

DX-77/DX-707

HF TRANSCEIVER

Service Manual

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SPECIFICATIONS

■ General

Operating mode	J3E(LSB,USB),A3E(AM),A1A(CW),F3E(FM)	
Number of memory channels	100	
Antenna impedance	50	
Power requirement	13.8V DC $\pm 15\%$ (11.7 to 15.8V)	
Ground method	Negative ground	
Current drain	Receive	1.1A max.
	Transmit	20A max.
Operating temperature	-10°C to 60°C	
Frequency stability	± 10 ppm (-10°C to 50°C)	
Dimensions	246(w) X 94(h) X 228(d) mm	
	(247X100X268mm for projection included)	
Weight	Approx. 3.8kg	

■ Transmitter

Transmit frequency coverage	160m band	1.8000 to 1.9999MHz
	80m band	3.5000 to 3.9999MHz
	40m band	7.0000 to 7.2999MHz
	30m band	10.1000 to 10.1499MHz
	20m band	14.0000 to 14.3499MHz
	17m band	18.0680 to 18.1679MHz
	15m band	21.0000 to 21.4499MHz
	12m band	24.8900 to 24.9899MHz
Power output	SSB,CW,FM	100W(high) Approx. 10W(low)
	AM	40W(high) Approx. 4W(low)
Spurious emission	Less than -50dB (-45dB in 30m band)	
Modulation system	SSB	Balanced modulation
	AM	Low power modulation
	FM	Reactance modulation
Carrier suppression	More than 40dB	
Sideband suppression	More than 50dB(at 1kHz)	
Maximum FM deviation	± 2.5 KHz	
Microphone impedance	2k Ω	

■ Receiver

Receiver circuitry	Double conversion superheterodyne	
Receiver frequency range	0.16MHz to 29.9999MHz	
Intermediate frequency	71.75MHz(1st) 8.875MHz(2nd) 455kHz(FM 3rd)	
Sensitivity	SSB,CW,FM	0dBuV(1uV)
		-12dBuV(0.25uV)
Selectivity	AM (1kHz)	+20dBuV(10uV)
	30% mod.)	+ 6dBuV(2uV)
	FM (12dB SINAD)	- 6dBuV(0.5uV)
	SSB,CW,AM(narrow)	2.7kHz(-6dB), 4.7kHz(-60dB)
Spurious and image rejection ratio	AM,FM	8kHz(-6dB), 30kHz(-50dB)
	CW(narrow)	*DX-7TT 500Hz(-6dB), 1.35kHz(-60dB)
Audio output power	More than 70dB More than 2.0W(8 Ω ,10%THD)	
RIT range	± 1.0 kHz	

! Note: Specifications are subject to change without notice.

CIRCUIT DESCRIPTION

Antenna Input

The SA501 and R501 at the input of the antenna terminal are for lightning arrest. Charges on the antenna are discharged through the R501, and if the voltage is above 300V approximately the gap in the SA501 would discharge hence protecting the receiver circuit. The signal coming from the antenna goes thru a Tx/Rx relay (RL502), and passes thru the attenuator of about 20dB (RL514 ON or OFF). The signal further goes thru a lowpass filter rejecting images from the 2m-band and the first I.F., besides preventing leakage from the first local (71.75 to 101.75MHz) to antenna terminal, and is output to the PLL unit.

Front End

The received signal output from the filter unit is input to the PLL unit thru the CN701. Strong signals of Medium Wave broadcasts below 1.6MHz are filtered out by a high pass filter consisting of L761, L762, C803, C804, C805, C810, C811, and C812. When receiving frequencies below 1.6MHz, sensitivity is lowered by the R748 and the attenuator in the bandpass filter and signals above and below 1.6MHz are segregated.

The bandpass filter comprises of 8 subunits each having its range. For frequencies above 2.5MHz, bandpass filters are of Chebyshev non-polar type, while below 2.5MHz are low pass filters.

Range	For amateur band
~1.6MHz	
1.6~2.5MHz	1.8MHz
2.5~4.5MHz	3.5MHz
4.5~7.5MHz	7 MHz
7.5~10.5MHz	10MHz
10.5~14.5MHz	14MHz
14.5~21.5MHz	18, 21MHz
21.5~30MHz	24, 28MHz

The signal from the bandpass filter goes thru switching diodes D711 and D710 that switches between the next stage preamp and bypassing. The preamp is designed with low noise figure and high immunity against strong input by grounded gates of the Q705 and Q707 (2SK2171). It amplifies about 10dB in the range of about 1MHz to 30MHz. In combination with the said preamp

and the 20dB attenuator in the filter unit, four levels of RF gain are made available in -20, -10, 0, and +10dB. The receiver first mixer comprising of the Q703 and Q706 is a balanced mixer with gate input to 2SK2171. The third intercept point is about +20dBm and the local oscillator signal of approximately 2V is input, for converting the received signal to 71.75MHz which is the first I.F.

First I.F. Amp

The FL701:A and FL701:B are crystal filters of 71.75MHz which has the passband response of 15kHz/±3dB, at a guaranteed attenuation of 70dB. The second I.F. image rejection is determined here, and is about 80dB typically. Between the two there is the 1st I.F. amp (Q704) which alleviates affects of each other besides meliorating the loss in the front end.

Second Mixer/Second I.F. Amp

The L710, D702, D705, and L711 form a double balanced mixer (DBM) with diode. This DBM is bidirectional and the signal direction is opposite between transmit and receive. The level of the second local oscillation is about 3dBm and the third intercept point is about +10dBm. The received signal (71.75MHz) and the second local oscillation (62.875MHz) are mixed, and with the low pass filter comprising of the L703, C703, and C922, unwanted signals are filtered out thus obtaining 8.875MHz signal which is output to the main unit. The signal input to the main unit goes thru a crystal filter (FL1), Tx/Rx switching diode (D8), and noise blanker amplifier circuit, and is fed to the Q22 for amplification. The FL1 has the passband response of 8kHz/±3dB at a guaranteed attenuation of 36kHz/±20dB.

I.F. Filter

After passing thru a Tx/Rx switching diode (D9), the signal goes through one of three crystal filters (8.875MHz), and selectivity for each mode is thereby determined.

SSB, CW, AM-NARROW	FL2(XF0027)	2.7KHz/±6dB	4.7KHz/±60dB
CW-NARROW	FL3(XF0036)	0.5KHz/±6dB	1.34KHz/±60dB (with EJ-35U)
FM, AM	FL4(XF0028)	8KHz/±3dB	36KHz/±20dB

There are two switching diodes for input and output of each filter (D37 to D48), securing isolation. The isolation required is more than the guaranteed attenuation for each filter (about 70dB). The filters not used are shorted by diodes parallel to the filters and cut by the diodes in series, therefore the combination achieves high level of isolation from the signal. The filter switching is done by the Q18, Q39, Q40, Q36, Q37, D7, D79, D80 D82, and D83, and the switching configuration depends on the mode, Tx/Rx, and Wide/Narrow status.

Second I.F. Amp

After the filter, passing thru a Tx/Rx switching diode (D49), the signal is amplified by the Q23 and Q24, and buffered by the Q25. The second gates of the Q22, Q23, and Q24 are controlled by the AGC circuit. The level of the received signal for which AGC is applied is of high amplitude and constant at the output of the Q25. This output is used for demodulation of SSB, AM, and CW modes besides used for AGC detection. In the FM mode, the signal having amplified by the Q23 is partly input to the IC7(MC3357) thru the C211, and is amplified and demodulated. The demodulated signal is amplified by an op-amp inside the IC7. A feedback resistor (R182) has a parallel capacitor (C214) for de-emphasis. The Q23, Q24, and Q25 are also operational during the FM mode and the AGC is effected.

Demodulator

When in SSB or CW mode, the local oscillation signal mentioned below from the PLL unit is input to the balanced mixer of the IC19. The received signal is input to pin No.3, the local signal at 5V p-p to pin No.10. The Q17 is an amplifier that amplifies the local signal to 5V p-p. The outputs are from pin Nos. 2 and 4 which are demodulated by the IC3:B, the differential amplifier.

Local Osc:	USB	8.8765MHz
	LSB	8.8735MHz
	CWU	8.875MHz +(sidetone freq)
	CWL	8.875MHz -(sidetone freq)
	AM FM Tx	CW Tx 8.875009MHz
	AM Rx	DDS no output

CW Audio Filter

The IC4 is an active filter combined of high-pass and low-pass filters by op-amps, which has a passband of about 600Hz (-6dB) with its centre at about 800Hz.

AF Switching / AGC Time-Constant Switching

The IC5 is an analogue multiplexer with two channels and four contacts, which switches the demodulated output and AGC time-constant dependent on mode. The mode voltage is made by combination of the D50, D55, and D56, which is input to pin Nos. 9 and 10, thereby switching CW audio filter output and demodulated output of (SSB), FM, and AM of the IC3. While transmitting, 8V is imposed to pin No.6 (inhibit) turning the demodulated output off.

AF Amplifier

The AF signal, after passing thru an analogue switch, is amplified by about 20dB with the IC22:A. Part of this output is connected to the microphone terminal on the front panel so that audio without squelching can be utilized by the user, for RTTY, SSTV, for example.

AF Gain Control, AF Amp

The output of pin No.7 of the IC22 is fed to AF Gain potentiometer for audio output control. The potentiometer output is voltage-divided with the R1122 and R1123 and is fed to the IC10:10, an AF amp. By said voltage division, input level is adjusted at the same time the input impedance is lowered for the IC10:10 therefore residue noise is lowered. The IC10:10 is an AF power amp, while the Q10:18 and C10:64 form ripple filter. Over 2W output is obtained at 8 ohm load and 10% distortion.

AGC

The AGC is affecting to one stage in the first IF circuit, and three stages in the second IF circuit, a total of four stages. Each amplifier stage is made of 3SK131 with AGC on the second gate. The bias on the first gate of 3SK131, and the source resistor and voltage at the second gate have been determined their operational level so that the gain is lowered linearly against the voltage lowering at the second gate. (The source resistor: 470 ohm; the first gate about 2V). The D53 is for signal detection and the Q26 is for DC amplification. The anode of the D100 is set at 2V by the R176, D110, D111, D100, and R177; Since little current flows through the IC14's feedback resistor the VR14, R257, input resistor R168, and D100 to R177, the voltage of AGC line is about 2.4V. When there is detection voltage on the D53 due to receiver input signal, the Q26 attempts to lower the AGC voltage. When AGC is set FAST in SSB or CW, there is the C204 between AGC line and the power supply. The raise in receiver input signal is AGC controlled dependent on the time-constant which is determined by R167 and C204, hence the transient response is set. Discharging is determined by the C204 and R168, and the resulting characteristic is of fast-attack / slow delay type. When the AGC is set to SLOW, an analogue switch in the IC6 turns ON and the R175 and C287 comes in parallel, and R175 with IC287 makes discharge time longer without affecting the attack time. When in AM mode, the C205 is further added in parallel, which delays the attack time and the AGC response becomes of average-value type. The D110, D111, and D100 are for temperature compensation. If the received signal delays with a narrow filter before AGC detection followed by AGC-detection and amplification further delaying for AGC-detection, it would cause amplifying with more gain and this loop would start hunting effects. For anti-hunting purpose in this regard, the AGC has more CR time-constant and slower operation as applicable stage comes closer to the

antenna input. The final stage of I.F. varies its amplification immediately by the AGC detection voltage resulting in uniform level received signal, dependent on the transient response. That is, if the received signal suddenly increases, the received output would first be controlled for uniform output by the I.F. final stage, then step by step the AGC is applied to earlier stages, finally affecting the AGC on the final stage to be smaller. For AM reception, there is already AGC voltage due to carrier, and the AGC is averaged independent of the modulation level.

S-meter, Squelch

The output of pin No.1 and RF meter output are combined in the diode, then it is sent to the CPU to display the S-meter. The output signal of pin No.1 is fed to pin No.6 of the IC14-A. The voltage of pin No.5 is determined by the squelch VR of front unit. Comparing with this voltage the squelch is opened or closed. During the check operation the CPU output decreases the voltage of squelch VR in front side to open the squelch deliberately. The squelch output controls the IC13, at the same time it is provided to the front unit to light RX LED and led to CPU unit.

Noise Blanker

Part of the second mixer output whose bandwidth has been limited with the first I.F. filter is amplified by the Q20, IC12, and Q16. After detection by the D33 it controls the NB AGC. The AGC's charging time-constant is determined by the R82 and C128, and discharging time-constant is determined by the R422 and C128. Due to charging time-constant, the AGC voltage does not raise sharply therefore short signals such as pulse noise are not affected while continual signals such as received signal are affected by AGC controlling the gain. Pulse noise, when there, the AGC voltage will not follow and the D33's detection voltage will be high thus the Q15 is activated. For continual signals the detection voltage of the D33 will be fairly averaged due to AGC, and because of the R85 and R84's emitter bias the Q15 will be turned off. That is, for the duration of noise (pulse) the Q15 is ON which turns the Q21 on, applying reverse voltages to the D112, D113, D114, and D115 blocking the passage of noise signal. Also to reduce the leading part of a pulse noise, the signal is blocked with the Q9 for the amplifier after IF filter.

Mic Amp

The input signal from microphone goes thru mic-gain pot the VR14 and is fed to a low noise amp the Q56. At the mic terminal there is an 8V bias thru the R388 for providing voltage to certain type of mics. The IC21 has the gain (about 15dB) which is determined by the R329 and R328. When in FM mode, the gain increases by about 34dB due to the R330 parallel to the R329 thru the Q55, and by the C277 the lower cut-off frequency is increased thereby activating pre-emphasis and limiter. When in SSB or AM, if the speech compressor is turned ON, the gain increases by about 15dB due

to the C345, R384, and Q63, and the IC21B works as a limiter. The C345 cuts off lower spectrum portion and the audio quality becomes suitable for speech compression. The in FM, the gain is adequately obtained and there is no effect of speech compression. If the FM subtone is activated, the output of the IC21B pin No.1 is voltage divided by the R326 and R325, and the sub-tone fed thru the R325. The IC21A is a low pass filter which works as a splatter filter when in FM and a lowpass filter when speech compressor is in use. The output is either fed to PLL unit for FM modulating, or to the IC19 for balanced modulation. The output of the IC19 is muted by the Q54 when in CW or FM. When in AM, the mic gain goes down by the Q8 limiting the modulation.

Balanced Mixer

The IC19 is a balanced mixer by multiplexer, and the carrier is suppressed when in SSB mode. To improve the carrier suppression ratio further, there is the VR3 for balance adjustment. A carrier will be necessary for CW, FM, and AM, which is obtained by applying a DC voltage to pin No.14 unbalancing the mixer. When in FM or AM, DC is applied as transmission begins, while when in CW, balance is unbalanced by keying obtaining a carrier. The VR4 is adjustment for carrier balance which in turn means carrier level adjustment. When in AM, modulation is done simultaneously as DC is applied. The VR11 is the carrier level control for AM.

I.F. Filter

The output of the IC2 goes thru a temperature compensating thermistor THTM and the D49 and is fed to bandwidth limiting I.F. filter. Pulling down pin No.9 of the IC9 when in Tx (and H when in Rx) makes Tx/Rx isolation better. When in SSB mode, the signal becomes DSB without the carrier. Switching of the filters is done by the diode switching mentioned before. For each respective mode, filters are used as follows:

SSB, CW, AM-NARROW	FL2(XF0027)	2.7KHz/-6dB	4.7KHz/-60dB
CW-NARROW	FL3(XF0036)	0.5KHz/-6dB	1.34KHz/-60dB
FM, AM	FL4(XF0028)	8KHz/-3dB	36KHz/-20dB

I.F. Amp, Second Mixer

Having passed the filter, the signal passes thru a switching diode (D37), amp (Q7), and the D8, and thru the second mixer in reverse direction of Rx, making 71.75MHz signal. The Q6 depends on CW keying that improves isolation when CW key is up. An ALC voltage is applied on the second gate of the Q7. Signals from 62.875MHz local oscillator and reverse heterodyne are filtered by the FL701:A. The signal is amplified by the Q702 and is input to a balanced mixer (D701, D704).

Transmitter First Mixer

The first transmit mixer comprising of the D701, D704, L706, and L705 is a double balanced mixer (DBM) and input about 3dBm of local oscillator (71.75Mhz+TxFreq) to obtain the wanted frequency. When transmitting, the input is about -10dBm with 6dB loss. The signal converted to the wanted frequency by the first Tx mixer is passed thru an LPF to filter out the local frequency and image components before it is input to the Tx preamp.

Tx Pre Amp

The IC701 is a wide band amplifier IC operational at 5V and with input and output impedances of 50 ohms. It can put out high power with saturating output of about +13dBm and more than 20dB gain. Inserting attenuators on both the input and output make it widen its range with more stability. The Q701 supplies power to the IC701 while transmitting. The output at the PLL unit is about 0dBm when the transmitter power is 100W.

Power Amp

The signal input is amplified by the Q601 to about 100mW. By having the idling current of about 100mA the amplification is A-class. With the feedback the frequency response is compensated, and with a capacitor parallel to the emitter resistor the frequency is compensated totally. Then the signal is amplified to about 5 watt with the Q602 and Q603 (2SC3133) where the idling current is 100mA (adjusted with the VR601) in push-pull configuration. The D601 is thermally contacting the Q602 and Q603 to compensate idling temperature.

Final Power Amp

There is about 250mA of idling current in the final amp circuit consisting of the Q604 and Q605 (2SC2904). Base bias is applied by Q606. The D605 and D605 are thermally conducting with the Q604, Q605, and Q606 for temperature compensation. Feedbacks exist thru the R628 and R623 from collector side averaging the gain in a wide range. The output of 100W goes to the filter unit. The collector current of the Q604/Q605 is detected due to the voltage drop caused by resistance of the FB606 and L611, and is output to the main unit.

Cooling Fan Control

The fan is controlled under the temperature of the Q604 and Q605 which is sensed by a thermister (TH601). While transmitting, due to temperature rise, the resistance of the TH601 goes down and voltage of inverted input for the IC601:A, B goes down. The non-inverted input is applied a voltage corresponding to its voltage thus is compared. When the temperature is over 50 degrees

Celsius approximately, the inverted-input voltage would go down with comparative voltage, and by the comparator output voltage of the IC601:A, the Q607 is turned ON and the fan starts running with a series resistor (R639). When the temperature further rises and the voltage goes down more than the comparative voltage of the IC601:B, the Q608 turns ON and to lower IC601:A's comparative voltage the R639 goes OFF hence with the series resistor R640 the fan runs faster. Furthermore when the temperature is about 100 degrees Celsius and the voltage goes down more than the lowered voltage, the IC601:A would output a voltage that makes the R639 and R640 parallel for the fan running at the highest speed. The PDW/N is usually pulled up at 13.8V by the R637; however when the fan is running at the highest speed the cathodes of the D608 would go up High and the output would be High which is sent to the main unit as a control signal for high temperature power down. During reception, the IC601:B's comparative voltage goes further down with the D611, and the IC601:B would not turn on unless the temperature goes higher than that of transmitting state, hence the temperature would have to be higher in order for the fan to go faster than the slow speed.

Protection Circuit

As a protection for the final power amp, power down circuits detecting SWR, excessive current, and temperature rise have been installed.

CW Keying Circuit

By keying, the base of the Q49 in the main unit is pulled to Low which causes the collector to output a voltage. This output controls all the circuit which operates by CW keying. The output of the Q49 collector goes thru the D95, IC3:A, VR4, and D52 and by applying a DC voltage to the balanced mixer it unbalances the mixer and generates a carrier. The VR4 is the adjuster for carrier level, while the R287, R64, R65, and C40 determines the CW waveform as to its rising and falling edges. At the same time, the Q48 is turned ON to turn OFF the Q6 ensuring isolating in keying. The C244 makes the Q6 OFF duration longer than keying duration, to avoid effects to the output waveform. By the D95 a voltage is input to pin No.5 of the IC17:A, and by the output from pin No.7 the Q46 is turned ON and the D72 pulling the PTT line down to Low brings the transmitter ON. The capacitors at the input of pin No.5 of the IC17:A (C246, C247) determines transmit time delay after stop of keying. The BK1, BK2, and BK3 are 3 bit break-in time constant voltages which are combined by the combination of the R269, R270 and R272 as D/A for obtaining 8 levels of voltage. When all of the BK1, BK2, and BK3 are low, the status is full-break-in, when more than one of the BK1, BK2, and BK3 have voltage the status is semi-break-in and the break-in time fastest when all of them have voltage. When in full-break-in, each of the BK1, BK2, and BK3 voltages are low hence the Q47 is OFF, making a very fast discharge time-constant with the C246 alone. When either of several of the BK1, BK2, or BK3 has voltage, the Q47 would turn ON and the C247 would

be added parallel to the C246 making the time-constant longer which determines the delay time for semi-break-in. There are 7 levels of semi-break-in voltages out of the BK1, BK2, and BK3, that is fed to the IC17:A as comparative voltage to change the discharge time constant. Thus the time constant is the shortest if all of the BK1, BK2 BK3 outputs voltage. When in AUTO-break-in, the output is from BK1 only, and the comparative voltage for the IC17:A is controlled with the output voltage of the IC17:B. The keying output when in AUTO mode is output with each keying using the one-shot multi-vibrator comprising of the IC18:C, and D. Hence the average value of the IC18:C output voltage would be proportional to average speed of keying. To obtain average voltage, the R281 and C245, etc. are used for integrating, and the output is DC amplified by the IC17:B whose output is used as comparative voltage for keying. The D97 is for turning OFF when in AUTO mode; when AUTO is Low, the voltage charging the C245 is shorted and AUTO is stopped. The D107 and R360 help to follow speeding up the keying, while the D92 and R280 determine the discharging time constant in transmission and elongate the time constant in reception so that it compensates the time constant recovery during the reception. By doing this, the circuit can follow the keying speed; transmission can continue between letters; and reception can take place between words. The circuit is good typically between 30 characters per minute to 200 characters per minute.

Power Control / ALC Circuit

The forward voltage obtained in the filter unit correspondent with transmit power is input to the IC8:A for invert amplification. At the non-inverting input there is a voltage, and the output voltage is shifted by the non-inverted input voltage. There is already about 2.7V on the ALC line which is applied to the second gate of amplification stage that is under ALC control. When a forward voltage is applied, the output voltage of the IC8:A goes down, and when becomes lower than about 3V, the D63 lowers the voltage of the ALC line. The VR7 is for adjusting the Tx output to 100W. By switching the S1 to 50W position, the Q27 turns ON and by having the VR5 in parallel the voltage is brought down to result in 50W. When in AM, the R195 comes in parallel to lower the output to 40W. When in Low power, the LOW line brings the R191 in parallel to lower the voltage. The Q29 and VR8 are for making the (antenna matcher) TUNE output to 10W output. Necessary output, however, may be different depending on the automatic tuner. When the SWR is high, reflected voltage turns on the Q28 lowering the power. The Q28 is activated from SWR 3 approximately.

Overcurrent Protection

The voltage difference detected in the PA unit by the final collector current is differentially amplified by the IC8:B. The output voltage lowers as current increases and at some point the ALC

line is pulled down thru the D63 lowering the output power. The operating point is determined by the VR6.

RF meter circuit, ALC indication

The forward voltage is amplified by the IC9:A for driving the meter. The D70, R223, and C223 are for instant peak-holding to show the meter more visible. The D71 and D86 switch to S-meter. The ALC voltage is invert amplified by the IC98:B. The output voltage is divided from 8V thereby lowering the feedback resistance so that tolerance caused by bias-leakage is minimized; further this feedback resistor lets some current to the R212 to obtain 2.7V to the ALC line. The output is fed to the base of the Q31, leading to the front unit tell the CPU to switch Tx and Rx besides illuminating the Tx LED. The LED varies its intensity with the ALC voltage indicating the ALC level.

Beep and Sidetone Circuit

Both beep and sidetone are output by the beep line at pin No.79 of the CPU in square wave. The sidetone frequency is switchable in the range of 400Hz to 1KHz. The beep line has a holding voltage of 2.5V which softens crackling sound at the start of the sound. The VR1002 is the volume control put which leads to the AF amp.

Tune Circuit

At the start of the tuning, the TUNE voltage comes out by which the one-shot multi-vibrator operates and by the Q52, approximately 8V is output to command the external auto tuner as a starting signal. Separately, an output which goes low while tuning is created by the Q53 using the TUNE voltage. When the starting signal is received by the external auto tuner (e.g. EDX-2), the tuner outputs the said (low) output at TKEY terminal. The radio's CPU monitors the TKEY terminal and while the voltage is at low level the radio is put to the TUNE mode. If the TKEY terminal is low for more than 20 seconds, the CPU releases the TUNE mode. During the TUNE mode the radio transmits in AM mode besides microphone is muted and the carrier is suppressed at 10W (adjustable).

Regulated Power Supply

The IC11 is a regulated power supply of 8V output. The voltage necessary for transmission, namely 78V is created by the Q33, and for reception 88V by the Q35. The IC10, Q32 and Q34 are Tx/Tx control. When PTT line is grounded at the output of the Q46 by mic's PTT or CW keying, a High level is output from the IC10:C, and buffered by the Q31 the output is sent to the CPU in the front unit for Tx/Rx switching. The IC10:A, having delayed the rising of reception with the R227, C224, and D62, controls Q33 with Q32. When transmitting, the current flows from 13.8V thru the

R230 and D75, and since the Q33's base voltage is higher by one diode voltage difference than 8V, the emitter output will be just 8V. When transmitting, the Q32 is turned ON thus the Q33's base voltage will be 0V, resulting no output on T8V line. When receiving, the T8V line is shorted by the D76 to discharge remaining charges in the capacitors on T8V line. The Q35 while receiving, similarly as T8V line, has currents coming thru the D77 and R232 from the 13.8V line, and since the base voltage of the Q35 is higher by one diode voltage than 8V, the base voltage of the Q35 will be 0V hence no output on R8V line. When transmitting the R8V line is shorted by the D78 to discharge remaining charges in the capacitors on R8V line. The input to the IC10:D, which goes low when reception is started, is delayed with the R228 and C225, then inverted by the IC10:B, followed by the Q34 to control R8V. If a voltage is applied to pin No. 8 of IC10:C, the output at pin No.10 would vary with PTT going Low, hence a PTT Lock is activated.

Mode Voltage, Functions Control, BPF/LPF Switching

The IC23 controls band switching, and activates by pulling down. The IC15 is controlling the mode voltage, preamp On/Off, Attenuator, Power, while the IC15 controls the filter, AGC, break-in, and PTT-Lock. For each mode, the Q41 and Q43 are turned on providing 8V.

Low Pass Filter

The output from the final power amp goes through the low pass filter in the filter unit removing the harmonics. The input/output for this filter is switched with a relay, and the filters not used are shorted to ground thru relays. The LPF control utilizes the control voltage for the BPF in the main unit. Each LPF is made of 5 pole Chebyshev filters, attenuating the second and higher order harmonics by more than 40dB.

L0	~2.5MHz	BB0, BB1	1.8MHz band
L1	2.5MHz~4.0MHz	BB2	3.5MHz band
L2	4.0MHz~7.5MHz	BB3	7MHz band
L3	7.5MHz~14.5MHz	BB4, BB5	10, 14MHz band
L4	14.5MHz~21.5MHz	BB6	18, 21MHz band
L5	21.5MHz~30.0MHz	BB7	24, 28MHz band

The transmitting signal, having removed spurious contents by the LPF goes thru the power detection circuit and Tx/Rx switching relay.

Power Detection Circuit

The L502 is made by bifilar winding on a toroidal core in 8 turns. Hence the two sides will have 16 turns with a center tap. When the jumper wire goes thru the hole of the core, this itself is considered one turn having 1:16 transformer. Since there are the R502 and R503 in parallel, it effectively means 40 ohm load existing on both ends. For the jumper wire, it is equivalent to having $40\Omega / (16 * 16) = 0.15\Omega$ resistor existing in series. Hence when outputting 100W, the voltage applied to ends of the said quasi-resistor is :

$$0.15 / (50 + 0.15) * \sqrt{(100 * 50)} = 0.211V$$

Since the turn ratio is 16:1, the voltage between the L502 is $[0.211 * 16 = 3.376V]$

The center tap of the coil has the voltage a half of the above therefore the current will flow reversely to that in the jumper wire. A voltage divided by the TC501 and C507 is applied to the center tap, the voltage being in phase with that in the jumper wire. If the voltage is adjusted with the TC501 to be equal to the center tap voltage, the R510 would have the voltages in phase adding each other, and the R11 would have inverted phase cancelling each other. If the antenna impedance changes, there would be a differential voltage on the R511 without having cancellation due to phase or voltage difference, hence having a DC voltage after passing thru the D504. In this way, the voltage applied on the R514 is proportional to the output power (forward voltage) and on the R515 is to the reflected power (reflected voltage). Thus the output and reflected powers are detected and in the main unit the power is controlled.

Dial Rotation Detection

The pulses created by rotating the main dial are passed thru the IC1001:A and :B to remove chattering. The IC1001:A and :B are of Schmitt trigger type by feedback from its output. For each output, the rising and falling edges are differentiated with the IC1003:A and :C making the pulse numbers double, and by combining with the IC1001:C the pulse numbers finally become 4 times. To detect rotating direction, the rotation sense is detected with the IC1003:B and IC1002 which is input to the CPU. Since S1002 creates 50 pulses per rotation, the input to the CPU would be 200 pulses per rotation, that translates to 2kHz per rotation when the pitch is 10Hz. Since the rotation of the main dial can be very fast with many pulses, it is necessary to help the CPU to follow such an input. To do this, the pulses are frequency-divided with the IC1006, and with each divider output it is made possible to accumulate the pulse numbers as 6 bit binary numbers. When the rotation is very fast, the IC1006 counts accumulated pulse numbers and advances the frequency, and when done resets the pulse number accumulated in the IC1006 by the CPU output. Dial rotation pulses

are charged with the D1010, R1082 and C1044 obtaining an average voltage depending on the rotation speed, and the rotation speed is input to the CPU's A/D input port. When the rotation is very high and the voltage is higher than a certain level, advancing-frequency change per pulse is made four times, making track.

Power Switch

Pressing the SW1001 turns the RL517 contact ON and 13.8V is supplied.

Power Supply and Resetting

The IC1004, a resetting IC for resetting the CPU, turns on and off at 3.2V. When OFF (0V) the CPU resets. The IC1003:D produces interrupt signal for the CPU to backup data (for writing data to the EEPROM), where when the supplied power 13.8V goes down to about 9V it sends out a LOW signal, which starts data writing. Then the IC1004's reset signal goes Low and the CPU stops. The Q1021 is the power supply for the CPU, which is made separate in order for the voltage to sustain 5V until the data is written to the EEPROM and resetting signal is input.

Dimmer

A regulated power supply of about 10.5V is made of the Q1003, Q1004, and Q1005. When the DIMM output from the CPU is 5V, about 10.5V is output by the Q1003. The CPU's DIMM output is a pulse, which turns on and off the 10.5V output with 0/5V. When the illumination is at the highest intensity, the DIMM output is constant at 5V; when set to "LP4" it is at 80% duty, "LP3" at 60%, etc. such that the output of the Q1003 is pulsating and the illumination varies with the duty. Since the Q1003 is outputting its current with on and off operation, at the maximum load the illumination is the highest and with the lower illumination the duty goes down and so as the power consumption. At the highest illumination level the voltage applied is 10.5V which is lower than the rated voltage for the lamp (6.3V²) elongating its life cycle.

LCD

For displays requiring speed (e.g. frequency) they are done directly by the CPU, while others are driven by the IC1009's LCD driver transferring data from the CPU. The LCD display has a frame frequency of approximately 128kHz, 1/2 duty, and 1/2 bias.

Tone

The IC1005 is an IC for tone encoding which can output 50 standard tone frequencies 67 to 254.1Hz. The tone output is output in digital 4 bit configuration which is D/A converted by R1056, R1064, R1075 and R1081 to form a tone waveform. The output from the tone unit goes thru the front unit

leading to the main unit's mic amp LPF having mixed with audio signal. The tone is output only when in FM mode.

Electronic Keyer

The IC981 is a keyer IC which is activated by input to pin No.9 for dots, and pin No.10 for dash, outputting High level from pin No.18 which activates the Q981 to key. When ElecKey is ON, the electronic keyer is ON, and when ElecKey is OFF the keying is of semi-automatic (the "bug key") operation. On the front unit, the IC1001:D dash input is the input for straight key while OFF.

Cloning

The Q1012 and Q1013 are buffers for clone data transmission, and the Q1014 and Q1015 are buffers for receiving data. Each data is of one line, and input/output is done thru J692 on the jack unit.

Miscellaneous

The X1001 is a ceramic resonator of 8MHz carefully chosen on its harmonics not interfering on amateur bands. When the power is turned ON, voltages appear on the outputs Y2 and Y3, determining whether connected with the DB0~DB5 or not, whereupon the status is decided. For the front panel switches, the Y0 and Y1 with regard to the DB0~DB5 are monitored to determine which key is pressed. On the terminals of RIT and IF-Shift pots, 5V is applied and the voltage at the input of A/D determines the positions of these pots. During the CHECK operation (MONITOR), the MONI output from the CPU turns on the Q1001 that pulls down the squelching voltage from the front panel, and the squelch is forced to open. The Q1006 is for transmit detection whose output from the main unit superimposes the amount for ALC changing the voltage and illuminating the LCD. For this reason it cannot be directly input to the CPU therefore the change is only either on or off. The Q1002 is the squelch output from the main unit which illuminates the Rx LED.

PLL Unit

Reference frequency oscillator circuit. The reference oscillation frequency for the PLL of the second local oscillator reference and DDS clock, etc. is set at 33.554432MHz (2³²). The signal is oscillated by the X701 and Q173 and buffered with the Q714. Amplified with the IC710, it is used for the DDS clock for BFO oscillation. For the first local oscillation DDS clock, the above reference is divided half by the IC707 1/2 to 16.777216MHz (5V amplitude). It is further divided half with the IC707 2/2 to 8.388608MHz for the second local oscillator PLL (IC7050) reference frequency.

First Local Oscillator: The Q719 is a Hartley oscillator with the Q719 gate grounded which works as VCO with the oscillation frequency range of 71.75 to 101.75MHz. The Q715 eliminates ripples for stabilizing the power supply, while the Q717 is a buffer circuit. The output is amplified by the wide range amp IC962 and divided 1/20 with the IC961, further halved with the IC963, hence 1/40 of the first local oscillator frequency (about 1.8 to 2.5MHz) is input to the phase comparator in the IC715. Meanwhile the DDS in the IC715 can output in 0.25Hz step, and with a D/A converter of 10bit and LPF, a sinusoidal wave that is 1/40 of the first local frequency can be obtained. This output, with the phase comparator will control the signal. The oscillator output frequency will be 10Hz patch ($0.25 * 40$). The phase comparator's 2 phase output goes thru a loop filter which is made of high response, low noise op-amp inside the IC706B; controlling the D717, the oscillation frequency is controlled. To widen the lock range, some voltages are supplied to cathodes of the IC706 and D717. The locking voltage applicable to the anode of the D717 is in a wide range of -2V to +6V. The IC711 is a DC-DC converter to create the necessary negative voltage, and about -4.5V is attained. The first local frequency of 71.75 to 101.75MHz is amplified by the IC709 which is of wide range and high saturation point, and having passed thru an LPF it is fed to the first Rx mixer.

Second Local Oscillator is a PLL circuitry with 62.875MHz oscillation frequency. The reference oscillation frequency input to the IC705 is 8.388608MHz which is divided 1/424 inside, and the comparison frequency is about 9.892kHz. The Q711 is a VCO with 62.875MHz which is buffered with Q712. The output is amplified by the wideband amplifier IC704, and dividing it 1/6356 in the IC705, it is fed to a phase comparator and thru a loop filter, the oscillation frequency is output, controlled by the D716. Also, this output is amplified by the wide band amplifier IC702 and fed to the second mixer circuit. Strictly speaking, the oscillation frequency is 62.874991MHz with the difference of about 9Hz; the difference, however, will be compensated in the BFO oscillator later on. When transmitting FM, the anode of the D716 will be superimposed by the modulating signal from the microphone, modulating into FM signal. When in FM mode, the C935 is added to a loop filter by the Q723, having the time constant larger and the control under the modulation is unabled, a modulated signal is created thru the VCO. The IC717 is an analog switch which enables frequency modulation on the VCO only when in FM mode.

