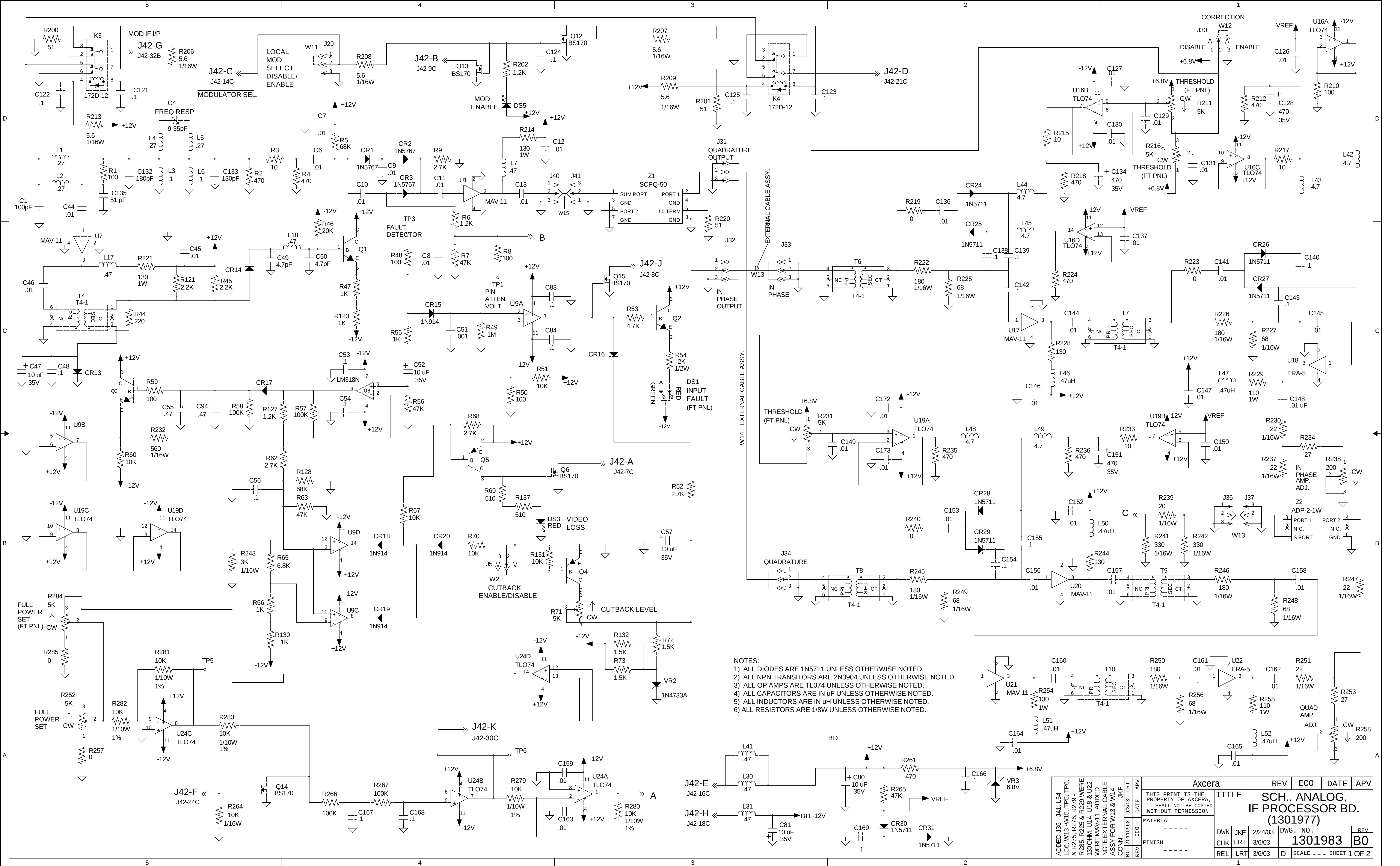
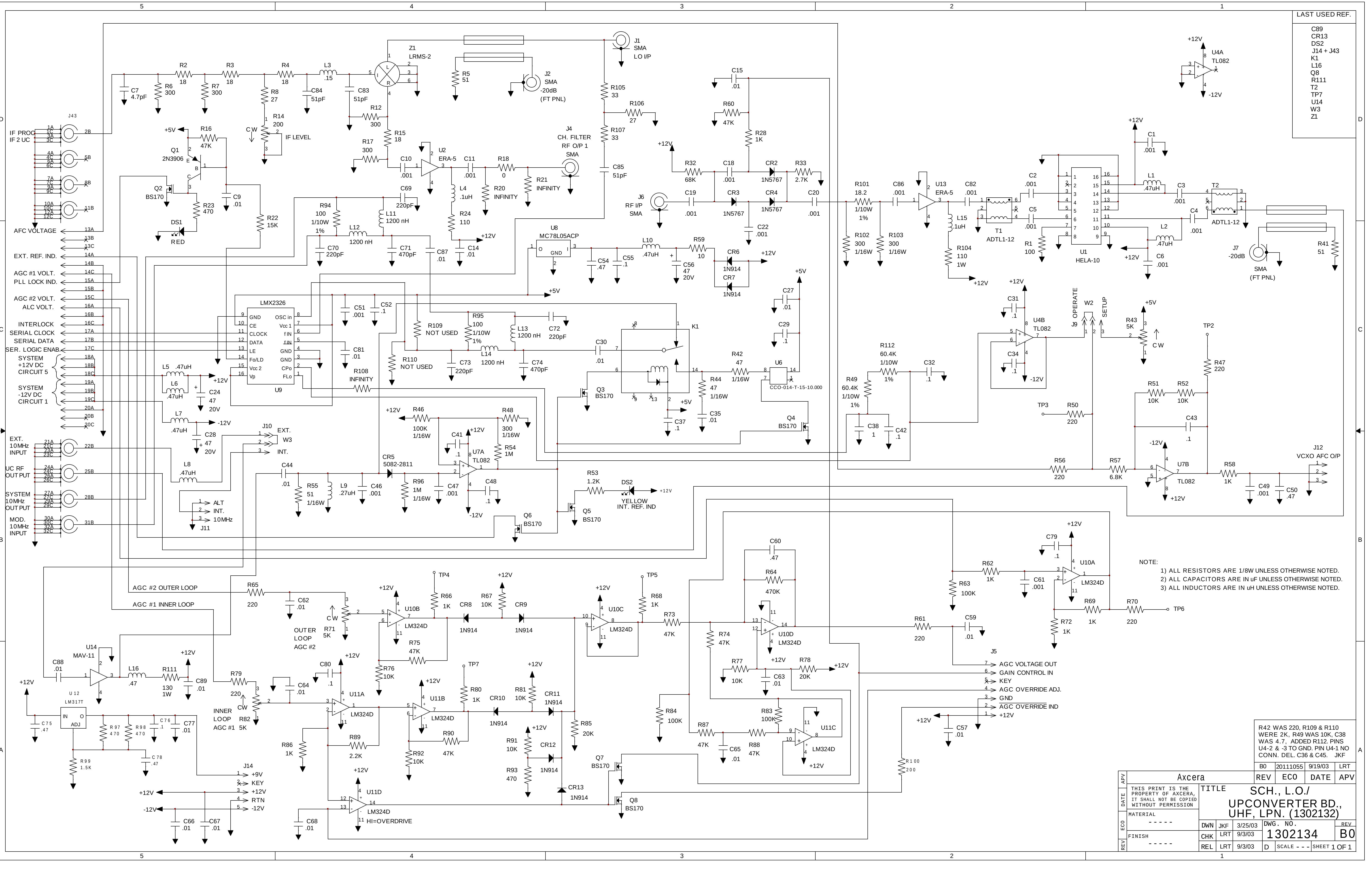




Xxcera		REV	ECO	DATE	APV
THIS PRINT IS THE PROPERTY OF Xxcera, IT SHALL NOT BE COPIED WITHOUT PERMISSION		TITLE			
MATERIAL		SCH., ANALOG, IF PROCESSOR BD. (1301977)			
FINISH		DWN	JKF	2/24/03	DWG. NO.
		CHK	LRT	3/6/03	1301983
		REL	LRT	3/6/03	B0
		SCALE --- SHEET 1 OF 2			



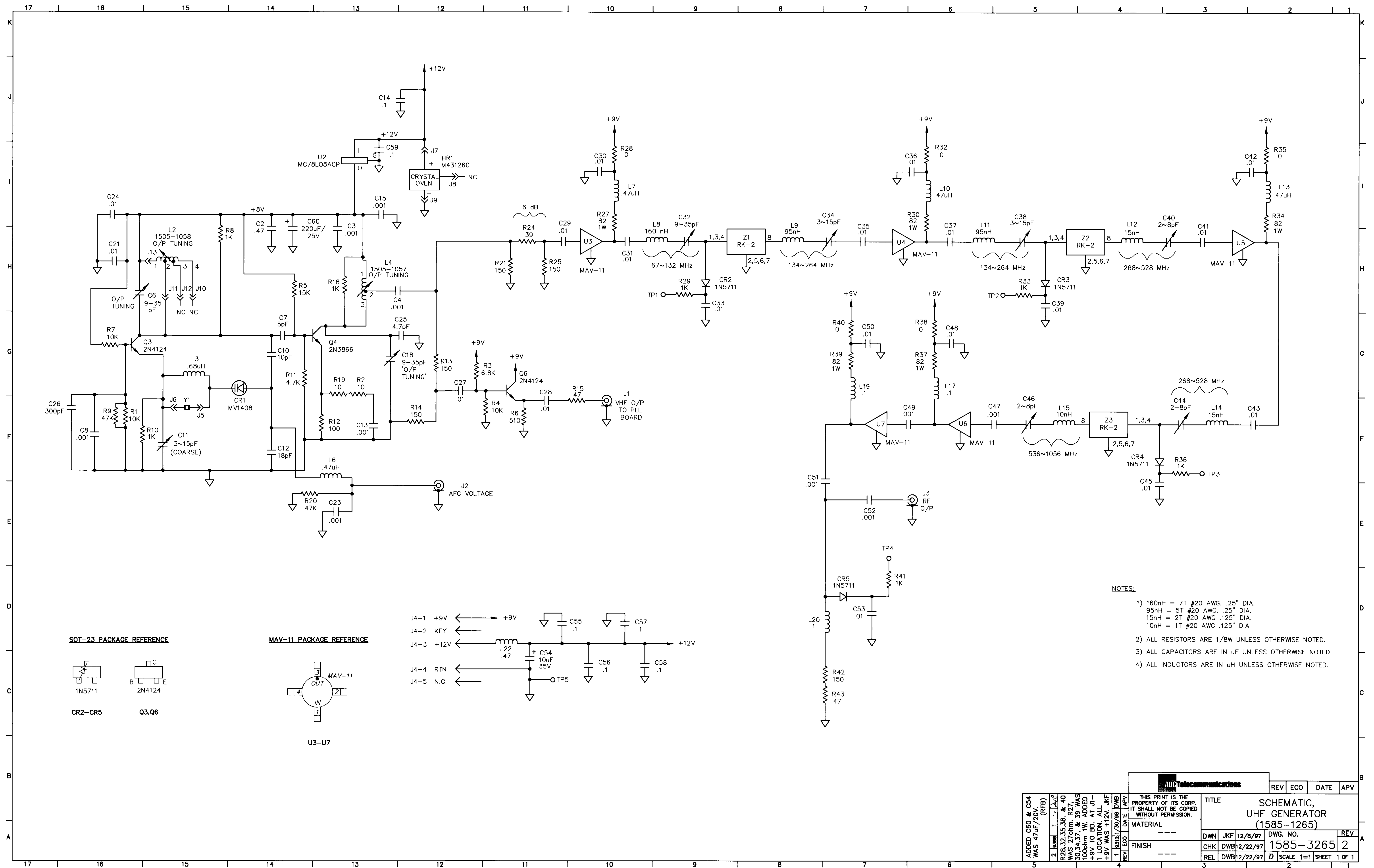
LAST USED REF.				
C89	CR13	DS2	J14 + J43	
K1	L16	Q8	R111	
TP7	U14	W3	Z1	

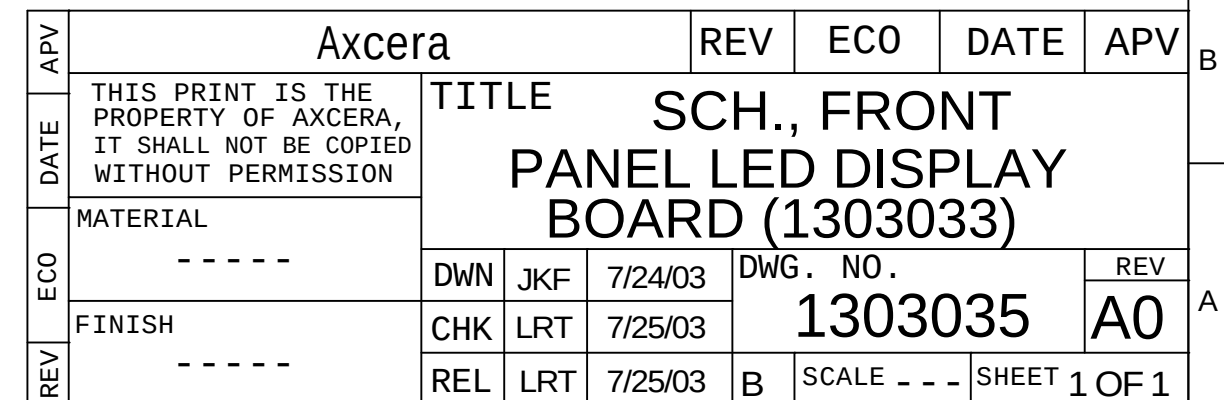
NOTE:
1) ALL RESISTORS ARE 1/8W UNLESS OTHERWISE NOTED.
2) ALL CAPACITORS ARE IN uF UNLESS OTHERWISE NOTED.
3) ALL INDUCTORS ARE IN uH UNLESS OTHERWISE NOTED.

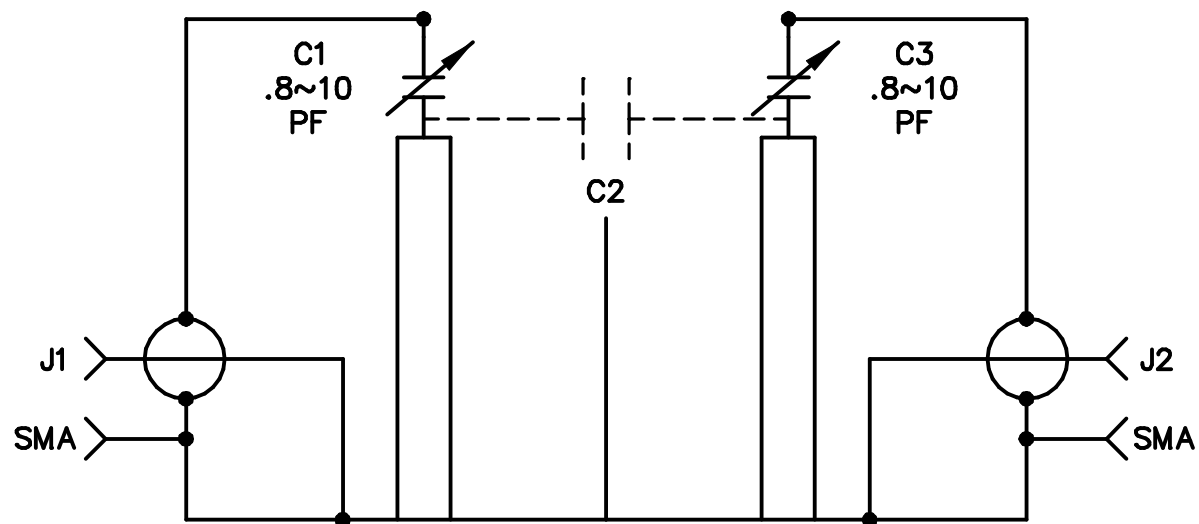
R42 WAS 220, R109 & R110 WERE 2K, R49 WAS 10K, C38 WAS 4.7, ADDED R112. PINS U4-2 & -3 TO GND. PIN U4-1 NO CONN. DEL C36 & C45. JKF

Axcera					REV	ECO	DATE	APV
THIS PRINT IS THE PROPERTY OF AXCERA, IT SHALL NOT BE COPIED WITHOUT PERMISSION								
MATERIAL								
FINISH								
REL								

TITLE				REV	
SCH., L.O./					
UPCONVERTER BD.,					
UHF, LPN. (1302132)					
DWN JKF 3/25/03				REV	
CHK LRT 9/3/03				1302134	
REL LRT 9/3/03				B0	
D				SCALE - - - SHEET 1 OF 1	

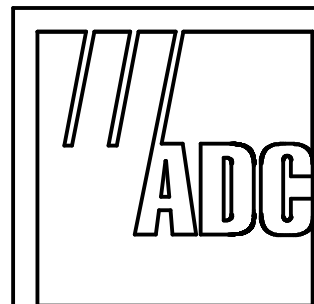






NOTE: C2 IS STRAY CAPACITANCE
BETWEEN LINE SECTIONS.

