# PCC 2100 Connections to ATS - rev 2

In this course we'll discuss the setup and bindings PCC 2100 for annunciation using both networked and non-networked transfer switches. We'll also review binding with DIMs, reading system data and general PCC2100 configuration and binding techniques.

# Section 1. Review of PCC 2100 configuration with InPower

In this section we'll review setting some of the PCC 2100's configurable parameters.

# Customer Outputs

The PCC 2100's 4 output relays can be mapped to events and enabled or disabled by navigating to "Adjustment-Features-Customer Outputs". . The event code and color of each LED can be modified, and the LEDs can be enabled or disabled. Access this by navigating to "Adjustments-Features-Customer Outputs"

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🖻 🤅	PCC 2100 [DYN]	Customer Outputs Mapping	<datatable></datatable>		03/28/2003 11:38:43.85
	🖹 🧮 Adjustments	Customer Output 1 Enable	Enable		03/28/2003 11:38:43.63
	🗈 🧮 AC Measurement Calibrat	P Customer Output 1 Status	Driver Off		03/28/2003 11:38:43.63
	Alternator Protection	Customer Output 2 Enable	Enable		03/28/200311:38:43.63
	🗈 🛄 Automatic Voltage Regula	P Customer Output 2 Status	Driver Off		03/28/2003 11:38:43.63
	Engine Protection Adjustm	Customer Output 3 Enable	Enable		03/28/2003 11:38:43.52
	E Heatures	P Customer Output 3 Status	Driver On		03/28/2003 11:38:43.52
	Custom Displays	Customer Output 4 Enable	Enable		03/28/2003 11:38:43.52
	Customer Outputs	P Customer Output 4 Status	Driver Off		03/28/2003 11:38:43.52
	🗎 kW Overload Warning				
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Event codes are set by clicking on "Data Table". These outputs can also be enabled or disabled by navigating to "Test-Outputs-Customer Outputs." Always remember to Save Adjustments or values will be changed back during the next start order. Note that these 4 relays are NOT the same as the Customer Outputs in the LonWorks section.

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Customer	Event	1540	
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Customer	1541		
Customer	1463		
Customer	1465		

For a list of available events navigate to "Events and Faults"

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🖻 🖞 ASTC	Fault Code	Fault Description	Fault Effect	Notification	
🗄 🜀 PCC 2100 [DYN]	121	Engine speed sensor failure	Shutdown	Dial Out	Dis
🖻 进 Adjustments	135	Oil pressure sensor input voltage too high - shorted to power	Warning	Don't Dial Out	Dis
i 🖶 🧮 AC Measurement Calibrat	141	Oil pressure sensor input voltage too low - shorted to around or open circuit	Warning	Don't Dial Out	Dis
Alternator Protection	143	Oil pressure below normal	Warning	Don't Dial Out	Dis
🗉 进 Automatic Voltage Regula	144	Coolant temperature sensor voltage too high - shorted to power or open circuit	Warning	Don't Dial Out	Dis
Engine Protection Adjustr	145	Coolant temperature sensor voltage too low - shorted to ground	Warning	Don't Dial Out	Dis
E Features	146	Coolant temperature above normal	Warning	Don't Dial Out	Dis
Custom Displays	151	Coolant temperature far above normal	Shutdown	Don't Dial Out	Dis
Customer Outputs	197	Coolant level below normal	Warning	Don't Dial Out	Dis
Direct Connect Moderr	212	Oil temperature sensor input voltage too high - shorted to power or open circuit	Warning	Don't Dial Out	Dis
kW Overload Warning	213	Oil temperature sensor input voltage too low - shorted to ground	Warning	Don't Dial Out	Dis
🔚 Load Dump Setup	234	Engine overspeed	Shutdown	Dial Out	Dis
Low Battery Voltage Se	235	Coolant level far below normal	Shutdown	Don't Dial Out	Dis
Power Down Condition	359	Engine failed to fire during cranking.	Shutdown	Dial Out	Dis
🔚 Warmup/Cooldown	415	Oil pressure far below normal	Shutdown	Dial Out	Dis
Genset Power Ratings	421	Oil temperature above normal	Warning	Don't Dial Out	Di
⊞ 🗮 Governor	441	Battery voltage is at or below the low battery voltage threshold for a time greater than or equal	Warning	Don't Dial Out	Dis
E LonWorks	442	Battery voltage is at or above the high battery voltage threshold for a time greater than or equa	Warning	Don't Dial Out	Dis
⊞ 🗮 Passwords	1311	The customer #1 switch is in an active state.	None	Don't Dial Out	Dis
🕀 🧮 Power Transfer Control (P	1312	The customer #2 switch is in an active state.	None	Don't Dial Out	Dis
🕀 🧮 Reset History Counters	1313	The network input #1 is in an active state.	None	Don't Dial Out	Dis
Starting	1314	The network input #2 is in an active state.	None	Don't Dial Out	Dis
E Switch Setup	1315	The network input #3 is in an active state.	None	Don't Dial Out	Dis
Events and Faults	1316	The network input #4 is in an active state.	None	Don't Dial Out	Dis
Faults	1317	The customer #3 switch is in an active state.	None	Don't Dial Out	Dis
🕀 🧮 Monitor	1318	The customer #4 switch is in an active state.	None	Don't Dial Out	Dis
	1334	Critical AC Scaler out of range.	Shutdown	Don't Dial Out	Dis
Capture Files	1335	Non critical AC Scaler out of range.	Warning	Don't Dial Out	Dis
	1337	A LonWorks network Wink command has been issued to the unit.	None	Don't Dial Out	Dis
	1416	Shutdown fault has occurred but genset has not shutdown due to the battle short flag being ena	Warning	Don't Dial Out	Die
	1417	Controller failed to power down correctly	Warning	Don't Dial Out	Die
	1433	Controller has received a local Emergency Stop command	Shutdown	Dial Out	Die
	1434	Controller has received a remote Emergency Stop command	Shutdown	Dial Out	Die
	1435	Engine Cold Warning - Engine may not start	Warning	Don't Dial Out	Dis
	1438	Engine failed to rotate when cranking was commanded.	Shutdown	Don't Dial Out	Die
	1442	During cranking the battery voltage is at or below the weak battery threshold for a time greater	Warning	Don't Dial Out	Die
	1443	Battery voltage is so low during cranking that the controller has been reset three times.	Shutdown	Don't Dial Out	Dis
	1444	The kW load on the genset is at or above the overload warning threshold for a time greater the	Warning	Don't Dial Out	Dis 🗸
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# LonWorks Custom Annunciation

