

Service Manual

MT-4000L

DUAL BAND – HIGH POWER
PMR 3 Channel + LPD 69Channel

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SPECIFICATIONS

STANDARD TEST CONDITIONS

Supply Voltage - Battery	6.0V DC
Antenna Impedance	50 Ohm
Audio Frequency	1 KHz
Main Signal Input	1mV
Deviation PMR	AF 1 KHz / 1.5 KHz Dev
LPD	AF 1 KHz / 3.0 KHz Dev
Audio Output Power	300mW at external Speaker
Audio Output Impedance.....	8 ohms, non-inductive
Test Temperature	25 °C

GENERAL SPECIFICATIONS

Transmitter.....	CPU Controlled PLL Synthesizer
Receiver.....	CPU Controlled double conversion, super-heterodyne system
Intermediate Frequency 1 st	21.7 MHz
2 nd	450 KHz
Operating Frequencies PMR.....	446.00625MHz ~ 446.09375 MHz
LPD.....	433.07500 MHz ~ 433.77500 MHz
Frequency Stability.....	0.0005%
Battery Life.....	30 hours (typical)
Battery.....	6.0 V DC @ 2200 mA Alkaline Batteries
Transmitter/Receiver Switching.....	Electrical
Ambient Conditions, Temperature / Humidity	-15°C ~ 55°C / 40% ~ 70%

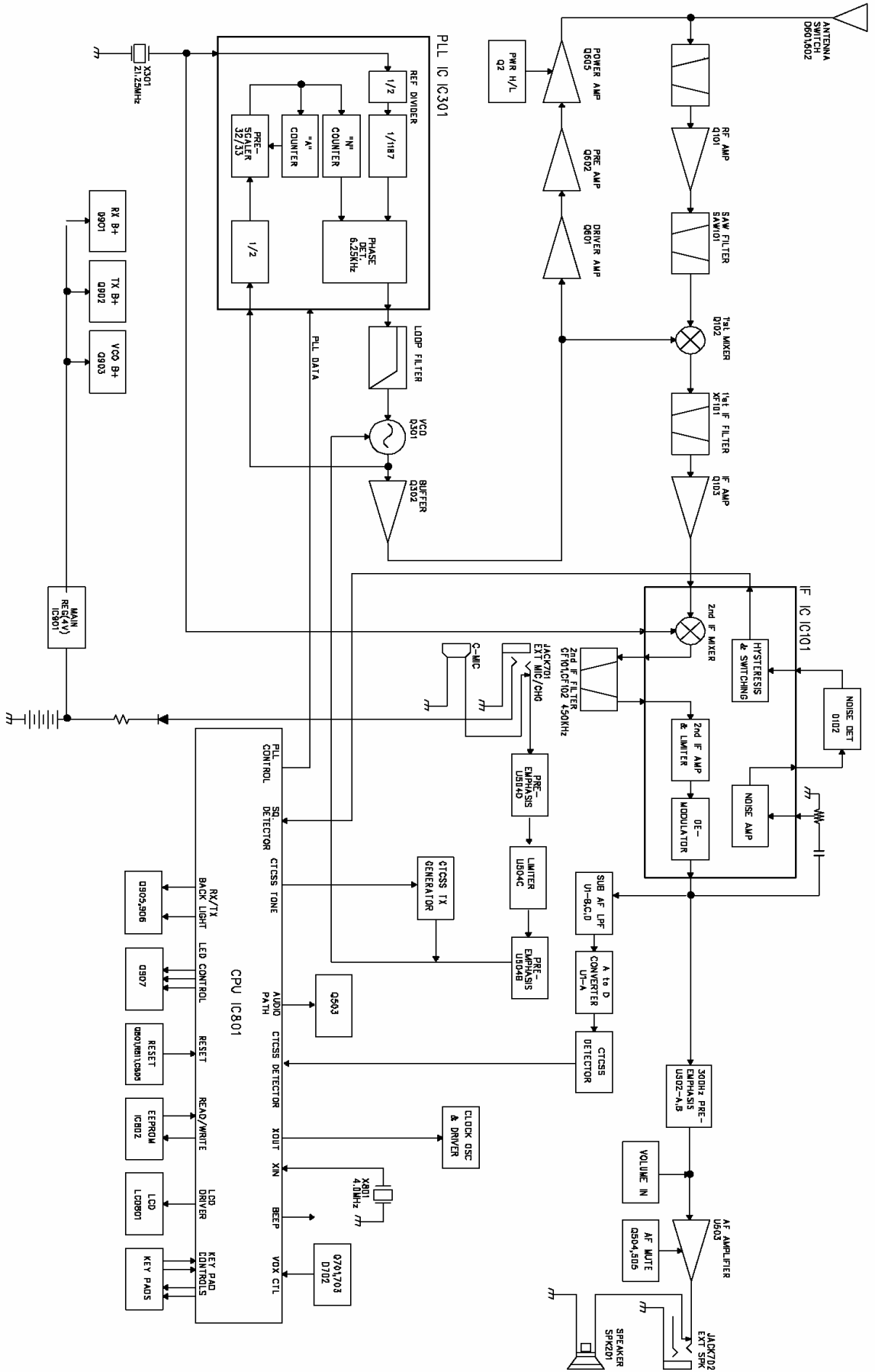
RECEIVER SPECIFICATIONS

Sensitivity	0.354uV or better for 12dB SINAD
Audio Output	300mW
Frequency Response	300 Hz ~ 2500 Hz
Image Rejection	54dB
Adjacent Channel Rejection	60dB
Inter Modulation Distortion	60dB
Conducted Rx Spurious	54dB

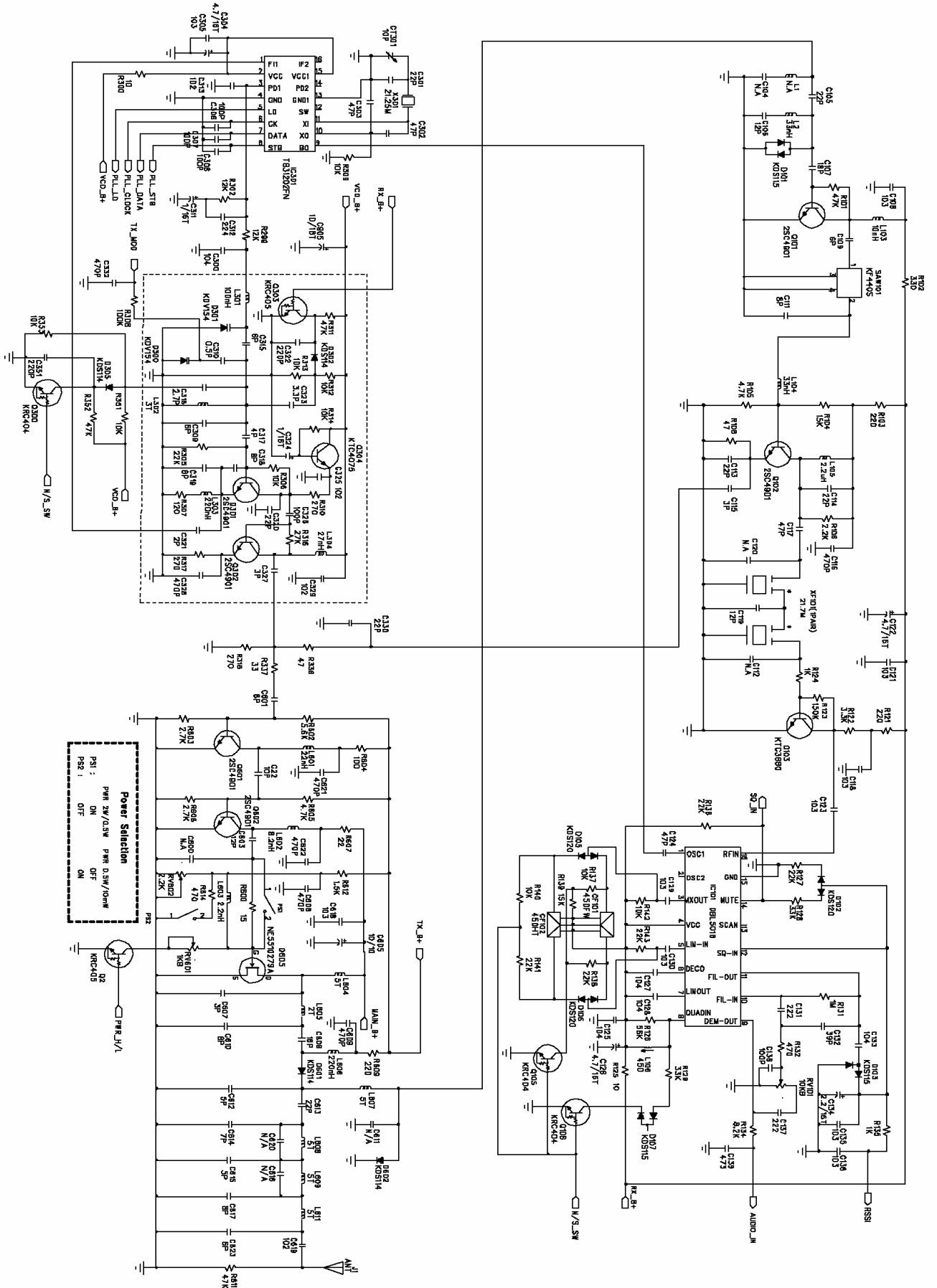
TRANSMITTER SPECIFICATIONS

Output Power (Conducted)	500mW
Max. Deviation PMR	± 2.5 KHz(MAX)
LPD	± 5.0 KHz(MAX)
Frequency Error	5ppm(-15~+55°C)
Current Drain	400 mA
Spurious Emission(Conducted)	LESS THAN -43dBc.
Antenna Impedance	50 Ohm

BLOCK DIAGRAM



SCHEMATIC DIAGRAM



CHANNEL FREQUENCY CHARTS

PMR Frequency Chart

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	446.00625Mhz	2	446.01875Mhz
3	446.03125Mhz	4	446.04375Mhz
5	446.05625Mhz	6	446.06875Mhz
7	446.08125Mhz	8	446.09375Mhz

CTCSS Tone Frequency Chart

NO	FREQ.(Hz)	NO	FREQ. (Hz)	NO	FREQ. (Hz)
1	67.0	14	107.2	27	167.9
2	71.9	15	110.9	28	186.2
3	74.4	16	114.8	29	179.9
4	77.0	17	118.8	30	186.2
5	79.7	18	123.0	31	192.8
6	82.5	19	127.3	32	203.5
7	85.4	20	131.8	33	210.7
8	88.5	21	136.5	34	218.1
9	91.5	22	141.3	35	225.7
10	94.8	23	146.2	36	233.6
11	97.4	24	151.4	37	241.8
12	100.0	25	156.7	38	250.3
13	103.5	26	162.2		

