

Network Operation and Troubleshooting

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Starting the network

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Starting the Network

PLC as Master Networks

If you're using a PLC as the master station, you must put the CPU in Run mode before the communications program can be executed. This is because the PLC master uses RLL instructions included in your application program to initiate the data transfer requests. There are two ways to place the CPUs in run mode.

- Turn the keyswitch to the RUN position.
- Turn the keyswitch to the TERM position and use a programming device to change the operating mode.

PLC Peer as Master Networks

PLC Peer master networks require both CPUs be in Run mode, since either station can initiate data transfer requests. Both stations contain the necessary RLL instructions.

Host as Master Networks

Host master networks require a *DirectNET* communications program to manage the data requests. If you're using a host software package you should check the documentation that came with it for network startup information. If you created your own *DirectNET* program, you'll have to execute the program file to get things started. Check the documentation for your particular programming language to determine the steps required to execute program files.

Slave Stations

Depending on your application, you may also have to place the slave PLCs in Run mode to obtain meaningful data. The DCM and DCU interfaces also have On-line switches that must be in the On-line position before communications can begin. CPUs with built-in ports do not necessarily have to be in Run mode, but again the data may not be current.

Troubleshooting

- First Place to Look** If the network does not seem to be working correctly, check the following items.
1. Cable and connections. Incorrectly wired cables and loose connectors cause the majority of problems. Verify you've selected the proper cable configuration and check to see the cable is wired correctly.
 2. Switch settings. Make sure you've set the slave stations to match the communication parameters required by the master station (DCM, operator interface or host computer).
 3. Incorrect protocol. Make sure your network stations are all set for the same protocol. *DirectNET* networks can use the *DirectNET* or HostLink/CCM2 protocol selections.
 4. Communications program. Check the communications program for errors.

Try an Example Program

Sometimes it is helpful to have an example you can try. Appendices A, B, and C provide examples of the three network configurations. You can quickly and easily build a small network to make sure you are following all the appropriate steps. These are especially helpful if this is your first *DirectNET* application.

CPUs with Built-in *DirectNET* Ports

Most problems that occur with the CPUs are related to communication settings. Check the switch settings, and/or use a programming device to check the station address.

Host Masters

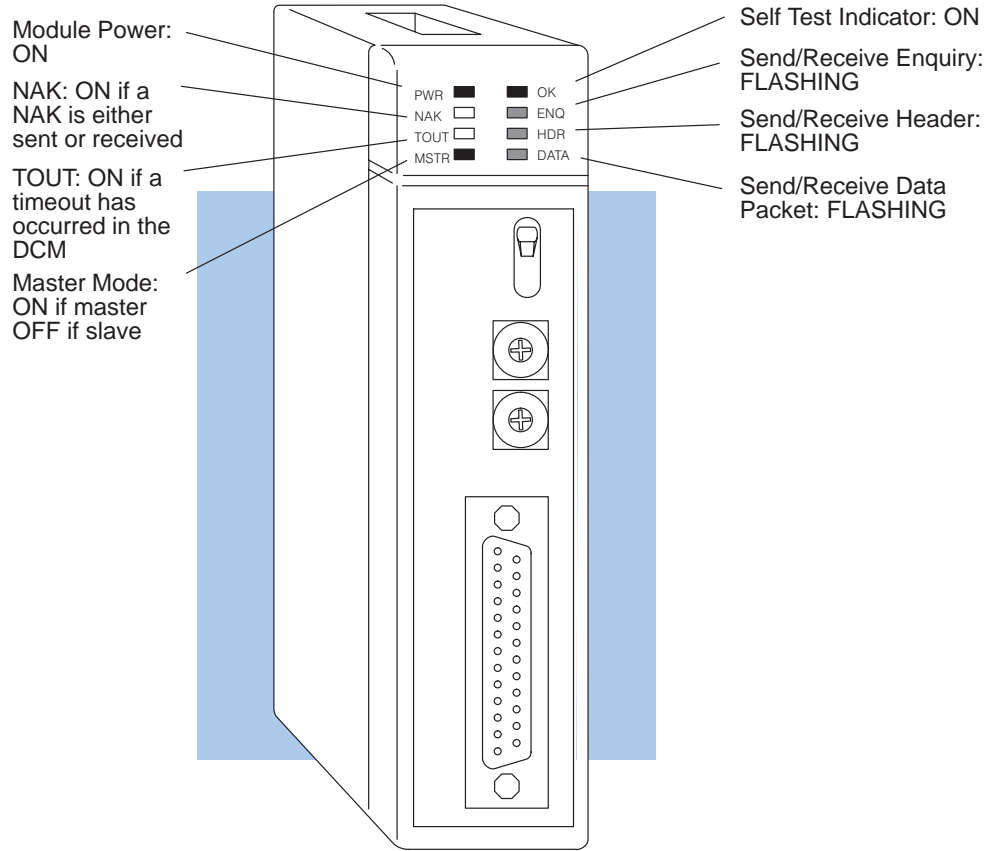
DirectNET programs must manage all aspects of network communication including timing considerations. Chapter 6 provides information on network timing issues that can affect network performance.

