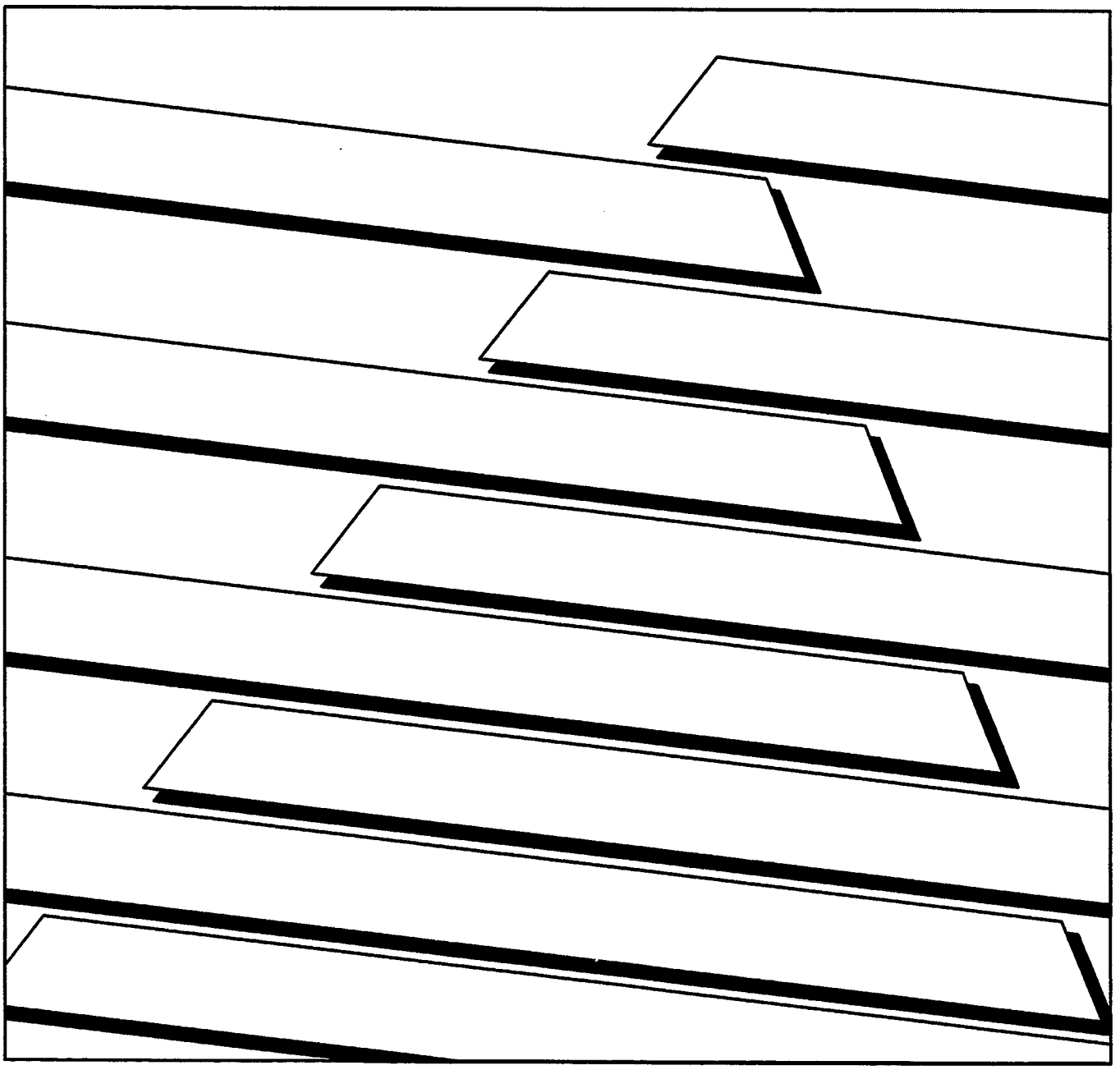
ALLEN-BRADLEY

SPI Protocol Interface Module
Cat. No. 1771-SPI Series C

User Manual



Important User Information

Because of the variety of uses for the products described in this publication, those responsible for the application and use of this control equipment must satisfy themselves that all necessary steps have been taken to assure that each application and use meets all performance and safety requirements, including any applicable laws, regulations, codes and standards.

The illustrations, charts, sample programs and layout examples shown in this guide are intended solely for example. Since there are many variables and requirements associated with any particular installation, Allen-Bradley does not assume responsibility or liability (to include intellectual property liability) for actual use based upon the examples shown in this publication.

Allen-Bradley publication SGI–1.1, "Safety Guidelines For The Application, Installation and Maintenance of Solid State Control" (available from your local Allen-Bradley office) describes some important differences between solid-state equipment and electromechanical devices which should be taken into consideration when applying products such as those described in this publication.

Throughout this manual we make notes to alert you to possible injury to people or damage to equipment under specific circumstances.

ATTENTION: Tells readers where people may be hurt if procedures are not followed properly.

ATTENTION: Tells readers where machinery may be damaged or economic loss can occur if procedures are not followed properly.

Important: We recommend you frequently backup your application programs on appropriate storage medium to avoid possible data loss.

Summary of Changes

Summary of Changes

This release of the publication contains updated information from the last release.

Updated Information

This release documents series C of the 1771-SPI Interface module. It also includes information previously included in a documentation update (publication 1771-6.5.97–RN1 dated June 1993).

The status blocks (Chapter 4) have been revised for the following:

- Blender Volumetric Controller
- Blender Continuous Weigh Controller
- Blender Batch Weigh Controller

To help you find new and updated information in this release of the publication, we have included change bars as shown to the right of this paragraph.

Important: The series C 1771-SPI module is **not** interchangeable with the series A version. This 1771-SPI series C module is directly interchangeable with the series B module if blenders **are not** used in the system. (**Note:** You must remove the existing 120 ohm resistor from the field wiring arm.)

If blenders are present in the system, you can use the series B module only if you modify your processor program. Refer to chapter 1 in the user manual, publication 1771-6.5.97 dated December 1994, for more information.

Using This Manual

Purpose of Manual

This manual shows you how to use your 1771-SPI series C interface module (1771-SPI/C) with an Allen-Bradley programmable controller. It helps you install, program, and troubleshoot your module.

ATTENTION: This 1771-SPI series C SPI Protocol Interface module is **not** interchangeable with the 1771-SPI series A module.

This 1771-SPI series C module is directly interchangeable with the series B module if blenders are not used in the system. (**Note:** You must remove the existing 120 ohm resistor from the field wiring arm.)

If blenders are present in the system, you can use the series B module only if you modify your processor program.

Audience

You must be able to program and operate an Allen-Bradley programmable controller to make efficient use of your module. In particular, you must know how to program block transfer and file instructions. We assume that you know how to do this in this manual.

If you do not, refer to the appropriate programmable controller programming and operations manual before you attempt to program this module.

Vocabulary

In this manual, we refer to:

- The individual 1771-SPI/C interface module as the "module," the "SPI module" or the "interface module."
- The programmable controller, as the "controller," "programmable controller," the "host processor" or the "processor."
- The Society of the Plastics Industry as "SPI."

Manual Organization

This manual is divided into 5 chapters. The following chart shows each chapter with its corresponding title and a brief overview of the topics covered in that chapter.

Chapter	Title	Topics Covered
1	Installing the SPI/C Protocol Interface Module	Module power requirements, keying, chassis location Wiring of field wiring arm
2	Module Operation and Block summary	Description of the module operation, and an explanation of the module configuration command and system status block.
3	SPI/C Interface Module Command Block Descriptions	Explanations of the individual device specific command blocks.
4	SPI/C Module Status Block Descriptions	Explanations of the individual device specific status blocks.
5	Troubleshooting	Diagnostics reported by the module
Appendix A	Specifications	Module specifications
Appendix B	Sample Program	PLC-5 example program
Appendix C	Series A and B SPI Modules	Differences between series A and B modules.

Product Compatibility

This module can be used with any 1771 I/O chassis. Communication between the module and the processor is bidirectional. The processor block-transfers output data through the output image table to the module and block-transfers input data from the module through the input image table. The module also requires an area in the data table to store the read block and write block data. I/O image table use is an important factor in module placement and addressing selection.

Related Publications

For a list of publications with information on Allen-Bradley programmable controller products, consult our publication index SD499.

Installing the SPI/C Protocol Interface Module

Chapter 1

Module Operation and Block Summary

Chapter 2

SPI/C Interface Module Command Block Descriptions

Chapter 3

SPI/C Interface Module Status Block Descriptions

Chapter 4

Troubleshooting

Chapter 5

Specifications

Appendix A

Sample Program

Appendix B

Series A and B 1771-SPI Protocol Interface Modules

Appendix C

Chapter 1

Installing the SPI/C Protocol Interface Module

Chapter Objectives

In this section we tell you how to handle your SPI/C protocol interface module, key your I/O chassis, install your module and make your wiring connections.

Initial Handling

Certain precautions must be followed when handling the interface module.

ATTENTION: Remove power from the 1771 I/O chassis backplane and wiring arm before removing or installing the interface module.

- Failure to remove power from the backplane or wiring arm could cause module damage, degradation of performance, or injury.
- Failure to remove power from the backplane could cause injury or equipment damage due to possible unexpected operation.

Electrostatic Discharge Damage

The module contains components which can be damaged by electrostatic discharge. The module is shipped in an electrostatic shielded bag for protection. Follow the handling procedures outlined below to guard against damage to your module.

ATTENTION: Under some conditions, electrostatic discharge can degrade performance or damage the module. Read and observe the following precautions to guard against electrostatic damage.

- Touch a grounded object to discharge yourself before handling the module.
- Do not touch the backplane connector or connector pins.
- If you configure or replace internal components, do not touch other circuit components inside the module. If available, use a static-safe work station.

When not in use, keep the module in its static-free shield bag.

Keying the I/O Chassis

Use the plastic keying bands, shipped with each I/O chassis, to key your I/O slots to accept only this type of module. Place the keying bands on the chassis backplane between:

- 12 and 14
- 16 and 18

Slots on the rear edge of the circuit board are matched to these slots to allow insertion of this type of module. You can key any connector in an I/O chassis to receive this module except for the left-most connector, which is reserved for adapter or processor modules.

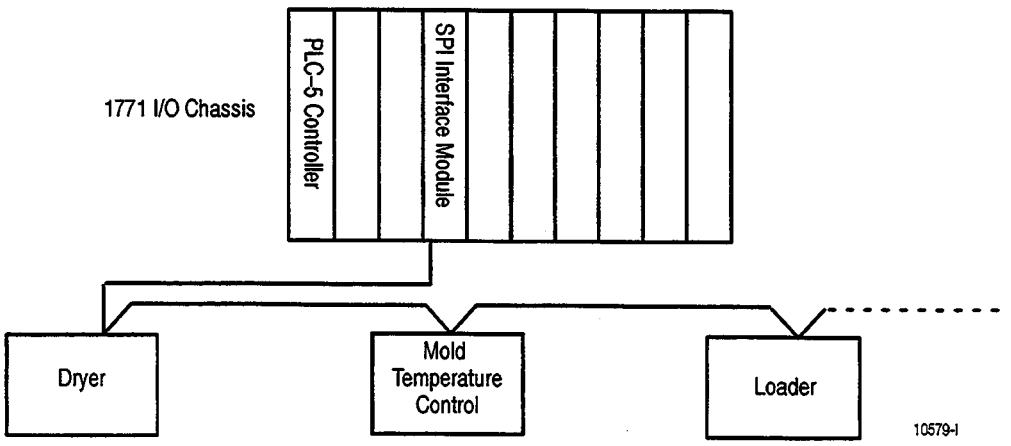
Inserting the Module Into the Chassis

1. Position the module so that the circuit board on the rear of the module lines up with the top and bottom card guides in the chassis.
2. Slide the module into the chassis.
3. Press firmly to seat the module in the chassis backplane connector.
4. Swing the module locking latch down into place over the front edge of the module.

Connecting Wiring to the Interface Module

You make connections to the module through the 1771-WA field wiring arm. The arm pivots on the I/O chassis to connect with terminals on the front of the module and acts as a terminal strip. The wiring arm allows the module to be removed from the chassis without disconnecting wiring.

Figure 1.1
Simplified Block Diagram



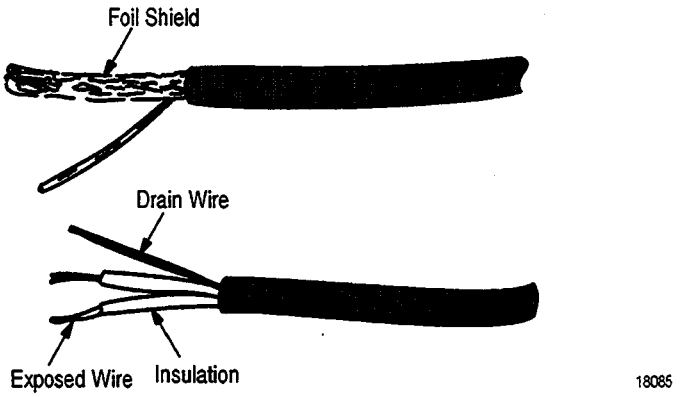
ATTENTION: Remove power from the 1771 I/O chassis backplane and wiring arm before removing or installing the interface module.

1. Swing the wiring arm up into position on the front of the module. The locking tab on the module will secure it into place.

NOTE: Use twinaxial cable (cat. no. 1770-CD) shielded twisted-pair cable with a minimum impedance of 60 ohms and a maximum capacitance of 75pF per meter for the serial link. Do not exceed 4000 ft.

2. Refer to Figure 1.2. Strip 2 inches of the outer insulation from the cable end which will connect to the field wiring arm.

Figure 1.2
Preparing the Connecting Wiring

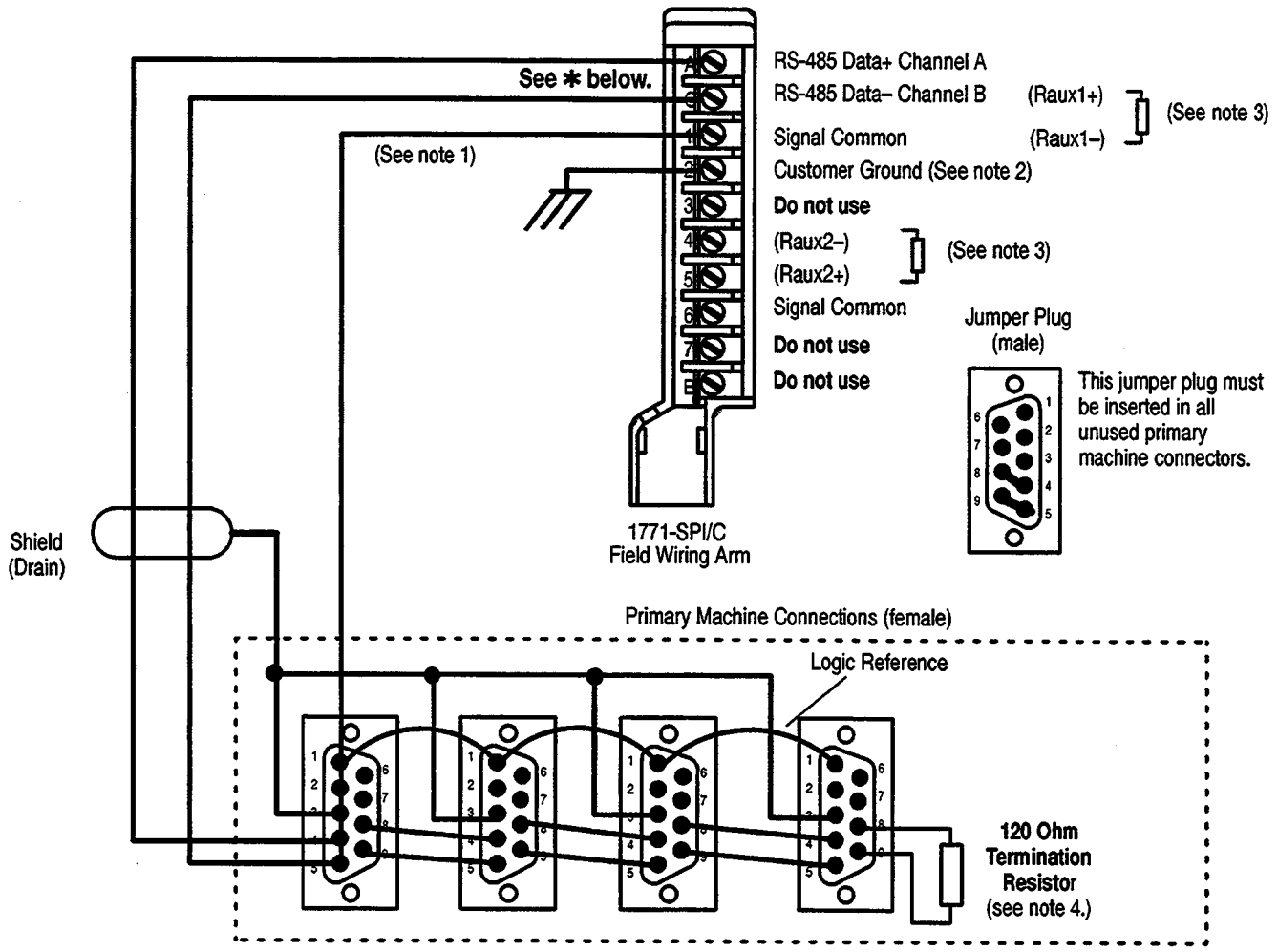


3. Remove exposed foil.

4. Strip 3/8 inch of insulation from the end of each wire.

5. Connect the wires to the field wiring arm as shown in Figure 1.3. (Use the label on the front of the wiring arm to identify your wiring.)

Figure 1.3
Field Wiring Arm Connections for 1771-SPI/C Interface Module



*** The Series C version of the 1771-SPI module has an internal 120 ohm primary termination resistor. If replacing a Series B version, remove any termination resistors now present on the field wiring arm.**

Note 1: Optionally, you may run a wire from terminal 1 of the 1771-SPI wiring arm to pin 1 of the first Primary Machine Connection if recommended by the SPI device manufacturer and if it increases performance. (Grounding this point is optional, depending on performance.)

Note 2: If grounded shield is required, **ground here.** Tie customer ground here for shield use.

Note 3: Raux1 and Raux2 are pull-up and pull-down resistors. Extra resistors can be added as needed. Raux1 and Raux2 **must** be of equal value. Each resistor is in parallel with a 100K ohm resistor. The effective resistance (EFF_R) on the lines will be:

$$EFF_R = \frac{100K \times Raux(1 \text{ or } 2)}{100K + Raux(1 \text{ or } 2)}$$

For example, if Raux1 and Raux2 equal 40K ohms:

$$EFF_R = \frac{100K \times 40K}{100K + 40K} = \frac{4000K}{140K} = 28.57K$$

Note 4: Termination resistors should match the impedance of the cable you are running from device to device. Typically, a 120 ohm resistor on each end is sufficient. If you experience problems with data integrity on your network, experiment with resistors that have a slightly higher impedance.

10580-I

Important: Some peripheral devices may have an on-board resistor that you can connect to provide the second termination resistance. Make sure you only connect two resistors on the SPI serial link.

6. Connect the wiring from the wiring arm to the D-shell bus on the control cabinet.

7. Refer to your SPI Communication Protocol or other equipment installation manuals for specific machine wiring concerns.

Chapter Summary

In this chapter, you learned how to install and wire your SPI/C module.

Chapter 2

Module Operation and Block Summary

Chapter Objectives

In this chapter you will learn about:

- module operation
- command block summary
- module configuration command block
- system status block

How the Module Operates

The 1771-SPI/C module interfaces Allen-Bradley controls to auxiliary equipment using the SPI protocol. The module enables machinery controlled by Allen-Bradley programmable controllers to exchange setpoints and process actuals with devices from other SPI/C compatible vendors.

Acting as a master on the link, the 1771-SPI/C interface module receives generic and defined I/O type commands destined for specific SPI auxiliary devices from a programmable controller by means of block transfer write (BTW) instructions. The module interprets, verifies, and processes the received commands by generating the necessary SPI protocol commands and sends them over the SPI communication link. The SPI communication link uses the RS-485 standard.

The responses from the SPI auxiliary devices are mapped into the appropriate response blocks for return to the programmable controller using block transfer read (BTR) instructions.

Command Block Summary

On power up, the module initializes and prepares the input/output port. The module command blocks (block transfer write) and status blocks (block transfer read) are listed in Tables 2.A and 2.B

Table 2.A
Command (Block Transfer Write) Block Summary

Acronym	Description	Block ID (Device Type)
—	Reserved for future use	00000000
....	....	....
—	Reserved for future use	00011111
MTC	Mold Temperature Controller Command Block	00100000
CHC	Chiller Command Block	00100001

Acronym	Description	Block ID (Device Type)
DRC	Dryer Command Block	00100010
LDC	Loader Command Block	00100011
MPC	Melt Pump Command Block	00100100
AFC	Additive Feeder Command Block	00100101
STC	Self Tuning Temperature Controller	00100110
GPC	General Purpose Temperature Controller	00100111
BVC	Blender Volumetric Controller	00101000
BCW	Blender Continuous Weigh Controller	00101001
BBW	Blender Batch Weigh Controller	00101010
—	Optional Custom Configuration	00101011
....	....	....
—	Optional Custom Configuration	11111110
MCC	Module Configuration Command Block	11111111

Table 2.B
Status (Block Transfer Read) Block Summary

Acronym	Description	Block ID (Device Type)
—	Reserved for future use	00000000
....	....	....
—	Reserved for future use	00011111
MTS	Mold Temperature Controller Status Block	00100000
CHS	Chiller Status Block	00100001
DRS	Dryer Status Block	00100010
LDS	Loader Status Block	00100011
MPS	Melt Pump Status Block	00100100
AFS	Additive Feeder Status Block	00100101
STS	Self Tuning Temperature Controller Status	00100110
GPS	General Purpose Temperature Controller Status	00100111
BVS	Blender Volumetric Controller Status	00101000
BCS	Blender Continuous Weigh Controller Status	00101001

Acronym	Description	Block ID (Device Type)
BBS	Blender Batch Weigh Controller Status	00101010
—	Optional Custom Configuration	00101011
....	....	....
—	Optional Custom Configuration	11111110
SYS	System Status Block	11111111

Module Configuration Command Block (MCC)

The command block (MCC) is required on power-up to establish module configuration, communication priority and baud rate, and data format.

Important: You must send a valid BTW from the programmable controller to the module after powerup in order to prepare the module for use. This can be an MCC header block (4 words) or a complete MCC configuration command. Until the 1771-SPI/C module receives its first valid copy of the command block (or its first complete set if more than one MCC is required), the module will not access the SPI communication link; it will not accept any command blocks; and will default to a response of the system status block (SYS) when servicing all block transfer read requests from the programmable controller.

Figure 2.1
Sample Communication Block Diagram

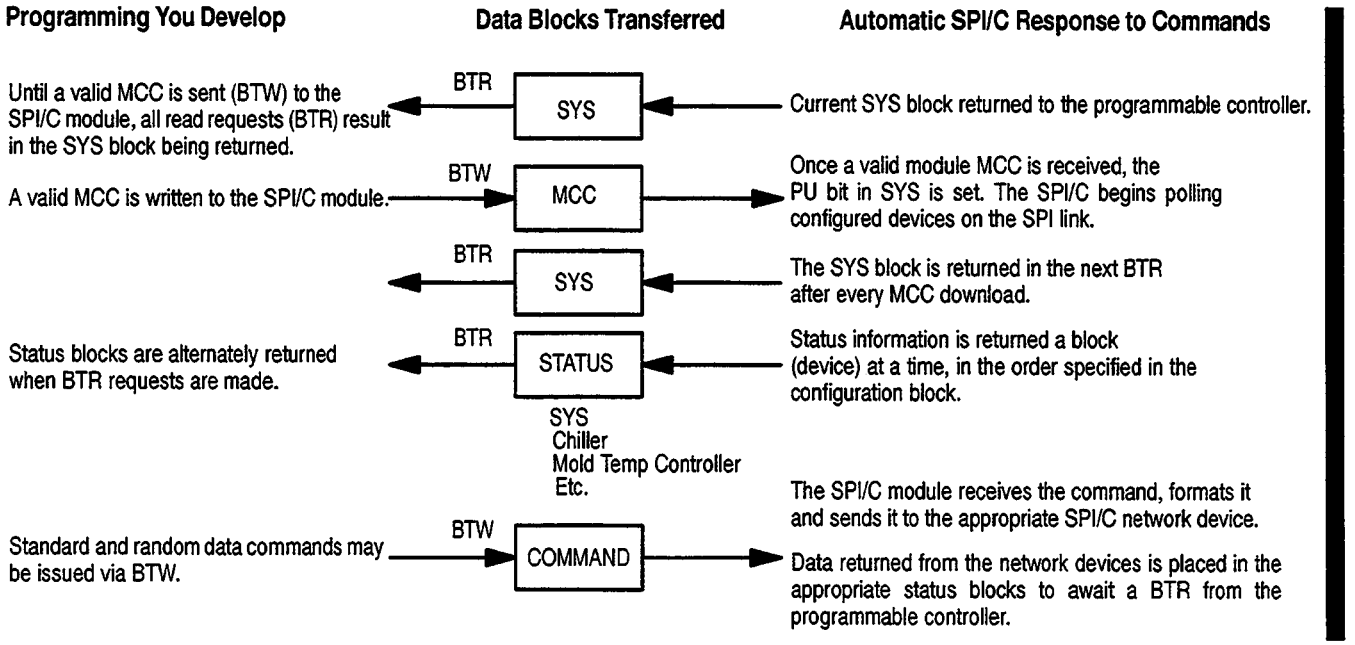


Figure 2.2
Module Configuration Block (MCC)

Word \ Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	EI	Baud Select			AI	NF		DF	Block Identification							
2	0				0				Page Number				Total Pages			
3	0				0				0				0			
4	0				0				0				0			
Connected Stations (Listed by BTR reporting priority)																
5	DS	CS	PM	Reserved					Device Type (for first queued BTR)							
6	Zone Address								Station Address							
7	DS	CS	PM	Reserved					Device Type (for 2nd queued BTR)							
8	Zone Address								Station Address							
⇓ ⇓ ⇓ ⇓																
63	DS	CS	PM	Reserved					Device Type (for 30th queued BTR)							
64	Zone Address								Station Address							

Word/Bit Definitions

Word 1

Word 1 contains the EI command executed alarm inhibit, the baud selection bits, the AI command not supported alarm inhibit bit, the NF numeric format bit, the DF data format bits, and device identification bits.

