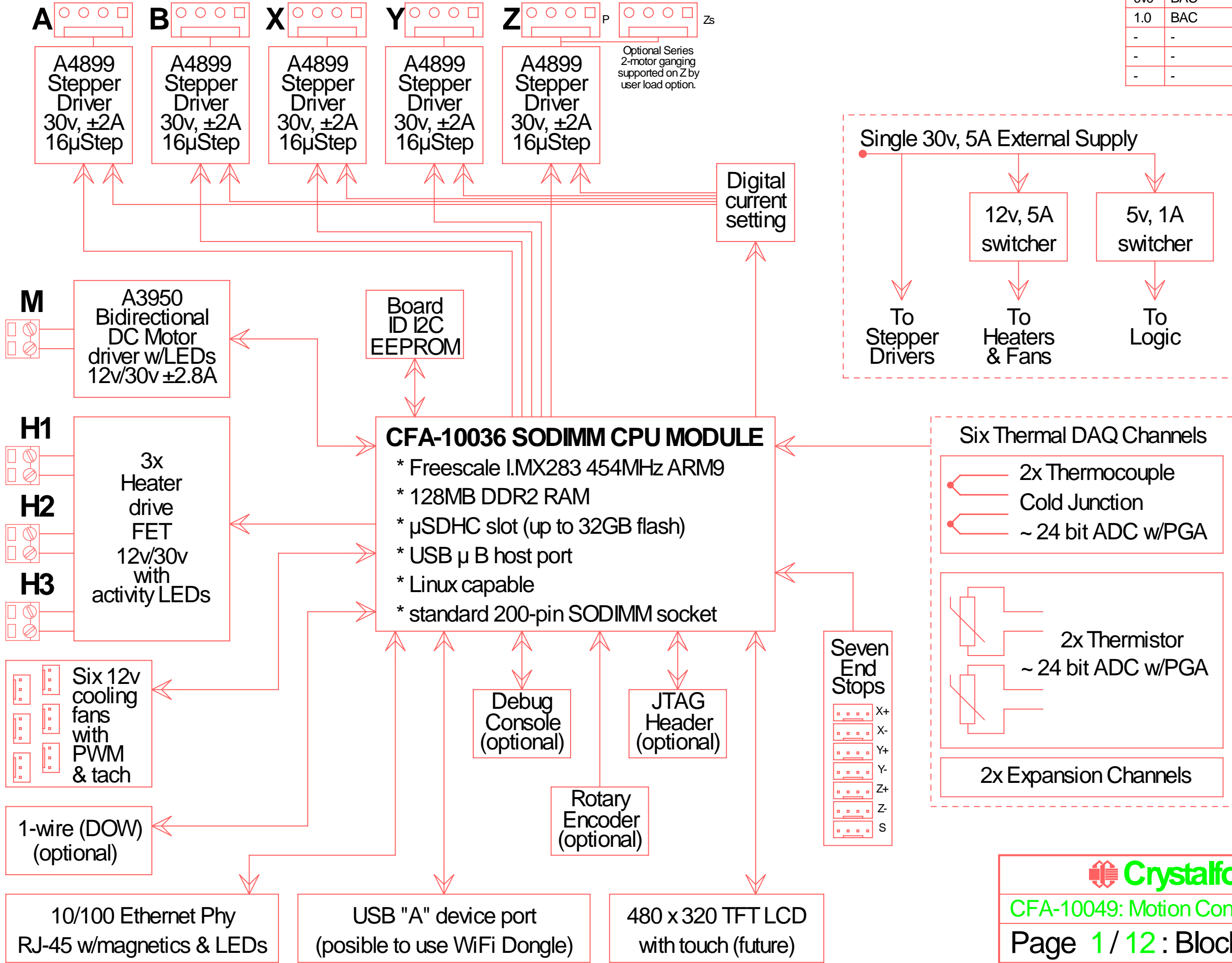


REV	ENGINEER	DATE	REMARKS
0v0	BAC	2012-01-18	Initial Creation
1.0	BAC	2013-02-11	Public Pilot
-	-	-	-
-	-	-	-
-	-	-	-



SYSTEM FEATURES

- * One 4-layer PCB
- * One Processor
- * Connectivity
- * Minimal Interconnects
- * Quality PCB design
- * High Performance
- * High Reliability
- * Competitive Cost
- * Multi-Axis Acceleration

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CFA-10049: Motion Control Demo Board for CFA-10036