REV	ECO	DATE	APV
-----	-----	------	-----



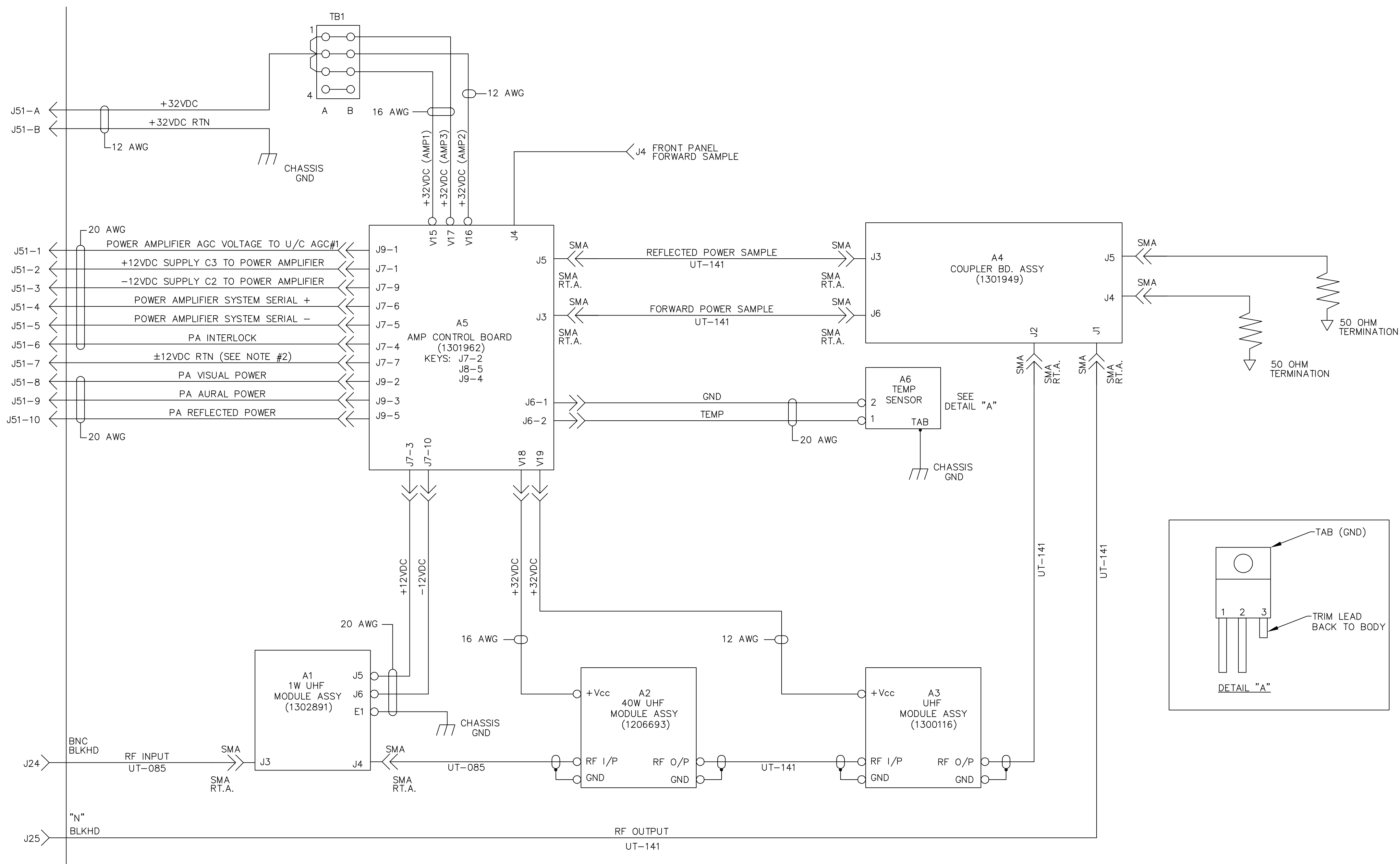
THIS PRINT IS THE
PROPERTY OF ADC,
IT SHALL NOT BE COPIED
WITHOUT PERMISSION.

MATERIAL

FINISH

TITLE **91-00-00-50Z-61**
UHF FILTER

DWN	DD	9/13/83	DWG. NO.	REV
CHK	RWZ	9/13/83	1007-3101	0
REL	RWZ	7/20/90	A SCALE ---	SHEET 1 OF 1

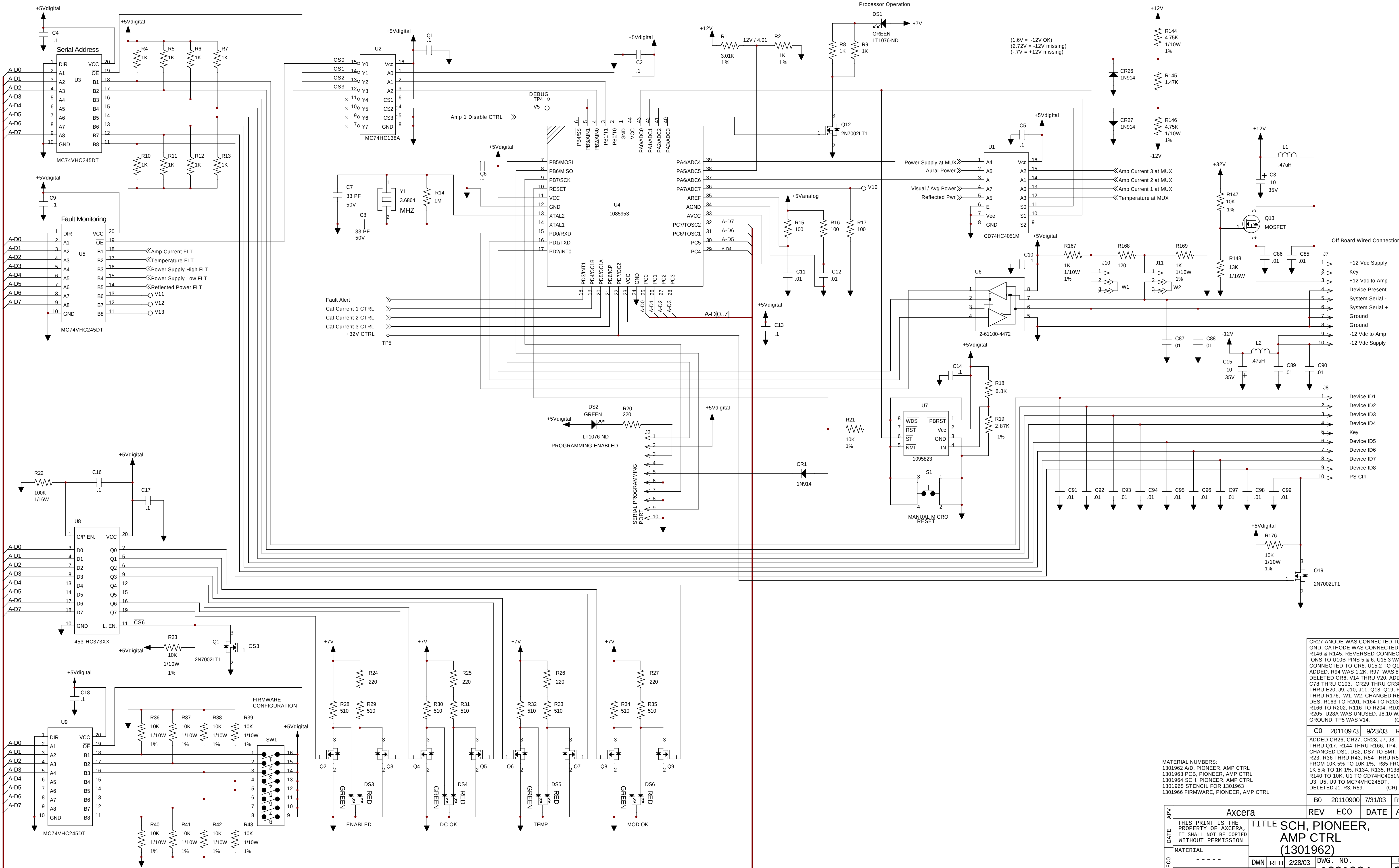


NOTE:
1. ALL WIRE IS 18AWG UNLESS OTHERWISE NOTED.
2. THIS CONNECTION MUST BE EQUIPPED WITH LONGER GROUND PIN. (MAKE FIRST BREAK LAST)



THIS PRINT IS THE PROPERTY OF AXCERA, IT SHALL NOT BE COPIED WITHOUT PERMISSION.		TITLE I/C, PA ASSEMBLY, 100W PIONEER SERIES			
		DWN	MH	8/13/03	DWG. NO. 1302061
MATERIAL -----	CHK	JCM	8/27/03	REL	REV B0
FINISH -----	REL	JCM	8/27/03	SCALE ---	SHEET 1 OF 1

DELETED .141 RIGID BETWEEN A5-J4 AND J1. (SAK)			
REV	ECO	DATE	APV

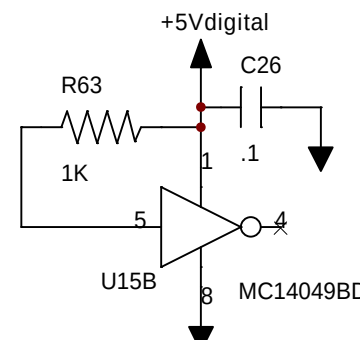
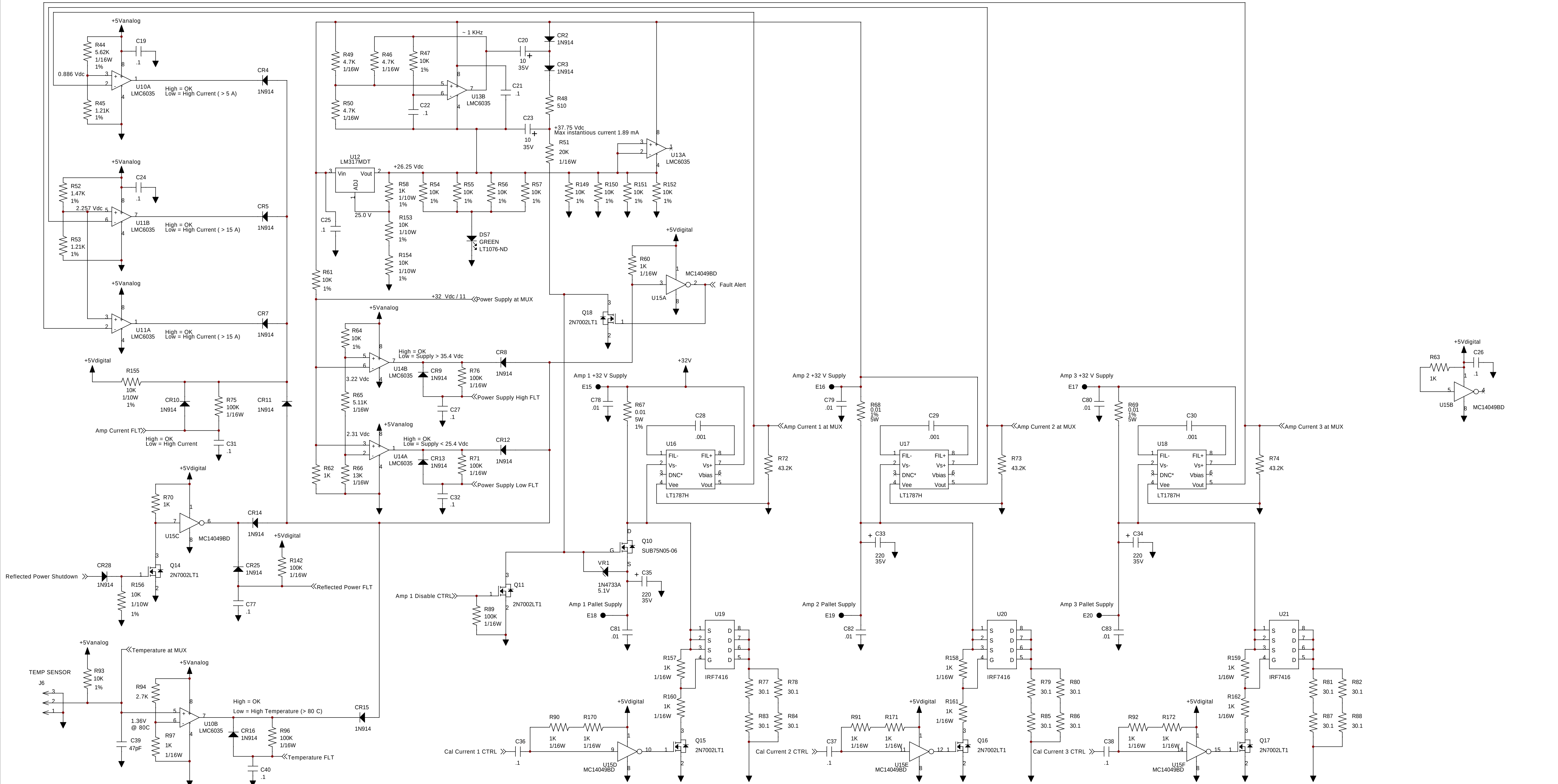


MATERIAL NUMBERS:
1301962 A/D, PIONEER, AMP CTRL
1301963 PCB, PIONEER, AMP CTRL
1301964 SCH, PIONEER, AMP CTRL
1301965 STENCIL FOR 1301963
1301966 FIRMWARE, PIONEER, AMP CTRL

CR27 ANODE WAS CONNECTED TO GND, CATHODE WAS CONNECTED TO R146 & R145. REVERSED CONNECTIONS TO U10B PINS 5 & 6. U15.3 WAS CONNECTED TO CR8. U15.2 TO Q18.1 ADDED. R94 WAS 1.2K. R97 WAS 8.25K. DELETED CR6, V14 THRU V20. ADDED C78 THRU C103. CR29 THRU CR38. E15 THRU E20. J9, J10, J11, Q18, Q19, R167 THRU R176. W1, W2. CHANGED REF. DES. R163 TO R201. R164 TO R203, R166 TO R202. R116 TO R204, R102 TO R205. U28A WAS UNUSED. J8.10 WAS GROUND. TP5 WAS V14. (CR)

