SYSdev Variables

The variables to be used in SYSdev programming are actually register addresses. Each register address can be given off-line documentation (3 lines, 7 characters each) and a "nickname" which serves as on-line documentation for Ladder Logic blocks. This documentation is <u>not</u> interchangeable with the address for program development purposes. All programming must use the variable address. Note that I/O addresses are the only addresses with an assigned function. Every specific address is free to use however the programmer desires. All variables are stored as unsigned integers.

PLC Variable Formats

F = Flag = 1 Bit = (0 or 1)
B = Byte = 8 Bits = (0 – 255)
W = Word = 16 Bits = 2 Bytes (Even, Odd = Low, High) = (0 – 65535)
X = Input Xaab.c
Y = Output Yaab.c
where aa = slot number, b = group number, c = output point
Notes:
1. X and Y addressing is not used for the M4500 PLC/PLS. In the M4500, I/O is directly addressed.
2. Leading zeroes in the variable name are optional. For example, B32 is the same address as B032.

Variable Overlap Map

Because it is possible to refer to registers using different size variables (1 bit, 8 bits, or 16 bits), there is overlap between variable names. For example, W32 refers to B32 (low byte) and B33 (high byte) and also F0 (bit 0) – F15 (bit 15). SYSdev does not support addressing a bit of a word (e.g. W100.4), to access a bit that is in Upper Memory (not in Flag memory), the program must use the byte.bit format (e.g. B100.4). A partial memory layout is shown below. For a complete memory map, please refer to the User / Program Development Manual for the PLC in question.

Table 1 Flag Memory Example

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Byte	Word
F007	F006	F005	F004	F003	F002	F001	F000	**B032**	**W032 (L)**
F015	F014	F013	F012	F011	F010	F009	F008	**B033**	**W032 (H)**
F023	F022	F021	F020	F019	F018	F017	F016	**B034**	**W034 (L)**
F031	F030	F029	F028	F027	F026	F025	F024	**B035**	**W036 (H)**

Table 2 Upper Memory Example

| Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Byte	Word
B66.7	B66.6	B66.5	B66.4	B66.3	B66.2	B66.1	B66.0	**B066**	**W066 (L)**
B67.7	B67.6	B67.5	B67.4	B67.3	B67.2	B67.1	B67.0	**B067**	**W066 (H)**
B68.7	B68.6	B68.5	B68.4	B68.3	B68.2	B68.1	B68.0	**B068**	**W068 (L)**
B69.7	B69.6	B69.5	B69.4	B69.3	B69.2	B69.1	B69.0	**B069**	**W068 (H)**

Running SYSdev

SYSdev uses the executable file sysdev.exe. This file can be executed from a DOS prompt by typing *sysdev<Enter>*. SYSdev works perfectly well as a DOS window inside Windows™ 3.x or Windows™ 95/98. Windows™ does not allow for two programs to have control of a serial port at the same time. It will be necessary to close any other programs that use the serial port to be used with SYSdev. Keep in mind that some programs (notably RSLogix™) take control of a serial COM port when they are opened, and don't necessarily relinquish this control when they are closed.

