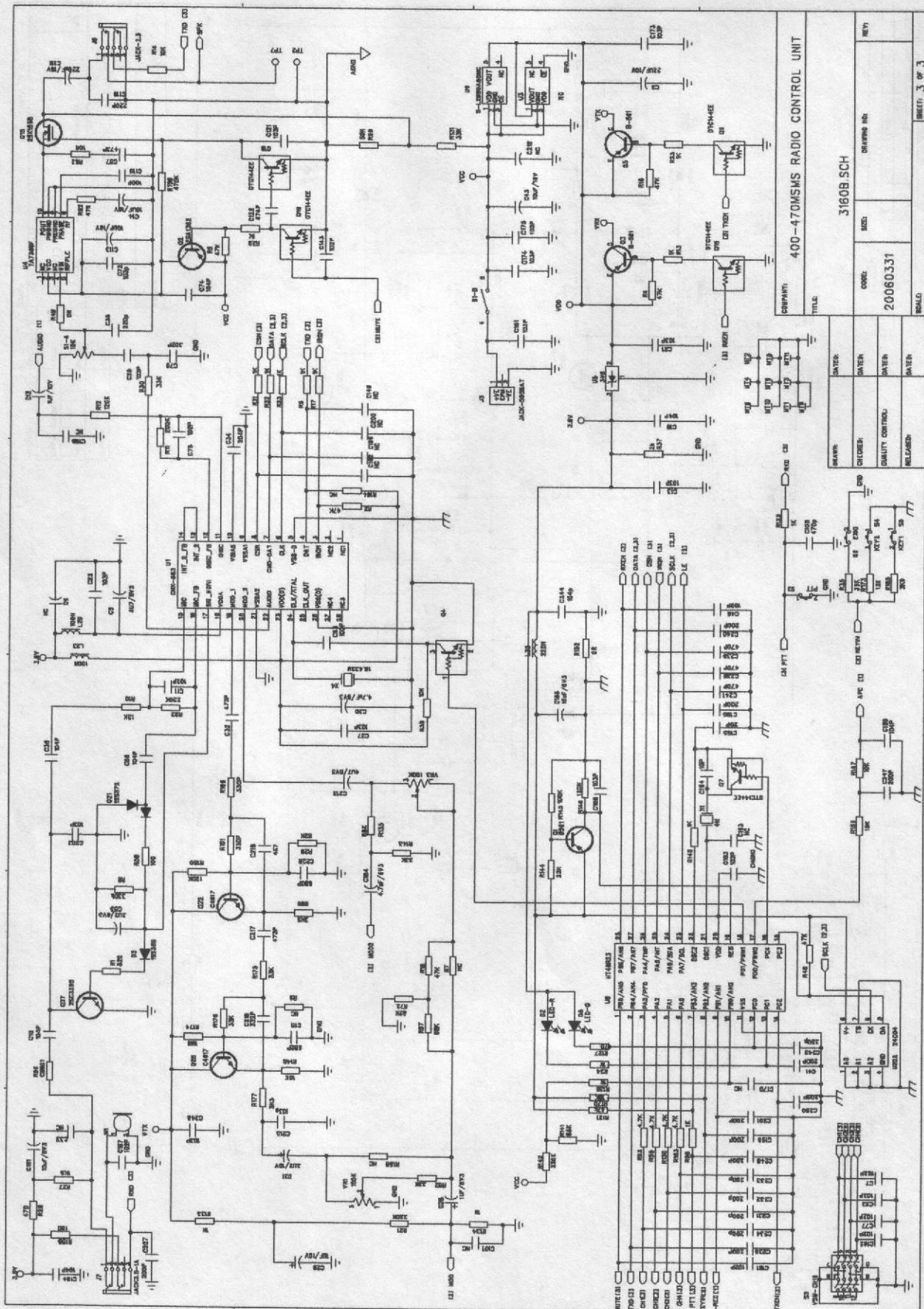
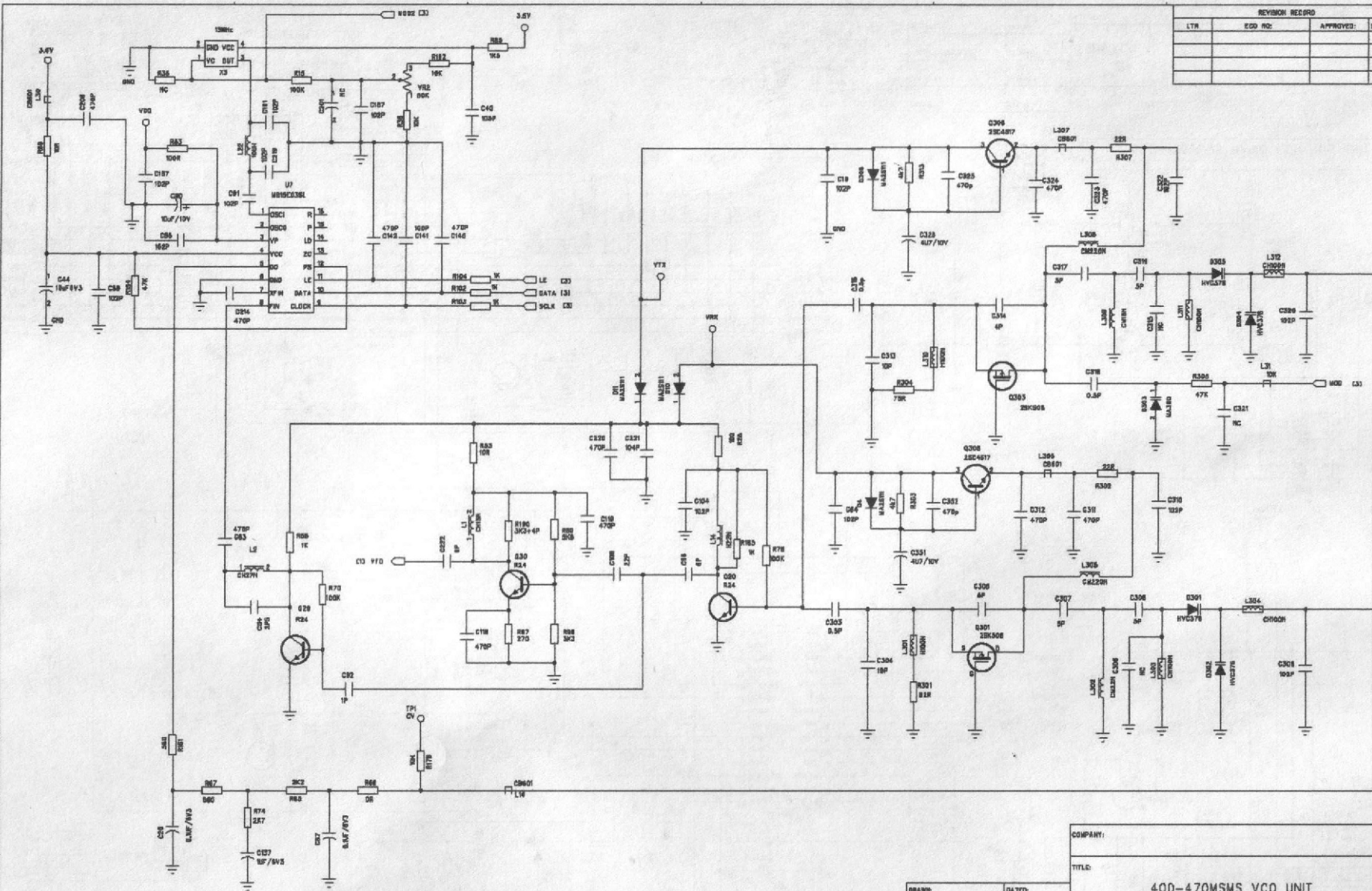


