## J40 Receiver

RCVR_IF_OUT 2B
Add Hole for Cable LO2 5B
RF_SPARE_2 8B
Add Hole for Cable LO1 11B
RCVR_MUTE 13A
BANDSWITCH 13B
RCVR_ALC_FAULT 14A
SPARE_AIN_1 14C
RCVR_PLL_LOCK 15A
SPARE_AIN_2 15C
RCVR_ALC_VOLTAGE 16A
RCVR_INTERLOCK 16C
SPARE_DIN_4 17A
SPARE_DIN_5 17B
SPARE_DOUT_2 17C
System +12Vdc_C3 18A
System +12Vdc_C3 18B
System +12Vdc_C3 18C
System -12Vdc_C1 19A
System -12Vdc_C1 19B
System -12Vdc_C1 19C
System_Serial+ 20B
System_Serial- 20C
MOD_10_MHz_INPUT 22B
RCVR_RF_IN 25B
28B
31B

MOD_EXTERNAL_CW_PRESENT
MOD_OUTPUT_SIGNAL_LEVEL
MOD_AURAL_DEVIATION_LEVEL
MOD_INTERLOCK
MOD_BASEBAND_AUDIO(+)
MOD_BASEBAND_AUDIO(-)
MOD_COMPOSITE_AUDIO(-)
MOD_COMPOSITE_AUDIO(+)
MOD_SAP/PRO_AUDIO(+)
MOD_SAP/PRO_AUDIO(-)
MOD_VIDEO(-)
MOD_VIDEO(+)
MOD_STATION_ID_CONTROL
System +12Vdc_C4
System -12Vdc_C1
SPARE_AUX_I/O_3
SPARE_AUX_I/O_4
MOD_CW_IF_INPUT
MOD_PLL_UNLOCKED

## J41A Modulator

## J41B

System +12Vdc_C4 25B
System -12Vdc_C1 26B
MOD_VISUAL_IF_INPUT 3C
MOD_AURAL_IF_OUTPUT 6C
MOD_VISUAL_IF_OUTPUT 17C
MOD_AURAL_IF_INPUT 23C
System +12Vdc_C4 25C
System -12Vdc_C1 26C
MOD_COMBINED_IF_OUTPUT 28C
MOD_10_MHz_INPUT 30C

## J41C

913642

## J42A IF Processor

System +12Vdc_C4
System -12Vdc_C1
SPARE_AUX_I/O_3
SPARE_AUX_I/O_4
System +12Vdc_C4
System -12Vdc_C1

## J42B

MOD_COMBINED_IF_OUTPUT 32B
IF_PROCS_IF_2_UC 1C

## J42C

V4204
IF_PROCS_ALC_AUTO_MANUAL_SW 6C
IF_PROCS_MODULATION_PRESENT 7C
IF_PROCS_INPUT_FAULT 8C
IF_PROCS_SELECTED_IF_SOURCE 9C
IF_PROCS_MUTE_COMMAND 10C
IF_PROCS_ALC_VOLTAGE 11C
IF_PROCS_INTERLOCK 12C
IF_PROCS_BOARD_TYPE 13C
IF_PROCS_IF_SIGNAL_SELECT 14C
System +12Vdc_C4 16C
System -12Vdc_C1 18C
IF_PROCS_MODULATED IF INPUT 21C
IF_PROCS_IF_POWER_CTRL 24C
IF_PROCS_DLC_VOLTAGE 30C

913642

## J43 Upconverter

IF_PROCS_IF_2_UC 2B
Add Hole for Cable LO 2 5B
RF_SPARE_1 8B
Add Hole for Cable LO 1 11B
UC_AFC_VOLTAGE 13A
SPARE_AUX_I/O_3 13B
BANDSWITCH 13C
UC_EXTERNAL_REF_INDICATOR 14A
UC_AGC_#1_VOLTAGE 14C
UC_PLL_LOCK_INDICATOR 15A
UC_AGC_#2_VOLTAGE 15C
IF_PROCS_ALC_VOLTAGE 16A
UC_INTERLOCK 16C
UC_SERIAL_CLOCK 17A
UC_SERIAL_DATA 17B
UC_SERIAL_LOGIC_ENABLE 17C
System +12Vdc_C5 18A
System +12Vdc_C5 18B
System +12Vdc_C5 18C
System -12Vdc_C1 19A
System -12Vdc_C1 19B
System -12Vdc_C1 19C
System_Serial+ 20B
System_Serial- 20C
EXT_10_MHz_INPUT 22B
UC_RF_OUTPUT 25B
SYSTEM_10_MHz_OUTPUT 28B
MOD_10_MHz_INPUT 31B

RCVR_IF_OUT — J13 BNC — RECEIVER IF OUT
RCVR_RF_IN — J12 BNC — RECEIVER RF IN
RF_SPARE_2 — J14 BNC — RF SPARE 2
RF_SPARE_1 — J15 BNC — RF SPARE 1

## J44A Control

RMT_INTERLOCK_ISOLATED_RTN 1A
System +12Vdc_C3 2A
System -12Vdc_C2 3A
System -12Vdc_C1 4A
System +12Vdc_C6 5A
System +12Vdc_C5 6A
System +12Vdc_C4 7A
RMT_TRANSMITTER_STATE 9A
RMT_INTERLOCK 10A
RMT_AUX_I/O_1 11A
RMT_RF_SYSTEM_INTERLOCK 12A
RMT_SET_TO_OPERATE_CMD 13A
RMT_SET_TO_STAND-BY_CMD 14A
RMT_POWER_RAISE 15A
RMT_POWER_LOWER 16A
RMT_SYSTEM_REFLECTED_PWR 17A
RMT_SYSTEM_VISUAL_PWR 18A
RMT_SYSTEM_AURAL_PWR 19A
SYSTEM_REFLECTED_PWR 21A
SYSTEM_VISUAL_PWR 22A
SYSTEM_AURAL_PWR 23A
UC_PLL_LOCK_INDICATOR 24A
UC_AFC_VOLTAGE 25A
UC_AGC_#1_VOLTAGE 26A
UC_AGC_#2_VOLTAGE 27A
UC_INTERLOCK 28A
UC_SERIAL_CLOCK 29A
UC_SERIAL_DATA 30A
UC_SERIAL_LOGIC_ENABLE 31A
UC_EXTERNAL_REF_INDICATOR 32A

## J44B

System_Serial- 1B
System +12Vdc_C3 2B
System -12Vdc_C2 3B
System -12Vdc_C1 4B
System +12Vdc_C6 5B
System +12Vdc_C5 6B
System +12Vdc_C4 7B
RCVR_INTERLOCK 9B
RCVR_ALC_FAULT 10B
RCVR_PLL_LOCK 11B
SPARE_DIN_4 12B
SPARE_DIN_5 13B
PA_VISUAL_POWER 14B
PA_AURAL_POWER 15B
PA_REFLECTED_POWER 16B
SPARE_AIN_1 17B
SPARE_AIN_2 18B
RCVR_ALC_VOLTAGE 19B
RCVR_MUTE 21B
SPARE_DOUT_2 22B
RMT_SPARE_1 23B
RMT_SPARE_2 24B
Auto_Test_1 25B
Auto_Test_2 26B
SCADA_232_B_IN 30B
SCADA_232_A_IN 31B
SCADA_485- 32B

## J44C

System_Serial+ 1C
System +12Vdc_C3 2C
System -12Vdc_C2 3C
System -12Vdc_C1 4C
System +12Vdc_C6 5C
System +12Vdc_C5 6C
System +12Vdc_C4 7C
MOD_EXTERNAL_CW_PRESENT 9C
MOD_OUTPUT_SIGNAL_LEVEL 10C
MOD_AURAL_DEVIATION_LEVEL 11C
MOD_PLL_UNLOCKED 12C
MOD_INTERLOCK 13C
MOD_STATION_ID_CONTROL 14C
IF_PROCS_ALC_AUTO_MANUAL_SW 16C
IF_PROCS_MODULATION_PRESENT 17C
IF_PROCS_INPUT_FAULT 18C
IF_PROCS_SELECTED_IF_SOURCE 19C
IF_PROCS_MUTE_COMMAND 21C
IF_PROCS_ALC_VOLTAGE 22C
IF_PROCS_INTERLOCK 23C
IF_PROCS_BOARD_TYPE 24C
IF_PROCS_IF_POWER_CTRL 25C
IF_PROCS_DLC_VOLTAGE 26C
SCADA_232_B_OUT 30C
SCADA_232_A_OUT 31C
SCADA_485+ 32C

SPARE_TB_D_DIN_[1..8]

## TB02 BASE BAND AUDIO

MOD_BASEBAND_AUDIO(+) 1
MOD_BASEBAND_AUDIO(-) 2
3
MOD_COMPOSITE_AUDIO(+)
MOD_COMPOSITE_AUDIO(-)
MOD_SAP/PRO_AUDIO(+)
MOD_SAP/PRO_AUDIO(-)
MOD_VIDEO(+)
MOD_VIDEO(-)
MOD_VISUAL_IF_INPUT
MOD_AURAL_IF_INPUT
MOD_CW_IF_INPUT
IF_PROCS_MODULATED IF INPUT
EXT_10_MHz INPUT
SYSTEM_10_MHz_OUTPUT
MOD_VISUAL_IF_OUTPUT
MOD_AURAL_IF_OUTPUT
UC_RF_OUTPUT
RMT_TRANSMITTER_STATE
RMT_INTERLOCK
RMT_INTERLOCK_ISOLATED_RTN
RMT_AUX_I/O_1
RMT_RF_SYSTEM_INTERLOCK
RMT_SET_TO_OPERATE_CMD
RMT_SET_TO_STAND-BY_CMD
RMT_POWER_RAISE
RMT_POWER_LOWER
RMT_SYSTEM_REFLECTED_PWR
RMT_SYSTEM_VISUAL_PWR
RMT_SYSTEM_AURAL_PWR
RMT_SPARE_1
RMT_SPARE_2
System +12Vdc_C6
System -12Vdc_C2
IF_PROCS_IF_SIGNAL_SELECT
IF_PROCS_DLC_VOLTAGE
UC_AGC_#2_VOLTAGE
SYSTEM_REFLECTED_PWR
SYSTEM_VISUAL_PWR
SYSTEM_AURAL_PWR
System +12Vdc_C6
System -12Vdc_C2

J3 BNC COMPOSITE AUDIO
J4 BNC SAP/PRO AUDIO
J7 BNC VIDEO INPUT
J17 BNC VIDEO LOOP-THRU
J11 BNC SYSTEM 10 MHz OUTPUT
L1 .27uH
C1 .001
J10 BNC EXTERNAL 10 MHz INPUT
J18 BNC VISUAL IF LOOP-THRU INPUT
J19 BNC AURAL IF LOOP-THRU INPUT
J5 BNC CW IF INPUT
J6 BNC MODULATED IF INPUT
J8 BNC VISUAL IF LOOP-THRU OUTPUT
J9 BNC AURAL IF LOOP-THRU OUTPUT
J23 BNC UPCONVERTER RF OUTPUT

C2 .01, C3 .01, C4 .01, C5 .01, C6 .01, C7 .01, C8 .01, C9 .01
C10 .01, C11 .01, C12 .01, C13 .01, C14 .01
C15 .01, C16 .01, C17 .01, C18 .01, C19 .01, C20 .01, C21 .01, C22 .01, C23 .01, C24 .01

## TB30

## TB31

## J32 SCADA (Input / Loop-Thru)

SCADA_485+ 1
SCADA_485- 2
SCADA_485+ 4
SCADA_485- 5
SCADA_232_A_IN 7
SCADA_232_A_OUT 8
GND 9
GND 10
95123-2881

## J33 SCADA (Input / Loop-Thru)

SCADA_485+ 1
SCADA_485- 2
SCADA_485+ 4
SCADA_485- 5
SCADA_232_B_IN 7
SCADA_232_B_OUT 8
GND 9
GND 10
95123-2881

## J34 System RS-485 Serial

UC_AGC_#2_VOLTAGE 1
System_Serial+ 4
System_Serial- 5
GND 9
GND 10
95123-2881

## J52

PA_VISUAL_POWER 1
KEY 2
PA_AURAL_POWER 3
PA_REFLECTED_POWER 4
RTN 5

Related Part Numbers:
ASSY: 1304047
SCH: 1304049
PCB: 1304048
STENCIL: 1304050

REMOVED KEY REF FOR TB30 & TB31. JKF

| REV | ECO | DATE | APV |
|---|---|---|---|
| B0 | 20111491 | 8/16/04 | DB |

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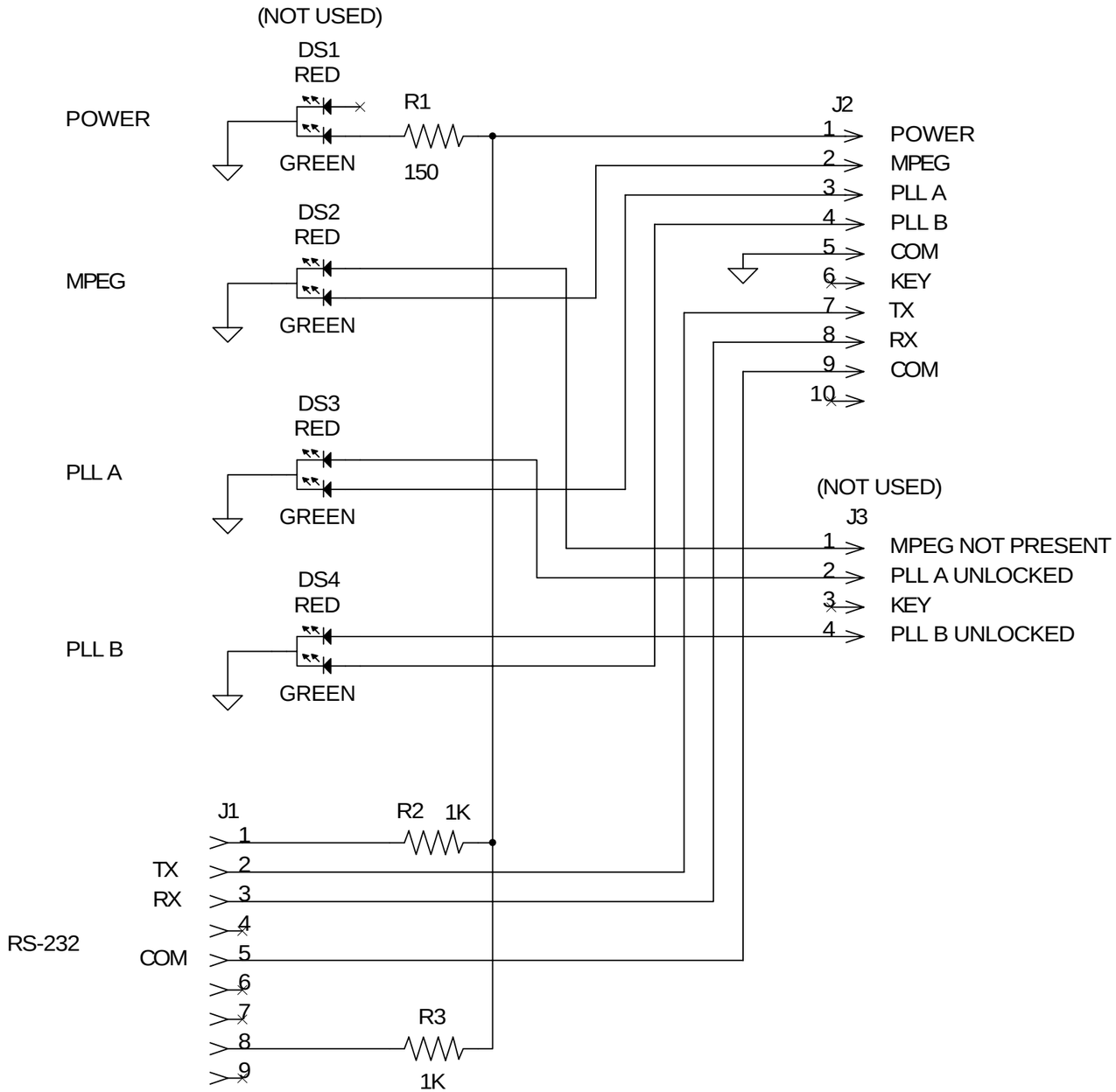
MATERIAL -----

FINISH -----

TITLE SCH, BACKPLANE BOARD, V2, LX (1304047)

| | | | |
|---|---|---|---|
| DWN | DB | 5/3/04 | DWG. NO. 1304049 REV B0 |
| CHK | DB | 5/3/04 | |
| REL | DB | 5/3/04 | D SCALE - - - SHEET 1 OF 1 |




| REV | ECO | DATE | APV |
|---|---|---|---|
| B0 | 20111868 | 11/15/05 | LAJ |

ADDED R1, R2 & R3. ADDED "NOT USED" TO DS1 & J3. (CR)

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MATERIAL: - - - - -

FINISH: - - - - -

TITLE: SCH., 8 VSB FRONT PANEL BD., LX (1305939)

| | | | DWG. NO. | REV |
|---|---|---|---|---|
| DWN | JKF | 4/8/05 | 1305940 | B0 |
| CHK | LAJ | 4/8/05 | | |
| REL | LAJ | 4/8/05 | B | SCALE - - - SHEET 1 OF 1 |

CS[2..0]
ADDR[7..0]
ADDRDAT[7..0]
ADDR[15..8]
DAT[15..8]

U10
AM29LV010B
ADDR11 1 A11
ADDR9 2 A9
ADDR8 3 A8
ADDR13 4 A13
ADDR14 5 A14
NC 6
WE 7
VCC 8
NC 9
ADDR15 11 A15
ADDR12 12 A12
ADDR7 13 A7
ADDR6 14 A6
ADDR5 15 A5
ADDR4 16 A4
OE 32 /RD
A10 31 ADDR10
CE 30 CS2
DQ7 29 ADDRDAT7
DQ6 28 ADDRDAT6
DQ5 27 ADDRDAT5
DQ4 26 ADDRDAT4
DQ3 25 ADDRDAT3
VSS 24
DQ2 23 ADDRDAT2
DQ1 22 ADDRDAT1
DQ0 21 ADDRDAT0
A0 20 ADDR0
A1 19 ADDR1
A2 18 ADDR2
A3 17 ADDR3
/WR
+3.3 V
C4 .01
FLASHPG2

