Using N5747A High-Power Power Supply with the *Medalist* i3070 Series 5

Application Note

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Agilent N5747A high-power power supply

Agilent Medalist i3070 Series 5 in-circuit tester

Overview

This paper documents the information needed to develop and turn on a test program utilizing the new Agilent N5747A high-power power supply on the Agilent *Medalist* i3070 Series 5 in-circuit test (ICT) system. Compatibility on N5747A upgraded system with existing fixtures and test programs will also be discussed.

The N5747A is the latest high-power power supply for the i3070 tester. It is a single-output programmable DC power supply in a compact package, capable of driving up to 50 V @ 10 A (500 W). The N5747A power supply is connected to channel 3 and/or 4 on the Agilent ASRU-N card, or channel 7 and/or 8 on the Agilent utility card.

Agilent *Medalist* i3070 software revision 08.20p (or above) is required.

Agilent Technologies

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ASRU-N Card with N5747A Power Supply

The Agilent 6624A and N5747A power supplies can be assigned across the six channels on the ASRU-N card. Outputs from the 6624A power supply connecting to ASRU-N channels 1, 2, 5 and 6 while outputs from two N5747A power supply connecting to ASRU-N channel 3 and 4 (as shown in Figure 1).
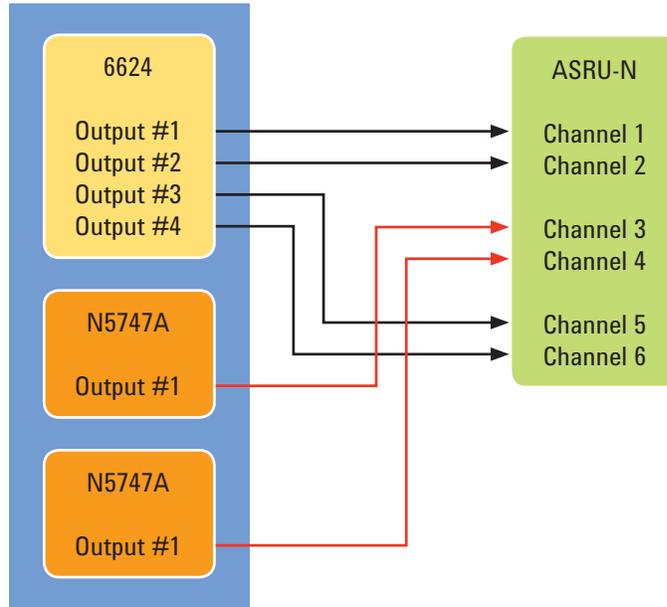

Figure 1. ASRU-N with 6624A and N5747A power supplies

Configuration file declaration for ASRU-N with N5747A power supply

Table 1 shows the new power supply syntaxes for the system and board configuration files needed to reflect the new N5747A power supply connection to the ASRU-N card.

Table 1. ASRU-N N5747A power supply syntax for system and board configuration file.

Module 2	Module 0
supplies hp6624 5,6,19,20 asru channels 1,2,5,6 supplies ps5747 7 asru channels 3 supplies ps5747 8 asru channels 4	supplies hp6624 13,14,23,24 asru channels 1,2,5,6 supplies ps5747 15 asru channels 3 supplies ps5747 16 asru channels 4
Module 3	Module 1
supplies hp6624 1,2,17,18 asru channels 1,2,5,6 supplies ps5747 3 asru channels 3 supplies ps5747 4 asru channels 4	supplies hp6624 9,10,21,22 asru channels 1,2,5,6 supplies ps5747 11 asru channels 3 supplies ps5747 12 asru channels 4

(Note: syntax "ps5747" refers to N5747A power supply)

ASRU-N Card with N5747A Power Supply

The system configuration example below shows the new power supply syntax with two N5747A power supplies connecting to channels 3 and 4 of the ASRU-N card.

Figure 2. System configuration file with N5747A connected to channels 3 and 4 on ASRU-N card.

The board configuration example below shows the new power supply syntax with two N5747A power supplies connecting to channels 3 and 4 of the ASRU-N card.

Figure 3. Board configuration file with N5747A connected to channels 3 and 4 on the ASRU-N card.

