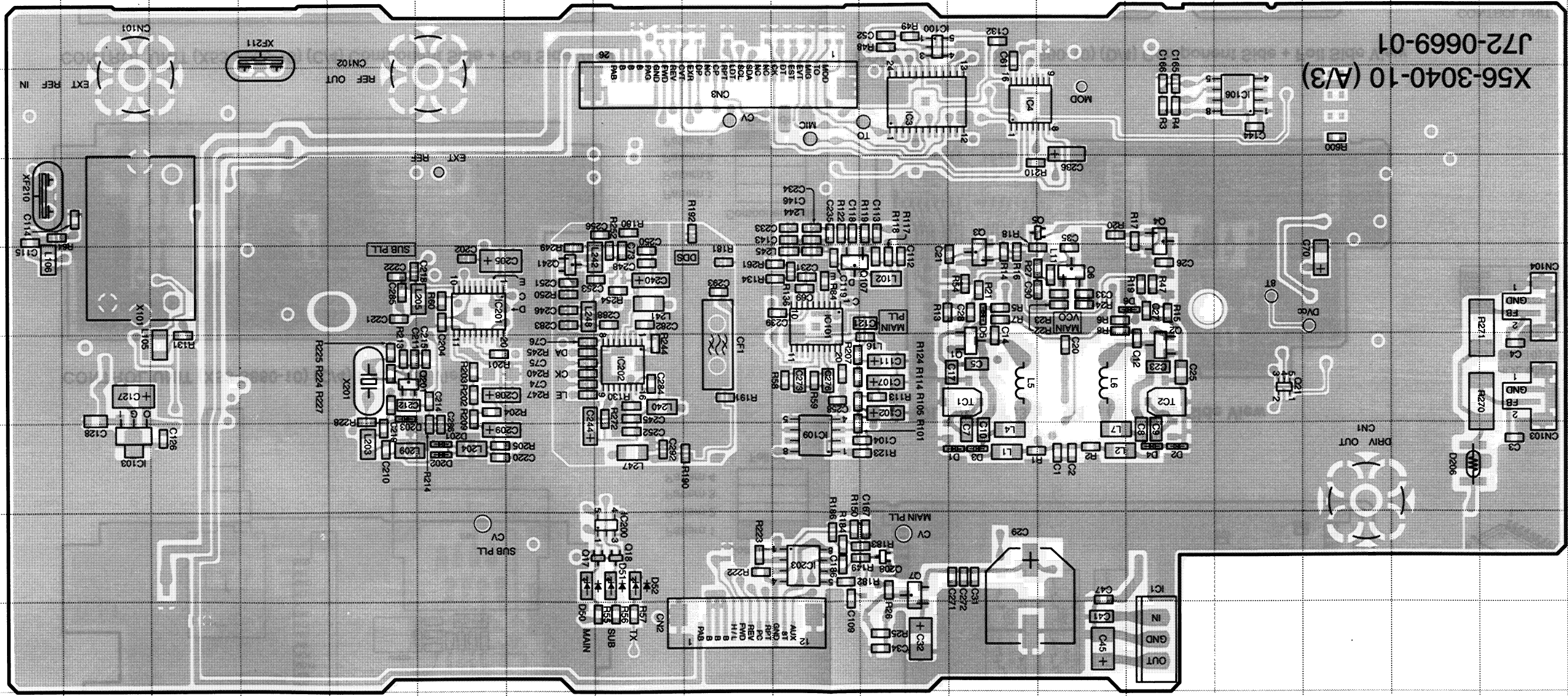
TA75S01F



NJM2904E



SA7025DK



TX UNIT (X56-3040-10) (A/3) Component Side View

TX UNIT (X56-3040-10) (A/3)

Ref. NO.	Address
IC1	3F
IC3	9I
IC4	9H
IC100	10I
IC101	7J
IC103	5R
IC106	9E
IC109	5J
IC201	4L
IC202	6L
IC203	4J
Q1	6H
Q2	6F
Q3	7H
Q4	8F
Q6	7G

Ref. NO.	Address	Q7	41	Q17	4L	Q18	4L	Q21	6E	Q107	7J	Q201	60	Q208	41	Q241	7M	5H	D2	5F	D3	5H	D4	5F	D5	7H	D6	7F	D50	4M	D51	4L	D52	4L
----------	---------	----	----	-----	----	-----	----	-----	----	------	----	------	----	------	----	------	----	----	----	----	----	----	----	----	----	----	----	----	-----	----	-----	----	-----	----

Ref. NO.	Address
D201	5N
D202	5N
D203	60
D206	5C



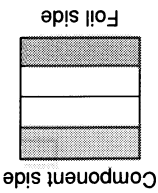
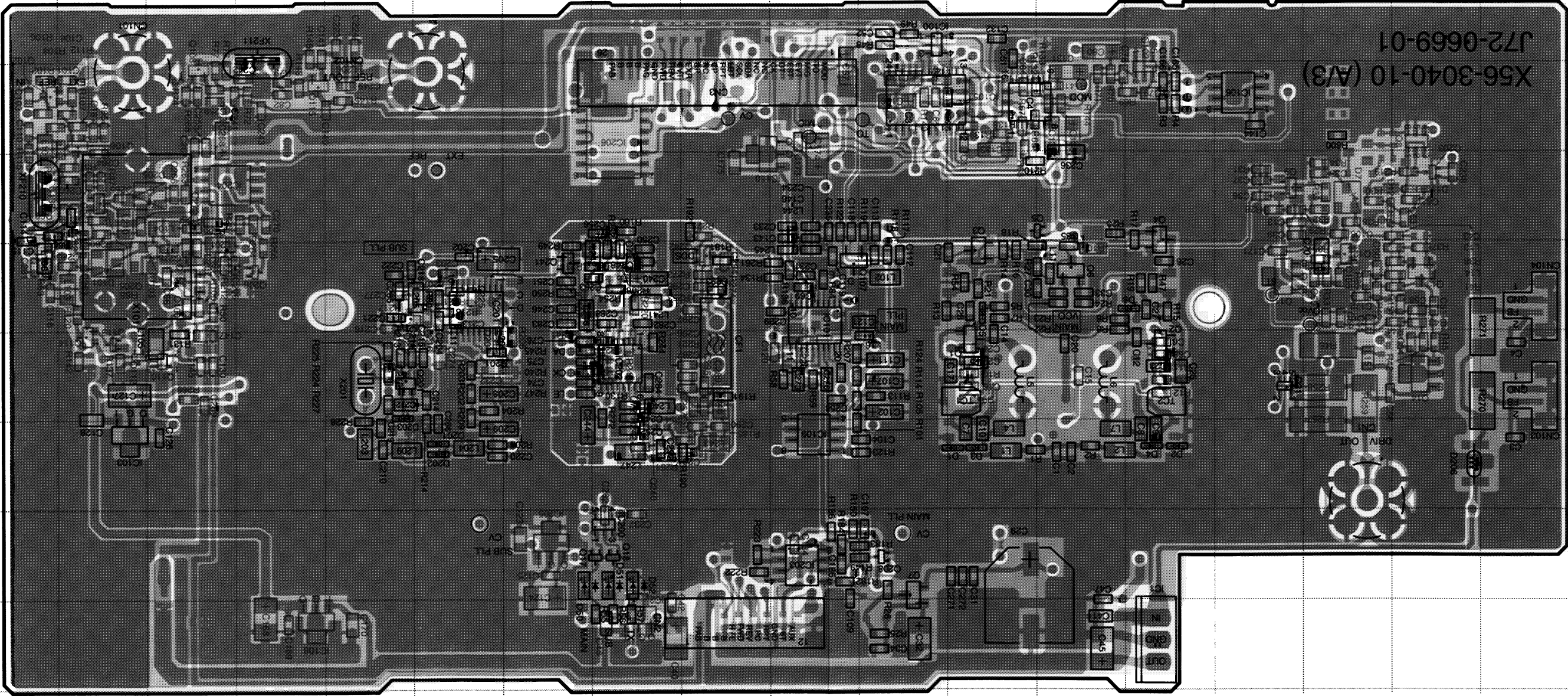
1	2	3
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1	2	3
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TKR-740 PC BOARD VIEW

