MegaThermo

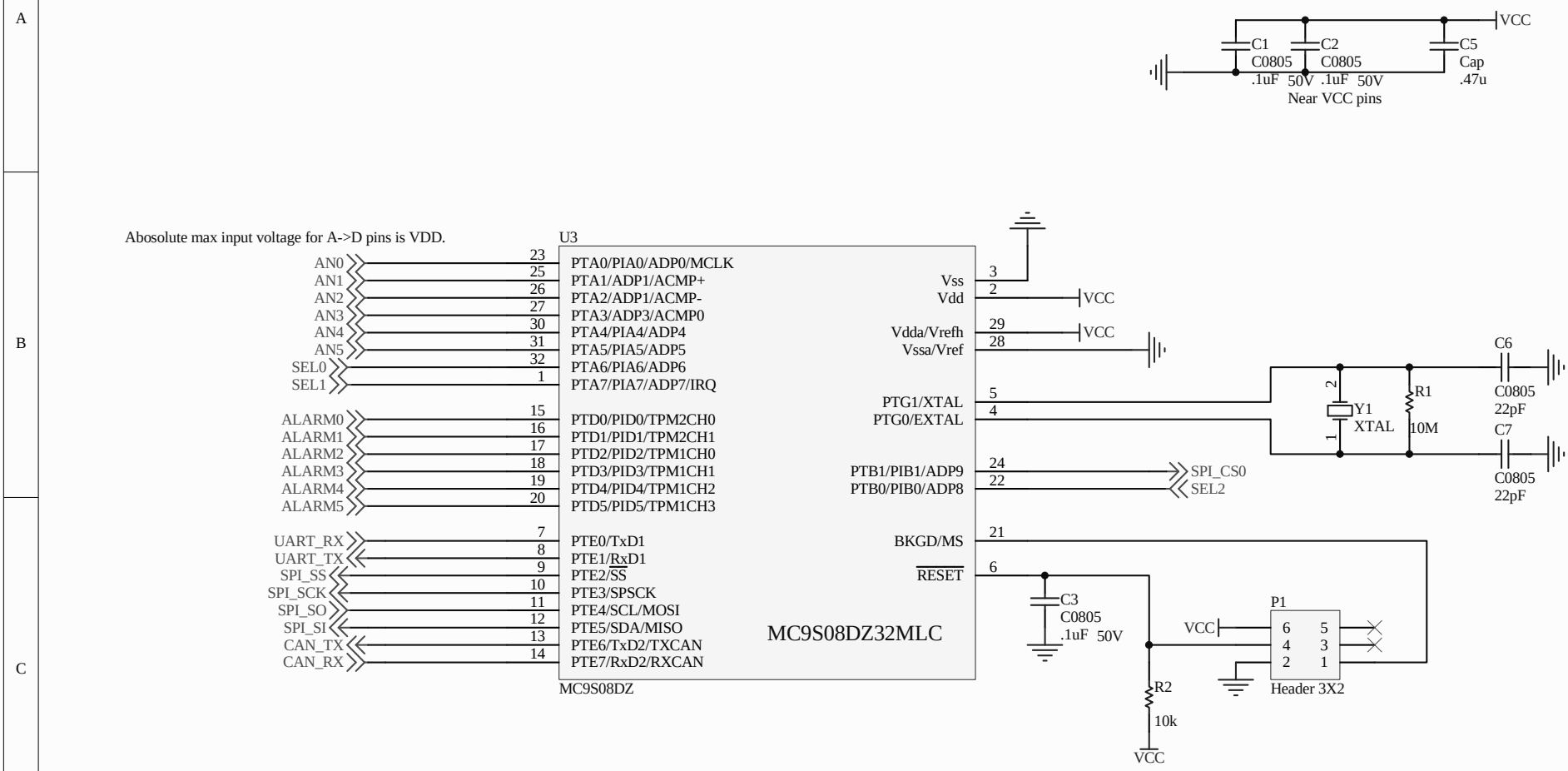
16 Channel Thermocouple Interface Board with CAN and Serial Interfaces

