



OVATION[®]

EXPERT CONTROL SYSTEM

OV150-WIN ***Ovation Maintenance Course***

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COURSE OBJECTIVES

Upon Successful Completion of this course the student will be able to:

- **Understand** the typical Ovation Distributed Control System.
- **Use** Ovation Software Tools to Perform Basic Maintenance and Troubleshooting
- **Perform** Controller Diagnostics and Maintenance
- **Diagnose** and Troubleshoot I/O Subsystems
- **Perform** Tests of I/O Modules
- **Understand** Ovation Power and Grounding Requirements

Module 1

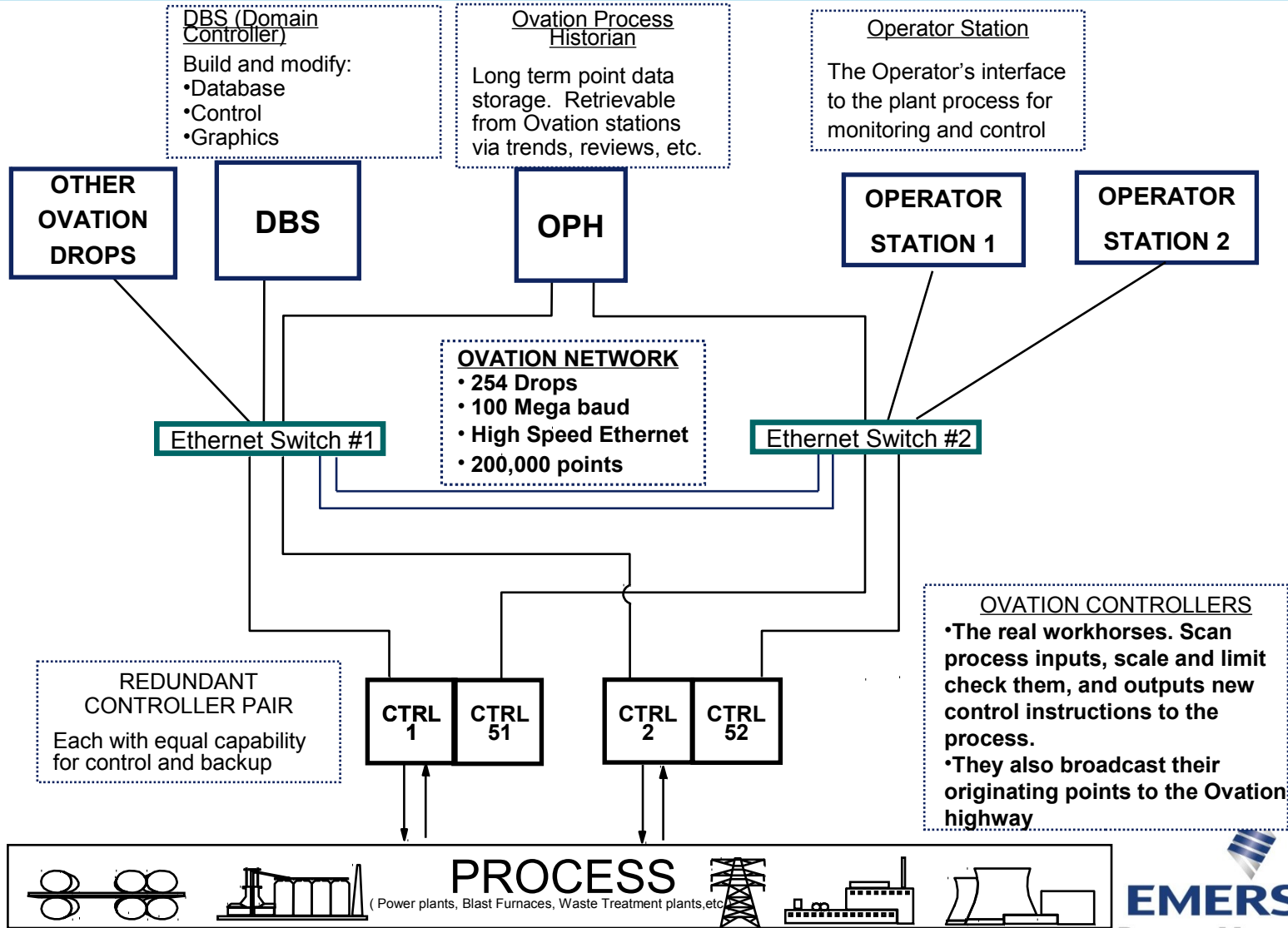
OVATION SYSTEM OVERVIEW



MODULE 1 OBJECTIVES

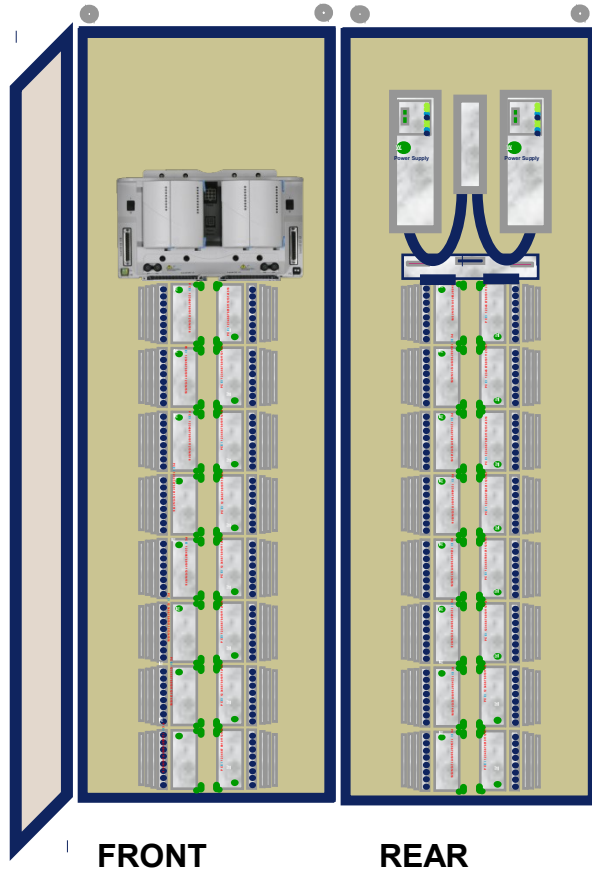
- Understand the Ovation DCS.
- Describe the function of all the Ovation HMI drops.
- Describe the function of the Ovation controller drops.
- Understand the function of the Ovation network.

OVATION TYPICAL SYSTEM CONFIGURATION



OVATION CONTROLLER MAJOR FUNCTIONS

Ovation Controller Cabinet

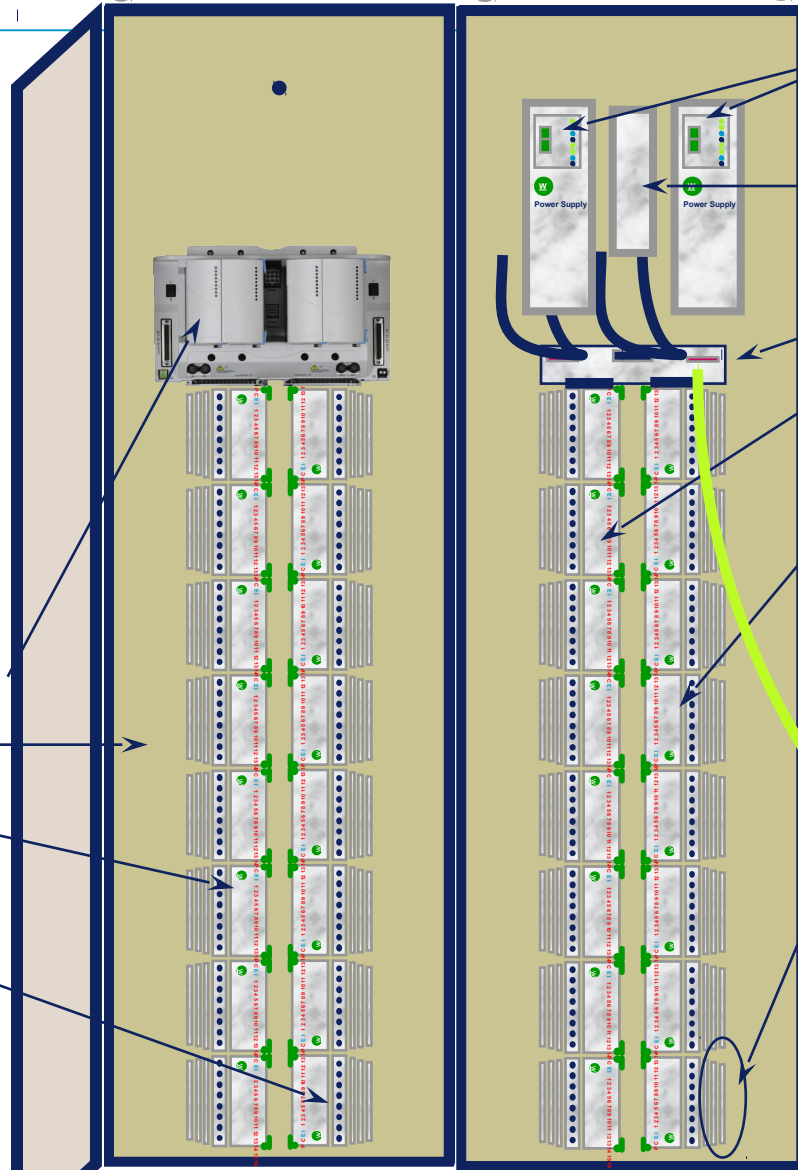


- DATA ACQUISITION
- MODULATING CONTROL
- SEQUENTIAL CONTROL

OVIATION CONTROLLER – CABINET LAYOUT

Front

Rear

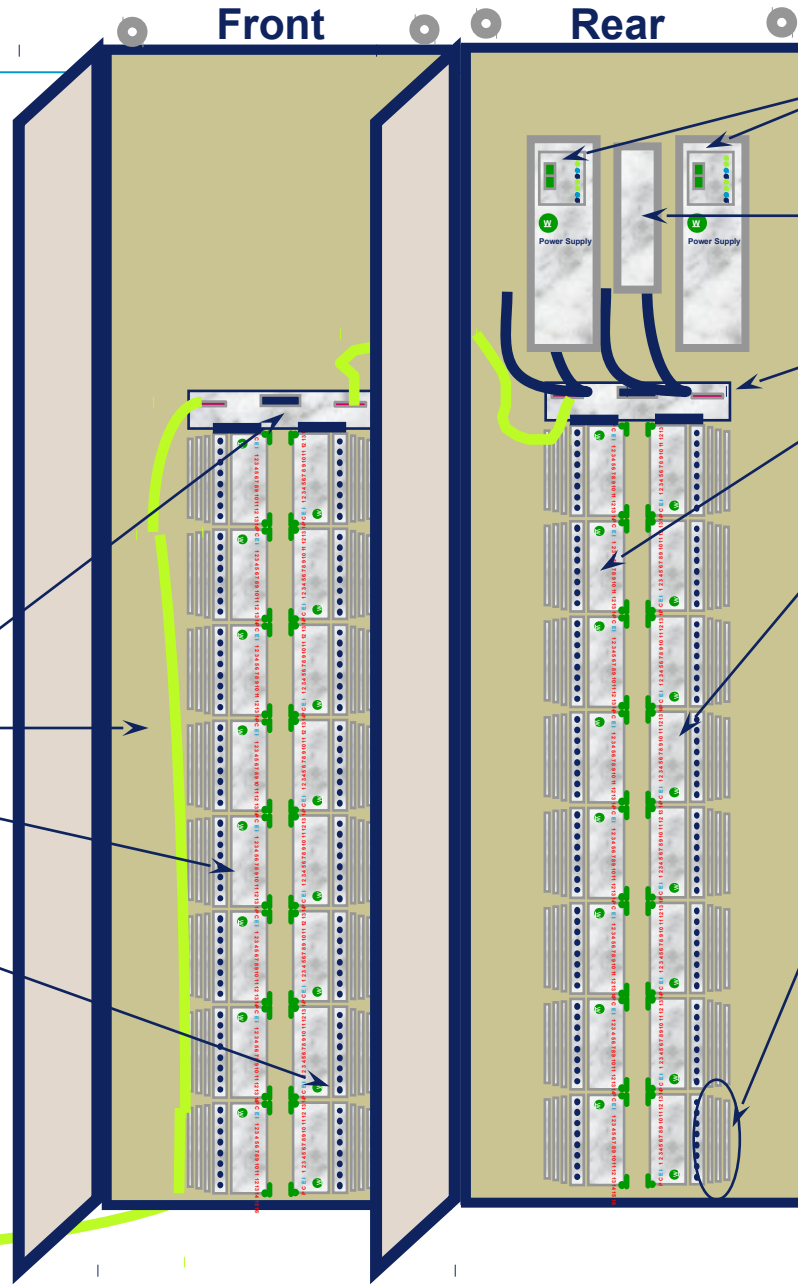


- Redundant Power Supplies
- Power Distribution Module
- Transition Panel
- I/O branch 3
 - 8 Modules
- I/O branch 4
 - 8 Modules

- Controller chassis
- Mounting plate
- I/O branch 1
 - 8 Modules
- I/O branch 2
 - 8 Modules

• I/O terminal blocks at each module

OVATION CONTROLLER – EXPANSION CABINET LAYOUT

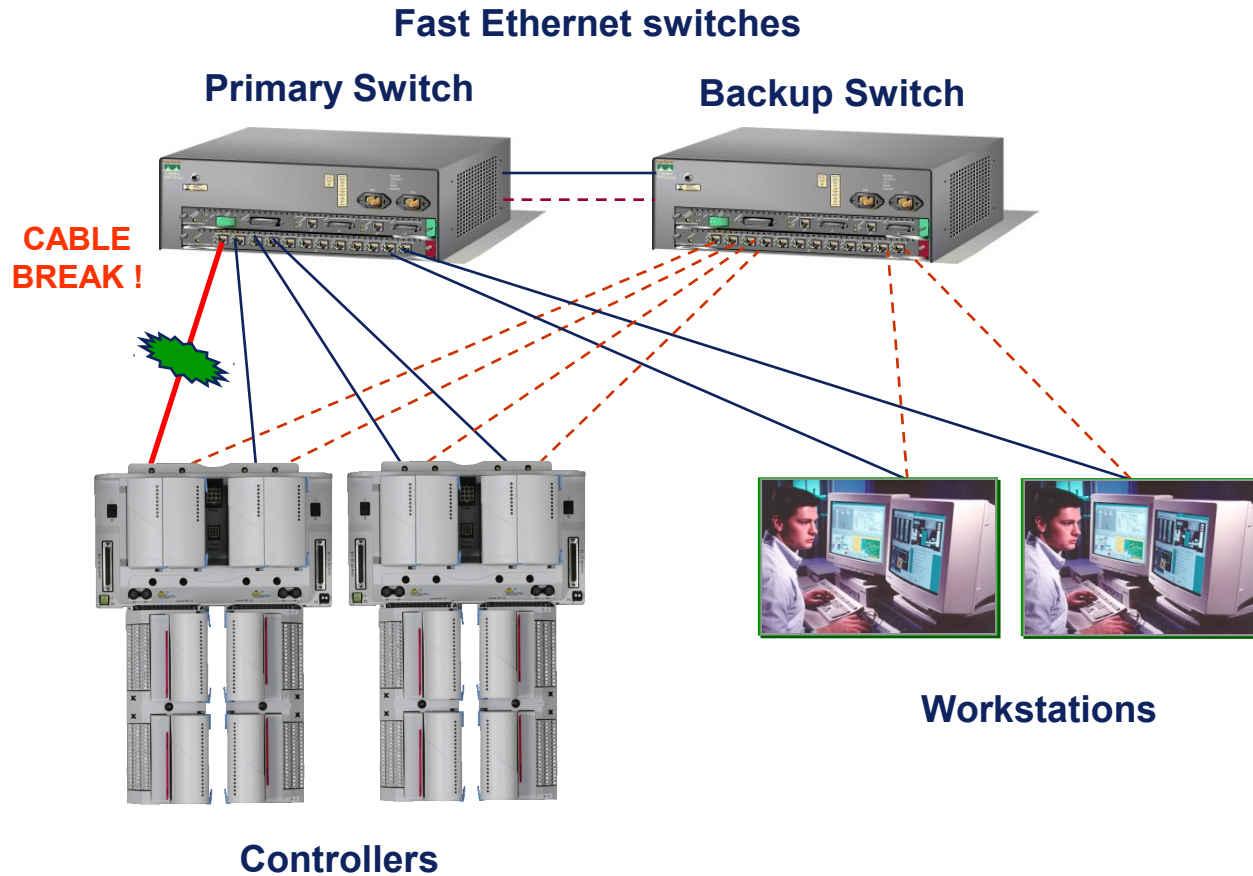


- Redundant Power Supplies
- Power Distribution Module
- Transition Panel
- I/O branch 7
 - 8 Modules
- I/O branch 8
 - 8 Modules

