

KENWOOD

SERVICE MANUAL

TS-711A/E, TS-811A/B/E

AC-10,
CD-10,
TU-5, VS-1

144MHz/430MHz ALL MODE TRANSCEIVER



Photo is TS-711A.

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TS-711/811

CIRCUIT DESCRIPTION

MODEL UNIT	TS-711A (K,M1,M2,X)	TS-711E (T,W)	TS-811A (K)	TS-811B (M,X) TS-811E (T,W)
SWITCH UNIT	X41-1580-11	X41-1580-61	X41-1580-01	X41-1580-01 (M,X) X41-1580-62 (T,W)
AVR UNIT	X43-1490-11	X43-1490-11	X43-1490-11	X43-1490-11
RF UNIT	X44-1620-11	X44-1620-01	X44-1650-11	X44-1650-01
FINAL UNIT	X45-1380-11	X45-1380-11	X45-1390-11	X45-1390-01 (M,X) X45-1390-61 (T,W)
IF UNIT	X48-1400-11	X48-1400-00	X48-1400-01	X48-1400-01
AF UNIT	X49-1180-00	X49-1180-00	X49-1180-00	X49-1180-00
PLL UNIT	X50-1990-11	X50-1990-00	X50-1990-12	X50-1990-01
HET UNIT	—	—	X50-2010-10	X50-2000-00
TONE UNIT	—	X52-1290-60	—	X52-1290-60 (T,W)
CONTROL UNIT	X53-1410-11 (K,M1) X53-1410-21 (M2,X)	X53-1410-51 (T) X53-1410-61 (W)	X53-1410-12 (K)	X53-1410-22 (M,X) X53-1410-52 (T) X53-1410-62 (W)
DISPLAY UNIT	X54-1820-11	X54-1820-11	X54-1820-11	X54-1820-11

Table 1 TS-711A/E, TS-811A/B/E PC Board chart

TS-711A/E

Destination	Frequency (MHz)	VFO step (kHz)	TX OFFSET DISPLAY	Repeater shift (kHz)	Tone circuit
K,M1,M2	144.000~147.995	5	— S +	±600	Option
T	144.000~145.995	12.5	— S +	±600	1750Hz Tone Burst
W	144.000~145.995	12.5	— S +	±600	1750Hz Tone
X	144.000~147.995	5	— S +	±600	Option

TS-811A/B/E

Destination	Frequency (MHz)	VFO step (kHz)	TX OFFSET DISPLAY	Repeater shift (kHz)	Tone circuit
K	430.000~450.000	25	— S +	±5	Option
M,X	430.000~440.000	25	— S +	±5	1750Hz Tone Burst
T	430.000~440.000	12.5	— S +	±1.6	1750Hz Tone
W	430.000~440.000	12.5	— S +	+7.6 -1.6	Option

Table 2 Frequency configuration of destination

MODE	STEP CH.0	K,M1,M2		T,W
		OFF	ON	
FM	OFF	10Hz	5kHz	12.5kHz
	ON	100Hz	5kHz	5kHz
SSB	OFF	10Hz	5kHz	5kHz
	ON	100Hz	1kHz	1kHz
CW	OFF	10Hz	5kHz	5kHz
	ON	100Hz	1kHz	1kHz

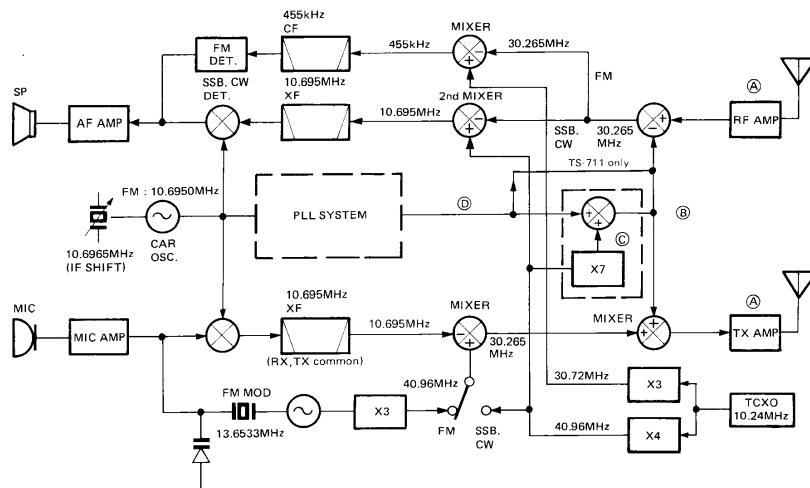
Table 3 Frequency step function's chart

TS-711/TS-811 FREQUENCY CONFIGURATION

Fig. 1 represents the frequency configuration. Reception uses a double conversion superheterodyne system, in which the second IF (Intermediate Frequency) differs according to the mode. Here, the signal from the antenna is mixed with the PLL (Phase Locked Loop) local OSC (Oscillator) signal in the first mixer common to the respective modes and is then converted to the first IF at 30.265MHz. At this point, the first IF is separated between SSB/CW and FM modes. In SSB/CW, it is mixed with a 40.96MHz local OSC signal (4 times the TCXO frequency) in the second mixer (Q34) and is converted to the second IF at 10.695MHz. Then, this IF is product detected with a 10.695MHz carrier. In the FM mode, it is mixed

with the 30.72MHz local OSC signal (3 times the TCXO frequency) in the second mixer (Q36) and is converted to the second IF at 455kHz. Then, this IF is detected. In SSB/CW transmission, the SSB/CW signal at 10.695MHz is mixed with the 40.96MHz local OSC signal (4 times the TCXO frequency) in the balanced mixer (Q6/Q7) and is converted to a 30.265MHz signal. It is then mixed with the 113.735–115.725MHz PLL signal to the transmission frequency. In case TS-811, PLL signal (113.015–123.005 MHz) mixed with the 296.720MHz (A), 286.720MHz (B,E) HET signal to the transmission frequency. In the FM mode, a 13.6533MHz X'tal OSC signal, used in place of the 40.96 MHz local OSC signal, is modulated and multiplied by 3 to a 40.96MHz local OSC signal.

CIRCUIT DESCRIPTION



Model	TS-711 (K,M1,M2,X)	TS-711 (T,W)	TS-811 (K)	TS-811 (M,X) TS-811 (T,W)
(A)	144.000 – 147.995MHz	144.000 – 145.995MHz	430.000 – 449.995MHz	430.000 – 439.995MHz
(B)	113.735 – 117.730MHz	113.735 – 115.730MHz	399.735 – 409.730MHz	399.735 – 419.730MHz
(C)	–	–	296.720MHz	286.720MHz
(D)	113.735 – 117.730MHz	113.735 – 115.730MHz	113.015 – 123.005MHz	113.015 – 123.005MHz

Fig. 1 Frequency-related block diagram

RF UNIT

(X44-1620-XX) : TS-711, (X45-1650-XX) : TS-811

● Reception system

The signal input from the RA terminal enters the RF amplifier (Q1) through the ATT circuit (-20dB) TS-711 only. The RF amplifier uses GaAs FET : 3SK129. The input uses a 2-pole helical and the output a 3-pole helical, thus obtaining the desired bandwidth and skirt attenuation. The input signal is converted in the receiving mixer, Q2 : C-MOS FET : 3SK122 (in the TS-811, GaAs FET : 3SK129), to the first IF at 30.265MHz. Then, the first IF is converted to the RIF level signal through the 2-stage MCF (Monolithic Crystal Filter) and is output to the IF unit.

● Transmission system (TS-711)

The lower IF signal (30.265MHz) from the IF unit is mixed with the HET signal in the FET balanced mixer (Q3, Q4 : 2SK192A(GR)*N) and converted to the transmission frequency. From this transmission signal, any spurious component is eliminated by the 5-stage VCT (Varactor Tuned) circuit in which the PLL unit CV (Correction Voltage) is used.

Further, the transmission signal is amplified up to the drive output level of for the output transceiver 0.3W for the output transceiver in amplifier Q6. This output is fed to the final module.

● Transmission system (TS-811)

The lower IF signal (30.265MHz) from the IF unit is mixed with the HET signal in the Schottky-type DBM (Double Balanced) mixer and is converted to the transmission frequency. From this signal, any spurious component is eliminated by the 2-stage band-pass amplifier with small Hi-Q helical coils. In particular, the second-stage band-pass amplifier has helical coils connected in series, thus providing acute BPF characteristics.

Further, the transmission signal is amplified up to the drive output level of for the output transceiver 0.35W for the output transceiver in amplifier Q4. This output is fed to the final module. VR1 at Q4 controls Q4's idling current. The idling current is set to about 15mA for this stage.

Item	Rating
Nominal center frequency	30.265MHz
Pass bandwidth	± 6.5kHz or more at 3dB
Attenuation bandwidth	± 32kHz or less at 40dB
Ripple	1.5dB or less
Loss	3dB or less
Guaranteed attenuation	60dB or more within ± 1MHz Spurious level : 40dB or more
Input and output impedance	1.4kΩ ± 10%/1pF ± 10%

Table 4 MCF (L71-0248-05)
(RF unit L4 TS-711, L16 TS-811)

TS-711/811

CIRCUIT DESCRIPTION

IF UNIT (X48-1400-XX)

● Reception system

The reception system is generally divided into SSB/CW and FM modes.

1) SSB/CW mode

The RIF signal (30.265MHz) from the RF unit (X44-1620-11 : TS-711, X45-1650-XX : TS-811) is mixed with the 40.96MHz output from Q2 at Q34 : 3SK73(Y) and is converted to the 10.695MHz second IF. Then, this signal is amplified via the noise blanker gate circuit and SSB filter L12 by IF amplifiers Q20–22 : 3SK73(GR) (to which AGC is applied), and is then mixed with the carrier OSC signal by product detector (D10–13 : IN60) to obtain a demodulated audio output.

For AGC, the IF output of Q22 is taken through AGC buffer Q24 : 2SC2458(Y). Q23 controls the AGC voltage. Part of the output of AGC buffer Q24 is connected as the SSB squelch release signal with SSB squelch mixer Q40 : 2SC2668(Y,O) via Q39.

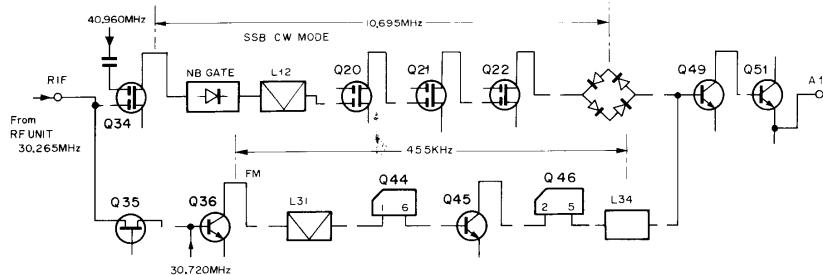
Q25 is the AGC time constant selection circuit. Q26 and Q27 from the S-meter amplifier.

2) FM mode

The RIF is input to mixer Q36 : 2SC2668(Y) via gate-grounded amplifier Q35 : 2SK125. For the local OSC signal, 30.72MHz is obtained by multiplying the PLL 10.24MHz reference by 3-times (Q38). There, the RIF signal is converted to the 455kHz second IF. This output is amplified via ceramic filter L31 in the IF amplifiers, consisting of Q44 : TA7302P, Q45 : 2SC2668(Y) and Q46 : μ PC577H, and is then demodulated by ceramic discriminator L34 : CFY455S.

The demodulated signal is filter separated between the AF pre-amplifier Q49 : 2SC2458(Y) and the squelch noise amplifier Q53 : 2SC2458(Y), Q54 : 2SC3113(B). The "busy" lamp is controlled by the squelch circuit and the center detection circuit Q47 : μ PC4558C. To suppress ignition noise, a "killer" circuit using Q62 is added and is controlled by Q61.

RX SECTION



TX SECTION

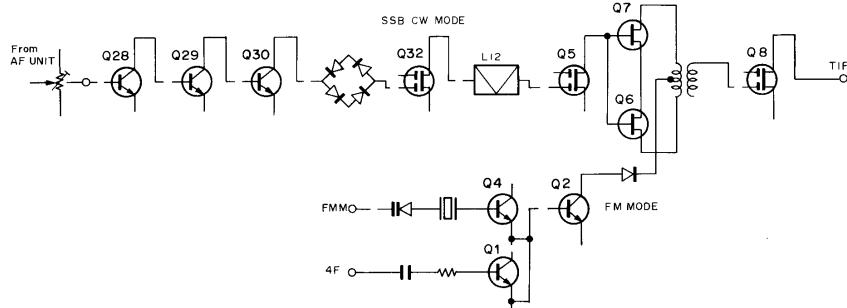


Fig. 2 IF unit block diagram

CIRCUIT DESCRIPTION

3) Noise blanker

Q41 noise amplifier the second IF output, obtained by mixing the 30.265MHz first IF at Q36. It is switched by Q43. Q37 is a switching circuit to blank PLL reset noise which would otherwise occurs every 20kHz.

4) SSB squelch

This acts as a noise squelch. The SSB squelch release signal, taken from AGC buffer Q24, is input to buffer Q39 through squelch sensitivity pot VR6. This output is mixed with 10.24MHz in the SSB squelch mixer Q40 and converted to 455kHz. This signal is then input to the FM IF amplifier. Thereafter, the FM squelch circuit is used to provide SSB squelch.

In the SSB mode, Q56 in the squelch circuit operates to set the attack and slow release time constants.

● Transmission system

1) SSB and CW mode

The audio signal from the AF unit is amplified in the microphone amplifier Q28-30 : 2SC2458C and sent to the balanced modulator, D16 : ND487C1-3R. In CW mode, the modulator is unbalanced by DC, and this carrier signal output from the modulator is used. The double sideband output is filtered by SSB X'tal filter L12 amplified by FET Q5 : 3SK73(GR), and mixed with the 40.96MHz output from Q2 in balanced mixer Q6, Q7 : 2SK161(GR) for conversion to the TIF (Transmit IF) signal at 30.265 MHz. Then, the TIF signal is amplified by FET Q8 : 3SK73(GR) and sent to the RF unit. In CW mode, keying controlled by Q32 and Q8 gate biases using -6V and Q13 switching.

2) FM mode

The carrier signal output from the unbalanced SSB modulator is used. Different from the SSB/CW mode is that the local OSC signal used in FM for balanced mixers Q6, Q7 is supplied by X'tal OSC L4 (13.657MHz), which in FM mode operates at 13.653MHz, pulled by varicap D3. This OSC output is tripled 40.96MHz. In the FM mode, $\pm 5\text{kHz}$ frequency deviation is obtained after tripling the direct modulated X'tal OSC output.

3) Power control

Fig. 3 shows the power control circuit configuration. The final output is detected, and the ALC (Automatic Level Control) voltage is controlled by Q4 in the Display unit (X54-1820-11). The ALC voltage is applied to the second gates of FETs Q5 and Q8, by which the TIF level is adjusted and then APC (Automatic Power Control) is applied. In addition, the power control, in which two pots are used, controls the G2 voltage of generator buffer Q32, to counter excessive ALC at low power.

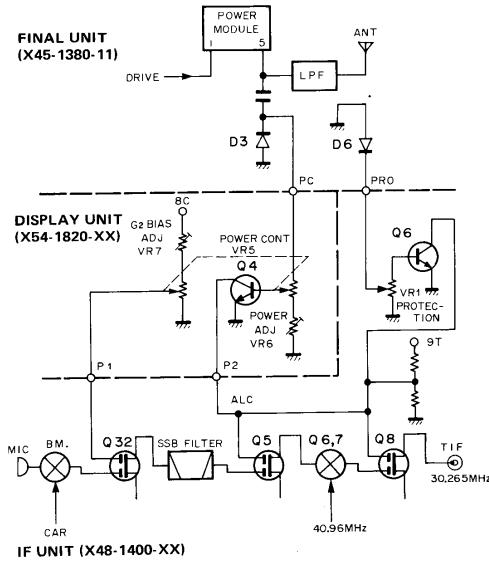


Fig. 3 Power control configuration (TS-711)

Item	Symbol	Condition	Rating			Unit
			Max.	St.	Min.	
Forward Voltage (DC)	VF1	IF=50mA			0.7	V
Forward Voltage (DC)	VF2	IF=1.0mA		0.2	0.3	V
Forward Voltage Difference	$\Delta VF2$				0.02	V
Terminal Capacitance	Ct	VR=0		0.9	1.2	pF
Terminal Capacitance Difference	ΔCt	f=1.0MHz			0.2	pF

Table 5 ND487C1-3R Electric characteristic
(IF unit D16)

TS-711/811

CIRCUIT DESCRIPTION

AF UNIT (X49-1180-00)

• Microphone amplifier

The signal from the microphone is amplified by Q1 : 2SC2459(GR), which is common to both FM and SSB modes. In FM mode, the signal is subject to 6dB/oct pre-emphasis by Q4 (1/2) : NJM4558S and is amplified by OP amplifier Q4 (2/2). Then, it is high-cut by active LPF (Low Pass Filter) Q9 for -24dB/oct via amplitude limiter D8 : MC911 and applied as modulation to the X'tal OSC in the IF unit.

In the SSB mode, the output from amplifier Q1 is impedance-converted by emitter-follower Q3 : 2SC2458(Y) and provided as modulation for the balanced modulator in the IF unit through the microphone gain control on the front panel. The input signal to pin AN1 of accessory terminal ACC2, in the SSB/CW mode is mixed with the output of microphone amplifier Q3 and is then input to the microphone gain control. In the FM mode, it is input to amplifier Q4, but not through the pre-emphasis circuit. Further, Q2 is controlled by the signal input to ACC2 pin MM to turn OFF amplifier Q1 for microphone muting.

• Processor

When the processor SW is ON, the processor circuit consisting of Q5, Q6 and Q7 is connected through transistor switch Q8. Q5 is an amplifier circuit with ALC. The NFB (Negative Feedback) signal from Q5 pin 3 is amplified by Q7, detected by D5 and input for ALC at pin 6. Then, the input is controlled by ALC output pin 5. Q6, an FET switch, adjusts the SSB level to that which has been previously adjusted in the FM mode.

• Other circuits

Q11 is the AF PA. Transistor Q10 is an AF amplifier through which the signal is supplied to ACC2. Q12 is the CW side-tone OSC circuit. Q13–Q16 forms the CW semi-break-in circuit.

FINAL UNIT

(X45-1380-11) : TS-711, (X45-1390-XX) : TS-811

The drive signal from the RF unit is amplified up to 25W by power hybrid Q1 : M57727 (TS-711), Q2 : M57745 (TS-811). It is then supplied to the antenna through the ANT switch and the LPF for removal of harmonic component content.

In addition, ALC detection, RF meter, reflected Power detection and fan temperature detection circuits are provided. The RF meter circuit is a peak holding circuit in which voltage doubler detection is used. The final PA hybrid is protected in two ways. Reflected power (VSWR) is detected from the antenna circuit and lowers the drive voltage by control of the ALC reference voltage to prevent damage to the final PA hybrid for the second protection circuit, thermistor TH1 detects the Final unit temperature to control the fan and prevent abnormal heating in the Final unit PA.

AVR UNIT (X43-1490-11)

The AVR (Automatic Voltage Regulator) unit consists of the rectifier and filter section and the AVR circuit section. The AVR circuit section has 13.8V, 8V and 9V AVR circuits and a temperature protection circuit. There is also a fan drive circuit.

The 13.8V AVR circuit consists of Q1–Q4 and pass transistor, Q5 : 2SD717. Transistor Q1, which controls Q5 emitter, supplies power (pin BB) which is separately rectified and filtered.

The fan is switched by comparator Q10 (1/2) and Q11 after heat detection by thermistor TH1 in the Final unit. The temperature protection circuit functions to stop transmission if the transformer heats abnormally due to excessive continuous transmission, etc. during AC operation. The detection circuit, like the fan, turns OFF the AVR 9T (9V, transmit) output.

PLL UNIT (X50-1990-XX)

The PLL unit has a double loop configuration an ouput in 10Hz steps and uses a 10.24MHz TCXO (Temperature Compensates Crystal Oscillator) ($\pm 3\text{ppm}$) as the reference OSC. 10Hz step operaiton is achieved by dividing the output of the 2kHz comparison PLL (loop B) by a 1/200 divider. Digital tuning in 10Hz steps is obtained by mixing that division signal with the output of the 20kHz comparison PLL (loop A). In addition, the carrier OSC, which is located in the PLL unit, is configures to an IF shift.

Loop B is a mixing type PLL. The VCO output operates from 64–68MHz (Q28 : 2SK192A (GR)*N) in loop B and, is mixed in Q31 : SN16931P with a 51.2MHz signal. This injection signal is derived by multiplying 10.24MHz 5 times in Q32 : 2SC2668(Y,O) via buffer amplifier Q29 : 2SC2668(Y) and then converting to 12.8–16.8MHz.

CIRCUIT DESCRIPTION

Then, the resultant signal is amplified in Q30 : TA7302 and divided at a frequency division coefficient of from 6400–8400 so that a 2kHz output is obtained. Further, 10.24MHz is also divided by 1/10 at Q36 and again divided by 1/5, and the resultant signal is phase compared with the 2kHz reference signal at Q21 : MC145155P*K.

The PD (Phase Detector) output is converted to a DC Correction Voltage by a 3 transistor stage LPF (Q25–27 2SC2459(BL)) to control the VCO (Q28).

Additionally, part of the 64–68MHz VCO output which passed through buffer amplifier Q29 is subject to 1/2000 division by divider IC Q23 : M5449L for 1/1000 division, and Q22 : SN74LS90N for 1/2 division through buffer Q24 : 2SC260(Y,O). The output of Q22 therefore becomes 320–340kHz at a 10kHz step rate. This output and the output of the carrier OSC are input to mixer Q6 : SN16913P. A 11.025MHz output is taken through a ceramic filter and a buffer Q5 : 2SC2668(Y). Then, this 11.025MHz output is mixed at Q4 : SN16913P with a 20.48MHz signal which is obtained by multiplying 10.24MHz by two at Q40 : 2SC2668(Y) so that an output of 31.505MHz is obtained. Then this 31.505MHz output is input to mixer Q3 : SN16913P as the loop A local OSC signal. Loop A is a dual modulus type PLL with a 20kHz comparison frequency. Prescaler Q20 : μPB555 operates at either a 1/16 or 1/17 division ratio. The VCO output 113.735–115.735MHz (TS-711E, 113.735–117.735MHz TS-711A (Q10 : 2SK129A(GR), N) in loop A is separated into the HET (Heterodyne) output and the input to mixer Q3 : SN16913P through buffer Q11 : 2SC2668(Y). Mixer Q3 output (80–90MHz) is amplified in a 2 transistor stage amplifier (Q17, Q18 : 2SC2668(Y)) through a 80–95MHz BPF and is input to prescaler Q10.

The prescaler, connected with PLL IC Q19, forms a swallow counter to divide this input at a frequency division coefficient NA = 4112–4212 (TS-711E), NA = 4112–4312 (TS-711A) to 20kHz. This signal is phasecompared with the 20kHz reference signal obtained by dividing 10.24MHz by two, and 1/256 division of 5.12MHz. The PD output is DC converted by a 3 transistor LPF stage (Q12, 13, 14) to control the VCO (Q10). HET output is obtained by amplifying the VCO output (Q10) by transistor Q1 : 2SC2668(Y).

Comparison frequency derivation :

• Loop A

The TCXO 10.24MHz output is amplified by two transistor stages (Q34, 35 : 2SC2458(Y)) via buffers (Q33, 38 : 2SC2458(Y)), is divided by Q36/2 to 5.12MHz, which in turn is input to PLL IC Q19. This input is divided 1/256 by the divider contained inside Q19 to 20kHz, which is the comparison frequency.

• Loop B

The 5.12MHz output in loop A is further divided 1/5 by divider Q36/2 to 1.024MHz. This signal is then input to PLL IC Q21 and is divided 1/512 by the divider contained inside Q21 to 2kHz, which is the comparison signal.

For unlock detection, the output of PLL IC Q19 pin 9 in loop A is used. The power supply to buffer Q1 is switched by transistors Q15 and Q16.

The carrier X'tal OSC is switched by diode switches D4 and D5. The bias voltage for D4 is applied from the 8C (8V DC common supply) line, and is independent of the mode. However, in the LSB mode, D4 and D5 can be selected by the ratios of R37/R38 and R40/R39.

Item	Rating
Center frequency of 3dB bandwidth	11.025MHz ± 50kHz
3dB attenuation bandwidth	Within 150 ± 40kHz
20dB attenuation bandwidth	380kHz or less
Insertion loss $20 \cdot \log \left(\frac{E_1}{2 \cdot E_2} \right)$	8dB or less
Spurious (Within 9–12MHz)	38dB or more
Input and output impedance	330Ω

Table 6 Ceramic filter (L72-0346-05)
(PLL unit L8,10)

HET UNIT

(X50-2000-00) : TS-811 M,X,T,W only

(X50-2010-10) : TS-811 K type only

The HET unit gives the HET output by mixing the PLL VCO output and the local OSC signal, which is obtained by a 7 times multiplication of the 40.96MHz local OSC from the PLL unit. 40.96MHz from the PLL unit is amplified up to 0.5V (rms) by amplifier Q4. To remove unwanted harmonic components, it is low pass filtered by amplifier Q7 through a Hi-Q tuning circuit (stage Q6) to become the local OSC signal for HET section.

This signal is mixed with the PLL signal (113.015–123.015MHz) in the Schottky barrier DBM (Double Balanced) diode mixer : ND-487 and converted to the actual HET signal of from 399.735–409.735MHz (TS-811B/E), 399.735–419.730MHz (TS-811A). After passing a 2-stage bandpass amplifier with small helical coils to obtain the necessary band-width, it is amplified up to the HET signal level by broad band amplifier Q3.

CIRCUIT DESCRIPTION

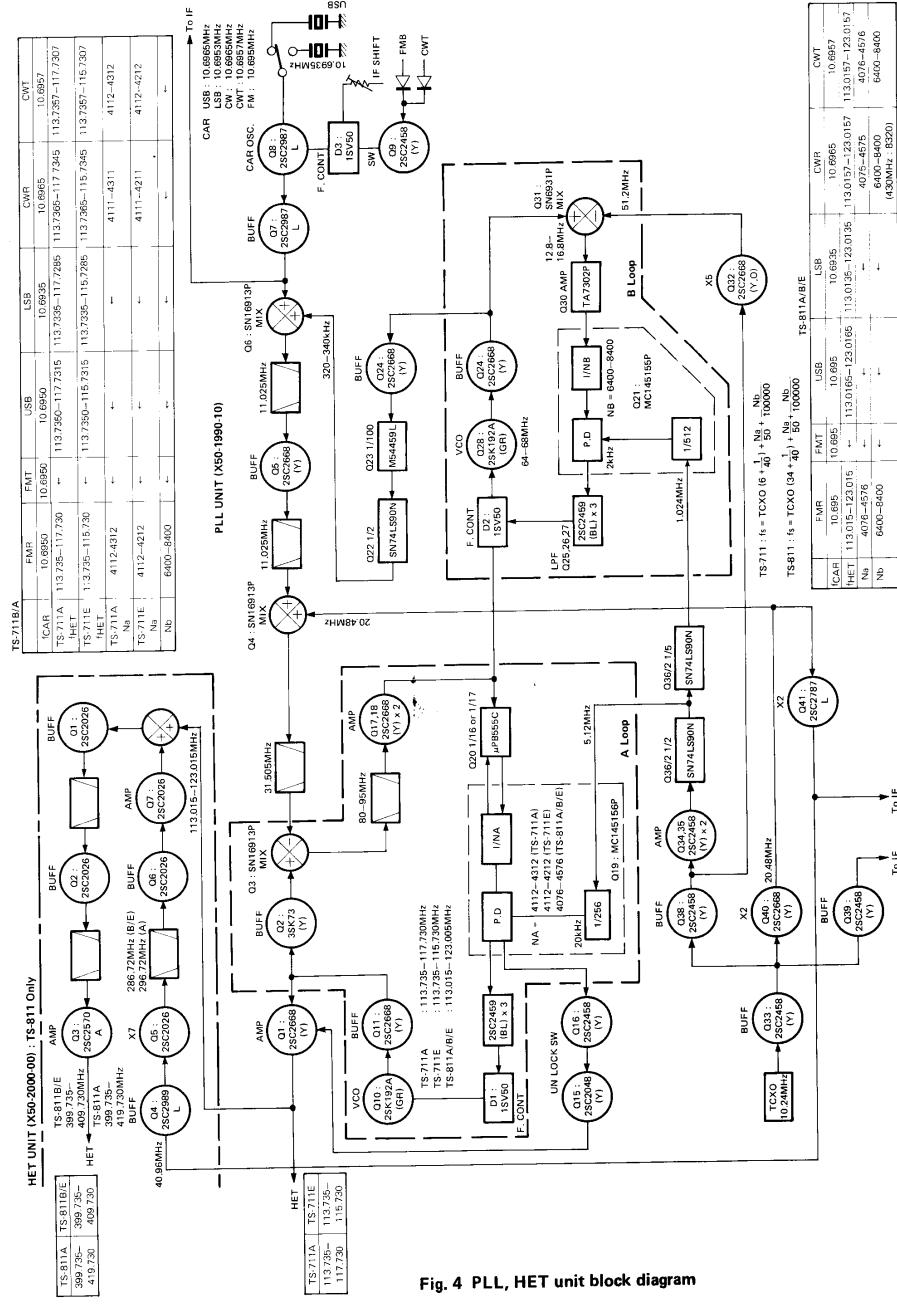


Fig. 4 TEE, IVUS and block diagram.

TS-711/811

CIRCI

Th
div
84
Mf
1/
2k
Th
Co
2S
Ad
pas
div
anc
Q2
32
ou'
SN
cer
11
20
Mf
of
is i
sig
cor
eitl
11
TS
rat
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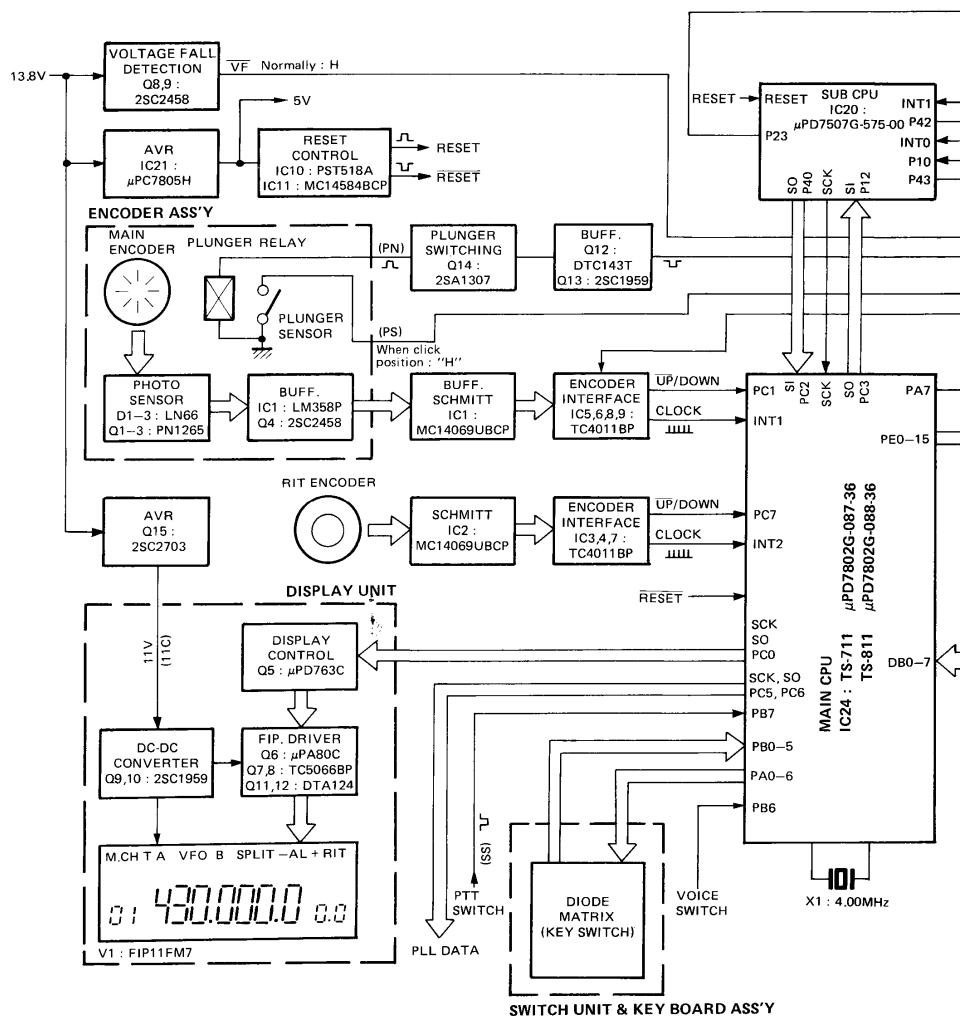
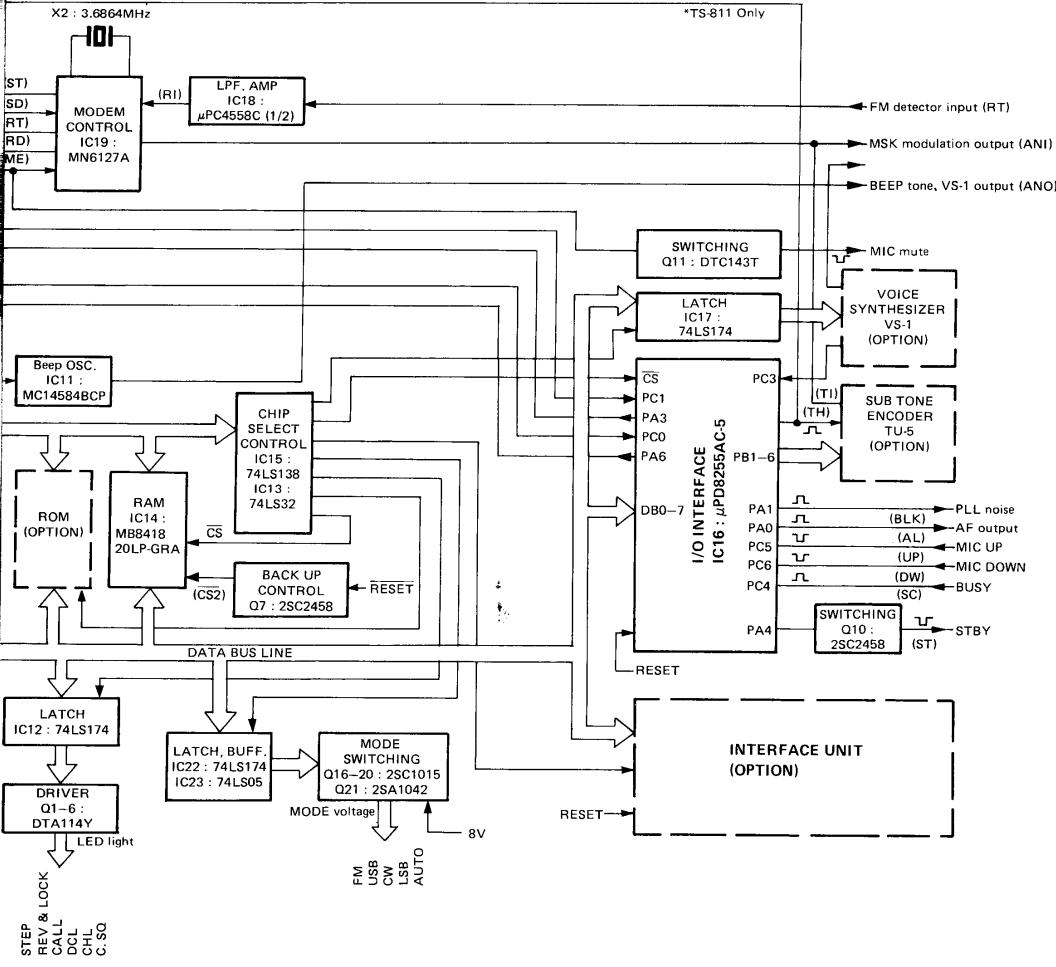
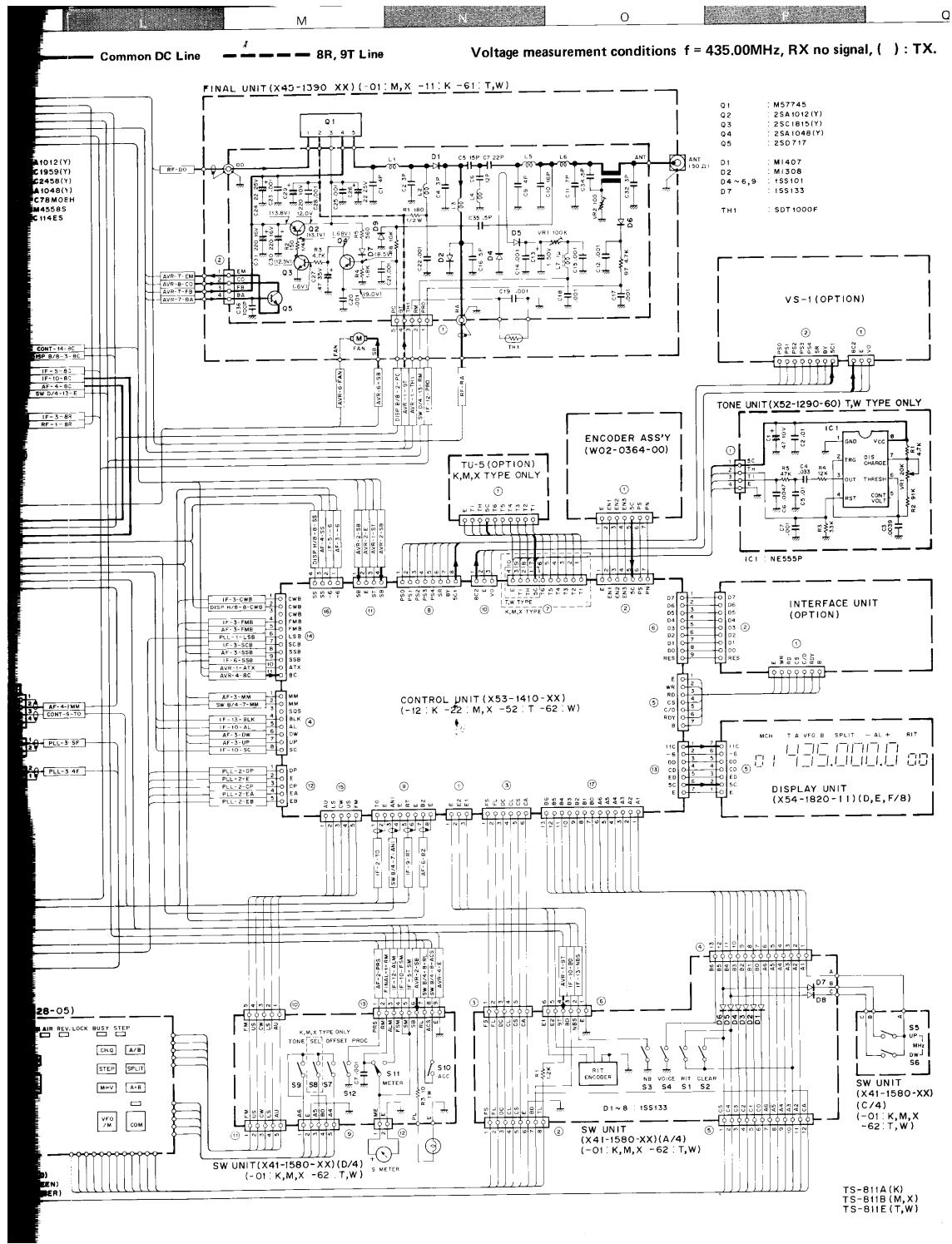


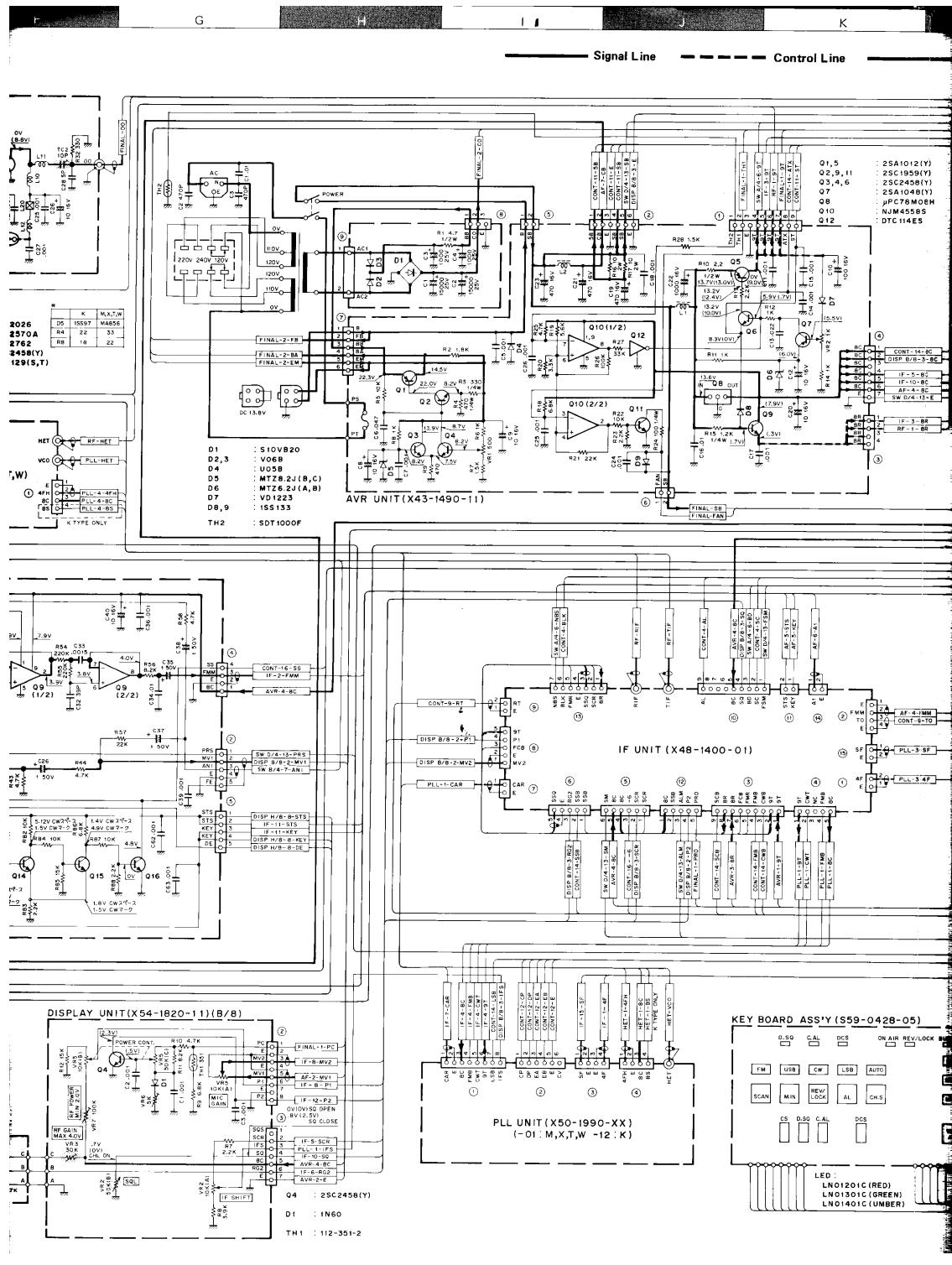
Fig. 5 Digi

CIRCUIT DESCRIPTION

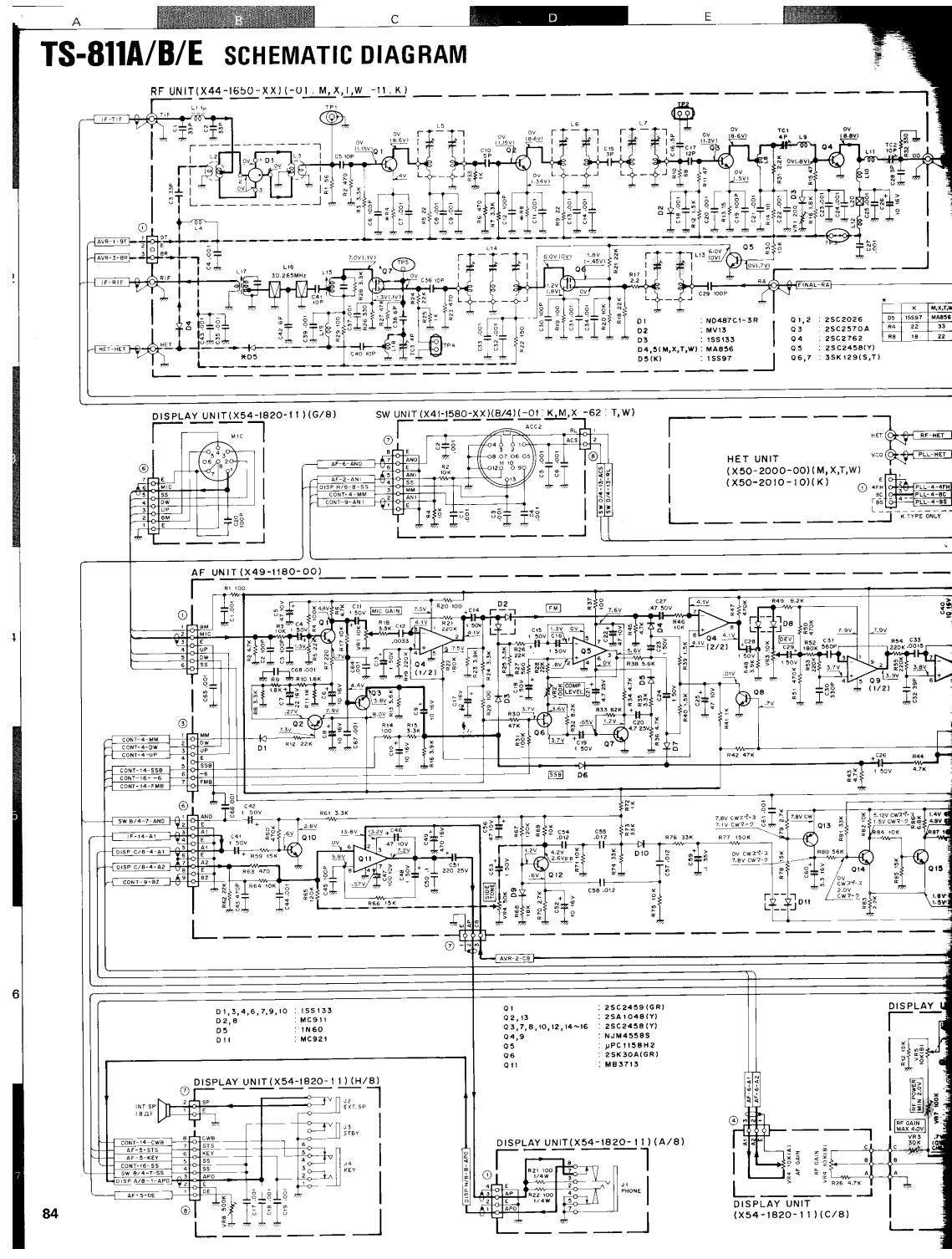


TS-811 control block diagram





TS-811A/B/E SCHEMATIC DIAGRAM



CIRCUIT DESCRIPTION

CONTROL UNIT (X53-1410-XX)

- Basic configuration

Fig. 5 shows the block diagram of the digital control section. The microprocessor, which has an 8-bit (ROM, 6-kbyte) main CPU IC24 : μ PD7802G-087-36 (TS-711), μ PD7802G-088-36 (TS-811) and a 4-bit (ROM, 2-kbyte) sub CPU IC20 : μ PD7507G-575-00, uses a CMOS RAM IC14 : MB847C-20LP-GRA with a capacity of 8 bits x 2kbytes as the external memory IC, the I/O interface IC IC16 : μ D8255AC-5 for I/O port extension and three 6-bit D-flip-flop ICs IC12, 17, 22 : 74LS174. In addition, it is provided with 24 pin IC socket for the external ROM for optional personal computer interface.

These ICs, connected in parallel with the data bus in the main CPU, exchange data with the main CPU synchronizes

by timing signals WR or RD from the main CPU, or the CS signal from IC15. IC15, a 3 to 8 bit line decoder decodes inputs to address lines PE13-15 in the main CPU to generate the chip select signal (CS). In addition, IC13 takes an OR logic between signals CS and WR to supply the clock pulse to IC12, IC 17 and IC22, all of which are used as latches.

The main CPU controls the frequency, mode, offset, tone, display, memory, dial click mechanism, DCL system, voice synthesis, etc. and accepts interface with the sub CPU or an external personal computer.

The sub CPU, (common to the TM-211, -411, TR-2600, and TR-3600) interfaces with the main CPU or the MODEM, IC IC19, to handle digital signal code conversion and control tone ON/OFF and other such operation.

Pin No.	Name	In/Out	Function	Logic	Pin No.	Name	In/Out	Function	Logic
1	PA3	O	Output for plunger switching		21	PB3	O	Sub-tone frequency data output (T3)	
2	PA2	O	Unused (NC)		22	PB4	O	Sub-tone frequency data output (T4)	
3	PA1	O	PLL noise blanking pulse output (BLK)		23	PB5	O	Sub-tone frequency data output (T5)	
4	PA0	O	AF output mute (AL)		24	PB6	O	Sub-tone frequency data output (T6)	
5	RD	I	Read strobe input		25	PB7	O	Unused (NC) : only in area T,W for TS-711/811, 1750Hz continuous tone control output (TH)	
6	CS	I	Chip select input		26	Vcc	-	Power supply pin (+5V)	
7	GND	-	GND		27	D7	I/O	Data bus (D7)	
8	A1	I	Address bus (A1)		28	D6	I/O	Data bus (D6)	
9	A0	I	Address bus (A0)		29	D5	I/O	Data bus (D5)	
10	PC7	I	Unused (L)		30	D4	I/O	Data bus (D4)	
11	PC6	I	MIC DOWN switch input (UP)		31	D3	I/O	Data bus (D3)	
12	PC5	I	MIC UP switch input (DOWN)		32	D2	I/O	Data bus (D2)	
13	PC4	I	Busy input (SC)		33	D1	I/O	Data bus (D1)	
14	PC0	I	Plunger sensor input (PS) : "H" at click		34	D0	I/O	Data bus (D0)	
15	PC1	I	Low supply voltage detection input : "L" at less than about 9.5V		35	RESET	I	Reset input	
16	PC2	I	Unused (L)		36	WR	I	Write strobe input	
17	PC3	I	Voice busy input (BY)		37	PA7	O	Unused (NC)	
18	PB0	O	Unused (NC)		38	PA6	O	Encoder pulse select output "H" at click	
19	PB1	O	Sub-tone frequency data output (T1)		39	PA5	O	Unused (NC)	
20	PB2	O	Sub-tone frequency data output (T2)		40	PA4	O	Standby (transmission) output : "H" in transmission	

Table 7 Function of μ D8255AC-5 (Control unit IC16)

TS-711/811

CIRCUIT DESCRIPTION

• Key switch section

The key switches on the front panel are arranged in a diode matrix (Fig. 6) and their signals are input to the main CPU in a key scan system. The switches, LEDs, RIT encoder, etc. on the front panel are electrically connected in the switch unit and sent to the control unit over simple wiring.

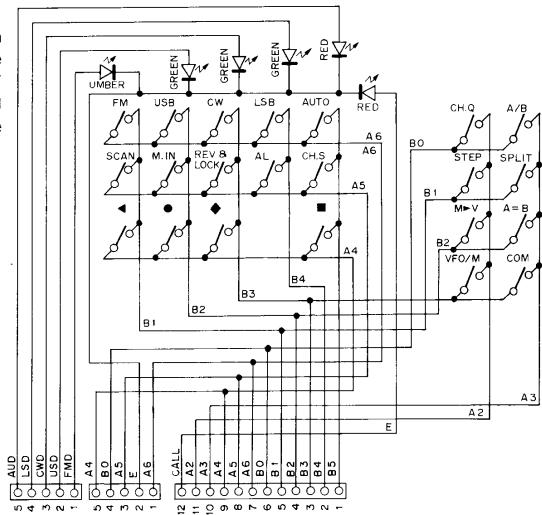
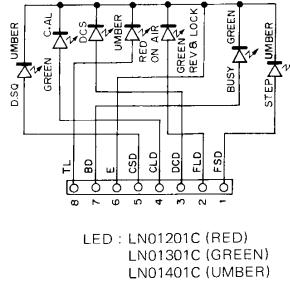


Fig. 6 Keyboard ass'y schematic diagram

• Display mode control section

The fluorescent display section, using custom IC : FIP11FM7, serially transfers the data corresponding to the display contents from the main CPU. The data transferred is 79 bits at power ON and 71 bits whenever the display contents change. The data is output by use of 3 pins SCK (clock), SO (data) and PCO (enable) from the main CPU when pin PCO is "L". After emission of all data bits, pin PCO is made "H". The "CALL", "STEP", "REV & LOCK", "DCL", "CHL", "C" and "SQ" LEDs each light by switching the latch output (active "L") of IC12 : 74LS174 via digital transistors Q1-Q6. Mode LED's light with the voltage for that mode. The voltage for each mode is produced by switching 8V by Q16-21 with the latch output (active "H") of IC22 : 74LS174 configured as an open-collector output by IC23 : 74LS05.

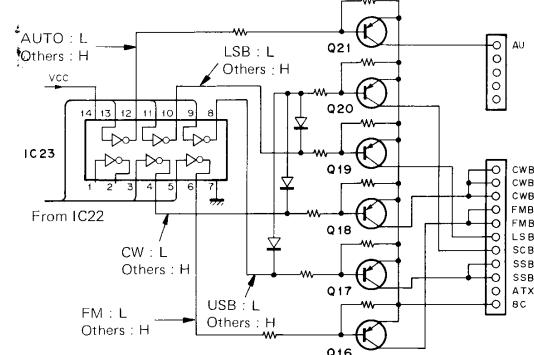


Fig. 7 MODE switching circuit

CIRCUIT DESCRIPTION

● DCS system control section

The processing of the digital control signal used in the DCS system is performed by the sub CPU (IC20 : μ PD7507G-575-00), the MODEM process IC (IC19 : MN6127A) and IC18 : μ PC4558C.

In transmission, first, the data (digital code, call sign, idle channel) for the control signal is transferred to the sub CPU from the main CPU. In the sub CPU, logic transforms that data to NRZ (None Return to Zero) code, which is then output to IC19. It is subject to MSK (Minimum Shift Keying) modulation at IC19. Subsequently, that output is input to Q4 in the AF unit via pin AN1 and is applied as

FM modulation. In reception, the signal which was subject to FM detection at discriminator L34 in the IF unit is input to IC18 from pin RT. IC18, an active filter, cuts off the high frequency component of this signal and also amplifies it up to the proper input level for IC19, and it is then output to IC19.

At IC19, it is subject to MSK demodulation to NRZ code and is output to the sub CPU, in which it receives the reverse logic operation to that in transmission and is transferred to the main CPU. For the functions of IC pins used in this transfer, see **Fig. 8** and **Table 8, 9**.