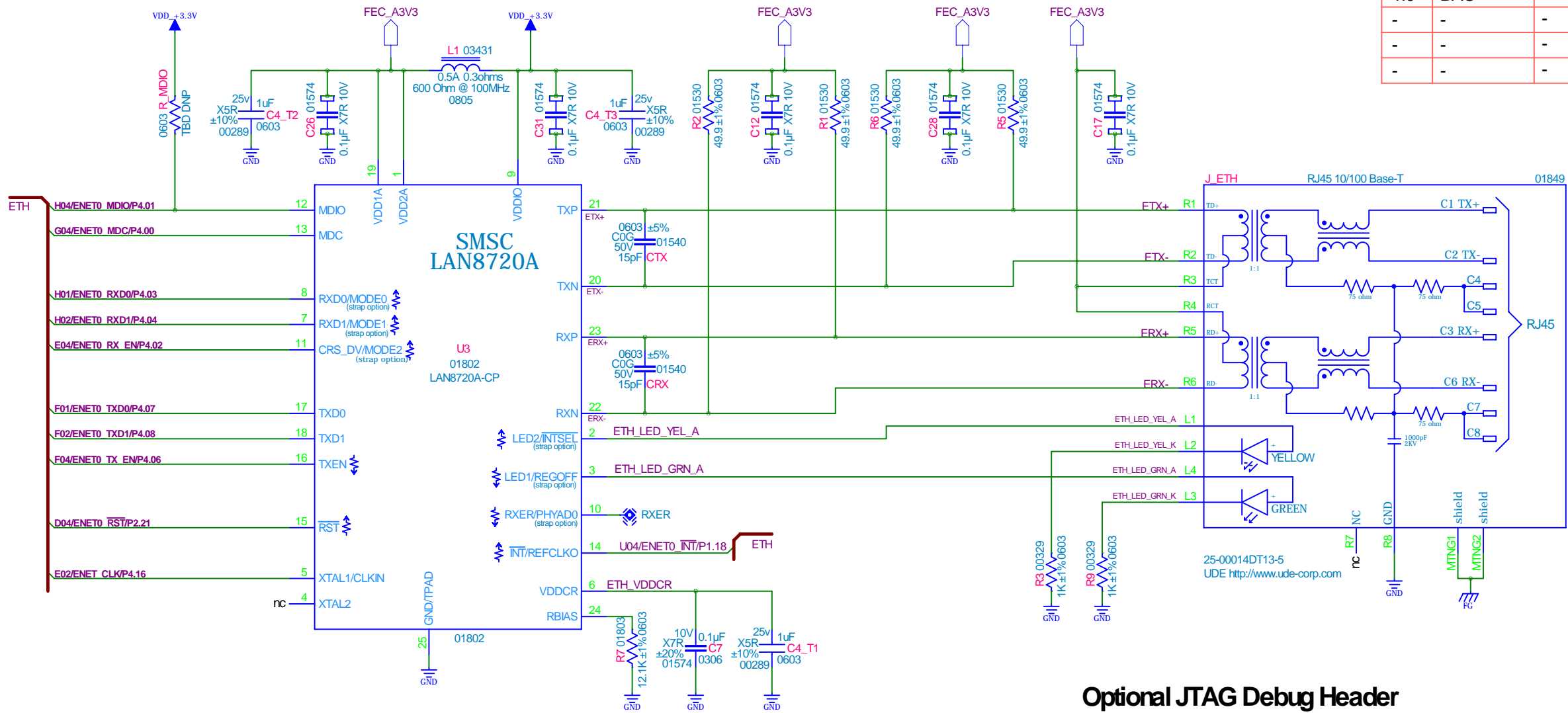
Page 1 / 12 : Block Diagram

FILE NAME:
CFA-10049.SCH

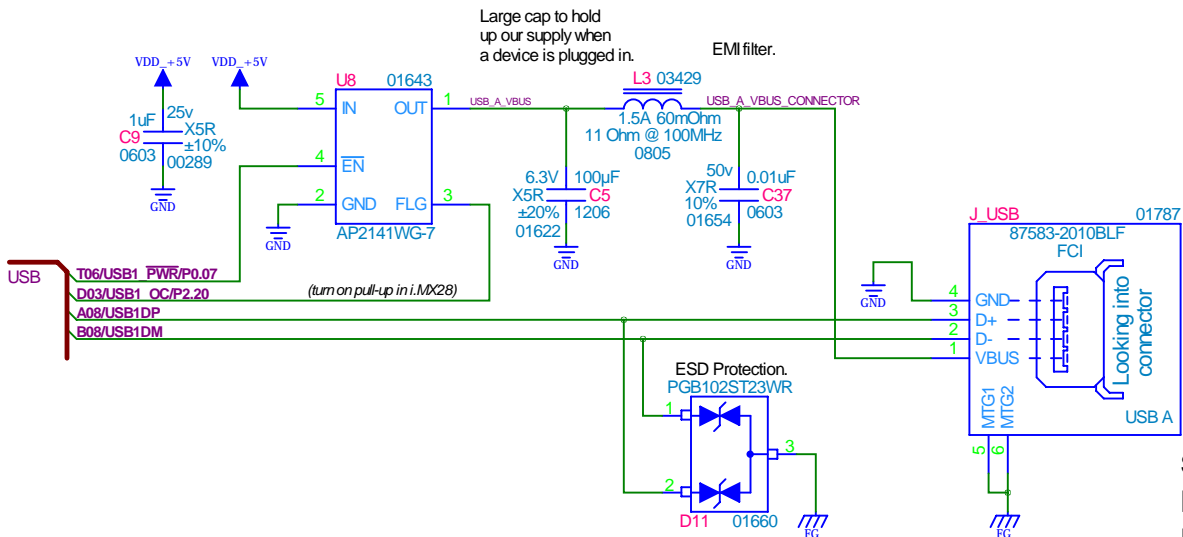
REVISION:
1.0

10/100 Ethernet Phy and RJ-45

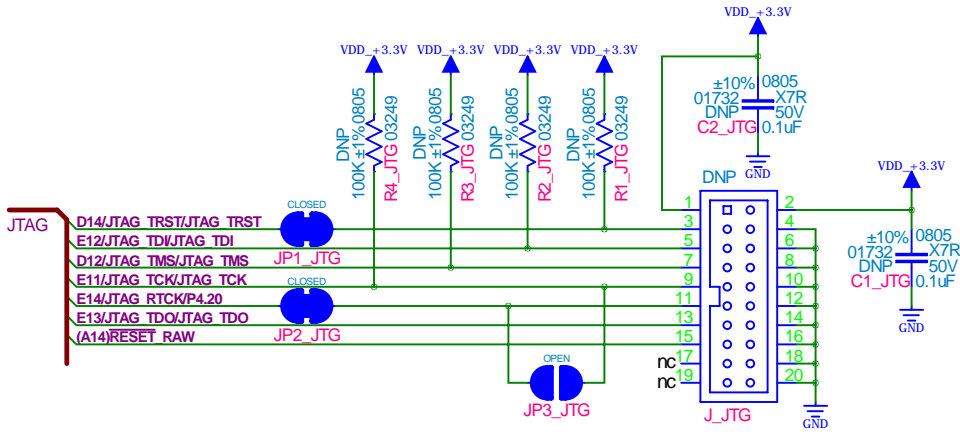
REV	ENGINEER	DATE	REMARKS
0v0	BAC	2012-01-18	Initial Creation
1.0	BAC	2013-02-11	Public Pilot
-	-	-	-
-	-	-	-
-	-	-	-



USB A Connector and Power Switch

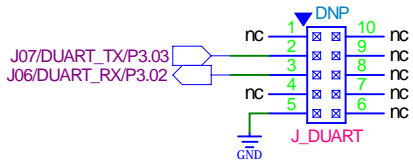


Optional JTAG Debug Header



Optional Logic Level Console Port

(Mates with USB633 FTDI Adapter PCB.)



Signal Naming:


B##[NC/FUNC][P#.##]

B## = i.MX28 298-ball BGA ball/pin number

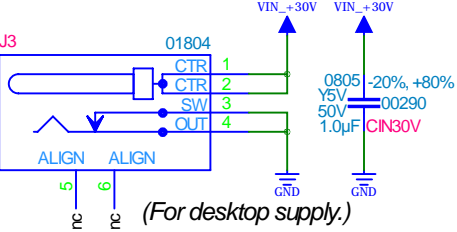
NC = No connect on i.MX283 processor

FUNC = dedicated function on 10K36, or i.MX28 dedicated function

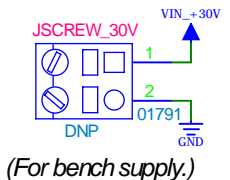
P#.## = GPIO port bank and pin

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CFA-10049: Motion Control Demo Board for CFA-10036	
Page 4 / 12 : Ethernet and USB	
FILE NAME: CFA-10049.SCH	REVISION: 1.0

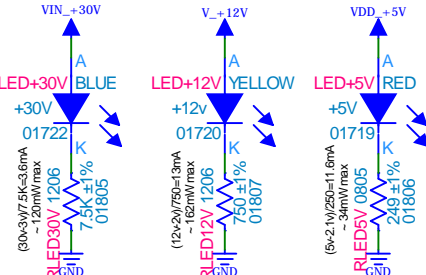
30VDC (28~32) @ 5A Power Input



Optional 30v External Supply Screw Terminals



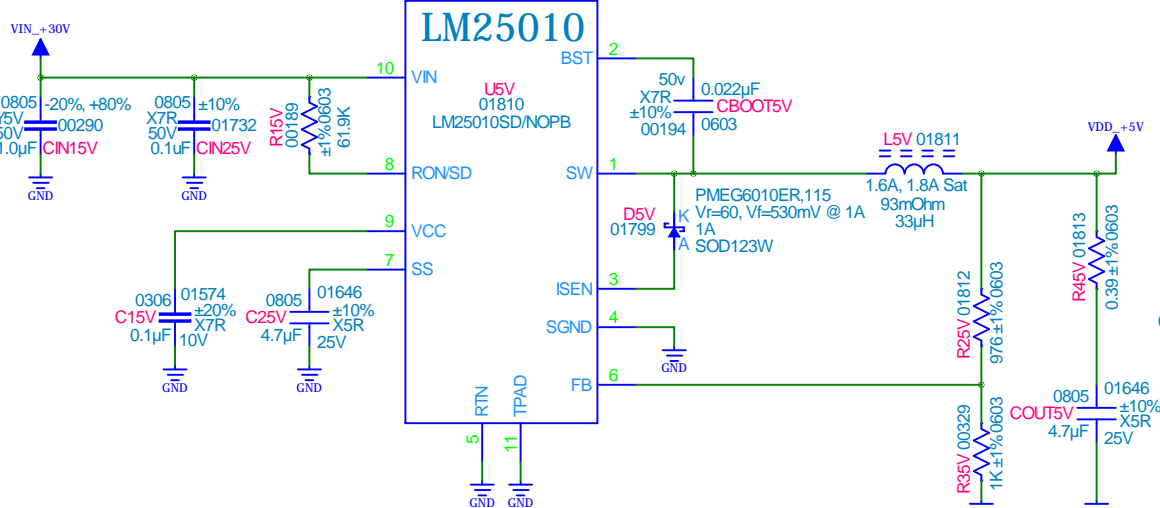
Power LEDs



REV	ENGINEER	DATE	REMARKS
0v0	BAC	2012-01-18	Initial Creation
1.0	BAC	2013-02-11	Public Pilot
-	-	-	-
-	-	-	-
-	-	-	-

30VDC (28~32) to 5V @1A Buck Switcher

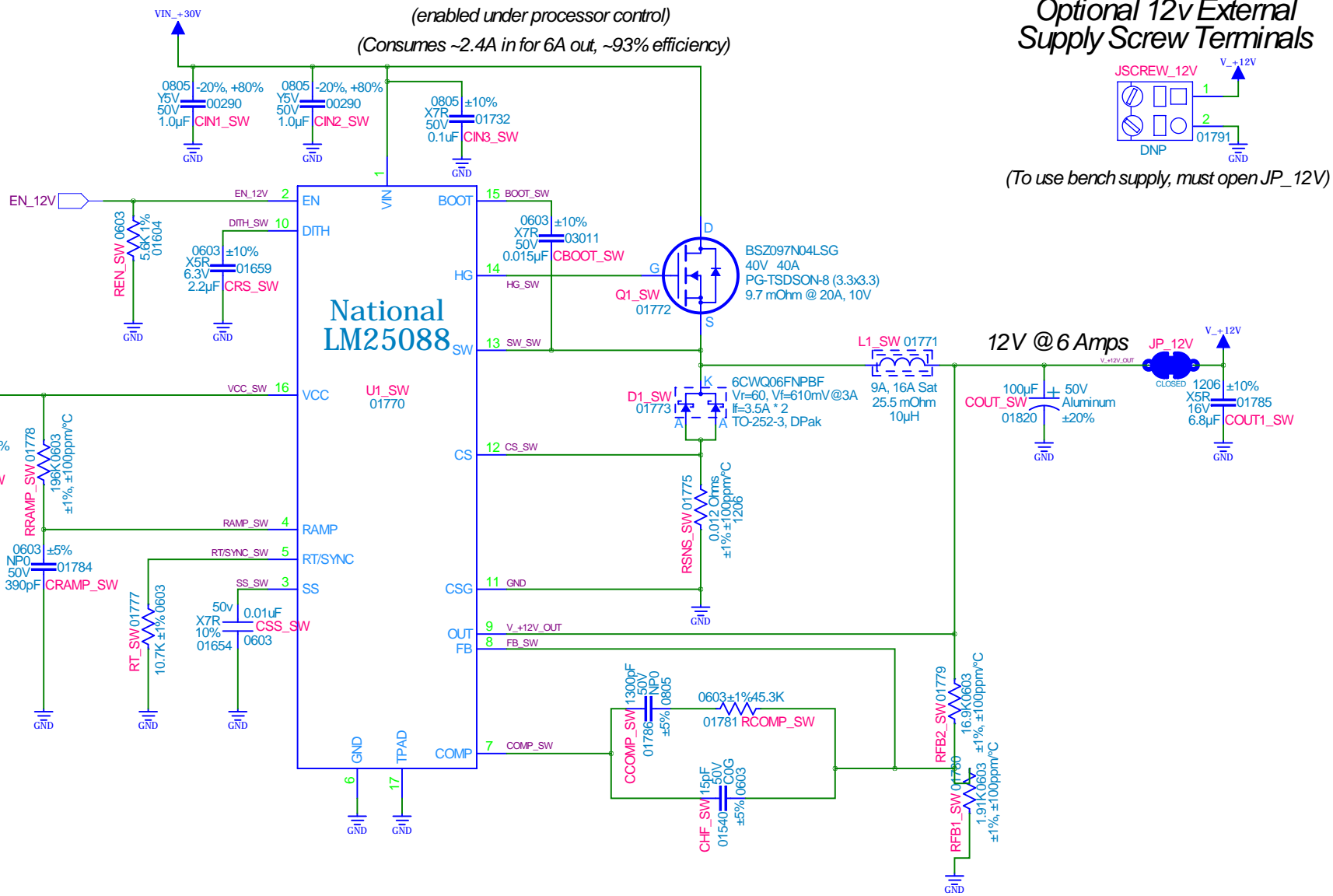
(always enabled)
(Consumes ~200mA in for 1A out, ~83% efficiency)



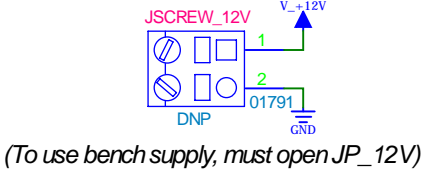
Open JP_USB_PWR on CFA-10036
so the CFA-10036 USB does not try
to back-power the CFA-10049.

