

SPI V7 and Higher I/O Cards and I/O Termination Configurations

Company: Overload Services, Inc.

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**OSI Project Team Leader / SPI
Support**

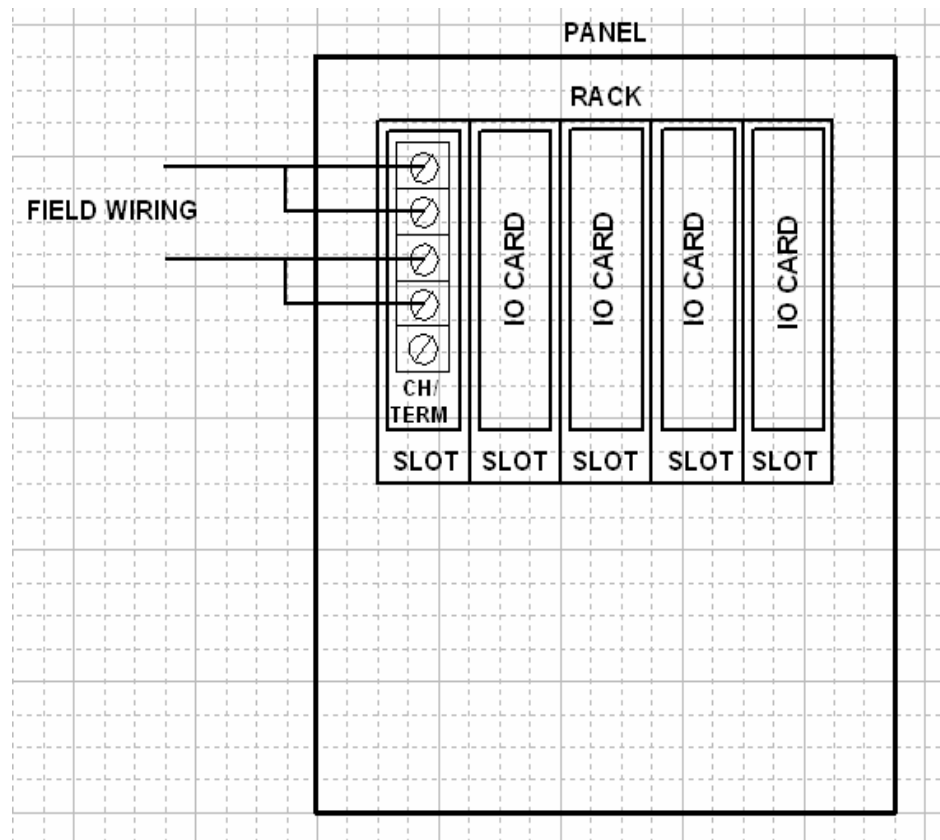
The purpose of this presentation is:

1. Show the SPI user the proper ways of configuring “creating” I/O cards and I/O terminations in SPI V7 and higher.
2. Recommendations
3. Proper upgrade setup from V6 to V7 and higher for I/O Cards
4. SPI DCS Interface rules

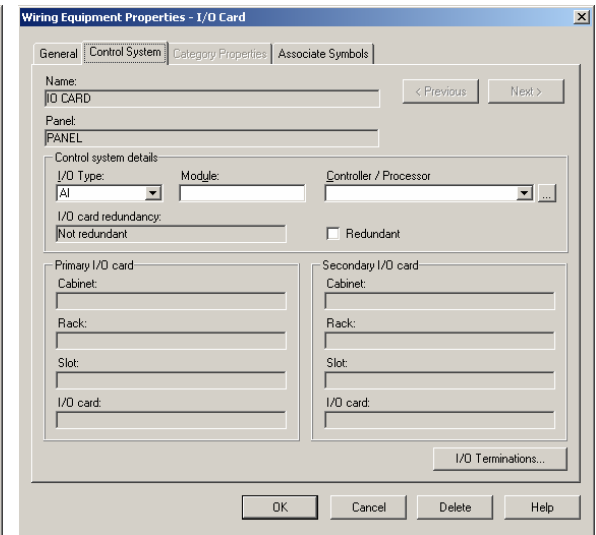
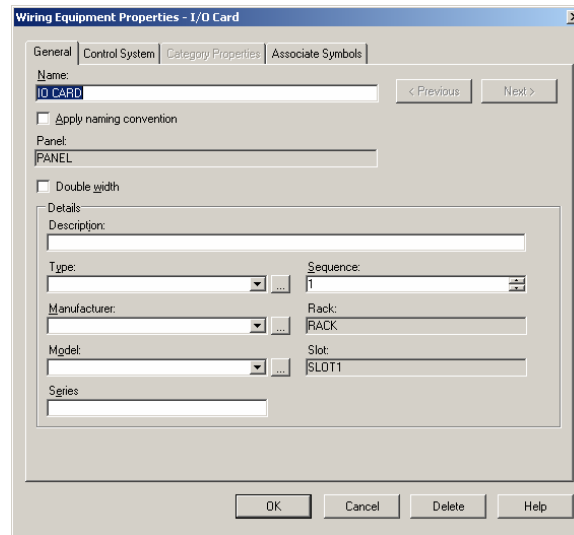
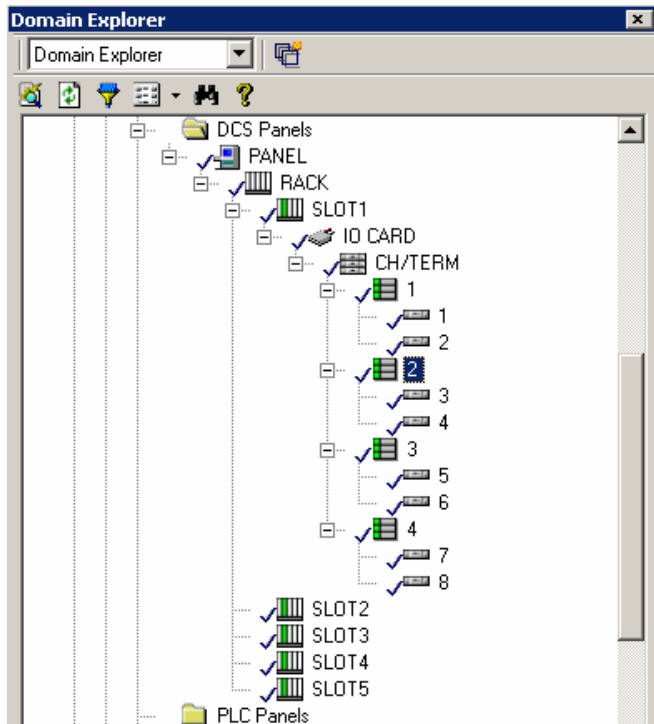
Scenario No.1

Wiring Directly to an I/O Card

Ex: Allen Bradley, Bently Nevada, DeltaV,
Honeywell “C200, C300”