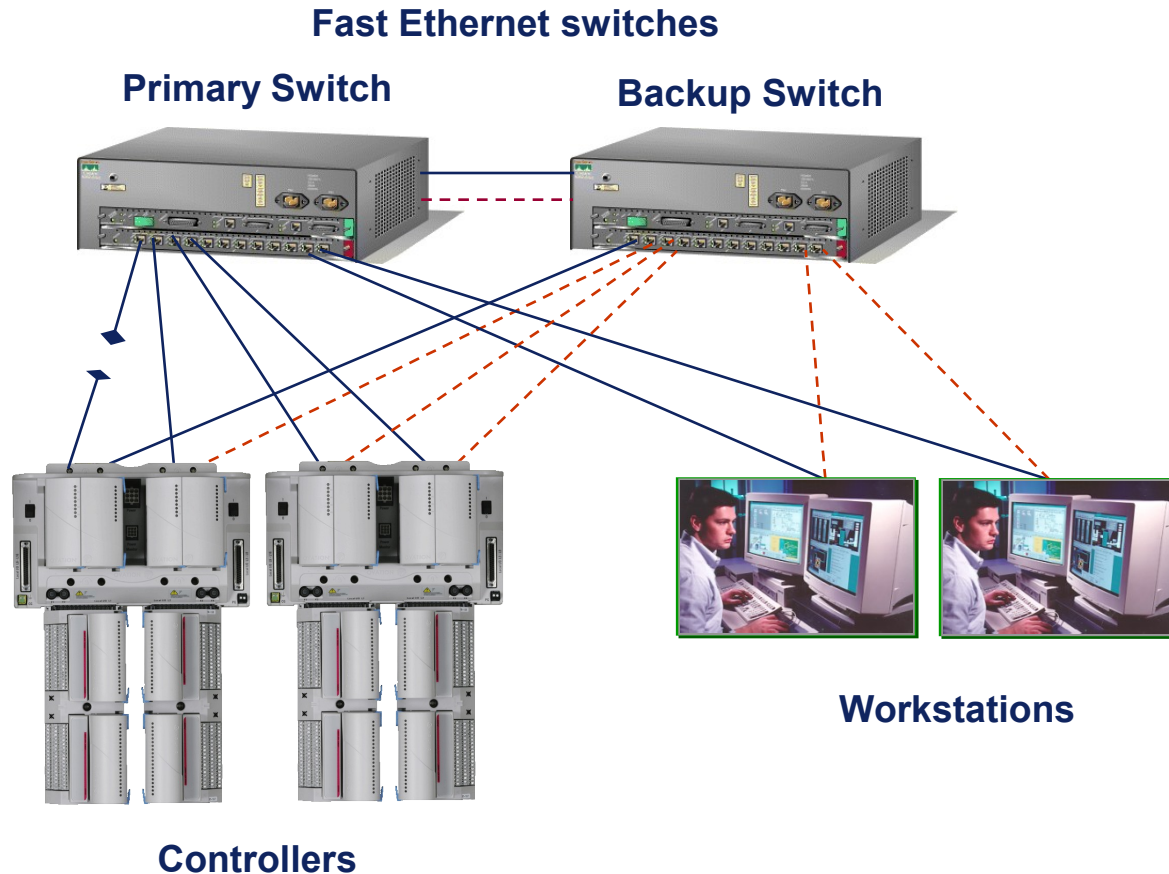
- Transition Panel
- Mounting plate
- I/O branch 5
 - 8 Modules
- I/O branch 6
 - 8 Modules

- I/O terminal blocks at each module

Ovation Network – Fault Tolerance



OVATION NETWORK – FAULT TOLERANCE



Module 2

MMI STATION FUNCTIONS USEFUL FOR SYSTEM MAINTENANCE AND TROUBLESHOOTING



MODULE 2 OBJECTIVES

- Utilize the Alarm List and History and understand different alarm types
- Use the Point information window to identify process point status
- Understand the meaning of Sensor Alarms and different qualities of signals
- Use Point Review function to identify possible problem areas

SIGNALS/PROCESS POINTS

- Process points – Database records
- Record Types – Signal types
- Signal value
- Signal status: normal vs. in alarm
- Signal quality (creditability)
- Signal possible source

OVATION DATABASE RECORD TYPES

<u>Record Type</u>	<u>Abbr.</u>	<u>Monitor status of</u>	<u>Examples</u>	<u>Point name break down</u>
Drop record	DU	Computers (MMI's or Controllers)	DROP100, DROP1	
Node record	RN	Power supplies, local and remote nodes	D002P1 D001P2N4	Drop 2 PCI slot 1, Drop1 PCI slot 2 remote node 4
Module record	RM	Configured I/O modules	D001P1B4L3	Drop1 PCI 1 Branch 4 Slot 3
◆ Long digital	LD	Digital points, two possible values (1 or 0), both software and hard wired.		
◆ Long analog	LA	Points with a range of values, both software and hardware. <i>Look for engineering units (PSI, %, °F, in Hg)</i>		
◆ Long Packed	LP	16 digital bits that are treated as a single point or “word”.		
Long control	LC	Algorithm points created by Ovation Control Builder for use on control sheets		

Ovation Solaris = The first three digits are the originating Drop number. 001-00123 is a DROP1 originated point

Ovation for Windows = Prefaced with **OCB** for Ovation Control Builder

◆ Note: There are no “standard” Ovation point names and therefore, no examples are given.

POINT QUALITY

Generated by the Controller based on the operational readiness of a Process Point

Good - On scan, within Sensor Limits, within reasonability limits, Power ok, or Test Mode on

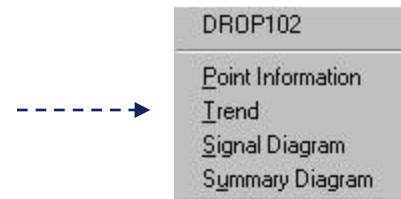
Fair - Entered Value or Test Mode on

Poor - Out of Engineering Limits, Over-range on AI module, some special algorithm, or Test mode on

Bad - Off scan, Out of Sensor limits, Out of Reasonability Limits, Power bad on a Digital point, bad card, or Test mode on

ALARM SYSTEM

- 15000 Alarm buffer at Operator Station
- Alarms are Color Coded by Priority
- Alarm Acknowledge and Reset functions are available
- Right Click to Point Menu



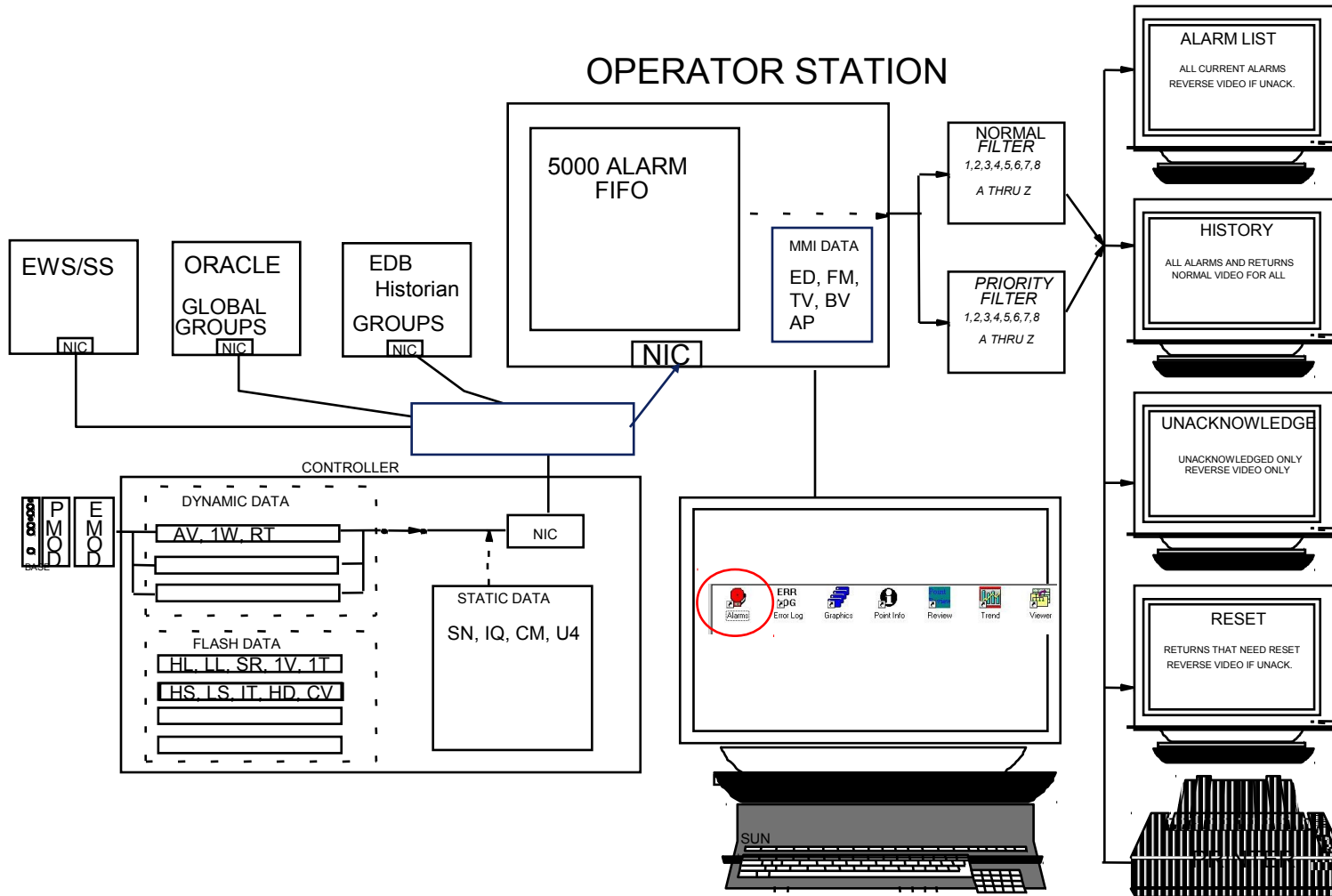
ALARM COLOR CODES

PRIORITY	COLOR
Priority 1	Red
Priority 2	Magenta
Priority 3	Yellow
Priority 4	
Priority 5	Purple
Priority 6	Tan
Priority 7	Brown
Priority 8	Blue
Returns	Green

**Default
Ovation Alarm
color scheme**

**Changes are
made by the
Project Engineer.**

Ovation Alarm Flow



ALARM WINDOW

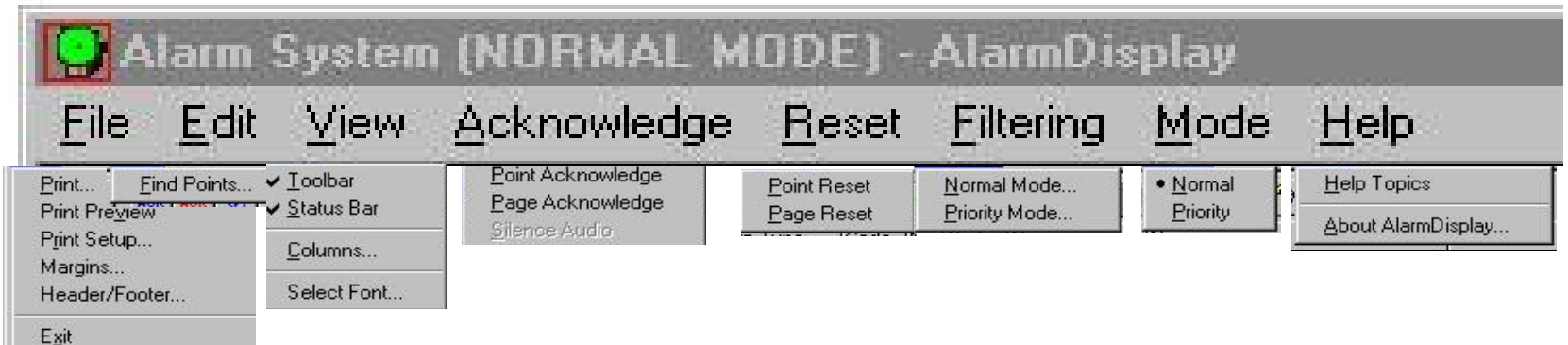
The screenshot displays a Windows desktop environment with a blue background. On the left side, there is a vertical taskbar with icons for My Computer, Internet Explorer, Network Neighborhood, Inbox, Recycle Bin, Dell Documents, My Briefcase, Command Prompt, Windows NT Explorer, (H:) Zip 250, and Ovation Applications. The Ovation Applications folder is open, showing a sub-window titled "Alarm System (NORMAL MODE) - AlarmDisplay".

The "Alarm System (NORMAL MODE) - AlarmDisplay" window contains a table with the following columns: Date, Time, Alarm, Code, Name, Description, AP, AY, Value, Q, Units, Limit, and Incr. The table lists various system events, including returns and alarms, with corresponding values and units.

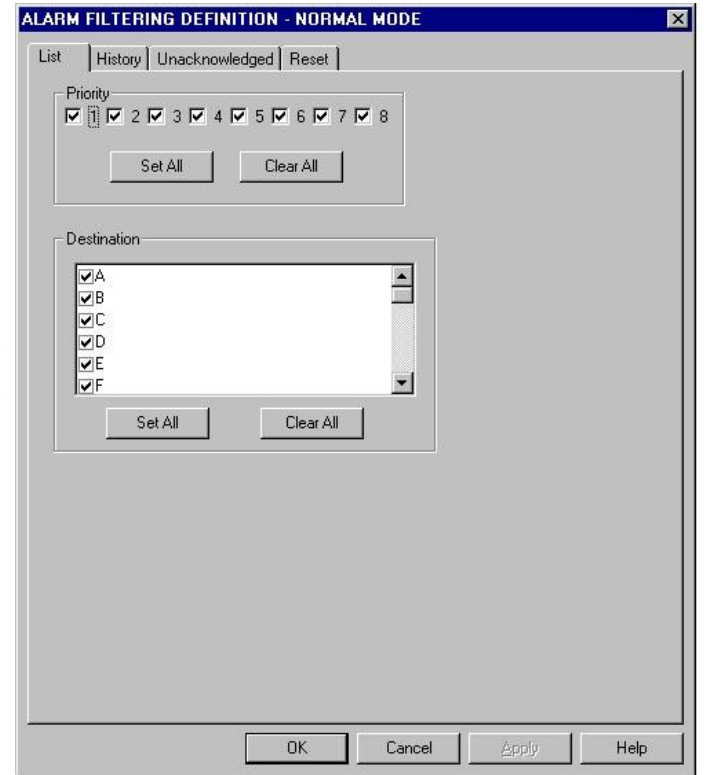
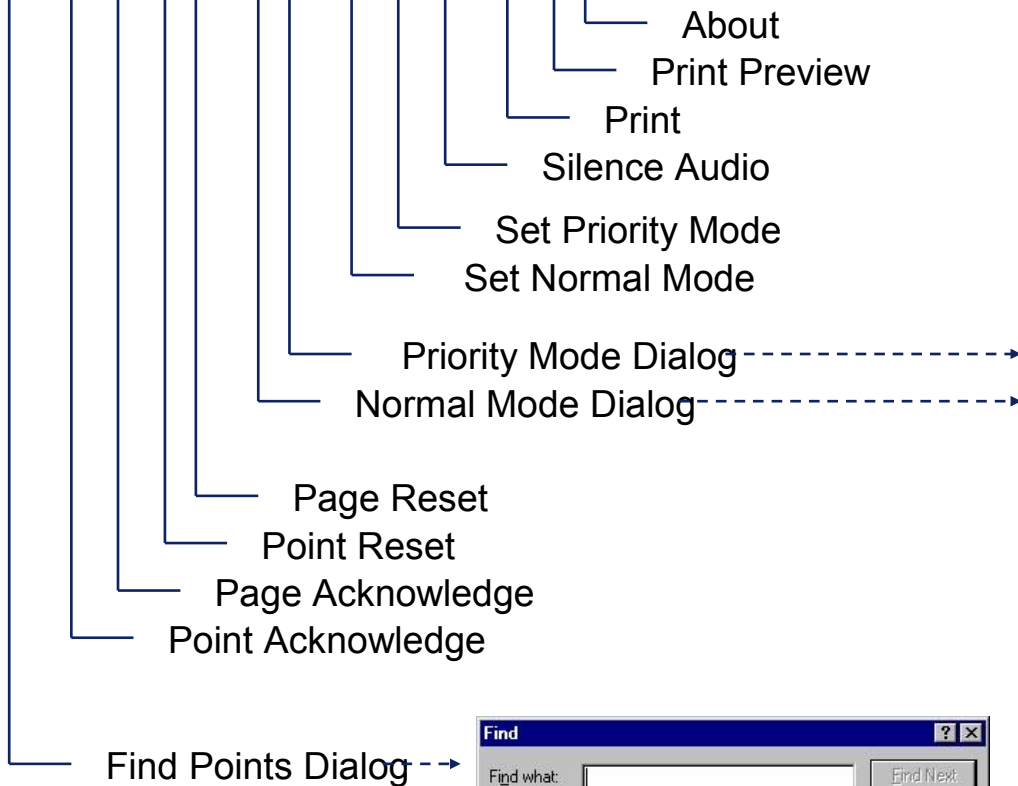
Date	Time	Alarm	Code	Name	Description	AP	AY	Value	Q	Units	Limit	Incr
1/3/03	12:51:45 PM	RETURN	DROP3			1	-					
1/3/03	12:51:45 PM	RETURN	DROP2			1	-					
1/3/03	12:51:45 PM	RETURN	DROP1		Primary Controller	1	-					
12/31/02	3:17:18 PM	RETURN	PA301			1	-	59.912				
12/31/02	3:16:48 PM	RETURN	SW301			1	-	OKAY	0			
12/31/02	3:16:36 PM	RETURN	LED301			1	-	OKAY	0			
12/31/02	3:01:37 PM	RETURN	SW201			1	-	okay	0			
12/31/02	3:01:27 PM	RETURN	LED201			1	-	okay	0			
12/31/02	2:44:39 PM	RETURN	SW101			1	-	okay	0			
12/31/02	2:44:18 PM	RETURN	LED101			1	-	stop	0			
12/31/02	2:13:01 PM	ALARM	TANK103LOWLEVEL		System 103 Simulation	1	-	TRUE	1			
12/31/02	2:13:00 PM	LOWVI	TANK103LEVEL		System 103 Simulation	1	-	5.499		FEET	8.000	
12/31/02	2:12:59 PM	LOWVI	TANK103LEVELB		System 103 Simulation	1	-	5.980		FEET	8.000	
12/31/02	2:12:59 PM	LOWVI	TANK103LEVELA		System 103 Simulation	1	-	5.000		FEET	8.000	
12/31/02	2:12:38 PM	RETURN	D003P1B1L3			1	-	0000000000000000		0000000000000000		
12/31/02	2:12:38 PM	ALARM	C2PG1			1	-	000110001000010		0000100000000000		
12/31/02	2:12:38 PM	RETURN	D003P1B1L1			1	-	111111110000000		0000000000000000		
12/31/02	2:12:38 PM	RETURN	D003P1B1L4			1	-	010000000000000		0000000000000000		
12/31/02	2:12:38 PM	RETURN	D003P1B1L2			1	-	111110000011111		0000000000000000		
12/31/02	2:12:38 PM	ALARM	D003P2B1L1			1	-	111111110011100		0000000000000100		
12/31/02	2:12:38 PM	ALARM	D003P2B1L2			1	-	111111110011100		0000000000000100		
12/31/02	2:12:36 PM	ALARM	PUMP103STATUS		System 103 Simulation	1	-	FALSE	0			
12/31/02	2:12:08 PM	ALARM	TANK102LOWLEVEL		System 102 Simulation	1	-	TRUE	1			
12/31/02	2:12:07 PM	LOWVI	TANK102LEVEL		System 102 Simulation	1	-	5.461		FEET	8.000	
12/31/02	2:12:06 PM	LOWVI	TANK102LEVELA		System 102 Simulation	1	-	5.000		FEET	8.000	
12/31/02	2:12:06 PM	LOWVI	TANK102LEVELB		System 102 Simulation	1	-	5.920		FEET	8.000	
12/31/02	2:11:45 PM	ALARM	C2PG1			1	-	000110001000010		0000100000000000		
12/31/02	2:11:43 PM	ALARM	PUMP102STATUS		System 102 Simulation	1	-	FALSE	0			
12/31/02	2:10:56 PM	ALARM	TANK101LOWLEVEL		System 101 Simulation	1	-	TRUE	1			
12/31/02	2:10:54 PM	LOWVI	TANK101LEVEL		System 101 Simulation	1	-	5.382		FEET	8.000	
12/31/02	2:10:53 PM	LOWVI	TANK101LEVELA		System 101 Simulation	1	-	5.000		FEET	8.000	