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ASRU-N Card with N5747A Power Supply

Board file declaration for ASRU-N with N5747A power supply

There is no difference in the way the N5747A power supply is defined in the board file. The user enters the Node Name, PS#, Voltage and Current Limit under Power Node Options Form in the Board Consultant as shown in Figure 4. The entries will be reflected correctly into the board file.
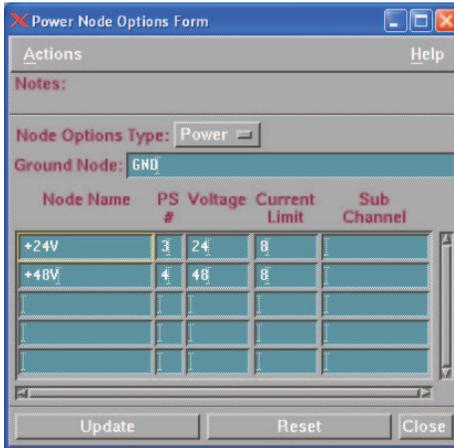

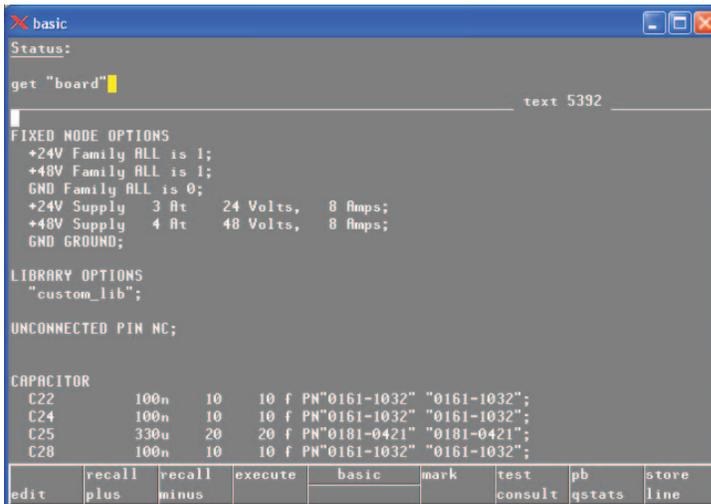*Figure 4. Defining N5747A power supply (connected to ASRU-N) in board consultant.*

Figure 5. Defining N5747A power supply (connected to ASRU-N) in board file.

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ASRU-N Card with N5747A Power Supply

Fixture wiring for ASRU-N with N5747A power supply

After running the test consultant, the user will notice that in additional to the usual six BRC resources assigned for each DUT power supply channel on ASRU-N, there are four additional BRC resources on the second row of ASRU-N allocated for channel 3 and channel 4, as shown in Figure 6.

These additional four BRC resources are connected to the device under test (DUT) power and ground (two pins each) to handle the higher current involved.

IPG will automatically assign all wirings for N5747A connections, and include this information into the fixture file for fixture fabrication.


Figure 6. Fixture consultant view of DUT power supply channels on ASRU-N card.

ASRU-N Card with N5747A Power Supply

Testplan for ASRU-N with N5747A power supply

In the testplan, there is no change in term of "cps", "sps" and "dps" syntax and statements for the N5747A power supply; whatever applies for existing 66xx series power supplies, will apply for the N5747A power supply as shown in Figure 7.
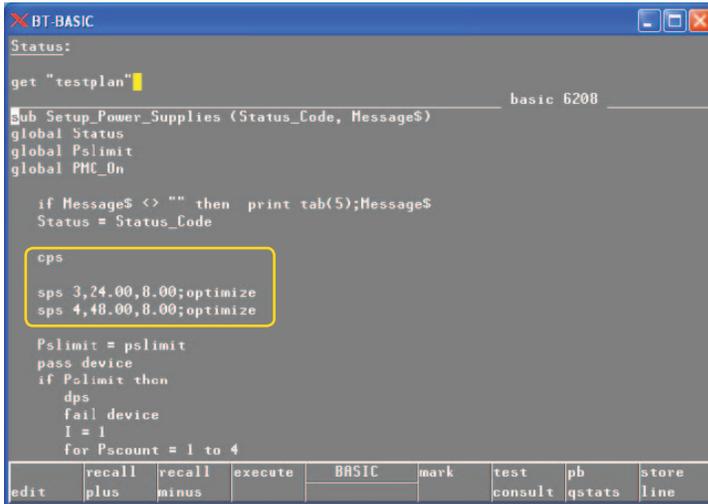

```
get "testplan"
                                                      basic 6208
Sub Setup_Power_Supplies (Status_Code, Message$)
global Status
global Pslimit
global PMC_On

    if Message$ <> "" then  print tab(5);Message$
    Status = Status_Code

    cps

    sps 3,24.00,8.00;optimize
    sps 4,48.00,8.00;optimize

    Pslimit = pslimit
    pass device
    if Pslimit then
        dps
        fail device
        I = 1
        for Pscount = 1 to 4
```

Figure 7. Setup_Power_Supplies subroutine in testplan (N5747A connected to ASRU-N).