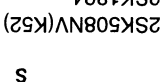
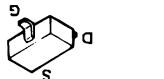
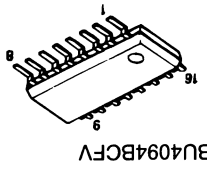
TX UNIT (X56-3040-10) (A/3) Component Side + Foil Side View



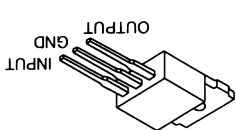
2SC3722K(S)
DTC114EUA
2SC4215(Y)



NJM78L08UA
NJM78L05UA



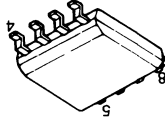
2SK302(Y)



TA7808S



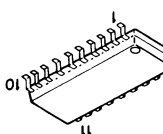
TA75S01F



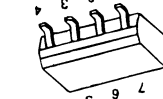
NJM4558E



NJM2904E



SA7025DK



NJM2903M

Ref. NO.	Address
IC1	IC204
IC2	IC205
IC3	IC206
IC4	IC207
IC100	IC208
IC101	IC209
IC102	IC210
IC103	IC211
IC106	IC212
IC107	IC213
IC108	IC214
IC109	IC215
IC110	IC216
IC200	IC217
IC201	IC218
IC202	IC219
IC203	IC220

Ref. NO.	Address
Q1	Q204
Q2	Q205
Q3	Q206
Q4	Q207
Q6	Q208
Q7	Q209
Q8	Q210
Q9	Q211
Q11	Q212
Q12	Q213
Q13	Q214
Q14	Q215
Q15	Q216
Q17	Q217
Q18	Q218
Q19	Q219
Q20	Q220

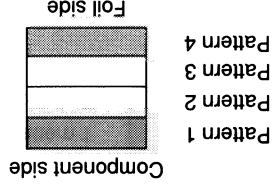
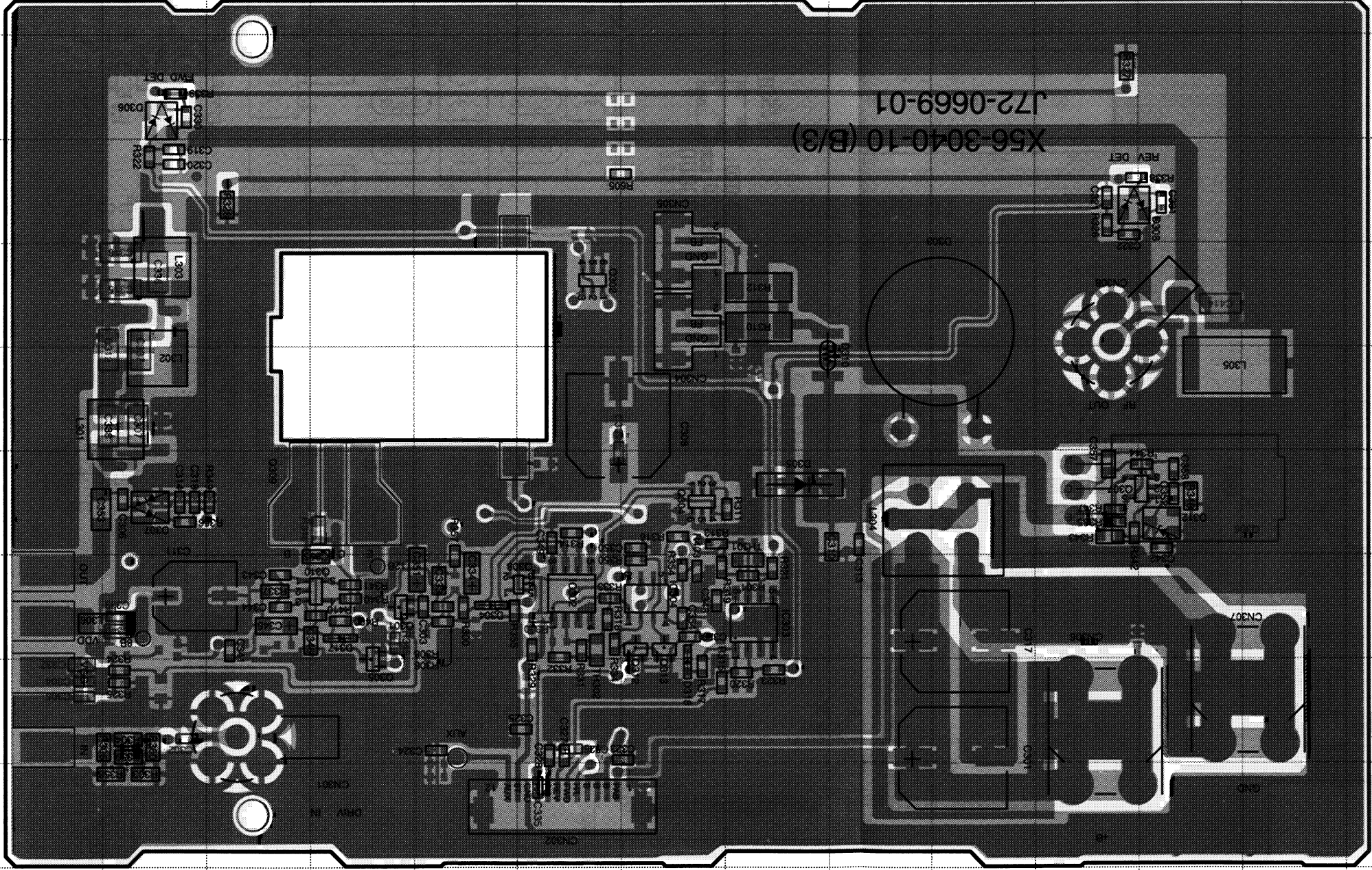
Ref. NO.	Address
Q18	Q204
Q19	Q205
Q20	Q206
Q21	Q207
Q22	Q208
Q23	Q209
Q24	Q210
Q25	Q211
Q26	Q212
Q27	Q213
Q28	Q214
Q29	Q215
Q30	Q216
Q31	Q217
Q32	Q218
Q33	Q219
Q34	Q220

Ref. NO.	Address
Q207	Q204
Q208	Q205
Q209	Q206
Q210	Q207
Q211	Q208
Q212	Q209
Q213	Q210
Q214	Q211
Q215	Q212
Q216	Q213
Q217	Q214
Q218	Q215
Q219	Q216
Q220	Q217
Q221	Q218
Q222	Q219
Q223	Q220

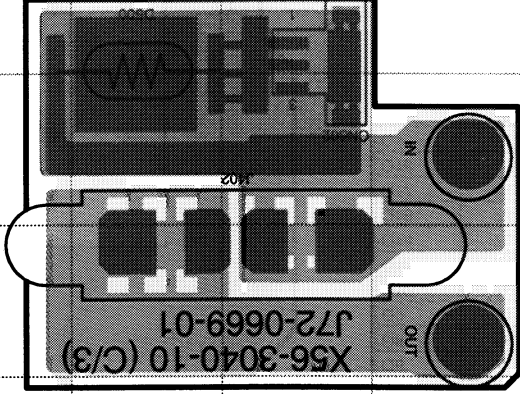
Ref. NO.	Address
D101	7R
D103	7R
D201	5N
D202	5N
D203	6O
D204	6N
D205	8Q
D206	5C

