EZ LADDER® TOOLKIT

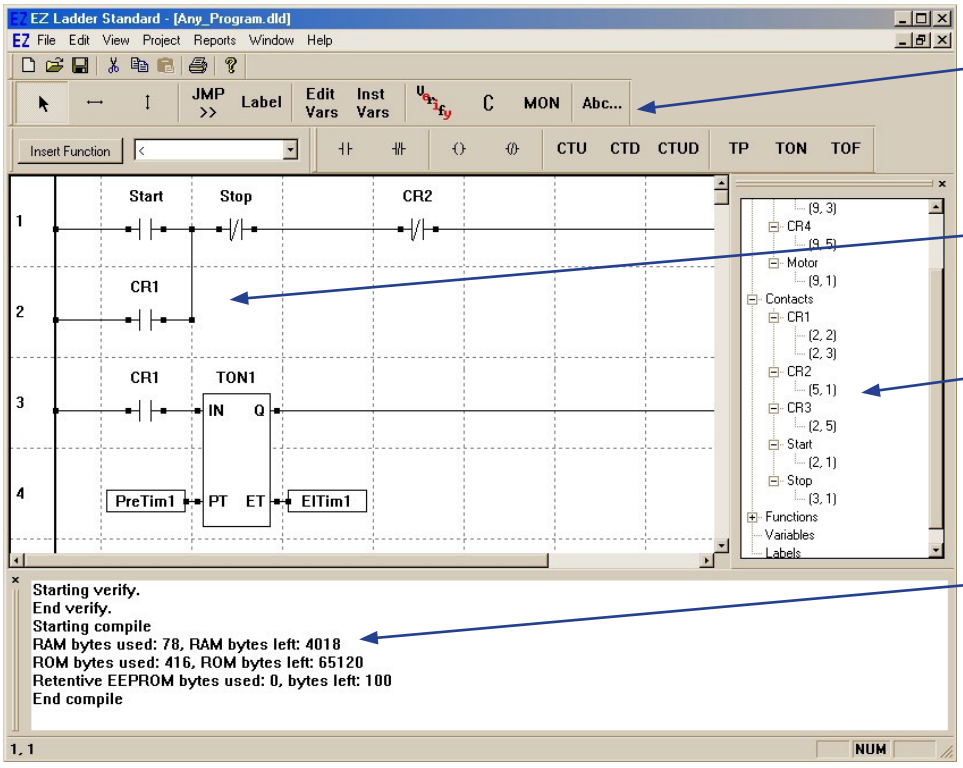
Ladder Diagram Development Platform

- Programs PLC on a Chip™ Based Products
- Parallels the IEC61131-3 Standard
- Ladder Diagram, Function Block and Structured Text
- RS232 / Ethernet / Wi-Fi Programming Interface
- Modbus Master / Slave / TCP Supported
- J1939, NMEA 2000 & OptiCAN Support
- Password Protection Levels and Options
- Real Time Monitoring
- Debugging Tools
- Printable Reports

The Divelbiss EZ LADDER® Toolkit software is a powerful and easy-to-use Windows® based programming platform used to create the ladder diagram programs for any PLC on a Chip® based controller or product. When coupled with the PLC on a Chip Development Kit it provides a full featured design and proof-of-concept capability at very reasonable cost.

Production tooling is easier since any programs developed are “transportable” for use with the final product. Code libraries are easily created to allow for simple “cut and paste” reuse of previously designed circuit elements. All elements are cross referenced making it easy to locate all instances of an element used in multiple rungs of the program ladder.

For all P-Series PLC on a Chip based products, EZ LADDER now supports additional features such as Modbus Master, SD Card Support, Expanded I/O, Structured Text and Cloud Portal Communications. With structured text, EZ LADDER provides the ability to create and use custom functions and function blocks that allow for customized functionality including customer communications interfaces.



Tool Bars:
Easy to use shortcut buttons for object placement, drawing links and variable insertion.

Ladder Diagram Workspace:
Power rails with numbered rungs.

Cross Reference Window:
Quick reference for contacts, coils, functions and variables used in the displayed ladder.

Output Window:
Displays status, memory use and any errors encountered during the Compile or Verify process.

The EZ LADDER Toolkit User Manual and EZ LADDER Toolkit can be downloaded from http://www.divelbiss.com.

