



# D2-262 Key Features



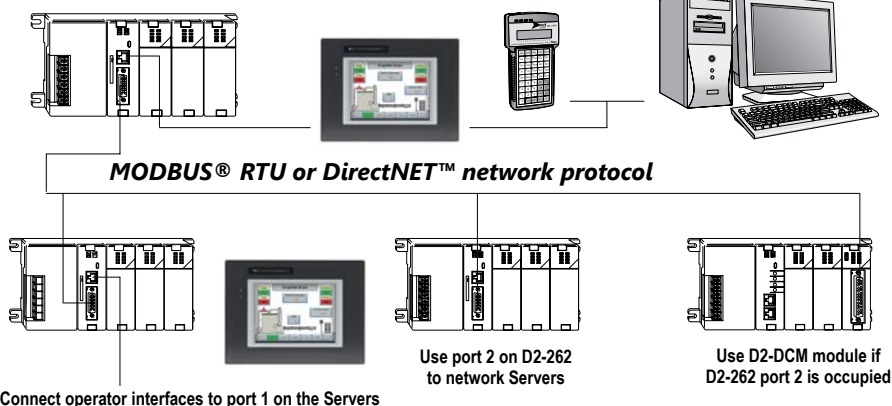
## D2-262: Our most powerful DL205 CPU

Our D2-262 CPU provides all the capabilities of the D4-450 and D4-454 CPUs, plus several additional features rarely found in a PLC of this size. With such an incredible array of features, you may be able to replace PLCs costing hundreds (or thousands) more.

DirectSOFT is required to program the D2-262. If using a handheld programmer (H2-HPP), version 2.10 of the handheld programmer firmware is required. Here are a few key features about the D2-262 CPU

D2-262 can serve as network Client

Easily connect programming devices or HMI to CPU ports



## Powerful built-in CPU communications

Each D2-262 CPU offers two communications ports that provide a vast array of communication possibilities. The top RJ-12

RS-232 port can be used for connection to a **C-more** operator interface panel or as a single K-sequence or DirectNET Server. The 15-pin bottom port (port 2) supports RS-232 or RS-422/RS485. This port offers several different protocol options such as:

- K-sequence
- **DirectNET** Client/Server
- Modbus RTU Client/Server
- ASCII In/Out Communications

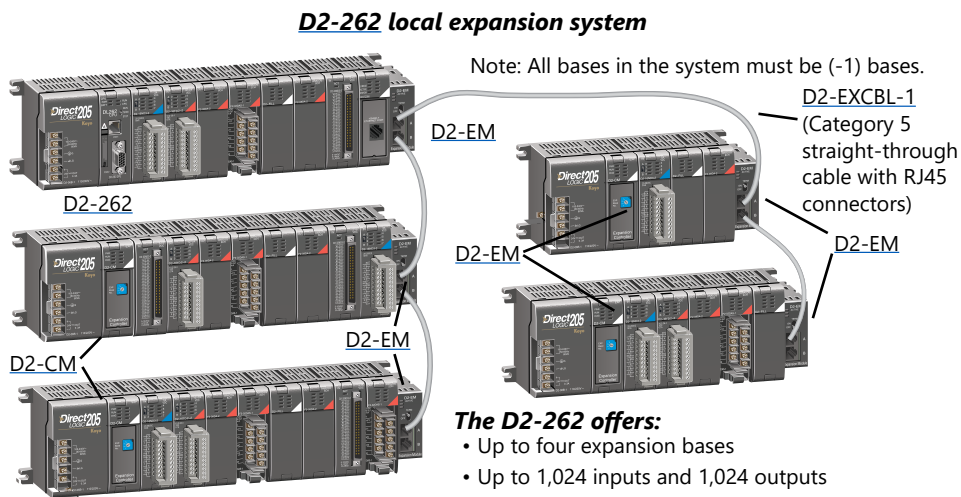
Port 2 can also serve as a remote I/O Client. The D2-262 supports the Ethernet Communication module and Data Communication Module for additional communications ports.



