

FIRE

4100U-S1 Fire Indicator Panel Programming Guide



**Australian
Programming
Guide**

**LT0400
Iss 1.4**

Simplex

AMENDMENT LOG

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1 Introduction

1.1 About this Manual

This manual provides information for creating and maintaining configuration files that contain site-specific information for 4100U-S1 installations, based on standardized templates.

This manual does not cover how to install or configure hardware items. Refer to LT0394 4100U-S1 Installation and Maintenance Manual for details about this.

This manual does not cover configuration of networked 4100U-S1 systems. Contact your local Simplex office/dealer for assistance with this.

The manual is divided into the following chapters:

- Chapter 2 describes the 4100U-S1 system hardware and how this affects the configuration procedure.
- Chapter 3 describes the 4100U programming tools used for creating and updating the configuration for a 4100U-S1.
- Chapter 4 details the procedure for creating a configuration file for a new 4100U-S1 installation, using the configuration templates.
- Chapter 5 describes how to add addressable devices to the configuration for the in-built IDNet loop.
- Chapter 6 details the configuration settings for addressable devices and how these affect the operation of the devices.
- Chapter 7 describes how to add zone display modules for more zones to the configuration. This is for when an existing system is being extended to have more zones.
- Chapter 8 describes how to add expansion modules such as a second IDNet loop to the configuration. This will apply to a new system which has additional modules over the basic 4100U-S1, or to an existing 4100U-S1 installation that is being extended.
- Chapter 9 describes how custom control equations are written and entered. Some examples are given.
- Chapter 10 describes how to configure the panel to control AS1668 Fans.
- Chapter 11 describes how to build the configuration and download it to the panel.
- Chapter 12 contains appendices which describe how AS4428.1 operation is produced in 4100U-S1 using Custom Control equations. This is for reference only, and is not required reading for normal configuration work.
- Appendix A – a general description of AS4428.1 requirements.
- Appendix B – describes the allocation of internal system resources and custom control for system-wide functions.
- Appendix C – describes custom control for control key and indicator operation on the keyboard.
- Appendix D – describes custom control for Alarm Zone Facility operation.

- Appendix E – describes 4100-1282 AZF Switch and LED Address mapping.
- Appendix F – describes useful pseudo points and lists for when working on a 4100U panel, especially when chasing intermittent faults.

1.2 Before you start

To get the job done with the minimum of problems and re-work, get the project specific data sent to you via email or in writing – this helps keep track of the project details and changes.

You will need the cards and addressable loop/s details, including the devices types, description/label and zoning. If there are zoned output trips, they should be defined via a “cause and effect” matrix. Microsoft Excel or similar is very good for this purpose.

The most variable programming details are related to sprinkler flowswitch functionality and AS1668 Fan and Damper control. Get the requirements resolved as soon as possible, otherwise you may need to partially re-program so the required functionality is met.

Flowswitches may require:

Delayed activation – if so, how long is the delay?

Latching or non-latching operation.

ANDing with a Sprinkler Pressure Switch – to reduce unwanted alarms.

Which outputs will be tripped and are the outputs to latch?

AS1668 operation depends on the Mechanical Services Board/s and their functionality.

In some cases, general trip and zone trips are all that is required, with the Mech Board starting and stopping the correct fans. In other cases, full start and stop control for smoke management (with the manual controls in Auto position) is required by the panel.

Will fan operations be limited to manual Start/Stop control?

Will some fans be required to start (or stop) on any alarm – e.g. stair pressurization fans.

Will some fans be required to start (or stop) on specific zones in alarm – e.g. sandwich Pressurization/smoke management?

Note: Dampers are programmed the same as exhaust fans.

The actual programming consists of four stages:

1. Adding/editing cards and addressable devices.
2. Adding the detection devices into pre-defined lists.
3. Adding/editing custom control, panel LEDs and switches mapping.
4. Build and download.

Follow the above sequence and the instructions in this guide - the programming will be straight forward, especially if the templates are used to start the project file.

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2 System Overview

2.1 General Description

The 4100U-S1 is a pre-packaged configuration of the well-established 4100U fire alarm system. It is aimed at smaller applications requiring one to four loops of Simplex addressable devices with status and control for up to 64 zones.

The 4100U-S1 is available from stock, along with a range of expansion cards and modules, making the 4100U-S1 an off the shelf solution.

4100U-S1 retains the standard 4100U features, such as: enhanced CPU with dual configuration programs, convenient service port access, and module level earth fault search to locate and isolate faults to assist installation and service. It is fully compatible with all existing 4100U networks and modules.

Note:

Larger or more complex 4100U systems are custom configured and constructed, using a range of cabinet sizes and multiple cabinets if needed. While this manual does not cover the many customization options, the programming principles remain the same and 4100U-S1 program templates can be used as a starting point for large systems.



The 4100U-S1 comes in a 21U cabinet with external dimensions 1050 x 575 x 280mm (H x W x D), with a cream wrinkle finish.

In the upper part of the cabinet is a CPU bay containing the 4100U CPU card, its motherboard, and the Australian SPS power supply module. The SPS module provides the first IDNet loop and is fitted with an Alarm Relay card (for alarm/fault/isolate brigade signalling) and a 24V fused distribution board as standard. Up to two 4100 legacy style cards and motherboards can be added to this bay.

Below the CPU bay is the expansion bay which is supplied fitted with Alarm and Isolate indicators and controls for 16 zones. The number of indicators is expandable up to 64 zones by adding LED modules (8 zones each) and a second 64 LED/Switch controller if more than 32 zones are required.

Internally, the expansion bay is empty except for a switched power outlet to supply the SPS and other service requirements. There is space for up to six 4 x 5 modules in this bay. In practice, a 4100U-S1 system will usually run out of zone display space or battery capacity before all these positions are filled. If required, up to four 4100 legacy style cards and motherboards can be added to the expansion bay, depending on how many 4 x 5 modules are also fitted.

Each module fitted into the 4100U-S1 is a "Slave" card that is controlled by the CPU card in the loop bay. Each slave is allocated a unique address so the Panel Master CPU can address it. The configuration programmed into the 4100U defines the slave card type at each address and the devices on its loop.

The 4100U programmer has built-in rules about what modules can be installed in each bay of the cabinet.

2.2 Programming

This manual describes the steps in programming of the 4100U-S1. Take care to modify only the described tabs, fields, etc., as it is possible to accidentally modify other properties and change the operation unexpectedly.

Custom control programs 3 – 5 have been produced to ensure the panel behaviour meets Australian standard AS4428.1 and behaves as described. Generally, these should not be modified without consulting with your local Simplex office/dealer unless directed by this or another manual.

Custom control program 7 supports AS1668 fire fan operations and the equations will need to be edited by replacing pseudo point "fillers" with actual fan start and stop relays, fan run indications and mechanical board fault signal inputs.

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3 About the Programming Tools

3.1 General

The 4100U Panel can be programmed by downloading into it a configuration file that meets the desired site installation requirements.

3.2 4100U Programmer

The programmer for the 4100U panel is a Windows® based application with graphical interface that enables the user to build a specific site configuration (job) and download the configuration image into the 4100U panel via the PC serial port.

The programmer operation is controlled by a Programming Key (Dongle) that must be attached to either the PC parallel port or USB socket (depending on the dongle type) to enable programming access. USB dongles take up to 1 minute to be recognized by the software, so don't expect it to be immediately ready when first plugged in.

It is essential to use the 4100U Programmer version that matches the Panel Master Exec version. The following table summarises the compatibility of the 4100U Programmer versions with the 4100U Panel Exec versions.

Panel Exec Version	Programmer Version	Programmer Part Number
11.11.01	11.11.01	SF0371
11.11.02J1	11.11.02J1	SF0380
12.05.02	12.05.02	SF0416
12.06.01	12.06.01	SF0416

The appropriate programmer can be ordered from Simplex Fire Products using the part number listed.

3.3 4100U-S1 Configuration Templates

The 4100U-S1 panel is shipped with a basic 16 zone configuration to meet the Australian standard. The configuration templates (part number SF0369) can be used by installation technicians as the basis for each new 4100U-S1 site-specific configuration.

3.4 4100U Programmer Installation and Launch

Log on to the computer as an administrator and then run the 4100U Programmer installation executable and follow the instructions – this will install the new programmer (with other 4100U programming utilities) on your PC. There is no need to uninstall any old versions as multiple versions can co-exist simultaneously. In fact it can sometimes be useful to have different versions of the programmer installed to support the different Panel Exec versions in the field.

The installation process will create a directory named after the Programmer's version (e.g. Version 12.05.02) under the 'C:\Program Files\Simplex\4100U Programmer' directory.

To launch the programmer click Start | (ALL) Programs | Simplex | the appropriate version number | 4100U Programmer.

3.5 Steps to Configuring a New System

The steps to configuring a new system are covered in Sections 4 -10.

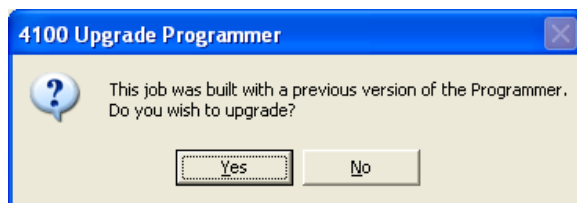
Section 11 contains details on “building” the configuration and downloading it into the panel.

3.6 Upgrading an Existing Configuration

The configuration must be prepared/edited using a version of the programmer that matches the Panel Exec firmware installed. If the panel Exec firmware is updated, e.g. to add some new features, then the configuration will need to be upgraded using the new compatible programmer version and downloaded to the panel after the firmware has been updated.

A panel with a non-matching configuration will report that the existing configuration is an incompatible version and repeatedly restart. The upgraded version of the configuration must be downloaded before normal operation will resume.

Locate the existing database file (job *.SDB4100U) for this system. If you want to keep the old version as well as the upgraded version of the configuration, you may open it using the old Programmer - do a ‘Save As’/‘Copy...’ and enter a new job name for the upgraded version, or simply copy the entire directory of the old configuration to a backup directory. Open the database file using the Programmer with the new version required. The Programmer will identify that the database is an older version and will prompt to do an upgrade.

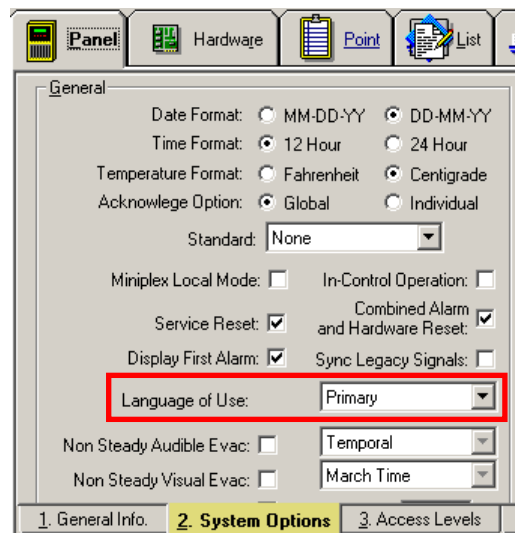


Click on the Yes button.

This will upgrade the database to the format for the new programmer version.

With the introduction of version 12 Exec firmware, the Australian message library is loaded as a primary message library. Select Panel and then System Options and ensure the setting for ‘Language of Use’ is set to ‘Primary’.

Make any other changes required, save the new database, build it and download it to the panel as described in this manual.



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4 Creating a Configuration

4.1 Creating a New Project File

This method describes how to create a new 4100U-S1 configuration using the template configuration file as the starting point. SF0369 contains the zipped template files. These files should be unzipped to an appropriate folder on your PC such as C:\4100UJOBS. Run the 4100U programmer of the correct version and click on the 'File' menu and select 'Open'.

Browse to the location containing the 5 default configurations supplied with SF0369:

S1_16ZN.SDB4100U for 16 zones,
S1_32ZN.SDB4100U for 32 zones
S1_64ZN.SDB4100U for 64 zones.
S1_16Z_F.SDB4100U for 16 zones, 8 fans
S1_32Z_F.SDB4100U for 32 zones, 12 fans

Choose the one that has more front panel zones than are required, as it is easier to remove extra zones rather than add more. Click OK.

All templates have the required Pseudo points and custom control equations for fan controls. The templates with _F also have hardware preconfigured.

After the file is opened do a 'Save As'/'Copy...', enter the new job name and click OK. Note that the 'Job Name' you enter will show on the front panel when the "**Display Software Revision Level**" command is entered.

Now proceed with adding and modifying the site specific information as described below.

4.2 Adding Panel Information

Enter the relevant information on the 'General Info' page in the 'Panel' tab.

- Panel Information
 - Description = Site name.
 - Alternate Description = Site name.
 - Project Number = Software job number (must be obtained from Simplex).
 - Order number = Client's order # for the panel.
 - Agency listing = should always be - CSIRO.
 - NFPA Standard = (not required).
 - Standby Generator = unticked.
 - Hours of standby battery = should be 24, or 72 if not brigade connected.
 - A/C breaker location = (fill in if known).
- Branch Information
 - Branch number = (not required).
 - Branch location = Local Simplex office location.
 - Contact = Local Simplex contact name (could be sales person or tech etc).
 - Sales person = Local Simplex sales person's name.
 - Project Eng = Name of project engineer (system designer).
 - Technician = Service technician's name (if known).
 - Customer = Building owner (if known).
 - Contractor = Contractor company name.
- Programmed by - Appropriate fields to be filled in, i.e., if programmed by Simplex we fill in branch name file and phone. If programmed by contractor put in local Simplex contact name (e.g., sales rep).
- Hardware lock enable = leave unchecked.
- Comment = Further information like panel location.

To enter the panel CPU serial number click on the 'Panel' tab, then click on the 'Features' page. Then tick the 'Runtime Enable Edit' checkbox. Enter the serial number of the panel

CPU in the text entry field labelled 'CPU #', and then click on the 'Update Access Codes' button.

If the CPU Serial number is not known then power up the panel - the CPU Serial Number appears on the initial screens displayed during the panel start-up. If the panel is not available, leave the CPU serial number empty for now. If you try downloading the configuration to a panel without entering the serial number, or it is wrong, a warning will be given but you can still complete the process. Once the number is known, enter it and download the configuration.

4.3 Adjusting the Number of Zone Displays

To delete unnecessary front panel display zones:

- Click the Custom Control tab.
- Open Program 4 (labelled as 'AS4428 CONTROL LOGIC ZONES 1 - xx').
- Scroll down to display the last zones' equations.
- Highlight the equations for the unused zones using the Shift and Down Arrow keys. Each zone is comprised of 6 custom control equations that are labelled with that zone number.
- Press the 'Delete' key and then the 'y' key repeatedly to acknowledge the deletion of each equation.

4.4 Adding the AZF Logic

The Alarm Zone Facility logic (the custom control equations for the zones) should not need to be modified unless new hardware is added to the panel, e.g., when extending an existing 4100U-S1 panel with 16 zones to 32 or 64 zones, etc. Note this may require an additional 64 LED/switch controller (4100-1288) and LED/switch modules (4100-1282) to be installed in the panel. This programming is described in Chapter 7.

4.5 Where to Next?

New systems have to be configured with the addressable devices, and the devices assigned to zones. This is covered in chapter 5.

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5 Adding Addressable Devices

5.1 Adding devices to an SPS Addressable Loop

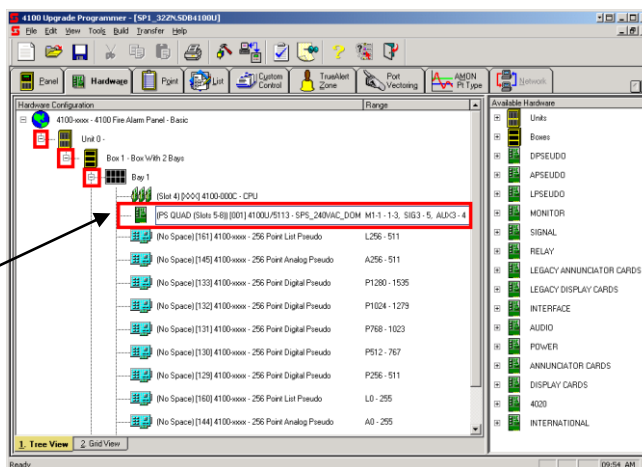
The 4100U-S1 panel is supplied with one addressable loop. This loop is located on the SPS Power Supply.

To add addressable devices to this loop using the programmer follow these steps.

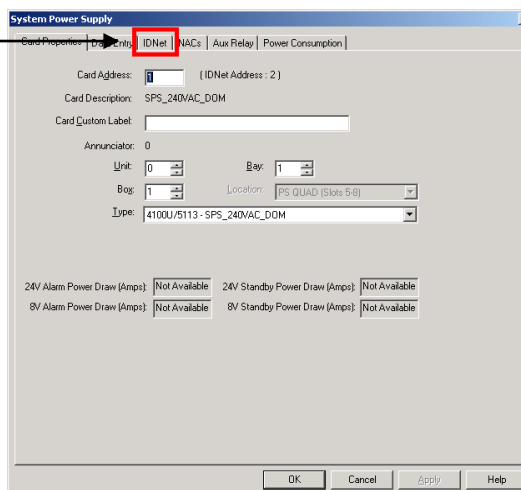
- Select the *HARDWARE* Tab
- Click on the “+” sign beside Unit 0
- Click on the “+” sign beside Box 1
- Click on the “+” sign beside Bay 1

Double click on the green card beside the text:

“(PS QUAD (Slots 5-8))[001]
 4100U/5113 – SPS_240V_DOM M1-1
 – 1-3, SIG3 – 5, AUX 3-4”

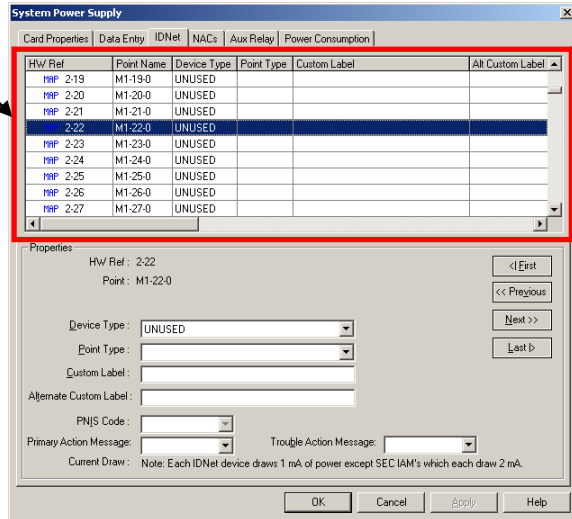


- Select the *IDNET* Tab

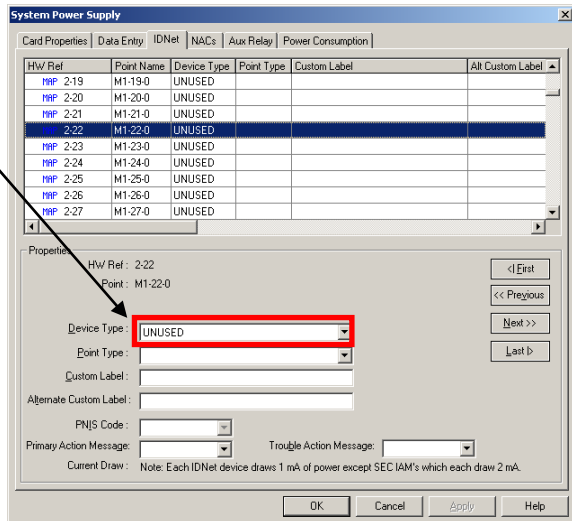


Note: Holding the PC Shift key down while clicking on a “+” sign will expand all items in that section

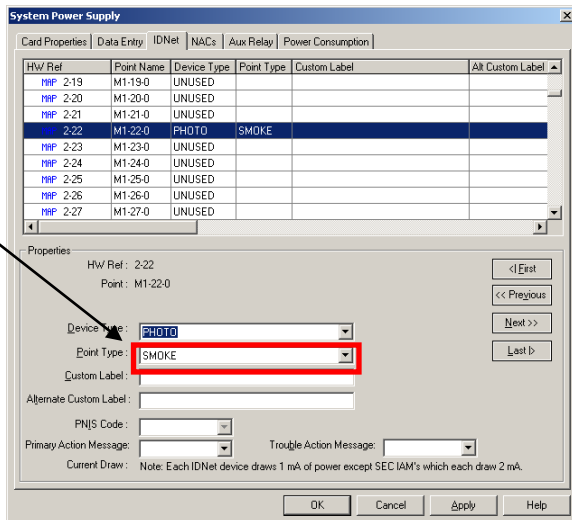
- Select the desired address of the device by clicking on the line.



- Select the *Device type*
- Refer to Section 6.2 for Device type options



- Select the *Point type*
- Refer to Sections 6.2 for Point type options

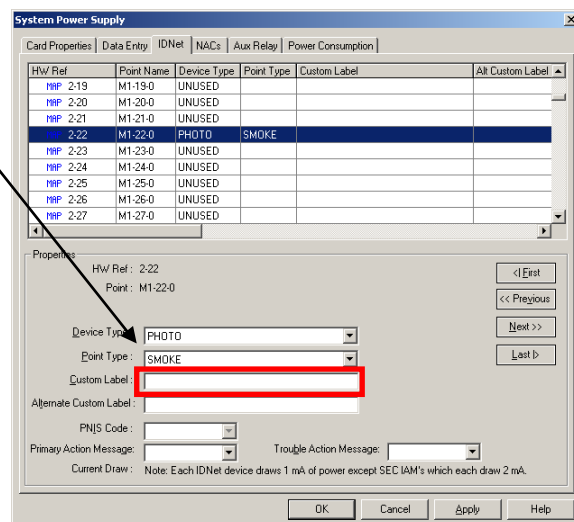


- Enter Custom Label into the Custom Label box

The Custom Label is limited to 40 characters. It is recommended that the first characters be the point address, followed by the description of the point location and then lastly the zone number.

e.g. M1-188 FOYER RECEPTION DESK ZN01

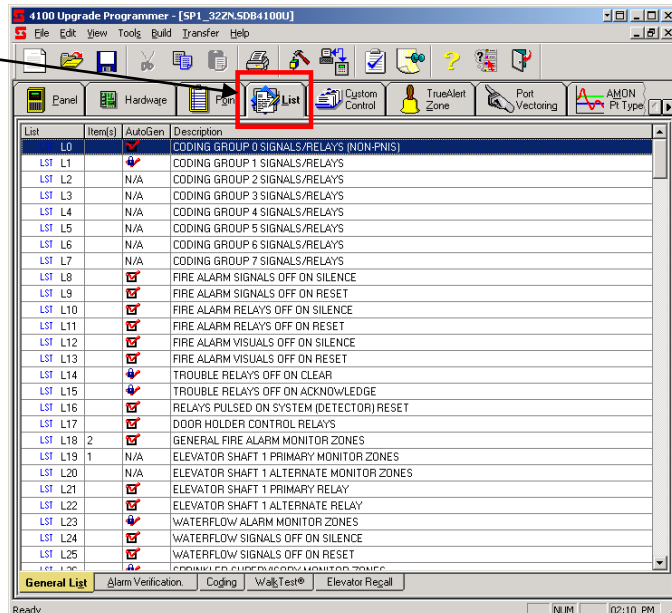
- To continue entering new devices click the APPLY or NEXT buttons.



