CONNECT SYSTEMS INCORPORATED

1802 Eastman Ave., Suite 116
Ventura, Ca. 93003

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FLEX IIIA CONTROLLER

Hardware Reference Manual

Made in U.S.A.

CONNECT SYSTEMS INCORPORATED

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FLEX IIIA NETWORK CONTROLLER

Hardware Reference Manual

VERSION 1.03

Made in U.S.A.

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TWELVE POSITION REMOVABLE SCREW TYPE OF TERMINAL BLOCK (J3)

NAME	PIN	
GND	**1,3**	The two grounds in the system are internally connected to each other.
+12 VDC	**2**	Connect to a source of 12 volts to 15 volts DC. The Flex Series Controllers are reverse polarity protected, so a polarity mistake will not damage the product. Connect the return lead to ground.
TX AUD	**4**	Connect to the high side of the microphone. This line contains voice audio.
TX KEY	**5**	The PTT normally hooks to the PTT of the transmitter. If you are using a Hand Held with the PTT sharing a common connection with the transmit audio, then attach a resistor with a value between 2.4K and 4.7K from the PTT to the TX Audio and attach the TX audio line to the center conductor of the microphone cable.
RX DET	**6**	Audio from the receiver. Must be connected to the discriminator.
TX SUB	**7**	The SUBCODE output is used to inject signaling tones separately from voice audio and is normally only used if the system is generating CTCSS, DCS, or LTR. Connect the SUBCODE output past the instantaneous deviation control (IDC) circuit in the transmitter. Preferably directly to the modulator.
RX COS	**8**	Connect to a point that has a good voltage swing when the squelch is opened/closed. The best point to connect is to the collector of the transistor that controls the busy light (if the receiver has one). Otherwise you may connect to the squelch control voltage. The minimum voltage for the COS is about 0 volts and the Maximum voltage is the supply voltage. Some radios have that point coming out the back of the radio. It sometimes goes under the name of squelch detect, sq det, or COR. In some case a pull up or pull down resistor is necessary.

The polarity and other parameters associated with the COS is contained within the programming parameters described in another manual. It should be noted that in most cases, the COS can be replaced with the internal squelch.

Not Used 9,10 There is no connection between these terminals and the internal circuitry.

SENSE 1 11 This point is used as an auxiliary input for various enhancements to this product. The minimum voltage for this sense input is about 0 volts and the Maximum voltage is the supply voltage.

The polarity and other parameters associated with the SENSE is contained within the programming parameters if used.

SSB SUB 12 Special digital input. Not currently implemented. Please contact the factory for details.

FRONT PANEL DB9 CONNECTOR (J2)

This connector is used for programming the system using a lap top computer or a desk top computer or as a serial output port for certain options

Programming will be via a Microsoft windows based program that is available at no charge.

Pin 1: -6 volts
Pin 2: transmit (data from flex to P.C.)
Pin 3: receive (data from P.C. to flex)
Pin 4: not used
Pin 5: ground
Pin 6: -6 volts
Pin 7: not used
Pin 8: -6 volts
Pin 9: not used

JTAG CONNECTOR (J1)

This connector is used for changing the FLASH program built into the microprocessor. It is used in conjunction with the EC-2 programming module (Our part number FLEX-M). Power for the module is obtained through this connector.

REPEATER BUS IN (J6)

Termination of the local area network from another FLEX IIIA, FLEX III or FLEX IV.

Pin 1: not used
Pin 2: RS485 Connection
Pin 3: not used
Pin 4: not used
Pin 5: RS485 Connection
Pin 6: not used

REPEATER BUS OUT (J7)

Source of the local area network to another FLEX IIIA, FLEX III or FLEX IV.

Pin 1: not used
Pin 2: RS485 Connection
Pin 3: not used
Pin 4: not used
Pin 5: RS485 Connection
Pin 6: not used

ADJUSTMENTS

P4 PREAMP The preamp control is used to match the audio level from your receiver to the Flex IIIA Series controller. To adjust, a signal containing 100 Hz CTCSS with about 600 Hz deviation should be applied to the receiver. Adjust the preamp control until a level of 3 volts peak to peak is observed at test point 9. If an oscilloscope is not available, read 1 volt RMS using a VOM.

P6 AUDIO OUT Adjust the maximum level going to the transmitter. When turned fully clockwise, an output voltage of about five volts peak to peak is obtained. In most case the output level can also be set in the programming mode.

P7 CONTRAST Sets the contrast of the LCD. Adjust to what is most pleasing to the individual.

P9 SQUELCH It adjusts the internal squelch detector circuit sensitivity. Will not work unless the Rx Audio is connected to the discriminator of the radio.

P10 DCS/LTR Sets the level for the DCS/LTR generation for output to the SUBCODE terminal.

P11 CTCSS Sets the level for the CTCSS generation for output to the SUBCODE terminal.

JUMPER STRAP OPTIONS

JP4 Product Specific. See product manual
JP5 Product Specific. See product manual
JP6 Product Specific. See product manual

JP10 The terminating resistor when used for RS485

JP13,JP14 **Preamp Gain.** With jumper 13 not installed and Jumper 14 not installed, gain is 100 with flat audio.

With jumper 13 not installed and Jumper 14 in "B" position, gain is 10 with flat audio.

With Jumper 13 not installed and Jumper 14 in "A" position, gain is 10 with a 3 db roll off starting at 300 Hz.

With jumper 13 installed and Jumper 14 not installed, gain is 100 with 3 db roll off starting at 300 Hz.

With jumper 13 installed and jumper 14 in "B" position, has a gain of 10 with 3 db roll off starting at 3 KHz.

With jumper 13 installed and jumper 14 in "A" position, has a gain of 10 with a 3 db roll off starting at 300 Hz.

JP28 When inserted, allows the Subtone Audio output to be DC coupled.

JP29 When connected, gain of last stage is 2.7. When not connected gain is 10.

GENERAL CIRCUIT DESCRIPTION

Page 1 of Schematic

Microprocessor
The microprocessor controls the overall operation of the system and has the built in hardware to do voice delay, read analog signals, and control all peripherals.

JTAG Interface
The microprocessor can be reprogrammed via a JTAG interface. This allows the user to update his controller for feature enhancements and bugs in the software.

RS232 Interface
The RS232 Level shifter allows the microprocessor to communicate to a P.C. for programming, the gateway for remote programming, or the Digital Multiplexer/Demultiplexer for advanced features.

