A-B RIO Interface Manual for SVS 2000™

CAUTION

It is essential that all instructions in this manual be followed precisely to ensure proper operation of the equipment.

ROCKWELL AUTOMATION
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KM

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Chapter 1. Introduction

Introduction

This manual covers the setup and program commands for interfacing the SVS 2000™ signal processor with Allen-Bradley's PLC network.

The SVS 2000 is a single-channel signal processing and display system. The SVS 2000 can monitor a vessel instrumented with K-M bolt-on sensors (L-Cells or Microcells), K-M direct support sensors (Load Stand IIs, Load Disc IIs, or Load Links), or full bridge, foil gage sensors from other manufacturers.

The SVS 2000 is available with an optional Allen-Bradley Remote I/O (A-B RIO) PCB. This provides an interface between the signal processor and the Allen-Bradley Remote I/O network. Once interfaced in the Allen-Bradley network, a programmer can use an Allen-Bradley PLC and ladder logic programming language to read and write data to and from the SVS 2000.

Chapter 2 covers the setup of the SVS 2000 for interfacing with the Allen-Bradley PLC. Chapter 3 covers the programming instructions.

Manual Conventions

Three kinds of special explanations appear throughout the manual — **WARNING**, CAUTION, and *Note*. The format and significance of each is defined below:

WARNING

Possible danger to people. Injury may result if this information is ignored.

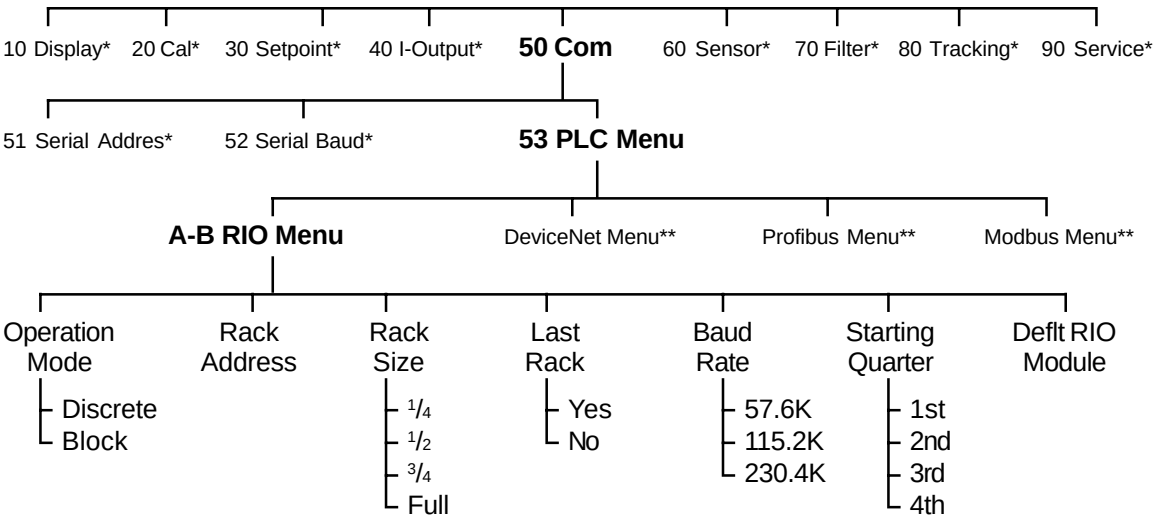
CAUTION

Possible risk to the product. The signal processor or other equipment may be damaged if this information is ignored.

Note

Contains additional information about a step or feature critical to the installation or operation of the signal processor.

Chapter 2. Setting Up the Interface for SVS 2000



*See the *SVS 2000 Installation and Operation Manual* for detailed menus for these items.
**See the applicable K-M PLC manuals for detailed menus for these items.

Operation Mode: select block or discrete transfer of data
Rack Address: set the rack address of the SVS 2000 for communication with the PLC
Rack Size: set the required logical rack space in the PLC
Last Rack: indicate whether this is the last quarter in the logical rack with the same address
Baud Rate: select the baud rate for communication with the PLC
Starting Quarter: select the starting quarter for the SVS 2000 in the logical rack in the PLC
Deflt RIO Module: reset all RIO parameters to factory-set default values

Figure 2-1. SVS 2000 PLC Menu Tree

Introduction

The Allen-Bradley Remote I/O Interface for SVS 2000 provides a connection between the SVS 2000 and the Allen-Bradley Remote I/O (A-B RIO) network. Once interfaced in the Allen-Bradley network, a programmer can use an Allen-Bradley PLC and ladder logic programming language to read and write data to and from the SVS 2000.

The SVS 2000's menu tree is used to perform setup and calibration of the SVS 2000. This chapter covers only the menus and submenus needed to set up the A-B RIO. Figure 2-1 is the menu tree for the SVS 2000, with only those menu items applicable to the A-B RIO detailed. For a complete description of all SVS 2000 menu functions, refer to the *SVS 2000 Installation and Operation Manual*.

Notes

1. Before adding the A-B RIO PCB to the SVS 2000 (if not pre-installed), turn off power to the SVS 2000. Refer to the *SVS 2000 Installation and Operation Manual* for PCB installation details.
2. Complete the installation and setup of the SVS 2000 and sensors before setting up the A-B RIO PCB to interface with the PLC. Refer to TI-SVS.RIO-01 in Appendix B and to the *SVS 2000 Installation and Operation Manual.*

As shown in Figure 2-1, the *A-B RIO* Menu has seven submenus. The remaining sections of this chapter cover the use of these submenus in setting up the A-B RIO interface with the PLC.

Setting Up the A-B RIO PCB to Interface with the PLC

This section describes how to set up the A-B RIO PCB. Table 2-1 shows the defaults for the setup parameters.

Parameter	Default Value
Operation Mode	Block
Rack Address	3 Dec, 3 Oct
Rack Size	1/4
Last Rack	Yes
Baud Rate	57.6K
Starting Quarter	1st

Table 2-1. Setup Default Parameters

Follow this procedure to set up the A-B RIO PCB. Refer to Figure 2-1 to help navigate through the menu tree.

Note

Each time you enter a setup parameter, the SVS 2000 provides a warning message to cycle power when PLC setup is done. When you have completed setting up the A-B RIO PCB:

- Turn SVS 2000 power off and on to activate all your selections.
- Reconfigure the PLC to match your selections.

