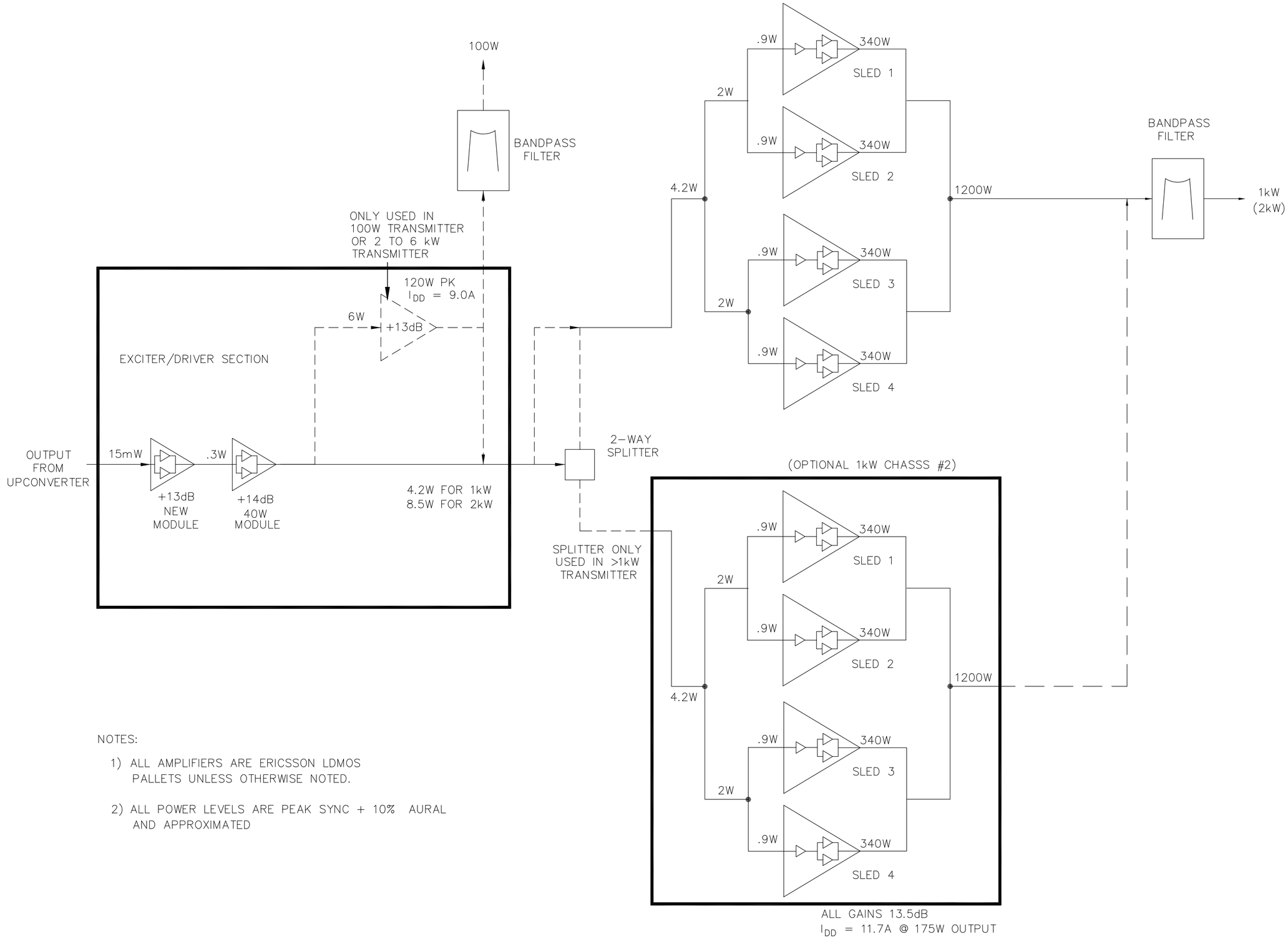
LX SERIES AMPLIFIER LINE UP

CHASSS #1 FOR 1kW
EACH SLED CONTAINS (2) LDMOS PALLETS & (1) NEW MODULE.



NOTES:

1) ALL AMPLIFIERS ARE ERICSSON LDMOS PALLETS UNLESS OTHERWISE NOTED.

