

# Installation Instructions for FT-10 PowerCommand<sup>®</sup> Control 2100 Genset Network Communications Module Kit 541-0770

## GENERAL INFORMATION

This instruction sheet describes installation of a genset Network Communications Module (NCM) on a PowerCommand<sup>®</sup> Control 2100 (PCC). A NCM is required for connection of a PCC to an FT-10 LONWORKS<sup>®</sup> network. The NCM provides an interface for data from the genset to other modules on the network. It communicates with the PCC 2100 baseboard, providing complete monitoring and control of the genset.

The following parts are included in this kit.

Part Description	Qty
Standoffs (M3)	4
Pan Head Screws (M3 x 8mm)	4
Network Communications Module	1

## GENERAL PRECAUTIONS

Read these installation instructions completely and become familiar with safety warnings, cautions, and the installation procedure before starting.

**Before servicing the PCC, it is recommended that all settings be recorded by making a capture file. This will make sure of correct and complete readjustment of the PCC in the event that all previous entries are lost during servicing.**

**⚠️ *WARNING* Incorrect service or replacement of parts can result in severe personal injury or death, and/or equipment damage. Service personnel must be trained and experienced to perform electrical and mechanical service.**

**⚠️ *WARNING* The PCC 2100 control cabinet must be opened only by technically qualified personnel. Voltages of up to 600 VAC are present in the PCC cabinet. These voltages can cause electrical shock, resulting in personal injury or death.**

***Even with power removed, improper handling of components can cause electrostatic discharge and damage to circuit components.***

## Requirements

- NEMA Level IV, 22 AWG Stranded Twisted-Pair Cable
- Cummins Power Generation (CPG) Device Stencil (LonMaker installation only)
- LonMaker<sup>™</sup> Software (Manual Installation)
- Self-installation with an ATS requires an FT-10 OTPC NCM or a CCM-T

Network installation must be performed by trained network personnel. When installation is complete, the genset is ready for connection to a network. Refer to the *PowerCommand Network Installation and Operation Manual (900-0529)* for instructions on network wiring and network software installation.

## Circuit Board Removal Safety Precautions

To prevent circuit board damage due to electrostatic discharge (ESD), a grounding wrist strap must be worn when handling circuit boards or socket-mounted ICs. (The wrist strap **does not** provide a direct short to ground, but is typically rated at approximately 1 megohm to ground.)

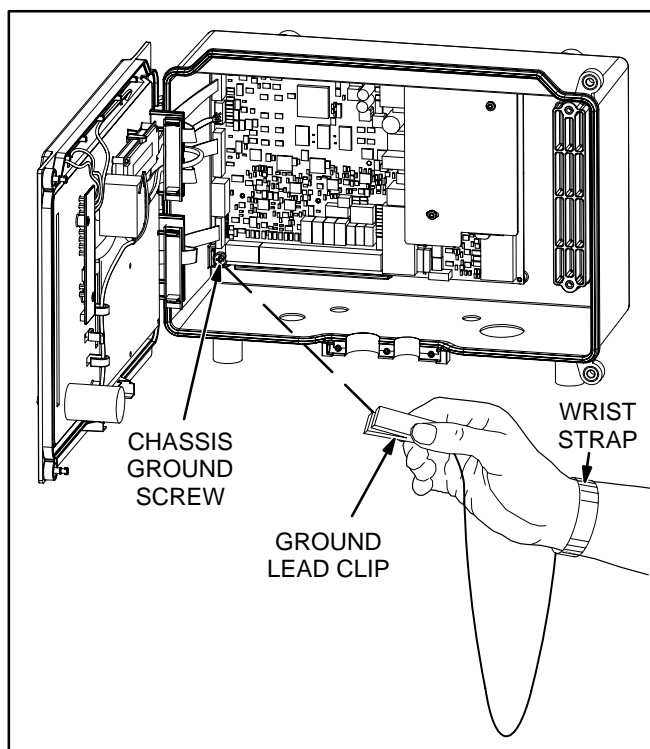
Network installation must be performed by trained network personnel. When installation is complete, the transfer switch is ready for connection to a network. Refer to the *PowerCommand Network Installation and Operation Manual (900-0529)* for instructions on network wiring and network software installation.