U1
1302044
ADDRDAT0 ADDRDAT1 ADDRDAT2 ADDRDAT3 ADDRDAT4 ADDRDAT5 ADDRDAT6 ADDRDAT7 ADDR15 ADDR14 ADDR13 ADDR12 ADDR11 ADDR10 ADDR9 ADDR8
48 47 46 45 44 43 42 41 40 39 38 37 36 35 34 33
PA3 PA4 PA5 PA6 PA7 ALE PC7 (A15) PC6 (A14) PC5 (A13) PC4 (A12) PC3 (A11) PC2 (A10) PC1 (A9) PC0 (A8) RD WR
49 PA2
50 PA1
51 PA0
52 Vcc
53 GND
54 (ADC7) PF7
55 (ADC6) PF6
56 (ADC5) PF5
57 (ADC4) PF4
58 (ADC3) PF3
59 (ADC2) PF2
60 (ADC1) PF1
61 (ADC0) PF0
62 AREF
63 AGND
64 AVCC
PD7 32 CS2
PD6 31 CS1
PD5 30 CS0
PD4 29 FLASHPG2
PD3 28
PD2 27
PD1 26 /DS
PD0 25 R/W
XTAL1 24
XTAL2 23
GND 22
Vcc 21
RESET 20
TOSC1 19
TOSC2 18
PB7 17 DAT15
PEN 1
PE0 2
PE1 3
PE2 4
PE3 5
PE4 6
PE5 7
PE6 8
PE7 9
PB0 10
PB1 11
PB2 12
PB3 13
PB4 14
PB5 15
PB6 16
DAT8 DAT9 DAT10 DAT11 DAT12 DAT13 DAT14
DAT[15..8]
/STATUSB
/RESETB
/DEVOE
SPMICRO
CODERRESET
ANALOGIN0
+3.3 V
C24 .01
C26 .01
C25 .01
C27 .01
R1 10K
ALE
/RD
/WR
R2 10K
R4 10K
R5 10K
R3 150
46MPLLIND
R7 5.6M .1W
C13 33 PF 50V
Y1 3.6864 MHZ
C21 33 PF 50V
R8 10K
/CONFIGB
Q2 2N7002LT1

U4B
ISL5239KI
ADDR5 D3 A5
ADDR4 E4 A4
ADDR3 C1 A3
ADDR2 C3 A2
ADDR1 D2 A1
ADDR0 C2 A0
DAT15 J5 P15
DAT14 J4 P14
DAT13 K1 P13
DAT12 H2 P12
DAT11 G5 P11
DAT10 H1 P10
DAT9 H5 P9
DAT8 H4 P8
ADDRDAT7 G1 P7
ADDRDAT6 G2 P6
ADDRDAT5 G3 P5
ADDRDAT4 F5 P4
ADDRDAT3 F4 P3
ADDRDAT2 F3 P2
ADDRDAT1 F2 P1
ADDRDAT0 E1 P0
E12 FB19
E13 FB18
D14 FB17
F11 FB16
F12 FB15
E11 FB14
F10 FB13
G12 FB12
G13 FB11
F14 FB10
G11 FB9
J14 FB8
J11 FB7
J12 FB6
J13 FB5
K14 FB4
K13 FB3
L14 FB2
L12 FB1
K11 FB0
M14 FBCLK
J1 CLK
D1 CS
E3 RD
E5 WR
J3 RESET
K4 BUSY
K2 TDO
K3 TCK
L2 TDI
L3 TMS
N1 TRST
L13 TRIGIN
J10 TRIGOUT
H13 SERCLK
H10 SERSYNC
G14 SERIN
G10 SEROUT
NC A1
NC A14
NC B2
NC B13
NC N2
NC N13
DC TEST(NC) L1
NC P1
NC P14
THERMAL F6
THERMAL F7
THERMAL F8
THERMAL F9
THERMAL G6
THERMAL G7
THERMAL G8
THERMAL G9
THERMAL H6
THERMAL H7
THERMAL H8
THERMAL H9
THERMAL J6
THERMAL J7
THERMAL J8
THERMAL J9
65MHZ5
CS1
/RD
/WR
/RESET
SERCLK
SERSYNC
SERIN
SEROUT
R10 10K
VCCIO A12
VCCIO B8
VCCIO B9
VCCIO D12
VCCIO F1
VCCIO H3
VCCIO H12
VCCIO L7
VCCIO M10
VCCIO N12
VCCIO P9
VCCC A2
VCCC A13
VCCC B5
VCCC C10
VCCC E2
VCCC E8
VCCC E14
VCCC K7
VCCC K12
VCCC L10
VCCC N5
VCCC P2
VCCC P13
GND A9
GND A11
GND B14
GND E7
GND F13
GND G4
GND H11
GND J2
GND K8
GND K10
GND M8
GND N11
GND P10
C1 .01
C2 .01
C3 .01
C5 .01
C6 .01
C7 .01
C8 .1
C9 .1
C10 .01
C11 .01
C12 .01
C15 .01
C16 .01
C17 .01
C18 .1
C19 .1
C20 .01
C22 .01
C23 .01
+3.3 V
+1.8 V

R6 150
PROGRAM GREEN
DS1
J2
RX 1
VCC 2
PGM 3
COM 4
RST 5
COM 6
CLK 7
COM 8
TX 9
COM 10
MICRO CONTROLLER PROGRAMMING INTERFACE
PRGRESET
DAT9

U11
MC14066BDR2
IN1 1 VCC 14
OUT1 2 CTRL1 13
OUT2 3 CTRL4 12
IN2 4 IN4 11
CTRL2 5 OUT4 10
CTRL3 6 OUT3 9
GND 7 IN3 8
C14 .01
PRGRESET

U12
LTC1385
DISABLE ON/OFF 1 20
C1+ 2 VCC 19
V+ 3 GND 18
C1- 4 TR1 OUT 17
C2+ 5 RX1 IN 16
C2- 6 RX1 OUT 15
V- 7 TR1 IN 14
TR2 OUT 8 TR2 IN 13
RX2 IN 9 RX2 OUT 12
NC 10 NC 11
C28 .1
C29 .1
C30 .1
C31 .1
C32 .1
C33 100pF
C34 100pF
PRGRESET
R11 100K

DS2
RUN
R9 150
J3
J4
J5
KEY

U13
1302064
WDS PBRST 8 1
RST Vcc 7 2
ST GND 6 3
NMI IN 5 4
/RESET
ALE
PRGRESET
JUMPER
R14 10K
R15 NOT USED
R16 NOT USED
R19 NOT USED
R23 NOT USED
+1.5 V
+1.8 V

RS-485 TERMINATION
W1
J6
R21 120
R22 1K 1/10W 1%
R24 1K 1/10W 1%
U14
LTC1480
RO 1 VCC 8
RE 2 B 7
DE 3 A 6
DI 4 GND 5
C35 .1
RS485P
RS485N
R12 10K
R13 10K
R17 10K
R18 10K
R20 10K

NOTE:
1) ALL RESISTORS ARE 1/16W UNLESS OTHERWISE NOTED.
2) ALL CAPACITORS ARE IN uF UNLESS OTHERWISE NOTED.
3) ALL INDUCTORS ARE IN uH UNLESS OTHERWISE NOTED.

J1 WAS MADE NOT USED IN THIS ASSY. JKF
C0 | 20112851 | 1/24/08 | GJN
CHGD R167 & R173 TO 10K, R184 TO 31.6 OHM, R187 & R189 TO 180 OHM, R190 TO 68 OHM, R207 TO 150K, R222 & R223 TO 100K. ADD JUMPER FROM R14 TO R23 CONN. MADE C216, R15, R16, R19, R23, R182, R183, R186, R197, R198, R208 & R220 NOT USED. JKF
B0 | 20111870 | 10/12/05 | LAJ
REV | ECO | DATE | APV

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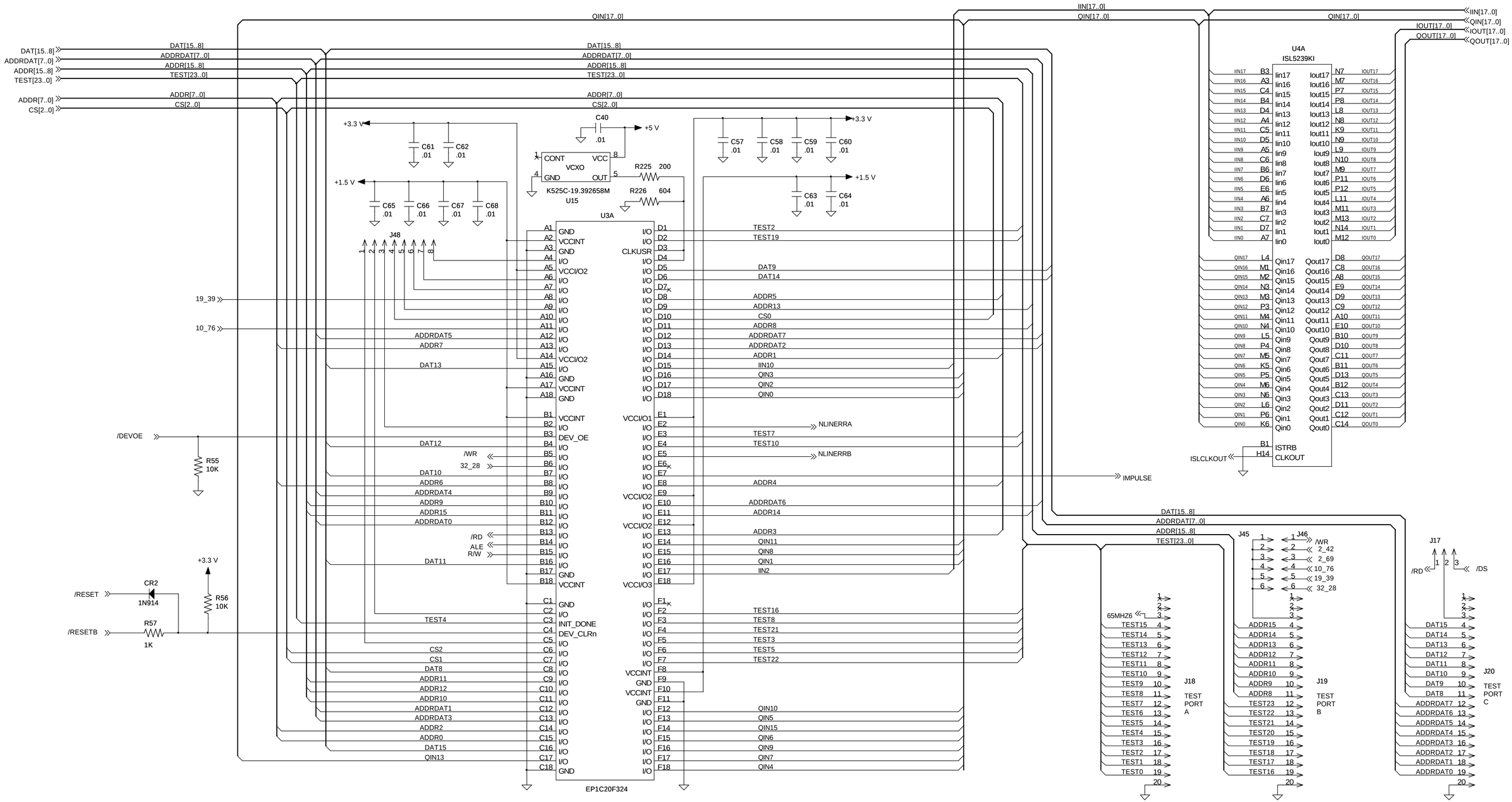
MATERIAL -----
FINISH -----
TITLE SCH., DIGITAL MODULATOR, DT1D (ASSY 1304883)
DWN JKF 5/1/05
CHK LAJ 5/1/05
REL LAJ 5/1/05
DWG. NO. 1304884
REV C0
D SCALE --- SHEET 1 OF 6


DAT[15..8]
ADDRDAT[7..0]
ADDR[15..8]
TEST[23..0]
ADDR[7..0]
CS[2..0]
QIN[17..0]
IIN[17..0]
IOUT[17..0]
QOUT[17..0]
U4A
ISL5239KI
U3A
EP1C20F324
U15
K525C-19.392658M
VCXO
C40
.01
+5 V
+3.3 V
+1.5 V
C61 .01
C62 .01
C65 .01
C66 .01
C67 .01
C68 .01
C57 .01
C58 .01
C59 .01
C60 .01
C63 .01
C64 .01
R225 200
R226 604
J48
19_39
10_76
/DEVOE
R55 10K
/WR
32_28
/RD
ALE
R/W
/RESET
CR2
1N914
R56 10K
/RESETB
R57 1K
IMPULSE
ISLCLKOUT
J18
J19
J20
J45
J46
J17
65MHZ6
TEST PORT A
TEST PORT B
TEST PORT C
/DS
Axcera
REV
ECO
DATE
APV
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TITLE
SCH., DIGITAL MODULATOR, DT1D (ASSY 1304883)
MATERIAL
FINISH
DWN JKF 5/1/05
CHK LAJ 5/1/05
REL LAJ 5/1/05
DWG. NO. 1304884
REV C0
SCALE ---
SHEET 2 OF 6

ID/A[11..0]
QD/A[11..0]
IIN[17..0]
QIN[17..0]
IOUT[17..0]
QOUT[17..0]
TEST[23..0]

+3.3 V
+1.5 V
C69 .01
C70 .01
C71 .01
C72 .01
C73 .01
C74 .01
C75 .01
C76 .01
C77 .01
C78 .01
C238 .01
C80 .01
C81 .01
C82 .01
C83 .01
C84 .01
C85 .01
C86 .01
C87 .01

J21
SPOUT0

U3B
EP1C20F324

TEST20 TEST23 TEST12 TEST17
65MHZBUF ERRORA ASDO
IIN7 IIN11
CONF_DONE
R224 10K
DCLK 2_42 SPMICRO 32MHZ 2_69 ERRORB
SERIN TEST11 TEST0 2_42 19_39
DATA0
VCCINT GND VCCIO1 VCCIO3
IIN4 IIN15 IIN1 IIN16 IIN14 IIN6 IIN13 IIN3
nCSO nCONFIG nCE
65MHZ1 32MHZ 46MHZ 10MHZ
TDI
TEST9 TEST1 2_69 TEST15 SERCLK CBIT7
QOUT2 QOUT12 QOUT11 QOUT7 QOUT15 QOUT1
QOUT3 QOUT4 QOUT5
IIN9 IIN5 IIN0
nSTATUS /STATUSB
R61 10K
QIN17 QIN12 IIN8 IIN12 QIN14 QIN16 IIN17
CODERRESET
R58 10K
R59 10K
C79 .01
/CONFIGB
U9 EPCS4SI8
nCS DATA Vcc GND Vcc DCLK ASDI
C88 .01
DCLK ASDO
J25
CONF_DONE
R62 10K

MPEG DATA CLOCK
TP12 TP13
CONFIG B
IMPULSE
J22 J23
R60 150
DS3 RUN

J7
R25 150
R26 150
R27 150
46MPLLIND
+3.3 V
MPEG ACQD
32M PLL
46M PLL
KEY
COM

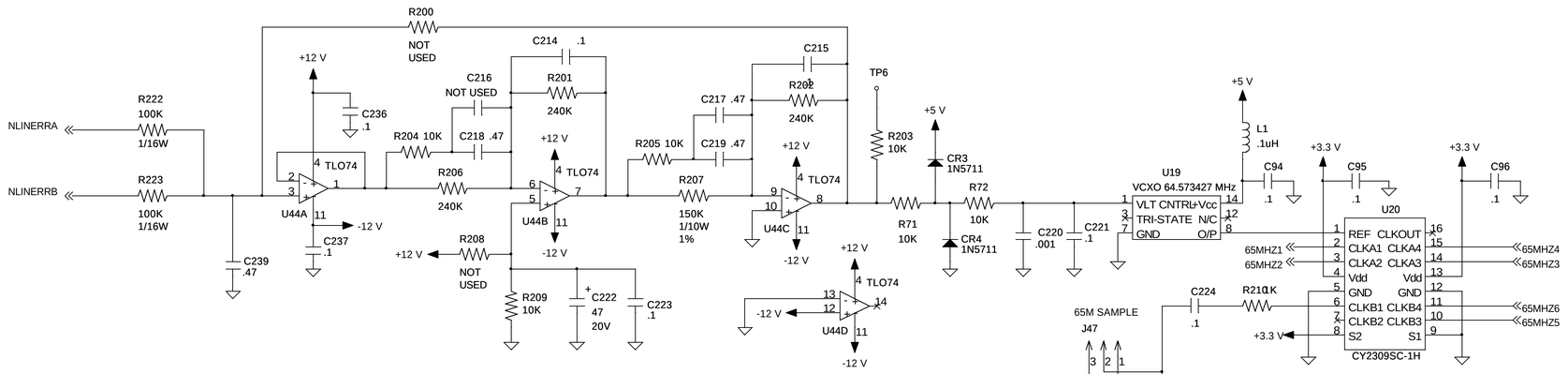
U3C
EP1C20F324

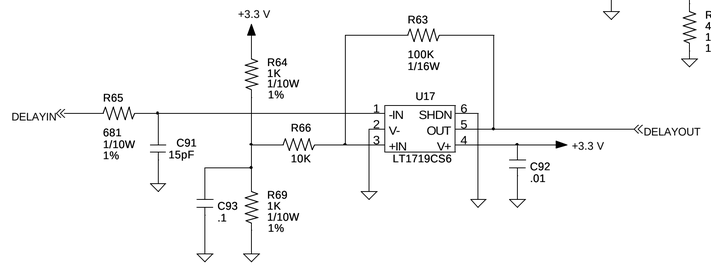
TEST6 TEST14
10_76 DELAYOUT
QOUT6 QOUT16 QOUT13 QOUT0 QOUT8 QOUT17 QOUT14
CBIT3 ISLCLKOUT
TEST13
DELAYIN 65MHZBUF SMPT310
IOUT2 IOUT15 QOUT9 QOUT10
CBIT4
TEST18
SPOUT0 65MHZ2 CBIT6
CBIT5 10MHZ 10MHZEXT SEROUT IOUT0 IOUT5 IOUT4 IOUT7 SERSYNC
ID/A10 ID/A7 ID/A5 ID/A2 QD/A9 QD/A6 QD/A3 QD/A0 IOUT1 IOUT3 IOUT9 IOUT16
ID/A11 ID/A9 ID/A6 ID/A4 ID/A1 QD/A10 QD/A7 QD/A4 QD/A1 IOUT10 IOUT11 IOUT14 IOUT13 IOUT12
ID/A8 ID/A3 ID/A0 QD/A11 QD/A8 QD/A5 QD/A2 IOUT8 IOUT17 IOUT6