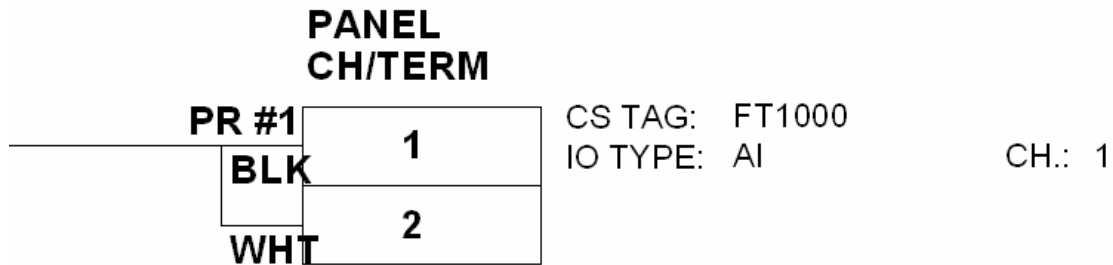


**The SPI Hierarchy will be:
Panel – Rack – Slot – I/O Card – Strip – Channel - Terminals**



The Final Result using ESL for a Loop Drawing

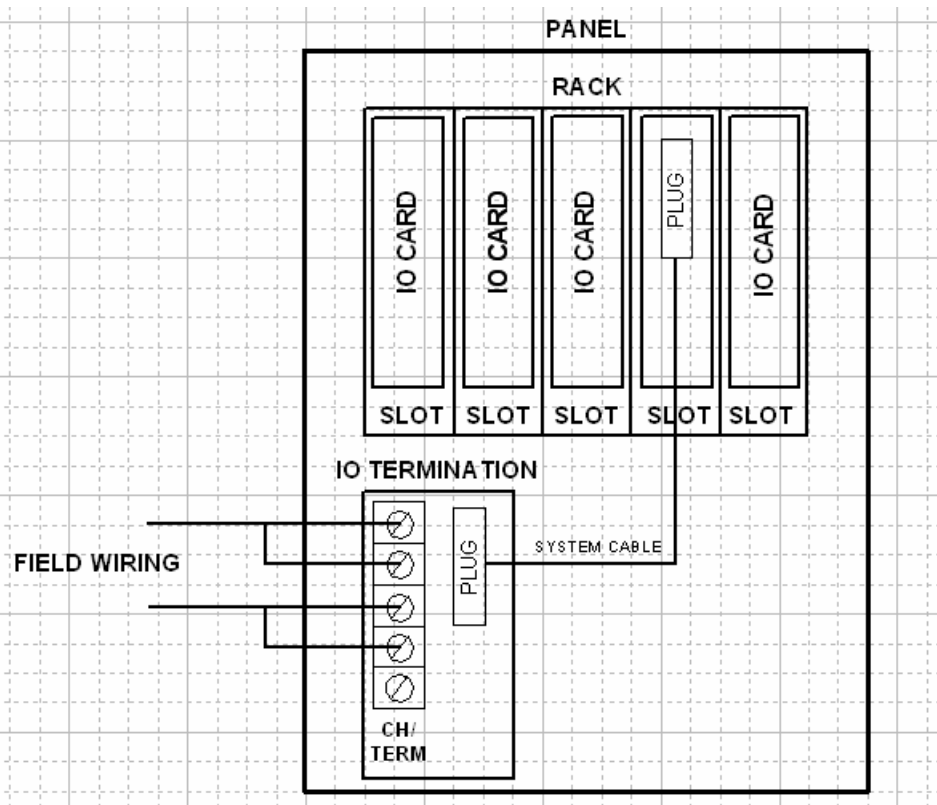
	CABINET	FILE	POS.
PRIM	PANEL	RACK	SLOT 1



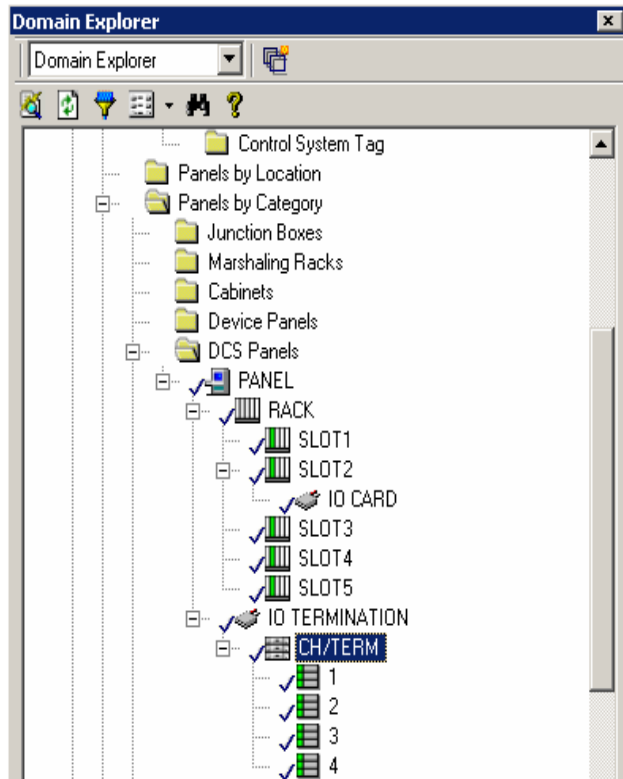
Scenario No.2a

**Wiring to an I/O Termination “FTA or ETB” with
NO IO Redundancy**

Ex: Honeywell TDC3000, Triconex



The SPI Hierarchy will be
Panel – Rack – Slot – I/O Card
Panel – I/O Termination - Strip – Channel - Terminals



Wiring Equipment Properties - I/O Termination

General | Control System | **Category Properties** | Associate Symbols

Name: IO TERMINATION

Apply naming convention

Panel: PANEL

Double width

Description:

Type: [] Sequence: 1

Manufacturer: [] Rack: []

Model: [] Slot: []

Series: []

OK Cancel Delete Help

Wiring Equipment Properties - I/O Termination

General | Control System | **Category Properties** | Associate Symbols

Name: IO TERMINATION

Panel: PANEL

I/O type: []

Define a redundant I/O card

Secondary I/O card

Cabinet: []

Rack: []

Slot: []

I/O card: []

I/O card model: []

System cable: SYSTEM CABLE

Clear

OK Cancel Delete Help

Wiring Equipment Properties - I/O Card

General | Control System | **Category Properties** | Associate Symbols

Name: IO CARD

Apply naming convention

Panel: PANEL

Double width

Details

Description:

Type: [] Sequence: 1

Manufacturer: [] Rack: RACK

Model: [] Slot: SLOT2

Series: []

OK Cancel Delete Help

Wiring Equipment Properties - I/O Card

General | Control System | **Category Properties** | Associate Symbols

Name: IO CARD

Panel: PANEL

Control system details:

I/O Type: [] Module: [] Controller / Processor: []

I/O card redundancy:

Primary I/O card: [] Redundant:

Primary I/O card

Cabinet: []

Rack: []

Slot: []

I/O card: []

Secondary I/O card

Cabinet: []

Rack: []

Slot: []

I/O card: []

