DDS

PHASE DETECTOR / CHARGE PUMP A

VCO / BUFFER A

REFERENCE DIVIDER

QUADRATURE MIXER

OUTPUT DIVIDER / FILTER

÷N / PHASE DETECTOR / CHARGE PUMP B

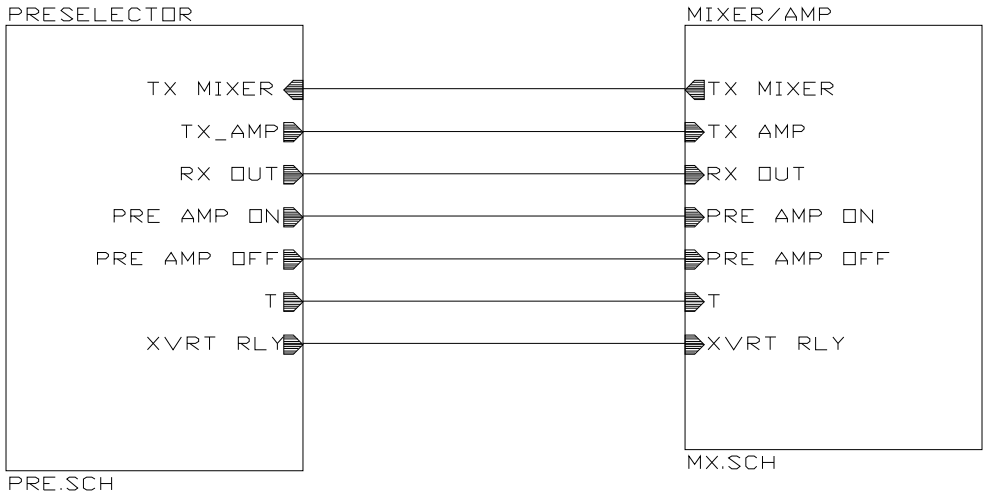
VCO / BUFFER B

PRESTEER

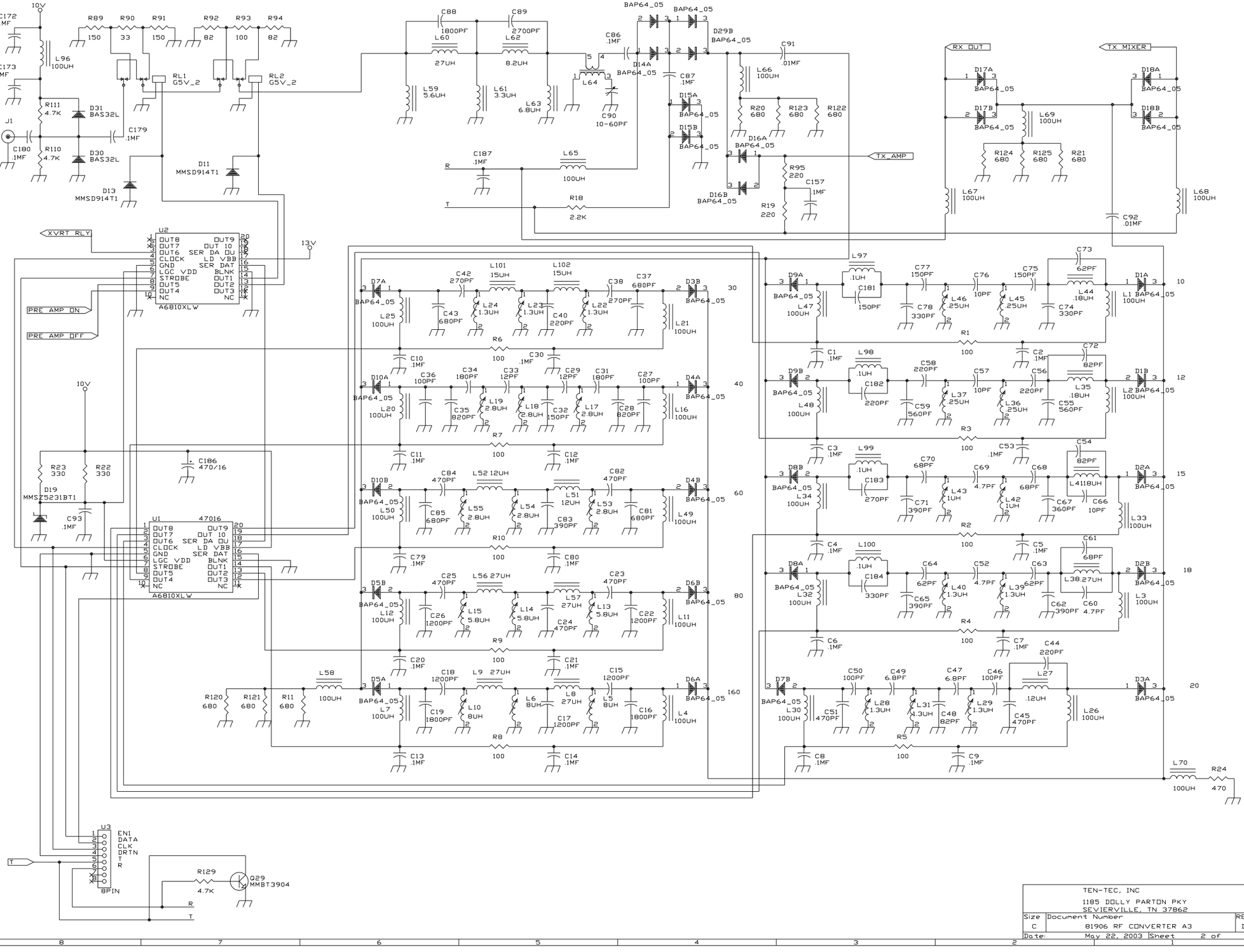
REFERENCE DESIGNATORS NOT USED:
C60, C119, R97

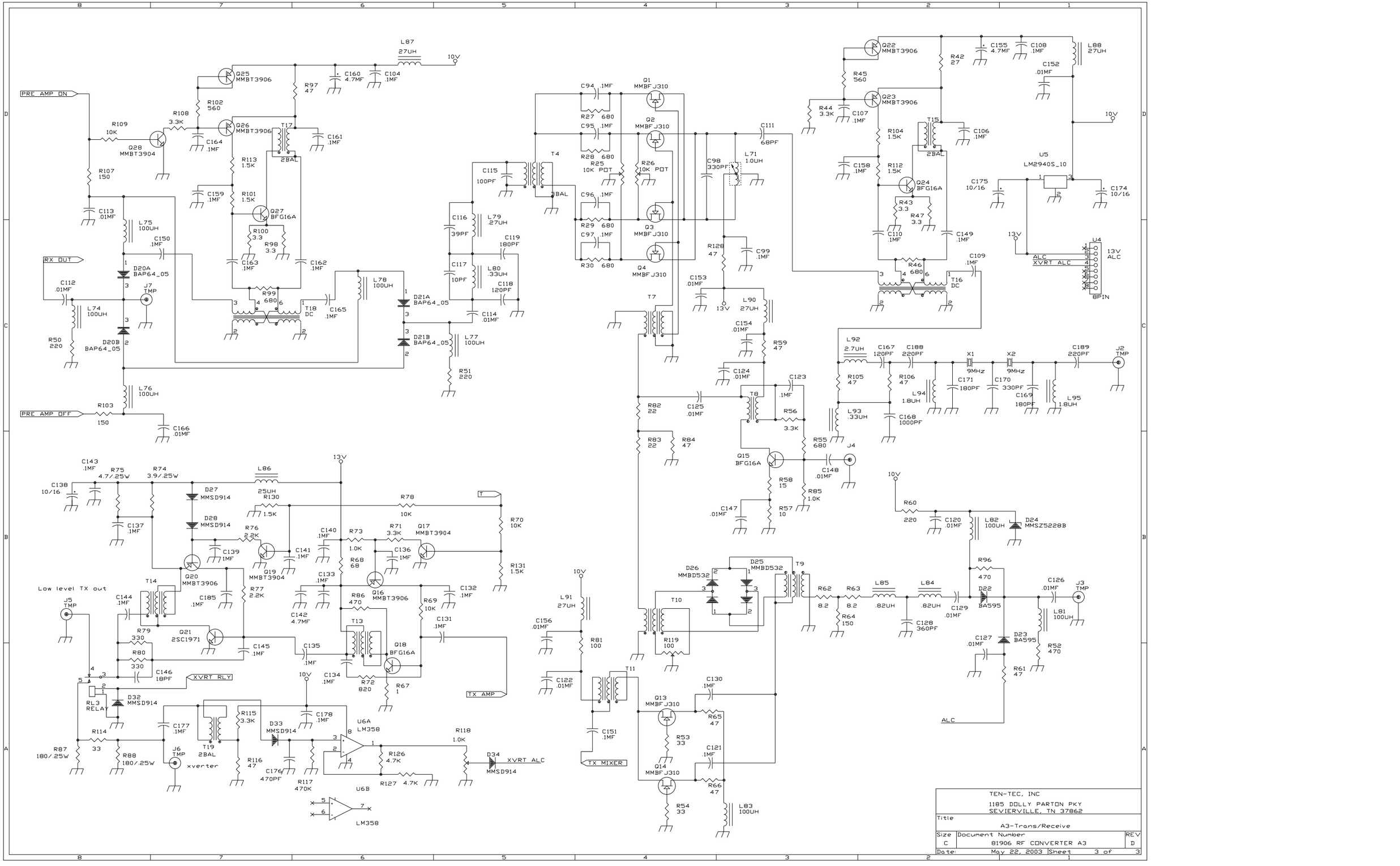
REFERENCE DESIGNATORS LAST USED:	
R205, C175, D22, U30, T1, FB6, L44, J7, Q30, Y1, TP12	
U1	LM2940-10
U2, U10-12, U23	78L05
U3, U6	LM1086-3.3
U4, U9, U18, U22, U26	74AC00
U5, U25	78L08
U7	AD9852
U8, U17, U19, U24, U27	74AC74
U13, U21	UPC2758
U14, U20	LM358
U15	MC12080
U16, U30	74AC109
U29	74AC04
U28	ADF4111
Q1, Q4, Q6, Q11, Q12, Q14-16, Q19, Q21,Q27	3906
Q2, 5, 7, 9, 13, 17, 20, 23, 24, 26, Q28-30	3904
Q3, Q8, Q10, Q18, Q22, Q25	NE68119
Y1	44.55MHz TCXO
D1, D2, D5, D6, D13, D14, D17, D18	SMV1255-4
D3, D7-12, D15, D19, D21, D22	MMSD914
D4, D16	BAP64-05
D20	MMSZ5228B

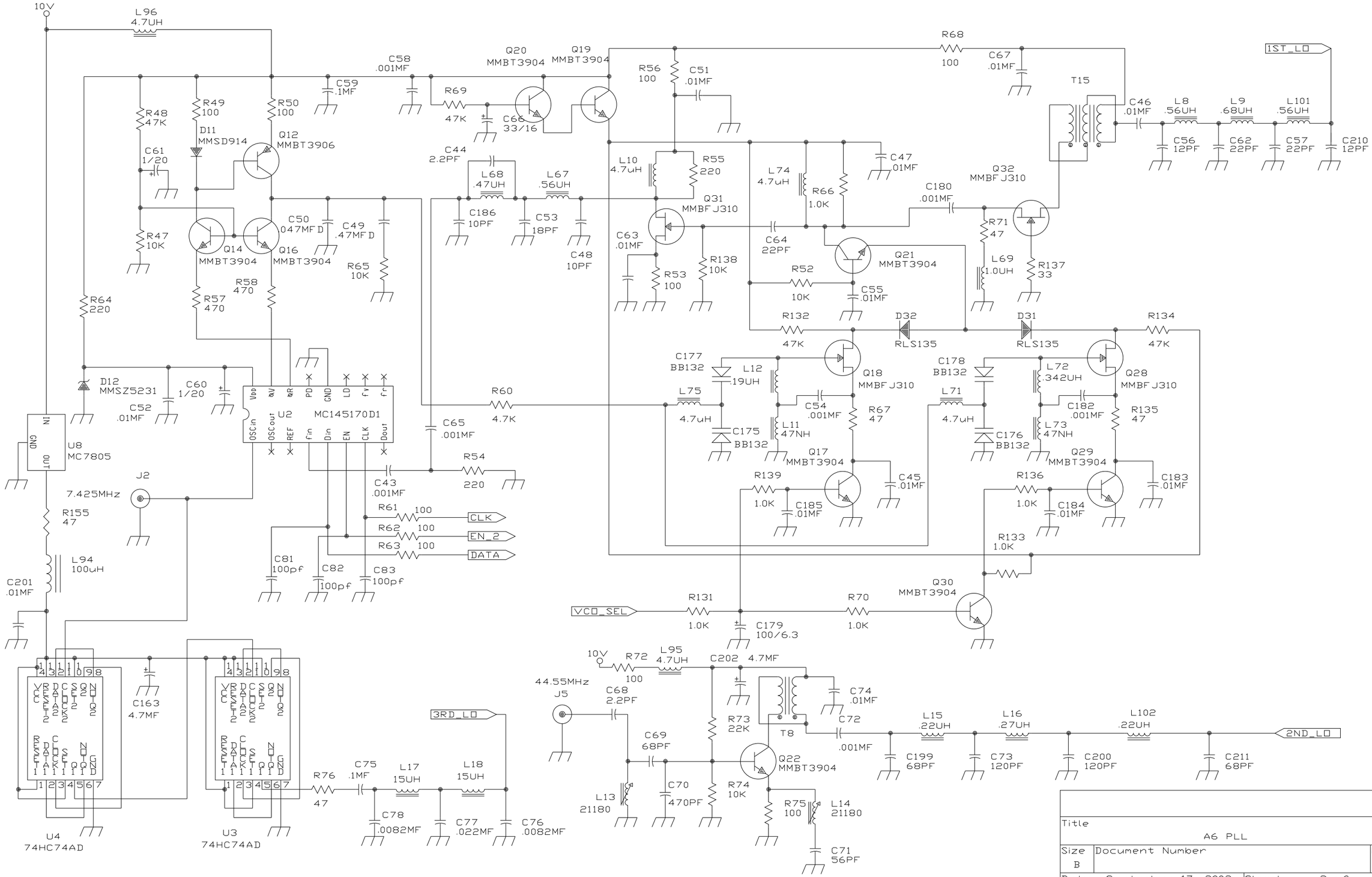
3/24/03 rev C	A10 SYNTHESIZER	81912



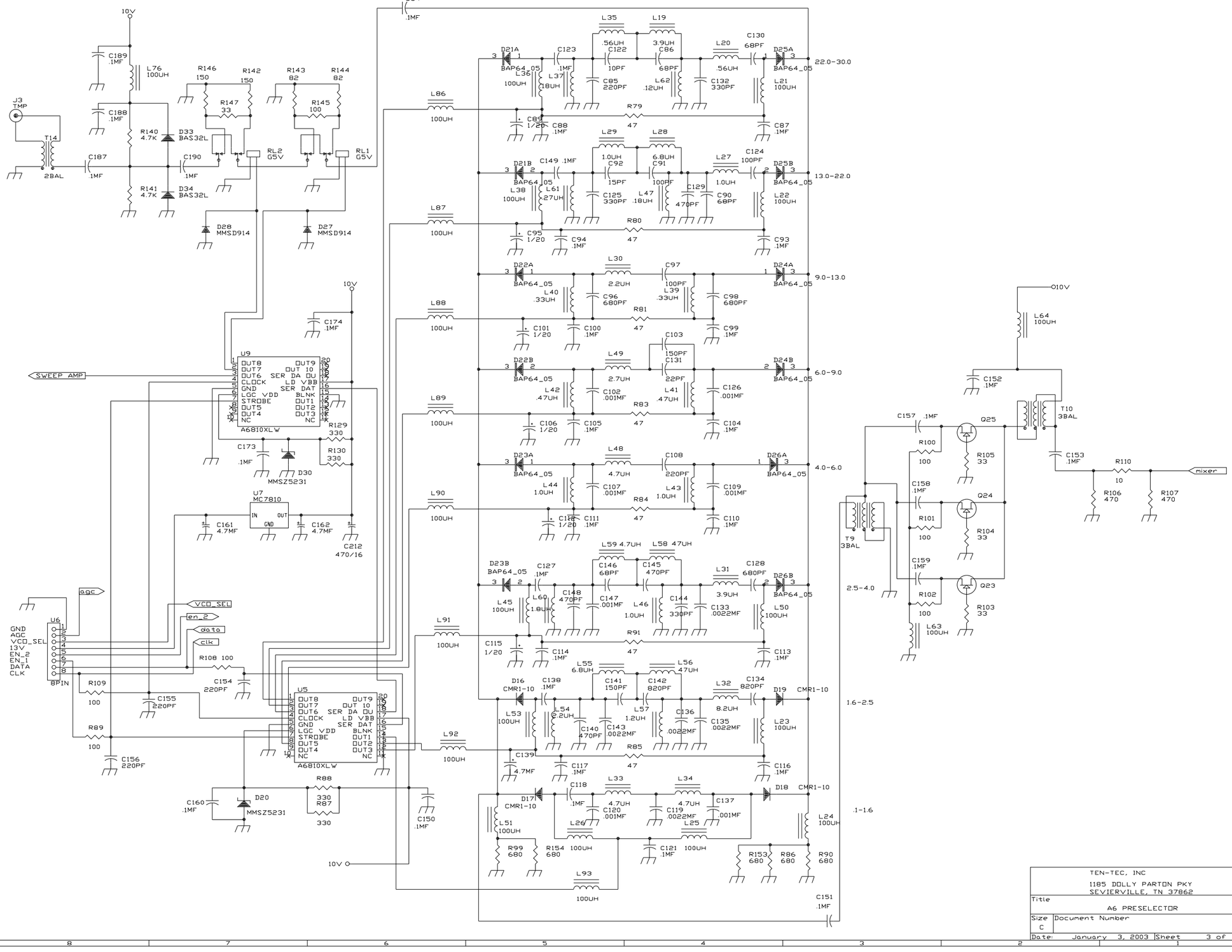
TEN-TEC, INC 1185 DOLLY PARTON PKY SEVIERVILLE, TN 37862		
Size A	Document Number 81906 RF CONVERTER A3	REV D
Date: May 22, 2003	Sheet 1 of 3	


10V
C172 .1MF
C173 .1MF
L96 100UH
R89 150
R90 33
R91 150
R92 82
R93 100
R94 82
RL1 G5V_2
RL2 G5V_2
J1
C180 .1MF
R111 4.7K
R110 4.7K
D31 BAS32L
D30 BAS32L
C179 .1MF
D13 MMSD914T1
D11 MMSD914T1
C88 1800PF
C89 2700PF
L60 27UH
L62 8.2UH
L59 5.6UH
L61 3.3UH
L63 6.8UH
C86 .1MF
L64
C90 10-60PF
D14B BAP64_05
D29A BAP64_05
D29B BAP64_05
D14A BAP64_05
C87 .1MF
C91 .01MF
L66 100UH
D15A BAP64_05
D15B BAP64_05
R20 680
R123 680
R122 680
D16A BAP64_05
D16B BAP64_05
C187 .1MF
L65 100UH
R
T
R18 2.2K
R95 220
C157 .1MF
R19 220
TX_AMP
RX OUT
TX MIXER
D17A BAP64_05
D17B BAP64_05
D18A BAP64_05
D18B BAP64_05
L69 100UH
R124 680
R125 680
R21 680
L67 100UH
L68 100UH
C92 .01MF
XVRT RLY
U2
A6810XLW
OUT8 OUT7 OUT6 CLOCK GND LGC VDD STROBE OUT5 OUT4 NC
OUT9 OUT 10 SER DA OU LD VBB SER DAT BLNK OUT1 OUT2 OUT3 NC
13V
PRE AMP ON
PRE AMP OFF
D7A BAP64_05
L101 15UH
L102 15UH
C42 270PF
C38 270PF
C37 680PF
D3B BAP64_05
L24 1.3UH
L23 1.3UH
L22 1.3UH
C40 220PF
C43 680PF
L25 100UH
L21 100UH
R6 100
C30 .1MF
C10 .1MF
D10A BAP64_05
C36 100PF
C34 180PF
C33 12PF
C29 12PF
C31 180PF
C27 100PF
D4A BAP64_05
L19 2.8UH
L18 2.8UH
L17 2.8UH
C35 820PF
C32 150PF
C28 820PF
L20 100UH
L16 100UH
R7 100
C11 .1MF
C12 .1MF
D9A BAP64_05
L97 .1UH
C181 150PF
C77 150PF
C76 10PF
C75 150PF
C73 62PF
D1A BAP64_05
L46 .25UH
L45 .25UH
L44 .18UH
C78 330PF
C74 330PF
L47 100UH
L1 100UH
R1 100
C1 .1MF
C2 .1MF
C72 82PF
D9B BAP64_05
L98 .1UH
C182 220PF
C58 220PF
C57 10PF
C56 220PF
D1B BAP64_05
L37 .25UH
L36 .25UH
L35 .18UH
C59 560PF
C55 560PF
L48 100UH
L2 100UH
R3 100
C3 .1MF
C53 .1MF
C54 82PF
D8B BAP64_05
L99 .1UH
C183 270PF
C70 68PF
C69 4.7PF
C68 68PF
D2A BAP64_05
L43 .1UH
L42 .1UH
L41 18UH
C71 390PF
C67 360PF
C66 10PF
L34 100UH
L33 100UH
R2 100
C4 .1MF
C5 .1MF
C61 68PF
D8A BAP64_05
L100 .1UH
C184 330PF
C64 62PF
C52 4.7PF
C63 62PF
D2B BAP64_05
L40 1.3UH
L39 1.3UH
L38 27UH
C65 390PF
C62 390PF
C60 4.7PF
L32 100UH
L3 100UH
R4 100
C6 .1MF
C7 .1MF
C44 220PF
D7B BAP64_05
C50 100PF
C49 6.8PF
C47 6.8PF
C46 100PF
L27 .12UH
D3A BAP64_05
L31 1.3UH
L29 1.3UH
C48 82PF
C45 470PF
L30 100UH
L26 100UH
R5 100
C8 .1MF
C9 .1MF
L70 100UH
R24 470
L58 100UH
D5A BAP64_05
C18 1200PF
L9 27UH
C15 1200PF
D6A BAP64_05
L6 8UH
L8 27UH
L5 8UH
C19 1800PF
L10 8UH
C17 1200PF
C16 1800PF
L7 100UH
L4 100UH
R8 100
C13 .1MF
C14 .1MF
R120 680
R121 680
R11 680
D5B BAP64_05
C25 470PF
L56 27UH
C23 470PF
D6B BAP64_05
L15 5.8UH
L14 5.8UH
L13 5.8UH
C26 1200PF
C24 470PF
C22 1200PF
L12 100UH
L11 100UH
R9 100
C20 .1MF
C21 .1MF
D10B BAP64_05
L52 12UH
C84 470PF
C82 470PF
D4B BAP64_05
L55 2.8UH
L54 2.8UH
L53 2.8UH
C85 680PF
C83 390PF
C81 680PF
L50 100UH
L49 100UH
R10 100
C79 .1MF
C80 .1MF
U1 47016
OUT8 OUT7 OUT6 CLOCK GND LGC VDD STROBE OUT5 OUT4 NC
OUT9 OUT 10 SER DA OU LD VBB SER DAT BLNK OUT1 OUT2 OUT3 NC
C186 470/16
R23 330
R22 330
D19 MMSZ5231BT1
C93 .1MF
U3
EN1 DATA CLK DRTN T R
8PIN
R129 4.7K
Q29 MMBT3904
R
T
TEN-TEC, INC
1185 DOLLY PARTON PKY
SEVIERVILLE, TN 37862
Size C
Document Number 81906 RF CONVERTER A3
REV D
Date: May 22, 2003
Sheet 2 of 3

