

Model 599 Technical Description

With the Model 599 Eagle, Ten-Tec has created a transceiver combining simplified controls and ease of operation with the excellent performance of a low first IF 160-through 6-meter ham-band architecture in a compact, mobile-friendly structure. The analog portion of the radio is double conversion with IF frequencies of 9.0015 MHz and 22.5 kHz. A third conversion to zero-frequency IF is accomplished in the DSP processor. General coverage receive is provided between 0.5 and 30 MHz.

Refer to the Block Diagram for the following discussion. Receive signals are routed through the optional antenna tuner and transmit lowpass filter to a switchable 10dB attenuator at the input of the BPF/Preselector board. This board also contains the bandpass filter selected for the band in use and a switchable 12dB receive preamplifier.

On the TX/RX board, output from the preamplifier is mixed with the first Local Oscillator to 9.0015 MHz and routed optionally through the noise blanker to one of three roofing filters. After selectivity roofing, IF amplification is provided by a variable gain amplifier which also develops the high-level AGC. Finally, the 9.0015 IF signal is mixed with the second LO to develop a 22.5 kHz low IF for the Signal Processing Unit (SPU).

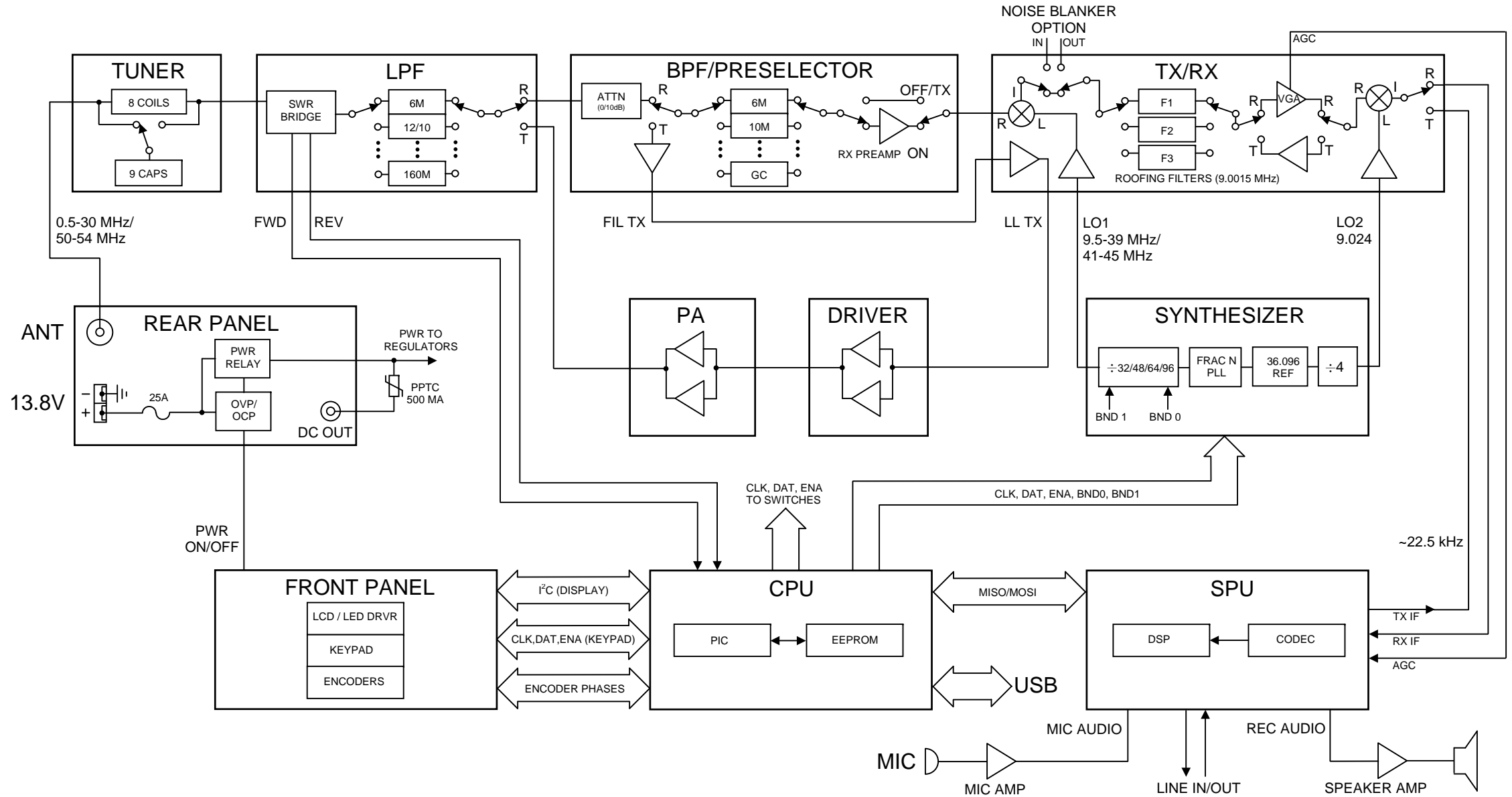
Based on a 36.096 MHz temperature-stable reference, the Synthesizer board generates first and second LOs via fractional-N synthesis and fixed frequency division.

The SPU samples the low IF at 96K samples per second and applies the resulting data to a digital signal processor. Numerical algorithms running in the digital processor accomplish additional selectivity filtering, low-level AGC, and demodulation. The resulting audio appears at the speaker and line outputs.

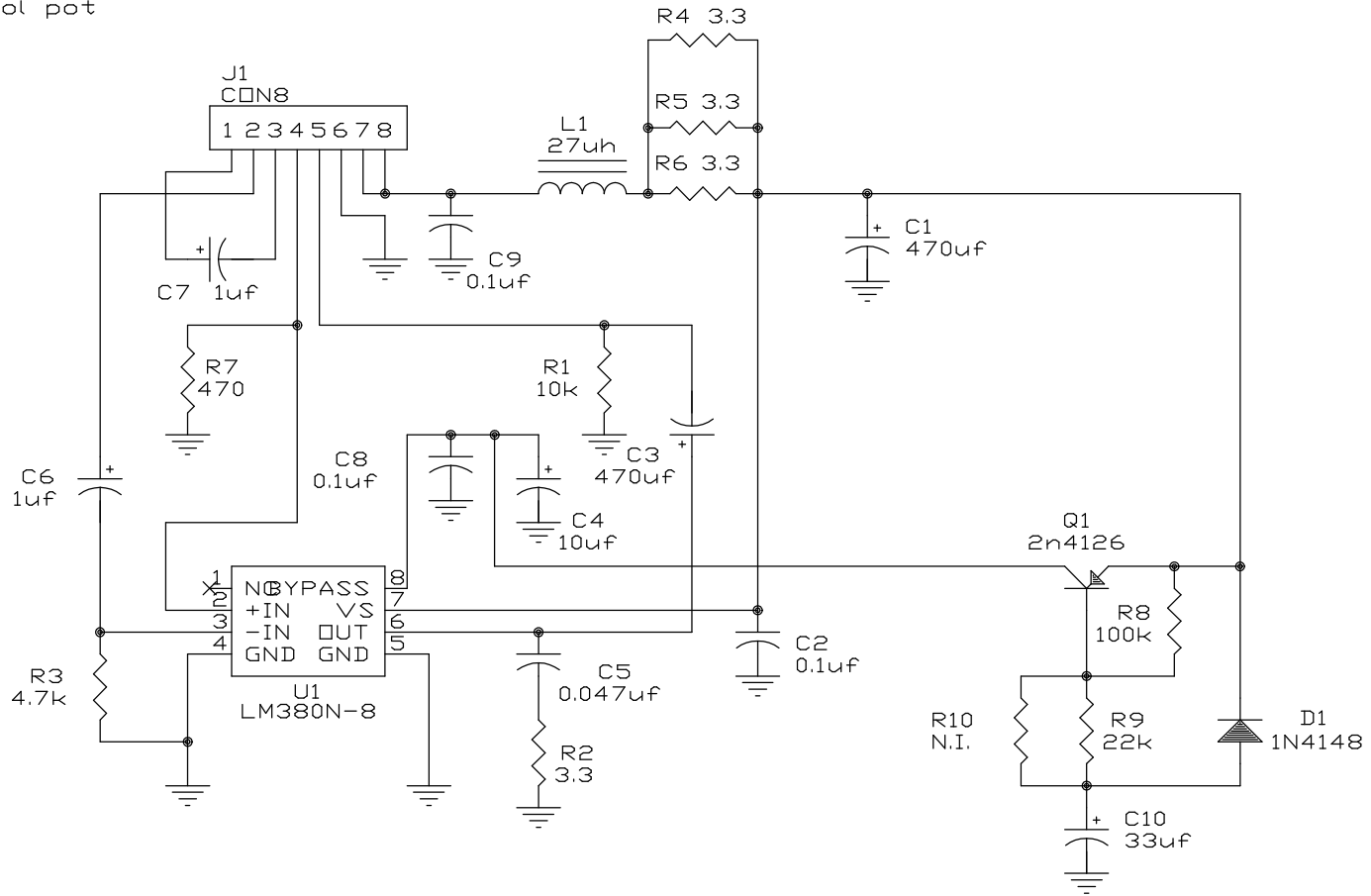
The PIC processor in the CPU module executes firmware stored in EEPROM to perform housekeeping functions such as synthesizer programming/tuning, signal switching, and front panel display and control input. Based on the control inputs from the front panel (or remotely via the USB interface), the CPU writes display information, tunes the LOs, adjusts selectivity, and chooses both receiver detection and transmit emission modes.