By James Peverill Dec 2008

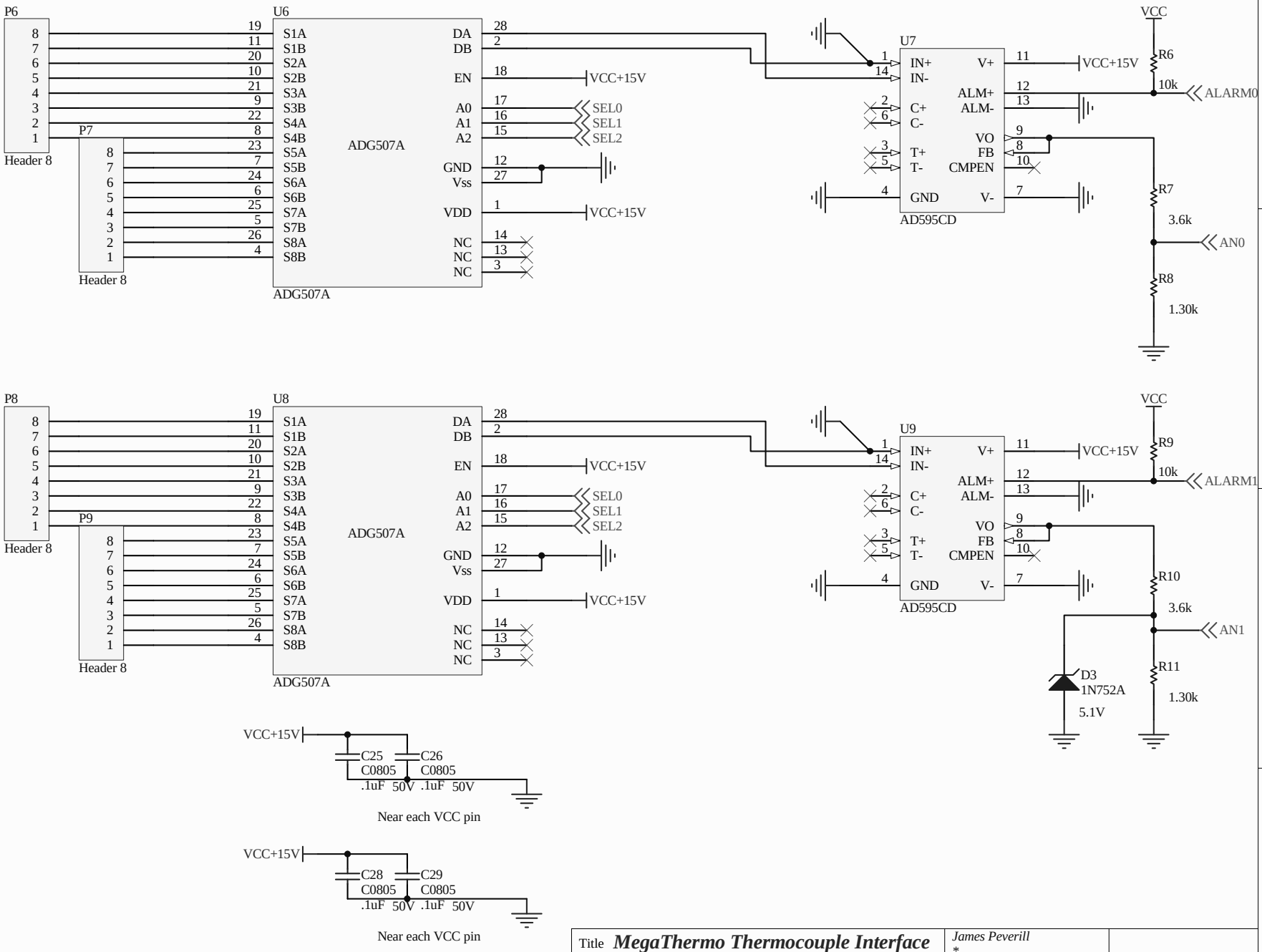
Design Overview:
* Microcontroller is a Freescale HC9S08 part with CAN, SPI and 12 bit A->Ds
* Thermocouple interface is two Analog Devices AD595 conditioning chips
* Thermocouples are hooked to two Analog Devices 2x8 analog multiplexer chips for a total of 16 support thermocouples
* Board is laid out to acommodate 32 screw terminals for connecting the 16 thermocouples
* A debugging header is present for flashing the microcontroller
* An SPI header is available for future expansion use
* Board has dual power supplies
  * A 5V supply which accepts 7-24V input range
  * A 15V supply which accepts 11V-24V
* Board has a 2.5mm headphone jack hooked to an RS232 transceiver
* CAN transceiver chip is hooked to two 6 pin modular plugs
* Board is setup with top and bottom expansion headers to allow up to 3 of the boards to be daisy chained, supporting up to 48 thermocouples.