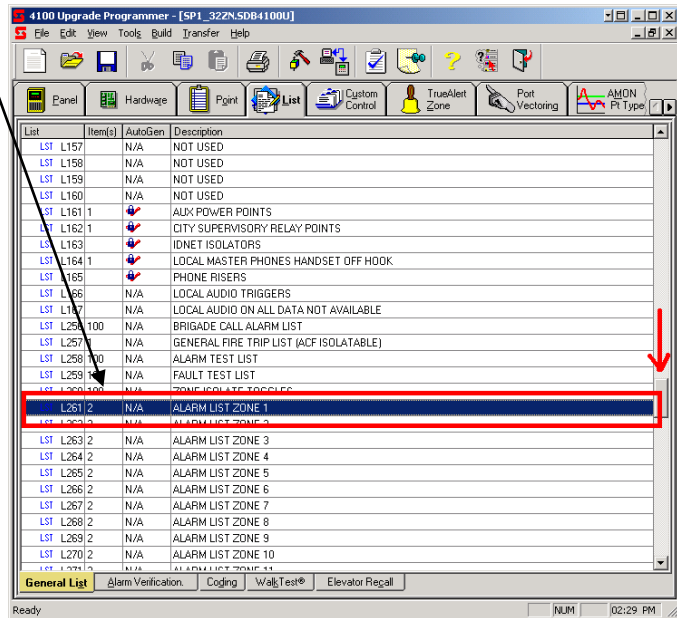
5.2 Assigning Devices to Zones

Once addressable devices have been entered into the configuration (refer Section 5.1) they can then be assigned to Zones on the 4100U. This is done by adding the device to preset Lists as follows:

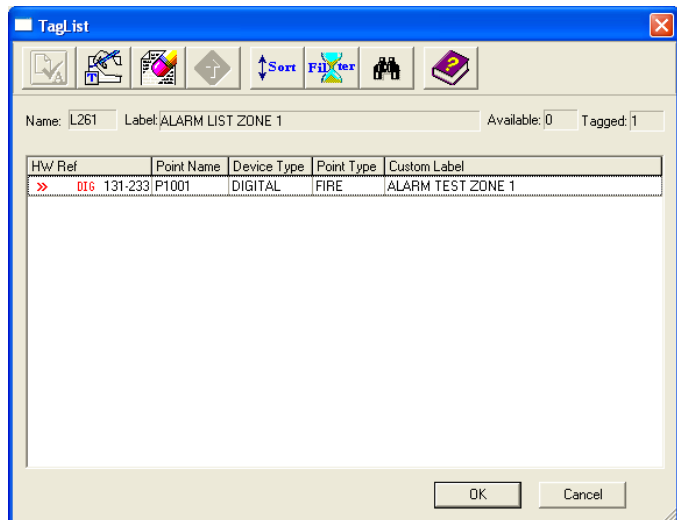
- Select the LIST tab



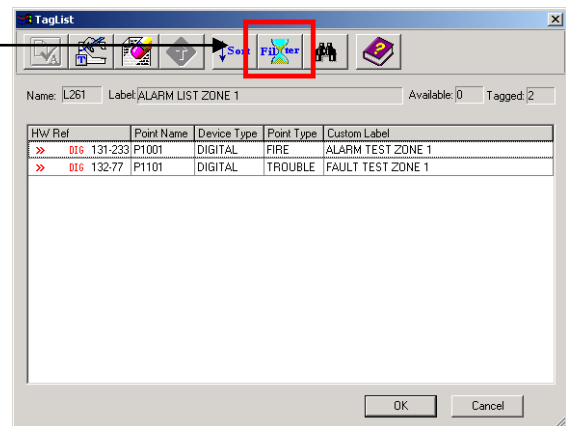
- Scroll down until L261 is reached.
L261 = Zone 1
L260+n = Zone n



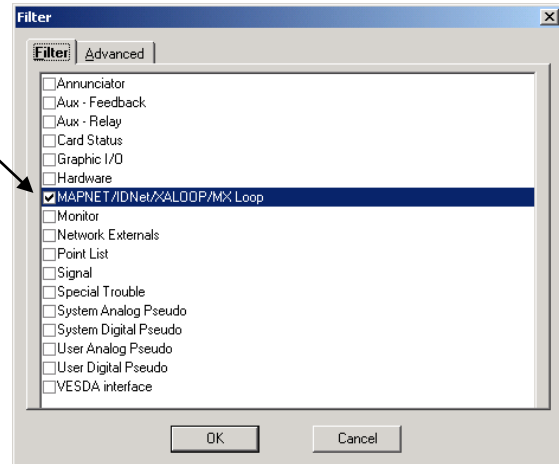
- Once the correct List is highlighted press **F9** to display the points assigned to this list.
- The Alarm List Zone should always have at least one point tagged; the Alarm Test Zone digital point with the matching zone number.



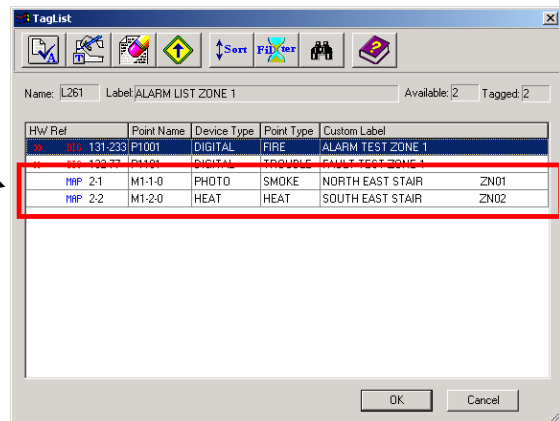
- Click on the **Filter** button



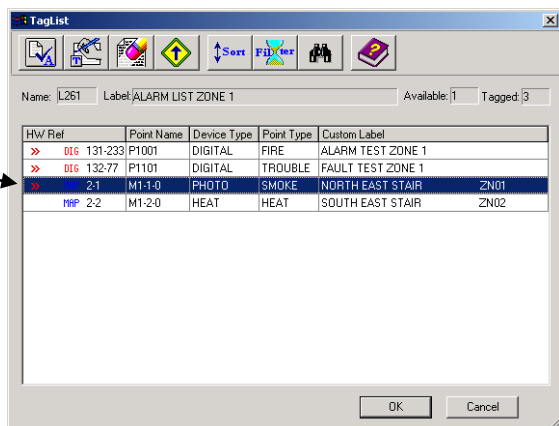
- Select the *MAPNET/IDNet* option



- All available addressable devices (MAPNET, IDNet, etc) will now be listed in the Tag List window.



- Select the required devices by highlighting the device and pressing the <SPACEBAR>. Two red chevrons ">>" indicate the device has been tagged.
- Press OK when all devices are tagged for this zone.



Note: If a point is inadvertently un-tagged, it might be necessary to use the Filter function to find the appropriate point to re-tag it back into the Zone List, e.g. if L261 ALARM LIST ZONE 1 has lost its ALARM TEST ZONE 1 digital point, the filter function can be used to find and re-tag the User Digital Pseudo P1001.

6 Addressable Device Settings

6.1 Introduction

6.1.1 Alarm Device Types

The 4100U-S1 supports a range of addressable device types on its IDNet addressable loops. The following sections detail for each of the compatible addressable devices (detectors and modules) what device type and what point type should be selected in the 4100U programmer. Other point types should not be used without consulting a Simplex technical representative as most have code associated with them that can activate outputs automatically with no isolate control. The device type defines what type of device it is, including, for detectors, what type of base is used. The point type defines how the device is to be used, i.e. the functionality or application.

6.2 Addressable Detector Settings

6.2.1 4098-9714E Photo Detector

Device Types

- PHOTO – Standard photo detector on Standard base
- IPHOTO – Standard photo detector on Isolator base
- SPHOTO – Standard photo detector on Sounder base

Point Types

- SMOKE – Standard setting
- VSMOKE – Verified Smoke Detector (Recommended setting to reduce nuisance alarms)
- DUCT – Return Air Duct detector
- UTILITY – Supply Air or Stair Pressurization Duct detector

6.2.2 4098-9717E Ion Detector

Device Types

- ION – Standard ion detector on standard base
- IION – Standard ion detector on Isolator base
- SION – Standard ion detector on Sounder base

Point Types

- SMOKE – Standard setting
- VSMOKE – Verified Smoke Detector (Recommended setting to reduce nuisance alarms)

6.2.3 4098-9733E Heat Detector

Device Types

- HEAT – Standard heat detector on standard base
- IHEAT – Standard heat detector on Isolator base
- SHEAT – Standard heat detector on Sounder base

- OHEAT – Standard heat detector with Rate of Rise on standard base
- IOHEAT – Standard heat detector with Rate of Rise on Isolator base
- SOHEAT – Standard heat detector with Rate of Rise on Sounder base

- UHEAT – Heat detector that can only be used as a Utility (non-MAF) detector

Point Types

- HEAT – Standard setting
- UTILITY – Heat detector used for non-MAF usage only

6.2.4 4098-9754E Multi-Sensor Photo Heat Detector (COMBO)

Mx-x-0 Parent Point

Device Type

- COMBO – Standard Multi-Sensor detector on standard base
- ICOMBO – Standard Multi-Sensor detector on Isolator base
- SCOMBO – Standard Multi-Sensor detector on Sounder base

Mx-x-1 1st Sub Point

Device Type

- MPHOTO – Standard setting

Point Type – Photo Part

- SMOKE – Standard setting
- VSMOKE – Verified Smoke Detector (Recommended setting to reduce nuisance alarms)
- DUCT – Duct detector

Mx-x-2 2nd Sub Point

Device Type

- MHEAT – Standard setting

Point Type – Heat Part

- MHEAT – Standard setting
- MOHEAT – Standard heat detector with Rate of Rise

Mx-x-3 3rd Sub Point

Device Type

- MARCOR – Default not used in Australia

CAUTION DO NOT USE MARCOR SETTING NOT CSIRO ACTIVFIRE LISTED

Point Type – R-Correlation Part

- FCOR – Alarm Smoke / Heat Correlation
- UCOR – Utility Smoke / Heat Correlation used for non-MAF usage only

Device Type

- MAOFF – Standard setting used in Australia

Point Type – R-Correlation Part

- UTILITY – Standard setting

6.3 Addressable Device Settings

Any unused points should be set as utility to avoid potential false alarms from unused fire point type inputs.

6.3.1 4099-9032 MCP

Device Type

- KACPULL – Standard MCP

Point Type

- PULL – Standard setting

6.3.2 4090-9001 Supervised Input IAM and 4090-9051 Encapsulated Input IAM

Device Type
IAM – Standard setting

Point Type
FIRE – General Fire Point.
UTILITY – Input used by Custom Control Logic only
TROUBLE – Input used to indicate a Fault status

6.3.3 4090-9002 Relay IAM

Device Type
RIAM – Standard Setting

Point Type
RELAY – General Purpose relay.
TRELAY – Fault Relay on until fault cleared

6.3.4 4090-9101 Monitor ZAM

Device Type
MBZAM – Standard Setting

Point Type
FIRE – Standard setting

6.3.5 4190-9050 4-20mA Analog Monitor ZAM

Device Type
ANAMON – Standard Setting

Point Type
The Point Types are custom configurable using the *AMON Pt Type* Tab. The Point types need to be configured before the 4190-9050 is added.

6.3.6 4090-9118 Relay IAM with T-Sense Input

This device has multiple sub points. The sub points can have the point type changed depending on the operation.

Mx-x-0 Parent Point

Device Type
TRIAM – Standard setting

Point Type
UTILITY – Standard setting

Mx-x-1 1st Sub Point (relay output)

Device Type
MRELAY – Fixed Device type

Point Type

RELAY – General Purpose relay
TRELAY – Fault Relay on until fault cleared

Mx-x-2 2nd Sub Point (T-Sense input)

Device Type

MTSENSE – Fixed Device type

Point Type

FIRE – General Fire Point
UTILITY – Input used by Custom Control Logic only
TROUBLE – Input used to indicate a Fault status
WATER – Sprinkler -Flow Switch setting
WSO – Sprinkler – Flow Switch and Valve Monitor

6.3.7 4090-9119 Relay IAM with Unsupervised Input

This device has multiple sub points. The sub points can have the point type changed depending on the operation.

Mx-x-0 Parent Point

Device Type

FRIAM – Standard setting

Point Type

UTILITY – Standard setting

Mx-x-1 1st Sub Point (relay output)

Device Type

MRELAY – Fixed Device type

Point Type

RELAY – General Purpose relay
TRELAY – Fault Relay on until fault cleared

Mx-x-2 2nd Sub Point (feedback input)

Device Type

MFEEDBK – Fixed Device type

Point Type

UTILITY – Input used by Custom Control Logic only
TROUBLE – Input used to indicate a Fault status

6.3.8 4090-9120AU 6 Point I/O Module (4 Inputs, 2 Relay outputs)

This device has multiple sub points. The sub points can have the point type changed depending on the operation.

Mx-x-0 Parent Point

Device Type
MLPTIO – Standard setting

Point Type
UTILITY – Standard setting

Mx-x-1 to Mx-x-4 Sub Points (input)

Device Type
MINPUT – Fixed Device type

Point Type
FIRE – General Fire Point.
UTILITY – Input used by Custom Control Logic only e.g. fan control inputs
TROUBLE – Input used to indicate a Fault status

Mx-x-5 and Mx-x-6 Sub Points (relay outputs)

Device Type
MOUTPUT – Fixed Device type

Point Type
RELAY – General Purpose relay
TRELAY – Fault Relay on until fault cleared

6.3.9 4090-9116 Addressable IDNET Isolator

Device Type
IDNETISO – Standard Setting

Point Type
ISO – Standard setting

6.3.10 4090-9117AU Addressable IDNET Power Isolator

Device Type
POWERISO – Standard Setting

Point Type
ISO – Standard setting

6.4 IDNET Devices Typical Applications

The following examples show the programming needed for various ID-Net modules being used in some common applications.

IAM – Valve Tamper Monitor

- 1) At the required address add an IAM, Point type SUPERV, Custom Label - Valve Tamper Monitor. In this example we will use address M1-6-0.
- 2) If using alternate LED display hardware (4100-1276 8 LEDs only) Tag Device the point into the required zone List. For example, List L277 for zone 17. Then in point editing of the LED display add L277 as the reference address. When operated the IAM device will display on the LCD as an Isolated Valve Tamper.

Relay IAM – AC Trip

- 1) Program a relay RIAM point type RELAY (M1-8-0 in our example).
- 2) Add M1-8-0 to track ON into AC Trip Equation under Program 3 in Custom Control Tab equation 5.

```
[INPUTS]
  STATUS ON
  P521 | DIGITAL | UTILITY | A/C TRIP
  AND NOT STATUS SUPV
  P517 | DIGITAL | SUPERV | ACF ISOLATE
[END INPUTS]
[OUTPUTS]
  TRACK ON PRI=9,9
  AUX3 | RELAY | RELAY | A/C FIRE TRIP          AUX3
  TRACK ON PRI=9,9
  M1-8-0 | RIAM | RELAY | AC TRIP
[END OUTPUTS]
```

TRIAM – Flow Switch / Test Solenoid

- 1) Program a TRIAM – Point Type UTILITY (M1-7-0 mapping to zone 16 in this example) with the following sub points.
 - M1-7-1 – MRELAY – Point Type RELAY – Test Solenoid
 - M1-7-2 – MTSENSE – Point Type WATER – Flow Switch AZF 16
- 2) To program the flow switch indication follow the following steps:
- 3) Tag the sub point 2 (M1-7-2 – MTSENSE – WATER – Flow Switch AZF 16) into List L276, being the Zone 16 list.
- 4) Rename L276 to suit the description of the Flow Switch, and remove it from the Fire Brigade List L256, unless you want the flow switch to call the brigade. Do the same with the AC trip list L257.
- 5) Rename P616 (Zone 16 ISO) to be Flow Switch ISO AZF 16.
- 6) To program the test solenoid follow these steps:
- 7) With a test solenoid assigned to Zone 16 change P1016 from FIRE to UTILITY because we do not want it to come up as an ALARM.
- 8) Create a Custom Control (CC) equation for the output point (M1-7-1 – MRELAY – RELAY – Test Solenoid) to track the pseudo point as follows.

```
INPUTS]
  STATUS ON
  P1016 | DIGITAL | FIRE | ALARM TEST ZONE 16
[END INPUTS]
[OUTPUTS]
```

TRACK ON PRI=9,9

M1-7-1 | MRELAY | RELAY | TEST SOLENOID
[END OUTPUTS]

- 9) Create another Custom Control equation, this time for the Print statement on the panel display as follows:

```
[INPUTS]
STATUS ON
M1-7-1 | MRELAY | RELAY | TEST SOLENOID
[END INPUTS]
[OUTPUTS]
PRINT ALL "RELEASE BUTTON TO STOP SOLENOID TEST"
[END OUTPUTS]
```

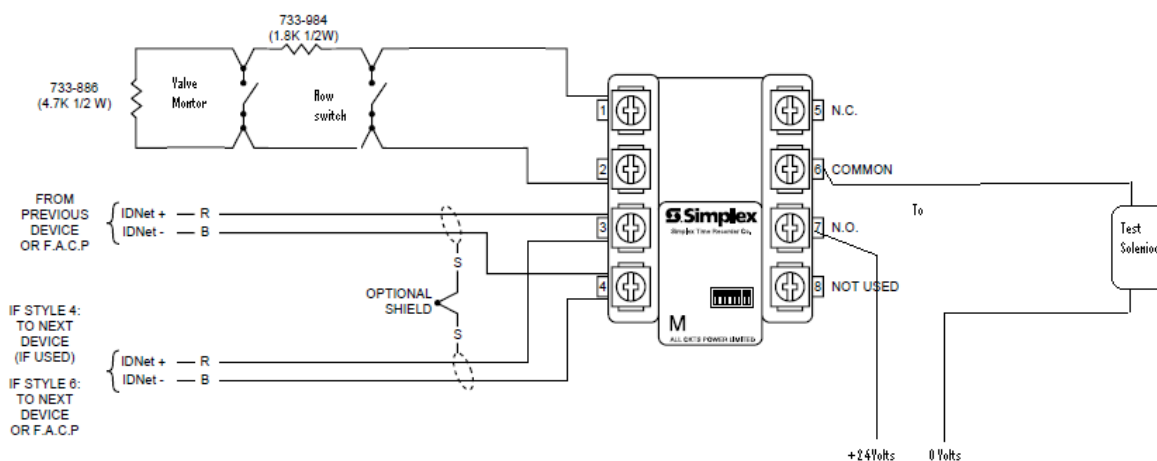
- 10) Alter CC equation 6-32 by changing the output statement from Hold to Track. This will allow the Solenoid to turn off when the button is released.

```
[INPUTS]
STATUS ON
P514 | DIGITAL | UTILITY | ALARM TEST
AND STATUS ON
P916 | DIGITAL | UTILITY | MULTIFUNCTION SWITCH - ZONE 16
[END INPUTS]
[OUTPUTS]
TRACK ON PRI=9,9
P1016 | DIGITAL | FIRE | ALARM TEST ZONE 16
[END OUTPUTS]
```

TRIAM – Flow Switch / Test Solenoid/ Valve Monitor

Repeat above but use WSO in place of WATER and wire a 1K8 Ohm resistor in series with the normally open contacts of the monitor valve. The flow switch will give a S/C. Valve Monitor will be a current limited S/C and be shown as an Isolate for AZF 16.

- 1) Program a TRIAM – Utility (M1-7-0 in our example).
- 2) M1-7-1 – MRELAY – Point Type RELAY – Test Solenoid.
- 3) M1-7-2 – MTSENSE – Point Type WSO – Flow Switch/ Monitor AZF 16.



7 Adding Zone Displays

7.1 General

This chapter describes how to add more zones to the configuration. It applies when an existing 4100U-S1 panel is being upgraded to have more zones and the existing configuration needs to be expanded to control them. Configuring zones for new sites where the configuration is built for the 1st time is described in Chapter 4.

7.2 Zone Control and LED Modules

The basic hardware modules to provide zone LEDs and controls in a 4100U-S1 are:

- 4100-1282 – 8 Pushbuttons/16 Red-Yellow LEDs – provides 8 pushbuttons and 16 LEDs.
- 4100-1288/1289 – 64 LED / 64 SW Controller – slave module - controls 64 LEDs and 64 switches i.e. 4 X 4100-1282 modules.

Other LED and switch modules are available for different applications (e.g. 4100-ME0456 4-way AS1668 Control Module).

The standard configuration of a 4100U-S1 as it leaves the factory is to have 16 zones, which means 1 X LED/switch controller (4100-1288) and 2 X LED/switch modules (4100-1282) are fitted.

For every additional 8 zones an additional LED/switch module (4100-1282) needs to be fitted and configured, and if the number of zones goes above 32 then an additional LED/switch controller (4100-1288) needs to be configured.

For mounting and wiring instructions for these modules refer to the 4100U-S1 Installation Manual (LT0394).

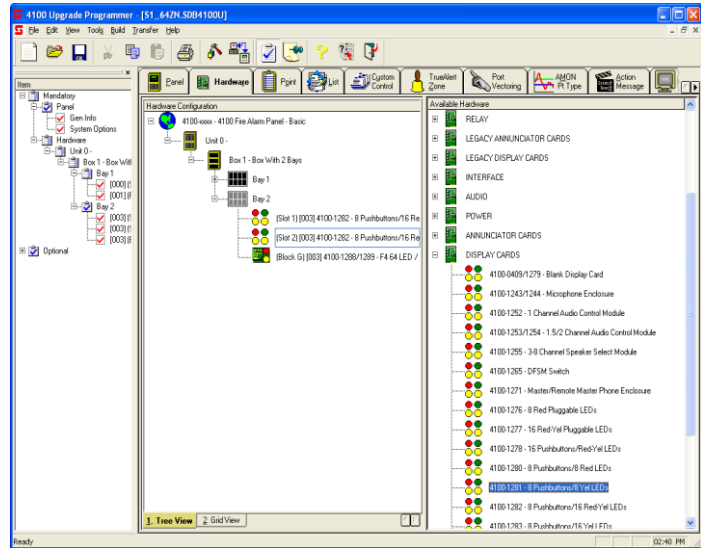
- Note that when the 2nd LED/switch controller (4100-1289) is to be configured – its address must be set to 4 to match the template configuration.

7.3 Hardware Configuration Modification

To add new Zone Switch/LED and Controller modules to the configuration do the following:

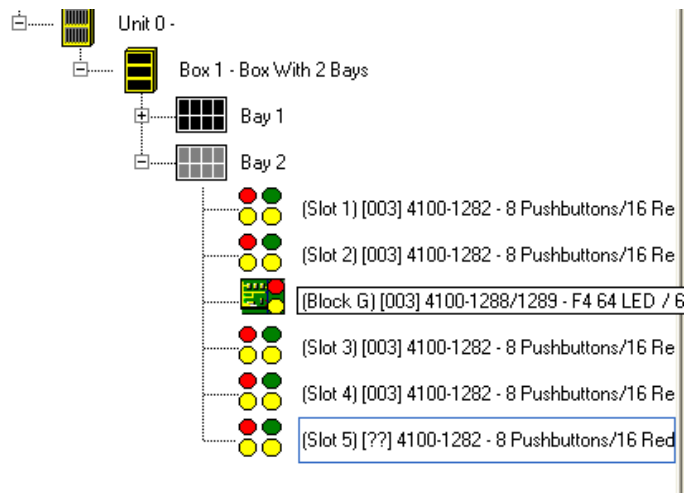
- Select the **HARDWARE** Tab
- Click on the “+” sign beside **Unit 0**
- Click on the “+” sign beside **Box 1**
- Click on the “+” sign beside **Bay 2**
- This will show the currently configured display cards in **Bay 2**.

- Click on the “+” sign beside the **DISPLAY CARDS** option on the **Available Hardware** window.
- Drag and drop the **4100-1282 – 8 Pushbuttons/16 Red-Yellow LEDs** icon over the Bay 2 icon.
- An **8 Pushbuttons/16 red-Yellow LEDs** module will be added to the configuration.
- Repeat adding more **8 Pushbuttons/16 Red-Yellow LEDs** modules as required (up to 8 in total).