Agilent Utility Card with N5747A Power Supply

The utility card provides an additional two channels of high current output. Each channel has six multiplexing sub-channels that are connected together to provide the high current. Alternatively, they can be used to individually power boards on a panelized board. For example, a panel with six boards can be powered using just one channel.

- The additional channels are channel 7 and 8; each has six multiplexing sub-channels.

- Each channel can support 30 V 18 A output (3 A per sub-channel).

- Each channel can be used either for muxed power supply or high current power supply.

- Channel 7 and 8 may be configured differently, but it is not possible to set different voltage levels for the sub-channels within a channel.

- There are two sensing modes: remote sensing and real sensing.

The connection of two N5747A power supplies to the Agilent utility card (channel 7 and 8) is shown in Figure 8.
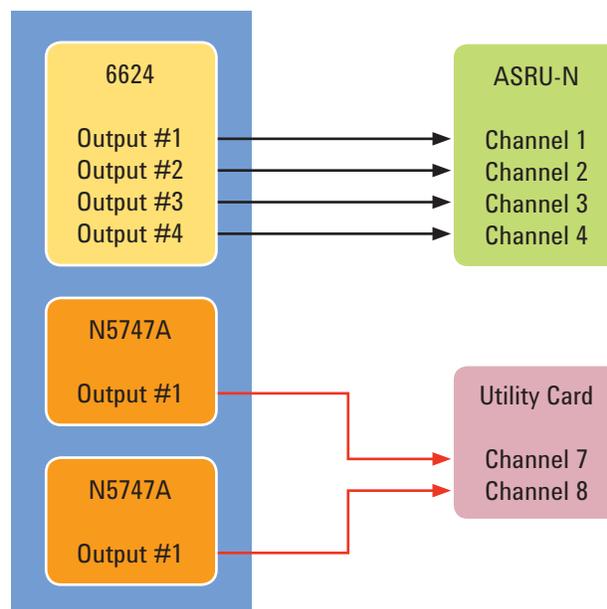

Figure 8. Agilent utility card with N5747A power supplies

Agilent Utility Card with N5747A Power Supply

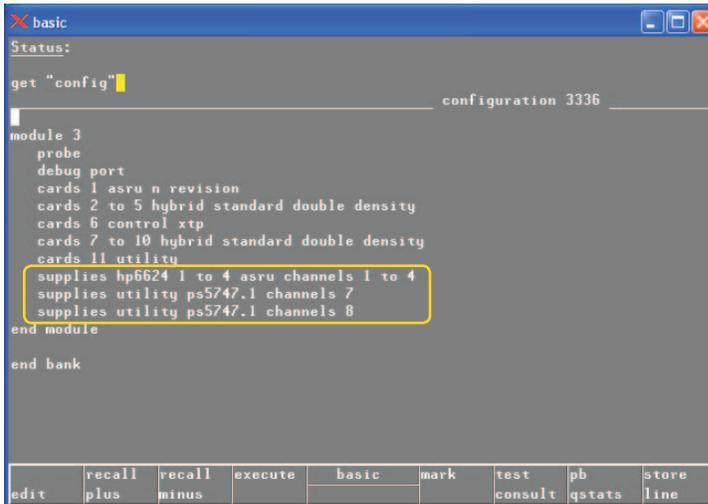## Configuration file declaration for Agilent utility card with N5747A power supply

There are new power supply syntaxes for the system and board configuration files to reflect the new N5747A power supply connected to the Agilent utility card, as illustrated in Table 2.

Table 2. Utility N5747A power supply syntax for system and board configuration file.

