Do-more H2 Series PLC Overview

Do-more Designer
(Part No. DM-PGMSW-USB)

Do-more Designer is the full-featured programming software for the Do-more PLC series. Do-more Designer is a free download from Automationdirect.com. A USB version is also available for purchase for $13.00.

Start Page

When the software is started, the Start Page is displayed. This page contains a Launchpad with Projects, Applications and Links windows. It also contains shortcuts to important help file topics and the Do-more Simulator.

Launchpad
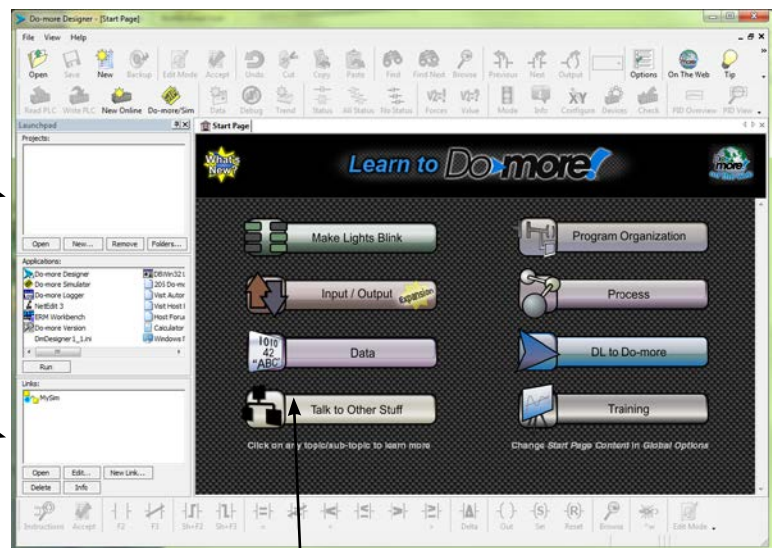
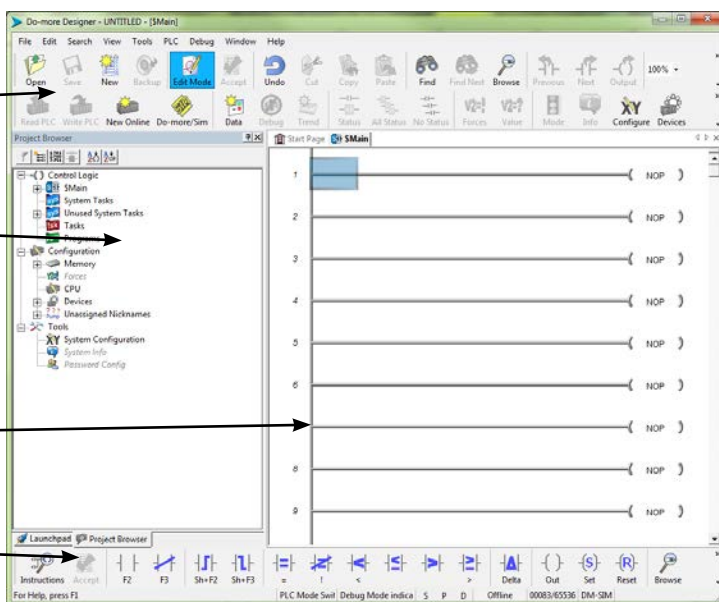Help File
Shortcuts

Main Programming Window

The Main Programming Window is displayed when a new program is started or an existing program is opened. It is divided into Menus, Toolbars, and Windows that work together to make project development as simple as possible.

Project Toolbar

Project Browser

Ladder View

Ladder Palette Bar

Do-more H2 Series PLC Overview

Do-more Designer Features
Do-more Designer has the following main features:

 • Supports the Do-more PLC instruction set
 • Project Browser (Window to organize the user project)
 • Data View (Interface to monitor PLC data in a list)
 • Trend View (Interface to monitor PLC data with trend graphs)
 • PID View (Interface to monitor and tune the individual PID control loop)
 • PID Overview (Interface to monitor multiple PID control loops)
 • Debug View (Interface to debug the ladder programs)

When Do-more Designer is installed on your PC, the following tools are also installed:

 • Do-more Simulator (Offline simulator of ladder program execution and PID control)
 • Do-more Logger (Software tool to log PLC data)
 • ERM Workbench (Configuration tool for the ERM modules)
 • NetEdit 3 (Configuration tool for the ECOM/EBC Ethernet modules)

PC Requirements
The Do-more Designer Windows-based programming software works with Windows® XP (Home or Professional, 32-bit), Vista (Home, Basic, Premium, 32 or 64-bit), Windows 7 (Home, Professional, Ultimate, 32 or 64-bit) or Windows 8 (Home, Professional, Enterprise 32 or 64-bit; Windows 8 RT edition is NOT supported).