Specifications are subject to change without notice.

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The EZ LADDER Toolkit software has many built-in features to help make the task of programming easier. ***Figure 1*** shows the errors for missing links around the coil of CR1. Errors are reported in both the VERIFY and COMPILE modes. Pinpointing the error location saves time for the programmer

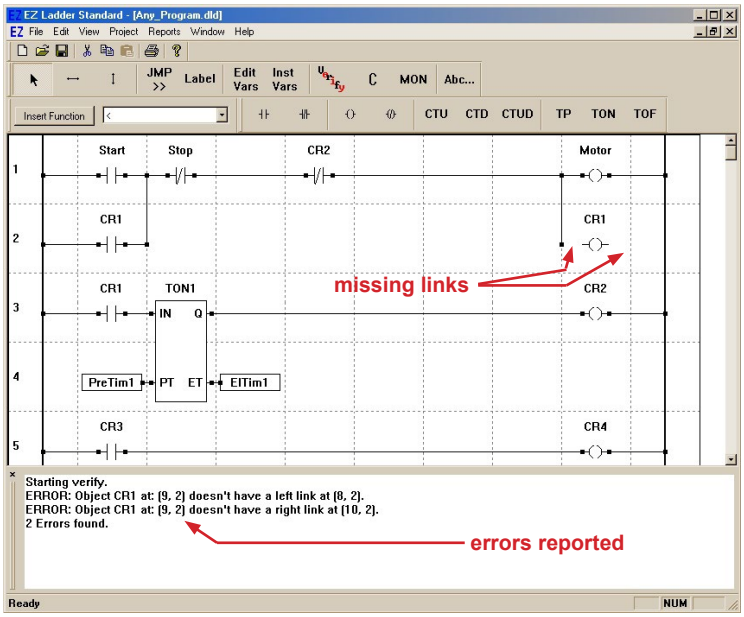

Figure 1

Once corrected, VERIFY and COMPILE go smoothly. See ***Figure 2***.

