GE Energy, Louisville, KY
Revision 2.01

IS200MACCH#AE_
BENCH TEST INSTRUCTIONS
USING BOARDLETS
For PWAs THAT HAVE ALREADY PASSED ICT

Multiple Application Converter Control (MACC)

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File Name: MACCh#AD_ BenchTestIfPassedICT.doc

Authors: Terry Tackman / Brian Holzman (Hardware) and Sid Barker (Software)

Louisville re-write: Robert Duvall

1.1.1.1.1.1.1 Revision History

Date	Revision	By	Description
10/18/06	2.01	RKD	Re-write for Louisville use on RR cards
09/15/06	1.05	TMT	Add IP settings & note on BACHMAN cycle power
07/31/06	1.04	TMT	Add CAN bus cable diagram
01/02/06	1.03	TMT	Add possible alternatives for AEPS
07/27/05	1.02	TMT	Misc. corrections
07/01/05	1.01	TMT	Update for AEF boards
02/01/05	1.0	TMT	Remove tests that are redundant to ICT and loads.
10/22/04	0.10	TMT	Modify for H#D_ and groups & versions –removes PLD load & adds ISBUS test.
04/07/04	0.01	SAB	Create from instructions for test that does not use boardlets
04/08/04	0.02	SAB	Modify to account for first trial run
04/19/04	0.03	SAB	Minor corrections resulting from initial uses of procedure.
04/28/04	0.04	SAB	Minor corrections resulting from George Curry's use.
05/11/04	0.05	SAB	More minor corrections and additions per George Curry

1 Circuit Verification

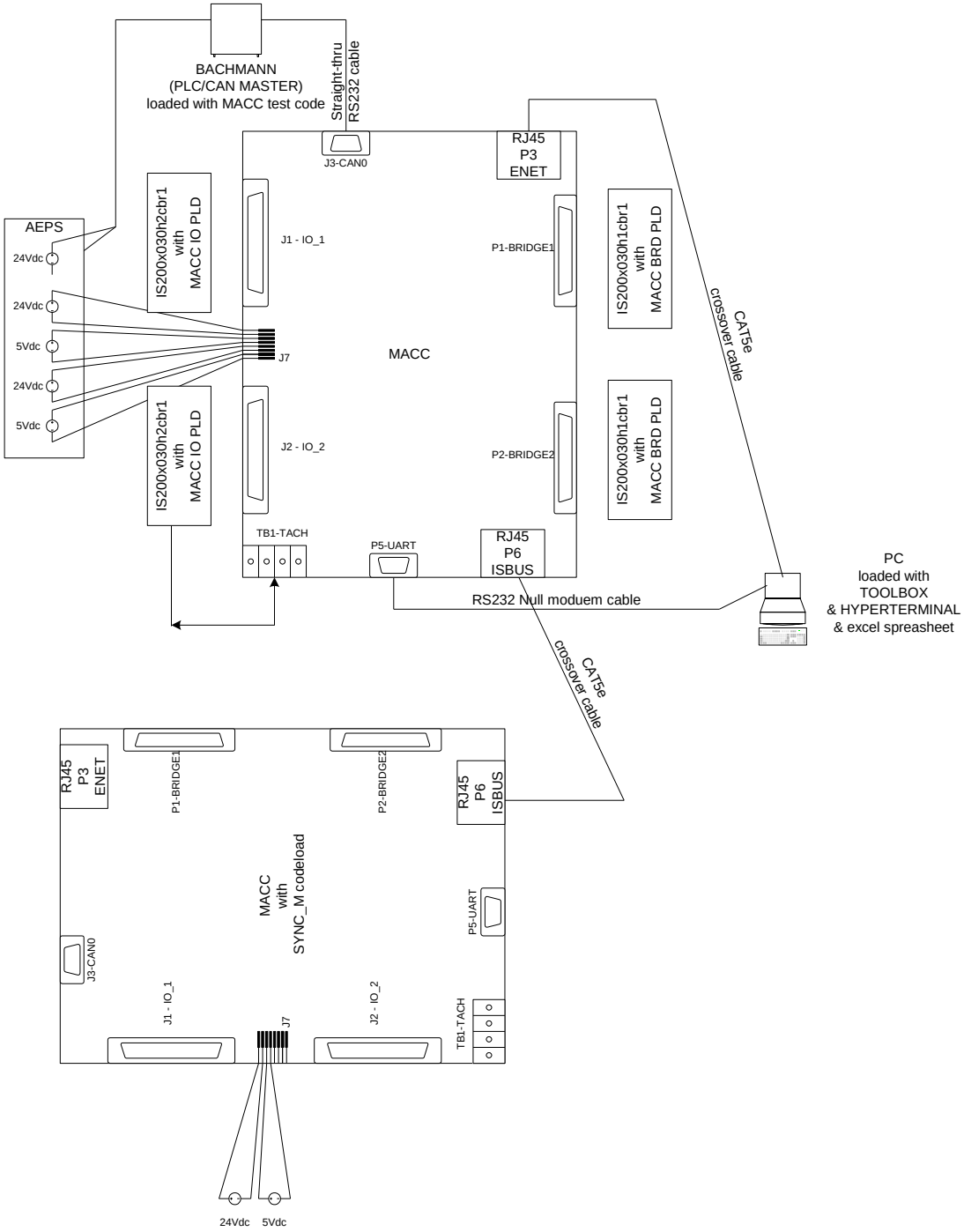
1.2 Power Supply Checks:

1.2.1.1 Plug in the following cables:

CAN0, Ethernet, Power, TACH, and UART

Insert proper BROADLET into P1, P2, J1, J2 (if connector is present).

Use connectors to force BOARDLET into connector, do not shove in using board itself.



1.2.1.2 Apply power to the MACC card.

DS1 (red) should be light.

1.2.1.3 Initial Operation Check via HyperTerminal:

1.2.1.3.1 Start HyperTerminal and verify it is connected.

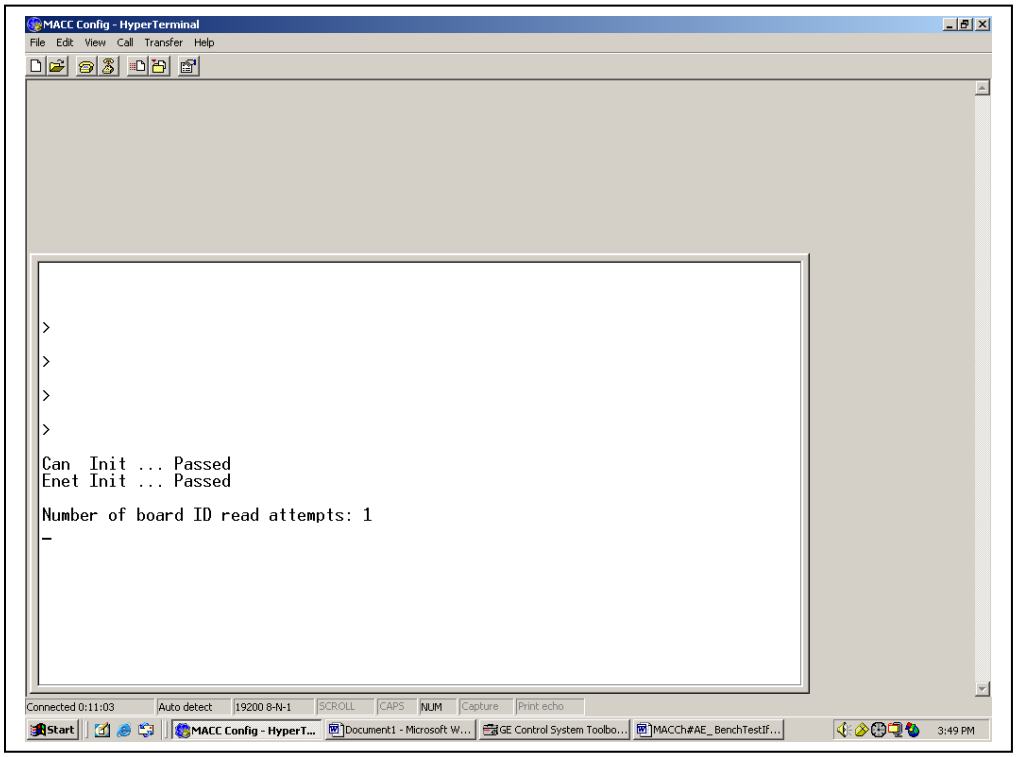
1.2.1.3.2 Reset MACC board (white button).

