g	GE Energy	**Functional Testing Specification**
	Parts & Repair Services *Louisville, KY*	**LOU-GED-IS210MACC**

<div align="center">

Test Procedure for a MACC control card

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

REV.	DESCRIPTION	SIGNATURE	REV. DATE
A	Total re-write of procedure to move from Salem to Louisville format. Added process for WECA cards and numbers to each step. Added additional reference information.	R. Duvall	1/9/2010
B			
C			

PREPARED BY Robert Duvall	REVIEWED BY Lloyd Groves	REVIEWED BY	QUALITY APPROVAL *Charlie Wade*
DATE 1/9/2010	DATE 1/10/10	DATE	DATE 1/9/2010

1. SCOPE

1.1 This is a functional testing procedure for an IS210MACC card in any configuration.

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 Check board's electronic folder for more information such as schematics and system documentation. (**N:\Design Folders\IS2\IS210\MACC**)

    3.1.2 Test programs for WECA fixture are located at: **N:\Simulators\Sim121_WECA**.

    3.1.3 Old procedure can be found at the following location: **N:\Design Folders\Test Procedures\IS210MACC-old.doc**

    3.1.4 MACC Excel data file is located at the following location: **N:\Design Folders\IS2\IS210\MACC\MACC technical Information.xls**

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 site specific SRAs 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	H188727	Mobile MACC/WECA test fixture
1	IS200BPDBH1B	Serial adapter for BPPB cards

5.2 Fixture Photos
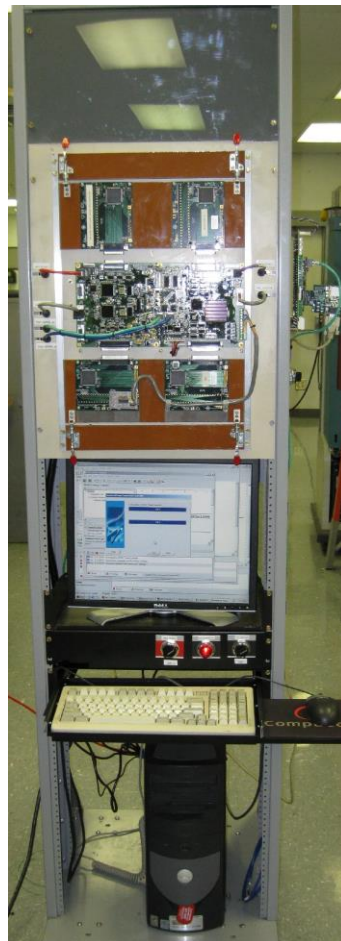
6. TESTING PROCESS

6.1 Overview

6.1.1 The MACC card can be used in multiple operations. Some operations require the use of a BPPB control card installed on the MACC. Some configurations use a daughter card with a serial ID chip in between the BPPB and MACC cards to alter the configuration of the assembly (such as on the WECA).
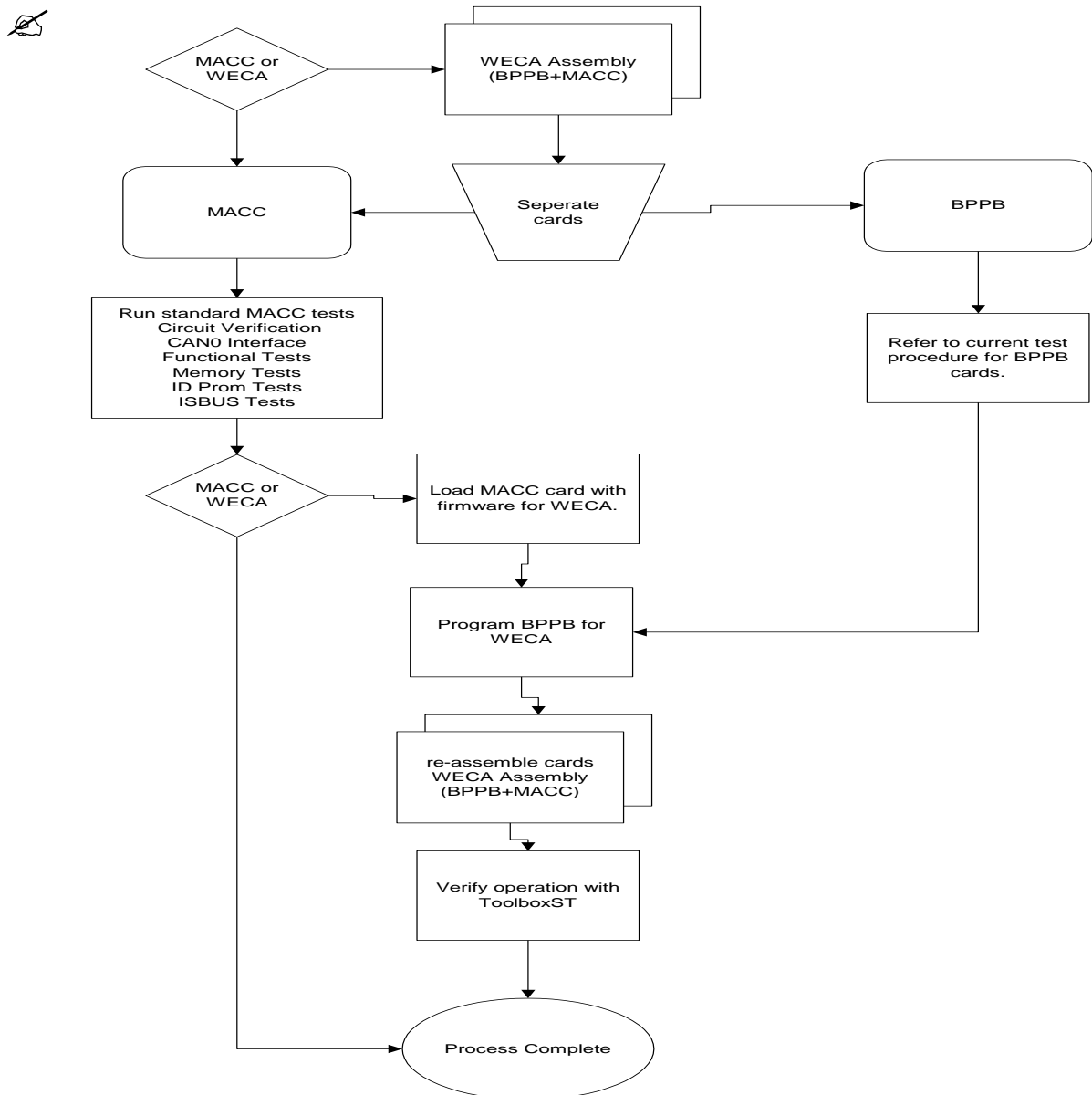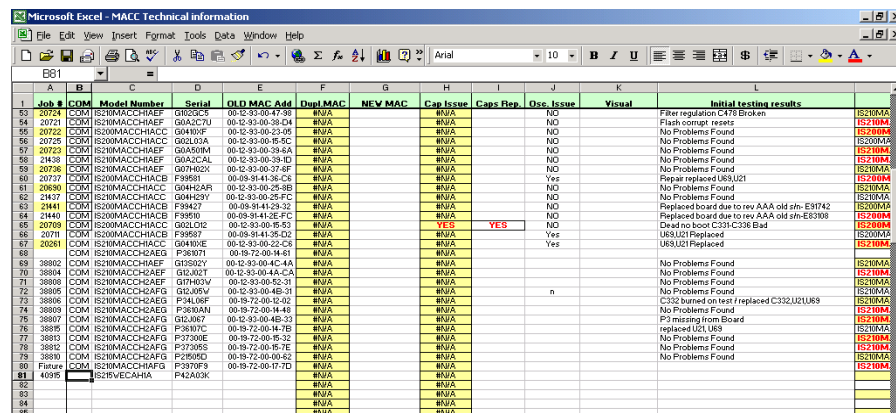
6.2 Initial Inspection Setup

6.2.1 There are a few items that need an additional visual inspection on the MACC card prior to testing. As of release Revision A these items include the crystals, tantalum capacitors, and IC U16.

6.2.1.1 Excel log file

6.2.1.1.1 Open the Excel log file and type Job number and barcode serial number into next available line at end of list.

6.2.1.1.2

6.2.1.2 Capacitor Validation (Ref: 8.8) - If the Cap Issue column shows up as "**YES**" then replace all Tantalum capacitors prior to testing.

6.2.1.2.1 Minimize on screen for later use.

6.2.1.3 Crystal Verification (Ref 8.7) - Check the board for the following U21 issues. Replace if either 3.3V or RI part.

6.2.1.4 IC Verification (Ref: 8.9) – Validate **U15, 16, 32, & 75** manufacturer is Texas Instruments ONLY. No other manufacturer is currently acceptable.

6.2.2 Identify card/assembly to be tested. If the card is a MACC card with no daughter cards then jump to 6.3 for MACC only testing.

6.2.3 Remove any cards attached to MACC and follow their current test procedure.

6.2.4 Verify SW2 (MACC Power switch) is in off position.

6.2.5 Install MACC card on test fixture and attach the following cables: CAN0, ENET, TACH, Serial, and Power.

6.2.6 Do not activate bottom and top levers to attach boardlets to side connectors P1, P2, J1, & J2 until prompted.

6.3   Testing Procedure – MACC only

    6.3.1   Circuit Verification / Communication testing

        6.3.1.1   Move SW2 to the ON position and verify DS1 LED on MACC illuminates RED.

        6.3.1.2   Open HyperTerminal session on fixture PC and verify it is online with COM1.

            (19200 N-8-1)

        6.3.1.3   Press the white RESET button on the MACC card and verify the following:

Can Init ... Passed (This only shows up on some configurations.)
Enet Init ... Passed
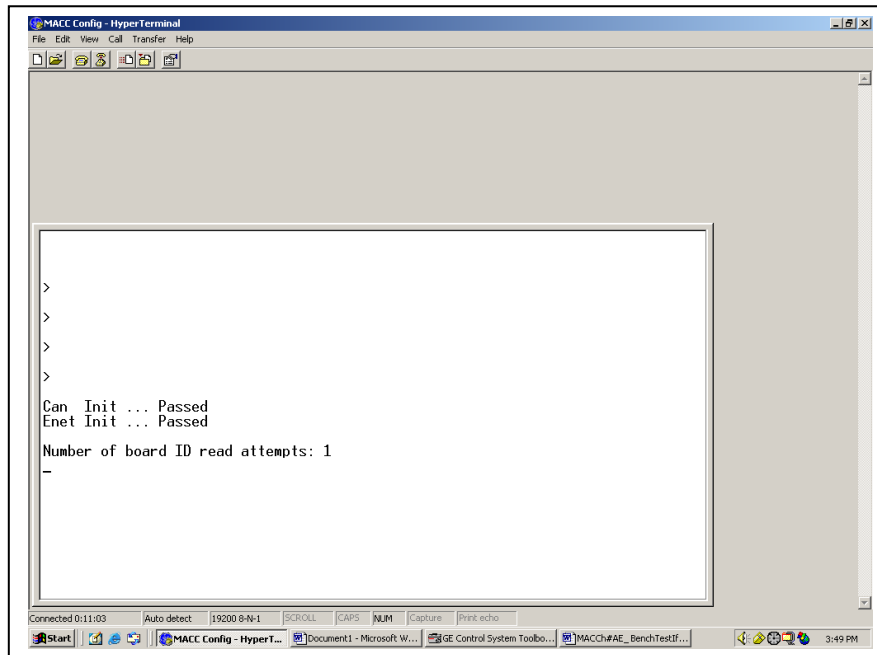
        6.3.1.4   Disconnect HyperTerminal session and minimize.