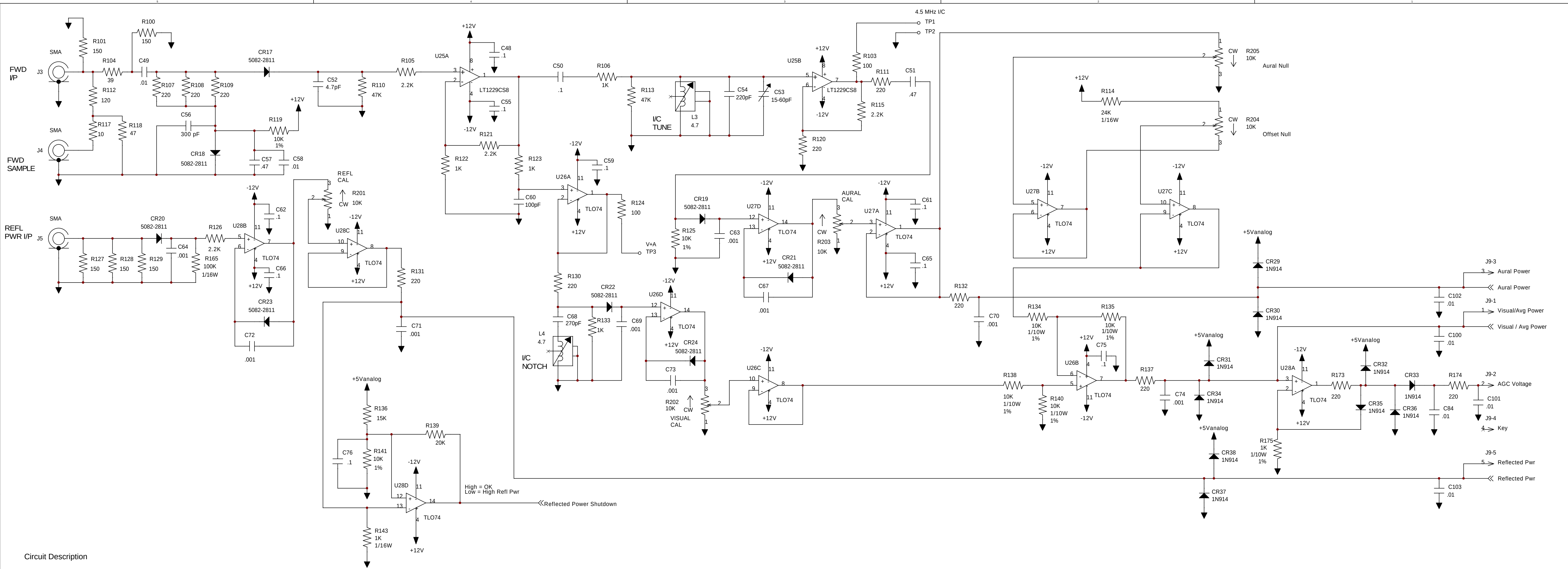
C0	20110973	9/23/03	REH
ADDED CR26, CR27, CR28, J7, J8, Q12 THRU Q17. R144 THRU R166, TP4. CHANGED DS1, DS2, DS7 TO SMT. R23, R36 THRU R43, R54 THRU R57 FROM 10K 5% TO 10K 1%. R85 FROM 1K 5% TO 1K 1%. R134, R135, R138, R140 TO 10K. U1 TO CD74HC4051M. U3, U5, U9 TO MC74VHC245DT. DELETED J1, R3, R59. (CR)			

APV	Xxcera			REV	ECO	DATE	APV
DATE	THIS PRINT IS THE PROPERTY OF Xxcera, IT SHALL NOT BE COPIED WITHOUT PERMISSION			TITLE SCH, PIONEER, AMP CTRL (1301962)			
ECO	MATERIAL			DWN	REH	2/28/03	DWG. NO.
REV	FINISH			CHK	REH	3/6/03	1301964
				REL	REH	3/6/03	D SCALE - - - SHEET 1 OF 3



NOTE:
A track width of 0.3 inch is needed between power input vias and sense resistors R55,R56,R57. 0.3 inch track width is also needed between the output of the sense resistors and the output vias that provide power to the amplifier pallets.

APV		Xxcera		REV	ECO	DATE	APV
DATE		THIS PRINT IS THE PROPERTY OF XxcERA, IT SHALL NOT BE COPIED WITHOUT PERMISSION		TITLE SCH, PIONEER, AMP CTRL (1301962)			
MATERIAL		-----		DWN		2/28/03	
FINISH		-----		CHK		3/6/03	
				REL		3/6/03	
				D		SCALE - - - SHEET 2 OF 3	



Circuit Description

Page 1:
Upper center of page one is U4 which is the controller. This in-circuit Atmel microcontroller is operated at 3.6864 MHz. Programming of this device is performed through J2. U4 selects the desired analog channel of U1 through the settings of PA0 - PA3. PA4 of U4 is a processor operating LED that can be flashed to show continued operation. The outputs of Port A must be set and not changed during an analog input read of channels PA5 - PA7. PA5 is used to monitor the +12 Vdc supply to the board. PA6 is the selected channel of analog switch U1. PA7 is connected to a via for future access.

U6 is our standard serial to RS-485 driver IC. U7 is a watchdog IC used to hold the microcontroller in reset if the supply voltage is less than 4.21 Vdc; (1.25 Vdc < Pin 4 (IN) < Pin 2 (Vcc)). U7 momentarily resets the microcontroller if Pin 6 (!ST) is not clocked every second. A manual reset switch is provided but should not be needed.

Upper right corner U3 is used to determine where the amplifier control board is located. The eight inputs come from the main amp connector and are used to set the SCADA address of the controller. Pull-up resistors set a default condition of logic high.

U5 below U3 is used for getting digital input information of the board. Page two has several monitoring circuits that provide information on the amplifier's status. Many of these circuits automatically shut down the amplifier if a specific fault occurs.

U8 below U5 is used to control four board mounted status LEDs. A FET is turned on to shut current away from the LED to turn it off. U9 below U8 is used to enable different features within software. Actual use is TBD.

Page 2:

In the lower right corner are voltage regulator circuits. U22 should allow for 0.14 amps of power using its 92 C/W rating if Ta = 60C max and Tj = 125C max. 0.26 amps can be obtained from U22 if the mounting pad is 0.5 sq. inches. The controller will not need this much current.

U23 and U24 are low drop-out voltage regulators with a tolerance greater than or equal to 1%. 100 mA is available from each device but again the controller will not need this much current.

In the upper left section are circuits with U12 and U13. U12 is used to generate a regulated voltage that is about 5 Volts less than the +32 Volt supply. When the +32 Volt supply is enabled, the circuitry around U13B is used to provide gate voltage to Q10 that is 5 volts greater than the source pin of this FET. The gate of Q10 can be turned off by any one of a few different circuits.

U10A is used to turn off the gate of Q10 in the event of high current in amplifier #1. At 0.886 Vdc, the current to amplifier #1 should be about 5.12 Amps. U11 is used to turn off the FET if high current is detected in amplifier #2 or #3. With 2.26 Vdc at pin 5 and pin 3 of U11, the voltage output of current sense amplifier U17 or U18 at high current shut down should be about 13.1 Amps.

U14B is used to turn off the gate of Q10 in the event of high power supply voltage. U14A is used to keep the FET disabled if the power supply voltage is less than 26 volts.

U28D on page 3 is used to turn off the gate of Q10 in the event of high reflected power. U10B turn off the gate of Q1 if the power supply temperature gets too hot.

Current Monitoring Sections - A 0.01 ohm 1% 5 Watt thru-hole resistor is used for monitoring the current through several sections of the amplifier. The voltage developed across this resistor is amplified for current monitoring by U16, U17, or U18. The Linear Technology LT1787HVCS8 precision high side current sense amplifier accepts a maximum voltage of 60 Vdc. The 43.2 Kohm resistor from Pin 5 to ground sets the gain of the amplifier to about 17.28. This value is not set with much accuracy since the manufacture internal matches the resistors of this part but their actual resistance value is not closely defined. A trimming resistor is suggested to give a temperature stability of -200ppm/C but instead the microcontroller will determine the exact gain of the circuit and use a correction factor for measurements. Circuit loading components are located in the lower portion of each current monitoring circuit. These components allow for short duration high current loading of the supply. By measuring the current through the sense resistor with and without the additional load, the microcontroller can determine the gain of each circuit. The input to each hex inverter protects the load resistors from prolonged power dissipation. The load resistors are four 30.1 ohm 1% 1206 resistors. For very short duration pulses, a 1206 resistor can handle up to 60 watts. The Atmel processor requires 226 uSec per conversion. A supply voltage of 32 volts will pass 1.06 amps + 1% through the load resistors.

Page 3:

RF power detector circuits. Gain of power measurements will be done through software. Only the Aural Null and Offset Null need to be done through front panel pots.

NOTES:
1) ALL RESISTORS ARE 1/8 WATT UNLESS NOTED OTHERWISE.
2) ALL CAPACITORS ARE uF UNLESS NOTED OTHERWISE.
3) ALL INDUCTORS ARE uH UNLESS NOTED OTHERWISE.

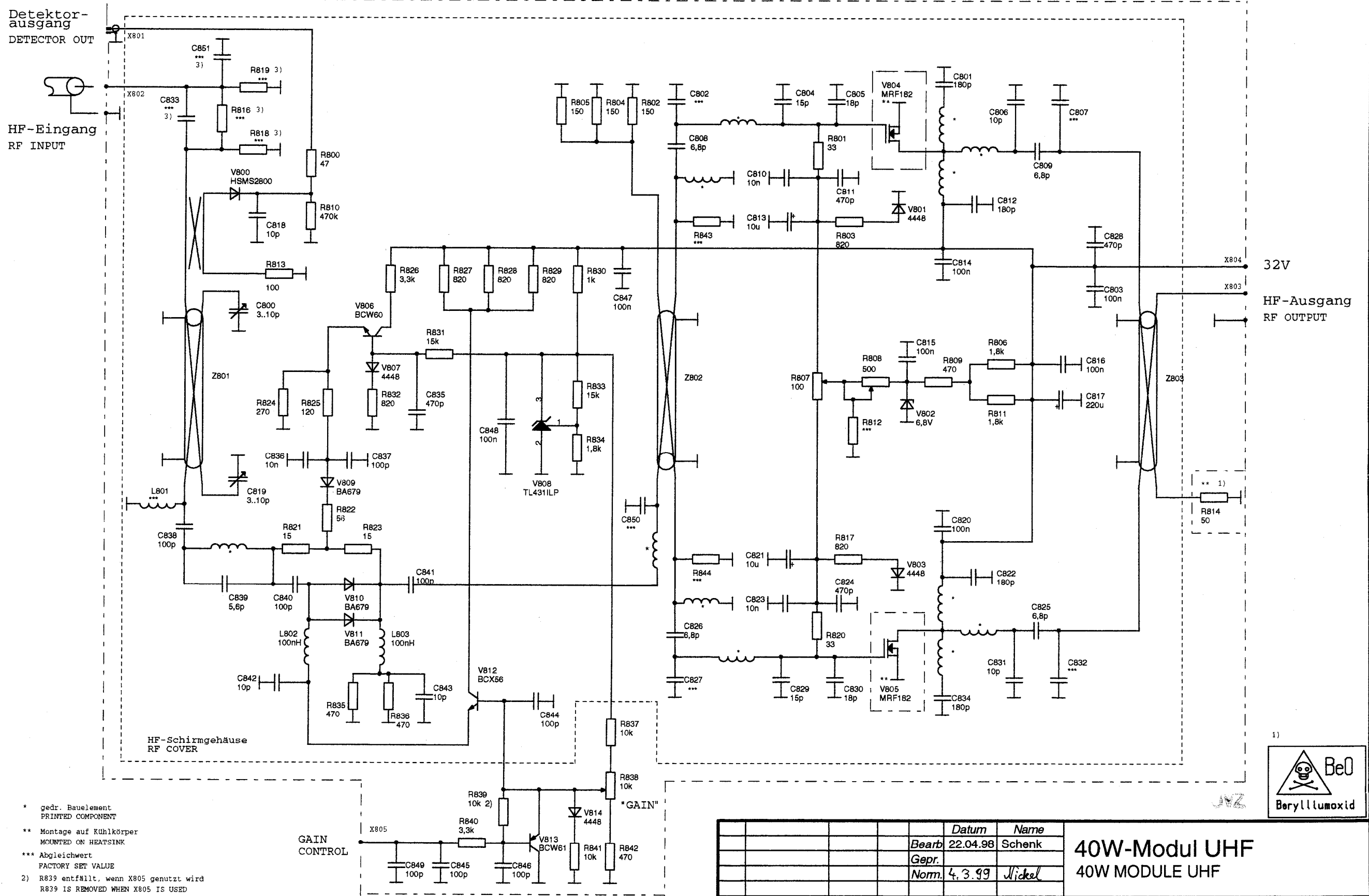
APV	Axcera				REV	ECO	DATE	APV
DATE	THIS PRINT IS THE PROPERTY OF AXCERA, IT SHALL NOT BE COPIED WITHOUT PERMISSION				TITLE SCH, PIONEER, AMP CTRL (1301962)			
ECO	MATERIAL				DWN	REH	2/28/03	DWG. NO.
REV	FINISH				CHK	REH	3/6/03	1301964
					REL	REH	3/6/03	C0
				D	SCALE - - - SHEET 3 OF 3			

Maschinell erzeugt!
Nicht manuell ändern!

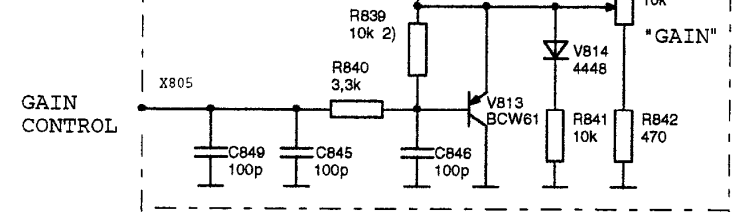
Schutzvermerk nach DIN 34 beachten!
NOTE: copyright protected as in DIN 34!

SN79-308
SCHEMATIC 1
G:\PROJ\ORCAD\WSP\5379\308-02\SN79-308.DSN

ORCAD SCHEMATIC

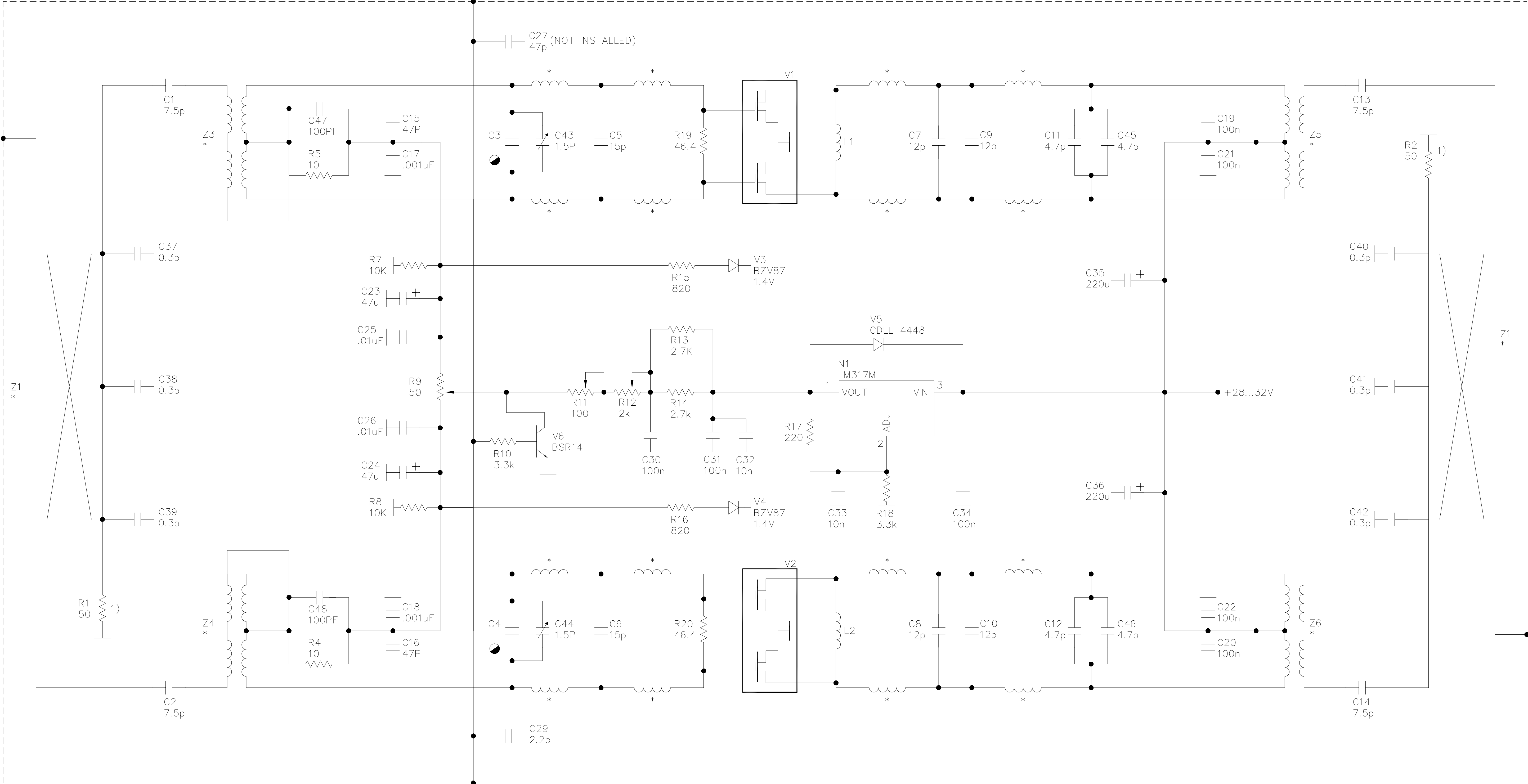


- * gedr. Bauelement
PRINTED COMPONENT
- ** Montage auf Kühlkörper
MOUNTED ON HEATSINK
- *** Abgleichwert
FACTORY SET VALUE
- 2) R839 entfällt, wenn X805 genutzt wird
R839 IS REMOVED WHEN X805 IS USED
- 3) C833, C851 entfallen bei Bestückung von R816, R818
u. R819
C833, C851 ARE REMOVED WHEN R816, R818, R819 ARE INSTALLED



