

# Serial Remote I/O Master/Slave Modules

## Remote I/O Master Module

D2-RMSM <---->



## Remote I/O Slave Module

D2-RSSS <---->



## Overview

You can use remote I/O in addition to the I/O in the local base. The remote master is located in the CPU base and communicates with the remote slaves via shielded twisted-pair cable. To use a remote I/O system, you will need the following:

### Remote master

One master can be used for each channel. It can be a D2-RMSM, or the bottom port on a D2-250-1 or D2-260 CPU. (The CPU port only supports RM-NET.)

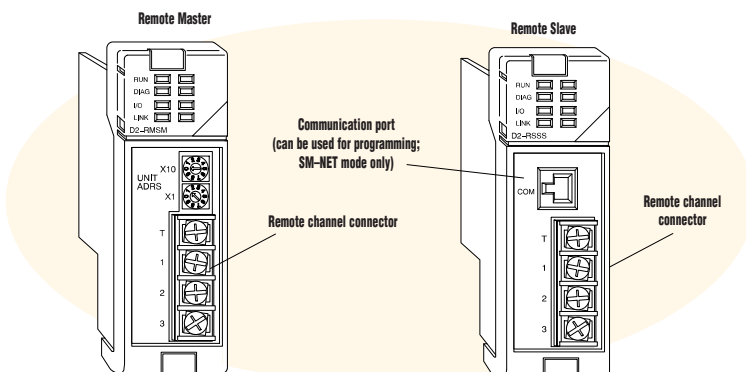
### Remote slave

A D2-RSSS and I/O base must be used for each slave.

*The remote I/O points are updated asynchronously to the CPU scan. For this reason, remote I/O applications should be limited to those that do not require the I/O points to be updated on every scan.*

Remote Master Specifications		
<b>Module Type</b>	Intelligent device	
<b>Number of Masters per CPU</b>	Two maximum for D2-240 and eight (seven + one CPU port) for the D2-250(-1) and D2-260 (built-in master feature in D2-250(-1) and D2-260 bottom port can be used as a master for RM-NET and would count as one master if used). D2-230 does not support remote I/O.	
<b>Maximum Number of Channels</b>	CPU dependent as above Channels may be split between RM-NET and SM-NET if necessary.	
<b>Channel Capacity:</b>	<b>RM-NET</b>	<b>SM-NET</b>
<b>Maximum # Slaves</b>	7	31
<b>Baud Rates</b>	19.2K, 38.4K baud	Selectable (19.2K, 38.4K, 153.6K, 307.2, 614.4K baud)
<b>Transmission Distance</b>	3,900 ft. (1.2Km)	3,900 feet (1.2Km) @ 19.2 K or 38.4K baud
		1,968 feet (600m) @ 153.6K baud
		984 feet (300m) @ 307.2K baud
		328 feet (100m) @ 614.4K baud
<b>Communication to Slaves</b>	RS-485 via twisted pair with shield @ 38.4 Kbaud	
<b>Recommended Cable</b>	Belden 9841 or equivalent - 120 ohm impedance, 12pF/ft	
<b>Terminal Type</b>	Fixed	
<b>Operating Environment</b>	0°C to 60°C (32°F to 140°F), 5% to 95% humidity (non-condensing)	
<b>Internal Power Consumption</b>	200 mA maximum	
<b>Manufacturer</b>	Koyo Electronics	

Remote Slave Specifications	
<b>Maximum Slave Points per CPU</b>	No remote I/O for D2-230 D2-240, D2-250(-1), D2-260 support a maximum of 2048 points per channel. However, actual I/O available is limited by available I/O points and number of local I/O being used. The D2-240 has a total of 320 X input, 320 Y outputs, and 256 control relays available to share between local and remote I/O. The D2-250(-1) has a total of 512 X inputs, 512 Y outputs and 1024 control relays to share between local and remote I/O. The D2-260 has 1024 X inputs, 1024 Y outputs, 2048 control relays, 2048 GX inputs and 2048 GY outputs to share between local and remote I/O points.
<b>I/O Addresses Used</b>	I/O modules in slave bases do not automatically consume any standard input and output points. You select which points are consumed by setup instructions in your RLL program.
<b>Terminal Type</b>	Fixed
<b>Communications Port</b>	RS-232, 9.6 Kbaud (same as top port on CPUs, SM-NET mode only)
<b>Base Power Requirement</b>	200 mA maximum
<b>Operating Environment</b>	0°C to 60°C (32°F to 140°F), 5% to 95% humidity (non-condensing)
<b>Manufacturer</b>	Koyo Electronics



# Ethernet Vs. Serial Remote I/O

## I/O throughput

I/O throughput is defined as the time it takes from when an output is set in the ladder logic to when its corresponding input value is equal. This includes the PLC scan time, I/O backplane update time, and I/O module response times.

## Testing I/O throughput times

A test was performed by our partner, Host Automation Products, to compare the difference between H2-ERM Ethernet remote I/O and D2-RSM serial remote I/O throughput times. Host Automation Products supplies the H2-ERM, H2-EBC, H2-ECOM, etc. as well as *DirectSOFT* and *DSDData Server* software.

### I/O groups tested

**Discrete I/O** - D2-16TD1-2 discrete outputs of slot 2 are tied to the D2-16ND3-2 discrete inputs of slot 0.

**Analog I/O** - F2-02DAS-2 analog output channel 1 is tied to the F2-04AD-2 analog input channel 1 of slot 3. The analog values were scaled from the full 16-bit range down to 12 bit range.

