Ethernet Remote I/O Client Modules

ETHERNET REMOTE I/O CLIENT MODULE

H4-ERM100 $410.00

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.

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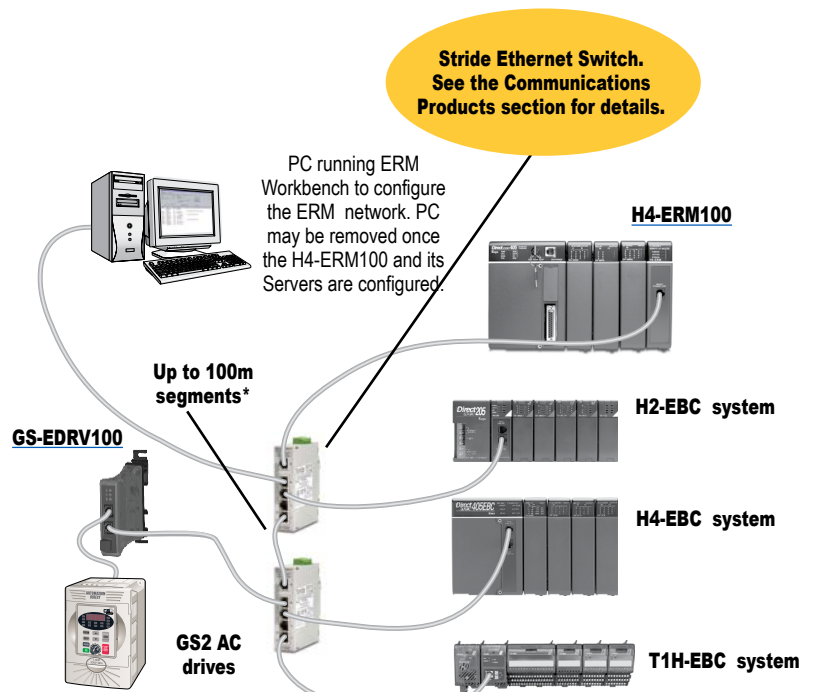
Software configuration
ERM Workbench is a software utility that must be used to configure the ERM and its remote Ethernet Servers. ERM Workbench supports two methods of configuring the ERM I/O network:

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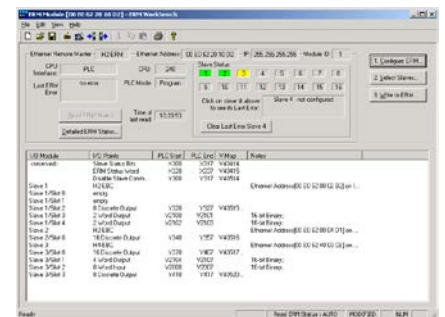
| Specifications	H4-ERM100
Communications	10/100BaseT Ethernet
Data Transfer Rate	100 Mbps
Link Distance	100m (328ft)
Ethernet Port	RJ45
Ethernet Protocols	TCP/IP, IPX, Modbus TCP/IP, DHCP, HTML configuration
Power Consumption	300mA @ 5VDC

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

PC running ERM Workbench to configure the ERM network. PC may be removed once the H4-ERM100 and its Servers are configured.

H4-ERM100

Up to 100m segments*

GS-EDRV100

H2-EBC system

H4-EBC system

GS2 AC drives

T1H-EBC system

*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

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

H4-EBC
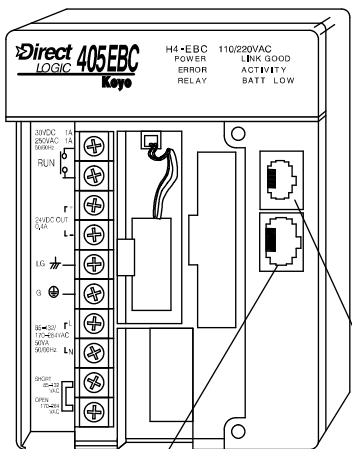
RJ45 port for 10BaseT   RJ12 serial port

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).

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.
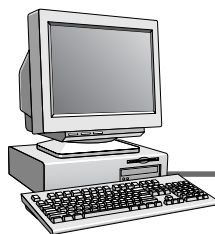
**The H4-EBC supports up to three expansion bases.**
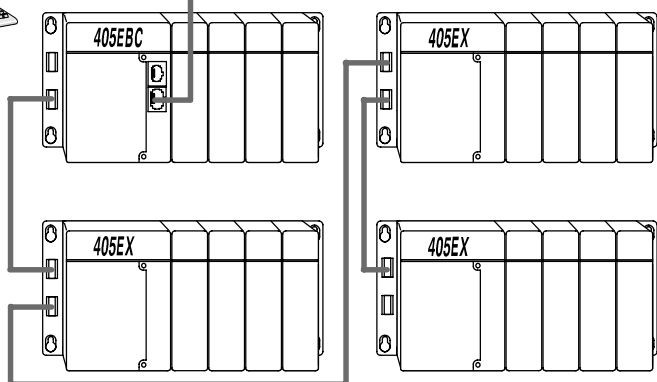
Ethernet Base Controller Modules

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.

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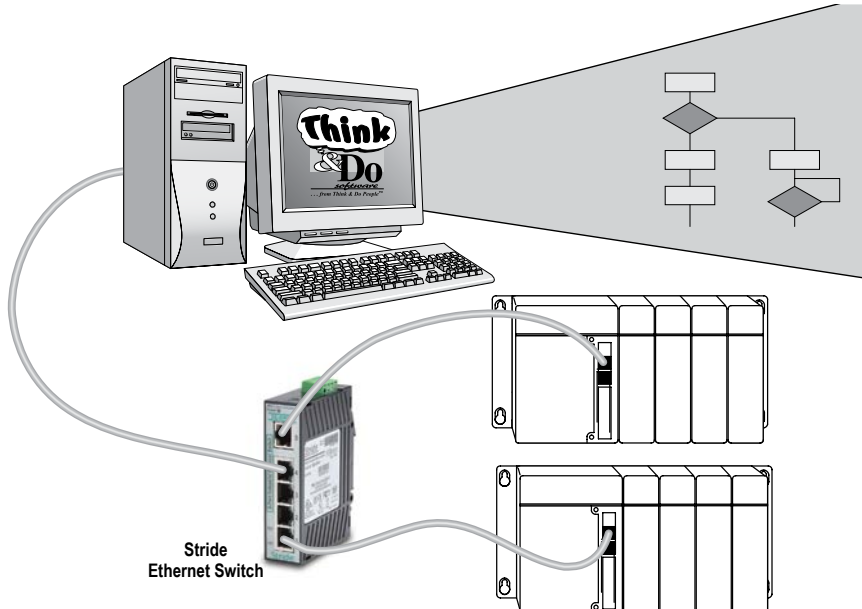
The following vendors have PC-based Control products ready to control our I/O, or they have compatible products to be released in the future.

Vendor	Product	Web Address
Phoenix Contact	Think & Do Live!	www.phoenixcon.com/software
KEPware	KEPServerEX	www.kepware.com
Wonderware	InControl	www.wonderware.com

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

Power Requirements

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