At the bottom of the window, there is a status bar with the following information: Total Alarms: 42, Unacknowledged: 42, Resets: 0, and buttons for FILTER and LAI.

ALARM MENUS



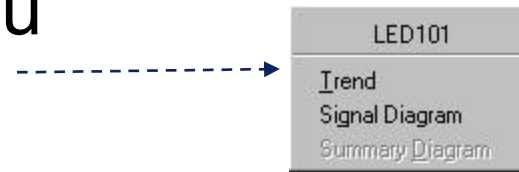
ALARM TOOLBAR



Identical (except title) for both.

POINT INFORMATION

- Application to bring up information on individual points.
- Points can be searched for using the file menu or the search button.
- Information is presented in a tabular fashion
- Right Click to Point menu



POINT INFO WINDOW

Point Information

File View Help

Point Name: PA101 pa101 Search

1st Pot on Panel 63.355 PCT

Point Config Security Value/Status Mode Hardware Initial Alarm Instrumentation Limits Display Ancillary

System ID	ID	2147492152	80002138H
Point Alias	PA		
Point Description	ED	1st Pot on Panel	
Record Type	RT	91 (LA) Analog	
Characteristics	KR	-----	
Originating Drop Number	DO	1	
Frequency		Slow	
Point Version Number	VN	447	

Ready LAI

SEARCHING FOR POINTS

Point Information

File View Help

Point Name: PA101 pa101 Search

1st Pot on Panel 63.355 PCT

Point Config Security Value/Status Mode Hardware Initial Alarm Instrumentation Limits Display Ancillary

System ID	ID	2147492152	80002138H
Point Alias	PA		
Point Description	ED	1st Pot on Panel	
Record Type	RT	91 (LA) Analog	
Characteristics	KR	-----	
Originating Drop Number	DD	1	
Frequency		Slow	
Point Version Number	VN	447	

Ready

Find Points

Filters

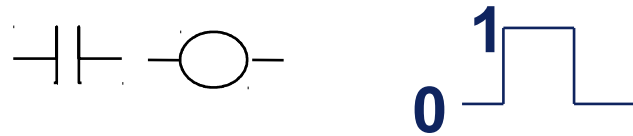
W3	ANALOG1
UNIT0	DROP100
DROP1/51	
DROP100	
DROP101	

2 points found

Apply Abort Search Dismiss

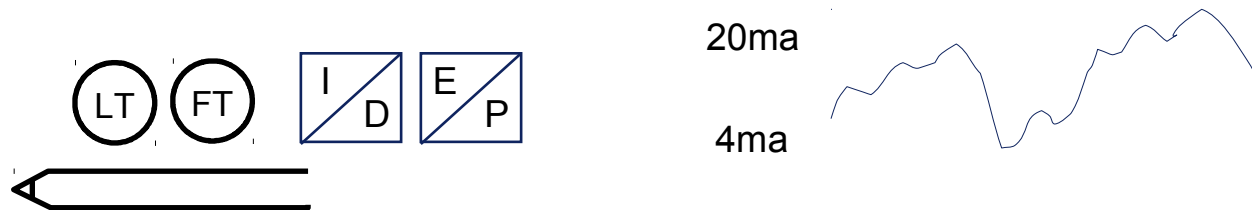
POINT INFORMATION TABS

•DIGITAL



Point	Config	Security	Value/Status	Mode	Hardware	Alarm	Display
--------------	--------	----------	--------------	------	----------	-------	---------

•ANALOG



Point	Config	Security	Value/Status	Mode	Hardware	Initial	Alarm	Instrumentation	Limits	Display
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POINT TAB

Point Information File View Help

Point Name: Sw101 Sw101 Search

0 (okay)

Point Config Security Value/Status Mode Hardware Alarm Display

System ID	ID	2147492181	80002155H
Point Alias	PA		
Point Description	ED		
Record Type	RT	141 (LD) Digital	
Characteristics	KR	-----	
Originating Drop Number	DO	1	
Frequency		Slow	
Point Version Number	VN	4054	

Ready LAI

Digital

Point Information File View Help

Point Name: PA101 PA101 Search

1st Pot on Panel 40.723 PCT

Point Config Security Value/Status Mode Hardware Initial Alarm Instrumentation Limits Display

System ID	ID	2147492151	80002137H
Point Alias	PA		
Point Description	ED	1st Pot on Panel	
Record Type	RT	91 (LA) Analog	
Characteristics	KR	-----	
Originating Drop Number	DO	1	
Frequency		Slow	
Point Version Number	VN	4421	

Ready LAI

Analog

CONFIG TAB

Digital

Point Information File View Help

Point Name: SW101 [SW101.UNIT0@W3] Search

0 (okay)

Point **Config** Security Value/Status Mode Hardware Alarm Display

Alarm/Limit Configuration

Alarm/Limit Configuration	LB	00000004H
SID Configuration	SJ	00000000H
Flags	FL	00000001H
Digital Configuration	EQ	0000H
Oscillation Count	OT	0
Relay Close Delay Time (msec)	RL	0

Rates

DPP Scan Rate	OR	5
Processing Task Index	PZ	0

Power Check Channel Numbers

Power Check Channel	PG	16
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Ready LAI

Analog

Point Information File View Help

Point Name: PA101 [PA101] Search

1st Pot on Panel 40.674 PCT

Point **Config** Security Value/Status Mode Hardware Initial Alarm Instrumentation Limits Display

Alarm/Limit Configuration

Alarm/Limit Configuration	LB	00000000H
SID Configuration	SJ	00000000H
Flags	FL	00000001H

Rates

DPP Scan Rate	OR	5
Processing Task Index	PZ	0

Ready LAI

SECURITY TAB

Digital

Point Name: SW101 [SW101.LUNIT0@w3] Search

0 (okay)

Point	Config	Security	Value/Status	Mode	Hardware	Alarm	Display
Security Groups:		GS	00000001H				
Security Group 1		instructors				YES	
Security Group 2						NO	
Security Group 3						NO	
Security Group 4						NO	
Security Group 5						NO	
Security Group 6						NO	
Security Group 7						NO	
Security Group 8						NO	
Security Group 9						NO	
Security Group 10						NO	
Security Group 11						NO	
Security Group 12						NO	
Security Group 13						NO	
Security Group 14						NO	
Security Group 15						NO	

Analog

Point Name: PA101 [PA101] Search

1st Pot on Panel 40.674 PCT

Point	Config	Security	Value/Status	Mode	Hardware	Initial	Alarm	Instrumentation	Limits	Display
Security Groups:		GS	00000001H							
Security Group 1		instructors					YES			
Security Group 2							NO			
Security Group 3							NO			
Security Group 4							NO			
Security Group 5							NO			
Security Group 6							NO			
Security Group 7							NO			
Security Group 8							NO			
Security Group 9							NO			
Security Group 10							NO			
Security Group 11							NO			
Security Group 12							NO			
Security Group 13							NO			
Security Group 14							NO			
Security Group 15							NO			

VALUE/STATUS TAB

Digital

Analog

Point Information

File View Help

Point Name: SW101 SW101.UNIT0@w3 Search

0 (okay)

Point Config Security **Value/Status** Mode Hardware Alarm Display

Value Params

Scan: On Scan: On Off

Quality: GOOD Digital Value: 1 0

Digital Value: okay 0 Apply Cancel

Out of Service: NO

Reasons

Status Words

First Digital Status: 1W 00002000H
(Binary) 0000 0000 0000 0000 0010 0000 0000 0000

Second Digital Status: 2W 00000000H
(Binary) 0000 0000 0000 0000 0000 0000 0000 0000

Ready LAI

Point Information

File View Help

Point Name: PA101 PA101 Search

1st Pot on Panel 40.649 PCT

Point Config Security **Value/Status** Mode Hardware Initial Alarm Instrumentation Limits Display

Value Params

Scan: On Scan: On Off

Clamp: On Clamp: On Off

Quality: GOOD

Analog Value: AV 40.649

Out of Service: NO Apply Cancel

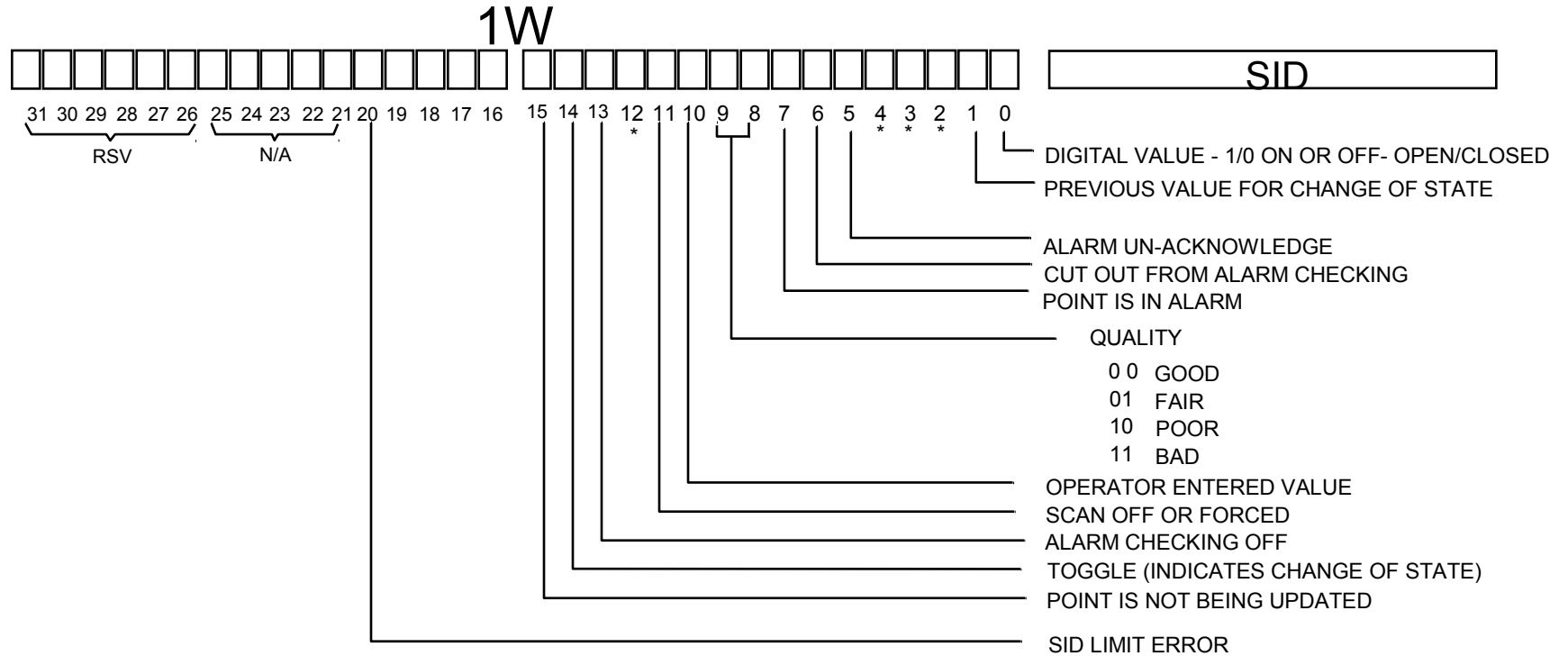
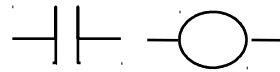
Reasons

