REVISION HISTORY:

REVISION	DATE	DESCRIPTION	PURPOSE	PARTS ADDED / DROPPED / CHANGED	SHEETS	EFFECTED BY / PER DIRECTOR
0.00.00	03/13/2018	PROJECT STARTUP ; SCH - PCB - ALLOCATION - ADMIN	MARKETING DIRECTIVES ; NEW CUSTOM PROJECT	N/A	ALL SHEETS	SPIKE per E Rossi
	04/03/2018	1st SCH DSN REVIEW RELEASE TO CUSTOMER	PROCEDURAL NORMS	N/A	N/A	PROCEDURAL NORMS
0.01.00	04/04/2018	UPDATES PER INTERNAL DSN REVIEW	PROCEDURAL NORMS	REMOVE USB CAPS , ADD RTC BATTERY & JUMPER , CORRECT I2C PORT , FIX CONNECTOR LABELING	2 , 3	SPIKE per Jake Pollex , E Rossi
		2nd SCH DSN REVIEW RELEASE TO CUSTOMER	PROCEDURAL NORMS	N/A	N/A	PROCEDURAL NORMS
	04/09/2018	REMOVE SUPERFLUOUS 2nd 3.3V REGULATOR BY RELOCATING TO POWER SHEET & REMOVE U23 & RELATED PASSIVES	CORRECT AN ORIGINAL DSN BOO-BOO HAVING SEPARATED 3.3V & 3.4V POWER NETS	NUMEROUS	2 , 3	SPIKE per Clyde Phillips CAP post
0.02.00	04/13/2018	REVISE SCH TO NEW WILDCARD REV8 SCHEMATIC POPPED OUT OF BLUE	PROCEDURAL HICCUPS WITH MISLAID ECO'S	NUMEROUS	ALL SHEETS	SPIKE
		3rd SCH DSN REVIEW RELEASE TO CUSTOMER	PROCEDURAL NORMS	N/A	N/A	PROCEDURAL NORMS
0.03.00	04/16/2018	INCREASE SIZE OF SIGNAL CONNECTOR FROM 12 POS TO 14 POS ; ADDING TWO AGND PINS	CUSTOMERS DIRECTIVE	J1 COMPONENT & EPN	5	SPIKE per Clyde Phillips CAP post
		CHANGE PROBE HOOK TERMINAL TO TURRET TERMINAL AT TP1	INITIATIVE ; TURRET TERMINAL WILL MAKE HANDIER SCOPE PROBE ATTACHMENT THAN SQUAT HOOK TERMINAL	TP1	2 , 4	SPIKE
		INSTALL COMMON MODE CHOKE IN NORMAL POWER - GND DOMAIN TO ANALOG POWER - GND DOMAIN TRANSITION	INITIATIVE ; CMC CHOKE WILL MAKE BETTER FILTERING TRANSISTION THEN ORIGIANAL ONE SIDED FILTER	FB1 REPLACED WITH CH1	4	SPIKE
0.04.00	04/17/2018	REMOVE I2C PULLUPS BETWEEN MPU AND I2C TRANSLATORS , CHANGE VALUES ON CONNECTOR SIDE .	CUSTOMERS DIRECTIVE	REMOVED R59 , R60 , R61 , & R62 . CHANGE R32 , R33 , R40 , & R41 TO 2.0 Kohms	3	SPIKE per Arthur Simon
	04/18/2018	CHANGE SOLDERED-IN BR1225 BATTERY TO LARGER BR2032 BATTERY & HOLDER	CUSTOMERS DIRECTIVE	CHANGE B1 ; ADD BH1	3	SPIKE per Arthur Simon
		SWAP LABELS ON I2C PRIMARY & SECONDARY	CUSTOMERS DIRECTIVE	TEXTS ON SCH & PCB ONLY ; NO ELECTRICAL OR BOM IMPACTS	3	SPIKE per Arthur Simon
		PLACE ADDITIONAL 0.1 & 2.2 uF CAPACITOR BYPASSING ONTO XO1	CUSTOMERS DIRECTIVE	0.1 & 2.2 uF CAPACITOR BYPASSING ADDED TO XO1 Vcc	3	SPIKE per Arthur Simon
		REMOVE 10 uF CAPS NOT PRESENT IN ORIGINAL CUST DRAWING ; SUB WITH 0.1 & 2.2 uF CAPS WHERE APPLICABLE	CUSTOMERS DIRECTIVE	NUMEROUS	3 , 4	SPIKE per Arthur Simon
		RESTORE BEAD CHOKE IN GND-AGND TRANSITION , DIRECT CONNECT V+ AS PER ORIGINAL CUSTOMER DWG	CUSTOMERS DIRECTIVE	CH1 REPLACED BY FB1	4	SPIKE per Arthur Simon
		REMOVE 2nd (BOOTSTRAP) CHARGE PUMP CHIP	CUSTOMERS DIRECTIVE	2nd LM2665 REMOVED	4	SPIKE per Arthur Simon
0.05.00	05/18/2018	BOM TUNEUPS (DOESN'T AFFECT LAYOUT) REPLACE D3	DUAL DIODE DETCTED OBSOLETE IN BOM SCRUB	EPN 04-90005 CHANGED TO 04-90060	3	SPIKE per Matt Eeastman
		BOM TUNEUPS (DOESN'T AFFECT LAYOUT) RESTORE R36 , R37 , R38 , & R49 TO 4.99 Kohms	CUSTOMERS DIRECTIVE	CHANGED R36 , R37 , R38 , & R49 TO 4.99 Kohms	2 , 3	SPIKE per Arthur Simon
	05/18/2018	ADD MATING CONNECTOR INFORMATION FOR TESTING	PROCEDURAL NORMS	ADD PHC2 FOR ALTERNATE POWER	2	SPIKE