The **EI alarm inhibit bit** (bit 15) allows the user to optionally inhibit the module from reporting "command not executed" errors from all stations during link status queue reporting.

The **baud selection bits** (12-14) identify the selected baud rate of the command. The possible baud selections are shown in Table 2.C.

Table 2.C
Baud Selection Bit Settings

Baud	Bit 14	Bit 13	Bit 12
1200	0	0	0
2400	0	0	1
4800	0	1	0
9600	0	1	1
19200	1	0	0

The **AI** alarm inhibit bit (bit 11) allows the user to optionally inhibit the module from reporting the "command not supported" error from all stations during link status queue reporting.

Note: If more than one MCC page is required for module configuration, the module will respond only to the EI and AI bits in MCC page 1.

The **NF** numeric formats bits (bits 9-10) allow the selection of one of 3 available numeric formats that the 1771-SPI/C can send to or receive from devices on the SPI link. The data formats available are shown in Table 2.D.

Table 2.D
Numeric Formats Bit Settings

Bit 10	Bit 09	Format Selected	Range
0	0	IEEE Real Four Floating Point Format (R4F)	$\pm 1.1754944^{e-38}$ to $\pm 3.4028237^{e+38}$
0	1	Two's Complement Binary	0 to ±32767 (TCB)
1	0	BCD	0 to 9999 (BCD)

The **DF** data format bit (bit 8) allows the selection of data formats for address, zone address and device identification entry. The 2 data formats available are: binary coded decimal (BCD) with a range of 0-9999, and 2's complementary binary (TCB), with a range of 0 to ±32767.

Note: If more than one MCC page is required for module configuration, the module will respond only to the DF bit in MCC page 1.

The **device identification** (bits 0-7) identifies this as the MCC block.

Word 2
Word 2 contains the page number and total pages bits.

The **page number** bits (bits 4-7) allows multiple sends of this block if the BTR service priority queue requires more than 60 entries. The value of 0 in this nibble (4 bits) indicates page 1.

The **total pages** bits (bits 0-3) informs the module of how many MCC copies to expect before it can consider itself fully configured and can begin returning status blocks in the established priority order. A value of 0 in this nibble indicates that only one page of MCC will be required for complete configuration.

Important: If more than 1 MCC page is required to fully configure the 1771-SPI/C (a value greater than 0), the pages must be downloaded to the module in sequential order beginning with 0 and ending with the page where the **page no** nibble is equal to the **tot pages** nibble. Otherwise, the module will detect an out of sequence condition and return an error code.

If more than one MCC page is required to fully configure the module, each sequential numbered page must be received and successfully error-checked before the module will accept the next page.

Words 3 and 4
Words 3 and 4 are not used.

Words 5
Word 5 identifies the SPI defined I/O device type, protected mode (PM), configuration select (CS), and the enable/disable bit (DS) for that station.

The **DS** device select bit (bit 15) associated with each station allows the end user to selectively enable or disable the reports of that station's status block. If a station is disabled, the module will remove that station's status block from the service priority queue.

Judicious use of the **DS** bit can allow you to shorten the block transfer read reporting queue by downloading a new MCC with some of the **DS** bits set. This way you can more closely monitor critical stations on a heavily loaded SPI communication link.

The **CS** configuration select bit (bit 14) associated with each station allows the end user to inform the 1771-SPI/C that the device identification and its associated command pairs is a custom configuration block (chapter 3), and is stored in the 1771-SPI/C configuration random access memory (RAM).

The **PM** bit (bit 13) will tells the module what type of machine control to use; either machine mode or protected machine mode. Protected machine mode allows you to provide a means of safety using machine on/off action with the use of an alarm acknowledge. Refer to your auxiliary equipment manufacturer for the best mode to use for your application.

The **device type** (bits 0-7) allows you to inform the module of the type of SPI supported device at that location, as well as the block identification associated with all BTW and BTR data passed between the module and the programmable controller.

Word 6
Word 6 identifies the station address and the zone address for the first queued block transfer read (BTR).

The **station address** (bits 0-7) identifies the location of the device on the communication link. The module will ignore this byte if the device type is 11111111 (SYS BLOCK).

The **zone address** (bits 8-15) is required by devices with multiple zones and is used in association with the **station address**.

Important: If the device type does not require a zone address this byte should be zero.

Important: The 1771-SPI/C module will not accept any SPI defined I/O type command blocks unless the device type, station address and zone address match at least one of the BTR queue entries in the MCCs. This does not apply with RDC type commands (chapter 3).

Words 7 thru 64

Words 7 thru 64 identify the following 1 thru 30 queued BTRs.

Figure 2.3
Module Configuration Command Block Word/Bit Definitions

Word	Bits	Description	Data	Range
1	0-7	Block Identification		11111111
	8	Data Format (DF)	Bit	0 = TCB 1 = BCD
	9-10	NF	Bit	00 = IEEE REAL FOUR floating point format 01 = Integer format (TCB) 10 = BCD format
	11	AI	Bit	0 = "Command not supported" errors received from all stations will be reported in the status block returned to the host processor 1 = "Command not supported" errors received from all stations will be discarded by the module and will not be reported in the status block
	12-14	Baud Select	Bit	Bits 12-14. Refer to Table 2.C
	15	EI	Bit	0 = "Command not executed" errors received from all stations will be reported in the status block returned to the host processor. 1 = "Command not executed" errors received from all stations will be discarded by the module and will not be reported in the status block returned to the host processor.
2	0-3	Total Pages	BCD TCB	0 to 9 0 to 9
	4-7	Page Number	BCD TCB	0 to 9 0 to 9
	8-15	Not used		
3		Not used		
4		Not used		

Word	Bits	Description	Data	Range
5	0-7	Device Type		00100000 to 11111110 or 11111111
	8-12	Reserved		
	13	PM	Bit	0 = Do not use machine protected mode 1 = Use machine protected mode
	14	CS	Bit	0 = No action 1 = Use command pairs in configuration store
	15	DS	Bit	0 = BTR reporting enabled 1 = BTR reporting disabled
6	0-7	Station Address	BCD TCB	32-99 BCD 20-FF (32-255) TCB
	8-15	Zone Address	BCD TCB	48-99 BCD 30-FF (48-255) TCB

System Status Block (SYS)

The system status block is returned on power-up with the **PU** (power up) bit reset (0) to indicate that the module is awaiting its module configuration command block. As long as the module remains unconfigured, this SYS block will be returned with each BTR request regardless of the device type or station address specified. As soon as the module receives a valid copy of the required MCC, the SYS block will be returned one final time with the PU bit set (1) before the module begins to respond to BTR requests in its newly established priority order.

After the module begins to respond to BTR requests in priority order, the system status block is returned each time it is queued in established priority order.

Important: If you want the SYS block returned to the 1771-SPI/C module after power up, the SPI/B block identification must entered in the MCC.

Figure 2.4
System Status Block (SYS)

Word \ Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	PU	Baud Select			AI	NF		DF	Block Identification							
2	Device Type								Page Number				Total Pages			
3	Diagnostic Word															
4	Zone Address								Station Address							

Word \ Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
SPI Link Communications Status Bits (OK Bits)																
5	Stations 47 - 32															
6	Stations 63 - 48															
	: : :															
18	Stations 255 - 240															

Word 1
Word 1 contains the power up bit (PU), baud select bits, AI bit, NF numeric format bits, DF data format bit, and block identification bits (bits 0-7).

The **power up** (PU) bit (bit 15) indicates that the module has received its required MCC and is fully configured.

The **baud selection bits** (12-14) identify the selected baud rate of the command. The possible baud selections are shown in Table 2.C.

The **AI** "mirror" bit (bit 11) indicates the monitored state of the AI received in page 0 of the last valid MCC.

The **NF** numeric formats bits (bits 9-10) echo the selection of one of 3 available numeric formats that the 1771-SPI/C uses to send or receive data on the SPI link. The data formats available are shown in Table 2.D.

The **DF** data format bit (bit 8) shows the selection of data formats for address, zone address and device identification entry. The 2 data formats available are: binary coded decimal (BCD) with a range of 0-9999, and 2's complementary binary (TCB), with a range of ±32767.

Note: If the module is configured for BCD data format, and a value returned from the SPI communication link is negative or greater than 9999, a value of zero (0) will be returned to the controller.

If the module is configured for TCB data format, and a value returned from the SPI communication link is greater than ±32767, a value of zero (0) will be returned to the controller.

The **block identification** bits (bits 0-7) identifies this as the SYS block.

Word 2
Word 2 contains the device type, page number and total pages.

The device type (bits 8-15) indicate the device type associated with any MCC diagnostic error codes returned in word 3.

The **page number** nibble (bits 4-7) indicates the MCC page number that was just processed.

The **total pages** nibble (bits 0-3) indicates how many MCC pages the module is expecting before it considers itself fully configured.

Word 3

Word 3 is the **diagnostic word** reserved for use by the module to return MCC diagnostic error codes (as defined in chapter 6) to the programmable controller.

Word 4

Word 4 contains the station address and the zone address of the reporting device.

The **zone address** (bits 8-15) indicates the zone address associated with any MCC diagnostic error codes returned in word 3.

The **station address** (bits 0-7) indicates the station address associated with any MCC diagnostic error codes returned in word 3.

Words 5 through 18

Words 5 through 18 contain the SPI link communication status bits (OK). OK bits indicate that the module has established SPI/C link communication with the station indicated by the bit position in the 14 by 16 bit map.

Figure 2.5
System Status Block Word/Bit Definitions

Word	Bits	Description	Data	Range
1	0-7	Block Identification		11111111 for SYS status
	8	Data Format (DF)	Bit	0 = TCB 1 = BCD
	9-10	Numeric Format (NF)	Bit	00 = IEEE REAL FOUR format 01 = Integer format 10 = BCD format
	11	AI	Bit	0 = "Command not supported" errors received from all stations will be reported in the device status block returned to the programmable controller 1 = "Command not supported" errors received from all stations will be discarded by the module and will not be reported in the device status block
	12-14	Baud Rate	Bit	Refer to Table 2.C
	15	Power Up (PU)	Bit	0 = Need MCCs 1 = All MCCs on board

Word	Bits	Description	Data	Range
2	0-3	Total Pages	BCD or TCB	0-9 BCD or TCB
	4-7	Page Number	BCD or TCB	0-9 BCD or TCB
	8-15	Device Type		00100000 to 11111111
3		Diagnostic Word	BCD or TCB	9000 to 9999 BCD or TCB
4	0-7	Station Address	BCD or TCB	32-99 BCD 32-255 TCB
	8-15	Zone Address		48 to 99 BCD 30 to FF (48 to 255) TCB
5 thru 18		SPI Link (OK)	Bit	0 = No communications on SPI link 1 = Communications okay

Chapter Summary

In this chapter you learned about module operation, the commands used by the module, and a detailed description of the module configuration command block and the system status block.

Chapter 3

SPI/C Interface Module Command Block Descriptions

Chapter Objectives

In this chapter you will learn about the SPI/C module command blocks received by the module from the programmable controller. The SPI/C command blocks you will learn about are:

Standard Data Configuration

When the module receives an SPI defined I/O command block with the DC bit = 000 (standard data), the module's interpretation of the trailing data in the command block is dependent upon the device ID received in the command block header. The device IDs are defined below.

All SPI defined I/O command blocks use a standard 4 word block header. This header must be included as the first 4 words in any standard data configuration command block BTW from the programmable controller to the 1771–SPI/C module. This header is described below.

Figure 3.1
Standard Data Configuration Command Block (MTC)

Word \ Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	0					DC			Device Identification							
2	Zone Address								Station Address							
3	0					0			0				0			
4	0					0			0				0			

Word 1

Word 1 contains the **DC** bits and the **block identification** of the associated device.

The **DC** bits (bits 8–10) inform the module as to the layout and configuration of the trailing data in words 5 through 64 of the command block. When DC = 00, the module relates the data as standard configuration device data and uses SPI devices in the module erasable programmable read only memory (EPROM) to interpret.

The **block identification** (bits 0–7) informs the module of the specific device associated with the trailing data in words 5 through 64 of the command block.

Word 2

Word 2 identifies the station address and the zone address.

The **station address** (bits 0–7) informs the module of the logical station assignment of the device that will receive any of the appropriate data in the command block.

The **zone address** (bits 8–15) informs the module of logical zone assignment of the device that will receive the trailing words 5 thru 64 of the device specific ID. If this value is 0, it will be ignored. If it is not 0, it will be used in the SPI establishment string.

Words 3 and 4 are not used.

Figure 3.2
Standard Data Configuration Command Block Word/Bit Definitions

Word	Description	Data	Range
1	Block Identification	Bits 0–7	00100000 to 11111110
	DC	Bits 8–10	000 = Standard data configuration
	Not used	Bits 11–15	
2	Station Address	Bits 0–7 BCD or TCB	32 to 99 BCD 20 to FF (32 to 255) TCB
	Zone Address	Bits 8–15 BCD or TCB	48 to 99 BCD 30 to FF (48 to 255) TCB
3	Not used		
4	Not used		

Standard Mold Temperature Controller Command Block (MTC)

Figure 3.3
Standard Mold Temperature Controller Command Block (MTC)

Word \ Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	0				0	DC			Device Identification							
2	Zone Address								Station Address							
3	0				0				0				0			
4	0				0				0				0			
5	Machine Command Word (Bit Map)															
6	Process Temperature Setpoint (F)															
7																
8	High Temperature Deviation Alarm Limit (F)															
9																
10	Low Temperature Deviation Alarm Limit (F)															
11																
12	Controller Integrity Command (ASCII)															
13																

Figure 3.4
Standard Mold Temperature Controller Command Block Word/Bit Definitions

Word	Description	Data	Range
1	Block Identification	Bits 0–7	00100000
	DC	Bits 8–10	000 = Standard data configuration
	Not used	Bits 11–15	
2	Station Address	Bits 0–7 BCD or TCB	32 BCD 20 (32) TCB
	Zone Address	Bits 8–15 BCD or TCB	48 to 99 BCD 30 to FF (48 to 255) TCB
3	Not used		
4	Not used		

Word	Description	Data	Range
If the PM bit in the MCC is 0, then word 5 =			
5	Machine Run Command	Bit 0	Bit 0 = 0 – Stop Machine Bit 0 = 1 – Run Machine
	Alarm Acknowledge	Bit 1	Bit 1 = 0 – Normal Bit 1 = 1 – Acknowledge
	Reserved	Bits 2–15	
If the PM bit in the MCC is 1, then word 5 =			
5	Machine Run Command	Bit 0	Bit 0 = 0 – Stop Machine Bit 0 = 1 – Run Machine
	On/Off	Bit 1	Bit 1 = 0 – Machine on/off not allowed Bit 1 = 1 – Machine on/off allowed
	Alarm Acknowledge	Bit 2	Bit 2 = 0 – Normal Bit 2 = 1 – Acknowledge
	Reserved	Bits 3–15	
6, 7	Process Temperature Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
8, 9	High Temp Deviation Alarm Limit	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
10, 11	Low Temp Deviation Alarm Limit	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
12, 13	Controller Integrity Command	ASCII	ASCII data set

Standard Chiller Command Block (CHC)

Figure 3.5
Standard Chiller Command Block (CHC)

Word \ Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	0					DC			Device Identification							
2	Zone Address								Station Address							
3	0					0			0				0			
4	0					0			0				0			
5	Machine Command Word (Bit Map)															
6	Process Temperature Setpoint (F)															
7																
8	High Temperature Deviation Alarm Limit (F)															
9																
10	Low Temperature Deviation Alarm Limit (F)															
11																
12	Controller Integrity Command (ASCII)															
13																

Figure 3.6
Standard Chiller Command Block Word/Bit Definitions

Word	Description	Data	Range
1	Block Identification	Bits 0–7	00100001
	DC	Bits 8–10	000 = Standard data configuration
	Not used	Bits 11–15	
2	Station Address	Bits 0–7 BCD or TCB	32 to 99 BCD 20 to FF (32 to 255) TCB
	Zone Address	Bits 8–15 BCD or TCB	48 to 99 BCD 30 to FF (48 to 255) TCB
3	Not used		
4	Not used		

Word	Description	Data	Range
If the PM bit in the MCC is 0, then word 5 =			
5	Machine Run Command	Bit 0	Bit 0 = 0 – Stop Machine Bit 0 = 1 – Run Machine
	Alarm Acknowledge	Bit 1	Bit 1 = 0 – Normal Bit 1 = 1 – Acknowledge
	Reserved	Bits 2–15	
If the PM bit in the MCC is 1, then word 5 =			
5	Machine Run Command	Bit 0	Bit 0 = 0 – Stop Machine Bit 0 = 1 – Run Machine
	On/Off	Bit 1	Bit 1 = 0 – Machine on/off not allowed Bit 1 = 1 – Machine on/off allowed
	Alarm Acknowledge	Bit 2	Bit 2 = 0 – Normal Bit 2 = 1 – Acknowledge
	Reserved	Bits 3–15	
6, 7	Process Temperature Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
8, 9	High Temp Deviation Alarm Limit	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
10, 11	Low Temp Deviation Alarm Limit	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
12, 13	Controller Integrity Command	ASCII	ASCII data set

Standard Dryer Command Block (DRC)

Figure 3.7
Standard Dryer Command Block (DRC)

Word \ Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	0					DC			Device Identification							
2	Zone Address								Station Address							
3	0					0			0				0			
4	0					0			0				0			
5	Machine Command Word (Bit Map)															
6	Process Temperature Setpoint (F)															
7																
8	High Temperature Deviation Alarm Limit (F)															
9																
10	Low Temperature Deviation Alarm Limit (F)															
11																
12	High Dewpoint Alarm Setpoint (F)															
13																
14	Controller Integrity Command (ASCII)															
15																

Figure 3.8
Standard Dryer Command Block Word/Bit Definitions

Word	Description	Data	Range
1	Block Identification	Bits 0–7	00100010
	DC	Bits 8–10	000 = Standard data configuration
	Not used	Bits 11–15	
2	Station Address	Bits 0–7 BCD or TCB	32 to 99 BCD 20 to FF (32 to 255) TCB
	Zone Address	Bits 8–15 BCD or TCB	48 to 99 BCD 30 to FF (48 to 255) TCB
3	Not used		
4	Not used		

Word	Description	Data	Range
If the PM bit in the MCC is 0, then word 5 =			
5	Machine Run Command	Bit 0	Bit 0 = 0 – Stop Machine Bit 0 = 1 – Run Machine
	Alarm Acknowledge	Bit 1	Bit 1 = 0 – Normal Bit 1 = 1 – Acknowledge
	Reserved	Bits 2–15	
If the PM bit in the MCC is 1, then word 5 =			
5	Machine Run Command	Bit 0	Bit 0 = 0 – Stop Machine Bit 0 = 1 – Run Machine
	On/Off	Bit 1	Bit 1 = 0 – Machine on/off not allowed Bit 1 = 1 – Machine on/off allowed
	Alarm Acknowledge	Bit 2	Bit 2 = 0 – Normal Bit 2 = 1 – Acknowledge
	Reserved	Bits 3–15	
6, 7	Process Temperature Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
8, 9	High Temp Deviation Alarm Limit	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
10, 11	Low Temp Deviation Alarm Limit	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
12, 13	High Dewpoint Alarm Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
14, 15	Controller Integrity Command	ASCII	ASCII data set

Standard Loader Command Block (LDC)

Figure 3.9
Standard Loader Command Block (LDC)

Word \ Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	0					DC			Device Identification							
2	Zone Address								Station Address							
3	0					0			0				0			
4	0					0			0				0			
5	Machine Command Word (Bit Map)															
6	Load Time A Setpoint (sec)															
7																
8	Load Time B Setpoint (sec)															
9																
10	Controller Integrity Command (ASCII)															
11																

Figure 3.10
Standard Loader Command Block Word/Bit Definitions

Word	Description	Data	Range
1	Block Identification	Bits 0–7	00100011
	DC	Bits 8–10	000 = Standard data configuration
	Not used	Bits 11–15	
2	Station Address	Bits 0–7 BCD or TCB	32 to 99 BCD 20 to FF (32 to 255) TCB
	Zone Address	Bits 8–15 BCD or TCB	48 to 99 BCD 30 to FF (48 to 255) TCB
3	Not used		
4	Not used		

Word	Description	Data	Range
If the PM bit in the MCC is 0, then word 5 =			
5	Machine Run Command	Bit 0	Bit 0 = 0 – Stop Machine Bit 0 = 1 – Run Machine
	Alarm Acknowledge	Bit 1	Bit 1 = 0 – Normal Bit 1 = 1 – Acknowledge
	Reserved	Bits 2–15	
If the PM bit in the MCC is 1, then word 5 =			
5	Machine Run Command	Bit 0	Bit 0 = 0 – Stop Machine Bit 0 = 1 – Run Machine
	On/Off	Bit 1	Bit 1 = 0 – Machine on/off not allowed Bit 1 = 1 – Machine on/off allowed
	Alarm Acknowledge	Bit 2	Bit 2 = 0 – Normal Bit 2 = 1 – Acknowledge
	Reserved	Bits 3–15	
6, 7	Load Time A Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
8, 9	Load Time B Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
10, 11	Controller Integrity Command	ASCII	ASCII data set

Standard Melt Pump Command Block (MPC)

Figure 3.11
Standard Melt Pump Command Block (MPC)

Word \ Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	0					DC			Device Identification							
2	Zone Address								Station Address							
3	0				0				0				0			
4	0				0				0				0			
5	Machine Command Word (Bit Map)															
6	RPM Setpoint (RPM)															
7																
8	High RPM Alarm Deviation (RPM)															
9																
10	Low RPM Alarm Deviation (RPM)															
11																
12	Inlet Pressure Setpoint (PSI)															
13																
14	High Inlet Pressure Alarm Deviation (PSI)															
15																
16	Low Inlet Pressure Alarm Deviation (PSI)															
17																
18	Controller Integrity Command (ASCII)															
19																

Figure 3.12
Standard Melt Pump Command Block Word/Bit Definitions

Word	Description	Data	Range
1	Block Identification	Bits 0–7	00100100
	DC	Bits 8–10	000 = Standard data configuration
	Not used	Bits 11–15	

Word	Description	Data	Range
2	Station Address	Bits 0–7 BCD or TCB	32 to 99 BCD 20 to FF (32 to 255) TCB
	Zone Address	Bits 8–15 BCD or TCB	48 to 99 BCD 30 to FF (48 to 255) TCB
3	Not used		
4	Not used		
	If the PM bit in the MCC is 0, then word 5 =		
5	Machine Run Command	Bit 0	Bit 0 = 0 – Stop Machine Bit 0 = 1 – Run Machine
	Alarm Acknowledge	Bit 1	Bit 1 = 0 – Normal Bit 1 = 1 – Acknowledge
	Reserved	Bits 2–15	
	If the PM bit in the MCC is 1, then word 5 =		
5	Machine Run Command	Bit 0	Bit 0 = 0 – Stop Machine Bit 0 = 1 – Run Machine
	On/Off	Bit 1	Bit 1 = 0 – Machine on/off not allowed Bit 1 = 1 – Machine on/off allowed
	Alarm Acknowledge	Bit 2	Bit 2 = 0 – Normal Bit 2 = 1 – Acknowledge
	Reserved	Bits 3–15	
6, 7	RPM Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
8, 9	High RPM Alarm Deviation	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
10, 11	Low RPM Alarm Deviation	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
12, 13	Inlet Pressure Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
14, 15	High Inlet Pressure Alarm Deviation	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
16, 17	Low Inlet Pressure Alarm Deviation	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
18, 19	Controller Integrity Command	ASCII	ASCII data set