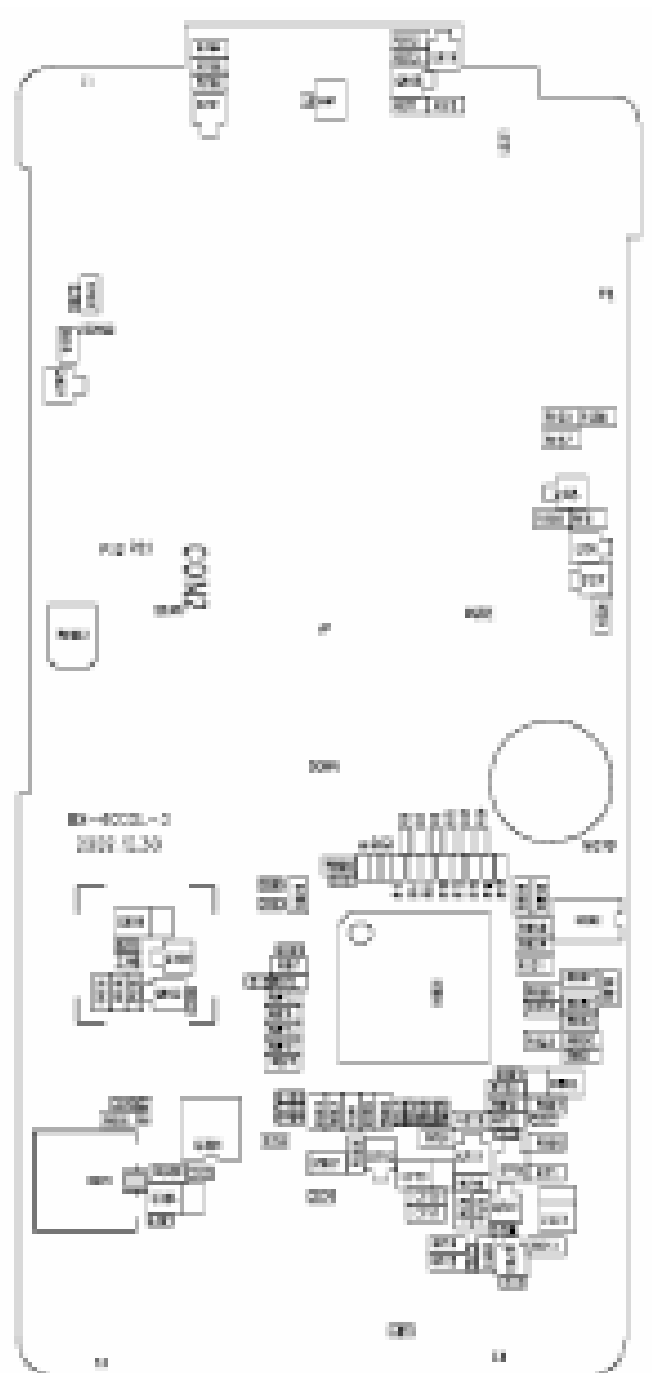
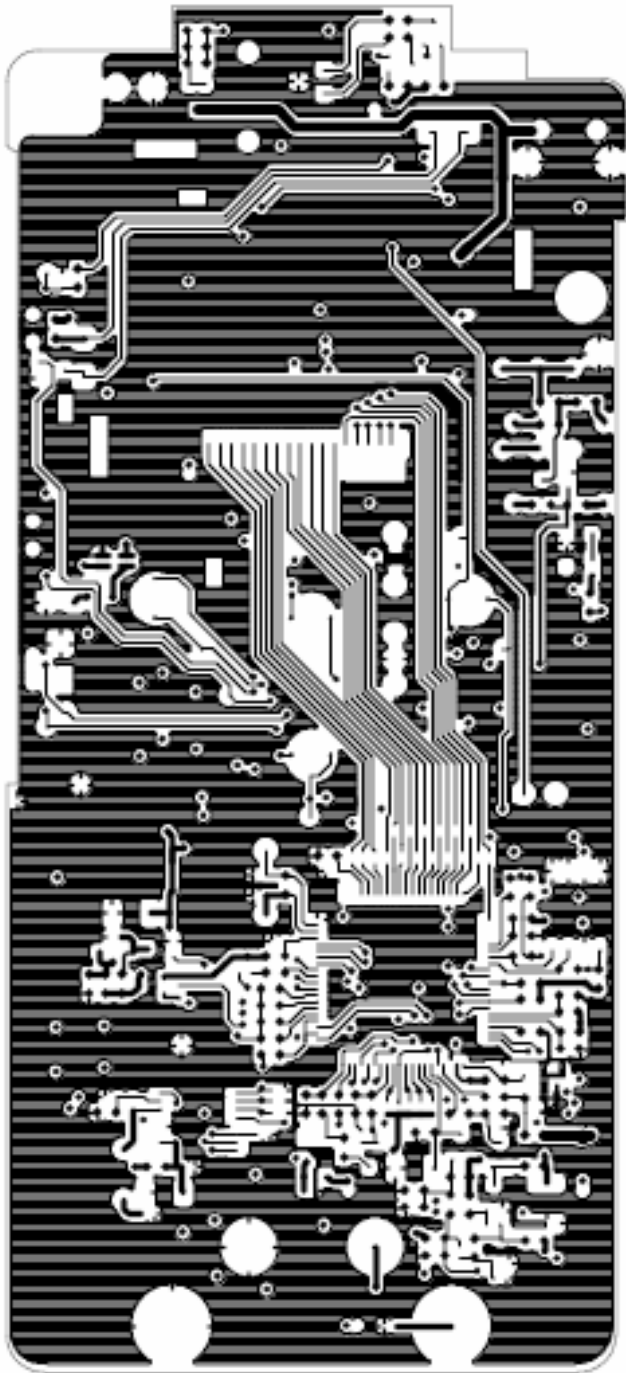
CHANNEL FREQUENCY CHARTS

LPD Frequency Chart

Channel	Frequency(MHz)	Channel	Frequency(MHz)
01	433.07500	36	433.95000
02	433.10000	37	433.97500
03	433.12500	38	434.00000
04	433.15000	39	434.02500
05	433.17500	40	434.05000
06	433.20000	41	434.07500
07	433.22500	42	434.10000
08	433.25000	43	434.12500
09	433.27500	44	434.15000
10	433.30000	45	434.17500
11	433.32500	46	434.20000
12	433.35000	47	434.22500
13	433.37500	48	434.25000
14	433.40000	49	434.27500
15	433.42500	50	434.30000
16	433.45000	51	434.32500
17	433.47500	52	434.35000
18	433.50000	53	434.37500
19	433.52500	54	434.40000
20	433.55000	55	434.42500
21	433.57500	56	434.45000
22	433.60000	57	434.47500
23	433.62500	58	434.50000
24	433.65000	59	434.52500
25	433.67500	60	434.55000
26	433.70000	61	434.57500
27	433.72500	62	434.60000
28	433.75000	63	434.62500
29	433.77500	64	434.65000
30	433.80000	65	434.67500
31	433.82500	66	434.70000
32	433.85000	67	434.72500
33	433.87500	68	434.75000
34	433.90000	69	434.77500
35	433.92500		

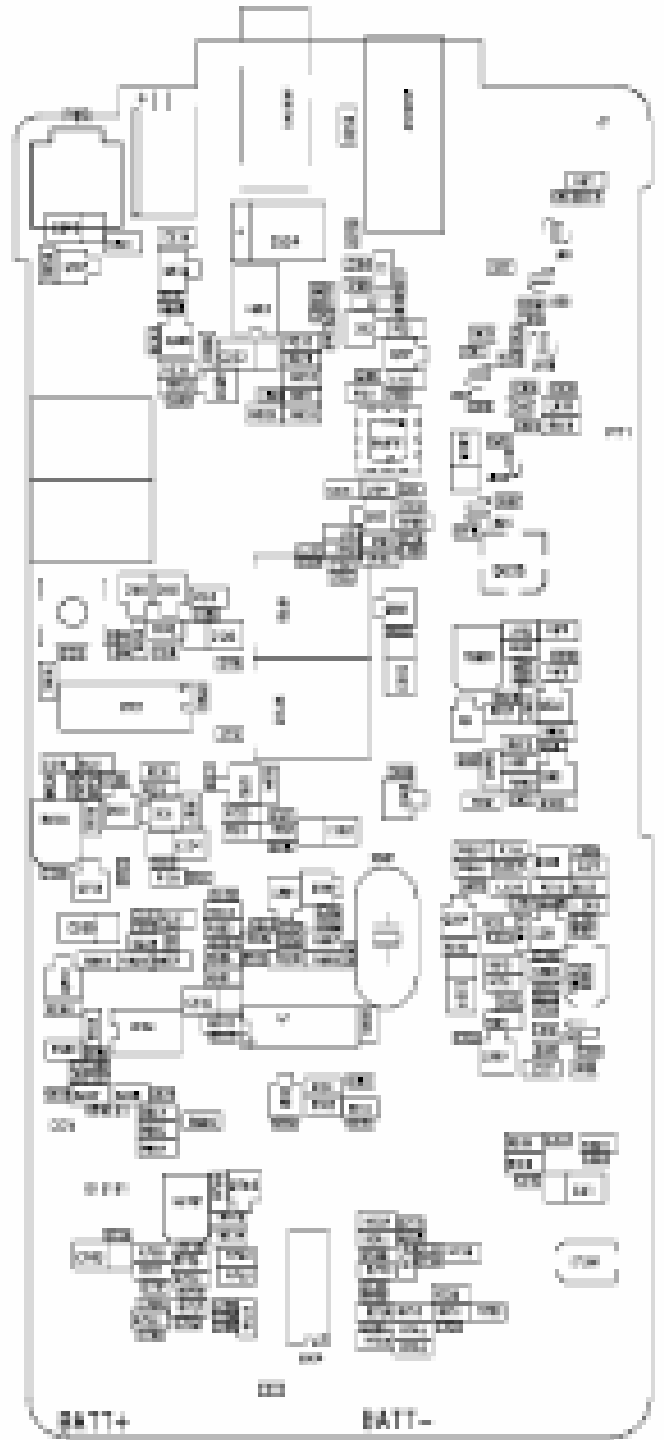
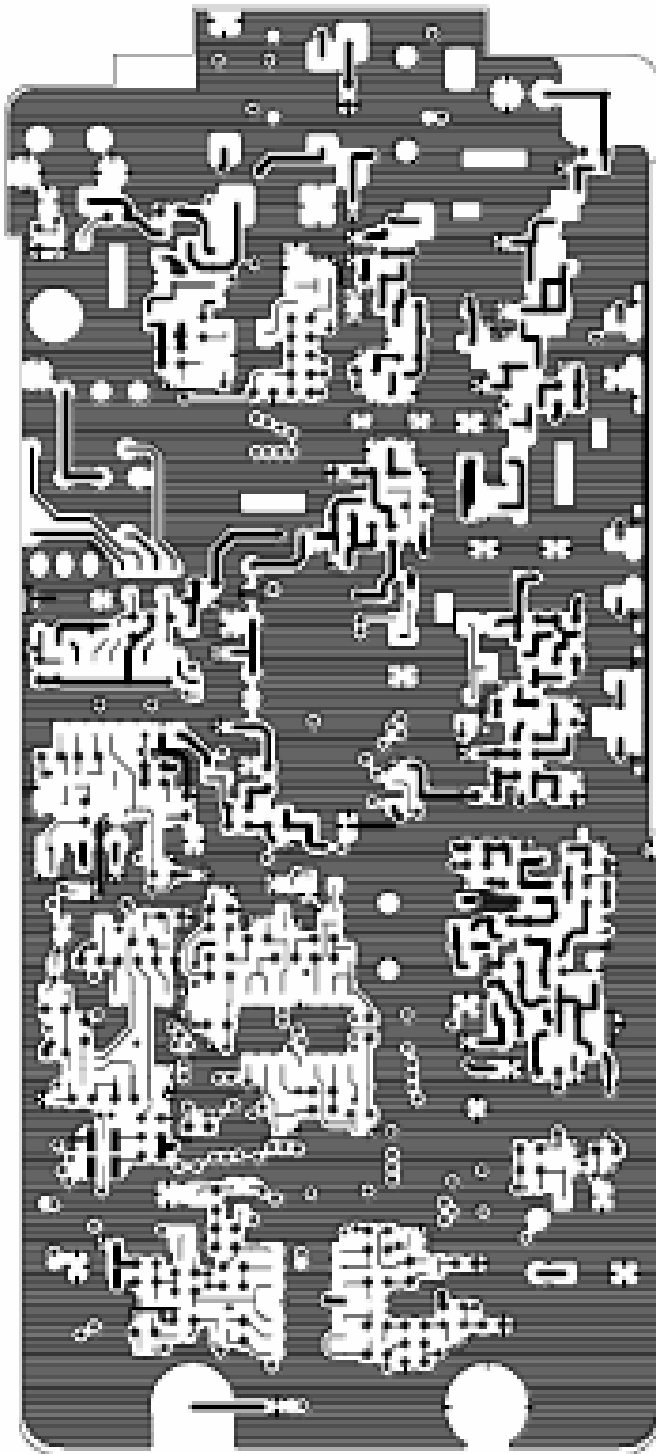
PRINTED CIRCUIT BOARD