COS Detector
U3B acts as a buffer between the outside world and the internal A/D converter of the microprocessor. The logic within the microprocessor determines if the COS should be derived from the COS circuitry or the squelch circuitry.

SENSE 1 Detector
U3A acts as a buffer between the outside world and the internal A/D converter of the microprocessor. The logic within the microprocessor determines the function of Sense 1.

Page 2 of Schematic

Squelch Detector
U14A and U14B act as a four pole high pass filter to remove any signals below 11 KHz. U14C is a gain stage where the rest of the circuitry is used to detect the average power passing through the high pass filter and amplifier.

Low Pass Filter and Zero Crossing Detector
U10, U11C and the miscellaneous hardware surrounding those parts provide the ability to convert the data from the discriminator of the radio to a logic level sufficient for the microprocessor to interpret as LTR, CTCSS, or DCS signals.

Page 3 of Schematic

Power Supply

The voltage coming into the back terminal of the Controller is converted into 3.3 volts and 5 volts to permit the various circuits to operate properly. Raw 12 volts coming in the back terminal is filtered and use to power the Op-Amps.

Page 4 of Schematic

Sense 2 Detector
U9 is an optoisolator providing isolated input for the functions of sense 2.

EEPROM
U4 is a 512K eeprom providing 65,536 bytes of nonvolatile storage for storing programming parameters.

LCD
The LCD is a two by sixteen alphanumeric display. It allows the system operator to see the status of the controller at all times. Allows the ability to program the system locally without a computer.

Gain and De-emphasis
U20B and U20C determine the gain from the radio and whether or not de-emphasis is required.

High Pass Filter
U21A, U21B, and U21D are a six pole low pass filter used to remove the CTCSS, DCS, or LTR data from the voice audio.

Page 5 of Schematic

Local Area Network
U8 allows all of the controllers to communicate among themselves. This interface provides the information to allow each controller to determine the status of the LTR repeaters so they can trunk. Also used for sending information from the master to the slaves for purposes of parameter programming.

Radio DTMF Decoder
U23 is used for decoding DTMF from the radio.

Reconstruction Filter
U22 is a low pass reconstruction filter for the D/A converter on the microprocessor. This is used for processing voice audio to the radio transmitter.

Transmit Buffer
U24C and U24D provide amplification and buffering to pass the audio to the radio transmitter.

PTT
Q8 and Q9 provide the PTT circuitry to turn on the transmitter.

Page 6 of Schematic

LTR and DCS Generator
U27A and U27B is used for generating LTR and DCS code words. The output is smoothed by U28A and U28C which act as a four pole low pass filter.

CTCSS Generator
CTCSS is generated by applying a square wave from the microprocessor and filtering out the harmonics. U32 is a six pole low pass filter whose cutoff frequency is determined by U33 and the associated capacitors.

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PARTS LIST
PCBA,FLEX IIIA

REV B

SHEET 1 OF 10

DRAWN BY J. WANGER | APPROVED | DATE APPROVED

ITEM	QTY UNIT	QTY ISSUED	DESCRIPTION	REF DESIGNATION	MANUFACTURER	SOURCE
1	1		P.C.B., MODEL LOW COST LTR	MODEL LC LTR	CENTURY	CENTURY
2						
3						
4	3		CAP, SMD 0805, 33 pF 08055A330JAT2A	C7,C8,C92		
5	1		CAP, SMD 0805, 82 pF 08055A820JAT2A	C89		
6	1		CAP, SMD 0805, 120 pF 08055A121JAT2A	C75		
7						
8	1		CAP, SMD 0805, 270 pF 08055A271JAT2A	C138		
9	8		CAP, SMD 0805, .001 uF 008055C102JAT2A	C15,C16,C17,C18,		
10				C19,C139,c140,		
11				c143		
12	4		CAP, SMD 0805, .0022 uF 08055C222JAT2A	C51,C52,C53,C54		
13						
14	4		CAP, SMD 0805, .0047 uF 08055C472JAT2A	C32,C77,C119,		
15				C121		
16	9		CAP, SMD 0805, .01 uF 08055C103JAT2A	C34,C35,C55,		
17				C78.C79,C80,C81,		
18				C82,C83		
19						
20	1		CAP, SMD 0805, .015 uF 08055C153JAT2A	C33		
21						
22	4		CAP, SMD 0805, .047 uF 08055C473JAT2A	C31,C76,C120,		
23				C122		
24						

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ITEM	QTY UNIT	QTY ISSUED	DESCRIPTION	REF DESIGNATION	MANUFACTURER	SOURCE
25	35		CAP, SMD 0805, .1 uF 08055C104KAT2A	C1,C2,C3,C4,C6,		
26				C9,C10,C11,C12,		
27				C13,C14,C20,		
28				C30,C40,C41,C42,		
29				C43,C44,C45,C47,		
30				C48,C49,C57,C84,		
31				C85,C86,C88,C90,		
32				C125,C134,C135,		
33				C136,C137,C141,		
34				C142		
35						
36						
37						
38						
39						
40						
41						
42						
43	1		CAP, 1 uF, 50V, ELECT, 50TWSS1	C56	RUBYCON	LAUBE
44						
45						
46	2		CAP, 2.2 uF, 50V, ELECT, 50TWSS2R2	C73,C74	RUBYCON	LAUBE
47	3		CAP, 4.7 uF, 50V, ELECT, 50TWSS4R7	C5,C36,C91	RUBYCON	LAUBE
48						

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ITEM	QTY UNIT	QTY ISSUED	DESCRIPTION	REF DESIGNATION	MANUFACTURER	SOURCE
49	1		CAP, 10 uF, 50V, ELECT, 50TWSS10	C144	RUBYCON	LAUBE
50						
51	3		CAP, 33 uF, 25V, ELECT, 25TWSS33	C39,C46,C50	RUBYCON	LAUBE
52						
53						
54	1		CAP, 47 uF, 35V, ELECT, 35TWSS47	C93	RUBYCON	LAUBE
55	6		CAP, 220 uF, 35V, ELECT, 35TWSS220	C37,C38,C94,C95,	RUBYCON	LAUBE
56				C123,C124		
57	2		CONNECTOR, RJ11, 6 POS, 66011-002	J6,J7	BERG	ARROW
58	1		CONNECTOR, 12 POS, MSTBA2.5/12G-5.08	J3	PHOENIX	
59						DAEC
60	1		CONNECTOR, DP9S, RT ANG, DE9S318,104951	J2	MOLEX	HAMILTON
61	1		CONNECTOR, 2 x 5,FAN-10SGS	J1		DAEC
62						
63	1		HEADER, 14 PIN, 2X7, 10-88-1141	LCD1	MOLEX	HAMILTON
64	7		CONNECTOR, 2 PIN HEADER, TD-2SG	JP4,JP5,JP6,		DAEC
65				JP10,JP13,JP28,		
66				JP29		
67						
68						
69						
70						
71						
72						

