Allen Bradley - SLC150 Course

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Unit 2: Programming Basics
Using PCIS Development Software
Relay Type Instructions
Program Structures I

In this Unit your modified relay ladder logic program from Unit 1 will be entered into a Personal Computer using Allen Bradley PCIS software.

PCIS Software Summary

The PCIS software package is used to develop relay ladder logic programs on a personal computer and download via a RS232 module into a SLC 150. Listed below is a summary of commonly used functions available.

F1 = Program Transfer.
F1 = Read An Existing Program from a Drive to the Workspace.
F2 = Saves the Workspace Program to a Drive.
F3 = Prints the Workspace Program on Printer.
F4 = Clears the Workspace.
F5 = EEPROM transfer to and from SLC150 Non-Volatile RAM.
F6 = Change Directory or Drive.

F2 = Program Development / Edit.
INSERT = Insert an instruction before the high-lighted area.
DELETE = Delete high-lighted instruction.
F1 = -] [- F2 = -]\[- F5 = -( )-
F6 = Clipboard used to copy and paste a rung.
F7 = Search/Replace
F8 = Program Info
F9 = Edit Attribute

F3 = Run / Monitor / Test

RELAY TYPE INSTRUCTIONS

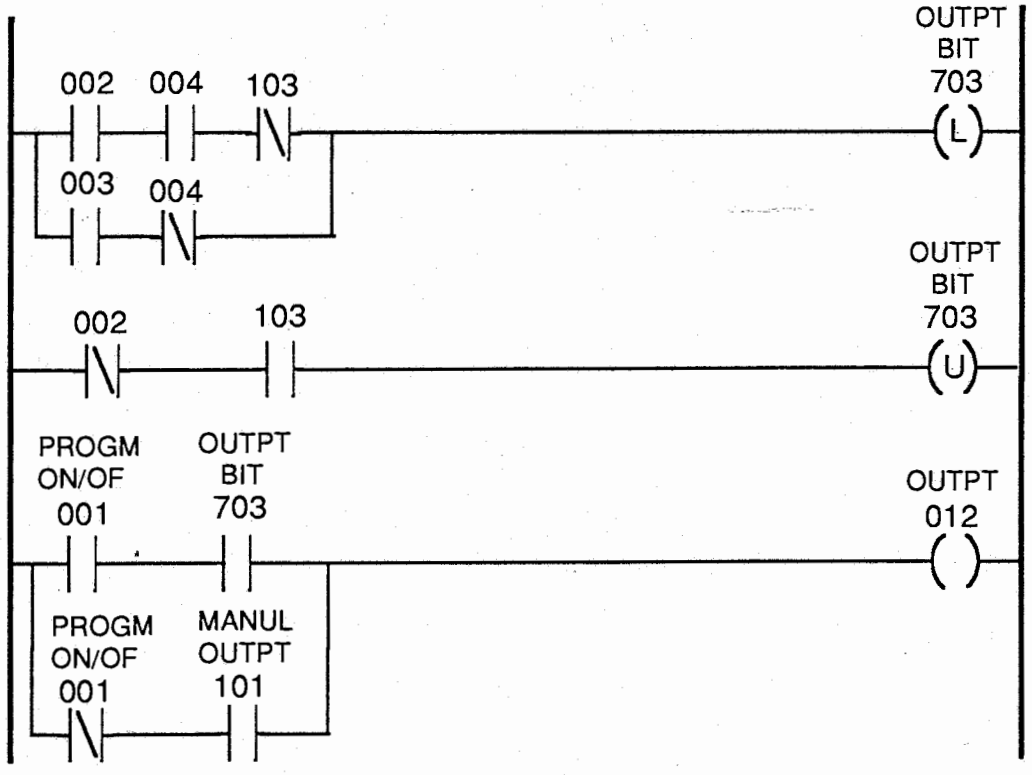
Often a relay coil and contacts are required to implement control, but they do not need to be connected to an actual output. Internal addresses can be used as relay instructions. Internal addresses **701 though 863** are available for programming and are individually accessed bits of the data table.

Addresses	Description
001-010	External Input
101-110	External Input (SLC-150 Only)
011-016	External Output
111-116	External Output (SLC-150 Only)
701-863	Internal Relay Type Addresses

The Latch "---(L)---" and Unlatch "---(U)---" instructions are relay type instructions which are used to perform latch functions on external outputs and internal bits. Once a data table bit is latched it will remain ON until it is unlatched.