    6.3.2   Download Parameters for Ethernet communication.

        6.3.2.1 Toolbox Setup:

            6.3.2.1.1   Click on Toolbox icon

            6.3.2.1.2   Change Privilege Level to 4:

                6.3.2.1.2.1 Click on Options

                6.3.2.1.2.2 Click on Privilege Level

                6.3.2.1.2.3 Click on 4

                6.3.2.1.2.4 Password is: gesalem9 <Return>

                6.3.2.1.2.5 Enter your initials <Return>

6.3.2.2 Download of Parameter file.

6.3.2.2.1   Click on "File", then "Open"

6.3.2.2.2   Open File > **C:\Program Files\GE Control System Solutions\GE Power Conversion\Wind-DFIG\V01.06.02C**

6.3.2.2.3   Highlight "**V01.06.02C_ShipDownload.wcb**", and click "Open"

6.3.2.2.4   Click on "Device"

6.3.2.2.5   Click on "Download to Device"

6.3.2.2.6   Click on "Pattern Flash (Runtime)"

6.3.2.2.7   Click "Yes"

6.3.2.2.8   Open file, choose "**MACCCODE.ARC**" (can take up to 10 minutes to serial download)

6.3.2.2.9   Toolbox will go online automatically.
   May need to Double-Click AWD1 and ok.

6.3.2.2.10   Click "Red Down Arrow" on toolbar.

6.3.2.2.11   Click "Yes" (parameters will download and unit will reboot)
   May need to Double-Click AWD1 and ok.

6.3.2.2.12   Verify " = " in status area

6.3.2.2.13   Verify that the numbers in the box next to the equals sign changes.
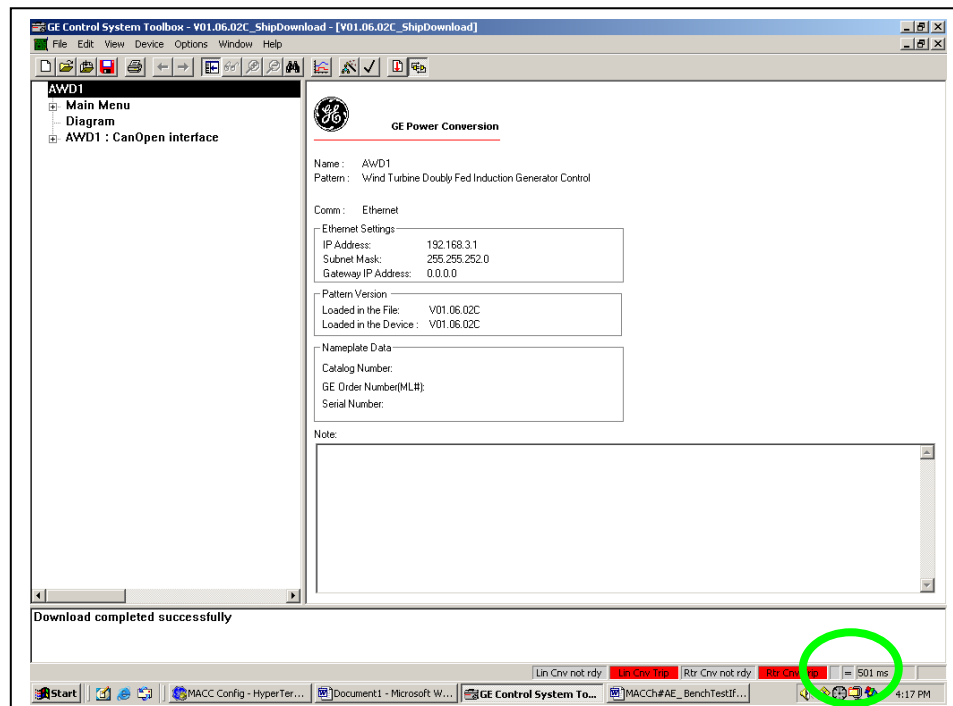
6.3.3 CAN0 Test

6.3.3.1 Double-click on the red Fault Status area of the screen. You should see 1 or more faults.

6.3.3.2 Click the Reset Faults button and verify that the "PLC Heartbeat Fault **IS NOT** present"

6.3.3.3 Unplug the CAN0 interface cable from the MACC card and click "Reset Faults" to refresh fault list.

6.3.3.4 Verify that a "PLC Heartbeat Fault" appeared in the fault list.

6.3.3.5 Reattach CAN0 cable and click "Reset Faults" button.

6.3.3.6 Verify that the "PLC Heartbeat Fault" **IS NOT** present.

6.3.3.7 Close fault window.

6.3.3.8 Click the online/offline button to go offline.

6.3.3.9 Close open Toolbox file.

6.3.4 Functional Testing Setup

6.3.4.1 Click on File, then Open

6.3.4.2 Find the following: **C:\Program Files\GE Control System Solutions\GE Power Conversion\Wind-DFIG\Functional Test BoardletsV01.01.79E**
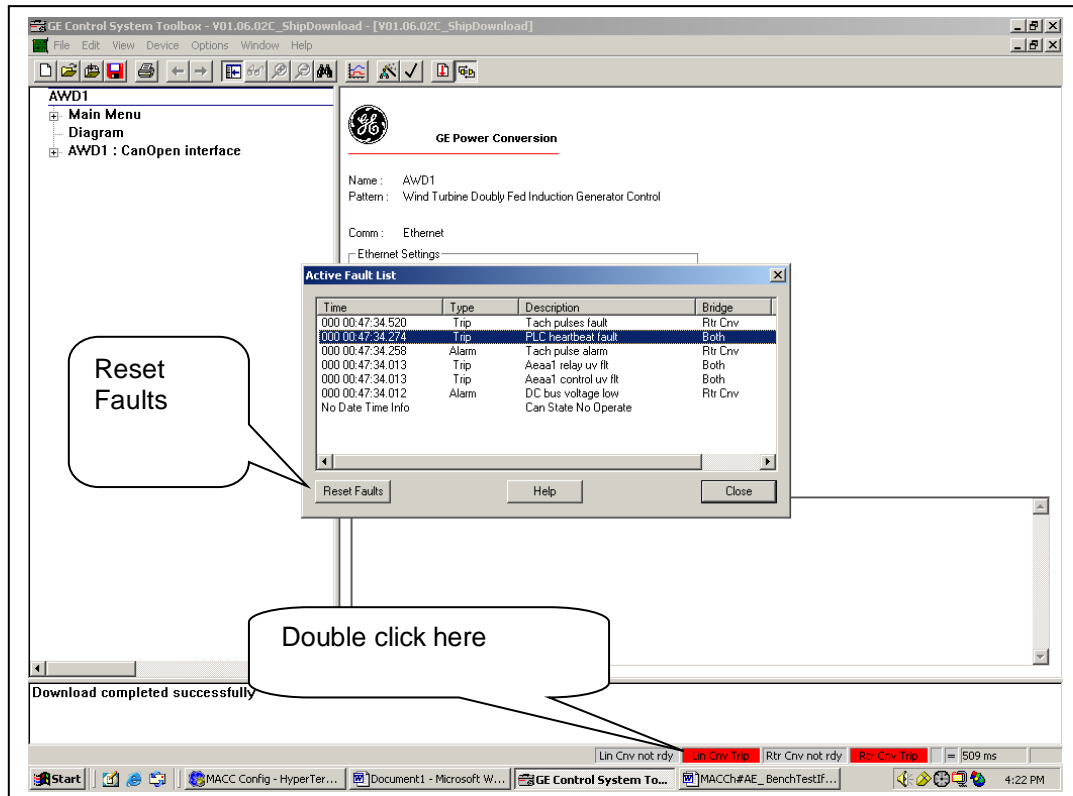
> If H1 then: Click on "**Functional Test Boardlets V01.01.79E.wcb**"
>
> If H2 then   Click on "**H2_Functional Test Boardlets V01.01.79E.wcb**"
>
> If H3 then   Click on "**H3_Functional Test Boardlets V01.01.79E.wcb**"

6.3.4.3 Click on "Device"

6.3.4.4 Click on "Download to Device"

6.3.4.5 Click on "Pattern Flash (Runtime)"

6.3.4.6 Click "Yes"

6.3.4.7 Open file, choose "**MACCONLY.ARC**" (can take up to 10 minutes to serial download)

6.3.4.8 Toolbox will go online automatically.

> *May need to Double-Click AWD8 and ok.*

6.3.4.9 Click "Red Down Arrow" on toolbar.

6.3.4.10 Click "Yes" (parameters will download and unit will reboot, a communications error message will appear if using Ethernet for download.)

