

金阿波羅股份有限公司

GOLD APOLLO CO; LTD.

Rm 1,3rd F1; No. 77 Sec. 1,Hsin Tai Wu Rd;

His-Chih,Taipei Hsien, Taiwan,R.O.C.

TEL: (886)-2-2698-8888. FAX:(886)-2-2698-1750

Website : www.gapollo.com

GOLD APOLLO

Service Manual

MODEL: TE310

FREQUENCY: 450-470Mhz

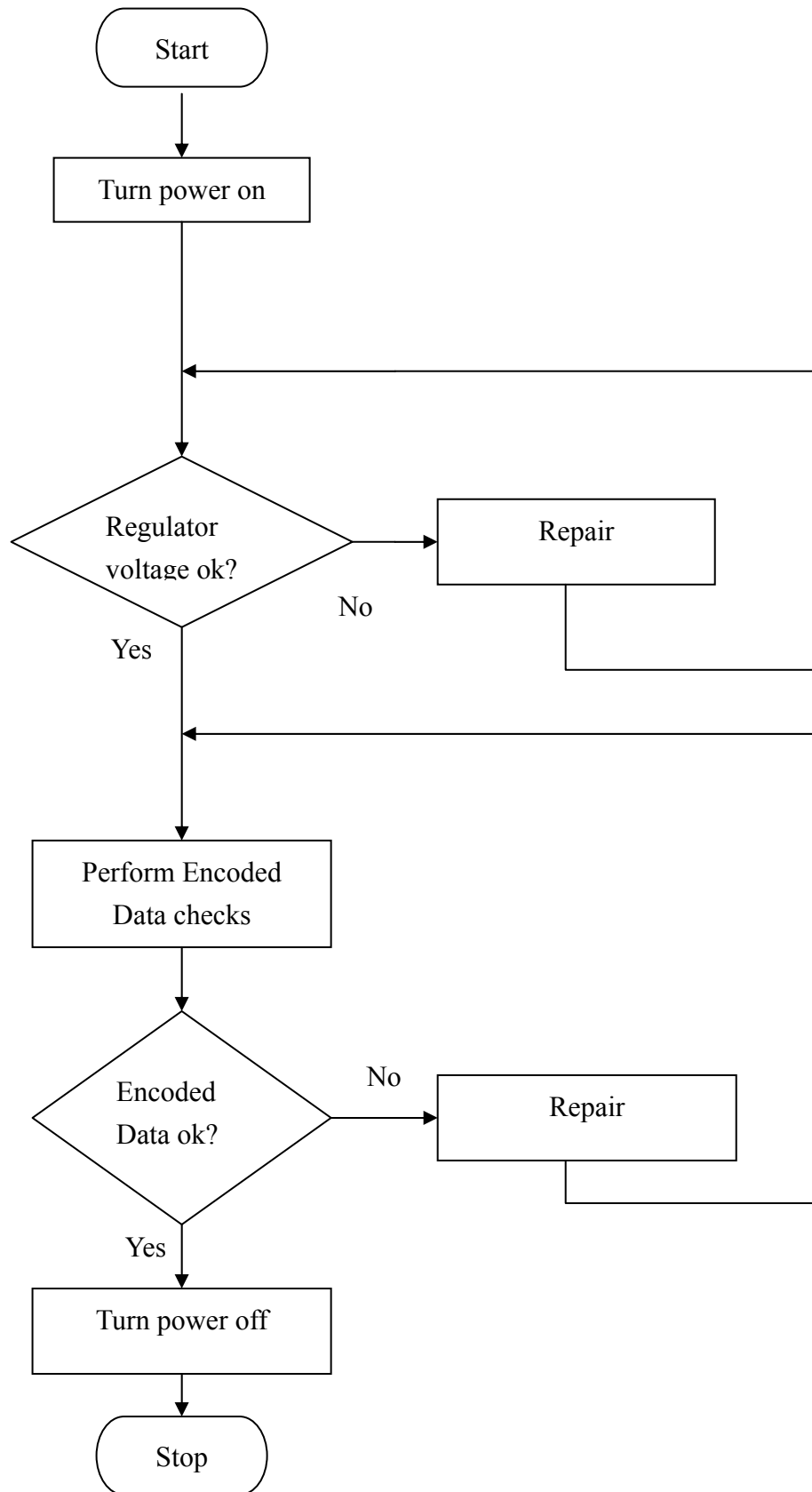
RF_PCB VERSION: TE100RFV130 VER:6.0

DIGIT_PCB VERSION: TE-310MAIN DIGIT VER1.1 VER:1.1

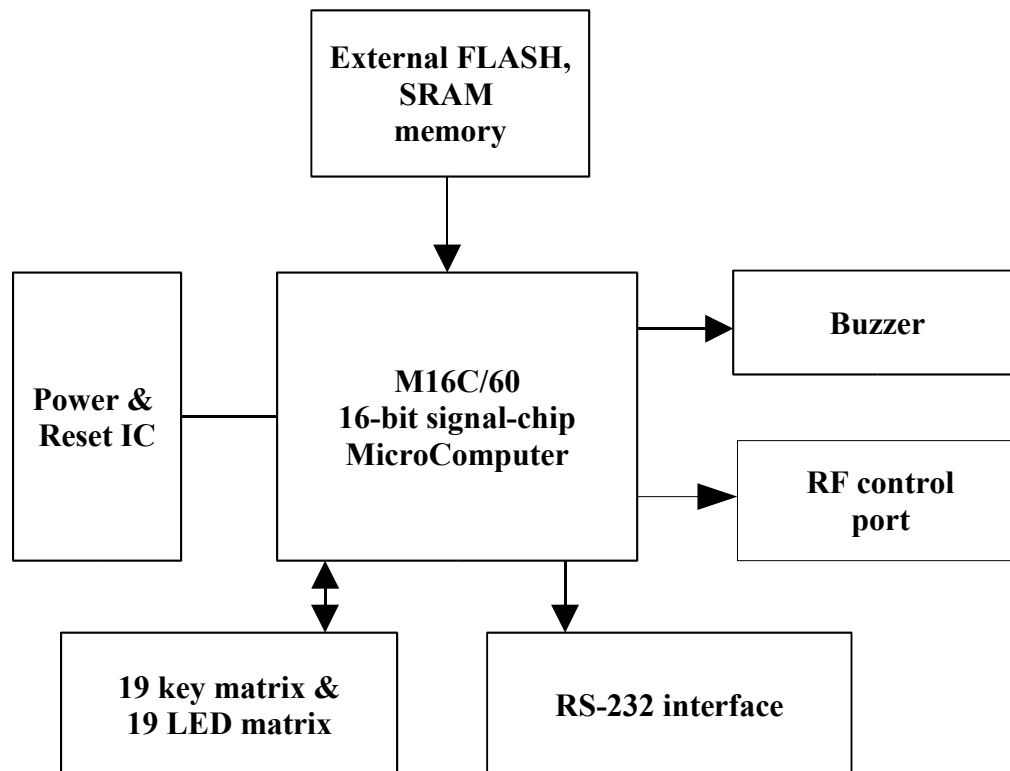
APPROVED DATE : 07/28/2005