Setting Up A Windows™ Shortcut

A sample "Properties" listing of a Windows™ 98 desktop shortcut is shown below. Note that SYSdev is installed on the "d:" drive for this example. Substitute the proper drive path as necessary. The icon used in this example is located in "c:\windows\system\moricons.dll."
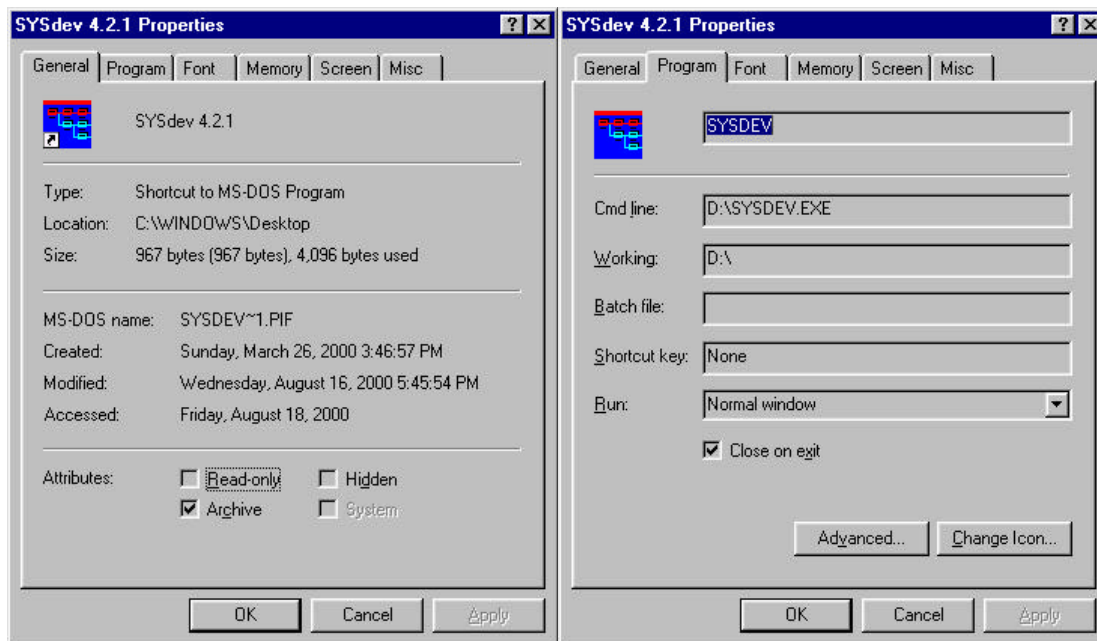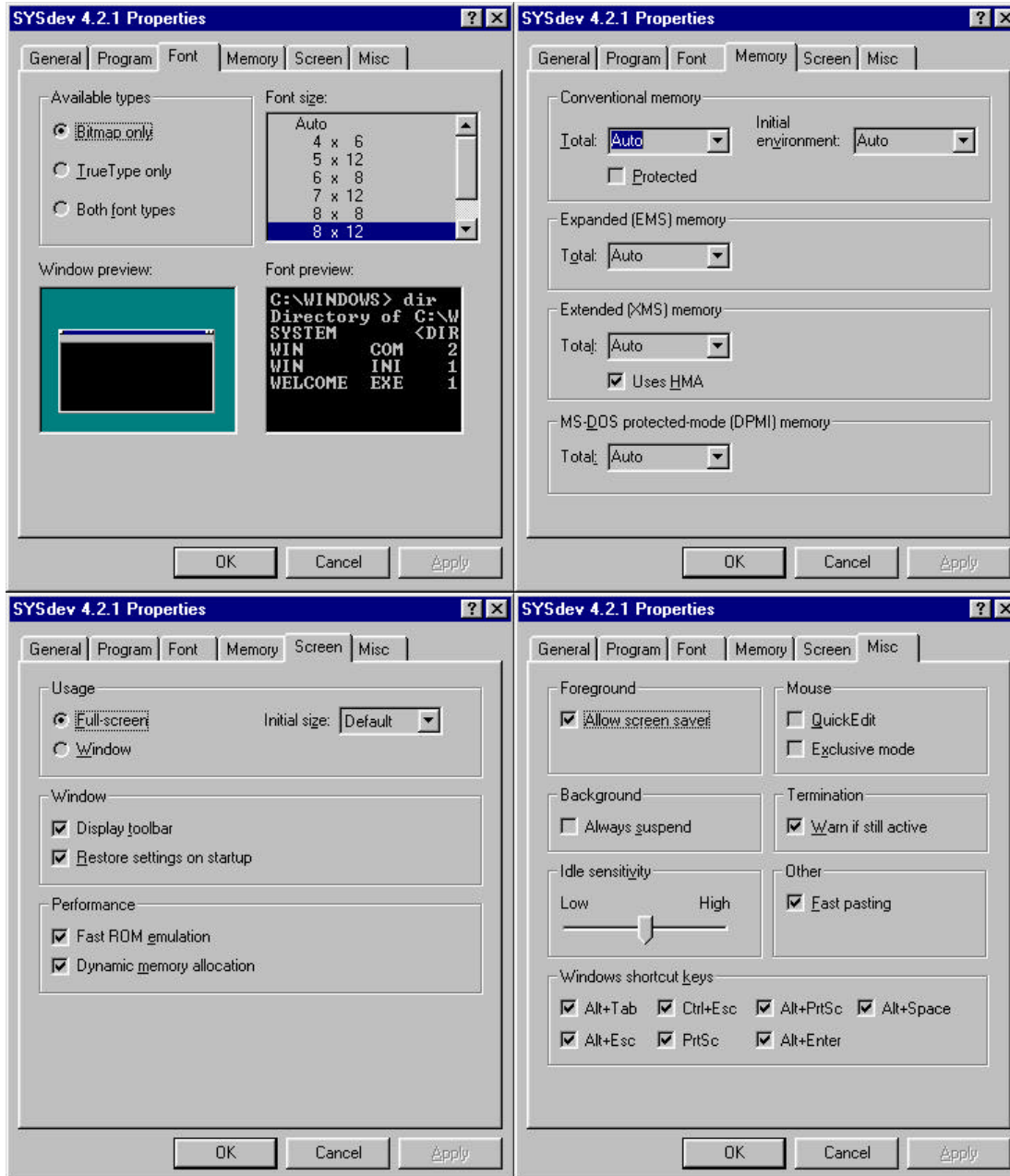
SYSdev Quick Reference