Leiterplattenbestückung siehe
PC BOARD LAYOUT SEE
51-5379-308-00 (1)

					Datum	Name	40W-Modul UHF 40W MODULE UHF	51-5379-308-00 WSP XB	Blatt 1	
					Bearb.	22.04.98				Schenk
					Gepr.					
					Norm.	4.3.99				Nickel
02	E185	26.10.98	Sche		TELEFUNKEN	Sendertechnik			1	
01		8.5.98	Sche							
Zust.	Änderung	Datum	Name	Urspr.:	Ers. f.:			Ers. d.:	K	



* PRINTED COMPONENT

◐ FACTORY SET VALUE

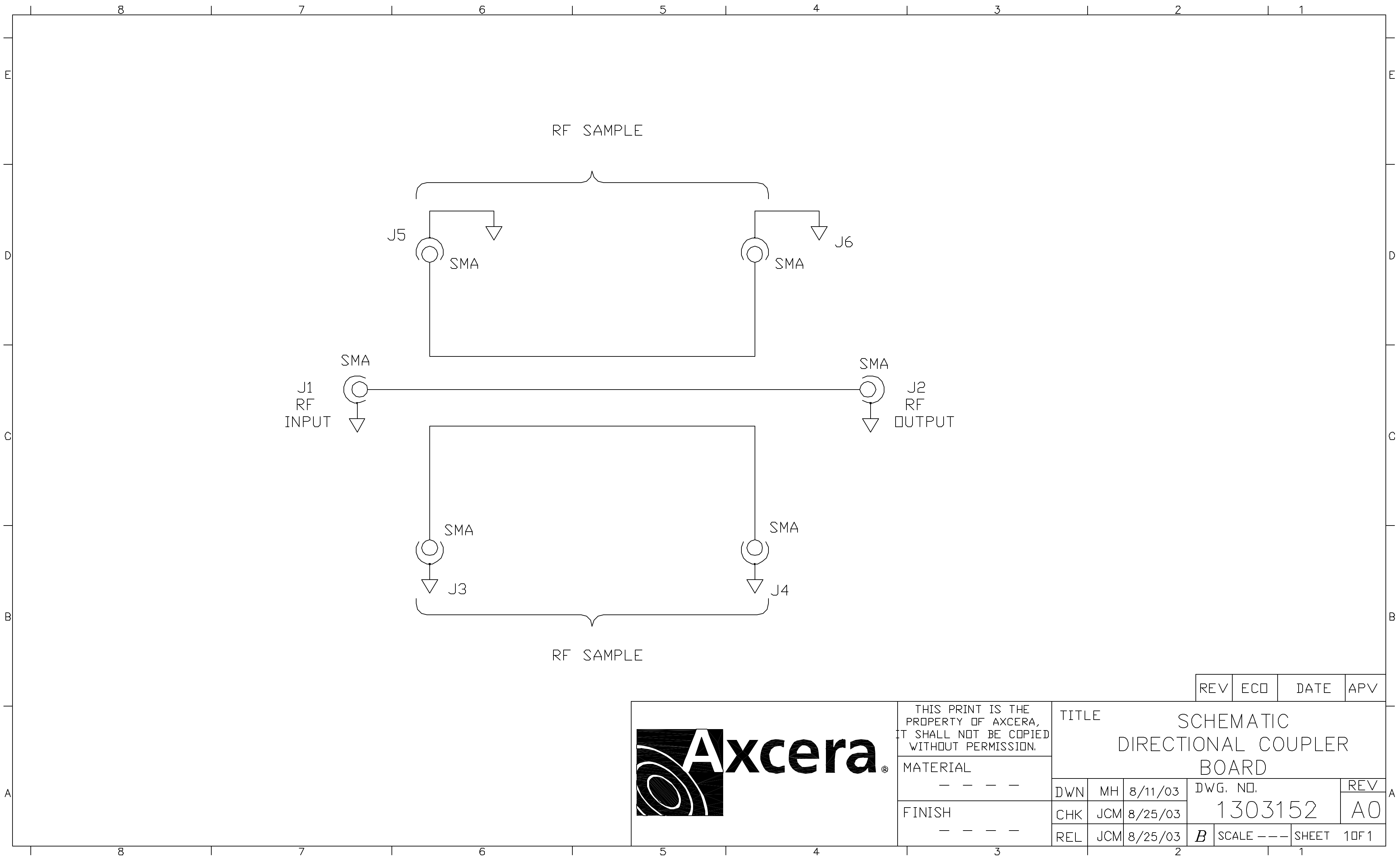
PC BOARD LAYOUT SEE
51-5379-309-00 (2)

DELETED PTF10159 P/N FROM LDMOS. ADDED C23,C24 & C27. CDD/CR			
CO	20110221	5/17/02	RE
R15 AND R16 WERE 680 OHMS. PWN			
BO	20100316	04/02/02	LRT
REV	ECO	DATE	APV

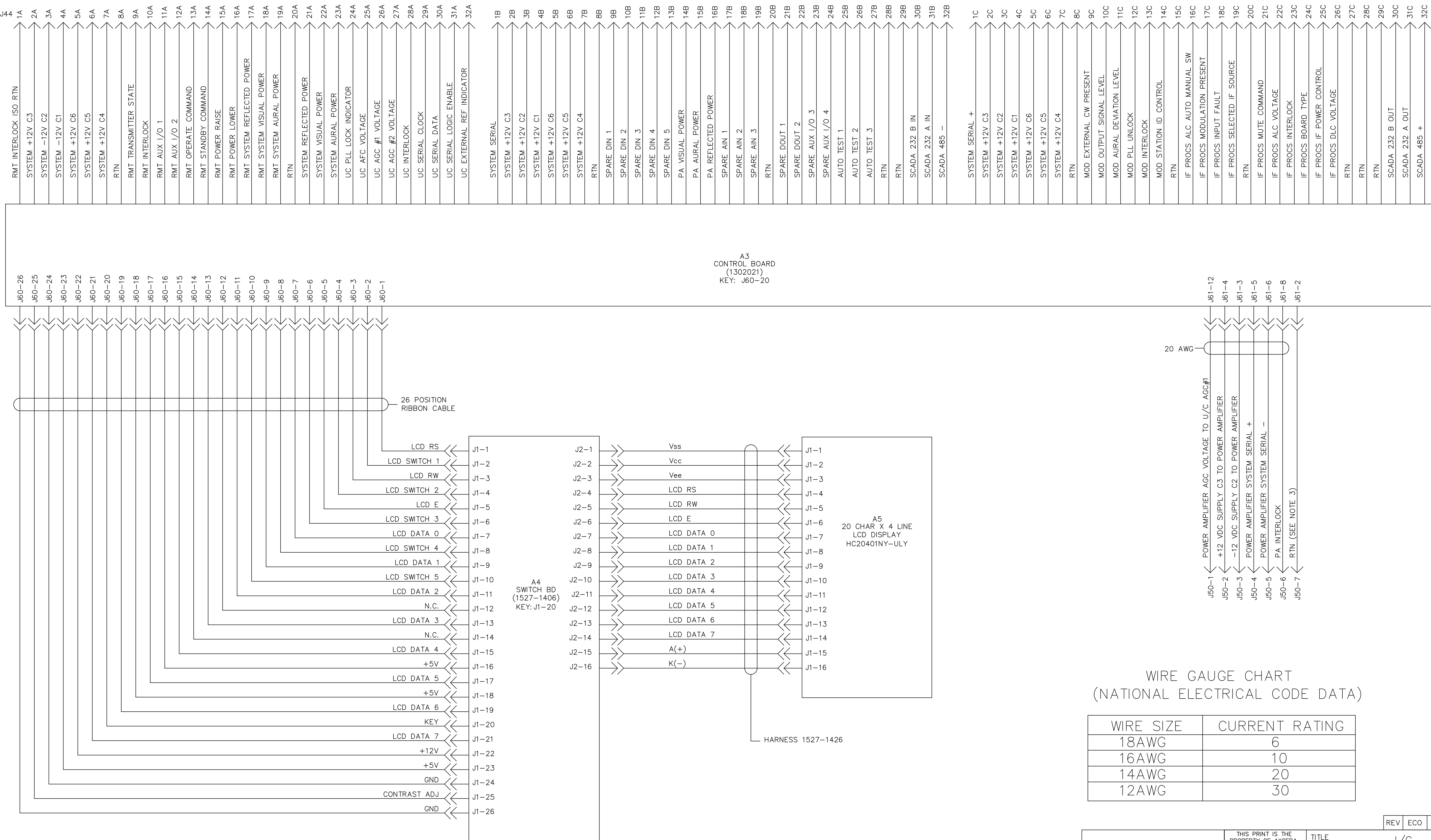
CHANGE R3 FROM A 22 OHM RESISTOR TO C47, SM, CAP, 100PF, 500WDC. FROM CHANGE R6 FROM A 22 OHM RESISTOR TO C48, SM, CAP, 100PF, 500WDC. FROM CHANGE R4 FROM A 22 OHM RESISTOR TO 15906003SMT SM,, RES, 10 OHM 5% 1/8W CHANGE R5 FROM A 22 OHM RESISTOR TO 15906003SMT SM,, RES, 10 OHM 5% 1/8W CHANGE C17 FROM A 47PF CAP FIXED CERAMIC, 47 PF TO 15906160SMT SM,, CAP, .001 UF, 50 WVDC CHANGE C18 FROM A 47PF CAP FIXED CERAMIC, 47 PF TO 15906160SMT SM,, CAP, .001 UF, 50 WVDC ADD C23 1301246, SM, CAP, 47MF, 50V, LOW ESR ADD C24 1301246, SM, CAP, 47MF, 50V, LOW ESR ADD C25 15906161SMT SM,, CAP, .01 UF, 50 WVDC ADD C26 15906161SMT SM,, CAP, .01 UF, 50 WVDC PWN	DO 20100409/18/02	RJ
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THIS PRINT IS THE PROPERTY OF AXCIERA, IT SHALL NOT BE COPIED WITHOUT PERMISSION.		TITLE AMPLIFIER MODULE	
MATERIAL		REV	
FINISH		DWN	PWN04/01/02
CHK	LRT04/03/02	DWG. NO.	51-5379-309-00 WSP
REL	LRT04/03/02	SCALE	SHEET 1 OF 1



 Axcera®	THIS PRINT IS THE PROPERTY OF AXCERA, IT SHALL NOT BE COPIED WITHOUT PERMISSION.		TITLE						
			SCHEMATIC DIRECTIONAL COUPLER BOARD						
	MATERIAL	DWN	MH	8/11/03	DWG. NO.		REV		
	— — — —								
FINISH	CHK	JCM	8/25/03	1303152		A0			
— — — —									
	REL	JCM	8/25/03	B	SCALE — — —	SHEET 1 OF 1			

