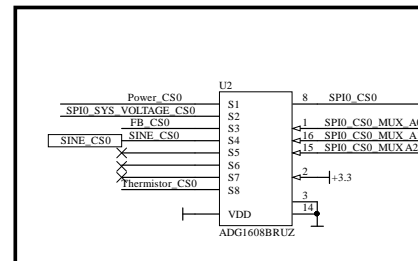


Layout files for Beaglebone Black can be found at:  
<http://elinux.org/Beagleboard:BeagleBoneBlack>

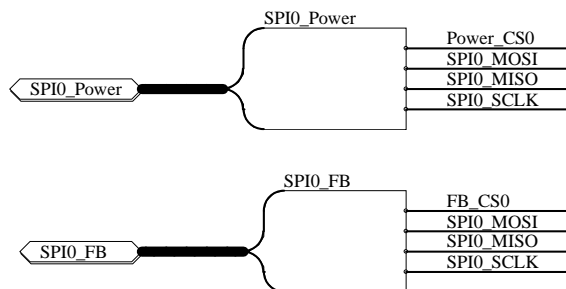
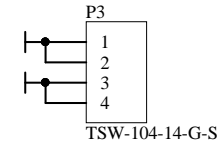
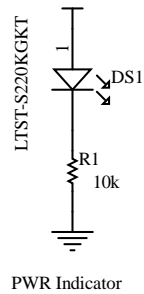
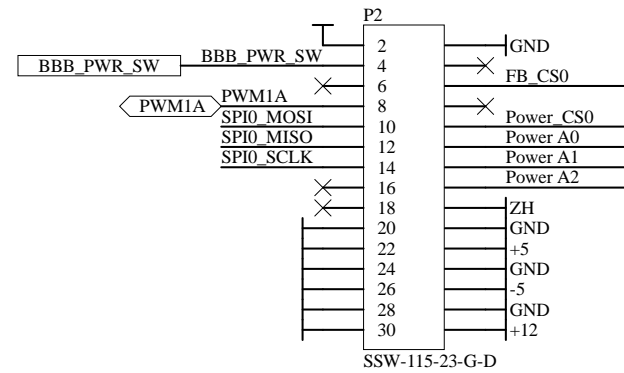
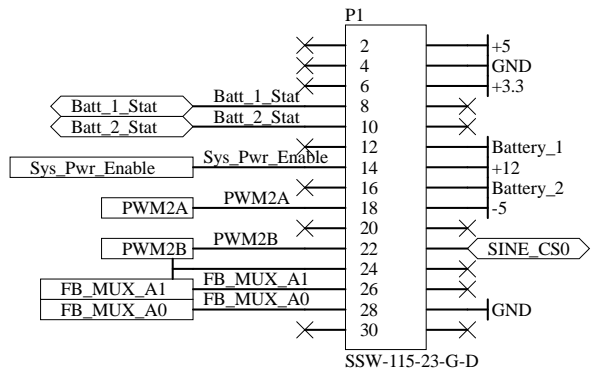
Ensure headers will mate to the BBB

<http://www.noritake-iron.com/NewWeb/TFT/Overview/Overview.asp>



Title <b>BBB Headers</b>			ZLS Corporation 7801 North Lamar Blvd. Suite E-184 Austin, Texas 78752 USA (512) 453-0268
Size: Tabloid	Number: LM-003	Revision: C	
Date: 10/5/2018	Time: 9:06:05 AM	Sheet: 1 of 4	
File: C:\Users\zls\Desktop\Land_Meter_PCB\LM-003-Rev C\BBB Headers.SchDoc			





Mating Pigtail: MMSST-04-28-F-12.00-S-K

Title <b>Connectors</b>			ZLS Corporation 7801 North Lamar Blvd Suite E-184 Austin, TX 78752 Phone: (512) 453-0288	Cannot open file Z:\jackwalker On My Mac\Documents \Misc
Size: Orcad A	Number:LM-003	Revision:C		
Date: 10/5/2018	Time: 9:06:05 AM	Sheet2 of 4		
File: C:\Users\zls\Desktop\Land Meter PCB\LM-003-Rev C\Connectors.SchDoc				

### Heater Buffers

The diagram illustrates four identical heater buffer stages, each designed to protect a sensitive FET from high-voltage heater pulses. Each stage consists of an OPA188AIDBVR operational amplifier configured as a voltage follower. The input of the op-amp is connected to the heater FET through a 20K resistor (R2, R4, R8, R12). A feedback capacitor (C1, C2, C4, C6) of 0.1µF is connected between the op-amp's output and its inverting input. The output of the op-amp is connected to the heater FET's gate through a diode (DS2, DS3, DS5, DS7) and a 4.99K resistor (R3, R5, R9, R13) to ground. The diode is oriented to allow current flow from the FET to the heater and block reverse current.