Figure 1 Windows™ 95/98 Shortcut for SYSdev

SYSdev Quick Reference

Navigating Directories and Programs

When SYSdev is first executed, a DOS shell graphic screen will appear, with the root directory shown. Notice the Menu at the bottom of the screen.

```
╔══════════ Systems S3000/M4000 Program Development - SYSdev Version 4.2 ═══════╗
║ PROMPT: Select program and Press Enter<CR>                                     ║
╠═══════════════════════════════════╦═══════════════════╦═══════════════════════╣
║ DIR: D:\PRFDLNRS                   ║ PROG: 18UWPNL2    ║ TARGET BOARD: M4500<PLC>║
╠═══════════════════════════════════╬═══════════════════╬═══════════════════════╣
║    PROGRAM SELECTIONS:            ║ SUB-DIRECTORY SELECTIONS: ║ TARGET BOARD SELECTIONS:   ║
║    18LNR1                          ║                   ║ S3010        M4010     ║
║    18RSLU1                         ║                   ║ S3012        M4011     ║
║  ►18UWPNL2                         ║                   ║ S3014        M4012     ║
║                                    ║                   ║ S3016        M4020<PLC>║
║                                    ║                   ║ S3021        M4020<PLS>║
║                                    ║                   ║ S3022        M4021<PLC>║
║                                    ║                   ║ S3024        M4021<PLS>║
║                                    ║                   ║ S3041        M4040     ║
║                                    ║                   ║              M4041     ║
║                                    ║                   ║              D4110     ║
║                                    ║                   ║              M4500<PLC>║
║                                    ║                   ║              M4500<PLS>║
╠════════╦═══════╦════════╦═════════╬═══════╦════════╦═══════╦═══════╦═══════╦════════╣
║ Create ║ Set   ║ Select ║ Root    ║ Make  ║ Select ║ Copy  ║Backup ║Restor ║Delete ║Exit to ║
║ Prog   ║Colors ║ Dir    ║ Dir     ║ Dir   ║Drive   ║ prog  ║ Prog  ║ Prog  ║ Prog  ║ DOS    ║
║ F1     ║ F2    ║ F3     ║ F4      ║ F5    ║ F6     ║ F7    ║ F8    ║ F9    ║ F10   ║ ESC    ║
╚════════╩═══════╩════════╩═════════╩═══════╩════════╩═══════╩═══════╩═══════╩═══════╩════════╝
```

Figure 2 SYSdev Shell

SYSdev Shell Menu Notes

<F1> creates a new program.
<F2> allows the user to change the foreground and background colors of SYSdev screens as desired.
<F3> allows for changing the current directory.
<F4> returns the current directory to the root (e.g. c:\) directory.
<F5> allows the user to create a new directory.
<F6> allows the user to switch the current drive letter (a: to z:).
<F7> copies the currently selected program to a new program in the same directory.
<F8> allows the user to backup all of the files associated with the current program to a floppy (a: or b:).
<F9> allows the user to restore the currently selected program from a floppy (a: or b:).
<F10> deletes the currently selected program (deleted programs are not retrievable).
<Esc> exits SYSdev. If the PC is running Windows™, control will return to the desktop.

Selecting a Program

Use *<F3>* to start the directory selection process. A pointer arrow ( ) will appear in the subdirectory selection area. Use the arrow keys to move the pointer arrow to the desired subdirectory (prfdlnrs according to the installation instructions in this manual), and press *<Enter>* to select that directory. Repeat this procedure until the directory where the control programs are to be stored is active. All of the control programs stored in that directory will be listed. Note that the target board (PLC model) for which each program was written is shown toward the top right of the screen. Use the arrow keys to move the pointer until it points at the desired program. Press *<Enter>* to select the program.

SYSdev Quick Reference

Main Development Menu

Once the program is selected, the Main Development Menu will appear.

```
Systems S3000 Program Development - SYSdev Version 4.2
              Program Name: D:\PRFDLNRS\18UWPNL2


              Main Development Menu


         1:  On-line Monitoring
         2:  Off-line Programming
         3:  Edit System Configuration
         4:  Print Program
         5:  Compile Program
         6:  Target Board Interface
         7:  Edit Variable Names
         8:  Print Compile Errors
         9:  File Utilities

        12:  Return to SYSdev Shell


         Enter selection:
```