30VDC (28~32) to 12V @ 6A Buck Switcher

(enabled under processor control)
(Consumes ~2.4A in for 6A out, ~93% efficiency)



Optional 12v External Supply Screw Terminals



 Crystalfontz America, Inc.

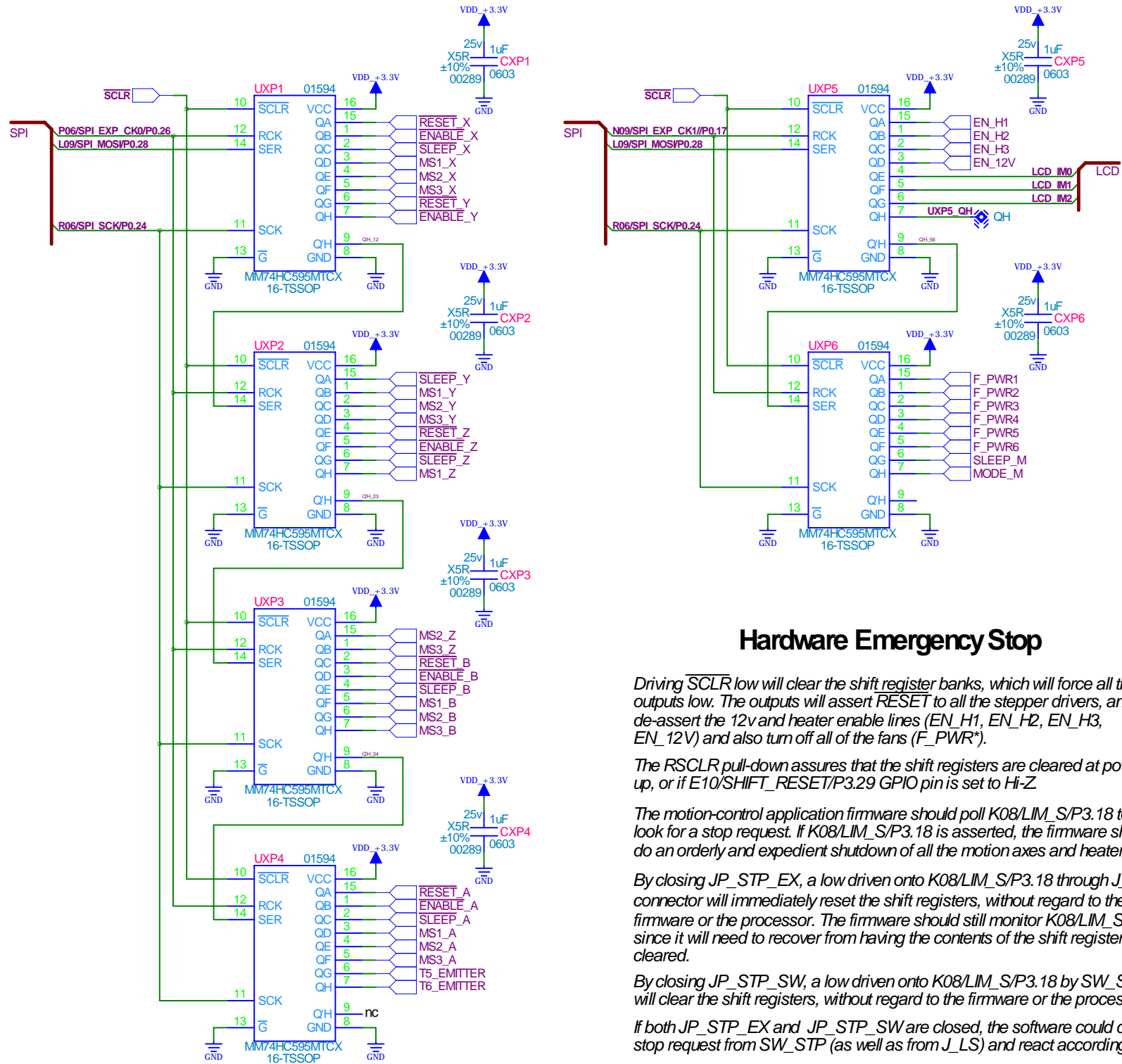
CFA-10049: Motion Control Demo Board for CFA-10036

Page 5 / 12: Power Supplies & LEDs

FILE NAME:
CFA-10049.SCH

REVISION:
1.0

48 bits of SPI Output Expansion for Low-Speed Signals



Hardware Emergency Stop

Driving \overline{SCLR} low will clear the shift register banks, which will force all the outputs low. The outputs will assert \overline{RESET} to all the stepper drivers, and de-assert the 12v and heater enable lines (EN_H1 , EN_H2 , EN_H3 , EN_12V) and also turn off all of the fans (F_PWR^*).

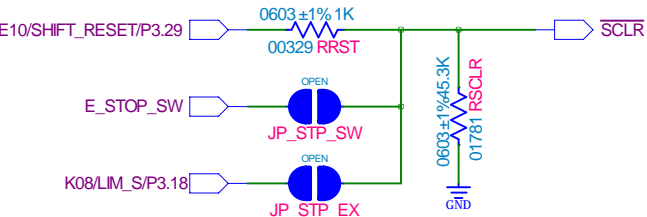
The \overline{RSCLR} pull-down assures that the shift registers are cleared at power up, or if $E10/SHIFT_RESET/P3.29$ GPIO pin is set to Hi-Z

The motion-control application firmware should poll $K08/LIM_S/P3.18$ to look for a stop request. If $K08/LIM_S/P3.18$ is asserted, the firmware should do an orderly and expedient shutdown of all the motion axes and heaters.

By closing JP_STP_EX , a low driven onto $K08/LIM_S/P3.18$ through J_LS connector will immediately reset the shift registers, without regard to the firmware or the processor. The firmware should still monitor $K08/LIM_S/P3.18$, since it will need to recover from having the contents of the shift registers cleared.

By closing JP_STP_SW , a low driven onto $K08/LIM_S/P3.18$ by SW_STP will clear the shift registers, without regard to the firmware or the processor.

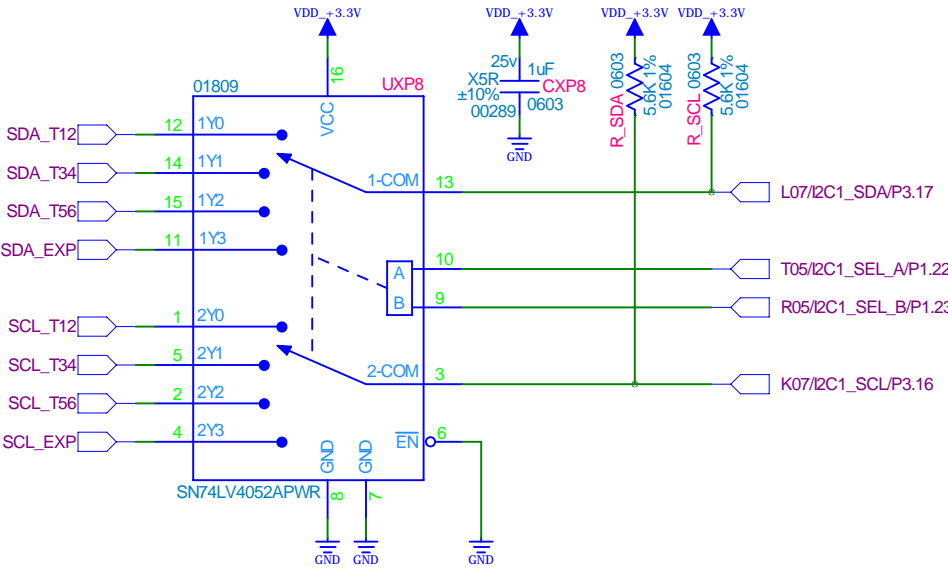
If both JP_STP_EX and JP_STP_SW are closed, the software could detect a stop request from SW_STP (as well as from J_LS) and react accordingly.



