

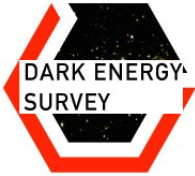
Vicor Hardware Sequencer



Power rail sequencing is a requirement for proper operation of the DECcam electronics during power up/down.

Although this can be accomplished with digital controllers it would be desirable to have a hardware solution dedicated to doing this task.

The Vicor Sequencer provides this functionality when AC is applied and removed. Additionally it allows digital On/Off control from an external source or switch closure.

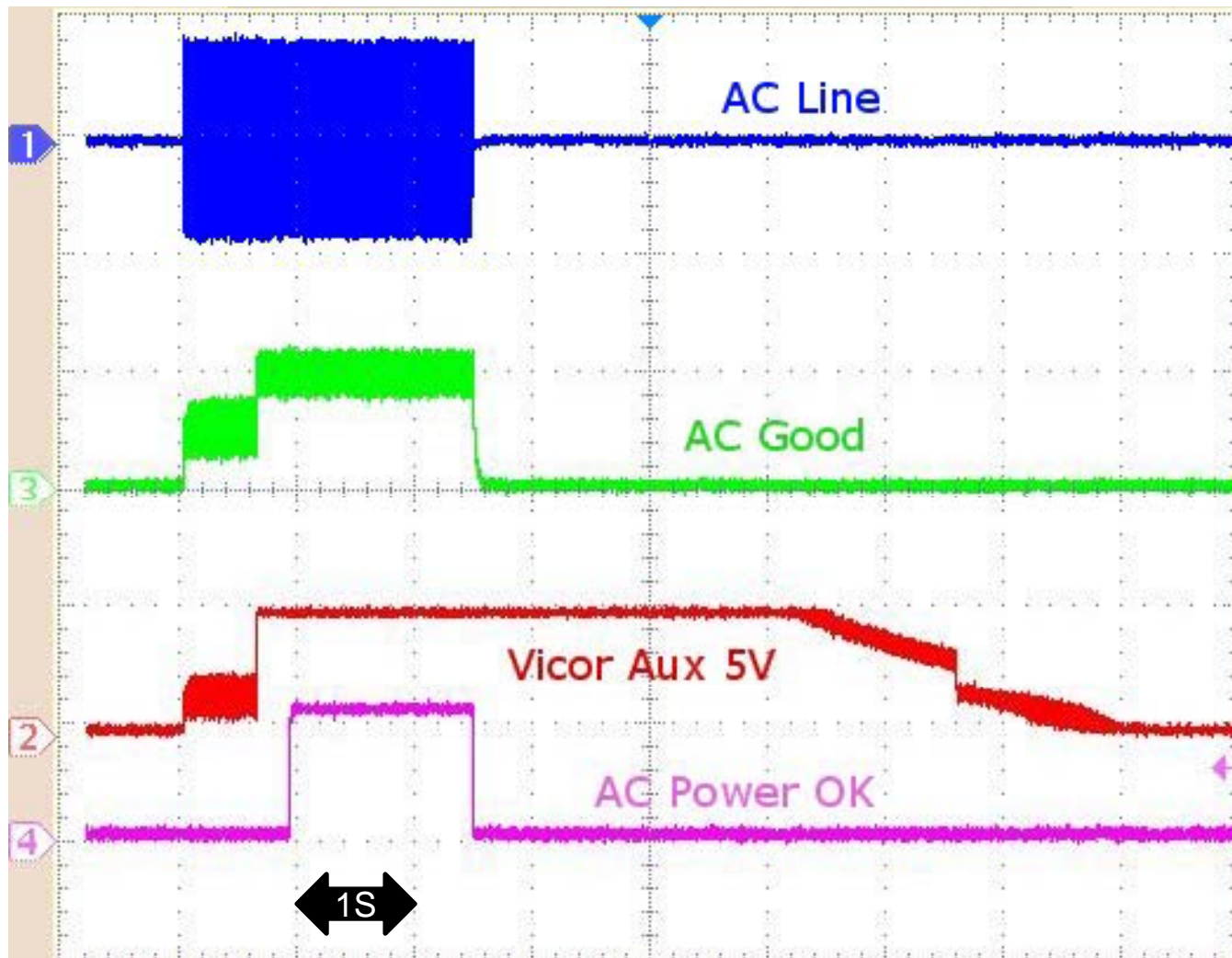


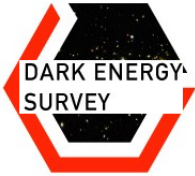
Vicor Timing



-
- Event timeline
 - AC applied
 - Vicor Aux 5V good
 - Vicor AC Power OK = true
 - PAC modules enabled
 - AC removed
 - Vicor AC Power OK = fails
 - PAC modules disabled
 - Vicor Aux 5V drops after ~3 seconds