1. If the SVS 2000 is in Run Mode, press the '5' Key, '3' Key, and Enter Key to access the menu tree. The display shows:

   ```
   53 PLC MENU
   ```

2. Press the Enter Key to access the *PLC* Menu. The display shows:

   ```
   A-B RIO MENU
   ```

3. Press the Enter Key to access the *A-B RIO* Menu. The display shows:

   ```
   OPERATION MODE
   ```

4. See Chapter 3, PLC Programming for SVS 2000, for a detailed description of the two modes. Press the Enter Key to access the *Operation Mode* Menu. The display looks like this:

   ```
   MODE:   *BLOCK
   ```

   (Asterisk indicates the current selection.) If the displayed menu does not have the desired mode, press the Up Arrow Key to display the next page of the menu. The display looks like this:

   ```
   MODE:    DISCRETE
   ```

5. When the display shows the desired mode, press the Enter Key to save the selection in memory. The display briefly shows *Entered! Cycle Power When PLC Setup Done* and returns to:

   ```
   OPERATION MODE
   ```

6. Press the Up Arrow Key to proceed to the next menu. The display shows:

   ```
   RACK ADDRESS
   ```

7. Press the Enter Key to access the *Rack Address* Menu. The display looks like this:

   ```
   >  3 DEC   3 OCT
   ```

   The display shows two number fields. The first number is the rack address in decimal form. The second number is the octadecimal equivalent. Only the decimal form of the address can be altered by the user; the octadecimal form changes automatically to correspond to the decimal form.

8. Use the Numeric or Arrow Keys to input the decimal address. Press the Enter Key to save the value in memory. The display briefly shows *Entered! Cycle Power When PLC Setup Done* and returns to:

   ```
   RACK ADDRESS
   ```

9. Press the Up Arrow Key to proceed to the next menu. The display shows:

   ```
   RACK SIZE
   ```

10. The A-B RIO PCB requires 1/4 logical rack space for both block and discrete transfer. Press the Enter Key to access the *Rack SIze* Menu. The display looks like this:

    ```
    RACK SIZE: *1/4
    ```

    (Asterisk indicates the current selection.) If the displayed menu does not have the desired rack size, press the Up Arrow Key to display the next page of the menu. Continue to press an Arrow Key until you see the desired rack size (there are four pages to the *Rack Size* Menu).
11. When the display shows the desired rack size, press the Enter Key to save the selection in memory. The display briefly shows *Entered! Cycle Power When PLC Setup Done* and returns to:

    ```
    RACK SIZE
    ```

12. Press the Up Arrow Key to proceed to the next menu. The display shows:

    ```
    LAST RACK
    ```

13. Press the Enter Key to access the *Last Rack* Menu. The display looks like this:

    ```
    LAST RACK: *YES
    ```

    (Asterisk indicates the current selection.) If the displayed menu does not have the desired selection, press the Up Arrow Key to display the next page of the menu. The display looks like this:

    ```
    LAST RACK:  NO
    ```

14. When the display shows the desired selection, press the Enter Key to save the selection in memory. The display briefly shows *Entered! Cycle Power When PLC Setup Done* and returns to:

    ```
    LAST RACK
    ```

15. Press the Up Arrow Key to proceed to the next menu. The display shows:

    ```
    BAUD RATE
    ```

16. Press the Enter Key to access the *Baud Rate* Menu. The display looks like this:

    ```
    BAUD RATE:*57.6K
    ```

    (Asterisk indicates the current selection.) If the displayed menu does not have the desired baud rate, press the Up Arrow Key to display the next page of the menu. Continue to press an Arrow Key until you see the desired baud rate (there are three pages to the *Baud Rate* Menu).
17. When the display shows the desired baud rate, press the Enter Key to save the selection in memory. The display briefly shows *Entered! Cycle Power When PLC Setup Done* and returns to:

    ```
    BAUD RATE
    ```

18. Press the Up Arrow Key to proceed to the next menu. The display shows:

    ```
    STARTING QUARTER
    ```

19. Press the Enter Key to access the *Starting Quarter* Menu. The display looks like this:

    ```
    START QRT: *1st
    ```

    (Asterisk indicates the current selection.) If the displayed menu does not have the desired starting quarter, press the Up Arrow Key to display the next page of the menu. Continue to press an Arrow Key until you see the desired starting quarter (there are four pages to the *Starting Quarter* Menu).
20. When the display shows the desired starting quarter, press the Enter Key to save the selection in memory. The display briefly shows *Entered! Cycle Power When PLC Setup Done* and returns to:

    ```
    STARTING QUARTER
    ```

21. Press the Gross or Net Key to return to Run Mode.
22. Turn SVS 2000 power off and on to activate all the selections.
23. Reconfigure the PLC to match the SVS 2000 parameters.

Resetting the A-B RIO PCB to Default Parameters

The A-B RIO PCB default setup parameters are listed in Table 2-1. If you want to reset the parameters to the default values, use the *Deflt RIO Module* function.

Follow this procedure to reset to default parameters. Refer to Figure 2-1 to help navigate through the menu tree.

1. If the SVS 2000 is in Run Mode, press the '5' Key, '3' Key, and Enter Key to access the menu tree. The display shows:

   ```
   53 PLC MENU
   ```

2. Press the Enter Key to access the *PLC* Menu. The display shows:

   ```
   A-B RIO MENU
   ```

3. Press the Enter Key to access the *A-B RIO* Menu. The display shows:

   ```
   OPERATION MODE
   ```

4. Press the Down Arrow Key. The display shows:

   ```
   DEFLT RIO MODULE
   ```

5. Press the Enter Key to access the *Deflt RIO Module* Menu. The display shows:

   ```
   DEFAULT RIO?
   ```

6. Respond to the verification request:
   - To prevent the SVS 2000 from continuing with the default, press the Gross or Net Key to exit this function and return to Run Mode.
   - To continue with the default, press the Enter Key and proceed to Step 7.
7. The SVS 2000 resets all RIO parameters to default values. The display briefly shows *Entered! Cycle Power When PLC Setup Done* and returns to:

   ```
   DEFLT RIO MODULE
   ```

8. Press an Arrow Key to scroll to another menu or press the Gross or Net Key to return to Run Mode.

Note

When you have completed defaulting and setting up the A-B RIO PCB:
- Turn SVS 2000 power off and on to activate all your selections.
- Reconfigure the PLC to match the SVS 2000 selections.

Chapter 3. PLC Programming for SVS 2000

Introduction

The information contained in this chapter documents K-M's program commands for interfacing with Allen-Bradley's PLC network. This material is written for users who have experience with Allen-Bradley's PLC programming and have Allen-Bradley PLC programming documentation available for reference.

