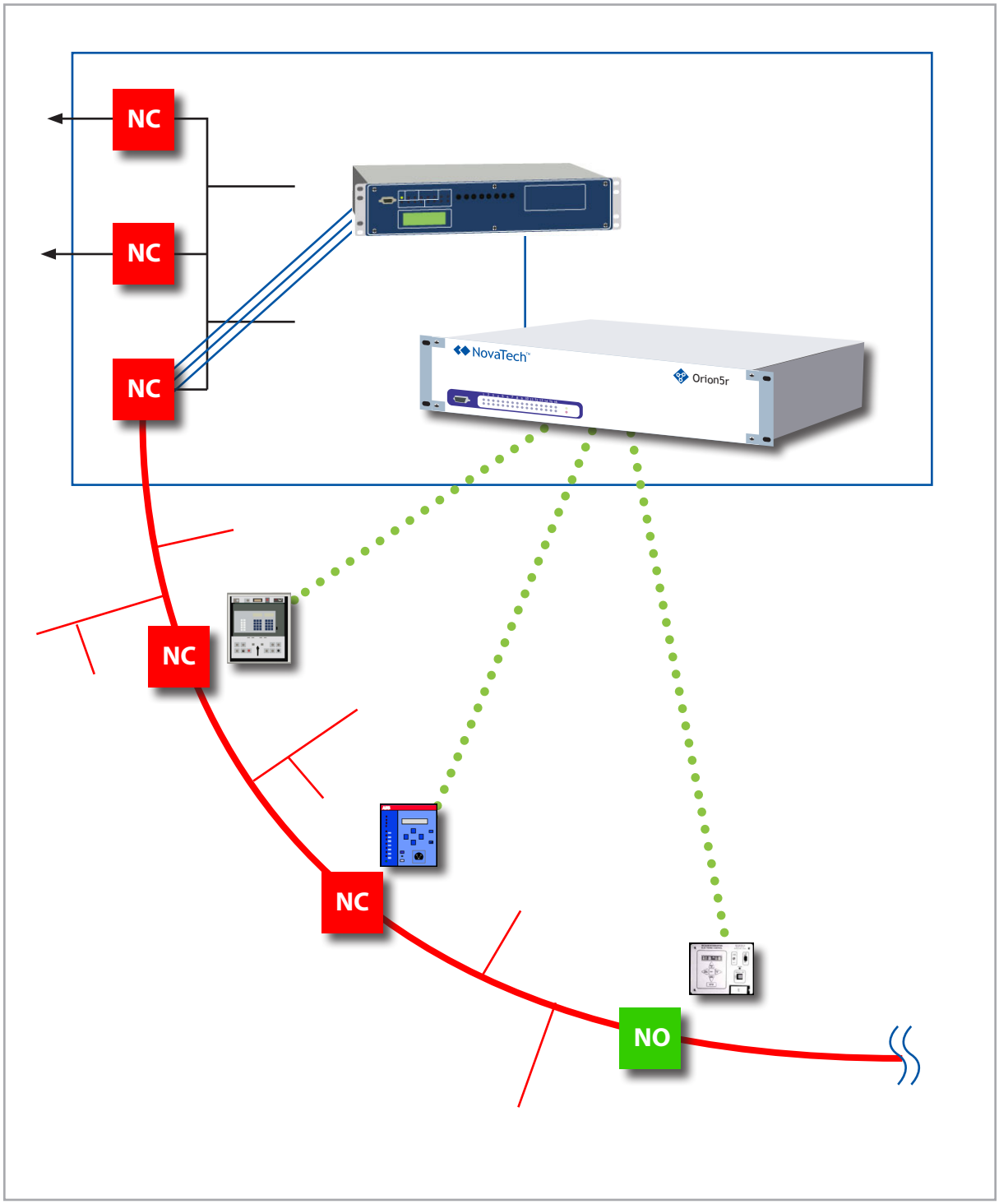
Distribution Automation
Orion Application Document



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Orion DA-Master Application Note

DA-Master is a software option available on the Orion5 and Orion5r Automation Platforms. Using point-and-click configuration techniques within NovaTech Communications Director (NCD), DA-Master reduces the complexity of setting up DA isolation and restoration schemes.

This note describes a typical, but simplified, Orion DA-Master application where a three-zone radial feeder, with an alternate source, is automated to minimize outage times.

Included in this note:

1) Description of DA system components
2) Breaking a feeder into Zones
3) Step-by-step details of the DA-Master response to four different fault conditions
4) NCD Configuration for these schemes

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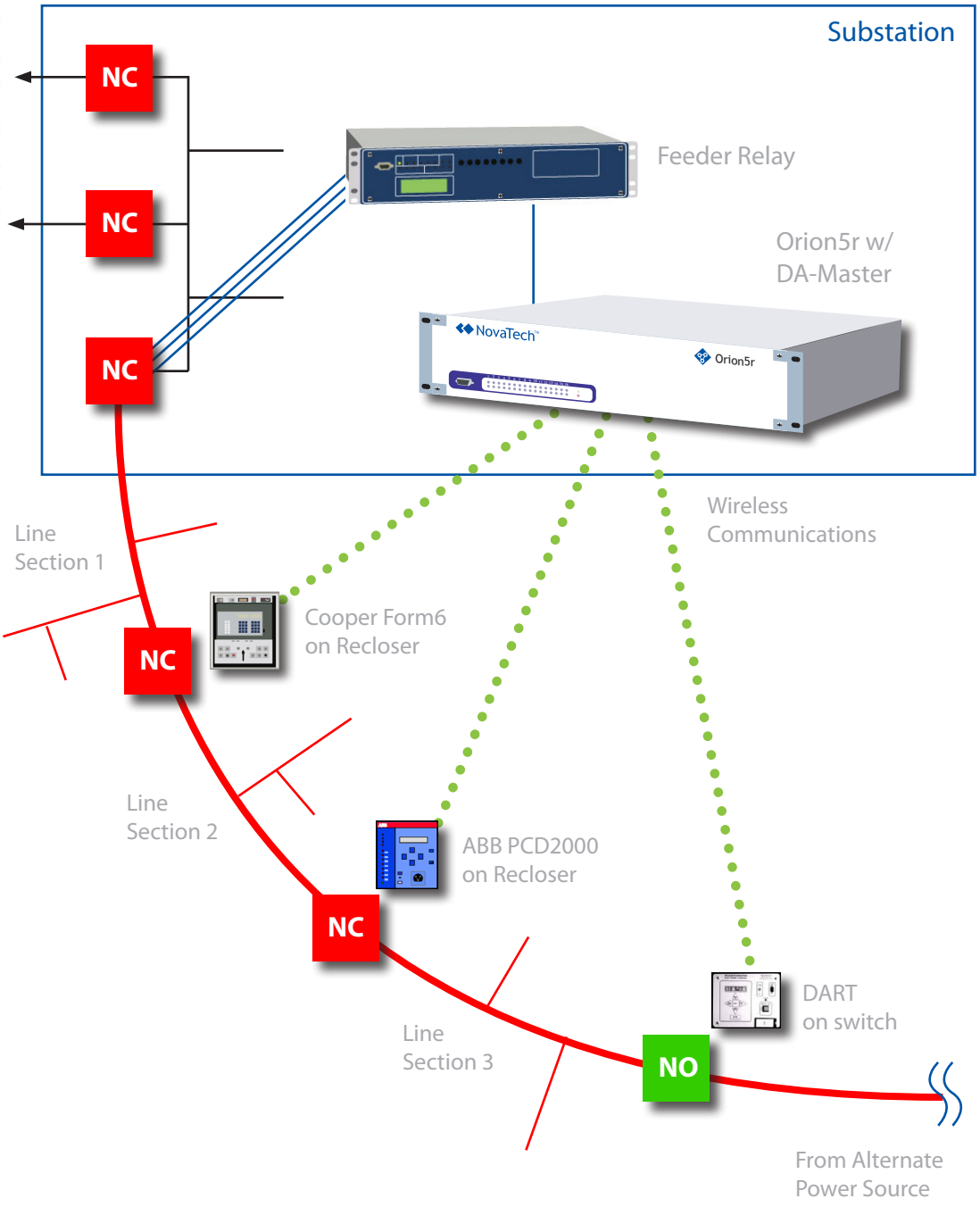
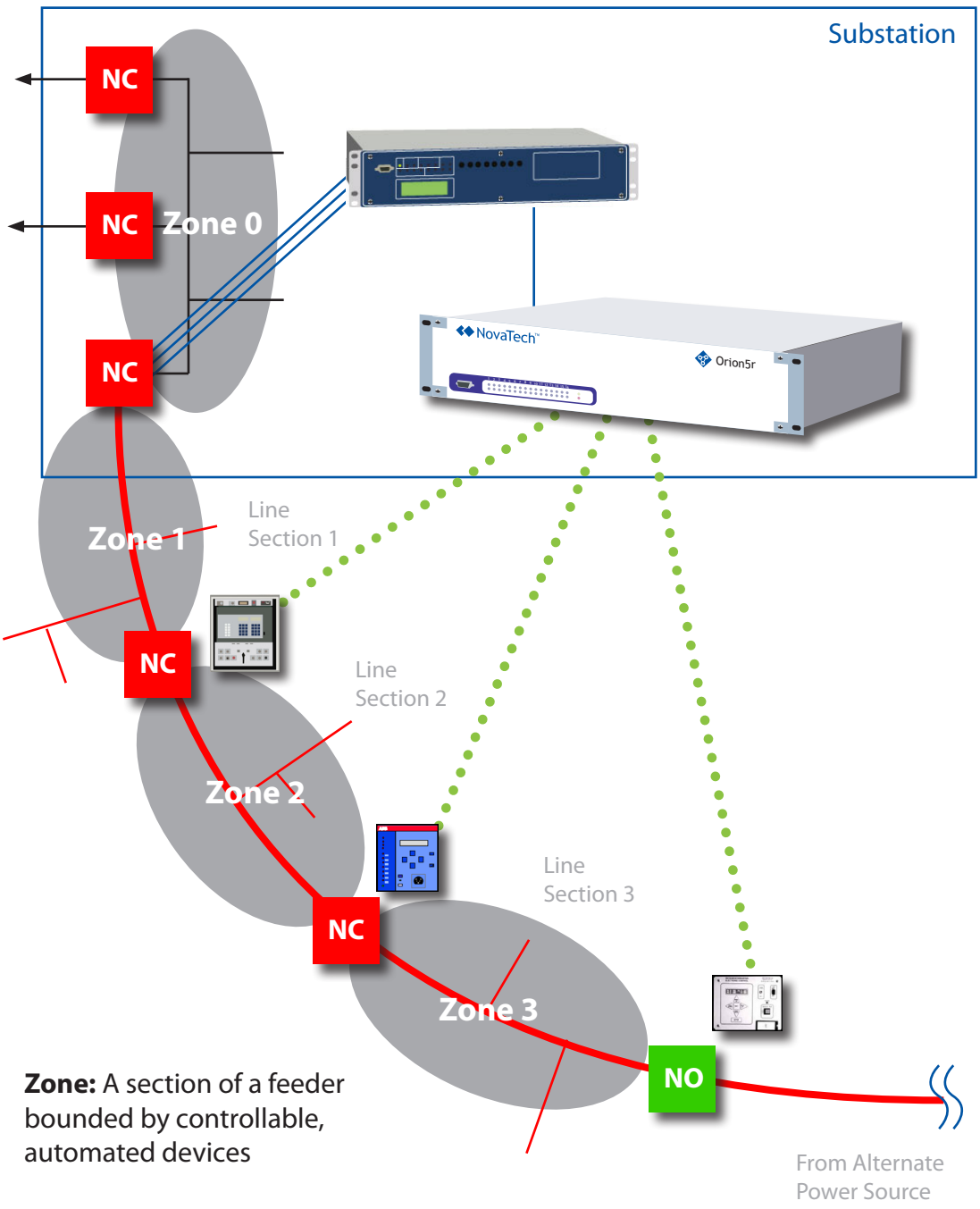
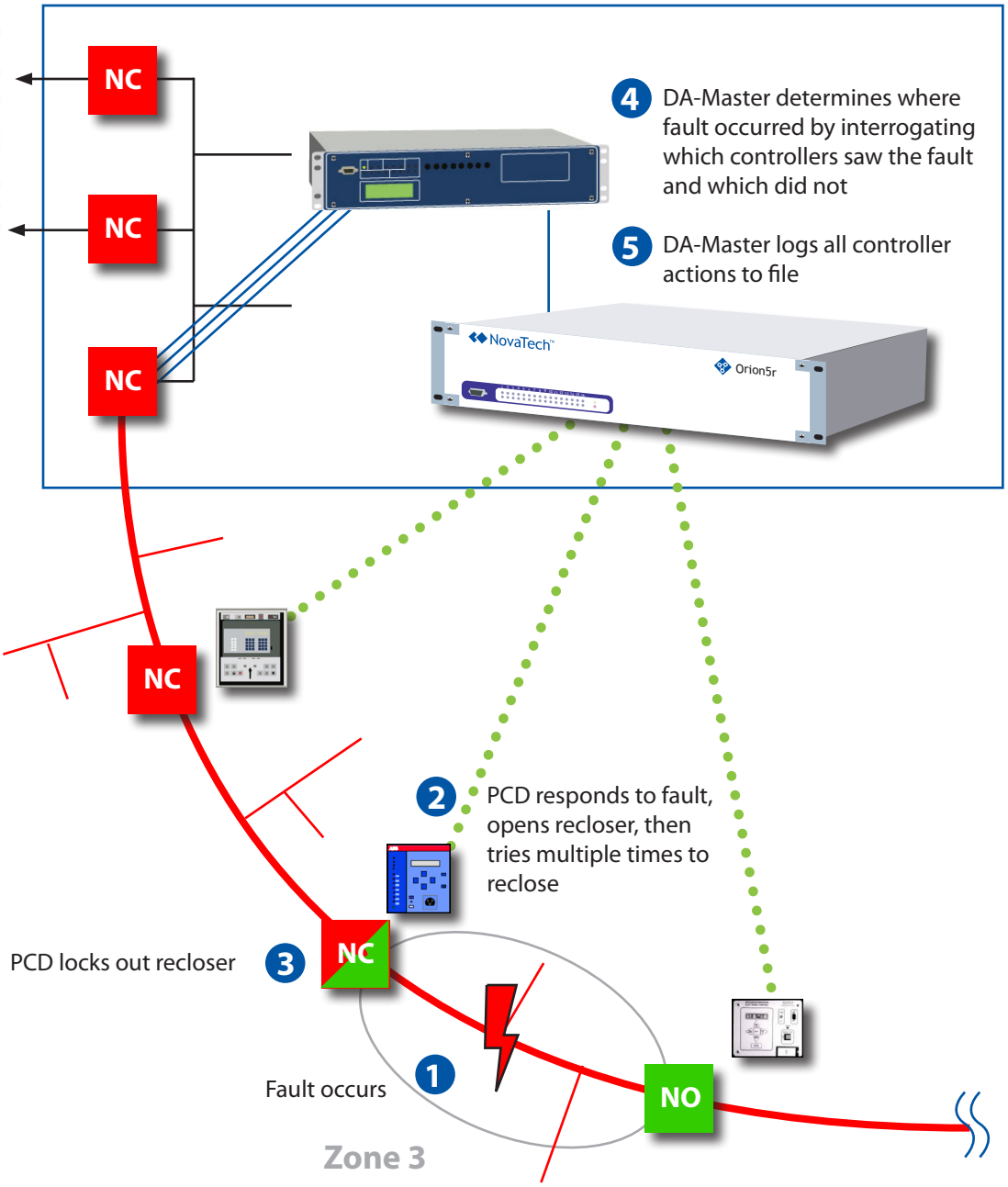