Vicor MegaPAC Timing



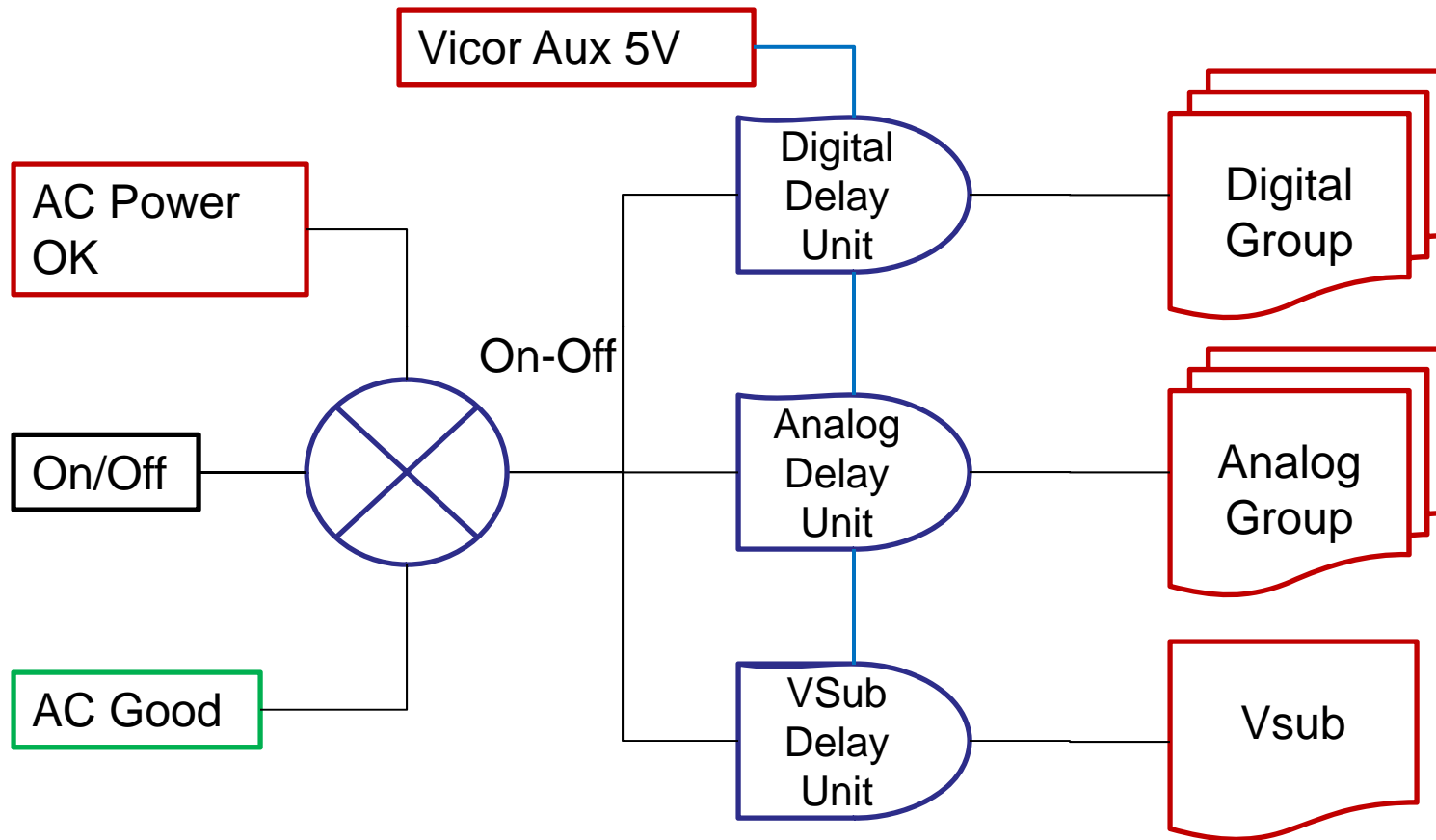


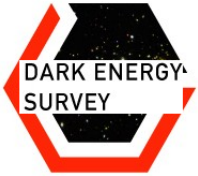
Utilizing Vicor Utilities



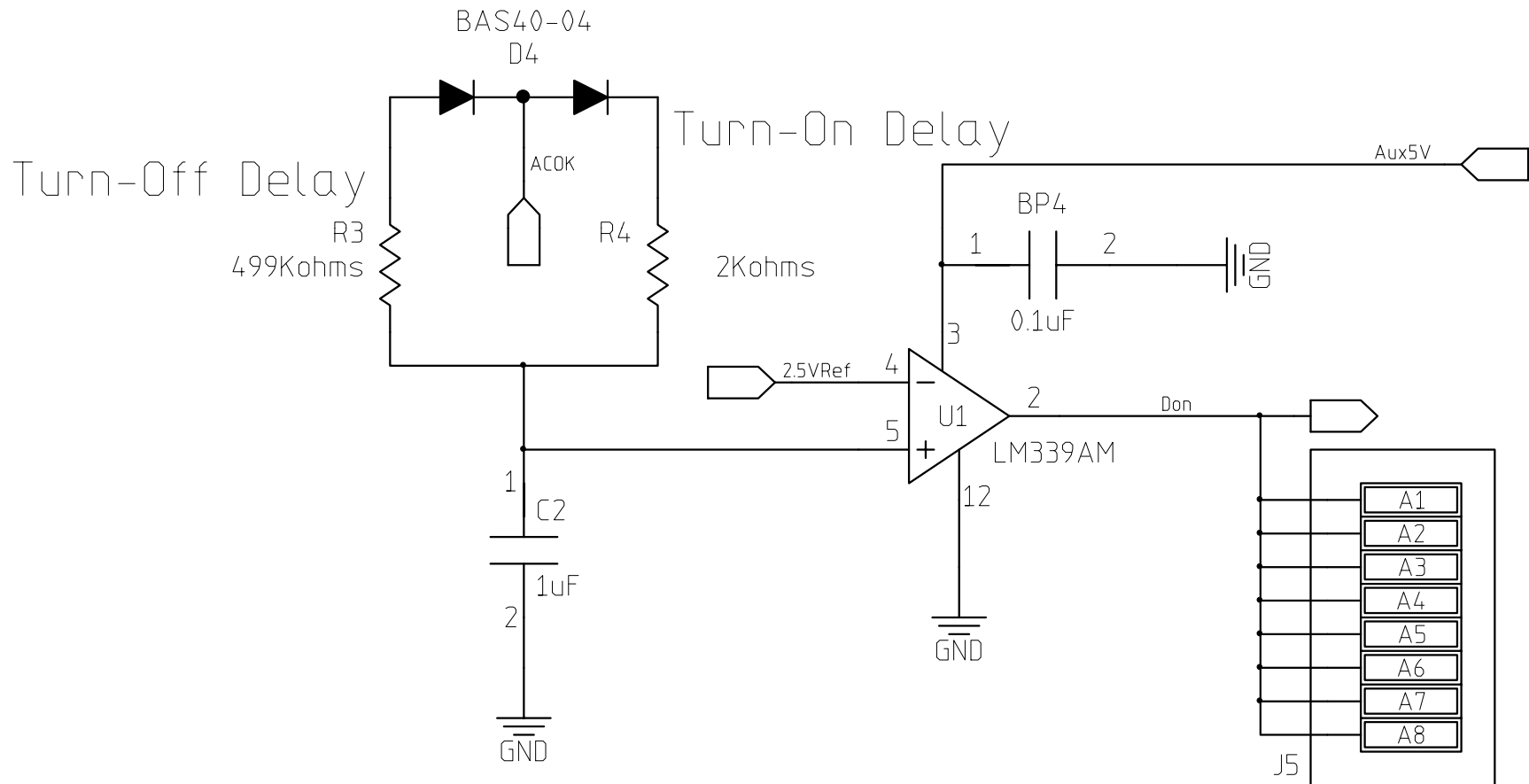
-
-
- When AC is applied to the Vicor input about 600ms later the Auxiliary +5V appears followed by the AC Power OK on the J10 connector.
 - We can use the Aux 5V to power our circuitry and the AC Power OK signal to trigger the sequencing delays.
 - We can also logically AND this trigger with other inputs so the supplies always sequence on and off.
 1. Normal On-Off signal
 2. AC Good (Digital signal that indicate AC Line Present)
 3. Vicor AC Power OK