1.2.1.3.3 Verify that Screen displays: (After several seconds)

Can Init ... Passed (Groups H1 & H2 only)

Enet Init ... Passed

1.2.1.3.4 Disconnect HyperTerminal



2 DOWNLOAD SHIPPING PARAMETERS

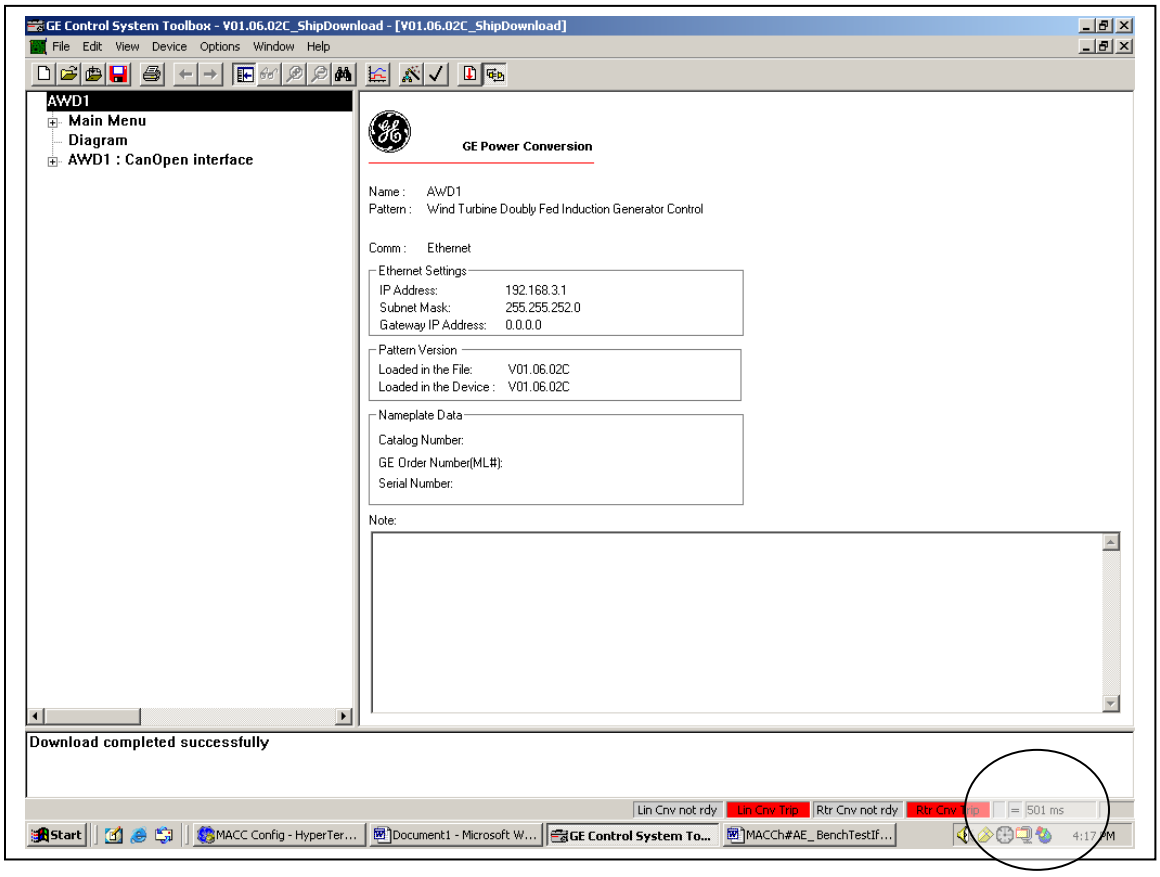
New PWA comes with Wind-DFIG shipping code already loaded – but not parameters – download parameters so can use Ethernet for other code downloads.

2.1 Open toolbox

- Click on Toolbox icon
- Change Priviledge Level to 4:
  a) Click on Options
  b) Click on Priviledge Level
  c) Click on 4
- Password is: gesalem9 <Return>
- Enter your initials <Return>
- Make sure Com: is set to Com2-19200 (if have 2 RS232 COM ports else use COM1-19200).

2.2 Download parameters

1) Click on “File”, then “Open”
2) Open File > **C;\Program Files\GE Control System Solutions\GE Power Conversion\Wind-DFIG\V01.06.02C**
3) Highlight “**V01.06.02C_ShipDownload.wcb**”, and click “Open”
4) Click on “Device”
5) Click on “Download to Device”
6) Click on “Pattern Flash (Runtime)”
7) Click “Yes”
8) Open file, choose “**MACCCODE.ARC**” (takes about 3 ½ minutes to download)
9) Toolbox will go online automatically.
    i. *May need to Double-Click AWD1 and select serial then ok/apply.*
10) Click “Red Down Arrow” on toolbar.
11) Click “Yes” (parameters will download and unit will reboot)
    i. *May need to Double-Click AWD1 and select serial then ok/apply.*
12) Verify “ = “ in status area
13) Verify that the numbers in the box next to the equals sign changes.
14) Go offline.
15) Turn off power.