Substation
NC
NC
NC
Feeder Relay
Orion5r w/
DA-Master
NovaTech
Orion5r
Wireless
Communications
Line
Section 1
Cooper Form6
on Recloser
NC
Line
Section 2
ABB PCD2000
on Recloser
NC
DART
on switch
Line
Section 3
NO
From Alternate
Power Source



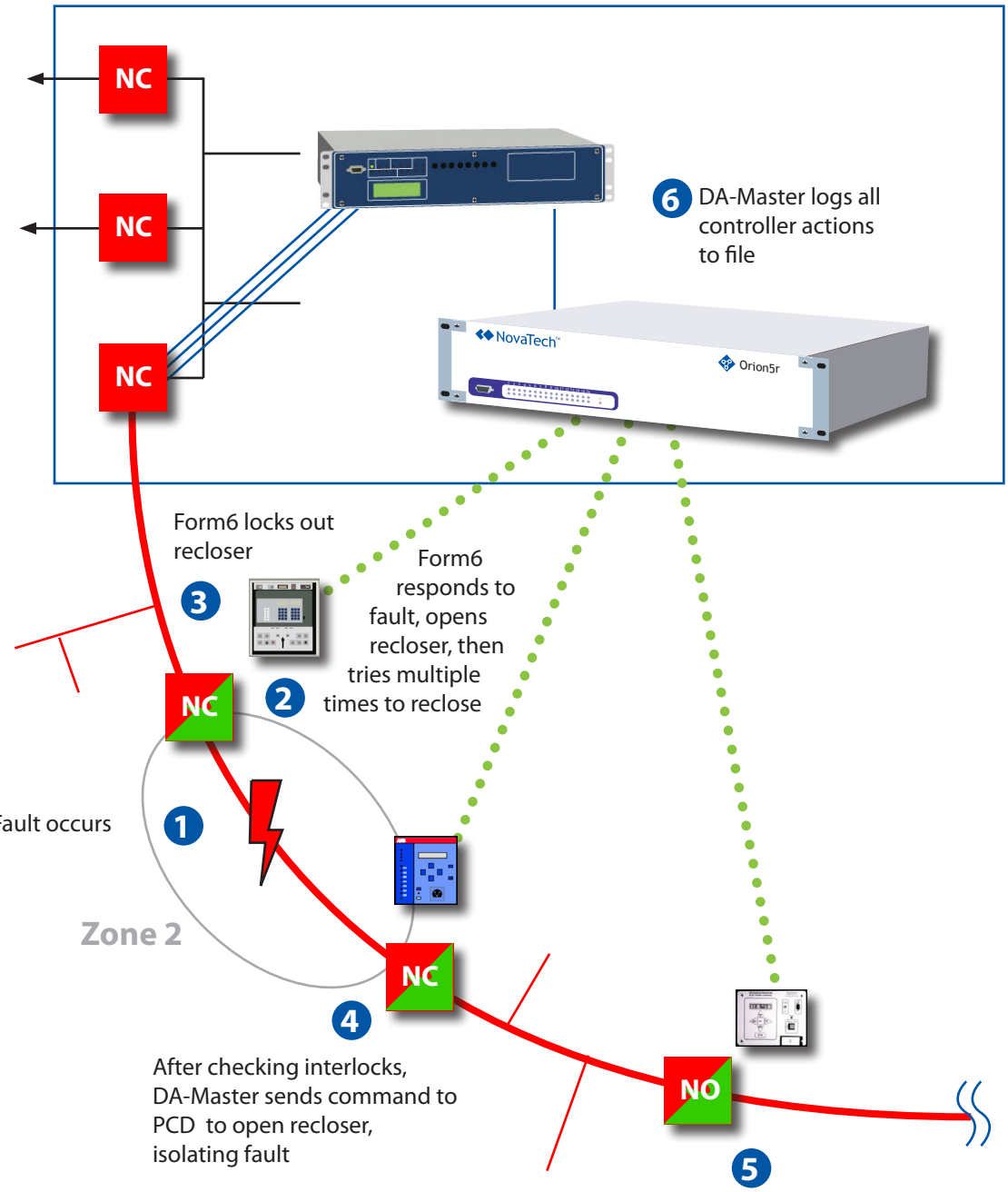
Zone: A section of a feeder bounded by controllable, automated devices

NOTE: The Bus Zone 0 is a special zone.

DA-Master Response to Permanent Zone 3 Fault (Automatic)



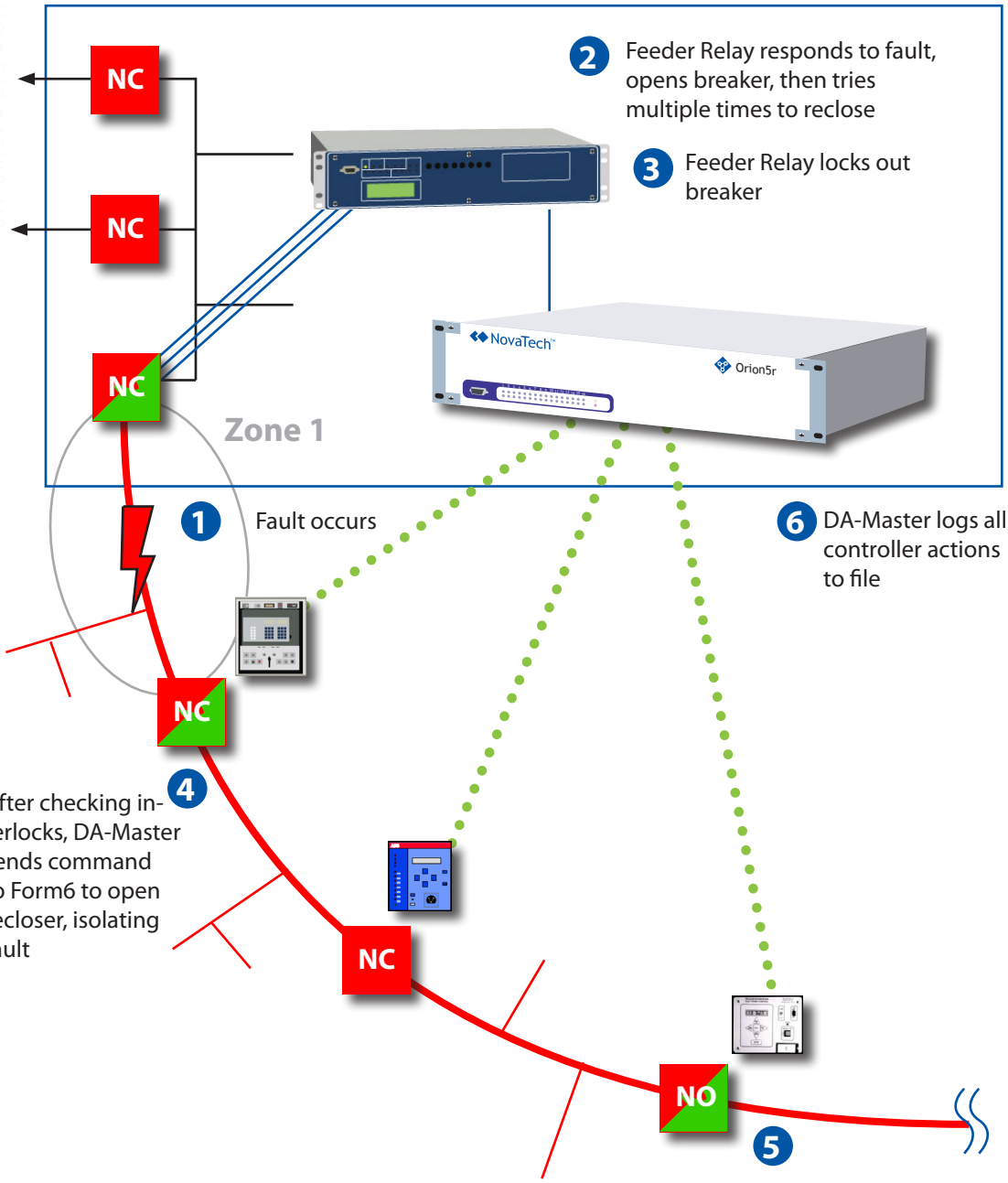
DA-Master Response to Permanent Zone 2 Fault (Automatic)



After checking interlocks, DA-Master sends command to DART to close switch, restoring service to unfaulted section

DA-Master can check pre-fault loads to ensure alternate power source can pick up load.