Please check the following requirements when choosing your PC configuration:

 • Minimum PC to PLC Connectivity, at least one of the following:
   - USB Port: connects to the CPU with USB-A connector (USB-A to USB-B cable)
   - RS-232 Serial Port: connects to the CPU with RJ-12 connector (RJ-12 to DB9 or RJ-12 to USB-B serial converter cable)
     - Ethernet Port: connects to the CPU (H2-DM1E) with RJ-45 10Base-T or 100Base-T (Cat5 Patch Cable)
 • Hard Disk: 100MB free disk space
 • Video Display: 1024x768, 256 colors resolution (1280x720, true color recommended)
 • Windows XP, 32-bit:
   - 800MHz, single core CPU (2GHz, multi-core or hyperthreaded recommended)
   - 512MB RAM (2GB recommended)
 • Vista or Windows 7 or Windows 8, 32 or 64-bit:
   - 1GHz, single core CPU (2GHz, multi-core recommended)
   - 1GB RAM (3GB recommended)

Programming Cables
The Do-more H2 Series CPU module H2-DM1 has two communication ports (USB and RS-232 serial) and the H2-DM1E has three communication ports (USB, RS-232 serial and Ethernet). You can use any of those ports for programming and monitoring. Needed cables for these ports are listed below and can be purchased at Automationdirect.com.

USB Cables (USB 2.0, Type A-B connectors) available:
 • USB-CBL-AB3 (3 ft.)
 • USB-CBL-AB6 (6 ft.)
 • USB-CBL-AB10 (10 ft.)
 • USB-CBL-AB15 (15 ft.)

RS232 Serial Cable
 • • D2-DSCBL (12 ft. 9-pin D-sub to RJ12 connector)

Ethernet Cables (Cat5e)
 • Automationdirect.com sells many Ethernet patch cables in various colors and lengths. Please check the Cables section in this catalog for further details.

Do-more H2 Series PLC Overview

Do-more PLC Instruction Set
This Instruction Set was developed specifically for the new Do-more PLC; the 'Instruction Palette' displays all available instructions.

You may see some similarities to the DirectLOGIC PLC instruction set. However, the instruction set for the Do-more PLC is more advanced and intuitive. A good example is the MATH instruction. Now, just one MATH instruction covers all math operations and also allows you to mix different data types in one expression.

There are over 60 operators and functions available with the MATH instruction.

Note: To learn more about the MATH instruction, please refer to the Do-more Designer help topic 'MATH – Math Expression'.

Operators

+, -, *, /, %, **, <, <=, ==, !=, >=, >, &&, ||, &, |, ^, <<, >>, >>>, -, ~, !

Functions

ABS, ACOS, ASIN, ATAN, AVGR, COS, COUNTIFEQ, COUNTIFNE, COUNTIFGE, COUNTIFGT, COUNTIFLE, COUNTIFLT, DEG, E, FRAC, IF, LN, LOG, MAXR, MAX, MINR, MIN, NOW, PI, RAD, RANDINT, RANDREAL, REF, ROUND, SIN, SQRT, STDEVR, STDEVPR, SUMIFEQ, SUMIFNE, SUMIFGE, SUMIFGT, SUMIFLE, SUMIFLT, SUMR, TAN, TICKms, TICKus, TOINT, TOREAL, TRUNC

Do-more H2 Series PLC Overview

Data Types
The Do-more PLC supports the following seven primary data types:

- Bit (0 or 1)
- Unsigned Byte (0 to 255)
- Signed Byte (-128 to 127)
- Unsigned Word (0 to 65,535)
- Signed Word (-32,768 to 32,767)
- Signed DWord (-2,147,483,648 to 2,147,483,647)
- Real (-3.4028235E+038 to 3.4028235E+038)

Note: As you can see, the BCD data type that is popular for the DirectLOGIC PLC is not included in this list. However, you can use the BCDTO and TOBCD instructions if you need to use the BCD data type with your application. Those instructions convert the data between the BCD data type and the integer/real data types.