Module 2	Module 0
supplies utility ps5747.1 channels 7 (for sys config) supplies utility ps5747.1 channels 8 (for sys config) supplies utility ps5747.1 27 channels 7 supplies utility ps5747.1 28 channels 8 supplies utility ps5747.1 27 channels 7 mux supplies utility ps5747.1 28 channels 8 mux	supplies utility ps5747.1 channels 7 (for sys config) supplies utility ps5747.1 channels 8 (for sys config) supplies utility ps5747.1 31 channels 7 supplies utility ps5747.1 32 channels 8 supplies utility ps5747.1 31 channels 7 mux supplies utility ps5747.1 32 channels 8 mux
Module 3	**Module 1**
supplies utility ps5747.1 channels 7 (for sys config) supplies utility ps5747.1 channels 8 (for sys config) supplies utility ps5747.1 25 channels 7 supplies utility ps5747.1 26 channels 8 supplies utility ps5747.1 25 channels 7 mux supplies utility ps5747.1 26 channels 8 mux	supplies utility ps5747.1 channels 7 (for sys config) supplies utility ps5747.1 channels 8 (for sys config) supplies utility ps5747.1 29 channels 7 supplies utility ps5747.1 30 channels 8 supplies utility ps5747.1 29 channels 7 mux supplies utility ps5747.1 30 channels 8 mux

Agilent Utility Card with N5747A Power Supply

The system configuration example below shows the new power supply syntax with two N5747A power supplies connecting to channels 7 and 8 of the Agilent utility card.
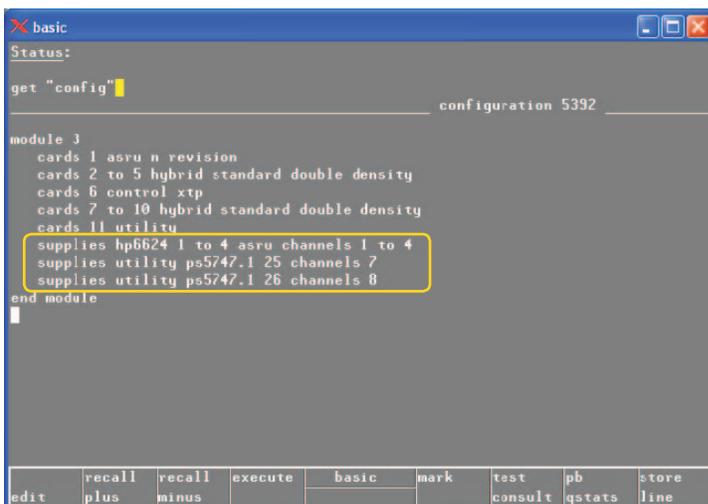

Figure 9. System configuration file with N5747A connected to channels 7 and 8 on the utility card.

The board configuration example below shows the new power supply syntax with two N5747A power supplies connecting to channels 7 and 8 of the Agilent utility card.

Figure 10. Board configuration file with N5747A connected to channels 7 and 8 on the utility card.

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Agilent Utility Card with N5747A Power Supply

Board file declaration for Agilent utility card with N5747A power supply

There is no difference in the way the N5747A power supply is defined in the board file. The user enters the Node Name, PS#, Voltage and Current Limit under Power Node Options Form in the Board Consultant as shown in Figure 8. The entries will be reflected correctly into the board file.

(Note that logical ID #25 & #26 are used, reflecting channels 7 and 8 declared in previous board file)

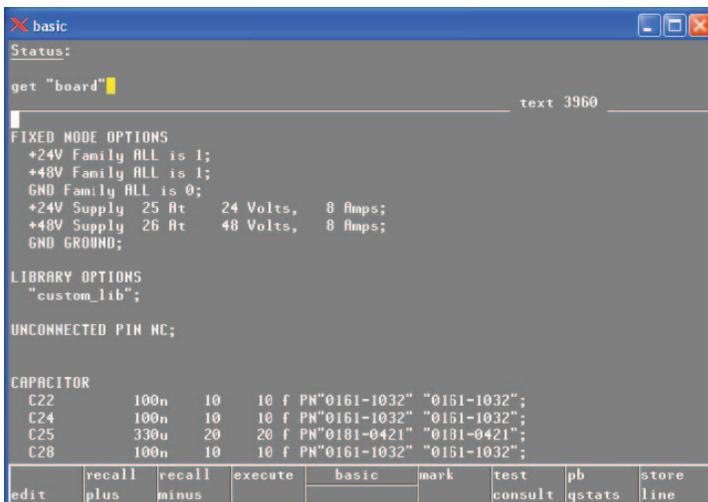*Figure 11. Defining N5747A power supply (connected to utility card) in board consultant.*

Figure 12. Defining N5747A power supply (connected to utility card) in board file.