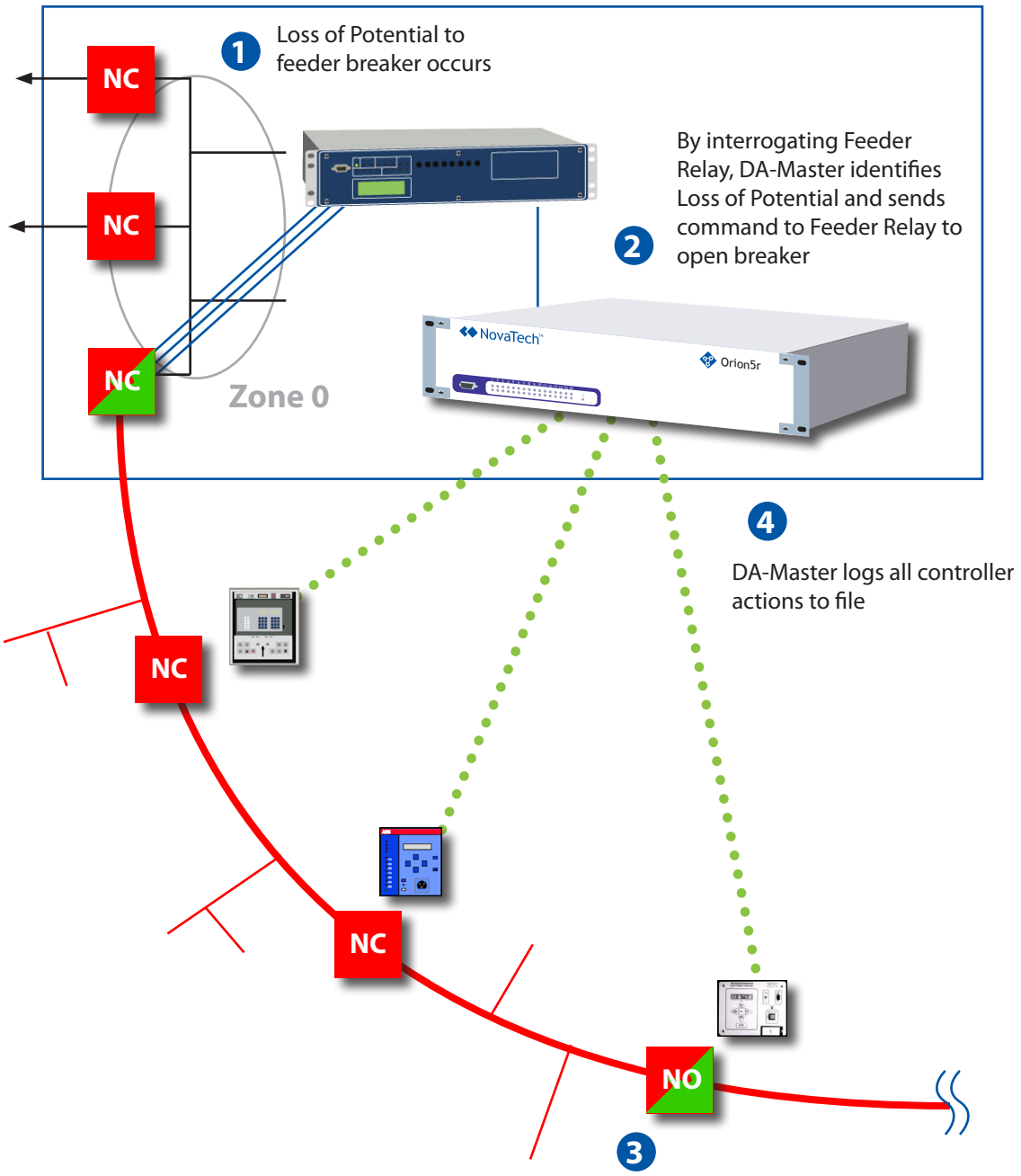
DA-Master Response to Permanent Zone 1 Fault (Automatic)



After checking interlocks, DA-Master sends command to DART to close switch, restoring service to unfaulted section

DA-Master can check pre-fault loads to ensure alternate power source can pick up load.

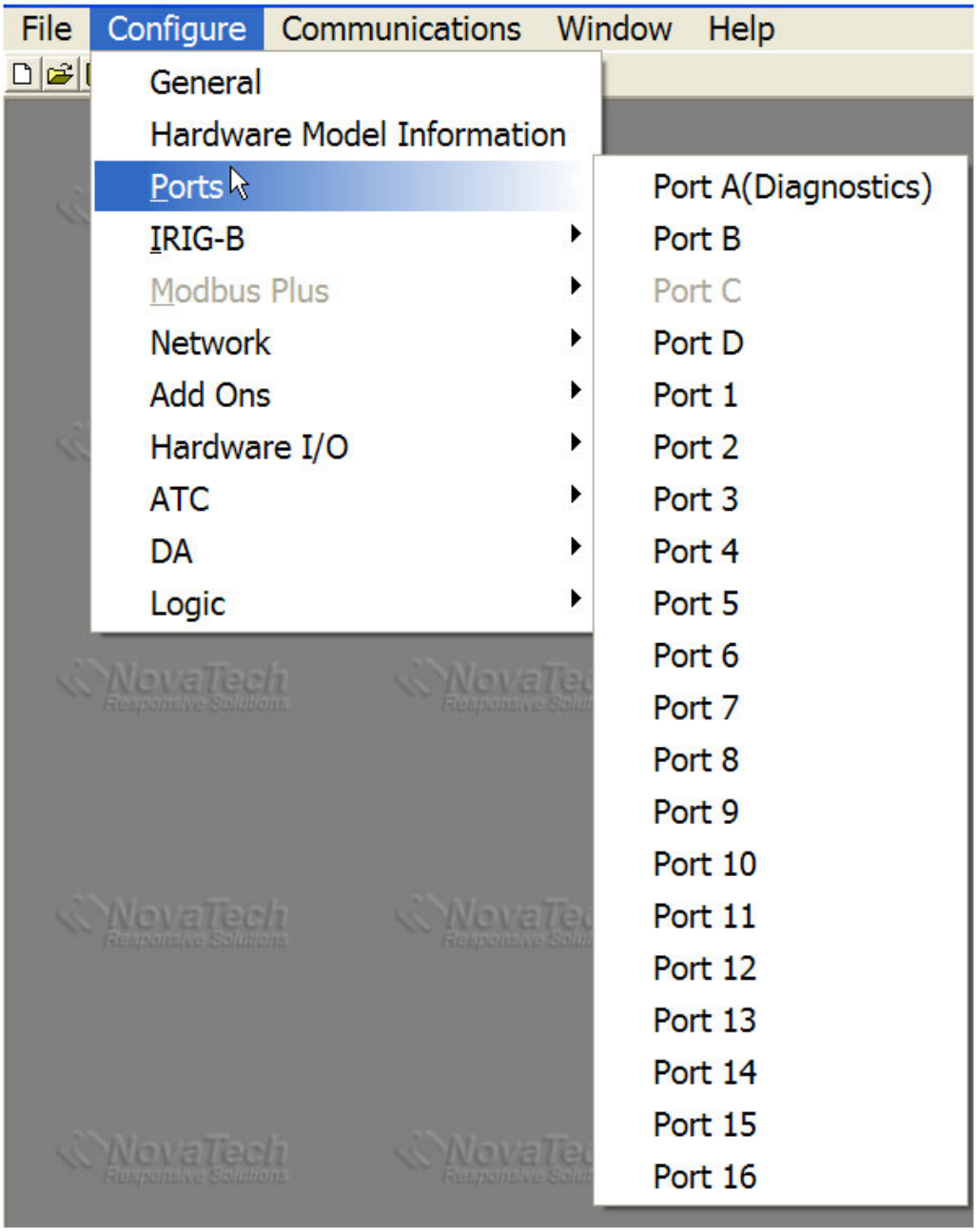
DA-Master Response to Bus Zone 0 Fault - Loss of Potential (Automatic)



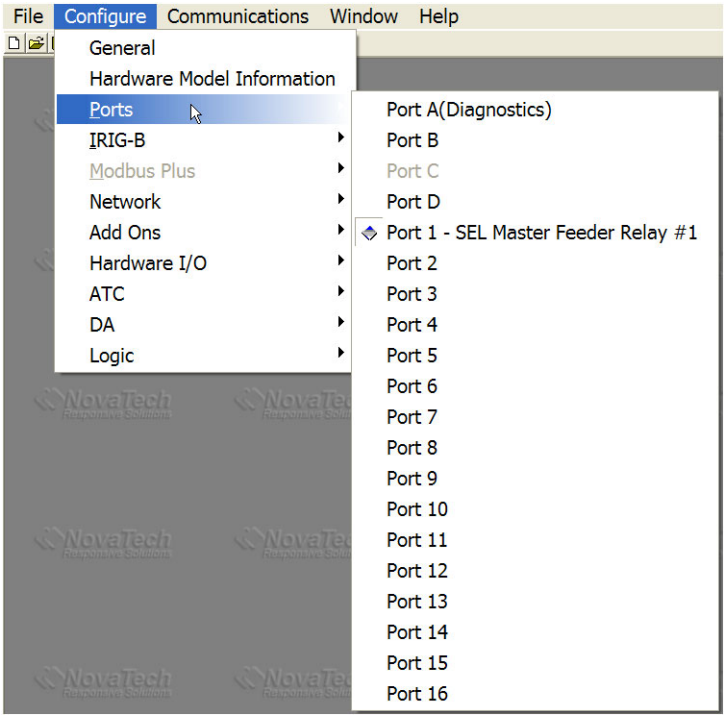
After checking interlocks, DA-Master sends command to DART to close switch, restoring service to unfaulted feeder.

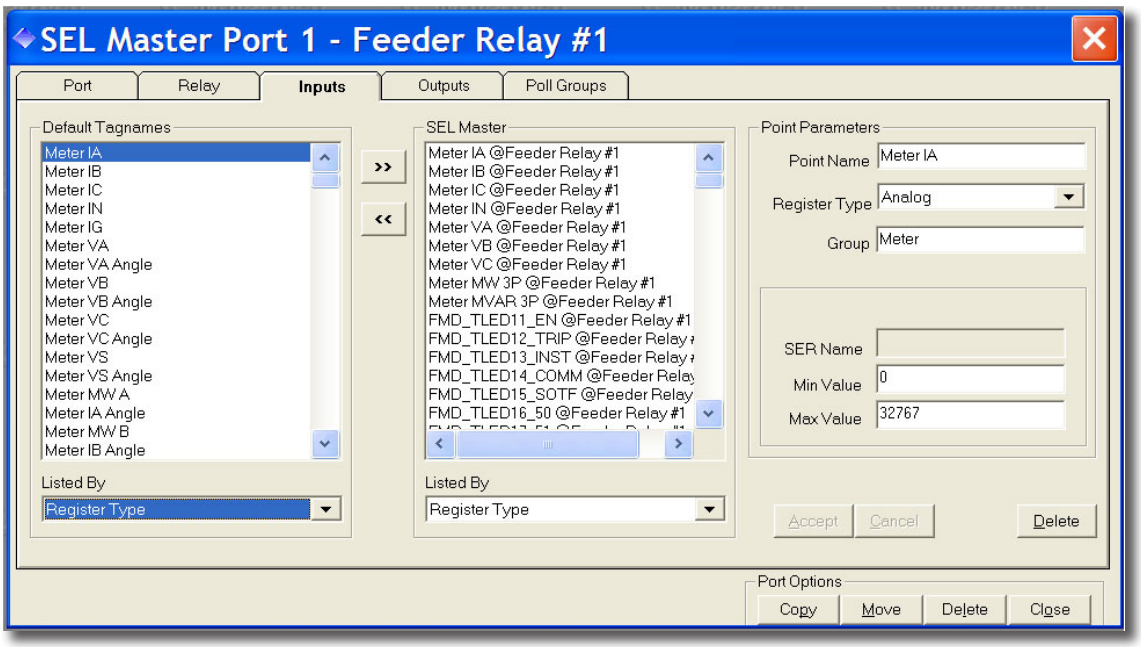
DA-Master can check pre-fault loads to ensure alternate power source can pick up load.