Transmit operation is basically the reverse of receive. Audio or CW signals are generated at zero-frequency (baseband) in the DSP, frequency-shifted to the 22.5 kHz low IF, and output to mixers on the TX/RX board for conversion to the operating frequency. The signal then travels in the reverse direction through the selected Bandpass Filter to the low-level drivers and Power Amplifier, then finally through the Lowpass Filter and optional antenna tuner to the antenna. If the tuner is installed, forward and reverse power measurements from the SWR bridge are used by the CPU to select the correct inductance and capacitance in an L-network to provide a 50 Ohm load to the transmitter output.

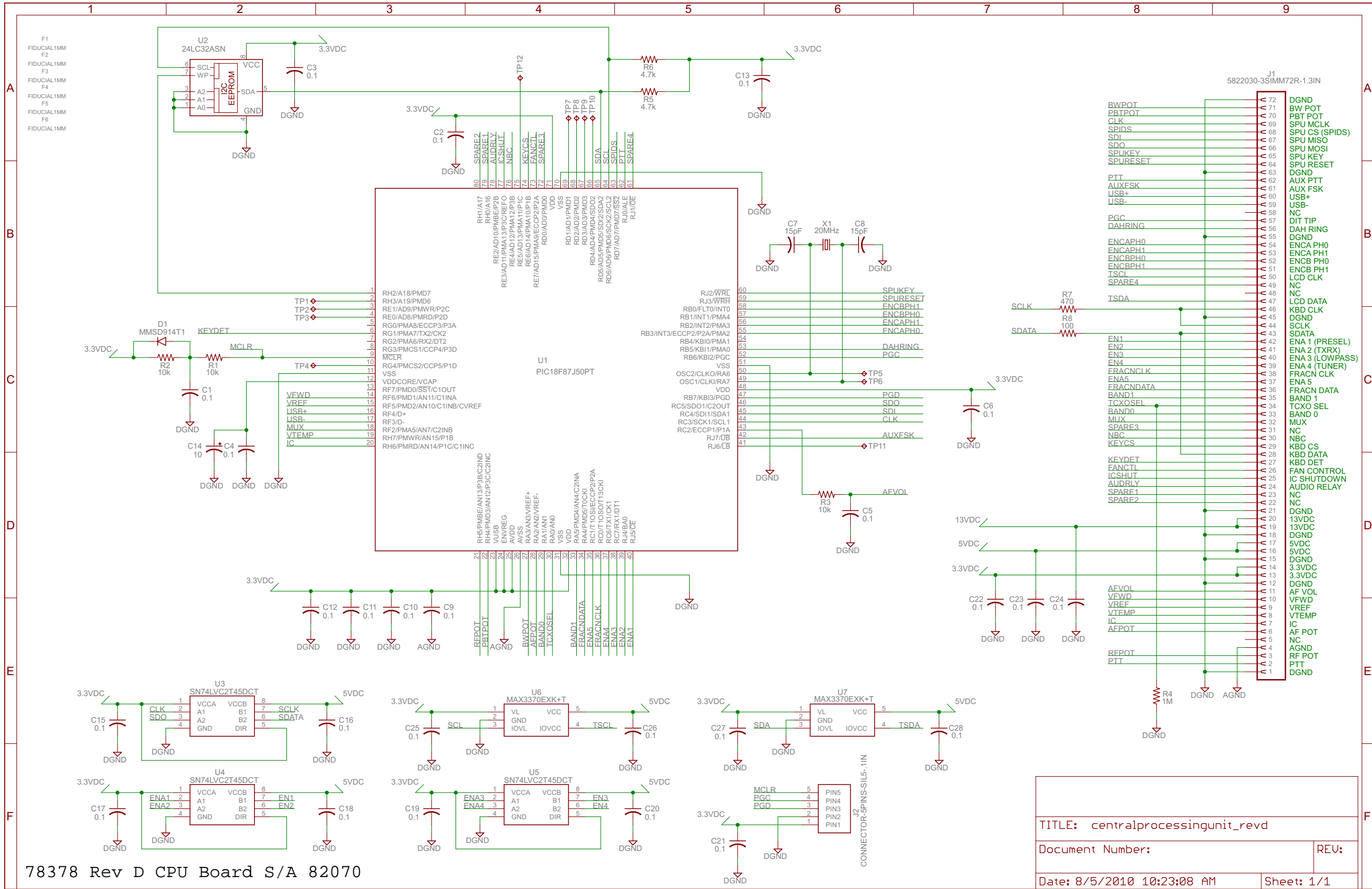
MODEL 599



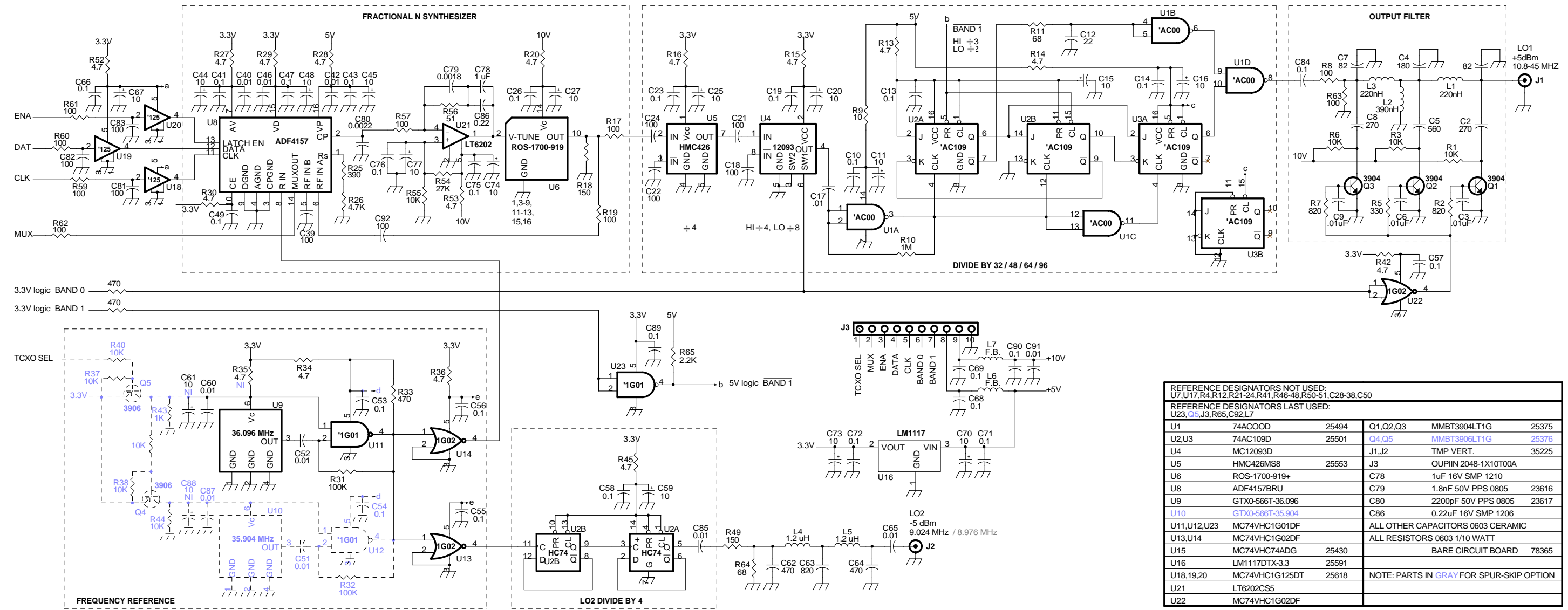
1. Main audio from SPU
2. Side tone in
3. To high side of vol pot
4. signal from wiper
5. Speaker out
6. Ground
7. +13.5 volts
8. +13.5 volts



Size	Document Number	REV
A		
Date:	August 31, 2010	Sheet 1 of 1



REVISION HISTORY:		
REV	ECN NO.	DATE



REFERENCE DESIGNATORS NOT USED:			
U7,U17,R4,R12,R21-24,R41,R46-48,R50-51,C28-38,C50			
REFERENCE DESIGNATORS LAST USED:			
U23, Q5, J3, R65, C92, L7			
U1	74AC00D	25494	Q1,Q2,Q3 MMBT3904LT1G 25375
U2,U3	74AC109D	25501	Q4,Q5 MMBT3906LT1G 25376
U4	MC12093D		J1,J2 TMP VERT. 35225
U5	HMC426MS8	25553	J3 OUPIIN 2048-1X10T00A
U6	ROS-1700-919+		C78 1uF 16V SMP 1210
U8	ADF4157BRU	C79	1.8nF 50V PPS 0805 23616
U9	GTX0-566T-36.096	C80	2200pF 50V PPS 0805 23617
U10	GTX0-566T-35.904	C86	0.22uF 16V SMP 1206
U11,U12,U23	MC74VHC1G01DF	ALL OTHER CAPACITORS 0603 CERAMIC	
U13,U14	MC74VHC1G02DF	ALL RESISTORS 0603 1/10 WATT	
U15	MC74VHC74ADG	25430	BARE CIRCUIT BOARD 78365
U16	LM1117DXTX-3.3	25591	
U18,19,20	MC74VHC1G125DT	25618	NOTE: PARTS IN GRAY FOR SPUR-SKIP OPTION
U21	LT6202CS5		
U22	MC74VHC1G02DF		