Pin No.	Name	In/Out	Function	Logic	Pin No.	Name	In/Out	Function	Logic
1	NC				27	NC			
2	P73	I	Unused (L)		28	P42	O	Transmission data output to IC19	
3	RESET	I	Reset input		29	NC			
4	NC				30	P43	O	IC19 enable output	
5	CL1		CR connection pin for clock pulse OSC		31	Vss		GND	
6	NC				32	X1		Unused (NC)	
7	VDD	I	Power supply pin (+5V)		33	VDD		Unused (NC)	
8	NC				34	X2		Unused (L)	
9	CL2		CR connection pin for clock pulse OSC		35	NC			
10	INT1	I	Clock pulse input for data transmission to IC19 (ST)		36	P20	O	Unused (NC)	
11	INT0	I	Clock pulse input for data reception from IC19 (RT)		37	P21	O	Unused (NC)	
12	SCK	O	Serial clock pulse output (for main CPU)		38	P22	O	Unused (NC)	
13	NC				39	P23			
14	NC				40	NC			
15	SO	O	Serial data output (for main CPU)		41	P10	I	Reception data input from IC19	
16	SI	I	Serial data input (for main CPU)		42	P11	I	Unused (H)	
17	P60	I	Unused (L)		43	P12	I	Communication request input from main CPU (IC20)	
18	P61	I	Unused (L)		44	P13	I	88.5Hz tone control input (connected to P23)	
19	P62	I	Unused (L)		45	NC			
20	P63	I	Unused (L)		46	P30	O	Unused (NC)	
21	P50	O	Unused (NC)		47	P31	O	Unused (NC)	
22	P51	O	Unused (NC)		48	P32	O	Unused (NC)	
23	P52	O	Unused (NC)		49	P33	O	Unused (NC)	
24	P53	O	Unused (NC)		50	P70	I	Setting of interface function for IC19, IC20 and IC24 (H)	
25	P40	O	Communication request output to main CPU (IC20)		51	P71	I	Setting of interface function for IC19, IC20 and IC24 (L)	
26	P41	O	Unused (NC)		52	P72	I	Setting of interface function for IC19, IC20 and IC24 (H)	

Table 8 Function of μ PD7507G-575-00 (Control unit IC20)

TS-711/811

CIRCUIT DESCRIPTION

Pin No.	Name	In/Out	Function	Logic	Pin No.	Name	In/Out	Function	Logic
1	PE15	O	Address output for chip select (IC15), address bus		30	X2	-	Ceramic OSC connection pin	
2	O OUT				31	X1	-	Ceramic OSC connection pin	
3	DB7	I/O	Data bus (D7)		32	Vss	-	GND	
4	DB6	I/O	Data bus (D6)		33	PA0	O	Key matrix output	[U]
5	DB5	I/O	Data bus (D5)		34	PA1	O	Key matrix output ($\bar{A}1$)	[U]
6	DB4	I/O	Data bus (D4)		35	PA2	O	Key matrix output ($\bar{A}2$)	[U]
7	DB3	I/O	Data bus (D3)		36	PA3	O	Key matrix output ($\bar{A}3$)	[U]
8	DB2	I/O	Data bus (D2)		37	PA4	O	Key matrix output ($\bar{A}4$)	[U]
9	DB1	I/O	Data bus (D1)		38	PA5	O	Key matrix output ($\bar{A}5$)	[U]
10	DB0	I/O	Data bus (D0)		39	PA6	O	Key matrix output ($\bar{A}6$)	[U]
11	INT2	I	RIT clock pulse	[U]	40	PA7	I	Beep OSC control signal output	
12	INT1	I	Main encoder clock pulse	[U]	41	PB0	I	Key matrix input ($\bar{A}0$)	[U]
13	INT0	I	Interruption input for interface with personal computer (RDY)	[U]	42	PB1	I	Key matrix input ($\bar{A}1$)	[U]
14	WAIT		Unused (connected to Vcc)		43	PB2	I	Key matrix input ($\bar{A}2$)	[U]
15	M1		Unused (NC)		44	PB3	I	Key matrix input ($\bar{A}3$)	[U]
16	WR	O	Write strobe output for IC14, IC16 and IC13 (WR)		45	PB4	I	Key matrix input ($\bar{A}4$)	[U]
17	RD	O	Read strobe output for IC14 and IC16 ($\bar{R}D$)		46	PB5	I	Key matrix input ($\bar{A}5$)	[U]
18	PC7	I	RIT UP/DOWN		47	PB6	I	Key matrix input ($\bar{A}6$)	[U]
19	PC6	O	2nd PLL (B loop) data latch (EB)	[U]	48	PB7	I	Standby (P.T.T.) input (SS)	[U]
20	PC5	O	1st PLL (A loop) data latch (EA)	[U]	49	PE0	O		
21	PC4	O	Unused (NC)		50	PE1	O		
22	PC3	O	Communication request output to sub CPU (IC20)	[U]	51	PE2	O		
23	PC2	I	Communication request input from sub CPU (IC20)	[U]	52	PE3	O		
24	PC1	I	Main encoder UP/DOWN		53	PE4	O		
25	PC0	O	Enable output for display LSI (Q5 in display unit) (ED)		54	PE5	O		
26	SCK	I/O	Serial clock pulse I/O (Output for PLL, output for display IC, input for sub CPU)	[U]	55	PE6	O		
27	SI	I	Serial data input (for sub CPU)	[U]	56	PE7	O		
28	SO	O	Serial data output (for sub CPU, PLL and display IC)	[U]	57	PE8	O		
29	RESET	I	Reset pulse input	[U]	58	PE9	O		
					59	PE10	O		
					60	PE11	O		
					61	PE12	O	Unused (NC)	
					62	PE13	O	Address output for chip select (IC15)	
					63	PE14	O		
					64	Vcc	-	Power supply pin (+ 5V)	

Table 9 Function of μ PD7802G-087-36 (Control unit IC24) TS-711
Function of μ PD7802G-088-36 (Control unit IC24) TS-811

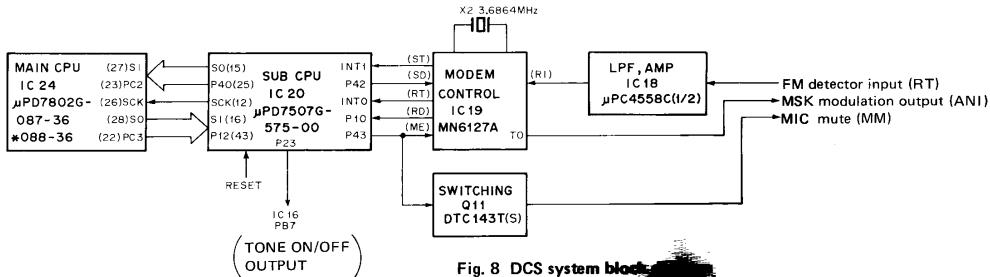


Fig. 8 DCS system block

CIRCUIT DESCRIPTION

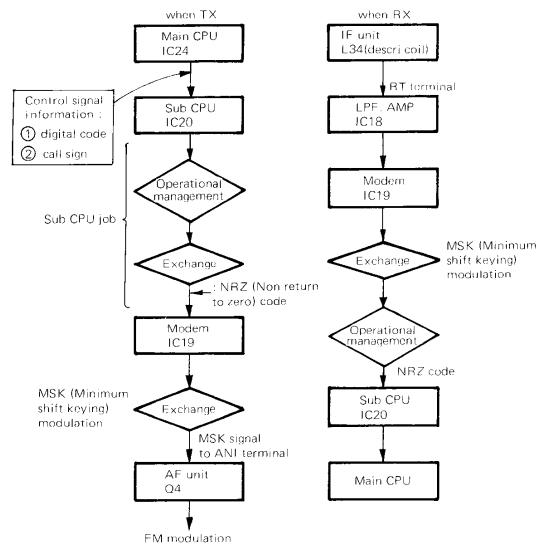
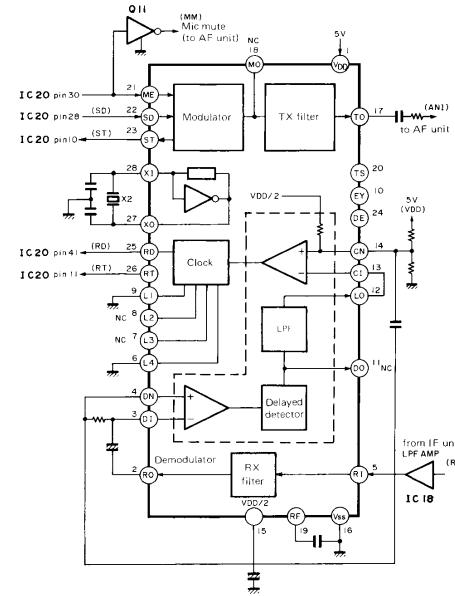


Fig. 9 DCS system flow chart

Fig. 10 Modem IC MN6127A block diagram
(Control unit IC19)

● Reset and backup

A custom IC (IC10 : PST518A) (Fig. 11) is used to output the pre-determined reset pulse at power ON or momentary power failure. At IC10, the voltage in the 5V line is detected. When it becomes less than 4.2V, the open-collector output is turned ON, thus, "H" (RESET) and "L" (RESET) pulses of about 10msec are generated through a Schmitt trigger when resetting and applied to the reset pin of each IC. At power OFF, when Q8 and Q9 detect the supply line voltage (13.8V) is less than about 9.5V, the CPU returns the transceiver to the reception mode to stop all other processes. In addition, when the voltage at the 5V line becomes less than 4.2V, Q7 (normally ON) turns OFF to establish IC14 in the standby (backup) state.

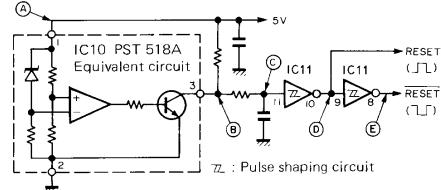


Fig. 11 Reset circuit and waveforms at respective points

CIRCUIT DESCRIPTION

● "Beep" tone oscillator and voice synthesis control section

For the "beep" tone output (including Morse Annunciation), its corresponding ON/OFF signal is output from the main CPU PA7 (pin 40) and is generated in oscillation circuit IC11 : MC14584BCP. It is then mixed with the audio output of the voice synthesizer (VS-1) and is input to the AF unit from pin ANO.

The control output (PSO-4, SR) of the voice synthesizer unit (option VS-1) is output from IC17 latch and the control input (BY) is input to IC16 PC3.

● Encoder section

Fig. 12 shows the configuration of the encoder section. The control pulse of the main dial "click" detent mechanism is as shown in **Fig. 13**. When operating the [CHO], [CS], [VFO/M], [M▶V], [SELECT], etc., keys, the CPU performs its associated process, judges whether or not the dial is detented, and inputs the status signal of the sensor (pin PS) to IC16 PC0 (pin 14). For example, when the dial retent is activated, as when the dial is already detented when pin PS is "H", the process ends. However, when pin PS is "L", a 100msec pulse is emitted from PA3 IC16 pin 17, thereupon the plunger drive pulse (PN) is emitted through the switching operation of Q12 : DTC143T(S), Q13 : 2SC2459(Y) or Q14 : 2SA1307(Y).

After 100msec, the sensor status is checked. If it is "H", the process ends. However, if it is found not "H", the process series is repeated. If it does not become "H" after this is repeated 7 times, the CPU stops the process, judging that the plunger section has a malfunction. Out of waveforms EN1, EN2 and EN3 in the encoder, waveforms EN1 and EN2 are connected to four waveforms EN1, EN2, EN1 and EN2 in IC3 : MC14069UBCP. These four waveforms are combined with their respective differentiation waveforms and multiplied 4 times in IC5 and IC6 : TC4011. Output UP/DOWN and a clock pulse are generated in IC8 and IC9 and are entered to the main CPU PC1 (pin 24) and INT1 (pin 12). In the detent mode, the Schmitt trigger differentiation waveform output of EN3 is selected in IC9 and is taken as the clock pulse. RIT encoder waveform chatter is absorbed at Schmitt trigger IC2, and waveforms E1 and E2 are combined with their inversion waveforms and differentiation waveforms. They are then multiplied 4 times at IC4 and IC7, from which signal UP/DOWN and clock pulse outputs are produced and entered to PC7 and INT2 of the main CPU.

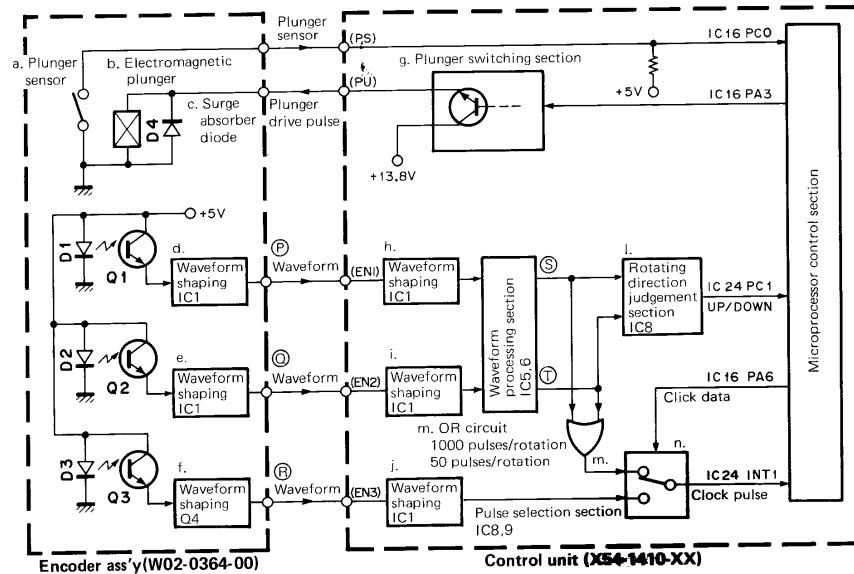
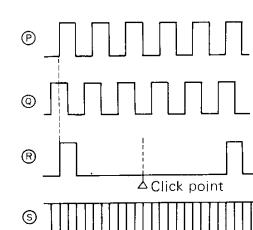


Fig. 12 Configuration of encoder processing

CIRCUIT DESCRIPTION



- (P) 250 pulses/rotation
- Waveforms (P) and (Q) have a phase difference of 90° from each other.
- At counterclockwise rotation : (Q) has a delay of 90° from (P).
- At clockwise rotation : (Q) has an advance of 90° from (P).
- (R) 50 pulses/rotation
- With 50 clicks per rotation, one pulse is equal to one click.
- (S) At clockwise rotation, 1000 pulses/rotation
- (T) At counterclockwise rotation, 1000 pulses/rotation

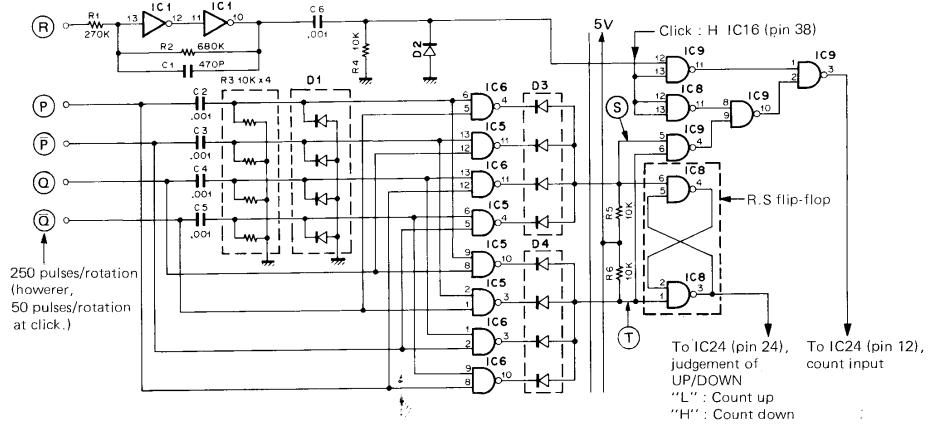


Fig. 13 Output waveform of main encoder

- Other I/O sections

- a. Standby (ST) output :

The P.T.T. switch ON/OFF signal (ST) from pin SS is taken in PB7 of the main CPU. In transmission, Q10 (open-collector) is thus switched with IC16 PA4 (pin 40) "H".

In auto-transmission in the DCL system, the ON/OFF control for Q10 is also generated in the main CPU to control transmission and reception along with a personal computer.

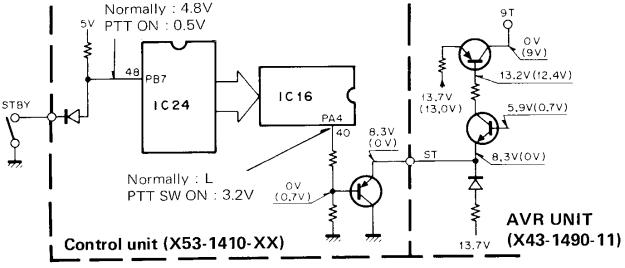


Fig. 14 STBY output circuit

TS-711/811

CIRCUIT DESCRIPTION

b. PLL select switching noise blanking output :

When the data in PLL loop A (in 20kHz steps) changes, the timing pulse (BLK) in synchronization with the data output is output from IC16 PA1 (pin 3). Q37 in the IF unit switches to momentarily mute the PLL select switching noise.

c. Busy (SC) input :

In scan mode operation, the SC signal corresponding to busy lamp status is input to IC16 PC4 (pin 13) to select between "open" or "busy".

d. Microphone UP/DOWN switch :

These are input to IC16 PC5 or PC6 after chatter filtering. (The following are for DCL system control.)

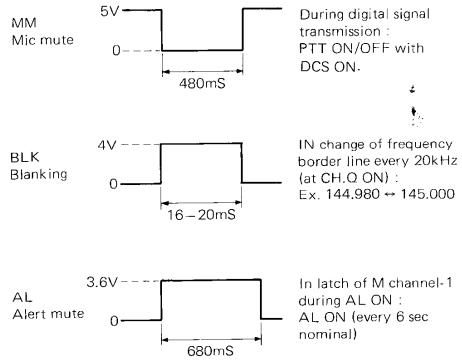
e. Microphone mute (MM) output :

This signal cuts off microphone audio during digital signal transmission. This signal, which is output to IC19 from P43 of the sub CPU, controls Q11 (open-collector) to switch Q2 in the AF unit.

f. Audio mute (AL) output :

This mutes the audio output by making IC16 PA0 "H" in code squelch operation, during retrieval of an idle channel or in memory channel check during alert operation.

Connector ④



Connector ⑨

RT . . . In reception of standard modulation signal (1kHz ± 3kHz deviation, 60dB μ) → 100mVp-p (36mVrms)

ANI . . . In transmission of digital signal, PTT ON/OFF at DCS ON → 80mVp-p.

BZ . . . In output of beep sound, M.JN pressed → 22mVp-p.

TO . . . In output of 88.5Hz tone (0.6kHz deviation) → 420mVrms.

Fig. 15 Waveforms at ④ and ⑨ I/O pins
(With harness connected)

16

Encoder ass'y (W02-0364-00)

● Encoder section

An IR (Infrared) output is taken through a 250 slit/rotation disk is detected at phototransistors Q1 and Q2. These detection signals are each waveform-shaped at comparator IC1 and emitted to pins EN1 and EN2. Then, they are adjusted by VR1 and VR2 so that they have a precise phase difference of 90° from each other with a precise duty cycle of 50%.

An IR output which is taken through 50 slit/rotation disk is detected at phototransistor Q3. The detection signal is amplified at Q4 and emitted to pin EN3. Signal EN3 is extracted without adjustment. Fig. represents each output waveform.

● Detent : electromagnetic plunger section

Whenever the plunger relay is turned ON and then OFF by the Control unit control pulse (pin PN), the detent mode changes to the slew (continuous tuning) mode or vice versa. Normally, the plunger relay is OFF. In addition, the plunger sensor switch is OFF (open) at the detent mode and ON (closed) at the slew mode.

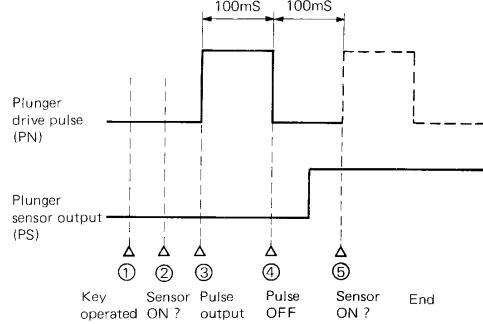


Fig. 16 Relationship between plunger drive pulse and sensor



CIRCUIT DESCRIPTION

DISPLAY UNIT (X54-1820-11)

- **Display section**

When display data is transferred on its 3 lines : DD (data) CD (clock) and ED (enable) from the control unit, they are input to the display control IC Q5 : μ PD763C. Q5 outputs both digit signals (T0-T11) and segment signals (Sa-Sg, I0,I1) for dynamic display lighting. (**Table 10**). The digit

and segment signals are driven by Q7 and Q8, and by Q6, Q11 and Q12 so display tube (V1) lights. Q7, Q8, Q6 and Q11 switch about -23V and + 5V. Specifically, Q12 switches about -23V and + 11V, as it drives the red character segments. In addition, Q9 and Q10, which are a DC-DC converter oscillator circuit, produce negative voltages for the display tube and AGC circuits.

Pin No.	Name	In/Out	Function	Logic	Pin No.	Name	In/Out	Function	Logic
1	X2		IFT connect pin for clock pulse OSC		15	I0	O	Segment signal Character	
2	T0	O	Digit signal RIT 10^0 Hz digit		16	I1	O	Segment signal Decimal point	
3	T1	O	Digit signal RIT 10^1 Hz digit		17	Sa	O	Segment signal a	
4	T2	O	Unused (NC)		18	Sb	O	Segment signal b	
5	T3	O	Digit signal 10^2 Hz digit		19	Sc	O	Segment signal c	
6	T4	O	Digit signal 10^3 kHz digit		20	Sd	O	Segment signal d	
7	T5	O	Digit signal 10^4 kHz digit		21	Se	O	Segment signal e	
8	T6	O	Digit signal 10^5 kHz digit		22	Sf	O	Segment signal f	
9	T7	O	Digit signal 10^6 MHz digit		23	Sg	O	Segment signal g	
10	T8	O	Digit signal 10^7 MHz digit		24	CS	I	Chip select input	
11	T9	O	Digit signal 10^8 MHz digit		25	SCK	I	Serial clock pulse input	
12	T10	O	Digit signal M.CH 10^0 digit		26	SI	I	Serial display data input	
13	T11	O	Digit signal M.CH 10^1 digit		27	Vcc		Power supply pin (+5V)	
14	GND		GND		28	X1		For clock pulse OSC	

Table 10 Function of μ PD763C (Display unit Q5)

TS-711/811

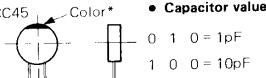
PARTS LIST

CAPACITORS

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

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

CC45



Capacitor value

1 0 3 = 0.01μF

2 2 0 = 22pF

1st number | Multiplier
2nd number

Temperature Coefficient

1st Word	C	L	P	R	S	T	U
Color*	Black	Red	Orange	Yellow	Green	Blue	Violet
ppm/°C	0	-80	-150	-220	-330	-470	-760

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

Tolerance

Code	C	D	G	J	K	M	X	Z	P	No code	Code	B	C	D	F	G
(%)	± 0.25	± 0.5	± 2	± 5	± 10	± 20	+ 40	+ 80	+ 100	More than Less than	(pF)	± 0.1	± 0.25	± 0.5	± 1	± 2

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

Less than 10 pF

Rating voltage

1st word	A	B	C	D	E	F	G	H	J	K	V
0	1.0	1.25	1.6	2.0	2.5	3.15	4.0	5.0	6.3	8.0	—
1	10	12.5	16	20	25	31.5	40	50	63	80	35
2	100	125	160	200	250	315	400	500	630	800	—
3	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	—

Chip capacitors

(EX) C C 7 3 F S L 1 H 0 0 0 J
1 2 3 4 5 6 7
(Chip) (CH,RH,UJ,SL)

Dimension

Dimension code	L	W	T
Empty	5.6 ± 0.5	5.0 ± 0.5	Less than 2.0
E	3.2 ± 0.2	1.6 ± 0.2	Less than 1.25
F	2.0 ± 0.3	1.25 ± 0.2	Less than 1.25

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

Dimension

Dimension code	L	W	T	Wattage
E	3.2 ± 0.2	1.6 ± 0.2	0.57	2B
F	2.0 ± 0.3	1.25 ± 0.2	0.45	2A

Rating wattage

Cord	Wattage	Cord	Wattage	Cord	Wattage
2A	1 10W	2E	1 4W	3A	1W
2B	1 8W	2H	1 2W	3D	2W
2C	1 6W				



(EX) R D 7 3 L B 2 B 0 0 0 J
1 2 3 4 5 6 7
(Chip) (B,F)

Carbon resistor (Normal type)

(EX) R O 1 4 B B 2 C 0 0 0 J
1 2 3 4 5 6 7
(Chip) (B,F)

Carbon resistor (Normal type)

(EX) R O 1 4 B B 2 C 0 0 0 J
1 2 3 4 5 6 7
(Chip) (B,F)

MODEL UNIT	TS-711A (K,M1,M2,X)	TS-711E (T,W)	TS-811A (K)	TS-811B (M,X) TS-811E (T,W)
SWITCH UNIT	X41-1580-11	X41-1580-61	X41-1580-01	X41-1580-01 (M,X) X41-1580-62 (T,W)
AVR UNIT	X43-1490-11	X43-1490-11	X43-1490-11	X43-1490-11
RF UNIT	X44-1620-11	X44-1620-01	X44-1650-11	X44-1650-01
FINAL UNIT	X45-1380-11	X45-1380-11	X45-1390-11	X45-1390-01 (M,X) X45-1390-61 (T,W)
IF UNIT	X48-1400-11	X48-1400-00	X48-1400-01	X48-1400-01
AF UNIT	X49-1180-00	X49-1180-00	X49-1180-00	X49-1180-00
PLL UNIT	X50-1990-11	X50-1990-00	X50-1990-12	X50-1990-01
HET UNIT	—	—	X50-2010-10	X50-2000-00
TONE UNIT	—	X52-1290-60	—	X52-1290-60 (T,W)
CONTROL UNIT	X53-1410-11 (K,M1) X53-1410-21 (M2,X)	X53-1410-51 (T) X53-1410-61 (W)	X53-1410-12 (K)	X53-1410-22 (M,X) X53-1410-52 (T) X53-1410-62 (W)
DISPLAY UNIT	X54-1820-11	X54-1820-11	X54-1820-11	X54-1820-11

PARTS LIST TS-711A/E

SEMICONDUCTOR (TS-711A/E)

N : New parts

* : Please note that parts are sometimes not in stock and it takes much time to deliver.

Item	Re-marks	Part No.	Item	Re-marks	Part No.	Item	Re-marks	Part No.
Diode	N	1N60 1S1587 1SS101 1SS133 1SV50 1SV123 DAP401 MA856 MC911 MC921 MC931 M1308 M1407 ND487C1-3R U05B V06B	Resistor block		S10VB20	IC		BU4011B LM358P M5L8255AP-5 M54459L MB3713
Vari-cap		1S2208	Photo TR		PN126S(R)		N	MB8418-20LP-GRA MC14069UBCP MC14584BCP MC145155P*K MC145156P MN6127A NJM78L05A NJM4558S NE555P NJM78L05A NJM4558S
Varistor		VD1223	Digital TR	N	DTA114Y(S) DTA124EF DTC114E(S) DTC143T(S)	TR	N	PST518A SN74LS05N SN74LS32N SN74LS90N SN74LS138N SN74LS174N SN16913P TA7302P TC4011BP TC4069UBP TC5066BP
Zener diode		MT26.2JA MT26.2J(A,B) MT27.5JA MT28.2J(B,C) MT29.1JB MTZ12JB			2SA1012(Y) 2SA1015(Y) 2SA1048(Y) 2SA1115(E) 2SA1307(Y) 2SC1815(Y) 2SC1959(Y) 2SC2240(GR) 2SC2358-22-A 2SC2458(Y) 2SC2459(BL) 2SC2459(GR) 2SC2538-22-A 2SC2668(Y) 2SC2668(Y,O) 2SC2703(O,Y) 2SC2787(L) 2SC3113(B) 2SD717(O,Y)	FET	N	TMP8255AP-5 μ PA80C μ PB55C μ PC78M08H μ PC577H(E,F) μ PC1158H ² μ PC4558C μ FC7805H μ PD763C μ PD7507G-575-00 μ PD7802G-087-36 μ PD8255AC-5
LED		LN66(R) LN01201C LN01301C LN01401C			2SK30A(GR) 2SK30A(O) 2SK125 2SK161(GR) 2SK192A(GR)*N 3SK73(GR) 3SK73(Y) 3SK122(L) 3SK129(Q,R)	Power module		M57727
Dispaly tube		FIP11FM7						
Thermister		112-102-2 112-103-2 112-351-2 SDT1000F						

ENCODER ASS'Y (W02-0364-00)

PART. NO	Re-marks	NAME & DESCRIPTION		Q'TY	REFERENCE. NO
CE04CW0J330M		ELECTRO	33 6.3V	1	C1
LM358P		IC		1	IC1
LN66(R)		LED		3	D1, 2, 3
RD14BB2C102J		RES. CARBON	1k Ω	2	R5, 10
RD14BB2C105J		RES. CARBON	1M Ω	2	R8, 13
RD14BB2C181J		RES. CARBON	180 Ω	3	R1, 2, 3
RD14BB2C182J		RES. CARBON	1.8k Ω	4	R6, 7, 11, 12
RD14BB2C222J		RES. CARBON	2.2k Ω	1	R15
RD14BB2C472J		RES. CARBON	4.7k Ω	4	R4, 9, 14, 16
R12-2413-05		TRIM. POT.	5k Ω	2	VR1, 2
R92-0150-05		SHORT JUMPER		2	
PN126S		PHOTO TR		3	Q1, 2, 3
V06B		DIODE		1	D1
2SC2458(Y)		TR		1	Q4

TS-711A/E PARTS LIST

TS-711A/E GENERAL

PART NO.	NOTE	NAME & DESCRIPTION	DISTINCTION	QTY	REFERENCE NO.			
			011	021	022	031	061	071
A01-0979-02	N	CASE(A) UPPER	1	1	1	1	1	1
A01-0980-02	N	CASE(B) LOWER	1	1	1	1	1	1
A20-2524-03	N	FRONT PANEL	1	1	1	1	1	1
B05-0708-04	N	SP GRILLE	1	1	1	1	1	1
B10-0648-04	N	FRONT GLASS	1	1	1	1	1	1
B30-0817-15	N	LAMP 14V 80MA	1	1	1	1	1	1
B31-0655-05	N	METER	1	1	1	1	1	1
B39-0407-04	N	NUMBER	2	2	2	2	2	2
B41-0134-04	N	MODEL NAME PLATE TS-711A	1	1	1	1	1	1
B40-5325-04	N	MODEL NAME PLATE TS-711E	1	1	1	1	1	1
B40-3524-04	N	MODEL NAME PLATE TS-711A	1	1	1	1	1	1
B41-0134-04	N	CAUTION LABEL	1	1	1	1	1	1
B42-2335-04	N	SIMPLY IN DCS	1	1	1	1	1	1
B42-2394-04	N	VOLTAGE INDICATING PLATE 120V	1	1	1	1	1	1
B42-1720-04	N	VOLTAGE INDICATING PLATE 220V	1	1	1	1	1	1
B42-1741-04	N	VOLTAGE INDICATING PLATE 240V	1	1	1	1	1	1
B42-1740-04	N	VOLTAGE INDICATING PLATE 220V	1	1	1	1	1	1
B42-1741-04	N	VOLTAGE INDICATING PLATE 240V	1	1	1	1	1	1
B42-1740-04	N	VOLTAGE INDICATING PLATE 220V	1	1	1	1	1	1
B42-1023-04	N	CURRENT INDICATING PLATE 6A	1	1	1	1	1	1
B43-1023-04	N	BADGE	1	1	1	1	1	1
B43-1024-04	N	BADGE	1	1	1	1	1	1
B43-1022-04	N	BADGE	1	1	1	1	1	1
B44-0418-00	N	WARRANTY CARD	1	1	1	1	1	1
B50-4148-00	N	INSTRUCTION MANUAL	1	1	1	1	1	1
B50-4149-00	N	INSTRUCTION MANUAL	1	1	1	1	1	1
B50-4148-00	N	INSTRUCTION MANUAL	1	1	1	1	1	1
C91-0496-05	N	CERAMIC FOR AC 470P	2	2	2	2	2	2
C91-0647-05	N	CERAMIC FOR AC 0.01	1	1	1	1	1	1
D09-0306-04	■	ENCODER DISC ROTOR	1	1	1	1	1	1
D09-0307-04	■	ENCODER DISC STATOR	1	1	1	1	1	1
D40-0627-05	N	DETECTOR MECHANISM UNIT	1	1	1	1	1	1
E07-1351-05	N	13P PLUG (ACC)	1	1	1	1	1	2
E07-0852-05	N	VOLTAGE SELECTOR PLUG	1	1	1	1	1	1
E08-0474-05	N	4P SOCKET DC	1	1	1	1	1	1
E09-0472-05	N	4P SOCKET DC	1	1	1	1	1	1
E12-0001-15	N	PHONE PLUG (ACSS)	2	1	1	1	1	1
E12-0002-15	N	PHONE PLUG (ACSS)	2	1	1	1	1	1
E13-0351-05	N	3P AC SOCKET	1	1	1	1	1	1
E29-0463-05	N	1P JUNCTION CONNECTOR	1	1	1	1	1	1
E30-1643-15	N	AC CABLE (ACSS)	1	1	1	1	1	1
E30-1644-15	N	AC CABLE (ACSS)	1	1	1	1	1	1
E30-1645-05	N	AC CABLE (ACSS)	1	1	1	1	1	1
E30-1647-05	N	AC CABLE (ACSS)	1	1	1	1	1	1
E31-3049-05	N	CABLE WITH TERMINAL	1	1	1	1	1	1
E31-3091-05	N	CABLE WITH TERMINAL HET	1	1	1	1	1	1
E31-3064-05	N	WIRE'S KIT (ACSS)	1	1	1	1	1	1
F05-2023-05	N	FUSE 2A	1	1	1	1	1	1
F05-1023-05	N	FUSE 1A	1	1	1	1	1	1
F05-2023-05	N*	FUSE 2A	1	1	1	1	1	1
F07-0858-03	N*	HEAT SINK COVER	1	1	1	1	1	1
F10-1206-04	N	SHIELDING PLATE	1	1	1	1	1	2

PART NO.	NOTE	NAME & DESCRIPTION	DISTINCTION	QTY	REFERENCE NO.			
			011	021	022	031	061	071
F19-0655-04	N*	BLINDING PLATE	1	1	1	1	1	1
F20-0521-04	N	INSULATING PLATE	1	1	1	1	1	1
G01-0818-04	N	COILED SPRING	5	5	5	5	5	5
G01-0818-04	N	COILED SPRING	5	5	5	5	5	5
G02-0505-04	N	KNOB FITTING SPRING	3	3	3	3	3	3
G13-0644-04	N	CUSHION FDR METER	2	2	2	2	2	2
G13-0642-04	N	CUSHION FDR PLL	1	1	1	1	1	1
G53-0510-04	N	PACKING FDR PANEL	1	1	1	1	1	1
H05-4573-04	N	CARTON(INSIDE)	1	1	1	1	1	1
H05-4574-04	N	CARTON(INSIDE)	1	1	1	1	1	1
H05-4621-04	N	CARTON(INSIDE)	1	1	1	1	1	1
H05-4573-04	N	CARTON(INSIDE)	1	1	1	1	1	1
H05-2200-04	N	CARTON(OUTSIDE) TS-711A	1	1	1	1	1	1
H05-2230-04	N	CARTON(OUTSIDE) TS-711E	1	1	1	1	1	1
H05-2256-04	N	CARTON(OUTSIDE) TS-711A	1	1	1	1	1	1
H10-2596-02	N	PACKING FIXTURE	1	1	1	1	1	1
H10-2597-02	N*	PACKING FIXTURE	1	1	1	1	1	1
H12-1315-04	N	BUFFER	1	1	1	1	1	1
H20-1423-03	N	POSITION COVER	1	1	1	1	1	1
H25-0105-04	N	BAG(ACSS)	1	1	1	1	1	1
H25-0105-04	N	BAG(ACSS) : 150X150	1	1	1	1	1	1
H25-0103-04	N	BAG(ACSS) : 125X250	1	1	1	1	1	1
J05-0323-05	N	FOOT CASE(B)	4	4	4	4	4	4
J05-0407-04	N	FOOT CASE(B)	1	1	1	1	1	1
J05-0403-04	N	FOOT CASE(SIDE)	4	4	4	4	4	4
J21-2573-04	N	FOOT HARDWARE	2	2	2	2	2	2
J29-0407-04	N	SW GUIDE A (TACT KNOB)	5	5	5	5	5	5
J29-0407-04	N	SW GUIDE B (TACT KNOB)	4	4	4	4	4	4
J37-0414-04	N	UP/DOWN	1	1	1	1	1	1
J42-0402-05	N	HOLE DUSH ACC1	1	1	1	1	1	1
J61-0404-05	N	FASTNER FOR DC PLUG	1	1	1	1	1	1
J61-0408-05	N	VINYL TIE	6	6	6	6	6	6
K05-0410-05	N	HANDLE CASE(B)	1	1	1	1	1	1
K22-0768-04	N	MAIN KNOB	1	1	1	1	1	1
K23-0776-04	N	ROUND KNOB RIT	1	1	1	1	1	1
K25-0710-04	N	KNOB	5	5	5	5	5	5
K27-0467-04	N	KNOB UP/DOWN	2	2	2	2	2	2
K29-0771-04	N	ROTATING TUNING KNOB	1	1	1	1	1	1
K29-0771-04	N	KNOB	3	3	3	3	3	3
K29-0758-04	N	KNOB POWER	1	1	1	1	1	1
K29-3001-04	N	KNOB NB	5	5	5	5	5	5
K29-3032-04	N	TACT KNOB RIT.TONE	5	5	5	5	5	5
K29-3032-04	N	TACT KNOB RIT.TONE	4	4	4	4	4	4
L01-8226-05	N	POWER TRANSFORMER	1	1	1	1	1	1
M09-0646-04	N	SCREW M4X4	2	2	2	2	2	2
N16-0040-46	N	SPRING WASHER	1	1	1	1	1	1
N30-2004-46	N	PAN HD SCREW	2	2	2	2	2	2
N30-3004-46	N	PAN HD SCREW	2	2	2	2	2	2
N30-3010-46	N	PAN HD SCREW	2	2	2	2	2	2
N30-3006-46	N	PAN HD SCREW	6	6	6	6	6	6
N32-2604-46	N	FLAT HD SCREW	6	6	6	6	6	6

PARTS LIST TS-711A/E

PART. NO.	NOTE	NAME & DESCRIPTION	DISTINCTION & QUANTITY						REFERENCE. NO
			011	021	022	051	061	071	
N32-2606-46		FLAT HD SCREW	6	6	6	6	6	6	
N32-3004-46		FLAT HD SCREW	2	2	2	2	2	2	
N32-2606-46		FLAT HD SCREW	2	2	2	2	2	2	
N33-3004-45		ROUND FLAT SCREW	4	4	4	4	4	4	
N33-3004-45		ROUND FLAT SCREW	4	4	4	4	4	4	
N35-2604-46		BIND SCREW	11	11	11	11	11	11	
N35-3004-41		BIND SCREW	18	18	18	18	18	18	
N87-2605-46		BIN TSCREW	2	2	2	2	2	2	
N87-2605-46		TAPPING SCREW	38	38	38	38	38	38	
N87-3006-46		TAPPING SCREW	10	10	10	10	10	10	
N87-3010-41		TAPPING SCREW	6	6	6	6	6	6	
N87-4006-46		TAPPING SCREW	3	3	3	3	3	3	
N87-4006-46		TAPPING SCREW	4	4	4	4	4	4	
N87-4008-46		TAPPING SCREW	1	1	1	1	1	1	
N88-2606-46		FLAT TAPPING SCREW	2	2	2	2	2	2	
N88-3006-46		FLAT TAPPING SCREW	2	2	2	2	2	2	
N89-3006-45		BIN TAPPING SCREW	4	4	4	4	4	4	
SDT1000F									
S29-2409-05	N	THERMISTER	1	1	1	1	1	1	
S31-1415-05	N	VOLTAGE SELECTOR SWITCH	1	1	1	1	1	1	
S31-1415-05	N	SLIDE SWITCH	1	1	1	1	1	1	
S40-2450-05	N	PUSH SWITCH	1	1	1	1	1	1	
S50-1406-05	N	TACT SWITCH(UP,DOWN)	2	2	2	2	2	2	
S59-6428-05	N	KEYBOARD ASS'Y DCS	1	1	1	1	1	1	
TO3-0027-15									
T91-0331-05	N	SPEAKER	1	1	1	1	1	1	
T91-0331-05	N	MICROPHONE (M,W)	1	1					
T91-0331-05	N	PHONE (T)							
T94-0049-05	N	MICROPHONE (M,W)	1	1	1	1	1	1	
T94-0049-05	N	PLANGER	1	1	1	1	1	1	
W02-0364-00	N	ENCODER ASS'Y	1	1	1	1	1	1	
W09-0326-03	N	LITHIUM BATTERY	1	1	1	1	1	1	
X41-1580-11	N	SWITCH UNIT	1	1	1				
X41-1580-65	N	SWITCH UNIT			1	1			
X41-1580-11	N	SWITCH UNIT							
X41-1580-11	N	RF UNIT	1	1	1	1	1	1	
X42-1620-11	N	RF UNIT	2	1	1				
X44-1620-01	N	RF UNIT							
X44-1620-11	N	RF UNIT							
X45-1380-11	N	FINAL UNIT	1	1	1	1	1	1	
X48-1400-11	N	IF UNIT	1	1	1				
X48-1400-00	N	IF UNIT							
X48-1400-11	N	IF UNIT	1	1	1	1	1	1	
X49-1180-00	N	AF UNIT	1	1	1	1	1	1	
X50-1990-11	N	PLL UNIT	1	1	1				
X50-1990-11	N	PLL UNIT			1	1	1	1	
X50-1990-11	N	PLL UNIT							
X50-1990-11	N	PLL UNIT							
X50-1990-11	N	PLL UNIT							
X52-1290-60	N	PLL UNIT							
X52-1290-60	N	TONE UNIT							
X53-1410-11	N	CONTROL UNIT	1	1		1	1		
X53-1410-21	N	CONTROL UNIT							
X53-1410-21	N	CONTROL UNIT							
X53-1410-61	N	CONTROL UNIT					1		
X53-1410-21	N	CONTROL UNIT						1	
X54-1820-11	N	DISPLAY UNIT	1	1	1	1	1	1	

SWITCH UNIT (X41-1580-XX) (-11 : K,M1,M2,X -61 : T,W)

TS-711A/E PARTS LIST

AVR UNIT (X43-1490-11)

PART NO	NOTE	NAME & DESCRIPTION	DISTINCTION & QUANTITY		REFERENCE.NO
			011	011	
CE04W1C100M		ELECTRO 100 16V	6		C / 8, 9, 12, 20
CE04W1C101M		ELECTRO 100 16V	1		C / 10
CK4581H102K		CERAMIC 1000P 50V	10		C / 5, 7, 11, 14, 15, 17, 18 C / 24, 25, 26
C90-2004-05	N	ELECTRO 1000 25V	2		C / 3, 2
C90-2005-05	N	ELECTRO 1000 25V	2		C / 3, 4
C90-0817-05		ELECTRO 1000 16V	1		C / 22
C90-0820-05		ELECTRO 470 16V	3		C / 19, 21, 23
C91-0117-05		CERAMIC 0.01 50V	1		C / 16
C91-1008-05		CERAMIC 0.022 50V	1		C / 13
C91-0119-05		CERAMIC 0.047 50V	1		C / 6
DTC114ES		DIGITAL TR	1		Q / 12
E05-0375-05	*	MINI CONNECTOR 8P	1		
E25-5043-05	*	INSIDE CONNECTING WIRE	1		
E40-5044-05	N*	MINI CONNECTOR 2P	1		
E40-5045-05	N*	MINI CONNECTOR 6P	1		
E40-0273-05	*	MINI CONNECTOR 2P	2		
E40-0473-05	*	MINI CONNECTOR 4P	1		
E40-0673-05	*	MINI CONNECTOR 6P	1		
E40-0773-05	*	MINI CONNECTOR 7P	1		
E40-0973-03	*	MINI CONNECTOR 9P	1		
F20-0078-05		INSULATING PLATE	2		
F29-0014-05		INSULATING WASHER	2		
J13-0055-05		FUSE HOLDER	2		
J19-0306-05		HOLDER	1		
L15-0016-05		LOW-FREQUENCY COIL	2		L / 1, 2
M726.24(A,B)	ZENER DIODE	6.2V	1		D / 6
M728.22(B,C)	ZENER DIODE	8.2V	1		D / 5
NJM4558S		IC	1		Q / 10
R12-1429-05		TRIM.POT. 500 OHM	1		VR / 1
R12-1428-05		TRIM.POT. 1K OHM	1		VR / 2
R92-0674-05	N	RESISTOR BLOCK 10 OHM 2W	2		R / 16, 17
S10VB20		RESISTOR_BLOCK	1		D / 1
UPC78M08H		IC	1		Q / 8
U09B		DIODE	1		D / 4
V01223		VARISTOR	1		D / 7
V06B		DIODE	2		D / 2, 3
1S5133		DIODE	2		D / 8, 9
2SA1012(Y)		TR	2		Q / 1, 5
2SA1049(Y)		TR	1		Q / 7
2SC1959(Y)		TR	3		Q / 2, 9, 11
2SC2458(Y)		TR	3		Q / 3, 4, 6

RF UNIT (X44-1620-XX) (-01 : T,W -11 : K,M1,M2,X)

PART NO	NOTE	NAME & DESCRIPTION	DISTINCTION & QUANTITY		REFERENCE.NO
			001	011	
CC45CH1H085C		CERAMIC 0.5P 50V	1	1	C / 40
CC45CH1H128J		CERAMIC 100 50V	1		C / 27, 28
CC45CH1H129J		CERAMIC 100 50V	4	1	C / 27
CC45CH1H080D		CERAMIC 8P 50V	1	1	C / 38
CC45CH1H150J		CERAMIC 15P 50V	2	2	C / 8, 56
CC45CH1H100D		CERAMIC 10P 50V	4		C / 12, 23, 24, 49
CC45CH1H100D		CERAMIC 10P 50V	1	1	C / 12
CC45CH1H100D		CERAMIC 20P 50V	1	1	C / 4
CC45CH1H330J		CERAMIC 33P 50V	4	4	C / 14, 20, 21, 22
CC45SL1H101J		CERAMIC 100P 50V	1	1	C / 1, 47
CC45CH1H010C		CERAMIC 1P 50V	2	1	C / 9, 36
CC45CH1H010C		CERAMIC 1P 50V	1	1	C / 37, 41
CC45CH1H030C		CERAMIC 2P 50V	2	2	C / 10, 34
CC45CH1H060D		CERAMIC 3P 50V	2	2	C / 13
CC45CH1H080D		CERAMIC 8P 50V	2	2	C / 33, 42
C773EC1H1070D		CHIP CAP. 7P 50V	1	1	C / 30
GE94K1100H		INDUCTOR 10 16V	1	1	C / 35
GE94K1100H		INDUCTOR 20 16V	1	1	C / 36
C05-0030-15K		CHIP CAP. 2000P 50V	5	5	C / 2, 29, 35, 43, 55
C05-0030-15		TRIMMER 20P	1	1	TC / 2
C05-0031-15		TRIMMER 20P	1	1	TC / 1
E04-0154-05		RF COAX. CONNECTOR RA,HE,T,DO	3	3	
L31-0180-05		TUNING COIL	1	1	L / 15
L31-0247-05		TUNING COIL	2	2	L / 16, 17
L34-0886-05		TUNING COIL	1	1	L / 14
L34-0205-05		TUNING COIL	1	1	L / 6
L34-0893-05		TUNING COIL	3	3	L / 5, 10
L34-0894-05		COIL 3 5T	2	2	L / 19, 21
L34-0908-05		COIL 3 9.5T	1	1	L / 11
L40-1092-14		INDUCTOR 1.0H	1	1	L / 22
L40-1092-14		INDUCTOR 1.0H	2	2	L / 23, 8
L40-4713-13		INDUCTOR 4.7H	1	1	L / 24
L40-1001-13		INDUCTOR 10 UH	1	1	L / 24
L40-1091-03		INDUCTOR 1 UH	1	1	L / 9
L71-0248-05	N	MCF 30.265MHZ	1	1	L / 4
L79-0643-05	N	HELICAL BLOCK	1		L / 1
L79-0643-05	N	HELICAL BLOCK	1		L / 1
L79-098-15		HERICAL	1		L / 2
L79-0499-05		HELICAL	1		L / 2
MAB56		DIODE	2	2	D / 1, 2
S51-1420-05		RELAY	1	1	RL / 1
1SS133		DIODE	1	1	D / 9
1SS133		DIODE	5	5	D / 8
1SV123		DIODE	5	5	D / 3, 4, 5, 6, 7
2SC2538-22-A		TR FET	1	1	Q / 6
2SK192A(GR)+N		FET	2	2	Q / 3, 4
3SK12910(R)	N	FET	1	1	Q / 1
3SK127(L)		FET	2	2	Q / 2, 5

PARTS LIST TS-711A/E

FINAL UNIT (X45-1380-11)

PART NO.	NOTE	NAME & DESCRIPTION	011	DISTINCTION & QUANTITY	REFERENCE NO
CC45CH1H0R5C		CERAMIC 0.5P 50V	1		C / 6
CC45CH1H01C		CERAMIC 1P 50V	2		C / 2, 9
CC45CH1H1B0J		CERAMIC 18P 50V	1		C / 10
CC45SL1H10D		CERAMIC 6P 500V	1		C / 31, 32
CC45SL1H220J		CERAMIC 10P 500V	2		C / 3, 5, 7, 8, 33
CC45SL1H220J		CERAMIC 22P 500V	5		C / 23
CE04W1C220M		ELECTRO 22 16V	1		C / 25
CE04W1C101M		ELECTRO 100 16V	1		C / 26
CS15E1VR47M		TANTALUM 0.47 35V	1		C / 26
CS15E1VR47M		TANTALUM 2.20 16V	2		C / 29, 30
C90-0838-05		ELECTRO 1 50V	1		C / 13
C90-0861-05		ELECTRO 22 16V	1		C / 28
E04-0141-05	N	UNF RECEPTACLE	1		
E29-0440-14		GND WAFFER	1		
E31-2061-05		JUMPER WIRE DO	1		
E31-3061-05	*	WIRE WITH CONNECFAN	1		
F09-0405-34		FAN	1		
F09-0078-05		INSULATING PLATE	1		
F29-0014-05		INSULATING WASHER	4		
G02-0549-04	N	SPRING FOR MOTOR	1		
L34-0157-09		VHF COIL	3 6		L / 4, 6
L34-0823-05		VHF COIL	5 3T		L / 9
L34-0894-05		COIL	3 5T		L / 3
L34-0908-05		COIL	3 9.5T		L / 2, 5
L34-1019-05		COIL	3 2.5T		L / 4
L40-1092-14		INDUCTOR	1 UH		L / 7
L40-1092-16		INDUCTOR	1 UH		L / 8
M130B		DIODE	1		D / 2
M1407		DIODE	1		D / 1
MS7727		POWER MODULE	1		Q / 1
N14-0509-05		NUT	1		
R12-0541-05		TRIM.POT. 100 DMM	1		VR / 2
R12-5517-05		TRIM.POT. 100 DMM	1		VR / 1
SDT1000F		THERMISTER	1		TH / 1
T42-0302-05		DC MOTOR	1		
18S101		DIODE	1		D / 3
18S107		DIODE	4		D / 4, 5, 6, 7
2SA1012(Y)		TR	1		Q / 2
2SA1048(Y)		TR	1		Q / 4
2SC1815(Y)		TR	1		Q / 3
Z30717(D,Y)	N	TR.	1		Q / 5

IF UNIT (X48-1400-XX) (-00 : T,W -11 : K,M1,M2,X)

PART NO.	NOTE	NAME & DESCRIPTION	000.001.011	DISTINCTION & QUANTITY	REFERENCE NO
CC45CH1H156J		CERAMIC 15P 50V	1		C / 52, 57, 90, 121, 190
CC45SL1H230J		CERAMIC 22P 50V	3 3		C / 1, 118, 185
CC45CH1H100D		CERAMIC 10P 50V	1 7		C / 119
CC45SL1H470J		CERAMIC 47P 50V	3 3		C / 69, 106, 107
CC45CH1H0R5C		CERAMIC 0.5P 50V	2 2		C / 31
CC45CH1H100D		CERAMIC 10P 50V	1 1		C / 165
CC45SL1H121J		CERAMIC 120P 50V	1 1		C / 114
CC45CH1H220J		CERAMIC 22P 50V	1 1		C / 8, 115
CC45CH1H0R5C		CERAMIC 0.5P 50V	2 2		C / 14, 15
CC45SL1H2470J		CERAMIC 47P 50V	1 1		C / 37
CC45CH1H100D		CERAMIC 10P 50V	1 1		C / 103
CC45CH1H200		CERAMIC 33P 50V	1 1		C / 3, 37
CC45CH1H330J		CERAMIC 33P 50V	2 2		C / 3, 37
CC45CH1H030C		CERAMIC 3P 50V	1 1		C / 15
CC45CH1H121J		CERAMIC 120P 50V	1 1		C / 32, 65
CC45CH1H100D		CERAMIC 5P 50V	2 2		C / 64, 101, 108, 126
CC45SL1H470J		CERAMIC 47P 50V	4 4		C / 16
CC45SL1H221J		CERAMIC 220P 50V	1 1		C / 6, 91
CC45CH1H070M		CERAMIC 7P 50V	2 2		C / 19, 24, 25, 48, 61, 74, 97
CC45CH1H100D		CERAMIC 10P 50V	1 1		C / 14
CC45SL1H100D		CERAMIC 10P 50V	1 1		C / 13
CE04W1H010M		ELECTRO 1 50V	9 9		C / 38, 77, 80, 82, 83, 157, 163
CE04W1H010M		ELECTRO 1 50V	10		C / 17, 170, 171, 172, 173
CE04W1H222M		ELECTRO 2.2 50V	1 1		C / 187
CE04W1E4R7M		ELECTRO 4.7 25V	6 6		C / 81, 155, 162, 181, 182, 188
CE04W1C100M		ELECTRO 10 16V	3 3		C / 130, 173
CE04W1C220M		ELECTRO 22 16V	1 1		C / 180
CE04W1A021M		ELECTRO 40 10V	3 3		C / 79, 171, 183
CE04W1C220M		ELECTRO 220 10V	1 1		C / 182
CK45B1H100M		ELECTRO 1 50V	1 1		C / 131
CK45B1H100M		ELECTRO 1 50V	1 1		C / 179
CK45B1H102K		ELECTRO 1 50V	6 6		C / 5, 9, 12, 42, 94, 135
CK45B1H102K		ELECTRO 1 50V	12 12		C / 140
CK45B1H102K		ELECTRO 1 50V	2 2		C / 70, 87
CK45B1H102K		ELECTRO 1 50V	4 4		C / 47, 110, 153, 177
CK45B1H471K		ELECTRO 470P 50V	1 1		C / 47, 110, 145, 157
CK45B1H102K		ELECTRO 1000P 50V	12 12		C / 4, 10, 11, 88, 134, 145, 156, 159, 168, 186, 189, 193
CK45B1H102K		ELECTRO 1000P 50V	12 12		C / 6, 23, 45, 98, 136, 156, 159, 168, 186, 189, 193
CK45F1H103Z		CERAMIC 0.01 50V	1 1		C / 88
CK45F1H103Z		CERAMIC 0.01 50V	6 6		C / 29, 43, 85, 89, 138, 144
CK45F1H103Z		CERAMIC 330P 50V	1 1		C / 14
CK45F1H103Z		MYLAR 0.01 50V	1 1		C / 176
CK02M1H153K		MYLAR 0.015 50V	1 1		C / 160
CK02M1H223K		MYLAR 0.022 50V	1 1		C / 169
CK02M1H473K		MYLAR 0.047 50V	2 2		C / 78, 161
CK02M1H683K		MYLAR 0.068 50V	2 2		C / 14, 170
CK15E1VR47M		TANTALUM 0.1 35V	2 2		C / 178, 191
CK15E1VR47M		TANTALUM 0.47 35V	1 1		C / 39
CS15E1E010M		TANTALUM 1 25V	2 2		C / 71, 133
CS15E1C2R2M		TANTALUM 2.2 16V	1 1		C / 44
C05-0030-15		TRIMMER 20P	1 1		TC / 2

TS-711A/E PARTS LIST

PART NO	NOTE	NAME & DESCRIPTION	DISTINCTION & QUANTITY			REFERENCE.NO
			000	001	011	
C05-0031-15		TRIMMER 10P	2	2		TC , 1, 3
C91-0667-05		CERAMIC 0.0047 50V	1	1		C , 167
C91-0117-05		CERAMIC 0.01 50V	6	6		C , 33, 49, 17, 67, 112, 137
C91-1008-05		CERAMIC 0.022 50V	11	11		C , 125, 146, 149, 150
C91-0117-05		CERAMIC 0.01 50V	12	12		C , 26, 27, 35, 36, 46, 68, 86
C91-1008-05		CERAMIC 0.022 50V	32	32		C , 111, 116, 117, 139, 154
C91-1008-05		CERAMIC 0.022 50V				C , 50, 58, 60, 72, 34, 51, 53, 54
C91-1008-05		CERAMIC 0.047 50V	1	1		C , 84, 93, 95, 96, 100, 104
C91-0667-05	N	CERAMIC 0.022 50V	2	2		C , 105, 127, 128, 129, 132, 134, 141
C91-0119-05		CERAMIC 0.047 50V	2	1		C , 143, 147, 148, 151, 158
C91-0119-05		CERAMIC 0.047 25V				C , 109, 115, 142
C91-0457-05		CERAMIC 0.022 50V	2	2		C , 38
E40-0457-05	*	CERAMIC 0.022 50V	4	4		C , 51, 59, 120, 124
E40-0087-05	*	MINI CONNECTOR 4P	1	1		C , 192
E40-0667-05	*	MINI CONNECTOR 5P	4	4		C , 164, 184
E40-0773-05	*	MINI CONNECTOR 5P	1	1		C , 40
E40-0773-05	*	MINI CONNECTOR 7P	1	1		
E40-0973-05	*	MINI CONNECTOR 9P	2	2		
DTC114ES		DIGITAL TR	1	1		Q , x 19
E04-0154-05		RF COAX. CONNECTOR RA, HET, DO				
E23-0512-05		TERMINAL 1P	4	4		
E40-0273-05	*	MINI CONNECTOR 2P	6	6		
E40-0473-05	*	MINI CONNECTOR 4P	1	1		
E40-0573-05	*	MINI CONNECTOR 5P	4	4		
E40-0773-05	*	MINI CONNECTOR 5P	1	1		
E40-0973-05	*	MINI CONNECTOR 7P	1	1		
E40-0973-05	*	MINI CONNECTOR 9P	2	2		
G02-0535-04			2	2		
L30-0281-15		IFT	4	4		L , 13, 14, 15, 18
L30-0289-05		IFT	5	5		L , 6, 10, 11, 21, 22
L30-0503-05		IFT	3	3		L , 32, 27, 33
L30-0504-05		IFT	2	2		L , 32
L33-0681-05	N	CHOKER COIL 6.8 UH	1	1		L , 5
L34-2038-05	N	TUNING COIL 30MHZ	4	4		L , 8
L34-2038-05	N	TUNING COIL	4	4		L , 9, 10, 11, 24
L34-2041-05		TUNING COIL	5	5		L , 13, 23, 28, 29
L34-2045-05		TUNING COIL	5	5		L , 26
L40-1501-05		INDUCTOR 15 UH	1	1		L , 17, 19
L40-1501-05		INDUCTOR 150 UH	2	2		L , 16, 35, 36
L40-1501-05		INDUCTOR 1 MH	5	5		L , 38
L40-1501-16		INDUCTOR 100 UH	1	1		L , 30
L40-1011-17		INDUCTOR 100 UH	1	1		L , 12
L71-0249-05	N	X-TAL FILTER 100 S	1	1		L , 31
L72-0342-05		CERAMIC FILTER CFY455F	1	1		L , 4
L77-1250-05	N	X-TAL 33,6570MHZ	1	1		L , 34
L79-0446-05		CERAMIC DISCRI CFY455S	1	1		
MC931		DIODE	2	2		D , 27, 28
MC931		DIODE	5	5		D , 9, 24, 29, 32, 38
ND487C1-3R		DIODE	1	1		D , x 16
R12-0421-05		TRIM.POT. 100 OHM	1	1		VR , 8