1. Open new NCD configuration.

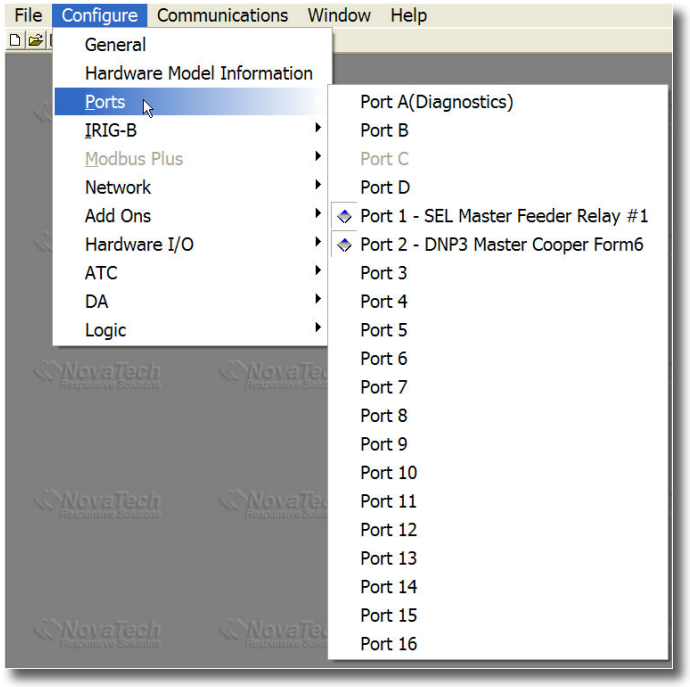


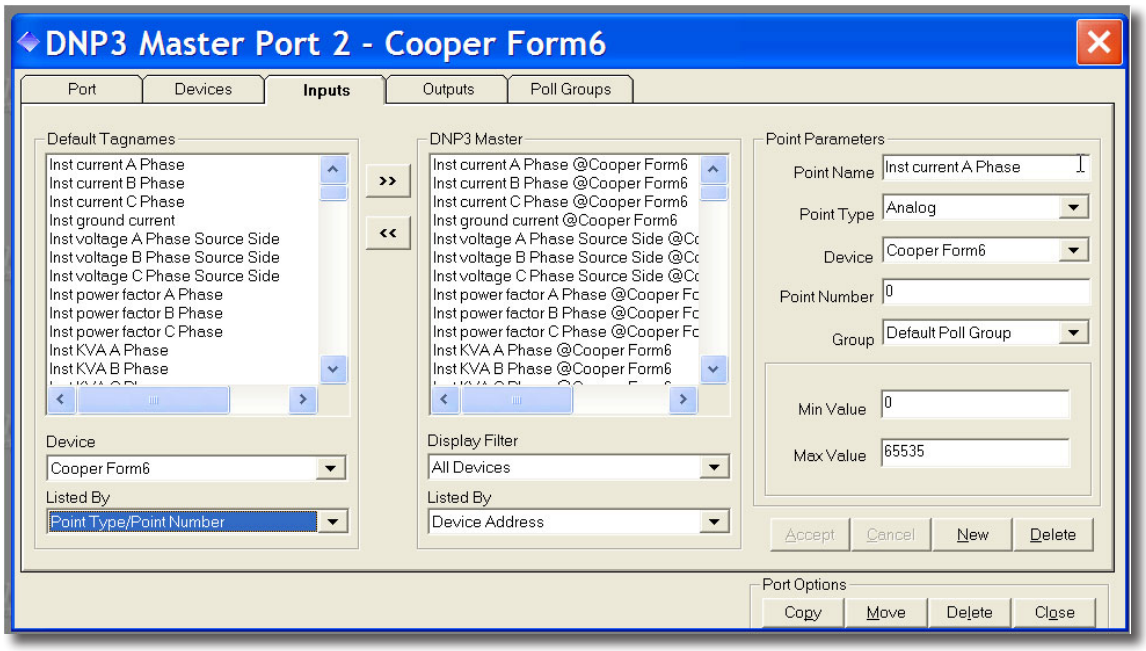
2. Configure points to be read from and written to SEL® Feeder Relay.



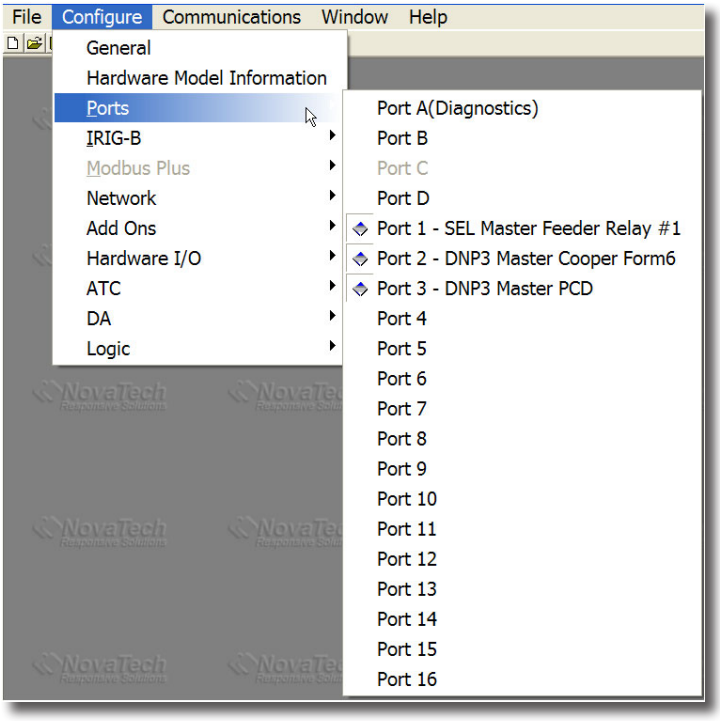


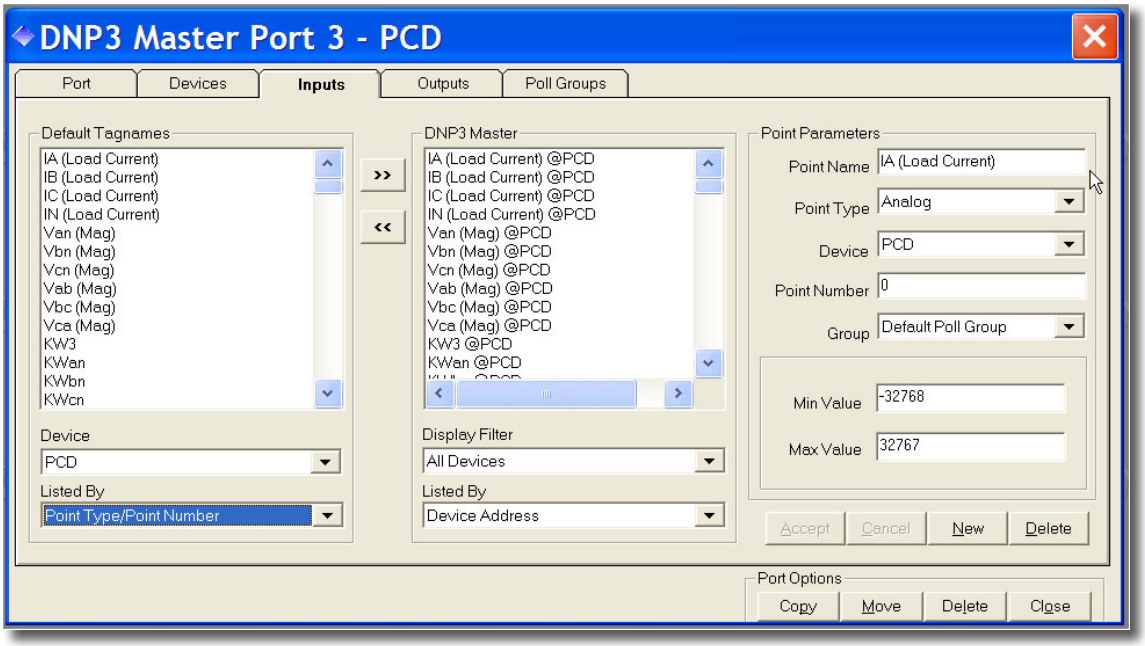
3. Configure points to be read from and written to Cooper Form6.



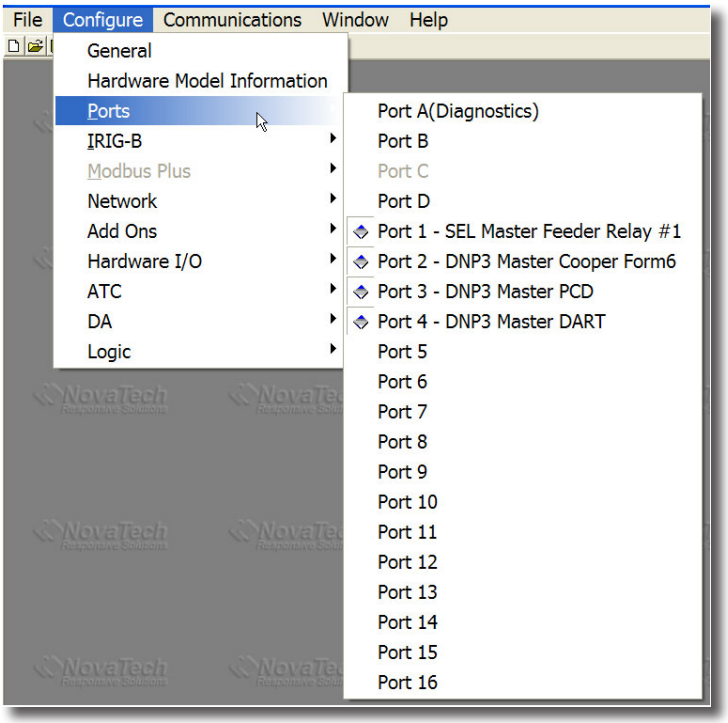


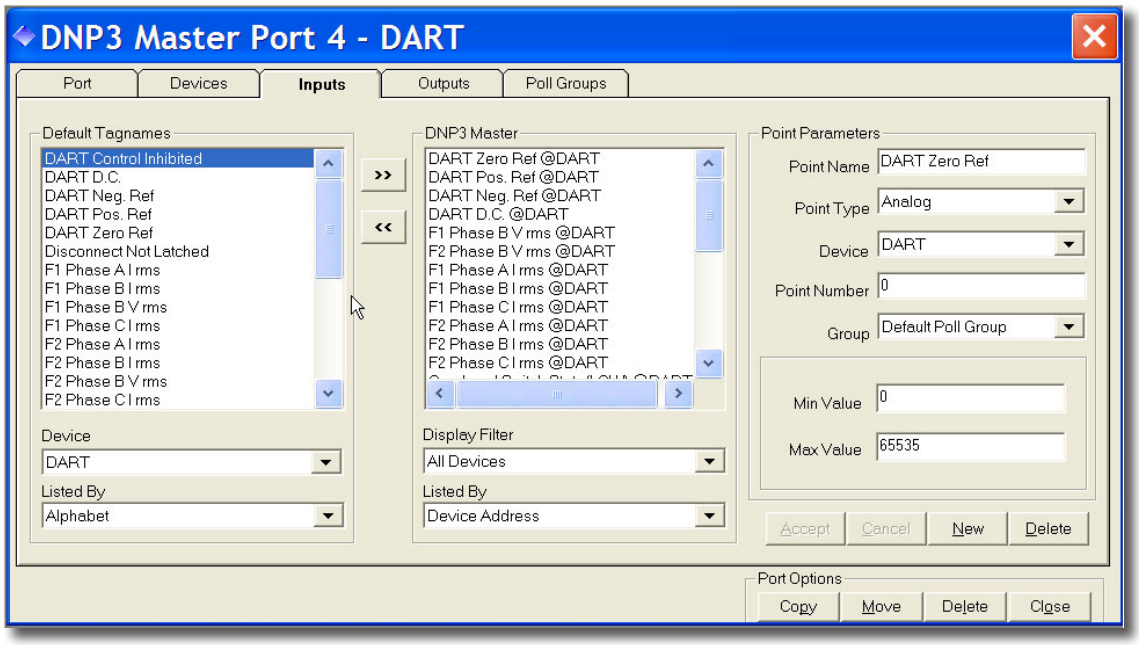
4. Configure points to be read from and written to PCD.