TOP VIEW



PRINTED CIRCUIT BOARD

BOTTOM VIEW



ALIGNMENT AND ADJUSTMENT

TRANSMITTER

A. Power Supply Voltage : 6.0VDC

B. Frequency Setting

1. Connect a frequency counter or Communications Service Monitor to the antenna connector through an RF power attenuator (5.0 watts min. rating, 20 dB min. attenuation).
2. Depress the PTT switch.
3. Adjust the TCXO such that output frequency is equal to the channel. Frequency with a maximum error of ± 300 Hz.
4. Adjust CT-301 for ± 300 Hz.
5. Release the PTT switch.

C. Output Power Alignment

1. Set the power supply voltage for 6.0 V DC.
2. Connect a communications Service Monitor or a wattmeter and dummy load to the antenna connector.
3. Depress the PTT switch. To be convinced for PMR 0.5 watt / LPD 10m watt output power.
4. Release the PTT switch.

D. Deviation Adjustment

1. Connect an audio generator to the microphone jack JIG. The audio frequency should be set at 1 KHz
2. Connect an FM deviation meter or communication Service Monitor to the antenna connector through an RF power attenuates (5.0 watt minimum rating, 20 dB minimum attenuates). Set the monitor to read peak deviation.
3. Depress the PTT switch.
4. Adjust the audio generator level 100 mV rms.
5. Adjust RV701 for 2.5 KHz maximum deviation.
6. Release the PTT switch.

RECEIVER

A. Power Supply Voltage : 6.0VDC

B. Receiver Alignment

1. Connect an RF signal generator or Communications Service Monitor to the antenna connect.
2. Connect a SINAD meter and oscilloscope across the speaker terminals.
3. Set the output level of the RF signal generator for -47 dBm the generator should be set for PMR 1.5 KHz / LPD 3.0 KHz deviation of a 1 KHz AF.
4. Set the audio output level for 0.6 Vrms by adjusting volume.
5. Reduce the output level of the RF signal generator for produce a 12 dB SINAD indication

TEST EQUIPMENT SETUP AND ALIGNMENT INSTRUCTIONS

ALIGNMENT PROCEDURE

Step	Setting	Connection	Adjuster	Adjust for
1	RX VCO voltage adjustment Channel PMR: (P1) 446.00625 MHz LPD: (69) 434.775 MHz Mic : Receive Volume : Optional Squelch : On	DC voltmeter to VCO Test point (Figure 1)	L302	0.7~3.5 V DC
2	TX VCO voltage adjustment Channel PMR: (P1) 446.00625 MHz LPD: (69) 434.775 MHz Mic : Transmit (Un-modulated) Volume : Optional	DC voltmeter to VCO Test point (Figure 1)		0.7~3.5 V DC confirm
3	Frequency adjustment Channel PMR: (P1) 446.00625 MHz LPD: (69) 434.775 MHz Mic : Transmit (Un-modulated) Volume : Optional Squelch : Optional	Antenna to frequency Counter, Through Attenuator (Figure 2)	CT301	±300 Hz

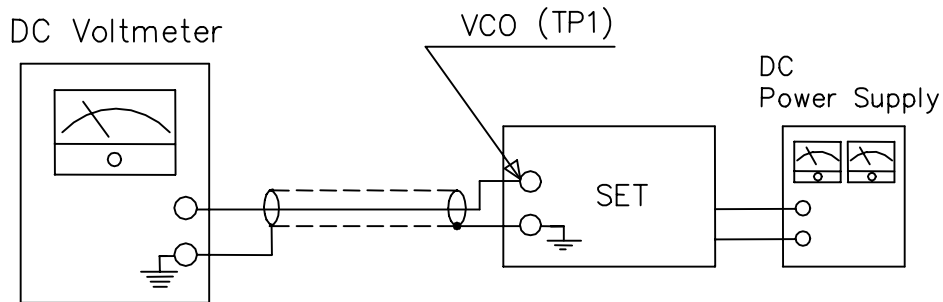


Figure 1

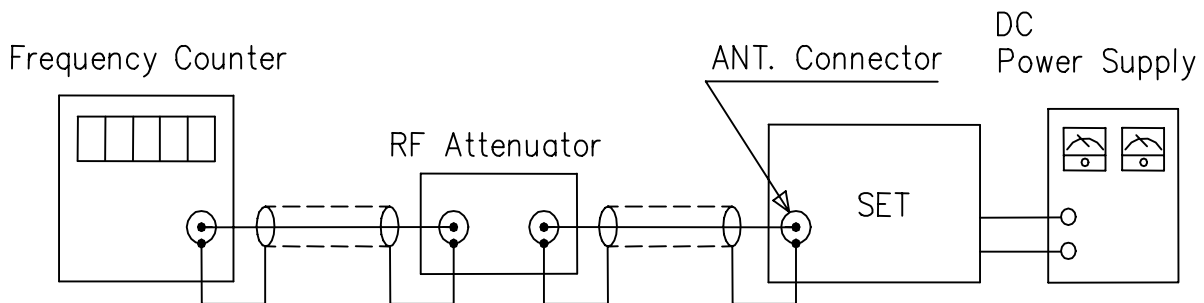


Figure 2

TRANSMITTER SECTION

A. Test Equipment Required

- RF power meter (RF SSVM)
- 50 ohms dummy load (non-inductive)
- RF attenuator (50 ohms non-inductive)
- Oscilloscope
- Audio generator
- DC power supply
- Spectrum analyzer
- Frequency counter
- Coupler
- Modulation meter (FM)

B. Alignment Procedure

1. Adjust output Power

Step	Setting	Connection	Adjuster	Adjust for
1	High power adjustment Channel PMR: (P1) 446.00625 MHz LPD: (69) 434.775 MHz Mic : Transmit Volume : Optional Squelch : Optional	-Set the power supply voltage for 6V DC -Connect a communications service monitor or a wattmeter and dummy load to the antenna connector. -Depress the PTT switch.		PMR: 450 ~ 600mW LPD: 0.8~30mW confirm
2	Low power adjustment Channel PMR: (P1) 446.00625 MHz Mic : Transmit Volume : Optional Squelch : Optional	-Set the power supply voltage for 6 VDC. -Connect a communications service monitor or a watt meter and dummy load to the antenna connector. -Depress the PTT switch.	RV601	0.5 ~ 30mW confirm

2. Adjust Deviation

Step	Setting	Connection	Adjuster	Adjust for
1	AF Modulation adjustment Channel PMR: (P1) 446.00625 MHz LPD: (69) 434.775 MHz Mic : Transmit Volume : Optional Squelch : Optional	-Connection the audio generator (set to 1 KHz)to the microphone jack. -Connect the modulation meter through the RF attenuator to the ANT jack. -Adjust the audio signal level to obtain by 1.5 KHz deviation. When you increase the audio Signal by 20 dB, the deviation Should not exceed 2.5 KHz deviation (Figure 3)	RV701	* For PMR: 2.3 ~ 2.5KHz Normal Adjust: 2.5KHz * For LPD: 4.5~5.0KHz Normal Adjust: 5.0KHz

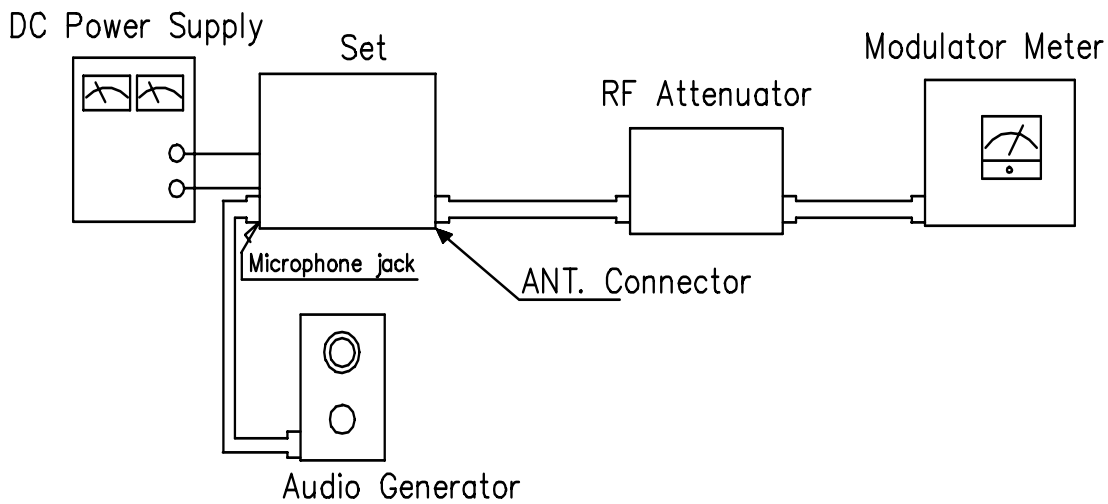


Figure 3

RECEIVER SECTION

A. Test Equipment Required

- Standard signal generator (SSG)
- DC power supply
- AC level meter
- 12 dB SINAD Meter
- Distortion meter

B. Alignment Procedure

Step	Setting	Connection	Adjuster	Adjust for
1	RX SINAD PMR: (P1) 446.00625 MHz LPD: (69) 434.775 MHz Mic : Receive Volume : adjust for 0.6 V on the level meter SSG : Audio 1 KHz Modulation 1.5 KHz / 3.0KHz	Connect the standard signal Generator to the EXT-ANT Jack. Connect the AC volts level meter, distortion meter and SINAD meter across the EXT speaker jack with an 8 ohm dummy load.		Maximum sensitivity indication on 12 dB SINAD meter.
2	RX squelch adjustment Setting should be same as above	Connect the AC volts level meter, distortion meter and SINAD meter across the EXT speaker jack with an 8 ohm dummy load. (Figure 4)	RV101	Max. sensitivity indication on 12 dB SINAD meter. Adjust until the audio output appears
3	Distortion adjustment Setting should be same as above		L106	Max. indication on AC volts level meter