Notes:
* Board does not have a negative power supply, and such the AD595s cannot read temperatures below 0 degrees C. This was done to simplify the board. A negative supply could be added, but that would also require instrumentation amps to be used to convert the thermocouple signals to a range suitable for the microcontrollers A->Ds.

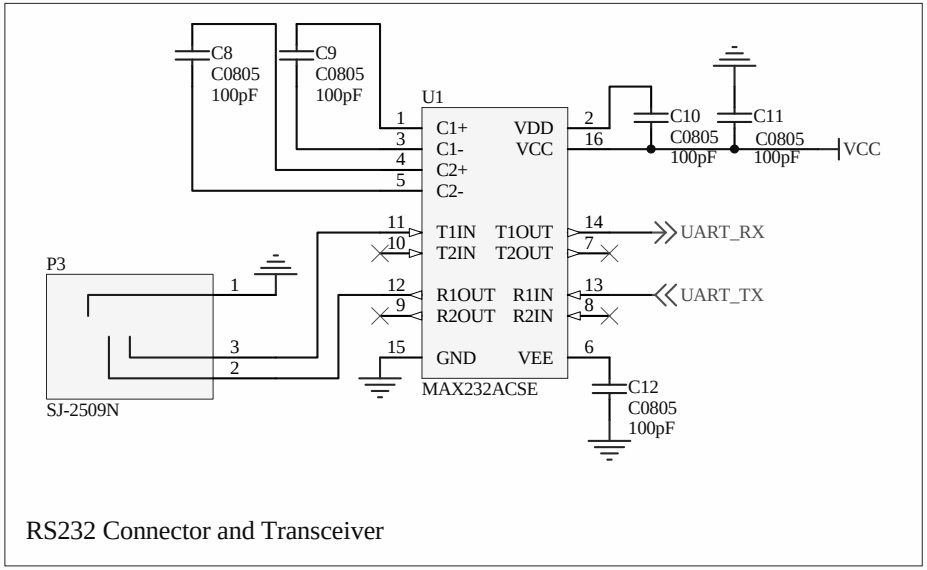
Title ***MegaThermo Information Sheet***			*James Peverill* * * * *
Size: A	Number: *	Revision: -	
Date: 7/15/2010 Time: 9:46:48 AM		Sheet 1 of 5	
File: Z:\personal\Megasquirt\MegaThermo\MegaThermoInfo.SCHDOC			



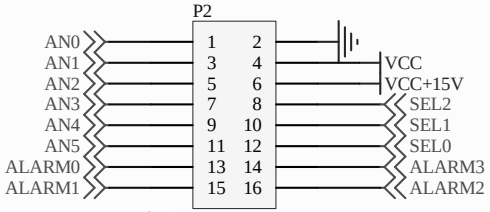
Title ***MegaThermo Microcontroller***			*James Peverill* * * * *
Size: A	Number: *	Revision: -	
Date: 7/15/2010	Time: 9:46:49 AM	Sheet 2 of 5	
File: Z:\personal\Megasquirt\MegaThermo\Microcontroller.SchDoc			



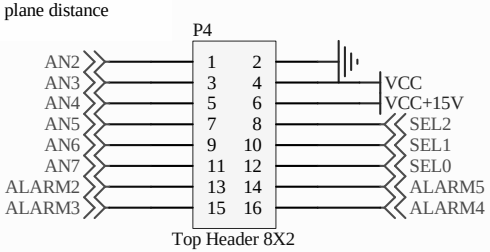
Title	***MegaThermo Thermocouple Interface***		*James Peverill* * * * *
Size: A	Number:*	Revision:-	
Date: 7/15/2010	Time: 9:46:49 AM	Sheet 3 of 5	
File: Z:\personal\Megasquirt\MegaThermo\TC Chips.SchDoc			