2) ALL POWER LEVELS ARE PEAK SYNC + 10% AURAL AND APPROXIMATED

REV	ECO	DATE	APV

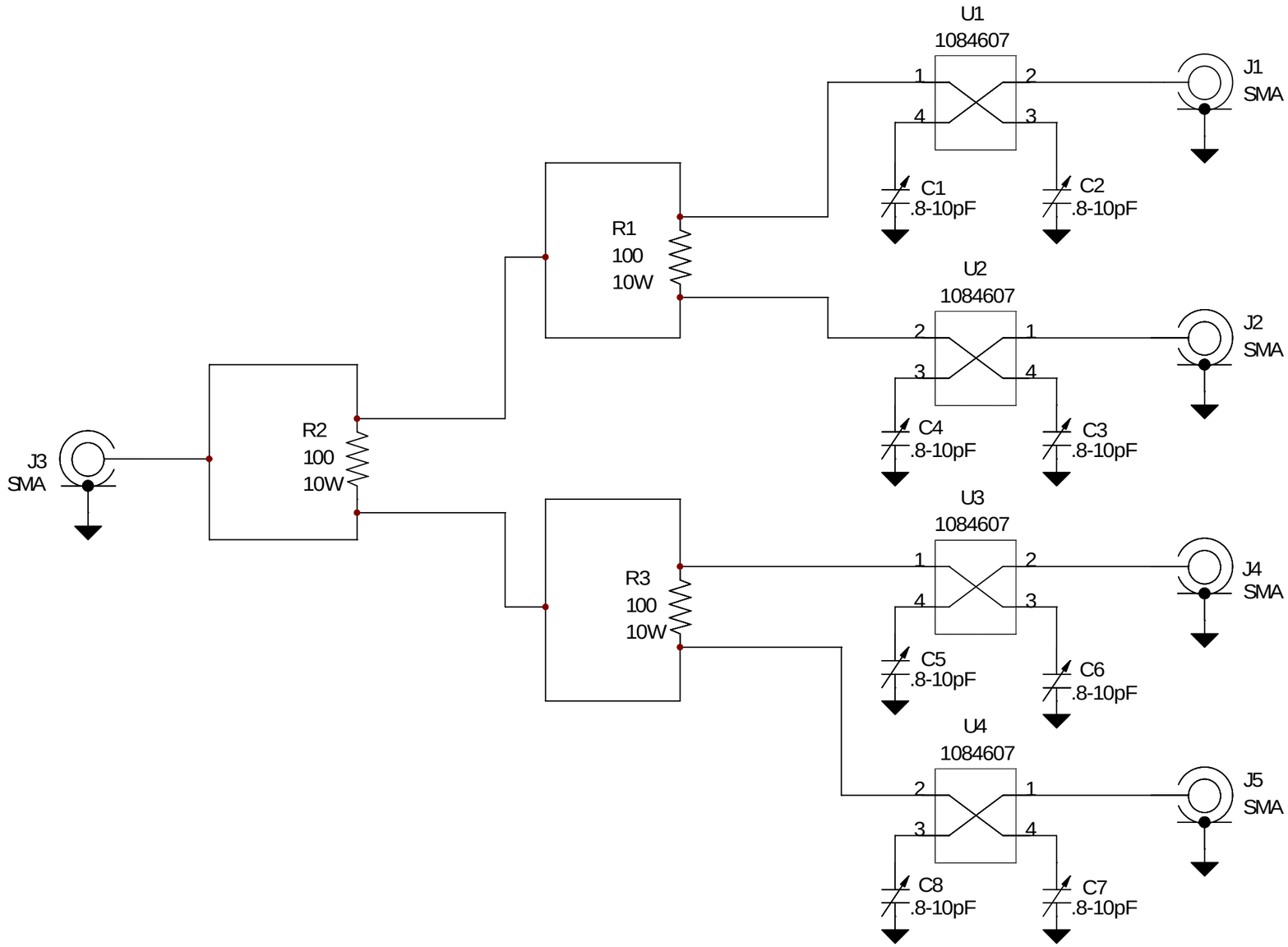
Axcera®

MATERIAL — — — —

FINISH — — — —

TITLE: B/D, LX SERIES AMPLIFIER LINE UP, 1 – 2 KW

DWN	CDD	1/9/03	DWG. NO. 1302633	REV 20
CHK				
REL			C	SCALE – – SHEET 1 OF 1



LAST USED
C8 J5 R3 U4

J1 - J5 CHANGED FROM EXTERNAL CONN. TO SMA. JKF

REV	ECO	DATE	APV
B0	20111101	11/5/03	TB

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MATERIAL: - - - - -

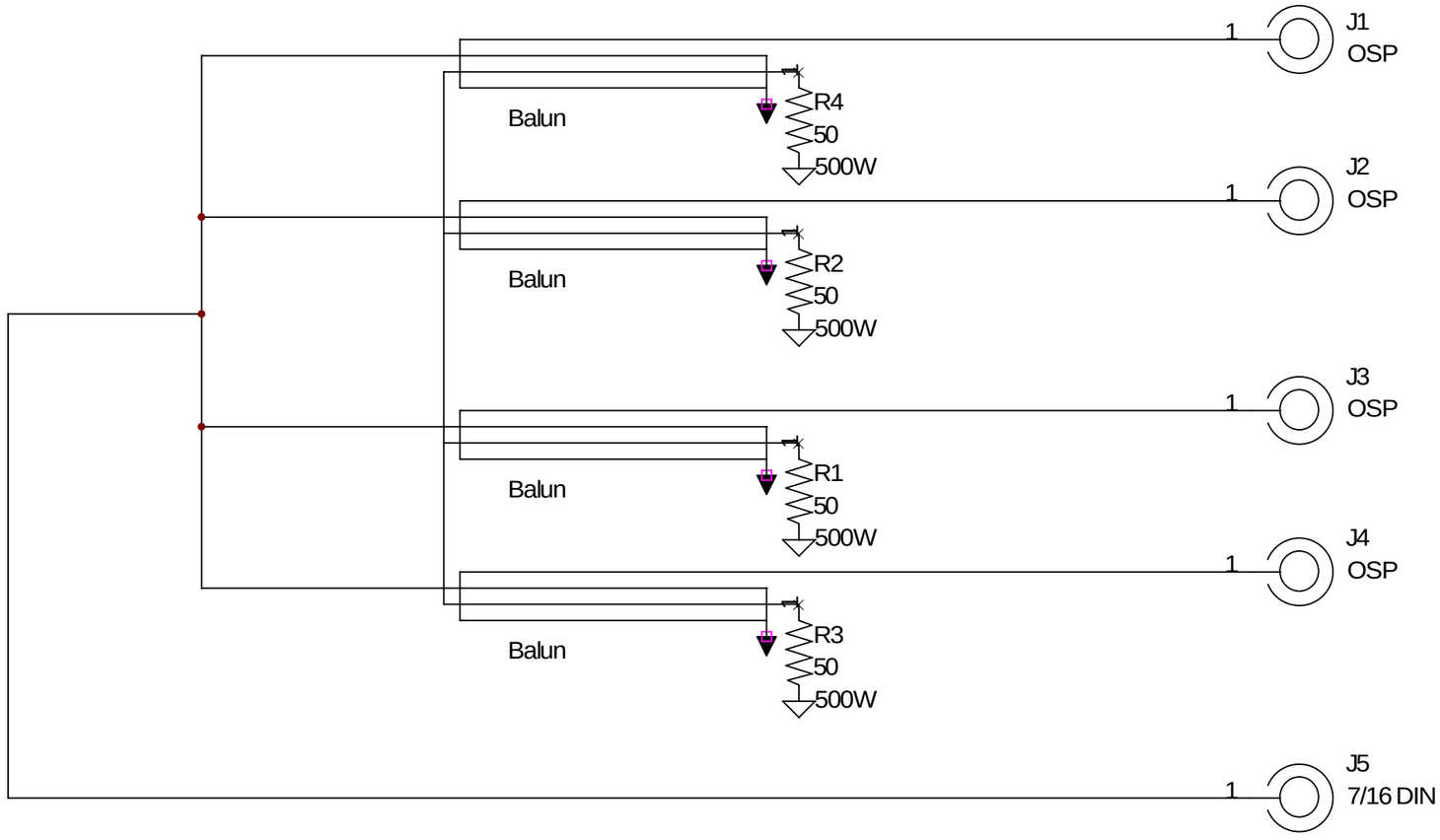
FINISH: - - - - -

TITLE: SCH, 4 WAY SPLITTER, UHF (1303234)

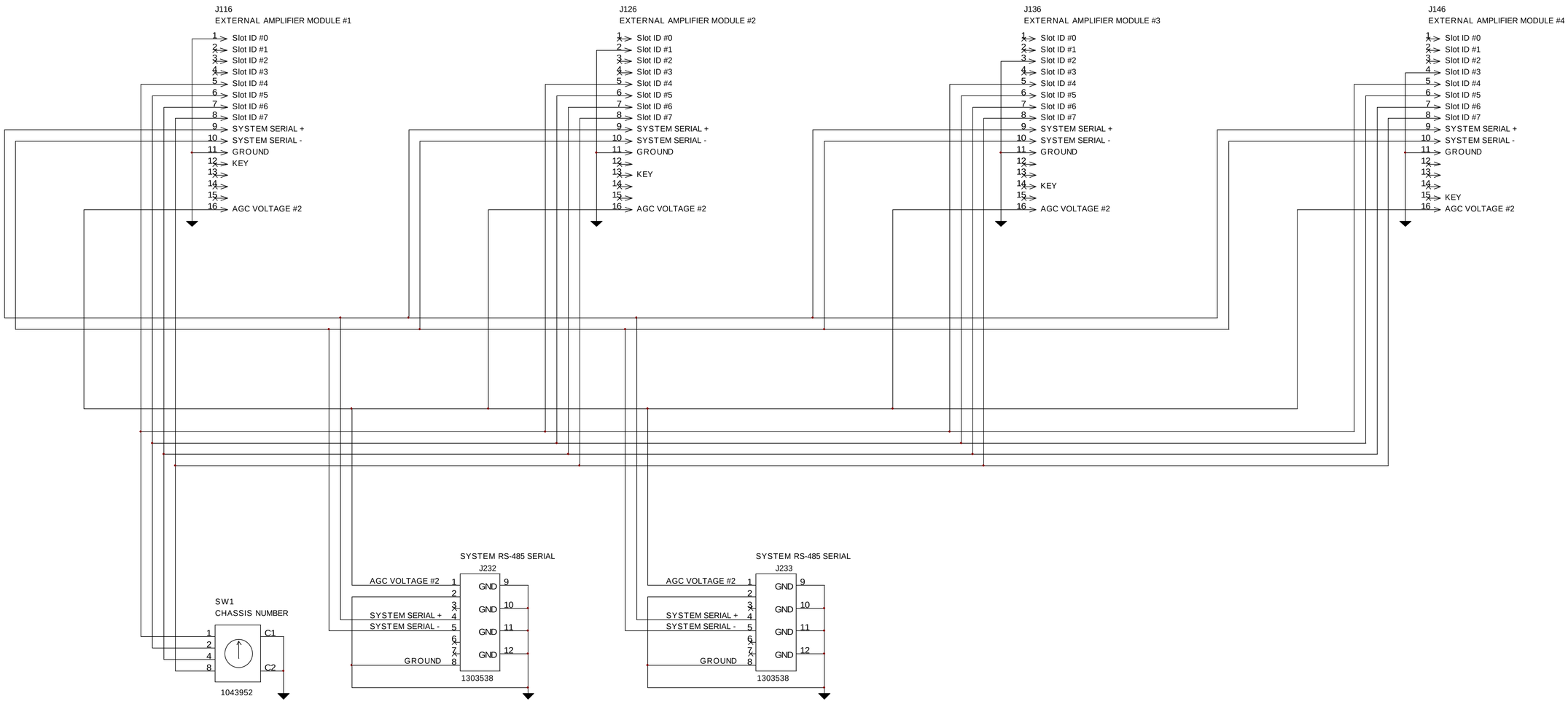
DWN	JKF	9/16/03	
CHK	TB	9/23/03	
REL	TB	9/23/03	