Note

For installation, setup, and calibration of the SVS 2000, refer to the *SVS 2000 Installation and Operation Manual.*

The A-B RIO PCB provides an interface for SVS 2000 systems into the Allen-Bradley I/O network. The A-B RIO PCB supports block or discrete transfer capability. The material in this chapter is organized into two major parts:

- Block transfer commands
- Discrete transfer commands

For block transfer, the A-B RIO PCB memory is set up as 2 words, 16 bits per word (see Figure 3-1A). Two words are allocated for each channel (see Figure 3-2), giving a capacity of one channel for each A-B RIO PCB.

Discrete transfer is set up as 2 words, 16 bits per word (see Figure 3-1B). Two words are allocated for each channel (see Figure 3-3), giving a capacity of one channel for each A-B RIO PCB.

The procedure describing how to select block or discrete transfer programming is in Chapter 2, Setting Up the Interface for SVS 2000.

A-B RIO Block Transfer Commands

This section describes the table structures, commands, and channel status reports for block transfer. Follow the procedure in Chapter 2, Setting Up the Interface for SVS 2000, to set the A-B RIO PCB for block transfer programming.

The PLC processor transfers data to and from the A-B RIO PCB using BTW (Block Transfer Write) and BTR (Block Transfer Read) instructions in your ladder logic program.

The data obtained from the A-B RIO PCB using BTR is set up by instructions sent by BTW commands. Figure 3-2 shows the BTW bit/word configuration. The first word is the data word. Data is placed here if the command is to send data from the PLC to the SVS 2000. The second word is the command word, which may include subcommands and additional data (if the data could not fit within the 16 bits of the first word). Bit 15 of the command word is called the Write Bit. Bit 15 is set to '1' when the command is to send data from the PLC to the SVS 2000. Bit 15 is set to '0' when the command is to send data from the SVS 2000 to the PLC. After the BTW instruction has been completed, a BTR instruction is used.

Figure 3-2 also shows the BTR bit/word configuration. The first word is the data word. Data is placed here if the command in the BTW table is to send data from the SVS 2000 to the PLC. The second word is the command word. The command used in the BTW is echoed here to confirm the command has been processed. Bit 14 of the command word is the polarity bit ('0' = +, '1' = –). Bit 15 of the command word is the error bit. If bit 15 is set to '1,' use the Status Command ('7') to determine the error source. If the error condition is cleared, Bit 15 is reset to '0.'

The Quick Command Reference Table lists all of the commands, parameters, and value ranges needed to program the PLC to interface with the SVS 2000. The tables that follow the Quick Command Reference Table are the individual BTW and BTR tables for each command.

Figure 3-1A: Block Transfer

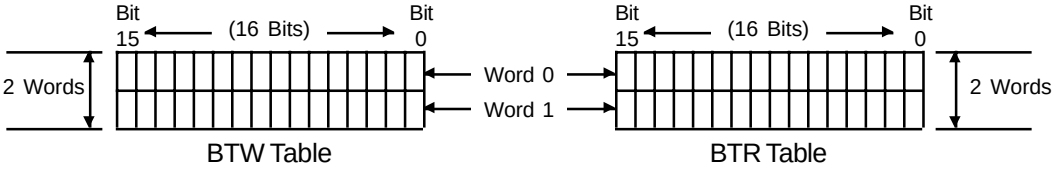


Figure 3-1B: Discrete Transfer

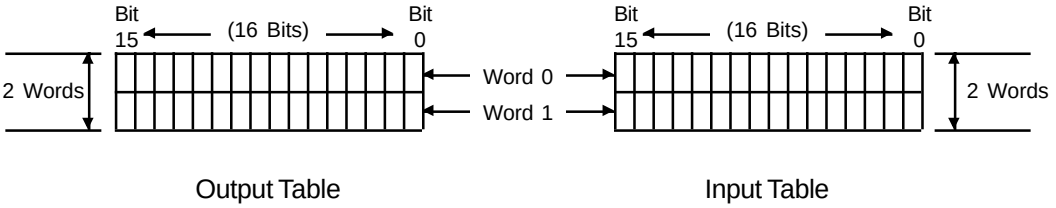


Figure 3-1. Illustration of Allen-Bradley and A-B RIO PCB Memory Registers

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	Data Word																Data Word
Word 1 -	w	p	Command Area						Sub-Command Area or Data				Data				Command Word

Block Transfer Write Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	Data Word																Data Word
Word 1 -	e	p	Command Echo Area						Sub-Command Echo Area or Data				Data				Command Word

Block Transfer Read Table

Notes:

1. Two words are used. The first word is the Data Word and the second word is the Command Word.
2. Description of Data Word: Bits 0-15 is the data area, used when data is to be sent/received.
3. Description of Command Word for Block Transfer Write Table:
   - Bits 0-7 is the data area. This area is used when data larger than 16 bit is to be sent/received. Data Bits 0-15 are in the Data Word and the remaining data are in this area of the Command Word.
   - Bits 4-7 is the Sub-Command Area. This area is used (when not being used for data) to point to specific setpoints or entries in the linearization table for the SVS 2000 channel.
   - Bits 8-13 is the Command Area.
   - Bit 14 is the Polarity bit (p): '0' = +, '1' = –
   - Bit 15 is the Write bit (w). Set this bit to '1' when sending data from the PLC to the SVS 2000. Set this bit to '0' when requesting that data be sent from the SVS 2000 to the PLC.
4. Description of the Command Word for Block Transfer Read Table:
   - Bits 0-7 is the data area. This area is used when data larger than 16 bit is to be sent/received. Data Bits 0-15 are in the Data Word and the remaining data are in this area of the Command Word.
   - Bits 4-7 is the Sub-Command Echo Area. This area is used (when not being used for data) to point to specific setpoints or entries in the linearization table for the SVS 2000 channel.
   - Bits 8-13 is the Command Echo Area.
   - Bit 14 is the Polarity bit (p): '0'= +, '1' = –
   - Bit 15 is the Error bit (e).