DC Power Supply

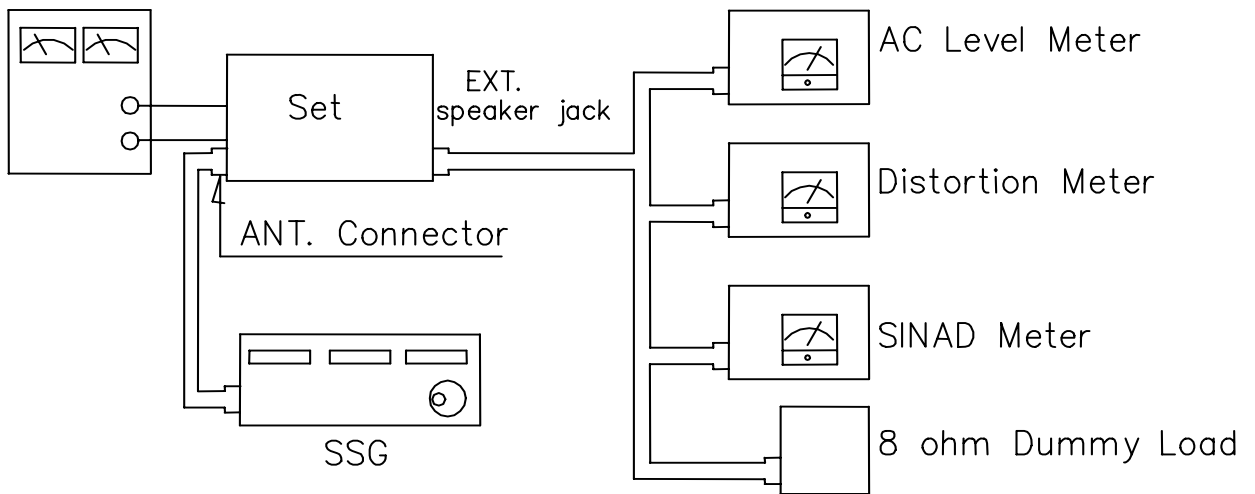


Figure 4

TROUBLE SHOOTING

Symptom	Probable Cause	Remedy
Unit does not work at all	<ul style="list-style-type: none"> • Defective regulator IC901.. • Defective components of X801. • Broken DC power terminal. 	<ul style="list-style-type: none"> • Replace • Replace defective component(s) • Replace
No output from speaker at all	<ul style="list-style-type: none"> • Defective external speaker line. • Measure all the voltage of IC101, U502, U503, Q508, Q503. • Defective internal speaker. 	<ul style="list-style-type: none"> • Repair or replace • Repair or replace • Replace
No noise on speaker	<ul style="list-style-type: none"> • Measure all the voltage of RF. • Defective squelch circuit components. (IC101, RV101, C131, R132, R131, C133, D103, D102, R128, R127) 	<ul style="list-style-type: none"> • Replace defective component(s)
No modulation	<ul style="list-style-type: none"> • Defective microphone. • Measure all the voltage of U504, RV701. 	<ul style="list-style-type: none"> • Replace • Replace
LCD does not work	<ul style="list-style-type: none"> • Measure all the voltage of X801, IC801. 	<ul style="list-style-type: none"> • Replace defective component(s)
Black light does not work	<ul style="list-style-type: none"> • Defective components of LED902, Q907. 	<ul style="list-style-type: none"> • Replace

PARTS LIST

LEVEL	PART NO	NAME & DESCRIPTION	Q'TY	REFERENCE NO
4		MAIN PCB SMD ASS'Y	1.000	
5	010-101-00	CHIP RESISTOR 100 1/16W 5% J 1005	2.000	R922.923
6	010-104-00	CHIP RESISTOR 100K 1/16W 5% J 1005	22.000	R1.2.3.4.5.6.7.8.9.10.11.12.13.14.15.16.17.820.821.822.823.827
7	020-000-00	CHIP RESISTOR 0 1/16W 5% J 1608	5.000	R540.810.852.854.901. 913.915
8	020-100-00	CHIP RESISTOR 10 1/16W 5% J 1608	5.000	R125.300.545.555.805
9	020-101-00	CHIP RESISTOR 100 1/16W 5% J 1608	3.000	R534.604.817
10	020-102-00	CHIP RESISTOR 1K 1/16W 5% J 1608	12.000	R124.135.502.527.705.734.751.856.900.902.910.914
11	020-103-00	CHIP RESISTOR 10K 1/16W 5% J 1608	14.000	R137.140.142.306.309.312.313.314.351.353.511.713741.858
12	020-104-00	CHIP RESISTOR 100K 1/16W 5% J 1608	14.000	R308.526.528.551.712.735.802.803.804.808.812.815.830.850
13	020-105-00	CHIP RESISTOR 1M 1/16W 5% J 1608	4.000	R131.728.732.809
14	020-121-00	CHIP RESISTOR 120 1/16W 5% J 1608	1.000	R307
15	020-122-00	CHIP RESISTOR 1.2K 1/16W 5% J 1608	1.000	R531
16	020-123-00	CHIP RESISTOR 12K 1/16W 5% J 1608	3.000	R302.729.299
17	020-124-00	CHIP RESISTOR 120K 1/16W 5% J 1608	3.000	R506.510.512
18	020-150-00	CHIP RESISTOR 15 1/16W 5% J 1608	1.000	R600
19	020-152-00	CHIP RESISTOR 1.5K 1/16W 5% J 1608	2.000	R612.754
20	020-153-00	CHIP RESISTOR 15K 1/16W 5% J 1608	3.000	R104.139.508
21	020-154-00	CHIP RESISTOR 150K 1/16W 5% J 1608	1.000	R123
22	020-182-00	CHIP RESISTOR 1.8k 1/16W 5% J 1608	1.000	R753
23	020-183-00	CHIP RESISTOR 18K 1/16W 5% J 1608	3.000	R505.730.739
24	020-184-00	CHIP RESISTOR 180K 1/16W 5% J 1608	2.000	R504.525
25	020-220-00	CHIP RESISTOR 22 1/16W 5% J 1608	1.000	R607
26	020-221-00	CHIP RESISTOR 220 1/16W 5% J 1608	5.000	R103.121.609.911.912
27	020-222-00	CHIP RESISTOR 2.2K 1/16W 5% J 1608	2.000	R106.726
28	020-223-00	CHIP RESISTOR 22K 1/16W 5% J 1608	9.000	R127.136.138.141.143.305.801.904.908
29	020-224-00	CHIP RESISTOR 220K 1/16W 5% J 1608	3.000	R509.743.814
30	020-271-00	CHIP RESISTOR 270 1/16W 5% J 1608	3.000	R310.317.318
31	020-272-00	CHIP RESISTOR 2.7K 1/16W 5% J 1608	4.000	R603.606.737.738
32	020-273-00	CHIP RESISTOR 27K 1/16W 5% J 1608	1.000	R316
33	020-332-00	CHIP RESISTOR 3.3K 1/16W 5% J 1608	2.000	R122.752
34	020-330-00	CHIP RESISTOR 33 1/16W 5% J 1608	1.000	R337
35	020-331-00	CHIP RESISTOR 330 1/16W 5% J 1608	2.000	R102.530
36	020-333-00	CHIP RESISTOR 33K 1/16W 5% J 1608	3.000	R128.129.800

PARTS LIST

37	020-392-00	CHIP RESISTOR	3.9K	1/16W	5%	J	1608	2.000	R524.736
38	020-393-00	CHIP RESISTOR	39K	1/16W	5%	J	1608	2.000	R722.745
39	020-394-00	CHIP RESISTOR	390K	1/16W	5%	J	1608	1.000	R813
40	020-470-00	CHIP RESISTOR	47	1/16W	5%	J	1608	5.000	R108.336.702.703.704
41	020-471-00	CHIP RESISTOR	470	1/16W	5%	J	1608	2.000	R132.614
42	020-472-00	CHIP RESISTOR	4.7K	1/16W	5%	J	1608	6.000	R105.532.533.541.605.740
43	020-473-00	CHIP RESISTOR	47K	1/16W	5%	J	1608	12.000	R101.311.352.520.521.611.720.807.811.903.905.909
44	020-474-00	CHIP RESISTOR	470K	1/16W	5%	J	1608	6.000	R507.522.535.714.733.906
45	020-562-00	CHIP RESISTOR	5.6K	1/16W	5%	J	1608	3.000	R602.706.742
46	020-563-00	CHIP RESISTOR	56K	1/16W	5%	J	1608	2.000	R126.816
47	020-564-00	CHIP RESISTOR	560K	1/16W	5%	J	1608	2.000	R715.907
48	020-682-00	CHIP RESISTOR	6.8K	1/16W	5%	J	1608	1.000	R711
49	020-683-00	CHIP RESISTOR	68K	1/16W	5%	J	1608	3.000	R501.503.721
50	020-684-00	CHIP RESISTOR	680K	1/16W	5%	J	1608	1.000	R725
51	020-822-00	CHIP RESISTOR	8.2K	1/16W	5%	J	1608	2.000	R731.134
52	020-823-00	CHIP RESISTOR	82K	1/16W	5%	J	1608	4.000	R523.723.724.727
53	060-102-00	CHIP SEMI	EVM3YSX50BE4	1KB				1.000	RV601
54	060-472-00	CHIP SEMI	EVM3YSX50BE4	4.7KB				1.000	RV701
55	060-222-00	CHIP SEMI	EVM3YSX50BE4	2.2KB				1.000	RV602
56	060-103-00	CHIP SEMI	EVM3YSX50BE4	10KB				1.000	RV101
57	111-105-00	CHIP CERAMIC	CL10F105ZONC		1UF		1608	3.000	C535.751.752
58	110-104-00	CHIP CERAMIC	CL05F104ZONC		0.1UF			20.000	C125.127.128.133.300.501.505.509.512.521.525.529.530.540.704.727.730.732.800.805
59	110-0R5-00	CHIP CERAMIC	CL05C0R5CBNC (X7R)		0.5P			1.000	C310
60	110-2R7-00	CHIP CERAMIC	CL05C2R7CBNC (X7R)		2.7P			1.000	C316
61	110-020-00	CHIP CERAMIC	CL05C020CBNC (X7R)		2PF			1.000	C321
62	110-100-00	CHIP CERAMIC	CL05C100JBNC (X7R)		10PF			2.000	C22
63	110-101-00	CHIP CERAMIC	CL05C101JBNC		100PF			5.000	C138.306.307.308.326
64	110-120-00	CHIP CERAMIC	CL05C120JBNC (X7R)		12PF			2.000	C106.603.119
65	110-150-00	CHIP CERAMIC	CL05C150JBNC (X7R)		15PF			2.000	C803.804
66	110-180-00	CHIP CERAMIC	CL05C150JBNC (X7R)		18PF			1.000	C107
67	110-160-00	CHIP CERAMIC	CL05C160JBNC (X7R)		16PF			1.000	C608
68	110-220-00	CHIP CERAMIC	CL05C220JBNC		22PF			7.000	C105.114.613.113.301.320.330
69	110-221-00	CHIP CERAMIC	CL05C221JBNC		220PF			4.000	C322.351.513.906
70	110-030-00	CHIP CERAMIC	CL05C030CBNC (X7R)		3PF			3.000	C115.327.607
71	110-3R3-00	CHIP CERAMIC	CL05C3R3CBNC (X7R)		3.3PF			1.000	C323
72	110-330-00	CHIP CERAMIC	CL05C330JBNC		33PF			1.000	C544