TX UNIT (X56-3040-10) (A/3) Component Side + Foil Side View

PC BOARD VIEW TCR-740



TX UNIT (X56-3040-10) (B/3) (C/3) Component Side + Foil Side View



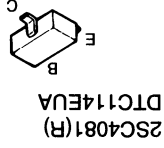
TX UNIT (X56-3040-10) (C/3)
Component Side + Foil Side View

Ref. NO.	Address
D500	8D

TX UNIT (X56-3040-10) (B/3)
Component Side + Foil Side View

Ref. NO.	Address
D306	10Q
D307	6Q
D308	9H
D310	7K
D312	6G
D317	5O
D318	4L

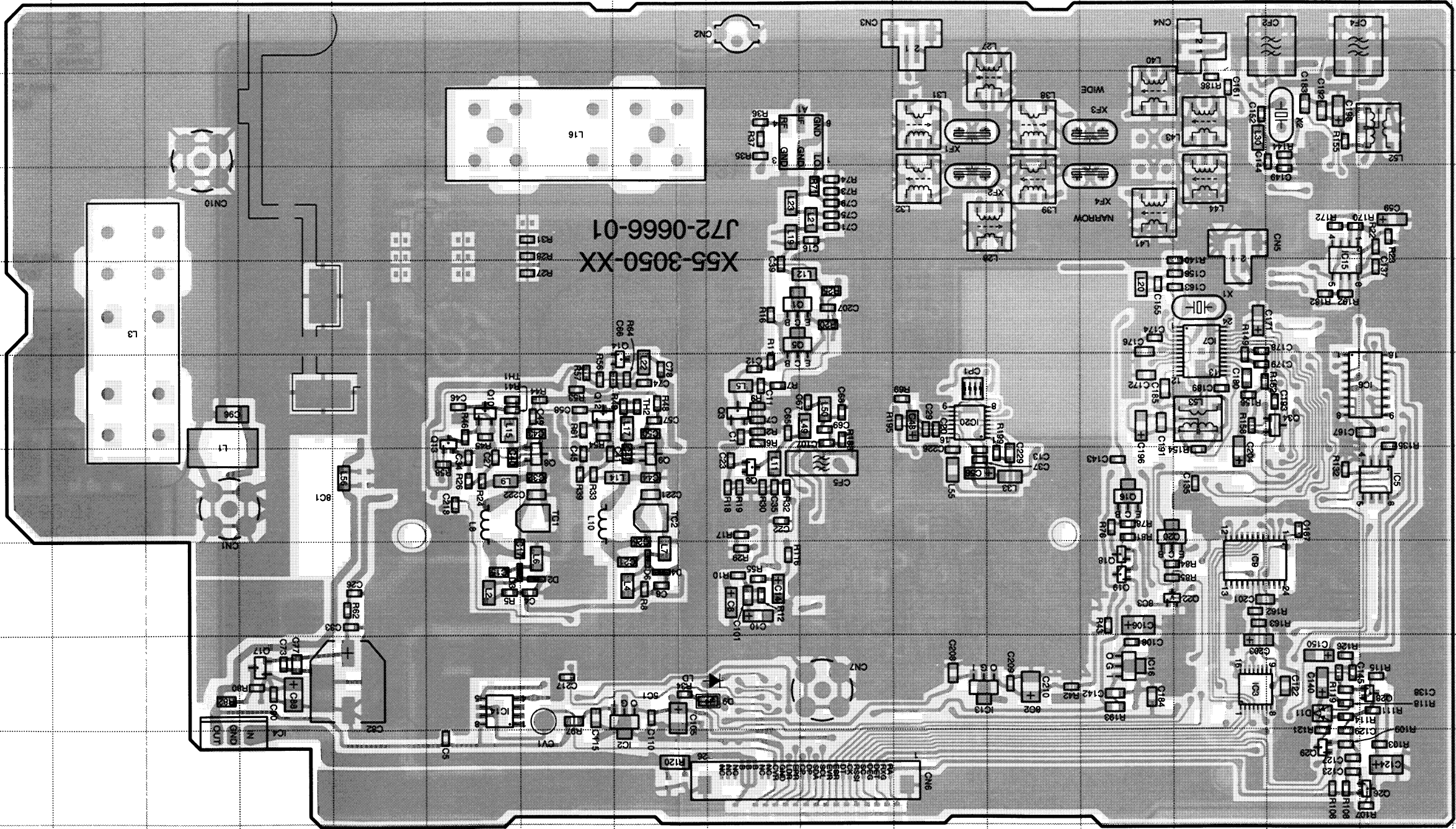
Ref. NO.	Address
IC302	5M
IC303	5K
IC304	5L
Q301	5O
Q302	8M
Q304	6L
Q305	5O
Q306	6G
Q307	6G
Q308	5M
Q309	6O
Q310	5O
Q312	5L
Q313	5L
D303	8I
D304	5N
D305	6K



1 2 3 4 5 6 7 8 9 10 11 12 13 101 102

TKR-740 PC BOARD VIEW

RX UNIT (X55-3050-XX) Component Side View



Component side
Foil side

2SC3722K(S)
DTC114EUA
2SC4215(Y)
2SC4081(R)

2SC3357
2SB1386(R)
2SK508NV(K53)
2SJ106(GH)

NJM4558E

NJM2904E

TA7808S

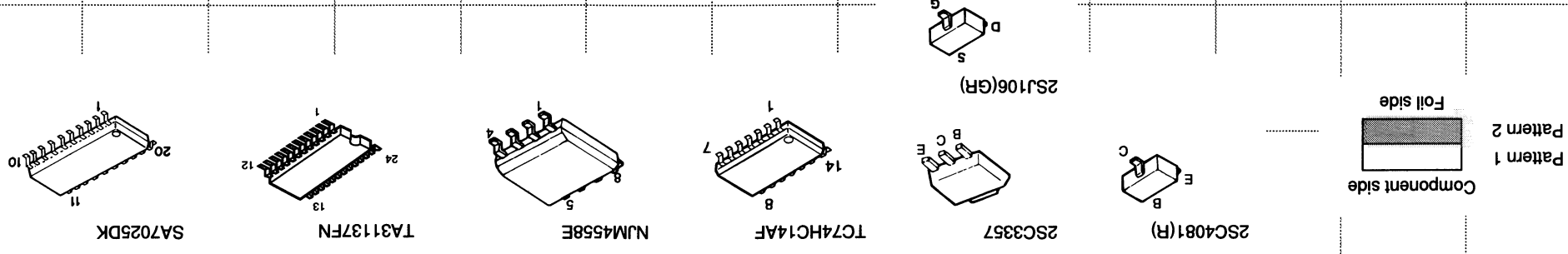
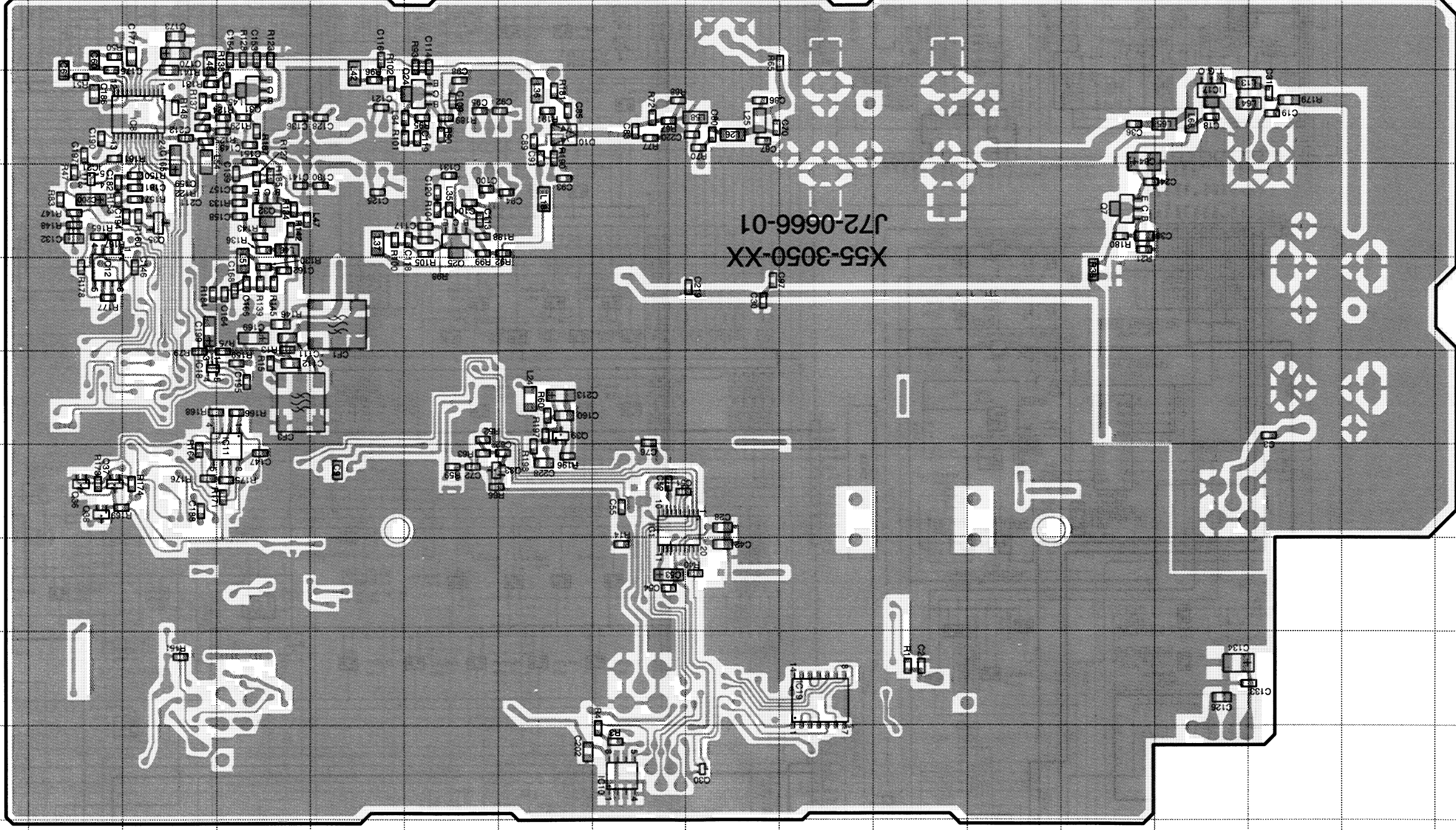
BU4053BCF
BU4094BCFV