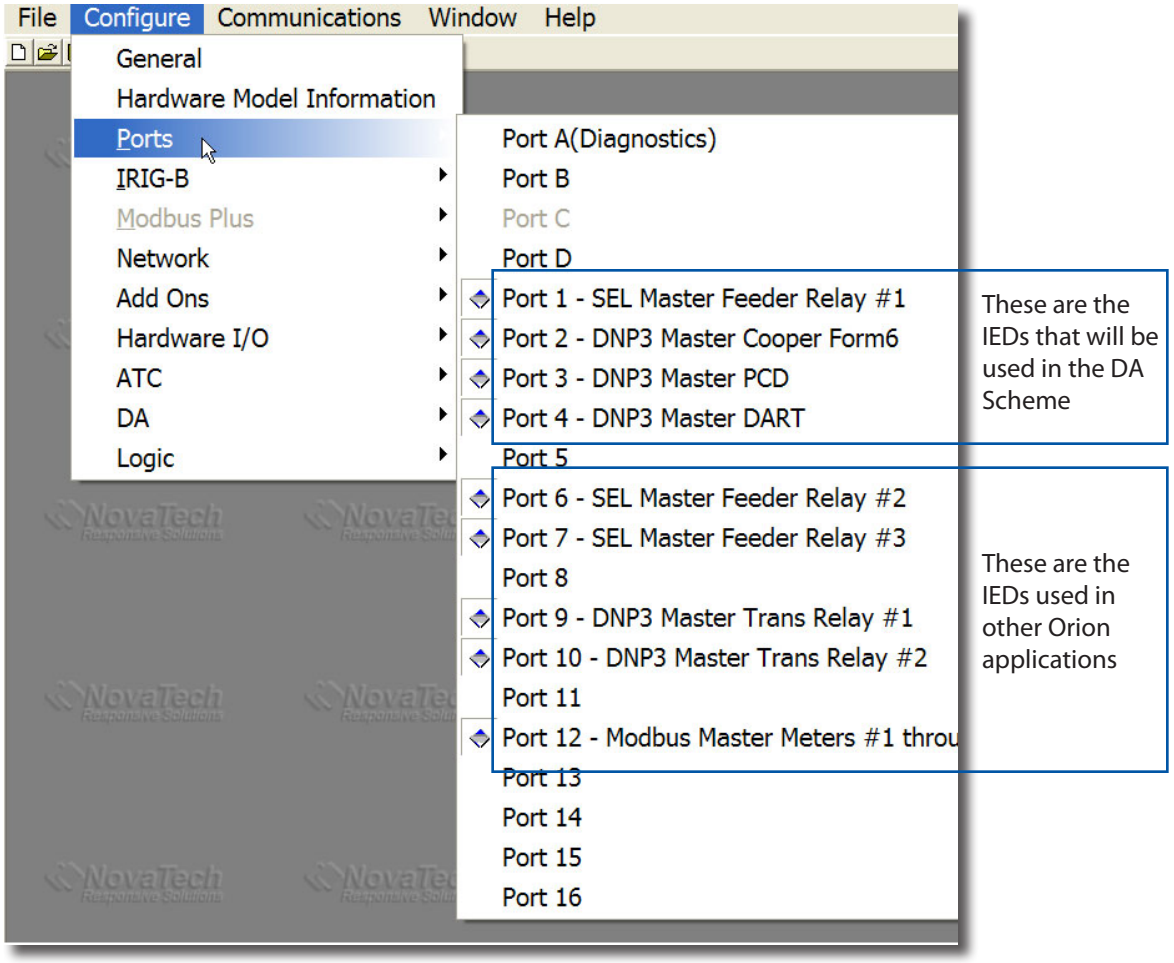


4. Configure points to be read from and written to DART.

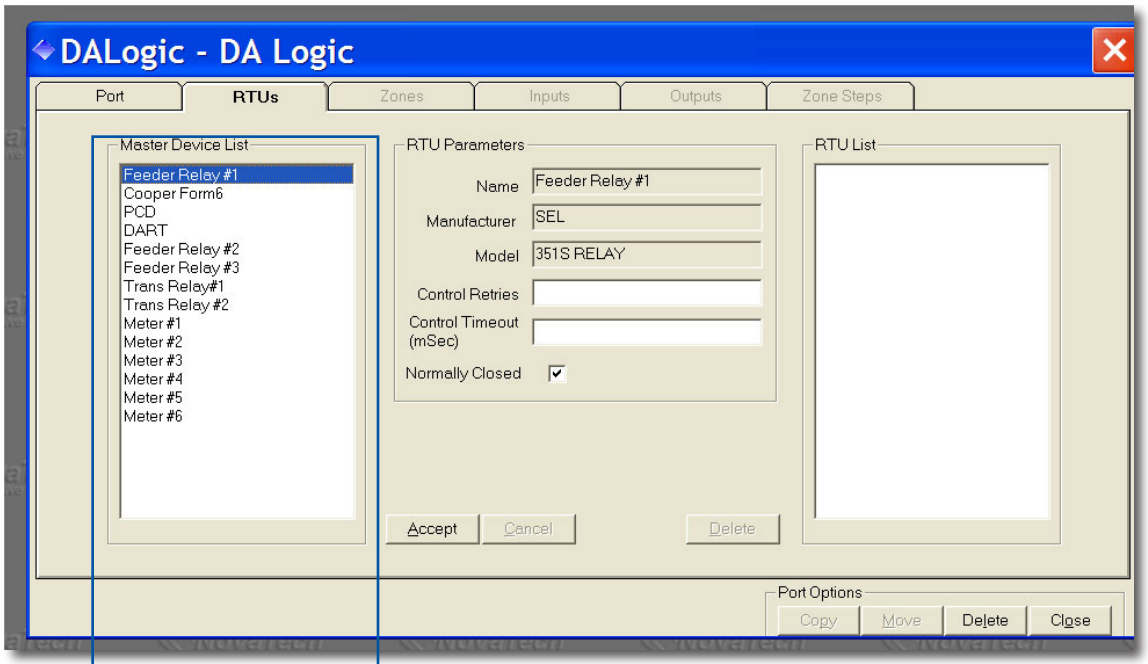




5. Complete configuration of points to be read from and written to IEDs.

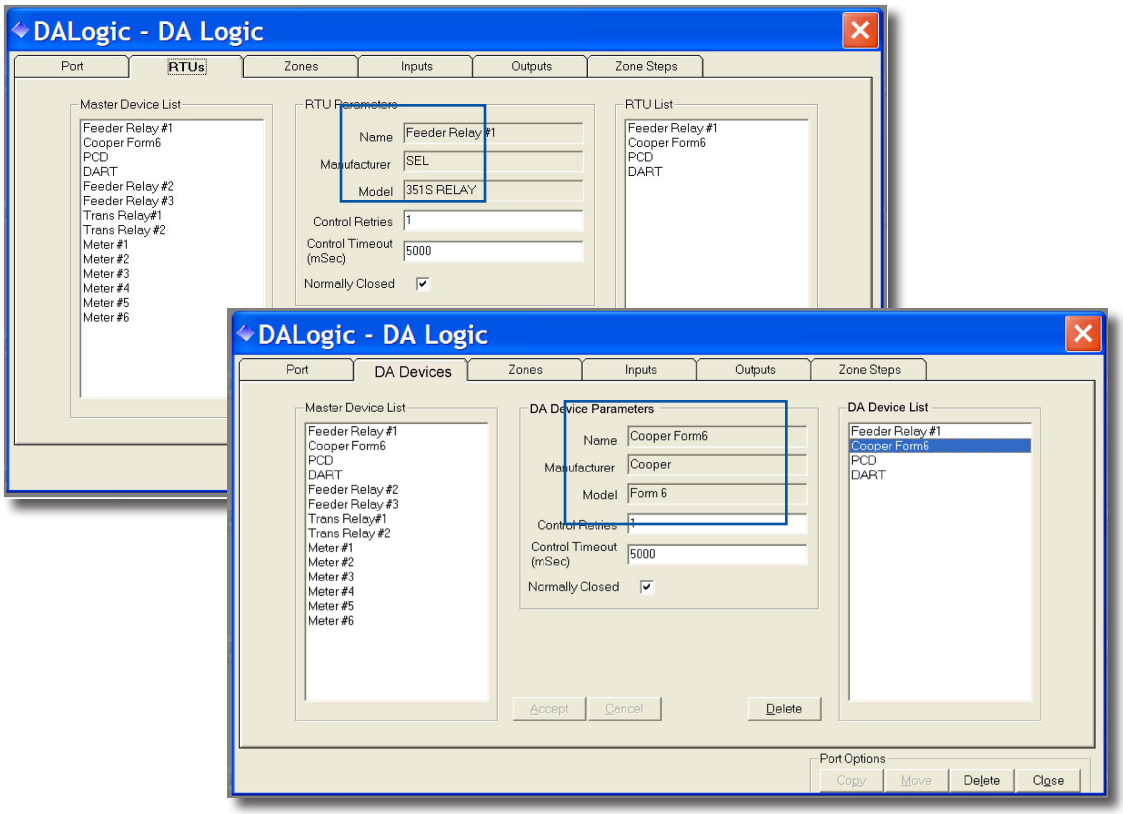


6. Select DA Configuration

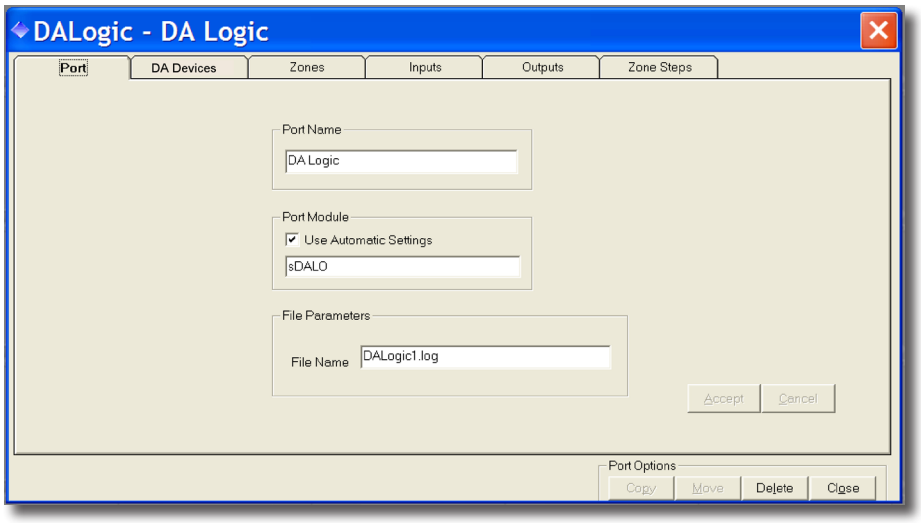


These are all of the IEDs in this configuration

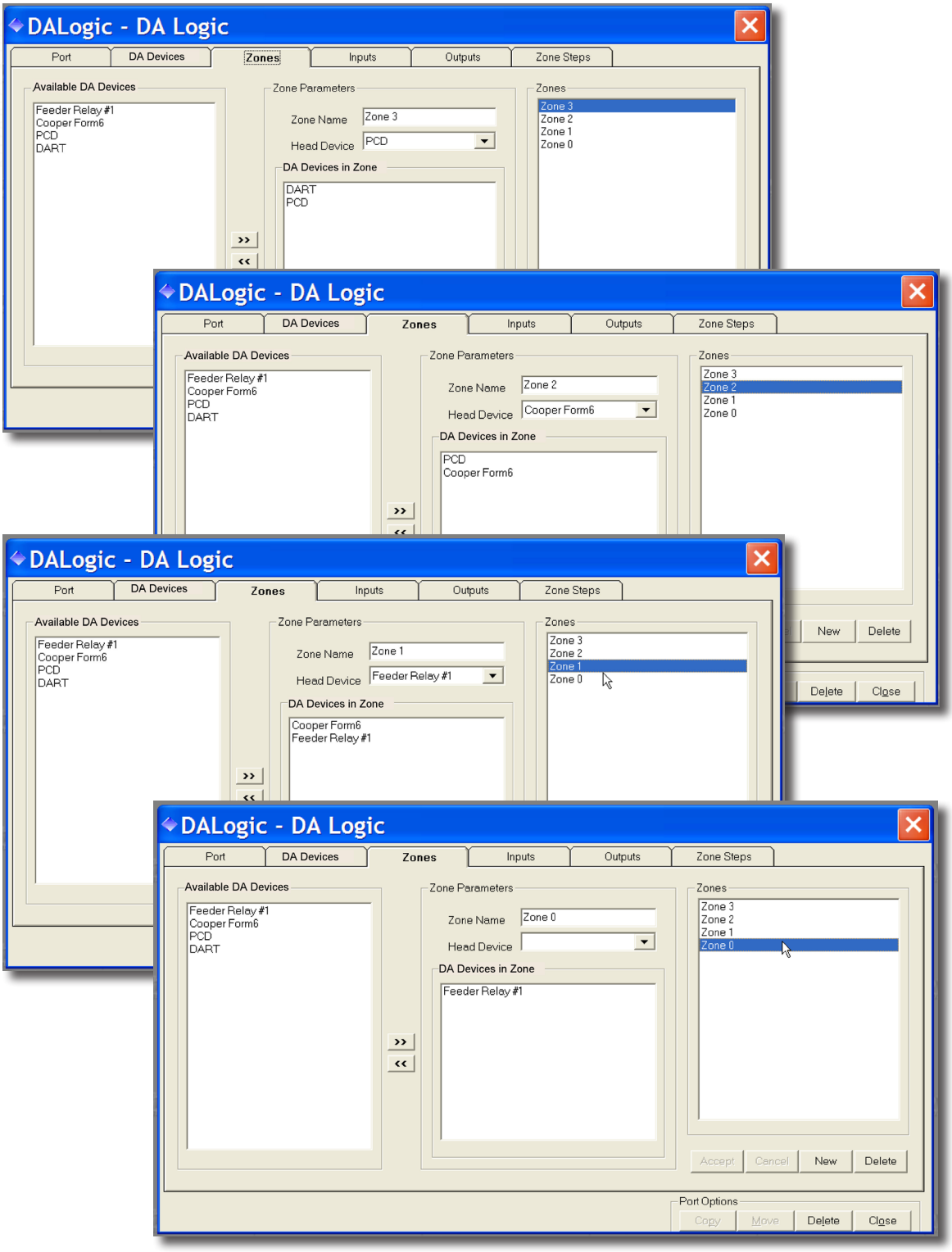
6. Select the IEDs to be used in the DA scheme and configure parameters.



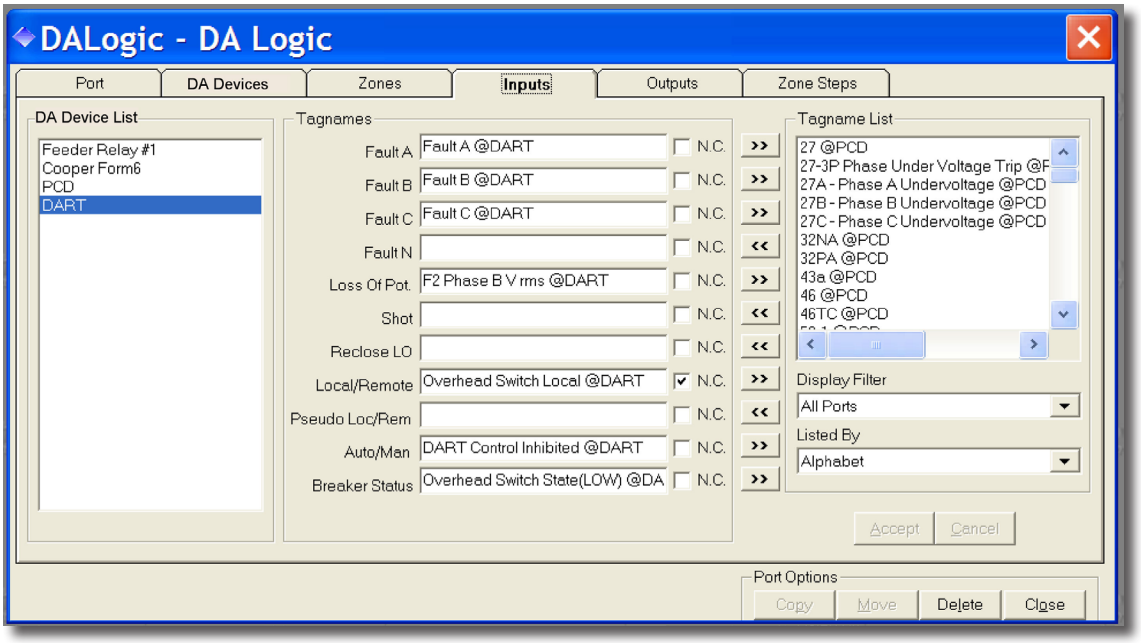
7. "Port" tab parameters. Note .log file name