I.F. Shifting (Δ IF): When in SSB or CW, by varying the first local and BFO interlocked, it is possible to change the relative receiving bandwidth without changing the receiving frequency. The range for the I.F. shifting for DX-77 is +/- 1.5kHz in 50Hz pitch.

PARTS LIST

REF. NO.	Parts NO.	Description	Parts Name
		FREQ DIVIDER UNIT	
C961	CE0376	Electromyic C.	ECEVIC5100SR
C962	CU3035	Chip C.	C1608JB1H102KTA
C963	CU3047	Chip C.	C1608JB1H103KTA
C964	CU3047	Chip C.	C1608JB1H103KTA
C965	CU3035	Chip C.	C1608JB1H102KTA
C966	CU3035	Chip C.	C1608JB1H102KTA
C967	CU3035	Chip C.	C1608JB1H102KTA
C968	CU3035	Chip C.	C1608JB1H102KTA
C969	CU3035	Chip C.	C1608JB1H102KTA
CN961	UE0183	Connector	B4P-BC-2
IC961	XA0292	IC	MC12019DR2
IC962	XA0454	IC	UPC1688G
IC963	XA0459	IC	TC74HC74AF(EL)
L961	OC0048	Chip L.	NL322522T100J
L962	OC0048	Chip L.	NL322522T100J
OC961	XT0095	Transistor	2SC4081 T108R
R961	RK3026	Chip R.	ERJ3GSYJ101V
R962	RK3038	Chip R.	ERJ3GSYJ102V
R963	RK3062	Chip R.	ERJ3GSYJ104V
R964	RK3014	Chip R.	ERJ3GSYJ100V
R965	RK3034	Chip R.	ERJ3GSYJ471V
R966	RK3034	Chip R.	ERJ3GSYJ471V
		EJ-33U (ELEC-KEY)	
C984	CU3017	Chip C.	C1608CH1H330JTA
C985	CU3017	Chip C.	C1608CH1H330JTA
D981	XD0234	Diode	MA728 TX
D982	XD0234	Diode	MA728 TX
IC981	XA0541	IC	PIC16C54A-04/60
OC981	XU0061	Transistor	UN5211 TX
R981	RK3046	Chip R.	ERJ3GSYJ472V
R983	RK3030	Chip R.	ERJ3GSYJ221V
R985	RK3058	Chip R.	ERJ3GSYJ473V
R986	RK3034	Chip R.	ERJ3GSYJ471V
R987	RK3034	Chip R.	ERJ3GSYJ471V
R988	RK3058	Chip R.	ERJ3GSYJ473V
R989	RK3034	Chip R.	ERJ3GSYJ471V
R991	RK3001	Chip R.	ERJ3GSYJ471V
W981	UX1221	Wire	WIRE FRONT-ELK
X981	XB0014	Oscillator	CSAC3.586MC300GA-TC
		FILTER UNIT	
C501	CC5095	Ceramic C.	RCC12SL471J
C502	CU3047	Chip C.	C1608JB1H103KTA
C504	CC5085	Ceramic C.	RCC09SL181J
C505	CU3047	Chip C.	C1608JB1H103KTA
C507	CU0087	Chip C.	C2012CH11221J

REF. NO.	Parts NO.	Description	Parts Name
C508	CU3047	Chip C.	C1608JB1H103KTA
C512	CU3029	Chip C.	C1608JB1H331KTA
C514	CC5087	Ceramic C.	RCC09SL221J
C515	CC5103	Ceramic C.	HM17SJS102J
C516	CC5103	Ceramic C.	HM17SJS102J
C519	CU3031	Chip C.	C1608JB1H471KTA
C520	CU3031	Chip C.	C1608JB1H471KTA
C523	CC5087	Ceramic C.	RCC09SL221J
C524	CC5077	Ceramic C.	RCC07SL820J
C526	CU3047	Chip C.	C1608JB1H103KTA
C529	CC5097	Ceramic C.	HM15SJS1561J
C530	CC5097	Ceramic C.	HM15SJS1561J
C531	CC5099	Ceramic C.	HM15SJS1881J
C532	CC5099	Ceramic C.	HM15SJS1881J
C533	CU3047	Chip C.	C1608JB1H103KTA
C537	CU3047	Chip C.	C1608JB1H103KTA
C538	CC5079	Ceramic C.	RCC07SL101J
C539	CC5068	Ceramic C.	RCC06SL390J-L46AU
C540	CU3047	Chip C.	C1608JB1H103KTA
C541	CC5091	Ceramic C.	RCC11SL331J
C542	CC5099	Ceramic C.	HM15SJS1881J
C543	CC5093	Ceramic C.	RCC12SL381J
C544	CU3047	Chip C.	C1608JB1H103KTA
C545	CU3025	Chip C.	C1608CH1H151JTA
C546	CU3025	Chip C.	C1608CH1H151JTA
C547	CU3006	Chip C.	C1608CH1H050CTA
C548	CU3019	Chip C.	C1608CH1H470JTA
C549	CU3047	Chip C.	C1608JB1H103KTA
C550	CU3047	Chip C.	C1608JB1H103KTA
C552	CC5077	Ceramic C.	RCC07SL820J
C553	CC5062	Ceramic C.	RCC05SL180J-L46AE
C554	CU3047	Chip C.	C1608JB1H103KTA
C555	CU3021	Chip C.	C1608CH1H680JTA
C556	CU3023	Chip C.	C1608CH1H101JTA
C557	CU3022	Chip C.	C1608CH1H820JTA
C558	CU3047	Chip C.	C1608JB1H103KTA
C559	CC5085	Ceramic C.	RCC09SL181J
C560	CC5091	Ceramic C.	RCC11SL331J
C561	CC5087	Ceramic C.	RCC09SL221J
C562	CU9033	Chip C.	C3216JB1H104KT-A
C563	CU3047	Chip C.	C1608JB1H103KTA
C564	CU3047	Chip C.	C1608JB1H103KTA
C565	CC5059	Ceramic C.	RCC05SL120J-L46AE
C566	CC5069	Ceramic C.	RCC06SL470J-L46AU
C567	CU3047	Chip C.	C1608JB1H103KTA
C568	CU3047	Chip C.	C1608JB1H103KTA

REF. NO.	Parts NO.	Description	Parts Name
C569	CU3047	Chip C.	C1608JB1H103KTA
C570	CU3047	Chip C.	C1608JB1H103KTA
C571	CC5087	Ceramic C.	RCC09SL221J
C572	CC5103	Ceramic C.	HM17SJS102J
C573	CC5079	Ceramic C.	HM17SJS101J
C574	CC5081	Ceramic C.	RCC07SL101J
C575	CU3047	Chip C.	C1608JB1H103KTA
C576	CC5058	Ceramic C.	RCC05SL100D-L46AE
C577	CC5067	Ceramic C.	RCC05SL330J-L46AE
C578	CU3047	Chip C.	C1608JB1H103KTA
C579	CU3047	Chip C.	C1608JB1H103KTA
C580	CC5077	Ceramic C.	RCC07SL820J
C581	CC5083	Ceramic C.	RCC08SL151J-L46AU
C582	CC5075	Ceramic C.	RCC06SL680J-L46AU
C584	CC5087	Ceramic C.	RCC09SL221J
C585	CC5103	Ceramic C.	HM17SJS102J
C586	CC5095	Ceramic C.	RCC12SL471J
C587	CU3047	Chip C.	C1608JB1H103KTA
CN501	RD0108	Resistor	J1/6Z
CN502	UE0136	Connector	TMPJ02XA1
CN504	UE0071	Connector	PI22A05M
CN505	UE0070	Connector	PI22A04M
CN506	UE0235	Connector	00-6208-000-112-001
CN507	UE0043	Connector	PI22A02M
D501	XD0273	Diode	RLS-93TE-11
D502	XD0273	Diode	RLS-93TE-11
D504	XD0127	Diode	MA704WA TX
D505	XD0273	Diode	RLS-93TE-11
D507	XD0273	Diode	RLS-93TE-11
D509	XD0273	Diode	RLS-93TE-11
D511	XD0273	Diode	RLS-93TE-11
D512	XD0273	Diode	RLS-93TE-11
D513	XD0273	Diode	RLS-93TE-11
D514	XD0273	Diode	RLS-93TE-11
F501	EF0011	Fuse	FGMB125V-5A
FH501	UH0014	Fuse Holder	PFC5000-0301
FH502	UH0014	Fuse Holder	PFC5000-0301
L501	RD1013	Resistor	J1/4Z
L502	QR0022	Troidal Coil	QR0022
L504	QR0021	Troidal Coil	TROIDAL COIL OR0021
L505	CC0087	Chip L.	NL322522T121J
L506	QR0004	Troidal Coil	TROIDAL COIL OR4
L508	QR0006	Troidal Coil	TROIDAL COIL OR0006
L510	QR0007	Troidal Coil	TROIDAL COIL OR0007
L512	CC0087	Chip L.	NL322522T121J
L516	QR0008	Troidal Coil	TROIDAL COIL OR0008
L517	QR0009A	Troidal Coil	OR0009A

REF. NO.	Parts NO.	Description	Parts Name
L519	QC0087	Chip L.	NL322522T121J
L520	QC0032	Chip L.	NL322522TR27M
L521	QC0067	Chip L.	NL322522TR10J
L522	QC0069	Chip L.	NL322522TR15M
L523	QR0010	Troidal Coil	TROIDAL COIL QR0010
L524	QR0011	Troidal Coil	TROIDAL COIL QR0011
L525	OC0048	Chip L.	NL322522T100J
L526	OKA75H	Air Core Coil	MR10.0 7.5T 1.0
L527	OKA65H	Air Core Coil	MR10.0 6.5T 1.0
L528	OC0048	Chip L.	NL322522T100J
L529	QB0037	Ferrite Beads	ZBF253D-00
L530	OKA55H	Air Core Coil	MR10.0 5.5T 1.0
L531	OKA45H	Air Core Coil	MR10.0 4.5T 1.0
L532	QC0048	Chip L.	NL322522T100J
O501	XU0078	Transistor	UN5211L-TX
O506	XT0067	Transistor	FMA4A-T-48
O507	XT0067	Transistor	FMA4A-T-48
O508	XU0116	Transistor	DTA123EUAJ106
R501	RK0065	Chip R.	ERJ6GEYJ683V
R502	RK1020	Chip R.	ERJ6GEYJ151V
R503	RK4054	Chip R.	ERJ4YJ560V
R509	RK0005	Chip R.	ERJ6GEYJ220V
R510	RK3050	Chip R.	ERJ3GSYJ103V
R511	RK3050	Chip R.	ERJ3GSYJ103V
R513	RK3052	Chip R.	ERJ3GSYJ153V
R514	RK3062	Chip R.	ERJ3GSYJ104V
R515	RK3062	Chip R.	ERJ3GSYJ153V
R516	RK3052	Chip R.	ERJ3GSYJ222V
R517	RK3042	Chip R.	ERJ3GSYJ103V
R519	RK3050	Chip R.	ERJ3GSYJ103V
R523	RK3038	Chip R.	ERJ3GSYJ102V
R524	RK3038	Chip R.	ERJ3GSYJ102V
R526	RK3038	Chip R.	ERJ3GSYJ102V
R527	RK3038	Chip R.	ERJ3GSYJ102V
R528	RK4064	Chip R.	ERJ14YJ471V
R529	RK0008	Chip R.	ERJ6GEYJ330V
R530	RK3038	Chip R.	ERJ3GSYJ102V
R532	RK1013	Chip R.	ERJ6GEYJ560V
R533	RK3042	Chip R.	ERJ3GSYJ222V
R534	RK0005	Chip R.	ERJ6GEYJ220V
R535	RD1013	Resistor	J1/4Z
R539	RL1107	Chip R.	ERJ6GEYR000V
RL501	UL0016	Relay	KH-12
RL502	UL0016	Relay	KH-12

REF. NO.	Parts Name	Description	Parts Name	Parts NO.	Description	Parts Name	REF. NO.	Parts NO.	Description	Parts Name	REF. NO.	Parts NO.	Description	Parts Name
RL504	UL0016	Relay	KH-12	C1041	Chip C.	C1608JB1H103KTA	D1018	XD0230	Diode	DAN202U T106	R1009	RK3034	Chip R.	ERJ3G5YJ471V
RL505	UL0016	Relay	KH-12	C1042	Electrolytic C.	16MV220HC	D1019	XD0230	Diode	DAN202U T106	R1011	RK3047	Chip R.	ERJ3G5YJ562V
RL506	UL0016	Relay	KH-12	C1044	Chip Tantallum	TMCMA1E105MTR	D1020	XD0230	Diode	DAN202U T106	R1012	RK3050	Chip R.	ERJ3G5YJ103V
RL507	UL0016	Relay	KH-12	C1046	Chip C.	C1608CH1H101JTA	D1021	XD0230	Diode	DAN202U T106	R1013	RK3038	Chip R.	ERJ3G5YJ102V
RL508	UL0016	Relay	KH-12	C1047	Chip C.	C1608JB1H561KTA	D1022	XD0230	Diode	DAN202U T106	R1014	RK3038	Chip R.	ERJ3G5YJ102V
RL511	UL0016	Relay	KH-12	C1048	Chip C.	C1608CH1H390JTA	D1023	XD0291	Diode	MAZ29 TX	R1015	RK3046	Chip R.	ERJ3G5YJ472V
RL512	UL0016	Relay	KH-12	C1049	Chip C.	C1608JB1H103KTA	D1026	XD0254	Diode	1SS355 TE17	R1016	RK3038	Chip R.	ERJ3G5YJ102V
RL513	UL0016	Relay	KH-12	C1050	Chip C.	C1608JB1C104M	D1028	XD0254	Diode	1SS355 TE17	R1018	RK3062	Chip R.	ERJ3G5YJ104V
RL514	UL0016	Relay	KH-12	C1051	Chip C.	C1608JB1H102KTA	D1029	XD0291	Diode	MAZ29 TX	R1019	RK3046	Chip R.	ERJ3G5YJ472V
RL515	UL0016	Relay	KH-12	C1052	Chip C.	C1608JB1H102KTA	D1030	XD0273	Diode	RLS-93TE-11	R1020	RK3046	Chip R.	ERJ3G5YJ472V
RL516	UL0016	Relay	KH-12	C1053	Chip C.	C1608JB1H103KTA	D1031	XD0165	Diode	ULZ TE-17 5.1B TT11	R1021	RK3034	Chip R.	ERJ3G5YJ472V
RL517	UL0012	Relay	KH-12	C1054	Chip C.	C1608CH1H390JTA	IC1001	XA0296	IC	MC14071BFL2	R1024	RK3046	Chip R.	ERJ3G5YJ471V
SA501	EU0001	Relay	AJK3241	C1055	Chip C.	C1608JB1C104M	IC1002	XA0299	IC	BU4001BF-E2	R1025	RK3026	Chip R.	ERJ3G5YJ101V
TC501	CT0035	Trimmer	DSA-301LA	C1059	Chip C.	C1608JB1H103KTA	IC1003	XA0247	IC	TC4030BF (EL)	R1026	RK3056	Chip R.	ERJ3G5YJ333V
UA0050	UX1079	Wire	ECV2W20X53T	C1060	Chip C.	C1608JB1E473ZTA	IC1004	XA0190	IC	RH5VA32CA T1	R1027	RK3030	Chip R.	ERJ3G5YJ221V
UX1079	UX1079	Wire	SMCD12X95B06BL-P1.0	C1061	Chip C.	C1608JF1E473ZTA	IC1006	XA0295	IC	MC140248FL2	R1028	RK3042	Chip R.	ERJ3G5YJ221V
UX1080	UX1080	Wire	WIRE FILTER-MAIN 2	C1062	Chip C.	C1608JF1E473ZTA	IC1007	XA0303	IC	MC140248FL2	R1030	RK3030	Chip R.	ERJ3G5YJ472V
Y20042	Y20042	Wire	WIRE FILTER-MAIN 3	C1063	Chip C.	EEUFA1C471L	IC1008	XA0460	IC	LC75621W	R1031	RK3046	Chip R.	ERJ3G5YJ221V
			CEMENT G17 / 1G	C1064	Chip C.	16MV220HC	IC1009	XA0351	IC	CPU DX7E(JOTP)	R1032	RK3030	Chip R.	ERJ3G5YJ221V
				C1065	Chip C.	16MV47HW+TS	IC1010	XA0410	IC	24LC16BT1/SN	R1034	RK3058	Chip R.	ERJ3G5YJ473V
				C1066	Chip Tantallum	TMCMA1A475MTR	IC1013	UE0035	Connector	LA442SA	R1037	RK3038	Chip R.	ERJ3G5YJ221V
				C1067	Chip C.	TMCMA1A475MTR	L1001	QC0487	Chip L	FM214-8SMPY	R1038	RK3050	Chip R.	ERJ3G5YJ473V
				C1069	Electrolytic C.	16MV220HC	L1002	QC0086	Chip L	LQH4M151J04	R1039	RK3050	Chip R.	ERJ3G5YJ103V
				C1070	Electrolytic C.	16MV330HC	L1003	QC0086	Chip L	NL322522T101J	R1041	RK3058	Chip R.	ERJ3G5YJ473V
				C1073	Chip C.	C1608JB1C104M	PL1001	EP0009	Lamp	NL322522T101J	R1042	RK3062	Chip R.	ERJ3G5YJ104V
				C1078	Chip C.	C1608JF1E473ZTA	PL1002	EP0009	Lamp	BO031 20805A	R1044	RK3062	Chip R.	ERJ3G5YJ104V
				C1081	Electrolytic C.	25MV22HC	PL1003	EP0009	Lamp	BO031 20805A	R1046	RK3074	Chip R.	ERJ3G5YJ104V
				CN1005	Connector	16MV100HC	PL1004	EP0009	Lamp	BO031 20805A	R1047	RK3066	Chip R.	ERJ3G5YJ105V
				CN1008	Connector	PI22A03M	Q1001	XU0061	Transistor	UN5211 TX	R1048	RK3062	Chip R.	ERJ3G5YJ104V
				CN1010	Connector	PI22A07M	Q1002	XU0061	Transistor	UN5211 TX	R1049	RK3052	Chip R.	ERJ3G5YJ153V
				CN1011	Connector	205082301005100	Q1003	XT0095	Transistor	2SB1132T 1000	R1051	RK3034	Chip R.	ERJ3G5YJ471V
				CN1014	Connector	PI22A03M	Q1004	XU0095	Transistor	2SC4081 T106R	R1052	RK3062	Chip R.	ERJ3G5YJ104V
				CN1016	Connector	PI22A04M	Q1005	XT0095	Transistor	2SC4081 T106R	R1053	RK3034	Chip R.	ERJ3G5YJ104V
				D1001	Chip LED	CL-170G-CD-T	Q1006	XU0025	Transistor	DTC123JK T96	R1054	RK3054	Chip R.	ERJ3G5YJ471V
				D1002	Chip LED	CL-170R-CD-T	Q1010	XU0061	Transistor	UN5211 TX	R1057	RK3034	Chip R.	ERJ3G5YJ471V
				D1003	Diode	1SS355 TE17	Q1012	XU0061	Transistor	UN5211 TX	R1058	RK3050	Chip R.	ERJ3G5YJ103V
				D1004	Diode	1SS355 TE17	Q1013	XU0061	Transistor	UN5211 TX	R1060	RK3034	Chip R.	ERJ3G5YJ471V
				D1005	Diode	DAN202U T106	Q1014	XU0061	Transistor	UN5211 TX	R1061	RK3058	Chip R.	ERJ3G5YJ473V
				D1007	Diode	UBZ TE-17 5.1B TT11	Q1015	XU0061	Transistor	UN5211 TX	R1062	RK3050	Chip R.	ERJ3G5YJ105V
				D1010	Diode	1SS355 TE17	Q1018	XT0127	Transistor	2SC3419-Y	R1063	RK3074	Chip R.	ERJ3G5YJ103V
				D1011	Diode	DAN202U T106	Q1019	XT0077	Transistor	2SC3326A TE85R	R1065	RK3038	Chip R.	ERJ3G5YJ102V
				D1012	Diode	DAN202U T106	Q1020	XU0125	Transistor	DTA144EUAT106	R1067	RK0035	Chip R.	ERJ3G5YJ102V
				D1013	Diode	DAN202U T106	Q1021	XT0037	Transistor	2SC2412K T146R	R1069	RK3066	Chip R.	ERJ3G5YJ224V
				D1014	Diode	DAN202U T106	R1004	RK1108	Chip R.	ERJ3G5YJ471V	R1070	RK3062	Chip R.	ERJ3G5YJ104V
				D1015	Diode	DAN202U T106	R1006	RK3034	Chip R.	ERJ3G5YJ471V	R1071	RK3038	Chip R.	ERJ3G5YJ102V
				D1016	Diode	DAN202U T106	R1007	RK3034	Chip R.	ERJ3G5YJ471V	R1072	RK3038	Chip R.	ERJ3G5YJ102V
				D1017	Diode	DAN202U T106	R1008	RK3038	Chip R.	ERJ3G5YJ102V				

REF. NO.	Parts NO.	Description	Parts Name
C158	CU3047	Chip C.	C1608JB1H103KTA
C159	CU3047	Chip C.	C1608JB1H103KTA
C160	CU3047	Chip C.	C1608JB1H103KTA
C161	CU3047	Chip C.	C1608JB1H103KTA
C162	CU3039	Chip C.	C1608JB1H222KTA
C163	CU3047	Chip C.	C1608JB1H103KTA
C164	CU3047	Chip C.	C1608JB1H103KTA
C165	CU3022	Chip C.	C1608JB1H103KTA
C166	CU3047	Chip C.	C1608JB1H820JTA
C167	CU3022	Chip C.	C1608JB1H103KTA
C168	CU3022	Chip C.	C1608JB1H103KTA
C169	CU3056	Chip C.	C1608JF1E473ZTA
C170	CU3027	Chip C.	C1608CH1H221JTA
C171	CU3047	Chip C.	C1608JB1H103KTA
C172	CU3047	Chip C.	C1608JB1H103KTA
C173	CU3035	Chip C.	C1608JB1H103KTA
C174	CU3051	Chip C.	C1608JF1E473ZTA
C175	CU3056	Chip C.	C1608JB1H102KTA
C176	CU3047	Chip C.	C1608JB1E223KTA
C177	CU3047	Chip C.	C1608JB1H103KTA
C178	CU3047	Chip C.	C1608JB1H103KTA
C179	CU3047	Chip C.	C1608JB1H103KTA
C180	CU3111	Chip C.	C1608JB1C104M
C181	CS0237	Chip Tantalum	TMCSA1A475MTR
C182	CU3047	Chip C.	C1608JB1H103KTA
C183	CS0237	Chip Tantalum	TMCSA1A475MTR
C184	CU3047	Chip C.	C1608JB1H103KTA
C185	CU3111	Chip C.	C1608JB1C104M
C186	CS0372	Chip Tantalum	TMCSA1C106MTR
C187	CU3047	Chip C.	C1608JB1H103KTA
C188	CU3035	Chip C.	C1608JB1H102KTA
C189	CU3035	Chip C.	C1608JB1H102KTA
C191	CU3111	Chip C.	C1608JB1C104M
C192	CU3051	Chip C.	C1608JB1E223KTA
C193	CU3051	Chip C.	C1608JB1E223KTA
C194	CU3051	Chip C.	C1608JB1E223KTA
C195	CU3047	Chip C.	C1608JB1H103KTA
C196	CS0372	Chip Tantalum	TMCSA1C106MTR
C197	CU3045	Chip C.	C1608JB1H682KTA
C198	CU3053	Chip C.	C1608JF1E332ZTA
C199	CU3029	Chip C.	C1608JB1H331KTA
C200	CS0049	Chip Tantalum	TMCSA1C105MTR
C201	CU3008	Chip C.	C1608CH1H070CTA
C202	CU3029	Chip C.	C1608JB1H331KTA
C203	CU3111	Chip C.	C1608JB1C104M
C204	CS0061	Chip Tantalum	TMCSA1V224MTR
C205	CS0049	Chip Tantalum	TMCSA1C105MTR

REF. NO.	Parts NO.	Description	Parts Name
C40	CS0232	MAIN UNIT	TMCSA1V474MTR
C41	CU3024	Chip C.	C1608CH1H121JTA
C42	CU3047	Chip C.	C1608JB1H103KTA
C43	CU3047	Chip C.	C1608JB1H103KTA
C44	CU3047	Chip C.	C1608JB1H103KTA
C45	CU3047	Chip C.	C1608JB1H103KTA
C46	CU3047	Chip C.	C1608JB1H103KTA
C47	CU3047	Chip C.	C1608JB1H103KTA
C49	CU3041	Chip C.	C1608JB1H332KTA
C50	CU3041	Chip C.	C1608JB1H332KTA
C51	CU3035	Chip C.	C1608JB1H102KTA
C52	CS0237	Chip Tantalum	TMCSA1A475MTR
C53	CE0376	Electrolytic C.	ECEVIC1005R
C54	CU3035	Chip C.	TMCSA1C105MTR
C55	CS0049	Chip Tantalum	TMCSA1V224MTR
C56	CS0215	Chip Tantalum	TMCSA1A475MTR
C128	CS0215	Chip Tantalum	TMCSA1A475MTR
C129	CU3047	Chip C.	C1608JB1H103KTA
C130	CE0310	Electrolytic C.	ECEVIC1005R
C131	CU3015	Chip C.	C1608CH1H220JTA
C132	CU3023	Chip C.	C1608JB1H101JTA
C133	CU3047	Chip C.	C1608JB1H103KTA
C134	CU3022	Chip C.	C1608CH1H820JTA
C135	CU3047	Chip C.	C1608JB1H103KTA
C136	CU3002	Chip C.	C1608CH1H010CTA
C137	CU3047	Chip C.	C1608JB1H103KTA
C138	CS0367	Chip Tantalum	TMCSA0J106MTR
C139	CE0315	Electrolytic C.	ECEVIC4705P
C140	CU3047	Chip C.	C1608JB1H103KTA
C141	CU3047	Chip C.	C1608JB1H103KTA
C142	CU3022	Chip C.	C1608CH1H820JTA
C143	CU3047	Chip C.	C1608JB1H103KTA
C144	CU3047	Chip C.	C1608JB1H103KTA
C145	CU3056	Chip C.	C1608JB1H103KTA
C146	CU3003	Chip C.	C1608CH1H020CTA
C147	CU3047	Chip C.	C1608JB1H103KTA
C148	CU3022	Chip C.	C1608CH1H820JTA
C149	CU3051	Chip C.	C1608JB1E223KTA
C150	CU3047	Chip C.	C1608JB1H103KTA
C151	CU3047	Chip C.	C1608JB1H103KTA
C152	CU3047	Chip C.	C1608JB1H103KTA
C153	CU3047	Chip C.	C1608JB1H103KTA
C154	CU3047	Chip C.	C1608JB1H103KTA
C155	CU3047	Chip C.	C1608JB1H103KTA
C156	CU3047	Chip C.	C1608JB1H103KTA
C157	CU3047	Chip C.	C1608JB1H103KTA

REF. NO.	Parts NO.	Description	Parts Name
R1135	RK3046	Chip R.	ERJ3GSYJ472V
R1136	RK3046	Chip R.	ERJ3GSYJ472V
R1137	RK3001	Chip R.	ERJ3GSY0R00V
R1138	RK3058	Chip R.	ERJ3GSYJ473V
R1140	RK3046	Chip R.	ERJ3GSYJ472V
R1142	RK3001	Chip R.	ERJ3GSY0R00V
R1143	RK0039	Chip R.	ERJ6GEYJ222V
S1001	UJ0019	Switch	ESB64601
S1002	UJ0023	Switch	SKQMAH
S1003	UJ0022	Switch	SKHUPD (77only)
S1004	UJ0023	Switch	SKQMAH
S1005	UJ0022	Switch	SKHUPD (77only)
S1006	UJ0022	Switch	SKHUPD (77only)
S1007	UJ0022	Switch	SKHUPD (77only)
S1009	UJ0022	Switch	SKHUPD
S1010	UJ0022	Switch	SKHUPD
S1011	UJ0022	Switch	SKHUPD
S1012	UJ0022	Switch	SKHUPD
S1013	UJ0022	Switch	SKHUPD
S1014	UJ0022	Switch	SKHUPD
S1015	UJ0022	Switch	SKHUPD
S1016	UJ0022	Switch	SKHUPD
S1017	UJ0022	Switch	SKHUPD (707only)
S1018	UJ0022	Switch	SKHUPD (707only)
S1019	UJ0022	Switch	SKHUPD (707only)
S1020	UR0001	Switch	RES20D50-201-1B
VR1001	RV0039	Volume	EVUF2JFK3A14
VR1002	RH0089	Trim.Pol.	EM1YXS09BES
W1004	RV0036	Volume	EVUF2JFK3B14
W1006	UX1216	Wire	WIRE FRONT-MAIN
W1008	UX1216	Wire	WIRE FRONT-MAIN
X1002	XB0019	Oscillator	CSACS8.00MT-TC
DG0023	DG0023	LCD	LCD LIGHT
FG0192	FG0192	LCD	LCD T464004
FM0105C	FM0105C	LCD	ZNNS10Q1.57267.7
FP0129	FP0129	MIC SPACER	LCD HOLDER DX70
TL0014	TL0014	LCD FILTER XM601	MIC SPACER
TL0015A	TL0015A	LCD FILTER LOW DX70	LCD FILTER XM601
TT1002	TT1002	P.C.B	TUBE1.0 1mm#
UP0320A	UP0320A	JACK UNIT	DX77 FRONT INTEG
C694	CU3019	Chip C.	C1608CH1H470JTA
J692	UJ0032	Jack	HSJ1332-01-040
R691	RK3001	Chip R.	ERJ3GSY0R00V
W691	UX1217	Wire	WIRE FRONT-JACK
C39	CS0232	Chip Tantalum	TMCSA1V474MTR

REF. NO.	Parts NO.	Description	Parts Name
R1073	RK3038	Chip R.	ERJ3GSYJ102V
R1074	RK3052	Chip R.	ERJ3GSYJ153V
R1076	RK3034	Chip R.	ERJ3GSYJ471V
R1078	RK3062	Chip R.	ERJ3GSYJ104V
R1079	RK3034	Chip R.	ERJ3GSYJ471V
R1080	RK3038	Chip R.	ERJ3GSYJ102V
R1082	RK3054	Chip R.	ERJ3GSYJ223V
R1080	RK3038	Chip R.	ERJ3GSYJ102V
R1091	RK3038	Chip R.	ERJ3GSYJ102V
R1094	RK3074	Chip R.	ERJ3GSYJ105V
R1095	RK3058	Chip R.	ERJ3GSYJ101V
R1096	RK3038	Chip R.	ERJ3GSYJ102V
R1097	RK3050	Chip R.	ERJ3GSYJ473V
R1098	RK3058	Chip R.	ERJ3GSYJ103V
R1099	RK3046	Chip R.	ERJ3GSYJ473V
R1100	RK3046	Chip R.	ERJ3GSYJ472V
R1101	RK3074	Chip R.	ERJ3GSYJ105V
R1102	RK3030	Chip R.	ERJ3GSYJ221V
R1103	RK1011	Chip R.	ERJ6GEYJ470V
R1104	RK3001	Chip R.	ERJ3GSY0R00V
R1105	RK3034	Chip R.	ERJ3GSYJ471V
R1106	RK3050	Chip R.	ERJ3GSYJ103V
R1107	RK3050	Chip R.	ERJ3GSYJ103V
R1108	RK3034	Chip R.	ERJ3GSYJ471V
R1109	RK3044	Chip R.	ERJ3GSYJ332V
R1110	RK3050	Chip R.	ERJ3GSYJ103V
R1111	RK3050	Chip R.	ERJ3GSYJ103V
R1112	RK3050	Chip R.	ERJ3GSYJ103V
R1113	RK3050	Chip R.	ERJ3GSYJ103V
R1114	RK3050	Chip R.	ERJ3GSYJ103V
R1115	RK3050	Chip R.	ERJ3GSYJ471V
R1116	RK3034	Chip R.	ERJ3GSYJ103V
R1119	RK3050	Chip R.	ERJ3GSYJ103V
R1120	RK3062	Chip R.	ERJ3GSYJ104V
R1121	RK3050	Chip R.	ERJ3GSYJ103V
R1122	RK3038	Chip R.	ERJ3GSYJ102V
R1123	RK3050	Chip R.	ERJ3GSYJ103V
R1124	RK0022	Chip R.	ERJ6GEYJ221V
R1125	RK3052	Chip R.	ERJ6GEYJ221V
R1126	RK3052	Chip R.	ERJ3GSYJ153V
R1127	RK3056	Chip R.	ERJ3GSYJ333V
R1128	RK3046	Chip R.	ERJ3GSYJ472V
R1129	RK3001	Chip R.	ERJ3GSY0R00V
R1130	RK3038	Chip R.	ERJ3GSYJ102V
R1132	RK3001	Chip R.	ERJ3GSY0R00V
R1134	RK1030	Chip R.	ERJ3GSYJ221V

