

# **RX-321**

# **DSP**

# **Receiver**

Ten-Tec, Inc  
1185 Dolly Parton Parkway  
Sevierville, TN 37862



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## **Rx-321 Receiver**

The RX-321 receiver was designed by Ten-Tec for OEM applications. It was manufactured by Ten-Tec under agreement with third parties and never produced with the Ten-Tec brand name. The RX-321 is based on the RX-320D receiver. Additional circuitry to support integration with a transmitter was added, along with an RF preselector and 600 Ohm audio output.

## **GENERAL DESCRIPTION**

The Rx-321 is a general coverage receiver capable of receiving AM, SSB, and CW signals from 100kHz to 30MHz. The receiver is controlled by an external computer via a serial connection (see [www.rfsquared.com](http://www.rfsquared.com) to download the Rx-320D PC-GUI and programmers reference guide which will provide more information on controlling and programming the Rx-321). The Rx-321 is powered from any DC power supply operating in the range of 12-28VDC and capable of supplying at least 800mA of current (please observe the correct polarity as shown on rear panel). The antenna connection is designed for a 50-ohm antenna and is an SO239 type connector. The speaker connection is also available on the rear panel and is clearly marked. Please connect a 4 to 8 ohm speaker (again, please observe the correct polarity as shown). Finally, there is also a 9-pin connector on the rear panel labeled REMOTE. This connector provides an optional 600-ohm audio output and a mute pin that allows the AGC circuit to be turned off when used with an external transmitter (this keeps the external transmitter from loading up the AGC and causing receive recovery problems). Please see the schematic description of the 9-pin connector labeled remote for the pin out of this connector and DC voltage levels to apply to the mute pin when using an external transmitter.

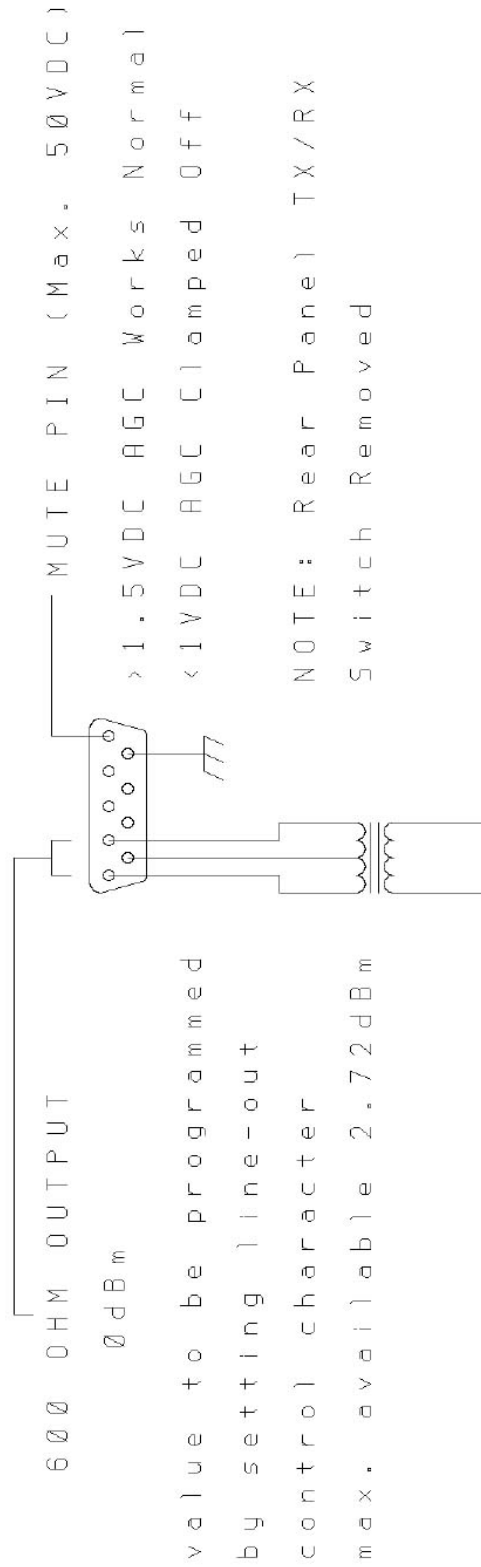
## **SCHEMATIC DESCRIPTION**

The receive signals from the antenna pass through one of eight preselector filters that are selected based on the band in which the receiver is tuned. From there, the selected signals go through a preamp stage before passing through an IF notch filter and on to the first mixer. The first mixer translates the tuned signal to 45MHz. The 45MHz signal then passes through a 45MHz IF filter and gain stage before going to the second mixer. The second mixer translates the signal to 455kHz. The 455kHz signal then pass through a 455kHz IF filter and gain stage before going to the third mixer. The third mixer translates the signal to 12kHz where the signal is then passed on to the AD1847 codec and ADSP-2101 DSP processor for decoding and translating to a low-level audio signal. The low level audio signal is then passed on to an audio amplifier which amplifies the signal and passes it on to the external speaker connector provided at the rear panel. An external speaker can be connected and the received signal can be heard.