PART NO	NOTE	NAME & DESCRIPTION	DISTINCTION & QUANTITY			REFERENCE.NO
			000	001	011	
R12-1429-05		TRIM.POT. 500 OHM	1	1		VR , 6
R12-1429-05		TRIM.POT. 3K OHM	1	1		VR , 2
R12-3443-05		TRIM.POT. 10K OHM	4	3		VR , 1, 4, 7
R12-5450-05	N	TRIM.POT. 20K OHM	1	1		VR , 9
R12-7408-05	N	TRIM.POT. 500KOHM	2	2		VR , 3, 5
TA7302P		IC	2	2		Q , 41, 44
UPC527H(E,F)		IC	1	1		Q , 46
UPC6558C		IC	2	1		Q , 47
I1N60		DIODE	6	6		D , 10, 11, 12, 13
1SS133		DIODE	6	6		D , 2, 4, 6, 7, 8, 15, 17
1SS133		DIODE	17	17		D , 21, 22, 23, 25, 26, 31, 34
1S1587		DIODE	1	1		D , 14
1S1587		DIODE	2	2		D , 19, 20
1S2218		VOLTAGE VARIABLE	1	1		D , 3
112-102-2		TERMISTER	2	2		D , 2, 3
112-103-2		TERMISTER	1	1		D , 1
ZSA1048(Y)		TR	9	9		Q , 11, 12, 13, 15, 16, 17, 18
ZSA2458(Y)		TR	9	2		Q , 27, 60
ZSC3113(B)		TR	9	2		Q , 55, 56, 58, 59, 61, 62
ZSC2668(Y,D)		TR	5	6		Q , 54, 55
ZSC2668(Y)		TR	5	6		Q , 1, 2
ZSC2229(GR)		TR	26	1		Q , 4, 36, 38, 40, 48
ZSC2458(Y)		TR				Q , 29
ZSC2458(Y)		TR		23		Q , 3, 9, 14, 23, 24, 29
ZSC2458(Y)		TR				Q , 31, 33, 37, 39, 42, 43
ZSK125		FET	1	1		Q , 49, 50, 51, 52, 53
ZSK30A(O)		FET	5	3		Q , 3, 9, 14, 23, 24, 28, 30
ZSK161(GR)		FET	2	2		Q , 49, 50, 51, 52, 53, 55
3SK73(GR)		FET	6	6		Q , 56, 58, 59
3SK73(Y)		FET	1	1		Q , 5, 8, 20, 21, 22, 32
						Q , 34

PARTS LIST TS-711A/E

AF UNIT (X49-1180-00)

PART NO	NOTE	NAME & DESCRIPTION	000	DISTINCTION & QUANTITY	REFERENCE.NO
CC455L1H390J		CERAMIC 39P 50V	1		C ✓ 32
CC455L1H101J		CERAMIC 100P 50V	3		C ✓ 2, 3, 45
CE04W1E4R7M		ELECTRO 4.7 25V	2		C ✓ 20, 21
CE04W1C100M		ELECTRO 10 16V	7		C ✓ 6, 8, 9, 10, 17, 40, 52
CE04W1C102M		ELECTRO 0.2 50V	5		C ✓ 5, 22, 25, 46, 56
CE04W1A101M		ELECTRO 100 10V	1		C ✓ 47
CE04W1HHR47M		ELECTRO 0.47 50V	1		C ✓ 27
CE04W1H010M		ELECTRO 1 50V	18		C ✓ 6, 11, 13, 14, 15, 16, 18 ✓ 14, 20, 26, 29, 35, 37, 38 ✓ 41, 42, 48, 53
CE04BW1H010M		ELECTRO 1 50V	2		C ✓ 43
CK455B1H471K		CERAMIC 470P 50V	1		C ✓ 31
CK455B1H561K		CERAMIC 560P 50V	1		C ✓ 39, 44, 61, 63
CK455B1H02K		CERAMIC 100P 50V	5		C ✓ 33
CS15E1VR47M		CERAMIC 1500P 50V	1		C ✓ 12
C092M1H332K		MYLAR 3300P 50V	1		C ✓ 34
C092M1H103K		MYLAR 0.01 50V	1		C ✓ 54, 55, 57, 58
C092M1H123K		MYLAR 0.012 50V	4		C ✓ 5
C092M1H104K		MYLAR 0.1 50V	1		C ✓ 59
CS15E1VR47M		TANTALUM 0.1 35V	1		C ✓ 60
C092M1H303M		TANTALUM 3.3 16V	1		C ✓ 51
C90-0882-05		ELECTRO 220 25V	1		C ✓ 49
C90-0820-05		ELECTRO 470 16V	1		
E40-0373-05	*	MINI CONNECTOR 3P	1		
E40-0473-05	*	MINI CONNECTOR 4P	1		
E40-0573-05	*	MINI CONNECTOR 5P	2		
E40-0673-05	*	MINI CONNECTOR 6P	1		
E40-0773-05	*	MINI CONNECTOR 7P	1		
E40-0973-05	*	MINI CONNECTOR 9P	1		
MB3713	IC		1		Q ✓ 11
MC921	DIODE		2		D ✓ 2, 8
MC921	DIODE		1		D ✓ 11
NM45588	IC		2		Q ✓ 4, 9
N30-3004-46	PAN HD SCREW		4		
R12-5443-05	TRIM.POT.	10K OHM	2		VR ✓ 1, 3
R12-4413-05	TRIM.POT.	50K OHM	1		VR ✓ 4
R12-3420-05	TRIM.POT.	100KOHM	1		VR ✓ 2
UPC1158H2	IC		1		Q ✓ 5
1N60	DIODE		1		D ✓ 5
1S5133	DIODE		1		D ✓ 10
1S5133	DIODE		6		D ✓ 1, 3, 4, 6, 7, 9
2SA1048(Y)	TR		2		Q ✓ 2, 13
2SC2458(Y)	TR		8		Q ✓ 3, 7, 8, 10, 12, 14, 15
2SC2459(GR)	TR		1		Q ✓ 1
2SK30A(GR)	FET		1		Q ✓ 6

PLL UNIT (X50-1990-XX) (-00 : T,W -11 : K,M1,M2,X)

PART NO	NOTE	NAME & DESCRIPTION	000	001	011	012	DISTINCTION & QUANTITY	REFERENCE.NO
CC45CH1H060D		CERAMIC 6P 50V	1	1	1	1		C ✓ 135
CC45CH1H060D		CERAMIC 1P 50V	1	1	1	1		C ✓ 110
CC45CH1H070D		CERAMIC 7P 50V	1	1	1	1		C ✓ 14, 32, 89, 161, 170
CC45SL1H470J		CERAMIC 47P 50V	5	5	5	5		C ✓ 66, 152
CC45CH1H050J		CERAMIC 5P 50V	2	2	2	2		C ✓ 120
CC45CH1H060D		CERAMIC 6P 50V	1	1	1	1		C ✓ 13, 158
CC45CH1H100J		CERAMIC 10P 50V	2	2	2	2		C ✓ 30, 81, 119, 164
CC45CH1H180J		CERAMIC 18P 50V	4	4	4	4		C ✓ 96, 155
CC45CH1H080D		CERAMIC 8P 50V	2	2	2	2		C ✓ 166, 160
CC45SL1H101J		CERAMIC 100P 50V	2	2	2	2		C ✓ 95, 165
CC45CH1H150J		CERAMIC 15P 50V	1	1	1	1		C ✓ 145
CC45SL1H100D		CERAMIC 220P 50V	1	1	1	1		C ✓ 135
CC45U1H270J		CERAMIC 1P 50V	1	1	1	1		C ✓ 118
CC45SL1H331J		CERAMIC 27P 50V	1	1	1	1		C ✓ 46
CC45CH1H150J		CERAMIC 330P 50V	1	1	1	1		C ✓ 65
CC45CH1H180J		CERAMIC 15P 50V	1	1	1	1		C ✓ 54
CC45CH1H080D		CERAMIC 18P 50V	2	2	2	2		C ✓ 144, 152, 169
CC45CH1H100J		CERAMIC 0.5P 50V	3	3	3	3		C ✓ 136, 128
CC45CH1H230J		CERAMIC 22P 50V	2	2	2	2		C ✓ 1, 9, 20, 22
CC45CH1H202J		CERAMIC 22P 50V	4	4	4	4		C ✓ 21, 44, 124, 151
CC45CH1H030J		CERAMIC 3P 50V	4	4	4	4		C ✓ 4, 5
CC45CH1H270J		CERAMIC 27P 50V	1	1	1	1		C ✓ 64
CC45CH1H040J		CERAMIC 4P 50V	1	1	1	1		C ✓ 10, 50, 121
CC45CH1H270J		CERAMIC 27P 50V	3	3	3	3		C ✓ 128, 129
CC45C1H330J		CERAMIC 33P 50V	2	2	2	2		C ✓ 3, 40, 85
CC45CH1H050J		CERAMIC 5P 50V	1	1	1	1		C ✓ 12, 14
CC45CH1H050J		CERAMIC 68P 50V	1	1	1	1		C ✓ 45
CC45SL1H330J		CERAMIC 39P 50V	4	4	4	4		C ✓ 82, 84, 86, 88
CC45CH1H030J		CERAMIC 5P 50V	1	1	1	1		C ✓ 147
CC45SL1H470J		CERAMIC 47P 50V	4	4	4	4		C ✓ 4, 84, 87, 127
CC73EC1H1H010C		CHIP CAP. 1P 50V	1	1	1	1		C ✓ 5
CC73EC1H1H010C		CHIP CAP. 8P 50V	1	1	1	1		C ✓ 63
CC73EC1H1H070D		CHIP CAP. 7P 50V	1	1	1	1		C ✓ 62
CC73EC1H1H100D		CHIP CAP. 10P 50V	1	1	1	1		C ✓ 62
CC73EC1H1H160J		CHIP CAP. 16P 50V	1	1	1	1		C ✓ 60
CE04W1E4R7M		ELECTRO 4.7 25V	1	1	1	1		C ✓ 58
CE04W1A74R7M		ELECTRO 47 10V	5	5	5	5		C ✓ 107, 113, 116, 150
CE04W1A101M		ELECTRO 100 10V	3	3	3	3		C ✓ 69, 99, 122
CK45B1H102K		CERAMIC 1000P 50V	10	10	10	10		C ✓ 8, 11, 13, 57, 94, 97, 102, 117, 145, 166
CK45F1H103Z		CERAMIC 0.01 50V	4	4	4	4		C ✓ 47, 138, 143, 156
CK45B1H681K		CERAMIC 680P 50V	2	2	2	2		C ✓ 107, 113, 116, 150
CK45B1H102K		CERAMIC 1000P 50V	12	12	12	12		C ✓ 2, 6, 7, 12, 59, 68, 70, 71, 92, 131, 167, 177
C992M1H222K		MYLAR 2200P 50V	1	1	1	1		C ✓ 74
C992M1H182K		MYLAR 820P 50V	1	1	1	1		C ✓ 114
C992M1H233K		MYLAR 0.05 50V	1	1	1	1		C ✓ 75
C992M1H183K		MYLAR 0.147 50V	1	1	1	1		C ✓ 56
C992M1H683K		MYLAR 0.068 50V	1	1	1	1		C ✓ 111
CS15E1VR22M		TANTALUM 0.22 35V	1	1	1	1		C ✓ 69
CS15E1VR47M		TANTALUM 0.47 35V	1	1	1	1		C ✓ 78
CS15E1E010M		TANTALUM 1 25V	2	2	1	1		C ✓ 72, 73
CS0-0030-15		TRIMMER 6P	1	1	1	1		TC ✓ 1
CS0-0047-05		TRIMMER 20P	2	2	2	2		TC ✓ 3, 4
C91-0117-05		CERAMIC 0.01 50V	15	15	15	15		C ✓ 5, 19, 23, 24, 29, 33, 34

TS-711A/E PARTS LIST

PART. NO.	NOTE	NAME & DESCRIPTION	DISTINCTION			QUANTITY	REFERENCE NO
			000	001	011		
C93-0117-05		CERAMIC 0.01 50V	7	7			, 39, 51, 76, 79, 90, 96, 123 , 154
C91-1008-05		CERAMIC 0.022 50V	21	21			C , 41, 48, 53, 108, 115, 126, 149 C , 15, 17, 25, 26, 27, 28, 32, 53 C , 112, 137, 138, 139, 140, 160, 166 C , 113, 132, 139, 134, 140, 53
C91-1008-05		CERAMIC 0.022 50V	15	15			C , 176 C , 16, 18, 31, 42, 98, 100, 109 C , 130, 139, 141, 142, 157, 159, 163 C , 168
E04-0154-05		RF COAX. CONNECTOR RA, HET, DO		1			
E23-0512-05		TERMINAL 18°	9	9			L , 44
E40-0473-05	*	MINI CONNECTOR 6P	1	1			L , 9, 13
E40-0673-05	*	MINI CONNECTOR 6P	1	1			L , 21
E40-0673-05	*	MINI CONNECTOR 8P	1	1			L , 33
F11-0818-14		SHIELD CASE(VCO TOP CASE)	1	1			L , 14
L30-0889-05		I.F.T	1	1			L , 20
L30-0281-15		I.F.T	2	2			L , 25, 26
L32-0624-05		OSCILLATING COIL	1	1			L , 27, 35
L32-0639-05		OSCILLATING COIL 50MHZ	1	1			L , 28, 29
L33-0647-05		CHORE COIL 18 UH	1	1			L , 4
L33-0650-05		INDUCTOR 3.5 UH	2	2			L , 45, 46
L34-0894-05		COIL 3 ST	2	2			L , 47, 48
L34-0908-05		COIL 3 9.5T	3	3			L , 50, 51
L34-1033-05		COIL 3 8.5T	3	3			L , 52, 7
L34-0683-05		TUNING COIL	2	2			L , 6
L34-0749-05		TUNING COIL	2	2			L , 37, 38, 43
L34-0232-05	N	TUNING COIL 51.2MHZ	2	2			L , 32, 34
L34-3064-05		TUNING COIL	2	2			L , 35
L34-3066-05		TUNING COIL	2	2			L , 30, 31
L40-4891-05		INDUCTOR 68 UH	3	3			L , 11, 16, 18
L40-5017-05		INDUCTOR 100 UH	2	2			L , 22
L40-5533-05		INDUCTOR 150 UH	2	2			L , 23, 36
L40-5311-05		INDUCTOR 330 UH	2	2			L , 42
L40-1021-05		INDUCTOR 1 MH	3	3			L , 8, 10
L40-2092-16		INDUCTOR 10 UH	3	3			L , 17
L40-2092-16		INDUCTOR 100 UH	2	2			L , 19
L40-7711-13		INDUCTOR 470 UH	1	1			L , 41
L77-0536-05	N	CERAMIC FILTER SEE11.025MJ-A	2	2			L , 28, 29
L77-0950-05		XATL 10.6965MHZ	1	1			D , 4, 5
L77-0951-05		XATL 10.6965MHZ	1	1			Q , 21
L77-1255-05	N	TCXO 30.220MHZ	2	2			Q , 19
L79-2644-05	N	BPF BP193	2	2			Q , 41
MA856		DIODE	2	2			Q , 6, 8
MC14155P*#		IC	1	1			Q , 23
MC14155P		IC	1	1			Q , 23
MC921		DOUBLE DIODE	2	2			
MC921		DIODE	1	1			
MS4459L		IC	1	1			
NJM78L05A		IC	1	1			

PART. NO.	NOTE	NAME & DESCRIPTION	DISTINCTION			QUANTITY	REFERENCE NO
			000	001	011		
R52-1405-05		TRIM.POT. 5K OHM	3	3			VR , 1, 2, 3
			4				
SN16913P		IC	4	4			Q , 3, 4, 6, 31
SN74LS90N		IC	2	2			Q , 22, 36
TA7302P		IC	1	1			Q , 30
UP8555C		IC	1	1			Q , 20
1SV50		DIODE	3	3			D , 1, 2, 3
2SA1048(Y)		TR	1	1			Q , 15
2SC2459(BL)		TR	3	3			Q , 12, 14, 25
2SC2459(BL)		TR	3	3			Q , 13, 26, 27
2SC2458(Y)		TR	4	4			Q , 9, 34, 35, 39
2SC2458(Y)		TR	3	3			Q , 16, 33, 38
2SC2458(Y)		TR	3	3			Q , 7, 8, 41
2SC2668(Y)		TR	1	1			Q , 24
2SC2668(Y)		TR	6	6			Q , 32
2SC2668(Y,D)		TR	1	1			Q , 5, 11, 17, 18, 29, 40
2SC2668(Y,D)		TR	6	6			Q , 1
2SC2668(Y)		TR	1	1			Q , 10, 28
2SC2668(Y)		TR	2	2			Q , 2
2SK192A(GR)*N		FET	1	1			
3SK73(Y)		FET	1	1			

PARTS LIST TS-711A/E

TONE UNIT (X52-1290-60) (T,W)

CONTROL UNIT (X53-1410-XX) (-11 : K,M1 -21 : M2,X -51 : T -61 : W)

TS-711A/E PARTS LIST

PART NO	NOTE	NAME & DESCRIPTION	DISTINCTION & QUANTITY						REFERENCE NO
			011	012	013	022	051	052	
R12-4416-05	N	TRIM POT SOK	1	1	1	1	1	1	VR / 1
R90-0515-05		RESISTOR BLOCK 10K	2	2	2	2	2	2	R / 3, 15
R90-0521-05		RESISTOR BLOCK 47K X7	1	1	1	1	1	1	R / 89
R90-0532-05		RESISTOR BLOCK 27K X5	1	1	1	1	1	1	R / 3
R90-0534-05		RESISTOR BLOCK 10K X5	2	1	2	2	2	1	R / 36
R90-0578-05	N	RESISTOR BLOCK 5.1K X10	1	1	1	1	1	1	R / 70
SN74LS05N	IC		1	1	1	1	1	1	IC / 23
SN74LS22N	IC		1	1	1	2	1	1	IC / 23
SN74LS138N	IC		1	1	1	1	1	1	IC / 15, 17, 22
SN74LS174N	IC		3	3	3	3	3	3	IC / 15, 17, 22
TC4011BP	IC	OR BU4011BP	7	7	7	7	7	7	IC / 3, 4, 5, 6, 7, 8, 9
TC4069UBP	IC		1	1	1	1	1	1	IC / 2
TMP8255AP-5	N	IC	4	4	4	4	4	4	IC / 16
UPC455BC	IC		1	1	1	1	1	1	IC / 18
UPC7805H	IC		1	1	1	1	1	1	IC / 21
UPD7802G-087-56	N	MICRO-PROCESSOR	1	1	1	1	1	1	IC / 24
UPB8255AC-5	V	IC							IC / 16
UPB7507G-575-00	N	MICRO-PROCESSOR FOR DCS	1	1	1	1	1	1	IC / 20
ISS133		DIODE	19	19	19	19	19	19	D / 2, 8, 9, 10, 13, 14, 15, 18, 19, 20, 21, 22, 23, 24
ISS132		DIODE	4	4	4	4	4	4	D / 2, 8, 9, 10, 13, 14, 15, 18, 19, 20, 21, 22, 23, 24
ISS133		DIODE	3	3	3	3	3	3	D / 30, 31, 33, 35
ISS133		DIODE	5	5	5	5	5	5	D / 30, 33, 35
ISS133		DIODE	6	6	6	6	6	6	D / 16, 30, 33, 34, 35
ISS133		DIODE	6	6	6	6	6	6	D / 16, 30, 31, 33, 34, 35
2SA105(Y)	N	TR	1	1	1	1	1	1	Q / 14
2SA105(Y)		TR	2	2	2	2	2	2	Q / 18, 20
2SA105(Y)		TR	1	1	1	1	1	1	Q / 21
2SA175(E)	TR		1	1	1	1	1	1	Q / 21
2SA1015(Y)	TR		3	3	3	3	3	3	Q / 16, 17, 19
2SC1959(Y)	TR		1	1	1	1	1	1	Q / 13
2SC2458(Y)	TR		4	4	4	4	4	4	Q / 8, 9, 10
2SC2703(X,Y)	TR		1	1	1	1	1	1	Q / 15

DISPLAY UNIT (X54-1820-11)

PART NO	NOTE	NAME & DESCRIPTION	DISTINCTION & QUANTITY						REFERENCE NO
			011	012	013	022	051	052	
CC455L1H101J		CERAMIC 1000P 50V	1	1	1	1	1	1	C / 20
CE04101104		ELECTRO 10 35V	1	1	1	1	1	1	C / 12, 13
CE04101100M		ELECTRO 10 16V	2	2	2	2	2	2	C / 10, 14
CE04101330M		ELECTRO 33 16V	1	1	1	1	1	1	C / 8
CE04101470M		ELECTRO 47 10V	1	1	1	1	1	1	C / 5
CK45B1H102K		CERAMIC 1000P 50V	8	8	8	8	8	8	C / 1, 2, 3, 15, 16, 17, 18
C092M1H03K		MYLAR 0.01 50V	1	1	1	1	1	1	C / 19
C092M1H23K		MYLAR 0.022 50V	1	1	1	1	1	1	C / 11
C91-0769-05		CERAMIC 0.01 50V	1	1	1	1	1	1	C / 4
C91-1008-05		CERAMIC 0.022 50V	2	2	2	2	2	2	C / 6
DTA124EF	N	DIGITAL TR	2	2	2	2	2	2	Q / 11, 12
E06-0858-05		8P METAL SOCKET	1	1	1	1	1	1	
E11-0401-03		EARPHONE JACK EXT.SP	1	1	1	1	1	1	T / 1
E11-0407-05		PHONE JACK	1	1	1	1	1	1	L / 2
E11-0407-05		PHONE JACK PHONES	1	1	1	1	1	1	L / 3
E31-0423-05	N	KEY JACK KEY	1	1	1	1	1	1	L / 1
E31-3052-15	N	TAPE CABLE 10X25MM	1	1	1	1	1	1	
E31-3053-15	N	TAPE CABLE 12X25MM	1	1	1	1	1	1	
E31-3054-05	N	TAPE CABLE 12X50MM	1	1	1	1	1	1	
E31-3055-05	N	TAPE CABLE 11X50MM	1	1	1	1	1	1	
E31-3056-05	N	TAPE CABLE 12X50MM	1	1	1	1	1	1	
F1P1FMT		DISPL TUBE	1	1	1	1	1	1	V / 1
I-19-0323-05		TRANSFORMER	1	1	1	1	1	1	T / 1
L30-D504-05		IFT	1	1	1	1	1	1	L / 2
L40-1511-14		INDUCTOR 150 UH	1	1	1	1	1	1	L / 3
L40-1011-04		INDUCTOR 100 UH	1	1	1	1	1	1	L / 1
MC231		DIODE	2	2	2	2	2	2	D / 3, 4
MT26_22A		DIODE	1	1	1	1	1	1	D / 2
MT27_5JA		DIODE	1	1	1	1	1	1	D / 5
R12-2413-05		TRIM POT (5K)	1	1	1	1	1	1	VR / 6
R12-2446-05		TRIM POT (30K)	1	1	1	1	1	1	VR / 3
R12-7403-05		TRIM POT 100KOHM	1	1	1	1	1	1	VR / 7
R12-7403-05		TRIM POT 500KOHM	1	1	1	1	1	1	VR / 8
R19-3420-05	N	POTENTIOMETER	1	1	1	1	1	1	VR / 4
R19-9409-05	N	POTENTIOMETER	1	1	1	1	1	1	VR / 2
R24-9204-05	N	POTENTIOMETER	1	1	1	1	1	1	VR / 5
R90-0522-05		RESISTOR BLOCK 47K OHM X5	1	1	1	1	1	1	R / 25
R90-0522-05		RESISTOR BLOCK 47K OHM X6	1	1	1	1	1	1	R / 24
R90-0579-05	N	RESISTOR BLOCK 47K OHM X11	1	1	1	1	1	1	R / 23
TC5066BP		IC	2	2	2	2	2	2	Q / 7, 8
UPA80C		IC	1	1	1	1	1	1	Q / 6
UPD763C	N	IC	1	1	1	1	1	1	Q / 5
1N60		DIODE	2	2	2	2	2	2	D / 1
112-351-2		TERMISTOR	2	2	2	2	2	2	TH / 1
2SC1959(Y)		TR	2	2	2	2	2	2	Q / 9, 10
2SC2458(Y)		TR	1	1	1	1	1	1	Q / 4

PARTS LIST TS-811A/B/E

SEMICONDUCTOR (TS-811A/B/E)

N : New parts

* : Please note that parts are sometimes not in stock and it takes much time to deliver.

Item	Re-marks	Part No.	Item	Re-marks	Part No.	Item	Re-marks	Part No.	
Diode		1N60 1S1587 1SS97 1SS101 1SS133 1SV50 DAP401 MA856 MC911 MC921 MC931 MI308 MI407 ND487C1-3R U05B V06B	N	Resistor block	S10VB20	Photo TR	PN126S(R)	Power module	M57745
Vari-cap		1S2208		Digital TR	DTA114Y(S) DTA124EF DTC114E(S) DTC143T(S)	TR	N	IC	BU4011B LM358P M54459L M5L8255AP-5 MB3713
Varistor		MV13 VD1223			2SA933S(Q) 2SA1012(Y) 2SA1015(Y) 2SA1048(Y) 2SA1115(E) 2SA1307(Y) 2SC1740S(Q)	N		N	MB8418-20LP-GRA MC14069UBCP MC14584BCP MC145155P*K MC145156P MN6127A NE555P NJM78L05A NJM4558S
Zener diode		MTZ6.2JA MTZ6.2J(A,B) MTZ7.5JA MTZ8.2J(B,C) MTZ9.1JB MTZ12JB			2SC1815(Y) 2SC1959(Y) 2SC2026 2SC2240(GR) 2SC2458(Y) 2SC2459(BL) 2SC2459(GR)	N		N	PS1518A SN74LS05N SN74LS32N SN74LS90N SN74LS138N SN74LS174N SN16913P TA7302P TC4011BP TC4069UBP TC5066BP
Display tube		FIP11FM7			2SC2570A 2SC2668(Y) 2SC2668(Y,O) 2SC2703(O,Y) 2SC2762 2SC2787(L) 2SC3113(B) 2SD717(O,Y)	N		N	TMP8255AP-5 μ PA80C μ PB55C μ PC78M08H μ PC577H(E,F) μ PC1158H2 μ PC4558C μ PC7805H μ PD763C
LED		LN66(R) LN01201C LN01301C LN01401C		FET	2SK30A(GR) 2SK30A(O) 2SK125 2SK161(GR) 2SK192A(GR)*N 3SK73(GR) 3SK73(Y) 3SK129(S,T)			N	μ PD7507G-575-00 μ PD7802G-088-36 μ PD8255AC-5
Thermister		112-102-2 112-103-2 112-351-2 SDT1000F							

ENCODER ASS'Y (W02-0364-00)

PART. NO	Re-marks	NAME & DESCRIPTION	O'TY	REFERENCE. NO
CE04CW0J330M		ELECTRO 33 6.3V	1	C1
LM358P		IC	1	IC1
LN66(R)		LED	3	D1, 2, 3
RD14BB2C102J		RES. CARBON 1k Ω	2	R5, 10
RD14BB2C105J		RES. CARBON 1M Ω	2	R8, 13
RD14BB2C181J		RES. CARBON 180 Ω	3	R1, 2, 3
RD14BB2C182J		RES. CARBON 1.8k Ω	4	R6, 7, 11, 12
RD14BB2C222J		RES. CARBON 2.2k Ω	1	R15
RD14BB2C472J		RES. CARBON 4.7k Ω	4	R4, 9, 14, 16
R12-2413-05		TRIM. POT. 5k Ω	2	VR1, 2
R92 0150-05		SHORT JUMPER	2	
PN126S		PHOTO TR	3	Q1, 2, 3
V06B		DIODE	1	D1
2SC2458(Y)		TR	1	Q4

TS-811A/B/E PARTS LIST

TS-811A/B/E GENERAL

PART NO.	NOTE	NAME & DESCRIPTION	DISTINCTION & QUANTITY							REFERENCE, NO.
			011	021	051	061	071			
A01-0979-02	N	CASE(A) UPPER	1	1	1	1	1			
A01-0980-02	N	CASE(B) LOWER	1	1	1	1	1			
A20-2529-03	N	PANEL	1	1	1	1	1			
B01-0469-04	*	SIL GRILLE PROTE GLASS	1	1	1	1	1			
B30-0817-15		LAMP 14V 80MA	1	1	1	1	1			
B31-0655-05		METER	1	1	1	1	1			
B39-0407-06		SPACER	2	2	2	2	2			
B40-3562-02		MODEL NAME PLATE TS-811A	1							
B40-3569-14	N	MODEL NAME PLATE TS-811B	1							
B40-3550-14	N	MODEL NAME PLATE TS-811E	1	1						
B40-3549-14	N	MODEL NAME PLATE TS-811B	1							
B41-0140-04		CAUTION LABEL FUSE 3A	1							
B42-1740-04		VOLTAGE INDICATING PLATE 120V	1							
B42-1741-04		VOLTAGE INDICATING PLATE 220V	1							
B42-1740-04		VOLTAGE INDICATING PLATE 240V	1							
B42-1741-04		VOLTAGE INDICATING PLATE 240V	1							
B42-2400-04	N	CURRENT INDICATING PLATE 8.5A	1							
B42-2473-04	N	CURRENT INDICATING PLATE 8.0A	1	1	1	1	1			
B43-0343-04	N	SWITCH LABEL DCS	1	1	1	1	1			
B43-1044-04	N	BADGE TS-811A	1							
B43-1039-04	N	BADGE TS-811B	1							
B43-1041-04	N	BADGE TS-811E TRIO	1							
B43-1044-04	N	BADGE TS-811E	1							
B43-1039-04	N	BADGE TS-811B	1							
B46-0410-00		WARRANTY CARD	1							
B50-4195-00	N	INSTRUCTION MANUAL (K)	1							
B50-4161-00	N	INSTRUCTION MANUAL (M,W,X)	1							
B50-4162-00	N	INSTRUCTION MANUAL (T)	1							
B50-4161-00	N	INSTRUCTION MANUAL (M,W,X)	1	1						
C91-0496-05		CERAMIC FOR AC 470P	2	2	2	2	2			
C91-0647-05		CERAMIC FOR AC 0.01	1	1	1	1	1			
D09-0304-04		ENCODER DISC ROTOR	1	1	1	1	1			
D09-0307-04		ENCODER DISC STATOR	1	1	1	1	1			
D40-0627-05		DETECTOR MECHANISM UNIT	1	1	1	1	1			
E07-1351-05	N	13P PLUG (ACC)	1	1	1	1	1			
E07-1352-05		VOLTAGE SELECTOR PLUG	1	1	1	1	1			
E08-0474-05		4P SOCKET DC	1	1	1	1	1			
E09-0472-05		4P PLUG DC	1	1	1	1	1			
E12-0001-15		PHONE PLUG (ACS)	1	1	1	1	1			
E12-0401-15		PHONE PLUG (ACS)	1	1	1	1	1			
E12-0402-15		PHONE PLUG (ACS)	1	1	1	1	1			
E29-0463-05		1P JUNCTION CONNECTOR	1	1	1	1	1			
E30-1643-15		AC CABLE (ACS)	1	1						
E30-1644-15		AC CABLE (ACS)	1							
E30-1645-05		AC CABLE (ACS)	1							
E30-1646-05		AC CABLE (ACS)	1							
E31-0449-05		CABLE WITH TERMINAL	1	1	1	1	1			
E31-3092-05	N*	CABLE WITH TERMET	1	1	1	1	1			
E31-3051-05		WIRE'S KIT (ACS)	1	1	1	1	1			
E40-0774-05	*	PIN ASS'Y	1	1	1	1	1			

PART NO.	NOTE	NAME & DESCRIPTION	DISTINCTION & QUANTITY							REFERENCE, NO.
			011	021	051	061	071			
F05-3022-05		FUSE 5A	1							
F05-3023-05		FUSE 5A	1							
F05-3022-05		FUSE 5A	1							
F07-0858-03		HEAT SINK COVER	1	1	1	1	1			
F10-1206-04	*	SHIELDING PLATE	1	1	1	1	1			
F10-1206-04		SHIELDING PLATE	6	6	6	6	6			
F11-0455-04	*	BLINDING PLATE	1	1	1	1	1			
F11-0455-04	*	BLINDING PLATE	1	1	1	1	1			
F20-0521-04		INSULATING PLATE	1	1	1	1	1			
F29-0041-05	*	CAPACITOR COVER	1	1	1	1	1			
G01-0838-04		COILED SPRING	5	5	5	5	5			
G01-0838-04		COILED SPRING	4	4	4	4	4			
G02-0505-05		KNOB FITTING SPRING	3	3	3	3	3			
G02-0550-04		GND SPRING	1							
G13-0649-04	*	CUSHION FOR METER	2	2	2	2	2			
G13-0642-04	*	CUSHION FOR PLL	1	1	1	1	1			
G53-0510-04		PACKING FOR PANEL	2	1	1	1	1			
H01-4634-04	N	CARTON(INSIDE) TS-811A	1							
H01-4594-04	N	CARTON(INSIDE) TS-811B	1							
H01-4595-04	N	CARTON(INSIDE) TS-811E TRIO	1							
H01-4594-04	N	CARTON(INSIDE) TS-811B	1							
H03-2221-04	N	CARTON(OUTSIDE) TS-811A	1							
H03-2221-04	N	CARTON(OUTSIDE) TS-811B	1							
H03-2234-04	N	CARTON(OUTSIDE) TS-811E	1							
H04-2594-04	*	PACKING FIXTURE	1	1	1	1	1			
H10-2597-02	*	PACKING FIXTURE	1	1	1	1	1			
H12-1315-04		BUFFER	1	1	1	1	1			
H20-1425-03		PROTECTION COVER	1	1	1	1	1			
H25-0079-04		BAG(ACS) 60X110	2	2	2	2	2			
H25-0105-04		BAG 550X350	1	1	1	1	1			
H25-0105-04		BAG 125X250	1	1	1	1	1			
J02-0323-05		FOOT CASE(B)	4	4	4	4	4			
J02-0323-05		FOOT CASE(B)	1	1	1	1	1			
J02-0323-05		FOOT CASE(SIDE)	4	4	4	4	4			
J29-0407-04	*	FOOT HARDWARE	2	2	2	2	2			
J29-0407-04		SW GUIDE A (TACT KNOB)	5	5	5	5	5			
J29-0407-04		SW GUIDE A (TACT KNOB)	4	4	4	4	4			
J31-0141-04		COLLAR	1	1	1	1	1			
J41-0442-05		ROLL BUSH	1	1	1	1	1			
J61-0404-05		FASTNER FOR DC PLUG	1	1	1	1	1			
J61-0408-05		VINYL TIE	1	1	1	1	1			
J61-0408-05		VINYL TIE	6	6	6	6	6			
K01-0410-05		HANDLE CASE(B)	1	1	1	1	1			
K21-0748-04		MAIN KNOB	1	1	1	1	1			
K23-0776-04		ROUND KNOB R/T	1	1	1	1	1			
K23-0773-04	*	KNOB UP/DOWN	3	3	3	3	3			
K27-0467-04		KNOB POWER	2	2	2	2	2			
K29-0308-04		KNOB	1	1	1	1	1			
K29-3001-04		KNOB R/T	5	5	5	5	5			
K29-3024-04		TACT KNOB R/T,TONE	5	5	5	5	5			

PARTS LIST TS-811A/B/E

PART. NO	NOTE	NAME & DESCRIPTION	DISTINCTION & QUANTITY					REFERENCE.NO
			011	021	051	061	071	
K29-3032-04		TACT KNOB SIT.TONE	4	4	1	1		
K29-0771-04		MAIN TUNING KNOB	1	1	1	1		
K29-0741-04		KNOB	3	3	3	3		
L01-8246-05	N	POWER TRANSFORMER	1	1	1	1		
N09-0646-04		SCREW M4X4	2	2	2	2	2	
N14-0040-46		SPRING WASHER	1	1	1	1	1	
N30-2604-66		PAN HD SCREW	2	2	2	2	2	
N30-3004-46		PAN HD SCREW	2	2	2	2	2	
N30-3010-46		PAN HD SCREW	2	2	2	2	2	
N32-2604-46		PAN HD SCREW	2	2	2	2	2	
N32-2604-46		FLAT HD SCREW	6	6	6	6	6	
N32-2606-46		FLAT HD SCREW	6	6	6	6	6	
N32-3004-46		FLAT HD SCREW	2	2	2	2	2	
N32-3006-46		FLAT HD SCREW	4	4	4	4	4	
N33-3004-45		ROUND FLAT SCREW	4	4	4	4	4	
N35-2604-46		BIND SCREW	11	11	11	11	11	
N35-3004-41		BIND SCREW	18	18	18	18	18	
N35-3008-46		BIND SCREW	2	2	2	2	2	
N87-2605-46		TAPPING SCREW	4	4	4	4	4	
N87-2606-46		TAPPING SCREW	10	10	10	10	10	
N87-4006-46		TAPPING SCREW	5	5	5	5	5	
N87-3010-41		TAPPING SCREW	6	6	6	6	6	
N87-3008-41		TAPPING SCREW	6	6	6	6	6	
N88-2606-46		TAPPING SCREW	1	1	1	1	1	
N88-3006-46		FLAT TAPPING SCREW	2	2	2	2	2	
N88-3006-46		FLAT TAPPING SCREW	2	2	2	2	2	
N89-3006-45		BIND TAPPING SCREW	4	4	4	4	4	
SDT1000F		THERMISTER	1	1	1	1	1	
S29-2409-05		VOLTAGE SELECTOR SWITCH	1	1	1	1	1	
S31-1415-05		SLIDE SWITCH	1	1	1	1	1	
S40-2450-05		PUSH SWITCH	1	1	1	1	1	
S50-1406-05		TACT SWITCH(UP-DOWN)	1	2	2	2	2	
S59-0428-05		KEYBOARD ASSY DCS	1	1	1	1	1	
T03-0027-15		SPEAKER	1	1	1	1	1	
T91-0331-05		MICROPHONE (M,W)	1					
T91-0335-05		MICROPHONE (T)						
T91-0335-05		MICROPHONE (K,W)						
T94-0049-05		PLANGER	1	1	1	1	1	
W02-0364-00		ENCODER ASSY	1	1	1	1	1	
W09-0326-05		LITHIUM BATTERY	1	1	1	1	1	
X41-1580-01		SWITCH UNIT	1	1				
X41-1580-62		SWITCH UNIT		1	1			
X41-1580-01		SWITCH UNIT			1	1		
X43-1490-11		AVR UNIT	1	1	1	1	1	
X44-1630-11	N	RF UNIT	1	1	1	1	1	
X45-1390-04	N	RF UNIT	1	1	1	1	1	
X45-1390-11	N	FINAL UNIT	1					
X45-1390-01	N	FINAL UNIT		1				
X45-1390-61	N	FINAL UNIT		1	1			

PART. NO	NOTE	NAME & DESCRIPTION	DISTINCTION & QUANTITY					REFERENCE.NO
			011	021	051	061	071	
X45-1390-01	N	FINAL UNIT	1	1	1	1	1	
X48-1400-01	N	AU. UNIT	1	1	1	1	1	
X48-1400-00	N	AF. UNIT	1	1	1	1	1	
X50-1990-12	N	PLL UNIT	1	1	1	1	1	
X50-1990-01	N	PLL UNIT	1	1	1	1	1	
X50-2010-10	N	HET UNIT	1					
X50-2000-00	N	BEAM UNIT	1	1	1	1	1	
X52-1200-60	N	TONE UNIT	1		1	1		
X53-1410-12	N	CONTROL UNIT	1					
X53-1410-22	N	CONTROL UNIT	1					
X53-1410-52	N	CONTROL UNIT		1				
X53-1410-62	N	CONTROL UNIT		1				
X53-1410-22	N	CONTROL UNIT		1				
X54-1820-11	N	DISPLAY UNIT	1	1	1	1	1	

TS-811A/B/E PARTS LIST

SWITCH UNIT (X41-1580-XX) (-01 : K,M,X -62 : T,W)

AVR UNIT (X43-1490-11)

PART. NO.	NOTE	NAME & DESCRIPTION	QTY	DISTINCTION & QUANTITY	REFERENCE NO
C004W1C200M		ELECTRO	1000	16V	C / 8, 9, 12, 20
C004W1C101M		ELECTRO	100	16V	C / 10
CK45B1H102K		CERAMIC	1000P	50V	C / 5, 7, 11, 14, 15, 17, 18 ↓ 10
C90-2004-05	N	ELECTRO	15000	25V	C / 24, 25, 26
C90-2005-05	N	ELECTRO	1000	25V	C / 3, 4
C90-0817-05		ELECTRO	1000	16V	C / 22
C90-0820-05		ELECTRO	470	16V	C / 19, 21, 23
C91-0117-05		CERAMIC	0.01	50V	C / 16
C91-1008-05		CERAMIC	0.022	50V	C / 13
C91-0119-05		CERAMIC	0.047	50V	C / 6
DTCL14E5		DIGITAL TR	1		Q / 12
E08-0373-05	*	MINI CONNECTOR 3P	1		
E08-0373-05	*	INSIDE CONNECTING WIRE	1		
E40-5044-05	N*	MINI CONNECTOR 2P	1		
E40-5045-05	N*	MINI CONNECTOR 6P	1		
E40-0273-05	*	MINI CONNECTOR 2P	2		
E40-0473-05	*	MINI CONNECTOR 4P	1		
E40-0673-05	*	MINI CONNECTOR 6P	2		
E40-0773-05	*	MINI CONNECTOR 7P	1		
E40-0973-05	*	MINI CONNECTOR 9P	1		
F20-0078-05		INSULATING PLATE	2		
F29-0014-05		INSULATING WASHER	2		
J13-0055-05		FUSE HOLDER	2		
J19-0306-05		HOLDER	1		
L15-0016-05		LOW-FREQUENCY COIL	2		L / 1, 2
MTZ6.2J(A,B)	ZENER DIODE	6.2V	1		D / 6
MTZ8.2J(B,C)	ZENER DIODE	8.2V	1		D / 5
NJM5558S	IC		1		Q / 10
R12-1429-05		TRIM.POT.	500 OHM	1	VR / 1
R12-1428-05		TRIM.POT.	1K OHM	1	VR / 2
R92-0674-05	N	RESISTOR BLOCK 10 OHM 2W	2		R / 16, 17
S10V820		RESISTOR BLOCK	1		D / 1
UPC78M08H	IC		1		Q / 8
U05B	DIODE		1		D / 6
V51223	VARISTOR		1		D / 7
V626	DIODE		2		D / 2, 3
15S133	DIODE		2		D / 8, 9
2SA1012(Y)	TR		2		Q / 1, 5
2SA1048(Y)	TR		1		Q / 7
2SC1959(Y)	TR		3		Q / 2, 9, 11
2SC2458(Y)	TR		5		Q / 3, 4, 6

PARTS LIST TS-811A/B/E

RF UNIT (X44-1650-XX) (-01 : M, T, W, X -11 : K)

PART NO	NOTE	NAME & DESCRIPTION	001 011	DISTINCTION & QUANTITY	REFERENCE, NO
CC45CH1H101Z		CERAMIC 100P 50V	1 1		C / 29, 30
CC45CH1H0RSC		CERAMIC 0.5P 50V	1 1		C / 16
CC45CH1H050C		CERAMIC 5P 50V	2 2		C / 10, 28
CC45CH1H060D		CERAMIC 6P 50V	2 2		C / 38, 42
CC45CH1H100D		CERAMIC 10P 50V	4 4		C / 5, 56, 40, 41
CC45CH1H100D		CERAMIC 20P 50V	1 1		C / 13
CC73EC1H330J		CERAMIC 33P 50V	1 1		C / 15
CC73EC1H0H30C		CHIP CAP. 3P 50V	1 1		C / 1, 2
CC73EC1H330J		CHIP CAP. 33P 50V	2 2		C / 6, 12, 19
CC73ESL1H101J		CHIP CAP. 100P 50V	3		C / 3, 12, 19
CC73ESL1H101J		CHIP CAP. 100P 50V	3		C / 26
E04W1C100M		ELECTRO 10 16V	1 1		C / 24
CK45B1H102K		CERAMIC 1000P 50V	14 14		C / 4, 8, 13, 18, 22, 23, 27
CK73EB1H102K		CHIP CAP. 1000P 50V	9 9		C / 31, 32, 34, 35, 37, 39, 45
COS-0031-15		TRIMMER 10P	1 1		TC / 2
COS-0308-05		TRIMMER 4PF	2 2		TC / 1, 3
E04-0154-05		RF COAX. CONNECTOR RA, HET, DO	4 4		
E31-2064-05		CONNECTING WIRE (A)	1 1		
E31-2089-05		CONNECTING WIRE (B)	1 1		
L19-0309-05		WIDE BAND TRANSFORMER	2 2		L / 2, 3
L34-0824-05		COIL 3.5 2.5T	1 1		L / 8
L34-0825-05		COIL 2.5T	1 1		L / 18
L34-0908-05		COIL 3 9.5T	2 2		L / 4, 19
L34-1083-05		COIL 1.25T	2 2		L / 9, 11
L34-1083-05		COIL 1.25T	1 1		L / 10
L34-2038-05		TUNING COIL	2 2		L / 15, 17
L40-1091-03		INDUCTOR 1 UH	1 1		L / 1
L40-1091-15		INDUCTOR 1 UH	1 1		L / 12
L41-0485-15		MIC 30.265MHZ	1		L / 16
L79-0649-05	N	HELICAL BLOCK 450-450MHZ	3		L / 5, 6, 7
L79-0658-05	N	HELICAL BLOCK 450-450MHZ	3		L / 5, 6, 7
L79-0659-05	N	HELICAL BLOCK	1		L / 13
L79-0660-05	N	HELICAL BLOCK	1		L / 14
L79-0660-05	N	HELICAL BLOCK	1		L / 14
L92-0310-05		FERRITE CORE	1 1		L / 20
M4856		DIODE	2		D / 4, 5
M4856		DIODE	1		D / 4
MV13		VARISTOR	1 1		D / 2
ND487C1-3R		DIODE	1 1		D / 1
R12-0433-05		POTENTIOMETER 200 OHM	1 1		VR / 1
1SS133		DIODE	1 1		D / 3
1SS97		DIODE	1 1		D / 5
2SC1926		TR	2 2		Q / 1, 2
2SC2458(Y)		TR	1 1		Q / 3
2SC2570A		TR	1 1		Q / 4
2SC2762		TR	1 1		Q / 6, 7
2SK129(S, T)		FET	2 2		Q / 6, 7

FINAL UNIT (X45-1390-XX) (-01 : M, X -11 : K -61 : T, W)

PART NO	NOTE	NAME & DESCRIPTION	001 011 061	DISTINCTION & QUANTITY	REFERENCE, NO
CC45CH1H050C		CERAMIC 5P 50V	1 1 1		C / 16
CC45SL2H050C		CERAMIC 0.5P 50V	1 1 1		C / 5
CC45SL2H050C		CERAMIC 0.5P 50V	1 1 1		C / 35
CC45SL2H030C		CERAMIC 3P 500V	3 3 3		C / 2, 4, 32
CC45SL2H040C		CERAMIC 4P 500V	1 1 1		C / 9
CC45SL2H070D		CERAMIC 7P 500V	1 1 1		C / 11
CC45SL2H120J		CERAMIC 12P 500V	1 1 1		C / 6
CC45SL2H120J		CERAMIC 10P 500V	1 1 1		C / 36
CC73EC1H10RSC		CHIP CAP. 0.5P 50V	1 1 1		C / 34
E04W1E2C02M		ELECTRO 22 25V	2 2 2		C / 24, 26
CK45B1H102K		CERAMIC 1000P 50V	7		C / 12, 14, 15, 22, 23, 25, 28
CK73EB1H102K		CHIP CAP. 1000P 50V	6 6 6		C / 10, 18, 19, 20, 21, 33
CM73FD1H20J		CHIP MICA 14P 500V	1 1 1		C / 5
CM73FD2H20J		CHIP MICA 15P 500V	1 1 1		C / 7
CM73FD2H20J		CHIP MICA 22P 500V	1 1 1		C / 1
CM73FD2H20J		CHIP MICA 4P 500V	1 1 1		C / 27
CS175F2H040C		TANTALUM 0.47 35V	1 1 1		C / 29
CS175F2H040C		ELECTROLYTIC 220 10V	1 1 1		C / 30, 31
C90-1253-05		ELECTRO 220 16V	2 2 2		C / 13
C90-0817-05		ELECTRO 1 50V	1 1 1		
E04-0161-05	N	UHF RECEPTACLE	1 1		
E04-0162-05	N	TYPE RECEPTAC	1 1		
E09-0460-14		GND WAFER	1 1 1		
F01-0917-05		HEAT SINK	1 1 1		
F09-0405-34		FAN	1 1 1		
F20-0078-05		INSULATING PLATE	1 1 1		
F29-0014-05		INSULATING WASHER	1 1 1		
G02-0549-04		SPRING FOR MOTOR	1 1 1		
L34-1113-05		CHOKE COIL 1.5T	1 1 1		L / 5
L34-0909-05		COIL 3 9.5T	1 1 1		L / 2
L34-1032-05		COIL 3 3.5T	1 1 1		L / 4
L34-2019-05		COIL 3 2.5T	1 1 1		L / 3
L34-2040-05		COIL 1.5T	2 2 2		L / 1, 6
L60-1092-14		INDUCTOR 1 UH	1 1 1		L / 7
M1308		DIODE	1 1 1		D / 2
M1407		DIODE	1 1 1		D / 1
M57745	N	POWER MODULE	1 1 1		D / 1
R12-0541-05		TRIM, POT. 100 OHM	1 1 1		VR / 2
R12-5517-05		TRIM, POT. 100 OHM	1 1 1		VR / 1
SDT1000F		THERMISTER	1 1 1		TH / 1
T42-0302-05		DC MOTOR	1 1 1		
1SS101		DIODE	4 4 4		D / 4, 5, 6, 9
1SS133		DIODE	1 1 1		D / 7
2SA1012(Y)		TR	1 1 1		Q / 2
2SA1048(Y)		TR	1 1 1		Q / 4
2SC1855(Y)		TR	1 1 1		Q / 3
2SD717		TR	1 1 1		Q / 5

TS-811A/B/E PARTS LIST

IF UNIT (X48-1400-01)

PART NO.	NOTE	NAME & DESCRIPTION	DISTINCTION		QUANTITY	REFERENCE NO
			001	011		
CC45CH1H500J		CERAMIC 15P 50V	5		1	C , 52, 57, 90, 121, 190
CC45SL1H220J		CERAMIC 22P 50V	3		1	C , 1, 118, 185
CC45CH1H300D		CERAMIC 10P 50V	1		1	C , 119
CC45SL1H470J		CERAMIC 5P 50V	3		1	C , 69, 106, 107
CC45CH1H085C		CERAMIC 0.5P 50V	2		1	C , 7, 31
CC45CH1H085C		CERAMIC 1.8P 50V	1		1	C , 18
CC45SL1H212J		CERAMIC 120P 50V	1		1	C , 165
CC45CH1H212J		CERAMIC 22P 50V	1		1	C , 114
CC45CH1H085C		CERAMIC 0.7P 50V	2		1	C , 8, 115
CC45SL1H470J		CERAMIC 4.7P 500V	1		1	C , 122
CC45SL1H220J		CERAMIC 2P 50V	1		1	C , 205
CC45CH1H530J		CERAMIC 3.5P 50V	2		1	C , 3, 37
CC45SL1H301J		CERAMIC 100P 50V	1		1	C , 194
CC45CH1H300C		CERAMIC 3P 50V	1		1	C , 92
CC45CH1H212J		CERAMIC 120P 50V	1		1	C , 15
CC45CH1H212J		CERAMIC 5P 50V	1		1	C , 65
CC45SL1H470J		CERAMIC 4.7P 50V	4		1	C , 16, 101, 108, 126
CC45SL1H221J		CERAMIC 220P 50V	1		1	C , 91
CC45CH1H070D		CERAMIC 7P 50V	1		1	C , 19, 24, 25, 48, 61, 74, 97
CC45CH1H100D		CERAMIC 10P 50V	7		1	C , 30
CC45CH1H100D		CERAMIC 8P 50V	1		1	C , 14
CC45CH1H020C		CERAMIC 2P 50V	1		1	C , 13
CC45U1H100D		CERAMIC 10P 50V	1		1	C , 11, 38, 77, 80, 82, 83, 157
CE04W1H010A		ELECTRO 1 P 50V	10		1	C , 163, 172, 174
CE04W1H2R2M		ELECTRO 2.2 50V	1		1	C , 187
CE04W1E4R7M		ELECTRO 4.7 25V	6		1	C , 11, 155, 162, 181, 182, 188
CE04W1C100M		ELECTRO 10 16V	3		1	C , 99, 130, 173
CE04W1C220M		ELECTRO 22 16V	1		1	C , 180
CE04W1A470M		ELECTRO 4.7 10V	3		1	C , 79, 171, 183
CE04W1A221M		ELECTRO 220 10V	1		1	C , 182
CK45BH1H70K		CERAMIC 330P 50V	1		1	C , 13
CK45BH1H71K		CERAMIC 330P 50V	1		1	C , 179
CK45BH1H72K		CERAMIC 470P 50V	1		1	C , 4, 5, 9, 12, 42, 94, 135
CK45BH1H73K		CERAMIC 1000P 50V	8		1	C , 140
CK45BH1H73K		CERAMIC 330P 50V	2		1	C , 70, 87
CK45BH1H73K		CERAMIC 470P 50V	4		1	C , 110, 153, 177
CK45F1H03Z		CERAMIC 0.01 50V	1		1	C , 88
CK45F1H03Z		CERAMIC 0.02 50V	6		1	C , 29, 43, 85, 89, 138, 144
C092M2H532K		MYLAR 330P 50V	1		1	C , 175
C092M2H105K		MYLAR 0.01 50V	1		1	C , 176
C092M2H155K		MYLAR 0.015 50V	1		1	C , 160
C092M2H155K		MYLAR 0.022 50V	1		1	C , 29
C092M2H155K		MYLAR 0.047 50V	2		1	C , 78, 161
C092M2H155K		MYLAR 0.068 50V	2		1	C , 166, 170
CS15E1V01R1M		TANTALUM 0.1 16V	1		1	C , 178
CS15E1V01R1M		TANTALUM 0.4P 35V	1		1	C , 39
CS15E1V01G		TANTALUM 1 25V	2		1	C , 11, 133
CS15E1C2R2M		TANTALUM 2.2 16V	1		1	C , 2
C03-0031-15		TRIMMER 20P	1		1	C , 1, 3
C03-0031-15		TRIMMER 19P	1		1	C , 16
C91-0667-05		CERAMIC 0.0047 50V	1		1	C , 2, 10, 17, 67, 112, 137
C91-0667-05		CERAMIC 0.01 50V	6		1	C , 33, 49, 56, 62, 63, 102, 123
C93-1008-05		CERAMIC 0.022 50V	11		1	C , 125, 126, 149, 150
C91-0117-05		CERAMIC 0.01 50V	12		1	C , 26, 27, 35, 36, 46, 68, 86
C91-0117-05		CERAMIC 0.01 50V	12		1	C , 111, 116, 117, 139, 154

