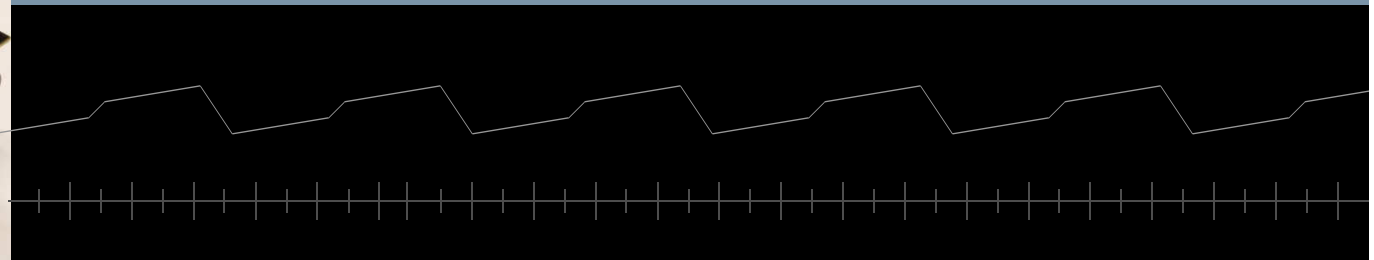


LT3791-1

360W and 240W 24V Voltage Regulators Using Parallel 60V 4-Switch Buck-Boost Controller

