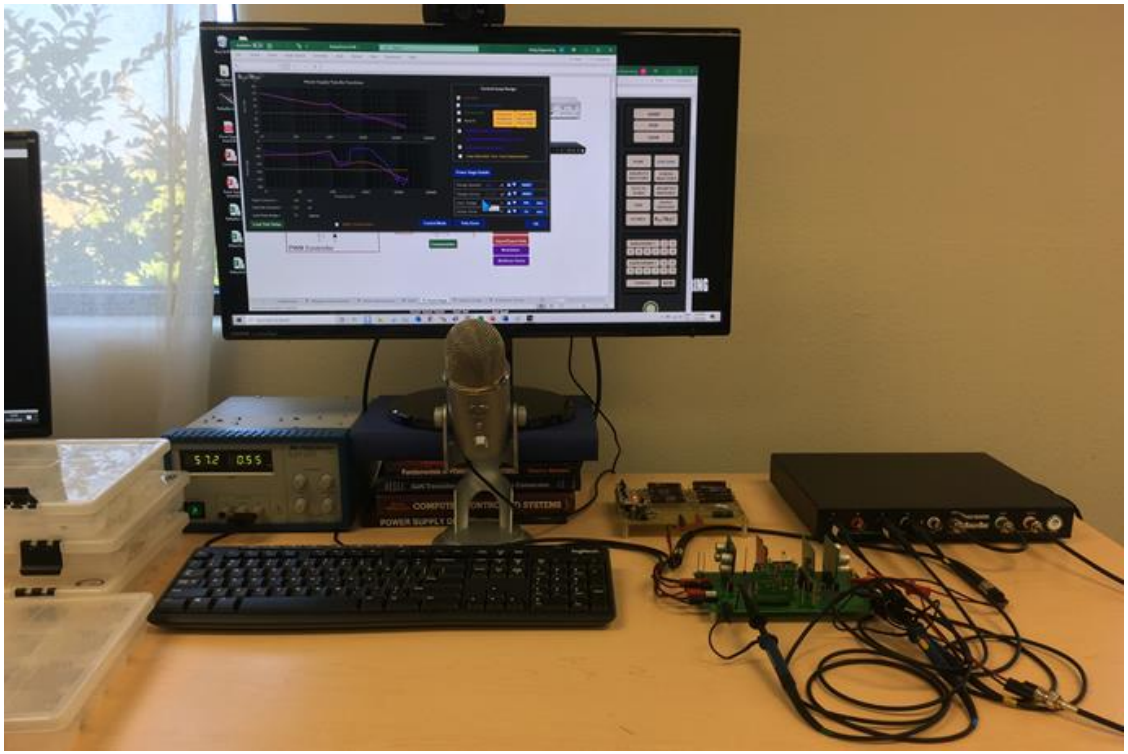
Designing and Measuring Converter Control Loops