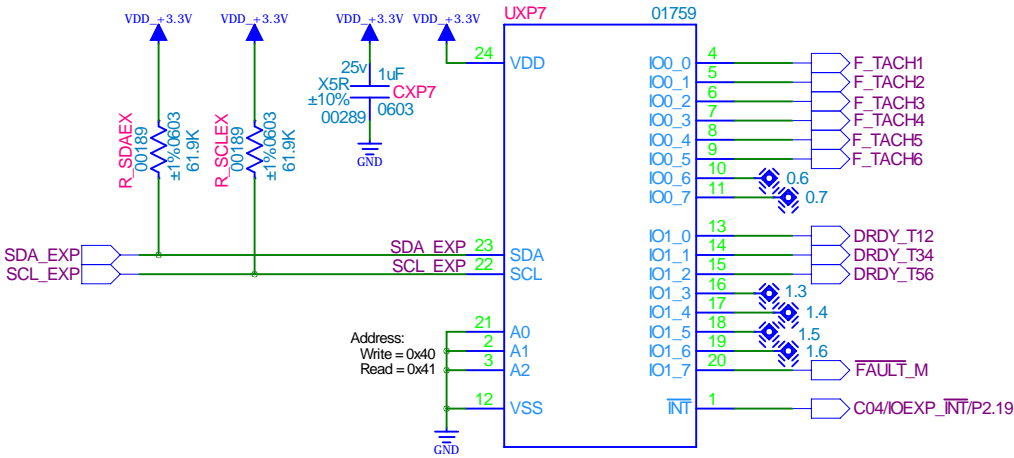
REV	ENGINEER	DATE	REMARKS
0v0	BAC	2012-01-18	Initial Creation
1.0	BAC	2013-02-11	Public Pilot
-	-	-	-
-	-	-	-
-	-	-	-

I2C 1:4 Mux

(NAU7802 ADCs all have the same I2C address)



16 bits of I2C Input/Output Expansion for Low-Speed Signals



Signal Naming:
B###[NC/FUNC][P#.##]
B## = i.MX28 298-ball BGA ball/pin number
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P#.# = GPIO port bank and pin



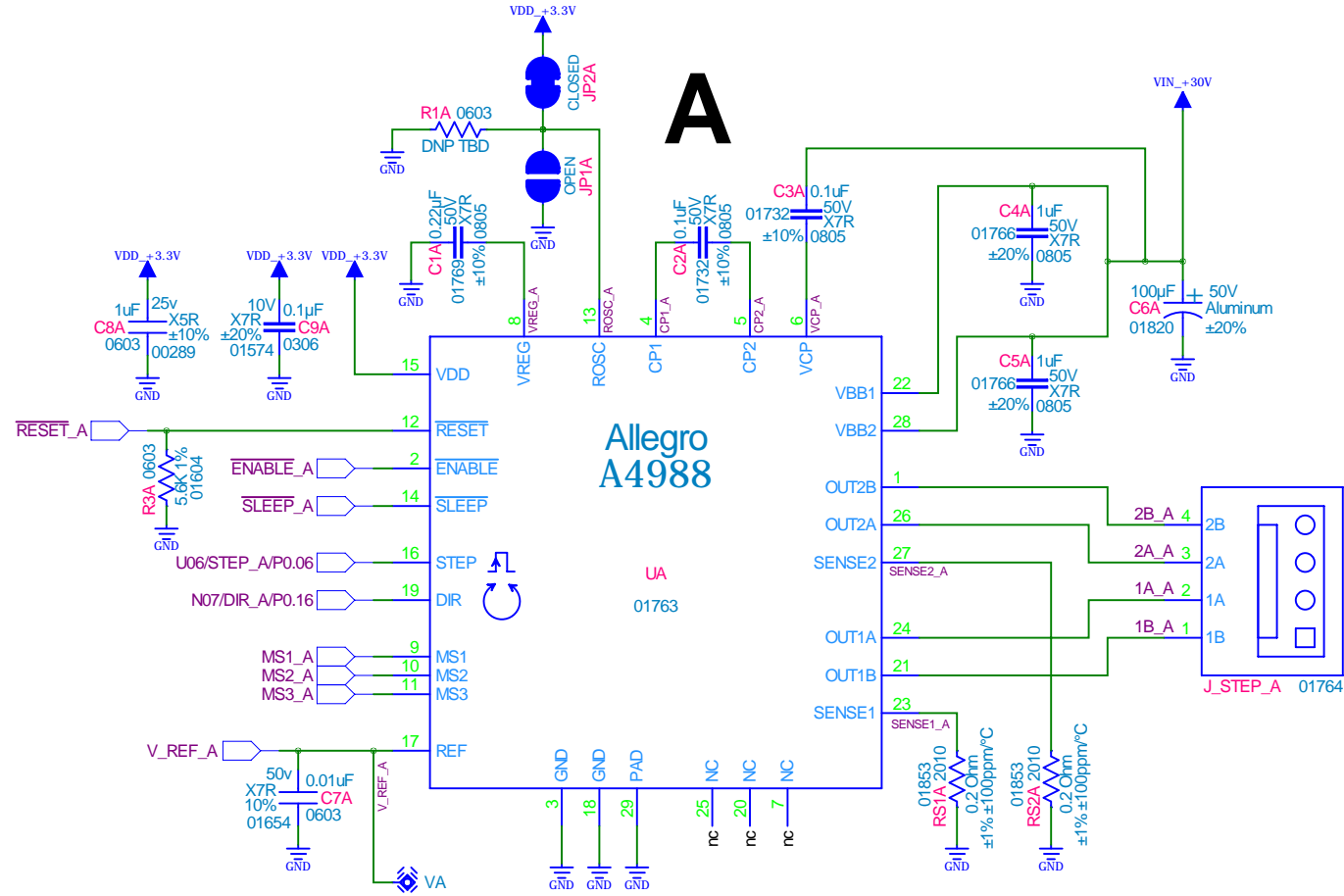
CFA-10049: Motion Control Demo Board for CFA-10036

Page 6 / 12 : GPO Expansion & I2C Mux

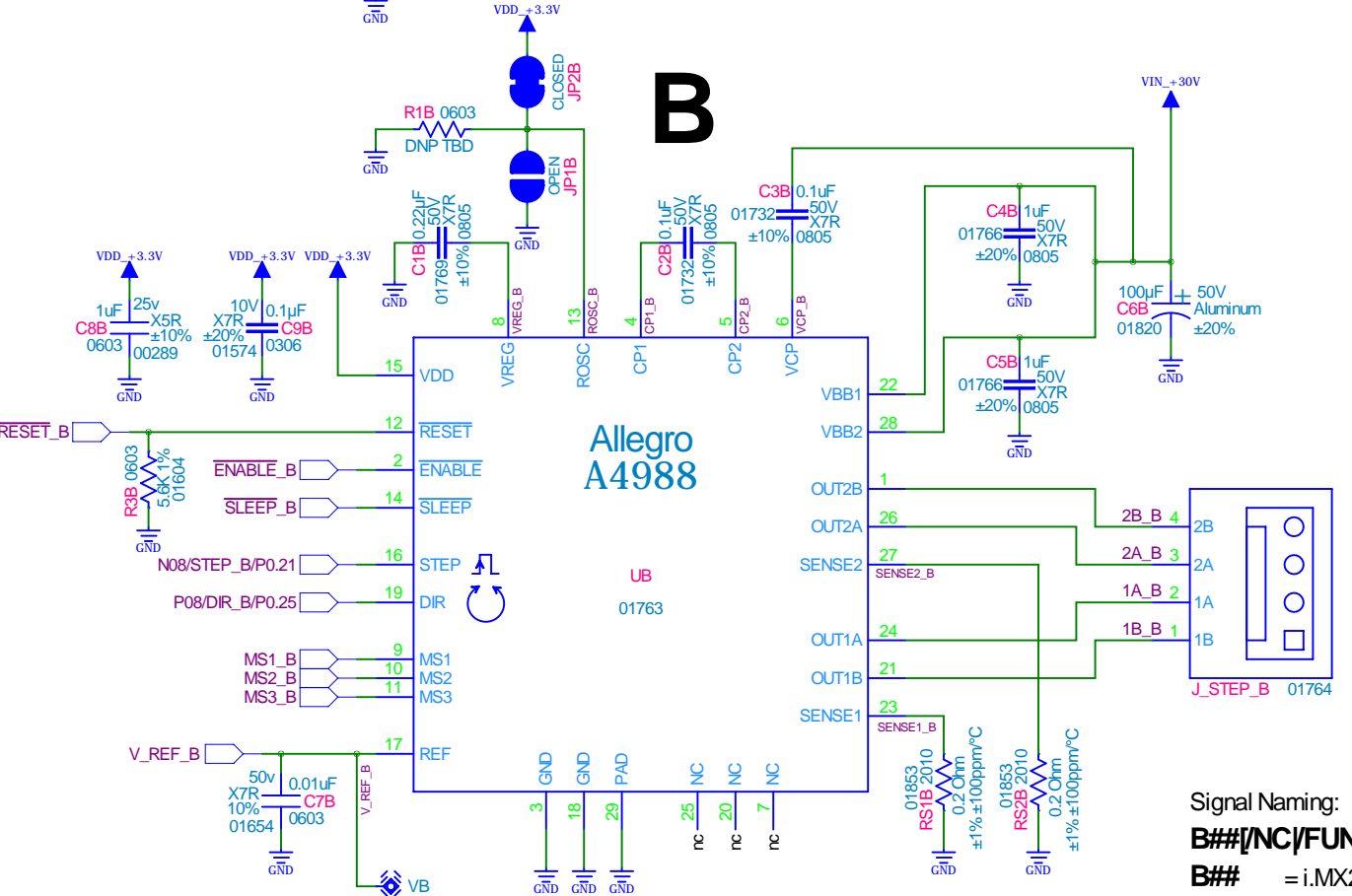
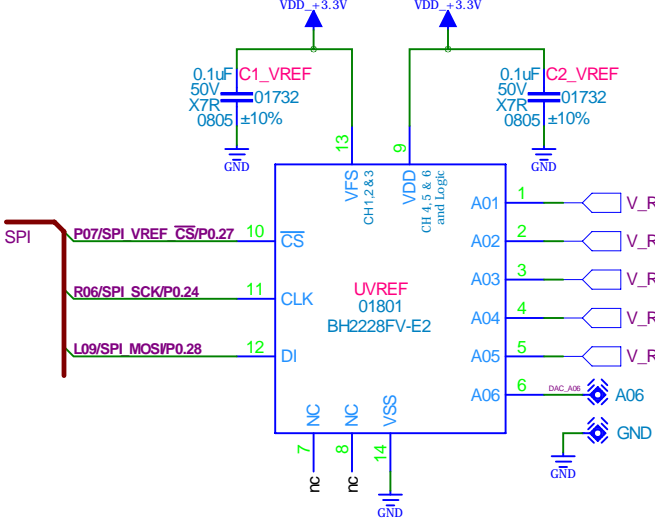
FILE NAME:
CFA-10049.SCH