November 2012

2x and 3x Parallel 120W Voltage Regulators

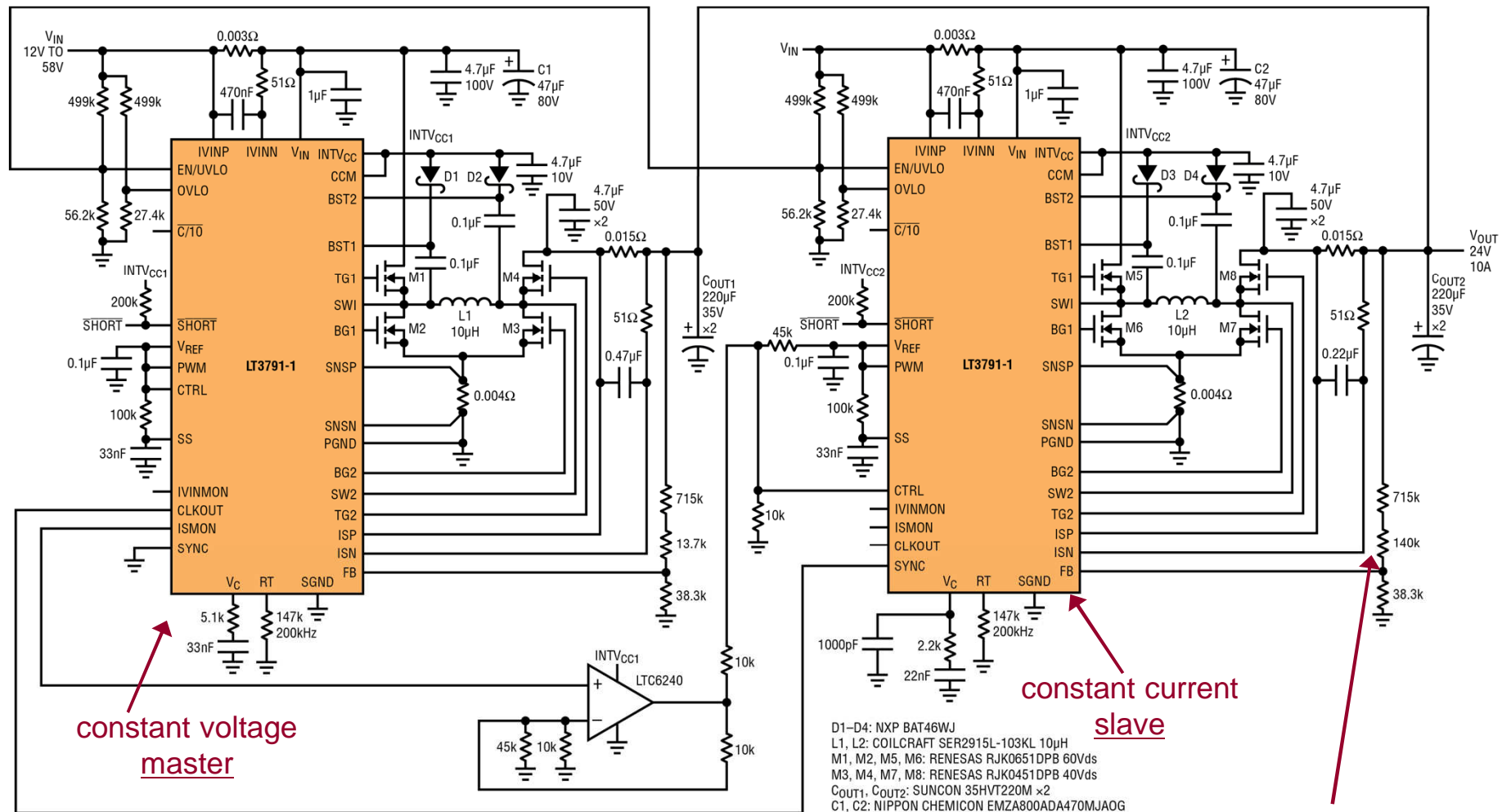


Keith Szolusha
Senior Applications Engineer SPower
Milpitas, CA



LT3791-1 2x Parallel 120W Voltage Regulators = 240W 24V 10A

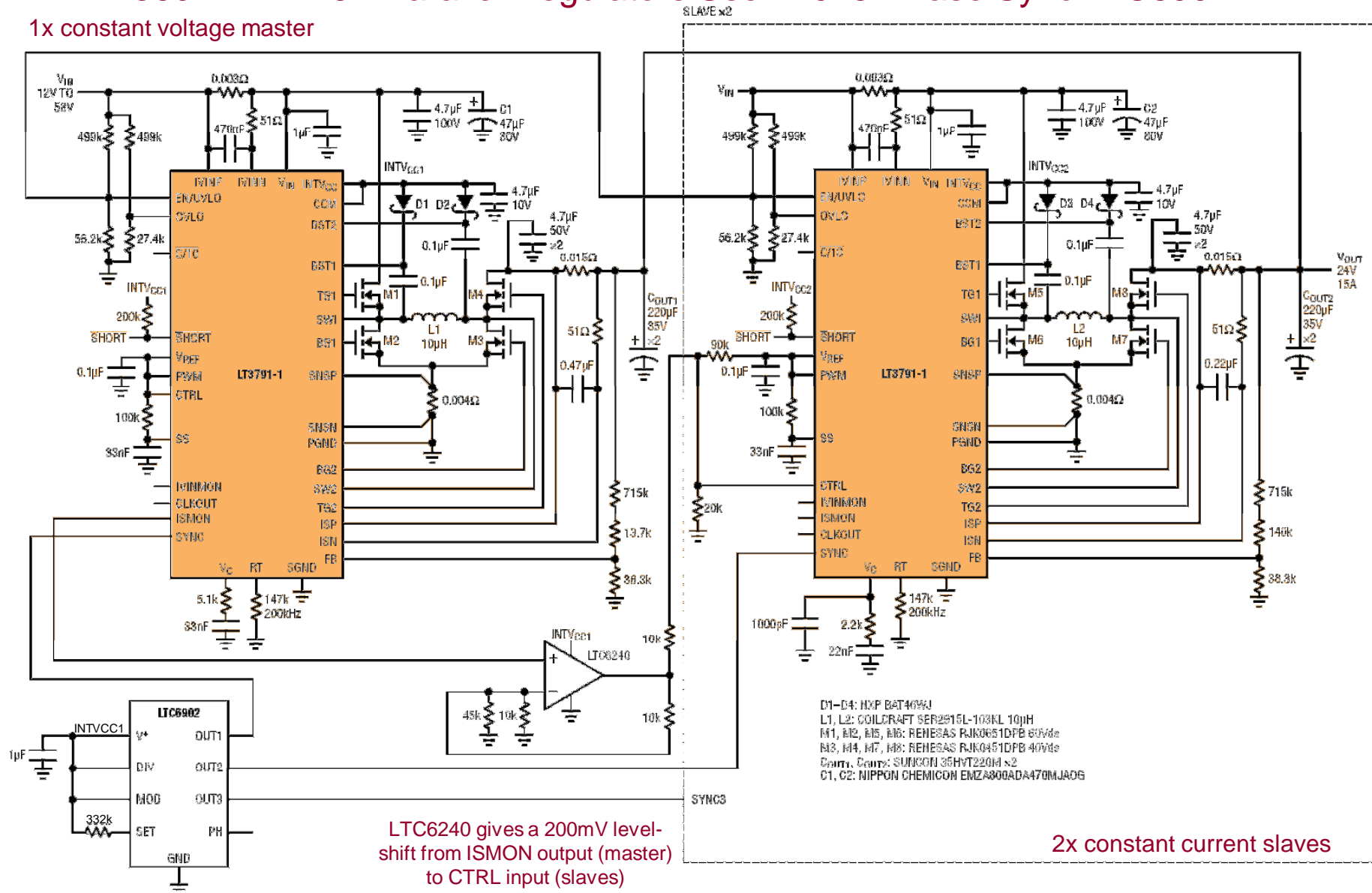
240W 24V 10A Parallel Regulators Share Current Equally