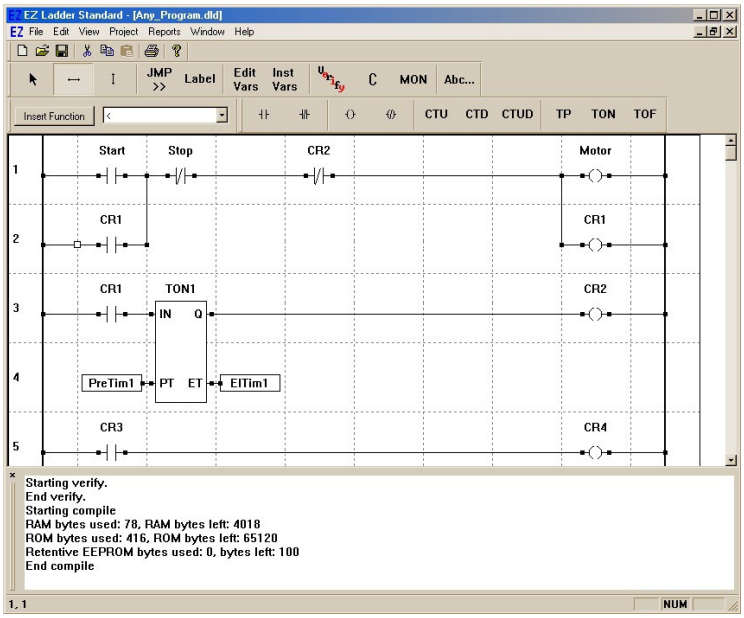

Figure 2

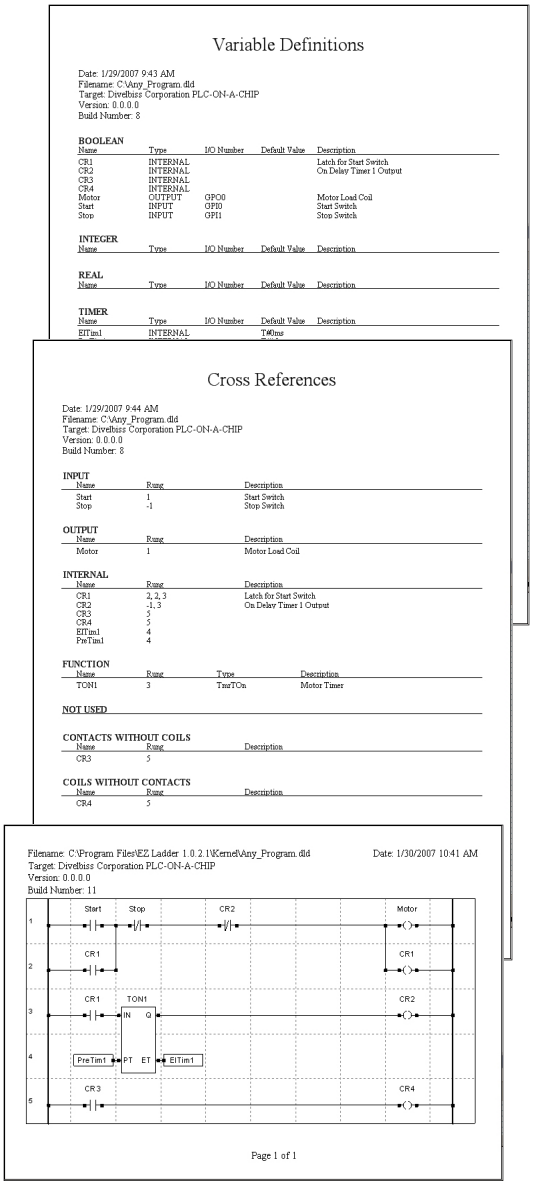

Figure 3

The EZ LADDER Toolkit software provides a variety of reporting formats to aid program debugging in addition to the documentation required for any project.

Figure 3 above shows examples of the Variable Definition and the Cross Reference reports followed by the complete ladder diagram program printout for the example shown.

The EZ LADDER “HINT” feature is available in both the EDIT and MONITOR program modes.

See ***Figure 4*** for the example

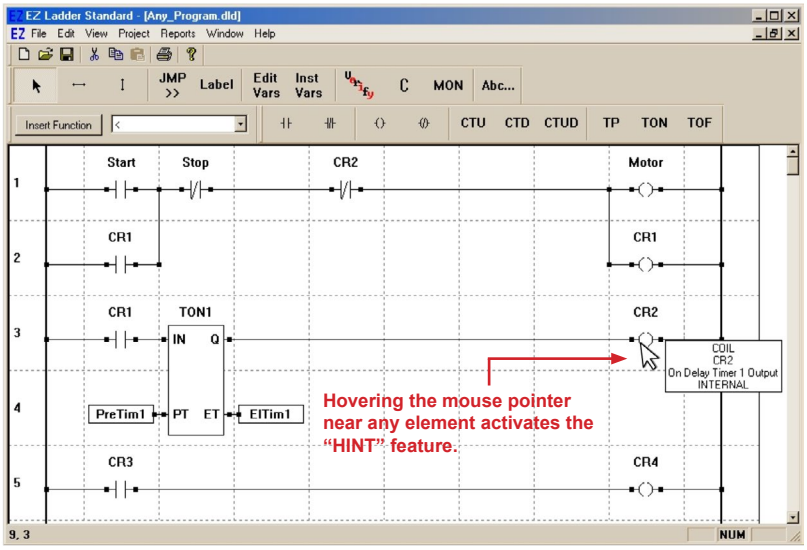

Figure 4

In the MONITOR program mode, the elements turn red when there is power flow. They are blue when power flow is removed. This feature is illustrated in ***Figure 5*** below.