DWG. NO. 1303237 REV B

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., 4 WAY COMBINER BD. (1302871)		
ECO	MATERIAL -----	DWN	JKF	11/7/03	DWG. NO. 1303241 / REV A0
REV	FINISH -----	CHK	TB	11/7/03	
		REL	TB	11/7/03	B / SCALE --- / SHEET 1 OF 1



Circuit Description:

Each power amplifier module plugs into an associated 16 position header. The serial address of each module is specified by the slod ID lines. A chassis number rotary switch identifies the chassis number to the amplifier modules on the upper 4 bits and the lower four bits are set by position in the chassis.

Two serial I/O ports are used for System RS-485 Serial functionality.

An AGC Voltage #2 signal is carried over the System Serial cable from each of the Power Amplifiers back to the driver Upconverter sled. AGC Voltage #1 is from the driver PA. AGC Voltage #2 is set by the Amplifier modlue with the highest forward power.

MATERIAL NUMBERS:
1303344 PIONEER,EX AMP, SIGNAL BRD
1303345 PCB, PIONEER, EX AMP, SGNL
1303346 SCH, PIONEER, EX AMP, SGNL
(A stencil is not needed for this board)

J232 & J233 WERE RJ45-6L2-B. JKF

B0	20111105	11/13/03	REH	
REV	ECO	DATE	APV	

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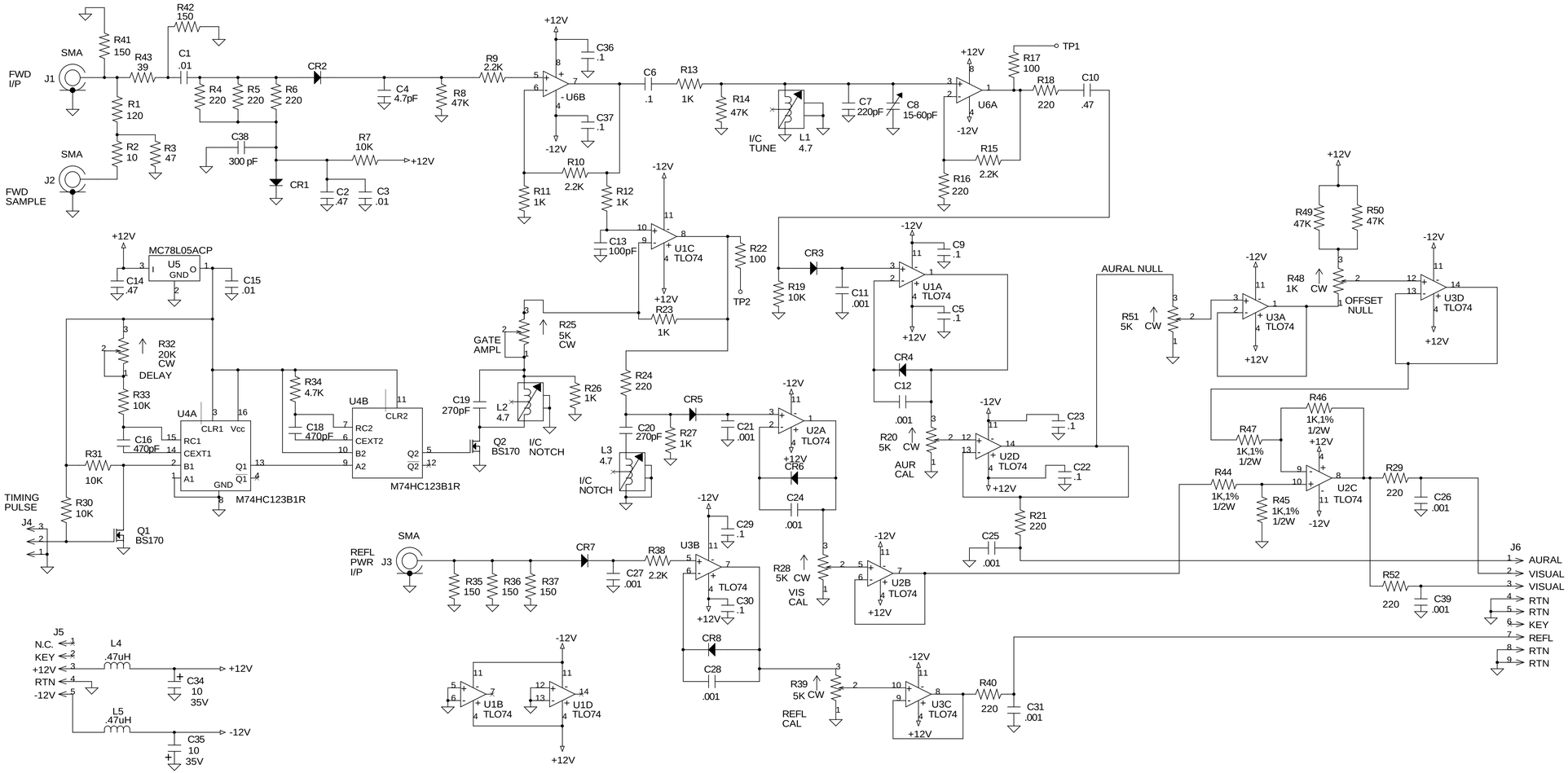
MATERIAL
- - - - -

FINISH
- - - - -

TITLE SCH, PIONEER EX AMP, SGNL (1303344)

DWN	REH	9/24/03	DWG. NO.	REV
CHK	REH	10/8/03	1303346	B0
REL	REH	10/8/03	D SCALE - - -	SHEET 1 OF 1



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.
4) ALL DIODES ARE 5082-2811 UNLESS NOTED OTHERWISE.
5) ALL TRANSISTORS ARE BS170 UNLESS NOTED OTHERWISE.
6) U6 IS HA50231B OR LT1229CS8.

