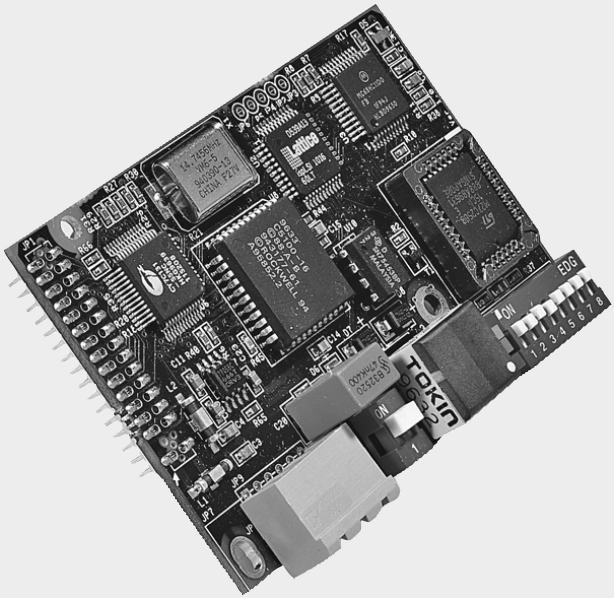
Communications

SmartLinx Module - Remote I/O

Operating Instructions · 02/2011



Milltronics

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Safety Guidelines: Warning notices must be observed to ensure personal safety as well as that of others, and to protect the product and the connected equipment. These warning notices are accompanied by a clarification of the level of caution to be observed.

Qualified Personnel: This device/system may only be set up and operated in conjunction with this manual. Qualified personnel are only authorized to install and operate this equipment in accordance with established safety practices and standards.

Unit Repair and Excluded Liability:

- The user is responsible for all changes and repairs made to the device by the user or the user's agent.
- All new components are to be provided by Siemens Milltronics Process Instruments.
- Restrict repair to faulty components only.
- Do not reuse faulty components.

Warning: Cardboard shipping package provides limited humidity and moisture protection. This product can only function properly and safely if it is correctly transported, stored, installed, set up, operated, and maintained.
This product is intended for use in industrial areas. Operation of this equipment in a residential area may cause interference to several frequency based communications.

Note: Always use product in accordance with specifications.

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- For a selection of Siemens Milltronics weighing manuals, go to: **www. siemens.com/processautomation**. Under Weighing Technology, select *Continuous Weighing Systems* and then go to the manual archive listed under the product family.

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Safety Notes

Special attention must be paid to warnings and notes highlighted from the rest of the text by grey boxes.

WARNING: relates to a caution symbol on the product, and means that failure to observe the necessary precautions can result in death, serious injury, and/or considerable material damage.

WARNING: means that failure to observe the necessary precautions can result in death, serious injury, and/or considerable material damage.

CAUTION: means that failure to observe the necessary precautions can result in considerable material damage.

Note: means important information about the product or that part of the operating manual.

The Manual

Notes:

- Please follow the installation and operating procedures for a quick, trouble-free installation and to ensure the maximum accuracy and reliability of your Siemens Milltronics SmartLinx Remote I/O module.
- This manual applies to the SmartLinx Remote I/O module only.

This manual will help you install and connect a Siemens Milltronics SmartLinx-DP module, and set it up for communication with a master device on a Remote I/O network. The manual is targeted at a technical audience in the industrial communications field with a sound working knowledge of Remote I/O.

We always welcome questions, comments, or suggestions about manual content, design, and accessibility.

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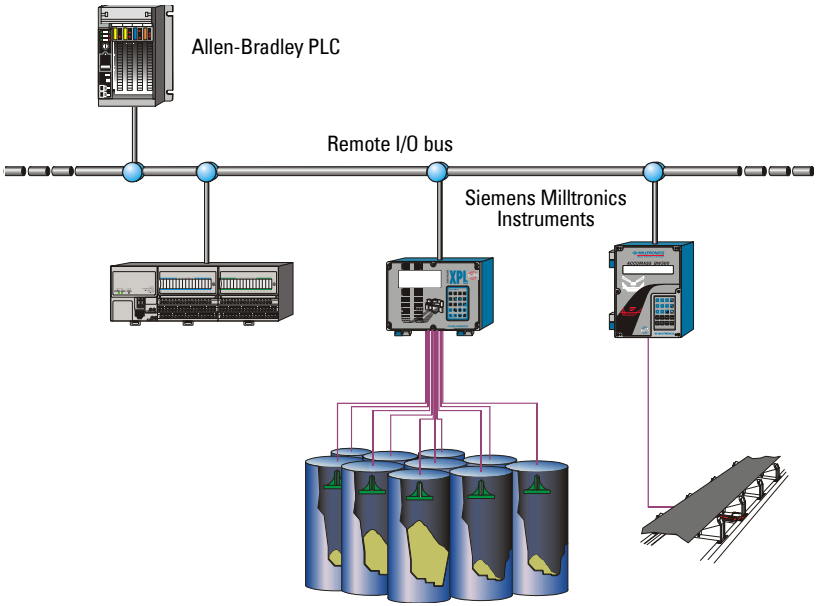
SmartLinx Remote I/O

Note: This product is intended for use in industrial areas. Operation of this equipment in a residential area may cause interference to several frequency based communications.

The Siemens Milltronics SmartLinx[1] module for Allen-Bradley Remote I/O is a plug-in communications card designed to interface a Siemens Milltronics SmartLinx compatible instrument to an Allen-Bradley Remote I/O network.

Only those instruments which support the Remote I/O protocol can use this card. See *Compatible Instruments*: on page 9 for a list of compatible host instruments.



Remote I/O is an industry standard protocol owned by Allen-Bradley® which is part of Rockwell Automation. For a full description of the Remote I/O protocol, contact Rockwell or visit their web site at www.rockwell.com.

Note: Siemens Milltronics does not own the Remote I/O protocol. All information regarding that protocol is subject to change without notice.

1. SmartLinx® is a registered trademark of Siemens MIlltronics Process Instruments Inc.

Specifications

Application:

- compatible with master devices on an Allen-Bradley Remote I/O bus

Compatible Instruments:

- AiRanger XPL Plus / SITRANS LU 10
- AiRanger DPL Plus / SITRANS LU 02
- AiRanger SPL / SITRANS LU 01
- CraneRanger
- InterRanger DPS 300
- EnviroRanger ERS 500
- MultiRanger 100/200
- HydroRanger 200

Mass Dynamics

- Milltronics BW500
- Milltronics BW500/L
- Milltronics SF500

Communication Settings:

- baud rate: 57.6, 115.2, or 230.4 Kbaud
- starting group: ¼ to full rack
- rack size: ¼ to full rack

Connection:

- 3-position terminal block for wire end

Termination:

- switch selectable, open or 82 Ω internal

Cable:

- Belden 9463 “Blue Hose” or equivalent

Installation

The SmartLinx module is either shipped already installed in the Siemens Milltronics instrument or separately for on-site installation. Refer to the manual of your Siemens Milltronics instrument for details on module location and physical installation.

Compatibility

For the SmartLinx Profibus card there are different hardware and software configurations available depending on the equipment used.

Software Compatibility

If a device is SmartLinx ready, it will work with the correct SmartLinx card for that device. However, if the firmware version is a lower number than the one listed below, the Map Element Selection Parameter (P762) will not be available. Also, for the BW500, BW500/L and the SF500, the read block will be a smaller size.

Product	Software Rev.	Product	Software Rev.
AiRanger XPL Plus / SITRANS LU 10	5.23	Milltronics BW500/L	3.13
AiRanger DPL Plus / SITRANS LU 02		Milltronics BW500	3.05
		Milltronics SF500	
AiRanger SPL / SITRANS LU 01		MultiRanger 100	1.04
InterRanger DPS 300		MultiRanger 200	1.03
		HydroRanger 200	
		EnviroRanger ERS 500	5.06

Retrofits:

If you are replacing an older SmartLinx device with a new SmartLinx device, and you are using any product other than the BW500, BW500/L or SF500, then you can use the default values for P762.

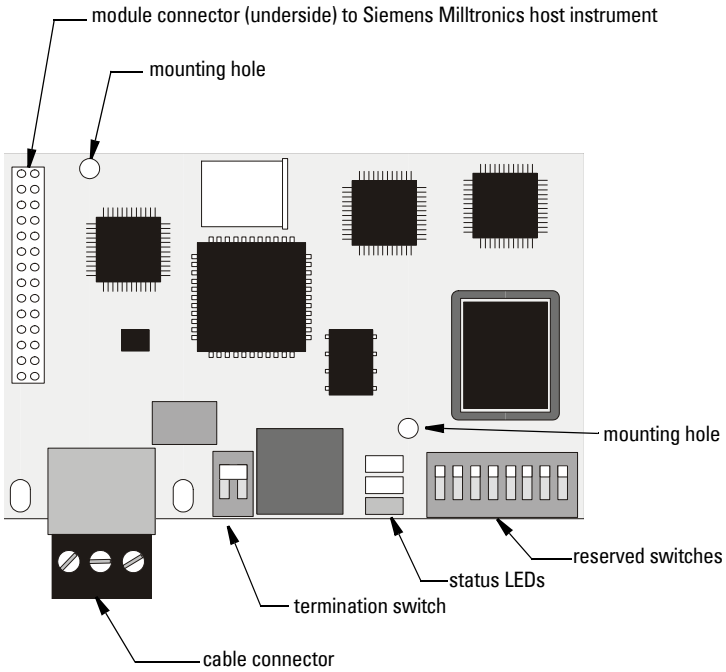
If you are replacing a BW500, BW500/L or SF500 with a new device, then set P762 primary index 15 = 0, and P762 primary index 16 = 0.

Hardware Compatibility

All available SmartLinx card configurations are shown here for reference.

