

Installation and Network Layouts

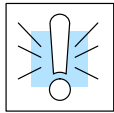
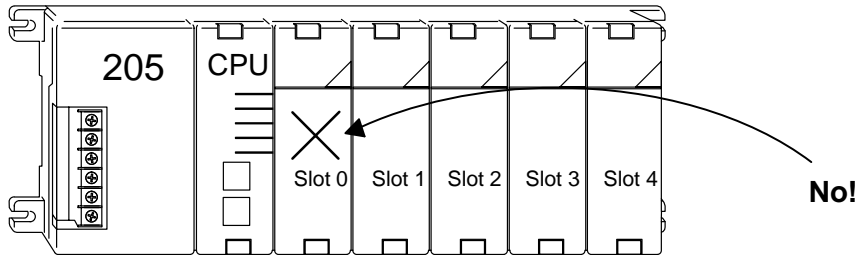
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- Inserting the ERM Module in the I/O Base
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Inserting the ERM Module in the I/O Base

DL205 Slot Choices

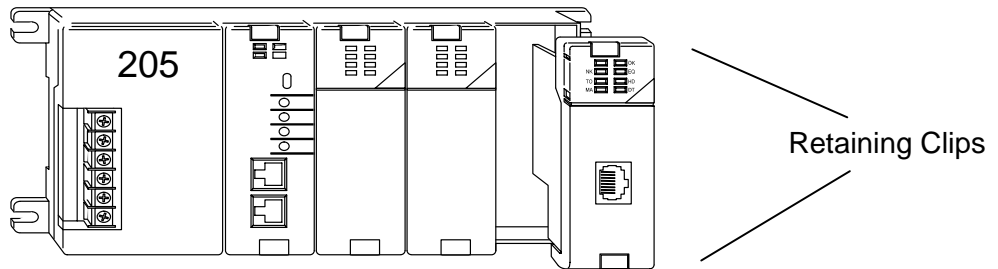
The DL205 system supports placement of the ERM module in the **CPU-base only**. It does not support installation of the ERM in local expansion or remote I/O bases. The number of usable slots depends on how many slots your base has. **The module does not work in slot 0 of the DL205 series PLCs**, the slot next to the CPU. The D2-240, D2-250-1 and D2-260 CPUs support the ERM modules. The D2-230 CPU does not.



WARNING: Your system can be damaged if you install or remove system components before disconnecting the system power. To minimize the risk of equipment damage, electrical shock, or personal injury, always disconnect the system power before installing or removing any system component.

Module Type	CPU	CPU-Base	Usable Slots
H2-ERM(-F)	DL240 DL250-1 DL260	D2-03B-1, D2-03BDC1-1, D2-03BDC-2	1
		D2-04B-1, D2-04BDC1-1, D2-04BDC-2	1, 2
		D2-06B-1, D2-06BDC1-1, D2-06BDC2-1	1, 2, 3, 4
		D2-06B-1, D2-06BDC1-1, D2-06BDC2-1	1, 2, 3, 4, 5, 6, 7

H2-ERM (-F) Module Installation



To install the ERM module, line up the module's printed circuit board with the grooves in the base and push the module until it is flush with face of the DL205 base power supply. If you feel more than moderate resistance when you push the module into the base, the circuit board may not be aligned with the grooves in the base. When the module is firmly seated in the slot, depress the top and bottom retaining clips to lock the module in place.

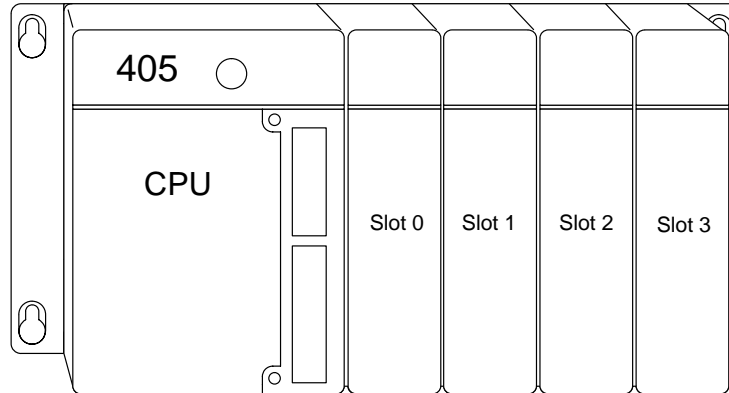


NOTE: When adding modules to your PLC always confirm that your **power budget** will accommodate the added module. See the User Manual for your PLC for more information about calculating the power budget. See Appendix A for the power consumption of the ERM modules.

