Test Procedure for a UC2000 Controller Assembly: IS2020ISUCG1/G3 (UCIB) or 3VRM (UCIA)

DOCUMENT REVISION STATUS: Determined by the last entry in the "REV" and "DATE" column

REV.	DESCRIPTION	SIGNATURE	REV. DATE
A	Initial release	John Madden	3/30/06
B	Fine tuning most of section 6.2; too many items to list here, but mostly to make test more user friendly: updated to reflect changes to test file names on server, better explanations of functions of test, hints for smoother navigation of GE Control Systems Toolbox	John Madden	8-14-06
C	Added PANA Port A & B diagram & testing instructions, fine tuned process, added new compact flash card process, corrected a few typos	John Madden	5-09-07
D	Added step specifically related to testing AAHA cards as individual jobs, or testing other individual cards that may normally go into an ISUC assembly	John Madden	5-14-07
E	Modified procedure to include re-burning the flashcard at the end, so as not to create a conflict with earlier revisions of Toolbox that may be used by the customer	John Madden	7-19-07
F	Added language pertaining to testing older 3VRMxxxx (DS200UCIA, UCPB) systems	John Madden	8-22-07
G	Changed name of platform selected in dropdown box in step 6.2.1. Changed name of program to select in step 6.2.2.	Frank Howard	8-10-2009
H	Added modification to assembly to keep control card from coming loose during shipping.	M. Starling	6/9/2010
I	Added special note page 5 on part list for DS215UCIBG3AZZ01A	C. Wade	9/14/2010
J	Added comments to 6.4.7 and photo attachments 8.4 showing ARCNET connections and Dip Switch settings on units with DS200PANAG2A cards.	Frank Howard	05/12/16

PREPARED BY John Madden	REVIEWED BY Frank Howard	REVIEWED BY M. Starling	QUALITY APPROVAL *Charlie Wade*
DATE August 22, 2007	DATE 8/10/2009	DATE 6/9/2010	DATE 8/23/2007

1. **SCOPE**

   1.1 This is a functional testing procedure for a UC2000/Innovation Series Control Assy.

2. **STANDARDS OF QUALITY**

   2.1 Refer to the current revision of the IPC-A-610 standard for workmanship standards.

3. **APPLICABLE DOCUMENTS**

   3.1 The following document(s) shall form part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue shall apply.
   3.1.1 **GEI-100599 IS2020ISUC & DS215UCIBG3Azz0#A Troubleshooting Guide**
   3.1.2 **N:\Design Folders\IS2\IS2020\IS2020ISUC\Port A&B Tests**
   3.1.3 **N:\Design Folders\IS2\IS2020\IS2020ISUC**

4. **ENGINEERING REQUIREMENTS**

   4.1 Equipment Cleaning
   4.1.1 Equipment should be clean and free of debris prior to applying power unless performing an initial check. Refer to the local documented procedures for cleaning guidelines.
   4.2 Equipment Inspection
   4.2.1 Equipment should be visually inspected for any defects prior to applying power. This inspection should include the following as a minimum:
   4.2.1.1 Wires - broken, cracked, or loosely connected
   4.2.1.2 Terminal strips / connectors - broken or cracked
   4.2.1.3 Components - visually damaged
   4.2.1.4 Capacitors - bloated or leaking
   4.2.1.5 Solder joints - damaged or cold
   4.2.1.6 Circuit board - burned or de-laminated
   4.2.1.7 Printed wire runs / Traces - burned or damaged