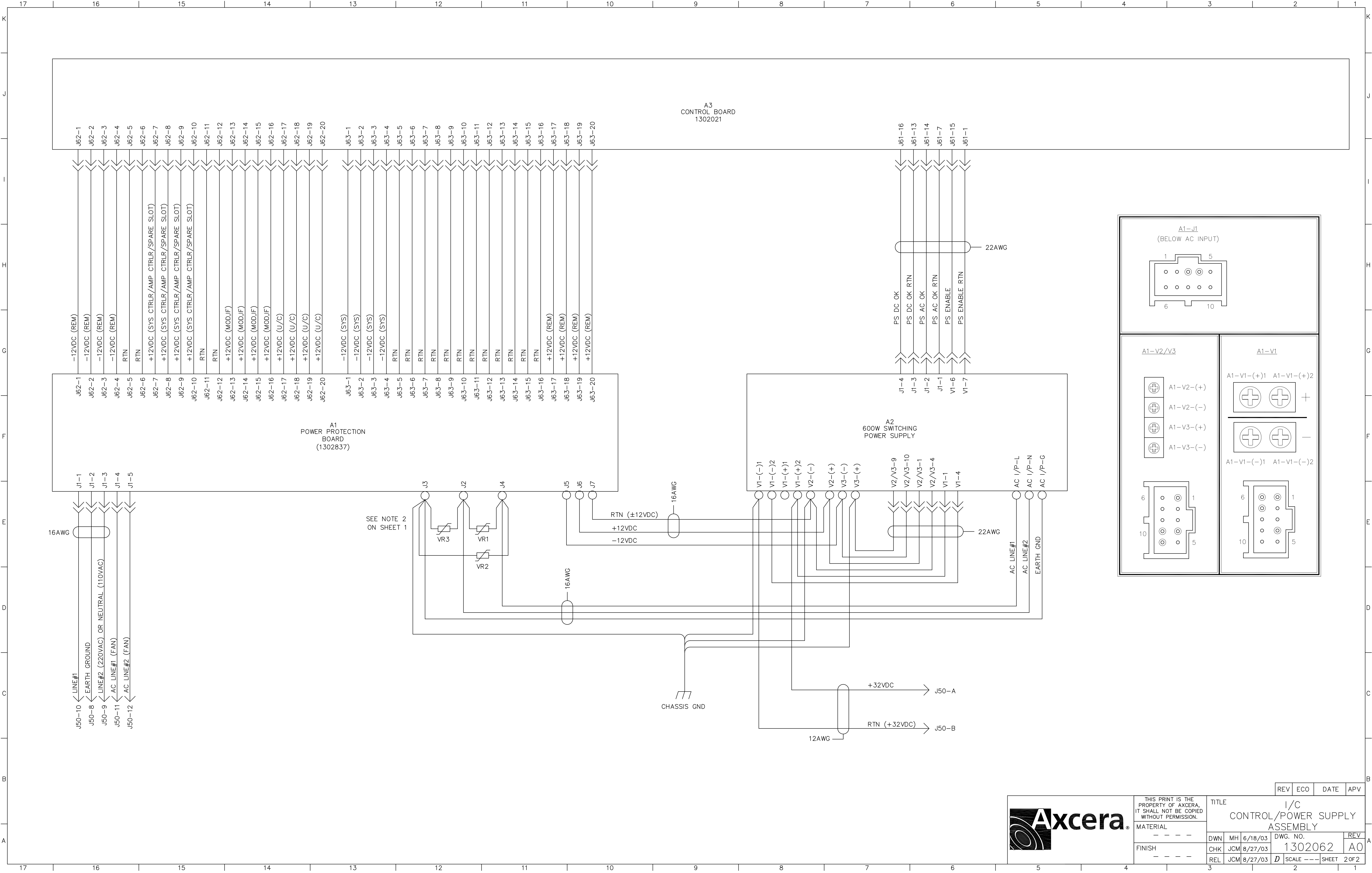


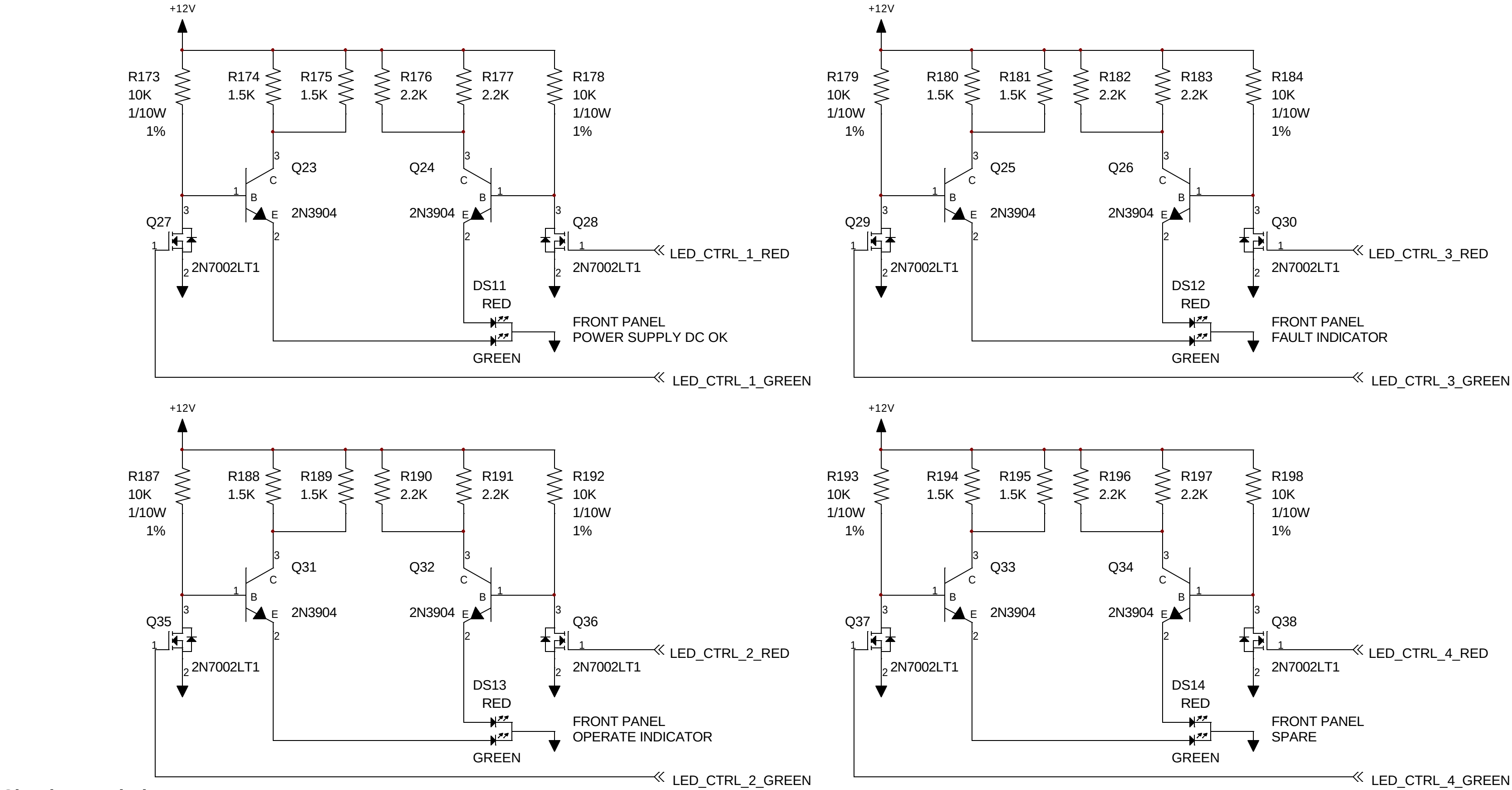
NOTES:

- 1) ALL SINGLE WIRE IS 18AWG UNLESS OTHERWISE NOTED.
- 2) VALUES FOR VR1, VR2 AND VR3 ARE PART OF VOLTAGE SELECTION KITS.
- 3) THIS CONNECTION MUST BE EQUIPPED WITH LONGER GROUND PIN (MAKE FIRST BREAK LAST).

WIRE GAUGE CHART (NATIONAL ELECTRICAL CODE DATA)

WIRE SIZE	CURRENT RATING
18AWG	6
16AWG	10
14AWG	20
12AWG	30





Circuit Descriptions:

PAGE 1:

U1 is an Atmel Atmega128 microcontroller. This part is in-circuit programmed using the serial programming port. When the microcontroller is held in reset by either the programming port or the external watchdog IC, a transistor inverts the reset signal while serial programming lines are connected to U1 through analog switch U5.

U2 is a watchdog IC used to hold the microcontroller in reset if the supply voltage is less than 4.21 Vdc; (1.25 Vdc < Pin 4 (IN) < Pin 2 (Vcc)). The watchdog momentarily resets the microcontroller if Pin 6 (!ST) is not clocked every second. A manual reset switch is provided but should not be needed.

Diodes DS1 through DS8 are used for display of auto test results. A test board is used to execute self test routines. When the test board is installed, Auto_Test_1 is held low and Auto_Test_2 is allowed to float at 5 Vdc. This is the signal to start the auto test routines.

U3 and U4 are used to selectively enable various input and output ICs found on page 2 and 3 of the schematic.

U1 has two serial ports available. In this application, one port is used to communicate with transmitter system components where U1 is the master of a RS-485 serial bus. The other serial port is used to provide serial data I/O where U1 is not the master of the data port. A dual RS-232 port driver IC and a RS-485 port driver is also in the second serial data I/O system. The serial ports are wired such that serial data input can come through one of the three serial port channels. Data output is sent out through each of the three serial port channels.

Switch SW1 is used to select either transmitter operation or exciter driver operation. When the switches of SW1 are on, transmitter operation is selected and the power monitoring lines of the transmitter's power amplifier are routed to the system power monitoring lines.

PAGE 2:

Digital output latches are used to control system devices. Remote output circuits are implemented using open drain FETs with greater than 60 Volt drain to source voltage ratings.

Remote digital inputs are diode protected with a 1 Kohm pull-up resistor to 5Vdc. If the remote input voltage is greater than about 2 volts or floating, a FET is turned on and a logic low is applied to the digital input buffer. If the remote input voltage is less than the turn on threshold of the FET (about 2 Vdc), a logic high is applied to the digital input buffer.

Four of the circuits on page two are auxiliary I/O connections wired for future use. They are wired similar to the remote digital inputs but include a FET for digital output operation. To operate these signals as an input, the associated output FET must be turned off. These circuits are also connected to an analog input multiplexer IC.

PAGE 3:

Several ICs are used as input buffers to allow the microcontroller to monitor various digital input values. Most digital inputs use a 10 Kohm pull-up resistor. The buffer IC used for data transfer to the display is wired for read and write control.

PAGE 4:

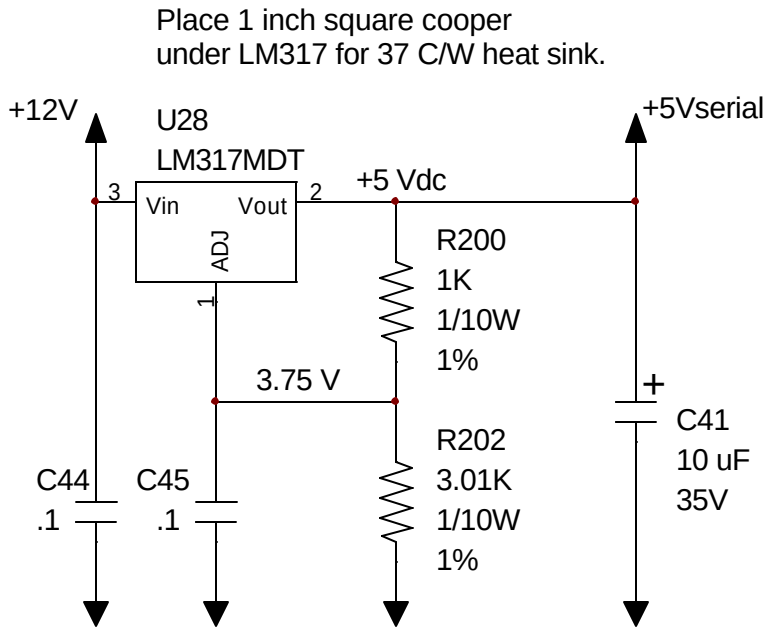
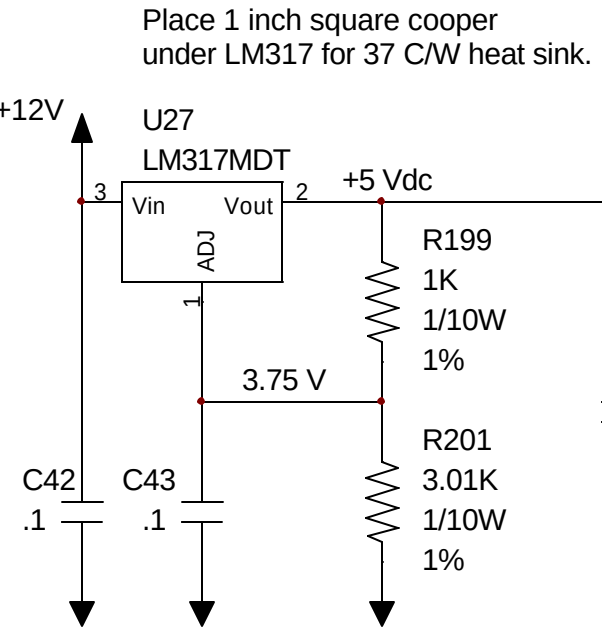
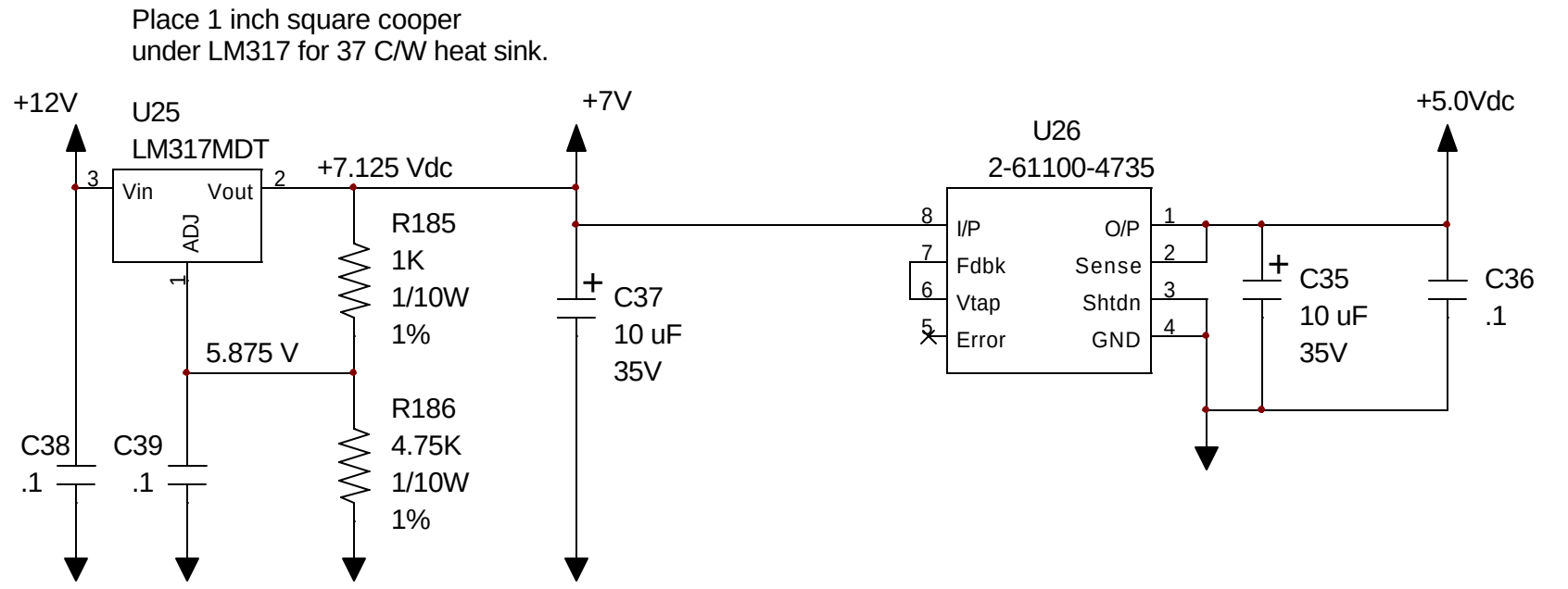
Each analog input is expected to be between 0 and 5 Vdc. If a signal exceeds 5.1 Vdc, a 0.225 Watt zenor diode clamps the signals voltage. Most signals are calibrated at their source however two dual serial potentiometer ICs are used to calibrate four signals. For these four circuits, the input value is divided in half before it is applied to an op-amp. The serial potentiometer is used to adjust the input signal between 80 and 120% of the input signal. Serial data to the second serial potentiometer is transferred through the first IC.

Two 20 position connectors are used to provide power to the backplane. J62 and J63 get power from the power supply after a nominal 3 amp resettable fuse. The Raychem polyswitch resettable fuses may open on a current as low as 2.43 amps at 50C, 3 amps at 25 C or 3.3 amps at 0C. They definately will open when the current is 4.86 amps at 50C, 6 amps at 20C, or 6.6 amps at 0C. Trace widths of these circuits are 0.140" (designed for maximum current).