Figure 3-2. Basic Bit/Byte Word Configuration for Block Transfer Write Table and Read Table

Quick Command Reference Table for A-B RIO PCB

System Parameters	Command Dec	Command Hex	Range	Comments	Page No.
Null Command	0	0	—	Returns zero in all data/command fields	3-5
A-B Device & Revision Report	5	5	0-255 MSB 0-255 LSB	MSB A-B RIO firmware revision: 0-127=XNEW-XZZV, 128-255=NEW-ZZV. LSB Signal processor type: 0=MVS, 1=Sono 5000 series-ITU-SSU, 2=STX, 5=ITX, 10=1000, 11=1020, 7=Sono II, 8=Weigh II, 14=SVS 2000	3-5

SVS 2000 Parameters	Command Dec	Command Hex	Range	Comments	Page No.
Gross Weight	1	1	0-9999999	Value in selected engineering units	3-6
Net Weight	2	2	0-±9999999	Value in selected engineering units	3-6
Tare	6	6	—		3-6
Status (includes errors)	7	7	0-255		3-7
Display Value Correction (Auto)	8	8	0-999999	Value in selected engineering units	3-7
Lo Span Cal (Auto)	9	9	0-999999	Value in selected engineering units	3-7
Hi Span Cal (Auto)	10	A	0-999999	Value in selected engineering units	3-8
Scale Factor Counts (Manual)	11	B	0-2097151		3-8
Scale Factor Weight (Manual)	12	C	0-999999	Value in selected engineering units	3-8
Zero Counts (Manual)	13	D	0-2097151		3-9
Averaging	16	10	1-255		3-9
Linearize Set — Raw Input Weight[1]	30	1E	0-999999		3-9
Linearize Set — Corrected Output Weight[1]	31	1F	0-999999		3-10
Linearize Enable	32	20	0-1	0=linearization off, 1=linearization on	3-10
Raw A/D Counts	33	21	0-2097151		3-10
Filtered A/D Counts	35	23	0-2097151		3-11
Setpoint Preact[2]	39	27	0-65535	Value in selected engineering units	3-11
Setpoint Value[2,3]	40	28	0-±999999	Value in selected engineering units	3-11
Setpoint Deadband[2]	41	29	0-65535	Value in selected engineering units	3-12
Setpoint Hi/Lo[2]	42	2A	0-1	0=Lo, 1=Hi	3-12
Setpoint Track[2]	43	2B	0-3	0=Gross, 1=Net, 2=Total, 3=Fault	3-12
Setpoint Failsafe[2]	44	2C	0-2	0=Off, 1=No Change, 2=On	3-13
Setpoint Force Mode[2,4]	45	2D	—		3-13
IOut Range	46	2E	0-1	0=0-20mA, 1=4-20mA	3-14
IOut 4/0mA Value[5]	47	2F	0-±999999	Value in selected engineering units	3-14
IOut 20mA Value[5]	48	30	0-±999999	Value in selected engineering units	3-14
IOut Track	49	31	0-1	0=Gross, 1=Net	3-15
IOut Failsafe	50	32	0-2	0=Lo, 1=Hi, 2=No Change	3-15
Current Force Mode[6]	51	33	0-16383		3-15

Notes:

1. Bits 5-7 of Command Word is linearization table entry number (0=1st entry through 4=5th entry).
2. Bits 4-6 of Command Word is setpoint number (0=Relay1, 1=Relay2, 2=Digital Output1, through 7=Digital Output6).
3. When Net is selected for Setpoint Track, Bit 7 of Command Word is polarity for Setpoint Value.
4. To activate Setpoint Force Mode, set bit 1 of Data Word to 1 and set Write bit to 1. To deactivate Setpoint Force Mode, set bit 1 of Data Word to 0 and set Write bit to 1. Bit 0 of Data Word represents setpoint state (1=On, 0=Off) when Force Mode is active. When Force Mode is inactive, setpoint is controlled by SVS 2000.
5. When Net is selected for IOut Track, Bit 7 of Command Word is polarity for 4/0 and 20 mA Values.
6. To activate Current Force Mode, set bit 0 of Command Word to 1 and set Write bit to 1. To deactivate Current Force Mode, set bit 0 of Command Word to 0 and set Write bit to 1. Data in bits 0-13 of Data Word is value loaded into Current Output PCB of SVS 2000. When Force Mode is inactive, current output is controlled by SVS 2000.

CAUTION

The Setpoint and Current Force Mode commands remove control of the selected setpoint(s) and current output from the SVS 2000 and give control to the PLC. The SVS 2000 will not update the setpoint(s) or current output when the respective Force Mode is active.

Legend: Dec = numbers in decimal form; Hex = numbers in hexadecimal form

Block Transfer Command Format Notes

Three types of commands are used when interfacing between the PLC and the SVS 2000:

1. **Read only** commands are used to read a calculated parameter, such as a gross weight or net weight. This type of command is **always** used to send data from the **SVS 2000 to the PLC**. The BTW and BTR tables for these commands reflect that the data can only go from the SVS 2000 to the PLC. These commands are identified as 'read only' in the Block Transfer Commands that follow.
2. **Set only** commands are used to set a parameter, such as a command to tare a channel. This type of command is **always** used to send data from the **PLC to the SVS 2000**. The BTW and BTR tables for these commands reflect that the data can only go from the PLC to the SVS 2000. These commands are identified as 'set only' in the Block Transfer Commands that follow.
3. **Read or Set** commands are used to read a parameter value **or** set a parameter value, such as a command for Lo Span Calibration. This type of command can be used to send data from the SVS 2000 to the PLC or from the PLC to the SVS 2000. Note that the BTW and BTR tables for these commands in the Block Transfer Commands that follow are written for the case where the data is being sent from the SVS 2000 to the PLC. However, these commands can also be used to set parameters.

Block Transfer Commands

Null Command (read only)

Dec: 0 Hex: 0 Range: 0

BTW Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Data Word
Word 1 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Command Word

BTR Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Data Word
Word 1 -	e	p	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Command Word

A-B Device and Revision Report (read only)

Dec: 5 Hex: 5 Range: 0-255 MSB, 0-255 LSB

BTW Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Data Word
Word 1 -	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	Command Word

BTR Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	Data Word
Word 1 -	e	p	0	0	0	1	0	1	0	0	0	0	0	0	0	0	Command Word

Notes: MSB A-B RIO firmware revision: 0-127=XNEW-XZZV, 128-255=NEW-ZZV.
LSB Signal processor type: 0=MVS, 1=Sono 5000 series-ITU-SSU, 2=STX, 5=ITX, 10=1000, 11=1020, 7=Sono II, 8=Weigh II, 14=SVS 2000

Legend: Dec = # in decimal form; Hex = # in hexadecimal form; e = error; p = polarity; ddd... = data; D. . . = subcommand

Block Transfer Commands

Gross Weight (read only)

Dec: 1 Hex: 1 Range: 0-9999999

BTW Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Data Word
Word 1 -	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	Command Word

BTR Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	Data Word
Word 1 -	e	p	0	0	0	0	0	1	d	d	d	d	d	d	d	d	Command Word

Net Weight (read only)

Dec: 2 Hex: 2 Range: 0-±9999999

BTW Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Data Word
Word 1 -	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	Command Word

BTR Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	Data Word
Word 1 -	e	p	0	0	0	0	1	0	d	d	d	d	d	d	d	d	Command Word

Tare (set only)

Dec: 6 Hex: 6 Range: N/A

BTW Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	Data Word
Word 1 -	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	Command Word

BTR Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Data Word
Word 1 -	e	p	0	0	0	1	1	0	0	0	0	0	0	0	0	0	Command Word

Note: To set tare, set bit 0 of Data Word to 1 and use the Write bit.

