Serial Remote I/O Master/Slave Modules

Remote I/O Master Module
D2-RMSM   <--->

Remote I/O Slave Module
D2-RSSS   <--->

Remote Master Specifications		
Module Type	Intelligent device	
Number of Masters per CPU	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.	
Maximum Number of Channels	CPU dependent as above	
	Channels may be split between RM-NET and SM-NET if necessary.	
Channel Capacity:	**RM-NET**	**SM-NET**
Maximum # Slaves	7	31
Baud Rates	19.2K, 38.4K baud	Selectable (19.2K, 38.4K, 153.6K, 307.2, 614.4K baud)
Transmission Distance	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
Communication to Slaves	RS-485 via twisted pair with shield @ 38.4 Kbaud	
Recommended Cable	Belden 9841 or equivalent - 120 ohm impedance, 12pF/ft	
Terminal Type	Fixed	
Operating Environment	0ºC to 60ºC (32ºF to 140ºF), 5% to 95% humidity (non-condensing)	
Internal Power Consumption	200 mA maximum	
Manufacturer	Koyo Electronics	

Remote Slave Specifications	
Maximum Slave Points per CPU	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.
I/O Addresses Used	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.
Terminal Type	Fixed
Communications Port	RS-232, 9.6 Kbaud (same as top port on CPUs, SM-NET mode only)
Base Power Requirement	200 mA maximum
Operating Environment	0ºC to 60ºC (32ºF to 140ºF), 5% to 95% humidity (non-condensing)
Manufacturer	Koyo Electronics

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.)
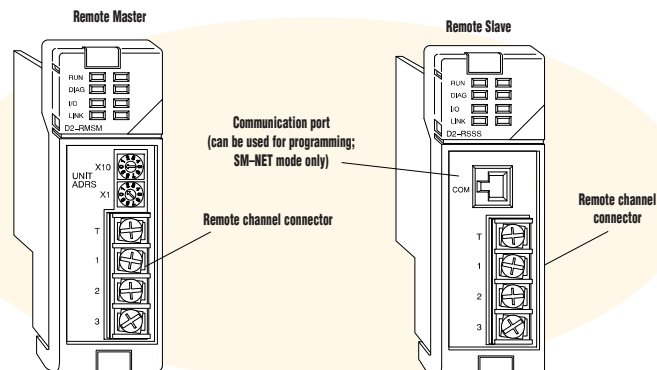
Remote slave

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 / Remote Slave
Communication port (can be used for programming; SM–NET mode only)
Remote channel connector
Remote channel connector

Automationdirect

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-RMSM serial remote I/O throughput times. Host Automation Products supplies the H2-ERM, H2-EBC, H2-ECOM, etc. as well as *Direct*SOFT 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

Step2: 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.
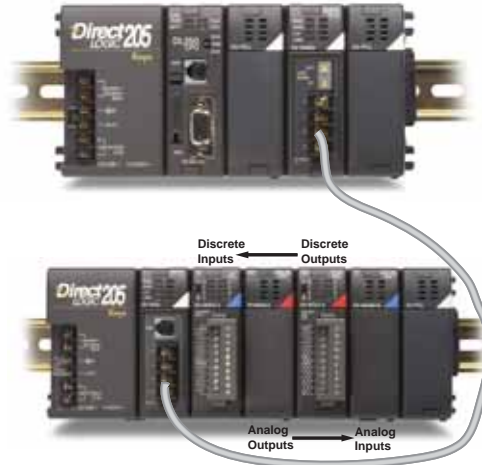
Test results

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-RMSM slaves and I/O points increase, the I/O throughput times increase proportionally.

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

Discrete Inputs ← Discrete Outputs

Analog Outputs → Analog Inputs

D2-RMSM / D2-RSSS Serial Remote I/O System

Discrete Inputs ← Discrete Outputs

Analog Outputs → Analog Inputs

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-RMSM / 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-RMSM / D2-RSSS	64ms	321ms	117.38ms	37.44ms