6.3.4.11 Verify "=" sign at bottom right of screen

6.3.4.12 Change Communications Interface:

6.3.4.12.1 Double-click AWD8

6.3.4.12.2 Change "Communications" to "Ethernet"

6.3.4.13 Set Control Interface:

6.3.4.13.1 Select "None" in Control Interface dropdown box.

6.3.4.13.2 Click "OK"

6.3.4.13.3 A message box should appear, Click "YES" to continue.

6.3.4.13.4 Click the online/offline button to go offline.

6.3.4.13.5 Turn SW2 to the off position.

6.3.4.13.6 Activate bottom and top levers to attach boardlets to side connectors P1, P2, J1, & J2.

6.3.4.13.7 Turn SW2 to the on position.

6.3.4.13.8 Click the online/offline button to go online.
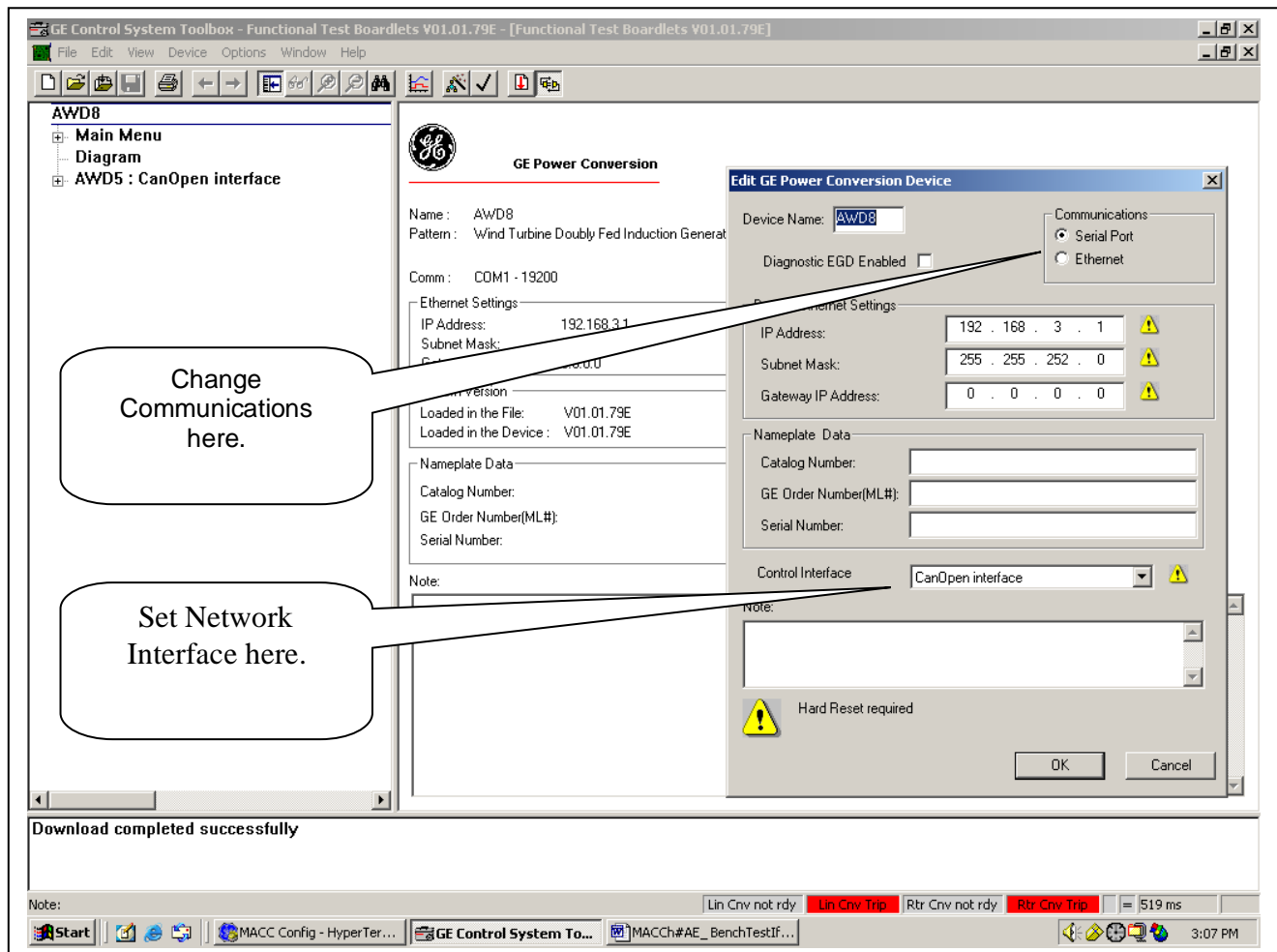
6.3.5   MACC Boardlet Test Activation

6.3.5.1 Click on the "finder" (binoculars) button on the Toolbox toolbar.

6.3.5.2 Verify that the "Non-menu search" checkbox is checked.

6.3.5.3 Type "L_EETest1" in the text search field and click the "FIND" button.

6.3.5.4 Double click on the "L_EETest1" parameter and update.

6.3.5.4.1   1. Enter "1.0" in the Value field.

6.3.5.4.2   2. Click on "OVERRIDE IN DEVICE"

6.3.5.4.3   3. Click on "ok" (The "Device Value" field should update with the new value).

6.3.5.4.4   4. Do not close this window.
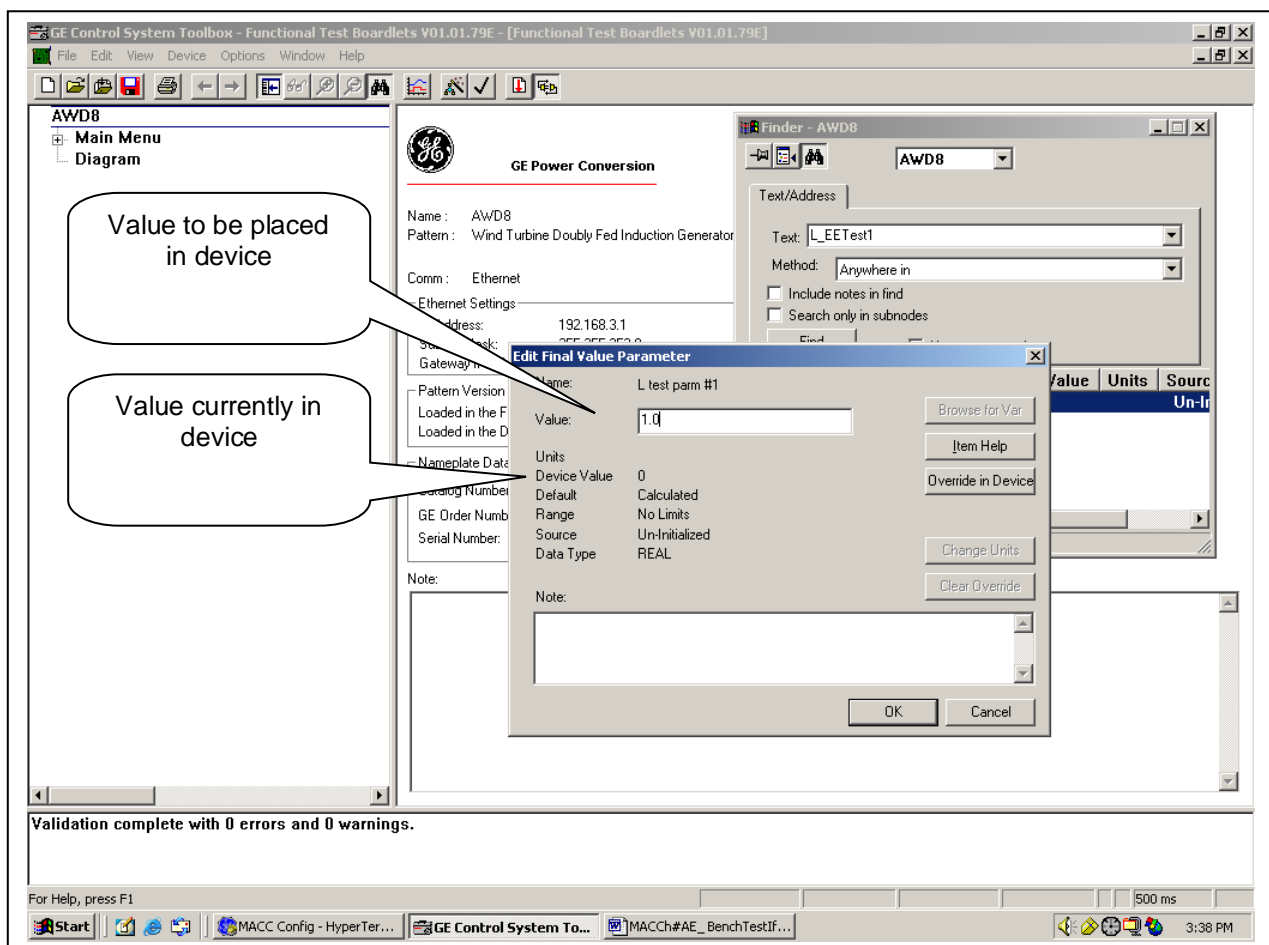
6.3.6 Boardlet Test Verification