Legend: Dec = # in decimal form; Hex = # in hexadecimal form; e = error; p = polarity; ddd... = data; D... = subcommand

Block Transfer Commands

Status (read only)

Dec: 7 Hex: 7 Range: 0-255

BTW Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Data Word
Word 1 -	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	Command Word

BTR Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	d	d	d	d	d	d	d	d	0	0	0	0	0	0	0	0	Data Word
Word 1 -	e	p	0	0	0	1	1	1	0	0	0	0	0	0	0	0	Command Word

Notes: Description of status (bits 8-15 of data word)

Bit 8 -Net units negative
Bit 9 - N/A
Bit 10 - During Auto Cal ”Warning: Move More Material”
Bit 11 - During Auto Cal: “Ambiguous Error”
lo_cnt>hi_cnt. Other: Illegal average factor
Bit 12 - N/A
Bit 13 - Analog input overrange
Bit 14 - Engineering unit overflow
Bit 15 - Gross units negative

Display Value Correction (Auto Calibration)

Dec: 8 Hex: 8 Range: 0-999999

BTW Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Data Word
Word 1 -	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	Command Word

BTR Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	Data Word
Word 1 -	e	p	0	0	1	0	0	0	0	0	0	0	d	d	d	d	Command Word

Lo Span Cal (Auto Calibration)

Dec: 9 Hex: 9 Range: 0-999999

BTW Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Data Word
Word 1 -	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	Command Word

BTR Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	Data Word
Word 1 -	e	p	0	0	1	0	0	1	0	0	0	0	d	d	d	d	Command Word

Note: You must move material when performing Auto Cal. See *SVS 2000 Installation and Operation Manual*.

Legend: Dec = # in decimal form; Hex = # in hexadecimal form; e = error; p = polarity; ddd... = data; D... = subcommand

Block Transfer Commands

Hi Span Cal (Auto Calibration)

Dec: 10 Hex: A Range: 0-999999

BTW Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Data Word
Word 1 -	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	Command Word

BTR Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	Data Word
Word 1 -	e	p	0	0	1	0	1	0	0	0	0	0	d	d	d	d	Command Word

Note: You must move material when performing Auto Cal. See *SVS 2000 Installation and Operation Manual*.

Scale Factor Counts (Manual Calibration)

Dec: 11 Hex: B Range: 0-2097151

BTW Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Data Word
Word 1 -	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	Command Word

BTR Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	Data Word
Word 1 -	e	p	0	0	1	0	1	1	0	0	0	d	d	d	d	d	Command Word

Scale Factor Weight (Manual Calibration)

Dec: 12 Hex: C Range: 0-999999

BTW Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Data Word
Word 1 -	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	Command Word

BTR Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	Data Word
Word 1 -	e	p	0	0	1	1	0	0	0	0	0	0	d	d	d	d	Command Word

Legend: Dec = # in decimal form; Hex =# in hexadecimal form; e = error; p = polarity; ddd... = data; D... = subcommand

Block Transfer Commands

Zero Counts (Manual Calibration)

Dec: 13 Hex: D Range: 0-2097151

BTW Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Data Word
Word 1 -	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	Command Word

BTR Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	Data Word
Word 1 -	e	p	0	0	1	1	0	1	0	0	0	d	d	d	d	d	Command Word

Averaging

Dec: 16 Hex: 10 Range: 1-255

BTW Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Data Word
Word 1 -	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	Command Word

BTR Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	0	0	0	0	0	0	d	d	d	d	d	d	d	d	Data Word
Word 1 -	e	p	0	1	0	0	0	0	0	0	0	0	0	0	0	0	Command Word

Linearize Set — Raw Input Weight

Dec: 30 Hex: 1E Range: 0-999999

BTW Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Data Word
Word 1 -	0	0	0	1	1	1	1	0	D	D	D	0	0	0	0	0	Command Word

BTR Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	Data Word
Word 1 -	e	p	0	1	1	1	1	0	0	0	0	0	d	d	d	d	Command Word

Note: Bits 5, 6, and 7 of Command Word is Linear Table Entry Number (0=1st through 4=5th)

Legend: Dec = # in decimal form; Hex = # in hexadecimal form; e = error; p = polarity; ddd... = data; D... = subcommand

Block Transfer Commands

Linearize Set — Corrected Output Weight

Dec: 31 Hex: 1F Range: 0-999999

BTW Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Data Word
Word 1 -	0	0	0	1	1	1	1	1	D	D	D	0	0	0	0	0	Command Word

BTR Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	Data Word
Word 1 -	e	p	0	1	1	1	1	1	0	0	0	0	d	d	d	d	Command Word

Note: Bits 5, 6, and 7 of Command Word is Linear Table Entry Number (0=1st through 4=5th)

Linearize Enable

Dec: 32 Hex: 20 Range: 0-1

BTW Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Data Word
Word 1 -	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	Command Word

BTR Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	d	Data Word
Word 1 -	e	p	1	0	0	0	0	0	0	0	0	0	0	0	0	0	Command Word

Note: 0 = linearization off, 1 = linearization on

Raw A/D Counts (read only)

Dec: 33 Hex: 21 Range: 0-2097151

BTW Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Data Word
Word 1 -	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	Command Word

BTR Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	Data Word
Word 1 -	e	p	1	0	0	0	0	1	0	0	0	d	d	d	d	d	Command Word

Legend: Dec = # in decimal form; Hex = # in hexadecimal form; e = error; p = polarity; ddd... = data; D... = subcommand

Block Transfer Commands

Filtered A/D Counts (read only)

Dec: 35 Hex: 23 Range: 0-2097151

BTW Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Data Word
Word 1 -	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	Command Word

BTR Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	Data Word
Word 1 -	e	p	1	0	0	0	1	1	0	0	0	d	d	d	d	d	Command Word

Setpoint Preact

Dec: 39 Hex: 27 Range: 0-65535

BTW Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Data Word
Word 1 -	0	0	1	0	0	1	1	1	0	D	D	D	0	0	0	0	Command Word

BTR Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	Data Word
Word 1 -	e	p	1	0	0	1	1	1	0	0	0	0	0	0	0	0	Command Word

Note: Bits 4, 5, and 6 of Command Word is the setpoint number (0=Relay1, 1=Relay2, 2=Digital Output1, through 7=Digital Output6).

