Comparing N3300A Series Electronic Loads with Earlier Models

Introduction

The Agilent N3300A Series Electronic Loads are compatible in many ways with the previous HP/Agilent 6050B, 6051B, 60501B, 60502B, 60503B, 60504B, 60507B Electronic Loads. This means that in most cases, programs written for earlier electronic loads will run on the N3300A Series Electronic Loads. However, be aware that there are also many differences between the previous version and the N3300A Series loads that will require you to modify previous electronic load programs.

If you are using Agilent N3300A Series Electronic Loads in test systems or with software designed for 6050B, 6051B, 60501B, 60502B, 60503B, 60504B, 60507B Electronic Loads, you may experience some of the differences documented in Table D-1. If so, refer to the possible reason for the difference in the table below for suggestions on what to do about the difference.

It is not the intent of this table to provide an exhaustive list of all the differences between previous version electronic loads and the N3300A Series loads or all possible solutions to problems with previously written software. This table only highlights the areas that affect the behavior of the instrument in normal use.

Table 1: Examples of Operating Differences

Difference Noticed	Possible Reason (see table D-2)
Values read back on the display and over the bus are slightly different than on previous electronic load units.	#1, #2, #3, #4
Values read back on the display and over the bus are significantly different than on previous electronic load units.	#1, #4, #7, #9
Values on front panel display fluctuate more than on previous electronic load units.	#2, #3, #4
Unit unexpectedly turns off; Prot annunciator is on.	#11, #19
Response to analog programming input is different than on previous electronic load units.	#15, #16
Err annunciator comes on when program is run.	#8, #9, #10, #13
Unit under test occasionally behaves unexpectedly.	#1, #7

Table 2: Reasons for Differences

Item	HP/Agilent Series 6050x	Agilent Series N3300A
1. Command Execution Time	70 milliseconds (typical)	5 milliseconds (typical)
	If external equipment is connected to the load, the decreased command execution time of the N3300A Series loads may not allow sufficient settling time for the equipment under test. You may need to insert wait statements in your program if the equipment under test requires a certain amount of settling time after a load change before a measurement can be made.	
2. Voltage Programming and Readback Range	1 range (model dependent): 0-60 volts or 0-150 volts or 0-240 volts	2 ranges (model dependent): 0-6, 0-60 volts or 0-15, 0-150 volts or 0-24, 0-240 volts
	The addition of voltage programming and readback ranges provides 16-bit accuracy with the N3300A Series loads. Existing programs may need to be modified to take advantage of the improved accuracy provided with the additional ranges.	
3. Current Readback Range	1 range (model dependent): 0-10 amps or 0-30 amps or 0-60 amps or 0-120 amps	2 ranges (model dependent): 0-1, 0-10 amps or 0-3, 0-30 amps or 0-6, 0-60 amps or 0-12, 0-120 amps
	The addition of current readback ranges provides greater accuracy with the N3300A Series loads. Existing programs may need to be modified to take advantage of the improved accuracy provided with the additional ranges.	
4. Measurement Mode	Single measurement occurs at command execution.	Multiple measurements at command execution. Average value is returned. Number of samples and time interval between samples is programmable.
	This feature provides greater accuracy and noise immunity when making measurements. The time required to make measurements with the N3300A Series loads may vary considerably, depending on the type of measurement specified. The default measurement settings on the N3300A Series loads are faster than measurements on previous electronic loads.	
5. Programming Accuracy (300W model shown)	Voltage (60V) = 0.1% +50mV Current (60A) = 0.1% +75mA Resistance (1Ω) = 0.8% +8mΩ Resistance (100Ω) = 0.3% +8mS Resistance (10kΩ) = 0.3% +8mS	Voltage (60V) = 0.1% +8mV Current (60A) = 0.1% +12mA Resistance (2Ω) = 0.4% +12mΩ Resistance (20Ω) = XX% +XXmΩ Resistance (200Ω) = XX% +XXmΩ Resistance (2kΩ) = XX% +XXmΩ
	This feature provides greater accuracy with the N3300A Series loads. Existing programs may need to be modified to take advantage of the improved programming accuracy provided with the additional ranges.	
6. Programming Resolution (300W model shown)	Voltage (60V) = 16mV Current (60A) = 16mA Resistance (1Ω) = 0.27mΩ Resistance (100Ω) = 0.27mS Resistance (10kΩ) = 0.027mS	Voltage (60V) = 1mV Current (60A) = 1mA Resistance (2Ω) = 0.02mΩ Resistance (20Ω) = XXmΩ Resistance (200Ω) = XXmΩ
	This feature provides greater accuracy with the N3300A Series loads. Existing programs may need to be modified to take advantage of the improved programming resolution.	