LT3791-1 3x Parallel 120W Voltage Regulators = 360W 24V 15A

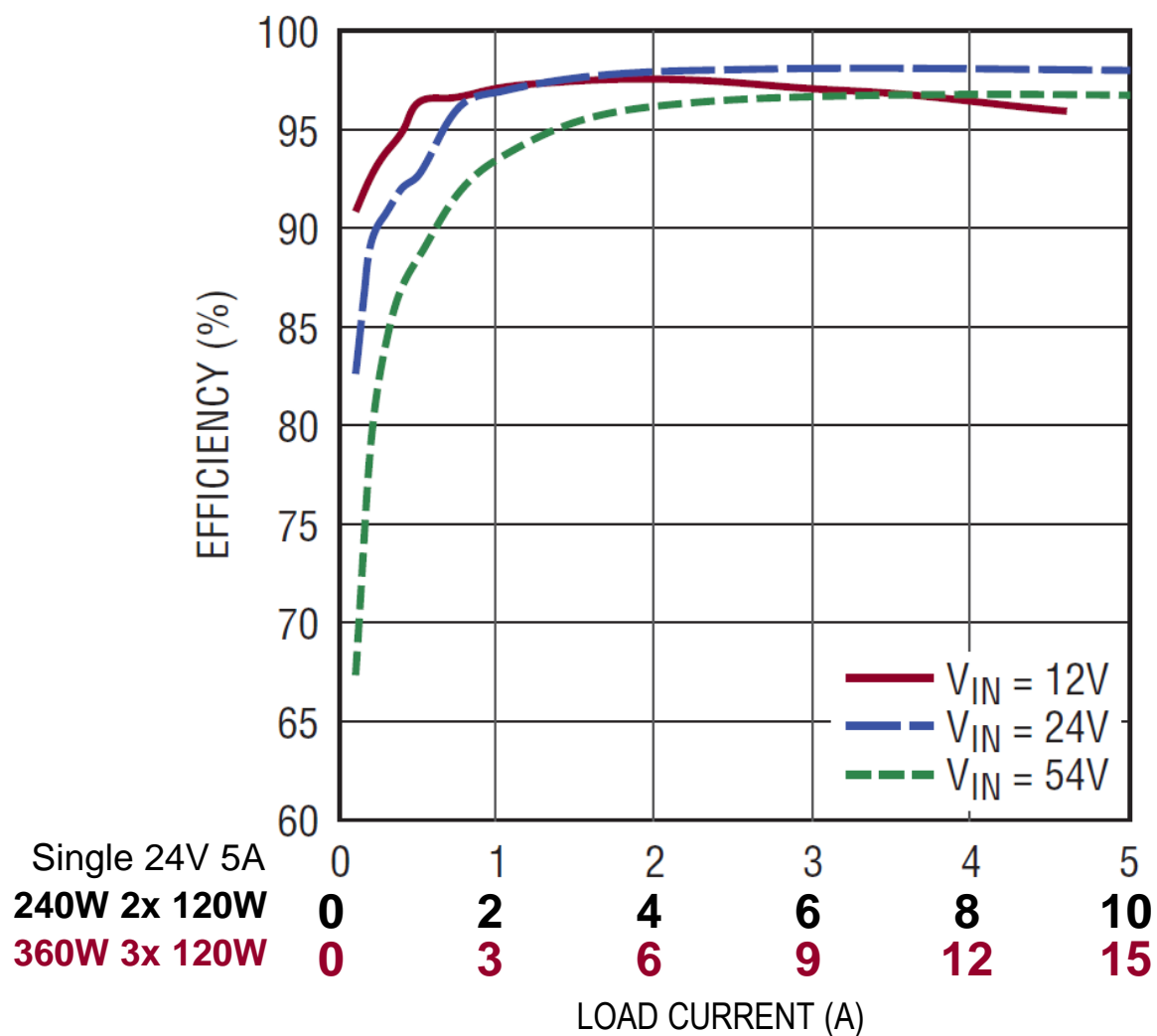
360W 24V 15A Parallel Regulators Use 120° 3-Phase Sync LTC6902