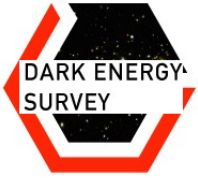
Hardware Control



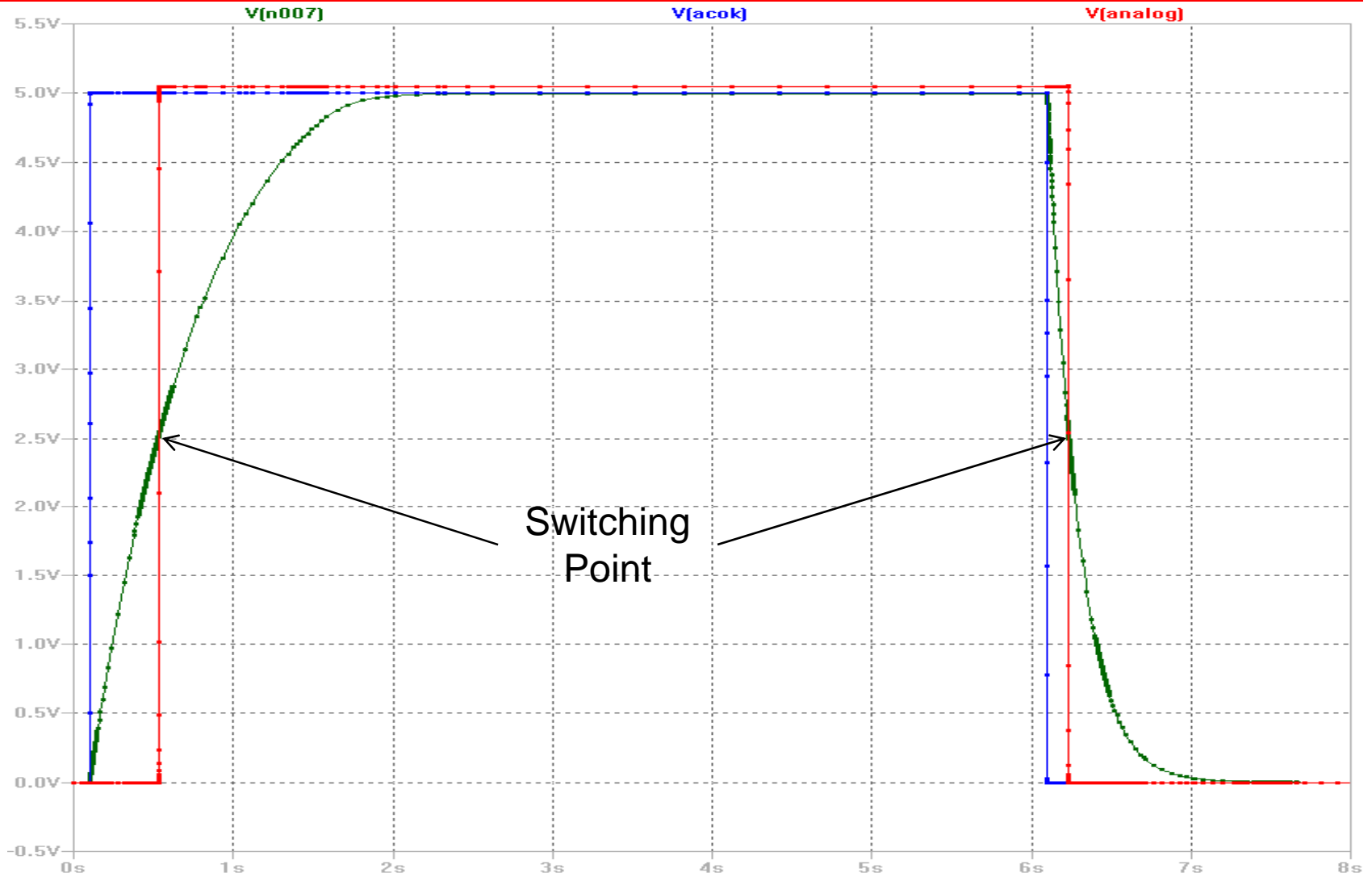


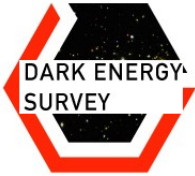
Typical Delay Unit





Delay Waveforms



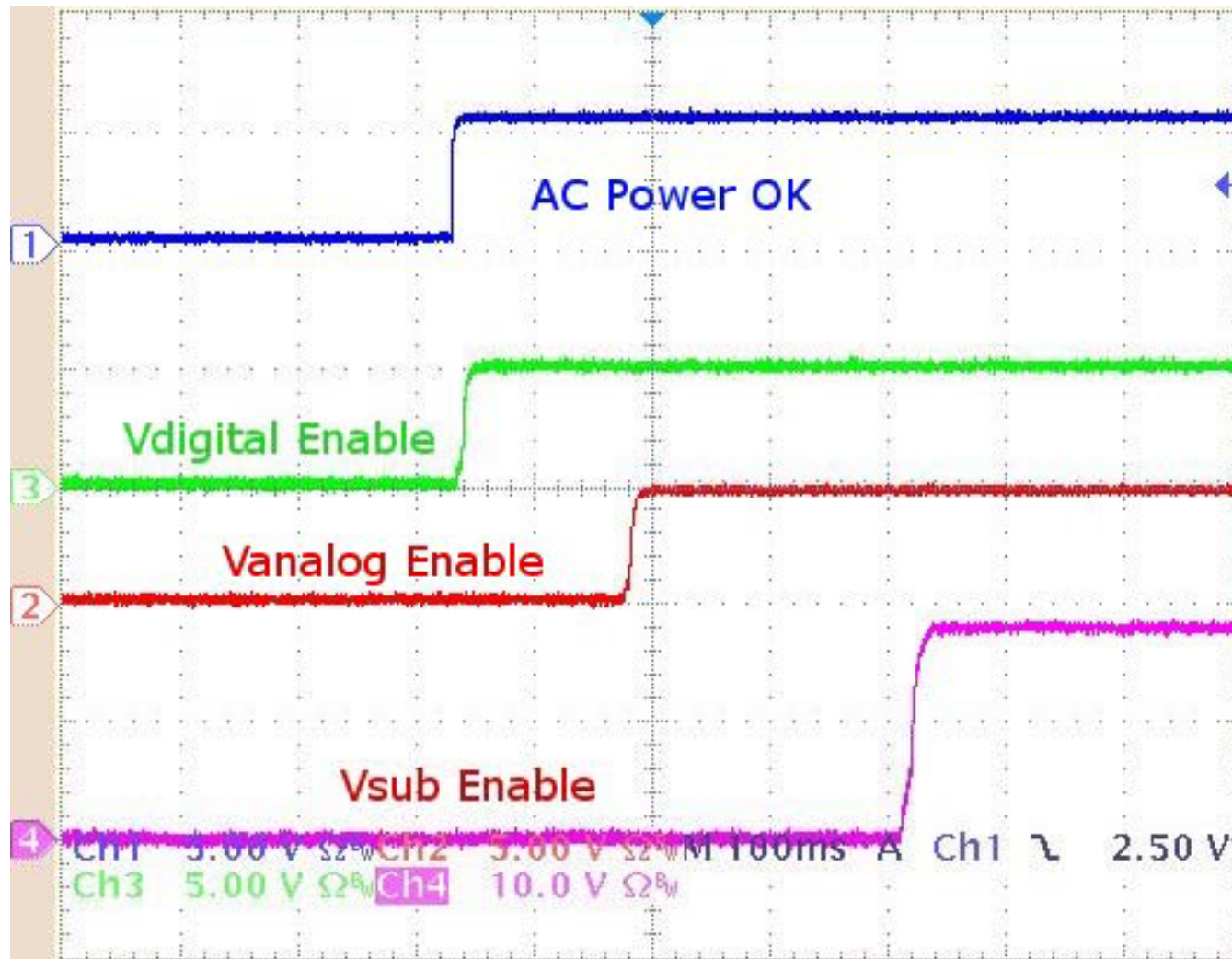


Desired Sequencing

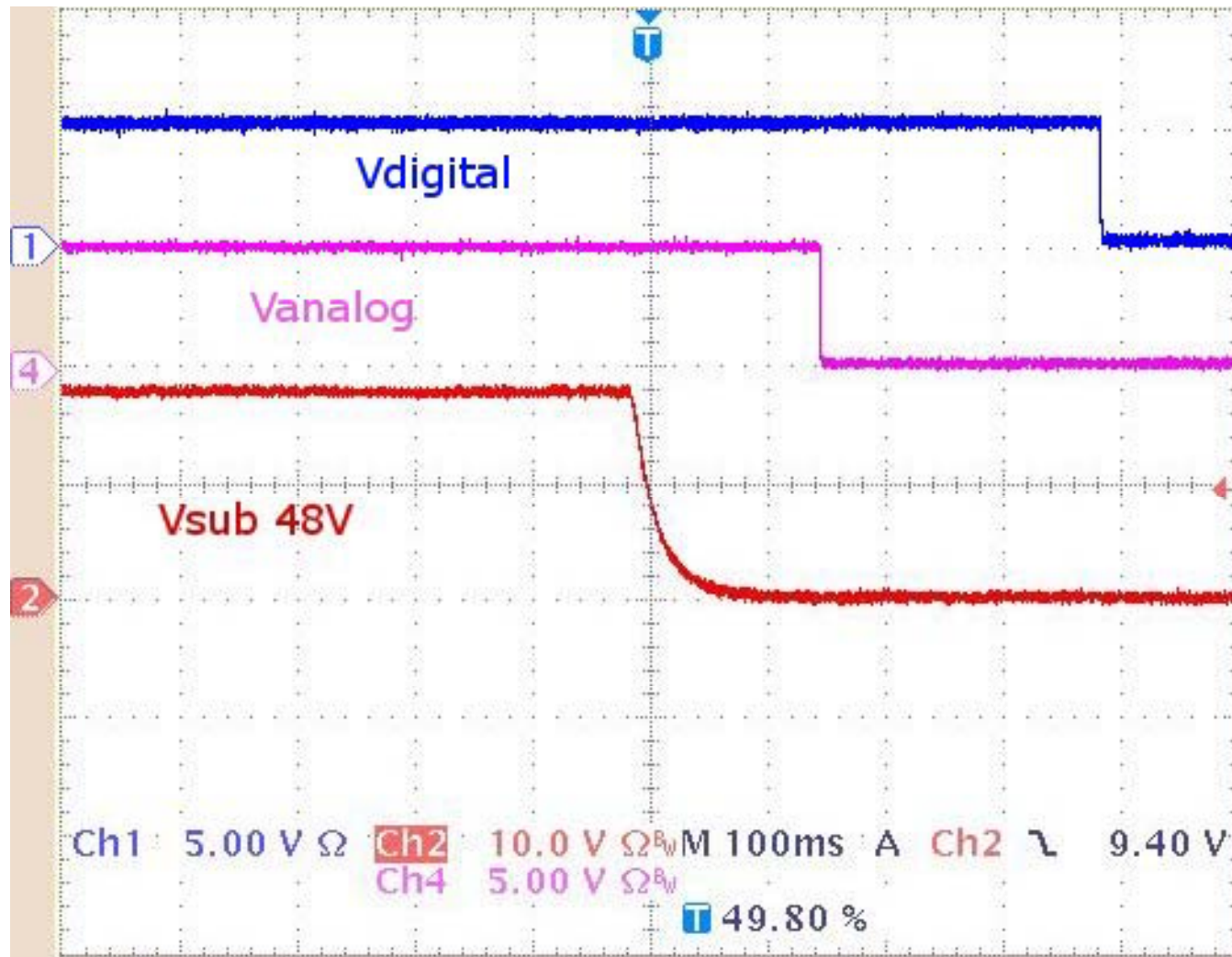


-
-
- Once we have a On-Off signal the following sequence will be initiated.
 - On-Off goes high
 - Digital Power enabled (+5V & 3.3V)
 - Delay 100-200ms
 - Analog Power enabled (+/-5V, +/-15V & -28V)
 - Delay 200ms
 - Substrate Voltage enabled.
 - On-Off goes low
 - Substrate Voltage disabled.
 - Analog Power disabled (+/-5V, +/-15V & -28V)
 - Delay 200ms
 - Digital Power disabled (+5V & 3.3V)
 - Delay 100-200ms