PARTS LIST

73	110-390-00	CHIP CERAMIC	CL05C390JBNC	39PF	1.000	C132
74	110-040-00	CHIP CERAMIC	CL05C040CBNC (X7R)	4PF	1.000	C317
75	110-470-00	CHIP CERAMIC	CL05C470JBNC	47PF	4.000	C117.124.302.303
76	110-471-00	CHIP CERAMIC	CL05B471KBNC	470PF	12.000	C116.328.332.537.541.606.609.621.622.738.901.911
77	110-050-00	CHIP CERAMIC	CL05C050CBNC (X7R)	5PF	2.000	C612.615
78	110-561-00	CHIP CERAMIC	CL05B561KBNC	560PF	4.000	C503.507.722.728
79	110-060-00	CHIP CERAMIC	CL05C060CBNC (X7R)	6PF	4.000	C109.309.315.623
80	110-070-00	CHIP CERAMIC	CL05C060CBNC (X7R)	7PF	1.000	C614
81	110-080-00	CHIP CERAMIC	CL05C080CBNC (X7R)	8PF	6.000	C111.318.601.610.617.319
82	110-102-00	CHIP CERAMIC	CL05B102KBNC	0.001UF	9.000	C313.325.329.502.619.702.733.734.806
83	110-103-00	CHIP CERAMIC	CL05B103KONC	0.01UF	25.000	C108.118.121.123.129.130.135.136.305.506.524.539. 618.701.703.720.724.731.737.801.904.910.528.532.545
84	110-122-00	CHIP CERAMIC	CL05B122KBNC	0.0012UF	2.000	C504.508
85	110-123-00	CHIP CERAMIC	CL05B123KONC	0.012UF	1.000	C705
86	110-182-00	CHIP CERAMIC	CL05B182KBNC	0.0018UF	2.000	C726.736
87	110-222-00	CHIP CERAMIC	CL05B222KBNC	0.0022UF	2.000	C131.137
88	110-224-00	CHIP CERAMIC	CL05B224KONC	0.22UF	1.000	C312
89	110-223-00	CHIP CERAMIC	CL05B223KONC	0.022UF	4.000	C522.523.531.538
90	110-273-00	CHIP CERAMIC	CL05B273KONC (X7R)	0.027UF	3.000	C526.527.709
91	110-472-00	CHIP CERAMIC	CL05B472KBNC	0.0047UF	2.000	C510.511
92	110-473-00	CHIP CERAMIC	CL05B473KONC	0.047UF	6.000	C139.473.723.725.729.735
93	110-683-00	CHIP CERAMIC	CL05B683KONC	0.068UF	1.000	C721
94	180-100-00	CHIP TRIMMER	STC3M10-T1	10P	1.000	CT301
95	112-102-16	CHIP TANTAL	1uF/16V "A"		2.000	C311.324
96	112-103-16	CHIP TANTAL	10uF/16V "A"		3.000	C520.605.905
97	112-222-16	CHIP TANTAL	2.2uF/16V "A"		1.000	C134
98	112-472-16	CHIP TANTAL	4.7uF/16V "A"		10.000	C122.126.304.514.533.542.740.753.802.902
99	112-473-20	CHIP TANTAL	47uF/10T "B"		1.000	C903
100	130-473-40	CHIP TANTAL	47uF/16T "D"		1.000	C534
101	230-422-05	CHIP TR	2SC4901YK-TR		6.000	Q101.102.301.302.601.602
102	230-551-02	FET	NE5510279A		1.000	Q605
103	233-407-30	CHIP TR	KTC4075		3.000	Q304.701.703
104	231-388-30	CHIP TR	KTC3880S		1.000	Q103
105	233-201-10	CHIP TR	KTA2014		2.000	Q505.751
106	201-226-01	CHIP TR	KRA226		1.000	Q508.902
107	233-305-10	CHIP TR	KRA305		5.000	Q503.901.903.905.906
108	233-404-30	CHIP TR	KRC404		8.000	Q105.106.300.501.502.504.507.702

PARTS LIST

109	233-405-30	CHIP TR	KRC405	2.000	Q2.303
110	233-411-30	CHIP TR	KRC411	1.000	Q907
111	233-412-30	CHIP TR	KRC412	1.000	Q704
112	201-154-00	CHIP DIODE	KDV154	2.000	D300.301
113	201-114-00	CHIP DIODE	KDS115	4.000	D101.103.107.501
114	201-200-00	CHIP DIODE	KDS120	3.000	D102.105.106
115	201-201-00	CHIP DIODE	KDS121	3.000	D701.702.703
116	201-193-00	CHIP DIODE	KDS114	4.000	D302.305.601.602
117	250-4V0-00	IC	R1120N401B (4.0V)	1.000	IC901
118	250-240-27	EEPROM	AT24C02N-10SC-2.7	1.000	IC802
119	250-312-00	IC	TB31202FN(EL)	1.000	IC301
120	250-501-00	IC	DBL5018 (SOP)/SL5018	1.000	IC101
121	250-870-00	IC	TMP87CM2ICDF-3VA3 (MAXTRYCOM)	1.000	IC801
122	250-324-00	IC	LM324MX/IL324D	2.000	U1.504
123	250-358-00	IC	LM358MX/IL358D	1.000	U502
124	250-386-10	IC	LM386MX-1/IL386D	1.000	U503
125	281-440-10	CHIP SAW FILTER	KF440S 50 ohm	1.000	SAW101
126	331-222-10	CHIP INDUCTOR	MCI1608HQ2.2NK 2.2nH	1.000	L603
127	331-225-10	CHIP INDUCTOR	MCI1608HQ2R2K 2.2uH	1.000	L105
128	331-101-10	CHIP INDUCTOR	MCI1608HQR10K 100nH	1.000	L301
129	331-221-10	CHIP INDUCTOR	MCI1608HQR22K 220nH	2.000	L303.606
130	331-100-10	CHIP INDUCTOR	MCI1608HQ10NK 10nH	1.000	L103
131	331-220-10	CHIP INDUCTOR	MCI1608HQ22NK 22nH	1.000	L601
132	331-270-10	CHIP INDUCTOR	MCI1608HQ27NK 27nH	1.000	L304
133	331-330-10	CHIP INDUCTOR	MCI1608HQ33NK 33nH	2.000	L2.104
134	331-822-10	CHIP INDUCTOR	MCI1608HQ8.2NK 8.2nH	1.000	L602
135	370-131-10	CHIP LED LAMP	LT8B33URB-110T	2.000	LED902.903
136	370-233-10	CHIP LED LAMP	SAM2333T (DUAL)	1.000	LED901
137	311-040-10	SPRING COIL (SMD/BULK) (0.4X1.8RX2T)		1.000	L605
138	311-035-10	SPRING COIL (SMD/BULK) (0.35x1.5Rx5T)		5.000	L604.607.608.609.611
139	311-027-10	SPRING COIL (SMD/BULK) (0.27X0.9LX3T)		1.000	L302
140	350-303-00	IFT COIL 450KHz (303LC-KL5047NK=P3)		1.000	L106
141	403-400-0M	MAIN PCB 10.7x4.7x1.0T (4LAYER) for MT4000L		1.000	
142		MAIN PCB SUB ASS'Y		1.000	
143	130-224-10	CAPACITOR ELECT 220uF/10V SMS 5*11		1.000	C536
144	280-450-20	CERAMIC FILTER LTM 450HT		1.000	CF102
145	261-212-10	CRYSTAL 21.25MHZ UM-5		1.000	X301

PARTS LIST

146	270-217-12	CRYSTAL FILTER 21.7MHZ+/-3.75KHz UM-5(4PLOE) PAIR	1.000	XF101(1PAIR)
147	261-400-10	CRYSTAL 4.0MHz 30ppm C/L:20pF HC-49S H=2.5mm	1.000	X801
148	128-9R7-45	Condenser Mic EM-05FP Φ9.7X4.5mm(-36dB +/-2dB)	1.000	MIC701
149	440-2R5-10	MIC JACK SKJS-2511S NOR	1.000	JACK701
150	440-3R5-10	SPEAKER JACK SKJS-3511S NOR	1.000	JACK702
151	425-110-26	TACT SW SKTS-1102VHA6 (power s/w)	1.000	POWER
152	425-110-62	TACT SW SKTS-1106R (PTT / CALL / MONIT)	3.000	PTT/CALL/MONIT
153	290-DM1-270	LCD STD-DM127- HP-0 For MT4000L	1.000	LCD801
154	280-450-21	CERAMIC FILTER LTM 450FW	1.000	CF101
155	711-014	DIFFUSER ACRYL CLEAR	1.000	
156	721-002	VCO CAN "A" SPTE 0.3T	1.000	
157	721-003	VCO CAN "B" SPTE 0.3T	1.000	
158	721-009	FILTER SHIELD CAN SPTE 0.2T	1.000	
159	721-004	RF SHIELD CAN SPTE 0.3T	1.000	
160	721-010	LCD MOUNT SPTE 0.3T	1.000	
161	811-009	INTERCONNECTOR SILICONE RUBBER(ZEBRA)	1.000	
162	941-006	CU TAPE(VCO) CU 6X10X0.07T	1.000	
163	941-009	REFLECTOR SHEET SHEET T=75	1.000	
164	941-015	X-TAL SPONGE CR SPONGE BLACK 1T	1.000	

SEMICONDUCTOR VOLTAGE CHART

1. IC's

IC NO.	PIN NO	RX	TX	IC NO	PIN NO	RX	TX	IC NO	PIN NO	RX	TX	
IC801 (TMP87 CH21DF)	1	0	0	IC801 (TMP87 CH21DF)	30	4.0	4.0	IC801 (TMP87CH21DF)	59	3.0	3.0	
	2	3.5	3.5		31	4.0	4.0		60	3.0	3.0	
	3	3.1	3.1		32	4.0	4.0		61	4.0	4.0	
	4	4.0	4.0		33	4.0	4.0		62	4.0	4.0	
	5	0	0		34	0	4.0		63	4.0	4.0	
	6	0	0		35	0	0		64	4.0	4.0	
	7	0	0		36	1.0	0		65	3.0	3.0	
	8	0	0		37	3.0	3.0		66	3.0	3.0	
	9	CLK	0		38	0	0		67	3.0	3.0	
	10	4.0	4.0		39	4.0	4.0		68	3.0	3.0	
	11	CLK	0		40	4.0	4.0		69	4.0	4.0	
	12	CLK	0		41	0	0		70	3.0	3.0	
	13	0	0		42	4.0	4.0		71	4.0	4.0	
	14	0	0		43	0	0		72	4.0	4.0	
	15	0	0		44	4.0	4.0		73	4.0	4.0	
	16	0	0		45	0	0		74	4.0	4.0	
	17	3.0	0		46	0	0		75	4.0	4.0	
	18	4.0	0		47	0	0		76	4.0	4.0	
	19	3.0	0		48	0	4.0		77	0	0	
	20	4.0	0		49	4.0	0		78	0	0	
	21	4.0	0		50	0	0		79	0	0	
	22	4.0	0		51	4.0	4.0		80	0	0	
	23	0	0		52	4.0	0		IC901 R1120N 400B	1	4.0	4.0
	24	4.0	4.0		53	4.0	4.0			2	0	0
	25	0	0		54	4.0	4.0			3	6.0	6.0
	26	0	0		55	0	0			4	4.0	4.0
	27	0	0		56	4.0	4.0			5	0	0
	28	0	0		57	3.0	3.0		IC101 DBL5018	1	4.0	0
	29	0	2.0		58	3.0	3.0			2	3.0	0

