N6705A DC Power Analyzer – Simplified Demo Guide

Figures have been taken directly from the Comprehensive Demo Guide, therefore their numbering will be off.

Equipment Required:

- (1) Agilent N6705A DC Power Analyzer mainframe with the following modules installed:
  - **Output 1**: N6762A
  - **Output 2**: N6762A
  - **Output 3**: N6752A
  - **Output 4**: N6773A

This is the standard configuration that is setup in each demo hub worldwide. See Figure 1.

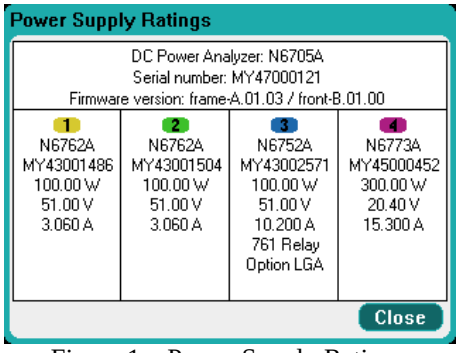

Figure 1 – Power Supply Ratings

GENERAL SETUP

1. Plug the power cable into the N6705A and turn it on.
2. Plug the demo kit cables into their respective outputs on the N6705A mainframe. Cable "1" to **Output 1**, cable "2" to **Output 2**, etc.
   a. Observe polarity – red to red (+) and black to black (–)
   b. The cable labeled "S" should be connected to the "Sense" terminals of **Output 4**, red to +S and black to –S.

DEMO 1: CHARACTERIZE A DC FAN'S CURRENT WITH AMMETER MODE (METER VIEW)

Average DC Measurement

1. Make sure that Switch 1 on the Demo Kit is in the "Fan/Relay" position.
2. Load the "Demo1.state" file. The fan will begin spinning.
3. The current displayed in the yellow section of the Meter View (**Output 1**) is the average current for the fan. Observe that it is ~250 mA.
4. Press the "Meter View" key with **Output 1** selected to see more information
5. Press the "Meter View" key again if you'd like to return to the previous screen.

Demo 1 shows:

- Ease of test setup
  - Color coding of the outputs to reduce errors
  - Large, easy to read, color display shows set values and measured values
- Easy to make accurate current measurements thanks to the integrated DMM (ammeter) functions in "Meter View"
  - No current shunt (aka sense resistor) or current probe needed
  - Fully specified measurement compared to difficult to determine specs when using separate pieces (Voltmeter + Shunt or Scope + Current probe)
- The N6705A has 21 different modules to choose from so you can pick the right voltage, current, power and accuracy needed for your particular test configuration(s).

DEMO 2: CHARACTERIZE THE CURRENT WAVEFORM OF A DC FAN USING SCOPE MODE (SCOPE VIEW)

1. Load the "Demo2.state" file.
2. Use your finger to apply resistance to the fan as it spins to see the changes in the waveform. Compare Figure 8 to Figure 7.

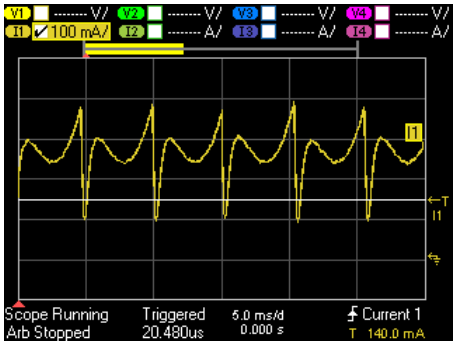

Figure 7 – DC Fan Current Waveform (Scope View)

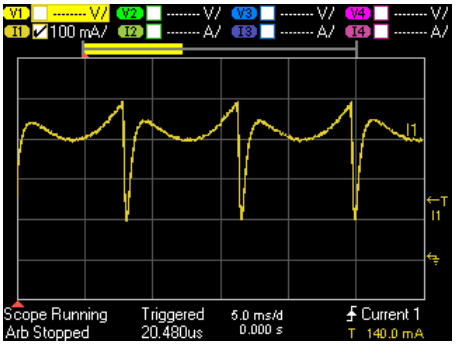

Figure 8 – DC Fan Current Waveform with Resistance Applied (Scope View)