PART NO.	NOTE	NAME & DESCRIPTION	DISTINCTION		QUANTITY	REFERENCE NO
			001	011		
C91-1008-05		CERAMIC 0.022 50V	3		1	C , 20, 21, 22, 34, 50, 53, 54, 55, 57, 60, 72, 75, 79, 76, 109, 113, 142
C91-0119-05		CERAMIC 0.047 50V	3		1	C , 28, 66
C91-0457-05		CERAMIC 0.022 50V	2		1	C , 51, 59, 120, 124
C91-0457-05		CERAMIC 0.022 50V	2		1	C , 192
C91-0808-05	N	CERAMIC 0.022 50V	2		1	C , 164, 184
C91-0666-05		CERAMIC 0.0047 50V	1		1	C , 40
C91-0119-03		CERAMIC 0.047 25V	1		1	C , 19
DTC114ES		DIGITAL TR	1		1	
E04-0194-05		RF COAX. CONNECTOR RAJHET, 00	2		1	
E23-0512-05		TERMINAL 1P	4		1	
E40-0273-05		MINI CONNECTOR 2P	2		1	
E40-0273-05	*	MINI CONNECTOR 4P	4		1	
E40-0273-05	*	MINI CONNECTOR 6P	4		1	
E40-0273-05	*	MINI CONNECTOR 7P	1		1	
E40-0273-05	*	MINI CONNECTOR 9P	2		1	
G02-0535-04			3		1	
L50-0291-15		I.F.T	4		1	L , 14, 15, 18
L50-0289-03		I.F.T	5		1	L , 6, 7, 20, 21, 22
L50-0533-05		I.F.T	3		1	L , 23, 24, 33
L30-0504-05		I.F.T	1		1	L , 32
L53-0681-05	N	CHOKING COIL 6.8 UH	1		1	L , 5
L53-0681-05	N	TUNING COIL 20MHZ	1		1	L , 6
L34-2041-05		TUNING COIL	4		1	L , 8, 10, 11, 24
L34-2041-05		TUNING COIL	3		1	L , 1, 2, 3
L34-2041-05		TUNING COIL	3		1	L , 23, 28, 29
L40-1501-05		INDUCTOR 150UH	1		1	L , 26
L40-1021-03		INDUCTOR 150UH	2		1	L , 14, 19
L40-1021-03		INDUCTOR 1 MH	3		1	L , 6, 33, 36
L40-1011-16		INDUCTOR 100UH	1		1	L , 38
L40-1011-17		INDUCTOR 100UH	1		1	L , 50
L40-1011-17		INDUCTOR 100UH	1		1	L , 37
L40-1011-17		INDUCTOR 100UH	1		1	L , 12
L71-1254-05	N	XTAL FILTER 10F22S	1		1	L , 31
L77-1254-05	N	CERAMIC FILTER CFY455P	1		1	L , 4
L77-1254-05	N	XTAL 13.6570MHZ	1		1	L , 34
L79-0464-05	N	CERAMIC DISCR1.CFY455S	1		1	
MC911		DIODE	2		1	D , 27, 28
MC931		DIODE	4		1	D , 9, 24, 29, 32
ND487C1-3R		DIODE	1		1	D , 16
R12-0421-05		TRIM.POT. 100 OHM	1		1	VR , 8
R12-1430-05		TRIM.POT. 500 OHM	1		1	VR , 2
R12-1430-05		TRIM.POT. 3K OHM	1		1	VR , 1, 6, 7
R12-3443-05		TRIM.POT. 10K OHM	3		1	VR , 9
R12-3450-05	N	TRIM.POT. 20K OHM	1		1	VR , 3
R12-7408-05	N	TRIM.POT. 50KOHMM	2		1	VR , 5
TA7302P		IC	2		1	Q , 41, 44

PARTS LIST TS-811A/B/E

PART.NU	NUCLE	NAME & DESCRIPTION	DISTINCTION		QUANTITY	REFERENCE.NO
			001	011		
UPC577H(E,F)	IC		1			Q , 46
UPC4558C	IC		1			Q , 47
IN60	DIOODE		4			D , 10, 11, 12, 13
ISS133	DIOODE		6			D , 1, 5, 18, 30, 33, 39
ISS133	DIOODE		17			D , 2, 4, 6, 7, 8, 15, 17 31, 32, 33, 34, 35
S51587	D1006		1			D , 16
S51587	D100E		2			D , 19, 20
IS2208	VOLTAGE VARIABLE		1			D , 3
112-102-2	THERMISTER		2			D , 2, 3
112-103-2	THERMISTER		1			D , 1
2CS2458(Y)						Q , 56, 58, 59
2SA1048(X,Y)	TR		9			Q , 11, 12, 13, 15, 16, 17, 18 27, 60
2SC2313(G)	TR		2			Q , 5, 6
2SC2468(Y,D)	TR		2			Q , 1, 2
2SC2468(X,Y)	TR		5			Q , 4, 36, 38, 40, 48
2SC2240(GR)	TR		1			Q , 29
2SC2458(Y)	TR		23			Q , 3, 8, 14, 23, 24, 26, 30 31, 32, 37, 39, 42, 43, 48 49, 50, 51, 52, 53, 55
2SK125	FET		1			Q , 35
2SK30A(D)	FET		3			Q , 10, 25, 26
2SK161(GR)	FET		2			Q , 6, 7
3SK73(GR)	FET		6			Q , 5, 8, 20, 21, 22, 32
3SK73(Y)	FET		1			Q , 34

AF UNIT (X49-1180-00)

Part No	Note	Name & Description	QTY	DISINCTION & QUANTITY	REFERENCE NO
CG45SL1H359U		CERAMIC 39P 50V	1		C , 32
CE04W1H101U		CERAMIC 100P 50V	3		C , 2, 3, 45
CE04W1E47R7M		ELECTRO 4.7 25V	2	4	C , 20, 21
CE04W1C100M		ELECTRO 10 16V	7		C , 6, 8, 9, 10, 17, 40, 52
CE04W1E22R7M		ELECTRO 22 16V	1		C , 1
CE04W1E70R7M		ELECTRO 47 10V	5		C , 5, 22, 25, 46, 56
CE04W1A101M		ELECTRO 100 10V	1		C , 47
CE04W1H47R7M		ELECTRO 0.47 50V	1		C , 27
CE04W1H010M		ELECTRO 1 50V	18		C , 11, 13, 14, 15, 16, 18, 19, 24, 28, 29, 35, 37, 38, 41, 42, 48, 53
					C , 23, 26
CE04W1H010M		ELECTRO 1 50V	2		
CK45B1H471K		CERAMIC 470P 50V	1		C , 43
CK45B1H561K		CERAMIC 560P 50V	1		C , 44
CK45B1H522K		CERAMIC 1000P 50V	5		C , 36, 39, 44, 61, 63
CK45B1H131K		CERAMIC 1500P 50V	1		C , 33
CQ92M1H332K		MYLAR 3300P 50V	1		C , 12
CQ92M1H103K		MYLAR 0.01 50V	1		C , 34
CQ92M1H123K		MYLAR 0.012 50V	4		C , 55, 57, 58
CQ92M1H164K		MYLAR 0.1 50V	1		C , 50
CS15E1C33R3M		TANTALUM 0.1 35V	1		C , 59
CS15E1C33R3M		TANTALUM 5.3 16V	1		C , 60
C90-0882-02		ELECTRO 220 25V	1		C , 51
C90-0882-05		ELECTRO 470 16V	1		C , 49
E40-0373-05	*	MINI CONNECTOR 3P	1		
E40-0473-05	*	MINI CONNECTOR 4P	1		
E40-0573-05	*	MINI CONNECTOR 5P	2		
E40-0673-05	*	MINI CONNECTOR 6P	1		
E40-0773-05	*	MINI CONNECTOR 7P	2		
E40-0973-05	*	MINI CONNECTOR 9P	1		
MB3713		IC	1		Q , 11
MC911		DIODE	2		D , 2, 8
MC921		DIODE	1		D , 11
NJM455BS		IC	1		Q , 4, 9
N30-3004-46		PAN HD SCREW	1		
R12-3443-05		TRIM.POT. 10K OHM	2		VR , 1, 3
R12-4413-05		TRIM.POT. 50K OHM	1		VR , 4
R12-5420-05		TRIM.POT. 100KOHM	1		VR , 2
UPC1158H2		IC	1		Q , 5
LN60		DIODE	1		D , 5
ISS133		DIODE	1		D , 10
ISS133		DIODE	6		D , 1, 3, 4, 6, 7, 9
ZSA1048(Y)		TR	2		Q , 2, 13
ZSC2458(Y)		TR	8		Q , 3, 7, 8, 10, 12, 14, 15
ZSC2459(GR)		TR	1		Q , 1
ZSK30A(GR)		FET	1		Q , 6

TS-811A/B/E PARTS LIST

PLL UNIT (X50-1990-XX) (-01 : M,T,W,X -12 : K)

PART. NO.	NOTE	NAME & DESCRIPTION	DISTINCTION & QUANTITY			REFERENCE.NO.
			001	011	012	
CC45CH1H060D		CERAMIC 0.5P 50V	1	1		C , 91, 91
CC45CH1H060D		CERAMIC 0P 50V	1	1		C , 91
CC45CH1H060C		CERAMIC 1P 50V	1	1		C , 12
CC45CH1H070D		CERAMIC 7P 50V	1	1		C , 110
CC45SL1H470J		CERAMIC 47P 50V	4	4		C , 14, 32, 89, 161
CC45CH1H050C		CERAMIC 5P 50V	2	2		C , 66, 152
CC45CH1H060D		CERAMIC 6P 50V	1	1		C , 120
CC45CH1H060D		CERAMIC 10P 50V	2	2		C , 137, 158
CC45CH1H060J		CERAMIC 18P 50V	3			C , 30, 81, 119
CC45CH1H060J		CERAMIC 18P 50V	1	1		C , 30, 81, 119, 164
CC45CH1H060J		CERAMIC 18P 50V	1	1		C , 96, 155
CC45CH1H060J		CERAMIC 18P 50V	1	1		C , 146, 160
CC45CH1H180J		CERAMIC 18P 50V	2	2		C , 10
CC45CH1H080D		CERAMIC 8P 50V	2	2		C , 104
CC45SL1H101J		CERAMIC 10P 50V	2	2		C , 133
CC45CH1H101J		CERAMIC 15P 50V	1	1		C , 118
CC45CH1H102J		CERAMIC 220P 50V	1	1		C , 46
CC45CH1H102D		CERAMIC 10P 50V	1	1		C , 65
CC45U1M270J		CERAMIC 27P 50V	1	1		C , 13, 54
CC45SL1H331J		CERAMIC 33P 50V	1	1		C , 144, 162, 169
CC45CH1H350J		CERAMIC 1.5P 50V	1	1		C , 144, 162
CC45CH1H050J		CERAMIC 18P 50V	2	2		C , 136, 148
CC45CH1H050C		CERAMIC 0.5P 50V	3			C , 20, 22, 165, 171
CC45CH1H050C		CERAMIC 0.5P 50V	2			C , 22, 177
CC45CH1H220J		CERAMIC 22P 50V	4	4		C , 21, 44, 124, 151
CC45CH1H220J		CERAMIC 22P 50V	1	1		C , 43
CC45CH1H220J		CERAMIC 22P 50V	3			C , 64
CC45CH1H230C		CERAMIC 3P 50V	4	4		C , 10, 50, 121
CC45CH1H270J		CERAMIC 27P 50V	1	1		C , 128, 129
CC45CH1H040C		CERAMIC 4P 50V	1	1		C , 3, 40, 85
CC45CH1H270J		CERAMIC 33P 50V	2	2		C , 147
CC45CH1H270J		CERAMIC 33P 50V	3	3		C , 9, 147
CC45CH1H330J		CERAMIC 33P 50V	1	1		C , 45
CC45CH1H050C		CERAMIC 5P 50V	1	1		C , 82, 84, 86, 88
CC45CH1H050C		CERAMIC 6P 50V	1	1		C , 84, 87, 127
CC45CH1H680J		CERAMIC 12P 50V	4	4		C , 174
CC45CH1H680J		CERAMIC 39P 50V	4	4		C , 178
CC45CH1H680J		CERAMIC 47P 50V	4	4		C , 179
CC45SL1H120J		CERAMIC 5P 50V	1	1		C , 63
CC45SL1H050C		CERAMIC 33P 50V	1	1		C , 1
CC45SL1H133J		CERAMIC 8P 50V	1	1		C , 62
CC73EC1H080D		CHIP CAP. 22P	50V	1	1	C , 60
CC73EC1H120J		CHIP CAP. 7P	50V	1	1	C , 58
CC73EC1H120J		CHIP CAP. 16P	50V	1	1	C , 77, 107, 113, 116, 150
CE04W1A470M		ELECTRO 4.7 25V		1	1	C , 8, 11, 13, 57, 94, 97, 102
CE04W1A470M		ELECTRO 100 10V	5	5		C , 117, 145, 166
CE04W1A510M		ELECTRO 100 10V	3	3		C , 47, 139, 143, 156
CK45B1H102K		CERAMIC 1000P 50V	10	10		C , 175
CK45F1H103Z		CERAMIC 0.01 50V	4	4		C , 10, 103
CK45B1H331K		MYLAR 330P 50V	1	1		C , 2, 6, 7, 12, 59, 68, 70, 92
CK45B1H481K		MYLAR 680P 50V	2	2		C , 71, 92, 131, 167
CK45B1H102K		MYLAR 1000P 50V	9			C , 131, 167
CK45B1H102K		CERAMIC 1000P 50V	9			C , 74
C092M1H22ZK		MYLAR 2200P 50V	1	1		C , 114
C092M1H22ZK		MYLAR 6200P 50V	1	1		C , 125
C092M1H22ZK		MYLAR 0.022 50V	1	1		

PART. NO.	NOTE	NAME & DESCRIPTION	DISTINCTION & QUANTITY			REFERENCE.NO.
			001	011	012	
C092M1H483K		MYLAR 0.047 50V	1	1		C , 56
C092M1H483K		MYLAR 0.068 50V	4	4		C , 111
CS15EL1VR22M		TANTALUM 0.22 50V	1	1		C , 49
CS15EL1VR27M		TANTALUM 0.47 35V	1	1		C , 78
CS15EL1VR27M		TANTALUM 1 25V	2	2		C , 78, 73
CS15EL1VR27M		TRIMMER 6P	1	1		TC , 1
C05-0067-05		TRIMMER 20P	1	1		TC , 1
C05-0030-15		TRIMMER 25P	2	2		TC , 3, 4
C05-0067-05		TRIMMER 0.01 50V	15	15		C , 5, 19, 23, 24, 29, 33, 34
C91-0117-05		CERAMIC 0.35P 50V	1			C , 154
C91-0117-05		CERAMIC 0.01 50V	7	7		C , 41, 48, 53, 108, 115, 126, 149
C91-1008-05		CERAMIC 0.022 50V	23	23		C , 15, 17, 25, 26, 27, 28, 35, 36, 37, 38, 35, 80, 105, 106, 112, 113, 114, 133, 134, 140, 153, 172, 173
C91-1008-05		CERAMIC 0.022 50V	15			C , 16, 18, 31, 42, 98, 100, 109, 130, 139, 141, 142, 157, 159, 163, 168
C91-0498-05		CERAMIC 0.35P 50V	1			C , 169
E04-0154-05		RF COAX. CONNECTOR RA-HET-00	1	1		L , 24
E25-0512-05		TERMINAL 1P	9	9		L , 9, 13
E33-1641-00						L , 21
E40-0473-05	*	MINI CONNECTOR 4P	2	2		L , 35
E40-0673-05	*	MINI CONNECTOR 6P	1	1		L , 14
E40-0673-05	*	MINI CONNECTOR 8P	1	1		L , 20
F11-0818-14		SHIELD CASE(VCO TOP CASE)	1	1		L , 24, 26, 27, 35
L30-0089-05		I.F.T	1	1		L , 1, 2, 3
L30-0281-15		I.F.T	2	2		L , 6
L32-0634-05		OSCILLATING COIL	1			L , 5, 7
L32-0639-05		OSCILLATING COIL 50MHZ	1			L , 6
L33-0647-05		COKE COIL 18 UH	1	1		L , 14
L33-0648-05		COKE COIL 3.3 UH	1			L , 20
L34-0908-05		COIL 3 5T	2	2		L , 24, 26, 27, 35
L34-0908-05		COIL 3 9.5T	3	3		L , 1, 2, 3
L34-1033-05		COIL 3 8.5T	2	2		L , 4
L34-0683-05		TUNING COIL	2	2		L , 45, 46
L34-0749-05		TUNING COIL	2	2		L , 47, 48
L34-0749-05		TUNING COIL	2	2		L , 59, 60
L34-2232-05	N	TUNING COIL 51.2MHZ	2	2		L , 6
L34-3064-05		TUNING COIL	2	2		L , 57, 58, 43
L34-3066-05		TUNING COIL	1	1		L , 36, 37
L40-6891-05		INDUCTOR 68 UH	3	3		L , 12, 15
L40-1021-05		INDUCTOR 100 UH	2	2		L , 30, 31
L40-1512-03		INDUCTOR 150 UH	2	2		L , 11, 16, 18
L40-3311-03		INDUCTOR 330 UH	2	2		L , 22
L40-1021-03		INDUCTOR 1 MH	3	3		L , 2, 36
L40-1092-15		INDUCTOR 1 UH	1	1		L , 42
L40-1092-15		INDUCTOR 100 UH	2	2		L , 49
L40-4711-13		INDUCTOR 470 UH	1	1		L , 8, 10
L40-1011-13		INDUCTOR 100 UH	1	1		L , 17
L77-0364-05	N	CERAMIC FILTER SFE1-025MHz-A	2	2		L , 19
L77-0950-05		XTAL 10.6945MHz	1	1		
L77-0951-05		XTAL 10.6935MHz	1	1		

PARTS LIST TS-811A/B/E

PART NO.	NOTE	NAME & DESCRIPTION	DISTINCTION & QUANTITY			REFERENCE, NO.
			001	011	012	
L77-1255-05 L79-0644-05	N	TCXO BPF	10,240MHZ BPJB3	1 2	1 2	L ✓ 41 L ✓ 28, 29
MAR86 MC145155P*K MC145156P	N	DIODE IC IC		2 1 1	2 1 1	D ✓ 4, 5 Q ✓ 21 Q ✓ 19
W9231 MC921 MS4459L		DOUBLE DIODE DIODE IC		2 1 1	2 1 1	Q ✓ 6, 8 D ✓ 7 Q ✓ 25
NJM78L05A		IC		1	1	Q ✓ 37
R12-1405-05		TRIM.POT.	1K OHM	3	3	VR ✓ 1, 2, 3
SN16913P SN74LS90N		IC		4 2	4 2	Q ✓ 3, 4, 6, 31 Q ✓ 22, 36
TAT7302P		IC		1	1	Q ✓ 30
UPB55C		IC		1	1	Q ✓ 20
ISV50		DIODE		3	3	D ✓ 1, 2, 3
2SA1048(Y) 2SC2459(BL)		TR		1	1	Q ✓ 15
2SC2459(BL)		TR		3	3	Q ✓ 12, 14, 25
2SC2458(Y)		TR		3	3	Q ✓ 13, 24, 27
2SC2458(Y)		TR		4	4	Q ✓ 14, 15, 26, 39
2SC2458(Y)		TR		3	3	Q ✓ 16, 33, 38
2SC2458(Y)		TR		3	3	Q ✓ 8, 41
2SC2668(Y,O)		TR		1	1	Q ✓ 26
2SC2668(Y,O)		TR		1	1	Q ✓ 32
2SC2668(Y,O)		TR		6	6	Q ✓ 5, 11, 17, 18, 29, 40
2SC2668(Y)		TR		1	1	Q ✓ 10
2SK192A(GR)*N		FET		2	2	Q ✓ 10, 28
3SK73(Y)		FET		1	1	Q ✓ 2

HET UNIT (X50-2000-00) (M,T,W,X)

PART. NO.	NOTE	NAME & DESCRIPTION	QTY	DESCRIPTION	QTY	REFERENCE NO.
C454CH1H0RSC		GERAMIC .05P 50V	2			C x 14, 27
C454CH1H050C		GERAMIC .5P 50V	3			C x 1, 9, 38
C454CH1H100D		GERAMIC 10P 50V	5			C x 12, 34, 44
C454CH1H220A		GERAMIC 22P 50V	2			C x 23, 28
C454CH1H100J		GERAMIC 10P 50V	5			C x 6, 11, 18, 34, 40
C737ECH1H100D		CHIP CAP. 10P 50V	1			C x 2
C737ECH1H220J		CHIP CAP. 22P 50V	1			C x 1
C737ECH1H330J		CHIP CAP. 33P 50V	1			C x 43
CE04W1C100M		ELECTRO 10V	1			C x 12
C454SH1H471K		GERAMIC 1.70P 50V	2			C x 16, 22
C454SH1H102K		GERAMIC 1000P 50V	14			C x 4, 5, 7, 10, 17, 19, 21, 25, 26, 29, 33, 35, 39, 42
C735E81H102K		CHIP CAP. 1000P 50V	6			C x 8, 13, 20, 31, 36, 42
C05-062-05		TRIMMER 60P	3			TC x 1, 2, 3
C05-063-05		TRIMMER 10P	1			TC x 4
C91-0598-05		GERAMIC 0.35P 50V	1			C x 37
C91-0757-05		GERAMIC 0.001 50V	1			C x 30 *
C91-1008-05		GERAMIC 0.022 50V	1			C x 24
E04-0154-05		RF COAX. CONNECTOR RA-MET-D0	2			TP x 1, 4, 5, 6, 7
E23-0512-05		TERMINAL 1P	5			
E31-2046-05	*	CONNECTING WIRE (A)	1			
E31-3079-05	N	LEAD WITH CONNECTOR	1			
E40-0211-05		MINI CONNECTOR 2P	1			TP x 3
L19-0309-05		WIDE BAND TRANSFORMER	2			L x 2, 3
L34-2041-05		TUNING COIL	2			L x 8, 9
L34-0824-05		COIL 3.5 2.5T	1			L x 6
L34-0833-05		COIL 3.5 1.5T	1			L x 14
L34-1020-05		COIL 3 9.5T	1			L x 1
L34-1025-05		COIL 3 4.5T	1			L x 12
L34-1016-05		COIL 3 4.5T	1			L x 11
L34-1114-05	N	COIL 3 4.5T	1			L x 13
L40-1092-14		INDUCTOR 1.0U	1			L x 7
L79-0650-05	N	HELICAL 190MHz	1			L x 10
L79-0651-05	N	HELICAL 405MHz	2			L x 4, 5
MV13		VARISTOR	1			D x 2
N04B7C1-3R		DIODE	1			D x 1
2SC2026		TR	5			G x 1, 2, 5, 6, 7
2SC2570A		TR	1			G x 3
2SC2787(L)		TR	1			G x 4

PARTS LIST TS-811A/B/E

CONTROL UNIT (X53-1410-XX) (-12 : K -22 : M,X -52 : T -62 : W)

PART NO.	NOTE	NAME & DESCRIPTION	DISTINCTION & QUANTITY						REFERENCE.NO	
			012	021	022	051	052	061	062	
CC45CH1H150J		CERAMIC 15P 50V	2	2	1	2	1	1		C , 52, 53
CC45CH1H270J		CERAMIC 27P 50V	1	1	1	1	1	1		C , 73
CC45CH1H270J		CERAMIC 27P 50V	1	1	1	1	1	1		C , 72
CC45CH1H270J		CERAMIC 33P 50V	1	1	1	1	1	1		C , 54
CC45CH1H270J		CERAMIC 120P 50V	1	1	1	1	1	1		C , 44
CC45CH1H270J		ELECTRO 220 16V	2	2	2	2	2	2		C , 65, 69
CEO4W1A73M		ELECTRO 470 10V	1	1	1	1	1	1		C , 66
CEO4W1H47M		ELECTRO 0.47 50V	1	1	1	1	1	1		C , 19
CEO4W1H47M		POLY-TESTER 0.47 50V	2	2	2	2	2	2		C , 47, 79
CG45B1H182K		CERAMIC 1800P 50V	1	1	1	1	1	1		C , 37
CG92M1H102K		MYLAR 1800P 50V	1	1	1	1	1	1		C , 21
CG92M1H102K		MYLAR 1000P 50V	1	1	1	1	1	1		C , 43
CG92M1H692K		MYLAR 6800P 50V	1	1	1	1	1	1		C , 46
CG92M1H692K		TIN ALUM 10 10V	1	1	1	1	1	1		C , 22
CG92M1H692K		ELECTRO 1 50V	1	1	1	1	1	1		C , 45
C90-0846-05		ELECTRO 33 10V	2	2	2	2	2	2		C , 48, 50
C90-0847-05		ELECTRO 47 10V	1	1	1	1	1	1		C , 42
C90-0837-05		ELECTRO 0.1 50V	1	1	1	1	1	1		C , 41
C91-0457-05		CERAMIC 0.022 50V	8	8	8	8	8	8		C , 7, 8, 16, 30, 31, 70, 71
C91-0457-05		CERAMIC 0.022 50V	2	2	2	2	2	2		C , 84
C91-0753-05		CERAMIC 470P 50V	4	4	4	4	4	4		C , 1, 9, 10, 36
C91-0117-05		CERAMIC 0.01 50V	1	1	1	1	1	1		C , 86
C91-0757-05		CERAMIC 0.001 50V	21	21	21	21	21	21		C , 2, 3, 4, 5, 6, 11, 12, 13, 14, 29, 32, 35, 38, 39, 40, 68, 79, 80, 81, 82
C91-0757-05		CERAMIC 0.001 50V								C , 83
C91-0757-05		CERAMIC 470P 50V	1	1	1	1	1	1		C , 56
C91-0757-05		CERAMIC 0.001 50V	4	4	4	4	4	4		C , 1, 18, 20, 23, 24, 33, 34
C91-0769-05		CERAMIC 0.001 50V	12	12	12	12	12	12		C , 51, 55, 67, 76, 85
C91-0769-05		CERAMIC 0.001 50V	5	5	5	5	5	5		C , 17, 25, 63, 74, 75
DPA401	N	DIODE	6	6	6	6	6	6		D , 1, 5, 4, 5, 6, 7
DTA114VS		DIGITAL TR	3	3	3	3	3	3		D , 4, 6
DTA114VS	N	DIGITAL TR	3	3	3	3	3	3		D , 2, 4, 6
DTG143TS		DIGITAL TR	2	2	2	2	2	2		D , 11, 12
E02-0122-05	N	IC SOCKET 24PIN	1	1	1	1	1	1		
E23-0512-05		TERMINAL IP	2	2	2	2	2	2		
J32-0761-04		STUD & BOSS (STICK TYPE)	1	1	1	1	1	1		
L77-1206-05	N	Xtal 3.6864MHZ	1	1	1	1	1	1		X , 2
L78-0009-05	N	CERAMIC OSC 4MHz	1	1	1	1	1	1		X , 1
M88418-20LP-GRA	N	IC 8BIT X2(RAM)	1	1	1	1	1	1		IC , 14
MC14584BCP		IC	1	1	1	1	1	1		IC , 11
MC14069UBCP		IC	2	2	2	2	2	2		IC , 1, 2
MN6127A		IC	1	1	1	1	1	1		IC , 19
M7212B		ZENER DIODE 12V	1	1	1	1	1	1		D , 17
WT2013B		ZENER DIODE 9.1V	1	1	1	1	1	1		D , 11
MSL2555AP-5	N	IC								IC , 16
N30-3006-46		PAN HD SCREW	2	2	2	2	2	2		
N30-3010-46		PAN HD SCREW	1	1	1	1	1	1		
NB7-2606-46		TAPPING SCREW	2	2	2	2	2	2		

PART NO.	NOTE	NAME & DESCRIPTION	DISTINCTION & QUANTITY						REFERENCE.NO	
			012	021	022	051	052	061	062	
PS5118A	N	IC	1	1	1	1	1	1		IC , 10
R12-4416-05	N	TRIM POT 50K	1	14	11	1	1	1		VR , 1
R90-0515-05		RESISTOR BLOCK 10K	2	2	2	2	2	2		R , 1, 15
R90-0521-05		RESISTOR BLOCK 1K X7	1	1	1	1	1	1		R , 89
R90-0525-05		RESISTOR BLOCK 22K X5	1	1	1	1	1	1		R , 83
R90-0534-05		RESISTOR BLOCK 10K X5	1	1	1	1	1	1		R , 38
R90-0578-05	N	RESISTOR BLOCK 5.1K X10	1	1	1	1	1	1		R , 70
SN74LS05N		IC	1	1	1	1	1	1		IC , 23
SN74LS32N		IC	1	1	1	1	1	1		IC , 23
SN74LS153N		IC	1	1	1	1	1	1		IC , 15
SN74LS174N		IC	3	3	3	3	3	3		IC , 12, 17, 22
TC4011BP		IC DR_BU4011BP	7	7	7	7	7	7		IC , 3, 4, 5, 6, 7, 8, 9
TC4089UBP		IC	1	1	1	1	1	1		IC , 1, 2
TMQ8235AP-5	N	IC	1	1	1	1	1	1		IC , 16
UPC4558C		IC	1	1	1	1	1	1		IC , 18
UPC7805H		IC	1	1	1	1	1	1		IC , 21
UPD78026-088-36		MICRO-PROCESSOR	1	1	1	1	1	1		
UPD5235AC-F	N	MICRO-PROCESSOR FOR DCS	1	1	1	1	1	1		IC , 16
UPD7507G-575-00		MICRO-PROCESSOR FOR DCS	1	1	1	1	1	1		IC , 20
ISS1133		DIODE	19	19	19	19	19	19		D , 2, 8, 9, 10, 13, 14, 15, 18, 19, 20, 21, 22, 23, 24
ISS1133		DIODE	2							D , 33, 35
ISS1133		DIODE	3							D , 12, 30, 35
ISS1133		DIODE	5							D , 16, 30, 35, 34, 35
ISS1133		DIODE	7							D , 16, 30, 31, 32, 33, 34, 35
2SA1307(YY)	N	TR	1	1	1	1	1	1		Q , 14
2SA1015(YY)		TR	2	2	2	2	2	2		Q , 18, 20
2SA1048(YY)		TR	1	1	1	1	1	1		Q , 21
2SA1115(EE)		TR								Q , 21
2SC2031(YY)		TR	3	3	3	3	3	3		Q , 16, 17, 19
2SC2959(YY)		TR	1	1	1	1	1	1		Q , 13
2SC2458(Y)		TR	4	4	4	4	4	4		Q , 7, 8, 9, 10
2SC2703(D-Y)		TR	1	1	1	1	1	1		Q , 15

TS-811A/B/E PARTS LIST

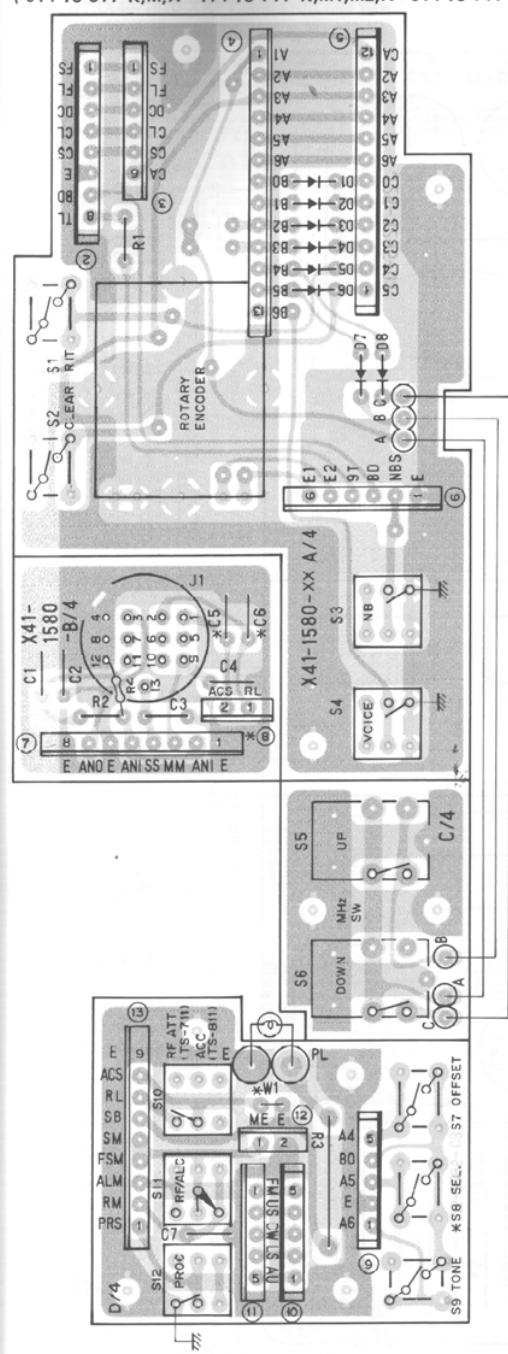
DISPLAY UNIT (X54-1820-11)

PART NO.	NOTE	NAME & DESCRIPTION	QTY	DISTINCTION	QUANTITY	REFERENCE NO
CC455LH101J		CERAMIC 100P 50V	1			C ✓ 20
CE04W1V100M		ELECTRO 10 35V	2			C ✓ 2, 13
CE04W1C100M		ELECTRO 10 16V	2			C ✓ 10, 14
CE04W1C330M		ELECTRO 33 20V	1			C ✓ 8
CE04W1A270M		ELECTRO 7 10V	1			C ✓ 1, 2, 3, 15, 16, 17, 18
CK45B1H202K		CERAMIC 1000P 50V	8			C ✓ 19
C992M1H03K		MYLAR 0.01 50V	1			C ✓ 11
C992M1H223K		MYLAR 0.022 50V	1			C ✓ 4
C91-0769-05		CERAMIC 0.01 50V	1			C ✓ 6
C91-1008-05		CERAMIC 0.022 50V	2			C ✓ 7, 9
DTA24EF	N	DIGITAL TR	2			Q ✓ 11, 12
E06-0850-05		BP METAL SOCKET	1			
E11-0401-05		EARPHONE JACK EXT. SP	1			
E11-0407-05		EARPHONE JACK	1			
E11-0413-05		PHONE JACK PHONES	1			
E11-0422-05	N	KEY JACK KEY	1			
E31-3052-15	N	TAPE CABLE 10X25MM	1			
E31-3053-15	N	TAPE CABLE 12X25MM	1			
E31-3054-05	N	TAPE CABLE 4X50MM	1			
E31-3055-05	N	TAPE CABLE 1X150MM	1			
E31-3056-05	N	TAPE CABLE 12X50MM	1			
F1P11FM7		DISPLAY TUBE	1			V ✓ 1
L19-0323-05		TRANSFORMER IFT	1			T ✓ 4
L30-0504-05		INDUCTOR 350 UH	1			T ✓ 2
L40-1511-14		INDUCTOR 200 UH	1			T ✓ 3
L40-1011-04						L ✓ 1
M931		DIODE	2			D ✓ 3, 4
MT26.2JA		DIODE	1			D ✓ 2
MT27.5JA		DIODE	1			D ✓ 5
R12-2413-05		TRIM.POT. (5K)	1			VR ✓ 6
R12-2446-05		TRIM.POT. (30K)	1			VR ✓ 5
R12-5420-05		TRIM.POT. 100KOHM	1			VR ✓ 7
R12-7403-05		TRIM.POT. 500KOHM	1			VR ✓ 8
R19-3420-05		POTENTIOMETER	1			VR ✓ 4
R19-3420-05	N	POTENTIOMETER	1			VR ✓ 2
R24-9404-05	N	POTENTIOMETER	1			VR ✓ 5
R90-0520-05		RESISTOR BLOCK 47K OHM X5	1			R ✓ 5
R90-0522-05		RESISTOR BLOCK 47K OHM X6	1			R ✓ 26
R90-0579-05	N	RESISTOR BLOCK 47K OHM XII	2			R ✓ 23
TC5066BP		IC	2			Q ✓ 7, 8
UPABOC		IC	1			Q ✓ 6
UPP763C	N	IC	1			Q ✓ 5
I460		DIODE	1			D ✓ 1
112-351-2		THERMISTOR	1			TH ✓ 1
2SC1959(Y)		TR	2			Q ✓ 9, 10
2SC2458(Y)		TR	2			Q ✓ 4

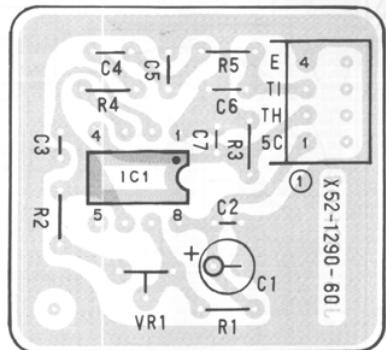
PC BOARD VIEWS TS-711/811

SWITCH UNIT (X41-1580-XX) Component side view

(-01 : TS-811 K,M,X -11 : TS-711 K,M1,M2,X -61 : TS-711 T,W -62 : TS-811 T,W)



**TONE UNIT (X52-1290-60) Component side view
(TS-711 T,W TS-811 T,W)**



IC1 : NF555P

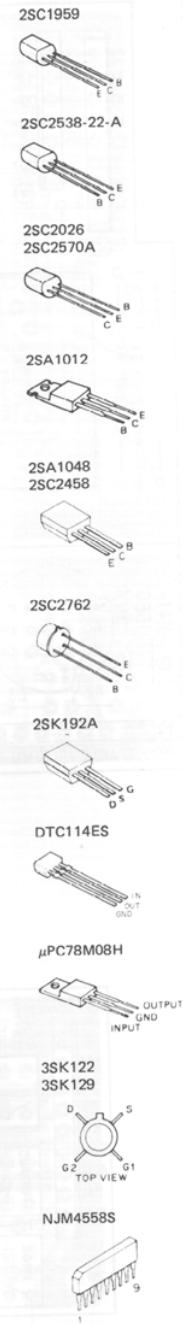
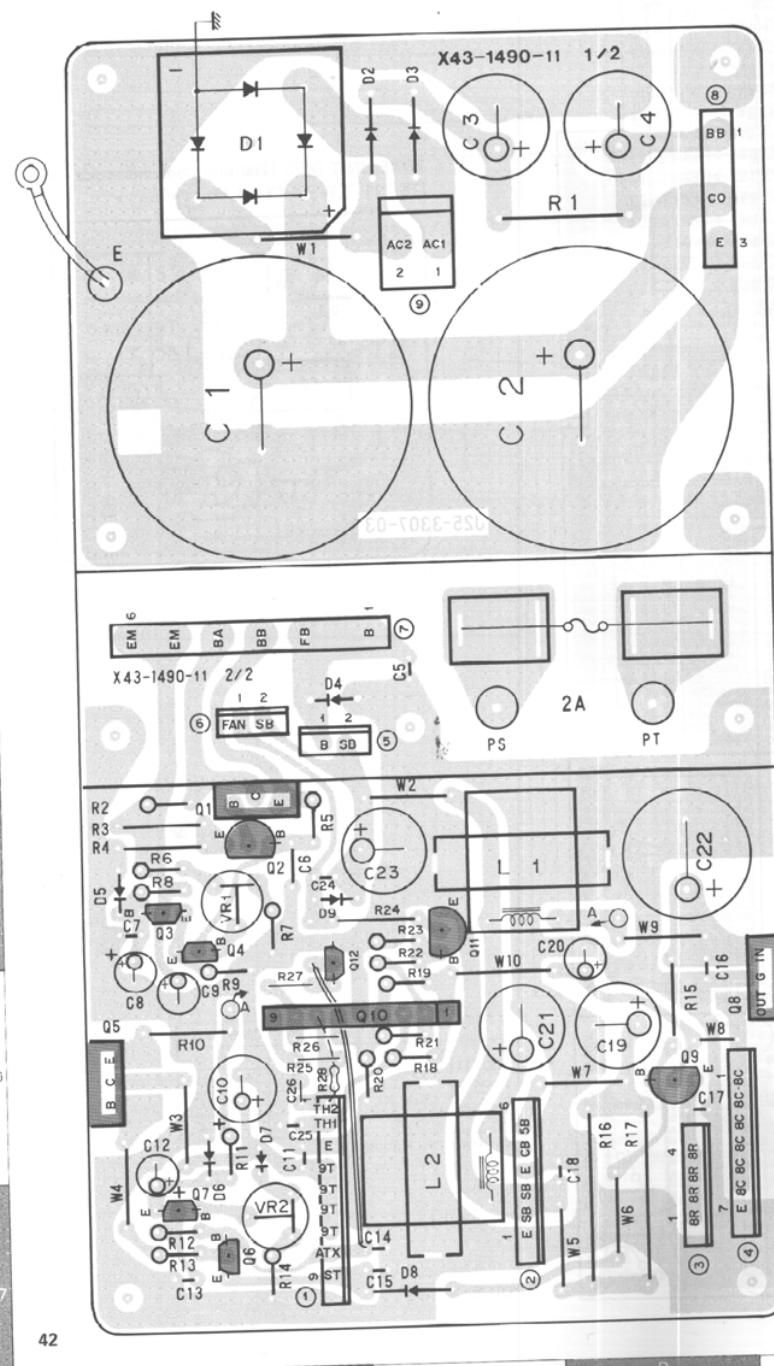
		(8)	SW8	C5,6	W1
TS-711	K,M1,M2,X	X	O	X	O
	T,W	X	X	X	O
TS-811	K,M,X	O	O	O	X
	T,W	O	X	O	X

○ : Used X : Not used

D1-8 : 1SS133

TS-711/811 PC BOARD VIEW

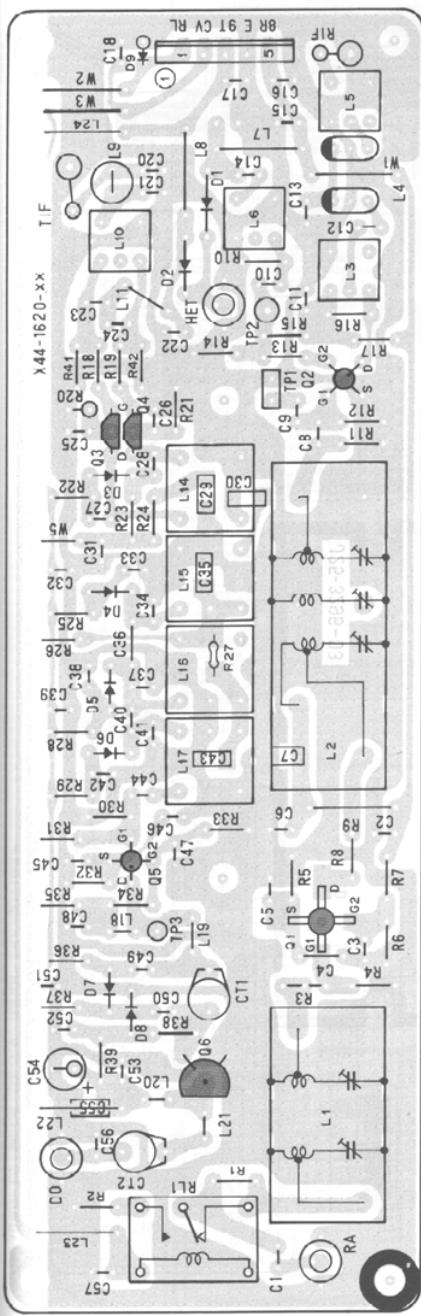
AVR UNIT (X43-1490-11) Component side view



Q1.5 : 2SA1012(Y) Q2.9.11 : 2SC1959(Y) Q3.4.6 : 2SC2458(Y) Q7 : μ PC78M08H Q8 : μ PC78M08H Q10 : NJM4558S Q12 : DTC114ES
D1 : ST10VB20 D2.3 : V06B D4 : U05B D5 : MT26.2.(A,B) D7 : VD1223 D8.9 : ISS133

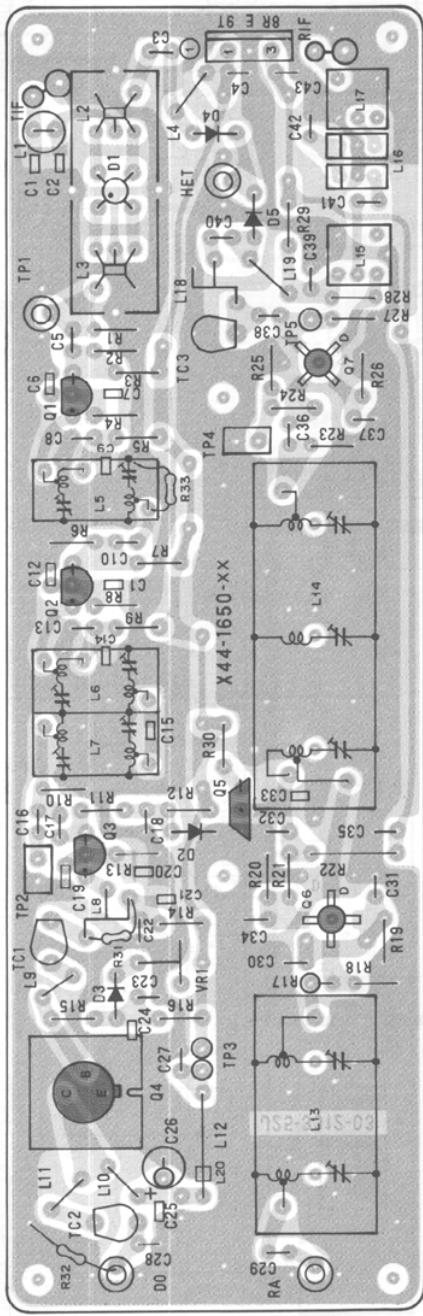
PC BOARD VIEWS TS-711/811

RF UNIT (X44 1620 XX) Component side view
(-01 : TS-711 T,W -11 : TS-711 K,M1,M2,X)



Q1: 3SK1291Q F1 Q2,5: 3SK1221L Q3,4: 2SK192A(GRI+N Q5: 2SC2538-22 A
D1,2: MA856 D3-7: 1SV123 D8,9: 1SS133

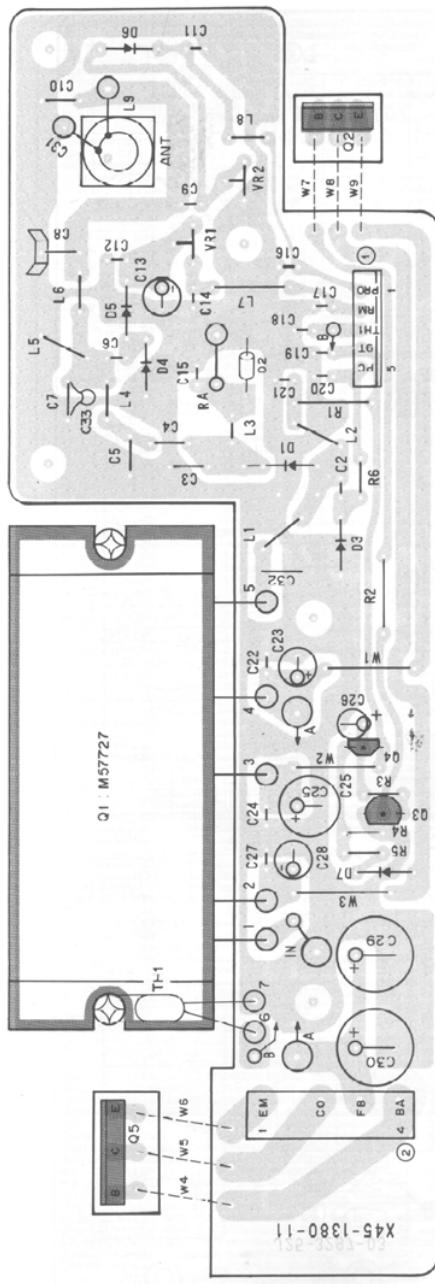
RF UNIT (X44-1650-XX) Component side view
(-01 : TS-811 M,T,W,X -11 : TS-811 K)



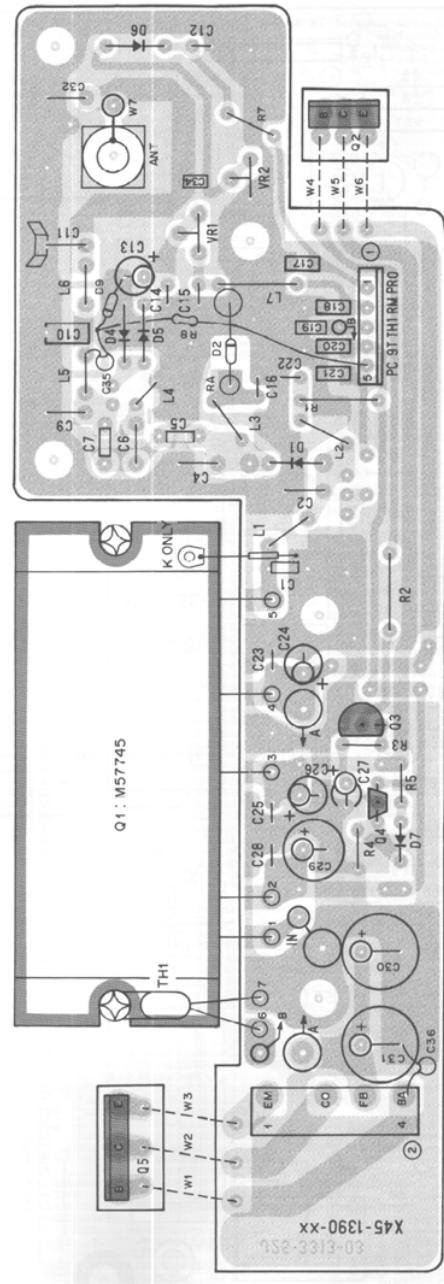
Q1,2: 2SC2026 Q3: 2SC2670A Q4: 2SC2762 Q5: 2SC2458(Y) Q6,7: 3SK129(S,T)
D1: ND467C1-3R D2: MV13 D3: 1SS133 D4: MA856 D5: MA856 (M,T,W,X), 1SS97 (K)

TS-711/811 PC BOARD VIEWS

FINAL UNIT (X45-1380-11) Component side view
(TS-711 K,M1,M2,T,W,X)

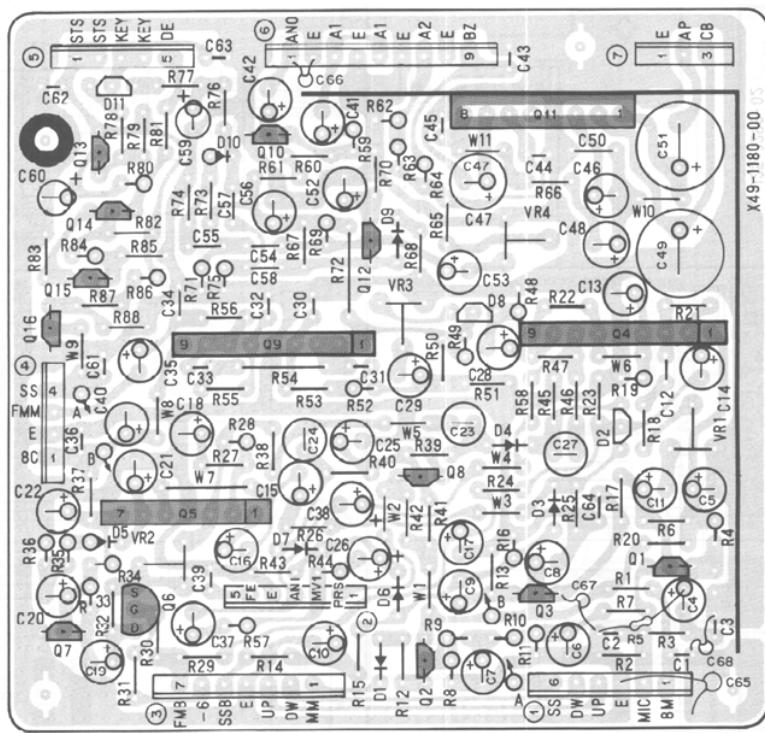


FINAL UNIT (X45-1390-XX) Component side view
(-01 : TS-811 M,X -11 : TS-811 K -61 : TS-811 T,W)



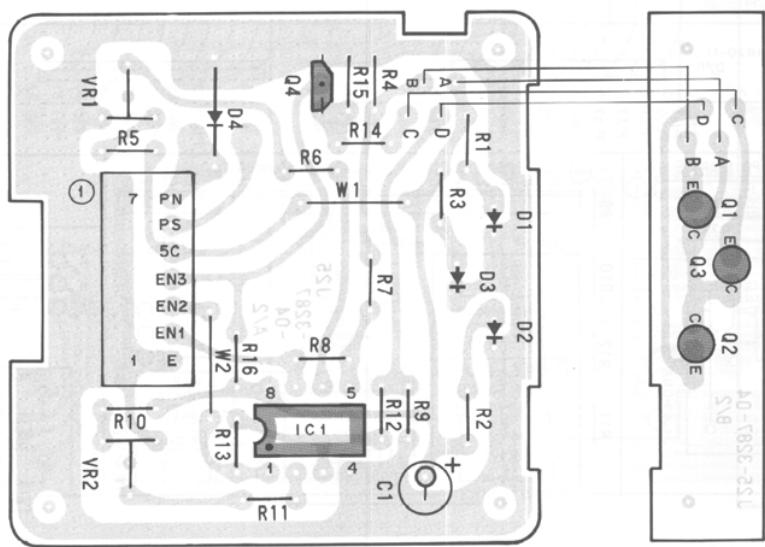
PC BOARD VIEWS TS-711/811

AF UNIT (X49-1180-00) Component side view



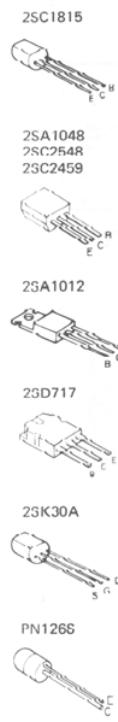
X49-1180-00
X49-1180-00
Q1 : 2SC2459(GR) Q2 : 2SA1048(Y) Q3 : 7.8.10.12.14-16 : 2SC2458(Y)
Q4,9 : NJM4558S Q5 : μPC1158H2 Q6 : 2SK30A(GR) Q11 : MB3713
D1,3,4,6,7,9,10,11SS133 D2,8 : MC911 D5 : 1N50 D11 : MC921

ENCODER ASS'Y (W02-0364-00) Component side view



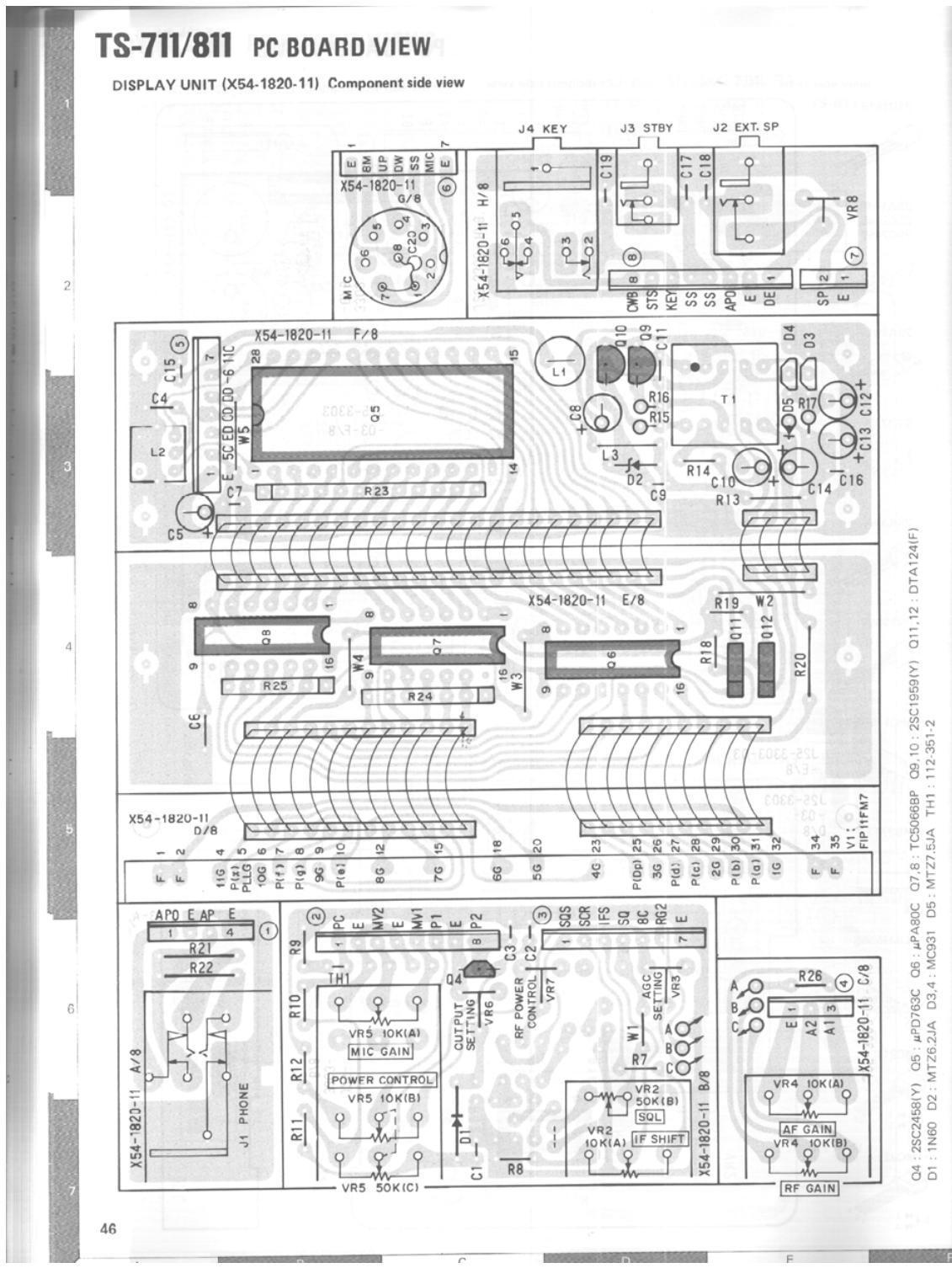
Q1-3 : FN126S(R) Q4 : 2SC2458(Y)
IC1 : LM368P
D1-3 : LN66(R) D4 : V06B
132-338J-04