1x constant voltage master



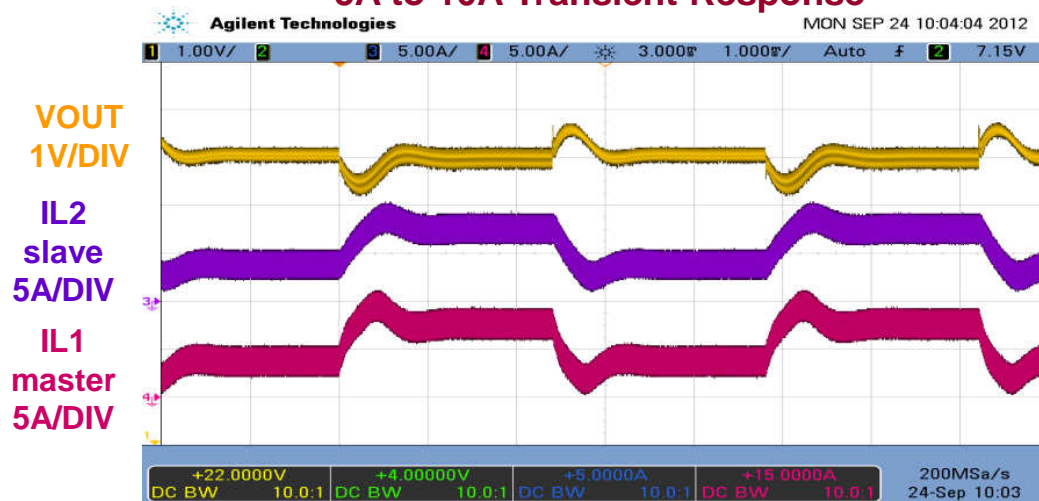
LT3791-1 Parallel 120W Voltage Regulators Efficiency

Efficiency vs Load Current



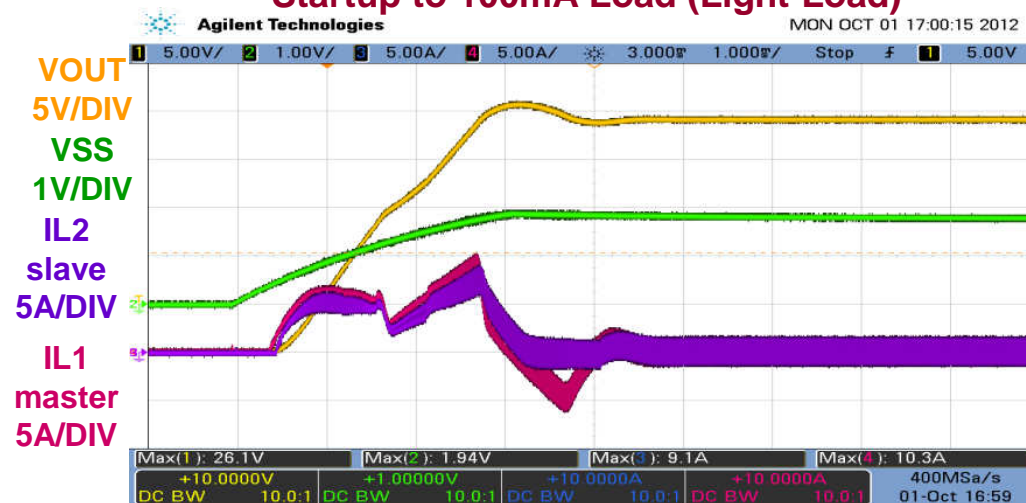
LT3791-1 2x Parallel 120W Voltage Regulators **Sharing Current**