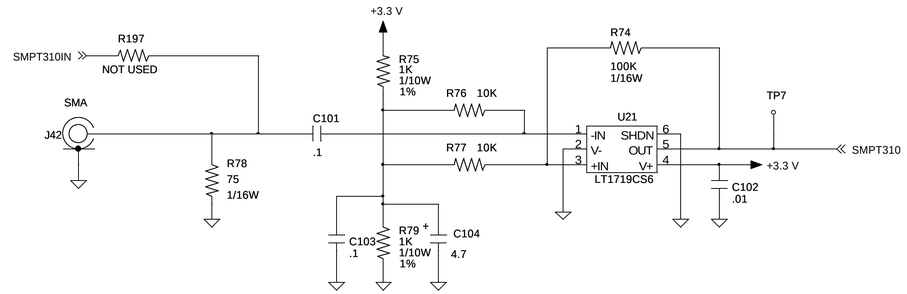
TP5
U43 CXOH-AP3Y-10.000
C89 .01

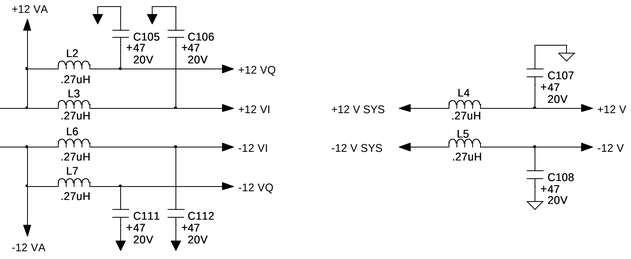
CONFIG A
J26 J27
CBIT3 CBIT4 CBIT5 CBIT6 CBIT7

| | | | | | |
|---|---|---|---|---|---|
| | Axcera | REV | ECO | DATE | APV |
| THIS PRINT IS THE PROPERTY OF AXCERA, IT SHALL NOT BE COPIED WITHOUT PERMISSION | TITLE SCH., DIGITAL MODULATOR, DT1D (ASSY 1304883) | | | | |
| MATERIAL ----- | DWN JKF 5/1/05 | DWG. NO. 1304884 | | REV C0 | |
| FINISH ----- | CHK LAJ 5/1/05 | | | | |
| | REL LAJ 5/1/05 | D | SCALE --- | SHEET 3 OF 6 | |



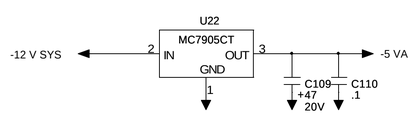



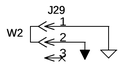



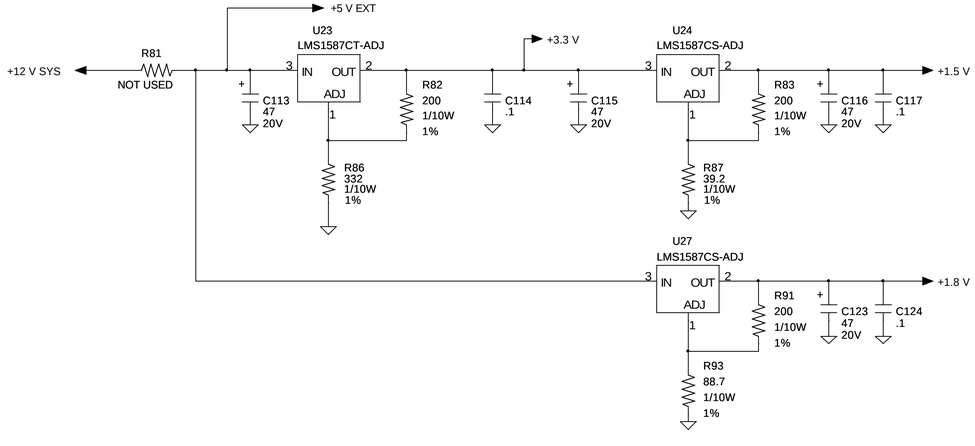



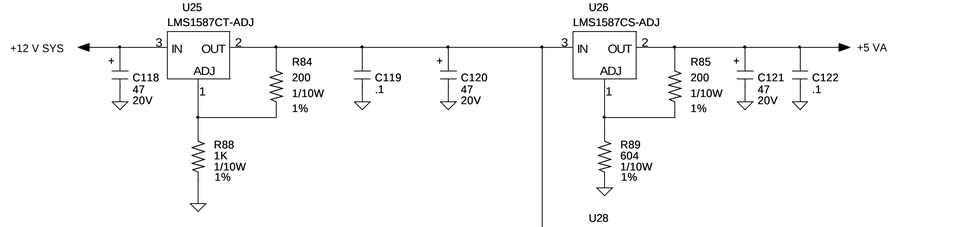


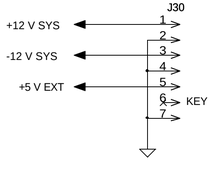


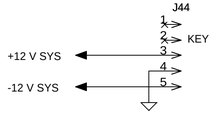


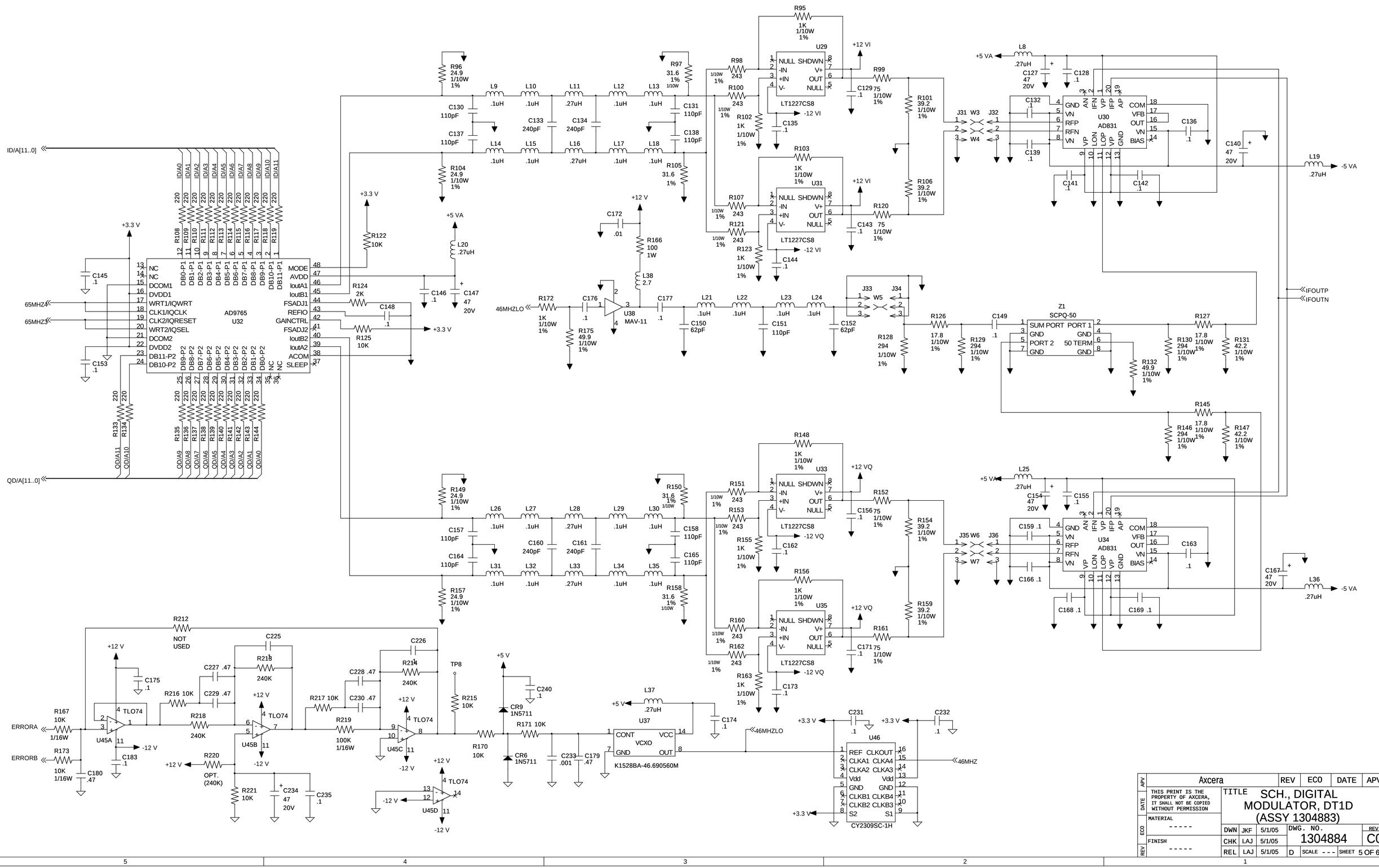




| | | | | | | |
|---|---|---|---|---|---|---|
| APV | Axcera | | REV | ECO | DATE | APV |
| DATE | THIS PRINT IS THE PROPERTY OF AXCERA, IT SHALL NOT BE COPIED WITHOUT PERMISSION | TITLE | SCH., DIGITAL MODULATOR, DT1D (ASSY 1304883) | | | |
| ECO | MATERIAL ----- | DWN | JKF | 5/1/05 | DWG. NO. 1304884 | REV C0 |
| REV | FINISH ----- | CHK | LAJ | 5/1/05 | | |
| | | REL | LAJ | 5/1/05 | D SCALE --- | SHEET 4 OF 6 |




| | | | | | |
|---|---|---|---|---|---|
| APV | Axcera | REV | ECO | DATE | APV |
| DATE | THIS PRINT IS THE PROPERTY OF AXCERA, IT SHALL NOT BE COPIED WITHOUT PERMISSION | TITLE | SCH., DIGITAL MODULATOR, DT1D (ASSY 1304883) | | |
| ECO | MATERIAL ----- | DWN | JKF | 5/1/05 | DWG. NO. 1304884 REV C0 |
| REV | FINISH ----- | CHK | LAJ | 5/1/05 | |
| | | REL | LAJ | 5/1/05 | D SCALE --- SHEET 5 OF 6 |

LAST USED REF

C245
L54
J48
R226
U46
CR9
TP13
VR1
T1
W7
Z1
DS3
Y1
Q2

IFOUTP
IFOUTN
C190 390pF
C201 390pF
L46 .22
L47 .22
C200 .1
R185 49.9 1/10W 1%
+5 VA
L39 .1uH
L40 .1uH
L41 .1uH
L42 .1uH
L43 .1uH
L44 .1uH
L48 .1uH
L49 .1uH
L50 .1uH
L51 .1uH
L52 .1uH
L53 .1uH
C191 120pF
C192 120pF
C195 15pF
C196 82pF
C198 120pF
C199 120pF
C197 15pF
T1
CT SEC PRI NC
T1-1T-KK81

+12 VA
C188 .1
C189 .01
R181 100 1W
L45 2.7
R182 NOT USED
R183 NOT USED
SMA J38
SMA J39
IF OUT
U40 MAV-11
R184 31.6 1/10W 1%
R186 NOT USED
R187 182 1/10W 1%
C193 .1
C194 .1

+12 VA
C203 .01
C202 .1
R188 100 1W
L54 2.7
R189 182 1/10W 1%
R190 68.1 1/10W 1%
C204 .1
C205 .1
U41 MAV-11
IF SAMPLE FRONT PANEL
J40

J37
R180 1M 1/16W
R177 10K 1/16W
VR1 1N4733A 5.1V
C185 .01
R178 10K 1/16W
+12 V
C184 .01
U39A TL082
C187 .01
-12 V
R179 10K 1/16W
+3.3 V
CR7 1N5711
CR8 1N5711
TP9
C186 .1
ANALOGIN0

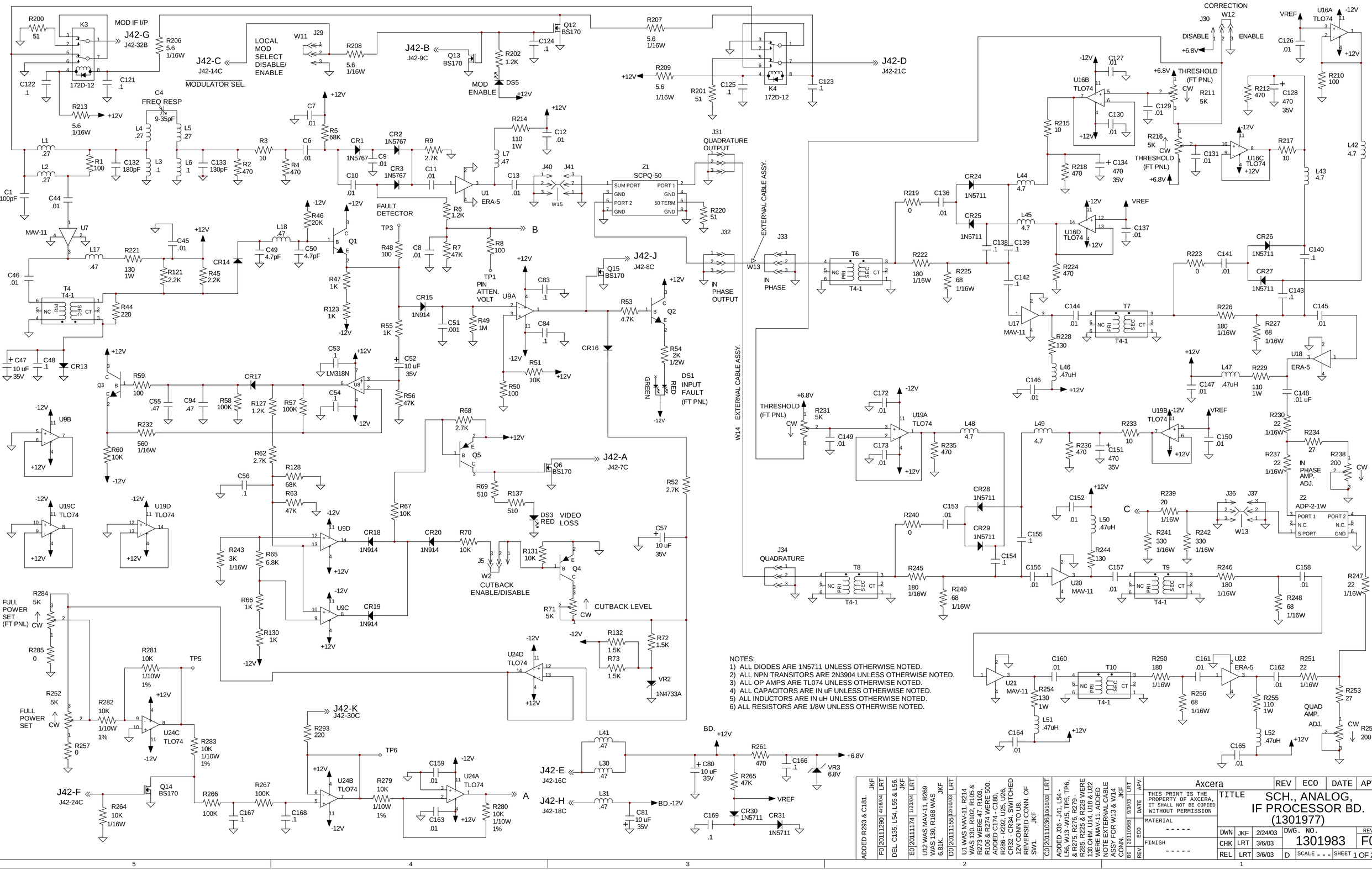
J1
NOT USED
C241 100pF
COM
TP10
NOT USED
J1 IS NOT USED IN THIS ASSY.

C206 +47 20V
C207 .01
C242 100pF
+12 V SYS
C208 +47 20V
C209 .01
C243 100pF
-12 V SYS
RS485P
RS485N
C244 100pF
C245 100pF

R199 0
J41
C210 .1
R195 49.9 1/10W 1%
+3.3 V
R192 1K 1/10W 1%
R193 10K
R194 10K
R191 100K 1/16W
U42
-IN SHDN
V- OUT
+IN V+
LT1719CS6
TP11
10MHZEXT
+3.3 V
C211 .01
C212 .1
R196 1K 1/10W 1%
C213 4.7

SMPT310IN
R198 NOT USED
SMA J43
NOT USED

| | | | | | |
|---|---|---|---|---|---|
| APV | Axcera | REV | ECO | DATE | APV |
| DATE | THIS PRINT IS THE PROPERTY OF AXCERA, IT SHALL NOT BE COPIED WITHOUT PERMISSION | TITLE | SCH., DIGITAL MODULATOR, DT1D (ASSY 1304883) | | |
| ECO | MATERIAL ----- | DWN | JKF | 5/1/05 | DWG. NO. 1304884 REV C0 |
| REV | FINISH ----- | CHK | LAJ | 5/1/05 | |
| | | REL | LAJ | 5/1/05 | D SCALE --- SHEET 6 OF 6 |




NOTES:
1) ALL DIODES ARE 1N5711 UNLESS OTHERWISE NOTED.
2) ALL NPN TRANSITORS ARE 2N3904 UNLESS OTHERWISE NOTED.
3) ALL OP AMPS ARE TL074 UNLESS OTHERWISE NOTED.
4) ALL CAPACITORS ARE IN uF UNLESS OTHERWISE NOTED.
5) ALL INDUCTORS ARE IN uH UNLESS OTHERWISE NOTED.
6) ALL RESISTORS ARE 1/8W UNLESS OTHERWISE NOTED.

| | | | |
|---|---|---|---|
| ADDED R293 & C181. | JKF | | |
| FD \| 20111290 | 4/16/04 | LRT | |
| DEL. C135, L54, L55 & L56. | | JKF | |
| ED \| 20111174 | 1/23/04 | LRT | |
| U12 WAS MAV-11, R269 WAS 130, R168 WAS 6.81K. | | JKF | |
| DD \| 20111155 | 12/10/03 | LRT | |
| U1 WAS MAV-11, R214 WAS 130, R102, R105 & R273 WERE 47, R103, R106 & R274 WERE 500. ADDED C174 - C180, R286 - R292, U25, U26, CR32 - CR34, SWITCHED 12V CONN TO U8, REVERSED CONN. OF SW1. | | JKF | |
| CD \| 20111036 | 10/10/03 | LRT | |
| ADDED J36 - J41, L54 - L56, W13 -W15, TP5, TP6, & R275, R276, R279 - R285, R225 & R229 WERE 130 OHM. U14, U18 & U22 WERE MAV-11. ADDED NOTE EXTERNAL CABLE ASSY FOR W13 & W14 CONN. | | JKF | |
| BD \| 20110968 | 9/3/03 | LRT | |
| REV | ECO | DATE | APV |

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

TITLE: SCH., ANALOG, IF PROCESSOR BD. (1301977)

| | | | |
|---|---|---|---|
| DWN | JKF | 2/24/03 | |
| CHK | LRT | 3/6/03 | |
| REL | LRT | 3/6/03 | |

DWG. NO. 1301983 REV F0

D SCALE --- SHEET 1 OF 2

LAST USED REF.

