



GE Energy

Functional Testing Specification

Parts & Repair Services
Louisville, KY

LOU-GED-IS200AEPCH1C

IS200AEPCH1C for 2.5 MW Wind System

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DATE 4/21/2010	DATE	DATE	DATE 4/23/2010

1. SCOPE

- 1.1 This is a functional testing procedure for the IS200AEPCH1C control card used in the 2.5 MW GE Wind Pitch System.

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 GEH-6701 – ToolboxST for Power Conversion Control
- 3.1.2 Check the board's electronic folder for current schematics for revision being serviced.

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 SRA's 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	SIM120 Wind card mobile programming system
1	H188922	SIM127 2.5MW Add on Rack
1	Shop Meter	DVM (Fluke 77 or equivalent)

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6. **TESTING PROCESS**

This card is tested by checking the functionality of all inputs, outputs, and system interconnects. The card has few active circuits and mainly provides interconnects between I/O and AXIS cards.

6.1 **Test Station Setup**

- 6.1.1 The test station used during this test is designed to work with either of the two MACC/WECA mobile test stands. The computer on the MACC/WECA test stand will be used to conduct all software loads and observations.
- 6.1.2 Place the AEPCH1C test stand next to a MACC/WECA test stand.
- 6.1.3 Connect ENET cable from AEPC Fixture to WECA fixture Linksys Hub.
- 6.1.4 Connect Serial cable from AEPC fixture to WECA fixture PC Serial port 2.
- 6.1.5 Connect 48VDC supply to AEPC fixture.
- 6.1.6 Connect 115VAC plug to free outlet on WECA fixture outlet strip.
- 6.1.7 Install card to be tested onto AEPC fixture and verify all connectors on card have cables attached.
- 6.1.8 Verify selector switch SW-8 is in the full CCW position (selection 1).
- 6.1.9 Connect a calibrated DVM to the meter output jacks and set to measure DC volts on Auto Range.

6.2 **Visual Inspection**

- 6.2.1 Perform a complete visual inspection of card and verify that there are no physical indications of defects.
- 6.2.2 For CAA revisions, Verify that VR 13 Arrestor (218A4586P1) has been replaced with an MOV (64G2901-P13Q65 ROHS, or 259A9249P38 NON-ROHS).

6.3 **Card Testing**

- 6.3.1 Apply power to both test stands and boot computer.
- 6.3.2 Open GE Control Systems Toolbox ST and load file SIM127.
- 6.3.3 Minimize Toolbox ST and open a HyperTerminal (HT) session with Port 2.
- 6.3.4 Connect serial cable to BPPB card on AEPC.
- 6.3.5 Turn on internal 24VDC supply. *This only supplies power to N-Tron E-NET switch.*
- 6.3.6 Turn on 48VDC supply and wait 60 seconds (need BPPB cards to complete boot process)
- 6.3.7 Verify IL-1, IL-2, & IL-3 illuminate. *These are the three independent supplies generated by the AEPA Axis cards.*

6.4 BPPB Configuration

6.4.1 Prior to testing the BPPB card on the AEPC, it will require to be programmed with a specific TCP/IP address to match the software of the test system.

6.4.2 In the HT session, login to the BPPB card and set the IP address using the following information:

6.4.2.1 Logon ID: root

6.4.2.2 Password: ge

6.4.2.3 Ifconfig: displays IP address information. (Varies depending upon where card was installed).

6.4.2.4 Ifconfig en0 192.168.4.1: Sets IP address of BPPB port to proper address to talk with SIM127 test program.

6.4.3 Verify IP change was successful by opening a Command Prompt window and performing a ping command to check communication.

6.4.3.1 Ping 192.168.4.1

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Port-2 - HyperTerminal
File Edit View Call Transfer Help

login: root
Password:

# ifconfig

lo0: flags=8009<UP,LOOPBACK,MULTICAST> mtu 33212
capabilities=7<IP4CSUM,TCP4CSUM,UDP4CSUM>
enabled=0<>
inet 127.0.0.1 netmask 0xff000000
inet6 fe80::1%lo0 prefixlen 64 scopeid 0x1
inet6 ::1 prefixlen 128
en0: flags=8843<UP,BROADCAST,RUNNING,SIMPLEX,MULTICAST> mtu 1500
address: 00:1c:6c:03:30:ce
media: Ethernet 10baseT half-duplex
status: active
inet 192.168.4.1 netmask 0xfffff00 broadcast 192.168.4.255
inet6 fe80::21c:6cff:fe03:30ce%en0 prefixlen 64 scopeid 0x2
en1: flags=8843<UP,BROADCAST,RUNNING,SIMPLEX,MULTICAST> mtu 1500
address: 00:1c:6c:03:30:cf
media: Ethernet 100baseTX half-duplex
status: active
inet 192.168.1.8 netmask 0xfffff00 broadcast 192.168.1.255
inet alias 192.168.111.100 netmask 0xfffff00 broadcast 192.168.111.255
inet6 fe80::21c:6cff:fe03:30cf%en1 prefixlen 64 scopeid 0x3