D1 : M1407 D2 : M1308 D4-7,9 : 1SS133 D5 : SDT1100P



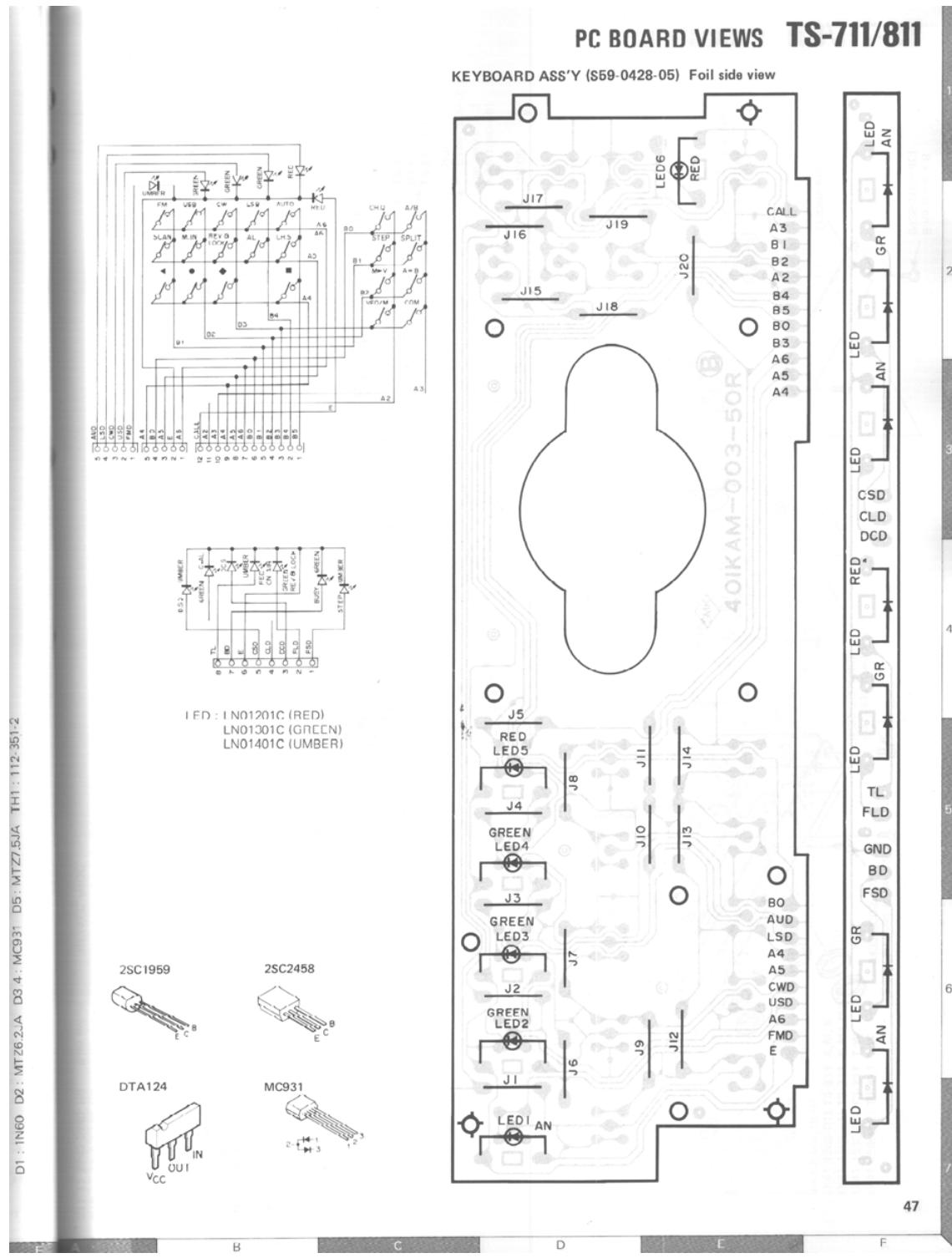
TS-711/811 PC BOARD VIEW

DISPLAY UNIT (X54-1820-11) Component side view



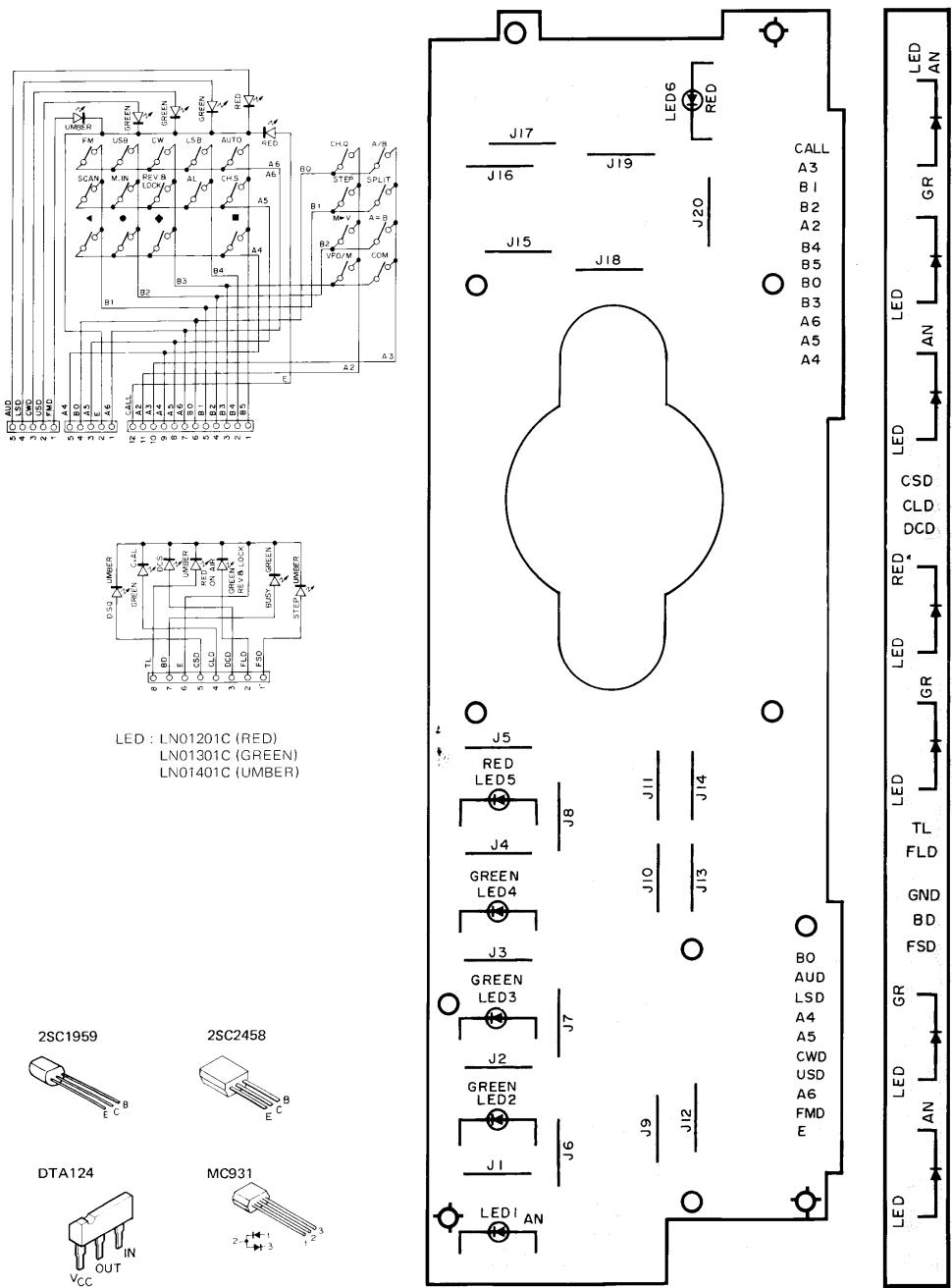
PC BOARD VIEWS TS-711/811

KEYBOARD ASS'Y (S59-0428-05) Foil side view



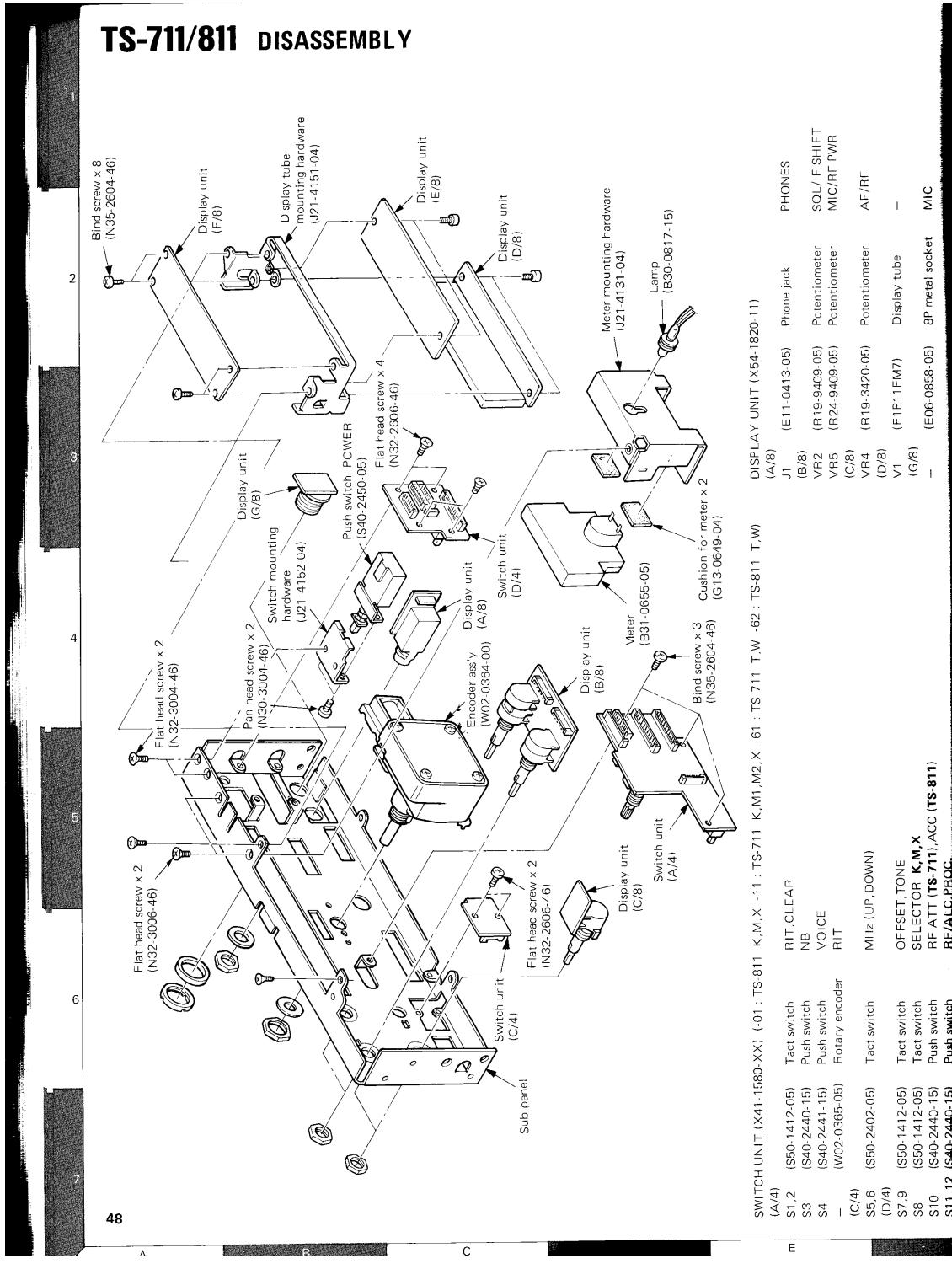
PC BOARD VIEWS TS-711/811

KEYBOARD ASS'Y (S59-0428-05) Foil side view

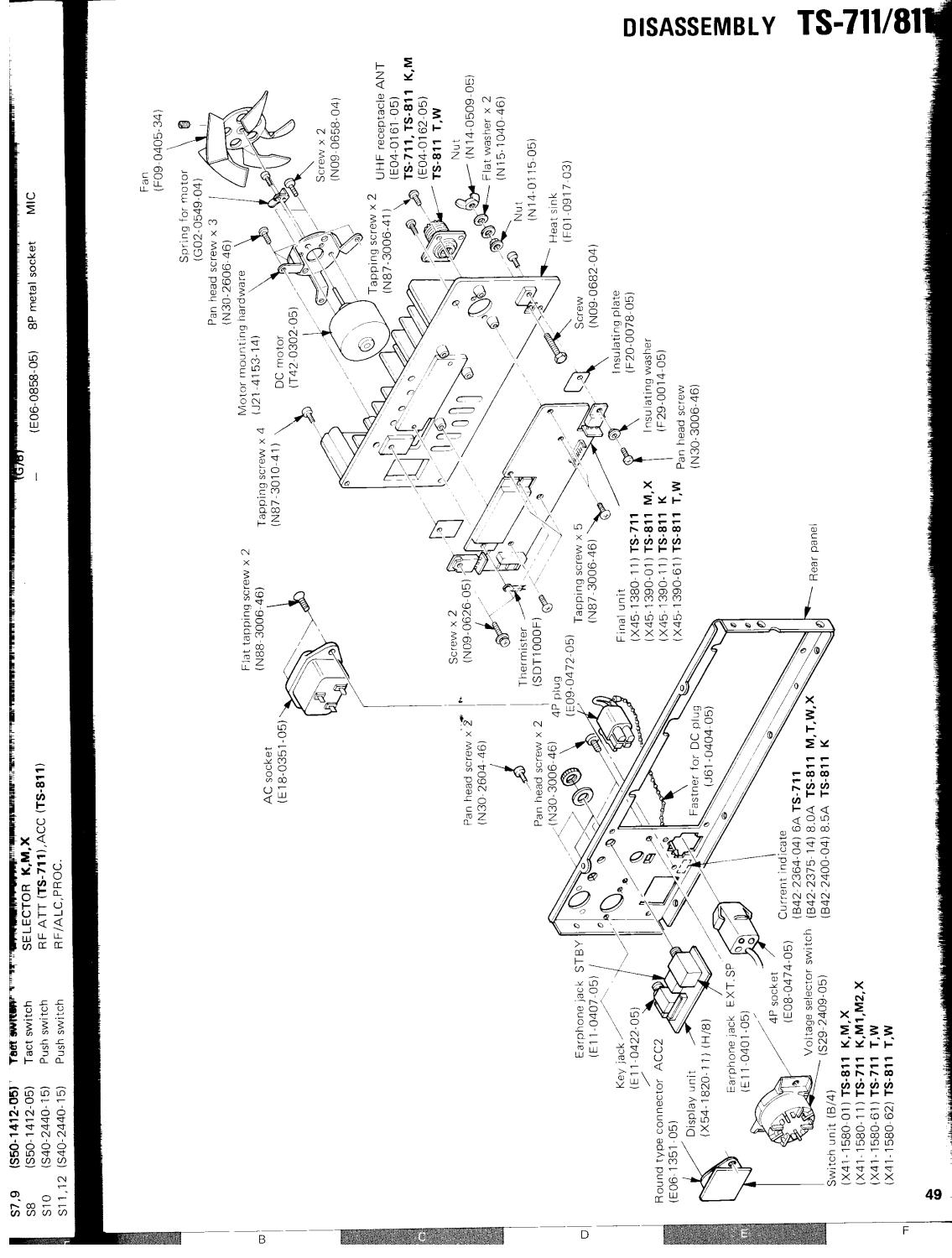


D1 : 1N60 D2 : MTZ6.2JA D3,4 : MC931 D5 : MTZ7.5JA TH1 : 112-351-2

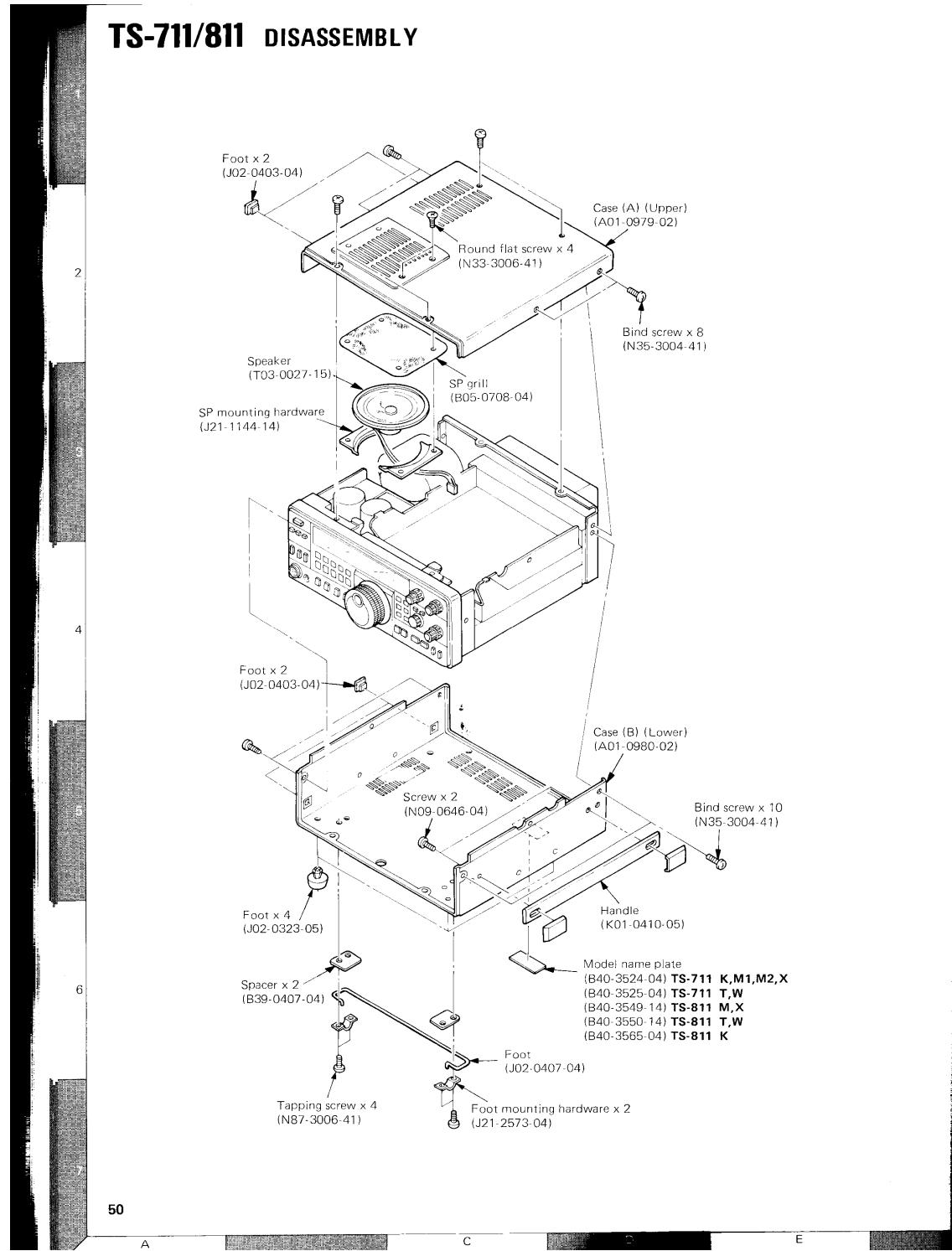
TS-711/811 DISASSEMBLY



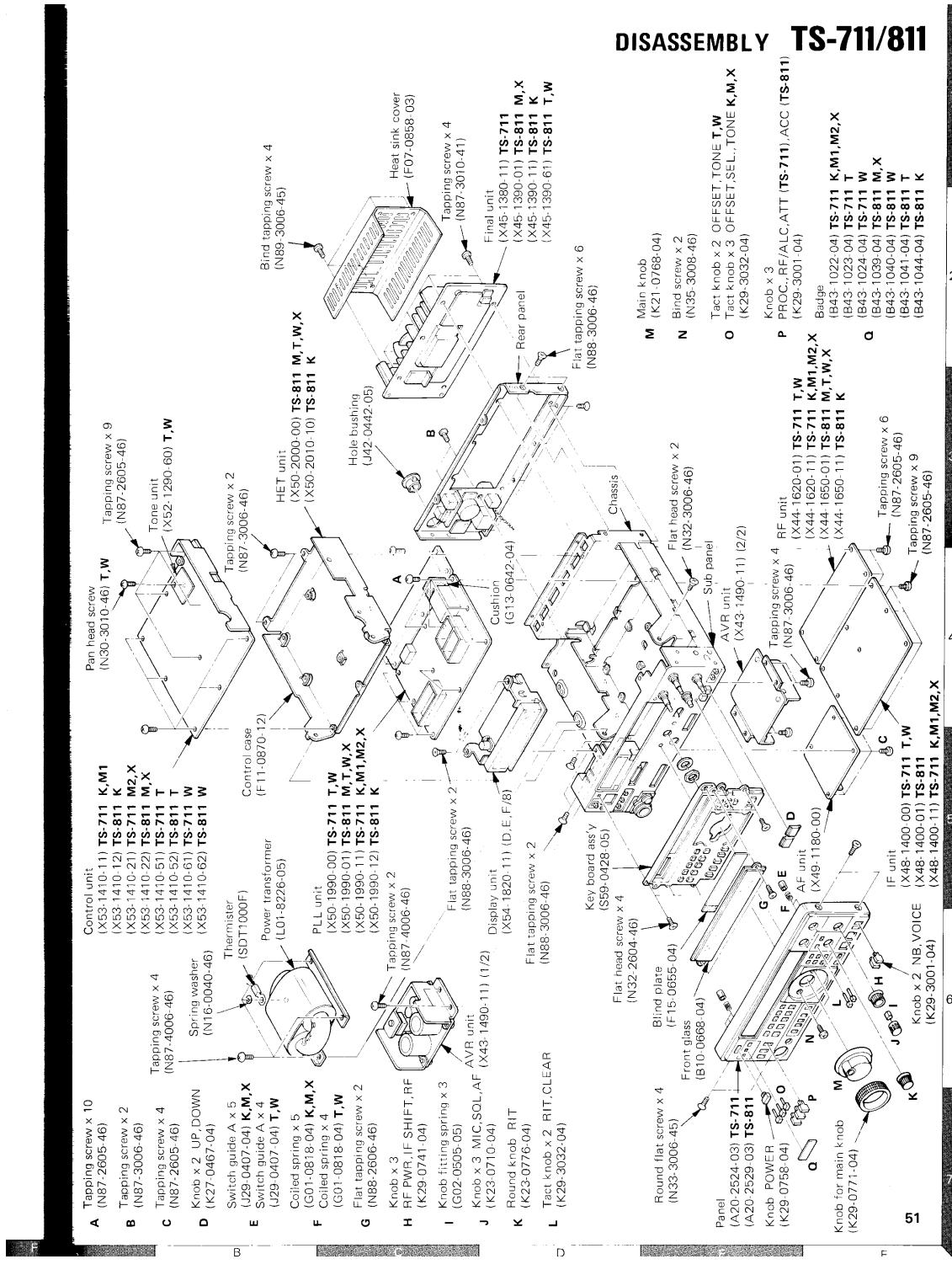
DISASSEMBLY TS-711/811



TS-711/811 DISASSEMBLY



DISASSEMBLY TS-711/811



TS-711/811

ADJUSTMENT

REQUIRED TEST EQUIPMENT

1. **DC V.M**
 - 1) High input impedance
2. **RF VTVM (RF V.M)**
 - 1) Input impedance : $1M\Omega$ min., $2pF$ max.
 - 2) Voltage range : F.S = $10mV \sim 300V$
 - 3) Frequency range : Up to 450MHz
3. **Frequency Counter (f. counter)**
 - 1) Input sensitivity : Approx. $50mV$
 - 2) Frequency range : Up to 450MHz
4. **DC Power Supply**
 - 1) Voltage : $10V \sim 17V$, variable
 - 2) Current : $6A$ min.
5. **Power Meter**
 - 1) Measurement range Approx. : $30W$, $3W$, $1W$
 - 2) Input impedance : 50Ω
 - 3) Frequency range : 450MHz
6. **AF VTVM (AF V.M)**
 - 1) Input impedance : $1M\Omega$ min.
 - 2) Voltage range : F.S = $1mV \sim 30V$
 - 3) Frequency range : $50Hz \sim 10kHz$
7. **AF Generator (AG)**
 - 1) Output frequency : $100Hz \sim 10kHz$
 - 2) Output voltage : $0.5mV \sim 1V$
8. **Linear Detector**
 - 1) Frequency range : 450MHz
9. **Field Strength Meter**
 - 1) Frequency range : 450MHz
10. **Directional Coupler**
11. **Oscilloscope**
 - 1) High sensitivity oscilloscope with horizontal input terminal
12. **SSG**
 - 1) Frequency range : 144MHz and 430MHz bands
 - 2) Modulation : AM and FM MOD.
 - 3) Output level : $-20dB$ to $100dB$
13. **Dummy Load**
 - 1) 8Ω , $30W$ (approx.)
14. **Noise Generator**
 - 1) Must generate ignition-like noise containing harmonics beyond 450MHz.
15. **Sweep Generator**
 - 1) Sweep range : 1440MHz and 430MHz bands
16. **Tracking generator**

PREPARATION

- 1) Unless otherwise specified, knobs and switches should be set as follows **Table 11**.

POWER SW	ON	RF POWER	MAX
PROC. SW	OFF	SQUELCH VR	MIN
ALC/RF SW	RF	AF GAIN VR	MIN
ATT SW TS-711A/E	OFF	RF GAIN VR	MAX
ACC SW TS-811A/B/E	OFF	MIC GAIN VR	MIN
SELECT SW K,M,X	OFF	TONE SW	OFF
TONE SW	OFF	MODE SW	FM
IF SHIFT VR	CENTER		

Table 11

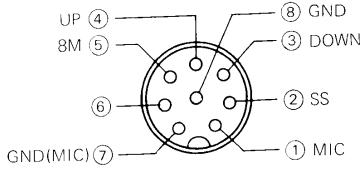


Fig. 17 MIC terminals (view from front panel side)

- 2) Use an insulated adjusting rod to adjust trimmers and coils.
- 3) To prevent damaging SSG, never set the stand by switch to SEND while adjusting the receiver section.
- 4) Be sure to turn the power switch OFF, before connecting the power cable to a power source.
- 5) SSG output levels are those at the time the output terminal is open.
- 6) Meter and display section should be set as follows Fig. 18 or 19.

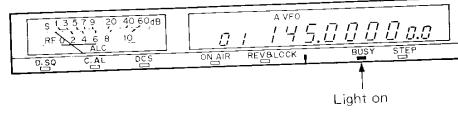


Fig. 18 Meter and display section (TS-711A/E)

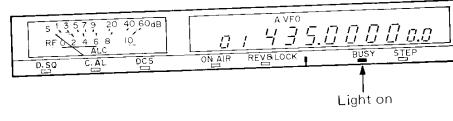


Fig. 19 Meter and display section (TS-811A/B/E)

TS-711A/E

TS-711 ADJUSTMENT

TS-711A/E TX/RX Section (Common)

CW : Clockwise, CCW : Counterclockwise

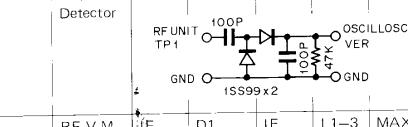
Item	Condition	Measurement			Adjustment			Specification/Remarks
		Test equipment	Unit	Terminal	Unit	Part	Method	
1. Reset	1) Set the power SW on, while depressing the A=B key. Then release the A=B key.							VFO A 144.000 MODE : CW The "Beeper" sounds
2. Voltage adjustment (1) 13.8V, 9V AVR (2) AGC voltage	1) Connect the AC power cable to the power terminal on the rear panel. 2) POWER SW : ON 1) RF GAIN : MAX (3) RF OUT-PUT voltage 1) RF POWER : MIN STBY : SEND 2) RF POWER : MAX STBY : SEND	DVM	AVR	D4 9T	VR1 VR2	13.8V 9.0V	±0.1V ±0.1V	
3. PLL	1) SF level adjustment MODE SW : FM FREQ. : 145.0000 2) 20.48MHz level adjustment MODE SW : FM FREQ. : 145.0000 3) 4F (40.96MHz) level adjustment MODE SW : FM FREQ. : 145.0000 4) 51.2MHz level adjustment MODE SW : FM FREQ. : 145.0000 5) B loop VCO adjustment MODE SW : FM FREQ. : 145.0000 : 144.9999 6) 11.025MHz level adjustment MODE SW : FM FREQ. : 145.010 7) 31.505MHz level adjustment MODE SW : FM FREQ. : 145.010 8) A loop VCO adjustment MODE SW : FM FREQ. : 144.0000 : 145.9999 T,W : 148.0000 K,M1,M2,X	RF V.M	PLL	SF (③-1) TP9 4F (③-4) TP8 TP7 TP4 TP3 TP6	L44 L45,46 L47,48 L39,40 L33 TP4 L9 L5-7 TC2	Adjust the core for the MAX reading, then turn it outward until a reading of 0.4V is obtained. MAX MAX MAX 5.5V MAX MAX MAX 6.3V T,W 5.1V K,M1,M2,X	0.4V±0.01V 0.4-0.5V 0.10-0.15V ±0.1V 2.0-3.5V 0.15-0.18V 0.1-0.15V ±0.1V 5.2-6.0V 1.8-3.8V	
4. PLL output	1) MODE SW : FM FREQ. : 145.9999 T,W : 146.0000 K,M1,M2,X	RF V.M	PLL	TP2 TP1	PLL	L4 TC1	MAX MAX	0.14-0.15V 0.45-0.58V
5. CAR	1) MODE SW : USB IF SHIFT VR : Center MODE SW : LSB MODE SW : FM 2) MODE SW : USB : LSB	RF V.M	PLL	TP5	PLL	L13 Confirm	Turn the core outward until a reading of 0.3V is obtained. Confirm the peak point. 0.3 ± 0.02V 0.3 ± 0.03V	0.3 ± 0.01V
					PLL	TC3 TC4	10.69650MHz 10.69350MHz	±100Hz ±100Hz

TS-711A/E

TS-711 ADJUSTMENT

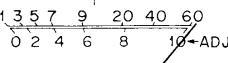
Item	Condition	Measurement			Adjustment			Specification/Remarks
		Test equipment	Unit	Terminal	Unit	Part	Method	
5. CAR	3) MODE SW : LSB (SEND) : CW	f.counter	PLL	TP5	PLL	VR1	10.69350MHz	±100Hz
	: FM					VR2	10.69570MHz	±100Hz
						VR3	10.69500MHz	±100Hz
6. IF SHIFT check	1) MODE SW : USB (RX)	f.counter	PLL	TP5			Turn the IF SHIFT all the way CW and CCW.	±1.0kHz or greater Not work on FM mode.
	2) MODE SW : LSB (TX)							Does not change
7. TCXO f.adjustment (Temperature consequence crystal oscillator)	1) MODE SW : USB	f.counter	PLL	TP8	PLL	L41 (TC XO)	51.20000MHz	±10Hz

TS-711 A/E RX Section

Item	Condition	Measurement			Adjustment			Specification/Remarks
		Test equipment	Unit	Terminal	Unit	Part	Method	
1. Helical	1) MODE SW : FM Connect the Sweep G. to the ANT terminal	Sweep G. Oscillo- scope Detector	RF	TP1	RF	L1,2	Adjust the L1 and L2 as waveform as shown on right.	(K,M1,M2,X) 144 146 148 (T,W) 144 145 146
								
2. 4F level adjustment (40.96MHz)	1) MODE SW : FM RX	RF V.M	IF	D1 (cathode)	IF	L1-3	MAX (0.9V)	0.8V or greater
3. IF GAIN (1) (FM MODE)	1) MODE SW : FM VFO : 145.0000 SSG : 10dB μ SSG MOD : 1kHz SSG DEV : 5kHz	SSG Oscillo- scope AF V.M S-meter			RF	L3,5,6	Adjust the each coil for MAX S-meter reading repeatedly.	Maintain the SSG output level to about the "3" S-meter reading.
					IF	L24, 28,29		
4. IF GAIN (2) (CW MODE)	1) MODE SW : CW VFO : 145.0000 SSG : -10dB μ VR6 : 	SSG Oscillo- scope AF V.M			IF	L23	Adjust the L23 CCW to the -2dB point from MAX AF V.M reading.	Maintain the SSG output level to about the "3" S-meter reading.
	2) MODE SW : FM VFO : 145.0000 SSG : 10dB μ				RF	L13-15, 20-22	Adjust the L13-15, L20-22, for MAX S-meter reading repeatedly.	
	3) MODE SW : CW VCO : 145.0000 SSG : -10dB μ				IF	L3,5	MAX	
					IF	L23	Adjust the L23 CCW to the -2dB point from MAX AF V.M reading.	
5. S-meter (1) (CW, SSB)	1) MODE SW : CW SSG output : OFF				IF	VR4	Adjust to the "0" S-meter reading on RF meter scale.	

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TS-711 ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specification/Remarks
		Test equipment	Unit	Terminal	Unit	Part	Method	
5. S-meter (1) (CW, SSB)	2) SSG : 20dB μ Adjust the SSG frequency to the MAX S-meter reading.	SSG AF V.M Oscillo-scope			IF	VR5	"S-9"	
	3) SSG : 0dB μ					L14	Adjust the L14 CCW to the "S-3" reading.	Adjust the L14 to MAX, if S-meter does not read the "S-3".
	4) SSG : 20dB μ					VR5	"S-9"	
6. S-meter (2) (FM)	1) MODE SW : FM VFO : 145.0000 SSG : 36dB μ SSG MOD : 1kHz SSG DEV : 5kHz	SSG AF V.M Oscillo-scope			IF	VR9	"S-10"	
7. Carrier balance	1) MODE SW : USB RF GAIN : MIN (After confirm RF GAIN : MAX)	RF V.M	IF	TP3	IF	TC2	Adjust to the dip point.	
8. NB	1) MODE SW : CW VFO : 145.0000 SSG : 10dB μ	DC V.M	IF	TP4	IF	L25,27	MIN	
9. SSG squench	1) MODE SW : CW VFO : 145.0000 SSG : 0dB μ SQ VR : MAX Adjust the SSG frequency to MAX AF V.M reading.	SSG Oscillo-scope AF V.M			IF	VR6	Adjust the VR6 slowly and stop at the threshold point.	SQ open : SSG 0–6dB
	2) SSG output : OFF						Adjust the SQ VR to the threshold point.	
	3) SSG : -10dB μ							SQ open
10. SSB/CW S/N	1) MODE SW : LSB VFO : 144.0000 SSG : -10dB μ K,M1,M2,X : -12dB μ T,W	SSG AF V.M Oscillo-scope						S/N 10dB or greater
11. FM S/N	1) MODE SW : FM SSG : -7dB μ K,M1,M2,X : -8dB μ T,W VFO : 144.0000 : 145.0000 T,W : 145.9999 : 144.0000 : 146.0000 K,M1,M2,X : 148.0000	SSG AF V.M Oscillo-scope						20dB or greater

TS-711 A/E TX Section

Item	Condition	Measurement			Adjustment			Specification/Remarks
		Test equipment	Unit	Terminal	Unit	Part	Method.	
1. Setting	1) Disconnect the coax. cable from the TIF terminal in the IF unit.							
2. IF output	1) RF POWER : MAX MODE SW : CW STBY : SEND IF unit VR7 : Center	RF V.M	IF	TP1	IF	L6–11,18	Adjust the each coil for the MAX RF V.M reading repeatedly.	(0.3–0.4V)
3. CW CAR level	1) MODE SW : CW STBY : SEND Connect the coax. cable to the TIF terminal after adjust.	RF V.M	IF	D18	IF	L8	MAX	0.3V or less
				TP1		VR7	0.38V	±0.01V

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TS-711 ADJUSTMENT

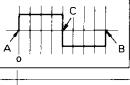
Item	Condition	Measurement			Adjustment			Specification/Remarks
		Test equipment	Unit	Terminal	Unit	Part	Method	
4. Drive output	1) Disconnect the coax. cable from the D0 terminal in the RF unit. Then connect the 1W power meter MODE SW : CW STBY : SEND VFO : 145.0000 T,W : 146.0000 K,M1,M2,X	0.6W Power-meter DO terminal	RF	D0	RF	L10, 14-17 TC1,2	Adjust the each coil for the MAX output repeatedly. Connect the coax. cable to the D0 terminal after adjust. (adjust the L15 from peak to center position of coil)	0.25W or greater
5. Output power	1) MODE SW : CW STBY : SEND VFO : 145.0000 T,W : 146.0000 K,M1,M2,X	Power-meter (30W or 50W)			IF	VR1	Adjust to the mechanical center.	38W or greater
					DISP (B/8)	VR6	26W	±1W
6. ALC meter	1) POWER CONTROL : MAX MIC GAIN VR : MIN MODE SW : USB ALC/RF SW : ALC FREQ. : 145.000 STBY : SEND	ALC meter			IF	VR2	Adjust to the mechanical zero point.	RF meter "8"
	2) MODE SW : CW STBY : SEND				RF	TC2	Adjust for the MAX ALC meter reading.	
					IF	VR3	RF "8"	
7. RF meter	1) MODE SW : CW FREQ. : 145.000 ALC/RF SW : RF	RF meter			Final	VR1	RF "8"	RF meter "8"
8. Protection	1) MODE SW : CW	DC V.M	IF	PRO (⑫ 5)	Final	VR2	MIN	
	2) Connect the ANT terminal to GND.	DC A.M			IF	VR1	3.5A	±0.1A
9. Carrier suppression	1) MODE SW : USB, LSB MIC GAIN : MIN POWER CONTROL : MAX	RF V.M Power-meter Oscilloscope			IF	VR8 TC3	MIN or USB and LSB.	50dB or more
10. SSB frequency response	1) MODE SW : USB, LSB MIC GAIN : Center AG output : Two-tone 2mV, 400Hz, 2600Hz STBY : SEND MIC GAIN VR : 25W	Power-meter (30 or 50W) Oscilloscope			PLL	TC3 (USB) TC4 (LSB)	Adjust to within -9dB level at the 400Hz and the 2.6kHz from the 1.5kHz Note : Confirm the carrier suppression after this adjustment.	
	2) AG output : Single tone 2mV, 1.5kHz MIC GAIN VR : 25W						Adjust to the sharp cross point.	
	3) MODE SW : CW STBY : SEND	f.counter	PLL	TP5	PLL	VR2	10.69570MHz	±10Hz
	4) MODE SW : FM					VR3	10.6950MHz	±10Hz
11. FM FREQ.	1) Front panel CH.O : ON DISPLAY : 145.000 MODE SW : FM STBY : SEND	Power-meter f.counter	DISP (D/8)	Display tube (V1)	IF	TC1	Adjust to 145.000 MHz on f.counter.	±10Hz
							PO meter	
							f counter	

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TS-711 ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specification/Remarks
		Test equipment	Unit	Terminal	Unit	Part	Method	
12. Deviation	1) PROC : OFF MODE SW : FM FREQ. : 145.000 STBY : SEND AG output : 1kHz, 20mV (30mV K)	AG Linear detector		ANT (Directional coupler)	AF	VR3	4.6kHz	$\pm 0.1\text{kHz}$
	2) AG output : 1kHz, 2mV (3mV K)					VR2	3kHz	
13. Speech processor	1) PROC : ON MODE SW : FM FREQ. : 145.000 STBY : SEND AG output : 1kHz, 20mV (30mV K)	AG Linear detector			AF	VR2	4.1kHz	$\pm 0.1\text{kHz}$
	2) PROC : OFF							
14. SSB MIC sensitivity	1) MODE SW : USB MIC GAIN VR : Center AG output : 1kHz, 3mV	AG Power-meter					Confirm	15W or greater
15. CW sidetone breakin	1) MODE SW : CW AF GAIN VR : Center Connect KEY to KEY jack.	AF V.M Oscilloscope			AF	VR4	Key down 0.63V	$\pm 0.1\text{V}$ Confirm sidetone output.
					Rear panel	VR8	Turn the VR8 and check breakin. function.	Delay time: VR8 MIN : Short time MAX : longer time
16. Beep tone	1) SQL VR : Center AF GAIN VR : Center M. IN : 1 push	AF V.M Oscilloscope			CONT	VR1	0.4V/P-P	$\pm 0.1\text{V}$ Confirm tone output.
17. TONE (T)	1) MODE SW : FM TONE SW : ON STBY : SEND	Linear detector f. counter			TONE	VR1	Shorted wire between "TH" and "SC" on TONE unit. 1750Hz	DEV : $\pm 2.5\text{kHz}$ $\pm 5\text{kHz}$
	1) MODE SW : FM TONE SW : push (hold)				TONE	VR1	1750Hz	DEV : $\pm 2.5\text{kHz}$ $\pm 5\text{kHz}$
18. TONE (W)								

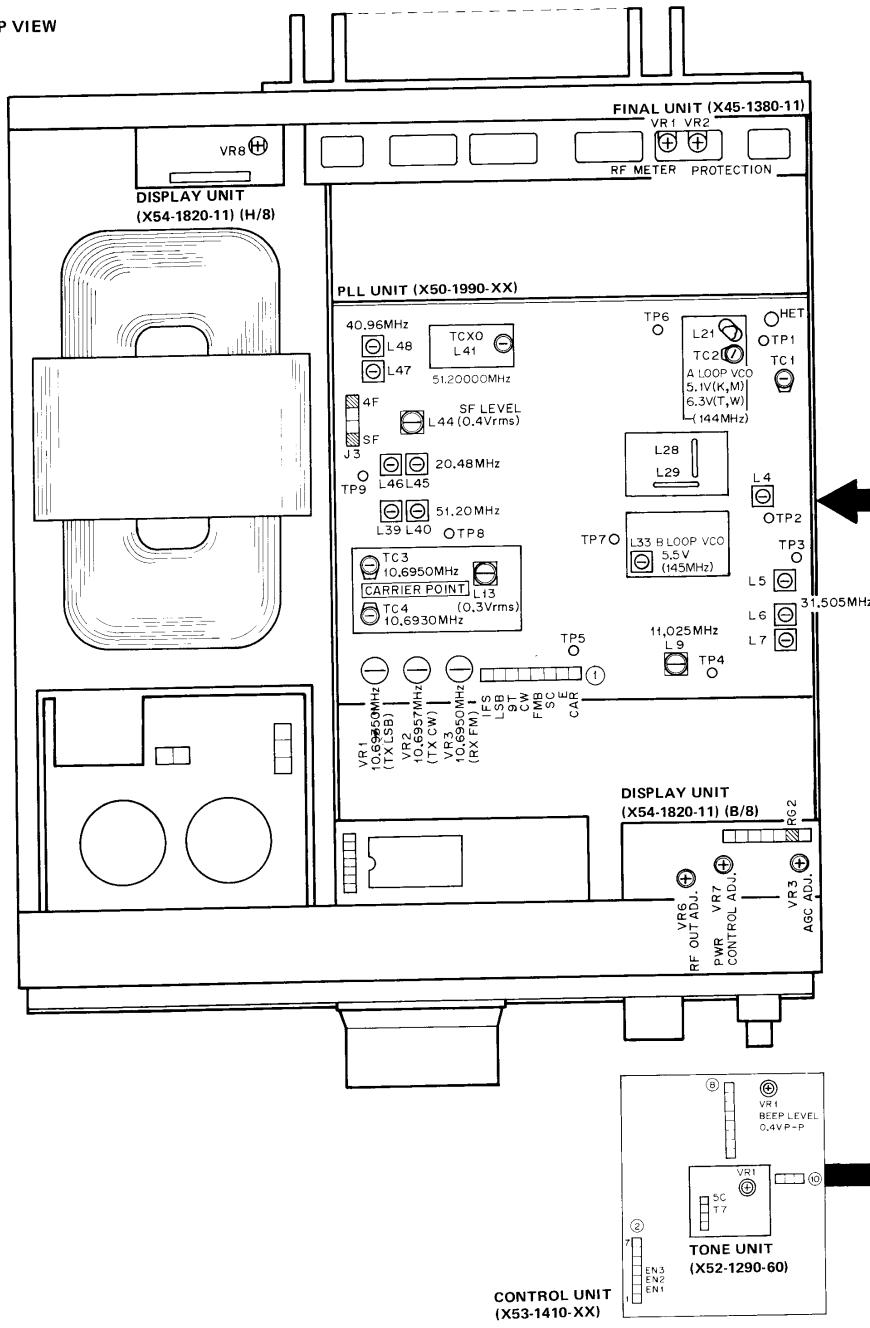
TS-711 A/E ENCODER Section

Item	Condition	Measurement			Adjustment			Specification/Remarks
		Test equipment	Unit	Terminal	Unit	Part	Method	
1. Encoder	1) Remove the VFO knob and motor-drive the encoder at approx. 300rpm.	Oscilloscope	CONT	EN3 (②-4)		VR1		Point C may be located anywhere. When a motor is not available, manually turn the VFO to check the duty ratio.
	2) EN1 duty ratio adjustment : Turn both CW and CCW CW : Clockwise CCW : Counter clockwise				EN1 (②-2)	Encoder		
	3) EN2 duty ratio adjustment : Turn in the both directions.				EN2 (②-3)		VR2	After adjusting with the VFO control turned CW, check that intervals D and E are also identical when the VFO control is turned CCW. Adjust until intervals D and E are equal to each other with point C placed at the center.

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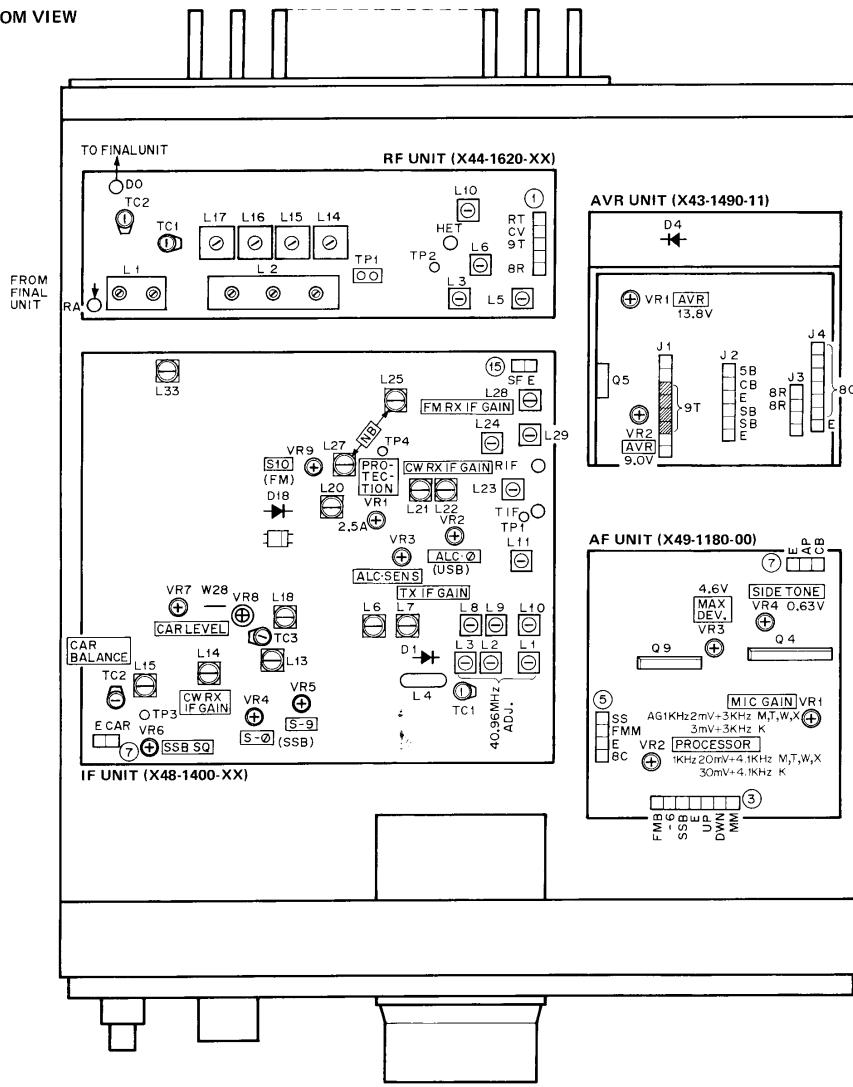
TS-711 ADJUSTMENT

TOP VIEW



TS-711 ADJUSTMENT

BOTTOM VIEW



TS-811A/B/E

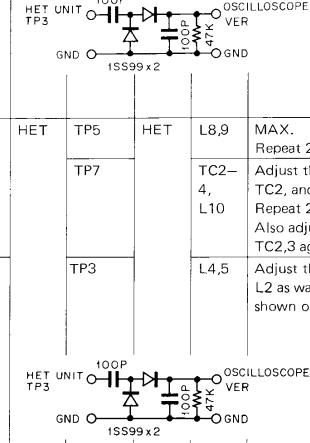
TS-811 ADJUSTMENT

TS-811A/B/E TX/RX Section (Common)

Item	Condition	Measurement			Adjustment		Specification/Remarks	
		Test equipment	Unit	Terminal	Unit	Part		
1. Reset	1) Set the power SW on, while depressing the A=B key. Then release the A=B key.						VFO A 433.000 MODE : CW The "Beeper" sounds	
2. Voltage adjustment (1) 13.8V, 9V AVR (2) AGC voltage	1) Connect the AC power cable to the power terminal on the rear panel. 2) POWER SW : ON	DVM	AVR	D4 9T	AVR	VR1 VR2	13.8V 9.0V	$\pm 0.1V$ $\pm 0.1V$
(3) RF OUTPUT voltage	1) RF GAIN : MAX 2) RF POWER : MIN STBY : SEND	DVM	DISP (B/8)	RG2	DISP (B/8)	VR3	4.0V	$\pm 0.1V$
	2) RF POWER : MAX STBY : SEND						2.0V 3.4V	$\pm 0.05V$ $\pm 0.2V$
3. PLL	1) SF level adjustment MODE SW : FM FREQ. : 435.0000 2) 20.48MHz level adjustment MODE SW : FM FREQ. : 435.0000 3) 4F (40.96MHz) level adjustment MODE SW : FM FREQ. : 435.0000 4) 51.2MHz level adjustment MODE SW : FM FREQ. : 435.0000 5) B loop VCO adjustment MODE SW : FM FREQ. : 430.0000 : 439.9999 6) 11.025MHz level adjustment MODE SW : FM FREQ. : 435.010 7) 31.505MHz level adjustment MODE SW : FM FREQ. : 435.010 8) A loop VCO adjustment MODE SW : FM FREQ. : : 430.0000 : 439.9999	RF V.M	PLL	SF (③-1) TP9 4F (③-4) TP8 TP7 TP4 TP3 TP6	PLL	L44 L45,46 L47,48 L39,40 L33 L9 L5-7 TC2	Adjust the core for the MAX reading, then turn it outward until a reading of 0.4V is obtained. MAX MAX MAX 5.5V MAX MAX MAX 6.5V	0.4V $\pm 0.01V$ 0.4–0.5V 0.10–0.15V 0.10–0.15V $\pm 0.1V$ 2.0–3.5V 0.15–0.18V 0.1–0.15V $\pm 0.1V$ 0.9–2.0V
4. PLL output	1) MODE SW : FM FREQ. : 435.0000	RF V.M	PLL HET	TP2 TP1	PLL	L4 TC1	MAX MAX	0.14–0.15V 0.2V or greater
5. CAR	1) MODE SW : USB (CAR level) IF SHIFT VR : Center MODE SW : LSB MODE SW : FM 2) MODE SW : USB : LSB	RF V.M	PLL	TP5	PLL	L13	Turn the core outward until a reading of 0.3V is obtained. Confirm the peak point. Confirm	0.3 $\pm 0.01V$ 0.3 $\pm 0.02V$ 0.3 $\pm 0.03V$
					PLL	TC3 TC4	10.69650MHz 10.69350MHz	$\pm 100Hz$ $\pm 100Hz$

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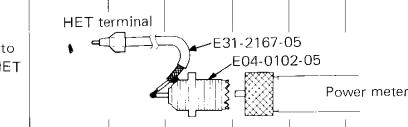
TS-811 ADJUSTMENT

Item	Condition	Measurement			Adjustment		Specification/Remarks	
		Test equipment	Unit	Terminal	Unit	Part		
5. CAR	3) MODE SW : LSB (SEND) : CW : FM	f.counter	PLL	TP5	PLL	VR1	10.69350MHz	±100Hz
						VR2	10.69570MHz	±100Hz
						VR3	10.69500MHz	±100Hz
6. IF SHIFT check	1) MODE SW : USB (RX)	f.counter	PLL	TP5			Turn the IF SHIFT all the way CW and CCW.	±1.0kHz or greater Not work on FM mode.
	2) MODE SW : LSB (TX)							Does not change
7. TCXO f. adjustment (Tempera-ture conse-quence crystal oscillator)	1) MODE SW : USB FREQ. : 439.000	f.counter	HET	TP7	PLL	L41 (TC XO)	286.72000MHz	±30Hz
	2) MODE : USB K FREQ. : 441.000					TC3	296.72000MHz	±30Hz
8. HET K type	1) 40.96MHz level adjustment FREQ. : 439.000	RF V.M	HET	TP4	HET	L8,9	MAX. Repeat 2-3 times.	0.4V or more
	2) 286.72MHz level adjustment					TC2 L10,11	MAX. Repeat 2-3 times. Then, adjust the TC2 for the MAX again.	
	3) 42.38857MHz level adjustment FREQ. : 441.000 IF unit TC3 : Center					L18,19	MAX. Repeat 2-3 times.	0.4V or more
	4) 296.72MHz level adjustment FREQ. : 439.000 : 441.000			TP6		L20,21		
						TC2	VFO frequency change to 439.000. Adjust same level.	0.3V or more
	5) Helical adjustment Disconnect the coax. cable from the HET terminal in the PLL unit. Connect the sweep G. (OUT : 25dB) to TP2 in the HET unit, connect the detector to TP3 in the HET unit. HET unit TC1 : MAX After adjustment, connect the coax. cable to the HET terminal in the PLL unit.	Sweep G. Oscillo-scope Detector	TP3			L4,5	Adjust the L4 and L2 as waveform as shown on right.	
9. HET M,T,W,X type	1) 40.96MHz level adjustment	RF V.M	HET	TP5	HET	L8,9	MAX. Repeat 2-3 times.	0.4V or more
	2) 286.72MHz level adjustment					TC2-4, L10	Adjust the TC4, TC2, and TC3. Repeat 2-3 times. Also adjust the TC2,3 again.	0.3V or more
	3) Helical adjustment Disconnect the coax. cable from the HET terminal in the PLL unit. Connect the Sweep G. (OUT : 25dB) to TP2 in the HET unit, connect the detector to TP3 in the HET unit. HET unit TC1 : MAX After adjustment, connect the coax. cable to the HET terminal in the PLL unit.	Sweep G. Oscillo-scope Detector				L4,5	Adjust the L4 and L2 as waveform as shown on right.	
								