LEDs on a network annunciator can be mapped to PCC 2100 event codes using this feature and binding the network variable nvoAnnunCustom to the annunciator. This will work with either self-installed/autobound networks or LonMaker installed networks, however if the network is self-installed then the annunciator LED color, flash and horn can not be configured. They will default to red, horn on and no flash (although the horn can be disabled using a dipswitch on the annunciator. Navigate to "Adjustments-LonWorks-Custom Annunciation".

Also, when autobinding with an NFPA110 configuration, the top four events in this table will be mapped to the bottom four LEDs on the annunciator.



# LonWorks Custom Relay Events

This feature allows the customer to map PCC 2100 events to the 16 relays on a DIM using the network variable nvoRelayCustom. The first 8 events can be mapped to the 8 relays on a DIM base board and the last 8 events can be mapped to the 8 relays of a DIM expansion board. This will work with either self-installed/autobound networks or LonMaker installed networks. Navigate to "Adjustments-LonWorks-Customer Outputs – Custom Relay Events".



# LonWorks Custom Outputs

This feature allows the customer to map PCC 2100 events to 5 network variables which can be bound to individual annunciator LEDs or DIM relays. This can only be done with LonMaker installed networks. Navigate to "Adjustments-LonWorks-Customer Outputs – Custom Outputs".



# LonWorks Device

Several LonWorks parameters can be modified by navigating to "Adjustments-LonWorks-Device". (Note that with the PCC 2100 the LonWorks card auto enables when the card is detected. "Enable is provided in InPower" so that LonWorks can be disabled if the card is removed.) Also, to properly deliver alarms to PCW 2.0 "Site ID" must be set to the network name and "Name" must be set to the device name used when setting up this network with LonMaker. The configuration plug in will write to this location on the NCM, however LonMaker by itself will not. If you don't run the plug in you'll have to write this information with InPower. After writing this information press the "Reset" pin on the PCC 2100 NCM for these changes to take effect.