Turn off or remove AC power from the battery charger and then remove the negative (-) battery cable from the set starting battery. This is to make sure the set will not start while working on it and to avoid circuit board damage, caused by voltage spikes when removing and replacing circuit board connectors.

**⚠️ *CAUTION* Always disconnect a battery charger from its AC source before disconnecting the battery cables. Otherwise, disconnecting the cables can result in voltage spikes high enough to damage the DC control circuits of the generator set.**

**⚠ WARNING** Accidental starting of the generator set while working on it can cause severe personal injury or death. Prevent accidental starting by disconnecting the starting battery cables (negative [-] first).

Make certain the battery area has been well-ventilated before servicing the battery. Arcing can ignite explosive hydrogen gas given off by batteries, causing severe personal injury. Arcing can occur when a cable is removed or re-attached, or when the negative (-) battery cable is connected and a tool used to connect or disconnect the positive (+) battery cable touches the frame or other grounded metal part of the generator set. Always remove the negative (-) cable first, and reconnect it last. Make certain hydrogen from the battery, engine fuel, and other explosive fumes are fully dissipated. This is especially important if the battery has been connected to a battery charger.



**FIGURE 1. WRIST STRAP**

Attach the clip to the chassis ground connection in the lower left-hand corner of the control box and place the strap around your wrist before handling a circuit board (see Figure 1).

**⚠ CAUTION** Electrostatic discharge will damage circuit boards. Always wear a grounding wrist strap when handling circuit boards or socket-mounted ICs.

## PHYSICAL INSTALLATION

### Network Module Installation

1. Turn the PCC selector switch to the “O” (Off) position.
2. Disconnect the battery charger (if applicable). Remove all electrical supply sources.
3. If there is an external battery charger, disconnect it from its AC power source. Then disconnect the set starting battery (negative [-] lead first).

**⚠ WARNING** Ignition of explosive battery gases can cause severe personal injury. Do not smoke or cause any spark, arc, or flame while servicing batteries.

4. Disconnect the generator set starting battery cable(s). Disconnect the negative (-) cable(s) first to reduce the risk of arcing.
5. Open the control door.
6. Use a wrist strap, or touch a grounded surface to discharge any static charge before handling circuit boards (see Figure 1).
7. Attach the four standoffs to the base circuit board (see Figure 2).
8. Mount the network module to the four standoffs using four M3 x 8mm pan head screws.

