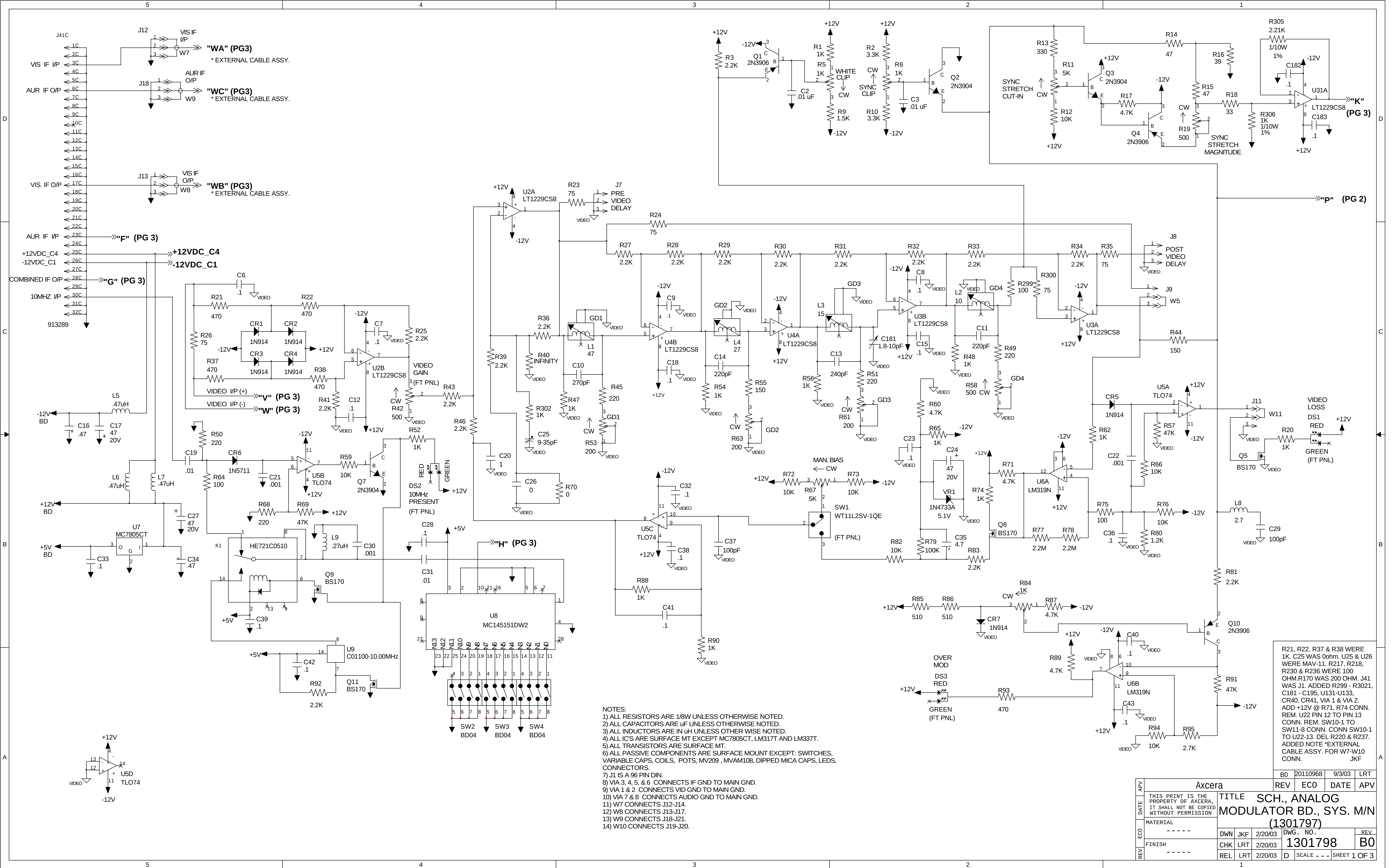
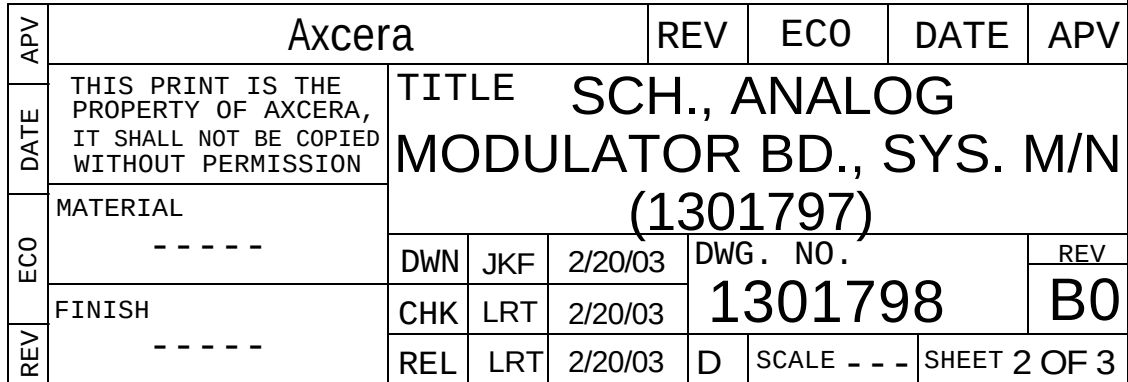
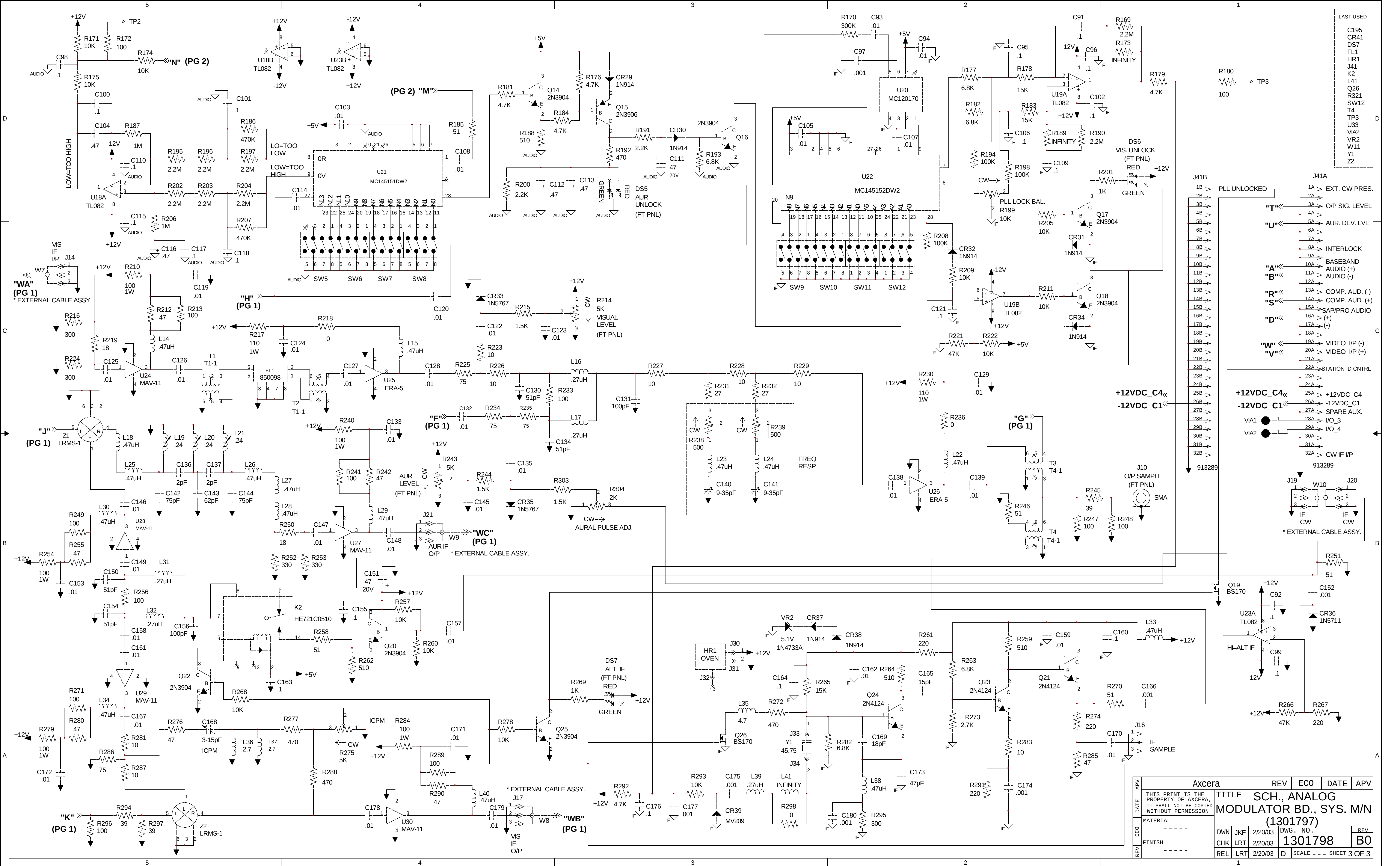
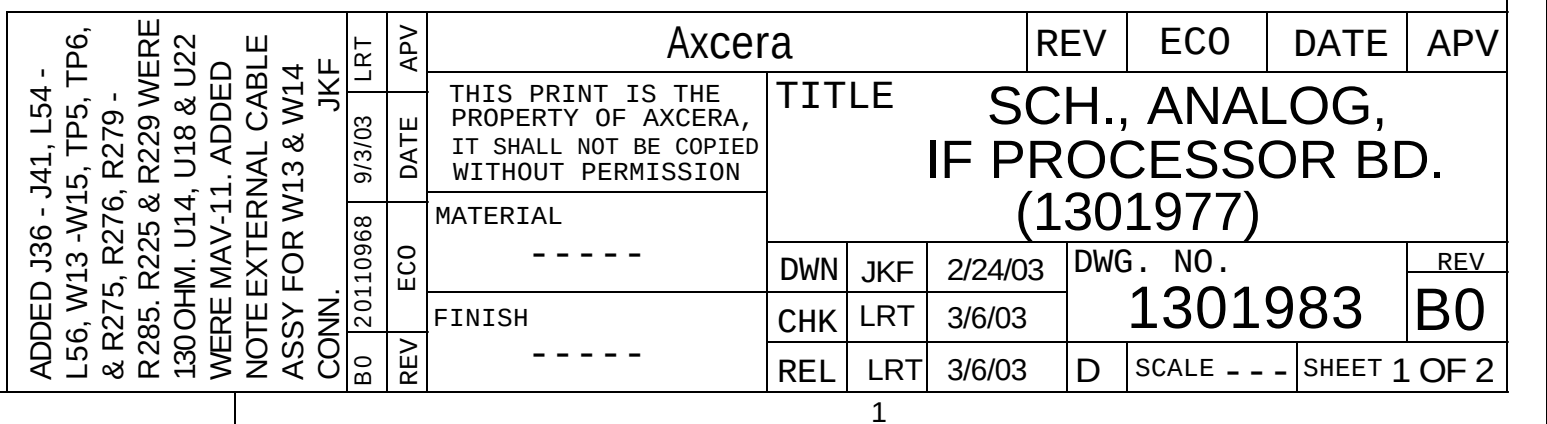
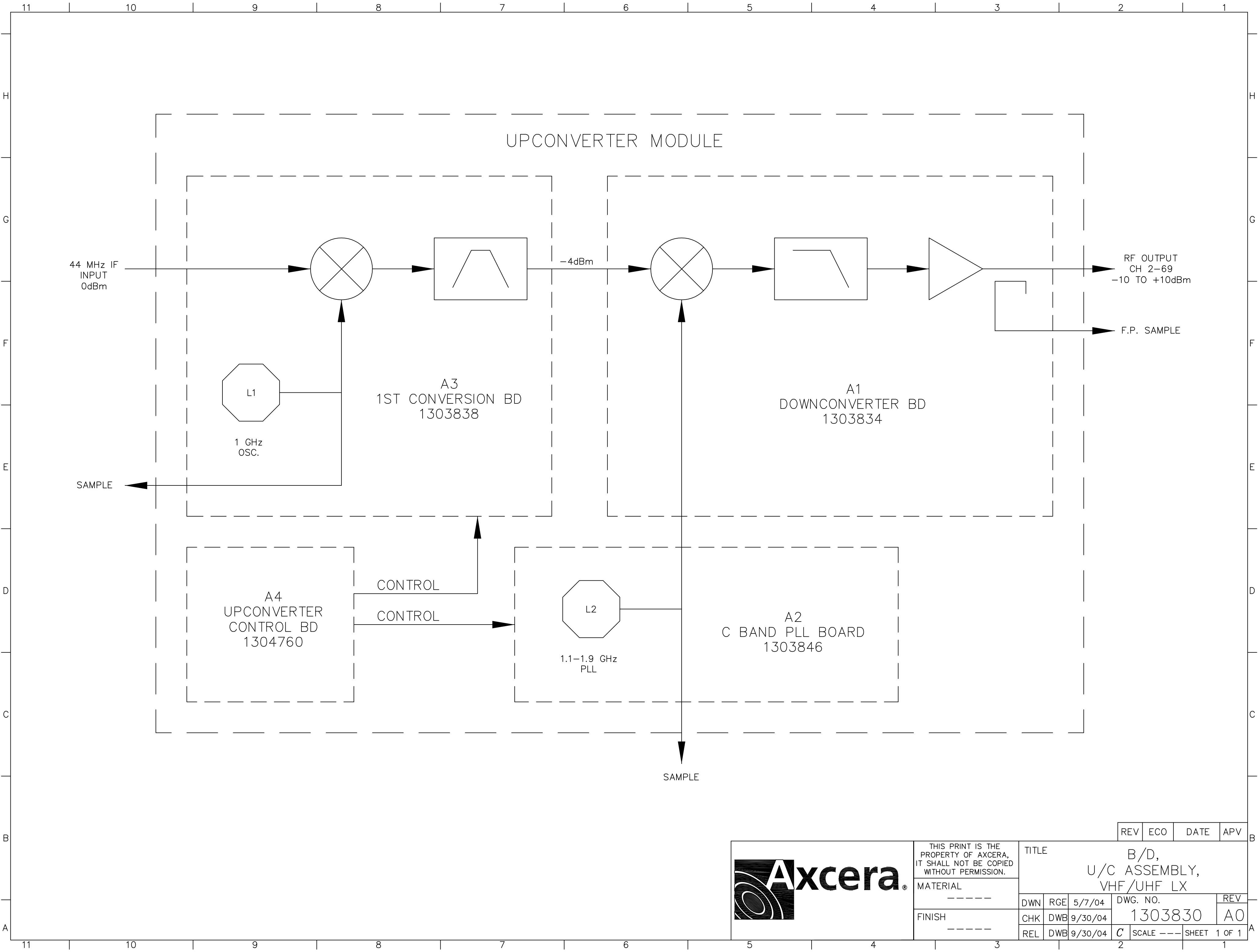












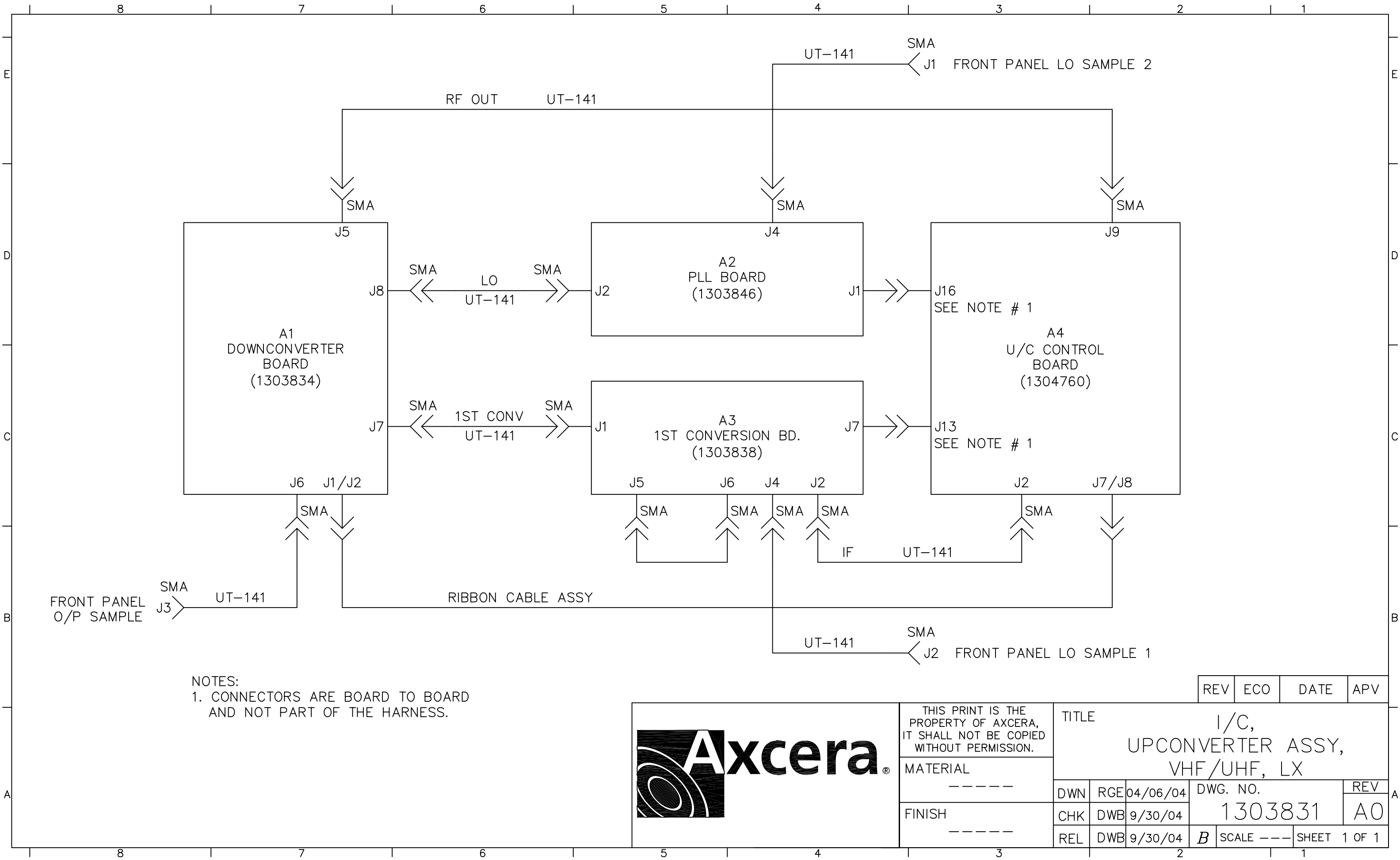


THIS PRINT IS THE PROPERTY OF AXCERA, IT SHALL NOT BE COPIED WITHOUT PERMISSION.