NJM78L08UA
NJM78L05UA

Ref. NO.	Address
IC2	3J
IC3	4D
IC4	3N
IC5	6B
IC6	7B
IC7	8D
IC9	5D
IC13	4G
IC14	4L
IC15	8C
IC16	4E
IC20	7G
Q1	8H
Q3	7I
Q5	8H
Q6	6I
Q8	6K
Q9	6J
Q12	7L
Q13	7K
Q14	7L
Q16	7J
Q17	4N
Q18	5E
Q19	5E
Q20	6E
Q22	5E
Q26	3B
Q28	4B
Q29	3C
Q34	7C
D2	5K
D3	5L
D4	5J
D6	5J
D9	4C
D11	4C

RX UNIT (X55-3050-XX) Component Side View

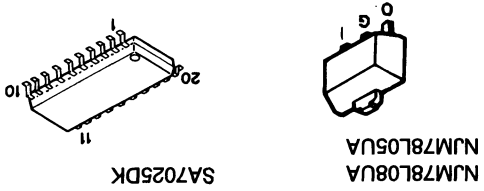
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IC1	6J
IC8	100
IC10	3J
IC11	6N
IC12	8P
IC17	10D
IC18	7O
IC19	4H
IC21	9P
O7	9E
O24	10L
O25	9L
O30	3I
O31	10N
O32	9N
O33	6L
O35	9O
O36	6P
O37	6P
O38	6P
O39	7K
D10	10K



PC BOARD VIEW

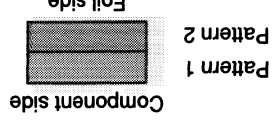
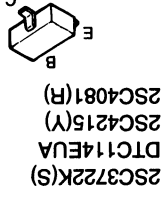
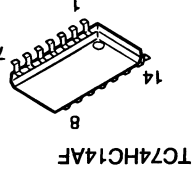
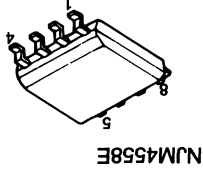
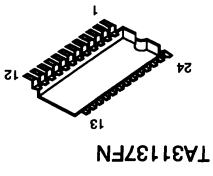
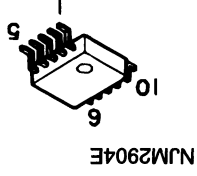
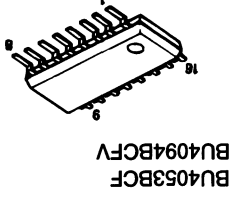
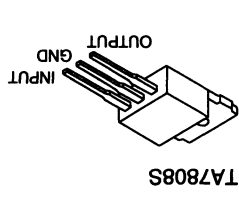
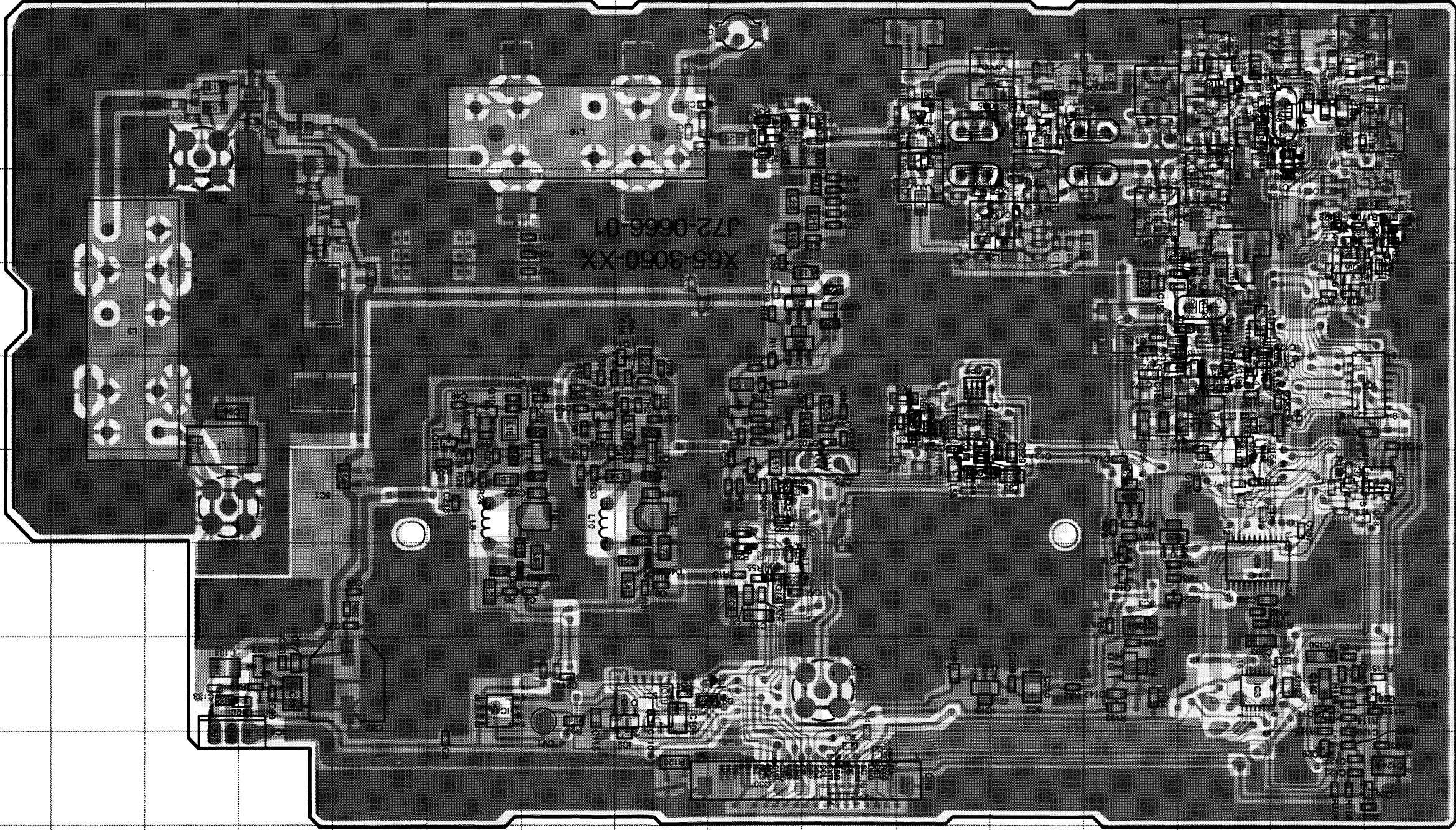
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RX UNIT (X55-3050-XX) Component Side + Foil Side View