SEMICONDUCTOR VOLTAGE CHART

IC NO.	PIN NO	RX	TX	IC NO	PIN NO	RX	TX	IC NO	PIN NO	RX	TX
IC101 DBL5018	3	3.6	0	U504 LM324	12	0	1.2	IC301 TB3120FN	9	3.0	3.0
	4	4.0	0		13	0	1.2		10	3.4	3.4
	5	3.6	0		14	0	1.2		11	3.8	4.0
	6	3.6	0	U1 LM324	1	3.0	0		12	0	0
	7	3.6	0		2	2.0	0		13	0	0
	8	4.0	0		3	2.0	0		14	0	0
	9	1.5	0		4	4.0	0		15	4.0	4.0
	10	0.8	0		5	2.0	0		16	3.4	3.6
	11	3.0	0		6	2.0	0	U502 LM358	1	2.0	0
	12	1.0	0		7	2.0	0		2	2.0	0
	13	0	0		8	2.0	0		3	2.0	0
	14	4.0	0	9	2.0	0	4		0	0	
	15	0	0	10	2.0	0	5		0	0	
	16	1.8	0	11	0	0	6		2.0	0	
	U504 LM324	1	0	1.0	12	2.0	0		7	0	0
		2	0	1.0	13	2.0	0		8	4.0	0
3		0	1.0	14	2.0	0	U503 LM386	1	1.2	1.4	
4		0	4.0	IC301 TB3120FN	1	3.2		3.2	2	0	0
5		0	1.2		2	4.0		4.0	3	0	0
6		0	1.2		3	1.4		1.2	4	0	0
7		0	1.2		4	0		0	5	1.2	1.4
8		0	1.2		5	4.0		4.0	6	6.0	5.8
9		0	1.2		6	CLK		0	7	6.0	5.8
10		0	1.2		7	CLK		0	8	1.3	1.4
11		0	0		8	CLK	0				

SEMICONDUCTOR VOLTAGE CHART

2. Transistor

PIN NO	Receiver			Transceiver		
	B	E	C	B	E	C
Q101	0.8	0	3.2	0	0	0
Q102	0.8	0	3.8	0	0	0
Q103	0.8	0	1.5	0	0	0
Q105	0	0	4.0	0	0	0
PIN NO	Receiver			Transceiver		
	B	E	C	B	E	C
Q106	0	0	3.0	0	0	0
Q300	0	0	4.0	0	0	4.0
Q301	1.	0.4	2.0	1.2	0.4	2.0
Q302	2.5	1.8	4.0	2.5	1.8	4.0
Q303	4.0	0	0	0	0	4.0
Q304	3.8	3.0	4.0	3.8	3.0	4.0
Q501	4.0	0	0	4.0	0	0
Q502	4.0	0	0	4.0	0	0
Q503	4.0	4.0	0	4.0	4.0	0
Q504	4.0	0	0	4.0	0	0
Q505	5.4	6.0	6.0	5.4	6.0	6.0
Q507	4.0	0	0	4.0	0	0
Q508	3.8	6.0	6.0	3.8	6.0	6.0
Q601	0	0	0	1.5	0.8	4.0
Q602	0	0	0	1.0	0.2	3.0
Q2	0.4	0	0	0.4	0	3.0
Q605	0	0	6.0	0	0	6.0
Q701	0.8	0	0	0.8	0	0
Q702	0	0	3.6	2.0	0	0
Q703	0.6	0	1.4	0.6	0	1.4
Q704	0	0	0	0	0.4	1.4
Q751	3.8	4.0	0	3.5	4.0	4.0
Q901	0	4.0	4.0	4.0	4.0	0
Q902	4.0	4.0	0	0	4.0	4.0
Q903	0	4.0	4.0	0	4.0	4.0
Q905	4.0	4.0	0	4.0	4.0	0
Q906	4.0	4.0	0	0	2.0	2.0
Q907	0	0	4.0	0	0	4.0

SEMICONDUCTOR LEAD ASSIGNMENT AND BLOCK DIAGRAM

DIODEs

- KDV154 → VHF,UHF Tuner AFC VCO for UHF BAND Radio
- KDS114 → VHF Tuner BAND Switch Applications

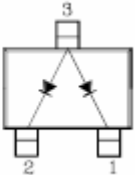
- 1. ANODE
- 2. CATHODE



- KDS115 → VHF Tuner BAND Switch Applications

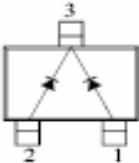
- KDS120 → Ultra High Speed Switching Application

- 1. CATHODE 1
- 2. CATHODE 2
- 3. ANODE



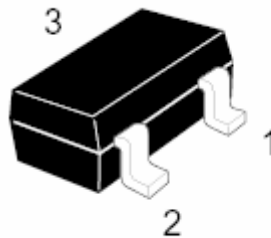
- KDS121 → Ultra High Speed Switching Application

- 1. ANODE 1
- 2. ANODE 2
- 3. CATHODE



TRANSISTORS

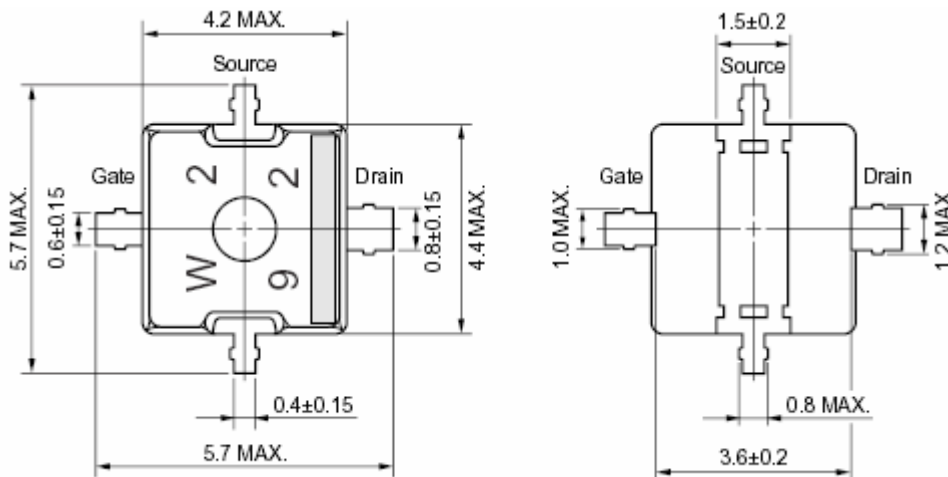
2SC4901YK	→ UHF / VHF Wide Band Amplifier
KTC4075	→ Switching Application
KTC3880S	→ High Frequency Low Noise Amplifier.VHF Band Amplifier
KTA2014	→ Switching application
KRA226	→ High Current Switching Application. Interface Circuit and Driver Circuit Application.
KRA305	→ Switching Application. Interface Circuit and Driver Circuit Application.
KRC404	→ Switching Application. Interface Circuit and Driver Circuit Application.
KRC405	→ Switching Application. Interface Circuit and Driver Circuit Application.
KRC411	→ Switching Application. Interface Circuit and Driver Circuit Application.
KRC412	→ Switching Application. Interface Circuit and Driver Circuit Application.



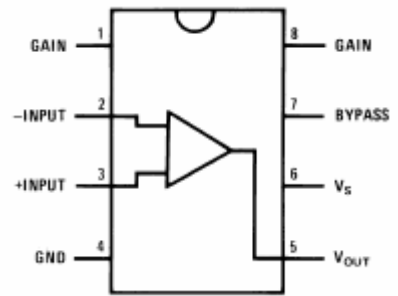
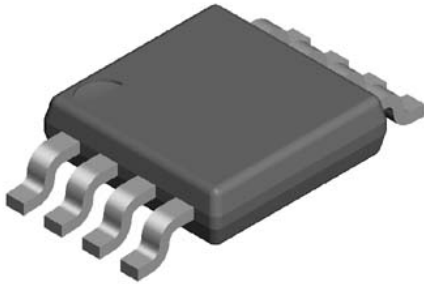
- 1. Emitter
- 2. Base
- 3. Collector

SILICON Power MOS FET

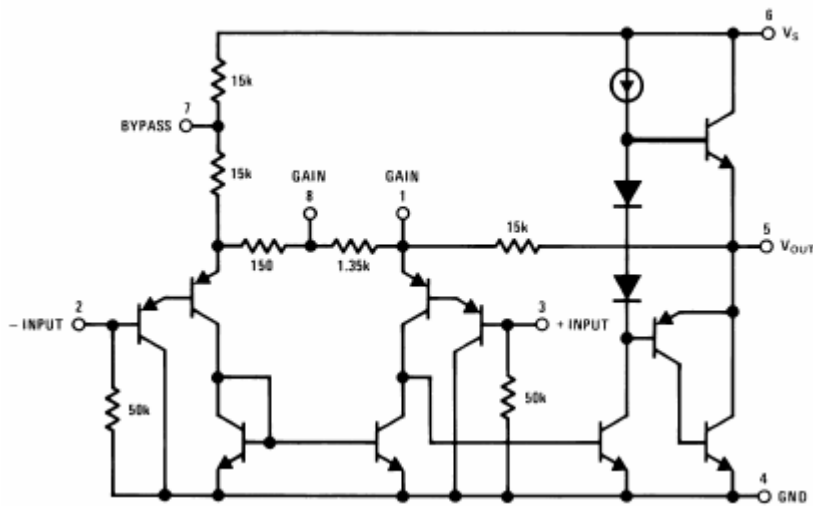
NE5510279A



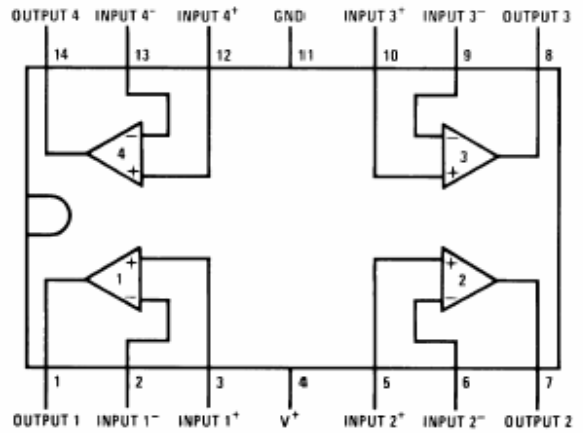
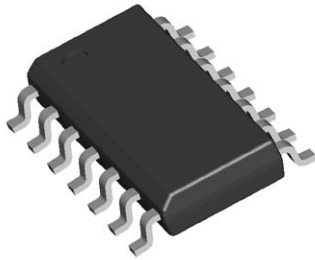
LM386MX-1