Communication Interface Indicators

The communications interfaces, DCMs and DCUs, have indicators that are specifically for communication status. The following paragraphs show these indicators and describe their meanings.

DL405 DCM Indicators

Check the DCM indicators to verify the DCM is operating correctly. The following diagram shows the proper indicator conditions.

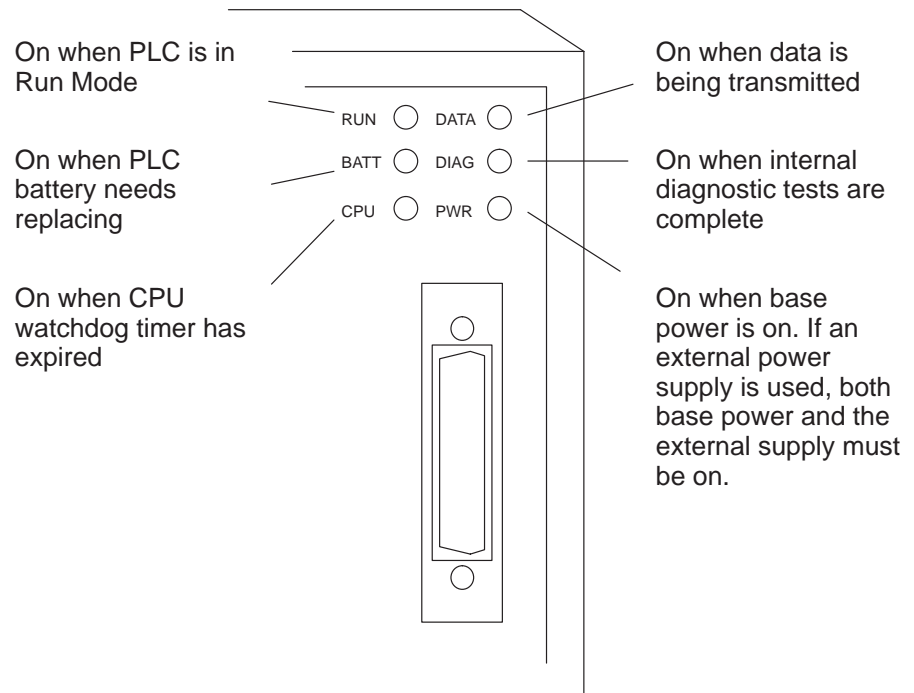


The following table provides additional troubleshooting details for the DL405 DCM.

Indicator Status	Possible Cause	Corrective Action
PWR or OK off	PLC power is disconnected DCM is defective	Check the PLC source power. Replace the DCM.
MSTR off (and DCM is in a master station)	Switch setting is incorrect	Remove power from the PLC, remove the DCM and check switch positions 1 and 2 on SW5.
ENQ indicator does not come on when communications program is executed	The PLC master station is not in Run mode Online / Offline switch is in the Offline position Communications program is not correct	Place the PLC in Run mode. Set the switch to Online. Check the communications program. Verify the address, amount of data, and data type are correct.
ENQ stays on, but NAK, TOUT, or HDR indicators do not come on at all	Communication timeout is disabled RTS and CTS signals are not looped back on the master station end of the cable	Remove power from the PLC, remove the DCM, and check switch position 3 on SW5. Remove master station connector, ensure that RTS and CTS are connected according to the cable diagram.
ENQ comes on and TOUT indicator flashes	RLL communications program is not correct Modes are different Communication cable	Check the communications program. Verify the address is correct. Set baud rate, parity, and mode (HEX/ASCII) to match the master station. Verify the cable is wired according to the cable pinouts.
ENQ indicator comes on and NAK indicator flashes (slave responds, but the data is incorrect)	Modes are different Communication cable	Set baud rate, parity, and mode (HEX/ASCII) to match the master station. Make sure the + and – connections are correct (RS422). Check pin 7 (GND) if you're using RS232C.
ENQ and HDR indicators come on and the NAK indicator flashes	Communications program is not correct Modes are different	Check the amount of data being transferred. You must use the correct byte boundaries for the data type being used. Set baud rate, parity, and mode (HEX/ASCII) to match the master station.
DATA indicator is on, but the NAK indicator comes on intermittently	Electrical noise	Make sure the system has good earth grounds. Only one end of the cable shield should be grounded. If you're using RS232C, try using RS422 .

**DL305 DCU
Indicators**

Check the DCU indicators to verify the DCU is operating correctly. The following diagram shows the proper indicator conditions.



The following table provides additional troubleshooting details for the DL305 DCU.

Indicator Status	Possible Cause	Corrective Action
PWR off	PLC power is disconnected DCU is not connected to the CPU properly DCU external power source (if used) is not connected DCU is defective	Check the PLC source power. Make sure the DCU is securely fastened to the CPU and that no connector pins are bent. Check the external power source. Replace the DCU
DIAG off	DCU is defective	Replace the DCU
DATA does not flash during communications	Loose or incorrectly wired cable Online / Offline switch is in the Offline position Communications program is not correct	Check the cable connections and pinouts. Set the switch to Online. Check the master communications program. Verify the address, amount of data, and data type are correct. (See Appendices D, E, and F for address references.)