# D2-262 Key Features

## Local expansion I/O

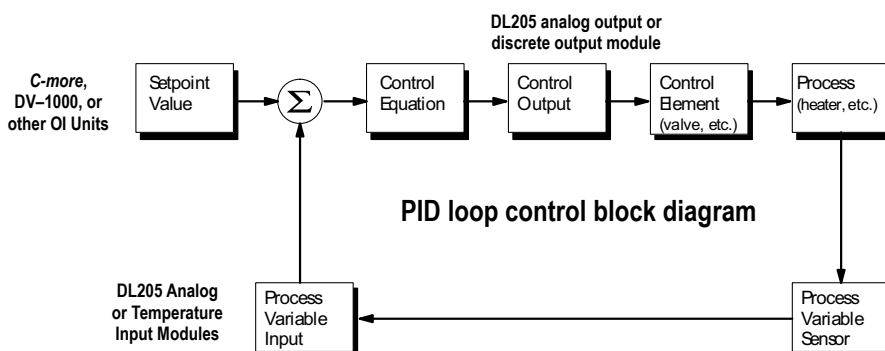
The D2-262 supports local expansion up to five total bases (one CPU base and four expansion bases). Expansion bases are commonly used when there are not enough slots available in the CPU base, when the base power budget will be exceeded, or when placing an I/O base at a location away from the CPU base (but within the expansion cable limits). All local and expansion I/O points are updated on every CPU scan. Each local expansion base requires the D2-CM module in the CPU slot. The local CPU base requires the D2-EM Expansion Module, as well as each expansion base. For more information on local expansion, refer to the Expansion Modules pages later in this section.



## 16 PID loops with auto-tuning

The D2-262 CPU can process up to 16 PID loops directly in the CPU. You can select from various control modes including automatic, manual, and cascade. There are also a wide variety of alarms including Process Variable, Rate of Change, and Deviation. The loop operation parameters (Process Variable, Setpoint, Setpoint Limits, etc.) are stored in V-memory, which allows easy access from operator interfaces or HMIs. Setup is accomplished with easy-to-use setup menus and monitoring views in DirectSOFT programming.

The auto-tuning feature is easy to use and can reduce setup and maintenance time. Basically, the CPU uses the auto-tuning feature to automatically determine near optimum loop settings.





# D2-262 Key Features

## Full array of instructions

The right instruction can greatly simplify your programming task and can save hours of programming time.

The D2-262 supports over 280 powerful instructions, such as:

- Four types of drum sequencers
- Leading / trailing edge triggered one-shots
- Bit-of-word manipulation
- Floating point conversions
- Trigonometric functions
- Table instructions
- ASCII IN/OUT instructions

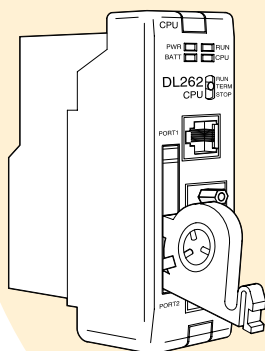
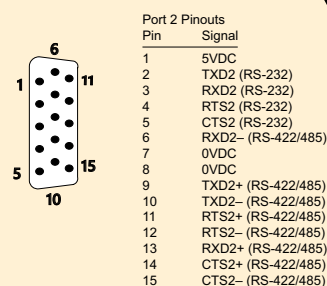
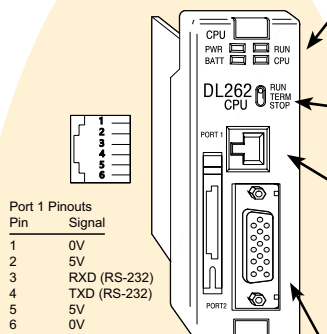
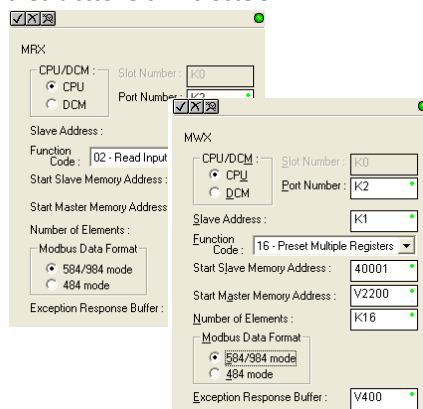
For a complete list of instructions supported by all DL205 CPUs, see the end of this section.