MATERIAL -----

FINISH -----

TITLE				B/D, U/C ASSEMBLY, VHF/UHF LX			
DWN	RGE	5/7/04	DWG. NO.		REV		
CHK	DWB	9/30/04	1303830		A0		
REL	DWB	9/30/04	C	SCALE ---	SHEET 1 OF 1		



NOTES:
1. CONNECTORS ARE BOARD TO BOARD
AND NOT PART OF THE HARNESS.

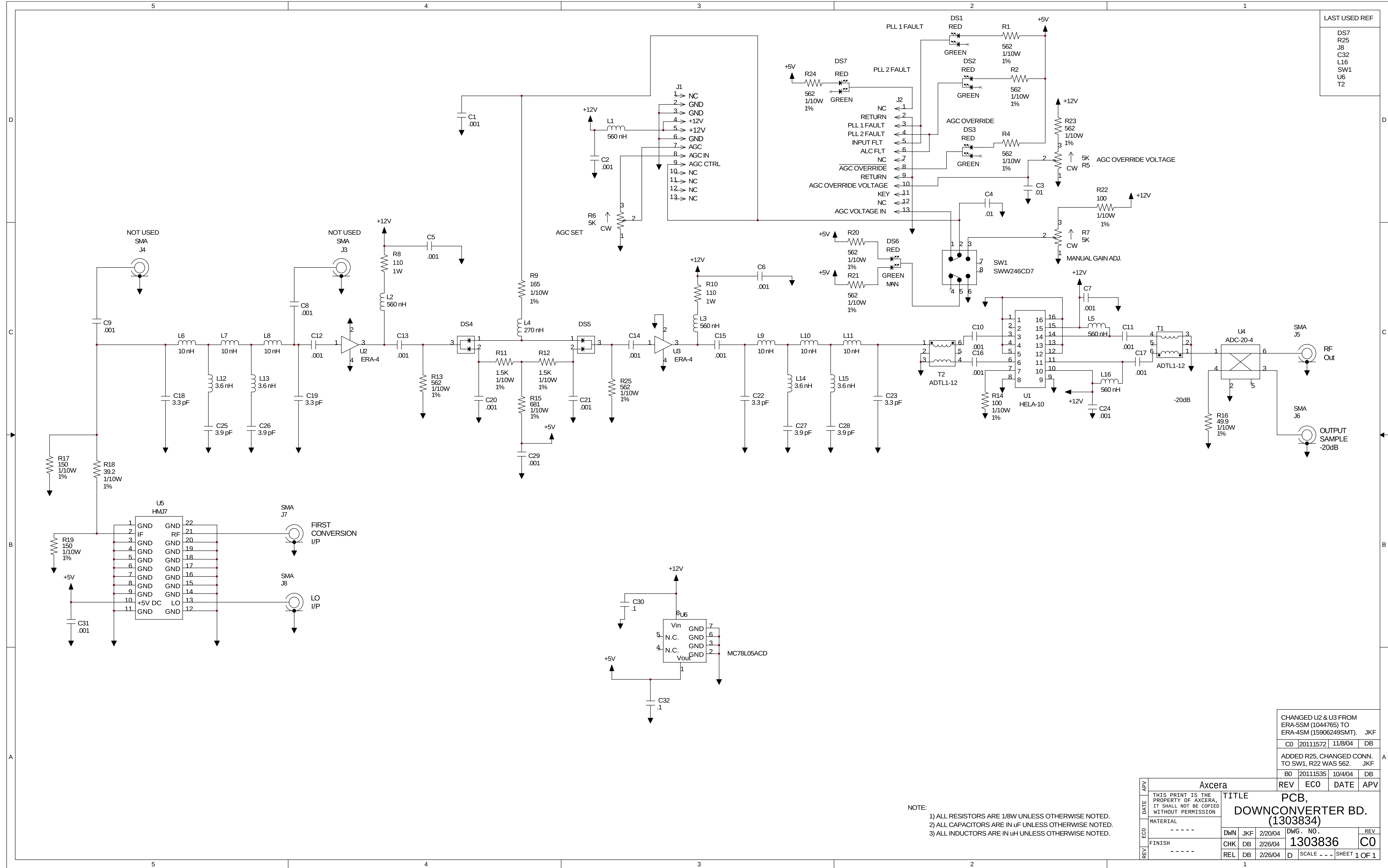


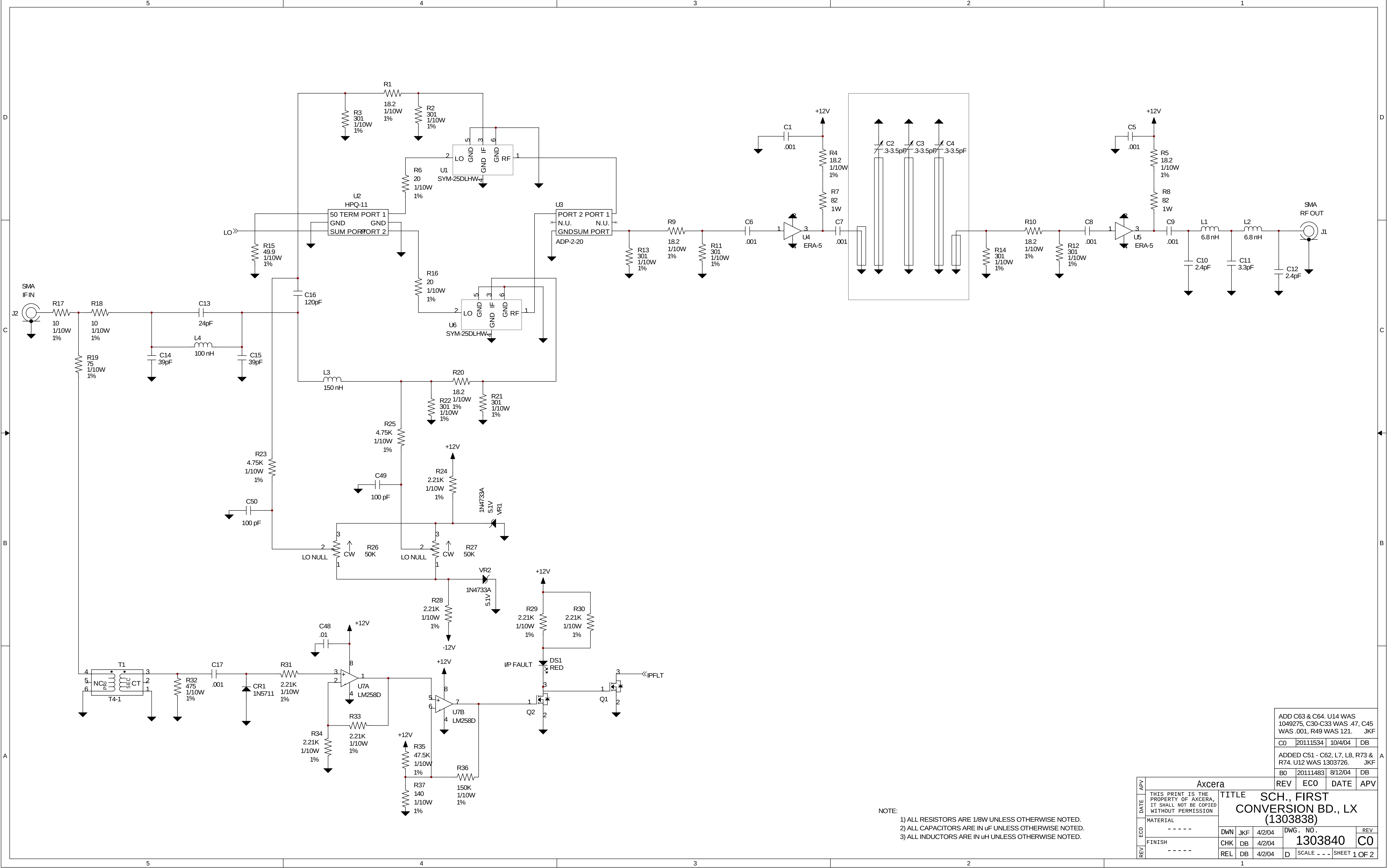
THIS PRINT IS THE
PROPERTY OF AXCERA,
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WITHOUT PERMISSION.

MATERIAL

FINISH

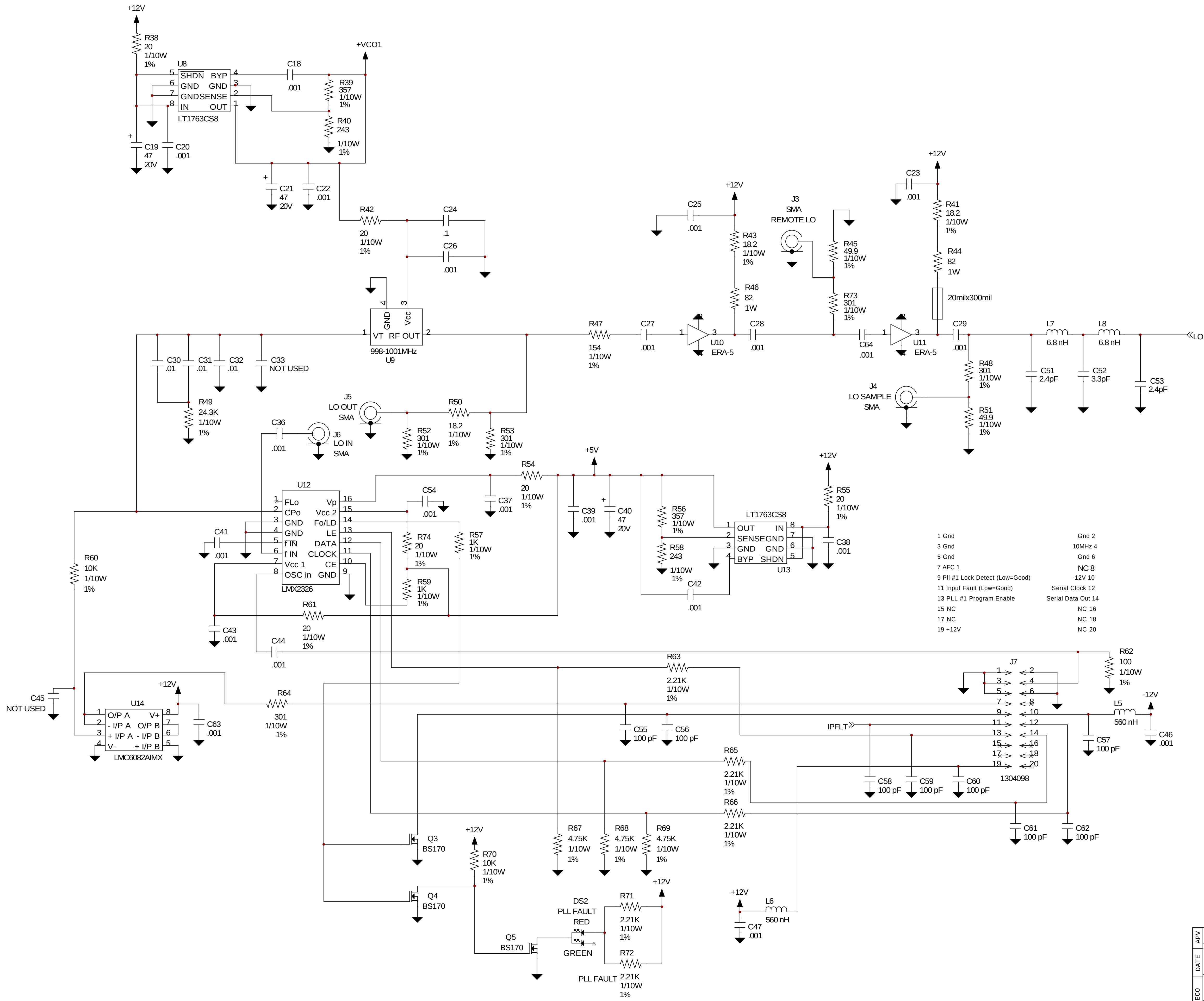
TITLE					REV	
I/C, UPCONVERTER ASSY, VHF/UHF, LX					ECO	APV
DWN	RGE	04/06/04	DWG. NO.		REV	
CHK	DWB	9/30/04	1303831		A0	
REL	DWB	9/30/04	B	SCALE ---	SHEET 1 OF 1	



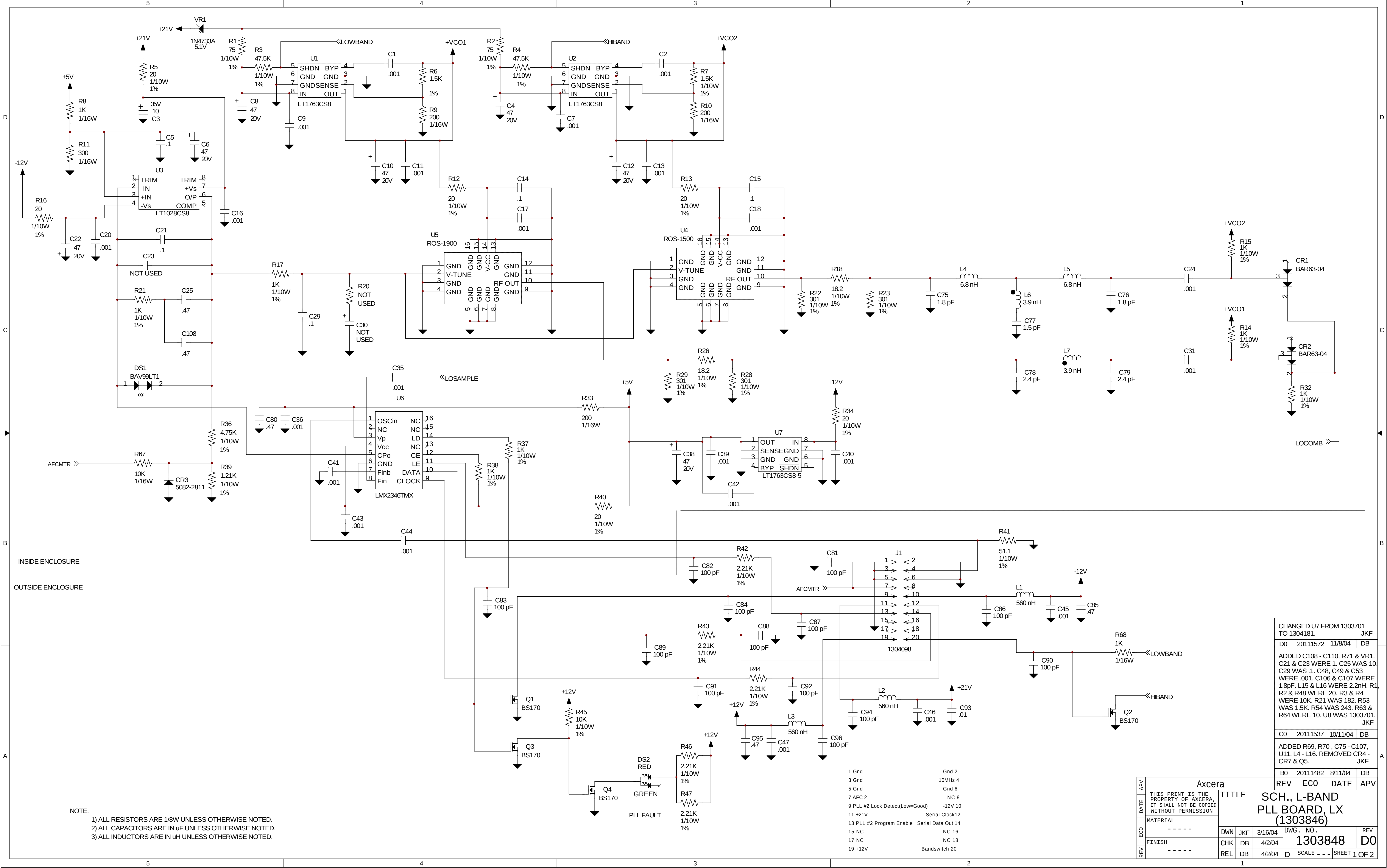


APV	Axcera				REV	ECO	DATE	APV
DATE	THIS PRINT IS THE PROPERTY OF AXCERA, IT SHALL NOT BE COPIED WITHOUT PERMISSION				TITLE SCH., FIRST CONVERSION BD., LX (1303838)			
MATERIAL	-----				DWN	JKF	4/2/04	DWG. NO.
FINISH	-----				CHK	DB	4/2/04	1303840
REV	-----				REL	DB	4/2/04	D
					SCALE	---	SHEET 1 OF 2	

LAST USED REF
L8
U14
C64
J7
R74
Q5
DS2
VR2
CR1
T1



APV				Axcera				REV	ECO	DATE	APV
DATE	THIS PRINT IS THE PROPERTY OF AXCERA, IT SHALL NOT BE COPIED WITHOUT PERMISSION			TITLE SCH., FIRST CONVERSION BD., LX (1303838)							
MATERIAL	-----			DWN		JKF	4/2/04	DWG. NO.		REV	
FINISH				CHK		DB	4/2/04	1303840		C0	
REV	-----			REL		DB	4/2/04	D	SCALE	---	SHEET 2 OF 2



CHANGED U7 FROM 1303701 TO 1304181. JKF
D0 20111572 11/8/04 DB

ADDED C108 - C110, R71 & VR1. C21 & C23 WERE 1. C25 WAS 10. C29 WAS .1. C48, C49 & C53 WERE .001. C106 & C107 WERE 1.8pF. L15 & L16 WERE 2.2nH. R1, R2 & R48 WERE 20. R3 & R4 WERE 10K. R21 WAS 182. R53 WAS 1.5K. R54 WAS 243. R63 & R64 WERE 10. U8 WAS 1303701. JKF