8. Define IEDs in each zone



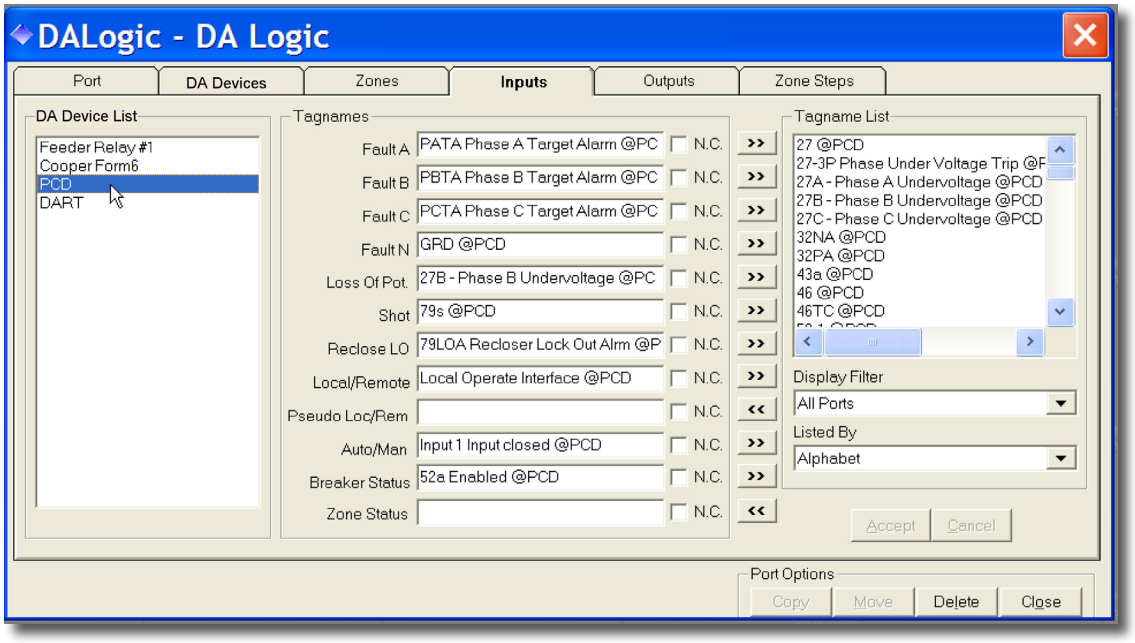
9. Select the "Inputs" needed from the DART for DA-Master logic to operate.



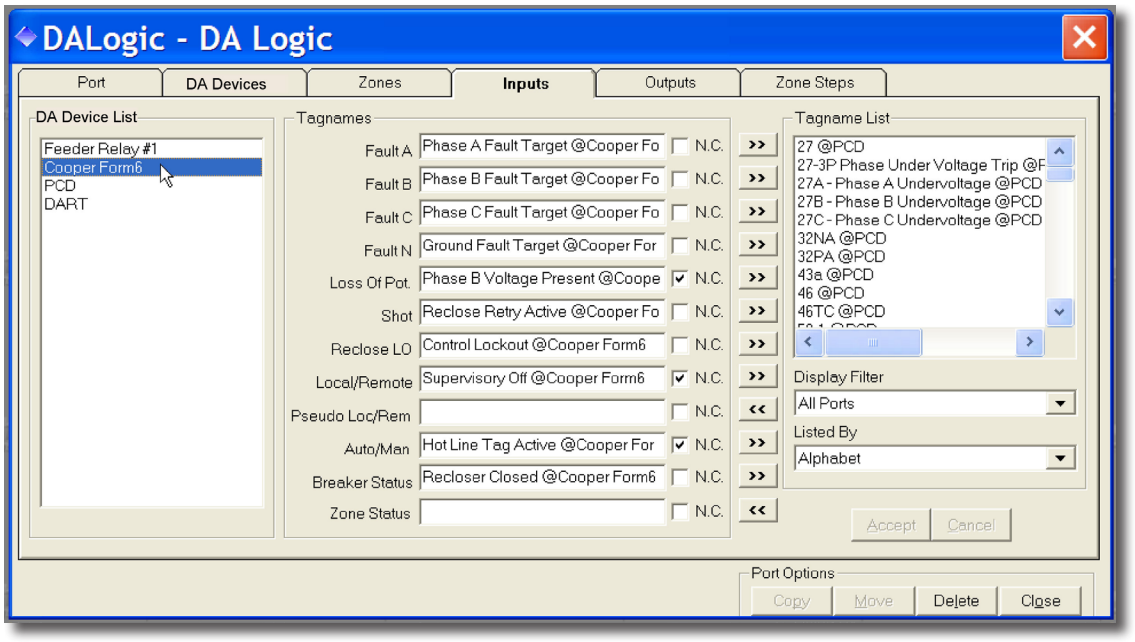
NOTE: Not all IEDs can present all points. As a minimum, DA-Master logic requires:

- Indication of whether fault was seen
- Recloser/Switch position
- Recloser/Switch LO (lock out) for non-tie points
- Loss of potential (voltage) for Bus Zone

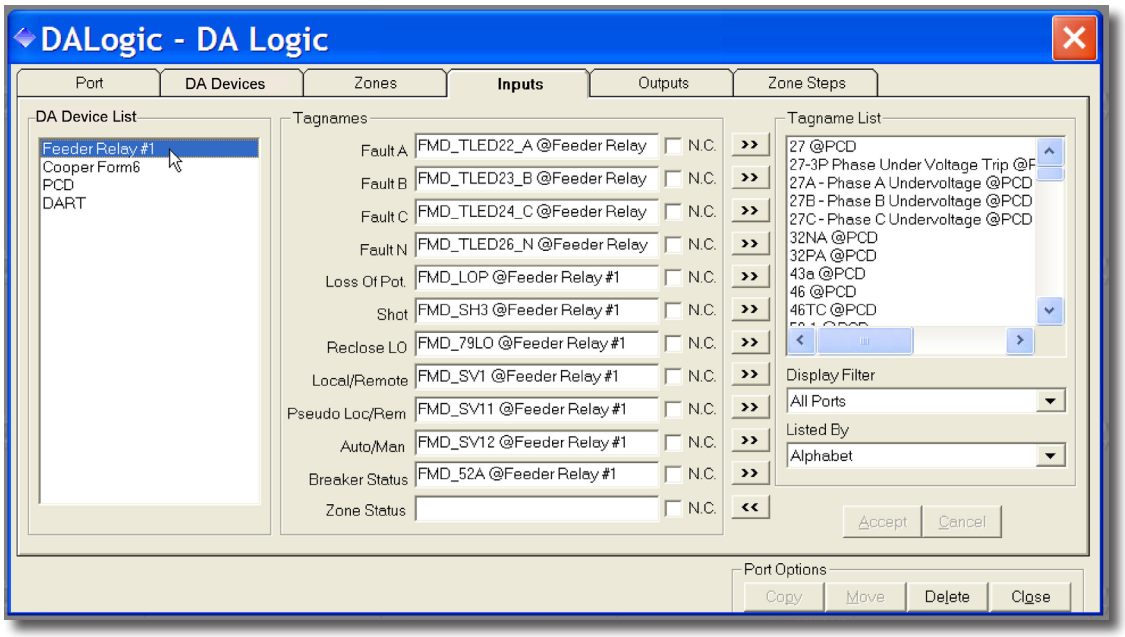
10. Select the "Inputs" needed from the PCD for DA-Master logic to operate.