C181
R293
W15
DS5
L56
CR34
J42
Q15
U26
TP6
VR3
K4
T10
Z2
SW1

C
B
A
D
C
B
A

U12 ERA-5
U10B
U13 MAV-11
U14 ERA-5
U25A TLO74
U25B TLO74
U25C TLO74
U11 4N25
U10A
U10C
U10D
U26 MC78L05ACD
T5 T9-1
SW1 SWW246CD7 (FT PNL)
W14
O/P LEVEL
CW
FREQ RESP
MANUAL GAIN
AUTO
MANUAL
(FT PNL)
GREEN MUTE (FT PNL)
GREEN ALC FAULT (FT PNL)
ALC VOLT.
J35 IF SAMPLE (FT PNL)
SMA

J42-A
J42-B
J42-C
J42-D
J42-E
J42-F
J42-G
J42-H
J42-J
J42-K

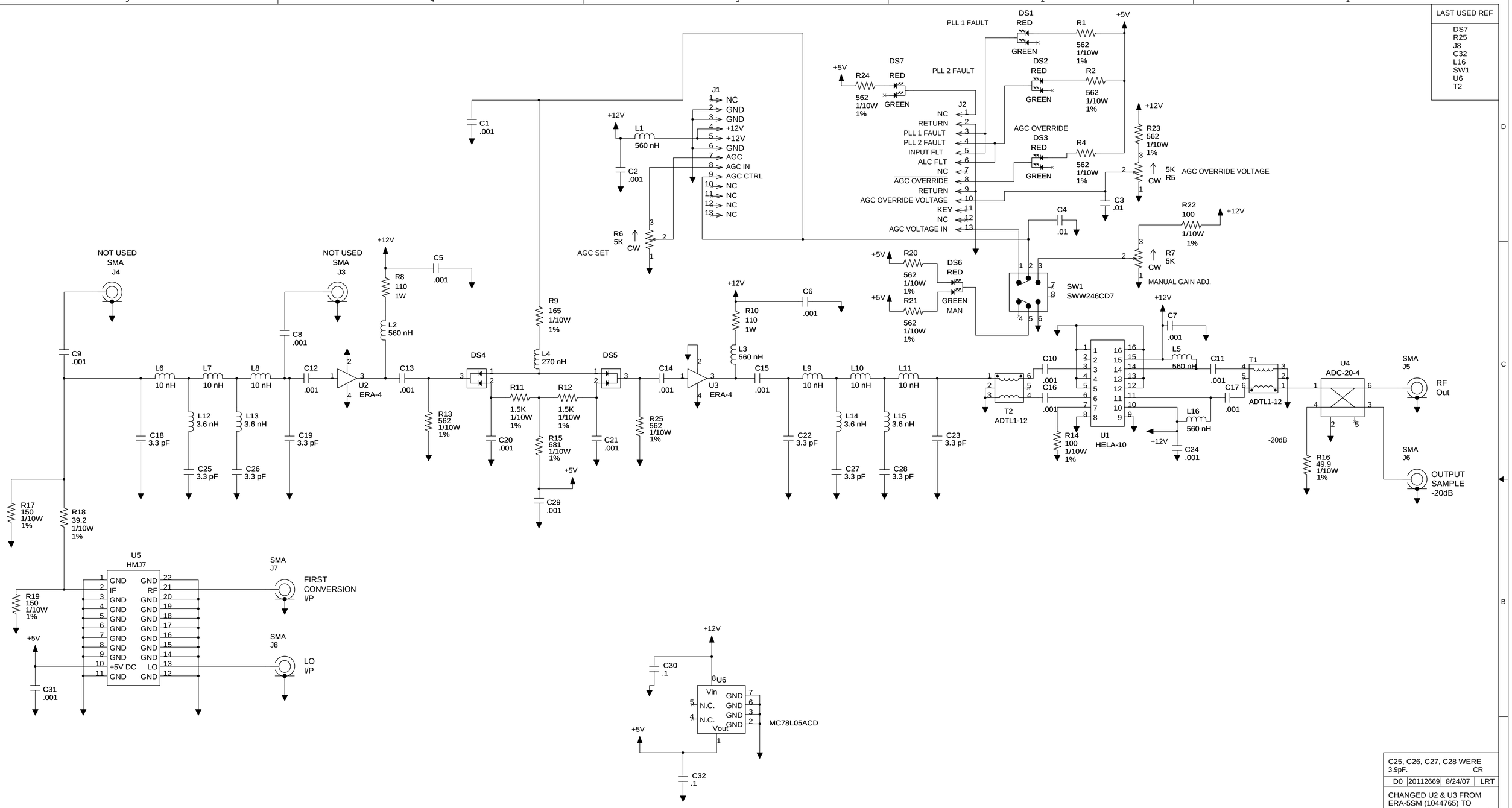
J42C
1C IF 2 UC
3C VIA 4204
6C ALC AUTO/MAN. SW
7C MODULATION PRES.
8C INPUT FAULT
9C SELECTED IF SOURCE
10C MUTE COMMAND
11C ALC VOLTAGE
12C INTERLOCK
13C BOARD TYPE
14C IF SIGNAL SELECT
16C +12VDC_C4
18C -12VDC_C1
21C MODULATED IF INPUT
24C IF POWER CONTROL
30C DLC VOLTAGE
913289

J42B
16B +12VDC_C4
18B -12VDC_C1
32B MOD. IF OUTPUT
913289

J42A
16A +12VDC_C4
18A -12VDC_C1
913289



| | | | | | | |
|---|---|---|---|---|---|---|
| APV | Axcera | REV | ECO | DATE | APV | |
| DATE | THIS PRINT IS THE PROPERTY OF AXCERA, IT SHALL NOT BE COPIED WITHOUT PERMISSION | TITLE | SCH., ANALOG, IF PROCESSOR BD. (1301977) | | | |
| ECO | MATERIAL ----- | DWN | JKF | 2/24/03 | DWG. NO. 1301983 | REV F0 |
| REV | FINISH ----- | CHK | LRT | 3/6/03 | | |
| | | REL | LRT | 3/6/03 | D | SCALE --- SHEET 2 OF 2 |




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.

| REV | ECO | DATE | APV |
|---|---|---|---|
| D0 | 20112669 | 8/24/07 | LRT |

C25, C26, C27, C28 WERE 3.9pF. CR

| REV | ECO | DATE | APV |
|---|---|---|---|
| C0 | 20111572 | 11/8/04 | DB |

CHANGED U2 & U3 FROM ERA-5SM (1044765) TO ERA-4SM (15906249SMT). JKF

| REV | ECO | DATE | APV |
|---|---|---|---|
| B0 | 20111535 | 10/4/04 | DB |

ADDED R25, CHANGED CONN. TO SW1, R22 WAS 562. JKF

Axcera

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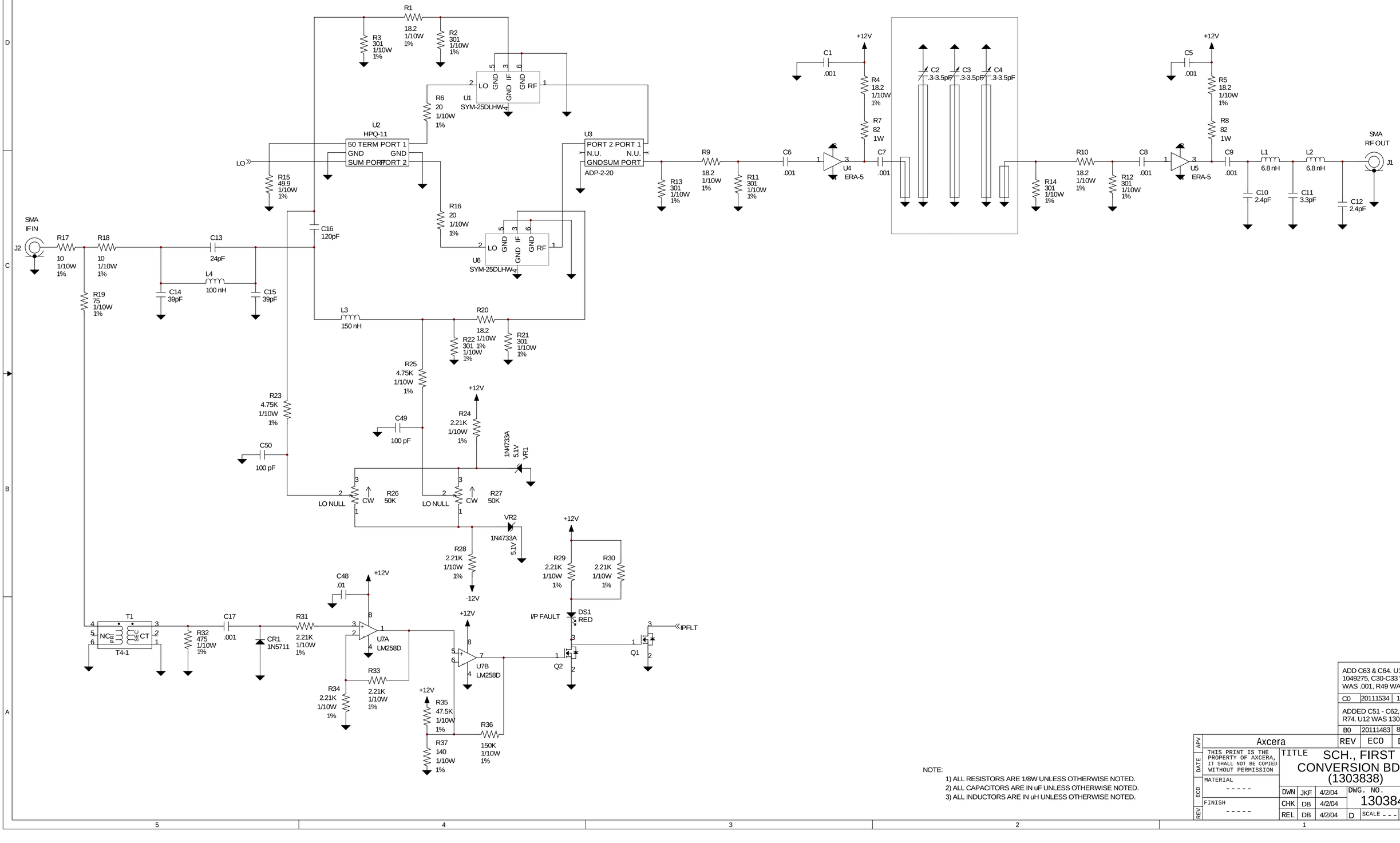
MATERIAL: -----

FINISH: -----

TITLE: SCH, DOWNCONVERTER BD. (1303834)

| | | | |
|---|---|---|---|
| DWN | JKF | 2/20/04 | DWG. NO. 1303836 REV D0 |
| CHK | DB | 2/26/04 | |
| REL | DB | 2/26/04 | D SCALE --- SHEET 1 OF 1 |




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.

| REV | ECO | DATE | APV |
|---|---|---|---|
| C0 | 20111534 | 10/4/04 | DB |
| B0 | 20111483 | 8/12/04 | DB |

ADD C63 & C64. U14 WAS 1049275, C30-C33 WAS .47, C45 WAS .001, R49 WAS 121. JKF

ADDED C51 - C62, L7, L8, R73 & R74. U12 WAS 1303726. JKF

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TITLE: SCH., FIRST CONVERSION BD., LX (1303838)