General Trouble shooting Flow chart



TE-310 BLOCK DIAGRAM OF DIGITAL BOARD



1. MCU: Mitsubishi 16-bit single-chip microcomputer M16C/60 family M30620 is packaged in a 100-pin plastic molded QFP and featured the serial I/O, DMAC, with 1M bytes of address space. The main clock is 4.9152MHz and the sub-clock is 32.768KHz. There have RF control port for generating the control signals and POCSAG encoded data to RF circuit.
2. External memory: There include FLASH and SRAM, the former is for storing main firmware program and pager

database, the latter is for saving temporary variable during program is running.

3. Power & Reset IC: There is Regulator 7805 to convert external plug-in DC power into 5-V for whole system.

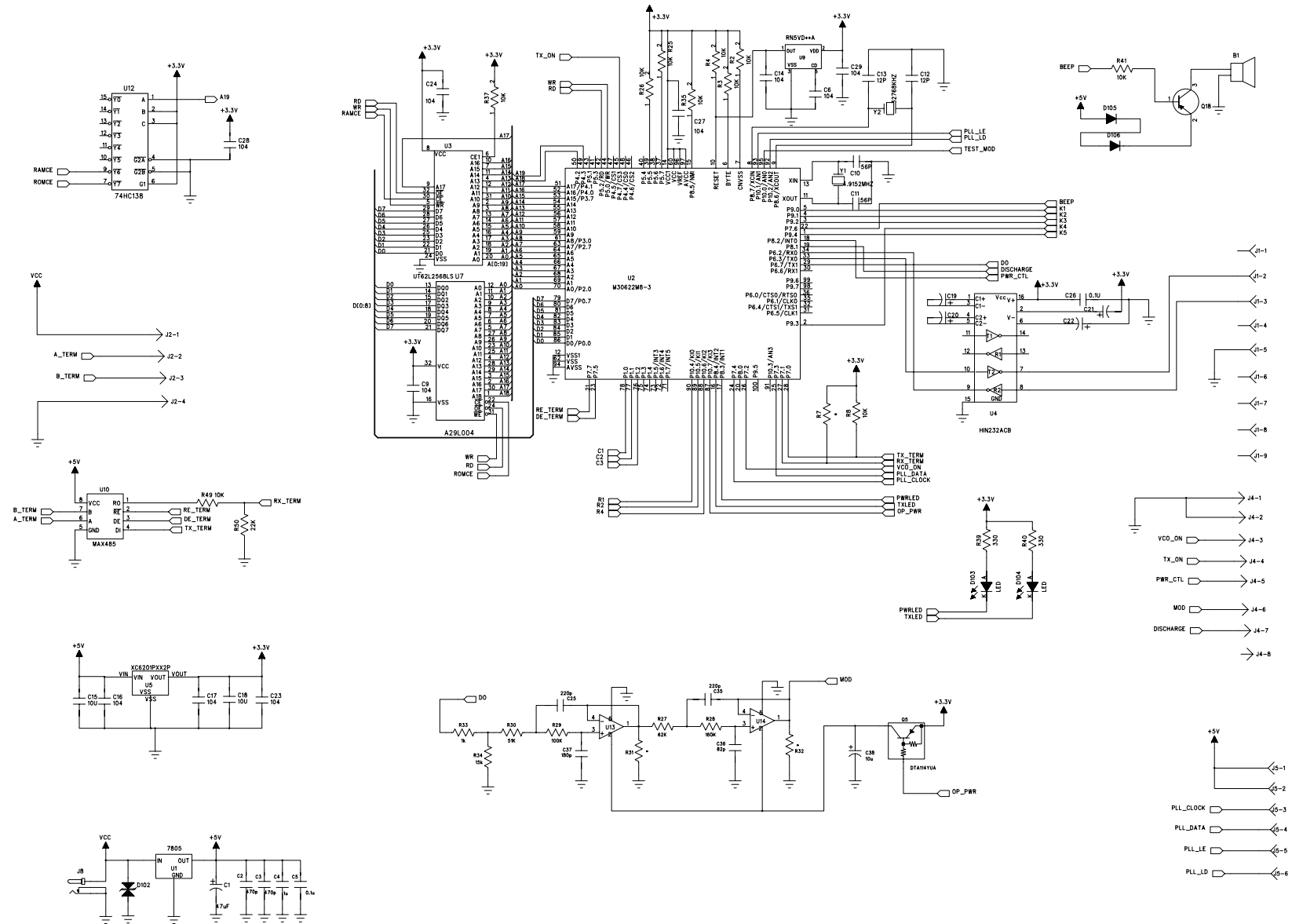
The Reset IC is a voltage detector. When voltage rising above the trigger voltage, it will send out Reset signal to MCU.