Agilent Utility Card with N5747A Power Supply

Fixture wiring for Agilent utility card with N5747A power supply

IPG will automatically assign all wirings for N5747A connections to channel 7 and 8 on Agilent utility card, and included into fixture file for fixture fabrication.

The detailed pin-out description for Channel 7 and 8 on the Agilent utility card can be found in Table 3 below.
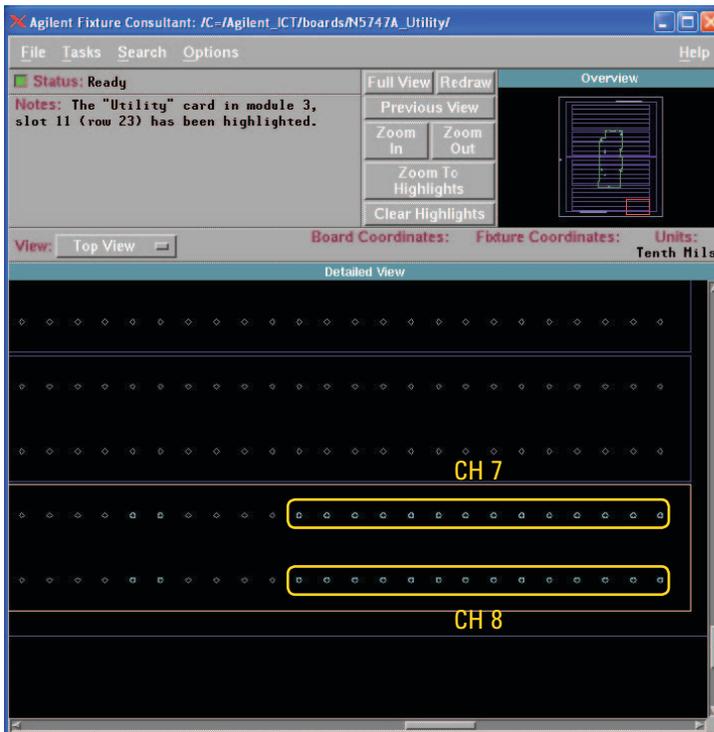

Figure 13. Fixture consultant view of DUT power supply channels on Agilent utility card.
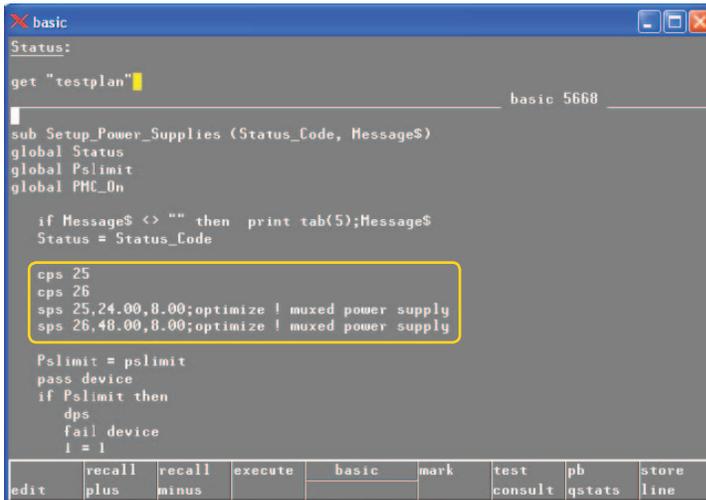
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Agilent Utility Card with N5747A Power Supply

Table 3. Pinout of DUT power supply channels 7 and 8 on utility card.