# SCHEMATIC DIAGRAM (CONTROL)



# SCHEMATIC DIAGRAM (VCO)

REVISION RECORD			
LTN	ECO NO.	APPROVED	DATE

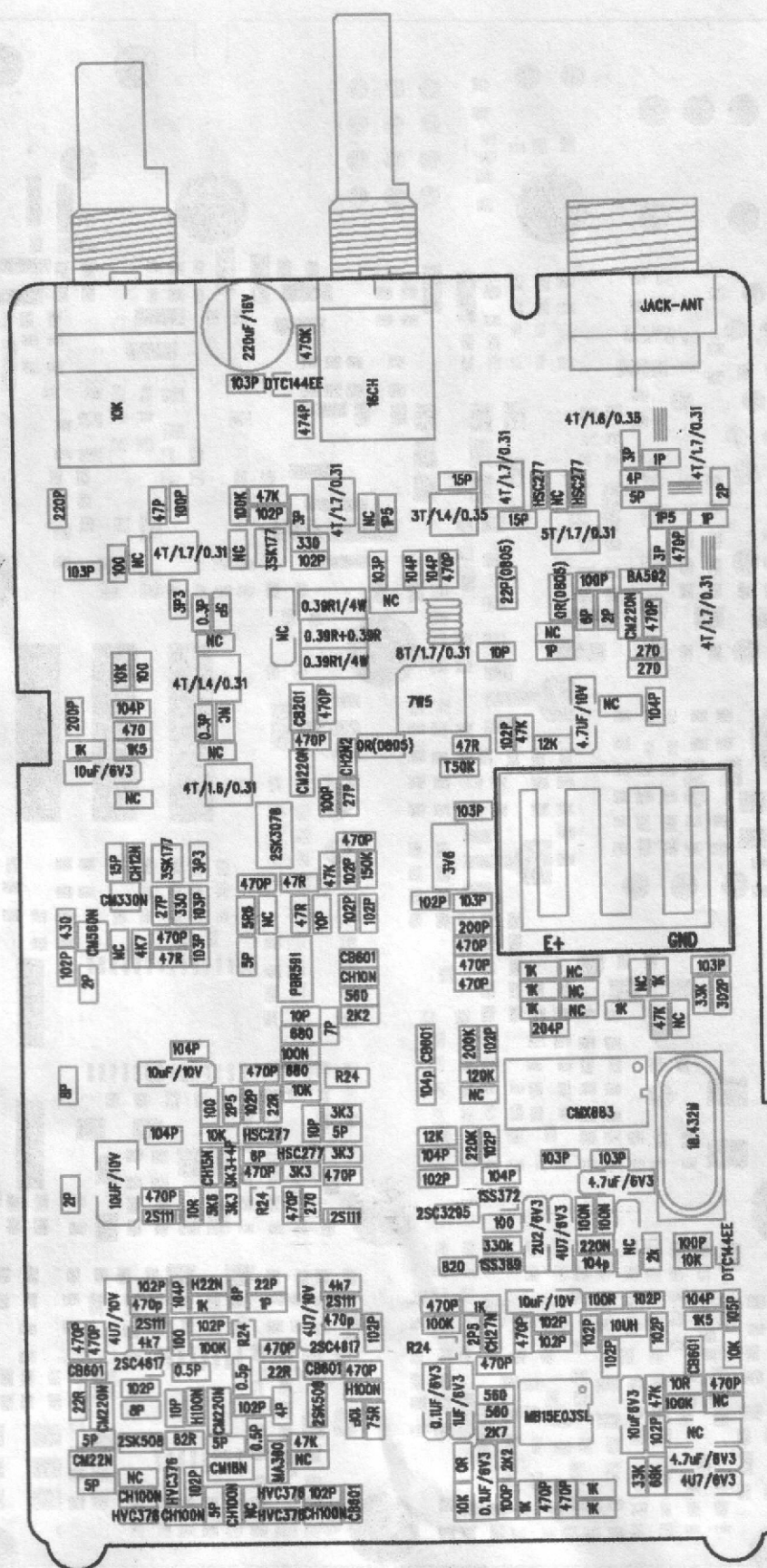


DRAWN:		DATED:		COMPANY:			
CHECKED:		DATED:		TITLE:			
QUALITY CONTROL:		DATED:		400-470MSMS VCO UNIT			
RELEASED:		DATED:		CODE:	SIZE:	DRAWING NO:	REV:
				20060331		3160B.SCH	
				SCALE:		SHEET: 3 OF 2	