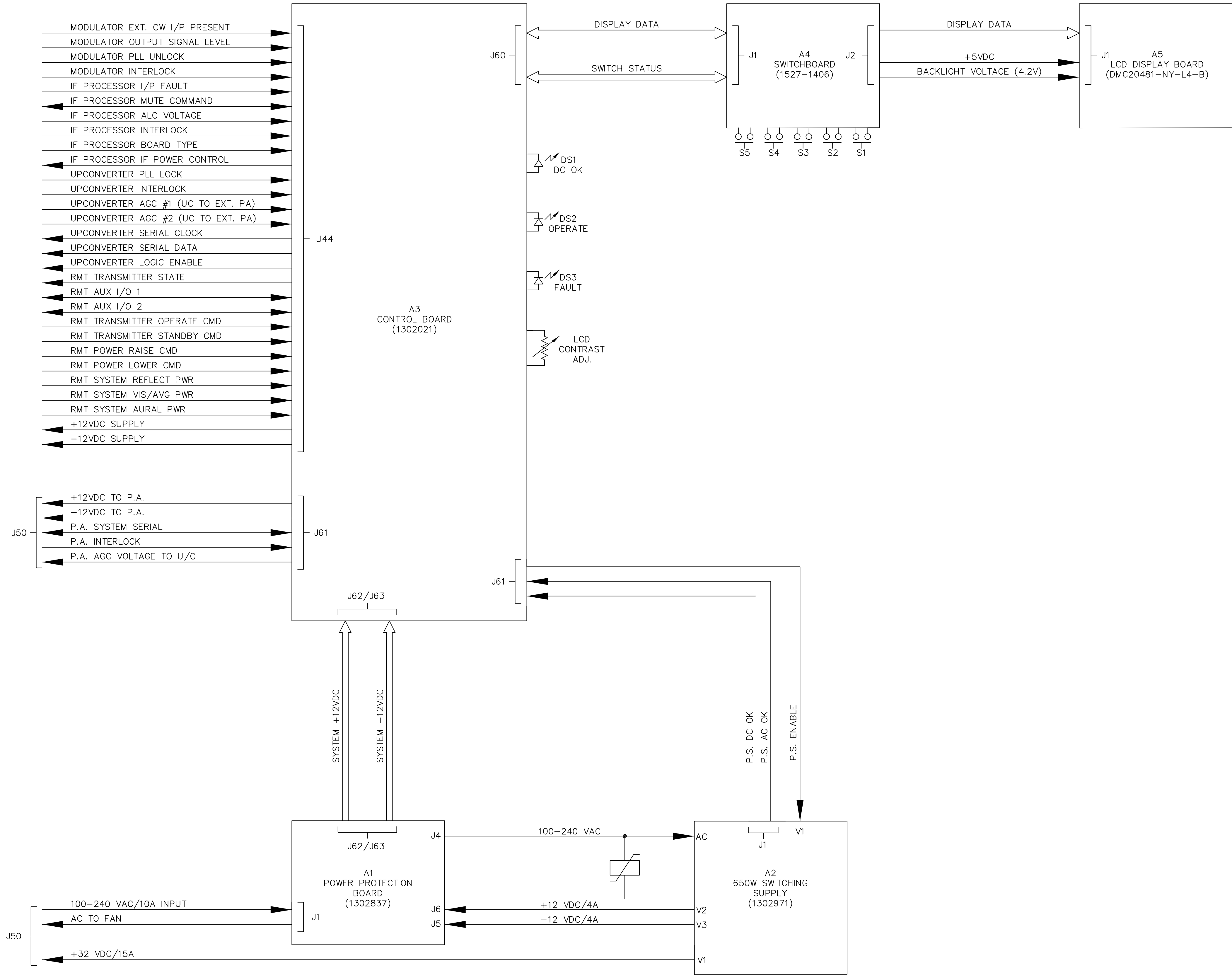
C0 20111537 10/11/04 DB

ADDED R69, R70, C75 - C107, U11, L4 - L16. REMOVED CR4 - CR7 & Q5. JKF

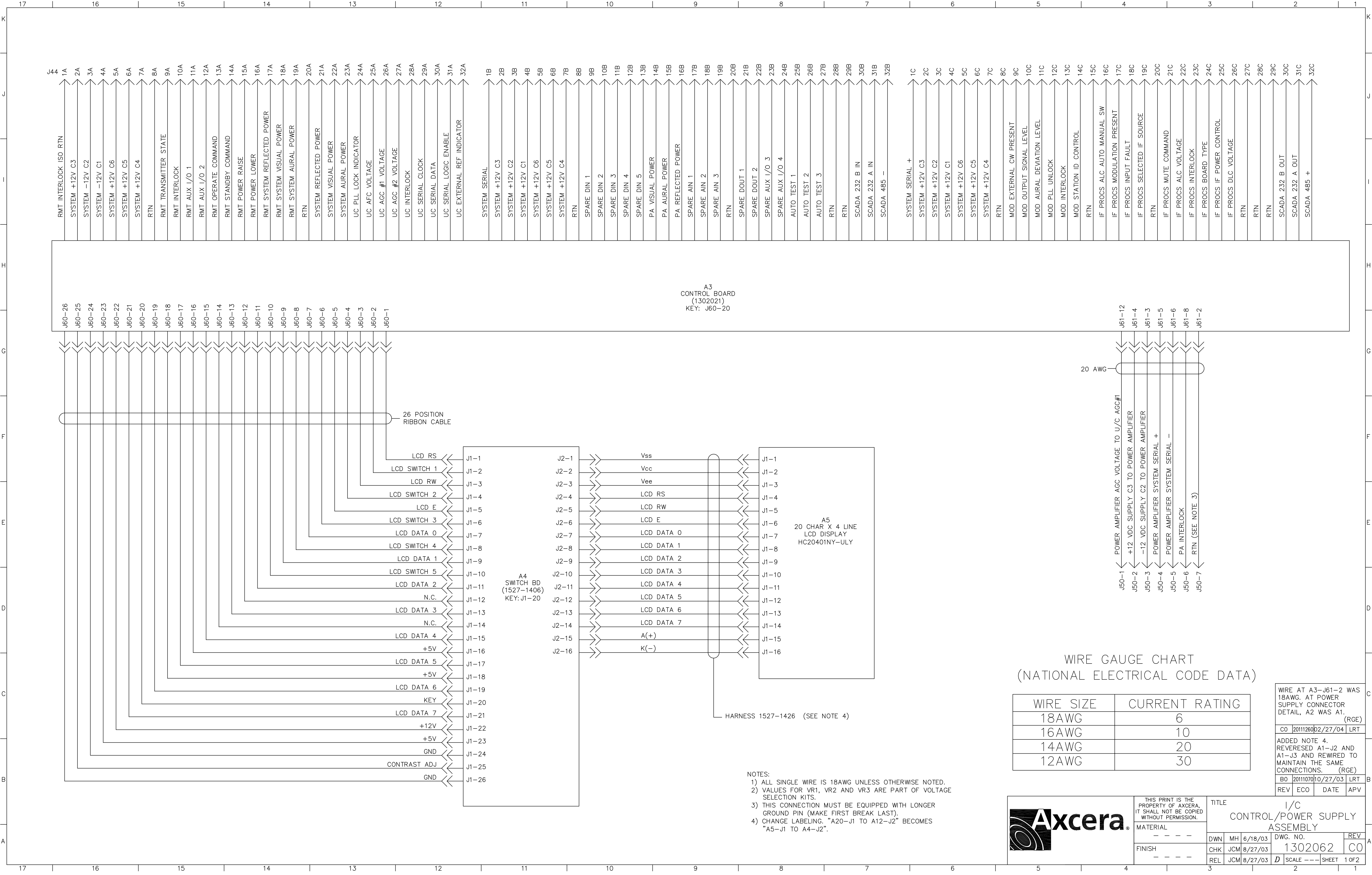
B0 20111482 8/11/04 DB

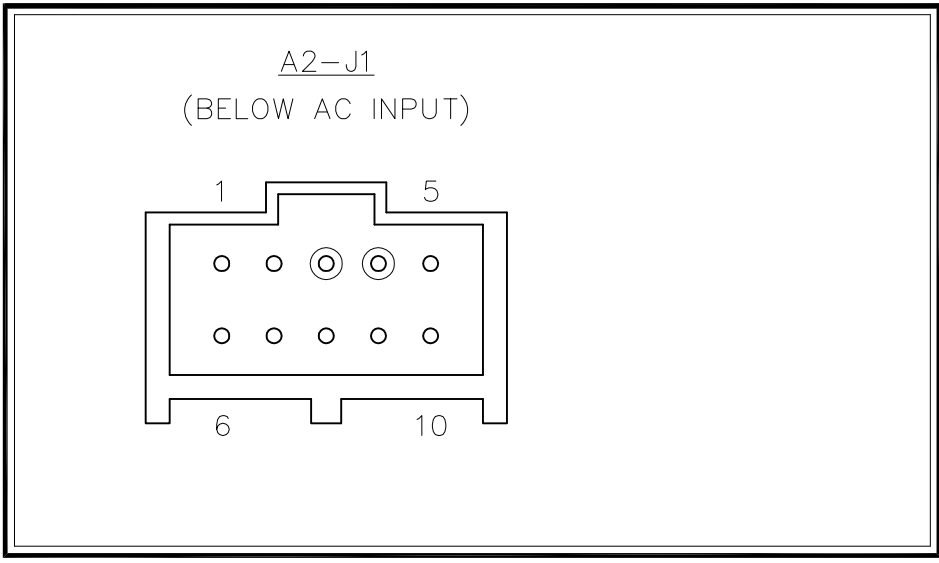
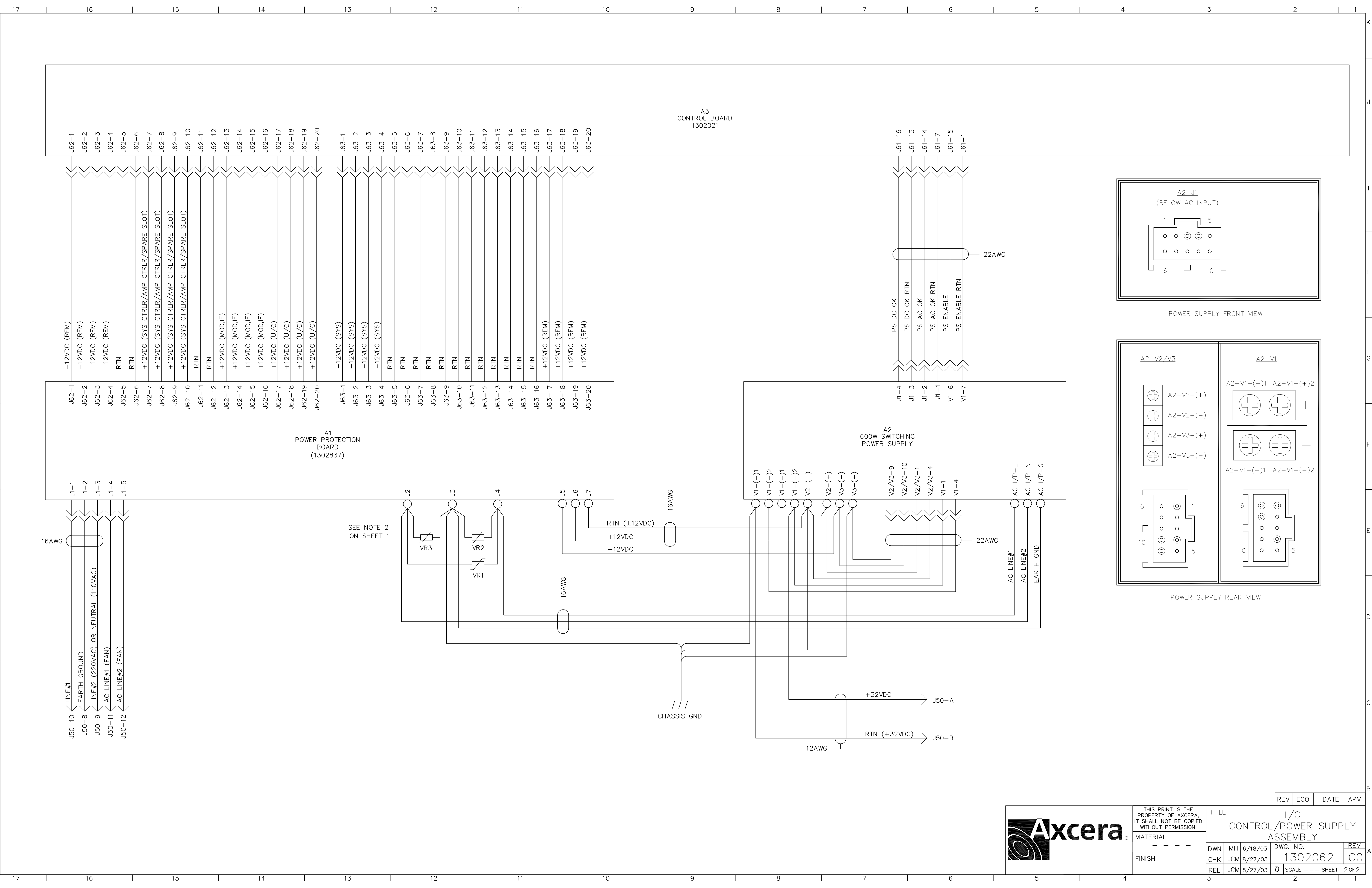
APV				Axcera				TITLE			
DATE				THIS PRINT IS THE PROPERTY OF AXCERA, IT SHALL NOT BE COPIED WITHOUT PERMISSION				SCH., L-BAND PLL BOARD, LX (1303846)			
MATERIAL				DWN JKF 3/16/04				DWG. NO.			
FINISH				CHK DB 4/2/04				1303848			
REV				REL DB 4/2/04				D SCALE --- SHEET 1 OF 2			

- 1 Gnd
3 Gnd
5 Gnd
7 AFC 2
9 PLL #2 Lock Detect (Low=Good)
11 +21V
13 PLL #2 Program Enable
15 NC
17 NC
19 +12V
- Gnd 2
10MHz 4
Gnd 6
NC 8
-12V 10
Serial Clock12
Serial Data Out 14
NC 16
NC 18
Bandswitch 20

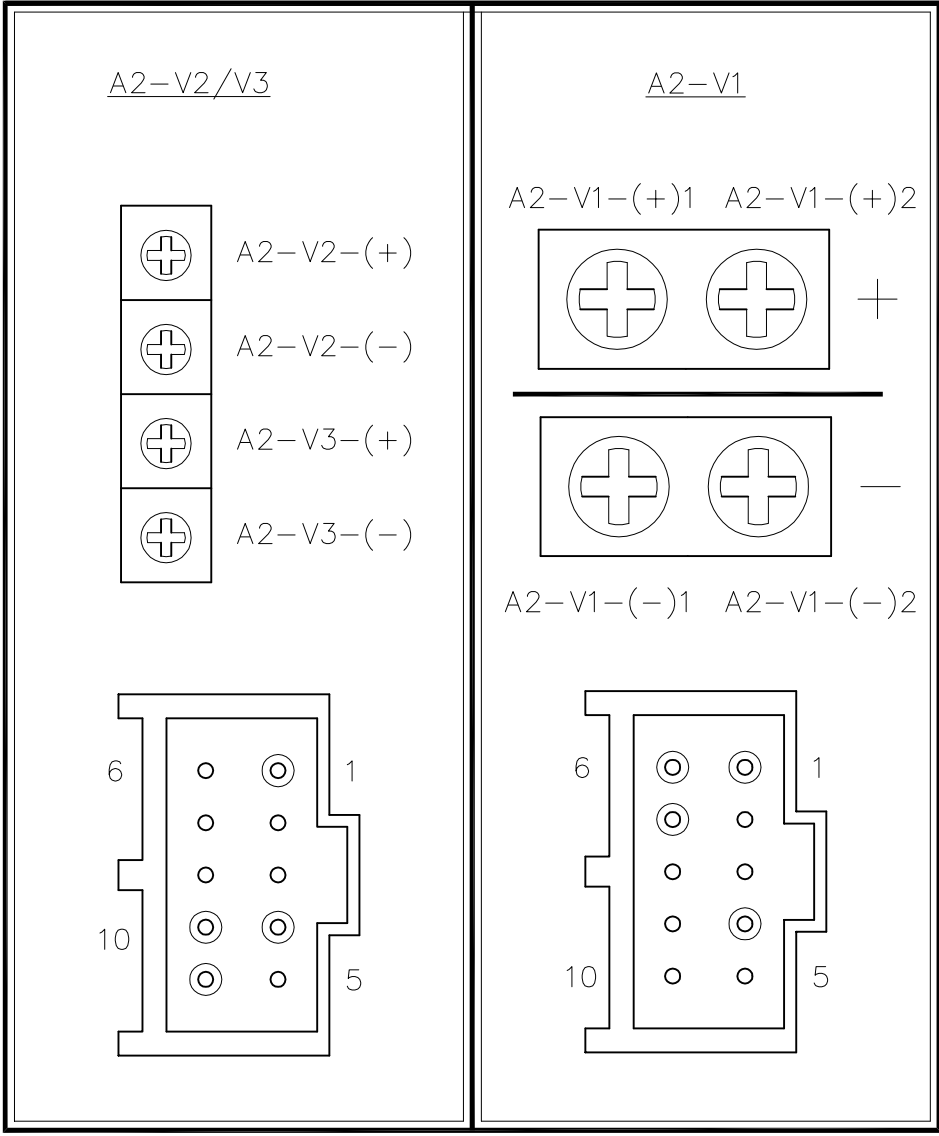


	THIS PRINT IS THE PROPERTY OF AXCERA, IT SHALL NOT BE COPIED WITHOUT PERMISSION.	TITLE B/D, CONTROL/POWER SUPPLY ASSEMBLY, INNOVATOR LX			
		MATERIAL -----			
FINISH -----	DWN	RGE	1/28/04	DWG. NO.	REV
	CHK	JCM	2/2/04	1303889	A0
	REL	JCM	2/2/04	D	SCALE --- SHEET 1 OF 1