**Meter Heater FET Buffer:** Input from Meter Heater FET through R2 (20K) to U3 (OPA188AIDBVR). Output to Meter Heater FET through DS2 (LTST-S220KRKT) and R3 (4.99K) to ground. Feedback capacitor C1 (0.1µF) is connected from output to inverting input.

**Arrestment Heater FET Buff:** Input from Arrestment Heater FET through R4 (20K) to U4 (OPA188AIDBVR). Output to Arrestment Heater FET through DS3 (LTST-S220KRKT) and R5 (4.99K) to ground. Feedback capacitor C2 (0.1µF) is connected from output to inverting input.

**Gearbox Heater FET Buff:** Input from Gearbox Heater FET through R8 (20K) to U6 (OPA188AIDBVR). Output to Gearbox Heater FET through DS5 (LTST-S220KRKT) and R9 (4.99K) to ground. Feedback capacitor C4 (0.1µF) is connected from output to inverting input.

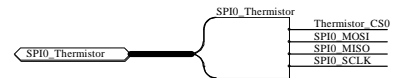
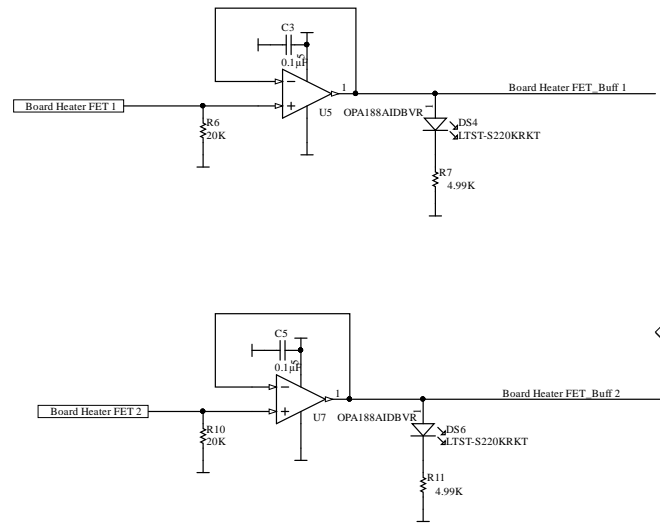
**Conning Tower Heater FET Buff:** Input from Conning Tower FET through R12 (20K) to U8 (OPA188AIDBVR). Output to Conning Tower Heater FET through DS7 (LTST-S220KRKT) and R13 (4.99K) to ground. Feedback capacitor C6 (0.1µF) is connected from output to inverting input.