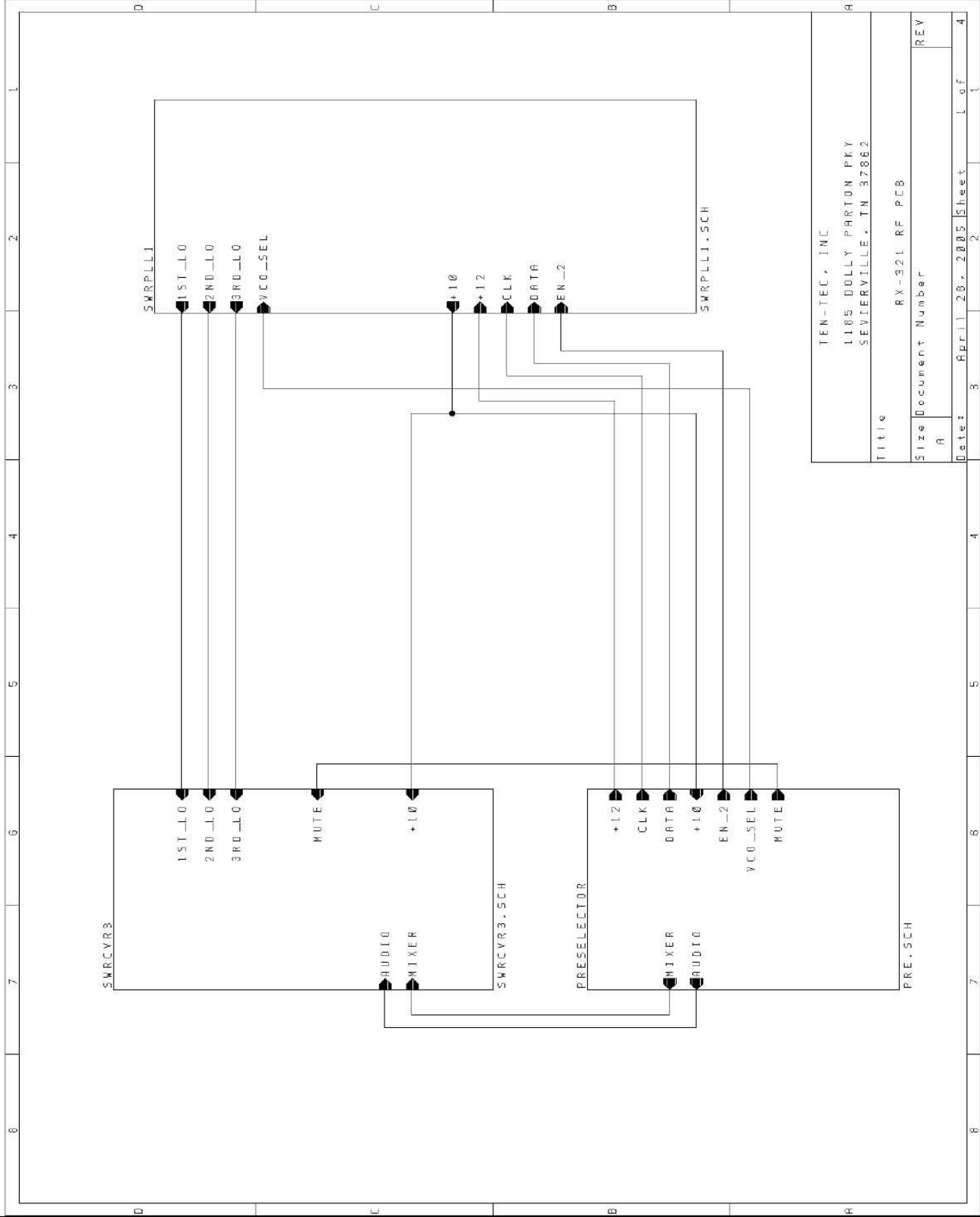


REAR VIEW RX-321  
9-PIN CONNECTOR LABELED REMOTE



The transformer shown  
is on the PC board

TEN-TEC, INC. 1185 DOLLY PARTON PARKWAY SEVIERVILLE, TN 37862	
Title	RX-321 9-PIN PIN-OUT
Size	Document Number
A	REV
Date:	APR 11 2005
Sheet	5 of 5