NOTE: INSTALL PARTS IN GRAY WITH SPUR-SKIP SOFTWARE OPTION ONLY
(3.3V ON TCXO SEL INDICATES SPUR-SKIP HARDWARE INSTALLED)

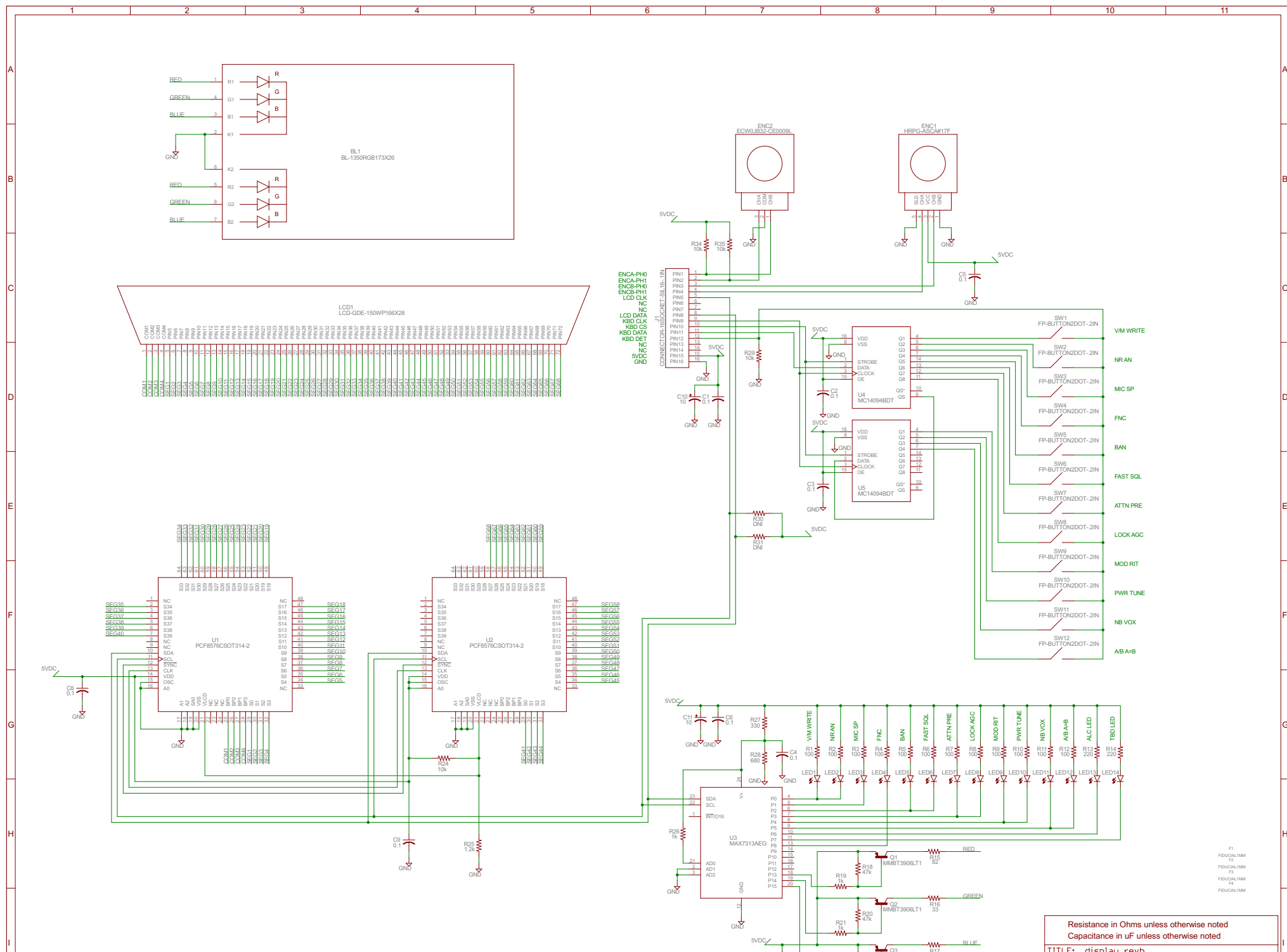
LO1 FREQUENCY	TOTAL DIVISION RATIO	BAND	
		0	1
10.8 - 16.3 MHz	4 x 8 x 3 = 96	LO	LO
16.3 - 23.35 MHz	4 x 8 x 2 = 64	HI	LO
23.35 - 33 MHz	4 x 4 x 3 = 48	LO	HI
33 - 45 MHz	4 x 4 x 2 = 32	HI	HI