2.3 CAN0 TEST

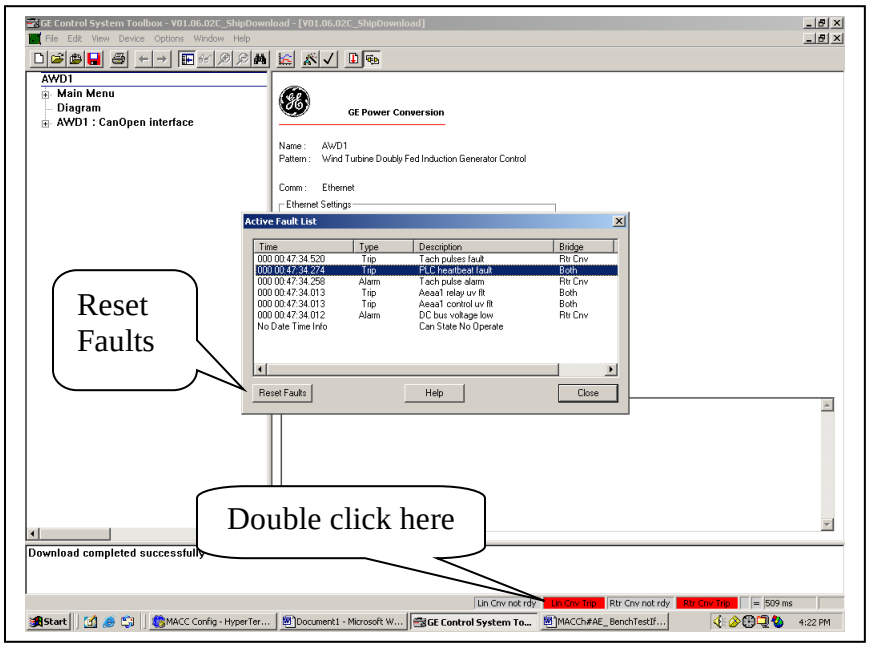
If board group# = H3 skip to step 3

NOTE: In the following, once power is turned on, you need to go online as soon as possible for the test to work properly!

1. Turn power on
2. Immediately go online
3. Double-click on the red Fault Status area of the screen. You should see 1 or more faults, including:

   "**PLC Heartbeat Fault**"

(NOTE: If the above fault does not appear, do not reset the faults or close the window. At the top of the screen, click on "View" and then "Fault history." The missing fault should be there. If so, close the "History" window. Continue with step 4.)



4. Wait for the green light on the CAN Interface Module of the PLC to come on - if fails to turn on after 3 minutes cycle power to PLC
5. Reset the faults and wait for screen to update
6. The "PLC Heartbeat Fault" fault should be gone.
7. Close the Fault box
8. Go offline and close open file.

3 Test Code

1) Close-out “V01.06.02C_ShipDownload.wcb”, if still present (Do NOT save).

3.1 FUNCTIONAL TESTS

3.1.1 Download Test Code File

3.1.1.1 Click on File, then Open

3.1.1.2 Find the following:

C:\Program Files\GE Control System Solutions\GE Power Conversion\Wind-DFIG\Functional Test BoardletsV01.01.79E

If **H1** then:

Click on “**Functional Test Boardlets V01.01.79E.wcb**”

If **H2** then

Click on “**H2_Functional Test Boardlets V01.01.79E.wcb**”

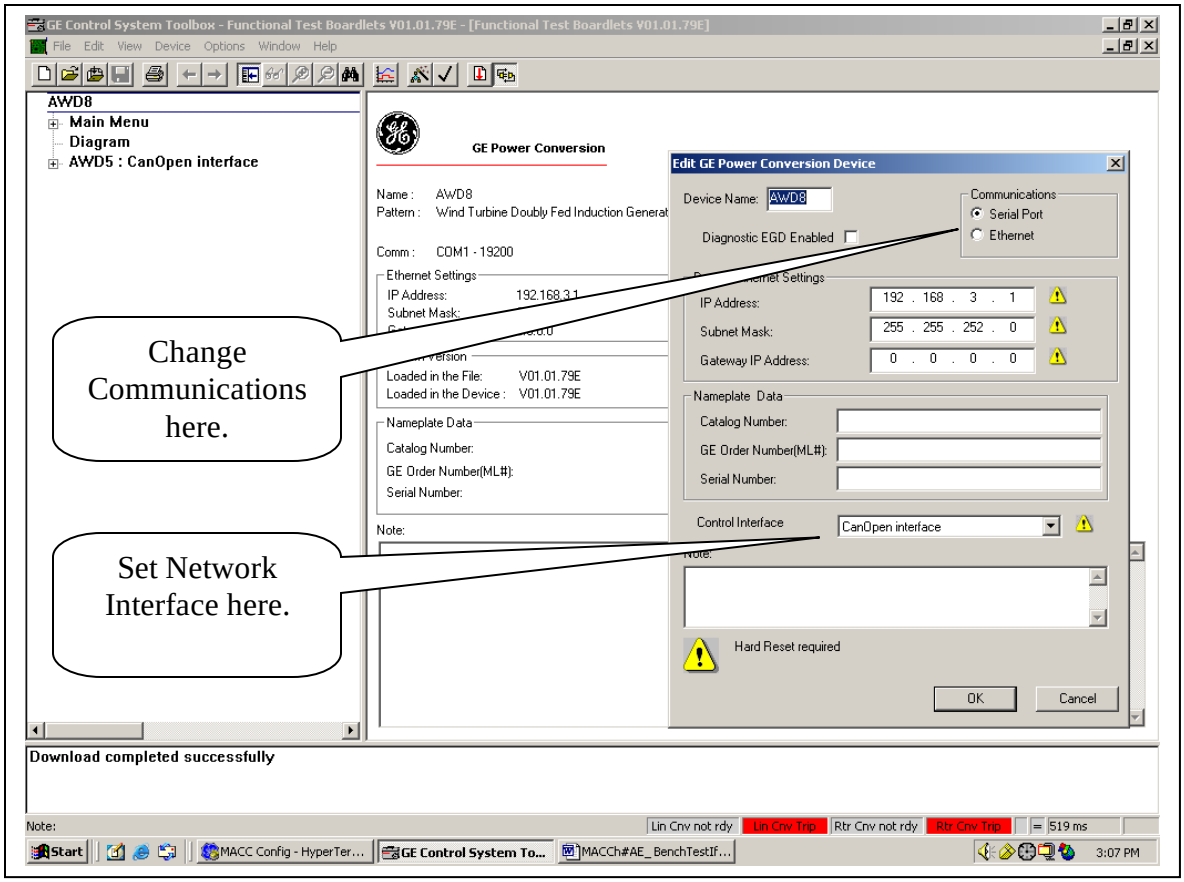
If **H3** then

Click on “**H3_Functional Test Boardlets V01.01.79E.wcb**”

1) Click on “Device”
2) Click on “Download to Device”
3) Click on “Pattern Flash (Runtime)”
4) Click “Yes”
5) Open file, choose “**MACCONLY.ARC**” (takes about 3 ½ minutes to download)
6) Toolbox will go online automatically.