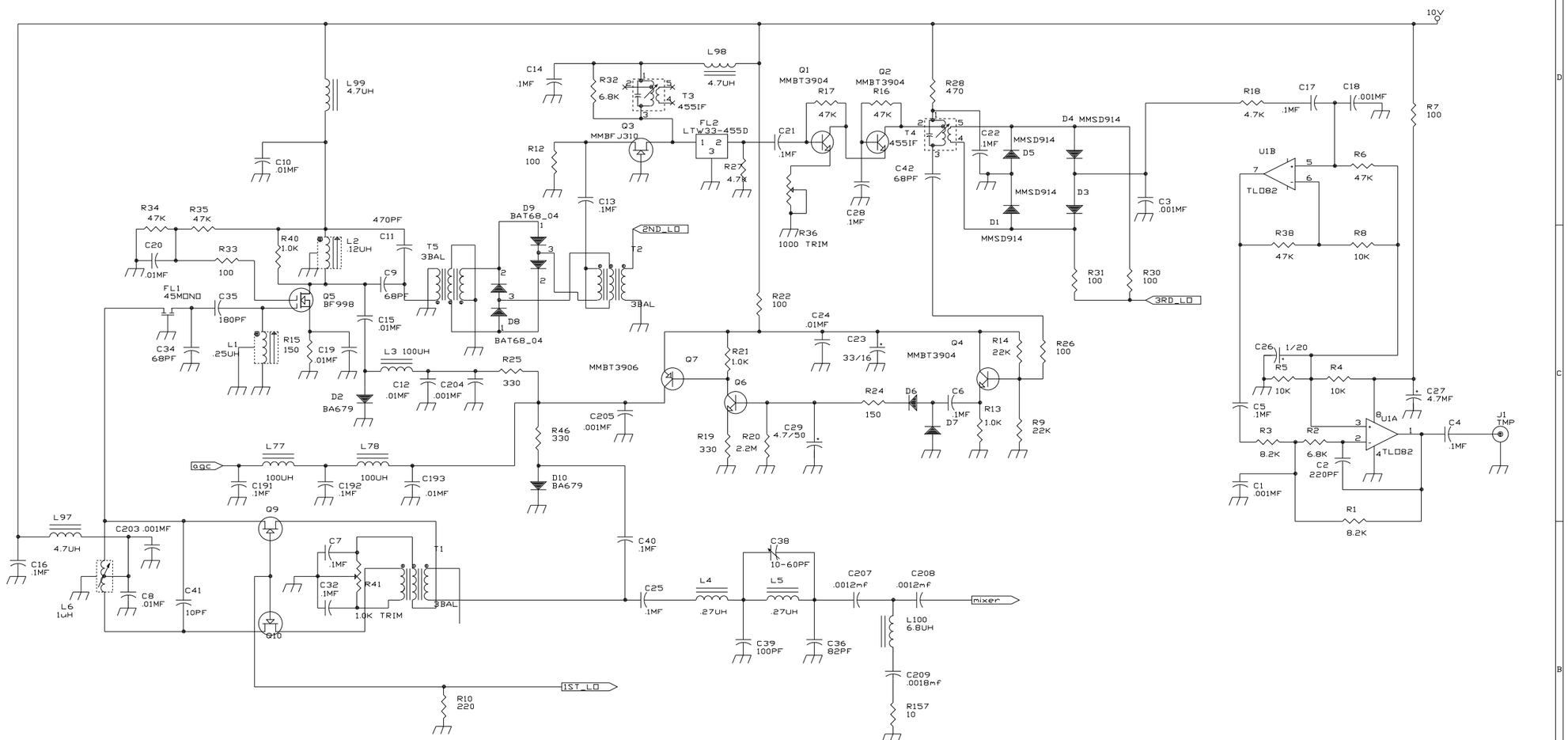

PRE AMP ON
PRE AMP OFF
RX OUT
Low level TX out
XVRT RLY
TX AMP
TX MIXER
ALC
XVRT ALC
Q1 MMBFJ310
Q2 MMBFJ310
Q3 MMBFJ310
Q4 MMBFJ310
Q13 MMBFJ310
Q14 MMBFJ310
Q22 MMBT3906
Q23 MMBT3906
Q24 BFG16A
Q25 MMBT3906
Q26 MMBT3906
Q27 BFG16A
Q28 MMBT3904
Q15 BFG16A
Q16 MMBT3906
Q17 MMBT3904
Q18 BFG16A
Q19 MMBT3904
Q20 MMBT3906
Q21 2SC1971
U4 13V ALC
U5 LM2940S_10
U6A LM358
U6B LM358
T4
T7
T9
T10
T11
T13
T14
T15
T16 DC
T17
T18 DC
T19 2BAL
2BAL
D20A BAP64_05
D20B BAP64_05
D21A BAP64_05
D21B BAP64_05
D23 BA595
D24 MMSZ5228B
D25 MMBD532
D26 MMBD532
D27 MMSD914
D28 MMSD914
D32 MMSD914
D33 MMSD914
D34 MMSD914
RL3 RELAY
J2 TMP
J3 TMP
J4
J5 TMP
J6 TMP xverter
J7 TMP
8PIN
13V
10V
L71 1.0UH
L74 100UH
L75 100UH
L76 100UH
L77 100UH
L78 100UH
L79 .27UH
L80 .33UH
L81 100UH
L82 100UH
L83 100UH
L84 .82UH
L85 .82UH
L86 25UH
L87 27UH
L88 27UH
L90 27UH
L91 27UH
L92 2.7UH
L93 .33UH
L94 1.8UH
L95 1.8UH
X1 9MHz
X2 9MHz
R25 10K POT
R26 10K POT
C98 330PF
C111 68PF
C115 100PF
C116 39PF
C117 10PF
C119 180PF
C118 120PF
C131 .1MF
C132 .1MF
C133 .1MF
C134 .1MF
C135 .1MF
C136 .1MF
C137 .1MF
C138 10/16
C139 .1MF
C140 .1MF
C141 .1MF
C142 4.7MF
C143 .1MF
C144 .1MF
C145 .1MF
C146 18PF
C147 .01MF
C148 .01MF
C150 .1MF
C151 .1MF
C152 .01MF
C153 .01MF
C154 .01MF
C155 4.7MF
C156 .01MF
C158 .1MF
C159 .1MF
C160 4.7MF
C161 .1MF
C162 .1MF
C163 .1MF
C164 .1MF
C165 .1MF
C166 .01MF
C167 120PF
C168 1000PF
C169 180PF
C170 330PF
C171 180PF
C174 10/16
C175 10/16
C176 470PF
C177 .1MF
C178 .1MF
C188 220PF
C189 220PF
R27 680
R28 680
R29 680
R30 680
R42 27
R43 3.3
R44 3.3K
R45 560
R46 680
R47 3.3
R50 220
R51 220
R52 470
R53 33
R54 33
R55 680
R56 3.3K
R57 10
R58 15
R59 47
R60 220
R61 47
R65 47
R66 47
R67 1
R68 68
R69 10K
R70 10K
R72 820
R73 1.0K
R74 3.9/.25W
R75 4.7/.25W
R76 2.2K
R77 2.2K
R78 10K
R80 330
R81 100
R82 22
R83 22
R84 47
R85 1.0K
R86 470
R87 180/.25W
R88 180/.25W
R96 470
R98 3.3
R99 680
R100 3.3
R101 1.5K
R102 560
R103 150
R104 1.5K
R105 47
R106 47
R107 150
R108 3.3K
R109 10K
R112 1.5K
R113 1.5K
R114 33
R115 3.3K
R116 47
R117 470K
R118 1.0K
R119 100
R120 47
R122 47
R123 .1MF
R124 .01MF
R125 .01MF
R126 4.7K
R127 4.7K
R128 47
R130 1.5K
R131 1.5K
TEN-TEC, INC
1185 DOLLY PARTON PKY
SEVIERVILLE, TN 37862
Title
A3-Trans/Receive
Size C
Document Number 81906 RF CONVERTER A3
REV D
Date: May 22, 2003
Sheet 3 of 3



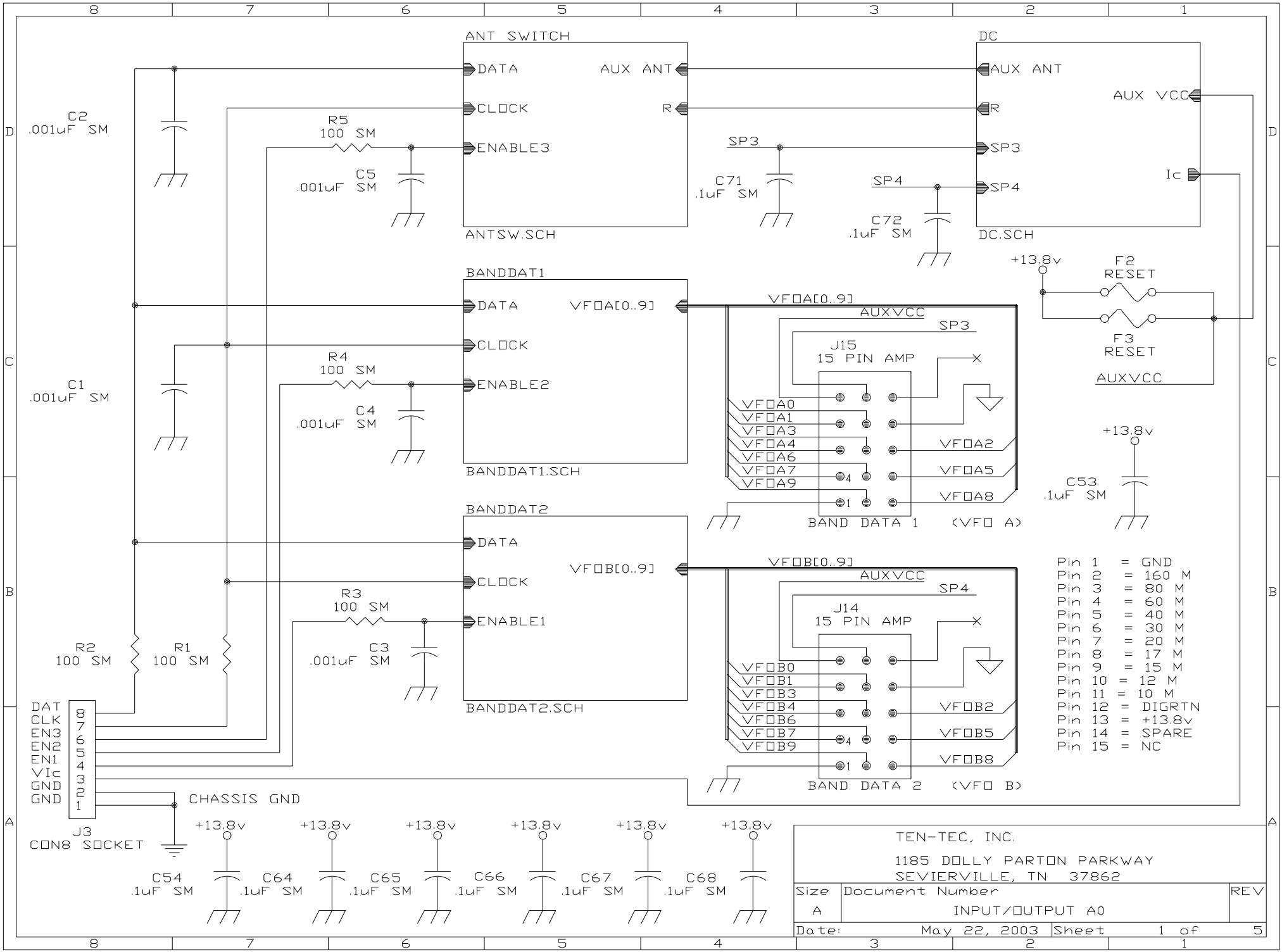
Title	A6 PLL	
Size B	Document Number	REV A
Date: September 17, 2002	Sheet 2 of 4	

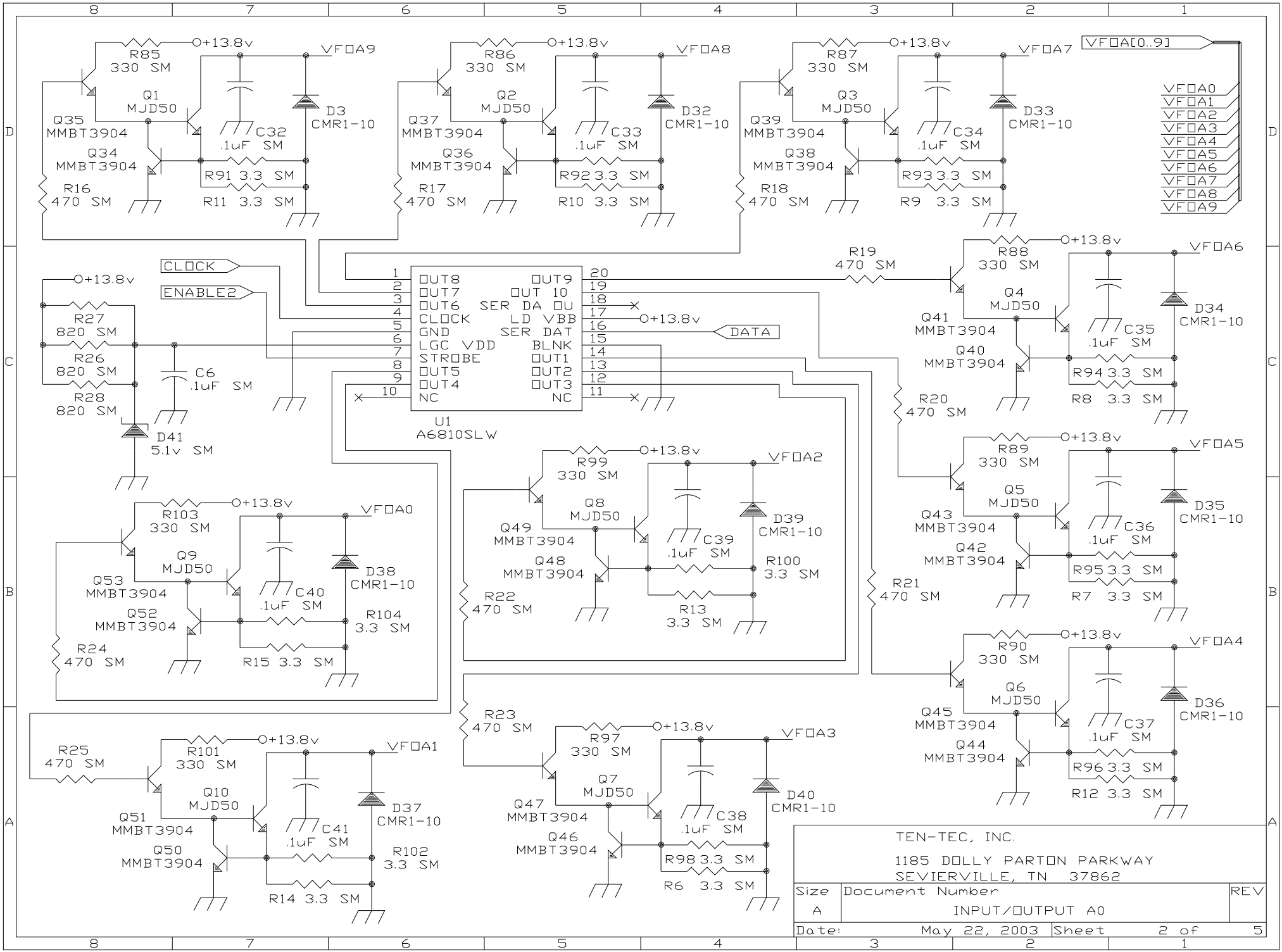


TEN-TEC, INC 1185 DOLLY PARTON PKY SEVIERVILLE, TN 37862		
Title: A6 PRESELECTOR		
Size: C	Document Number	REV: A
Date: January 3, 2003	Sheet 3 of 4	



TEN-TEC, INC		
1185 DOLLY PARTON PKY SEVIERVILLE, TN 37862		
Title: A6 RCVR		
Size: C	Document Number	REV: A
Date: January 3, 2003	Sheet 4 of 4	


ANT SWITCH
DATA
CLOCK
ENABLE3
AUX ANT
R
ANTSW.SCH
DC
AUX ANT
R
SP3
SP4
AUX VCC
Ic
DC.SCH
C2
.001uF SM
R5
100 SM
C5
.001uF SM
C71
.1uF SM
C72
.1uF SM
+13.8v
F2
RESET
F3
RESET
AUXVCC
BANDDAT1
DATA
CLOCK
ENABLE2
VFOA[0..9]
BANDDAT1.SCH
C1
.001uF SM
R4
100 SM
C4
.001uF SM
J15
15 PIN AMP
VFOA0
VFOA1
VFOA3
VFOA4
VFOA6
VFOA7
VFOA9
VFOA2
VFOA5
VFOA8
BAND DATA 1 (VFO A)
C53
.1uF SM
BANDDAT2
DATA
CLOCK
ENABLE1
VFOB[0..9]
BANDDAT2.SCH
R3
100 SM
C3
.001uF SM
J14
15 PIN AMP
VFOB0
VFOB1
VFOB3
VFOB4
VFOB6
VFOB7
VFOB9
VFOB2
VFOB5
VFOB8
BAND DATA 2 (VFO B)
R2
100 SM
R1
100 SM
DAT
CLK
EN3
EN2
EN1
VIc
GND
GND
J3
CON8 SOCKET
CHASSIS GND
Pin 1 = GND
Pin 2 = 160 M
Pin 3 = 80 M
Pin 4 = 60 M
Pin 5 = 40 M
Pin 6 = 30 M
Pin 7 = 20 M
Pin 8 = 17 M
Pin 9 = 15 M
Pin 10 = 12 M
Pin 11 = 10 M
Pin 12 = DIGRTN
Pin 13 = +13.8v
Pin 14 = SPARE
Pin 15 = NC
C54 .1uF SM
C64 .1uF SM
C65 .1uF SM
C66 .1uF SM
C67 .1uF SM
C68 .1uF SM
TEN-TEC, INC.
1185 DOLLY PARTON PARKWAY
SEVIERVILLE, TN 37862
Size A
Document Number
INPUT/OUTPUT A0
REV
Date: May 22, 2003
Sheet 1 of 5


R85 330 SM
+13.8v
VFOA9
Q1 MJD50
Q35 MMBT3904
Q34 MMBT3904
C32 .1uF SM
D3 CMR1-10
R16 470 SM
R91 3.3 SM
R11 3.3 SM
R86 330 SM
+13.8v
VFOA8
Q2 MJD50
Q37 MMBT3904
Q36 MMBT3904
C33 .1uF SM
D32 CMR1-10
R17 470 SM
R92 3.3 SM
R10 3.3 SM
R87 330 SM
+13.8v
VFOA7
Q3 MJD50
Q39 MMBT3904
Q38 MMBT3904
C34 .1uF SM
D33 CMR1-10
R18 470 SM
R93 3.3 SM
R9 3.3 SM
VFOA[0..9]
VFOA0
VFOA1
VFOA2
VFOA3
VFOA4
VFOA5
VFOA6
VFOA7
VFOA8
VFOA9
CLOCK
ENABLE2
DATA
+13.8v
R27 820 SM
R26 820 SM
R28 820 SM
C6 .1uF SM
D41 5.1v SM
U1
A6810SLW
1 OUT8
2 OUT7
3 OUT6
4 CLOCK
5 GND
6 LGC VDD
7 STROBE
8 OUT5
9 OUT4
10 NC
20 OUT9
19 OUT 10
18 SER DA OU
17 LD VBB
16 SER DAT
15 BLNK
14 OUT1
13 OUT2
12 OUT3
11 NC
R19 470 SM
R88 330 SM
+13.8v
VFOA6
Q4 MJD50
Q41 MMBT3904
Q40 MMBT3904
C35 .1uF SM
D34 CMR1-10
R94 3.3 SM
R8 3.3 SM
R20 470 SM
R89 330 SM
+13.8v
VFOA5
Q5 MJD50
Q43 MMBT3904
Q42 MMBT3904
C36 .1uF SM
D35 CMR1-10
R95 3.3 SM
R7 3.3 SM
R21 470 SM
R90 330 SM
+13.8v
VFOA4
Q6 MJD50
Q45 MMBT3904
Q44 MMBT3904
C37 .1uF SM
D36 CMR1-10
R96 3.3 SM
R12 3.3 SM
R103 330 SM
+13.8v
VFOA0
Q9 MJD50
Q53 MMBT3904
Q52 MMBT3904
C40 .1uF SM
D38 CMR1-10
R104 3.3 SM
R24 470 SM
R15 3.3 SM
R99 330 SM
+13.8v
VFOA2
Q8 MJD50
Q49 MMBT3904
Q48 MMBT3904
C39 .1uF SM
D39 CMR1-10
R100 3.3 SM
R22 470 SM
R13 3.3 SM
R23 470 SM
R97 330 SM
+13.8v
VFOA3
Q7 MJD50
Q47 MMBT3904
Q46 MMBT3904
C38 .1uF SM
D40 CMR1-10
R98 3.3 SM
R6 3.3 SM
R25 470 SM
R101 330 SM
+13.8v
VFOA1
Q10 MJD50
Q51 MMBT3904
Q50 MMBT3904
C41 .1uF SM
D37 CMR1-10
R102 3.3 SM
R14 3.3 SM
TEN-TEC, INC.
1185 DOLLY PARTON PARKWAY
SEVIERVILLE, TN 37862
Size A
Document Number
INPUT/OUTPUT A0
REV
Date: May 22, 2003
Sheet 2 of 5