5. **EQUIPMENT REQUIRED**

   5.1 The following equipment is required to perform the process requirements. Equipment may be substituted provided that all accuracy's and test ratios are equivalent or better.
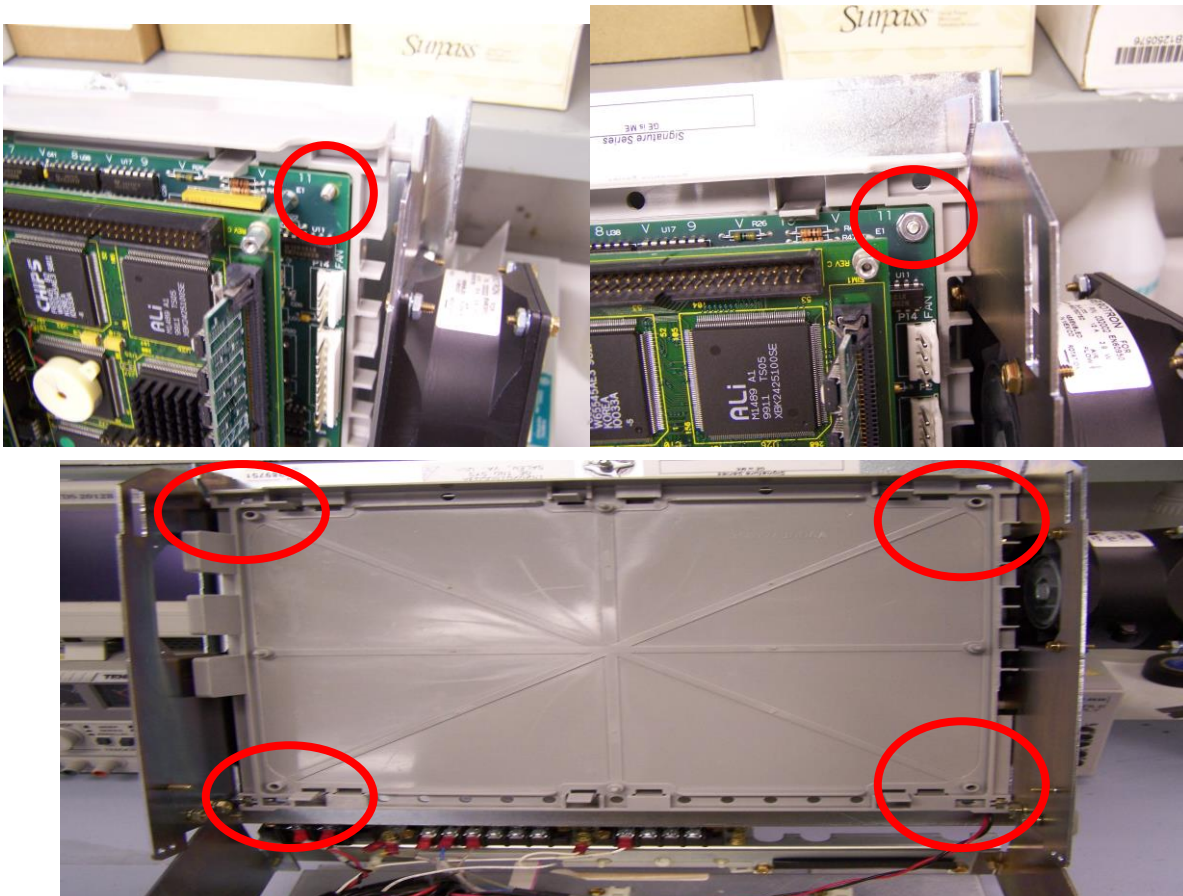
Qty	Reference #	Description
1		Fluke 87 DMM (or Equivalent)
1		PC with Toolbox, SLOADER, and UCIB Product Code and Application Code
1	H188627	UCIB fixture with power supply, AAHA card, and two Genius blocks
1		PC keyboard and monitor (the ones on the above mentioned PC may be used if needed)
1		OC2000 panel (connected through ARCNET)

6. TESTING PROCESS

6.1 Modifications

6.2 New Modification 6-9-2010.

6.2.1 In an effort to reduce shipping damage please performed the following modifications.

6.2.2 Cut nipples off of the four corners, front and back side of the grey card carrier. Leaved all other nipples intact.

6.2.3 Using a scrap card that fits the card carrier, select a drill bit that is the same size as the four corner holes of the scrap card.

6.2.4 Snap scrap board into the carrier and use drill press to drill holes through the four corners of the carrier. The scrap card acts as a guide to keep the drill centered, and to locate holes in proper position.

6.2.5 Remove scrap board and install customers card. Select the appropriate length #6 screw and #6 shoulder nut and fasten customers card to the card carrier.