6.3.6.1 Open HyperTerminal session and connect to device.

6.3.6.2 In HyperTerminal, hit the "Enter" key until the ">" prompt is displayed.

6.3.6.3 Type "uq" + "Enter", then wait 10 seconds.

6.3.6.4 HyperTerminal should display "Test Aborted"

6.3.6.5 Issue a hard reset to the card using white button

6.3.6.6 Observe card output in HyperTerminal window.

6.3.6.7 Allow the test to progress until it has looped at least 10 times.

6.3.6.8 Verify that there are no failures and temperature is between 22 – 35C and ASIC version is displayed.

✍   **Note: 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.*

6.3.6.9 Type "uq" to discontinue the test loop.

6.3.6.10 Disconnect HyperTerminal Session.

6.3.6.11 Return to Toolbox and reset the "L_EETest1" parameter to 0.0. (Communications may need to be re-established).

6.3.6.12 Press the white RESET button on the card under test.

6.3.7 Backup Memory Test

6.3.7.1 Close open popup windows inside ToolBox. (do not close Functional test Boardlet window.)

6.3.7.2 Click on "Device"

6.3.7.3 Click on "Save Parameter Values to the Backup Copy"

6.3.7.4 Click "Yes", then "OK"

6.3.7.5 Click on the "finder" (binoculars) button on the Toolbox toolbar.

6.3.7.6 Verify that the "Non-menu search" checkbox is checked.

**6.3.7.7** Type "simm" in the text search field and click the "FIND" button.

6.3.7.8 Double click on the "P Simulate mode" parameter.

6.3.7.9 Change the Value dropdown from "Yes" to "No"

6.3.7.10 Click on "Send to Device" button.

6.3.7.11 Click on "OK"

6.3.7.12 Close the Finder popup window.
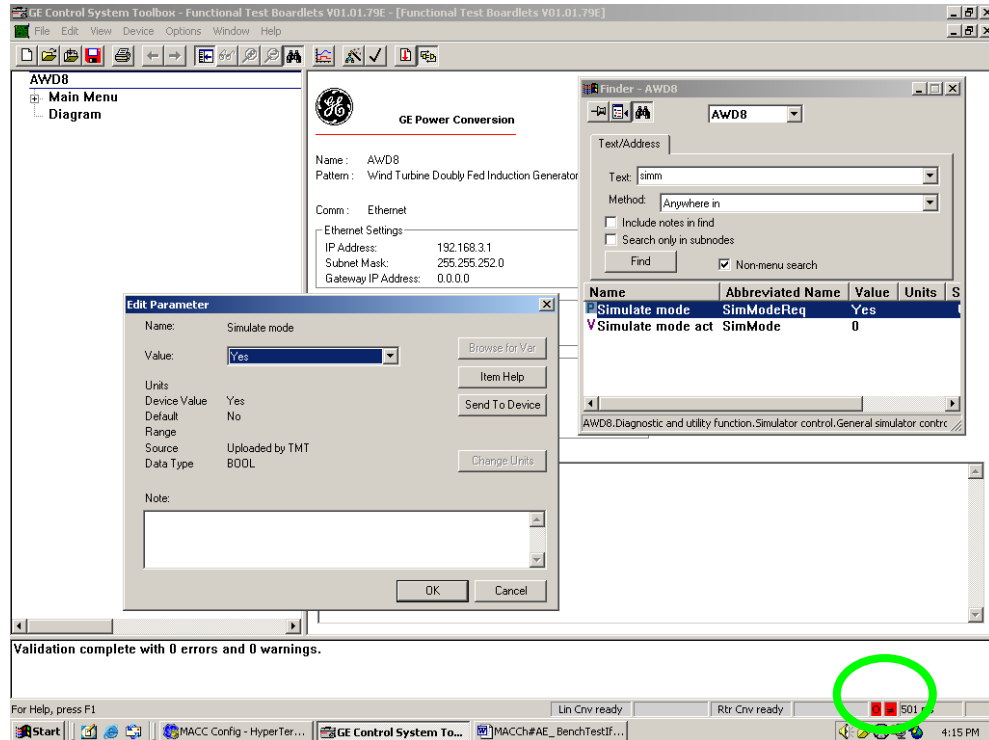
6.3.7.13

6.3.7.14 Click on "Device"

6.3.7.15 Click on "Restore Parameter Values from the Backup Copy"

6.3.7.16 Click "Yes"

6.3.7.17 Click "OK" (Note the red "≠" sign at the bottom right of the screen)

6.3.7.18 Click on "Device"

6.3.7.19 Click on "Upload Parameter Values from Device" (Note "Difference" box. Tool value = No and Device Value = Yes

6.3.7.20 Click on small box to the left of "Simulate Mode" and "L test parm #1" (this will highlight the line)

6.3.7.21 Click on "Upload"

6.3.7.22 Bottom right of the screen should now indicate " = "
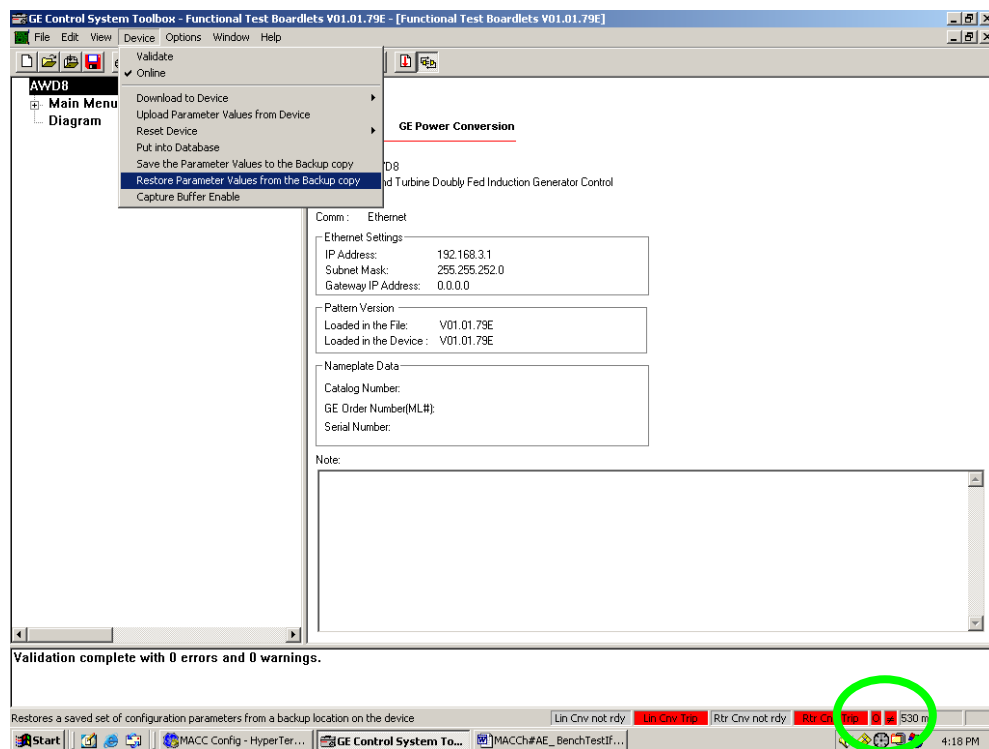
6.3.7.23

6.3.8 ID PROM Test

✍ **Note: Please read over the following steps before performing the test!**

6.3.8.1 Click on "View" in Toolbox

6.3.8.2 Highlight "Reports"

6.3.8.3 Click on "Device Version and Hardware Information"

6.3.8.3.1 Verify Bar Code Number.

6.3.8.3.2 Verify MAC (Ethernet) Address is not set to all 0 or all F. (if so, Serial ID must be reprogrammed and test must be repeated from beginning of section 6.)

6.3.8.3.3 Verify two IS210AEBI and two IS210AEAA cards are listed.

6.3.8.4 Copy the line of the report that shows model number, serial number, and MAC address and paste into EXCEL log file.
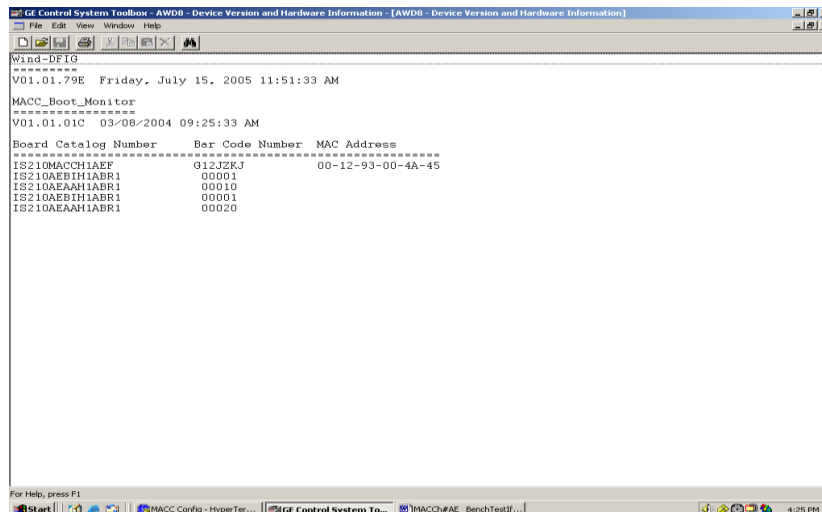
6.3.8.5

6.3.8.6 Close Report window.

6.3.8.7 Click the online/offline button in Toolbox to go Offline.

6.3.8.8 Close open ToolBox file, **(DO NOT SAVE CHANGES).**

6.3.8.9 Turn SW2 to the off position.

6.3.8.10 Remove boardlets by activating upper and lower levers on fixture.

6.3.9 **ISBUS Communication Test** *(Skip for H2 series MACC cards – ISBUS circuits not installed)*

    6.3.9.1 Turn SW2 to the on position.

    6.3.9.2 Click on "File", then "Open"

    6.3.9.3 Open File > **C:\Program Files\GE Control System Solutions\GE Power Conversion\Wind-Sync-T\V01.00.03E\WcbFiles**

    6.3.9.4 Click on "**T001t.wcb**".

    6.3.9.5 Click on "Device"

    6.3.9.6 Click on "Download to Device"

    6.3.9.7 Click on "Pattern Flash (Runtime)"

    6.3.9.8 Click "Yes"

    6.3.9.9 Open file, choose "**MACCCODE.ARC** " (can take up to 10 minutes to serial download)

    6.3.9.10 Close file "T001t.wcb".

    6.3.9.11 Open File > **C:\Program Files\GE Control System Solutions\GE Power Conversion\Wind-Sync-T\V01.00.03E\WcbFiles**

    6.3.9.12 Click on "**T001t_afterCodeDownload.wcb**".

    6.3.9.13 Go Online.

    6.3.9.14 Click "Yes" if prompted.

    6.3.9.15 Download parameters (red down-arrow)

    6.3.9.16 Click "Yes" if prompted.

    6.3.9.17 Verify " = " in status area

    6.3.9.18 If there is a FAULT (RED) or ALARM (YELLOW) then:

        Go OffLine.

        Turn power off (to both MACC PWAs).

        Wait 5 sec.

        Turn power back on.

        Go online.

        Verify no ISBUS alarms or faults.

            May have to wait 10 sec.

            If fail to clear:

            Click on "Device->Reset->reset faults"

    6.3.9.19 Remove ISBUS cable and verify that a fault or alarm is displayed.

    6.3.9.20 Reattach ISBUS cable and verify fault clears.

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6.3.9.21 Go offline

6.3.9.22 Close file (if more boards are to be done, DO NOT close Toolbox) (minimize)

6.3.9.23 Turn SW2 to the off position.

6.3.9.24 If testing IS215WECA cards then jump to section 7.

6.3.10 <u>*Downloading shipping software*</u> *(H2 revision ONLY)*

6.3.10.1 Click on "File", then "Open"

6.3.10.2 Open File > "**C:\Program Files\GE Control System Solutions\GE Power Conversion\Wind-DFIG\V01.06.02C**"

6.3.10.3 Click on "**V01.06.02C_code Download.wcb**"

6.3.10.4 Click on "Device"

6.3.10.5 Click on "Download to Device"

6.3.10.6 Click on "Pattern Flash (Runtime)"

6.3.10.7 Click "Yes"

6.3.10.8 Open file, choose "**MACCCODE.ARC** " (can take up to 10 minutes to download)

6.3.10.9 Go online

6.3.10.10 Download parameters (red down-arrow)

6.3.10.11 Verify " = " in status area

6.3.10.12 Reset board a few times. After each reset, verify that the numbers in the box next to the equals sign changes.

6.3.10.13 Go offline

6.3.10.14 Close file *(if more boards are to be done, DO NOT close Toolbox, minimize)*

6.3.10.15 Turn SW2 to the off position.

6.3.10.16 Disconnect board from fixture

6.3.11 <u>**MACC Only - Final process if NOT testing with daughter cards. (not for WECA)**</u>

6.3.11.1 Disconnect board from fixture

6.3.11.2 Insert empty Header connector into TB1-Tach connector.

6.3.11.3 Enter board data into Excel data file.

✍ **Note:** 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#   SYNC-Master: 192.168.101.100

6.3.11.4 **** Testing Complete ****

7. WECA Assembly setup for testing

7.1 Once the MACC and BPPB cards are tested individually, DO NOT reassemble them to be tested as a set until prompted to do so.