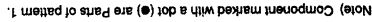


Ref. NO.	Address
IC1	6J
IC2	3J
IC3	4D
IC4	3N
IC5	6B
IC6	7B
IC7	8D
IC8	10D
IC9	5D
IC10	3J
IC11	6N
IC12	8P
IC13	4G
IC14	4L
IC15	8C
IC16	4E
IC17	10D
IC18	7D
IC19	4H
IC20	7G
IC21	9P
Q1	8H
Q3	7I
Q5	8H
Q6	6I
Q7	9E
Q8	6K
Q9	6J
Q12	7L
Q13	7K
Q14	7L
Q16	7J
Q17	4N
Q18	5E
Q19	5E
Q20	6E
Q22	5E
Q24	10L
Q25	9L
Q26	3B
Q28	4B
Q29	3C
Q30	3I
Q31	10N
Q32	9N
Q33	6L
Q34	7C
Q35	9O
Q36	6P
Q37	6P
Q38	6P
Q39	7K
D2	5K
D3	5L
D4	5J
D6	5J
D9	4I
D10	10K
D11	4C

RX UNIT (X55-3050-XX)
Component Side + Foil Side View

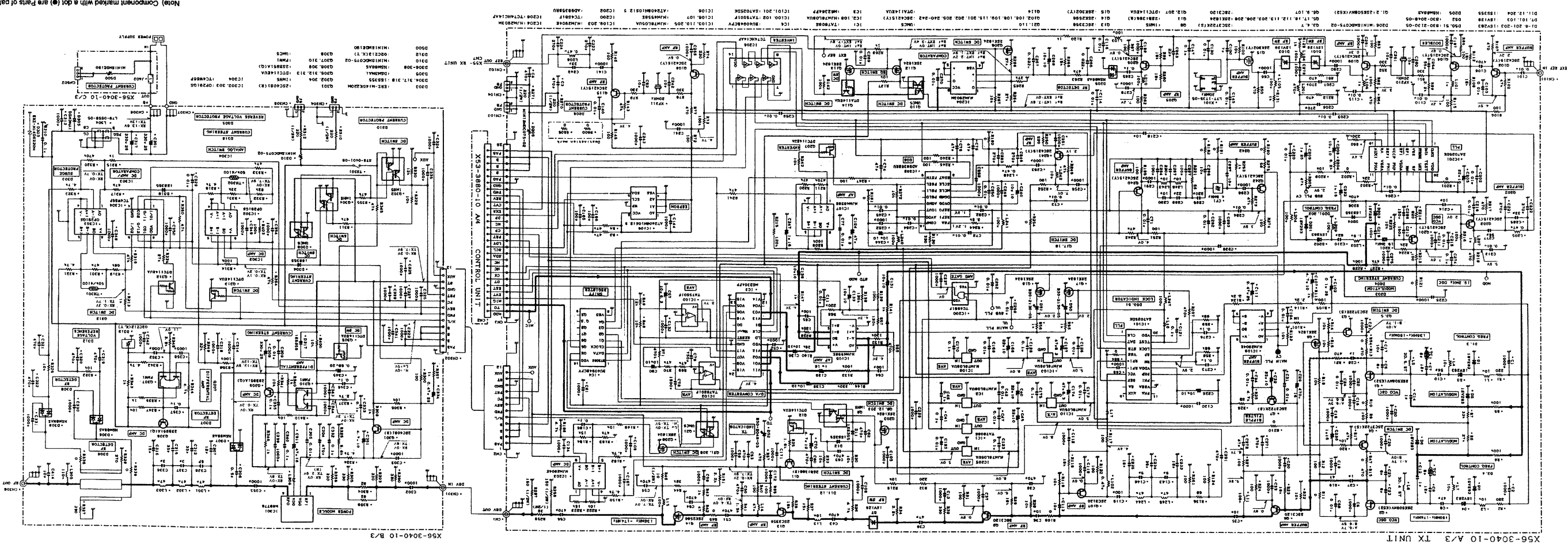


SCHEMATIC DIAGRAM



TKR-740

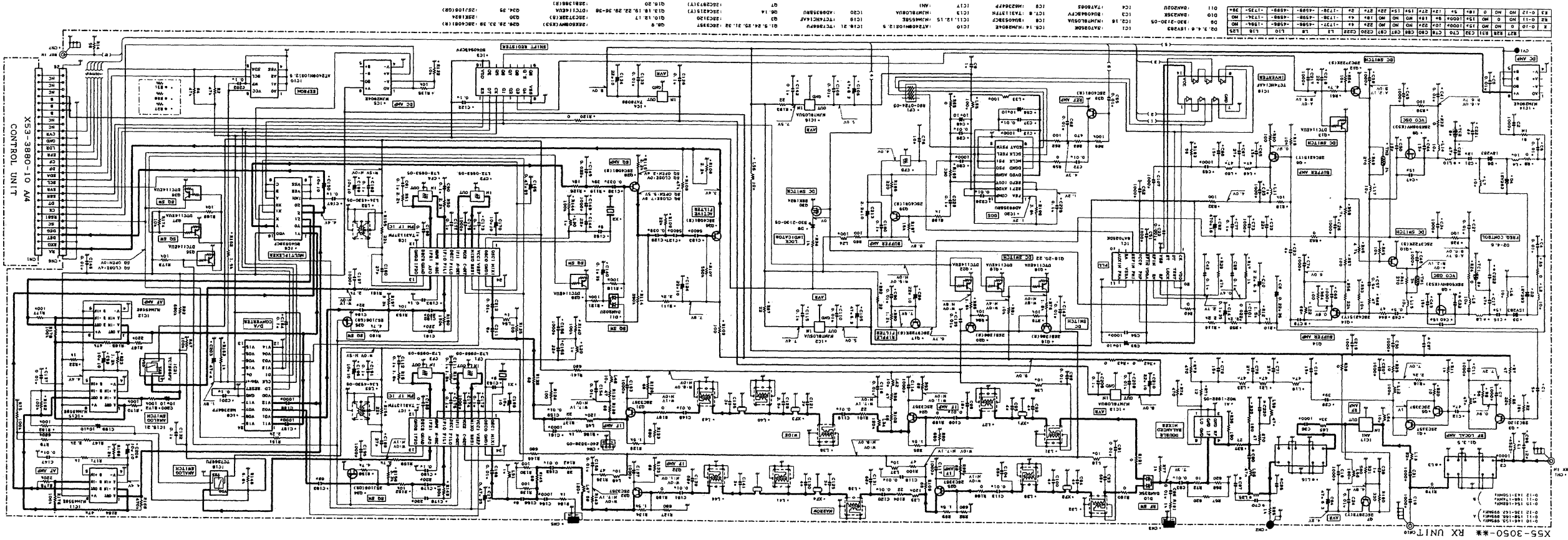
SCHEMATIC DIAGRAM



(Note) Component marked with a dot (•) are Parts of pattern 1.