Standard Additive Feeder Command Block (AFC)

Figure 3.13
Standard Additive Feeder Command Block (AFC)

Word \ Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	0					DC			Device Identification							
2	Zone Address								Station Address							
3	0					0			0				0			
4	0					0			0				0			
5	Machine Command Word (Bit Map)															
6	Additive Setpoint (VS)															
7																
8	Reference Setpoint (VS)															
9																
10	Calibration Setpoint (VS)															
11																
12	Controller Integrity Command (ASCII)															
13																

Note: VS = Vendor Specific

Figure 3.14
Standard Additive Feeder Command Block Word/Bit Definitions

Word	Description	Data	Range
1	Block Identification	Bits 0–7	00100101
	DC	Bits 8–10	000 = Standard data configuration
	Not used	Bits 11–15	
2	Station Address	Bits 0–7 BCD or TCB	32 to 99 BCD 20 to FF (32 to 255) TCB
	Zone Address	Bits 8–15 BCD or TCB	48 to 99 BCD 20 to FF (32 to 255) TCB
3	Not used		
4	Not used		

Word	Description	Data	Range
If the PM bit in the MCC is 0, then word 5 =			
5	Machine Run Command	Bit 0	Bit 0 = 0 – Stop Machine Bit 0 = 1 – Run Machine
	Alarm Acknowledge	Bit 1	Bit 1 = 0 – Normal Bit 1 = 1 – Acknowledge
	Reserved	Bits 2–15	
If the PM bit in the MCC is 1, then word 5 =			
5	Machine Run Command	Bit 0	Bit 0 = 0 – Stop Machine Bit 0 = 1 – Run Machine
	On/Off	Bit 1	Bit 1 = 0 – Machine on/off not allowed Bit 1 = 1 – Machine on/off allowed
	Alarm Acknowledge	Bit 2	Bit 2 = 0 – Normal Bit 2 = 1 – Acknowledge
	Reserved	Bits 3–15	
6, 7	Additive Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
8, 9	Reference Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
10, 11	Calibration Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
12, 13	Controller Integrity Command	ASCII	ASCII data set

Self Tuning General Purpose Temperature Controller Command Block (STC)

Figure 3.15
Self Tuning General Purpose Temperature Controller Command Block (STC)

Word \ Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	0					DC			Device Identification							
2	Zone Address								Station Address							
3	0					0			0				0			
4	0					0			0				0			
5	Autotune Controls (Bit Map)															
6	Open/Closed Loop Control (Bit Map)															
7	Soft Start Sequence (Bit Map)															
8	Alarm 1 Reset (Bit Map)															
9	Alarm 2 Reset (Bit Map)															
10	Alarm 1 Control (Bit Map)															
11	Alarm 2 Control (Bit Map)															
12	Zero Reset Term (Bit Map)															
13	Process Setpoint 1 (F)															
14																
15	Process Setpoint 2 (F)															
16																
17	Cycle Time 1 (S)															
18																
19	Cycle Time 2 (S)															
20																
21	Alarm 1 Setpoint (F)															
22																
23	Alarm 2 Setpoint (F)															
24																
25	Alarm Hysterisis (F)															
26																
27	Autotune Proportional Band 1 (F)															

Word | Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
28																
29	Autotune Proportional Band 2 (F)															
30																
31	Autotune Reset 1 (S)															
32																
33	Autotune Reset 2 (S)															
34																
35	Autotune Rate 1 (S)															
36																
37	Autotune Rate 2 (S)															
38																
39	Heat/Cool Ratio (%)															
40																
41	Manual Percent Output (%)															
42																
43	Proportional Band 2 (F)															
44																
45	Controller Integrity Command (ASCII)															
46																

Figure 3.16
Self Tuning General Purpose Temperature Controller Command Block Word/Bit Definitions

Word	Description	Data	Range
1	Block Identification	Bits 0–7	00100110
	DC	Bits 8–10	000 = Standard data configuration
	Not used	Bits 11–15	
2	Station Address	Bits 0–7 BCD or TCB	32 to 99 BCD 20 to FF (32 to 255) TCB
	Zone Address	Bits 8–15 BCD or TCB	48 to 99 BCD 30 to FF (48 to 255) TCB
3	Not used		

Word	Description	Data	Range
4	Not used		
5	Autotune Controls	Bit 0	Bit 0 = 0 – No action Bit 0 = 1 – Clear and start tuning
	Reserved	Bits 1–15	
6	Control Mode	Bit 0	Bit 0 = 0 – Open loop control (manual) Bit 0 = 1 – Closed loop control (auto)
	Reserved	Bits 1–15	
7	Soft Start	Bit 0	Bit 0 = 0 – Disable soft start Bit 0 = 1 – Enable soft start
	Reserved	Bits 1–15	
8	Alarm 1 Clear	Bit 0	Bit 0 = 0 – No action Bit 0 = 1 – Clear alarm
	Reserved	Bits 1–15	
9	Alarm 2 Clear	Bit 0	Bit 0 = 0 – No action Bit 0 = 1 – Clear alarm
	Reserved	Bits 1–15	
10	Low Hold	Bit 0	Bit 0 = 0 – Disable low hold alarm function Bit 0 = 1 – Enable low hold alarm function
	Latching	Bit 1	Bit 1 = 0 – Disable latching alarm Bit 1 = 1 – Enable latching alarm
	NO/NC	Bit 2	Bit 2 = 0 – Normally open Bit 2 = 1 – Normally closed
	Alarm Type	Bits 3–5	001 – Process low alarm 010 – Process high alarm 011 – Deviation low alarm 100 – Deviation high alarm 101 – Deviation band alarm
	Reserved	Bits 6–15	
11	Low Hold	Bit 0	Bit 0 = 0 – Disable low hold alarm function Bit 0 = 1 – Enable low hold alarm function
	Latching	Bit 1	Bit 1 = 0 – Disable latching alarm Bit 1 = 1 – Enable latching alarm
	NO/NC	Bit 2	Bit 2 = 0 – Normally open Bit 2 = 1 – Normally closed
	Alarm Type	Bits 3–5	001 – Process low alarm 010 – Process high alarm 011 – Deviation low alarm 100 – Deviation high alarm 101 – Deviation band alarm
	Reserved	Bits 6–15	

Word	Description	Data	Range
12	Zero Reset Term	Bit 0	Bit 0 = 0 – No action Bit 0 = 1 – Zero term
	Reserved	Bits 1–15	
13, 14	Process Setpoint 1	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
15, 16	Process Setpoint 2	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
17, 18	Cycle Time 1	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
19, 20	Cycle Time 2	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
21, 22	Alarm Setpoint 1	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
23, 24	Alarm Setpoint 2	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
25, 26	Alarm Hysterisis	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
27, 28	Autotune Proportional Band 1	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
29, 30	Autotune Proportional Band 2	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
31, 32	Autotune Reset 1	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
33, 34	Autotune Reset 2	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
35, 36	Autotune Rate 1	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
37, 38	Autotune Rate 2	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
39, 40	Heat/Cool Ratio	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$

Word	Description	Data	Range
41, 42	Manual Percent Output	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
43, 44	Proportional Band 2	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
45, 46	Controller Integrity Command	ASCII	ASCII data set

General Purpose Temperature Controller Command Block (GPC)

Figure 3.17
General Purpose Temperature Controller Command Block (GPC)

Word \ Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	0					DC			Device Identification							
2	Zone Address								Station Address							
3	0					0			0				0			
4	0					0			0				0			
5	Autotune Controls (Bit Map)															
6	Open/Closed Loop Control (Bit Map)															
7	Soft Start Sequence (Bit Map)															
8	Alarm 1 Reset (Bit Map)															
9	Alarm 2 Reset (Bit Map)															
10	Alarm 1 Control (Bit Map)															
11	Alarm 2 Control (Bit Map)															
12	Zero Reset Term (Bit Map)															
13	Process Setpoint 1 (F)															
14																
15	Process Setpoint 2 (F)															
16																
17	Cycle Time 1 (S)															
18																
19	Cycle Time 2 (S)															
20																
21	Alarm 1 Setpoint (F)															
22																
23	Alarm 2 Setpoint (F)															
24																
25	Alarm Hysterisis (F)															
26																
27	Autotune Proportional Band 1 (F)															
28																

Word | Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
29	Autotune Proportional Band 2 (F)															
30																
31	Autotune Reset 1 (S)															
32																
33	Autotune Reset 2 (S)															
34																
35	Autotune Rate 1 (S)															
36																
37	Autotune Rate 2 (S)															
38																
39	Heat/Cool Ratio (%)															
40																
41	Manual Percent Output (%)															
42																
43	Proportional Band 1 (F)															
44																
45	Proportional Band 2 (F)															
46																
47	Reset 1 (S)															
48																
49	Rate 1 (S)															
50																
51	Controller Integrity Command (ASCII)															
52																

Figure 3.18
General Purpose Temperature Controller Command Block Word/Bit Definitions

Word	Description	Data	Range
1	Block Identification	Bits 0–7	00100111
	DC	Bits 8–10	000 = Standard data configuration
	Not used	Bits 11–15	
2	Station Address	Bits 0–7 BCD or TCB	32 to 99 BCD 20 to FF (32 to 255) TCB
	Zone Address	Bits 8–15 BCD or TCB	48 to 99 BCD 30 to FF (48 to 255) TCB
3	Not used		
4	Not used		
5	Autotune Controls	Bit 0	Bit 0 = 0 – No action Bit 0 = 1 – Clear and start tuning
	Reserved	Bits 1–15	
6	Control Mode	Bit 0	Bit 0 = 0 – Open loop control (manual) Bit 0 = 1 – Closed loop control (auto)
	Reserved	Bits 1–15	
7	Soft Start	Bit 0	Bit 0 = 0 – Disable soft start Bit 0 = 1 – Enable soft start
	Reserved	Bits 1–15	
8	Alarm 1 Clear	Bit 0	Bit 0 = 0 – No action Bit 0 = 1 – Clear alarm
	Reserved	Bits 1–15	
9	Alarm 2 Clear	Bit 0	Bit 0 = 0 – No action Bit 0 = 1 – Clear alarm
	Reserved	Bits 1–15	
10	Low Hold	Bit 0	Bit 0 = 0 – Disable low hold alarm function Bit 0 = 1 – Enable low hold alarm function
	Latching	Bit 1	Bit 1 = 0 – Disable latching alarm Bit 1 = 1 – Enable latching alarm
	NO/NC	Bit 2	Bit 2 = 0 – Normally open Bit 2 = 1 – Normally closed
	Alarm Type	Bits 3–5	001 – Process low alarm 010 – Process high alarm 011 – Deviation low alarm 100 – Deviation high alarm 101 – Deviation band alarm
	Reserved	Bits 6–15	

Word	Description	Data	Range
11	Low Hold	Bit 0	Bit 0 = 0 – Disable low hold alarm function Bit 0 = 1 – Enable low hold alarm function
	Latching	Bit 1	Bit 1 = 0 – Disable latching alarm Bit 1 = 1 – Enable latching alarm
	NO/NC	Bit 2	Bit 2 = 0 – Normally open Bit 2 = 1 – Normally closed
	Alarm Type	Bits 3–5	001 – Process low alarm 010 – Process high alarm 011 – Deviation low alarm 100 – Deviation high alarm 101 – Deviation band alarm
	Reserved	Bits 6–15	
12	Zero Reset Term	Bit 0	Bit 0 = 0 – No action Bit 0 = 1 – Zero term
	Reserved	Bits 1–15	
13, 14	Process Setpoint 1	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
15, 16	Process Setpoint 2	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
17, 18	Cycle Time 1	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
19, 20	Cycle Time 2	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
21, 22	Alarm Setpoint 1	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
23, 24	Alarm Setpoint 2	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
25, 26	Alarm Hysterisis	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
27, 28	Autotune Proportional Band 1	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
29, 30	Autotune Proportional Band 2	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
31, 32	Autotune Reset 1	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$

Word	Description	Data	Range
33, 34	Autotune Reset 2	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
35, 36	Autotune Rate 1	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
37, 38	Autotune Rate 2	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
39, 40	Heat/Cool Ratio	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
41, 42	Manual Percent Output	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
43, 44	Proportional Band 1	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
45, 46	Proportional Band 2	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
47, 48	Reset 1	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
49, 50	Rate 1	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
51, 52	Controller Integrity Command	ASCII	ASCII data set

Blender Volumetric Controller Command Block (BVC)

Figure 3.19
Blender Volumetric Controller Command Block (BVC)

Word | Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	0					DC			Device Identification							
2	Zone Address								Station Address							
3	0				0				0				0			
4	0				0				0				0			
5	Machine Command Word (Bit Map)															
6	Process Command Word (Bit Map)															
7	Ingredient Blend Percentage Setpoint 1 (%)															
8																
9	Ingredient Blend Percentage Setpoint 2 (%)															
10																
11	Ingredient Blend Percentage Setpoint 3 (%)															
12																
13	Ingredient Blend Percentage Setpoint 4 (%)															
14																
15	Ingredient Blend Percentage Setpoint 5 (%)															
16																
17	Ingredient Blend Percentage Setpoint 6 (%)															
18																
19	Ingredient Blend Percentage Setpoint 7 (%)															
20																
21	Ingredient Blend Percentage Setpoint 8 (%)															
22																
23	Calibration Setpoint (VS) 1															
24																
25	Calibration Setpoint (VS) 2															
26																
27	Calibration Setpoint (VS) 3															
28																

Word | Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
29	Calibration Setpoint (VS) 4															
30																
31	Calibration Setpoint (VS) 5															
32																
33	Calibration Setpoint (VS) 6															
34																
35	Calibration Setpoint (VS) 7															
36																
37	Calibration Setpoint (VS) 8															
38																
39	Total Rate Setpoint (Pounds per Hour)															
40																
41	Quantity Setpoint (Pounds)															
42																
43	Controller Integrity Command (ASCII)															
44																

Note: VS = Vendor Specific

Figure 3.20
Blender Volumetric Controller Command Block Word/Bit Definitions

Word	Description	Data	Range
1	Block Identification	Bits 0–7	00101000
	DC	Bits 8–10	000 = Standard data configuration
	Not used	Bits 11–15	
2	Station Address	Bits 0–7 BCD or TCB	32 to 99 BCD 20 to FF (32 to 255) TCB
	Zone Address	Bits 8–15 BCD or TCB	48 to 99 BCD 30 to FF (48 to 255) TCB
3	Not used		
4	Not used		

Word	Description	Data	Range
If the PM bit in the MCC is 0, then word 5 =			
5	Machine Run Command	Bit 0	Bit 0 = 0 – Stop Machine Bit 0 = 1 – Run Machine
	Alarm Acknowledge	Bit 1	Bit 1 = 0 – Normal Bit 1 = 1 – Acknowledge
	Reserved	Bits 2–15	
If the PM bit in the MCC is 1, then word 5 =			
5	Machine Run Command	Bit 0	Bit 0 = 0 – Stop Machine Bit 0 = 1 – Run Machine
	On/Off	Bit 1	Bit 1 = 0 – Machine on/off not allowed Bit 1 = 1 – Machine on/off allowed
	Alarm Acknowledge	Bit 2	Bit 2 = 0 – Normal Bit 2 = 1 – Acknowledge
	Reserved	Bits 3–15	
6		Bits 0–3	Not used
	Mixer On/Off	Bit 4	Bit 4 = 0 – Mixer Off Bit 4 = 1 – Mixer On
	On/Off Action Allowed	Bit 5	Bit 5 = 0 – Inhibit mixer on/off Bit 5 = 1 – Enable mixer on/off
	Quantity Reset	Bit 6	Bit 6 = 1 – No action Bit 6 = – Reset quantity measure value to 0
	All Totals Reset	Bit 7	Bit 7 = 0 – No action Bit 7 = 1 – Reset inventory totals all hoppers
	Hopper A Totals Reset	Bit 8	Bit 8 = 0 – No action Bit 8 = 1 – Reset inventory total for hopper A
	Hopper B Totals Reset	Bit 9	Bit 9 = 0 – No action Bit 9 = 1 – Reset inventory total for hopper B
	Hopper C Totals Reset	Bit 10	Bit 10 = 0 – No action Bit 10 = 1 – Reset inventory total for hopper C
	Hopper D Totals Reset	Bit 11	Bit 11 = 0 – No action Bit 11 = 1 – Reset inventory total for hopper D
	Hopper E Totals Reset	Bit 12	Bit 12 = 0 – No action Bit 12 = 1 – Reset inventory total for hopper E
	Hopper F Totals Reset	Bit 13	Bit 13 = 0 – No action Bit 13 = 1 – Reset inventory total for hopper F
	Hopper G Totals Reset	Bit 14	Bit 14 = 0 – No action Bit 14 = 1 – Reset inventory total for hopper G
	Hopper H Totals Reset	Bit 15	Bit 15 = 0 – No action Bit 15 = 1 – Reset inventory total for hopper H

Word	Description	Data	Range
7 thru 22	Ingredient Blend Percentages Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
23 thru 38	Calibration Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
39, 40	Total Rate Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
41, 42	Quantity Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
43, 44	Controller Integrity Command	ASCII	ASCII data set

Blender Continuous Weigh Controller Command Block (BCW)

Figure 3.21
Blender Continuous Weigh Controller Command Block (BCW)

Word \ Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	0					DC			Device Identification							
2	Zone Address								Station Address							
3	0					0			0				0			
4	0					0			0				0			
5	Machine Command Word (Bit Map)															
6	Process Command Word (Bit Map)															
7	Ingredient Blend Percentage Setpoint 1 (%)															
8																
9	Ingredient Blend Percentage Setpoint 2 (%)															
10																
11	Ingredient Blend Percentage Setpoint 3 (%)															
12																
13	Ingredient Blend Percentage Setpoint 4 (%)															
14																
15	Ingredient Blend Percentage Setpoint 5 (%)															
16																
17	Ingredient Blend Percentage Setpoint 6 (%)															
18																
19	Ingredient Blend Percentage Setpoint 7 (%)															
20																
21	Ingredient Blend Percentage Setpoint 8 (%)															
22																
23	Calibration Setpoint (VS) 1															
24																
25	Calibration Setpoint (VS) 2															
26																
27	Calibration Setpoint (VS) 3															
28																

Word | Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
29	Calibration Setpoint (VS) 4															
30																
31	Calibration Setpoint (VS) 5															
32																
33	Calibration Setpoint (VS) 6															
34																
35	Calibration Setpoint (VS) 7															
36																
37	Calibration Setpoint (VS) 8															
38																
39	Total Rate Setpoint (Pounds per Hour)															
40																
41	Quantity Setpoint (Pounds)															
42																
43	Controller Integrity Command (ASCII)															
44																

Note: VS = Vendor Specific

Figure 3.22
Blender Continuous Weigh Controller Command Block (BCW) Word/Bit Definitions

Word	Description	Data	Range
1	Block Identification	Bits 0–7	00101001
	DC	Bits 8–10	000 = Standard data configuration
	Not used	Bits 11–15	
2	Station Address	Bits 0–7 BCD or TCB	32 to 99 BCD 20 to FF (32 to 255) TCB
	Zone Address	Bits 8–15 BCD or TCB	48 to 99 BCD 30 to FF (48 to 255) TCB
3	Not used		
4	Not used		

Word	Description	Data	Range
	If the PM bit in the MCC is 0, then word 5 =		
5	Machine Run Command	Bit 0	Bit 0 = 0 – Stop Machine Bit 0 = 1 – Run Machine
	Alarm Acknowledge	Bit 1	Bit 1 = 0 – Normal Bit 1 = 1 – Acknowledge
	Reserved	Bits 2–15	
	If the PM bit in the MCC is 1, then word 5 =		
5	Machine Run Command	Bit 0	Bit 0 = 0 – Stop Machine Bit 0 = 1 – Run Machine
	On/Off	Bit 1	Bit 1 = 0 – Machine on/off not allowed Bit 1 = 1 – Machine on/off allowed
	Alarm Acknowledge	Bit 2	Bit 2 = 0 – Normal Bit 2 = 1 – Acknowledge
	Reserved	Bits 3–15	
6		Bits 0–3	Not used
	Mixer On/Off	Bit 4	Bit 4 = 0 – Mixer Off Bit 4 = 1 – Mixer On
	On/Off Action Allowed	Bit 5	Bit 5 = 0 – Inhibit mixer on/off Bit 5 = 1 – Enable mixer on/off
	Quantity Reset	Bit 6	Bit 6 = 1 – No action Bit 6 = – Reset quantity measure value to 0
	All Totals Reset	Bit 7	Bit 7 = 0 – No action Bit 7 = 1 – Reset inventory totals all hoppers
	Hopper A Totals Reset	Bit 8	Bit 8 = 0 – No action Bit 8 = 1 – Reset inventory total for hopper A
	Hopper B Totals Reset	Bit 9	Bit 9 = 0 – No action Bit 9 = 1 – Reset inventory total for hopper B
	Hopper C Totals Reset	Bit 10	Bit 10 = 0 – No action Bit 10 = 1 – Reset inventory total for hopper C
	Hopper D Totals Reset	Bit 11	Bit 11 = 0 – No action Bit 11 = 1 – Reset inventory total for hopper D
	Hopper E Totals Reset	Bit 12	Bit 12 = 0 – No action Bit 12 = 1 – Reset inventory total for hopper E
	Hopper F Totals Reset	Bit 13	Bit 13 = 0 – No action Bit 13 = 1 – Reset inventory total for hopper F
	Hopper G Totals Reset	Bit 14	Bit 14 = 0 – No action Bit 14 = 1 – Reset inventory total for hopper G
	Hopper H Totals Reset	Bit 15	Bit 15 = 0 – No action Bit 15 = 1 – Reset inventory total for hopper H

Word	Description	Data	Range
7 thru 22	Ingredient Blend Percentages Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
23 thru 38	Calibration Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
39, 40	Total Rate Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
41, 42	Quantity Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
43, 44	Controller Integrity Command	ASCII	ASCII data set

Blender Batch Weigh Controller Command Block (BBW)

Figure 3.23
Blender Batch Weigh Controller Command Block (BBW)

Word \ Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	0					DC			Device Identification							
2	Zone Address								Station Address							
3	0					0			0				0			
4	0					0			0				0			
5	Machine Command Word (Bit Map)															
6	Process Command Word (Bit Map)															
7	Ingredient Blend Percentage Setpoint 1 (%)															
8																
9	Ingredient Blend Percentage Setpoint 2 (%)															
10																
11	Ingredient Blend Percentage Setpoint 3 (%)															
12																
13	Ingredient Blend Percentage Setpoint 4 (%)															
14																
15	Ingredient Blend Percentage Setpoint 5 (%)															
16																
17	Ingredient Blend Percentage Setpoint 6 (%)															
18																
19	Ingredient Blend Percentage Setpoint 7 (%)															
20																
21	Ingredient Blend Percentage Setpoint 8 (%)															
22																
23	Secondary Setpoint (Lbs) 1															
24																
25	Secondary Setpoint (Lbs) 2															
26																
27	Secondary Setpoint (Lbs 3															
28																

Word | Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
29	Secondary Setpoint (Lbs) 4															
30																
31	Secondary Setpoint (Lbs) 5															
32																
33	Secondary Setpoint (Lbs) 6															
34																
35	Secondary Setpoint (Lbs) 7															
36																
37	Secondary Setpoint (Lbs) 8															
38																
39	Calibration Setpoint (VS) 1															
40																
41	Calibration Setpoint (VS) 2															
42																
43	Calibration Setpoint (VS) 3															
44																
45	Calibration Setpoint (VS) 4															
46																
47	Calibration Setpoint (VS) 5															
48																
49	Calibration Setpoint (VS) 6															
50																
51	Calibration Setpoint (VS) 7															
52																
53	Calibration Setpoint (VS) 8															
54																
55	Total Rate Setpoint (Pounds per Hour)															
56																
57	Quantity Setpoint (Pounds)															
58																

Word \ Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
59	Controller Integrity Command (ASCII)															
60																

Note: VS = Vendor Specific

Figure 3.24
Blender Batch Weigh Controller Command Block (BBW) Word/Bit Definitions

Word	Description	Data	Range
1	Block Identification	Bits 0–7	00101010
	DC	Bits 8–10	000 = Standard data configuration
	Not used	Bits 11–15	
2	Station Address	Bits 0–7 BCD or TCB	32 to 99 BCD 20 to FF (32 to 255) TCB
	Zone Address	Bits 8–15 BCD or TCB	48 to 99 BCD 30 to FF (48 to 255) TCB
3	Not used		
4	Not used		
If the PM bit in the MCC is 0, then word 5 =			
5	Machine Run Command	Bit 0	Bit 0 = 0 – Stop Machine Bit 0 = 1 – Run Machine
	Alarm Acknowledge	Bit 1	Bit 1 = 0 – Normal Bit 1 = 1 – Acknowledge
	Reserved	Bits 2–15	
If the PM bit in the MCC is 1, then word 5 =			
5	Machine Run Command	Bit 0	Bit 0 = 0 – Stop Machine Bit 0 = 1 – Run Machine
	On/Off	Bit 1	Bit 1 = 0 – Machine on/off not allowed Bit 1 = 1 – Machine on/off allowed
	Alarm Acknowledge	Bit 2	Bit 2 = 0 – Normal Bit 2 = 1 – Acknowledge
	Reserved	Bits 3–15	

Word	Description	Data	Range
6		Bits 0–3	Not used
	Mixer On/Off	Bit 4	Bit 4 = 0 – Mixer Off Bit 4 = 1 – Mixer On
	On/Off Action Allowed	Bit 5	Bit 5 = 0 – Inhibit mixer on/off Bit 5 = 1 – Enable mixer on/off
	Quantity Reset	Bit 6	Bit 6 = 1 – No action Bit 6 = – Reset quantity measure value to 0
	All Totals Reset	Bit 7	Bit 7 = 0 – No action Bit 7 = 1 – Reset inventory totals all hoppers
	Hopper A Totals Reset	Bit 8	Bit 8 = 0 – No action Bit 8 = 1 – Reset inventory total for hopper A
	Hopper B Totals Reset	Bit 9	Bit 9 = 0 – No action Bit 9 = 1 – Reset inventory total for hopper B
	Hopper C Totals Reset	Bit 10	Bit 10 = 0 – No action Bit 10 = 1 – Reset inventory total for hopper C
	Hopper D Totals Reset	Bit 11	Bit 11 = 0 – No action Bit 11 = 1 – Reset inventory total for hopper D
	Hopper E Totals Reset	Bit 12	Bit 12 = 0 – No action Bit 12 = 1 – Reset inventory total for hopper E
	Hopper F Totals Reset	Bit 13	Bit 13 = 0 – No action Bit 13 = 1 – Reset inventory total for hopper F
	Hopper G Totals Reset	Bit 14	Bit 14 = 0 – No action Bit 14 = 1 – Reset inventory total for hopper G
	Hopper H Totals Reset	Bit 15	Bit 15 = 0 – No action Bit 15 = 1 – Reset inventory total for hopper H
7 thru 22	Ingredient Blend Percentages Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
23 thru 38	Secondary Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
39 thru 54	Calibration Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
55, 56	Total Rate Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
57, 58	Quantity Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
59, 60	Controller Integrity Command	ASCII	ASCII data set

Custom Configuration Command Block (CCB)

This command block is required if the user wants to custom configure a unique SPI device identification.