REVISION:
1.0

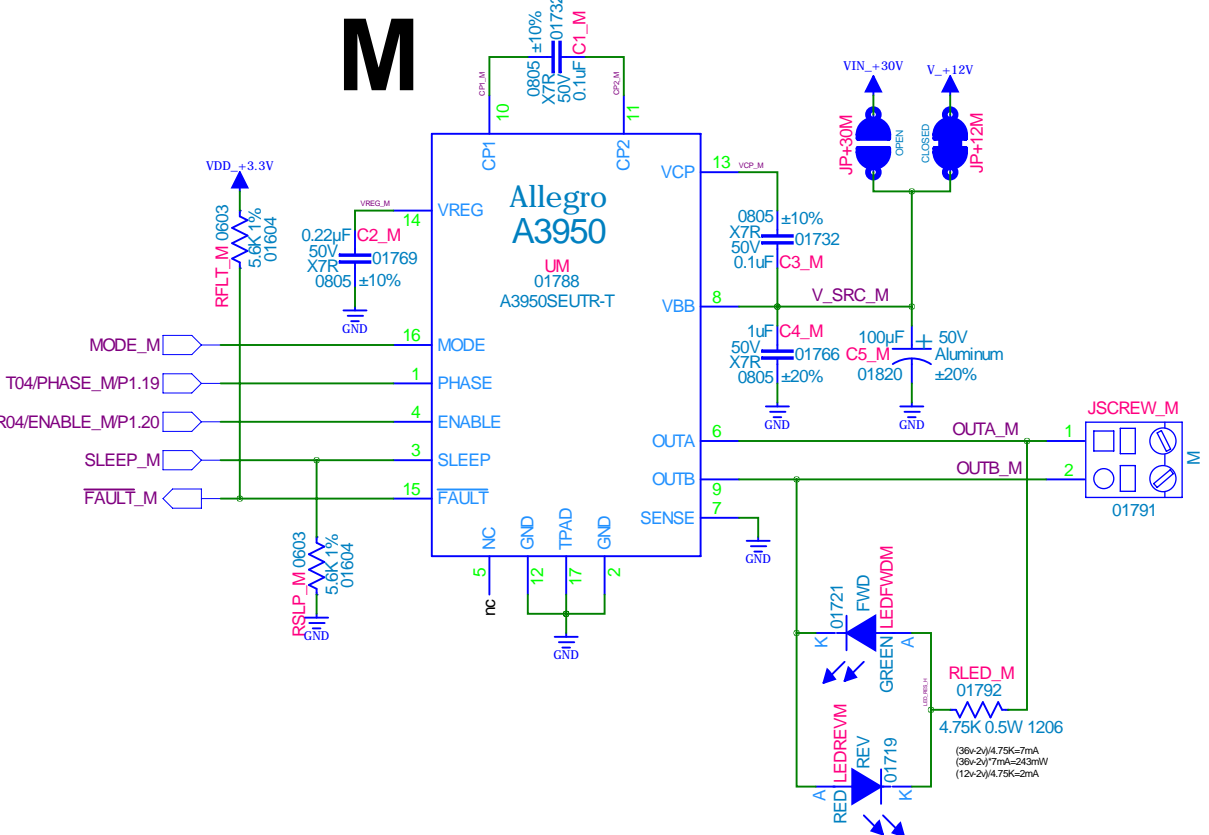
REV	ENGINEER	DATE	REMARKS
0v0	BAC	2012-01-18	Initial Creation
1.0	BAC	2013-02-11	Public Pilot
-	-	-	-
-	-	-	-
-	-	-	-




DAC to set Stepper Currents



M



Signal Naming:
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P#.## = GPIO port bank and pin

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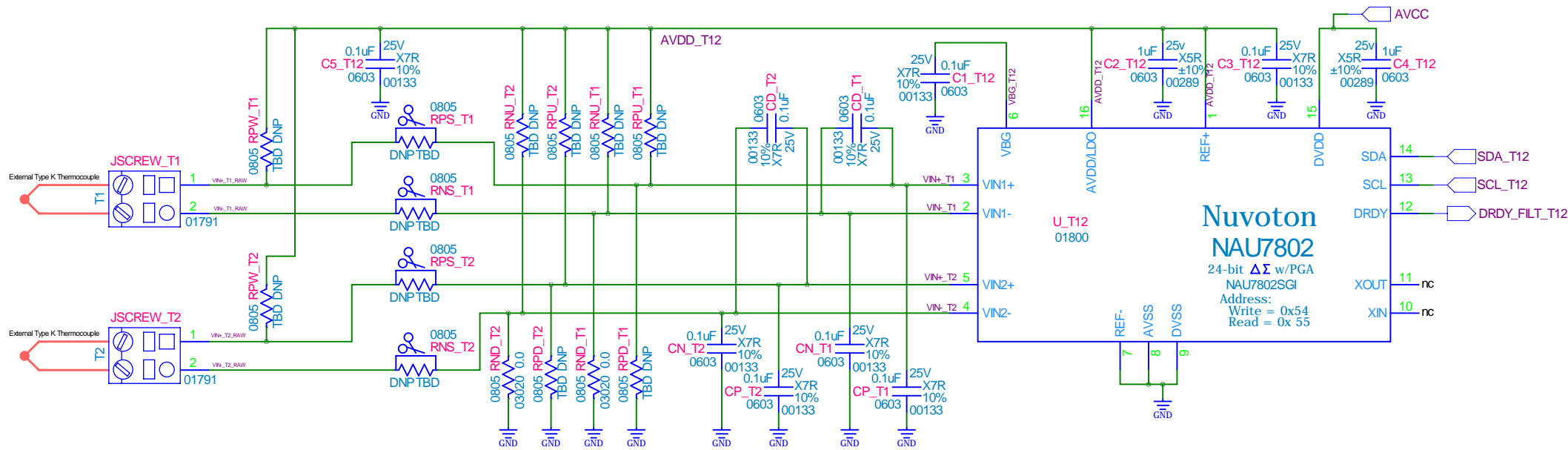
CFA-10049: Motion Control Demo Board for CFA-10036