5A to 10A Transient Response



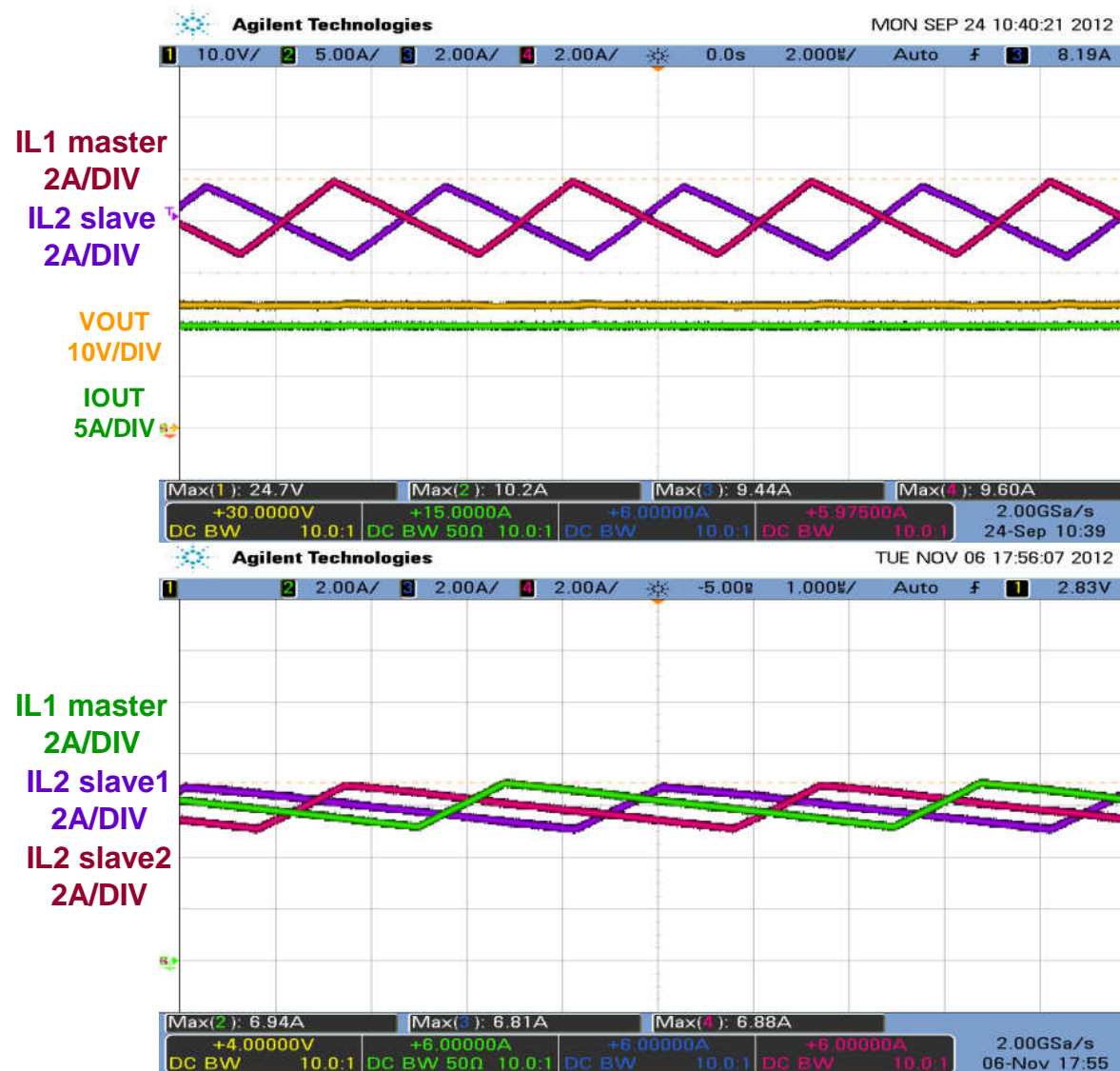
The parallel circuits share current well. The master tells the slave how much current to control as the master is controlling its own output voltage.