Webinar July 9, 2020 10:00 am PCT

Dr. Ray Ridley **Ridley Engineering**

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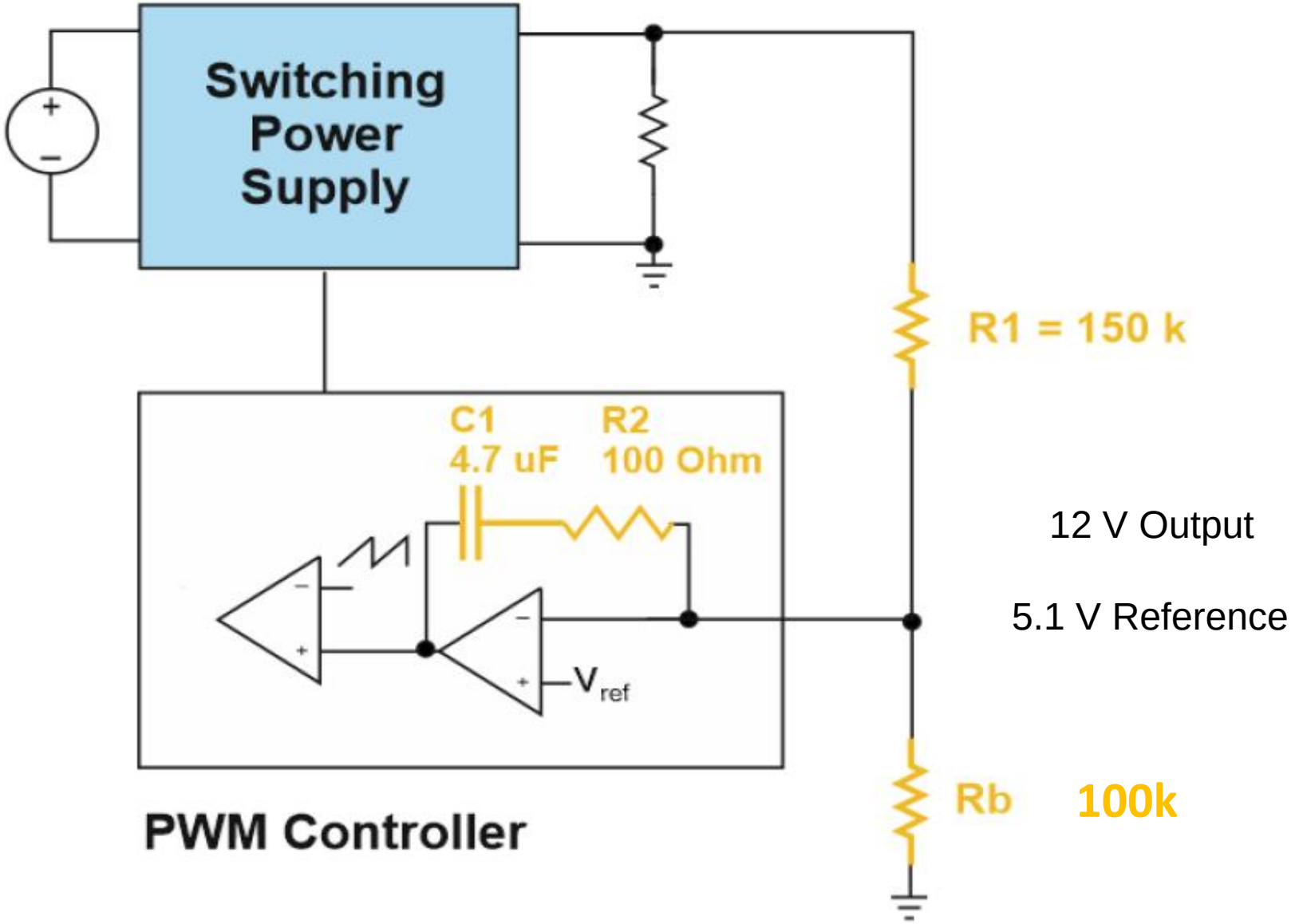
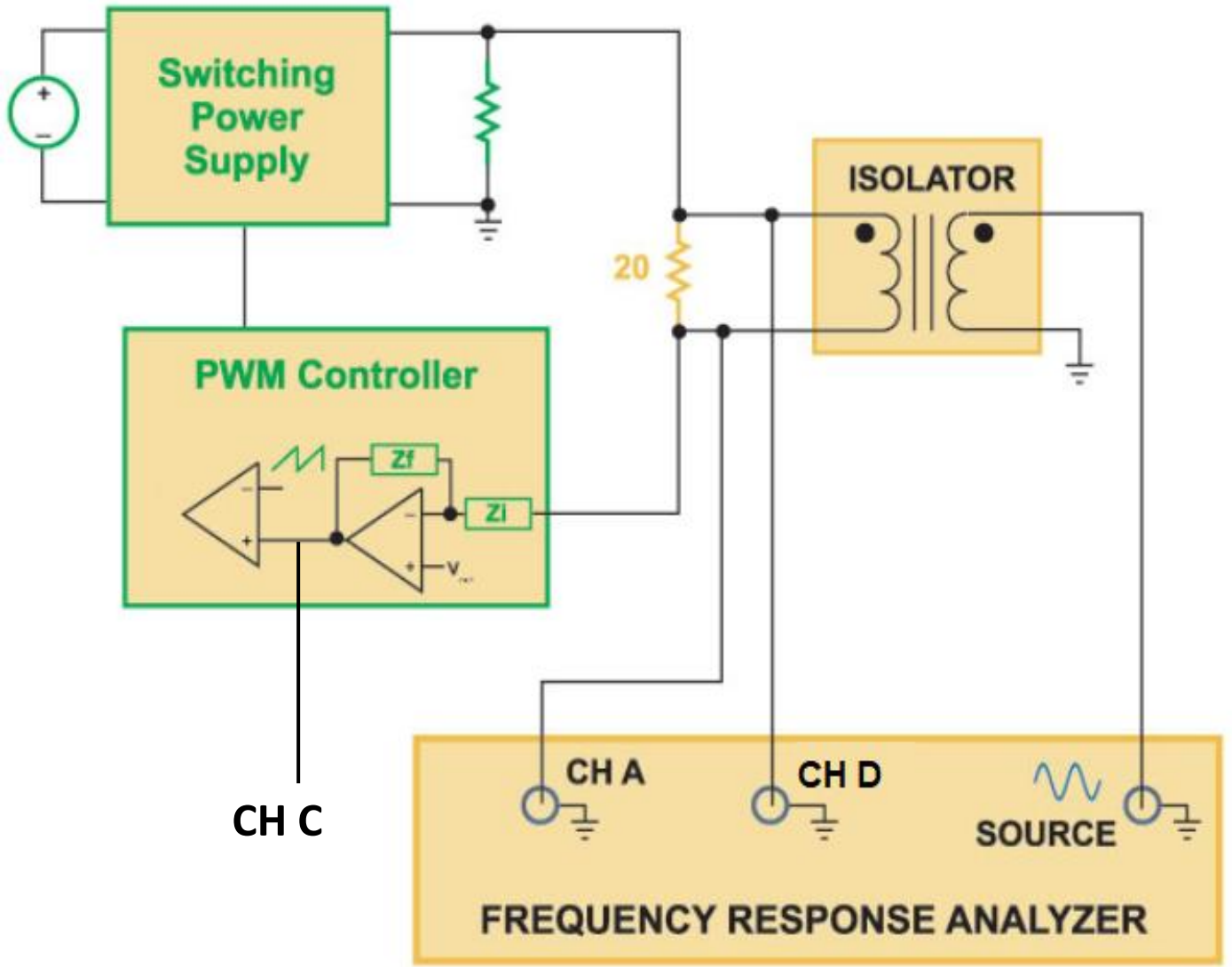
Loop Design Process - Who Measures Bode Plots?

