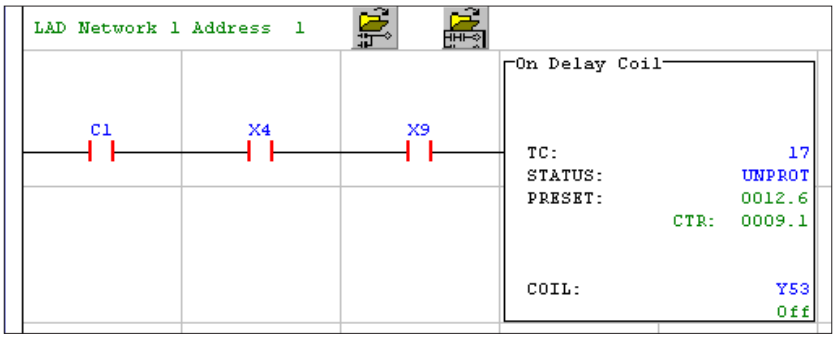
PLC WORKSHOP SUITE FOR CTI 2500 SERIES

FasTrak worked with Control Technology, Inc. to create enhanced instructions for the CTI 2500 Series™ processors. These instructions allow robust programming through the *PLC WorkShop Suite™* and updated CTI 2500 ladder language.

ON DELAY COIL

The new On Delay Coil and Off Delay Coil instructions are output box instructions that are displayed as the right-most instructions in the network.



On Delay Coil in a ladder logic network

The parameters of the On Delay Coil instruction:

- **TC:** Supports constant values within the configured memory limits of Timers and Counters.
- **PRESET:** Supports constant values from 0.0 to 3276.7.
- **CTR:** Displays the TCC value when Ladder Status is enabled.
- **STATUS:** Supports the “PROT” and “UNPROT” options.
- **COIL:** Supports discrete Y, C, B, V, WY, W, DCC, TCP, and TCC address types.

Input: When the input to the On Delay Coil is enabled, and the instruction is timing (the CTR value/TCC address is greater than zero), the time counts down from the PRESET value/TCP address to zero and the COIL address is OFF.

When the input to the On Delay Coil is enabled, and the instruction has timed out (the CTR value/TCC address equals zero), the COIL address is ON.

When the input to the On Delay Coil is disabled, the CTR value/TCC address is set to the PRESET value/TCP address and the COIL address is OFF.

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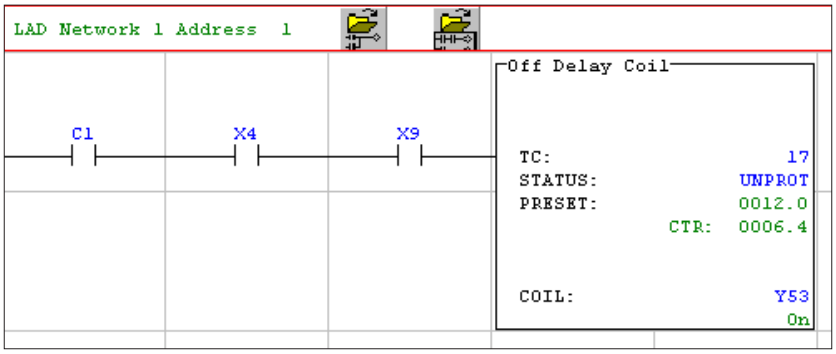
OFF DELAY COIL



Off Delay Coil in a ladder logic network

The parameters of the Off Delay Coil instruction are:

- **TC:** Supports constant values within the configured memory limits of Timers and Counters.
- **PRESET:** Supports constant values from 0.0 to 3276.7.
- **CTR:** Displays the TCC value when Ladder Status is enabled.
- **STATUS:** Supports the “PROT” and “UNPROT” options.
- **COIL:** Supports discrete Y, C, B, V, WY, W, DCC, TCP, and TCC address types.

Input: When the input to the Off Delay Coil transitions from enable to disabled, and the instruction is timing (the CTR value/TCC address is greater than zero), the time counts down from the PRESET value/TCP address to zero and the COIL address is ON.

When the input to the Off Delay Coil is disabled, the COIL address is OFF.