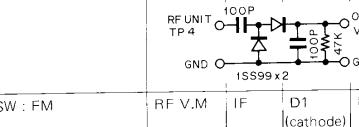
TS-811A/B/E

TS-811 ADJUSTMENT

Item	Condition	Measurement			Adjustment		Specification/Remarks	
		Test equipment	Unit	Terminal	Unit	Part		
10. HET	1) PLL VCO OUT level adjustment FREQ. : 435.000	RF V.M	HET	TP1	PLL	TC1	MAX	0.3V or more
	2) HET OUT level adjustment Disconnect the coax. cable from the HET terminal in the HET unit. Connect the power meter to the HET terminal in the HET unit. (HET OUT terminal are connected 50Ω dummy.)			TP4	HET	TC1	MAX	(0.1~0.2V)



TS-811A/B/E RX Section

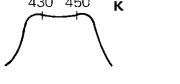
Item	Condition	Measurement			Adjustment		Specification/Remarks
		Test equipment	Unit	Terminal	Unit	Part	
1. Helical	1) MODE SW : FM Connect the Sweep G. to the ANT terminal	Sweep G. Oscillo-scope Detector	RF	TP4	RF	L13,14	Adjust the L13 and L14 as waveform as shown on right.
							M,X,T,W
2. 4F level adjustment (40.96MHz)	1) MODE SW : FM RX	RF V.M	IF	D1 (cathode)	IF	L1~3	MAX (0.9V)
			PLL	4FH			0.8V or greater
3. IF GAIN (1) (FM MODE)	1) MODE SW : FM VFO : 435.0000 SSG : 10dB μ SSG MOD : 1kHz SSG DEV : 5kHz	SSG Oscillo-scope AF V.M S-meter			RF	L15,17	Adjust the each coil for MAX S-meter reading repeatedly.
					IF	L24, 28.29	
4. IF GAIN (2) (CW MODE)	1) MODE SW : CW VFO : 435.0000 SSG : -10dB μ VR6 : 	SSG Oscillo-scope AF V.M			IF	L33	MAX AF V.M reading.
					IF	L23	Adjust the L23 CCW to the -2dB point from MAX AF V.M reading.
5. S-meter (1) (CW, SSB)	1) MODE SW : CW SSG output : OFF				IF	L13~15, 20~22	Adjust the L13~15, L20~22, for MAX S-meter reading repeatedly.
	2) SSG : 20dB μ Adjust the SSG frequency to the MAX S-meter reading.	SSG AF V.M Oscillo-scope			RF	L15,17	MAX
	3) SSG : 0dB μ				IF	L23	Adjust the L23 CCW to the -2dB point from MAX AF V.M reading.
	4) SSG : 20dB μ				IF	VR4	Adjust to the "0" S-meter reading on RF meter scale.
					VR5	"S-9"	
					L14	Adjust the L14 CCW to the "S-3" reading.	Adjust the L14 to MAX, if S-meter does not read the "S-3".
					VR5	"S-9"	

TS-811A/B/E

TS-811 ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specification/Remarks
		Test equipment	Unit	Terminal	Unit	Part	Method	
6. S-meter (2) (FM)	1) MODE SW : FM VFO : 435.0000 SSG : 30dB μ SSG MOD : 1kHz SSG DEV : 5kHz	SSG AF V.M Oscillo-scope			IF	VR9	"S-10"	
							1 3 5 7 9 20 40 60 0 2 4 6 8 10 ADJ	
7. Carrier balance	1) MODE SW : USB RF GAIN : MIN (After confirm RF GAIN : MAX)	RF V.M	IF	TP3	IF	TC2	Adjust to the dip point.	
8. NB	1) MODE SW : CW VFO : 435.0000 SSG : 10dB μ	DC V.M	IF	TP4	IF	L25.27	MIN	
9. SSG squelch	1) MODE SW : CW VFO : 435.0000 SSG : 0dB μ SQ VR : MAX Adjust the SSG frequency to MAX AF V.M reading. 2) SSG output : OFF 3) SSG : -12dB μ	SSG Oscillo-scope AF V.M			IF	VR6	Adjust the VR6 slowly and stop at the threshold point. Adjust the SQ VR to the threshold point. SQ open	SQ open : SSG 0~6dB
10. SSB/CW S/N	1) MODE SW : LSB VFO : 430.0000 SSG : -10dB μ K,M,X :-12dB μ T,W	SSG AF V.M Oscillo-scope						S/N 10dB or greater
11. FM S/N	1) MODE SW : FM SSG : -7dB μ K,M,X :-8dB μ T,W VFO : 430.0000 : 435.0000 T,W : 439.0000 : 430.0000 K,M,X : 449.9999	SSG AF V.M Oscillo-scope						20dB or greater

TS-811A/B/E TX Section

Item	Condition	Measurement			Adjustment			Specification/Remarks
		Test equipment	Unit	Terminal	Unit	Part	Method	
1. Setting	1) Disconnect the coax. cable from the TIF terminal in the IF unit.							
2. Helical	1) Connect the sweep G. (OUT : 20dB) to TP1. RF unit TC1 : MAX  Disconnect the coax. cable from the HET terminal.	Sweep G. Oscillo-scope Detector	RF	TP2	L6-7			  NG GOOD
3. IF output	1) RF POWER : MAX MODE SW : CW STBY : SEND IF unit VR7 : Center	RF V.M	IF	TP1	IF	L6-11,18	Adjust the each coil for the MAX RF V.M reading repeatedly. (0.3~0.4V)	
4. CW CAR level	1) MODE SW : CW STBY : SEND Connect the coax. cable to the TIF terminal after adjust.	RF V.M	IF	D18	IF	L8	MAX	0.3V or less
				TP1		VR7	0.38V	+0.01V

TS-811A/B/E

TS-811 ADJUSTMENT

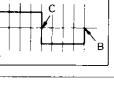
Item	Condition	Measurement			Adjustment			Specification/Remarks
		Test equipment	Unit	Terminal	Unit	Part	Method	
5. Drive output	1) Disconnect the coax. cable from the DO terminal in the RF unit. Then connect the 1W power meter MODE SW : CW STBY : SEND. VFO : 435.000 M,T,W,X : 438.000 K	0.6W Power-meter DO terminal	RF	DO	RF	TC1,2	Adjust the each coil for the MAX output repeatedly. Connect the coax. cable to the DO terminal after adjust. (adjust L15 peak to center position of coil)	0.30W or greater
6. Output power	1) MODE SW : CW STBY : SEND VFO : 439.9999 M,T,W,X : 449.9999 K	Power-meter (30W or 50W)			IF	VR1	Adjust to the mechanical center.	32W or greater
7. ALC meter	1) POWER CONTROL : MAX MIC GAIN VR : MIN MODE SW : USB ALC/RF SW : ALC FREQ. : 145.000 STBY : SEND	ALC meter			IF	VR2	Adjust to the mechanical zero point.	RF meter "8"
	2) MODE SW : CW STBY : SEND				RF	TC2	Adjust for the MAX ALC meter reading.	
					IF	VR3	RF "8"	
8. RF meter	1) MODE SW : CW FREQ. : 435.000 ALC/RF SW : RF	RF meter			Final	VR1	RF "8"	RF meter "8"
9. Protection	1) MODE SW : CW	DC V.M	IF	PRO (⑫-5)	Final	VR2	MIN	
	2) Connect the ANT terminal to GND.	DC A.M			IF	VR1	4.0A	±0.1A
10. Carrier suppression	1) MODE SW : USB, LSB MIC GAIN : MIN POWER CONTROL : MAX	RF V.M Power-meter Oscilloscope			IF	VR8 TC3	MIN or USB and LSB	50dB or more
11. SSB frequency response	1) MODE SW : USB, LSB MIC GAIN : Center AG output : Two-tone 2mV, 400Hz, 2600Hz STBY : SEND MIC GAIN VR : 25W	Power-meter (30 or 50W) Oscilloscope			PLL	TC3 (USB) TC4 (LSB)		Adjust to within -9dB level at the 400Hz and the 2.6kHz from the 1.5kHz Note : Confirm the carrier suppression after this adjustment.
	2) AG output : Single tone 2mV, 1.5kHz MIC GAIN VR : 25W					TC3 (USB) TC4 (LSB)	Adjust for equal output power at 400Hz, 2600Hz as measured on wattmeter.	
	3) MODE SW : CW STBY : SEND	f.counter	PLL	TP5	PLL	VR2	10.69570MHz	±10Hz
	4) MODE SW : FM					VR3	10.6950MHz	±10Hz
12. FM FREQ.	1) Front panel CH.Q : ON DISPLAY : 435.000 MODE SW : FM STBY : SEND	Power-meter f.counter	DISP (D/8)	Display tube (V1)	IF	TC1	Adjust to 145.000 MHz on f.counter.	±10Hz
				TS 811A/B/E		Coupler	PO meter	
							f counter	

TS-811A/B/E

TS-811 ADJUSTMENT

Item	Condition	Measurement			Adjustment		Specification/Remarks	
		Test equipment	Unit	Terminal	Unit	Part		
13. Deviation	1) PROC : OFF MODE SW : FM FREQ. : 435.000 STBY : SEND AG output : 1kHz, 20mV (30mV K)	AG Linear detector		ANT (Directional coupler)	AF	VR3	4.6kHz	$\pm 0.1\text{kHz}$
	2) AG output : 1kHz, 2mV (3mV K)				VR2		3kHz	
14. Speech processor	1) PROC : ON MODE SW : FM FREQ. : 435.000 STBY : SEND AG output : 1kHz, 20mV (30mV K)	AG Linear detector			AF	VR2	4.1kHz	$\pm 0.1\text{kHz}$
	2) PROC : OFF							
15. SSB MIC sensitivity	1) MODE SW : USB MIC GAIN VR : Center AG output : 1kHz, 3mV	AG Power-meter				Confirm	15W or greater	
16. CW side tone breakin	1) MODE SW : CW AF GAIN VR : Center Connect KEY to KEY jack.	AF V.M Oscillo-scope		AF	VR4	Key down 0.63V	$\pm 0.1\text{V}$ Confirm side tone output.	
					Rear panel	VR8	Turn the VR8 and check break in function. Delay time : VR8 MIN : Short time MAX : longer time	
17. Beep tone	1) SOL VR : Center AF GAIN VR : Center M. IN : 1 push	AF V.M Oscillo-scope		CONT	VR1	0.4V/P-P	$\pm 0.1\text{V}$ Confirm tone output.	
18. TONE (T)	1) MODE SW : FM TONE SW : ON STBY : SEND	Linear detector f. counter		TONE	VR1	Shorted wire between "TH" and "SC" on TONE unit. 1750Hz	DEV : $\pm 2.5\text{kHz}$ $\pm 5\text{kHz}$	
	1) MODE SW : FM TONE SW : push (hold)			TONE	VR1	1750Hz	DEV : $\pm 2.5\text{kHz}$ $\pm 5\text{kHz}$	

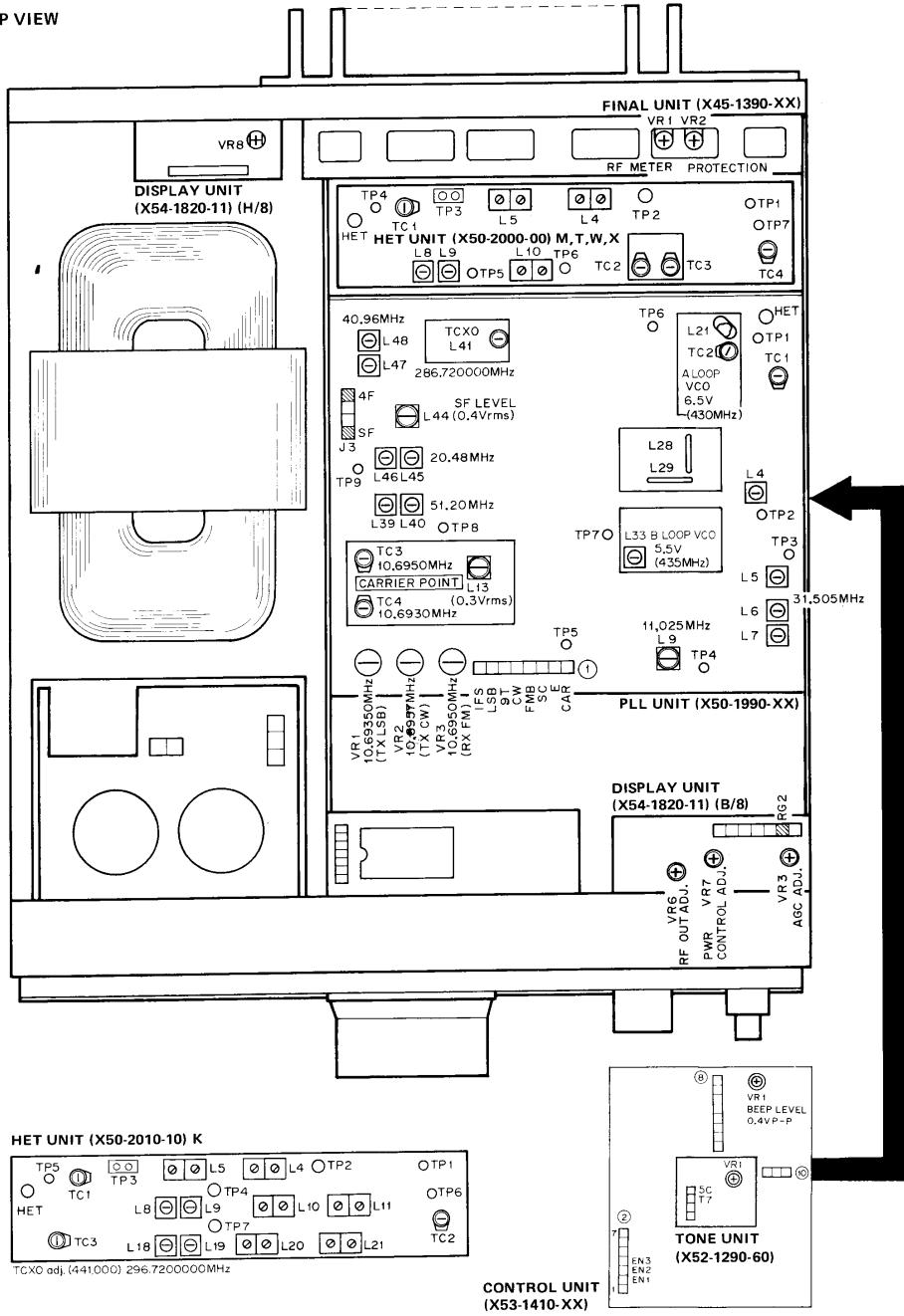
TS-811A/B/E ENCODER Section

Item	Condition	Measurement			Adjustment		Specification/Remarks
		Test equipment	Unit	Terminal	Unit	Part	
1. Encoder	1) Remove the VFO knob and motor-drive the encoder at approx. 300rpm.	Oscillo-scope	CONT	EN3 (②-4)			 Point C may be located anywhere. When a motor is not available, manually turn the VFO to check the duty ratio.
	2) EN1 duty ratio adjustment : Turn both CW and CCW CW : Clockwise CCW : Counter clockwise			EN1 (②-2)	Encoder	VR1	
	3) EN2 duty ratio adjustment : Turn in the both directions.			EN2 (②-3)		VR2	After adjusting with the VFO control turned CW, check that intervals D and E are also identical when the VFO control is turned CCW. Adjust until intervals D and E are equal to each other with point C placed at the center.

TS-811A/B/E

TS-811 ADJUSTMENT

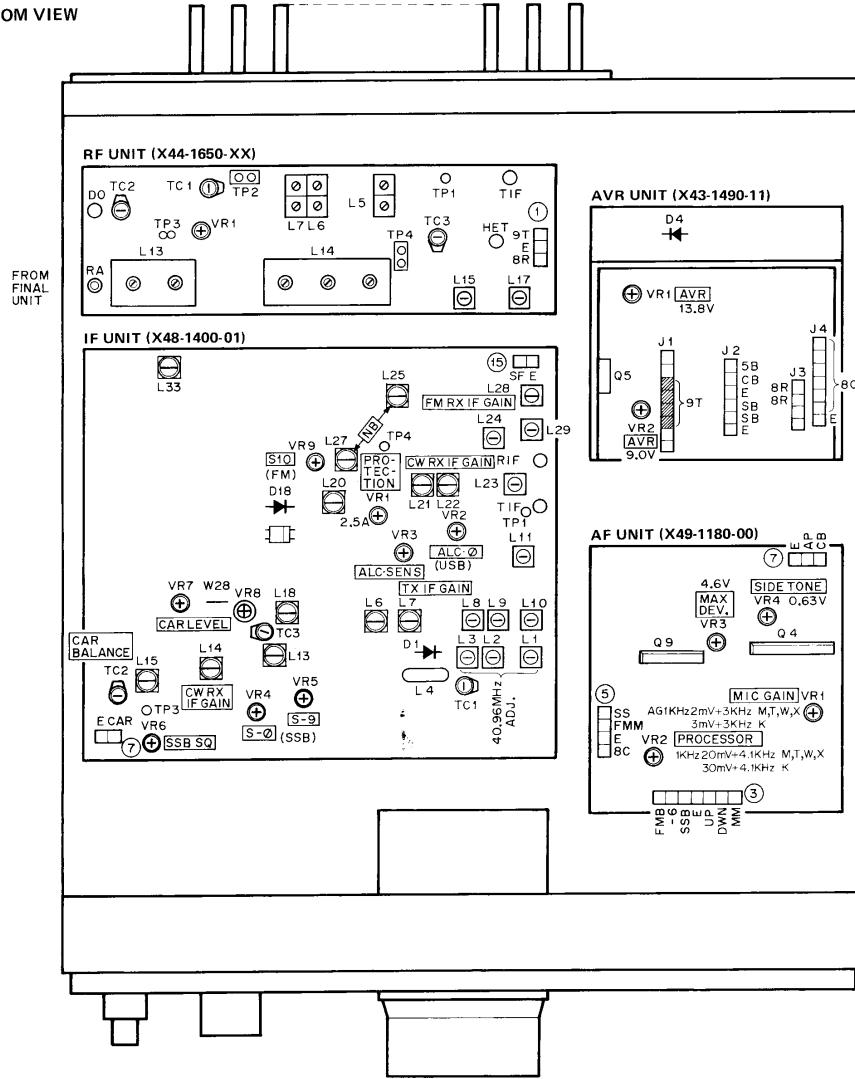
TOP VIEW



TS-811A/B/E

TS-811 ADJUSTMENT

BOTTOM VIEW

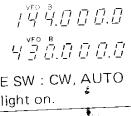
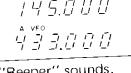


TS-711/811

ADJUSTMENT

TS-711A/E, TS-811A/B/E

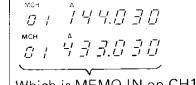
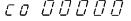
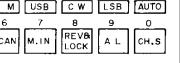
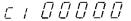
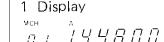
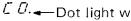
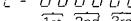
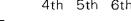
Microprocessor operation check

Item	Condition	Operation check	Item	Condition	Operation check
1. Reset	1) Set the Power SW ON, while depressing the A=B key. Then release the A=B key.	Display :  MODE SW : CW LED light on. The "Beeper" sounds. Encoder is the click position.	8. A = B (VFO A and VFO B become same frequency)	1) Push the A=B key once. 2) Push the A/B key once	The "Beeper" sounds. Ex. VFO A : 145.000 TS-711 VFO B : 144.000.0 TS-811 VFO A : 435.000 VFO B : 434.000.0
2. MODE function (FM, USB, CW LSB, LSB, AUTO)	1) Change MODE (ex. : depress CW once) Note : If depress same MODE key then same morse code continuously	CW : "C" morse code — Ex. FM --- USB --- CW --- LSB --- AUTO ---	9. COM CH	1) Push the COM key once.	The "Beeper" sounds. COM LED : Light on Display : 
3. Encoder	1) MODE SW : FM (push once) Turn the main dial knob to CW and CCW.	STEP LED K,M1,M2,X T,W OFF 5kHz 12.5kHz ON 5kHz 5kHz	10. MHz	1) Push the MHz SW (UP) one by one. 2) Push the MHz SW (UP) continuously. 3) Push the MHz SW (DOWN) one by one. 4) Push the MHz SW (DOWN) continuously.	UP MHz order 1MHz each push. The "Beeper" sounds each push. UP MHz order continuously. Down MHz order 1MHz each one push. The "Beeper" sounds each push. Down MHz order continuously.
4. CH.Q (Channel quick)	1) Push the CH.Q key once.	The plunger sounds. Display : VFO A 144.000.0 → 100Hz VFO B 434.000.0 order Release click function on VFO knob.	11. SCAN	1) MODE SW : SCAN push once. SCAN Step	The "Beeper" sounds. The dot point light winks. Start SCAN after 6 seconds.
5. A/B	1) Push the A/B key once 2) Push the A/B key again.	The plunger sounds. (Release click function) Display :  MODE SW : CW, AUTO LED light on. 		Display 5 digit Display 5 digit Display 6 digit Display 6 digit STEP : ON FM 20kHz step 10kHz step 5kHz step 5kHz step CW, SSB 5kHz step 1kHz step 1kHz step 1kHz step	Stop SCAN The "Beeper" sounds. (SCAN stop)
6. STEP	1) Push the STEP key once. 2) Turn the main dial CW and CCW. 3) Push the CH.Q key once. (click off condition) 4) Push the STEP key again	The "Beeper" sounds. STEP LED (orange) light on Up and Down each 10kHz step. (VFO A, FM mode) Display shows 7 digits and become fast step as of STEP off. STEP LED light off. (STEP function off) The "Beeper" sounds.	12. Memory (Write)	1) Push the M.IN key once. 2) STBY : SEND 3) SCAN start : Push SCAN again. 4) Memo in up to 40 channel following 1), 2), 3).	The "Beeper" sounds (Memorized frequency) Frequency has memorized with any mode. The "Beeper" sounds (Main dial works only on MHz order.) Changes only on M.CH display. The "Beeper" sounds (Main dial works as VFO knob) The "Beeper" sounds each M. IN, CH. S push.
7. SPLIT	1) Push the SPLIT key once (VFO A and VFO B frequency works for both TX and RX) Transmitt 2) Push the SPLIT key again	The "Beeper" sounds Display : SPLIT light on. Ex. :   Display : SPLIT light off. (SPLIT function off)			

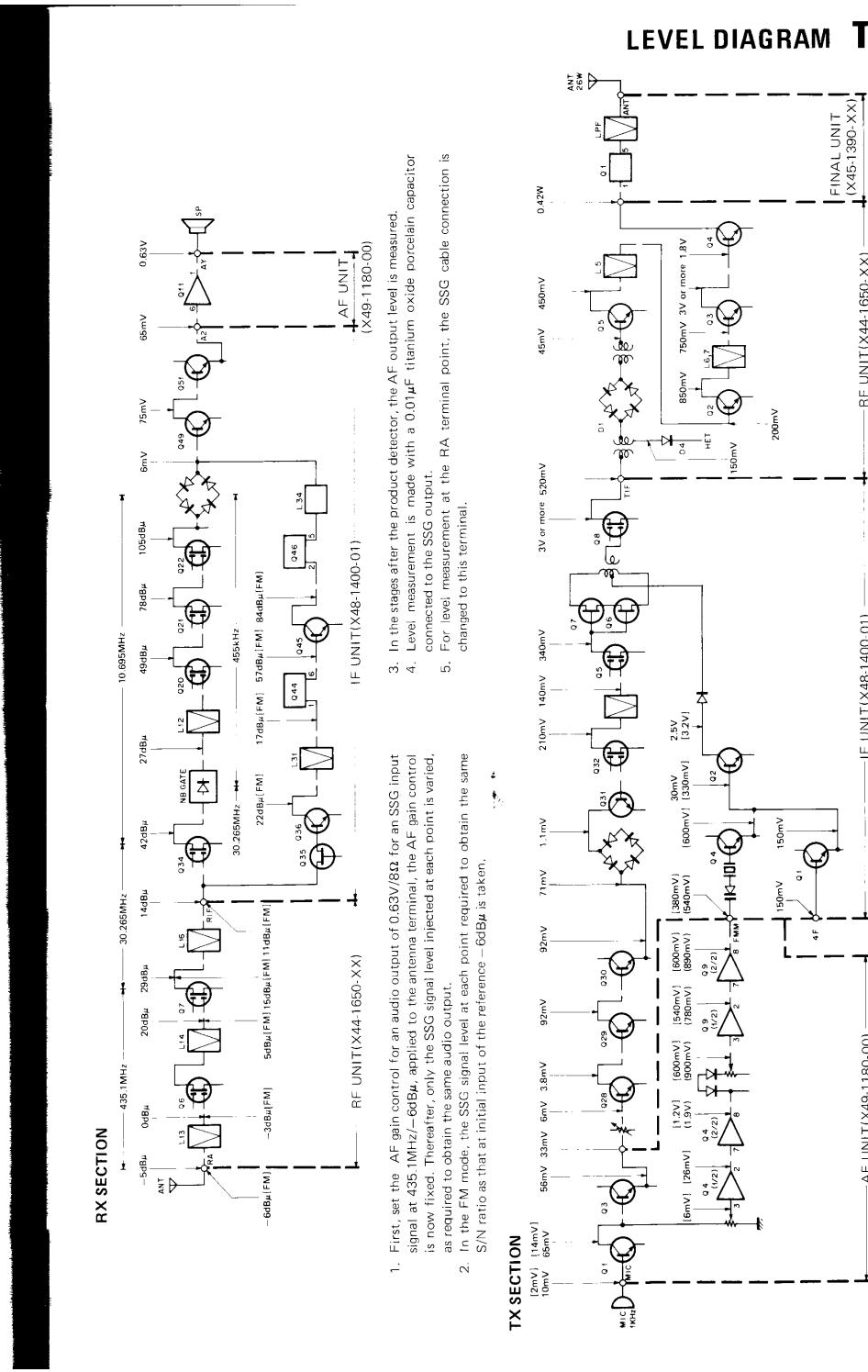
TS-711/811

ADJUSTMENT

TS-711A/E, TS-811A/B/E DCS (Digital Code Squelch)
system operation check

Item	Condition	Operation check	Item	Condition	Operation check
13. Memory (Recall)	1) Recall memorized frequency at item 12. Push the VFO/M key once.	The "Beeper" sounds. Display :  Which is MEMO IN on CH1	1. Digital code input	1) Display : any Push the CS key once.	The "Beeper" sounds. Display :  (Digital code has 5 digits and can input 9 kind)
	2) Tuning the main dial	Display shows memorized CH and frequency.		2) Digital code input MODE SW : FM-CH.S has dual function as digital code and each key works : FM : 1-CH.S : 0	 Each one input makes "Pi" sound and each 5 digit input makes "Pee" sound.
	3) Push the VFO/M key again.	The "Beeper" sounds Display shows VFO frequency.		3) Turn main dial one click CW, and input digital code following step 2).	Display : 
14. M▶V	1) Transfer MEMO frequency to VFO. Ex. MEMO frequency : 144.800 : 433.800 VFO A frequency : 144.000 : 434.000 Push the M▶V key once.	1. Display  The "Beeper" sounds. 2. Display  Display has transfer 1 to 2		4) Input digital code for C 0~E 9 turning main dial.	Confirm "Pee" sound at each 5 digit input.
15. Frequency	1) MODE SW : REV & LOCK push once.	The "Beeper" sounds. REV & LOCK LED light on.		5) Push the D.SQ key when digital code has displayed.	 Dot light winks. If push the D.SQ key again, this dot has disappear.
	2) Turn main dial CW and CCW.	Confirm the display does not change.	2. Call sign input	1) Push the C.AL key while digital code has displayed.	The "Beeper" sounds.  1st 2nd 3rd
	3) MODE SW : REV & LOCK push again.	The "Beeper" sounds. REV & LOCK LED light off. (Freq. lock free)		2) Push the C.AL key again.	 4th 5th 6th Ex. : J A 1 Y K X ↑ ↑ ↑ ↑ ↑ ↑ 74 65 49 89 75 88
16. Alert (AL)	1) MODE SW : AL push once	The "Beeper" sounds. Display shows AL.	3. DCS system	1) Set monitor's radio to condition below. Digital code : 6 7 8 9 0 MODE SW : FM DCS : ON	
	2) RX : 6 seconds each	Confirm the "Beeper" sounds.		2) MODE SW : FM VFO : 146.0000 Push the DCS key once.	DCS LED light on.
	3) MODE SW : AL push again	The "Beeper" sounds AL sign disappear.		3) Push the CS key once. Push the 6, 7, 8, 9, 0 key each time. Push the CS key once after checks.	CO 6 7 8 9 0
				4) Push the D.SQ key once. SQL VR : MIN	D.SQ LED light on. Squelch closed.
				5) Push the C.AL key once. Monitor : SEND Push the C.AL key once after check.	C. AL LED light on. Squelch opened. D. SQ LED light off. The "Beeper" sounds. (Monitor's radio : "Beeper" sounds heard during transmit.)
				6) STBY : SEND	"Beeper" sounds heard when TX.

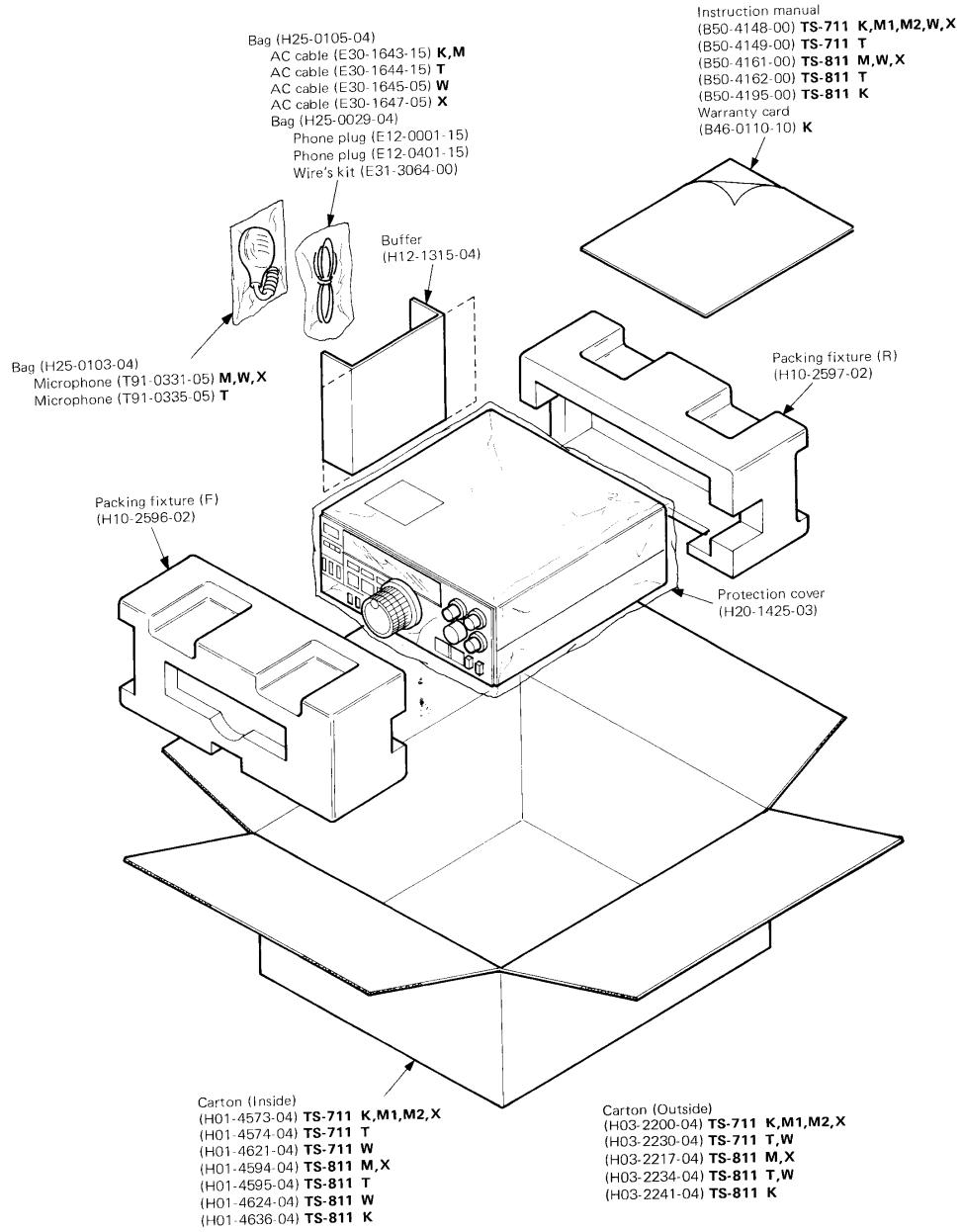
LEVEL DIAGRAM TS-811A/B/E



1. Frequency : 435, 10MHz
 2. For level measurement before pin DO in the RF unit, the coaxial cable connected to pin DO is disconnected.
 3. In IF & RF sections, measurements are taken by an RF VTVM in the CW mode. In AF sections, it is taken by an AF VTVM in the USB mode. In this case, the values [] are with the FM mode processor OFF, and those in () are with the FM mode processor ON.
 4. The audio input voltage in the USB mode, is a 1kHz signal tone which gives a nearly full scale reading within the ALC range. In the FM mode, it is that which gives the standard modulation degree ($\pm 3\text{kHz}$ deviation).

TS-711/811

PACKING



TERMINAL FUNCTION

Connector No.	Terminal No.	Terminal name	Terminal Function
SWITCH UNIT (X41-1580-XX)			
①	1	FS	Frequency STEP LED
	2	FL	Frequency LOCK LED
	3	DC	DCL LED
	4	CL	CHL LED
	5	CS	CSQ LED
	6	E	GND (Earth)
	7	BD	Busy Display
	8	TL	TX LED
③	1	FS	Frequency STEP LED
	2	FL	Frequency LOCK OUT
	3	DC	DCL LED
	4	CL	CHL LED
	5	CS	CSQ LED
	6	CA	CALL LED
	7	BD	Busy Display
	8	TL	TX LED
④	1	A1	Port A1
	2	A2	Port A2
	3	A3	Port A3
	4	A4	Port A4
	5	A5	Port A5
	6	A6	Port A6
	7	B0	Port B0
	8	B1	Port B1
	9	B2	Port B2
	10	B3	Port B3
	11	B4	Port B4
	12	B5	Port B5
	13	B6	Port B6 VOICE Switch
⑤	1	C5	KEY Line C5
	2	C4	KEY Line C4
	3	C3	KEY Line C3
	4	C2	KEY Line C2
	5	C1	KEY Line C1
	6	C0	KEY Line C0
	7	A6	Port A6
	8	A5	Port A5
	9	A4	Port A4
	10	A3	Port A3
	11	A2	Port A2
	12	CA	CALL LED
⑥	1	E	GND (Earth)
	2	NBS	Noise Blanker Switch
	3	BD	Busy Display
	4	9T	TX 9V
	5	E2	RIT ENCODER PULSE 2
	6	E1	RIT ENCODER PULSE 1
⑦	1	E	GND (Earth)
	2	ANI	Analog input
	3	MM	MIC MUTE
	4	SS	Standby Switch
	5	ANI	Analog input
	6	E	GND (Earth)
	7	ANO	Analog output
	8	E	GND (Earth)
⑧	1	ACS	Accessory Switch
	2	RL	Relay

Connector No.	Terminal No.	Terminal name	Terminal Function
AVR UNIT (X43-1490-11)			
⑨	1	A6	Port A6 KEY SCAN output
	2	E	GND (Earth)
	3	A5	Port A5 KEY SCAN output
	4	B0	Port B0 KEY SCAN input
	5	A4	Port A4 KEY SCAN output
	1	AU	AUTO LED
	2	LS	LSB LED
	3	CW	CW LED
	4	US	USB LED
⑩	5	FM	FM LED
	1	FM	FM LED
	2	US	USB LED
	3	CW	CW LED
	4	LS	LSB LED
⑪	5	AU	AUTO LED
	1	ME	Meter +
	2	E	GND (Earth)
	1	PRS	Processor Switch
	2	RM	RF Meter
⑫	3	ALM	ALC Meter
	4	FSM	FM S Meter
	5	SM	SSB S Meter
	6	SB	Switched B (13.8V)
	7	RL	Relay
	8	ACS	Accessory Switch TS-811 only
	9	E	GND (Earth)
	AVR UNIT (X43-1490-11)		
⑬	1	TH1	Thermister 1
	2	TH2	Thermister 2
	3	E	GND (Earth)
	4	9T	TX 9V
	5	9T	TX 9V
	6	9T	TX 9V
	7	9T	TX 9V
	8	ATX	Anti-TX {No TX when 0V} Standby output
	9	ST	
⑭	1	5B	B for 5C
	2	CB	Common B
	3	E	GND (Earth)
	4	SB	Switched B (13.8V)
	5	SB	Switched B (13.8V)
	6	E	GND (Earth)
⑮	1	8R	RX 8V
	2	8R	RX 8V
	3	8R	RX 8V
	4	8R	RX 8V
⑯	1	8C	+ 8V
	2	8C	+ 8V
	3	8C	+ 8V
	4	8C	+ 8V
	5	8C	+ 8V
	6	8C	+ 8V
	7	E	GND (Earth)
⑰	1	B	+ B
	2	SB	Switched B (13.8V)
⑱	1	FAN	FAN Motor
	2	SB	Switched B (13.8V)

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TERMINAL FUNCTION

Connector No.	Terminal No.	Terminal name	Terminal Function
(7)	1	B	+ B
	2	FB	FINAL B (13.8V)
	3	BB	+B (22V)
	4	BA	AVR Transistor Base
	5	EM	AVR Transistor Emitter
	6	EM	AVR Transistor Emitter
(8)	1	BB	AVR Transistor Collector
	2	CO	GND (Earth)
	3	E	
(9)	1	B	+ B
	2	FB	FINAL B (13.8V)
	3	BB	+B (22V)
	4	BA	AVR Transistor Base
	5	EM	AVR Transistor Emitter
	6	EM	AVR Transistor Emitter
RF UNIT (X44-1620-XX) TS-711			
(1)	1	RL	Relay
	2	CV	Control Voltage
	3	9T	TX 9V
	4	E	GND (Earth)
	5	8R	RX 8V
RF UNIT (X44-1650-XX) TS-811			
(1)	1	9T	TX 9V
	2	E	GND (Earth)
	3	8R	RX 8V
FINAL UNIT (X45-1380-11) TS-711 (X45-1390-XX) TS-811			
(1)	1	PRO	Protection
	2	RM	RF Meter
	3	TH1	Thermister 1
	4	9T	TX 9V
	5	PC	Power control
(2)	1	EM	AVR Transistor Emitter
	2	CO	AVR Transistor Collector
	3	FB	FINAL B (13.8V)
	4	BA	AVR Transistor Base
IF UNIT (X48-1400-XX)			
(1)	1	4F	4th Frequency
	2	E	GND (Earth)
(2)	1	E	GND (Earth)
	2	FMM	FM MIC
	3	TO	Tone out (Tone input terminal)
	4	E	GND (Earth)
(3)	1	9T	TX 9V
	2	9T	TX 9V
	3	CWB	CW +B (8V)
	4	FMB	FM +B (8V)
	5	FMR	FM RX +B
	6	FCB	FM/CW +B
	7	8R	RX 8V
	8	8R	RX 8V
	9	SCB	SSB/CW +B (8V)
(4)	1	9T	TX 9V
	2	CWT	CW TX +B (8V)
	3	NC	Not connection
	4	FMB	FM +B (8V)
	5	8C	+8V

Connector No.	Terminal No.	Terminal name	Terminal Function
(5)	1	SCR	SSB/CW RX + B
	2	SCR	SSB/CW RX + B
	3	-6	-6V
	4	8C	+ 8V
	5	8C	+ 8V
	6	SM	SSB S Meter
(6)	1	SSB	SSB + B
	2	SSB	SSB + B
	3	RG2	RF Gain volume 2
	4	E	GND (Earth)
	5	SSQ	SSB Squelch
(7)	1	CAR	Carrier
	2	E	GND (Earth)
(8)	1	MV2	MIC Volume 2
	2	E	GND (Earth)
(9)	3	FCB	FM CW + B
	4	P1	Power Control 1
	5	9T	TX 9V
	1	RT	Modem Receive Output
	2	E	GND (Earth)
(10)	1	FSM	FM S Meter
	2	SC	Scan Control
	3	BD	Busy Display
	4	SQ	Squelch Volume
	5	8C	+ 8V
(11)	6		
	7		
	8		
	9	AL	Alert Mute
	1	KEY	KEY
	2	STS	Side Tone Switch
	1	8C	+ 8V
	2	SSB	SSB + B
	3	ALM	ALC Meter
(12)	4	P2	Power Control 2
	5	PRO	Protection
	1	8R	RX 8V
	2	SCR	SSB/CW RX + B
	3	SSQ	SSB Squelch
(13)	4	E	GND (Earth)
	5	FMR	FM RX + B
	6	BLK	Blinking Pulse
	7	NBS	Noise Blanker Switch
	1	A1	Audio Volume 1
(14)	2	E	GND (Earth)
	1	SF	Standby Frequency
(15)	2	E	GND (Earth)
	1		
AF UNIT (X49-1180-00)			
(1)	1	8M	MIC 8V
	2	MIC	MIC AF input
	3	E	GND (Earth)
	4	UP	MIC UP
	5	DW	MIC DOWN
	6	SS	Standby Switch
(2)	1	PRS	Processor Switch
	2	MV1	MIC Volume 1
	3	AN1	Analog input
	4	E	GND (Earth)
	5	FE	Floating earth

TERMINAL FUNCTION

Connec- tor No.	Termin- al No.	Terminal name	Terminal Function
(3)	1	MM	MIC Mute
	2	DW	MIC DOWN
	3	UP	MIC UP
	4	E	GND (Earth)
	5	SSB	SSB + B
	6	-6	-6V
	7	FMB	FM + B (8V)
(4)	1	8C	+ 8V
	2	E	GND (Earth)
	3	FMM	FM MIC
	4	SS	Standby Switch
(5)	1	STS	Sidetone Switch
	2	STS	Sidetone Switch
	3	KEY	KEY
	4	KEY	KEY
	5	DE	Delay
(6)	1	ANO	Analog output
	2	E	GND (Earth)
	3	A1	Audio Volume 1
	4	E	GND (Earth)
	5	A1	Audio Volume 1
	6	E	GND (Earth)
	7	A2	Audio Volume 2
	8	E	GND (Earth)
	9	BZ	Beep out
(7)	1	E	GND (Earth)
	2	AP	Audio Power
	3	CB	Common B
PLL UNIT (X50-1990-XX)			
(1)	1	CAR	Carrier
	2	E	GND (Earth)
	3	8C	+ 8V
	4	FMB	FM + B (8V)
	5	CWT	CW TX + B (8V)
	6	9T	TX 9V
	7	LSB	LSB + B (8V)
	8	IFS	IF Shift Voltage
(2)	1	CP	PLL Clock
	2	DP	PLL Data
	3	EA	PLL A Enable
	4	EB	PLL B Enable
	5	E	GND (Earth)
	6	CV	Control Voltage
(3)	1	SF	Standard Frequency
	2	E	GND (Earth)
	3	E	GND (Earth)
	4	4F	4th Frequency
(4)	1	4FH	4th Frequency for HET unit
	2	E	GND (Earth)
	3	8C	+ 8V
	4	BS	Band Select K only
HET UNIT (X50-2000-00) TS-811 M,T,W,X (X50-2010-10) TS-811 K			
(1)	1	E	GND (Earth)
	2	4FH	4th Frequency from PLL unit
	3	8C	+ 8V
	4	BS	Band Select K only
TONE UNIT (X52-1290-60) T,W only			
(1)	1	5C	
	2	TH	Tone on : H (5V)
	3	TI	Tone input
	4	E	GND (Earth)

Connec- tor No.	Termin- al No.	Terminal name	Terminal Function
CONTROL UNIT (X53-1410-XX)			
(1)	1	E	GND (Earth)
	2	E2	RIT ENCODER PULSE 2
	3	E1	RIT ENCODER PULSE 1
(2)	1	E	GND (Earth)
	2	EN1	MAIN ENCODER PULSE 1
	3	EN2	MAIN ENCODER PULSE 2
	4	EN3	MAIN ENCODER PULSE 3
	5	5C	Common 5V
	6	PS	PLANGER SENSOR
	7	PN	PLANGER SWING PULSE
(3)	1	FS	Frequency STEP LED
	2	FL	Frequency LOCK LED
	3	DC	DCL LED
	4	CL	CHL LED
	5	CS	CSQ LED
	6	CA	CALL LED
(4)	1	MM	MIC MUTE
	2	MM	MIC MUTE
	3	SQS	Squelch Select
	4	BLK	Blanking Pulse
	5	AL	Alert Mute
	6	DW	MIC DOWN
	7	UP	MIC UP
	8	SC	SCAN Control 5.4V (Busy : H)
(5)	1	E	GND (Earth)
	2	WR	Write strobe
	3	RD	Read strobe
	4	CS	Chip Select
	5	C/D	Common/Data
	6	RDY	Receiver Ready
	7	SB	Switched B (13.8V)
(6)	1	D7	Data Bus 7
	2	D6	Data Bus 6
	3	D5	Data Bus 5
	4	D4	Data Bus 4
	5	D3	Data Bus 3
	6	D2	Data Bus 2
	7	D1	Data Bus 1
	8	D0	Data Bus 0
	9	RES	Reset
(7)	1	T1	Tone data 1
	2	T2	Tone data 2
	3	T3	Tone data 3
	4	T4	Tone data 4
	5	T5	Tone data 5
	6	T6	Tone data 6
	7	5C	
	8	TH	Tone on : H (5V)
	9	TI	Tone input
	10	E	GND (Earth)
(8)	1	PSQ	
	2	PS1	
	3	PS2	
	4	PS3	
	5	PS4	
	6	SR	
	7	BY	
	8	5C1	

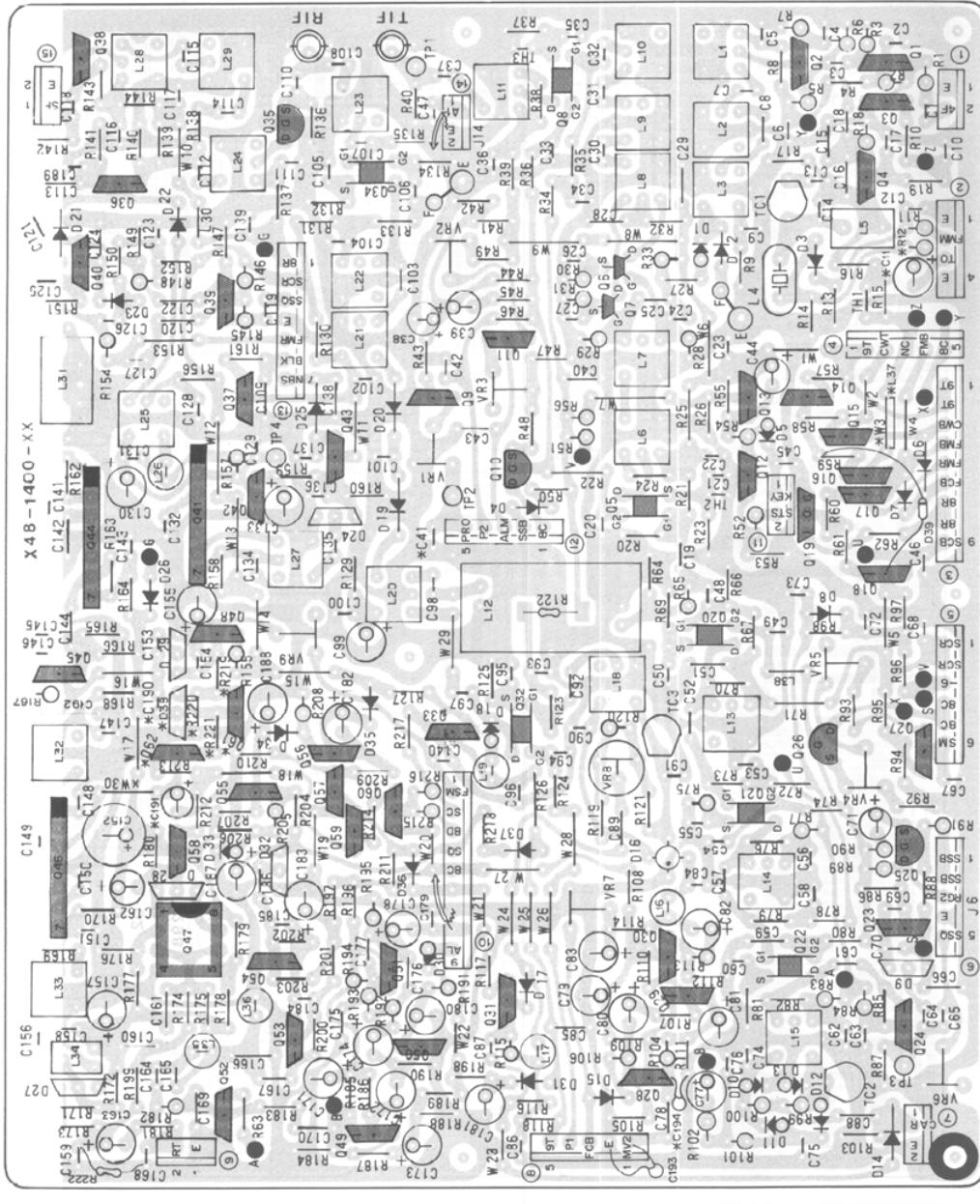
TS-711/811

TERMINAL FUNCTION

Connector No.	Terminal No.	Terminal name	Terminal Function
⑨	1	TO	Tone out O
	2	E	GND (Earth)
	3	AN1	Analog input O
	4	E	GND (Earth)
	5	RT	Modem Receive Input I
	6	E	GND (Earth)
	7	BZ	Beep out O
	8	E	GND (Earth)
⑩	1	8C2	{ VS-1 O
	2	E	
	3	VO	I
⑪	1	5B	B for 5C I
	2	E	GND (Earth)
	3	ST	Standby out O
	4	SB	Switched B I
⑫	1	DD	PLL Data O
	2	E	GND (Earth)
	3	CP	PLL Clock O
	4	EA	PLL A Enable O
	5	EB	PLL B Enable O
⑬	1	11C	Common 11V O
	2	-6V	-6V I
	3	DD	Display Data O
	4	CD	Display Clock O
	5	ED	Display Enable O
	6	5C	Common 5V O
	7	E	GND (Earth)
⑭	1	CWB	CW + B (8V) O
	2	CWB	CW + B (8V) O
	3	CWB	CW + B (8V) O
	4	FMB	FM + B (8V) O
	5	FMB	FM / B (8V) O
	6	LSB	LSB + B (8V) O
	7	SCB	SSB/CW + B (8V) O
	8	SSB	SSB + B (8V) O
	9	SSB	SSB + B (8V) O
	10	ATX	Anti-TX O
	11	8C	Common 8V O
⑮	1	AU	AUTO LED O
	2	LS	LSB LED O
	3	CW	CW LED O
	4	US	USB LED O
	5	FM	FM LED O
⑯	1	-6	-6V O
	2	-6	-6V O
	3	SS	Standby Switch I
	4	SS	Standby Switch I
⑰	1	A1	Port A1 O
	2	A2	Port A2 O
	3	A3	Port A3 KEY SCAN output O
	4	A4	Port A4 O
	5	A5	Port A5 O
	6	A6	Port A6 O
	7	B0	Port B0 I
	8	B1	Port B1 I
	9	B2	Port B2 KEY SCAN input I
	10	B3	Port B3 I
	11	B4	Port B4 I
	12	B5	Port B5 I
	13	B6	Port B6 VOICE Switch I

Connector No.	Terminal No.	Terminal name	Terminal Function
DISPLAY UNIT (X54-1820-11)			
①	1	APO	Audio Power out
	2	E	GND (Earth)
	3	AP	Audio Power
	4	E	GND (Earth)
②	1	PC	Power Control
	2	E	GND (Earth)
	3	MV2	MIC Volume 2
③	4	E	GND (Earth)
	5	MV1	MIC Volume 1
	6	P1	Power Control 1
	7	E	GND (Earth)
	8	P2	Power Control 2
④	1	SOS	Squelch Select
	2	SCR	SSB/CW RX + B
	3	IFS	IF Shift Voltage
	4	SQ	Sauelch Volume
	5	8C	+ 8V
	6	RG2	RF Gain Volume 2
	7	E	GND (Earth)
⑤	1	APO	Audio Power out
	2	E	GND (Earth)
	3	AP	Audio Power
	4	E	GND (Earth)
⑥	1	E	GND (Earth)
	2	5C	Common 5V
	3	ED	Display Enable
	4	CD	Display Clock
	5	DD	Display Data
	6	-6	-6V
	7	11C	Common 11V
⑦	1	E	GND (Earth)
	2	SP	Speaker
⑧	1	DE	Delay
	2	E	GND (Earth)
	3	APO	Audio Power out
	4	SS	Standby Switch
	5	SS	Standby Switch
	6	KEY	KEY
	7	STS	Sidetone Switch
	8	CWB	CW + B (8V)
ENCODER ASS'Y (W02-0364-00)			
①	1	E	GND (Earth)
	2	EN1	MAIN ENCODER PULSE 1
	3	EN2	MAIN ENCODER PULSE 2
	4	EN3	MAIN ENCODER PULSE 3
	5	5C	Common 5V
	6	PS	PLANGER SENSOR
	7	PN	PLANGER SWING PULSE

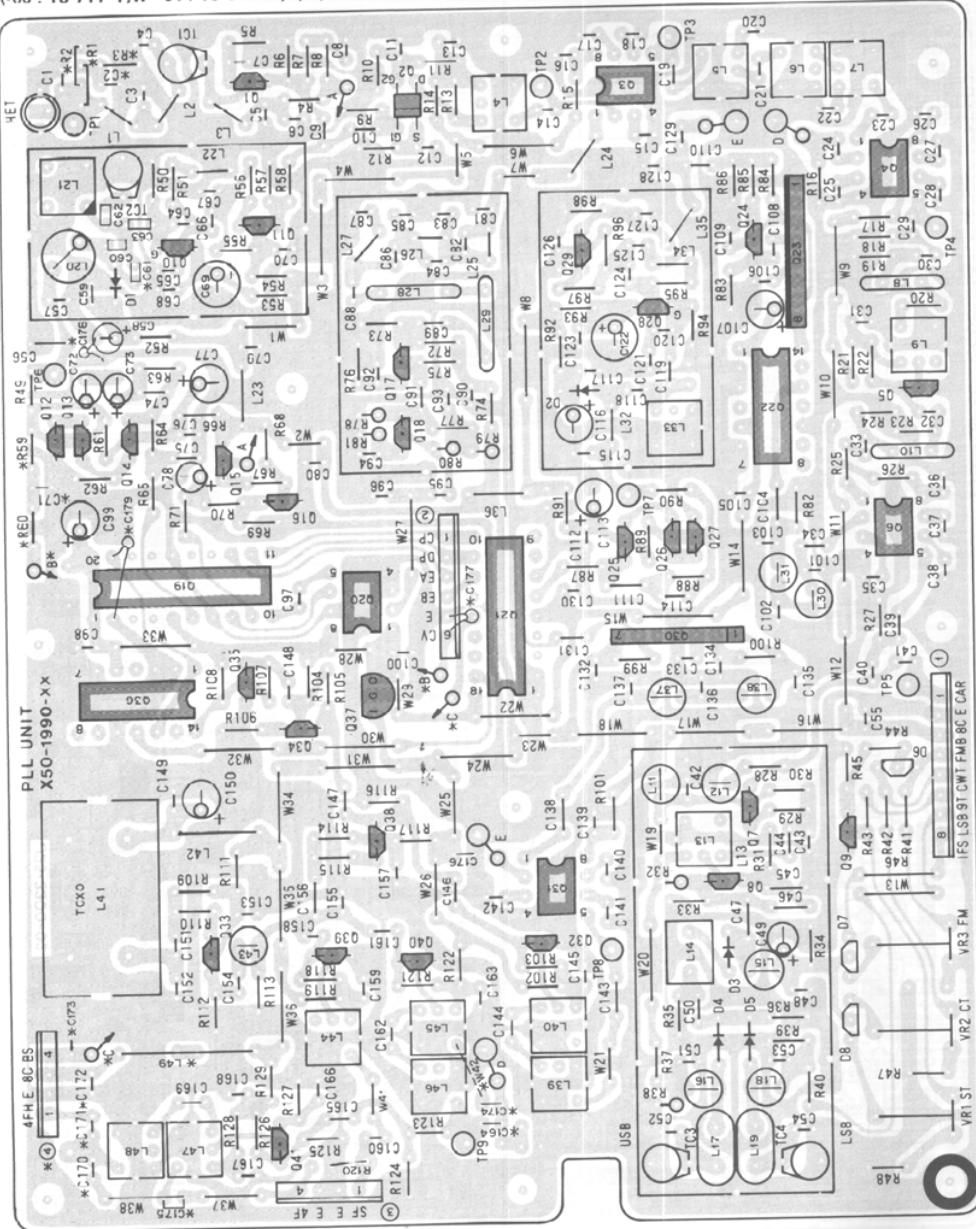
IF UNIT (X48-1400-XX) Component side view
(-00 : TS-711 T,W -01 : TS-811 K,M,T,W,X -11 : TS-711 K,M1,M2,X)



		Q61,62	D38	C11	C41	C190,191	C194	R12	R219~221	L37	W3,30
TS-711	T,W	○	○	X	X	○	X	X	○	X	○
	K,M1,M2,X	○	○	○	X	○	X	○	○	X	○
TS-811	K,M,T,W,X	X	X	○	○	X	○	○	X	○	X

PLL UNIT (X50-1990-XX) Component side view

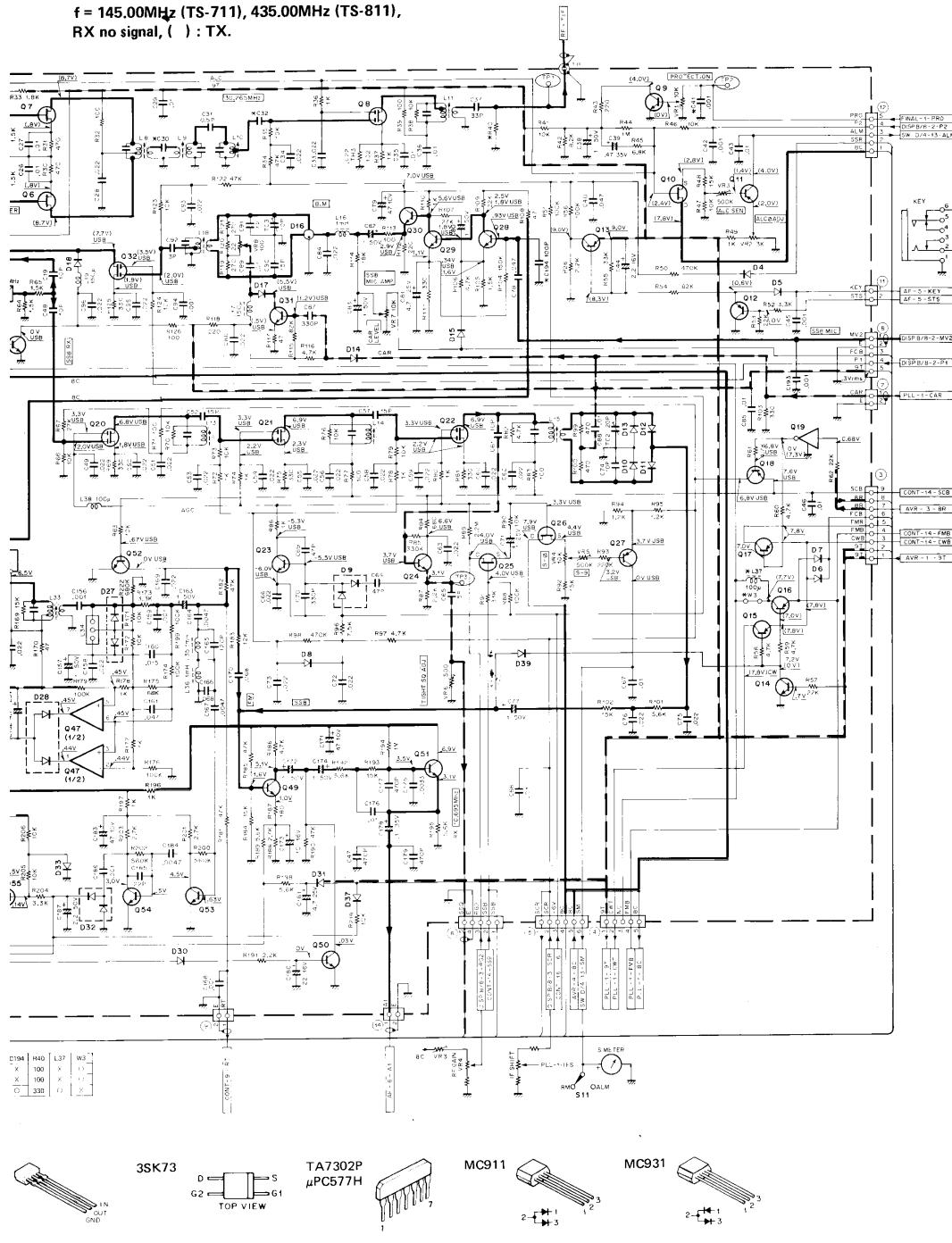
(-00 : TS-711 T,W -01 : TS-811 M,T,W,X -11 : TS-711 K,M1,M2,X -12 : TS-811 K)

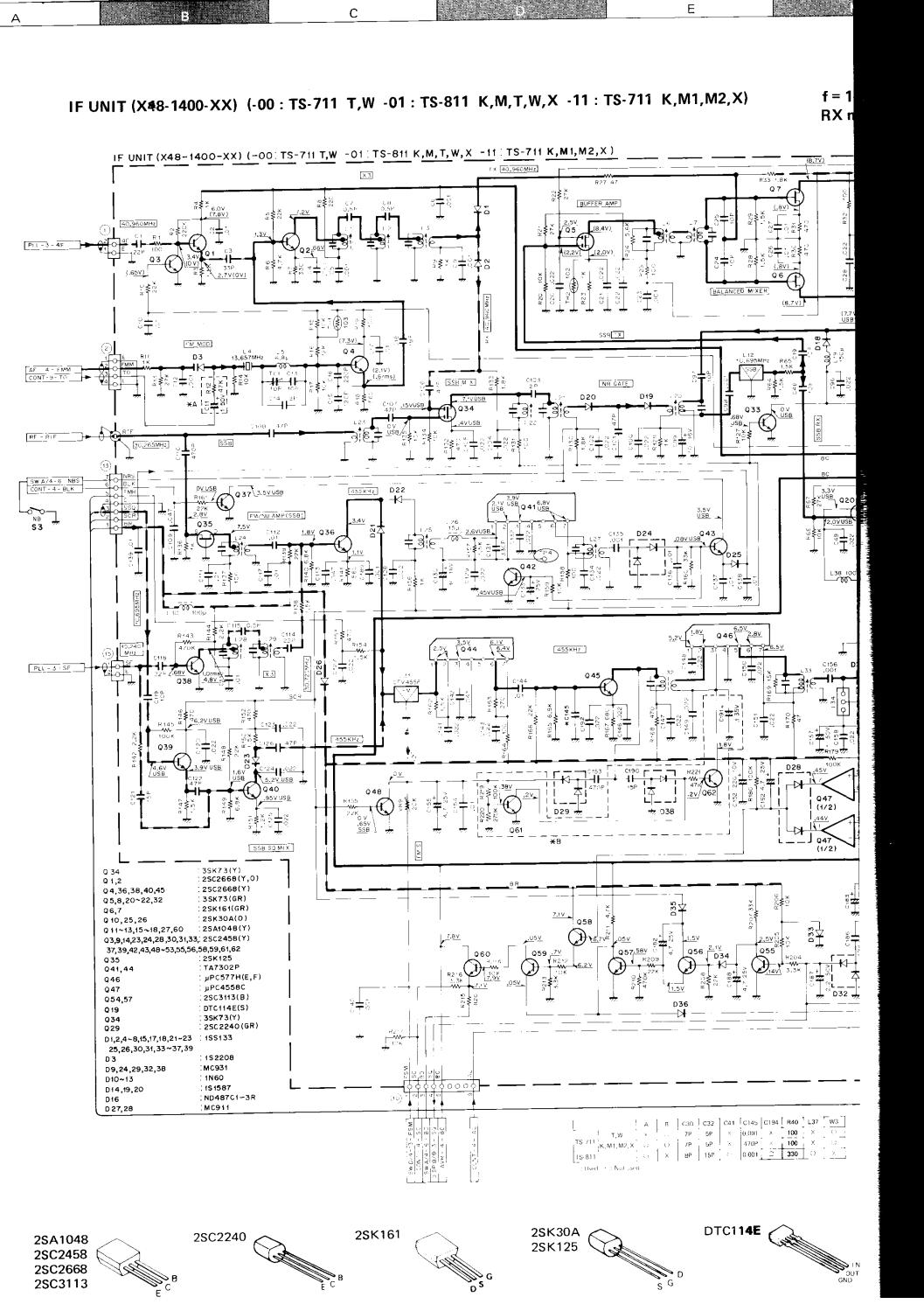


		L40	R1	R2	R3	R59,60	C2	C61	C71	C164	C170	C171-175	C177	C178,179	W42	④	B	C
TS 711	T,W	x	o	x	o	o	o	x	o	o	o	x	o	x	x	x	o	x
	K,M1,M2,X	x	o	x	o	o	o	o	o	o	o	x	o	x	x	x	o	x
TS-811	M,T,W,X	o	x	o	x	x	x	x	x	x	x	o	x	o	o	o	x	o
	K	o	x	o	x	x	x	x	x	x	x	o	x	o	o	o	x	o

CIRCUIT DIAGRAM/PC BOARD VIEW TS-711/81

f = 145.00MHz (TS-711), 435.00MHz (TS-811),
RX no signal, () : TX.