7.2 Verify SW2 (MACC Power) is in the OFF position.

7.3 Install MACC card on test fixture and connect the following cables: MACC- CAN0, ENET, TACH, Serial, and Power.

7.4 Start WECA ToolboxST

✎ **Note: ToolboxST will automatically open the last file used. File should not change on test fixture. File name is "WECA Module.tcw" in case of issues.**

7.4.1 On computer desktop double click WECA ToolboxST desktop ICON to start program.

7.4.2 Double click the MACC item displayed on the list.

7.4.3 Select – **Options** then **Settings** then **Power Conversion.**

7.4.4 Set full access to "TRUE". When prompted, the Password = gesalem9.

7.4.5 Click OK.

7.4.6 In the middle window (Communications) on the left side, scroll through the list until you find "Communication Type" and Select Serial communications COM1.

7.4.7 Enter initials if prompted and click OK.

7.5 MACC firmware download

7.5.1 Turn SW2 to the ON position to apply power.

7.5.2 Wait 10 seconds.

7.5.3 The MACC may be defective if DS5, DS7 & DS8 yellow LED's are not blinking (Ignore DS2 and DS6). Run MACC diagnostics again to verify operation.

7.5.4 On the ToolboxST screen, Select - **Device** – **Download** – **Download Wizard**.

7.5.5 Click Next.

7.5.6 Check only Firmware, uncheck all others (expand selections if necessary).

Note: Boot Loader and Parameters will be downloaded later using high speed Ethernet.

7.5.7
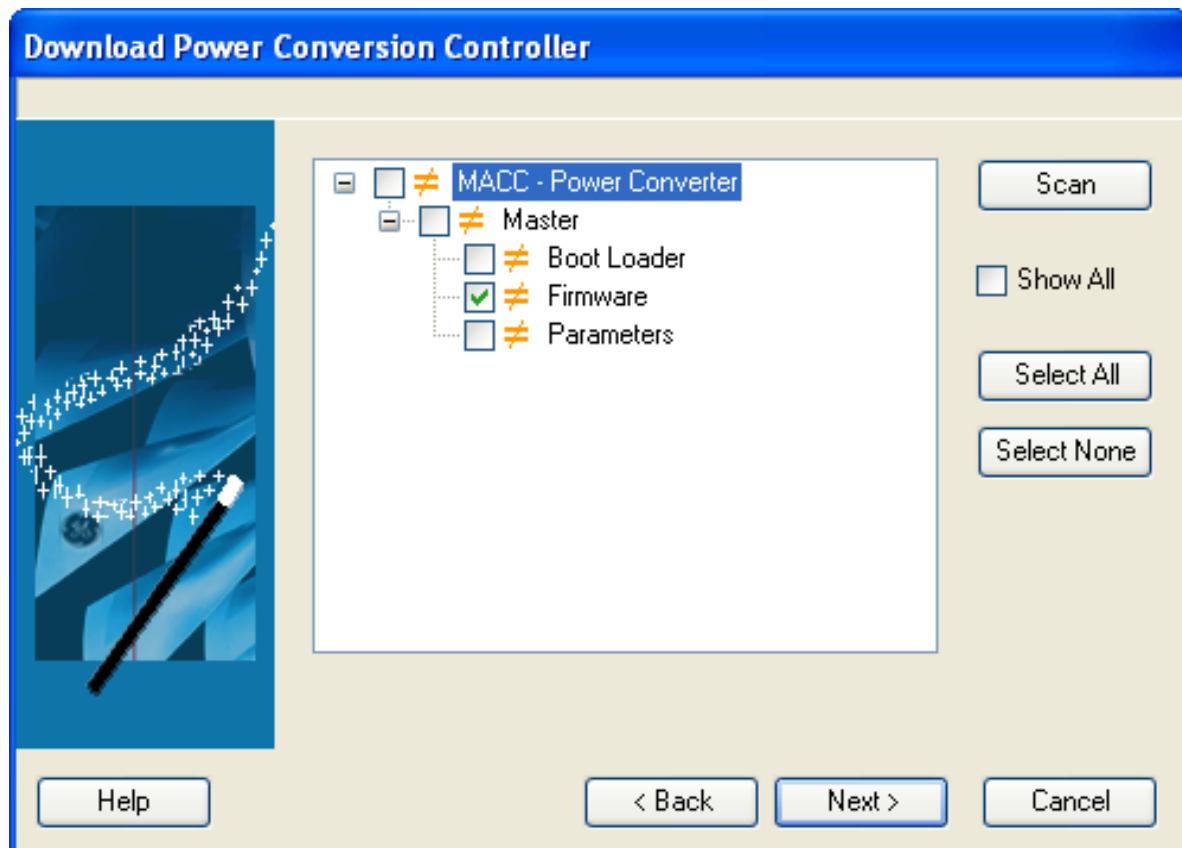
7.5.8 Click Next.

7.5.9 Click Yes   (to perform downloads).

7.5.10 This will take approximately 13 minutes.

7.5.11 Then click Finish.

7.5.12 A status box will appear showing the status of download. When both lines = 100%, verify download completed with zero errors and zero warnings is displayed.

7.5.13 Click YES.

7.5.14 Click the online/offline button and verify ToolboxST is offline.

7.5.15 Minimize MACC(WECA Module) and WECA ToolboxST windows.

7.6 BPPB BOOT/BASE download

7.6.1 Verify SW3 (BPPB Power) is in the off position.

7.6.2 Install BPPB card to be programmed onto AEPC card mounted on side of fixture.

7.6.3 Attach Ethernet cable to EN1-J3 connector and Serial connector to high-density connector on front of BPPB card.

7.6.4 Turn SW3 to the ON position to apply power to BPPB card to be programmed.

7.6.5 On computer desktop double click "BPPB Downloader" ICON.

7.6.6 In the "**BPPB Downloader**" program:

    7.6.6.1 Select COM2 as the communications port.

    7.6.6.2 Select Product = IO PACK

    7.6.6.3 Set IP Address = 192.168.3.100

    If just powered up, wait 60 seconds or until window momentarily pauses scrolling. If errors scroll by, ignore them.

    7.6.6.4 Click the Login button and verify # prompt is displayed.

    7.6.6.5 Type the command "resetreg 10" <Enter> in the I/O window.

    7.6.6.6 Verify "Process ###### (resetreg) exited status=10" is displayed.

    7.6.6.7 Click the **Shutdown** button.

7.6.7 Wait 60 seconds or until window momentarily pauses scrolling.

    7.6.7.1 Click the **Login** button.

    7.6.7.2 Verify # prompt and No home directory is displayed.

    7.6.7.3 Click the **Set IP Address** button.

    7.6.7.4 Click the **Ping** button and verify correct response in the DOS window:

        Reply from 192.168.3.100: bytes=32 time<10ms TTL=255

    7.6.7.5 Click the "**Download Boot, Base button**". Wait for Download Complete message.

    7.6.7.6 Click the **Install BOOT** button. Wait for Boot Install Complete message.

    7.6.7.7 Click the **Install BASE** button. Wait for Base Install Complete message.

    7.6.7.8 Click the **Shutdown** button. Wait for card to reboot completely and stop scrolling messages. Should take about 60 seconds.

7.6.8 Click the **Login** button.

7.6.9 Type the command **tcpsetup remove** <Enter> (To ensure auto IP address)

7.6.10 Close BPPB Downloader window.

7.6.11 Wait 5 seconds then turn SW3 to OFF position to remove power.

7.6.12 Remove BPPB card from AEPC card.

7.7 BPPB Operational load

7.7.1 Reconnect WEMD and BPPB pair onto MACC (power cable between BPPB and MACC is required).

7.7.2 Turn SW2 to the ON position to apply power.

7.7.3 MACC is defective if yellow LED's DS5, DS7 & DS8 are not blinking (Ignore DS2 and DS6)

7.7.4 Wait 60 seconds

7.7.5 Observe BPPB LED's
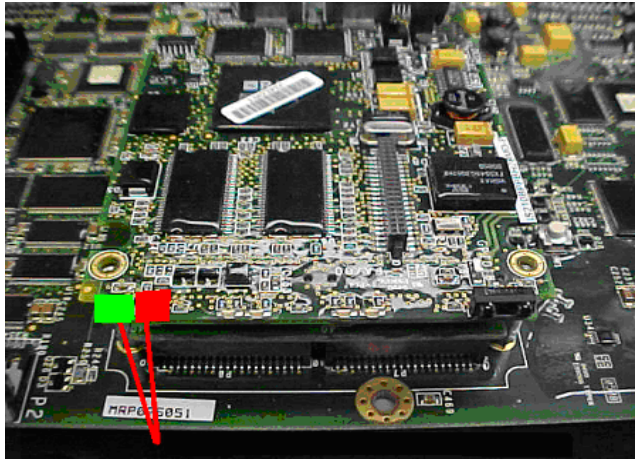
7.7.6

7.7.7 If the LED on the left is GREEN and the other is not lit, IS200WEMDH1A ID Prom U1 is not programmed.   Replace / program IS200WEMDH1A ID Prom U1.

7.7.8 If both LED'S are GREEN indicates the MACC is keeping BPPB in reset. Try retesting/reprogramming the MACC and restart test from the beginning of section 7.

7.7.9 BPPB should now have one RED LED lit (right); otherwise, BPPB or WEMD is defective or possibly MACC.

7.8 UCSA – WECA firmware download

7.8.1 Bring up TollboxST window.

7.8.2 Double click UCSA (large) ICON in WECA_Module - ToolboxST window.

7.8.3 During the next test steps if you see this:
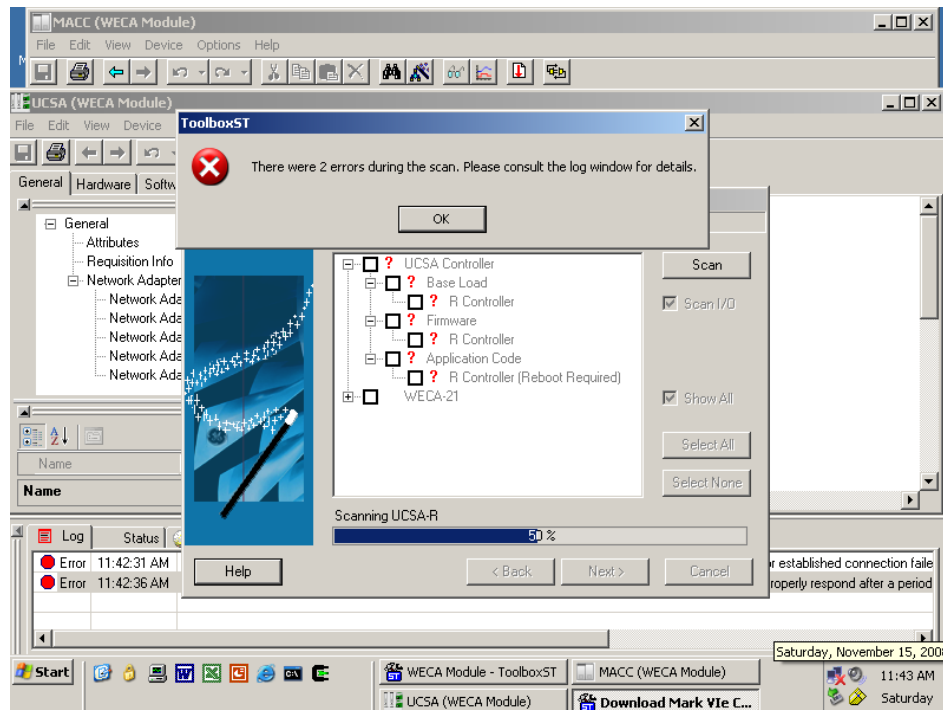
7.8.4

    7.8.4.1 You may not have waited long enough for USCA to boot up.

    7.8.4.2 Wait 45 seconds then click OK then click Scan

7.8.5 If no change, this usually indicates IS200WEMDH1A U1 is defective or not programmed. Replace/repair WEMD and restart from section 7.8.