I/O Terminations

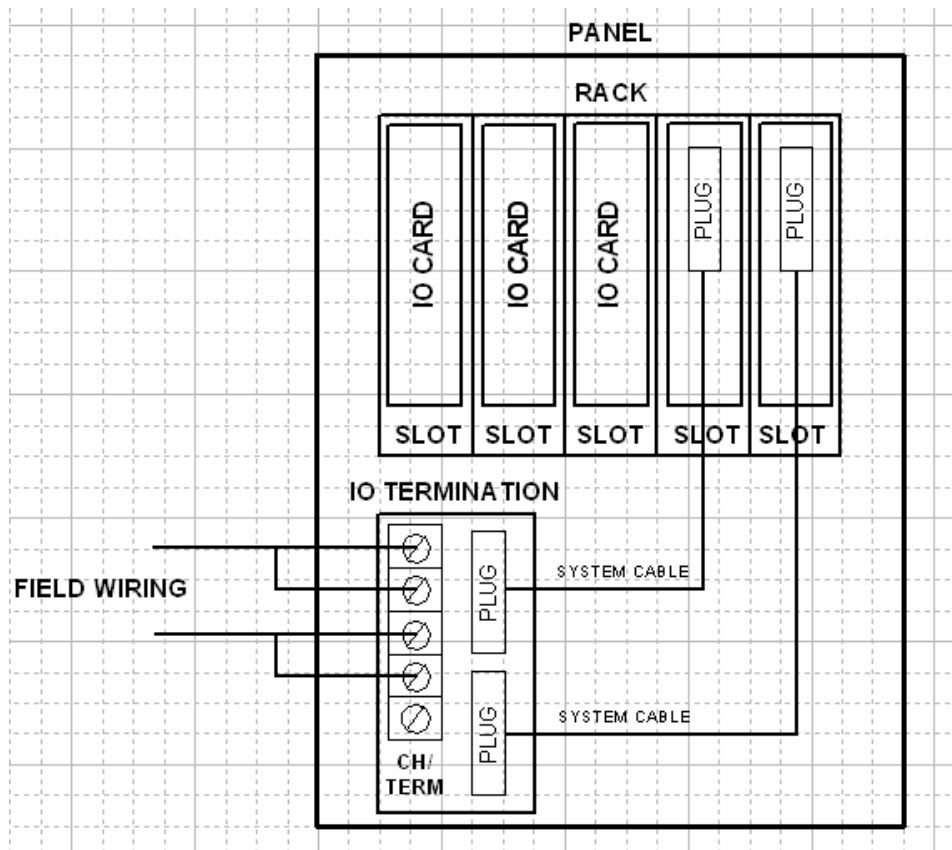
Name	Description	Panel	Rack	Slot
IO TERMINATION		PANEL		

OK Cancel Delete Help

Scenario No.2b

Wiring to an I/O Termination “FTA or ETB” with IO Redundancy

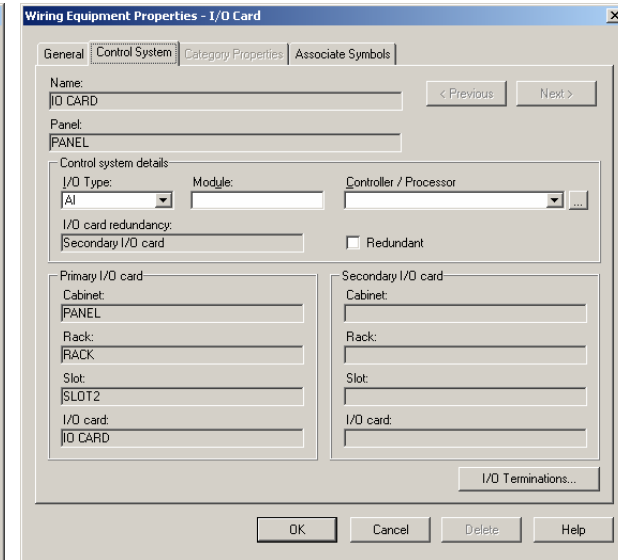
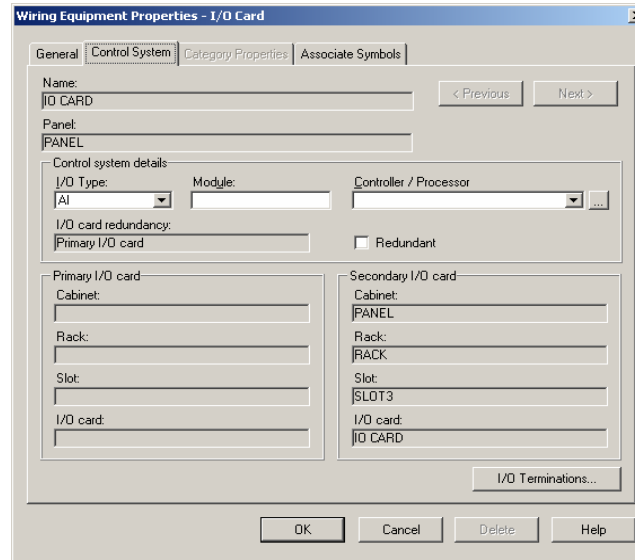
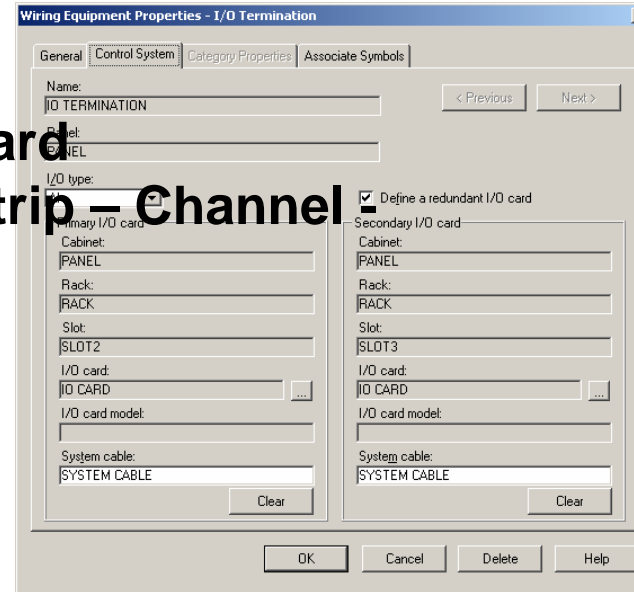
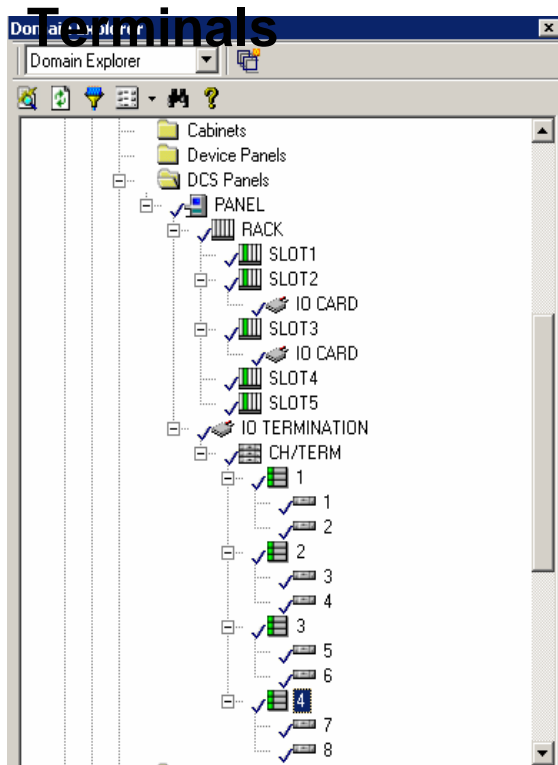
Ex: Honeywell TDC3000, Triconex



The SPI Hierarchy will be:

Panel – Rack – Slot – I/O Card

Panel – I/O Termination - Strip – Channel



The Final Result using ESL for a Loop Drawing

With NO I/O Redundancy

	CABINET	FILE	POS.
PRIM	PANEL	RACK	SLOT 2

**PANEL
CH/TERM**

PR #1
BLK
WHT

1
2

CS TAG: FT1000
IO TYPE: AI

CH.: 1

With I/O Redundancy

	CABINET	FILE	POS.
PRIM	PANEL	RACK	SLOT 2
SEC	PANEL	RACK	SLOT 3

**PANEL
CH/TERM**

PR #1
BLK
WHT

1
2

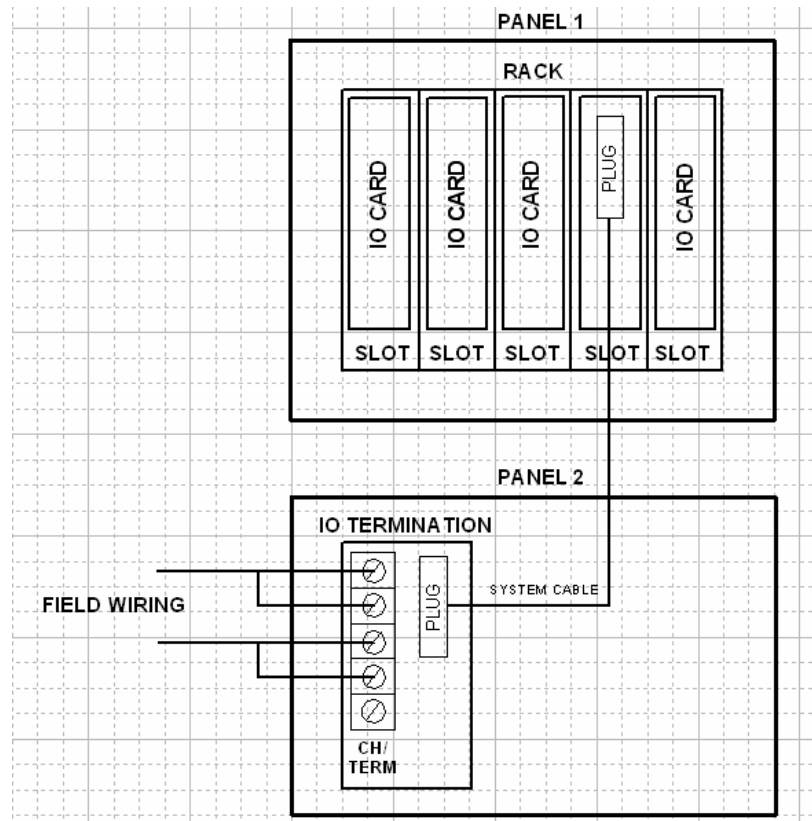
CS TAG: FT1000
IO TYPE: AI

CH.: 1

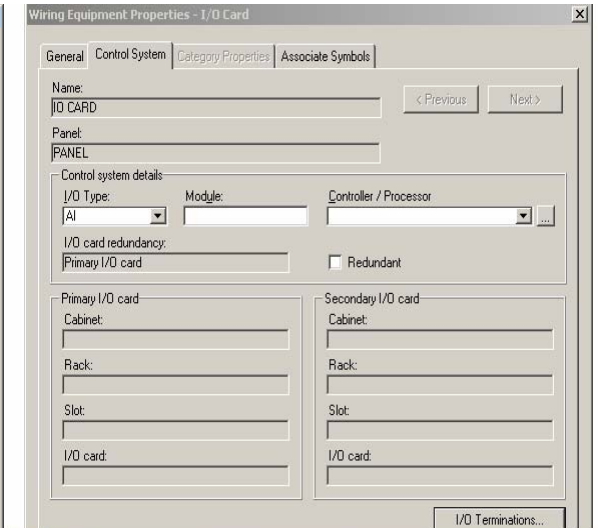
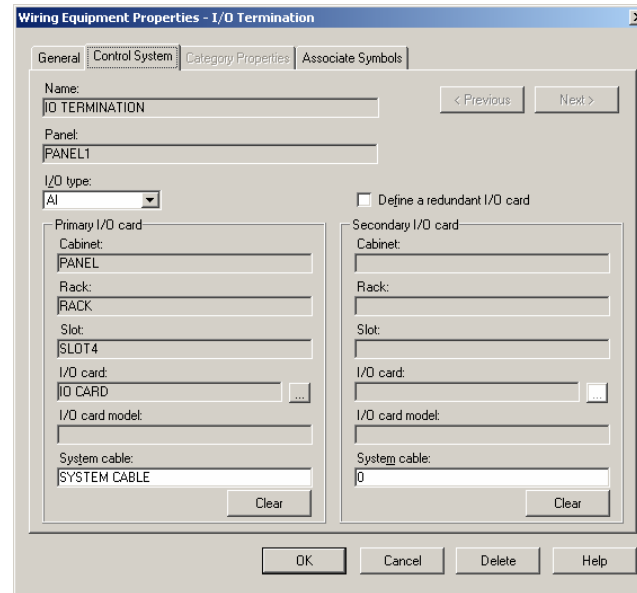
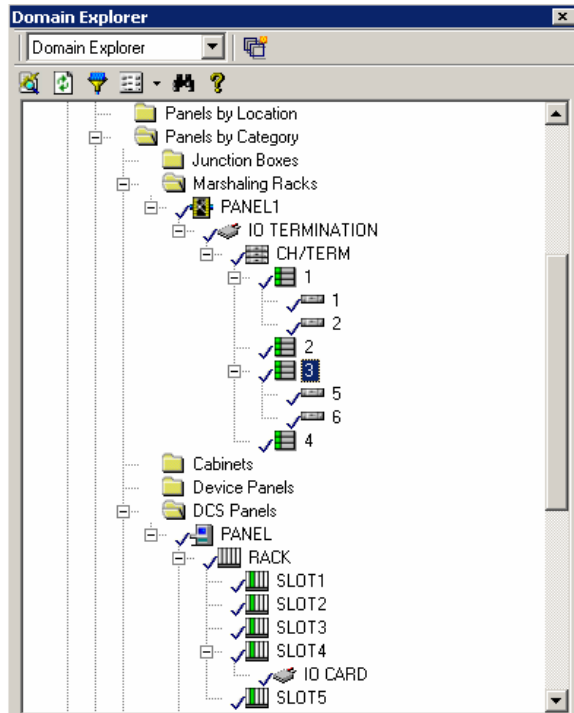
Scenario No.3a

**Wiring to an I/O Termination “FTA or ETB” with
NO IO Redundancy**

Ex: Honeywell TDC3000, Yokogawa CS3000



The SPI Hierarchy will be:
Panel – Rack – Slot – I/O Card
**Panel – I/O Termination - Strip – Channel -
 Terminals**