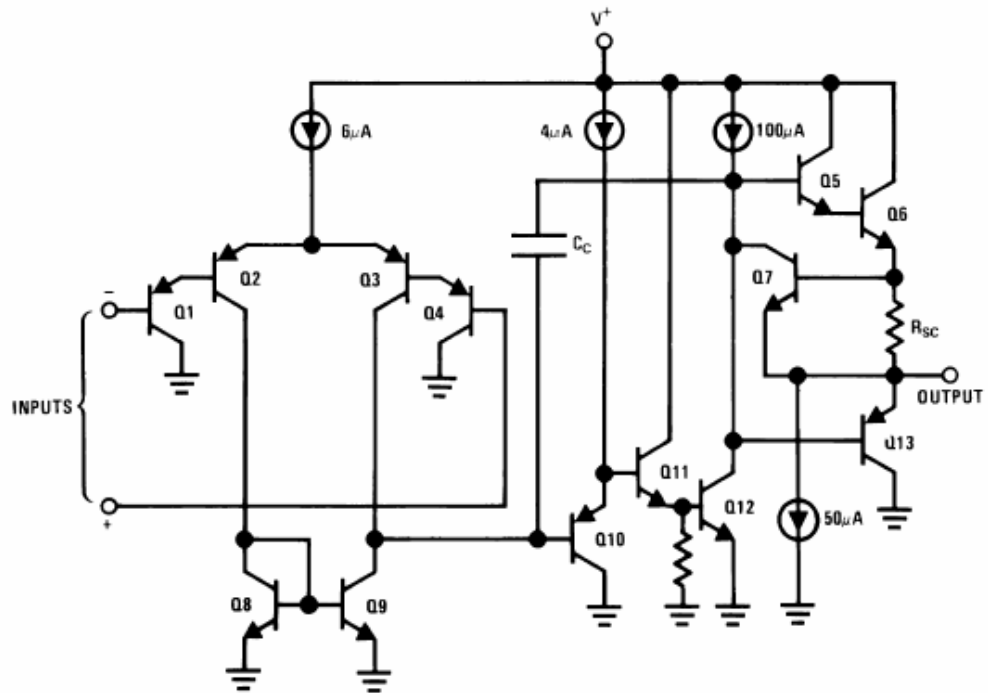
Equivalent Schematic and Configuration Diagram



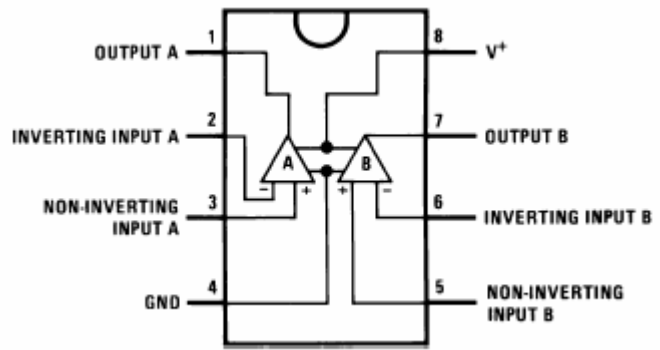
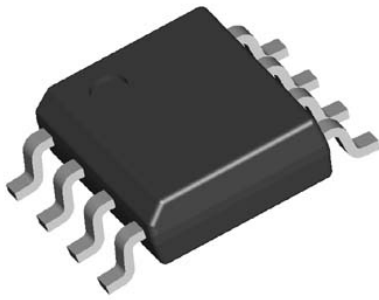
LM324MX



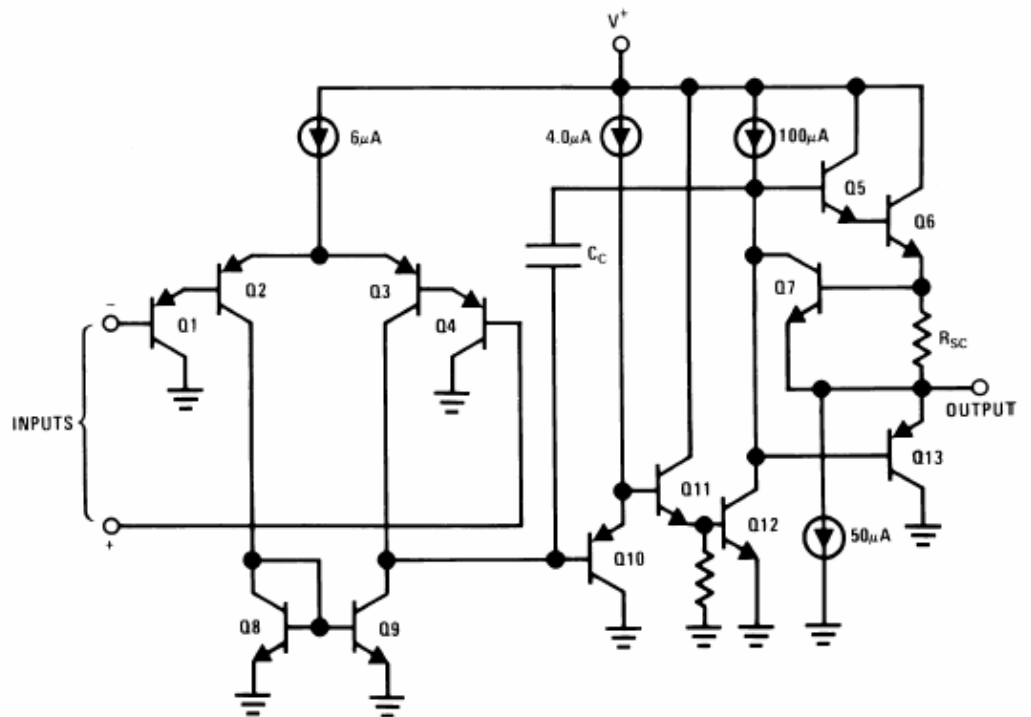
Schematic Diagram (Each Amplifier)



LM358MX

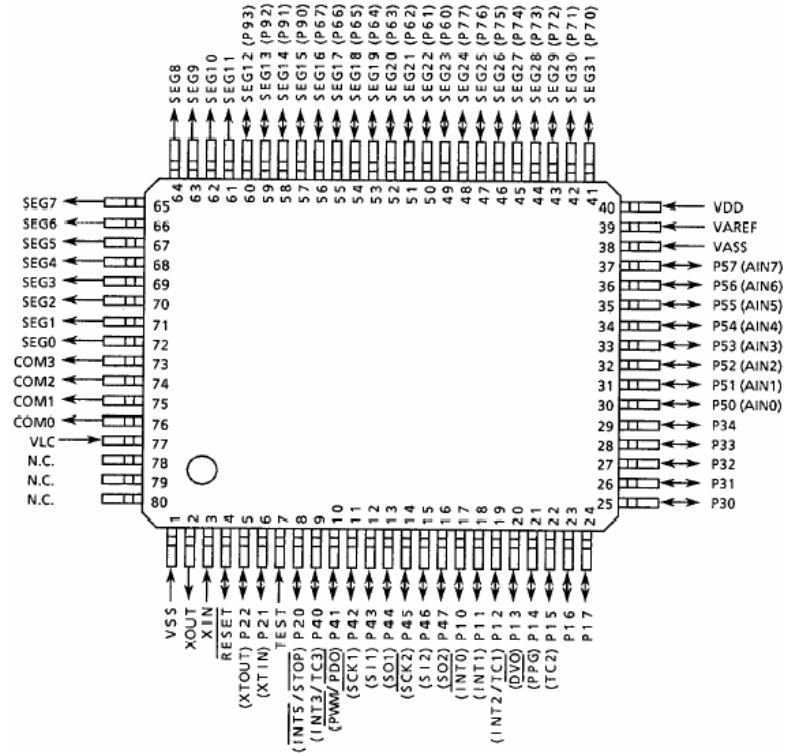


Schematic Diagram (Each Amplifier)

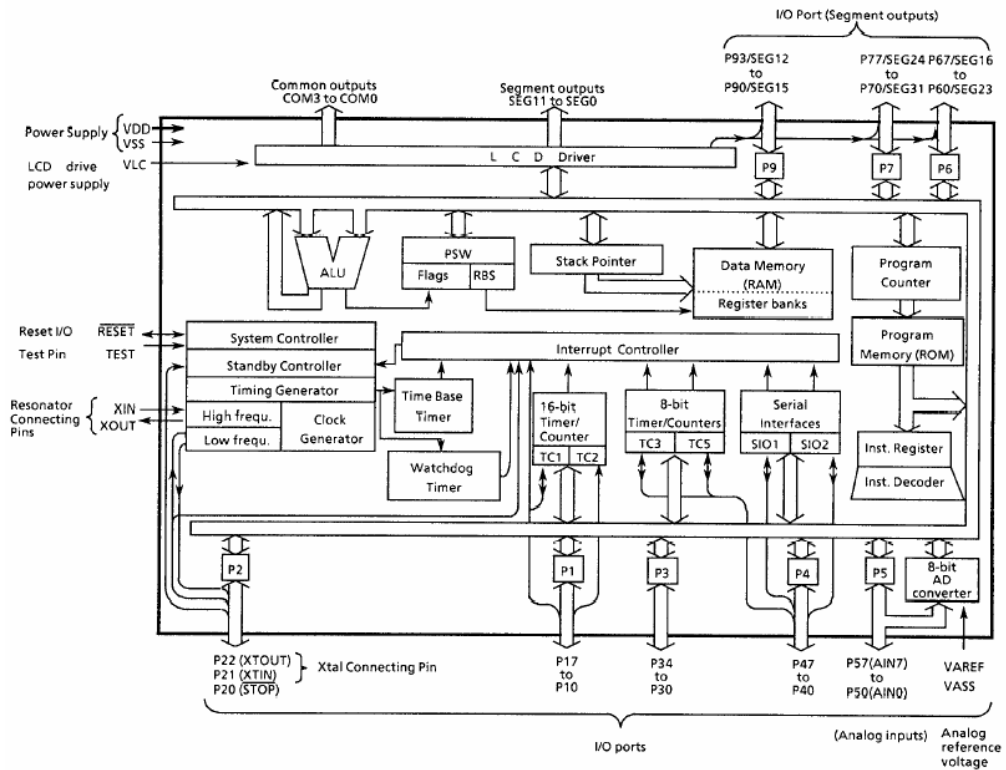


TMP87CM21CDF

Pin assignments (top view)

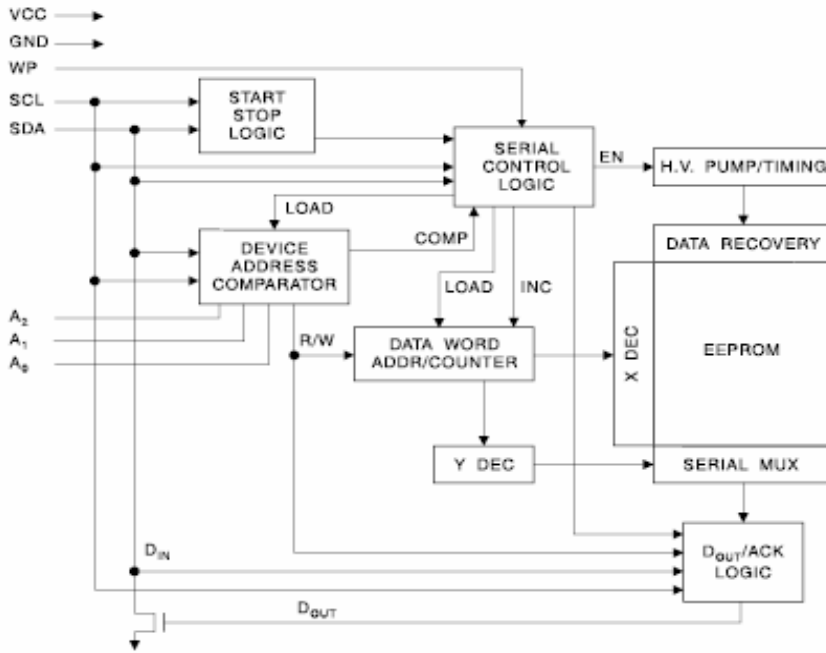
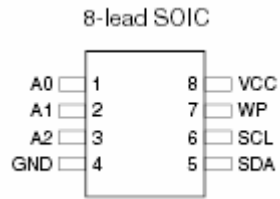