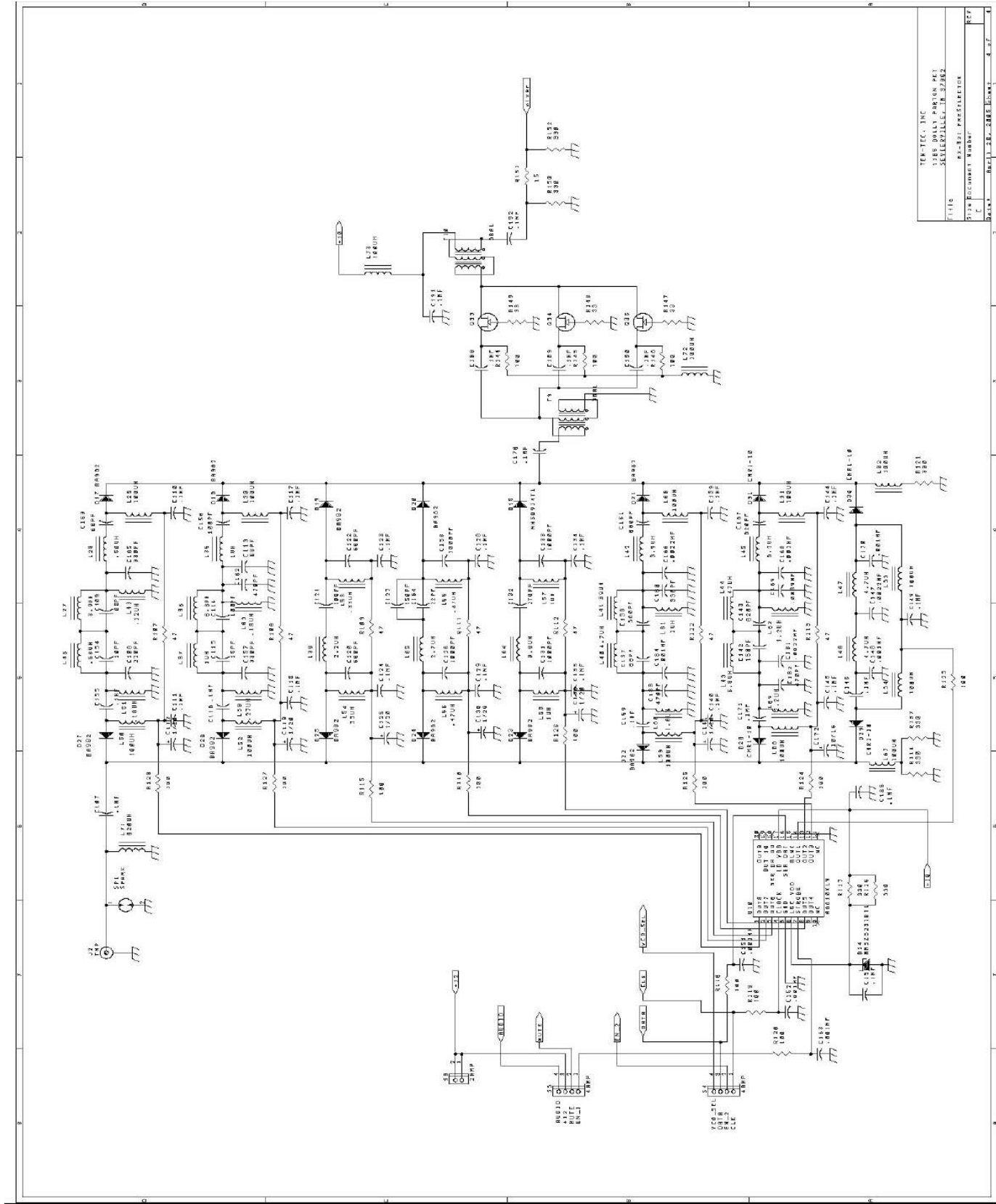
TEN-TEC, INC 1185 DOLLY PARTON PKY SEVIERVILLE, TN 37862	
Title RX-321 RF PCB	
Size A	Document Number REV
Date: APR11 2005	Sheet 2
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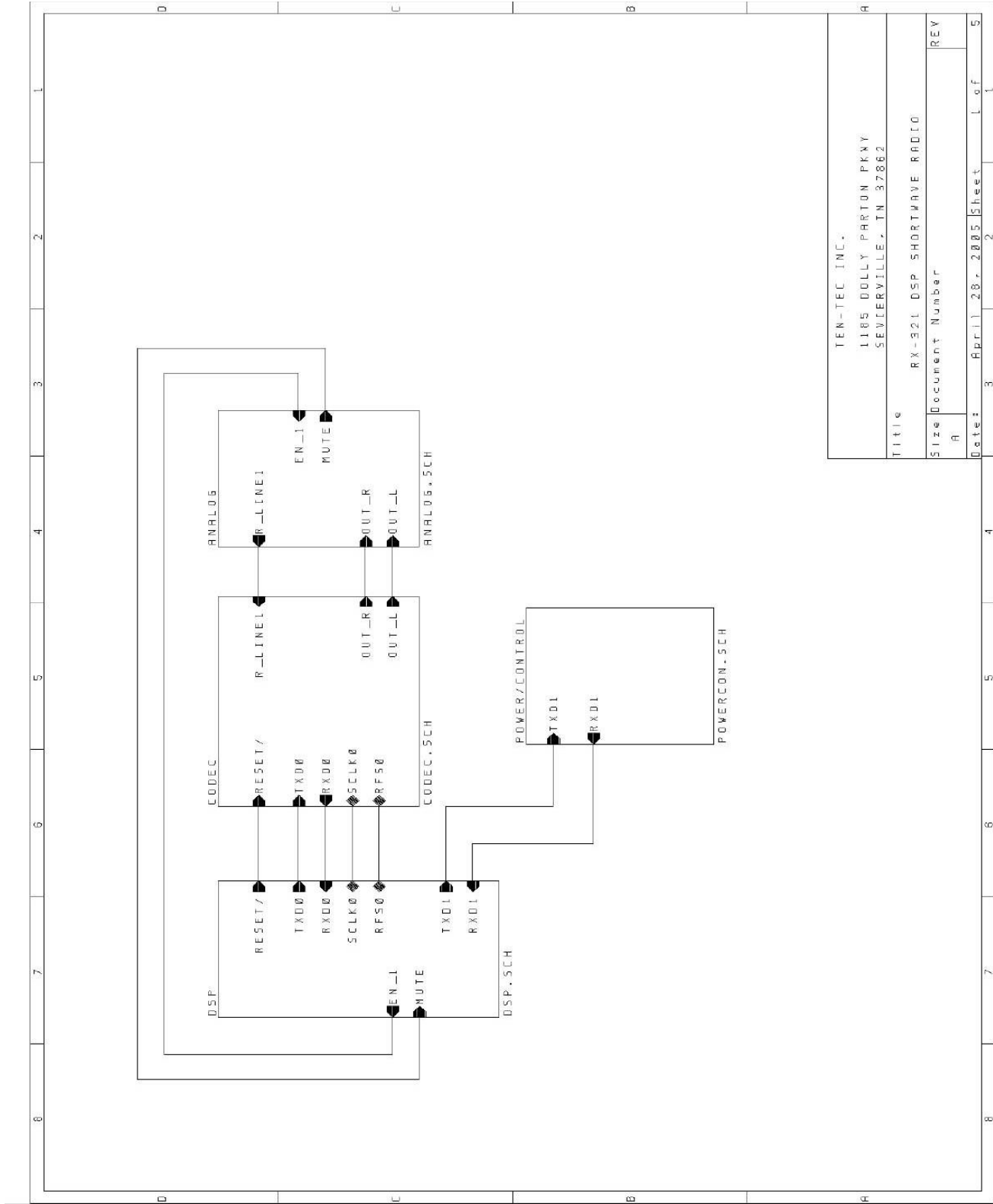