Page 8 / 12 : A and B Steppers, H Bridge

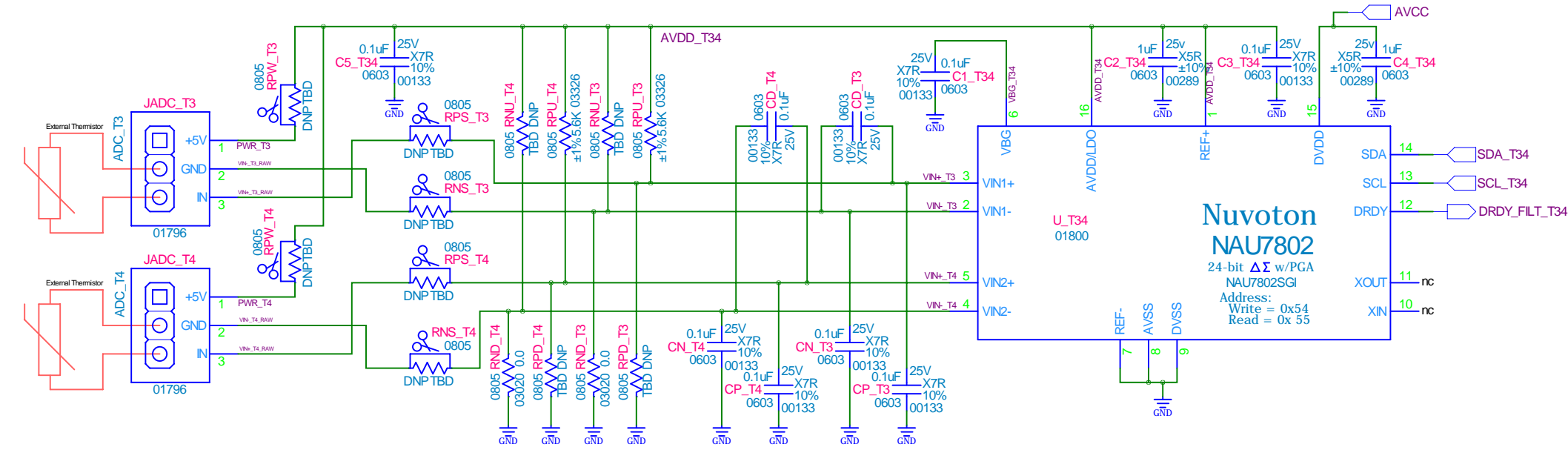
FILE NAME: CFA-10049.SCH

REVISION: 1.0

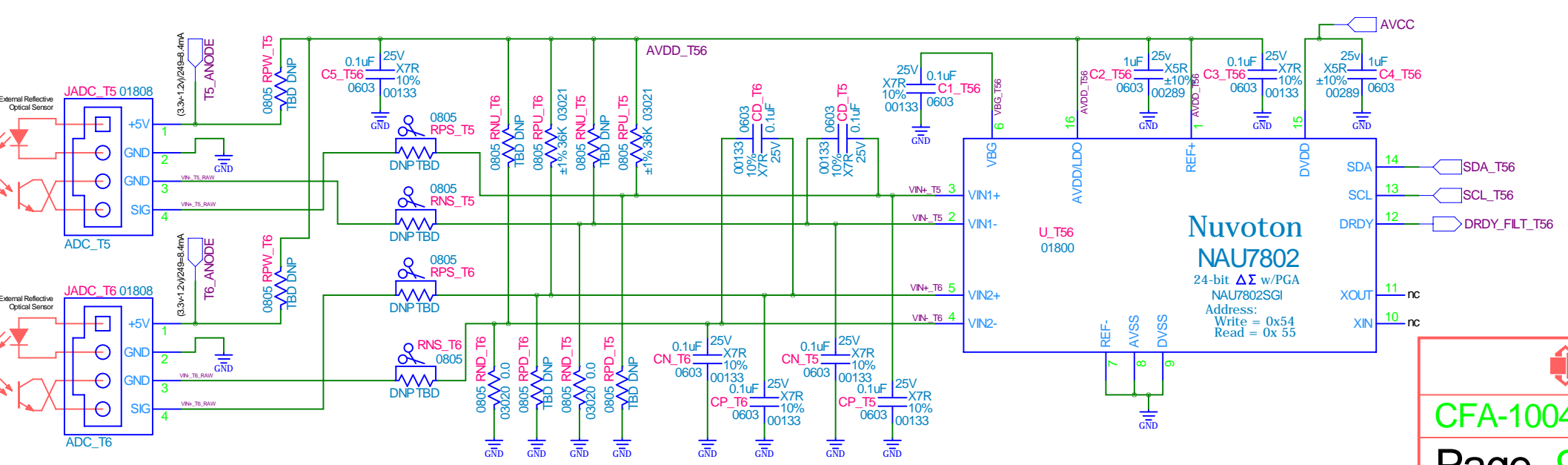
Thermocouples



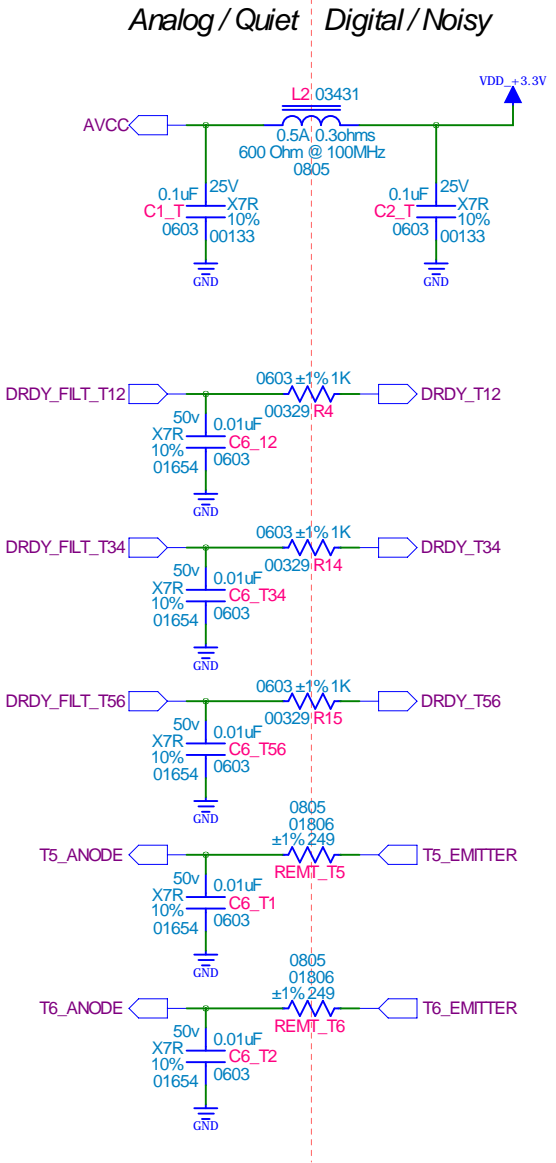
Thermistors



Expansion



REV	ENGINEER	DATE	REMARKS
0v0	BAC	2012-01-18	Initial Creation
1.0	BAC	2013-02-11	Public Pilot
-	-	-	-
-	-	-	-
-	-	-	-



I2C SDA and SCL traces are much shorter in the digital area



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CFA-10049: Motion Control Demo Board for CFA-10036

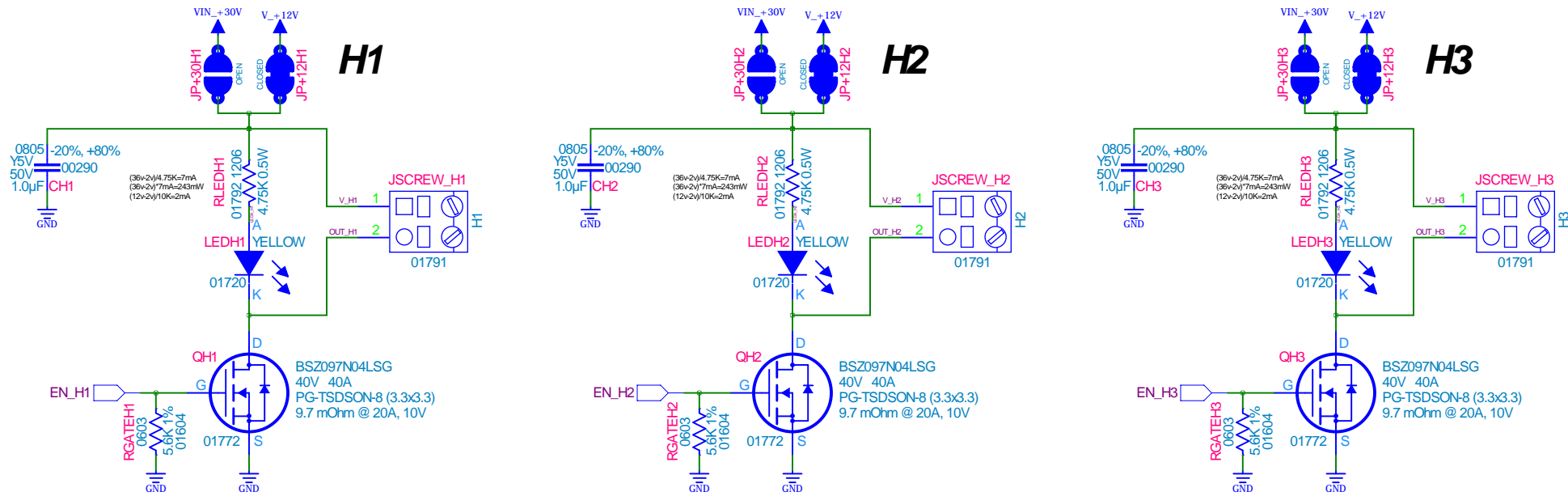
Page 9 / 12 : 24-bit ADCs with PGA

FILE NAME:
CFA-10049.SCH

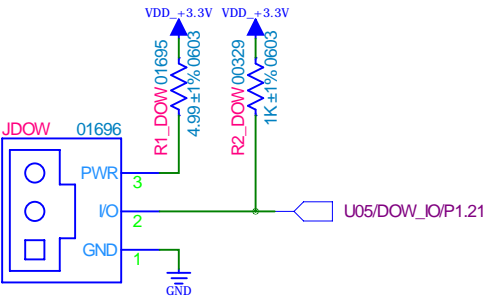
REVISION:
1.0

REV	ENGINEER	DATE	REMARKS
0v0	BAC	2012-01-18	Initial Creation
1.0	BAC	2013-02-11	Public Pilot
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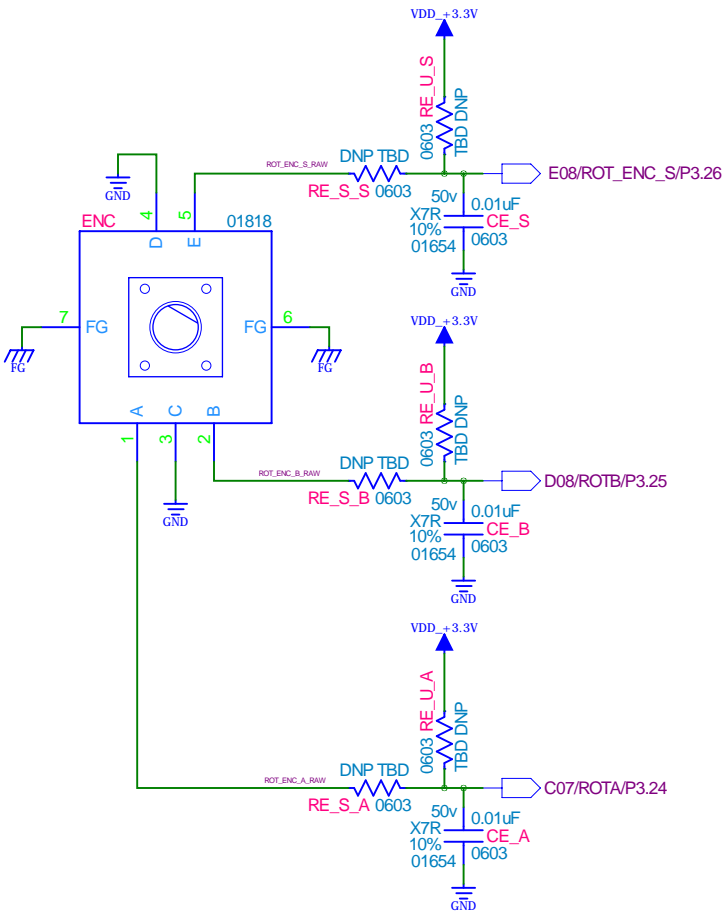
FETs to control Heaters