DL405 Slot Choices

For PLC systems with D4-430 and D4-440 CPUs, the ERM modules can reside in any I/O slot but **only** in the CPU-base. The D4-450 CPU allows the installation of the ERM module in the CPU-base or in **local expansion** bases.

If the ERM module is used in a local expansion base, *all bases in the system* must be the “-1” type bases. The valid part numbers for these bases are D4-04B-1, D4-06B-1, and D4-08B-1. The “-1” on the end of the part number indicates that the base supports specialty modules including the ERM. The “-1” bases can be connected as **local expansion** bases or **remote** bases. They are not the same thing. Remote bases **do not** support the ERM modules!



WARNING: Your system can be damaged if you install or remove system components before disconnecting the system power. To minimize the risk of equipment damage, electrical shock, or personal injury, always disconnect the system power before installing or removing any system component.

Module Type	CPU	Base	Usable CPU-Base Slots	Usable Expansion Base Slots
H4-ERM (-F)	D4-430/440	D4-04B, D4-04B-1	0, 1, 2, 3	N/A
		D4-06B, D4-06B-1	0, 1, 2, 3, 4, 5	N/A
		D4-08B, D4-08B-1	0, 1, 2, 3, 4, 5, 6, 7	N/A
H4-ERM (-F)	D4-450	D4-04B	0, 1, 2, 3	N/A
		D4-06B	0, 1, 2, 3, 4, 5	N/A
		D4-08B	0, 1, 2, 3, 4, 5, 6, 7	N/A
H4-ERM (-F)	D4-450	D4-04B-1	0, 1, 2, 3	0, 1, 2, 3*
		D4-06B-1	0, 1, 2, 3, 4, 5	0, 1, 2, 3, 4, 5*
		D4-08B-1	0, 1, 2, 3, 4, 5, 6, 7	0, 1, 2, 3, 4, 5, 6, 7*

* You must use the “-1” base for the CPU-base and all local expansion bases.

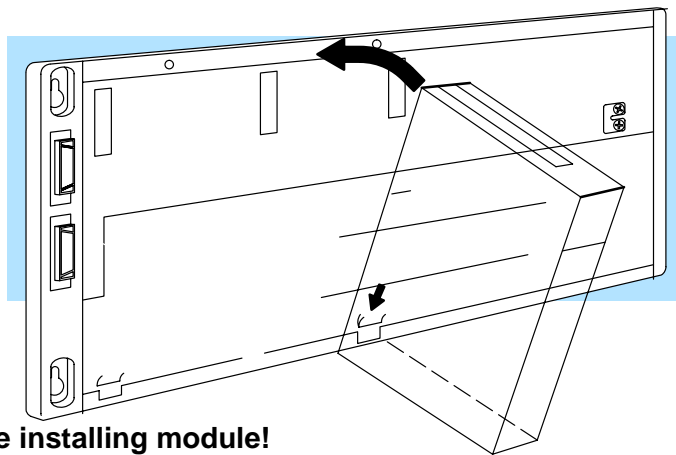


NOTE: Before installing the ERM module, confirm that your **power budget** will accommodate the added module. See the **DL205** or **DL405 User Manual** for your PLC for more information about calculating the power budget. See Appendix A for the power consumption of the ERM modules.

**H4-ERM (-F)
Module Installation**

To insert the ERM module in a DL405 base, place the bottom tab of the module into the notch at the bottom of the base. Pivot the module toward the base as shown below. Ensure that each module is tightly seated and secured with the captive screw at the top of the module.

DL405 Base



Disconnect power before installing module!