You may want to use a custom configuration command block for several reasons:

1. A " non-standard" device is connected to your SPI network and it supports SPI protocol
2. Your standard device only needs a portion of all identified device commands, so creating a streamlined, condensed command block will increase performance.

The trailing data will be laid out in a specific format to allow the 1771–SPI/C module to store the data as user defined SPI commands in temporary memory.

Important: Block transfer lengths are limited to 64 words (128 bytes). The maximum number of command pairs that can be stored for a particular device identification is 60. Configuration storage also limits the number of custom configuration command blocks to 10. If power is lost to the module, the SPI-resident configuration(s) will be lost.

Figure 3.25
Custom Configuration Command Block (CCB)

Word \ Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	0				CA	DC			Device Identification							
2	Number of Numeric Selects								Number of Bit Selects							
3	Number of Bit Polls								Number of ASCII Selects							
4	Number of ASCII Polls								Number of Numeric Polls							
5	CMD1								CMD2							
	⇓		⇓		⇓		⇓		⇓		⇓		⇓			
64	CMD1								CMD2							

The **DC** bits (bits 8–10) inform the module as to the layout and configuration of the trailing data in words 5 through 64 of the SPI defined I/O status block.

When the 1771–SPI/C module receives a device specific command block with the DC bits = 100, 101, 110 or 111 the module interprets the trailing data in the command block as follows:

Bit 10	Bit 09	Bit 08	
1	0	0	Store Sent Configuration
1	0	1	Read Stored Configuration
1	1	0	Overwrite Stored Configuration
1	1	1	Clear Stored Configuration

Store sent configuration (DC = 100). Attempt to store the following configuration in the 1771-SPI/C temporary storage. If the device ID matches a device ID already stored return an error code indicating so; or else store the sent configuration and return a flag indicating a valid configuration storage.

Read stored configuration (DC = 101). Search the 1771-SPI/C temporary storage for a matching device ID and return all configuration information associated with the stored device ID. If no matching device ID is found, then return an error code indicating so. Ignore all other information in the command block.

Overwrite stored configuration (DC = 110). Store the following configuration regardless of any duplicate device ID that may be currently stored. Return a flag indicating a valid configuration storage. The current configuration will overwrite any matching device ID currently stored if one exists.

Clear stored configuration (DC = 111) Clear all configuration information associated with the sent device ID. Return a flag indicating valid execution. Ignore all other data in the command block.

The **CA** flag (bit 11), when set, will clear the entire configuration storage in the module. All other data in the command block will be ignored, An image of the command block will be returned with a flag indicating valid execution.

Word 2

The **number of bit selects** (bits 0–7) will inform the module of the total number of bit select command pairs to be stored and executed in association with the sent **device ID. Note:** All **bit select** command pairs must be sent first in the command block. The number can range from 0 to 3Ch (TCB) or 0 to 60 (BCD). If the number is 0, the module will assume no **bit select** pairs and the next command pair type will be assumed stored in its position.

The **number of numeric selects** (bits 8–15) will inform the module of the total number of numeric select command pairs to be stored and executed in association with the sent **device ID. Note:** All **numeric select** command pairs must be sent second in the command block. The number can range from 0 to 1Eh (TCB) or 0 to 30 (BCD). If the number is 0, the module will assume no **numeric select** pairs and the next command pair type will be assumed stored in its position.

Word 3
The **number of ASCII selects** (bits 0–7) will inform the module of the total number of ASCII select command pairs to be stored and executed in association with the sent **device ID. Note:** All **ASCII select** command pairs must be sent third in the command block and are limited to 4 bytes. The number can range from 0 to 1Eh (TCB) or 0 to 30 (BCD). If the number is 0, the module will assume no **ASCII select** pairs and the next command pair type will be assumed stored in its position.

The **number of bit polls** (bits 8–15) will inform the module of the total number of bit poll command pairs to be stored and executed in association with the sent **device ID. Note:** All **bit poll** command pairs must be sent fourth in the command block. The number can range from 0 to 3Ch (TCB) or 0 to 60 (BCD). If the number is 0, the module will assume no **bit poll** pairs and the next command pair type will be assumed stored in its position.

Word 4
The **number of numeric polls** (bits 0–7) will inform the module of the total number of numeric poll command pairs to be stored and executed in association with the sent **device ID. Note:** All **numeric poll** command pairs must be sent second in the command block. The number can range from 0 to 1Eh (TCB) or 0 to 30 (BCD). If the number is 0, the module will assume no **numeric poll** pairs and the next command pair type will be assumed stored in its position.

The **number of ASCII polls** (bits 8–15) will inform the module of the total number of ASCII poll command pairs to be stored and executed in association with the sent **device ID. Note:** All **ASCII poll** command pairs must be sent third in the command block and are limited to 4 bytes. The number can range from 0 to 1Eh (TCB) or 0 to 30 (BCD). If the number is 0, the module will assume no **ASCII select** pairs and the next command pair type will be assumed stored in its position.

Words 5 – 64
The **CMD1** byte (bits 8–15) is used in the module in the connection establishment string as the most significant command byte. It is used in conjunction with CMD2 to specify a vendor specific particular action to be taken or data to be communicated.

The **CMD2** byte (bits 0–7) is used in the module in the connection establishment string as the least significant command byte. It is used in conjunction with CMD2 to specify a vendor specific particular action to be taken or data to be communicated.

Important: Refer to your SPI Protocol 3.01 for more information on SPI command pairs (CMD1 and CMD2).

Figure 3.26
Custom Configuration Command Block Word/Bit Definitions

Word	Description	Bits	Data	Range	Notes
1	Device Identification	0–7	Bit	00100000 to 11111110	
	DT	8–10	Bit	100 = Store sent configuration 101 = Read stored configuration 110 = Overwrite stored configuration 111 = Clear stored configuration	
	CA	11	Bit	0 = No action 1 = Clear all configuration storage	
	Not used	12–15			
2	Number of Bit Selects	0–7	BCD or TCB	0 to 60 BCD 0 to 3C (0 to 60) TCB	
	Number of Numeric Selects	8–15	BCD or TCB	0 to 30 BCD 0 to 1E (0 to 30) TCB	
3	Number of ASCII Selects	0–7	BCD or TCB	0 to 30 BCD 0 to 1E (0 to 30) TCB	
	Number of Bit Polls	8–15	BCD or TCB	0 to 30 BCD 0 to 1E (0 to 30) TCB	
4	Number of Numeric Polls	0–7	BCD or TCB	0 to 30 BCD 0 to 1E (0 to 30) TCB	
	Number of ASCII Polls	8–15	BCD or TCB	0 to 30 BCD 0 to 1E (0 to 30) TCB	
5	CMD1	8–15		00100000 to 11111111	All Bit Select command pairs first
	CMD2	0–7		00100010 to 11111111	
5	CMD1	8–15		00100000 to 11111111	All Numeric Select command pairs second
	CMD2	0–7		00100010 to 11111111	
5	CMD1	8–15		00100000 to 11111111	All ASCII Select command pairs third
	CMD2	0–7		00100010 to 11111111	
5	CMD1	8–15		00100000 to 11111111	All Bit Poll command pairs fourth
	CMD2	0–7		00100010 to 11111111	

Word	Description	Bits	Data	Range	Notes
5	CMD1	8–15		00100000 to 11111111	All Numeric Poll command pairs fifth
	CMD2	0–7		00100010 to 11111111	
5	CMD1	8–15		00100000 to 11111111	All ASCII Poll command pairs fifth
	CMD2	0–7		00100010 to 11111111	

Custom Data Command Block (CDB)

Custom data command blocks are used to write control and setpoint information to custom configuration devices created when the 1771–SPI/C module receives a device specific command block with the DC bits = 001. The module's interpretation of the trailing data in the command block will be dependent on the device ID received in the command block header and command pairs stored in the configuration storage.

Important: The trailing data in words 5 thru 64 must match the data type required for each command pair and in order as stored by the configuration store or overwrite commands.

Figure 3.27
Custom Data Command Block Header

Word / Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	0					DC			Device Identification							
2	Zone Address								Station Address							
3	0					0			0				0			
4	0					0			0				0			
5	Bit Select Data for CMD Pair															
	Bit Select Data for CMD Pair															
	:					:			:				:			
	Numeric Select Control Data for CMD Pair															
	Numeric Select Control Data +1 for CMD Pair															
	:					:			:				:			
	Numeric Select Control Data for CMD Pair															
	Numeric Select Control Data +1 for CMD Pair															
	:					:			:				:			
	ASCII Select Control Data for CMD Pair															
	ASCII Select Control Data +1 for CMD Pair															
	:					:			:				:			

Word 1

Word 1 contains the DC bits and the block identification of the associated device.

The **DC** bits (bits 8–10) inform the module as to the layout and configuration of the trailing data in words 5 through 64 of the command block. When DC = 001, the module relates the data as command block data for a stored custom configuration.

The **block identification** (bits 0–7) informs the module of the specific device associated with the trailing data in words 5 through 64 of the command block.

Word 2

Word 2 identifies the station address and the zone address of the destination station.

The station address informs the module of the logical station assignment of the device that will receive any of the appropriate data in the command block.

The zone address informs the module of logical zone assignment of the device that will receive the trailing words 5 thru 64 of the device specific ID. If this value is 0, it will be ignored. If it is not 0, it will be used in the SPI establishment string.

Figure 3.28
Custom Data Command Block Word/Bit Definitions

Word	Description	Data	Range
1	Block Identification	Bits 0–7	00100000 to 11111110
	DC	Bits 8–10	000= Standard Data configuration **001 = Configuration Data** 010 = Random data configuration 011 = Random Data Open
	Not used	Bits 11–15	
2	Station Address	Bits 0–7 BCD or TCB	32 to 99 BCD 20 to FF (32 to 255) TCB
	Zone Address	Bits 8–15 BCD or TCB	49 to 99 BCD 30 to FF (48 to 255) TCB
3	Not used		
4	Not used		
5	Bit Select Data Word for CMD Pair	Bits	0–255 TCB
	:	:	: :

Word	Description	Data	Range
	Bit Select Data Word for CMD Pair	Bits	0–255 TCB
	Numeric Select Data for CMD Pair	BCD, TCB or R4F	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
	Numeric Select Data +1 for CMD Pair	BCD, TCB or R4F	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
	:	:	: :
	Numeric Select Data for CMD Pair	BCD, TCB or R4F	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
	Numeric Select Data +1 for CMD Pair	BCD, TCB or R4F	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
	ASCII Select Data for CMD Pair	BCD, TCB or R4F	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
	ASCII Select Data +1 for CMD Pair	BCD, TCB or R4F	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
	:	:	: :

Random Data Configuration Command Block (RDC)

Random data command blocks allow you to configure your own block of SPI-protocol defined commands to send to an SPI device. This feature is particularily useful if you need to send a varying set of commands to a device based on conditional logic in the programmable controller.

When the module receives an SPI device particular command block with the DC bit = 010 (RD selected) the module interprets the trailing data in the command block as shown below.

The block will be broken into 15 command groups with the first group starting at word 5. (Since a programmabler controller block transfer consists of 64 words, 15 specific SPI commands can be accessed in one block transfer.)

Figure 3.29
Random Data Configuration Command Block (RDC)

Word / Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	0					DC			Block Identification							
2	0					0			Station Address							
3	0					0			0				0			
4	0								Number of Command Groups							
5	0					0			0				0			DT
6	CMD1								CMD2							
7	Data															
8	Data															
9	0					0			0				0			DT
10	CMD1								CMD2							
11	Data															
12	Data															
	⇓ ⇓ ⇓ ⇓															
61	0					0			0				0			DT
62	CMD1								CMD2							
63	Data															
64	Data															

Word 1
Word 1 contains the DC bits and the block identification of the associated device.

The **DC** bits (bits 8–10) inform the module as to the layout and configuration of the trailing data in words 5 through 64 of the command block.

The **block identification** (bits 0–7) informs the module of the specific device associated with the trailing data in words 5 through 64 of the command block.

Word 2
Word 2 contains the **station address** (bits 0–7). The station address informs the module of the logical station assignment of the device slated to receive the trailing data in words 5 through 64 of the command block.

Word 3 is not used.

Word 4
Word 4 contains the number of command groups. This entry informs the 1771-SPI module of the total number of commands included in this block.

Word 5
Word 5 defines the type of data to be sent (if any).

If the DT bit is 0 (numeric), this value tells the module the values in words 5 and 6 are numeric type. If the data is numeric, the NF nibble in the MCC block will dictate its format.

If the DT bit is 1 (bit mapped data), this value informs the module that the values in words 5 and 6 are bit mapped type.

Word 6
Word 6 contains the CMD1 and CMD2 bytes.

CMD1 is used by the module in the connection establishment string as the most significant command byte. It is used in conjunction with CMD2 to specify a vendor specific action to be taken or data to be communicated.

CMD2 is used by the module in the connection establishment string as the least significant command byte. It is used in conjunction with CMD1 to specify a vendor specific action to be taken or data to be communicated.

If the CMD2 is even (least significant bit reset) the action to be taken is a poll request, and all data in this particular group will be disregarded by the module.

If the CMD2 is odd (least significant bit set) the action to be taken is a select request, and the data in the group will be encoded by the module into the message transfer string to be transmitted to the indicated station.

After all command groups have been executed, the appropriate RDC status will be returned to the programmable controller by the module with appropriate data (if any) for all executed groups.

The AI flag will be ignored when executing the RDC command.

Word 7 and 8

Words 7 and 8 are the **data** words associated with the first command pair (if applicable). These words will be encoded by the module into the message transfer string if the value of CMD2 indicates that the action to be taken is a select request.

Figure 3.30
Random Data Command Block Word/Bit Definitions

Word	Description	Data	Range
1	Block Identification	Bits 0–7	00100000 to 11111111
	DC	Bits 8–10	000= Standard Data configuration 001 = Configuration Data **010 = Random data configuration** 011 = Random Data Open
	Not used	Bits 11–15	
2	Station Address	Bits 0–7 BCD or TCB	32 to 99 BCD 20 to FF (32 to 255) TCB
	Not used	Bits 8–15	
3	Not used		
4	Number of Command Groups	Bits 0–7 BCD or TCB	1–15 BCD 01–0F (1–15) TCB
5	DT	Bits 0	0 = Numeric word pair data 1 = Bit–mapped word data
	Not used	Bits 1–15	
6	CMD2	Bits 0–7	00100000 to 11111111
	CMD1	Bits 8–15	00100000 to 11111111
7–8	Command Data	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$

Random Data Open Command Block (RDO)

Random data open command blocks allow you to send a single command with up to 59 words of data associated with that command. This is used when a single command sends multiple setpoints, or when you desire to send an ASCII string to a supporting device.

When the module receives an SPI defined I/O command block with the DC bits = 011, the module interprets the trailing data in the command block as shown below.

Figure 3.31
Random Data Open Configuration Block (RDO)

Word \ Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	DT		0			DC			Block Identification							
2	0					0			Station Address							
3	0					0			0				0			
4	0					Number of Values										
5	CMD1								CMD2							
6	Data 1								Data 0							
7	Data 3								Data 2							
	⇓					⇓			⇓			⇓				
64	Data 117								Data 116							

Word 1

Word 1 contains the DC bits, the DT bits and the block identification of the associated device.

The **block identification** (bits 0–7) informs the module of the specific device associated with the trailing data in words 5 through 64 of the command block.

The **DC** bits (bits 8–10) are used to select the random data open command block when equal to 010.

The **DT** bits (bits 14–15) inform the module what type of data is being used in this command block.

Bit 15	Bit 14	Description
0	0	ASCII byte data
0	1	numeric word pair data
1	0	Bit word data

Note: If the data is numeric, the 1771-SPI/C module will use the NF bits in the MCC block to determine its format.

Word 2
Word 2 contains the **station address** (bits 0–7). The station address informs the module of the logical station assignment of the device slated to receive the trailing data in words 5 through 64 of the command block.

Word 3 is not used.

Word 4
Word 4 defines the number of values to be sent. If data type (DT) bits are 10 (bit word data), this value will tell the module the number of bit words to be sent if the command pair indicate a select operation or the number of bit words to be returned if the command pair indicate a polled operation.

If the DT bits are 01 (numeric word pair data), this value will tell the module the number of numeric word pairs to be sent if the command pair indicate a select operation or the number of numeric word pairs to be returned if the command pair indicate a polled operation.

If the DT bits are 00 (ASCII byte data), this value will inform the module of the number of ASCII bytes to be sent if the command pair indicate a select operation. If the command pair indicate a polled operation, the number of values will be set to the actual amount of ASCII bytes returned from the device on the SPI link.

Word 5
Word 5 contains the CMD1 and CMD2 bytes.

CMD1 is used by the module in the connection establishment string as the most significant command byte. It is used in conjunction with CMD2 to specify a vendor specific action to be taken or data to be communicated.

CMD2 is used by the module in the connection establishment string as the least significant command byte. It is used in conjunction with CMD1 to specify a vendor specific action to be taken or data to be communicated.

If the CMD2 is even (least significant bit reset) the action to be taken is a poll request, and all data in this particular group will be disregarded by the module.

If the CMD2 is odd (least significant bit set) the action to be taken is a select request, and the data in the group will be encoded by the module into the message transfer string to be transmitted to the indicated station.

After all command groups have been executed, the appropriate RDO status will be returned to the programmable controller by the module with appropriate data (if any).

Word 6 thru 64
Words 6 thru 64 are the **data** words. These words will be encoded by the module into the message transfer string if the value of CMD2 indicates that the action to be taken is a select request.

Figure 3.32
Random Data Open Command Block Word/Bit Definitions

Word	Description	Data	Range
1	Block Identification	Bits 0–7	00100000 to 11111111
	DC	Bits 8–10	000= Standard Data configuration 001 = Configuration Data 010 = Random data configuration **011 = Random Data Open**
	Not used	Bits 11–13	
	DT	Bits 14–15	00 = ASCII byte data 01 = Numeric word pair data 10 = Bit word data
2	Station Address	Bits 0–7 BCD or TCB	32 to 99 BCD 20 to FF (32 to 255) TCB
	Not used	Bits 8–15	
3	Not used		
4	Number of Values	Bits 0–11	If DT = 00 1 to 118 BCD 1 to 76 (1 to 118) TCB If DT = 01 1 to 59 BCD 1 to 3B (1 to 59) TCB If DT = 10 1 to 29 BCD 1 to 1D (1 to 29) TCB
5	CMD2	Bits 0–7	00100000 to 11111111
	CMD1	Bits 8–15	00100000 to 11111111
6–64	Control Data	Bits 0–7 Bits 8–15	If DT = 00 ASCII data set If DT = 01 0000000000000000 to 1111111111111111 If DT = 10 0 to 9999 BCD 0 to ±32767 TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$

Chapter Summary

In this chapter you learned about the command block descriptions used by the SPI/C interface module. This included word/bit definitions.

Chapter 4

SPI/C Interface Module Status Block Descriptions

Chapter Objectives

In this chapter you will learn about the SPI/C defined I/O status blocks returned from the module to the programmable controller. The SPI defined I/O status blocks are:

Standard Data Status Block

All standard data status blocks returned from the module will contain a 4 word block header having a common layout. This header is included as the first 4 words in any SPI defined I/O status block that is block transfer read (BTR) from the module.

When the host processor receives a device specific status block with the DC = 000, the processor interprets the trailing data in the status block as dependent on the device ID received in the status block header, described below.

Figure 4.1
Standard Data Status Block Header

Word \ Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	Page Number		CR	CE	0	DC			Device Identification							
2	Zone Address								Station Address							
3	Diagnostic Word															
4	0				0				0				0			

Word 1

Word 1 contains the page number, CR, CE, and DC bits and the device identification of the associated device.

The **page number** (bits 14-15) informs you of what page of status information for a device is being read. All status information for some particular devices will not fit in a single 64 word block. Multiple blocks (or pages) may be required.

The **CR** flag (bit 13) informs the host processor whether the block of information is in response to a queued read (per the devices entered in the MCC), or a response to a specific request through a block transfer write (BTW) request.

The **CE** flag (bit 12) informs the host processor that the previously sent command block has been executed properly with no errors.

The **DC** bits (bits 8-10) inform the module as to the layout and configuration of the trailing data in words 5 through 64 of the status block. These bits will all be reset (0) for all standard data status blocks.

The **device identification** (bits 0-7) informs the module of the specific device associated with the trailing data in words 5 through 64 of the status block.

Word 2

Word 2 identifies the station address and the zone address.

The station address (bits 0-7) informs the host processor of the logical station assignment of the device that will receive any of the appropriate data in the status block.

The zone address (bits 8-15) informs the host processor of logical zone assignment of the device.

Words 3 and 4 are not used.

