

# Serial Remote I/O Client/Server Modules

## REMOTE I/O CLIENT MODULE

**D4-RM \$617.00**



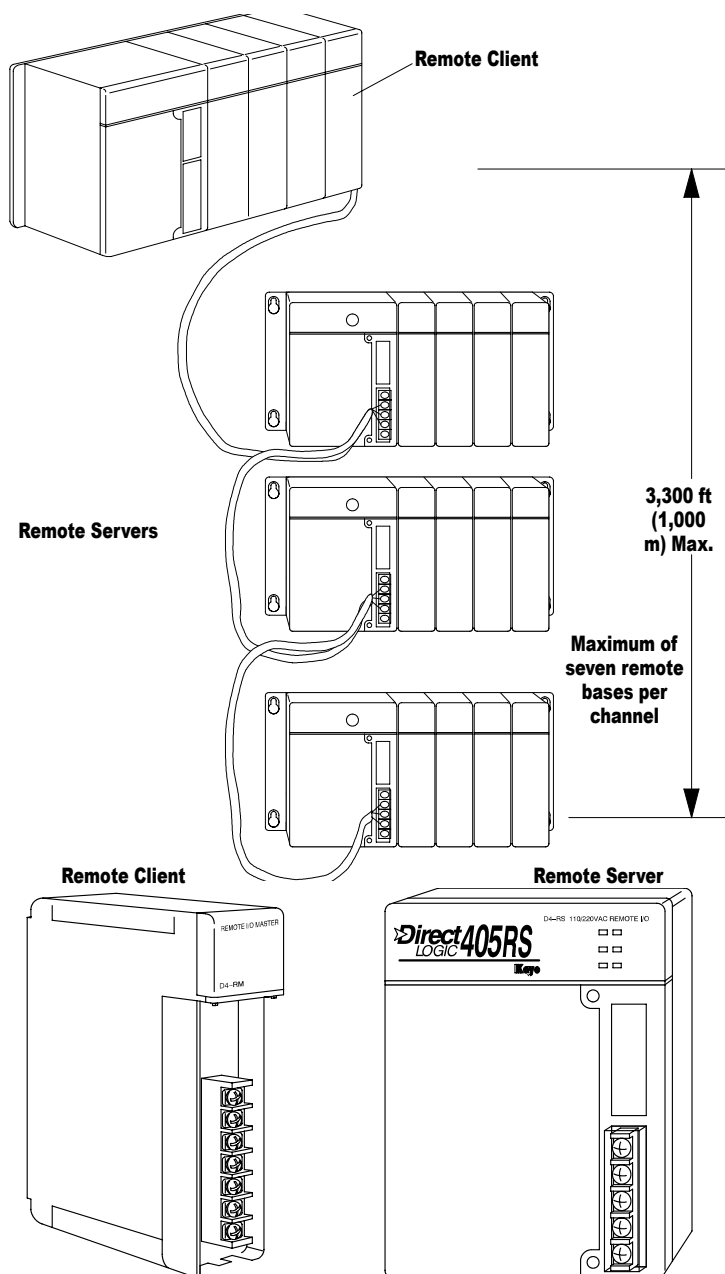
## REMOTE I/O SERVER MODULE

**D4-RS \$710.00**



### Overview

The DL405 offers full-size remote I/O. The goal of remote I/O is to reduce wiring costs by allowing I/O points to be located near the devices they are controlling. The chart at the bottom of this page shows the capacity for each CPU. The D4-454 has the D4-RM functionality built into the 25-pin port directly on the CPU. However, you can also choose to use the D4-RM discussed here. Here's how it works: A special module called the Remote Client is placed in the CPU base. This Client module controls up to seven Remote Servers. The Remote Servers are connected to the Client in a daisy-chain manner over a twisted pair communication cable (maximum length of 3,300 feet or 1000 meter). Each Remote Server attaches to a DL405 base (any size). Standard DL405 modules populate the remote bases.