## Modbus RTU instructions

The D2-262 CPU supports easy-to-use Modbus Read/Write instructions that expand our existing Modbus network instruction capabilities. The MRX or MWX instructions allow you to enter native Modbus addressing in your ladder program with no need to perform octal-to-decimal conversion. We added Function codes 05, 06 and the ability to read Server Exception Codes. These flexible instructions allow the user to select the following parameters within one instruction window:

- 584/984 or 484 Modbus data type
- Server node (0-247)
- Function code
- Modbus starting Client / Server memory address
- Number of bits
- Exception code starting address

### Examples of MRX and MWX instructions in DirectSOFT



## ZIPLink communications adapter modules

ZIPLink cables and communications adapter modules offer fast and convenient screw terminal connection for the bottom port of the D2-262 CPUs. The adapter modules are RS232/422/485 compatible and are offered with or without indicating LEDs and surge protection. See the Terminal Blocks and Wiring Solutions section in this catalog for more information.



ZL-CMA15L shown

| CPU Status Indicators                                                                                                                                                               |                                                                                                                                                                                                                       |                                          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|
| RUN                                                                                                                                                                                 | ON                                                                                                                                                                                                                    | CPU is in RUN mode                       |
|                                                                                                                                                                                     | OFF                                                                                                                                                                                                                   | CPU is in PROGRAM mode                   |
| BATT                                                                                                                                                                                | ON                                                                                                                                                                                                                    | Battery backup voltage is low            |
|                                                                                                                                                                                     | OFF                                                                                                                                                                                                                   | Battery backup voltage is OK or disabled |
| CPU                                                                                                                                                                                 | ON                                                                                                                                                                                                                    | CPU internal diagnostics detects error   |
|                                                                                                                                                                                     | OFF                                                                                                                                                                                                                   | CPU is OK                                |
| PWR                                                                                                                                                                                 | ON                                                                                                                                                                                                                    | CPU power good                           |
|                                                                                                                                                                                     | OFF                                                                                                                                                                                                                   | CPU power failure                        |
| Mode Switch                                                                                                                                                                         |                                                                                                                                                                                                                       |                                          |
| RUN                                                                                                                                                                                 | Puts CPU into RUN mode                                                                                                                                                                                                |                                          |
| TERM                                                                                                                                                                                | Allows peripherals (HPP, <b>DirectSOFT</b> ) to select the mode of operation                                                                                                                                          |                                          |
| STOP                                                                                                                                                                                | Forces CPU out of RUN mode                                                                                                                                                                                            |                                          |
| Port 1                                                                                                                                                                              |                                                                                                                                                                                                                       |                                          |
| Protocols                                                                                                                                                                           | K-sequence Server, <b>DirectNET</b> ™ Server, Modbus RTU Server                                                                                                                                                       |                                          |
| Devices                                                                                                                                                                             | Can connect w/HPP, <b>DirectSOFT</b> , <b>C-more</b> , O/I panels, or any <b>DirectNET</b> Client                                                                                                                     |                                          |
| Specs.                                                                                                                                                                              | 6P6C phone jack connector RS-232<br>9,600 baud<br>Fixed address<br>Odd parity only<br>8 data bits one start, one stop<br>asynchronous, half-duplex, DTE                                                               |                                          |
| Port 2                                                                                                                                                                              |                                                                                                                                                                                                                       |                                          |
| Protocols                                                                                                                                                                           | K-sequence Server, <b>DirectNET</b> Client/Server, Modbus RTU Client/Server, ASCII IN/OUT, Remote I/O Client                                                                                                          |                                          |
| Devices                                                                                                                                                                             | Can connect w/many devices, such as PCs running <b>DirectSOFT</b> , DSDData, HMI packages, <b>C-more</b> , other O/I panels, any <b>DirectNET</b> or Modbus RTU Client or Server, or ASCII devices                    |                                          |
| Specs.                                                                                                                                                                              | HD15 connector<br>RS-232, RS-422/485*<br>2400/4800/9600/19.2K/38.4K baud<br>Odd, even, or no parity<br>Selectable address (1-90, HEX 1 – 5A)<br>8 data bits, one start, one stop<br>Asynchronous,<br>Half-duplex, DTE |                                          |
| Battery (Optional)                                                                                                                                                                  |                                                                                                                                                                                                                       |                                          |
| D2-BAT-1                                                                                                                                                                            | Coin type, 3.0V Lithium battery, 560mA, battery number CR2354                                                                                                                                                         |                                          |
| <b>Note: Batteries are not needed for program backup. However, you should order a battery if you have parameters in V-memory that must be maintained in case of a power outage.</b> |                                                                                                                                                                                                                       |                                          |
| <b>*RS485 for Modbus protocol only</b>                                                                                                                                              |                                                                                                                                                                                                                       |                                          |

## On-board memory

The D2-262 has 15.5K words of flash memory on board for your program plus 14.2K words of data registers. With flash memory, you don't have to worry about losing the program due to a bad battery.