Normal Turn-On Timing

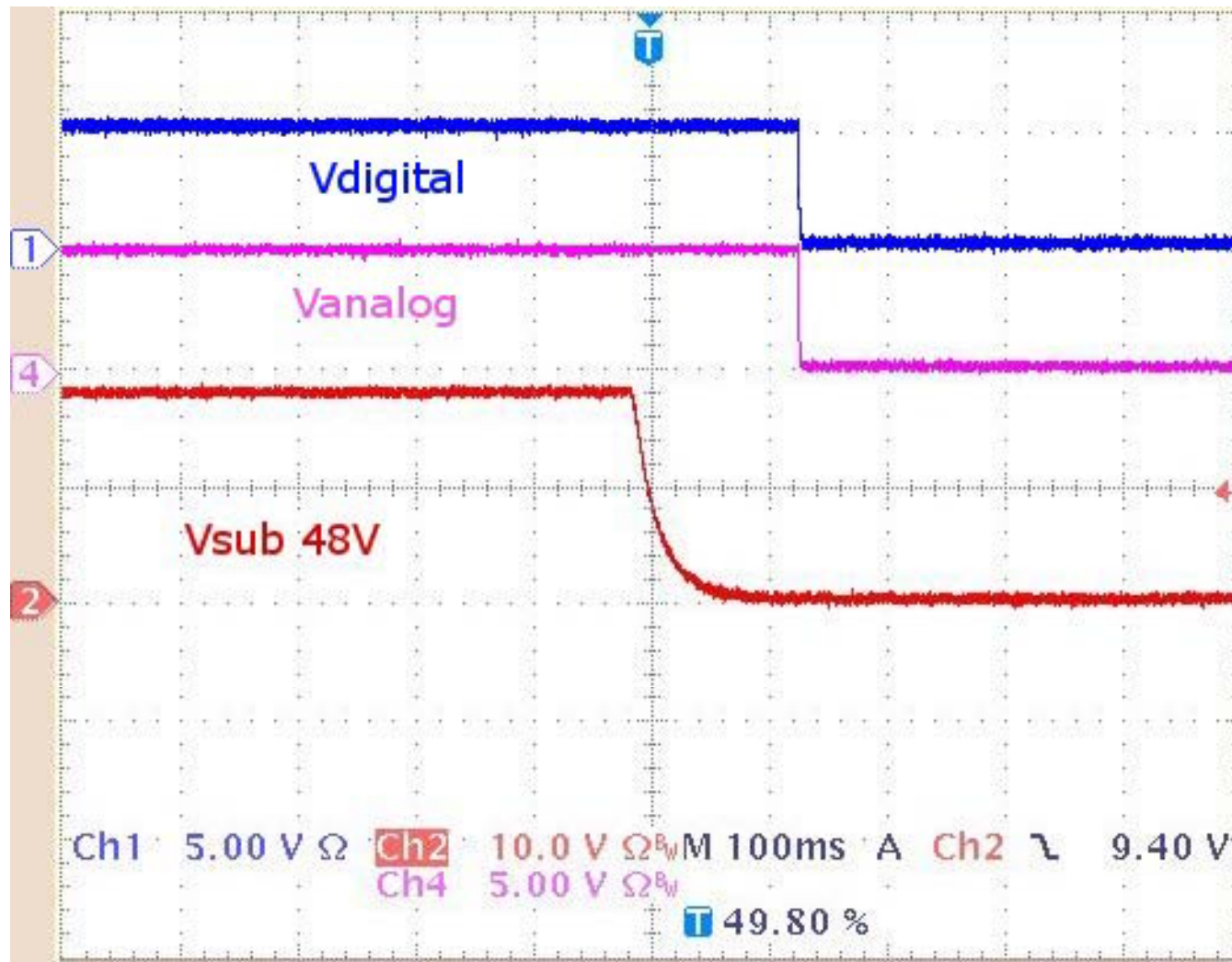


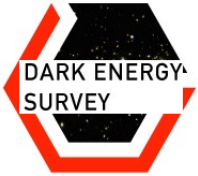
Normal Turn-Off Timing



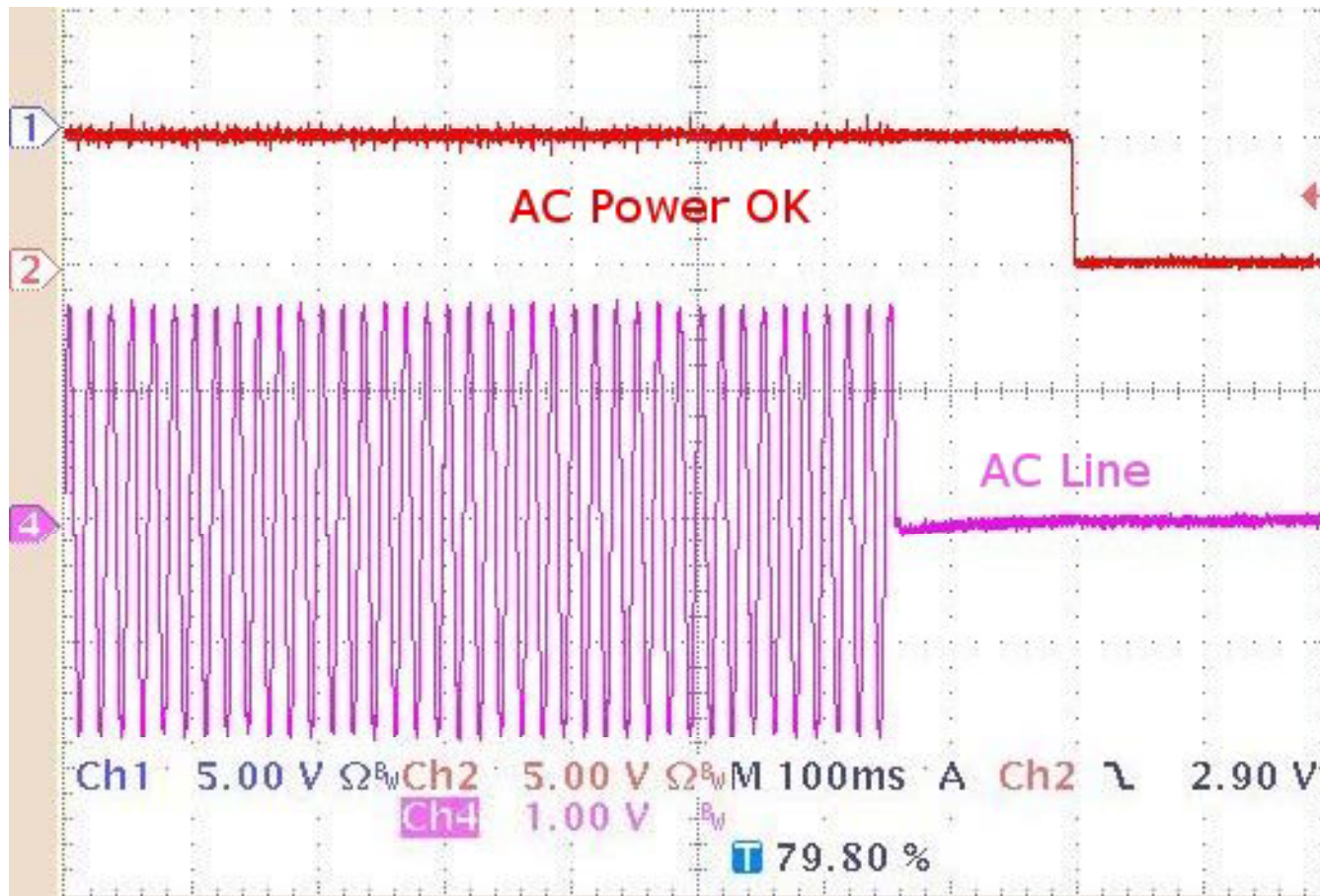


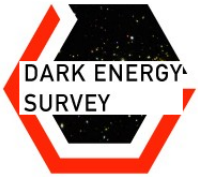
AC Line Loss



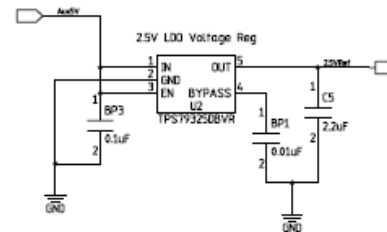