The card shown below is compatible with the following Siemens Milltronics units:

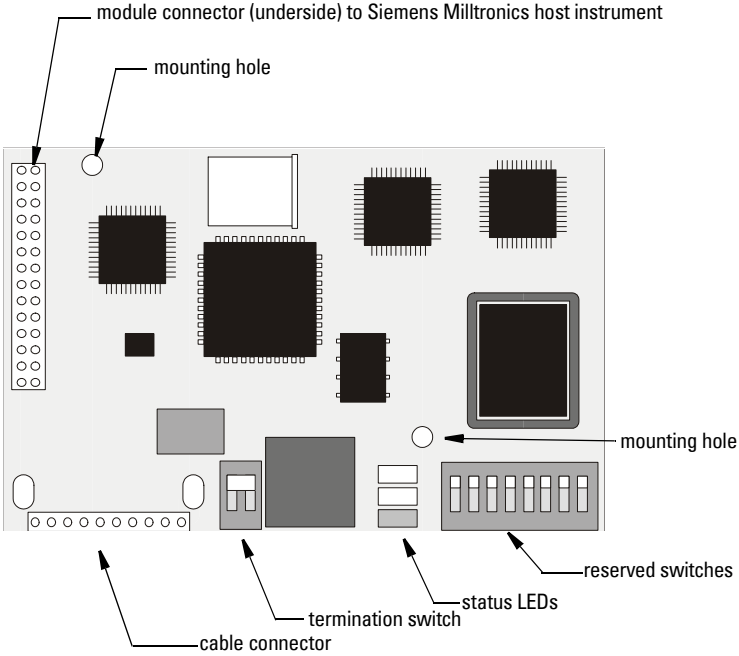
- AiRanger XPL Plus / SITRANS LU 10
- AiRanger DPL Plus / SITRANS LU 02
- AiRanger SPL / SITRANS LU 01
- CraneRanger
- InterRanger DPS 300



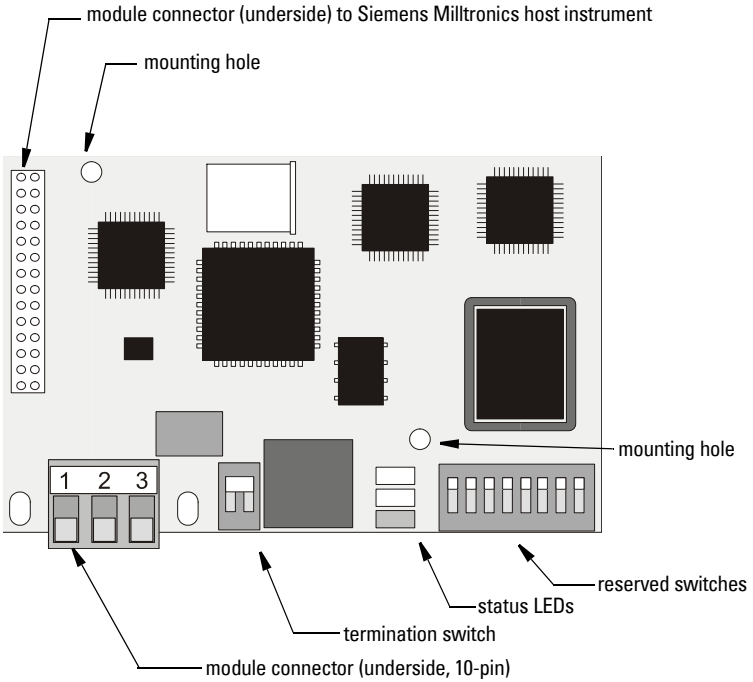
The card shown below is compatible with the following Siemens Milltronics units:

- EnviroRanger ERS 500
- Milltronics BW500
- Milltronics BW500/L
- Milltronics SF500
- MultiRanger 100/200
- HydroRanger 200

EnviroRanger Rack or Panel



The card shown below is compatible with EnviroRanger Wallmount, Milltronics BW500, Milltronics BW500/L, Milltronics SF500, MultiRanger 100/200, HydroRanger 200



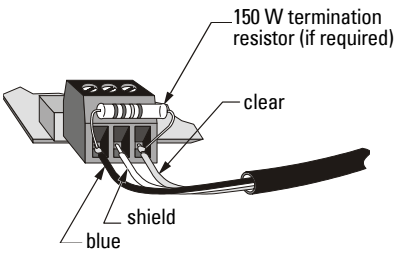
Notes:

- Install the SmartLinx card so that the mounting holes align and the pin connectors will mate correctly. You'll find that the module connectors have room for two more pins than are found on the card.
- Correct cable routing is important for electromagnetic noise suppression. Follow the routing instructions contained your unit's instruction manual.

Cable Connector

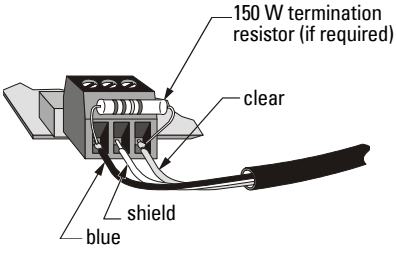
Connect using Belden 9463 “Blue Hose” cable or equivalent and terminate (blue/clear) according to Allen-Bradley specification and conventions.

AiRanger / SITRANS LU Series, CraneRanger, InterRanger DPS 300



terminal block number	cable colour
1	blue
2	shield
3	clear

EnviroRanger ERS 500 (Wall Mount), Milltronics BW500, Milltronics BW500/L, Milltronics SF500, MultiRanger 100/200, HydroRanger



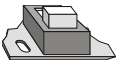
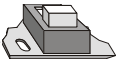
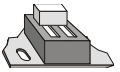
terminal block number	cable colour
1	blue
2	shield
3	clear

EnviroRanger ERS 500 (Rack or Panel Mount)

When using a SmartLinx card with the EnviroRanger all wiring is made to the EnviroRanger terminal board. The Remote I/O connections map to the EnviroRanger terminal board as shown:

EnviroRanger	Connection
65	Blue
66	Clear
69	Shield

Termination Switch[1]

Termination	Setting	Switch Position
open (not used)	off	
150 Ω (use external resistor)*	off	
82 Ω on	on	

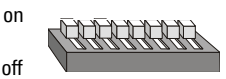
*See Cable Connector, below for resistor placement

Use the onboard 82 Ω for 230.4 kbps or an external 150 Ω for 57.6 or 115.2 kbps. Using 150 Ω termination will limit the number of physical devices on your network to 16.

Refer to your PLC User Manual for information on selecting the baud rate, cable type, maximum cable length, and termination resistor values for your installation.

Reserved Switch

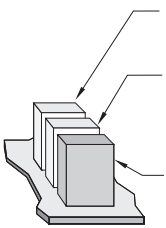
All dip switches must be set “on.”



1. The termination switch is not present on all cards.

Operation

Communication on the Remote I/O link is indicated by the SmartLinx LEDs.



Green LED

ON module is operational

Amber LED

ON data is being exchanged

OFF data is not being exchanged

Red LED

FLASH bus intact: Allen-Bradley PLC in program, or Siemens Milltronics host instrument set to different rack size than PLC

ON not being scanned by PLC

Communications Setup

Host instruments use parameters to configure the SmartLinx card. Parameters values may be entered into the instrument with a hand-held programmer, or by using Siemens Milltronics' Dolphin Plus PC software.

Note: Some parameters used for SmartLinx are similar to those that are used for other functions in the host instrument. Ensure that you change the correct ones (P751 to P755) to configure the SmartLinx card.
For example:P772 on some host instruments is the Baud Rate of the built in communications ports. Do not confuse that parameter with P751, which is the Baud Rate of the SmartLinx A-B Remote I/O card.

Recommendations

The following are recommendations about how to configure the Siemens Milltronics instrument on the Remote I/O network. Other configurations are possible but these have been found to provide the best operation.

Rack Size

Set up the Siemens Milltronics host instrument as a 1/4 rack size to conserve remote rack space available to the PLC. As discrete I/O operation is very limited when using 1/4 rack size configuration, block transfer read and write commands (see page 17) are recommended.

Communication Type

If you are using an Milltronics BW500, Milltronics BW500/L or Milltronics SF500, then you have to use Block Transfers. However, if you are using a level product, you then have a choice between using Discrete I/O method and Block Transfer Method.

Generally, Block Transfers are the better way to go, since more data is available to you. However, if you are using an older SLC500 and only want the level information, the Discrete I/O is definitely the easiest method.

BTR and BTW Timing

Exercise caution when deciding how often to trigger the Block Transfer Read (BTR) and Block Transfer Write (BTW) instructions.

Triggering too often increases the delay of all block transfers on the Remote I/O link. The recommended guideline is to trigger the BTR and BTW instructions no faster than every 0.3 seconds.

Note: Shipped with the SmartLinx A-B Remote I/O card is a diskette containing some program examples for a PLC5, SLC500, and ControLogix.

BTR and BTW Data Sizes

The data size of the input and output modules is dependent on P762, and on the type of unit the module is plugged into, (either Level or Mass Dynamics). (The following instructions assume that P762 is set to the default values shown in the chart on page 15.)

Level Products (includes AiRanger / SITRANS LU Series, ERS 500, MultiRanger 100/200, HydroRanger 200)

- 42 words input (see *Write Block* on page 25)
- 13 words output (see *Read Block* on page 28)
- read and write data as 16-bit words (see *Data Types* on page 46)

Mass Dynamics Products (includes BW500, SF500)

- 34[1] words input (see *Write Block* on page 36)
- 19 words output (see *Read Block* on page 57)
- read and write data as 16-bit words (see *Data Types* on page 46)

Mass Dynamics Products (BW500/L)

- 23 words input (see *Write Block* on page 36)
- 10 words output (see *Read Block* on page 57)
- read and write data as 16-bit words (see *Data Types* on page 46)

1. 34 is the correct value for BW500/SF500 units that have firmware V 3.05 or greater and have all the values of P762 turned on. For older units, the input size is 31 words.

Specific Parameters

These parameters are set on the host instrument. The SmartLinx card must be installed before they are accessible. Consult the host instrument's manual for instructions on programming.

"f" indicates the factory preset.

P751 Baud Rate

Sets the baud rate for Remote I/O communication between the Siemens Milltronics host instrument and the Allen-Bradley PLC.

Set this parameter to match the baud rate used by all devices on the RIO bus.

Values

0		57.6 Kbaud
1		115.2 Kbaud
2	*f*	230.4 Kbaud

P752 Rack Number

Sets the rack number (octal) that the Siemens Milltronics host instrument has been assigned on the Remote I/O link.

Check your PLC manual for the supported range.

Values

01 to 73
Preset: 2

P753 Starting Group

Sets the starting group number for the Siemens Milltronics host instrument

Values		Rack Size (see P754)
0	*f*	1/4, 1/2, 3/4 or full
2		1/4, 1/2 or 3/4
4		1/4 or 1/2
6		1/4

P754 Rack Size

Sets the discrete I/O address space. Valid settings are 1 to 4 quarter racks, dependent upon the starting group (P753).

Values	Rack Size		Starting Group (P753)
1	*1/4*	/	0, 2, 4, or 6
2	1/2		0, 2 or 4
3	3/4		0 or 2
4	full		0

P755 Last Rack

Indicates if the Siemens Milltronics host instrument is on the last rack.

The last rack is defined as the highest numbered rack on the Remote I/O link.

Value		
0	f	not last
1		last

Map Element Selection

P762 Map Element Selection parameter

P762 allows you to select what elements to include in the Input and Output Tables. By selecting only the data required, you can reduce the amount of data being transferred over the bus.

Notes:
- P762 should only be modified by an advanced user who wants to limit the amount of data being transferred. See Appendix A – Reducing the amount of data being transferred over the Bus on page 54 for more details.
- Changes do not take effect until after a power cycle.

The chart on page 16 gives the default values for this parameter. If the default values are used then the configuration and Data Map (see page 24) in the main body of this manual remain correct. If any of these values is changed, then the Data Map will be shortened and the configuration will change. Please see Appendix A on page 54 for details on how to use P762.