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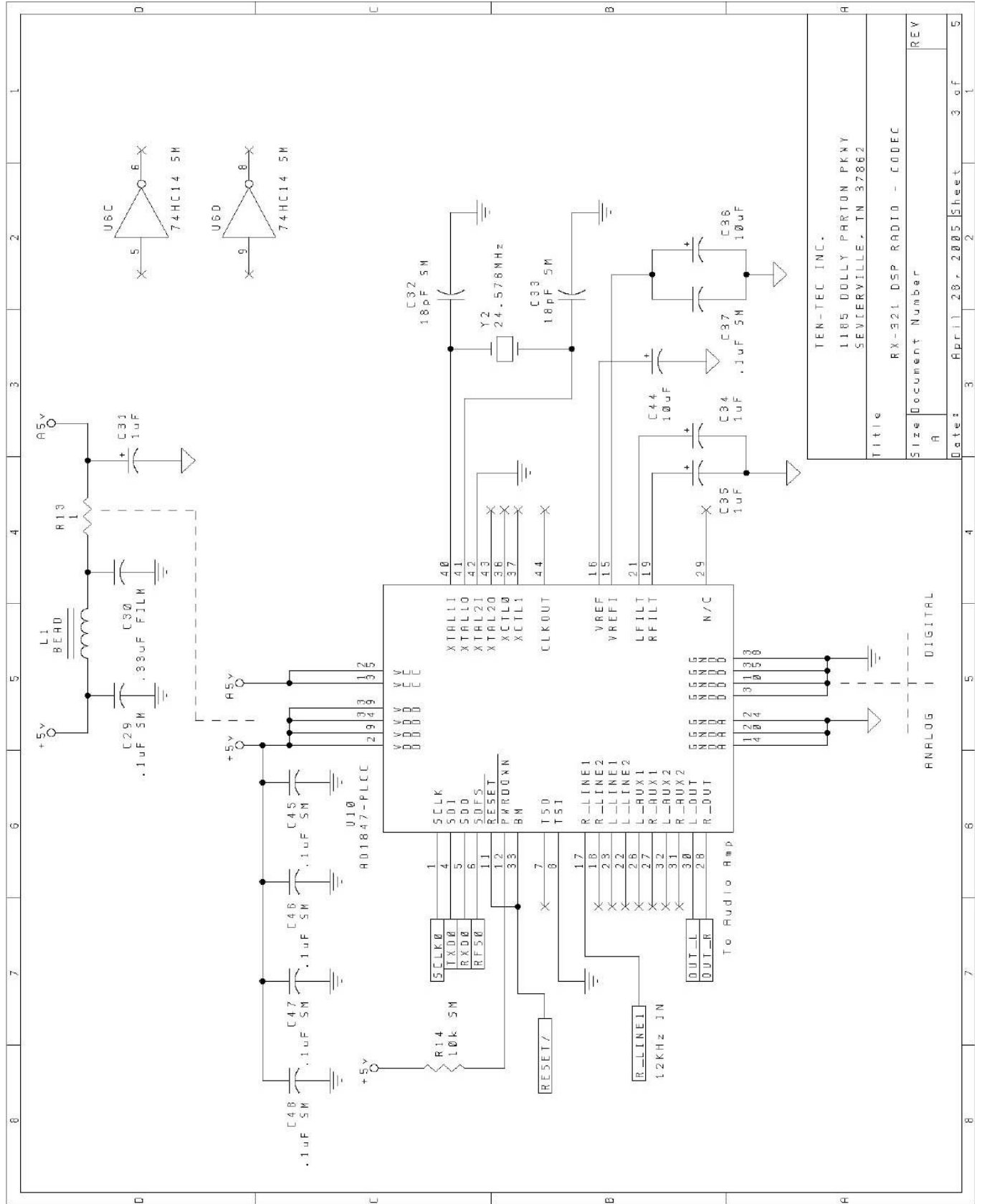
TEN-TEC, INC. 1185 DOLLY PARTON PKWY SEVIERVILLE, TN 37862	
Title	RX-321 DSP SHORTWAVE RADIO
Size	Document Number
A	REV
Date:	April 28, 2005 Sheet 1 of 5