ANT1
ANTENNA

J19
TMP

J20
TMP

ANT2
ANTENNA

L3
1mH PC

L4
1mH PC

GAP1
SPARK GAP

GAP2
SPARK GAP

D85
CMR1-10

S15
RELAY SPDT

C10
.1uF SM

C11
.1uF SM

L1
1mH

R133 1k SM

C12
.01uF 500v

C13
.1uF SM

L2
1mH

TX IN

D87
1N4007

D90
BAV21W

D92
BAV21W

D93
1N4007

R55
470 SM

R58
470 SM

C9
.1uF SM

D89
BAV21W

D91
BAV21W

C14
.1uF SM

R56
470 SM

C75
.01uF 500v
L6
100uH SM

R57
47k SM

R59
470 SM

L8
100uH SM

D88
1N4007

D94
1N4007

R60
3.3k SM

C16
.1uF SM

Q21
PZTA92

C15
.1uF SM

R61
10k SM

L9
100uH SM

R135
220 SM

R134
220 SM

L7
100uH SM

C17
.1uF SM

C18
.1uF SM

R

R

AUX ANT

L5
1mH PC

GAP3
SPARK GAP

S10
RELAY SN1A12A

D98
MMSD914

S9
RELAY SN1A12A

D99
MMSD914

S8
RELAY SN1A12A

D100
MMSD914

S4
RELAY SN1A12A

D101
MMSD914

S6
RELAY SN1A12A

D102
MMSD914

S5
RELAY SN1A12A

D103
MMSD914

S3
RELAY SN1A12A

D105
MMSD914

S2
RELAY SN1A12A

D106
MMSD914

S1
RELAY SN1A12A

D107
MMSD914

D96
MMSD914

D97
MMSD914

D95
MMSD914

K2
RELAY REED

J4
TMP

+13.8v

C73
.01uF SM

R81
560 SM

R84
2.2k SM

Q33
MMBT3904

R83
4.7k SM

Q32
MMBT3904

R82
4.7k SM

T2
BIFILAR CT

T1
TRANSFORMER

R62
47 SM

S7a
RELAY SN1A12A

D83
MMSD914

S7b
RELAY SN1A12A

D84
MMSD914

To SUB RX

J5
TMP

To MAIN RX

J6
TMP

+13.8v

R52
820 SM

R53
820 SM

R54
820 SM

C8
.1uF SM

CLOCK

ENABLE3

DATA

D86
5.1v SM

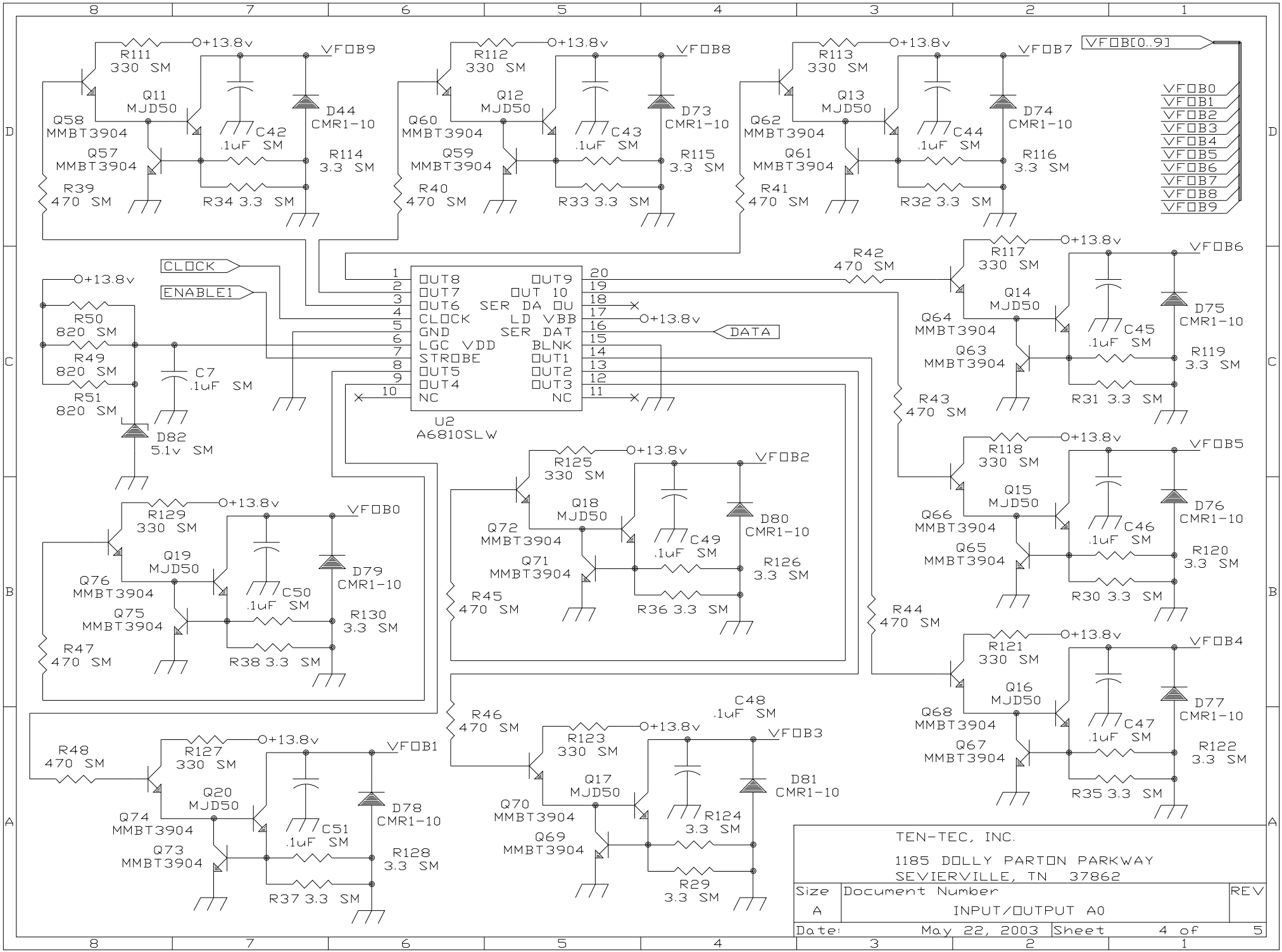
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A6810SLW

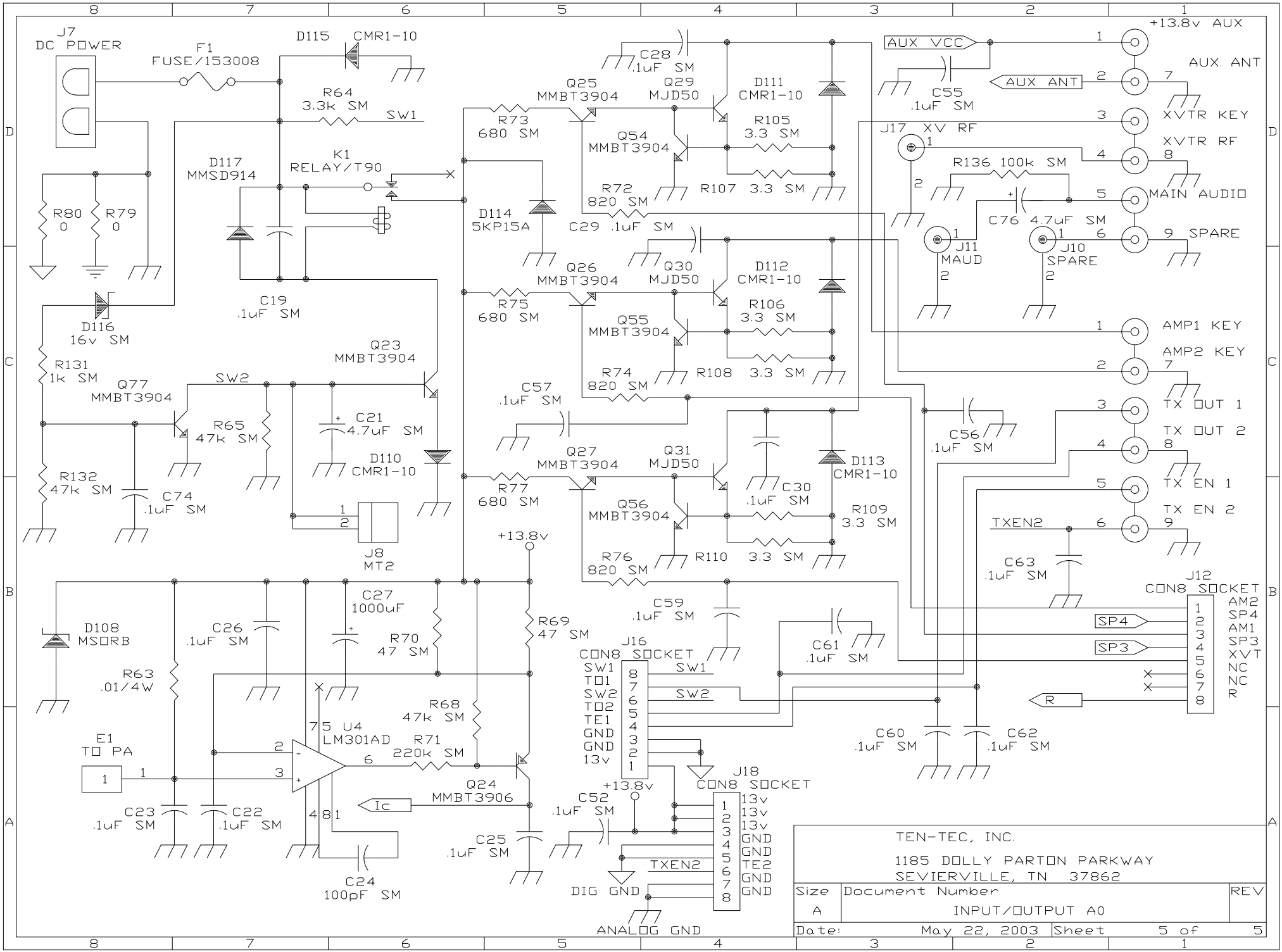
1	OUT8	OUT9 20
2	OUT7	OUT 10 19
3	OUT6	SER DA OU 18
4	CLOCK	LD VBB 17
5	GND	SER DAT 16
6	LGC VDD	BLNK 15
7	STROBE	OUT1 14
8	OUT5	OUT2 13
9	OUT4	OUT3 12
10	NC	NC 11

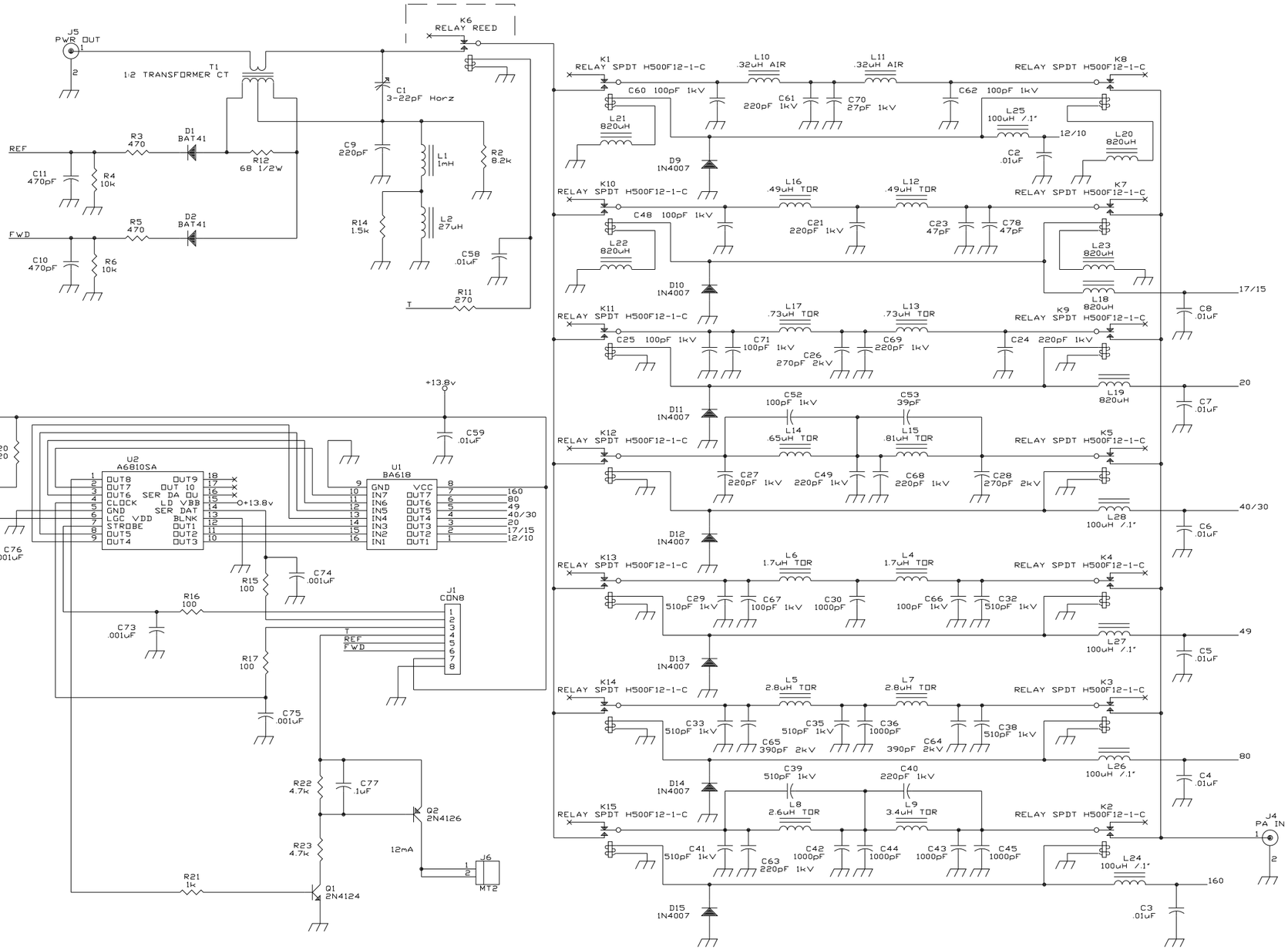
TEN-TEC, INC.

1185 DOLLY PARTON PARKWAY
SEVIERVILLE, TN 37862

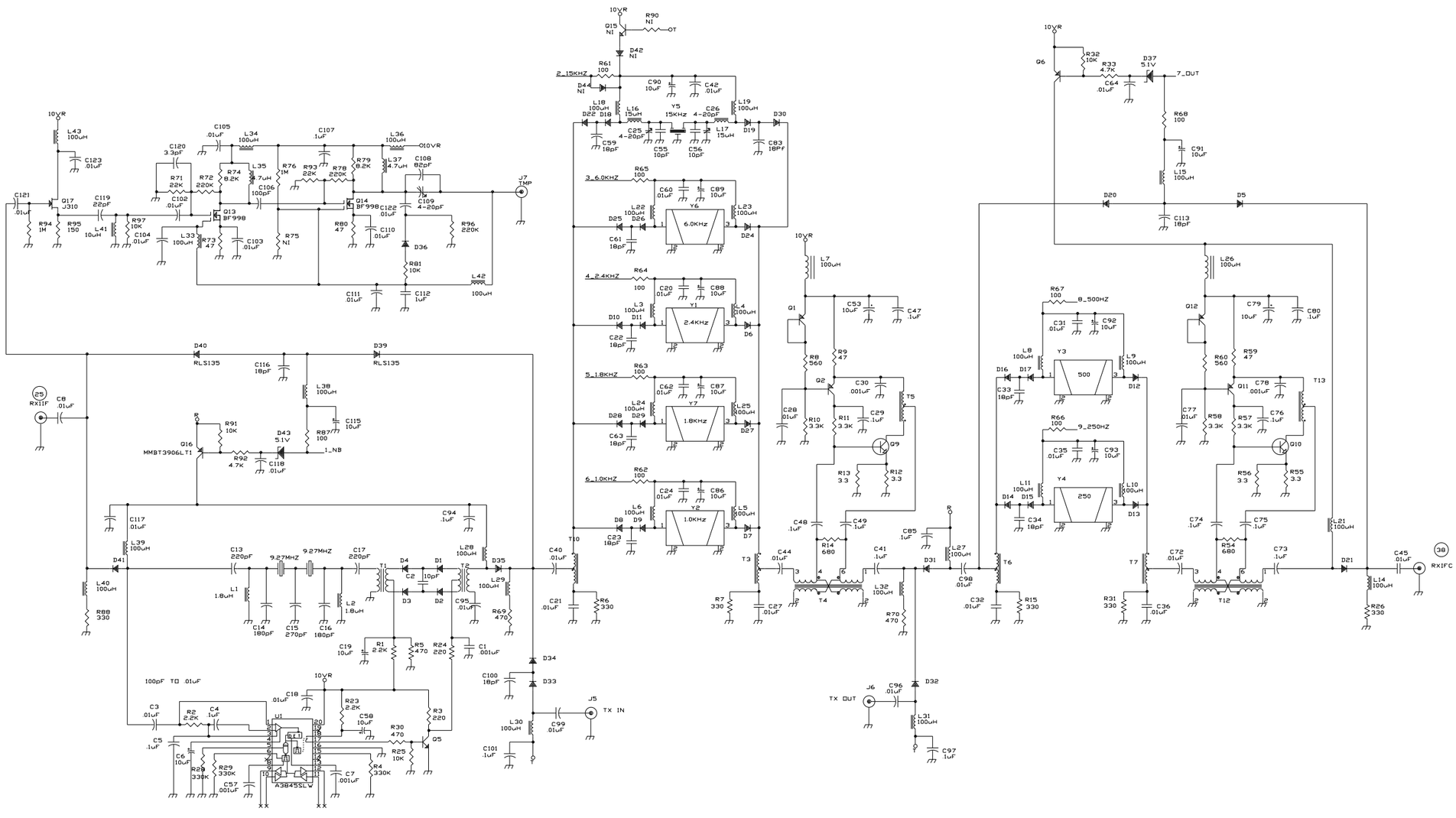
Size	Document Number	REV
B	INPUT/OUTPUT A0	
Date: May 22, 2003	Sheet 3 of 5	


VFOB[0..9]
VFOB0
VFOB1
VFOB2
VFOB3
VFOB4
VFOB5
VFOB6
VFOB7
VFOB8
VFOB9
+13.8v
R111 330 SM
Q11 MJD50
Q58 MMBT3904
Q57 MMBT3904
C42 .1uF SM
D44 CMR1-10
R114 3.3 SM
R34 3.3 SM
R39 470 SM
R112 330 SM
Q12 MJD50
Q60 MMBT3904
Q59 MMBT3904
C43 .1uF SM
D73 CMR1-10
R115 3.3 SM
R33 3.3 SM
R40 470 SM
R113 330 SM
Q13 MJD50
Q62 MMBT3904
Q61 MMBT3904
C44 .1uF SM
D74 CMR1-10
R116 3.3 SM
R32 3.3 SM
R41 470 SM
CLOCK
ENABLE1
DATA
R50 820 SM
R49 820 SM
R51 820 SM
C7 .1uF SM
D82 5.1v SM
OUT8
OUT7
OUT6
CLOCK
GND
LGC VDD
STROBE
OUT5
OUT4
NC
OUT9
OUT 10
SER DA OU
LD VBB
SER DAT
BLNK
OUT1
OUT2
OUT3
NC
U2
A6810SLW
R42 470 SM
R117 330 SM
Q14 MJD50
Q64 MMBT3904
Q63 MMBT3904
C45 .1uF SM
D75 CMR1-10
R119 3.3 SM
R31 3.3 SM
R43 470 SM
R118 330 SM
Q15 MJD50
Q66 MMBT3904
Q65 MMBT3904
C46 .1uF SM
D76 CMR1-10
R120 3.3 SM
R30 3.3 SM
R44 470 SM
R125 330 SM
Q18 MJD50
Q72 MMBT3904
Q71 MMBT3904
C49 .1uF SM
D80 CMR1-10
R126 3.3 SM
R36 3.3 SM
R45 470 SM
R129 330 SM
Q19 MJD50
Q76 MMBT3904
Q75 MMBT3904
C50 .1uF SM
D79 CMR1-10
R130 3.3 SM
R38 3.3 SM
R47 470 SM
R121 330 SM
Q16 MJD50
Q68 MMBT3904
Q67 MMBT3904
C47 .1uF SM
D77 CMR1-10
R122 3.3 SM
R35 3.3 SM
R46 470 SM
C48 .1uF SM
R123 330 SM
Q17 MJD50
Q70 MMBT3904
Q69 MMBT3904
R124 3.3 SM
D81 CMR1-10
R29 3.3 SM
R48 470 SM
R127 330 SM
Q20 MJD50
Q74 MMBT3904
Q73 MMBT3904
C51 .1uF SM
D78 CMR1-10
R128 3.3 SM
R37 3.3 SM
TEN-TEC, INC.
1185 DOLLY PARTON PARKWAY
SEVIERVILLE, TN 37862
Size A
Document Number
INPUT/OUTPUT A0
REV
Date: May 22, 2003
Sheet 4 of 5