	AiRanger / SITRANS LU, EnviroRanger, MultiRanger			BW500, BW500/L, SF500			
P762 Index	Name of area	Default value	Range	Name of area	Default value		Range
					SF500 , BW500	BW500/L	
1	Instrument status	1	0 = No 1 = Yes	Instrument status	1	1	0 = No 1 = Yes
2	Reading	10	0 = No 1…10 = include that number of items	Rate	1	1	0 = No 1 = Yes
3	Alarm	10	0 = No 1…10 = include that number of items	Load	1	1	0 = No 1 = Yes
4	Point-on-priority	1	0 = No 1 = Yes	Speed	1	1	0 = No 1 = Yes
5	MPA	1	0 = No 1 = Yes	Total	1	1	0 = No 1 = Yes
6	SPA	1	0 = No 1 = Yes	Relay Status	1	1	0 = No 1 = Yes
7	Operating Mode	1	0 = No 1 = Yes	DI Status	1	1	0 = No 1 = Yes
8				SPA	1	1	0 = No 1 = Yes
9				Command Control	1	1	0 = No 1 = Yes
10				MultiSpan	1	0	0 = No 1 = Yes
11				PID	1	0	0 = No 1 = Yes
12				Batch	1	0	0 = No 1 = Yes
13				Batch Prewarn	1	0	0 = No 1 = Yes
14				Word Order	1	1	0 = No 1 = Yes
15				Status 2	1[1]	1	0 = No 1 = Yes
16				Batch Total	1[1]	0	0 = No 1 = Yes

1. For firmware V 3.05, the default is 0. For all higher ersions, the default is 1.

Module Identification

Parameters P794 and P795 are used together to identify the module type and protocol used.

P794 SmartLinx Module Type (Read only)

Identifies the module used.

Value	Module
0	No module present
1	Anybus DT module
2	Anybus S module

P795 SmartLinx Protocol (Read only)

Identifies the protocol used: the value varies according to the module, and whether it is a type 1 or type 2.

Siemens Milltronics Instrument	Card	P794 value	P795 value
ER-500 BW500, BW500/L, SF500 MultiRanger 100 / 200	AB RIO	1	72
	Profibus-DP	2	1
	DeviceNet	2	37
AiRanger / SITRANS LU	AB RIO	1	72
	Profibus-DP	1	0
	DeviceNet	1	24
	Modbus RTU	1	57
	Modem Card	1	133

P634: Communication Totalizer Resolution

Parameter P634 is used to set the number of fixed decimal places for Total 1 and Total 2 for SmartLinx communication.

Note: P634 applies only to Milltronics BW500, Milltronics BW500/L and Milltronics SF500.

P634 Index	Description	Value		# of decimal places
Primary Index 1	Total 1 for SmartLinx communication	3	*[1]	3
		2		2
		1		1
		0		0
Primary Index 2	Total 2 for SmartLinx communication	3	*	3
		2		2
		1		1
		0		0

1. Factory setting.

Application Layer

The application layer describes the organization and format of data that an Allen-Bradley PLC can access. Allen-Bradley has defined two different methods through which the host instrument can access data:

1. Block Transfer

This method is used to pass a large amount of data from the remote instrument to the PLC. This method is recommended.

2. Discrete I/O

Requests a single parameter value on a single indexed measurement point. This was the original method for passing data in remote I/O. Using this method, the Siemens Milltronics instrument would look like a remote I/O rack to the AB PLC. If you are using a level instrument and just want a few levels, then this method works fine. Ifyou have a weigh feeder, then this method is not supported because there is too much data to be passed.

Page Reference

For information on the application layer for each supported instrument refer to page shown.

	Block Transfer	Discrete I/O
Level Products	22	29
Mass Dynamic Products	34	N/A

For a description of the parameter values, see Data Types on page 43. For a description of the parameters themselves, refer to the manual for the host instrument.

Parameter Indexes

Most parameters used on Siemens Milltronics SmartLinx instruments are indexed. Indexing allows a parameter to relate to more than one input or output. For example, many parameters are indexed by measurement point while others are indexed by relay output or discrete input.

The way that indexes are handled in the memory map depends on the data access method used.

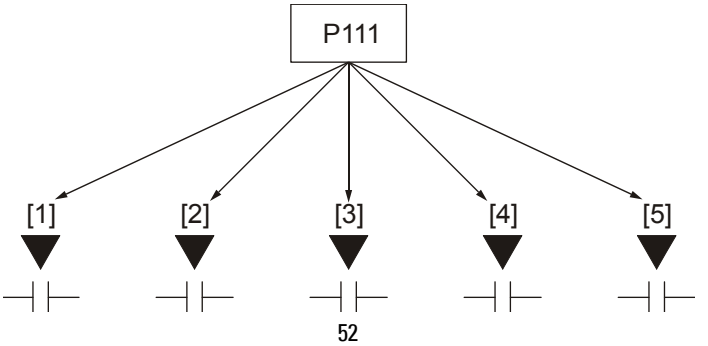
Primary Index

An index that relates to an input or output is called a Primary Index. (On some older Siemens Milltronics products the primary index is called a point.)

Example:

P111[3] = 52

means P111 (Relay Control Function) for relay 3 is set to value 52.



Secondary Index

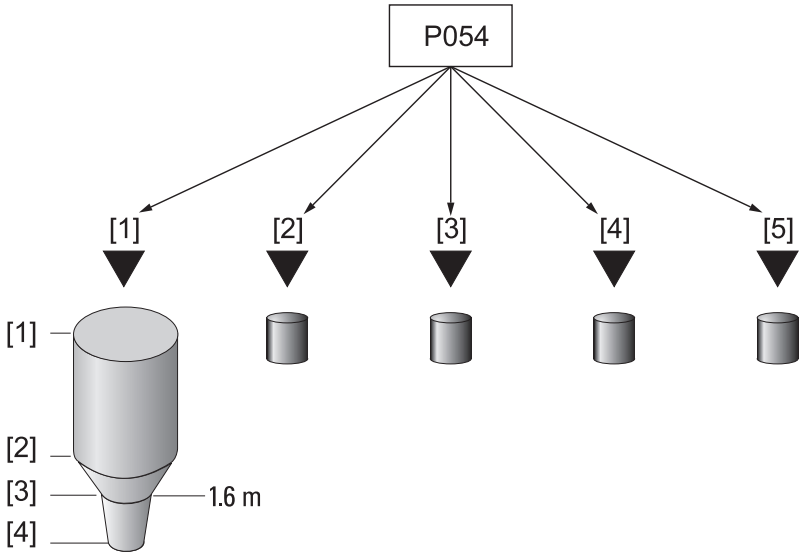
Sometimes a parameter requires a second index to allow for multiple values on an indexed input or output. For example a measurement point which calculates a reading on volume can require characterization breakpoints. These breakpoints are given on a secondary index (the primary index relates to the transducer input).

An index that relates to a previously indexed parameter is called a secondary index. (On some older Siemens Milltronics products the secondary index is called a mark.)

Example:

P054[1,3] = 1.6m

means P054 (Breakpoint Levels) for breakpoint 3 on transducer 1 is set to 1.6m



Data Access Methods

There are three different methods used in the memory mapping to give the users access to the SmartLinx Instrument parameter table. They are:

- Direct Access
- Multiple Parameter Access (MPA)
- Single Parameter Access (SPA)

Direct Access

Certain values are mapped directly into words. These words can be monitored continuously but they are not configurable.

Multiple Parameter Access (MPA)

Note:
- MPA is used on Level products only.
- In Siemens Milltronics' products, the memory is arranged as Parameter number, Primary Index, Secondary Index.

This is a hand-shaking method where the user specifies the parameter number, secondary index, decimal place, and format, then the SmartLinx writes into a certain area all 10 primary indexes of that parameter.

Using Multiple Parameter Access (MPA)

3. In the output table of the PLC (Write Block) write the values for the parameter number, secondary Index, decimal place and format in the correct location.
4. Monitor the Input table of the PLC (Read Block), and watch for the values you wrote to appear in the appropriate locations of the read block, then go to Step 3.
5. Read the requested values in the appropriate location of the Read Block. These values are continuously updated. Continue reading from these words until values for another parameter are required. At that time, go back to step 1.

Note: MPA values are only updated in Run mode (word 12=0).

Parameter Indexing with MPA

Primary Index

The primary index is implicit in the memory address. MPA values are returned through words 21 to 30 of the read block (see page 26).

Secondary Index

The secondary index is nearly always left at zero. See the manual for the Siemens Milltronics SmartLinx-compatible instrument for information on parameters, including those which require a secondary index.

Single Parameter Access (SPA)

Note: SPA is used on both Level and Mass Dynamics products.

This is a hand-shaking method where the PLC specifies:

- parameter number
- primary index
- secondary index
- decimal place
- format
- read/write flag
- value

With this method any value in the Siemens Milltronics product can be read or written.

Note: Parameter P999 (Master Reset) is not accessible via the SmartLinx interface on Level products.

Using Single Parameter Access (SPA)

SPA allows continuous monitoring or demand programming of a parameter.

Reading a Parameter

1. Set the Read/Write flag in the output table (Write Block) to 0, "Read."
2. Write the Parameter Number, Primary Index, Secondary Index, Decimal Place and Format in the correct locations.

Note If there is no secondary index, then place a 0 in this location.

3. Monitor the Input table of the PLC (Read Block) and watch for the values you wrote to appear in the appropriate locations, then go to Step 4.
4. Read the requested parameter value in the Input table (Read Block). These values are continuously updated. Continue reading from these words until values for other parameters are required. At that time, go back to step 1.

Writing a Parameter

1. Set the Read/Write flag in the output table (Write Block) to **0**, "Read."
2. Write the Parameter Number, Primary Index, Secondary Index, Decimal Place and Format in the correct locations.
3. Write the new value of the parameter into the correct location of the output memory (Write Block)
4. Verify the unit is in program mode (not needed for BW500, BW500/L and SF500). For Level see bit 10 of status word in Read Block.
5. If the unit is not in program mode, write a **1** to the operating mode word in the output memory (Write Block). Please note that writing a **1** will only work if the word is currently a **0:** if not, you need to change it to **0** before writing a **1** so it can take effect.
6. Set the Read / Write flag in the output table (Write Block) to a **1** "write."
7. Monitor the Input table of the PLC (Read Block) and watch for the values you wrote to appear in the appropriate locations.
8. Set Read / Write flag back to **0**.
9. Place unit in Run mode.

Note: Parameters for Level Products should only be written to while the unit is in PROGRAM mode. If the level instrument is still in RUN mode, the written value might be ignored.

Data Map – Level Products

Note: The data maps shown for the Block Transfers Write and Read Blocks apply if P762 is set to the default values (see page 15). If any of these values is changed, the data map will be shortened and the configuration will change. (See *Appendix A – Reducing the amount of data being transferred over the Bus*, on page 54.)

This section describes the meaning of the data read from and written to the Siemens Milltronics SmartLinx instrument.

Level Products – Block Transfers

This section describes the meaning of the data read from and written to the Siemens Milltronics host instrument in block transfer mode.

Refer to the Allen-Bradley PLC documentation on how to program block transfer read (BTR) and block transfer write (BTW) rungs in your PLC ladder logic.