Process 426016 (ifconfig) exited status=0.
# 01/25/2007 00:01:42 syncd mips.cc line:194
UTC step from 01/25/2007 00:01:43 to 01/25/2007 00:01:42

C:\> Command Prompt
Reply from 192.168.4.1: bytes=32 time<1ms TTL=255
Reply from 192.168.4.1: bytes=32 time=2ms TTL=255
Reply from 192.168.4.1: bytes=32 time=2ms TTL=255

Ping statistics for 192.168.4.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 2ms, Average = 1ms

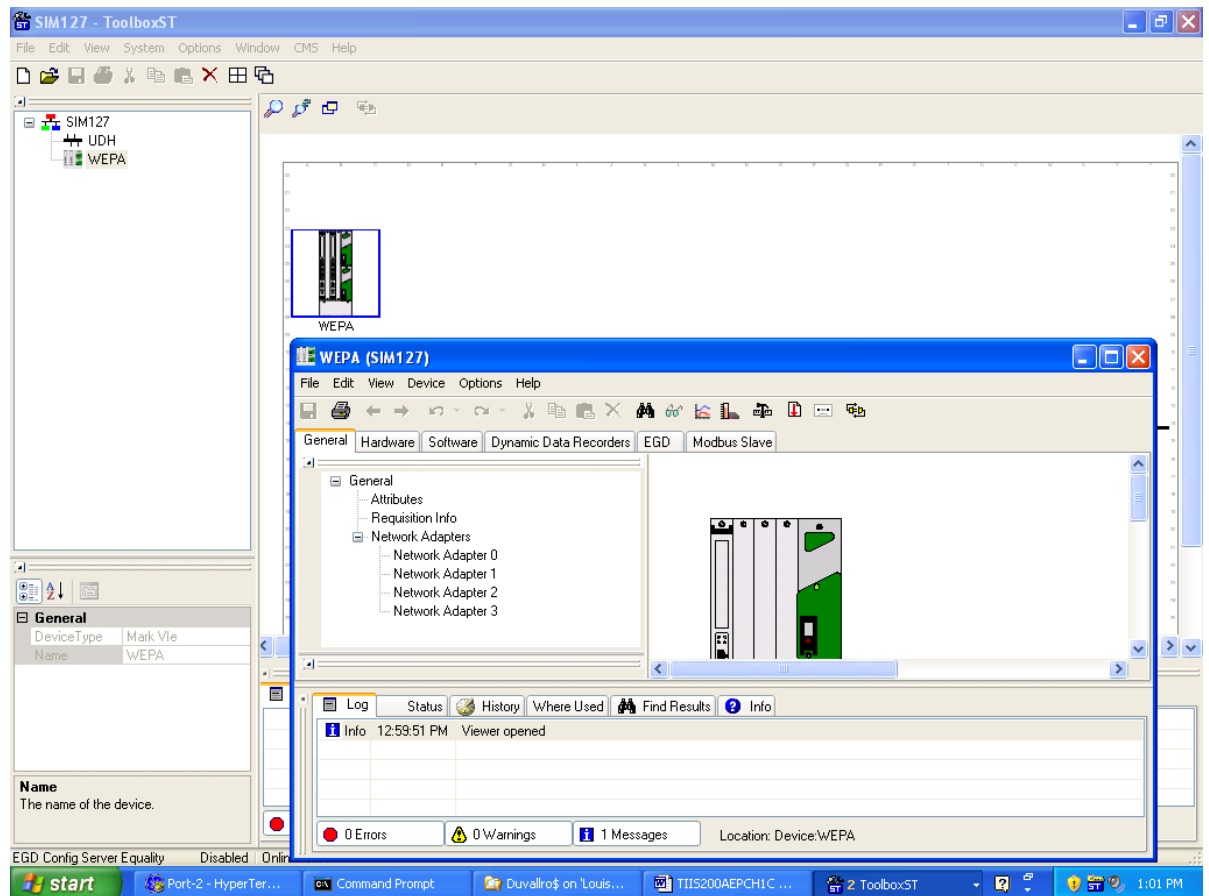
Z:\>
  
```

6.4.3.2

6.5 BPPB Download

6.5.1 Maximize Toolbox ST and open SIM127 WEPA program from SIM127 folder.

6.5.2 Double click on WEPA device to open the WEPA (SIM127) secondary window.



6.5.3

6.5.4 Maximize the WEPA (SIM127) window.

6.5.5 Click on the HARDWARE tab. (This will show status of all three WEPA cards)

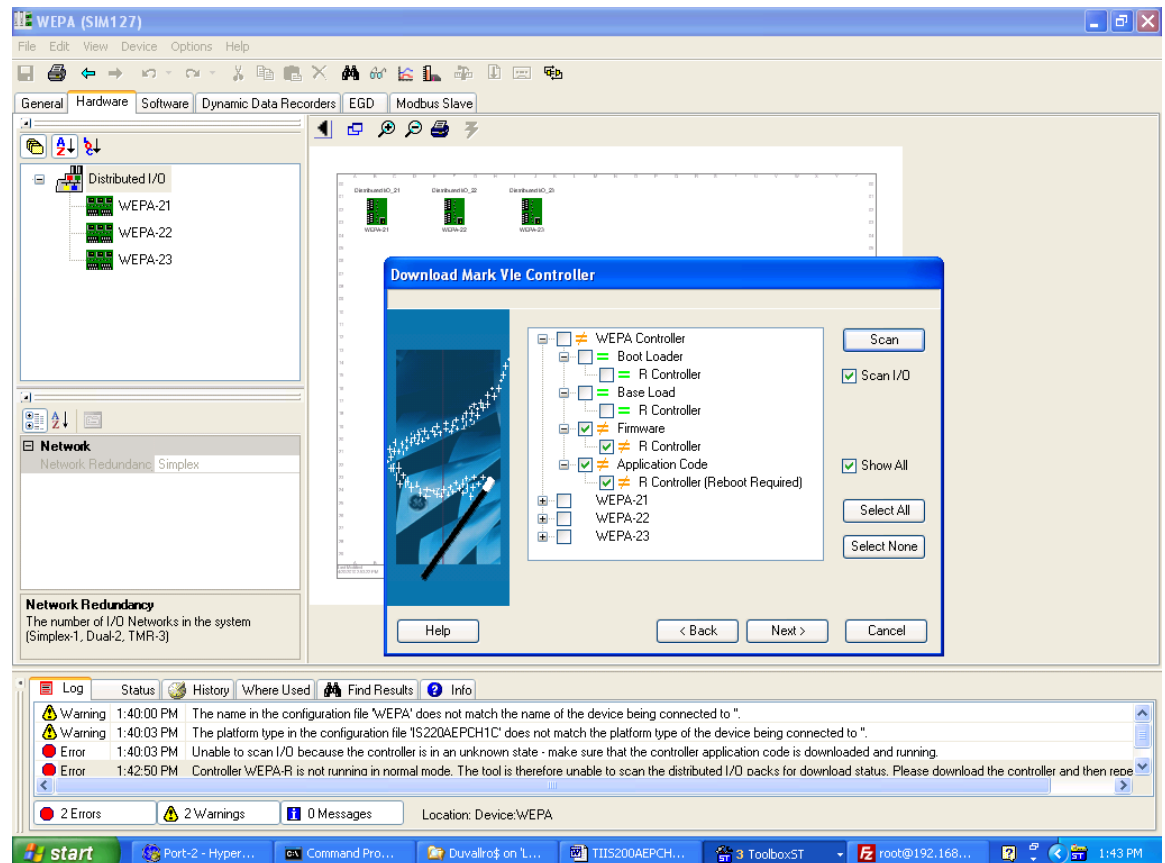