Figure 3 SYSdev Main Development Menu

Main Development Menu Notes

1. On-line Monitoring – allows the user to monitor program execution. See on-line section below.
2. Off-line Programming – allows the user to edit the program. See off-line programming section below.
3. Edit System Configuration – allows the user to determine whether interrupt inputs, timed interrupts or fixed main scan features are active. Also sets up communication baud rates for some PLCs. See Figure 4.
4. Print Program – allows the program to be printed.
5. Compile Program – allows the user to compile a program that has been changed. Note that changing the system configuration requires the program to be compiled for the change to take effect.
6. Target Board Interface – allows interaction with the target board. See Target Board Menu screen below.
7. Edit Variable Names – opens the variable name editor without opening the program.
8. Print Compile Errors – this option lets the user print errors detected during compilation. This is especially useful if there are too many to fit on the screen.
9. File Utilities – allows the user to backup, restore or copy a program exactly as from the graphic screen.
12. Return to SYSdev Shell – backs out of the current program to the SYSdev shell screen.

```
        Systems S3000 Program Development - SYSdev51 Version 4.2
                    Program Name: D:\PRFDLNRS\18LNR1


                      System Configuration Menu

       Target Board: M4012                          Network Baud
                                                     Selections:
       Network baud rate: 344KBPS                    1: 344KBPS
                                                     2: 229KBPS
       Input0 Interrupt enable: no                   3: 106KBPS

       Input1 Interrupt enable: no
                                                     Fixed Main Scan/
       Fixed scan time/Timed Interrupt mode          Tmd Intrpt Time
          Fixed main scan: no                        Selections:
          Timed Interrupt: yes                       1: 0.5msec
          Fixed/Timed time: 0.5msec                  2: 1.0msec
                                                     3: 10.0msec


       Enter serial network baud (1,2,3):
```

Figure 4 M4012 System Configuration Screen

The System Configuration Menu allows the programmer to enable or disable the interrupt inputs and timed interrupt or fixed main scan. Fixed main scan / Timed interrupt timing is configured here. Some PLC models also set up the network baud rate here.

On-line Monitoring

As mentioned earlier, the compiled nature of Systems PLCs makes on-line programming impossible. On-line monitoring is available so a user with a personal computer (PC) can connect to the PLC and monitor the status of the machine. Quick highlights of the most commonly used features are detailed here. For more information, please refer to the SYSdev Program Development Manual.

Getting On-line (Monitoring)

1. Connect a serial cable between a serial port of your computer and the Prog (program) Port of the PLC.
2. Run SYSdev.
3. Use *<F3>* (Select Dir) and the arrow keys to select directory where control programs are stored.
4. Make sure the pointer arrow points to the program you wish to check and press *<Enter>*.
5. From the Main Development Menu, choose 1: On-line Monitoring: *1<Enter>*.

Menu Highlights

<F1> Decimal/ Hex - switches the display format of the variables in the data table (see below).
<F2> Change Value – allows the user to change the current value of a register (see below).
<F3> Status Table – switches to a full screen data table (no logic visible).
<F4> Help
<F5> Enters Search Mode. See Section Below.
<F6> Select File – brings up file Menu to allow display of files other than the Main Program.

Search Mode

A few notes about the search function
- The search mode allows you to search by Block Number or Variable. The variable must be referred to by its address. There is no way to search for a variable using its documentation.
- The search function is not global. This means that searching for a variable will only detect usage inside the current file. For example, if you are searching the Main Program, and the variable is only used inside the Timed Interrupt File, the search will show the variable as not used.
- Repeatedly pressing <F2><Enter> will cycle through the uses of the variable inside the current file. This cycling will not stop when all of the uses are found – it will start over from the beginning. The exception to this rule is if the variable is only used inside a single Block.
- While in search mode, the current values of variables are not updated to the PC. This does not mean that the PLC values are not changing. It means the monitoring software is not showing the latest status.
- Press <Esc> to exit search mode.

Using the Data Table

1. Once On-line, the screen will look similar to this:

```
B102 = B191;                    /* Set input image for keypad input */

if (B102 == 0)                  /* No function switches */
   F40 = 0, F47 = 0, F44 = 0;     /* Clear Reset, Adjust */
else if (B102 == 1)             /* Time switch depressed */
   F41 = 1, F42 = 0, F45 = 0;     /* Set Time and reset Lift, Speeds */
else if (B102 == 2)             /* Lift switch depressed */
   F41 = 0, F42 = 1, F45 = 0;     /* Set Lift and reset Time, Speeds */

else if (B102 == 3)             /* Guns Auto switch depressed */
   F32 = 1, F33 = 0;              /* Set Auto flag and reset Bleed flag */
else if (B102 == 4)             /* Guns Man switch depressed */
   F32 = 0, F33 = 0;              /* Reset Auto & Bleed flags for Manual */
else if (B102 == 5)             /* Guns Bleed switch depressed */
   F32 = 0, F33 = 1;              /* Set Bleed flag and reset Auto flag */

else if (B102 == 6)             /* Speeds switch depressed */
   F41 = 0, F42 = 0, F45 = 1;     /* Set Speeds and reset Time, Lift */


 Block: 1        Page: 1        Type: High-level     Status: comm stat
                                                    ══ FILE: MAIN PROG ══
║1▶────────=──────  ║4:────────=────── ║ F1-Decimal/Hex   F4-Help Screen ║ Prev
║2:────────=──────  ║5:────────=────── ║ F2-Change Value  F5-Search Func ║ Menu
║3:────────=──────  ║6:────────=────── ║ F3-Status Table  F6-Select File ║▒ESC▒
```