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ITEM	QTY UNIT	QTY ISSUED	DESCRIPTION	REF DESIGNATION	MANUFACTURER	SOURCE
73	1		CONNECTOR, 3 PIN HEADER, TD-3SG	JP14		DAEC
74						
75						
76						
77	9		CONNECTOR, SHORTING BLOCK, DM-2GM-0			DAEC
77						
78	1		DIODE, 1N5245B,ZENER, 15V, CMBZ5245B	D23	RECTRON	MOUSER
79	1		DIODE, 1N4004	D4	MOTOROLA	FUTURE
80						
81						
82	2		DIODE, 1N4148, MMBD4148	D11,D12		
83						
84						
85						
86						
87						
88	1		LED ASSY, RED, LL64233R, LTL-523-11	D3	LITE ON	FUTURE
89	1		LED, RED, SMALL, 35BL504	D2	LITE ON	MOUSER
90						
91						
92	1		FUSE, 2 AMP, 473.002	F1	LITTLEFUSE	FUTURE
93						
94						
95	1		I.C. H11AA4.S, OPTOISOLATOR	U9	FAIRCHILD	FUTURE
96						

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ITEM	QTY UNIT	QTY ISSUED	DESCRIPTION	REF DESIGNATION	MANUFACTURER	SOURCE
97	6		I.C. LF347M, QUAD OP AMP	U10,U14,U20,U21,	FAIRCHILD/NATIONAL	FUTURE
98				U24,U28		
99	2		I.C. LM324M, QUAD OP AMP	U3,U11	FAIRCHILD/NATIONAL	FUTURE
100	1		I.C. M-88L70-01S, DTMF DECODER	U23	CLARE	
101	1		I.C. uA78M33CKC, 3.3 V REGULATOR	U13	NATIONAL	FUTURE
102	1		I.C. LM78L05ACM, 5.0 V REGULATOR	U12	NATIONAL	FUTURE
103						
104	1		I.C. MAX3221CAE, RS232 INTERFACE	U2	MAXIM	FUTURE
105	1		I.C. 24LC512/SN, 512K IIC EEPROM	U4	ATMEL	
106	1		I.C. C8051F120, MICROPROCESSOR	U1	CYGNAL	
107	1		I.C. SP3485CN, RS485 TRANCEIVER	U8	MAXIM/SIPEX	FUTURE
108						
109						
110	2		I.C. MAX7413CUA, 5th ORDER BESSEL FLTR	U22,U32	MAXIM	
111						
112	1		I.C. MC14049B, HEX INVERTER	U27		
113	1		I.C. MAX4751 QUAD SWITCH	U33	MAXIM	
114						
115						
116						
117						
118						
119						
120						

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ITEM	QTY UNIT	QTY ISSUED	DESCRIPTION	REF DESIGNATION	MANUFACTURER	SOURCE
121						
122	5		POT, 10K, 3386P-1-103	P4,P6,P7,P10,P11	BOURNS	ARROW
123						
124	1		POT, 100K, 3386P-1-104	P9	BOURNS	ARROW
125						
126						
127						
128						
129						LAUBE
130						
131	2		RESISTOR, 1/2 W, 1K, CARBON FILM	R22,R23	ROYAL OHM	LAUBE
132						
133						
134						
135						
136						
137						
138	1		RESISTOR, SMD 0805, 0	R13		
139						
140						
141	1		RESISTOR, SMD 0805, 240	R117		
142						
143	2		RESISTOR, SMD 0805, 470	R34,R159		
144	1		RESISTOR, SMD 0805, 620	R27		

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ITEM	QTY UNIT	QTY ISSUED	DESCRIPTION	REF DESIGNATION	MANUFACTURER	SOURCE
145	7		RESISTOR, SMD 0805, 1K	R6,R12,R16,R35,		
146				R94,R105,R115		
147						
148						
149	1		RESISTOR, SMD 0805, 1.1K	R39		
150						
151	1		RESISTOR, SMD 0805, 2K	R58		
152	8		RESISTOR, SMD 0805, 2.2K	R7,R8,R9,R38,		
153				R46,R51,R55,		
154				R116		
155						
156	1		RESISTOR, SMD 0805, 3.3K	R48		
157	4		RESISTOR, SMD 0805, 4.7K	R5,R17,R18,R107		
158	10		RESISTOR, SMD 0805, 5.1K	R11,R15,R41,R45,		
159				R52,R53,R57,		
160				R104,R158,R169		
161						
162						
163	3		RESISTOR, SMD 0805, 8.2K	R37,R50,R151		
164	4		RESISTOR, SMD 0805, 10K	R95,R96,R113,		
165				R148		
166	1		RESISTOR, SMD 0805, 12K	R103		
167	1		RESISTOR, SMD 0805, 13K	R49		
168						

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ITEM	QTY UNIT	QTY ISSUED	DESCRIPTION	REF DESIGNATION	MANUFACTURER	SOURCE
169	1		RESISTOR, SMD 0805, 18K	R149		
170						
171	1		RESISTOR, SMD 0805, 24K	R156		
172						
173	7		RESISTOR, SMD 0805, 33K	R10,R14,R25,R40,		
174				R47,R56,R101		
175						
176						
177	2		RESISTOR, SMD 0805, 47K	R98,R99		
178						
179	2		RESISTOR, SMD 0805, 51K	R28,R29		
180	3		RESISTOR, SMD 0805, 62K	R30,R31,R100		
181	1		RESISTOR, SMD 0805, 75K	R32		
182	2		RESISTOR, SMD 0805, 82K	R146,R150		
183						
184	9		RESISTOR, SMD 0805, 100K	R33,R42,R54,R93,		
185				R97,R106,R108,		
186				R110,R153		
187						
188						
189						
190						
191	1		RESISTOR, SMD 0805, 150K	R92		
192	1		RESISTOR, SMD 0805, 180K	R102		