6.5.6 Click on "Device" then "Download" then "Download Wizard".

6.5.7 Click the "Next" button in the message box to start scan of connected system. (*Upon first connection you may see a note indicating that the name in the device does not match the name of the file. This is normal, click "YES" to continue.*)

6.5.8 **If you receive a platform error at this point this means that the BPPB card is currently programmed for something other than AEPC (this should be rare).**

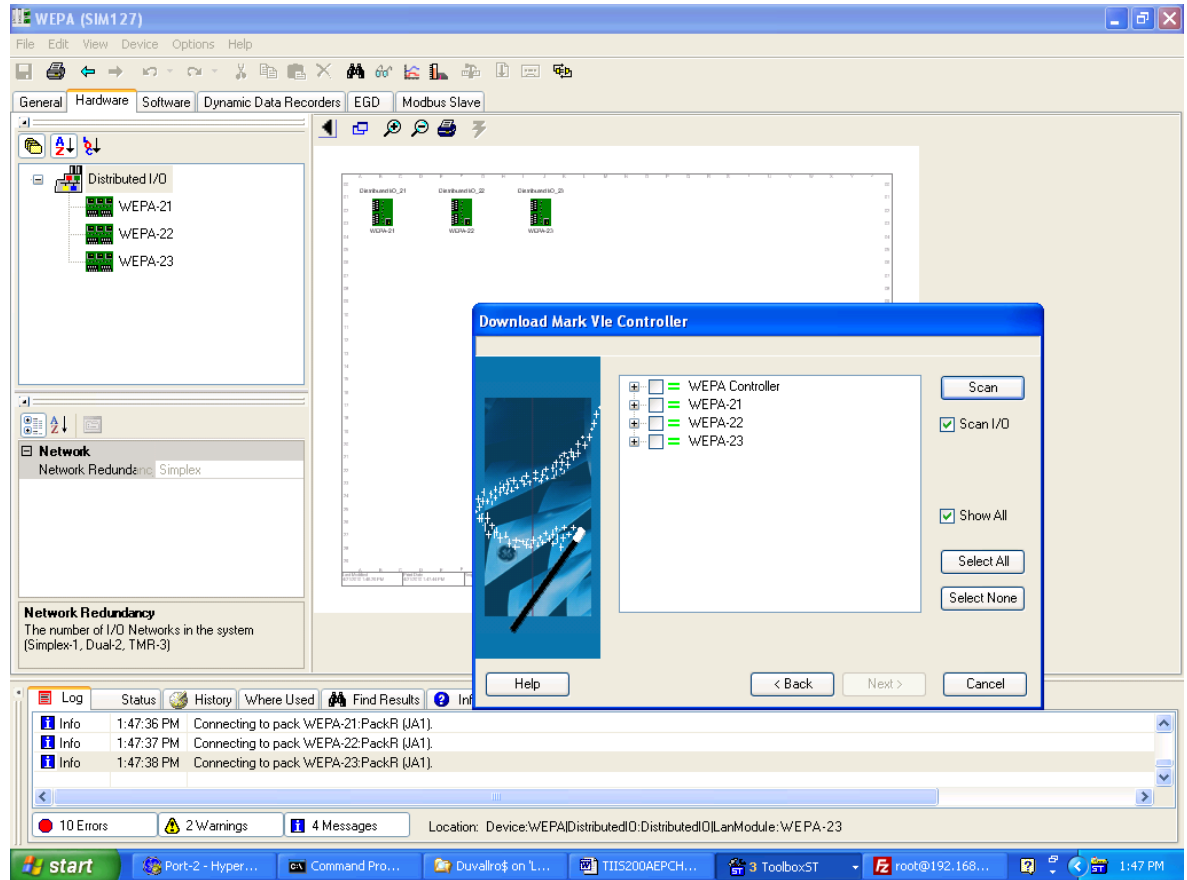
Follow the BPPB programming procedure to reload the BOOT and BASE code to the BPPB card.

6.5.9 Perform download to WEPA controller (BPPB on AEPC card).



6.5.10

6.5.11 Repeat Download Wizard process until all devices show green = sign.



6.5.12

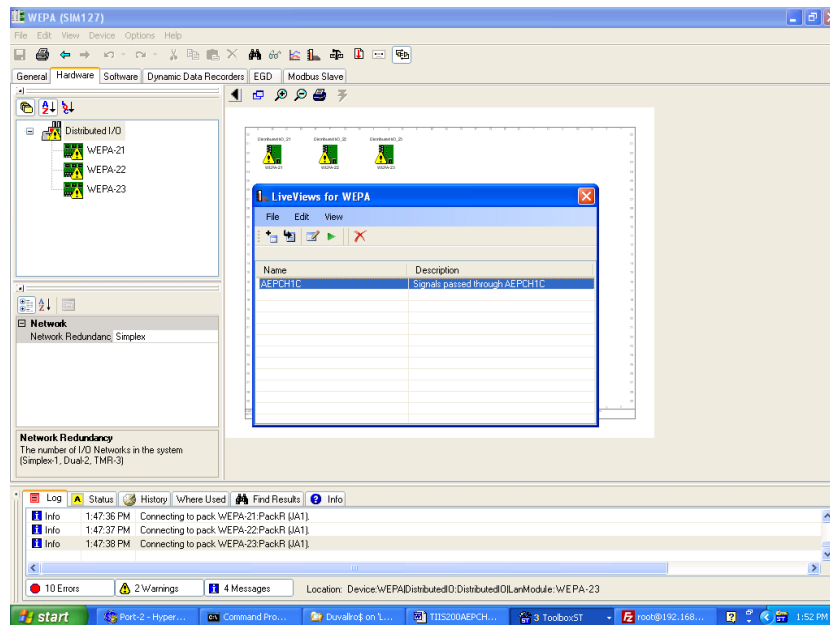