REF. NO.	Parts NO.	Description	Parts Name
C207	CU3111	Chip C.	C1608JB1C104M
C208	CU3111	Chip C.	C1608JB1C104M
C209	CU3111	Chip C.	C1608JB1C104M
C210	CU3025	Chip C.	C1608CH1H151JTA
C211	CU3004	Chip C.	C1608CH1H030CTA
C212	CU3111	Chip C.	C1608JB1C104M
C213	CE0376	Electrolytic C.	EEV1CS100SR
C214	CU3051	Chip C.	C1608JB1E223KTA
C215	CU3047	Chip C.	C1608JB1H103KTA
C216	CU3047	Chip C.	C1608JB1H103KTA
C217	CU3111	Chip C.	C1608JB1C104M
C218	CU3047	Chip C.	C1608JB1H103KTA
C219	CU3047	Chip C.	C1608JB1H103KTA
C220	CU3111	Chip C.	C1608JB1C104M
C221	CS0372	Chip Tantalum	TMCMB1C106MTR
C222	CS0049	Chip Tantalum	TMCSA1C105MTR
C223	CE0376	Electrolytic C.	EEV1CS100SR
C224	CU3047	Chip C.	C1608JB1H103KTA
C225	CU3047	Chip C.	C1608JB1H103KTA
C226	CS0049	Chip Tantalum	TMCSA1C105MTR
C227	CS0232	Chip Tantalum	TMCMA1V474MTR
C228	CU3047	Chip C.	C1608JB1H103KTA
C229	CE0376	Electrolytic C.	EEV1CS100SR
C230	CU3047	Chip C.	C1608JB1H103KTA
C231	CE0315	Electrolytic C.	EEV1CA470SP
C232	CS0049	Chip Tantalum	TMCSA1C105MTR
C233	CU3025	Chip C.	C1608CH1H151JTA
C234	CU3111	Chip C.	C1608JB1C104M
C235	CU3023	Chip C.	C1608JB1H471KTA
C236	CU3023	Chip C.	C1608CH1H101JTA
C237	CE0376	Electrolytic C.	EEV1CS100SR
C238	CU3003	Chip C.	C1608CH1H020CTA
C239	CU3003	Chip C.	C1608CH1H020CTA
C241	CE0376	Electrolytic C.	EEV1CS100SR
C242	CU3047	Chip C.	C1608JB1H103KTA
C244	CS0371	Chip Tantalum	TMCSA1C395MTR
C245	CS0372	Chip Tantalum	TMCMB1C106MTR
C246	CU3041	Chip C.	C1608JB1H532KTA
C247	CS0049	Chip C.	TMCSA1C105MTR
C249	CU3056	Chip C.	C1608JF1E473ZTA
C251	CS0220	Chip Tantalum	TMCSA1C225MTR
C252	CU3047	Chip C.	C1608JB1H103KTA
C269	CS0049	Chip Tantalum	TMCSA1C105MTR
C270	CU3111	Chip C.	C1608JB1C104M
C271	CS0049	Chip Tantalum	TMCSA1C105MTR
C272	CU3026	Chip C.	C1608CH1H181JTA
C273	CU3043	Chip C.	C1608JB1H472KTA
C344	CU3047	Chip C.	C1608JB1H222KTA
C345	CU3044	Chip C.	C1608JB1H103KTA
C346	CU3047	Electrolytic C.	EEV1CS100SR
C348	CU3111	Chip C.	C1608JB1E223KTA
C349	CU3111	Chip C.	C1608JB1C104M
C350	CU3047	Chip C.	C1608JB1H103KTA
C351	CU3022	Chip C.	TMCSA1V224MTR
C355	CU3047	Chip C.	EEV1CA470SP
C356	CU3047	Chip Tantalum	TMCSA1V224MTR
C358	CU3032	Chip C.	C1608JB1H103KTA
C359	CU3032	Chip C.	C1608CH1H221JTA
CN1	UE0235	Chip C.	C1608CH1H221JTA
CN3	UE0070	Chip C.	C1608CH1H221JTA
CN5	UE0044	Chip C.	C1608CH1H221JTA
CN6	UE0259	Chip C.	TMCMB0J156MTR
CN12	UE0174	Chip C.	C1608JB1H103KTA
CN13	UE0174	Chip C.	C1608JB1H103KTA
D5	XD0254	Diode	C1608JB1H103KTA
D6	XD0130	Diode	C1608JB1H103KTA
D7	XD0246	Diode	C1608JB1H103KTA
D8	XD0246	Diode	C1608JB1H103KTA
D9	XD0246	Diode	C1608JB1H103KTA
D10	XD0231	Diode	C1608JB1H103KTA
D11	XD0231	Diode	C1608JB1H103KTA
D12	XD0254	Diode	C1608JB1H103KTA
D33	XD0118	Diode	C1608JB1H103KTA
D34	XD0254	Diode	C1608JB1H103KTA
D37	XD0272	Diode	C1608CH1H221JTA
D38	XD0272	Diode	C1608CH1H221JTA
D39	XD0272	Diode	C1608CH1H221JTA
D40	XD0272	Diode	C1608CH1H221JTA
D41	XD0272	Diode	C1608CH1H221JTA
D42	XD0272	Diode	C1608JB1H103KTA
D43	XD0272	Diode	C1608JB1H103KTA
D44	XD0272	Diode	C1608JB1C104M
D45	XD0272	Diode	C1608JB1H103KTA
D46	XD0272	Diode	C1608JB1H103KTA
D47	XD0272	Diode	C1608JB1H562KTA
D48	XD0272	Diode	C1608JB1H222KTA
D49	XD0246	Diode	C1608JB1H103KTA
D50	XD0254	Diode	C1608JB1H103KTA
D51	XD0234	Diode	C1608JB1H103KTA
D52	XD0234	Diode	C1608JB1H103KTA
D53	XD0118	Diode	C1608JB1H103KTA
D55	XD0231	Diode	C1608JB1H103KTA
D56	XD0254	Diode	C1608JB1H103KTA
D59	XD0231	Diode	TMCMB1C106MTR
C344	CU3047	Chip C.	C1608JB1H103KTA
C345	CU3044	Chip C.	C1608JB1H562KTA
C346	CU3047	Chip C.	C1608JB1H103KTA
C348	CU3111	Chip C.	C1608JB1C104M
C349	CU3047	Chip C.	C1608JB1H103KTA
C350	CU3047	Chip C.	C1608JB1H103KTA
C351	CU3022	Chip C.	C1608CH1H820JTA
C355	CU3022	Chip C.	C1608CH1H820JTA
C356	CU3047	Chip C.	C1608JB1H103KTA
C358	CU3032	Chip C.	C1608JB1H561KTA
CN1	UE0235	Connector	00-6208-000-112-001
CN3	UE0070	Connector	PI22A04M
CN5	UE0044	Connector	PI22A09M
CN6	UE0259	Connector	CFP0526-0201
CN12	UE0174	Connector	B13B-ZR
CN13	UE0174	Connector	B13B-ZR
D5	XD0254	Diode	1SS355 TE17
D6	XD0130	Diode	DA204U T106
D7	XD0246	Diode	1SS355 TE17
D8	XD0246	Diode	DAN235UT 106
D9	XD0246	Diode	DAN235UT 106
D10	XD0231	Diode	DAP202U T106
D11	XD0231	Diode	DAP202U T106
D12	XD0254	Diode	1SS355 TE17
D33	XD0118	Diode	MA716 TX
D34	XD0254	Diode	1SS355 TE17
D37	XD0272	Diode	1SS356 TW11
D38	XD0272	Diode	1SS356 TW11
D39	XD0272	Diode	1SS356 TW11
D40	XD0272	Diode	1SS356 TW11
D41	XD0272	Diode	1SS356 TW11
D42	XD0272	Diode	1SS356 TW11
D43	XD0272	Diode	1SS356 TW11
D44	XD0272	Diode	1SS356 TW11
D45	XD0272	Diode	1SS356 TW11
D46	XD0272	Diode	1SS356 TW11
D47	XD0272	Diode	1SS356 TW11
D48	XD0272	Diode	1SS356 TW11
D49	XD0246	Diode	DAN235UT 106
D50	XD0254	Diode	1SS355 TE17
D51	XD0234	Diode	MA728 TX
D52	XD0234	Diode	MA716 TX
D53	XD0118	Diode	MA716 TX
D55	XD0231	Diode	DAP202U T106
D56	XD0254	Diode	1SS355 TE17
D59	XD0231	Diode	DAP202U T106
D60	XD0254	Diode	1SS355 TE17
D62	XD0254	Diode	1SS355 TE17
D63	XD0231	Diode	DAP202U T106
D64	XD0140	Diode	DTZ5.6C TT11
D65	XD0254	Diode	1SS355 TE17
D66	XD0254	Diode	1SS355 TE17
D67	XD0231	Diode	DAP202U T106
D68	XD0230	Diode	DAN202U T106
D69	XD0254	Diode	1SS355 TE17
D70	XD0254	Diode	1SS355 TE17
D71	XD0231	Diode	DAP202U T106
D72	XD0231	Diode	DAP202U T106
D74	XD0254	Diode	1SS355 TE17
D75	XD0254	Diode	1SS355 TE17
D76	XD0254	Diode	1SS355 TE17
D77	XD0254	Diode	1SS355 TE17
D78	XD0254	Diode	1SS355 TE17
D79	XD0230	Diode	DAN202U T106
D80	XD0230	Diode	DAN202U T106
D82	XD0230	Diode	DAN202U T106
D83	XD0254	Diode	1SS355 TE17
D86	XD0231	Diode	DAN235UT 106
D88	XD0254	Diode	DAP202U T106
D92	XD0254	Diode	1SS355 TE17
D93	XD0272	Diode	1SS356 TW11
D94	XD0254	Diode	1SS355 TE17
D95	XD0231	Diode	DAP202U T106
D96	XD0254	Diode	1SS355 TE17
D97	XD0254	Diode	1SS355 TE17
D99	XD0254	Diode	1SS355 TE17
D100	XD0230	Diode	DAN202U T106
D101	XD0254	Diode	1SS355 TE17
D102	XD0230	Diode	DAN202U T106
D107	XD0254	Diode	1SS355 TE17
D110	XD0254	Diode	1SS355 TE17
D111	XD0254	Diode	1SS355 TE17
D112	XD0272	Diode	1SS356 TW11
D113	XD0272	Diode	1SS356 TW11
D114	XD0272	Diode	1SS356 TW11
D115	XD0272	Diode	1SS356 TW11
D116	XD0230	Diode	DAN202U T106
D117	XD0254	Diode	1SS355 TE17
FB1	QB0037	Ferrite Beads	ZBF253D-00
FL1	XF0028	Crystal Filter	RE2M1007 8.875MHz
FL2	XF0027	Crystal Filter	RE2MF991 8.875MHz
FL3	XF0036	Crystal Filter	RE61E978 8.875MHz (7TOnly)
FL4	XF0028	Crystal Filter	RE2M1007 8.875MHz

REF. NO.	Parts NO.	Description	Parts Name	REF. NO.	Parts NO.	Description	Parts Name	REF. NO.	Parts NO.	Description	Parts Name	REF. NO.	Parts NO.	Description	Parts Name
IC2	XA0066	IC	M521BAFF/600E	Q23	XE0028	FET	3SK131V12-T1	R45	RK3073	Chip R.	ERJ3G5YJ824V	R105	RK3050	Chip R.	ERJ3G5YJ103V
IC3	XA0224	IC	NJM2904M T1	Q24	XE0028	FET	3SK131V12-T1	R46	RK3044	Chip R.	ERJ3G5YJ32V	R106	RK3051	Chip R.	ERJ3G5YJ123V
IC4	XA0068	IC	M521BAFF/600E	Q25	XT0095	Transistor	2SC4081 T106R	R47	RK3062	Chip R.	ERJ3G5YJ04V	R108	RK3040	Chip R.	ERJ3G5YJ152V
IC5	XA0236	IC	BU4052BFC-E2	Q26	XT0095	Transistor	2SC4081 T106R	R48	RK3056	Chip R.	ERJ3G5YJ33V	R109	RK3044	Chip R.	ERJ3G5YJ32V
IC6	XA0115	IC	TC4S66F TE65R	Q27	XU0148	Transistor	DTC144EUA T106	R49	RK3052	Chip R.	ERJ3G5YJ153V	R110	RK3040	Chip R.	ERJ3G5YJ152V
IC7	XA0063	IC	MC3357DR2	Q28	XT0095	Transistor	2SC4081 T106R	R50	RK3054	Chip R.	ERJ3G5YJ23V	R111	RK3050	Chip R.	ERJ3G5YJ103V
IC8	XA0224	IC	NJM2904M T1	Q29	XU0148	Transistor	DTC144EUA T106	R51	RK3054	Chip R.	ERJ3G5YJ23V	R112	RK3030	Chip R.	ERJ3G5YJ21V
IC9	XA0224	IC	NJM2904M T1	Q30	XT0094	Transistor	2SA1576A T106R	R52	RK3054	Chip R.	ERJ3G5YJ22V	R113	RK3030	Chip R.	ERJ3G5YJ21V
IC10	XA0299	IC	BU4001BF-E2	Q31	XT0095	Transistor	2SC4081 T106R	R53	RK3070	Chip R.	ERJ3G5YJ474V	R114	RK3030	Chip R.	ERJ3G5YJ21V
IC11	XA0082	IC	MC7808CT	Q32	XU0061	Transistor	UN5211 TX	R54	RK3070	Chip R.	ERJ3G5YJ474V	R115	RK3042	Chip R.	ERJ3G5YJ22V
IC12	XA0452	IC	LA1150N	Q33	XT0136	Transistor	2SD1664 T100 Q	R55	RK3046	Chip R.	ERJ3G5YJ472V	R116	RK3040	Chip R.	ERJ3G5YJ152V
IC13	XA0224	IC	NJM2904M T1	Q34	XU0061	Transistor	UN5211 TX	R56	RK3046	Chip R.	ERJ3G5YJ472V	R117	RK3044	Chip R.	ERJ3G5YJ32V
IC14	XA0224	IC	NJM2904M T1	Q35	XT0136	Transistor	2SD1664 T100 Q	R57	RK3042	Chip R.	ERJ3G5YJ22V	R118	RK3040	Chip R.	ERJ3G5YJ152V
IC15	XA0246	IC	BU4094BFC-E2	Q36	XU0148	Transistor	DTC144EUA T106	R58	RK3054	Chip R.	ERJ3G5YJ23V	R119	RK3030	Chip R.	ERJ3G5YJ21V
IC16	XA0114	IC	UPD6345GS T1	Q37	XT0095	Transistor	2SC4081 T106R	R59	RK3050	Chip R.	ERJ3G5YJ03V	R120	RK3030	Chip R.	ERJ3G5YJ21V
IC17	XA0224	IC	NJM2904M T1	Q39	XT0095	Transistor	2SC4081 T106R	R60	RK3026	Chip R.	ERJ3G5YJ101V	R121	RK3030	Chip R.	ERJ3G5YJ21V
IC18	XA0299	IC	BU4001BF-E2	Q40	XU0051	Transistor	UN511F TX	R61	RK3026	Chip R.	ERJ3G5YJ101V	R122	RK3051	Chip R.	ERJ3G5YJ123V
IC19	XA0538	IC	TC74HC052AF(EL)	Q41	XU0049	Transistor	UMAGNTR	R62	RK3046	Chip R.	ERJ3G5YJ472V	R123	RK3050	Chip R.	ERJ3G5YJ103V
IC21	XA0068	IC	M521BAFF/600E	Q43	XU0061	Transistor	UN5211 TX	R63	RK3054	Chip R.	ERJ3G5YJ22V	R124	RK3050	Chip R.	ERJ3G5YJ103V
IC22	XA0068	IC	M521BAFF/600E	Q46	XU0061	Transistor	UN5211 TX	R64	RK3046	Chip R.	ERJ3G5YJ472V	R125	RK3058	Chip R.	ERJ3G5YJ473V
IC23	XA0114	IC	UPD6345GS T1	Q47	XT0095	Transistor	2SC4081 T106R	R65	RK3050	Chip R.	ERJ3G5YJ103V	R126	RK3026	Chip R.	ERJ3G5YJ101V
J1	UE0041	Connector	TMPJ01XV6	Q48	XU0148	Transistor	DTC144EUA T106	R66	RK3050	Chip R.	ERJ3G5YJ103V	R127	RK3026	Chip R.	ERJ3G5YJ101V
J3	UE0041	Connector	TMPJ01XV6	Q49	XT0094	Transistor	2SA1576A T106R	R67	RK3050	Chip R.	ERJ3G5YJ103V	R128	RK3034	Chip R.	ERJ3G5YJ471V
L18	CC0044	Chip L.	NL322522T2R7J	Q52	XU0061	Transistor	UN5211 TX	R68	RK3051	Chip R.	ERJ3G5YJ103V	R129	RK3054	Chip R.	ERJ3G5YJ23V
L63	QA0154	Coil	A638BN-1051XQ=P3	Q53	XU0061	Transistor	UN5211 TX	R69	RK3034	Chip R.	ERJ3G5YJ471V	R130	RK3050	Chip R.	ERJ3G5YJ103V
L65	QA0154	Coil	A638BN-1051XQ=P3	Q54	XT0095	Transistor	2SC4081 T106R	R70	RK3042	Chip R.	ERJ3G5YJ22V	R131	RK3026	Chip R.	ERJ3G5YJ101V
L67	CC0078	Chip L.	NL322522T2J0J	Q55	XU0148	Transistor	DTC144EUA T106	R71	RK3001	Chip R.	ERJ3G5YR00V	R132	RK3030	Chip R.	ERJ3G5YJ22V
L68	QA0154	Coil	A638BN-1051XQ=P3	Q56	XT0111	Transistor	2SC4081LN T106S	R72	RK3043	Chip R.	ERJ3G5YJ27V	R133	RK3026	Chip R.	ERJ3G5YJ101V
L69	QA0154	Coil	A638BN-1051XQ=P3	Q63	XU0148	Transistor	DTC144EUA T106	R82	RK3046	Chip R.	ERJ3G5YJ472V	R134	RK3058	Chip R.	ERJ3G5YJ473V
L70	CC0048	Chip L.	NL322522T100J	Q64	XU0029	Transistor	DTC144EUA T106	R83	RK3038	Chip R.	ERJ3G5YJ102V	R135	RK3058	Chip R.	ERJ3G5YJ563V
L78	QA0154	Coil	A638BN-1051XQ=P3	Q66	XU0148	Transistor	DTC144EUA T106	R84	RK3030	Chip R.	ERJ3G5YJ103V	R136	RK3038	Chip R.	ERJ3G5YJ102V
L81	QA0154	Coil	A638BN-1051XQ=P3	Q69	XT0094	Transistor	2SA1576A T106R	R85	RK3050	Chip R.	ERJ3G5YJ22V	R137	RK3042	Chip R.	ERJ3G5YJ22V
L82	QA0154	Coil	A638BN-1051XQ=P3	R30	RK3026	Chip R.	ERJ3G5YJ101V	R86	RK3026	Chip R.	ERJ3G5YJ101V	R138	RK3032	Chip R.	ERJ3G5YJ331V
L83	CC0493	Chip L.	LOH4N471K04	R31	RK3034	Chip R.	ERJ3G5YJ471V	R87	RK3042	Chip R.	ERJ3G5YJ22V	R139	RK3070	Chip R.	ERJ3G5YJ474V
O6	XU0061	Transistor	UN5211 TX	R32	RK3066	Chip R.	ERJ3G5YJ24V	R88	RK3062	Chip R.	ERJ3G5YJ04V	R140	RK3047	Chip R.	ERJ3G5YJ562V
O7	XE0028	FET	3SK131V12-T1	R33	RK3026	Chip R.	ERJ3G5YJ101V	R89	RK3062	Chip R.	ERJ3G5YJ104V	R141	RK3062	Chip R.	ERJ3G5YJ104V
O8	XU0148	Transistor	DTC144EUA T106	R34	RK3058	Chip R.	ERJ3G5YJ473V	R92	RK3026	Chip R.	ERJ3G5YJ101V	R142	RK3030	Chip R.	ERJ3G5YJ22V
O9	XT0059	Transistor	DTC3082K T146Q	R35	RK3050	Chip R.	ERJ3G5YJ103V	R93	RK3022	Chip R.	ERJ3G5YJ470V	R143	RK3042	Chip R.	ERJ3G5YJ22V
O10	XU0131	Transistor	DTC144EUA T106	R36	RK3030	Chip R.	ERJ3G5YJ103V	R94	RK3034	Chip R.	ERJ3G5YJ471V	R144	RK3042	Chip R.	ERJ3G5YJ102V
O15	XT0095	Transistor	2SC4081 T106R	R37	RK3050	Chip R.	ERJ3G5YJ103V	R95	RK3078	Chip R.	ERJ3G5YJ22V	R145	RK3061	Chip R.	ERJ3G5YJ823V
O16	XT0095	Transistor	2SC4081 T106R	R38	RK3052	Chip R.	ERJ3G5YJ153V	R97	RK3053	Chip R.	ERJ3G5YJ163V	R146	RK3034	Chip R.	ERJ3G5YJ471V
O17	XT0095	Transistor	2SC4081 T106R	R39	RK3039	Chip R.	ERJ3G5YJ122V	R99	RK3042	Chip R.	ERJ3G5YJ22V	R147	RK3034	Chip R.	ERJ3G5YJ471V
O18	XU0148	Transistor	DTC144EUA T106	R40	RK3051	Chip R.	ERJ3G5YJ123V	R100	RK3070	Chip R.	ERJ3G5YJ101V	R148	RK3054	Chip R.	ERJ3G5YJ23V
O19	XT0095	Transistor	DTC144EUA T106	R41	RK3054	Chip R.	ERJ3G5YJ23V	R101	RK3026	Chip R.	ERJ3G5YJ101V	R149	RK3054	Chip R.	ERJ3G5YJ23V
O20	XE0028	FET	3SK131V12-T1	R42	RK3050	Chip R.	ERJ3G5YJ103V	R102	RK3034	Chip R.	ERJ3G5YJ471V	R150	RK3054	Chip R.	ERJ3G5YJ23V
O21	XU0051	Transistor	UN511F TX	R43	RK3030	Chip R.	ERJ3G5YJ22V	R103	RK3058	Chip R.	ERJ3G5YJ473V	R151	RK3032	Chip R.	ERJ3G5YJ331V
O22	XE0028	FET	3SK131V12-T1	R44	RK3050	Chip R.	ERJ3G5YJ103V	R104	RK3026	Chip R.	ERJ3G5YJ101V	R152	RK3048	Chip R.	ERJ3G5YJ682V

REF. NO.	Parts NO.	Description	Parts Name	REF. NO.	Parts NO.	Description	Parts Name	REF. NO.	Parts NO.	Description	Parts Name	REF. NO.	Parts NO.	Description	Parts Name
R153	RK3052	Chip R.	ERJ3GGSYJ153V	R282	RK3038	Chip R.	ERJ3GGSYJ102V	R282	RK3038	Chip R.	ERJ3GGSYJ102V	R331	RK3062	Chip R.	ERJ3GGSYJ104V
R154	RK3044	Chip R.	ERJ3GGSYJ332V	R283	RK3034	Chip R.	ERJ3GGSYJ471V	R283	RK3034	Chip R.	ERJ3GGSYJ471V	R332	RK3054	Chip R.	ERJ3GGSYJ23V
R155	RK3068	Chip R.	ERJ3GGSYJ334V	R284	RK3034	Chip R.	ERJ3GGSYJ471V	R284	RK3034	Chip R.	ERJ3GGSYJ471V	R333	RK3055	Chip R.	ERJ3GGSYJ273V
R156	RK3050	Chip R.	ERJ3GGSYJ103V	R285	RK3058	Chip R.	ERJ3GGSYJ473V	R285	RK3058	Chip R.	ERJ3GGSYJ473V	R334	RK3038	Chip R.	ERJ3GGSYJ102V
R157	RK3058	Chip R.	ERJ3GGSYJ473V	R286	RK3034	Chip R.	ERJ3GGSYJ471V	R286	RK3034	Chip R.	ERJ3GGSYJ471V	R335	RK3026	Chip R.	ERJ3GGSYJ101V
R158	RK3051	Chip R.	ERJ3GGSYJ123V	R287	RK3053	Chip R.	ERJ3GGSYJ183V	R287	RK3053	Chip R.	ERJ3GGSYJ183V	R336	RK3066	Chip R.	ERJ3GGSYJ224V
R159	RK3058	Chip R.	ERJ3GGSYJ473V	R288	RK3034	Chip R.	ERJ3GGSYJ471V	R288	RK3034	Chip R.	ERJ3GGSYJ471V	R337	RK3038	Chip R.	ERJ3GGSYJ102V
R160	RK3050	Chip R.	ERJ3GGSYJ103V	R289	RK3058	Chip R.	ERJ3GGSYJ473V	R289	RK3058	Chip R.	ERJ3GGSYJ473V	R338	RK3026	Chip R.	ERJ3GGSYJ101V
R161	RK3058	Chip R.	ERJ3GGSYJ473V	R290	RK3054	Chip R.	ERJ3GGSYJ223V	R290	RK3054	Chip R.	ERJ3GGSYJ223V	R339	RK3042	Chip R.	ERJ3GGSYJ222V
R162	RK3030	Chip R.	ERJ3GGSYJ473V	R291	RK3074	Chip R.	ERJ3GGSYJ105V	R291	RK3074	Chip R.	ERJ3GGSYJ105V	R340	RK3042	Chip R.	ERJ3GGSYJ471V
R163	RK3050	Chip R.	ERJ3GGSYJ103V	R292	RK3050	Chip R.	ERJ3GGSYJ103V	R292	RK3050	Chip R.	ERJ3GGSYJ103V	R341	RK3034	Chip R.	ERJ3GGSYJ471V
R164	RK3062	Chip R.	ERJ3GGSYJ222V	R293	RK3074	Chip R.	ERJ3GGSYJ105V	R293	RK3074	Chip R.	ERJ3GGSYJ105V	R342	RK3034	Chip R.	ERJ3GGSYJ471V
R165	RK3046	Chip R.	ERJ3GGSYJ104V	R294	RK3070	Chip R.	ERJ3GGSYJ104V	R294	RK3070	Chip R.	ERJ3GGSYJ104V	R343	RK3034	Chip R.	ERJ3GGSYJ471V
R166	RK3046	Chip R.	ERJ3GGSYJ472V	R295	RK3062	Chip R.	ERJ3GGSYJ822V	R295	RK3062	Chip R.	ERJ3GGSYJ822V	R344	RK3024	Chip R.	ERJ3GGSYJ680V
R167	RK3034	Chip R.	ERJ3GGSYJ472V	R296	RK3058	Chip R.	ERJ3GGSYJ474V	R296	RK3058	Chip R.	ERJ3GGSYJ474V	R345	RK3066	Chip R.	ERJ3GGSYJ154V
R168	RK3076	Chip R.	ERJ3GGSYJ155V	R297	RK3058	Chip R.	ERJ3GGSYJ473V	R297	RK3058	Chip R.	ERJ3GGSYJ473V	R346	RK3048	Chip R.	ERJ3GGSYJ224V
R169	RK3062	Chip R.	ERJ3GGSYJ471V	R298	RK3058	Chip R.	ERJ3GGSYJ473V	R298	RK3058	Chip R.	ERJ3GGSYJ473V	R347	RK3042	Chip R.	ERJ3GGSYJ682V
R170	RK3058	Chip R.	ERJ3GGSYJ104V	R299	RK3080	Chip R.	ERJ3GGSYJ335V	R299	RK3080	Chip R.	ERJ3GGSYJ335V	R348	RK3040	Chip R.	ERJ3GGSYJ222V
R171	RK3050	Chip R.	ERJ3GGSYJ103V	R300	RK3074	Chip R.	ERJ3GGSYJ105V	R300	RK3074	Chip R.	ERJ3GGSYJ105V	R349	RK3040	Chip R.	ERJ3GGSYJ152V
R172	RK3049	Chip R.	ERJ3GGSYJ822V	R301	RK3074	Chip R.	ERJ3GGSYJ105V	R301	RK3074	Chip R.	ERJ3GGSYJ105V	R350	RK3001	Chip R.	ERJ3GGSYJ0R00V
R173	RK3058	Chip R.	ERJ3GGSYJ473V	R302	RK3067	Chip R.	ERJ3GGSYJ474V	R302	RK3067	Chip R.	ERJ3GGSYJ474V	R351	RK3050	Chip R.	ERJ3GGSYJ103V
R174	RK3001	Chip R.	ERJ3GGSYJ0R00V	R303	RK3074	Chip R.	ERJ3GGSYJ103V	R303	RK3074	Chip R.	ERJ3GGSYJ103V	R352	RK3050	Chip R.	ERJ3GGSYJ103V
R175	RK3044	Chip R.	ERJ3GGSYJ332V	R304	RK3050	Chip R.	ERJ3GGSYJ103V	R304	RK3050	Chip R.	ERJ3GGSYJ103V	R353	RK3050	Chip R.	ERJ3GGSYJ103V
R176	RK3047	Chip R.	ERJ3GGSYJ562V	R305	RK3046	Chip R.	ERJ3GGSYJ105V	R305	RK3046	Chip R.	ERJ3GGSYJ105V	R354	RK3050	Chip R.	ERJ3GGSYJ103V
R177	RK3044	Chip R.	ERJ3GGSYJ332V	R306	RK3050	Chip R.	ERJ3GGSYJ103V	R306	RK3050	Chip R.	ERJ3GGSYJ103V	R355	RK3050	Chip R.	ERJ3GGSYJ103V
R178	RK3058	Chip R.	ERJ3GGSYJ332V	R307	RK3049	Chip R.	ERJ3GGSYJ822V	R307	RK3049	Chip R.	ERJ3GGSYJ822V	R356	RK3050	Chip R.	ERJ3GGSYJ103V
R179	RK3036	Chip R.	ERJ3GGSYJ473V	R308	RK3070	Chip R.	ERJ3GGSYJ474V	R308	RK3070	Chip R.	ERJ3GGSYJ474V	R357	RK3050	Chip R.	ERJ3GGSYJ103V
R180	RK3049	Chip R.	ERJ3GGSYJ681V	R309	RK3074	Chip R.	ERJ3GGSYJ105V	R309	RK3074	Chip R.	ERJ3GGSYJ105V	R358	RK3050	Chip R.	ERJ3GGSYJ103V
R181	RK3026	Chip R.	ERJ3GGSYJ822V	R310	RK4082	Chip R.	ERJ-14YJ4R7H	R310	RK4082	Chip R.	ERJ-14YJ4R7H	R359	RK3050	Chip R.	ERJ3GGSYJ103V
R182	RK3054	Chip R.	ERJ3GGSYJ101V	R311	RK1035	Chip R.	ERJ3GGSYJ102V	R311	RK1035	Chip R.	ERJ3GGSYJ102V	R360	RK3050	Chip R.	ERJ3GGSYJ103V
R183	RK3050	Chip R.	ERJ3GGSYJ223V	R312	RK4082	Chip R.	ERJ3GGSYJ102V	R312	RK4082	Chip R.	ERJ3GGSYJ102V	R361	RK3050	Chip R.	ERJ3GGSYJ103V
R184	RK3048	Chip R.	ERJ3GGSYJ103V	R313	RK1035	Chip R.	ERJ3GGSYJ103V	R313	RK1035	Chip R.	ERJ3GGSYJ103V	R362	RK3050	Chip R.	ERJ3GGSYJ103V
R185	RK3050	Chip R.	ERJ3GGSYJ682V	R314	RK3050	Chip R.	ERJ3GGSYJ103V	R314	RK3050	Chip R.	ERJ3GGSYJ103V	R363	RK3050	Chip R.	ERJ3GGSYJ103V
R186	RK3058	Chip R.	ERJ3GGSYJ103V	R315	RK3050	Chip R.	ERJ3GGSYJ103V	R315	RK3050	Chip R.	ERJ3GGSYJ103V	R364	RK3050	Chip R.	ERJ3GGSYJ103V
R187	RK3050	Chip R.	ERJ3GGSYJ473V	R316	RK3064	Chip R.	ERJ3GGSYJ154V	R316	RK3064	Chip R.	ERJ3GGSYJ154V	R365	RK3050	Chip R.	ERJ3GGSYJ103V
R188	RK3050	Chip R.	ERJ3GGSYJ103V	R317	RK3052	Chip R.	ERJ3GGSYJ153V	R317	RK3052	Chip R.	ERJ3GGSYJ153V	R366	RK3050	Chip R.	ERJ3GGSYJ103V
R189	RK3062	Chip R.	ERJ3GGSYJ103V	R318	RK3046	Chip R.	ERJ3GGSYJ153V	R318	RK3046	Chip R.	ERJ3GGSYJ153V	R367	RK3050	Chip R.	ERJ3GGSYJ103V
R190	RK3062	Chip R.	ERJ3GGSYJ104V	R319	RK3050	Chip R.	ERJ3GGSYJ153V	R319	RK3050	Chip R.	ERJ3GGSYJ153V	R368	RK3050	Chip R.	ERJ3GGSYJ103V
R191	RK3059	Chip R.	ERJ3GGSYJ104V	R320	RK3053	Chip R.	ERJ3GGSYJ183V	R320	RK3053	Chip R.	ERJ3GGSYJ183V	R369	RK3050	Chip R.	ERJ3GGSYJ103V
R192	RK3058	Chip R.	ERJ3GGSYJ563V	R321	RK3051	Chip R.	ERJ3GGSYJ123V	R321	RK3051	Chip R.	ERJ3GGSYJ123V	R370	RK3050	Chip R.	ERJ3GGSYJ103V
R193	RK3058	Chip R.	ERJ3GGSYJ473V	R322	RK3026	Chip R.	ERJ3GGSYJ101V	R322	RK3026	Chip R.	ERJ3GGSYJ101V	R371	RK3050	Chip R.	ERJ3GGSYJ103V
R194	RK3056	Chip R.	ERJ3GGSYJ473V	R323	RK3069	Chip R.	ERJ3GGSYJ394V	R323	RK3069	Chip R.	ERJ3GGSYJ394V	R372	RK3050	Chip R.	ERJ3GGSYJ103V
R195	RK3064	Chip R.	ERJ3GGSYJ333V	R324	RK3071	Chip R.	ERJ3GGSYJ564V	R324	RK3071	Chip R.	ERJ3GGSYJ564V	R373	RK3050	Chip R.	ERJ3GGSYJ103V
R196	RK3054	Chip R.	ERJ3GGSYJ154V	R325	RK3074	Chip R.	ERJ3GGSYJ105V	R325	RK3074	Chip R.	ERJ3GGSYJ105V	R374	RK3050	Chip R.	ERJ3GGSYJ103V
R197	RK3056	Chip R.	ERJ3GGSYJ223V	R326	RK3041	Chip R.	ERJ3GGSYJ105V	R326	RK3041	Chip R.	ERJ3GGSYJ105V	R375	RK3050	Chip R.	ERJ3GGSYJ103V
R198	RK3074	Chip R.	ERJ3GGSYJ105V	R327	RK3052	Chip R.	ERJ3GGSYJ182V	R327	RK3052	Chip R.	ERJ3GGSYJ182V	R376	RK3050	Chip R.	ERJ3GGSYJ103V
R199	RK3058	Chip R.	ERJ3GGSYJ473V	R328	RK3060	Chip R.	ERJ3GGSYJ153V	R328	RK3060	Chip R.	ERJ3GGSYJ153V	R377	RK3050	Chip R.	ERJ3GGSYJ103V
				R329	RK3062	Chip R.	ERJ3GGSYJ683V	R329	RK3062	Chip R.	ERJ3GGSYJ683V	R378	RK3050	Chip R.	ERJ3GGSYJ103V
				R330	RK3042	Chip R.	ERJ3GGSYJ222V	R330	RK3042	Chip R.	ERJ3GGSYJ222V	R379	RK3050	Chip R.	ERJ3GGSYJ103V

REF. NO.	Parts NO.	Description	Parts Name
R418	RK3039	Chip R.	ERJ3G6YJ22V
R419	RK3036	Chip R.	ERJ3G6YJ681V
R420	RK3054	Chip R.	ERJ3G6YJ223V
R421	RK0001	Chip R.	ERJ6GEYJ10V
R422	RK3060	Chip R.	ERJ3G6YJ683V
S1	US0012	Switch	SS5212ANSL2
TH1	X50035	Thermistor	TBFS1R221K410H5Q
TH2	X50017	Thermistor	TBFS1R222K410H5Q
VR2	RH0101	Trim.Pot.	EVM1YSX50B02
VR3	RH0116	Trim.Pot.	EVM1YSX50B14
VR4	RH0103	Trim.Pot.	EVM1YSX50B14
VR5	RH0111	Trim.Pot.	EVM1YSX50B05
VR6	RH0103	Trim.Pot.	EVM1YSX50B14
VR7	RH0108	Trim.Pot.	EVM1YSX50B15
VR8	RH0111	Trim.Pot.	EVM1YSX50B05
VR10	RH0099	Trim.Pot.	EVM1YSX50B03
VR11	RH0103	Trim.Pot.	EVM1YSX50B14
VR13	RH0103	Trim.Pot.	EVM1YSX50B14
VR14	RH0103	Trim.Pot.	EVM1YSX50B14
VR15	RH0113	Trim.Pot.	EVM1YSX50B16
X1	XK0001	Discriminator	CDB455C7
SD0034	SD0034	GND Spring	GND SPRING DR130
SD0055	SD0055	GND Spring	GND SPRING
TZ0056	TZ0056	SILICON DUMPER 49U	SILICON DUMPER 49U
TZ0056	TZ0056	SILICON DUMPER 49U	SILICON DUMPER 49U
UA0062	UA0062	FFC SMD-25 60-BD	FFC SMD-25 60-BD
UJ0321A	UJ0321A	P.C.B	DX77 MAIN INTEGRATED
NFB UNIT			
D604	XD0264	Diode	MA30-B(TX)
D605	XD0264	Diode	MA30-B(TX)
L612	OC0010	Chip L.	MLF3216E100M
R623	RE0023	Resistor	ERG3S-0330
R628	RE0023	Resistor	ERG3S-0330
TH601	X50021	Thermistor	TBFS1R103K440H5Q
PA UNIT			
C601	CU8042	Chip C.	C2012JB1C104KTA
C602	CU8042	Chip C.	C2012JB1C104KTA
C603	CU3047	Chip C.	C1608JB1H103KTA
C604	CU3019	Chip C.	C1608CH1H470JTA
C605	CU3035	Chip C.	C1608JB1H102KTA
C606	CU3035	Chip C.	C1608JB1H102KTA
C608	CU8042	Chip C.	C2012JB1C104KTA
C609	CU3035	Chip C.	C1608JB1H102KTA
C610	CE0350	Electrolytic C.	16MV100H
C611	CU8042	Chip C.	C2012JB1C104KTA
C612	CU3035	Chip C.	C1608JB1H102KTA
C613	CU8002	Chip C.	C2012JB1H103KTA