6.3 Setup

6.3.1 On the OC2000, set the drop dipswitches to 4. There's a note posted inside the unit showing how to do this. See photo in attachment 8.3.

6.3.2 If you are testing a newer style UC, the IS2020ISUC with the UCIB base card, then skip to the next step and proceed with testing. If you happen to be testing an older version of the UC, the 3VRMxxxxxxx with the UCIA base card, then be advised that there are a few differences, mostly pertaining to the IP address flashing, and in which simulator you run in the Control System Toolbox. These units still run the same UC1 test, just as the newer UCIB cards do. They take forever to load software into, and the processor cards are obsolete, so keep this in mind when troubleshooting and/or replacing parts. Where there are differences in the procedure for the two different styles of UC, this will be called out in the particular steps where required.

6.3.3 If you intend to test a complete assembly, go on to the next step at this time. Also, if you need to test a PANA, Flash, WinSys, UCIB, or Genius II card individually, install it at this time into the test fixture in place of the fixture's card, and continue on with this test. If you merely need to test an AAHA card, H1 or H2, then skip down to the **bold-faced note** following step **6.2.5** for quick instructions on how to test just the AAHA card.

6.3.4 **UCIA:** Set the entire unit up next to the UC2000 test stand, and connect Genius, COM1, power, ARCNET, and Ethernet connections to the unit. For the Genius connections, it's best to connect these straight to the UCIA card rather than using the discreet TB connectors on the frame. **UCIB:** Install UCIB card, with it's associated Winsys, PANA, Compact Flash, AAHA, and Genius II cards from the ISUC assy. into the fixture. Connect both power cables, all communication cables such as Ethernet, ARCNET, and Genius to their respective connections. Connect the serial port COM 1 to the PC's COM 1. *The reason for the difference in the two setups has mainly to do with the wiring harness coming up from the power supply card to the UCIA or UCIB card. The connectors are in different locations, and our fixture was originally setup with UCIB in mind.*

6.3.5 **(UCIB ONLY)** Pop the Compact Flash card from its socket. Take it over to (for now) the Mark VI Simplex rack system PC. Click on "My Computer", then "C:\", "Flash Unzip", "Compact Flash", then "Compact Flash" once again, and finally it will bring up a menu of part numbers that represent flash revisions. Slip your Compact Flash card into the little reader sitting on the bench just behind the keyboard, and you should see the red LED light up on top of the reader. Select the revision choice that is closest to what's labeled

on your compact flash card, but try to select the latest revision if ours is newer than what is on the card. For example, if your card has 336A4940BUP2 on its label, then you would select 336A4940BUP3 from the menu. Once you've double clicked on your selection, it will bring another window open, where you will click on the "Write" button. Doing this will bring another open another window, where you will select the part number revision you selected previously, and this should cause the system to begin the flash process. It will continue through two windows that display 0-100% progress bars, and once completed it should bring you back to the Compact Flash window. You are ready to remove the card and install it into your ISUC machine to begin testing.

✍ **Note: Hopefully no one has reconfigured the cabling and/or the PC for testing something different. Consult Robert Duval, Monte Starling, or John Madden to confirm this.**

ALSO: You now need to come back and do this step (6.1.3) once again AFTER you've finished this test, to insure that there are no conflicts with our version of Toolbox and a customer's version. Problems have arisen from us leaving the flashcard programmed using our version of Toolbox and the customer not being able to run or program the unit because their version isn't capable of supporting the newer programming.

✍ **Special Note on assemblies; It is imperative that assemblies go out complete. If the base number is a DS215 you can be sure there is more than one card required.**

DS215UCIBG3AZZ01A assembly has six cards; DS200UCIBG3, DS200PANA, 336A5199, 336A4940, and two IC660ELB912. Check MRP for proper list.