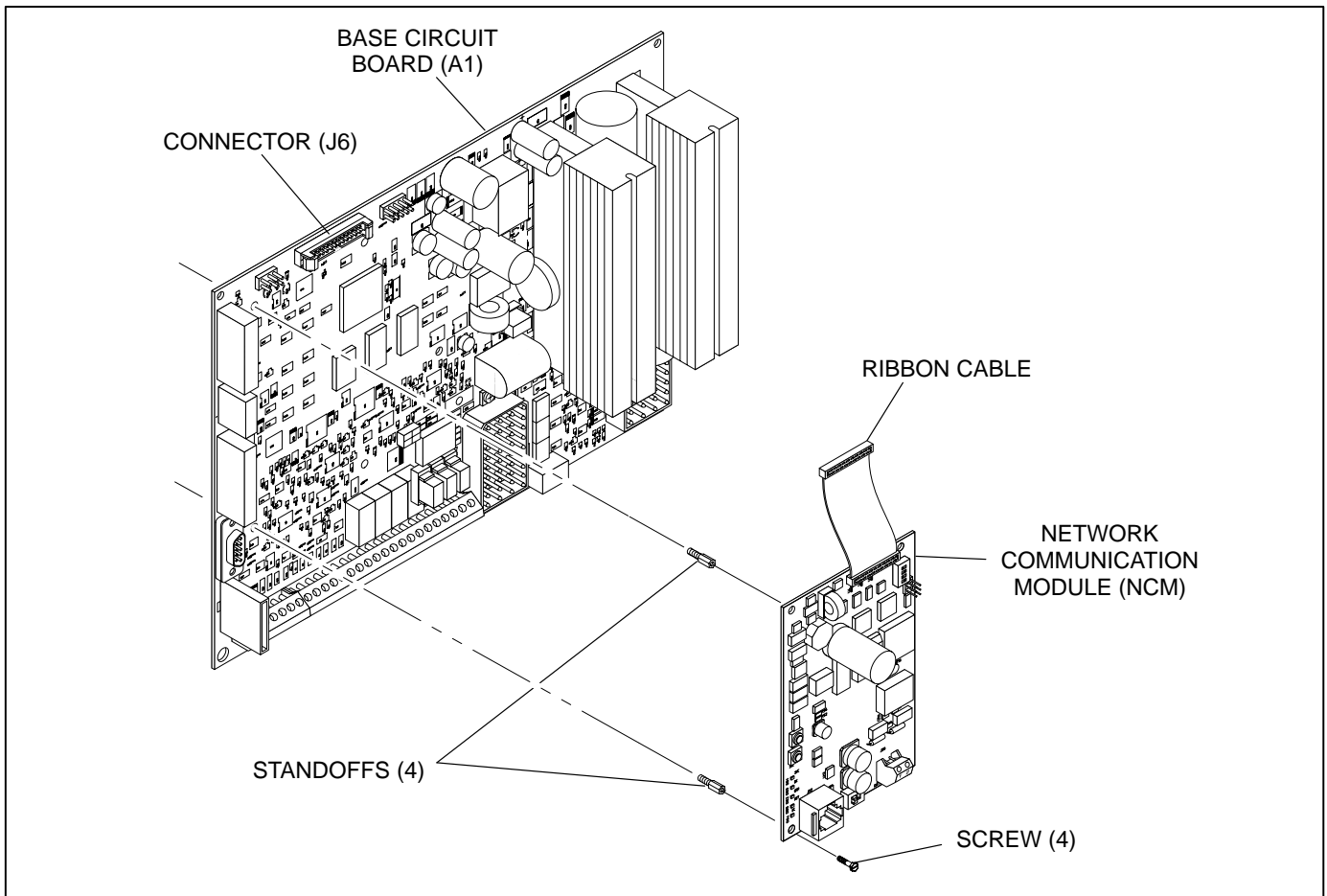
**⚠ CAUTION** Ribbon cables are fragile. Do not fold or bend sharply or pull on the end connectors. Cable damage can degrade signal performance.

9. Attach the network module ribbon cable to connector J6, on the base circuit board (A1).
10. Attach one end of the network harness to the Data 1 and Data 2 terminals of the two-position terminal block (J30), (polarity insensitive, see Figure 3).
11. Attach the other end of the network harness to another network device.

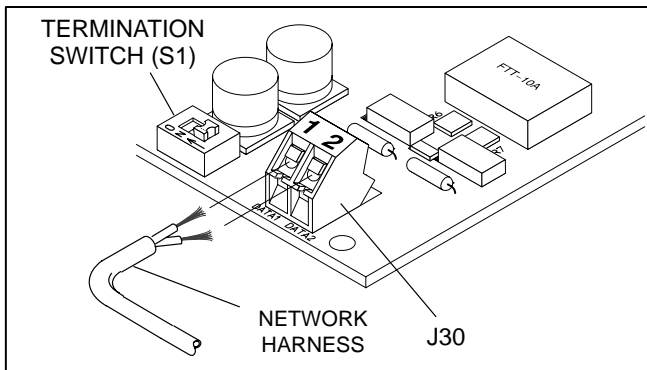
### Termination

12. If the device is to be terminated, set the S1 termination switch to the ON position.

**NOTE:** For free topology, only one device on each segment must be terminated. Multidrop bus topology requires termination at each end of the bus using multidrop bus terminators (Echelon P/N 44101) or the device terminator switch.