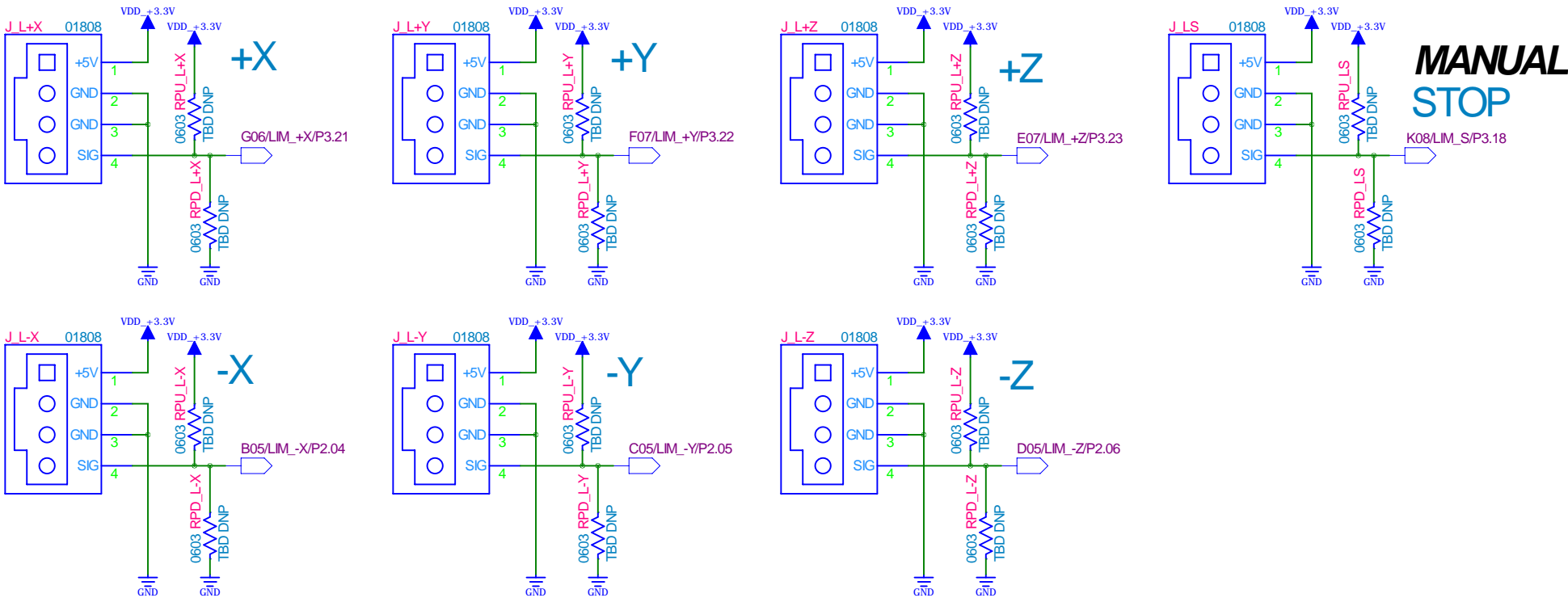
Optional Dallas One Wire Support



Optional Rotary Encoder with Push Switch



Optical or Mechanical Limit Switch Connectors



Signal Naming:
B##/[NC/FUNC]/[P#.##]
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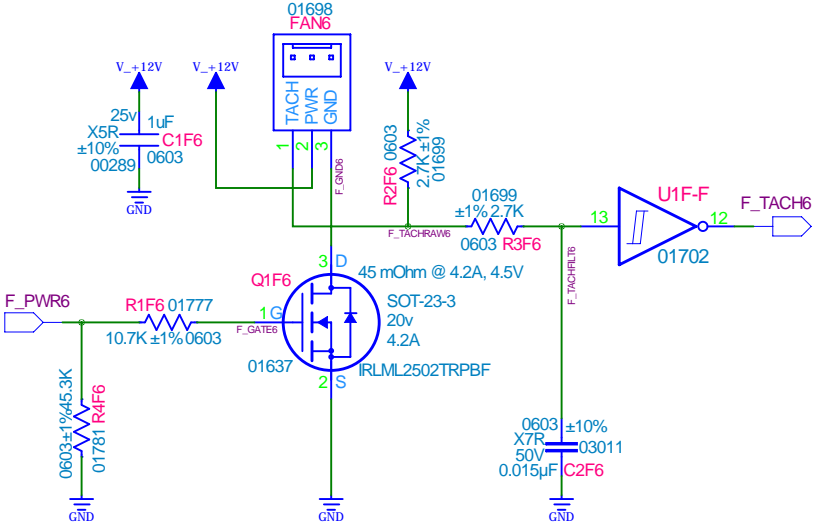
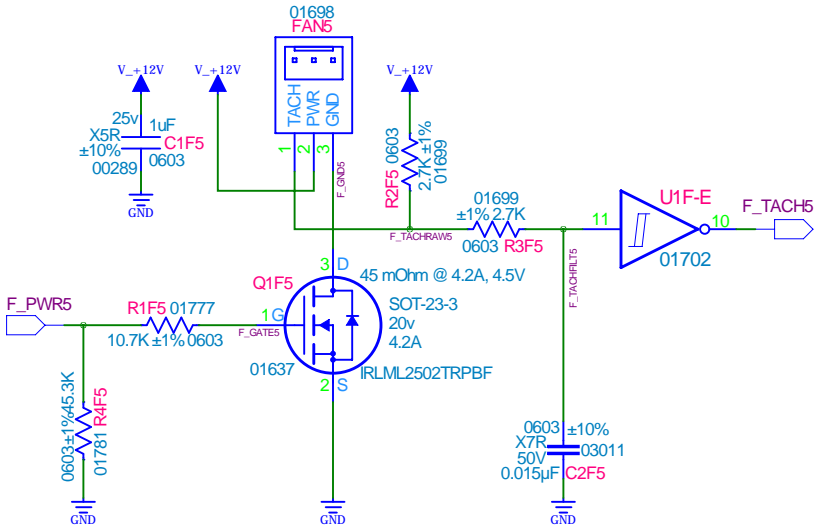
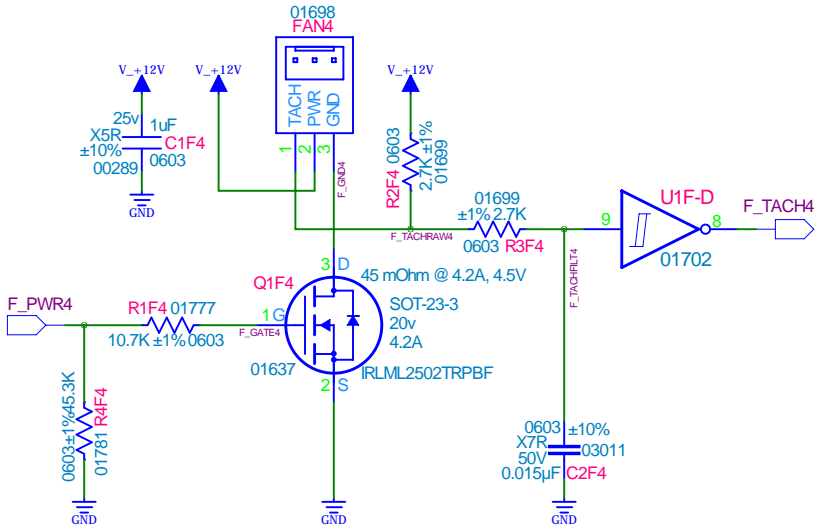
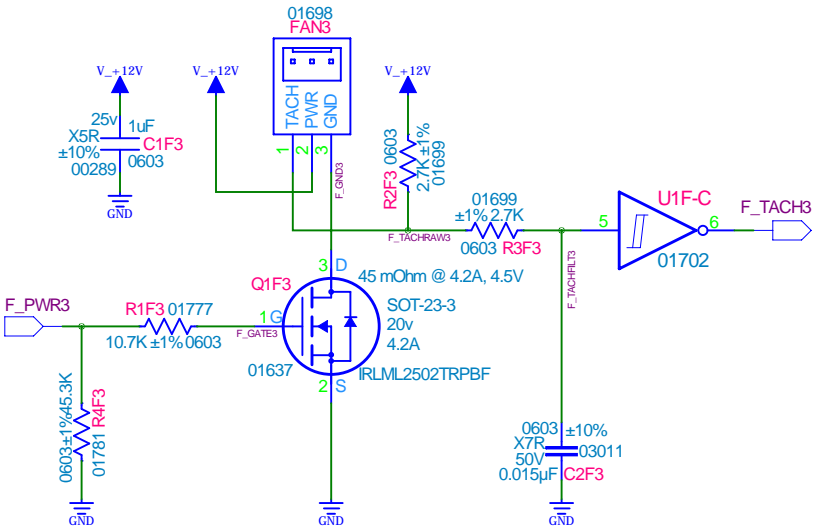
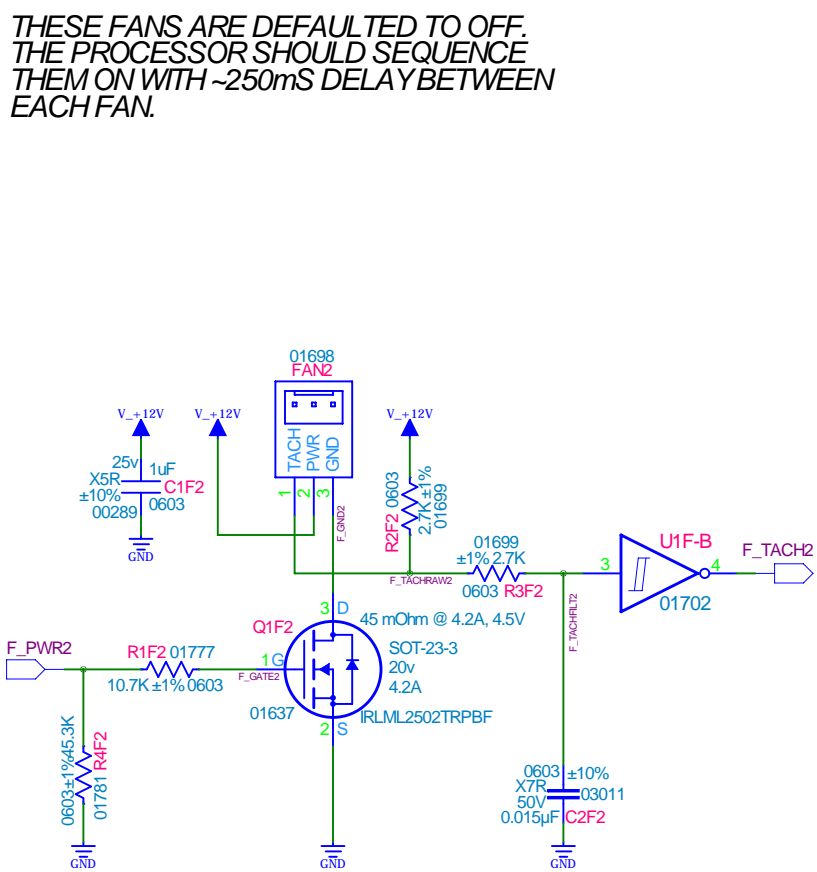
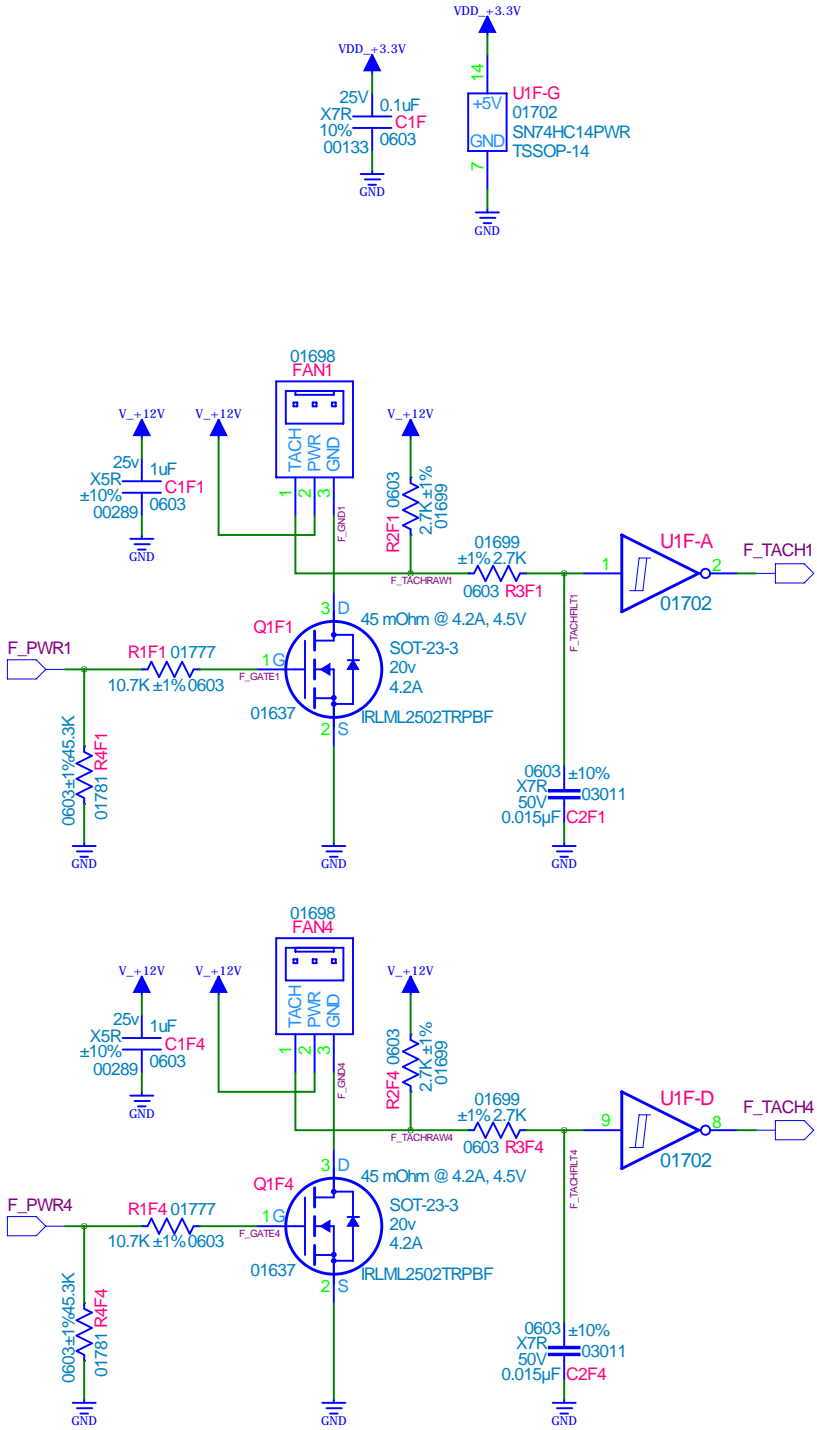
CFA-10049: Motion Control Demo Board for CFA-10036