TKR-740

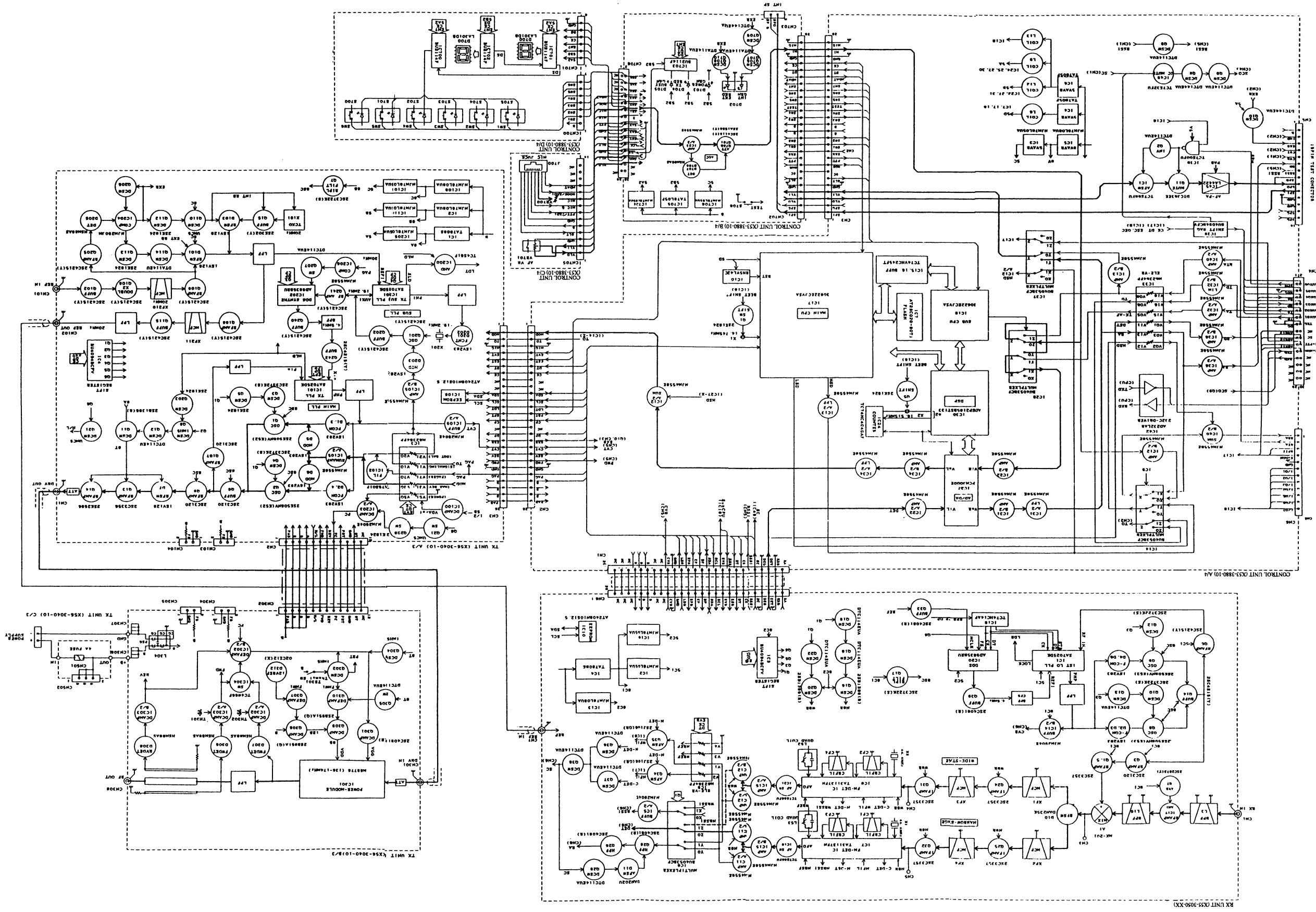
SCHEMATIC DIAGRAM



(Note) Component marked with a dot (•) are Parts of pattern 1.