2. The bottom left part of the screen has 6 placeholders for monitoring variable values:

```
                                                    ══ FILE: MAIN PROG ══
║1▶────────=──────  ║4:────────=────── ║ F1-Decimal/Hex   F4-Help Screen ║ Prev
║2:────────=──────  ║5:────────=────── ║ F2-Change Value  F5-Search Func ║ Menu
║3:────────=──────  ║6:────────=────── ║ F3-Status Table  F6-Select File ║▒ESC▒
```

3. To find the current value of a specific variable, simply type the variable name. For example, typing *B1174<Enter>* would change the display to this:

```
                                                    ══ FILE: MAIN PROG ══
║1:B1174  =150     ║4:────────=────── ║ F1-Decimal/Hex   F4-Help Screen ║ Prev
║2▶────────=──────  ║5:────────=────── ║ F2-Change Value  F5-Search Func ║ Menu
║3:────────=──────  ║6:────────=────── ║ F3-Status Table  F6-Select File ║▒ESC▒
```

where the value of B1174 is 150 in this case.

4. To change the value stored in an address, choose *<F2>* Change value. A new prompt will appear changing the bottom of the screen to:

```
                                                    ══ FILE: MAIN PROG ══
║1:B1174  =150     ║4:────────=────── ║Enter "Addr=Value":          ║ Prev
║2:────────=──────  ║5:────────=────── ║                             ║ Menu
║3:────────=──────  ║6:────────=────── ║                             ║▒ESC▒
```

5. As the prompt suggests, simply enter the address, "=", and the value to change to. For example:

```
                                                    ══ FILE: MAIN PROG ══
║1:B1174  =150     ║4:────────=────── ║Enter "Addr=Value": B1174=100 ║ Prev
║2:────────=──────  ║5:────────=────── ║                             ║ Menu
║3:────────=──────  ║6:────────=────── ║                             ║▒ESC▒
```

6. Pressing *<Enter>* will change the value stored in the specified address:

```
                                                    ══ FILE: MAIN PROG ══
║1:B1174  =100     ║4:────────=────── ║ F1-Decimal/Hex   F4-Help Screen ║ Prev
║2▶────────=──────  ║5:────────=────── ║ F2-Change Value  F5-Search Func ║ Menu
║3:────────=──────  ║6:────────=────── ║ F3-Status Table  F6-Select File ║▒ESC▒
```

Notes:

- SYSdev does not support Forces. The user can change the value of any register, but the PLC will overwrite all addresses according to program logic.
- Any valid variable (address) can be monitored in this fashion, and the variables can be viewed in any order.
- Use the arrow keys to move the pointer to a different location as desired.
- To monitor a different variable in the same slot, simply position the pointer and type the new variable address.
- <F3> will change the whole screen to a data table to monitor more values at once without viewing the logic.
- While in the process of changing a value, the displayed data is not updated by the monitoring software. The program is still running in the PLC, however, so values may be changing inside the PLC.

On-line Monitoring Ladder Logic

When on-line monitoring a Ladder Logic Block, the contacts that enable power to pass to the right are highlighted with reverse video. The data table is still present. Note that contact highlighting, similar to data table values, will not change to reflect current values while in Search mode or while changing a value manually.
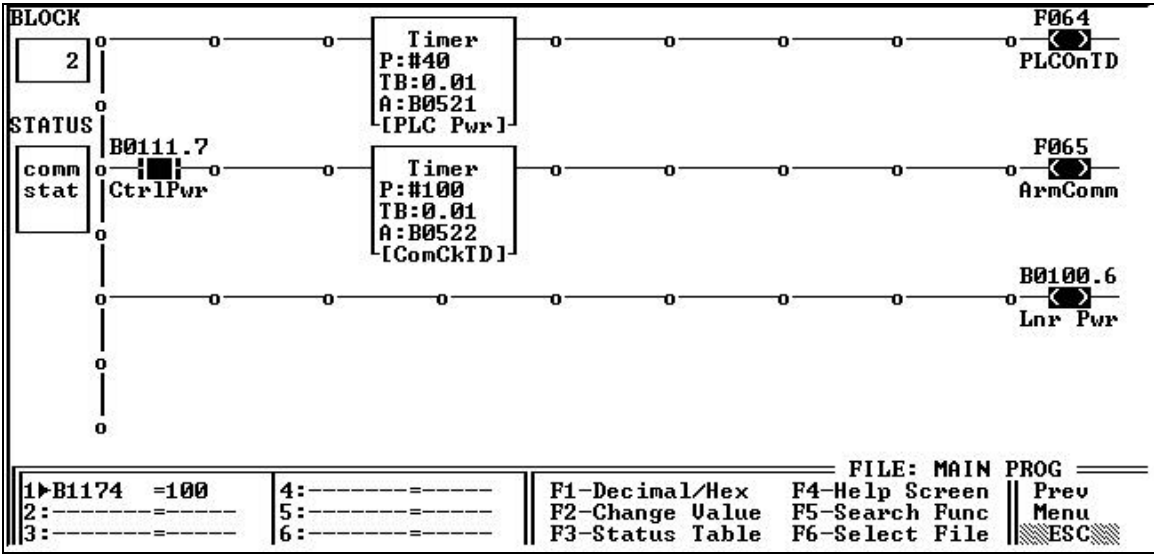
Figure 5 A Ladder Block viewed in On-line Monitoring