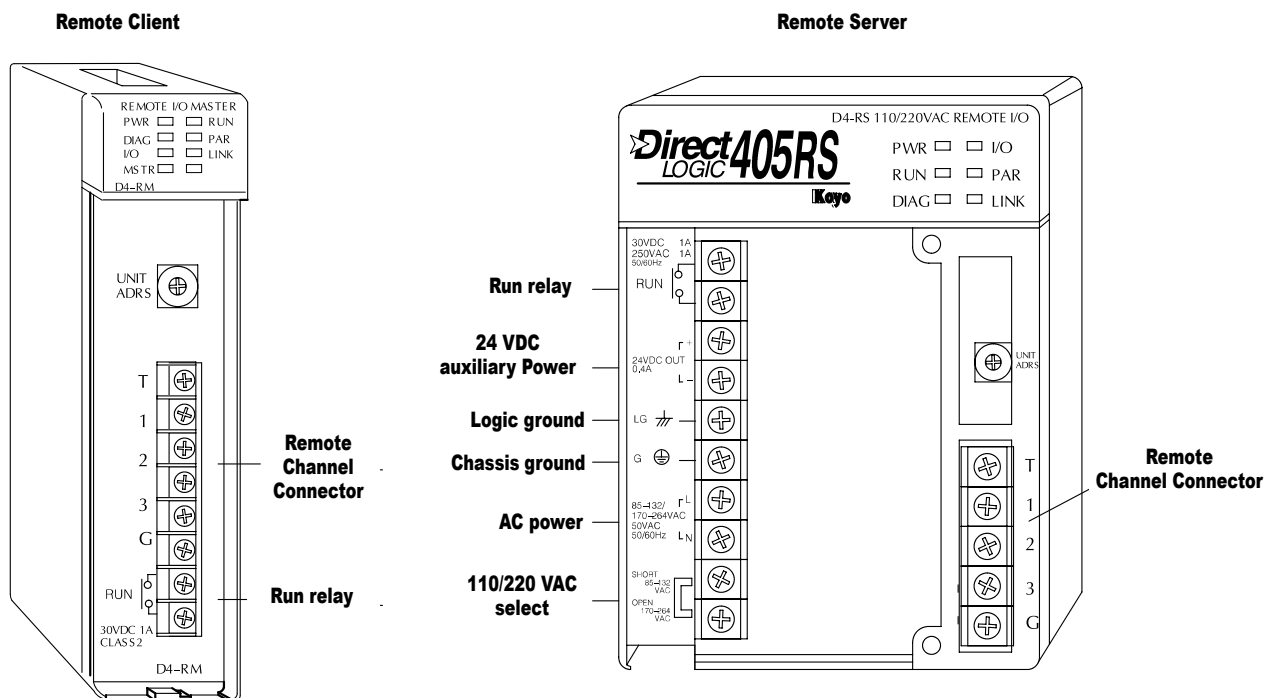


You can assign normal input and output addresses to the remote points, or you can assign special remote I/O addresses. The Remote Client sends the remote I/O information to the CPU. The communication between the Remote Client and the CPU is asynchronous to

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

|                                                           | <b>D4-454</b> |
|-----------------------------------------------------------|---------------|
| <b>Maximum number of remote Clients supported</b>         | 3*            |
| <b>Maximum I/O points supported</b>                       | 1536          |
| <b>Maximum I/O points supported per channel</b>           | 512           |
| <b>Maximum number of remote I/O bases per channel</b>     | 7             |
| <b>*Max. of 2 D4-RM, 1 channel is via 25-pin CPU port</b> |               |

# Serial Remote I/O Client/Server Modules



| Remote Client Specifications      |                                                                  |
|-----------------------------------|------------------------------------------------------------------|
| <b>Module Type</b>                | Intelligent device                                               |
| <b>Number of Clients per CPU</b>  | Three maximum for D4-454                                         |
| <b>Maximum Servers Supported</b>  | Seven Servers per channel                                        |
| <b>Communication to Servers</b>   | RS485 via twisted pair with shield @ 38.4K baud                  |
| <b>Recommended Cable</b>          | Belden 9841 or equivalent                                        |
| <b>Transmission Distance</b>      | 3300 ft maximum                                                  |
| <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> | 300mA maximum                                                    |

| Remote Server Specifications         |                                                                                                                                                                                                                                                             |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Maximum Server Points per CPU</b> | 1536 for D4-454                                                                                                                                                                                                                                             |
| <b>I/O Addresses Used</b>            | I/O modules in Server bases do not automatically consume any standard input and output points. They consume remote I/O points at a rate equal to the number of I/O points in each base. However, you can choose to use standard I/O addresses as an option. |
| <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>Power Required</b>                | 110VAC /220VAC (D4-RS)                                                                                                                                                                                                                                      |