6.4   Testing Procedure

6.4.1   Turn on unit. When using the test fixture **(UCIB)**, be sure to turn on both switches, otherwise you will not be powering up the Genius blocks. Pull up the program with the SLOADER icon on the black PC. Set TCP/IP to match the test system using **192.168.1.188**. In SLOADER, click the "TCP/IP Settings" button, **and be sure to select IS2020ISUC** in the "Select Platform" drawdown box. Then change whatever numbers are in the **IP Address** and **Router IP** boxes to **192.168.1.188** and click "OK". Now check the "Configure TCP/IP" box, click on "Start Command", and follow the instructions in the window below the "Start Command" button. It should go through and tell you to "Cycle power on the target". This puts the number into the Flash memory. **Any failure at this point can be due to a bad/misadjusted PANA card, bad Winsys card, bad Flash, or wrong size Flash card installed into unit.** See section 7 Notes that cover

these items before continuing in such cases. **When testing a UCIA, select DS200UCPB** in the upper drawdown box. You will use **192.168.101.122** for your address, and you will check all four empty boxes so that they all have check when you click on the "Start Command" button. It will prompt you to restart the machine AFTER you click "OK". Be sure to have the machine powered down and don't turn it on until **AFTER** you've clicked "OK"! This is the longest part of the test. It should say something like "waiting for CTS", and then it should come up with a progress bar. The flash load process on a UCIA is _murderously_ slow, sometimes a half hour. You should be prompted to reboot after it's done. Be sure to do so. If the TCP/IP took, then you are done with SLOADER. You don't need to close it out, just minimize it.

✍   **Note: This step loaded TCP/IP address to the unit's flash memory through the serial port so that it can accept application code (drivers), product code, or whatever else through the Ethernet when the time comes. By doing this you have verified function of serial port COM1, the flash card (UCIB), and a big chunk of the WinSys card. If this step failed, then those are the items to look at. One other thing you can do after loading the IP Address is to go to the pc's command prompt and type in the command "ping 192.168.1.188" for UCIB ("ping 192.168.101.122" for UCIA) and see if it is successful in getting a return from the unit under test.**

6.4.2   Now you are ready to bring up Toolbox. **UCIA:** From Toolbox, go to N:\Simulators\SIM004_11-5, and open up SIM04. This should open up a standard Toolbox window. Click on "Device", "Download", then "Product Code (Runtime)". Click "OK", then once unit is done downloading reboot it. After rebooting, you should be able to do a "check and build". By this I mean clicking on the button on the upper right with a checkmark. The window at the bottom should come back and say something like "Validation complete with 0 errors and 0 warnings." Next you'll click on the button next to the checkmark, the one with a hammer and ruler in it. It will bring up a "Build Option" window, where you will click "OK". In the window at the bottom of the page you should eventually see "Build completed with # records & 0 errors. –SUCCESS". **Reboot the unit**. Now click on the red Download arrow button. In the window that opens, un-check the box next to Download Compressed Controller File and then click "OK". You should now be able to go online (the button in the upper part of the screen with the two yellow plugs that are pointing at each other.) You may test the ARCNET by opening the OC1 file in the same directory you've been using, and clicking the red download arrow in that window.

6.4.3 **UCIB:** You will need to match the UCIBG#AZZ0# icons to the particular revision UCIB board in your unit. Basically, G3 units have only one Genius module, G1 units have two. (If you chose the wrong one, you may not see the second Genius module power up.) With toolbox up, look under **N:\simulators\UCIB.Test**, and then select either UCIBG3AZZ**01** or UCIBG3AZZ**03**. Under each option, you shall find another file starting with **LOU-GED-IS200ISUC**—followed by the version you just selected. Open this file, and there should be at least three options: the UCIB window (renamed **PMTST-for Product & Application code.ucb**), the OC2000 window used for ARCNET testing (named **OC1-for ARCNET.ocb**), and the final test screen window (renamed **Genius & DLAN.grw**). You may open all three of these, but for now minimize the Genius & DLAN window (identified by the grey box with a green "Start Test" button); and minimize the OC2000 window (characterized by the red type on the left column and the nearly blank right side box area). This leaves you with the PMTST window.