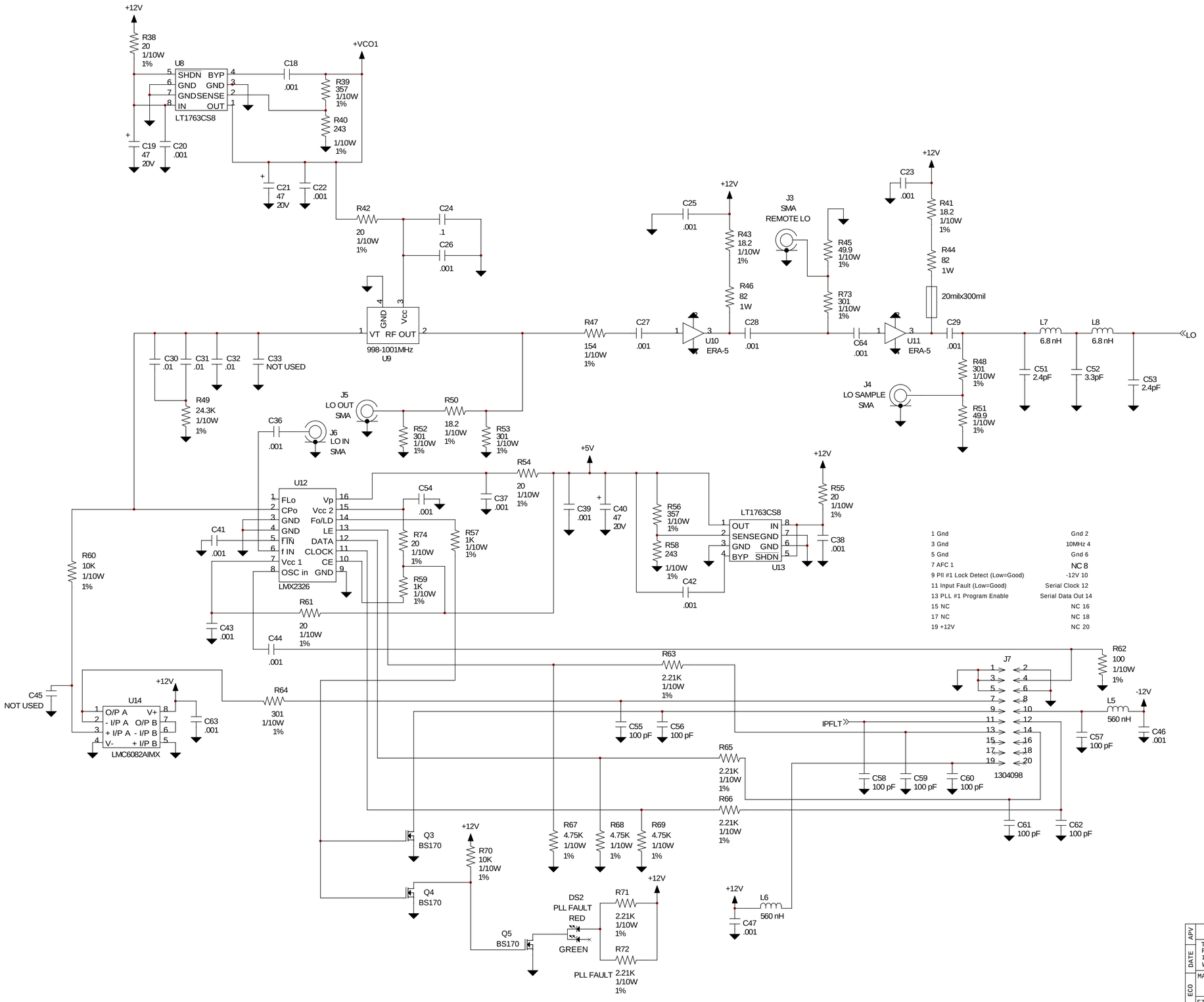
MATERIAL: - - - - -

FINISH: - - - - -

| | | | |
|---|---|---|---|
| DWN | JKF | 4/2/04 | |
| CHK | DB | 4/2/04 | |
| REL | DB | 4/2/04 | |

DWG. NO. 1303840 REV C0

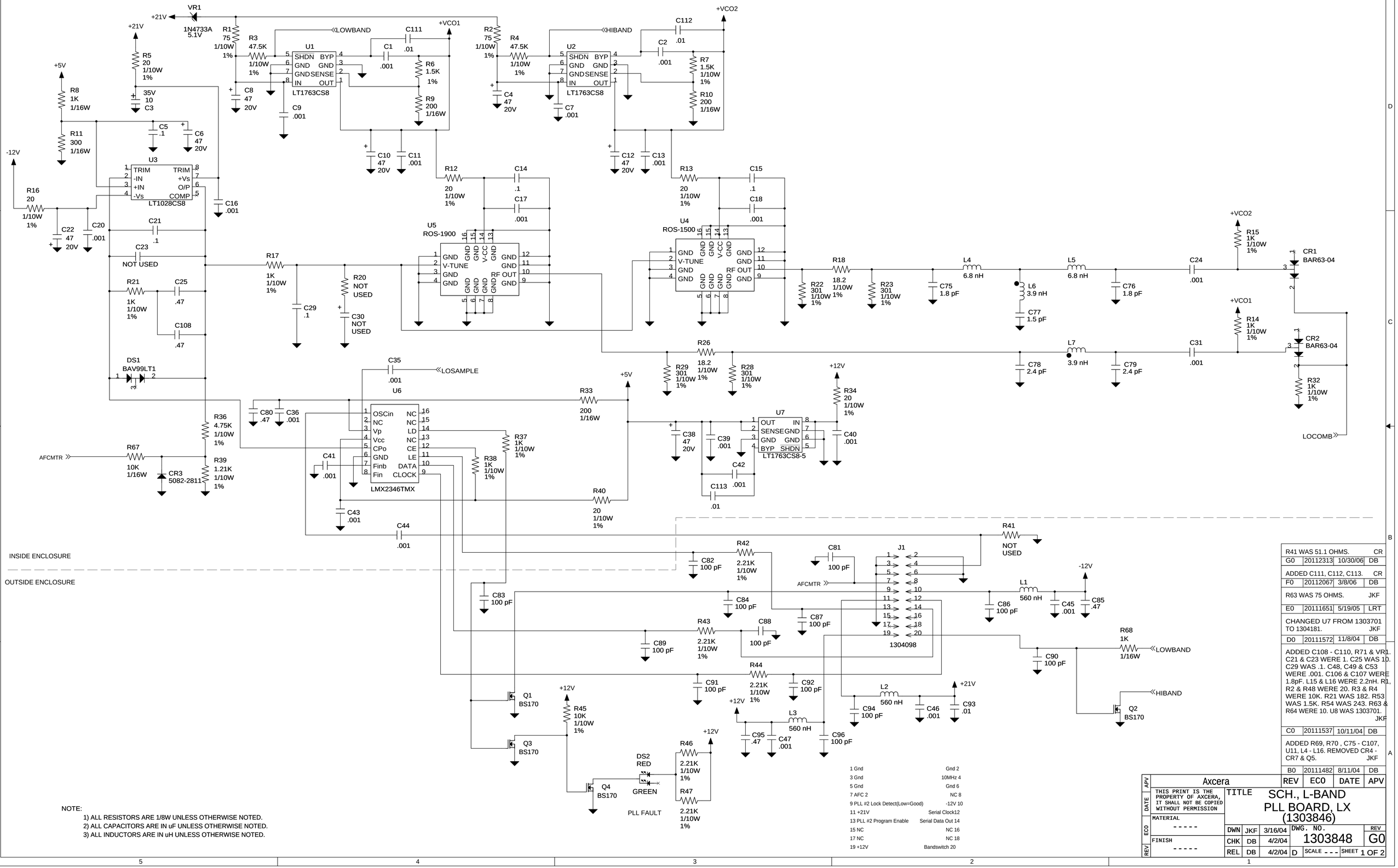
D SCALE - - - SHEET 1 OF 2




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) | | |
| ECO | MATERIAL ----- | DWN | JKF | 4/2/04 | DWG. NO. 1303840 REV C0 |
| | FINISH ----- | CHK | DB | 4/2/04 | |
| REV | | REL | DB | 4/2/04 | D SCALE --- SHEET 2 OF 2 |




| | | | |
|---|---|---|---|
| R41 WAS 51.1 OHMS. | | | CR |
| G0 | 20112313 | 10/30/06 | DB |
| ADDED C111, C112, C113. | | | CR |
| F0 | 20112067 | 3/8/06 | DB |
| R63 WAS 75 OHMS. | | | JKF |
| E0 | 20111651 | 5/19/05 | LRT |
| 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 |

| | | | | |
|---|---|---|---|---|
| Axcera | | REV | ECO | DATE APV |
| THIS PRINT IS THE PROPERTY OF AXCERA, IT SHALL NOT BE COPIED WITHOUT PERMISSION | | | | |
| TITLE | SCH., L-BAND PLL BOARD, LX (1303846) | | | |
| MATERIAL | ----- | DWN | JKF | 3/16/04 |
| FINISH | ----- | CHK | DB | 4/2/04 |
| | | REL | DB | 4/2/04 |
| DWG. NO. | 1303848 | REV | G0 | |
| SCALE | --- | SHEET | 1 OF 2 | |

LAST USED REF

C113
L16
U11
R71
J4
Q4
CR3
DS2
VR1

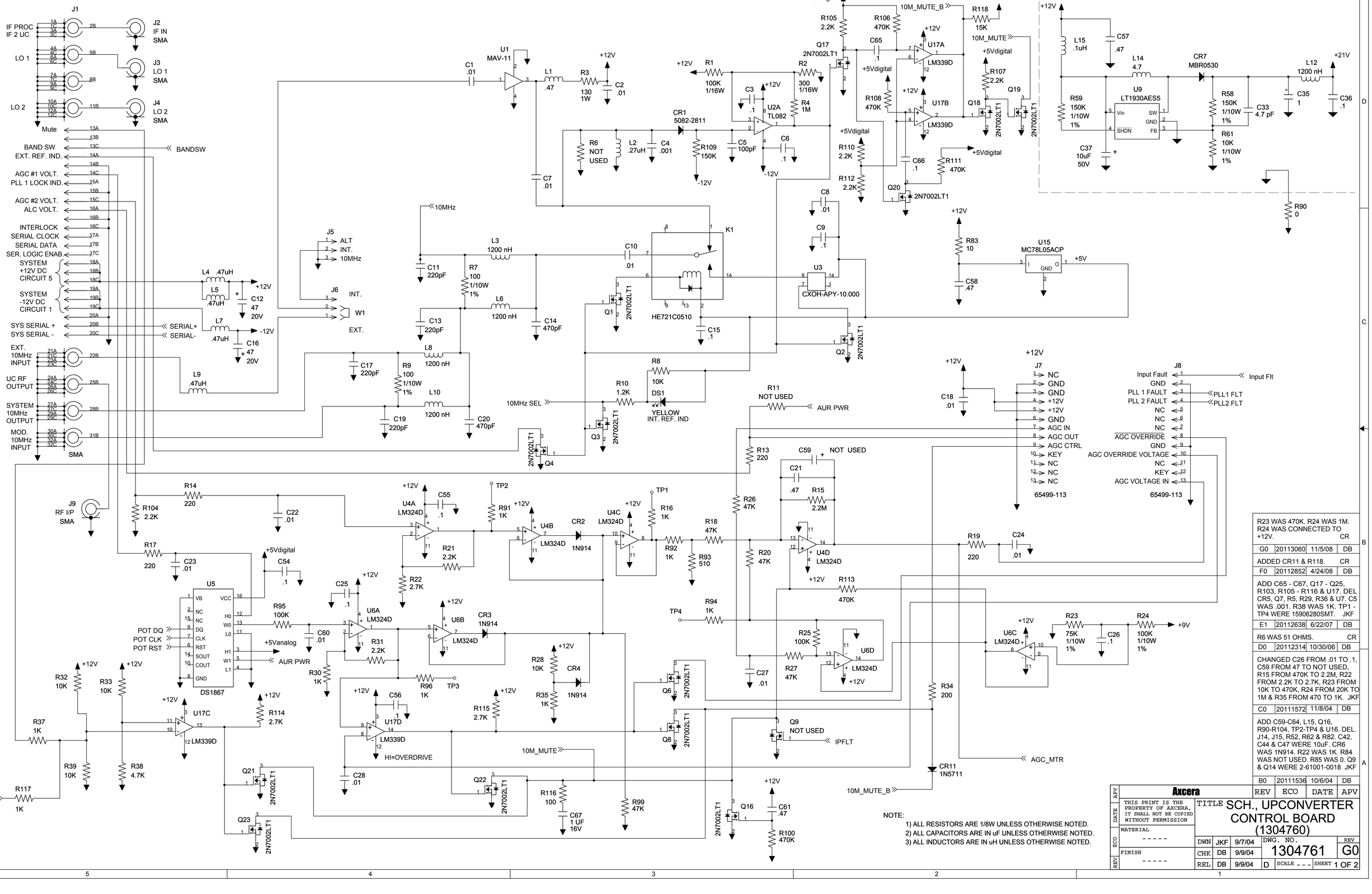
+12V
R71
0
R48
NOT
USED
U8
NOT USED
IN OUT
GND SENSE
GND GND
SHDN BYP
+9V
C48
NOT
USED
R53
NOT
USED
C49
NOT
USED
C50
47
20V
C53
NOT
USED
R54
NOT
USED

+12V
C58
.001
R56
10
C109
.1
R61
82
1W
LOCOMB
C67
.001
U9
ERA-5
C68
.001
R62
10
1/16W

+12V
C72
.001
R65
10
C110
.1
R66
82
1W
R63
200
1/16W
R64
75
1/16W
C73
.001
U10
ERA-5
C74
.001
LOSAMPLE
C99
1.8 pF
C100
1.2 pF
C101
1.8 pF
L9
1.5 nH
L13
6.8 nH
L14
6.8 nH
C104
1.5 pF
R69
300
1/16W
SMA
J4
LO SAMPLE
R70
68
1/16W

+9V
L8
22 nH
C97
56 pF
C98
.01
U11
AH102
C102
.001
C103
1.6 pF
L10
4.7 nH
L11
3.9 nH
L12
4.7 nH
SMA
J3
L-Band LO
L15
1.5 nH
C106
1.2 pF
L16
1.5 nH
C107
1.2 pF
C105
1.6 pF

| | | | | | | |
|---|---|---|---|---|---|---|
| APV | Axcera | | REV | ECO | DATE | APV |
| DATE | THIS PRINT IS THE PROPERTY OF AXCERA, IT SHALL NOT BE COPIED WITHOUT PERMISSION | TITLE | SCH., L-BAND PLL BOARD, LX (1303846) | | | |
| ECO | MATERIAL ----- | DWN | JKF | 3/16/04 | DWG. NO. | REV |
| | | CHK | DB | 4/2/04 | 1303848 | G0 |
| REV | FINISH ----- | REL | DB | 4/2/04 | D SCALE --- | SHEET 2 OF 2 |




R23 WAS 470K. R24 WAS 1M. R24 WAS CONNECTED TO +12V. CR

| | | | | |
|---|---|---|---|---|
| G0 | 20113060 | 11/5/08 | DB |
| ADDED CR11 & R118. | | | CR |
| F0 | 20112852 | 4/24/08 | DB |
| ADD C65 - C67, Q17 - Q25, R103, R105 - R116 & U17. DEL CR5, Q7, R5, R29, R36 & U7. C5 WAS .001. R38 WAS 1K. TP1 - TP4 WERE 15906280SMT. | | | JKF |
| E1 | 20112638 | 6/22/07 | DB |
| R6 WAS 51 OHMS. | | | CR |
| D0 | 20112314 | 10/30/06 | DB |
| CHANGED C26 FROM .01 TO .1, C59 FROM 47 TO NOT USED, R15 FROM 470K TO 2.2M, R22 FROM 2.2K TO 2.7K, R23 FROM 10K TO 470K, R24 FROM 20K TO 1M & R35 FROM 470 TO 1K. JKF | | | |
| C0 | 20111572 | 11/8/04 | DB |
| ADD C59-C64, L15, Q16, R90-R104, TP2-TP4 & U16. DEL. J14, J15, R52, R62 & R82. C42, C44 & C47 WERE 10uF. CR6 WAS 1N914. R22 WAS 1K. R84 WAS NOT USED. R85 WAS 0. Q9 & Q14 WERE 2-61001-0018 JKF | | | |
| B0 | 20111536 | 10/6/04 | DB |

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

Axcera

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MATERIAL: -----

FINISH: -----

TITLE SCH., UPCONVERTER CONTROL BOARD (1304760)

| | | | | |
|---|---|---|---|---|
| DWN | JKF | 9/7/04 | DWG. NO. 1304761 | REV G0 |
| CHK | DB | 9/9/04 | | |
| REL | DB | 9/9/04 | D SCALE --- SHEET 1 OF 2 | |

LAST USED REF

R118
SW1
DS3
U17
C67
Q25
Y1
J16
W3
L15
CR11
S1
K1
TP4

FIRMWARE CONFIGURATION

R40 10K 1/10W 1%
R41 10K 1/10W 1%
R42 10K 1/10W 1%
R43 10K 1/10W 1%
SW1
BD08
+5Vdigital
R46 10K 1/10W 1%
R47 10K 1/10W 1%
R48 10K 1/10W 1%
R49 10K 1/10W 1%

+12V
+9V
R84 0
R85 NOT USED
U13
I/P
Fdbk
Vtap
Error
O/P
Sense
Shtdn
GND
2-61100-4735
C42 4.7
C43 .1

+9V
DS2 GREEN
LT1076-ND
Processor Operation
R44 1K
R45 1K
Q11 2N7002LT1

BANDSW
BANDSW1
2N7002LT1 Q10
2N7002LT1 Q12
POT DQ
POT CLK
POT RST

AGC_MTR
R97 20K
R98 10K
+5Vdigital
C30 .1

U8
1302044
I1VSB
AFC 1
AFC 2
PA2 PA1 PA0 Vcc GND (ADC7) PF7 (ADC6) PF6 (ADC5) PF5 (ADC4) PF4 (ADC3) PF3 (ADC2) PF2 (ADC1) PF1 (ADC0) PF0 AREF AGND AVCC
PA3 PA4 PA5 PA6 PA7 ALE
PC7 (A15) PC6 (A14) PC5 (A13) PC4 (A12) PC3 (A11) PC2 (A10) PC1 (A9) PC0 (A8) RD WR
PD7 PD6 PD5 PD4 PD3 PD2 PD1 PD0 XTAL1 XTAL2 GND Vcc RESET TOSC1 TOSC2 PB7
PEN PE0 PE1 PE2 PE3 PE4 PE5 PE6 PE7 PB0 PB1 PB2 PB3 PB4 PB5 PB6
10MHz SEL

+5Vdigital
R50 10K 1/10W 1%
R51 10K 1/10W 1%
Sets U/C Config
R54 NOT USED
R53 1M
Y1 3.6864 MHZ
C29 33 PF 50V
C31 33 PF 50V
C34 .1

+5Vdigital
C32 .1
R55 1K 1/10W 1%
R56 120
R57 1K 1/10W 1%
J10
J11
W2
W3
U10
2-61100-4472
SERIAL-
SERIAL+
C38 .01
C39 .01

+12V
R60 3.01K
12V / 4.01
R66 1K
R63 10K 1/10W 1%
R64 10K 1/10W 1%
R65 10K 1/10W 1%

+5Vanalog
L13 15906260SMT
R67 100
C41 .01

+5Vdigital
C40 .1
R68 6.8K
R70 10K 1%
U11
WDS RST ST NMI
PBRST Vcc GND IN
1095823
R71 2.87K 1%
S1
SPST
MANUAL MICRO RESET

+12V
R69 4.75K 1/10W 1%
(1.6V = -12V OK)
(2.72V = -12V missing)
(-.7V = +12V missing)
CR8 1N914
R74 1.47K
CR10 1N914
R76 4.75K 1/10W 1%
-12V

DS3 GREEN
LT1076-ND
PROGRAMMING ENABLED
R72 220
+5Vdigital
J12
SERIAL PROGRAMMING PORT
1063095
CR9 1N914

TO
First Conversion Bd

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

TO
L-Band PLL BD

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

+5Vdigital
R75 0
R78 10K 1%
R77 10K 1%

PLL1 FLT
Q13 2N7002LT1
Input Flt
NOT USED
Q14
IPFLT
PLL2 FLT
Q15 2N7002LT1
PLL MUTE
Q24 2N7002LT1
Q25 2N7002LT1

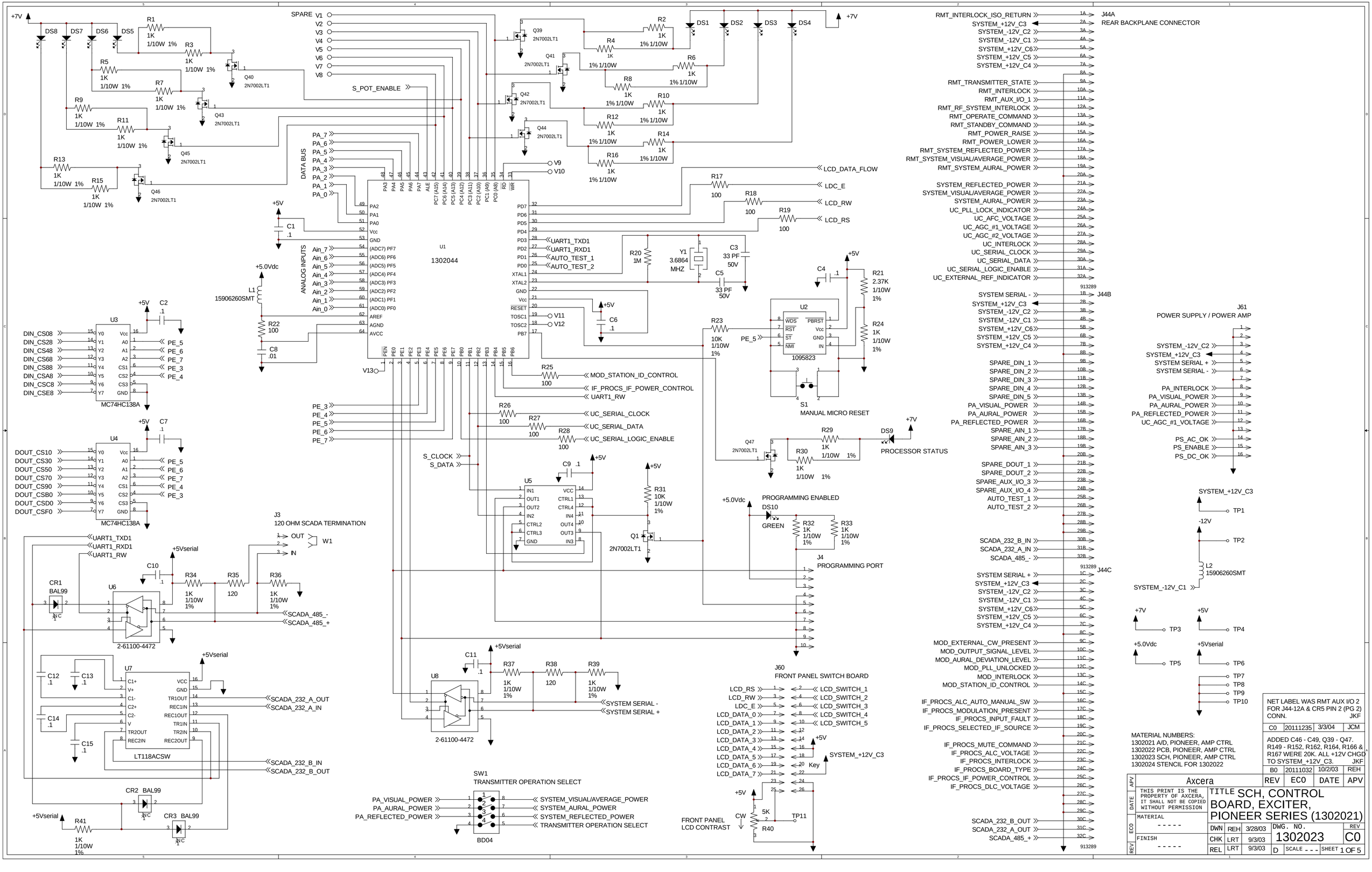
AFC 1
R79 10K 1%
AFC 2
R81 10K 1%
J13 1304097
10MHz
-12V
C49 .01
C50 .01
C51 .01
C52 .01
C53 .01
J16 1304097
BANDSW1
+21V
+9V
+5Vdigital
R80 10K 1%