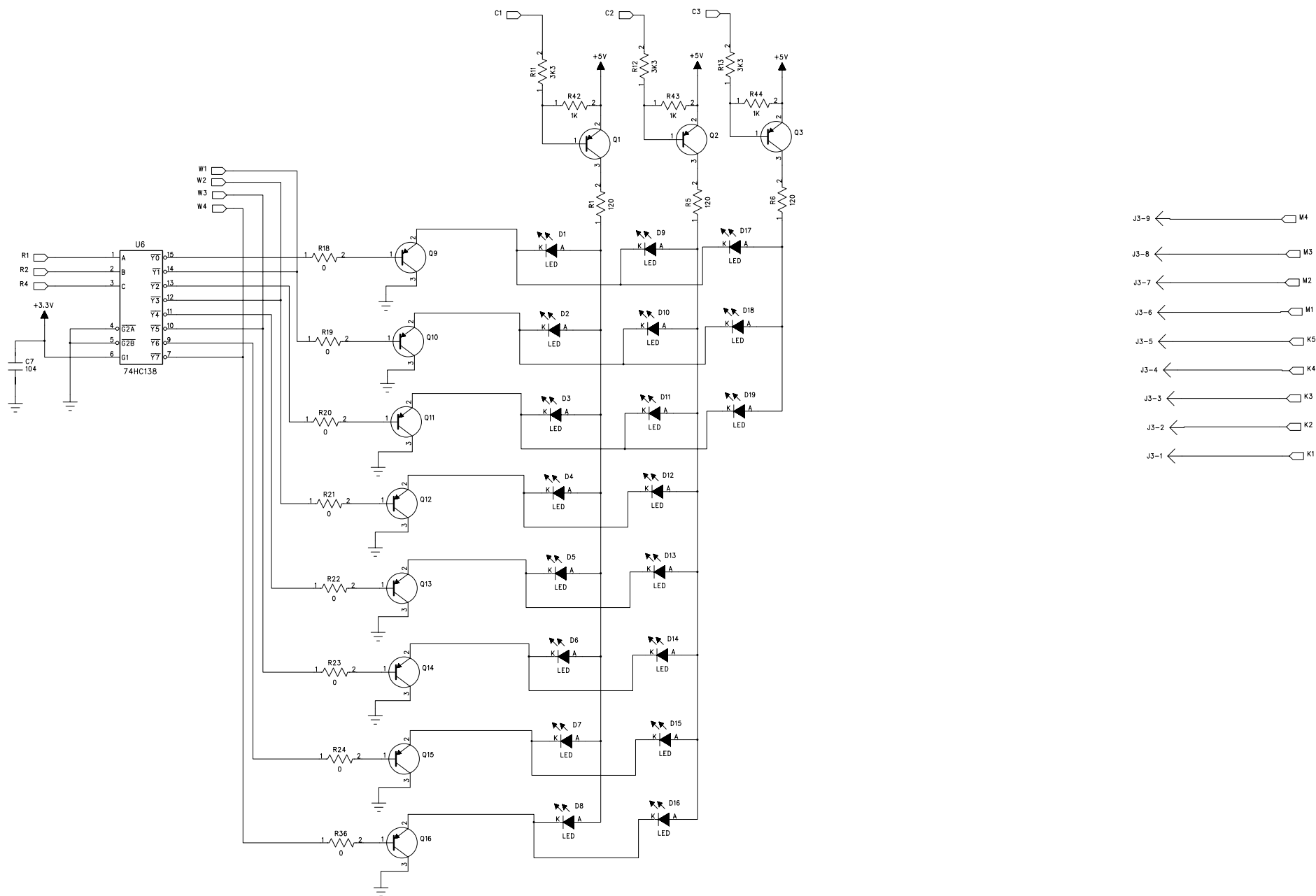
4. 19 Key Matrix and 19 LED matrix: There have 19 keys at the front panel of the case, marked number from 1 to 16, and F1,F2,F3, each company with one LED to indicate the status of operation.