Figure 4.2
Standard Data Status Block Word/Bit Definitions

Word number	Description	Data	Range
1	Block Identification	Bits 0-7	00100000 to 11111111
	DC	Bits 8-10	**000= Standard Data configuration** 001 = Configuration Data 010 = Random data configuration 011 = Random Data Open 100 = Store Sent configuration 101 = Read Stored configuration 110 = Overwrite Stored configuration 111 = Clear Stored configuration
	Reserved	Bit 11	Not used
	CE	Bit 12	Bit 12 = 0 - Command did not execute properly Bit 12 = 1 - Command executed with no errors
	CR	Bit 13	Bit 13 = 0 - This status block is a response to an id/address stored in the MCC configuration Bit 13 = 1 - This status block is a response to a previously sent command block from the host computer
	Page Number	Bits 14, 15	00 = This is page 0 of status for a previously sent SDC command 01 = This is page 1 of status for a previously sent SDC command 10 = This is page 2 of status for a previously sent SDC command
2	Station Address	Bits 0-7 BCD or TCB	32 to 99 BCD 20 to FF (32 to 255) TCB
	Zone Address	Bits 8-15 BCD or TCB	48 to 99 BCD 30 to FF (48 to 255) TCB
3	Diagnostic Word	Bits 0-15 BCD or TCB	0 to 9999 BCD 0 to 9999 TCB
4	Not used		

Standard Mold Controller Status Block (MTS)

Figure 4.3
Standard Mold Controller Status Block (MTS)

Word \ Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	Page Number		CR	CE	0	DC			Device Identification							
2	Zone Address								Station Address							
3	Diagnostic Word															
4	0				0				0				0			
5	Machine Command Word (Bit Map)															
6	Process Status (Bit Map)															
7	Machine Status Word 1 (Bit Map)															
8	Machine Status Word 2 (Bit Map)															
9	To Process Temperature (F)															
10																
11	From Process Temperature (F)															
12																
13	To Processor Pressure (PSI)															
14																
15	From Processor Pressure (PSI)															
16																
17	To Process Flow (GPM)															
18																
19	Process Temperature Setpoint (F)															
20																
21	High Temperature Deviation Alarm Limit (F)															
22																
23	Low Temperature Deviation Alarm Limit (F)															
24																
25	Controller Integrity (ASCII)															
26																
27	Controller Version (ASCII)															
28																

Figure 4.4
Standard Mold Controller Status Block Word/Bit Definitions

Word number	Description	Data	Range
1	Block Identification	Bits 0-7	00100000
	DC	Bits 8-10	**000= Standard Data configuration** 001 = Configuration Data 010 = Random data configuration 011 = Random Data Open 100 = Store Sent configuration 101 = Read Stored configuration 110 = Overwrite Stored configuration 111 = Clear Stored configuration
	Reserved	Bit 11	Not used
	CE	Bit 12	Bit 12 = 0 - Command did not execute properly Bit 12 = 1 - Command executed with no errors
	CR	Bit 13	Bit 13 = 0 - This status block is a response to an id/address stored in the MCC configuration Bit 13 = 1 - This status block is a response to a previously sent command block from the host computer
	Page Number	Bits 14, 15	**00 = This is page 0 of status for a previously sent SDC command** 01 = This is page 1 of status for a previously sent SDC command 10 = This is page 2 of status for a previously sent SDC command
2	Station Address	Bits 0-7 BCD or TCB	32 to 99 BCD 20 to FF (32 to 255) TCB
	Zone Address	Bits 8-15 BCD or TCB	48 to 99 BCD 30 to FF (48 to 255) TCB
3	Diagnostic Word	Bits 0-15 BCD or TCB	0 to 9999 BCD 0 to 9999 TCB
4	Not used		
If PM bit = 0, then word 5 = :			
5	Machine Run Command	Bit 0	Bit 0 = 0 - Machine stopped Bit 0 = 1 - Machine running
	Alarm Acknowledge	Bit 1	Bit 1 = 0 - Normal Bit 1 = 1 - Acknowledged
	Reserved	Bits 2-15	

Word number	Description	Data	Range
If PM bit = 1, then word 5 = :			
5 Cont.	Machine Run Command	Bit 0	Bit 0 = 0 - Machine stopped Bit 0 = 1 - Machine running
	On/Off	Bit 1	Bit 1 = 0 - Machine on/off not allowed Bit 1 = 1 - Machine on/off allowed
	Alarm Acknowledge	Bit 2	Bit 2 = 0 - Normal Bit 2 = 1 - Acknowledged
	Reserved	Bits 3-15	Not used
6	Machine Run Status	Bit 0	0 = Machine off 1 = Machine running
	System Status	Bit 1	0 = Normal 1 = Alarm
	Process Status	Bit 2	0 = Normal 1 = Alarm
	Machine Status	Bit 3	0 = Normal 1 = Alarm
	Temperature Status	Bit 4	0 = Normal 1 = High Alarm
	Temperature Status	Bit 5	0 = Normal 1 = Low Alarm
	Pressure Status	Bit 6	0 = Normal 1 = High Alarm
	Pressure Status	Bit 7	0 = Normal 1 = Low Alarm
	Reserved	Bit 8	Not used
	Flow Status	Bit 9	0 = Normal 1 = Low Alarm
6	Reserved	Bits 10-15	Not used
7	Machine Run Status	Bit 0	0 = Machine off 1 = Machine processing
	System Status	Bit 1	0 = Normal 1 = Alarm
	Process Status	Bit 2	0 = Normal 1 = Alarm
	Machine Status	Bit 3	0 = Normal 1 = Alarm

Word number	Description	Data	Range
7 Cont.	Temperature Status	Bit 4	0 = Normal 1 = High Alarm
	Temperature Status	Bit 5	0 = Normal 1 = Low Alarm
	Pressure Status	Bit 6	0 = Normal 1 = High Alarm
	Pressure Status	Bit 7	0 = Normal 1 = Low Alarm
	Reserved	Bit 8	Not used
	Reserved	Bit 9	Not used
	Voltage Status	Bit 10	0 = Normal 1 = High Alarm
	Voltage Status	Bit 11	0 = Normal 1 = Low Alarm
	Current Status	Bit 12	0 = Normal 1 = High Alarm
	Current Status	Bit 13	0 = Normal 1 = Low Alarm
	Phase Status	Bit 14	0 = Normal 1 = Reversed or lost
	Reserved	Bits 15	Not used
8	Machine Run Status	Bit 0	0 = Machine off 1 = Machine processing
	System Status	Bit 1	0 = Normal 1 = Alarm
	Process Status	Bit 2	0 = Normal 1 = Alarm
	Machine Status	Bit 3	0 = Normal 1 = Alarm
	Sensor Status	Bit 4	0 = Normal 1 = Fault
	Calibration Status	Bit 5	0 = Normal 1 = Fault
	Reserved	Bits 6-15	Not used
9, 10	To Process Temperature Actual		0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
11, 12	From Process Temperature Actual	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$

Word number	Description	Data	Range
13, 14	To Process Pressure Actual	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
15, 16	From Process Pressure Actual	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
17, 18	To Process Flow Actual	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
19, 20	Process Temperature Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
21, 22	High Temp Deviation Alarm Limit	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
23, 24	Low Temp Deviation Alarm Limit	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
25, 26	Controller Integrity	ASCII	ASCII data set
27, 28	Controller Version	ASCII	ASCII data set

Standard Chiller Status Block (CHS)

Figure 4.5
Standard Chiller Status Block (CHS)

Word | Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	Page Number		CR	CE	0	DC			Device Identification							
2	Zone Address								Station Address							
3	Diagnostic Word															
4	0				0				0				0			
5	Machine Command Word (Bit Map)															
6	Process Status (Bit Map)															
7	Machine Status Word 1 (Bit Map)															
8	Machine Status Word 2 (Bit Map)															
9	To Process Temperature (F)															
10																
11	From Process Temperature (F)															
12																
13	To Processor Pressure (PSI)															
14																
15	From Processor Pressure (PSI)															
16																
17	To Process Flow (GPM)															
18																
19	Process Temperature Setpoint (F)															
20																
21	High Temperature Deviation Alarm Limit (F)															
22																
23	Low Temperature Deviation Alarm Limit (F)															
24																
25	Controller Integrity (ASCII)															
26																

Word \ Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
27	Controller Version (ASCII)															
28																

Figure 4.6
Standard Chiller Status Block Word/Bit Definitions

Word	Description	Data	Range
1	Block Identification	Bits 0-7	00100001
	DC	Bits 8-10	**000= Standard Data configuration** 001 = Configuration Data 010 = Random data configuration 011 = Random Data Open 100 = Store Sent configuration 101 = Read Stored configuration 110 = Overwrite Stored configuration 111 = Clear Stored configuration
	Reserved	Bit 11	Not used
	CE	Bit 12	Bit 12 = 0 - Command did not execute properly Bit 12 = 1 - Command executed with no errors
	CR	Bit 13	Bit 13 = 0 - This status block is a response to an id/address stored in the MCC configuration Bit 13 = 1 - This status block is a response to a previously sent command block from the host computer
	Page Number	Bits 14, 15	**00 = This is page 0 of status for a previously sent SDC command** 01 = This is page 1 of status for a previously sent SDC command 10 = This is page 2 of status for a previously sent SDC command
2	Station Address	Bits 0-7 BCD or TCB	32 to 99 BCD 20 to FF (32 to 255) TCB
	Zone Address	Bits 8-15 BCD or TCB	48 to 99 BCD 30 to FF (48 to 255) TCB
3	Diagnostic Word	Bits 0-15 BCD or TCB	0 to 9999 BCD 0 to 9999 TCB
4	Not used		

Word	Description	Data	Range
If PM bit = 0, then word 5 = :			
5	Machine Run Command	Bit 0	Bit 0 = 0 - Machine stopped Bit 0 = 1 - Machine running
	Alarm Acknowledge	Bit 1	Bit 1 = 0 - Normal Bit 1 = 1 - Acknowledged
	Reserved	Bits 2-15	Not used
If PM bit = 1, then word 5 = :			
5	Machine Run Command	Bit 0	Bit 0 = 0 - Machine stopped Bit 0 = 1 - Machine running
	On/Off	Bit 1	Bit 1 = 0 - Machine on/off not allowed Bit 1 = 1 - Machine on/off allowed
	Alarm Acknowledge	Bit 2	Bit 2 = 0 - Normal Bit 2 = 1 - Acknowledged
	Reserved	Bits 3-15	Not used
6	Machine Run Status	Bit 0	0 = Machine off 1 = Machine running
	System Status	Bit 1	0 = Normal 1 = Alarm
	Process Status	Bit 2	0 = Normal 1 = Alarm
	Machine Status	Bit 3	0 = Normal 1 = Alarm
	Temperature Status	Bit 4	0 = Normal 1 = High Alarm
	Temperature Status	Bit 5	0 = Normal 1 = Low Alarm
	Pressure Status	Bit 6	0 = Normal 1 = High Alarm
	Pressure Status	Bit 7	0 = Normal 1 = Low Alarm
	Reserved	Bit 8	Not used
	Flow Status	Bit 9	0 = Normal 1 = Low Alarm
	Reserved	Bits 10-15	Not used

Word	Description	Data	Range
7	Machine Run Status	Bit 0	0 = Machine off 1 = Machine processing
	System Status	Bit 1	0 = Normal 1 = Alarm
	Process Status	Bit 2	0 = Normal 1 = Alarm
	Machine Status	Bit 3	0 = Normal 1 = Alarm
	Temperature Status	Bit 4	0 = Normal 1 = High Alarm
	Temperature Status	Bit 5	0 = Normal 1 = Low Alarm
	Pressure Status	Bit 6	0 = Normal 1 = High Alarm
	Pressure Status	Bit 7	0 = Normal 1 = Low Alarm
	Reserved	Bit 8	Not used
	Reserved	Bit 9	Not used
	Voltage Status	Bit 10	0 = Normal 1 = High Alarm
	Voltage Status	Bit 11	0 = Normal 1 = Low Alarm
	Current Status	Bit 12	0 = Normal 1 = High Alarm
	Current Status	Bit 13	0 = Normal 1 = Low Alarm
	Phase Status	Bit 14	0 = Normal 1 = Reversed or lost
	Reserved	Bit 15	Not used
8	Machine Run Status	Bit 0	0 = Machine off 1 = Machine processing
	System Status	Bit 1	0 = Normal 1 = Alarm
	Process Status	Bit 2	0 = Normal 1 = Alarm
	Machine Status	Bit 3	0 = Normal 1 = Alarm
8 cont.	Sensor Status	Bit 4	0 = Normal 1 = Fault
	Calibration Status	Bit 5	0 = Normal 1 = Fault

Word	Description	Data	Range
	Reserved	Bits 6-15	Not used
9, 10	To Process Temperature Actual	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
11, 12	From Process Temperature Actual	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
13, 14	To Process Pressure Actual	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
15, 16	From Process Pressure Actual	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
17, 18	To Process Flow Actual	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
19, 20	Process Temperature Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
21, 22	High Temp Deviation Alarm Limit	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
23, 24	Low Temp Deviation Alarm Limit	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
25, 26	Controller Integrity	ASCII	ASCII data set
27, 28	Controller Version	ASCII	ASCII data set

Standard Dryer Status Block (DRS)

Figure 4.7
Standard Dryer Status Block (DRS)

Word \ Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	Page Number		CR	CE	0	DC			Device Identification							
2	Zone Address								Station Address							
3	Diagnostic Word															
4	0				0				0				0			
5	Machine Command Word (Bit Map)															
6	Process Status (Bit Map)															
7	Machine Status Word 1 (Bit Map)															
8	Machine Status Word 2 (Bit Map)															
9	To Process Temperature (F)															
10																
11	From Process Temperature (F)															
12																
13	To Process Pressure (PSI)															
14																
15	From Process Pressure (Inches of H_2O)															
16																
17	To Process Flow (CFM)															
18																
19	Dewpoint (F)															
20																
21	Process Temperature Setpoint (F)															
22																
23	High Temperature Deviation Alarm Limit (F)															
24																
25	Low Temperature Deviation Alarm Limit (F)															
26																

Word | Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
27	High Dewpoint Alarm Setpoint (F)															
28																
29	Controller Integrity (ASCII)															
30																
31	Controller Version (ASCII)															
32																

Figure 4.8
Standard Dryer Status Block Word/Bit Definitions

Word	Description	Data	Range
1	Block Identification	Bits 0-7	00100010
	DC	Bits 8-10	**000= Standard Data configuration** 001 = Configuration Data 010 = Random data configuration 011 = Random Data Open 100 = Store Sent configuration 101 = Read Stored configuration 110 = Overwrite Stored configuration 111 = Clear Stored configuration
	Reserved	Bit 11	Not used
	CE	Bit 12	Bit 12 = 0 - Command did not execute properly Bit 12 = 1 - Command executed with no errors
	CR	Bit 13	**Bit 13 = 0 - This status block is a response to an id/address stored in the MCC configuration** Bit 13 = 1 - This status block is a response to a previously sent command block from the host computer
	Page Number	Bits 14, 15	**00 = This is page 0 of status for a previously sent SDC command** 01 = This is page 1 of status for a previously sent SDC command 10 = This is page 2 of status for a previously sent SDC command
2	Station Address	Bits 0-7 BCD or TCB	32 to 99 BCD 20 to FF (32 to 255) TCB
	Zone Address	Bits 8-15 BCD or TCB	48 to 99 BCD 30 to FF (48 to 255) TCB

Word	Description	Data	Range
3	Diagnostic Word	Bits 0-15 BCD or TCB	0 to 9999 BCD 0 to 9999 TCB
4	Not used		
If PM bit = 0, then word 5 = :			
5	Machine Run Command	Bit 0	Bit 0 = 0 - Machine stopped Bit 0 = 1 - Machine running
	Alarm Acknowledge	Bit 1	Bit 1 = 0 - Normal Bit 1 = 1 - Acknowledged
	Reserved	Bits 2-15	Not used
If PM bit = 1, then word 5 = :			
5	Machine Run Command	Bit 0	Bit 0 = 0 - Machine stopped Bit 0 = 1 - Machine running
	On/Off	Bit 1	Bit 1 = 0 - Machine on/off not allowed Bit 1 = 1 - Machine on/off allowed
	Alarm Acknowledge	Bit 2	Bit 2 = 0 - Normal Bit 2 = 1 - Acknowledged
	Reserved	Bits 3-15	Not used
6	Machine Run Status	Bit 0	0 = Machine off 1 = Machine running
	System Status	Bit 1	0 = Normal 1 = Alarm
	Process Status	Bit 2	0 = Normal 1 = Alarm
	Machine Status	Bit 3	0 = Normal 1 = Alarm
	Temperature Status	Bit 4	0 = Normal 1 = High Alarm
	Temperature Status	Bit 5	0 = Normal 1 = Low Alarm
	Reserved	Bit 6, 7	Not used
	Filter Status	Bit 8	0 = Normal 1 = Clogged
	Flow Status	Bit 9	0 = Normal 1 = Low Alarm
	Dewpoint Status	Bit 10	0 = Normal 1 = High Alarm
	Reserved	Bits 11-15	Not used

Word	Description	Data	Range
7	Machine Run Status	Bit 0	0 = Machine off 1 = Machine processing
	System Status	Bit 1	0 = Normal 1 = Alarm
	Process Status	Bit 2	0 = Normal 1 = Alarm
	Machine Status	Bit 3	0 = Normal 1 = Alarm
	Temperature Status	Bit 4	0 = Normal 1 = High Alarm
	Temperature Status	Bit 5	0 = Normal 1 = Low Alarm
	Reserved	Bit 6-8	Not used
	Flow Status	Bit 9	0 = Normal 1 = Low Alarm
	Voltage Status	Bit 10	0 = Normal 1 = High Alarm
	Voltage Status	Bit 11	0 = Normal 1 = Low Alarm
	Current Status	Bit 12	0 = Normal 1 = High Alarm
	Current Status	Bit 13	0 = Normal 1 = Low Alarm
	Phase Status	Bit 14	0 = Normal 1 = Reversed or lost
	Reserved	Bits 15	Not used
8	Machine Run Status	Bit 0	0 = Machine off 1 = Machine processing
	System Status	Bit 1	0 = Normal 1 = Alarm
	Process Status	Bit 2	0 = Normal 1 = Alarm
	Machine Status	Bit 3	0 = Normal 1 = Alarm
	Sensor Status	Bit 4	0 = Normal 1 = Fault
	Calibration Status	Bit 5	0 = Normal 1 = Fault
	Reserved	Bits 6-15	Not used

Word	Description	Data	Range
9, 10	To Process Temperature Actual	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
11, 12	From Process Temperature Actual	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
13, 14	To Process Pressure Actual	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
15, 16	From Process Pressure Actual	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
17, 18	To Process Flow Actual	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
19, 20	Dewpoint Actual	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
21, 22	Process Temperature Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
23, 24	High Temp Deviation Alarm Limit	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
25, 26	Low Temp Deviation Alarm Limit	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
27, 28	High Dewpoint Alarm Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
29, 30	Controller Integrity	ASCII	ASCII data set
31, 32	Controller Version	ASCII	ASCII data set

Standard Loader Status Block (LDS)

Figure 4.9
Standard Loader Status Block (LDS)

Word \ Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	Page Number		CR	CE	0	DC			Device Identification							
2	Zone Address								Station Address							
3	Diagnostic Word															
4	0				0				0				0			
5	Machine Command Word (Bit Map)															
6	Process Status (Bit Map)															
7	Load Time A Setpoint (sec)															
8																
9	Load Time B Setpoint (sec)															
10																
11	Controller Integrity (ASCII)															
12																
13	Controller Version (ASCII)															
14																

Figure 4.10
Standard Loader Status Block Word/Bit Definitions

Word	Description	Data	Range
1	Block Identification	Bits 0-7	00100011
	DC	Bits 8-10	**000= Standard Data configuration** 001 = Configuration Data 010 = Random data configuration 011 = Random Data Open 100 = Store Sent configuration 101 = Read Stored configuration 110 = Overwrite Stored configuration 111 = Clear Stored configuration
	Reserved	Bit 11	Not used
	CE	Bit 12	Bit 12 = 0 - Command did not execute properly Bit 12 = 1 - Command executed with no errors

Word	Description	Data	Range
1 Cont.	CR	Bit 13	Bit 13 = 0 - This status block is a response to an id/address stored in the MCC configuration Bit 13 = 1 - This status block is a response to a previously sent command block from the host computer
	Page Number	Bits 14, 15	**00 = This is page 0 of status for a previously sent SDC command** 01 = This is page 1 of status for a previously sent SDC command 10 = This is page 2 of status for a previously sent SDC command
2	Station Address	Bits 0-7 BCD or TCB	32 to 99 BCD 20 to FF (32 to 255) TCB
	Zone Address	Bits 8-15 BCD or TCB	48 to 99 BCD 30 to FF (48 to 255) TCB
3	Diagnostic Word	Bits 0-15 BCD or TCB	0 to 9999 BCD 0 to 9999 TCB
4	Not used		
If the PM bit in the MCC is 0, then word 5 =			
5	Machine Run Command	Bit 0	Bit 0 = 0 - Machine stopped Bit 0 = 1 - Machine running
	Alarm Acknowledge	Bit 1	Bit 1 = 0 - Normal Bit 1 = 1 - Acknowledged
	Reserved	Bits 2-15	Not used
If the PM bit in the MCC is 1, then word 5 =			
5	Machine Run Command	Bit 0	Bit 0 = 0 - Machine stopped Bit 0 = 1 - Machine running
	On/Off	Bit 1	Bit 1 = 0 - Machine on/off not allowed Bit 1 = 1 - Machine on/off allowed
	Alarm Acknowledge	Bit 2	Bit 2 = 0 - Normal Bit 2 = 1 - Acknowledged
	Reserved	Bits 3-15	Not used

Word	Description	Data	Range
6	Machine Run Status	Bit 0	0 = Machine off 1 = Machine processing
	System Status	Bit 1	0 = Normal 1 = Alarm
	Process Status	Bit 2	0 = Normal 1 = Alarm
	Machine Status	Bit 3	0 = Normal 1 = Alarm
	Reserved	Bits 4-10	Not used
	Material Status	Bit 11	0 = Normal 1 = Alarm
	Vacuum Status	Bit 12	0 = Normal 1 = Alarm
	No Load Status	Bit 13	0 = Normal 1 = Alarm
6	Reserved	Bits 14-15	Not used
7, 8	Load Time A Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
9, 10	Load Time B Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
11, 12	Controller Integrity	ASCII	ASCII data set
13, 14	Controller Version	ASCII	ASCII data set

Standard Melt Pump Status Block (MPS)

Figure 4.11
Standard Melt Pump Status Block (MPS)

Word \ Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	Page Number		CR	CE	0	DC			Device Identification							
2	Zone Address								Station Address							
3	Diagnostic Word															
4	0				0				0				0			
5	Machine Command Word (Bit Map)															
6	Process Status (Bit Map)															
7	Inlet Pressure (PSI)															
8																
9	Outlet Pressure (PSI)															
10																
11	RPM (RPM)															
12																
13	RPM Setpoint (RPM)															
14																
15	High RPM Alarm Deviation (RPM)															
16																
17	Low RPM Alarm Deviation (RPM)															
18																
19	Inlet Pressure Setpoint (PSI)															
20																
21	High Inlet Pressure Alarm Deviation (PSI)															
22																
23	Low Inlet Pressure Alarm Deviation (PSI)															
24																
25	Controller Integrity (ASCII)															
26																

Word / Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
27	Controller Version (ASCII)															
28																

Figure 4.12
Standard Melt Pump Status Block Word/Bit Definitions

Word	Description	Data	Range
1	Block Identification	Bits 0-7	00100100
	DC	Bits 8-10	**000= Standard Data configuration** 001 = Configuration Data 010 = Random data configuration 011 = Random Data Open 100 = Store Sent configuration 101 = Read Stored configuration 110 = Overwrite Stored configuration 111 = Clear Stored configuration
	Reserved	Bit 11	Not used
	CE	Bit 12	Bit 12 = 0 - Command did not execute properly Bit 12 = 1 - Command executed with no errors
	CR	Bit 13	Bit 13 = 0 - This status block is a response to an id/address stored in the MCC configuration Bit 13 = 1 - This status block is a response to a previously sent command block from the host computer
	Page Number	Bits 14, 15	**00 = This is page 0 of status for a previously sent SDC command** 01 = This is page 1 of status for a previously sent SDC command 10 = This is page 2 of status for a previously sent SDC command
2	Station Address	Bits 0-7 BCD or TCB	32 to 99 BCD 20 to FF (32 to 255) TCB
	Zone Address	Bits 8-15 BCD or TCB	48 to 99 BCD 30 to FF (48 to 255) TCB
3	Diagnostic Word	Bits 0-15 BCD or TCB	0 to 9999 BCD 0 to 9999 TCB
4	Not used		

Word	Description	Data	Range
		If PM bit = 0, then word 5 = :	
5	Machine Run Command	Bit 0	Bit 0 = 0 - Machine stopped Bit 0 = 1 - Machine running
	Alarm Acknowledge	Bit 1	Bit 1 = 0 - Normal Bit 1 = 1 - Acknowledged
	Reserved	Bits 2-15	
		If PM bit = 1, then word 5 = :	
5	Machine Run Command	Bit 0	Bit 0 = 0 - Machine stopped Bit 0 = 1 - Machine running
	On/Off	Bit 1	Bit 1 = 0 - Machine on/off not allowed Bit 1 = 1 - Machine on/off allowed
	Alarm Acknowledge	Bit 2	Bit 2 = 0 - Normal Bit 2 = 1 - Acknowledged
	Reserved	Bits 3-15	Not used
6	Machine Run Status	Bit 0	0 = Machine off 1 = Machine running
	System Status	Bit 1	0 = Normal 1 = Alarm
	Process Status	Bit 2	0 = Normal 1 = Alarm
	Machine Status	Bit 3	0 = Normal 1 = Alarm
	Reserved	Bits 4-5	Not used
	Pressure Status	Bit 6	0 = Normal 1 = High Alarm
	Pressure Status	Bit 7	0 = Normal 1 = Low Alarm
	Reserved	Bit 8-11	Not used
	RPM Status	Bit 12	0 = Normal 1 = High Alarm
	RPM Status	Bit 13	0 = Normal 1 = Low Alarm
	Reserved	Bits 14-15	Not used
7, 8	Inlet Pressure Actual	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
9, 10	Outlet Pressure Actual	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$