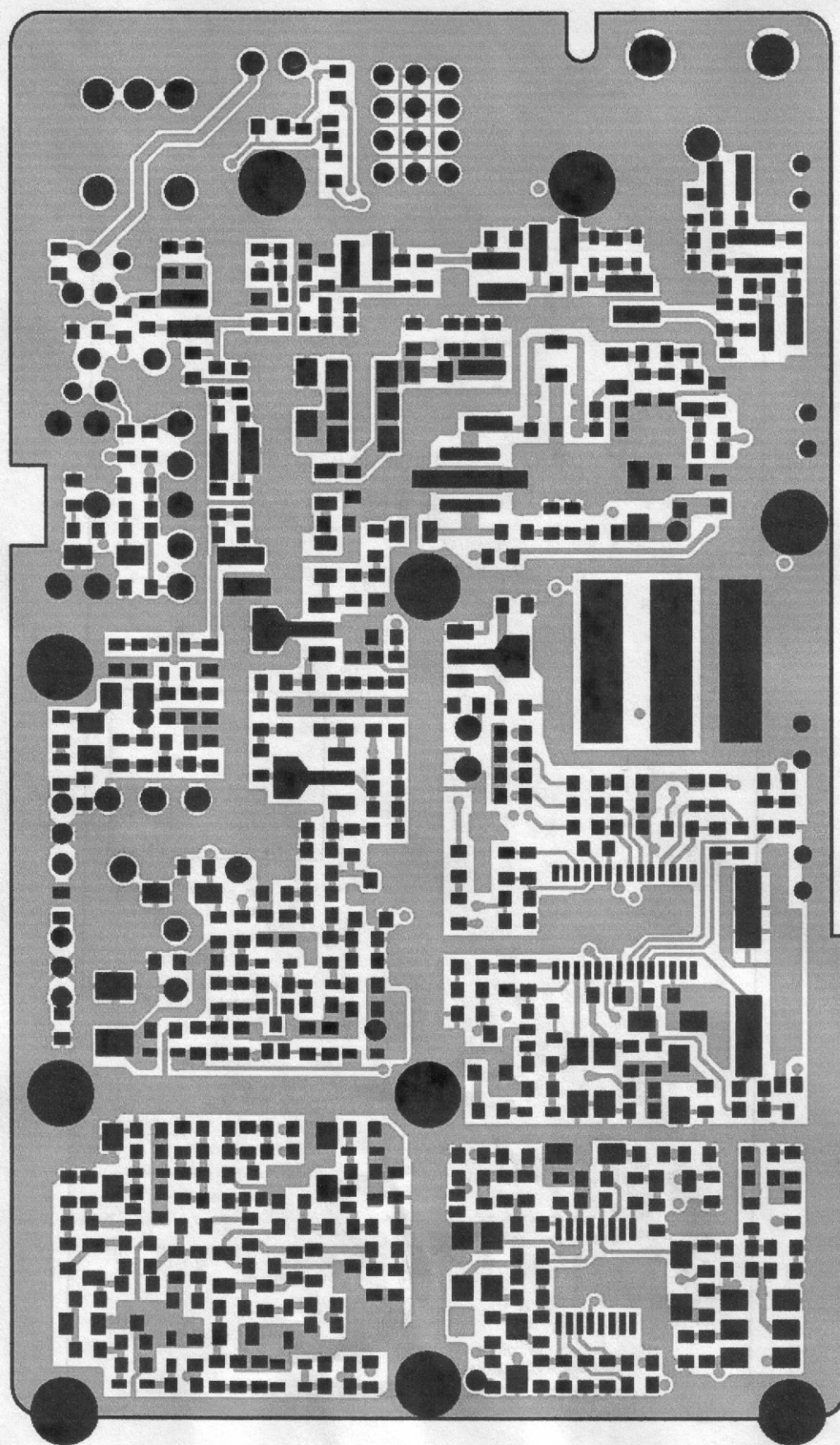


### MAIN PC BOARD (BOTTOM VIEW WITH COMPONENTS)

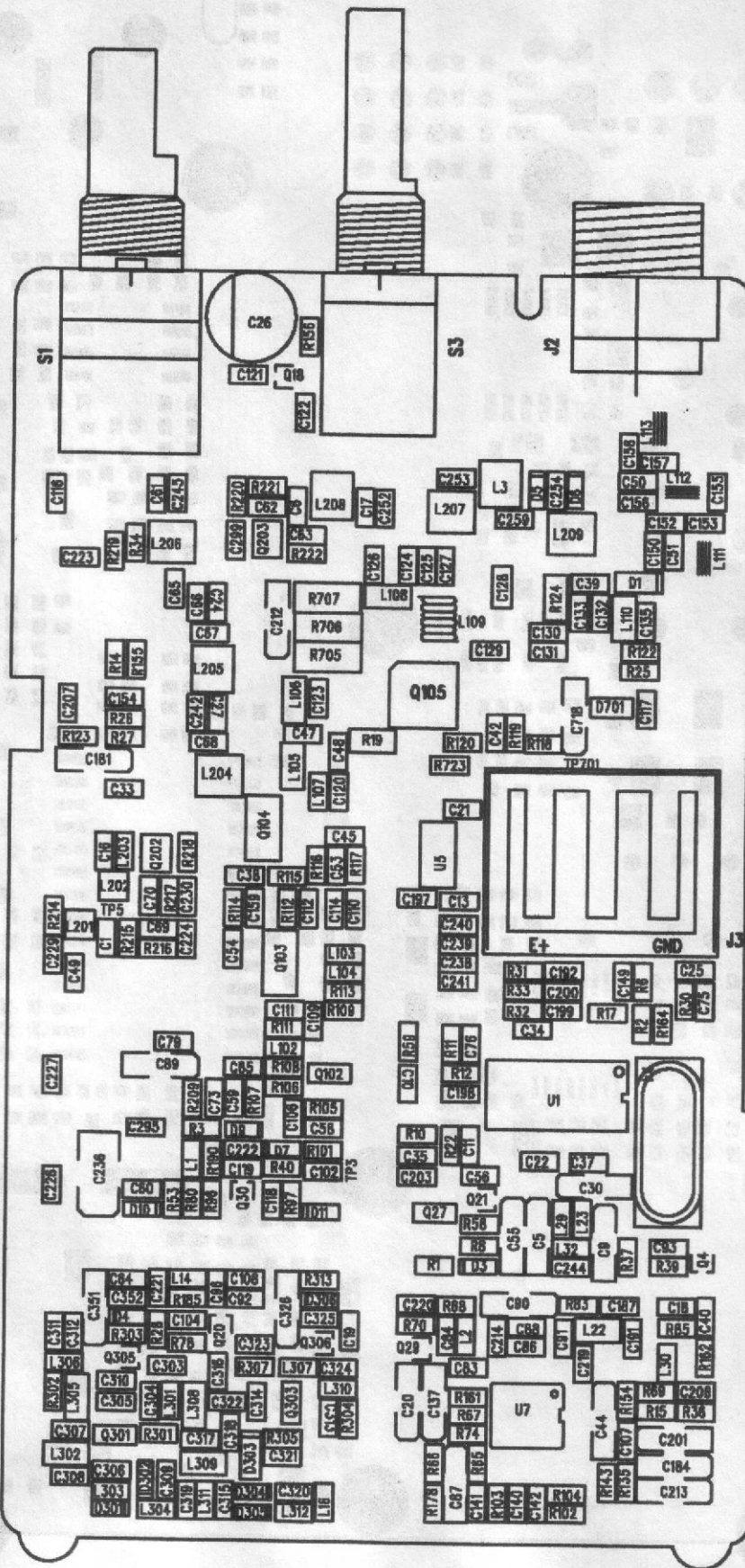




MAIN PC BOARD CIRCUIT (BOTTOM VIEW)