Setpoint Value

Dec: 40 Hex: 28 Range: 0-±999999

BTW Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Data Word
Word 1 -	0	0	1	0	1	0	0	0	0	D	D	D	0	0	0	0	Command Word

BTR Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	Data Word
Word 1 -	e	0	1	0	1	0	0	0	p	0	0	0	d	d	d	d	Command Word

Notes:

1. Bits 4, 5, and 6 of Command Word is the setpoint number (0=Relay1, 1=Relay2, 2=Digital Output1, through 7=Digital Output6).
2. When Net is selected for Setpoint Track, Bit 7 of Command Word is polarity for the Setpoint Value.

Legend: Dec = # in decimal form; Hex = # in hexadecimal form; e = error; p = polarity; ddd... = data; D... = subcommand

Block Transfer Commands

Setpoint Deadband

Dec: 41 Hex: 29 Range: 0-65535

BTW Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Data Word
Word 1 -	0	0	1	0	1	0	0	1	0	D	D	D	0	0	0	0	Command Word

BTR Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	Data Word
Word 1 -	e	p	1	0	1	0	0	1	0	0	0	0	0	0	0	0	Command Word

Note: Bits 4, 5, and 6 of Command Word is the setpoint number (0=Relay1, 1=Relay2, 2=Digital Output1, through 7=Digital Output6).

Setpoint Hi/Lo

Dec: 42 Hex: 2A Range: 0-1

BTW Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Data Word
Word 1 -	0	0	1	0	1	0	1	0	0	D	D	D	0	0	0	0	Command Word

BTR Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	d	Data Word
Word 1 -	e	p	1	0	1	0	1	0	0	0	0	0	0	0	0	0	Command Word

Notes:
1. Bits 4, 5, and 6 of Command Word is the setpoint number (0=Relay1, 1=Relay2, 2=Digital Output1, through 7=Digital Output6).
2. Bit 0 of Data Word: 0=Lo, 1=Hi

Setpoint Track

Dec: 43 Hex: 2B Range: 0-3

BTW Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Data Word
Word 1 -	0	0	1	0	1	0	1	1	0	D	D	D	0	0	0	0	Command Word

BTR Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	d	d	Data Word
Word 1 -	e	p	1	0	1	0	1	1	0	0	0	0	0	0	0	0	Command Word

Notes:
1. Bits 4, 5, and 6 of Command Word is the setpoint number (0=Relay1, 1=Relay2, 2=Digital Output1, through 7=Digital Output6).
2. Bit 0 and 1 of Data Word: 0=Gross, 1=Net, 2=Total, 3=Fault

Legend: Dec = # in decimal form; Hex = # in hexadecimal form; e = error; p = polarity; ddd... = data; D... = subcommand

Block Transfer Commands

Setpoint Failsafe

Dec: 44 Hex: 2C Range: 0-2

BTW Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Data Word
Word 1 -	0	0	1	0	1	1	0	0	0	D	D	D	0	0	0	0	Command Word

BTR Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	d	d	Data Word
Word 1 -	e	p	1	0	1	1	0	0	0	0	0	0	0	0	0	0	Command Word

Notes:

1. Bits 4, 5, and 6 of Command Word is the setpoint number (0=Relay1, 1=Relay2, 2=Digital Output1, through 7=Digital Output6).
2. Bits 0 and 1 of Data Word: 0=Off, 1=No Change, 2=On

Setpoint Force Mode (set only)

Dec: 45 Hex: 2D Range: N/A

BTW Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	d	Data Word
Word 1 -	1	0	1	0	1	1	0	1	0	D	D	D	0	0	0	0	Command Word

BTR Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Data Word
Word 1 -	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	Command Word

Notes:

1. Bits 4, 5, and 6 of Command Word is setpoint number (0=Relay1, 1=Relay2, 2=Digital Output1, through 7=Digital Output6).
2. To activate Force Mode, set bit 1 of Data Word to 1 and set Write bit (bit 15 of Command Word) to 1. To deactivate Force Mode, set bit 1 of Data Word to 0 and set Write bit to 1.
3. Bit 0 of Data Word represents state of setpoint (1=On, 0=Off) when Force Mode active. When Force Mode inactive, setpoint controlled by SVS 2000.

CAUTION

Setpoint Force Mode command removes control of setpoint from the SVS 2000 and gives it to the PLC. SVS 2000 will not update setpoint when Force Mode is active.

Legend: Dec = # in decimal form; Hex = # in hexadecimal form; e = error; p = polarity; ddd... = data; D... = subcommand

Block Transfer Commands

IOut Range

Dec: 46 Hex: 2E Range: 0-1

BTW Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Data Word
Word 1 -	0	0	1	0	1	1	1	0	0	0	0	0	0	0	0	0	Command Word

BTR Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	d	Data Word
Word 1 -	e	p	1	0	1	1	1	0	0	0	0	0	0	0	0	0	Command Word

Note: Bit 0 of Data Word: 0=0-20 mA, 1=4-20 mA

IOut 4/0 mA Value

Dec: 47 Hex: 2F Range: 0-±999999

BTW Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Data Word
Word 1 -	0	0	1	0	1	1	1	1	0	0	0	0	0	0	0	0	Command Word

BTR Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	Data Word
Word 1 -	e	0	1	0	1	1	1	1	p	0	0	0	d	d	d	d	Command Word

Note: When Net is selected for IOut Track, Bit 7 of Command Word is polarity of 4/0 mA value.

IOut 20 mA Value

Dec: 48 Hex: 30 Range: 0-±999999

BTW Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Data Word
Word 1 -	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	Command Word

BTR Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	Data Word
Word 1 -	e	0	1	1	0	0	0	0	p	0	0	0	d	d	d	d	Command Word

Note: When Net is selected for IOut Track, Bit 7 of Command Word is polarity of 20 mA value.