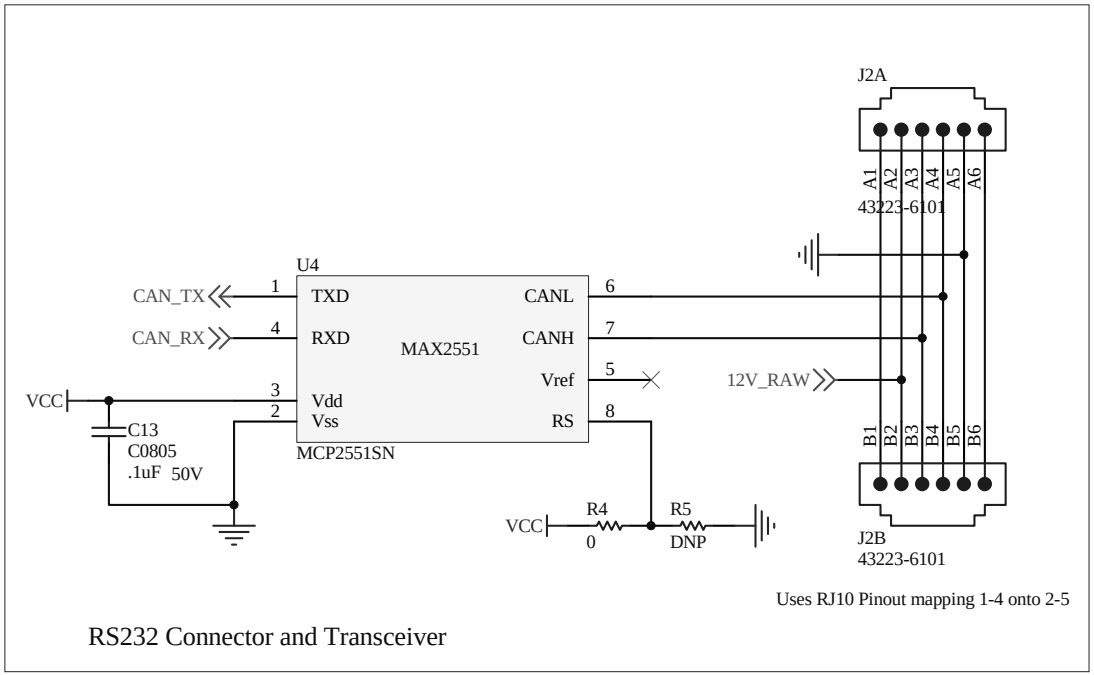


RS232 Connector and Transceiver



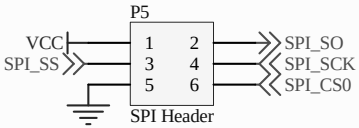
These two headers are placed at the top and bottom of the board, both are right angle. Female on the top connector, male on the bottom.
Male header is .16" pin to mating plane distance
Female header is .395"

