

# Ethernet Remote I/O Client Modules



The Ethernet Remote Client H4-ERM100 connects D4-454 CPU systems to Ethernet Base Controller (EBC) Server I/O over a high-speed Ethernet link.

## Need a lot of I/O?

Each ERM module can support up to 16 DL205 EBC systems (SE-MC2U-SC), 16 Terminator I/O EBC systems (T1H-EBC100), or 16 fully expanded DL405 EBC systems (H4-EBC). See the next page for more information. Of course, combinations are fine, too. The ERM also supports E-drives. See the Drives section for details.

Specifications	H4-ERM100
<b>Communications</b>	10/100BaseT Ethernet
<b>Data Transfer Rate</b>	100 Mbps
<b>Link Distance</b>	100m (328ft)
<b>Ethernet Port</b>	RJ45
<b>Ethernet Protocols</b>	TCP/IP, IPX, Modbus TCP/IP, DHCP, HTML configuration
<b>Power Consumption</b>	300mA @ 5VDC

*Note: Applications requiring an extremely large number of T1H-EBC analog I/O or H4-EBC 16-channel analog I/O could exceed the buffer capacity of a single H4-ERM100 module. In these cases, an additional H4-ERM100 may be required.*

## Simple connections

The ERM connects to your control network using Category 5 UTP cables for cable runs up to 100 meters. Distances can be greatly extended with Ethernet/Fiber media converters like the SE-MC2U-ST.

## Networking ERMs with other Ethernet devices

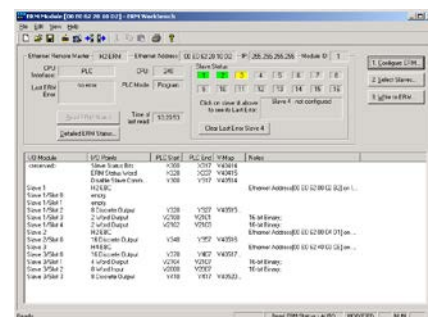
It is required that a dedicated Ethernet remote I/O network be used for the ERM and its Servers. While Ethernet networks can handle a very large number of data transactions, and normally handle them very quickly, heavy Ethernet traffic can adversely affect the reliability of the Server I/O and the speed of the I/O network. Keep ERM networks, multiple ERM networks and ECOM/office networks isolated from one another.

## Software configuration

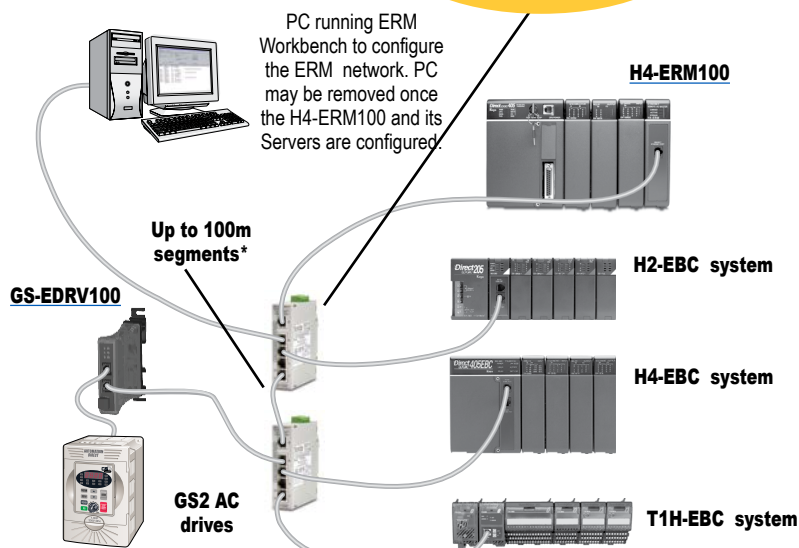
ERM Workbench is a software utility that must be used to configure the ERM and its remote Ethernet Servers. ERM Workbench supports two methods of configuring the ERM I/O network:

- ERM Workbench PLC Wizard - greatly simplifies the configuration procedure when a PLC is used as the CPU interface.
- ERM Workbench - configures the I/O network whether the CPU interface is a PLC or WinPLC, and allows access to all ERM I/O network parameters.

## ERM Workbench Software



**Stride Ethernet Switch.  
See the Communications  
Products section for details.**



\*Distances can be greatly extended with Ethernet/Fiber media converters like the SE-MC2U-ST.