Status Words

First Analog Status: 1W 00004000H

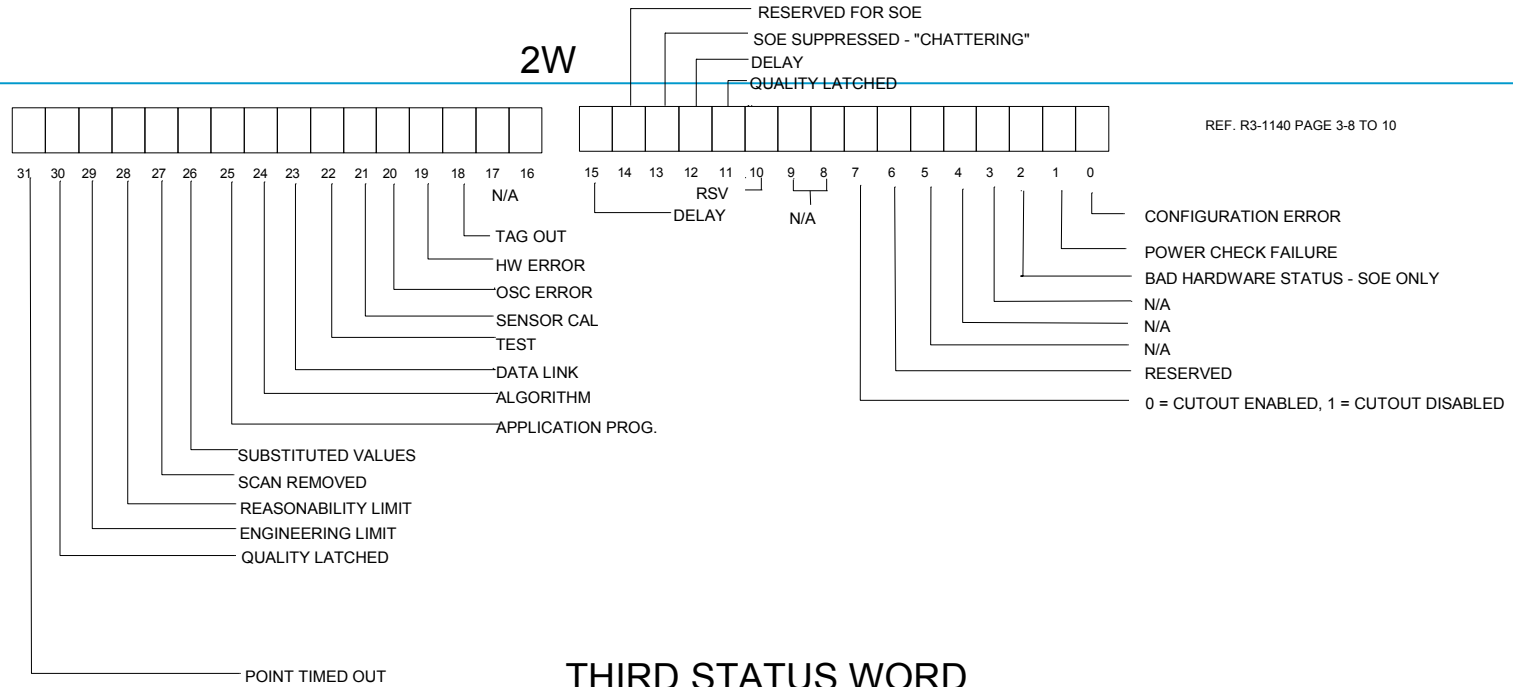
Ready LAI

DIGITAL POINT ON OVATION HIGHWAY

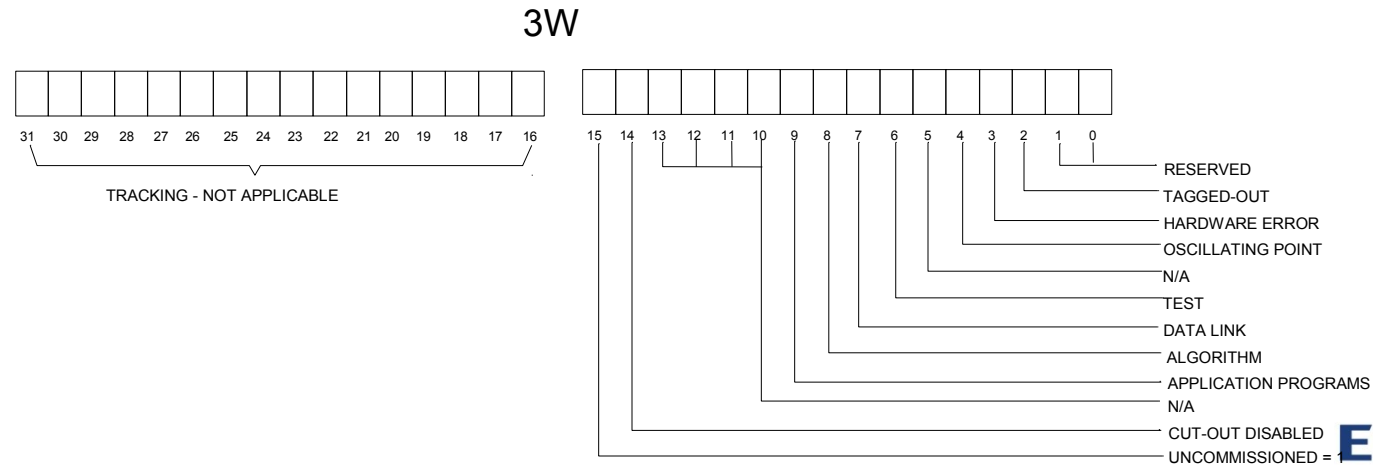


Refer to R3 – 1140 Ovation Record Types Reference Manual

•SECOND STATUS WORD

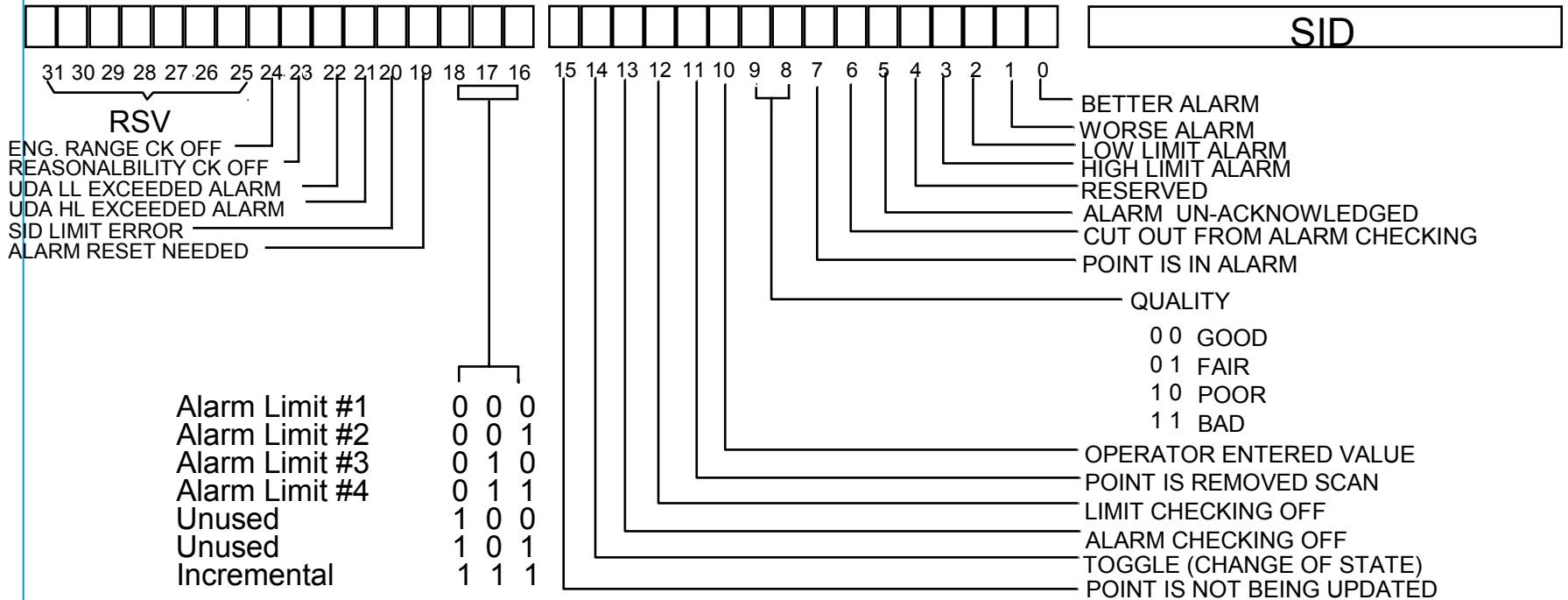


THIRD STATUS WORD



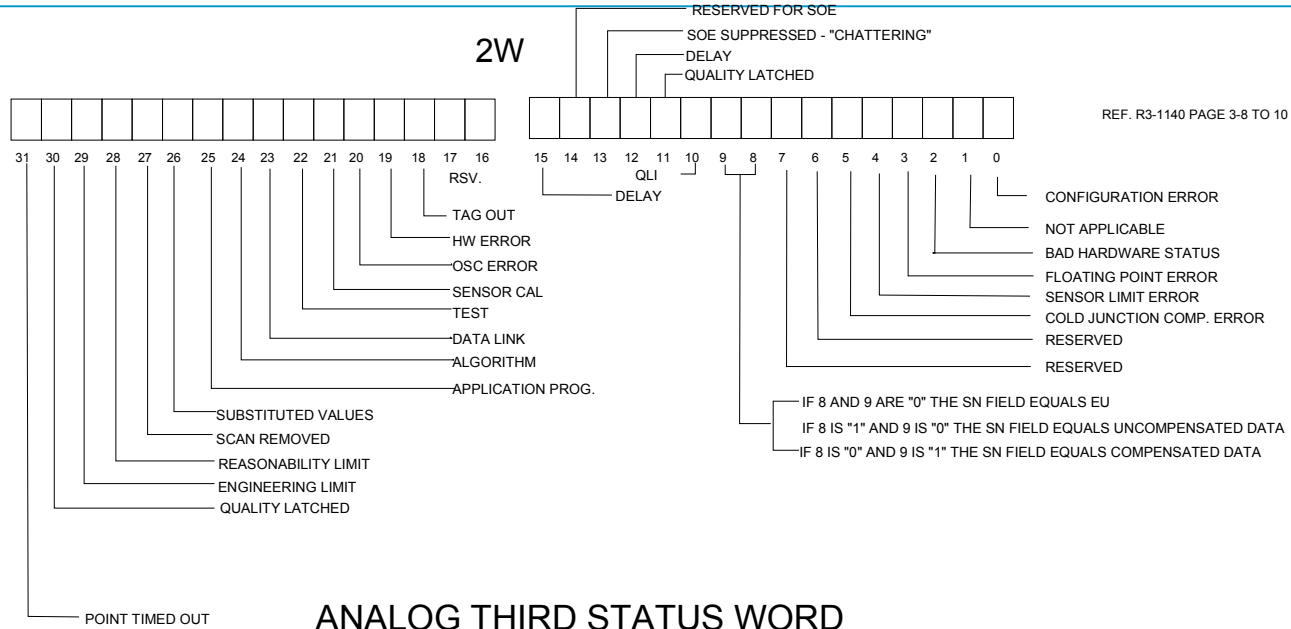
ANALOG POINT ON OVATION HIGHWAY

1W

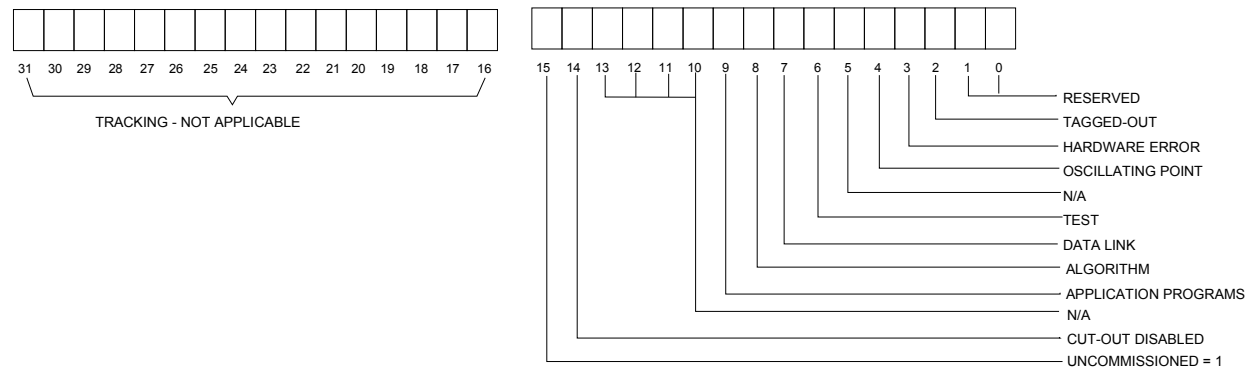


ANALOG 2W - 3W

ANALOG SECOND STATUS WORD



3W



MODE TAB

Digital

Analog

Point Information
File View Help

Point Name: SW101 SW101.UNIT0@W3 Search

0 (okay)

Point Config Security Value/Status **Mode** Hardware Alarm Display

Mode

Latched Quality:

Latched Quality:
 GOOD
 FAIR
 POOR
 BAD

Test Mode: Off

Test Mode:
 On Off

Apply Cancel

Command Word

Command Word: ZY

Ready LAI

Point Information
File View Help

Point Name: PA101 PA101 Search

1st Pot on Panel 40.698 PCT

Point Config Security Value/Status **Mode** Hardware Initial Alarm Instrumentation Limits Display

Mode

Latched Quality:

Latched Quality:
 GOOD
 FAIR
 POOR
 BAD

Test Mode: Off

Test Mode:
 On Off

Range Checking

Engineering Range Check: On Engineering Range Check:
 On Off

Reasonability Range Check: On Reasonability Range Check:
 On Off

Apply Cancel

Ready LAI

INITIAL TAB

Digital

Analog

The screenshot shows a software window titled "Point Information" with a menu bar (File, View, Help). The main area contains the following fields and controls:

- Point Name: PA101 (text box) | PA101 (dropdown menu) | Search (button)
- 1st Pot on Panel: (text box) | 40.698 (text box) | PCT (text box)
- Navigation tabs: Point, Config, Security, Value/Status, Mode, Hardware, **Initial**, Alarm, Instrumentation, Limits, Display
- Initial Analog Value: IV (text box) | 0.000 (text box)

At the bottom left of the window, it says "Ready" and at the bottom right, there is a "LAI" label.

HARDWARE TAB

Digital

The screenshot shows the 'Point Information' window for point SW101. The 'Hardware' tab is selected, and the value is 0 (okay). The table below lists the parameters for this point.

Parameter Name	Value
IO type	Ovation
IO module	1.1.2 Contact Input w/ Onboard 48V wetting
IO channel	1
IO task index	2
Relay module	
Contact type	
Termination type	
Power source	
Ground	
Half shell	
Terminal 1	
Terminal 2	
Terminal 3	
Terminal 4	
Terminal 5	
Terminal 6	

Analog

The screenshot shows the 'Point Information' window for point PA101. The 'Hardware' tab is selected, and the value is 63.428 PCT. A warning message is displayed: 'A version mismatch exists between the database values and the current realtime values.' The table below lists the parameters for this point.

A version mismatch exists between the database values and the current realtime values.

Parameter Name	Value
IO type	Ovation
IO module	1.1.4 Analog Input (13 bit) -5 to 5V
IO channel	1
IO task index	2
Termination type	
Power source	
Ground	
Half shell	
Terminal 1	
Terminal 2	
Terminal 3	
Terminal 4	
Terminal 5	
Terminal 6	

ALARM TAB

Digital

The screenshot shows the 'Digital' alarm configuration window. The title bar is 'Point Information'. The 'Point Name' is 'SW101' and the search dropdown shows 'SW101.UNIT0@w3'. The 'Alarm' tab is selected. The 'Alarm Params' section includes: Alarm Check (Off), Auto Cutout (Enabled), Tagout (Enabled), Status Checking (AR, 0>1), Alarm Status (Not in alarm), Alarm Ack Status, and Alarm Sequence Number (AZ, 360481). The 'Configurations' section includes: Init Alarm Delay Time (1T, 0), Alarm Cutout (CX, 0), Destination (AY, -), Alarm Cutout Delay (CY, 0), Status Copy (SK, 80000023H), and Priority (AP, 01H). The 'Alarm Times' section shows Time Of First Alarm (Sec: U4, 10/30/00 1:46:19 PM) and Time Of First Alarm (NanoSec: 115, 200000000). The status bar shows 'Ready' and 'LAI'.

Analog

The screenshot shows the 'Analog' alarm configuration window. The title bar is 'Point Information'. The 'Point Name' is 'PA101' and the search dropdown shows 'PA101'. The 'Alarm' tab is selected. The 'Alarm Params' section includes: Alarm Check (On), Limit Check (On), Auto Cutout (Enabled), Tagout (Enabled), Alarm Status (Not in alarm), Alarm Ack Status, and Alarm Sequence Number (AZ, 366707). The 'Configurations' section includes: Init Alarm Delay Time (1T, 0), Alarm Cutout (CX, 0), Destination (AY, -), Alarm Cutout Delay (CY, 0), Status Copy (SK, 00000000H), and Priority (AP, 01H). The 'Alarm Times' section shows Time Of First Alarm (Sec: U4, 10/27/00 8:09:29 AM) and Time Of First Alarm (NanoSec: 115, 800000000). The status bar shows 'Ready' and 'LAI'.

INSTRUMENTATION TAB

Digital

Analog

N/A

The screenshot shows the 'Point Information' window with the 'Instrumentation' tab selected. The window title is 'Point Information' and it has a menu bar with 'File', 'View', and 'Help'. The main area contains the following fields and sections:

- Point Name: PA101 (text box) and PA101 (dropdown menu) with a Search button.
- 1st Pot on Panel: (text box) and 40.674 (text box) with a PCT button.
- Navigation tabs: Point, Config, Security, Value/Status, Mode, Hardware, Initial, Alarm, **Instrumentation**, Limits, Display.
- Scaling** section:
 - Min Scale Value: BV 0.000
 - Max Scale Value: TV 100.000
 - Bottom Output Scale: BW 0.000
 - Top Output Scale: TW 0.000
- Sensor** section:
 - Sensor Low Limit: LS -0.10000000
 - Sensor High Limit: HS 5.00000000
 - Low Sensor Deadband Range: BL 0.00000000
 - High Sensor Deadband Range: BH 0.00000000
- Cold Junction Compensation** section:
 - Cold Junction Comp SID: CE 0
- Conversion** section:
 - Conversion Type Index: CV 1
 - Conversion Coeff #1: 1V 20.00000000
 - Conversion Coeff #2: 2V 0.00000000
 - Conversion Coeff #3: 3V 0.00000000
 - Conversion Coeff #4: 4V 0.00000000
 - Conversion Coeff #5: 5V 0.00000000
 - Conversion Coeff #6: 6V 0.00000000
 - Conversion Coeff #7: 7V 0.00000000
 - Conversion Coeff #8: 8V 0.00000000

Ready LAI

LIMITS TAB (TOP)

Digital

Analog

N/A

Point Information

File View Help

Point Name: PA101 [PA101] Search

1st Pot on Panel 40.698 PCT

Point Config Security Value/Status Mode Hardware Initial Alarm Instrumentation **Limits** Display

Deadband

Low Alarm Deadband	DJ	0.000	
High Alarm Deadband	DB	0.000	

Low Limits

Low Value Clamp Limit	VL	0.000	
Engineering Low Limit	EL	0.000	
Reasonability Low Limit	RW	0.000	
Low Alarm Limit #1	LL	0.000	
Low Alarm Limit #2	ZL	0.000	
Low Alarm Limit #3	3Z	0.000	
Low Alarm Limit #4	4Z	0.000	

LAI

LIMITS TAB (BOTTOM)

Digital

N/A

Analog

High Limits			
High Value Clamp Limit	VH	0.000	<input type="text"/>
Engineering Hi Limit	EH	0.000	<input type="text"/>
Reasonability Hi Limit	RV	0.000	<input type="text"/>
HI Alarm Limit #1	HL	80.000	<input type="text"/>
HI Alarm Limit #2	ZH	90.000	<input type="text"/>
HI Alarm Limit #3	3Y	0.000	<input type="text"/>
HI Alarm Limit #4	4Y	0.000	<input type="text"/>
User Defined HI Alarm Limit	UH	0.000	<input type="text"/>

Alarm Limits			
Low Inc Alarm Limit	ZM	0.000	<input type="text"/>
High Inc Alarm Limit	ZI	0.000	<input type="text"/>

Ready

Apply Cancel

DISPLAY TAB

Digital

Analog

Point Information [min] [max] [close]

File View Help

Point Name: SW101 [SW101.UNIT0@w3] Search

[] 0 (okay)

Point Config Security Value/Status Mode Hardware Alarm **Display**

Set State Description: ST [alarm]

Reset State Description: RS [okay]

Signal Diagram Index: DG [25006]

Pt Summary Diagram: SD [0]

Ready [LAI]

Point Information [min] [max] [close]

File View Help

Point Name: PA101 [PA101] Search

1st Pot on Panel [40.674] PCT

Point Config Security Value/Status Mode Hardware Initial Alarm Instrumentation Limits **Display**

Signal Diagram Index: DG [25006]

Pt Summary Diagram: SD [0]

Printer Format: FM [3]

Ready [LAI]

POINT REVIEW WINDOW

The screenshot shows the 'Point Review' application window. The interface includes a menu bar (File, Edit, View, Review, Help), a toolbar with various icons, and search filters. The search filters are set to 'UNIT3@NET1', 'CHARACTERISTICS', and 'BQ'. The 'Drops' field is set to '6,160,208' and 'Record Types' is set to 'LA,DA,LD,DD,LP,DP,PD,PM,RN'. The main data area is a table with the following columns: Name, Alarm Status, Drop, Description, and Characteristics.