POWER SUPPLY FRONT VIEW

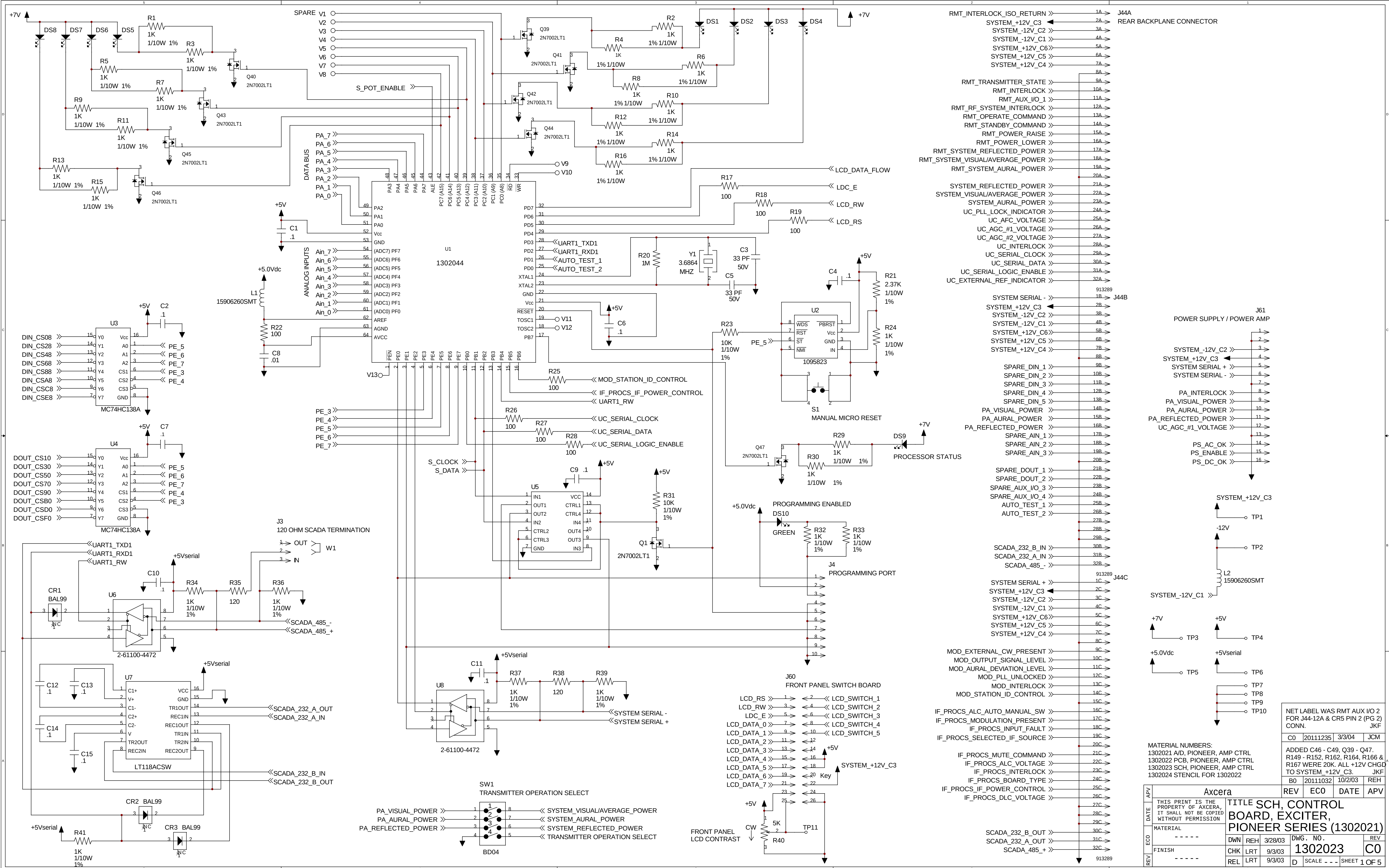


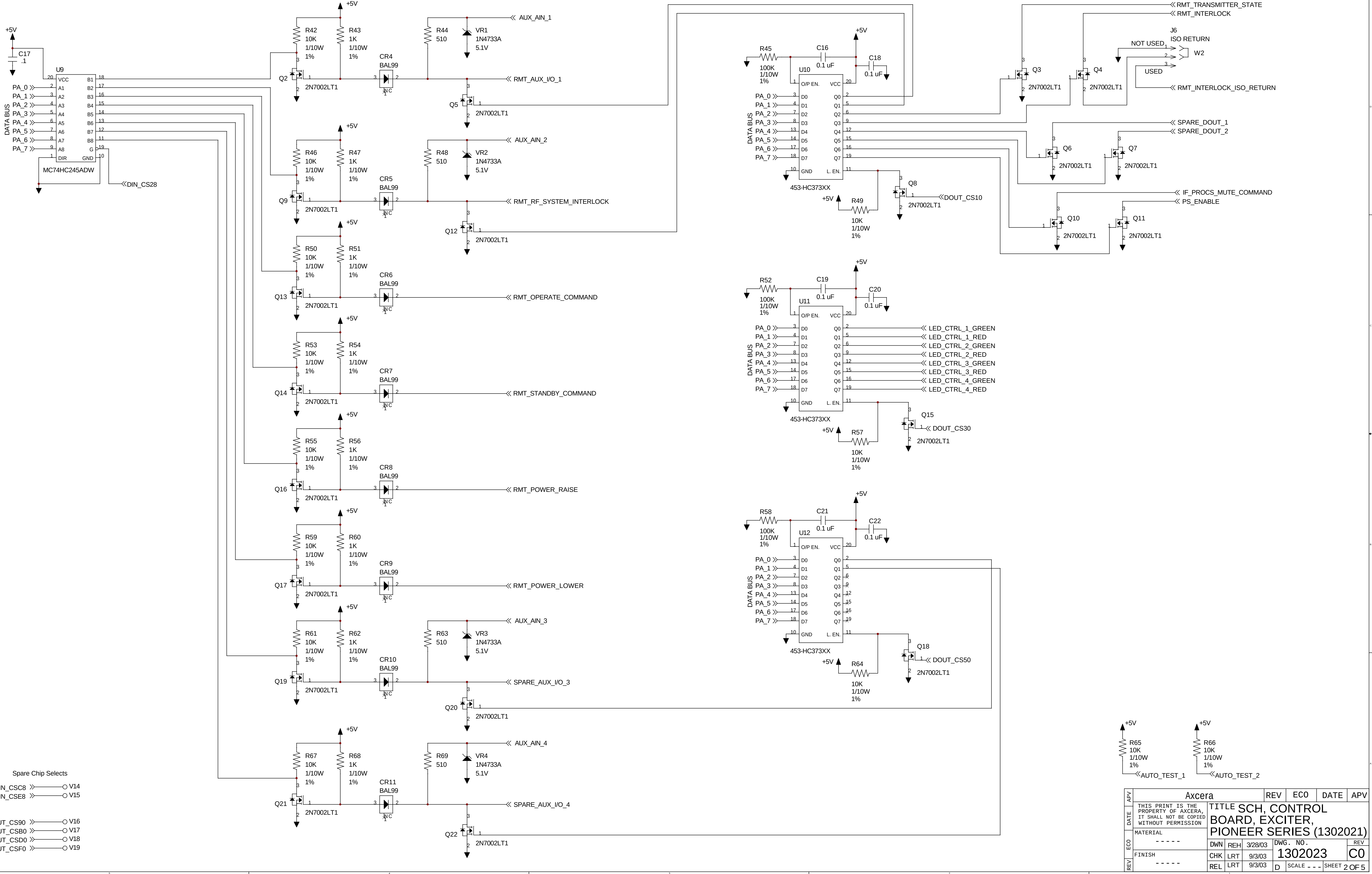
POWER SUPPLY REAR VIEW



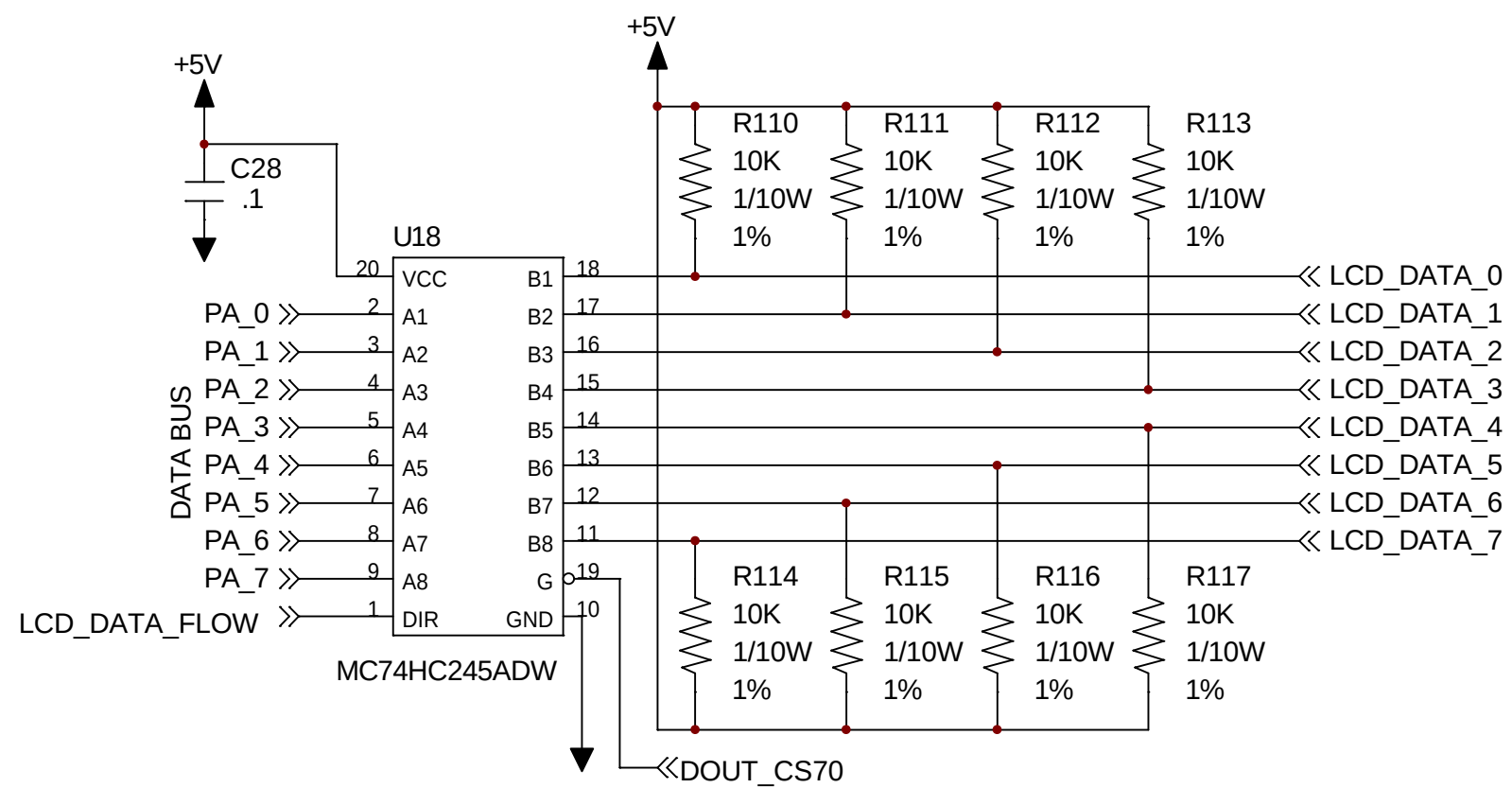
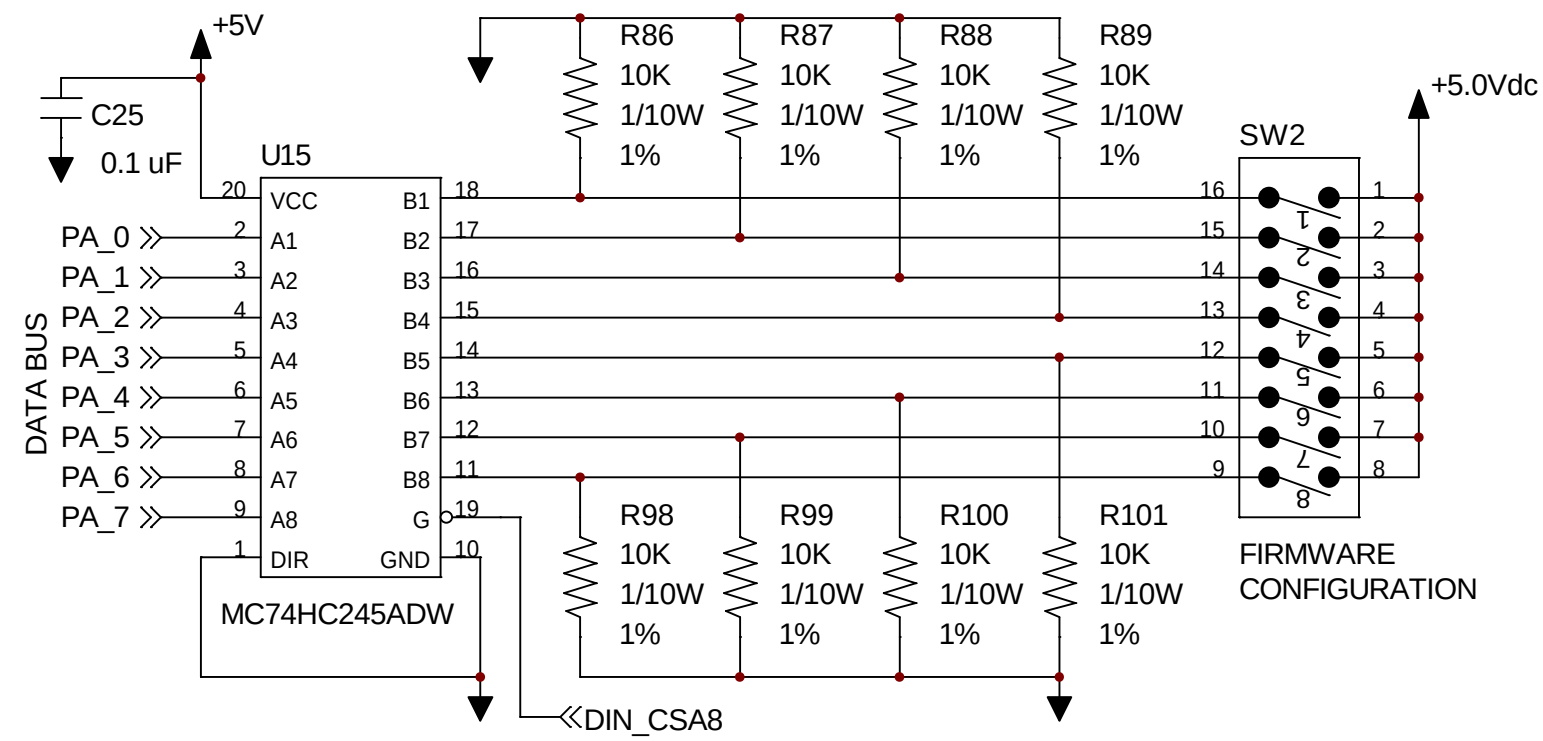
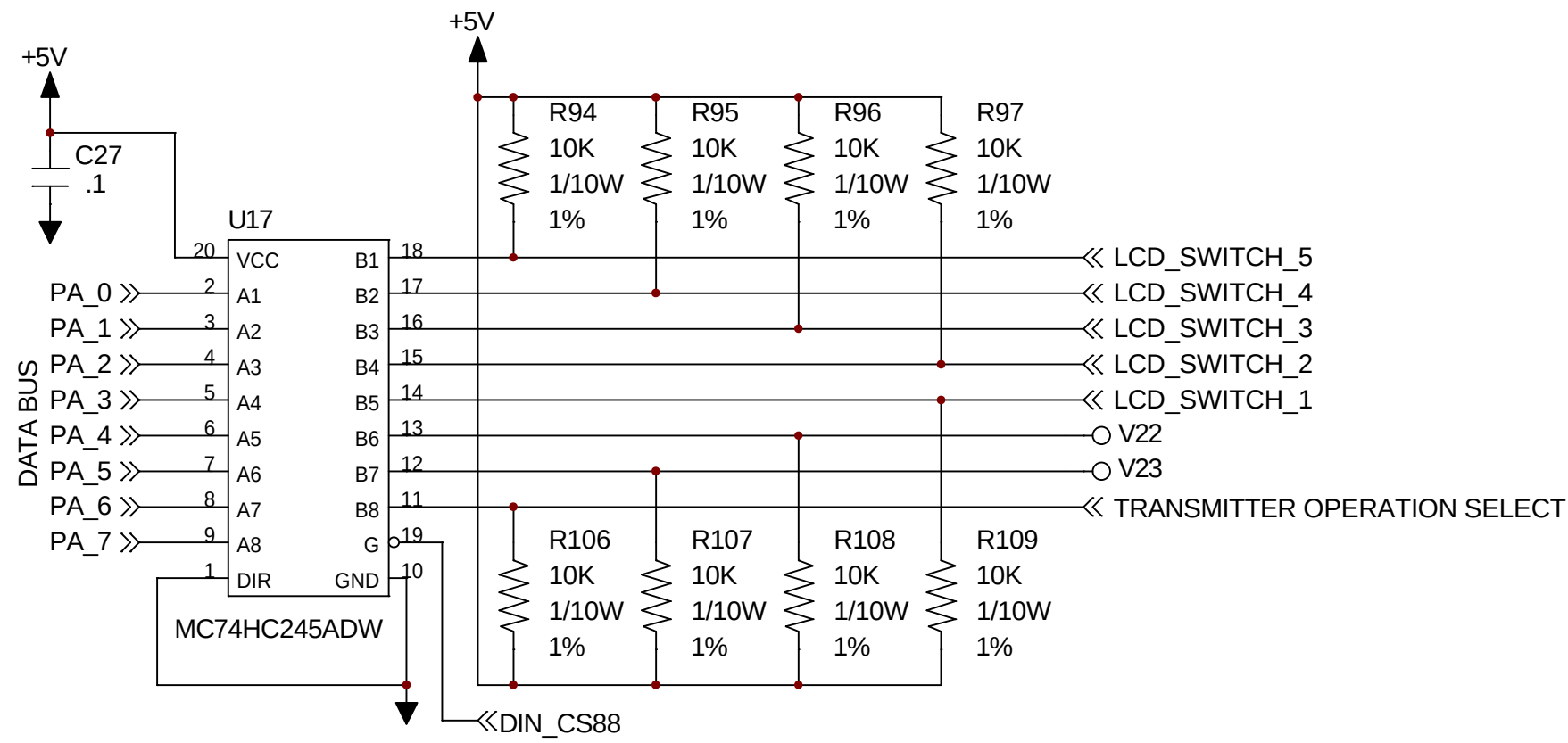
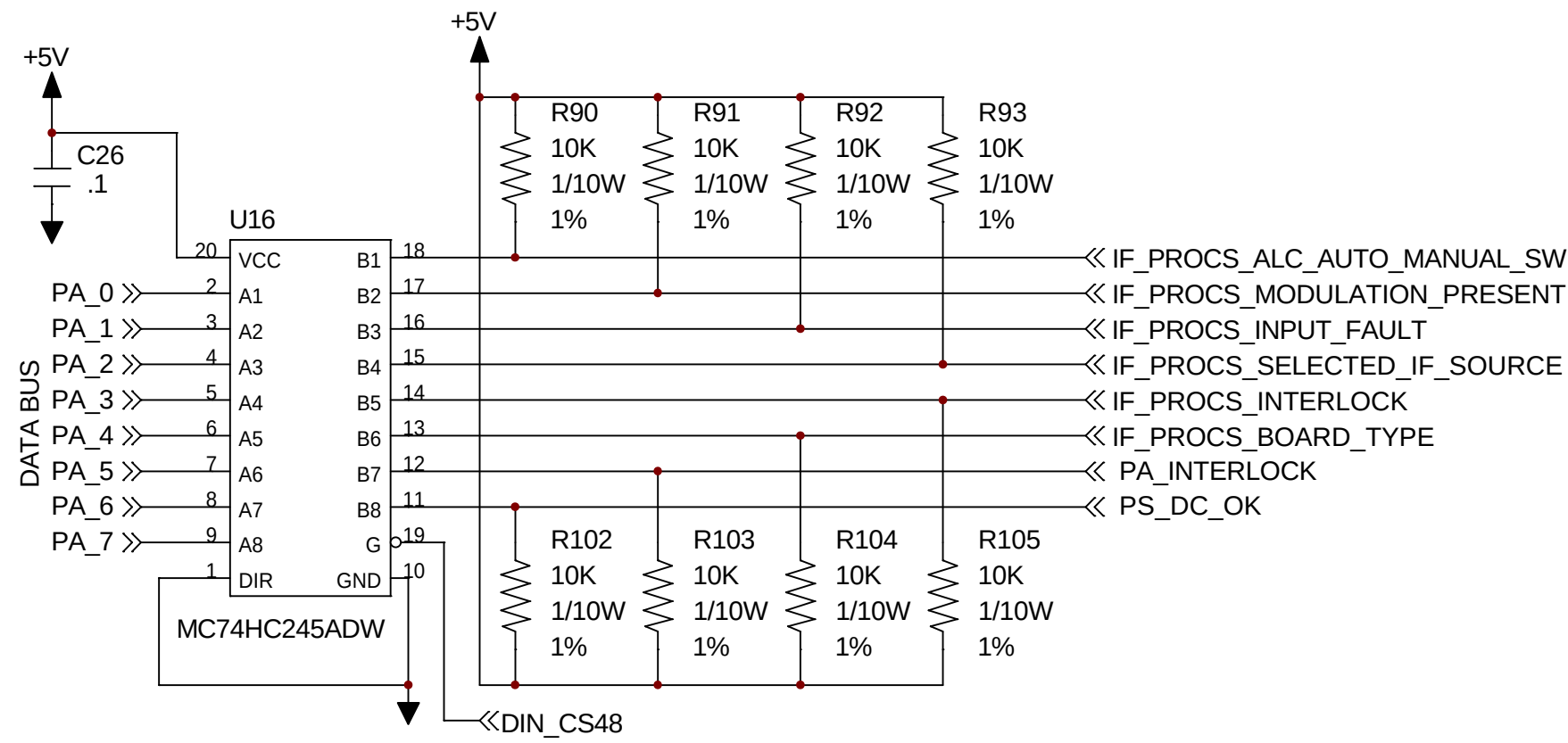
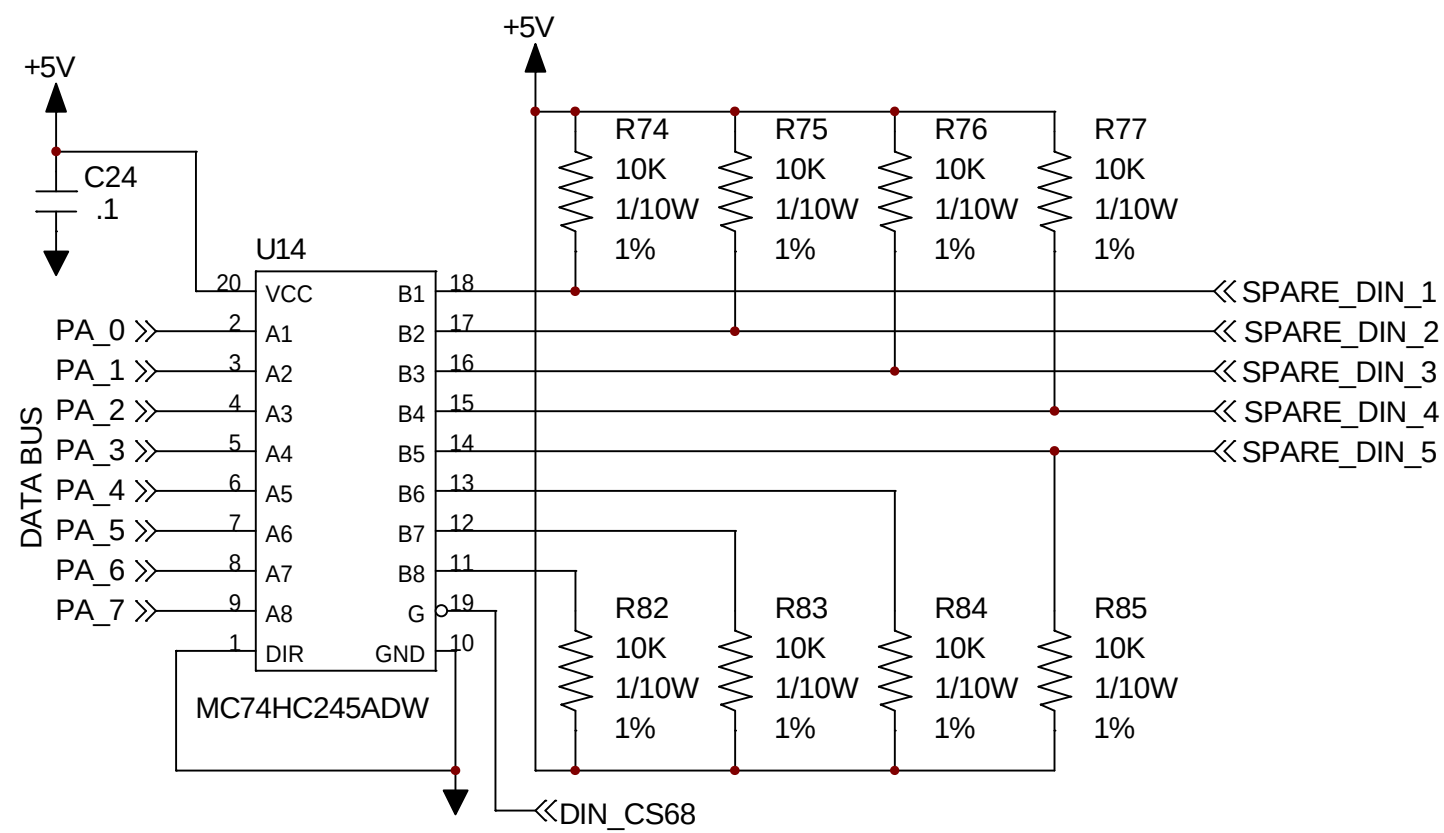
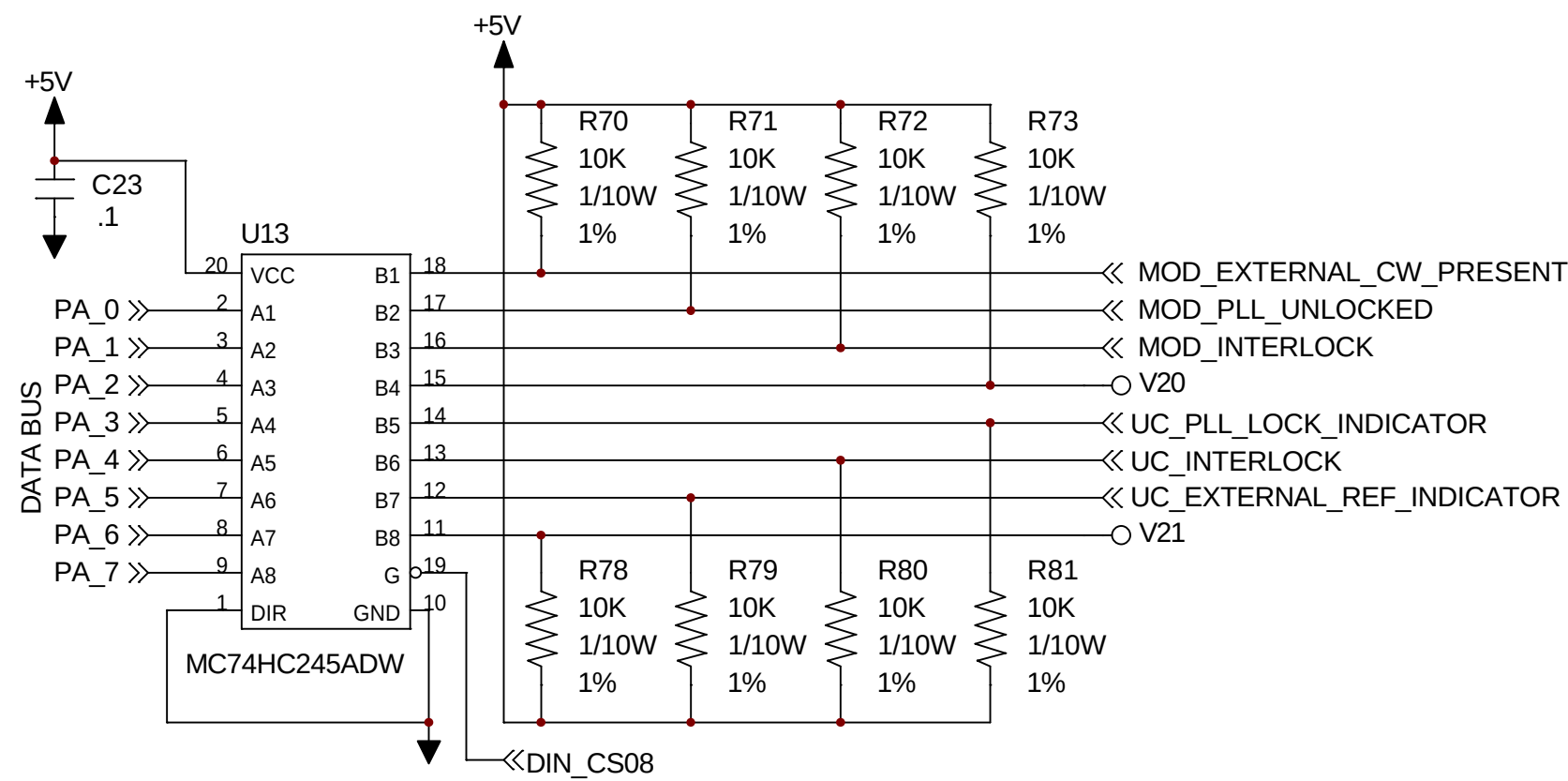
THIS PRINT IS THE PROPERTY OF AXCERA. IT SHALL NOT BE COPIED WITHOUT PERMISSION.				TITLE I/C CONTROL/POWER SUPPLY ASSEMBLY			
MATERIAL - - - -				DWN MH 6/18/03		DWG. NO. 1302062	
FINISH - - - -				CHK JCM 8/27/03		REL JCM 8/27/03	REV C0
				SCALE ---		SHEET 2 OF 2	