5. Buzzer: The key tone is generated from buzzer.

6. RS-232 interface: It used for communicating with PC's programming software, we can write some parameter into TE-300 like CAPSCODE, baud rate, function..

TE-310 Digital Board V110





TE-310 TRANSMITTER B.O.M.

TE310 DIGIT PCB V-1.10

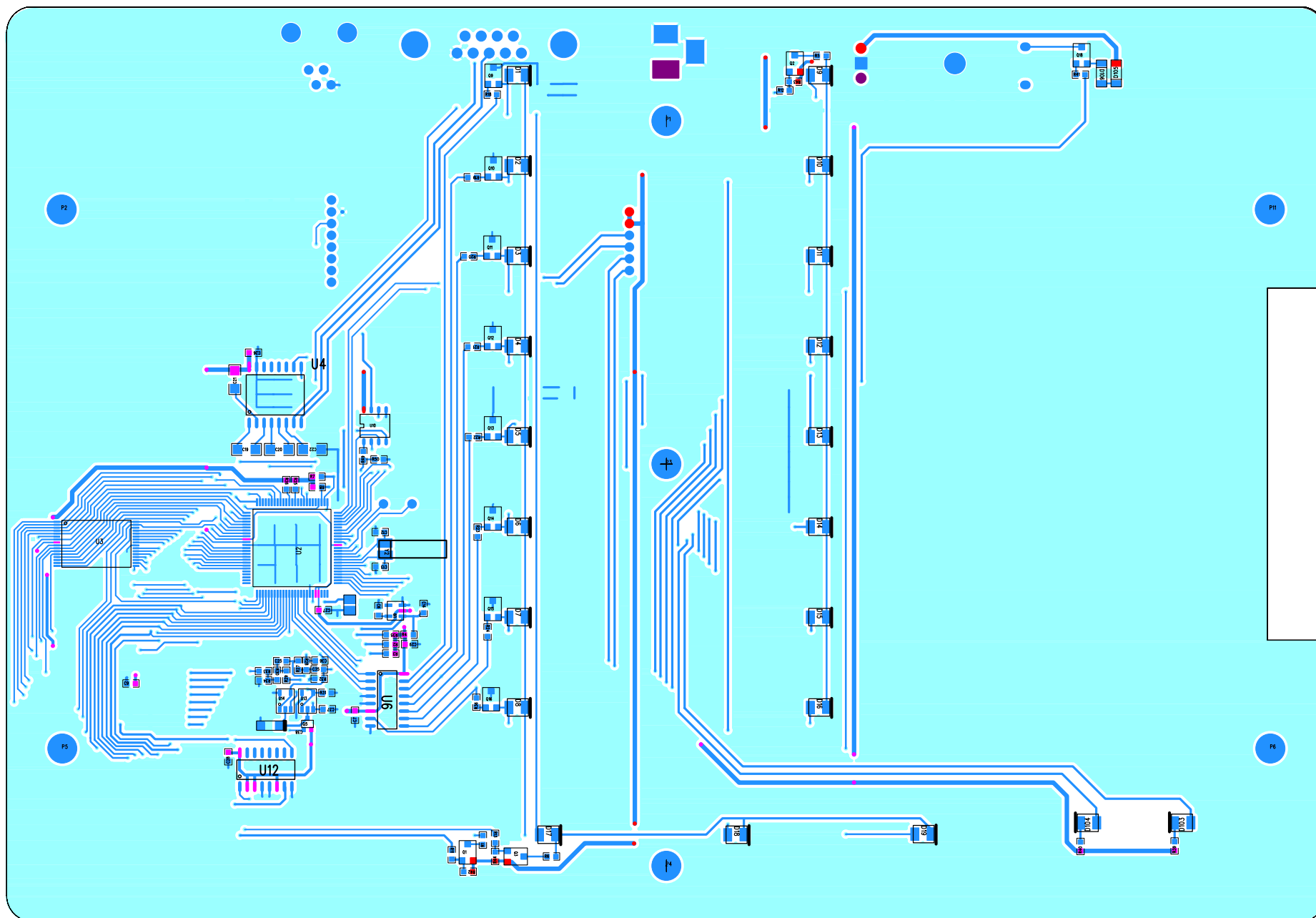
DATE : APR,4/2005

Item	Part Name	Description	Qty	Reference	Mfg.
1	LM7805	正電壓 1A 穩壓IC, TO-220	1	U1	
2	M30620M8-3	M30620M8A-2N1GP	1	U2	
3	UT62L2568	256K X 8 SRAM	1	U3	
4	HIN232ACB	RS232 DRIVER/RECEIVER	1	U4	
5	XC6201P332P	Voltage Regulator, SOT-89	1	U5	
6	74HC138	3-8 LINE DECODER	2	U6,U12	
7	A29L004UL	512K X 8 BIT FLASH	1	U7	
8	RN5VD24AA	Voltage Detector	1	U9	
8A	ISL8485ECB-T	RS-485 TRANSCEIVERS	1	U10	
9	XC221A1100M	CMOS OP AMP SOT-25	2	U13,U14	
10	2SA1362GR	PNP Transistor	12	Q1~Q3,Q9~ Q16,Q18	
11	DTA114YUA	Switch Transistor(PNP)	1	Q5	
12	BUZZER	BUZZER,AS-1201E-RPB,12m	1	B1	
13	E/C-6.3	6.3mm E-CAP, 47u/25V	1	C1	
14	CAP0603	470p	2	C2,C3	
15	CAP0603	1u	1	C4	
				C5~C7,C9, C14,C16, C17,C23, C24,C26~ C29	
16	CAP0603	0.1u	13		
17	CAP0603	56p	2	C10,C11	
18	CAP0603	12p	2	C12,C13	
				C15,C18~ C22,C38	
19	C/C	10u/16V (A)	7		
20	CAP0603	220p	2	C25,C35	
21	CAP0603	82p	1	C36	
22	CAP0603	180p	1	C37	
23	CON/DBRA-9PIN-F	9 PIN D-Sub connector	1	J1	
24	CON-SIP-100MIL-4P	RJ-11 TELEPHONE JACK	1	J2	
25	CON-SIP-2.0MM-8P	connector patch 2.0mm	1	J4	
26	CON-SIP-2.00MM-6P	connector patch 2.0mm	1	J5	
27	JACK-DJ0702	DC POWER JACK	1	J8	
28	LED(YELLOW)	LT5K33-AA-UC9T-T01	20	D1~D19, D103	