TEN-TEC

TITLE: MODEL 599 SYNTHESIZER

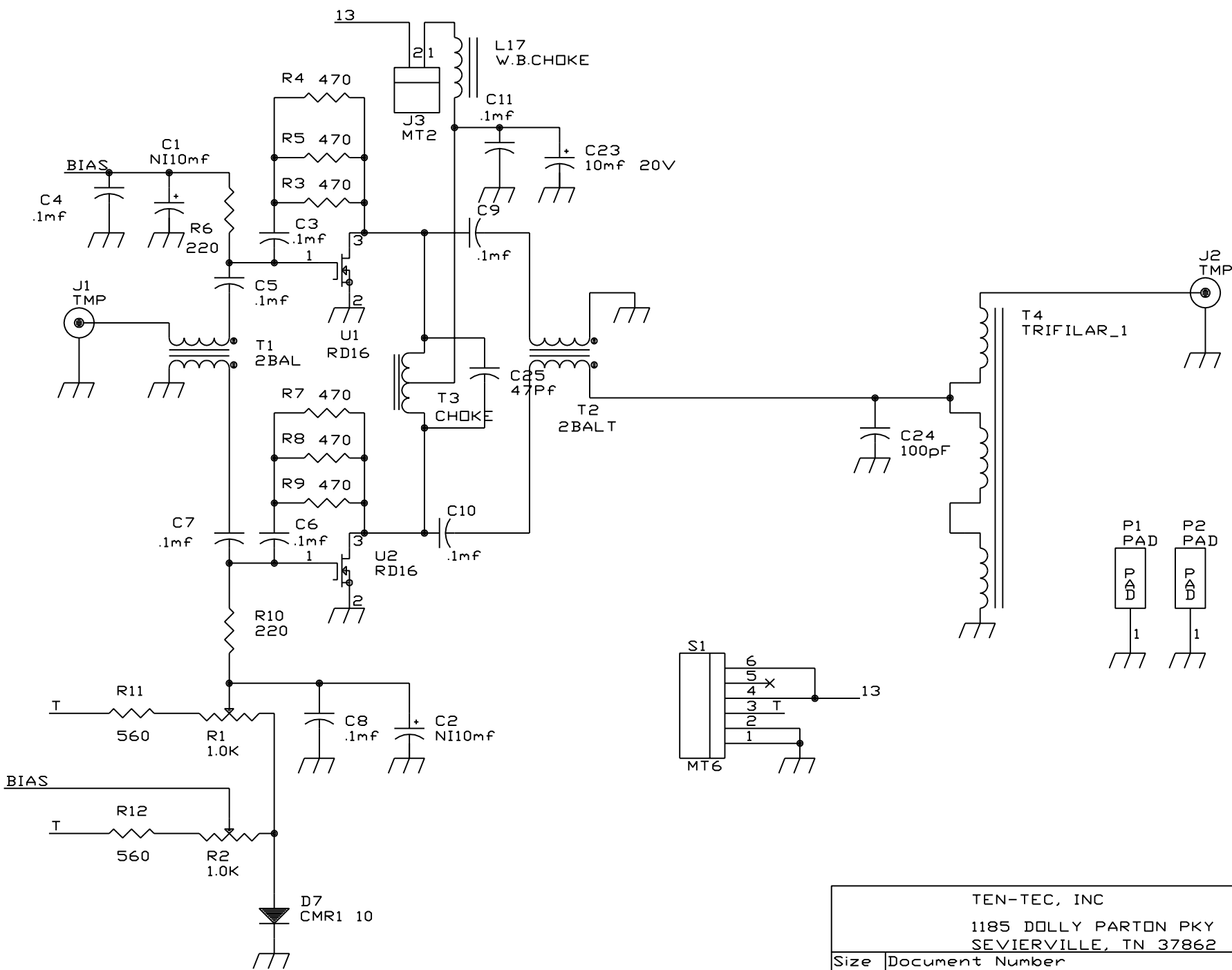
PART NO: 82061 REV: A

DATE: 9/25/2009 SHEET: 1/1

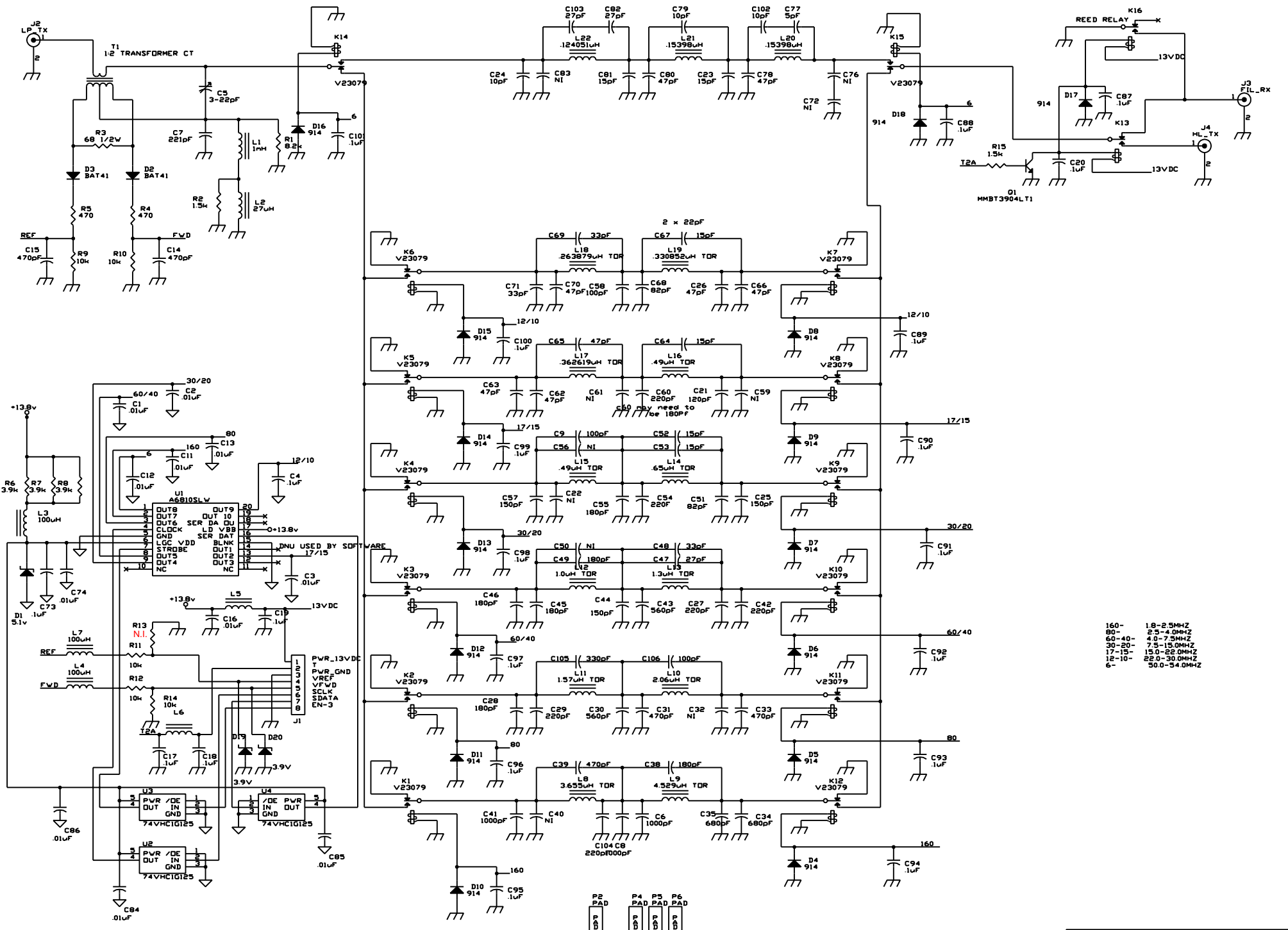


78365 Rev B Front Panel Board S/A 82061

Resistance in Ohms unless otherwise noted Capacitance in uF unless otherwise noted	
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Date: 7/1/2010 2:18:07 PM	Sheet: 1/1