## Built-in remote I/O connection

The bottom port on the D2-262 can be used as a Client for serial remote I/O networks.



# D2-262 Key Features

## ASCII communications instructions

The [D2-262](#) CPU supports several easy-to-use instructions that allow ASCII strings to be read into and written from the PLC communications ports.

**Raw ASCII:** Port 2 can be used for either reading or writing raw ASCII strings, but not for both.

**Embedded ASCII characters:** The [D2-262](#) can decipher ASCII embedded within a supported protocol (K-Sequence, **DirectNet**, Modbus, Ethernet) via the CPU ports or [D2-DCM](#).

### Here's how the D2-262 can receive ASCII input strings:

- **ASCII IN (AIN)** - This instruction configures port 2 for raw ASCII input strings with parameters such as fixed and variable length ASCII strings, termination characters, byte swapping options, and instruction control bits. Use barcode scanners, weight scales, etc. to write raw ASCII input strings into port 2 based on the (AIN) instruction's parameters.
- Write embedded ASCII strings directly to V-memory from an external HMI or similar Client device via a supported communications protocol using the CPU ports, [H2-ECOM100](#) or [D2-DCM](#). The AIN instruction is not used in this case.
- If a [D2-262](#) PLC is a Client on a network, the Network Read instruction (RX) can be used to read embedded ASCII data from a Server device via a supported communications protocol using port 2, [H2-ECOM100](#) or [D2-DCM](#). The RX instruction places the data directly into V-memory.

### Here's how the D2-262 can write ASCII output strings:

- **Print from V-memory (PRINTV)** - Use this instruction to write raw ASCII strings out of port 2 to a display panel or a serial printer, etc. The instruction features the starting V-memory address, string length, byte swapping options, etc. When the instruction's permissive bit is enabled, the string is written to port 2.
- **Print to V-memory (VPRINT)** - Use this instruction to create pre-coded ASCII strings in the PLC (i.e. alarm messages). When the instruction's permissive bit is enabled, the message is loaded into a pre-defined V-memory address location. Then the (PRINTV) instruction may be used to write the pre-coded ASCII string out of port 2. American, European and Asian Time/Date stamps are supported.
- **Print Message (PRINT)** - This existing instruction can be used to create pre-coded ASCII strings in the PLC. When the instruction's permissive bit is enabled, the string is written to port 2. The VPRINT/PRINTV instruction combination is more powerful and flexible than the PRINT instruction.
- If a [D2-262](#) PLC is a Client on a network, the Network Write instruction (WX) can be used to write embedded ASCII data to an HMI or Server device directly from V-memory via a supported communications protocol using port 2, [H2-ECOM100](#) or [D2-DCM](#).

### Example of AIN instruction in DirectSOFT

### Additional instructions that help manage the ASCII strings

The following instructions can be very helpful in managing the ASCII strings within the CPU's V-memory:

- **ASCII Find (AFIND)** - Finds where a specific portion of the ASCII string is located in continuous V-memory addresses. Forward and reverse searches are supported.
- **ASCII Extract (AEX)** - Extracts a specific portion (usually some data value) from the ASCII find location or other known ASCII data location.
- **Compare V-memory (CMPV)** - This instruction is used to compare two blocks of V-memory addresses and is usually used to detect a change in an ASCII string. Compared data types must be of the same format (i.e. BCD, ASCII, etc.).
- **Swap Bytes (SWAPB)** - Usually used to swap V-memory bytes on ASCII data that was written directly to V-memory from an external HMI or similar Client device via a communications protocol. The AIN and AEX instructions have a built-in byte swap feature.