# Ethernet Base Controller Modules

## ETHERNET BASE CONTROLLER MODULE

**H4-EBC \$836.00**



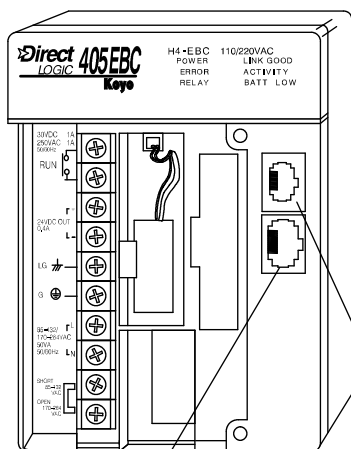
Use EBCs for PC-based control and for [H4-ERM100](#) remote I/O Servers

The [H4-EBC](#) Ethernet Base Controller modules provide a high-performance, low-cost Ethernet link between your PC-based control system or H4-ERM100 Ethernet remote I/O system and DL405 I/O. The H4-EBC module supports industry standard 10Base-T Ethernet communication. This module offers 10Mbps transfer rates between your PC application and your DL405 I/O base. The EBC module is compatible with TCP/IP and IPX protocols for flexible PC communications. Four addressing schemes make it easy to identify the module on the network using the method that works best for you. EBCs also offer:

- Virtually unlimited number of I/O points
- I/O updates on dedicated networks
- Use off-the-shelf networking components to connect to your existing network
- Fast I/O updates (< 1ms per base possible based on I/O)
- On-board serial port for operator interface, etc., when used with a PC-based program like Think and Do Live. (Serial port not supported when used with the H4-ERM100 module).

Specifications	H4-EBC
<b>Communications</b>	10Base-T Ethernet
<b>Data Transfer Rate</b>	10Mbps
<b>Link Distance</b>	100 meters (328 ft)
<b>Ethernet Port</b>	RJ45
<b>Ethernet Protocols</b>	TCP/IP, IPX
<b>Serial Port</b>	RJ12, K-Sequence, ASCII IN/OUT
<b>Max. Expansion Bases</b>	3
<b>Max. Discrete I/O</b>	1280
<b>Max. Analog I/O</b>	512
<b>Power Supplied</b>	3470mA @ 5VDC 400mA @ 24VDC

**H4-EBC**



**RJ45 port for 10BaseT**

**RJ12 serial port**

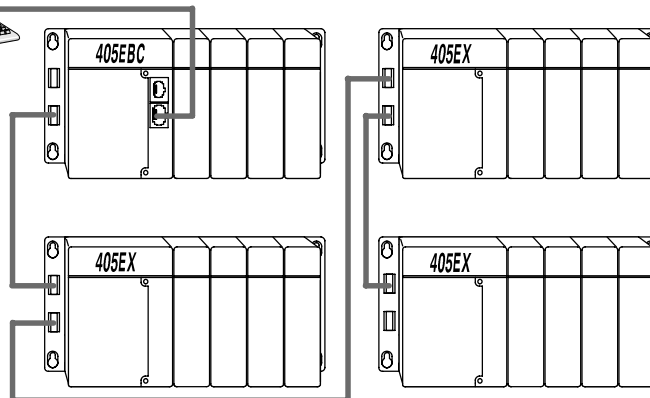
## Easy to use, reliable and fast

The H4-EBC module plugs into the CPU slot of any DL405 I/O base. The 10Base-T port can be networked using commercially available cabling, hubs, and repeaters.

The [H4-EBC](#) module supports all DL405 discrete and analog I/O modules. The H4-EBC module also supports the H4-CTRIO but no other intelligent modules.