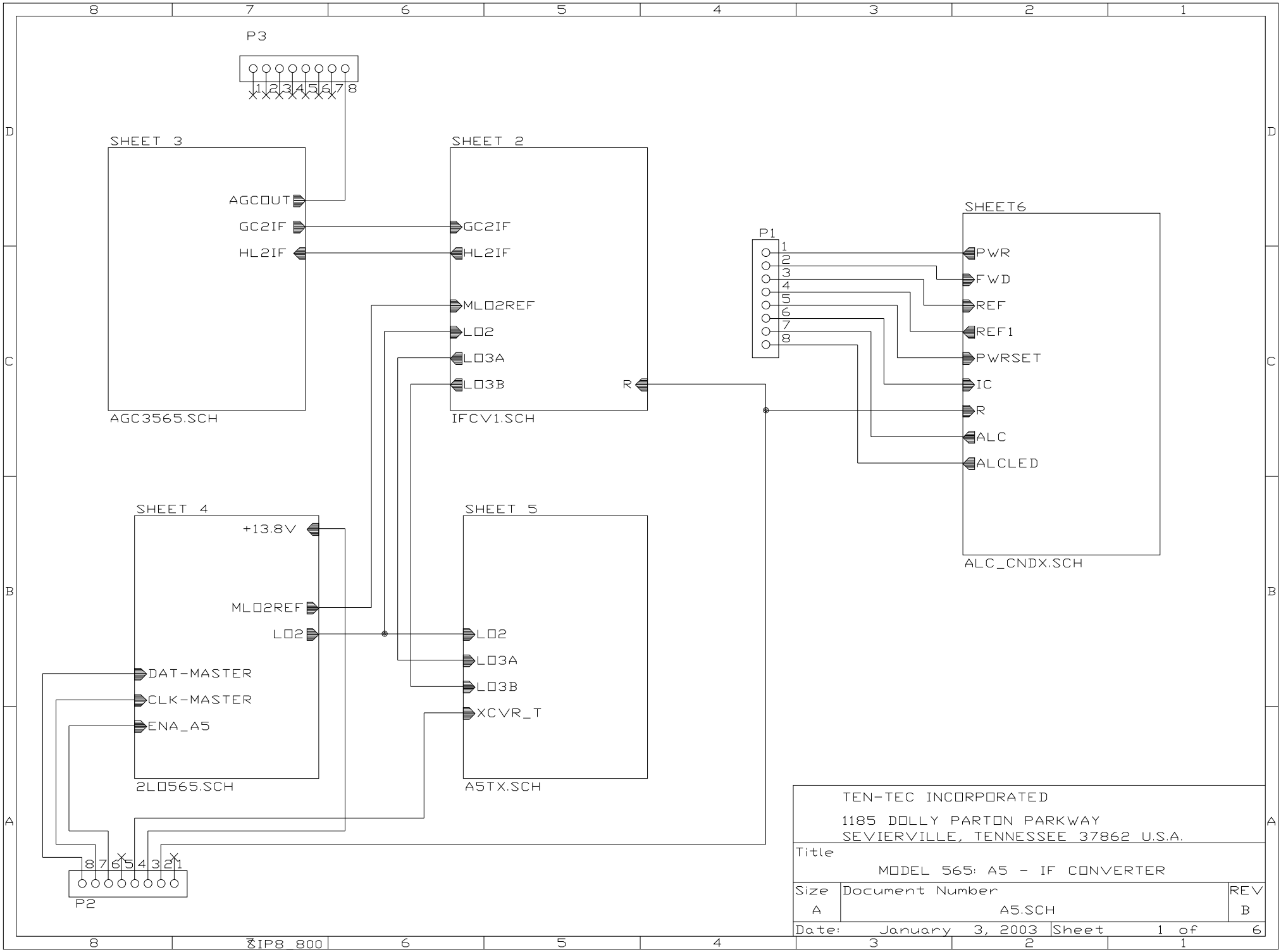

J7
DC POWER
F1
FUSE/153008
D115 CMR1-10
R64
3.3k SM
SW1
D117
MMSD914
K1
RELAY/T90
R80
0
R79
0
D116
16v SM
C19
.1uF SM
R131
1k SM
Q77
MMBT3904
SW2
R65
47k SM
C21
4.7uF SM
D110
CMR1-10
Q23
MMBT3904
R132
47k SM
C74
.1uF SM
J8
MT2
D114
5KP15A
C28
.1uF SM
Q25
MMBT3904
Q29
MJD50
D111
CMR1-10
R73
680 SM
R105
3.3 SM
Q54
MMBT3904
R72
820 SM
R107 3.3 SM
C29 .1uF SM
Q26
MMBT3904
Q30
MJD50
D112
CMR1-10
R75
680 SM
R106
3.3 SM
Q55
MMBT3904
R74
820 SM
R108 3.3 SM
C57
.1uF SM
Q27
MMBT3904
Q31
MJD50
D113
CMR1-10
R77
680 SM
C30
.1uF SM
R109
3.3 SM
Q56
MMBT3904
R76
820 SM
R110 3.3 SM
+13.8v
C27
1000uF
R70
47 SM
R69
47 SM
D108
MSORB
C26
.1uF SM
R63
.01/4W
R68
47k SM
75 U4
LM301AD
R71
220k SM
E1
TO PA
Q24
MMBT3906
Ic
C23
.1uF SM
C22
.1uF SM
C24
100pF SM
C25
.1uF SM
C52
.1uF SM
C59
.1uF SM
C61
.1uF SM
J16
CON8 SOCKET
SW1
TO1
SW2
TO2
TE1
GND
GND
13v
J18
CON8 SOCKET
13v
13v
13v
GND
GND
TE2
GND
GND
TXEN2
DIG GND
ANALOG GND
AUX VCC
C55
.1uF SM
AUX ANT
+13.8v AUX
AUX ANT
XVTR KEY
XVTR RF
MAIN AUDIO
SPARE
J17 XV RF
R136 100k SM
C76 4.7uF SM
J11
MAUD
J10
SPARE
AMP1 KEY
AMP2 KEY
TX OUT 1
TX OUT 2
TX EN 1
TX EN 2
TXEN2
C63
.1uF SM
C56
.1uF SM
J12
CON8 SOCKET
AM2
SP4
AM1
SP3
XVT
NC
NC
R
SP4
SP3
R
C60
.1uF SM
C62
.1uF SM
TEN-TEC, INC.
1185 DOLLY PARTON PARKWAY
SEVIERVILLE, TN 37862
Size
A
Document Number
INPUT/OUTPUT A0
REV
Date: May 22, 2003
Sheet 5 of 5

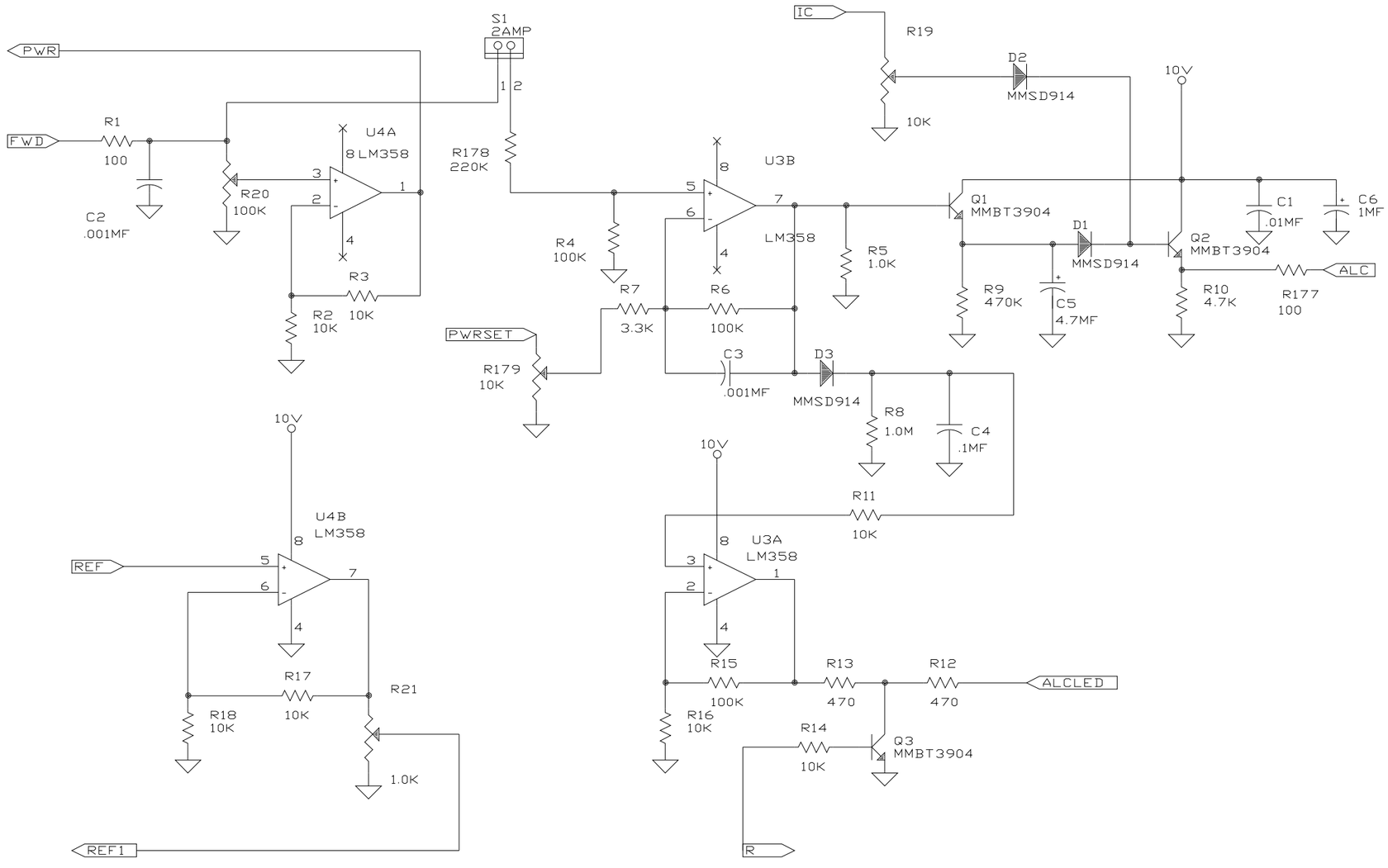


TEN-TEC, INC.		
1185 DOLLY PARTON PARKWAY SEVIERVILLE, TN 37862		
Size: C	Document Number: 81909 LOWPASS FILTER A1	REV:
Date: May 22, 2003	Sheet 1 of 1	



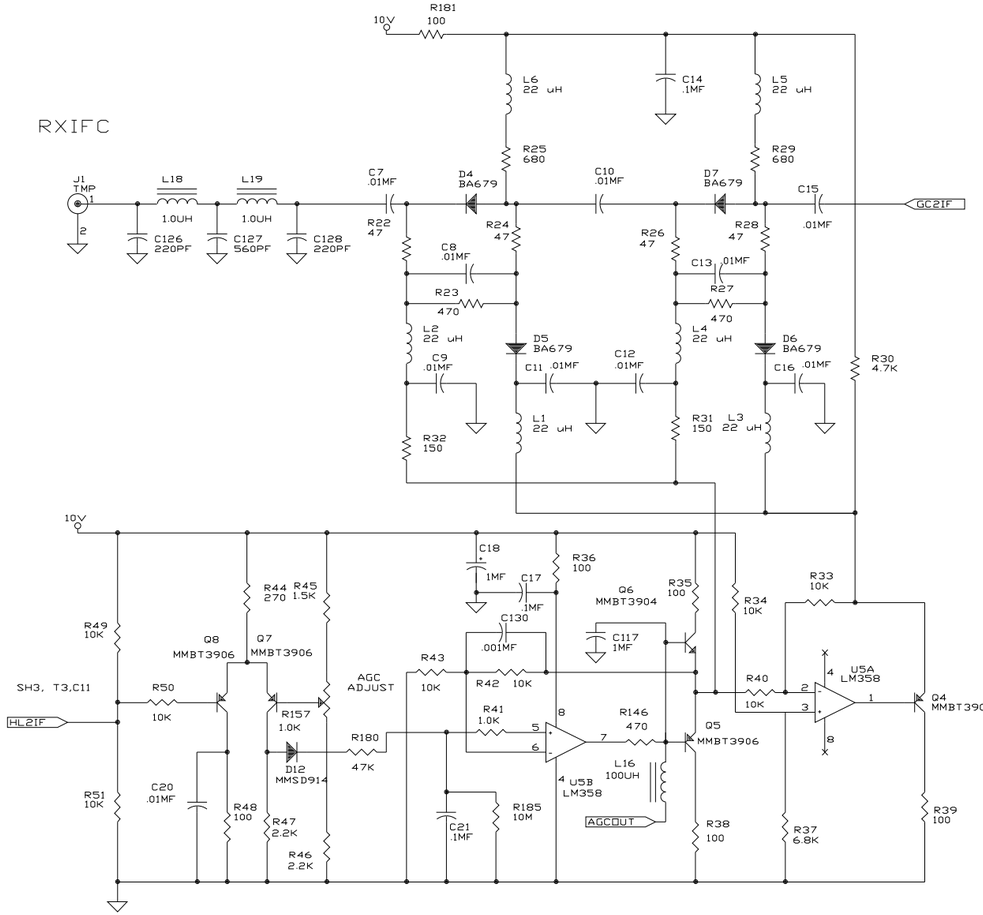
Ten-Tec, Inc.		
Size	Document Number	REV
D	81910 9MHz IF A4	A
Date: May 22, 2003	Sheet 1 of 1	


P3
1 2 3 4 5 6 7 8
SHEET 3
AGCOUT
GC2IF
HL2IF
AGC3565.SCH
SHEET 2
GC2IF
HL2IF
ML02REF
L02
L03A
L03B
R
IFCV1.SCH
P1
1
2
3
4
5
6
7
8
SHEET6
PWR
FWD
REF
REF1
PWRSET
IC
R
ALC
ALCLED
ALC_CNDX.SCH
SHEET 4
+13.8V
ML02REF
L02
DAT-MASTER
CLK-MASTER
ENA_A5
2L0565.SCH
SHEET 5
L02
L03A
L03B
XCVR_T
A5TX.SCH
8 7 6 5 4 3 2 1
P2
TEN-TEC INCORPORATED
1185 DOLLY PARTON PARKWAY
SEVIERVILLE, TENNESSEE 37862 U.S.A.
Title
MODEL 565: A5 - IF CONVERTER
Size
A
Document Number
A5.SCH
REV
B
Date: January 3, 2003
Sheet 1 of 6

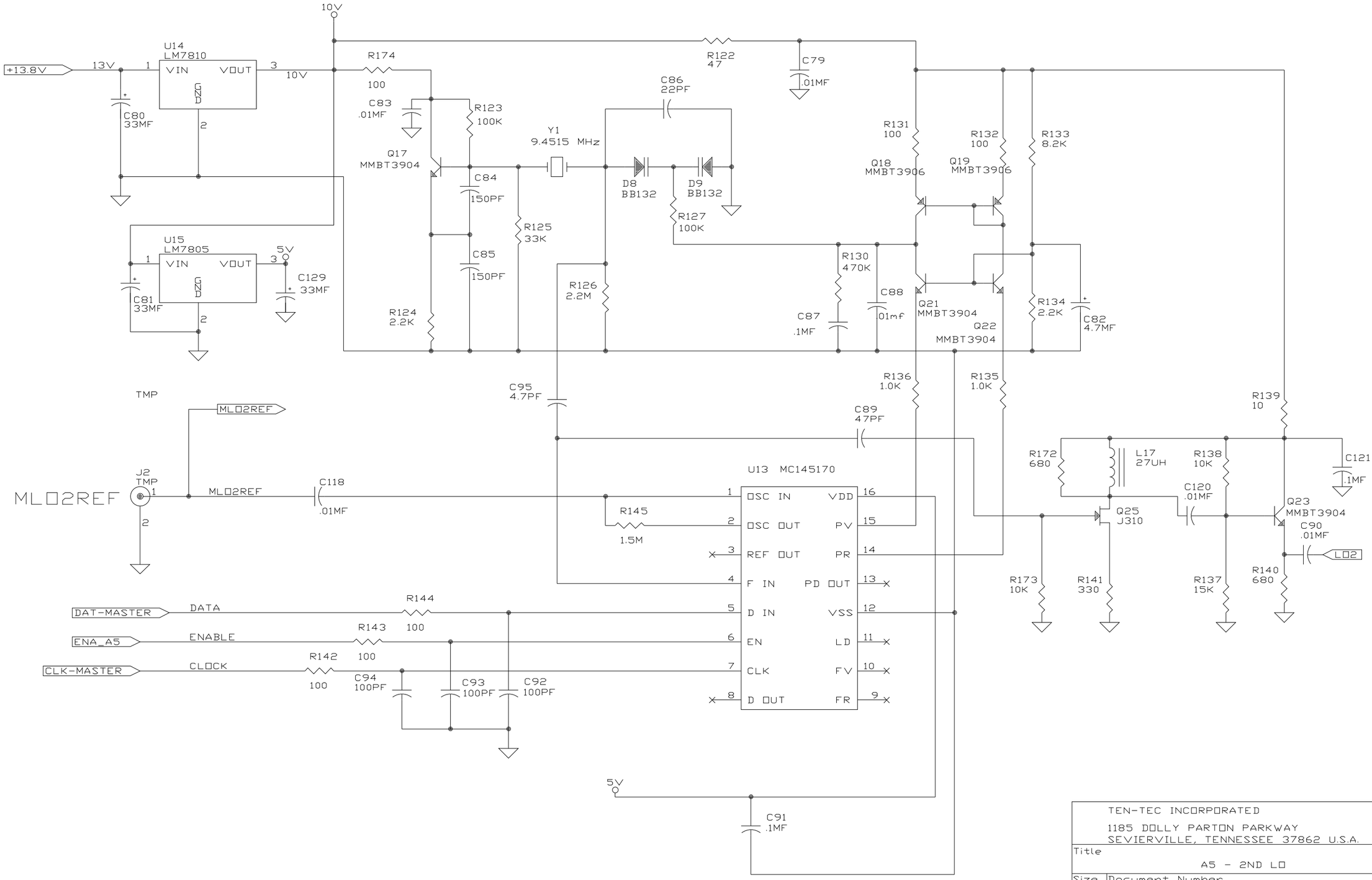


TEN-TEC INCORPORATED 1185 DOLLY PARTON PARKWAY SEVIERVILLE, TENNESSEE 37863, USA		
Title MODEL 565 - A5 ALC CIRCUITRY		
Size B	Document Number	REV B
Date: February 14, 2002	Sheet 2 of 6	