ACRONYM KEY :
NA : Information Not Available or Not Applicable depending on context

JUMPER TABLE:

LOCATION	PCB LEGEND	STYLE	FUNCTION	MANUFACTURING DEFAULT SETTING AS NOTED ON PCB	QTY OF JUMPERS REQUIRED PER LOCATION
JU1	JU1	1x 2mm	BOOT0 JUMPER	TBD	TBD
JU2	JU2	1x 2mm	BOOT1 JUMPER	TBD	TBD
JU3	JU3	1x 2mm	MPU RESET	NONE	ONE INTERMITTENTLY
JU4	JU4	1x 2mm	5V POWER TO J2	TBD	TBD
JU5	JU5	1x 2mm	USB SERIAL PORT 1 DM DISCONNECT	INSTALLED	ONE
JU6	JU6	1x 2mm	USB SERIAL PORT 1 DP DISCONNECT	INSTALLED	ONE
JU7	JU7	1x 2mm	USB AS MAIN POWER DISCONNECT	TBD	TBD
JU8	JU8	1x 2mm	USB SERIAL PORT 2 DM DISCONNECT	INSTALLED	ONE
JU9	JU9	1x 2mm	USB SERIAL PORT 2 DP DISCONNECT	INSTALLED	ONE
JU10	JU10	1x 2mm	3V TO JTAG HEADER PIN #4	TBD	TBD
JU11	JU11	1x 2mm	RESET line to MPU interrupter	TBD	TBD
JU12	JU12	1x 2mm	JTAG HEADER MUXSEL	TBD	TBD
JU13	JU13	1x 2mm	RTC BATTERY SAVER	TBD	TBD

DESIGN DIRECTIVES COMPLIANCE NOTES :

OPERATING TEMPERATURE: 0C TO 60C
ALL COMPONENTS USED IN THIS DESIGN MEET THE CUSTOMER'S TEMPERATURE RANGE SPECIFICATION EXCEPT FOR THE FOLLOWING :