### Example of VPRINT instruction in DirectSOFT



# D2-262 CPU Specifications

| D2-262 CPU Specifications                                                                         |                                                                                       |        |
|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------|
| System Capacity                                                                                   |                                                                                       |        |
| Total memory available (words)                                                                    | 30.4                                                                                  |        |
| Ladder memory (words)                                                                             | 15872 Flash                                                                           |        |
| V-memory (words)                                                                                  | 14592                                                                                 |        |
| Battery backup                                                                                    | Yes                                                                                   |        |
| Total CPU memory I/O pts. available (actual I/O pts. depend on I/O configuration method selected) | 8192 (1024 X + 1024 Y + 2048 CR + 2048 GX + 2048 GY)                                  |        |
| Local I/O (pts.)                                                                                  | 256                                                                                   |        |
| Local Expansion I/O (pts.)                                                                        | 1280 (4 exp. bases max.) (Including local I/O)                                        |        |
| Serial Remote I/O (pts.)                                                                          | 8192 max. (Including local & exp. I/O)                                                |        |
| Remote I/O channels                                                                               | 8 (7+1 CPU port)                                                                      |        |
| I/O per remote channel                                                                            | 2048                                                                                  |        |
| Ethernet Remote I/O                                                                               | Yes                                                                                   |        |
| Discrete I/O pts.                                                                                 | 8192 (Including local and exp.I/O)                                                    |        |
| Analog I/O channels                                                                               | Map into V-memory                                                                     |        |
| Remote I/O channels                                                                               | Limited by power budget                                                               |        |
| I/O per remote channel                                                                            | 16,384 (16 fully expanded H4-EBC Servers using V-memory and bit-of-word instructions) |        |
| Performance                                                                                       |                                                                                       |        |
| Contact execution (Boolean)                                                                       | 0.61 μs                                                                               | 0.1 μs |
| Typical scan (1K Boolean)                                                                         | 1.9 ms                                                                                | 1.0 ms |
| Programming and Diagnostics                                                                       |                                                                                       |        |
| RLL Ladder Style                                                                                  | Yes                                                                                   |        |
| RLL PLUS/Flowchart Style (Stages)                                                                 | Yes/1024                                                                              |        |
| Run time editing                                                                                  | Yes                                                                                   |        |
| Supports Overrides                                                                                | Yes                                                                                   |        |
| Variable/fixed scan                                                                               | Variable                                                                              |        |
| Instructions                                                                                      | 231                                                                                   |        |
| Control relays                                                                                    | 2048                                                                                  |        |
| Timers                                                                                            | 256                                                                                   |        |
| Counters                                                                                          | 256                                                                                   |        |
| Immediate I/O                                                                                     | Yes                                                                                   |        |
| Subroutines                                                                                       | Yes                                                                                   |        |
| For/Next loops                                                                                    | Yes                                                                                   |        |
| Timed Interrupt                                                                                   | Yes                                                                                   |        |
| Integer Math                                                                                      | Yes                                                                                   |        |
| Floating-point Math                                                                               | Yes                                                                                   |        |
| Trigonometric functions                                                                           | Yes                                                                                   |        |
| Table Instructions                                                                                | Yes                                                                                   |        |
| PID                                                                                               | Yes, 16 loops                                                                         |        |
| Drum Sequencers                                                                                   | Yes                                                                                   |        |
| Bit of Word                                                                                       | Yes                                                                                   |        |
| ASCII Print                                                                                       | Yes                                                                                   |        |
| Real-time clock/calender                                                                          | Yes                                                                                   |        |
| Internal diagnostics                                                                              | Yes                                                                                   |        |
| Password security                                                                                 | Multi-level                                                                           |        |
| System and user error log                                                                         | Yes                                                                                   |        |
| Communications                                                                                    |                                                                                       |        |
| Built-in ports                                                                                    | Port 1 RS-232<br>Port 2 RS-232/422/485                                                |        |
| K-sequence (proprietary protocol)                                                                 | Yes                                                                                   |        |
| DirectNET™                                                                                        | Yes                                                                                   |        |
| Modbus RTU Client/Server                                                                          | Yes                                                                                   |        |
| ASCII communications                                                                              | IN/OUT                                                                                |        |
| Maximum baud rate                                                                                 | 38.4K port 2                                                                          |        |