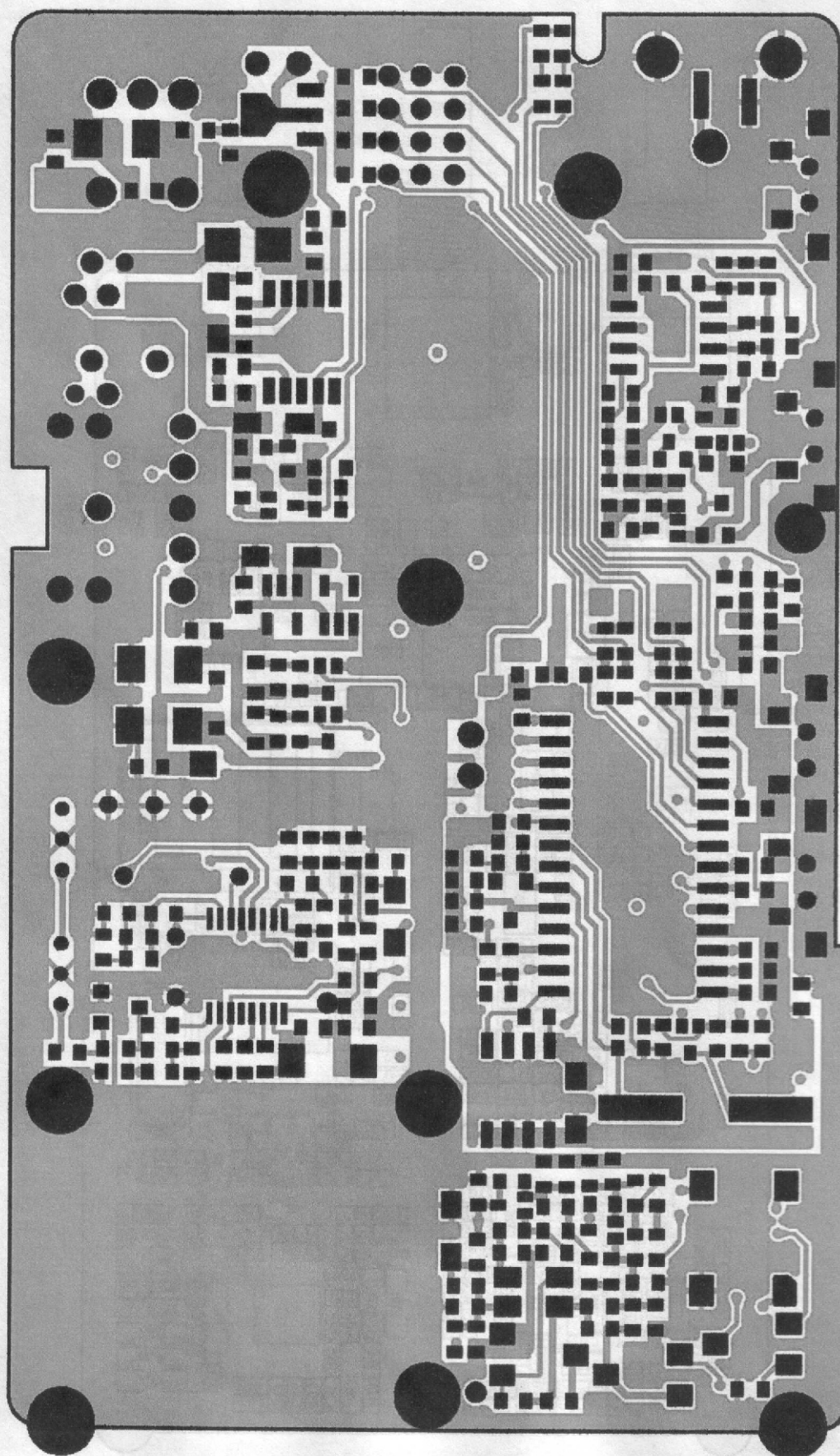


### MAIN PC BOARD (BOTTOM VIEW)





# MAIN PC BOARD CIRCUIT (TOP VIEW)

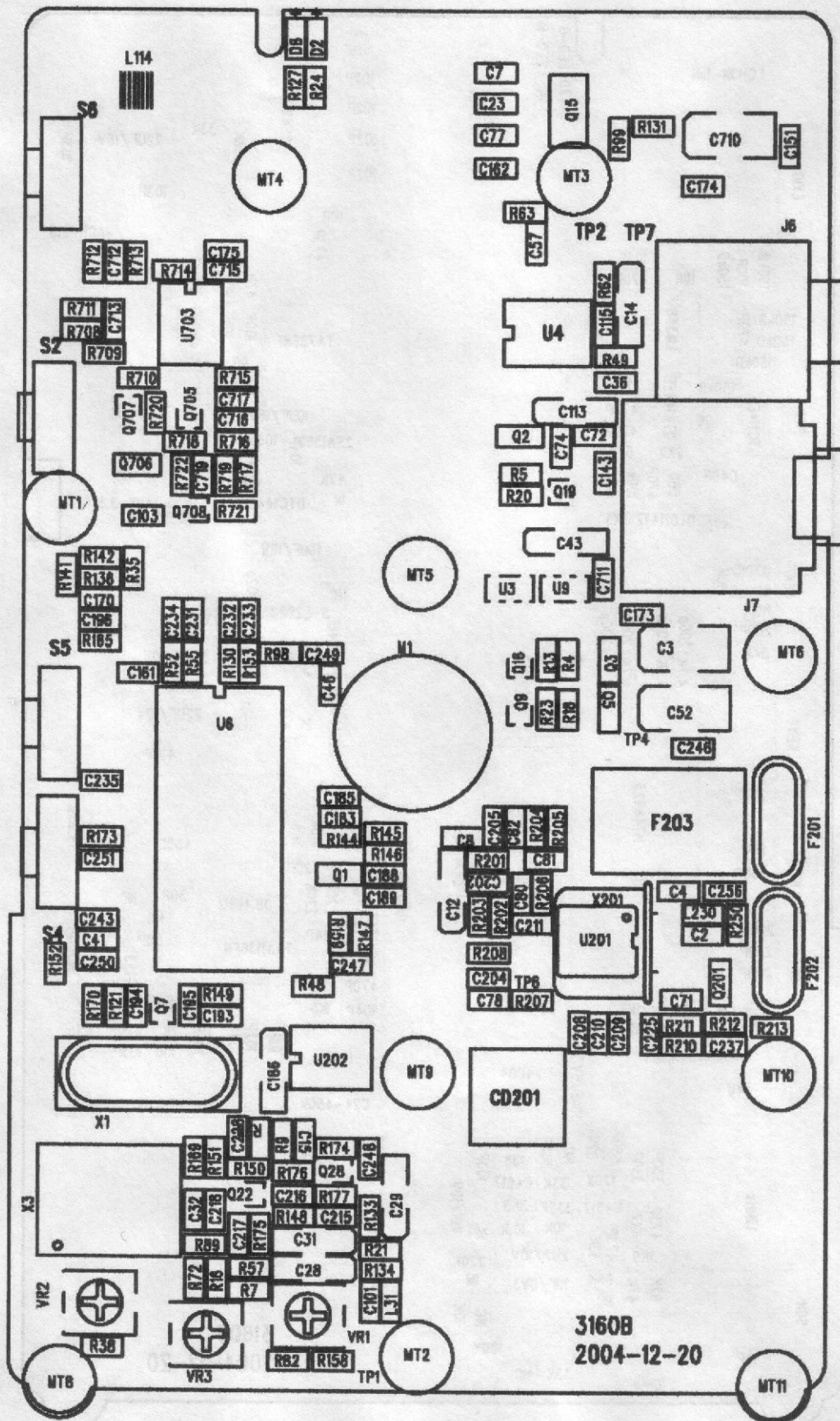


The diagram illustrates a complex electronic circuit board layout. Key components and their locations are as follows:

- Resistors:** Various values are distributed across the board, including 10K, 100K, 1M, 100P, 100N, 100U, 100V, 100W, 100X, 100Y, 100Z, 100AA, 100AB, 100AC, 100AD, 100AE, 100AF, 100AG, 100AH, 100AI, 100AJ, 100AK, 100AL, 100AM, 100AN, 100AO, 100AP, 100AQ, 100AR, 100AS, 100AT, 100AU, 100AV, 100AW, 100AX, 100AY, 100AZ, 100BA, 100BB, 100BC, 100BD, 100BE, 100BF, 100BG, 100BH, 100BI, 100BJ, 100BK, 100BL, 100BM, 100BN, 100BO, 100BP, 100BQ, 100BR, 100BS, 100BT, 100BU, 100BV, 100BW, 100BX, 100BY, 100BZ, 100CA, 100CB, 100CC, 100CD, 100CE, 100CF, 100CG, 100CH, 100CI, 100CJ, 100CK, 100CL, 100CM, 100CN, 100CO, 100CP, 100CQ, 100CR, 100CS, 100CT, 100CU, 100CV, 100CW, 100CX, 100CY, 100CZ, 100DA, 100DB, 100DC, 100DD, 100DE, 100DF, 100DG, 100DH, 100DI, 100DJ, 100DK, 100DL, 100DM, 100DN, 100DO, 100DP, 100DQ, 100DR, 100DS, 100DT, 100DU, 100DV, 100DW, 100DX, 100DY, 100DZ, 100EA, 100EB, 100EC, 100ED, 100EE, 100EF, 100EG, 100EH, 100EI, 100EJ, 100EK, 100EL, 100EM, 100EN, 100EO, 100EP, 100EQ, 100ER, 100ES, 100ET, 100EU, 100EV, 100EW, 100EX, 100EY, 100EZ, 100FA, 100FB, 100FC, 100FD, 100FE, 100FF, 100FG, 100FH, 100FI, 100FJ, 100FK, 100FL, 100FM, 100FN, 100FO, 100FP, 100FQ, 100FR, 100FS, 100FT, 100FU, 100FV, 100FW, 100FX, 100FY, 100FZ, 100GA, 100GB, 100GC, 100GD, 100GE, 100GF, 100GG, 100GH, 100GI, 100GJ, 100GK, 100GL, 100GM, 100GN, 100GO, 100GP, 100GQ, 100GR, 100GS, 100GT, 100GU, 100GV, 100GW, 100GX, 100GY, 100GZ, 100HA, 100HB, 100HC, 100HD, 100HE, 100HF, 100HG, 100HH, 100HI, 100HJ, 100HK, 100HL, 100HM, 100HN, 100HO, 100HP, 100HQ, 100HR, 100HS, 100HT, 100HU, 100HV, 100HW, 100HX, 100HY, 100HZ, 100IA, 100IB, 100IC, 100ID, 100IE, 100IF, 100IG, 100IH, 100II, 100IJ, 100IK, 100IL, 100IM, 100IN, 100IO, 100IP, 100IQ, 100IR, 100IS, 100IT, 100IU, 100IV, 100IW, 100IX, 100IY, 100IZ, 100JA, 100JB, 100JC, 100JD, 100JE, 100JF, 100JG, 100JH, 100JI, 100JJ, 100JK, 100JL, 100JM, 100JN, 100JO, 100JP, 100JQ, 100JR, 100JS, 100JT, 100JU, 100JV, 100JW, 100JX, 100JY, 100JZ, 100KA, 100KB, 100KC, 100KD, 100KE, 100KF, 100KG, 100KH, 100KI, 100KJ, 100KL, 100KM, 100KN, 100KO, 100KP, 100KQ, 100KR, 100KS, 100KT, 100KU, 