

Model 2701 Fast Data Rates Using Front Panel Controls

Introduction

The Model 2701 maximum data rate is specified at 3500 readings per second¹. To achieve this rate there are several parameters that must be configured. Not all of the parameters are available through front panel controls. This technical note describes a technique to configure the 2701 for maximum speed with a remote connection and how to save this set up in order to achieve the maximum data rate using the front panel controls at a later time without the remote connection.

Setting Parameters

Four parameters can be controlled from the front panel to configure the Model 2701 for high speed. With this configuration the data rate achieved is about 220 readings per second. These parameters and their settings are as follows:

1. Rate = Fast
2. Range = fixed
3. Filter = Off
4. Delay = Off

But this is not the maximum rate the data can be obtained with the Model 2701. The following additional parameters need to be configured in order to obtain the maximum data rate.

1. Rate = 0.002 NPLC (Fast from front panel is 0.1 NPLC)
2. AutoZero = Off
3. Trigger Count set to 1
4. Sample Count set to 1000 or higher

These parameters are only controlled through software control over a remote connection (Ethernet or RS-232). Once these parameters are set, the entire configuration could be saved in memory. Then this configuration is recalled from memory using front panel controls. The fast 3500 readings/sec rate is now achievable from front panel controls.

The memory is nonvolatile so the parameters remain intact when power is off. Once the configuration is set it will not change unless overwritten with new settings. Up to four different configurations can be saved in memory.

The following is a sample of SCPI command codes to configure the Model 2701 for maximum data rate.

*RST	Reset Model 2701
:SENSE:VOLT:DC:NPLC 0.002	Set 0.002 Line Cycle Integration
:SENSE:VOLT:DC:RANGE 10	Fix range to 10V
:SENSE:VOLT:DC:AVERAGE:STATE OFF	Disable Filter
:TRIGGER:DELAY 0	Trigger delay set to 0.0
:SYSTEM:AZERO:STATE OFF	Disable AutoZero function
:TRIGGER:COUNT 1	Trigger count = 1
:SAMPLE:COUNT 1000	Take 1000 readings for every one trigger
*SAV 1	Save configuration in memory 1

¹ This is the speed of the 2701 mainframe without any switching.

These commands set the Model 2701 configuration for maximum speed. This is only achieved when the memory location is invoked. Once the configuration is downloaded it must be recalled on the front panel in order to obtain the high reading rates.

For example...

1. Press SHIFT.
2. Press SETUP.
3. Use the left arrow and up/down arrows to select the Saved configuration (e.g. SAV1).
4. Press ENTER.
5. Now the configuration is restored.

Maximum speed may not be the exact rate required for some applications. The most important parameter to affect speed is the rate command (NPLC). Table 1 contains some typical reading rates for various NPLC configurations. This is with storing 1000 readings into the buffer and monitoring the elapsed time with the time stamp feature.

NPLC	Readings per Second	Resolution
.002	3500	3 ½
.004	3200	4 ½
.006	2900	4 ½
.008	2600	4 ½
.01	2400	4 ½
.02	1750	5 ½
.04	1100	5 ½
.06	800	5 ½
.08	600	5 ½
0.1	525	5 ½
0.2	280	5 ½
0.5	110	5 ½
1	58	6 ½

Table 1.

All of these rates are approximate and were performed with 60Hz power. Actual rates may vary slightly.

Summary

Model 2701 maximum data rate is 3500 readings per second. This rate is achievable only when the Rate, AutoZero, Range, Trig Count, Sample Count, Filter and Trig delay are set appropriately. Some applications do not require the maximum rate, but require some rate in between. Judicious use of the parameters, especially NPLC (rate), allows a variety of rates and resolutions to be realized.