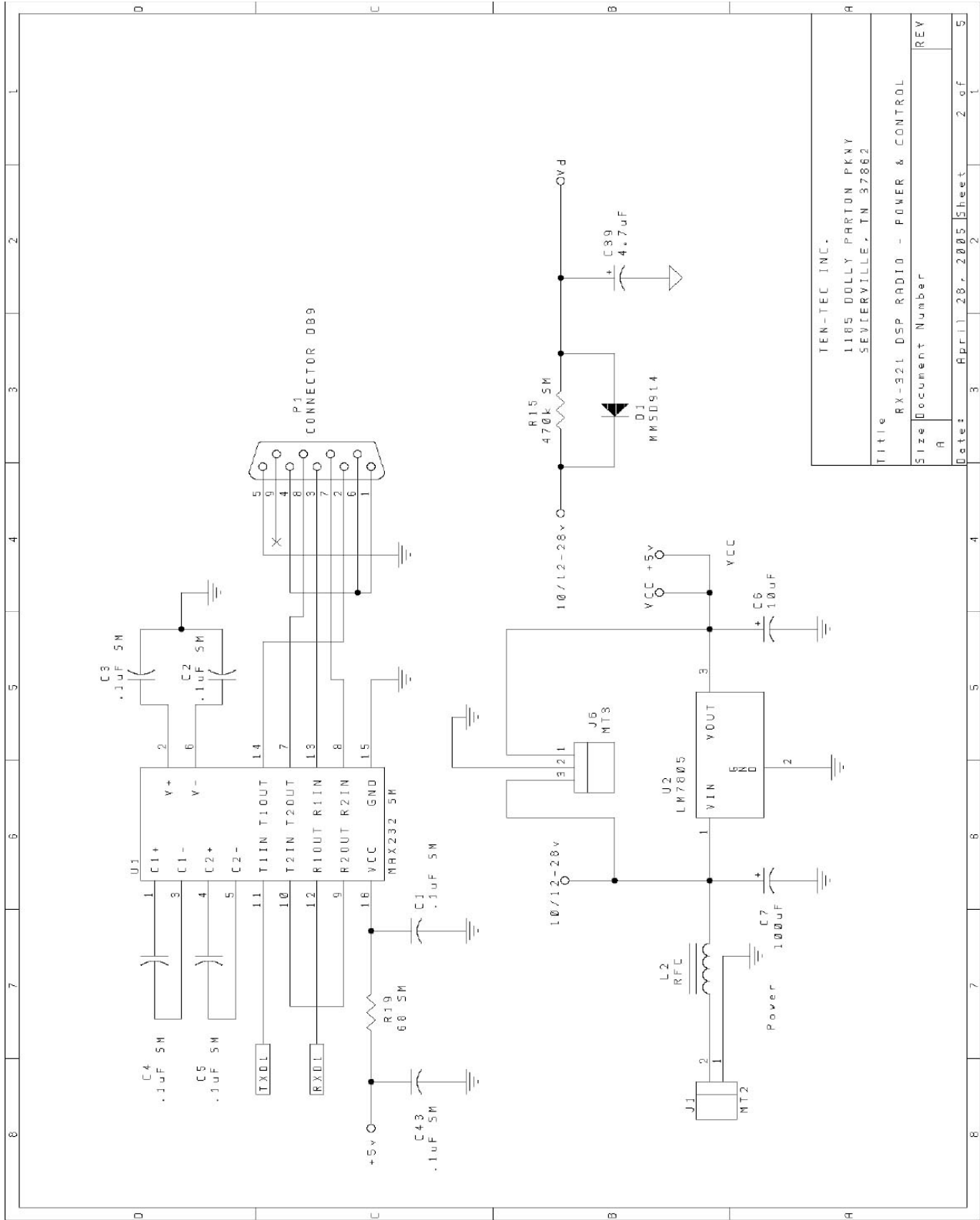


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1185 DOLLY PARTON PKWY	
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Title	RX-321 DSP RADIO - CODEC
Size	A
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Date	April 28, 2005
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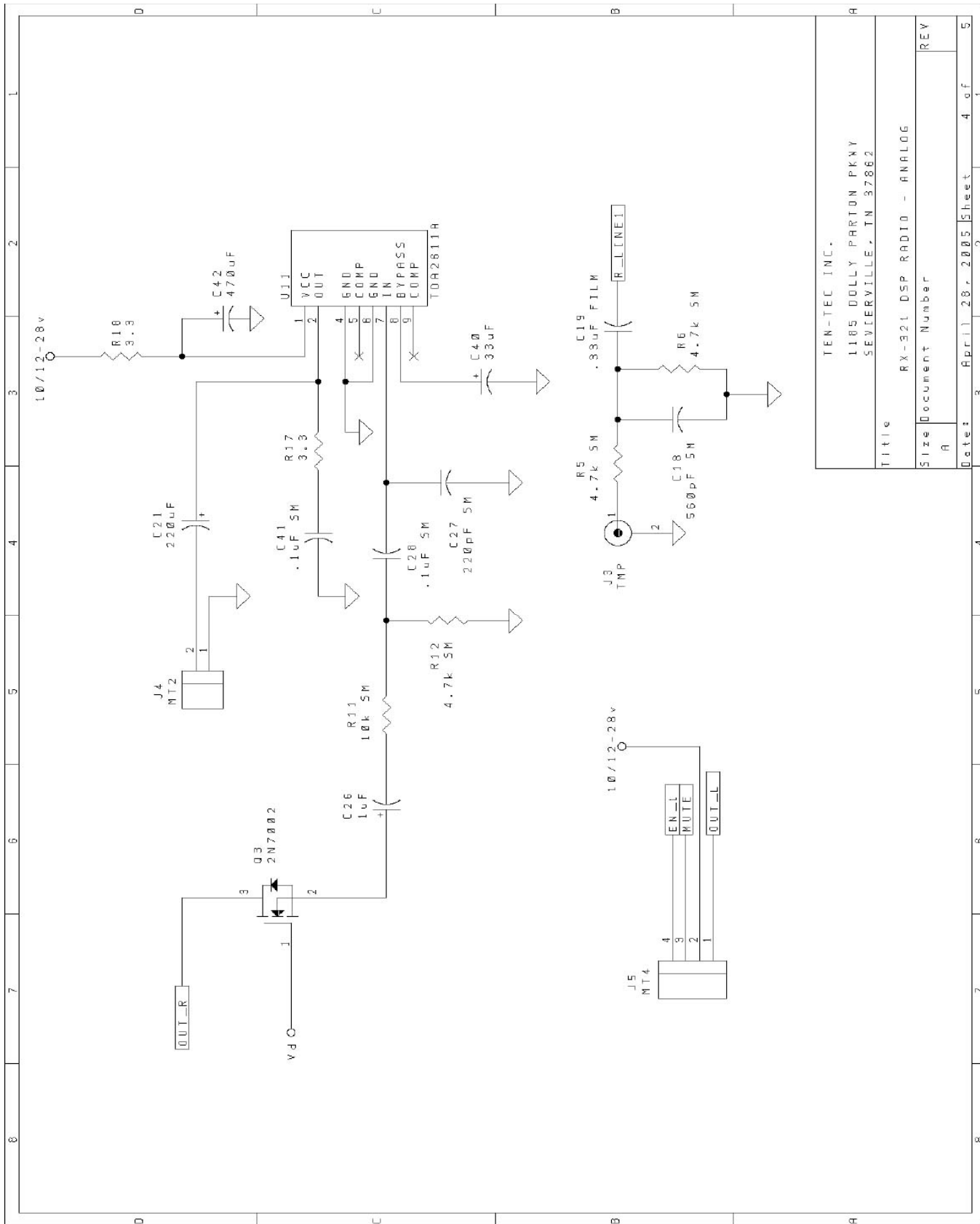
ANALOG | DIGITAL



