

# 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.)

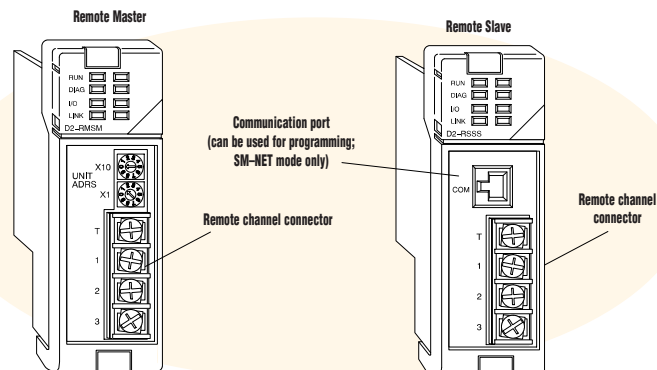
#### Remote slave

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



- PLC Overview
- DL05/06 PLC
- DL105 PLC
- DL205 PLC**
- DL305 PLC
- DL405 PLC
- Field I/O
- Software
- C-more HMIs
- Other HMI
- AC Drives
- Motors
- Steppers/Servos
- Motor Controls
- Proximity Sensors
- Photo Sensors
- Limit Switches
- Encoders
- Current Sensors
- Pushbuttons/Lights
- Process
- Relays/Timers
- Comm.
- TB's & Wiring
- Power
- Circuit Protection
- Enclosures
- Appendix
- Part Index

# 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 *DSData 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.

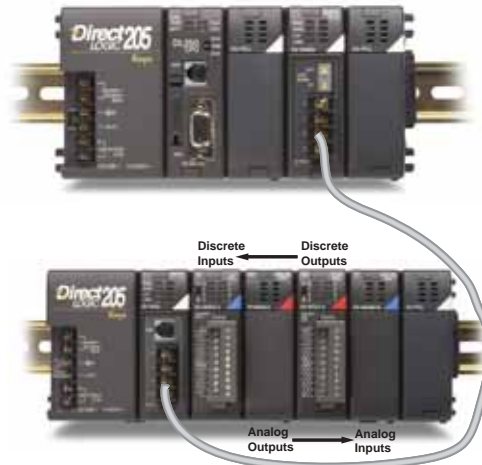
## Test results

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