Notice that if more than 4 modules are configured then the 5th and higher will appear with a ‘[??]’ sign as follows:

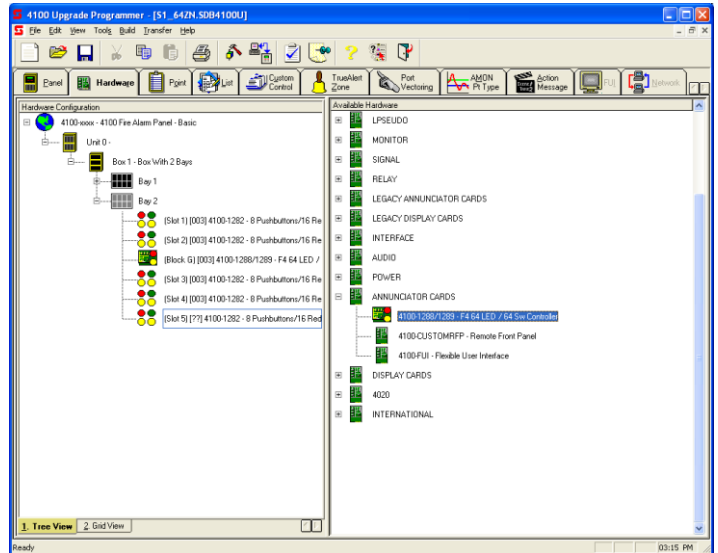
This means that the configuration requires an additional **4100-1288/1289 – F4 64 LED / 64 SW Controller** to be added.



To add the **4100-1288/1289 – F4 64 LED / 64 SW Controller**

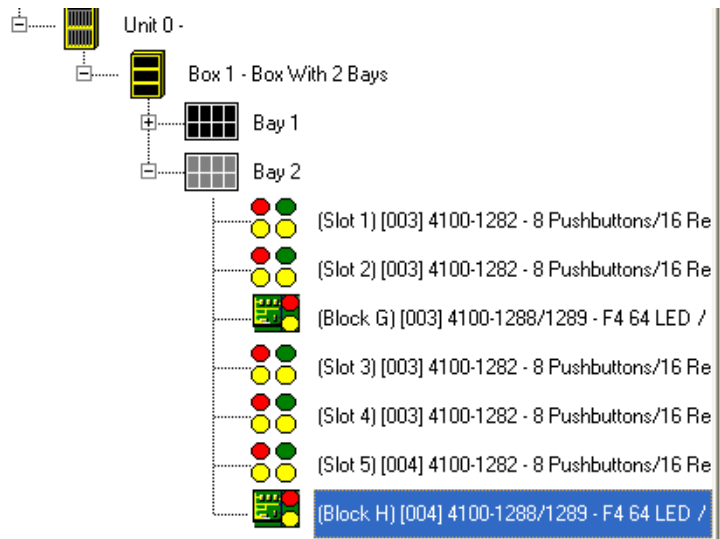
- Click on the “+” sign beside the **ANUNCIATOR CARDS** option on the **Available Hardware** window.
- Drag the **4100-1288/1289 – F4 64 LED / 64 SW Controller** Icon over to the **Bay 2** icon and release.

The card will be added to the configuration.



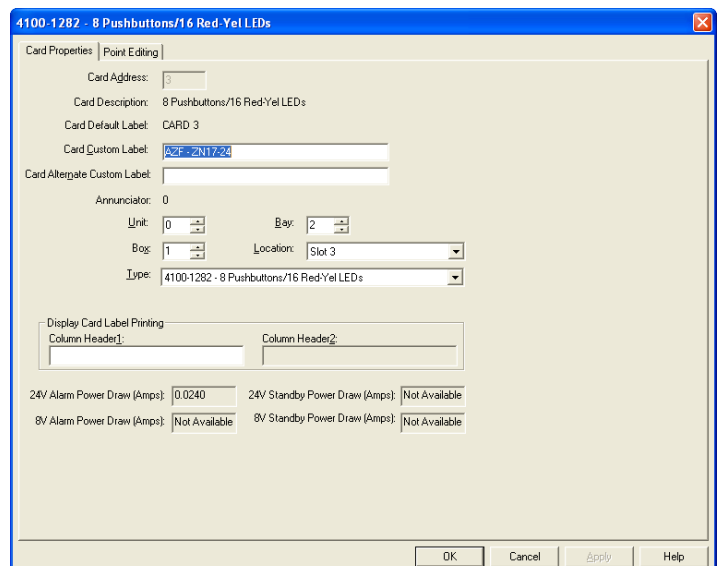
Verify that the card appears with address 4 and that **4100-1282 – 8 Pushbuttons/16 Red-Yellow LEDs** modules that previously appeared with ‘[??]’ sign – now appear with address 4 – [004].

Do not change the 2nd LED/Switch Controller from address 4 as this will mean all the custom control equations will need modifying.



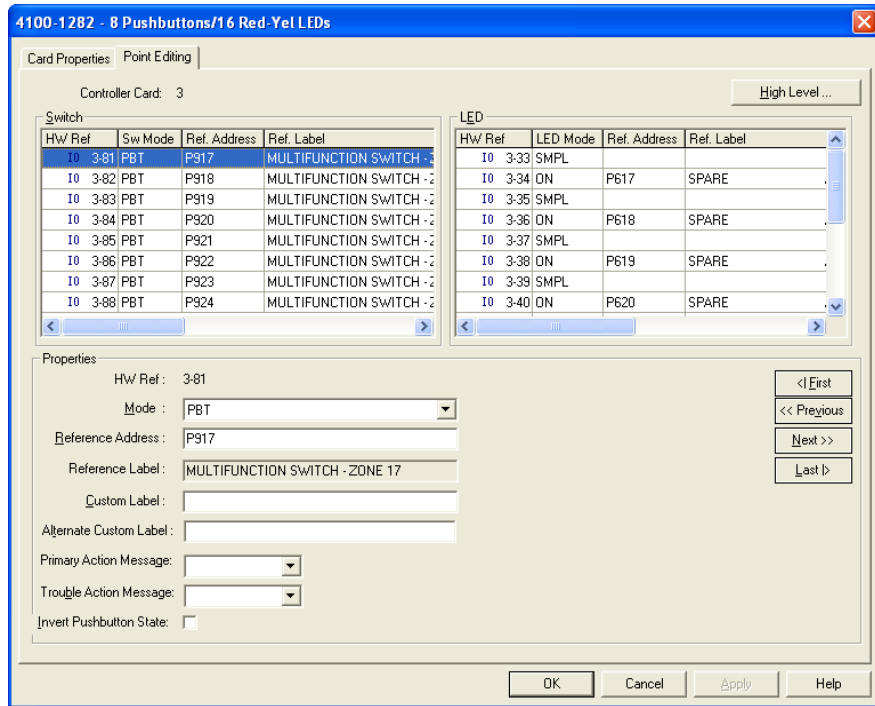
After the new **4100-1282 – 8 Pushbuttons/16 Red-Yellow LEDs** cards have been installed configure their **SW Mode** and **Ref Address**:

Double click on the card and enter the **Card Properties** tab. Enter the **Card Custom Label** text box with an appropriate name.



Then go to the **Point Editing** tab and edit the points: On the **Switch** side, for each point, configure **Mode:** as **PBT** and on the **LED** side configure **Mode:** for odd addresses as **SMPL** and for even addresses as **ON**.

For both sides (the **Switch** and **LED**) configure the **Reference Address:** as detailed in Section 12.5.



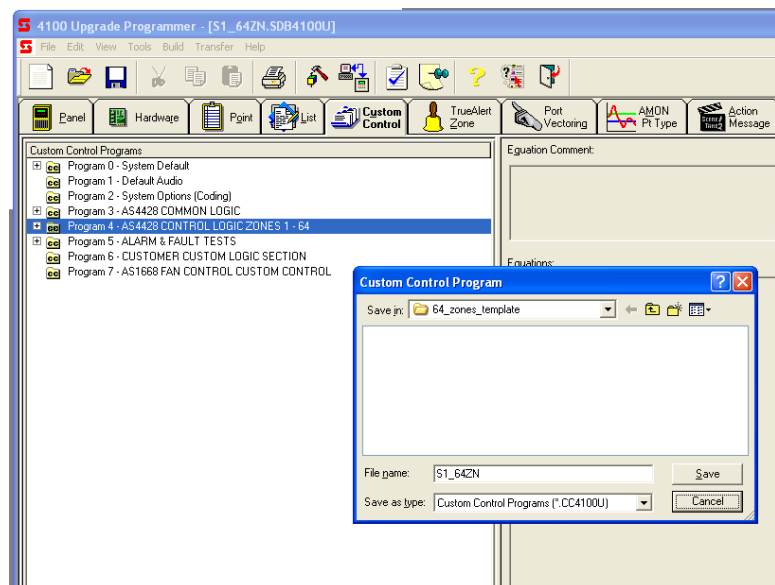
7.4 Modify the Custom Control Equations for the Zones

The simplest method to add more custom control equations for the new displays is to open a 32 or 64 zones template and export the custom control equations for the zones, then from within the original site configuration import these equations. The detailed steps are as follow:

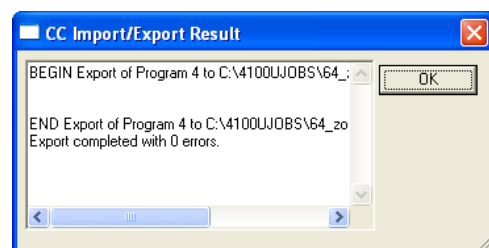
1. Click on the 'File' menu and select 'Open'.

Browse to the location containing the 3 default configuration templates supplied with SF0369 and select the S1_64ZN.SDB4100U configuration if more than 32 zones (up to 64) are needed, or select S1_32ZN.SDB4100U if the configuration should include up to only 32 zones. Click **OK**.

2. Click on the 'Custom Control' tab. Right Click on **Program 4** and select 'Export Program...'.
Save the exported .CC4100U file in an accessible location. .



At the end of the export process a message with the process status will appear with the export result. Click the OK button.



3. Close the template and re-open the site configuration database.

4. Click on the 'Custom Control' tab.

Right Click on **Program 4** and select 'Import, Append Program...'. .

Browse to the location where you saved the exported .CC4100U file, select it and click 'Open'.

The import process will start.

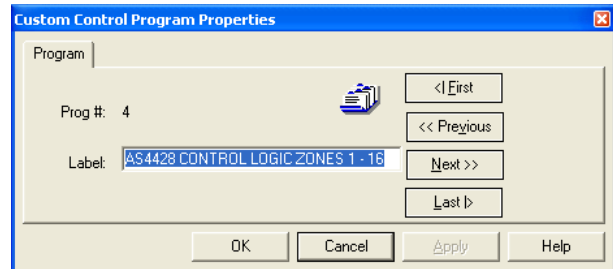
At the end of the import process, a message with the process status will appear with the import result.

Click the OK button.

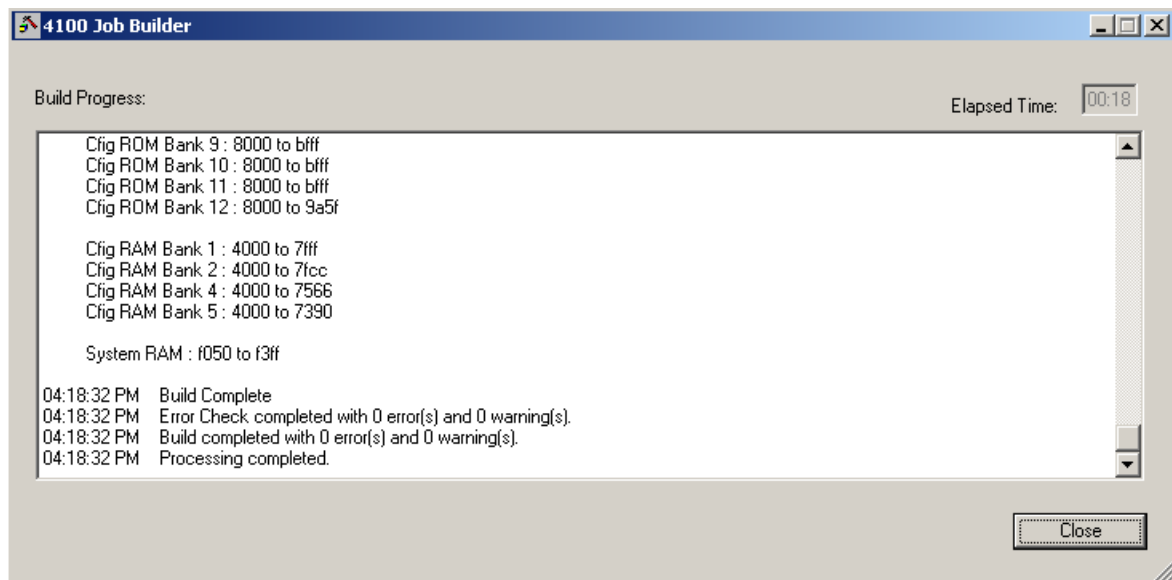
- Note: the import process message box may display errors if the hardware configuration does not match the number of zones. E.g., in the case where the hardware configuration modification (see 7.3) included only 48 zones and custom control equations referring to zones 49-64 use undefined points.

Delete any unnecessary equations for zones that are not present, as described in Section 4.3.

Rename program 4 to reflect the modification. This is done by right click and selecting 'Properties...' and editing the 'Label:' text box to have the correct zone range.



Finally do a 'Build' to the new configuration which should result with no errors.



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8 Adding Expansion Modules

8.1 General

See Installation manual LT0394 Iss1.4 Chapter 2 for Physical requirements of fitting cards in bays.

This section describes the procedure to configure the panel with additional modules which may be added to the panel. It describes the concept and method of adding modules by giving detailed examples of 6 cards: IDNet, 6 Supervised Signal Card, 8 Point Monitor Card, 8 Aux Relay Card, 24 Point Graphic Interface and a Dual RS232 printer card.

Each slave card must be assigned a unique address so the CPU card can communicate with it. When a new slave is added it will automatically be assigned the next unused address.

- Note that all additional cards must use address 5 or above since addresses 0-4 are reserved as follows:
 - #0 – CPU card
 - #1 – SPS card
 - #2 – IDNet card that is embedded on the SPS
 - #3 – First 64 LED / 64 SW Controller
 - #4 – Optional second 64 LED / 64 SW Controller

Therefore, when adding the first extra slave, do not use address 4, unless the slave is the second 64 LED/Switch Controller.

The 4100U Programmer automatically allocates card addresses with the rule that the lowest free address is used. If you want to reserve addresses for later use, temporarily add some cards so the reserved addresses are used and delete them later.

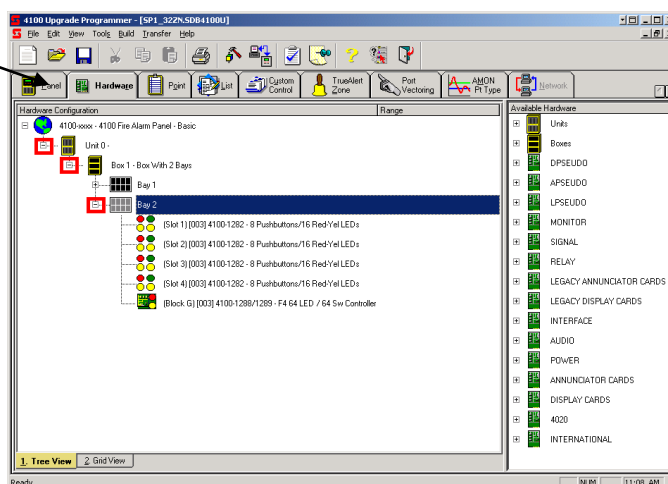
The procedure for adding cards is identical for all cards – only the points and settings differ.

8.2 Adding 4100-3101 IDNet Loop Card

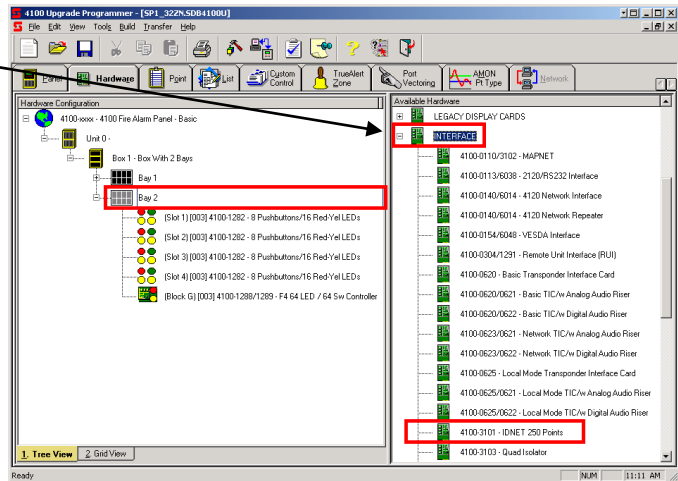
If more than 250 devices are required or two physical loops are needed an additional **4100-3101AU IDNet Addressable Loop** card can be added to the panel. For mounting instructions refer to the documentation supplied with the module and LT0394 4100U-S1 Installation Manual.

Before any devices can be added to the panel's configuration the new 4100-3101 card must be added as follows:

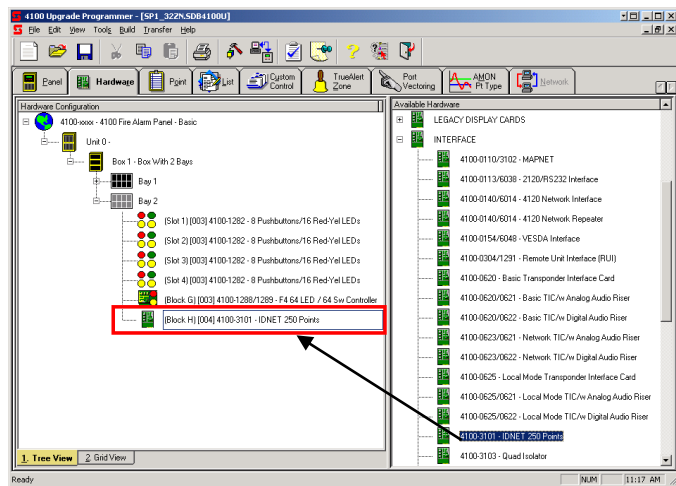
- Select the **HARDWARE** Tab
- Click on the “+” sign beside **Unit 0**.
- Click on the “+” sign beside **Box 1**.
- Click on the “+” sign beside **Bay 2**.



- Click on the “+” sign beside the **INTERFACE** option on the **Available Hardware** window.
- Drag and drop the **4100-3101 – IDNET 250 Points** icon on to the **Bay 2** icon.

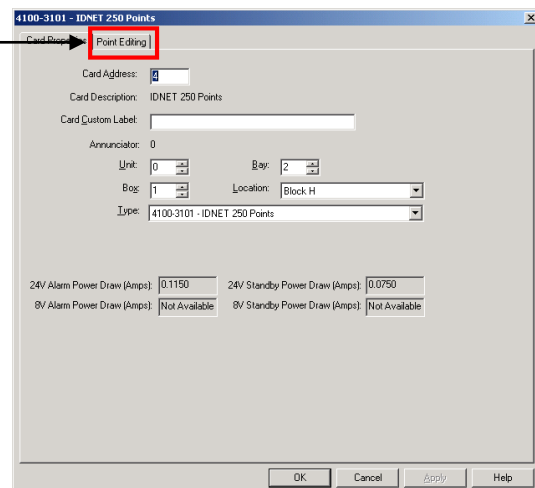


- An IDNET card will be added to the panel configuration.
- Block H** represents the location in the bay, but this is not relevant for the 4100U-S1.
- [004]** is the address of the card and **MUST** match the physical address on the IDNET module. **WARNING:** Use Address 5 or higher.
- 4100-3101-IDNET 250 Points** is the type of the card.

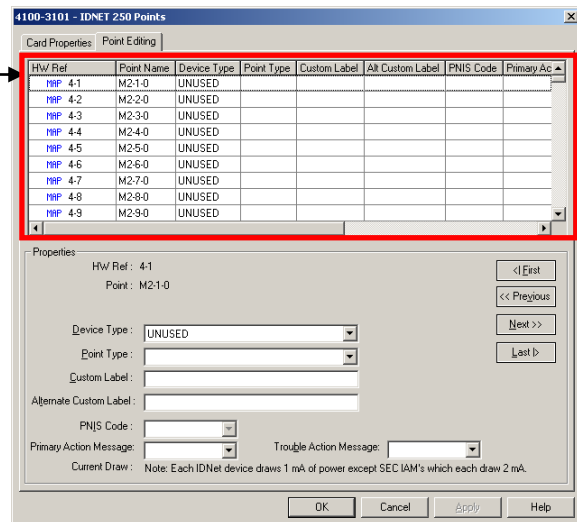


Now that the new IDNet card has been added, the addressable devices connected to this card can be added to the panel configuration as follows:

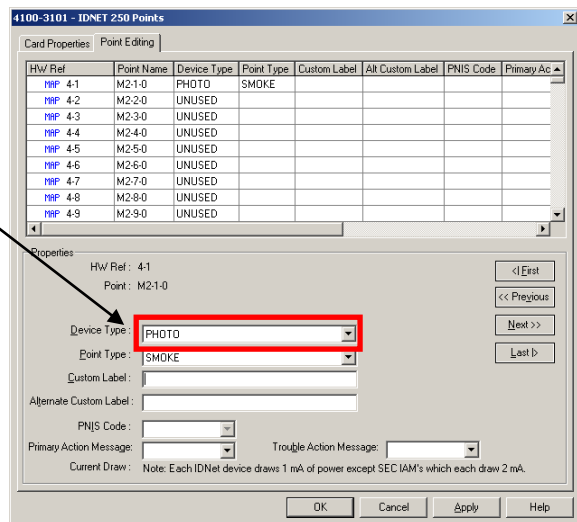
- Select the **Point Editing** Tab.



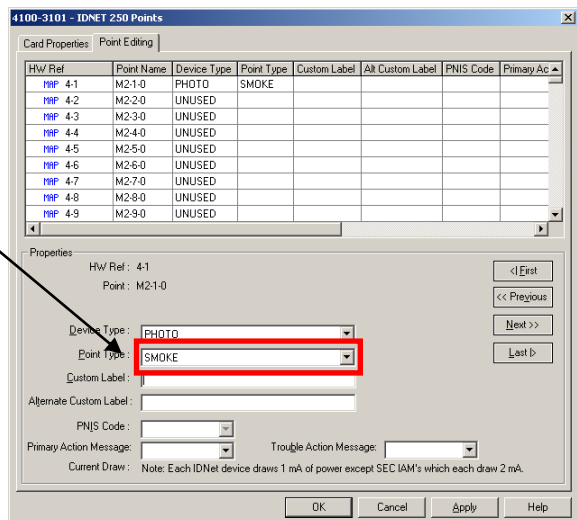
- Select the desired address for the device. →



- Select the **Device type**
- Refer to Section 6.2 for Device type options.



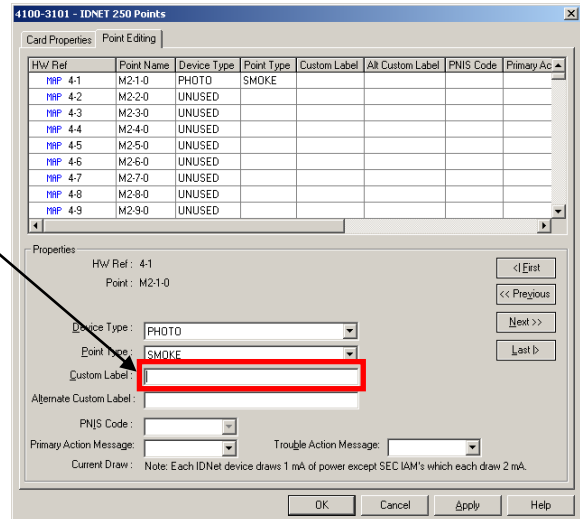
- Select the **Point type**
- Refer to Section 6.2 for Point type options.



- Enter a Custom Label into the Custom Label text box.

The Custom Label is limited to 40 characters. It is recommended that the first characters be the point address, followed by the description of the point location and then lastly the zone number, e.g. M1-188 FOYER RECEPTION DESK ZN01

- To continue entering new devices click the **Apply** or **Next** buttons
- The devices can then be added to zones as described in Section 5.2.