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🖻 🌀 PCC 2100 [DYN]	Z Site ID	NTEST		03/28/2003 12:14:50 67
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Alternator Protection	🖊 Name	DYN		03/28/2003 12:14:50.57
🗈 🛄 Automatic Voltage Reg		200.16		03/28/2003 12:14:50.57
Engine Protection Adju:	P Terminated	Yes		03/28/2003 12:14:50.39
E Eatures	🖊 Update Interval	2.0	Seconds	03/28/2003 12:14:50.39
Custom Displays	🖊 Test Interval	10.0	Seconds	03/28/2003 12:14:50.39
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🗄 🛅 Passwords				
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# <u>Dialout</u>

The alarm dialout characteristics can be set by navigating to "Adjustments-LonWorks-Dialout". Up to 5 hosts can be enabled to receive alarms. (Note that host phone numbers are not set written to the device with InPower but are written to the network gateway (SLTA-10) using Echelon's LinkManager program. If the "Dialout Break" parameter is enabled it will cause the network gateway to hang up an existing connection and dialout upon receipt of an alarm. If it is disabled it will not break an existing connection to deliver an alarm. After writing this information press the "Reset" pin on the PCC 2100 NCM for these changes to take effect. Note that dial out parameters can also be set using the configuration plug in.



### LonWorks Fault Settings

By navigating to "Adjustments-LonWorks-Fault Settings" event names can be assigned to the 8 network faults. These faults can be autobound to the states of the 8 customer inputs on a DIM, or they can be individually bound with LonMaker to output network variables on a DIM or some other device.

Also on this screen. a customer can enter event codes for Battery Charger Fail, S1 Circuit Breaker trip, Low Fuel Level and Genset Connected.

Battery Charger Fail, Low Fuel Level and Genset Connected events are all required for NFPA110 annunciation. S1 Circuit Breaker trip is part of the extended annunciation set.

A typical use for this feature would be in an application in which NFPA110 annunciation was required and a non-networked transfer switch is used. Two signals coming from the transfer switch (genset connected and battery charger fail) are required to be annunciated. The customer would wire those signals to two of the four customer switches on the 2100 and would enter the event codes for those inputs on this screen. The event codes for customer switches 1 through 4 are 1311, 1312, 1317 and 1318.

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AIRFORT	Parameter		Value	Units	Time Last Read		
Capture Files	🔊 Network Input #1 Status	Inactive			05/15/2004 08:17:43.39		
	Network Input #1 Event Name	NETWOR	RK FAULT 1		05/15/2004 08:17:43.39		
Adjustments	P Network Input #2 Status	Inactive			05/15/2004 08:17:43.39		
AC Measurement Calibrations	Network Input #2 Event Name	NETWOR	RK FAULT 2		05/15/2004 08:17:43.39		
Alternator Protection	Network Input #3 Status	Inactive			05/15/2004 08:17:43.39		
🕀 🧮 Automatic Voltage Regulator	Network Input #3 Event Name	NETWOR	RK FAULT 3		05/15/2004 08:17:43.39		
Engine Protection Adjustments	P Network Input #4 Status	Inactive			05/15/2004 08:17:43:39		
🕀 🛄 Features	A Network Input #4 Event Name	NETWOR	RK FAULT 4		05/15/2004 08:17:43.39		
Genset Power Ratings	Network Input #5 Status	Inactive			05/15/2004 08:17:43.39		
Governor	Network Input #5 Event Name	NETWOR	RK FAULT 5		05/15/2004 08:17:43:39		
	P Network Input #6 Status	Inactive			05/15/2004 08:17:43.39		
Customer Outputs	🖋 Network Input #6 Event Name	NETWOR	RK FAULT 6		05/15/2004 08:17:43.39		
Device		Inactive			05/15/2004 08:17:43.39		
- 🧮 Dialout	🖋 Network Input #7 Event Name	NETWOR	R FAULT 7		05/15/2004 08:17:43.39		
Fault Settings	P Network Input #8 Status	Inactive			05/15/2004 08:17:43:39		
Paralleling	🖋 Network Input #8 Event Name	NETWOR	RK FAULT 8		05/15/2004 08:17:43.39		
Passwords	🖋 Battery Charger AC Failure Fau	ilt Code 0	ev	ent code	05/15/2004 08:17:43.39		
Power transfer control (PTC) Reset History Coupters	🖋 S1 Circuit Breaker Trip Fault C	ode O	ev	ent code	05/15/2004 08:17:43.39		
Starting	🖉 Low Fuel Level Fault Code	0	ev	ent code	05/15/2004 08:17:43:39		
🕀 🧮 Switch Setup	🖋 Genset Connected Fault Code	0.	ev	ent code	05/15/2004 08:17:43.39		
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# Customer Switch Setup

By navigating to "Adjustments-Switch Setup-Customer Switch Setup" a customer can configure the active state, enable or disable, and assign a name to each of the 4 customer inputs.