Legend: Dec = # in decimal form; Hex = # in hexadecimal form; e = error; p = polarity; ddd... = data; D... = subcommand

Block Transfer Commands

IOut Track

Dec: 49 Hex: 31 Range: 0-1

BTW Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Data Word
Word 1 -	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	Command Word

BTR Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	d	Data Word
Word 1 -	e	p	1	1	0	0	0	1	0	0	0	0	0	0	0	0	Command Word

Note: Bit 0 of Data Word: 0=Gross, 1=Net

IOut Failsafe

Dec: 50 Hex: 32 Range: 0-2

BTW Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Data Word
Word 1 -	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	Command Word

BTR Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	d	d	Data Word
Word 1 -	e	p	1	1	0	0	1	0	0	0	0	0	0	0	0	0	Command Word

Note: Bits 0 and 1 of Data Word: 0=Lo, 1=Hi, 2=No Change

Current Force Mode (set only)

Dec: 51 Hex: 33 Range: 0-16383

BTW Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	d	d	d	d	d	d	d	d	d	d	d	d	d	d	Data Word
Word 1 -	1	0	1	1	0	0	1	1	0	0	0	0	0	0	0	1	Command Word

BTR Table

Dec. Bit -	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word 0 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Data Word
Word 1 -	0	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0	Command Word

Notes:

1. To activate Force Mode, set bit 0 of Command Word to 1 and set Write bit (bit 15) to 1. To deactivate Force Mode, set bit 0 of Command Word to 0 and set Write bit to 1.
2. Data in bits 0-13 of Data Word is value loaded into Current Output PCB of SVS 2000. 0 is associated with 0/4 mA (dependent on what was selected for IOut Range) and 16383 is associated with 20 mA. A-B RIO does a linear interpolation between those two currents to calculate value of the forced current.
3. When Force Mode inactive (bit 0 of Command Word set to 0), current output is controlled by SVS 2000.

CAUTION

Current Force Mode command removes control of current output from the SVS 2000 and gives it to the PLC. SVS 2000 will not update current output when Force Mode is active.

Legend: Dec = # in decimal form; Hex = # in hexadecimal form; e = error; p = polarity; ddd... = data; D... = subcommand

A-B RIO Discrete Transfer Commands

This section describes the table structures, commands, and channel status reports for discrete transfer. Follow the procedure in Chapter 2, Setting Up the Interface for SVS 2000, to set the A-B RIO PCB for discrete transfer programming.

The A-B RIO PCB supports one channel using two words of data. Those words are structured as shown in Figure 3-3.

The command word is Word 0 (Figure 3-3). The desired command from the Discrete Transfer Command Table is entered in the first three bits in the Output Table. The first three bits in the Input Table echo the command. Bit 3 indicates polarity (0 = '+', 1 = '-') and bit 4 indicates status. If a status bit contains '1,' status/error information can be found using Command 7.

Parameters, commands, and value ranges for discrete transfer are listed in the Discrete Transfer Command Table. Channel status is given in the Channel Status Table. Use this information when entering commands in the Discrete Output Table and reading the requested information in the Discrete Input Table.

17	16	15	14	13	12	11	10	7	6	5	4	3	2	1	0	Octal Bits
N/U											N/U	N/U	Command			Word 0
																Word 1

Discrete Output Table

17	16	15	14	13	12	11	10	7	6	5	4	3	2	1	0	Octal Bits
N/U											s	p	Command			Word 0
Return Data																Word 1

Discrete Input Table

Figure 3-3. Discrete Output Table and Input Table

Legend: N/U = not used; s = status; p = polarity

Discrete Transfer Command Table

Parameter	Command Dec	Command Hex	Range	Comments
Null Command	0	0	—	Returns zero in all data/command fields (including error and polarity bits)
Gross Weight	1	1	0-9999999	
Net Weight	2	2	0-±9999999	
Reserved	3	3		
Reserved	4	4		
A-B Revision Report	5	5	0-255 MSB 0-255 LSB	MSB (1st byte of the word) is A-B RIO PCB firmware revision: 0-127 (XNEW-XZZV), 128-255 (NEW-ZZV). LSB (2nd byte of the word) is signal processor type: 0=MVS, 1=Sono 5000 series-ITU-SSU, 2=STX, 5=ITX, 10=1000, 11=1020, 7=Sono II, 8=Weigh II, 14=SVS 2000
Tare	6	6		SVS 2000 channel is tared
Status (includes errors)	7	7	0-255	Channel status (errors included) is reported as shown in the Channel Status Table.

Note: The Command Number is echoed back in the Discrete Input Table when complete. Polarity and error status are also updated in the Discrete Input Table.

Channel Status Table (Bit set to 1)

Bit 17	Bit 16	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10
Gross units negative	Engineering unit overflow error	Analog input overranging A/D converter	COM error	—	—	—	Net units negative

Legend: Dec = numbers in decimal form; Hex = numbers in hexadecimal form

Appendix A. Kistler-Morse Service and Warranty

Product Warranty

A complete, unabridged copy of our product warranty is available upon request from Kistler-Morse. A summary of the warranty, *subject to the terms and conditions listed fully in the warranty*, follows:

> Kistler-Morse warrants equipment of its own manufacture to be free from defects in material and workmanship for one year from date of shipment to original user. Kistler-Morse will replace or repair, at our option, any part found to be defective. Buyer must return any part claimed defective to Kistler-Morse, transportation prepaid.

Service

Kistler-Morse maintains a fully trained staff of field service personnel who are capable of providing you with complete product assistance. Our field service staff is based in Bothell, Washington USA (corporate headquarters) and Antwerp, Belgium (European office).

Phone Consultation

Our Field Service staff provides the following services by telephone, via our regular and toll free number (toll free number in USA and Canada only):

- Technical, application, and troubleshooting assistance
- Spare parts assistance
- Warranty (replacement) assistance

On-Site Consultation

Kistler-Morse's Field Service staff can provide additional services at your request. Contact Kistler-Morse at the closest office for rate and scheduling information for the following services:

- Technical, application, startup, and troubleshooting assistance on-site
- Training on-site or at our corporate office
- Service calls
- Equipment updates to our latest configuration

General descriptions of some of these standard services follow. Of course, if your service needs vary from those described, we are available to discuss them with you.

Installation, Startup Assistance, and On-Site Training

Notes

1. For vessels to be instrumented with Microcells or L-Cells®, the customer may contract to have K-M install the sensors. For all other sensors and transducers, installation must be performed by the customer.
2. Field wiring, conduit installation, junction box mounting, and signal processor mounting must be performed by the customer. AC power must be connected to the signal processor, but not energized, prior to K-M beginning work.

All field wiring will be checked for errors. The system will be powered up and checked out for proper electrical operation. The *Quick Config* procedure will be performed. For best results, K-M requires moving a known amount of material, such as a truckload, for Live Load calibration. Live Load calibration will be performed if actual material or weight devices can be moved. Recommendations for the optimal performance of the system will be provided.

On-site training will include simulation of the Live Load calibration process (if Live Load calibration could not be performed while K-M is on site) and instruction covering operation and maintenance of the system.