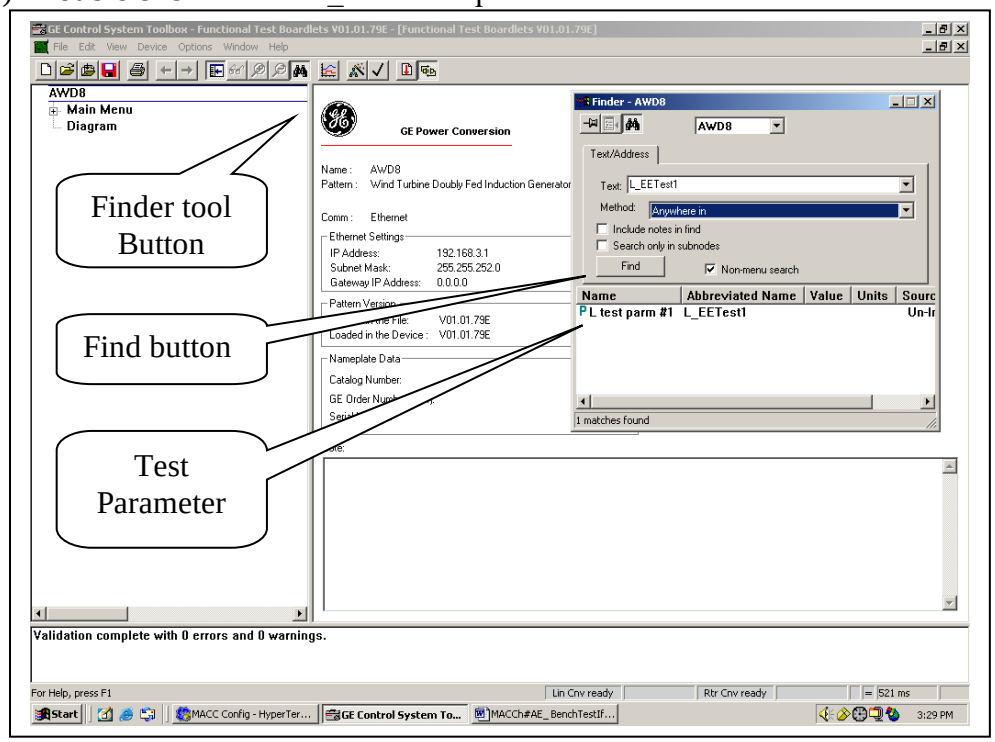
3.1.1.3 Download parameters (red down-arrow)

1) Click “Red Down Arrow” on toolbar.
2) Click “Yes” (parameters will download and unit will reboot)
3) Verify “=” sign at bottom right of screen
4) **Change Communications Interface:**
    a. Double-click AWD8
    b. Change “Communications” to “Ethernet”
5) **Set Control Interface:**
    a. Select “None” in Control Interface dropdown box.
    b. A message box should appear, Click “YES” to continue



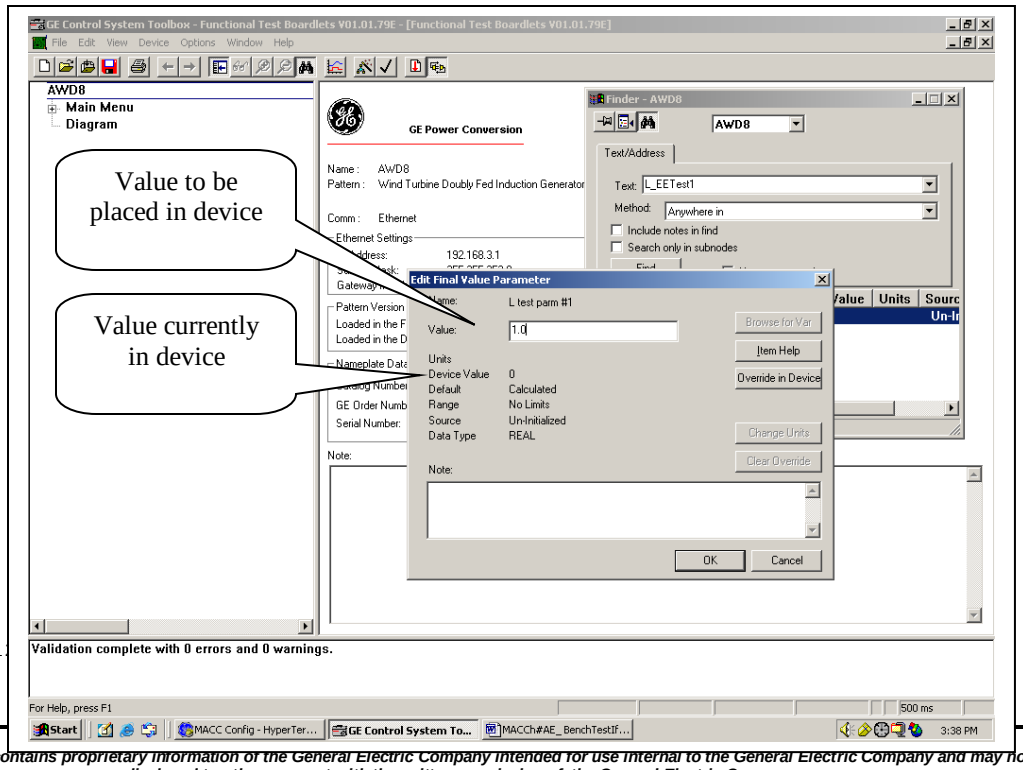
MACC Boardlet Test

1) Click on the “finder” (binoculars) button on the Toolbox toolbar.
2) Verify that the“Non-menu search” checkbox is checked.
3) Type “L_EETest1” in the text search field and click the “FIND” button.
4) Double click on the “L_EETest1” parameter.



Parameter Update:

1) Enter “1.0” in the Value field.
2) Click on “OVERRIDE IN DEVICE”
3) Click on “ok” (The “Device Value” field should update with the new value).
4) Do not close this window.



Boardlet Test Verification:

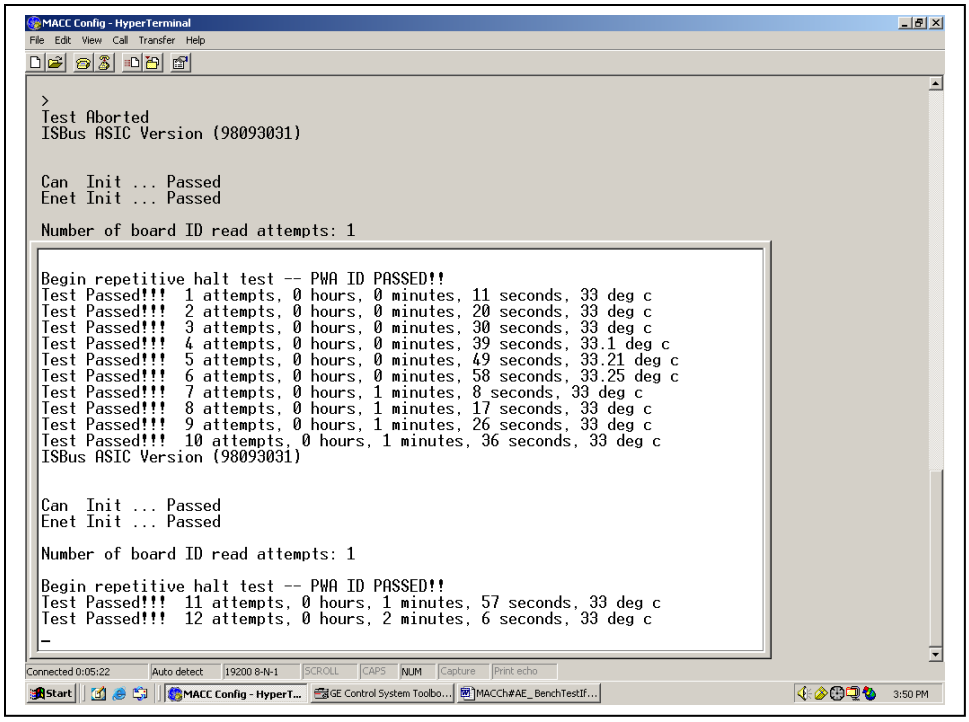
1) Open HyperTerminal session and connect to device.
2) In HyperTerminal, hit the “Enter” key until the “>” prompt is displayed.
3) Type “uq”+”Enter”, then wait 10 seconds.
4) HyperTerminal should display ”Test Aborted”
5) Issue a hard reset to the card using white button
6) Observe card output in HyperTerminal window.
7) Allow the test to progress until it has looped at least 10 times.
8) Verify that there are no failures and temperature is between 22 – 35C