Page 10/ 12 : Heater Control, Limit Switches

FILE NAME:
CFA-10049.SCH


REVISION:
1.0

REV	ENGINEER	DATE	REMARKS
0v0	BAC	2012-01-18	Initial Creation
1.0	BAC	2013-02-11	Public Pilot
-	-	-	-
-	-	-	-
-	-	-	-



THESE FANS ARE DEFAULTED TO OFF.
THE PROCESSOR SHOULD SEQUENCE
THEM ON WITH ~250ms DELAY BETWEEN
EACH FAN.

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**Crystalfontz America, Inc.**

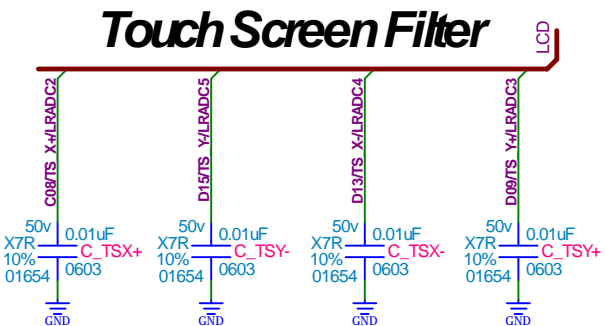
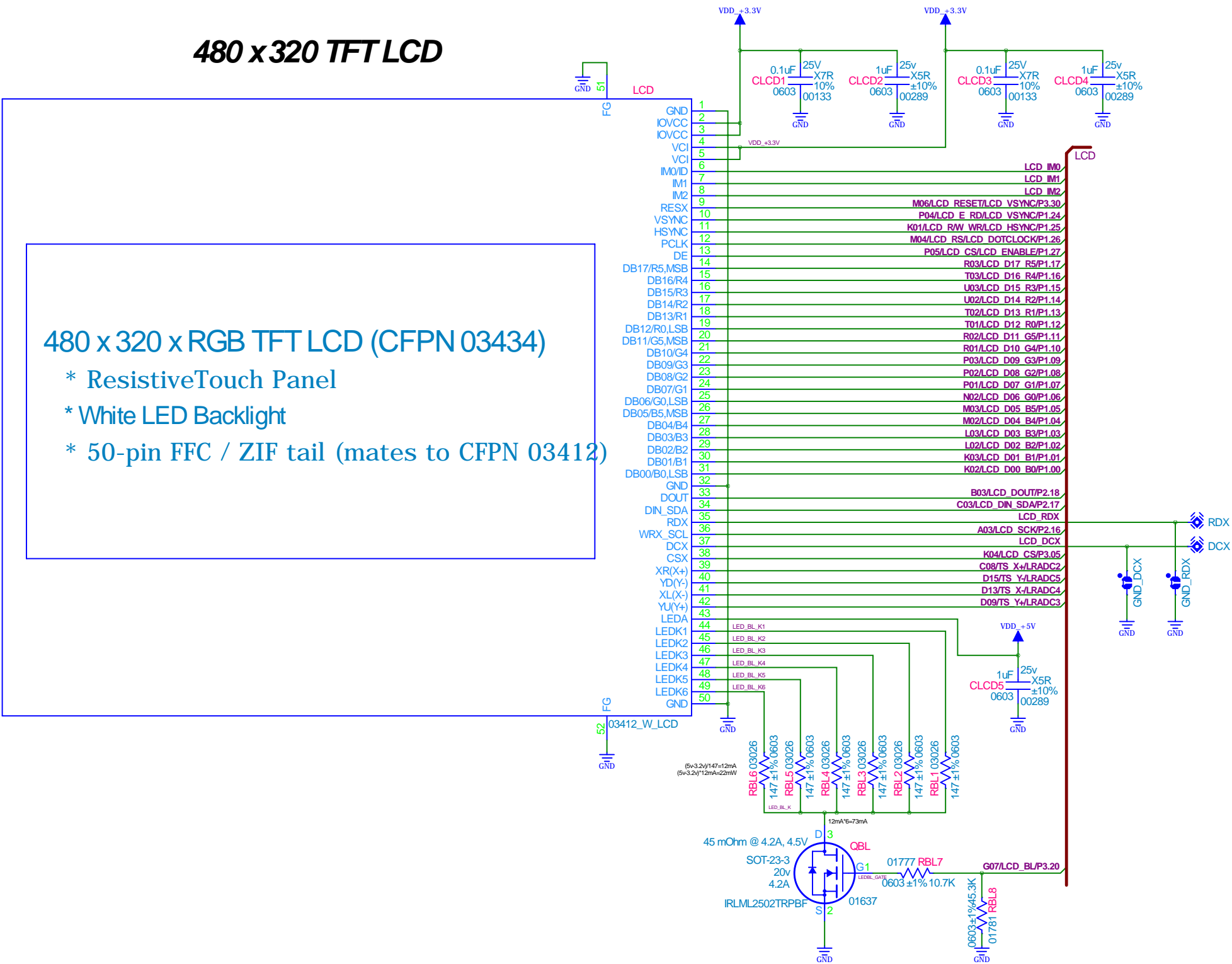
CFA-10049: Motion Control Demo Board for CFA-10036

Page 11/12: Cooling Fan Control

FILE NAME:
CFA-10049.SCH

REVISION:
1.0

REV	ENGINEER	DATE	REMARKS
0v0	BAC	2012-01-18	Initial Creation
1.0	BAC	2013-02-11	Public Pilot
-	-	-	-
-	-	-	-
-	-	-	-



Signal Naming:
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CFA-10049: Motion Control Demo Board for CFA-10036

Page12/ 12 : 480 x 320 TFT LCD w/Touch

FILE NAME:
CFA-10049.SCH

REVISION:
1.0