Printing the Program

Choosing option 4 from the Main Development Menu (*4<Enter>*) brings up the following screen.

```
Systems S3000 Program Development - SYSdev96 Version 4.2
              Program Name: D:\PRFDLNRS\18VWPNL2


            Printer Selections Menu


        1:   Standard printer
        2:   Okidata 92/93
        3:   Okidata 192/193/321
        4:   Epson FX86/FX286/EX800/EX1000
        5:   IBM Proprinter II/XL
        6:   HP LaserJet


        Enter selection:
```

Figure 6 Printer Selection Screen

The purpose of this screen is to allow for special print commands. Most modern printers use the commands for option 6. HP Laserjet. If this causes problems, use 1. Standard Printer.

```
Systems S3000 Program Development - SYSdev96 Version 4.2
           Program Name: D:\PRFDLNRS\18UWPNL2


                    Program Print-outs Menu

             1:    Print complete program
             2:    Print Initialization file
             3:    Print Main Program file
             4:    Print Timed Interrupt file
             5:    Print Co-Cpu Com Interrupt file
             6:    Print User Function file
             7:    Print Cross Reference
             8:    Print Variables Overlap map
             9:    Print Memory map
            10:    Print System Configuration
            11:    Enter Program Title

            12:    Return to Main Development menu


             Enter selection:
```

Figure 7 Program Printouts Menu

Program Printout Menu Notes

* All printouts of program files include top of Block documentation and full variable documentation. The user is given the option to print a cross-reference for every Block which includes every address used inside that Block.

1. Prints all of the control logic from all files used.
2. Prints the selected Blocks of the Initialization File only.
3. Prints the selected Blocks of the Main Program File only.
4. Prints the selected Blocks of the Timed Interrupt File only.
5. Prints the selected Blocks of the Co-CPU File only. Note: the PMC Liner control programs do not include any Co-CPU files. These files are used for an older model PLC.
6. Prints the selected Blocks of a selected User Function File only.
7. Prints the Cross Reference, which lists every used address along with the File, Block and line of every occurrence of that address in the program.
8. Prints a cross reference listing showing where addresses overlap with each other due to differing references to the address (I.e. Bytes that hold the Flag memory, and Bytes included in each Word), and a listing of variables that are used in multiple places. This is a tool to prevent using an address for two different purposes.
9. Prints a memory map showing which addresses have been used in the program.
10. Prints the System Configuration File.
11. Allows the user to enter a title for the program, which shows up on the printouts.
12. Returns to the Main Development Menu.

Target Board Interface

```
Systems S3000 Program Development — SYSdev96 Version 4.2
              Program Name: D:\PRFDLNRS\18UWPNL2


              Target board Interface Menu


          1:   Download program to target board
          2:   Download data to target board
          3:   Upload data from target board
          4:   Target board Fault codes/status
          5:   Target board Network address
          6:   Current target board program Ident/Revision
          7:   Target board Hardware Confidence Test
          8:   Program EPROM

         12:   Return to Main Development Menu

         Enter selection:
```

Target Board Interface Menu Notes

* Procedures are located in the Setup Procedures section of this Manual for many of these tasks. Further explanations are included in that section.

1. Downloads the current program from the PC to the PLC.
2. Downloads data (address values as stored previously) from the PC to the PLC. Important: if data has never been uploaded onto this PC, the data downloaded will load all addresses with 0.
3. Uploads data (address values) from the PLC to the PC.
4. Allows the user to check out PLC faults.
5. Allows the user to check the serial network address set in the PLC.
6. Allows the user to check which program is running in the PLC.
7. Allows the user to test the hardware and firmware of the PLC. Some tests require special wiring rigs. Performing a hardware confidence test erases all of the program and data memory, so take precautions before experimenting with this feature.
8. Program EPROM. Not applicable for the PLCs used in the PMC Liner control system.
12. Returns to the Main Development Menu.

Setup Procedures

The common tasks involved for maintaining a HSL-X Liner are detailed in step-by-step procedures in this section. These procedures often involve connecting the serial cable to the Program Port of the PLC. Note that the Program Port for the Liner Tank PLC is extended to a connector on the outside of the upper turret electrical tank. Use this connector to connect to the Program Port of this PLC instead of connecting directly.