1. Build Power Stage
2. Close the Loop Slowly (Low Bandwidth < 10 Hz)
3. Measure the Power Stage
4. Compare with Theory
5. Design Compensator
6. Measure Loop
7. Compare Loop with Theory

Step 1 – Close the Loop Slowly

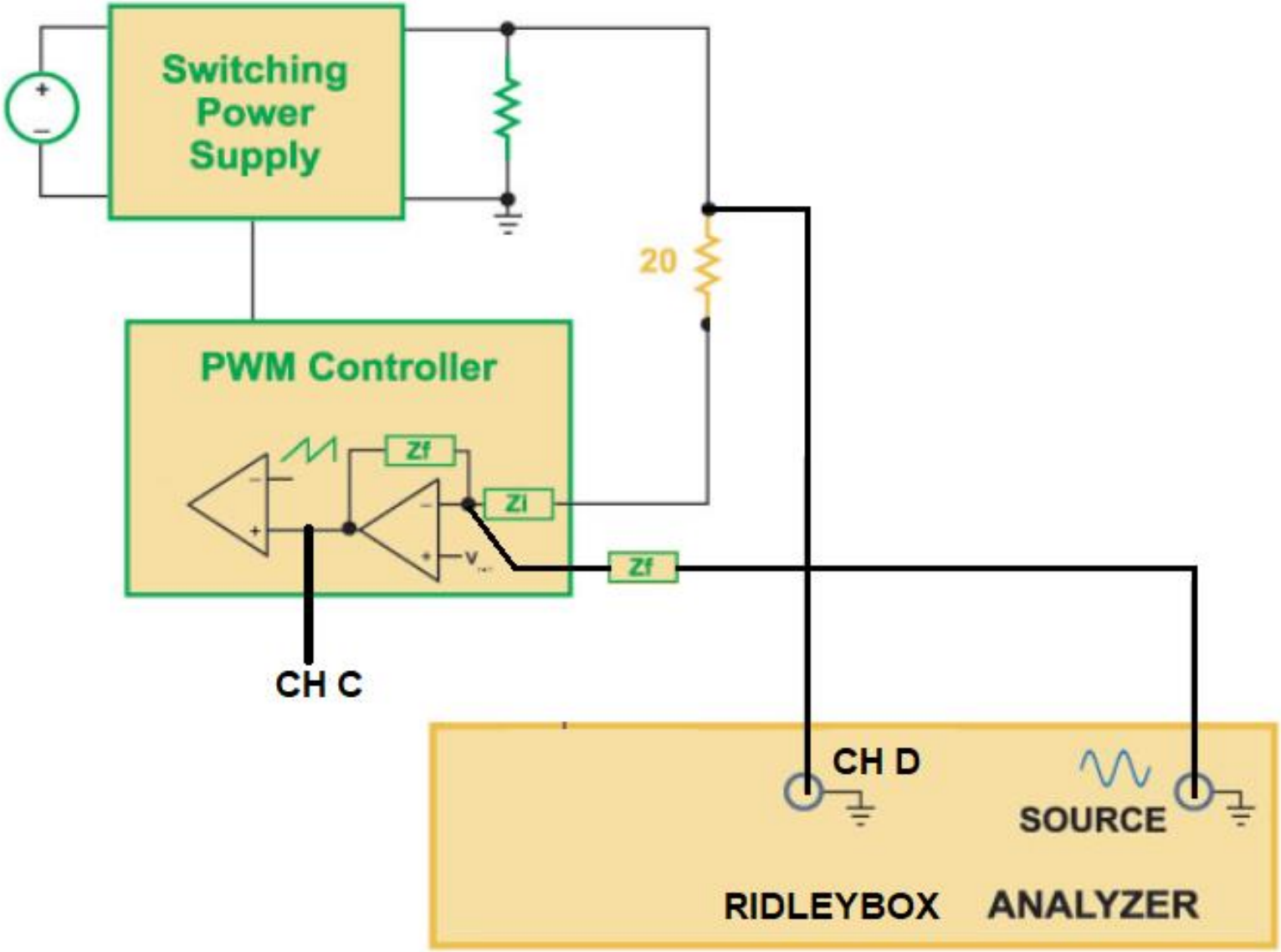


Loop Injection and Power Stage Measurement

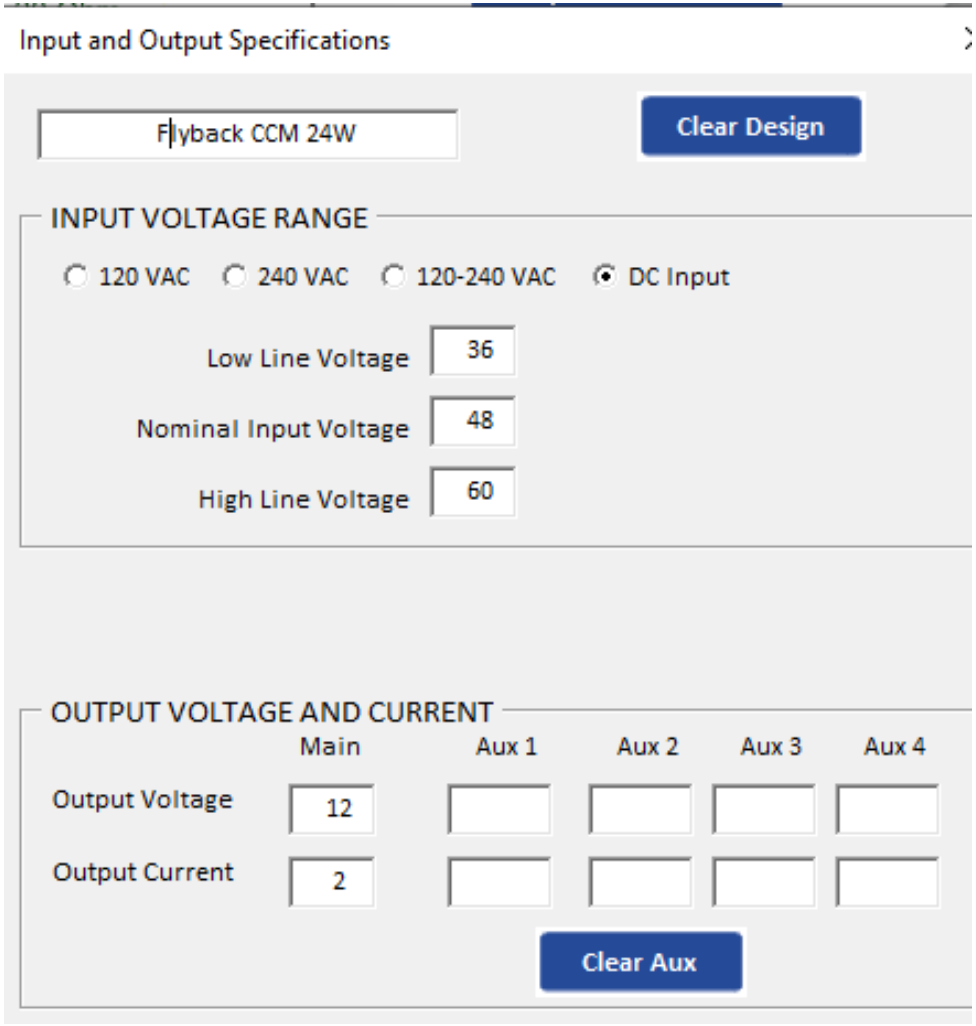