REF. NO.	Parts NO.	Description	Parts Name
C614	CU0071	Chip C.	C2012CH1H101J
C615	CU8002	Chip C.	C2012JB1H103KTA
C616	CU9030	Chip C.	CM516CH181J100AT
C617	CU9030	Electrolytic C.	16MV100HC
C618	CU8042	Chip C.	C2012JB1C104KTA
C619	CU3035	Chip C.	C1608JB1H102KTA
C620	C50095	Ceramic C.	RCC12SL471J
C623	CU8032	Chip C.	C2012B1E223K
C624	CU8032	Chip C.	C2012B1E223K
C625	CU8032	Chip C.	C2012B1E223K
C626	CM0006	Mica C.	DM19C152J5
C627	CU8032	Chip C.	C2012B1E223K
C628	CU8032	Chip C.	C2012B1E223K
C629	CU8032	Chip C.	C2012B1E223K
C630	CE0340	Electrolytic C.	16MV 47HW-TS
C631	CU8042	Chip C.	C2012JB1C104KTA
C632	CU3035	Chip C.	C1608JB1H102KTA
C634	C50103	Ceramic C.	HMT17SJS102J
C635	C50095	Ceramic C.	RCC12SL471J
C636	C50067	Ceramic C.	RCC12SL471J
C638	CU3035	Chip C.	RC020SSL39J-L46AE
C639	CU8042	Chip C.	C2012JB1C104KTA
C641	CU9035	Electrolytic C.	16MV470HC
C642	CU8042	Chip C.	C2012JB1C104KTA
C643	CU3047	Chip C.	C1608JB1H103KTA
C644	CU3035	Chip C.	C1608JB1H102KTA
C645	CU3035	Chip C.	C1608JB1H102KTA
C646	CU3035	Chip C.	C1608JB1H102KTA
C647	CE0343	Electrolytic C.	16MV 1000HC+T
C648	CU3047	Chip C.	C1608JB1H103KTA
C650	CU3047	Chip C.	C1608JB1H103KTA
C651	CU3047	Chip C.	C1608JB1H103KTA
C652	CU3047	Chip C.	C1608JB1H103KTA
C653	CU3035	Chip C.	C1608JB1H102KTA
C654	CE0201	Electrolytic C.	16MV 10S2+A1
C655	CE0353	Electrolytic C.	16MV470HC
C656	CU3047	Chip C.	C1608JB1H103KTA
C657	CU3047	Chip C.	C1608JB1H103KTA
C658	CU3047	Chip C.	C1608JB1H103KTA
C659	CU3047	Chip C.	C1608JB1H103KTA
C661	CU3047	Chip C.	C1608JB1H103KTA
C663	CU8042	Chip C.	C2012JB1C104KTA
C664	CU8042	Chip C.	C2012JB1C104KTA
C665	CU3047	Chip C.	C1608JB1H103KTA
C666	CU8042	Chip C.	C2012JB1C104KTA
C667	CU8042	Chip C.	C2012JB1C104KTA
C668	CU3047	Chip C.	C1608JB1H103KTA

REF. NO.	Parts NO.	Description	Parts Name
C669	CU3047	Chip C.	C1608JB1H103KTA
C670	CU3047	Chip C.	C1608JB1H103KTA
C671	CU9023	Chip C.	C1608CH1H101JTA
C672	CU9059	Chip C.	C1608JF1E104ZTA
C673	CU9059	Chip C.	C1608JF1E104ZTA
CN808	UE0071	Connector	PI22A05M
CN809	UE0226	Connector	B2B-PH-K-S
D601	XD0263	Diode	MA27-B
D607	XD0274	Diode	DS43A1
D608	XD0231	Diode	DAP202U T106
D609	XD0273	Diode	RLS-93TE-11
D610	XD0273	Diode	RLS-93TE-11
D611	XD0273	Diode	RLS-93TE-11
D612	XD0273	Diode	RLS-93TE-11
D613	XD0274	Diode	DS43A1
FB601	QB0037	Ferrite Beads	ZBF253D-00
FB602	QB0037	Ferrite Beads	ZBF253D-00
FB603	QB0037	Ferrite Beads	ZBF253D-00
FB604	QB0037	Ferrite Beads	ZBF253D-00
FB606	QB0038	Ferrite Beads	EXCELSA39
FB607	QB0008	Ferrite Beads	HF30AC8201209T
IC601	XA0224	IC	NJM2904M T1
J601	UJ0023	Jack	JPJ2545-01-510
J602	UJ0030	Jack	JPJ2545-01-510
L601	OC0047	Chip L.	NL32252T14R7J
L602	QR0014C	Transformer	QR0014C
L605	OC0039	Chip L.	NL32252T1R0J
L607	QR0023	Transformer	RF TRANS OR0023
L609	QR0012	Troical Coil	TROICAL COIL QR0012
L610	QR0016B	Transformer	QR0016B
L611	QR0012	Troical Coil	TROICAL COIL QR0012
Q607	XU0176	Transistor	UN2223-TX
Q608	XU0176	Transistor	UN2223-TX
Q609	XU0078	Transistor	UN521L-TX
R601	RK3030	Chip R.	ERJ3G6YJ221V
R602	RK3028	Chip R.	ERJ3G6YJ151V
R603	RK0028	Chip R.	ERJ6GEYJ471V
R604	RK0020	Chip R.	ERJ6GEYJ151V
R605	RK4083	Chip R.	ERJ-14YJ5R6H
R606	RK4081	Chip R.	ERJ-14YJ3R9H
R607	RK4023	Chip R.	ERJ-12YJ560V
R608	RK0028	Chip R.	ERJ6GEYJ471V
R609	RK4030	Chip R.	ERJ-12YJ221V
R610	RK4030	Chip R.	ERJ-12YJ221V
R611	RK4055	Chip R.	ERJ-14YJ470V
R612	RK4055	Chip R.	ERJ-14YJ470V

REF. NO.	Parts NO.	Description	Parts Name
R613	RK4030	Chip R.	ERJ-12YJ221V
R614	RK3032	Chip R.	ERJ3G6YJ331V
R615	RK3016	Chip R.	ERJ3G6YJ150V
R616	RK3032	Chip R.	ERJ3G6YJ331V
R617	RD3007	Resistor	ERX15S3R3
R618	RD3007	Resistor	ERX15S3R3
R619	RD3007	Resistor	ERX15S3R3
R620	RD3007	Resistor	ERX15S3R3
R624	RK4014	Chip R.	ERJ12YJ100H
R625	RK4014	Chip R.	ERJ12YJ100H
R629	RE0017	Resistor	ERX3S4R7
R630	RK0039	Chip R.	ERJ6GEYJ22V
R631	RK0039	Chip R.	ERJ6GEYJ22V
R633	RK1018	Chip R.	ERJ6GEYJ101V
R634	RK1018	Chip R.	ERJ6GEYJ101V
R635	RK1018	Chip R.	ERJ6GEYJ101V
R636	RK0028	Chip R.	ERJ6GEYJ471V
R637	RK3050	Chip R.	ERJ3G6YJ103V
R638	RK3026	Chip R.	ERJ3G6YJ101V
R639	RK6024	Chip R.	ERJ1WYJ690H
R640	RK6020	Chip R.	ERJ1WYJ300H
R641	RK3070	Chip R.	ERJ3G6YJ474V
R642	RK3050	Chip R.	ERJ3G6YJ103V
R643	RK3054	Chip R.	ERJ3G6YJ223V
R644	RK3050	Chip R.	ERJ3G6YJ103V
R645	RK3053	Chip R.	ERJ3G6YJ183V
R646	RK3056	Chip R.	ERJ3G6YJ333V
R647	RK3048	Chip R.	ERJ3G6YJ682V
R648	RK3052	Chip R.	ERJ3G6YJ153V
R649	RK3044	Chip R.	ERJ3G6YJ332V
R650	RK3038	Chip R.	ERJ3G6YJ02V
R654	RK3026	Chip R.	ERJ3G6YJ101V
R655	RK0008	Chip R.	ERJ6GEYJ330V
R659	RK3035	Chip R.	ERJ3G6YJ561V
R660	RK3026	Chip R.	ERJ3G6YJ101V
R661	RK3026	Chip R.	ERJ3G6YJ101V
RL601	UL0016	Relay	KH-12
TP601	UE0047	Connector	R9X10
TP602	UE0047	Connector	R9X10
TP603	UE0047	Connector	R9X10
TP604	UE0047	Connector	R9X10
TP605	UE0047	Connector	R9X10
TP606	UE0047	Connector	R9X10
TP607	UE0047	Connector	R9X10
TP608	UE0047	Connector	R9X10
TP609	UE0047	Connector	R9X10

REF. NO.	Parts NO.	Description	Parts Name
C834	CE0340	Electrolytic C.	16MV 47HW-TS
C835	CU3022	Chip C.	C1608CH1H820JTA
C836	CU3047	Chip C.	C1608JBI1H103KTA
C837	CU3047	Chip C.	C1608JBI1H103KTA
C838	CU3043	Chip C.	C1608JBI1H472KTA
C840	CU3047	Chip C.	C1608JBI1H103KTA
C841	CU3022	Chip C.	C1608CH1H820JTA
C842	CS0372	Chip Tantalum	TMCMB1C106MTR
C843	CS0372	Chip Tantalum	TMCMB1C106MTR
C844	CU3047	Chip C.	C1608JBI1H103KTA
C847	CU3035	Chip C.	C1608JBI1H102KTA
C848	CU3035	Chip C.	C1608JBI1H102KTA
C849	CU3035	Chip C.	C1608JBI1H102KTA
C850	CU3111	Chip C.	C1608JBI1C104M
C851	CU3027	Chip C.	C1608CH1H221JTA
C852	CU3047	Chip C.	C1608JBI1H103KTA
C853	CU3029	Chip C.	C1608JBI1H331KTA
C854	CE0356	Electrolytic C.	16MV100HC+T
C855	CS0225	Chip Tantalum	TMCMA1D155MTR
C856	CS0225	Chip Tantalum	TMCMA1D155MTR
C857	CU3035	Chip C.	C1608JBI1H102KTA
C858	CU3035	Chip C.	C1608JBI1H102KTA
C859	CE0356	Electrolytic C.	16MV100HC+T
C860	CU3008	Chip C.	C1608CH1H070CTA
C861	CU3003	Chip C.	C1608CH1H202CTA
C862	CU3047	Chip C.	C1608JBI1H102KTA
C863	CU3047	Chip C.	C1608JBI1H103KTA
C864	CU3035	Chip C.	C1608JBI1H102KTA
C865	CU3047	Chip C.	C1608JBI1H103KTA
C866	CU3027	Chip C.	C1608CH1H221JTA
C867	CU3031	Chip C.	C1608JBI1H471KTA
C868	CU3015	Chip C.	C1608CH1H220JTA
C869	CU3017	Chip C.	C1608CH1H330JTA
C870	CU3016	Chip C.	C1608CH1H270JTA
C871	CU3035	Chip C.	C1608JBI1H102KTA
C872	CU3051	Chip C.	C1608JBI1E223KTA
C873	CS0065	Chip C.	TMCSD1684MTR
C874	CU3002	Chip C.	C1608CH1H100CTA
C875	CU3047	Chip C.	C1608JBI1H103KTA
C876	CU3047	Chip C.	C1608JBI1H103KTA
C877	CU3020	Chip C.	C1608CH1H560JTA
C878	CU3020	Chip C.	C1608CH1H560JTA
C879	CS0237	Chip Tantalum	TMCMA1A475MTR
C880	CS0237	Chip Tantalum	TMCMA1A475MTR
C881	CU3043	Chip C.	C1608JBI1H472KTA
C882	CU3047	Chip C.	C1608JBI1H103KTA
C883	CU3047	Chip C.	C1608JBI1H103KTA

REF. NO.	Parts NO.	Description	Parts Name
C784	CU3032	Chip C.	C1608JBI1H561KTA
C785	CU3031	Chip C.	C1608JBI1H471KTA
C786	CU3029	Chip C.	C1608JBI1H331KTA
C787	CU3027	Chip C.	C1608CH1H221JTA
C788	CU3025	Chip C.	C1608CH1H151JTA
C789	CU3059	Chip C.	C1608JF1E104ZTA
C790	CU3047	Chip C.	C1608JBI1H103KTA
C791	CU3047	Chip C.	C1608JBI1H103KTA
C792	CU3047	Chip C.	C1608JBI1H103KTA
C793	CU3056	Chip C.	C1608JF1E473ZTA
C794	CU3056	Chip C.	C1608JF1E473ZTA
C795	CU3056	Chip C.	C1608JF1E473ZTA
C796	CU3035	Chip C.	C1608JBI1H102KTA
C797	CU3059	Chip C.	C1608JF1E104ZTA
C798	CU3047	Chip C.	C1608JBI1H103KTA
C799	CU3056	Chip C.	C1608JF1E473ZTA
C800	CU3056	Chip C.	C1608JF1E473ZTA
C801	CU3056	Chip C.	C1608JF1E473ZTA
C802	CU3056	Chip C.	C1608JF1E473ZTA
C803	CU3038	Chip C.	C1608JBI1H821KTA
C804	CU3037	Chip C.	C1608JBI1H152KTA
C805	CU3038	Chip C.	C1608JBI1H182KTA
C806	CU3047	Chip C.	C1608JBI1H103KTA
C807	CU3035	Chip C.	C1608JBI1H102KTA
C808	CU3035	Chip C.	C1608JBI1H102KTA
C809	CU3035	Chip C.	C1608JBI1H102KTA
C810	CU3041	Chip C.	C2012JBI1C104KTA
C811	CU3042	Chip C.	C1608JBI1H332KTA
C812	CU3051	Chip C.	C1608JBI1E223KTA
C813	CU3056	Chip C.	C1608JF1E473ZTA
C814	CU3035	Chip C.	C1608JBI1H102KTA
C815	CU3035	Chip C.	C1608JBI1H102KTA
C816	CE0358	Electrolytic C.	16MV100HC+T
C817	CU3020	Chip C.	C1608CH1H560JTA
C818	CU3020	Chip C.	C1608CH1H560JTA
C819	CU3047	Chip C.	C1608JBI1H103KTA
C820	CU3047	Chip C.	C1608JBI1H103KTA
C821	CU3011	Chip C.	C1608CH1H100CTA
C823	CU3020	Chip C.	C1608CH1H560JTA
C824	CU3012	Chip C.	C1608CH1H120JTA
C825	CU3002	Chip C.	C1608CH1H100CTA
C826	CU3047	Chip C.	C1608JBI1H103KTA
C827	CU3035	Chip C.	C1608JBI1H102KTA
C830	CE0358	Electrolytic C.	16MV100HC+T
C831	CU3035	Chip C.	C1608JBI1H102KTA
C832	CE0340	Electrolytic C.	16MV 47HW+TS
C833	CU3012	Chip C.	C1608CH1H120JTA

REF. NO.	Parts NO.	Description	Parts Name
C735	CU3059	Chip C.	C1608JF1E104ZTA
C736	CU3022	Chip C.	C1608CH1H820JTA
C737	CU3059	Chip C.	C1608JF1E104ZTA
C738	CU8042	Chip C.	C2012JBI1C104KTA
C739	CU3037	Chip C.	C1608JBI1H152KTA
C740	CU3047	Chip C.	C1608JBI1H103KTA
C741	CU3033	Chip C.	C1608JBI1H861KTA
C742	CU3044	Chip C.	C1608JBI1H562KTA
C743	CU3031	Chip C.	C1608JBI1H471KTA
C744	CU3040	Chip C.	C1608JBI1H272KTA
C745	CU3029	Chip C.	C1608JBI1H331KTA
C746	CU3038	Chip C.	C1608JBI1H821KTA
C747	CU3027	Chip C.	C1608CH1H221JTA
C748	CU3110	Chip C.	C1608JBI1H122KT-A
C749	CU3025	Chip C.	C1608CH1H151JTA
C750	CU3034	Chip C.	C1608JBI1H821KTA
C751	CU3007	Chip C.	C1608CH1H060CTA
C752	CU3011	Chip C.	C1608CH1H100CTA
C753	CU8042	Chip C.	C2012JBI1C104KTA
C754	CU3035	Chip C.	C1608JBI1H102KTA
C755	CU3037	Chip C.	C1608JBI1H152KTA
C756	CU3035	Chip C.	C1608JBI1H102KTA
C757	CU3031	Chip C.	C1608JBI1H471KTA
C758	CU3029	Chip C.	C1608JBI1H331KTA
C759	CU3027	Chip C.	C1608CH1H221JTA
C760	CU3025	Chip C.	C1608CH1H151JTA
C761	CU3024	Chip C.	C1608CH1H121JTA
C762	CU3011	Chip C.	C1608CH1H100CTA
C763	CU3011	Chip C.	C1608CH1H100CTA
C764	CU3035	Chip C.	C1608JBI1H102KTA
C765	CU3013	Chip C.	C1608JBI1H150JTA
C766	CU3019	Chip C.	C1608CH1H470JTA
C768	CU3023	Chip C.	C1608CH1H101JTA
C769	CU3027	Chip C.	C1608CH1H221JTA
C770	CU3024	Chip C.	C1608CH1H121JTA
C771	CU3022	Chip C.	C1608CH1H820JTA
C772	CU3019	Chip C.	C1608CH1H121JTA
C773	CU3017	Chip C.	C1608CH1H330JTA
C774	CU3016	Chip C.	C1608CH1H270JTA
C775	CU3014	Chip C.	C1608CH1H180JTA
C777	CU3022	Chip C.	C1608CH1H820JTA
C778	CU3059	Chip C.	C1608JF1E104ZTA
C779	CU3023	Chip C.	C1608CH1H101JTA
C780	CU3111	Chip C.	C1608JBI1C104M
C781	CU3035	Chip C.	C1608JBI1H102KTA
C782	CU3038	Chip C.	C1608JBI1H182KTA
C783	CU3110	Chip C.	C1608JBI1H122KT-A

REF. NO.	Parts NO.	Description	Parts Name
TP610	UE0047	Connector	R8X10
TP611	UE0047	Connector	R8X10
VR601	RH0164	Trim.Pot.	EVND8AA03BEE
VR602	RH0165	Trim.Pot.	EVND8AA03BEE
W601	UX1081	Wire	WIRE PA-MAIN 1
W604	UX1082	Wire	WIRE PA-MAIN 1
W606	UX1083	Wire	WIRE PA-MAIN 2
W607	UX1084	Wire	WIRE PA-FILTER 1
	TT1001	P.C.B	TUBE 0.7 1mm #
	UP0279	P.C.B	DX-70 TRANSFORMER
	LP0324A	P.C.B	DX77 PA INTEGRATED
		PLL UNIT	
C701	CU3043	Chip C.	C1608JBI1H472KTA
C702	CU3009	Chip C.	C1608CH1H060CTA
C703	CU3031	Chip C.	C1608JBI1H471KTA
C704	CU3059	Chip C.	C1608JF1E104ZTA
C705	CU3018	Chip C.	C1608CH1H390JTA
C706	CU3013	Chip C.	C1608CH1H150JTA
C707	CU3035	Chip C.	C1608JBI1H102KTA
C708	CU3012	Chip C.	C1608CH1H120JTA
C709	CU3011	Chip C.	C1608CH1H100CTA
C710	CU3011	Chip C.	C1608CH1H100CTA
C711	CU3024	Chip C.	C1608CH1H121JTA
C712	CU3027	Chip C.	C1608CH1H221JTA
C713	CU3025	Chip C.	C1608CH1H151JTA
C714	CU3059	Chip C.	C1608JF1E104ZTA
C715	CU3006	Chip C.	C1608CH1H050CTA
C716	CU3047	Chip C.	C1608JBI1H103KTA
C717	CU3047	Chip C.	C1608JBI1H103KTA
C718	CU3047	Chip C.	C1608JBI1H103KTA
C719	CU3047	Chip C.	C1608JBI1H103KTA
C720	CU3056	Chip C.	C1608JF1E473ZTA
C721	CU3056	Chip C.	C1608JF1E473ZTA
C722	CU3056	Chip C.	C1608JF1E473ZTA
C723	CU3056	Chip C.	C1608JF1E473ZTA
C724	CU3056	Chip C.	C1608JF1E473ZTA
C725	CU3056	Chip C.	C1608JF1E473ZTA
C726	CU3111	Chip C.	C1608JBI1C104M
C727	CU3111	Chip C.	C1608JBI1C104M
C728	CU3035	Chip C.	C1608JBI1H102KTA
C729	CU3032	Chip C.	C1608JBI1H561KTA
C730	CU3030	Chip C.	C1608JBI1H391KTA
C731	CU3028	Chip C.	C1608CH1H27JTA
C732	CU3025	Chip C.	C1608CH1H151JTA
C733	CU3023	Chip C.	C1608CH1H101JTA
C734	CU3059	Chip C.	C1608JF1E104ZTA

REF. NO.	Parts NO.	Description	Parts Name	REF. NO.	Parts NO.	Description	Parts Name	REF. NO.	Parts NO.	Description	Parts Name
C884	CU3014	Chip C.	C1608CH1H180JTA	C938	CU3015	Chip C.	C1608CH1H220JTA	L705	QR0017	Troidal Coil	QR0017
C885	CU3059	Chip C.	C1608JF1E104ZTA	C939	CU3056	Chip C.	C1608JF1E473ZTA	L706	QR0017	Troidal Coil	QR0017
C886	CU3027	Chip C.	C1608CH1H221JTA	C940	CU3035	Chip C.	C1608JBIH102KTA	L707	QA0107	Coil	A638AN-0561R=P3
C887	CU3016	Chip C.	C1608CH1H270JTA	C941	CU3015	Chip C.	C1608CH1H220JTA	L708	QA0107	Coil	A638AN-0561R=P3
C888	CU3016	Chip C.	C1608CH1H270JTA	C942	CU3035	Chip C.	C1608JBIH102KTA	L709	QA0107	Coil	A638AN-0561R=P3
C889	CU3059	Chip C.	C1608JF1E104ZTA	C943	UE0043	Connector	P12ZA02M	L710	QR0017	Troidal Coil	QR0017
C890	CU3047	Chip C.	C1608JBIH103KTA	C944	UE0259	Connector	CFP0526-0201	L711	QR0017	Troidal Coil	QR0017
C891	CU3047	Chip C.	C1608JBIH103KTA	D701	XD0305	Diode	1S5351-TB	L712	QC0044	Chip L.	NL322522T2R7J
C892	CE0340	Electrolytic C.	16MV.47HW+-TS	D702	XD0305	Diode	1S5351-TB	L713	QC0041	Chip L.	NL322522T1RSJ
C893	CU3047	Chip C.	C1608JBIH103KTA	D703	XD0246	Diode	DAN235UT 108	L714	QC0133	Chip L.	NL322522TR82J-3
C894	CU3047	Chip C.	C1608JBIH103KTA	D704	XD0305	Diode	1S5351-TB	L715	QC0131	Chip L.	NL322522TR56J-3
C895	CU3047	Chip C.	C1608JBIH103KTA	D705	XD0305	Diode	1S5351-TB	L716	QC0130	Chip L.	NL322522TR47J-3
C896	CE0358	Electrolytic C.	16MV100HC+T	D706	XD0286	Diode	DAP236UT106	L717	QC0128	Chip L.	NL322522TR33J-3
C897	CE0340	Electrolytic C.	16MV.47HW+-TS	D707	XD0266	Diode	DAP236UT106	L718	QC0493	Chip L.	LOH4N471K04
C898	CS0367	Chip Tantulum	TMCMA0J106MTR	D708	XD0286	Diode	DAP236UT106	L719	QC0044	Chip L.	NL322522T2R7J
C901	CU3035	Chip C.	C1608JBIH102KTA	D709	XD0286	Diode	DAP236UT106	L720	QC0041	Chip L.	NL322522T1RSJ
C905	CU3047	Chip C.	C1608JBIH103KTA	D710	XD0246	Diode	DAN235UT 106	L721	QC0133	Chip L.	NL322522TR82J-3
C908	CU3047	Chip C.	C1608JBIH103KTA	D711	XD0246	Diode	DAN235UT 106	L722	QC0131	Chip L.	NL322522TR56J-3
C909	CU3047	Chip C.	C1608JBIH103KTA	D712	XD0272	Diode	1S5356 TW11	L723	QC0130	Chip L.	NL322522TR47J-3
C910	CU3014	Chip C.	C1608CH1H180JTA	D713	XD0286	Diode	DAP236UT106	L724	QC0128	Chip L.	NL322522TR33J-3
C911	CU3017	Chip C.	C1608CH1H230JTA	D714	XD0286	Diode	DAP236UT106	L725	QC0124	Chip L.	NL322522TR15J-3
C912	CU3021	Chip C.	C1608CH1H680JTA	D715	XD0266	Diode	DAP236UT106	L726	QC0067	Chip L.	NL322522TR10J
C913	CU3021	Chip C.	C1608CH1H680JTA	D716	XD0300	Diode	1SV282PH2	L728	QR0017	Troidal Coil	QR0017
C914	CU3020	Chip C.	C1608CH1H560JTA	D717	XD0300	Diode	1SV282PH2	L729	QA0108	Coil	A638AN-0562R=P3
C915	CU3047	Chip C.	C1608JBIH103KTA	D718	XD0254	Diode	1S5355 TE17	L730	QA0107	Coil	A638AN-0561R=P3
C916	CU3047	Chip C.	C1608JBIH103KTA	D719	XD0254	Diode	1S5355 TE17	L731	QA0107	Coil	A638AN-0561R=P3
C917	CU3047	Chip C.	C1608JBIH103KTA	D720	XD0254	Diode	UPC2710T-E3	L732	QA0107	Coil	A638AN-0561R=P3
C918	CU3047	Chip C.	C1608JBIH103KTA	IC701	XA0449	IC	UPC2710T-E3	L733	QC0493	Chip L.	LOH4N471K04
C919	CU3047	Chip C.	C1608JBIH103KTA	IC702	XA0493	IC	UPC2713T-E3	L734	QC0078	Chip L.	NL322522T220J
C920	CU3047	Chip C.	C1608JBIH103KTA	IC703	XA0346	IC	MCT7805CT	L735	QC0046	Chip L.	NL322522T3R9J
C921	CU3047	Chip C.	C1608JBIH103KTA	IC704	XA0454	IC	UPC1688G	L736	QC0043	Chip L.	NL322522T2R2J
C922	CU3031	Chip C.	C1608JBIH471KTA	IC705	XA0455	IC	LC7153M-TLM	L737	QC0041	Chip L.	NL322522T1R5J
C923	CU3047	Chip C.	C1608JBIH103KTA	IC706	XA0456	IC	UPC457282	L738	QC0039	Chip L.	NL322522T1R0J
C924	CU3047	Chip C.	C1608JBIH103KTA	IC707	XA0305	IC	UPC457282	L739	QC0132	Chip L.	NL322522TR68J-3
C925	CU3005	Chip C.	C1608JBIH103KTA	IC709	XA0449	IC	UPC2710T-E3	L740	QC0130	Chip L.	NL322522TR47J-3
C926	CU3005	Chip C.	C1608CH1H040CTA	IC710	XA0523	IC	TC7S04MF(TE88J)	L741	QC0128	Chip L.	NL322522TR33J-3
C927	CS0367	Chip Tantulum	TMCMA0J106MTR	IC711	XA0458	IC	TK11830MTL	L742	QC0493	Chip L.	LOH4N471K04
C928	CU3056	Chip C.	C1608JF1E473ZTA	IC715	XA0400	IC	TC1700C030AF-001	L743	QC0079	Chip L.	NL322522T270J
C929	CS0230	Chip Tantulum	TMCMA1E105MTR	IC716	XA0400	IC	TC1700C030AF-001	L744	QC0046	Chip L.	NL322522T3R9J
C930	CU3047	Chip C.	C1608JBIH103KTA	IC717	XA0115	IC	TCAS66F TE85R	L745	QC0043	Chip L.	NL322522T2R2J
C931	CU3035	Chip C.	C1608JBIH102KTA	JK701	UX1087	Wire	DX70 PULL-MAIN 0.8D	L746	QC0041	Chip L.	NL322522T1R5J
C932	CS0230	Chip Tantulum	TMCMA1E105MTR	JK702	UE0041	Connector	TMP J01XV6	L747	QC0039	Chip L.	NL322522TR68J-3
C933	CU3026	Chip C.	C1608CH1H271JTA	JK703	UX1222	Wire	WIPE MAIN-PLL1	L748	QC0132	Chip L.	NL322522TR68J-3
C934	CS0065	Chip C.	C1608JBIH152KTA	L701	QC0126	Chip L.	NL322522TR22J-3	L749	QC0130	Chip L.	NL322522TR47J-3
C935	CU3021	Chip C.	TMCMA1E105MTR	L702	QC0127	Chip L.	NL322522TR27J-3	L750	QC0128	Chip L.	NL322522TR33J-3
C936	CU3021	Chip C.	C1608CH1H680JTA	L703	QC0039	Chip L.	NL322522T1R0J	L751	QC0497	Chip L.	LOH4N102K04
C937	CU3019	Chip C.	C1608CH1H470JTA	L704	QA0107	Coil	A638AN-0561R=P3	L752	QC0086	Chip L.	NL322522T101J
L753	QC0086	Chip L.	NL322522T101J	L753	QC0086	Chip L.	NL322522T100J	L773	QC0084	Coil	657AN-1372BK=P3
L754	QC0086	Chip L.	NL322522T101J	L754	QC0086	Chip L.	NL322522T100J	L774	QC0048	Chip L.	LOH4N151J04
L755	QC0086	Chip L.	NL322522T101J	L755	QC0086	Chip L.	NL322522T100J	L775	QC0048	Chip L.	LOH4N151J04
L756	QC0086	Chip L.	NL322522T101J	L756	QC0086	Chip L.	NL322522T100J	L776	QC0123	Chip L.	NL322522TR12J-3
L757	QC0086	Chip L.	NL322522T101J	L757	QC0086	Chip L.	NL322522T100J	L777	QC0048	Chip L.	NL322522T100J
L758	QC0048	Chip L.	NL322522T100J	L758	QC0048	Chip L.	NL322522T100J	L778	QC0048	Chip L.	NL322522T100J
L759	QR0017	Troidal Coil	QR0017	L759	QC0083	Chip L.	NL322522T100J	L779	QC0048	Chip L.	NL322522T100J
L760	QC0048	Chip L.	NL322522T100J	L760	QC0083	Chip L.	NL322522T100J	L780	QC0083	Chip L.	NL322522T100J
L761	QC0074	Chip L.	NL322522T6R2J#	L761	QC0083	Chip L.	NL322522T100J	L781	QC0083	Chip L.	NL322522T100J
L762	QC0072	Chip L.	NL322522T5R6J#	L762	QC0083	Chip L.	NL322522T100J	L782	QC0083	Chip L.	NL322522T100J
L763	QC0493	Chip L.	LOH4N471K04	L763	QC0083	Chip L.	NL322522T100J	L783	QC0083	Chip L.	NL322522T100J
L764	QC0133	Chip L.	NL322522TR82J-3	L764	QC0083	Chip L.	NL322522T100J	L784	QC0083	Chip L.	NL322522T100J
L765	QC0048	Chip L.	NL322522T100J	L765	QC0083	Chip L.	NL322522T100J	L785	QC0083	Chip L.	NL322522T100J
L766	QA0110	Coil	E558HN-100101=P3	L766	QC0083	Chip L.	NL322522T100J	L786	QC0086	Chip L.	NL322522T101J
L767	QC0047	Chip L.	NL322522T4R7J	L767	QC0083	Chip L.	NL322522T100J	L787	QC0128	Chip L.	NL322522TR33J-3
L768	QC0130	Chip L.	NL322522TR47J-3	L768	QC0083	Chip L.	NL322522T100J	L788	QC0047	Chip L.	NL322522T4R7J
L769	QC0077	Chip L.	NL322522T180J	L769	QC0083	Chip L.	NL322522T100J	L789	QC0039	Chip L.	NL322522T1R0J
L770	QC0076	Chip L.	NL322522T150J	L770	QC0083	Chip L.	NL322522T100J	Q701	XU0047	Transistor	UMC3NTR
L771	QC0041	Chip L.	NL322522T1RSJ	L771	QC0083	Chip L.	NL322522T100J	Q702	XU0047	Transistor	UMC3NTR
L772	QC0047	Chip L.	NL322522T4R7J	L772	QC0083	Chip L.	NL322522T100J	Q703	XU0047	Transistor	UMC3NTR
L773	QC0084	Coil	657AN-1372BK=P3	L773	QC0083	Chip L.	NL322522T100J	Q704	XU0047	Transistor	UMC3NTR
L774	QC0132	Chip L.	NL322522T056J	L774	QC0083	Chip L.	NL322522T100J	Q705	XU0047	Transistor	UMC3NTR
L775	QC0048	Chip L.	NL322522T100J	L775	QC0083	Chip L.	NL322522T100J	Q706	XU0047	Transistor	UMC3NTR
L776	QC0123	Chip L.	NL322522TR12J-3	L776	QC0083	Chip L.	NL322522T100J	Q707	XU0047	Transistor	UMC3NTR
L777	QC0048	Chip L.	NL322522T100J	L777	QC0083	Chip L.	NL322522T100J	Q708	XU0047	Transistor	UMC3NTR
L778	QC0048	Chip L.	NL322522T100J	L778	QC0083	Chip L.	NL322522T100J	Q709	XU0047	Transistor	UMC3NTR
L779	QC0048	Chip L.	NL322522T100J	L779	QC0083	Chip L.	NL322522T100J	Q710	XU0047	Transistor	UMC3NTR
L782	QC0048	Chip L.	NL322522T100J	L782	QC0083	Chip L.	NL322522T100J	Q711	XU0047	Transistor	UMC3NTR
L783	QC0083	Chip L.	NL322522T100J	L783	QC0083	Chip L.	NL322522T100J	Q712	XU0047	Transistor	UMC3NTR
L784	QC0083	Chip L.	NL322522T100J	L784	QC0083	Chip L.	NL322522T100J	Q713	XU0047	Transistor	UMC3NTR
L785	QC0083	Chip L.	NL322522T100J	L785	QC0083	Chip L.	NL322522T100J	Q714	XU0047	Transistor	UMC3NTR
L786	QC0086	Chip L.	NL322522T101J	L786	QC0083	Chip L.	NL322522T100J	Q715	XU0047	Transistor	UMC3NTR
L787	QC0128	Chip L.	NL322522TR33J-3	L787	QC0083	Chip L.	NL322522T100J	Q716	XU0047	Transistor	UMC3NTR
L788	QC0047	Chip L.	NL322522T4R7J	L788	QC0083	Chip L.	NL322522T100J	Q717	XU0047	Transistor	UMC3NTR
L789	QC0039	Chip L.	NL322522T1R0J	L789	QC0083	Chip L.	NL322522T100J	Q718	XU0047	Transistor	UMC3NTR
Q701	XU0047	Transistor	UMC3NTR	Q702	XU0047	Transistor	UMC3NTR	Q719	XU0047	Transistor	UMC3NTR
Q702	XU0047	Transistor	UMC3NTR	Q703	XU0047	Transistor	UMC3NTR	Q720	XU0047	Transistor	UMC3NTR
Q703	XU0047	Transistor	UMC3NTR	Q704	XU0047	Transistor	UMC3NTR	Q721	XU0047	Transistor	UMC3NTR
Q704	XU0047	Transistor	UMC3NTR	Q705	XU0047	Transistor	UMC3NTR	Q722	XU0047	Transistor	UMC3NTR
Q705	XU0047	Transistor	UMC3NTR	Q706	XU0047	Transistor					