Word	Description	Data	Range
11, 12	RPM Actual	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
13, 14	RPM Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
15, 16	High RPM Alarm Deviation	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
17, 18	Low RPM Alarm Deviation	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
19, 20	Inlet Pressure Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
21, 22	High Inlet Pressure Alarm Deviation	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
23, 24	Low Inlet Pressure Alarm Deviation	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
25, 26	Controller Integrity	ASCII	ASCII data set
27, 28	Controller Version	ASCII	ASCII data set

Additive Feeder Status Block (AFS)

Figure 4.13
Standard Additive Feeder Status Block (AFS)

Word | Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	Page Number		CR	CE	0	DC			Device Identification							
2	Zone Address								Station Address							
3	Diagnostic Word															
4	0				0				0				0			
5	Machine Command Word (Bit Map)															
6	Process Status (Bit Map)															
7	Material Usage															
8																
9	Additive Setpoint (VS)															
10																
11	Reference Setpoint (VS)															
12																
13	Calibration Setpoint (VS)															
14																
15	Controller Integrity (ASCII)															
16																
17	Controller Version (ASCII)															
18																

Figure 4.14
Standard Additive Feeder Status Block Word/Bit Definitions

Word	Description	Data	Range
1	Block Identification	Bits 0-7	00100000 to 11111111
	DC	Bits 8-10	**000= Standard Data configuration** 001 = Configuration Data 010 = Random data configuration 011 = Random Data Open 100 = Store Sent configuration 101 = Read Stored configuration 110 = Overwrite Stored configuration 111 = Clear Stored configuration
	Reserved	Bit 11	Not used
	CE	Bit 12	Bit 12 = 0 - Command did not execute properly Bit 12 = 1 - Command executed with no errors
	CR	Bit 13	**Bit 13 = 0 - This status block is a response to an id/address stored in the MCC configuration** Bit 13 = 1 - This status block is a response to a previously sent command block from the host computer
	Page Number	Bits 14, 15	**00 = This is page 0 of status for a previously sent SDC command** 01 = This is page 1 of status for a previously sent SDC command 10 = This is page 2 of status for a previously sent SDC command
2	Station Address	Bits 0-7 BCD or TCB	32 to 99 BCD 20 to FF (32 to 255) TCB
	Zone Address	Bits 8-15 BCD or TCB	48 to 99 BCD 30 to FF (48 to 255) TCB
3	Diagnostic Word	Bits 0-15 BCD or TCB	0 to 9999 BCD 0 to 9999 TCB
4	Not used		
If PM bit = 0, then word 5 = :			
5	Machine Run Command	Bit 0	Bit 0 = 0 - Machine stopped Bit 0 = 1 - Machine running
	Alarm Acknowledge	Bit 1	Bit 1 = 0 - Normal Bit 1 = 1 - Acknowledged
	Reserved	Bits 2-15	Not used

Word	Description	Data	Range
If PM bit = 1, then word 5 = :			
5	Machine Run Command	Bit 0	Bit 0 = 0 - Machine stopped Bit 0 = 1 - Machine running
	On/Off	Bit 1	Bit 1 = 0 - Machine on/off not allowed Bit 1 = 1 - Machine on/off allowed
	Alarm Acknowledge	Bit 2	Bit 2 = 0 - Normal Bit 2 = 1 - Acknowledged
	Reserved	Bits 3-15	Not used
6	Machine Run Status	Bit 0	0 = Machine off 1 = Machine running
	System Status	Bit 1	0 = Normal 1 = Alarm
	Process Status	Bit 2	0 = Normal 1 = Alarm
	Machine Status	Bit 3	0 = Normal 1 = Alarm
	Reserved	Bits 4-9	Not used
	Auger Status	Bit 10	0 = Normal 1 = Jammed
	Material Status	Bit 11	0 = Normal 1 = Low Alarm
	Reserved	Bit 12-15	Not used
7, 8	Material Usage Actual	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
9, 10	Additive Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
11, 12	Reference Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
13, 14	Calibration Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
15, 16	Controller Integrity	ASCII	ASCII data set
17, 18	Controller Version	ASCII	ASCII data set

Self Tuning General Purpose Temperature Controller Status Block (STS)

Figure 4.15
Self Tuning General Purpose Temperature Controller Status Block (STS)

Word \ Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	Page Number		CR	CE	0	DC			Device Identification							
2	Zone Address								Station Address							
3	Diagnostic Word															
4	0				0				0				0			
5	Open/Closed Loop Control (Bit Map)															
6	Soft Start Sequence (Bit Map)															
7	Alarm 1 Control (Bit Map)															
8	Alarm 2 Control (Bit Map)															
9	Controller Status (Bit Map)															
10	Alarm Active Status (Bit Map)															
11	Autotune Status (Bit Map)															
12	Load Current Value (F)															
13																
14	Process Value (F)															
15																
16	Process Temperature Deviation (F)															
17																
18	Process Setpoint 1 (F)															
19																
20	Process Setpoint 2 (F)															
21																
22	Cycle Time 1 (S)															
23																
24	Cycle Time 2 (S)															
25																
26	Alarm 1 Setpoint (F)															
27																

Word | Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
28	Alarm 2 Setpoint (F)															
29																
30	Alarm Hysterisis (F)															
31																
32	Autotune Proportional Band 1 (F)															
33																
34	Autotune Proportional Band 2 (F)															
35																
36	Autotune Reset 1 (S)															
37																
38	Autotune Reset 2 (S)															
39																
40	Autotune Rate 1 (S)															
41																
42	Autotune Rate 2 (S)															
43																
44	Heat/Cool Ratio (%)															
45																
46	Manual Percent Output (%)															
47																
48	Proportional Band 2 (F)															
49																
50	Controller Integrity (ASCII)															
51																
52	Controller Version (ASCII)															
53																

Figure 4.16
Self Tuning General Purpose Temperature Controller Command Block Word/Bit Definitions

Word	Description	Data	Range
1	Block Identification	Bits 0-7	00100110
	DC	Bits 8-10	**000= Standard Data configuration** 001 = Configuration Data 010 = Random data configuration 011 = Random Data Open 100 = Store Sent configuration 101 = Read Stored configuration 110 = Overwrite Stored configuration 111 = Clear Stored configuration
	Reserved	Bit 11	Not used
	CE	Bit 12	Bit 12 = 0 - Command did not execute properly Bit 12 = 1 - Command executed with no errors
	CR	Bit 13	Bit 13 = 0 - This status block is a response to an id/address stored in the MCC configuration Bit 13 = 1 - This status block is a response to a previously sent command block from the host computer
	Page Number	Bits 14, 15	**00 = This is page 0 of status for a previously sent SDC command** 01 = This is page 1 of status for a previously sent SDC command 10 = This is page 2 of status for a previously sent SDC command
2	Station Address	Bits 0-7 BCD or TCB	32 to 99 BCD 20 to FF (32 to 255) TCB
	Zone Address	Bits 8-15 BCD or TCB	48 to 99 BCD 30 to FF (48 to 255) TCB
3	Diagnostic Word	Bits 0-15 BCD or TCB	0 to 9999 BCD 0 to 9999 TCB
4	Not used		
5	Control Mode	Bit 0	Bit 0 = 0 - Open loop control (manual) Bit 0 = 1 - Closed loop control (auto)
	Reserved	Bits 1-15	Not used
6	Soft Start	Bit 0	Bit 0 = 0 - Soft start disabled Bit 0 = 1 - Soft start enabled
	Reserved	Bits 1-15	Not used

Word	Description	Data	Range
7	Alarm 1 Clear	Bit 0	Bit 0 = 0 - No action Bit 0 = 1 - Alarm cleared
	Reserved	Bits 1-15	Not used
8	Alarm 2 Clear	Bit 0	Bit 0 = 0 - No action Bit 0 = 1 - Alarm cleared
	Reserved	Bits 1-15	Not used
9	Heater Power	Bit 0	Bit 0 = 0 - No power to heaters Bit 0 = 1 - Power to heaters on
	Soft Start	Bit 1	Bit 1 = 0 - Soft start not active Bit 1 = 1 - Soft start active
	Manual Control	Bit 2	Bit 2 = 0 - Automatic control Bit 2 = 1 - Manual control
	Low Alarm 1	Bit 3	Bit 3 = 0 - Alarm not active Bit 3 = 1 - Alarm active
	High Alarm 1	Bit 4	Bit 3 = 0 - Alarm not active Bit 3 = 1 - Alarm active
	Low Alarm 2	Bit 5	Bit 5 = 0 - Alarm not active Bit 5 = 1 - Alarm active
	High Alarm 2	Bit 6	Bit 6 = 0 - Alarm not active Bit 6 = 1 - Alarm active
	Open TC Alarm	Bit 7	Bit 7 = 0 - TC normal Bit 7 = 1 - TC open
	Reverse TC Alarm	Bit 8	Bit 8 = 0 - TC normal Bit 8 = 1 - TC reversed
	Shorted TC Alarm	Bit 9	Bit 9 = 0 - TC normal Bit 9 = 1 - TC shorted
	Open Output Device	Bit 10	Bit 10 = 0 - Output device normal Bit 10 = 1 - Output device open
	Shorted Output Device	Bit 11	Bit 11 = 0 - Output device normal Bit 11 = 1 - Output device shorted
	Ground Fault Alarm	Bit 12	Bit 12 = 0 - No ground fault Bit 12 = 1 - Ground fault condition
	Low Alarm Current	Bit 13	Bit 13 = 0 - Alarm not active Bit 13 = 1 - Alarm active
	High Alarm Current	Bit 14	Bit 14 = 0 - Alarm not active Bit 14 = 1 - Alarm active
	Process Out of Control	Bit 15	Bit 15 = 0 - Alarm not active Bit 15 = 1 - Alarm active

Word	Description	Data	Range
10	Alarm Status	Bit 0	Bit 0 = 0 - No active alarms Bit 0 = 1 - Alarm active
	Reserved	Bits 1-15	Not used
11	Tuning in Process	Bit 0	Bit 0 = 0 - No tuning in process Bit 0 = 1 - Tuning in process
	No Tuning	Bit 1	Bit 1 = 0 - Using tuned parameters Bit 1 = 1 - Using default parameters
	Partial Tuning	Bit 2	Bit 2 = 0 - Not using partial tune parameters Bit 2 = 1 - Using partial tune parameters
	Full Tuning	Bit 3	Bit 3 = 0 - Not using autotune parameters Bit 3 = 1 - Using autotune parameters
	Reserved	Bits 4-15	Not used
12, 13	Load Current Value	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
14, 15	Process Value	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
16, 17	Process Temperature Deviation	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
18, 19	Process Setpoint 1	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
20, 21	Process Setpoint 2	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
22, 23	Cycle Time 1	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
24, 25	Cycle Time 2	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
26, 27	Alarm Setpoint 1	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
28, 29	Alarm Setpoint 2	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
30, 31	Alarm Hysterisis	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$

Word	Description	Data	Range
32, 33	Autotune Proportional Band 1	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
34, 35	Autotune Proportional Band 2	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
36, 37	Autotune Reset 1	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
38, 39	Autotune Reset 2	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
40, 41	Autotune Rate 1	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
42, 43	Autotune Rate 2	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
44, 45	Heat/Cool Ratio	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
46, 47	Manual Percent Output	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
48, 49	Proportional Band 2	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
50, 51	Controller Integrity	ASCII	ASCII data set
52, 53	Controller Version	ASCII	ASCII data set

General Purpose Temperature Controller Status Block (GPS)

Figure 4.17
General Purpose Temperature Controller Status Block (GPS)

Word \ Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	Page Number		CR	CE	0	DC			Device Identification							
2	Zone Address								Station Address							
3	Diagnostic Word															
4	0				0				0				0			
5	Open/Closed Loop Control (Bit Map)															
6	Soft Start Sequence (Bit Map)															
7	Alarm 1 Control (Bit Map)															
8	Alarm 2 Control (Bit Map)															
9	Controller Status (Bit Map)															
10	Alarm Active Status (Bit Map)															
11	Autotune Status (Bit Map)															
12	Load Current Value (F)															
13																
14	Process Value (F)															
15																
16	Process Temperature Deviation (F)															
17																
18	Process Setpoint 1 (F)															
19																
20	Process Setpoint 2 (F)															
21																
22	Cycle Time 1 (S)															
23																
24	Cycle Time 2 (S)															
25																
26	Alarm 1 Setpoint (F)															
27																
28	Alarm 2 Setpoint (F)															

Word | Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
29																
30	Alarm Hysterisis (F)															
31																
32	Autotune Proportional Band 1 (F)															
33																
34	Autotune Proportional Band 2 (F)															
35																
36	Autotune Reset 1 (S)															
37																
38	Autotune Reset 2 (S)															
39																
40	Autotune Rate 1 (S)															
41																
42	Autotune Rate 2 (S)															
43																
44	Heat/Cool Ratio (%)															
45																
46	Manual Percent Output (%)															
47																
48	Proportional Band 1 (F)															
49																
50	Proportional Band 2 (F)															
51																
52	Reset 1 (S)															
53																
54	Rate 1 (S)															
55																
56	Controller Integrity (ASCII)															
57																
58	Controller Version (ASCII)															
59																

Figure 4.18
General Purpose Temperature Controller Command Block Word/Bit Definitions

Word	Description	Data	Range
1	Block Identification	Bits 0-7	00100000 to 11111111
	DC	Bits 8-10	**000= Standard Data configuration** 001 = Configuration Data 010 = Random data configuration 011 = Random Data Open 100 = Store Sent configuration 101 = Read Stored configuration 110 = Overwrite Stored configuration 111 = Clear Stored configuration
	Reserved	Bit 11	Not used
	CE	Bit 12	Bit 12 = 0 - Command did not execute properly Bit 12 = 1 - Command executed with no errors
	CR	Bit 13	Bit 13 = 0 - This status block is a response to an id/address stored in the MCC configuration Bit 13 = 1 - This status block is a response to a previously sent command block from the host computer
	Page Number	Bits 14, 15	**00 = This is page 0 of status for a previously sent SDC command** 01 = This is page 1 of status for a previously sent SDC command 10 = This is page 2 of status for a previously sent SDC command
2	Station Address	Bits 0-7 BCD or TCB	32 to 99 BCD 20 to FF (32 to 255) TCB
	Zone Address	Bits 8-15 BCD or TCB	48 to 99 BCD 30 to FF (48 to 255) TCB
3	Diagnostic Word	Bits 0-15 BCD or TCB	0 to 9999 BCD 0 to 9999 TCB
4	Not used		
5	Control Mode	Bit 0	Bit 0 = 0 - Open loop control (manual) Bit 0 = 1 - Closed loop control (auto)
	Reserved	Bits 1-15	Not used
6	Soft Start	Bit 0	Bit 0 = 0 - Soft start disabled Bit 0 = 1 - Soft start enabled
	Reserved	Bits 1-15	Not used

Word	Description	Data	Range
7	Low Hold	Bit 0	Bit 0 = 0 - Low hold alarm function disabled Bit 0 = 1 - Low hold alarm function enabled
	Latching	Bit 1	Bit 1 = 0 - Latching alarm disabled Bit 1 = 1 - Latching alarm enabled
	NO/NC	Bit 2	Bit 2 = 0 - Normally open Bit 2 = 1 - Normally closed
	Alarm Type	Bits 3-5	001 - Process low alarm 010 - Process high alarm 011 - Deviation low alarm 100 - Deviation high alarm 101 - Deviation band alarm
	Reserved	Bits 6-15	Not used
8	Low Hold	Bit 0	Bit 0 = 0 - Disable low hold alarm function Bit 0 = 1 - Enable low hold alarm function
	Latching	Bit 1	Bit 1 = 0 - Disable latching alarm Bit 1 = 1 - Enable latching alarm
	NO/NC	Bit 2	Bit 2 = 0 - Normally open Bit 2 = 1 - Normally closed
	Alarm Type	Bits 3-5	001 - Process low alarm 010 - Process high alarm 011 - Deviation low alarm 100 - Deviation high alarm 101 - Deviation band alarm
	Reserved	Bits 6-15	Not used
9	Heater Power	Bit 0	Bit 0 = 0 - No power to heaters Bit 0 = 1 - Power to heaters on
	Soft Start	Bit 1	Bit 1 = 0 - Soft start not active Bit 1 = 1 - Soft start active
	Manual Control	Bit 2	Bit 2 = 0 - Automatic control Bit 2 = 1 - Manual control
	Low Alarm 1	Bit 3	Bit 3 = 0 - Alarm not active Bit 3 = 1 - Alarm active
	High Alarm 1	Bit 4	Bit 3 = 0 - Alarm not active Bit 3 = 1 - Alarm active
	Low Alarm 2	Bit 5	Bit 5 = 0 - Alarm not active Bit 5 = 1 - Alarm active
	High Alarm 2	Bit 6	Bit 6 = 0 - Alarm not active Bit 6 = 1 - Alarm active
	Open TC Alarm	Bit 7	Bit 7 = 0 - TC normal Bit 7 = 1 - TC open
	Reverse TC Alarm	Bit 8	Bit 8 = 0 - TC normal Bit 8 = 1 - TC reversed

Word	Description	Data	Range
9 cont.	Shorted TC Alarm	Bit 9	Bit 9 = 0 - TC normal Bit 9 = 1 - TC shorted
	Open Output Device	Bit 10	Bit 10 = 0 - Output device normal Bit 10 = 1 - Output device open
	Shorted Output Device	Bit 11	Bit 11 = 0 - Output device normal Bit 11 = 1 - Output device shorted
	Ground Fault Alarm	Bit 12	Bit 12 = 0 - No ground fault Bit 12 = 1 - Ground fault condition
	Low Alarm Current	Bit 13	Bit 13 = 0 - Alarm not active Bit 13 = 1 - Alarm active
	High Alarm Current	Bit 14	Bit 14 = 0 - Alarm not active Bit 14 = 1 - Alarm active
	Process Out of Control	Bit 15	Bit 15 = 0 - Alarm not active Bit 15 = 1 - Alarm active
10	Alarm Status	Bit 0	Bit 0 = 0 - No active alarms Bit 0 = 1 - Alarm active
	Reserved	Bits 1-15	Not used
11	Tuning in Process	Bit 0	Bit 0 = 0 - No tuning in process Bit 0 = 1 - Tuning in process
	No Tuning	Bit 1	Bit 1 = 0 - Using tuned parameters Bit 1 = 1 - Using default parameters
	Partial Tuning	Bit 2	Bit 2 = 0 - Not using partial tune parameters Bit 2 = 1 - Using partial tune parameters
	Full Tuning	Bit 3	Bit 3 = 0 - Not using autotune parameters Bit 3 = 1 - Using autotune parameters
	Reserved	Bits 4-15	Not used
12, 13	Load Current Value	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
14, 15	Process Value	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
16, 17	Process Temperature Deviation	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
18, 19	Process Setpoint 1	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
20, 21	Process Setpoint 2	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$

Word	Description	Data	Range
22, 23	Cycle Time 1	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
24, 25	Cycle Time 2	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
26, 27	Alarm Setpoint 1	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
28, 29	Alarm Setpoint 2	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
30, 31	Alarm Hysterisis	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
32, 33	Autotune Proportional Band 1	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
34, 35	Autotune Proportional Band 2	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
36, 37	Autotune Reset 1	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
38, 39	Autotune Reset 2	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
40, 41	Autotune Rate 1	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
42, 43	Autotune Rate 2	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
44, 45	Heat/Cool Ratio	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
46, 47	Manual Percent Output	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
48, 49	Proportional Band 1	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
50, 51	Proportional Band 2	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$

Word	Description	Data	Range
52, 53	Reset 1	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
54, 55	Rate 1	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
56, 57	Controller Integrity	ASCII	ASCII data set
58, 59	Controller Version	ASCII	ASCII data set

Blender Volumetric Controller Status Block (BVS)

Figure 4.19
Blender Volumetric Controller Status Block (BVS) Page 0

Word / Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	Page Number		CR	CE	0	DC			Device Identification							
2	Zone Address								Station Address							
3	Diagnostic Word															
4	0				0				0				0			
5	Machine Command Word (Bit Map)															
6	Process Command Word (Bit Map)															
7	Process Summary Status (Bit Map)															
8	Process Hopper Status 1 (Bit Map)															
9	Process Hopper Status 2 (Bit Map)															
10	Process Hopper Status 3 (Bit Map)															
11	Process Hopper Status 4 (Bit Map)															
12	Process Hopper Status 5 (Bit Map)															
13	Process Hopper Status 6 (Bit Map)															
14	Process Hopper Status 7 (Bit Map)															
15	Process Hopper Status 8 (Bit Map)															
16	Ingredient Blend Percentages Measured 1 (%)															
17																
18	Ingredient Blend Percentages Measured 2 (%)															
19																
20	Ingredient Blend Percentages Measured 3 (%)															
21																
22	Ingredient Blend Percentages Measured 4 (%)															
23																
24	Ingredient Blend Percentages Measured 5 (%)															
25																
26	Ingredient Blend Percentages Measured 6 (%)															
27																

Word | Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
28	Ingredient Blend Percentages Measured 7 (%)															
29																
30	Ingredient Blend Percentages Measured 8 (%)															
31																
32	Ingredient Rates Measured 1 (Lbs/hr)															
33																
34	Ingredient Rates Measured 2 (Lbs/hr)															
35																
36	Ingredient Rates Measured 3 (Lbs/hr)															
37																
38	Ingredient Rates Measured 4 (Lbs/hr)															
39																
40	Ingredient Rates Measured 5 (Lbs/hr)															
41																
42	Ingredient Rates Measured 6 (Lbs/hr)															
43																
44	Ingredient Rates Measured 7 (Lbs/hr)															
45																
46	Ingredient Rates Measured 8 (Lbs/hr)															
47																
48	Total Rate Measured Value (Lbs/hr)															
49																
50	Quantity Measured Value (Lbs)															
51																

Figure 4.20
Blender Volumetric Controller Status Block (BVS) Page 1

Bit/Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	Page Number		CR	CE	0	DC			Device Identification							
2	Zone Address								Station Address							
3	Diagnostic Word															
4	0				0				0				0			
5	Inventory Measured Value 1 (Lbs)															
6																
7	Inventory Measured Value 2 (Lbs)															
8																
9	Inventory Measured Value 3 (Lbs)															
10																
11	Inventory Measured Value 4 (Lbs)															
12																
13	Inventory Measured Value 5 (Lbs)															
14																
15	Inventory Measured Value 6 (Lbs)															
16																
17	Inventory Measured Value 7 (Lbs)															
18																
19	Inventory Measured Value 8 (Lbs)															
20																
21	Total Inventory Measured Value (Lbs)															
22																
23	Ingredient Blend Percentages Setpoint 1 (%)															
24																
25	Ingredient Blend Percentages Setpoint 2 (%)															
26																
27	Ingredient Blend Percentages Setpoint 3 (%)															
28																

Bit/Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
29	Ingredient Blend Percentages Setpoint 4 (%)															
30																
31	Ingredient Blend Percentages Setpoint 5 (%)															
32																
33	Ingredient Blend Percentages Setpoint 6 (%)															
34																
35	Ingredient Blend Percentages Setpoint 7 (%)															
36																
37	Ingredient Blend Percentages Setpoint 8 (%)															
38																
39	Calibration Setpoint (VS) 1															
40																
41	Calibration Setpoint (VS) 2															
42																
43	Calibration Setpoint (VS) 3															
44																
45	Calibration Setpoint (VS) 4															
46																
47	Calibration Setpoint (VS) 5															
48																
49	Calibration Setpoint (VS) 6															
50																
51	Calibration Setpoint (VS) 7															
52																
53	Calibration Setpoint (VS) 8															
54																
55	Total Rate Setpoint (Pounds per Hour)															
56																
57	Quantity Setpoint (Pounds)															
58																

Bit/Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
59	Controller Integrity Command (ASCII)															
60																
61	Controller Version Command (ASCII)															
62																

Figure 4.21
Blender Volumetric Controller Status Block Word/Bit Definitions (Page 0)