Block Diagram

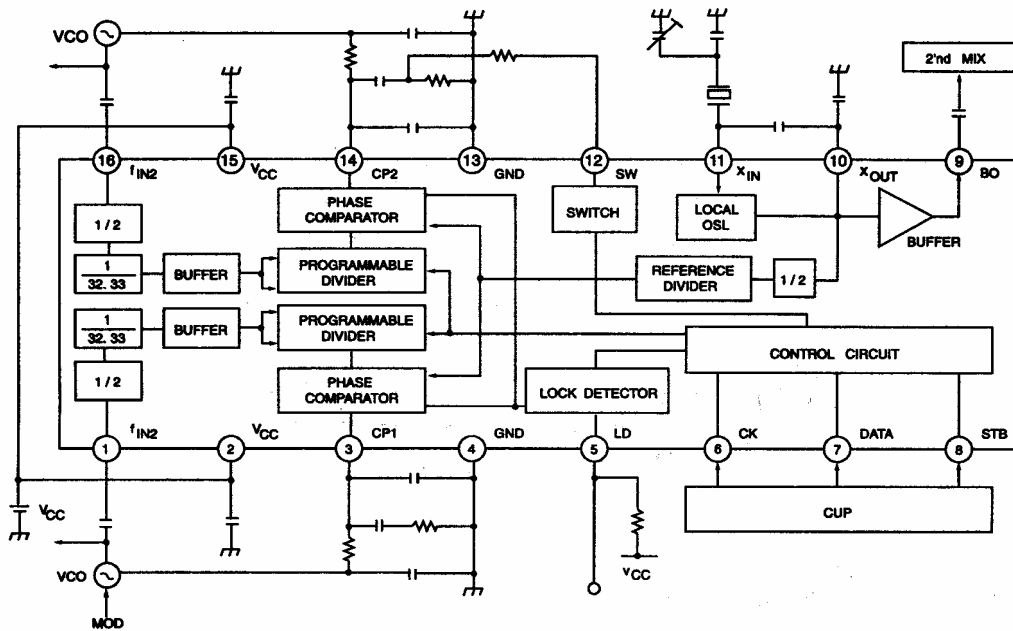


AT24C02N-10SC-2.7

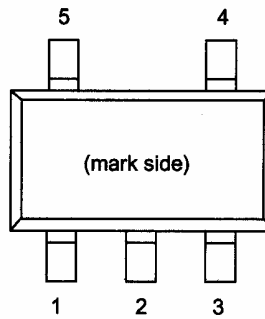
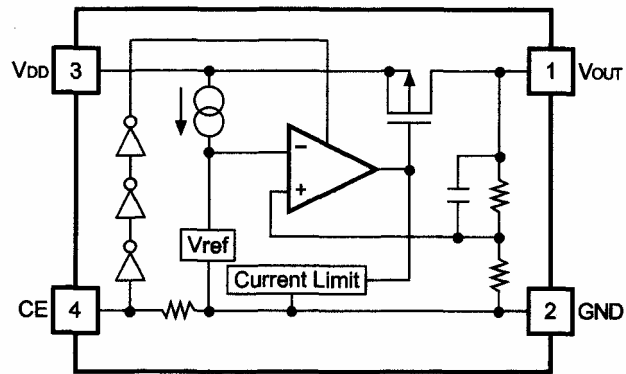
Pin Name	Function
A0 - A2	Address Inputs
SDA	Serial Data
SCL	Serial Clock Input
WP	Write Protect
NC	No Connect



TB31202FN



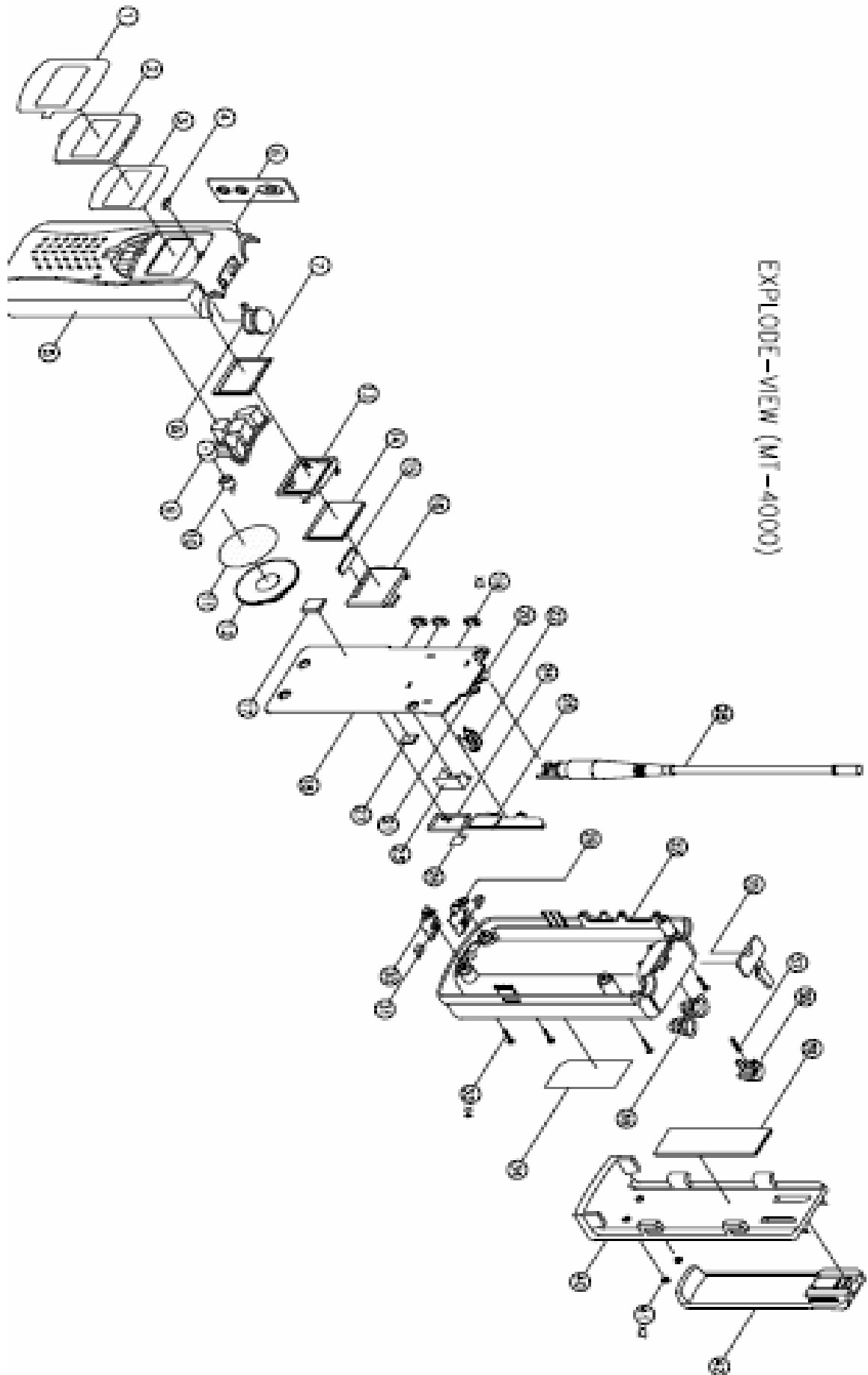
R1120N401B



PIN DESCRIPTION

Pin No.	Symbol	Pin Description
1	V _{OUT}	Output Pin
2	GND	Ground Pin
3	V _{DD}	Input Pin
4	CE or \overline{CE}	Chip Enable Pin
5	NC	No Connection

EXPLODED VIEW



EXPLODE-VIEW (MT-4000)

EXPLODED VIEW PARTS LIST

NO.	PART NO.	PART NAME & DESCRIPTION	Q'TY
1	941-003	PROTECTIVE SHEET PVC 150g (0.15T)	1
2	711-005	WINDOW LENS ACRYL CLEAR	1
3	941-002	DOUBLE TAPE 3M 0.16T	1
4	711-003	BEZEL ABS BLACK	1
5	711-001	UPPER COVER ABS GRAY+ INSERT 1EA	1
6	941-001	FELT(SPK) FELT 0.2T Φ 32.0	1
7	420-36N-H8	SPK NR-03606NB-A2409	1
8	811-002	PTT BUTTON SILICONE RUBBER BLACK	1
9	631-001	ANT SPRING SWP3	1
10	941-007	SPONGE(ANT) GRAY SPONGE 12X20X6T	1
11	711-008	ANT TUBE URETHANE BLACK	1
12	811-004	LED CAP SILICONE RUBBER CLEAR	1
13	811-001	KEY PAD SILICONE RUBBER 3° + SILK 3°	1
14	128-050-10	Condenser Mic EM-05FP Φ 9.7X6.5mm(-36dB +/-2dB)	1
15	721-001	LCD BRACKET SPTE 0.3T	1
16	290-281-E4	LCD STD-DT013-HP-0 (28.4X21.4X2.8mm)	1
17	821-001	ZEBRA SILICONE CARBONE 24.2X8.3X1T	1
18	711-007	DIFFUSER ACRYL	1
19	721-003	VCO CAN "B" SPTE 0.3T	1
20	403-200-0M	MAIN PCB 9.9x4.6x1.0T (4LAYER)	1
21	425-111-02	TACT SW SKTS-1102VSA	2
22	440-2R5-10	MIC JACK SKJS-2511S NOR	1
23	440-3R5-10	SPEAKER JACK SKJS-3511S NOR	1
24	721-009	FILTER SHIELD CAN SPTE 0.2T	1
25	721-002	VCO CAN "A" SPTE 0.3T	1
26	721-004	RF SHIELD CAN SPTE 0.3T	1
27	941-006	CU TAPE(VCO) CU 6X10X0.1T	1
28	941-005	FELT"B"(TERMINAL) FELT 28X6X0.5T	1
29	941-004	FELT"A"(TERMINAL) FELT 40X6X0.5T	1
30	721-007	TERMINAL"- " SK-5 0.2T Ni-PLATE	1
31	721-005	TERMINAL"+ , -" SK-5 0.2T Ni-PLATE	3
32	721-006	TERMINAL"+ " SK-5 0.2T Ni-PLATE	1
33	711-002	BOTTOM COVER ABS GRAY	1
34	611-003	SCREW TAPPING SCREW (+)PH 2.6X7-2S BLK	3
35	611-002	SCREW MACHINE SCREW (+)PH 2.6X6 BLK	1
36	811-003	DUST CAP NBR BLACK	1
37	931-001A	NAME LABEL POLYESTER 0.2T	1
38	711-006A	BELT CLIP PC BLACK + SILK 1°	1
39	721-008	CHARGE TERMINAL SUS 304 0.15T	2
40	711-004	BATTERY COVER ABS GRAY	1