Name	Alarm Status	Drop	Description	Characteristics
95_210		6	#5 REMOTE CTRL FROM	-----
95_211		6	#5 REMOTE CTRL FROM	-----
95_212		6	#5 REMOTE CTRL FROM	-----
95_213		6	#5 REMOTE CTRL FROM	-----
95_214		6	#5 REMOTE CTRL FROM	-----
95_215		6	#5 REMOTE CTRL FROM	-----
96_160		6	#6 REMOTE CTRL FROM	-----
96_200		6	#6 REMOTE CTRL FROM	-----
96_210		6	#6 REMOTE CTRL FROM	-----
96_211		6	#6 REMOTE CTRL FROM	-----
96_212		6	#6 REMOTE CTRL FROM	-----
96_213		6	#6 REMOTE CTRL FROM	-----
96_214		6	#6 REMOTE CTRL FROM	-----
96_215		6	#6 REMOTE CTRL FROM	-----
TEST_D		208		-----

At the bottom of the window, the status bar indicates 'Number of points reviewed = 15'. The Windows taskbar at the bottom shows the Start button, system tray icons, and several open applications: Point Information, Graphics - STARTING OV..., Alarm System 1 (NORMA...), Point Review, and C:\Documents and Setin...

POINT REVIEW MENUS

Point Review

File Edit View Review Help

Print... Ctrl+P
Print Preview
Print Setup...
Margins ...
Header/Footer...
Save As Text
Exit

✓ Toolbar
✓ Status Bar
Columns... Ctrl+R
Select Font...

Begin Review Ctrl+B
Abort Review Ctrl+A
Modify Point Attributes ... Ctrl+M
Set Review Filters... Ctrl+E
Select Page
Select Group

Help Topics
About review...

Find Points... Ctrl+F

POINT REVIEW FILTERS

Point Review: Set Filters

Filter by: Characteristics Group

Characteristic:

DESELECT

Condition Filters: Value/Status Change VL

Quality	Limit/Alarm Violations	Checking/Cutout Items	Other Reasons
<input type="checkbox"/> Good GQ	<input type="checkbox"/> Engr. Range Limits EL	<input checked="" type="checkbox"/> Alarm Check Removed AR	<input checked="" type="checkbox"/> Entered Values EV
<input type="checkbox"/> Fair FQ	<input type="checkbox"/> Limit Alarms LA	<input type="checkbox"/> Cutout Disabled CD	<input type="checkbox"/> External Calibration EC
<input type="checkbox"/> Bad BQ	<input type="checkbox"/> Reasonability Limits RL	<input type="checkbox"/> Cutout From Alarming CO	<input checked="" type="checkbox"/> Scan Removed SC
<input type="checkbox"/> Poor PQ	<input type="checkbox"/> Value Clamp Limits CL	<input type="checkbox"/> Engr Range Check Off EO	<input type="checkbox"/> Tagged Out XD
<input type="checkbox"/> Timed Out TQ	<input type="checkbox"/> Sensor Alarms SA	<input checked="" type="checkbox"/> Limit Check Removed LR	<input checked="" type="checkbox"/> Test Mode TM
	<input type="checkbox"/> SID Alarm IA	<input type="checkbox"/> Reasonability Check Off RO	<input type="checkbox"/> Uncommissioned UC
		<input type="checkbox"/> Value Clamp Off VO	<input type="checkbox"/> Out Of Service OS

Drops: DRDP1/51
 DRDP100
 DRDP101

Record Types: Analog (LA)
 Deluxe Analog (DA)
 Digital (LD)
 Deluxe Digital (DD)

Buttons: Set All, Clear All, OK, Set All, Clear All, Cancel

POINT REVIEW RESULTS

Point Review [Window Title Bar]

File Edit View Review Help

Unit0@w3 CHARACTERISTICS VL,LA,SA,IA,EL,RL,CL,AR,E0,LR,R0,V0,CD,CO,EV,EC,SC,X0,TM,UC,OS,GQ,FQ,PQ,BQ,TQ

Drops: 1/51,196,197 Record Types: LA,DA,LD,DD,LP,DP,RM,RN

Name	System ID	Alarm Status	Record Type	Frequency	Drop	Description	Characteristic	Value	Q	Units	Point Status
AOUTHWERROR	0X80002179		LD	Slow	1		-----	okay	0	B	
C1BR3S1	0X8000217E	ALARM	RM	Slow	1		-----	11111111000			LA
C1BR3S2	0X8000217F	ALARM	RM	Slow	1		-----	11111000001			LA
C1BR4S1	0X80002174	ALARM	RM	Slow	1		-----	01000000000			LA
C1BR4S2	0X80002175	ALARM	RM	Slow	1		-----	00000000000			LA
C1PCH	0X80002176	SENSOR	RN	Slow	1		-----	00000000000		H	SA
HUNDREDDVALUE	0X8000218C		LA	Slow	1	Constant Valu		100			
<input checked="" type="checkbox"/> LED101	0X8000217D		LD	Fast	1		-----	0			
M101	0X80002173		LA	Slow	1		-----	58			
PA101	0X80002172		LA	Slow	1		-----	58			
PUMP101AUTO	0X8000219F		LD	Slow	1	@ Ovation Co		FALSE	0	B	
PUMP101AUTOSTAT	0X800021A1		LD	Slow	1	@ Ovation Co		TRUE	1	B	
PUMP101CLEARTAG	0X8000219C		LD	Slow	1	@ Ovation Co		FALSE	0	B	
PUMP101MANUAL	0X800021A0		LD	Slow	1	@ Ovation Co		FALSE	0	B	
PUMP101STARTDMD	0X8000219D		LD	Slow	1	@ Ovation Co		FALSE	0	B	
PUMP101STATUS	0X8000219A		LD	Slow	1	@ Ovation Co		TRUE	1	B	
PUMP101STOPDMD	0X8000219E		LD	Slow	1	@ Ovation Co		FALSE	0	B	
PUMP101TAGOUT	0X8000219B		LD	Slow	1	@ Ovation Co		FALSE	0	B	
PUMP101TAGSTAT	0X800021A2		LD	Slow	1	@ Ovation Co		FALSE	0	B	
RAMPEROUTPUT	0X80002140	RETURN	LA	Slow	1		-----	20		B	
SIMIN	0X8000215E		LA	Slow	1		-----	0		B	
SIMOUT	0X80002161		LA	Slow	1		-----	0		B	
SW101	0X8000217C		LD	Fast	1		-----	okay	0		
SW102	0X80002234		LD	Fast	1	fdthcgfh	-----	0			
TANK101DRAINVALV	0X80002193		LA	Slow	1	@ Ovation Co		30			

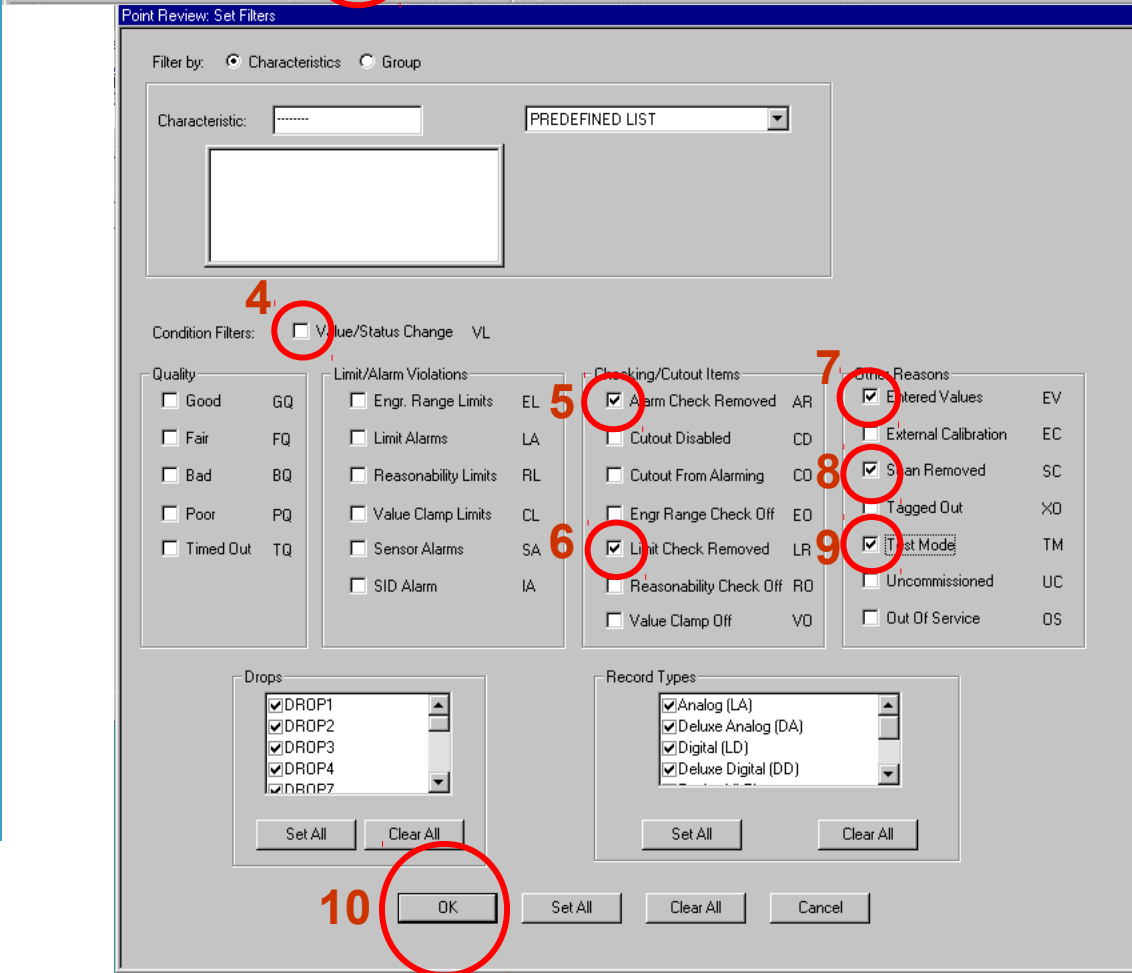
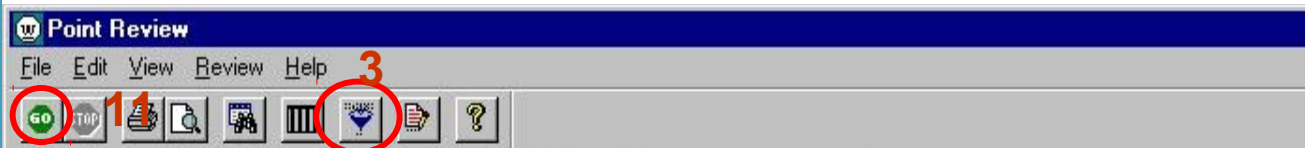
Number of points reviewed = 52

POINT REVIEW TOOLBAR

The image shows the Point Review toolbar with the following icons from left to right: a green 'GO' button, a red 'STOP' button, a printer icon, a magnifying glass icon, a list icon, a funnel icon, a document icon, and a question mark icon. Below the toolbar, text labels with arrows point to each icon: 'Begin Review' (GO), 'Abort Review' (STOP), 'Print' (Printer), 'Print Preview' (Magnifying Glass), 'Find Points (In Page)' (List), 'Add Remove Columns' (Funnel), 'Set Review Filters (See Previous Page)' (Document), 'Modify Point Attributes' (Document with pencil), and 'Help Topics' (Question Mark).

Three dialog boxes are shown to the right, each with a dashed arrow pointing from a toolbar icon to it:

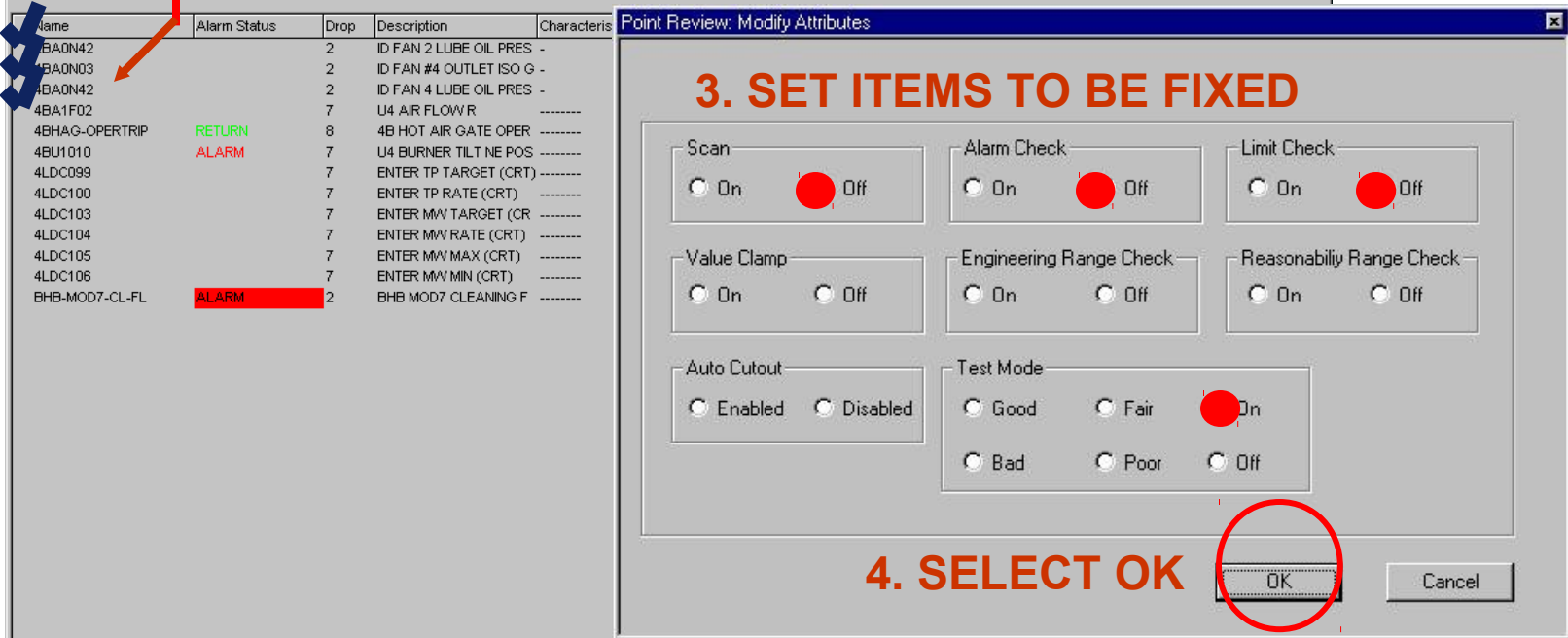
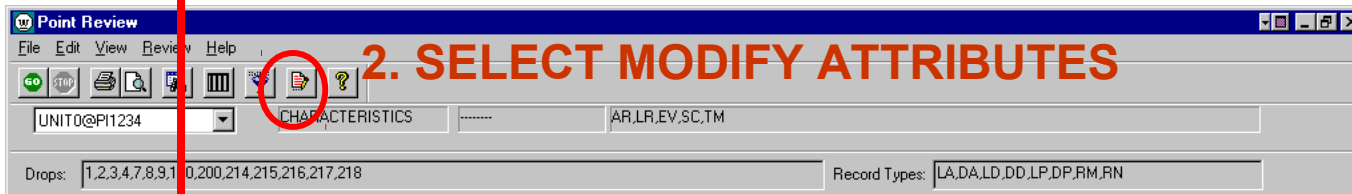
- Point Review: Modify Attributes**: Contains radio button options for Scan (On/Off), Alarm Check (On/Off), Limit Check (On/Off), Value Clamp (On/Off), Engineering Range Check (On/Off), Reasonability Range Check (On/Off), Auto Cutout (Enabled/Disabled), and Test Mode (Good/Fair/On/Bad/Poor/Off).
- Add/Remove Columns**: Contains checked checkboxes for SID, Record Type, Frequency, Drop, Description, Engineering Units, and Characteristics.
- Find**: Contains a 'Find what:' text box, a 'Match_case' checkbox, and 'Direction' radio buttons for Up and Down.