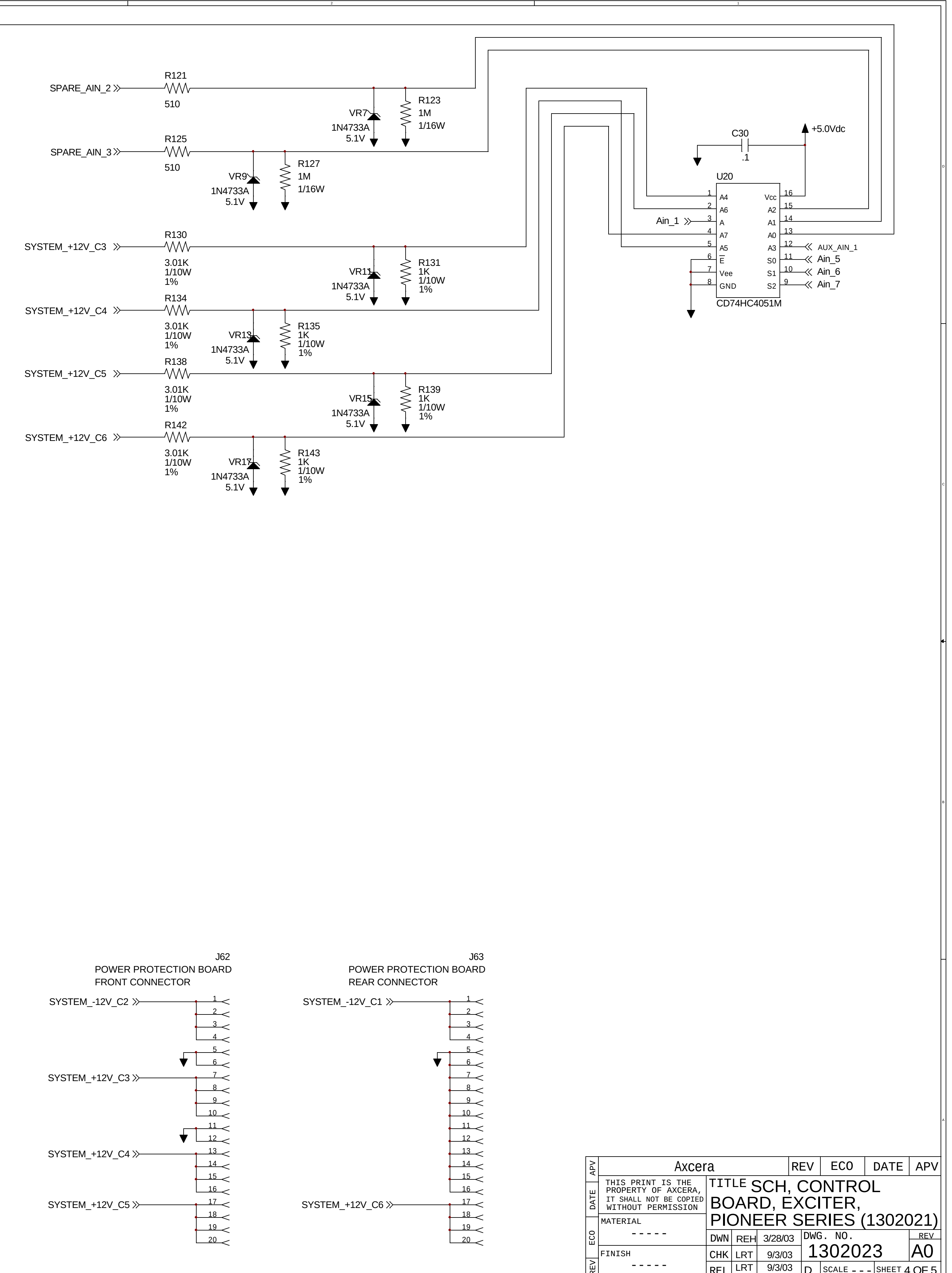
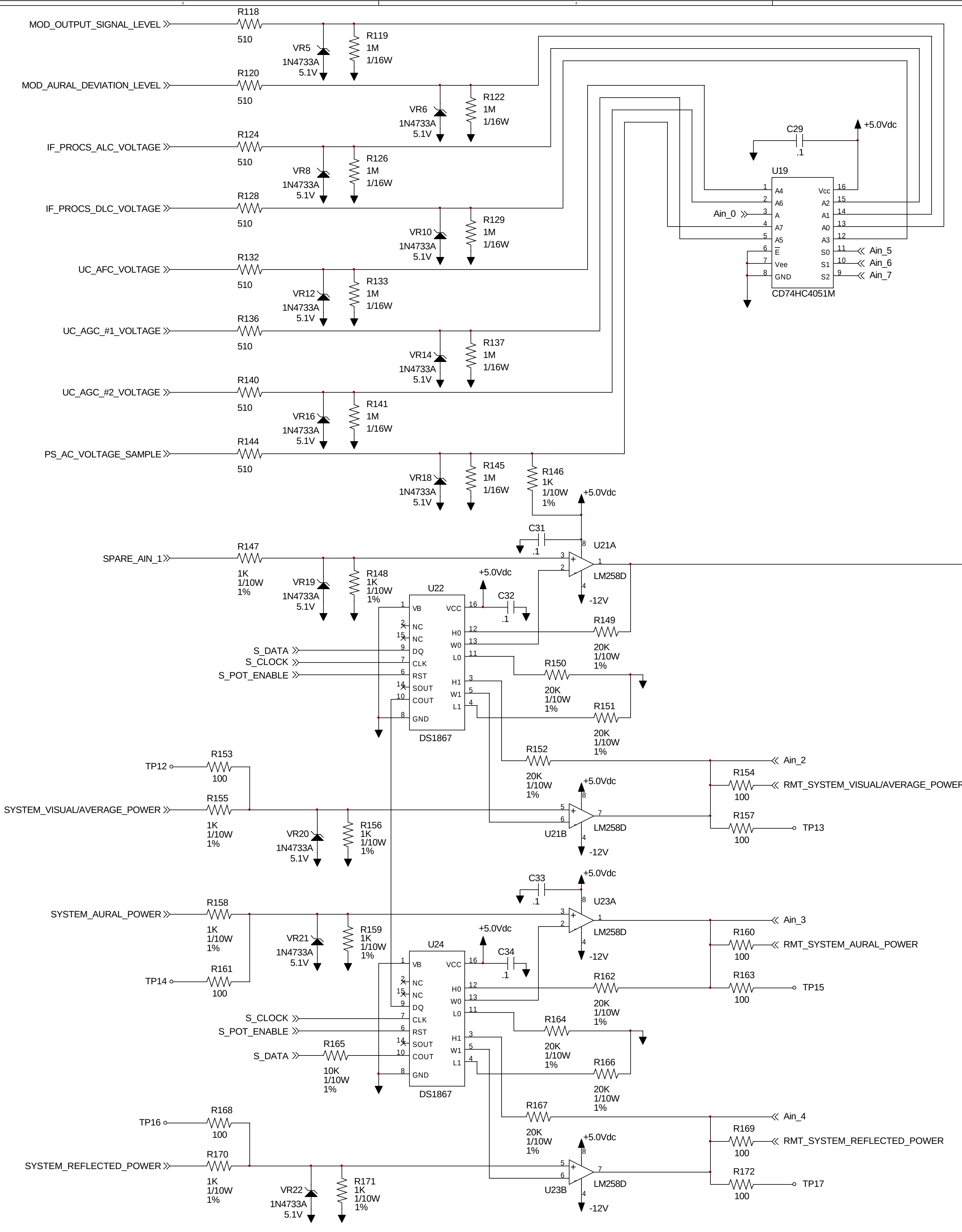
PAGE 5:

Each of the four LED circuits drive a dual element common cathode LED. To make a good amber color, the current applied to the green element is slightly greater than the red element.

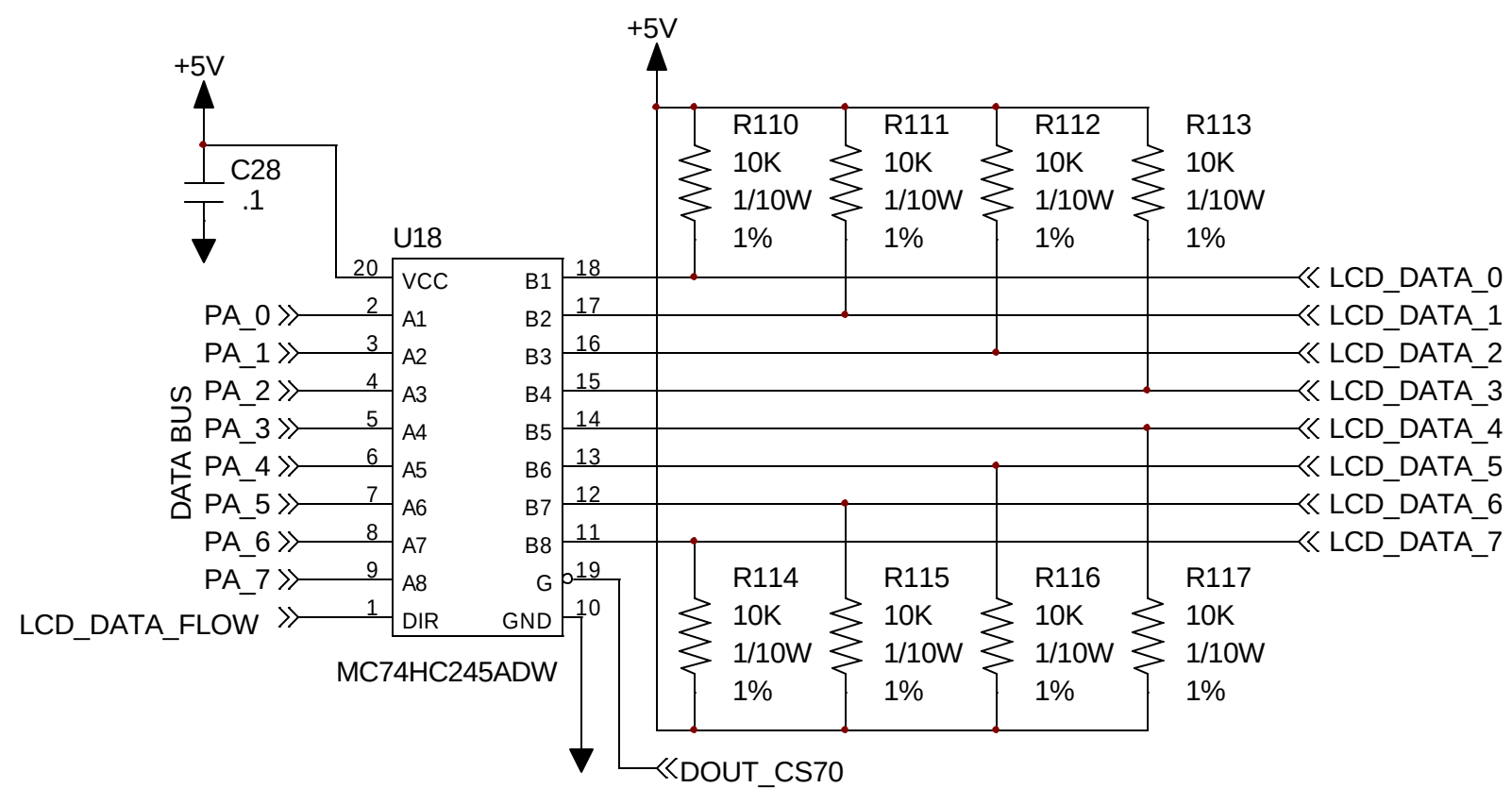
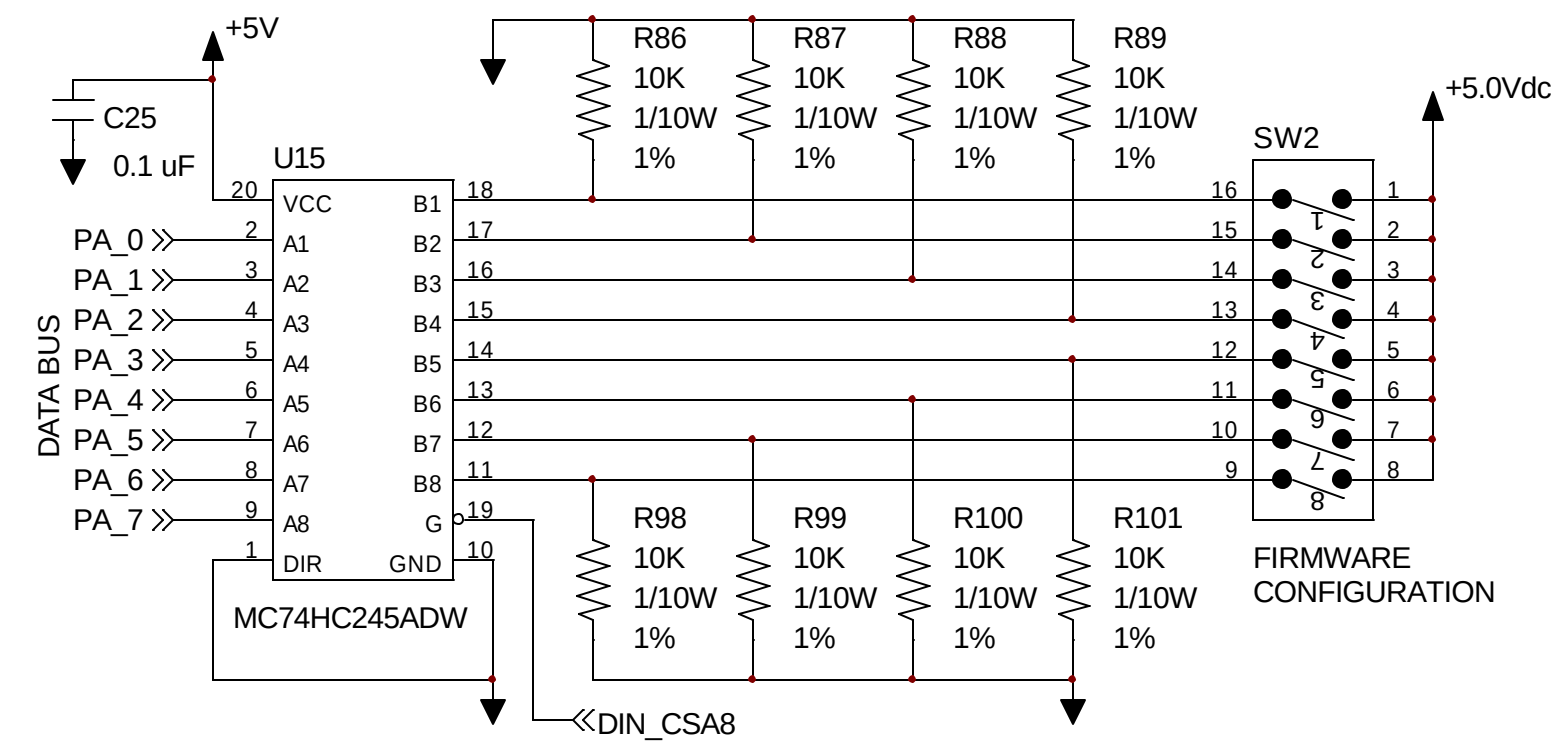
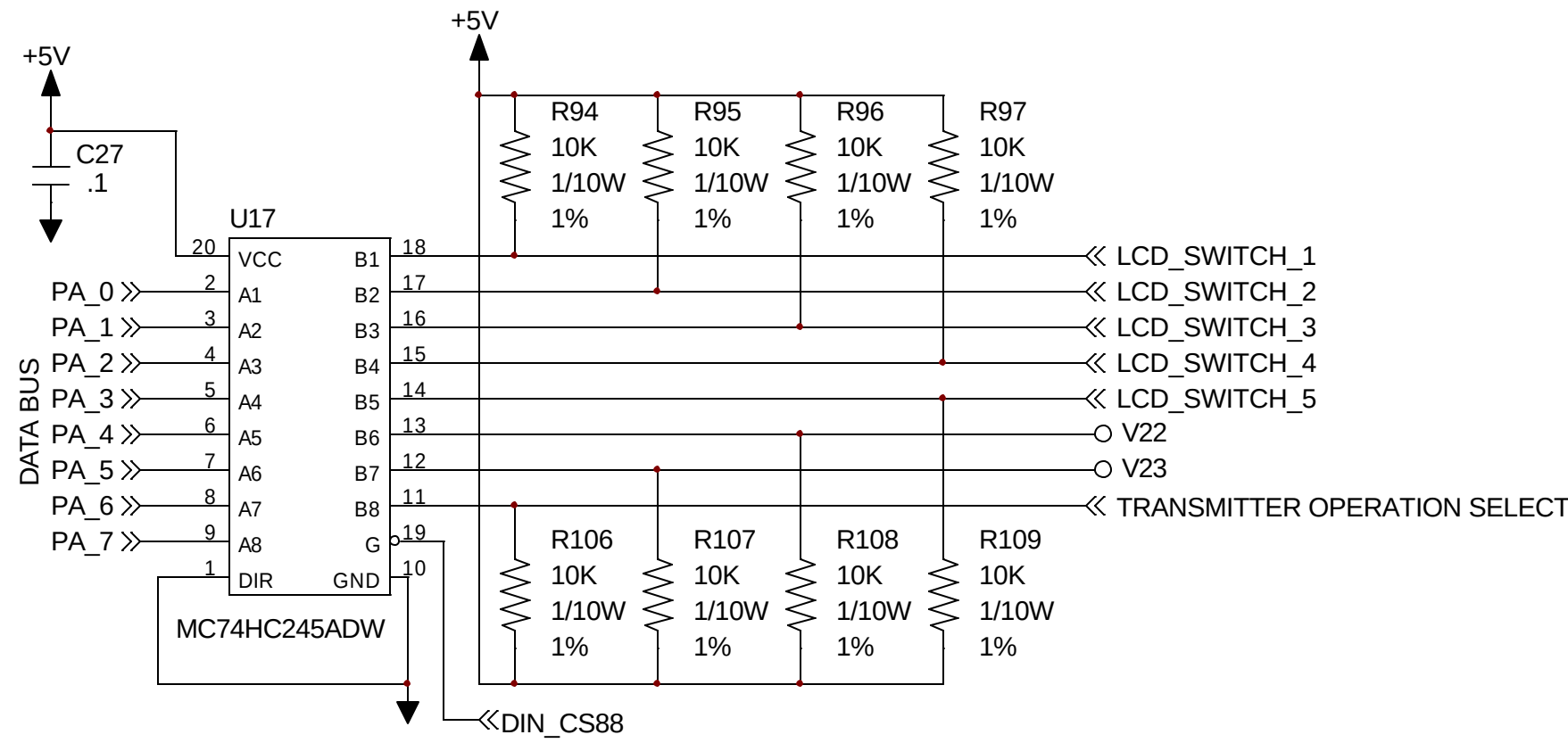
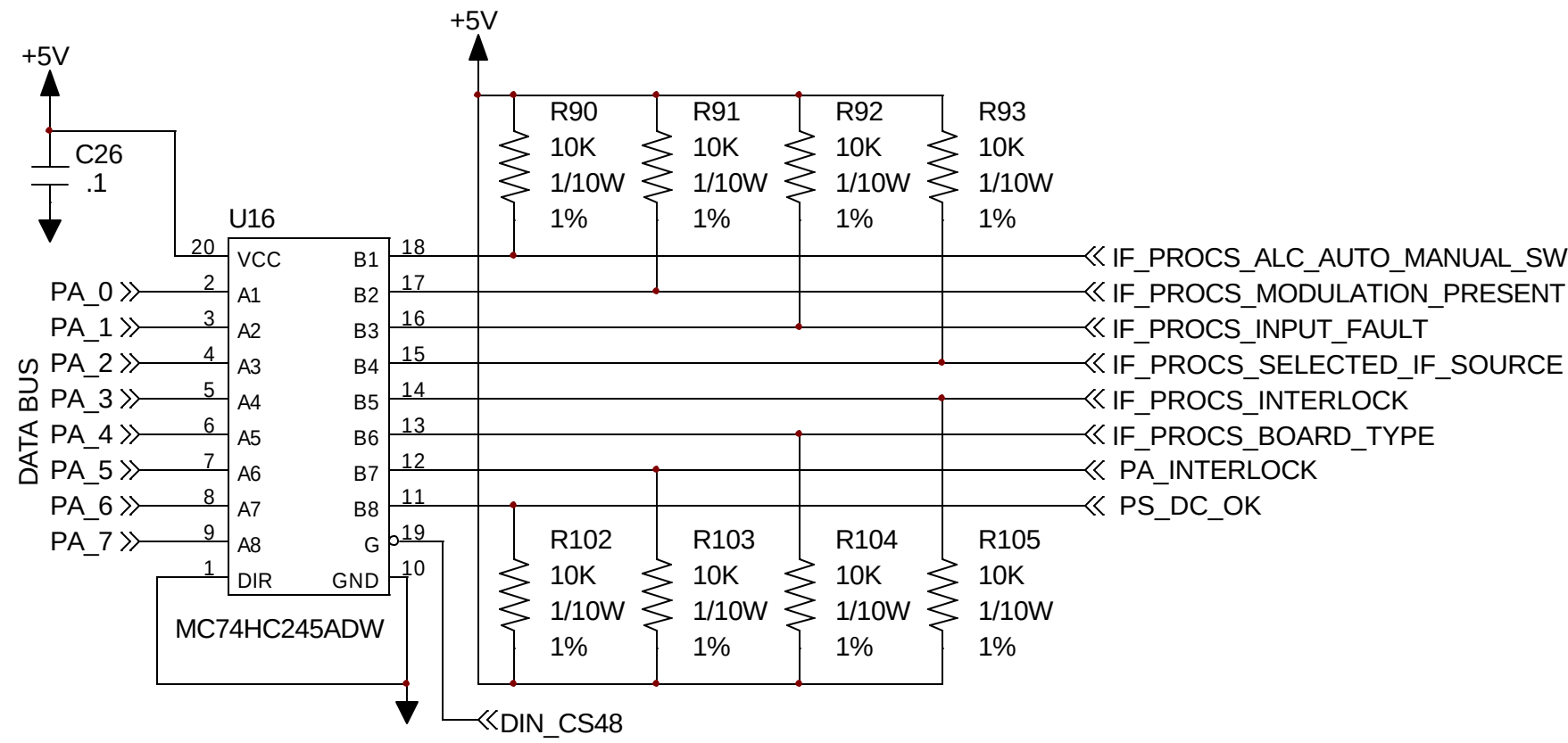
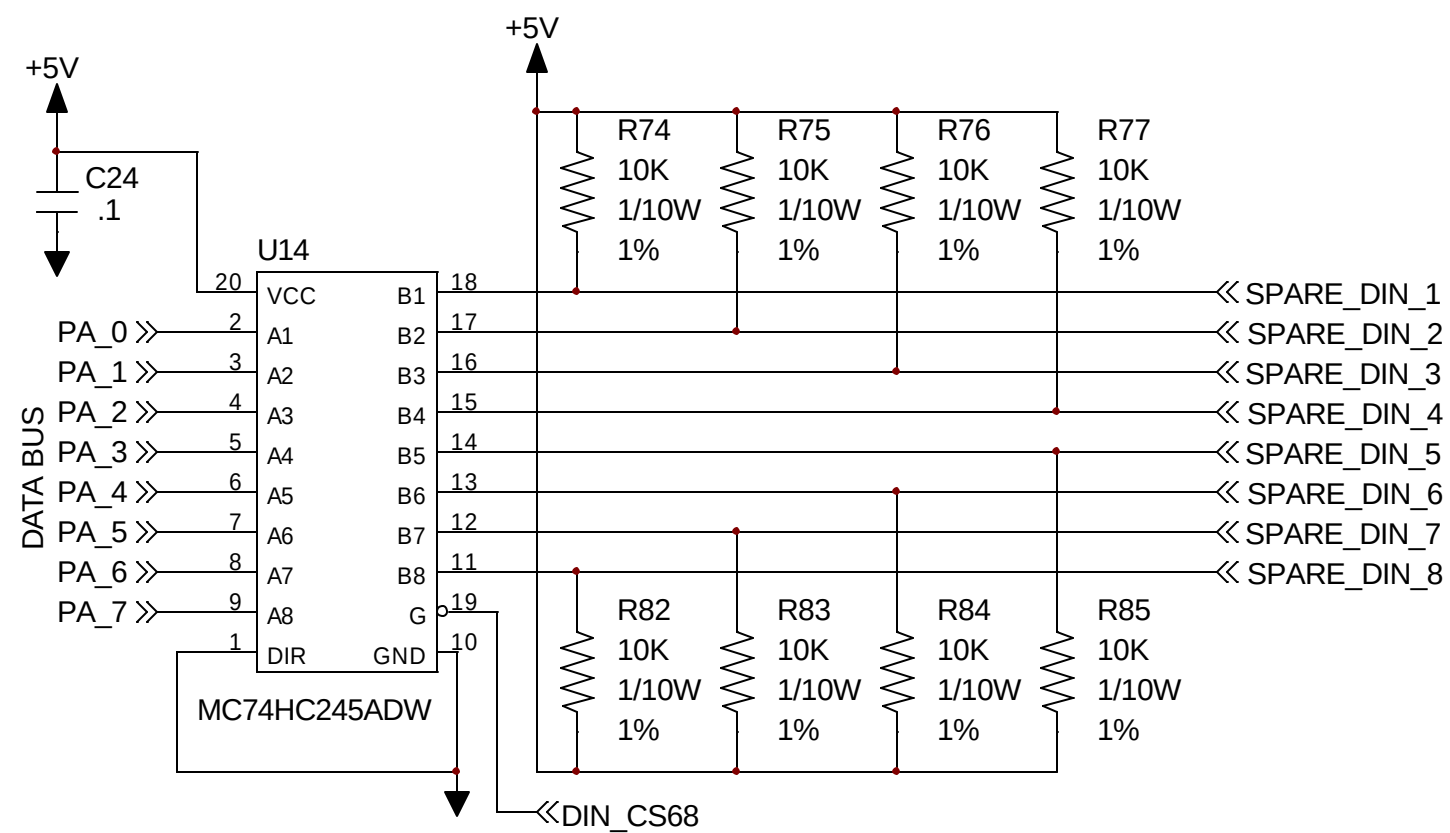
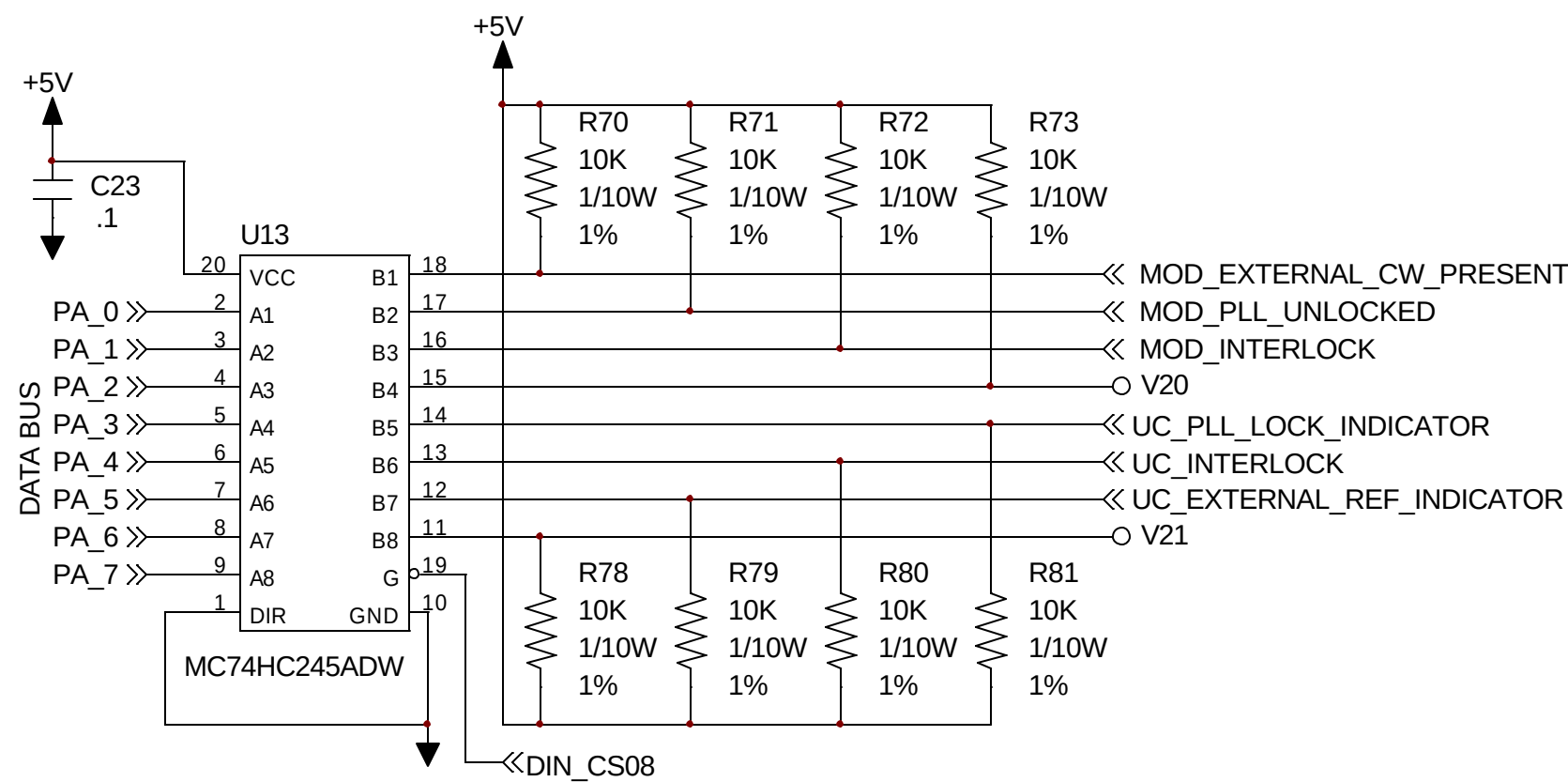
Several voltage regulators are used to power the board. Seven volts is typically applied to board LEDs and to the input of a precision 5.0 volt regulator. The 5.0 volt regulator is used for analog circuits and the microcontroller analog reference voltage. Another two 5 volt regulator circuits are used for most other board circuits.