J1		J2	
Pin	Description	Pin	Description
1	DUT PS Channel 7 Sense Hi	101	DUT PS Channel 8 Sense Hi
2	DUT PS Channel 7 Sense Lo	102	DUT PS Channel 8 Sense Lo
3	DUT PS Channel 7 Hi 1	103	DUT PS Channel 8 Hi 1
4	DUT PS Channel 7 Lo 1	104	DUT PS Channel 8 Lo 1
5	DUT PS Channel 7 Hi 2	105	DUT PS Channel 8 Hi 2
6	DUT PS Channel 7 Lo 2	106	DUT PS Channel 8 Lo 2
7	DUT PS Channel 7 Hi 3	107	DUT PS Channel 8 Hi 3
8	DUT PS Channel 7 Lo 3	108	DUT PS Channel 8 Lo 3
9	DUT PS Channel 7 Hi 4	109	DUT PS Channel 8 Hi 4
10	DUT PS Channel 7 Lo 4	110	DUT PS Channel 8 Lo 4
11	DUT PS Channel 7 Hi 5	111	DUT PS Channel 8 Hi 5
12	DUT PS Channel 7 Lo 5	112	DUT PS Channel 8 Lo 5
13	DUT PS Channel 7 Hi 6	113	DUT PS Channel 8 Hi 6
14	DUT PS Channel 7 Lo 6	114	DUT PS Channel 8 Lo 6

Agilent Utility Card with N5747A Power Supply

Testplan for Agilent utility card with N5747A power supply

For power supply connected to channel 7 and 8 on Agilent utility card, the user needs to **implicitly indicate cps the logical ID** (in this case, cps 25 and cps 26). The "sps" and "dps" syntax and statements are the same as existing 66xx series power supplies (as shown below).

Figure 13. Setup_Power_Supplies subroutine in testplan (N5747A connected to utility card).

Compatibility Discussion with N5747A Power Supply Upgrade

Being able to connect the N5747A power supply to the ASRU-N card or Agilent utility card provides users great flexibility to their system configuration. On top of that, this enables maximum compatibility for existing fixtures and test programs to be run on upgraded i3070 systems with N5747A power supply.
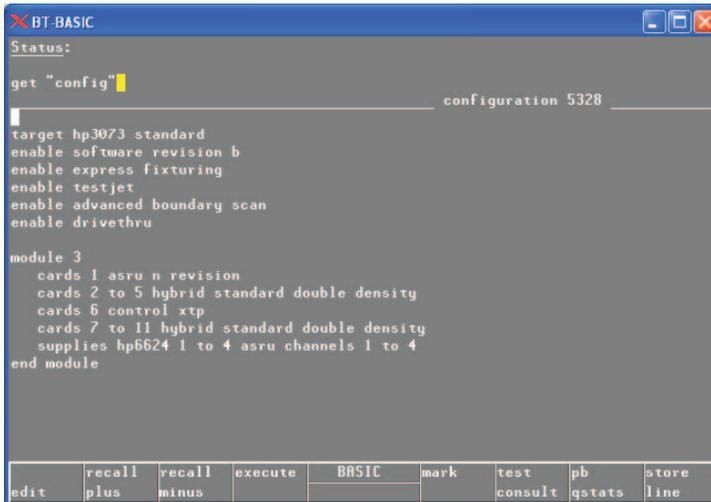
Assuming an existing i3070 Series 5 system is using the 6624 power supply connected to channels 1 to 4 of the ASRU-N card. To maintain maximum compatibility, two modules of N5747A power supplies are upgraded to channels 3 and 4 of the ASRU-N card. Existing 6624 connections on channels 3 and 4 will move over to channel 5 and 6 of the ASRU-N card. In this way, users can continue to make use of their capital investment, utilizing all six channel outputs on the ASRU-N card.

Users can start developing new projects with the new configuration (6624 + N5747A) utilizing N5747A power supplies and subsequently, running production on this upgraded system. The same upgraded system can still continue to run production tests with existing fixtures and test programs which are originally developed based on old configurations with only the 6624 model. Minimal change is needed to make them compatible. To make the existing fixture and test program compatible to run on N5747A upgraded systems, only the board configuration file is required to modify to reflect the new N5747A power supply. The rest of the test program (including testplan) remains the same and most importantly, no change to fixtures is required.

Compatibility Discussion with N5747A Power Supply Upgrade

Test program development and fixture fabrication are done based on board configuration using only the 6624 power supply as shown below.