NONE DETECTED

PCB1
MISC. PART
PCB Cust BI Group Potentiostat
01-90142-R0

OPTION TABLE:
00 - Always Populated
99 - Not Populated

PRODUCT COMPOSITION:
Bedbug Potentiostat C03458-00B00-00 = contains 00

FIDUCIAL COMPONENT TEMPLATE :
*G1 *G2 *G3 PCB GLOBALS
*P1 *P2 *P3 ARRAY TOOLING

ARRAY TOOLING HOLE TEMPLATE :
TH1 TH2 TH3 TH4

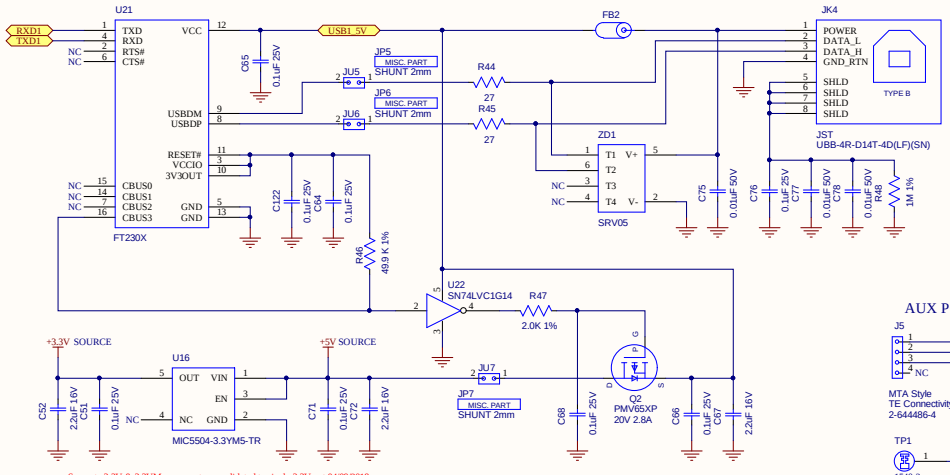
SN1
MISC. PART
PCB Serial Number Overlay
Big Intelligence Group : Potentiostat

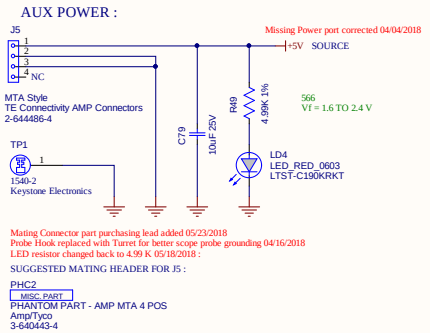
REVISION KEY :
PCB REV . SCHEMATIC REV . MODWIRE REV
X.XX.XX

EMAC, inc.
EQUIPMENT MONITOR AND CONTROL

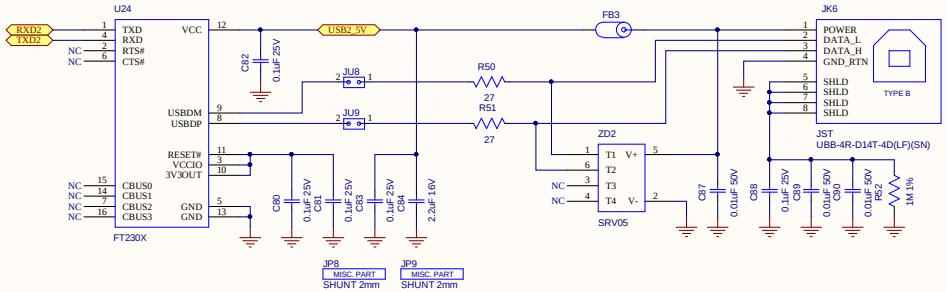
Title: Big Intelligence Group : Potentiostat
Size: C
Number: **
Revision: 0.05.00
Project Date: 03/13/2018 to **/**/**
Sheet 1 of 5
Drawn By: Spike
Reviewed By: **
SVN Revision Number: 4803

USB SERIAL PORT 1 & POWER SUPPLY INPUT :





USB SERIAL PORT 2 :



EMAC, inc. Equipment Monitor And Control	Title: Big Intelligence Group : Potentiostat		
	Size: C	Number: **	Revision: 0.05.00
	Project Date: 03/13/2018 to **/**/**		Sheet 2 of projSheetTotal
	Drawn By: Spike		Reviewed By: **
	SVN Revision Number: 4803		

0.1 & 2.2 uF Capacitor bypassing added existing 0.1 uF 04/18/2018 :

XO1
10.000MHz
ASFLMB-10.000MHZ-XY-T

RTC Crystal added 04/13/2018

Y1
32.768kHz
ABS07L-32.768KHZ-T

U15
STM32F205RCT6

MPU Bypassing rolled back to match customer schematic 04/18/2018
10 uF cap removed per directives 04/18/2018

RTC Battery and Batt Saver Jumper added 04/04/2018
RTC Battery upgraded to BR2032 Battery & Holder 04/17/2018
EPN 04-90004 found obsolete . Replaced with similar 04-90060 .