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

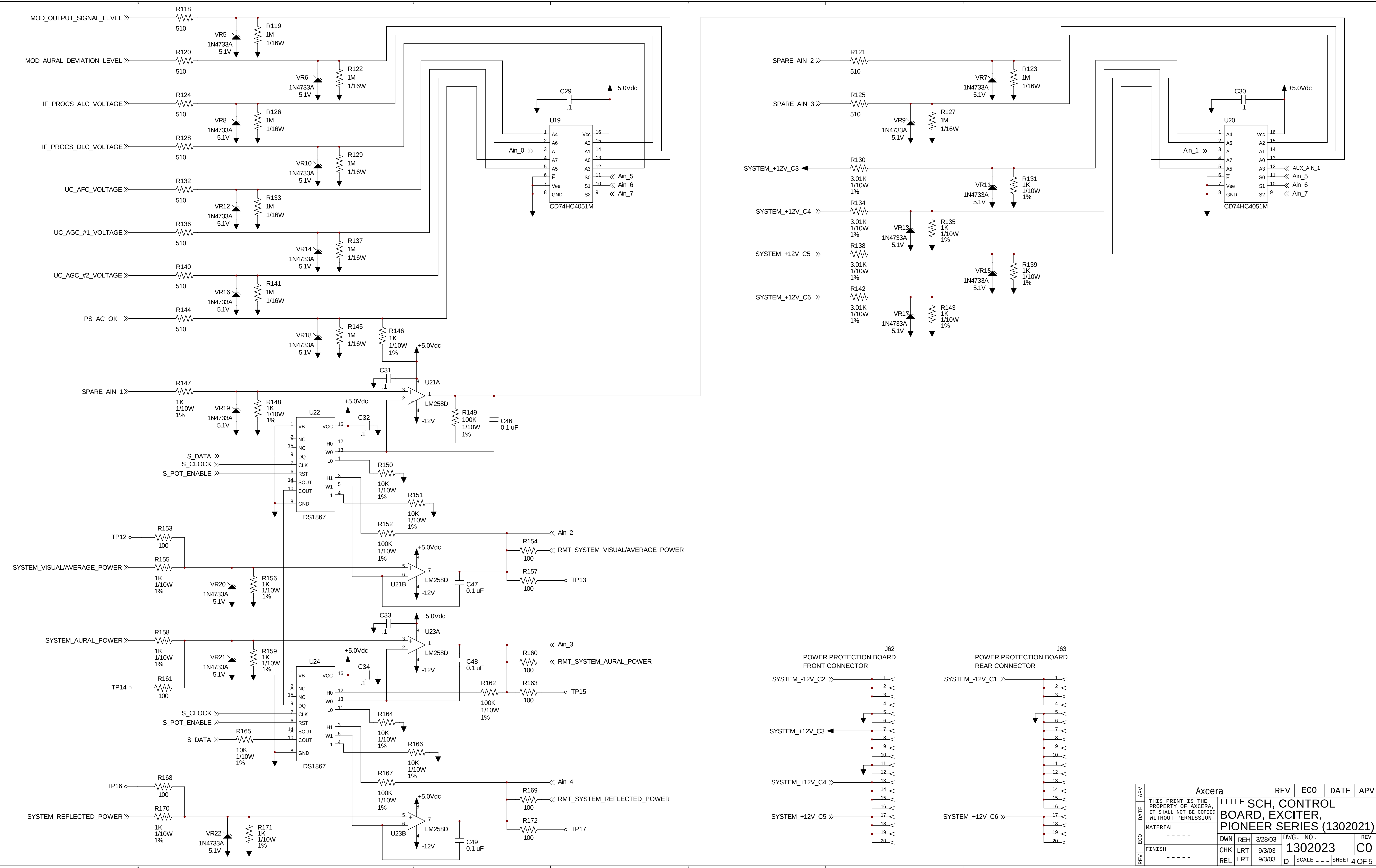




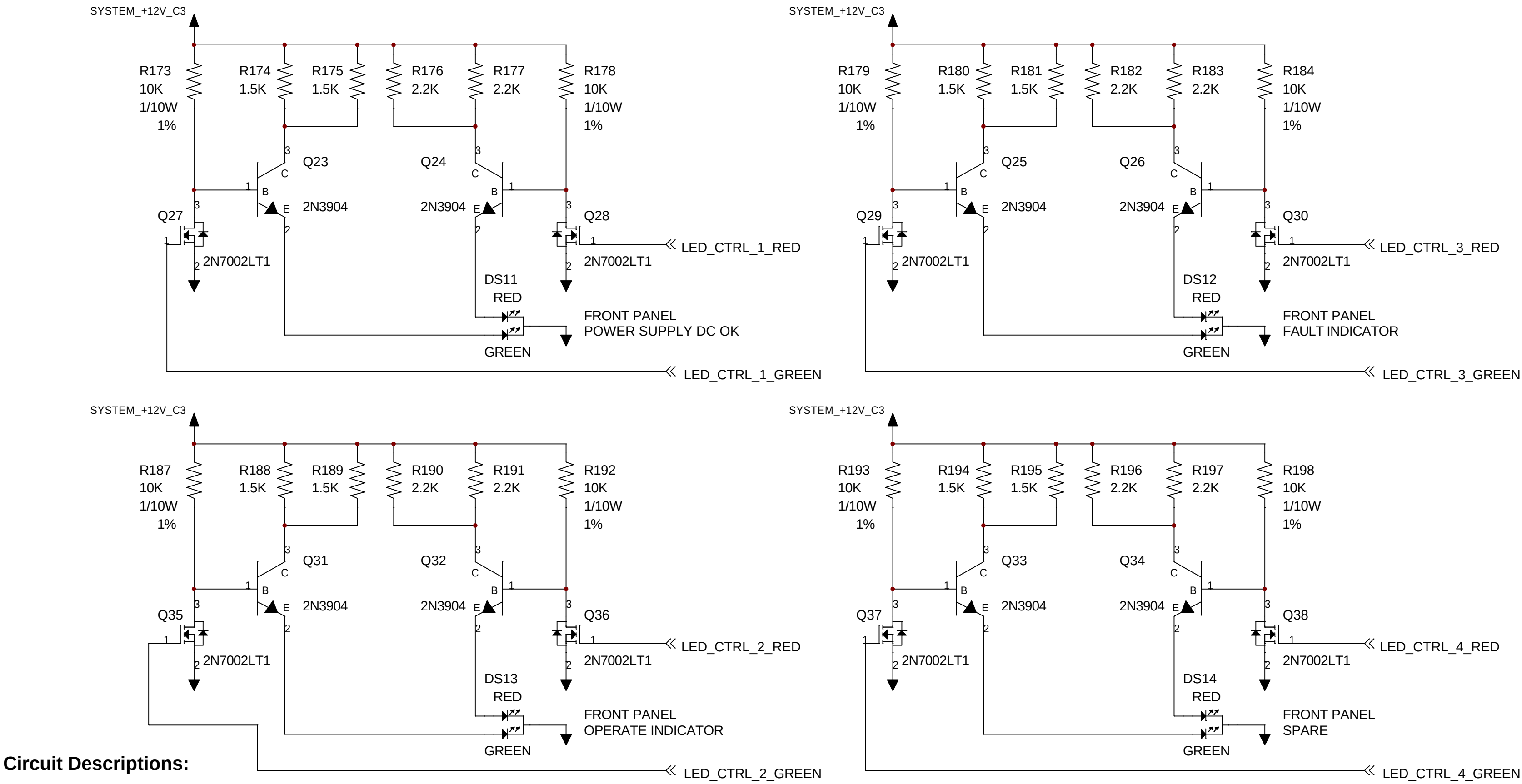
APV	Axcera	REV	ECO	DATE	APV
DATE	THIS PRINT IS THE PROPERTY OF AXCERA, IT SHALL NOT BE COPIED WITHOUT PERMISSION				
ECO	MATERIAL	DWN	REH	3/28/03	DWG. NO.
REV	FINISH	CHK	LRT	9/3/03	1302023
		REL	LRT	9/3/03	C0