REV			
ADDED R52 AND C39. (PJK)			
A0	20092325	5/31/01	LRT
R8 WAS 4.7K. (TMY)			
5	8470	9/30/96	LRT
R7 WAS 100K. (PJK)			
4	8408	9/9/96	JAG
ADDED R41 - R51 & C38. R13 WAS 10K, R19 WAS 2.2K, R7 WAS 10K. CHGD U1A TO U6B. CHGD U1D TO U1A. ADDED CIRCUIT TO U2B & U2D. ENLARGED TO "D" SIZE DWG. (TMY)			
3	8052	7/16/96	JAG
C7 WAS 160pF. J6 WAS A 7 PIN CONNECTOR. (PJK)			
2	8026	4/2/96	LRT
ADDED U6, C36, C37. ADDED NOTE #6. U5 WAS M78L05ACN. L5 WAS CONNECTED TO J5-1. U6A WAS U1A. 1A WAS U1B. U2D WAS U2A. U2A WAS U2B. U2B WAS U3D. (PJK)			
1	7999	3/4/96	LRT

APV	ADC Telecommunications	REV	ECO	DATE	APV
DATE	THIS PRINT IS THE PROPERTY OF ADC, IT SHALL NOT BE COPIED WITHOUT PERMISSION	TITLE 91-00-00-50AC-61 SCH., VIS/AURAL MTRNG BD (1265-1309)			
ECO	MATERIAL -----	DWN	PJK	12/21/95	DWG. NO. 1265-3309 REV A0
REV	FINISH -----	CHK	DWB	1/3/96	
		REL	DWB	1/3/96	D SCALE --- SHEET 1 OF 1

REAR PANEL

14 AWG

J4 +32VDC (DRIVER/PALLET#1) → E13
+32VDC (PALLET#2) → E16 / FL6
E17 / FL7

J5 → CHASSIS GND

J4 → J4 FRONT PANEL FOWARD SAMPLE

J3 ← FOWARD POWER SAMPLE

J5 ← REFLECTED POWER SAMPLE

A6
AMP CONTROL BOARD
(1301962)
KEYS: J7-2,J8-5,J9-4

J6 ← FL1 GND 2
J6 ← TEMP 1 / FL2

A7
TEMP SENSOR

J3 ← DEVICE CURRENTS → J8

J3 ← SYSTEM SERIAL + /- → J7

J3 ← ± 12VDC → J7

J3 ← POWER SUPPLY CNTRL → J8

J3 ← AGC#2 VOLTAGE → J9

E19 → FL3 +32VDC

E20 → FL5 +32VDC

E18 → FL4 +32VDC

J7-3

20 AWG

+12VDC RTN

+12VDC

CHASSIS GND

J3-1

J3-2

A1
PHASE/GAIN BOARD, UHF
(1303213)

RF I/P J1 ← +29 dBm (.8W PK-SYNC) / +26 dBm DTV (.4W AVG)

J1 → J2 SMA → +25 dBm (.32W PK-SYNC) / +22 dBm DTV (.16W AVG)

J3 +Vcc

A2
150W DRIVER PALLET
(1303293)

J2 → +39 dBm (8W PK-SYNC) / +36 dBm DTV (4W AVG)

J4 → +39 dBm (8W PK-SYNC) / +36 dBm DTV (4W AVG)

E01

A3
UHF MODULE ASSY #1
(1300116)

RF I/P

RF O/P → +52 dBm (160W PK-SYNC) / +49 dBm DTV (80W AVG)

E01

A4
UHF MODULE ASSY#2
(1300116)

RF I/P

RF O/P → +52 dBm (160W PK-SYNC) / +49 dBm DTV (80W AVG)

J2 J1

A5
2-WAY UHF
COMBINER
(1303208)

J4

J3

J5

RF O/P J2 ← +54.8 dBm (300W PK-SYNC) / +51.8 dBm DTV (150W AVG)

REV	ECO	DATE	APV

Axcera

MATERIAL: -----

FINISH: -----

TITLE: B/D
POWER AMPLIFIER ASSY,
250W, INNOVATOR LX

DWN	RGE	11/17/03	DWG. NO. 1303585 REV A0
CHK	LRT	11/18/03	
REL	LRT	11/18/03	D SCALE 1=1 SHEET 1 OF 1

REAR PANEL

14 AWG

J4 +32VDC (DRIVER/PALLET#1)

+32VDC (PALLET#2) J5

CHASSIS GND

14 AWG

E13 E16 E17

FL6 FL7

A6
AMP CONTROL BOARD
(1301962)
KEYS: J7-2,J8-5,J9-4

J3-1 DEVICE ID1 J8-1
J3-2 DEVICE ID2 J8-2
J3-3 DEVICE ID3 J8-3
J3-4 DEVICE ID4 J8-4
J3-5 DEVICE ID5 J8-6
J3-6 DEVICE ID6 J8-7
J3-7 DEVICE ID7 J8-8
J3-8 DEVICE ID8 J8-9
J3-9 SYSTEM SERIAL + J7-6
J3-10 SYSTEM SERIAL − J7-5
J3-12 +12VDC J7-1
J3-13 +12VDC RTN J7-8
J3-14 −12VDC J7-10
J3-15 POWER SUPPLY CNTRL J8-10
J3-19 AGC#2 VOLTAGE J9-2

20 AWG

J7-3

20 AWG

+12VDC RTN

+12VDC

CHASSIS GND

J3-1 J3-2

A1
PHASE/GAIN BOARD, UHF
(1303213)

J1 OSP

SMA RT.A.

UT-141

J1 J2

SMA

UT-141

J4 SMA J4 FRONT PANEL FOWARD SAMPLE

J3 SMA RT.A. FOWARD POWER SAMPLE UT-141

J5 SMA RT.A. REFLECTED POWER SAMPLE UT-141

J6-1 J6-2

FL1 FL2

GND TEMP 20 AWG

2 1

A7
TEMP SENSOR

TAB

CHASSIS GND

SEE DETAIL "A"

E19 E20 E18

FL3 FL5 FL4

14 AWG

16 AWG

J3 +Vcc

A2
150W DRIVER PALLET
(1303293)

J2 J1 J4

BUS WIRE

E01

A3
UHF MODULE ASSY #1
(1300116)

RF I/P RF O/P

BUS WIRE

J4

E01

A4
UHF MODULE ASSY#2
(1300116)

RF I/P RF O/P

BUS WIRE

J3

SMA RT.A. J2

SMA RT.A. J1

A5
2-WAY UHF
COMBINER
(1303208)

J5

J2 OSP

TAB (GND)

1 2 3

TRIM LEAD BACK TO BODY

DETAIL "A"

NOTE: ALL WIRES ARE 22AWG UNLESS OTHERWISE NOTED.

REV	ECO	DATE	APV

Axcera.