Data Structure
The Do-more PLC supports data structures as additional data types. Structures use the familiar PC programming organization of "dot notation". All available elements of a structure are shown in this format. The following data structures are currently available:

- Timer Structure
- Counter Structure
- String Structure
- PID Structure
- Date/Time Structure
- Task Structure
- Rampsoak Structure
- Program Structure
- DeviceRef Structure
- Drum Structure

The data structure is a set of data. For instance, a Timer structure (Timer Struct) has the following set of data:

- Acc (Accumulated Time, Signed DWord)
- Done (Bit)
- Zero (Bit)
- Timing (Bit)
- Reset (Bit)

When you use a timer instruction (TMR), a Timer structure is assigned to the instruction. If you select 'T0', you can access the above data with dot notation. For instance, to access the accumulated time (Acc), enter 'T0.Acc'.
To access the Done bit, enter 'T0.Done'

Memory Addressing
With the Do-more PLC, each memory address type has its own specific data type. Here are some examples:

- V (Unsigned Word)
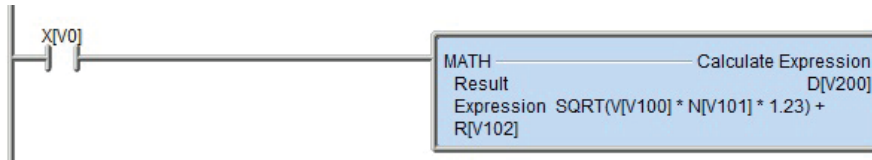- N (Signed Word)
- D (Signed DWord)
- R (Real)

If you see address 'V123' in the ladder program, the memory address always stores an Unsigned Word value. With this memory addressing method, it becomes easier to read and write the ladder programs.

Although most of the memory addressing is decimal, the memory addresses DLX, DLY, DLC and DLV use octal. These four memory addresses can be used to exchange data with DirectLOGIC PLCs, which use octal memory addressing.

Do-more H2 Series PLC Overview

Array Addressing

The Do-more PLC supports array addressing with all memory addresses. V-memory address must be used as the index for an array. With the Do-more PLC, the following ladder program is valid.

```
X[V0]
─┤ ├─────────────────────  MATH ─────────────── Calculate Expression
                            Result                          D[V200]
                            Expression  SQRT(V[V100] * N[V101] * 1.23) +
                            R[V102]
```

Note: In this example, V0, V100, V101, V102 and V200 are indices.

Code-block, Program and Task

One Do-more project can consist of more than one ladder program. Each ladder program is called a 'Code-block'. The Do-more PLC supports two types of code-blocks, Program and Task. Here are their definitions.

Program

Programs are code-blocks that run based on an event using the RUN instruction. They can be self-terminating or never terminate. Stage programming is only supported inside Program code-blocks.

Task

Tasks are code-blocks that are enabled and disabled using the ENTASK instruction. The ENTASK instruction allows you to specify an interval to execute the task's logic with a millisecond resolution or to execute a single time on a leading edge input.
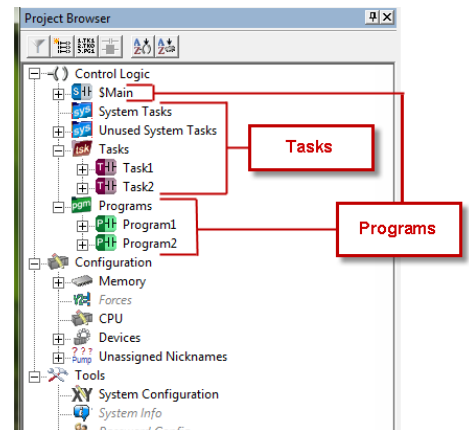
Stages

The Do-more PLC supports Stages. You can use Stages only in the Program code-blocks. (They are not available in the Task code-blocks.) The Do-more PLC supports the following instructions for Stage Programming[1]:

- SG (SG)
- JMP (Jump To Stage)[2]
- JMPI (Index Jump)
- SGSET (Enable Stage)
- SGRST (Disable Stage)
- SGRSTR (Disable Range of Stages)
- SGCONVRG (Converge Multiple Stages to SG)
- SGDIVRG (Jump to Multiple Stages)
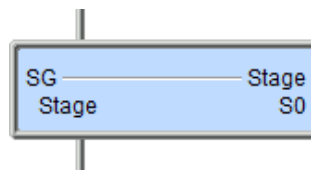
[1] There is no ISG (Initial Stage) instruction for the Do-more PLC; the first stage in the Program code-block becomes the initial stage automatically.

[2] Many asynchronous instructions can directly initiate a Jump to Stage.