Startup to 100mA Load (Light Load)



Current during startup matches well, but only the master can produce negative current during an overshoot since the CTRL input does not command negative current.

LT3791-1 2x and 3x Parallel 120W Voltage Regulators **Sharing Current**



10A load with 180° phase shift
between 2x LT3791-1s

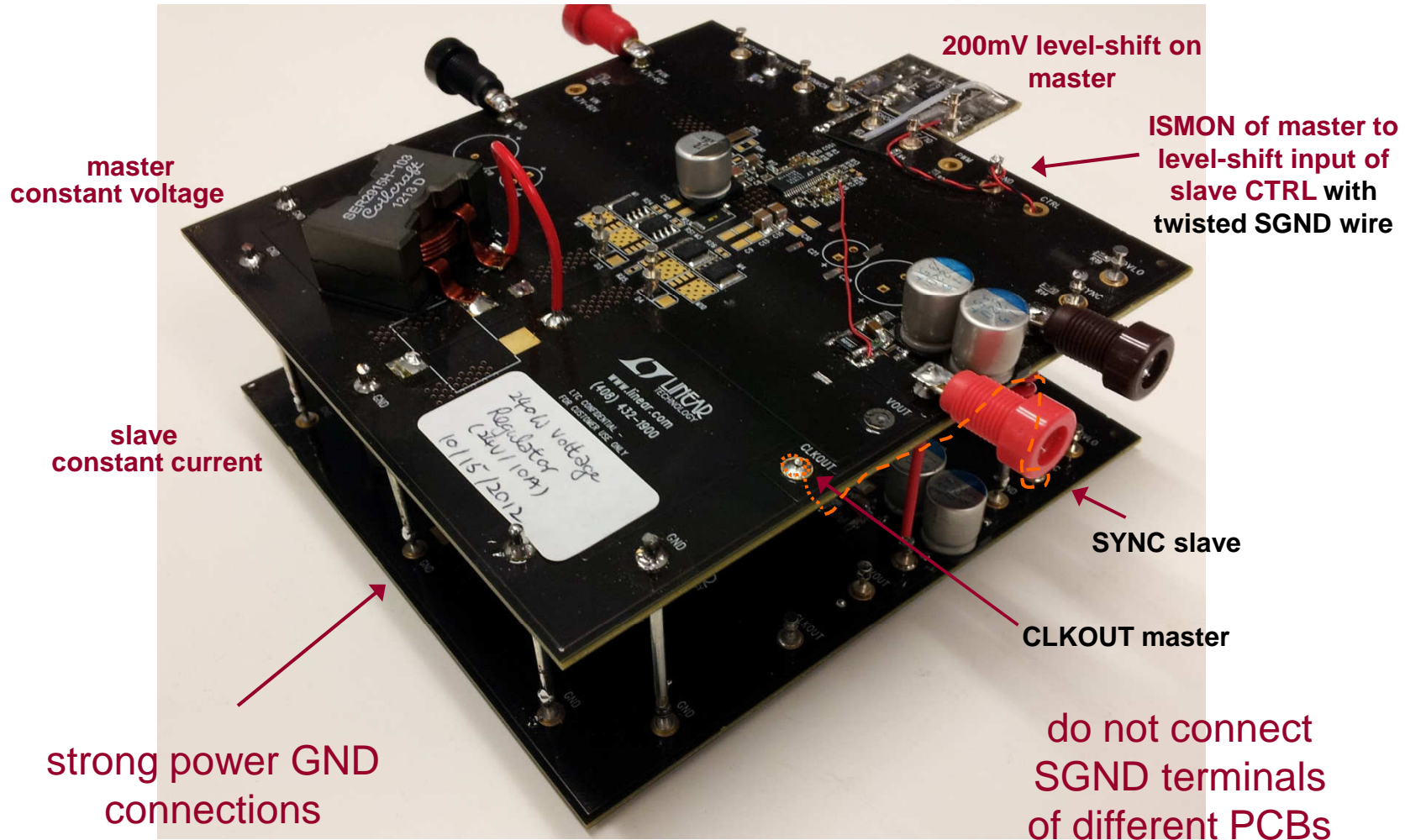
Switch phasing is provided by
CLKOUT output of master tied to
SYNC input of slave.