REF. NO.	Parts NO.	Description	Parts Name	REF. NO.	Parts NO.	Description	Parts Name	REF. NO.	Parts NO.	Description	Parts Name	REF. NO.	Parts NO.	Description	Parts Name
Q713	XT0095	Transistor	2SC4081 T106R	R738	RK4088	Chip R.	ERJ-14YJ561H	R785	RK3001	Chip R.	ERJ3GGSY0R00V	R834	RK3094	Chip R.	RR0816P-202-B-T5
Q714	XT0095	Transistor	2SC4081 T106R	R739	RK3028	Chip R.	ERJ3GGSYJ151V	R786	RK3038	Chip R.	ERJ3GGSYJ102V	R835	RK3094	Chip R.	RR0816P-202-B-T5
Q715	XT0095	Transistor	2SC4081 T106R	R740	RK1023	Chip R.	ERJ8GGEYJ271V	R787	RK3034	Chip R.	ERJ3GGSYJ471V	R836	RK3094	Chip R.	RR0816P-202-B-T5
Q716	XT0095	Transistor	2SC4081 T106R	R741	RK3043	Chip R.	ERJ3GGSYJ272V	R788	RK3034	Chip R.	ERJ3GGSYJ471V	R837	RK3094	Chip R.	RR0816P-202-B-T5
Q717	XT0059	Transistor	2SC3082K T146Q	R742	RK3034	Chip R.	ERJ3GGSYJ471V	R789	RK3046	Chip R.	ERJ3GGSYJ472V	R838	RK3094	Chip R.	RR0816P-202-B-T5
Q718	XT0059	Transistor	2SC3082K T146Q	R743	RK3026	Chip R.	ERJ3GGSYJ101V	R790	RK3046	Chip R.	ERJ3GGSYJ472V	R839	RK3094	Chip R.	RR0816P-202-B-T5
Q719	XE0026	FET	2SK2171-4TD	R744	RK1035	Chip R.	ERJ8GGEYJ102V	R792	RK3046	Chip R.	ERJ3GGSYJ472V	R840	RK3028	Chip R.	ERJ3GGSYJ151V
Q721	XT0095	Transistor	2SC4081 T106R	R745	RK3022	Chip R.	ERJ3GGSYJ470V	R793	RK3030	Chip R.	ERJ3GGSYJ221V	R841	RK3058	Chip R.	ERJ3GGSYJ151V
Q722	XU0148	Transistor	DTC-144EUA T106	R747	RK3018	Chip R.	ERJ3GGSY0R00V	R794	RK3068	Chip R.	ERJ3GGSYJ334V	R842	RK3022	Chip R.	ERJ3GGSYJ473V
Q723	XU0148	Transistor	DTC-144EUA T106	R748	RK4054	Chip R.	ERJ3GGSYJ220V	R796	RK3038	Chip R.	ERJ3GGSYJ102V	R843	RK3058	Chip R.	ERJ3GGSYJ470V
Q724	XT0059	Transistor	2SC3082K T146Q	R749	RK4070	Chip R.	ERJ-14YJ271H	R797	RK3034	Chip R.	ERJ3GGSYJ471V	R844	RK3034	Chip R.	ERJ3GGSYJ471V
R701	RK3030	Chip R.	ERJ3GGSYJ101V	R750	RK4065	Chip R.	ERJ-14YJ271H	R799	RK3050	Chip R.	ERJ3GGSYJ103V	R845	RK3054	Chip R.	ERJ3GGSYJ223V
R702	RK3026	Chip R.	ERJ3GGSYJ150V	R751	RK4068	Chip R.	ERJ-14YJ151H	R799	RK3046	Chip R.	ERJ3GGSYJ472V	R846	RK3062	Chip R.	ERJ3GGSYJ104V
R703	RK3016	Chip R.	ERJ3GGSYJ150V	R752	RK4068	Chip R.	ERJ-14YJ151H	R800	RK3050	Chip R.	ERJ3GGSYJ103V	R847	RK3030	Chip R.	ERJ3GGSYJ221V
R704	RK3032	Chip R.	ERJ3GGSYJ331V	R753	RK4068	Chip R.	ERJ-14YJ151H	R801	RK3050	Chip R.	ERJ3GGSYJ103V	R848	RK3049	Chip R.	ERJ3GGSYJ152V
R705	RK3032	Chip R.	ERJ3GGSYJ272V	R754	RK4068	Chip R.	ERJ-14YJ151H	R802	RK3022	Chip R.	ERJ3GGSYJ470V	R849	RK3049	Chip R.	ERJ3GGSYJ822V
R706	RK3032	Chip R.	ERJ3GGSYJ331V	R755	RK4068	Chip R.	ERJ-14YJ151H	R803	RK3034	Chip R.	ERJ3GGSYJ470V	R850	RK3068	Chip R.	ERJ3GGSYJ334V
R707	RK3043	Chip R.	ERJ3GGSYJ272V	R756	RK4068	Chip R.	ERJ-14YJ151H	R804	RK3022	Chip R.	ERJ3GGSYJ470V	R851	RK3058	Chip R.	ERJ3GGSYJ473V
R708	RK3032	Chip R.	ERJ3GGSYJ331V	R757	RK4068	Chip R.	ERJ-14YJ151H	R805	RK3040	Chip R.	ERJ3GGSYJ152V	R854	RK3030	Chip R.	ERJ3GGSYJ221V
R709	RK3032	Chip R.	ERJ3GGSYJ272V	R758	RK1025	Chip R.	ERJ8GGEYJ331V	R806	RK3030	Chip R.	ERJ3GGSYJ102V	R855	RK3030	Chip R.	ERJ3GGSYJ221V
R710	RK3049	Chip R.	ERJ3GGSYJ822V	R759	RK1023	Chip R.	ERJ8GGEYJ271V	R807	RK3038	Chip R.	ERJ3GGSYJ102V	R857	RK3030	Chip R.	ERJ3GGSYJ221V
R711	RK3042	Chip R.	ERJ3GGSYJ222V	R760	RK3030	Chip R.	ERJ3GGSYJ150V	R808	RK3043	Chip R.	ERJ3GGSYJ272V	R858	RK3022	Chip R.	ERJ3GGSYJ470V
R712	RK3043	Chip R.	ERJ3GGSYJ272V	R761	RK3016	Chip R.	ERJ3GGSYJ150V	R809	RK3038	Chip R.	ERJ3GGSYJ102V	R860	RK3038	Chip R.	ERJ3GGSYJ470V
R713	RK3034	Chip R.	ERJ3GGSYJ471V	R762	RK3030	Chip R.	ERJ3GGSYJ221V	R810	RK3042	Chip R.	ERJ3GGSYJ222V	R863	RK3030	Chip R.	ERJ3GGSYJ102V
R714	RK3026	Chip R.	ERJ3GGSYJ101V	R763	RK3016	Chip R.	ERJ3GGSYJ150V	R811	RK3034	Chip R.	ERJ3GGSYJ471V	R864	RK3030	Chip R.	ERJ3GGSYJ221V
R715	RK3046	Chip R.	ERJ3GGSYJ472V	R764	RK3032	Chip R.	ERJ3GGSYJ331V	R812	RK3038	Chip R.	ERJ3GGSYJ102V	R866	RK3030	Chip R.	ERJ3GGSYJ221V
R716	RK3021	Chip R.	ERJ3GGSYJ390V	R765	RK3032	Chip R.	ERJ3GGSYJ331V	R813	RK3038	Chip R.	ERJ3GGSYJ102V	R867	RK3093	Chip R.	RR0816P-102-B-T5
R717	RK3074	Chip R.	ERJ3GGSYJ105V	R766	RK3032	Chip R.	ERJ3GGSYJ331V	R814	RK3074	Chip R.	ERJ3GGSYJ105V	R868	RK3093	Chip R.	RR0816P-102-B-T5
R718	RK3028	Chip R.	ERJ3GGSYJ151V	R767	RK3032	Chip R.	ERJ3GGSYJ331V	R815	RK3046	Chip R.	ERJ3GGSYJ472V	R869	RK3093	Chip R.	RR0816P-102-B-T5
R720	RK3026	Chip R.	ERJ3GGSYJ101V	R768	RK3062	Chip R.	ERJ3GGSYJ104V	R816	RK3062	Chip R.	ERJ3GGSYJ472V	R870	RK3093	Chip R.	RR0816P-102-B-T5
R721	RK1020	Chip R.	ERJ8GGEYJ151V	R769	RK3030	Chip R.	ERJ3GGSYJ104V	R817	RK3093	Chip R.	RR0816P-102-B-T5	R871	RK3093	Chip R.	RR0816P-102-B-T5
R722	RK1002	Chip R.	ERJ8GGEYJ120V	R770	RK3030	Chip R.	ERJ3GGSYJ221V	R818	RK3093	Chip R.	RR0816P-102-B-T5	R872	RK3093	Chip R.	RR0816P-102-B-T5
R723	RK3034	Chip R.	ERJ3GGSYJ471V	R771	RK3030	Chip R.	ERJ3GGSYJ221V	R819	RK3093	Chip R.	RR0816P-102-B-T5	R873	RK3093	Chip R.	RR0816P-102-B-T5
R724	RK0020	Chip R.	ERJ8GGEYJ151V	R772	RK3022	Chip R.	ERJ3GGSYJ470V	R820	RK3093	Chip R.	RR0816P-102-B-T5	R874	RK3093	Chip R.	RR0816P-102-B-T5
R725	RK4070	Chip R.	ERJ-14YJ271H	R773	RK3030	Chip R.	ERJ3GGSYJ470V	R821	RK3093	Chip R.	RR0816P-102-B-T5	R875	RK3093	Chip R.	RR0816P-102-B-T5
R726	RK3054	Chip R.	ERJ3GGSYJ223V	R774	RK3022	Chip R.	ERJ3GGSYJ470V	R822	RK3093	Chip R.	RR0816P-102-B-T5	R876	RK3094	Chip R.	RR0816P-202-B-T5
R727	RK3043	Chip R.	ERJ3GGSYJ272V	R775	RK3036	Chip R.	ERJ3GGSYJ102V	R823	RK3093	Chip R.	RR0816P-102-B-T5	R877	RK3094	Chip R.	RR0816P-202-B-T5
R728	RK3036	Chip R.	ERJ3GGSYJ390V	R776	RK3030	Chip R.	ERJ3GGSYJ223V	R824	RK3093	Chip R.	RR0816P-102-B-T5	R878	RK3094	Chip R.	RR0816P-202-B-T5
R729	RK3036	Chip R.	ERJ3GGSYJ681V	R777	RK3062	Chip R.	ERJ3GGSYJ104V	R825	RK3093	Chip R.	RR0816P-102-B-T5	R879	RK3094	Chip R.	RR0816P-202-B-T5
R730	RK3049	Chip R.	ERJ3GGSYJ822V	R778	RK3052	Chip R.	ERJ3GGSYJ153V	R826	RK3021	Chip R.	ERJ3GGSYJ390V	R880	RK3094	Chip R.	RR0816P-202-B-T5
R731	RK3042	Chip R.	ERJ3GGSYJ222V	R779	RK3014	Chip R.	ERJ3GGSYJ100V	R827	RK3040	Chip R.	ERJ3GGSYJ152V	R881	RK3094	Chip R.	RR0816P-202-B-T5
R732	RK3028	Chip R.	ERJ3GGSYJ151V	R780	RK3038	Chip R.	ERJ3GGSYJ102V	R828	RK3094	Chip R.	RR0816P-202-B-T5	R882	RK3094	Chip R.	RR0816P-202-B-T5
R733	RK3028	Chip R.	ERJ3GGSYJ151V	R781	RK3042	Chip R.	ERJ3GGSYJ223V	R829	RK3046	Chip R.	RR0816P-202-B-T5	R883	RK3094	Chip R.	RR0816P-202-B-T5
R734	RK3028	Chip R.	ERJ3GGSYJ151V	R782	RK3054	Chip R.	ERJ3GGSYJ223V	R830	RK3094	Chip R.	RR0816P-202-B-T5	R884	RK3094	Chip R.	RR0816P-202-B-T5
R735	RK3028	Chip R.	ERJ3GGSYJ151V	R783	RK3054	Chip R.	ERJ3GGSYJ223V	R831	RK3094	Chip R.	RR0816P-202-B-T5	R885	RK3094	Chip R.	RR0816P-202-B-T5
R736	RK3028	Chip R.	ERJ3GGSYJ151V	R784	RK3054	Chip R.	ERJ3GGSYJ223V	R832	RK3094	Chip R.	RR0816P-202-B-T5	R886	RK3094	Chip R.	RR0816P-202-B-T5
R737	RK3028	Chip R.	ERJ3GGSYJ151V					R833	RK3094	Chip R.	RR0816P-202-B-T5	R887	RK3022	Chip R.	ERJ3GGSYJ470V

REF. NO.	Parts NO.	Description	Parts Name
	SS00088		Front Chassis
	TS0104		Fan Shield
	TS0105		Filter Shield
	TZ0066		Attachment
	UJ0258		Antenna Connector
	UX1085		ACC Connector
	YZ0001		Silicon Grease
	YZ20131		Tap #9110-12X1mm
		Packing	
	EMS42		MIC
	DS0388		Model/Serial No. sticker
	HK0443		Item Carton T/E (77only)
	HK0446		Item Carton (707only)
	HM0176		Item Carton
	HP0002		Protection Bag (Manual)
	HP0048		Protection Bag (Radio)
	HU0117		Fixture
	HU0118		Fixture F
	HU0119		Fixture R
	HU0120		Fixture
	PH0009A		Registration Card (77only)
	PK0069		Schematic Diagram (77only)
	PK0072		Schematic Diagram (707only)
	PR0369		Side Sticker for screw size
	PS0274		Instruction Manual (77only)
	PS0281		Instruction Manual (707only)
	PT0004A		Caron sticker for Serial No.
	ADUA52		Power Cord

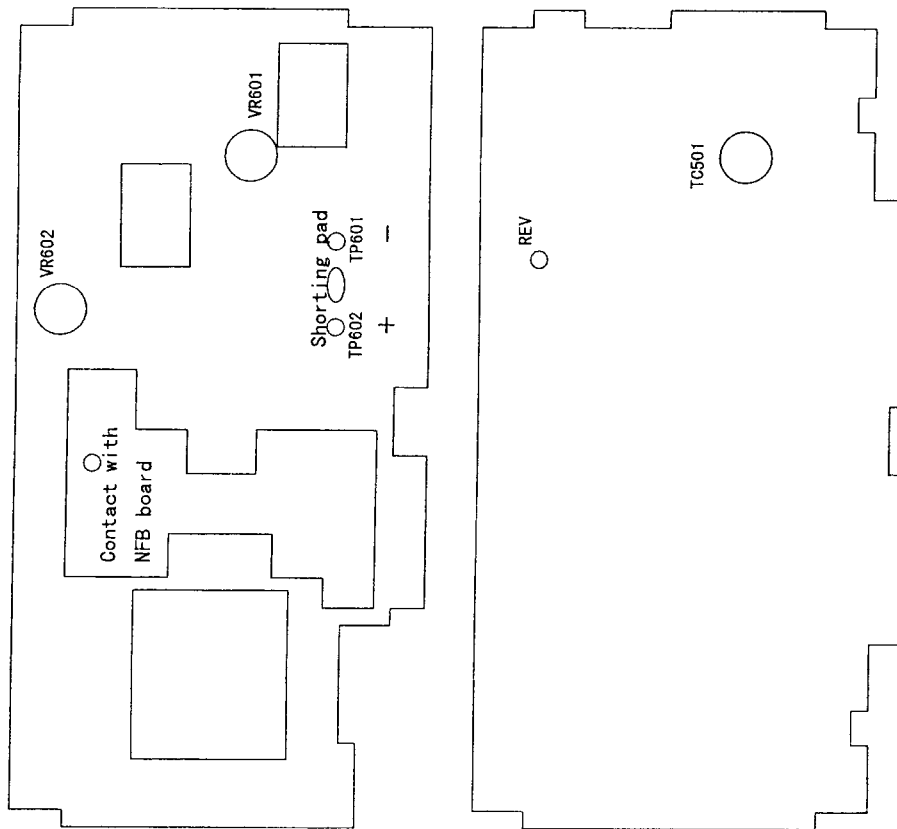
REF. NO.	Parts NO.	Description	Parts Name
	AA0060		Screw XSN4+20
	AA0070		Screw XSB26+8FN
	AB0011		Screw PHX M3+8 FE/N
	AD0005		Screw XYN4+FI0
	AJ0015		Screw XTJ26+6B
	AJ0017		Screw XTJ26+6BFN
	AJ0029		Screw XTNG+6B
	AN0012		Nut
	AP0001		Screw PH P2.6+8 FEZN
	AP0028		Screw XTNG+10G
	DG0022		LED Light
	DP0119A		LCD Panel (77only)
	DP0120A		LCD Panel (707only)
	ET0009		Fan Motor
	FF0020		Cable Protect
	FF0017		BLIND CLOTH
	FF0031		CLOTH 7.0X30
	FG0057		Attachment (77)
	FG0147		RUB.CUSHION
	FG0258		Speaker Cushion
	FG0259		Button Cushion
	FM0083		Washer
	FM0152		IC Spring
	FM0156		F Side bracket R
	FM0157		F Side bracket L
	FM0158		Chassis bracket R
	FM0159		Chassis bracket L
	FM0160		Fan Cover bracket
	FM0161		Jack bracket
	FP0004		Wire strap
	FP0106		Switch Cover
	KU0119		Upper Cover
	KZ0040		VOJ/SOL Dial
	KZ0076		Front Panel (77only)
	KZ0081		Front Panel (707only)
	KZ0077		Lower Cover
	KZ0078		Main Dial Knob
	KZ0079		RIT Knob (707only)
	NK0043		RIT Knob (77only)
	NK0044		IF Knob (77only)
	NP0097		Dial Lock/UP/DOWN Key
	NP0118		Power Button
	PR0348		Sticker with terminal locator
	SP0008		Grounding Spring
	SS0066		Chassis
	SS0067		Filter P.B. Chassis
	SS0087		Main Chassis

REF. NO.	Parts NO.	Description	Parts Name
	PIZ2A2M		PIZ2A2M
	HSJ2000-01-010		HSJ2000-01-010
	LG16501-0800		LG16501-0800
	HSJ091201040		HSJ091201040
	ERJ3G5YJ221V		ERJ3G5YJ221V
	ERJ3G5YJ21V		ERJ3G5YJ21V
	ERJ3G5YJ221V		ERJ3G5YJ221V
	ERJ3G5YJ221V		ERJ3G5YJ221V
	WIRE FRONT-SP1		WIRE FRONT-SP1
	WIRE FRONT-SP2		WIRE FRONT-SP2
		EJ-34U (TONE UNIT)	
	C1026	Chip C.	C1608JB1C104M
	C1035	Chip C.	TCMA1V474MTR
	C1039	Chip C.	C1608CH1H330JTA
	C1040	Chip C.	C1608CH1H330JTA
	IC1005	IC	LG6528F-4D24-TRM
	R1056	Chip R.	ERJ3G5YJ823V
	R1059	Chip R.	ERJ3G5YR00V
	R1064	Chip R.	ERJ3G5YJ993V
	R1075	Chip R.	ERJ3G5YJ223V
	R1081	Chip R.	ERJ3G5YJ03V
	R1084	Chip R.	ERJ3G5YJ472V
	R1085	Chip R.	ERJ3G5YJ472V
	R1088	Chip R.	ERJ3G5YJ472V
	R1089	Chip R.	ERJ3G5YJ472V
	R1133	Chip R.	ERJ3G5YJ222V
	W1007	Wire	WIRE FRONT-TONE
	X1001	Oscillator	CSAC3.58MGC3003A-TC
		SP UNIT	
	ES0019	Speaker	066M9021
	UX1047	Wire	WIRE DR130
		OTHER	
	O601	Transistor	2SC1971
	O602	Transistor	2SC3133
	O603	Transistor	2SC3133
	O604	Transistor	2SC2904
	O605	Transistor	2SC2904
	O606	Transistor	2SC3419-Y
		Mechanical Parts	
	AA0007		Screw XSB26+6 for front panel
	AA0024		Screw XSB3+6FN
	AA0050		Screw XSC26+6FZ for covers
	AA0057		Screw XSB26+6 for chassis
	AA0059		Screw XSB26+6FN

REF. NO.	Parts NO.	Description	Parts Name
R888	RK3042	Chip R.	ERJ3G5YJ222V
R889	RK3028	Chip R.	ERJ3G5YJ151V
R890	RK3042	Chip R.	ERJ3G5YJ222V
R891	RK3054	Chip R.	ERJ3G5YJ223V
R892	RK3054	Chip R.	ERJ3G5YJ223V
R893	RK3046	Chip R.	ERJ3G5YJ472V
R894	RK3058	Chip R.	ERJ3G5YJ473V
R895	RK3064	Chip R.	ERJ3G5YJ154V
R896	RK3046	Chip R.	ERJ3G5YJ472V
R897	RK3030	Chip R.	ERJ3G5YJ221V
R898	RK3030	Chip R.	ERJ3G5YJ221V
R899	RK3040	Chip R.	ERJ3G5YJ152V
R900	RK3038	Chip R.	ERJ3G5YJ02V
R901	RK3032	Chip R.	ERJ3G5YJ31V
R902	RK3001	Chip R.	ERJ3G5YR00V
R903	RK3038	Chip R.	ERJ3G5YJ02V
SH701	TS0106		VCO CASE(A) XM601
SH702	TS0106		VCO CASE(A) XM601
SH703	TS0106		VCO CASE(A) XM601
SH704	TS0032A		VCO CASE
TC701	CT0012	Trimmer	CTZ10AW
VR701	RH0116	Trim.Pol.	EVY1YS50BQ2
X701	XO0092	Crystal Oscillator	HC49L9 33.564432MHZ
XF701	XF0017	Crystal Filter	71M15B4 UM1
SD0034	SD0034	GND Spring	GND SPRING DR130
TZ0049	TZ0049		SILICON DUMPER
TZ0056	TZ0056		SILICON DUMPER 49U
UP0322A	UP0322A	P.C.B	DX77 PLL INTEGRATED
		RIT UNIT (77 only)	
CN1012	UE0322	Connector	105082311005100
R1055	RK3038	Chip R.	ERJ3G5YJ02V
R1077	RK3038	Chip R.	ERJ3G5YJ02V
VR1003	RV0022	Volume	RK0972210L25 10KB'2
		RIT UNIT (707 only)	
CN1015	UE0322	Connector	105082311005100
R1033	RK3038	Chip R.	ERJ3G5YJ02V
R1029	RK3046	Chip R.	ERJ3G5YJ472V
R1087	RK3046	Chip R.	ERJ3G5YJ472V
R1131	RK3038	Chip R.	ERJ3G5YJ02V
VR1005	RV0038	Volume	RK0971110
		SP/JACK UNIT	
C1001	CU3035	Chip C.	C1608JB1H102KTA
C1002	CU3035	Chip C.	C1608JB1H102KTA
C1003	CU3035	Chip C.	C1608JB1H102KTA
C1006	CU3035	Chip C.	C1608JB1H102KTA
C1079	CU3047	Chip C.	C1608JB1H103KTA
C1080	CU3047	Chip C.	C1608JB1H103KTA

ALIGNMENT

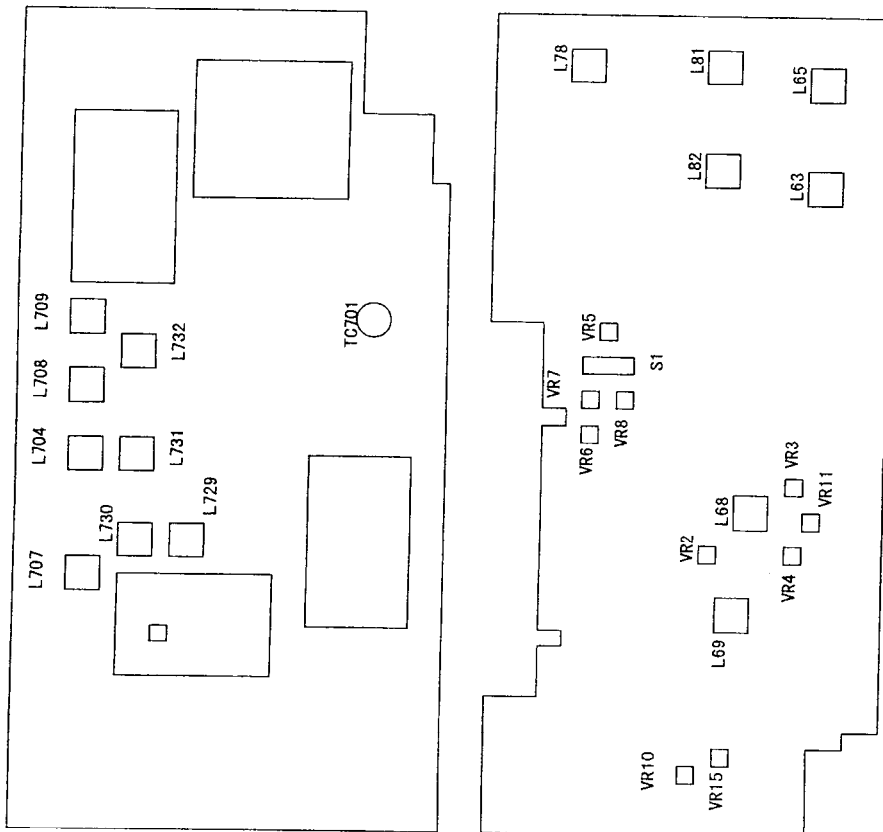
(1) PA, FILTER Unit Alignment PA, FILTER Unit Alignment Points



item	condition	UNIT	adjust	Procedure
2SC3133*2 idling current	No input USB mode VR601 VR602 MIN (fully counter clockwise)	PA	VR601	Measure current between TP601 & TP602 and adjust to 100mA. (Polarity written on PCB). Short specified pads after adjusting.
2SC2904*2 idling current	No input USB mode	PA	VR602	Ground the contact to NFB board and measure current. Then take it off from ground; adjust VR602 to get 300mA more than when grounded.
Reflected power detection	1. 9000MHz Input SG to PA	FIL	TC501	Adjust SG so that power output is about 50W; Adjust TC501 for minimum REV power.

(2) PLL, MAIN Unit Alignment

PLL, MAIN Unit Alignment Points



(3) Transmitter Arignment

Item	condition	UNIT	adjust	Procedure
Tx output	14. 1000MHz FM	PLL	L707 L704	Adjust for maximum
CW carrier	14. 1000MHz CW	MAIN	VR4	Adjust CW raising edge to be 3mS. (Sidetone to be audible during the procedure)
AM carrier	14. 1000MHz AM MOD 1KHz -35dBm	MAIN	VR11	Adjust for 100% modulation
Total current	10. 1000MHz FM unmodulated	MAIN	VR6	Adjust to22A
100W mode output	14. 1000MHz FM unmodulated	MAIN	VR7	Adjust to obtain 100W output
50W mode output	14. 1000MHz FM unmodulated	MAIN	VR5	Switch the S1 to 50W and adjust VR5 to 50W. output. Switch back S1 to 100W after.
TUNE power	14. 1000MHz	MAIN	VR8	Adjust to 10W
Carrier balance	14. 1000MHz SSB	MAIN	VR3	Adjust VR3 to get more ethan 50dB as compared to 100W
FM MOD	28. 1000MHz FM 1KHz -35dBm	MAIN	VR13	Adjust to 2. 3KHz/DEV

Note: Use High power mode unless mentioned

(4) Receiver Alignment

Item	condition	UNIT	adjust	Procedure
Reference frequency		PLL	TC701	Measure CP802 and adjust TC701 to 16.777216MHz±5Hz
Sensitivity	14.1000MHz USB RF:+10dB SG:-6dBu	PLL MAIN	L729 L730 L731 L732 L708 L709 L78 L81 L82 L68 L69	Adjust repeatedly for maximum receive audio S/N 10dB or better
Total Gain	14.1000MHz USB RF:0dB SG:40dBu	MAIN	VR2	Adjust AF gain for AF output of about 1V. Let this level be 0dB; Turn off the SG output, and adjust VR2 to get -28dB with noise only. L68 and L69 may be adjusted optionally
Smeter	14.1000MHz USB RF:0dB SG:20dBu SG:40dBu	MAIN	 VR10 VR15	 Adjust to display between 1 and 2. Adjust to display 9. Adjust VR10 and VR15 repeatedly.
Noise Blanker	14.1000MHz USB RF:+10dB SG:15dBu FM MOD 20Hz 100KHz/DEV	MAIN	L65 L63	Adjust for the least noise.

(5) Transmitter Check

item	condition	Adjusted value	Pass limit	Remarks
Ref freq FM	14.1000MHz	±5Hz	±50Hz	
Tx power FM unmodulated	1. 8MHz band 3. 5MHz band 7 Mhz band 10MHz band 14MHz band 18MHz band 21MHz band 24MHz band 28MHz band	95~110W	90~110W	Use default freq of each band
Tx power AM unmodulated	1. 9MHz band 3. 5MHz band 7MHz band 10MHz band 14MHz band 18MHz band 21MHz band 24MHz band 28MHz band	35~50W	30~50W	- ibid -
Current dissipation in Tx FM unmodulated	1. 9MHz band 3. 5MHz band 7MHz band 10MHz band 14MHz band 18MHz band 21MHz band 24MHz band 28MHz band	20A max	20A max	- ibid -

Item	Condition	Check
Low power	14. 1000MHz FM	See that the output is between 5~20W
AM power	Low Pwr. unmodulated 14. 1000MHz AM unmodulated	See that the output is between 35~50W
Power on each band	Each band FM unmodulated	See that the output is between 90 and 110W for each band
Spurious	Each band FM unmodulated	Better than -52dB (For 10MHz band -47dB)
Modulation	LSE/USB FM AM	Use a separate receiver and check audio
Elec. -keyer	14. 1000MHz CW	Install the keyer unit, activate, and see that it's working
CTCSS	28. 1000MHz FM	88.5Hz tone deviation is within 0.3~0.6KHz/DEV

item	Condition	Adjusted value	Pass limit	Remarks
Low pwr FM unmodulated	14. 1000MHz	5~20W	5~20W	
TUNE power	14. 1000MHz	10W	8~12W	
FM deviation	28. 1000MHz FM	2.3KHz	2.1~2.4KHz	
CW waveform	14. 1000MHz CW	Leading edge 3mS	2~6mS	
Spurious FM	1. 9MHz band	-52dB max	-52dB max	
	3. 5MHz band	-52dB max	-52dB max	
	7MHz band	-52dB max	-52dB max	
	10MHz band	-47dB max	-47dB max	
	14MHz band	-52dB max	-52dB max	
	18MHz band	-52dB max	-52dB max	
	21MHz band	-52dB max	-52dB max	
	24MHz band	-52dB max	-52dB max	
28MHz band	-52dB max	-52dB max	-52dB max	
Carrier balance SSB Unmodulated	14MHz band	-50dB max	-45dB max	Check both USB/LSB
modulationSSB FM AM	FM on 28MHz	Check only	Check only	See that its clear
	Other mode on any band			
	SPEECH Compressor ON		Check only	See modulation goes up / power meter swings more

Item	Condition	Aligned value	Pass limit	Remarks
Rx SSB sensitivity	1. 0000MHz	+6dBu (emf)	+6dBu (emf)	S/N 10dB or better
	1. 9000MHz	-6dBu	-6dBu	
	3. 6000MHz	-6dBu	-6dBu	
	7. 1000MHz	-6dBu	-6dBu	
	10. 1000MHz	-6dBu	-6dBu	Pass limit “-” means
	14. 1000MHz	-6dBu	-6dBu	the band has already
	18. 1000MHz	-6dBu	-	been checked in the
	21. 1000MHz	-6dBu	-6dBu	same BPF
24. 9000MHz	-6dBu	-		
28. 1000MHz	-6dBu	-6dBu		
Rx AM	1. 0000MHz	+26dBu	+26dBu	S/N 10dB 以上
Sensitivity	14. 1000MHz	+10dBu	+12dBu	MOD 1KHz 30%
Rx FM sensitivity	28. 1000MHz	0dBu	0dBu	SINAD 12dB 以上
Rx distortion	28. 1000MHz	3% max	3% max	MOD 1KHz 1. 75KHz/DEV
S-meter SSB 14. 1000MHz	No signal	No display	No display	
	RF: 0dB	S 1~2	displays	
	20dBu	S 9	S 8~9.5	
Squelch SSB 14. 1000MHz	No signal		Closes at	
	RF: 0dB		9 to 11	
	>+30dBu		o'clock.	
			>Can be	
			closed	

item	Condition	Aligned value	Pass limit	Remarks
Noise Blanker	14. 1000MHz SSB SG : 40dBu MOD 20Hz 100KHz/DEV		Check only	With NB ON the noise is reduced and the S-meter is not displaying
AGC (not for DX-707)	14. 1000MHz SSB SG : +40dBu	Check only	Check only	Toggle AGC-F/-S: With SG ON/OFF see that S-meter response changes
RF GAIN	14. 1000MHz SSB SG : +40dBu	Check only	Check only	With RF GAIN changed, see the S-meter changes
FILTER (Not for DX-707)	14. 1000MHz CW AM	Check only	Check only	See that noise changes with FILTER on and off

(6) Receiver Check

item	condition	Check
distortion	14. 1000MHz FM RF : +10dB SG : 40dBu 1KHz 1. 75KHz/DEV	To be less than 3% If not, fine-tune the L78.
squelch	14. 1000MHz USB RF : +10dB SG : OFF	Squelch to close at 10 o'clock, and see that S-meter is not displaying.
AGC	14. 1000MHz USB RF : +10dB SG : 40dBu	With AGC-Slow, at the moment the SG is turned OFF, the meter to go down slowly and with AGC-fast, to go down fast.
RF GAIN	14. 1000MHz USB SG : 40dBu	From RF GAIN +10dB, press the RF key to see that S-meter goes down gradually.
FILTER	SG : OFF	Press the MODE key and see that the audio quality changes.
Check each band	1. 9000MHz 3. 6000MHz 7. 1000MHz 10. 1000MHz 21. 1000MHz 28. 1000MHz LSB or USB SG : -6dBu	Toggle the SG ON and OFF, and see that the difference is more than 10dB, on each band.

(7) Operation Check

item	condition	Adjusted value	Pass limit	Remarks
Dial	Main dial	Check only	Check	Rotate both directions to see freq changes
Switches	Each switch	Check only	Check	See BEEP sounds for all switches except POWER
Volume	AF GAIN	Check only	Check	Loudness changes
	SQUELCH	Check only	Check	Squelch opens/closes
	IF SHIFT (DX77 only)	Check only	Check	Check that audio quality changes
	RIT	Check only	check	Varies in the range of ± 1.0 KHz and is 0.0 at the centre
Jacks	PHONES	Check	Check	Use a headset to check
LCD	REMOTE	check	Check	PC control possible
	LCD	Check	check	All segments show when resetting
DIMMER	DIMMER LPD~LP5		check	See that luminosity changes. Erases at LPO
Preshipment	Reset and DX77 shows default 7.1MHz (DX707 shows memory) AF, SQL volumes at full counterclockwise, RIT, Δ IF volumes at the centre.			

