TFM – Status Report

Preliminary Testing of Power Supplies

3/25/2020

Mircea Bogdan
TFM – Status Report

Preliminary Testing of Power Supplies:

• Simple Manual Power Supply Control
• Test of each supply individually:
  • Static Loads Only
  • Transition Times
  • Individual Supply Efficiency: \( \frac{V_{\text{out}} \cdot I_{\text{out}}}{[12V \cdot (I_{12V_2} - I_{12V_1})]} \)

• Test of all Supplies Together

• No Power Sequencing

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Testing Firmware - 1

Date: March 12, 2020

Firmware for Manual Supply Enable

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Firmware Simulation – Manual Control of EN and DIS Lines
Testing Firmware - 3
MAX10 Signal Tap – Manual Control of EN and DIS Lines

Power OK after ~ 1ms of Power Enable

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Test Setting - 1

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All Power ON:
  • $P_{out} = 43.23\text{W}$

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Test Setting - 3

Power ON:
• 5V_STBY
• 3.3V_STBY
• 3.3V_Main
• 12V_2
• 12V_2
• MAX10 sof ON

This is not the future IDLE state.
TFM - Core VCC

- $V_{out} = 0.9V$
- $I_{out} = 17.4A$
- $T_r \sim 8ms$
- $T_f \sim 8ms$

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LTC3884
TFM - VCCERAM

- $V_{out} = 0.9V$
- $I_{out} = 3.7A$
- Efficiency = 87%
- $T_r \sim 800 \text{ us}$
- $T_f \sim 250 \text{ us}$

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EN63A0QI
TFM - VCCRL

- $V_{out} = 1.03V$
- $I_{out} = 4.35A$
- Efficiency = 88%
- $T_r \sim 800\, \text{us}$
- $T_f \sim 350\, \text{us}$
TFM - VCCT

- $V_{out} = 1.03\text{V}$
- $I_{out} = 1.9\text{A}$
- Efficiency = 86%
- $T_r \sim 850\text{ us}$
- $T_f \sim 1100\text{ us}$

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EN63A0QI
TFM - VCCIOUIB

- $V_{out} = 1.2V$
- $I_{out} = 5.2A$
- Efficiency = 85%
- $T_r \sim 1000\ \mu s$
- $T_f \sim 1400\ \mu s$

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TFM - VCCH

- $V_{out} = 1.8V \ (1.78V^*)$
- $I_{out} = 3.28A$
- Efficiency = 87%
- $T_r \sim 800\ \text{us}$
- $T_f \sim 1100\ \text{us}$

* Will adjust Resistors to make it 1.8V  

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TFM - VCCM

- $V_{out} = 2.5V$ (2.44V*)
- $I_{out} = 2.39A$
- Efficiency = 84%
- $T_r \sim 6\ ms$
- $T_f \sim 800\ us$

* Will adjust Resistors to make it 2.5 V

EN6362QI
TFM – Blue Wire

Broken contact

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Core VCC Schematic

- Changed Core_VCC_EN output to “Open Drain” in MAX10 Firmware
- Changed R631 from 10K to DNI
- Changed R372 from DNI to 10K

To Do:
Install 10K to GND on the POWER_ON line, to prevent Core DC/DC Convertor from starting before MAX10 is configured.

LTC3884 Data Sheet Requirement:
RUN0/RUN1 (Pin 17/Pin 18, Pin 18/Pin 19): Enable Run Input and Output. Logic high on these pins enables the controller. An open-drain output holds the pin low until the LTC3884 is out of reset. This pin should be driven by an open-drain digital output. A pull-up resistor to 3.3V is required in the application.
TFM – To Do

- Test Power Supplies with Dynamic Loads
  - May have to change some capacitor values
- Output Voltage Ripple Measurement
  - May have to change some capacitor values
- Test Power Sequencing:
  - Will have to adjust Firmware
- Test TFM with TP Card
  - ………………………..?
- Other Ideas?

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