100KV, 100KW, 100KX, 100KY, 100KZ, 100LA, 100LB, 100LC, 100LD, 100LE, 100LF, 100LG, 100LH, 100LI, 100LJ, 100LK, 100LL, 100LM, 100LN, 100LO, 100LP, 100LQ, 100LR, 100LS, 100LT, 100LU, 100LV, 100LW, 100LX, 100LY, 100LZ, 100MA, 100MB, 100MC, 100MD, 100ME, 100MF, 100MG, 100MH, 100MI, 100MJ, 100MK, 100ML, 100MM, 100MN, 100MO, 100MP, 100MQ, 100MR, 100MS, 100MT, 100MU, 100MV, 100MW, 100MX, 100MY, 100MZ, 100NA, 100NB, 100NC, 100ND, 100NE, 100NF, 100NG, 100NH, 100NI, 100NJ, 100NK, 100NL, 100NM, 100NN, 100NO, 100NP, 100NQ, 100NR, 100NS, 100NT, 100NU, 100NV, 100NW, 100NX, 100NY, 100NZ, 100OA, 100OB, 100OC, 100OD, 100OE, 100OF, 100OG, 100OH, 100OI, 100OJ, 100OK, 100OL, 100OM, 100ON, 100OO, 100OP, 100OQ, 100OR, 100OS, 100OT, 100OU, 100OV, 100OW, 100OX, 100OY, 100OZ, 100PA, 100PB, 100PC, 100PD, 100PE, 100PF, 100PG, 100PH, 100PI, 100PJ, 100PK, 100PL, 100PM, 100PN, 100PO, 100PP, 100PQ, 100PR, 100PS, 100PT, 100PU, 100PV, 100PW, 100PX, 100PY, 100PZ, 100QA, 100QB, 100QC, 100QD, 100QE, 100QF, 100QG, 100QH, 100QI, 100QJ, 100QK, 100QL, 100QM, 100QN, 100QO, 100QP, 100QQ, 100QR, 100QS, 100QT, 100QU, 100QV, 100QW, 100QX, 100QY, 100QZ, 100RA, 100RB, 100RC, 100RD, 100RE, 100RF, 100RG, 100RH, 100RI, 100RJ, 100RK, 100RL, 100RM, 100RN, 100RO, 100RP, 100RQ, 100RR, 100RS, 100RT, 100RU, 100RV, 100RW, 100RX, 100RY, 100RZ, 100SA, 100SB, 100SC, 100SD, 100SE, 100SF, 100SG, 100SH, 100SI, 100SJ, 100SK, 100SL, 100SM, 100SN, 100SO, 100SP, 100SQ, 100SR, 100SS, 100ST, 100SU, 100SV, 100SW, 100SX, 100SY, 100SZ, 100TA, 100TB, 100TC, 100TD, 100TE, 100TF, 100TG, 100TH, 100TI, 100TJ, 100TK, 100TL, 100TM, 100TN, 100TO, 100TP, 100TQ, 100TR, 100TS, 100TT, 100TU, 100TV, 100TW, 100TX, 100TY, 100TZ, 100UA, 100UB, 100UC, 100UD, 100UE, 100UF, 100UG, 100UH, 100UI, 100UJ, 100UK, 100UL, 100UM, 100UN, 100UO, 100UP, 100UQ, 100UR, 100US, 100UT, 100UU, 100UV, 100UW, 100UX, 100UY, 100UZ, 100VA, 100VB, 100VC, 100VD, 100VE, 100VF, 100VG, 100VH, 100VI, 100VJ, 100VK, 100VL, 100VM, 100VN, 100VO, 100VP, 100VQ, 100VR, 100VS, 100VT, 100VU, 100VV, 100VW, 100VX, 100VY, 100VZ, 100WA, 100WB, 100WC, 100WD, 100WE, 100WF, 100WG, 100WH, 100WI, 100WJ, 100WK, 100WL, 100WM, 100WN, 100WO, 100WP, 100WQ, 100WR, 100WS, 100WT, 100WU, 100WV, 100WW, 100WX, 100WY, 100WZ, 100XA, 100XB, 100XC, 100XD, 100XE, 100XF, 100XG, 100XH, 100XI, 100XJ, 100XK, 100XL, 100XM, 100XN, 100XO, 100XP, 100XQ, 100XR, 100XS, 100XT, 100XU, 100XV, 100