D3 BAT54C
BH1
BATTERY HOLDER
MPD BU2032SM-HD-G
B1 3V 190mAh
RAYOVAC
BR2032-BA
-40°C ~ 85°C

2nd 3.3V regulator & related passives relocated to power sheet 04/09/2018

Separate 3.3V & 3.3VM power nets consolidated to single 3.3V net 04/09/2018

SPI & Other pinouts Revised 04/13/2018

I2C labeling changed 04/17/2018 :
I2C Primary :
Vref2 , EN , & resistor corrections 04/04/2018 R32 , R33 Changed to 2.0 Kohms 04/17/2017

Missing I2C Pullups corrected 04/04/2018
R59 & R60 removed per directive 04/16/2018
0.1 uF Cap removed to match cust DWG 04/18/2018

U17
PCA9306DCUR
Amphenol Commercial Products
RJE0166001
ZD3
SRV05

I2C labeling changed 04/17/2018 :
I2C Secondary :
Vref2 , EN , & resistor corrections 04/04/2018 R40 , R41 Changed to 2.0 Kohms 04/17/2017

Missing I2C Pullups corrected 04/04/2018
R61 & R62 removed per directive 04/16/2018
0.1 uF Cap removed to match cust DWG 04/18/2018

U20
PCA9306
J3
Amphenol Commercial Products
RJE0166001
ZD4
SRV05

STATUS LED DRIVERS :

0.1 & 2.2 uF Capacitor bypassing unified to 0.1 uF & 2.2 uF 04/18/2018 :
LED resistors changed back to 4.99 K 05/18/2018 :

U18 SN74LVC1G07DCKR
LD1
LED_RED_0603
LTST-C190KRKT
Vf = 1.6 TO 2.4 V
566

U28 SN74LVC1G07DCKR
LD2
LED_GREEN_0603
LTST-C190KGKT
Vf = 1.9 TO 2.4 V
516

U19 SN74LVC1G07DCKR
LD3
LED_BLUE_0603
VLMB1310-GS08
Vf = 2.8 TO 3.8 V
366

JTAG Revised 04/13/2018

JTAG HEADER
DUAL USE
J7
2x5 0.100 in

Z1
4x100K

R-Net assignments re-arranged for cleaner routing 05/01/2018 . Original connectivity retained .

JTAG HEADER's DUAL USE MUX

MUX Revised 04/13/2018

U26
TS5A3159DBVR

IMAGE CRAFT SMART I/O MODULE CONNECTOR :