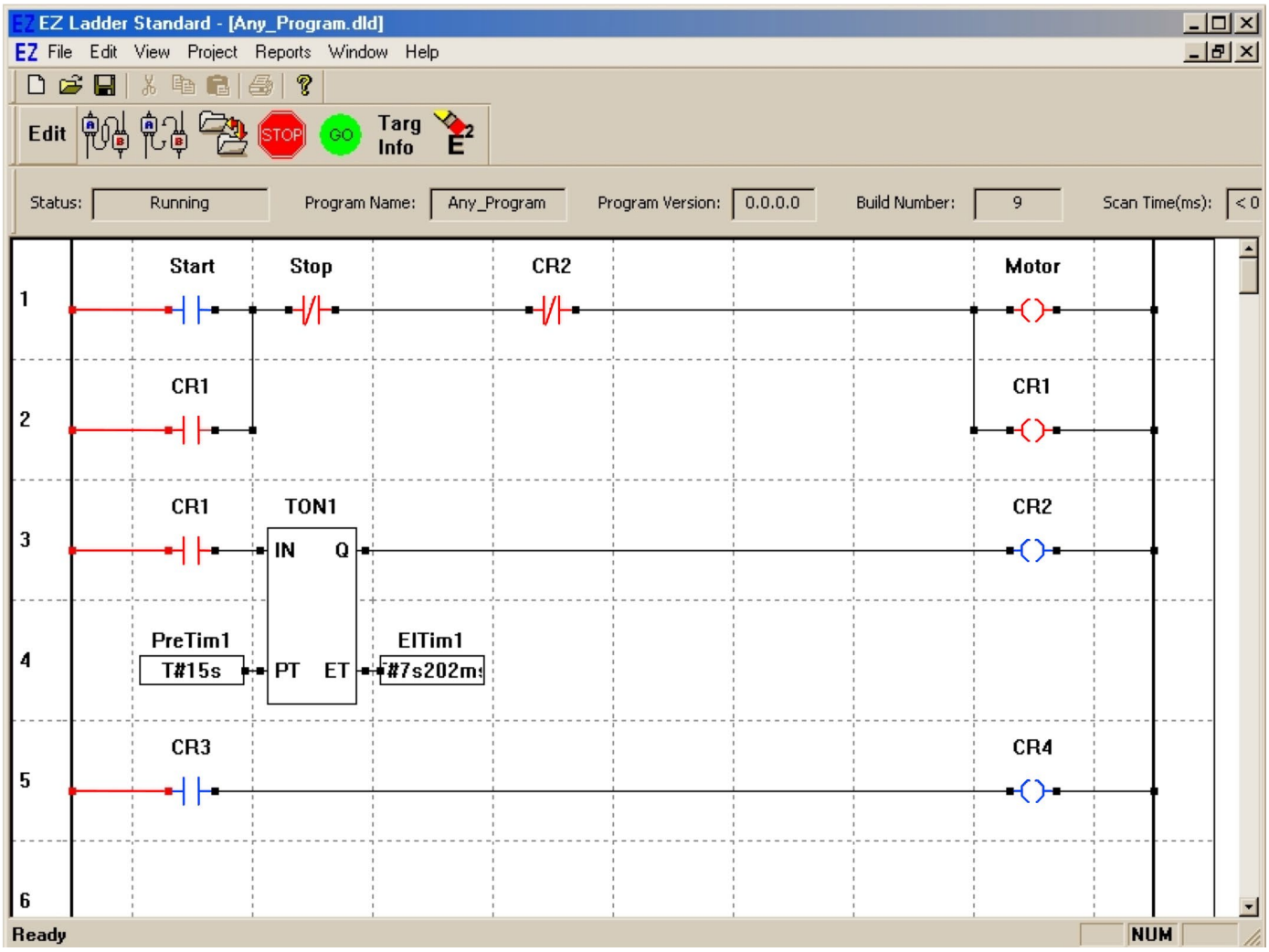

Figure 5

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EZ LADDER® TOOLKIT

M-Series Function Cross Reference

Common to All PLC on a Chip based Products

Less than	Add	Count Down	Convert to Integer	Multiply	ResetSet Rst dominant	Convert to Timer
Less than or equal	Bitwise AND	Count Up	Latching coil	Multiplexer	Select	Time delay OFF
Not equal	Average	Count Up/Down	Limit	Bitwise NOT	Bitwise OR	Time delay ON
Equal	Bit Pack	Divide	Moving Average	Rising edge detect	Shift Left	Pulse Timer
Greater	Bit Unpack	Drum Sequencer	Max	Convert to Real	Shift Right	Unlatching coil
Greater of equal	Convert to BOOLEAN	Falling edge detect	Min	Rotate Left	Set/Reset w/ set dominant	Bitwise XOR
Absolute value	Compare	Hysteresis	Modulo	Rotate Right	Subtract	