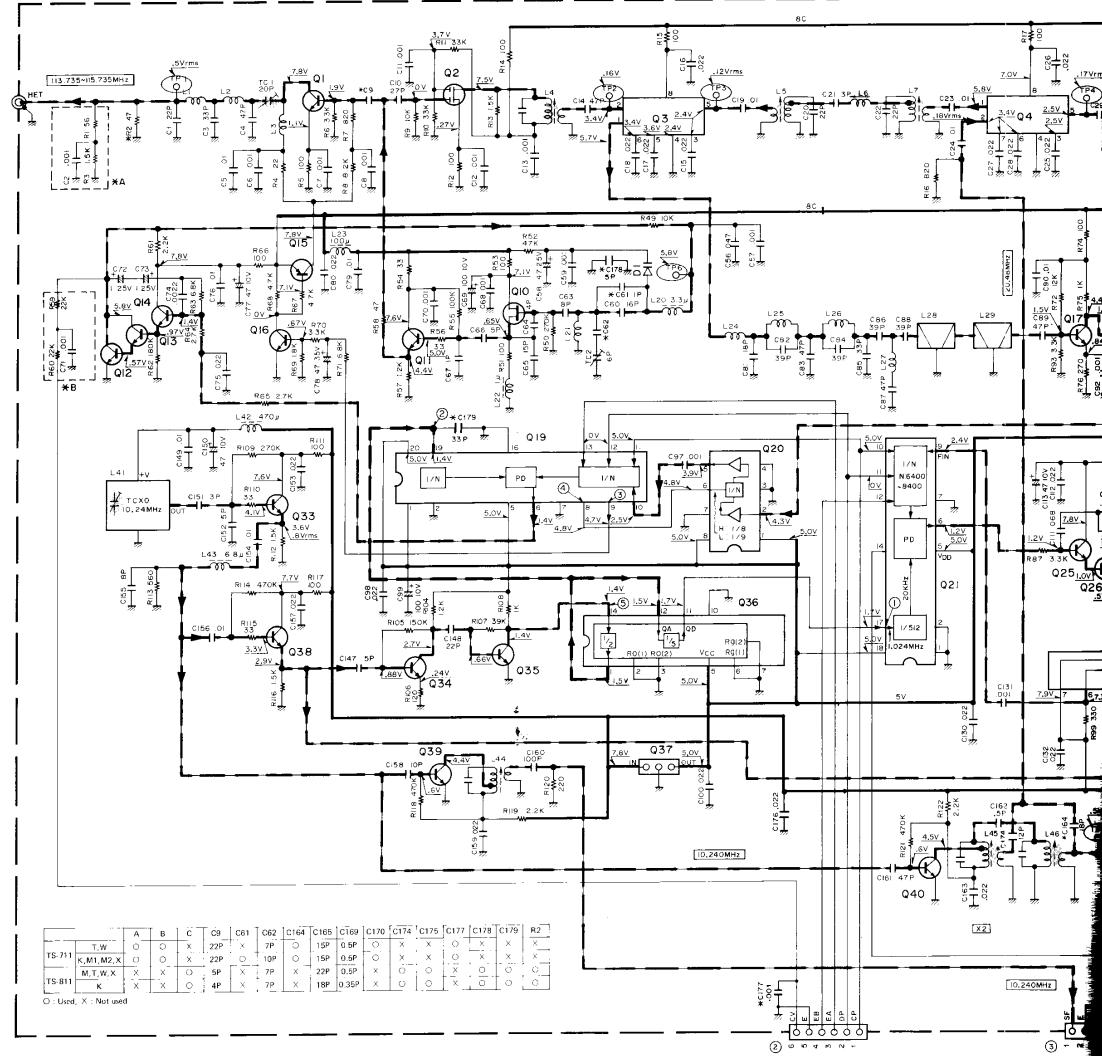




TS-711/811 CIRCUIT DIAGRAM/PC BOARD VIEW

PLL UNIT (X50-1990-XX) (-00 : TS-711 T,W -01 : TS-811 M,T,W,X -11 : TS-711 K,M1,M2,X -12 : TS-811 K)

PLL UNIT (X50-1990-XX) (-00 : TS-711 T,W -01 : TS-811 M,T,W,X -11 : TS-711 K,M1,M2,X -12 : TS-811 K)



	A	B	C	C8	C61	C62	C64	C65	C70	C74	C75	C76	C78	C79	R2
TS-711	T,W	○	○	X	22P	7P			15P	0.5P					ISV50
	K,M1,M2,X	X	X	X	22P	10P			15P	0.5P					MA856
TS-811	M,T,W,X	X	X	O	4P	7P			15P	0.5P					MC921
	K	X	X	O					15P	0.5P					

○ : Used, X : Not used

Q1~5,11,17,18,29,40 2SC2669(Y)
 Q2 3SK73(Y)
 Q3,4,6,31 SNI6913P
 Q7,8,41 2SC2787(L)
 Q9,16,33~35,38,39 2SC2458(Y)
 Q10,28, 2SK192A(GR)*N
 Q12~14,25~27 2SC2459(BL)
 Q15 2SA1048(Y)
 Q19 MC145156P

2SA1048
2SC2458
2SC2459
2SC2668
2SC2787



3SK73



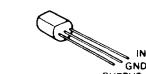
2SK192A



M54459L



NJM78L05A



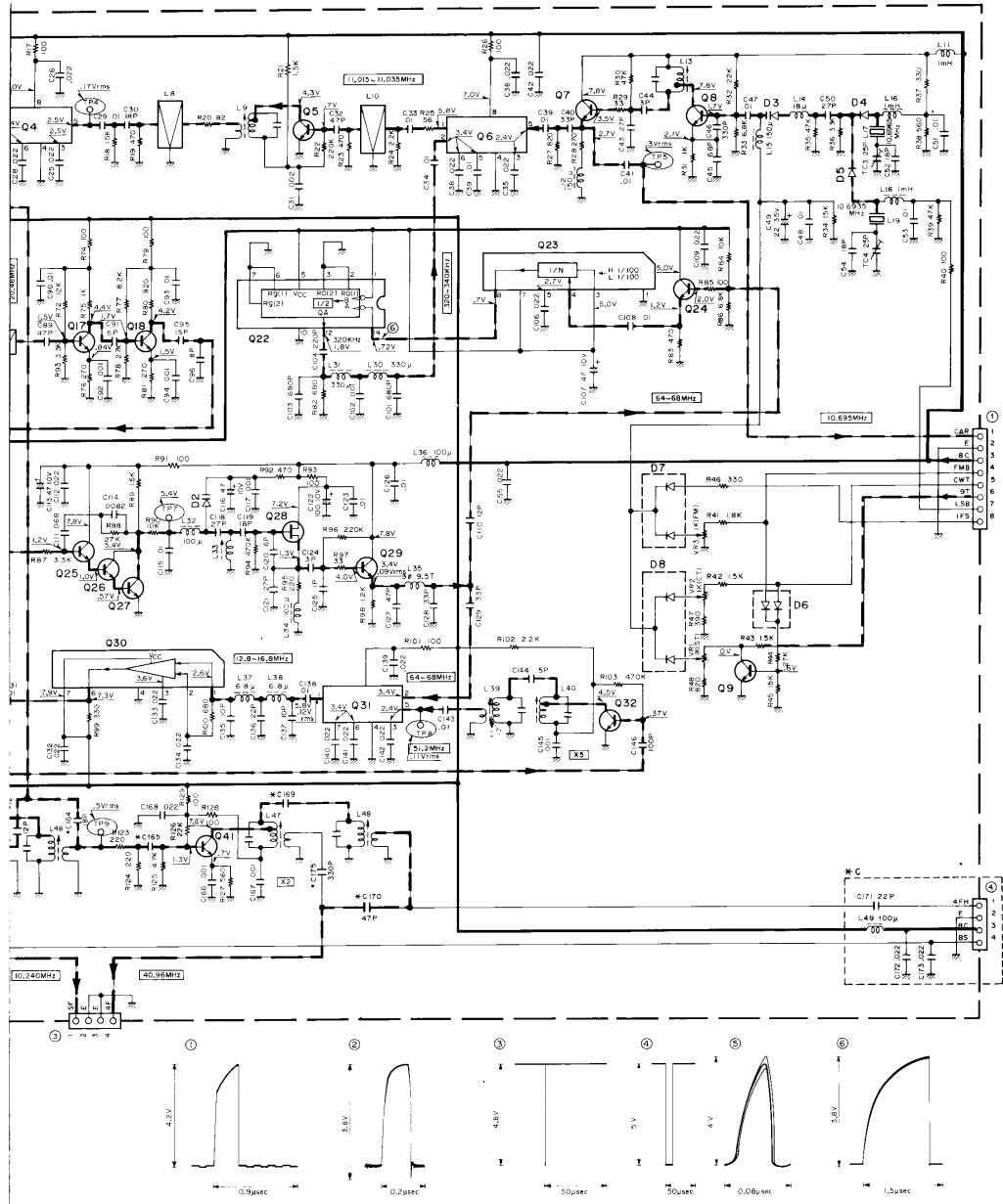
TA7302P



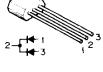
MC921

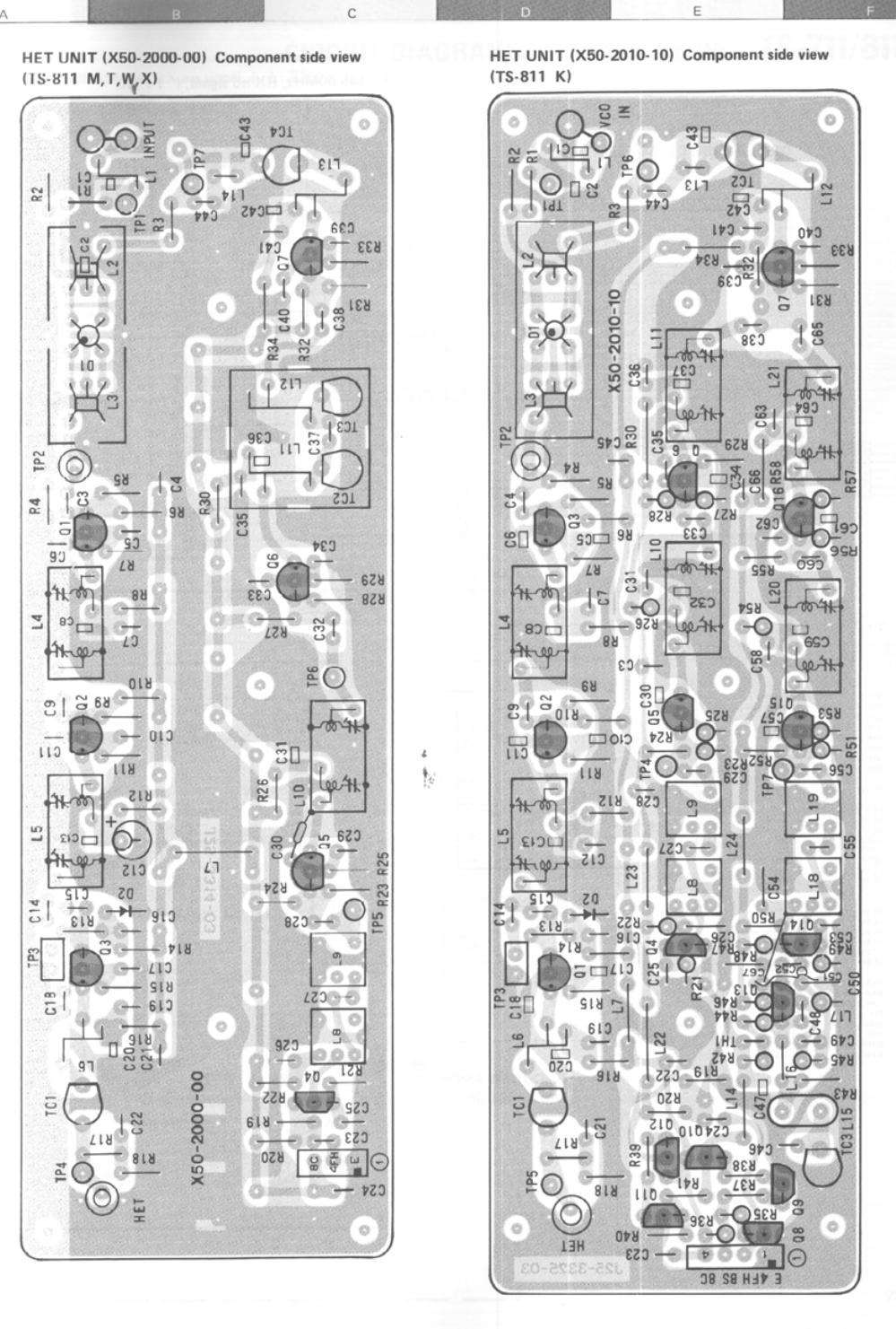


f = 145.00MHz (TS-711), 435.00MHz (TS-811), RX no signal, () : TX.



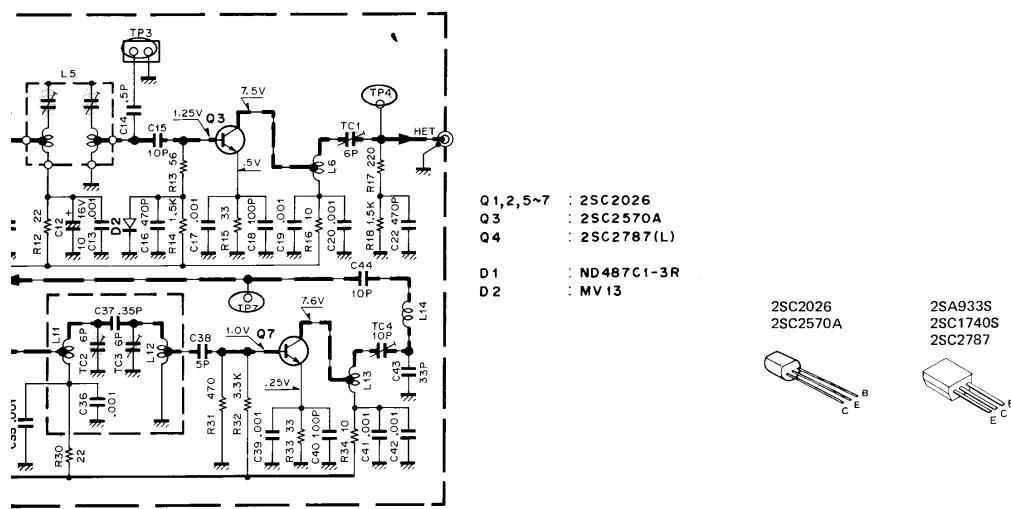
521



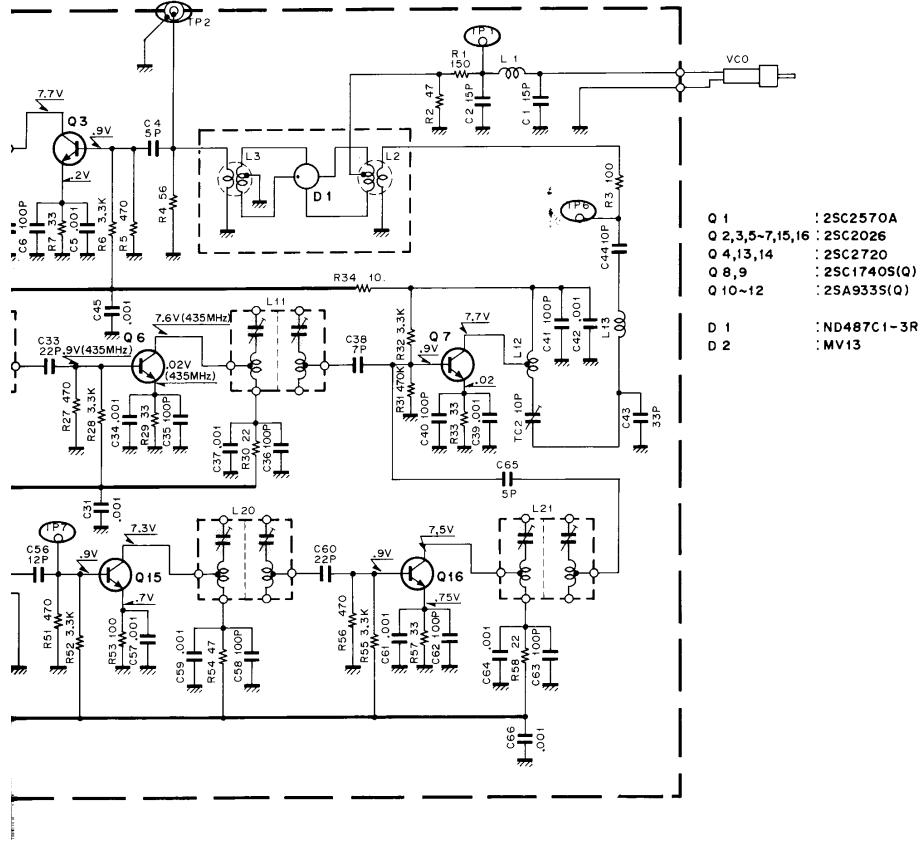


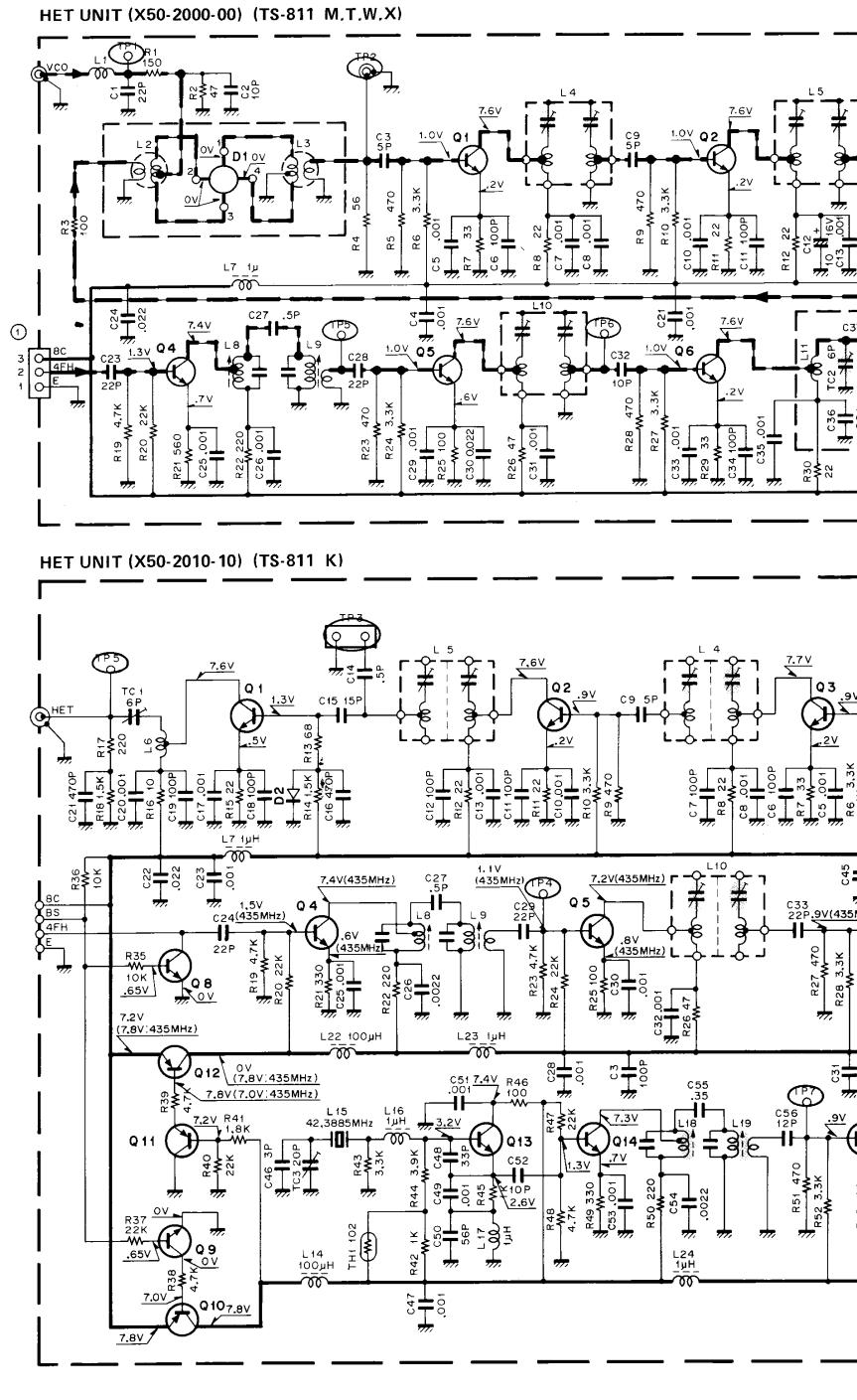
CIRCUIT DIAGRAMS/PC BOARD VIEWS TS-711/811

$f = 435.00\text{MHz}$, RX no signal, () : TX.



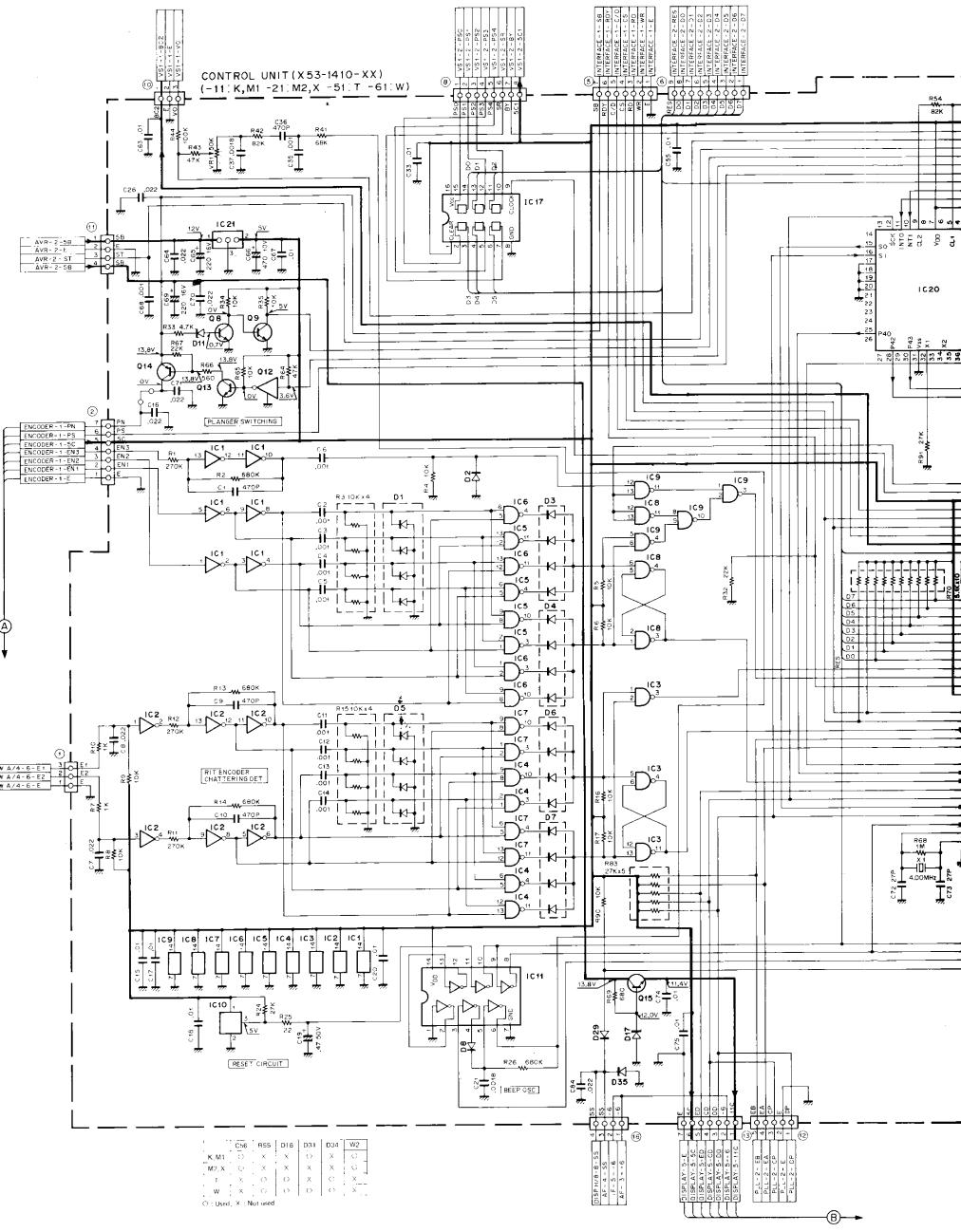
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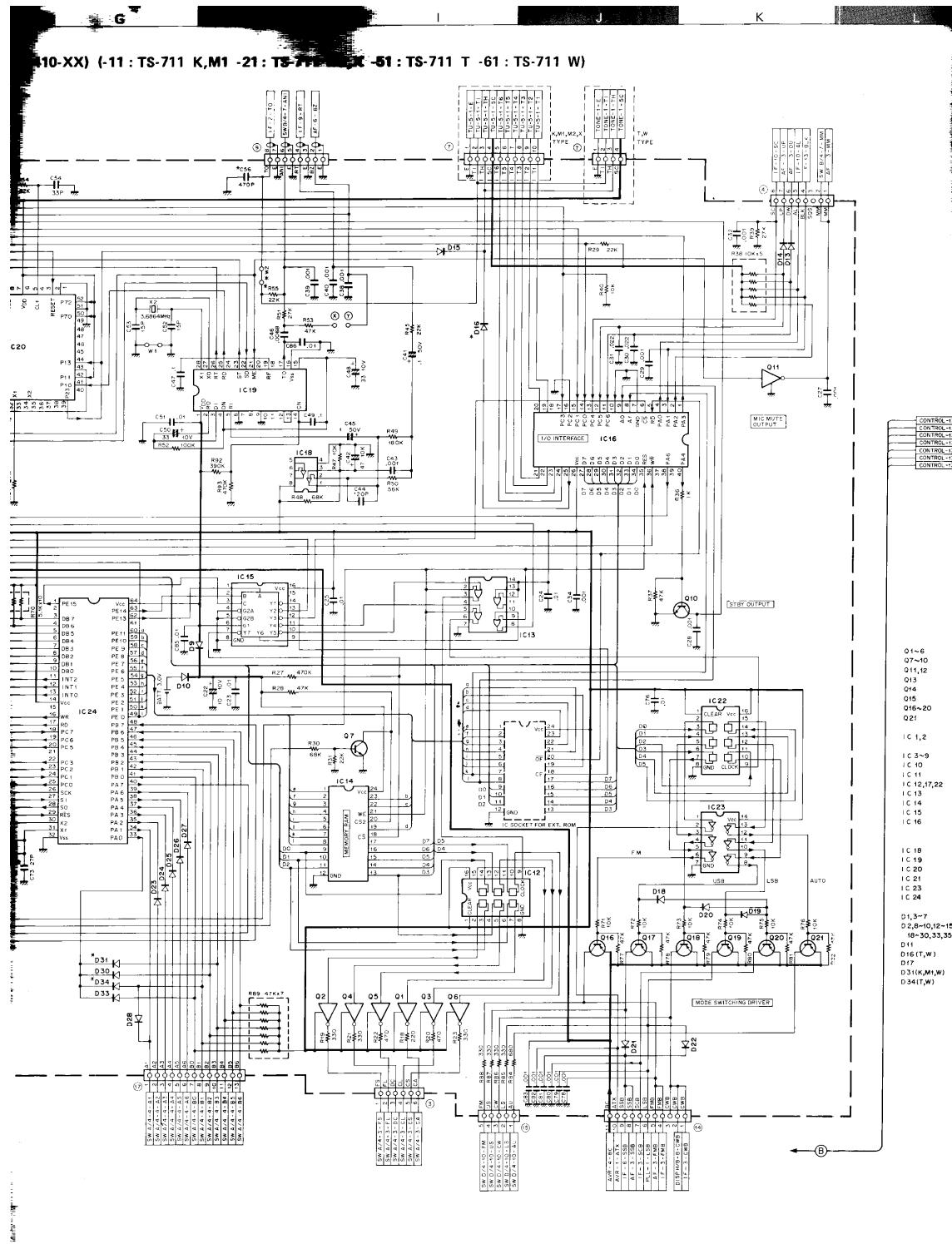


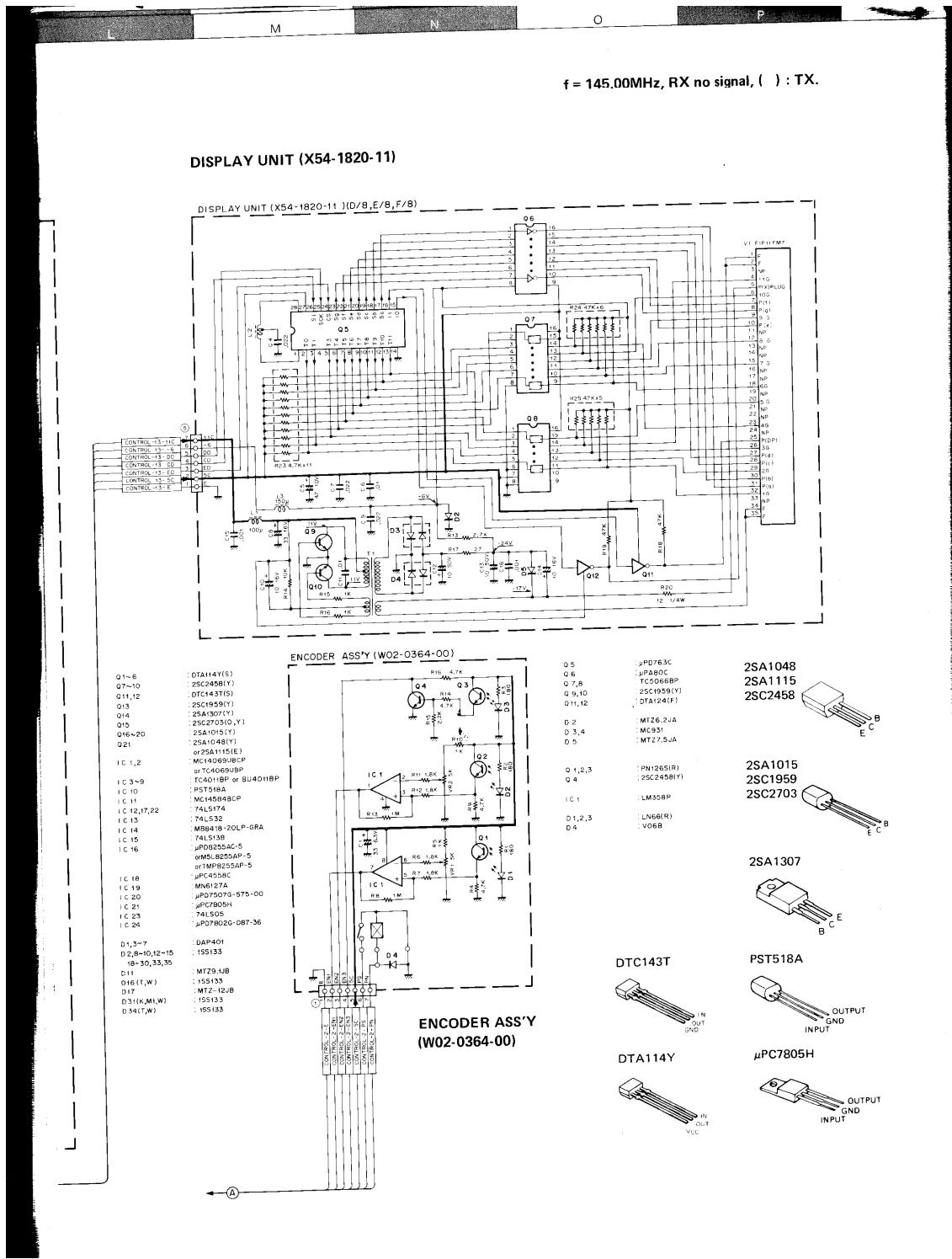


TS-711A/E CIRCUIT DIAGRAM

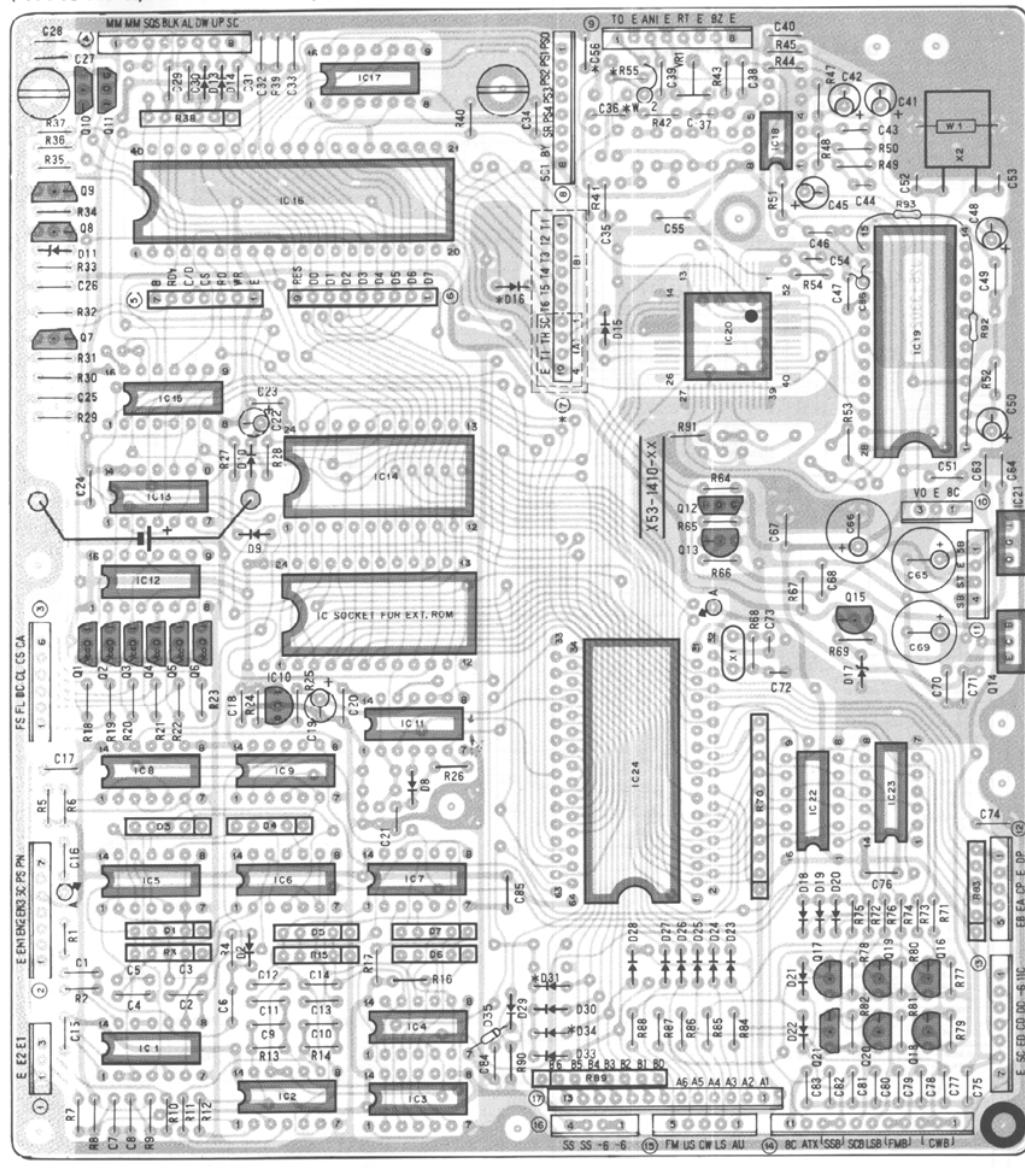
CONTROL UNIT (X53-141)





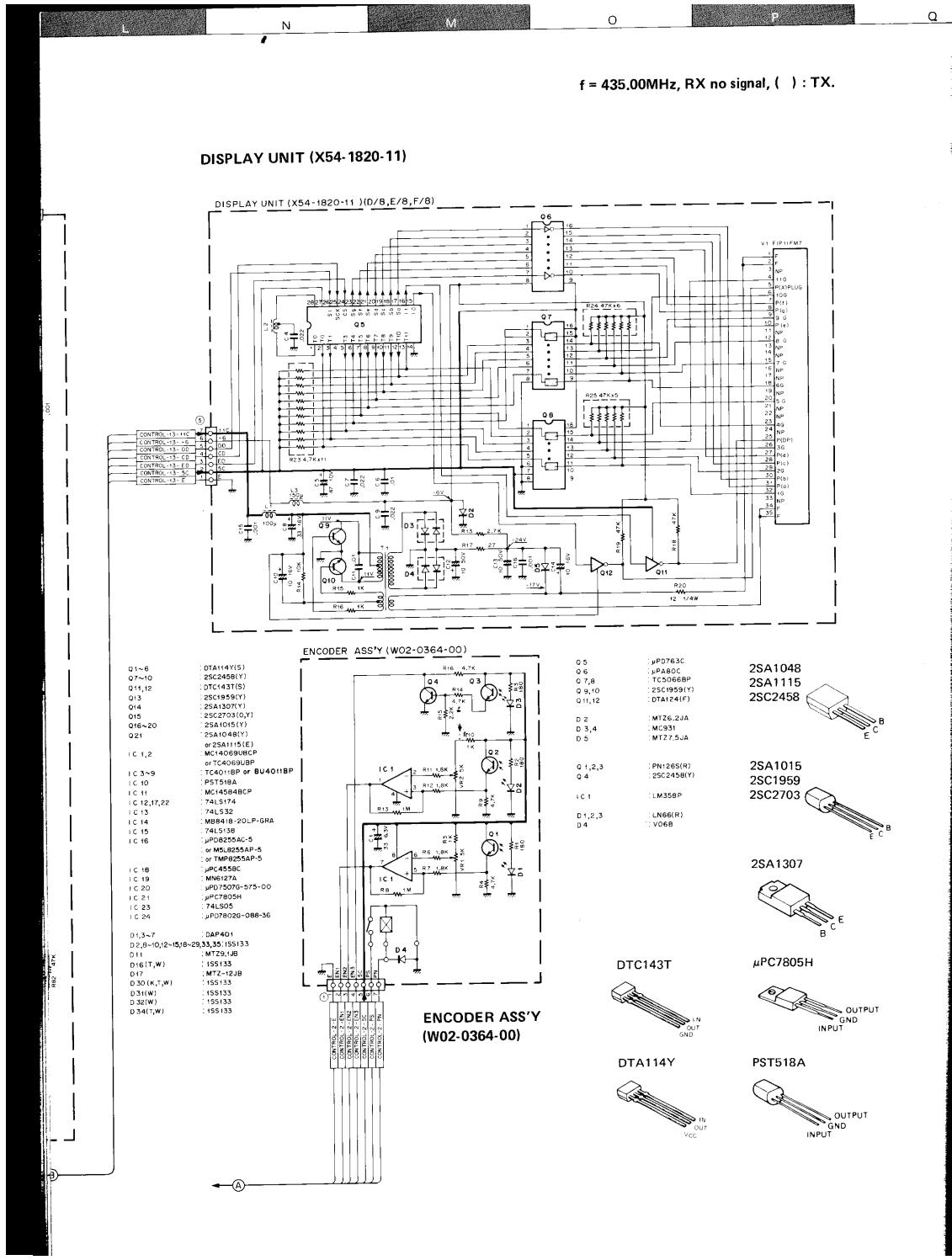


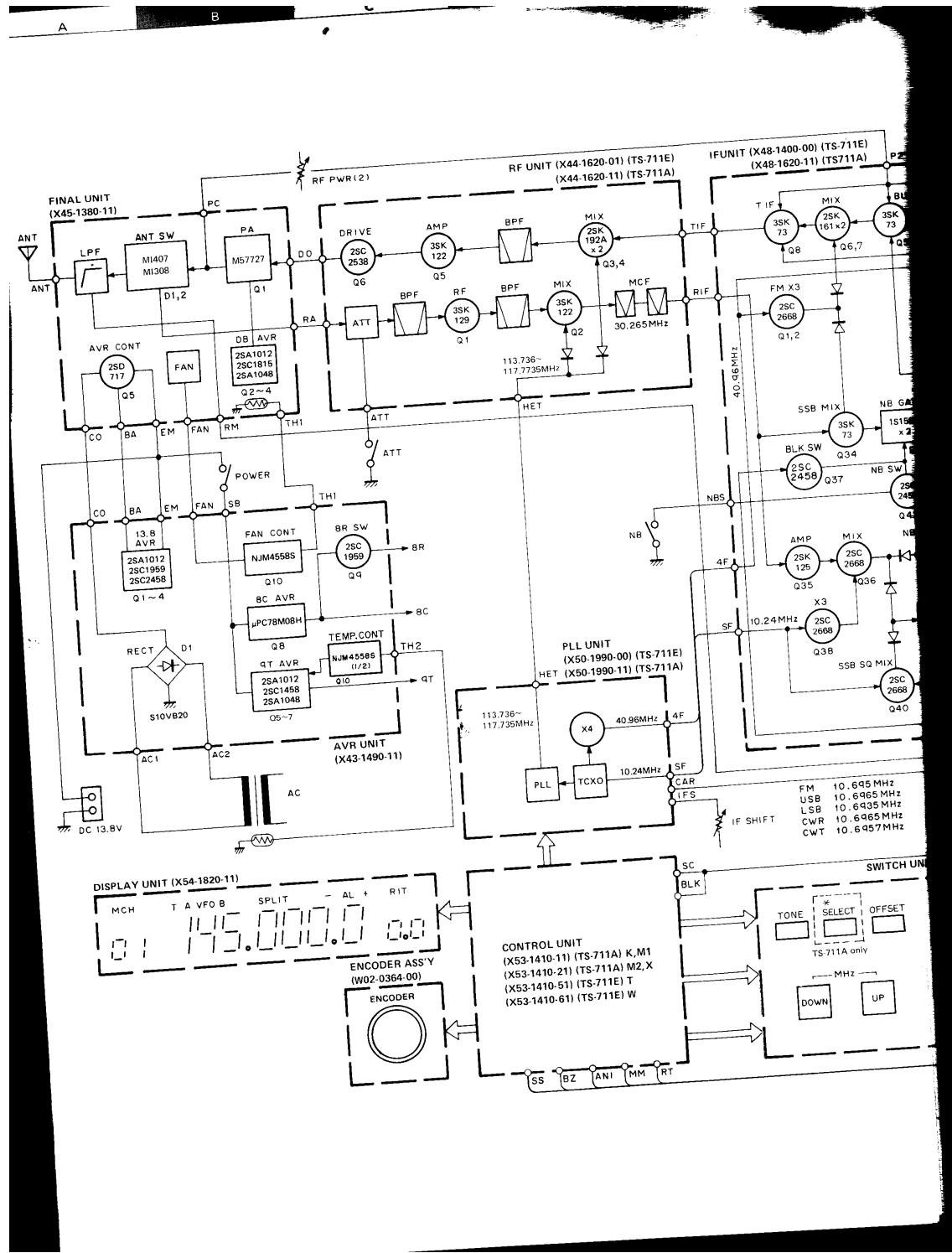
CONTROL UNIT (X53-1410-XX) Component side view
 (-11 : TS-711 K,M1 -21 : TS-711 M2,X -51 : TS-711 T -61 : TS-711 W)



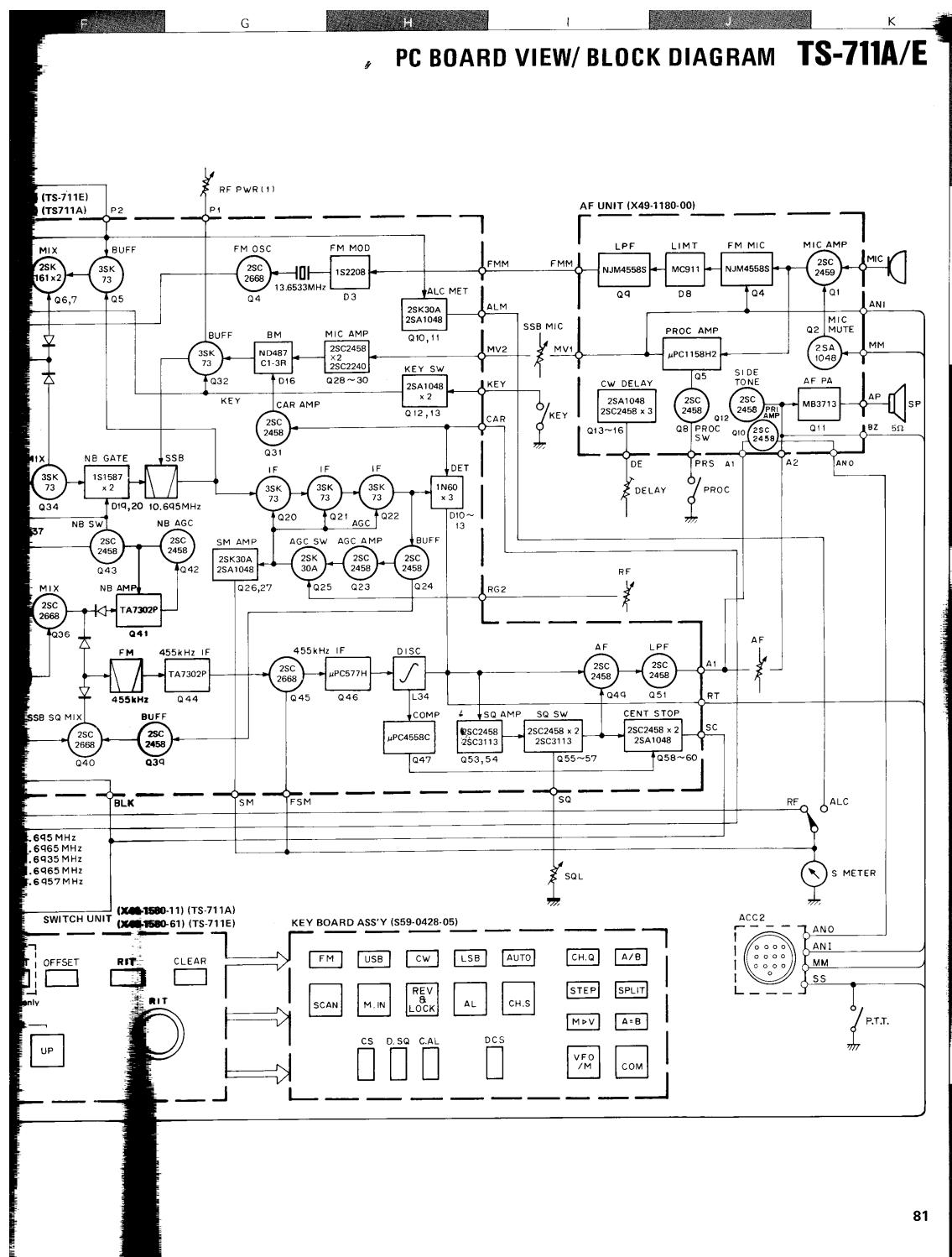
	C56	R55	D16	D31	D34	W2	(7)-(A)	(7)-(B)
K,M1	O	X	X	O	X	O	X	O
M2,X	O	X	X	X	X	O	X	O
T	X	O	O	X	O	X	O	X
W	X	O	O	O	O	X	O	X