Word	Description	Data	Range
1	Block Identification	Bits 0-7	00101000
	DC	Bits 8-10	**000= Standard Data configuration** 001 = Configuration Data 010 = Random data configuration 011 = Random Data Open 100 = Store Sent configuration 101 = Read Stored configuration 110 = Overwrite Stored configuration 111 = Clear Stored configuration
	Reserved	Bit 11	Not used
	CE	Bit 12	Bit 12 = 0 - Command did not execute properly Bit 12 = 1 - Command executed with no errors
	CR	Bit 13	Bit 13 = 0 - This status block is a response to an id/address stored in the MCC configuration Bit 13 = 1 - This status block is a response to a previously sent command block from the host computer
	Page Number	Bits 14, 15	**00 = This is page 0 of status for a previously sent SDC command** 01 = This is page 1 of status for a previously sent SDC command 10 = This is page 2 of status for a previously sent SDC command
2	Station Address	Bits 0-7 BCD or TCB	32 to 99 BCD 20 to FF (32 to 255) TCB
	Zone Address	Bits 8-15 BCD or TCB	48 to 99 BCD 30 to FF (48 to 255) TCB
3	Diagnostic Word	Bits 0-15 BCD or TCB	0 to 9999 BCD 0 to 9999 TCB
4	Not used		

Word	Description	Data	Range
If the PM bit in the MCC is 0, then word 5 =			
5	Machine Run Command	Bit 0	Bit 0 = 0 - Machine stopped Bit 0 = 1 - Machine running
	Alarm Acknowledge	Bit 1	Bit 1 = 0 - Normal Bit 1 = 1 - Acknowledged
	Reserved	Bits 2-15	
If the PM bit in the MCC is 1, then word 5 =			
5	Machine Run Command	Bit 0	Bit 0 = 0 - Machine stopped Bit 0 = 1 - Machine running
	On/Off	Bit 1	Bit 1 = 0 - Machine on/off not allowed Bit 1 = 1 - Machine on/off allowed
	Alarm Acknowledge	Bit 2	Bit 2 = 0 - Normal Bit 2 = 1 - Acknowledged
	Reserved	Bits 3-15	
6		Bits 0-3	Not used
	Mixer On/Off	Bit 4	Bit 4 = 0 - Mixer Off Bit 4 = 1 - Mixer On
	On/Off Action Allowed	Bit 5	Bit 5 = 0 - Mixer on/off inhibited Bit 5 = 1 - Mixer on/off enabled
	Quantity Reset	Bit 6	Bit 6 = 1 - No action Bit 6 = - Quantity measure value reset to 0
	All Totals Reset	Bit 7	Bit 7 = 0 - No action Bit 7 = 1 - Reset inventory totals all hoppers
	Hopper A Totals Reset	Bit 8	Bit 8 = 0 - No action Bit 8 = 1 - Reset inventory total for hopper A
	Hopper B Totals Reset	Bit 9	Bit 9 = 0 - No action Bit 9 = 1 - Reset inventory total for hopper B
	Hopper C Totals Reset	Bit 10	Bit 10 = 0 - No action Bit 10 = 1 - Reset inventory total for hopper C
	Hopper D Totals Reset	Bit 11	Bit 11 = 0 - No action Bit 11 = 1 - Reset inventory total for hopper D
	Hopper E Totals Reset	Bit 12	Bit 12 = 0 - No action Bit 12 = 1 - Reset inventory total for hopper E
	Hopper F Totals Reset	Bit 13	Bit 13 = 0 - No action Bit 13 = 1 - Reset inventory total for hopper F
	Hopper G Totals Reset	Bit 14	Bit 14 = 0 - No action Bit 14 = 1 - Reset inventory total for hopper G
	Hopper H Totals Reset	Bit 15	Bit 15 = 0 - No action Bit 15 = 1 - Reset inventory total for hopper H

Word	Description	Data	Range
7	Processing	Bit 0	Bit 0 = 0 - Not processing Bit 0 = 1 - Processing
	System Alarm	Bit 1	Bit 1 = 0 - No alarm Bit 1 = 1 - Machine or process alarm
	Process Alarm	Bit 2	Bit 2 = 0 - No alarm Bit 2 = 1 - Process alarm
	Machine Alarm	Bit 3	Bit 3 = 0 - No alarm Bit 3 = 1 - Machine alarm
	Reserved	Bit 4	Not used
	Quantity Complete Status	Bit 5	Bit 5 = 0 - Not complete Bit 5 = 1 - Complete
	Material Demand Status	Bit 6	Bit 6 = 0 - Normal operation Bit 6 = 1 - Operating due to material demand
	Mixer Failure Alarm	Bit 7	Bit 7 = 0 - No alarm Bit 7 = 1 - Alarm
	Feed Failure Alarm	Bit 8	Bit 8 = 0 - No alarm Bit 8 = 1 - Alarm
	Low Material Alarm	Bit 9	Bit 9 = 0 - No alarm Bit 9 = 1 - Alarm
	High Material Alarm	Bit 10	Bit 10 = 0 - No alarm Bit 10 = 1 - Alarm
	Reserved	Bits 11-15	Not used
8-15	Processing	Bit 0	Bit 0 = 0 - Hopper not processing Bit 0 = 1 - Processing
	System Alarm	Bit 1	Bit 1 = 0 - No alarm Bit 1 = 1 - Machine or process alarm
	Process Alarm	Bit 2	Bit 2 = 0 - No alarm Bit 2 = 1 - Process alarm
	Machine Alarm	Bit 3	Bit 3 = 0 - No alarm Bit 3 = 1 - Machine alarm
	Reserved	Bit 4	Not used
	Quantity Complete Status	Bit 5	Bit 5 = 0 - Not complete Bit 5 = 1 - Complete

Word	Description	Data	Range
8-15 continued	Material Demand Status	Bit 6	Bit 6 = 0 - Normal operation Bit 6 = 1 - Operating due to material demand
	Mixer Failure Alarm	Bit 7	Bit 7 = 0 - No alarm Bit 7 = 1 - Alarm
	Feed Failure Alarm	Bit 8	Bit 8 = 0 - No alarm Bit 8 = 1 - Alarm
	Low Material Alarm	Bit 9	Bit 9 = 0 - No alarm Bit 9 = 1 - Alarm
	High Material Alarm	Bit 10	Bit 10 = 0 - No alarm Bit 10 = 1 - Alarm
	Hopper Present Alarm	Bit 11	Bit 11 = 0 - Hopper not present Bit 11 = 1 - Hopper present in blender
	Reserved	Bits 12-15	Not used
16, 17	Ingredient Blend Percentages Measured Value	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
18 thru 33	Ingredient Rates Measure Value	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
34, 35	Total Rate Measured Value	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
36, 37	Quantity Measured Value	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$

Figure 4.22
Blender Volumetric Controller Status Block Word/Bit Definitions (Page 1)

Word	Description	Data	Range
1	Block Identification	Bits 0-7	00100000 to 11111111
	DC	Bits 8-10	**000= Standard Data configuration** 001 = Configuration Data 010 = Random data configuration 011 = Random Data Open 100 = Store Sent configuration 101 = Read Stored configuration 110 = Overwrite Stored configuration 111 = Clear Stored configuration
	Reserved	Bit 11	Not used
	CE	Bit 12	Bit 12 = 0 - Command did not execute properly Bit 12 = 1 - Command executed with no errors

Word	Description	Data	Range
1 continued	CR	Bit 13	Bit 13 = 0 - This status block is a response to an id/address stored in the MCC configuration Bit 13 = 1 - This status block is a response to a previously sent command block from the host computer
	Page Number	Bits 14, 15	00 = This is page 0 of status for a previously sent SDC command **01 = This is page 1 of status for a previously sent SDC command** 10 = This is page 2 of status for a previously sent SDC command
2	Station Address	Bits 0-7 BCD or TCB	32 to 99 BCD 20 to FF (32 to 255) TCB
	Zone Address	Bits 8-15 BCD or TCB	48 to 99 BCD 30 to FF (48 to 255) TCB
3	Diagnostic Word	Bits 0-15 BCD or TCB	0 to 9999 BCD 0 to 9999 TCB
4	Not used		
5 thru 20	Inventory Measured Value	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
21, 22	Total Inventory Measured Value	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
23 thru 38	Ingredient Blend Percentages Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
39 thru 54	Calibration Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
55, 56	Total Rate Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
57, 58	Quantity Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
59, 60	Controller Integrity	ASCII	ASCII data set
61, 62	Controller Version	ASCII	ASCII data set

Blender Continuous Weigh Controller Status Block (BCS)

Figure 4.23
Blender Continuous Weigh Controller Status Block (BCS) Page 0

Word \ Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	Page Number		CR	CE	0	DC			Device Identification							
2	Zone Address								Station Address							
3	Diagnostic Word															
4	0				0				0				0			
5	Machine Command Word (Bit Map)															
6	Process Command Word (Bit Map)															
7	Process Summary Status (Bit Map)															
8	Process Hopper Status 1 (Bit Map)															
9	Process Hopper Status 2 (Bit Map)															
10	Process Hopper Status 3 (Bit Map)															
11	Process Hopper Status 4 (Bit Map)															
12	Process Hopper Status 5 (Bit Map)															
13	Process Hopper Status 6 (Bit Map)															
14	Process Hopper Status 7 (Bit Map)															
15	Process Hopper Status 8 (Bit Map)															
16	Ingredient Blend Percentages Measured 1 (%)															
17																
18	Ingredient Blend Percentages Measured 2 (%)															
19																
20	Ingredient Blend Percentages Measured 3 (%)															
21																
22	Ingredient Blend Percentages Measured 4 (%)															
23																
24	Ingredient Blend Percentages Measured 5 (%)															
25																
26	Ingredient Blend Percentages Measured 6 (%)															
27																

Word | Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
28	Ingredient Blend Percentages Measured 7 (%)															
29																
30	Ingredient Blend Percentages Measured 8 (%)															
31																
32	Ingredient Rates Measured 1 (Lbs/hr)															
33																
34	Ingredient Rates Measured 2 (Lbs/hr)															
35																
36	Ingredient Rates Measured 3 (Lbs/hr)															
37																
38	Ingredient Rates Measured 4 (Lbs/hr)															
39																
40	Ingredient Rates Measured 5 (Lbs/hr)															
41																
42	Ingredient Rates Measured 6 (Lbs/hr)															
43																
44	Ingredient Rates Measured 7 (Lbs/hr)															
45																
46	Ingredient Rates Measured 8 (Lbs/hr)															
47																
48	Total Rate Measured Value (Lbs/hr)															
49																
50	Quantity Measured Value (Lbs)															
51																

Figure 4.24
Blender Continuous Weigh Controller Status Block (BCS) Page 1

Word | Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	Page Number		CR	CE	0	DC			Device Identification							
2	Zone Address								Station Address							
3	Diagnostic Word															

Word | Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4	0				0				0				0			
5	Inventory Measured Value 1 (Lbs)															
6																
7	Inventory Measured Value 2 (Lbs)															
8																
9	Inventory Measured Value 3 (Lbs)															
10																
11	Inventory Measured Value 4 (Lbs)															
12																
13	Inventory Measured Value 5 (Lbs)															
14																
15	Inventory Measured Value 6 (Lbs)															
16																
17	Inventory Measured Value 7 (Lbs)															
18																
19	Inventory Measured Value 8 (Lbs)															
20																
21	Total Inventory Measured Value (Lbs)															
22																
23	Hopper Weight Measured Value (Lbs) 1															
24																
25	Hopper Weight Measured Value (Lbs) 2															
26																
27	Hopper Weight Measured Value (Lbs) 3															
28																
29	Hopper Weight Measured Value (Lbs) 4															
30																
31	Hopper Weight Measured Value (Lbs) 5															
32																
33	Hopper Weight Measured Value (Lbs) 6															
34																

Word | Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
35	Hopper Weight Measured Value (Lbs) 7															
36																
37	Hopper Weight Measured Value (Lbs) 8															
38																
39	Ingredient Blend Percentages Setpoint (%) 1															
40																
41	Ingredient Blend Percentages Setpoint (%) 2															
42																
43	Ingredient Blend Percentages Setpoint (%) 3															
44																
45	Ingredient Blend Percentages Setpoint (%) 4															
46																
47	Ingredient Blend Percentages Setpoint (%) 5															
48																
49	Ingredient Blend Percentages Setpoint (%) 6															
50																
51	Ingredient Blend Percentages Setpoint (%) 7															
52																
53	Ingredient Blend Percentages Setpoint (%) 8															
54																

Figure 4.25
Blender Continuous Weigh Controller Status Block (BCS) Page 2

Word | Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	Page Number		CR	CE	0	DC			Device Identification							
2	Zone Address								Station Address							
3	Diagnostic Word															
4	0				0				0				0			
5	Calibration Setpoint (VS) 1															
6																
7	Calibration Setpoint (VS) 2															

Word \ Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8																
9	Calibration Setpoint (VS) 3															
10																
11	Calibration Setpoint (VS) 4															
12																
13	Calibration Setpoint (VS) 5															
14																
15	Calibration Setpoint (VS) 6															
16																
17	Calibration Setpoint (VS) 7															
18																
19	Calibration Setpoint (VS) 8															
20																
21	Total Rate Setpoint (Pounds per Hour)															
22																
23	Quantity Setpoint (Pounds)															
24																
25	Controller Integrity (ASCII)															
26																
27	Controller Version (ASCII)															
28																

Figure 4.26
Blender Continuous Weigh Controller Status Block (BCS) Word/Bit Definitions Page 0

Word	Description	Data	Range
1	Block Identification	Bits 0-7	00101001
	DC	Bits 8-10	**000= Standard Data configuration** 001 = Configuration Data 010 = Random data configuration 011 = Random Data Open 100 = Store Sent configuration 101 = Read Stored configuration 110 = Overwrite Stored configuration 111 = Clear Stored configuration
	Reserved	Bit 11	Not used
	CE	Bit 12	Bit 12 = 0 - Command did not execute properly Bit 12 = 1 - Command executed with no errors
	CR	Bit 13	Bit 13 = 0 - This status block is a response to an id/address stored in the MCC configuration Bit 13 = 1 - This status block is a response to a previously sent command block from the host computer
	Page Number	Bits 14, 15	**00 = This is page 0 of status for a previously sent SDC command** 01 = This is page 1 of status for a previously sent SDC command 10 = This is page 2 of status for a previously sent SDC command
2	Station Address	Bits 0-7 BCD or TCB	32 to 99 BCD 20 to FF (32 to 255) TCB
	Zone Address	Bits 8-15 BCD or TCB	48 to 99 BCD 30 to FF (48 to 255) TCB
3	Diagnostic Word	Bits 0-15 BCD or TCB	0 to 9999 BCD 0 to 9999 TCB
4	Not used		
If the PM bit in the MCC is 0, then word 5 =			
5	Machine Run Command	Bit 0	Bit 0 = 0 - Machine stopped Bit 0 = 1 - Machine running
	Alarm Acknowledge	Bit 1	Bit 1 = 0 - Normal Bit 1 = 1 - Acknowledged
	Reserved	Bits 2-15	Not used

Word	Description	Data	Range
If the PM bit in the MCC is 1, then word 5 =			
5	Machine Run Command	Bit 0	Bit 0 = 0 - Machine stopped Bit 0 = 1 - Machine running
	On/Off	Bit 1	Bit 1 = 0 - Machine on/off not allowed Bit 1 = 1 - Machine on/off allowed
	Alarm Acknowledge	Bit 2	Bit 2 = 0 - Normal Bit 2 = 1 - Acknowledged
	Reserved	Bits 3-15	Not used
6		Bits 0-3	Not used
	Mixer On/Off	Bit 4	Bit 4 = 0 - Mixer Off Bit 4 = 1 - Mixeer On
	On/Off Action Allowed	Bit 5	Bit 5 = 0 - Inhibit mixer on/off Bit 5 = 1 - Enable mixer on/off
	Quantity Reset	Bit 6	Bit 6 = 1 - No action Bit 6 = - Reset quantity measure value to 0
	All Totals Reset	Bit 7	Bit 7 = 0 - No action Bit 7 = 1 - Reset inventory totals all hoppers
	Hopper A Totals Reset	Bit 8	Bit 8 = 0 - No action Bit 8 = 1 - Reset inventory total for hopper A
	Hopper B Totals Reset	Bit 9	Bit 9 = 0 - No action Bit 9 = 1 - Reset inventory total for hopper B
	Hopper C Totals Reset	Bit 10	Bit 10 = 0 - No action Bit 10 = 1 - Reset inventory total for hopper C
	Hopper D Totals Reset	Bit 11	Bit 11 = 0 - No action Bit 11 = 1 - Reset inventory total for hopper D
	Hopper E Totals Reset	Bit 12	Bit 12 = 0 - No action Bit 12 = 1 - Reset inventory total for hopper E
	Hopper F Totals Reset	Bit 13	Bit 13 = 0 - No action Bit 13 = 1 - Reset inventory total for hopper F
	Hopper G Totals Reset	Bit 14	Bit 14 = 0 - No action Bit 14 = 1 - Reset inventory total for hopper G
	Hopper H Totals Reset	Bit 15	Bit 15 = 0 - No action Bit 15 = 1 - Reset inventory total for hopper H
7	Processing	Bit 0	Bit 0 = 0 - Not processing Bit 0 = 1 - Processing
	System Alarm	Bit 1	Bit 1 = 0 - No alarm Bit 1 = 1 - Machine or process alarm
	Process Alarm	Bit 2	Bit 2 = 0 - No alarm Bit 2 = 1 - Process alarm

Word	Description	Data	Range
7 cont.	Machine Alarm	Bit 3	Bit 3 = 0 - No alarm Bit 3 = 1 - Machine alarm
	Reserved	Bit 4	Not used
	Quantity Complete Status	Bit 5	Bit 5 = 0 - Not complete Bit 5 = 1 - Complete
	Material Demand Status	Bit 6	Bit 6 = 0 - Normal operation Bit 6 = 1 - Operating due to material demand
	Mixer Failure Alarm	Bit 7	Bit 7 = 0 - No alarm Bit 7 = 1 - Alarm
	Feed Failure Alarm	Bit 8	Bit 8 = 0 - No alarm Bit 8 = 1 - Alarm
	Low Material Alarm	Bit 9	Bit 9 = 0 - No alarm Bit 9 = 1 - Alarm
	High Material Alarm	Bit 10	Bit 10 = 0 - No alarm Bit 10 = 1 - Alarm
	Reserved	Bits 11-15	Not used
8-15	Processing	Bit 0	Bit 0 = 0 - Hopper not processing Bit 0 = 1 - Processing
	System Alarm	Bit 1	Bit 1 = 0 - No alarm Bit 1 = 1 - Machine or process alarm
	Process Alarm	Bit 2	Bit 2 = 0 - No alarm Bit 2 = 1 - Process alarm
	Machine Alarm	Bit 3	Bit 3 = 0 - No alarm Bit 3 = 1 - Machine alarm
	Reserved	Bit 4	Not used
	Quantity Complete Status	Bit 5	Bit 5 = 0 - Not complete Bit 5 = 1 - Complete
	Material Demand Status	Bit 6	Bit 6 = 0 - Normal operation Bit 6 = 1 - Operating due to material demand
	Mixer Failure Alarm	Bit 7	Bit 7 = 0 - No alarm Bit 7 = 1 - Alarm
	Feed Failure Alarm	Bit 8	Bit 8 = 0 - No alarm Bit 8 = 1 - Alarm
	Low Material Alarm	Bit 9	Bit 9 = 0 - No alarm Bit 9 = 1 - Alarm
	High Material Alarm	Bit 10	Bit 10 = 0 - No alarm Bit 10 = 1 - Alarm
	Hopper Present Alarm	Bit 11	Bit 11 = 0 - Hopper not present Bit 11 = 1 - Hopper present in blender
	Reserved	Bits 12-15	Not used

Word	Description	Data	Range
16 thru 31	Ingredient Blend Percentages Measured Value	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
32 thru 47	Ingredient Rates Measure Value	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
48, 49	Total Rate Measured Value	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
50, 51	Quantity Measured Value	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$

Figure 4.27
Blender Continuous Weigh Controller Status Block (BCS) Word/Bit Definitions Page 1

Word number	Description	Data	Range
1	Block Identification	Bits 0-7	00101001
	DC	Bits 8-10	**000= Standard Data configuration** 001 = Configuration Data 010 = Random data configuration 011 = Random Data Open 100 = Store Sent configuration 101 = Read Stored configuration 110 = Overwrite Stored configuration 111 = Clear Stored configuration
	Reserved	Bit 11	Not used
	CE	Bit 12	Bit 12 = 0 - Command did not execute properly Bit 12 = 1 - Command executed with no errors
	CR	Bit 13	Bit 13 = 0 - This status block is a response to an id/address stored in the MCC configuration Bit 13 = 1 - This status block is a response to a previously sent command block from the host computer
	Page Number	Bits 14, 15	00 = This is page 0 of status for a previously sent SDC command **01 = This is page 1 of status for a previously sent SDC command** 10 = This is page 2 of status for a previously sent SDC command

Word number	Description	Data	Range
2	Station Address	Bits 0-7 BCD or TCB	32 to 99 BCD 20 to FF (32 to 255) TCB
	Zone Address	Bits 8-15 BCD or TCB	48 to 99 BCD 30 to FF (48 to 255) TCB
3	Diagnostic Word	Bits 0-15 BCD or TCB	0 to 9999 BCD 0 to 9999 TCB
4	Not used		
38 thru 53	Inventory Measured Value	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
54, 55	Total Inventory Measured Value	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
5 thru 20	Hopper Weight Measured Value	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
21 thru 36	Ingredient Blend Percentages Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$

Figure 4.28
Blender Continuous Weigh Controller Status Block (BCS) Word/Bit Definitions Page 2

Word number	Description	Data	Range
1	Block Identification	Bits 0-7	00101001
	DC	Bits 8-10	**000= Standard Data configuration** 001 = Configuration Data 010 = Random data configuration 011 = Random Data Open 100 = Store Sent configuration 101 = Read Stored configuration 110 = Overwrite Stored configuration 111 = Clear Stored configuration
	Reserved	Bit 11	Not used

Word number	Description	Data	Range
1 Cont.	CE	Bit 12	Bit 12 = 0 - Command did not execute properly Bit 12 = 1 - Command executed with no errors
	CR	Bit 13	Bit 13 = 0 - This status block is a response to an id/address stored in the MCC configuration Bit 13 = 1 - This status block is a response to a previously sent command block from the host computer
	Page Number	Bits 14, 15	00 = This is page 0 of status for a previously sent SDC command **01 = This is page 1 of status for a previously sent SDC command** 10 = This is page 2 of status for a previously sent SDC command
2	Station Address	Bits 0-7 BCD or TCB	32 to 99 BCD 20 to FF (32 to 255) TCB
	Zone Address	Bits 8-15 BCD or TCB	48 to 99 BCD 30 to FF (48 to 255) TCB
3	Diagnostic Word	Bits 0-15 BCD or TCB	0 to 9999 BCD 0 to 9999 TCB
4	Not used		
5 thru 20	Calibration Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
21, 22	Total Rate Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
23, 24	Quantity Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
25, 26	Controller Integrity	ASCII	ASCII data set
27, 28	Controller Version	ASCII	ASCII data set

Blender Batch Weigh Controller Status Block (BBS)

Figure 4.29
Blender Batch Weigh Controller Status Block (BBS) Page 0

Word \ Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	Page Number		CR	CE	0	DC			Device Identification							
2	Zone Address								Station Address							
3	Diagnostic Word															
4	0				0				0				0			
5	Machine Command Word (Bit Map)															
6	Process Command Word (Bit Map)															
7	Process Summary Status (Bit Map)															
8	Process Hopper Status 1 (Bit Map)															
9	Process Hopper Status 2 (Bit Map)															
10	Process Hopper Status 3 (Bit Map)															
11	Process Hopper Status 4 (Bit Map)															
12	Process Hopper Status 5 (Bit Map)															
13	Process Hopper Status 6 (Bit Map)															
14	Process Hopper Status 7 (Bit Map)															
15	Process Hopper Status 8 (Bit Map)															
16	Ingredient Blend Percentages Measured 1 (%)															
17																
16	Ingredient Blend Percentages Measured 2 (%)															
17																
16	Ingredient Blend Percentages Measured 3 (%)															
17																
16	Ingredient Blend Percentages Measured 4 (%)															
17																
16	Ingredient Blend Percentages Measured 5 (%)															
17																
16	Ingredient Blend Percentages Measured 6 (%)															
17																

Word | Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
16	Ingredient Blend Percentages Measured 7 (%)															
17																
16	Ingredient Blend Percentages Measured 8 (%)															
17																
18	Ingredient Rates Measured 1 (Lbs/hr)															
19																
20	Ingredient Rates Measured 2 (Lbs/hr)															
21																
22	Ingredient Rates Measured 3 (Lbs/hr)															
23																
24	Ingredient Rates Measured 4 (Lbs/hr)															
25																
26	Ingredient Rates Measured 5 (Lbs/hr)															
27																
28	Ingredient Rates Measured 6 (Lbs/hr)															
29																
30	Ingredient Rates Measured 7 (Lbs/hr)															
31																
32	Ingredient Rates Measured 8 (Lbs/hr)															
33																
34	Total Rate Measured Value (Lbs/hr)															
35																
36	Quantity Measured Value (Lbs)															
37																