**The H4-EBC supports up to three expansion bases.**



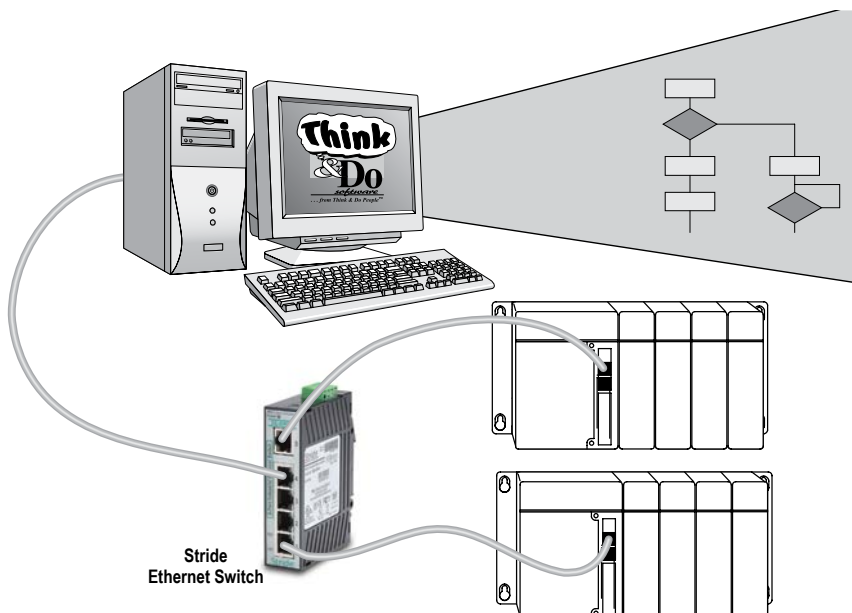
# Ethernet Base Controller Modules

## Off-the-shelf solutions

You can purchase PC-based control software that is ready to use with the H4-EBC module. PC-based control packages are equipped with compatible I/O device drivers, program development tools, and run-time environments. See the PC-based Control Products section for an integrated PC-based Control solution to make your PC into an industrial controller.

## Software developers

For programmers developing custom drivers for our I/O, we offer a free Ethernet Software Development Kit (SDK). The SDK provides a simplified API for interfacing with the H4-EBC. The software interface libraries are provided for WIN32, WIN16, and DOS operating systems. The source code is available to developers under a non-disclosure agreement. Visit the technical support link at our Web site for more information.



The following vendors have PC-based Control products ready to control our I/O, or they have compatible products to be released in the future.

Vendor	Product	Web Address
Phoenix Contact	Think & Do Live!	<a href="http://www.phoenixcon.com/software">www.phoenixcon.com/software</a>
KEPware	KEPServerEX	<a href="http://www.kepware.com">www.kepware.com</a>
Wonderware	InControl	<a href="http://www.wonderware.com">www.wonderware.com</a>

### READ I/O

```
int HEIReadIO
(
    HEIDevice *pDevice,
    Byte *pBuffer,
    WORD BuffSize
);
```

### WRITING I/O

```
int HEIWriteIO
(HEIDevice *pDevice,
  BYTE *pData,
  WORD SizeofData,
  BYTE *pReturnData,
  WORD *pSizeofReturnData
);
```



# Check the Power Budget

## Verify your power budget requirements

Your I/O configuration choice can be affected by the power requirements of the I/O modules you choose. When determining the types and quantity of I/O modules you will be using, it is important to remember there is a limited amount of power available from the power supply.

The chart on the opposite page indicates the power supplied and used by each DL405 device. The adjacent chart shows an example of how to calculate the power used by your particular system. These two charts should make it easy for you to determine if the devices you have chosen fit within the power budget of your system configuration.

If the I/O you have chosen exceeds the maximum power available from the power supply, you can resolve the problem by shifting some of the modules to an expansion base or remote I/O base (if you are using remote I/O).

**Warning:** It is extremely important to calculate the power budget correctly. If you exceed the power budget, the system may operate in an unpredictable manner which may result in a risk of personal injury or equipment damage.

## Use ZIPLinks to reduce power requirements

If your application requires a lot of relay outputs, consider using the Ziplink AC or DC relay output modules. These modules can switch high current (10A) loads without putting a load on your base power budget. Refer to Wiring System for DL405 PLCs later in this section for more information.

This logo is placed next to I/O modules that are supported by the Ziplink connection systems.



See the I/O module specifications at the end of this section.

## Calculating your power usage

The following example shows how to calculate the power budget for the DL405 system. The example is constructed around a single 8-slot base using the devices shown. It is recommended you construct a similar table for each base in your system.

A				
	Base Number 0	Device Type	5 VDC (mA)	External 24 VDC Power (mA)
B	CURRENT SUPPLIED			
	CPU/Expansion Unit /Remote Server	D4-454 CPU	3700	400
C	CURRENT REQUIRED			
	SLOT 0	D4-16ND2	+150	+0
	SLOT 1	D4-16ND2	+150	+0
	SLOT 2	F4-04DA-2	+90	+90
	SLOT 3	D4-08NA	+100	+0
	SLOT 4	D4-08NA	+100	+0
	SLOT 5	D4-16TD2	+100	+0
	SLOT 6	D4-16TD2	+100	+0
	SLOT 7	D4-16TR	+1000	+0
D	OTHER			
	BASE	D4-08B-1	+80	+0
	Handheld Programmer	D4-HPP-1	+320	+0
E	Maximum Current Required		2190	90
F	Remaining Current Available		3700-2190=1510	400-90=310
1. Using a chart similar to the one above, fill in column 2. 2. Using the tables on the opposite page, enter the current supplied and used by each device (columns 3 and 4). Pay special attention to the current supplied by the CPU, Expansion Unit, and Remote Server since they differ. Devices which fall into the "Other" category (Row D) are devices such as the Base and the Handheld programmer, which also have power requirements, but do not plug directly into the base. 3. Add the current used by the system devices (columns 3 and 4) starting with Slot 0 and put the total in the row labeled "maximum current required" (Row E). 4. Subtract the row labeled "Maximum current required" (Row E), from the row labeled "Current Supplied" (Row B). Place the difference in the row labeled "Remaining Current Available" (Row F). 5. If "Maximum Current Required" is greater than "Current Supplied" in either column 3 or 4, the power budget will be exceeded. It will be unsafe to use this configuration and you will need to restructure your I/O configuration. Note the auxiliary 24VDC power supply does not need to supply all the external power. If you need more than the 400mA supplied, you can add an external 24VDC power supply. This will help keep you within your power budget for external power.				