Write Block

Word	Description	Access	Data Type
0	measurement point-on-priority	direct	bitmapped
1	parameter number	MPA	integer
2	secondary index (mark)		integer
3	decimal place		integer
4	format		0/1
5	parameter number	SPA	integer
6	primary index (point)		integer
7	secondary index (mark)		integer
8	new value		integer
9	decimal place		integer
10	format		0/1
11	read/write flag		0/1
12	operating mode	direct	0/1

Word 0: Point-on-Priority

Bits 00-09 set the priority status of corresponding indexed points 1 to 10.

bit	09	08	07	06	05	04	03	02	01	00
index	10	9	8	7	6	5	4	3	2	1

bit status **0** = normal
1 = priority

For example, if bits 00 and 02 are set to **1**, then points 3 and 1 are on priority scan. All other bits are reserved and contain **0**.

bit	09	08	07	06	05	04	03	02	01	00
index	0	0	0	0	0	0	0	1	0	1

The Siemens Milltronics instrument must be configured to use word 0 to control point-on-priority. For each point, set parameter P720 to **1**, to permit priority control for that point.

Note: Point-on-priority only applies to the XPL+.

Word 1: Parameter Number, MPA

Specifies the parameter number for the returned values in words 21 to 30. (See Read Block on page 28.)

Word 2: Secondary Index, MPA

Specifies the secondary index for the parameter specified by word 1. This word is ignored for parameters that don't use multiple indexes. (See Parameter Indexes on page 19 for more information.)

Word 3: Decimal Place, MPA

Specifies the number of decimal places to shift the returned values in words 21 to 30 of the Read Block. Positive values indicate that the decimal place shifts to the left, and negative values indicate that the decimal place shifts to the right.

For example:

word 3 = **1**: all returned values have the decimal place shifted 1 space to the left and a returned value of 5,213 is interpreted as 521.3
word 3 = **–1:** a returned value of 5,213 is interpreted as 52,130

Word 4: Format, MPA

Sets the format for the returned values in words 21 to 30.

0 = normal

1 = percent

Note: When the format is selected as "percent" the decimal place value (word 3 of the Write block) is ignored and two decimal places are always used. For example, a value of 5947 represents 59.47%.

Word 5: Parameter, SPA

Specifies the parameter number for Single Parameter Access (SPA): see page 23.

Word 6: Primary Index, SPA

Specifies the primary index number for the parameter in word 5.

Word 7: Secondary Index, SPA

Specifies the secondary index for the parameter in word 5. This word is ignored for parameters that don't use multiple indexes. (See Parameter Indexes on page 19 for more information.)

Word 8: New Value, SPA

This word contains the value written to the specified parameter and index. The format of this word is specified by words 9 to 10.

To write a value, ensure word 11 = **1** and word 12 =**1**. (See also: Data Types on page 46.)

Word 9: Decimal Place, SPA

This word specifies the number of decimal places for the value in word 8 of the Write Block, and word 38 of the Read Block. Positive values indicate that the decimal place shifts to the left, and negative values indicate that the decimal place shifts to the right.

For example:

word 9 = **1**: all returned values have the decimal place shifted 1 space to the left and a returned value of 5,213 is interpreted as 521.3
word 9 = **–1:** a returned value of 5,213 is interpreted as 52,130

Word 10: Format, SPA

This word sets the format for the value in word 8 of the Write Block and word 38 of the Read Block.

0 = normal
1 = percent

Word 11: Read/Write Flag, SPA

This word instructs the read/write application of word 8.

0 = read parameter as described by words 5, 6, 7, 9 and 10; word 8 ignored
1 = set parameter to the value described by words 5 to 10

Word 12: Operating Mode

This word sets the operating mode of the Siemens Milltronics SmartLinx instrument.

The operating mode can get out of sync if the remote instrument resets back to run mode locally. This can happen due to a time-out or through local programming. The mode is always reported correctly through the Read block. (See bit 10 of Word 0: Instrument Status on page 28.)

To reset the instrument to program mode, write **0** to synchronize the SmartLinx module with the instrument and then write **1** to set the instrument to program mode.

0 = run mode
1 = program mode

Read Block

Values in words 0 to 20, and word 41, are directly available, no write operation is required to request them.

Values in words 21 to 41 are determined by the write operation that requested them, either MPA or SPA. (See *Write Block* on page 22.).)

Words	Description	Access	Data Type
0	instrument status		bitmapped
1-10	point reading	direct	integer
11-20	point alarm and status		bitmapped
21-30	returned values		integer
31	decimal place		integer
32	format	MPA	0/1
33	parameter number		integer
34	secondary index		integer
35	parameter		integer
36	primary index		integer
37	secondary index		integer
38	returned value	SPA	integer
39	decimal place		integer
40	format		0/1
41	read/write flag		0/1

Word 0: Instrument Status

<table>
<tr><th>Bit</th><th>Description</th></tr>
<tr><td>00 to 09</td><td>Measurement Point Status
Indicates the operation of measurement points 1 to 10.
<table>
<tr><td>bit</td><td>09</td><td>08</td><td>07</td><td>06</td><td>05</td><td>04</td><td>03</td><td>02</td><td>01</td><td>00</td></tr>
<tr><td>index</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr>
</table>
0 = operational
1 = non-operational
'Non-operational' means that either the point is not configured or there is an error in the reading. Further information is available in the Point Alarm and Status words (Words 11 to 20).</td></tr>
<tr><td>10</td><td>Operating Mode
0 = Siemens Milltronics SmartLinx instrument in RUN mode
1 = Siemens Milltronics SmartLinx instrument in PROGRAM mode</td></tr>
<tr><td>11 to 15</td><td>Reserved.
(These bits are reserved and set to 0.)</td></tr>
</table>

Words 1 to 10: Point Reading

These words contain the value of parameter P920 (Reading) for points 1 to 10, respectively. The reading is expressed as a percent of full scale, multiplied by 100, giving a range of –20,000 to 20,000 which corresponds to –200.00% to 200.00%. Refer to the Siemens Milltronics SmartLinx instrument documentation for a definition of "P920."

Note: These values may contain numeric level data for inoperative or malfunctioning points: refer to read word 0, and read words 11 to 20, for the actual operational status of the measurement points.

Words 11 to 20: Point Alarm and Status

These words contain the corresponding alarm and status bits for indexed measurement points 1 to 10, respectively.

Bit status:
0 = false
1 = true

Bit	description
00	point not configured
01	point failsafe timer expired
02	point failed (cable shorted, open, or transceiver problem)
03	point temperature sensor failed
04 to 12	reserved for future use
13	level emptying
14	level filling
15	scan mode priority

If the product is an AiRanger / SITRANS LU Version 5.19 or above, only:

Bit	Description
04	Low-Low Alarm (1 = ON)
05	Low Alarm (1=ON)
06	High Alarm (1 = ON)
07	High-High Alarm (1 = ON)

Bit	Description	
04	Low-Low Alarm	(1 = on)
05	Low Alarm	(1 = on)
06	High Alarm	(1 = on)
07	High-High Alarm	(1 = on)

Words 21 to 30: Returned Values, MPA

These words contain values requested by writing to words 1 to 4 of the Write Block. The type of data and format are specified with that request, and returned in Read words 31 to 34.

Words 31 and 32; 33 and 34: Decimal Place, Format, Parameter Number and Secondary Index, MPA

These words contain the last values written to Write block words 1 and 4. These words indicate what information is contained in Read block words 21 to 30. These words are provided since there can be a delay between writing a request via a Write and the appearance of the requested values.

Use these words as an indicator that the requested information is updated.

Words 35 to 37 and 39 to 41: Parameter Number / Primary Index / Secondary Index and Decimal Place / Format / Read Write Flag, SPA

These words contain the last values written to words 5 to 7 and 9 to 11 of the Write block. They confirm that the parameter value has been written. These words are not updated until the value has been successfully transferred and stored in the Siemens Milltronics SmartLinx instrument.

See Write formats on page 26 for details.

Word 38: Returned Value, SPA

This word contains the current value of the parameter identified by words 35 to 37 and 39 to 40, regardless of the value of word 11 (Write flag).

If this value does not change when a new value is written to word 8 (Parameter Value) then check the following:

1. Words 5 to 7 and 9 to 10 of the Write block **should match** words 35 to 37 and 39 to 40 of the Read block: if not, then the instrument hasn't responded yet.
2. If words 5 to 7 and 9 to 10 of the Write block **do** match words 35 to 37 and 39 to 40 of the Read block, then the parameter value has not been updated. Check that the Siemens Milltronics SmartLinx instrument is in **PROGRAM** mode and that the program lock (P000) is not on, then try again.

Level Products – Discrete I/O

The values returned in the discrete input words are determined by what has been written into the discrete output words. By writing the correct words, values stored in parameters can be accessed.

Discrete I/O does not allow write access to the parameters. That is, parameters cannot be changed via Remote I/O. In order to effect this type of operation, communication must be carried out using Block Transfer. However, output word 7 allows scan point priority of the Siemens Milltronics host instrument to be altered.

The number of discrete input and output words available is determined by the rack size as configured on the SmartLinx module. Each ¼ rack allows two words each for discrete inputs and outputs.

Rack Size	Number of Words Transferred	Words Used
1/4 rack	2	0, 1
1/2 rack	4	0, 1, 2, 3
3/4 rack	6	0, 1, 2, 3, 4, 5
full rack	8	0, 1, 2, 3, 4, 5, 6, 7

Because word 0 is always the format word, up to 6 values may be read in a full rack, or just 1 value in a quarter rack. When using a full rack word 7 is for point status control. The choice must be made as to how many values must be read simultaneously (i.e. data transfer bandwidth), and how much rack space may be occupied.

Any combination of parameters and measurement points is possible; for example, with a full rack 6 parameters from 6 points can be read simultaneously, 3 parameters each from 2 points, 6 parameters from 1 point, or any other desired combination of the 6 words available in the full rack configuration.

It is convenient to note the similarity between the input and output areas.

Note: Parameter P999 (Master Reset) is not accessible on level products through the SmartLinx interface.

Discrete Output Image Table

Word	Description	Data Type
0	format word	bitmapped
1	point and parameter number, word 1	integer
2	point and parameter number, word 2	integer
3	point and parameter number, word 3	integer
4	point and parameter number, word 4	integer
5	point and parameter number, word 5	integer
6	point and parameter number, word 6	integer
7	point status control	bitmapped

Output Word 0: Format Word

Bits 00 to 07 – Reserved

These bits are reserved for PLC use. They may contain any value, and therefore should not be relied upon to contain any expected value. These bits should be ignored, or "masked off."

Bits 08 to 09 – Reserved

These bits are reserved for future Siemens Milltronics use and should be set to 0.

Bits 10 to 12 – Decimal

Contains the value which indicates where the decimal place should be, for all of the returned values 1-6. For example, a 2 indicates the decimal should be shifted 2 places to the left or right (as determined by bit 13).

Bit 13 – Decimal Shift Direction

Determines the direction of shift for the decimal (bits 10-12):

0 = shift left

1 = shift right

If bits 08-10 are all 0, this bit may be ignored.

Bit 14 – Numerical Format

Determines the numerical format for the data returned in discrete input words

1-6:

0 = normal

1 = percent of span

If a parameter isn't available as a percent of span, the undefined value (22,222) is returned.

Bit 15 – Echo

The value of this bit is echoed back from the discrete output word 0, bit 15.

This bit is only used for test purposes.

Output Words 1-6: Measurement Point and Parameter Numbers

The words determine what will be returned in discrete input words 1-6. These words contain both the parameter and the point to be read, as determined by the following formula:

Word 1-6 = (point x 1,000) + parameter

For example
If it was desired to read the level of transducer 6 back in discrete input word 1, where level is returned in parameter 920, the value 6,920 decimal would be written to discrete output word 1.

