

SPEAR3 Booster Kicker Upgrade Review

Control Chassis

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Upgrade

Based on SD-444-290-43-C1

Two Chassis (Injection and Extraction)

● Inputs

- ▶ Timer
- ▶ Enclosure Doors #1 & #2
- ▶ Air Flux in the enclosure
- ▶ HV Crowbar Interlock #1 & #2
- ▶ MPS
- ▶ Thyatron Choke #1 & #2
- ▶ HVPS Current
- ▶ HVPS Inhibit (Computer)
- ▶ Remote/Local
- ▶ Chassis Power up (stroke switch)

● Outputs

- ⇒ Signaling
 - ▶ Door Closed #1 & #2
 - ▶ HV Crowbar Interlock #1 & #2
 - ▶ High Voltage Permit
- ⇒ Commands
 - ▶ High Voltage Permit
 - ▶ HV Permit Computer
 - ▶ Inhibit Crowbar #1 & #2
 - ▶ Power the Pulser #1 & #2 ON

Set Point and Read Back Voltage go directly to the Power Supply

Chassis Relay X PLC

● Relay

- Low flexibility
- Human resource to assembly
- Difficult upgrade
- Poor computer interface
- Not friendly user interface
- Complete System as Back UP
- “Cheaper”

● PLC

- Ease Documentation
- Upgradeable
- Embedded Computer Interface
- Friendly Interface
- Reliable
- Password Protected
- Modularity
- “Expensive”

Control Logic

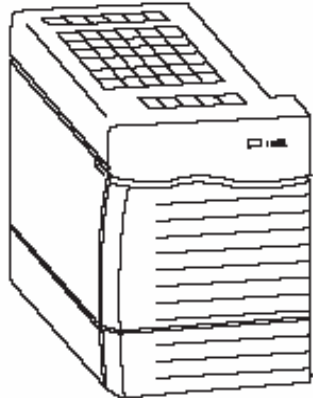
- Logix 5555
- 2 x Digital DC Input 1756 - IB16I
- 2 x Digital Contact Output 1756 – OW16I
- 7 Slot Chassis
- PanelView 600 (Using DF1 Interface)

Ancillary Circuits

- 2 x 24 Vdc Power Supplies
- 4 x 5 Vdc, 3 A Power Supplies (Choke Reset)