Each group was run independently through the following cycle 256 times:

- Step 1: Set all outputs to OFF for a random number of scans
- Step 2: Set all outputs to a random value for a random number of scans
- Step 3: Set all outputs to ON for a random number of scans
- Step 4: Set all outputs to a random value for a random number of scans

Since these four steps are repeated 256 times, there are actually 1,024 samples of I/O throughput.

## Test results

The results are listed in the tables at the right. As the number of H2-ERM slaves and I/O points increase, the I/O throughput times will remain flat until 64 analog inputs, 64 analog outputs, or 1,024 discrete I/O points are exceeded. As the number of D2-RSM slaves and I/O points increase, the I/O throughput times increase proportionally.

## H2-ERM / H2-EBC Ethernet Remote I/O System



## D2-RSM / D2-RSSS Serial Remote I/O System



Discrete I/O Test	I/O Throughput Times			
Remote I/O System	Min.	Max.	Avg.	Std. Dev.
H2-ERM / H2-EBC	45ms	71ms	53.32ms	6.14ms
D2-RSM / D2-RSSS	36ms	56ms	42.29ms	5.81ms

Analog I/O Test	I/O Throughput Times			
Remote I/O System	Min.	Max.	Avg.	Std. Dev.
H2-ERM / H2-EBC	46ms	113ms	62.94ms	14.48ms
D2-RSM / D2-RSSS	64ms	321ms	117.38ms	37.44ms

# Power Requirements

## These charts help determine your power requirements

This section shows the amount of power supplied by each of the base power supplies and the amount of power consumed by each DL205 device. The Power Consumed charts list how much INTERNAL power from each power source is required for the DL205 devices. Use this information when calculating the power budget for your system.

In addition to the internal power sources, the DL205 bases offer a 24 VDC auxiliary power supply with external power connections. This auxiliary power supply can power external devices.

## 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 the Terminal Blocks and Wiring Solutions section in this catalog for more information.

This logo is placed next to the I/O modules that are supported by the ZIPLink connection systems. See the I/O module specifications at the end of this section.



Power Consumed		
Device	5V(mA)	24V Auxiliary
<b>Operator Interface</b>		
DV-1000	150	0
C-more Micro-Graphic	210	0

Power Supplied							
Device	Price	5V(mA)	24V Auxiliary	Device	Price	5V(mA)	24V Auxiliary
<b>Bases</b>				<b>Bases</b>			
D2-03B-1	<--->	2600	300	D2-06BDC1-1	<--->	2600	None
D2-03BDC1-1	<--->	2600	None	D2-06BDC2-1	<--->	2600	300
D2-04B-1	<--->	2600	300	D2-09B-1	<--->	2600	300
D2-04BDC1-1	<--->	2600	None	D2-09BDC1-1	<--->	2600	None
D2-06B-1	<--->	2600	300	D2-09BDC2-1	<--->	2600	300

Power Consumed		
Device	5V(mA)	24V Auxiliary
<b>CPUs</b>		
D2-230	120	0
D2-240	120	0
D2-250-1	330	0
D2-260	330	0
H2-WPLC**	680	0
<b>DC Input Modules</b>		
D2-08ND3	50	0
D2-16ND3-2	100	0
D2-32ND3	25	0
D2-32ND3-2	25	0
<b>AC Input Modules</b>		
D2-08NA-1	50	0
D2-08NA-2	100	0
D2-16NA	100	0
<b>Input Simulator Module</b>		
F2-08SIM	50	0
<b>DC Output Modules</b>		
D2-04TD1	60	20
D2-08TD1	100	0
D2-08TD2	100	0
D2-16TD1-2	200	80
D2-16TD2-2	200	0
F2-16TD1P	70	50
F2-16TD2P	70	50
D2-32TD1	350	0
D2-32TD2	350	0
<b>AC Output Modules</b>		
D2-08TA	250	0
F2-08TA	250	0
D2-12TA	350	0
<b>Relay Output Modules</b>		
D2-04TRS	250	0
D2-08TR	250	0
F2-08TR(S)	670	0
D2-12TR	450	0
<b>Combination In/Out Module</b>		
D2-08CDR	200	0

Power Consumed		
Device	5V(mA)	24V Auxiliary
<b>Analog Modules</b>		
F2-04AD-1	100	5
F2-04AD-2	110	5
F2-08AD-1	100	5
F2-08AD-2	100	5
F2-02DA-1	40	60 (note 1)
F2-02DA-1L	40	70 @ 12V (note 1)
F2-02DA-2	40	60
F2-02DA-2L	40	70 @ 12V
F2-02DAS-1	100	50 / channel
F2-02DAS-2	100	60 / channel
F2-08DA-1	30	50 (note 1)
F2-08DA-2	60	140
F2-4AD2DA	60	80 (note 1)
F2-8AD4DA-1	35	100 (note 1)
F2-8AD4DA-2	35	80 (note 1)
F2-04RTD	90	0
F2-04THM	110	60
<b>Specialty Modules</b>		
D2-CTRINT	50*	0
D2-CM / D2-EM	100/130	0
H2-CTRIO	400	0
D2-DCM	300	0
F2-DEVNETS	160	0
F2-SDS-1	160	0
H2-PBC	530	0
H2-EBC(-F)	450, (640)	0
H2-ECOM(-F)	450, (640)	0
H2-ECOM100	300	0
F2-CP128	235	0
<b>Remote I/O</b>		
H2-ERM(-F)	320, (450)	0
D2-RMSM	200	0
D2-RSSS	150	0
<b>Programming Devices</b>		
D2-HPP	200	0

\*requires external 5VDC for outputs  
Note 1: Add an additional 20 mA per output loop.