O : Used X : Not used



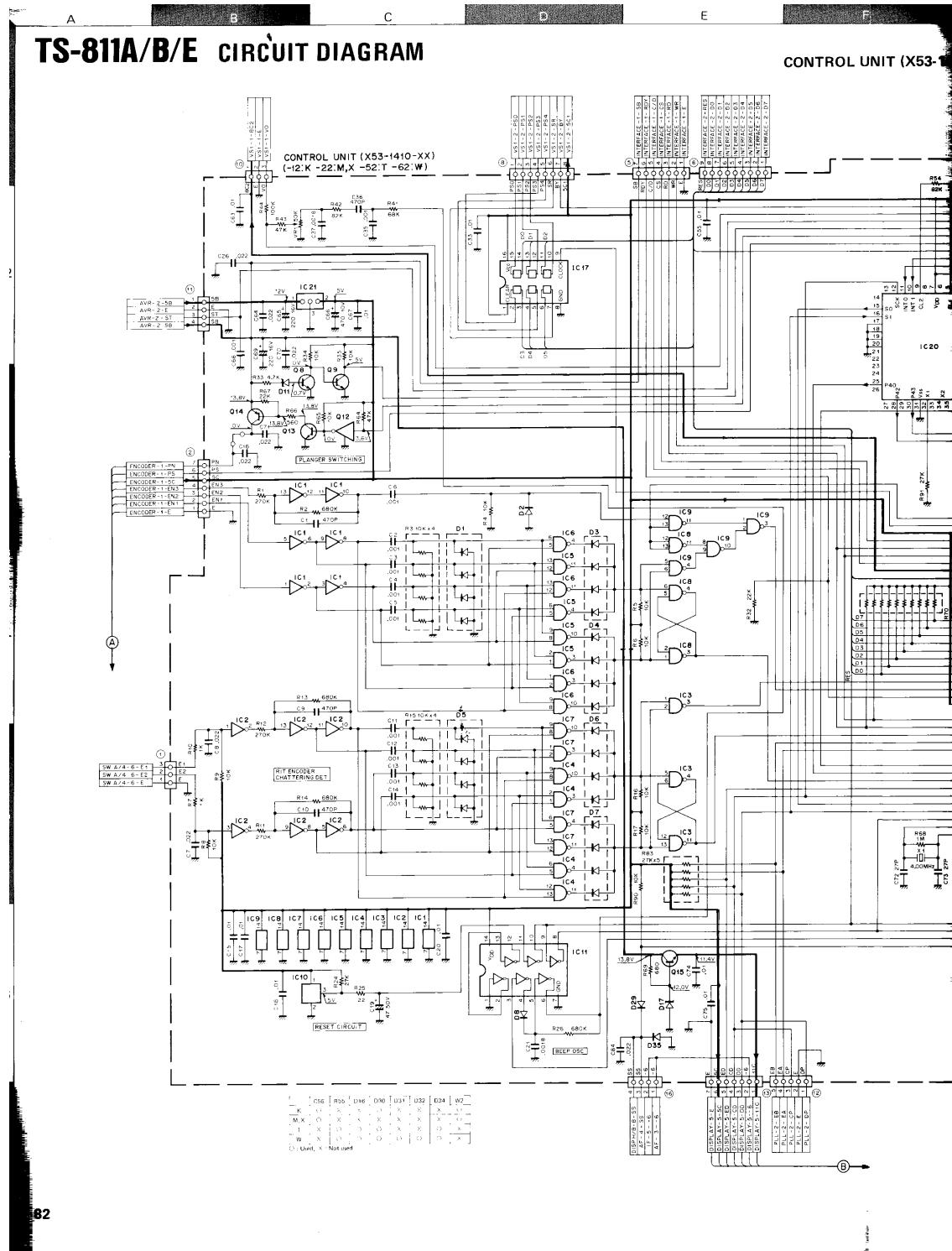


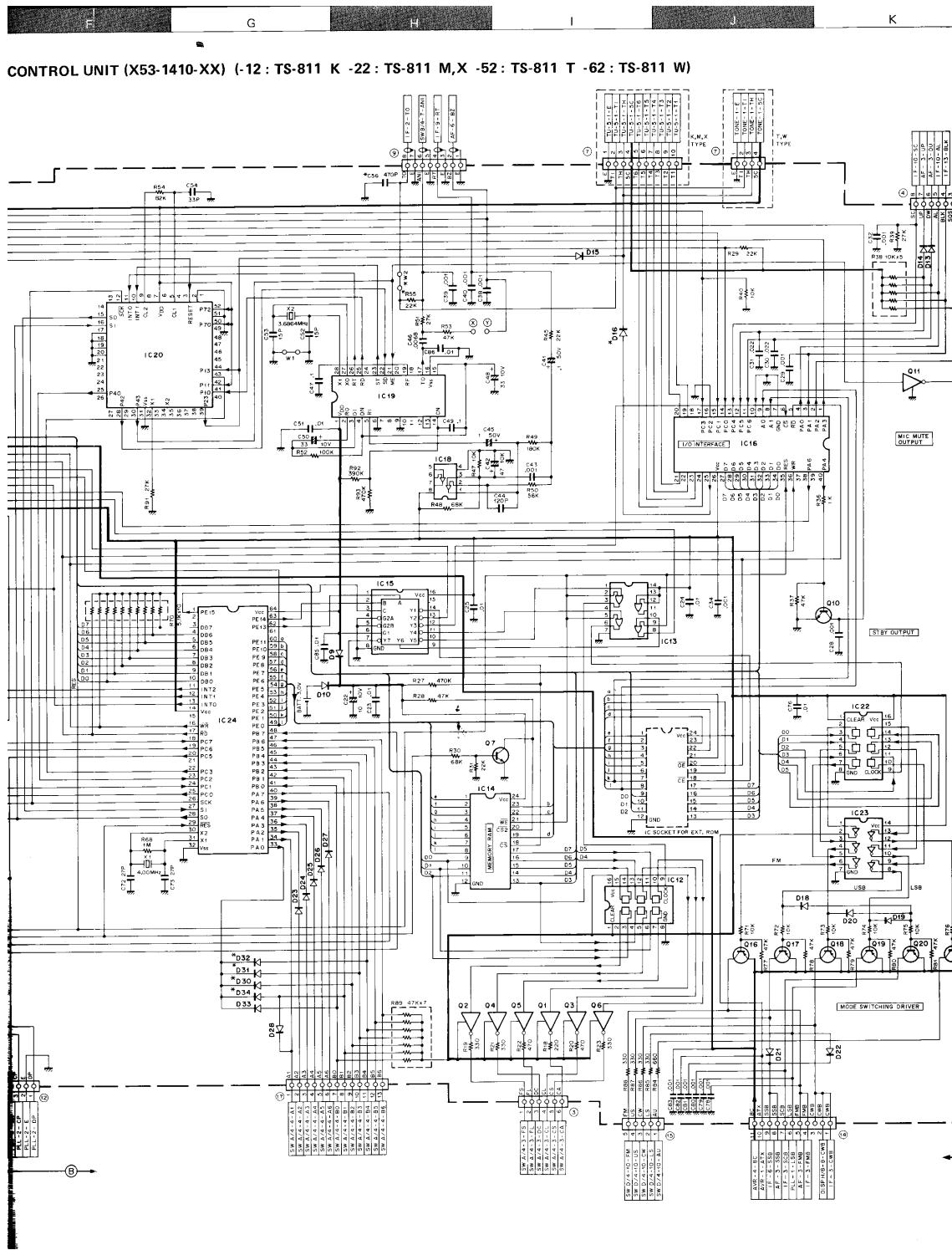
PC BOARD VIEW/ BLOCK DIAGRAM TS-711A/E

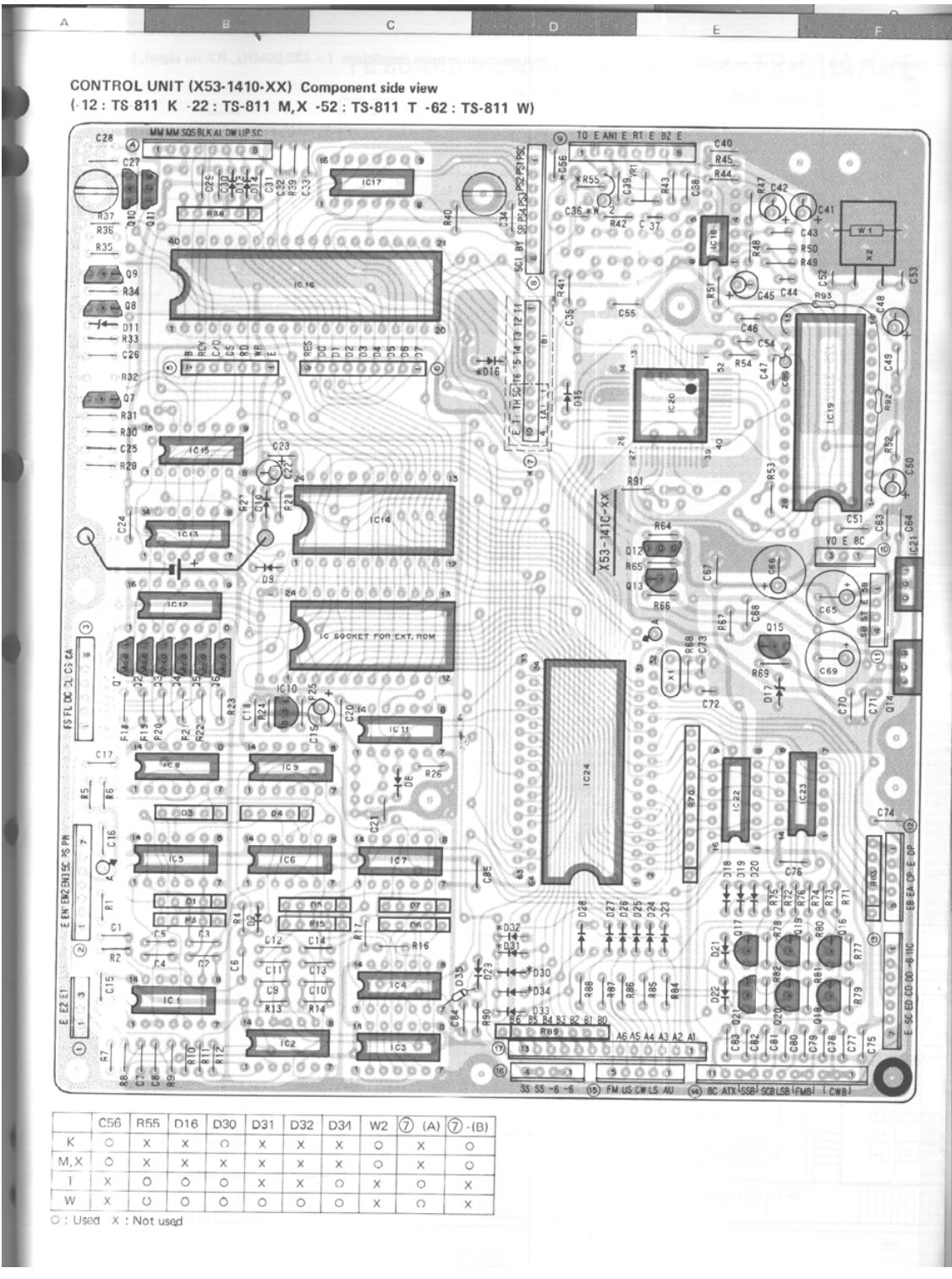


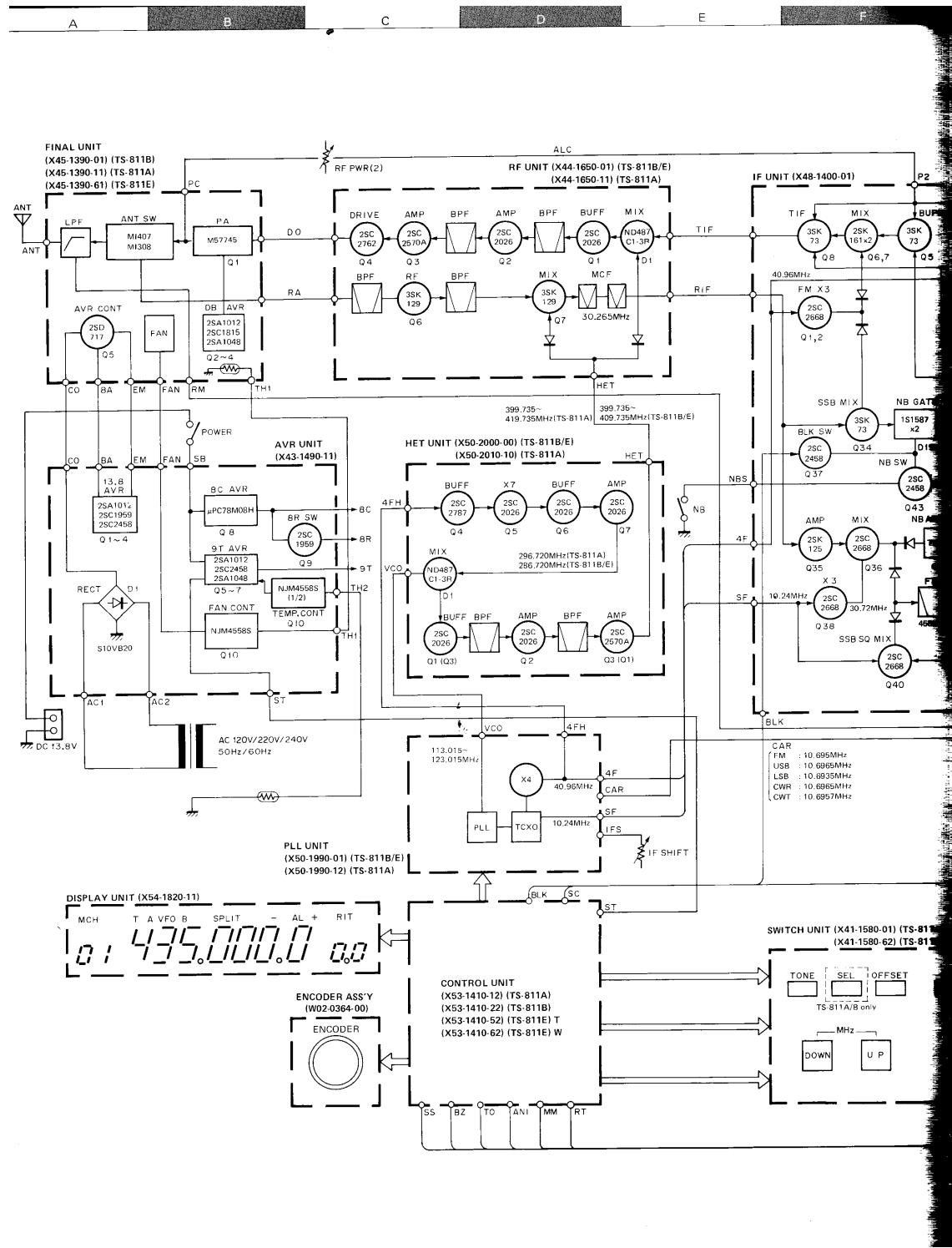
TS-811A/B/E CIRCUIT DIAGRAM

CONTROL UNIT (X53-1)

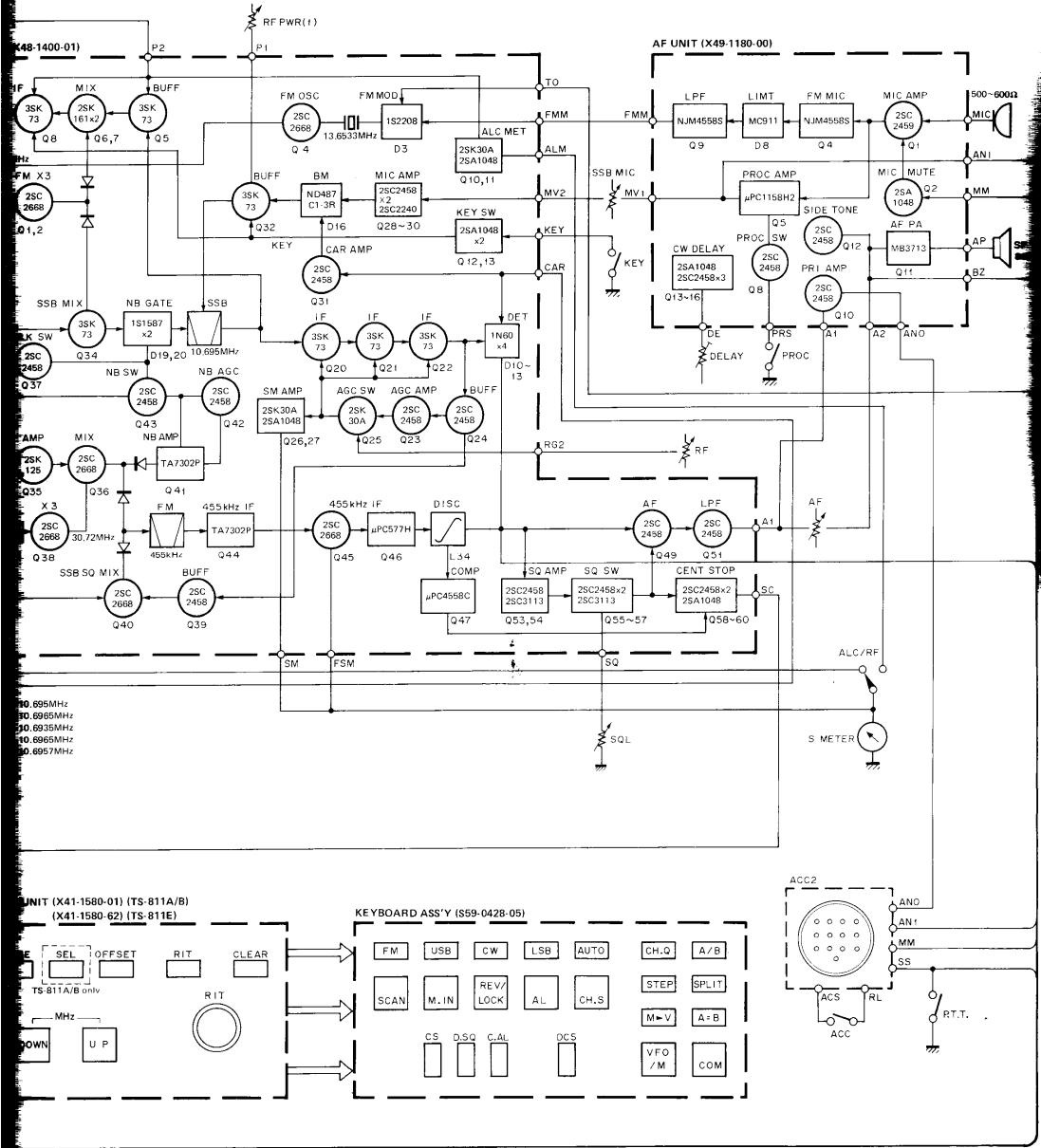




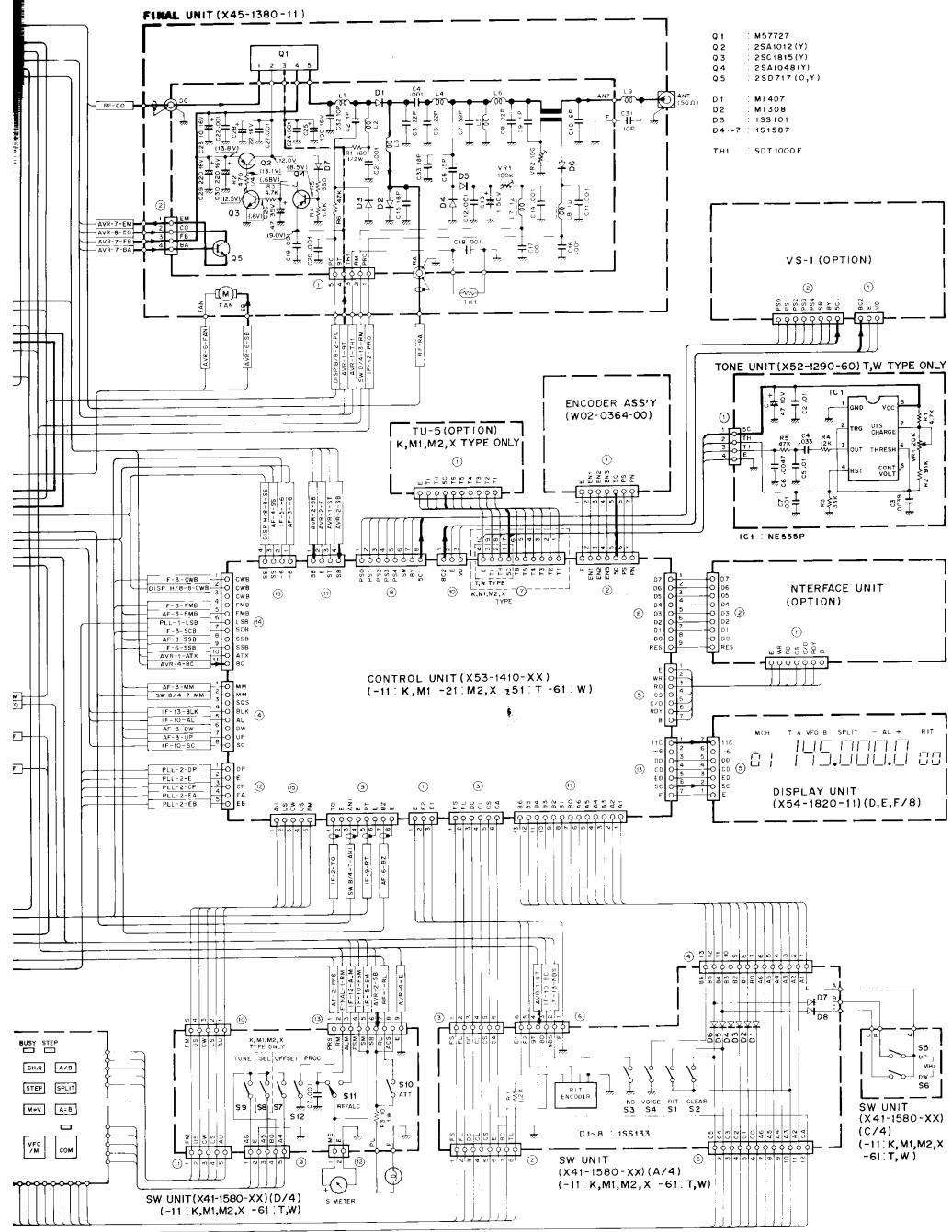




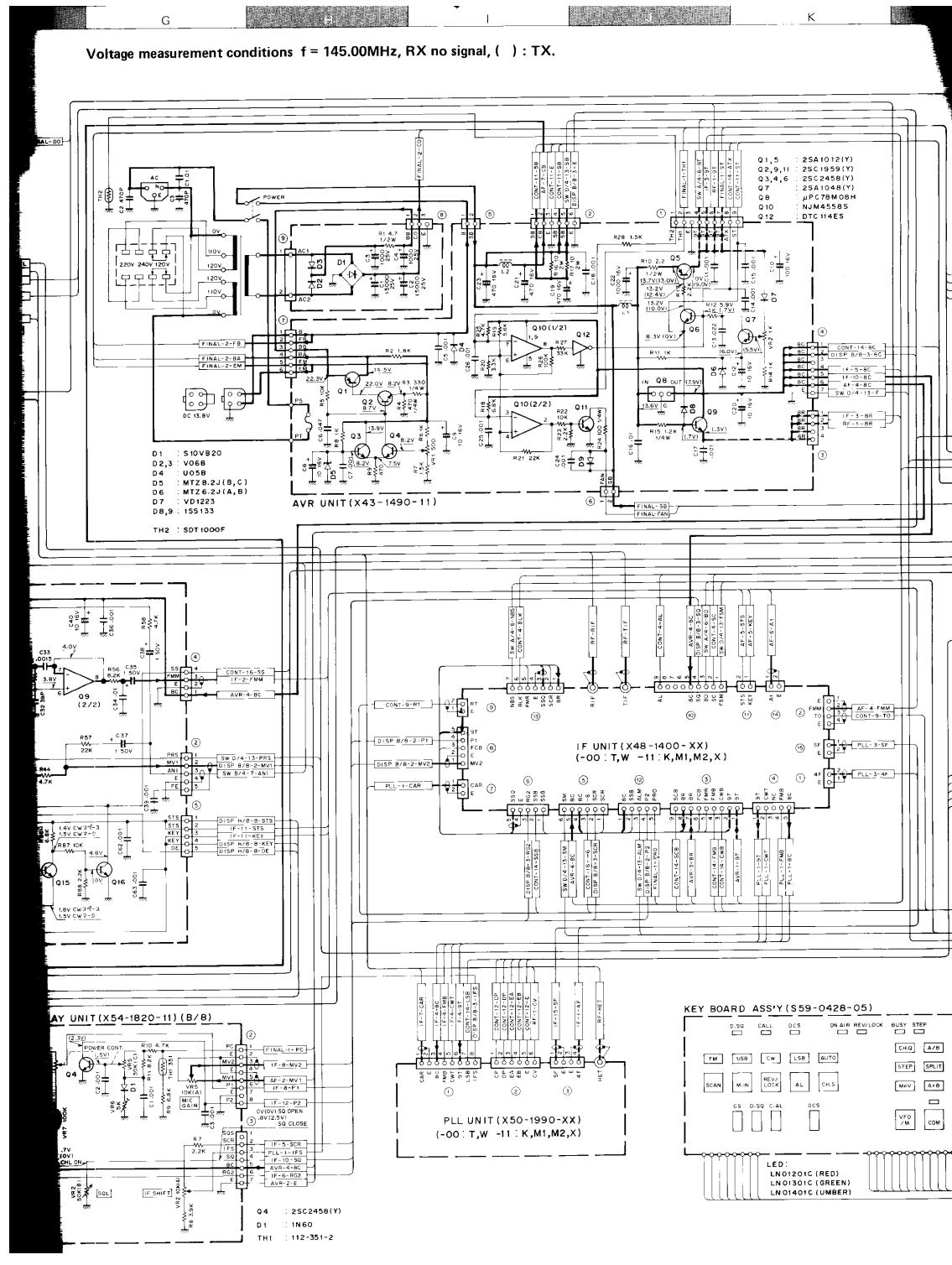
PC BOARD VIEW/BLOCK DIAGRAM **TS-811A/B**

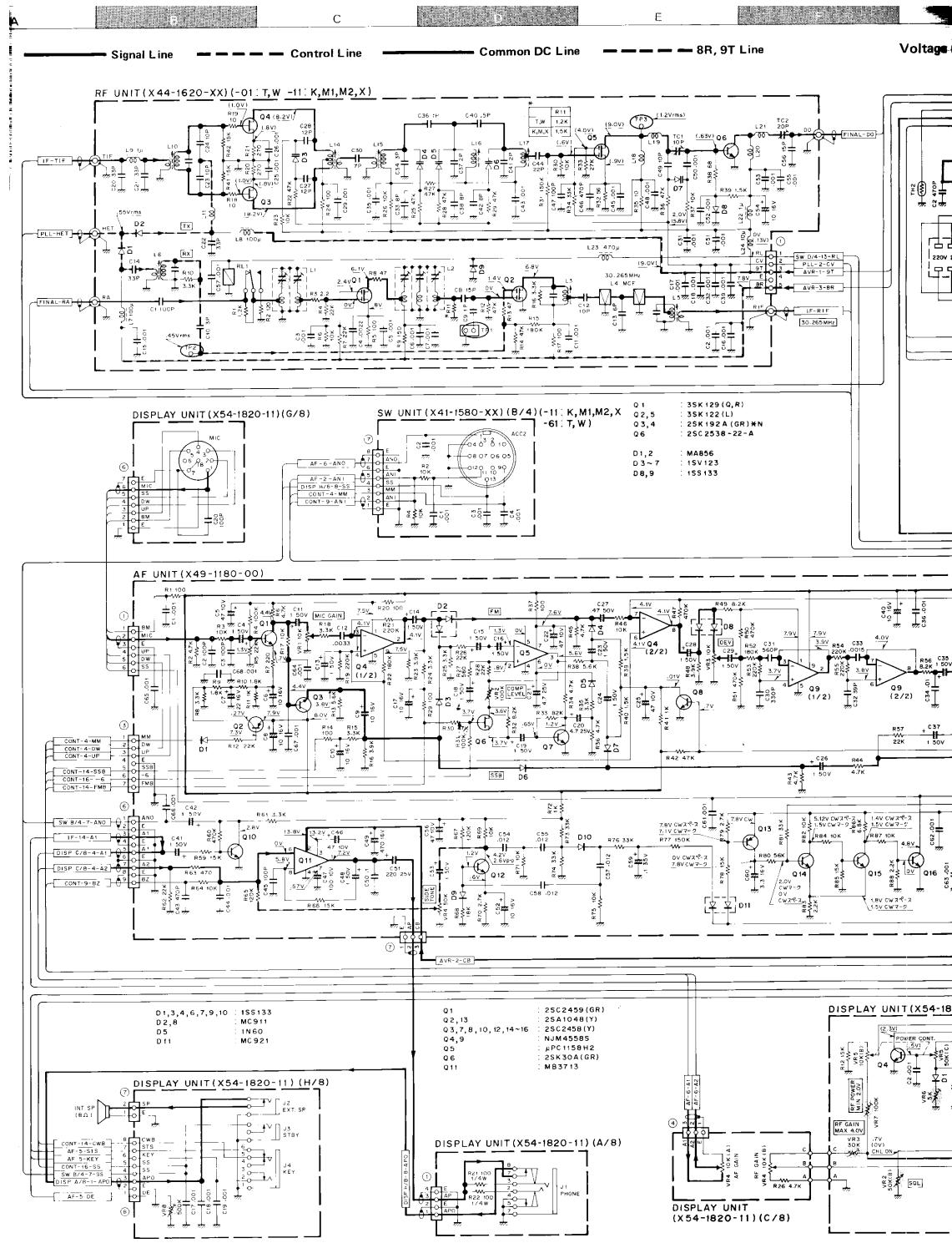


SCHEMATIC DIAGRAM TS-71A/E



TS-71A (K, M1, M2, X)
TS-71E (T, W)





TS-711/811

CD-10 (CALL SIGN DISPLAY)

PARTS LIST
CD-10 GENERAL

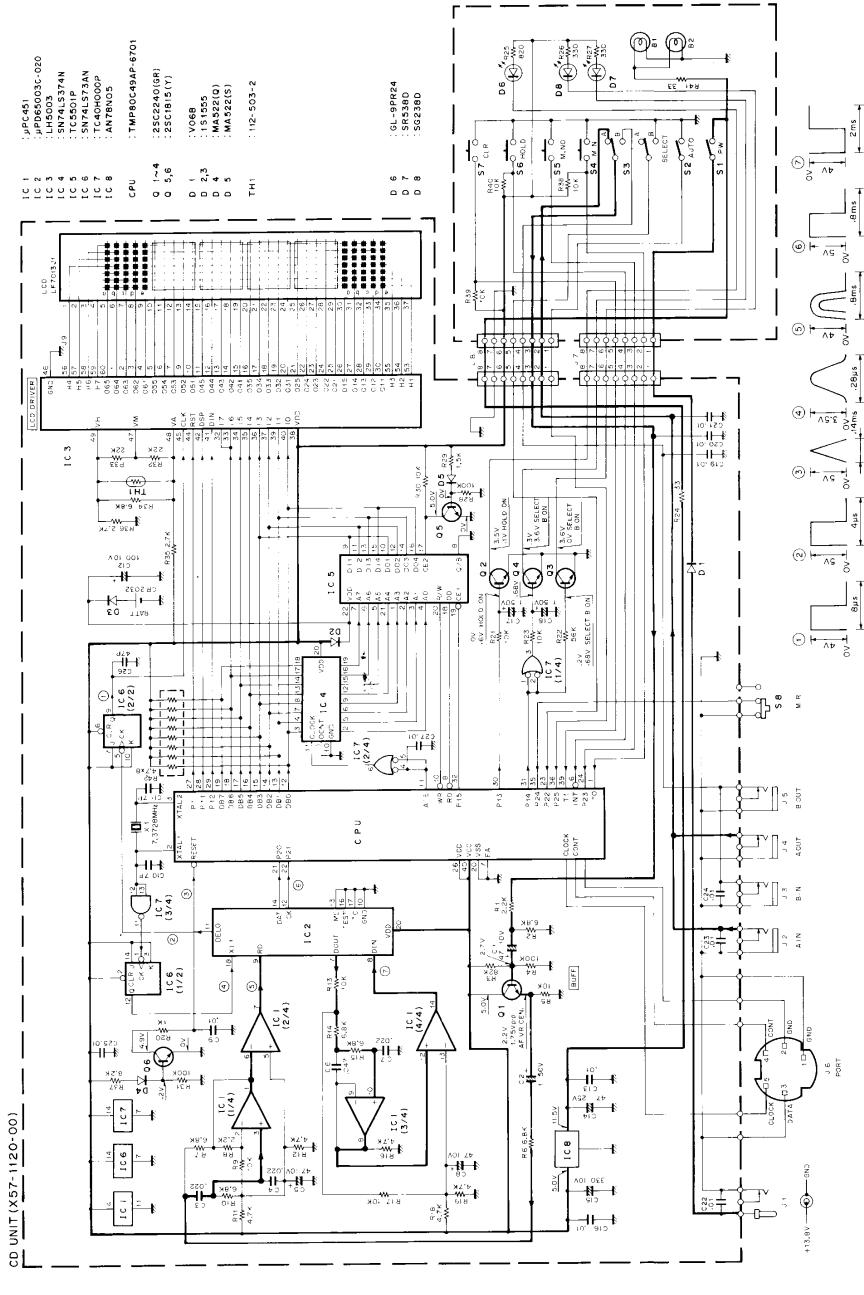
Part No	Note	Name & Description	Distinction & Quantity			Reference No
			013	023	051	
A02-0708-02	N	CASE	1	1	1	
A02-0708-02	N	CASE	1	1	1	
A13-0462-03	N*	BLACKET	1	1	1	
A20-2539-02	N	PANEL	1	1	1	
B10-0471-04	N	FRONT GLASS	1	1	1	
B11-0415-14	N	LCD LIGHT GUIDING PLATE	1	1	1	
B11-0425-04	N	LCD LIGHT GUIDING SHEET	1	1	1	
B11-0425-04	N	MOUNTING PLATE	1	1	1	
B42-2393-04	N	TABLET LABEL	1	1	1	
B43-1042-04	N	BADGE	1	1	1	
B43-1043-04	N	BADGE	1	1	1	
B50-8013-00	N	INSTRUCTION MANUAL	1	1	1	
B50-8014-00	N	INSTRUCTION MANUAL	1	1	1	
E07-0552-05	N	SP DIN PLUG	1	1	1	
E29-0460-05	N	EXCHANGE PLUG	1	1	1	
E30-1797-05	N	DC CABLE ASSY	1	1	1	
E30-1798-05	N	DC CABLE WITH PLUG	1	1	1	
E30-1799-05	N	DC CABLE WITH PLUG	1	1	1	
G01-0821-04	N	COIL SPRING X9	7	7	7	
G11-0814-04	N	RUBBER RING	2	2	2	
H01-4626-03	N	CARTON	1	1	1	
H01-4626-03	N	CARTON	1	1	1	
H12-1372-14	N*	BUFFER(B)	1	1	1	
H12-1372-13	N*	BUFFER	1	1	1	
H25-0312-04	N	PROTECTIVE_BAG 180X250	1	1	1	
H25-0312-04	N	PROTECTIVE_BAG 125X250	1	1	1	
H25-0029-04	N	RAG(ACS)	60X110	1	1	
H25-0029-04	N	RAG(ACS)	60X110	1	1	
H25-0049-03	N	PROTECTIVE_BAG 60X200	1	1	1	
J02-0435-05	N	RUBBER FOOT ACS	1	1	1	
J02-0436-04	N	FRONT FOOT ACS	1	1	1	
J29-0407-04	N	SW.GUIDE A (TACT KNOB)	3	3	2	
J29-0409-04	N	SW.GUIDE B (TACT KNOB)	2	2	2	
J32-0783-04	N	ROUND BOSS	M2X6	2	2	
K27-0440-04	N	PUSH KNOB (E)	3	3	3	
K27-0440-04	N	PUSH KNOB (F)	1	1	1	
K27-0445-05	N	SQUARE KNOB (A)	2	2	2	
K27-0446-05	N	SQUARE KNOB (B)	1	1	1	
M08-0513-04	N	DRESSED SCREW	2	2	2	
M09-0635-05	N	SCREW (OTHERS)	2	2	2	
M14-0113-03	N	FLAT WASHER	2	2	2	
M14-0113-03	N	SPRING WASHER	2	2	2	
M14-0040-66	N	PAN HD SCREW	2	2	2	
N30-2004-41	N	UPPER TAPPING SCREW	2	2	2	
N30-4041-66	N	UPPER TAPPING SCREW	1	1	1	
N30-2005-41	N	BIND SCREW	3	3	3	
N30-2005-46	N	BIND TAPPING SCREW	3	3	3	
X57-1120-00	N	CD UNIT	1	1	1	

CD UNIT (X57-1120-00)

ITEM NO.		ITEM NAME		QTY		ITEM NO.		ITEM NAME		QTY	
AN78NO5	N	IC	1			IC	8				
B39-0833-05	N	LAMP	2					S	1, 2		
CC45CH1W2Z0J		CERAMIC	22P	50V	1			C	11		
CC45CH1W2Z0J		CERAMIC	22P	50V	1			C	26		
CE04W1A70M		ELECTRO	47	10V	3			C	1, 5	8	
CE04W1A101M		ELECTRO	100	10V	1			C	15		
CE04W1A335M		ELECTRO	330	10V	1			C	14		
CE04W1E470M		ELECTRO	27	25V	1			C	2, 17, 18		
CE04W1E470M		ELECTRO	7	50V	3			C	2, 13, 16		
CKX511H103Z		CERAMIC	0.01		3			C	27		
CKS50B1H102K		CERAMIC	10000P	50V	1			C	3, 4, 7		
CQ29M1223K		MYLAR	0.032	10V	3			C	6		
CQ29M1223K		MYLAR	0.047	50V	1			C	19, 20, 21, 22, 23, 24, 2		
CS1-0131-05		CERAMIC	0.01	25V	7						
ED1-0431-05	N	DC JACK	1					J	1		
ED0-0355-05	N	EP SOCKET	1					J	6		
E11-0434-05		PHONE JACK	2					J	2, 3, 4, 5		
GL9PR24		LED	RED		5			O	6		
LF70131J	N	LCD			1			IC	3		
LH5003	N	L			1			X	1		
L77-1268-05	N	XTAL	7.3728MHZ		1			D	4		
MAS52Z(0)	N	DIODE			1			D	5		
MAS52Z(5)	N	DIODE			1			R	42		
R90-0557-05		MULTIPLE RESISTOR			1						
SG23BD		DIODE			1			D	8		
SN74LS174N		IC			1			IE	7		
SN74LS73AN		IC			1			IC	7		
SR53BD		DIODE			1			D	7		
SS1-0427-05	N	SLIDE SWITCH			1			S	8		
S40-2445-03		PUSH SW			3			S	1, 2, 3		
S50-1426-03	N	TACT SWITCH			2			S	1, 5, 6, 7		
TC40H00P	N	IC			1			IC	7		
TC5501P	N	IC			1			IC	7		
TPB80649AP-6701	N	CPU			2			CPU	7		
UPC451C		IC			1			IC	1		
UPD45003C-020		IC			1			IC	2		
V068		DIODE			4			O	1		
W09-0326-05		LITHIUM BATTERY			1						
1S1555		DIODE	OR IN4448		2			D	2, 3		
112-503-2		THERMISTOR			1			TH	1		
ZSC22400GR3		TR			4			Q	1, 2, 3		
ZSC1815(Y)		TR			2			Q	5, 6		

CD-10 (CALL SIGN DISPLAY)

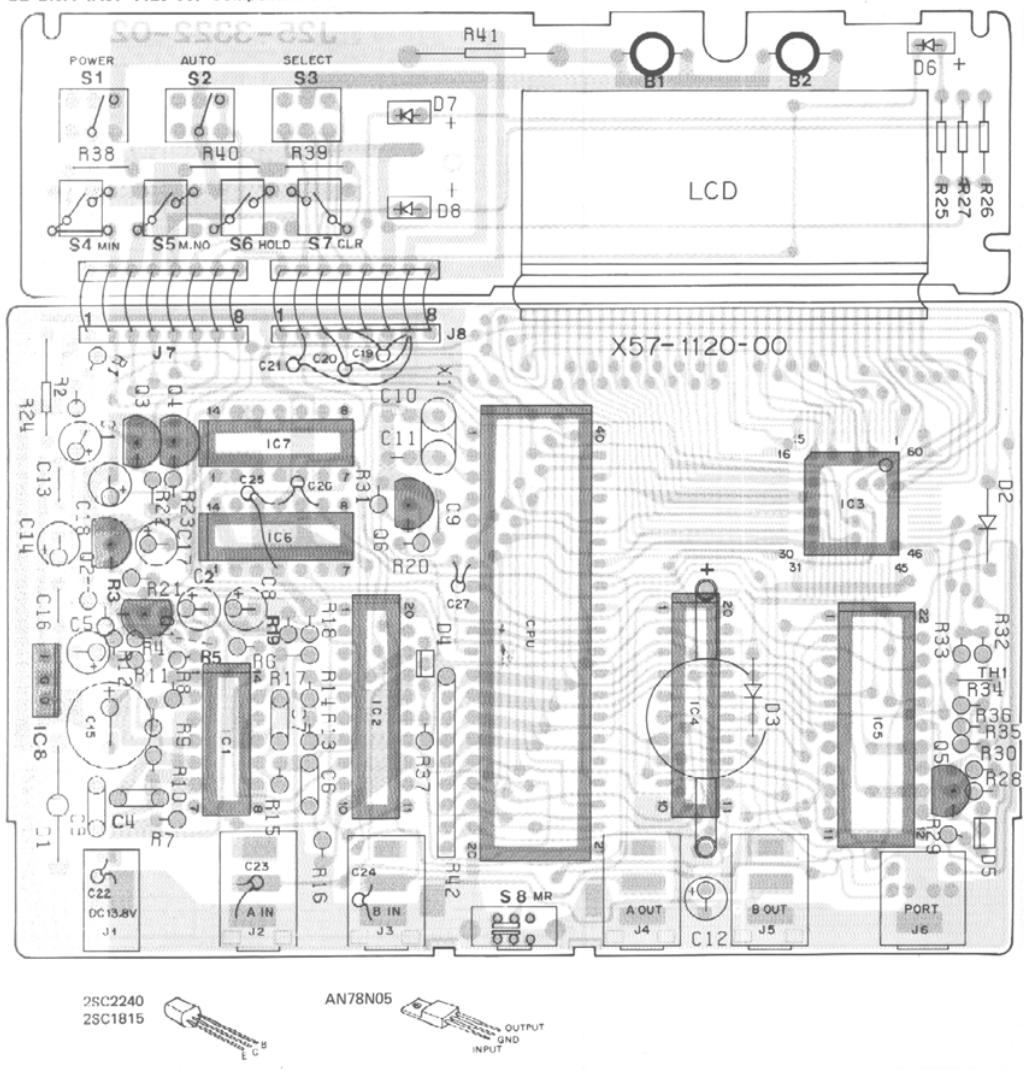
SCHEMATIC DIAGRAM



CD-10 (CALL SIGN DISPLAY)

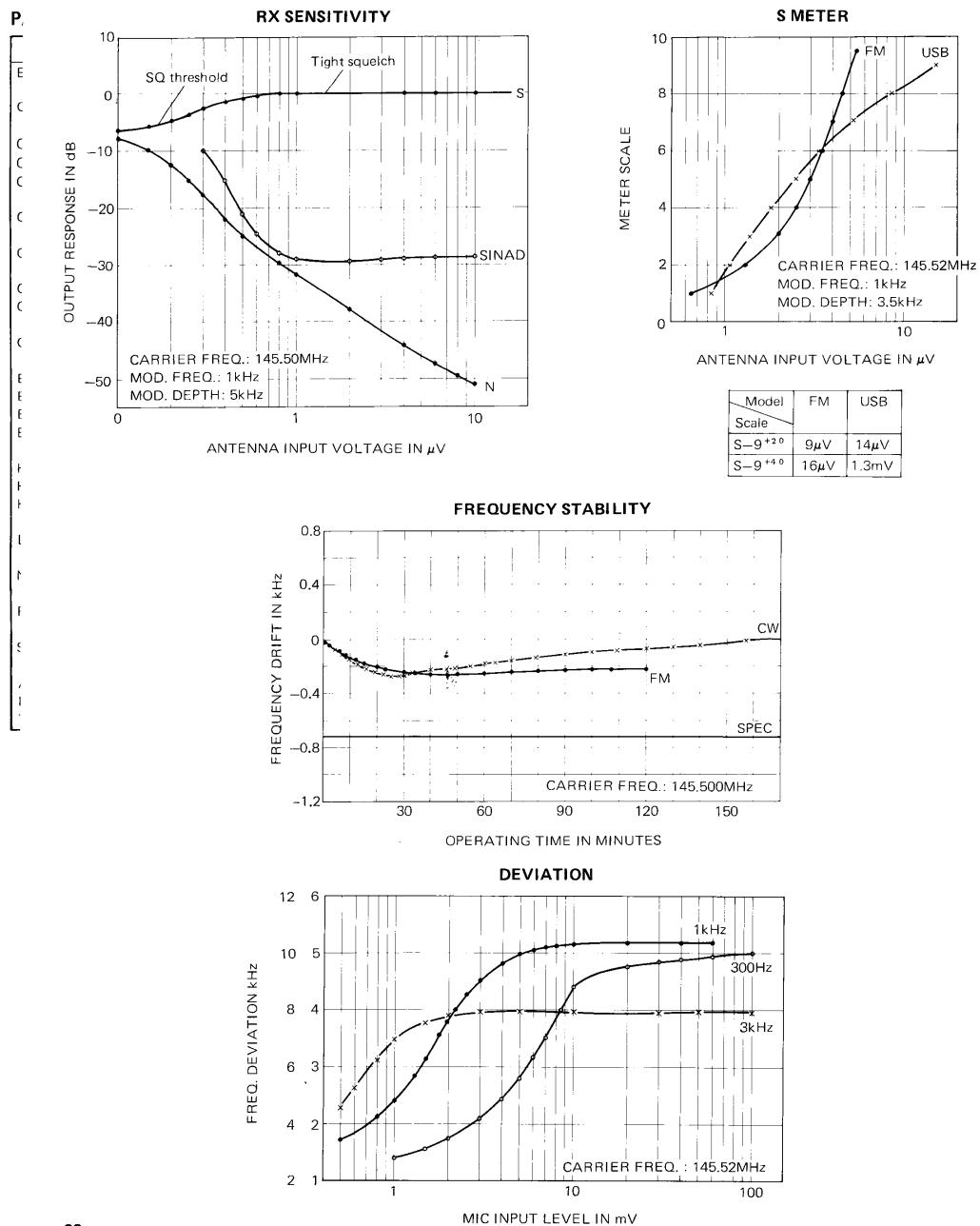
PC BOARD VIEW

CD UNIT (X57-1120-00) Component side view

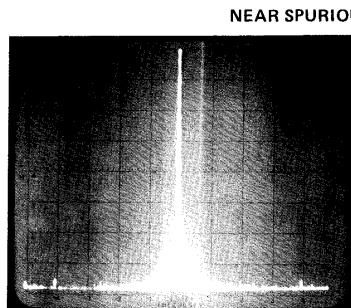
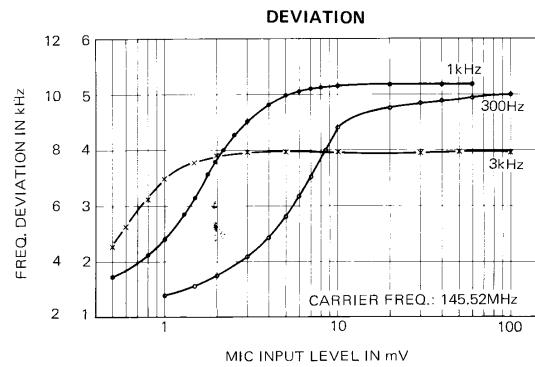
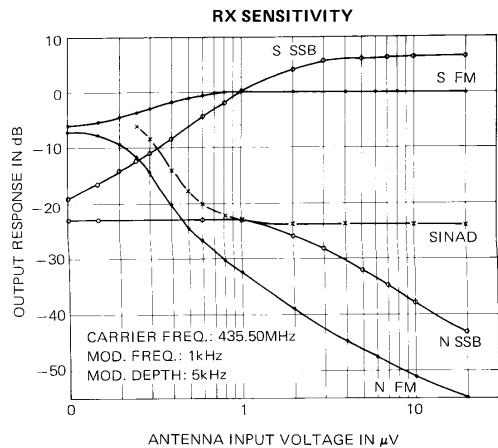
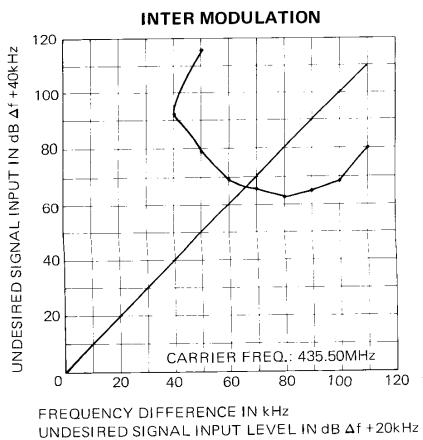


TS-711/811

TS-711 REFERENCE DATA



TS-811 REFERENCE DATA



CARRIER FREQ.: 430.00MHz
RF POWER: 10.5W
SCAN WIDTH: 200kHz/DIV
BAND WIDTH: 1kHz
SCAN TIME: 0.5 SEC.
VIDEO FILTER: 10kHz
INPUT ATT.: -20dB
LOG REF LEVEL: -2.5dBm
10dB/DIV

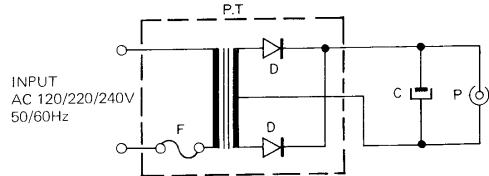
AC-10 (CD-10 FOR CHARGER)/TU-5 (TONE UNIT)

AC-10 SPECIFICATIONS

Input voltage AC 120/220/240V
 Frequency response 50/60Hz
 Output voltage DC 13.8V
 Output current 200mA

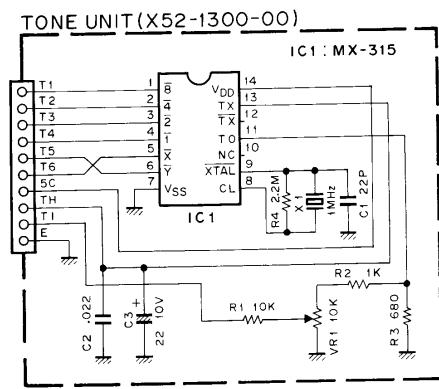
AC-10 SCHEMATIC DIAGRAM

(Y61-2680-XX) (-21 : K,M -51 : T -61 : W -71 : X)



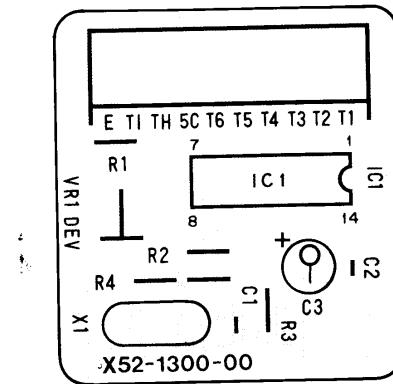
W09-0347-08 (K,M) AC 120V 60Hz
 W09-0348-08 (T) AC 240V 60Hz
 W09-0349-08 (W) AC 220V 50/60Hz
 W09-0350-08 (X) AC 240V 50/60Hz

TU-5 SCHEMATIC DIAGRAM



TU-5 PC BOARD VIEW

TONE UNIT (X52-1300-00) Component side view

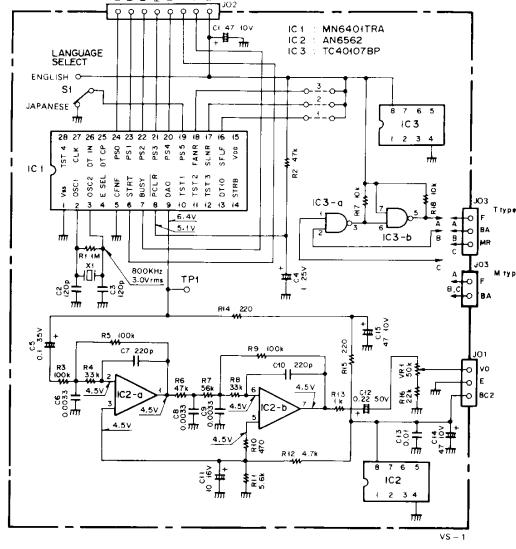


VS-1 (VOICE SYNTHESIZER)

PARTS LIST

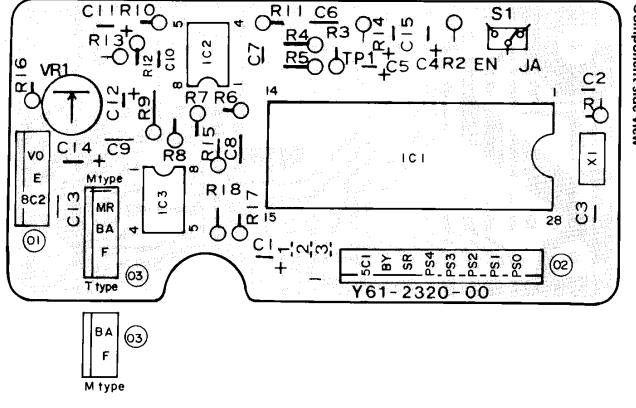
Part No.	Re- marks	Description	Ref. No.
B50-4035-00	N	Instruction manual	
CC45SL1H121J	C	120P x 2	C2,3
CE04W1A470M	E 47 10V		C1,14,15
CE04W1C100M	E 10 16V		C11
CE04W1HR22M	E 0.22 50V		C12
CK45B1H221K	C	220P x 2	C7,10
CO92M1H332K	ML 0.0033 x 3		C6,8,9
CS15E1E010M	T 1 25V		C4
CS15E1V0R1M	T 0.1 35V		C5
C91-0131-05	C 0.01 (SP)		C13
E40-0273-05	△ Mini connector 2P	M	
E40-0373-05	△ Mini connector 3P	M	
E40-0373-05	△ Mini connector x 2 3P	T	
E40-0873-05	△ Mini connector 8P		
H01-4481-03	N△ Packing carton (inside)	M	
H01-4501-03	N△ Packing carton (inside)	T	
H25-0029-04	Protective bag x 2		
L78-0006-05	N Ceramic OSC	X1	
N89-3006-46	Tapping screw x 4		
R12-4408-05	Trim. pot. 50kΩ	VR1	
S31-1411-05	N Slide switch	S1	
AN6562	N IC	IC2	
MN6401TRA	N IC	IC1	
TC40107BP	N IC	IC3	

SCHEMATIC DIAGRAM



VS-1

PC BOARD VIEW



TS-711 SPECIFICATION

[General]

Frequency range	144.0 ~ 148.0 MHz.... (TS-711A) 144.0 ~ 146.0 MHz.... (TS-711E)
Radio wave mode	A3J (SSB), F2, F3 (FM), A1 (CW)
Antenna impedance	50 ohms
Operating temperature	-10°C ~ +50°C
Power voltage	AC120V/240V/220V, 50/60 Hz DC 13.8V(12V ~ 16V)
Grounding	Negative
Power consumption	170W, 6.5A (DC13.8V) at maximum transmission 50W, 1.2A (DC13.8V) in receive mode without receiving signal
Frequency tolerance (-10°C ~ +50°C)	Within ± 3 ppm (SSB/CW) Within ± 5 ppm (FM)
Frequency stability	± 300 Hz 1 ~ 60 minutes after power on Within 50 Hz/every 30 minutes 60 minutes later (after power on)
Dimensions	W270 x H96 x D260 mm (W279 x H108 x D327 mm) – Projected parts measured.
Weight	7.1 kg (15.62 lb)

[Transmitter]

RF output power	25 watts (One minute transmission/three minutes reception) RF output variable from approx. 2W to maximum
Modulation	Balanced (SSB), Reactance (FM)
Spurious radiation	Less than -60 dB
Carrier suppression	Less than -40 dB
Side band suppression	Less than -40 dB
Maximum frequency deviation (FM)	± 5 kHz
Modulation distortion (FM60%)	Less than 3% (300 Hz ~ 3 kHz)
MIC impedance	500 ~ 600 Ω

[Receiver]

Circuitry	Double superheterodyne
Intermediate frequency	1st, 30.265 MHz 2nd 10.695 MHz (SSB/CW), 455 kHz (FM)
Receiver sensitivity FM	12 dB SINAD less than 0.22 μV.... (TS-711A) 12 dB SINAD less than 0.2 μV.... (TS-711E) S+N/N more than 50 dB at 1.0 mV input
SSB/CW	S+N/N 10 dB less than 0.16 μV.... (TS-711A) S+N/N 10 dB less than 0.13 μV.... (TS-711E)
Receiver selectivity FM	More than 12 kHz (-6 dB) Less than 24 kHz (-60 dB)
SSB/CW	More than 2.2 kHz (-6 dB) Less than 4.8 kHz (-60 dB)
Spurious response	Better than 70 dB
Squelch sensitivity	Less than 0.16 μV (threshold)
Auto scan stop level	Less than 0.2 μV (threshold)
Audio output power	More than 2.0 watts across 8 ohms load (5% dist.)
Audio output impedance	8 ohms

[DCS control]

Code	NRZ equal-length code
Modulation	MSK modulation
Frequency deviation	± 2.5 kHz or more ± 5 kHz or less ± 3.5 kHz Standard
Mark frequency and deviation	1200 Hz ± 200PPM
Space frequency and deviation	1800 Hz ± 200 PPM
Code transmission speed and deviation	1200 bits/second ± 200 PPM

Note: Circuit and ratings are subject to change without notice due to developments in technology.

TS-811A/B/E

TS-811 SPECIFICATION

[General]	
Frequency range	430 ~ 440MHz (TS 811B/E) 430 ~ 450MHz (TS 811A)
Radio wave mode	A3J (SSB), F2, F3 (FM), A1 (CW)
Antenna impedance	50 ohms
Operating temperature	-10°C ~ +50°C
Power voltage	AC120V/220V/240V, 50/60Hz DC 13.8V (12V ~ 16V)
Grounding	Negative
Power consumption	220W, 8.0A (DC 13.8V) at maximum transmission (TS-811B/E) 240W, 8.5A (DC 13.8V) at maximum transmission (TS-811A)
Frequency tolerance (-10°C ~ +50°C)	50W, 1.2A (DC 13.8V) in receive mode without receiving signal Within ± 3PPM (SSB, CW ; 430 ~ 440MHz) Within ± 5PPM (SSB, CW ; 440 ~ 450MHz) Within ± 5PPM (FM)
Frequency stability (430 ~ 440MHz)	± 1200Hz 1 ~ 60 minutes after power on Within 50Hz/every 30 minutes 60 minutes later (after power on)
Dimensions	W 270 x H 96 x D 260 mm (W 279 x H 108 x D 327 mm) — projected parts measured.
Weight	7.2kg (15.6lb)
[Transmitter]	
RF output power	25 watts (One minute transmission/three minutes reception) RF output variable from approx. 2W to maximum
Modulation	Balanced (SSB), Reactance (FM)
Spurious radiation	Less than -60dB
Carrier suppression	Less than -40dB
Side band suppression	Less than -40dB
Maximum frequency deviation (FM)	± 5kHz
Modulation distortion (FM 60%)	Less than 3% (300Hz ~ 3kHz)
MIC impedance	500 ~ 600Ω
[Receiver]	
Circuitry	Double superheterodyne
Intermediate frequency	1st 30.265MHz 2nd 10.695MHz (SSB/CW), 455kHz (FM)
Receiver sensitivity FM	12dB SINAD less than 0.2μV (TS 811B/E) 12dB SINAD less than 0.22μV (TS 811A) S + N/N more than 50dB at 1.0mV input
SSB/CW	S + N/N 10dB less than 0.13μV (TS 811B/E) S + N/N 10dB less than 0.14μV (TS 811A)
Receiver selectivity FM	More than 12kHz (-6dB) Less than 24kHz (-6dB)
SSB/CW	More than 2.2kHz (-6dB) Less than 4.8kHz (-6dB)
Spurious response	Better than 60dB
Squelch sensitivity	Less than 0.16μV (threshold)
Auto scan stop level	Less than 0.2μV (threshold)
Audio output power	More than 2.0 watts across 8 ohms load (5% dist.)
Audio output impedance	8 ohms
[DCS control]	
Code	NRZ equal-length code
Modulation	MSK modulation
Frequency deviation	± 2.5kHz or more ± 5kHz or less ± 3.5kHz Standard
Mark frequency and deviation	1200Hz ± 200PPM
Space frequency and deviation	1800Hz ± 200PPM
Code transmission speed and deviation	1200 bits/second ± 200PPM

Note : Circuit and ratings are subject to change without notice due to developments in technology.

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