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🗄 🜀 PCC 2100 [DYN]	Customer #1 Switch	Inactive		03/28/2003 12:59:35.63
🖻 🛄 Adjustments	Customer #1 Switch Enable	Enable		03/28/2003 12:59:35.63
AC Measurement Calib	Customer #1 Switch Active State Selection	Active Closed		03/28/2003 12:59:35.63
Alternator Protection	Customer #1 Switch Event Name	CUSTOMER FAULT 1		03/28/2003 12:59:35.63
🗈 🛄 Automatic Voltage Reg		Inactive		03/28/2003 12:59:35.50
Engine Protection Adju:	Customer #2 Switch Enable	Enable		03/28/2003 12:59:35.50
E Features	Customer #2 Switch Active State Selection	Active Closed		03/28/2003 12:59:35.50
Custom Displays	Customer #2 Switch Event Name	GROUND FAULT		03/28/2003 12:59:35.50
Customer Outputs		Inactive		03/28/2003 12:59:35.38
Direct Connect Mod	Customer #3 Enable	Enable		03/28/2003 12:59:35.38
kW Overload Warni	Customer #3 Switch Active State Selection	Active Closed		03/28/2003 12:59:35.38
🔚 Load Dump Setup	Customer #3 Switch Event Name	LOW FUEL		03/28/2003 12:59:35.38
🔚 Low Battery Voltage		Inactive		03/28/2003 12:59:35.26
Power Down Conditi	Customer #4 Switch Enable	Enable		03/28/2003 12:59:35.26
🔚 Warmup/Cooldown	Customer #4 Switch Active State Selection	Active Closed		03/28/2003 12:59:35.26
🧱 Genset Power Ratings	Customer #4 Switch Event Name	HIGH ALT TEMP		03/28/2003 12:59:35.26
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# LonWorks Switch Setup

This section is the same as the "Adjustments-LonWorks-Fault Settings"

# **Customer Supplied Wiring Connections**

By navigating to "Monitor-Customer Supplied Wiring Connections-Inputs" names can be assigned to the customer inputs, as is done in the "Customer Switch Setup" section. Names and active states for these inputs can also be assigned by navigating to "Test-Inputs-Customer Supplied Wiring Connections".

# Section 2. PCC 2100 Autobinding

The PCC 2100 can be self-installed on a network and autobound to one transfer switch (either an OTPC with an NCM card or a CCM-ATS) and up to 3 Annunciators and 4 DIMs (but no more than 5 DIMs and Annunciators combined.)

There are three different annunciation sets that the PCC 2100 can send to an annunciator or DIM when autobound: NFPA 110, Extended and Custom. Here is a listing of the NFPA 110 and Extended sets:

# <u>NFPA 110</u>

Field	Description	Event(s)
bit0	Check Genset	Common Warning or Shutdown Alarm
bit1	Genset Supplying Load	Genset Connected
bit2	Genset Running	Ready To Load (Genset Available)
bit3	Not In Auto	Not In Auto
bit4	High Battery Voltage	High Battery Voltage
bit5	Low Battery Voltage	Low Battery Voltage Weak Battery Dead Battery
bit6	Charger AC Failure	Must be configured by user.
bit7	Fail To Start	Fail To Start Fail To Crank
bit8	Low Coolant Temperature	Low Coolant Temperature
bit9	Pre-High Engine Temperature	High Engine Temperature Warning High Oil Temperature Warning
bit10	High Engine Temperature	High Engine Temperature Shutdown
bit11	Pre-Low Oil Pressure	Low Oil Pressure Warning
bit12	Low Oil Pressure	Low Oil Pressure Shutdown
bit13	Overspeed	Overspeed Overfrequency
bit14	Low Coolant Level	Low Coolant Level Warning Low Coolant Level Warning
bit15	Low Fuel Level	Must be configured by user.

#### Extended

Field	Description	Event(s)
bit0	Check Genset	Common Warning or Shutdown Alarm
bit1	Ground Fault	Must be configured by user.
bit2	High AC Voltage	High AC Voltage
bit3	Low AC Voltage	Low AC Voltage
bit4	Underfrequency	Underfrequency
bit5	Overload	Overload
bit6	Overcurrent	Overcurrent Warning
		Overcurrent Shutdown
bit7	Short Circuit	Short Circuit
bit8	Reverse kW	Reverse kW
bit9	Reverse kVAR	Reverse kVAR
bit10	Fail to Sync	Not Supported

Field	Description	Event(s)
bit11	Fail to Close	Fail to Close - Genset CB
		Fail to Close - Utility CB
bit12	Load Demand	Not Supported
bit13	Genset CB Tripped	Must be configured by user.
bit14	Utility CB Tripped	Must be configured by user.
bit15	Emergency Stop	Emergency Stop - Local
		Emergency Stop - Remote

For custom annunciation, the 16 events to be annunciated are set up using InPower as described in the "LonWorks Custom Annunciation" section. InPower is also used to set up the event code for the "Charger AC Failure", "Genset Connected" and "Low Fuel" bits in the NFPA 110-annunciation set and the "Utility CB Tripped" bit in the Extended annunciation set. This is described in the "LonWorks Fault Settings" section.