Output Word 7: Measurement Point Status

Bits 00 to 119 – Point ID

Indicates the operation of the points 1-10.

bit	09	08	07	06	05	04	03	02	01	00
point	10	9	8	7	6	5	4	3	2	1

Point status can indicate either alarm state or point on priority state. This is determined by bit 10.

When bit 10 = 0 then you are reading the alarm state and bits 00 - 99 do not matter

When bit 10 = 1 then bits 00 - 09 write point on priority state

If the user switches from point on priority to read alarm state, then point on priority will revert to whatever is being written in the block transfer section, which is most likely 0.

Example 1 – reading alarm states

Write bit 10 = 0 of output word 7, then input word 7 would be:

bit	10	09	08	07	06	05	04	03	02	01	00
point	--	10	9	8	7	6	5	4	3	2	1
value	0	0	0	0	0	0	0	0	1	0	1

points 3 and 1 are identified as being in alarm state.

Example 2 – writing point on priority states

Writing the following to output word 7:

bit	10	09	08	07	06	05	04	03	02	01	00
index	--	10	9	8	7	6	5	4	3	2	1
value	1	0	1	0	1	1	0	0	0	0	0

points 9, 7 and 6 are set to point on priority state.

Input word 7 will be a mirror of this.

If this word is used to control point-on-priority, then the Siemens Milltronics host instrument must be configured to permit this. Parameter P720 must be set to 1 (hand programmer, Dolphin Plus, BIC-II or SmartLinx) for each point to permit priority control for that point. To enable priority control for all points, simply store "1" to parameter P720, index "0."

Discrete Input Image Table

Word	Description	Data Type
0	communication status	bitmapped
1	returned value 1	integer
2	returned value 2	integer
3	returned value 3	integer
4	returned value 4	integer

5	returned value 5	integer
6	returned value 6	integer
7	point status	bitmapped

Input Word 0: Communication Status

Bits 00 to 07 – Reserved

Reserved for PLC use. These may contain any value, and should not be relied upon to contain any expected value. These bits should be ignored, or "masked off."

Bits 08 to 09 – Rack Size

Contains the rack size as configured:

00 = ¼ rack

01 = ½

10 = ¾

11 = full

This value may be useful for PLC programs to automatically "know" how much data is available.

Bits 10 to 12 – Decimal

Contains the 3-bit value (0-7) indicating the decimal place for all of the returned values 1-6. For example, a value of 2 indicates the decimal should be shifted 2 places to the left or right (as determined by bit 13). A zero indicates no shift.

Bit 13 – decimal shift

Determines the direction of shift for the decimal (bits 10-12):

0 = shift left

1 = shift right

If bits 10-12 are all 0, this bit may be ignored.

Bit 14 – Numerical Format

Indicates the numerical format for the returned values:

0 = normal

1 = % of span

Bit 15 – echo

The value of this bit is echoed back from the discrete output word 0, bit 15. This bit is only used for test purposes.

Example:

Input word 0 is 2,048 and input word 1 is 5,123 decimal. Input word 0 expressed in binary is 0000 1000 0000 0000. Bits 0-7 must be ignored. Bits 08-09 indicate the Siemens Milltronics host instrument is configured as 1/4 rack. Bit 14 indicates the returned value is in engineering units. Bits 10-12 are binary 010, or 2, indicating two decimal places in the returned value. Bit 13 is 0, indicating the decimal place of the returned value should be shifted left. So, the value 5,123 should be read as 51.23 engineering units, as specified in the Siemens Milltronics host instrument.

Input Words 1 to 6: Returned Values

These words contain the parameter value from the Siemens Milltronics host instrument, as determined by the values written to the corresponding discrete output words 1-6. Returned values conform to the data types available (see page 38) otherwise refer to Troubleshooting.

Input Word 7: Measurement Point Status

Bits 00 to 09 – Point ID

Point status can indicate either alarm state or point on priority state. This is determined by bit 10.

When bit 10 = 0 then bits 00-09 read alarm state

When bit 10 = 1 then bits 00-09 read point on priority state

Example 1 – reading alarm states

bit	10	09	08	07	06	05	04	03	02	01	00
point	--	10	9	8	7	6	5	4	3	2	1
value	0	0	0	0	0	0	0	0	1	0	1

measurement points 3 and 1 are identified as being in alarm state.

Example 2 – reading point on priority states

bit	10	09	08	07	06	05	04	03	02	01	00
point	--	10	9	8	7	6	5	4	3	2	1
value	1	0	1	0	1	1	0	0	0	0	0

measurement points 9, 7 and 6 are set to point on priority state.

Refer to discrete output word 7 on page 31 for instructions on how to control whether priority or alarm status is returned in this word.

Data Map: Mass Dynamics Products

Block transfer reads and writes are supported by the BW500, SF500 and BW500/L with the memory maps defined below. Discrete I/O is not supported.

Note: The data maps shown for the Write and Read Blocks apply if P762 is set to the default values (see page 15). If any of these values is changed, the data map will be shortened and the configuration will change. (See Appendix A – Reducing the amount of data being transferred over the Bus, on page 54.)

This section describes the meaning of the data read from and written to the Siemens Milltronics SmartLinx instrument.

Write Block

BW500 and SF500

Description	Start	End	Size	Data Type
parameter number, SPA	0	0	1	integer
primary index, SPA	1	1	1	integer
secondary index, SPA	2	2	1	integer
new value, SPA	3	4	2	UINT32
decimal place, SPA	5	5	1	integer
format, SPA	6	6	1	integer
read/write flag, SPA	7	7	1	integer
command control	8	8	1	bitmapped
multispan selection	9	9	1	1-4
PID 1 setpoint value	10	11	2	UINT32
PID 2 setpoint value	12	13	2	UINT32
batch setpoint value	14	15	2	UINT32
batch prewarn setpoint value	16	17	2	UINT32
word order	18	18	1	0/1

Notes:

- All the 32 bit numbers (except for the SPA numbers) have a fixed decimal place of 3 digits. For example PID 1 setpoint value of 3,245 is a value of 3.245 in the BW500 and the SF500.
- To make a change to any parameter in the BW500 or the SF500 using SmartLinx, P799 Communications Control must be set to 1.

BW500/L

Description	Start	End	Size	Data Type
parameter number, SPA	0	0	1	integer
primary index, SPA	1	1	1	integer
secondary index, SPA	2	2	1	integer
new value, SPA	3	4	2	UINT32
decimal place, SPA	5	5	1	integer
format, SPA	6	6	1	integer
read/write flag, SPA	7	7	1	integer
command control	8	8	1	bitmapped
word order	9	9	1	0/1

Note: To make a change to any parameter in the BW500/L using SmartLinx, P799 Communications Control must be set to 1.

Parameter, SPA

Specifies the parameter number for Single Parameter Access (SPA): see page 23.

Primary Index, SPA

Specifies the primary index number for the parameter specified by word 0.

Secondary Index, SPA

Specifies the secondary index for the parameter specified by word 0. This word is ignored for parameters that don't use multiple indexes.

New Value, SPA

The new value of the specified parameter and index.

Decimal Place, SPA

This word specifies the number of decimal places for the value in words 3 and 4. Positive values indicate that the decimal place shifts to the left, and negative values indicate that the decimal place shifts to the right.

For example:

word 5 = **1**: all returned values have the decimal place shifted 1 space to the left and a returned value of 5,213 is interpreted as 521.3
word 5 = **–1:** a returned value of 5,213 is interpreted as 52,130

Format, SPA

This word is always set to **0.**

Read / Write Flag, SPA

This word determines whether the instrument will allow parameter values to be written.

0 = Read
1 = Write

Command Control, Operational Commands

The command control word is used to control the unit. Each bit gives access to a command or state as if the operator was using the keypad.

Bits initiating a command (6 to 11) must change state in order to cause the command to begin. For example, to reset totalizer 1, Bit 8 must be cleared to **0**, then set to **1**. It can stay set or clear for any period.

BW500 and SF500

Bit #	Description	Bit Clear (0)	Bit Set (1)
00	PID 1 mode	manual	auto
01	PID 1 freeze	no	yes
02	PID 1 setpoint source	local	remote
03	PID 2 mode	manual	auto
04	PID 2 freeze	no	yes
05	PID 2 setpoint source	local	remote
06	zero	no change	start
07	span	no change	start
08	reset totalizer 1	no change	reset
09	reset totalizer 2	no change	reset
10	reset batch totalizer	no change	reset
11	print		print
12	reserved		
13	reserved		
14	reserved		
15	reserved		

BW500/L

Bit #	Description	Bit Clear (0)	Bit Set (1)
06	zero	no change	start
07	span	no change	start
08	reset totalizer 1	no change	reset
09	reset totalizer 2	no change	reset
10	reserved		
11	print		print
12	reserved		
13	reserved		
14	reserved		
15	reserved		

Bit 00 and 03: PID Mode (BW500 and SF500 only)

Sets the mode of PID control to either manual (output determined by P410 – PID Manual) or auto (output determined by PID control in instrument).

Bit 02 and 05 Setpoint Source (BW500 and SF500 only)

Controls the location of the setpoint. If it is set as "local," then the setpoint used is internal to the BW500 or SF500. If the setpoint source is set to "remote," then the setpoint is controlled by a mA input.

For setpoint control through communications this must be set to "local."

Bit 01 and 04: Freeze (BW500 and SF500 only)

Suspends PID function when PID Mode = **1** (auto) and holds the output at the last value. PID functionality resumes when the freeze bit is cleared.

Bit 06: Zero

Sets the zero point for calibration of the belt scale.

This is a momentary setting that must be reset to **0** once the input is accepted. To check that the input was accepted read word 0, bit 7 (zero status) and ensure it shows **1**. Once it shows a **1** then reset this bit to **0**

Bit 07: Span

Sets the span for calibration of the belt scale.

This is a momentary setting that must be reset to **0** once the input is accepted. To check that the input has been accepted, read word 0, bit 8 (Span Status) and ensure it shows a **1**. Once it shows **1** then reset this bit to **0**.

Bit 08: Reset Totalizer 1

Causes the internal totalizer 1 to be reset to **0**.

This is a momentary setting that must be reset to **0** once the input is accepted. To reset this back to **0**, the use of a timer is recommended.

Bit 09: Reset Totalizer 2

Causes the internal totalizer 2 to be reset to **0**.

This is a momentary setting that must be reset to **0** once the input is accepted. To reset this back to **0**, the use of a timer is recommended.

Bit 10: Reset Batch Totalizer (BW500 and SF500 only)

Causes the batch totalizer to be reset to **0**.

This is a momentary setting that must be reset to **0** once the input is accepted. To reset this back to **0**, the use of a timer is recommended.

Bit 11: Print

Starts print operation. One of the communications ports on your Milltronics Integrator must be configured for a printer.

This is a momentary setting that must be reset to **0** once the input is accepted. To reset this back to 0, the use of a timer is recommended.

Multispan Selection (BW500 and SF500 only)

Sets the current span (1 to 4). Any parameters that relate to span will use this value to determine which span is referenced. See the manual for the BW500 or SF500 for more information on multispan.