Table2: Differences (continued)

Item	HP/Agilent Series 6050x	Agilent Series N3300A
7. Mode/Range Change Performance	Input turns off between mode and range changes.	Input stays on between mode and range changes.
	This feature keeps the input on when modes and ranges change. This will affect the behavior of the device under test, since the input of N3300A Series loads no longer turns off as was the case with previous electronic loads.	
8. Calibration	Calibration procedure for previous loads is documented in the Operating manual.	Refer to the calibration procedure in the N3300A Series User's Guide.
	Existing programs must be modified to correctly calibrate the N3300A Series loads.	
9. Resistance Ranges (300W model shown)	3 ranges: 0-1Ω, 1-1kΩ, 10-10kΩ	5 ranges: 0-2Ω, 1-20Ω, 10-200Ω, 100-2kΩ
	Resistance transients may not work in some cases. For example if you are transitioning from 1Ω to 1kΩ (in previous electronic loads), the command will not work with the resistance ranges in the N3300A Series loads. You can only transition **within** a specific resistance range (100Ω to 2kΩ for example).	
10. Resistance Slew Rate	1Ω range slew rate uses the value programmed for the voltage slew. 1kΩ and 10kΩ range slew rate uses the values programmed for the current slew.	Slew rates are programmed in ohms/ second. Each resistance range has its own slew rate. Refer to Appendix A in the N3300A Series User's Guide.
	The addition of resistance slew rates provides greater capability when programming input resistance. Existing programs must be modified to correctly program resistance slew rates.	
11. UNR Status Reporting	Applied in constant current mode and in 1kΩ and the 10kΩ resistance mode.	Applies in all operating modes and ranges.
	This feature provides more comprehensive status reporting. Programs that use the UNR status reporting to generate service requests may need to be modified to account for the additional operating modes and ranges that may cause an unregulated status condition to be reported.	
12. *SAV 0 Storage Location	Module settings are saved in individual modules.	All module settings are saved in the mainframe.
	This feature saves all power up settings in the mainframe, not the module. This will cause the modules to behave according to the settings stored in each mainframe when swapped. Previous load modules cannot be installed in N3300A Series mainframes. N3300A Series modules cannot be installed in previous mainframes.	
13. Error Messages	Error messages for previous loads are documented in the Operating manual.	Refer to the error message table in the N3300A Series User's Guide.
	This feature adds more error messages. Existing programs need to be modified to trap the additional error messages.	
14. Query Response	*IDN? and *RDT? = Hewlett-Packard and earlier model numbers.	*IDN? and *RDT? = Agilent Technologies and N3300A Series model numbers; query number formats may also be different.
	This changes the company name and model numbers. Existing programs may need to be modified if the *IDN? and *RDT? queries are used.	

Table 2: Differences (continued)

Item	HP/Agilent Series 6050x	Agilent Series N3300A
15. CC and CV Analog Programming Accuracy (300W model shown)	Current (60A) = 4.5% +75mA Voltage (60V) = 0.8% +200mV	Refer to Appendix A in the N3300A Series User's Guide.
	This feature improves analog programming accuracy in both constant current and in constant voltage mode. Existing programs may need to be modified to take advantage of the improved analog programming accuracy.	
16. CR Analog Programming	Not available	A 0-to-10V signal at the analog programming input corresponds to the minimum to full scale input resistance of the selected resistance range.
	This feature adds analog programming in constant resistance mode. Existing programs will need to be modified to use the analog programming available in constant resistance mode.	
17. List Programming	Not available	Lists containing up to 50 steps can be programmed and downloaded to each electronic load module. They can be run simultaneously in response to an external trigger.
	This feature adds list programming to the current, voltage, resistance, transient, and port functions. Existing programs will need to be modified to use lists. Refer to the N3300A Series User's Guide for details.	
18. Front Panel	Deleted keys Range — Short on/off Tran Level — Tran on/off Slew — Freq Dcycl — Mode	Added keys Ident — Sense Channel — Protect ▲ ▼ Step — π θ List — Trigger Func — Trigger Control
	This feature adds additional keys and menus to the front panel. This results in significant differences in front panel operation between previous and N3300A Series loads. Refer to the N3300A Series User's Guide for more information.	
19. Reverse Voltage Protection	Available on input terminals	Available on input and sense terminals
	This feature adds reverse voltage protection on the sense terminals. Load modules will shut down with reverse voltage on remote sense terminals.	
20. Mainframe RS-232 Connector	Not available	An RS-232 connector is available on the 2-pin user-programmable digital output port is available on the back of the mainframe.
	Existing programs must be modified to use the digital port on the mainframe.	
21. Mainframe Digital Port	Not available	A 2-pin user-programmable digital output port is available on the back of the mainframe.
	Existing programs must be modified to use the digital port on the mainframe.	
22. Module Interconnections	3 ribbon cables including ac line distribution.	1 ribbon cable with no ac line distribution.
	Previous load modules cannot be installed in N3300A Series mainframes. N3300A Series modules cannot be installed in previous mainframes.	
23. Line Voltage Selection	Accomplished via internal switches on the mainframe.	No switching required.
	This feature eliminates manual line voltage selection. The line input of the N3300A Series mainframe is rated from 85 - 264 Vac.	