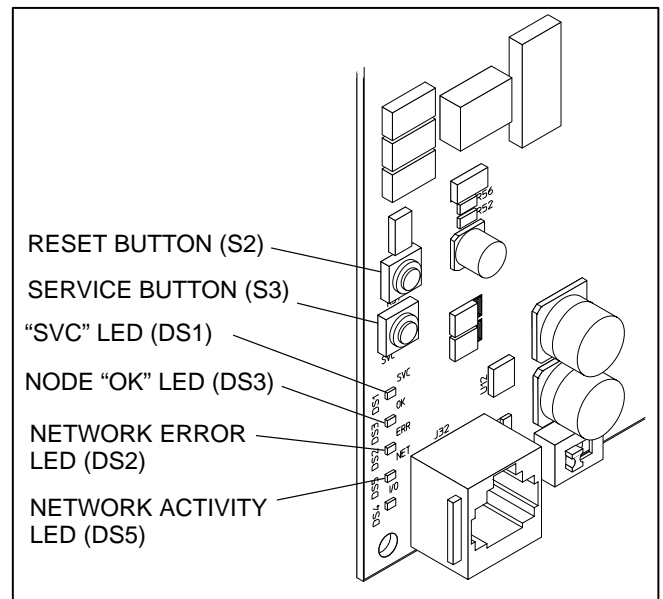
**FIGURE 2. NETWORK COMMUNICATION MODULE INSTALLATION**



**FIGURE 3. NETWORK HARNESS CONNECTION**

13. Reconnect the generator starting battery cable(s). Verify that the “SVC” indicator blinks on the NCM (see Figure 4).
14. If there is an external battery charger, reconnect it to its AC power source. Then reconnect the set starting battery (negative [-] lead last).
15. Turn the PCC selector switch to the “Manual” position to “wake up” the PCC 2100. Verify that the “OK” indicator blinks on the NCM (see Figure 4).

Refer to the *PowerCommand Network Installation and Operation Manual (900-0529)* for instructions on network wiring and network software installation.



**FIGURE 4. BUTTON AND LED LOCATIONS**

## SELF-INSTALLATION

### Requirements

This procedure can be used to logically install the NCM when the following requirements are met.

Self-installation is limited to one PowerCommand Genset or CCM-G, one PowerCommand Automatic Transfer Switch (ATS) or CCM-T, and no more than four annunciators or five DIMs. The PCC 2100 can be autobound by an ATS and up to three annunciators and four DIMs, but by no more than a total of five annunciators and DIMs.

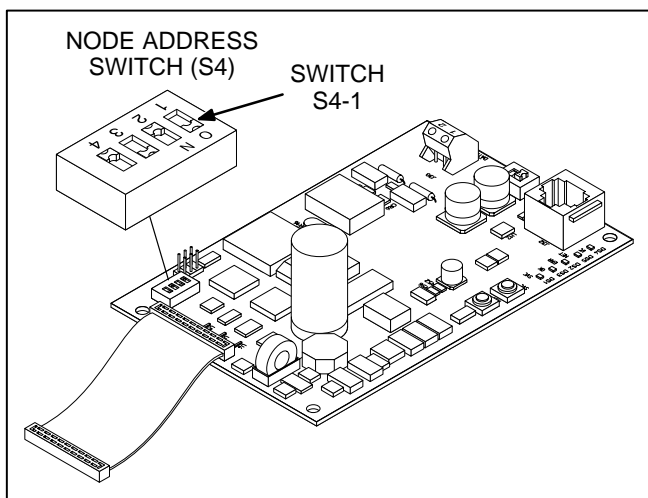
If these requirements cannot be met, the system must be installed with LonMaker. Refer to “LonMaker Installation” on Page 5.

A transfer switch (OTPC or BTPC) must be v1.2.138, or later, to support the Network Communication Module software. A CCM-T with an FTT-10 transceiver will also work.

With networks containing a transfer switch, the genset NCM must be installed before the transfer switch, the annunciator, DIM, and other network devices are logically installed.

**NOTE:** The genset must be installed first.

### Node Address



**FIGURE 5. NODE ADDRESS SWITCH**

Each node on a self-installed network must have a unique address. Switches 1 through 4 of switch S4 are used to set the *Node Address* (see Figure 5). The default node address is 0001, which is an “OK” LED pulse rate of 1.

The switches are oriented so that switch S4-1 is the most significant bit (MSB) of the *Node Address*.