Troubleshooting

Kistler-Morse will troubleshoot systems for mechanical, electrical, calibration, and wiring errors. Normal component repairs will be made and wiring errors will be corrected, including replacement of non-repairable printed circuit boards.

Service Calls

Kistler-Morse will perform on-site repair/ replacement services.

Return Material Authorization

If a part needs to be sent to the factory for repair, contact Kistler-Morse's corporate office and ask for a Return Material Authorization (RMA) number. The RMA number identifies the part and its owner and must be included with the part when it is shipped to the factory.

Address and Telephone Numbers

Corporate Office

Kistler-Morse Corporation
19021 120th Avenue NE
Bothell, WA 98011-9511 USA

Phone: 425-486-6600
Toll Free (U.S.A. and Canada): 800-426-9010
Fax: 425-402-1500
www.kistler-morse.com

European Office

Kistler-Morse Corporation
Rucaplein 531
B2610 Antwerp, Belgium

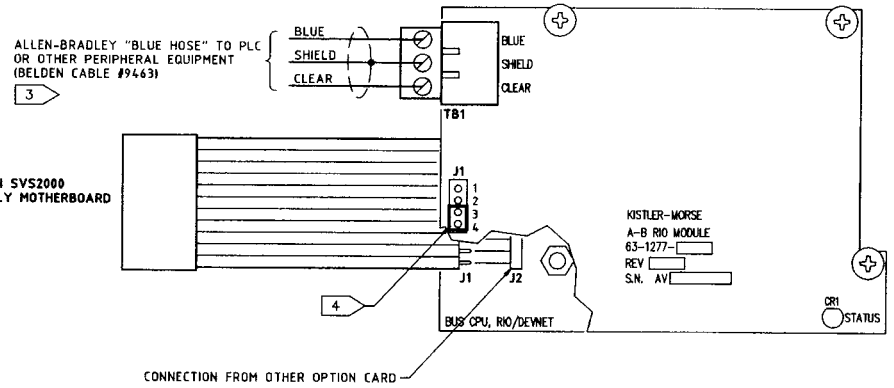
Phone: 32-3-218-99-99
Fax: 32-3-230-78-76

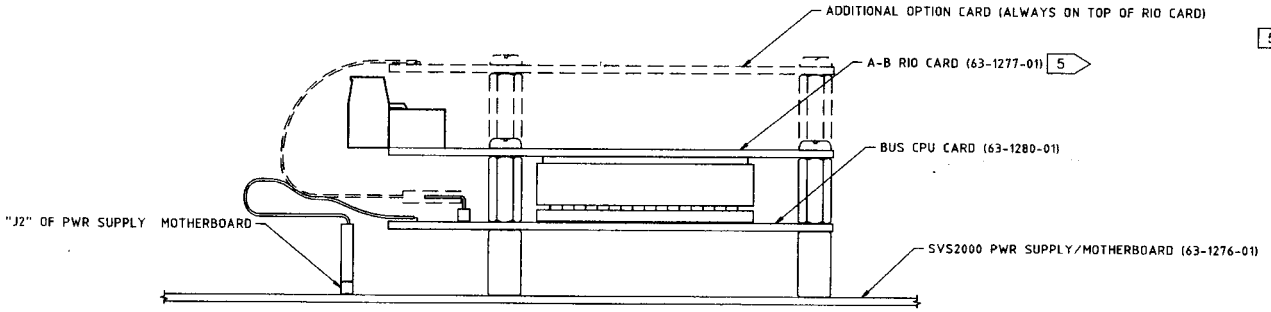
Appendix B. Technical Drawings

This appendix contains the following technical drawings for the Allen-Bradley RIO PCB:

Drawing No.	**Drawing Title**
TI-SVS.RIO-01	Wiring Diagram, A-B RIO Interface Card, SVS 2000

REVISIONS					
LTR	DESCRIPTION	INCORP.	CHECKED	APPROVED	DATE





DETAIL A

A-B RIO CARD & BUS CPU CARD STACKING ARRANGEMENT

NOTES: (UNLESS OTHERWISE SPECIFIED)

1. ROUTE ALL AC WIRING SEPARATELY FROM ALL OTHER WIRING.
2. THE A-B RIO INTERFACE IS CONSISTS OF A BUS CPU CARD AND AN A-B RIO INTERFACE CARD. REFER TO DETAIL A FOR STACKING ARRANGEMENT.
3. MAXIMUM OF 2 REMOTE I/O CABLE CONNECTIONS PERMITTED. CABLE SHIELD MUST BE CONNECTED TO CHASSIS GROUND ONLY AT THE SCANNER END OF THE REMOTE I/O.
4. A TERMINATION RESISTOR MUST BE INSTALLED ON THE LAST BLOCK IN A SERIES. RESISTOR INSTALLATION CAN BE DONE BY MAKING THE PROPER JUMPERING ON "J3" PER TABLE BELOW.

BAUD RATE	JUMPER	RESISTOR VALUE
--	1-2	NO CONNECTION
57.6K AND 115.2K	2-3	150 OHMS
* 230.4K	3-4	82 OHMS

* DEVICES THAT ARE OPERATING AT 230.4K BAUD MUST HAVE 82 OHMS TERMINATION RESISTOR (JUMPER "3-4" OF "J1")

5. WHEN INSTALLING THE A-B RIO OPTION CARD IN A UNIT WITH ANOTHER OPTION CARD, INSTALL THE A-B RIO CARD SO THAT IT IS BELOW THE OTHER OPTION CARD IN THE MOUNTING ORDER. ONLY ONE BUS CPU AND INTERFACE CARD ALLOWED PER UNIT.

ECO ACCUMULATION:	APPROVALS	DATE
ECO No. 1:	DRAWN: Raul M. Collado	11/5/98
ECO No. 2:	CHECKED:	
ECO No. 3:	PROJ. ENGR.:	11/25/98
ECO No. 4:	PRODUCTION:	
ECO No. 5: INCORPORATE ABOVE ECO'S	PURCHASING:	

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES
TOLERANCES
DECIMAL .X± -- .XX± -- .XXX± --
ANGULAR ±--°
DO NOT SCALE DRAWING
SCALE 1 = 1
FINISH
USED ON: (REF ONLY)

Kistler-Morse Corp.
Bothell, WA 98011

TITLE: WIRING DIAGRAM, A-B RIO INTERFACE CARD, SVS2000

SIZE	DWG. No.	REV.
B	TI-SVS.RIO-01	NEW

ACAD # SVSRIO | DATE: 12/28/98 | SHT. 1 OF 1