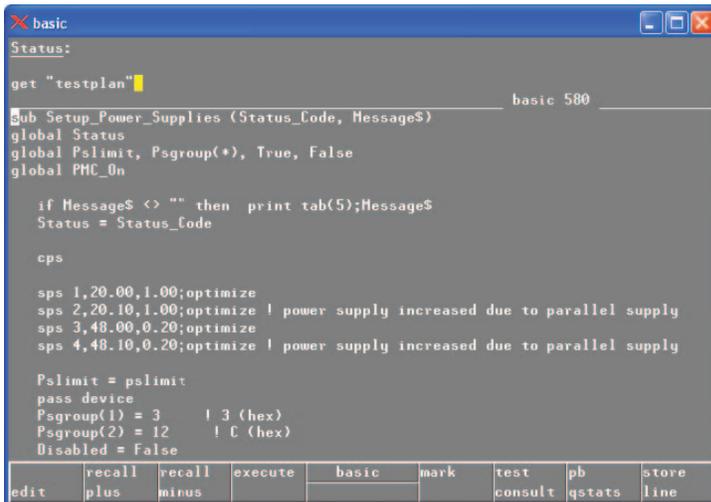*Figure 14. Original (existing) board configuration file with only 6624 power supply.*

Figure 15. Original (existing) testplan with sps 1 to 4 statements.

Compatibility Discussion with N5747A Power Supply Upgrade

With the N5747A power supplies upgraded to channels 3 and 4, the board configuration will be modified as shown below to reflect the new power supplies connection. Re-save and re-compile the board configuration file.
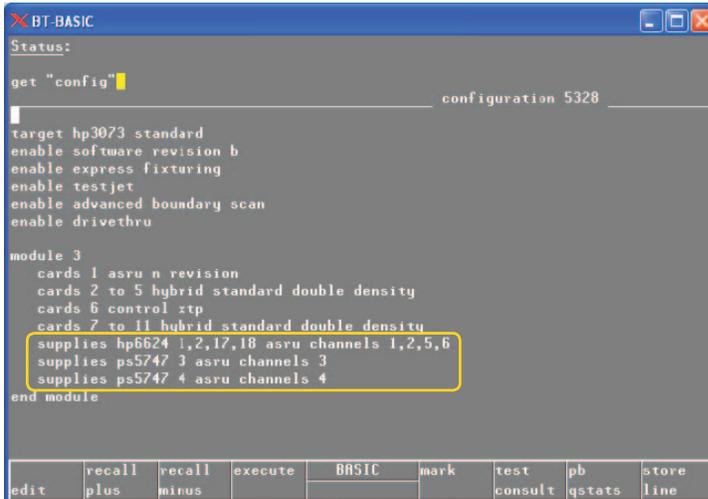
Figure 16. New (modified) board configuration file with 6624 and N5747A power supplies.

The test program now is ready to run on the N5747A upgraded system with existing fixture. The same testplan can be run.

(Reason: The N5747A has better power capability than each output channel of the 6624; there is no issue for the N5747A to drive the existing voltage and current previously set with the 6624 power supply.)

Conclusions

There is no significant difference in developing and turning on test programs utilizing the new N5747A power supply compared with existing procedures for the 6624 model. The only exceptions to note are some new N5747A power supply syntaxes associated with the system and board configuration files.

And in term of compatibility of the N5747A upgraded system when used with existing fixtures and test programs, users should see full backward compatibility (or at least, minimum impact with changes only to the board configuration file).

Overall, there is zero barrier to deploying the new N5747A power supply onto the user's i3070 Series 5 system. This allows users to enjoy better power capability while maintaining compatibility with existing test programs and fixtures, thereby saving valuable time and resources.

Summary Table

Table 4. Summary table for the N5747A power supply.

Item	Changed	Not changed	Comments
System Configuration file	√		New syntax for N5747A power supply. Example: supplies ps5747 3 asru channels 3 supplies ps5747 4 asru channels 4
Board Configuration file	√		New syntax for N5747A power supply. Example: supplies ps5747 3 asru channels 3 supplies ps5747 4 asru channels 4
Defining power supply in board file		√	As per existing declaration. Example: +24 V Supply 3 At 24 Volts, 8 Amps +48 V Supply 4 At 48 Volts, 8 Amps
Power supply statements in testplan		√	As per existing 'cps', 'sps', 'dps' statements. Example: sps 3, 24.00, 8.00; optimize sps 4, 48.00, 8.00; optimize
Power supply wiring in fixture with N5747A connected to ASRU-N card	√		Additional P-Pins installed and wired on 2nd row of ASRU-N for N5747A power supply. Example: ASRU-N in Module 3 BRC 213113 to 213116 (for channel 3) BRC 213119 to 213122 (for channel 4)
Power supply wiring in fixture with N5747A connected to Utility card		√	As per existing connection to channel 7 and 8 on the utility card. Example: On utility card 1st row – pins 1 to 14 (for channel 7) 2nd row – pins 1 to 14 (for channel 8)
DUT power supply cable for N5747A connecting to ASRU-N card	√		New DUT power supply cable to ASRU-N card is required for higher current rating with N5747A power supply.
DUT power supply cable for N5747A connecting to Utility card		√	As per existing Utility DUT power supply cable.