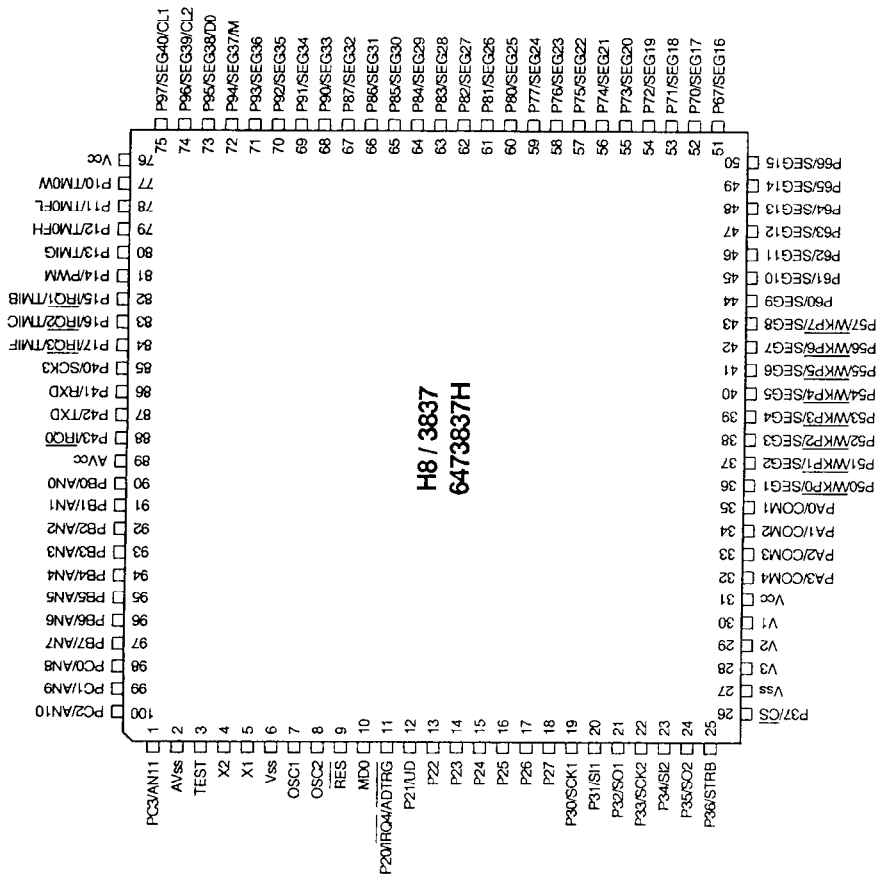
SEMICONDUCTOR DATA

CPU PIN USE

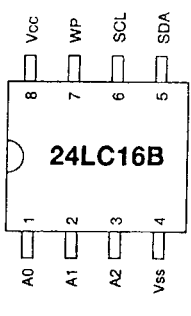
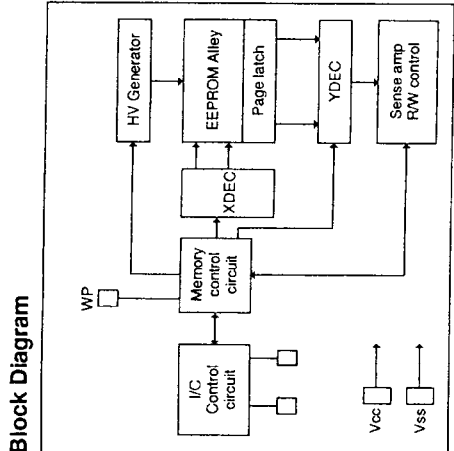
No.	PORT	USE	NAME	REMARKS	I/O	Int. setting	connection	Description	L	H
2		AVSS	GND							
3		GND								
4	X2	XTAL_L	OSC	32.768kHz						
5	X1	XTAL		32.768kHz						
6	VSS	GND								
7	OSC1	XTAL								
8	OSC2	XTAL								
9	/RES	/RST								
10	MDO	SV								
11	/RQA	DOCK	DIAL CLOCK		I		GATE	main dial and pulse sensor	raising edge sensed	
12	P21	DO			I		GATE	dial rotation UP		UP
13	P22	/DO			I		GATE	dial rotation DOWN		DOWN
14	P23	TREY	TUNE KEY		I		10k PU	ent tuner operation sensor	tuning	idling
15	P24	ULK	UNLOCK		I		100k PD	PLL unlock sensor	unlocked	locked
16	P25	MCK	EEPROM CK		O			clock for data I/O to EEPROM		
17	P26	MDAT	EEPROM DATA		I/O		10k PU	data I/O to EEPROM		
18	P27	EEN	ELEKEY ENABLE		O			elec-keyer enable		enabled
19	P30	CLK	SERIAL CK		O		R	clock for data output		
20	P31	DAT	SERIAL DATA		O		R	data output		
21	P32	EN	MODE ENABLE		O		R	data output enable, mode, etc.		enabled
22	P33	STB	BPF ENABLE		O		R	BPF data output enable		enabled
23	P34	TSTB	TOPE ENABLE		O		R	tone data output enable		enabled
24	P35	CMP	CMP SW		O		PD	speech compress on/off	OFF	ON
25	P36	DST	SERIAL SELECT		O		R	DOS data output enable		enabled
26	P37	PST	SERIAL SELECT		O		R	PLL data output enable		enabled
27	VSS	GND								
28	V3									
29	V2									
30	V1									
31	Vcc	5V								
32	COM4	COM4			O		LCD	LCD COMMON		
33	COM3	COM3			O		LCD	LCD COMMON		
34	A	COM2	COM2		O		LCD	LCD COMMON		
35	COM1	COM1			O		LCD	LCD COMMON		
36	P50	DB2			I		10k PD	SW, initial setting defect		detect
37	P51	DB1			I		10k PD	SW, initial setting defect		detect
38	P52	DB2			I		10k PD	SW, initial setting defect		detect
39	P53	DB3			I		10k PD	SW, initial setting defect		detect
40	5	P54	DB4		I		10k PD	SW, initial setting defect		detect
41	P55	DB5			I		10k PD	SW, initial setting defect		detect
42	P56	ELK	ELEKEY		I		PD	elec. key deflection	not installed	installed
43	P57	NBS	NB SW		O		PD	NB on/off Switch	OFF	ON
44	P60	Y0			O		D	front panel SW ON defect		detected
45	P61	Y1			O		D	front panel SW ON defect		detected
46	P62	Y2			O		D	initial status detection output		
47	P63	Y3			O		D	initial status detection output		
48	6	P64	TSW	TOPE SW	O		PD	TOPE ON/OFF SW	OFF	ON
49	P66	LCDBN			O		IC	LCD driver enable		
50	P66	LCDOK			O		IC	LCD driver clock		
51		P67	LCDATA		O		1C	LCD driver data		

No.	PORT	USE	NAME	REMARKS	I/O	Int. setting	connection	Description	L	H
52		SEG17	SEG17		O		LCD	output for LCD segment		
53		SEG18	SEG18		O		LCD	output for LCD segment		
54		SEG19	SEG19		O		LCD	output for LCD segment		
55		SEG20	SEG20		O		LCD	output for LCD segment		
56	7	SEG21	SEG21		O		LCD	output for LCD segment		
57		SEG22	SEG22		O		LCD	output for LCD segment		
58		SEG23	SEG23		O		LCD	output for LCD segment		
59		SEG24	SEG24		O		LCD	output for LCD segment		
60		SEG25	SEG25		O		LCD	output for LCD segment		
61		SEG26	SEG26		O		LCD	output for LCD segment		
62		SEG27	SEG27		O		LCD	output for LCD segment		
63		SEG28	SEG28		O		LCD	output for LCD segment		
64	8	SEG29	SEG29		O		LCD	output for LCD segment		
65		SEG30	SEG30		O		LCD	output for LCD segment		
66		SEG31	SEG31		O		LCD	output for LCD segment		
67		SEG32	SEG32		O		LCD	output for LCD segment		
68		SEG33	SEG33		O		LCD	output for LCD segment		
69		SEG34	SEG34		O		LCD	output for LCD segment		
70		SEG35	SEG35		O		LCD	output for LCD segment		
71		SEG36	SEG36		O		LCD	output for LCD segment		
72	9	SEG37	SEG37		O		LCD	output for LCD segment		
73		SEG38	SEG38		O		LCD	output for LCD segment		
74		SEG39	SEG39		O		LCD	output for LCD segment		
75		SEG40	SEG40		O		LCD	output for LCD segment		
76		Vcc	5V							
77		TMOW	MONI	MONITOR	O		PD	To open the squelch		open Command
78		P11	LIT		O		10k PD	LCD driver to flash display	flash	display
79		P12	BEEP		O		RC	output sidetone and beep	pulse output	
80		P13	SOL		I		LED PU	squelch sensor	closed	opened
81	1	P4M	DIMM	DIMMER	O		DTR	LCD illumination	pulse output duty	
82		IR01	TXS		I		NMOS PU	TX detection	transmitting	receiving
83		IR02	CWR		I		PU	CW keying detection	keying ON	keying OFF
84		P17	ELRST		O			reset data pulse-count	counting	reset
85		P40	DRST	COUNT RESET	O		GATE	close data input		
86		P41	RXD	CLONE IN	I			clone data output		
87	4	P42	TXD	CLONE OUT	O			clone data output		
88		IR00	PDN	POWER DOWN	I		GATE	power-down deflection	no power	power OK
89		AVcc	5V							
90		P80	DO1		I		GATE	dial clock 1/2		
91		P81	DO2		I		GATE	dial clock 1/4		
92		P82	DO3		I		GATE	dial clock 1/8		
93		P83	DO4		I		GATE	dial clock 1/16		
94	B	P84	DO5		I		GATE	dial clock 1/32		
95		P85	DO6		I		GATE	dial clock 1/64		
96		P86	MUD2	MIC UP DOWN	A/D			detects mic up/down	2-3V DOWN	0-2V UP
97		P87	MUD1	KEY UP DOWN	A/D			detects key up/down	2-3V DOWN	0-2V UP
98		AN8	DSDET		A/D		RC	dial rotation speed sensor	voltage vs. rotation	
99		AN9	RIT		A/D		VR	detects RIT VR position	0-5V	
100	C	AN10	IF SHIFT	IF SHIFT	A/D		VR	detects IF shift position	0-5V	
1		AN11	SRF		A/D		OP amp	S & RF Meter voltage input	0-5V	

CPU Pin Alignment (XA0460)



1) 24LC16B (XA0351)
16K bits CMOS Serial EEPROM

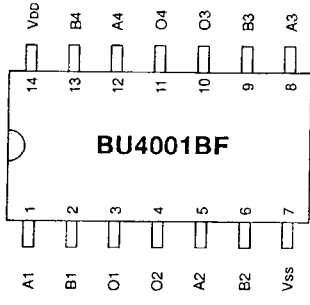
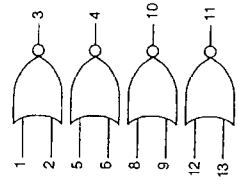


Pin Name	Description
Vss	GND terminal
SDA	Serial address/data I/O
SCL	Serial clock
WP	Write protect
Vcc	+2.5V-5.5V power supply
A0, A1, A2	No connection

2) BU4001BF (XA0299)
Quad 2 - Input NOR Gate

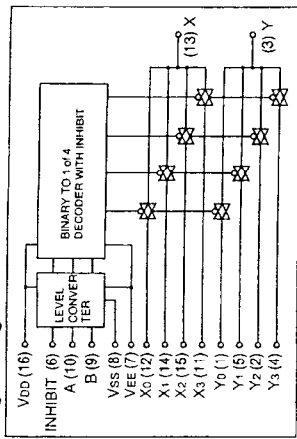
Truth Table

Input	Output
A B	X
L L	H
L H	L
H L	L
H H	L



3) BU4052BF (XA0236)

Analog Multiplexer/Demultiplexer
Logic Diagram



Truth Table
X: Don't Care

INHIBIT	A	B	ON SWITCH
L	L	L	X0 Y0
L	L	H	X1 Y1
L	L	L	X2 Y2
L	L	H	X3 Y3
L	H	L	X4 Y4
L	H	H	X5 Y5
L	H	L	X6 Y6
L	H	H	X7 Y7
L	H	L	X8 Y8
L	H	H	X9 Y9
L	H	L	X10 Y10
L	H	H	X11 Y11
L	H	L	X12 Y12
L	H	H	X13 Y13
L	H	L	X14 Y14
L	H	H	X15 Y15
H	X	X	NONE

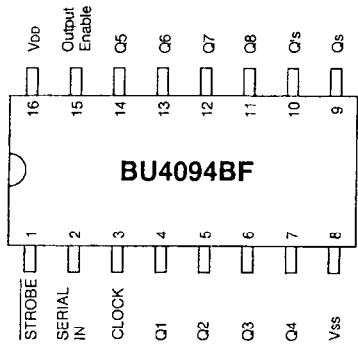
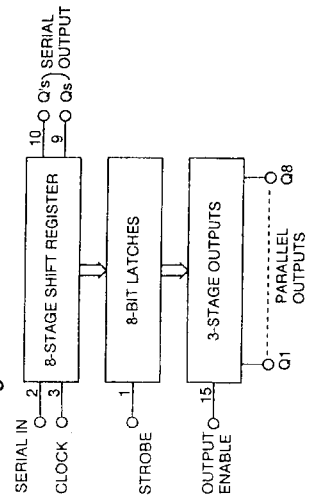
4) BU4094BF (XA0246)

8-Stage Shift Register

Truth Table
Z=High Impedance
X=Don't Care

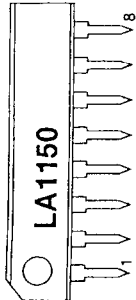
Clock	Output enable	Strobe	Data	Parallel outputs		Serial outputs	
				Q1	Qn	Qs	Qs
↑	L	X	X	Z	Z	Z	No Chg.
↓	L	X	X	Z	Z	Z	No Chg.
↑	H	L	X	No Chg.	No Chg.	Q7	No Chg.
↓	H	L	X	No Chg.	No Chg.	Q7	No Chg.
↑	H	H	L	L	Qn-1	Q7	No Chg.
↓	H	H	L	H	Qn-1	Q7	No Chg.
↑	H	X	X	No Chg.	No Chg.	Qs	No Chg.
↓	H	X	X	No Chg.	No Chg.	Qs	No Chg.

Block Diagram



5) LA1150N (XA0452)

FM IF Amplifier, Differential Peak Detector

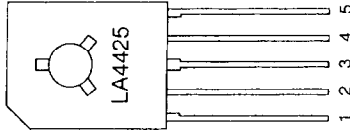


Characteristics
Ta=25°C, Vcc=12V, f=10.7MHz, fm=400Hz, 100% modulation

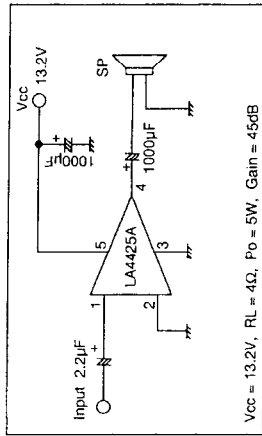
Characteristics	Symbol	Condition	Min.	Std.	Max.	Unit
Supply Current	Icc		8	12	15	mA
DC Voltage (Pin 7)	V7		3.7		5.2	V
Demodulated Output Voltage	VO	VIN = 80dBuV	400		600	mV rms
Input limiting Voltage	VIN(lim)	-3dB limiting		50	55	dBuV
Total Harmonic Distortion	THD	VIN = 80dBuV		0.2	0.3	%
SIN	SIN	VIN = 80dBuV		70	80	dB
AMR	AMR	AM = 1kHz 30% modulation		47	53	dB
Output Impedance	RO	f = 400Hz	6.2	7.7	9.5	kΩ

6) LA4425A (XA0410)

5W Audio Power Amplifier

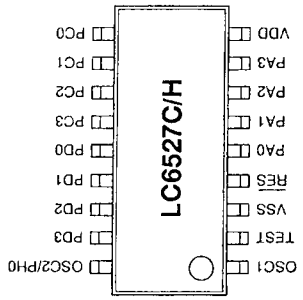


Test Circuit



7) LC6527C/H (XA0280)

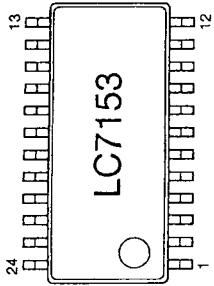
4BIT CPU



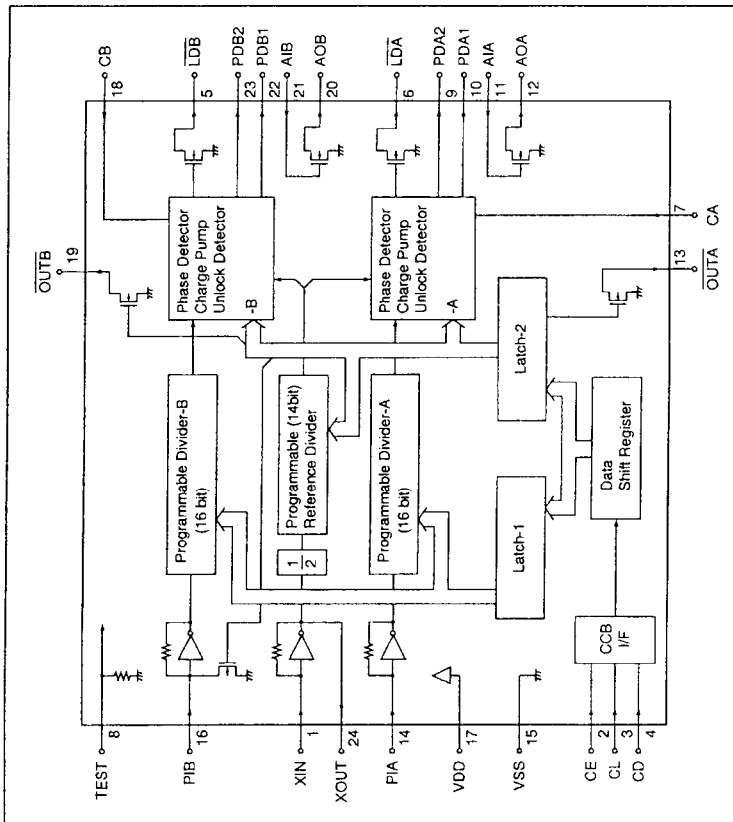
Terminal Symbol

- OSC1, OSC2 : OSC terminal
- RES : Reset terminal
- PA0 - 3 : Input/Output port A0 - 3
- PC0 - 3 : Input/Output port C0 - 3
- PD0 - 3 : Input/Output port D0 - 3
- PH0 : Input/Output port H0
- TEST : TEST terminal

8) LC7153M-TLM (XA0455)
PLL Circuit



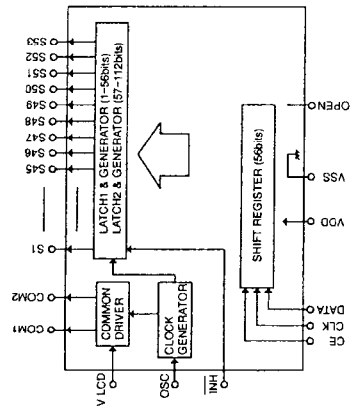
Block Diagram



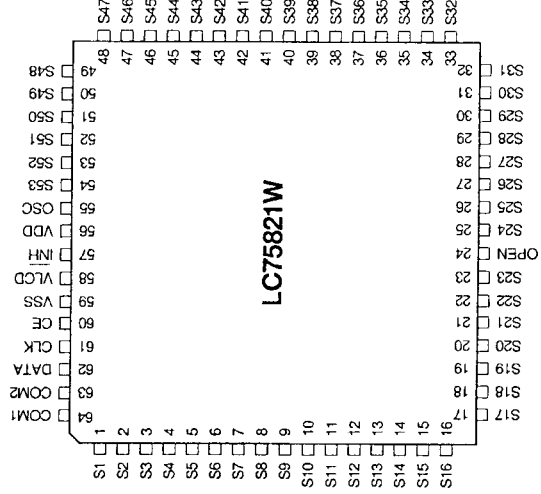
Terminal Symbol

- PIB : B Side Oscillator Signal Input
- XIN : Xtal OSC
- XOUT : Xtal OSC
- PIA : A Side Oscillator Signal Input
- VDD : Power Supply
- VSS : Ground
- CE : Chip Enable
- CL : Clock
- DI : Data
- TEST : LSI Test
- LDB : B Side Unlock Detect
- PDB2 : Charge Pump (Sub)
- PDB1 : Charge Pump (Main)
- AIB : Low Pass Filter Tr
- AOB : Low Pass Filter Tr
- OUTB : Output Port
- CB : High Speed Lock Up
- LDA : A Side Unlock Detect
- PDA2 : Charge Pump (Sub)
- PDA1 : Charge Pump (Main)
- AIA : Low Pass Filter Tr
- AOA : Low Pass Filter Tr
- OUTA : Output Port
- CA : High Speed Lock Up

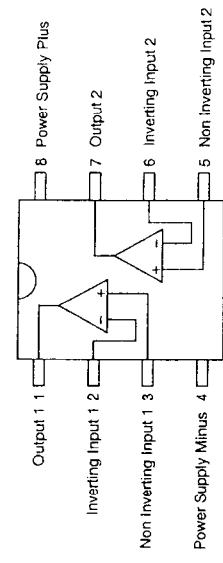
9) LC75821W (XA0303)
LCD Driver



Pin Name	Description
S1-S53	Segment output terminal
COM1, 2	Common output terminal
V LCD	LCD Bias voltage setting terminal
OSC	Oscillator terminal
CE, CLK, DATA	Serial data transmission terminal
VSS, VDD	Power supply terminal
INH	Display turn off input terminal INH=L: Vss, turn off (S1-S53, COM1,2=L) INH=H: Vdd, turn on
OPEN	No connection

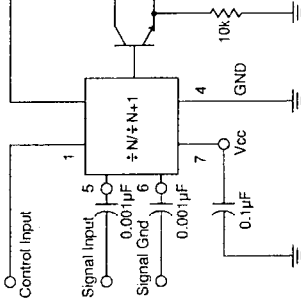


10) M5218FP (XA0068)
Dual Low Noise
Operational Amplifiers



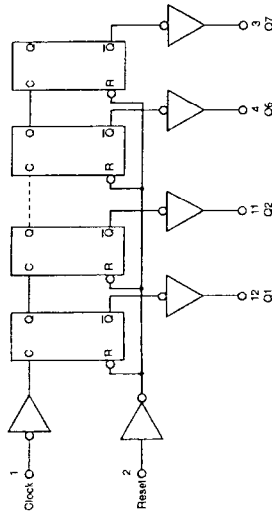
11) MC12019D (XA0292)
Two-Modulus Prescaler

Block Diagram



Characteristics	Symbol	Min.	Typ.	Max.	Unit
Toggle frequency (Sine wave input)	fmax fmin	225 -	- -	- 20	MHz
Supply current	Icc	-	-	7.5	mA
Control input High (1/20)	V _{IH}	2.0	-	-	V
Control input Low (1/21)	V _{IL}	-	-	0.8	V
Output voltage swing	V _{out}	600	-	1200	mVpp
Input voltage sensitivity	V _{in}	200	-	800	mVpp
PLL response time	t _{PLL}	-	-	70	ns

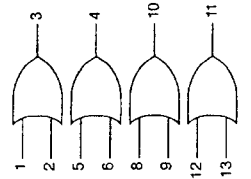
12) MC14024BF (XA0295)
7-Stage Binary Counter



Truth Table

Clock	Clear	Output State
Don't care	H	All Output="L"
	L	No Change
	L	Advance to next stage

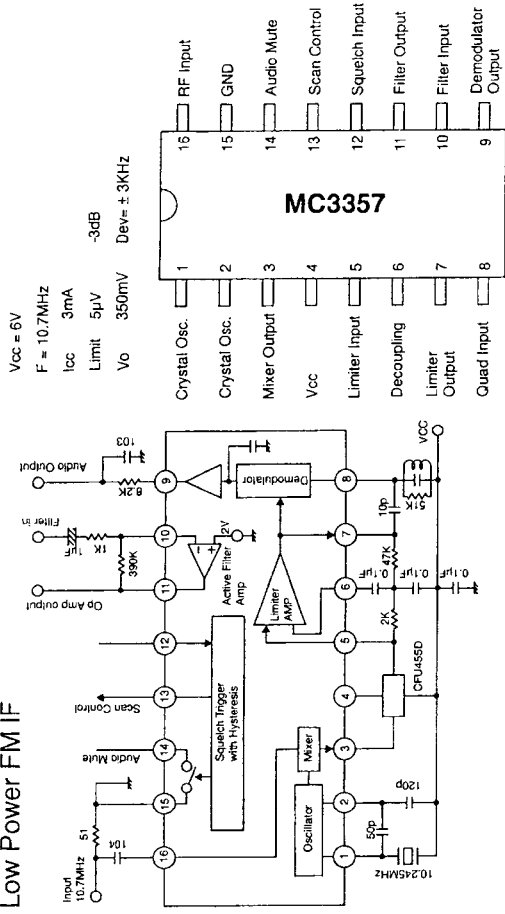
13) MC14071BF (XA0296)
Quad 2-Input OR Gate



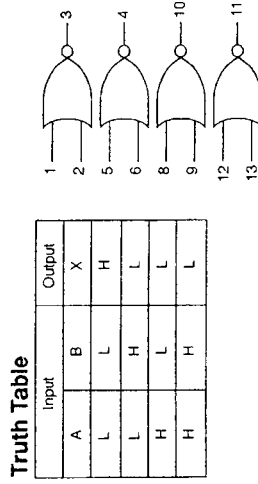
Truth Table

Input	Output
A B	X
L L	L
L H	H
H L	H
H H	H

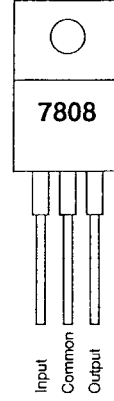
14) MC3357 (XA0063)
Low Power FM IF



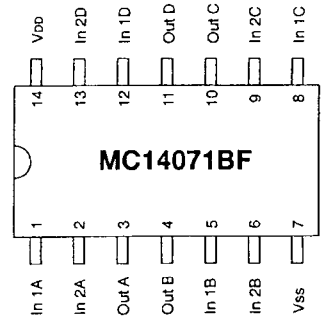
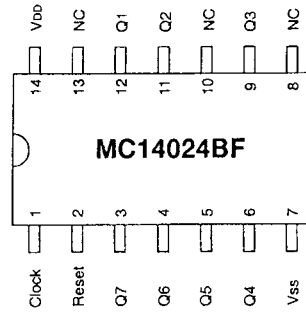
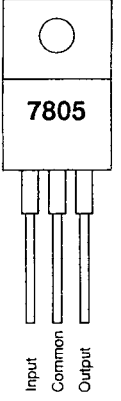
15) MC4001BF (XA0299)
Quad 2-Input NOR Gate



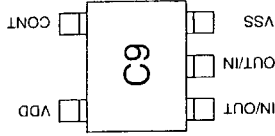
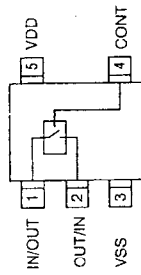
16) MC7808CT (XA0082)
8V Voltage Regulator



17) MCT7805 (XA0346)
5V Voltage Regulator



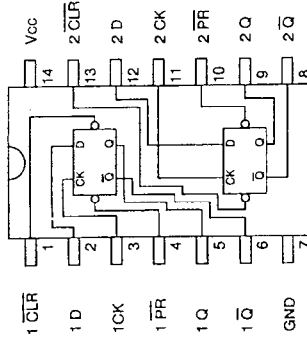
23) TC4S66F (XA0115)
Bilateral Switch



24) TC74AC74F (XA0305)
Dual D-Type Flip Flop

X=Don't Care

INPUTS		OUTPUTS		FUNCTION
CLR	D	Q	Q̄	
L	H	X	L	CLEAR
H	L	X	H	PRESET
L	L	X	H	-
H	H	L	L	-
H	H	H	L	-
H	H	X	Qn	NO CHARGE

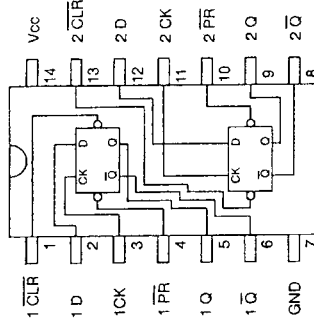


26) TC74HC74AP/AF (XA0459)
Dual D-Type Flip Flop with Preset and Clear

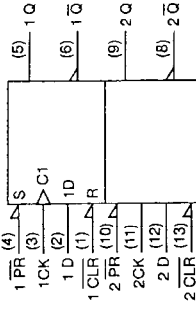
Truth Table

X=Don't Care

INPUTS		OUTPUTS		FUNCTION
CLR	D	Q	Q̄	
L	H	X	L	CLEAR
H	L	X	H	PRESET
L	L	X	H	-
H	H	L	L	-
H	H	H	L	-
H	H	X	Qn	NO CHARGE



LOGIC

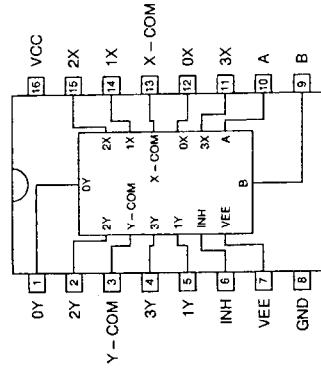


25) TC74HC4052AF (XA0538)
Analog Multiplexer/Demultiplexer

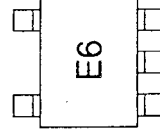
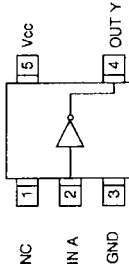
Truth Table

INHIBIT	A	B	"ON" CHANNEL
L	L	L	X0 Y0
L	H	L	X1 Y1
L	L	H	X2 Y2
L	H	H	X3 Y3
H	X	X	NONE

X: Don't Care

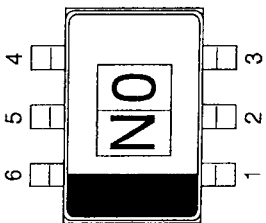


27) TC7SU04FU (XA0523)
High Speed CMOS Inverter

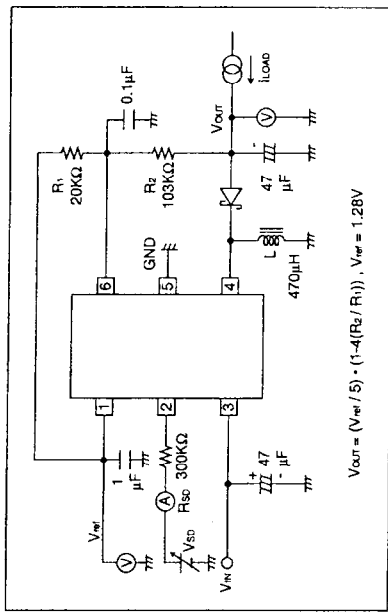


28) TK11830M (XA0458)

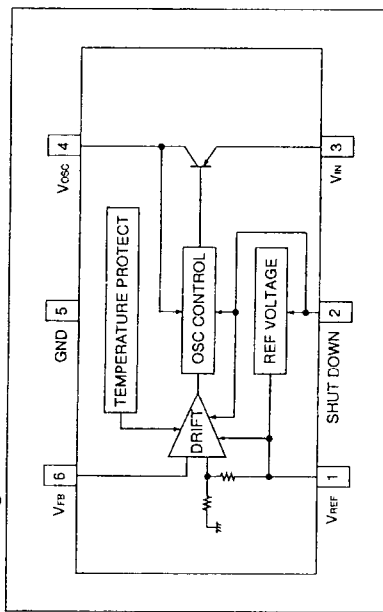
Regulator



Test Circuit



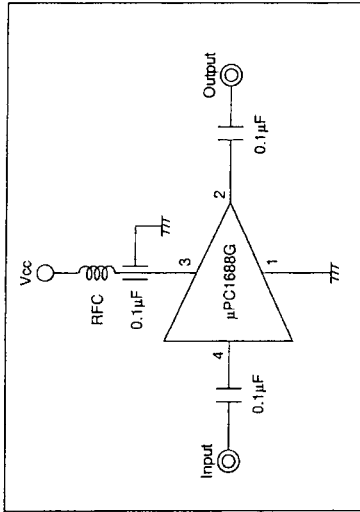
Block Diagram



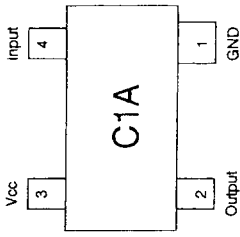
29) μPC1688G (XA0454)

Wide Band RF Amplifier for General Use

Test Circuit



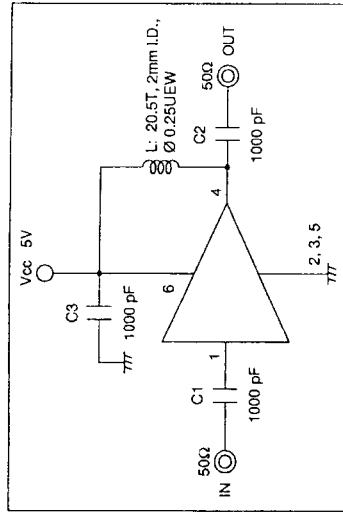
Parameter	Symbol	Condition	Ratings	Unit
Idle current	Icc	no signal	19	mA
Power gain	Gp	f=500MHz	21	dB
Noise figure	NF	f=500MHz	4.0	dB
Upper frequency	fu	3dB down	1.1	GHz
Isolation	ISL	f=500MHz	27	dB
Max. power	Po	f=0.5GHz Pin=5dBm	4	dBm



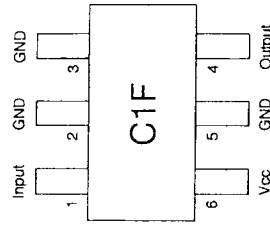
30) μPC2710T (XA0449)

1GHz Middle Power Wide Band RF Amplifier

Test Circuit

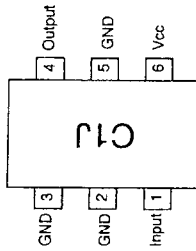
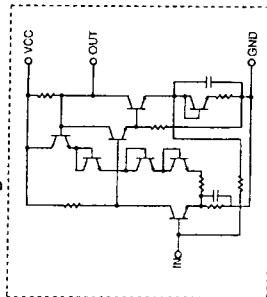


Parameter	Symbol	Condition	Ratings	Unit
Idle current	Icc	no signal	22	mA
Power gain	Gp	f=500MHz	33	dB
Max. output power	Po (sat)	f=500MHz Pin=8dBm	+13.5	dBm
Noise figure	NF	f=500MHz	3.5	dB
Upper frequency	fu	3dB down	1.0	GHz
Isolation	ISL	f=500MHz	39	dB
Gain flatness	Δ Gp	f=0.1-0.6GHz	±0.8	dB



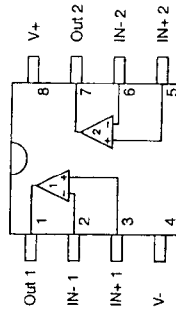
31) μ PC2713T (XA0493)
1.2GHz High Gain Wide Band RF Amplifier

Block Diagram



Parameter	Symbol	Condition	Ratings	Unit
Max. supply voltage	Vcc		6	V
Power dissipation	Ptot		200	mW
Idle current	Icc	no signal	19	mA
Power gain	GP	f=500MHz	22	dB
Noise figure	NF	f=500MHz	4.5	dB
Upper frequency	fu	3dB down	1200	MHz
Isolation	ISL	f=500MHz	28	dB
Input return loss	RLin	f=500MHz	12	dB
Output return loss	RLout	f=500MHz	9	dB
Max. output power	Po	f=500MHz	5.5	dBm

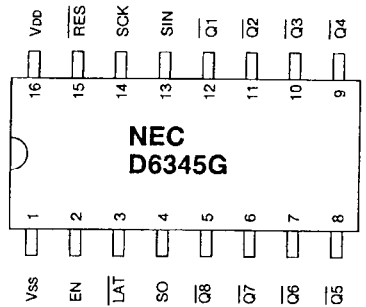
32) μ PC4572G2 (XA0456)
Operational Amplifiers



33) μ PD6345GS (XA0114)

8bit Serial in Parallel Out Driver

No.	Pin Name	Description
1	GND	GND terminal
2	EN	Enable terminal
3	LAT	Latch terminal
4	SO	Serial data output terminal
5-12	O ₀ -O ₇	Data output terminal
13	SIN	Serial data input terminal
14	SCK	Serial clock input terminal
15	RES	Reset input terminal
16	VDD	Power supply terminal