+12V
+9V
NOT USED
R86
R87 0
U14 2-61100-4735
+5Vanalog
C48 .1
C47 4.7

+12V
U12 LM317MDT
C45 .1
R73 1K 1/16W
C44 47 20V
5.75 V
C46 .1
R88 6.8K
R89 68K

+12V
U16 LM317MDT
C62 .1
R101 1K 1/16W
C63 4.7
C64 .1
5.75 V
R102 6.8K
R103 68K

| | | | | | | |
|---|---|---|---|---|---|---|
| APV | Axcera | | REV | ECO | DATE | APV |
| DATE | THIS PRINT IS THE PROPERTY OF AXCERA, IT SHALL NOT BE COPIED WITHOUT PERMISSION | TITLE SCH., UPCONVERTER CONTROL BOARD (1304760) | | | | |
| ECO | MATERIAL ----- | DWN | JKF | 9/7/04 | DWG. NO. 1304761 | REV G0 |
| REV | FINISH ----- | CHK | DB | 9/9/04 | | |
| | | REL | DB | 9/9/04 | D | SCALE --- SHEET 2 OF 2 |


+7V
DS8
DS7
DS6
DS5
R1 1K 1/10W 1%
R3 1K 1/10W 1%
R5 1K 1/10W 1%
R7 1K 1/10W 1%
R9 1K 1/10W 1%
R11 1K 1/10W 1%
R13 1K 1/10W 1%
R15 1K 1/10W 1%
Q40 2N7002LT1
Q43 2N7002LT1
Q45 2N7002LT1
Q46 2N7002LT1
SPARE V1
V2
V3
V4
V5
V6
V7
V8
S_POT_ENABLE
Q39 2N7002LT1
Q41 2N7002LT1
Q42 2N7002LT1
Q44 2N7002LT1
R2 1K 1% 1/10W
R4 1K 1% 1/10W
R6 1K 1% 1/10W
R8 1K 1% 1/10W
R10 1K 1% 1/10W
R12 1K 1% 1/10W
R14 1K 1% 1/10W
R16 1K 1% 1/10W
DS1
DS2
DS3
DS4
+7V
DATA BUS
PA_7
PA_6
PA_5
PA_4
PA_3
PA_2
PA_1
PA_0
V9
V10
LCD_DATA_FLOW
LDC_E
LCD_RW
LCD_RS
R17 100
R18 100
R19 100
+5V
C1 .1
ANALOG INPUTS
Ain_7
Ain_6
Ain_5
Ain_4
Ain_3
Ain_2
Ain_1
Ain_0
U1
1302044
PA2
PA1
PA0
Vcc
GND
(ADC7) PF7
(ADC6) PF6
(ADC5) PF5
(ADC4) PF4
(ADC3) PF3
(ADC2) PF2
(ADC1) PF1
(ADC0) PF0
AREF
AGND
AVCC
PD7
PD6
PD5
PD4
PD3
PD2
PD1
PD0
XTAL1
XTAL2
GND
Vcc
RESET
TOSC1
TOSC2
PB7
UART1_TXD1
UART1_RXD1
AUTO_TEST_1
AUTO_TEST_2
R20 1M
Y1 3.6864 MHZ
C3 33 PF 50V
C5 33 PF 50V
+5V
C6 .1
+5.0Vdc
L1 15906260SMT
R22 100
C8 .01
V13
V11
V12
R23 10K 1/10W 1%
R25 100
R26 100
R27 100
R28 100
MOD_STATION_ID_CONTROL
IF_PROCS_IF_POWER_CONTROL
UART1_RW
UC_SERIAL_CLOCK
UC_SERIAL_DATA
UC_SERIAL_LOGIC_ENABLE
PE_3
PE_4
PE_5
PE_6
PE_7
S_CLOCK
S_DATA
U5
IN1
OUT1
OUT2
IN2
CTRL2
CTRL3
GND
VCC
CTRL1
CTRL4
IN4
OUT4
OUT3
IN3
C9 .1
R31 10K 1/10W 1%
Q1 2N7002LT1
+5V
C4 .1
U2
WDS
RST
ST
NMI
PBRST
Vcc
GND
IN
1095823
R21 2.37K 1/10W 1%
R24 1K 1/10W 1%
PE_5
S1
MANUAL MICRO RESET
Q47 2N7002LT1
R29 1K 1/10W 1%
R30 1K 1/10W 1%
DS9
PROCESSOR STATUS
+7V
+5.0Vdc
PROGRAMMING ENABLED
DS10
GREEN
R32 1K 1/10W 1%
R33 1K 1/10W 1%
J4
PROGRAMMING PORT
J60
FRONT PANEL SWITCH BOARD
LCD_RS
LCD_RW
LDC_E
LCD_DATA_0
LCD_DATA_1
LCD_DATA_2
LCD_DATA_3
LCD_DATA_4
LCD_DATA_5
LCD_DATA_6
LCD_DATA_7
LCD_SWITCH_1
LCD_SWITCH_2
LCD_SWITCH_3
LCD_SWITCH_4
LCD_SWITCH_5
Key
SYSTEM_+12V_C3
FRONT PANEL LCD CONTRAST
CW
5K
R40
TP11
U3
DIN_CS08
DIN_CS28
DIN_CS48
DIN_CS68
DIN_CS88
DIN_CSA8
DIN_CSC8
DIN_CSE8
MC74HC138A
PE_5
PE_6
PE_7
PE_3
PE_4
U4
DOUT_CS10
DOUT_CS30
DOUT_CS50
DOUT_CS70
DOUT_CS90
DOUT_CSB0
DOUT_CSD0
DOUT_CSF0
C2 .1
C7 .1
J3
120 OHM SCADA TERMINATION
OUT
IN
W1
UART1_TXD1
UART1_RXD1
UART1_RW
+5Vserial
C10 .1
R34 1K 1/10W 1%
R35 120
R36 1K 1/10W 1%
CR1 BAL99
U6
2-61100-4472
SCADA_485_-
SCADA_485_+
U7
LT118ACSW
C12 .1
C13 .1
C14 .1
C15 .1
SCADA_232_A_OUT
SCADA_232_A_IN
SCADA_232_B_IN
SCADA_232_B_OUT
CR2 BAL99
CR3 BAL99
R41 1K 1/10W 1%
C11 .1
R37 1K 1/10W 1%
R38 120
R39 1K 1/10W 1%
U8
2-61100-4472
SYSTEM SERIAL -
SYSTEM SERIAL +
SW1
TRANSMITTER OPERATION SELECT
PA_VISUAL_POWER
PA_AURAL_POWER
PA_REFLECTED_POWER
SYSTEM_VISUAL/AVERAGE_POWER
SYSTEM_AURAL_POWER
SYSTEM_REFLECTED_POWER
TRANSMITTER OPERATION SELECT
BD04
RMT_INTERLOCK_ISO_RETURN
SYSTEM_+12V_C3
SYSTEM_-12V_C2
SYSTEM_-12V_C1
SYSTEM_+12V_C6
SYSTEM_+12V_C5
SYSTEM_+12V_C4
RMT_TRANSMITTER_STATE
RMT_INTERLOCK
RMT_AUX_I/O_1
RMT_RF_SYSTEM_INTERLOCK
RMT_OPERATE_COMMAND
RMT_STANDBY_COMMAND
RMT_POWER_RAISE
RMT_POWER_LOWER
RMT_SYSTEM_REFLECTED_POWER
RMT_SYSTEM_VISUAL/AVERAGE_POWER
RMT_SYSTEM_AURAL_POWER
SYSTEM_REFLECTED_POWER
SYSTEM_VISUAL/AVERAGE_POWER
SYSTEM_AURAL_POWER
UC_PLL_LOCK_INDICATOR
UC_AFC_VOLTAGE
UC_AGC_#1_VOLTAGE
UC_AGC_#2_VOLTAGE
UC_INTERLOCK
UC_SERIAL_CLOCK
UC_SERIAL_DATA
UC_SERIAL_LOGIC_ENABLE
UC_EXTERNAL_REF_INDICATOR
J44A
REAR BACKPLANE CONNECTOR
913289
J44B
SYSTEM SERIAL -
SYSTEM_+12V_C3
SYSTEM_-12V_C2
SYSTEM_-12V_C1
SYSTEM_+12V_C6
SYSTEM_+12V_C5
SYSTEM_+12V_C4
SPARE_DIN_1
SPARE_DIN_2
SPARE_DIN_3
SPARE_DIN_4
SPARE_DIN_5
PA_VISUAL_POWER
PA_AURAL_POWER
PA_REFLECTED_POWER
SPARE_AIN_1
SPARE_AIN_2
SPARE_AIN_3
SPARE_DOUT_1
SPARE_DOUT_2
SPARE_AUX_I/O_3
SPARE_AUX_I/O_4
AUTO_TEST_1
AUTO_TEST_2
SCADA_232_B_IN
SCADA_232_A_IN
SCADA_485_-
J44C
MOD_EXTERNAL_CW_PRESENT
MOD_OUTPUT_SIGNAL_LEVEL
MOD_AURAL_DEVIATION_LEVEL
MOD_PLL_UNLOCKED
MOD_INTERLOCK
MOD_STATION_ID_CONTROL
IF_PROCS_ALC_AUTO_MANUAL_SW
IF_PROCS_MODULATION_PRESENT
IF_PROCS_INPUT_FAULT
IF_PROCS_SELECTED_IF_SOURCE
IF_PROCS_MUTE_COMMAND
IF_PROCS_ALC_VOLTAGE
IF_PROCS_INTERLOCK
IF_PROCS_BOARD_TYPE
IF_PROCS_IF_POWER_CONTROL
IF_PROCS_DLC_VOLTAGE
SCADA_232_B_OUT
SCADA_232_A_OUT
SCADA_485_+
J61
POWER SUPPLY / POWER AMP
SYSTEM_-12V_C2
SYSTEM_+12V_C3
SYSTEM SERIAL +
SYSTEM SERIAL -
PA_INTERLOCK
PA_VISUAL_POWER
PA_AURAL_POWER
PA_REFLECTED_POWER
UC_AGC_#1_VOLTAGE
PS_AC_OK
PS_ENABLE
PS_DC_OK
SYSTEM_+12V_C3
TP1
-12V
TP2
L2
15906260SMT
SYSTEM_-12V_C1
+7V
TP3
+5V
TP4
+5.0Vdc
TP5
+5Vserial
TP6
TP7
TP8
TP9
TP10
NET LABEL WAS RMT AUX I/O 2 FOR J44-12A & CR5 PIN 2 (PG 2) CONN. JKF
C0 | 20111235 | 3/3/04 | JCM
ADDED C46 - C49, Q39 - Q47. R149 - R152, R162, R164, R166 & R167 WERE 20K. ALL +12V CHGD TO SYSTEM_+12V_C3. JKF
B0 | 20111032 | 10/2/03 | REH
MATERIAL NUMBERS:
1302021 A/D, PIONEER, AMP CTRL
1302022 PCB, PIONEER, AMP CTRL
1302023 SCH, PIONEER, AMP CTRL
1302024 STENCIL FOR 1302022
Axcera
REV | ECO | DATE | APV
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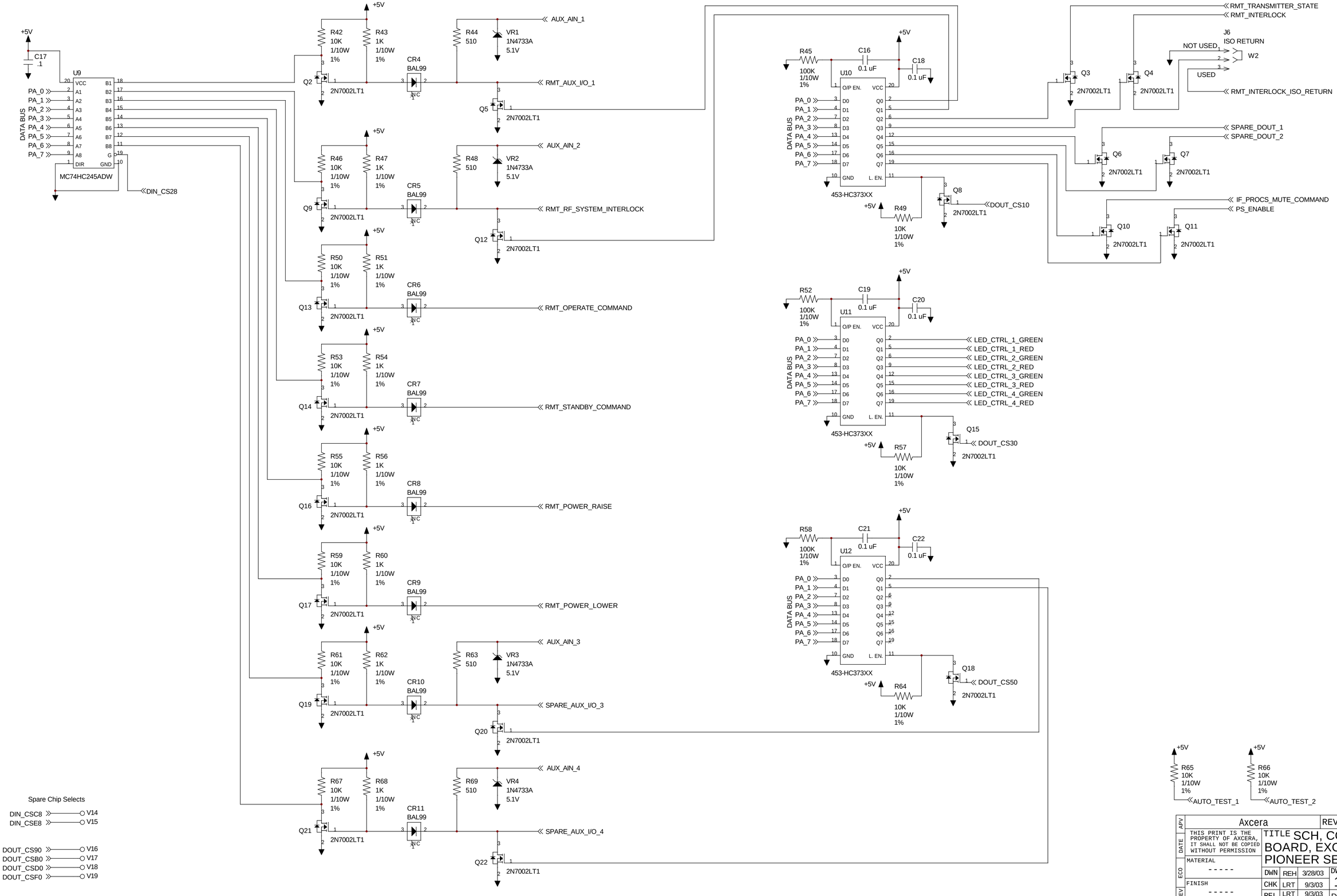
MATERIAL
FINISH
TITLE SCH, CONTROL BOARD, EXCITER, PIONEER SERIES (1302021)
DWN REH 3/28/03
CHK LRT 9/3/03
REL LRT 9/3/03
DWG. NO. 1302023
REV C0
D
SCALE - - -
SHEET 1 OF 5




| | | | | | |
|---|---|---|---|---|---|
| APV | Axcera | REV | ECO | DATE | APV |
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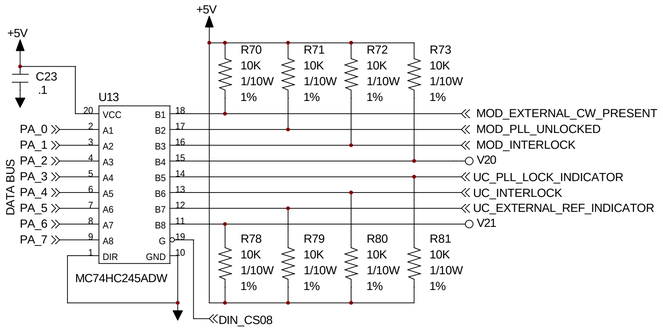
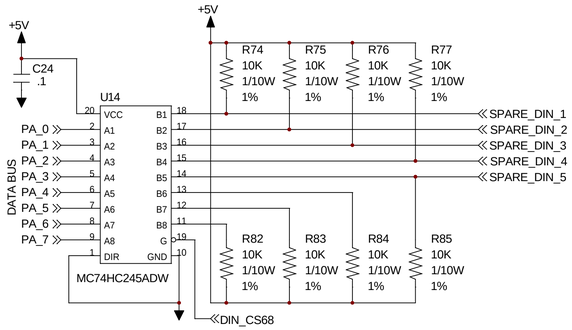
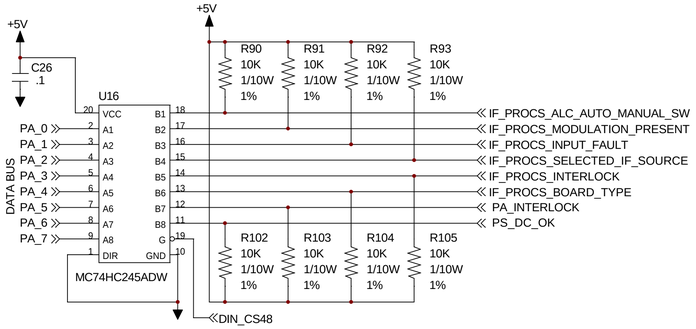
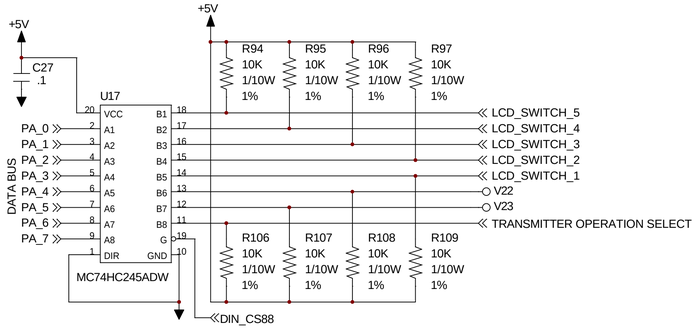
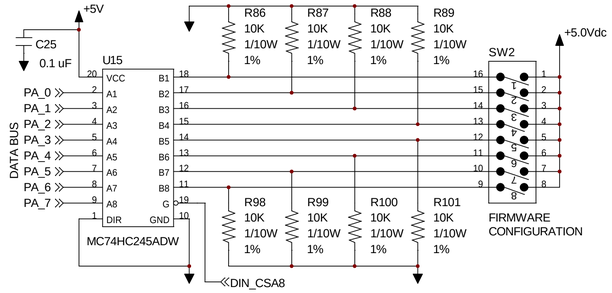
| ECO | MATERIAL ----- | DWN | REH | 3/28/03 | DWG. NO. 1302023 REV C0 |
| REV | FINISH ----- | CHK | LRT | 9/3/03 | |
| | | REL | LRT | 9/3/03 | D SCALE - - - SHEET 2 OF 5 |