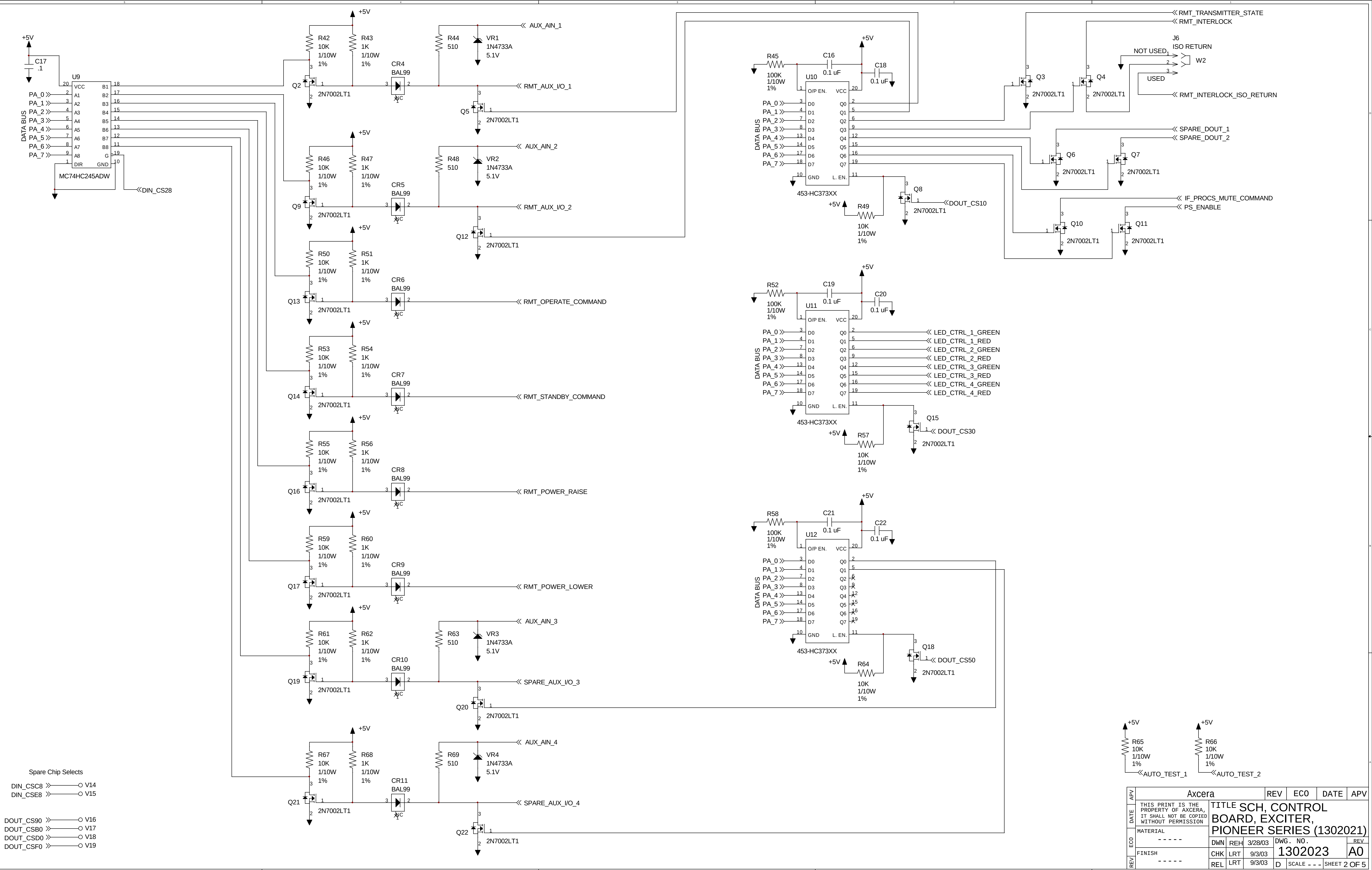
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ECO	MATERIAL						REV
REV	FINISH						REV
DWN		REH	3/28/03	DWG. NO.		REV	
CHK		LRT	9/3/03	1302023		A0	
REL		LRT	9/3/03	D		SCALE - - - SHEET 5 OF 5	