✎ **Note: G1 units have two Genius cards, and G3 units have only one Genius card. Select the correct file before loading it into the flash.**

6.4.4 The first thing to do is download your drivers, otherwise known as "product code". Click on the button in the upper part of the screen labeled "Device". When it opens, click on "Download", then "Product Code (Runtime)", then "Select.DNL". Then click the button "OPEN", then "OK". A window will pop up prompting you "Would you like to Reboot?" select "**NO**", then manually cycle power on the unit under test. Give the unit a few minutes to boot back up, watching the led array on the UCIB card. Usually it will reach a point where it will give a "scanning" display, have 4 in a row light up then go out, or 3 separate lights that flash together. This tells you it's going through the boot process and should be just about ready to continue. Give it another minute or two to finish, and then proceed.

✎ **Note: This section also used the serial port COM1, but loaded the drivers so the unit under test can use its Genius, ARCNET, and Ethernet capabilities. Any failures here would likely be either the flash card or the WinSys card.**

6.4.5 Application Code. Still in the same Toolbox window as before, you will now need to download the application code. First, validate your build by clicking the button with the black checkmark (this button will only be available if you have first highlighted the title or headline in the left column). After clicking the checkmark button, the window at the bottom of the screen should display "Validation complete with 0 errors and 0 warnings."

This would be a good thing. Next, you need to do a "build" by clicking on the button next to the checkmark button, the one with the hammer and ruler in it. It will bring up a "Build Option" window, where you will click "OK". In the window at the bottom of the page you should eventually see "Build completed with # records & 0 errors. –SUCCESS" So far so good. Now it is time to actually *download the Application Code to the unit*. Click on the download button, the one with the red arrow pointing downward. It will bring up the "Download Application Code" window where you will click "OK". A warning window will pop up, where you'll just click "YES". It should soon thereafter display "Download Complete". **Be sure to cycle power to the unit before continuing**.

6.4.6   Now you can go online (**Ethernet**) by clicking the button with the two plugs whose cords turn into arrows pointing in opposite directions (should be next to the red arrow download button you just clicked). Once it goes online, you should see green "Control" and "Equal" windows appear in the bottom right of the screen. Sometimes you may see a yellow "Minor" difference window appear in place of the green "Equal" window. In this case, just go offline (clicking the same button you used to go online), cycle power to the unit under test, and once it's booted back up, go online again and it should clear up the issue.

 ✎   **Note: If it went online and everything's fine, then you just tested the Ethernet function of the AAHA and the WinSys cards.**

If you are testing only an AAHA card, then simply install it in place of the test fixture's AAHA card. If yours is an H1, then connect both ARCNET coax cables, the Ethernet coax cable, the Molex-style connectors, and the ribbon cable. Power unit up and run tests outlined in steps 6.2.5, 6.2.6, & 6.2.7. If it passes, then the card is good. You may wish to verify that the fixture passes these tests, just to be sure you can isolate any potential failures to the customer's AAHA card.

IF, by chance, you have received an H2 version of the AAHA, then take note that it has deleted the connections for Ethernet. By plugging in the remaining connections from the fixture's AAHA card, you will still cause the fixture to lose Ethernet because you must take power away from the Fixture's AAHA card. The fix for this is to plug a 10base-T (telephonic) Ethernet cable directly into the WinSys card, and set jumper J35 to 0 (open). You must reboot the unit for the change to take effect, but once it reboots it should treat the AAHAH2 card as an ARCNET-only device, while retaining Ethernet communications through the 10base-T cable. Now, just as you would for the H1 card, perform steps 6.2.5, 6.2.6, & 6.2.7 to verify the functionality of the AAHA card. Be sure to set things back to where they were originally when you're done. You may even wish to retest the fixture itself in its original configuration afterward, since these machines can be finicky.