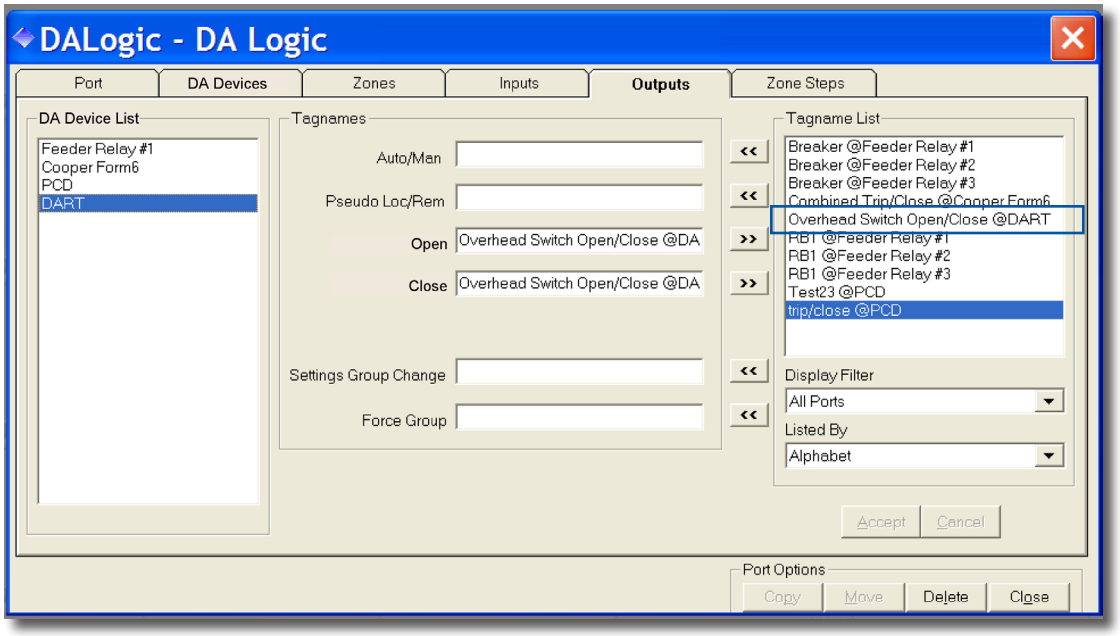
11. Select the "Inputs" needed from the Cooper Form6 for DA-Master logic to operate.



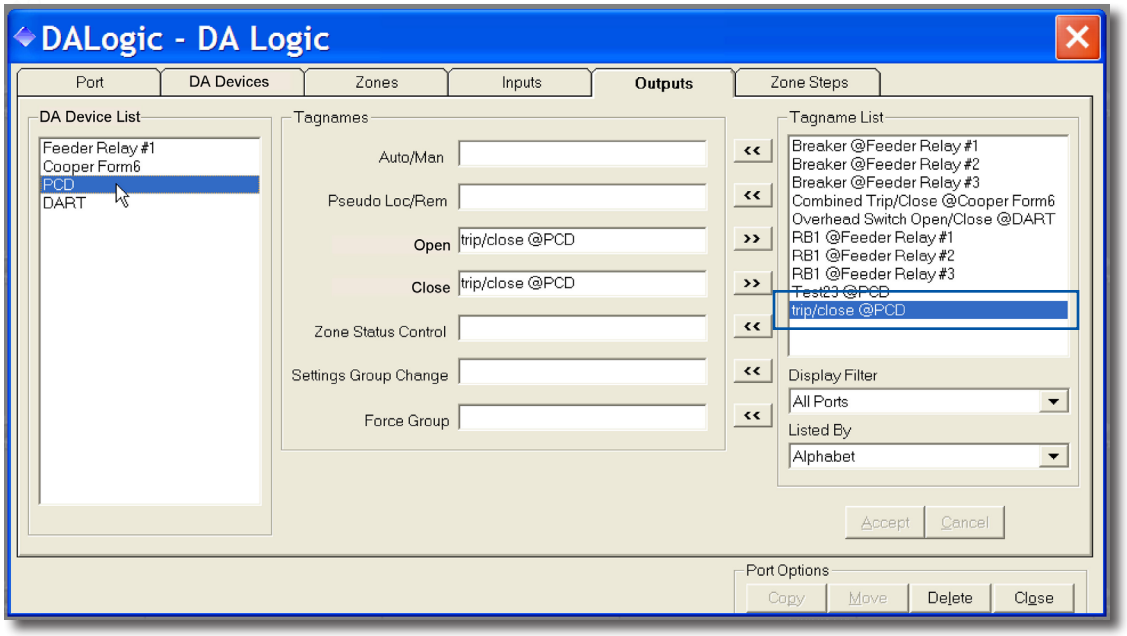
12. Select the "Inputs" needed from the Feeder Relay for DA-Master logic to operate.



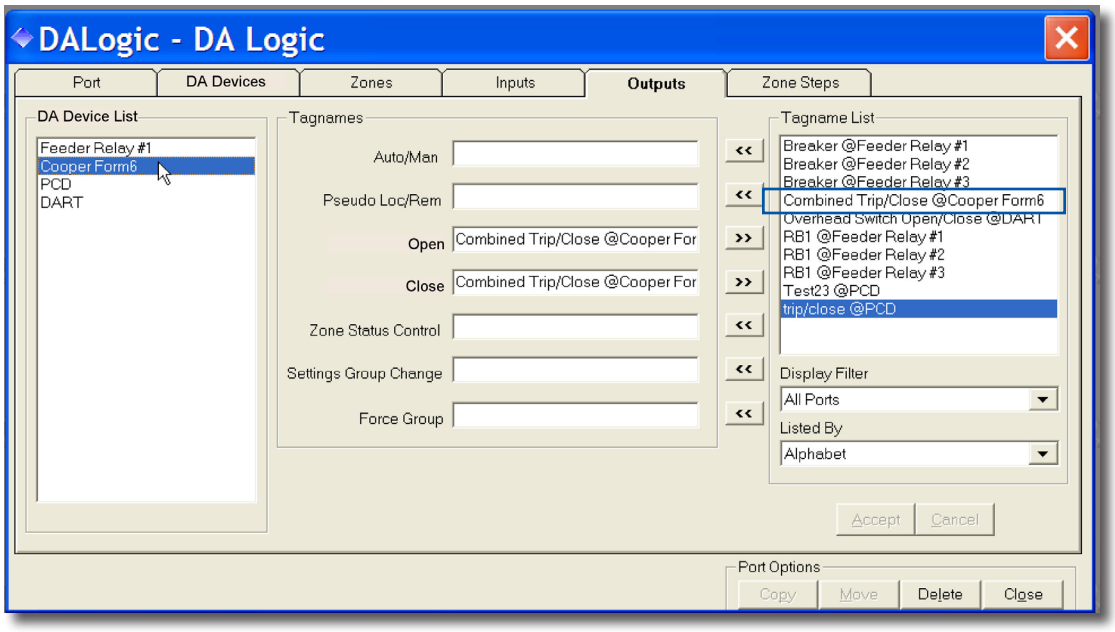
13. Select the "Outputs" to control the DART.



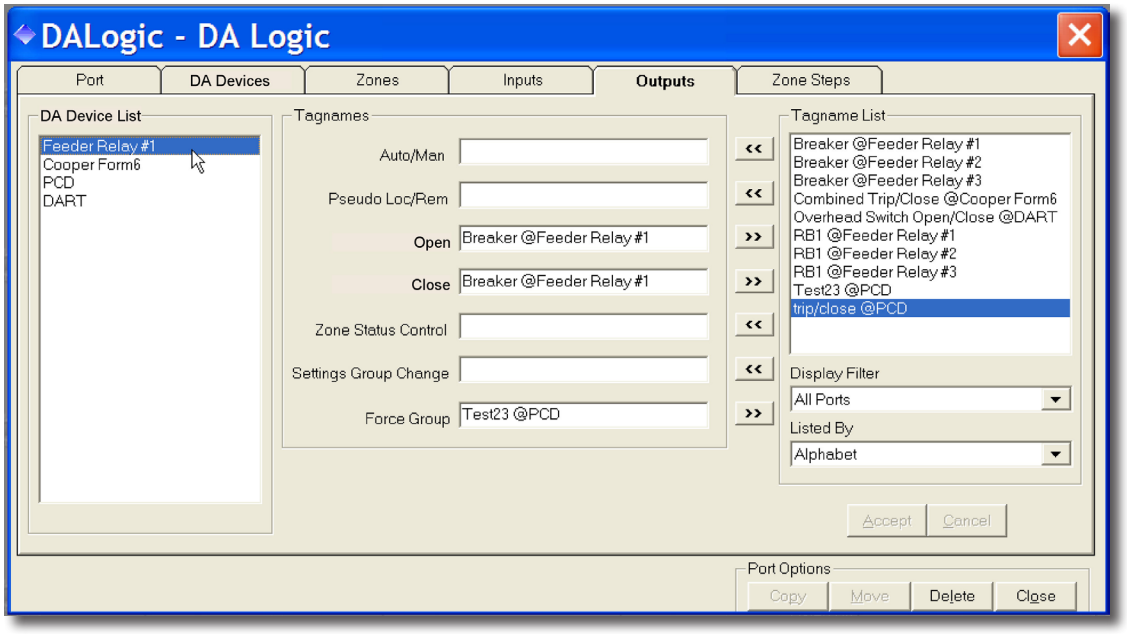
14. Select the "Outputs" to control the PCD.



15. Select the "Outputs" to control the Cooper Form6.



16. Select the "Outputs" to control the Feeder Relay.



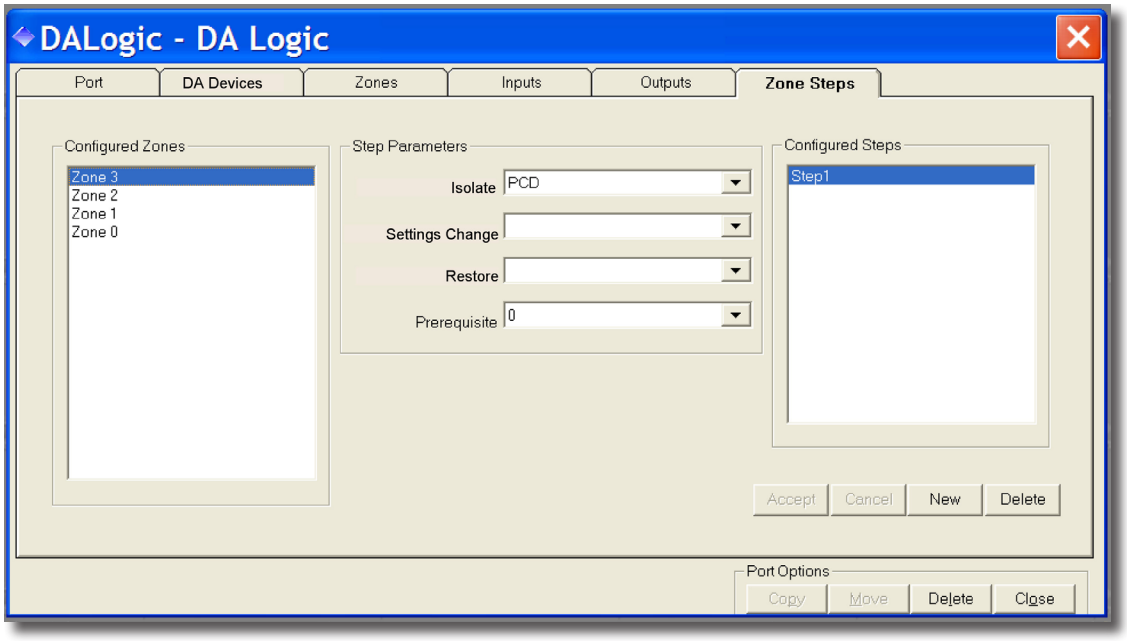
17. Define Zone 3 steps:

For **Zone 3**, only one step is required.