15A load with 120° phase shift
between 3x LT3791-1s

Switch phasing is provided by
LTC6902 multiphase oscillator output
tied to all three SYNC inputs.

LT3791-1 2x Parallel 120W Voltage Regulators = 240W 24V 10A

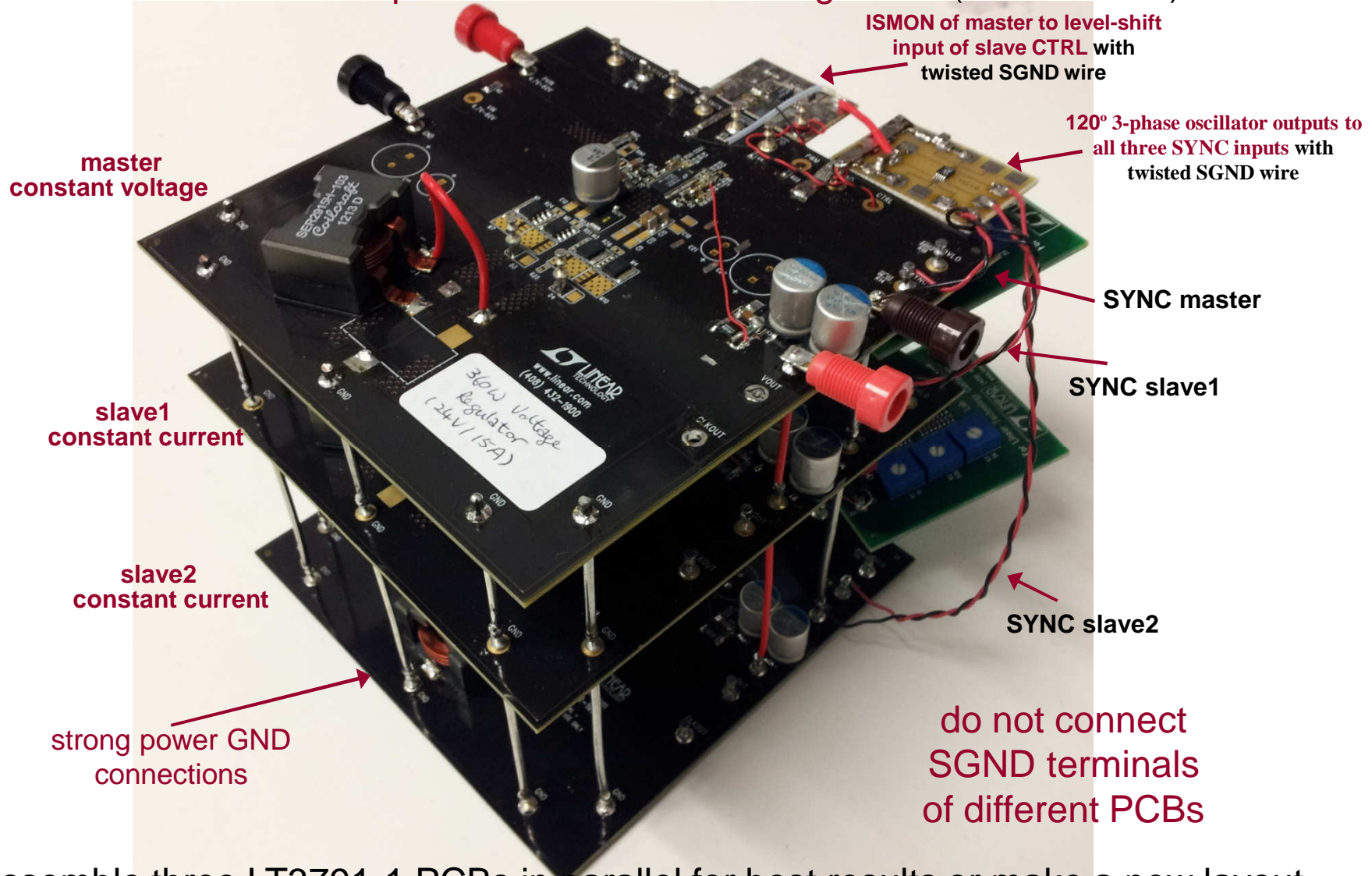
How to make a parallel circuit with existing PCBs (LB3791-1XLA)