MATERIAL -----

FINISH -----

TITLE I/C
POWER AMPLIFIER ASSY,
250W, INNOVATOR LX

DWN	MH	10/29/03	DWG. NO.		REV
CHK	JCM	11/5/03	1303510		A0
REL	JCM	11/5/03	D	SCALE 1=1	SHEET 1 OF 1

Serial Address
Fault Monitoring
MC74VHC245DT
MC74HC138A
1085953
CD74HC4051M
2-61100-4472
1095823
453-HC373XX
MC74VHC245DT
Processor Operation
(1.6V = -12V OK)
(2.72V = -12V missing)
(-.7V = +12V missing)
(See note on sheet 3)
Off Board Wired Connections
FIRMWARE CONFIGURATION
PROGRAMMING ENABLED
MANUAL MICRO RESET
SERIAL PROGRAMMING PORT
ENABLED
DC OK
TEMP
MOD OK

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

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

R51 & R139 WERE 20K. R64, R141 & R154 WERE 10K. R65 WAS 5.11K. R66 WAS 13K. R94 WAS 2.7K. R97 WAS 1K, 5%. R136 WAS 15K. ADDED C104 THRU C109. ADDED NOTES ON SHEETS 1 AND 3. Q18 NOT INSTALLED. (CR)

D0	20111061	10/21/03	REH

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)

B0	20110900	7/31/03	REH

APV	Axcera	REV	ECO	DATE	APV

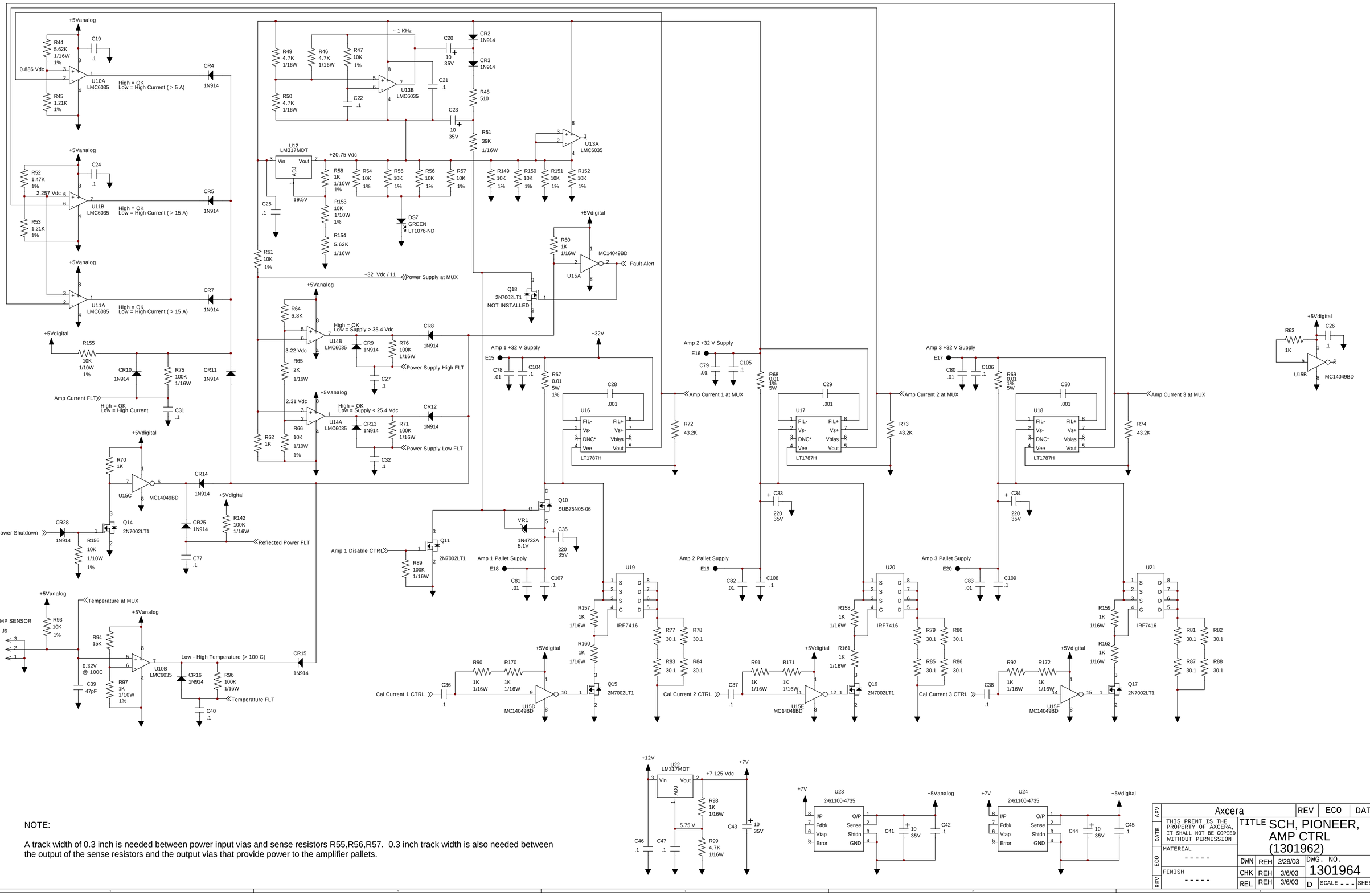
DATE: THIS PRINT IS THE PROPERTY OF AXCERA, IT SHALL NOT BE COPIED WITHOUT PERMISSION

ECO: MATERIAL -----

REV: FINISH -----

TITLE: SCH, PIONEER, AMP CTRL (1301962)

			DWG. NO.	REV
DWN	REH	2/28/03	1301964	D0
CHK	REH	3/6/03		
REL	REH	3/6/03	D	SCALE --- SHEET 1 OF 3



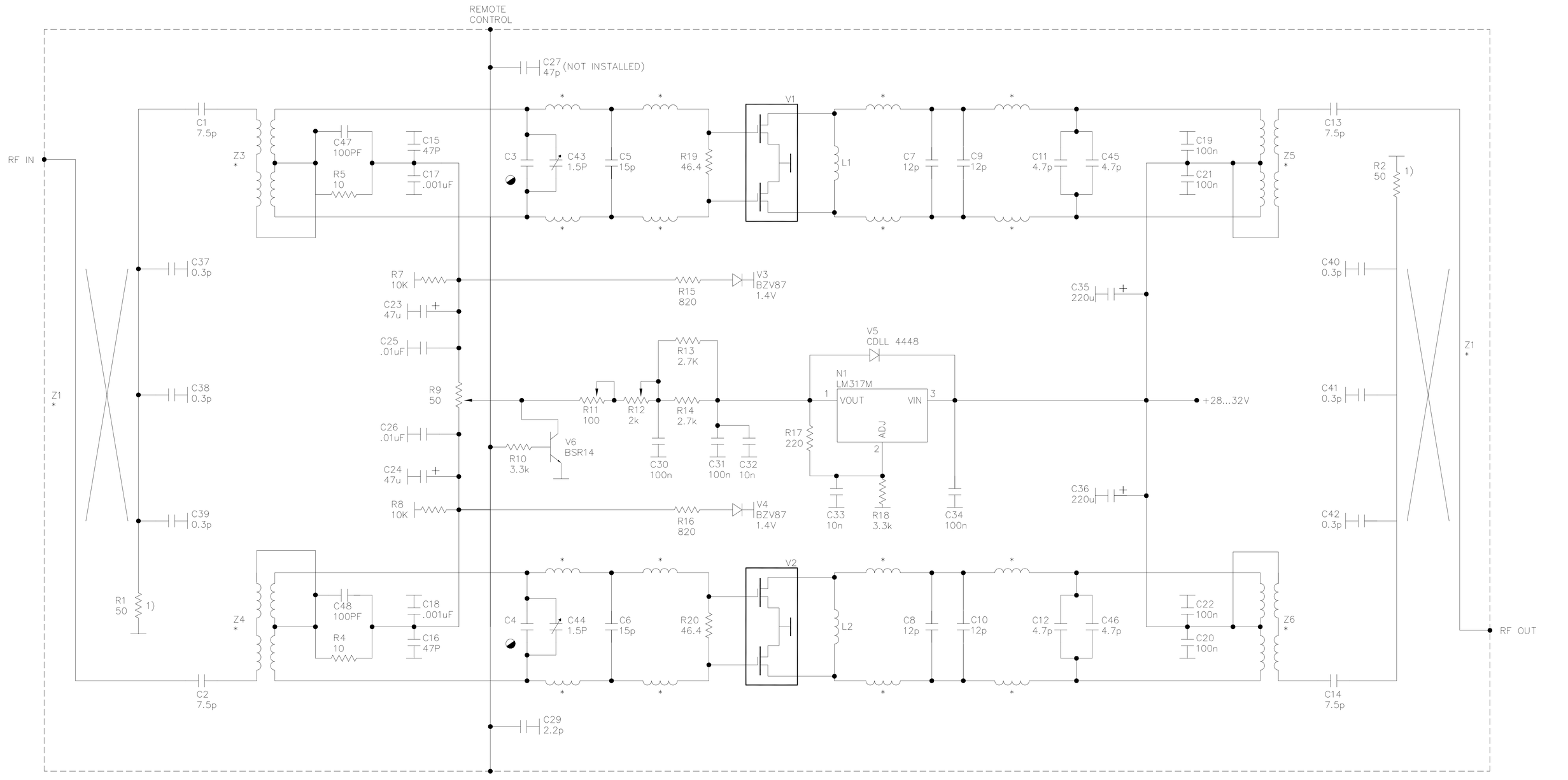
NOTE:

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.

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

TITLE SCH, PIONEER, AMP CTRL (1301962)

DWN	REH	2/28/03	DWG. NO. 1301964	REV D0
CHK	REH	3/6/03		
REL	REH	3/6/03	D	SCALE --- SHEET 2 OF 3



* PRINTED COMPONENT

FACTORY SET VALUE

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

REV	ECO	DATE	APV
BO	20100316	04/02/02	LRT
CO	20110221	5/17/02	RE

DELETED PTF10159 P/N FROM LDMOS. ADDED C23,C24 & C27. CDD/CR

R15 AND R16 WERE 680 OHMS. PWN

REV	DESCRIPTION	DATE	BY
D0	20110444	09/18/02	RJ

CHANGE R3 FROM A 2.2 OHM RESISTOR TO C47, SM., CAP., 100PF, 500WVDC. CHANGE R6 FROM A 2.2 OHM RESISTOR TO C48, SM., CAP., 100PF, 500WVDC. CHANGE R4 FROM A 2.2 OHM RESISTOR TO 1590600OSMT, SM., RES., 10 OHM 5% 1/8W. CHANGE R5 FROM A 2.2 OHM RESISTOR TO 1590600OSMT, SM., RES., 10 OHM 5% 1/8W. CHANGE C17 FROM A 47PF CAP, FIXED CERAMIC, 47 PF TO 1590616OSMT, SM., CAP., .001 UF, 50 WVDC. CHANGE C18 FROM A 47PF CAP, FIXED CERAMIC, 47 PF TO 1590616OSMT, 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, 1590616ISMT, SM., CAP., .01 UF, 50 WVDC. ADD C26, 1590616ISMT, SM., CAP., .01 UF, 50 WVDC. PWN

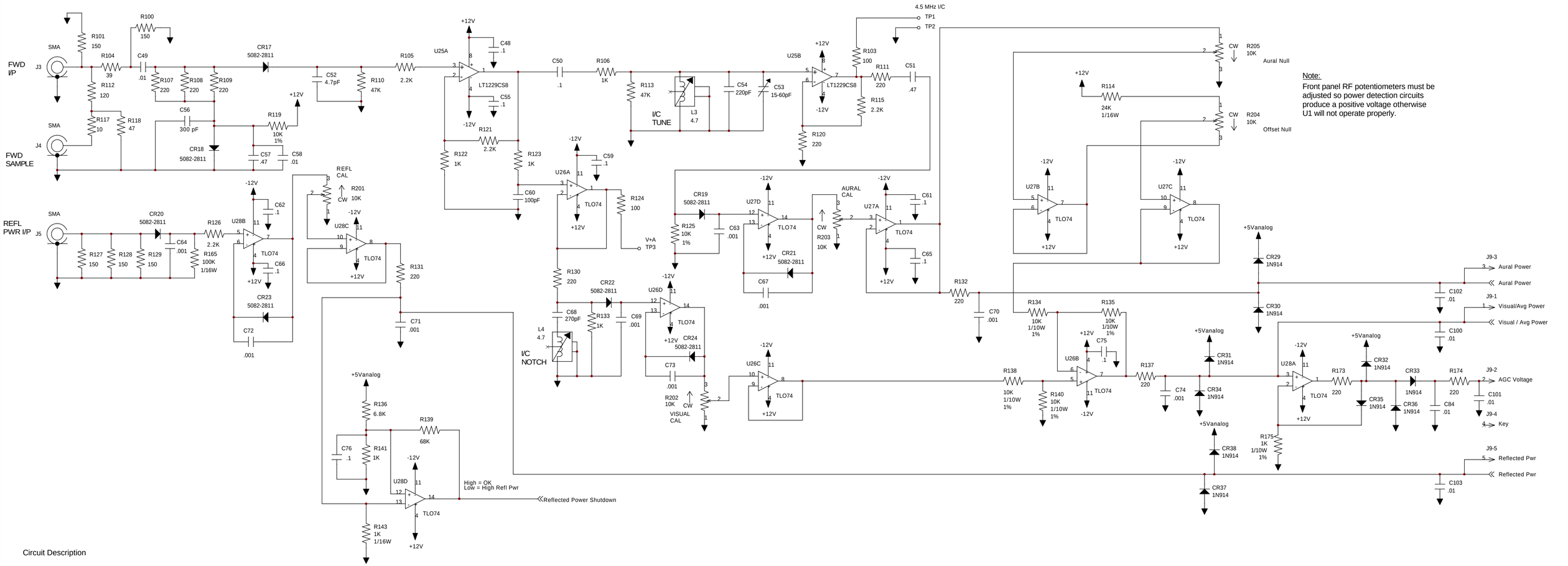
Axcera

MATERIAL

FINISH

TITLE AMPLIFIER MODULE

DWN	PWN	04/01/02	DWG. NO.	REV
CHK	LRT	04/03/02	51-5379-309-00 WSP	D0
REL	LRT	04/03/02	SCALE D	SHEET 1 OF 1



Note:
Front panel RF potentiometers must be adjusted so power detection circuits produce a positive voltage otherwise U1 will not operate properly.

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 sqr. 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 of 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.