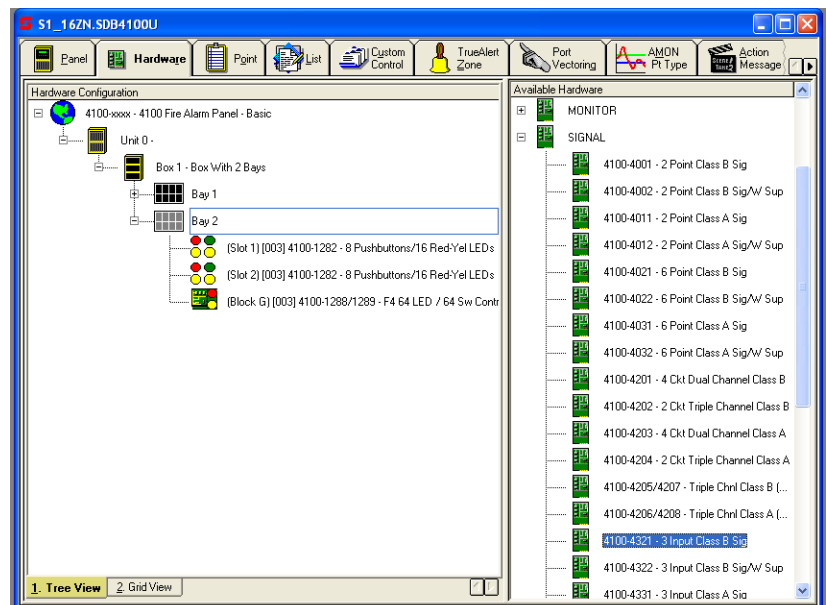
8.3 Adding 4100-4321 Legacy Signal Card

The 4100-4321K 6 Supervised Relay module provides 6 supervised output control (signal) circuits. The 6 circuits have two power inputs: one power input for every three signal circuits. Each of the signal circuits is supervised for ground faults, opens and line-to-line shorts.

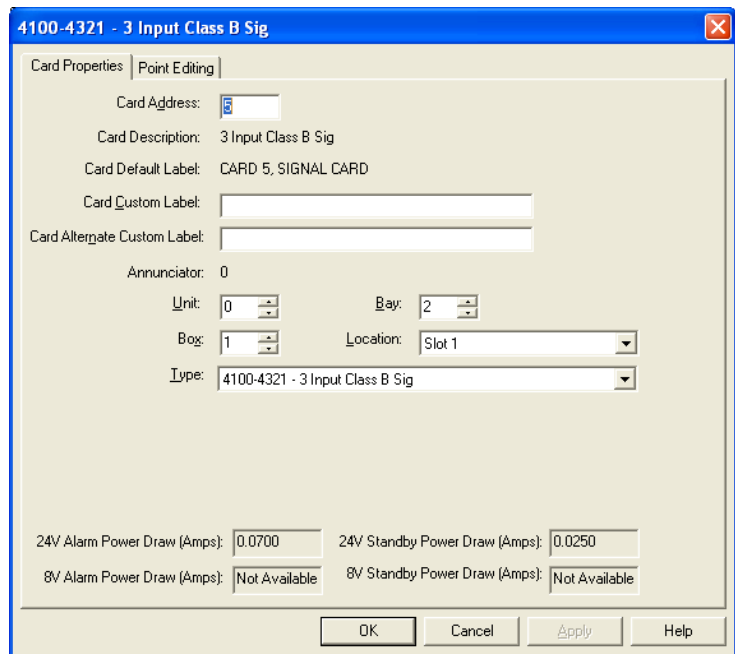
The card is added as follows:

- Select the **HARDWARE** Tab.
- Click on the “+” sign beside **Unit 0**.
- Click on the “+” sign beside **Box 1**.
- Click on the “+” sign beside **Bay 2**.
- Click on the “+” sign beside the **SIGNAL** option on the **Available Hardware** window.
- Drag and drop the **4100-4321-3 Input Class B Sig** icon over to the **Bay 2** icon.

The card will be added to the panel configuration.



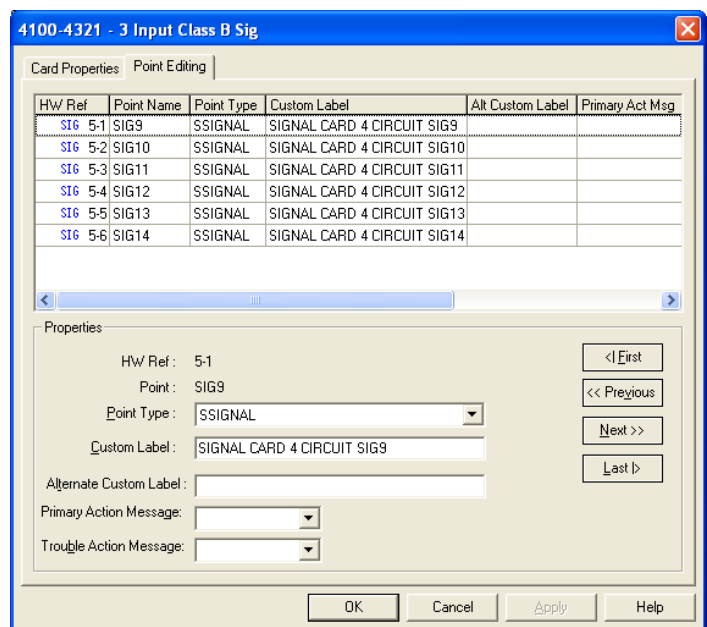
Double click on the card and in the **Card Properties** tab adjust its address to be greater than 4, then in the '**Card Custom Label:**' text box, enter a descriptive label.



Click the **Point Editing** tab and record the points' names. These names are used to control the outputs within user defined Custom Control equations as in the following example for SIG9.

```
[INPUTS]
STATUS ON
L257 | LIST | DPSEUDO | GENERAL FIRE
TRIP LIST (ACF ISOLATABLE)
[END INPUTS]
[OUTPUTS]
TRACK ON PRI=9,9
SIG9 | SIGB | SSIGNAL | SIGNAL CARD 5
CIRCUIT SIG9
[END OUTPUTS]
```

Refer to Chapter 9 for information on writing custom control equations.

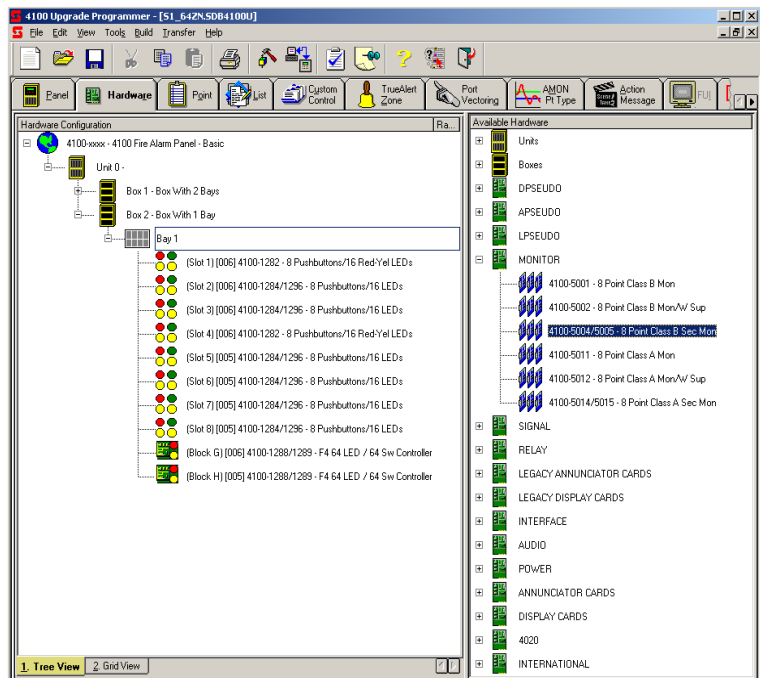


8.4 Adding 4100-5004 8 Point Monitor Card.

The 4100-5004 8 Point Monitor Card provides eight conventional detector or contact closure inputs. There are no restrictions on point types.

To add the 4100-5004 8 Point Monitor Card to the panel:

- Select the **HARDWARE** Tab.
- Expand the **Unit 0**, 'Box 1' and 'Bay 2'.
- Click on the "+" sign beside the **MONITOR** option on the **Available Hardware** window.
- Drag and drop the **4100-5004/5005 8 Point Class B Sec Monitor** Icon over to the **Bay 2** icon.



The card will be added to the panel configuration.

Double click on the card and in the **Properties** Tab, select the card's address and enter in the **Card Custom Label**: text box, a descriptive label.

Click the **Point Editing** tab and add/edit the points' point types and names. Record the point addresses, as they are used within user defined Custom Control equations as in the following example for ZN1 and SIG9.

When ZN1 is in ALARM, operate SIG9.

[INPUTS]

STATUS FIRE

ZN1 | SMONB | FIRE | MONITOR

CARD 7 ZONE ZN1

[END INPUTS]

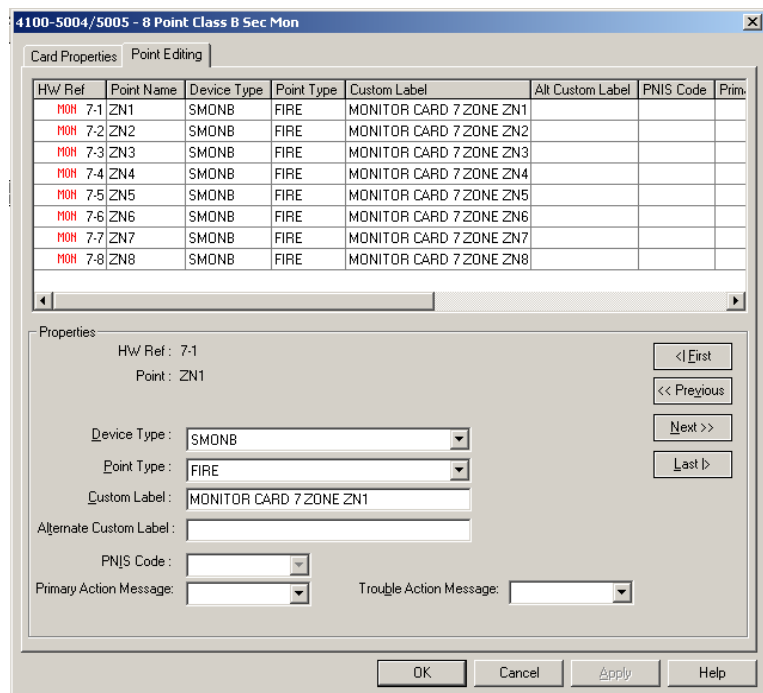
[OUTPUTS]

TRACK ON PRI=9,9

SIG9 | SIGB | SSIGNAL | SIGNAL

CARD 5 CIRCUIT SIG9

[END OUTPUTS]



8.5 Adding 4100-3003 8 Aux Relay Card.

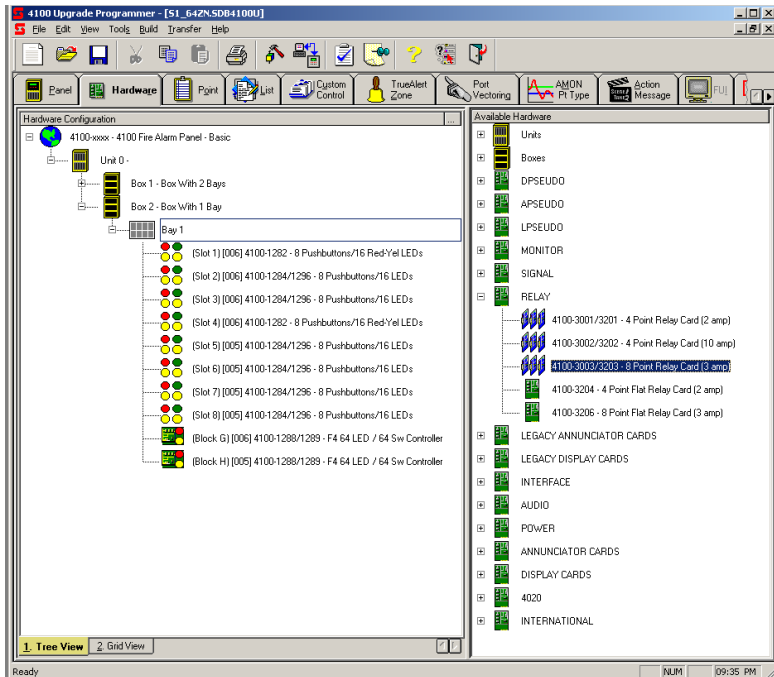
The 4100-3003 8 Aux Relay Card provides eight Single Pole Changeover relays and 8 contact closure inputs (Feedback points).

To add the 4100-3003 8 Aux Relay Card to the panel:

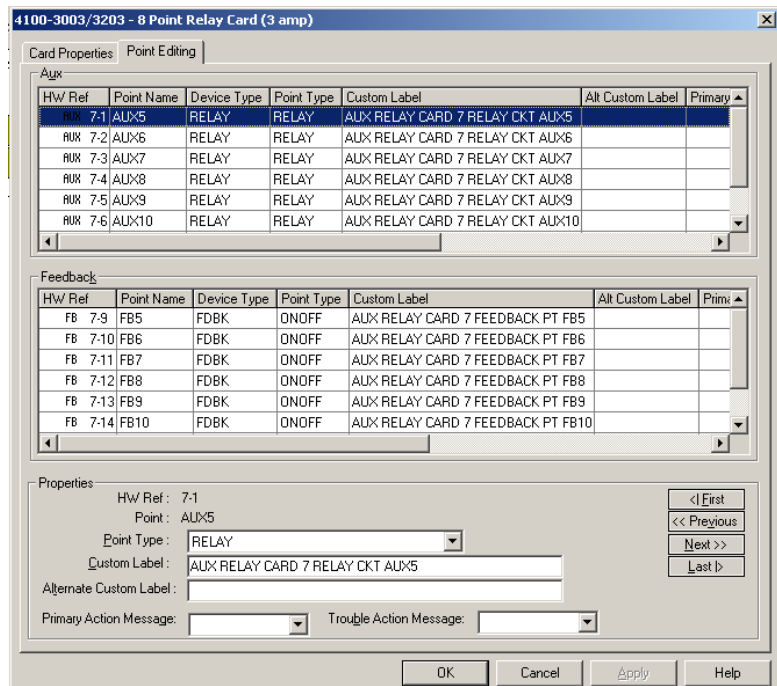
- Select the **HARDWARE** Tab.
- Expand the **Unit 0**, 'Box 1' and 'Bay 2'.
- Click on the "+" sign beside the **RELAY** option on the **Available Hardware** window.
- Drag and drop the **4100-3003/3203 8 Point Relay Card** icon over to the **Bay 2** icon.

The card will be added to the panel configuration.

Double click on the card and in the **Properties** Tab, select the card's address and enter in the **Card Custom Label**: text box, a descriptive label.



Click the **Point Editing** tab and add/edit the points' device types, point types and names. Record the point addresses, as they are used within user defined Custom Control equations

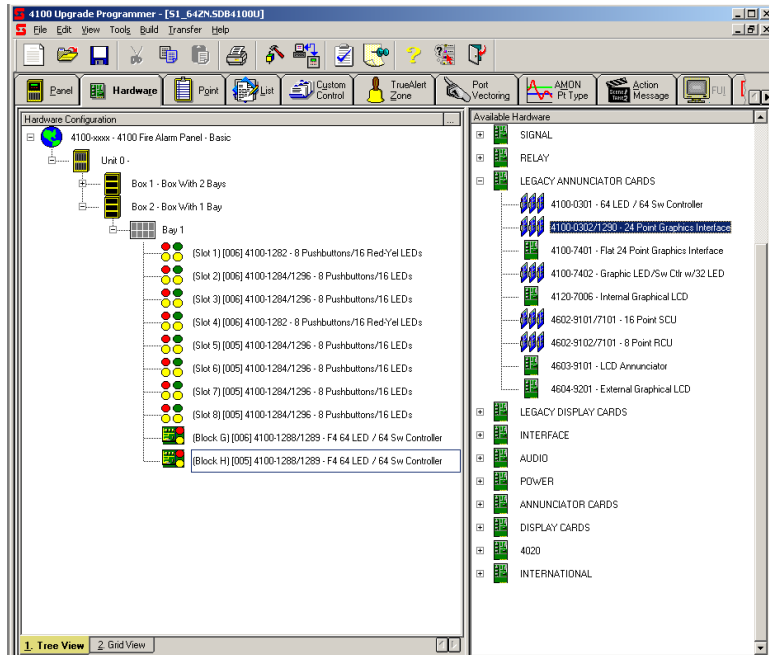


8.6 Adding 4100-0302/1290 24 Point Graphic Interface.

The 4100-0302 24 Point Graphic Interface provides 24 points that can be configured as inputs or outputs, with no restrictions on point's allocation as input or output.

To add the 4100--0302 24 Point Graphic Interface to the panel:

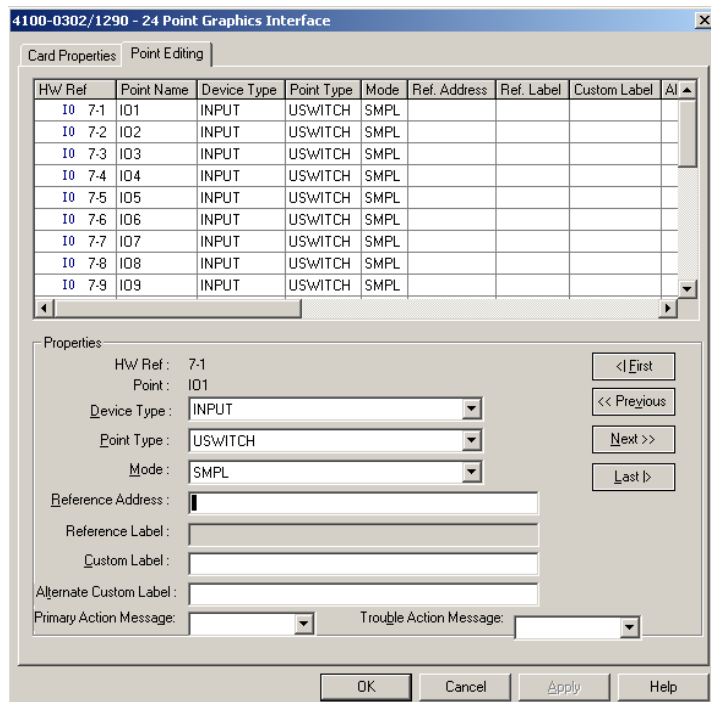
- Select the **HARDWARE** Tab.
- Expand the **Unit 0**, 'Box 1' and 'Bay 2'.
- Click on the "+" sign beside the **LEGACY ANNUNCIATOR CARDS** option on the **Available Hardware** window.
- Drag and drop the **4100-0302/1290 24 Point Graphic Interface** icon over to the **Bay 2** icon.



The card will be added to the panel configuration.

Double click on the card and in the **Properties** Tab, select the card's address and enter in the **Card Custom Label:** text box, a descriptive label.

Click the **Point Editing** tab and add/edit the points' device types, point types and Custom Labels. Record the point addresses, as they are used within user defined Custom Control equations.

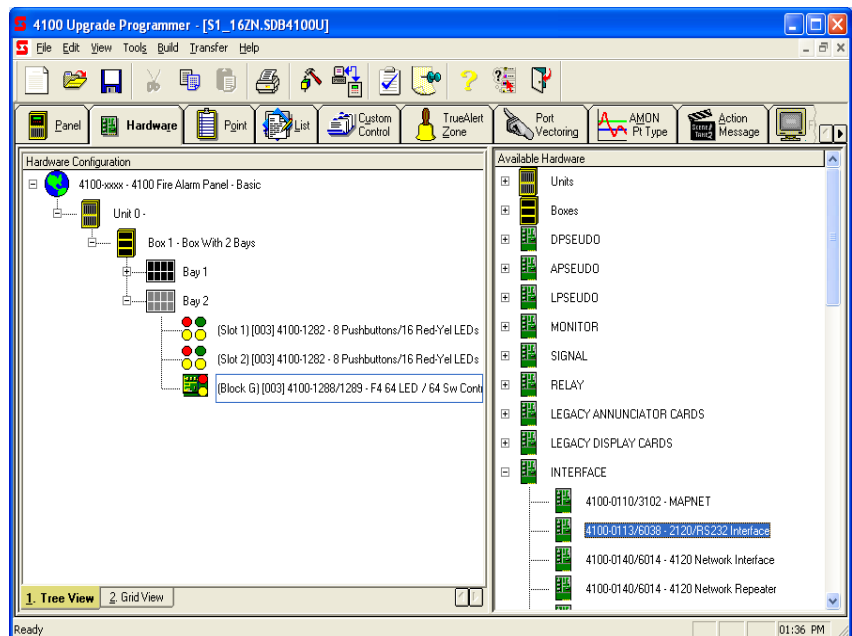


8.7 Adding Legacy Card – 4100-0113 RS-232/2120 Interface Module

The 4100-0113 RS-232/2120 Interface Module provides two RS-232-C outputs (Port A and Port B) that can be configured for remote printers, CRT, or as a Computer Port for communications to a remote system (e.g. BMS or BAS Systems).

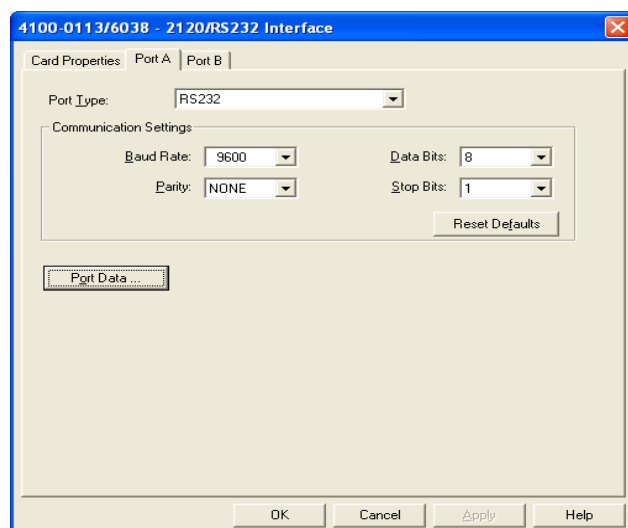
To add the 4100-0113 RS-232/2120 Interface Module to the panel:

- Select the **HARDWARE** Tab.
- Expand the **Unit 0**, 'Box 1' and 'Bay 2'.
- Click on the "+" sign beside the **INTERFACE** option on the **Available Hardware** window.
- Drag and drop the **4100-0113 RS-232/2120 Interface** icon over to the **Bay 2** icon.



The card will be added to the panel configuration.

Double click on the card and in the **Properties** Tab adjust its address to be greater than 4, then enter in the **Card Custom Label:** text box, a descriptive label.



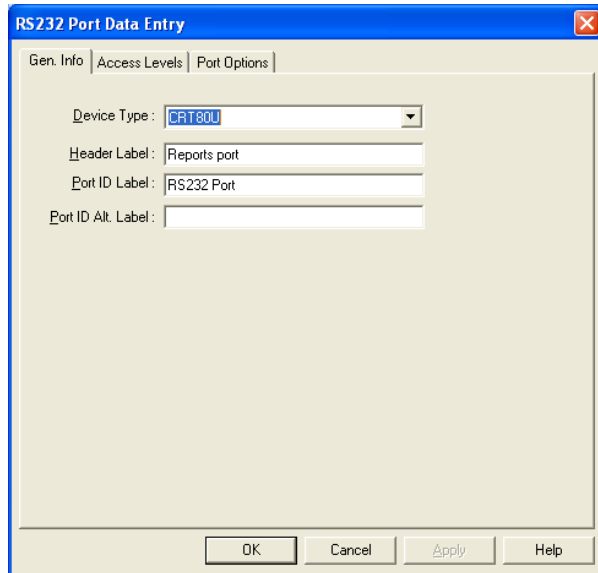
Set the **Ports** as in the following example for RS232 connection to PC (used for generating printed reports). Adjust the baud rate, etc, if needed.