# MAIN PC BOARD (TOP VIEW)



108	VARICAP DIODE	MA360	D303	1
109	TRANSISTOR	1SS372	Q21	1
110	TRANSISTOR	R24	Q102	1
111	TRANSISTOR	PBR951	Q103	1
112	TRANSISTOR	2SC4617	Q305, Q306	2
113	TRANSISTOR	2SC4226 (R24)	Q20, Q29, Q30	3
114	TRANSISTOR	7W5	Q105	1
115	TRANSISTOR	2SK508	Q301, Q303	2
116	TRANSISTOR	3SK177	Q202, Q203	2
117	TRANSISTOR	2SC3295	Q27	1
118	TRANSISTOR	DTC144EE	Q18, Q4	2
119	TRANSISTOR	2SK3078	Q104	1
120	IC	CMX883	U1	1
121	IC	3V6	U5	1
122	IC	MB15E03SL	U7	1
123	ENCODER	16CH	S3	1
124	POTENTIOMETE R	10K	S1	1

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## BILL OF MATERIAL

### MAIN PC BOARD (BOTTOM SIDE)

NO.	DESCRIPTION	SPECIFICATION	REF. NO.	QUANTITY
1	CHIP R (0603)	0Ω	R152, R250, R49	3



2	CHIP R (0603)	10 $\Omega$	R63	1
3	CHIP R (0603)	47 $\Omega$	R62	1
4	CHIP R (0603)	100 $\Omega$	R210	1
5	CHIP R (0603)	430 $\Omega$	R213	1
6	CHIP R (0603)	470 $\Omega$	R127	1
7	CHIP R (0603)	560 $\Omega$	R722	1
8	CHIP R (0603)	1K $\Omega$	R13, R133, R136, R149, R20, R208, R23, R24, R98	9
9	CHIP R (0603)	1.5K $\Omega$	R207	1
10	CHIP R (0603)	2K $\Omega$	R211	1
11	CHIP R (0603)	2.2K $\Omega$	R718	1
12	CHIP R (0603)	3.3K $\Omega$	R177, R203, R721	3
13	CHIP R (0603)	3.9K $\Omega$	R89, R165	2
14	CHIP R (0603)	4.7K $\Omega$	R130, R153, R52, R55, R202, C218	6
15	CHIP R (0603)	5.6K $\Omega$	R205	1
16	CHIP R (0603)	10K $\Omega$	R147, R148, R159, R201, R714, L31, R720, R170, R38	9
17	CHIP R (0603)	12K $\Omega$	R173	1
18	CHIP R (0603)	22K $\Omega$	R144	1
19	CHIP R (0603)	33K $\Omega$	R131, R82, R175, R176	4
20	CHIP R (0603)	39K $\Omega$	R35	1
21	CHIP R (0603)	47K $\Omega$	R121, R16, R18, R4, R48, R5, R717	7
22	CHIP R (0603)	56K $\Omega$	R716, R99	2
23	CHIP R (0603)	68K $\Omega$	R141, R57	2