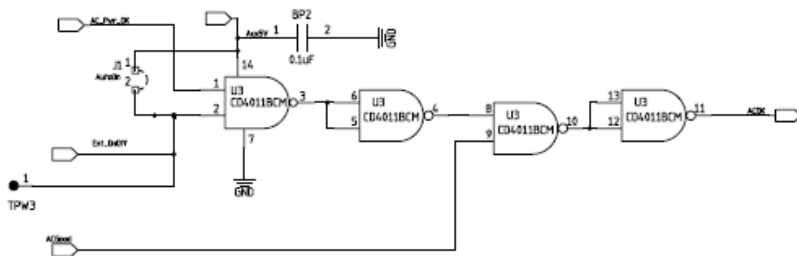
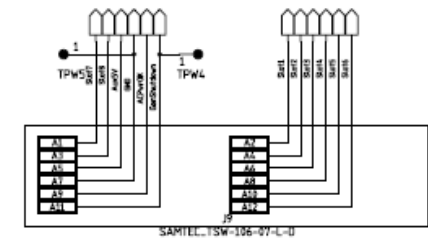
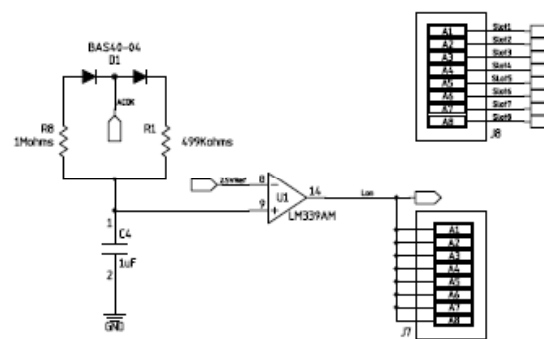
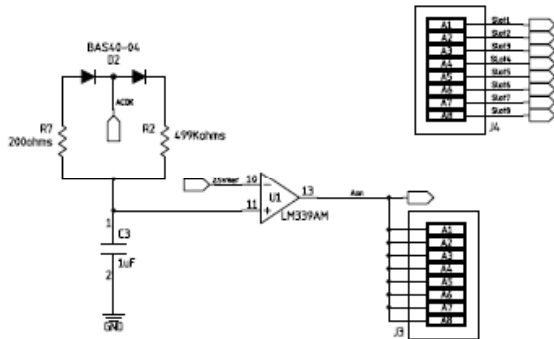
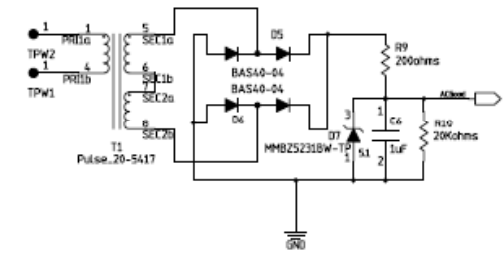
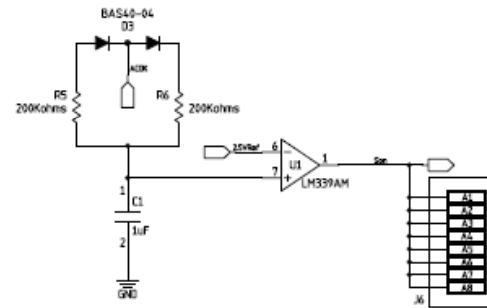
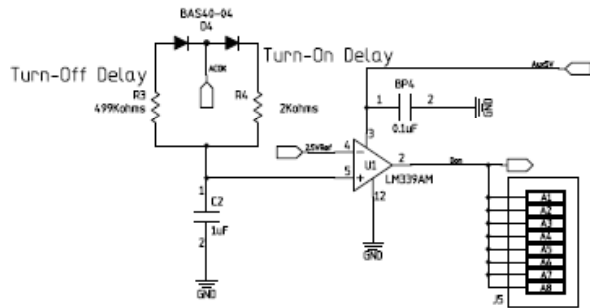