Demo 2 shows:

- How fast and easy was it is to make accurate current measurements vs. time measurements thanks to the integrated scope function?
  - Just press ONE key to see the trace – no additional hardware or wiring
  - No current shunt (aka sense resistor) or current probe needed
  - Fully specified measurement compared to difficult to determine specs when using separate pieces (Voltmeter + Shunt or Scope + Current probe)
- The scope mode operates just like an Agilent Oscilloscope, so that no relearning of new instruments is needed (leverages knowledge)
- How easy is it to save the data?
  - You can save a screen capture (.GIF file) to USB memory to integrate into a report
  - You can save the scope data to recall later
  - You can export the scope data to a CSV file for analysis on a PC (Excel, etc.)

DEMO 3: CHARACTERIZATION OF A COMPUTER CD DRIVE'S CURRENT WITH DATA LOGGER MODE (DATA LOGGER)

1. Press the **All Outputs "Off"** key to turn off all of the power supply outputs
2. Change Switch 1 on the demo kit to the "CD Drive" position.
3. Load the "Demo3.state" file.
4. Start capturing data by pressing the "Run/Stop" key
5. While 30 seconds of data is being captured, do the following:
    a. Turn both **Output 1** and **Output 2** on by pressing their colored "On" keys.
    b. Wait 5 seconds
    c. Open the drive door, then close the drive door
    d. Open the drive door again and insert a CD, if available
    e. Provide resistance to the door when it opens or closes
6. Once data is captured, you can use the "Vertical-Offset" and "Time / Div" knobs to zoom in on the waveform and inspect particular areas for more details (see Figure 11 below).

Figure 11 – Logged CD Drive Current Data

Demo 3 shows:

- How easy is it to make accurate current measurements vs. time measurements thanks to the integrated data logger function?
    - Just press ONE key to see the trace – no additional hardware or wiring
    - No current shunt (aka sense resistor) or current probe needed
    - Fully specified measurement compared to difficult to determine specs when using separate pieces (Voltmeter + Shunt or Scope + Current probe)
- Seeing multiple traces on the same screen shows relationships between data, such as door closing causes 5V logic to activate (drive searching for a disc)
- Data logging typically requires a PC and software
    - With the N6705A everything is integrated – one box solution, no mess of wires, everything is debugged and specified already
    - Fast setup gets results quickly - no programming required.
- It is extremely easy to save the data to the internal non-volatile memory
    - 64 MB of internal memory, more coming soon
        - That's enough for 16Million readings or 30 minutes of data at the max data rate of 1 ms per reading on all outputs simultaneously
- It is extremely easy to save the data externally
    - Max data log size is 2 GB, or 500 Million readings
    - You can save a screen capture (.GIF file) to USB memory to integrate into a report

- You can save the data logger data to recall later
- You can export the logged data to a CSV file for analysis on a PC (Excel, etc.)

DEMO 4: OUTPUT SEQUENCING

1. Press the **All Outputs "Off"** key to turn off all of the power supply outputs
2. Load the "Demo4.state" file.
3. Press the **All Outputs "On"** key to start the sequence
    a. You should see a screen approximately the same as the one shown in Figure 13.
    b. If the output sequence does not show up, repeat Steps 1-3.