Click the **Port Data...** button and select the desired **Device Type** as in the following example for an 80 column CRT output.

Click OK and again for the previous screen.

Repeat for **Port B** (if used) and select the appropriate device type and baud rate, etc.

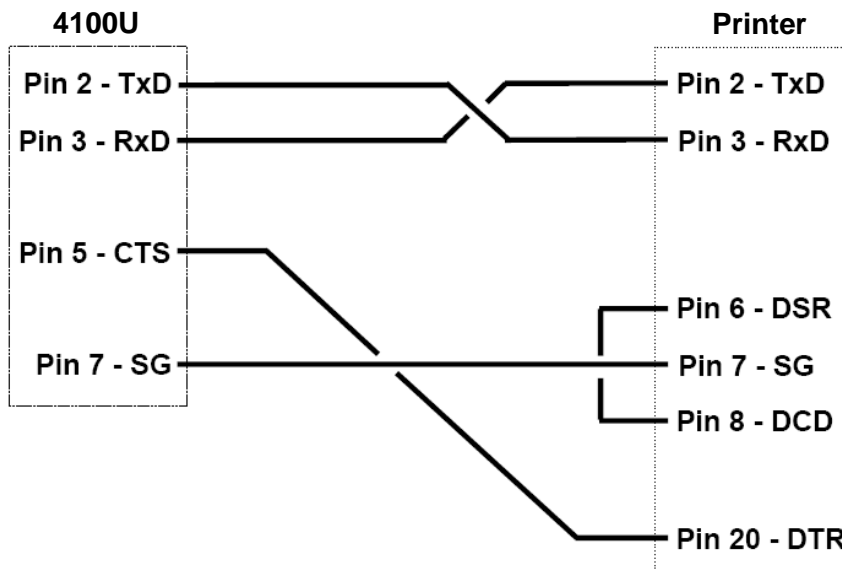
Note: Only Port A can be used for modems or 2120 interface. Either Port can be used for printers or terminals



8.7.1 Typical Printer Configuration:

Depending on the printer, the usual settings are:

Device type	PRT80U
Baud rate	9600
Parity	None
Data bits	8
Stop bits	1



Printer Cable Connections

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9 Custom Control

9.1 General

4100U Custom Control equations provide a way to override the 4100U's default operation. Each Custom Control equation has a similar form: one half of the equation, called the **input side**, is used to monitor the state of specific system inputs (initiating devices, for example). The other half of the equation, called the **output side**, is used to control specific system outputs (relays, addressable devices, etc.). If the input side of the equation is true, then execute the output side.

9.2 Custom Control Syntax

Input Statements are typically used to monitor the status of a point or list, or perform an action such as delay, cycle, compare two values, or save/recall values. Every input statement begins with an *Opcode*, which is the action that the input is performing (for example, monitor point status, recall memory register, etc.). The Custom Control wizard then displays a series of opcode-specific dialogs. For example if the Opcode is Point Status, the dialogs prompt the user for information about the condition (alarm, trouble, etc.) and point being monitored.

```
[INPUTS]
STATUS FIRE
  ZN1 | MONB | FIRE | MONITOR CARD 3 ZONE ZN1
```

Output Statements are the actions that occur only when the input side of the equation is true. Every output statement begins with an *Opcode*, which is the general action that occurs when the input side is true. The opcode is followed by a series of opcode-specific dialogs, which allow you to specify exactly how the selected opcode functions. For example, if you are using the Set Opcode, the wizard displays a series of dialogs that allow you to specify a qualifier (on, off, etc.) and the point (a signal, for example) on which you want the output action to execute.

```
[OUTPUTS]
HOLD ON PRI=9,9
  SIG3 | SIGB | SIGNAL | SIGNAL CARD 1 CIRCUIT SIG3
```

Logical Operators (AND, OR, NOT) allow you to link multiple input statements to form logical expressions. Logical operators are only used with input statements and are not used with Output statements. 4100U Custom Control uses the following logical operators.

- **AND Operator.** The AND logical operator allows you to put a group of points in series so that only the activation of *all points at the same time* causes the Output side of the equation to occur. In the following example, Zone1 and Zone2 must both be in alarm (FIRE) before the output (Hold ON SIG3) executes.

```
[INPUTS]
STATUS FIRE
  ZN1 | MONB | FIRE | MONITOR CARD 3 ZONE ZN1
AND STATUS FIRE
  ZN2 | MONB | FIRE | MONITOR CARD 3 ZONE ZN2
[END INPUTS]
[OUTPUTS]
HOLD ON PRI=9,9
  SIG3 | SIGB | SIGNAL | SIGNAL CARD 1 CIRCUIT SIG3
[END OUTPUTS]
```

- **OR Operator.** The OR operator allows you to put a group of points in parallel, *meaning the activation of **any** one or more of the points causes the output side of the equation to execute.* In the following example, if Zone1 **or** Zone2 enters an alarm state, the output (Hold ON SIG3) executes.

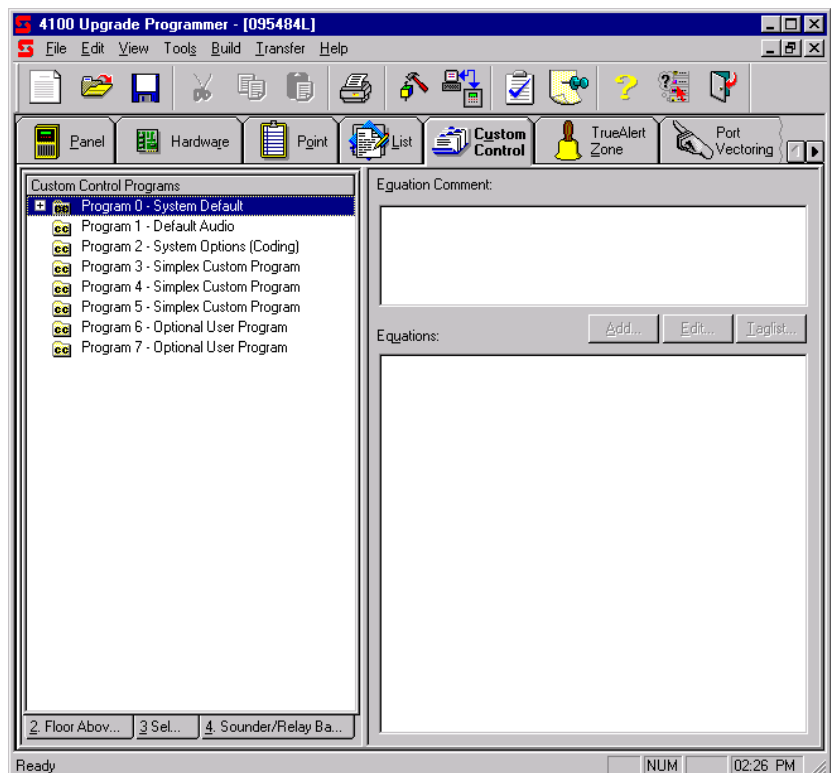
```
[INPUTS]
  STATUS FIRE
  ZN1 | MONB | FIRE | MONITOR CARD 3 ZONE ZN1
  OR STATUS FIRE
  ZN2 | MONB | FIRE | MONITOR CARD 3 ZONE ZN2
[END INPUTS]
[OUTPUTS]
  HOLD ON PRI=9.9
  SIG3 | SIGB | SIGNAL | SIGNAL CARD 1 CIRCUIT SIG3
[END OUTPUTS]
```

- **NOT Operator.** Use the NOT Operator to specify that a condition must not be true in order for the output to execute. In the following example, the output side of the equation (print message "Smoke not dirty") executes only if the condition of M1-1 is NOT dirty.

```
[INPUTS]
  NOT STATUS DIRTY
  M1-1 | PHOTO | SMOKE | LAB1-SMOKE1
[END INPUTS]
[OUTPUTS]
  PRINT ALL "SMOKE NOT DIRTY"
[END OUTPUTS]
```

Selecting the Custom Control tab from the main programmer window displays the Custom Control window. This window contains two halves:

- The left half lists user-defined and system-only (non-editable) equations. Click on the + sign to the left of an entry to expand the contents of that entry.
- The right half of the window is used for creating user-defined Custom Control equations. The Equation Comment text entry box allows you to enter descriptive text explaining the operation of the equation. The Equations area contains a text entry box for creating and editing an equation's input and output statements. The **Add...** Button starts the Custom Control Wizard and is used to create new equations. The **Edit...** Button is used to edit existing equations. The **Taglist...** Button starts a taglist that can be used for selecting/deselecting points in an existing equation.

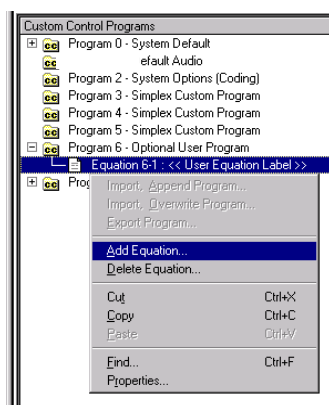


9.3 Creating a New Equation

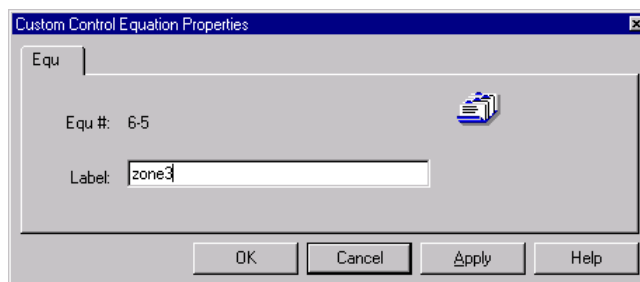
9.3.1 Select User Program

The first step in defining a new custom control equation is to add the equation to either one of the five User Programs -- Program 3 through Program 7. However, it is recommended that Program 6 is used for general functions and Program 7 is used for AS1668 Fan Controls. Follow these steps to do this.

1. Right click on one of the user programs (Program 3 through Program 7), located at the bottom of the program list, and select **Add Equation...** from the list of options.



2. The properties dialog shown below appears. Enter a name for the equation in the **Label:** text box and click on **OK**.

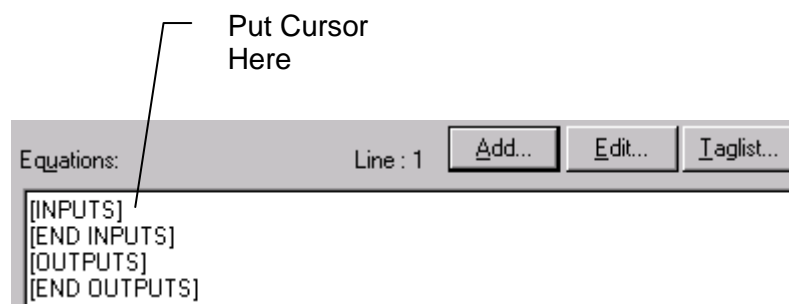


The Equations section of the Custom Control window updates to include the **[INPUTS]**, **[END INPUTS]**, etc entries.

9.3.2 Add Input Statements

The second step in creating a new Custom Control equation is to add input statements to the equation. Repeat the steps in this section until all input statements in the equation have been defined.

1. In the Equations box, position the cursor just to the right of **[INPUTS]**.



2. Click on the **Add** button. The dialog shown below appears.

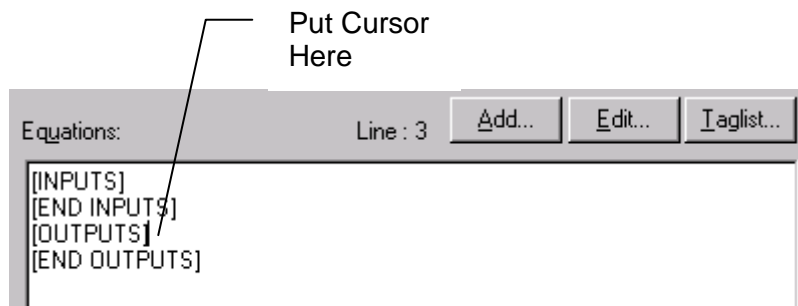


3. Click on the drop down list box, select one of the Opcodes, and click the **Next** button.
4. The next dialogs displayed by the wizard depend on the Opcode you selected in Step 3.
5. The **Finish** button becomes available when all dialogs related to the input opcode have appeared. Click it to finish defining the input statement.

9.3.3 Add Output Statements

The third step in creating a new Custom Control equation is to add output statements to the new equation. Repeat the steps in this section until all output statements in the equation have been defined.

1. In the Equations box, position the cursor just to the right of **[OUTPUTS]**



2. Click on the **Add** button. The dialog shown below appears.



3. Click on the drop down list box, select one of the output Opcodes, and click the **Next** button.
4. The next dialogs displayed by the wizard depend on the Opcode you selected in Step 3.
5. The **Finish** button becomes available when all dialogs related to the output opcode have appeared. Click it to finish defining the output statement.

9.3.4 Output Statements: Hold Vs. Track

The 2 commonly used output opcodes are **Hold** and **Track**. The main difference is that a **Hold** command is evaluated only when the inputs side of the equation goes **True** (on the transition from false to true). **Track** is evaluated when the inputs side is **True** and again when the inputs side goes **False**. The evaluation occurs only when the change on the inputs side changes state – it is not evaluated again until the inputs side changes state. When combined with the **On** and **Off** commands, all possible control requirements can be met:

Hold On – when the inputs side is goes True, the output turns on.

Hold Off - when the inputs side is goes True, the output turns off.

Track On – when the inputs side is goes True, the output turns on and when the inputs side goes False, the output turns off.

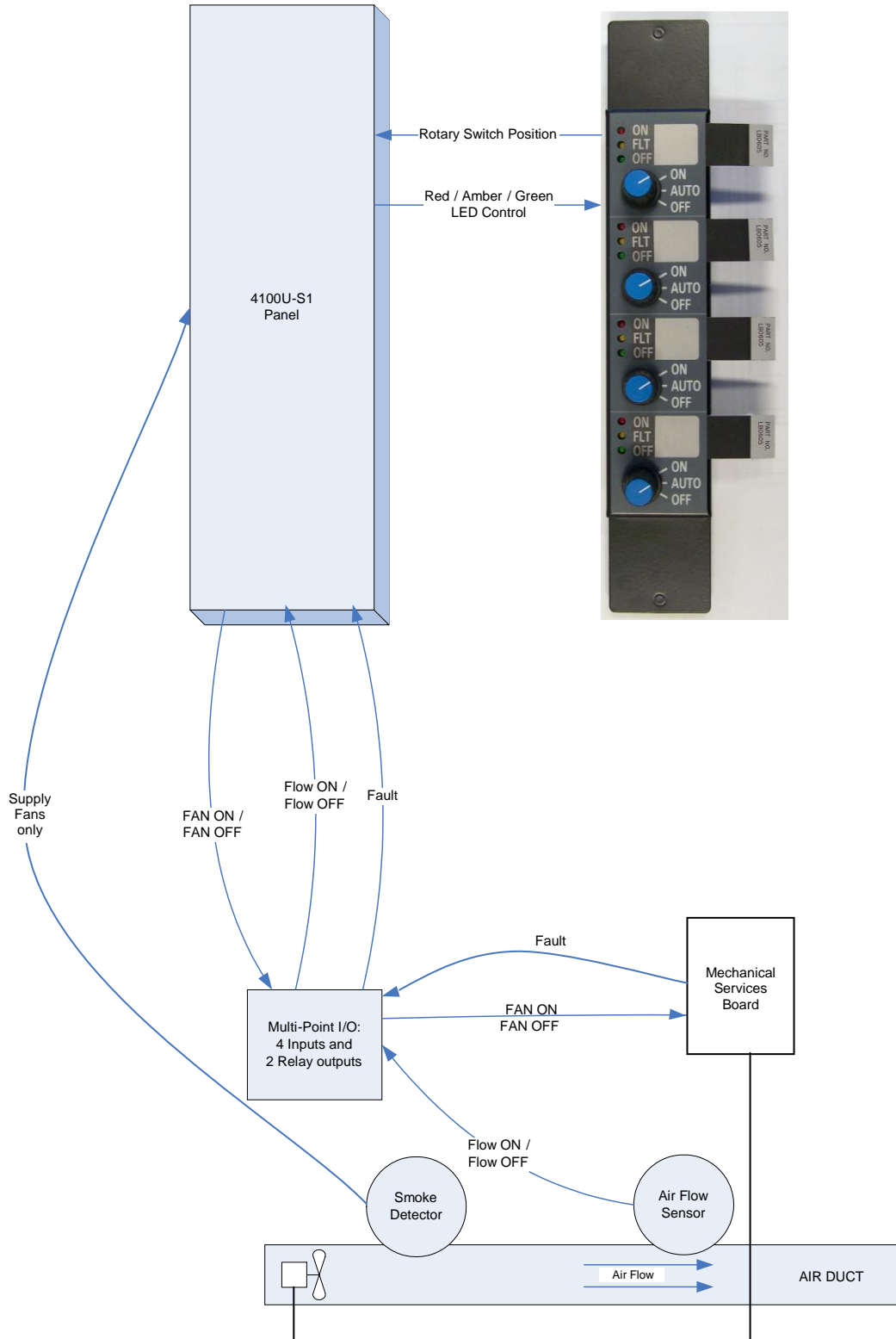
Track Off – when the inputs side is goes True, the output turns off and when the inputs side goes False, the output turns on. When rebooted or after power up, the output will be turned on and remain on until the inputs side is True.

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10 AS1668 Fan Controls

10.1 Typical Arrangement for AS1668 Fan Control

The following scheme illustrates a typical topology using the AS1668 Fan Control Module. Note: AS1668.1 recommends that the duct detector be downstream from the fan, before the first branch in the ducts – see clause 4.10.5 b.



10.2 AS1668 Fan Control Flows

The control of ventilation and air conditioning in buildings under fire mode is described in AS/NZS 1668.1:1998. This requires fire alarm detection to activate the fan to prevent the smoke from spreading to other zones. In another topology - when fire is detected it is required to stop the fan to prevent smoke spreading to other areas of the building.

The following fan control example describes the situation where on fire detection it is desired to activate the fan to spill the smoky air outside – an Exhaust Fan. It assumes that the 4100U is directly controlling the Fans on Alarm. In most cases, the 4100U send General Trip and Zone Trips to the Mechanical Services Board/s, which controls the Fans functionality when the manual controls are in the Auto Position.

Note: AS1668.1 requires that Fans continue to operate in Auto (after an alarm has cleared and been reset) until the A/C Reset button is pressed or a Manual Control is activated and in the case of Supply Air and Stair Pressurization Fans, stop the fan when smoke is detected in the supply side Air Duct. The Fan shall restart 60 seconds after the Duct Probe (Detector) has cleared of smoke / returned to normal and immediately if the zone is isolated. Supply air duct detectors shall be non-latching / self resetting and shall indicate on the FFCP (Fire Fan Control Panel). S/A Detectors are programmed as a Utility point type.

Fan Activate in AS1668 Auto Position:

1. The 4100U-S1 panel goes into Alarm and Custom Control determines that the fan should start.
2. The 4100U-S1 panel sends to the Multi-Point I/O a control to close the relay that controls the fan to start.
3. The Multi-Point I/O closes the relay to start the fan.
4. The fan runs, and air flows through the duct.
5. An air flow sensor in the duct sends status to the panel via the Multi-Point I/O that the air is flowing.
6. The panel controls the AS1668 module to turn the Red “ON” LED to ON and the Green “OFF” LED to OFF.

Fan Stop in AS1668 Auto Position:

1. The 4100U-S1 panel has reset and the A/C Reset button has been pressed.
2. Custom Control determines that the fan should stop.
3. The 4100U-S1 panel commands the Multi-Point I/O to open the relay that controls the fan.
4. The Multi-Point I/O opens the relay to stop the fan.
5. The fan stops and air does not flow through the duct.
6. An air flow sensor in the duct sends to the panel via the Multi-Point I/O that the air flow is OFF.
7. The panel controls the AS1668 module to turn the Green “OFF” LED to ON and the Red “ON” LED to OFF.

AS1668 Fan Manual Start:

1. The 4100U-S1 panel receives indication from its AS1668 board that Fan #n rotary switch state has changed to ‘Start’.
2. The 4100U-S1 panel commands the Multi-Point I/O to close the relay that controls the fan.
3. The Multi-Point I/O closes the relay to start the fan.
4. The fan runs and air flows through the duct.
5. An air flow sensor in the duct sends to the panel via the Multi-Point I/O an indication that the air flow is ON.
6. The panel controls the AS1668 to turn the Red “ON” LED to ON and the Green “OFF” LED to OFF.

AS1668 Fan Manual Stop:

1. The 4100U-S1 panel receives indications from its AS1668 board that Fan #n rotary switch state has changed to 'Stop'.
2. The 4100U-S1 panel commands the Multi-Point I/O to open the relay that controls the fan to stop.
3. The Multi-Point I/O opens the relay to stop the fan.
4. The fan stops and air does not flow through the duct.
5. An air flow sensor in the duct sends to the panel via the Multi-Point I/O an indication that the air flow is OFF.
6. The panel controls the AS1668 to turn the Green "OFF" LED to ON and the Red "ON" LED to OFF.

AS1668 Fan Faults:

Mechanical Services Board Faults:

1. The Mechanical Services Board sends a fault (e.g. mains failure) to the Multi-Point I/O.
2. The Multi-Point I/O sends to the panel a fault condition.
3. The panel controls the AS1668 module to turn the amber "FLT" LED to ON.

AS1668 Fan Start Failure:

1. The 4100U-S1 panel sends to the Multi-Point I/O a control to close the relay that controls the fan to start (e.g. as result of Manual start or auto start).
2. The air flow sensor in the duct **does not** send to the panel an indication that the air flow is ON.
3. After a programmable delay, to allow the fan to speed up.
4. The panel controls the AS1668 module to turn the amber Fault LED to ON.

AS1668 Fan Stop Failure:

1. The 4100U-S1 panel sends to the Multi-Point I/O a control to open the relay that controls the fan to stop.
2. The air flow sensor in the duct **does not** send to the panel an indication via the Multi-Point I/O that the air flow is OFF.
3. After a programmable delay, to allow the fan to slow down.
4. The panel controls the AS1668 module to turn the Amber Fault LED to ON.

10.3 AS1668 Fan Control State Table

The following table shows how the airflow input is reflected on the AS1668 red and green LEDs.

Airflow Input	AS1668 Green and Red LEDs
ON	Red ON Green OFF
OFF	Green ON Red OFF

The following table summarises the AS1668 amber (Fault) LED operation.

AS1668 Rotary Switch State	Airflow Input	Fault Input	AS1668 Amber LED
START	ON	OFF	Amber OFF
START	OFF	Don't care	Amber ON
STOP	OFF	OFF	Amber OFF
STOP	ON	Don't care	Amber ON
Don't care	Don't care	ON	Amber ON

10.4 AS1668 Fan Control Card Programming

The 4100U-S1 can be installed with an ME0456 AS1668 fan control module which is programmed as a 4100-1284 8 x Button and 16 x LED module.

Follow the 4100-1284 programming as described in Section 7.3, except for the **Point Editing** tab which differs from the standard zone programming and is described here.

10.4.1 Switch Configuration

The **Switch** configuration couples each of the fan's rotary switch states to a pseudo point that reflects the current fan state. The fan's pseudo points definition is built-in as part of the configuration template. These pseudo points can be monitored via the panel's display screen and referred to from the online executable via custom controls.

Each fan uses 2 X **Switch** entries with a pseudo point for each entry that is set whenever the entry state is reached:

1. In 'Manual Start' state –The 'Manual Start' pseudo point is set and the 'Manual Stop' pseudo point is cleared.
 2. In 'Manual Stop' state –The 'Manual Stop' pseudo point is set and the 'Manual Start' pseudo point is cleared.
- When in 'Auto' position both the 'Manual Start' and the 'Manual Stop' pseudo points are cleared.