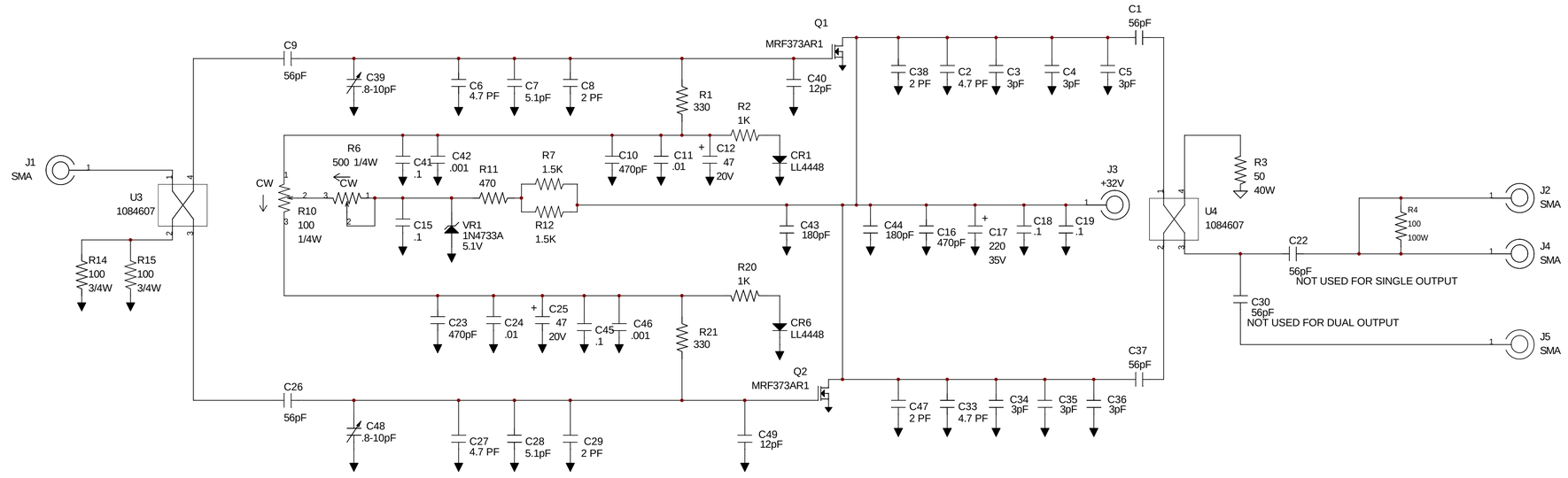
Page 3:

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. 1301964 REV D0
REV	FINISH -----	CHK	REH	3/6/03	
		REL	REH	3/6/03	D SCALE --- SHEET 3 OF 3

LAST USED REF.
C49
J6
R27
Q2
CR6
U5
VR1



ADDED C40 - C49. C2, C3, C4, C5, C6, C7, C8, C27, C28, C29, C33, C34, C35 & C36 WERE 56pF. R1 & R21 WERE 33 Ohm. C12 & C25 WERE 10uF, 35V. SWITCHED PIN 1 & 3 CONN. ON R6. DELETED U5. JKF

REV	ECO	DATE	APV
B0	20111082	10/31/03	TB

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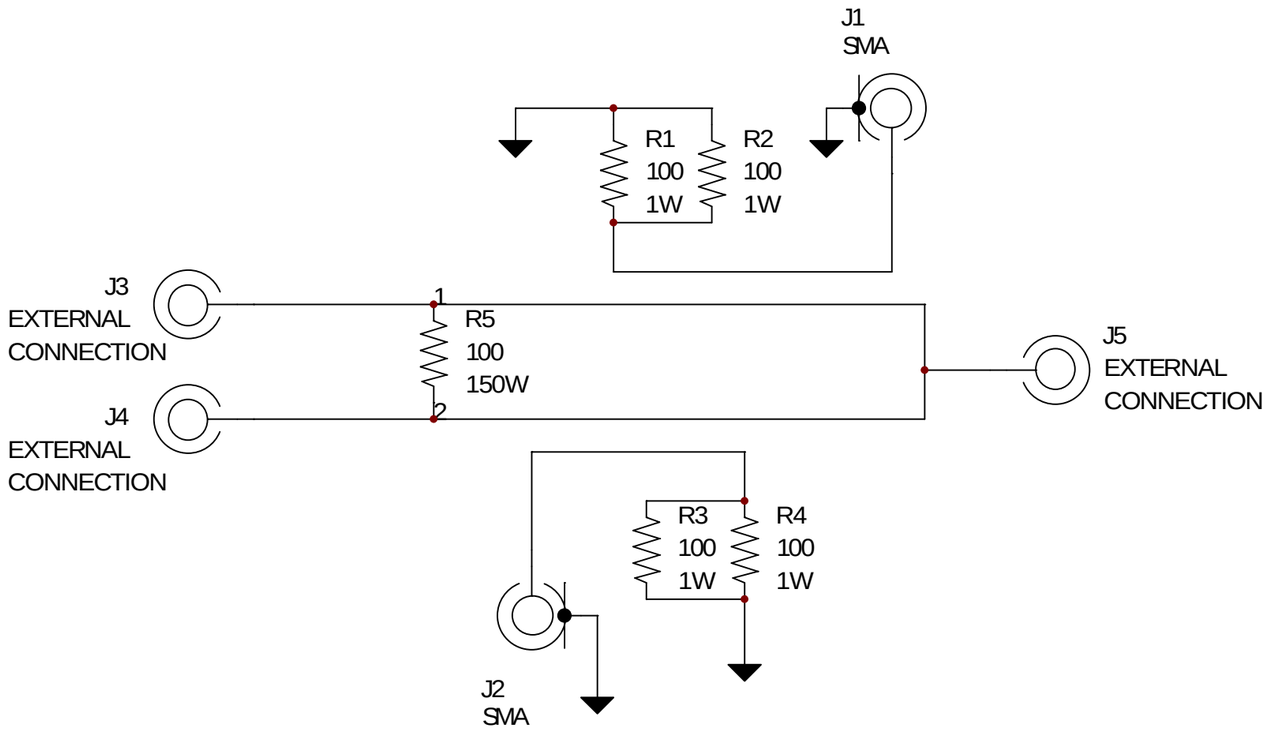
MATERIAL -----