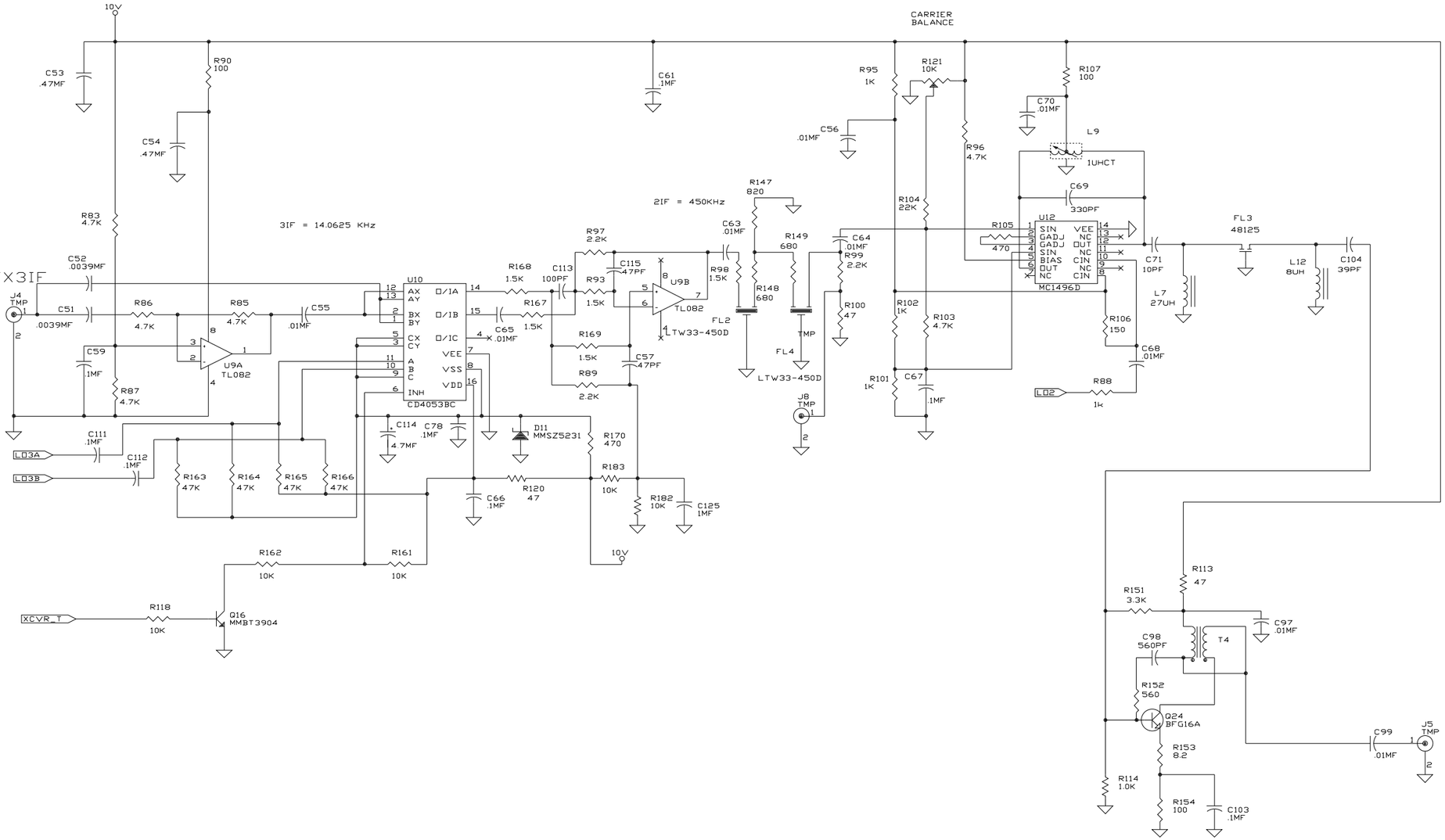
RXIFC



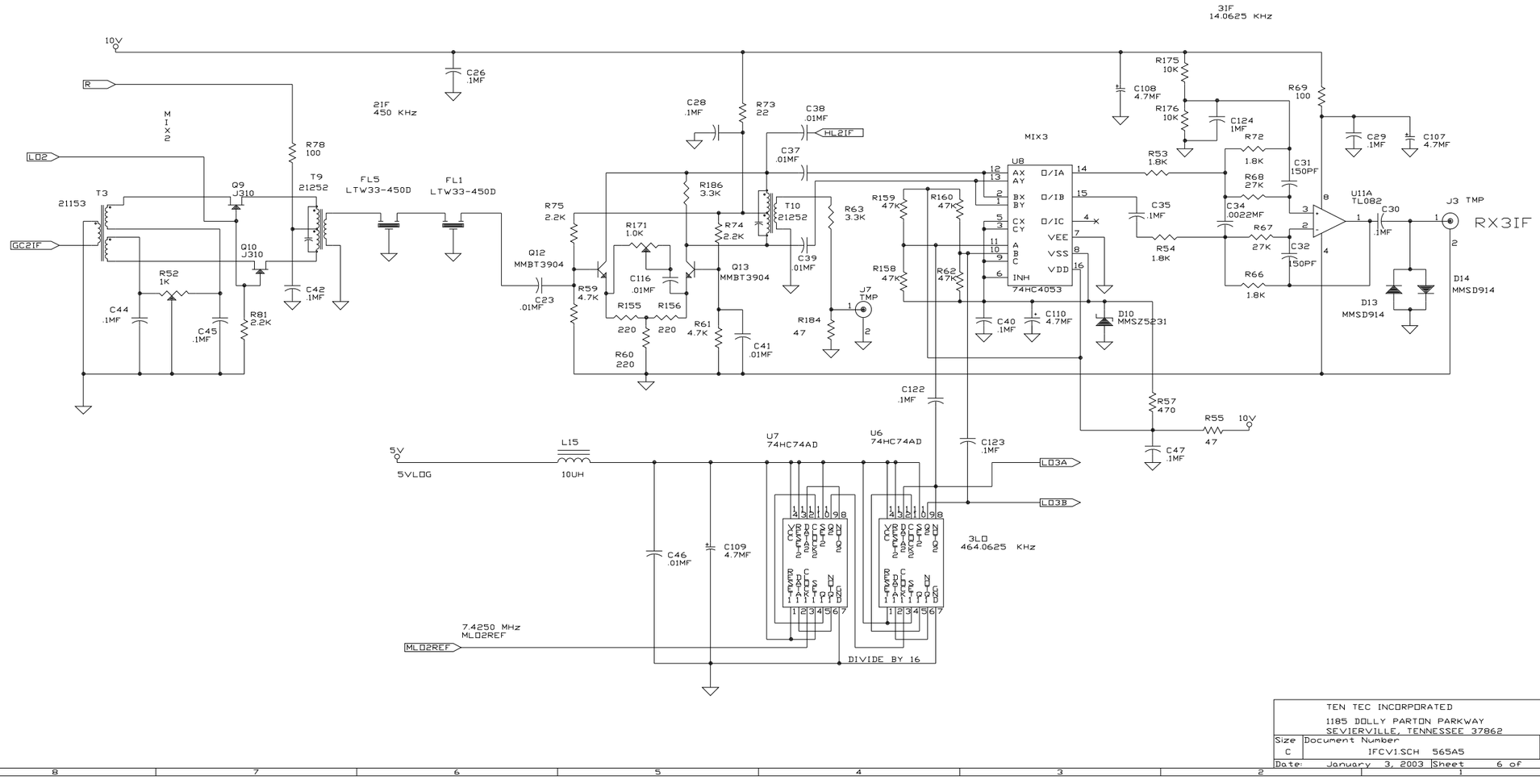
TEN-TEC INCORPORATED	
1185 DOLLY PARTON PARKWAY SEVIERVILLE, TENNESSEE 37862	
Title	A5 - AGCDET3
Size: C	Document Number: AGC3565.SCH
REV: B	
Date: February 18, 2003	Sheet 3 of 6



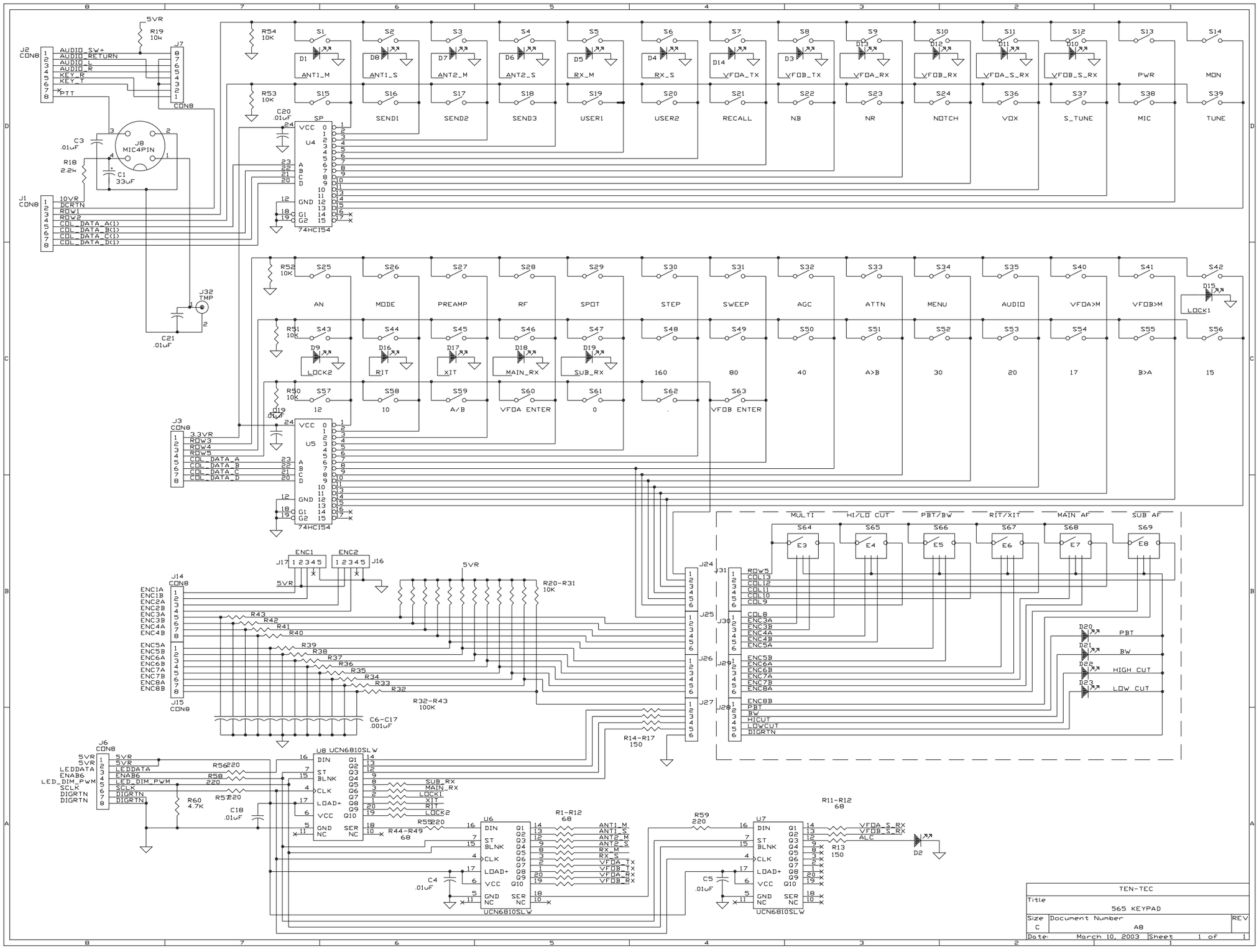
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Title A5 - 2ND LO		
Size B	Document Number 2LO565.SCH	REV B
Date: January 6, 2003	Sheet 4 of 6	

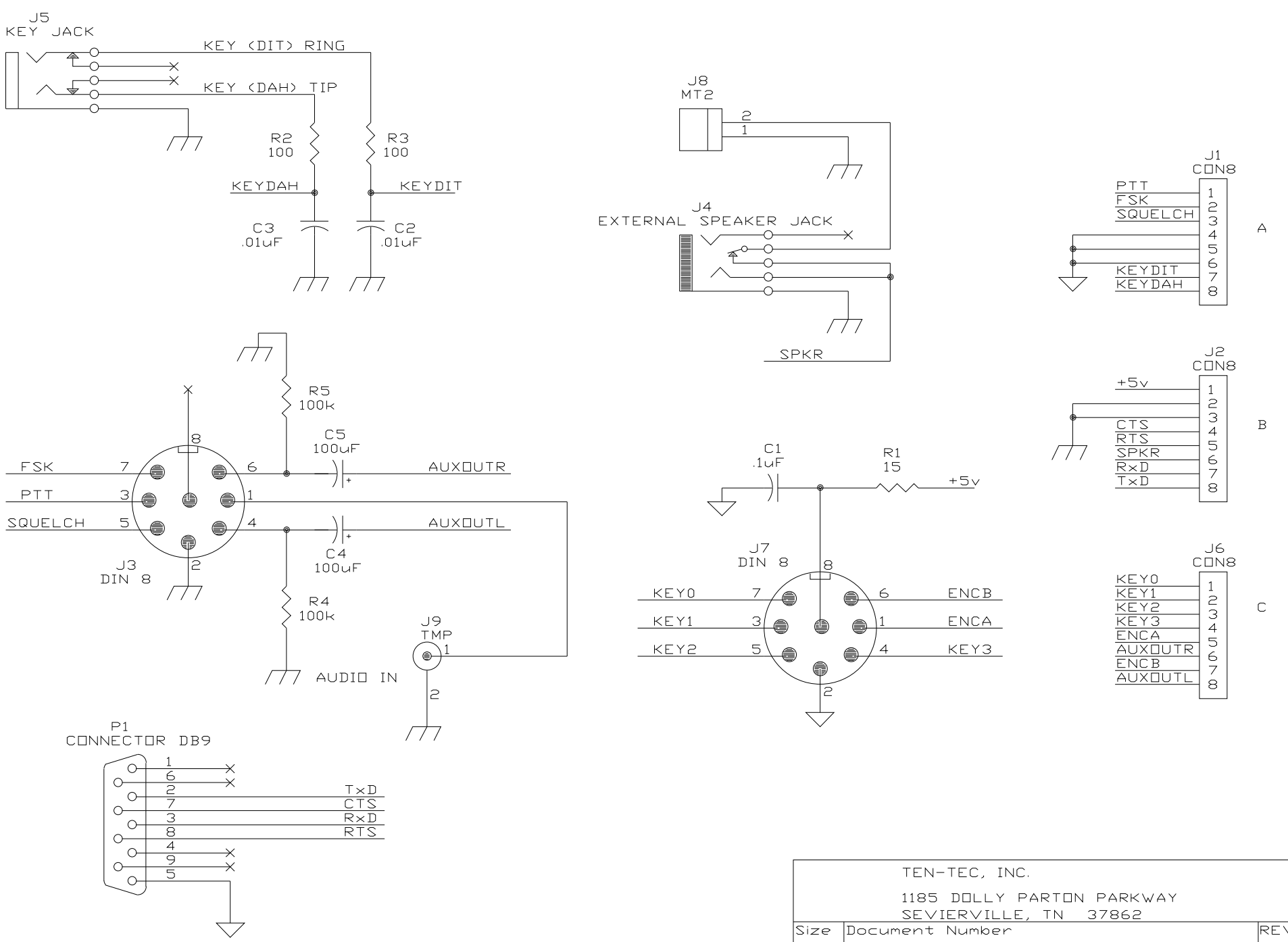


TEN-TEC INCORPORATED	
1185 DOLLY PARTON PARKWAY SEVIERVILLE, TENNESSEE 37862 U.S.A.	
Title	A5 TRANSMIT CHAIN
Size: C	Document Number: A5TX.SCH
REV: B	
Date: May 16, 2002	Sheet 5 of 6

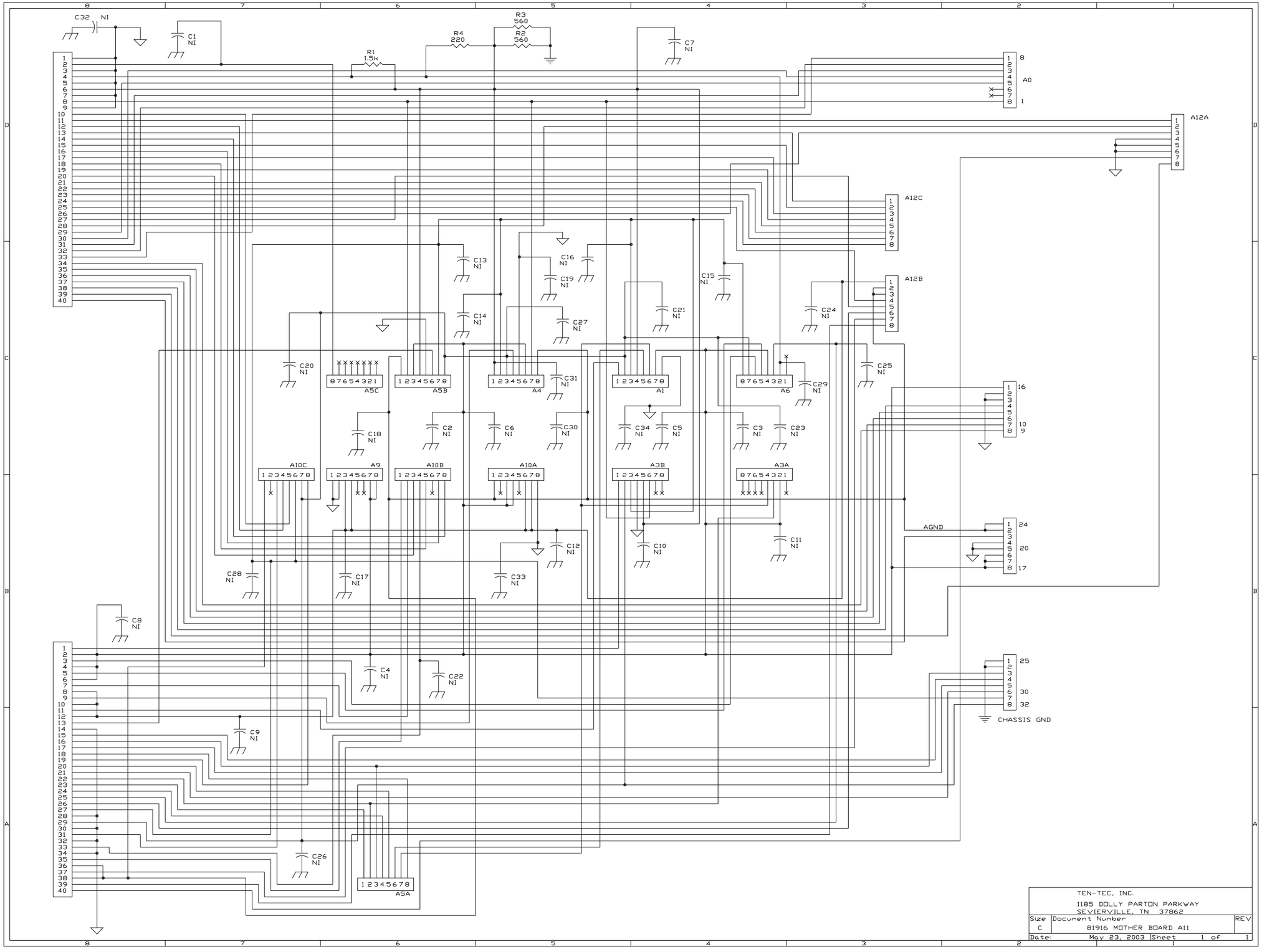


TEN TEC INCORPORATED		
1185 DOLLY PARTON PARKWAY		
SEVIERVILLE, TENNESSEE 37862		
Size C	Document Number IFCV1.SCH 565A5	REV B
Date: January 3, 2003	Sheet 6 of 6	


5VR
R19 10k
J2 CON8
AUDIO_SW+
AUDIO_RETURN
AUDIO_L
AUDIO_R
KEY_R
KEY_T
PTT
J7 CON8
R54 10K
R53 10K
C20 .01uF
SP
U4 74HC154
VCC
GND
G1
G2
S1 D1 ANT1_M
S2 D8 ANT1_S
S3 D7 ANT2_M
S4 D6 ANT2_S
S5 D5 RX_M
S6 D4 RX_S
S7 D14 VFOA_TX
S8 D3 VFOB_TX
S9 D13 VFOA_RX
S10 D12 VFOB_RX
S11 D11 VFOA_S_RX
S12 D10 VFOB_S_RX
S13 PWR
S14 MON
S15 SEND1
S16 SEND2
S17 SEND3
S18 USER1
S19 USER2
S20 RECALL
S21 NB
S22 NR
S23 NOTCH
S36 VOX
S37 S_TUNE
S38 MIC
S39 TUNE
C3 .01uF
R18 2.2k
C1 33uF
J8 MIC4P1N
J1 CON8
10VR
DCRTN
ROW1
ROW2
COL_DATA_A(1)
COL_DATA_B(1)
COL_DATA_C(1)
COL_DATA_D(1)
J32 TMP
C21 .01uF
R52 10K
S25 AN
S26 MODE
S27 PREAMP
S28 RF
S29 SPOT
S30 STEP
S31 SWEEP
S32 AGC
S33 ATTN
S34 MENU
S35 AUDIO
S40 VFOA>M
S41 VFOB>M
S42 D15 LOCK1
R51 10K
S43 D9 LOCK2
S44 D16 RIT
S45 D17 XIT
S46 D18 MAIN_RX
S47 D19 SUB_RX
S48 160
S49 80
S50 40
S51 A>B
S52 30
S53 20
S54 17
S55 B>A
S56 15
R50 10K
S57 12
S58 10
S59 A/B
S60 VFOA ENTER
S61 0
S62 .
S63 VFOB ENTER
D19 .01uF
J3 CON8
3.3VR
ROW3
ROW4
ROW5
COL_DATA_A
COL_DATA_B
COL_DATA_C
COL_DATA_D
U5 74HC154
MULTI
HI/LO CUT
PBT/BW
RIT/XIT
MAIN AF
SUB AF
S64 E3
S65 E4
S66 E5
S67 E6
S68 E7
S69 E8
ENC1
ENC2
J17
J16
J14 CON8
J15 CON8
ENC1A
ENC1B
ENC2A
ENC2B
ENC3A
ENC3B
ENC4A
ENC4B
ENC5A
ENC5B
ENC6A
ENC6B
ENC7A
ENC7B
ENC8A
ENC8B
R43
R42
R41
R40
R39
R38
R37
R36
R35
R34
R33
R32
R20-R31 10K
R32-R43 100K
C6-C17 .001uF
R14-R17 150
J24
J25
J26
J27
J31
J30
J29
J28
ROW5
COL13
COL12
COL11
COL10
COL9
COL8
ENC3A
ENC3B
ENC4A
ENC4B
ENC5A
ENC5B
ENC6A
ENC6B
ENC7A
ENC7B
ENC8A
ENC8B
PBT
BW
HICUT
LOWCUT
DIGRTN
D20 PBT
D21 BW
D22 HIGH CUT
D23 LOW CUT
J6 CON8
5VR
LEDDATA
ENAB6
LED_DIM_PWM
SCLK
DIGRTN
R56 220
R58 220
R57 220
R60 4.7K
C18 .01uF
U8 UCN6810SLW
DIN
ST
BLNK
CLK
LOAD+
VCC
GND
NC
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
SER
SUB_RX
MAIN_RX
LOCK1
XIT
RIT
LOCK2
R55 220
R44-R49 68
U6 UCN6810SLW
R1-R12 68
ANT1_M
ANT1_S
ANT2_M
ANT2_S
RX_M
RX_S
VFOA_TX
VFOB_TX
VFOA_RX
VFOB_RX
C4 .01uF
R59 220
U7 UCN6810SLW
R11-R12 68
R13 150
D2
VFOA_S_RX
VFOB_S_RX
ALC
C5 .01uF
TEN-TEC
Title
565 KEYPAD
Size C
Document Number A8
REV
Date: March 10, 2003
Sheet 1 of 1



TEN-TEC, INC.	
1185 DOLLY PARTON PARKWAY SEVIERVILLE, TN 37862	
Size: A	Document Number: 81915 REAR CONNECTOR BOARD A12 — REV:
Date: May 23, 2003	Sheet 1 of 1



TEN-TEC, INC.
1185 DOLLY PARTON PARKWAY
SEVIERVILLE, TN 37862

Size	Document Number	REV
C	81916 MOTHER BOARD A11	
Date: May 23, 2003	Sheet 1 of 1	

Sheet number	Sheet	Reference begins
1 of 16	CPU	1
2 of 16	CPLD	1
3 of 16	CONNECTORS	1
4 of 16	DRIVERS	
5 of 16	DSP	100
6 of 16	MAIN CODEC	200
7 of 16	SUB CODEC	200
8 of 16	(no sheet)	
9 of 16	MIC PREAMP	280
10 of 16	ADC/DAC	300
11 of 16	POWER	400
12 of 16	POWER BYPASS	400
13 of 16	MEMORY	500
14 of 16	RS-232	600
15 of 16	LCD	700
16 of 16	SWEEP	900