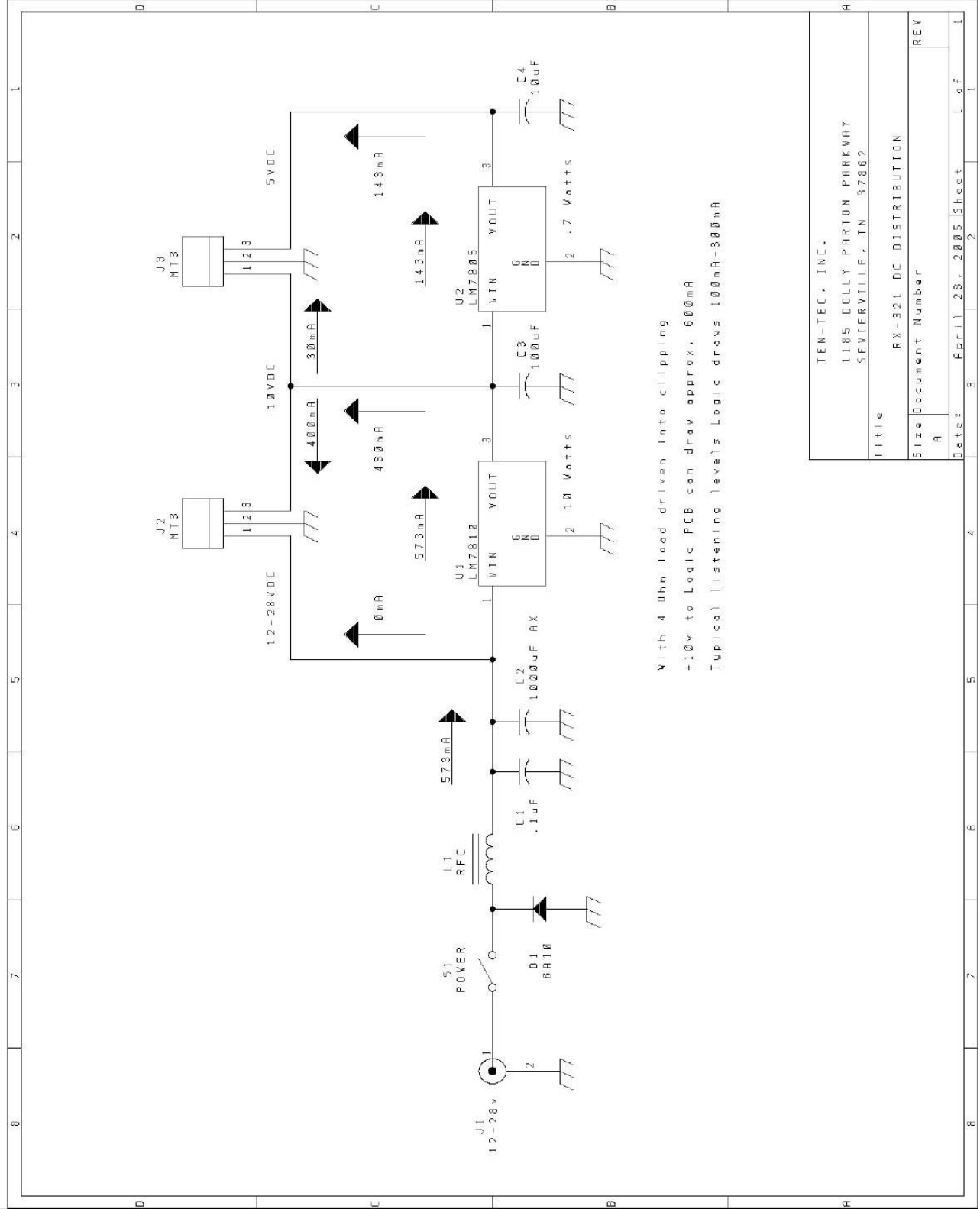
TEN-TEC INC. 1105 DOLLY PARTON PKWY SEVERVILLE, TN 37862	
Title RX-32L DSP RADIO - POWER & CONTROL	
Size A	Document Number
Date: April 28, 2005	Sheet 2 of 5