This won't work well with a very low gain loop

Step 2 – Signal Injection and Power Stage Measurement

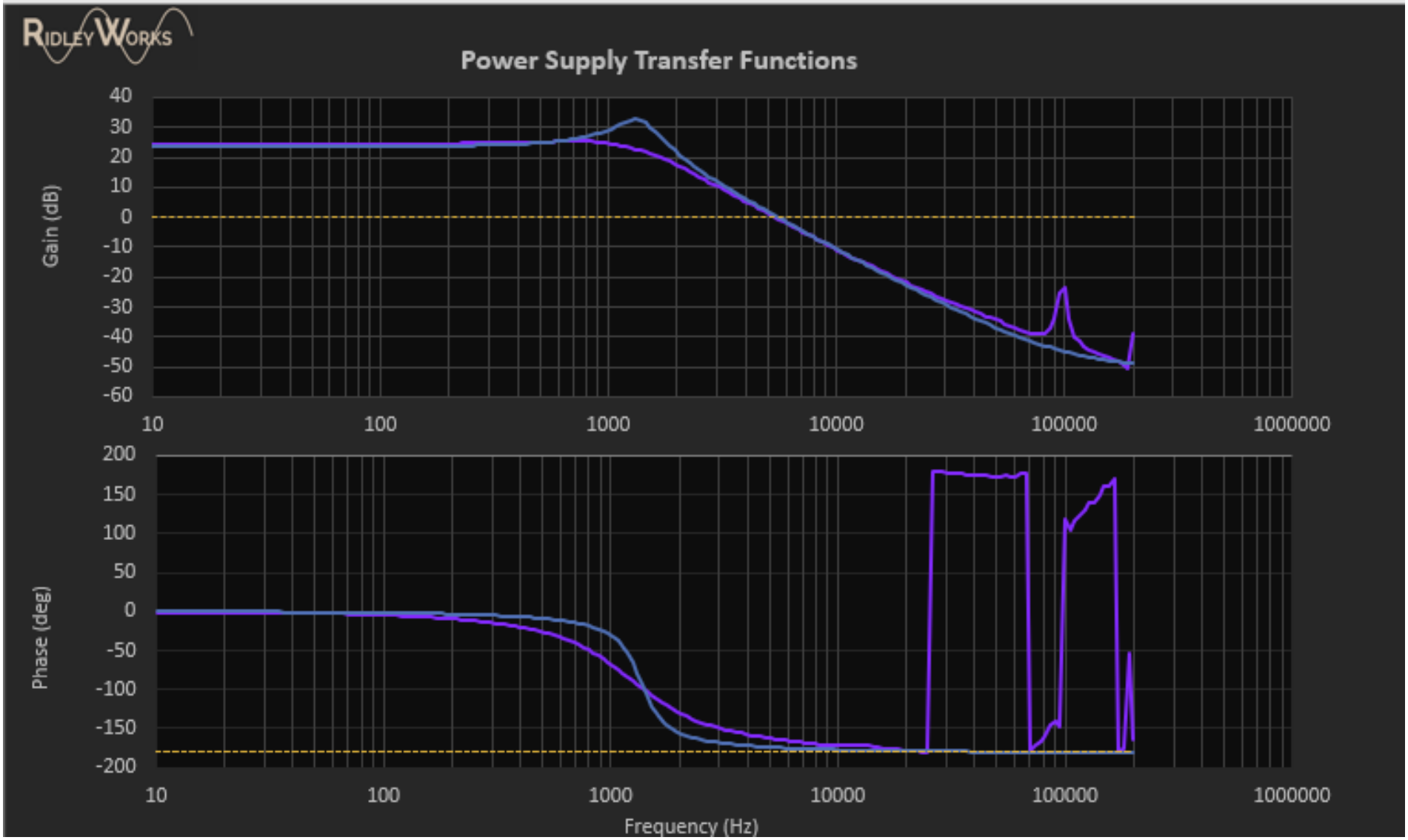


CCM Flyback Power Stage