    7.8.5.1 If WEMD replacement does not correct issue, there could be an issue with Test Fixture communications. UCSA-ENET1 communications to Computer may be inhibited. Click Start-Settings-Network Connections disable UDH then enable UDH. If this does not correct issue then restart computer and repeat tests starting at section 7.

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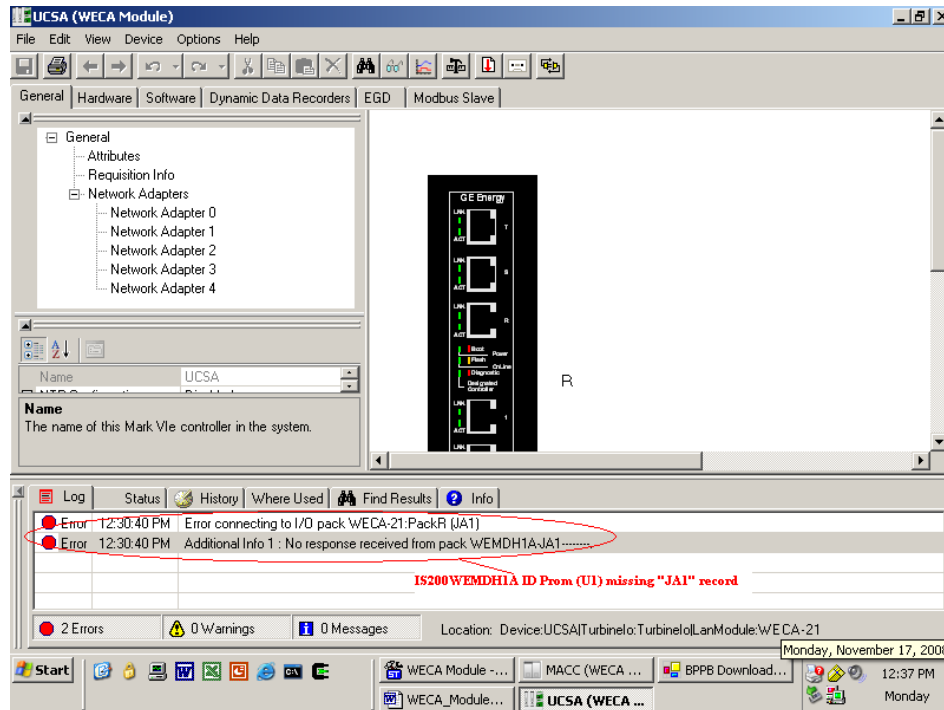
7.8.6

7.8.7 This window indicates IS200WEMDH1A U1 JA1 record is missing. Replace/repair WEMD.

7.8.8 **Download Process** – Must be repeated multiple times.

    7.8.8.1 Select the menu option **Device** – **Download** – **Download Wizard**

    7.8.8.2 Click **Next**> then **Next**> then **Next**>

    7.8.8.3 Verify **RED** LEDs are lit on BPPB and MACC.

    7.8.8.4 If errors appear the bootup process may be incomplete. Wait 10 seconds then click **Scan** - **Next**, to restart download process.
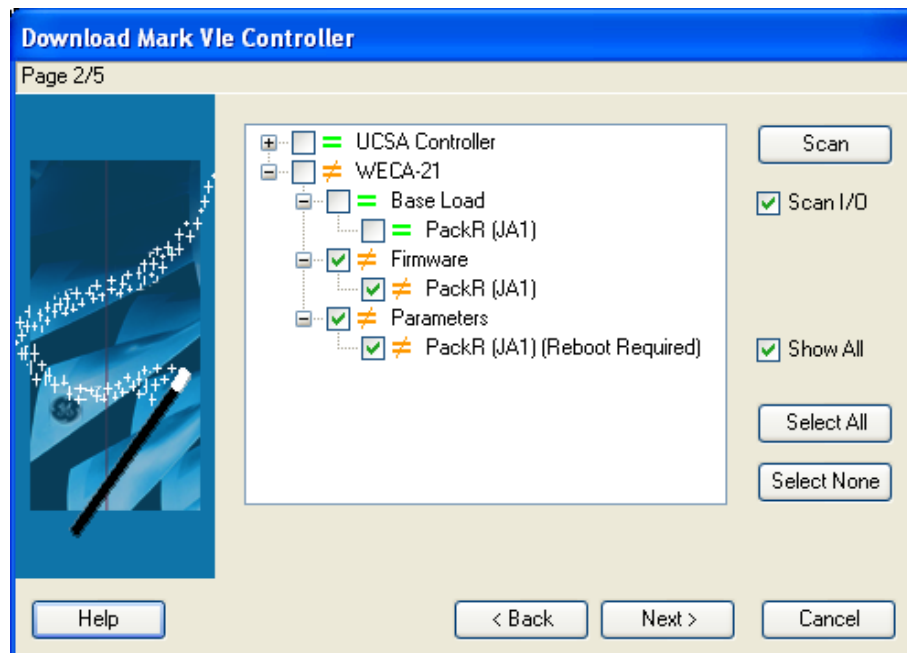
    7.8.8.5 Yes To All or Yes to perform downloads. Expand selection if desired.

    7.8.8.6 Note: Now we are going to repeat to make sure all UCSA downloads are done.
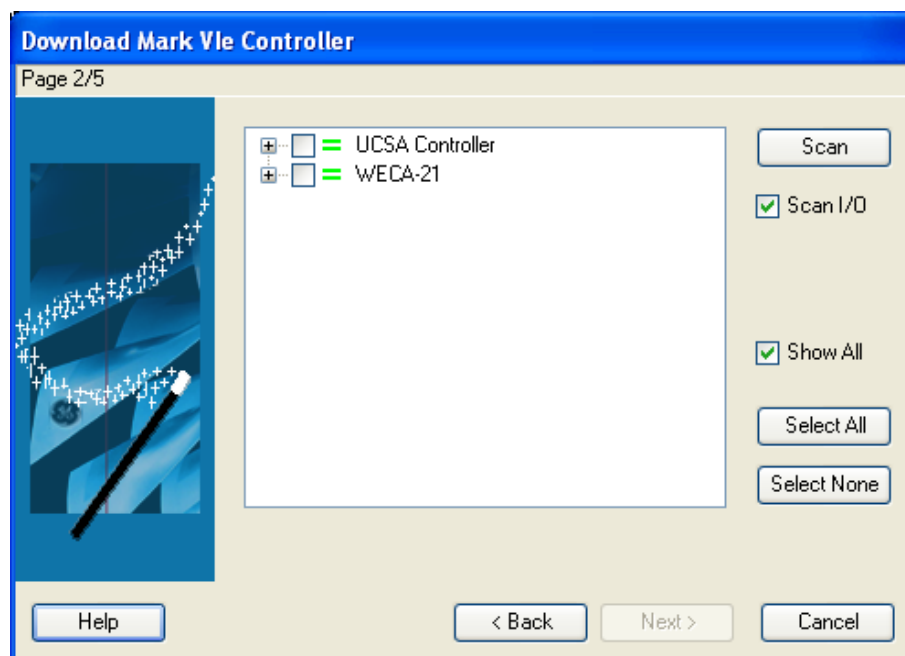
    7.8.8.7 Click check boxes of items not equal.

    7.8.8.8 Repeat steps until all items in list show "**Green =**" Reference screen shot 7.8.8.10.
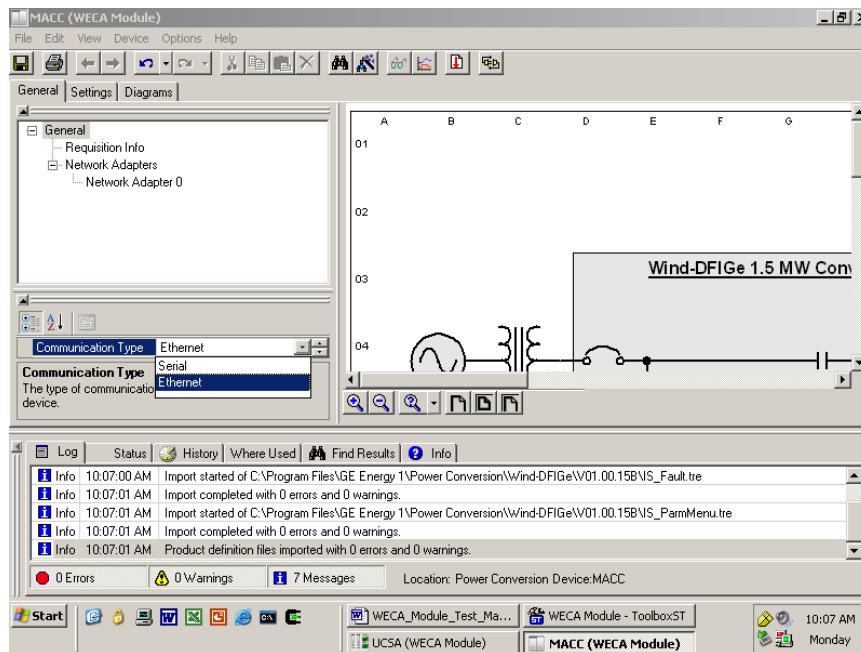
7.8.8.9

7.8.8.10

7.9 <u>Firmware verification</u>

7.10 Select MACC (WECA Module) window

7.11 Change the Communication Type to Ethernet.

7.12 Click up arrow until "Communication Type" is displayed.

7.13 Select Ethernet in dropdown. (Blue background)

7.14

7.15 Type your initials and click OK.

7.16 <u>Download Process</u> – Must be repeated multiple times.

    7.16.1 Select the menu option **Device** – **Download** – **Download Wizard**

    7.16.2 Click **Next**> then **Next**> then **Next**>

    7.16.3 Verify **RED** LEDs are lit on BPPB and MACC.

    7.16.4 If errors appear the bootup process may be incomplete. Wait 10 seconds then click
              Scan - **Next**, to restart download process.