1. Select Ovation Applications icon.
 2. Select Review.
 3. Select Review Filters icon.
- [FILTERS]
4. Reset VL
 5. Set AR
 6. Set LR
 7. Set EV
 8. Set SC
 9. Set TM
 10. OK
 11. GO

FIXING REVIEW RESULTS

1. CHECK POINTS THAT ARE TO BE FIXED. REMEMBER THE SHIFT KEY AND ADDITIONAL CLICK FILLS WITH CHECKS AND CTRL KEY REPEATS



5. PRESS GO AGAIN WITH NO POINTS IN REVIEW

Module 3

CONTROLLER DIAGNOSIS AND MAINTENANCE



MODULE 3 OBJECTIVES

- Understand the Architecture, components, redundancies of OCR Controller
- Understand the Controller features and capabilities
- Understand diagnostic diodes and displays on controller's cards
- Utilize System Status diagram; Error codes and Controller diagnostics
- Identification and replacement of a failed controller card

OVATION CONTROLLER OCR400

- Processor Intel Pentium CELERON 400MHz
- Commercially available operating system VxWorks
- Flash Memory 64 MB
- DRAM 64 MB expandable to 128 MB
No Battery / No PROM
- Capacity : up to 4778 I/Os
- Capacity : up to 32 000 process points
- Up to 5 control tasks,
 - T1 : 100 ms
 - T2 : 1000 ms (1s)
 - T3, T4, T5: configurable 10 ms to 30s
- Supported connection with third party systems:
 - Allen-Bradley; GE Mark V/VI; Modbus ; E/S RTP;
 - Toshiba; MHI; GE Genius; Foundation Fieldbus.
 - External Ovation



Entirely redundant
Bumpless failover
Watchdog function

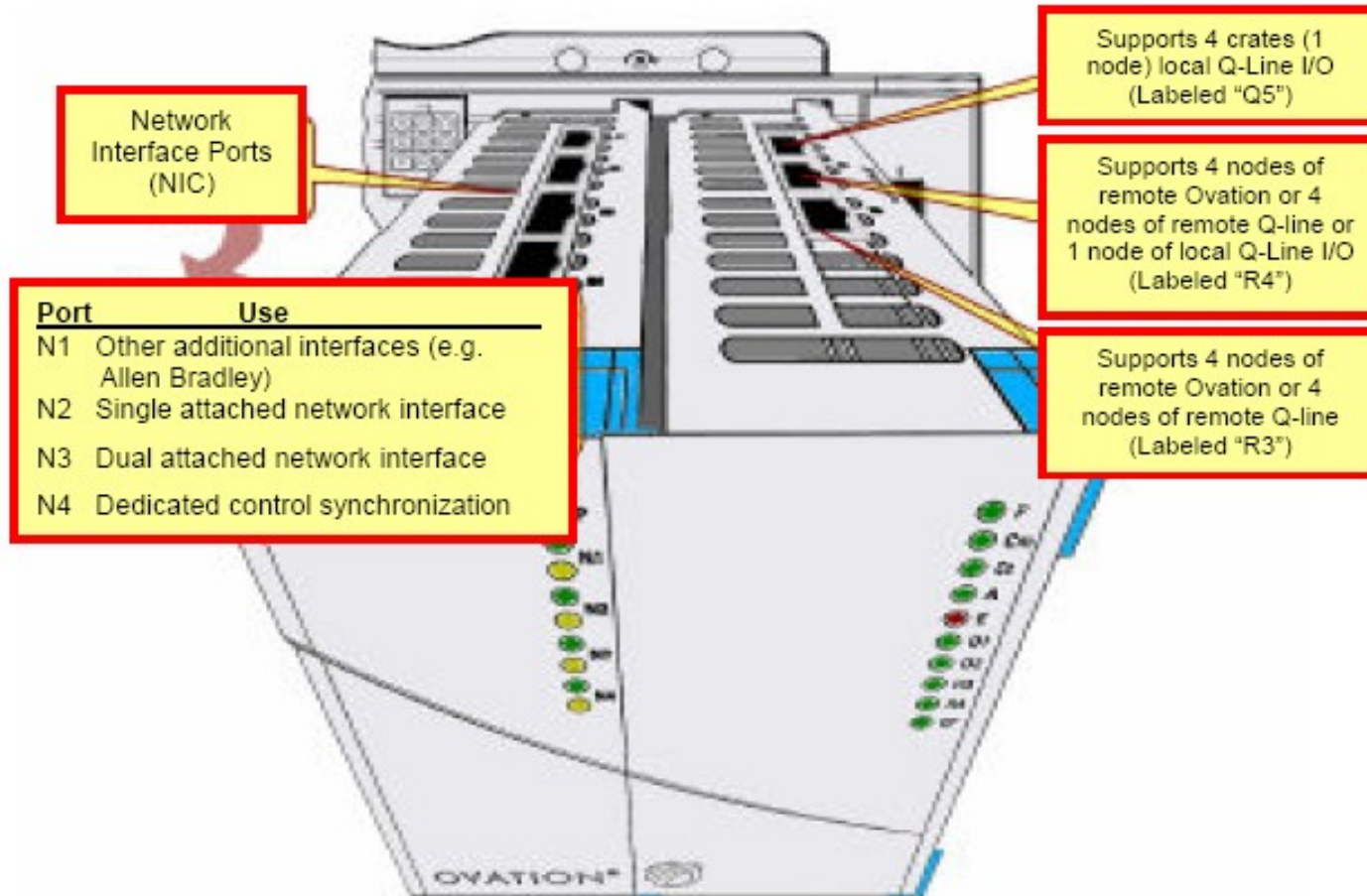
CONTROLLER COMPONENT MODULES

The OCR 400 Controller contains two main modules:

- **Processor Module:** This module communicates with the Ovation network and provides nine indicator LED's that display information about the status of network communication.
- **IOIC Module:** This module communicates with I/O devices and provides ten indicator LED's that display information about the status of I/O communication.

Note: *Fan assemblies are not required for OCR 400 Controllers.*

CONTROLLER COMPONENT MODULES



PROCESSOR MODULE LED INFORMATION

LED	MEANING	ON	OFF	BLINKING
P	Power	Module is Powered	Module has no Power	N/A
N1, N2, and N4	Ethernet port green LED (Link Integrity/Power)	Port Is Receiving Power	Port in not receiving power	Module is linked to the network through the port
	Ethernet port amber LED (Link Activity Status)	N/A	N/A	Module is receiving or transmitting data on the port

IOIC MODULE LED INFORMATION

STATUS				
Label	Meaning	ON (SOLID)	OFF	Blinking
P	Power	Controller powered	Controller not powered	N/A
CM	Communication	Communications hung	No commands being received from the processor module	Commands being received from processor module
CT	Control	Controller is acting as Primary	Controller not operational, in boot-up mode, or cleared	Controller acting as secondary
A	Alive	Alive (under hardware control)	Alive timer timed out	N/A
E	Error	Performing diagnostics during boot sequence	Application firmware running. No errors	An error is indicated. Read error codes from node LEDs, GMD / Error Log.

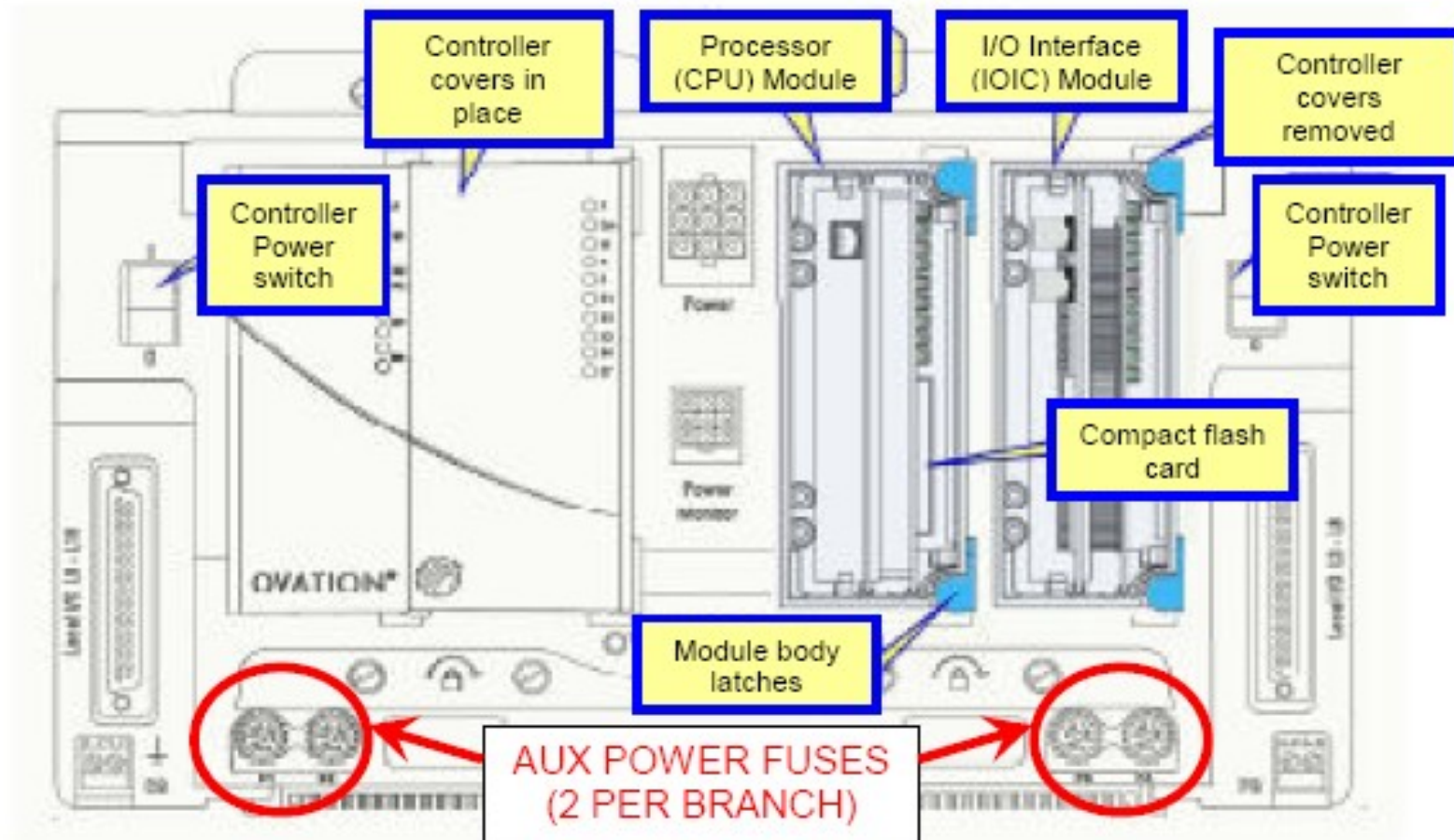
IOIC MODULE LED INFORMATION (cont.)

Node LED	STATUS				
	Label	Meaning	ON (SOLID)	OFF	Blinking
O1	local Ovation #1 (port L1)	All I/O cycles succeeding (with "E" LED off)	All I/O cycles succeeding (with "E" LED off)	No I/O cycles are being attempted (with "E" LED off)	Some or all I/O cycles are failing (with "E" LED off)
O2	local Ovation #2 (port L2)	All I/O cycles succeeding (with "E" LED off)	All I/O cycles succeeding (with "E" LED off)	No I/O cycles are being attempted (with "E" LED off)	Some or all I/O cycles are failing (with "E" LED off)
R3, R4	Port R3 and R4	All I/O cycles succeeding (with "E" LED off)	All I/O cycles succeeding (with "E" LED off)	No I/O cycles are being attempted (with "E" LED off)	Some or all I/O cycles are failing (with "E" LED off)
Q5	Port Q5	All I/O cycles succeeding (with "E" LED off)	All I/O cycles succeeding (with "E" LED off)	No I/O cycles are being attempted (with "E" LED off)	Some or all I/O cycles are failing (with "E" LED off)

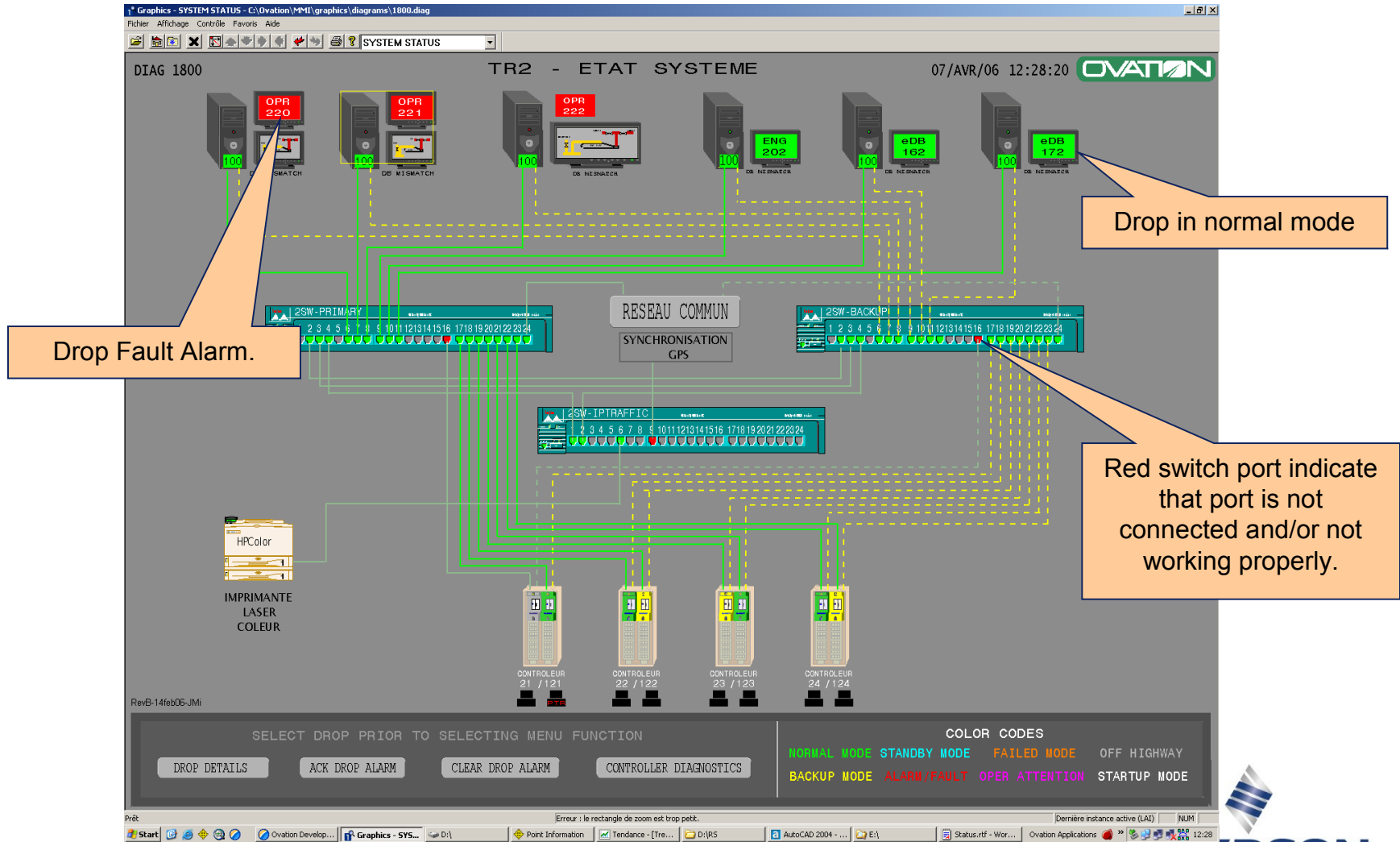
NOTE:

A Controller fault is indicated when the red E LED is blinking. In this state, the node LEDs (O1, O2, R3, R4, and Q5) will blink the actual error code as two separate binary numbers followed by a 3-second pause (all node LEDs off, 0000). This sequence repeats as long as the error state persists.

OCR400 CONTROLLER ASSEMBLY



SYSTEM STATUS DIAGRAM



DROP STATUS DIAGRAM

Data in selected drop does not match data in partner drop. Values are: Yes, No, and "???" (data not available to drop).

Data in Power Tools database does not match data in drop. values are: Yes, No, and "???" (data not available to drop).

Indicates if selected drop is in Backup or Control mode.

Number (in hexadecimal format) and description of the fault identifier code (value is taken from the FK record field of the DU record type).

Number (in decimal format) and text description of the drop fault code (value is taken from the FC record field of the Drop Status (DU) record type).

The screenshot shows a 'Drop Details Display' window with the following sections:

- Drop Details:** Name: DROP207, Drop Number: 207, Description: Ovation NT Drop, Partner ID: [redacted], Line: MMC, Data Ring: [redacted], Controller Status (HC): 0100 H, Partner Mismatch: No, PowerTools Database Mismatch: No, Drop Mode: Control, Highway Mode: Primary.
- DROP ALARM INFORMATION:** Drop Status (FA): 0000 H Normal, Fault Condition: None, Operator Attention Required: No.
- NETWORK INTERFACE INFORMATION:** Interface Type: Generic Ethernet, Input Packets: 4907258, Input Errors: 0, Output Packets: 2549112, Output Errors: 0.
- DROP FAULT DETAILS:** Fault Code (FC): 0 NO FAULT CONDITION EXISTS, Fault Param 1 (FS): 0000 H, Fault Param 2 (FD): 0000 H.
- DROP FUNCTIONS MENU:** System Status, Ack Drop Alarm, Clear Drop Alarm.

Callout boxes provide additional context for specific fields:

- Partner Mismatch:** Explains that values are Yes, No, or "???" (data not available to drop).
- PowerTools Database Mismatch:** Explains that values are Yes, No, or "???" (data not available to drop).
- Drop Mode:** Indicates if the selected drop is in Backup or Control mode.
- Fault Code (FC):** Explains that the value is taken from the FC record field of the Drop Status (DU) record type.
- Fault Param 1 (FS):** Explains that the value is taken from the FK record field of the DU record type.

DROP FAULT CODE

- Drop fault information is found on the System Status diagram and the Drop Details diagram.
- Drop Fault Code information is found in the following record fields of the Drop Status (DU) record or in a designated station's Error Log Viewer.
 - Fault Code = FC (displayed in decimal in the Drop Details diagram).
 - Fault ID = FK (displayed in hexadecimal in the Drop Details diagram).
 - Fault Parameter 1 = FS (displayed in hexadecimal in the Drop Details diagram).
 - Fault Parameter 2 = FO (displayed in hexadecimal in the Drop Details diagram).
 - Fault Parameters 3, 4, and 5 (displayed in hexadecimal in the Windows based Error Log Viewer).