### Heater Board Connector

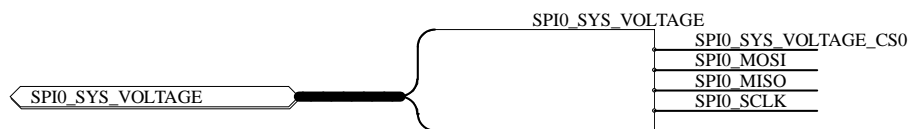
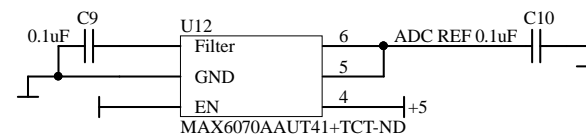
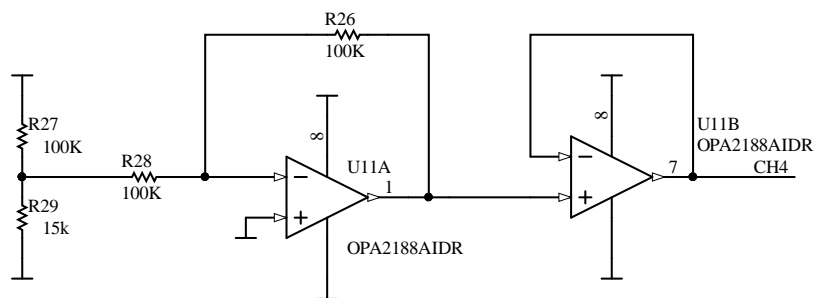
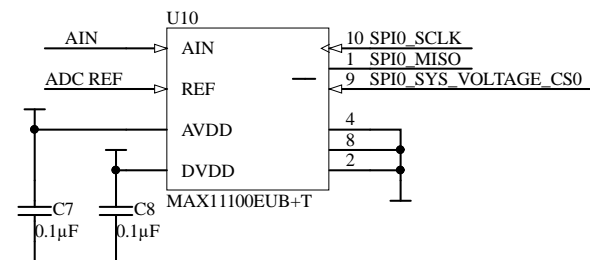
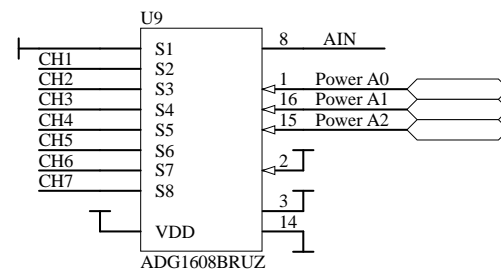
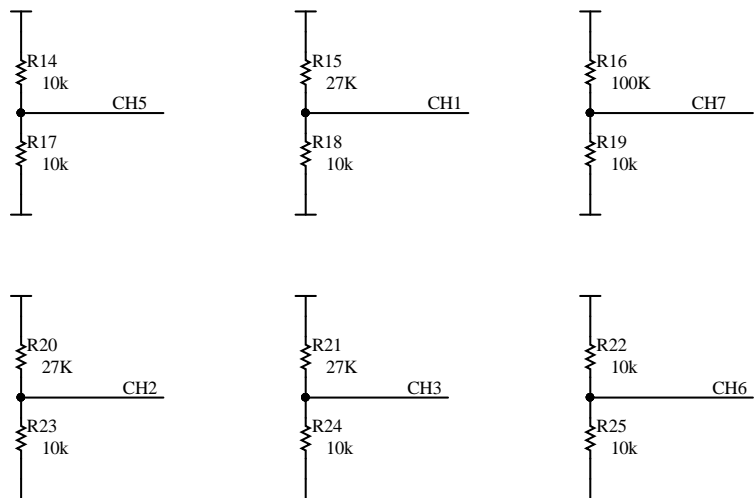
Pinout diagram for the Heater Board Connector:


Pin	Signal / Component
1	MUX A2
3	SPI0 MISO
5	MUX A3
7	Meter Heater FET_Buff
9	Gearbox Heater FET_Buff
11	Board Heater FET_Buff 1
13	MUX A1
15	MUX A0
17	Thermistor_MUX_A0
19	Thermistor_MUX_A1
21	CS0
23	Conning Tower Heater FET_Buff
2	GND
4	MUX A1
6	MUX A0
8	Thermistor_MUX_A0
10	SPI0 SCLK
12	Thermistor_CS0
14	Conning Tower Heater FET_Buff
16	Antenna Heater FET_Buff
18	Board Heater FET_2
20	+3.3
22	+12
24	GND

IPL-112-01-F-S-K



@ 12V	
Arrestment Heater	2.8W
Conning Tower Heater	2.8W
Gearbox Heater	2.8W
Meter Heater	6W
IC Heater	2.8W
<hr/>	
Total	16.2W



Title <b>ADC</b>			ZLS Corporation 7801 North Lamar Blvd. Suite E-184 Austin, Texas 78752 USA (512) 453-0288	
Size: Orcad A	Number:LM-003	Revision:C		
Date: 10/5/2018	Time: 9:06:07 AM	Sheet4 of 4		
File: C:\Users\zls\Desktop\Land_Meter_PCB\LM-003-Rev C\ADC.SchDoc				