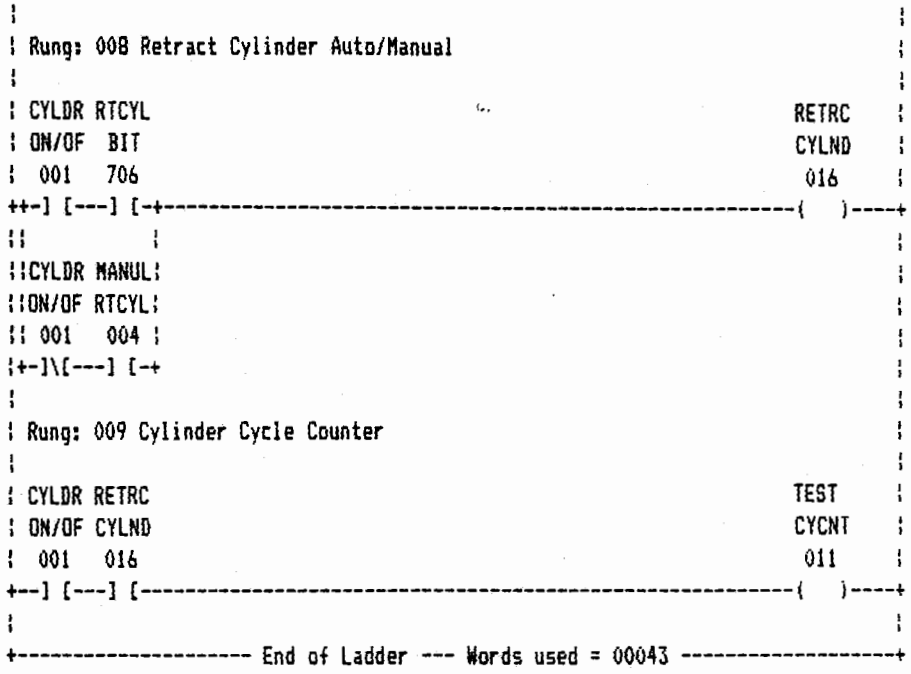
Program Structures I

Commonly used rung configurations are called program structures. Two program structures are shown below. Rungs one and two perform latch and unlatch operations on an internal address bit. Rung three is a structure used to perform manual and automatic control of an output. Note that an external input is used to implement the manual operation, while and internal bit is used for contol in the automatic mode.



EXCERCISE: Rewrite the cylinder actuation program from unit one using the latch and unlatch instructions and manual and automatic control.

```
Rung: 001 Hydraulic Pump On

 PUMP  EMSTP                                                    HYDRL
 START  BIT                                                     PUMP
  009   701                                                     012
--] [---]\[-----------------------------------------------------( L )----

Rung: 002 Hydraulic Pump Off

 PUMP                                                           HYDRL
 STOP                                                           PUMP
  010                                                           012
--] [-+-----------------------------------------------------------( U )----
      |
 EMSTP|
  BIT |
  701 |
-] [-+

Rung: 003 Extend Cylinder Control

 CYLDR HYDRL RTCYL LMSWT                                        EXCYL
 ON/OF PUMP   BIT  EXTND                                        BIT
  001   012   706   006                                        705
--] [---] [---]\[---]\[-------------------------------------------(   )----

Rung: 004 Retract Cylinder Control

 CYLDR HYDRL EXCYL LMSWT                                        RTCYL
 ON/OF PUMP   BIT  RETRC                                        BIT
  001   012   705   007                                        706
--] [---] [---]\[---]\[-------------------------------------------(   )----

Rung: 005 Emergency Stop Latch

 CYLDR LMSWT                                                    EMSTP
 ON/OF EMSTP                                                    BIT
  001   008                                                     701
--] [---] [-----------------------------------------------------( L )----

Rung: 006 Emergency Stop Un-Latch

 CYLDR                                                          EMSTP
 ON/OF                                                          BIT
  001                                                           701
--]\[-----------------------------------------------------------( U )----

Rung: 007 Extend Cylinder Auto/Manual

 CYLDR EXCYL                                                    EXTND
 ON/OF  BIT                                                     CYLDR
  001   705                                                     015
-] [---] [-+-------------------------------------------------------(   )----
           |
 CYLDR MANUL|
 ON/OF EXCYL|
  001   003 |
-]\[---] [-+
```


Rung: 008 Retract Cylinder Auto/Manual
CYLDR RTCYL
ON/OF BIT
001 706
RETRC
CYLND
016
CYLDR MANUL
ON/OF RTCYL
001 004
Rung: 009 Cylinder Cycle Counter
CYLDR RETRC
ON/OF CYLND
001 016
TEST
CYCNT
011
End of Ladder --- Words used = 00043

INPUT

Address	Element	Rung Number(s)	Instruction Comment
001	-] [-	003, 004, 005, 007,	CYLDR ON/OF:
		008, 009	
001	-]\[-	006, 007, 008	CYLDR ON/OF:
003	-] [-	007	MANUL EXCYL:
004	-] [-	008	MANUL RTCYL:
006	-]\[-	003	LMSWT EXTND:
007	-]\[-	004	LMSWT RETRC:
008	-] [-	005	LMSWT EMSTP:
009	-] [-	001	PUMP START:
010	-] [-	002	PUMP STOP :

OUTPUT

Address	Element	Rung Number(s)	Instruction Comment
011	-( )-	009	TEST CYCNT:
012	-] [-	003, 004	HYDRL PUMP :
012	-(L)-	001	HYDRL PUMP :
012	-(U)-	002	HYDRL PUMP :
015	-( )-	007	EXTND CYLDR:
016	-] [-	009	RETRC CYLND:
016	-( )-	008	RETRC CYLND:

INTERNAL

Address	Element	Rung Number(s)	Instruction Comment
701	-] [-	002	EMSTP BIT :
701	-]\[-	001	EMSTP BIT :
701	-(L)-	005	EMSTP BIT :
701	-(U)-	006	EMSTP BIT :
705	-] [-	007	EXCYL BIT :
705	-]\[-	004	EXCYL BIT :
705	-( )-	003	EXCYL BIT :
706	-] [-	008	RTCYL BIT :
706	-]\[-	003	RTCYL BIT :
706	-( )-	004	RTCYL BIT :