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ITEM	QTY UNIT	QTY ISSUED	DESCRIPTION	REF DESIGNATION	MANUFACTURER	SOURCE
193	4		RESISTOR, SMD 0805, 220K	R36,R114,R147,		
194				R157		
195	3		RESISTOR, SMD 0805, 270K	R152, R154, R170		
196						
197	2		RESISTOR, SMD 0805, 300K	R109,R112		
198						
199	1		RESISTOR, SMD 0805, 470K	R111		
200	2		RESISTOR, SMD 0805, 1M	R24,R155		
201						
202						
203						
204						
205						
206						
207						
208	1		TRANSISTOR, MMBT2907A/MMBT2907A-LT1	Q3	GENERAL SEMI/ON SEM	FUTURE
209	2		TRANSISTOR, MMBTA13/MMBTA13-LT1	Q4,Q8	GENERAL SEMI/ON SEM	FUTURE
210						
211	3		TRANSISTOR, MMBT2222A/PMBT2222A	Q2,Q5,Q9	GENERAL SEMI/PHILLI	FUTURE
212						
213						
214	1		INDUCTOR, FERRITE BEAD, BLM21PG331SN1	L1		
215						
216						

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ITEM	QTY UNIT	QTY ISSUED	DESCRIPTION	REF DESIGNATION	MANUFACTURER	SOURCE
217	1		XTAL, 3.58 MHz, KD0048FCB	Y1	KDS	KDS
218	1		XTAL, 22.1184 MHz, FOX 221	Y2	FOX	
219	2		XTAL SPACERS, SPACER-I	Y1,Y2		
220						
221						
222						
223						
224						
225	1		HARDWARE, HEATSINK, 6230B-TT	U13		
226	1		HARDWARE, 6-32 NUT	U13		CORLAND
227	1		HARDWARE, 6-32 X 1/4 SCREW	U13		CORLAND
228	1		HARDWARE, NO. 6 SS LOCKWASHER	U13		CORLAND
229						
230	1		LABOR, ASSEMBLY, LOW COST LTR			
231						
232						
233						
234						
235						
236						
237						
238						
239						
240						

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1802 EASTMAN AVE #116
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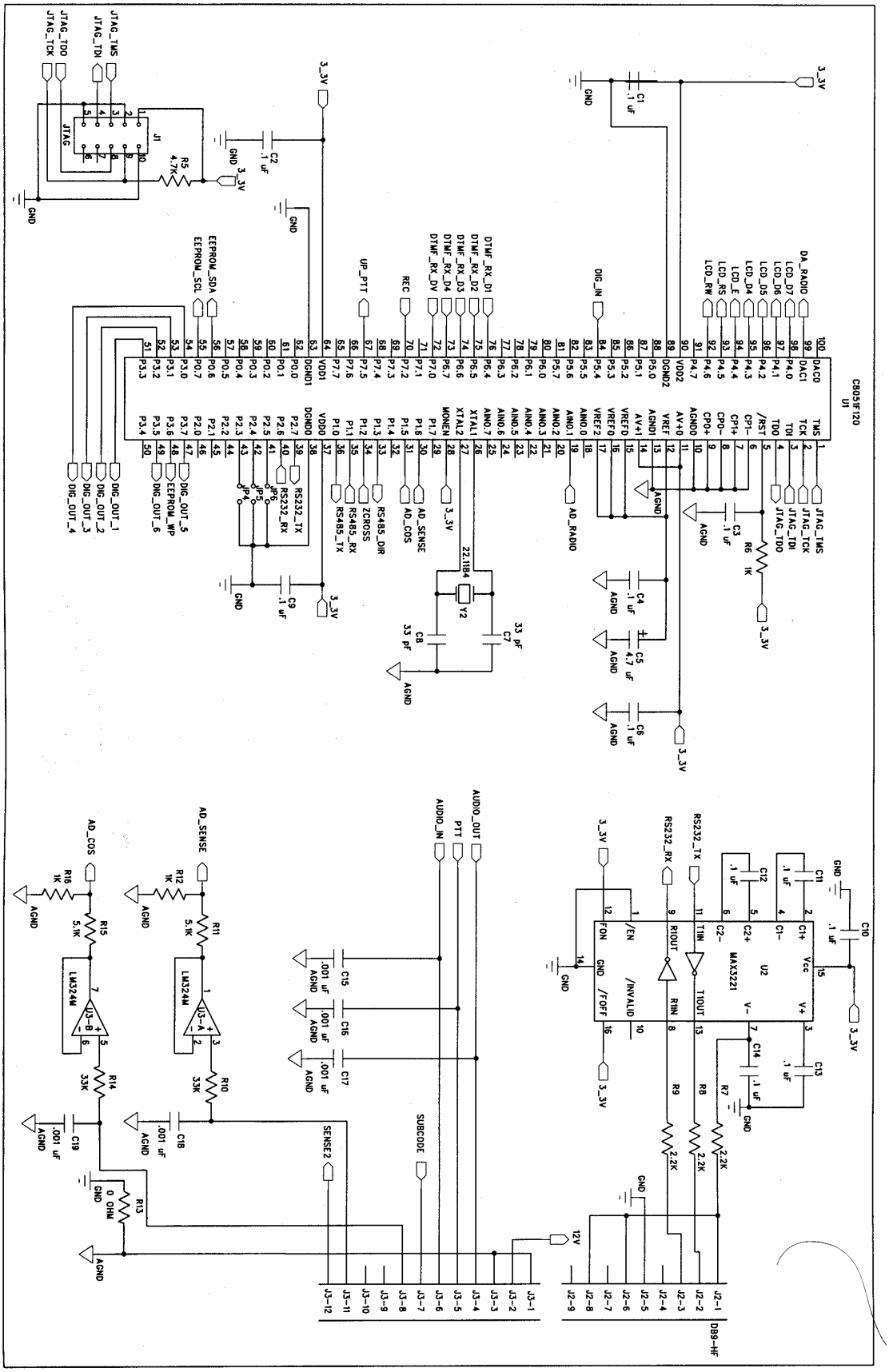
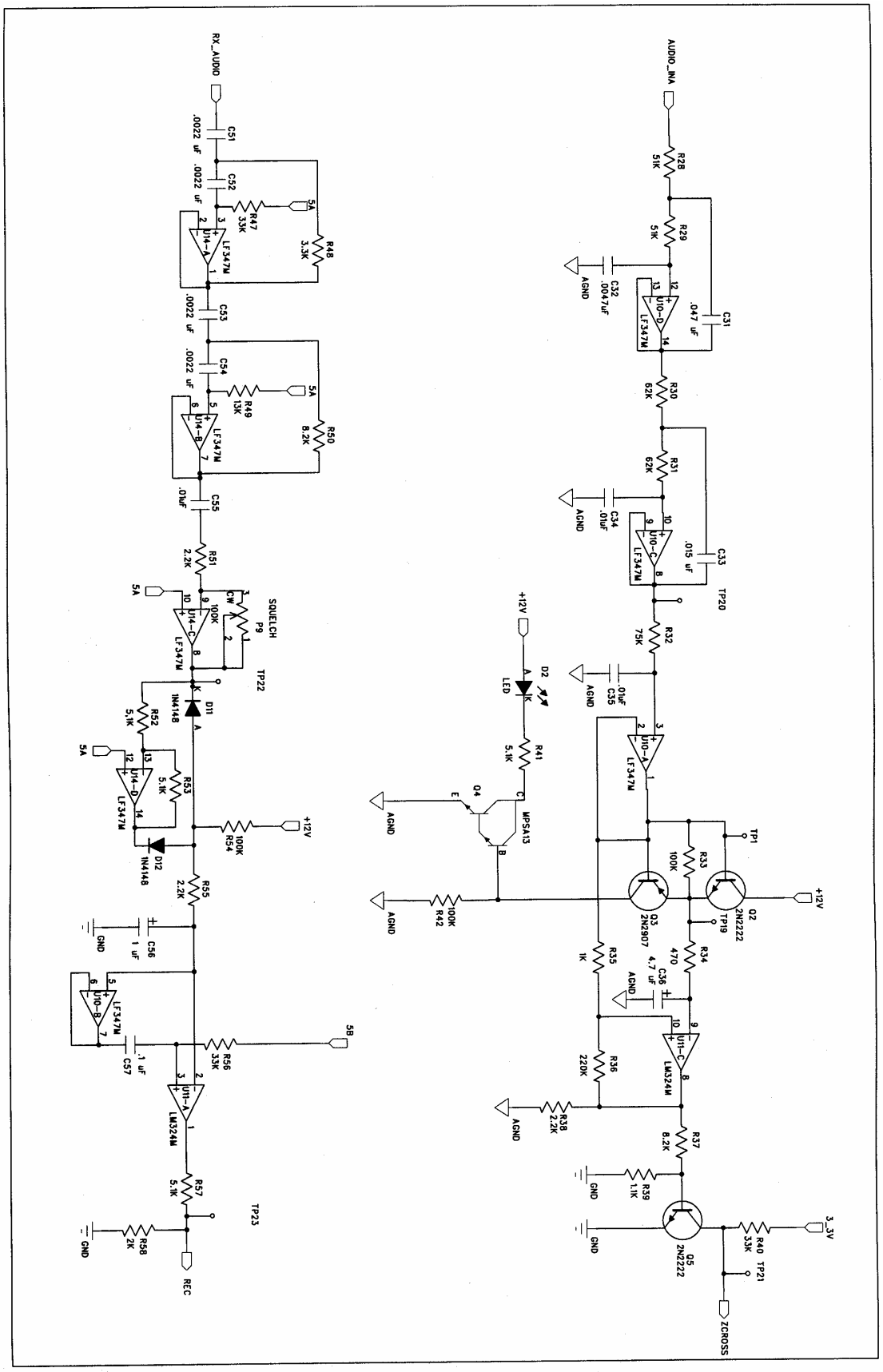
REVSION SHEET