PID Setpoints (BW500 and SF500 only)

Contain the current setpoint values as P415 in the Milltronics BW500 or SF500.

To write these setpoints bits 02 and 05 in word 8 - Control must be set to "local."

Batch Setpoint (BW500 and SF500 only)

Contain the current setpoint value as P564 in the Milltronics BW500 or SF500.

Batch Prewarn Setpoint (BW500 and SF500 only)

Contain the current setpoint value as P567 in the Milltronics BW500 or SF500.

Word Order

This word controls which word comes first in the UINT32 integers. For a value **0**, the most significant word is given first. For a value **1,** the least significant word is given first.

0 = MSW first
1 = LSW first

Read Block

Values returned in the words in the Read are in response to the Write to the Siemens Milltronics SmartLinx instrument.

Words 0 through 20 have values with fixed meanings and formats. This means that you do not have to start communications with a Write in order to use Read, the data is always there.

Words 22 through 29 are values returned in response to writing words 0 through 7 for Single Parameter Access (SPA): (see"Write Block" on page 36).

BW500 and SF500

Description	Start	End	Size	Type
instrument status 1	0	0	1	bitmapped
rate	1	2	2	UINT32
load	3	4	2	UINT32
speed	5	6	2	UINT32
total 1	7	8	2	UINT32
total 2	9	10	2	UINT32
relay status	11	11	1	bitmapped
discrete input status	12	12	1	bitmapped
multispan selection	13	13	1	integer
PID 1 setpoint value	14	15	2	UINT32
PID 2 setpoint value	16	17	2	UINT32

Description	Start	End	Size	Type
batch setpoint value	18	19	2	UINT32
batch prewarn setpoint value	20	21	2	UINT32
parameter, SPA	22	22	1	integer
primary index, SPA	23	23	1	integer
secondary index, SPA	24	24	1	integer
new value, SPA	25	26	2	UINT32
decimal place, SPA	27	27	1	integer
format, SPA	28	28	1	integer
read / write flag, SPA	29	29	1	1/0
word order	30	30	1	1/0
Instrument Status 2[1]	31	31	1	bitmapped
Batch Total[1]	32	33	2	UINT32

1. This is only available in firmware V 3.05 or higher. In V 3.05, these locations are "turned off" in P762. In higher firmware, they are defaulted on.

BW500/L

Description	Start	End	Size	Type
instrument status 1	0	0	1	bitmapped
rate	1	2	2	UINT32
load	3	4	2	UINT32
speed	5	6	2	UINT32
total 1	7	8	2	UINT32
total 2	9	10	2	UINT32
relay status	11	11	1	bitmapped
discrete input status	12	12	1	bitmapped
parameter, SPA	13	13	1	integer
primary index, SPA	14	14	1	integer
secondary index, SPA	15	15	1	integer
new value, SPA	16	17	2	UINT32
decimal place, SPA	18	18	1	integer
format, SPA	19	19	1	integer
read / write flag, SPA	20	20	1	integer
word order	21	21	1	integer
Instrument Status 2[1]	22	22	1	bitmapped

1. This is only available in firmware V 3.05 or higher. In V 3.05, these locations are "turned off" in P762. In higher firmware, they are defaulted on.

Instrument Status 1

This word is used to feed back the current operating state of the product. Each bit gives the state of different parts of the product, some mutually exclusive, others are not. The state should be checked to verify operation.

BW500 and SF500

Bit #	Description	Bit Clear (0)	Bit Set (1)
0	PID 1 mode	manual	auto
1	PID 1 freeze	no	yes
2	PID 1 setpoint source	local	remote
3	PID 2 mode	manual	auto
4	PID 2 freeze	no	yes
5	PID 2 setpoint source	local	remote
6	zero	no	in progress
7	span	no	in progress
8	reset totalizer 1	no change	reset
9	reset totalizer 2	no change	reset
10	reset batch totalizer	no change	reset
11	printing	not printing	printing
12	write privileges	no	yes
13	system configured	not configured	run mode
14	mode	calibration mode	run mode
15	totalizing	not totalizing	totalizing

BW500/L

Bit #	Description	Bit Clear (0)	Bit Set (1)
6	zero	no	in progress
7	span	no	in progress
8	reset totalizer 1	no change	reset
9	reset totalizer 2	no change	reset
10	reserved		
11	printing	not printing	printing
12	write privileges	no	yes
13	system configured	not configured	run mode
14	mode	calibration mode	run mode
15	totalizing	not totalizing	totalizing

Bits 0 to 5: PID Status (BW500 and SF500 only)

These bits give the status of the product. For example Bit 0 is the mode of the PID 1 controller (if used). It indicates whether the PID is in manual or auto modes.

Bit 6: Zero Status

Indicates whether the unit is currently performing a Zero calibration.

Bit 7: Span Status

Indicates whether the unit is currently performing a Span calibration.

Bits 8 to 11: Totalizer Status

Indicate "1" if the reset totalizer or print operations are taking place (these are momentary and will only stay set for a very short period). (Note: Bit 10 applies only to BW500 and SF500.)

Bit 12: Write Privileges

Indicates whether the PLC can write parameters/commands to the product. This is controlled by parameter P799.

P799 = **1** PLC may change the Siemens Milltronics SmartLinx instrument's parameters
P799 = **0** PLC can only read

Bit 13: Configuration Status

Indicates whether the unit is configured (all required parameters have been entered).

Bit 14: Program Mode

Indicates program (calibration) mode:

0 = **PROGRAM** mode
1 = **RUN** mode

Bit 15: Totalizing Status

Indicates whether the unit is totalizing.

Rate

Contains the current rate reading in engineering units. (For a full description of this reading, please refer to your Milltronics Integrator manual.)

Load

Contains the current load reading in engineering units. (For a full description of this reading, please refer to your Milltronics Integrator manual.)

Speed

Contains the current speed reading in engineering units. (For a full description of this reading, please refer to your Milltronics Integrator manual.)

Total 1[1]

Contains the current value for totalizer 1 in engineering units. (For a full description of this reading, please refer to your Milltronics Integrator manual.)

1. The number of fixed decimal places for this value is controlled by P634 primary indexes 1 and 2. The default setting is 3. (See page 18 for details.)

Total 2[1]

Contains the current value for totalizer 2 in engineering units. (For a full description of this reading, please refer to your Milltronics Integrator manual.)

Relay Status

Shows the current logical status of all relays.

bit	04	03	02	01	00
relay	05	04	03	02	01

0 = relay not asserted
1 = relay asserted

"Asserted" indicates that the function controlling the relay is in an active state. Relay contacts can open or close based on this state: see your instrument manual for details.

Discrete Input Status

Shows the current logical status of all discrete inputs.

bit	04	03	02	01	00
input	05	04	03	02	01

0 = discrete input open
1 = discrete input closed

Multispan Selection (BW500 and SF500 only)

Shows the currently selected span (1 to 4).

PID 1 Setpoint Value (BW500 and SF500 only)

Contains the current setpoint value for PID 1 in engineering units. (For a full description of this reading, please refer to your Milltronics Integrator manual.)

PID 2 Setpoint Value (BW500 and SF500 only)

Contains the current setpoint value for PID 2 in engineering units. (For a full description of this reading, please refer to your Milltronics Integrator manual.)

Batch Setpoint Value (BW500 and SF500 only)

Contains the value of P564 – Batch Setpoint. (For a full description of this parameter, please refer to your Milltronics Integrator manual.)

Batch Pre-Warn Setpoint Value (BW500 and SF500 only)

Contains the value of P567: Batch Pre-Warn Setpoint. (For a full description of this parameter, please refer to your Milltronics Integrator manual.)

Parameter Number / Primary Index / Secondary Index, SPA; Decimal Place, Format, Read/Write flag

These words contain the last values written to words 0 to 2 and words 5 to 7 of the Write area. They confirm that the parameter value has been written. These words are not updated until the value has been successfully transferred and stored in the Siemens Milltronics SmartLinx instrument.

Use these words as an indicator that the requested information has been updated.

Value, SPA

The returned value of the specified parameter and index.

Word Order

The placement of the most significant word (MSW).

0 = MSW first
1 = MSW second

Instrument Status 2

This word is used to feed back the current operating state of the product. Each bit gives the state of different parts of the product, some mutually exclusive, others are not. The state should be checked to verify operation.

Bit #	Description	Bit Clear (0)	Bit Set (1)
0	Totalizer 1 overflow	no overflow	overflow condition
1	Totalizer 2 overflow	no overflow	overflow condition

Bits 0 Totalizer 1 overflow

If Totalizer 1 has overflowed, (that is, has exceeded the spaces available in SmartLinx), this bit is set. The overflow condition can be changed by reducing Communication Totalizer resolution (P634).

Bit 1 Totalizer 2 overflow

If Totalizer 2 has overflowed, (that is, has exceeded the spaces available in SmartLinx), this bit is set. The overflow condition can be changed by reducing Communication Totalizer resolution (P634).

Batch Totalizer (BW500 and SF500 only)

Contains the current value for the Batch Totalizer in engineering units. (For a full description of this reading, please refer to your Milltronics Integrator manual.).

Data Types

The Siemens Milltronics host instrument parameters take on many values in various formats, as discussed in the Siemens Milltronics host instrument manual. For the convenience of the programmer, those values are converted to and from 16-bit integer numbers, since those are easily handled by most PLCs.

Integer

Level Products

Integer parameter values are by far the most common. For example, parameter P920 (Reading), returns a number representing the current reading (either level or volume, depending on the Siemens Milltronics host instrument configuration).

You can request numeric values in units or percent of span, and you can specify the number of decimal places.

Numeric values must be in the range -20,000 to +20,000 to be valid. If a parameter is requested and its value is more than +20,000, the number 32,767 is returned; if it is less than -20,000, the number -32,768 is returned. If this happens, increase the number of decimal places for that parameter.

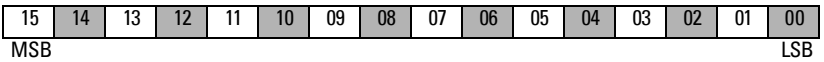
If a parameter cannot be expressed in terms of percent (e.g. span), or has no meaningful value, the special number 22,222 is returned. Try requesting the parameter in units, or refer to the Siemens Milltronics host instrument manual to understand the format and use of the requested parameter.

Mass Dynamics Products

Integers used on the Mass Dynamics Products can have any valid value. So, the entire range from –32,768 to 32,767 or 0 to 65,535 is available and no values are used as error conditions.

Bit Values

Bits are packed into registers in groups of 16 bits (1 word). In this manual we number the bits from 0 to 15, with bit 0 being the least significant bit and bit 15 referring to the most significant bit..



Unsigned Double Precision Integer (UINT32)

Note: Used for Mass Dynamics products only.

Large numbers are put into unsigned 32 bit integers. By default they are set up so that the first word (register) is the most siginificant word (MSW) and the second word (register) is the least siginificant word (LSW) deppending on the setting of the word order bit.

For example, if we read word 7 and 8 on the Mass Dynamics BTR (Total 1), the 32 bits would look as follows:

word 7			word 8		
15	MSW	0	15	LSW	0
31	32-bit integer value (UINT32)				0

The whole is read as a 32-bit integer.