- In the **Mode** text box enter 'PBT'.
- In the **Reference Address** text box enter the matching pseudo point (P1201 - P1264).
- Highlight the next line to configure the next entry with the adjacent pseudo point.

HW Ref	Sw Mode	Ref. Address	Ref. Label	Cut
4-73	PBT	P1201	FAN #1 MANUAL START	
10 4-74	PBT	P1202	FAN #1 MANUAL STOP	
10 4-75	PBT	P1203	FAN #2 MANUAL START	
10 4-76	PBT	P1204	FAN #2 MANUAL STOP	
10 4-77	PBT	P1205	FAN #3 MANUAL START	
10 4-78	PBT	P1206	FAN #3 MANUAL STOP	
10 4-79	PBT	P1207	FAN #4 MANUAL START	
10 4-80	PBT	P1208	FAN #4 MANUAL STOP	

HW Ref	LED Mode	Ref. Address	Ref. Label
10 4-17	DN	M1-5-2	FAN 1 RUN INDICATION
10 4-18	TROUBLE	P1265	FAN #1 FAULT
10 4-19	OFF	M1-5-2	FAN 1 RUN INDICATION
10 4-20	SMPL		
10 4-21	DN	M1-6-2	FAN 2 RUN INDICATION
10 4-22	TROUBLE	P1266	FAN #2 FAULT
10 4-23	OFF	M1-6-2	FAN 2 RUN INDICATION
10 4-24	SMPL		

Properties:

HW Ref : 4-73

Mode : PBT

Reference Address : P1201

Reference Label : FAN #1 MANUAL START

Custom Label :

Alternate Custom Label :

Primary Action Message :

Trouble Action Message :

Invert Pushbutton State:

10.4.2 LED Configuration

The LEDs configuration couples the Red Amber and Green LEDs of each fan to a pseudo point.

Each fan uses 4 LEDs:

LED 1 set = Red LED is ON = Fan is running.

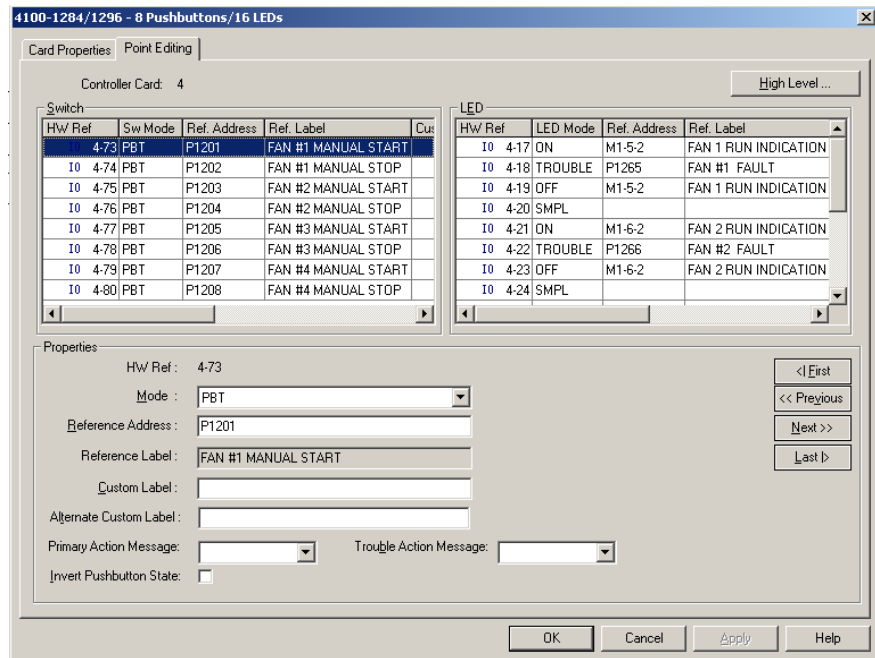
LED 2 set = Amber LED is ON = Fan is faulty.

LED 3 set = Green LED is ON = Fan is not running.

LED 4 is not used.

These pseudo points can be monitored via the panel's display screen and referred to from the online executable via custom controls.

- In the **Mode** text box enter 'ON'.
- In the **Reference Address** text box enter the address of the airflow monitoring device.
- Highlight the next line to configure the next entry with the Fault pseudo point (starting at P1265).
- In the **Mode** text box enter 'OFF'.
- In the **Reference Address** text box enter the address of the airflow monitoring device.
- Every 4th line (the 4th entry of each fan) should be left as SMPL and without a pseudo point configured.



When all the configured fans have pseudo points for the **Switch** and **LED** – click OK.

10.4.3 Point Editing

Click the **Point** tab and scroll to point P1265 which is coupled to the Fault LED of the 1st fan. Configure the points as described hereafter for the 1st fan:

Click on the line and select the **Point Type TROUBLE**.

In the **Custom Label** text box enter a related meaningful text e.g. *FAN #1 FAULT*.

The screenshot shows the '4100 Upgrade Programmer' software interface. The main window displays a table of points with columns: HW Ref, Point Name, Device Type, Point Type, Custom Label, Alt Custom Label, PNIS Code, Power Draw (Amps), Primary Act Msg, and Trouble. The 'Point' tab is selected. A 'Point Properties' dialog box is open for point P1265, showing the following configuration:

- HW Ref: 132-241
- Point Name: P1265
- Device Type: DIGITAL
- Point Type: TROUBLE
- Custom Label: FAN #1 FAULT
- Alternate Custom Label: (empty)
- PNIS / Message: (empty)
- Primary Action Message: (empty)
- Trouble Action Message: (empty)

Continue editing the points for the remainder of the configured fans in the same way.

10.5 AS1668 Custom Control Equations

The control of the fans and the AS1668 LEDs as described in Section 10.2 is done using custom control equations in custom control program 7: AS1668 FAN CONTROL CUSTOM CONTROL. Alarm/Active Test and Fault Test Custom Control resides in Program 5 - ALARM / ACTIVE and FAULT TESTS.

Equations provided in the template have a Pseudo point entered for the input and output devices. These should be replaced with the actual module address as shown in the following example:

Template Custom Control equations for Fan1 start is

```
[INPUTS]
  STATUS ON
    P521 | DIGITAL | UTILITY | A/C TRIP
  AND NOT STATUS ON
    P1298 | DIGITAL | UTILITY | FAN STOP RELAY SUBSTITUTE
  OR STATUS ON
    P1201 | DIGITAL | UTILITY | FAN #1 MANUAL START
[END INPUTS]
[OUTPUTS]
  TRACK ON PRI=9,9
    P1297 | DIGITAL | UTILITY | FAN START RELAY SUBSTITUTE
[END OUTPUTS]
```

Should be modified to:

```
[INPUTS]
  STATUS ON
    P521 | DIGITAL | UTILITY | A/C TRIP
  AND NOT STATUS ON
    M1-3-0 | RIAM | RELAY | FAN 1 STOP RELAY
  OR STATUS ON
    P1201 | DIGITAL | UTILITY | FAN #1 MANUAL START
[END INPUTS]
[OUTPUTS]
  TRACK ON PRI=9,9
    M1-5-1 | MRELAY | RELAY | FAN 1 START RELAY
[END OUTPUTS]
```

The following is an example of required custom control equations to control fan #1. In this example, the fan start is controlled by point M1-5-1 which is an output relay on a TRIAM module. The airflow status uses M1-5-2 and the fan stop is via M1-3-1, which is a RIAM. Mech board fault is on address M1-7-2.

10.5.1 FAN FAULT and S/A RESTART DELAYS-STARTUP

This equation loads the setpoint values to A260 and A261, 1 second after start up or rebooting so the other Custom Control uses a value of zero on start up. If the delay is not included, all supply fan stop relays will operate until the timer expires.

```
[INPUTS]
  NOT STATUS ON
    P32 | DIGITAL | TROUBLE | COLD START
  OR NOT STATUS ON
    P33 | DIGITAL | TROUBLE | WARM START
  DELAY CONSTANT 1
    A259 | Analog Timer | ANALOG | ANALOG | FAN CUSTOM CONTROL START UP DELAY
[END INPUTS]
[OUTPUTS]
  SET CONSTANT 15 SECS
    A260 | Set-Analog (Destination) | ANALOG | ANALOG | FAN FAULT DELAY SETPOINT
  SET CONSTANT 60 SECS
    A261 | Set-Analog (Destination) | ANALOG | ANALOG | S/A DETECTOR RESTART DELAY SETPOINT
[END OUTPUTS]
```

10.5.2 Set up Register 8

The state of P516 is stored in register 8 and is used in the S/A Detector Isolate and De-Isolate equations.

```
[INPUTS]
  NOT STATUS ON
    P516 | DIGITAL | UTILITY | ALARM OR FAULT TEST ACTIVE
  SAVE 8
[END INPUTS]
[OUTPUTS]
[END OUTPUTS]
```

10.5.3 S/A DETECTOR Isolate

This equation is the same as for zone isolate.

```
[INPUTS]
  STATUS ON
    P985 | DIGITAL | UTILITY | MULTIFUNCTION SWITCH - ZONE 85-FAN 1
  AND NOT STATUS ON
    P685 | DIGITAL | SUPERV | FAN #1           AZF85
  AND NOT STATUS ON
    P785 | DIGITAL | UTILITY | ISOLATE TOGGLE ZONE 85 - FAN 1
  AND RECALL 8
[END INPUTS]
[OUTPUTS]
  HOLD ON PRI=9,9
    P685 | DIGITAL | SUPERV | FAN #1           AZF85
  HOLD ON PRI=9,9
    P785 | DIGITAL | UTILITY | ISOLATE TOGGLE ZONE 85 - FAN 1
[END OUTPUTS]
```

10.5.4 S/A DETECTOR De-Isolate

This equation is the same as for zone de-isolate.

```
[INPUTS]
  STATUS ON
    P985 | DIGITAL | UTILITY | MULTIFUNCTION SWITCH - ZONE 85-FAN 1
  AND STATUS ON
    P685 | DIGITAL | SUPERV | FAN #1           AZF85
  AND NOT STATUS ON
    P785 | DIGITAL | UTILITY | ISOLATE TOGGLE ZONE 85 - FAN 1
  AND RECALL 8
[END INPUTS]
[OUTPUTS]
  HOLD OFF PRI=9,9
    P685 | DIGITAL | SUPERV | FAN #1 S/A DETECTOR
  HOLD ON PRI=9,9
    P785 | DIGITAL | UTILITY | ISOLATE TOGGLE ZONE 85 - FAN 1
[END OUTPUTS]
```

10.5.5 S/A DETECTOR ACTIVE

The S/A detector is added to the zone list.

This equation uses negative logic - all operations are triggered when the S/A Detector is not active - it has cleared of smoke. This is followed by the restart delay OR if the detector is isolated. The output uses TRACK OFF to work with the input conditions.

[INPUTS]

NOT STATUS ON

L345 | LIST | MIXED | S/A DETECTOR FAN #1

DELAY ANALOG

A262 | Analog Timer | ANALOG | TIMER | S/A DETECTOR RESTART DELAY-FAN 1

A261 | Analog Timer SetPoint | ANALOG | ANALOG | S/A DETECTOR RESTART DELAY SETPOINT

OR STATUS ON

P685 | DIGITAL | SUPERV | FAN #1 S/A DETECTOR

[END INPUTS]

[OUTPUTS]

TRACK OFF PRI=9,9

P885 | DIGITAL | UTILITY | S/A OR SPF FAN 1

[END OUTPUTS]

10.5.6 Trigger FAN ON

This equation sets the fan control relay to operate the fan when A/C Trip (P521) is ON, or when the 'manual-start' is operated. The relay is prevented from operating if the Stop Relay is active (from smoke in Duct Detector) and the control is in Auto position.

[INPUTS]

STATUS ON

P521 | DIGITAL | UTILITY | A/C TRIP

AND NOT STATUS ON

M1-3-0 | RIAM | RELAY | FAN 1 STOP RELAY

OR STATUS ON

P1201 | DIGITAL | UTILITY | FAN #1 MANUAL START

[END INPUTS]

[OUTPUTS]

TRACK ON PRI=9,9

M1-5-1 | MRELAY | RELAY | FAN 1 START RELAY

[END OUTPUTS]

10.5.7 Trigger FAN OFF

This equation sets the fan control relay to stop the fan when smoke is detected by the Duct Detector, or when the manual-stop is ON.

[INPUTS]

STATUS ON

P885 | DIGITAL | UTILITY | S/A OR SPF FAN 1

AND NOT STATUS ON

P1201 | DIGITAL | UTILITY | FAN #1 MANUAL START

OR STATUS ON

P1202 | DIGITAL | UTILITY | FAN #1 MANUAL STOP

[END INPUTS]

[OUTPUTS]

TRACK ON PRI=9,9

M1-3-0 | RIAM | RELAY | FAN 1 STOP RELAY

[END OUTPUTS]

10.5.8 FAN fault conditions

This equation sets the amber LED (fault) to ON when the fan control relay is set to operate the fan but the airflow indicator does not report that air is flowing, when the fan control relay is set to stop the fan but the airflow indicator reports that air is flowing or a fault signal is received from the Mechanical Services Board.

[INPUTS]

STATUS ON

M1-5-1 | MRELAY | RELAY | FAN 1 START RELAY

AND NOT STATUS ON

M1-5-2 | MTSENSE | UTILITY | FAN 1 RUN INDICATION

SAVE 1

STATUS ON

M1-3-0 | RIAM | RELAY | FAN 1 STOP RELAY

AND STATUS ON

M1-5-2 | MTSENSE | UTILITY | FAN 1 RUN INDICATION

OR RECALL 1

DELAY ANALOG

A278 | Analog Timer | ANALOG | TIMER | FAN FAULT DELAY - FAN 1

A260 | Analog Timer SetPoint | ANALOG | ANALOG | FAN FAULT DELAY SETPOINT

OR STATUS ON

M1-7-2 | MINPUT | TROUBLE | FAN MECH BOARD FAULT

[END INPUTS]

[OUTPUTS]

TRACK ON PRI=9,9

P1265 | DIGITAL | TROUBLE | FAN #1 FAULT

[END OUTPUTS]

11 Building and Downloading the Configuration

11.1 General

When you are finished programming a job, you must first build the job before downloading it. Building a job takes the .SDB file (the un-compiled, “working” file) and creates a CFG file (compiled version of job, usable by panel) that can be downloaded to the panel.

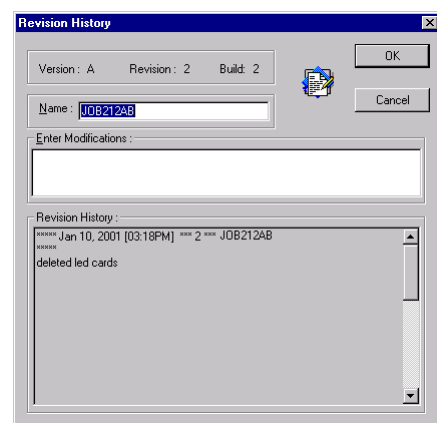
If errors are detected by the build operation, they are flagged and the build operation aborts. These errors must be resolved before the build can be performed and the CFG can be created. Contact Simplex Service Support for help in resolving build errors.

1. Start the programmer and open the job that you want to build.
2. Start the build utility, by clicking on the **Build** menu and selecting the **Build** menu option.

3. When the **Revision History** dialog appears, enter the name of the job in the **Name** field (or the name of the person making the changes). Enter the modifications made to the job in the **Enter Modifications** text box. Click OK.

The 4100U Job Builder dialog appears. It contains messages, including errors, related to the creation of the downloadable CFG file.

4. If the dialog says “**Build Complete**,” you are ready to download the file to the panel. If error messages appear, along with a “**Build Aborted**” message, you must first resolve the errors before rebuilding the job.

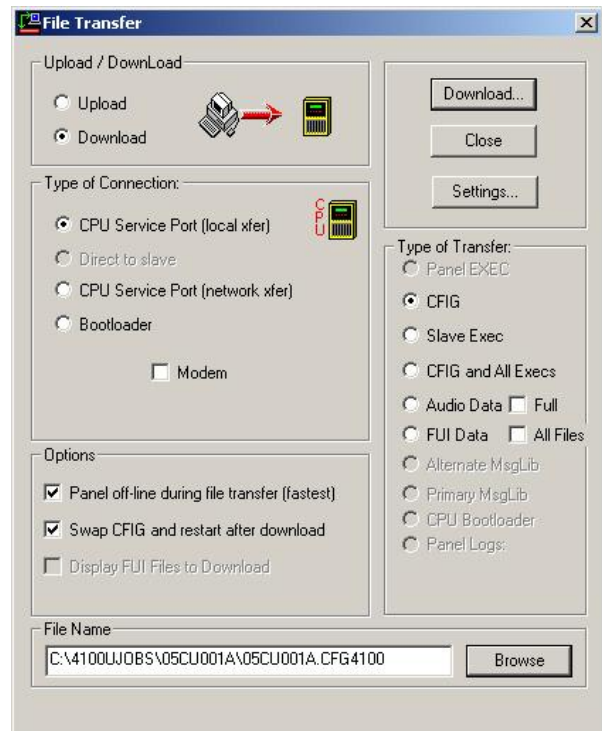


11.2 Starting the Transfer Utility

The 4100U **File Transfer** utility can be started from within the 4100U Programmer or from the Windows **Start** menu:

- From within the 4100U Programmer: If the programmer is already running, click on the **Transfer** menu, located along the menu bar at the top of the programmer window. When the options appear, click on **Transfer**.
- From the Windows **Start** Menu: Click the Start button. Move the pointer to the Programs option. When the list of choices appears, move the pointer to the **Simplex** option and click on the option containing the appropriate programmer (for example, **4100U Ver 11.01.01**). A list of options appears. Click on **File Transfer**.

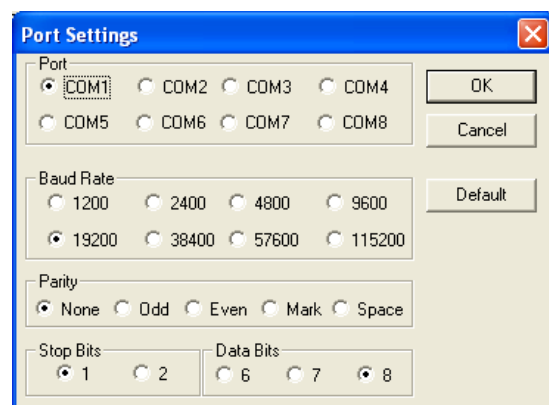
In both cases, the **File Transfer** utility is launched.



11.3 Serial Communication Parameter Settings

Clicking the **Settings...** button allows you to set the serial port, baud rate, parity, and stop bits used by the PC. In most cases (see note below), it is recommended that you use the default settings for these parameters.

Note: If you connect the serial cable (733-794) to a port other than COM1, make sure to open the Settings dialog and change the default Port (COM1) to the port being used.



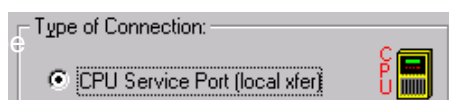
11.4 Direct Connection to the Panel

Follow these steps to connect the 733-794 serial cable between the PC and the panel.

1. Locate the PC within 6 feet of the panel and connect a 733-794 serial cable to the configured serial port (typically COM1) on the PC.
2. Connect the other end of the cable to the service port on the front panel of the 4100U, to the left of the operator interface. For 2 X 40 displays, make sure the red stripe is aligned to the left as you connect the cable. For InfoAlarm displays, make sure the red stripe is aligned to the bottom as you connect the cable.

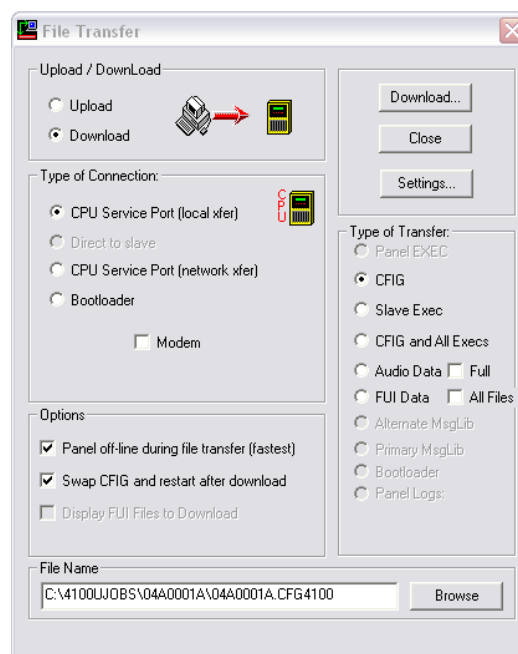


3. Run the **File Transfer** utility and select the **CPU Service Port (local xfer)** radio button.

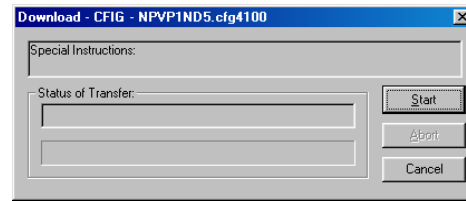


11.5 Downloading the CFG File

1. Set the **Download** radio button.
2. Set the **Type of Connection** to CPU Service (local xfer) and connect the PC's serial port to the panel's service port.
3. Click on the CFG radio button in the **Type of Transfer** area.
4. Set the **Options** to use during the download.
 - **Panel Off-Line During File Transfer (Fastest)** - Select this option when downloading a large job (thousands of points, complicated custom control equations). Note that the panel is non-functional for the duration of the download when this option is selected.
 - **Swap CFG and restart after download** - In most cases, this option should be selected. When selected, the existing CFG is automatically replaced with the CFG being downloaded and the panel is automatically restarted following download.
5. Click the **Browse** button and use the standard Windows dialog to open the folder containing the built job file (.CFG4100U). When the folder containing the CFG is open, click on the filename and click Open to select the file and close the dialog box.



6. Click the **Download...** button. A dialog as follow appears:

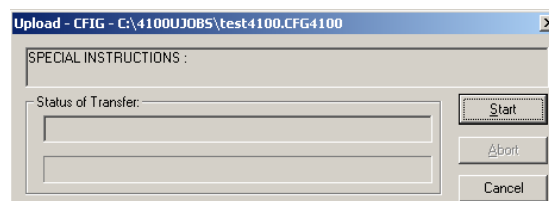
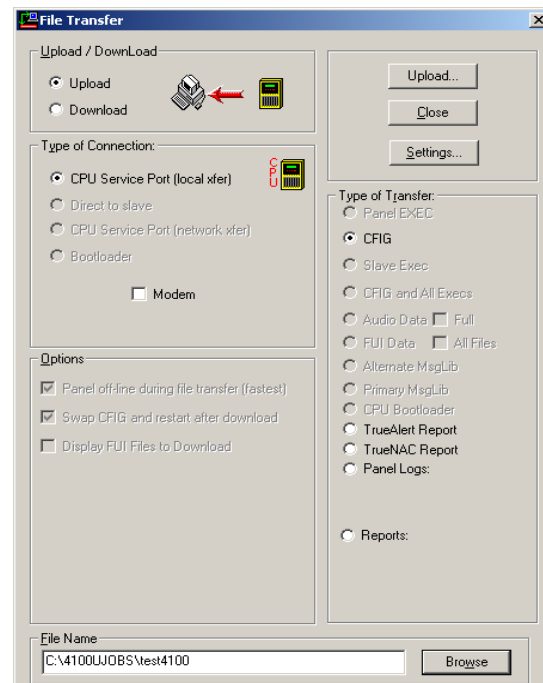


7. Click the **Start** button to begin the download. The display on the front panel of the 4100U shows the progress of the download, and notifies when the download is complete.
8. At the end of download the panel restarts automatically on the configuration.
9. The panel running the new configuration requires adjusting its date and time via the panel display menu.