M-Series PLC on a Chip based Products

Function \ Controller	ICM-EBB-100	ICM-EBB-200	ICM-EBB-300 / 400 / 500	ICM-EBB-600 / 700	PCS-1XX	PCS-2XX	MB-100	MB-110	HEC-150X-E-R	HEC-200X-E-R	HEC-4XXX-E-R	HEC-HMI-XXXXX-E-R	SI-100 / 101	SI-110	SI-200 / 201	SI-210	PLCHIP-M2-12800	PLCHIP-M2-25600	PLCHIP-M2-25620	PLCMOD-M2-128000	PLCMOD-M2-128010	PLCMOD-M2-256000	PLCMOD-M2-256010	PLCMOD-M2-256200	PLCMOD-M2-256210
Counter-Timer		•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Counter LS7366												•						•	•			•	•	•	•
EEPROM Read	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
EEPROM Write	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Gray Code SSI						•												•	•			•	•	•	•
Get Current Date			•	•	•	•			•					•		•	•	•	•		•		•		•
Get Current Time			•	•	•	•			•					•		•	•	•	•		•		•		•
High Speed Timer	•	•	•	•	•	•			•	•	•	•					•	•	•	•	•	•	•	•	•
Keypad																		•	•			•	•	•	•
Display Clear (LCD / LED)								•				•		•		•		•	•			•	•	•	•
Display Print (LCD / LED)								•				•		•		•		•	•			•	•	•	•
PID					•	•			•	•	•	•						•	•			•	•	•	•
PWM					•	•			•	•	•	•						•	•			•	•	•	•
Set PWM Frequency					•	•			•	•	•	•						•	•			•	•	•	•
Serial Print				•	•	•			•	•	•	•						•	•			•	•	•	•
Set Current Date			•	•	•	•			•					•		•	•	•	•		•		•		•
Set Current Time			•	•	•	•			•					•		•	•	•	•		•		•		•
Specialty Features																									
Modbus Slave				•	•	•			•	•	•	•						•	•			•	•	•	•
SPI Slave																		•	•			•	•	•	•
OptiCAN						•			•	•	•	•							•					•	•
J1939 Get SPN				•		•			•	•	•	•							•					•	•

P-Series PLC on a Chip based Products

Function \ Controller	HEC-P2000 / HEC-P2010	HEC-P5000 / HEC-P5010	HEC-P5100 / HEC-P5110	HEC-P5200 / HEC-P5210	HEC-P6000 / HEC-P6010	HEC-P6100 / HEC-P6110	HEC-P6200 / HEC-P6210	HEC-GW-X-X / C-X	HEC-GW-X-W / C-W	ICM-BB-P13-XX	VB-2000	VB-2100 / 2120 / 2200	VCG-X-X-X	PLCHIP-P10-51220	PLCHIP-P13-51220	PLCMOD-P10-512210	PLCMOD-P13-512210
Ceiling	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Cosine / Arc Cosine	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Counter LS7366														•	•	•	•
EEPROM Read / Write	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Exponentiation	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Floor	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Get Current Date / Time	•	•		•	•		•	•	•	•		•	•	•	•	•	•
Jump	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Keypad										•	•	•		•	•	•	•
Label	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Logarithm	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Display Clear (LCD/LED)										•	•	•		•	•	•	•
Display Print(LCD/LED)										•	•	•		•	•	•	•
Natural Exponential	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Natural Logarithm	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
PID	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
PWM	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•
Quadrature Read Cntr	•	•	•	•	•	•	•							•	•	•	•
Quadrature Velocity Cntr	•	•	•	•	•	•	•							•	•	•	•
Quadrature Compare Cntr	•	•	•	•	•	•	•							•	•	•	•
Random / Seed	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Sine / Arc Sine	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Set PWM Freq.	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•
Serial Print	•	•		•	•		•	•	•		•	•	•	•	•	•	•
Set Current Date / Time	•	•		•	•		•	•	•	•		•	•	•	•	•	•
Square Root	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Tangent / Arc Tangent	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
TimerCounter	•	•	•	•	•	•	•	•	•		•	•		•	•	•	•
UART Set Property	•	•		•	•		•	•	•		•	•	•	•	•	•	•
Specialty Features																	
Modbus Master / Slave	•	•		•	•		•	•	•		•	•	•	•	•	•	•
SPI Master (Structured Txt)														•	•	•	•
Structured Text	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
SD Card Support	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Modbus TCP	•	•		•	•		•		•	•		•	•	•	•	•	•
OptiCAN	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
SAE J1939 TX/RX	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
NMEA 2000	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Cloud Portals	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•