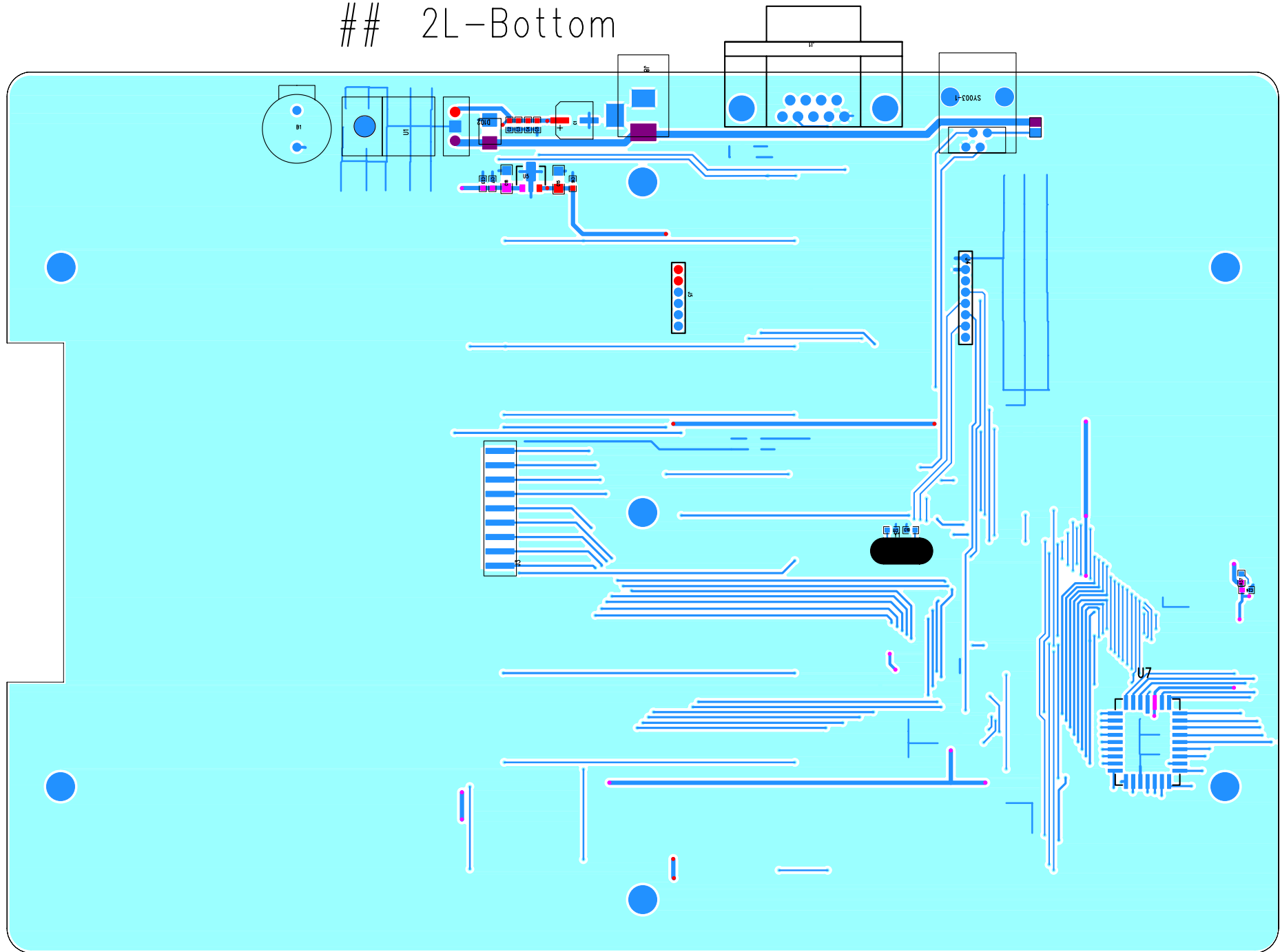
29	TVS SMBJ18A	TRANSIENT VOLTAGE SUPPRESSOR	1	D102	
30	LED(RED)	LT5K13-AA-UC9T-T01	1	D104	
31	1N4148	Switch Diode	2	D105,D106	
32	RES0603	10K	10	R2~R4,R25, R26,R35, R37,R41, R49,R8	
33	RES0603	120R	3	R1,R5,R6	
34	RES0603	3K3	3	R11~R13	
35	RES0603	0R	8	R18~R24, R36	
36	R0603	62K	1	R27	
37	R0603	160K	1	R28	
38	R0603	100K	1	R29	
39	R0603	51K	1	R30	
40	R0603	*		R31	
41	R0603	*		R32	
42	R0603	1K	4	R33,R42~ R44	
43	R0603	15K	1	R34	
44	RES0603	330R	2	R39,R40	
45	RES0603	22K	1	R50	
46	XTAL-HC-49/U	CRYSTAL 4.9152mHz	1	Y1	
47	XTAL-2X6MM	CRYSTAL 32.768KHz	1	Y2	
48	PCB	TE-310MAIN DIGIT VER1.1	1		
49		PLCC 32 SMD SOCKET	1	for U7	

1 打件時U7位置使用PLCC 32 SMD SOCKET,
FLASH IC待燒碼後再插入此SOCKET中

1L-TOP



2L-Bottom



TE100RF Alignment procedure

First programming frequency to "460.000MHz".

A. VCO SECTION

1. VCO voltage.

- I. Let transmitter in TEST mode.
- II. Check "VCO" point adjust C20 for 1.5V +/- 0.05V