When the input to the Off Delay Coil is enabled, the CTR value/TCC address is set to the PRESET value/TCP address and the COIL address is ON.

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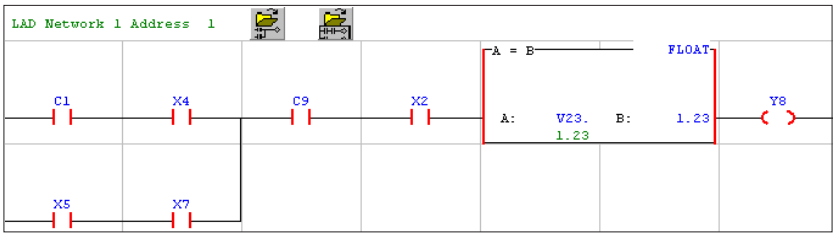
FLOATING POINT COMPARE

The Floating Point Compare instructions augment six of the existing ladder comparison instructions. The six Compare instructions that support floating point capability are:

- **EQU** - Equal To
- **NEQ** – Not Equal To
- **LESS** – Less Than
- **LEQ** – Less Than or Equal To
- **GRT** – Greater Than
- **GEQ** – Greater Than or Equal To

The new floating point compare instructions may be added to the ladder by entering their mnemonics or by the click-and-drop method. All floating point compare instructions follow the example in the following diagram.



Equal To Floating Point Compare instruction in a ladder logic network

The parameters of the Floating Point Compare instructions are:

- **Data Type:** In addition to the original INT (integer) and UINT (unsigned integer) designations, entering the FLOAT designation in the upper right corner allows the instruction to compare floating point values.
- **A:** Supports Real addresses V. and K. and Integer addresses WX, WY, K, V, STW, W, TCP, TCC, DCC, DSP, DSC, and DCP.
- **B:** Supports Real addresses V. and K. and Integer addresses WX, WY, K, V, STW, W, TCP, TCC, DCC, DSP, DSC, DCP, and Real constants.

Input: When the input to a Floating Point Compare instruction is enabled, the Compare instruction is executed. When the input to a Floating Point Compare instruction is disabled, the Compare instruction is not executed.

Output: The output is enabled with the comparison operation is TRUE.

Notes: Integers that are compared with floating point values are converted to floating point values before the comparison is executed. The values of the A and B parameters are displayed when Ladder Status is enabled.

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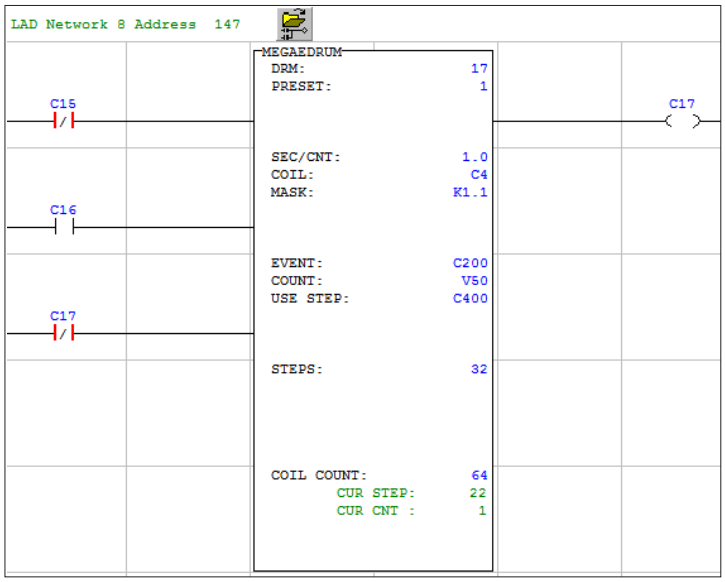
MEGAEDRUM

The existing EDRUM ladder instruction supports programming of up to 15 coils (horizontally) and 16 steps (vertically). For applications that require more than 15 coils or 16 steps, multiple EDRUM instructions must be linked.

The new MegaEDRUM instruction supports up to 128 coils (horizontal) in multiples of 16 and up to 128 steps (vertically) in multiples of 16.