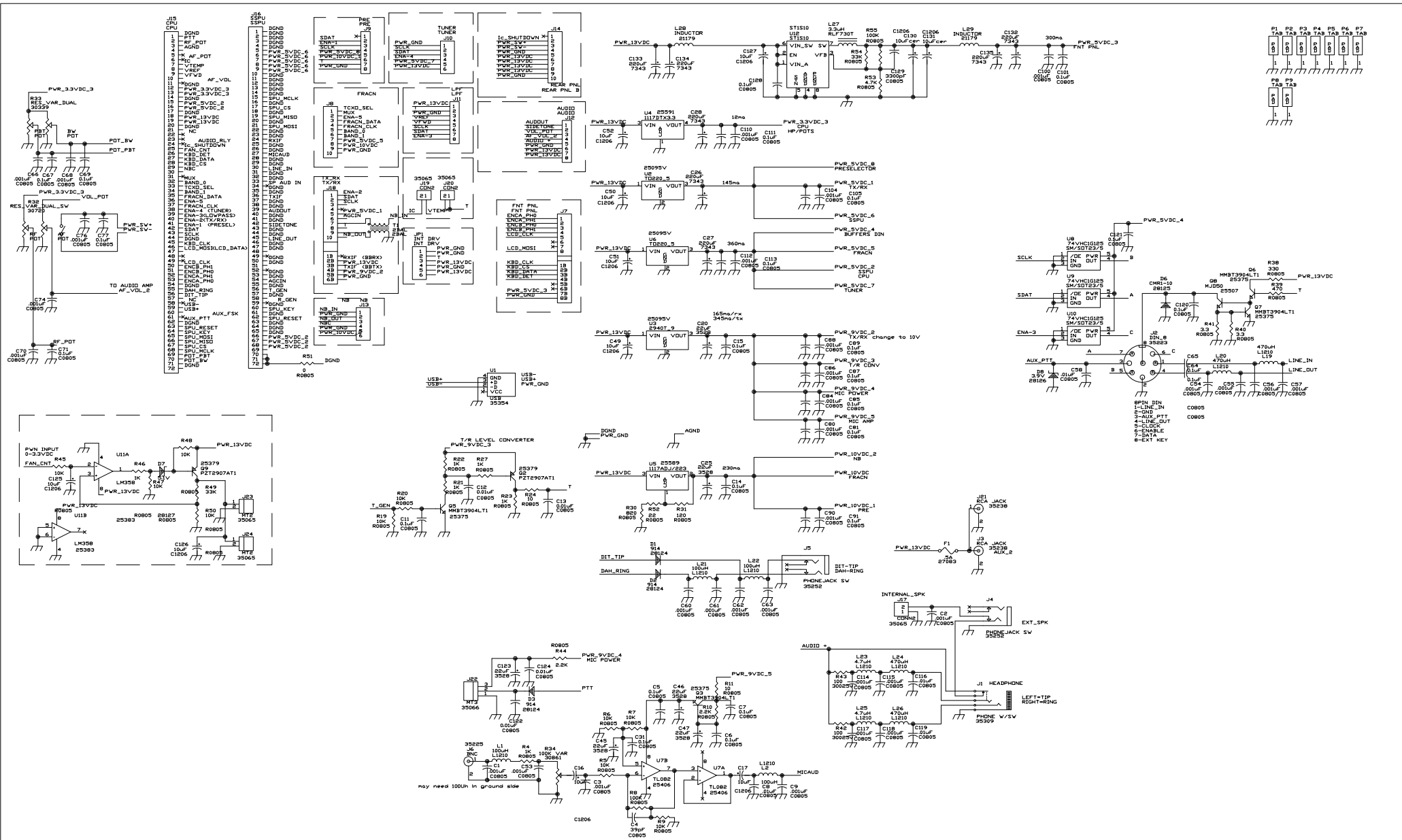


TEN-TEC, INC		
1185 DOLLY PARTON PKY		
SEVIERVILLE, TN 37862		
Size	Document Number	REV
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Date:	March 23, 2010	Sheet 1 of 1



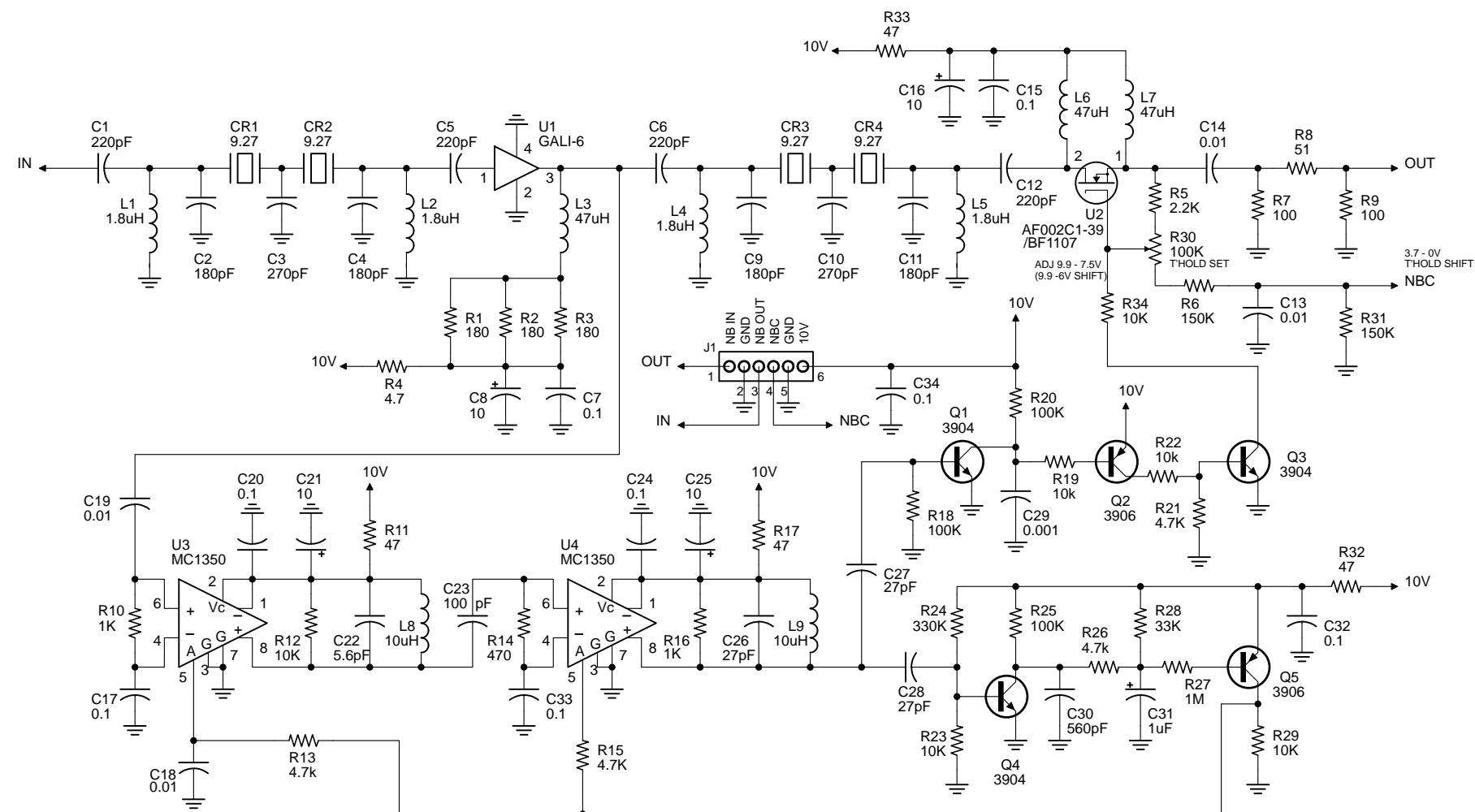
- 160- 1.8-2.5MHZ
- 80- 2.5-4.0MHZ
- 60-40- 4.0-7.5MHZ
- 30-20- 7.5-15.0MHZ
- 17-15- 15.0-22.0MHZ
- 12-10- 22.0-30.0MHZ
- 6- 50.0-54.0MHZ