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					
REV	-----		DWN	REH	3/28/03		DWG. NO.	REV
	FINISH		CHK	LRT	9/3/03		1302023	C0
	-----		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	C0	
REV	----	REL	LRT	9/3/03	D	SCALE - - -	SHEET 4 OF 5



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 (IST) 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:

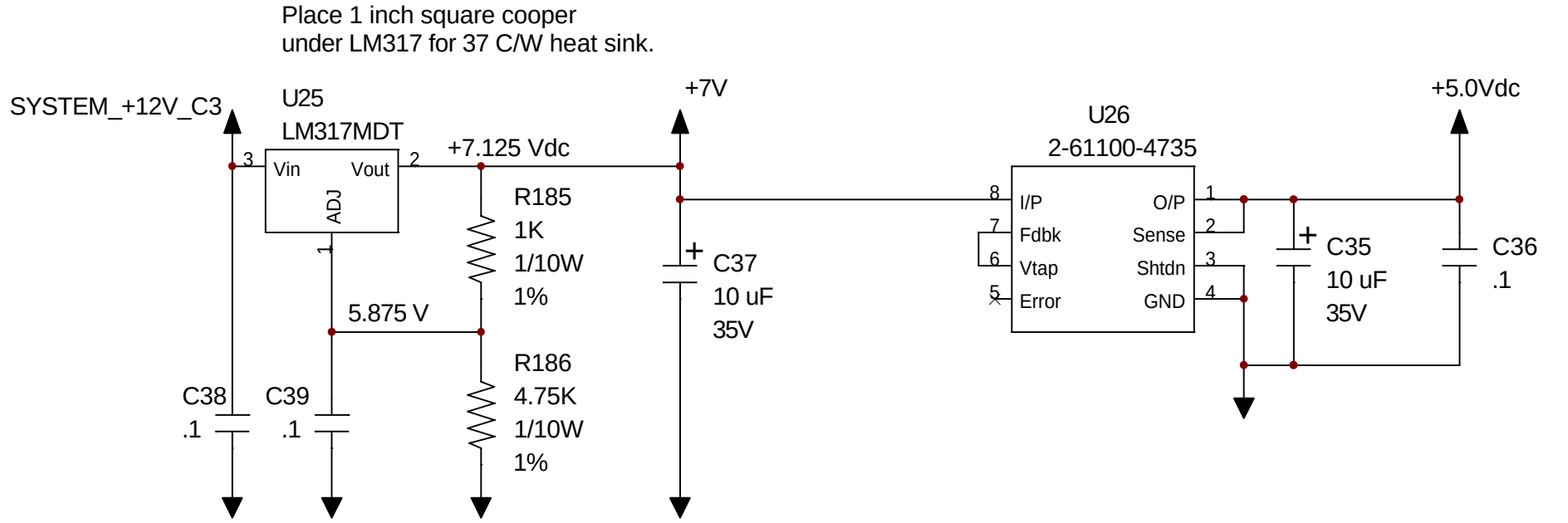
Each analog input is expected to be between 0 and 5 Vdc. If a signal exceeds 5.1 Vdc, a 0.225 Watt zenor diode clamps the signals voltage. Most signals are calibrated at their source however two dual serial potentiometer ICs are used to calibrate four signals. For these four circuits, the input value 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. The wiper position of the digital potentiometer circuit is used to set the gain of the op-amp. Lower digital values for the wiper setting increases the gain of the op-amp. If N= 0, gain = 6.0. If N = 255, gain = 3.00. If Vin = 1.0 at spare_Ain_1 and N = 128, U21A out = 4.0V with gain = 4.

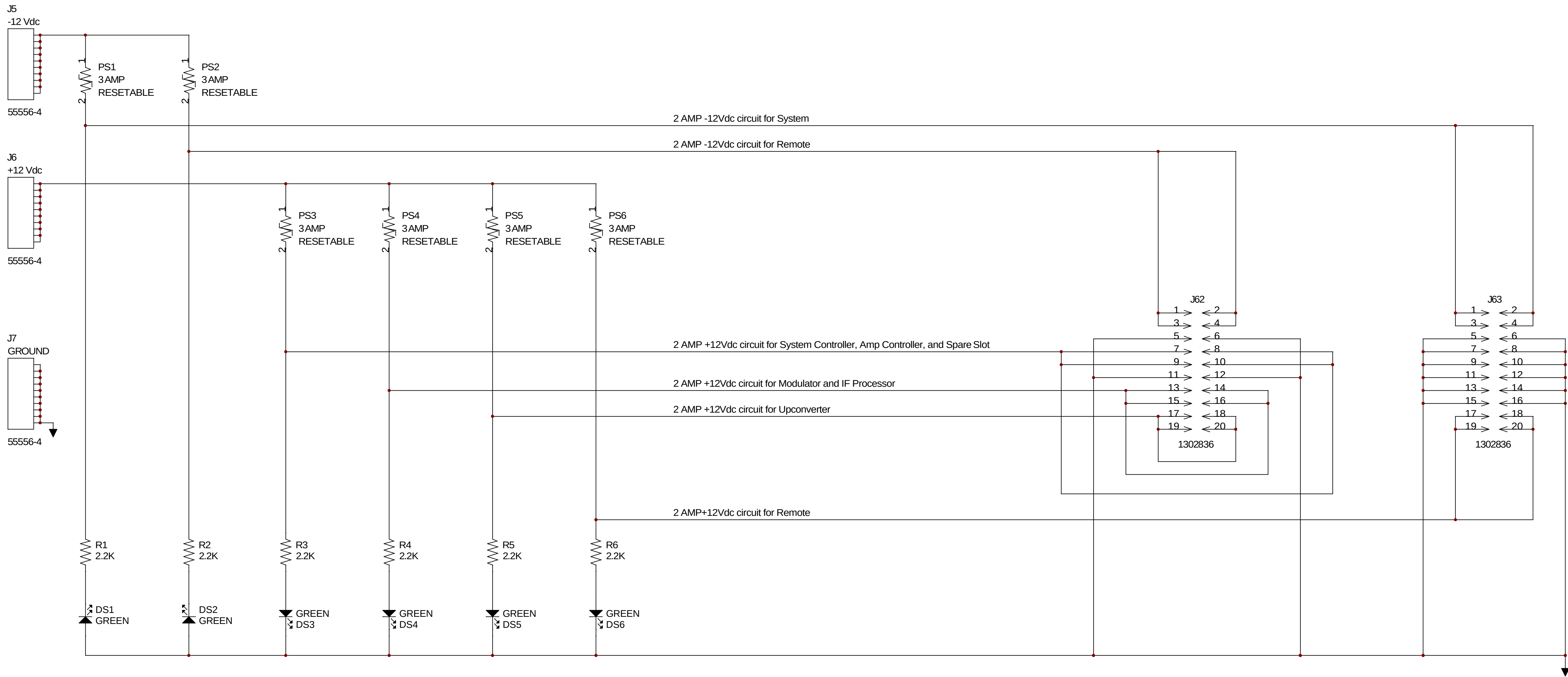
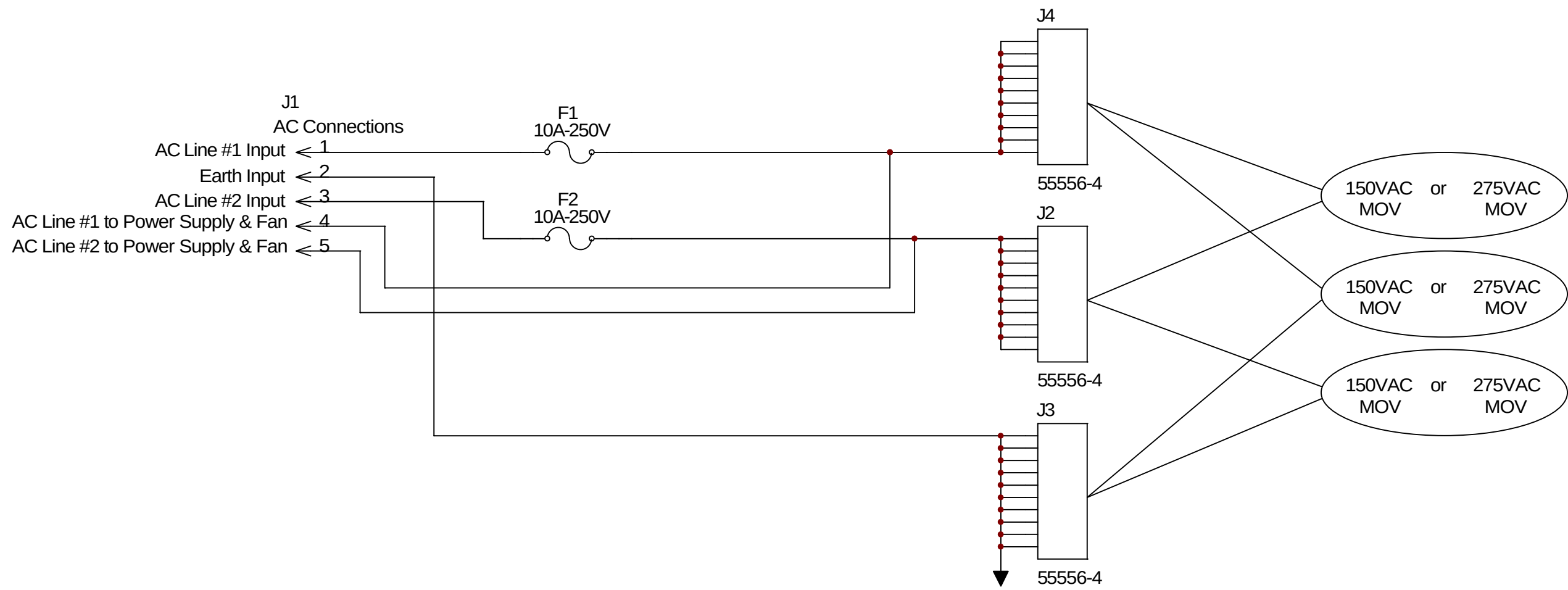
Two 20 position connectors are used to provide power to the backplane. J62 and J63 get power from the power supply after a nominal 3 amp resettable fuse. The Raychem polyswitch resettable fuses may open on a current as low as 2.43 amps at 50C, 3 amps at 25 C or 3.3 amps at 0C. They definately will open 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.





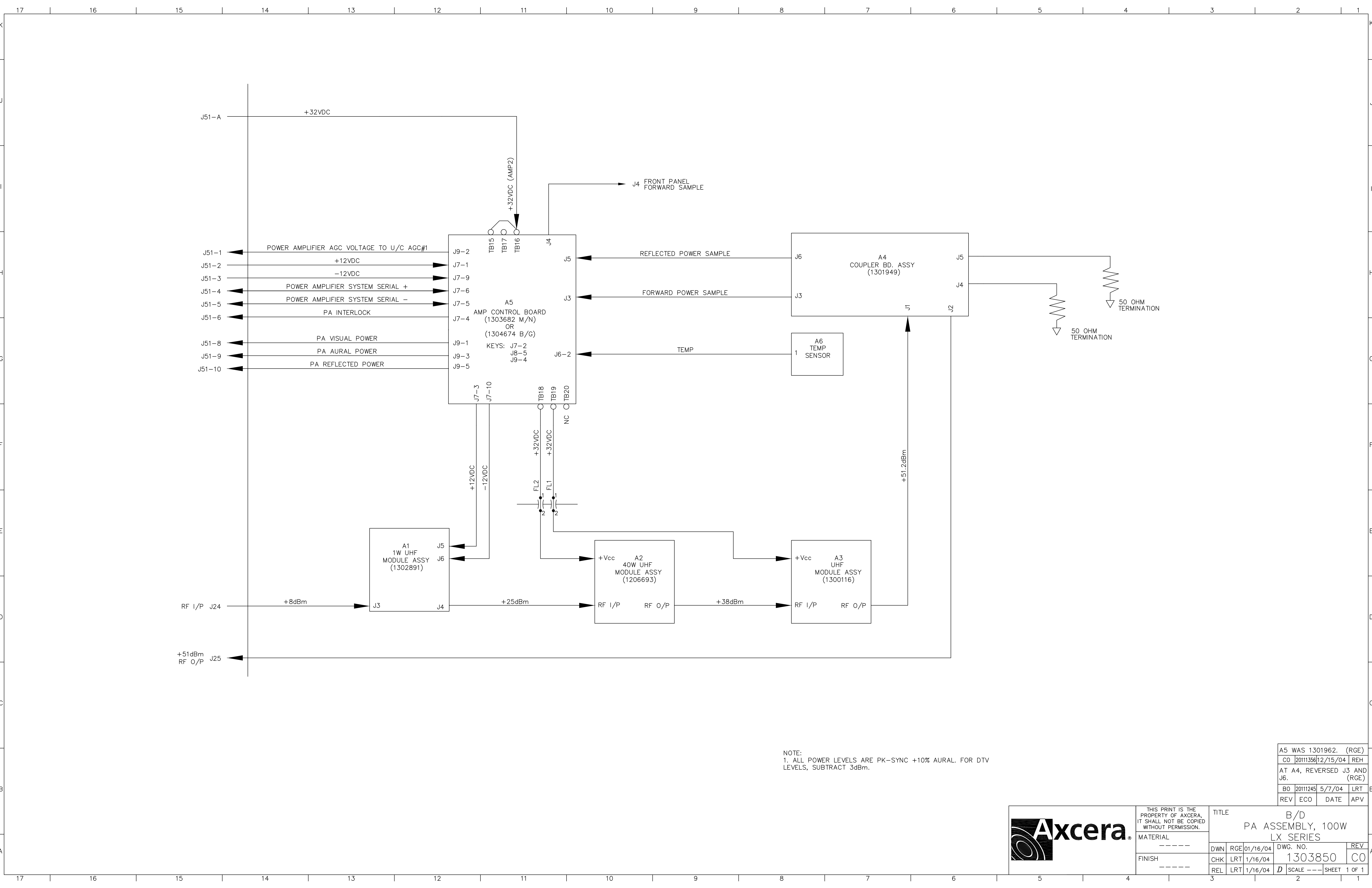
Circuit Design Notes:

1. Track widths of 0.140 inch minimum top and bottom of board shall be used to connections to J1, J2, J3, J4.
2. Track widths of 0.140 inch minimum top of board shall be used to connections to J5 and J6.
3. Track widths of 0.065 inch minimum shall be used to connections to J62 and J63.
4. Track widths of 0.020 inch minimum shall be used to connections between LEDs and resistors.
5. 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

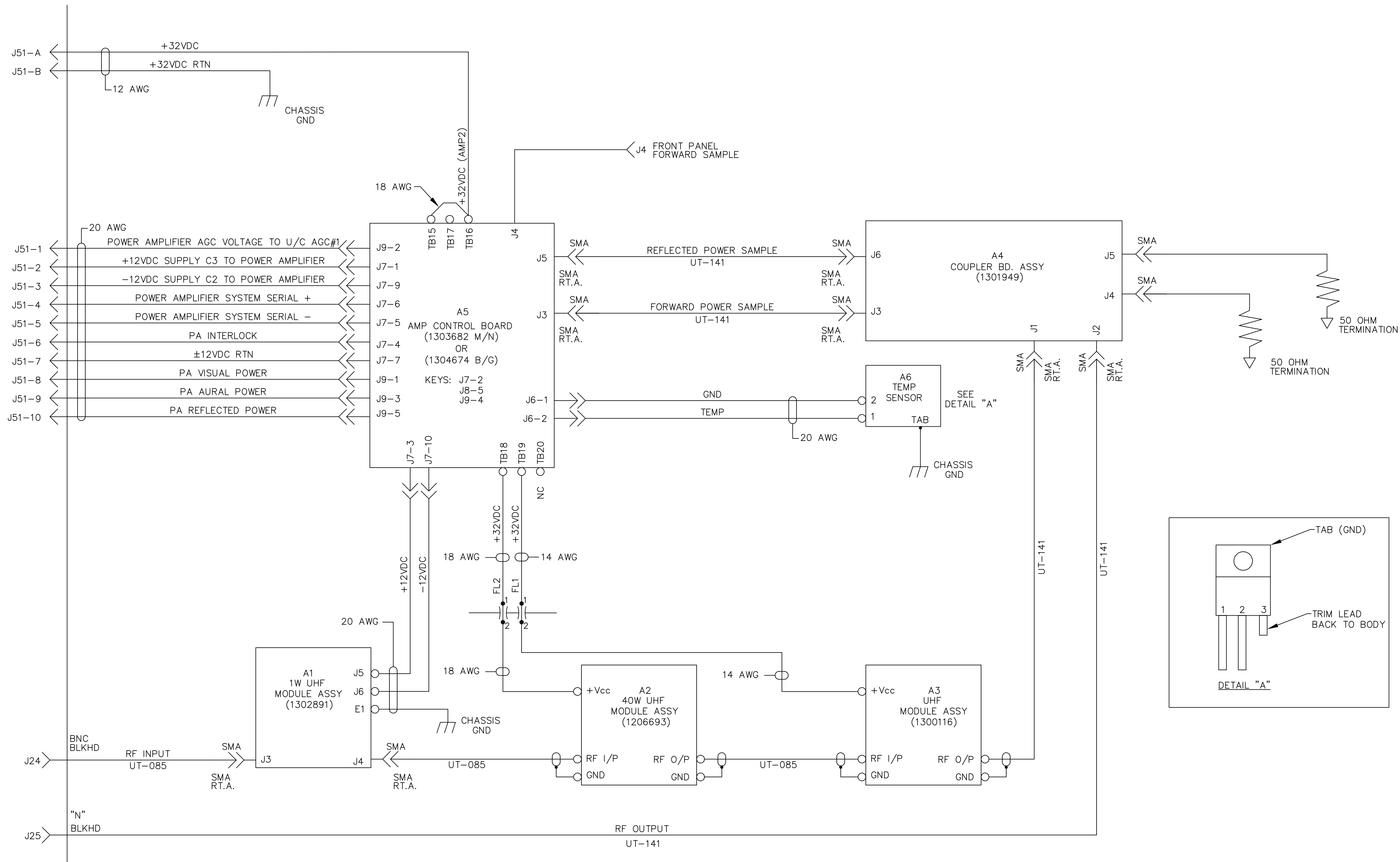
Axcera				REV	ECO	DATE	APV		
DATE	THIS PRINT IS THE PROPERTY OF AXCERA, IT SHALL NOT BE COPIED WITHOUT PERMISSION			TITLE SCH, PIONEER, PWR PROTECT (1302837)					
ECO	MATERIAL			DWN		REH	5/29/03	DWG. NO.	REV
REV	FINISH			CHK		REH	5/29/03	1302839	AO
				REL		REH	5/29/03	D	SCALE - - - SHEET 1 OF 1



NOTE:
1. ALL POWER LEVELS ARE PK-SYNC +10% AURAL. FOR DTV LEVELS, SUBTRACT 3dBm.