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Page 9 of 15

6.4.7 Now it's time to change to the next Toolbox window. But, before doing so, take a moment to ensure that all the jumpers on your PANA (ARCNET) card are set correctly for the particular port you are using. The easiest thing to do for testing purposes, since you should be sending the unit out configured for Port A, is to test it using Port B first, then reconfigure it for Port A and leave it there afterward. Refer to section 8 ATTACHMENTS of this test, step 8.2 in particular, for a visual reference of where the jumpers go to set it up for Port B. This section will also show the ARCNET and dip switch settings for G2 PANA card. Once this has been done, click on "Window" at the top of the screen and select the OC2000 window (**OC1-for ARCNET)**. Make sure the OC2000 panel is hooked up to the ARCNET and is powered up. It should be displaying "**0?00?00am**" or "**<oc1**" in the Diagnostic Monitor window. That's ok it it's not, because you're going to click the Download button (the one with the red arrow pointing downward, just as before) and you should see the OC2000 panel respond by displaying a download progress bar. Make sure "OC1" is highlighted in the left column (menu) of Toolbox before downloading. You may find it necessary to do another Build and Check before this step works. Once complete, it should then display the "0?00?00am" or "<oc1" you were looking for earlier. Now, go back and reconfigure the PANA card to test Port A, and refer to figure 8.1 to see where the jumpers go. Repeat this test step from the point of clicking on the Download Button once again, and the OC2000 panel should respond just as it did before.

✐   **Note: If the OC1-for ARCNET step worked, then you just successfully tested the ARCNET function of the AAHA, PANA, and WinSys cards.**

6.4.8 Now go to the third Toolbox window by clicking on "Window" and selecting the third option, **Genius & DLAN**. This should bring up the grey box titled "Innovation Series Controller Module" that has the aforementioned green "Start Test" button. Click on this button. It's going to test the Genius block connections, then it will test the OC2000 connection and prompt you to press the blinking light/button on the OC2000 panel. Press the button within the allotted time and you should see "Test Complete" appear. Feel free to repeat this step of the test as many times as you like. You are now finished testing the cards, and you can reassemble the unit into its metal case and retest again from this point. Be sure to do this, as many of the failures experienced on these machines are either power supply (blue three legged caps!) or AAHA card failures. Remember, if you plug the Genius cables directly to the UCIB board you will still need to

flip the switches on the fixture on so the Genius modules will have power, or you'll fail the last test. Good Luck.

✏ **Note: This last step tests the Genius cards and the UCIB card and the ARCNET again. G1 units have two Genius cards, whereas G3 units have one Genius card, as you learned in step 6.2.2. You will see the difference in this step, as it should have either one or two Genius test results listed on the screen before prompting you to push the blinking button on the OC2000.**

DON'T FORGET TO RE-FLASH THE FLASHCARD AGAIN, AS YOU DID IN STEP 6.1.3!!!!!

6.5   Post Testing Burn-in   Required   ___ Yes   _X_ No, but recommended.

✏ **Note: DO NOT burn unit in without having a fan blowing across the Winsys card! For that matter, it should always have an auxiliary fan running on it at all times just for extra insurance. Either reinstall unit into its metal case with functioning cooling fan, or place a fan in close proximity so that it blows across the Winsys card and it's processor. All your hard work will go up in smoke if you let the Winsys card overheat and burn out the processor…**
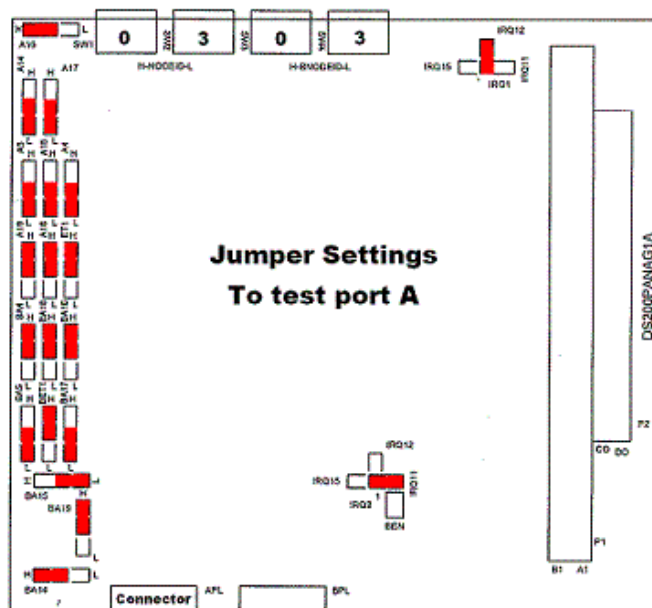
6.6   ***TEST COMPLETE ***