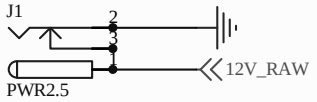




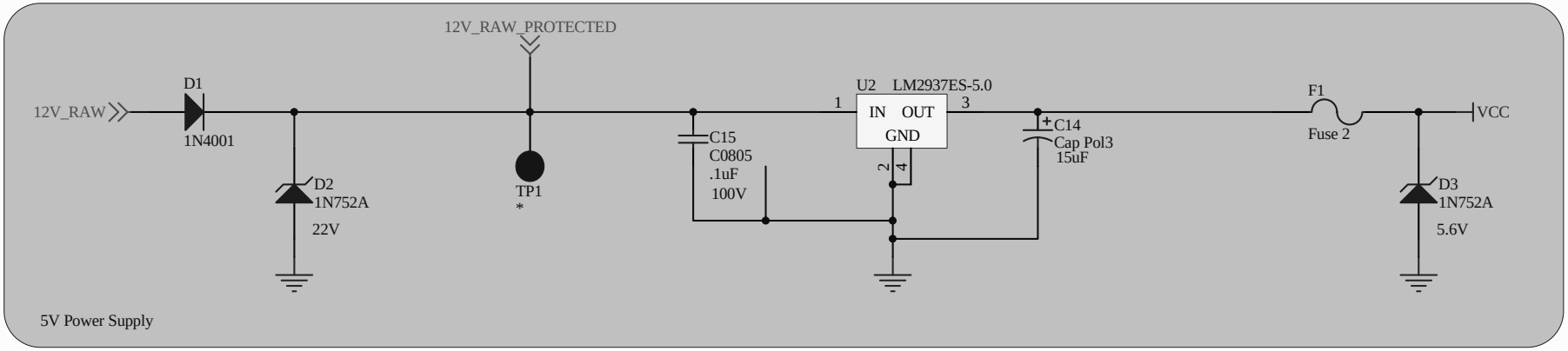
Uses RJ10 Pinout mapping 1-4 onto 2-5

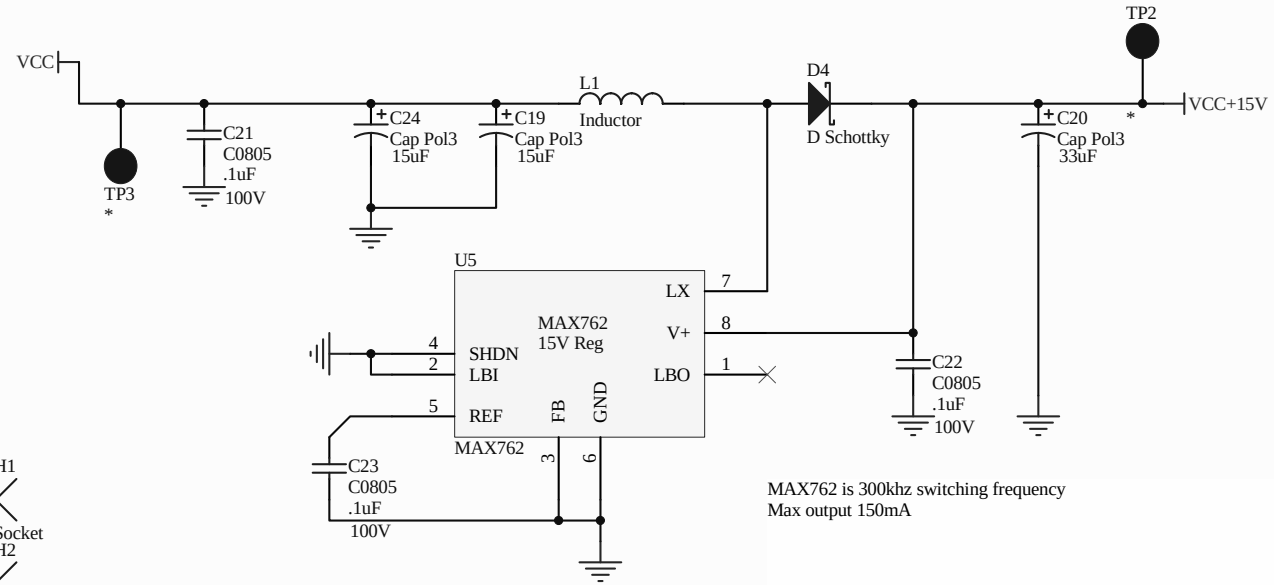
RS232 Connector and Transceiver

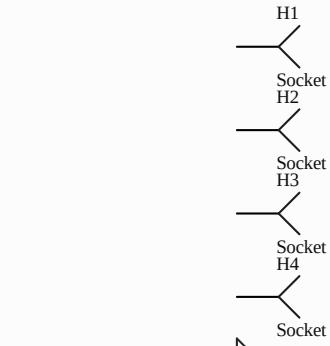


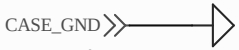


Title ***MegaThermo I/O***			*James Peverill* * * * *
Size: A	Number:*	Revision:-	
Date: 7/15/2010	Time: 9:46:49 AM	Sheet 4 of 5	
File: Z:\personal\Megasquirt\MegaThermo\MT_IO.SchDoc			









Case isolated from power and signal grounds.

Title	***MegaThermo Power Supplies***		*James Peverill* * * * *
Size: A	Number: *	Revision: -	
Date: 7/15/2010	Time: 9:46:50 AM	Sheet 5 of 5	
File: Z:\personal\Megasquirt\MegaThermo\MT_PowerSupply.SchDoc			