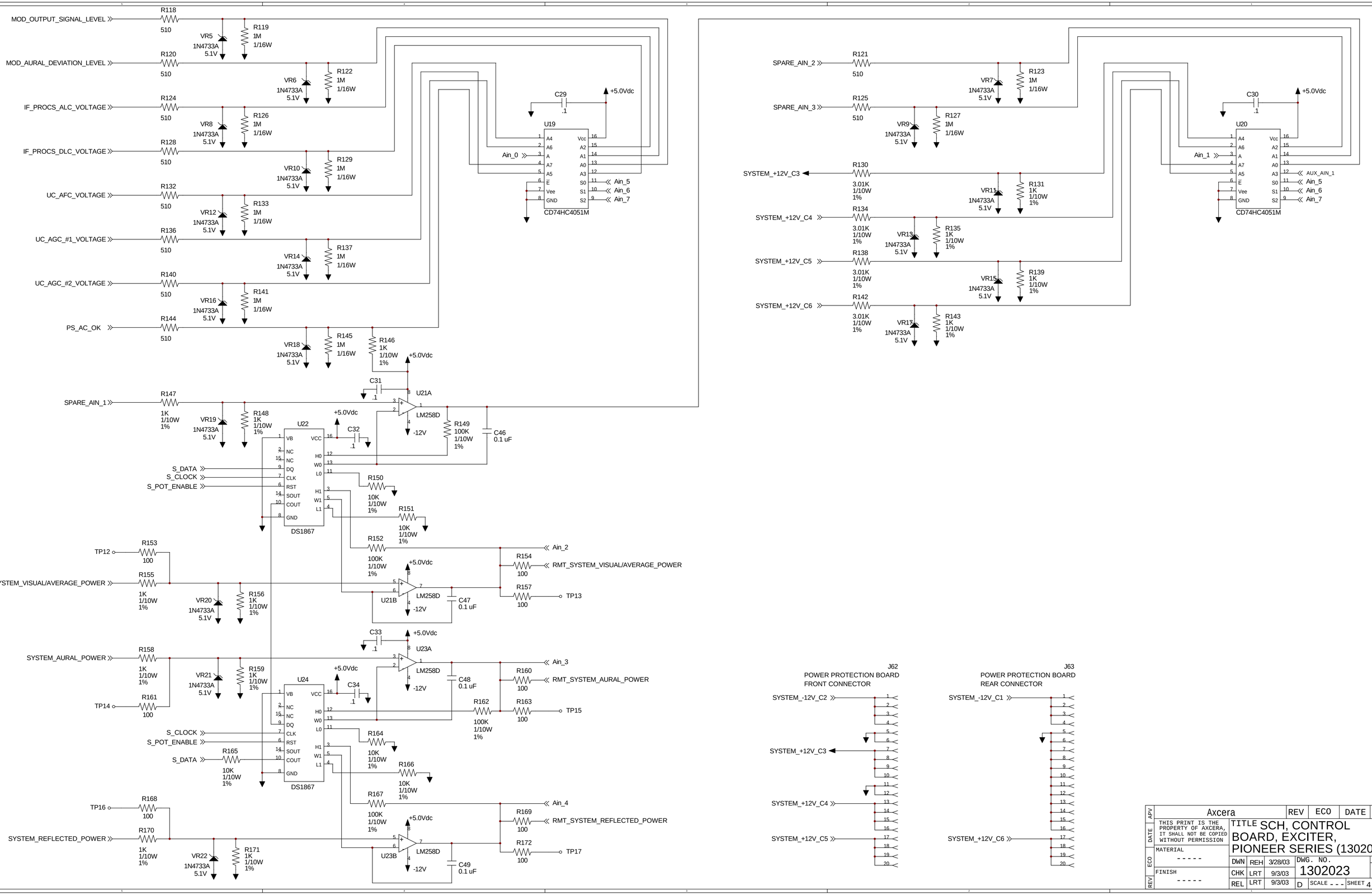





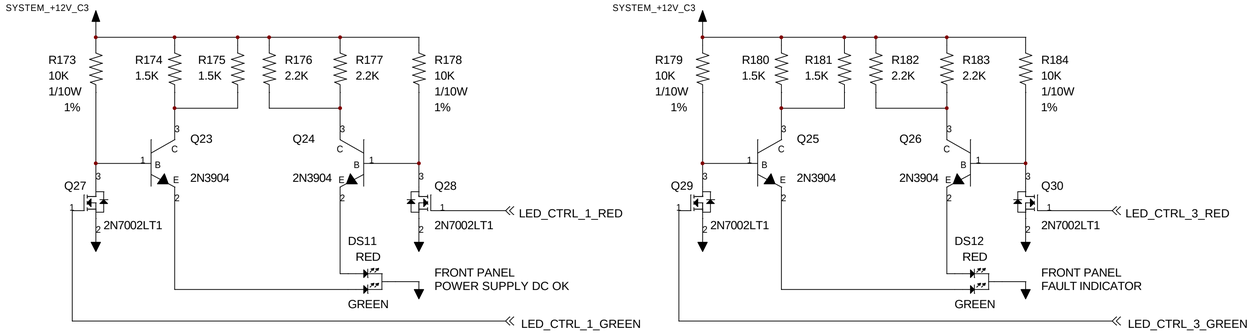


| | | | | | |
|---|---|---|---|---|---|
| APV | Axcera | REV | ECO | DATE | APV |
| DATE | THIS PRINT IS THE PROPERTY OF AXCERA, IT SHALL NOT BE COPIED WITHOUT PERMISSION | TITLE SCH, CONTROL BOARD, EXCITER, PIONEER SERIES (1302021) | | | |
| ECO | MATERIAL ----- | DWN REH 3/28/03 | DWG. NO. 1302023 | REV C0 | |
| REV | FINISH ----- | CHK LRT 9/3/03 | | | |
| | | REL LRT 9/3/03 | D | SCALE - - - | SHEET 3 OF 5 |


MOD_OUTPUT_SIGNAL_LEVEL
MOD_AURAL_DEVIATION_LEVEL
IF_PROCS_ALC_VOLTAGE
IF_PROCS_DLC_VOLTAGE
UC_AFC_VOLTAGE
UC_AGC_#1_VOLTAGE
UC_AGC_#2_VOLTAGE
PS_AC_OK
SPARE_AIN_1
R118 510
R119 1M 1/16W
R120 510
R122 1M 1/16W
R124 510
R126 1M 1/16W
R128 510
R129 1M 1/16W
R132 510
R133 1M 1/16W
R136 510
R137 1M 1/16W
R140 510
R141 1M 1/16W
R144 510
R145 1M 1/16W
R146 1K 1/10W 1%
R147 1K 1/10W 1%
R148 1K 1/10W 1%
VR5 1N4733A 5.1V
VR6 1N4733A 5.1V
VR8 1N4733A 5.1V
VR10 1N4733A 5.1V
VR12 1N4733A 5.1V
VR14 1N4733A 5.1V
VR16 1N4733A 5.1V
VR18 1N4733A 5.1V
VR19 1N4733A 5.1V
C29 .1
+5.0Vdc
U19
CD74HC4051M
Ain_0
Ain_5
Ain_6
Ain_7
C31 .1
U21A
LM258D
-12V
R149 100K 1/10W 1%
C46 0.1 uF
U22
DS1867
S_DATA
S_CLOCK
S_POT_ENABLE
C32 .1
R150 10K 1/10W 1%
R151 10K 1/10W 1%
R152 100K 1/10W 1%
TP12
TP13
TP14
TP15
TP16
TP17
R153 100
R154 100
R155 1K 1/10W 1%
R156 1K 1/10W 1%
R157 100
SYSTEM_VISUAL/AVERAGE_POWER
RMT_SYSTEM_VISUAL/AVERAGE_POWER
VR20 1N4733A 5.1V
U21B
C47 0.1 uF
Ain_2
C33 .1
U23A
C48 0.1 uF
SYSTEM_AURAL_POWER
R158 1K 1/10W 1%
R159 1K 1/10W 1%
R160 100
R161 100
R162 100K 1/10W 1%
R163 100
RMT_SYSTEM_AURAL_POWER
VR21 1N4733A 5.1V
U24
C34 .1
Ain_3
R164 10K 1/10W 1%
R165 10K 1/10W 1%
R166 10K 1/10W 1%
R167 100K 1/10W 1%
R168 100
R169 100
R170 1K 1/10W 1%
R171 1K 1/10W 1%
R172 100
SYSTEM_REFLECTED_POWER
RMT_SYSTEM_REFLECTED_POWER
VR22 1N4733A 5.1V
U23B
C49 0.1 uF
Ain_4
SPARE_AIN_2
SPARE_AIN_3
R121 510
R123 1M 1/16W
R125 510
R127 1M 1/16W
VR7 1N4733A 5.1V
VR9 1N4733A 5.1V
C30 .1
U20
AUX_AIN_1
Ain_1
SYSTEM_+12V_C3
SYSTEM_+12V_C4
SYSTEM_+12V_C5
SYSTEM_+12V_C6
R130 3.01K 1/10W 1%
R131 1K 1/10W 1%
R134 3.01K 1/10W 1%
R135 1K 1/10W 1%
R138 3.01K 1/10W 1%
R139 1K 1/10W 1%
R142 3.01K 1/10W 1%
R143 1K 1/10W 1%
VR11 1N4733A 5.1V
VR13 1N4733A 5.1V
VR15 1N4733A 5.1V
VR17 1N4733A 5.1V
J62
POWER PROTECTION BOARD
FRONT CONNECTOR
J63
POWER PROTECTION BOARD
REAR CONNECTOR
SYSTEM_-12V_C2
SYSTEM_-12V_C1
Axcera
REV
ECO
DATE
APV
THIS PRINT IS THE PROPERTY OF AXCERA, IT SHALL NOT BE COPIED WITHOUT PERMISSION
TITLE SCH, CONTROL BOARD, EXCITER, PIONEER SERIES (1302021)
MATERIAL
FINISH
DWN REH 3/28/03
CHK LRT 9/3/03
REL LRT 9/3/03
DWG. NO. 1302023
REV C0
D
SCALE - - -
SHEET 4 OF 5

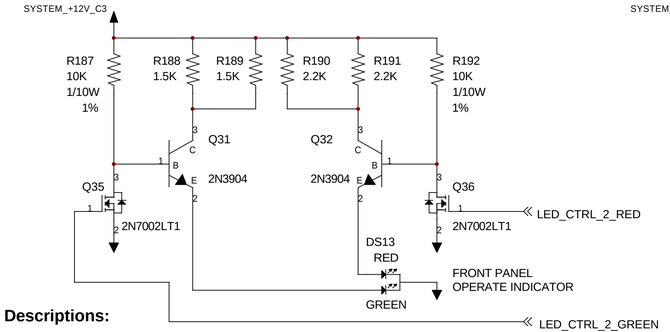
LAST USED REF.

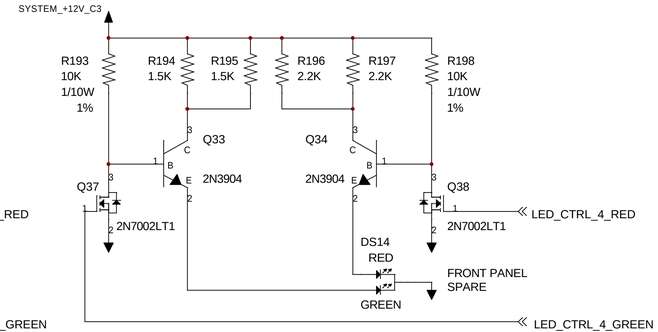
R202
C49
Q47
DS14
U28
VR22
J63
TP17
V23
SW2
CR11
W2
Y1
L2
S1

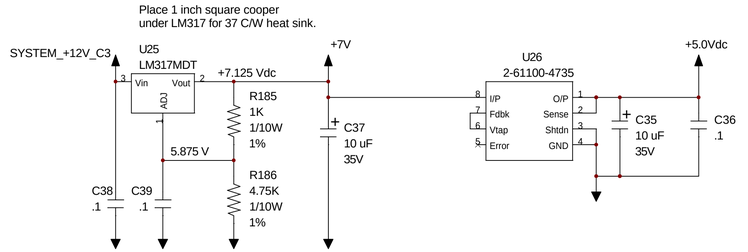


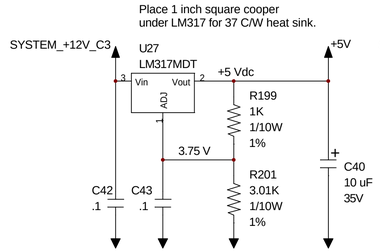


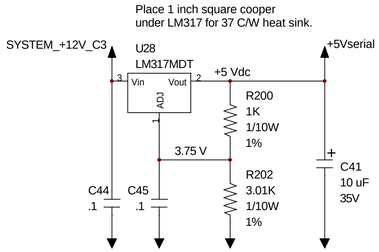





## Circuit Descriptions:

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. 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.

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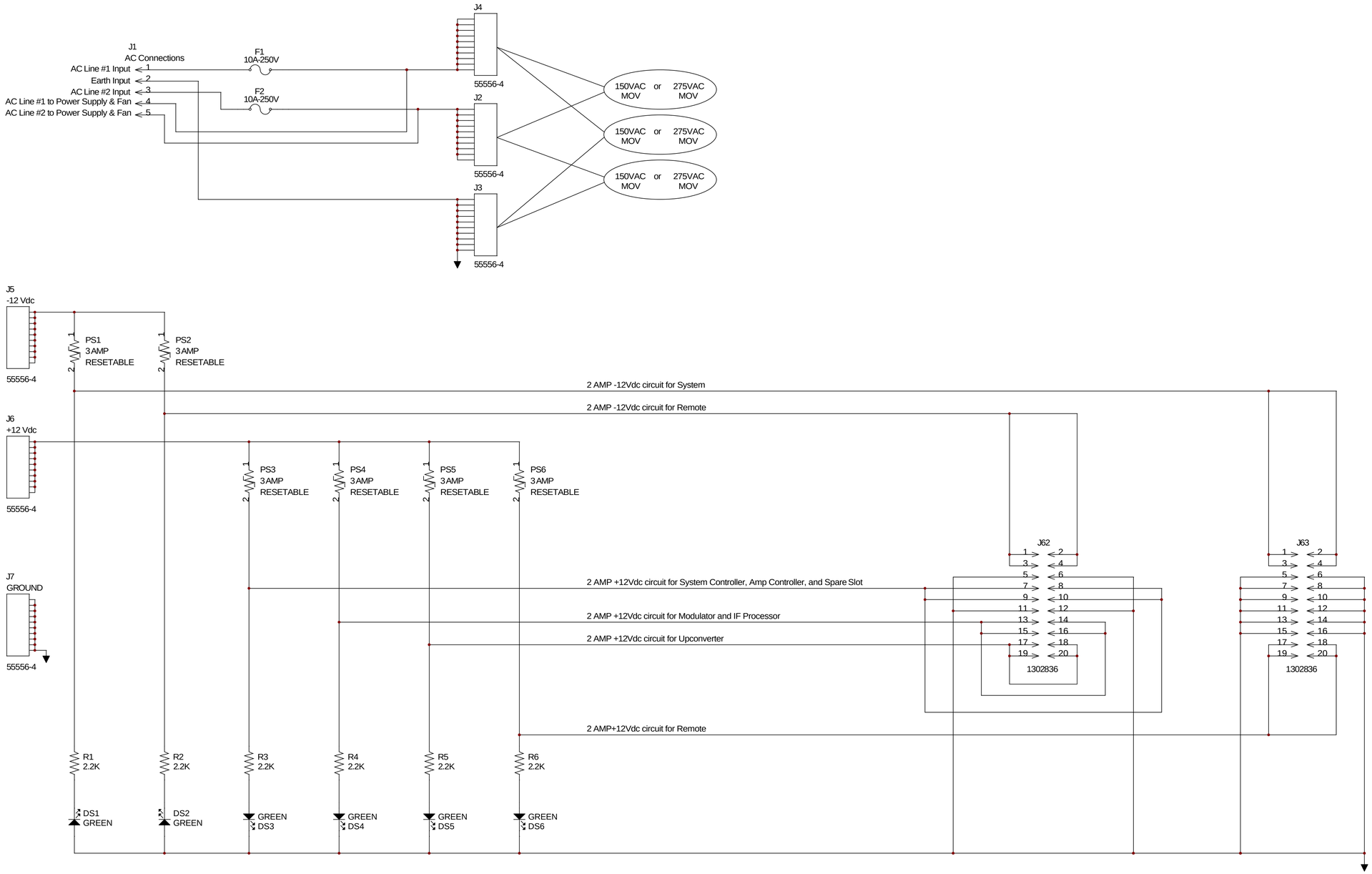
|---|---|---|---|---|---|
| DATE | THIS PRINT IS THE PROPERTY OF AXCERA, IT SHALL NOT BE COPIED WITHOUT PERMISSION | TITLE SCH, CONTROL BOARD, EXCITER, PIONEER SERIES (1302021) | | | |
| ECO | MATERIAL ----- | DWN REH 3/28/03 | DWG. NO. 1302023 | REV C0 | |
| REV | FINISH ----- | CHK LRT 9/3/03 | | | |
| | | REL LRT 9/3/03 | D | SCALE --- | SHEET 5 OF 5 |