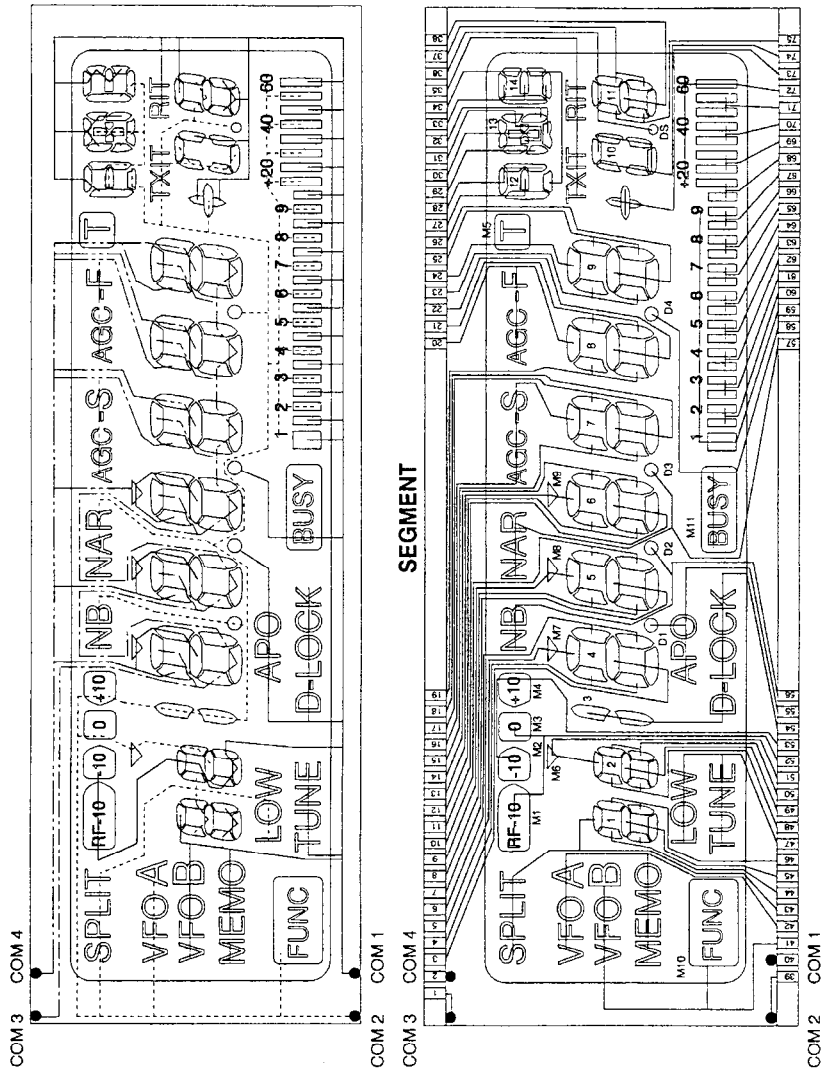


34) Transistor, Diode and LED Outline Drawings

Top View

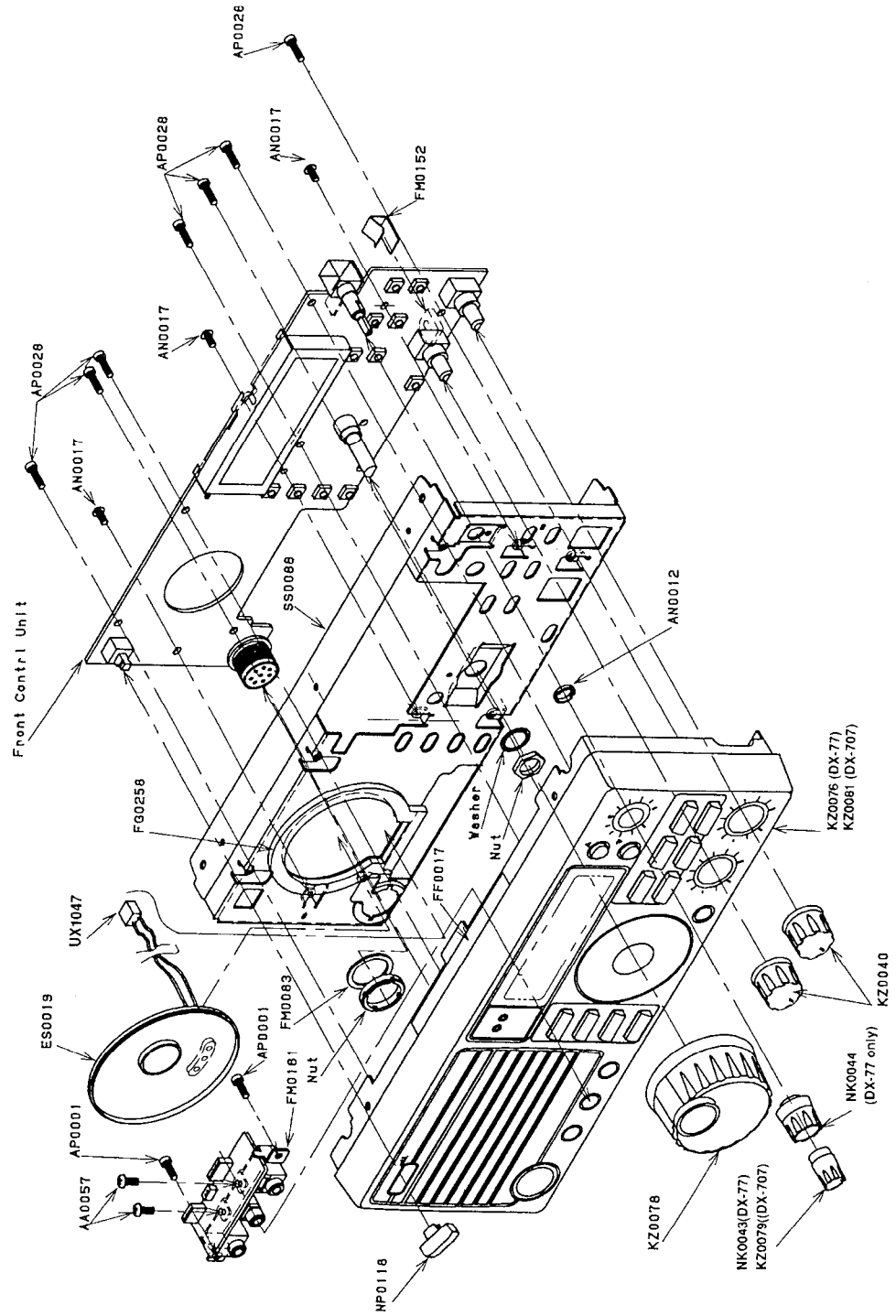
1SS351 XD0305	1SS356 XD0272	DA204U XD0130	DAN202U XD0230	DAN235U XD0246	DAP202U XD0231	DAP236U XD0266
DT25.6C XD0140	MA97.B XD0263	MA704WA XD0127	MA716 XD0118	MA728TX XD0234	CL-170G XL0042	CL-170F XL0043
2SA1576 XT0094	2SB1132 XT0061	2SC1971 XT0101	2SC3133 XT0134	2SC3082 XT0059	2SC3419Y XT0127	2SC4081 XT0095
2SC4081LNT XT0111	2SD1664 XT0136	2SK210 XE0006	2SK2171 XE0026	3SK131V12 XE0028		
LS B E	YG D G	KM S G D	DTA144EU XU0125	DTA144EU XU0125	DTC144EU XU0148	FMA4 XT0067
DTA114YU XU0112	DTA123EU XU0116	DTA144EU XU0131	DTC114YU XU0029	DTC123JKA XU0025	DTC144EU XU0148	
54 B E	12 B E	24 B E	64 B E	E42 B E	26 B E	
UMA9TR XU0049	UMC3TR XU0047	UN511F XU0051	UN5211 XU0061	UN5211L XU0078		
BE E BI C2 C1	E2 B1 E1 C3 C2 C1B2	9C B E	8A B E	8Q B E		

35) LCD Connection

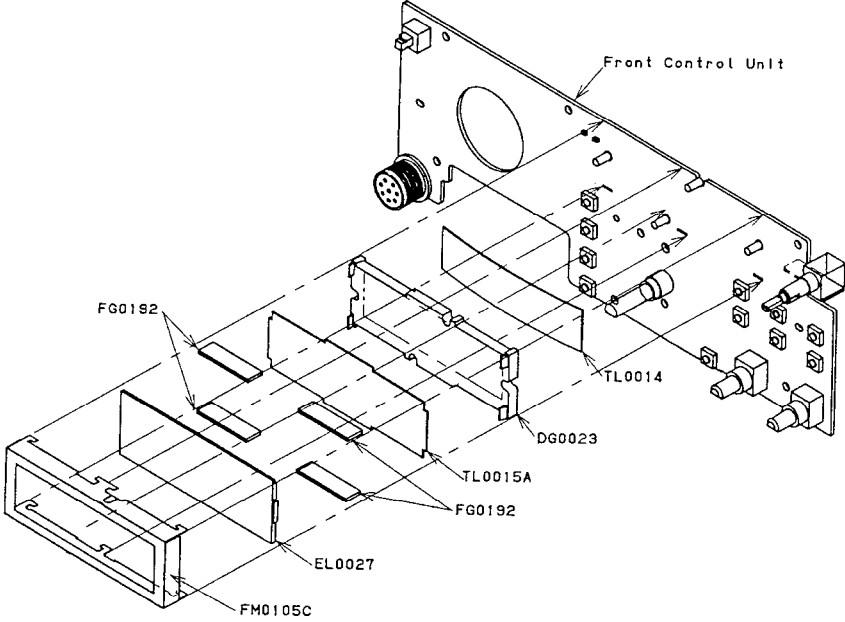


EXPLODED VIEW

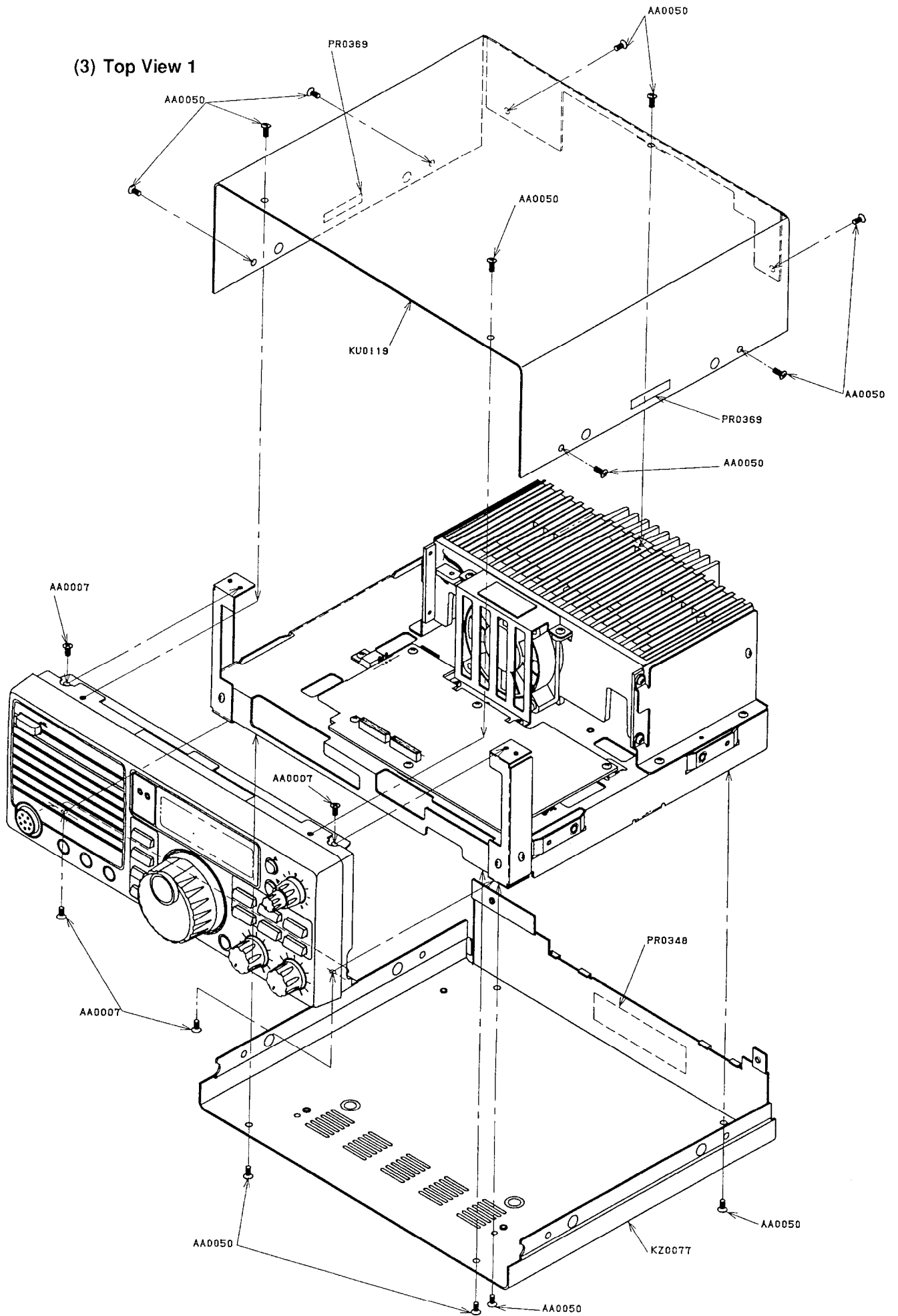
(1) Front Control Unit



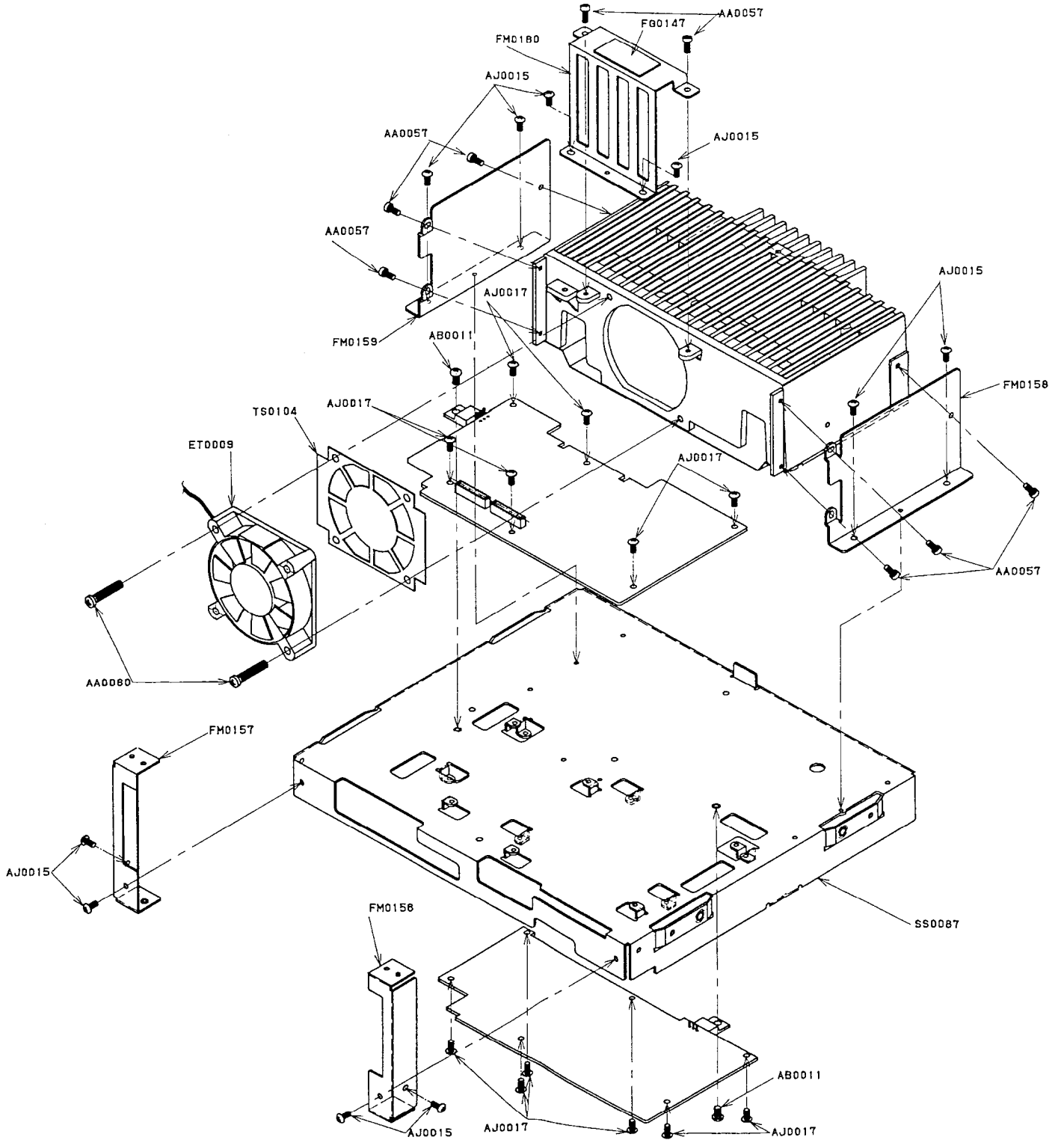
(2) LCD Unit



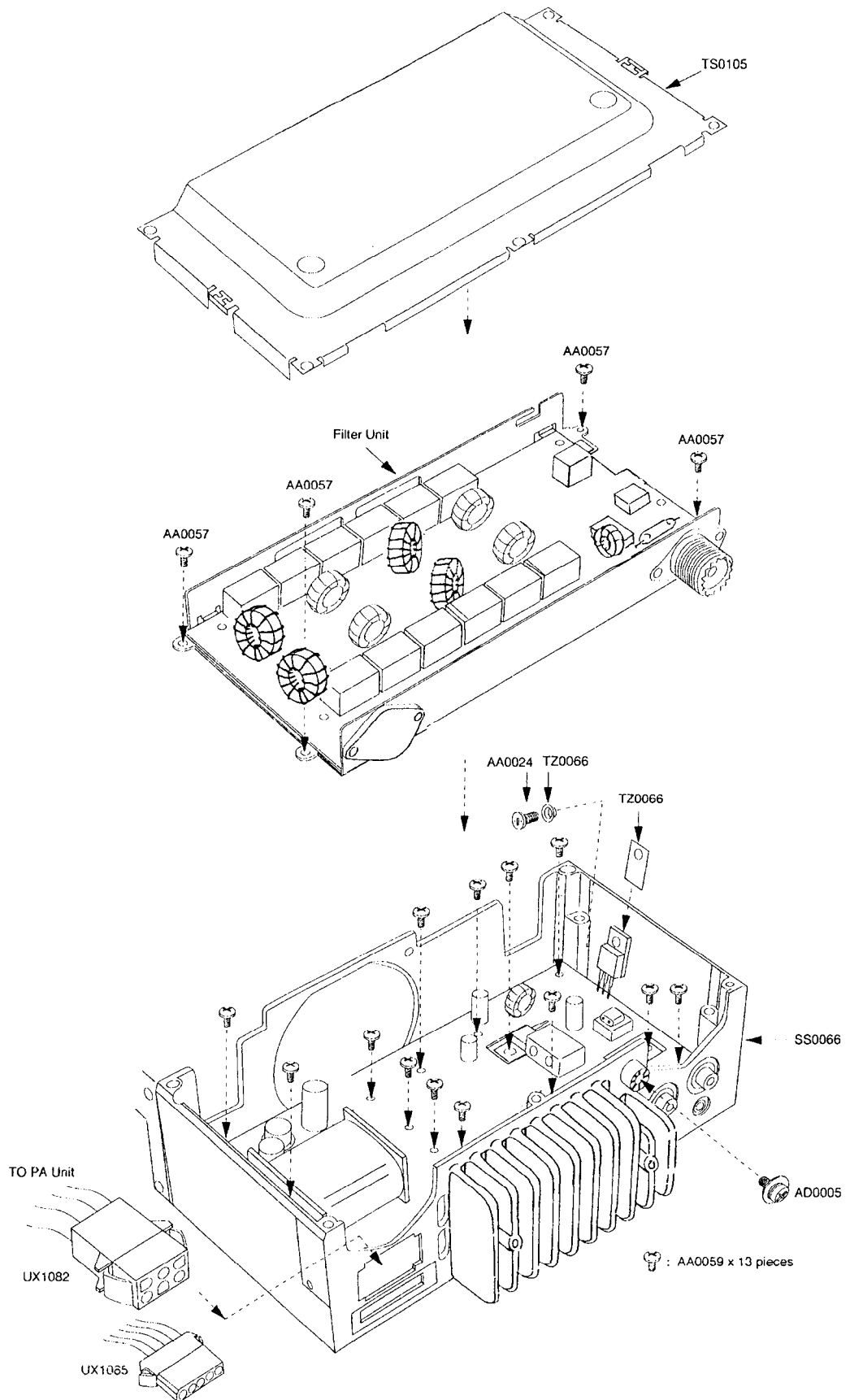
(3) Top View 1



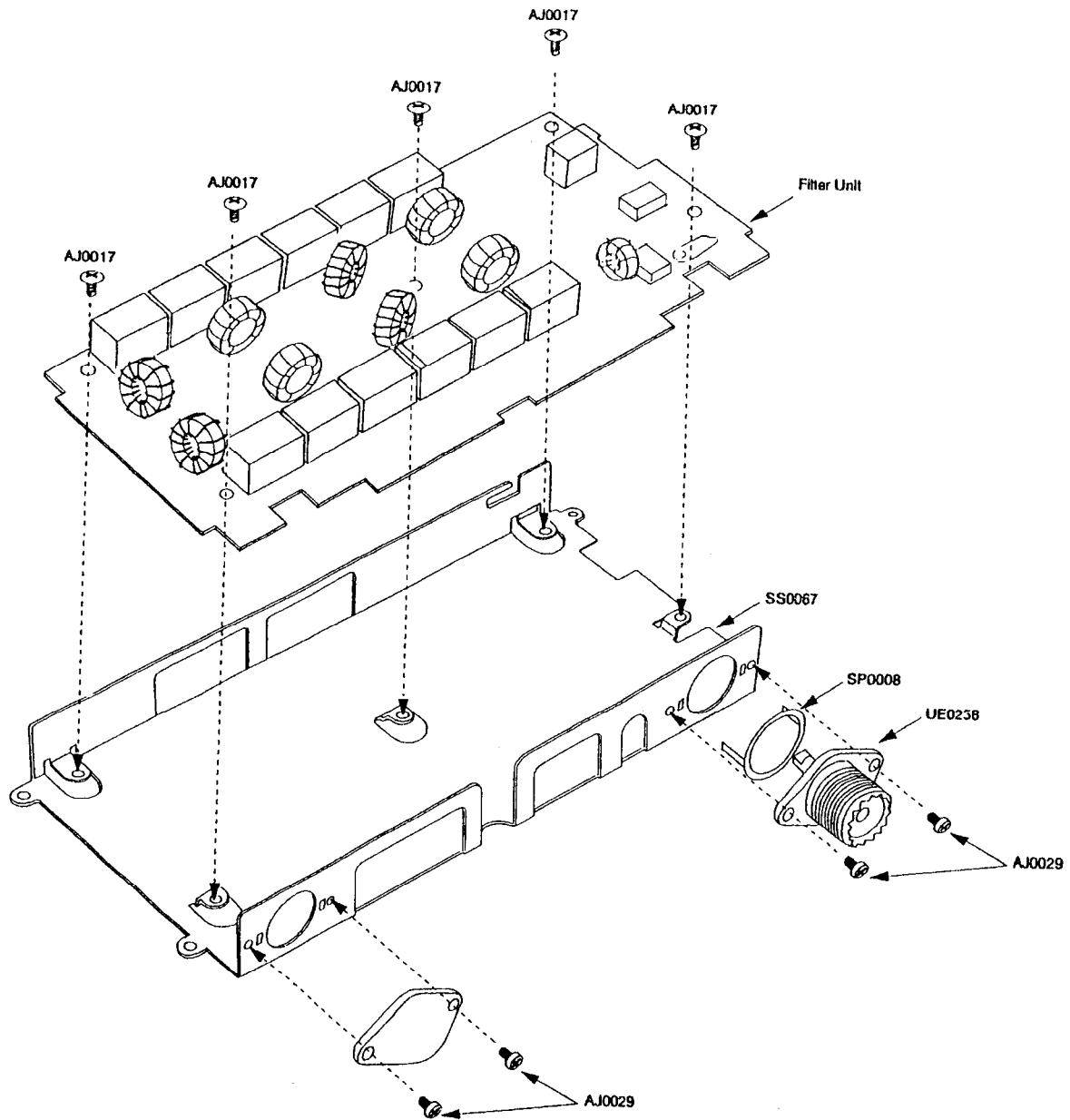
(4) Top View 2



(5) PA Unit and LPF Unit



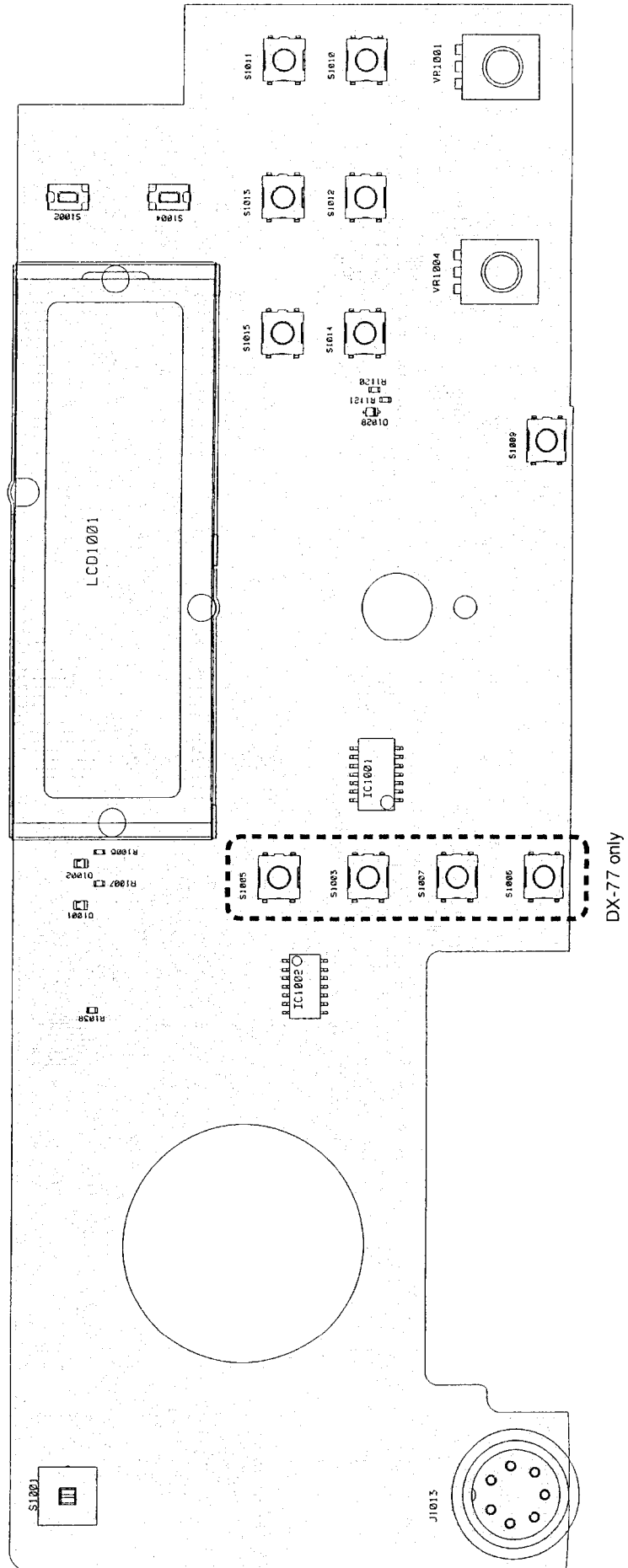
(6) LPF Unit



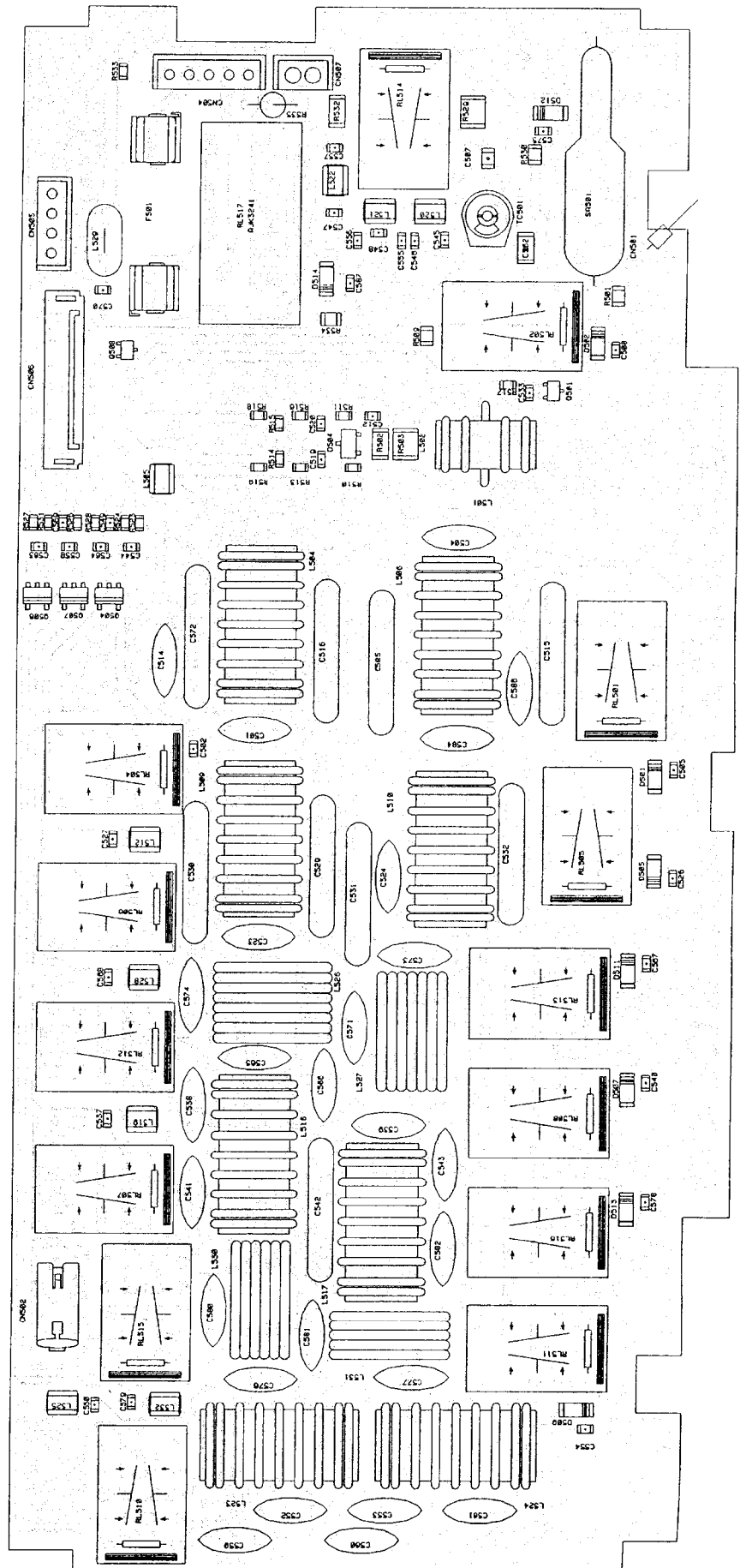
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COMPONENT LOCATOR