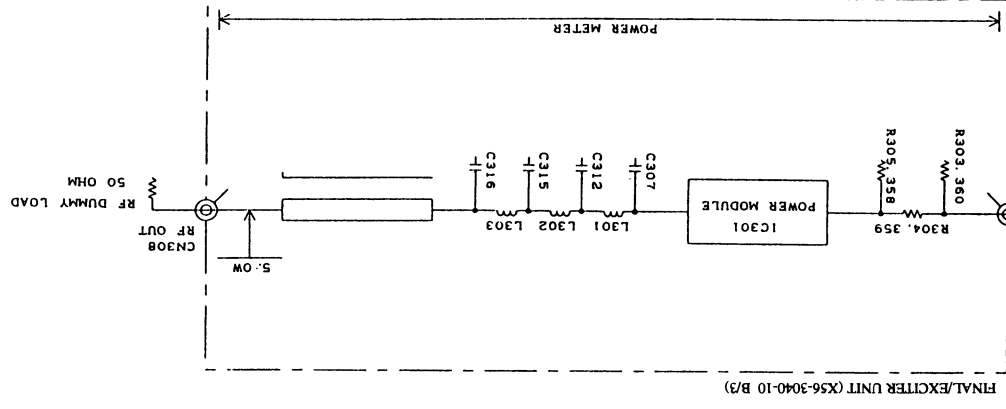
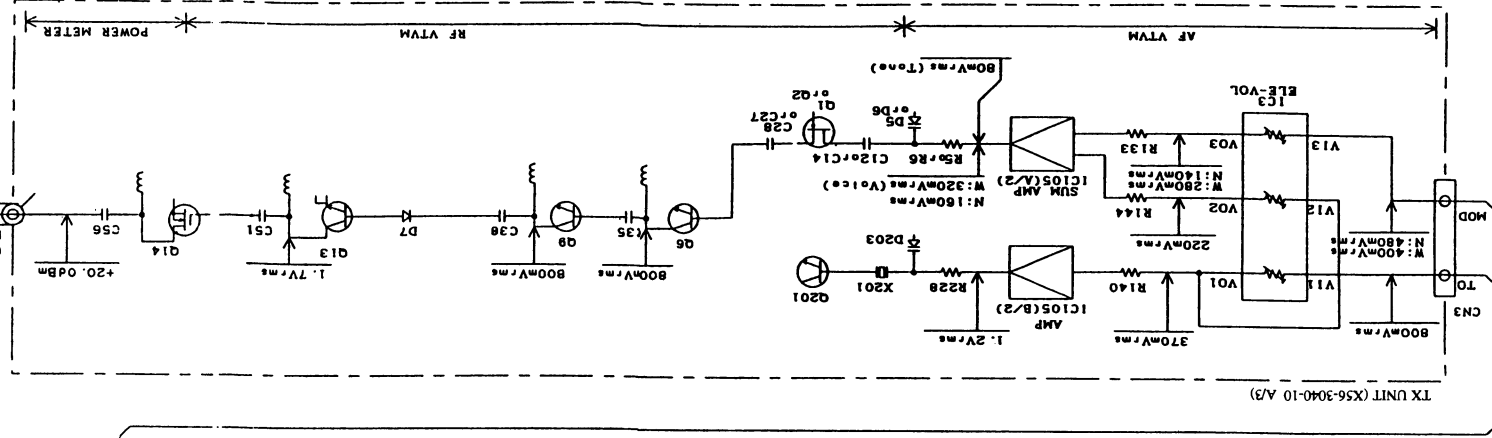
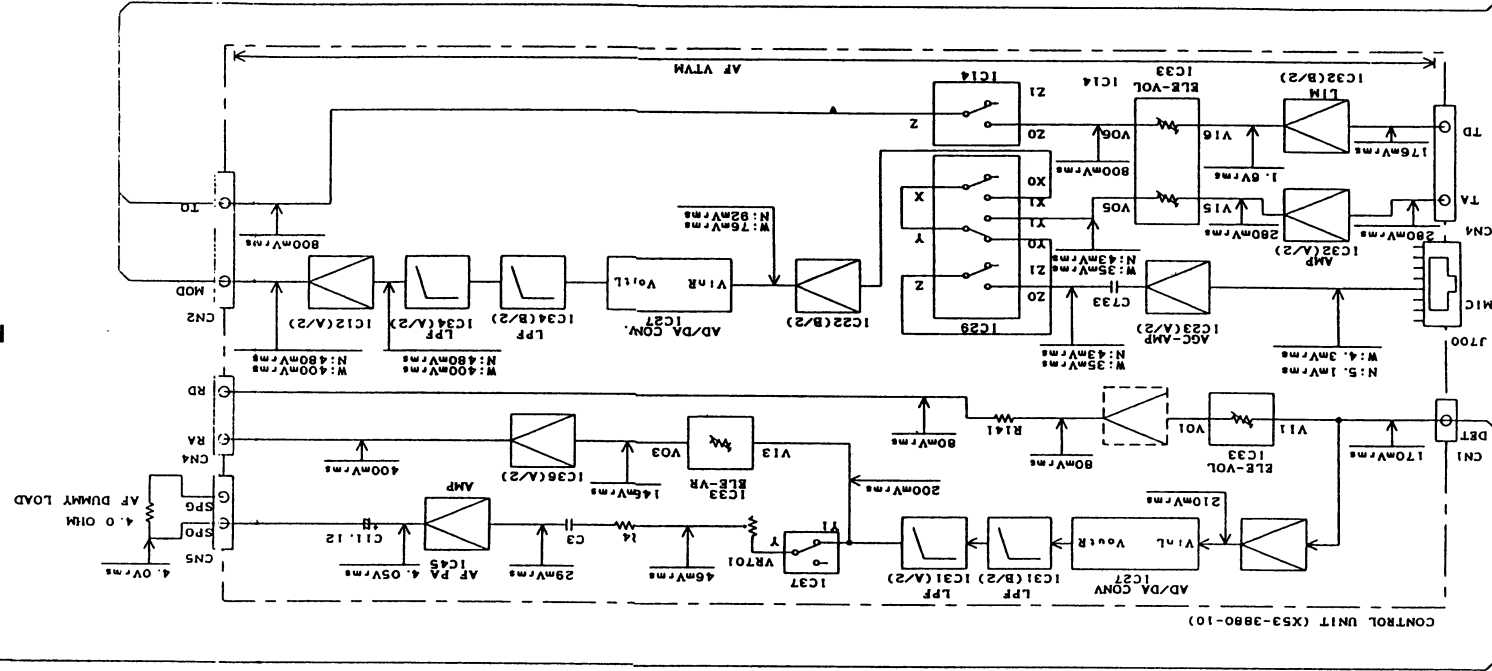
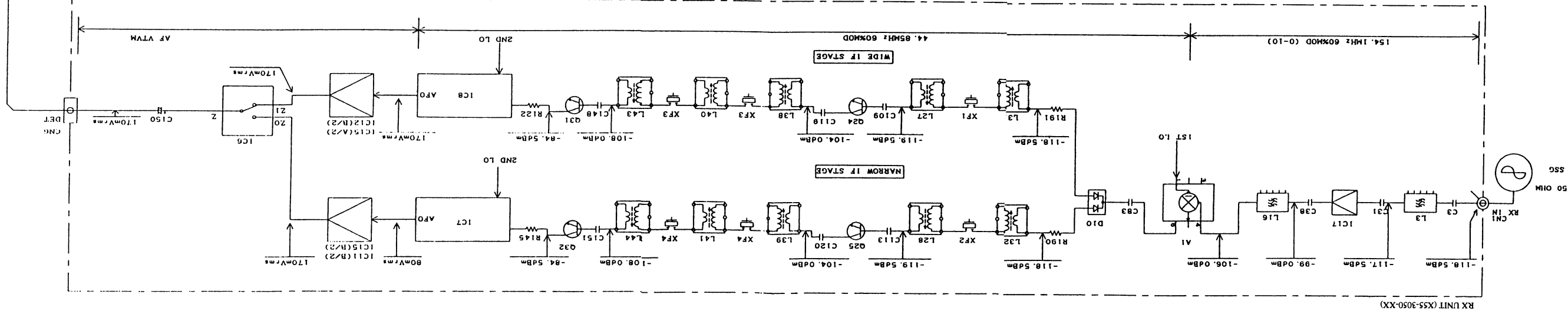
BLOCK DIAGRAM