    7.16.5 Yes To All or Yes to perform downloads. Expand selection if desired.

    7.16.6 Note: Now we are going to repeat to make sure all MACC downloads are done.

    7.16.7 Click check boxes of items not equal.

    7.16.8 Repeat steps until all items in list show "**Green =**" Reference screen shot 7.16.9.
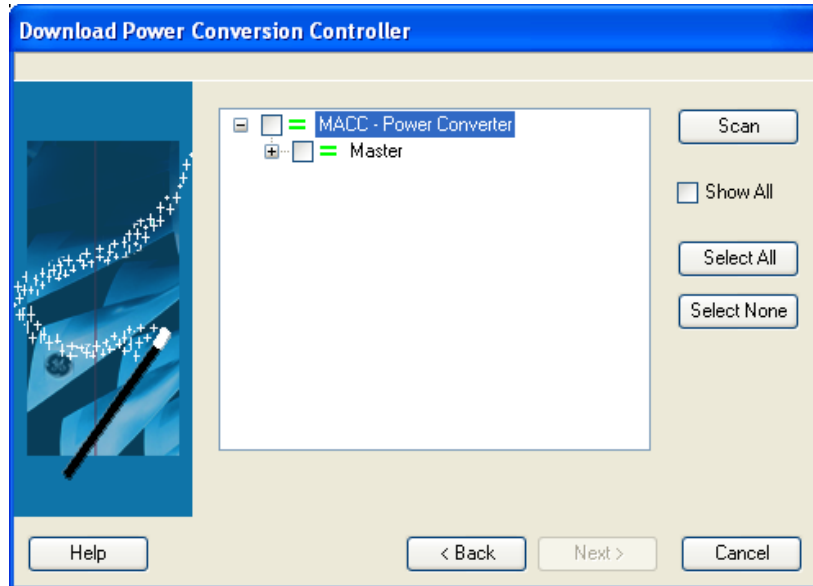
7.16.9

7.17 Verify MACC does not have any Red LED's lit. (A red LED on MACC card at this point will indicate a programming fault. Try restarting test from step 7 to resolve issue. Otherwise there could be corrupted flash.)

7.18 Pick the menu option Device, Click Online if not checked

7.19 On the lower part of the screen the Status tab should show no faults
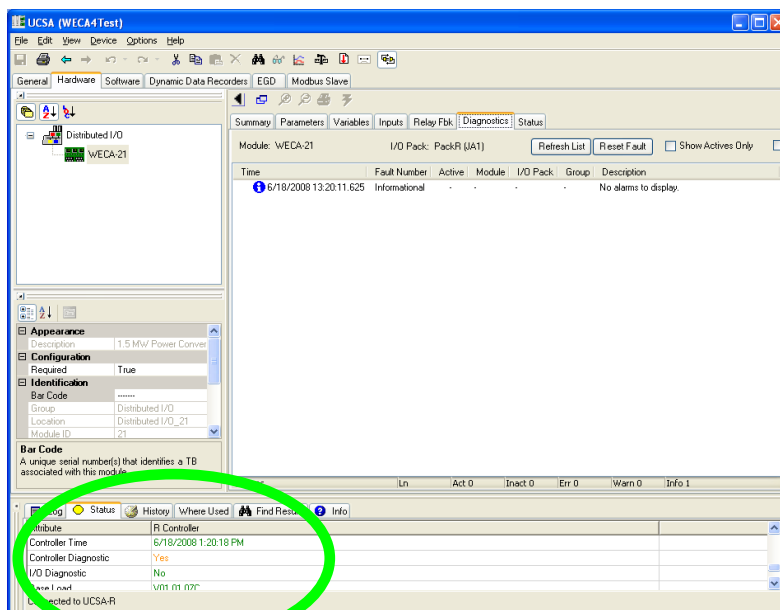
7.20

7.21 Return to the UCSA device (UCSA (WECA Module)

7.22 Check for faults in WECA

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7.23 Pick the menu option Device, Click Online if not checked
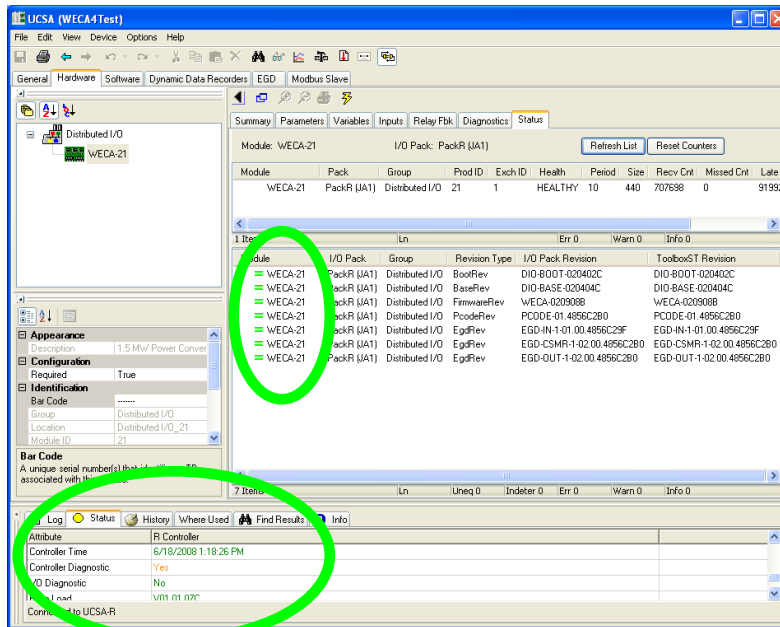
7.24 Select the Hardware tab across the top

7.25 Select the WECA 21

7.26 Check the Diagnostic tab for no alarms or errors

7.27 The Status tab should show all equals.

7.28

7.29 Click Status Tab with yellow indicator near bottom of window.

7.30 Scroll thru looking for no indication of errors.

7.31 If no error indication configuration process is complete.

7.32 Set MACC Power OFF.

7.33 Disconnect and Re-assemble IS215WECAH1A module.

7.34 Close ToolboxST, do not save.

7.35 ***TEST COMPLETE ***

8. <u>**Reference Information**</u>

    8.1 Using the "Board Data" MS Excel data file.
    8.2 Bachmann (PLC) controller
    8.3 Checking ASIC VERsion & ID registers
    8.4 Setting PC TCP/IP addresses
    8.5 TACH Signal for functional test
    8.6 CAN0 cable configuration
    8.7 Crystal Failure Information
    8.8 Capacitor Failure Information
    8.9 IC Failure Information
    8.10 Programming problems
    8.11 Serial Cable Details

8.1 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.

Note: The Excel data file has multiple functions. In addition to recording failure data the cells have search routines to check for specific serial numbers with known problems and verify MAC addresses are not ones with known problems.

8.2 Bachmann (PLC) controller – Reference Info

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

8.3 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}***
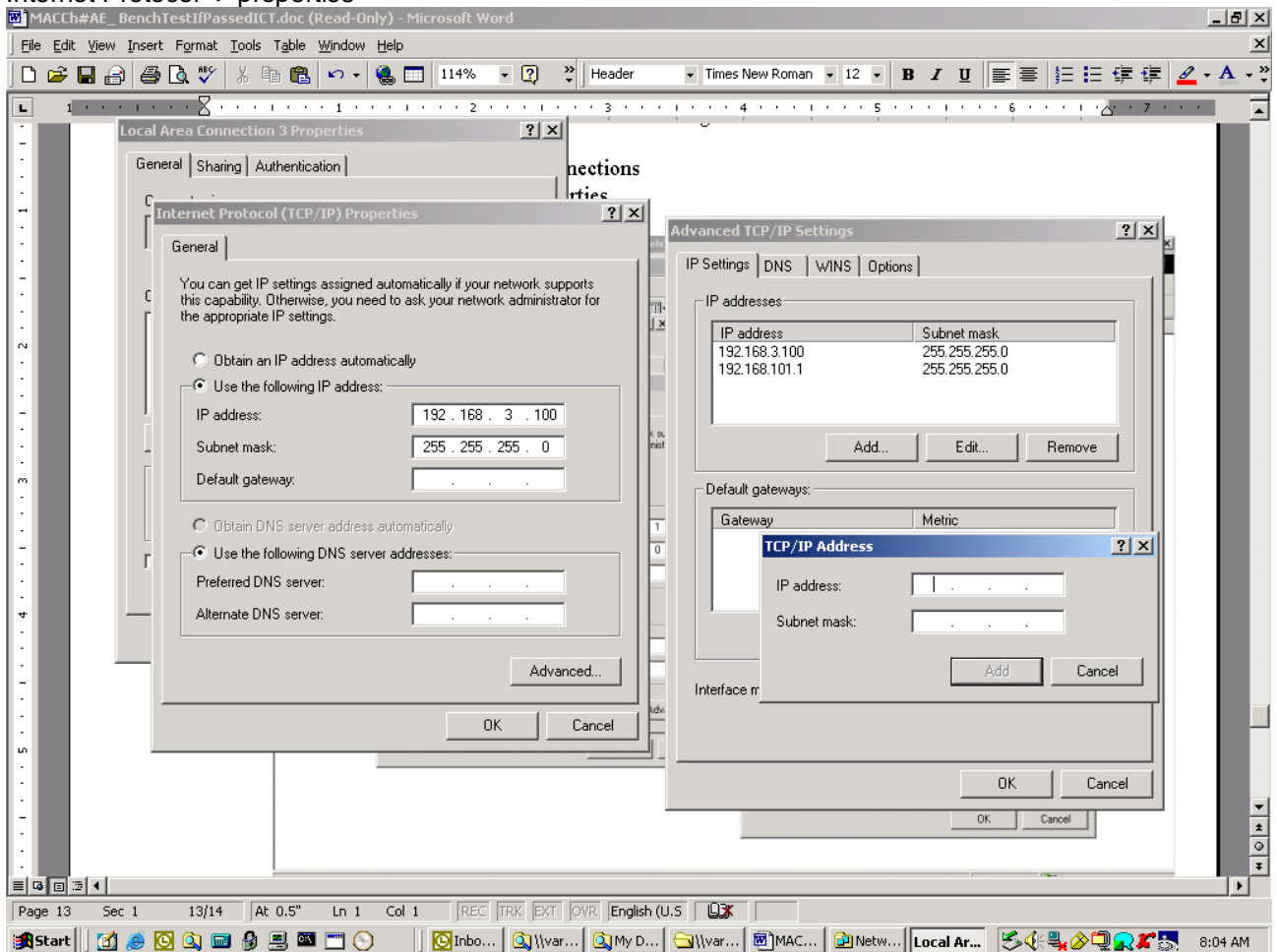   0x00680102 = 0x12345678 *{esc}*