AC Line Waveforms

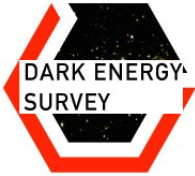




Autonomous Sequencer



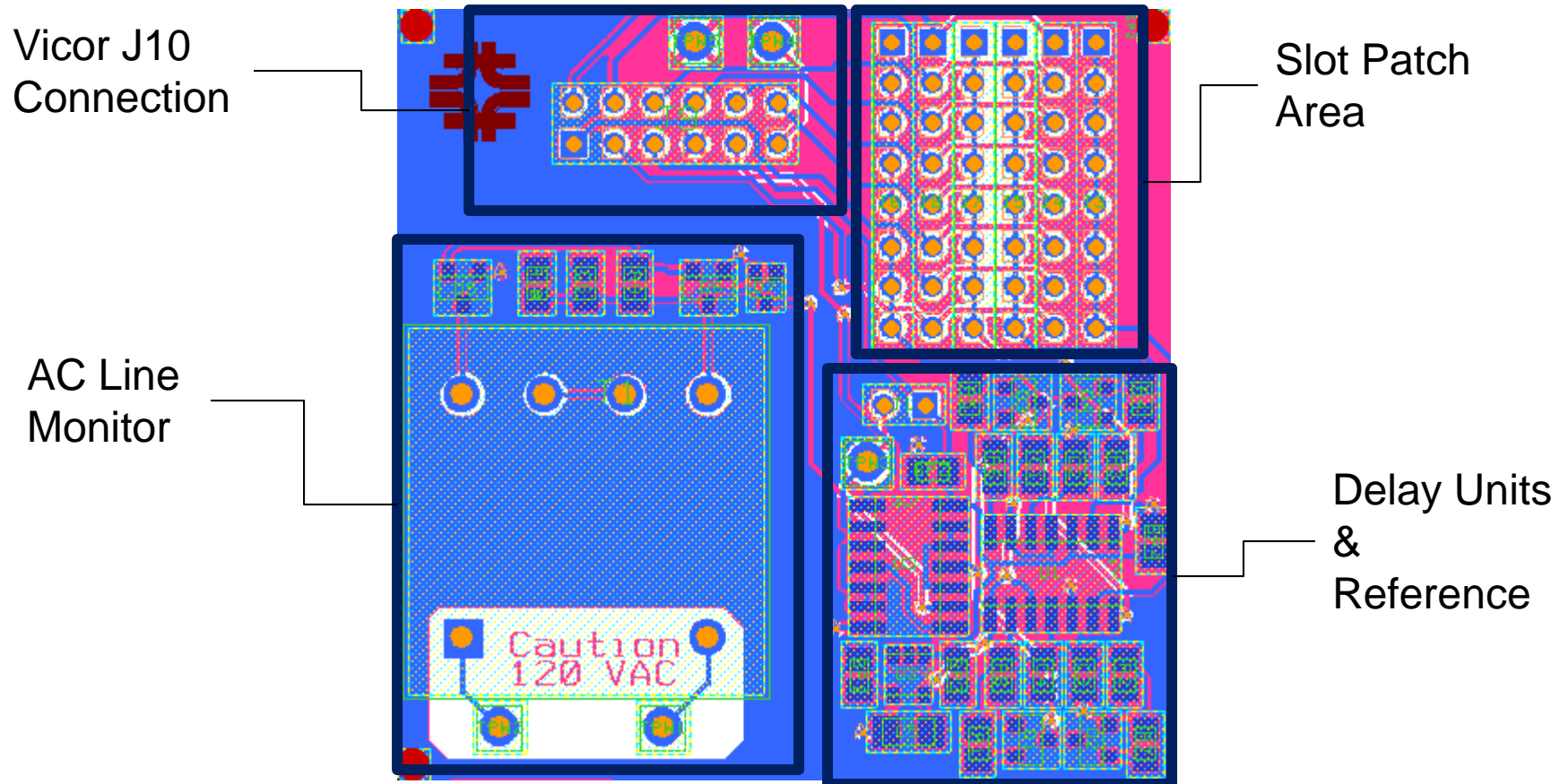
MODIFIED 4/5/2010 9:00:47 AM



Implementation



-
-
- A small 2x2" PCB contains an AC line monitor circuit, 4 delay units and voltage reference.
 - One connection is made to the Vicor MegaPAC via the J10 connector on the Fan/AC end of the supply.
 - Each delay enable output (open collector) can be connected to any slot using the patch area.
 - A spare delay unit is available if needed.



Installed Sequencer