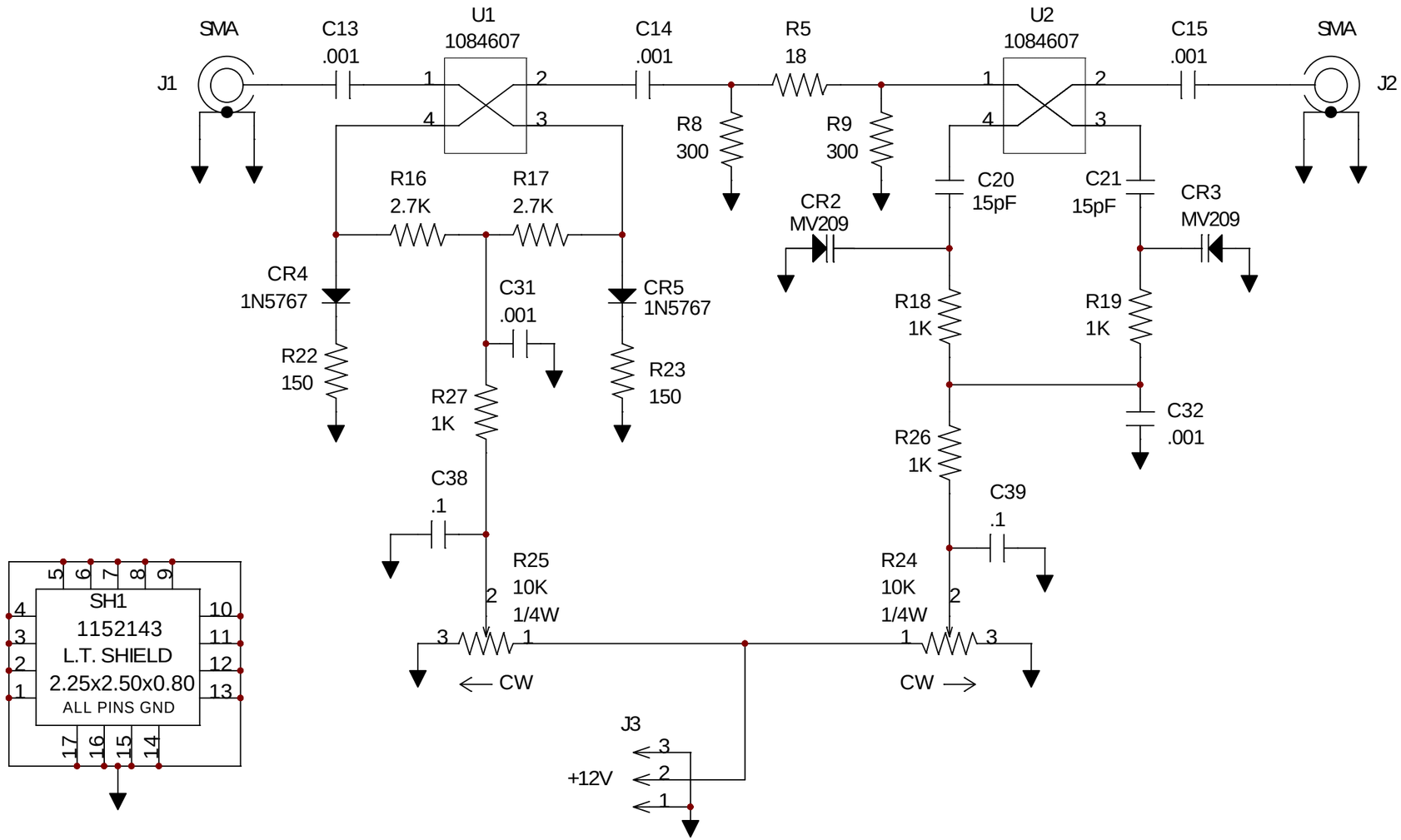
FINISH -----

TITLE SCH., 150W, DRIVER, UHF. (1303169)

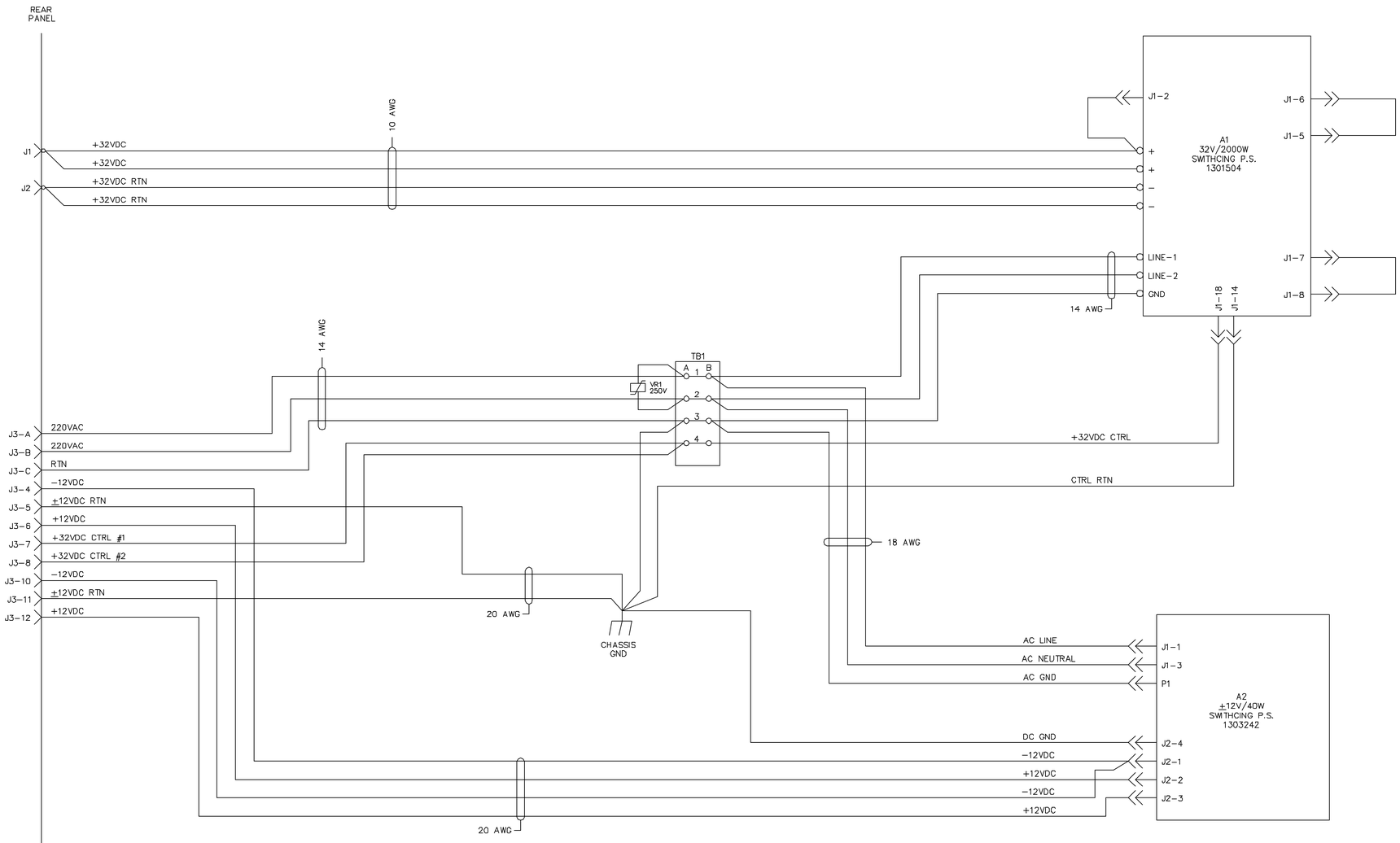
			DWG. NO.	REV
DWN	TB	8/15/03	1303171	B0
CHK	TB	9/12/03		
REL	TB	9/12/03	D	SCALE - - - SHEET 1 OF 1



APV	Axcera	REV	ECO	DATE	APV
DATE	THIS PRINT IS THE PROPERTY OF AXCERA, IT SHALL NOT BE COPIED WITHOUT PERMISSION	TITLE	SCH., 2 WAY COMBINER, UHF (1303208)		
ECO	MATERIAL -----	DWN	JKF	9/11/03	DWG. NO. 1303211 / REV A0
REV	FINISH -----	CHK	TB	9/11/03	
		REL	TB	9/11/03	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., PHASE / GAIN BD., UHF (1303213)		
ECO	MATERIAL -----	DWN	JKF	9/2/03	DWG. NO. 1303216 / REV A0
REV	FINISH -----	CHK	TB	9/11/03	
		REL	TB	9/11/03	B / SCALE --- / SHEET 1 OF 1



NOTE: ALL WIRES ARE 22AWG UNLESS OTERHWISE NOTED.

REV	ECO	DATE	APV

Axcera.

MATERIAL
–––––

FINISH
–––––

TITLE
I/C
POWER SUPPLY ASSY
1KW, INNOVATOR LX

DWN	MH	10/24/03	DWG. NO.		REV
CHK	JCM	11/5/03	1303479		A0
REL	JCM	11/5/03	D	SCALE 1=1	SHEET 1 OF 1