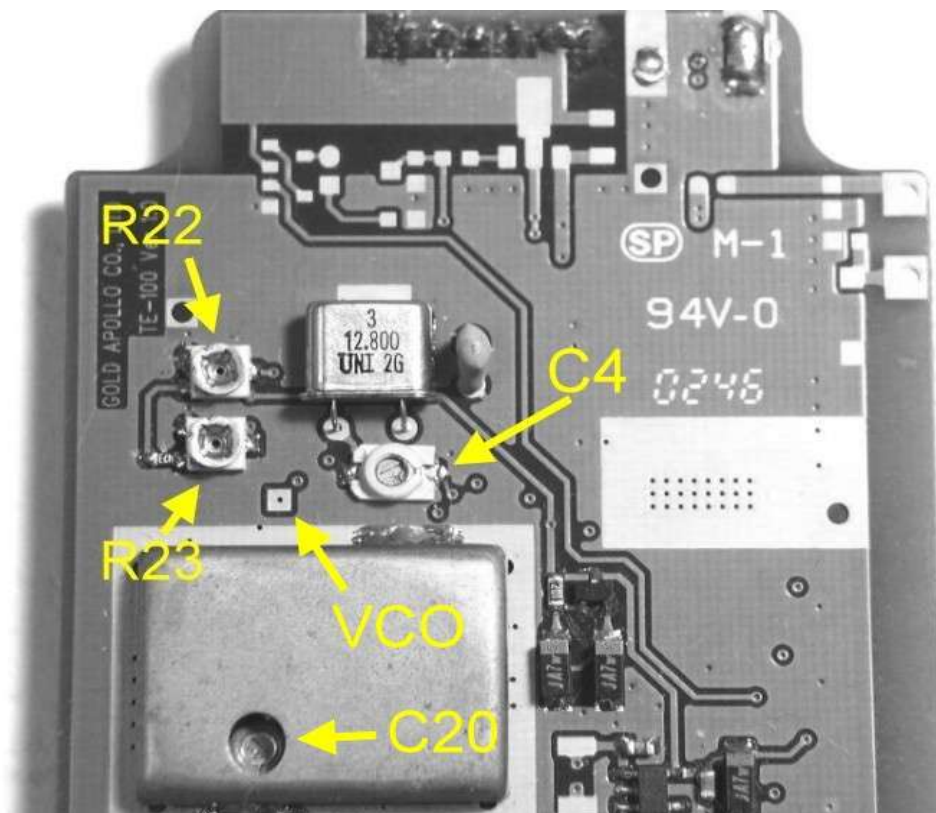
B. FREQUENCY SYNTHESIZER & MODULATOR

1. TX frequency

- I. Let transmitter in TEST mode.
- II. Adjust C4 for TX CF=460.000MHz +/- 200Hz.

2. TX FM deviation

- I. Let transmitter in TEST mode.
- II. Adjust R22 for TX FM deviation 2.0kHz.
- III. Adjust R23 to make modulation waveform like square wave.
- IV. Adjust C4 for TX CF=460.000MHz +/- 200Hz.



MODEL: TE100RF UHF 1W

DATE: 2004年4月7日

FREQ: 450~460MHz ,460~470MHz

VER: V6.00

E/C PO: RD-930048

Ref	Value	TYPE	Manufacturer	Description	Note
C1	470p	4V		CAP 0603	
C10	68p			CAP 0603	
C11	0.01u			CAP 0603	
C12	10u			TANCAP "A"	
C13	100p			CAP 0603	
C14	100p			CAP 0603	
C15	100p			CAP 0603	
C16	0.1u			CAP 0603	
C17	1.5p			CAP 0603	
C18	220p			CAP 0603	
C19	1u			CAP 0603	
C2	10p			CAP 0603	
C20	2-6p			Trimmer Cap Size 3mm	
C21	*			CAP 0603	
C22	5.6p			CAP 0603	
C23	100p			CAP 0603	
C24	6.8p			CAP 0603	
C25	2.2p			CAP 0603	
C26	470p	NPO		CAP 0603	
C27	0.5p			CAP 0603	
C28	*			CAP 0603	
C29	470p	NPO		CAP 0603	
C3	10p			CAP 0603	
C30	10u	4V		TANCAP "A"	
C31	0.01u			CAP 0603	
C32	1000p			CAP 0603	
C33	22p	N750	PHILIPS	負溫度係數電容	
C34	1.5p	NPO		CAP 0603	
C35	*			CAP 0603	
C36	4.7p			CAP 0603	
C37	470p			CAP 0603	
C38	470p			CAP 0603	
C39	470p			CAP 0603	
C4	3-10p			Trimmer Cap Size 3mm	
C40	39p			CAP 0603	
C41	*			CAP 0603	
C42	22k			RES 0603	
C43	470p			CAP 0603	
C43A	0.01u	X7R		CAP 0603	
C44	470p	NPO		CAP 0603	
C45	470p	NPO		CAP 0603	
C46	*			CAP 0603	
C46A	*			CAP 0603	
C47	2.7p			CAP 0603	
C47A	5.6p			CAP 0603	
C48	3.9p			CAP 0603	
C49	47u	10V		TANCAP "B"	
C5	0.47u			CAP 0603	
C50	4.7p			CAP 0603	
C51	10p			CAP 0603	
C52	10p			CAP 0603	
C53	4.7p	4V		CAP 0603	
C54	1u			CAP 0603	
C55	1u			CAP 0603	
C56	10u			TANCAP "A"	