ISBUS ASIC Version (98093031) *If message says **FPGA** instead of ASIC or if **DATE** is incorrect then **REJECT** card – U13, U11, U3, U1, U21, and/or U1 possibly defective.*

Can Init ... Passed (H1 and H2 only)
Enet Init ... Passed

Number of board ID read attempts: 1

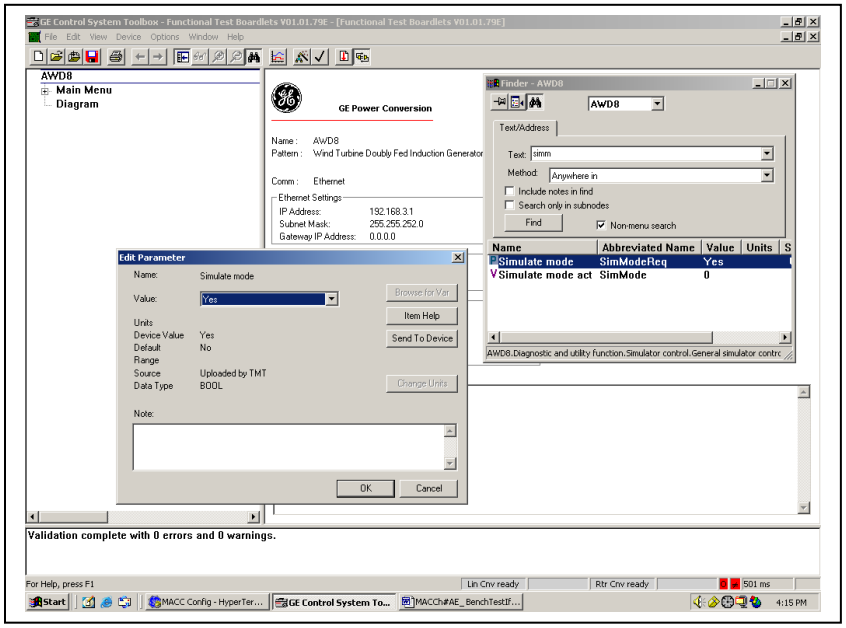
Begin repetitive halt test -- PWA ID PASSED!!
Test Passed!!! 1 attempts, 0 hours, 0 minutes, 11 seconds, 33.21 deg c
..
..
..
Test Passed!!! 10 attempts, 0 hours, 1 minutes, 35 seconds, 33.27 deg c



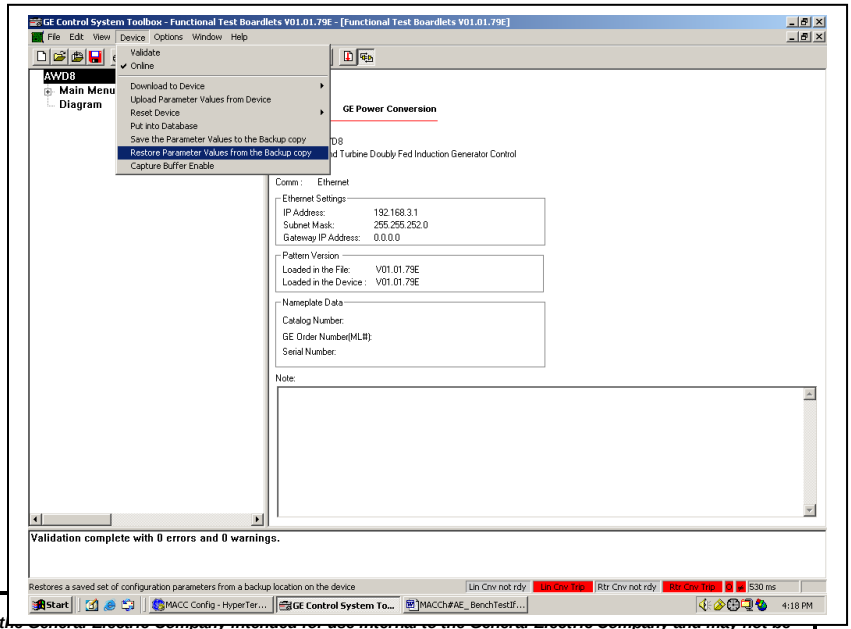
9) Type “uq” to discontinue the test loop.
10) Return to Toolbox and reset the “L_EETest1” parameter to 0.0. (Communications may need to be re-established)
11) Press the white RESET button on the card under test.

3.1.3 BACKUP MEMORY TEST

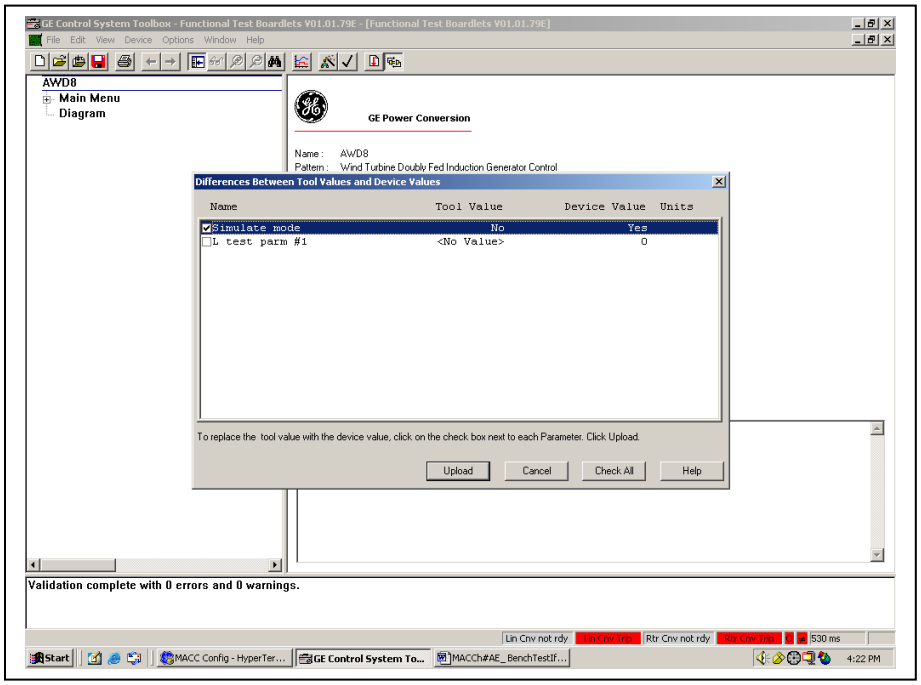
1) Close open popup windows inside ToolBox.(do not close Functional test Boardlet window.)
2) Click on “Device”
3) Click on “Save Parameter Values to the Backup Copy”
4) Click “Yes”, then “OK”
5) Click on the “finder” (binoculars) button on the Toolbox toolbar.
6) Verify that the“Non-menu search” checkbox is checked.
7) Type “simm” in the text search field and click the “FIND” button.
8) Double click on the “P Simulate mode” parameter.
9) Change the Value dropdown from “Yes” to “No”
10) Click on “Send to Device” button.
11) Click on “OK”