Appendix

Reserved GPIB addresses and device names

Table 5. New ps files for N5747A connection to channels 3 and 4 of ASRU-N card.

Dedicated device	File name (/dev/...)	GPIB address	
		Hex	Decimal
Module 0, ASRU Card channel 3	ps20	C	12
Module 0, ASRU Card channel 4	ps21	D	13
Module 1, ASRU Card channel 3	ps22	F	15
Module 1, ASRU Card channel 4	ps23	10	16
Module 2, ASRU Card channel 3	ps24	12	18
Module 2, ASRU Card channel 4	ps25	13	19
Module 3, ASRU Card channel 3	ps26	14	20
Module 3, ASRU Card channel 4	ps27	15	30

With the i3070 revision 08.20p software, eight new ps files (ps20 to ps27) are added in "C:\Agilent_ICT\dev" folder. These new ps files are dedicated for N5747A power supply connection to channels 3 and 4 of the ASRU-N card in each module.

Remember to set the correct GPIB address on the N5747A power supply module for proper connection.

Refer to the online help manual for a full listing of the reserved GPIB addresses and device names.

Appendix

N5747A power supply connection

(for ASRU-N card)

(for utility card)

N5747A power supply → N5747 short cable → Enclosure with barrier strip → DUT power supply cable → ASRU-N or utility card
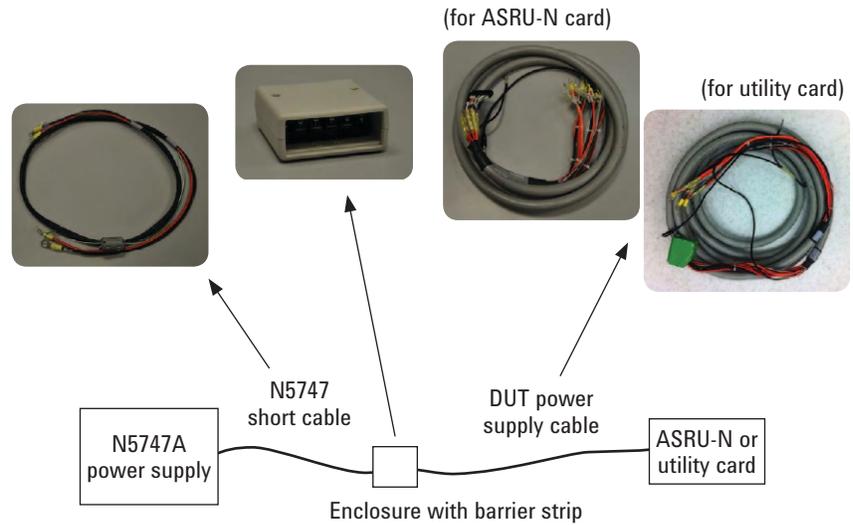
Figure 17. Connection for the N5747A power supply.

The N5747 short cable and enclosure (with barrier strip) is an interface adapter for connection from N5747A power supply to the DUT power supply cable. Each N5747A power supply order will come with the short cable and enclosure. Make sure the correct corresponding DUT power supply cable is ordered as well.

DUT power supply cable

Table 6. 5 by 5 part numbers for DUT power supply cables.

| Use for | Existing | | New | | |
| | All DUT PS except N5747A (with ASRU-C and ASRU-N) | | All DUT PS including N5747A (with ASRU-N only) | | Utility Card |
	Channel 1 - 4	Channel 5, 6	Channel 1 - 4	Channel 5, 6	Channel 7, 8
4-module	E4000-61602	E4000-61602	N1807-61610	N1807-61610	N1807-61600
2-module	E1170-61607	E4000-61606	N1807-61611	E4000-61606	N1807-61604
1-module	E1170-61607	E4000-61606	N1807-61611	E4000-61606	N1807-61604

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Product specifications and descriptions
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