11.6 Uploading from the Panel

The 4100U **File Transfer** utility can be started from within the 4100U Programmer:

1. From within the 4100U Programmer, click on the **Transfer menu**, located along the menu bar at the top of the programmer window. When the options appear, click on **Transfer**.
2. Set the **Upload** radio button.
3. Add a Filename in the dialog at the bottom of the window.
4. Click on the **Upload** button – a dialog box will appear – click on **Start** and the Panel config will be uploaded into the PC.



11.7 Sending 4100U files to Simplex.

If you need to send an existing (on your PC) 4100U config to Simplex, the best solution is to zip up the entire folder. The folder can normally be found under C:\4100Ujobs\.

If you have uploaded a config from a 4100U Panel, it must be sent to Simplex, so it can be de-compiled into an editable format. After conversion, Simplex will send you the editable files. As with the case above, the best solution is to zip up the entire folder. The folder can normally be found under C:\4100Ujobs\.

12 Appendices

12.1 Appendix A – AS4428.1 Operation

A 4100U-S1 that is required to comply with AS 4428.1 needs special functionality to be implemented. This is done by a number of custom control equations.

Program 3 contains the system functions to provide brigade relay operation, common front panel controls, battery testing and AVF. Program 4 contains the functions to operate the zone alarm and fault LEDs and to use the Isolate pushbutton to isolate/de-isolate the zone or general alarm/fault tests.

These programs should not be changed, except for removing unneeded zone equations in Program 4, or adding zone equations when more zones are added.

Details of these programs are contained in the following sections.

AS4428.1 does not require the FireFighter Interface if individual zone level alarm and isolate indicators are provided, which is why the 4100U-S1 comes with 4100-1288 LED and Switch modules. The LCD provides device level fault information and supplementary device information for alarms and isolations.

12.2 Appendix B - Common Variables and Custom Control

The following explains Points and Lists that are used in the AS 4428.1 Custom Control Logic. These Points and Lists may also be used in other custom control equations not listed below.

In the following sections the equation number is shown on the title line of the equation. For example, 3-8 Battery Test.

12.2.1 Digital Pseudo Points

Digital Pseudo Points have ON or OFF states and can be Fire (alarm), Pri2 (non-fire alarm), Supervisory (isolate), Trouble (fault) and Utility (silent, not displayed)

P0 – System Reset Key

Used in Equation 3-16 to Reset Alarm and Fault Test Lists

P11 – Unacknowledged device Alarm exists

Used in Equation 3-9 to make Common Alarm LED flash on Unacknowledged Alarm

P21 – Enable Program 5 – Alarm / Fault Tests

Used in Equation 3-7 to Turn OFF Alarm and Fault Test Code until required by Alarm / Fault Test Mode operation

Used in Equation 3-12 to enable code for Alarm Test operation

Used in Equation 3-14 to enable code for Fault Test operation

Used in Equation 3-15 to disable Alarm and Fault Test operation code after preset time delay

P204 – Signals Silenced

Used in equation 3-18 to disable the Alarm Silence LED on the Operator LCD

P210 – Network Detector Reset

Used in equation 3-16 to disable Alarm and Fault Tests when a Network Reset is initiated.

Note: P210 is only used with 4100+ UT panels

P212 – Detector/ System Reset

Used in equation 3-16 to disable Alarm and Fault Tests when a Local Reset is initiated.

P478 – Inhibits device trouble when the device is disabled

Used in equation 3-7 Alarm Verification Timing / Start up

P512 – An unacknowledged Zone Alarm Exists

Used in equation 3-9 to flash the Common Alarm LED

Used in equation 3-10 to set the Common Alarm LED to steady

Turned on by each of the AZF Zones “New Alarm” equation

P513 – Alarm/Fault Test Button pressed

P514 – Alarm Test Active

P515 – Fault Test Active

P516 – Alarm or Fault Test Active

P517 – ACF Isolated

P518 – Bell Isolated

P519 – Warning System Isolated

P520 – Manual Battery Test

P521 – A/C Trip

P522 – A/C Reset

12.2.2 Analog Points

Analog Points can have a value 0-65535 and can be used for Timers, Counters or store a numerical value.

A0 – Number of Devices in Alarm
A1 – Number of Isolates
A2 – Number of Faults
A34 – System Startup pulse
A257 – Alarm and Fault Test Timeout

12.2.3 Lists

Lists are container objects used to group several points. A list inherits the states and status of the points within the list and the list is used the same as a point.

L256 – Brigade call Alarm List
L257 – General Fire Trip List (ACF Isolatable)
L258 – Zone Alarm Test List
L259 – Zone Fault Test List
L260 – Zone Isolate Toggles

12.2.4 Physical Hardware Points (LEDs Relays etc)

Alarm Test Active LED or keyboard panel	(P514)
A/C Trip LED	(P521)
ACF Isolated LED	(P517)
Bells Isolated LED	(P518)
0-5-10	Warning System Isolated LED (P519)
0-5-11	Common Alarm LED
0-5-13	Fault Test Active LED (P515)
0-5-1	Alarm Fault Normal Button (P513)
0-5-2	A/C Reset Button (P522)
0-5-3	ACF Isolate Button (P517)
0-5-4	Bell Isolate Button (P518)
0-5-5	Warning System Isolate Button (P519)
0-7-3	City Alarm Relay
0-7-4	City Alarm Trouble Relay (FAULTS)
1-9	City Fire Relay 1 (ALARMS)
1-11	City Supervisory Relay 2 (ISOLATES)
1-12	City Trouble Relay 3 (FAULTS)
SIG3	ACF General Fire Trip (SPS NAC 1)
SIG4	Fire Alarm Bell (SPS NAC 2)
SIG5	Warning System (SPS NAC 3)

12.2.5 Battery Test

The battery is automatically tested at 8:00:03 every Tuesday morning according to the internal clock. The test runs for 1 hour (plus 5 seconds).

The battery test is disabled if any Alarm is present or an Alarm occurs during the battery test. Manual battery tests can be started by activating P520.

References:

Point Address: 1-10 Battery Test Point
A256 Battery Test Timer
P520 Manual Battery Test

Equation:

3-8 Battery Test

[INPUTS]

```

WHEN DAY IS TUE
AND IF ANALOG = CONSTANT 8 CNTS
    A6 | Compare Analog | ANALOG | ANALOG | CURRENT HOUR
AND IF ANALOG = CONSTANT 0 CNTS
    A7 | Compare Analog | ANALOG | ANALOG | CURRENT MINUTE
AND IF ANALOG <= CONSTANT 3 CNTS
    A8 | Compare Analog | ANALOG | ANALOG | CURRENT SECOND
OR STATUS ON
    P520 | DIGITAL | UTILITY | MANUAL BATTERY TEST CONTROL
AND NOT STATUS ON
    L257 | LIST | DPSEUDO | GENERAL FIRE TRIP LIST (ACF ISOLATABLE)
DELAY CONSTANT 3605
    A256 | Analog Timer | ANALOG | TIMER | BATTERY TEST TIMER
SAVE 1
IF ANALOG > CONSTANT 0 CNTS
    A256 | Compare Analog | ANALOG | TIMER | BATTERY TEST TIMER
AND NOT STATUS ON
    A256 | ANALOG | TIMER | BATTERY TEST TIMER

```

[END INPUTS]

[OUTPUTS]

```

TRACK ON PRI=8,8
    1-10 | SPECOUT | SPECOUT | CITY PRI2
TRACK ON PRI=9,9
    P520 | DIGITAL | UTILITY | MANUAL BATTERY TEST CONTROL

```

[END OUTPUTS]

12.2.6 Alarm Verification Timing and Start Up settings

This equation is used to set any default settings when the panel is powered up or has been restarted by CPU hardware reset button.

References:

Point Address:
A34 System Start up Pulse timer
A37 AVF Retard Time
A38 AVF Reset Time
A39 AVF Confirmation Time
P21 Disable Program 5 Custom Control for Alarm and Fault Test
P478 Inhibits device trouble when the device is disabled

Equations:

3-7 Alarm Verification Timing / Start up

```
[INPUTS]
  STATUS ON
    A34 | ANALOG | TIMER | SYSTEM STARTUP PULSE TIMER
[END INPUTS]
[OUTPUTS]
  SET CONSTANT 5 CNTS
    A37 | Set-Analog (Destination) | ANALOG | ANALOG | ALARM VERIFICATION - RETARD TIME
  SET CONSTANT 10 CNTS
    A38 | Set-Analog (Destination) | ANALOG | ANALOG | ALARM VERIFICATION - RESET TIME
  SET CONSTANT 180 CNTS
    A39 | Set-Analog (Destination) | ANALOG | ANALOG | ALARM VERIFICATION - CONFIRMATION TIME
  HOLD OFF PRI=7,7
    P21 | DIGITAL | UTILITY | SMPL PROGRAM 5 - USER CUSTOM CONTROL
  HOLD ON PRI=7,7
    P478 | DIGITAL | UTILITY | INHIBIT DEVICE TROUBLES WHILE DISABLED
[END OUTPUTS]
```

12.2.7 Brigade Relay Equations

The following are the equations used to drive the Alarm, Isolate and Fault Brigade Relays. ***These equations should not be modified without consulting a Simplex Technician.***

References:

Point Address:

0-7-3 City Alarm Relay (relay on 4100+ type CPU motherboard)
0-7-4 City Trouble Relay (relay on 4100+ type CPU motherboard)
1-9 City Fire/Opt Relay 1 (Alarm relay on SPS piggyback board)
1-11 City SUPV/Opt Relay 2 (Supervisory / Isolate relay on SPS piggyback board)
1-12 City Fire/Opt Relay 3 (Trouble relay on SPS piggyback board)
A1 Number of Isolates on Panel
A2 Number of Faults on Panel
L256 Brigade Call Alarm List

3-1 ASE Alarm Relay

```
[INPUTS]
  STATUS ON
    L256 | LIST | DPSEUDO | BRIGADE CALL ALARM LIST
[END INPUTS]
[OUTPUTS]
  TRACK ON PRI=7,7
    0-7-3 | MCODE7 | RELAY | Master Output - City Alarm Relay
  TRACK ON PRI=7,7
    1-9 | SPECOUT | SPECOUT | CITY FIRE/OPT RELAY 1
[END OUTPUTS]
```

3-2 ASE Isolate Relay

```
[INPUTS]
  STATUS ON
    A1 | ANALOG | ANALOG | NUMBER OF SYSTEM SUPERVISORIES
[END INPUTS]
[OUTPUTS]
  TRACK ON PRI=7,7
    1-11 | SPECOUT | SPECOUT | CITY SUPV/OPT RELAY 2
[END OUTPUTS]
```


3-3 ASE Fault Relay

[INPUTS]

STATUS ON

A2 | ANALOG | ANALOG | NUMBER OF SYSTEM TROUBLES

[END INPUTS]

[OUTPUTS]

TRACK ON PRI=7,7

0-7-4 | MCODE7 | RELAY | Master Output - City Trouble Relay

TRACK ON PRI=7,7

1-12 | SPECOUT | SPECOUT | CITY TBL/OPT RELAY 3

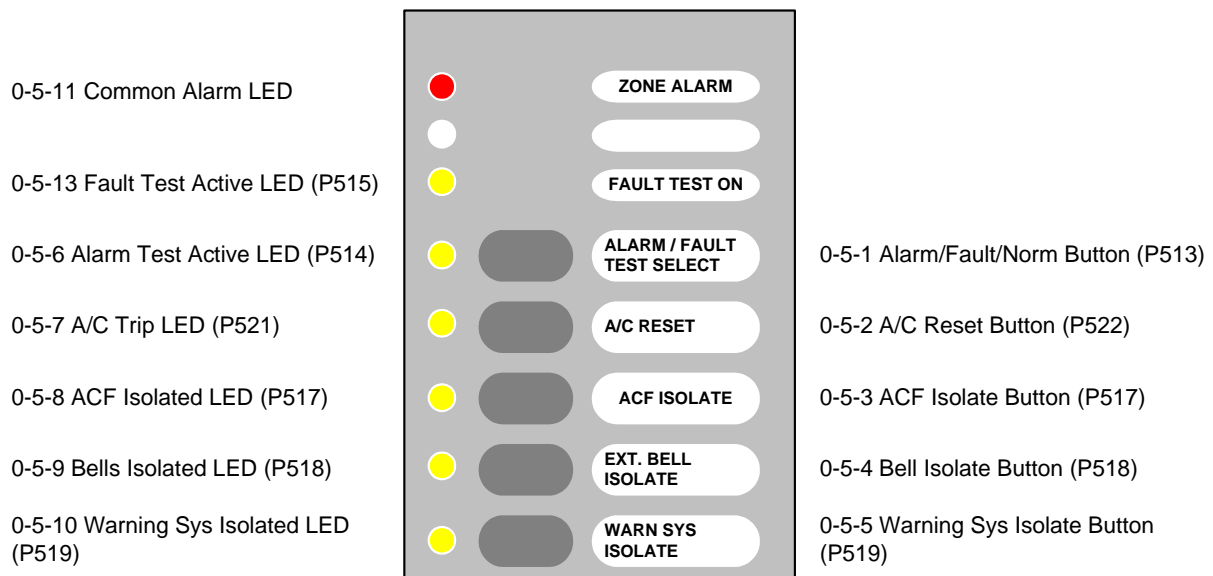
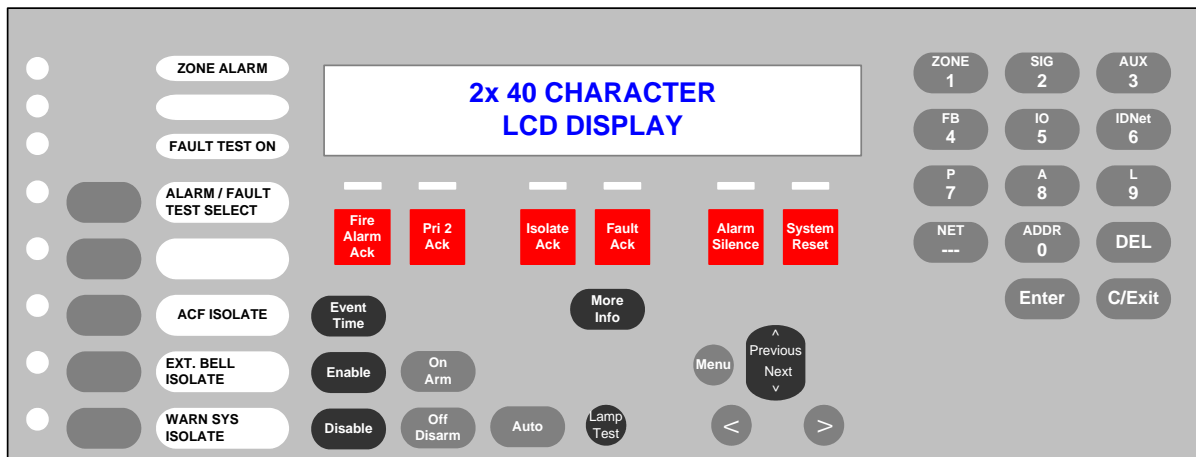
[END OUTPUTS]

12.3 Appendix C - Custom Control for Control Keys and Indicators

The main part of the Operator Interface (the several ACK keys, numeric keypad and LCD) has functionality which is controlled directly by the panel software, and cannot be re-configured.

The Control keys and Indicators at the left end of the Operator Interface provide functionality which is controlled by Custom Control equations to meet AS 4428.1 requirements.

These equations are part of Program 3. They should not be changed, except under the direction of Simplex Fire Products, since the operation of the panel may be adversely affected.



12.3.1 Common Zone Alarm LED

This Red LED flashes if any Zone is in alarm and is not acknowledged.
The LED is on steady if any Zone is in Alarm and all Alarms are acknowledged.
The LED is off when there are no Zones in Alarm.

References

Point address: **0-5-11 Common Zone Alarm LED**

Equations:

3-9 Common Fire Alarm LED Flash

```
[INPUTS]
  STATUS ON
    P11 | DIGITAL | UTILITY | UNACKNOWLEDGED FIRE ALARM EXISTS
  AND STATUS ON
    L256 | LIST | DPSEUDO | BRIGADE CALL ALARM LIST
  AND STATUS ON
    P512 | DIGITAL | UTILITY | A ZONE ALARM LED IS FLASHING
[END INPUTS]
[OUTPUTS]
  FLASH SLOW
    0-5-11 | MKYLED5CRY | LEDRED | COMMON ALARM LED
[END OUTPUTS]
```

3-10 Common Fire Alarm LED Steady

```
[INPUTS]
  STATUS ON
    A0 | ANALOG | ANALOG | NUMBER OF SYSTEM FIRE ALARMS
  AND NOT STATUS ON
    P512 | DIGITAL | UTILITY | A ZONE ALARM LED IS FLASHING
[END INPUTS]
[OUTPUTS]
  FLASH ON
    0-5-11 | MKYLED5CRY | LEDRED | COMMON ALARM LED
[END OUTPUTS]
```

3-11 Common Fire Alarm LED Off

```
[INPUTS]
  NOT STATUS ON
    A0 | ANALOG | ANALOG | NUMBER OF SYSTEM FIRE ALARMS
[END INPUTS]
[OUTPUTS]
  FLASH OFF
    0-5-11 | MKYLED5CRY | LEDRED | COMMON ALARM LED
[END OUTPUTS]
```

12.3.2 Alarm / Fault / Normal Test Button and LEDs

This button is used to select between Alarm Test, Fault Test and Normal operation for the Multifunction buttons. The Alarm Test and Fault Test LEDs indicate what operation the Multifunction buttons will initiate if pressed.

The Alarm and Fault Test code is stored in a separate Program to all other code. This Program is enabled only if the panel is in Alarm or Fault Test mode.

References:

Push Button Mode	set to "PBH" Mode
Point Address:	0-5-1 Alarm Fault Test Normal (AFN) Button
P513	Status of AFN button
0-5-6	Alarm Test LED
P514	Active if panel is in Alarm Test Mode
0-5-13	Fault Test LED
P515	Active if panel is in Fault Test Mode

Equations:

3-12 Alarm Test Mode

```
[INPUTS]
  STATUS ON
    P513 | DIGITAL | UTILITY | ALARM TEST/FAULT TEST/NORMAL BUTTON
  AND NOT STATUS ON
    P514 | DIGITAL | UTILITY | ALARM TEST
  AND NOT STATUS ON
    P515 | DIGITAL | UTILITY | FAULT TEST
[END INPUTS]
[OUTPUTS]
  HOLD ON PRI=9,9
    P514 | DIGITAL | UTILITY | ALARM TEST
  HOLD ON PRI=9,9
    P516 | DIGITAL | UTILITY | ALARM OR FAULT TEST ACTIVE
  HOLD OFF PRI=9,9
    P513 | DIGITAL | UTILITY | ALARM TEST/FAULT TEST/NORMAL BUTTON
  PRINT PANEL "ALARM TEST READY-PRESS FOR FAULT TEST"
  HOLD ON PRI=7,7
    P21 | DIGITAL | UTILITY | SMPL PROGRAM 5 - USER CUSTOM CONTROL
[END OUTPUTS]
```

3-13 Fault Test Mode

```
[INPUTS]
  STATUS ON
    P513 | DIGITAL | UTILITY | ALARM TEST/FAULT TEST/NORMAL BUTTON
  AND STATUS ON
    P514 | DIGITAL | UTILITY | ALARM TEST
  AND NOT STATUS ON
    P515 | DIGITAL | UTILITY | FAULT TEST
[END INPUTS]
[OUTPUTS]
  HOLD ON PRI=9,9
    P515 | DIGITAL | UTILITY | FAULT TEST
  HOLD OFF PRI=9,9
    P513 | DIGITAL | UTILITY | ALARM TEST/FAULT TEST/NORMAL BUTTON
  HOLD OFF PRI=9,9
    P514 | DIGITAL | UTILITY | ALARM TEST
  PRINT PANEL "FAULT TEST READY-PRESS AGAIN FOR NORMAL"
[END OUTPUTS]
```

3-14 Alarm and Fault Test Mode OFF

```

[INPUTS]
  STATUS ON
    P513 | DIGITAL | UTILITY | ALARM TEST/FAULT TEST/NORMAL BUTTON
  AND STATUS ON
    P515 | DIGITAL | UTILITY | FAULT TEST
[END INPUTS]
[OUTPUTS]
  HOLD OFF PRI=9,9
    P515 | DIGITAL | UTILITY | FAULT TEST
  HOLD OFF PRI=9,9
    P516 | DIGITAL | UTILITY | ALARM OR FAULT TEST ACTIVE
  HOLD OFF PRI=9,9
    P513 | DIGITAL | UTILITY | ALARM TEST/FAULT TEST/NORMAL BUTTON
  PRINT PANEL "ALARM and FAULT TEST OFF"
  HOLD OFF PRI=7,7
    P21 | DIGITAL | UTILITY | SMPL PROGRAM 5 - USER CUSTOM CONTROL
[END OUTPUTS]

```

3-15 Alarm and Fault Test Timer

```

[INPUTS]
  STATUS ON
    P516 | DIGITAL | UTILITY | ALARM OR FAULT TEST ACTIVE
  AND NOT STATUS ON
    L258 | LIST | DPSEUDO | ALARM TEST LIST
  AND NOT STATUS ON
    L259 | LIST | DPSEUDO | FAULT TEST LIST
  DELAY CONSTANT 60
    A257 | Analog Timer | ANALOG | TIMER | ALARM and FAULT TEST TIMEOUT
[END INPUTS]
[OUTPUTS]
  HOLD OFF PRI=9,9
    P514 | DIGITAL | UTILITY | ALARM TEST
  HOLD OFF PRI=9,9
    P515 | DIGITAL | UTILITY | FAULT TEST
  HOLD OFF PRI=9,9
    P516 | DIGITAL | UTILITY | ALARM OR FAULT TEST ACTIVE
  HOLD OFF PRI=7,7
    P21 | DIGITAL | UTILITY | SMPL PROGRAM 5 - USER CUSTOM CONTROL
[END OUTPUTS]

```

3-16 Reset Alarm and Fault Test

```

[INPUTS]
  STATUS ON
    L258 | LIST | DPSEUDO | ALARM TEST LIST
  AND NOT STATUS ON
    P514 | DIGITAL | UTILITY | ALARM TEST
  SAVE 1
  STATUS ON
    L259 | LIST | DPSEUDO | FAULT TEST LIST
  AND NOT STATUS ON
    P515 | DIGITAL | UTILITY | FAULT TEST
  OR RECALL 1
  OR STATUS ON
    P0 | DIGITAL | UTILITY | SYSTEM RESET KEY
  OR STATUS ON
    P210 | DIGITAL | UTILITY | NETWORK DETECTOR RESET
  OR STATUS ON
    P212 | DIGITAL | UTILITY | DETECTOR/SYSTEM RESET
[END INPUTS]
[OUTPUTS]
  HOLD OFF PRI=9,9
    L258 | LIST | DPSEUDO | ALARM TEST LIST
  HOLD OFF PRI=9,9
    L259 | LIST | DPSEUDO | FAULT TEST LIST
[END OUTPUTS]

```

12.3.3 Example Alarm and Fault Test equations

These equations (with point number modifications) must be included for each zone to carry out the zone alarm or fault test when the zone button is pressed and alarm or fault test modes are active.

5-1 ZONE 1 Alarm Test

```
[INPUTS]
  STATUS ON
    P514 | DIGITAL | UTILITY | ALARM TEST
  AND STATUS ON
    P901 | DIGITAL | UTILITY | MULTIFUNCTION SWITCH - ZONE 1
[END INPUTS]
[OUTPUTS]
  HOLD ON PRI=9,9
    P1001 | DIGITAL | FIRE | ALARM TEST ZONE 1
[END OUTPUTS]
```

5-2 ZONE 1 Fault Test

```
[INPUTS]
  STATUS ON
    P515 | DIGITAL | UTILITY | FAULT TEST
  AND STATUS ON
    P901 | DIGITAL | UTILITY | MULTIFUNCTION SWITCH - ZONE 1
[END INPUTS]
[OUTPUTS]
  HOLD ON PRI=9,9
    P1101 | DIGITAL | TROUBLE | FAULT TEST ZONE 1
[END OUTPUTS]
```

12.3.4 A/C Reset Button and A/C Trip LED

The A/C Trip LED indicates that the Air Condition system Automatic control has activated. The A/C Reset button is used to disable the automatic control.