Assemble two LT3791-1 PCBs in parallel for best results or make a new layout.

LT3791-1 3x Parallel 120W Voltage Regulators = 360W 24V 15A

How to make a parallel circuit with existing PCBs (LB3791-1XLA)

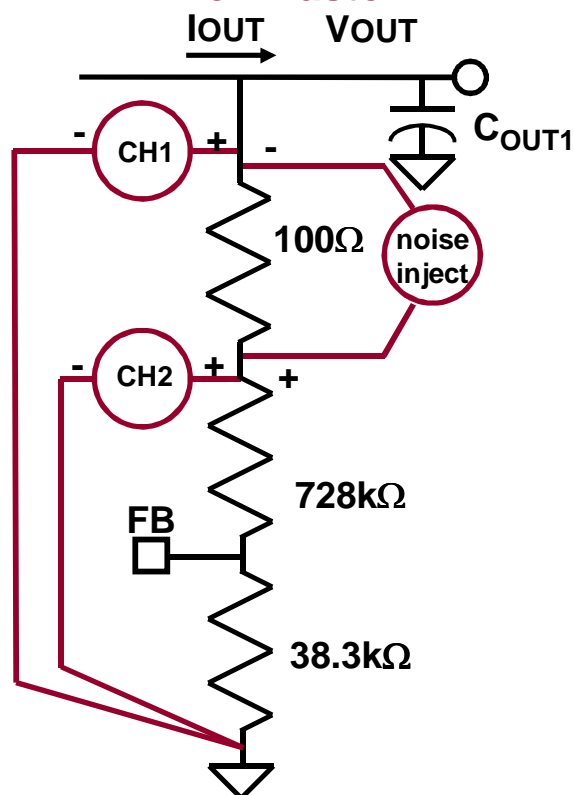


Assemble three LT3791-1 PCBs in parallel for best results or make a new layout.

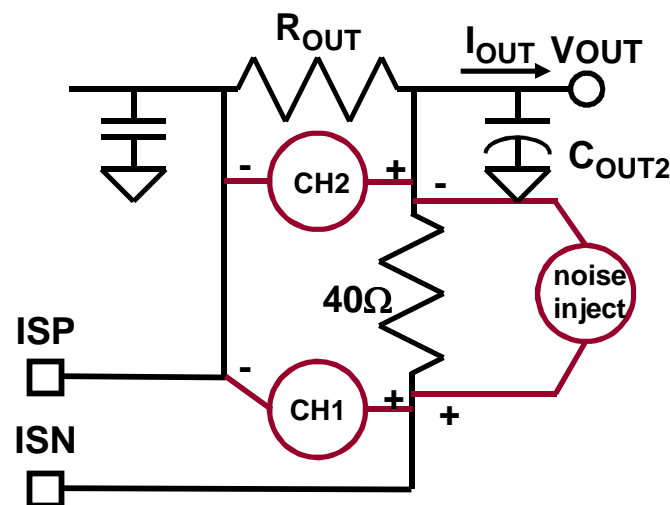
Measure the voltage loop of the master since it is regulating $24V_{OUT}$.

Measure the current loop of the slave since it is regulating constant current.

**voltage loop bode plot
measurement setup
for master**



**current loop bode plot
measurement setup
for slave**



Look for Intranet article “LED Driver with High-Side Sense Resistor Control Loop Response Measurement Using the Venable 350 (LT3796)” for reference.