78370 Rev B Low Pass Filter Board S/A 82067



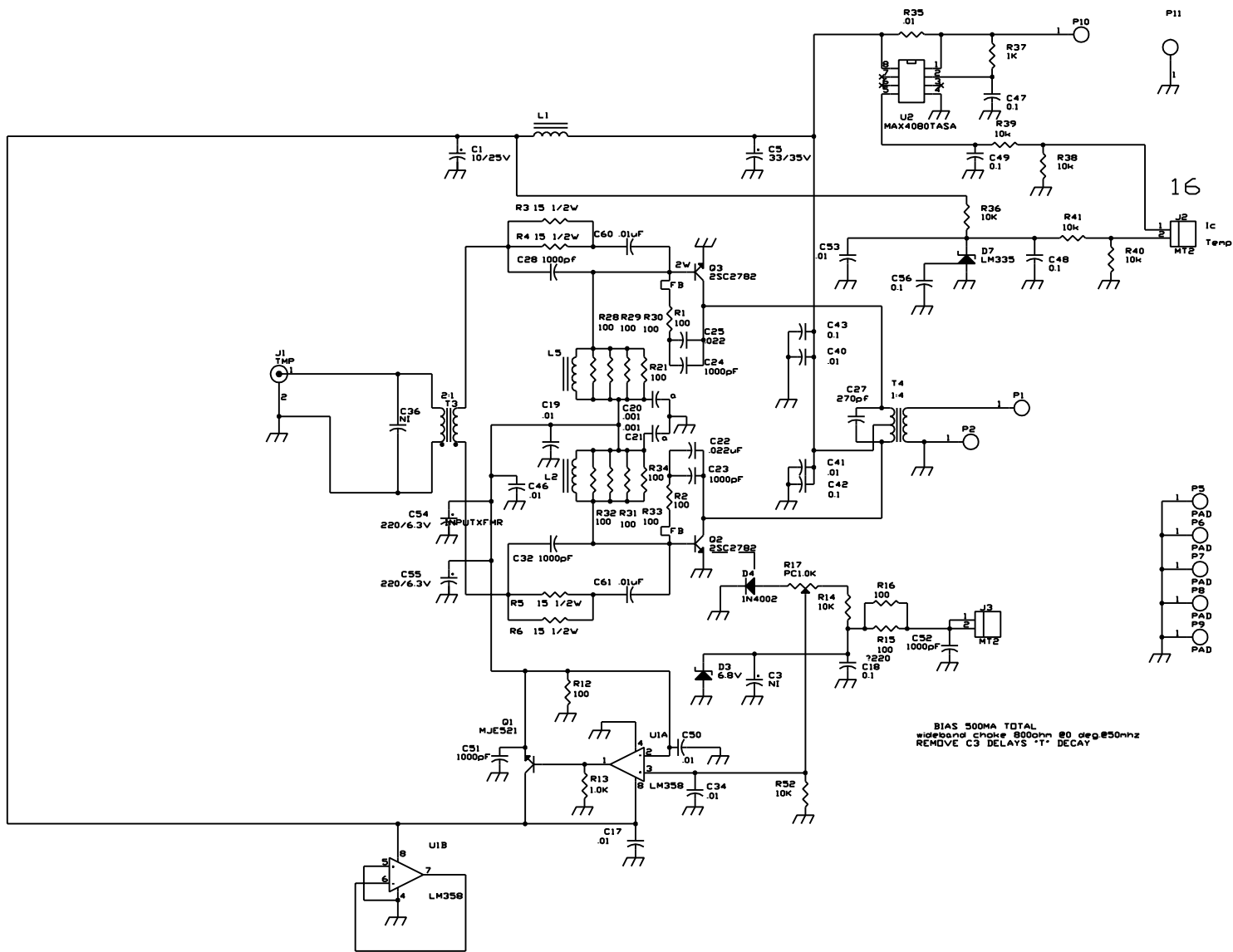
78372 Rev C Motherboard S/A 82069

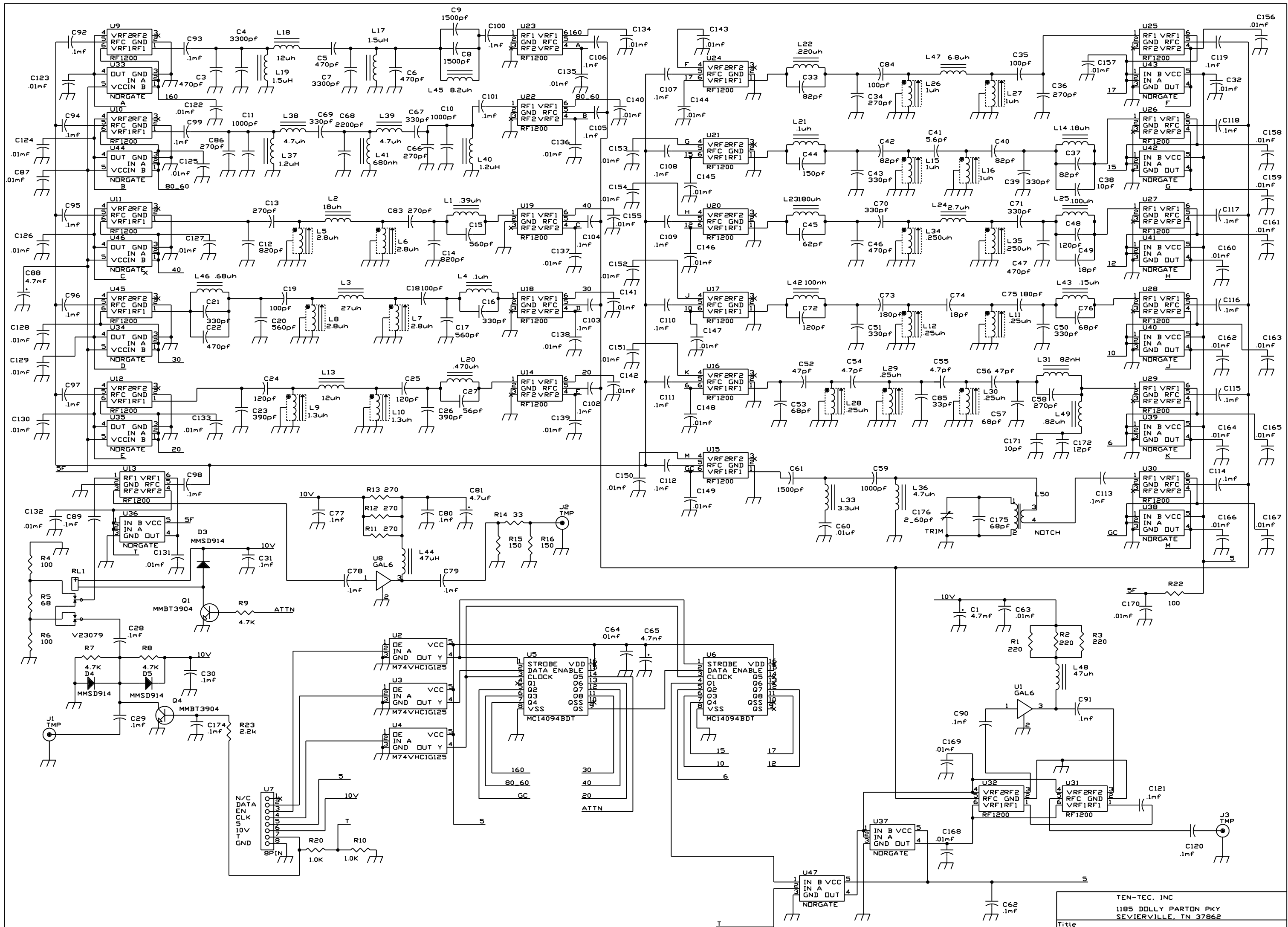
REVISION HISTORY		
REV	ECN NO.	DATE



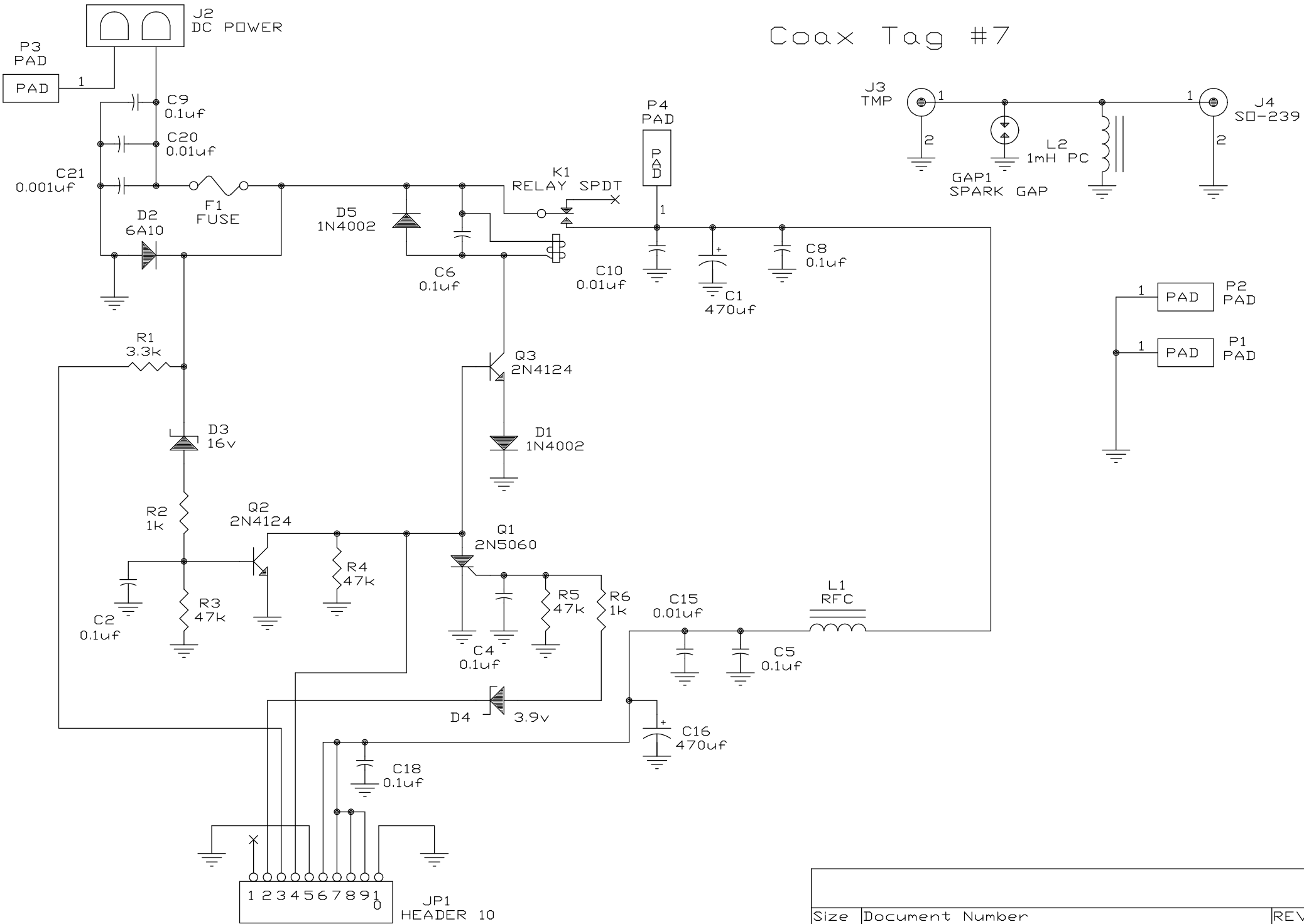
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REFERENCE DESIGNATORS LAST USED: U4, Q5, J1, R34, C34, L9, CR4				
U1	GALI-6	25564	C8, C16, C21, C25	10 uF 16V 1206 TANT. 23577
U2	AF002C1-39 / BF1107		C31	1 uF 16V 1206 TANT. 23524
U3, U4	MC1350D	25381	ALL OTHER CAPACITORS 0603 CERAMIC	
Q1, Q3, Q4	MMBT3904LT1G	25375	R30	100K RVM-06-HPO3 30858
Q2, Q5	MMBT3906LT1G	25376	ALL OTHER RESISTORS ARE 0603 1/10 WATT	
L1, L2, L4, L5	1.8 uH 1206 NL3225	21225	J1	OUPIN 2048-1X06T00A
L3, L6, L7	47 uH 1206 NL3225	21242	CR1-CR4	CQ ZTA/ZTACS9.27MT 48271
L8, L9	10 uH 1206 NL3225	21234	BARE CIRCUIT BOARD 78364	

Ten-Tec	
TITLE: 599 Noise Blanker	
Document Number:	82059
Date: 8/12/2010 10:38:44 AM	REV: A
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Sheet: 1/1	

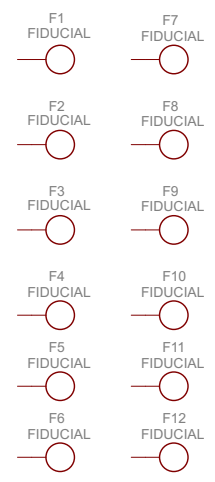
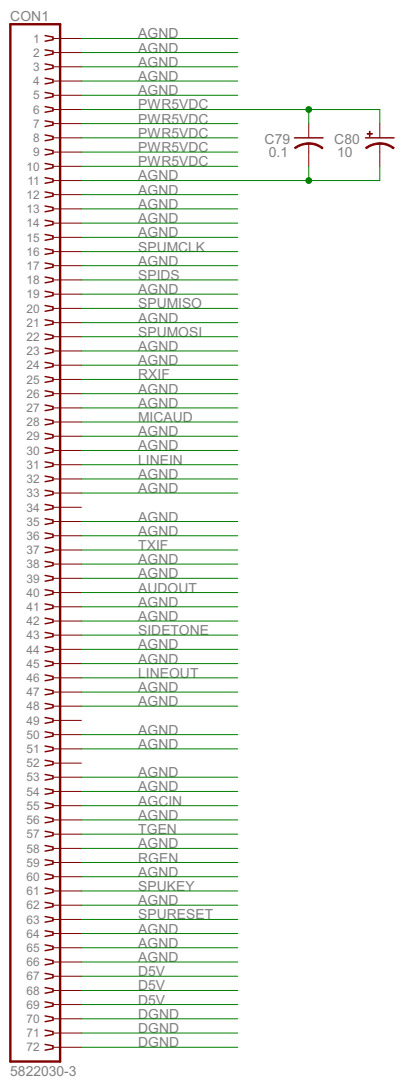
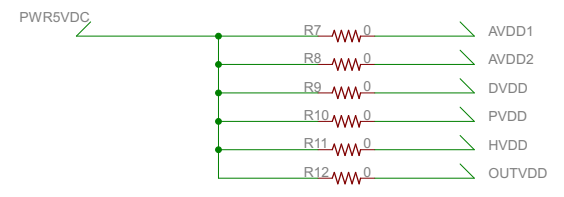
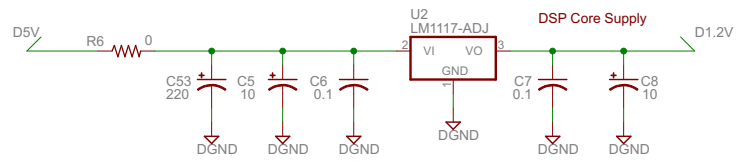
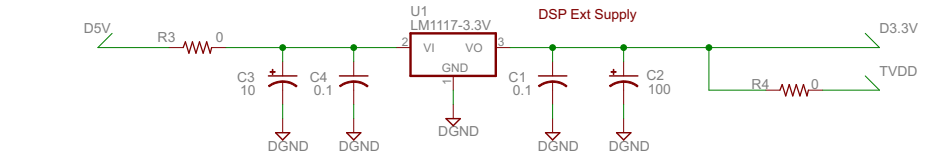