Which Modules are Supported in the Ethernet Slaves

The Ethernet remote I/O slaves accept the most commonly used I/O modules for the DL205/DL405 systems and Terminator I/O systems (AC, DC, AC/DC, Relay and Analog). The table below lists by category those modules that you may use in a remote I/O slave. A few specialty modules that are supported in the slaves are listed below.

Module/Unit	Remote Slave	Module/Unit	Remote Slave
PLC CPUs	No	H2-CTRIO	Yes
DC Input Modules	Yes	D2-CTRINT	No
AC Input Modules	Yes	H4-CTRIO, D4-HSC	Yes
AC/DC Input Modules	Yes	D2-EM	No
DC Output Modules	Yes	Communications and Networking Modules	No
AC Output Modules	Yes		
Relay Output Modules	Yes		
Analog I/O Modules	Yes		
Thermocouple Module	Yes		
RTD Module	Yes		

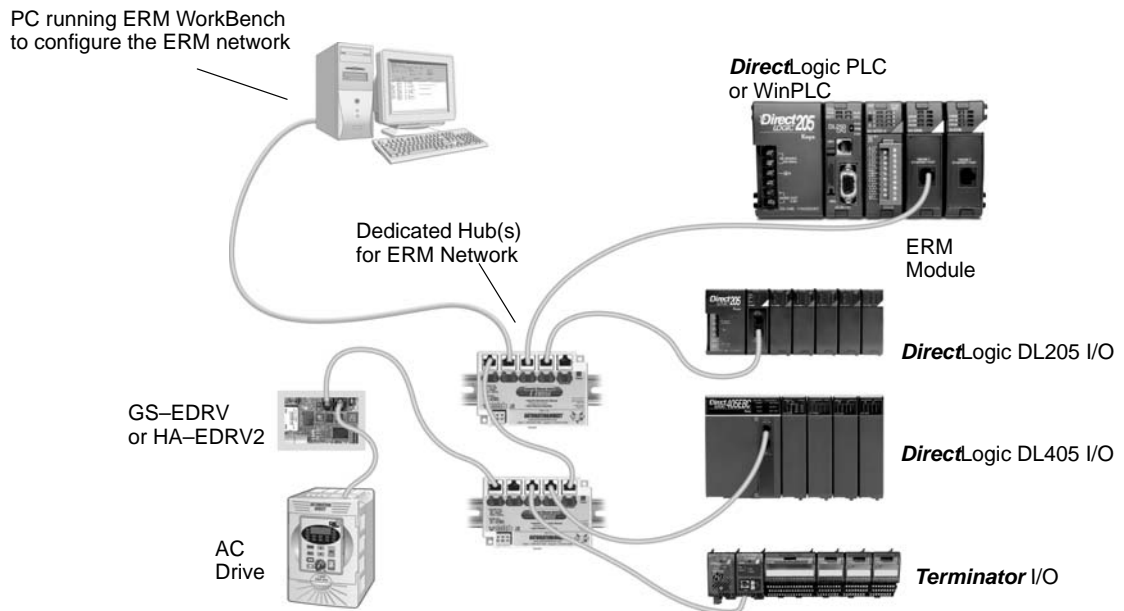
NOTE: The User Manual for Analog I/O Modules discusses scan times for updating analog I/O data for modules installed in *local* bases. Please be aware that the **scan times for updating are different for remote I/O modules installed in remote bases**. The CPU scan is **asynchronous** with the remote scan by the master module. Thus, an analog input module installed in a remote base, for example, may not have its data updated by the CPU "once every scan per channel" as stated in the user manual. The CPU scan may, in fact, cycle several times while the remote scan is taking place. Take this into account in applications where the timing is critical.

ERM Network Layouts

Each ERM module can support up to 16 remote slaves (if a WinPLC system is used, only one slave can be supported by the ERM module). The slaves supported are the H4-EBC(-F), H2-EBC(-F), T1H-EBC, GS-EDRV and HA-EDRV2. A hub or repeater connects multiple slaves into a star topology. Multiple hubs or repeaters can be used to create a star-bus-star topology. Once the ERM I/O network is configured and running, the PC can be removed from the network.