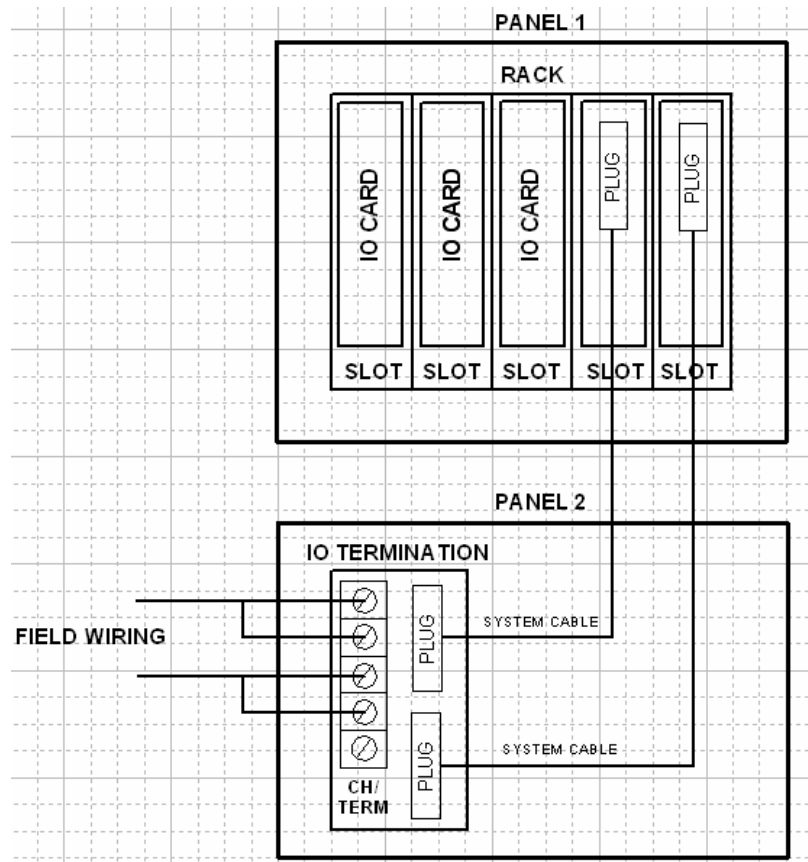
I/O Terminations

Name	Description	Panel	Rack	Slot
IO TERMINATION		PANEL1		

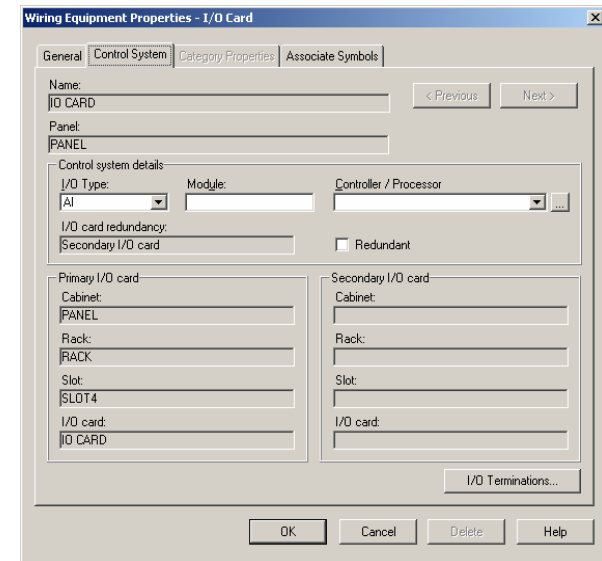
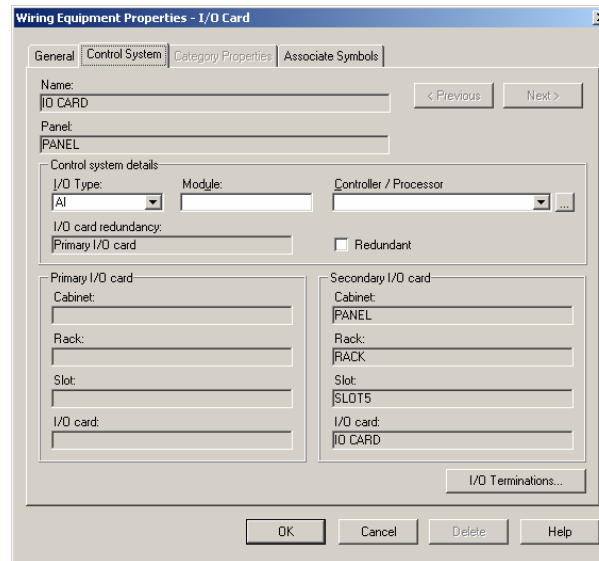
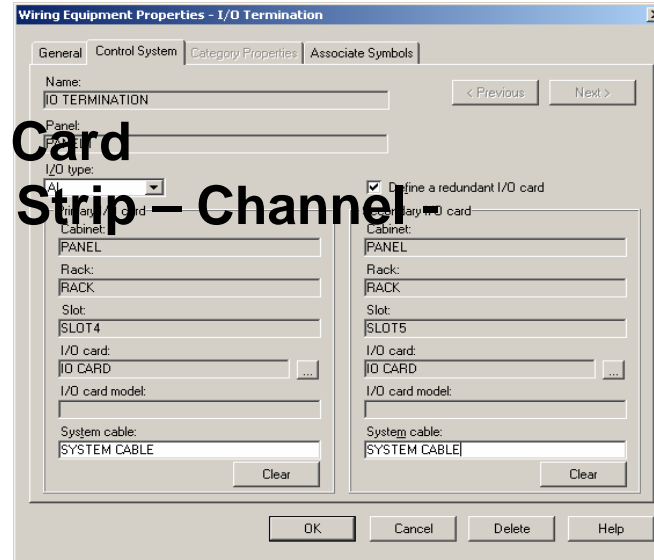
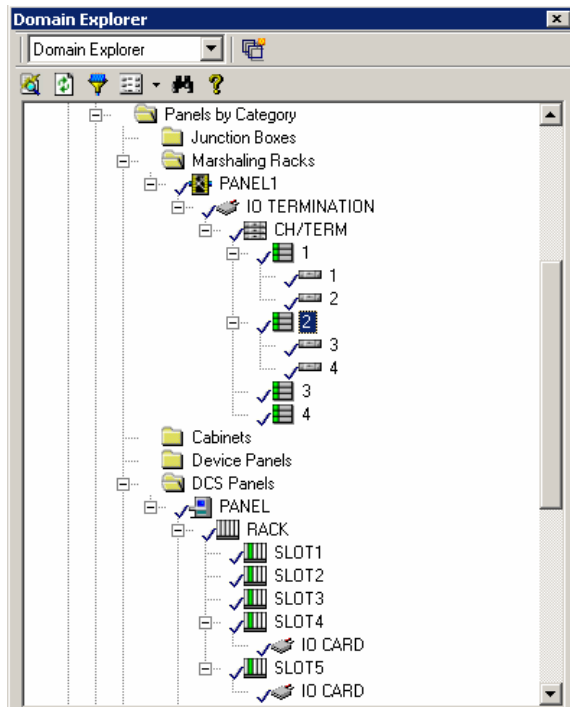
Scenario No.3a

**Wiring to an I/O Termination “FTA or ETB” with
IO Redundancy**

Ex: Honeywell TDC3000, Yokogawa CS3000



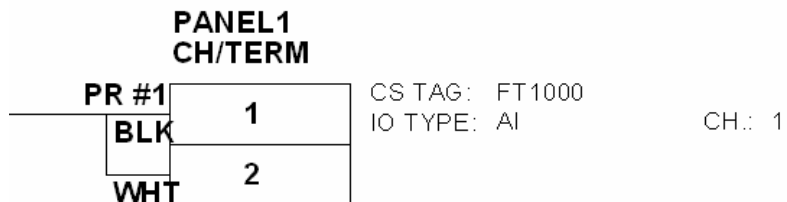
The SPI Hierarchy will be:
Panel – Rack – Slot – I/O Card
Panel – I/O Termination - Strip – Channel – Terminals