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ADD SERIES RESISTORS IN DATA LINES BETWEEN CODEC AND DSP

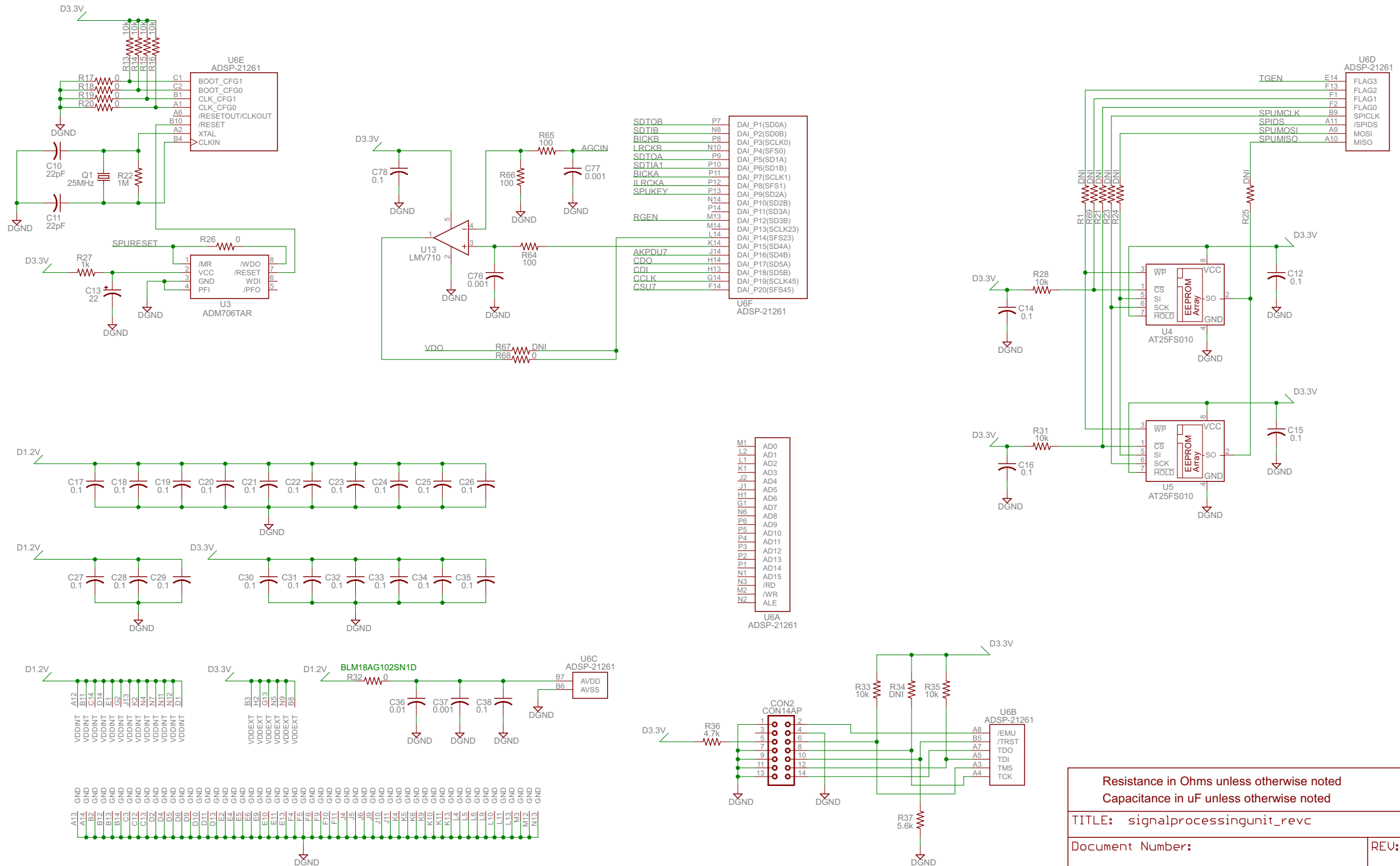
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Capacitance in uF unless otherwise noted	
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Date: 7/8/2010 4:43:06 PM	Sheet: 1/3

78361 Rev C Signal Processing Unit Board S/A 82056 (2)

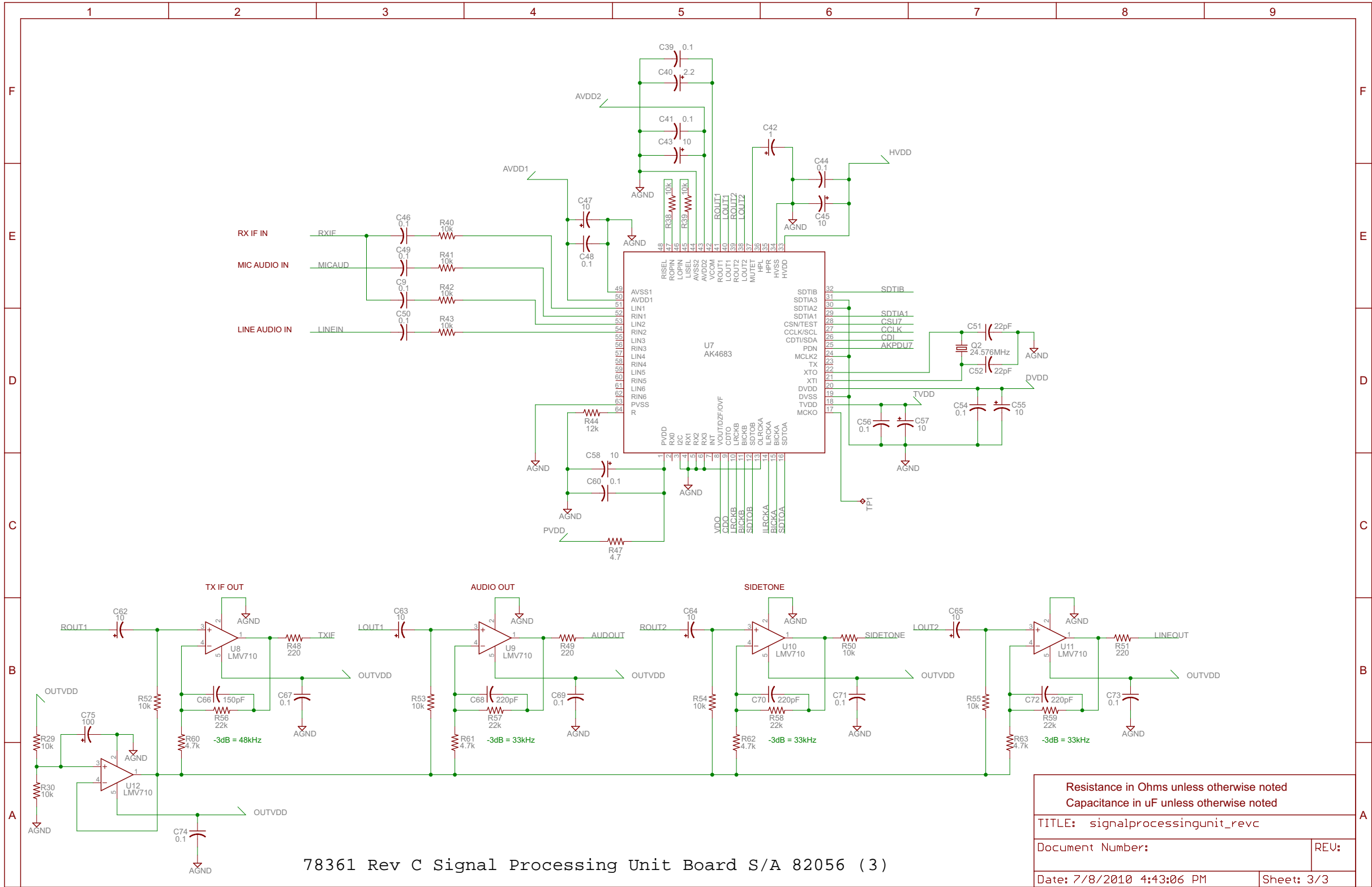
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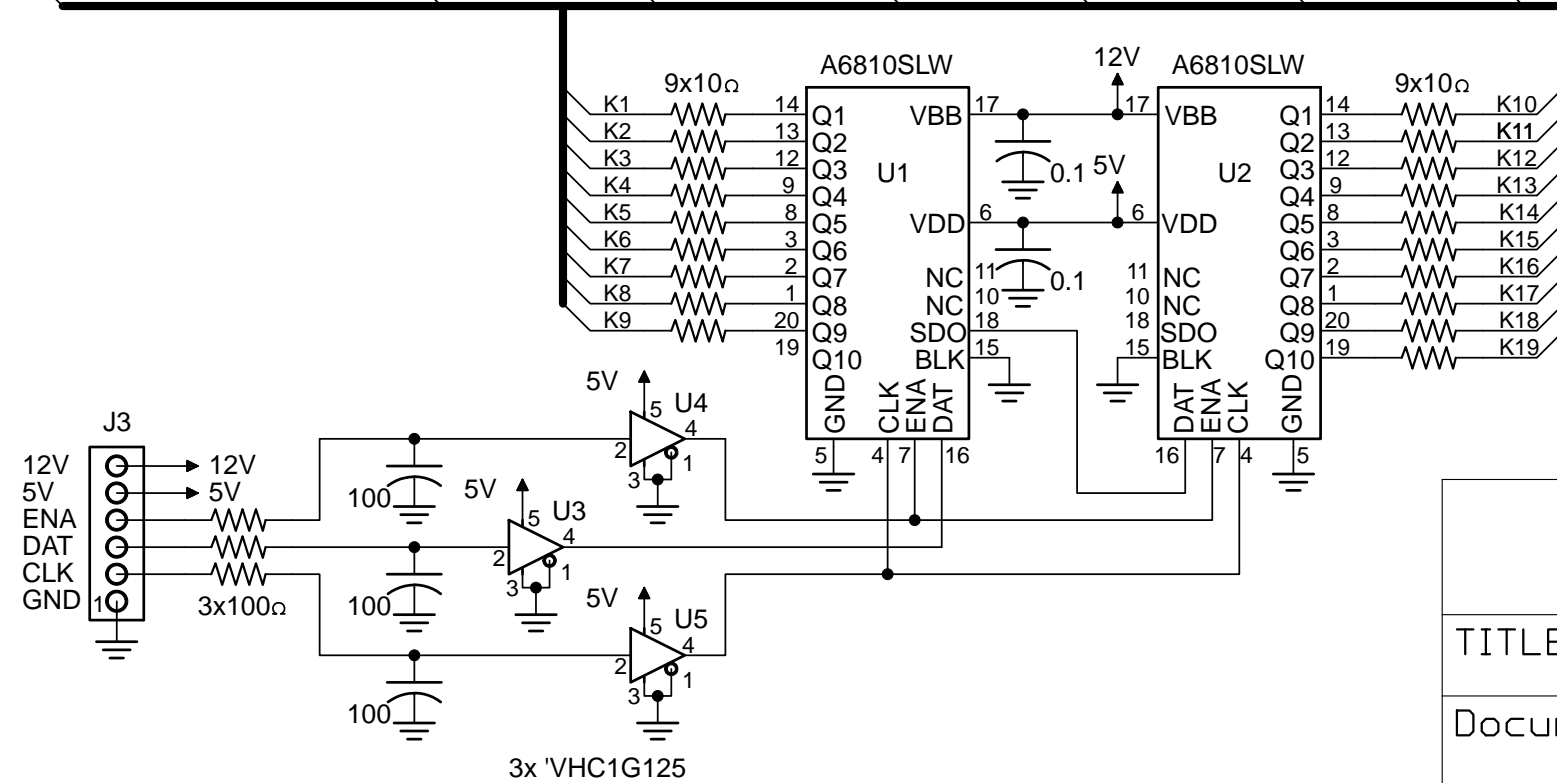
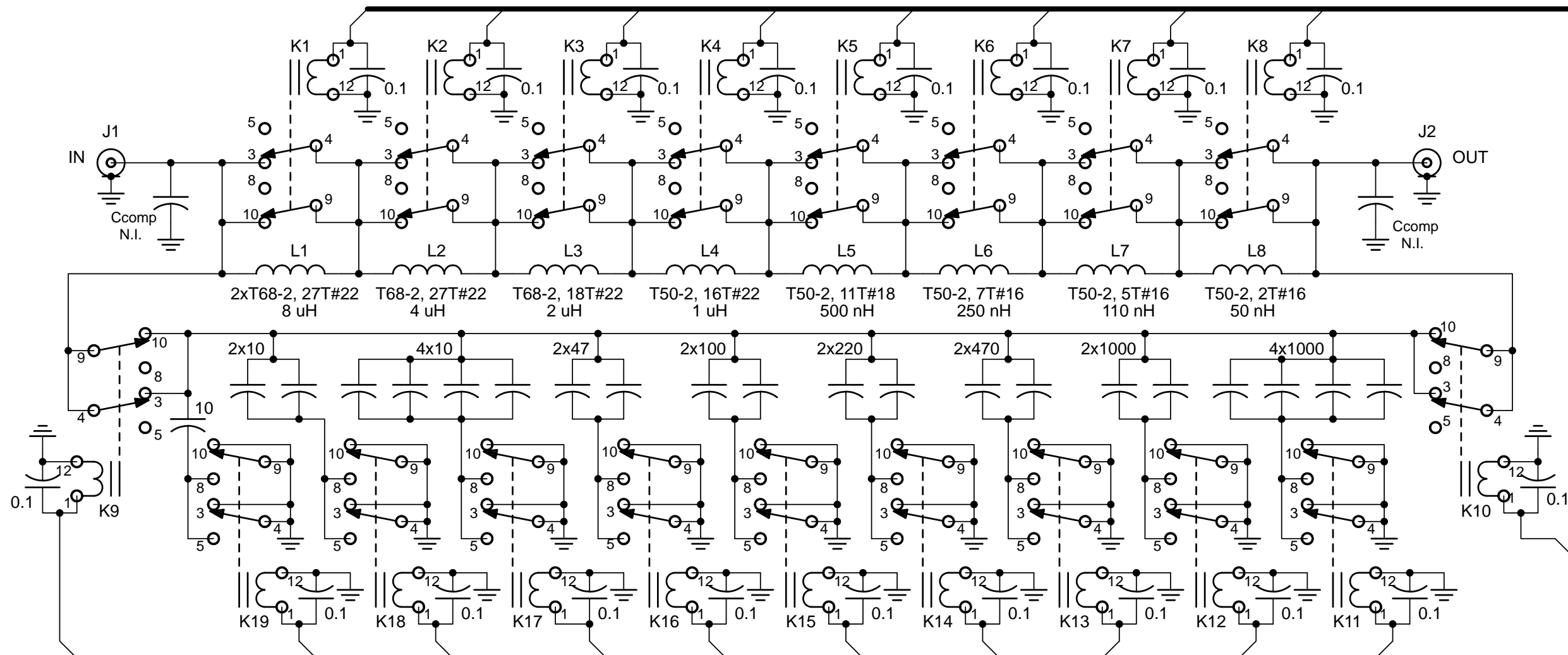