Split Values

Note: Used for Level products only.

Certain parameters are actually a pair of numbers separated by a colon, in the format xx:yy.

One example is P807, Transducer Noise, where:

xx = the average noise value in dB.
yy = the peak noise in dB.

The number which corresponds to xx:yy, either for reading or setting a parameter, is determined by the following formula:

For storing to the Siemens Milltronics device:

value = (xx + 128) x 256 + (yy + 128)

For reading from the Siemens Milltronics device:

xx = (value / 256) – 128
yy = (value % 256) – 128

Where:

% is the modulus operator.

The modulus can be computed by following these steps:

$value_1$ = value / 256
$value_2$ = remainder of $value_1$
$value_3$ = $value_2$ x 256
yy = $value_3$ - 128

It may simplify programming to notice:

xx = (most significant byte of value) – 128
yy = (least significant byte of value) – 128

Text Messages

Note: Used for Level products only.

If a Siemens Milltronics device parameter returns a text message, that message is converted to an integer and provided in the register. The numbers are shown in the table below:

Number	Text Message as displayed on LCD
22222	invalid value
30000	off
30001	on
30002	≡≡≡≡
30003	[ ]]] (parameter does not exist)
30004	err
30005	err1
30006	open
30007	shrt
30008	pass
30009	fail
30010	hold
30011	lo
30012	hi
30013	de
30014	en
30015	- - - - (parameter has not been set)
–32768	value is less than –20,000
32767	value is greater than 20,000

Relay Function Codes (P111 in Level Products Only)

If a Siemens Milltronics instrument parameter returns a relay function code, that message is converted to a number and provided in the register. The numbers are shown in the table below.

(See the Siemens Milltronics SmartLinx instrument manual for full information on P111).

Relay Function Code	Number	P111
off, relay not used	0	0
undesignated level alarm	1	1
low-low level alarm	2	1 – LL
low level alarm	3	1 – L
high level alarm	4	1 – H
high-high level alarm	5	1 – HH
in bounds alarm	6	2
in bounds alarm	7	2 – B1
in bounds alarm	8	2 – B2
out of bounds alarm	9	3
out of bounds alarm	10	3 – B1
out of bounds alarm	11	3 – B2
rate of level change alarm	12	4
rate of level change alarm	13	4 – R1
rate of level change alarm	14	4 – R2
temperature alarm	15	5
loss of echo (LOE) alarm	20	6
transducer cable fault alarm	16	7
pump efficiency alarm	17	8
clock failure alarm	18	9
time of day alarm	19	10
pump failure alarm	21	11
totalizer	22	40
flow sampler	23	41
fixed duty assist	25	50
fixed duty backup	26	51
alternate duty assist	30	52
alternate duty backup	31	53
service ratio duty assist	35	54
service ratio duty backup	36	55
first in first out (FIFO)	40	56
time	45	60
overflow	50	61
aeration	55	62
gate	60	63

Relay Function Code	Number	P111
flush valve	65	64
communication	66	65
pump failure alarm	70	11
power failure alarm	71	12
unknown function	200	

Troubleshooting

Generally

In all cases, first check that the SmartLinx module has passed its on-going built-in self test (host instrument parameter P790). The result should be PASS.

If FAIL is indicated, the module could be installed incorrectly, the module could be defective, or the module connector on the Siemens Milltronics host instrument could be defective. Ensure the module is installed correctly before calling Siemens Milltronics.

If "ERR1" is indicated, the Siemens Milltronics software doesn't recognize the ID number of the installed module. Please contact Siemens Milltronics or your distributor for instructions and/or upgraded Siemens Milltronics SmartLinx compatible host instrument software.

Specifically

1. **I connected the Siemens Milltronics host instrument to my remote I/O link. All communications have stopped, and I have rack fault bits set on all remote racks in the scan list.**
   Make sure the Siemens Milltronics host instrument is connected and terminated correctly and in agreement with all Allen-Bradley remote I/O wiring practices (please contact your Allen-Bradley representative for the latest guidelines).

   Make sure the termination resistor switch on the SmartLinx module is set correctly. Improper termination can interfere with proper remote I/O operation.

2. **I connected the Siemens Milltronics host instrument to my remote I/O link. Communication with certain racks has stopped, and I have rack fault bits set on those remote racks.**

   Make sure the Siemens Milltronics host instrument is connected and terminated correctly and in agreement with all Allen-Bradley remote I/O wiring practices (please contact your Allen-Bradley representative for the latest guidelines).

   Make sure the termination resistor switch on the SmartLinx module is set correctly. Improper termination can interfere with proper remote I/O operation.

   Check that those remote I/O host instruments have different rack numbers and starting groups from the Siemens Milltronics host instrument.

3. **My PLC indicates a rack fault where the Siemens Milltronics host instrument is addressed on the remote I/O link, but all other host instruments operate properly.**

   Check the baud rate, rack number, starting group, rack size and last rack settings on the Siemens Milltronics host instrument (P751-P755, respectively), and make sure they match the entry in the PLC's scan list.

   Check the rack number (P752) on the Siemens Milltronics host instrument; some Allen-Bradley PLCs can accept only a limited number of racks. Try setting the rack number to a lower available rack number.

Check that no other host instruments connected to this remote I/O link have been set to the same rack number and starting group as the Siemens Milltronics host instrument.

Make sure the Siemens Milltronics host instrument is connected and terminated correctly and in agreement with all Allen-Bradley remote I/O wiring practices (please contact your Allen-Bradley representative for the latest guidelines).

Make sure the termination resistor switch on the SmartLinx module is set correctly. Improper termination can interfere with proper remote I/O operation.

4. **Choosing the remote I/O Autoconfigure from my PLC programming software doesn't show the Siemens Milltronics host instrument on the remote I/O link.**

   Check the baud rate setting (P751) on the Siemens Milltronics host instrument; it should match the baud rate of the remote I/O scanner port on the PLC.

   Check the rack number (P752) on the Siemens Milltronics host instrument; some Allen-Bradley PLCs may accept only a limited number of racks. Try setting the rack number to a lower available rack number.

   Try manually adding the Siemens Milltronics host instrument to the PLC remote I/O scan list. If the problem persists, contact Siemens Milltronics technical support.

5. **The Siemens Milltronics host instrument indicates it is being scanned, but the PLC indicates a rack fault at that address.**

   Check the rack size setting (P754); make sure it matches the rack size in the PLC's remote I/O scan list.

6. **My PLC is scanning the Siemens Milltronics host instrument with no rack faults, but the data I'm reading makes no sense.**

   Make sure the PLC is actually addressing the Siemens Milltronics host instrument, and that no other units are addressed to the same remote I/O rack number and starting group. The PLC might be reading another host instrument at the same rack number and starting group.

   Check the information you've written to the discrete output area or block transfer write area. Most of the information returned depends on what (configuration) information was written to the Siemens Milltronics host instrument.

7. **I tried to set an Siemens Milltronics host instrument parameter using a block transfer write, but the parameter remains unchanged.**

   Some parameters can only be changed when the Siemens Milltronics host instrument isn't scanning. Try putting the Siemens Milltronics host instrument into program mode, using BTW word 12.

   Try setting the parameter from the keypad. If it can't be set using the keypad, check the lock parameter (P000).

8. **No matter what rack number the Siemens Milltronics host instrument is set for (P752), the Siemens Milltronics host instrument always appears at another (constant) rack number.**

   The SmartLinx module's reserved DIP switches 3-8 can override the Siemens Milltronics host instrument rack number setting (P752). Make sure all switches on the "reserved" DIP on the module are "on."

9. **No matter what baud rate the Siemens Milltronics host instrument is set for (P752), the Siemens Milltronics host instrument always uses another (constant) baud rate.**

   The SmartLinx module's reserved DIP switches 1-2 can override the Siemens Milltronics host instrument baud rate setting (P752). Make sure all switches on the "reserved" DIP on the module are "on."

10. **After connecting the Siemens Milltronics host instrument to the remote I/O and programming block transfer commands, the transfer rate of other block transfers on the remote I/O is slower.**

    Try triggering the Siemens Milltronics host instrument block transfer instructions less frequently, to allow other block transfers to take place.

11. **All of the parameters P751-P755 are correct and agree with the PLC. I've done an autoconfigure from the PLC, and the Siemens Milltronics host instrument appears as expected. But I'm still not scanning the Siemens Milltronics host instrument when I put the PLC into run mode, and the red LED on the SmartLinx module is on.**

    Check the PLC rack inhibit bit corresponding to Siemens Milltronics host instrument. Refer to your PLC documentation to locate the rack inhibit bits. If the bit is 1 (ON) for the Siemens Milltronics host instrument, the PLC will not scan that host instrument. Set the bit to 0 (OFF) and scanning should commence. This bit may be set to 1 (ON) by downloading a program into the PLC.

12. **The PLC is communicating, but the data from my Block Transfer is not what I expect from the manual.**

    Check P762 and verify that it is set to what you want.

Technical Support or Product Feedback

For product feedback or technical support, please contact your local Siemens Milltronics representative or e-mail us at SmartLinx@siemens-milltronics.com.

Appendix A – Reducing the amount of data being transferred over the Bus

You can limit the amount of data being transferred over the Bus, and save both bandwidth and memory, by using P762. However, when you reduce the size of the data map, the configuration will change. If the data block sizes in the device do not match what is configured in the master, no communications will occur. Therefore it is critical to calculate the size of the new map. The calculation is different for level applications and for mass dynamics applications.

The following sections provide explanations and examples of the calculation required, together with a worksheet to use as a template. The first section explains how it works with level products, and the second explains how it works with mass dynamics products. In each section, the Write Block map is calculated first, followed by the Read Block.

Level Products

The SmartLinx map[1] is controlled by the values of the indices of P762. By turning on an index (setting the value to one or more), you activate both the read and write blocks associated with that index. The table below shows which values in the read/write blocks are turned on by each P762 index.

Name of area	P762 Point	Value	Read area turned On	Write area turned on
Status	1	1	Instrument status	----------
Reading	2	1 -10	1-10 point readings	----------
Alarm	3	1-10	1-10 point alarm and status	----------
Point on Priority	4	1	----------	Measurement point-on-priority
MPA	5	1	Returned Values (1-10)	Parameter number
			Decimal place	Secondary index
			Format	Decimal place
			Parameter number	Format
			Secondary index	----------
SPA	6	1	Parameter Number	Parameter Number
			Primary index	Primary index
			Secondary index	Secondary index
			Returned Value	New Value
			Decimal Place	Decimal Place
			Format	Format
			Read/Write	Read/ Write
Operating Mode	7	1	----------	Operating Mode

1. For examples of the data maps before modification, see pages 57 and 59.

Write Block

The standard Write block is made up of the following sections: point on priority, MPA, SPA, and operating mode. If any of these sections is 'turned off' by setting the corresponding part of P762 to a zero, the new map will shift down accordingly and the size will be reduced by that amount. Multiply the parameter value by the memory size, then add up the results to get the total.