7.   <u>**NOTES**</u>

7.1   **{*NOTE: This note (7.1) was written before we had the visual representation of the PANA jumper settings to include in this test, but the note is left intact for informational purposes. Simply refer to 8.1 & 8.2 for PANA jumper guidance (JLM, 5-9-07).*} PANA card: Addressing and jumpers on the PANA card are critical to the success of this test. You can refer to the Card ID PC and look up UCIB testing in the MENU options by typing MENU at the C:\JOBS\CARD_ID prompt. It will bring up some test settings, and by hitting ENTER you will eventually come to a screen listing the jumper and LAN drop settings of the PANA card. The jumper settings will be correct. DO NOT USE THE LAN DROP SETTINGS LISTED AT THE TOP OF THE PAGE! The LAN drop settings for the white dial indicators on the PANA card are to be as follows: SW1=0, SW2=3, SW3=0, & SW4=3. It is NOT 3-1-3-1 as stated in the menu list.**

7.2   **{*NOTE: This note (7.2) was originally written before we had the ability to directly flash Compact Flash cards separate from the ISUC machine, but it is left intact in this test procedure for informational purposes (JLM, 5-9-07).*} Checking BIOS and making changes, as in which size FLASH module it is to have: To determine what size FLASH module the unit is setup to recognize, or to change this setting, you must enter SETUP just like you would on any Windows equipped PC. First, you must connect a monitor and keyboard directly to the UCIB card. There should be a white adapter cable labeled "Monitor" that plugs into J27 and converts it to the proper D-shell connector for a**

standard monitor to plug into. Depending on the particular style keyboard you use, you may or may not need to use an adapter pigtail to connect the keyboard to the large round serial port on the UCIB labeled KBD. Cycle power to the unit. When it boots up, you should see the statement "Press DEL to enter Setup" in the lower right portion of the screen. Pressing DEL at this time will take you into Setup so you can look over or alter BIOS settings. Since we are interested in the Flash capacity, you will need to tab or arrow over to "IDE HDD AUTO DETECTION". The system treats the Flash module just like a hard drive. Most of the time you will be using an 8M flash card, so insert one at this time. At "Select Drive C Option (N=Skip):" type Y for yes and hit enter and it should select the disc inserted into the slot. It will read app. 1M less than the actual size of the flash card, and you will see 0 for partitions, cylinders, etc. For Drive D ("Select Drive D Option (N=Skip)"), type N for no. To verify: select "Standard CMOS Setup" and it should show 7Mb for Drive C and 0Mb for Drive D. Hit ESC, then "Save and Exit Setup", then "Save to CMOS & Exit?" say YES. You may now remove the monitor and keyboard.