Thus, S4-1 has a value of “8” when it is ON. S4-2 has a value of 4, S4-3 has a value of 2, and S4-4 has a value of 1. For example, to set the *Node Address* to 9, set switch S4 to 1001 (8+0+0+1=9). See Table 1.

**TABLE 1. SETTING THE NODE ADDRESS (S4)**

S4-1 (8)	S4-2 (4)	S4-3 (2)	S4-4 (1)	Address (binary)	Address (decimal)
OFF	OFF	OFF	OFF	0000	0 <sup>1</sup>
OFF	OFF	OFF	ON	0001	1
OFF	OFF	ON	OFF	0010	2
				↓	↓
ON	ON	ON	ON	1111	15

NOTE 1. “0” (zero) is not a valid *Node Address*.

Be sure to assign each node in the network a unique address.

After the device has been installed, the *Node Address* can be verified by counting the number of pulses of the “OK” LED (DS3) (see Figure 4). Make sure each device has a unique node address.

After the genset has been installed, a DIM, annunciator, or ATS may bind to the genset. Because the genset does not execute the binding function, the genset must be installed first.

### Logical Installation

After the NCM is *physically* connected to the network, it is ready to be *logically* installed.

1. Make sure the NCM node and other network devices are powered and connected to the twisted-pair data bus.
2. Make sure S4-1, S4-2, S4-3, and S4-4 on the NCM are configured for the desired node address. Each device on the network must have a unique address.
3. Make sure the network is terminated.
4. Press and hold the *Service* button (S3) (see Figure 4) for approximately two seconds until the *Node “OK”* LED (DS3) begins flashing.
5. Release the *Service* button.

### Binding Sequence

Logically connecting to another device is referred to as *binding*. *Binding* may be done when all the nodes are installed, connected, and powered.

*Binding* the node must occur in the proper sequence. Logically install the genset first, followed by

the transfer switch, and then the annunciator(s) and other network accessories.

**NOTE:** The genset (NCM) and ATS module must be Cummins Power Generation (CPG) devices which are able to self-install in the network. Each device on the network must have a unique address.

### Verify Binding

To verify the genset has installed itself properly and is bound to the ATS, disconnect the twisted-pair data cable at J30. The “Network Error” LED (DS2) (see Figure 5) should turn on (red) within approximately 10 seconds. This indicates communications have failed and that the device was properly bound.

Reconnect the twisted pair cable and confirm that DS2 turns off within approximately 10 seconds.

If no error is produced, use InPower to verify the *Test Interval* (located in the LONWORKS device folder from the Adjustments directory) is set for 10.0 seconds. Also check the wiring and Address of each node. Repeat the Self-Installation steps to re-initiate *binding*.

### Remove Bindings

If unresolved system errors occur, the bindings can be removed and then re-installed to reset the system. The bindings can also be removed if the network is being changed or the device is being moved to another network.

To remove all bindings from the device, change the *Node Address* (S4) to 0 (zero) and re-install the device.

The node will remove all bindings at this time, including the genset and annunciator bindings. The

“OK” LED will not flash when the *Node Address* is 0, nor will it attempt to bind to a genset.

### Re-Binding

*Re-Binding* the node must occur in the proper sequence. Logically install the genset first, followed by the transfer switch; and then the annunciator(s), DIM(s), and other network accessories.

To re-bind an annunciator to the genset node, press and hold the annunciator’s *Silence/Lamp Test* button or service pin for 2 seconds. To rebind a DIM or ATS device to the genset, press and hold the service pin for two seconds.

## LONMAKER INSTALLATION

The PowerCommand 2100 Genset NCM can be manually installed with LonMaker. The Device Stencil is required.

LonMaker installation is required to use PowerCommand Software (PCW II). Self-installation does not require LonMaker.

To install using LonMaker:

1. Run LonMaker. Refer to the *PowerCommand Network Installation and Operation Manual (900-0529)*.
2. Open the Device Stencil.
3. Create a new site (or update an existing site).
4. Define, install, and bind devices.
5. Verify system operation.

The PowerCommand 2100 Genset is defined and installed like any other device in LonMaker where:

Device Type: “PCC 2100”