6.5.13 Click “Device” then “Online” to go online with system.

6.5.14 All three WEPA devices should show yellow status triangles on the screen.

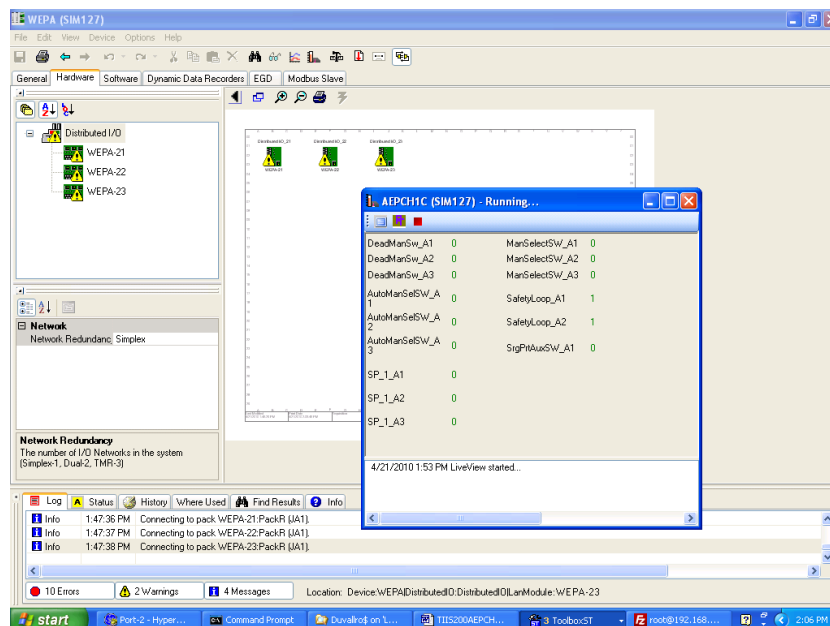
6.6 Live Signal View Screen (Switch Inputs)

6.6.1 Open the Live Signal View select screen by clicking on “Views” then “Live Views”.

6.6.2 Select the “AEPCH1C” view screen and click the Green Right Arrow (play) button to open active screen.



6.6.3



6.6.4

6.6.5 Set SW-1 through SW-6 to the left (open position).

6.6.6 Using the following table, verify the operation of the input signals by toggling the input switches.

Switch	Live View Signal	Open	Closed
SW-1	AutoManSelSW_A1	0	1
	AutoManSelSW_A2	0	1
	AutoManSelSW_A3	0	1
SW-2	ManSelectSW_A1	0	1
	ManSelectSW_A2	0	1
	ManSelectSW_A3	0	1
SW-3	SrgPrtAuxSW_A1	0	1
SW-4	DeadManSW_A1	0	1
	DeadManSW_A2	0	1
	DeadManSW_A3	0	1
SW-5	SP_1_A1	0	1
	SP_1_A2	0	1
	SP_1_A3	0	1
SW-6	SafetyLoop_A1	0	1
	SafetyLoop_A2	0	1

6.6.7 Set SW-1 through SW-6 to the left (open position).

6.7 Meter Checks

6.7.1 Using the following table, verify the selected items by rotating SW-9 selector switch.

Switch Selection	Meter Setting	Reading	
Position 1 – 72 Volt Supply	DC Volts	N/A – For future use	
Position 2 – 48 Volt Supply	DC Volts	48V +/- 10%	
Position 3 – 24 Volt Supply	DC Volts	24V +/- 10%	
Position 4 – CAN A1 Supply	DC Volts	17V +/- 0.4 volts	
Position 5 – CAN A2 Supply	DC Volts	17V +/- 0.4 volts	
Position 6 – CAN A3 Supply	DC Volts	17V +/- 0.4 volts	
Position 7 – CAN A3 Termination	Ohms	120.8 Ohm +/- 1.2	
Position 8 – E-Stop Loop	Ohms	< 5 Ohms	
Position 9 and above	N/A	N/A – For future use	

6.8 Test Complete

7. ATTACHMENTS

7.1 Fixture photos