The original EDRUM instruction is displayed in the ladder as a large box instruction, with a 15 x 16 matrix of coils and steps. However, the space limitations of ladder logic networks prevents depicting the MegaEDRUM as a 128 x 128 matrix. Therefore, the MegaEDRUM box instruction displays only the first address of several ranges of consecutive addresses.



MegaEDRUM instruction in a ladder logic network

Inputs: Like the original EDRUM, the MegaEDRUM uses the same Start, Jog, and Enable/Reset inputs.

Output: Like the original EDRUM, the MegaEDRUM enables its output when the last programmed step has executed.

DRM: Supports constant values within the configured memory limits of Drums. Like the original EDRUM, this number provides access to the Drum Count Current (DCC), Drum Step Current (DSC), and Drum Step Preset (DSP) variables. Unlike the original EDRUM, the Counts per Step (DCP) is represented by the address (and implied addresses) specified in the COUNT parameter.

PRESET: Like the original EDRUM, this parameter specifies to which step the MegaEDRUM returns when it is reset.

SEC/CNT: Like the original EDRUM, this parameter specifies the number of seconds one count represents. For example, if SEC/CNT is 1.5, and the COUNT for a step is 4, the MegaEDRUM dwells on that step for 1.5 x 4 = 6 seconds.

COIL: Unlike the original EDRUM, which displays up to 15 coils in a horizontal row, this parameter specifies the first of several consecutive addresses that are used as output coils. The total number of required consecutive addresses is specified by the COIL COUNT parameter. For example, if COIL COUNT is 64, then 64 consecutive bits are required. The valid address types for this parameter are Y, WYx.x, C, and Vx.x. Continuing the example above, the 64 required bits can be held in 64 consecutive C bit addresses or 4 consecutive V word addresses.

MASK: Like the original EDRUM, this parameter specifies the first of several consecutive addresses that contains zeros and ones, which indicate if the corresponding coils are turned OFF or ON in the step. Unlike the original EDRUM instruction, which supports up to 15 coils (horizontally) and 16 steps (vertically), the MegaEDRUM supports up to 128 coils and 128 steps. The MASK for these coils and steps are stored in consecutive addresses. The first of these consecutive addresses is specified in the MASK parameter. For example, if STEPS is 32 and COIL COUNT is 64, the bits required for the MASK is 32 x 64 = 2048. The valid address types for this MASK array are Kx.x, Vx.x, and Cx. Continuing the example above, the 2048 bits that are required by the MASK can be held in 2048 consecutive C bit addresses or in 128 consecutive V word addresses. Unlike the original EDRUM in which the MASK is hard-coded into the instruction, the values of the MegaEDRUM MASK can be changed programmatically in real time because they are held in addresses.

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EVENT: Like the original EDRUM, this parameter specifies the first of several consecutive addresses that contain zeros and ones, which indicate if the MegaEDRUM dwells on the corresponding step. Unlike the original EDRUM which displays up to 16 events in a vertical column, this parameter specifies the first of an array of consecutive addresses that are used as EVENT flags. The total number of required consecutive addresses is specified by the STEPS parameter. For example, if STEPS is 32, then 32 consecutive bits are required. The valid address types for this parameter are X, Y, C, Vx.x, WXx.x, and Wyx.x. Continuing the example above, the 32 required bits can be held in 32 consecutive C bit addresses or 2 consecutive V word addresses.

COUNT: Like the original EDRUM, this parameter specifies how long the MegaEDRUM dwells on its steps. For example, if SEC/CNT is 1.5 and the COUNT for a step is 4, the MegaEDRUM dwells on that step for 1.5 x 4 = 6 seconds. Like the original EDRUM, the COUNT value is a constant from 0-32767. Unlike the original EDRUM in which the COUNT values are hard-coded into the instruction, the COUNT values are held in consecutive word addresses. The total number of required consecutive word addresses is specified by the STEPS parameter. For example, if STEPS is 32, then 32 consecutive words are required. The valid address types for this parameter are Kx and Vx. Continuing the example above, the 32 required words are held in 32 consecutive V word addresses. Unlike the original EDRUM, if the current step (DSC) is changed during execution, the DCC value is reset to the preset COUNT of the new step.