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TEN-TEC INC.	
1185 DOLLY PARTON PKWY	
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Title RX-921 DSP RADIO - ANALOG	
Size A	Document Number
Date: April 28, 2005	Sheet 4 of 5



TEN-TEC, INC. 1185 DOLLY PARTON PARKWAY SEVIERVILLE, TN 37862	
Title RX-321 DC DISTRIBUTION	
Size A	Document Number REV
Date: April 28, 2005	Sheet 2 of 1

# RF BOARD

GW320

Revised: December 2, 1999

Revision:

Bill Of Materials

December 16, 1999 11:12:13 Page 1

Item	Quantity	Reference	Part
1	16	C1,C3,C18,C75,C76,C77, C82,C88,C94,C148,C151, C152,C153,C168,C170,C184	.001MF
2	2	C2,C108	220PF
3	56	C4,C5,C6,C7,C13,C14,C16, C17,C21,C22,C25,C28,C34, C36,C37,C38,C39,C44,C72, C74,C84,C87,C100,C103, C104,C105,C107,C110,C111, C116,C117,C118,C123,C124, C128,C129,C134,C135,C139, C140,C144,C145,C146,C149, C150,C155,C159,C171,C176, C185,C187,C188,C189,C190, C191,C192	.1MF
4	21	C8,C10,C12,C15,C19,C20, C24,C49,C50,C51,C54,C55, C56,C57,C58,C66,C67,C70, C83,C89,C106	.01MF
5	7	C9,C68,C80,C109,C113, C137,C163	68PF
6	7	C11,C52,C53,C85,C162, C182,C183	470PF
7	5	C23,C78,C91,C95,C99	33/16
8	7	C26,C112,C119,C125,C130, C136,C141	1/20
9	6	C27,C31,C32,C33,C90,C172	10/16
10	1	C29	33PF
11	1	C30	4.7/50
12	5	C35,C47,C98,C101,C154	10PF
13	1	C40	56PF
14	2	C41,C132	270PF
15	1	C42	82PF
16	4	C43,C114,C121,C156	100PF
17	1	C45	10-60PF
18	1	C46	18PF
19	2	C48,C164	22PF



20	2	C59,C61	.0082MF
21	1	C60	.022MF
22	4	C62,C63,C64,C65	BB620
23	2	C69,C73	100/35
24	1	C71	2.2PF
25	2	C79,C81	39PF
26	1	C86	5-30PF
27	1	C92	.1MFD
28	1	C93	.47MFD
29	1	C96	.01MFD
30	1	C97	.047MFD
31	1	C102	4.7PF
32	1	C115	15PF
33	3	C120,C122,C161	680PF
34	4	C126,C131,C133,C158	1000PF
35	2	C127,C142	150PF
36	1	C138	560PF
37	2	C167,C143	820PF
38	3	C147,C166,C181	.0022MF
39	3	C157,C160,C165	330PF
40	1	C169	.0039MF
41	7	D1,D3,D4,D5,D6,D7,D15	MMSD914T1
42	2	D2,D33	BA679
43	2	D8,D9	BAT68_04
44	2	D12,D13	RLS135
45	1	D14	MMSZ5231BT1
46	11	D17,D18,D19,D20,D21,D22, D23,D24,D25,D26,D27	BA982
47	4	D28,D29,D30,D31	CMR1-10
48	1	D32	RL
49	2	D34,D35	6.8V
50	1	FL1	45MONO
51	1	FL2	LTW33-455D
52	2	J1,J2	TMP
53	1	L1	.25UH
54	3	L2,L11,L49	.12UH
55	1	L3	BIF
56	16	L4,L26,L29,L30,L31,L32, L33,L34,L50,L52,L59,L66, L67,L68,L72,L73	100UH
57	3	L5,L6,L38	.27UH
58	2	L7,L8	15UH
59	3	L9,L28,L48	.56UH
60	3	L10,L55,L56	.47UH
61	1	L12	.19uH
62	1	L13	.342uH