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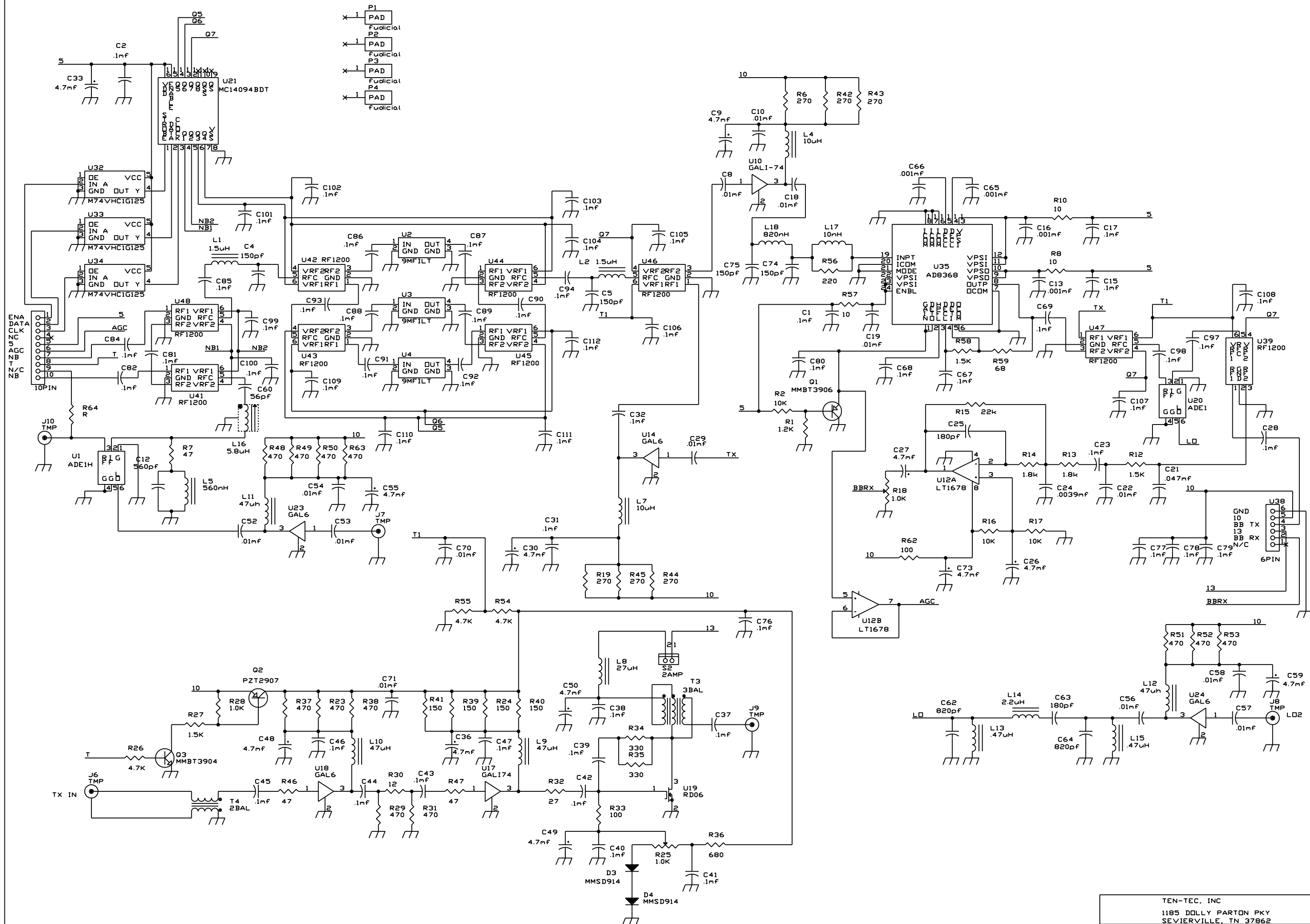


78361 Rev C Signal Processing Unit Board S/A 82056 (3)

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Date: 7/8/2010 4:43:06 PM	Sheet: 3/3



TEN-TEC	
TITLE: 599 Tuner_revB	
Document Number:	82060
	REV: B
Date: 8/27/2010 11:52:48 AM	Sheet: 1/1



78351 Rev F TxRx Board S/A 82057

TEN-TEC, INC		
1185 DOLLY PARTON PKY		
SEVIERVILLE, TN 37862		
Title	TX/RX	
Size	Document Number	REV
C	78352	C
Date	August 27, 2010	Sheet 1 of 1