12) Close the Finder popup window.
13) Click on “Device”
14) Click on “Restore Parameter Values from the Backup Copy”
15) Click “Yes”



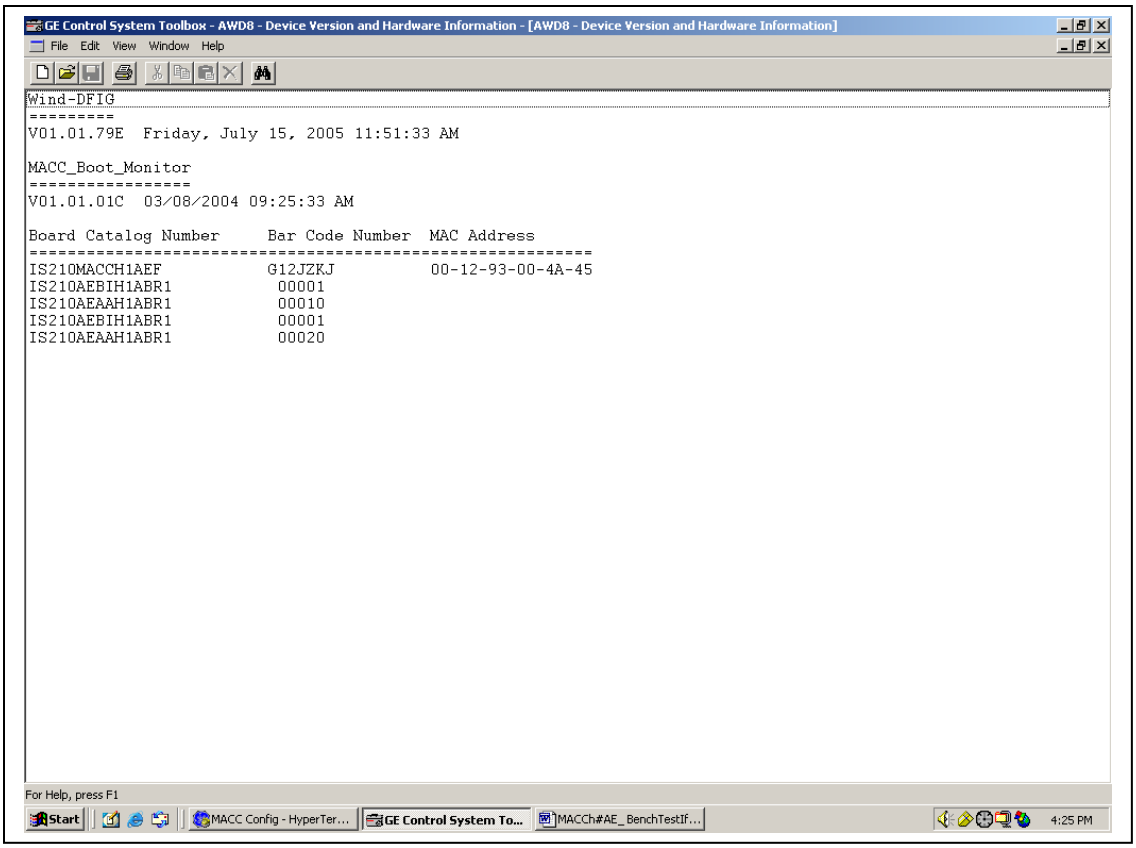
16) Click “OK” (Note the red “≠” sign at the bottom right of the screen)
17) Click on “Device”
18) Click on “Upload Parameter Values from Device” (Note “Difference” box. Tool value = No and Device Value = Yes
19) Click on small box to the left of “Simulate Mode” and “L test parm #1” (this will highlight the line)
20) Click on “Upload”
21) Bottom right of the screen should now indicate “ = ”



3.1.2 ID PROM TEST

NOTE: Please read over the following steps before performing the test!

1) Click on “View” in Toolbox
2) Highlight “Reports”
3) Click on “Device Version and Hardware Information”
4) Verify Bar Code Number.
5) Verify MAC (Ethernet) Address ≠ 0 or all F.
6) Verify see IS200AEBIH1AAA.
7) Close window
8) Go Offline
9) Close open ToolBox file, **(DO NOT SAVE CHANGES)**.
10) Turn-off power.
11) **Remove boardlets.**



4 Test ISBUS function

If board group# = H2 skip to step 5.

1) Turn on power to test fixture.
2) Click on "File", then "Open"
3) Open File > **C:\Program Files\GE Control System Solutions\GE Power Conversion\Wind-Sync-T\V01.00.03E\WcbFiles**
4) Click on "**T001t.wcb**".
5) Click on "Device"
6) Click on "Download to Device"
7) Click on "Pattern Flash (Runtime)"
8) Click "Yes"
9) Open file, choose "**MACCCODE.ARC** " (takes about 3 ½ minutes to download)
10) Close file "**T001t.wcb**".
11) Open File > **C:\Program Files\GE Control System Solutions\GE Power Conversion\Wind-Sync-T\V01.00.03E\WcbFiles**
12) Click on "**T001t_afterCodeDownload.wcb**".
13) Go Online.
14) Click "Yes" if prompted.
15) Download parameters (red down-arrow)
16) Verify " = " in status area
17) If there is a FAULT (RED) or ALARM (YELLOW) then:
    a. Go OffLine.
    b. Turn power off (to both MACC PWAs).
    c. Wait 5 sec.
    d. Turn power back on.
    e. Go online.
    f. Verify no ISBUS alarms or faults.
        i. May have to wait 10 sec.
        ii. If fail to clear:
        iii. Click on "Device->Reset->reset faults"
18) Remove ISBUS cable – verify get fault or alarm.
19) Go offline
20) Close file (if more boards are to be done, DO NOT close Toolbox) (minimize)
21) Turn off power at power strip
22) Disconnect board from fixture
23) Insert empty Header connector into TB1-Tach connector.
24) "T" stamp board just below P1 and U34. Also, "T" stamp box on the label.
25) Enter board data into Excel file.

Caution: Code for WIND-SYNC uses fixed IP addresses – the Toolbox IP address has no effect on MACC IP address and may be in conflict - preventing communication. The initial download above uses DFIG code and IP address (192.168.3.1) from prior parameter downloads. After the download of SYNC code then the IP address must be changed to software fixed IP address – which is in the 2nd .WCB file used.

SYNC-Thread: 192.168.101.10x x=thread#

5 DOWNLOAD SHIPPING SOFTWARE

Board group# = H2 only

1) Click on “File”, then “Open”
2) Open File > “**C:\Program Files\GE Control System Solutions\GE Power Conversion\Wind-DFIG\V01.06.02C**”
3) Click on “**V01.06.02C_code Download.wcb**”
4) Click on “Device”
5) Click on “Download to Device”
6) Click on “Pattern Flash (Runtime)”
7) Click “Yes”
8) Open file, choose “**MACCCODE.ARC** “ (takes about 3 ½ minutes to download)
9) Go online
10) Download parameters (red down-arrow)
11) Verify “ = “ in status area
12) Reset board a few times. After each reset, verify that the numbers in the box next to the equals sign changes.
13) Go offline
14) Close file (if more boards are to be done, DO NOT close Toolbox) (minimize)
15) Turn off power at power strip
16) Disconnect board from fixture
17) “T” stamp board just below P1 and U34. Also, “T” stamp box on the label.
18) Enter board data into Excel file.