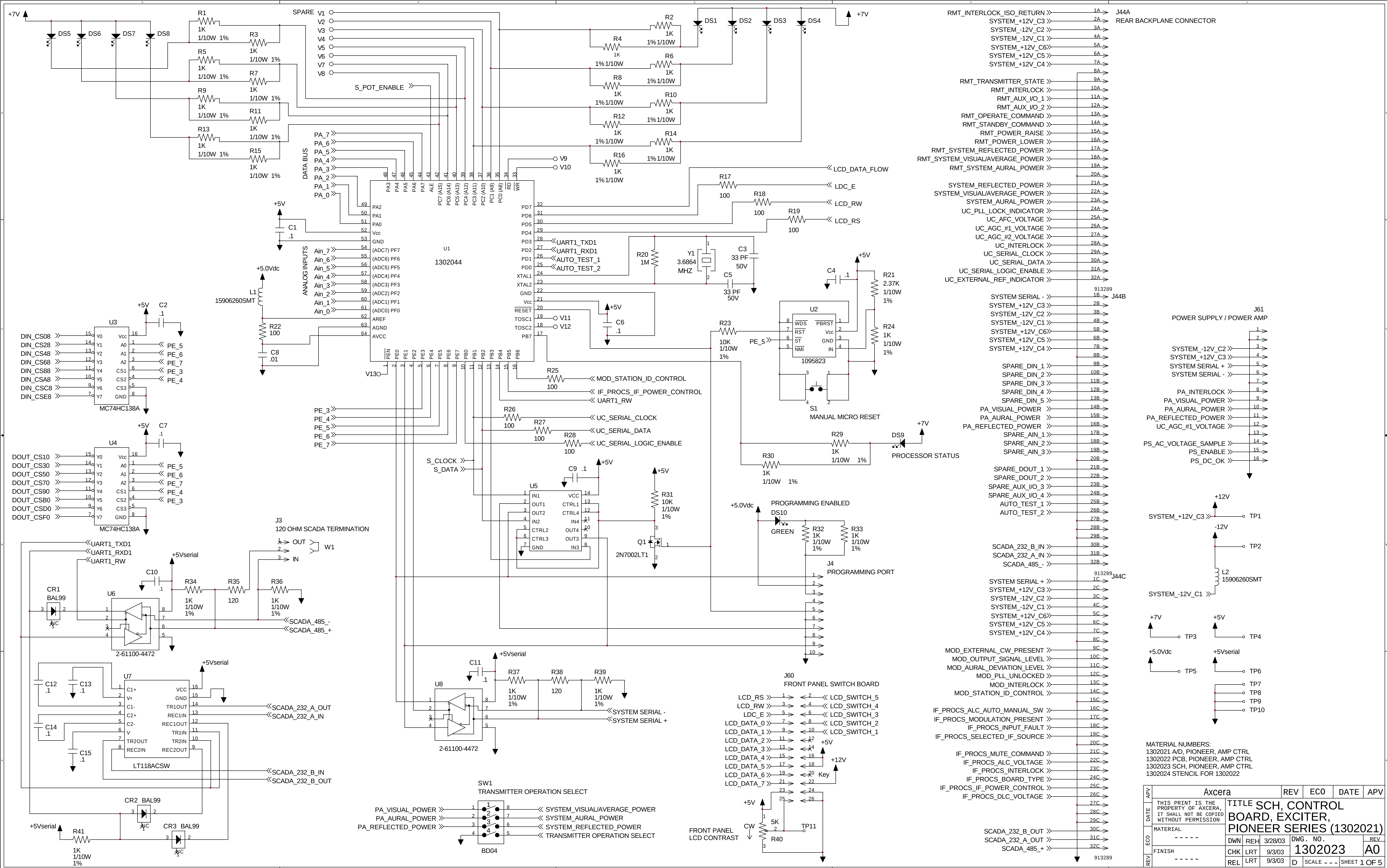
APV	Axcera	REV	ECO	DATE	APV
DATE	THIS PRINT IS THE PROPERTY OF AXCERA, IT SHALL NOT BE COPIED WITHOUT PERMISSION	TITLE	SCH, CONTROL BOARD, EXCITER, PIONEER SERIES (1302021)	DWG. NO.	REV
ECO	MATERIAL	DWN	REH	3/28/03	1302023
REV	FINISH	CHK	LRT	9/3/03	A0
		REL	LRT	9/3/03	SCALE - - - SHEET 4 OF 5

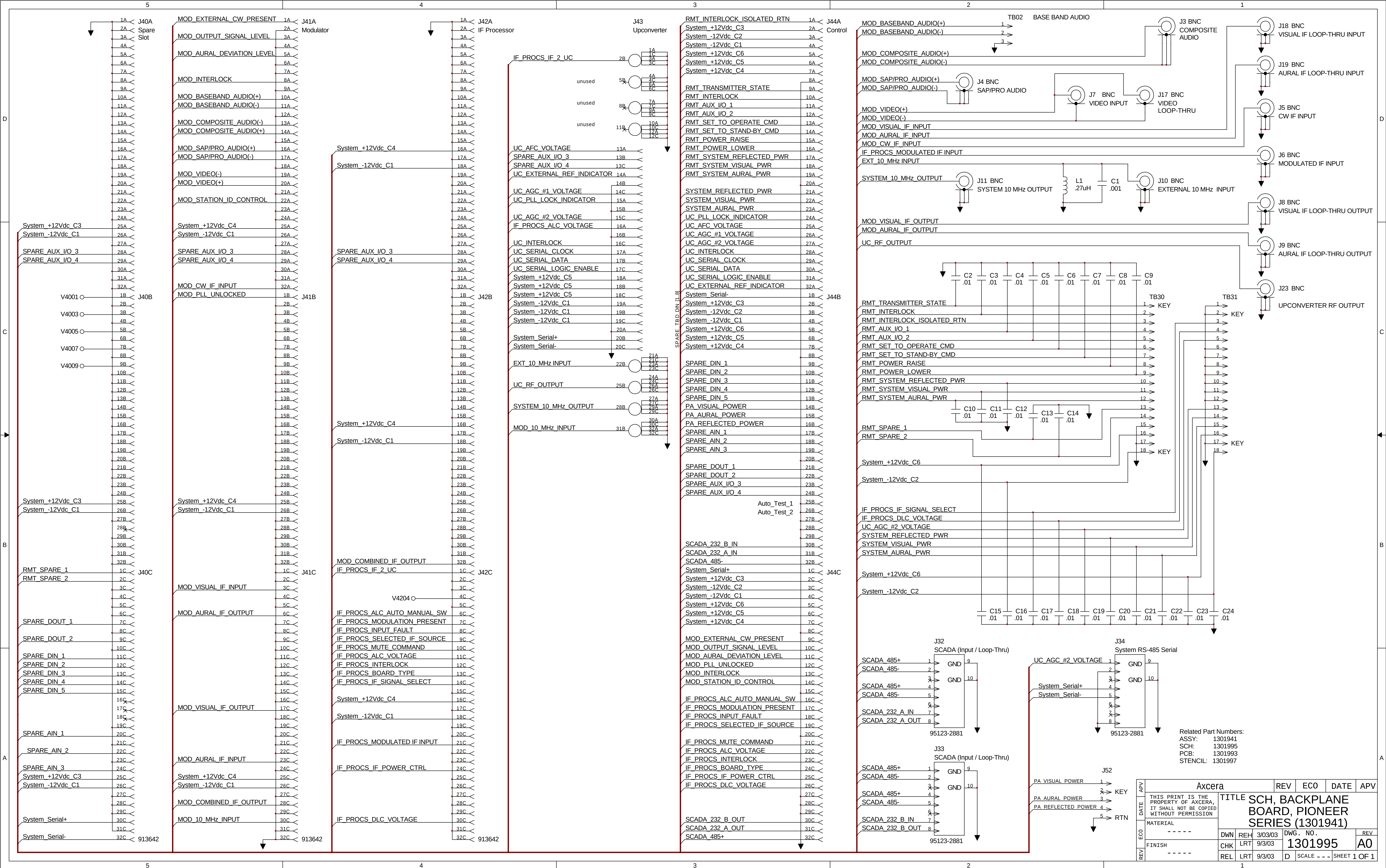


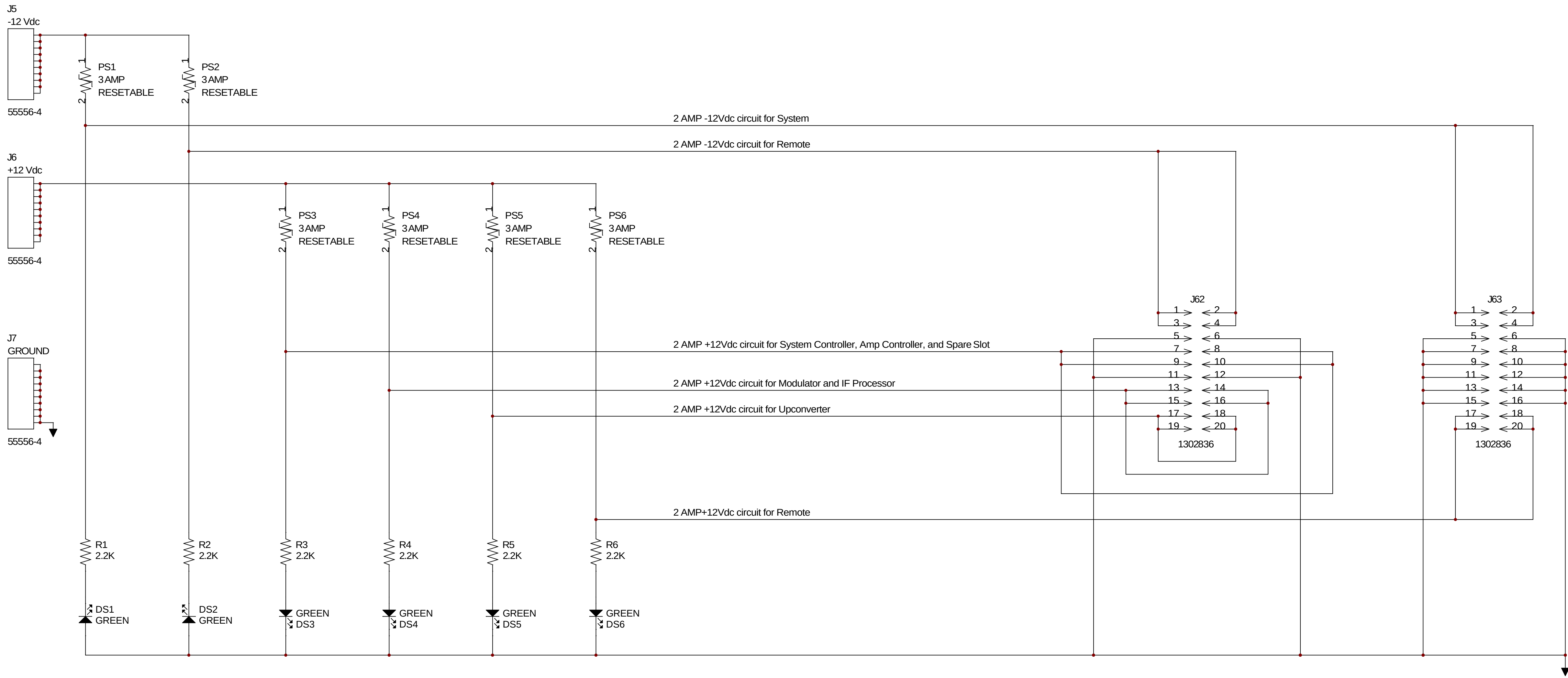
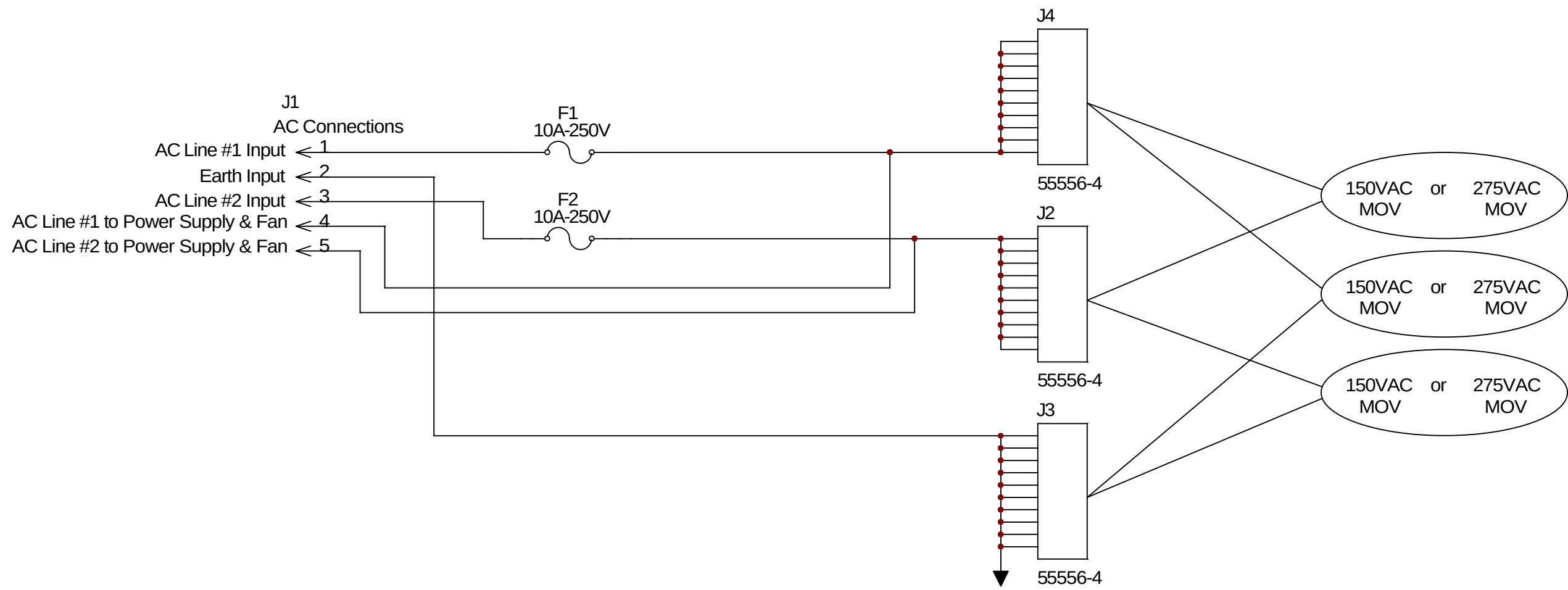
APV	Axcera				REV	ECO	DATE	APV
DATE	THIS PRINT IS THE PROPERTY OF AXCERA, IT SHALL NOT BE COPIED WITHOUT PERMISSION				TITLE SCH, CONTROL BOARD, EXCITER, PIONEER SERIES (1302021)			
ECO	MATERIAL				DWN	REH	3/28/03	DWG. NO.
REV	FINISH				CHK	LRT	9/3/03	1302023
					REL	LRT	9/3/03	D SCALE - - - SHEET 3 OF 5



APV	Axcera				REV	ECO	DATE	APV
DATE	THIS PRINT IS THE PROPERTY OF AXCERA, IT SHALL NOT BE COPIED WITHOUT PERMISSION		TITLE SCH, CONTROL BOARD, EXCITER, PIONEER SERIES (1302021)					
ECO	MATERIAL -----		DWN	REH	3/28/03	DWG. NO.		REV
FINISH	-----		CHK	LRT	9/3/03	1302023		A0
REV	-----		REL	LRT	9/3/03	D	SCALE ---	SHEET 2 OF 5







Circuit Design Notes:

- Track widths of 0.140 inch minimum top and bottom of board shall be used to connections to J1, J2, J3, J4.
- Track widths of 0.140 inch minimum top of board shall be used to connections to J5 and J6.
- Track widths of 0.065 inch minimum shall be used to connections to J62 and J63.
- Track widths of 0.020 inch minimum shall be used to connections between LEDs and resistors.
- Board BOM needs the following items added to those exported from Orcad:

Part Number	Qty	Description
102071	4	Fuse Clip, PC BD Mnt., 15 Amp

MATERIAL NUMBERS:
1302837 PIONEER, POWER PROTECTION
1302838 PCB, PIONEER, PWR PROTECT
1302839 SCH, PIONEER, PWR PROTECT
1302840 STENCIL FOR 1302838

REV	DATE	APV	Axcera				REV	ECO	DATE	APV
THIS PRINT IS THE PROPERTY OF AXCERA, IT SHALL NOT BE COPIED WITHOUT PERMISSION			TITLE SCH, PIONEER, PWR PROTECT (1302837)							
			MATERIAL		DWN		REH	5/29/03	DWG. NO.	
FINISH			CHK		REL	5/29/03	1302839		REV	
			REL		REL	5/29/03	D	SCALE	SHEET 1 OF 1	