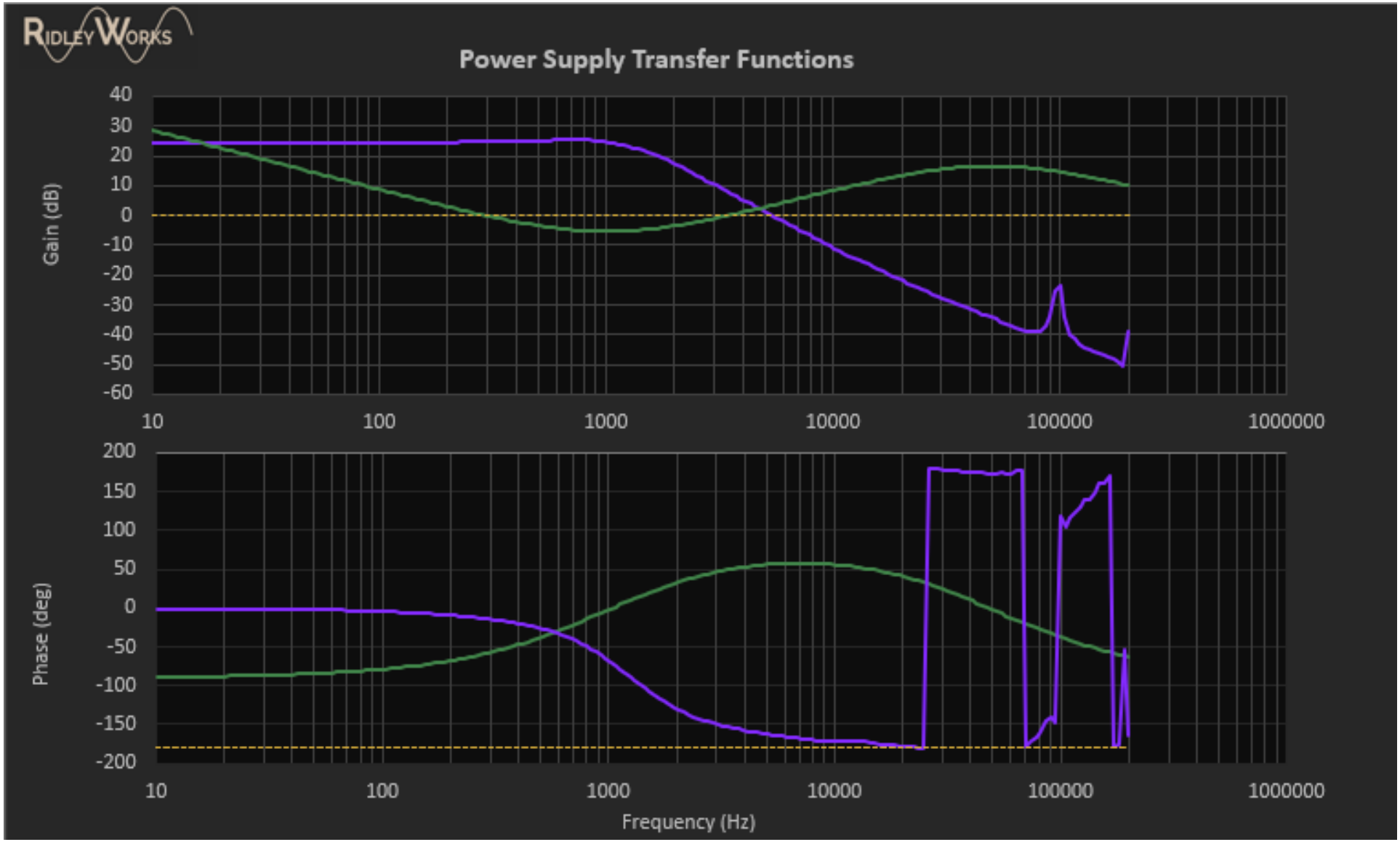


Step 3 - Power Stage Measurement

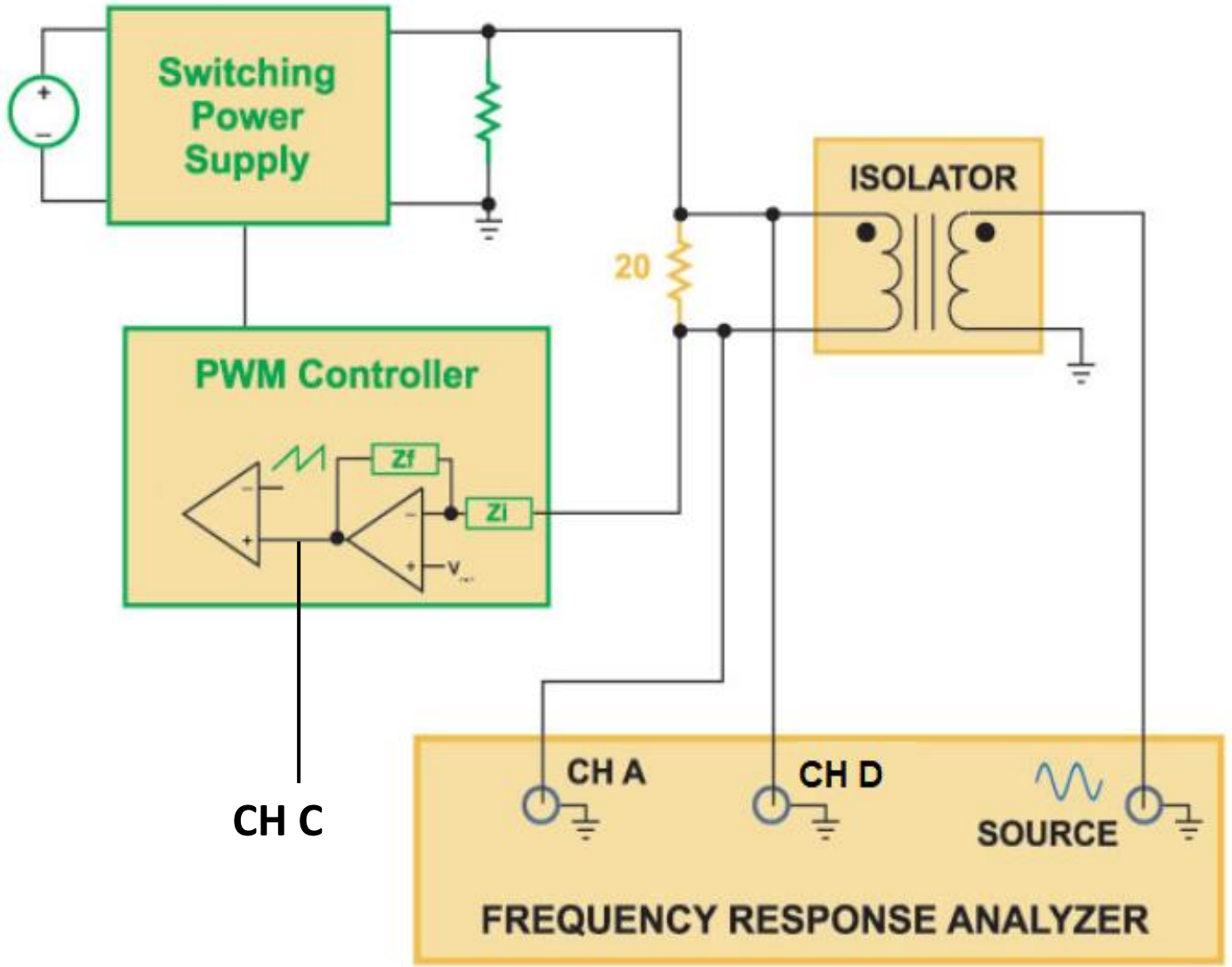
Step 4 - Power Stage Measurement vs Theory