- IF cannot change value of register for address above then add to reject note.
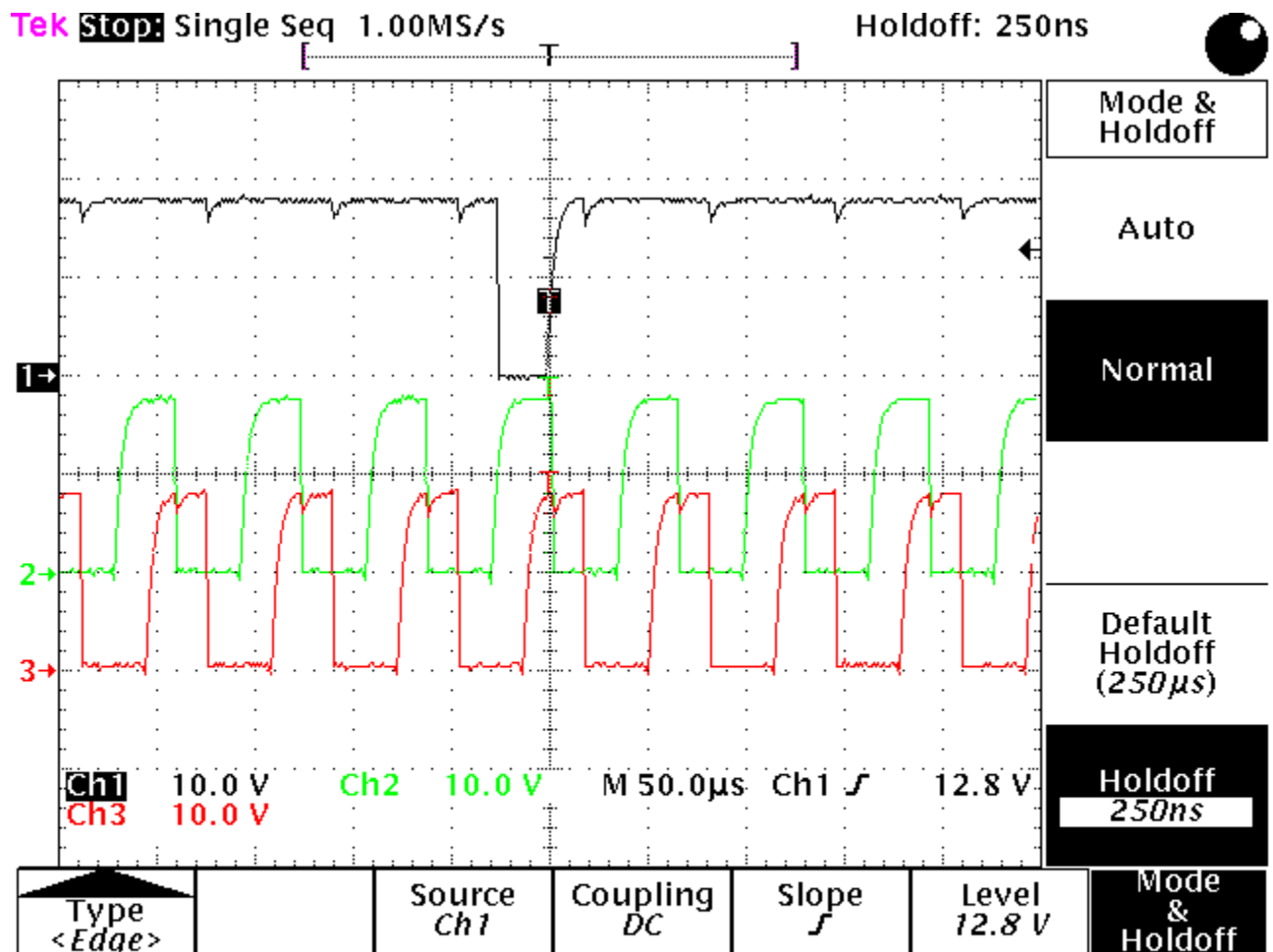
8.4 Setting PC TCP/IP addresses

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 Protocol -> properties

-

8.5 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.

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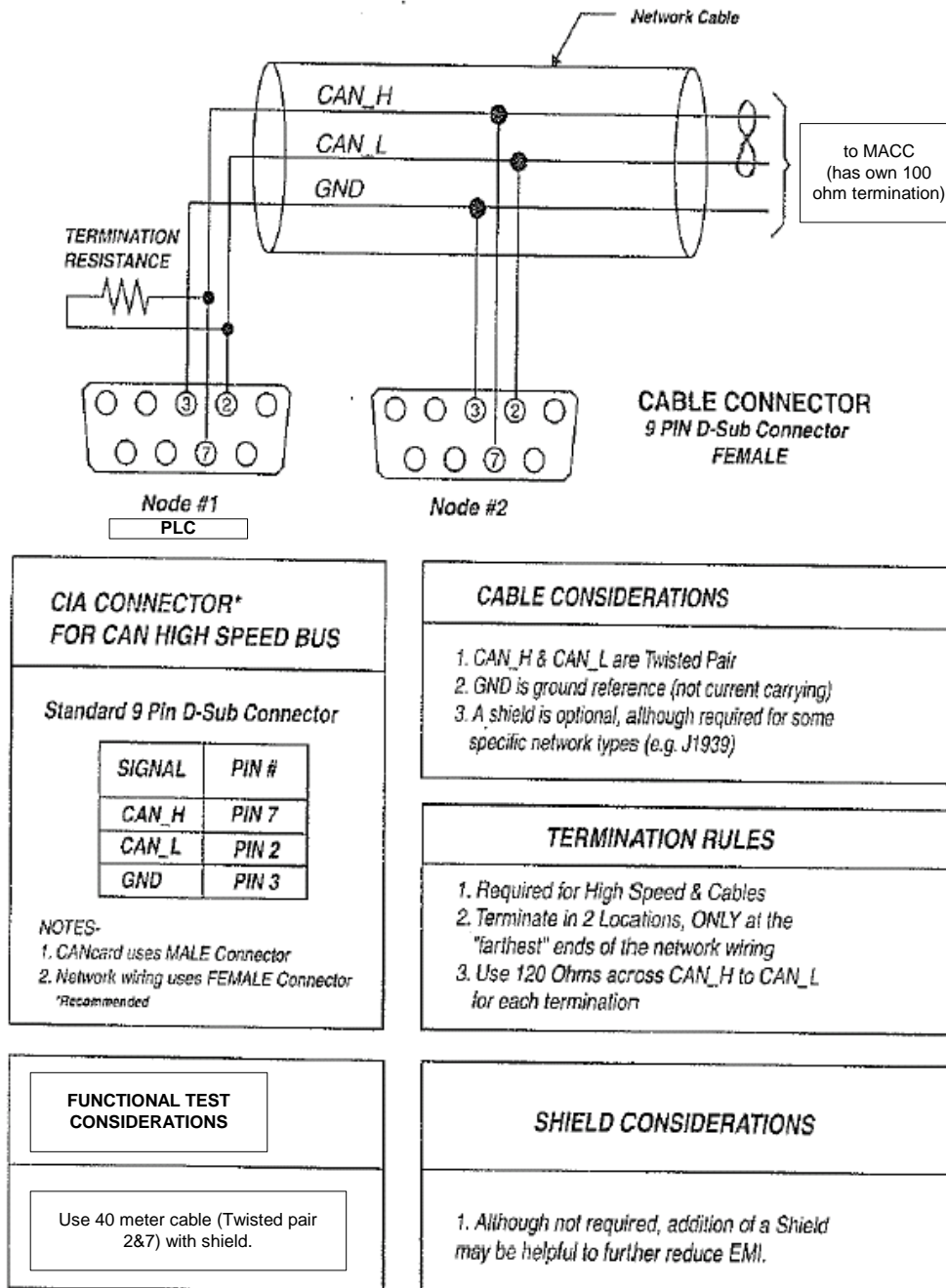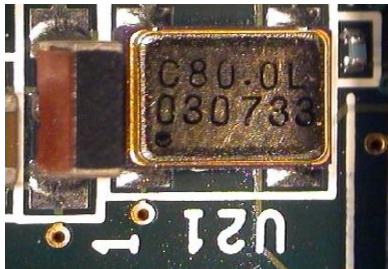
8.6 CAN0 cable configuration

Figure 1: CAN bus cable

8.7 Crystal Information

U21 on some cards is a 3.3V part instead of required 5V part.

The U21 part shown is bad because it is 3.3V (L on end).
U21 must also be replace if RALTRON part with date
code from this year

U69 photo is of a bad CARDINAL part - they begin with C48
The U69 RALTRON part known to be bad, has RI80.00 as designator - no photo.

Danny (Salem Engineer) said there were some boards out there with an unstable 80mhz Crystal (U21) made by Raltron. He said they were heat sensitive, especially under the thick conformal coating on the board. It causes an IS Bus failure. He said they can be identified having RI written on them. He said many boards have U21 crystals on them made by Plutronics or Cardinal and those are fine. (ewr)

8.8 – Capacitor Information

There were 250 boards that GMI manufactured that had defective Tantulum chip caps (C or D case size). GMI was able to recall and repair approximately ½ of them but the rest are still out in the field. The problem with the caps is that they are only filled up 25% with tantalum and should be filled up 50%. The defective caps are C327 and C331 through C336. Danny Day (Salem Engineer) said he would send me a list of serial numbers for the boards that have the bad caps on them.**(now built into Excel file)** He said we could also identify the bad caps by looking at the date code on the caps but he would have to find out what code we need to look for. (ewr)

8.9 – IC Problem Information

U16 has been linked to some field failures due to temperature. The problem appears to only be in the non-Texas Instruments components. Verify that only TI parts are installed in the U16 location.

8.10 – Programming Problems

Some early versions of the MACC card had their serial ID chip programmed with duplicate Ethernet MAC addresses**(now built into Excel file)**. By pasting the MAC address into the Excel file a check is performed against known problem addresses. If there is a problem the Duplicate MAC address column will show up as "YES".

8-11 - Cable for serial communication from PC to Wind Converter MACC card

Standard UC cable (336A3582P1) + female-to-male gender changer
This is a 9 pin-9 pin, female-female connector. This cable will be used to connect serially from the COM port of the laptop to the P5 RS232 connection on the MACC card. It needs to have a female-to-male gender changer attached to the serial connection on the MACC card. This will be used to serially communicate from the laptop to the MACC card to download flash, parameters (including IP address) and to upload parameter. Below is the pin-out and detailed description of this cable.

END A	END B
2	3
3	2
4	6
5	5
6	4
7	8
8	7

Notes:
a. Seven-conductor cable, 24 AWG with foil shield, PVC jacket, 25 feet in length.
b. Drain wire to be connected to conductive shell on end A.
c. Drain wire to be cut (not connected) on end B.
d. Both ends to have 9-pin Subminiature D connectors with female socket contacts.
e. Both ends to have male threaded screwlocks.
f. Label end A: UC2000
g. Label end B: PC COM PORT