Write Block Template for Level Products

Name of area	P762 Point	value	Memory size for Write block per value	Result of multiplying value * memory size
Status	1		0	
Reading	2		0	
Alarm	3		0	
Point-on-priority	4		1	
MPA	5		4	
SPA	6		7	
Operating mode	7		1	
Word Order	14		0	
			Total words:	

Example 1:

If you want only Point status, and to read the first 7 point readings, the chart is:

Name of area	P762 Point	value	Memory size for Write block per value	value * memory size
Status	1	1	0	0
Reading	2	7	0	0
Alarm	3	0	0	0
Point-on - priority	4	0	1	0
MPA	5	0	4	0
SPA	6	0	7	0
Operating mode	7	0	1	0
			Total words:	0

The output data block (Write block) is now 0 words in size (0 bytes).

No map

Example 2:

If you want only SPA, then the chart is:

Name of area	P762 Point	value	Memory size for Write block per value	value * memory size
Status	1	0	0	0
Reading	2	0	0	0
Alarm	3	0	0	0
Point-on - priority	4	0	1	0
MPA	5	0	4	0
SPA	6	1	7	7
Operating mode	7	0	1	0
			Total words:	7

The output data block (Write block) is now 7 words in size (14 bytes) and the Word numbers have shifted to a lower value

New Write Block Data Map

Word	Description
0	Parameter number
1	Parameter primary index
2	Parameter secondary index
3	Parameter value
4	Decimal place
5	Format
6	Read / Write flag

Original Write Block Data Map for Level Products

Words	Description	Access	Data Type
0	measurement point-on-priority	direct	bitmapped
1	parameter number	MPA	integer
2	parameter secondary index[1]		integer
3	decimal place		integer
4	format		0/1
5	parameter number	SPA	integer
6	parameter primary index		integer
7	parameter secondary index		integer
8	parameter value		integer
9	decimal place		integer
10	format		0/1
11	read/write flag		0/1
12	operating mode	direct	0/1

1. The primary index is implicit in the address of the returned parameter values.

Read Block

The standard Read block is made up of the following sections: status, reading, alarm, MPA, and SPA. If any of these sections is 'turned off' by setting the corresponding part of P762 to a zero, the new map will shift down accordingly and the size will be reduced by that amount for the Read block. Multiply the parameter value by the memory size, then add up the results to get the total.

Read Block Template for Level Products

Name of area	P762 Point	value	Memory size for Read block per value	Result of multiplying value * memory size
Status	1		1	
Reading	2		1	
Alarm	3		1	
Point-on-priority	4		0	
MPA	5		14	
SPA	6		7	
Operating mode	7		0	
			Total Words:	

Example 1:

If you want only Instrument status, and to read the first 7 point readings, then the chart is:

Name of area	P762 Point	value	Memory size for Read block per value	value * memory size
Status	1	**1**	**1**	**1**
Reading	2	**7**	**1**	**7**
Alarm	3	0	1	0
Point-on -priority	4	0	0	0
MPA	5	0	14	0
SPA	6	0	7	0
Operating mode	7	0	0	0
			Total words:	**8**

The input data block (Read block) is now 8 words in size (16 bytes), and the Word numbers have shifted to a lower value.

New Read Block Data map:

Word	Description
0	Instrument status
1	Reading for point 1
2	Reading for point 2
3	Reading for point 3
4	Reading for point 4
5	Reading for point 5
6	Reading for point 6
7	Reading for point 7

Example 2:

If you want only SPA, then the chart is:

Name of area	P762 Point	value	Memory size for Read block per value	value * memory size
Status	1	0	1	0
Reading	2	0	1	0
Alarm	3	0	1	0
Point-on -priority	4	0	0	0
MPA	5	0	14	0
SPA	6	**1**	**7**	**7**
Operating mode	7	0	0	0
			Total words:	**7**

The input data block (Read block) is now 7 words in size (14 bytes), and the Word numbers have shifted to a lower value.

New Read Block Data map:

Word	Description
0	Parameter number
1	Parameter primary index
2	Parameter secondary index
3	Parameter returned value
4	Decimal place
5	Format
6	Read/Write flag

Original Read Block Data map for Level Products

Words	Description	Access	Data Type
0	instrument status		bitmapped
1-10	point reading	direct	integer
11-20	point alarm and status		bitmapped
21-30	returned values		integer
31	decimal place		integer
32	format	MPA	0/1
33	parameter number		integer
34	parameter secondary index		integer
35	parameter		integer
36	parameter primary index		integer
37	parameter secondary index		integer
38	value	SPA	integer
39	decimal place		integer
40	format		0/1
41	read/write flag		0/1

Mass Dynamics Products

The SmartLinx map[1] is controlled by the values of the indices of P762. By turning on an index (setting the value to one or more), you activate both the read and write blocks associated with that index. The table below shows which values in the read/write blocks are turned on by each P762 index.

Name of area	P762 Point	Value		Read area turned On	Write area turned on
		BW500, SF500	BW500/L		
status	1	1	1	instrument status	----------
rate	2	1	1	rate	----------
load	3	1	1	load	----------
speed	4	1	1	speed	----------
total	5	1	1	total 1 total 2	----------
relay status	6	1	1	relay status	----------
DI status	7	1	1	discrete input status	----------

1. For examples of the data maps before modification, see pages 62 and 64

SPA	8	1	1	parameter number	parameter number
				primary index	primary index
				secondary index	secondary index
				returned value	new value
				decimal place	decimal place
				format	format
				read/write	read/ write
command control	9	1	1	----------	command control
multispan	10	1	0[1]	----------	multispan selection
PID	11	1	0[1]	----------	PID 1 setpoint value
					PID 2 setpoint value
batch	12	1	0[1]	----------	batch setpoint value
batch prewarn	13	1	0[1]	----------	batch prewarn setpoint value
word order	14	1	1	word order	word order
status 2	15	1	1	instrument status 2	----------
batch total	16	1	0[1]	batch total	----------

1. For the BW500/L, P762 indexes with values shown as 0 cannot be turned on.

Write Block

The standard Write block is made up of the following sections: SPA, command control, multispan, PID, batch, batch prewarn, word order. If any of these sections is 'turned off' by setting the corresponding part of P762 to a zero, the new map will shift down accordingly and the size will be reduced by that amount. Multiply the parameter value by the memory size, then add up the results to get the total

Write Block Template for Mass Dynamic Products

Name of area	P762 Point	value	Memory size for Write block per value	Result of multiplying value * memory size
Status	1		0	
Rate	2		0	
Load	3		0	
Speed	4		0	
Total	5		0	
Relay Status	6		0	
DI Status	7		0	
SPA	8		8	
Command Control	9		1	
Multispan	10		1	

Name of area	P762 Point	value	Memory size for Write block per value	Result of multiplying value * memory size
PID	11		4	
Batch	12		2	
Batch Prewarn	13		2	
Word Order	14		0	
Status 2	15		0	
Batch Total	16		0	
			Total words:	

Example 1:

If you want only rate, load, and batch prewarn, then the chart is:

Name of area	P762 Point	value	Memory size for Write block per value	value * memory size
Status	1	0	0	0
Rate	2	1	0	0
Load	3	1	0	0
Speed	4	0	0	0
Total	5	0	0	0
Relay Status	6	0	0	0
DI Status	7	0	0	0
SPA	8	0	8	0
Command Control	9	0	1	0
Multispan	10	0	1	0
PID	11	0	4	0
Batch	12	0	2	0
Batch Prewarn	13	1	2	2
Word Order	14	0	1	0
Status 2	15	0	0	0
Batch Total	16	0	0	0
			Total words:	2

The input data block (Write block) is now 2 words in size (4 bytes) and the Word numbers have shifted to a lower value:

New Write Block Data Map:

Word	Description
0-1	Batch prewarn

Original Write Block Data Map for Mass Dynamic Products

Description	Start	End	Size	Data Type
parameter number, SPA	0	0	1	integer
primary index, SPA	1	1	1	integer
secondary index, SPA	2	2	1	integer
value, SPA	3	4	2	UINT32
decimal place, SPA	5	5	1	integer
format, SPA	6	6	1	integer
read / write flag, SPA	7	7	1	integer
command control	8	8	1	bitmapped
multispan selection	9	9	1	1-4
PID 1 setpoint value	10	11	2	UINT32
PID 2 setpoint value	12	13	2	UINT32
batch setpoint value	14	15	2	UINT32
batch prewarn setpoint value	16	17	2	UINT32
word order	18	18	1	0/1

Read Block

The standard Read block is made up of the following sections: status, rate, load, speed, total, relay status, DI status, multispan, PID, batch, batch prewarn, SPA, Word order. If any of these sections is 'turned off' by setting the corresponding part of P762 to a zero, the new map will shift down accordingly and the size will be reduced by that amount, for the Read block. Multiply the parameter value by the memory size, then add up the results to get the total.

Read Block Template for Mass Dynamic Products

Name of area	P762 Point	value	Memory size for Read block per value	Result of multiplying value * memory size
Status	1		1	
Rate	2		2	
Load	3		2	
Speed	4		2	
Total	5		4	
Relay Status	6		1	
DI Status	7		1	
SPA	8		8	
Command Control	9		0	
Multispan	10		1	
PID	11		4	
Batch	12		2	
Batch Prewarn	13		2	
Word Order	14		1	
Status 2	15		1	
Batch Total	16		2	
			Total words:	

Appendix A

Example 1

If you want only rate, load, and batch prewarn, the chart is:

Name of area	P762 Point	value	Memory size for Read block per value	value * memory size
Status	1	0	1	0
Rate	2	1	2	2
Load	3	1	2	2
Speed	4	0	2	0
Total	5	0	4	0
Relay Status	6	0	1	0
DI Status	7	0	1	0
SPA	8	0	8	0
Command Control	9	0	0	0
Multispan	10	0	1	0
PID	11	0	4	0
Batch	12	0	2	0

Name of area	P762 Point	value	Memory size for Read block per value	value * memory size
Batch Prewarn	13	**1**	**2**	**2**
Word Order	14	0	1	0
Status 2	15	0	1	0
Batch Total	16	0	2	0
			Total words:	**6**

The input data block (Read block) is now 6 words in size (12 bytes) and the Word numbers have shifted to a lower value:

New Read Block Data Map

Word	Description
0-1	Rate
2-3	Load
4-5	Batch prewarn

Original Read Block Data Map for Mass Dynamic Products

Description	Start	End	Size	Type
instrument status	0	0	1	bitmapped
rate	1	2	2	UINT32
load	3	4	2	UINT32
speed	5	6	2	UINT32
total 1	7	8	2	UINT32
total 2	9	10	2	UINT32
relay status	11	11	1	bitmapped
discrete input status	12	12	1	bitmapped
multispan selection	13	13	1	integer
PID 1 setpoint value	14	15	2	UINT32
PID 2 setpoint value	16	17	2	UINT32
batch setpoint value	18	19	2	UINT32
batch prewarn setpoint value	20	21	2	UINT32
parameter, SPA	22	22	1	integer
primary index, SPA	23	23	1	integer
secondary index, SPA	24	24	1	integer
value, SPA	25	26	2	UINT32
decimal place, SPA	27	27	1	integer
format, SPA	28	28	1	integer
read / write flag, SPA	29	29	1	1/0
word order	30	30	1	1/0
instrument status 2[1]	31	31	1	bitmapped
batch total[1]	32	33	2	UINT32

1. This is only available in firmware V 3.05 or higher

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