FAULT INFORMATION TOOL

- The Ovation Fault information Tool provides general Fault information and recommended action steps (if any)
- OvFIT Available in web version and standalone version.

FAULT INFORMATION TOOL

The screenshot shows the Ovation Fault Information Tool interface. The left pane displays a tree view of errors under 'Ovation Errors'. The selected item is 'FP4 0x0000: *'. The right pane shows the 'Summary' and 'Action Steps' for this fault.

Summary

This fault means the Controller had a problem starting the edit task when the Controller was rebooted or turned on.

Action Steps

1. Check your error log for previous faults. This fault may be symptomatic of a larger problem.
2. Try to reboot the Controller. If the problem persists please gather the following information before you call Emerson support:
 - The operation system status number displayed in parameter 3.

General Fault Information

FC 66: This is a Controller fault.
There is a problem with the Controller. It could be one of your input/output modules or the network that connects them. Your Controller is one or more cabinets that contain input- and output-monitoring modules connected to your field devices.

FID 0x0002: This is an edit task fault.
The edit task is responsible for the communication between workstations in your system and your Controller. Edit task faults usually pertain to software. This fault may indicate that the data that Ovation is sending to the Controller is incorrect.

FP1 0x0001: The edit task is unable to start.
This fault means that the edit task is unable to start. This error could occur because the Controller is in a failed mode.

FP2 0x0000: This fault is due to an operating system reported problem while starting the edit task in the Controller.
There was an operating system problem starting the edit task.

FP3 x: This number represents a status returned from the operating system.
This value is an operating system status return code. Emerson can use this value to help you troubleshoot this fault.
This error generates the following message:
Edit Task error in attaching shared memory on startup. Return status is ____

FP4 0x0000: *
*

© 2006 Emerson Process Management

CONTROLLER DIAGNOSTICS TOOL

The Controller Diagnostics Tool is a diagnostic tool that displays information about the Controller.

You can select the Controller that you want to query from a drop hierarchy tree or from a dialog box. The information about the selected Controller appears in a user-friendly Controller Diagnostics window.

CONTROLLER DIAGNOSTIC TOOL

You can use the Controller Diagnostics window to perform the following functions on the selected Controller:

1. Select and display information about a Controller
2. Update data in a backup Controller to match the data in the primary Controller
3. Display information about the control tasks for that Controller
4. Display information about I/O modules that interface to the selected Controller
5. Download firmware to intelligent I/O modules that interface to the selected Controller

CONTROLLER DIAGNOSTIC TOOL

Controller Diagnostics

File View Help

Controller Overview

	Primary	Partner
Drop Name	DROP 11	DROP 61
IP Address	172.16.10.11	172.16.10.61
Ethernet Address	00:c0:95:ea:4e:44	00:c0:95:ea:4e:8c
Comm Services	Enabled	Enabled
Controller Type	OCR 161	OCR 161
Processor	Pentium	Pentium
Mode	Control	Backup
Fault Code	66	66
OS Version	5.4	5.4
Kernel Version	2.5	2.5
Controller Version	3.1	3.1
Total Ram	100659200	67104768
Sheet Count	57	57

Update Backup

Controller List

- DROP 3
- DROP 4/DROP 54
- DROP 6
- DROP 7
- DROP 11/DROP 61**
- DROP 15
- DROP 18
- DROP 19
- DROP 20
- DROP 24/DROP 74
- DROP 25/DROP 75
- DROP 36/DROP 86
- DROP 37/DROP 87
- DROP 39/DROP 89
- UNIT 1
 - DROP 41
 - DROP 42
 - DROP 43
 - DROP 44
 - DROP 45

Control Task Information | I/O Information | Software Versions | Point Details | Sheet Information

DROP 11

	Task 1	Task 2	Task 3	Task 4	Task 5	Total
Status	Enabled	Enabled	Enabled	Enabled	Enabled	
Total Control Memory	65000	500000	100000	65000	65000	795000
Used Control Memory	5436	76668	9272	5260	8164	104800
Capacity of Memory	8%	15%	9%	8%	12%	13%
Configured Cycle Time (msec)	100	1000	750	1000	250	
Average Cycle Time (msec)	8	71	5	9	4	
Worst Cycle Time (msec)	31	139	41	50	34	
Analog Input Points	0	90	0	0	0	90
Digital Input Points	1	121	1	0	0	123
Packed Input Points	0	8	0	0	0	8
Analog Output Points	0	35	0	0	0	35
Digital Output Points	16	18	0	0	0	34
Packed Output Points	0	0	0	0	0	0
Total I/O Points	17	272	1	0	0	290

Ready

REPLACING OCR400 CONTROLLER

To replace OCR400 Controller modules

1. Determine what Controller module needs to be replaced (Processor or IOIC module).
2. Make sure to Power Off the Controller to be replaced.
3. Unlatch the blue corner latches on the module case.
4. Remove the old module from the Controller backplane.
5. Install the new module in the Controller backplane.
6. Use the blue corner latches on the module to secure it to the Controller backplane

Note: *If you need to replace a module in the Controller, you must remove the IOIC module first. When you re-install the modules, you must install the Processor module first.*

Module 4

I/O SUBSYSTEM, DIAGNOSIS AND TROUBLESHOOTING



EMERSON[™]
Process Management

MODULE 4 OBJECTIVE

- Understand the Structure and addressing roles of I/O modules
- Interpret Diagnostic diodes on I/O modules
- Understand Consequences of signal hardware failure (transducer, cable, I/O module)
- Find hardware address / location and channel of the faulty process point
- Replace a failed I/O module and analyze possible consequences

I/O MODULES

- 16 Channel Digital Input
- 16 Channel Contact Input
- 16 Channel Digital Output
- 4 Channel Analog Output
- 8 Channel Analog Input
- 8 Channel 3 and 4 wire RTD Input
- 2 Channel Pulse Accumulator/Counter
- 16 Channel Sequence of Events
- Single Loop Interface with SLIM
- Datalink Controller
- Speed Sensor
- Servo Driver with Readback
- Valve Positioner
- 8 Channel HART Analog Input
- 4 Channel HART Analog Output
- FF devices



OVATION MODULE DIAGNOSTIC LED

Every Ovation module contains diagnostic LEDs. These are used to indicate the status of the module and to alert you to any module problems. All I/O modules contain the following LEDs:

- **P** = (Green) Power OK LED is lit when the power supply to the module is good.
- **C** = (Green) Communications OK LED is lit when the Controller is communicating with the module, and when the communication watchdog timer is not timed out.
- **E** = (Red) Optional External Error LED is lit when there is a problem external to the module, such as a blown common auxiliary power supply fuse.
- **I** = (Red) Internal Fault LED is lit when a failure internal to the module has occurred. This LED is typically an indication that the Electronics module needs to be replaced.

Note:

- **A communication timeout also lights the Internal Fault LED and turns off the Communications OK LED.**
- **The other LEDs for each module vary according to the functions of the module. Definitions for LEDs are provided for each module in their individual sections in the Ovation I/O reference Manual**

CONTROLLER CABINET with LOCAL OVATION I/Os

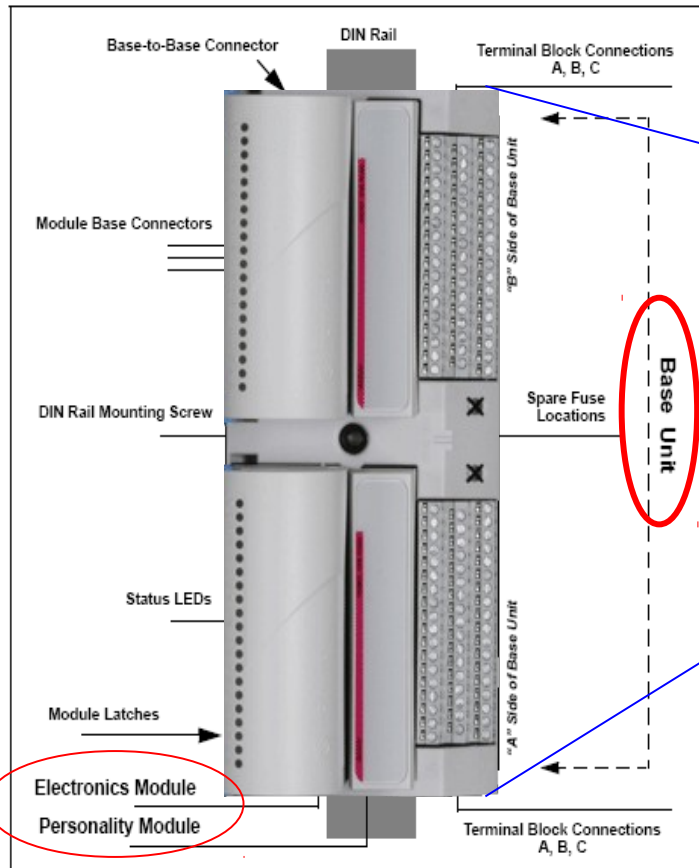
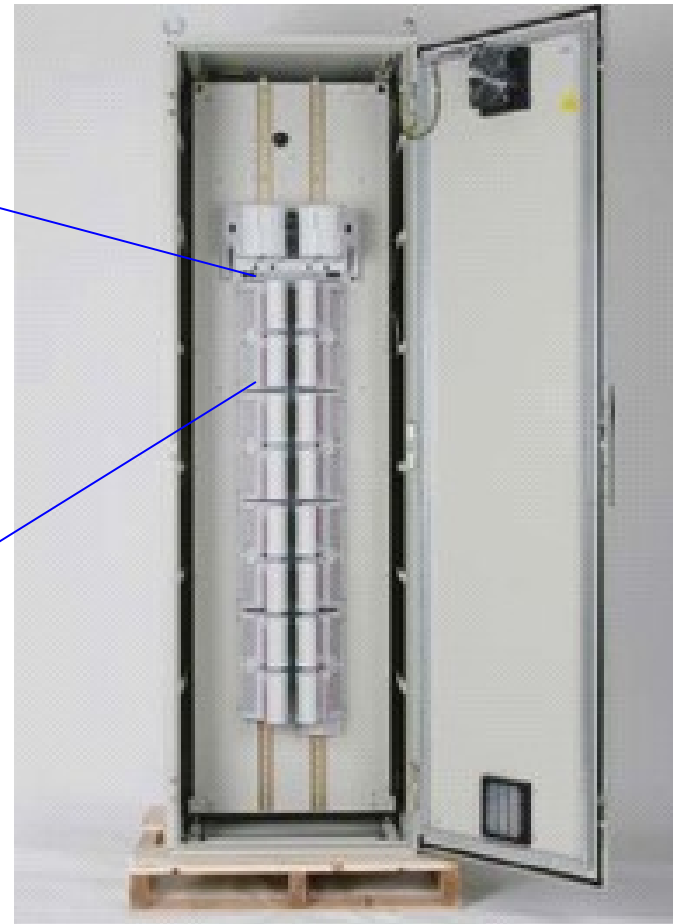
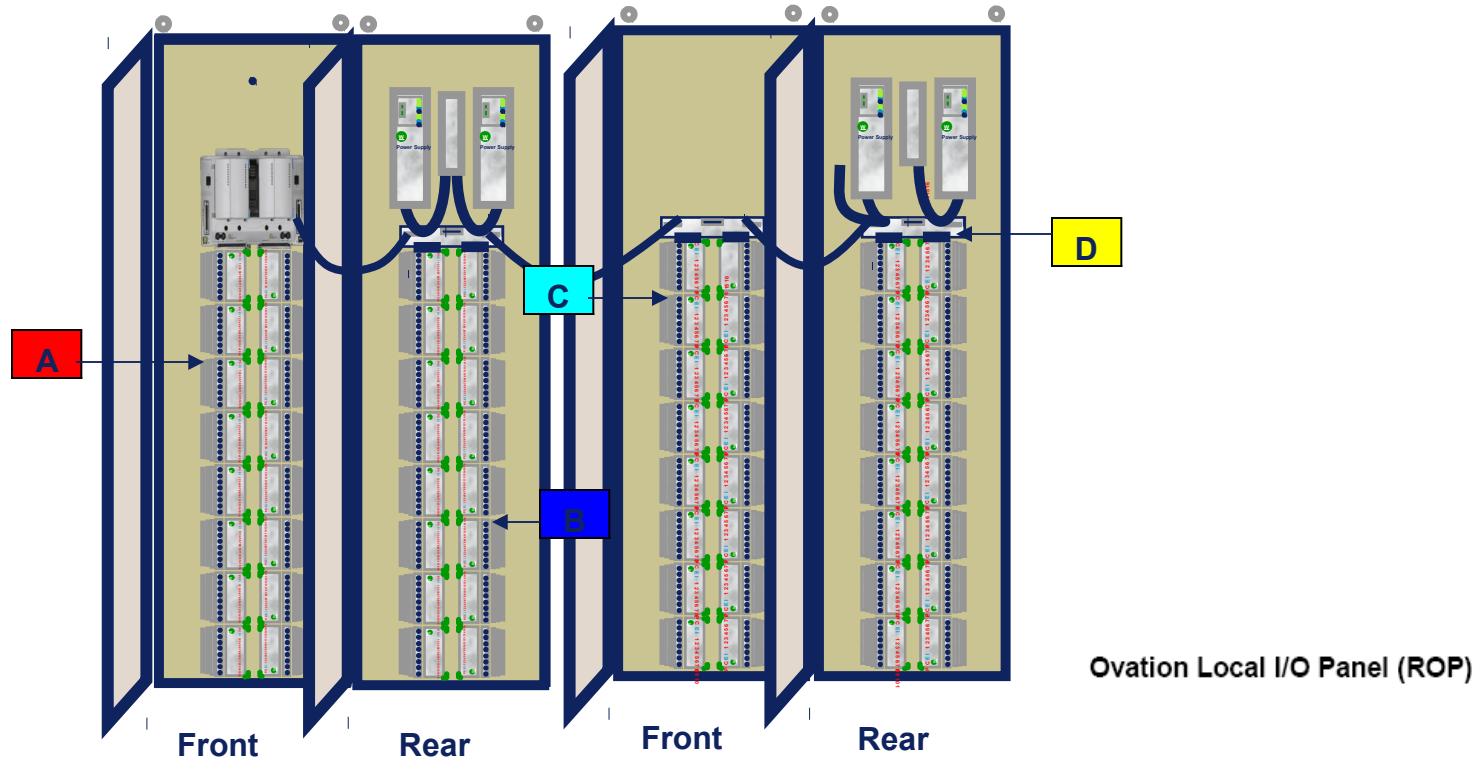


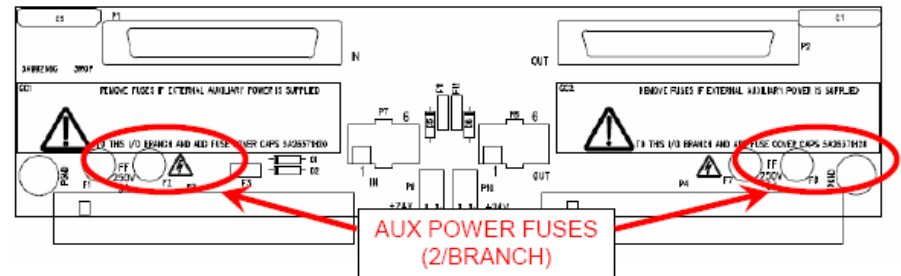
Figure 3-1. Ovation Modules (Top View)



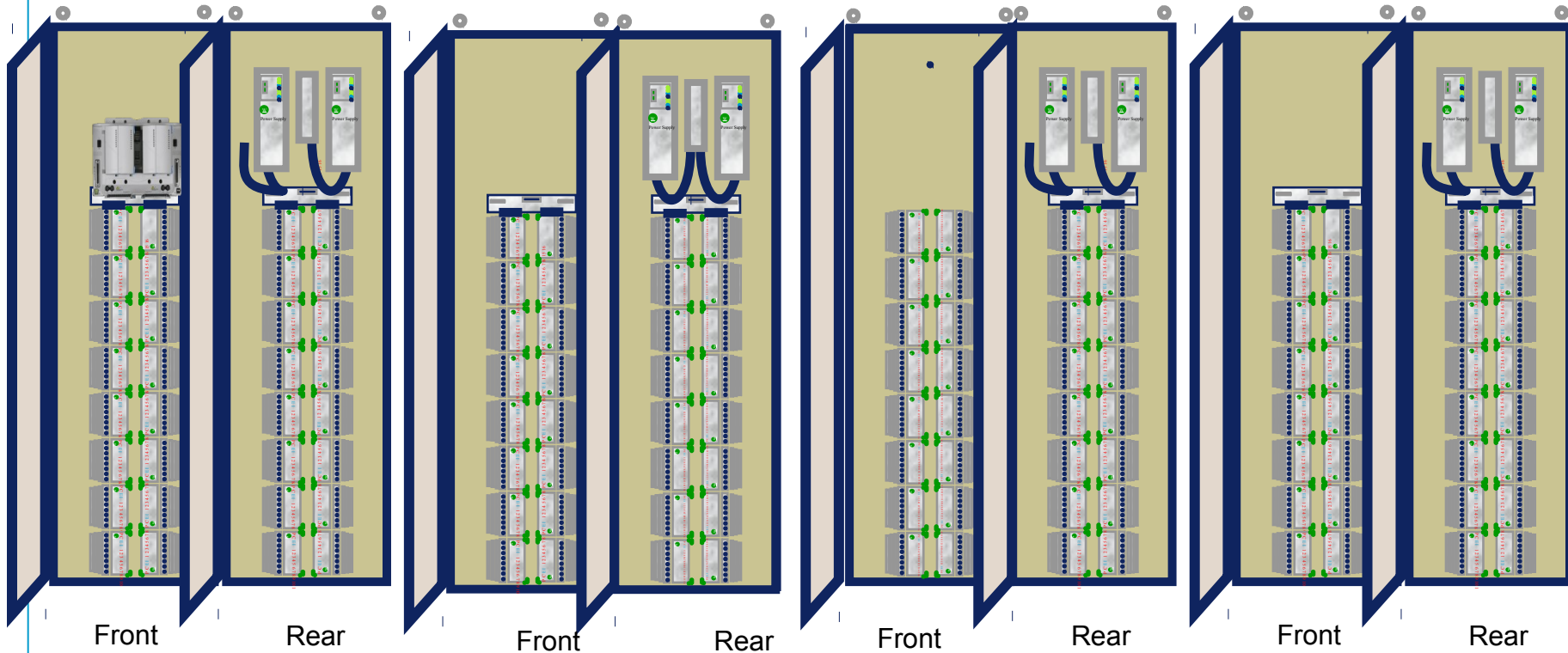
I/Os monitored from Controller's Device #1



- A** = Address 1.1.4 Device 1 Branch 1 Slot 4
- B** = Address 1.4.2 Device 1 Branch 4 Slot 2
- C** = Address 1.5.3 Device 1 Branch 5 Slot 3
- D** = Address _____ What is the I/O Address? Why?