TKR-740 TKR-740



TKR-740 TKR-740

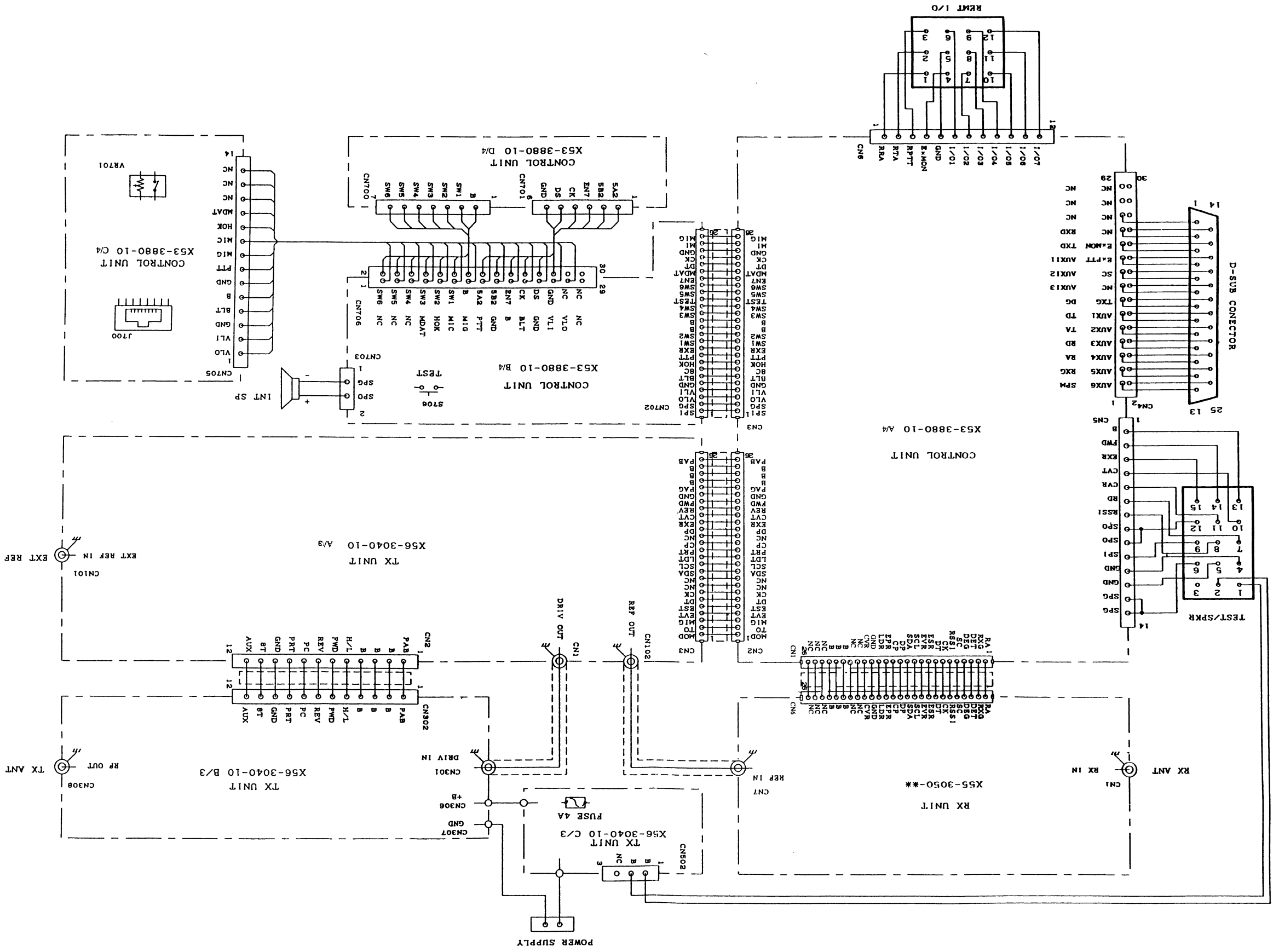
LEVEL DIAGRAM



- Because the speech output terminal reaches 12dB SINAD when receiving high frequencies, you need an antenna input level (60% modulation)
- Even though the speech output terminal reaches 4W when receiving low frequencies, you need a 1kHz AF signal level.
- Even though the modulation reaches 60% when transmitting low frequencies, you need a 1kHz MIC input level.
- Measure the level of transmitted high frequencies directly from a special quality 50Ω impedance spectrum analyzer.

Note

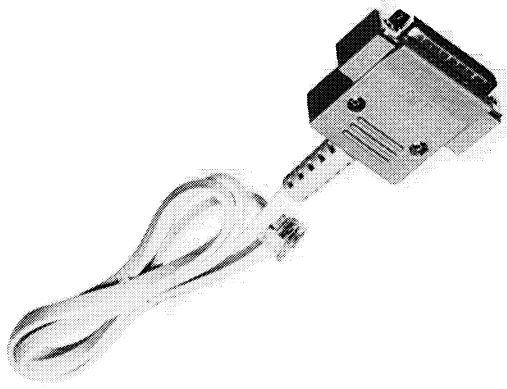
TKR-740 TKR-740



TKR-740

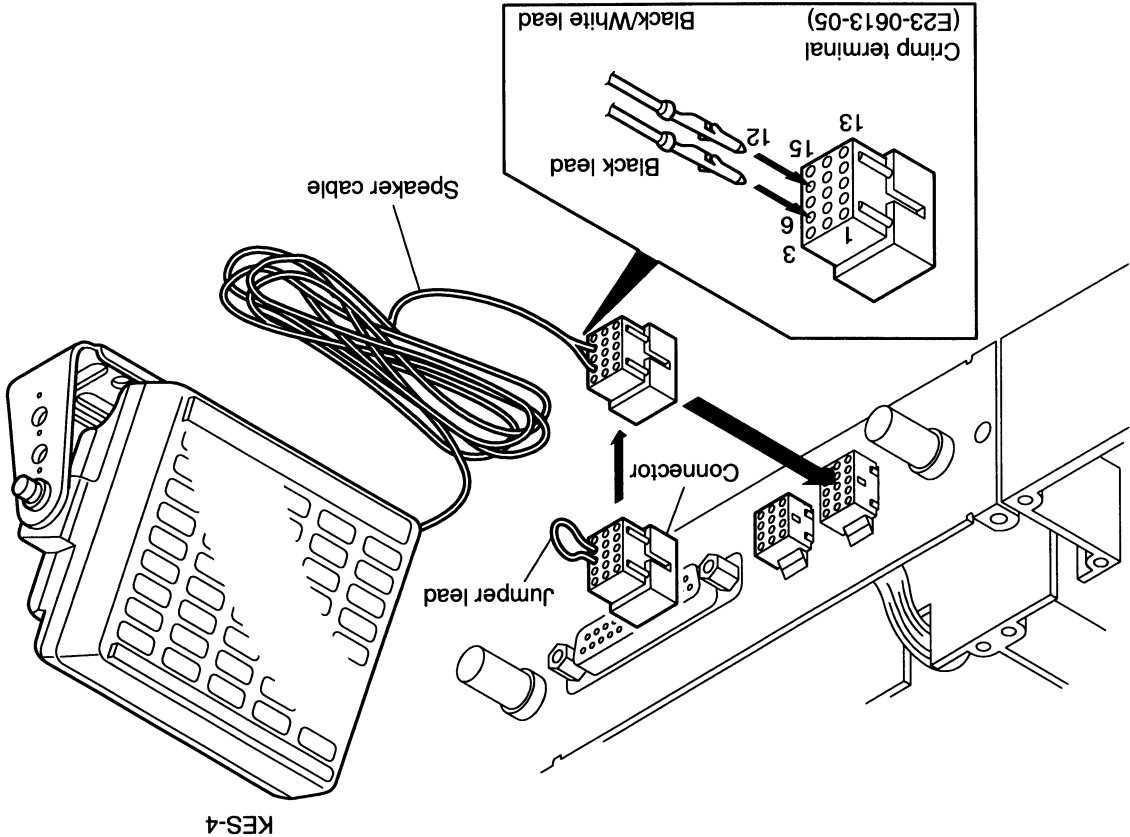
TKR-740

KPG-46 (PROGRAMMING INTERFACE CABLE)



KPG-46 External view

KES-4 (EXTERNAL SPEAKER)



- When using an external speaker :
1. Make sure the unit's power is turned OFF.
 2. When using the external speaker, remove the jumper lead and insert the connector into the speaker jack.
 3. When not using the external speaker, replace the jumper lead and insert the connector into the speaker jack. (pins 9 and 12)

Specifications	
Speaker size	120mm
Maximum input power	20W
Impedance	4 ohms
Frequency response	100 to 5000 Hz
Dimensions(W × H × D, projection not included)	127 × 127 × 65mm 5" × 5" × 2-9/16"
Weight	780g(1.72lbs)

MEMO

TKR-740

SPECIFICATIONS

General

Frequency range	RX : 146-162 MHz:K, 158-174 MHz:K2, 136-150 MHz:K3 TX : 136-174 MHz
Input volta	13.8V DC negative ground
Temperature range	-22°F to +140°F (-30°C to +60°C)
Frequency stability	±0.00015% (-22°F to +140°F)
Antenna impedance	50Ω
Channel Spacing	Wide : 30 kHz, Narrow : 15 kHz (PLL channel stepping 2.5kHz, 5 kHz, 6.25 kHz)
Channels quantity	32
Duty cycle	100%
Dimensions (including protrusions)	19 in (483mm) W X 1-3/4 in (44mm) H X 12 in (305mm) D
Weight	8.8 lbs. (4kg)

RECEIVER

Sensitivity (EIA 12dB SINAD)	0.30μV
Selectivity	Wide : 95dB at ±30kHz Narrow : 89dB at ±15kHz 87dB at ±12.5kHz
Channel Frequency Spread	3 MHz
Spurious and image rejection	100 dB
Intermodulation	Wide : 90dB at ±30kHz/±60kHz Narrow : 85dB at ±15kHz/±30kHz
FM Hum and Noise	Wide : 60dB, Narrow : 55dB

TRANSMITTER

RF power output	5W
Channel Frequency Spread	38MHz
Type of Emiss	11K0F3E, 16K0F3E
Audio distortion	Less than 0.5% at 1000Hz
Spurious and emission	70dB
FM Noise	Wide : 55dB, Narrow : 50dB

KENWOOD follows a policy of continuous advancement in development. For this reason specifications may be changed without notice.

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