The Final Result using ESL for a Loop Drawing

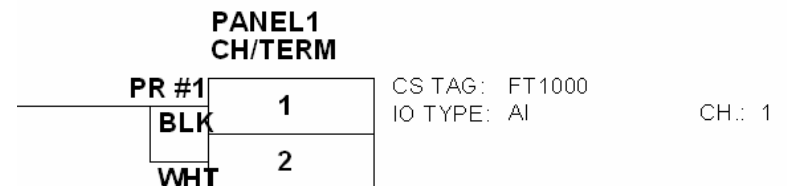
With NO I/O Redundancy

	CABINET	FILE	POS.
PRIM	PANEL	RACK	SLOT 4

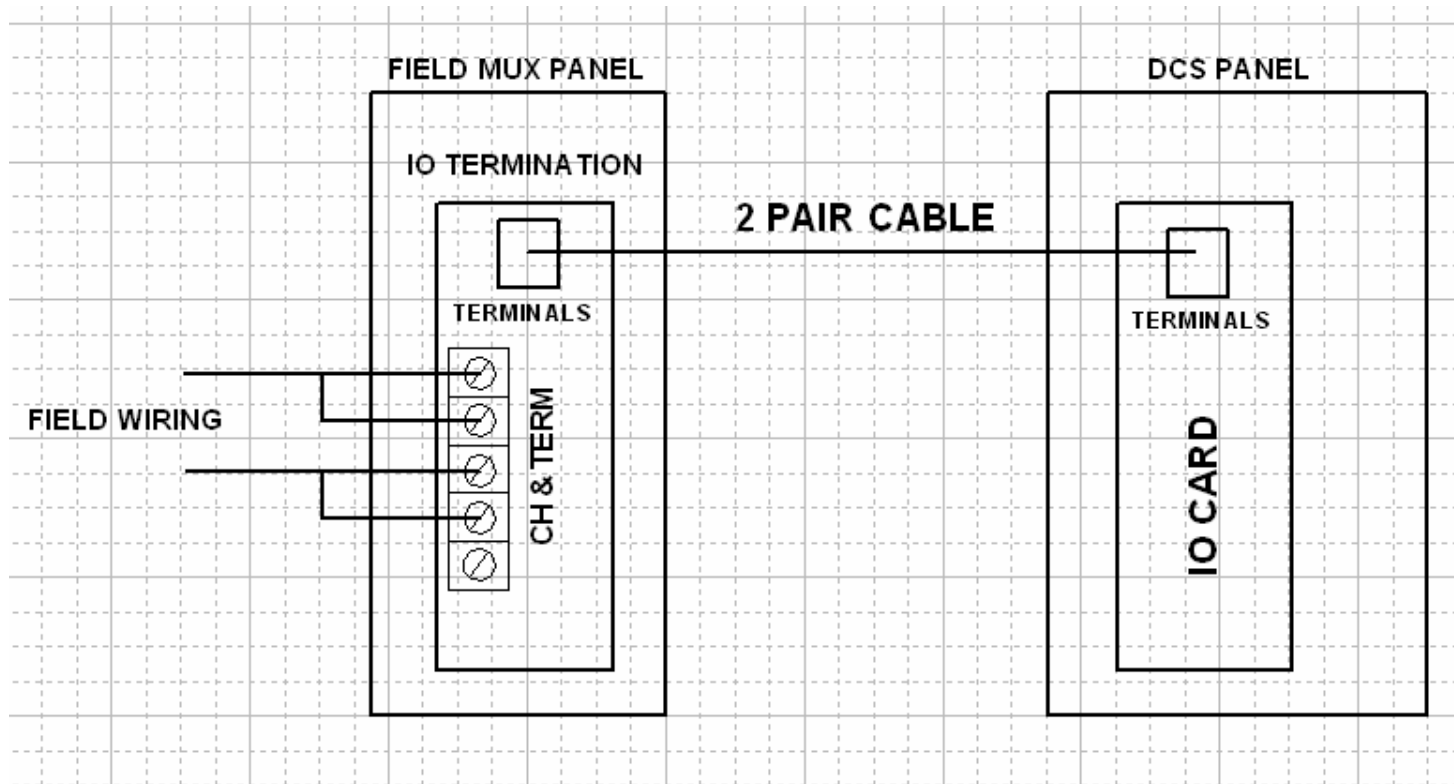


With I/O Redundancy

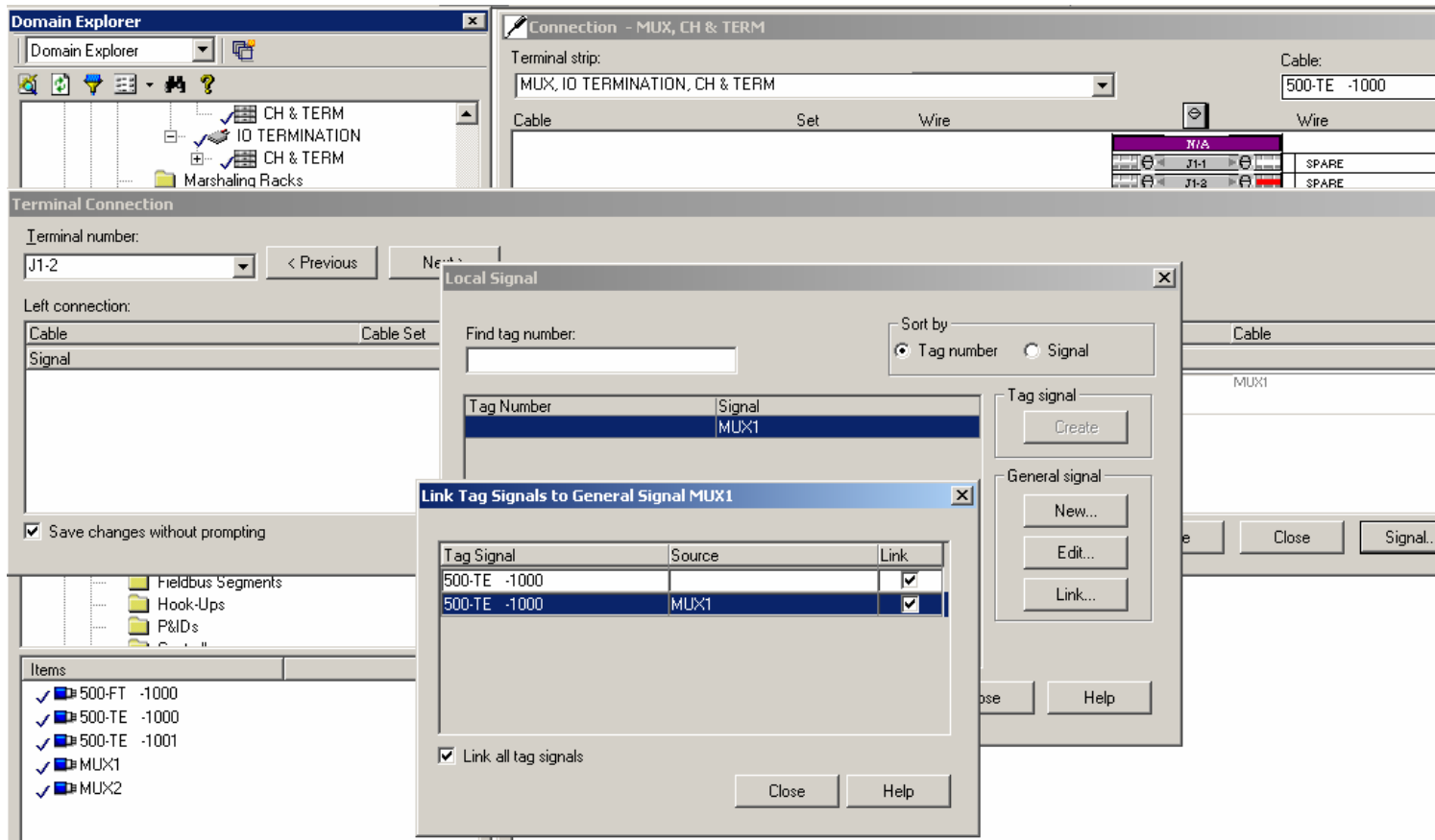
	CABINET	FILE	POS.
PRIM	PANEL	RACK	SLOT 4
SEC	PANEL	RACK	SLOT 5



Scenario No.4 Field MUX Wiring Ex: Honeywell C200, C300



The Usage of the General Signal for the MUX I/O Termination and I/O Card Connection