Checking the Revision and Checksum of a program

It is always good practice to check the Revision and Checksum of the program inside the PLC before downloading a new program. Make sure the current program is available in case there is an error in the new program. **Please have Revision and Checksum information available before calling Computrol for technical support.**

1. To check the Revision and Checksum of the program being used by the PLC, you must connect a serial cable between a serial port of your computer and the Prog (program) Port of the PLC. Note that the Program Port for the Liner Tank PLC is extended to a connector on the outside of the upper turret electrical tank. To simply check the program on your computer, this is not necessary.
2. Run SYSdev.
3. Use *<F3>* (Select Dir) and the arrow keys to select directory where control programs are stored.
4. Use the arrow keys to point the pointer arrow at the program you wish to check and press *<Enter>*.
5. From the Main Development Menu choose 6: Target Board Interface: *6<Enter>*.
6. From the Target Board Interface Menu choose 6: Current target board program Ident/Revision: *6<Enter>*.
7. The screen will look similar to this:

```
    Systems S3000 Program Development - SYSdev96 Version 4.2
                 Program Name: D:\PRFDLNRS\18UWPNL2
            When ready, press any key to exit:
    _____

            Program/Target Board Ident/Revision


            Current Program Selected (on disk)
            _____

            Program Ident: 18UWPNL2
            Program Revision: 157
            Program Checksum: 202

            Current Program in Target Board
            _____

            Target Board Ident: 18UWPNL2
            Target Board Revision: 157
            Target Board Checksum: 202

```

Current Program Selected (on disk) is the program stored on the computer (PC)
Current Program in Target Board is the program stored in the PLC.

8. If the PC cannot communicate with the PLC due to PLC fault, PLC not powered, or serial cable or PC Comm Port problems, the screen will look similar to this:

```
    Systems S3000 Program Development - SYSdev96 Version 4.2
                 Program Name: D:\PRFDLNRS\18UWPNL2
        Could not communication with target board, press any key:
    _____

            Program/Target Board Ident/Revision


            Current Program Selected (on disk)
            _____

            Program Ident: 18UWPNL2
            Program Revision: 157
            Program Checksum: 202

            Current Program in Target Board
            _____

            Target Board Ident and Revision Unknown

```

Downloading a program

Please ensure that the program being downloaded is intended for the PLC with which you are connected. Sending a D4110 program to a M4010/2 (or vice versa) will lock up the PLC, and the PLC will need to be "jolted."

1. Connect a serial cable between a serial port of your computer and the Prog (program) Port of the PLC. Note that the Program Port for the Liner Tank PLC is extended to a connector on the outside of the upper turret electrical tank.
1. Run SYSdev.
2. Use *<F3>* (Select Dir) and the arrow keys to select directory where control programs are stored.
3. Use the arrow keys to point the pointer arrow at the program you wish to check and press *<Enter>*.
4. From the Main Development Menu choose 6: Target Board Interface: *6<Enter>*.
5. From the Target Board Interface Menu choose 1: Download program to target board: *<1> <Enter>*.
6. SYSdev gives the user a chance to stop without downloading with an "are you sure?" Press *<Enter>* to continue or *<Esc>* to abort.
7. The screen will show:
   Downloading program to address: xxxxH (with the Hex address scrolling).
9. When the download is complete (screen says " Program dump complete, press any key", press *<Enter>* to return to the Target Board Interface Menu.

Setting Up PLC Presets

There are variables inside the panel PLC program that are changed only by a PC connected on-line. These variables are called Presets. The Presets for each control system are listed in the documentation located in Block 0 of the Main Program for the panel PLC. This list should be printed for your reference. For instructions on viewing and changing the current values of these registers, please refer to the section on On-line Monitoring with SYSdev.

A sample listing of presets is provided below:

Table 3 Sample Listing of PLC Presets (M4500 PLC)

BYTE	DEFAULT	UNITS	FUNCTION
B1114	000	0.5ms	Gun Pre-Spin Timer
B1115	255	0.5ms	Gun Anti-Bounce Timer
B1120-7	100	0.5ms	Gun On Times
B1130-7	040	Steps	Gun Lift Tracking Values
B1170	000	0.5ms	Infeed On Timing Delay
B1171	000	0.5ms	Infeed Off Timing Delay
B1174	150	0.5ms	Maximum Gun On Time
B1175	020	0.5ms	Minimum Gun On Time
B1176	065	Steps	Maximum Gun Lift Setting
B1177	015	Steps	Minimum Gun Lift Setting
B1178	050	.1s	Drive Up To Speed To Allow Infeed
B1179	090	1.0s	Purge Air Cycle (SB Only)
B1179	030	1.0s	Compound Slow Fill Check (WB Only)
W1180	1800	1.0s	Compound No Refill Check (WB Only)
B1184	002	retries	Serial Comm. Retries Before Fault
B1185	001	revs	Turret Revolutions Per End Prx Check
B1186	002	ends	Ends Per Exit Jam Check
B1187	050	10ms	Line Control Turn On Filter
B1188	050	10ms	Line Control Turn Off Filter
W1206	240	1s	Power Brush Cleaning Interval (WB Only)
B1208	015	1s	Power Brush Liquid Applied Time (WB Only)
B1209	030	1s	Power Brush Air Applied Time (WB Only)

Troubleshooting

This section provides some troubleshooting guidance for possible problems with the Liner.