MODULE PLUGS INTO THIS SIMPLE 12 POSITION FEMALE 0.100 in GRID HEADER

MODU1
2x6 0.100 in FEM
Sullins Electronics Corp
PPPC062LFBN-RC

RAD1
Image Craft Smart IO Module
PER-COM-1005PR0

EMAC, inc.
EQUIPMENT MONITOR AND CONTROL

Title:
Big Intelligence Group : Potentiostat

Size:	Number:	Revision:
C	**	0.05.00

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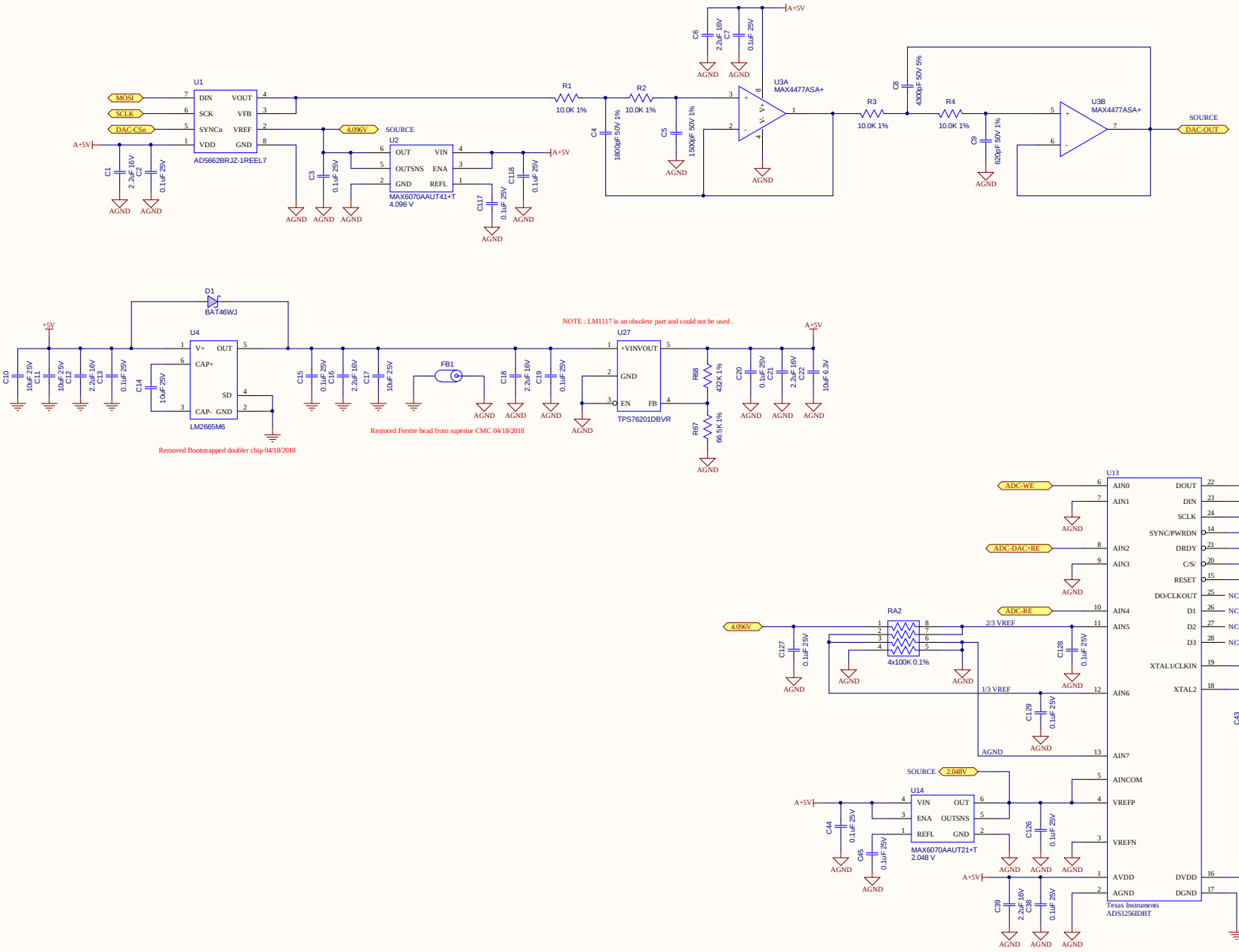
Drawn By: Spike	Reviewed By: **
SVN Revision Number: 4858	



EMAC, inc. Equipment Monitor And Control	Title: Big Intelligence Group : Potentiostat	
	Size: C / Number: **	Revision: 0.05.00
	Project Date: 03/13/2018 to **/**/**	Sheet 4 of projSheetTotal
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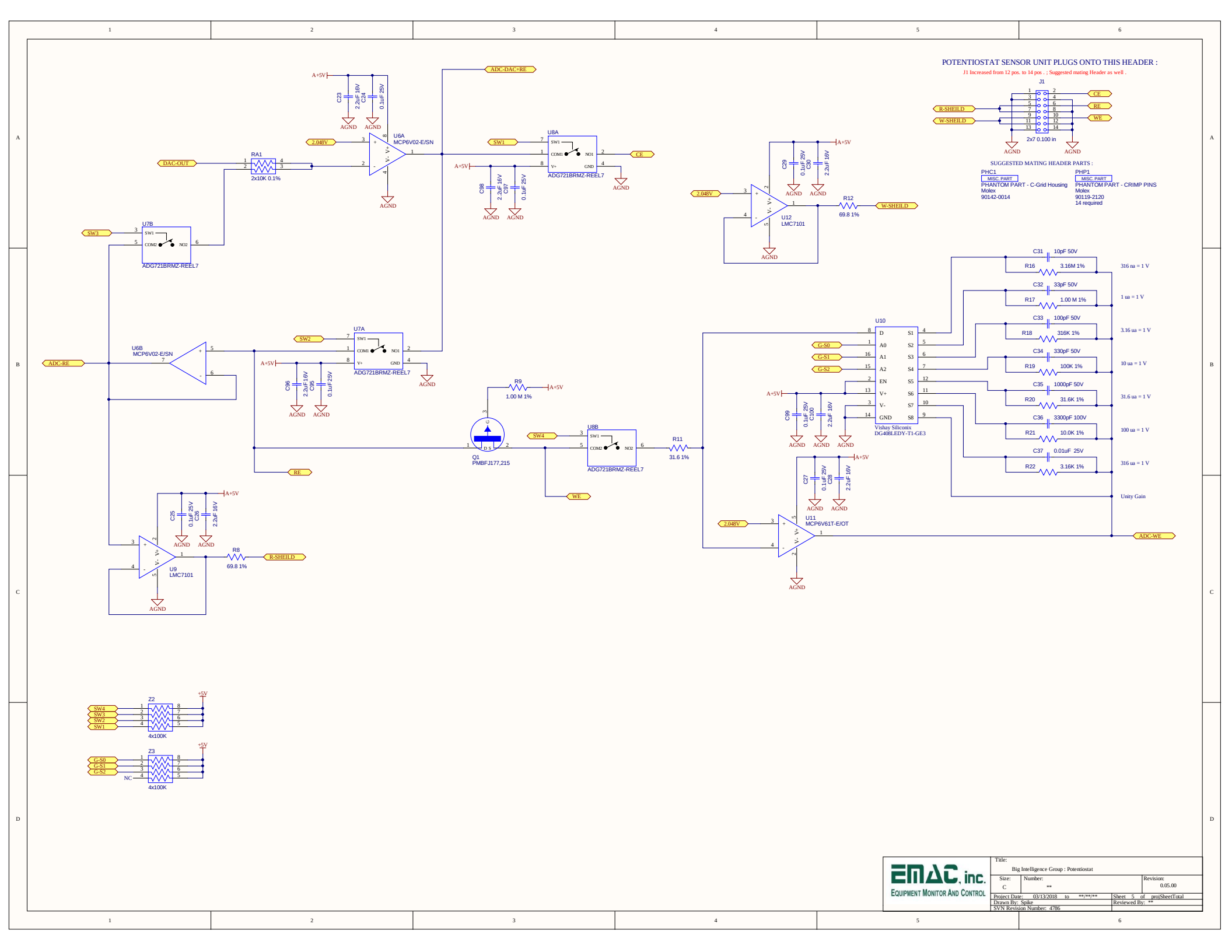
	SVN Revision Number: 4786	