CPU

Reference designators begin with 1

MAIN CPU

Motorola Dragonball

68EZ328

U1 MC68EZ328PU

MEMCTRL

LCD

LED_DIM_PWM From U2 CPLD

LCDOFF From U2 CPLD

MEMORY

JTAG PORT

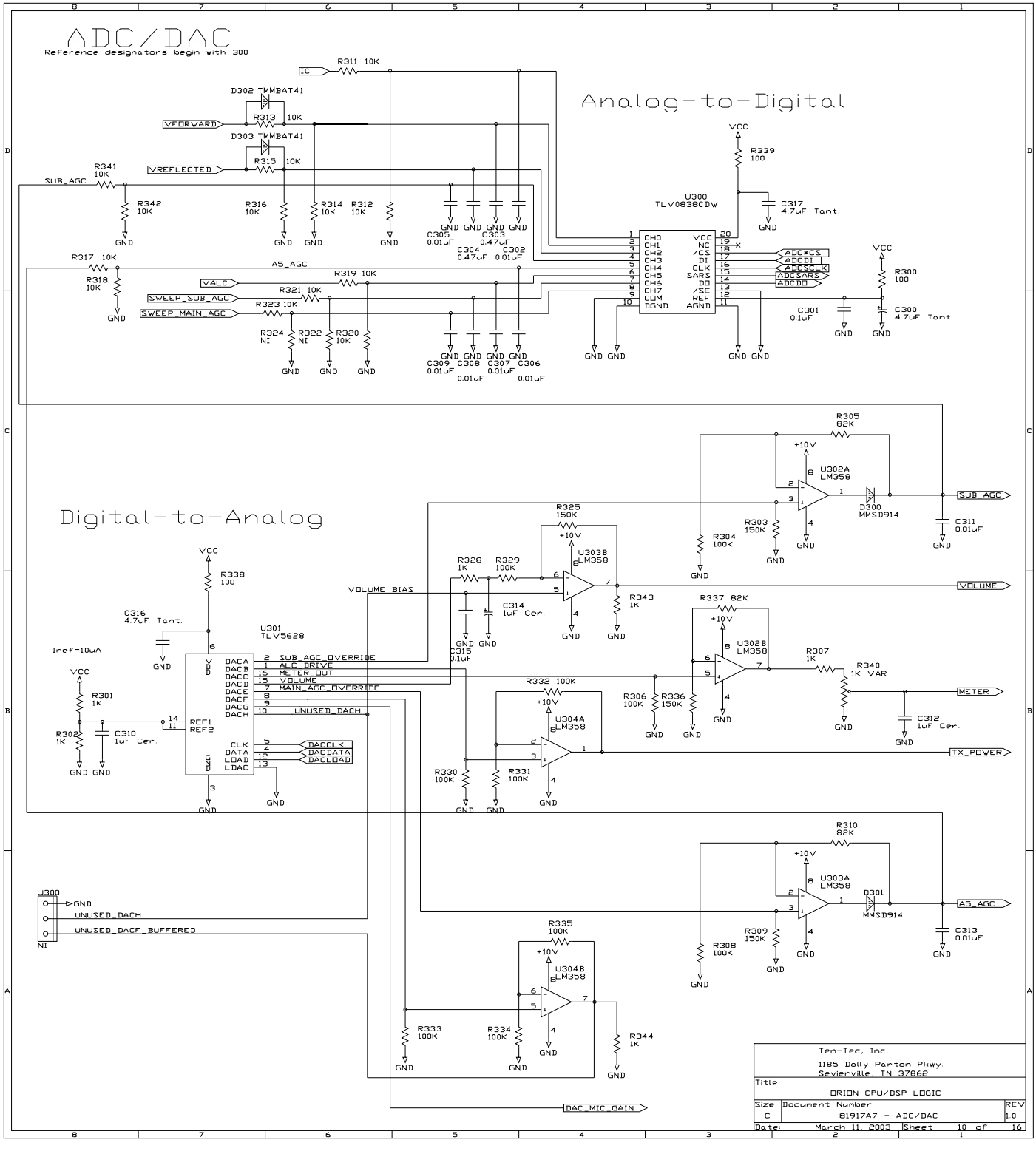
TO CPLDs

RS-232

ADC/DAC

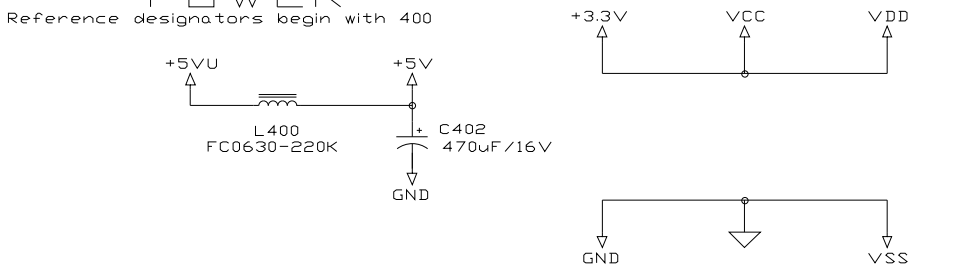
Meter

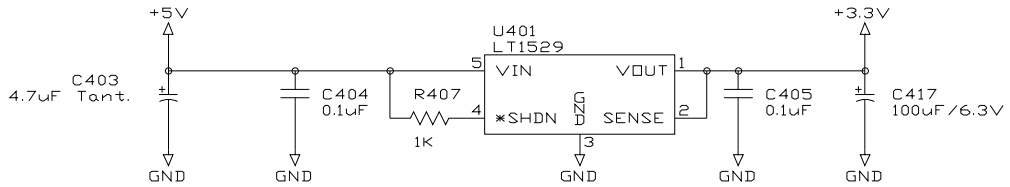
Ten-Tec, Inc.	
1185 Dolly Parton Pkwy. Sevierville, TN 37862	
Title	ORION CPU/DSP LOGIC
Size: C	Document Number: 81917A7 - Dragonball CPU
REV: 1.0	
Date: March 12, 2003	Sheet 1 of 16

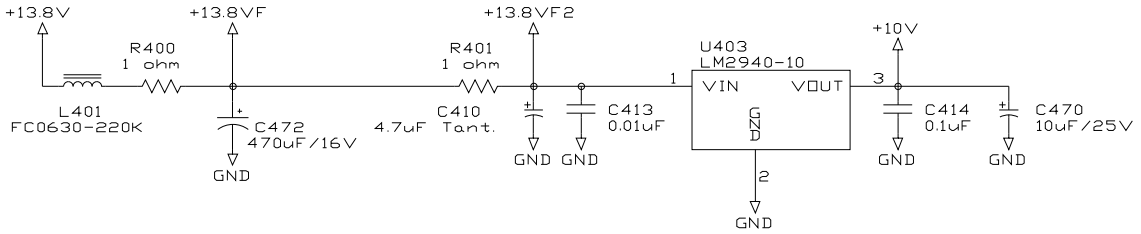

ADC/DAC
Reference designators begin with 300
Analog-to-Digital
Digital-to-Analog
U300 TLV0838CDW
U301 TLV5628
U302A LM358
U302B LM358
U303A LM358
U303B LM358
U304A LM358
U304B LM358
D300 MMSD914
D301 MMSD914
D302 TMMBAT41
D303 TMMBAT41
IC
VFORWARD
VREFLECTED
SUB_AGC
VALC
SWEEP_SUB_AGC
SWEEP_MAIN_AGC
A5_AGC
VOLUME_BIAS
Iref=10uA
SUB_AGC_OVERRIDE
ALC_DRIVE
METER_OUT
VOLUME
MAIN_AGC_OVERRIDE
UNUSED_DACH
DACCLK
DACDATA
DACLOAD
ADC*CS
ADCDI
ADCSCLK
ADCSARS
ADCDO
VOLUME
METER
TX_POWER
DAC_MIC_GAIN
UNUSED_DACF_BUFFERED
J300
Ten-Tec, Inc.
1185 Dolly Parton Pkwy.
Sevierville, TN 37862
Title
ORION CPU/DSP LOGIC
Size C
Document Number 81917A7 - ADC/DAC
REV 1.0
Date: March 11, 2003
Sheet 10 of 16

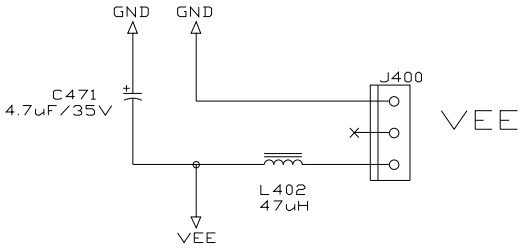
POWER

Reference designators begin with 400









Ten-Tec, Inc. 1185 Dolly Parton Pkwy. Sevierville, TN 37862		
Title: ORION CPU/DSP LOGIC		
Size: A	Document Number: 81917A7 - POWER	REV: 1.0
Date: March 11, 2003	Sheet 11 of 16	

POWER DECOUPLING

Reference designators begin with 400



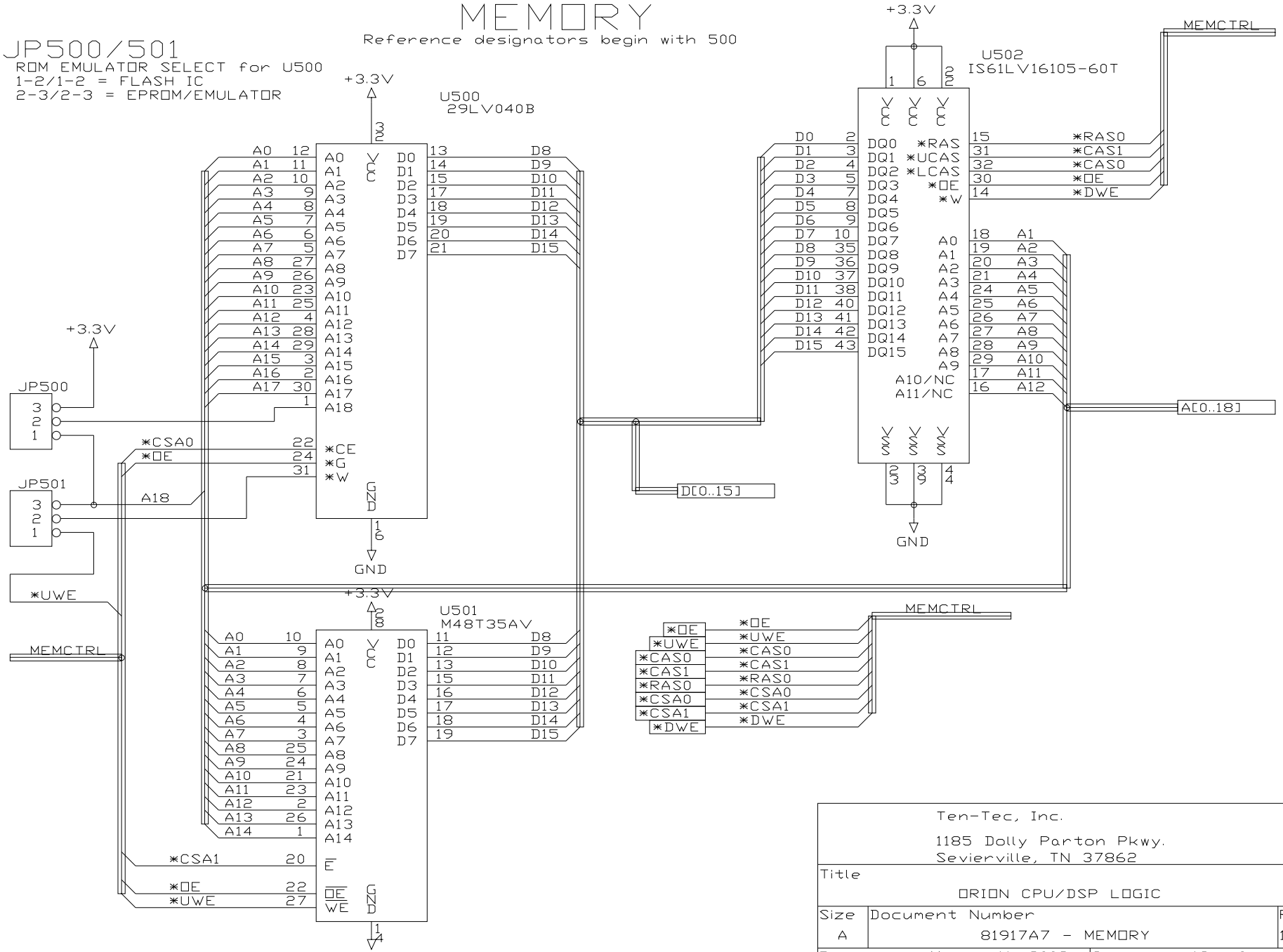
Ten-Tec, Inc. 1185 Dolly Parton Pkwy. Sevierville, TN 37862		
Title: ORION CPU/DSP LOGIC		
Size: A	Document Number: 81917A7 - POWER DECOUPLING	REV: 1.0
Date: March 6, 2003	Sheet 12 of 16	

MEMORY

Reference designators begin with 500

JP500/501

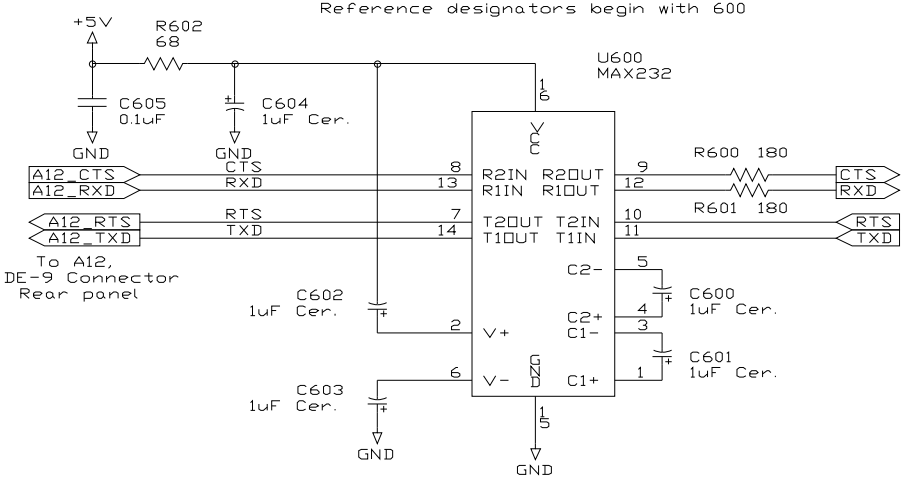
ROM EMULATOR SELECT for U500
1-2/1-2 = FLASH IC
2-3/2-3 = EPROM/EMULATOR



Ten-Tec, Inc. 1185 Dolly Parton Pkwy. Sevierville, TN 37862		
Title: ORION CPU/DSP LOGIC		
Size: A	Document Number: 81917A7 - MEMORY	REV: 1.0
Date: March 11, 2003	Sheet 13 of 16	

RS-232

Reference designators begin with 600

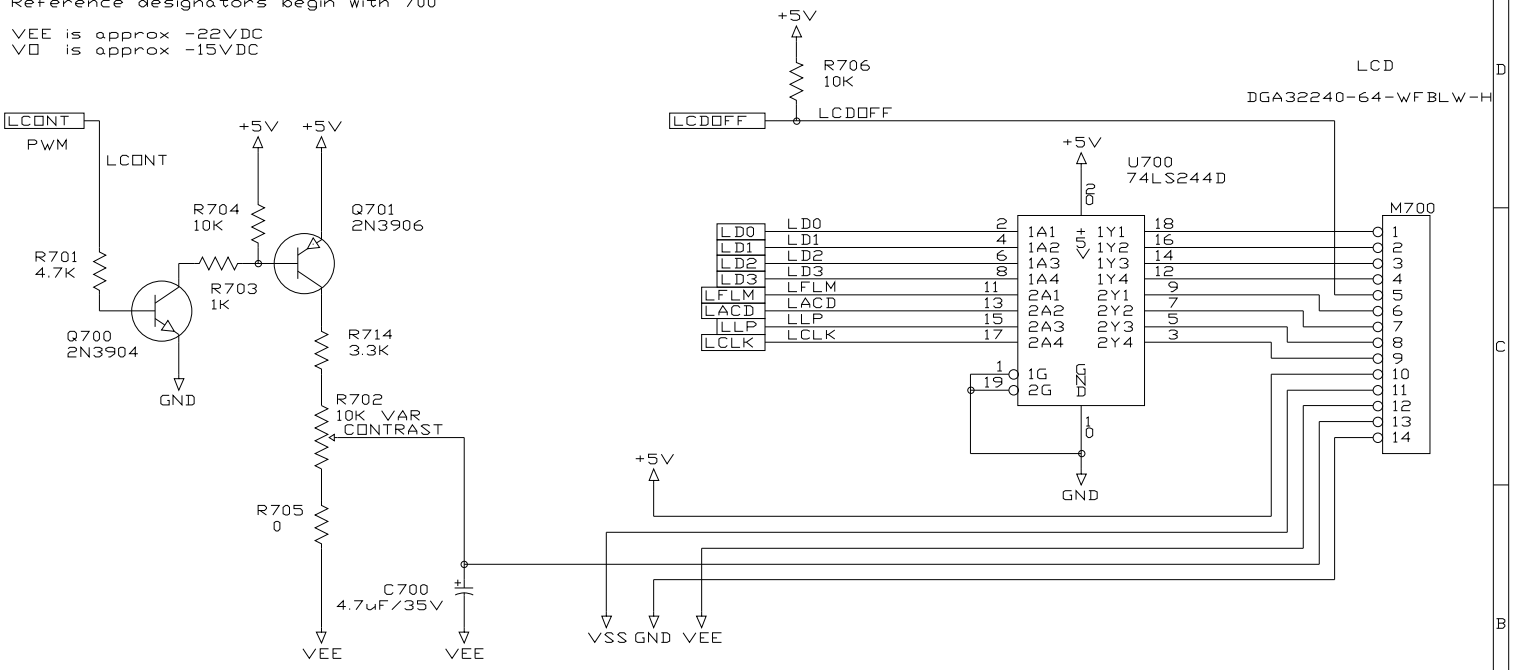


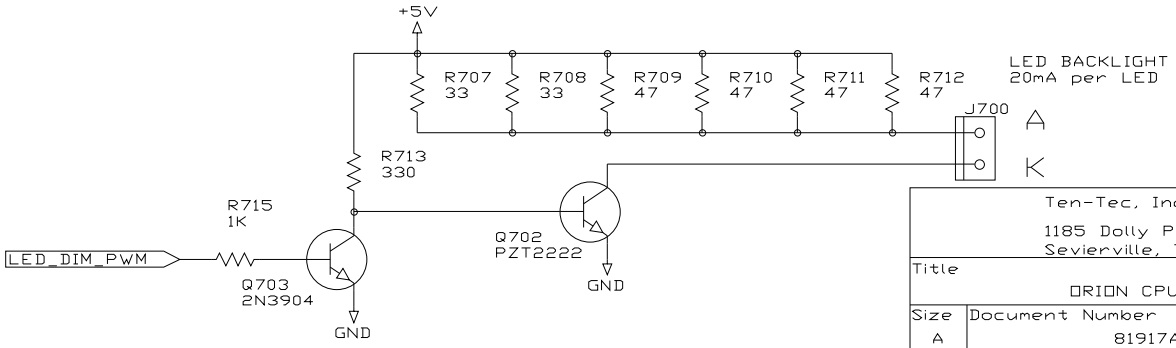
Ten-Tec, Inc. 1185 Dolly Parton Pkwy. Sevierville, TN 37862		
Title: ORION CPU/DSP LOGIC		
Size: A	Document Number: 81917A7 - RS-232	REV: 1.0
Date: March 11, 2003	Sheet 14 of 16	