Appendix

Using The “Board Data” Excel File

1. Double click on shortcut to “Board Data” icon.
2. Click on last complete line.
3. Do a “control C” (copies the line for later pasting).
4. Click on next line (line will highlight).
5. Do a “control V” (pastes the previously copied line).
6. Make changes to DATE, S/N, COMMENTS for current board.
7. Do a “Control S” to save the data.

Bachmann (PLC) controller:
Parts list:

- Module NT250 (24Vdc in - Power converter)
- Module MP213/E (controller)
  - ‘L’ setting: 0
  - ‘H’ setting: RUN
  - Flash module: PCC220 (8MB min)
    - Loaded with “MACC Functional Test V1” by JM NOWAK.
- Module CM202: CAN BUS (master) communication module.
- Module LM201:
- Rack

Alternatives to AEPS DC power supply:
MACC under test: 24Vdc@.5A (4A inrush), 5V@500mA, 24V@200mA, 5V@500mA.
MACC to test ISBUS against: : 24Vdc@.5A (2A inrush), 5V@500mA.
Bachmann PLC controller: : 24Vdc@1A .

- (2) AGILENT E6624A units (or E6626A or E6627A)
- (3) PSP05-020S & (4) PSP-024S (<<http://web5.automationdirect.com/adc/Shopping/Catalog/Power_Products/DC_Power_Supplies/RHINO_Plastic_Slim-Line_Case>>)
- (3) T450-p5p-nd & (2) T455-p5p.nd & (2) t944-p5p-nd (www.digikey.com wall-warts)

Checking ASIC VERsion & ID registers

- Check ASIC version: address 600000 should = 98093031.
- (user entries are ***BOLD ITALICS***)

> ***ph 0x600000{cr}***

0x00600000 = 0x98093031

- Check is an ASIC (not FPGA): address 680102 should = 1234567 & 680103 should = EDCBA987.

> ***ph 0x680102{cr}***

0x00680102 = 0x12345678 +
0x00680103 = 0xEDCBA987***{esc}***

- IF values for each register do not match the above info then reject card
- Also IF values for each register do not match the above info then check if can change the contents:

> ***ph 0x680102***

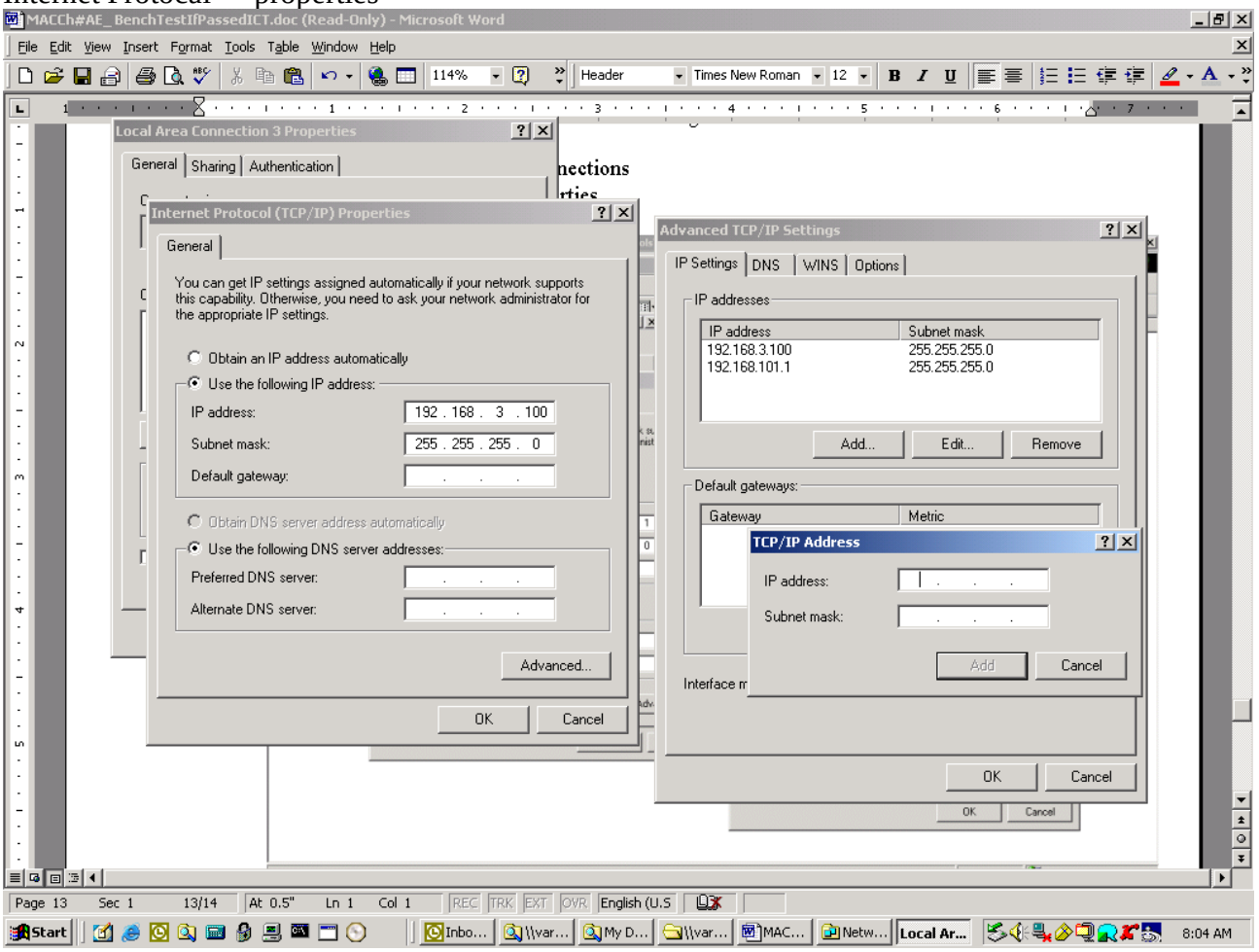
0x00680102 = 0x12345678 ***=aaaa5555{cr}***
0x00680102 = 0xAAAA5555 ***=12345678{cr}***
0x00680102 = 0x12345678***{esc}***

- IF cannot change value of register for address above then add to reject note.