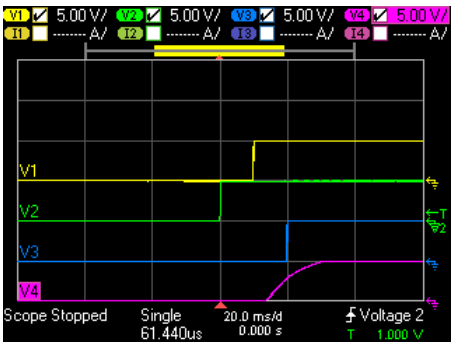

Figure 13 – Output On Delay in Scope View

Demo 4 shows:

- How would you have done this task with conventional test equipment?
    - Multiple power supplies, messy wiring, PC, programming, FET control (extra design work)?
- How long would it have taken you to build, debug, and validate your sequencing system? Days? Weeks?
    - You just did it in less than 5 minutes – no additional hardware or wiring, no software, no PC, no debugging, everything just works
- You can synchronize across multiple N6705A mainframes if sequencing of more than 4 outputs is necessary.

DEMO 5A: ARB – SINE WAVE

1. Press the **All Outputs "Off"** key to turn off all of the power supply outputs
2. Load the "Demo5A.state" file.
3. Start the sine wave by pressing the "Arb Run/Stop" key. The key will be lit when the Arb is engaged.
4. Turn the speaker on by flipping the speaker switch on the demo kit to "Speaker". You should hear a 500 Hz tone.
    HINT: If the tone becomes annoying, turn the switch to the "Off" position.
5. Press "Arb" twice then "Properties" to go back to the Arb Properties screen.
6. Change the frequency to 1000 Hz.
7. Cycle the ARB by pressing "Arb Run/Stop" twice. What happens to the tone?
8. Press the "Scope View" key to return to the scope screen to see the 1 kHz signal.
9. Press the "Scope View" key again to engage the markers. Use the "marker 1" and "marker 2" knobs to look at one period of the waveform.

Demo 5A shows:

- How would you have done this task with conventional test equipment?
    - Function generator doesn't have enough power, power supply with an analog input, PC, programming, custom design (extra design work)?
- How long would it have taken you to build, debug, and validate your Arb?
    - You just did it in less than 5 minutes – no additional hardware or wiring, no software, no PC, no debugging, everything just works
- You can create user defined waveforms for both voltage and current within minutes.
- You can import data points from a PC via USB memory or over the web interface to create waveforms of up to 512 points.

DEMO 5B: ARB – STAIRCASE

1. Press the **All Outputs "Off"** key to turn off all of the power supply outputs
2. Load the "Demo5B.state" file.
3. On the Demo Kit, switch the "Capacitor" and the "Light" on and the "Speaker" off
4. Press the "Run/Stop" key to begin data logging, within a few seconds of beginning the data log, press the "Arb Run/Stop" key to start the staircase function. **Immediately proceed to Step 19.**
5. This should create a fault condition and will illuminate the Fault light on the Demo Kit after approximately 20 seconds. When the Fault light illuminates, press the "**Emergency Stop**" key.
6. Figure 17 shows what the data log should look like. Even though you hit the Emergency Stop key, the data logger continues to capture valuable data.
7. Reset the popped circuit breaker on the Demo Kit by pressing it down.

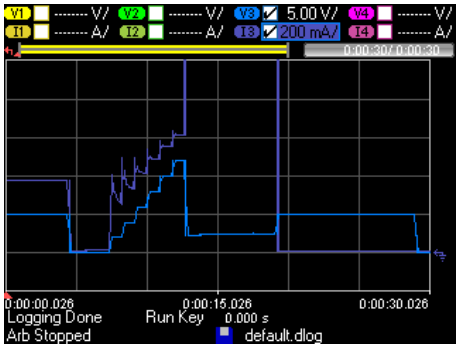

Figure 17 – Stepped Voltage Ramp into a Cap in Data Logger

Demo 5B shows:

- How would you have done this task with conventional test equipment?
  - PC, programming, custom design (extra design work)?
- How long would it have taken you to build, debug, and validate your system?
  - You just did it in less than 5 minutes – no additional hardware or wiring, no software, no PC, no debugging, everything just works
- You can create user defined waveforms for both voltage and current within minutes.
- You can import data points from a PC via USB memory or over the web interface to create waveforms of up to 512 points.
- How would you have handled the fault with a conventional power supply?
  - The Emergency Stop key shuts down all the outputs, but the data logger continues to run saving valuable data.