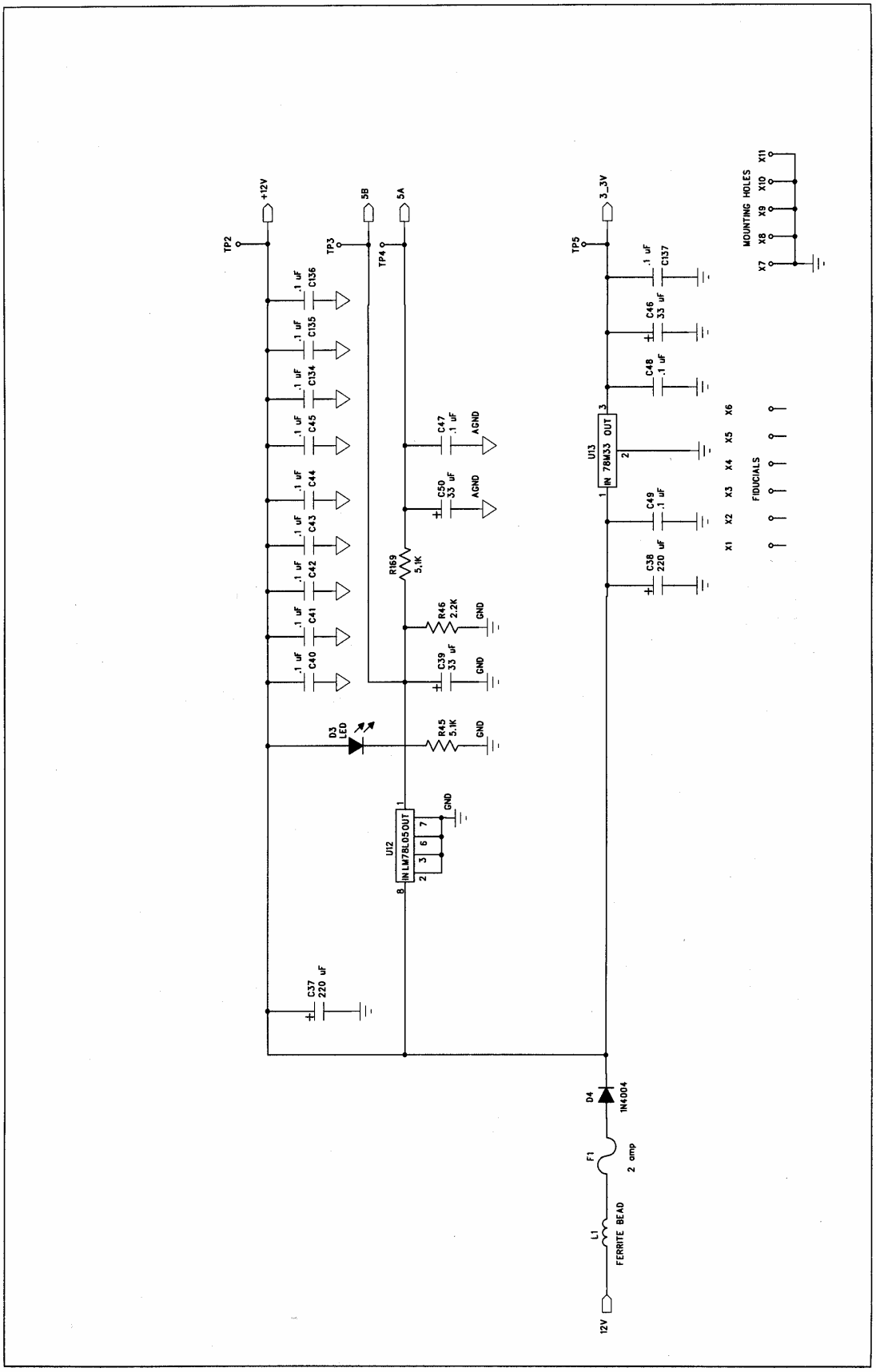
REVISION LETTER

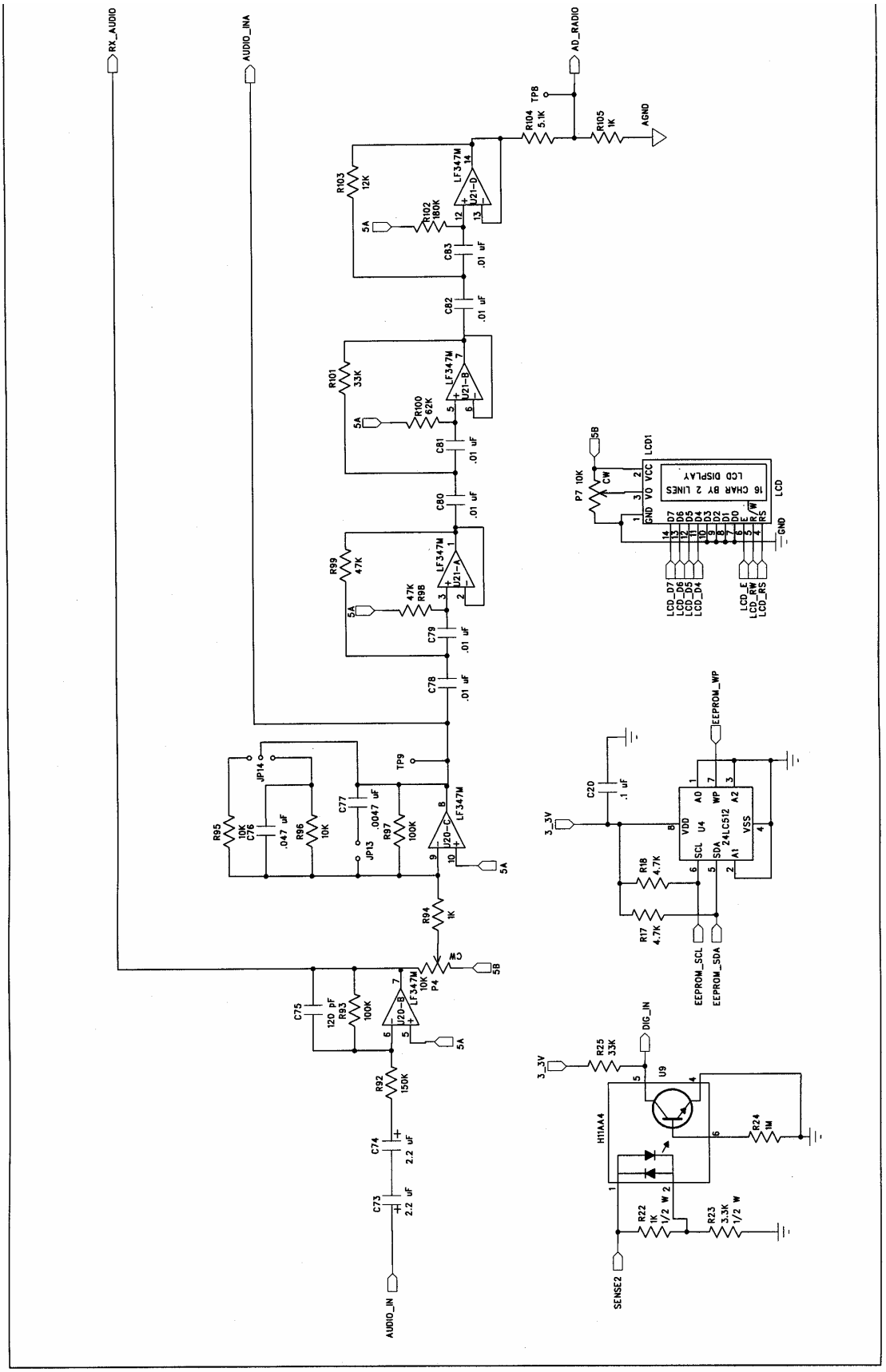
A	B															

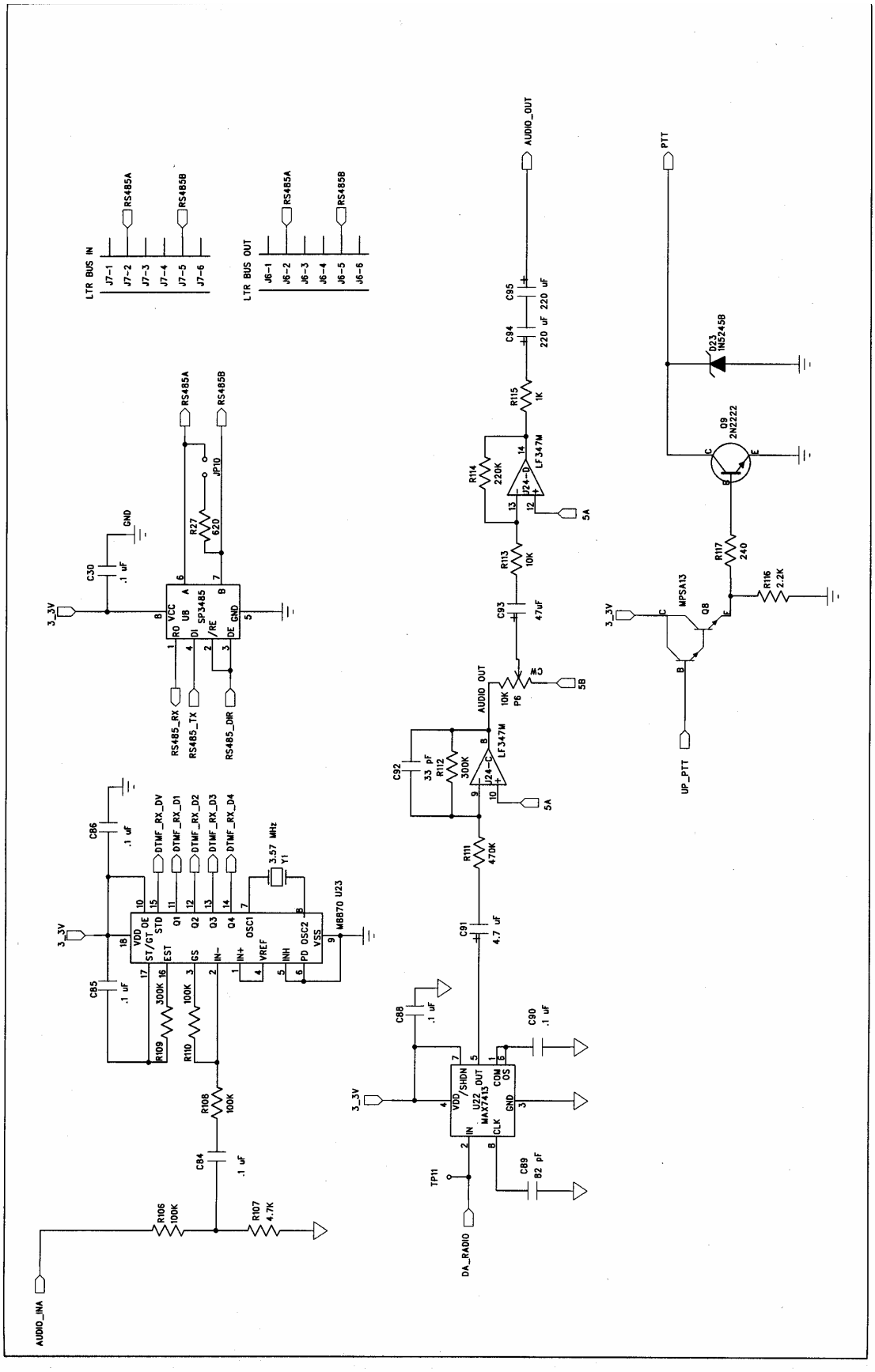
REV	EFF	REVISION DESCRIPTION	APP'D	DATE
A	ALL FUTURE ASSY'S	FIRST PROTOTYPE RELEASE		04/29/05
B	ALL FUTURE ASSY'S	FIRST PRODUCTION RELEASE		09/22/05