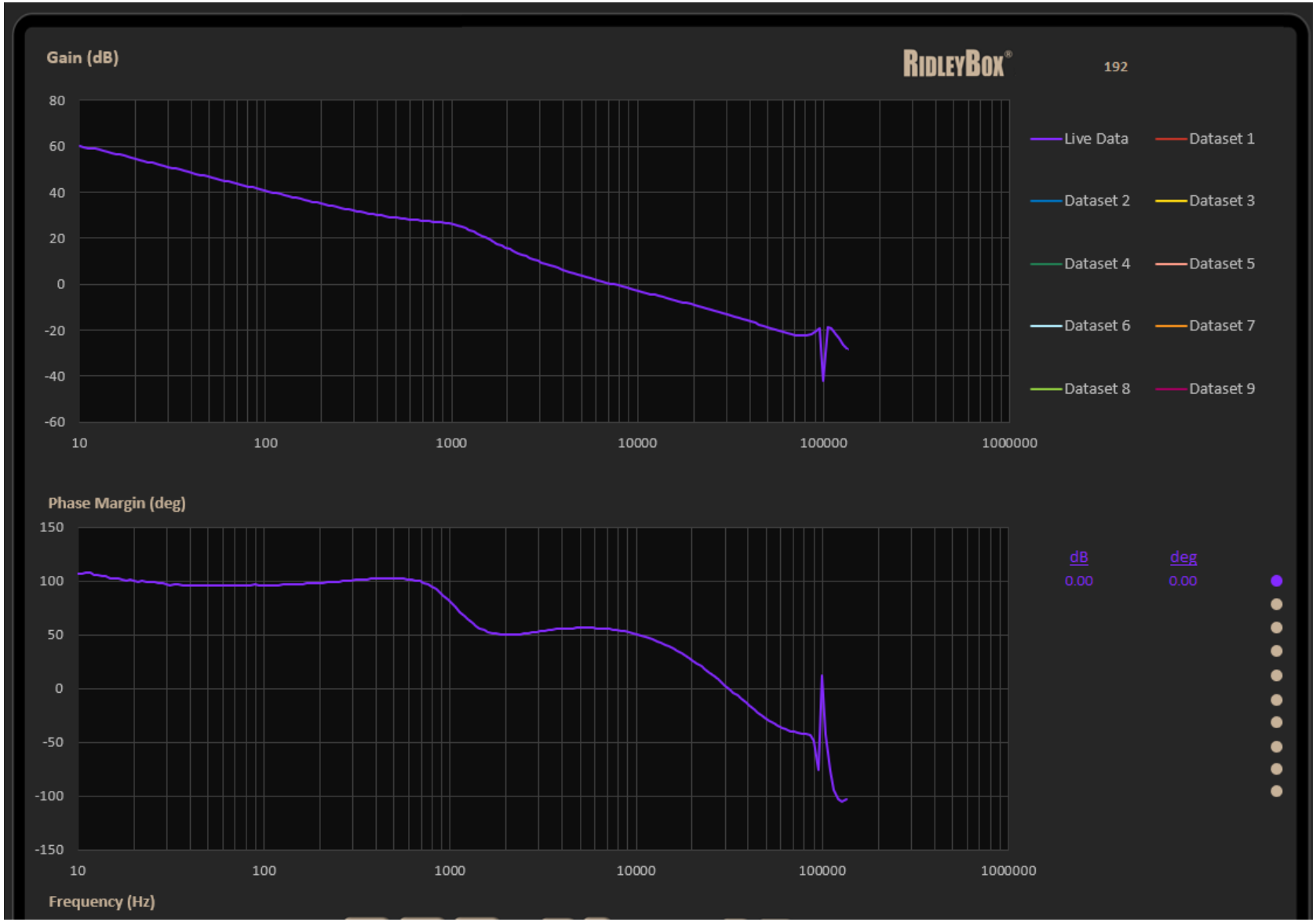
Step 5 – Compensator Design



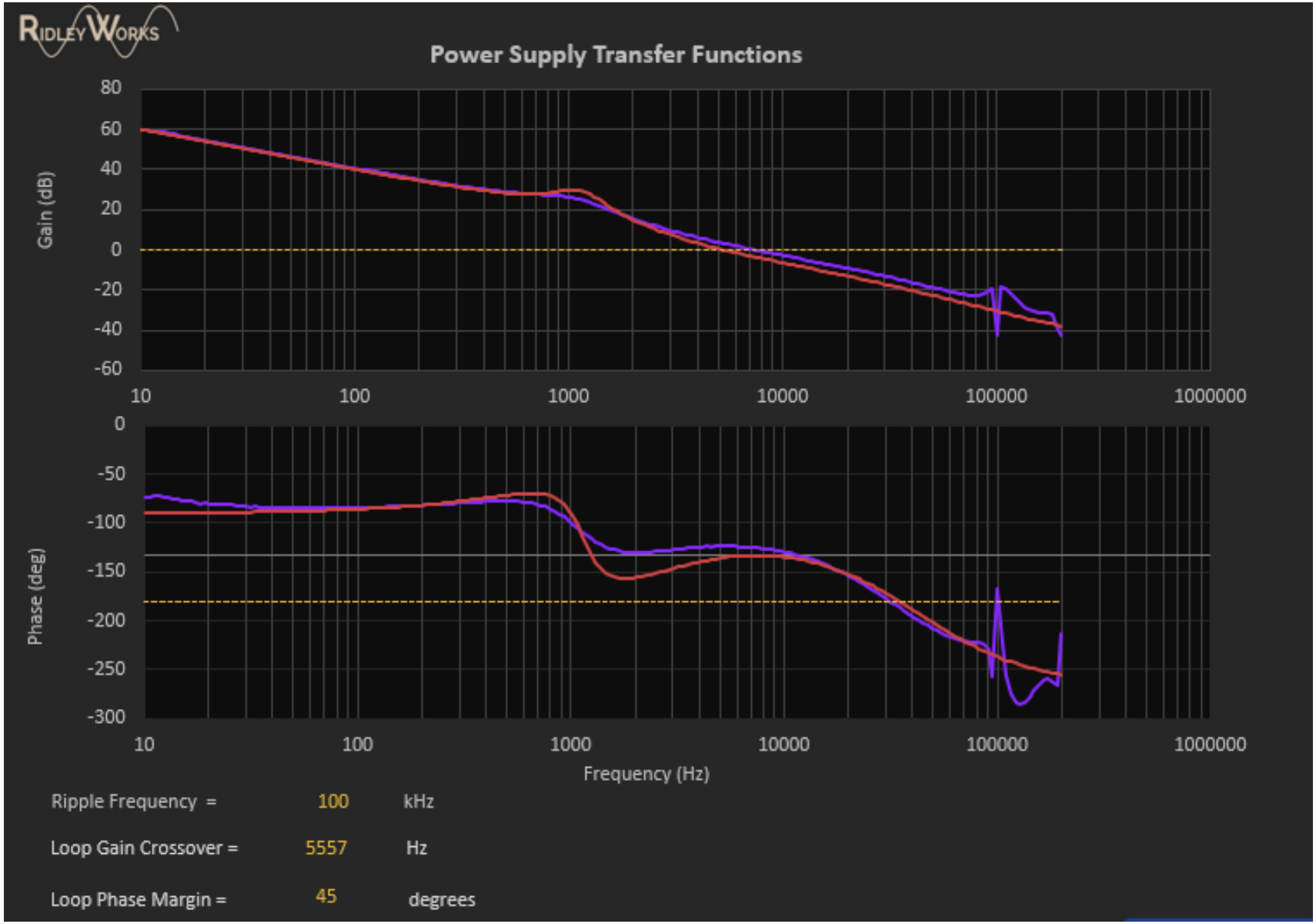
Step 6 – Loop Injection and Measurement



Step 6 – Loop Measurement



Step 7– Loop Measurement vs Theory



How to Learn More

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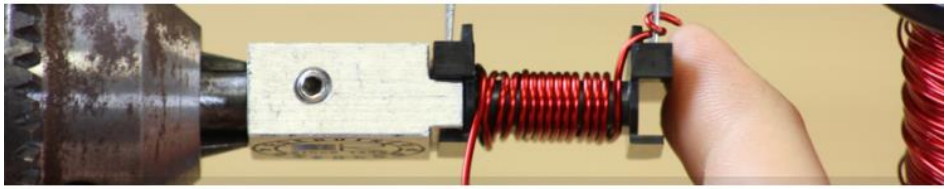
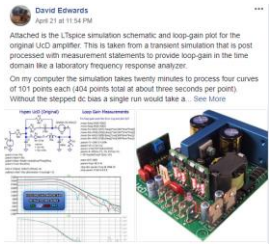
For full demo

Frequency Response Analyzers



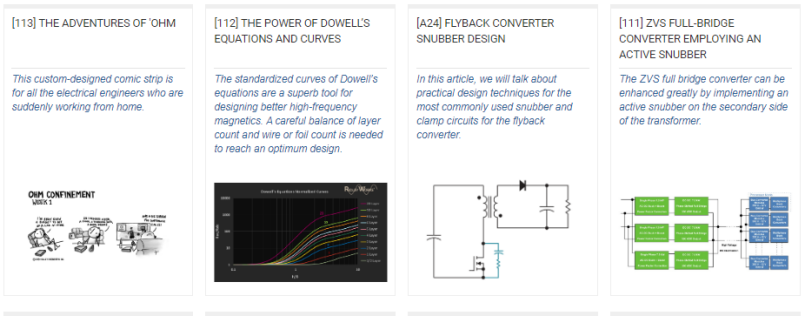
Education > Power Design Workshop > Intro

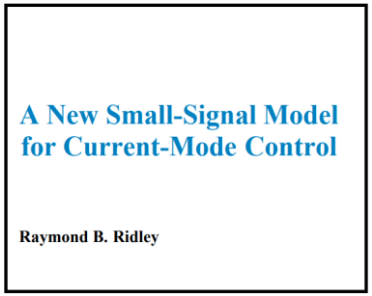
POWER SUPPLY DESIGN WORKSHOPS



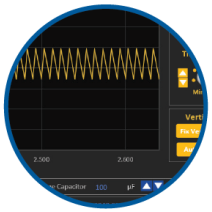
Power Supply Design Center Facebook Group

Power Supply Design Center Articles



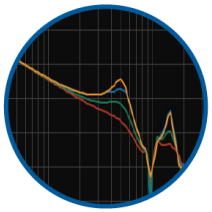


Free Book



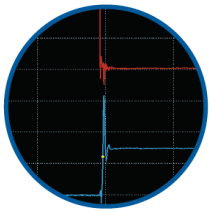
RidleyWorks® Lifetime License

- Power Stage Designer
- Power Stage Waveforms
- Magnetics Designer
- Transfer Function Bode Plots
- Closed Loop Design
- Automated FRA Control
- LTspice® Automated Link
- PSIM® Automated Link



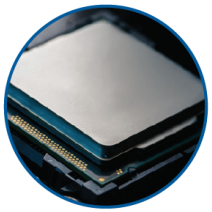
4-Channel Frequency Response Analyzer

- Frequency Range 1 Hz - 20 MHZ
- Source Control from 1 mV - 4 V P-P
- Built-In Injection Isolator
- Bandwidth 1 Hz - 1 kHz
- Automated Setup from RidleyWorks®
- Drect Data Flow into RidleyWorks®



4-Channel 200 MHz Oscilloscope

- Picoscope® 5444D 4-Channel Oscilloscope
- 200 MHz Bandwidth
- 1 GS/s at 8-bit res; 62.5 MS/s at 16-bit res
- Signal Generator up to 20 MHZ
- Computer Controlled



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- Intel® Computer with 32 GB RAM, 256 GB SSD
- Intel® HD Graphics 620
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