I/O Card connection “Strip” and general Signal propagation

The SPI Hierarchy will be:

Panel – Rack – Slot – I/O Card

Panel – Rack – Slot - Strip

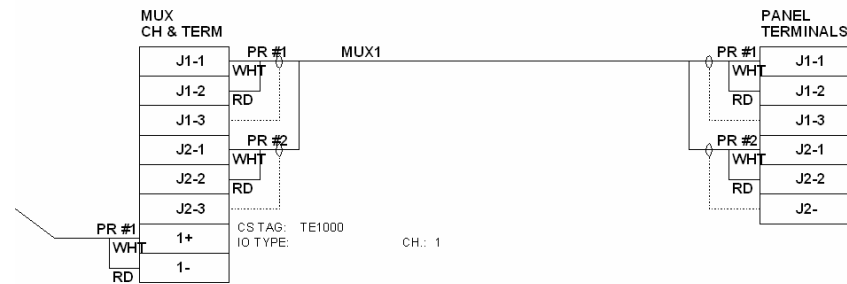
The screenshot displays the SmartPlant Instrumentation software interface. On the left, the 'Domain Explorer' window shows a hierarchical tree structure. The tree is expanded to show 'SLOT6' under 'MUX', which contains 'TERMINALS'. Under 'TERMINALS', there are two groups of terminals: 'J1-1' (J1-1, J1-2, J1-3) and 'J2-1' (J2-1, J2-2, J2-). Each terminal has a checkmark next to it, indicating it is selected or configured.

On the right, the 'Connection - PANEL, TERMINALS' window is open. It shows the 'Terminal strip' dropdown set to 'PANEL, RACK, SLOT6, TERMINALS' and the 'Cable' dropdown set to 'MUX1'. Below this, a table lists the cable configuration for 'MUX1' across two rack positions, 'PR #1' and 'PR #2'.

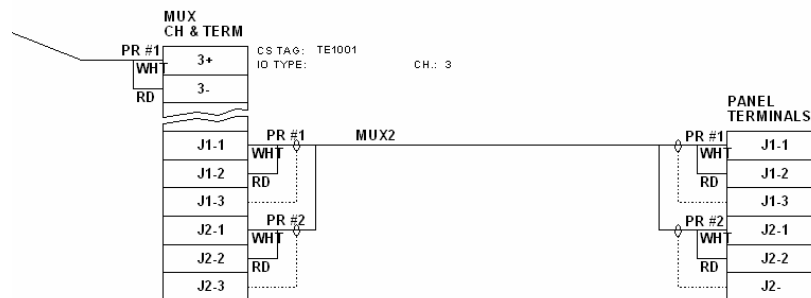
Cable	Set	Wire	Wire
MUX1	PR #1	MUX1	J1-1
		MUX1	J1-2
		Shield	J1-3
	PR #2	MUX1	J2-1
		MUX1	J2-2
		Shield	J2-