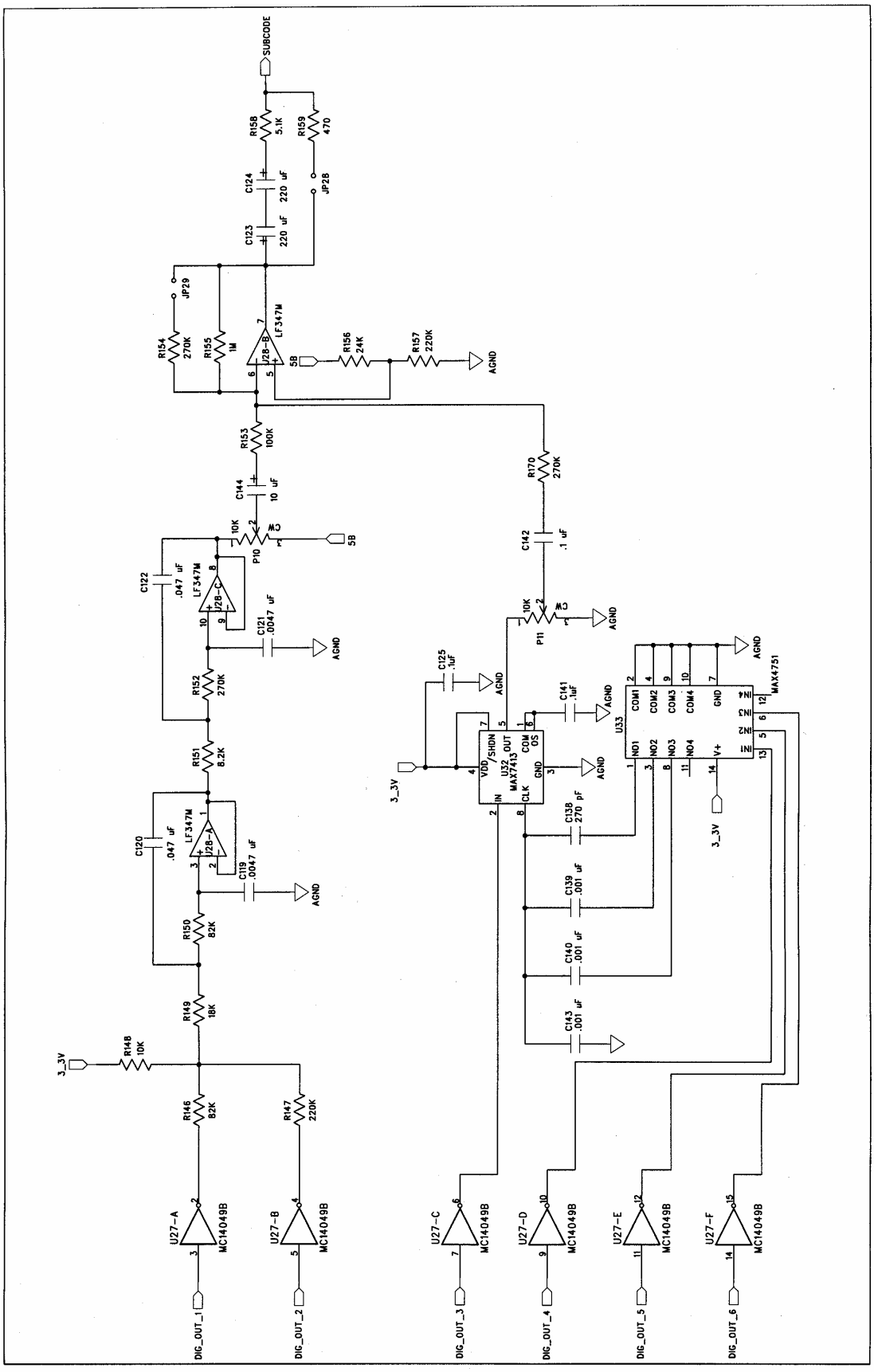



AUDIO_INA
R28 51K
R29 5K
C32 .0047uF
AGND
U10-D LF347M
C31 .047 uF
R30 62K
R31 62K
C34 .01uF
U10-C LF347M
C33 .015 uF
TP20
R32 75K
C35 .01uF
U10-A LF347M
+12V
D2 LED
R41 5.1K
Q4 MPSA13
R33 100K
TP1
Q3 2N2907
Q2 2N2222
TP19
R42 100K
R35 1K
R34 470
C36 4.7 uF
U11-C LM324M
R36 220K
R38 2.2K
R37 8.2K
R39 1.1K
Q5 2N2222
3_3V
R40 33K
TP21
ZCROSS
RX_AUDIO
C51 .0022 uF
C52 .0022 uF
R47 3.3K
U14-A LF347M
R48 3.3K
C53 .0022 uF
C54 .0022 uF
R49 13K
U14-B LF347M
R50 8.2K
C55 .01uF
R51 2.2K
5A
U14-C LF347M
100K CW
SQUELCH P9
TP22
D11 1N4148
R52 5.1K
U14-D LF347M
R53 5.1K
D12 1N4148
100K R54
R55 2.2K
C56 1 uF
U10-B LF347M
C57 .1 uF
R56 33K
5B
U11-A LM324M
R57 5.1K
R58 2K
TP23
REC
GND


TP2
+12V
TP3
5B
TP4
5A
TP5
3_3V
C136 .1 uF
C135 .1 uF
C134 .1 uF
C45 .1 uF
C44 .1 uF
C43 .1 uF
C42 .1 uF
C41 .1 uF
C40 .1 uF
C47 .1 uF
AGND
C50 33 uF
AGND
R169 5.1K
R46 2.2K
GND
C39 33 uF
GND
D3 LED
R45 5.1K
GND
U12 IN LM78L05 OUT
GND
C37 220 uF
C137 .1 uF
C46 33 uF
C48 .1 uF
U13 IN 78M33 OUT
C49 .1 uF
C38 220 uF
X1 X2 X3 X4 X5 X6
FIDUCIALS
MOUNTING HOLES
X7 X8 X9 X10 X11
D4 1N4004
F1 2 amp
L1 FERRITE BEAD
12V


RX_AUDIO
AUDIO_IN
AUDIO_INA
AD_RADIO
AGND
TP8
R104 5.1K
R105 1K
LF347M
U21-D
U21-B
U21-A
U20-B
U20-C
R103 12K
R102 180K
R101 33K
R100 62K
R99 47K
R98 47K
C83 .01 uF
C82 .01 uF
C81 .01 uF
C80 .01 uF
C79 .01 uF
C78 .01 uF
C77 .0047 uF
C76 .047 uF
C75 120 pF
C74 2.2 uF
C73 2.2 uF
R95 10K
R96 10K
R97 100K
R93 100K
R94 1K
R92 150K
JP14
JP13
TP9
P4 10K
CW
5A
5B
LCD1
LCD DISPLAY
16 CHAR BY 2 LINES
LCD
P7 10K
LCD_D7
LCD_D6
LCD_D5
LCD_D4
LCD_E
LCD_RW
LCD_RS
EEPROM_WP
EEPROM_SCL
EEPROM_SDA
C20 .1 uF
3_3V
U4
24LC512
R18 4.7K
R17 4.7K
DIG_IN
R25 33K
U9
H11AA4
R24 1M
R22 1K 1/2 W
R23 3.3K 1/2 W
SENSE2