## DL405 CPU power supply specifications and power requirements

Specification	AC Powered Units	24 VDC Powered Units
<b>Part Numbers</b>	D4-454, D4-EX (expansion base unit), D4-RS (remote Server unit)	D4-454DC-1, D4-EXDC (expansion base unit)
<b>Voltage Withstand (dielectric)</b>	1 minute @ 1,500 VAC between primary, secondary, field ground, and run relay	
<b>Insulation Resistance</b>	> 10MΩ at 500VDC	
<b>Input Voltage Range</b>	85-132 VAC (110V range) 170-264 VAC (220V range)	20-28 VDC (24VDC) with less than 10% ripple
<b>Maximum Inrush Current</b>	20A	20A
<b>Maximum Power</b>	50VA	38W

# Power Requirements

Power Supplied					
CPUs/Remote Units/ Expansion Units	5 VDC Current Supplied in mA	24V Aux Power Supplied in mA	CPUs/Remote Units/ Expansion Units	5V Current Supplied in mA	24V Aux Power Supplied in mA
D4-454 CPU D4-454DC-1	3100 3100	400 NONE	D4-EX D4-EXDC D4-RS H4-EBC	4000 4000 3700 3470	400 NONE 400 400
Power Consumed					
Power-consuming Device	5V Current Consumed	External 24VDC Required	Power-consuming Device	5V Current Consumed	External 24VDC Current Required
<b>I/O Bases</b>			<b>Analog Modules (continued)</b>		
D4-04B-1	80	NONE	F4-16AD-1	75	100
D4-06B-1	80	NONE	F4-16AD-2	75	100
D4-08B-1	80	NONE	F4-08DA-1	70	75+20 per circuit
			F4-08DA-2	90	90
			F4-04DAS-1	60	60 per circuit
			F4-08DA-1	90	100+20 per circuit
			F4-08DA-2	80	150
			F4-16DA-1	90	100+20 per circuit
			F4-16DA-2	80	25 max.
			F4-08RTD	80	NONE
			F4-08THM-J(-n)	120	50
			F4-08THMF4-08THM	110	60
<b>DC Input Modules</b>			<b>Remote I/O</b>		
D4-16ND2	150	NONE	H4-ERM100	320(300)	NONE
D4-16ND2F	150	NONE	H4-ERM-F	450	NONE
D4-32ND3-1	150	NONE	D4-RM	300	NONE
D4-64ND2	300 max.	NONE			
<b>AC Input Modules</b>			<b>Communications and Networking</b>		
D4-08NA	100	NONE	H4-ECOM100	300	NONE
D4-16NA	150	NONE	D4-DCM	500	NONE
			F4-MAS-MB	235	NONE
<b>AC/DC Input Modules</b>			<b>CoProcessors</b>		
D4-16NE3	150	NONE	F4-CP128-1	305	NONE
<b>DC Output Modules</b>			<b>Specialty Modules</b>		
D4-16TD1	200	125	H4-CTRIO	400	NONE
D4-16TD2	400	NONE	D4-16SIM	150	NONE
D4-32TD1	250	140	F4-4LTC	280	75
D4-32TD2	350	120 (4A max including loads)			
D4-64TD1	800	NONE			
<b>AC Output Modules</b>			<b>Programming</b>		
D4-08TA	250	NONE	D4-HPP-1 (Handheld Prog.)	320	NONE
D4-16TA	450	NONE	<b>Operator Interface</b>		
<b>Relay Output Modules</b>			C-more Micro-Graphic	210	NONE
D4-08TR	550	NONE			
F4-08TRS-1	575	NONE			
F4-08TRS-2	575	NONE			
D4-16TR	1000	NONE			
<b>Analog Modules</b>					
F4-04AD	150	100			
F4-04ADS	370	120			
F4-08AD	75	90			