2 Ways of Building the MUX I/O Termination

	CABINET	FILE	POS.
PRIM	PANEL	RACK	SLOT 6

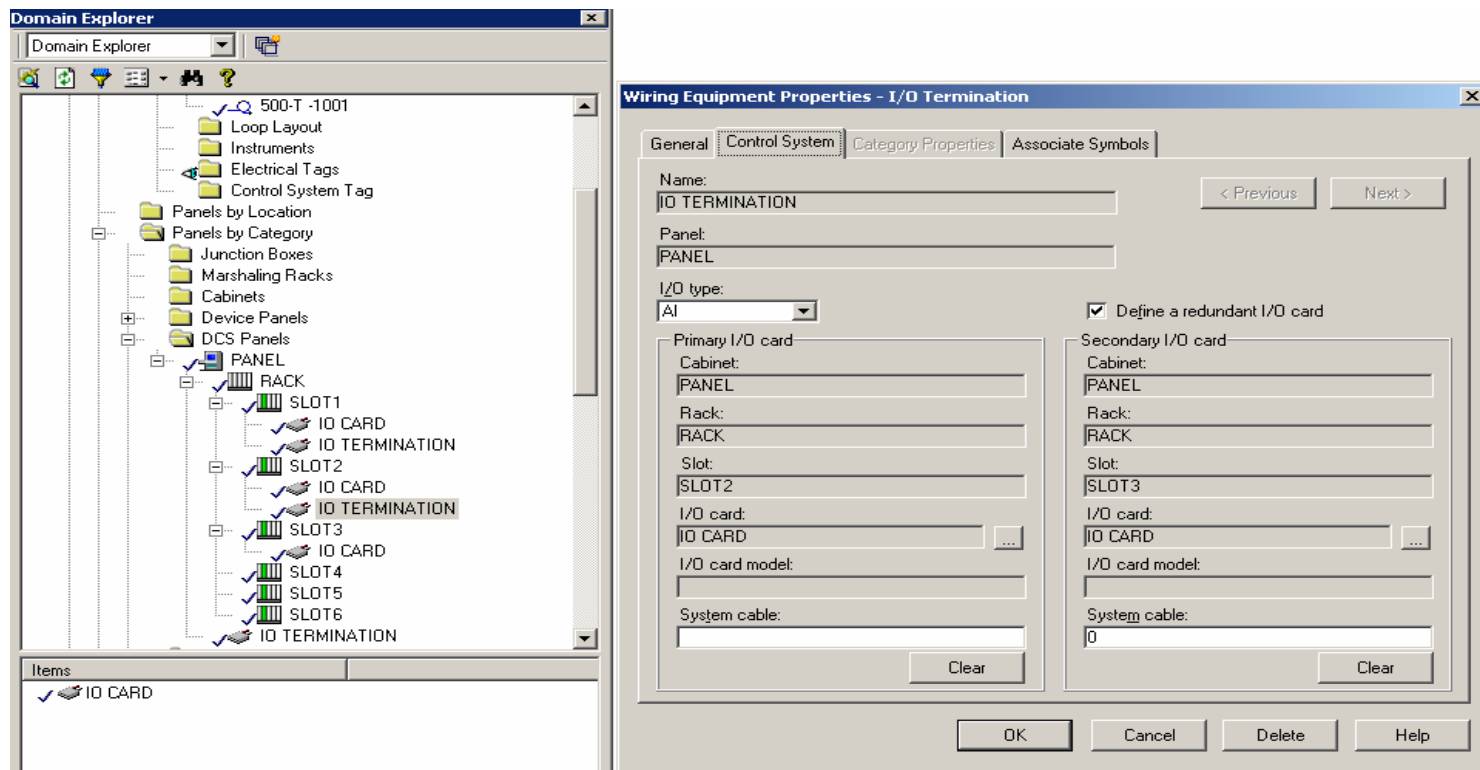


	CABINET	FILE	POS.
PRIM	PANEL	RACK	SLOT 6

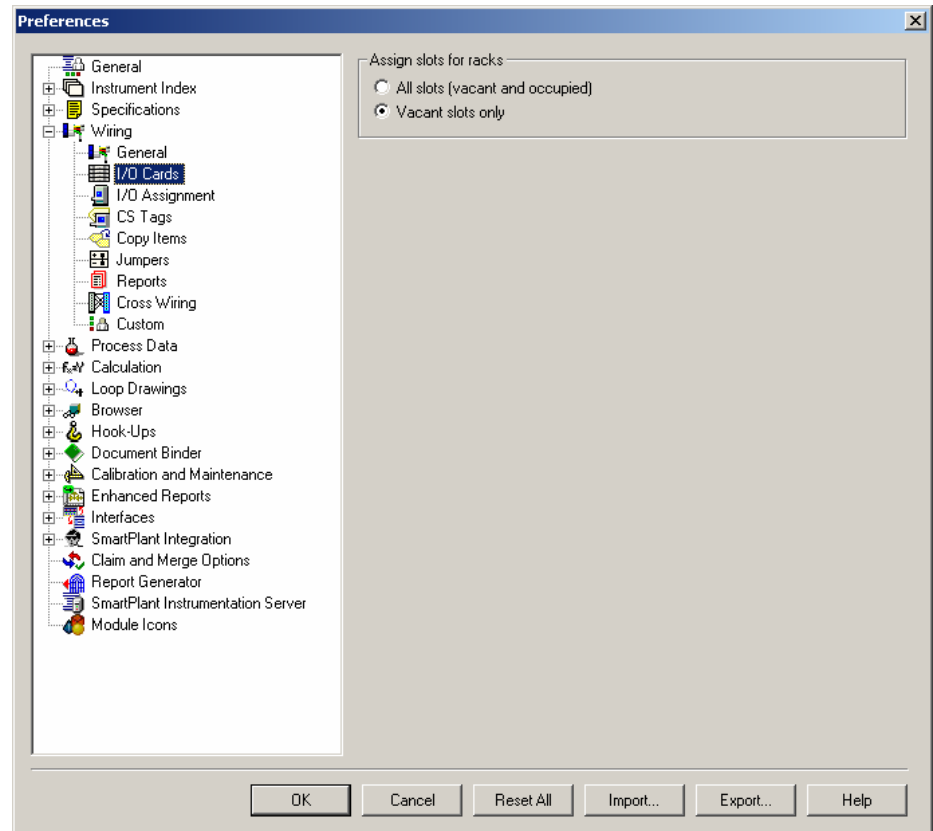
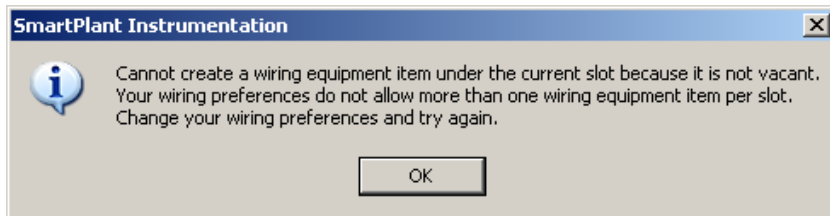


Not Recommended to DO:

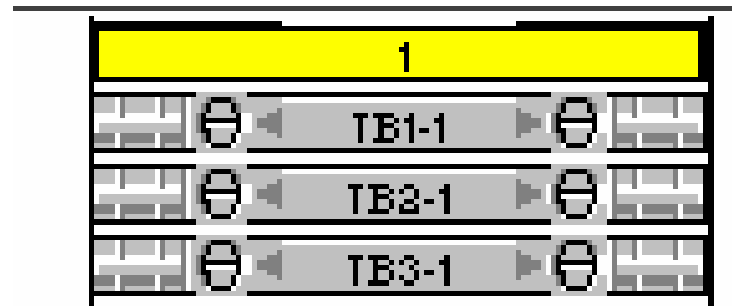
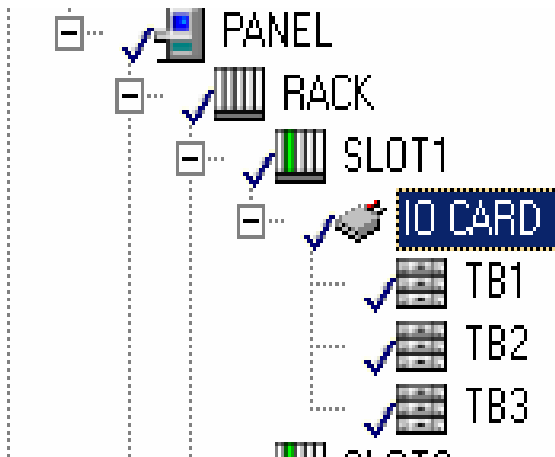
1. Building an I/O Card and an I/O termination within the Same SLOT. This is common these days by users to reflect I/O redundancy especially for DeltaV. Recommended to reflect this using Scenario No.2 to match the SPI upgrade process from V6 to V7 or V2007



Preference Setting that allows an I/O Card and an I/O termination to be built within the same SLOT



2. Building the Plug-in System cable between the I/O Termination and the I/O Card “Building the I/O termination as an Apparatus or a Regular strip and the I/O Card with channels and terminals”.
3. Building the MUX I/O Termination as an Apparatus or a Regular strip and the the IO Card with channels and terminals”.
4. Building an I/O Card or an I/O Termination with multiple strips “Channels and terminals”.



Upgrading from INtools V5 or V6 to SPI V7 and Higher

The key to the proper upgrade for an I/O card/termination is the
“Set within a Distant Cabinet check box and the Define Redundant I/O”

1. If neither boxes are checked, the upgrade will result in reflecting scenario No.1
2. If the distant cabinet is checked, and redundant is checked or not checked, the upgrade will result in reflecting scenario No.2 or No.3 depending on the Cabinet Name.
3. Upgrade Special Instructions Document

I/O Card Properties

General **Control System**

I/O card: AI-01 < Previous Next >

Panel: DCS-01

Control system details:

System I/O type: AI Module: Controller / Processor:

Set within a distant cabinet Define a redundant I/O

Primary location:

Cabinet: DCS-01

Rack:

Position: Double width

System cable:

Secondary location:

Cabinet:

Rack:

Position: Double width

System cable:

OK Cancel Revisions... Delete Help

DCS Interface and I/O Card Double Width and Redundant Check Box

Wiring Equipment Properties - I/O Termination

General | Control System | **Category Properties** | Associate Symbols

Name:
I/O TERMINATION < Previous Next >

Apply naming convention

Panel:
PANEL

Double width

Details

Description:
[Empty text box]

Type: [Dropdown] ... Sequence: [Spin box] 1

Manufacturer: [Dropdown] ... Rack: [Text box]

Model: [Dropdown] ... Slot: [Text box]

Series: [Text box]

OK Cancel Delete Help

Wiring Equipment Properties - I/O Card

General | Control System | **Category Properties** | Associate Symbols

Name:
I/O CARD < Previous Next >

Panel:
PANEL

Control system details

I/O Type: [Dropdown] AI Module: [Text box] Controller / Processor: [Dropdown] ...

I/O card redundancy:
Not redundant Redundant

Primary I/O card

Cabinet: [Text box]

Rack: [Text box]

Slot: [Text box]

I/O card: [Text box]

Secondary I/O card

Cabinet: [Text box]

Rack: [Text box]

Slot: [Text box]

I/O card: [Text box]

I/O Terminations...

OK Cancel Delete Help

Some of the DCS Interface Rules

1. Yokogawa CS3000
 1. Panel Name FCS0011 and can not exceed 7 characters
 2. Manufacture name must be CENTUM CS3000 “Panels, I/O cards, etc”
 3. I/O Card Name must match the IO Card Type Name
 4. Some data is in read-only mode and can not be modified such as channel address, and controller.

2. DeltaV
 1. DeltaV carrier is considered as a rack in SPI and not a controller
 2. Controller name must be Upper case and populated in the controller table
 3. Primary slot must be an odd number and secondary slot must be an even number

**Please Contact Intergraph Support for a complete list/document
of these roles and limitations**