LTR BUS IN
J7-1
J7-2
J7-3
J7-4
J7-5
J7-6
RS485A
RS485B
LTR BUS OUT
J6-1
J6-2
J6-3
J6-4
J6-5
J6-6
RS485A
RS485B
AUDIO_OUT
PTT
D23
1N5245B
C95
220 uF
C94
220 uF
R115
1K
Q9
2N2222
R114
220K
U24-A
LF347M
R113
10K
C93
47uF
R117
240
R116
2.2K
Q8
MPSA13
3_3V
5A
5B
P6
10K
AUDIO_OUT
C92
33 pF
R112
300K
U24-B
LF347M
5A
R111
470K
C91
4.7 uF
UP_PTT
RS485A
RS485B
JP10
R27
620
C30
.1 uF
GND
3_3V
U3
SP3485
VCC
RO
RI
/RE
DE
GND
A
B
RS485_RX
RS485_TX
RS485_DIR
C86
.1 uF
DTMF_RX_DV
DTMF_RX_D1
DTMF_RX_D2
DTMF_RX_D3
DTMF_RX_D4
3.57 MHz
Y1
U23
MB870
VDD
ST/GT
EST
OE
STD
Q1
Q2
Q3
Q4
OSC1
OSC2
VSS
GS
IN-
IN+
VREF
INH
PD
C85
.1 uF
R109
300K
R110
100K
R108
100K
C84
.1 uF
R106
100K
R107
4.7K
AUDIO_INA
C88
.1 uF
C90
.1 uF
U22
MAX7413
VDD
SHDN
OUT
COM
OS
IN
CLK
GND
TP11
C89
82 pF
DA_RADIO


SUBCODE
R158 5.1K
R159 470
C124 220 uF
C123 220 uF
JP28
JP29
R154 270K
R155 1M
U28-B LF347M
5B
R156 24K
R157 220K
AGND
R153 100K
C144 10 uF
R170 270K
C142 .1 uF
10K CW P10
10K CW P11
C122 .047 uF
U28-C LF347M
C121 .0047 uF
C125 .1uF
C141 .1uF
R152 270K
R151 8.2K
U32 MAX743
U33 MAX4751
C120 .047 uF
U28-A LF347M
C119 .0047 uF
C138 270 pF
C139 .001 uF
C140 .001 uF
C143 .001 uF
R150 82K
R149 18K
3_3V
R148 10K
R146 82K
R147 220K
U27-A MC14049B
U27-B MC14049B
U27-C MC14049B
U27-D MC14049B
U27-E MC14049B
U27-F MC14049B
DIG_OUT_1
DIG_OUT_2
DIG_OUT_3
DIG_OUT_4
DIG_OUT_5
DIG_OUT_6

REVISION HISTORY

Version 1.00, March 1, 2006, First Release

Version 1.01, March 9, 2006, Made minor changes

Version 1.02, April 3, 2006, Changed JP6 to JP9 on the following: "Adjust the preamp control until a level of 3 volts peak to peak is observed at test point 9."

Version 1.03, January 10, 2010, Mistake on page 8 where the Jumper A and Jumper B should be reversed for JP14.