# 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<br>0                     | Device Type | 5 VDC (mA)     | External 24 VDC<br>Power (mA) |
| B                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | CURRENT SUPPLIED                     |             |                |                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | CPU/Expansion Unit<br>/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.<br>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.<br>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).<br>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).<br>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,<br>D4-EX (expansion base unit),<br>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)<br>170-264 VAC (220V range)                          | 20-28 VDC (24VDC)<br>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/<br>Expansion Units | 5 VDC Current Supplied<br>in mA | 24V Aux Power<br>Supplied in mA | CPUs/Remote Units/<br>Expansion Units | 5V Current Supplied in<br>mA | 24V Aux Power<br>Supplied in mA    |
| D4-454 CPU<br>D4-454DC-1              | 3100<br>3100                    | 400<br>NONE                     | D4-EX<br>D4-EXDC<br>D4-RS<br>H4-EBC   | 4000<br>4000<br>3700<br>3470 | 400<br>NONE<br>400<br>400          |
| Power Consumed                        |                                 |                                 |                                       |                              |                                    |
| Power-consuming Device                | 5V Current<br>Consumed          | External 24VDC<br>Required      | Power-consuming Device                | 5V Current<br>Consumed       | External 24VDC<br>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                  |
| <b>DC Input Modules</b>               |                                 |                                 | F4-08DA-2                             | 90                           | 90                                 |
| D4-16ND2                              | 150                             | NONE                            | F4-04DAS-1                            | 60                           | 60 per circuit                     |
| D4-16ND2F                             | 150                             | NONE                            | F4-08DA-1                             | 90                           | 100+20 per circuit                 |
| D4-32ND3-1                            | 150                             | NONE                            | F4-08DA-2                             | 80                           | 150                                |
| D4-64ND2                              | 300 max.                        | NONE                            | F4-16DA-1                             | 90                           | 100+20 per circuit                 |
| <b>AC Input Modules</b>               |                                 |                                 | F4-16DA-2                             | 80                           | 25 max.                            |
| D4-08NA                               | 100                             | NONE                            | F4-08RTD                              | 80                           | NONE                               |
| D4-16NA                               | 150                             | NONE                            | F4-08THM-J(-n)                        | 120                          | 50                                 |
| <b>AC/DC Input Modules</b>            |                                 |                                 | F4-08THM                              | 110                          | 60                                 |
| <b>DC Output Modules</b>              |                                 |                                 | <b>Remote I/O</b>                     |                              |                                    |
| D4-16TD1                              | 200                             | 125                             | H4-ERM100                             | 320(300)                     | NONE                               |
| D4-16TD2                              | 400                             | NONE                            | H4-ERM-F                              | 450                          | NONE                               |
| D4-32TD1                              | 250                             | 140                             | D4-RM                                 | 300                          | NONE                               |
| D4-32TD2                              | 350                             | 120 (4A max<br>including loads) | <b>Communications and Networking</b>  |                              |                                    |
| D4-64TD1                              | 800                             | NONE                            | H4-ECOM100                            | 300                          | NONE                               |
| <b>AC Output Modules</b>              |                                 |                                 | D4-DCM                                | 500                          | NONE                               |
| D4-08TA                               | 250                             | NONE                            | F4-MAS-MB                             | 235                          | NONE                               |
| D4-16TA                               | 450                             | NONE                            | <b>CoProcessors</b>                   |                              |                                    |
| <b>Relay Output Modules</b>           |                                 |                                 | F4-CP128-1                            | 305                          | NONE                               |
| D4-08TR                               | 550                             | NONE                            | <b>Specialty Modules</b>              |                              |                                    |
| F4-08TRS-1                            | 575                             | NONE                            | H4-CTRIO                              | 400                          | NONE                               |
| F4-08TRS-2                            | 575                             | NONE                            | D4-16SIM                              | 150                          | NONE                               |
| D4-16TR                               | 1000                            | NONE                            | F4-4LTC                               | 280                          | 75                                 |
| <b>Analog Modules</b>                 |                                 |                                 | <b>Programming</b>                    |                              |                                    |
| F4-04AD                               | 150                             | 100                             | D4-HPP-1 (Handheld Prog.)             | 320                          | NONE                               |
| F4-04ADS                              | 370                             | 120                             | <b>Operator Interface</b>             |                              |                                    |
| F4-08AD                               | 75                              | 90                              | C-more Micro-Graphic                  | 210                          | NONE                               |