LCD

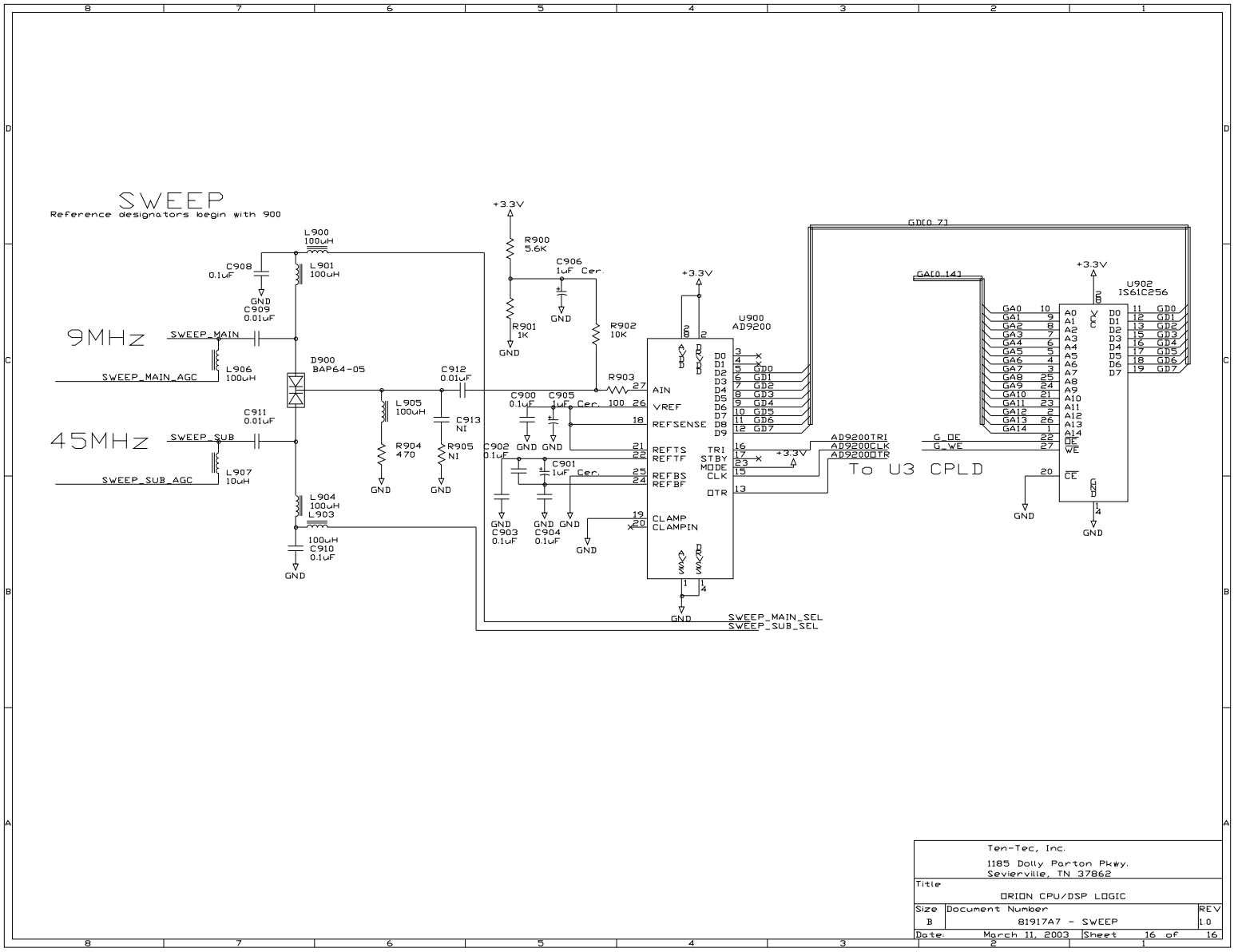
Reference designators begin with 700

VEE is approx -22VDC
VO is approx -15VDC





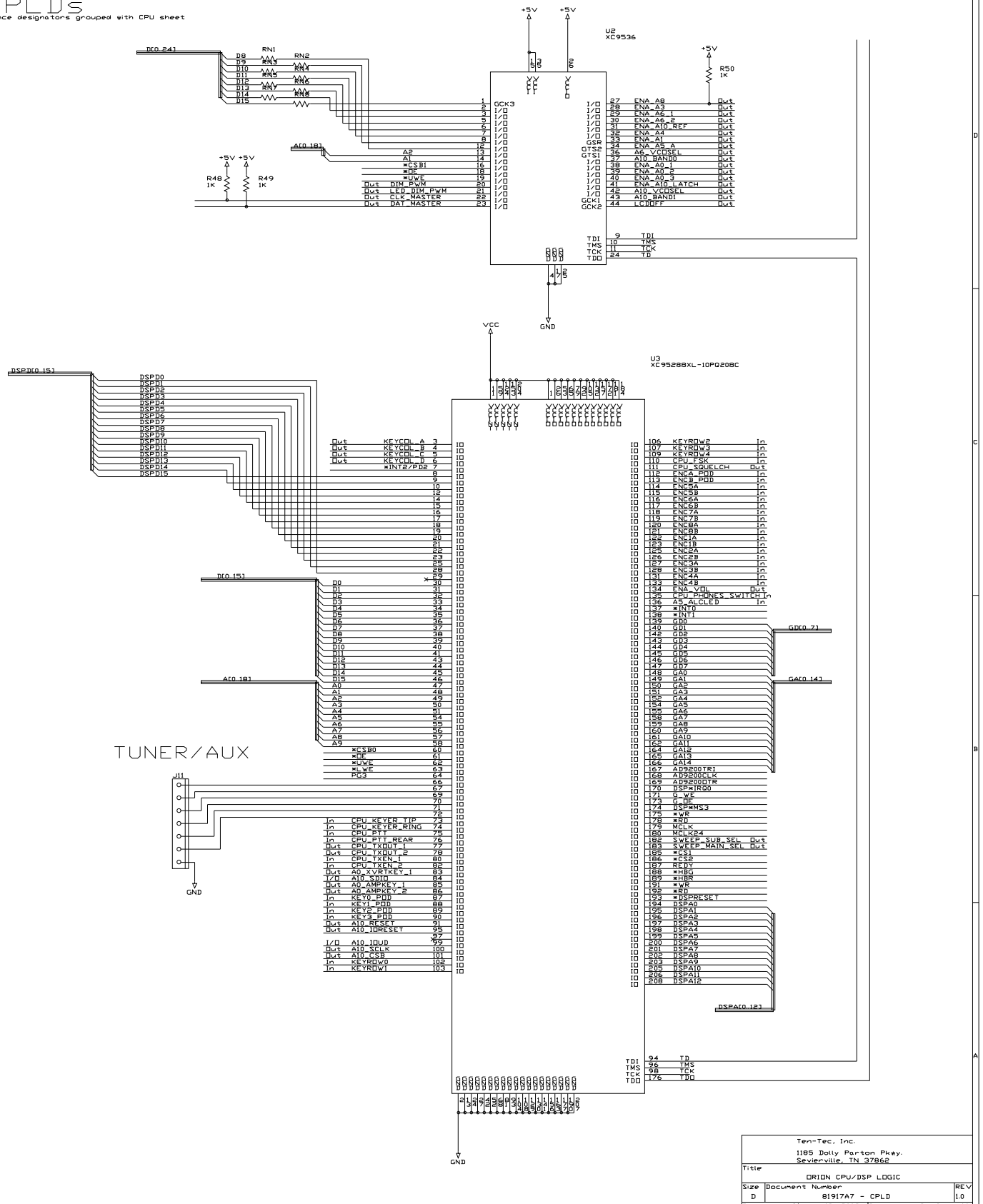
Ten-Tec, Inc. 1185 Dolly Parton Pkwy. Sevierville, TN 37862		
Title: ORION CPU/DSP LOGIC		
Size: A	Document Number: 81917A7 - LCD	REV: 1.0
Date: May 27, 2003	Sheet 15 of 16	



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Title: ORION CPU/DSP LOGIC		
Size: B	Document Number: 81917A7 - SWEEP	REV: 1.0
Date: March 11, 2003	Sheet 16 of 16	

CPLDs

Reference designators grouped with CPU sheet



Ten-Tec, Inc.	
1185 Dolly Parton Pkwy. Sevierville, TN 37862	
Title	ORION CPU/DSP LOGIC
Size: D	Document Number: 81917A7 - CPLD
REV: 1.0	
Date: March 12, 2003	Sheet 2 of 16

CONNECTORS

J2A/B connect to A11 Motherboard

TOP

J2A
20X2X0.100

DIGRTN		Power	1	2	A5_AGC	I/O	Analog
DIGRTN		Power	3	4	SUB_AGC	I/O	Analog
DIGRTN		Power	5	6	XCVR_T	Out	T voltage
DIGRTN		Power	7	8	XCVR_R	Out	R voltage
DIGRTN		Power	9	10	A10_VCOSEL	Out	Digital
PTT_REAR	In	Digital	11	12	A10_BAND1	Out	Digital
KEY0_POD	In	Digital	13	14	A10_RESET	Out	Digital
KEY1_POD	In	Digital	15	16	A10_IORESET	Out	Digital
KEY2_POD	In	Digital	17	18	A10_IOUD	Out	Digital
KEY3_POD	In	Digital	19	20	A10_CSB	Out	Digital
ENCA_POD	In	Digital	21	22	AUXOUT_R	Out	Audio
ENCB_POD	In	Digital	23	24	AUXOUT_L	Out	Audio
A12_CTS	In	RS-232	25	26	A12_FSK	In	Digital
A12_RTS	Out	RS-232	27	28	A12_SQUELCH	Out	Digital
A0_XVRTKEY_1	Out	Digital	29	30	A0_SPARE_3	I/O	Digital
A0_AMPKEY_1	Out	Digital	31	32	A0_SPARE_4	I/O	Digital
A0_AMPKEY_2	Out	Digital	33	34	A0_POWERSW+		Switch
A0_TXOUT_1	Out	Digital	35	36	A0_POWERSW-		Switch
A0_TXOUT_2	Out	Digital	37	38	A0_TXEN_1	Out	Digital
KEYER_TIP_REAR	In	Power	39	40	A0_TXEN_2	Out	Digital

R36 10K
R37 10K
R38 10K
R39 10K
R40 100K
R41 100K
+5V
GND

BOTTOM

J2B
20X2X0.100

ENA_A3	Out	Digital	1	2	+13.8V		Power
ENA_A6_1	Out	Digital	3	4	+13.8V		Power
ENA_A6_2	Out	Digital	5	6	+13.8V		Power
ENA_A10_REF	Out	Digital	7	8	+5VU		Power
ENA_A4	Out	Digital	9	10	+5VU		Power
ENA_A1	Out	Digital	11	12	+5VU		Power
ENA_A5_A	Out	Digital	13	14	DCRTN		Power
ENA_A0_1	Out	Digital	15	16	IC	In	Analog
ENA_A0_2	Out	Digital	17	18	PWR	In	Analog
ENA_A10_LATCH	Out	Digital	19	20	REF1	In	Analog
ENA_A0_3	Out	Digital	21	22	ALC	In	Analog
A5_ALCLED	In	Ditital	23	24	PWRSET	Out	Analog
A6_VCOSEL	Out	Digital	25	26	SPEAKER	Out	Analog
CLK_MASTER	Out	Digital	27	28	DIGRTN		Power
DAT_MASTER	Out	Digital	29	30	DIGRTN		Power
A10_BAND0	Out	Digital	31	32	DIGRTN		Power
A10_SCLK	Out	Digital	33	34	DIGRTN		Power
A10_SDIO	I/O	Digital	35	36	DIGRTN		Power
A12_RXD	In	RS-232	37	38	DIGRTN		Power
A12_TXD	Out	RS-232	39	40	KEYER_RING_REAR	In	Digital

COAX CONNECTIONS

Ident	Ref	Signal
4	J272	A12_AUXOUT_MAIN
14	J900	SWEEP_MAIN
17	J201	TX3IF
18	J200	RX3IF
20	J202	SUB_RX
22	J901	SWEEP_SUB
24	J203	AUX_IN
25	J280	MICROPHONE

DIGRTN
DCRTN
GND

J272
J200 — A12_AUXOUT_MAIN
J201 — RX3IF
J202 — TX3IF
J900 — SUB_RX
J901 — SWEEP_MAIN
J203 — SWEEP_SUB
AUX_IN

Z8 NI
Z9 NI
GND GND

J280
TMP
MICROPHONE
Z6 NI
GND GND

J10
A0_POWERSW-
A0_POWERSW+

To A8 Keypad

Right

+3.3V

J6

1	+3.3V		Power
2	KEYROW2		Digital
3	KEYROW3		Digital
4	KEYROW4		Digital
5	KEYCOL_A	(Right)	Digital
6	KEYCOL_B	(Right)	Digital
7	KEYCOL_C	(Right)	Digital
8	KEYCOL_D	(Right)	Digital

J8

1	ENC5A	Digital
2	ENC5B	Digital
3	ENC6A	Digital
4	ENC6B	Digital
5	ENC7A	Digital
6	ENC7B	Digital
7	ENC8A	Digital
8	ENC8B	Digital

Left

J5

8	KEYCOL_D	(Left)	Digital
7	KEYCOL_C	(Left)	Digital
6	KEYCOL_B	(Left)	Digital
5	KEYCOL_A	(Left)	Digital
4	KEYROW1		Digital
3	KEYROW0		Digital
2	DIGRTN		Power
1	+10V (MIC BIAS)		Power

+10V

R5
100

CPU_PHONES_SWITCH

J4

1	PHONES_SWITCH	Digital
2	GND	Power
3	PHONES-L	Signal
4	PHONES-R	Signal
5	KEYER_RING	Digital
6	KEYER_TIP	Digital
7		
8	PTT	Digital

C5
0.01uF
GND

Z1 Z2 Z3 Z4 Z5 Z7
NI NI NI NI NI NI
GND GND GND GND GND GND GND

J7

1	ENC1A	Digital
2	ENC1B	Digital
3	ENC2A	Digital
4	ENC2B	Digital
5	ENC3A	Digital
6	ENC3B	Digital
7	ENC4A	Digital
8	ENC4B	Digital

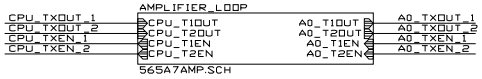
J9

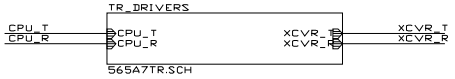
1	+5V	Power
2	+5V	Power
3	DAT_MASTER	Digital
4	ENA_A8	Digital
5	LED_DIM_PWM	Digital
6	CLK_MASTER	Digital
7	DIGRTN	Power
8	DIGRTN	Power

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Sevierville, TN 37862

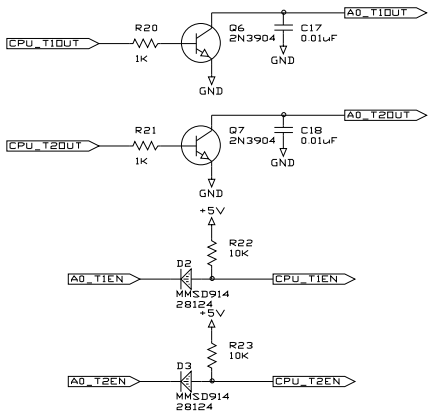
Title	ORION CPU/DSP LOGIC	
Size: C	Document Number: 81917A7 - CONNECTORS	REV: 1.0
Date: March 12, 2003	Sheet 3 of 16	

DRIVERS

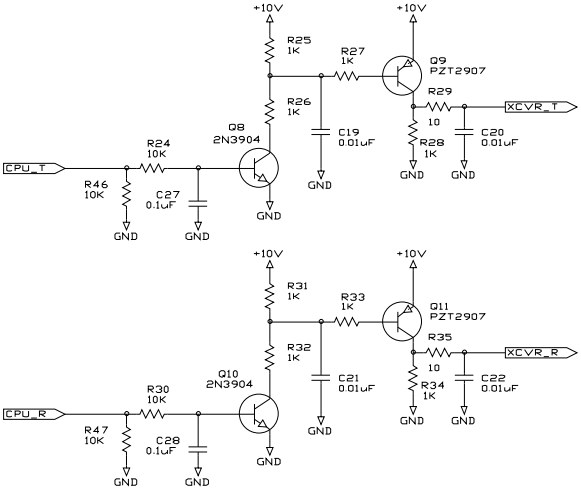


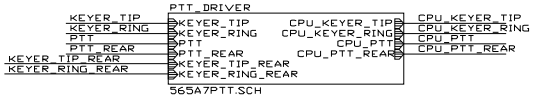


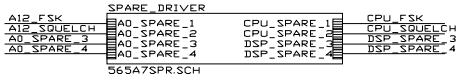
AMPLIFIER LOOP



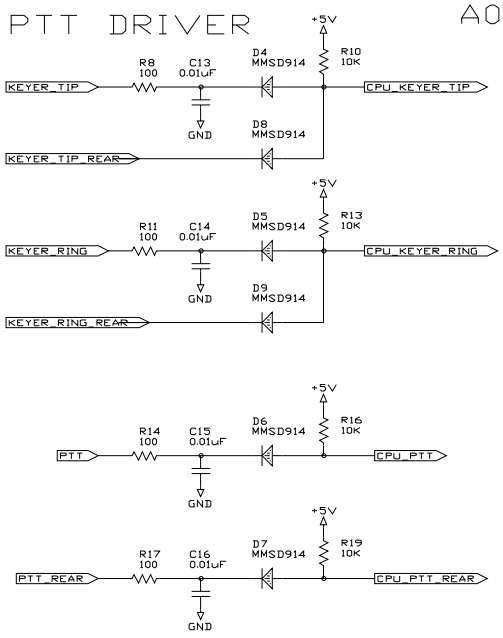
T/R DRIVERS



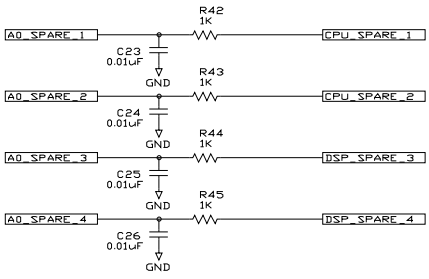




PTT DRIVER



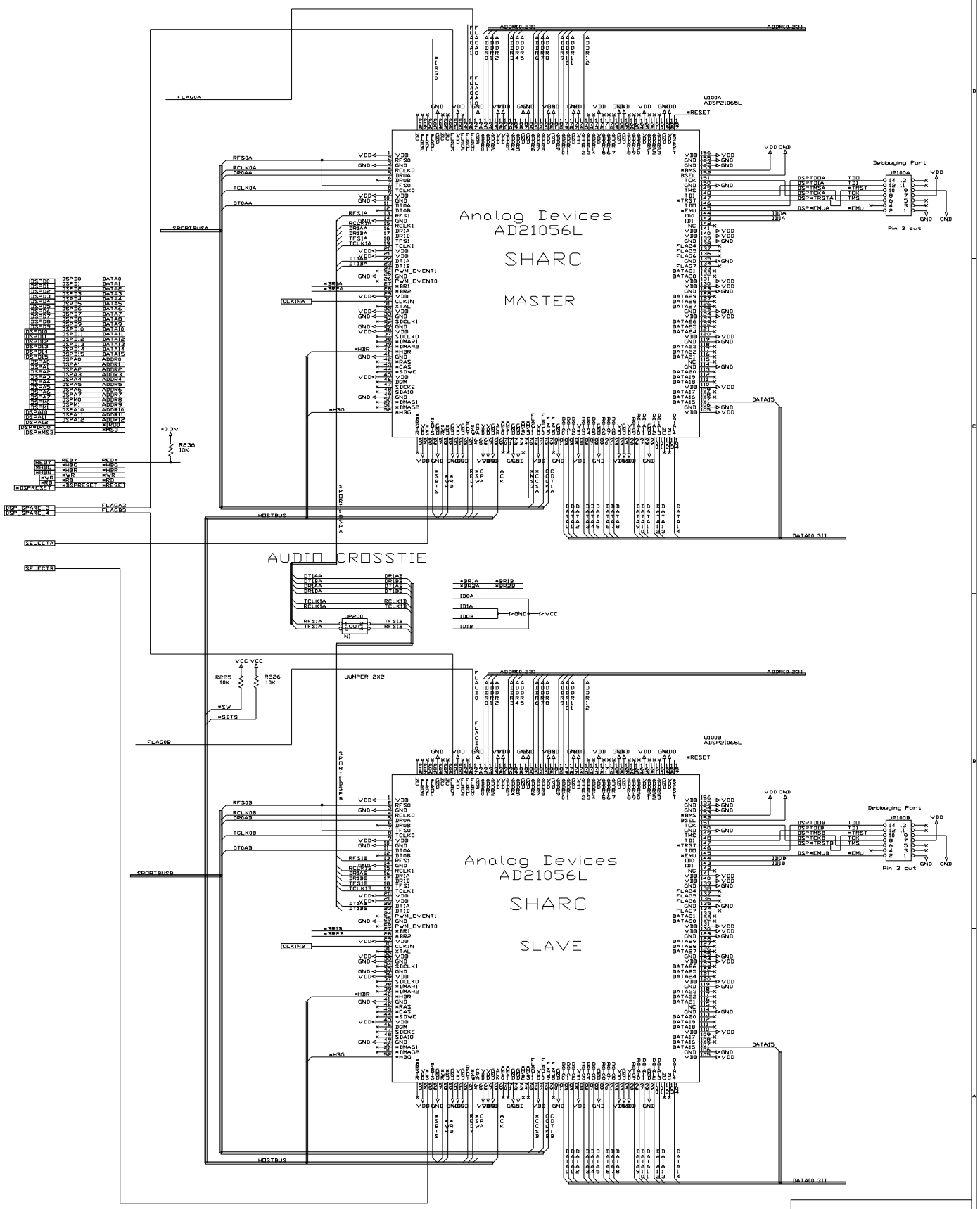
A0 SPARE-TO-CPU INTERFACE

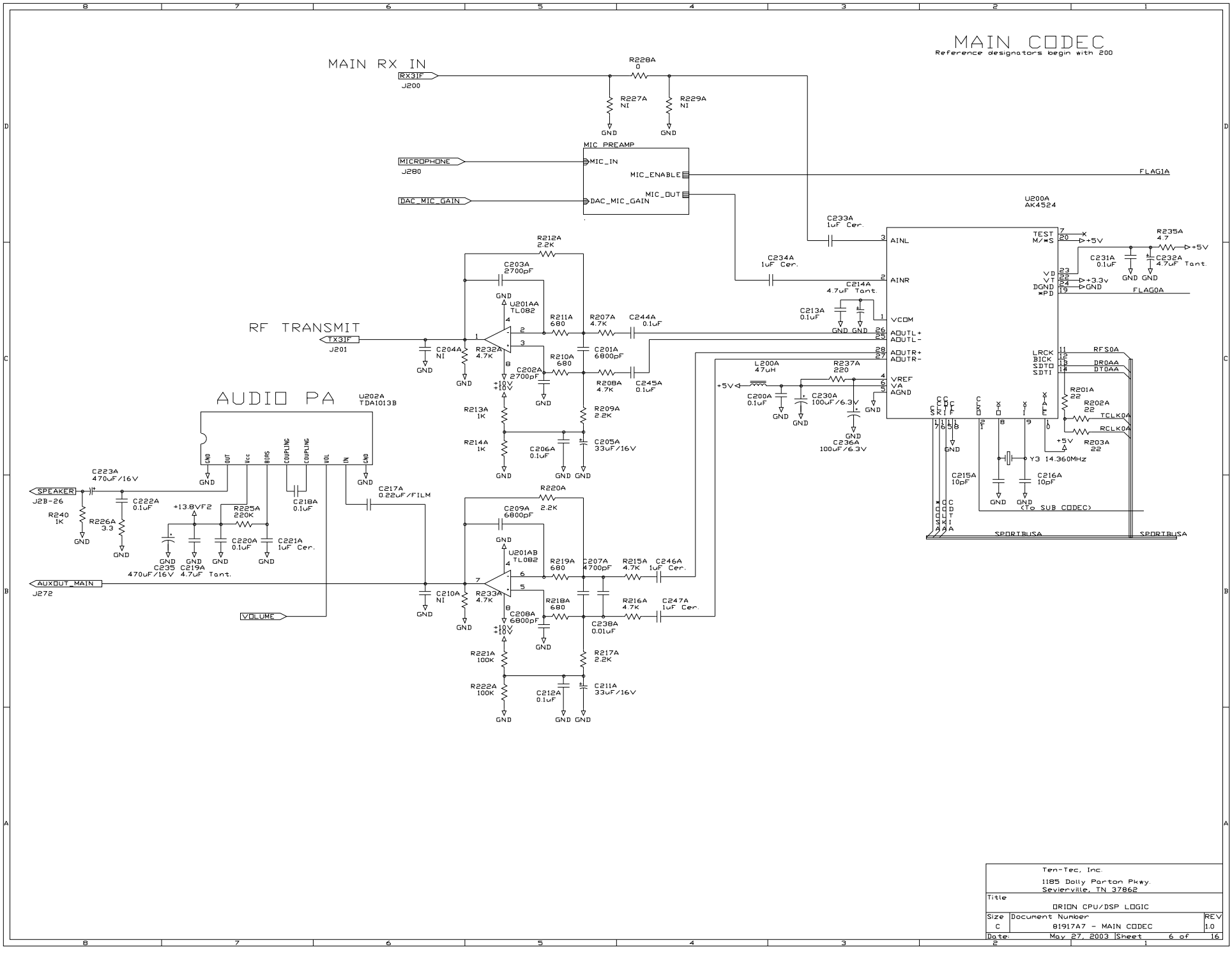


Ten-Tec, Inc. 1185 Dolly Parton Pkwy. Sevierville, TN 37862		
Title: ORION CPU/DSP LOGIC		
Size: C	Document Number: 81917A7 - DRIVERS	REV: 1.0
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DSP