The PCC 2100 can also be bound to a DIM so 16 events on the PCC 2100 can be mapped to DIM relays. This is described in the "LonWorks Customer Outputs" section. The 8 DIM customer inputs can be mapped to the PCC 2100 Network Faults. This is described in the "LonWorks Fault Settings" section.

The PCC 2100 can also be autobound by a transfer switch so that the transfer switch can issue a start command to a genset over the network.

#### The Self-Install and Autobinding Process

- 1. Physically connect all devices to a twisted pair. Provide power to all devices.
- 2. Configure 2100 customer switch inputs using InPower as described above. For NFPA110 annunciation, Charger AC Fail, Genset Supplying load and Low Fuel are all required. A low fuel signal should always be wired to one of the customer switch inputs. A networked transfer switch will communicate status of Charger Fail and Genset Supplying Load events to the annunciator. If a non-networked transfer switch is used these signals will have to be wired to customer switch inputs on the 2100 and InPower must be used to assign the event codes to the annunciation set.
- 3. Install PCC 2100 to the network first. Press and hold the service pin for more than two seconds. The NCM will go through it's start up sequence with the "OK" and "I/O" LEDs flashing rapidly, then the "OK" LED will blink the node address set by the dip switch, pause, and repeat. The default node address for the PCC 2100 is 1, which will look like a steady ½ Hz pulse.
- 4. Install the ATS (either PC ATS or CCM-ATS) next if a networked ATS is used. If a networked ATS is not used skip this step. Make sure that the node address configuration dipswitch is set to a different address than the PCC 2100. Press and hold the service pin for more than two seconds. The device will go through its start up sequence then "OK" LED will blink the node address set by the dipswitch, pause, and repeat. The default node address for all CPG FT-10 transfer switch nodes is 2. It will bind its Start Command output variable with the PCC 2100's Start Command Input variable.
- 5. Install annunciator(s) next. Set the node address dipswitches to an address different than the PCC 2100 and transfer switch addresses. Set the configuration dipswitches according to the following diagram depending on which annunciation set you want to use.

#### Annunciator AutoBinding



Note:nvoAnnunCustom - nvi4PointAnnunE binding in NFPA110 config is only valid for autobinding with PCC2100 or PCC3200 sets

# **DIM AutoBinding**





After setting the node address and configuration dipswitches, press and hold the service pin for more than two seconds. The device will go through its start up sequence then "OK" LED will blink the node address set by the dip switch, pause, and repeat and the device will be bound to the correct annunciation set if the genset or transfer switch node has been correctly installed. The default node address for DIMs is 8.

# Autobinding for NFPA 110 Annunciation with PCC 2100 and PC ATS

Physically install PCC 2100, PC ATS and Annunciator as stated above. Confirm that they each have a different node address and that the annunciator is configured for NFPA 110 annunciation. Press and hold the service pins for the PCC 2100, PCC ATS and annunciator in that order. Confirm that all three devices are blinking their node addresses and the Network LED on the annunciator is green. Note that the transfer switch NFPA 110 annunciation set is as follows.

Field	Description	Latched	Event	Default
bit0	ATS Common Alarm	N	ATS Common Alarm	0
bit1	Genset Supplying Load	N	Source2 Connected	0
bit2	NA	-		0
bit3	Not In Auto	N	Not In Auto	0
bit4bit5	NA	-		0
bit6	Charger AC Failure	Y	Charger AC Failure	0
bit7bit15	NA	-		0

Note that there will be 4 LEDs on the annunciator that both the ATS and the PCC 2100 could try to control. The annunciator will treat this as an OR function. If the event is true from either the PCC 2100 or the ATS the LED will be on.

### <u>Autobinding for NFPA 110 Annunciation with PCC 2100 and a nonnetworked transfer switch</u>

In this situation, the Genset supplying and charger failure signals are wired to PCC 2100 customer inputs. Use Inpower to tell the 2100 which event is assigned to which input. Follow the same procedure as is followed when autobinding with a networked transfer switch, simply skipping the step of installing the switch.