A5 WAS 1301962. (RGE)			
CO	20111356	12/15/04	REH
AT A4, REVERSED J3 AND J6. (RGE)			
B0	20111245	5/7/04	LRT
REV	ECO	DATE	APV

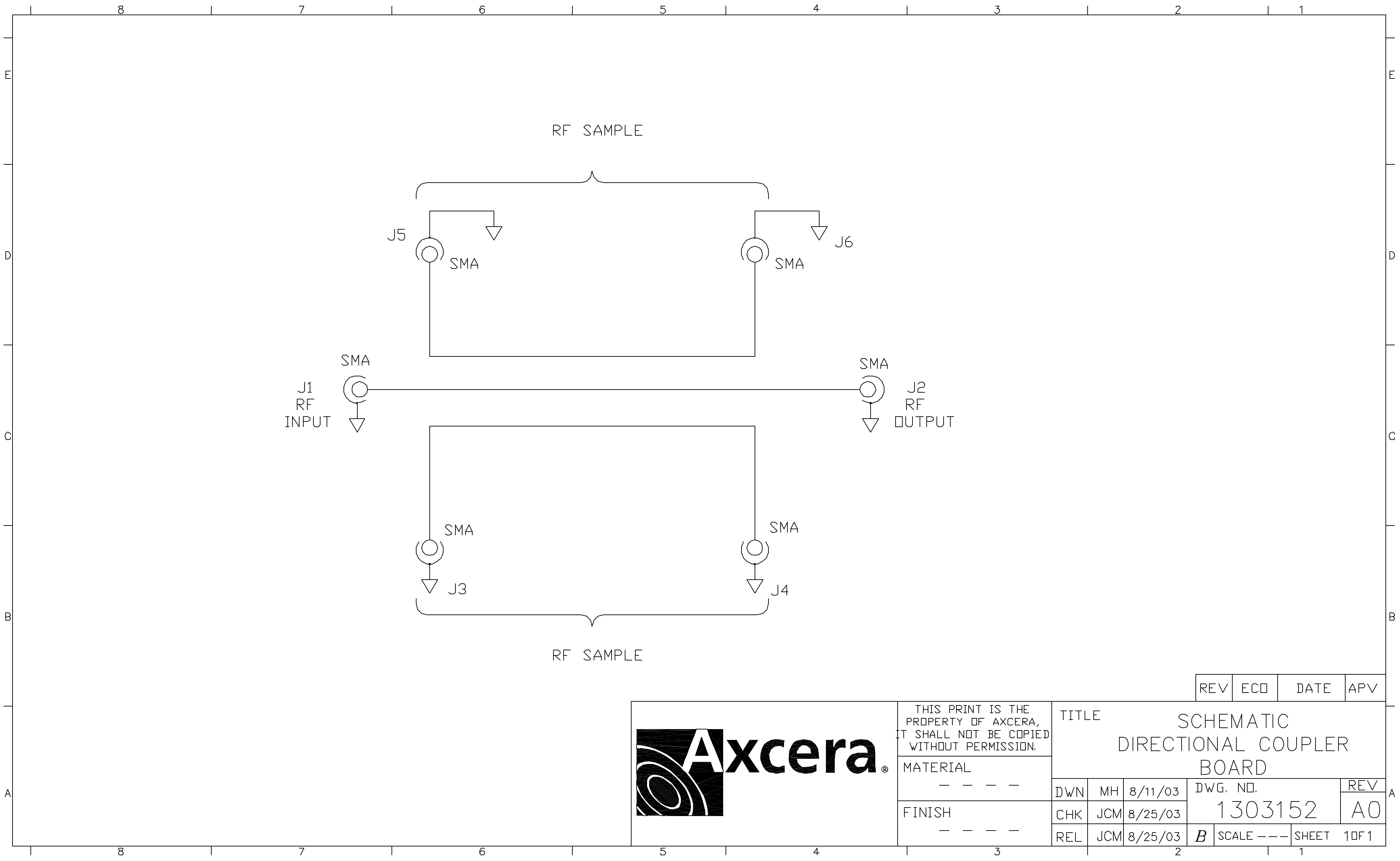
	THIS PRINT IS THE PROPERTY OF AXCERA. IT SHALL NOT BE COPIED WITHOUT PERMISSION.	TITLE		B/D				
		PA ASSEMBLY, 100W LX SERIES						
	MATERIAL	-----		DWN	RGE	01/16/04	DWG. NO.	REV
	FINISH	-----		CHK	LRT	1/16/04	1303850	C0
			REL	LRT	1/16/04	D	SCALE ---	SHEET 1 OF 1

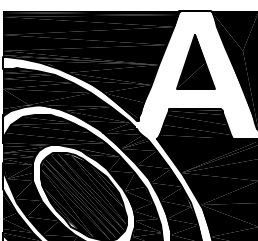


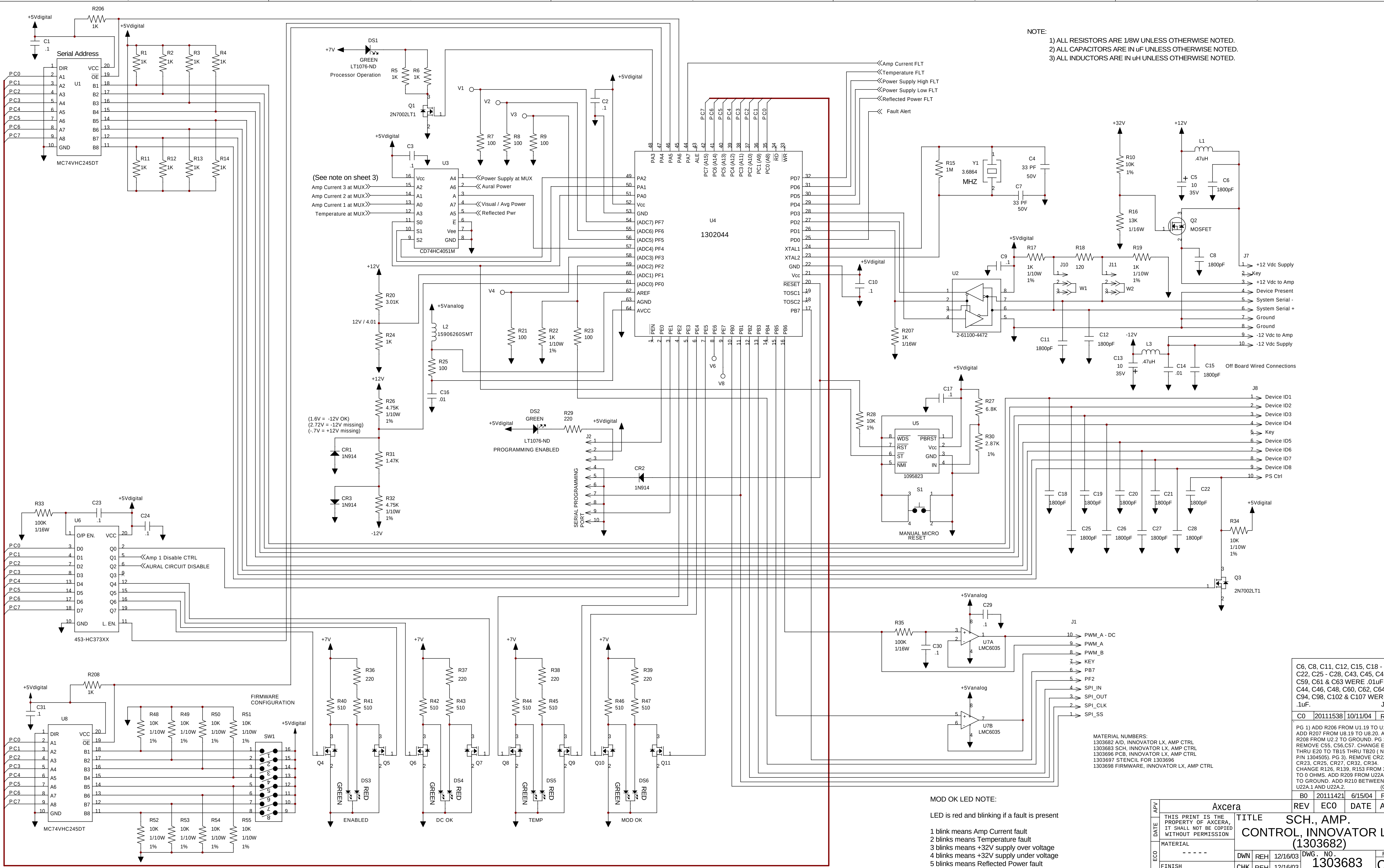
NOTE:
1. ALL WIRE IS 18AWG UNLESS OTHERWISE NOTED.

A5 WAS 1301962. (RGE)			
CO	20111356	12/15/04	REH
AT A4, REVERSED J3 AND J6. WIRE AT A5-J7-7 WAS 18 AWG. (RGE)			
B0	20111245	5/7/04	LRT
REV	ECO	DATE	APV

	THIS PRINT IS THE PROPERTY OF AXCERA. IT SHALL NOT BE COPIED WITHOUT PERMISSION.	TITLE I/C, PA ASSEMBLY, 100W LX SERIES						
		MATERIAL -----						
		DWN	RGE	01/13/04	DWG. NO.		REV	
		CHK	LRT	1/16/04	1303814		C0	
		REL	LRT	1/16/04	D	SCALE ---	SHEET	1 OF 1
FINISH -----								



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



MOD OK LED NOTE:

LED is red and blinking if a fault is present

- 1 blink means Amp Current fault
- 2 blinks means Temperature fault
- 3 blinks means +32V supply over voltage
- 4 blinks means +32V supply under voltage
- 5 blinks means Reflected Power fault
- 6 blinks means +12V or -12V fault

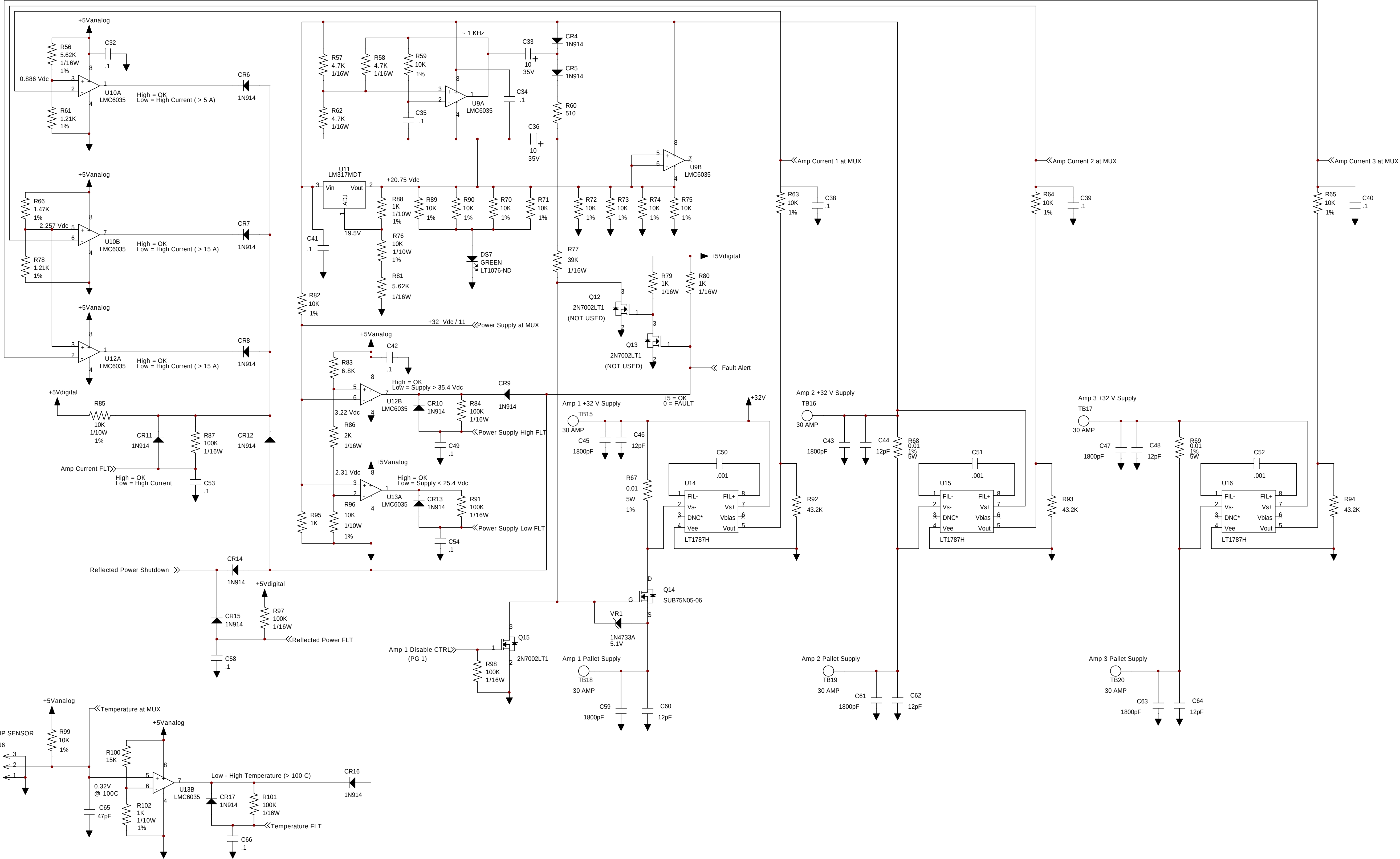
C6, C8, C11, C12, C15, C18 - C22, C25 - C28, C43, C45, C47, C59, C61 & C63 WERE .01uF. C44, C46, C48, C60, C62, C64, C94, C98, C102 & C107 WERE .1uF. JKF

C0 | 20111538 | 10/11/04 | REH

PG 1) ADD R206 FROM U1.19 TO U1.20. ADD R207 FROM U8.19 TO U8.20. ADD R208 FROM U2.2 TO GROUND. PG 2) REMOVE C55, C56, C57. CHANGE E15 THRU E20 TO TB15 THRU TB20 (NEW P/N 1304505). PG 3) REMOVE CR22, CR23, CR25, CR27, CR32, CR34. CHANGE R126, R139, R153 FROM 2.2K TO 0 OHMS. ADD R209 FROM U22A.2 TO GROUND. ADD R210 BETWEEN U22A.1 AND U22A.2. (CR)

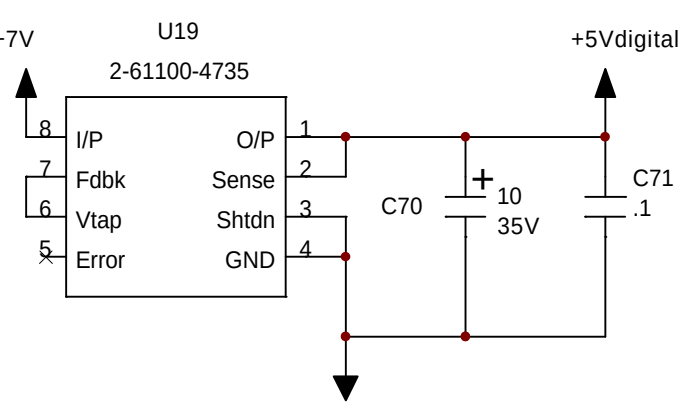
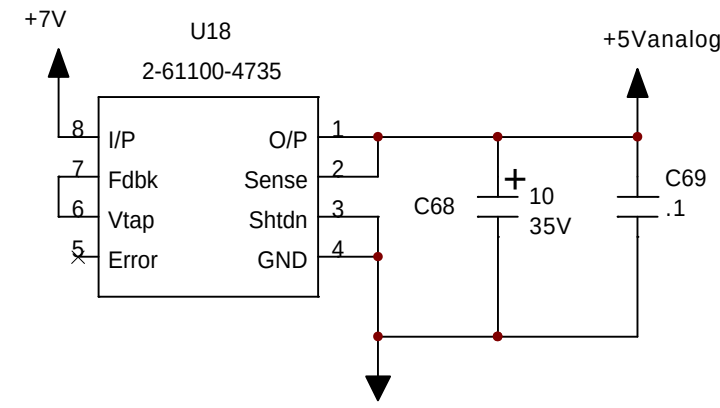
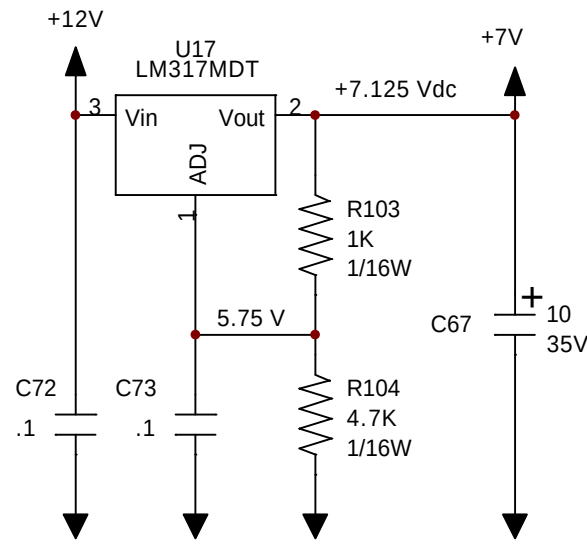
B0 | 20111421 | 6/15/04 | REH

APV		Xxcera		REV		ECO		DATE		APV	
DATE	REV	THIS PRINT IS THE PROPERTY OF AXGERA, IT SHALL NOT BE COPIED WITHOUT PERMISSION		TITLE		DWN		REH		REV	
MATERIAL		SCH., AMP. CONTROL, INNOVATOR LX (1303682)		DWG. NO.		1303683		C0		REV	
FINISH		CHK		REL		12/16/03		12/16/03		12/16/03	
REV		REL		D		SCALE		1 OF 3		SHEET	