Select the PCD as the IED that must isolate the fault from the source. Even though this is an automatic step, it is checked by DA-Master.

NOTE: There is no IED to control to "Restore Unfaulted Section".

As setting change can optionally be forced on any of the IEDs to accommodate a change in the line characteristics.



18. Define Zone 2 steps:

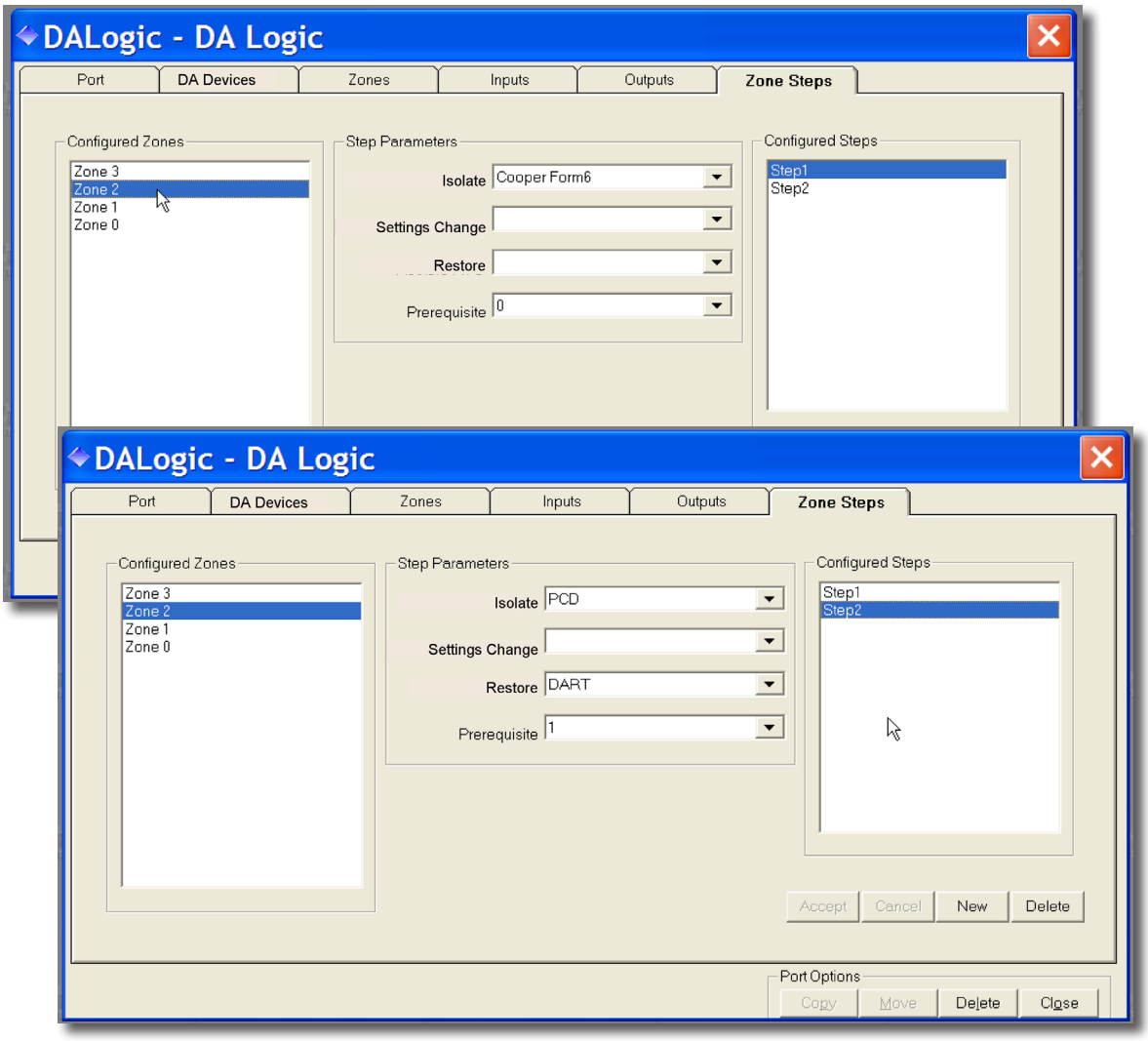
For **Zone 2**, two steps are required to isolate and restore service to the unfaulted section.

For **Step 1**, select the Cooper Form6 as the IED that must isolate the fault from the source. Even though this is an automatic step, it is checked by DA-Master.

For **Step 2**, select the PCD as the IED that must isolate the other end of the zone.

Select the DART as the IED that must restore service.

A settings change can optionally be forced on any of the IEDs to accomodate a change in the line characteristics.



19. Define Zone 1 steps

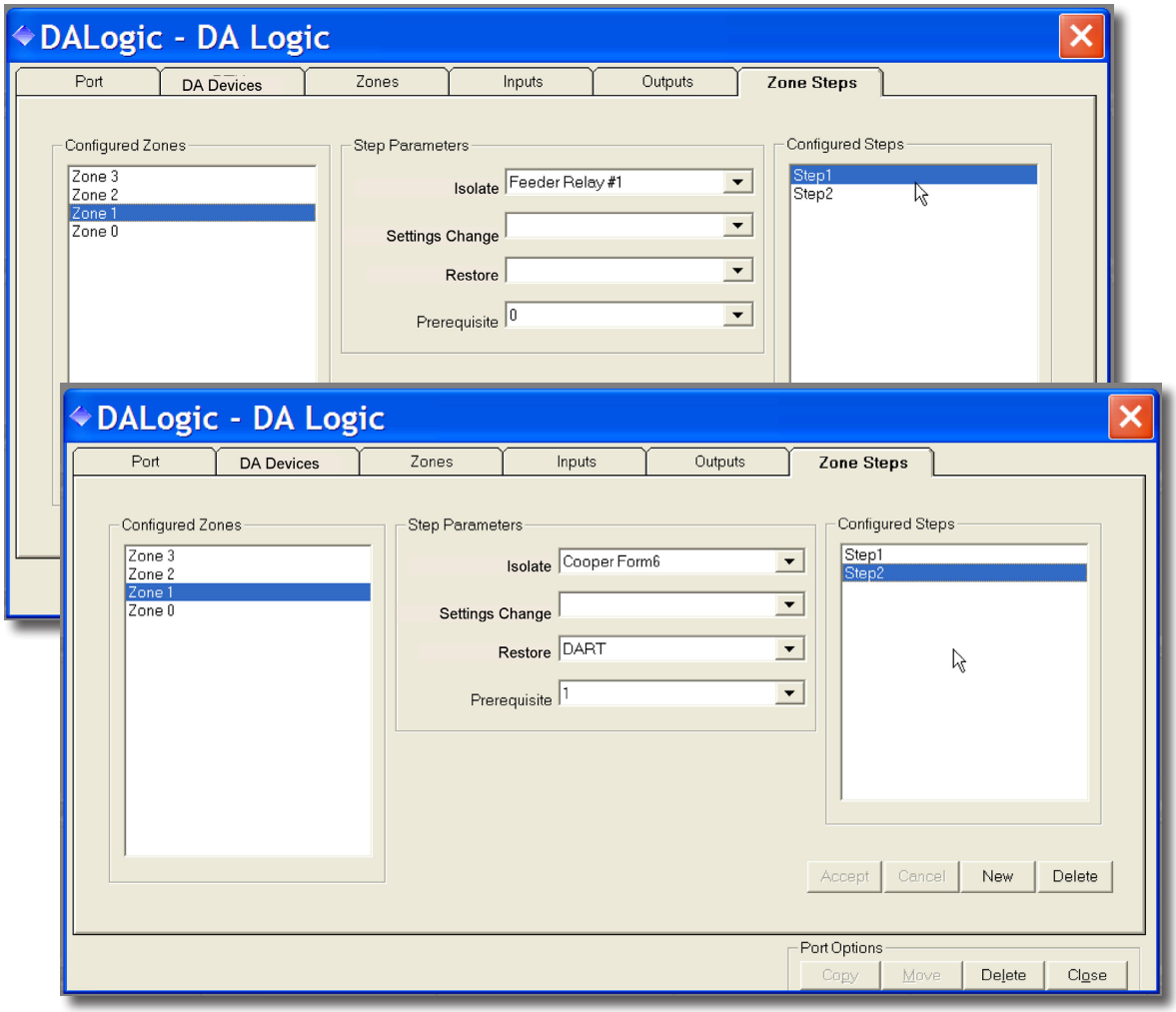
For **Zone 1**, two steps are required to isolate and restore service to the unfaulted section.

For **Step 1**, select the Feeder Relay as the IED that must isolate the fault from the source. Even though this is an automatic step, it is checked by DA-Master.

For **Step 2**, select the Cooper Form6 as the IED that must isolate the other end of the zone.

Select the DART as the IED that must restore service.

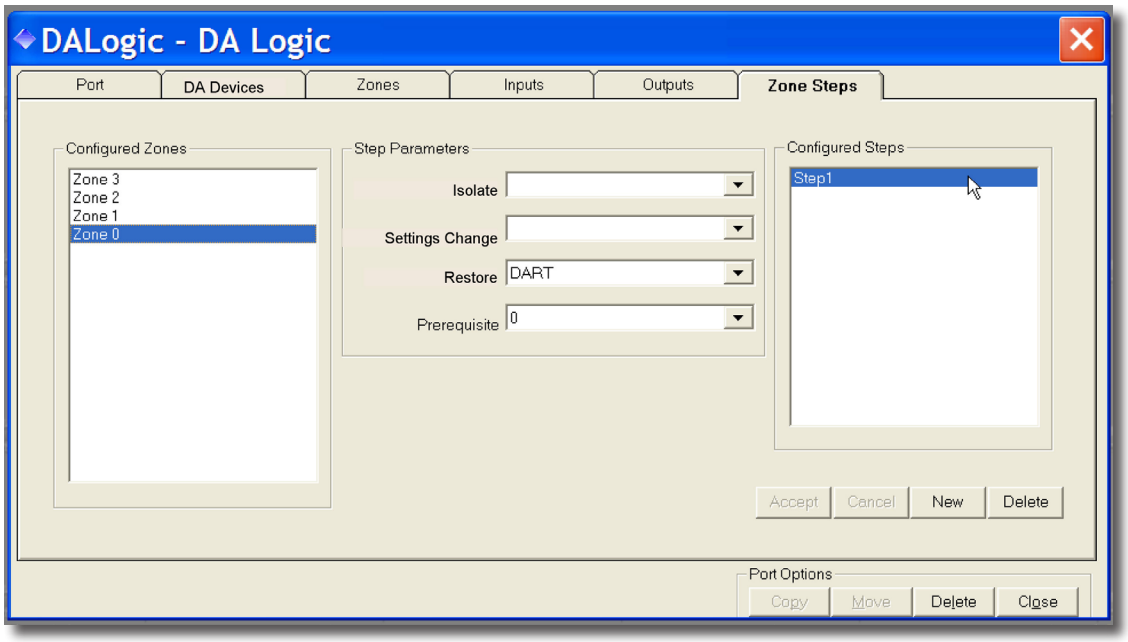
A settings change can optionally be forced on any of the IEDs to accomodate a change in the line characteristics.



20. Define Bus Zone Steps

For the **Special Bus Zone**, select the DART as the IED that must restore service to the entire line. In this special zone, DA-Master first commands the substation breaker to open and verifies operation before this step occurs.

A settings change can optionally be forced on any of the IEDs to accommodate a change in the line characteristics.



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AN_DistAutomation_102010

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