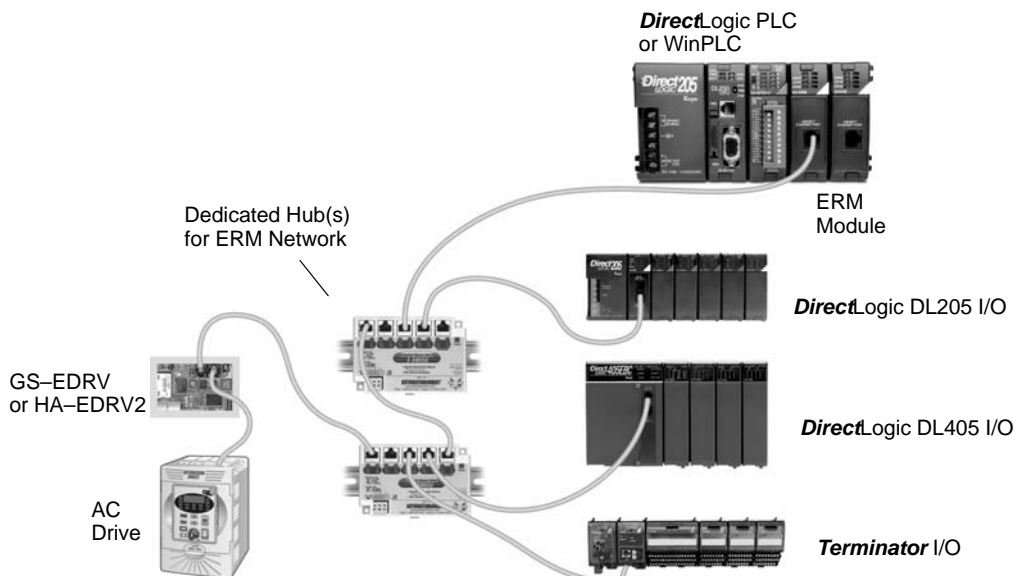
Configuring the Ethernet Remote I/O Network

Use a PC equipped with a 10BaseT or 10BaseFL network adapter card and the Ethernet Remote Master (ERM) Workbench software configuration utility that comes with this manual to configure the ERM module and its slaves over the ethernet remote I/O network.