USE STEP: This parameter specifies the first of several consecutive addresses that contains zeros and ones, which indicate if the MegaEDRUM skips the step or executes it. A value of 1 indicates that the step is executed; 0 indicates that the step is skipped. The total number of required consecutive addresses is specified by the STEPS parameter. For example, if STEPS is 32, then 32 consecutive bits are required. The valid address types for this parameter are Kx.x, Vx,x, and Cx. Continuing the example above, the 32 required bits can be held in 32 consecutive C bit addresses or 2 consecutive V word addresses.

STEPS: Unlike the original EDRUM that supports up to 16 steps, the MegaEDRUM supports from 16 to 128 steps in multiples of 16 which is specified in this parameter.

COIL COUNT: Unlike the original EDRUM that supports up to 15 coils, the MegaEDRUM supports from 16 to 128 coils in multiples of 16, which is specified in this parameter.

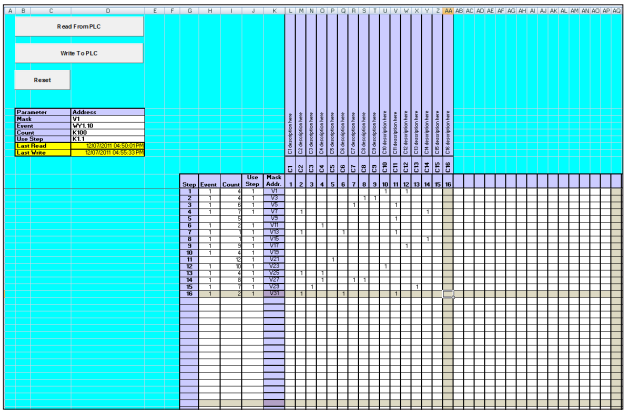
CUR STEP: Indicates which step the MegaEDRUM is currently executing when Ladder Status is enabled.

CUR COUNT: Indicates the current count of the step the MegaEDRUM is currently executing when Ladder Status is enabled.

MEGAEDRUM DATA ENTRY SPREADSHEET

Because there is not enough room in the Ladder Logic window to display a 128 by 128 matrix for the MegaEDRUM Coils and Drums, several parameters use implied addresses in which an address is specified and the MegaEDRUM automatically consumes the necessary number of following addresses. The values of these implied addresses must be entered through the Data Window or the companion Excel spreadsheet template, which is provided with PLC WorkShop for Siemens 505 v4.60 and later versions.

This spreadsheet can be used as a Pinning Chart with which data can be both read from, and written to, the MegaEDRUM. By default, it is configured for 16 Coils and 16 Steps, but can be expanded up to 128 Coils and 128 Steps with a simple drag of the mouse.



Companion MegaEDRUM data entry spreadsheet

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FasTrak SoftWorks, Inc. is a leading provider of industrial software solutions for PLC programming, file change management, and asset and maintenance management. Focused on solving the issues that are unique to manufacturers, FasTrak has been helping to automate industrial companies for over 30 years. FasTrak software is developed by an experienced team of computer software and electrical engineers, and is used by more than 20,000 customers worldwide. Located outside Milwaukee, Wisconsin, FasTrak provides a variety of support and service options for their automation and productivity software to maximize return on investment.

FasTrak is committed to the long-term development, service, and support of programming software for CTI, Siemens, Modicon, and Square D processors. These new instructions are the first in a series of enhanced capabilities to the PLC WorkShop Suite line.

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Control Technology, Inc. designs and manufactures advanced control, communications and I/O products for process control. CTI's 2500 Series PLC system is a compatible replacement for the former Simatic 505 PLC system, and includes state-of-the-art enhancements in functionality and performance. Products in the family include controllers, power supplies, bases, remote base controllers, analog and digital I/O, ethernet TCP/IP, Modbus, DeviceNet networking modules and specialty I/O modules. CTI 2500 Series products are installed in the plants of major industrial companies throughout the world.

CTI is continuing a heavy development investment in this system, with plans for enhancements in the instruction set, programming tools, network connectivity, and I/O system. A micro-PLC family based on the same technology, and a line of compatible networked I/O are included in their long-term product roadmap.

The enhanced instructions described in this case study are fully supported by the PLC WorkShop Suite programming software by FasTrak SoftWorks, Inc. and the CTI 2500 Series PLCs from Control Technology, Inc.

Contact each respective company for additional information.