24	CHIP R (0603)	82K $\Omega$	R72, R29	2
25	CHIP R (0603)	100K $\Omega$	R204, R719, R145	3
26	CHIP R (0603)	120K $\Omega$	R146, R150	2
27	CHIP R (0603)	150K $\Omega$ (D)	R708, R709, R710, R711, R712, R713	6
28	CHIP R (0603)	220K $\Omega$	R206, R212, R21	3
29	CHIP R (0603)	330K $\Omega$	R142	1
30	CHIP R (0603)	1M $\Omega$	R134, R715	2
31	CHIP R (0603)	1.8M $\Omega$	R174	1
32	CHIP C (0603)	7P	C82	1
33	CHIP C (0603)	10P	C194	1
34	CHIP C (0603)	20P	C195	1

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## BILL OF MATERIAL

### MAIN PC BOARD (BOTTOM SIDE)

NO.	DESCRIPTION	SPECIFICATION	REF. NO.	QUANTITY
35	CHIP C (0603)	30P	C4	1
36	CHIP C (0603)	50P	C2	1
37	CHIP C (0603)	91P	C208	1
38	CHIP C (0603)	100P	C115, C712	2
39	CHIP C (0603)	200P	C185, R196, R231, R232, R233, R234, R235, R243, C247, C249, C250, C251, C41	13
40	CHIP C (0603)	220P	C36, C80, C81	3
41	CHIP C (0603)	330P	C151, R169	2
42	CHIP C (0603)	470P	C103, C204, C205, C246, C713, C715, C716, C717, C719	9
43	CHIP C (0603)	680P	C228	1
44	CHIP C (0603)	102P	C143, C161, C162, C210, C23, C46, C7, C71, C711, C77, C8, C202	12
45	CHIP C (0603)	332P	C216	1
46	CHIP C (0603)	682P	C15	1
47	CHIP C (0603)	103P	C151, C173, C174, C175, C183, C188, C215, C225, C237, C248, C72	11
48	CHIP C (0603)	473P	C217, C32, C57	3



49	CHIP C (0603)	104P	C189, C209, C211, C74, C78	5
50	CHIP TAN (SMD)	1UF	C28, C12, C29	3
51	CHIP TAN (SMD)	2.2UF	C31	1
52	CHIP TAN (SMD)	10UF	C186, C43, C113, C14	4
53	CHIP TAN (SMD)	22UF	C52, C3, C710	3
54	INDUCTOR	LQH3N-1uH	C114	1
55	CRYSTAL FILTER	38.850MHz	F201, F202	2
56	CRYSTAL	4MHz	X1	1
57	TCXO	13MHz	X3	1
58	CRYSTAL	38.4MHz	X201	1
59	CERAMIC FILTER	450KHz	F203	1
60	CERAMIC RESONATOR	C24-450K	CD201	1
61	LED	RED	D2	1
62	LED	GREEN	D8	1
63	TRANSISTOR	2SC1923	Q201	1
64	TRANSISTOR	C4617	Q22 , Q28	2
65	TRANSISTOR	2SA1362	Q2	1

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## BILL OF MATERIAL

### MAIN PC BOARD (BOTTOM SIDE)

NO.	DESCRIPTION	SPECIFICATION	REF. NO.	QUANTITY
66	TRANSISTOR	2SK1588	Q15	1
67	TRANSISTOR	B561	Q1, Q3, Q5	3
68	TRANSISTOR	C458	Q706	1
69	TRANSISTOR	DTA144EE	Q705	1
70	TRANSISTOR	DTC114EE	Q707	1
71	TRANSISTOR	DTC114TE	Q708	1
72	TRANSISTOR	DTC144EE	Q16, Q19, Q7, Q9	4
73	IC	24C04	U202	1
74	IC	HT46R23	U6	1
75	IC	LN358	U703	1
76	IC	TA31136FN	U201	1
77	IC	TA7368	U4	1
78	VOLTAGE REGULATOR IC	5V	U9	1
79	VARIABLE R	100KΩ	VR3, VR1	2
80	VARIABLE R	50KΩ	VR2	1

70	CHIP C (0603)	474P	C122	1
71	CHIP C (0603)	105P	C40	1
72	CAPACITOR	220uF/16V	C26	1
73	CHIP TAN (SMD)	10uF	C181, C44, 236, C89, C90	5
74	CHIP TAN (SMD)	4.7uF	C184, C5, C30, C213, C718, C326, C351	7
75	CHIP TAN (SMD)	2.2uF	C55	1
76	CHIP TAN (SMD)	0.1uF	C20, C87	2
77	CHIP TAN (SMD)	1uF	C137	1
78	INDUCTOR	220nH	L32	1
79	INDUCTOR	10nH	L22	1
80	INDUCTOR	100nH	L102	1
81	INDUCTOR	CB1608-601	L103, L16, L30, L306, L307, R59	6
82	INDUCTOR	CB1608-201	L106	1
83	INDUCTOR	CM-18N	L309	1
84	INDUCTOR	CM-22N	L302	1
85	INDUCTOR	CM-220N	L110, L105, L305, L308	4
86	INDUCTOR	CM-330N	L202	1
87	INDUCTOR	CM-560N	L201	1
88	INDUCTOR	CH-1608-2N2	C48	1
89	INDUCTOR	CH-1608-10N	L104	1
90	INDUCTOR	CH-1608-12N	L203	1
91	INDUCTOR	CH-1608-15N	L1	1
92	INDUCTOR	CH-1608-27N	L2	1
93	INDUCTOR	CH-1608-22N	L14	1
94	INDUCTOR	CH-1608-100N	L303, L304, L311, L312, L301, L310, L23, L29	8
95	AIR-CORE COIL	3T/1.4/0.35	L207	1
96	AIR-CORE COIL	4T/1.4/0.31	L205	1
97	AIR-CORE COIL	4T/1.6/0.31	L204	1
98	AIR-CORE COIL	4T/1.6/0.35	L113	1
99	AIR-CORE COIL	4T/1.7/0.31	L112, L3, L111, L208, L206	5
100	AIR-CORE COIL	5T/1.7/0.31	L209	1
101	AIR-CORE COIL	8T/1.7/0.31	L109	1
102	TCXO	18.432MHz	X4	1
103	VARICAP DIODE	1SS389	D3	1
104	VARICAP DIODE	HSC277	D5, D6, D7, D9	4