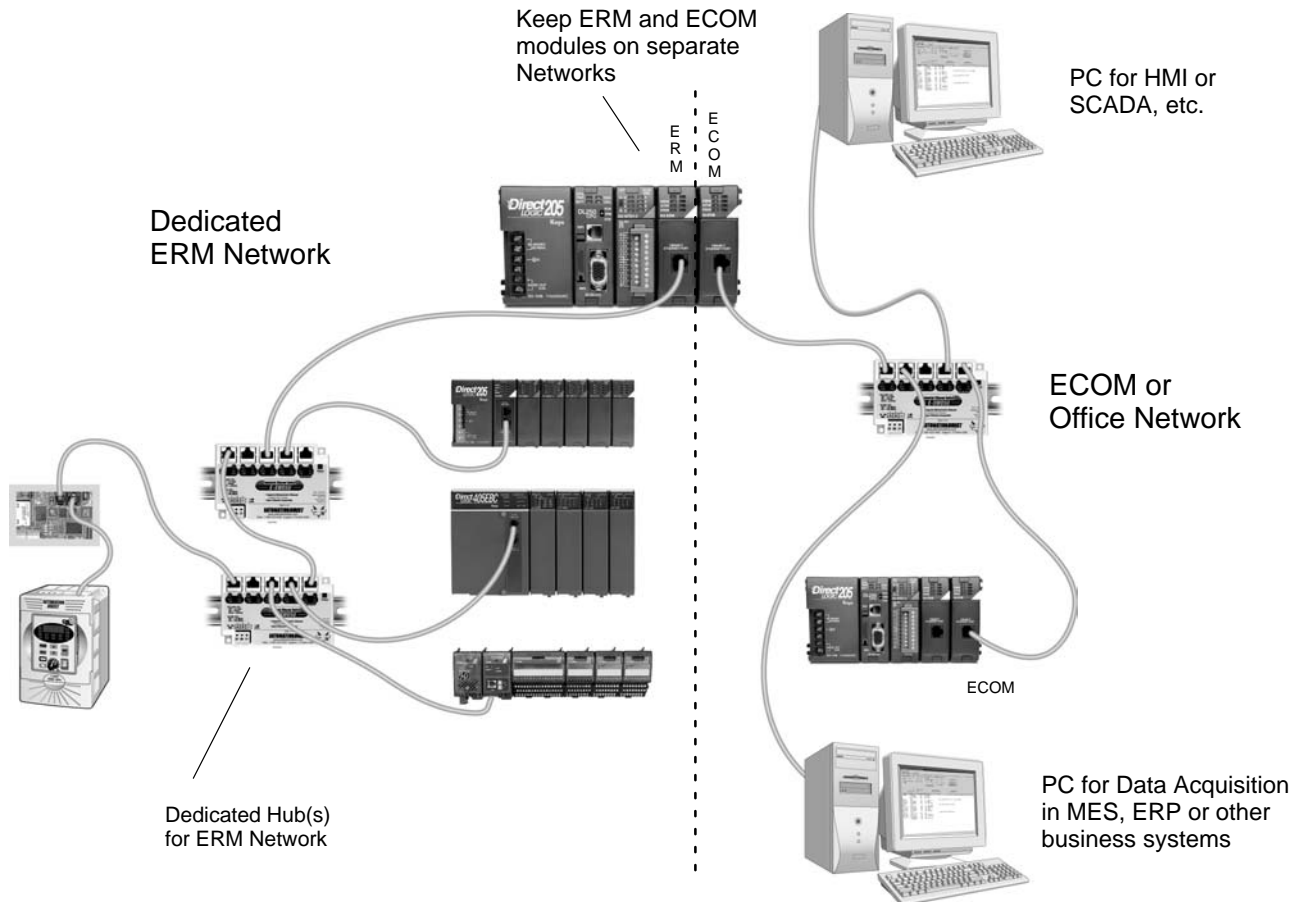
Running the Ethernet Remote I/O Network

Once the ERM I/O network is configured and running, the PC can be removed from the network.



ERM / ECOM Systems

Keep ERM networks, multiple ERM networks and ECOM / office networks isolated from one another as shown below. Do not attempt to connect an ECOM module or non ERM Workbench PC to a hub that the dedicated ERM network is using. **Having an ECOM module(s) on an ERM Ethernet network can adversely affect the reliability and the speed of the ERM slave I/O.**



Warning: We recommend using a dedicated Ethernet remote I/O network for the ERM and its slaves. While Ethernet networks can handle a very large number of data transmissions, and normally handle them very quickly, heavy Ethernet traffic can adversely affect the reliability of the slave I/O and the speed of the network.

Network Cabling

ERM Supports Two Standards

Two types of ERMs are available. One type supports the 10BaseT standard, and the other supports the 10BaseFL standard. The 10BaseT standard uses twisted pairs of copper wire conductors, and the 10BaseFL standard is for fiber optic cabling.