MODEL: TE100RF UHF 1W

DATE: 2004年4月7日

FREQ: 450~460MHz ,460~470MHz

VER: V6.00

E/C PO: RD-930048

Ref	Value	TYPE	Manufacturer	Description	Note
C57	10u	4V		TANCAP "A"	
C58	10u	4V		TANCAP "A"	
C59	470p			CAP 0603	
C6	22u	4V		TANCAP "A"	
C60	*			CAP 0603	
C61	*			CAP 0603	
C62	*			CAP 0603	
C63	470p	NPO		CAP 0603	
C64	*			CAP 0603	
C65	470p	NPO		CAP 0603	
C66	*			CAP 0603	
C67	*			CAP 0603	
C68	1000p			CAP 0603	
C69	*			Trimmer Cap Size 3mm	
C7	0.047u			CAP 0603	
C70	*			CAP 0603	
C71	0.01u			CAP 0603	
C72	47p			CAP 0603	
C73	470p	NPO		CAP 0603	
C74	18p			CAP 0603	
C75	*			CAP 0603	
C8	1u			CAP 0603	
C9	1u			CAP 0603	
D1	1SV270		TOSHIBA	Variable capacitance diode	
D2	1SV270		TOSHIBA	Variable capacitance diode	
D3	1SV270		TOSHIBA	Variable capacitance diode	
D4	*		TOSHIBA	Variable capacitance diode	
D5	*		TOSHIBA	Switch Diode	
J2	PTFY-08S-B-024		PLASTRON	connector patch 2.0mm	
J3	PTFY-06S-B-024		PLASTRON	connector patch 2.0mm	
L1	CREM1008R022	22nH	CLIDER	Air Coil 1008	
L10	CREM1008R027	27nH	CLIDER	Air Coil 1008	
L11	CREM1008R056	56nH	CLIDER	Air Coil 1008	
L12	CREM1008R8N2	8.2nH	CLIDER	Air Coil 1008	
L13	CREM1008R022	22nH	CLIDER	Air Coil 1008	
L14	CREM1008R022	22nH	CLIDER	Air Coil 1008	
L15	CREM1008R022	22nH	CLIDER	Air Coil 1008	
L16	15nH		SPI	IND 0603	
L2	100nH		SPI	IND 0603	
L3	1uH		SWI	IND 1008	
L4	15nH		SPI	IND 0603	
L5	15nH		SPI	IND 0603	
L6	8.2nH		SWI	IND 0805	
L7	100nH		SWI	IND 0805	
L8	0.47			RES 0603	
L9	0			RES 0603	
PCB1	TE100RFV130	4 Layer thicknes=1.2mm	SHIN PUU	Printing Circuit Board	
Q1	2SC4226	R25	NEC	RF Transistor	
Q10	DTC114YUA		ROHM	Switch Transistor (NPN) with resistor	
Q11	*		ROHM	Switch Transistor (PNP) with resistor	
Q12	*		ROHM	Switch Transistor (NPN) with resistor	
Q14	DTC114YUA		ROHM	Switch Transistor (NPN) with resistor	
Q15	2SC4226	R25	NEC	RF Transistor	
Q2	2SC4226	R25	NEC	RF Transistor	
Q3	2SC4226	R25	NEC	RF Transistor	

MODEL: TE100RF UHF 1W

DATE: 2004年4月7日

FREQ: 450~460MHz ,460~470MHz

VER: V6.00

E/C PO: RD-930048

Ref	Value	TYPE	Manufacturer	Description	Note
Q4	2SC3356	R25	NEC	RF Transistor	
Q5	NE5500179A		NEC	RF POWER MOS FET	
Q6	BC847BW		PHILIPS	NPN AF TRANSISTOR	
Q7	DTA114YUA		ROHM	Switch Transistor (PNP) with resistor	
Q8	*		PHILIPS	NPN AF TRANSISTOR	
Q9	*		PHILIPS	NPN medium power transistor	
R1	47			RES 0603	
R10	3.3k			RES 0603	
R11	3.3k			RES 0603	
R12	100			RES 0603	
R13	150k			RES 0603	
R14	47			RES 0603	
R15	15k			RES 0603	
R16	22k			RES 0603	
R17	47			RES 0603	
R18	47k			RES 0603	
R19	*			RES 0603	
R2	120			RES 0603	
R20	330			RES 0603	
R21	100			RES 0603	
R22	20k			SMD SVR	
R23	20k			SMD SVR	
R24	47k			RES 0603	
R25	*			RES 0603	
R26	100			RES 0603	
R27	10			RES 0603	
R28	4.7k			RES 0603	
R29	1k			RES 0603	
R3	5.6k			RES 0603	
R30	10k			RES 0603	
R31	2.2k			RES 0603	
R32	0			RES 0603	
R33	*			RES 0603	
R34	0			RES 0603	
R35	0			RES 0805	
R36	*			RES 0805	
R37	*			RES 0603	
R38	0			RES 0805	
R39	3.3k			RES 0603	
R4	47			RES 0603	
R40	*			SMD SVR	
R41	*			RES 0603	
R42	1k			RES 0603	
R43	33			RES 0603	
R44	33			RES 0603	
R45	1k			RES 0603	
R46	1k			RES 0603	
R47	0			RES 0603	
R48	150			RES 0603	
R49	680			RES 0805	
R5	100k			RES 0603	
R50	2.2k			RES 0603	
R51	1k			RES 0603	
R52	10k			RES 0603	
R53	47k			RES 0603	

MODEL: TE100RF UHF 1W

DATE: 2004年4月7日

FREQ: 450~460MHz ,460~470MHz

VER: V6.00

E/C PO: RD-930048

Ref	Value	TYPE	Manufacturer	Description	Note
R54	*			RES 0603	
R55	39			RES 0603	
R56	150			RES 0603	
R57	47k			RES 0603	
R58	*			RES 0603	
R59	220			RES 0603	
R6	1k			RES 0603	
R7	3.3k			RES 0603	
R8	3.3k			RES 0603	
R9	3.3k			RES 0603	
U1	MB15E07SL		FUJITSU	2.5GHz PLL IC	
U2	XC6204B302		TOREX	Voltage Regulator	
X1	12.8MHz	CL=20p 3ppm		X'TAL SIZE UM5	

1.'VALUE'欄位標示為 "*" 號者為不使用之零件.

2.調測步驟參考 "TE100RF調測步驟 Ver 2.1".