Setting PC IP addresses

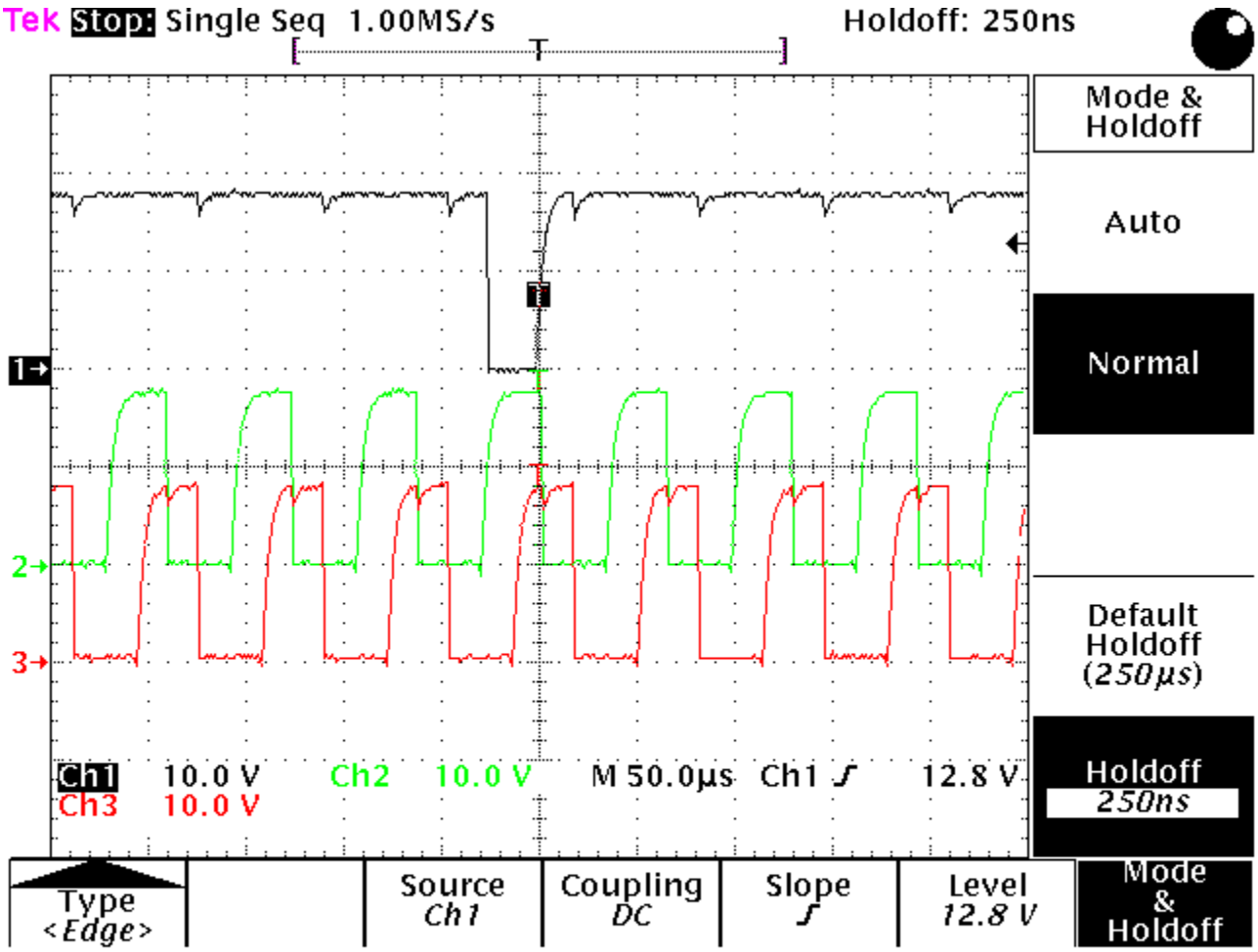
Must establish 2 IP addresses for the 2nd NIC card being used for Ethernet connection to MACC card: 192.168.3.100, 192.168.101.1.

- Start -> Settings -> Network connections
- Local area connection 2 -> properties
- Internet Protocal -> properties
-



TACH Signal for functional test:

- Speed feedback ~467.7 RPM



CH1: M, CH2: A, CH3: B
A/, B/, M/ are inverted version of respective signal.

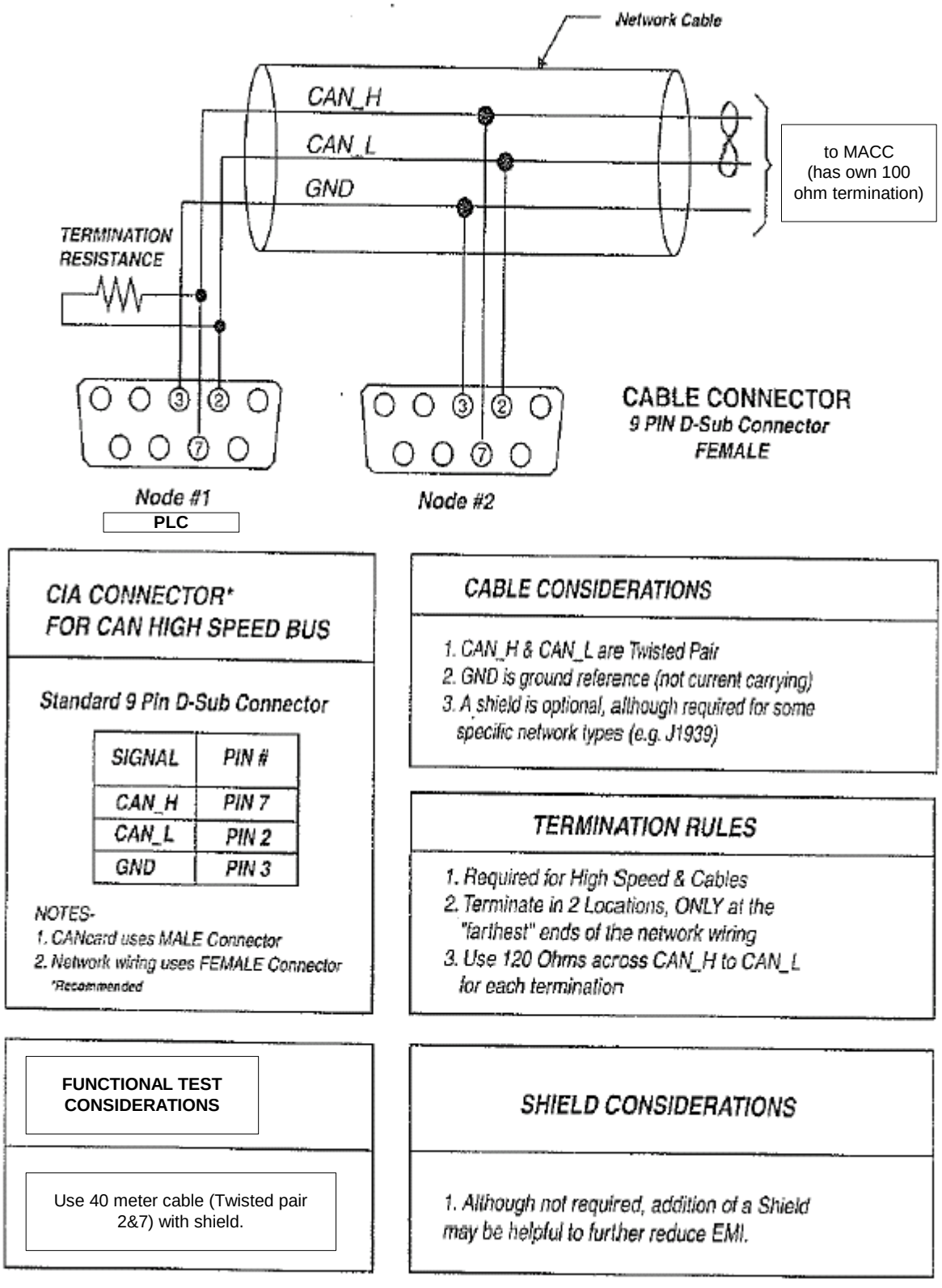


Figure 1: CAN bus cable

3/17/2021 12:56:00 PM