References

Push Button Mode set to "PBT" Mode

Point Address: **0-5-2 A/C Reset Button**
P522 A/C Reset Status

0-5-7 A/C Trip LED
P521 Status of A/C Trip

Equations:

3-17 A/C Trip Reset

```
[INPUTS]
  STATUS ON
    P522 | DIGITAL | UTILITY | A/C RESET
  AND NOT STATUS ON
    L257 | LIST | DPSEUDO | GENERAL FIRE TRIP LIST (ACF ISOLATABLE)
  OR STATUS ON
    P517 | DIGITAL | SUPERV | ACF ISOLATE
[END INPUTS]
[OUTPUTS]
  HOLD OFF PRI=9,9
    P521 | DIGITAL | UTILITY | A/C TRIP
[END OUTPUTS]
```

4.4 ACF Isolate LED and Button

The ACF Isolate LED indicates that the General Fire Trip List is Isolated. Pressing the ACF Isolate button toggles the isolation of this list.

References

Push Button Mode set to "TOF" Mode

Point Address: 0-5-3 ACF Isolate Button
P517 ACF Isolate Status

0-5-8 ACF Isolated LED
L257 General Fire Trip List

Equations:

3-4 General Fire Trip (ACF)

```

[INPUTS]
  STATUS ON
    L257 | LIST | DPSEUDO | GENERAL FIRE TRIP LIST (ACF ISOLATABLE)
  AND NOT STATUS SUPV
    P517 | DIGITAL | SUPERV | ACF ISOLATE
[END INPUTS]
[OUTPUTS]
  TRACK ON PRI=9,9
    SIG3 | SIGB | RELAY | ACF GENERAL FIRE TRIP
  HOLD ON PRI=9,9
    P521 | DIGITAL | UTILITY | A/C TRIP
[END OUTPUTS]

```

12.3.5 Bells Isolate LED and Button

The Bells Isolate LED indicates that the External Bell is Isolated. Pressing the Bells Isolate button toggles the isolation of the Bell.

References

Push Button Mode set to "TOF" Mode

Point Address: 0-5-4 Bell Isolate Button
P518 Bell Isolate Status

0-5-9 Bells Isolated LED
L257 General Fire Trip List
SIG4 Bells Isolate NAC 2 on SPS Power Supply

Equations:

3-5 Fire Alarm Bell

```

[INPUTS]
  STATUS ON
    L257 | LIST | DPSEUDO | GENERAL FIRE TRIP LIST (ACF ISOLATABLE)
  AND NOT STATUS ON
    P518 | DIGITAL | SUPERV | BELL ISOLATE
[END INPUTS]
[OUTPUTS]
  TRACK ON PRI=9,9
    SIG4 | SIGB | SIGNAL | FIRE ALARM BELL
[END OUTPUTS]

```

12.3.6 Warning System Isolate

The Warning System Isolate LED indicates that the Warning System Output is Isolated. Pressing the Warning System Isolate button toggles the isolation of the output.

SIG5 (NAC 3) on the SPS is activated when an alarm is present and the warning system is not isolated.

References

Push Button Mode set to "TOF" Mode

Point Address: 0-5-5 Warning Sys Isolate Button
P519 Warning Sys Isolate Status
0-5-10 Warning Sys Isolated LED
L257 General Fire Trip List
SIG5 Warning Sys Isolate NAC 3 on SPS Power Supply

Equations:

3-6 Warning System Trip

```
[INPUTS]
  STATUS ON
    L257 | LIST | DPSEUDO | GENERAL FIRE TRIP LIST (ACF ISOLATABLE)
  AND NOT STATUS ON
    P519 | DIGITAL | SUPERV | WARNING SYSTEM ISOLATE
[END INPUTS]
[OUTPUTS]
  TRACK ON PRI=9,9
    SIG5 | SIGB | SIGNAL | WARNING SYSTEM
[END OUTPUTS]
```

12.3.7 Clean up Equations

System Startup Initialization

This equation initializes the state of P204 to OFF during start up to prevent the alarm silenced LED from being turned on during start up.

3-18 prevent "alarm silenced" LED operating

```
[INPUTS]
  STATUS ON
    A34 | ANALOG | TIMER | SYSTEM STARTUP PULSE TIMER
[END INPUTS]
[OUTPUTS]
  HOLD OFF PRI=2,2
    P204 | DIGITAL | UTILITY | SIGNALS SILENCED
[END OUTPUTS]
```


Reset zone isolate toggle

This equation handles the toggling of the Isolate pushbuttons for each zone. A point in list 260 is set on any Isolate pushbutton being depressed so that only one action is carried out on the push of the button. This equation delays 1 second before it sets to off all the points in list L260, which contains the points P701 - P799.

Equations:

3-19 Reset zone isolate toggle

[INPUTS]

STATUS ON

L260 | LIST | DPSEUDO | ZONE ISOLATE TOGGLES

DELAY CONSTANT 1

A258 | Analog Timer | ANALOG | TIMER | ZONE ISOLATE TOGGLES DELAY

[END INPUTS]

[OUTPUTS]

HOLD OFF PRI=9,9

L260 | LIST | DPSEUDO | ZONE ISOLATE TOGGLES

RESET TIMER

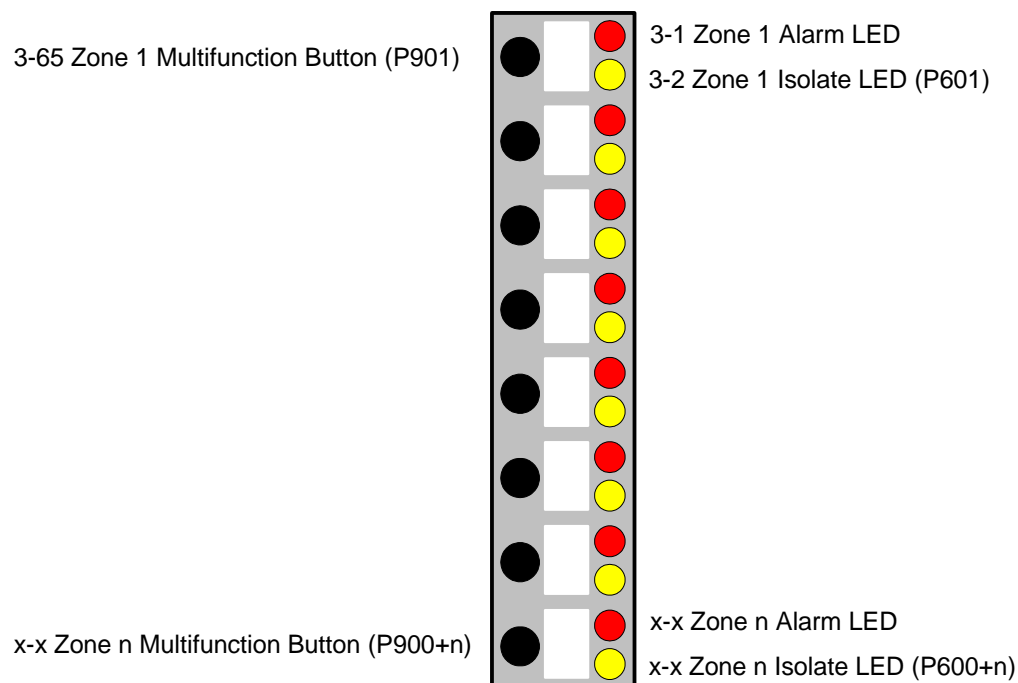
A258 | ANALOG | TIMER | ZONE ISOLATE TOGGLES DELAY

[END OUTPUTS]

12.4 Appendix D - Custom Control for Alarm Zone Facilities

A 4100-1282 8 Pushbutton/8 red LED/8 amber LED module is fitted for each 8 zones to display the alarm and isolate states of the zones (lists) and allow the zone to be isolated, alarm tested or fault tested.

This diagram shows the point numbers used for the push buttons and LEDs, where n = zone number. A number of pseudo digital points are used for each zone to store and control the operation.



12.4.1 Digital Points used

Zone 1

P601	– Zone 1 is Isolated
P701	– Zone 1 Isolate Toggle
P801	– Zone 1 is in Alarm
P901	– Zone 1 Multifunction pushbutton
P1001	– Zone 1 is in Alarm Test
P1101	– Zone 1 is in Fault Test

Zone n

P600+n	– Zone n is Isolated
P700+n	– Zone n Isolate Toggle
P800+n	– Zone n is in Alarm
P900+n	– Zone n Multifunction pushbutton
P1000+n	– Zone n is in Alarm Test
P1100+n	– Zone n is in Fault Test

12.4.2 Lists

Zone 1

L261 – Zone 1 Alarm List
 L262 – Zone 2 Alarm List
 ...
 L260+n – Zone n Alarm List

12.4.3 Switches and LEDs

Zone 1

3-65 – Zone 1 Multifunction Switch
 3-1 – Zone 1 Alarm LED
 3-2 – Zone 1 Isolated LED

12.4.4 Zone 1 Equations

4-2 ZONE 1 Isolate Switch

```
[INPUTS]
STATUS ON
  P901 | DIGITAL | UTILITY | MULTIFUNCTION SWITCH - ZONE 1
AND NOT STATUS ON
  P601 | DIGITAL | SUPERV | ISOLATE ZONE 1
AND NOT STATUS ON
  P701 | DIGITAL | UTILITY | ISOLATE TOGGLE ZONE 1
AND RECALL 8
[END INPUTS]
[OUTPUTS]
HOLD ON PRI=9,9
  P601 | DIGITAL | SUPERV | ISOLATE ZONE 1
HOLD ON PRI=9,9
  P701 | DIGITAL | UTILITY | ISOLATE TOGGLE ZONE 1
[END OUTPUTS]
```

4-3 ZONE 1 De-Isolate Switch

```
[INPUTS]
STATUS ON
  P901 | DIGITAL | UTILITY | MULTIFUNCTION SWITCH - ZONE 1
AND STATUS ON
  P601 | DIGITAL | SUPERV | ISOLATE ZONE 1
AND NOT STATUS ON
  P701 | DIGITAL | UTILITY | ISOLATE TOGGLE ZONE 1
AND RECALL 8
[END INPUTS]
[OUTPUTS]
HOLD OFF PRI=9,9
  P601 | DIGITAL | SUPERV | ISOLATE ZONE 1
HOLD ON PRI=9,9
  P701 | DIGITAL | UTILITY | ISOLATE TOGGLE ZONE 1
[END OUTPUTS]
```

4-4 ZONE 1 Isolate Stops Fire

```
[INPUTS]
STATUS FIRE
  L261 | LIST | MIXED | ALARM LIST ZONE 1
AND NOT STATUS ON
  P601 | DIGITAL | SUPERV | ISOLATE ZONE 1
[END INPUTS]
[OUTPUTS]
TRACK ON PRI=9,9
  P801 | DIGITAL | UTILITY | ALARM ZONE 1
[END OUTPUTS]
```

4-5 ZONE 1 New Alarm and LED Flash

```
[INPUTS]
  CONTINUE
  AND STATUS FALMACK
    L261 | LIST | MIXED | ALARM LIST ZONE 1
[END INPUTS]
[OUTPUTS]
  FLASH SLOW
    3-1 | LED | LED | AZF1 LED
  TRACK ON PRI=9,9
    P512 | DIGITAL | UTILITY | A ZONE ALARM LED IS FLASHING
[END OUTPUTS]
```

4-6 ZONE 1 Ack'ed Alarm and Steady LED

```
[INPUTS]
  NOT STATUS FALMACK
    L261 | LIST | MIXED | ALARM LIST ZONE 1
  OR STATUS ON
    P601 | DIGITAL | SUPERV | ISOLATE ZONE 1
  AND STATUS FIRE
    L261 | LIST | MIXED | ALARM LIST ZONE 1
[END INPUTS]
[OUTPUTS]
  FLASH ON
    3-1 | LED | LED | AZF1 LED
[END OUTPUTS]
```

4-7 ZONE 1 Alarm LED Off

```
[INPUTS]
  NOT STATUS FIRE
    L261 | LIST | MIXED | ALARM LIST ZONE 1
[END INPUTS]
[OUTPUTS]
  FLASH OFF
    3-1 | LED | LED | AZF1 LED
[END OUTPUTS]
```

12.4.5 Zone n Equations

ZONE n Isolate Switch

```
[INPUTS]
  STATUS ON
    P900+n | DIGITAL | UTILITY | MULTIFUNCTION SWITCH - ZONE n
  AND NOT STATUS ON
    P600+n | DIGITAL | SUPERV | ISOLATE ZONE n
  AND NOT STATUS ON
    P700+n | DIGITAL | UTILITY | ISOLATE TOGGLE ZONE n
  AND RECALL 8
[END INPUTS]
[OUTPUTS]
  HOLD ON PRI=9,9
    P600+n | DIGITAL | SUPERV | ISOLATE ZONE n
  HOLD ON PRI=9,9
    P700+n | DIGITAL | UTILITY | ISOLATE TOGGLE ZONE n
[END OUTPUTS]
```

ZONE n De-Isolate Switch

```
[INPUTS]
  STATUS ON
    P900+n | DIGITAL | UTILITY | MULTIFUNCTION SWITCH - ZONE n
  AND STATUS ON
    P600+n | DIGITAL | SUPERV | ISOLATE ZONE n
  AND NOT STATUS ON
    P700+n | DIGITAL | UTILITY | ISOLATE TOGGLE ZONE n
  AND RECALL 8
[END INPUTS]
[OUTPUTS]
  HOLD OFF PRI=9,9
    P600+n | DIGITAL | SUPERV | ISOLATE ZONE n
  HOLD ON PRI=9,9
    P700+n | DIGITAL | UTILITY | ISOLATE TOGGLE ZONE n
[END OUTPUTS]
```

ZONE n Isolate

```

[INPUTS]
  STATUS FIRE
    L260+n | LIST | MIXED | ALARM LIST ZONE n
  AND NOT STATUS ON
    P600+n | DIGITAL | SUPERV | ISOLATE ZONE n
[END INPUTS]
[OUTPUTS]
  TRACK ON PRI=9,9
    P800+n | DIGITAL | UTILITY | ALARM ZONE n
[END OUTPUTS]

```

ZONE n New Alarm and LED Flash

```

[INPUTS]
  CONTINUE
  AND STATUS FALMACK
    L260+n | LIST | MIXED | ALARM LIST ZONE n
[END INPUTS]
[OUTPUTS]
  FLASH SLOW
    X-X | LED | LED | AZFn LED (See table)
  TRACK ON PRI=9,9
    P512 | DIGITAL | UTILITY | A ZONE ALARM LED IS FLASHING
[END OUTPUTS]

```

ZONE n Ack'ed Alarm and Steady LED

```

[INPUTS]
  NOT STATUS FALMACK
    L260+n | LIST | MIXED | ALARM LIST ZONE n
  OR STATUS ON
    P600+n | DIGITAL | SUPERV | ISOLATE ZONE n
  AND STATUS FIRE
    L260+n | LIST | MIXED | ALARM LIST ZONE n
[END INPUTS]
[OUTPUTS]
  FLASH ON
    X-X | LED | LED | AZFn LED (See table)
[END OUTPUTS]

```

ZONE n Alarm LED Off

```

[INPUTS]
  NOT STATUS FIRE
    L260+n | LIST | MIXED | ALARM LIST ZONE n
[END INPUTS]
[OUTPUTS]
  FLASH OFF
    X-X | LED | LED | AZFn LED (See table)
[END OUTPUTS]

```

12.5 Appendix E - 4100-1282 AZF Switch and LED Address Mapping

The following table displays the fixed mapping of zones to Display modules (using 4100-1282) with HW Ref Addresses of the Push-Buttons, the Alarm LEDs and the Isolate LEDs, and their matching Pseudo Points.

Zone #	Display Module	HW Ref. Push-Button Address	Push-Button Pseudo point Ref. Address	HW Ref. Alarm LED Address	HW Ref. Isolate LED Address	LED Pseudo point Ref. Address
1	1	3-65	P901	3-1	3-2	P601
2	1	3-66	P902	3-3	3-4	P602
3	1	3-67	P903	3-5	3-6	P603
4	1	3-68	P904	3-7	3-8	P604
5	1	3-69	P905	3-9	3-10	P605
6	1	3-70	P906	3-11	3-12	P606
7	1	3-71	P907	3-13	3-14	P607
8	1	3-72	P908	3-15	3-16	P608
9	2	3-73	P909	3-17	3-18	P609
10	2	3-74	P910	3-19	3-20	P610
11	2	3-75	P911	3-21	3-22	P611
12	2	3-76	P912	3-23	3-24	P612
13	2	3-77	P913	3-25	3-26	P613
14	2	3-78	P914	3-27	3-28	P614
15	2	3-79	P915	3-29	3-30	P615
16	2	3-80	P916	3-31	3-32	P616
17	3	3-81	P917	3-33	3-34	P617
18	3	3-82	P918	3-35	3-36	P618
19	3	3-83	P919	3-37	3-38	P619
20	3	3-84	P920	3-39	3-40	P620
21	3	3-85	P921	3-41	3-42	P621
22	3	3-86	P922	3-43	3-44	P622
23	3	3-87	P923	3-45	3-46	P623
24	3	3-88	P924	3-47	3-48	P624
25	4	3-89	P925	3-49	3-50	P625
26	4	3-90	P926	3-51	3-52	P626
27	4	3-91	P927	3-53	3-54	P627
28	4	3-92	P928	3-55	3-56	P628
29	4	3-93	P929	3-57	3-58	P629
30	4	3-94	P930	3-59	3-60	P630
31	4	3-95	P931	3-61	3-62	P631
32	4	3-96	P932	3-63	3-64	P632
33	5	4-65	P933	4-1	4-2	P633
34	5	4-66	P934	4-3	4-4	P634
35	5	4-67	P935	4-5	4-6	P635
36	5	4-68	P936	4-7	4-8	P636
37	5	4-69	P937	4-9	4-10	P637
38	5	4-70	P938	4-11	4-12	P638
39	5	4-71	P939	4-13	4-14	P639
40	5	4-72	P940	4-15	4-16	P640

41	6	4-73	P941	4-17	4-18	P641
42	6	4-74	P942	4-19	4-20	P642
43	6	4-75	P943	4-21	4-22	P643
44	6	4-76	P944	4-23	4-24	P644
45	6	4-77	P945	4-25	4-26	P645
46	6	4-78	P946	4-27	4-28	P646
47	6	4-79	P947	4-29	4-30	P647
48	6	4-80	P948	4-31	4-32	P648
49	7	4-81	P949	4-33	4-34	P649
50	7	4-82	P950	4-35	4-36	P650
51	7	4-83	P951	4-37	4-38	P651
52	7	4-84	P952	4-39	4-40	P652
53	7	4-85	P953	4-41	4-42	P653
54	7	4-86	P954	4-43	4-44	P654
55	7	4-87	P955	4-45	4-46	P655
56	7	4-88	P956	4-47	4-48	P656
57	8	4-89	P957	4-49	4-50	P657
58	8	4-90	P958	4-51	4-52	P658
59	8	4-91	P959	4-53	4-54	P659
60	8	4-92	P960	4-55	4-56	P660
61	8	4-93	P961	4-57	4-58	P661
62	8	4-94	P962	4-59	4-60	P662
63	8	4-95	P963	4-61	4-62	P663
64	8	4-96	P964	4-63	4-64	P664

12.6 Appendix F – Useful Pseudo Points and Lists

The following tables list System Digital Pseudo points, System Analog Pseudo points and System Lists that are useful when working on a 4100U panel, especially when chasing intermittent faults.

System Digital Pseudo Points		
You must be logged in at level 3 to force system pseudo points on or off		
Point	Label	Type
P5	SET SERVICE PSEUDO VALUES	UTILITY
	When manually activated, this pseudo point changes the values of various “service pseudos”. When activated the system will: enable global acknowledge, disable keypad inactivity timer, reduce system reset timer, disable alarm silence inhibit, disable system trouble reminder, disable alarm verification, reduce monitor zone enable timer. See Custom Control Equation 0-122	
P132	ANALOG SENSOR ALMOST DIRTY LOG ENABLE	TROUBLE
	Activating this point lowers the dirty threshold by 10 analog units. This allows any analog sensors that are approaching the dirty threshold to report as dirty to the historical trouble log. (Note: For Field Service use.)	
P198	INHIBIT SONALERT	UTILITY
	This can be used to suppress the operation of the panel sounder when this pseudo point is forced ON	
P200	FORCE COLD START	UTILITY
	When panel is rebooted, all RAM memory contents are cleared.	
P214	Clear Alarm Verification Tallies (Trouble)	TROUBLE
	When activated, this point clears all alarm verification tallies in the local panel. The Alarm Verification Tally Limit Exceeded trouble point is cleared by this point.	
P248	EARTH FAULT LATCH ENABLE	TROUBLE
	This pseudo point is turned on when the user enables earth fault latching from the diagnostic menu. This pseudo point should not be directly controlled by custom control equations	
P439	DISABLE IDNET DETECTOR TEST MAGNETS	UTILITY
	This pseudo can be turned on to prevent accidentally triggering, or erroneous triggering of smoke detectors via the detector enclosed magnetic switch	
P447	IDNET DUPLICATE SEARCH ACTIVE	TROUBLE
	This trouble pseudo is ON when IDNet Duplicate Search activated.	
P448	IDNET WEAK SEARCH ACTIVE	TROUBLE
	This trouble pseudo is ON when IDNet Weak Search activated.	
P478	Inhibit Device Troubles while Disabled (V12.06)	UTILITY
	If this point is on, device level troubles (e.g. head missing, no answer, wrong type) are inhibited when the point is disabled. If the pseudo is off, those troubles will report even if a point is disabled. Turned ON after reboot by CC Equation 3.7	
P400	REMOTE SOUNDER INHIBIT	UTILITY
	This Inhibits the sounder on all remote annunciators including Info Alarm Display when the Pseudo is forced on.	
P482	RECURRING TROUBLE FILTERING ACTIVE	UTILITY
	The master will activate this trouble point whenever the algorithm to filter recurring, runaway device troubles has been activated. This is set on the Systems Option Page in the 4100U programmer (default is 0)	

System Lists	
Point	Label
L18	GENERAL FIRE ALARM MONITOR ZONES
	Stores the number of physical alarm type points connected to the panel.
L76	VARIABLE SENSITIVITY PHOTO ANALOG SENSOR
	Stores the number of TrueAlarm Photo detectors connected to the panel.
L77	VARIABLE SENSITIVITY ION ANALOG SENSOR
	Stores the number of TrueAlarm Ionization detectors connected to the panel.
L78	ANALOG SENSORS WITH PIEZO
	Stores the number of TrueAlarm detectors with Piezo (Sounder) bases connected to the panel.
L79	ANALOG SENSORS WITH RELAY
	Stores the number of TrueAlarm detectors with Relay bases connected to the panel.

System Analog Pseudo Points	
Point	Label
A98	BATTERY TROUBLE COUNTER
	Stores the number of times a Battery Fault has been detected since last reboot.
A99	AC POWER FAIL COUNTER
	Stores the number of times a Mains Fail Fault has been detected since last reboot.
A112	GROUND TROUBLE COUNTER
	Stores the number of times an Earth Fault has been detected since last reboot.
A115	EXCESSIVELY DIRTY (OUT OF RANGE)
	Stores the number of Excessively Dirty detectors.
A116	DIRTY SENSOR COUNTER
	Stores the number of Dirty detectors.
A117	ALMOST DIRTY COUNTER
	Stores the number of Almost Dirty detectors.

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