Ovation I/Os monitored from Devices #1 & #2



- Up to 16 local branches per controller
- Up to 128 I/O modules per controller

Module 5

TESTING I/O MODULES



MODULE 5 OBJECTIVES

- Overview of I/O modules
- Perform practical tests of digital I/Os
- Perform practical tests of analog I/Os

ANALOG INPUT TESTING

To test a 13-Bit Analog Input (1C31113), 14-Bit Analog Input (1C31224) and High Speed Analog Input (5X00070), apply input signal with current loop (either self or field powered) or voltage source and verify at min, mid, and max scale (per database, via termination list) by monitoring value in system graphics or engineering station.

RTD INPUT TESTING

To test RTD Input (1C31161) and 8-Channel RTD Input (5X00119), a decade resistor box is attached in 2, 3 or 4-wire configuration (per point configuration). Decade box is used to apply inputs at min, mid, and max scale (per database, via termination list).

ANALOG OUTPUT TESTING

To test Analog output modules, monitor output with voltmeter or ammeter to verify at min, mid, and max scale (per database, via termination list).

DIGITAL INPUT TESTING

To test Digital Input (1C31107) and Compact Digital Input (1C31232), apply specified signal (per database) and verify individual point activation. Apply "every other" point simultaneously to verify no cross-talk occurs.

CONTACT INPUT TESTING

To test Contact Input (1C31142) and Compact Contact Input (1C31234), apply individual inputs using a switch. Verify at system graphic. If possible, apply "every other" point simultaneously to verify no crosstalk occurs.

SEQUENCE OF EVENTS TESTING

To test Sequence of Events (1C31157) and Compact Sequence of Events (1C31233), the input is activated using a switch or jumper and verified at an engineering station or control graphic. If a historian drop is present, and all required SOE sub-system configuration with the database is completed, check the SOE report that shows the sequential activation of SOE points.

DIGITAL OUTPUT MODULE TESTING

To test Digital Output (1C31122), activate individual points via the system graphic faceplates, and verify by checking continuity of activated relay contacts (verified at open and closed state). If Module is not terminated to relay panel, point is verified using a test light for standard terminations or voltmeter for custom terminations.

RELAY OUTPUT MODULE TESTING

To test Relay Output (1C31219), Individual relays are activated via the control graphic. Outputs are verified via continuity check of the relay contact (verified at open and closed state).

Module 6

POWER SUPPLY AND GROUNDING – MAINTENANCE AND TROUBLESHOOTING

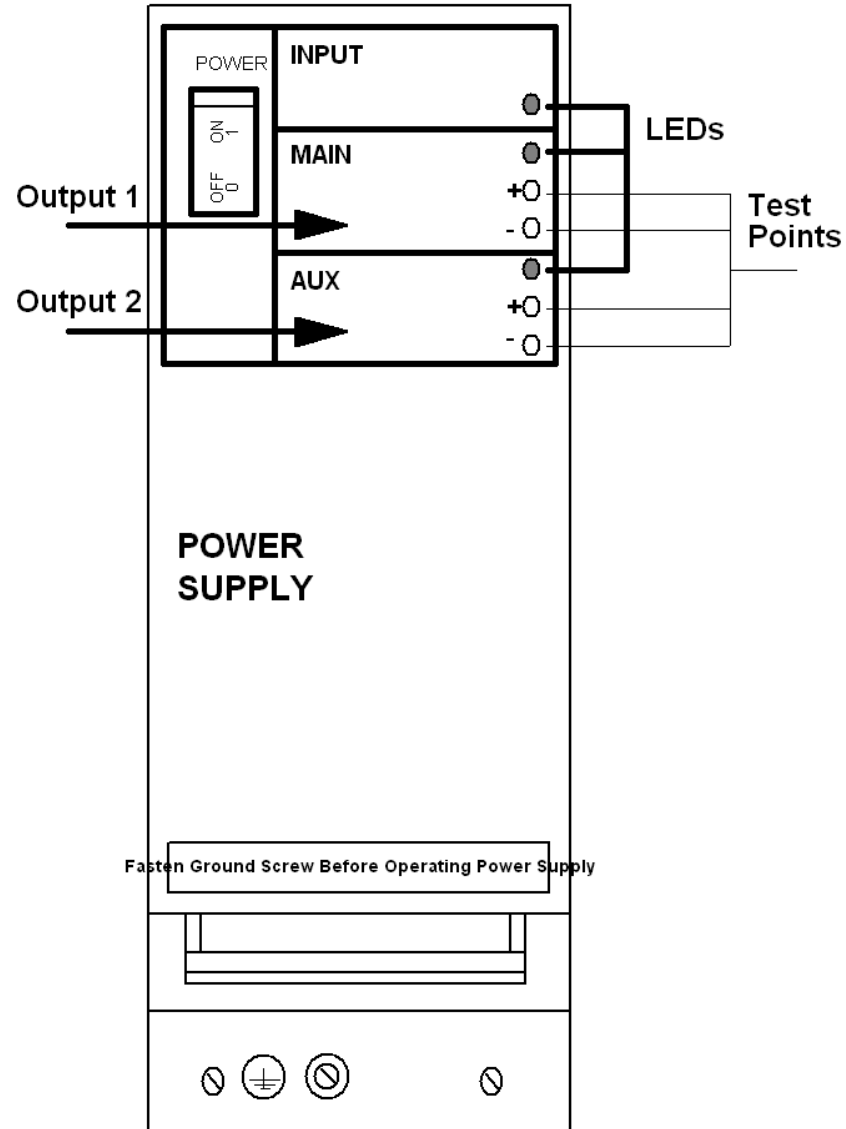


EMERSON[™]
Process Management

Module 6 Objective

- Understand Proper grounding for the Ovation equipment
- Understand Power requirements for Ovation equipment
- Locate Fuses – typical location
- Understand how to perform proper startup and shutdown of the Ovation equipment

OVATION POWER SUPPLY



OVATION POWER SUPPLY

- 24 VDC Main and 24/48 VDC auxiliary outputs.
- Power factor corrected
- Hot swap capability (online replacement in redundant configurations)
- 32 mS hold-up time

POWER SUPPLY RECOMENDATIONS

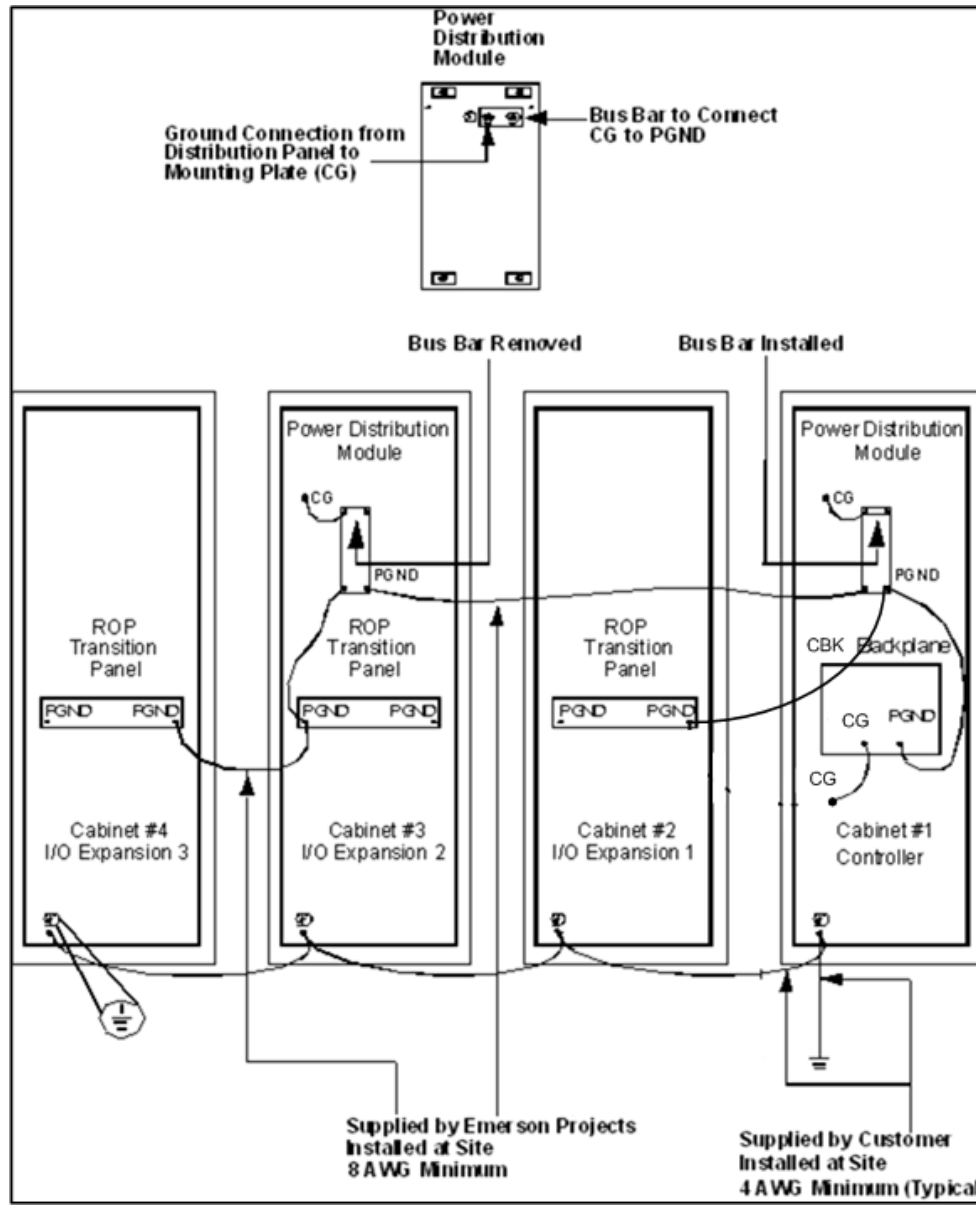
Reverse polarity and Improper Lead Connection

- You should always make proper connections to the power distribution module which provides power to the Ovation power supplies. This ensures proper operation and safety to the Ovation cabinet and associated electronics. The power supply units are tolerant of a reversal at the inputs, but proper terminations are important in maintaining the overall integrity and safety of the system.

Improper voltage level and/or frequency

- You should always maintain proper input voltage and frequency ranges for the applicable power supply unit. Failure to do so could cause the power supply output to go beyond the specification limits or cause the output to shut off which could result in a system upset.

GROUNDING OF OVATION CABINET



REPLACABLE FUSES

- Electronics Module

TYPE	RATING	MODEL (I/O Module)	PART NUMBER
5 x 20 mm cartridge	0.50A; 250V; Fast acting	Compact Digital Input Emod 1C31232G01 Compact Sequence of Events Emod 1C31233G01	EX06100

REPLACABLE FUSES

- Personality Module Fuses

TYPE	RATING	MODEL (I/O Module)	PART NUMBER
5 x 20 mm cartridge	1.0A; 250V Fast acting	Relay Base 16 G2R - 1C31223G01	EX06104
5 x 20 mm cartridge	1.25A; 250V; Fast acting	Loop Interface Pmods 1C31177G01 - G03 Digital Output Pmods - 1C31125G01 Valve Positioner Pmods 1C31197G01 - G04 Relay Panels (Solid State) 5A22410H01 - H02 Relay Panels (16 G2R) - 5A22411H01	EX06098
5 x 20 mm cartridge	2.0A; 250V; Fast acting	Relay Panels (8 KU) - 5A22412H01 Relay Base (12 KU) - 1C31222G01	EX06105

REPLACABLE FUSES (cont.)

- Personality Module Fuses

TYPE	RATING	MODEL (I/O Module)	PART NUMBER
Micro-Fuse Plug-in	0.5A;125V Fast acting	16 Point Individually fused, Digital Input Pmod - 5X00034G01 HART Analog Input Pmods 5X00063G01	1X00030H02
Micro-Fuse Plug-in	0.063A;125V Fast acting	HART Analog Input Pmods Analog Inputs - 5X00059G01	1X00030H01
Micro-Fuse Plug-in	0.6A;125V Fast acting	HART Analog Output Pmods 5X00063G01	1X00030H05

REPLACABLE FUSES

- Ovation Cabinet Fuses

TYPE	RATING	MODEL (I/O Module)	PART NUMBER	NOTES
Micro-Fuse Plug-in	5.0A; 250V; Fast acting	CBO Backplane 3A99200G01 - G02 ROP Panel 4D33922G01 TND Panel 4D33924G01 RRP Panel 3A99252G01 RRB Panel 3A99253G01	4A00120H01	Auxiliary power Branch fuses CBO: F1 -F4 ROP: F1, F2, F7, F8 TND: F1, F2, F6, F7 RRP: F1, F2 RRB: F1, F2
3AB	15A; 250V; Fast acting	Power Distribution Panel 5A26304G02	EX06009	AC Main fuses F1, F2

NORMAL CABINET POWER DOWN

To execute a normal cabinet power-down sequence for maintenance or repairs

- Assure that the power-down of one or more DCSs/RIOs inputs and outputs (and assumption of default values) will leave the plant processes in a safe condition.
- Turn off the Controller supplying information to the DCUs/RIOs in question.
- Turn off power supplies in any of the DCUs/RIOs in question.
- Turn off all circuit breakers to the DCU/RIO in question.

Note: *Some digital inputs are wetted (powered from) 120 VAC UPS power. Digital input power is fused on an individual branch basis. A removable 3.1A 120VAC fuse is provided for each branch.*

NORMAL CABINET POWER UP

To execute a normal cabinet power-up sequence following maintenance or repairs

- Assure that power-up of the DCS/RIO inputs and outputs, and activation of DCS command values will leave the plant processes in a safe condition.
- Turn on the all circuit breakers to DCU/RIO in question.
- Turn on power supplies in any of the DCUs/RIOs in question.
- Turn on the Controller supplying information to the DCUs/RIOs in question.
- ***Note:*** *Some digital inputs are wetted (powered from) 120 VAC UPS power. Digital input power is fused on an individual branch basis. A removable 3.1A 120VAC fuse is provided for each branch.*

REPLACING POWER SUPPLIES

- Turn the power OFF at the power supply by switching the power switch in the upper left corner to the **OFF position**.
- Remove the power cable from the bottom of the power supply by squeezing the two locking tabs on each side of the power cable connector, then pull downward removing the connector from the socket.
- Loosen the power supply locking mechanism which is located at the bottom of the power supply (see Power Supply Locking Mechanism)

POWER SUPPLY LOCKING MECHANISM



Note: A locking mechanism, located at the bottom on the power supply, holds the power supply firmly to the DIN rail. Using a slotted head screwdriver or a hex head wrench, loosen the center screw by turning the locking screw counter-clockwise. Re-tighten the locking screw using a clockwise rotation.

REPLACING POWER SUPPLIES

- After the locking mechanism has been loosened, lift the power supply slightly upward to remove the power supply from the power supply mounting bracket.
- Install the replacement power supply on the power supply mounting bracket.
- Make sure the replacement power supply is fitted securely on the mounting bracket, and then tighten the power supply locking mechanism.
- Make sure the power switch is in the OFF position before attaching power cabling to the power supply.

REPLACING POWER SUPPLIES

- Re-attach the power cable by pushing the power supply cable connector upward into the socket of the power supply.
- **Note:** *The power cable connector is designed to plug into the power supply socket in one way only.*
- Make sure that the cable connector locking tabs on each side of the connector secure the cable connector from falling out of the socket.
- If all connections are tight, you can re-apply power by switching the power switch in the upper left corner of the power supply to the ON position. This completes the power supply replacement process.

Glossary

CPU =	Central Processing Unit
CTRL =	Controller
DBS =	Data Base Server
EMOD =	Electronics Module
EWS =	Engineering Work Station
FIFO =	First In First Out
I/O =	Input/Output cards
NIC =	Network Interface Card (Highway Card)
OPH =	Ovation Process Historian
PMOD =	Personality Module
PTDB =	Power Tools Data Base Server
RAM =	Random Access Memory

QUESTIONS?