PLC Faults

If the red FLT (fault) LED is lit on the PLC, there is a problem with the PLC itself.

Check Power Supply Voltages

Using a Digital Multimeter, check the incoming AC line voltage and DC output voltages for normal values.

Check the PLC Fault Code

For most PLC faults, the PLC stops running the program before the program memory is corrupted. When this is the case, we can reset the fault manually and re-initialize the program.
1. Connect a serial cable between a serial port of your computer and the Prog (program) Port of the PLC
2. Run SYSdev.
3. Use *<F3>* (Select Dir) and the arrow keys to select directory where control programs are stored.
4. Use the arrow keys to point the pointer arrow at the program you wish to check and press *<Enter>*.
5. From the Main Development Menu choose 6: Target Board Interface: *6<Enter>*.
6. From the Target Board Interface Menu choose 4: Target board Fault codes/status *4<Enter>*.
7. The screen will be similar to:

```
Systems S3000 Program Development - SYSdev96 Version 4.2
               Program Name: D:\PRFDLNRS\18WPNL1
               Reset target board fault code? (y/n): y
-------------------------------------------------------------------------
  Target Board Internal Fault Code
  --------------------------
  Curr Flt: (code=xxH) Fault interpretation message here
  Last Flt: (code=xxH) Fault interpretation message here

  Co-CPU slot:

  Corrective action: What to do about the fault.


  Target Board Communications Network Error Codes
  -----------------------------------
  Current comm error: (code=00H) No network comm error

  Last comm error: (code=00H) No network comm error
```

Figure 8 Example PLC Fault Code Check Screen

8. If the Target Board Internal Fault Code is anything but 42H (Cannot communicate with Target Board), hit *<Enter>* to reset the fault, then *<Enter>* to allow the program to re-initialize.
9. If the Target Board Internal Fault Code is 42H (Cannot communicate with Target Board), double-check the cable connection, and that the PLC is powered-up. If these are OK, try cycling the power to the PLC. If the fault persists, follow the jolt procedure below.

SYSdev Quick Reference

Jolt

The Jolt procedure is used to reestablish communication with a corrupted PLC. This SYSdev function continuously sends a command string to the PLC through the Prog Port to tell the PLC to stop its Power On Self Test procedure and stay focused on the Prog Port. This allows the user to reset the PLC fault, and download a correct program. **Make sure that the current program is available before performing a "jolt." The program will need to be downloaded and data presets will need to be restored. See the Setup Procedures section for assistance on restoring the program and the data.**

1. Connect a serial cable between a serial port of your computer and the Prog (program) Port of the PLC
2. Run SYSdev.
3. Use *<F3>* (Select Dir) and the arrow keys to select directory where control programs are stored.
4. Use the arrow keys to point the pointer arrow at the program you wish to check and press *<Enter>*.
5. From the Main Development Menu choose 6: Target Board Interface: *6<Enter>*.
6. From Target Board Menu select 7: Target Board Hardware Confidence Test: *7<Enter>*.
7. From the Confidence Test Menu select (5: Re-establish Communication (JOLT) *5<Enter>* for M4010/4012) (3: Re-establish comm with corrupted board: *3 <Enter>* for M4500)
8. SYSdev explains that the JOLT procedure erases all memory. Press *<Enter>* to start the Jolt process, or <Esc> to abort.
9. SYSdev prompts with "Press any key to start jolt…". Press *<Enter>*. This will change the prompt to "Press any key to stop jolt…".
10. While the Jolt function is in process, cycle the power to the controller OFF and ON a few times. To cycle the panel controller power, use the appropriate fuse or circuit breaker. To cycle the liner tank controller power, use the fuse on the turret.
11. Leaving the power on, press *<Enter>* to stop the Jolt process.
12. You should now be at the Target Board Menu. Select 4: Target Board Fault Codes: *4<Enter>*.
13. If the PLC is talking, the message "Reset Target Board Fault Codes (y/n)" will appear at the top of the screen.
14. Press *<Enter>* "Target Board Will Be Initialized, Continue? (y/n)" should be displayed.
15. Press *N<Enter>*. This will return you to the Target Menu. The fault LED may still be illuminated on the processor board. This is normal, ignore it and proceed.
16. Select 1: Download Program *1<Enter>*.

Notes: Be sure you are attempting to download the correct program. It may take several times repeating steps 6 through 11 before the controller will reset the PLC fault.

Contacting Computrol, Inc.

We at Computrol are committed to providing excellent technical support for our control systems. We are also interested in any comments or suggestions you may have toward improving these systems. If you need troubleshooting help, or just have a suggestion for an improvement for this control system or this manual, please feel free to contact us.

If you need troubleshooting assistance, please include the program revisions and checksums currently in use, any relevant fault codes, conditions surrounding your problem (i.e. when starting after long shutdown, only on Tuesdays, etc.) and frequency of problem occurrence. Thank you.

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For technical updates to this manual and/or control system, please visit our web site: http://www.computrol1.net periodically.