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## BILL OF MATERIAL

### MAIN PC BOARD (TOP SIDE)

105	VARICAP DIODE	BA592	D1	1
106	VARICAP DIODE	MA2S111	D10, D11, D306, D4	4
107	VARICAP DIODE	HVC376	D301, D302, D304, D305	4



42	CHIP C (0603)	0.5P	C303, C316, C318	3
43	CHIP C (0603)	1P	C92, C153, C157, C131	4
44	CHIP C (0603)	1.5P	C152, C252	2
45	CHIP C (0603)	2P	C132, C226, C155, C49	4
46	CHIP C (0603)	2.5P	C73	1
47	CHIP C (0603)	3P	C150, C158, C6	3
48	CHIP C (0603)	3.3P	C65, R218	2
49	CHIP C (0603)	4P	C50	1
50	CHIP C (0603)	3.3K+4P	R190	1
51	CHIP C (0603)	5P	C54, C24, C317, 156, C58, C319, 307, C308	8
52	CHIP C (0603)	6P	C133, C96, C222	3
53	CHIP C (0603)	7P	C109	1
54	CHIP C (0603)	8P	C227, C314, C305	3
55	CHIP C (0603)	10P	C129, C112, C111, C106, C313, C304, C84	7
56	CHIP C (0603)	15P	C253, C259, C16	3
57	CHIP C (0805)	22P	C128	1
58	CHIP C (0603)	22P	C108	1
59	CHIP C (0603)	27P	C120, C70	2
60	CHIP C (0603)	47P	C61	1
61	CHIP C (0603)	100P	C141, C39, C93, L107, C245,	5
62	CHIP C (0603)	200P	C207, C240	2
63	CHIP C (0603)	220P	C116	1
64	CHIP C (0603)	470P	C102, C69, C83, C118, C119, C123, C127, C135, C206, C214, C220, C311, C312, C323, C324, C325, C352, C38, C45, C47, C85, C60, C51, C140, C142, C241, C238, C239	28
65	CHIP C (0603)	102P	C104, C107, C110, C114, C187, C19, C197, C203, C229, C219, C309, C310, C320, C322, C191, C42, C11, C53, C59, C62, R222, C64, C86, C88, C91, C76	26
66	CHIP C (0603)	302P	C75	1
67	CHIP C (0603)	103P	C121, C126, C13, C21, C22, C223, C224, C230, C37, C25	10

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## BILL OF MATERIAL

### MAIN PC BOARD (TOP SIDE)

68	CHIP C (0603)	104P	C10, C117, C124, C125, C154, C18, C221, C244, C295, C35, C56, C79	12
69	CHIP C (0603)	204P	C34	1

21	CHIP R (0603)	2K $\Omega$	R37	1
22	CHIP R (0603)	2.2K $\Omega$	R109, R65	2
23	CHIP R (0603)	2.7K $\Omega$	R74	1
24	CHIP R (0603)	3.3K $\Omega$	R101, R105, R40, R96	4
25	CHIP R (0603)	3.3K $\Omega$ +4P	R190	1
26	CHIP R (0603)	4.7K $\Omega$	R215, R303, R313	3
27	CHIP R (0603)	5.6K $\Omega$	R80	1
28	CHIP R (0603)	10K $\Omega$	R106, R14, R178, R3, R39, R162	6
29	CHIP R (0603)	12K $\Omega$	R10, R118	2
30	CHIP R (0603)	33K $\Omega$	R30, R143	2
31	CHIP R (0603)	47K $\Omega$	R116, R119, R154, R2, R221, R305	6
32	CHIP R (0603)	68K $\Omega$	R135	1
33	CHIP R (0603)	100K $\Omega$	R15, R70, R78, R220	4
34	CHIP R (0603)	120K $\Omega$	R12	1
35	CHIP R (0603)	150K $\Omega$	R117	1
36	CHIP R (0603)	200K $\Omega$	R11	1
37	CHIP R (0603)	220K $\Omega$	R22	1
38	CHIP R (0603)	330K $\Omega$	R8	1

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## BILL OF MATERIAL

### MAIN PC BOARD (TOP SIDE)

39	CHIP R (0603)	470K $\Omega$	R156	1
40	CHIP R (0603)	T50K $\Omega$	R723	1
41	CHIP C (0603)	0.3P	C66, C242	2



## BILL OF MATERIAL

### MAIN PC BOARD (TOP SIDE)

NO.	DESCRIPTION	SPECIFICATION	REF. NO	QUANTITY
1	CHIP R (0805)	0 $\Omega$	R124, R19	2
2	CHIP R (0603)	0 $\Omega$	R66	1
3	CHIP R (1206)	0.39 $\Omega$ +0.39 $\Omega$	R706, ADD	2
4	CHIP R (1206)	0.39 $\Omega$ 1/4W	R705, R707	2
5	CHIP R (0603)	5.6 $\Omega$	R114	1
6	CHIP R (0603)	10 $\Omega$	R53, R69	2
7	CHIP R (0603)	22 $\Omega$	R107, R302, R307	3
8	CHIP R (0603)	47 $\Omega$	R115, R120, R216, R112	4
9	CHIP R (0603)	75 $\Omega$	R304	1
10	CHIP R (0603)	82 $\Omega$	R301	1
11	CHIP R (0603)	100 $\Omega$	R155, R209, R219, R28, R58, R83	6
12	CHIP R (0603)	270 $\Omega$	R122, R25, R97	3
13	CHIP R (0603)	330 $\Omega$	R217, C63	2
14	CHIP R (0603)	430 $\Omega$	R214	1
15	CHIP R (0603)	470 $\Omega$	R26	1
16	CHIP R (0603)	560 $\Omega$	R113, R161, R67	3
17	CHIP R (0603)	680 $\Omega$	R108, R111	2
18	CHIP R (0603)	820 $\Omega$	R1	1
19	CHIP R (0603)	1K $\Omega$	R102, R103, R104, R123, R17, R185, R31, R32, R33, R6, R68	11
20	CHIP R (0603)	1.5K $\Omega$	R27, R85	2