8. **ATTACHMENTS**
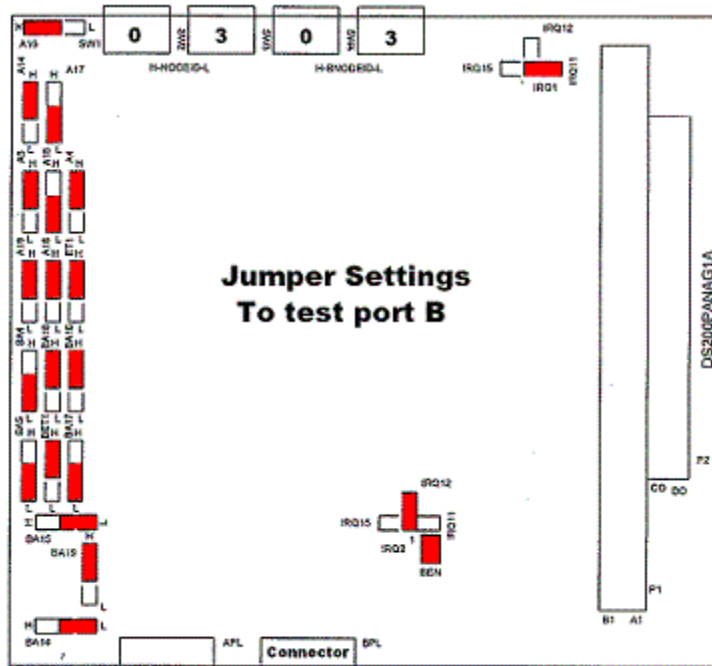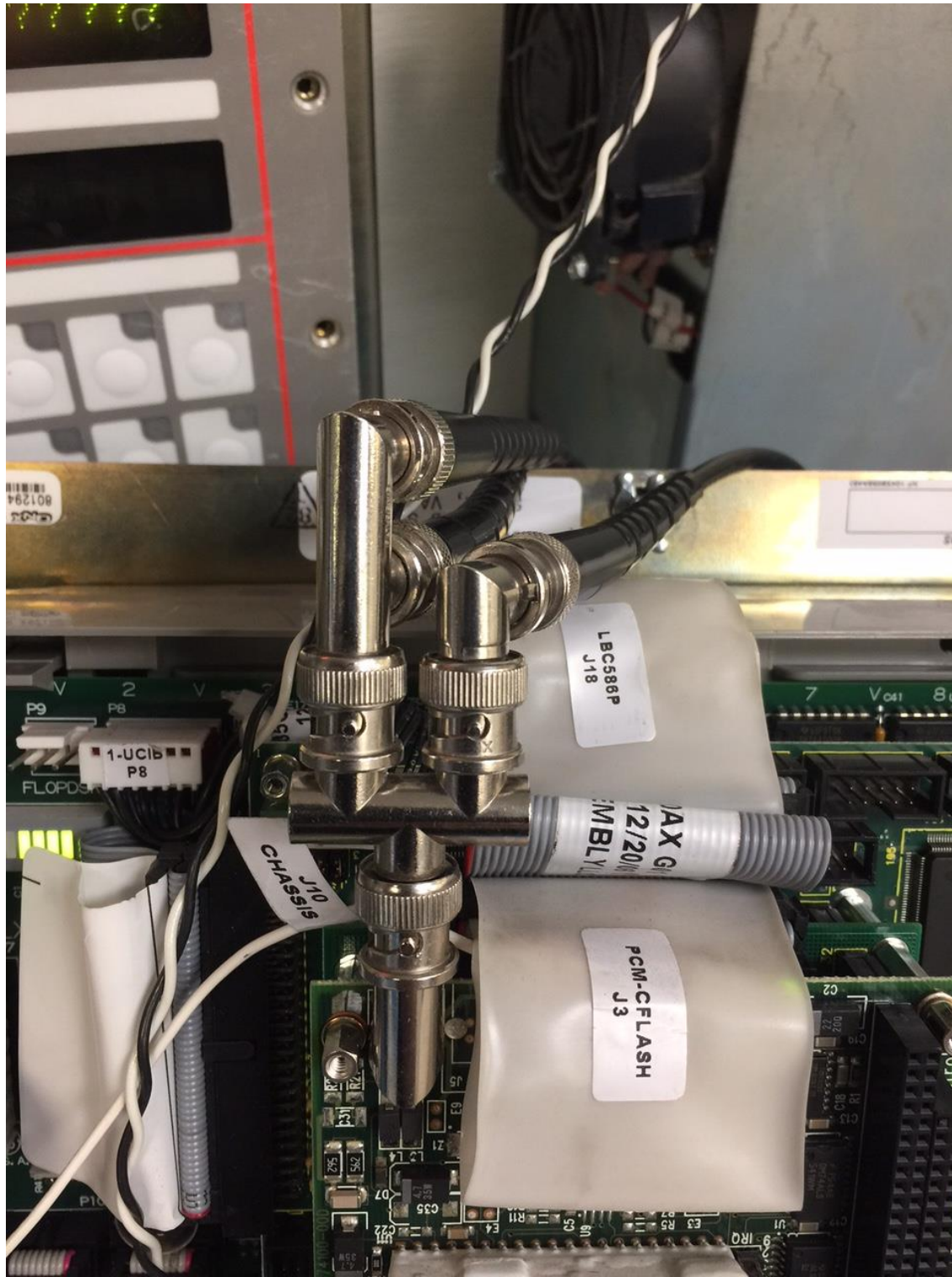

Figure 2. PANA Board Layout

8.1 _____

Figure 2. PANA Board Layout

8.2

8.3

8.4