10BaseT

Unshielded Twisted-Pair cable with **RJ45** connectors



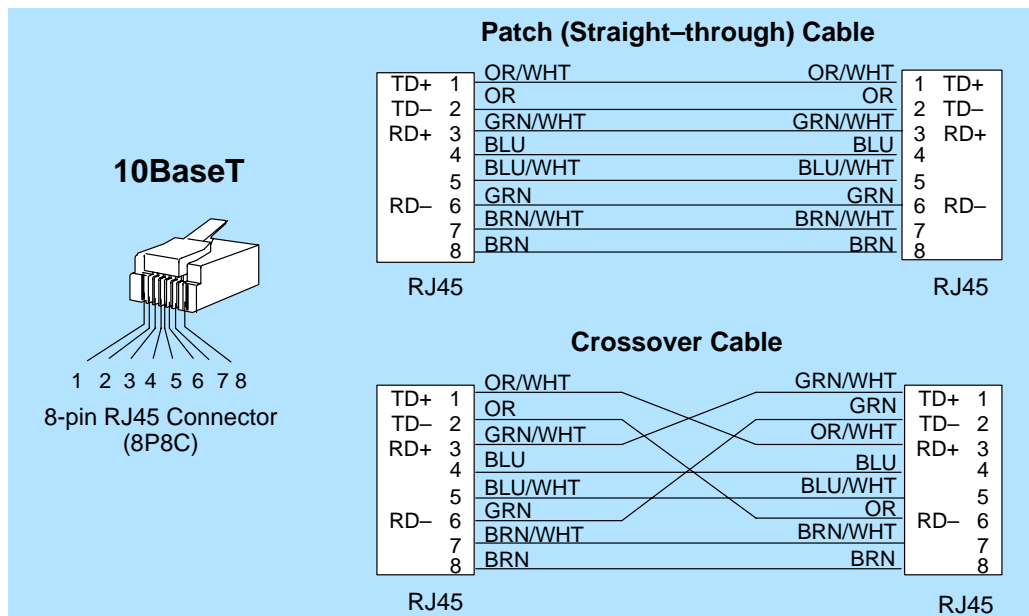
10BaseFL

62.5/125 MMF fiber optics cable with **ST-style** connectors



10BaseT Networks

The cable used to connect a PLC (or PC) to a hub or repeater is called a **patch** (straight-through) **cable**. The cable used to connect two Ethernet devices (Point-to-Point) together is a **crossover cable**. We recommend that you purchase cables pre-assembled with connectors for convenient and reliable networking.



This diagram illustrates the standard wire positions in the RJ45 connector. We recommend all ERM 10BaseT cables to be **Category 5**, UTP cable.

10BaseT Connections

Most 10BaseT hubs or repeaters use a **patch** (straight-through) cable for connecting the network devices (PLCs or PCs). For hub-to-hub connections a **crossover** type cable is commonly required. The figures on page 3-6 show pin assignments and insulation color codes for patch (straight-through) and crossover type Ethernet cables.

UTP Cable

The ERM has an eight-pin modular port that accepts RJ45 type connectors. UTP (Unshielded Twisted-Pair) cable is rated according to its data-carrying ability (bandwidth) and is given a “category” number. We strongly recommend using a category 5 cable for all ERM connections.

10BaseFL Connections

Each module has two bayonet ST-style connectors. The ST-style connector uses a quick release coupling which requires a quarter turn to engage or disengage. The connectors provide mechanical and optical alignment of fibers.

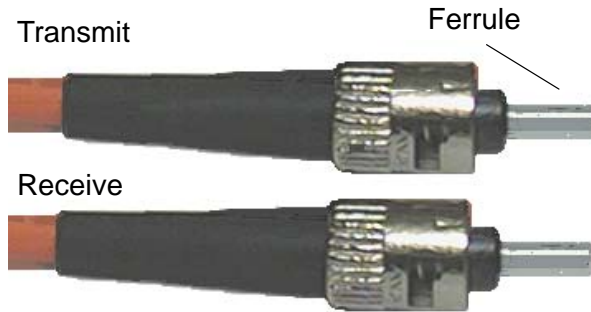
Each cable segment requires two strands of fiber: one to transmit data and one to receive data. The ST-style connectors are used to connect the H2-ERM-F or H4-ERM-F module to another H2-ERM-F or H4-ERM-F module or a fiber optic hub or repeater.

Fiber Optic Cable

The H2-ERM-F and H4-ERM-F modules accept 62.5/125 multimode fiber optic (MMF) cable. The glass core diameter is 62.5 micrometers and the glass cladding is 125 micrometers. The fiber optic cable is highly immune to noise and permits communications over much greater distances than 10BaseT.

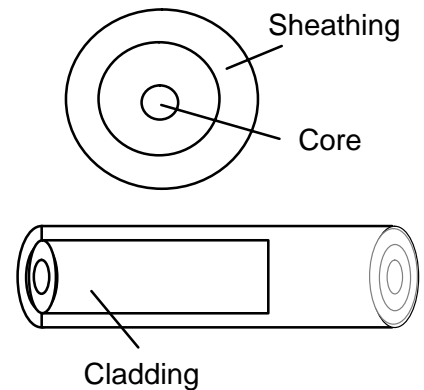
Fiber Optic Module ST Connector

Multimode Fiber Optic (MMF) Cable



62.5/125 MMF cable with bayonet ST-style connectors

Fiber cross-section



Connecting ERM to Slave