POTENTIOSTAT SENSOR UNIT PLUGS ONTO THIS HEADER :
J1 Increased from 12 pos. to 14 pos . ; Suggested mating Header as well .
J1
2x7 0.100 in
CE
RE
WE
R-SHEILD
W-SHEILD
AGND
SUGGESTED MATING HEADER PARTS :
PHC1
MISC_PART
PHANTOM PART - C-Grid Housing
Molex
90142-0014
PHP1
MISC_PART
PHANTOM PART - CRIMP PINS
Molex
90119-2120
14 required
A+5V
ADC-DAC+RE
C23 2.2uF 16V
C24 0.1uF 25V
2.048V
U6A
MCP6V02-E/SN
DAC-OUT
RA1
2x10K 0.1%
SW1
U8A
ADG721BRMZ-REEL7
C98 2.2uF 16V
C97 0.1uF 25V
C29 0.1uF 25V
C30 2.2uF 16V
U12
LMC7101
R12
69.8 1%
W-SHEILD
SW3
U7B
ADG721BRMZ-REEL7
U6B
MCP6V02-E/SN
ADC-RE
SW2
U7A
ADG721BRMZ-REEL7
C96 2.2uF 16V
C95 0.1uF 25V
R9
1.00 M 1%
Q1
PMBFJ177,215
SW4
U8B
ADG721BRMZ-REEL7
R11
31.6 1%
RE
WE
U10
Vishay Siliconix
DG408LEDY-T1-GE3
G-S0
G-S1
G-S2
C99 0.1uF 25V
C100 2.2uF 16V
C31 10pF 50V
R16 3.16M 1%
316 na = 1 V
C32 33pF 50V
R17 1.00 M 1%
1 ua = 1 V
C33 100pF 50V
R18 316K 1%
3.16 ua = 1 V
C34 330pF 50V
R19 100K 1%
10 ua = 1 V
C35 1000pF 50V
R20 31.6K 1%
31.6 ua = 1 V
C36 3300pF 100V
R21 10.0K 1%
100 ua = 1 V
C37 0.01uF 25V
R22 3.16K 1%
316 ua = 1 V
Unity Gain
C27 0.1uF 25V
C28 2.2uF 16V
U11
MCP6V61T-E/OT
ADC-WE
C25 0.1uF 25V
C26 2.2uF 16V
U9
LMC7101
R8
69.8 1%
R-SHEILD
Z2
4x100K
Z3
4x100K
NC
+5V
EMAC, inc.
EQUIPMENT MONITOR AND CONTROL
Title:
Big Intelligence Group : Potentiostat
Size: C
Number: **
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Reviewed By: **
SVN Revision Number: 4786