Reference designators begin with 100

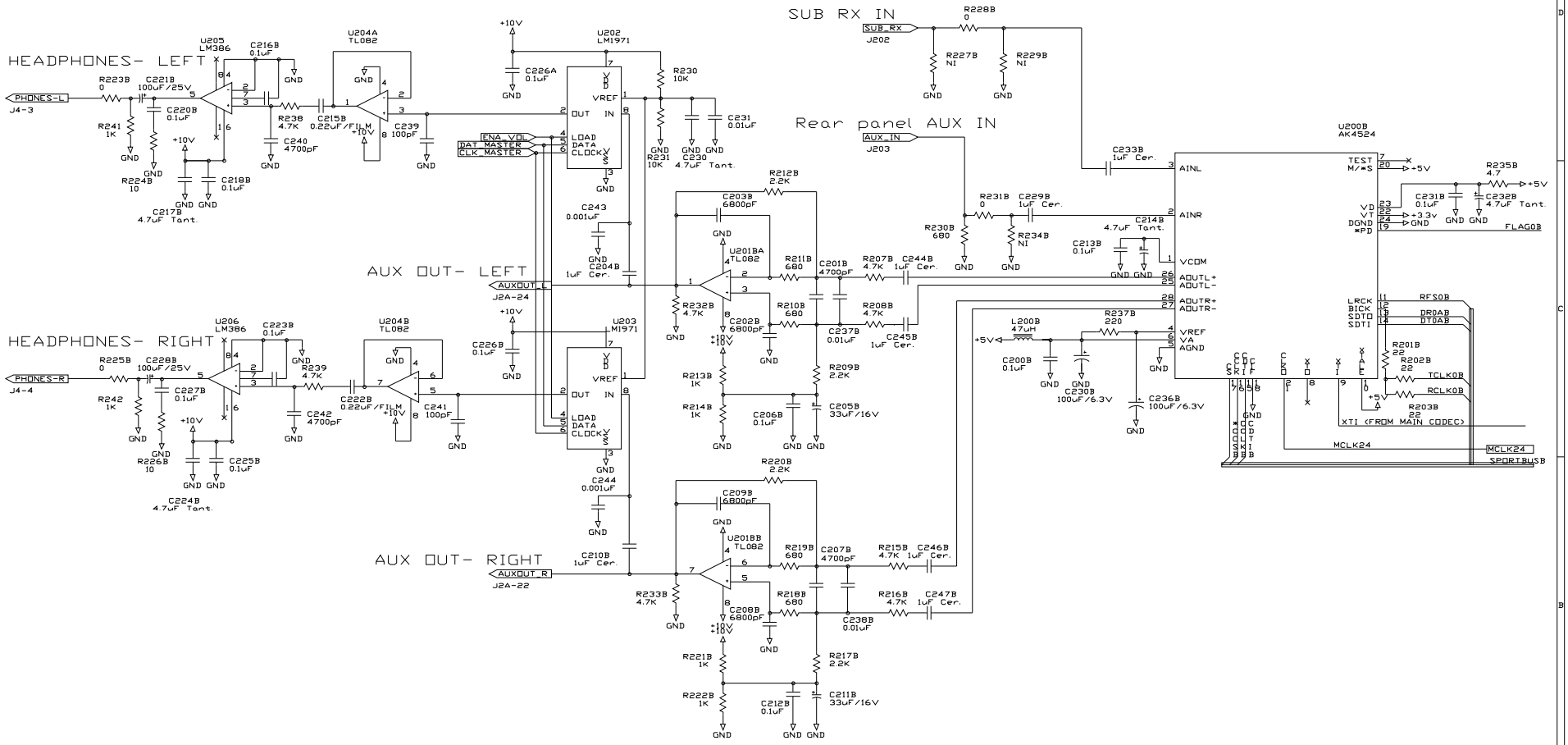




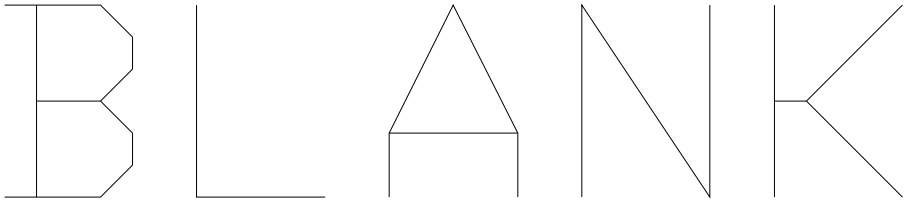
Ten-Tec, Inc. 1185 Dolly Parton Pkwy. Sevierville, TN 37862		
Title: ORION CPU/DSP LOGIC		
Size: C	Document Number: 81917A7 - MAIN CODEC	REV: 1.0
Date: May 27, 2003	Sheet 6 of 16	

SUB CODEC

Reference designators begin with 200



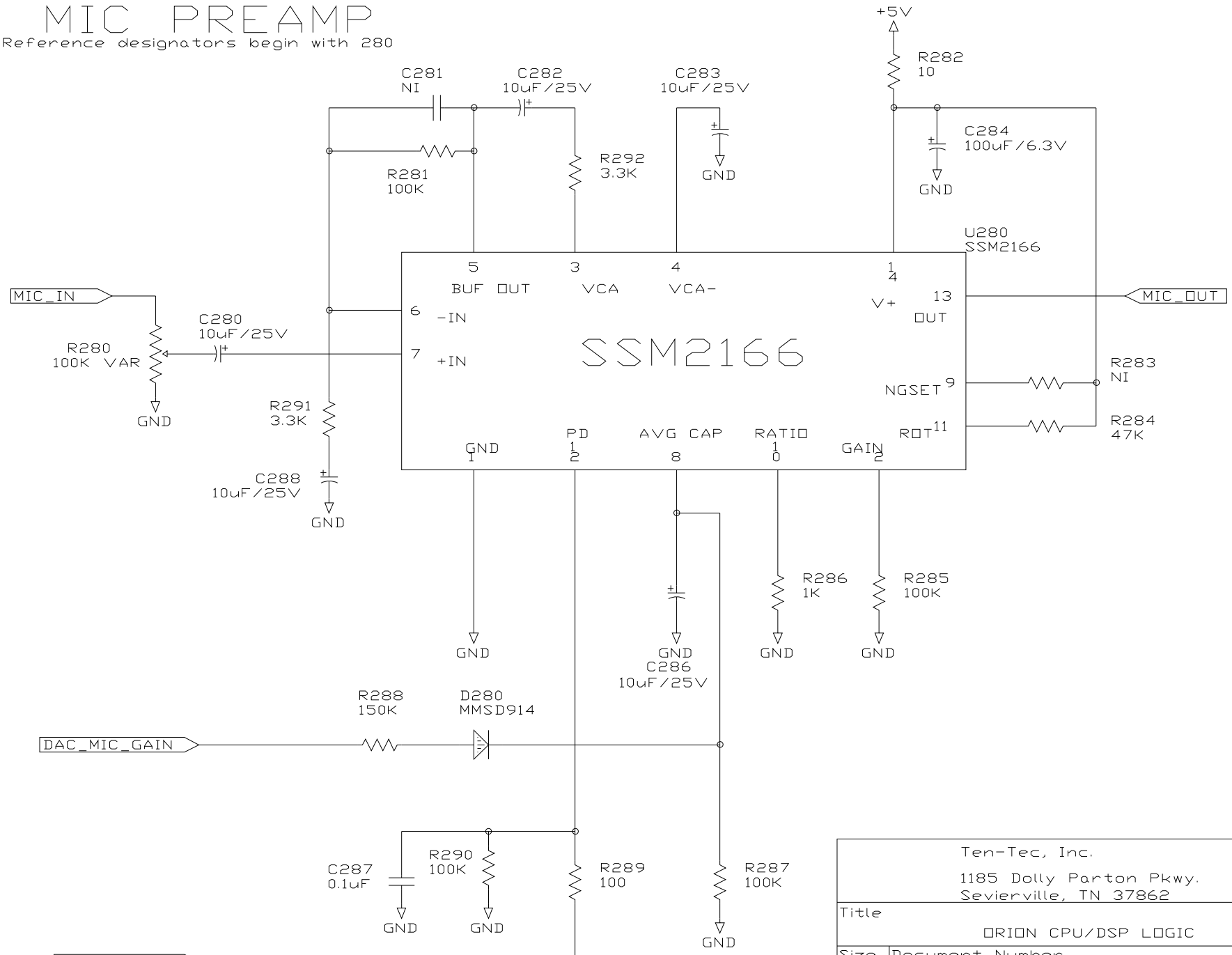
Ten-Tec, Inc. 1185 Dolly Parton Pkwy. Sevierville, TN 37862		
Title: ORION CPU/DSP LOGIC		
Size: C	Document Number: 81917A7 - SUB CODEC	REV: 1.0
Date: March 12, 2003	Sheet: 7 of 16	



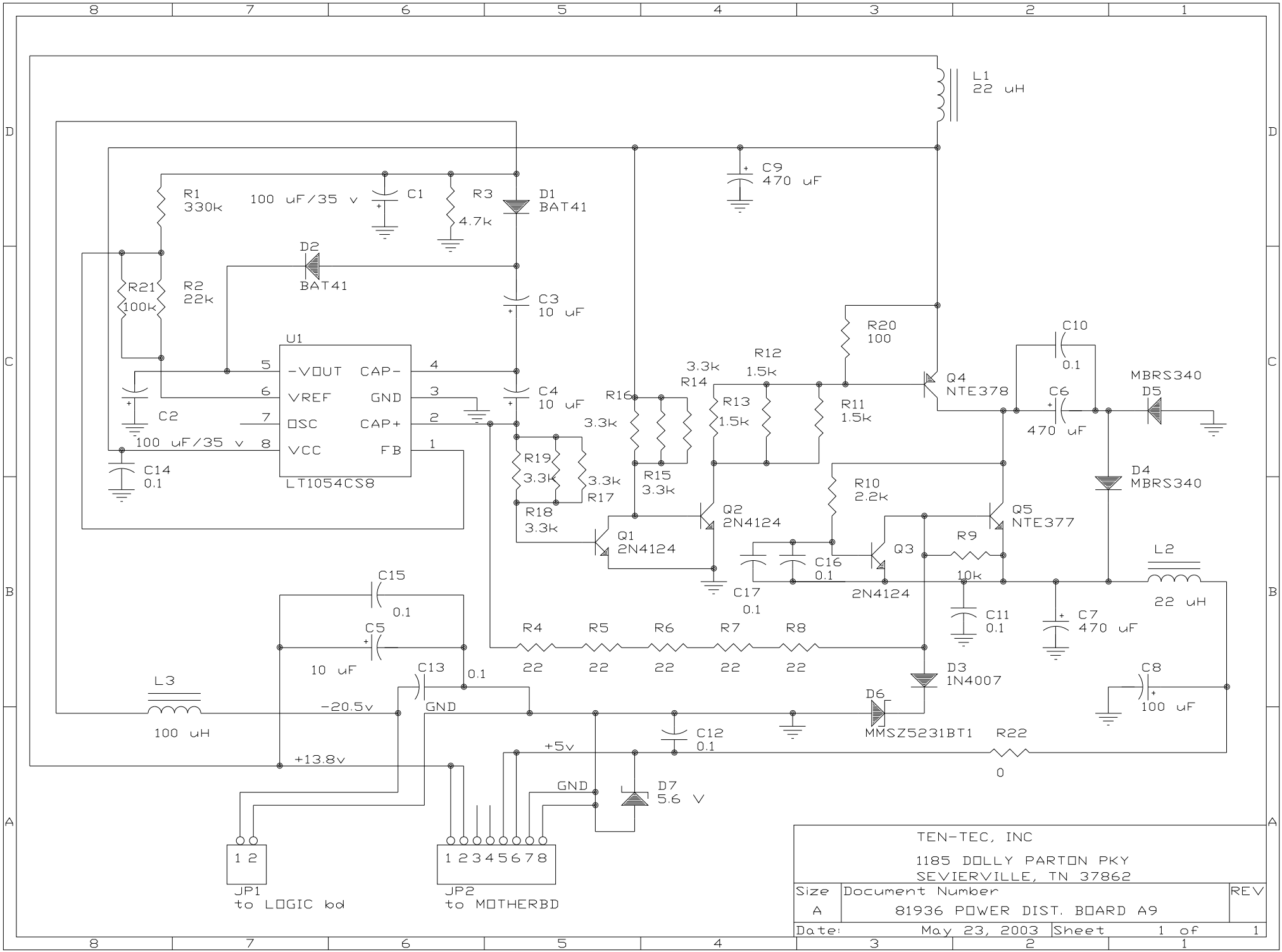
Ten-Tec, Inc. 1185 Dolly Parton Pkwy. Sevierville, TN 37862		
Title: Orion CPU/DSP Logic		
Size: A	Document Number: 81917A7 - Unused	REV:
Date: May 27, 2003	Sheet: 8 of 16	

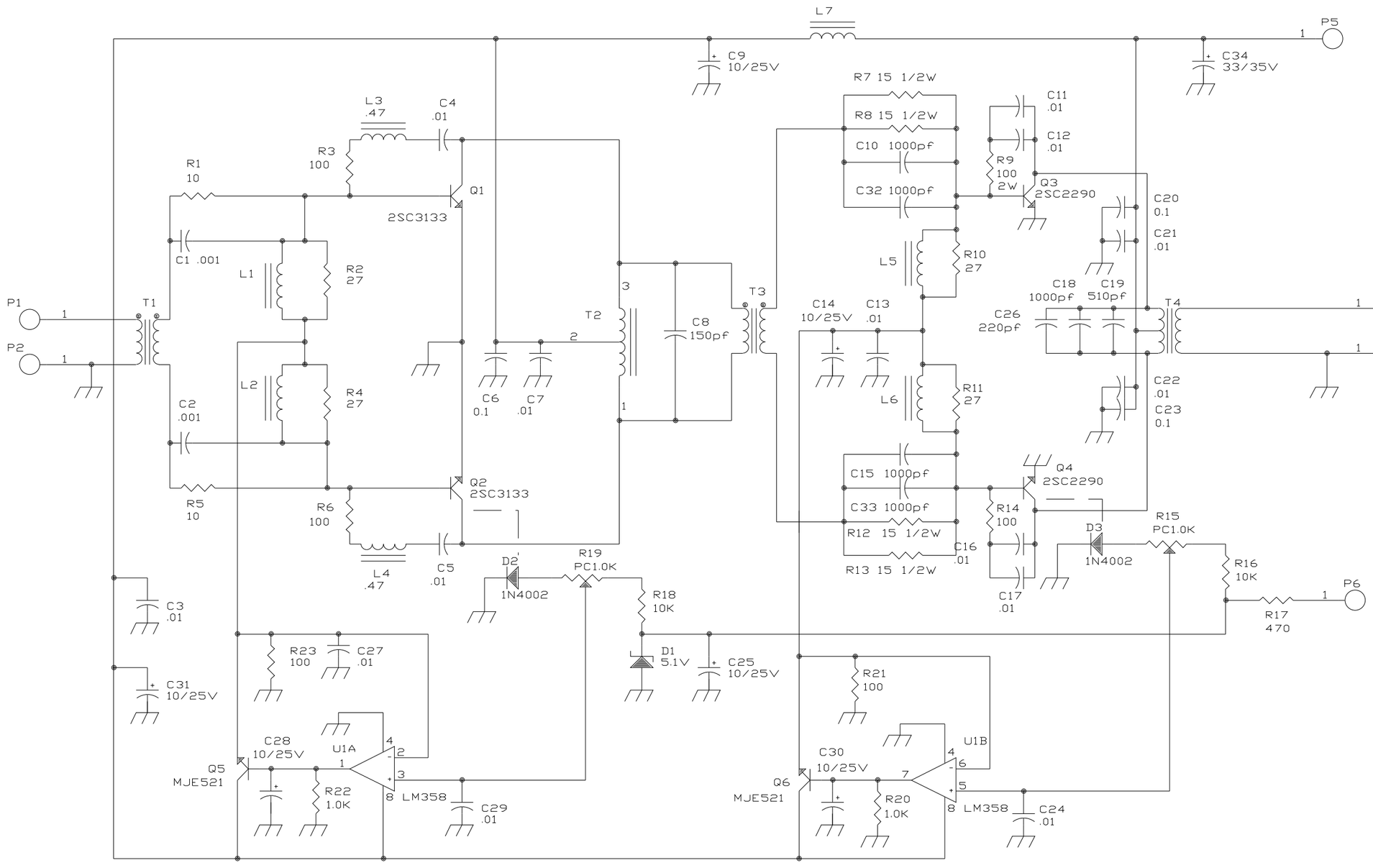
MIC PREAMP

Reference designators begin with 280

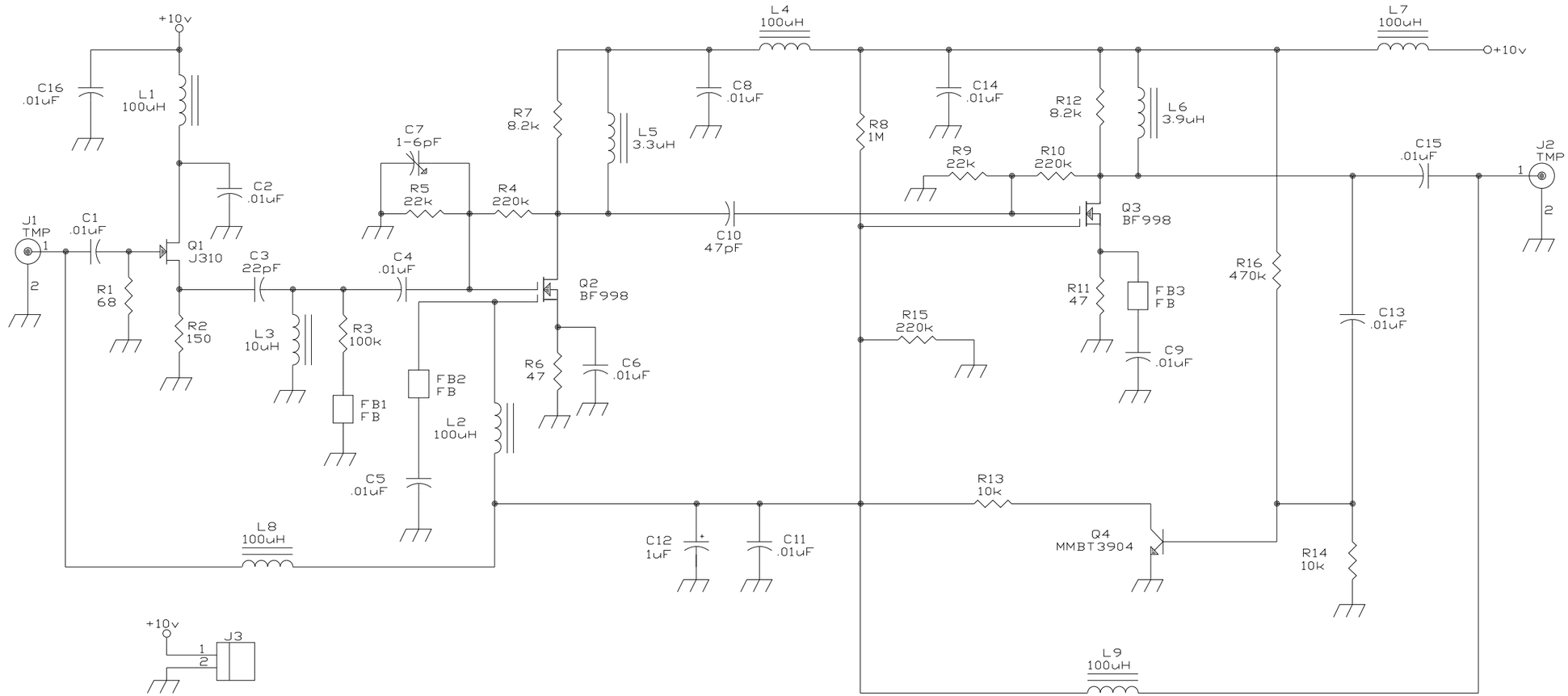


Ten-Tec, Inc. 1185 Dolly Parton Pkwy. Sevierville, TN 37862		
Title: ORION CPU/DSP LOGIC		
Size: A	Document Number: 81917A7 - MIC PREAMP	REV: 1.0
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L1
22 uH
C9
470 uF
R1
330k
100 uF/35 v
C1
R3
4.7k
D1
BAT41
D2
BAT41
R21
100k
R2
22k
C3
10 uF
U1
-VOUT
CAP-
VREF
GND
OSC
CAP+
VCC
FB
LT1054CS8
C2
100 uF/35 v
C14
0.1
C4
10 uF
R19
3.3k
R18
3.3k
R17
3.3k
R16
3.3k
R15
3.3k
R14
3.3k
R13
1.5k
R12
1.5k
R11
1.5k
R20
100
C10
0.1
Q4
NTE378
C6
470 uF
MBRS340
D5
D4
MBRS340
R10
2.2k
Q5
NTE377
Q2
2N4124
Q1
2N4124
C16
0.1
C17
0.1
Q3
2N4124
R9
10k
C11
0.1
C7
470 uF
L2
22 uH
C15
0.1
C5
10 uF
C13
0.1
R4
R5
R6
R7
R8
22
22
22
22
22
D3
1N4007
C8
100 uF
L3
100 uH
-20.5v
GND
D6
MMSZ5231BT1
R22
0
C12
0.1
+5v
+13.8v
GND
D7
5.6 V
1 2
JP1
to LOGIC bd
1 2 3 4 5 6 7 8
JP2
to MOTHERBD
TEN-TEC, INC
1185 DOLLY PARTON PKY
SEVIERVILLE, TN 37862
Size
A
Document Number
81936 POWER DIST. BOARD A9
REV
Date:
May 23, 2003
Sheet
1 of 1



Ten-Tec, Inc. 1185 Dolly Parton Pkwy. Sevierville, TN 37862		
Title: Orion PA		
Size: B	Document Number: 81940 A2	REV
Date: May 27, 2003	Sheet 1 of 1	



TEN-TEC, INC. 1185 DOLLY PARTON PARKWAY SEVIERVILLE, TN 37862		
Size B	Document Number 81957 SWEEP AMP A13	REV
Date: May 23, 2003	Sheet 1 of 1	