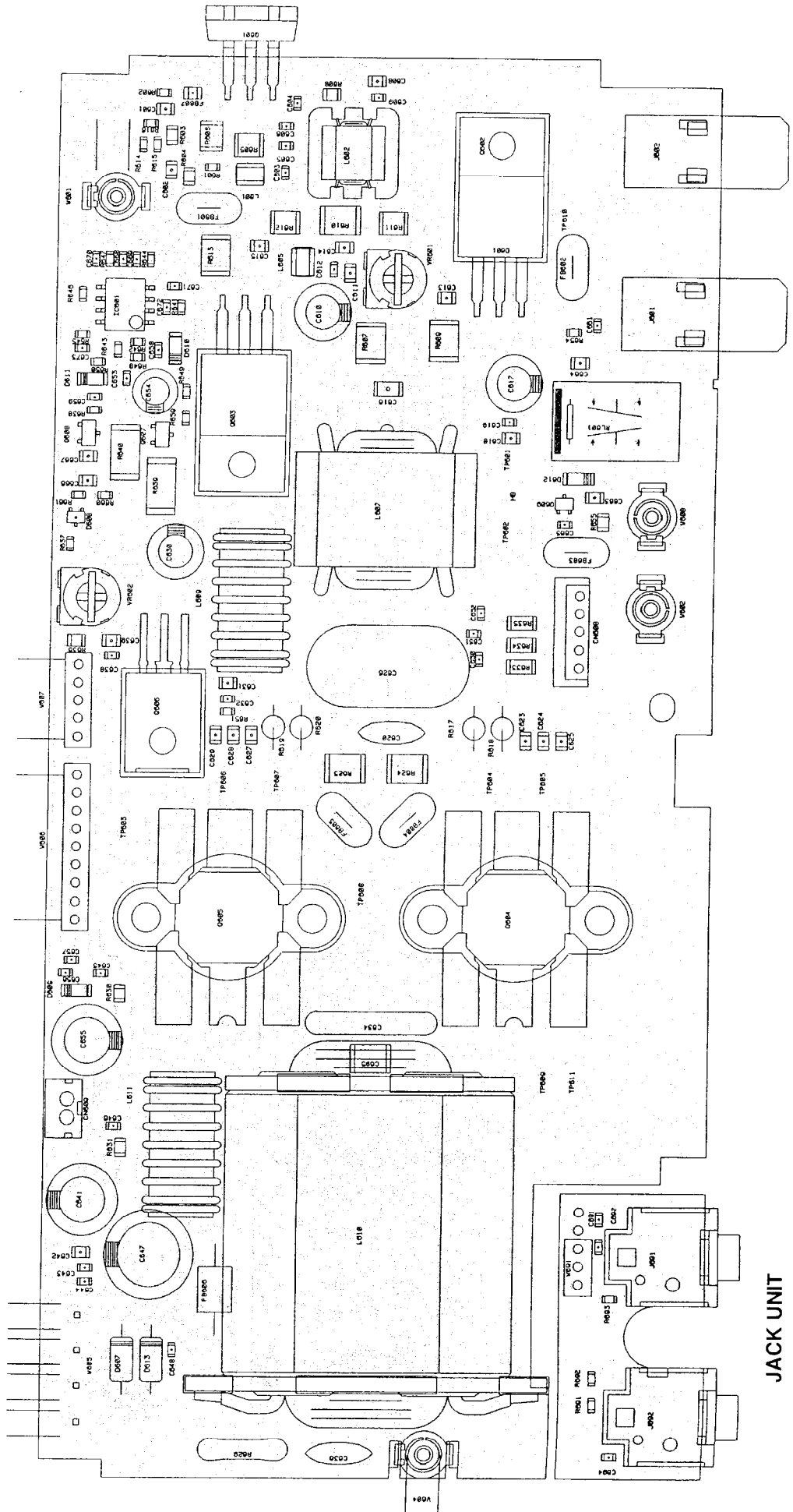
(1) FRONT UNIT sideA



(2) FILTER UNIT

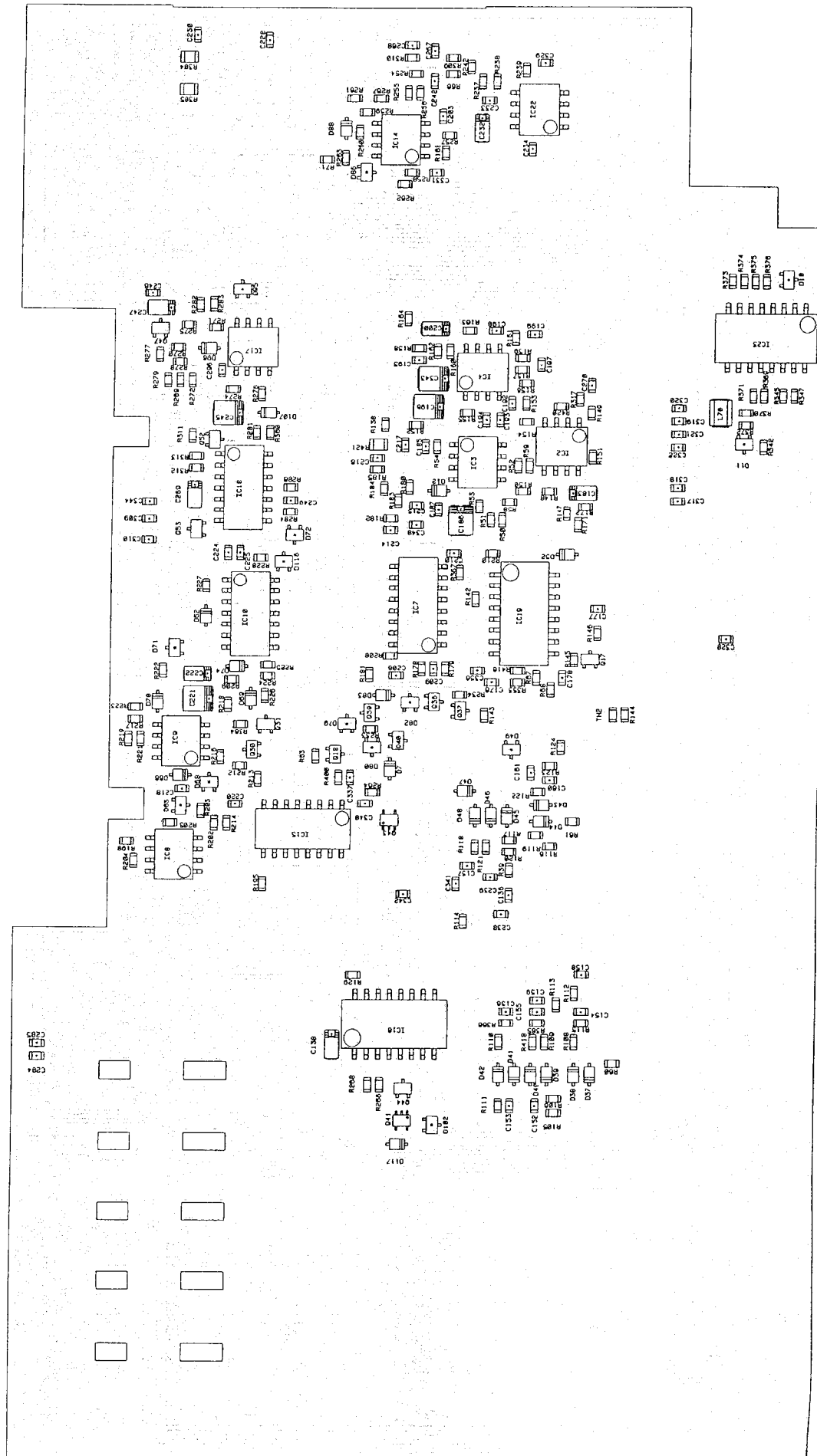


(3) PA UNIT

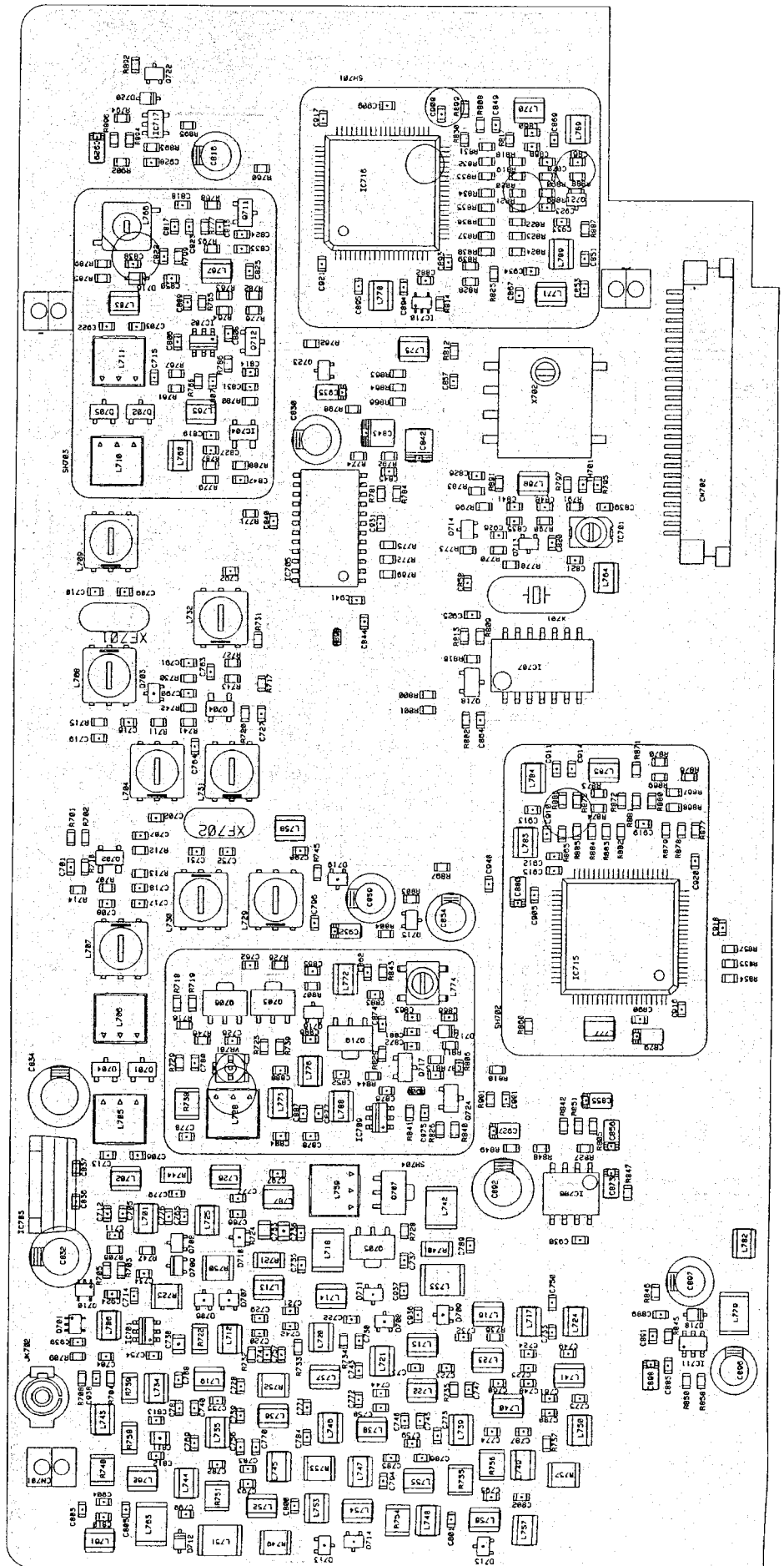


JACK UNIT

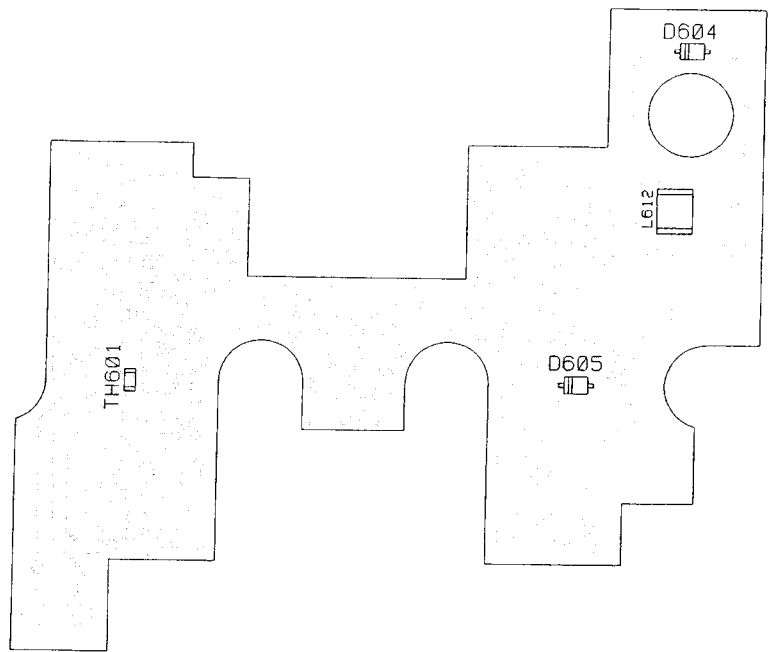
MAIN UNIT sideB



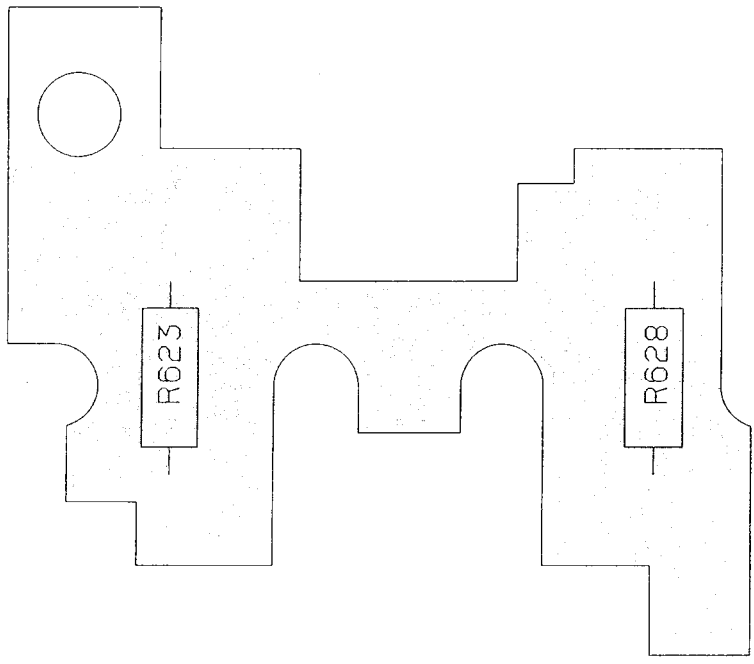
(5) PLL UNIT



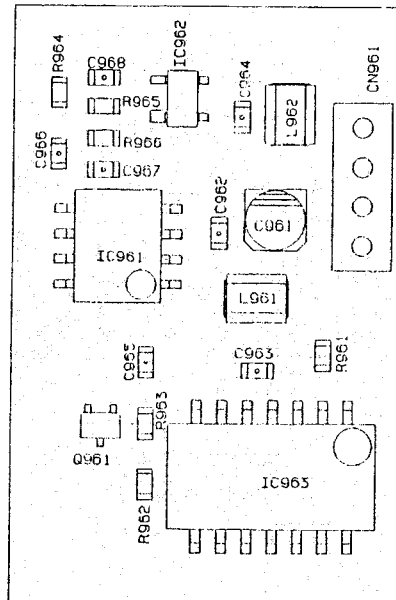
(6) NFB UNIT side A



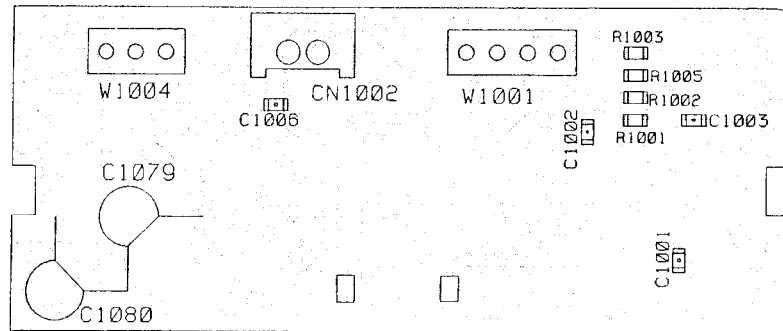
NFB UNIT side B



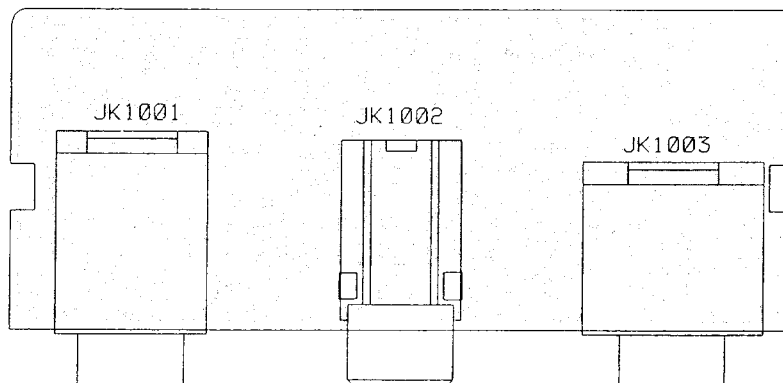
(7) DIVIDER UNIT



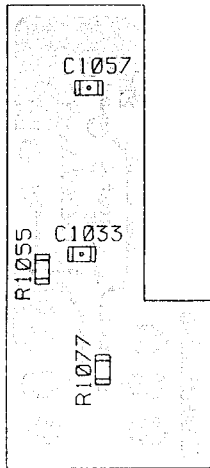
(8) SP JACK UNIT side A



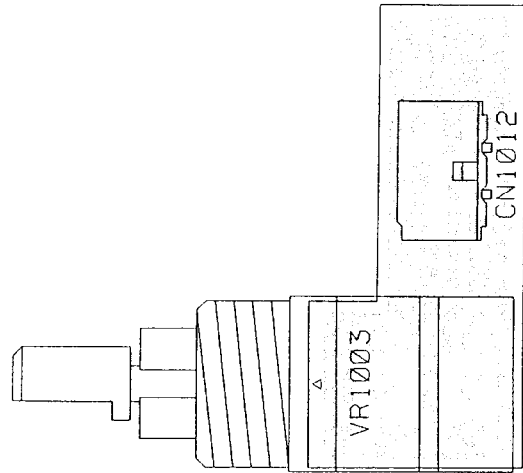
SP JACK UNIT side B



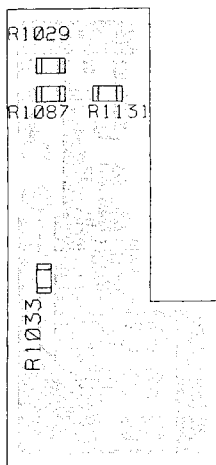
(9) RIT UNIT side A
(DX-77)



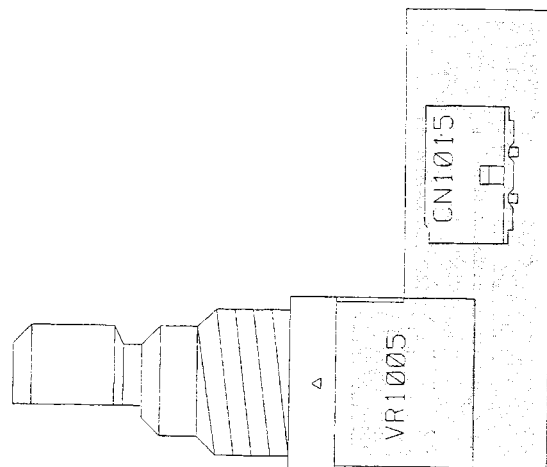
RIT UNIT side B
(DX-77)



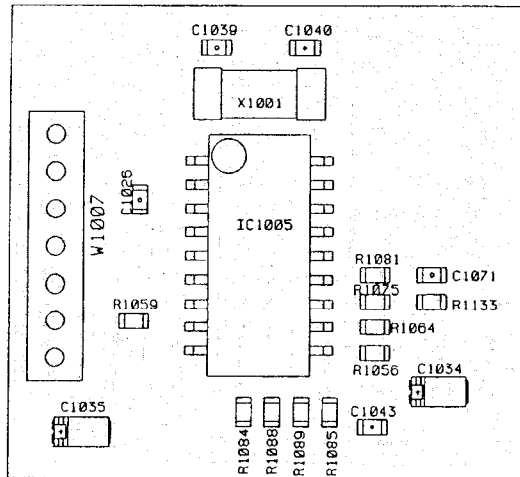
(10) RIT UNIT side A
(DX-707)



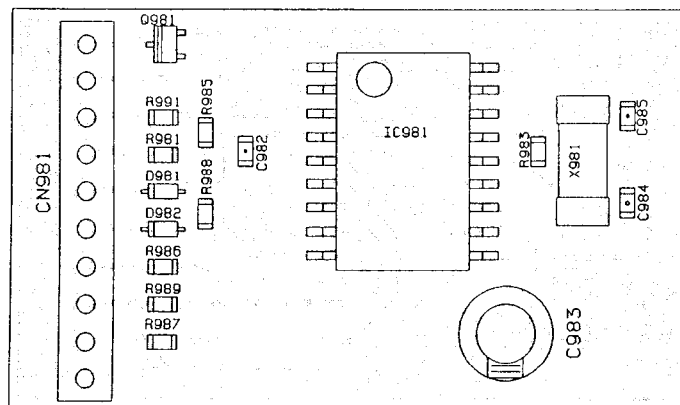
RIT UNIT side B
(DX-707)



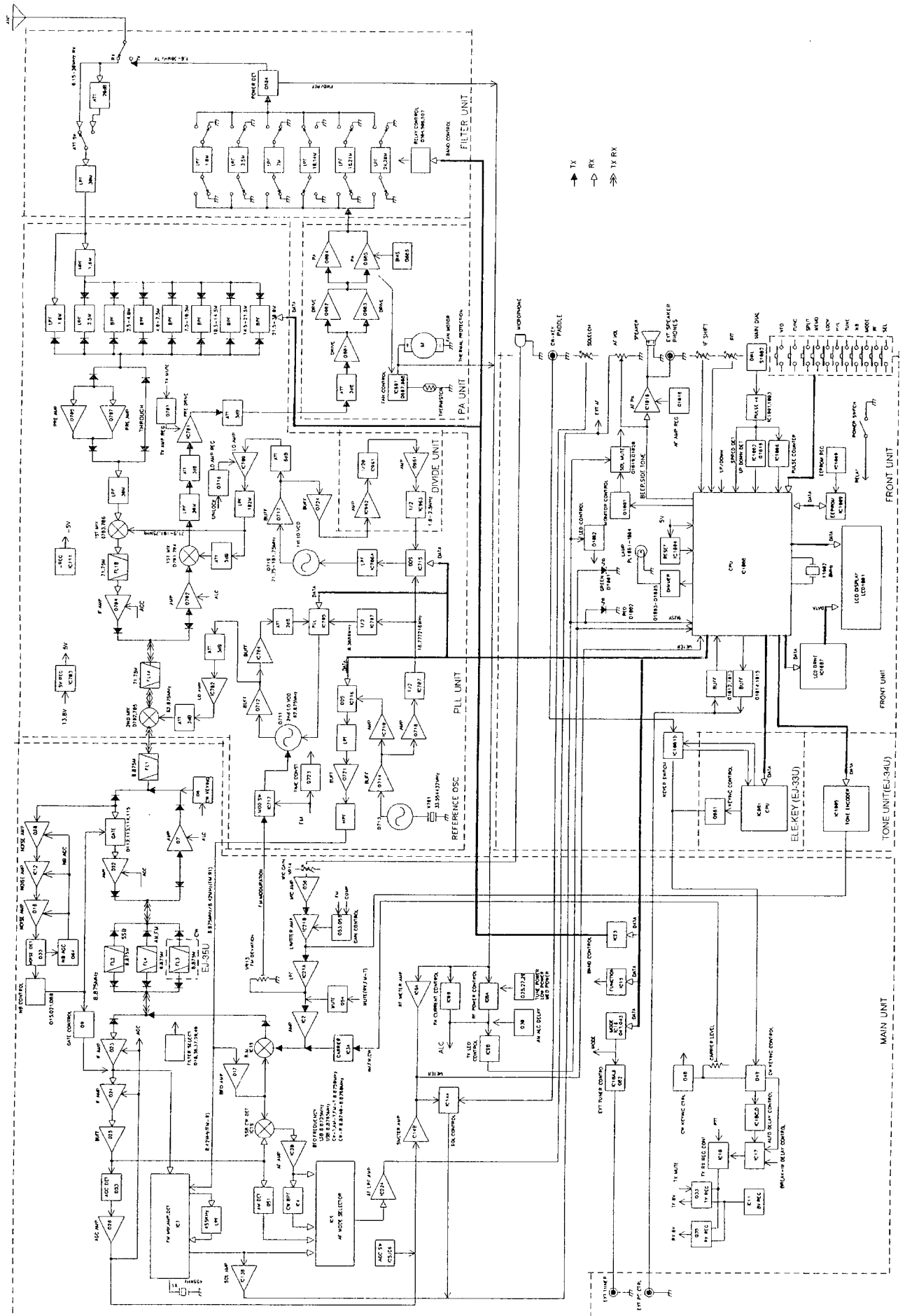
(11) TONE UNIT EJ-34U



(12) ELKEY UNIT EJ-33U

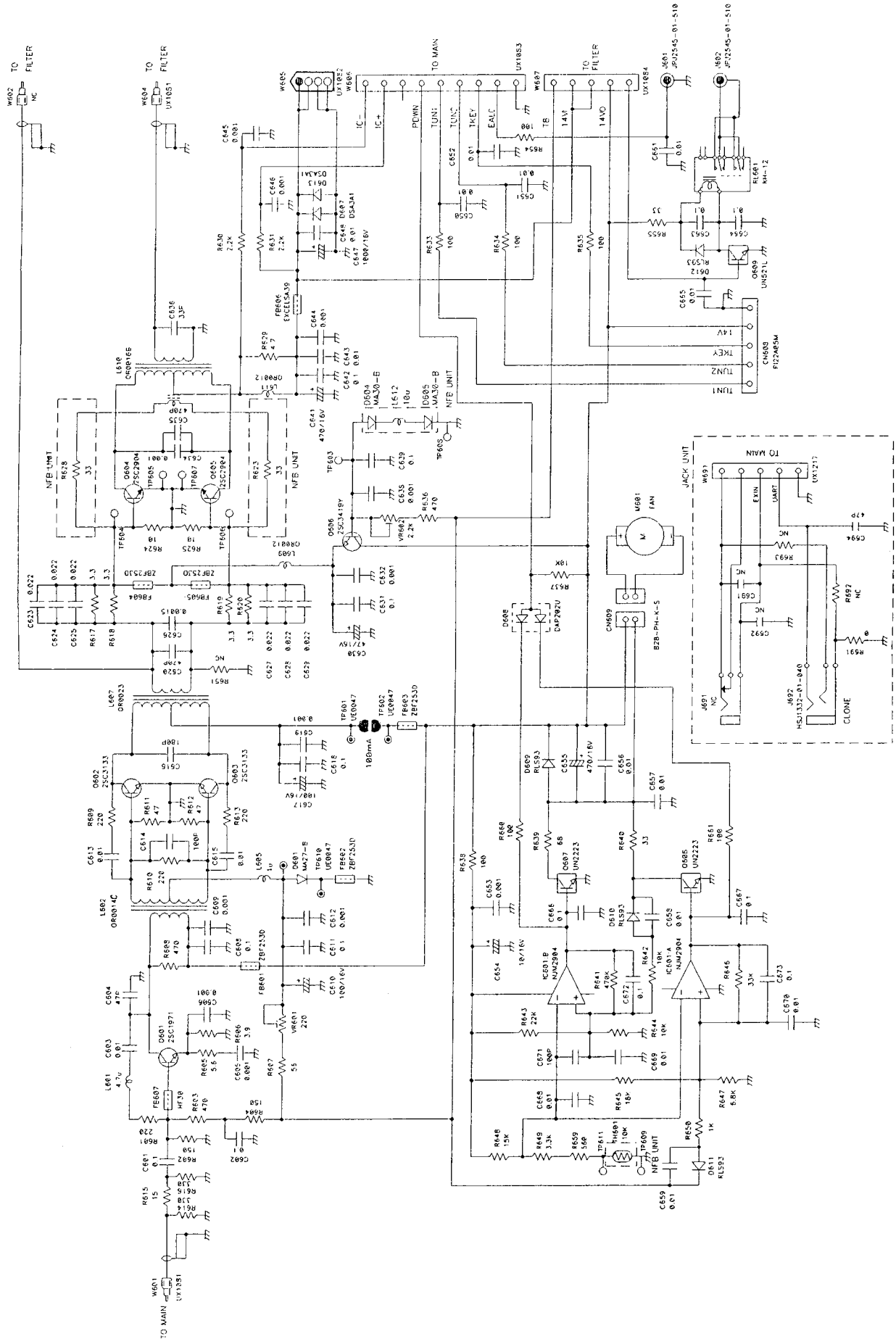


BLOCK DIAGRAM

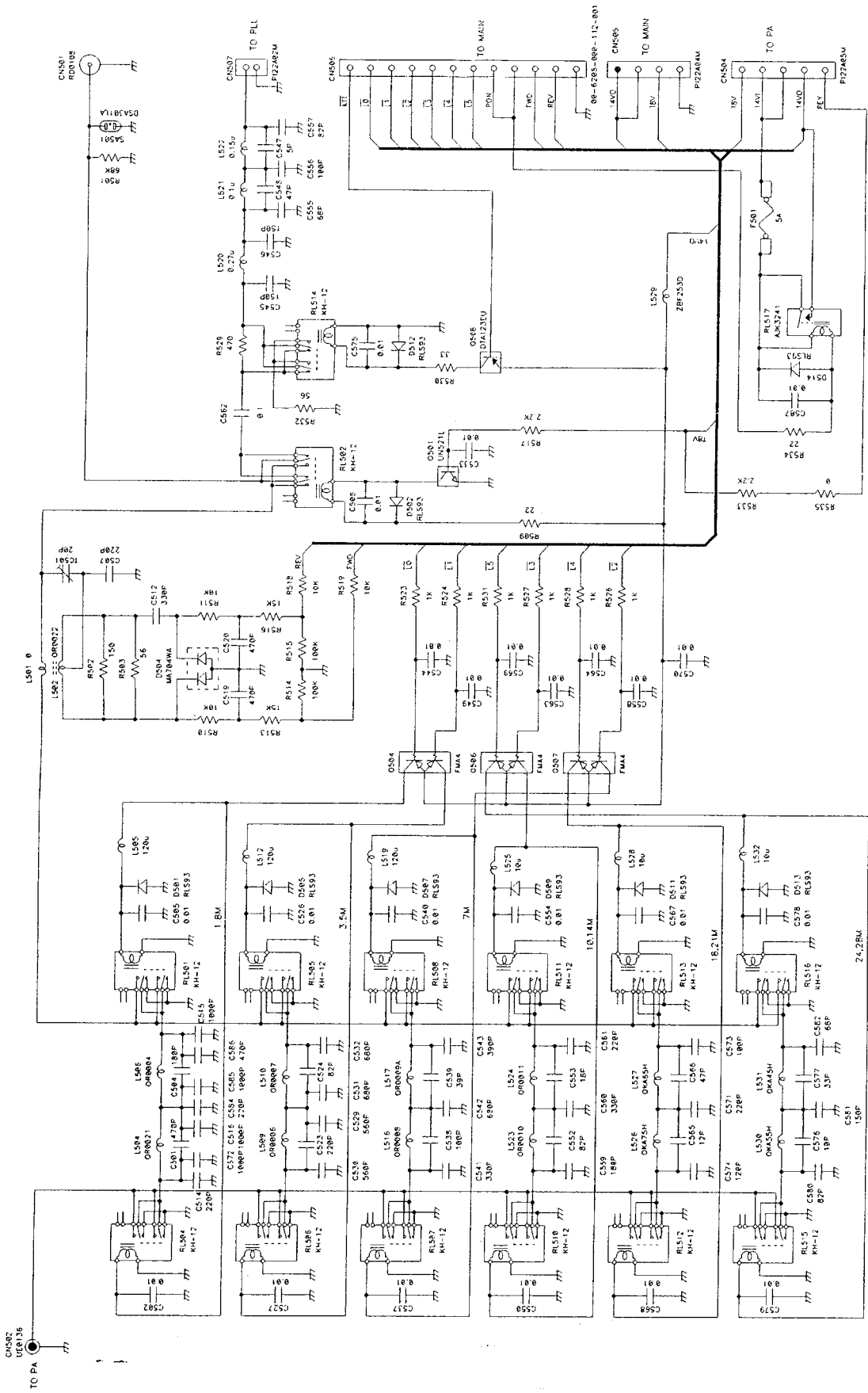


SCHEMATIC DIAGRAM

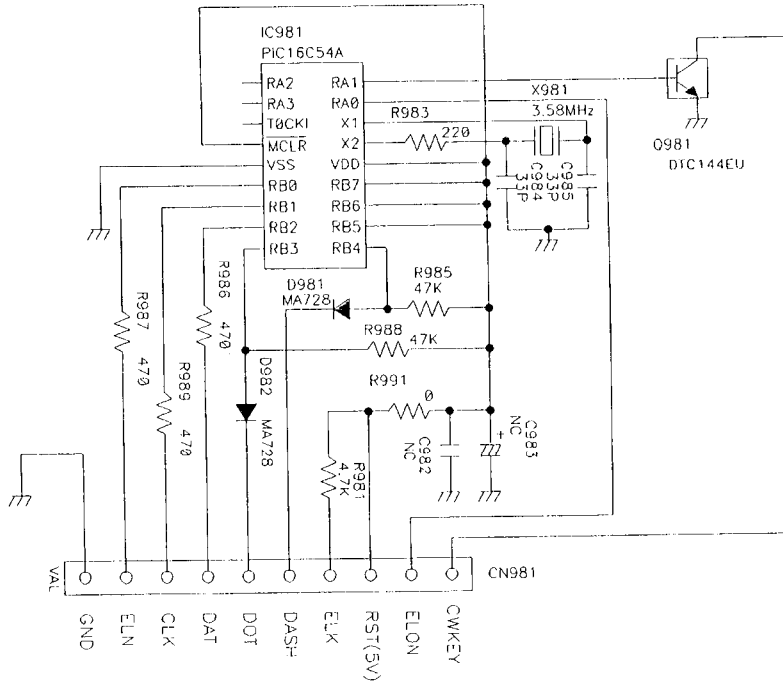
PA UNIT



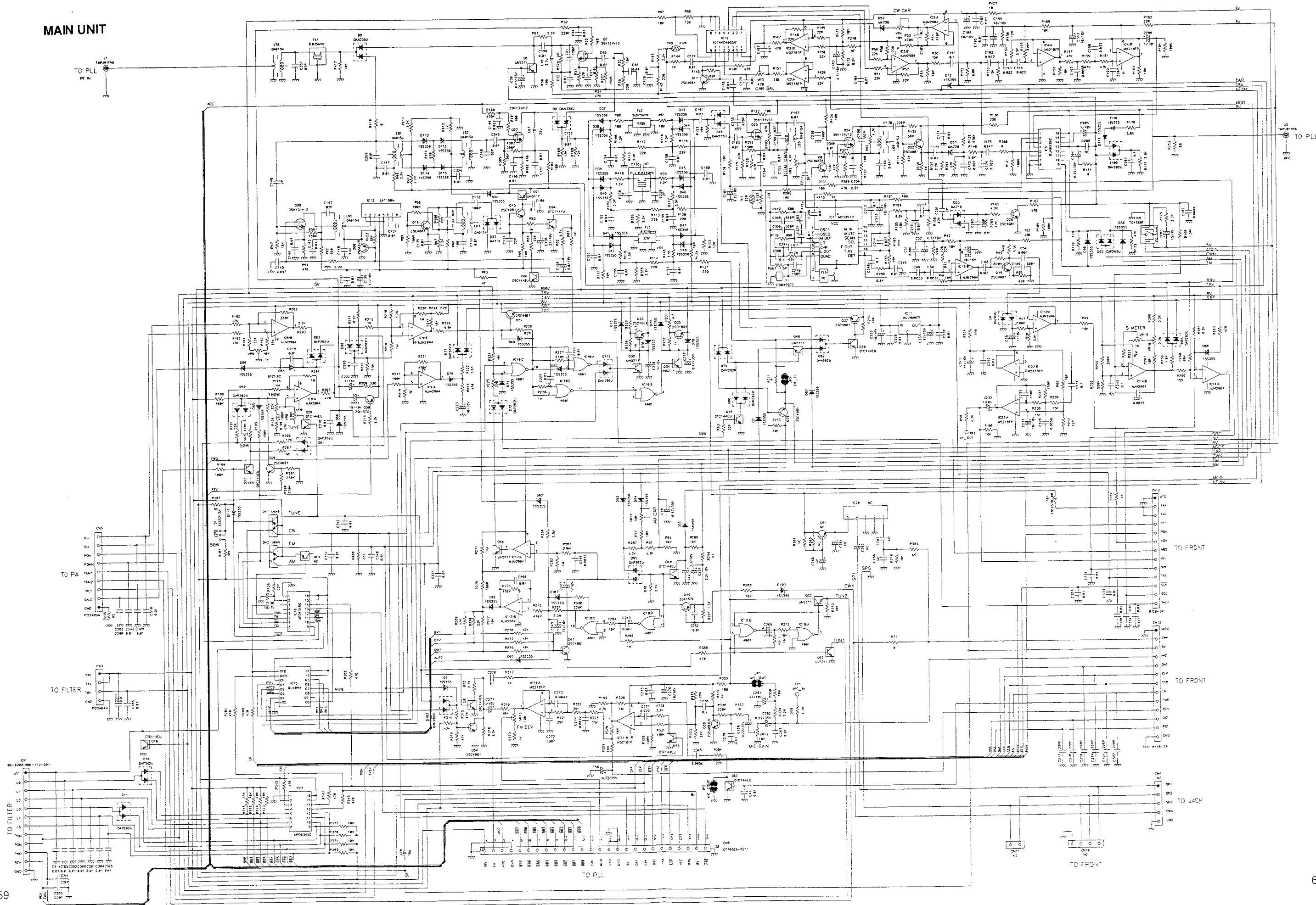
FILTER UNIT



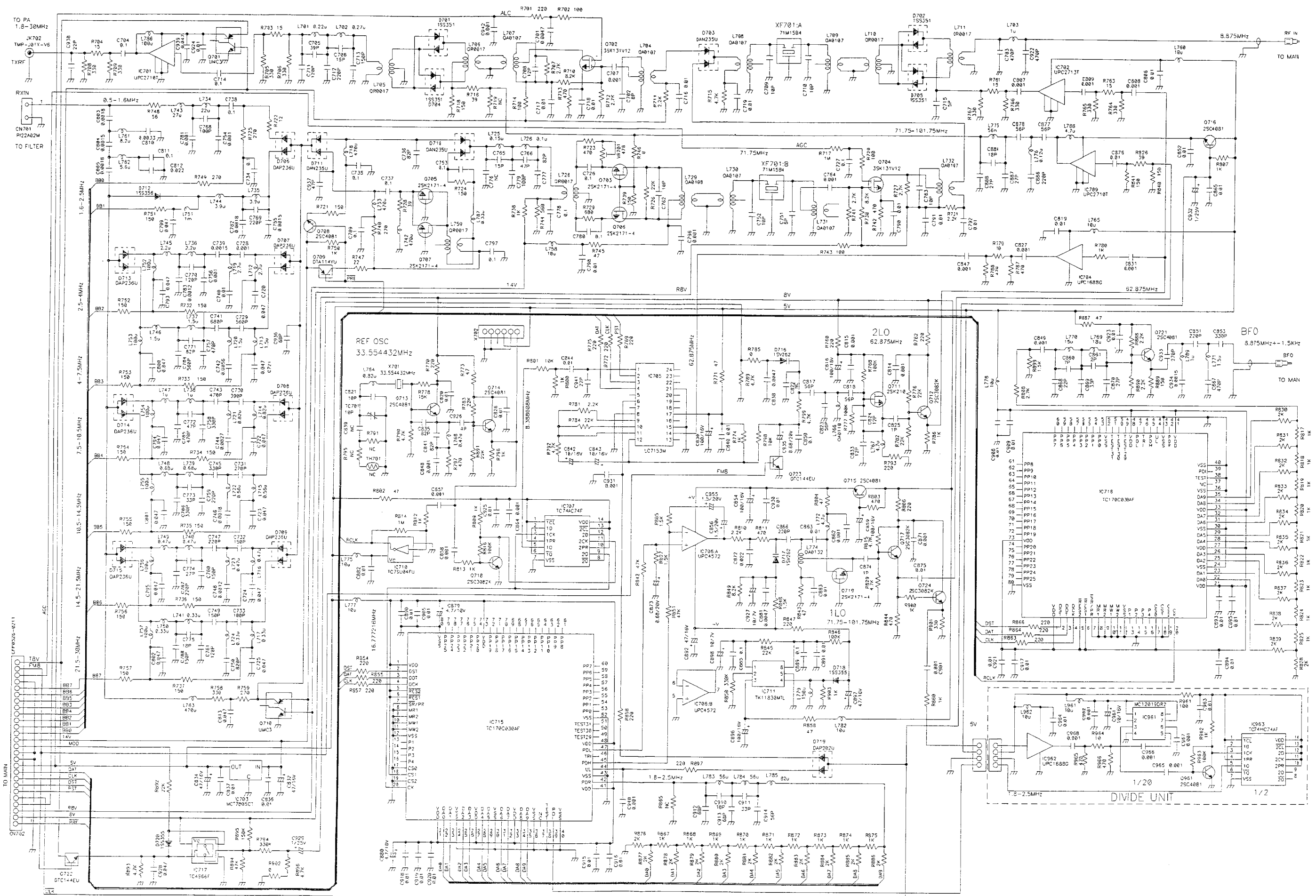
ELKEY UNIT EJ-33U



MAIN UNIT



PLL UNIT



TONE UNIT EJ-34U