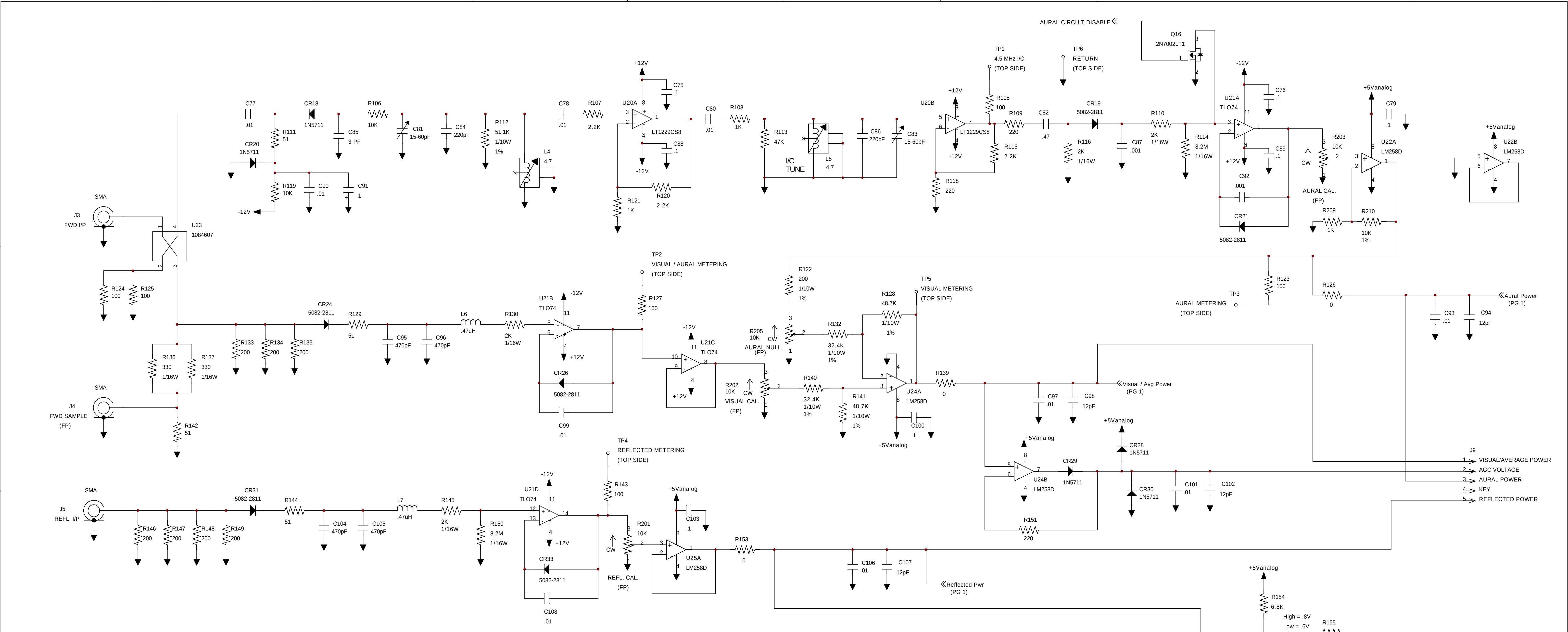


NOTE:

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	Axcera				REV	ECO	DATE	APV
DATE	THIS PRINT IS THE PROPERTY OF AXCERA, IT SHALL NOT BE COPIED WITHOUT PERMISSION				TITLE SCH., AMP. CONTROL, INNOVATOR LX (1303682)			
ECO					DWN	REH	12/16/03	REV
FINISH					CHK	REH	12/16/03	C0
REL					REL	REH	12/16/03	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 U3 through the settings of PA0 - PA2. PA3 of U4 is a processor operating LED that can be flashed to show continued operation. PF1 is used to monitor the +12 Vdc supply to the board. PF4 is the selected channel of analog switch U3. PF3 and other select microcontroller pins are connected to a via for future access.

U2 is our standard serial to RS-485 driver IC. U5 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)). U5 momentarily resets the microcontroller if Pin 6 (IST) is not clocked every second. A manual reset switch is provided but should not be needed.

Upper left corner U1 is used to determine where the amplifier control board is located. The eight inputs come from amp connector J8 and are used to set the SCADA address of the controller. Pull-up resistors set a default condition of logic high.

U6 below U1 is used to control two of the four board's status LEDs and three other circuits that are not allowed to change state during a microcontroller reset. A FET is turned on to shut current away from the LED to turn it off. U8 below U6 is used to enable different features within software. Actual use is TBD.

Page 2:

In the lower right corner are voltage regulator circuits. U17 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 U17 if the mounting pad is 0.5 sq. inches. The controller will not need this much current.

U18 and U19 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 U9 and U11. U11 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 U9A is used to provide gate voltage to Q14 that is 5 volts greater than the source pin of this FET. The gate of Q14 can be turned off by any one of a few different circuits. These circuits are wired through Q12 and Q13. At this time these transistors are not installed but they may be installed to increase the shut-down time on a detected fault. Without Q12 and Q13 installed, Q14 is only turned off by the microcontroller through Q16.

U10A is used to detect high current in amplifier #1. At 0.886 Vdc, the current to amplifier #1 should be about 5.12 Amps. U10B and U12A are used to detect a high current condition in amplifier stages #2 or #3. With a 2.26 Vdc reference, high current shut down should be about 13.1 Amps.

U12B is used to detect high power supply voltage. U13A is used to indicate that the power supply voltage is less than 26 volts.

U25B on page 3 is used to detect high reflected power. U13B determines if the power supply temperature gets too hot.

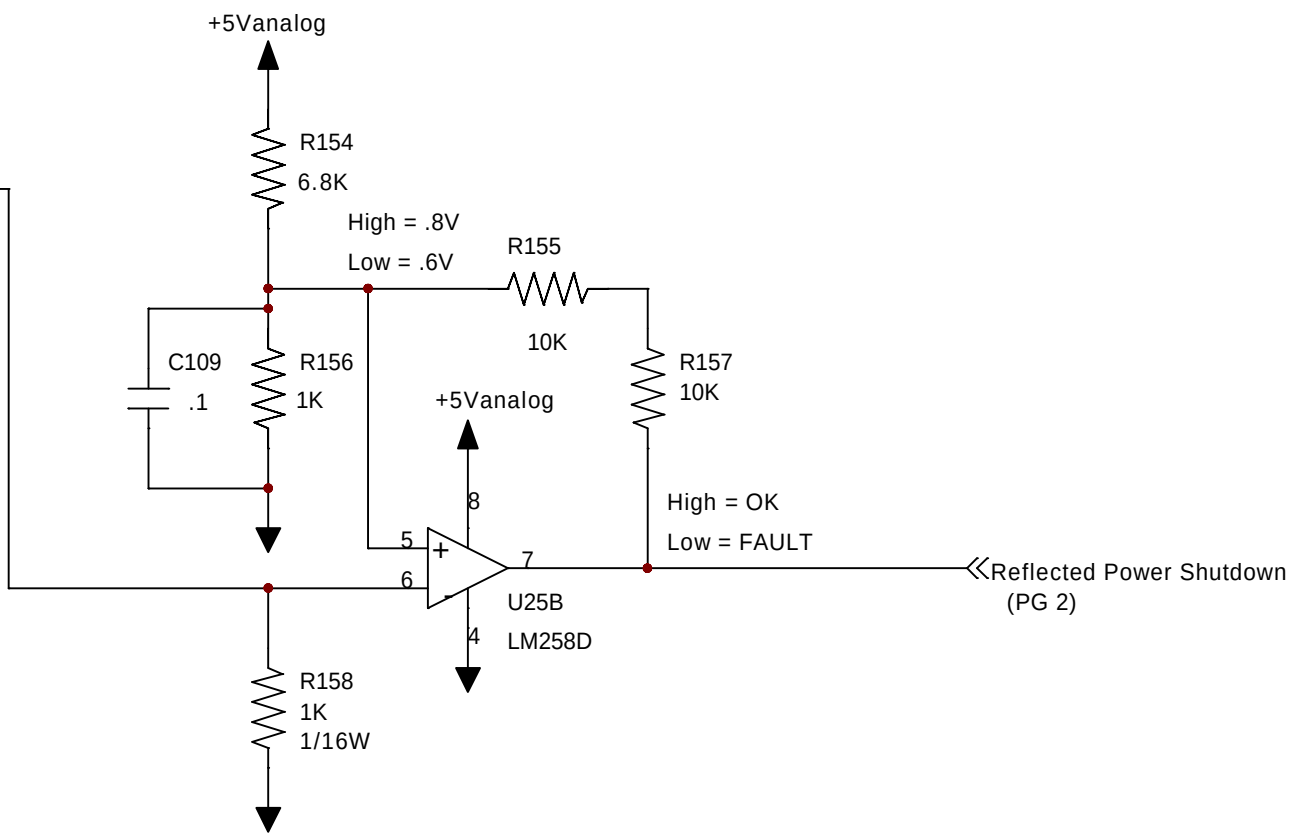
Current Monitoring Sections - A 0.01 ohm 1% 5 Watt thru-hole resistor is used for monitoring the current through several sections of the amplifier. The voltage developed across this resistor is amplified for current monitoring by U14, U15, or U16. The Linear Technology LT1787HVC58 precision high side 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.

Page 3:

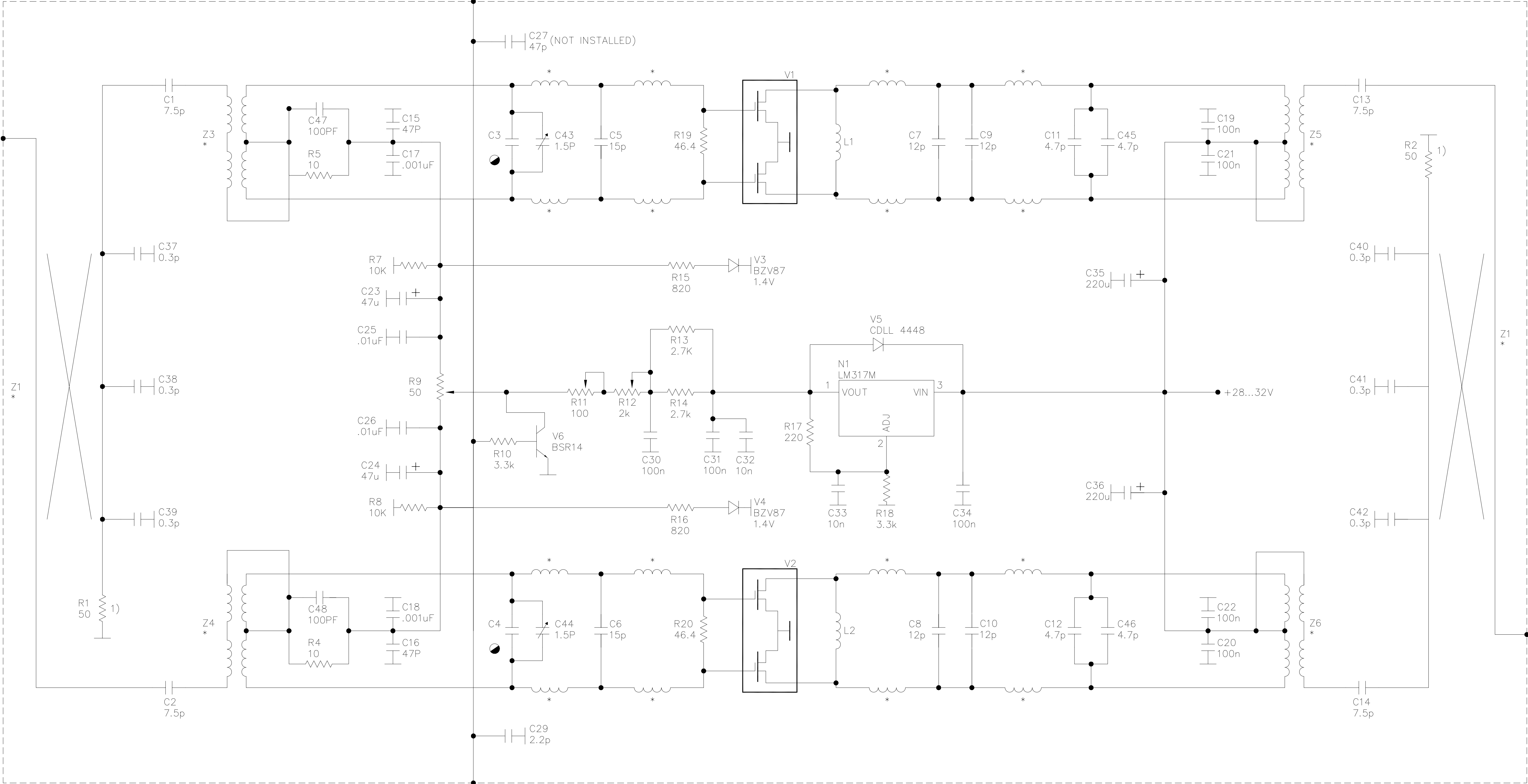
RF power detector circuits. Q16 is used by the microcontroller to disable the aural circuit of a digital transmitter or in external amplifiers where the amplifier is not to monitor visual power.

The Visual or Forward power circuit is calibrated and presented on the input of U24B pin 5. If this module has the highest detected forward power in a multi-amplifier system, it will have the highest forward power signal. This signal level into U24B pin 5 will be used to set the AGC output voltage of J9-2. If another amplifier has a higher forward power, the level into U24B pin 6 will be higher than pin5 and this amplifiers output signal will not be used to set the voltage level of J9-2.

- 1> VISUAL/AVERAGE POWER
- 2> AGC VOLTAGE
- 3> AURAL POWER
- 4> KEY
- 5> REFLECTED POWER



APV	Axcera				REV	ECO	DATE	APV
DATE	THIS PRINT IS THE PROPERTY OF AXCERA, IT SHALL NOT BE COPIED WITHOUT PERMISSION				TITLE SCH., AMP. CONTROL, INNOVATOR LX (1303682)			
MATERIAL					DWN	REH	12/16/03	DWG. NO. 1303683
ECO	----				CHK	REH	12/16/03	REV C0
REV	----				REL	REH	12/16/03	SCALE - - - SHEET 3 OF 3



* PRINTED COMPONENT

FACTORY SET VALUE

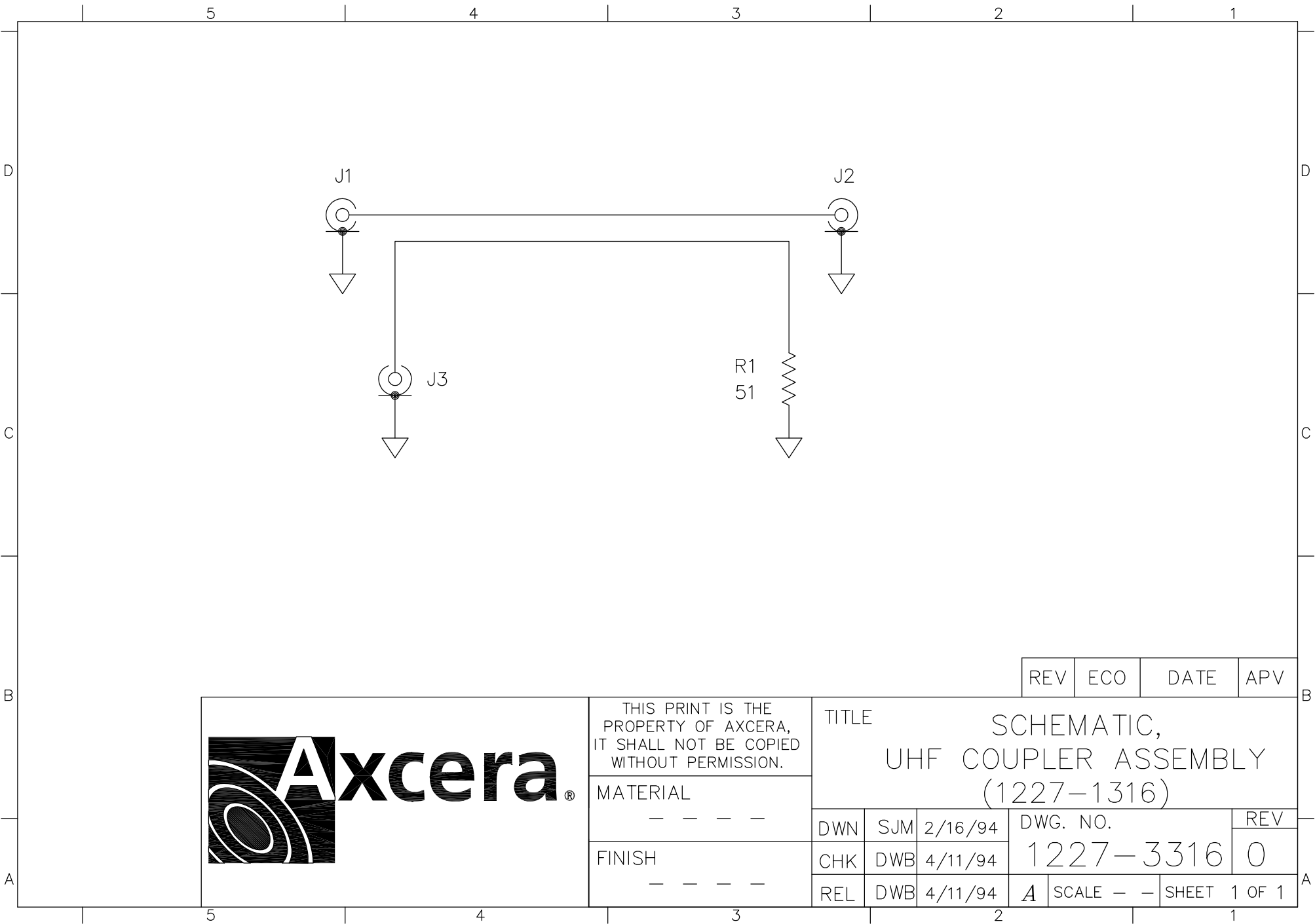
PC BOARD LAYOUT SEE
51-5379-309-00 (2)

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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MATERIAL				DWN	PWN	04/01/02	DWG. NO.
FINISH				CHK	LRT	04/03/02	51-5379-309-00 WSP
				REL	LRT	04/03/02	D SCALE SHEET 1 OF 1



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MATERIAL

— — — —

FINISH

— — — —

TITLE

SCHEMATIC,
UHF COUPLER ASSEMBLY
(1227-1316)

DWN

SJM

2/16/94

DWG. NO.

1227-3316

REV

0

REL

DWB

4/11/94

A

SCALE — —

SHEET 1 OF 1