63	2	L14,L15	.047UH
64	1	L16	.15UH
65	1	L17	.1UH
66	2	L18,L25	1.0UH
67	1	L19	1.5UH
68	1	L20	25UH
69	7	L21,L22,L23,L24,L40,L46,	4.7UH
		L47	
70	3	L27,L42,L64	3.9UH
71	5	L35,L37,L57,L58,L61	1UH
72	2	L36,L43	6.8UH
73	2	L39,L69	2.2UH
74	1	L41	39UH
75	1	L44	47UH
76	1	L45	8.2UH
77	2	L51,L63	.18UH
78	2	L53,L54	.33UH
79	1	L60	1.8UH
80	1	L62	1.2UH
81	1	L65	2.7UH
82	1	L71	820UH
83	1	P1	CONNECTOR DB9
84	16	Q1,Q2,Q4,Q6,Q8,Q18,Q20,	MMBT3904LT1
		Q21,Q22,Q23,Q24,Q26,Q27,	
		Q28,Q31,Q32	
85	12	Q3,Q12,Q13,Q14,Q15,Q16,	MMBFJ310LT1
		Q17,Q19,Q25,Q33,Q34,Q35	
86	1	Q5	BF998
87	4	Q7,Q29,Q30,Q36	MMBT3906LT1
88	2	R1,R3	8.2K
89	2	R2,R32	6.8K
90	12	R4,R5,R46,R47,R64,R68,	10K
		R70,R75,R77,R92,R96,R156	
91	9	R6,R16,R17,R34,R35,R38,	47K
		R66,R76,R93	
92	40	R7,R11,R12,R22,R23,R26,	100
		R29,R30,R31,R33,R37,R48,	
		R49,R53,R62,R65,R72,R78,	
		R80,R81,R82,R89,R94,R95,	
		R102,R103,R110,R115,R118,	
		R119,R120,R123,R124,R125,	
		R126,R127,R128,R144,R145,	
		R146	
93	6	R8,R18,R71,R97,R99,R154	4.7K
94	5	R9,R14,R51,R100,R157	22K
95	9	R10,R85,R107,R108,R109,	47





		R111,R112,R113,R122	
96	5	R13,R21,R73,R79,R135	1.0K
97	4	R15,R24,R67,R69	150
98	10	R19,R25,R114,R116,R117, R121,R136,R137,R150,R152	330
99	1	R20	1.0M
100	2	R87,R27	3.3K
101	1	R28	470
102	2	R36,R61	100 TRIM
103	1	R50	2.2K
104	1	R52	100K
105	9	R55,R56,R57,R58,R59,R74, R90,R91,R98	1.5K
106	2	R63,R88	220
107	1	R83	82K
108	1	R84	680K
109	1	R86	10
110	1	R101	27
111	2	R104,R106	1K PCPOT
112	1	R105	10M
113	3	R147,R148,R149	33
114	1	R151	15
115	3	R153,R155,R158	1K
116	1	SP1	SPARK
117	1	S3	2AMP
118	2	S4,S5	4AMP
119	6	T1,T2,T5,T7,T9,T10	3BAL
120	2	T3,T4	455IF
121	1	T8	2BAL
122	2	U1,U2	TLO82
123	1	U3	600 XF
124	1	U4	74LS390
125	1	U5	NJM7810FA
126	1	U6	MC145170
127	1	U7	MC7805CD2T
128	1	U8	4.67MHz
129	1	U9	14.8475MHz
130	1	U10	A6810XLW



# DSP BOARD

DSP SHORTWAVE RADIO

Revised: September 30, 1999

Revision:

Bill Of Materials      September 30, 1999    15:08:31    Page 1

Item	Quantity	Reference	Part	Ten-Tec Part Number
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1	1	R13	1	30103
2	2	R18,R17	3.3	30109
3	1	R19	68 SM	30648
4	1	R3	100 SM	30650
5	1	R27	1k SM	30662
6	3	R5,R6,R12	4.7k SM	30670
7	4	R4,R11,R14,R28	10k SM	30674
8	1	R2	100k SM	30686
9	1	R15	470k SM	30694
10	1	L2	RFC	21179
11	1	U2	LM7805	25095
12	1	U11	TDA2611A	25299
13	1	D2	5.1v SM	28127
14	2	J1,J4	MT2	35065
15	1	J6	MT3	35066
16	2	J5,J2	MT4	35067
17	4	C12,C13,C32,C33	18pF SM	23465
18	1	C27	220pF SM	23478
19	1	C18	560pF SM	23483
20	23	C1,C2,C3,C4,C5,C8,C9,C10, C11,C15,C16,C28,C29,C37, C41,C43,C45,C46,C47,C48, C51,C52,C53	.1uF SM	23488
21	2	C30,C19	.33uF FILM	23329
22	5	C14,C26,C31,C34,C35	1uF	23264
23	1	C39	4.7uF	23310
24	3	C6,C36,C44	10uF	23266
25	1	C40	33uF	23308
26	1	C7	100uF	23189
27	1	C21	220uF	23202
28	1	C42	470uF	23228
29	1	U3	00 SM	25394
30	1	Q3	2N7002	25412
31	1	Y1	16.66MHz	48209
32	1	Y2	24.576MHz	48239
33	1	U6	74HC14 SM	25403



34	1	U5	74HC574 SM	25404
35	1	U7	93LCS66 SM	N/A
36	1	U10	AD1847-PLCC	25402
37	1	U8	ADSP-2101 KP66	25411
38	1	U4	AT27C512	25329
39	1	L1	BEAD	21027
40	1	P1	CONNECTOR DB9	35242
41	1	U1	MAX232 SM	25410
42	1	D1	MMSD914	28124
43	1	J3	TMP	35225



# DC DISTRIBUTION BOARD

Revised: October 4, 1999

Revision:

Bill Of Materials      October 4, 1999    11:45:52    Page 1

Item	Quantity	Reference	Part	Ten-Tec Part Number
1	1	L1	RFC	21179
2	1	U2	LM7805	25095
3	1	U1	LM7810	25400
4	1	D1	6A10	28098
5	2	J3,J2	MT3	35066
6	1	C1	.1uF	23261
7	1	C4	10uF	23266
8	1	C3	100uF	23189
9	1	C2	1000uF AX	23042
10	1	J1	12-28v	35065
11	1	S1	POWER	35065