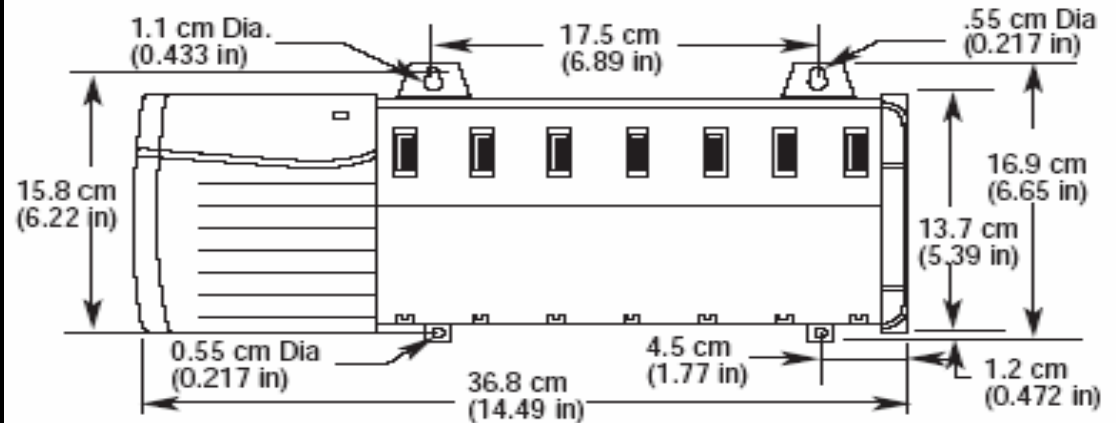
A-B Modules

Power Supply



44148

Chassis



Processor



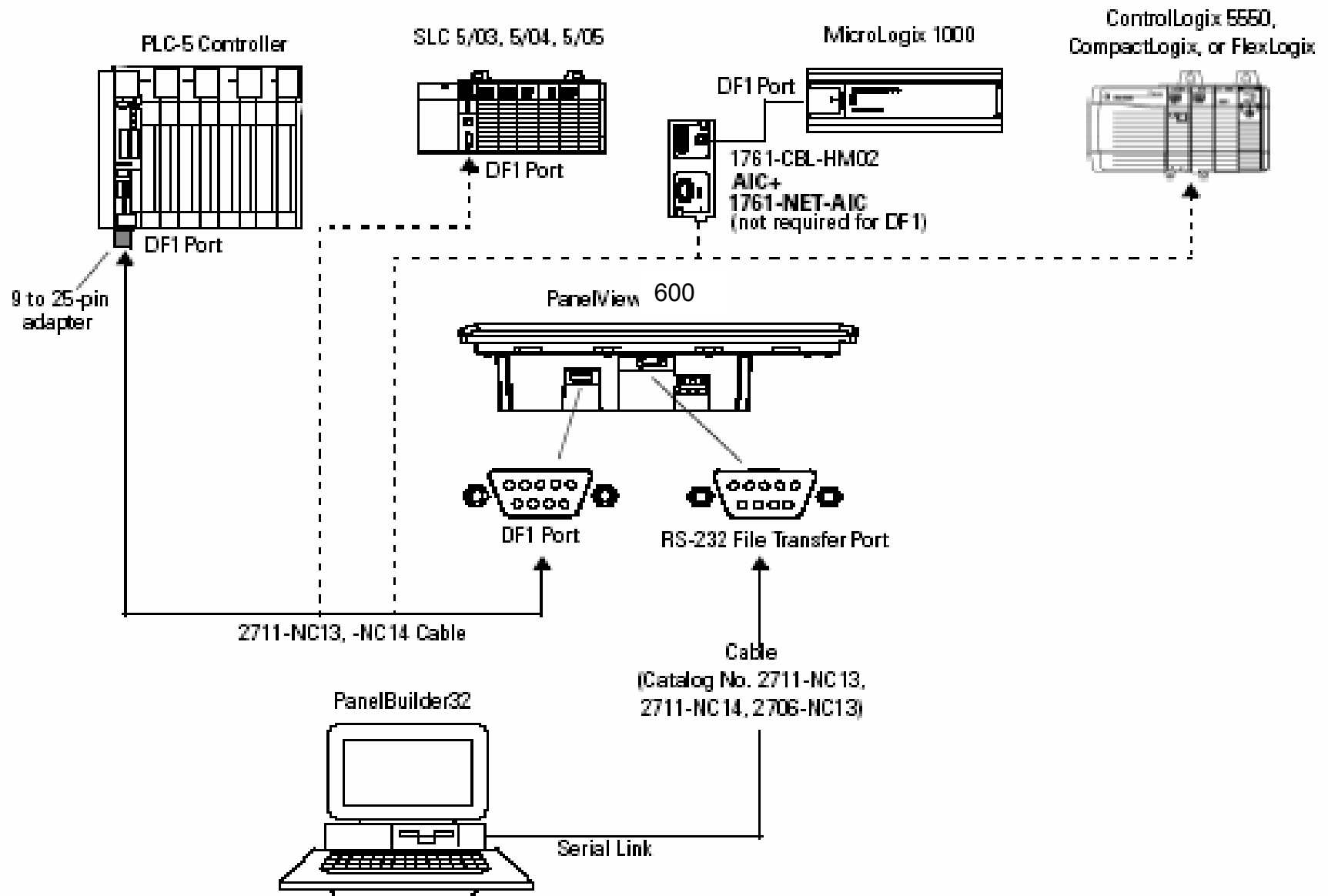
1756 Digital I/O Modules



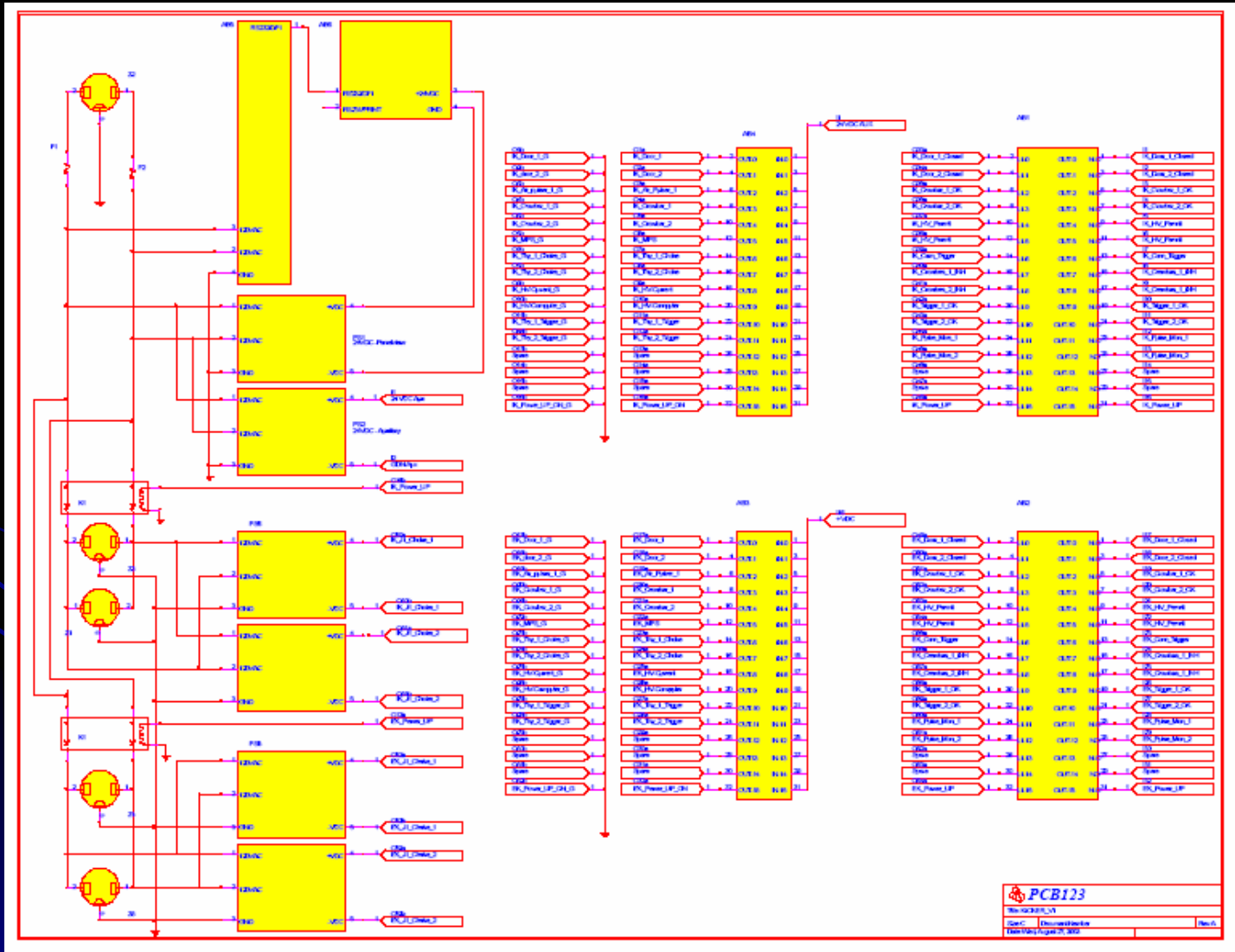
1756 Removable Terminal Blocks



Panel View Configuration



Chassis Configuration



User Interface

BOOSTER KICKER CONTROL

1H:MM:SS PM MM/DD/YY

Interlock OK!	Interlock OK!	
Injection Kicker	Extraction Kicker	
Operation Mode: Local	Operation Mode: Local	
LOGIN	HV Shut Down Config	LOGOUT

Injection Kicker Control

Injection Kicker Control

Control Rack

TURN ON

Remote

TURN ON

TURN OFF

TURN OFF

Check Interlock

Interlock

Return

High Voltage

Injection Kicker Interlock System

Injection Kicker Door #1 Closed

Injection Kicker Door #2 Closed

Injection Kicker Air Flux OK

Injection Kicker Crowbar #1 Closed

Injection Kicker Crowbar #2 Closed

Injection Kicker MPS Permit OK

Injection Kicker Thy #1 Choke OK

Injection Kicker Thy #2 Choke OK

Injection Kicker HV Over Current OK

Injection Kicker High Voltage Inhibit

Injection Kicker Thyatron #1 Trigger OK

Injection Kicker Thyatron #2 Trigger OK

Injection Kicker Chassis ON

Reset

Return

Extraction Kicker Control

Ejection Kicker Control

Control Rack

TURN ON

Remote

TURN OFF

Check Interlock

Interlock

High Voltage

TURN ON

TURN OFF

Return

Extraction Kicker Interlock System

Extraction Kicker Door #1 Closed

Extraction Kicker Door #2 Closed

Extraction Kicker Air Flux OK

Extraction Kicker Crowbar #1 Closed

Extraction Kicker Crowbar #2 Closed

Extraction Kicker MPS Permit OK

Extraction Kicker Thy #1 Choke OK

Extraction Kicker Thy #2 Choke OK

Extraction Kicker HU Over Current OK

Extraction Kicker High Voltage Inhibit

Extraction Kicker Thyatron #1 Trigger OK

Extraction Kicker Thyatron #2 Trigger OK

Extraction Kicker Chassis ON

Reset

Return



Future Upgrade

Two slots left

- Analog set-point and read-back capability
- Ethernet communication