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

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|---|---|---|---|---|---|
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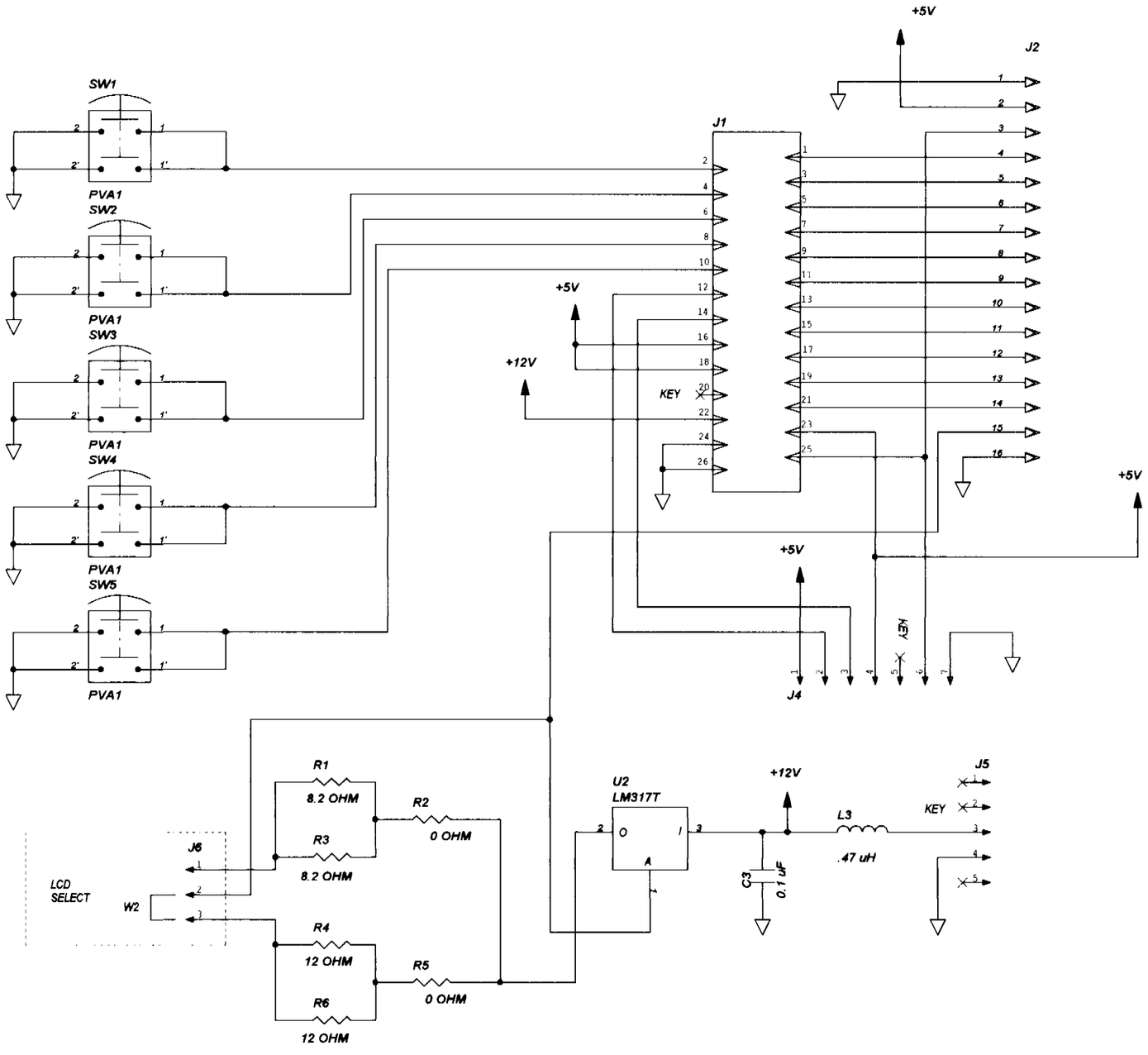
| ECO | MATERIAL ----- | DWN REH 5/29/03 | DWG. NO. 1302839 | | REV AO |
| | FINISH ----- | CHK REH 5/29/03 | | | |
| REV | | REL REH 5/29/03 | D | SCALE - - - | SHEET 1 OF 1 |




DELETED C1, C2, L1, L2, U1, J3, & W1. MOVED W2 FROM J6-1,-2 TO J6 -2,-3. JKF

| REV | ECN | DATE | APV |
|---|---|---|---|
| 3 | 8603 | 11/7/96 | RAS |
| AT J2 W2 WAS W1. (TMY) | | | |
| 2 | 8424 | 9/29/96 | JCM |
| SWITCHED PINS 1 & 2 OF U2. (TMY) | | | |
| 1 | 8368 | 8/27/96 | RAS |

ITS CORPORATION



MATERIAL ---

FINISH ---

TITLE SCHEMATIC SWITCH BOARD (1527-1406)

| | | | |
|---|---|---|---|
| DWN | DLM | 6/3/96 | |
| CHK | RAS | 6/14/96 | |
| REL | RAS | 6/14/96 | |

DWG. NO. 1527-3406 REV 3

B SCALE --- SHEET 1 OF 1

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.

Serial Address
MC74VHC245DT
CD74HC4051M
1302044
2-61100-4472
1095823
453-HC373XX
MC74VHC245DT
LT1076-ND
2N7002LT1
MOSFET
Processor Operation
PROGRAMMING ENABLED
ENABLED
DC OK
TEMP
MOD OK
MANUAL MICRO RESET
Off Board Wired Connections
FIRMWARE CONFIGURATION
SERIAL PROGRAMMING PORT
(See note on sheet 3)
Power Supply at MUX
Aural Power
Visual / Avg Power
Reflected Pwr
Amp Current 3 at MUX
Amp Current 2 at MUX
Amp Current 1 at MUX
Temperature at MUX
Amp 1 Disable CTRL
AURAL CIRCUIT DISABLE
Amp Current FLT
Temperature FLT
Power Supply High FLT
Power Supply Low FLT
Reflected Power FLT
Fault Alert
(1.6V = -12V OK)
(2.72V = -12V missing)
(-.7V = +12V missing)

J7: +12 Vdc Supply; Key; +12 Vdc to Amp; Device Present; System Serial -; System Serial +; Ground; Ground; -12 Vdc to Amp; -12 Vdc Supply

J8: Device ID1; Device ID2; Device ID3; Device ID4; Key; Device ID5; Device ID6; Device ID7; Device ID8; PS Ctrl

J1: PWM_A - DC; PWM_A; PWM_B; KEY; PB7; PF2; SPI_IN; SPI_OUT; SPI_CLK; SPI_SS

U21 PIN 8 WAS CONNECTED TO PIN 9. ADDED R215 & R216 AT U21-C. U25 PIN 1 WAS CONNECTED TO PIN 2. ADDED R217 & R218 AT U25-A. CR

| | | | |
|---|---|---|---|
| D0 | 20113027 | 8/19/08 | LRT |

SHT. 3, C85 WAS 3pF, R115 WAS 2.2K CR

| | | | |
|---|---|---|---|
| C0 | 20112676 | 8/23/07 | LRT |

SHT. 2, R214 WAS 100 OHMS. SHT. 3, U23 WAS 1084607. DELETED R124, R125. CR

| | | | |
|---|---|---|---|
| B0 | 20112385 | 3/1/07 | LRT |

MATERIAL NUMBERS:
1308260 AMP CTRL BD., HB VHF
1308261 SCH, AMP CTRL BD., HB VHF
1308262 PCB, AMP CTRL BD., HB VHF
1308263 STENCIL TOP
1308264 STENCIL BOTTOM
1303698 FIRMWARE, AMP CTRL BD., HB VHF

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

| Axcera | REV | ECO | DATE | APV |
|---|---|---|---|---|

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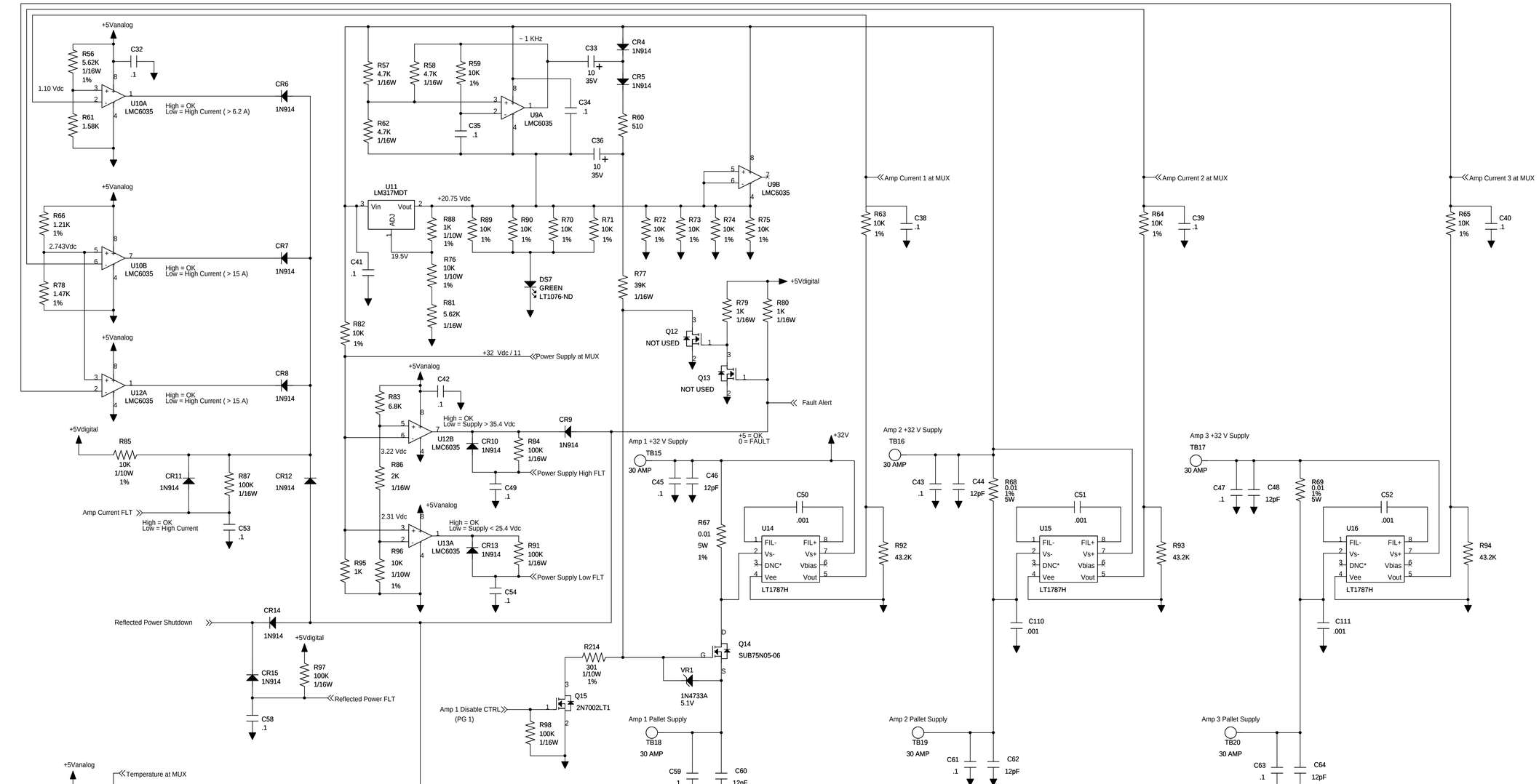
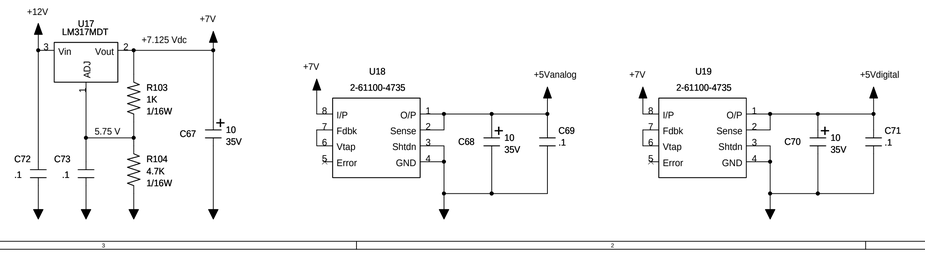
TITLE: SCH., AMP. CONTROL, HB, VHF (1308260)

MATERIAL: -----
FINISH: -----

| | | | |
|---|---|---|---|
| DWN | JKF | 10/27/06 | DWG. NO. 1308261 REV D0 |
| CHK | DWB | 10/31/06 | |
| REL | DWB | 10/31/06 | 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.

| | | | | | | |
|---|---|---|---|---|---|---|
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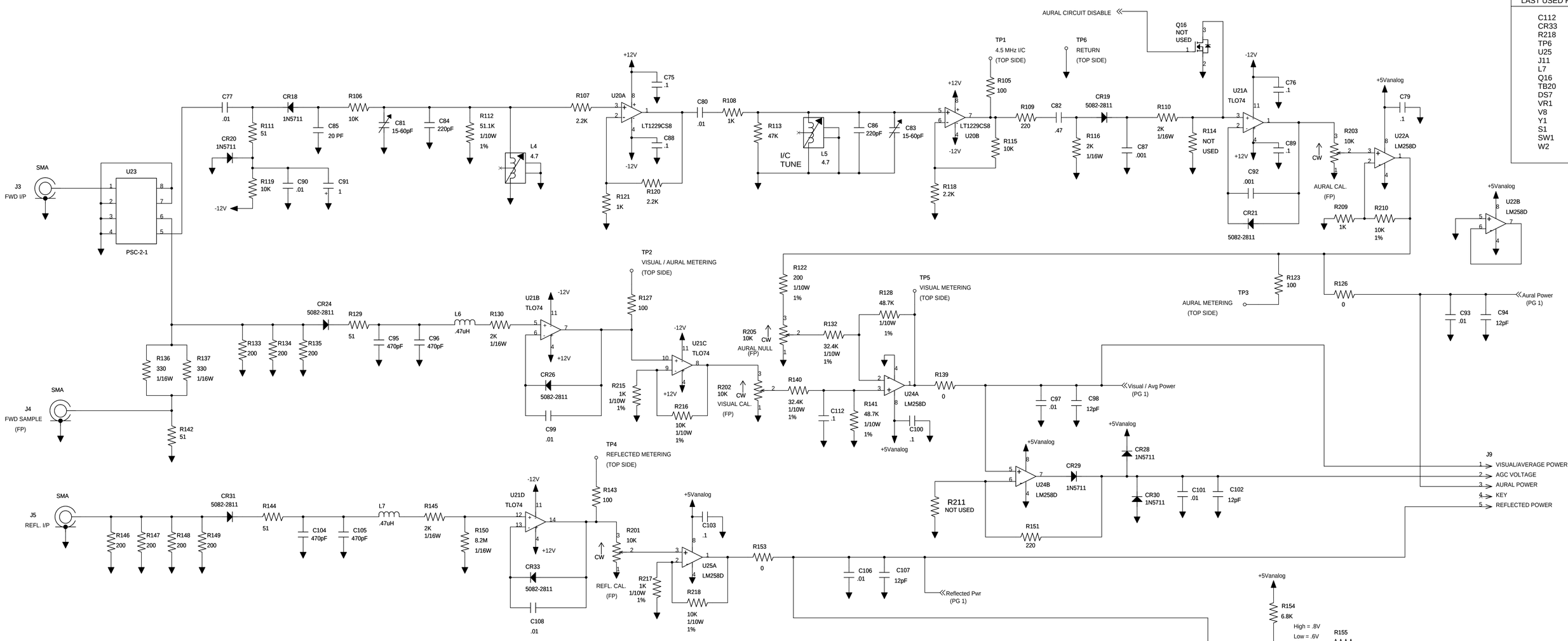
| ECO | MATERIAL ----- | DWN | JKF | 10/27/06 | DWG. NO. 1308261 | REV D0 |
| REV | FINISH ----- | CHK | DWB | 10/31/06 | | |
| | | REL | DWB | 10/31/06 | D SCALE --- | SHEET 2 OF 3 |

| LAST USED REF. |
|---|
| C112 |
| CR33 |
| R218 |
| TP6 |
| U25 |
| J11 |
| L7 |
| Q16 |
| TB20 |
| DS7 |
| VR1 |
| V8 |
| Y1 |
| S1 |
| SW1 |
| W2 |




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 (!ST) 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 sqr. 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 1.10 Vdc, the current to amplifier #1 should be about 6.20 Amps. U10B and U12A are used to detect a high current condition in amplifier stages #2 or #3. With a 2.74 Vdc reference, high current shut down should be about 15 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 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.

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.

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| ECO | MATERIAL ----- | DWN JKF 10/27/06 | DWG. NO. 1308261 | REV D0 | |
| REV | FINISH ----- | CHK DWB 10/31/06 | | | |
| | | REL DWB 10/31/06 | D | SCALE --- | SHEET 3 OF 3 |