Figure 4.30
Blender Batch Weigh Controller Status Block (BBS) Page 1

Word|Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	Page Number		CR	CE	0	DC			Device Identification							
2	Zone Address								Station Address							
3	Diagnostic Word															

Word|Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4	0				0				0				0			
5	Inventory Measured Value 1 (Lbs)															
6																
7	Inventory Measured Value 2 (Lbs)															
8																
9	Inventory Measured Value 3 (Lbs)															
10																
11	Inventory Measured Value 4 (Lbs)															
12																
13	Inventory Measured Value 5 (Lbs)															
14																
15	Inventory Measured Value 6 (Lbs)															
16																
17	Inventory Measured Value 7 (Lbs)															
18																
19	Inventory Measured Value 8 (Lbs)															
20																
21	Total Inventory Measured Value (Lbs)															
22																
23	Hopper Weight Measured Value 1 (Lbs)															
24																
25	Hopper Weight Measured Value 2 (Lbs)															
26																
27	Hopper Weight Measured Value 3 (Lbs)															
28																
29	Hopper Weight Measured Value 4 (Lbs)															
30																
31	Hopper Weight Measured Value 5 (Lbs)															
32																
33	Hopper Weight Measured Value 6 (Lbs)															
34																

Word|Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
35	Hopper Weight Measured Value 7 (Lbs)															
36																
37	Hopper Weight Measured Value 8 (Lbs)															
38																
39	Ingredient Blend Percentages Setpoint 1 (%)															
40																
41	Ingredient Blend Percentages Setpoint 2 (%)															
42																
43	Ingredient Blend Percentages Setpoint 3 (%)															
44																
45	Ingredient Blend Percentages Setpoint 4 (%)															
46																
47	Ingredient Blend Percentages Setpoint 5 (%)															
48																
49	Ingredient Blend Percentages Setpoint 6 (%)															
50																
51	Ingredient Blend Percentages Setpoint 7 (%)															
52																
53	Ingredient Blend Percentages Setpoint 8 (%)															
54																

Figure 4.31
Blender Batch Weigh Controller Status Block (BBS) Page 2

Word|Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	Page Number		CR	CE	0	DC			Device Identification							
2	Zone Address								Station Address							
3	Diagnostic Word															
4	0				0				0				0			
5	Secondary Setpoint (%) 1															
6																
7	Secondary Setpoint (%) 2															

Word|Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8																
9	Secondary Setpoint (%) 3															
10																
11	Secondary Setpoint (%) 4															
12																
13	Secondary Setpoint (%) 5															
14																
15	Secondary Setpoint (%) 6															
16																
17	Secondary Setpoint (%) 7															
18																
19	Secondary Setpoint (%) 8															
20																
21	Calibration Setpoint (VS) 1															
22																
23	Calibration Setpoint (VS) 2															
24																
25	Calibration Setpoint (VS) 3															
26																
27	Calibration Setpoint (VS) 4															
28																
29	Calibration Setpoint (VS) 5															
30																
31	Calibration Setpoint (VS) 6															
32																
33	Calibration Setpoint (VS) 7															
34																
35	Calibration Setpoint (VS) 8															
36																
37	Total Rate Setpoint (Pounds per Hour)															
38																

Word|Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
39	Quantity Setpoint (Pounds)															
40																
41	Controller Integrity (ASCII)															
42																
43	Controller Version (ASCII)															
44																

Figure 4.32
Blender Batch Weigh Controller Status Block (BBS) Word/Bit Definitions Page 0

Word	Description	Data	Range
1	Block Identification	Bits 0-7	00100000 to 11111111
	DC	Bits 8-10	**000= Standard Data configuration** 001 = Configuration Data 010 = Random data configuration 011 = Random Data Open 100 = Store Sent configuration 101 = Read Stored configuration 110 = Overwrite Stored configuration 111 = Clear Stored configuration
	Reserved	Bit 11	Not used
	CE	Bit 12	Bit 12 = 0 - Command did not execute properly Bit 12 = 1 - Command executed with no errors
	CR	Bit 13	Bit 13 = 0 - This status block is a response to an id/address stored in the MCC configuration Bit 13 = 1 - This status block is a response to a previously sent command block from the host computer
	Page Number	Bits 14, 15	**00 = This is page 0 of status for a previously sent SDC command** 01 = This is page 1 of status for a previously sent SDC command 10 = This is page 2 of status for a previously sent SDC command
2	Station Address	Bits 0-7 BCD or TCB	32 to 99 BCD 20 to FF (32 to 255) TCB
	Zone Address	Bits 8-15 BCD or TCB	48 to 99 BCD 30 to FF (48 to 255) TCB
3	Diagnostic Word	Bits 0-15 BCD or TCB	0 to 9999 BCD 0 to 9999 TCB

Word	Description	Data	Range
4	Not used		
If the PM bit in the MCC is 0, then word 5 =			
5	Machine Run Command	Bit 0	Bit 0 = 0 - Machine stopped Bit 0 = 1 - Machine running
	Alarm Acknowledge	Bit 1	Bit 1 = 0 - Normal Bit 1 = 1 - Acknowledged
	Reserved	Bits 2-15	
If the PM bit in the MCC is 1, then word 5 =			
5	Machine Run Command	Bit 0	Bit 0 = 0 - Machine stopped Bit 0 = 1 - Machine running
	On/Off	Bit 1	Bit 1 = 0 - Machine on/off not allowed Bit 1 = 1 - Machine on/off allowed
	Alarm Acknowledge	Bit 2	Bit 2 = 0 - Normal Bit 2 = 1 - Acknowledged
	Reserved	Bits 3-15	
6		Bits 0-3	Not used
	Mixer On/Off	Bit 4	Bit 4 = 0 - Mixer Off Bit 4 = 1 - Mixer On
	On/Off Action Allowed	Bit 5	Bit 5 = 0 - Inhibit mixer on/off Bit 5 = 1 - Enable mixer on/off
	Quantity Reset	Bit 6	Bit 6 = 1 - No action Bit 6 = - Reset quantity measure value to 0
	All Totals Reset	Bit 7	Bit 7 = 0 - No action Bit 7 = 1 - Reset inventory totals all hoppers
	Hopper A Totals Reset	Bit 8	Bit 8 = 0 - No action Bit 8 = 1 - Reset inventory total for hopper A
	Hopper B Totals Reset	Bit 9	Bit 9 = 0 - No action Bit 9 = 1 - Reset inventory total for hopper B
	Hopper C Totals Reset	Bit 10	Bit 10 = 0 - No action Bit 10 = 1 - Reset inventory total for hopper C
	Hopper D Totals Reset	Bit 11	Bit 11 = 0 - No action Bit 11 = 1 - Reset inventory total for hopper D
	Hopper E Totals Reset	Bit 12	Bit 12 = 0 - No action Bit 12 = 1 - Reset inventory total for hopper E
	Hopper F Totals Reset	Bit 13	Bit 13 = 0 - No action Bit 13 = 1 - Reset inventory total for hopper F
	Hopper G Totals Reset	Bit 14	Bit 14 = 0 - No action Bit 14 = 1 - Reset inventory total for hopper G
	Hopper H Totals Reset	Bit 15	Bit 15 = 0 - No action Bit 15 = 1 - Reset inventory total for hopper H

Word	Description	Data	Range
7	Processing	Bit 0	Bit 0 = 0 - Not processing Bit 0 = 1 - Processing
	System Alarm	Bit 1	Bit 1 = 0 - No alarm Bit 1 = 1 - Machine or process alarm
	Process Alarm	Bit 2	Bit 2 = 0 - No alarm Bit 2 = 1 - Process alarm
	Machine Alarm	Bit 3	Bit 3 = 0 - No alarm Bit 3 = 1 - Machine alarm
	Reserved	Bit 4	Not used
	Quantity Complete Status	Bit 5	Bit 5 = 0 - Not complete Bit 5 = 1 - Complete
	Material Demand Status	Bit 6	Bit 6 = 0 - Normal operation Bit 6 = 1 - Operating due to material demand
	Mixer Failure Alarm	Bit 7	Bit 7 = 0 - No alarm Bit 7 = 1 - Alarm
	Feed Failure Alarm	Bit 8	Bit 8 = 0 - No alarm Bit 8 = 1 - Alarm
	Low Material Alarm	Bit 9	Bit 9 = 0 - No alarm Bit 9 = 1 - Alarm
	High Material Alarm	Bit 10	Bit 10 = 0 - No alarm Bit 10 = 1 - Alarm
	Reserved	Bits 11-15	Not used
8-15	Processing	Bit 0	Bit 0 = 0 - Hopper not processing Bit 0 = 1 - Processing
	System Alarm	Bit 1	Bit 1 = 0 - No alarm Bit 1 = 1 - Machine or process alarm
	Process Alarm	Bit 2	Bit 2 = 0 - No alarm Bit 2 = 1 - Process alarm
	Machine Alarm	Bit 3	Bit 3 = 0 - No alarm Bit 3 = 1 - Machine alarm
	Reserved	Bit 4	Not used
	Quantity Complete Status	Bit 5	Bit 5 = 0 - Not complete Bit 5 = 1 - Complete
	Material Demand Status	Bit 6	Bit 6 = 0 - Normal operation Bit 6 = 1 - Operating due to material demand

Word	Description	Data	Range
8-15 Cont.	Mixer Failure Alarm	Bit 7	Bit 7 = 0 - No alarm Bit 7 = 1 - Alarm
	Feed Failure Alarm	Bit 8	Bit 8 = 0 - No alarm Bit 8 = 1 - Alarm
	Low Material Alarm	Bit 9	Bit 9 = 0 - No alarm Bit 9 = 1 - Alarm
	High Material Alarm	Bit 10	Bit 10 = 0 - No alarm Bit 10 = 1 - Alarm
	Hopper Present Alarm	Bit 11	Bit 11 = 0 - Hopper not present Bit 11 = 1 - Hopper present in blender
	Reserved	Bits 12-15	Not used
16 thru 31	Ingredient Blend Percentages Measured Value	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
32 thru 47	Ingredient Rates Measure Value	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
48, 49	Total Rate Measured Value	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
50, 51	Quantity Measured Value	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$

Figure 4.33
Blender Batch Weigh Controller Status Block (BBS) Word/Bit Definitions Page 1

Word number	Description	Data	Range
1	Block Identification	Bits 0-7	00101010
	DC	Bits 8-10	**000= Standard Data configuration** 001 = Configuration Data 010 = Random data configuration 011 = Random Data Open 100 = Store Sent configuration 101 = Read Stored configuration 110 = Overwrite Stored configuration 111 = Clear Stored configuration
	Reserved	Bit 11	Not used
	CE	Bit 12	Bit 12 = 0 - Command did not execute properly Bit 12 = 1 - Command executed with no errors
	CR	Bit 13	Bit 13 = 0 - This status block is a response to an id/address stored in the MCC configuration Bit 13 = 1 - This status block is a response to a previously sent command block from the host computer
	Page Number	Bits 14, 15	00 = This is page 0 of status for a previously sent SDC command **01 = This is page 1 of status for a previously sent SDC command** 10 = This is page 2 of status for a previously sent SDC command
2	Station Address	Bits 0-7 BCD or TCB	32 to 99 BCD 20 to FF (32 to 255) TCB
	Zone Address	Bits 8-15 BCD or TCB	48 to 99 BCD 30 to FF (48 to 255) TCB
3	Diagnostic Word	Bits 0-15 BCD or TCB	0 to 9999 BCD 0 to 9999 TCB
4	Not used		
5 thru 20	Inventory Measured Value	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
21, 22	Total Inventory Measured Value	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$

Word number	Description	Data	Range
23 thru 38	Hopper Weight Measured Value	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
39 thru 54	Ingredient Blend Percentages Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$

Figure 4.34
Blender Batch Weigh Controller Status Block (BBS) Word/Bit Definitions Page 2

Word Number	Description	Data	Range
1	Block Identification	Bits 0-7	00101010
	DC	Bits 8-10	**000= Standard Data configuration** 001 = Configuration Data 010 = Random data configuration 011 = Random Data Open 100 = Store Sent configuration 101 = Read Stored configuration 110 = Overwrite Stored configuration 111 = Clear Stored configuration
	Reserved	Bit 11	Not used
	CE	Bit 12	Bit 12 = 0 - Command did not execute properly Bit 12 = 1 - Command executed with no errors
	CR	Bit 13	Bit 13 = 0 - This status block is a response to an id/address stored in the MCC configuration Bit 13 = 1 - This status block is a response to a previously sent command block from the host computer
	Page Number	Bits 14, 15	00 = This is page 0 of status for a previously sent SDC command 01 = This is page 1 of status for a previously sent SDC command **10 = This is page 2 of status for a previously sent SDC command**
2	Station Address	Bits 0-7 BCD or TCB	32 to 99 BCD 20 to FF (32 to 255) TCB
	Zone Address	Bits 8-15 BCD or TCB	48 to 99 BCD 30 to FF (48 to 255) TCB
3	Diagnostic Word	Bits 0-15 BCD or TCB	0 to 9999 BCD 0 to 9999 TCB

Word Number	Description	Data	Range
4	Not used		
5 thru 20	Secondary Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
21 thru 36	Calibration Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
37, 38	Total Rate Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
39, 40	Quantity Setpoint	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
41, 42	Controller Integrity	ASCII	ASCII data set
43, 44	Controller Version	ASCII	ASCII data set

Custom Configuration Status Block (CCS)

Custom configuration status blocks are responses to command blocks sent to a custom configured device. When the host processor receives a device specific status block with the DC bits = 100, 101, 110 or 111 the module interprets the trailing data in the status block as follows:

The device identification (ID) 8-bit code as selected in the sent block.

The data code DC, as selected in the sent block.

The clear all configurations (CA) flag, as selected in the sent block.

The **CE** flag, when set, will indicate the configuration storage command has executed properly. If the CE flag indicates an improper execution, word 3 will contain the appropriate diagnostic error code, regardless of the data intended to be stored there.

The **number of bit selects** will inform the module of the total of command pairs stored in association with the sent **device ID. Note:** All **bit select** command pairs must be sent first in the custom command block. The number can range from 0 to 3Ch (TCB) or 0 to 60 (BCD). If the number is 0, the module will assume no **bit select** pairs and the next command pair type will be assumed stored in its position.

The **number of numeric selects** will inform the host processor of the total command pairs stored in association with the sent **device ID. Note:** All **numeric select** command pairs must be sent second in the custom command block. If the number is 0, the host processor will assume no

numeric select pairs and the next command pair type will be sent in its position.

The **number of ASCII selects** will inform the host processor of the total command pairs stored in association with the sent **device ID. Note:** All **ASCII select** command pairs must be sent third in the custom command block. If the number is 0, the host processor will assume no **ASCII select** pairs and the next command pair type will be sent in its position.

The **number of bit polls** will inform the host processor of the total of command pairs stored in association with the sent **device ID. Note:** All **bit poll** command pairs must be sent fourth in the custom command block. If the number is 0, the host processor will assume no **bit poll** pairs and the next command pair type will be sent in its position.

The **number of numeric polls** will inform the host processor of the total command pairs stored in association with the sent **device ID. Note:** All **numeric poll** command pairs must be sent 5th in the custom command block. If the number is 0, the host processor will assume no **numeric poll** pairs and the next command pair type will be sent in its position.

The **number of ASCII polls** will inform the host processor of the total command pairs stored in association with the sent **device ID. Note:** All **ASCII poll** command pairs must be sent sixth in the custom command block and are limited to 4 bytes. If the number is 0, the host processor will assume no **ASCII select** pairs.

The **CMD1** byte: as stored in the 1771-SPI/C configuration memory in response to configuration read command (DC = 101).

The **CMD2** byte: as stored in the 1771-SPI/C configuration memory in response to configuration read command (DC = 101).

Figure 4.35
Custom Configuration Status Block Header (CCS)

Word \ Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1				CE	CA	DC			Device Identification							
2	Number of Numeric Selects or 0								Number of Bit Selects or 0							
3	Number of Bit Polls or Diagnostics								Number of ASCII Selects or Diagnostics							
4	Number of ASCII Polls or 0								Number of Numeric Polls or 0							
5	CMD1								CMD2							
:	CMD1								CMD2							
:	CMD1								CMD2							
64	CMD1								CMD2							

Figure 4.36
Custom Configuration Status Block Word/Bit Definitions

Word	Description	Data	Range	Notes
1	Device Identification	Bits 0-7	00100000 to 11111110	
	DT	Bits 8-10	100 = Store sent configuration 101 = Read stored configuration 110 = Overwrite stored configuration 111 = Clear stored configuration	
	CA	Bit 11	0 = No action 1 = Clear all configuration storage	
	CE	Bit 12	Bit 12 = 0 - Command did not execute properly Bit 12 = 1 - Command executed with no errors	
	Not used	Bit 13-15		
If DC = 101, then word 2 = :				
2	Number of Bit Selects	Bits 0-7 BCD or TCB	0 to 60 BCD 0 to 3C (0 to 60) TCB	
	Number of Numeric Selects	Bits 8-15 BCD or TCB	0 to 30 BCD 0 to 1E (0 to 30) TCB	
If DC = 101, and CE flag = 1, then word 3 = :				
3	Number of ASCII Selects	Bits 0-7 BCD or TCB	0 to 30 BCD 0 to 1E (0 to 30) TCB	
	Number of Bit Polls	Bits 8-15 BCD or TCB	0 to 30 BCD 0 to 1E (0 to 30) TCB	
If DC = 101, and CE flag = 0, then word 3 = :				
3	Diagnostics			
If DC = 101, then word 4 = :				
4	Number of Numeric Polls	Bits 0-7 BCD or TCB	0 to 30 BCD 0 to 1E (0 to 30) TCB	
	Number of ASCII Polls	Bits 8-15 BCD or TCB	0 to 30 BCD 0 to 1E (0 to 30) TCB	

Word	Description	Data	Range	Notes
5 thru 64	CMD1	8-15	00100000 to 11111111	All Bit Select command pairs first
	CMD2	0-7	00100010 to 11111111	
	CMD1	8-15	00100000 to 11111111	All Numeric Select command pairs second
	CMD2	0-7	00100010 to 11111111	
	CMD1	8-15	00100000 to 11111111	All ASCII Select command pairs third
	CMD2	0-7	00100010 to 11111111	
	CMD1	8-15	00100000 to 11111111	All Bit Poll command pairs fourth
	CMD2	0-7	00100010 to 11111111	
	CMD1	8-15	00100000 to 11111111	All Numeric Poll command pairs fifth
	CMD2	0-7	00100010 to 11111111	
	CMD1	8-15	00100000 to 11111111	All ASCII Poll command pairs fifth
	CMD2	0-7	00100010 to 11111111	

Configuration Data Status Block (CDS)

Configuration data status blocks are returned either as a queued read of a custom configuration device in the MCC, or as an acknowledgement to a block written to such a device. When the host processor receives a device specific command block with the DC bits = 001, the processor's interpretation of the trailing data in the command block will be dependent on the device ID received in the status block header and command pairs stored in the configuration storage.

Important: The trailing data in words 5 thru 64 will match the data type required for each command pair and in order as stored by the configuration store command.

The station address and zone address reflects the selections as chosen in the matching command block.

Figure 4.37
Configuration Data Command Block Header (CDS)

Word | Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	0		CR	CE	0	DC			Device Identification							
2	Zone Address								Station Address							
3	Diagnostic Word															
4	0				0				0				0			
5	Bit Poll Status Word for CMD Pair															
	Bit Poll Status Word for CMD Pair															
	Numeric Poll Status Data for CMD Pair															
	Numeric Poll Status Data +1 for CMD Pair															
	Numeric Poll Status Data for CMD Pair															
	Numeric Poll Status Data +1 for CMD Pair															
	ASCII Poll Status Data for CMD Pair															
	ASCII Poll Status Data +1 for CMD Pair															
	ASCII Poll Status Data for CMD Pair															
64	ASCII Poll Status Data +1 for CMD Pair															

Figure 4.38
Configuration Data Status Block Word/Bit Definitions

Word	Description	Data	Range
1	Block Identification	Bits 0-7	00100000 to 11111111
	DC	Bits 8-10	000= Standard Data configuration **001 = Configuration Data** 010 = Random data configuration 011 = Random Data Open 100 = Store Sent configuration 101 = Read Stored configuration 110 = Overwrite Stored configuration 111 = Clear Stored configuration
	Reserved	Bit 11	Not used
	CE	Bits 12	Bit 12 = 0 - Command not executed Bit 12 = 1 - Command executed
	CR	Bit 13	Bit 13 = 0 - This status block is a response to an id/address stored in the MCC configuration Bit 13 = 1 - This status block is a response to a previously sent command block from the host computer
	Reserved	Bits 14, 15	Not used
2	Station Address	Bits 0-7 BCD or TCB	32 to 99 BCD 20 to FF (32 to 255) TCB
	Zone Address	Bits 8-157 BCD or TCB	48 to 99 BCD 30 to FF (48 to 255) TCB
3	Diagnostic Word	Bits 0-15 BCD or TCB	0 to 9999 BCD 0 to 9999 TCB
4	Not used		
5 thru 64	Bit Poll Status Word for CMD Pair		
	Bit Poll Status Word for CMD Pair		
	Numeric Poll Status for CMD Pair		
	Numeric Poll Status +1 for CMD Pair		
	Numeric Poll Status for CMD Pair		

Word	Description	Data	Range
5 thru 64 Cont.	Numeric Poll Status +1 for CMD Pair		
	ASCII Poll Status for CMD Pair		
	ASCII Poll Status +1 for CMD Pair		

Random Data Status Block (RDS)

Random data status blocks are returned as a response to a random data command block. When the host processor receives an SPI defined I/O status block with the DC bit = 010, the module will intrepret the trailing data in the status block as follows:

The status block will be broken into 15 status groups with the first group starting at word 5. Since the host processor block transfer consists of 64 words, this allows a maximum of 15 status groups to be read in one block transfer.

Figure 4.39
Random Data Status Block (RDS)

Word / Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	0					DC			Block Identification							
2	0					0			Station Address							
3	Diagnostic Word															
4	0					0			Number of Command Groups							
5	0					0			0						CE	DT
6	CMD1								CMD2							
7	Data or Diagnostic Word															
8	Data															
⇓	⇓			⇓			⇓		⇓			⇓			⇓	
61	0					0			0						CE	DT
62	CMD1								CMD2							
63	Data or Diagnostic Word															
64	Data															

The number of command groups will indicate the total previously sent.

The **DT** bit will indicate the type of data to be expected in each status group of that particular status block. The data located in each group of the returned status block in RDC can be either bit mapped or numeric.

The **CE** bit will inform the host processor of a valid execution of this particular command group. If the CE flag indicates a nonvalid execution, the first data value will contain the appropriate diagnostic word indicating the failure.

Note: If the data is numeric, it's format will be dictated by the NF nibble in the MCC block.

The **CMD1** and **CMD2** bytes will reflect the commands chosen in the appropriate command block.

The **data areas** have valid data only if the previously issued command pairs caused a polled operation.

Figure 4.40
Random Data Status Block Word/Bit Definitions

Word	Description	Data	Range
1	Block Identification	Bits 0-7	00100000 to 11111111
	DC	Bits 8-10	010 = Random data
	Reserved	Bits 11-15	Not used
2	Station Address	BCD or TCB	32 to 99 BCD 20 to FF (32 to 255) TCB
3	Diagnostic Word	BCD or TCB	0 to 9999 BCD 0 to 9999 TCB
4	Number of Command Groups	Bits 0-7 BCD or TCB	1 to 15 BCD 01 to 0F (1 to 15) TCB
5	DT	Bit 0	Bit 0 = 0 - Numeric Bit 0 = 1 - Bit mapped
	CE	Bit 1	Bit 1 = 0 - Command group not executed Bit 1 = 1 - Command group executed properly
	Reserved	Bits 2-15	Not used
6	CMD2	Bits 0-7	00100000 to 11111111
	CMD1	Bits 8-15	00100000 to 11111111

Word	Description	Data	Range
If CE flag = 1, then word 7 and 8 = :			
7, 8	Numeric or bit control data	BCD, TCB or Float. Pt.	0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$
If CE flag = 0, then word 7 and 8 = :			
7	Diagnostic Word	BCD or TCB	0 to 9999 BCD 0 to 9999 TCB
8	N/A		

Random Data Open Status Block (ROS)

Random data open status blocks are responses to a random data open command block sent to the module by the host processor. When the module receives an SPI defined I/O command block with the DC bit = 011 the module interprets the trailing data in the command block as shown below.

The DT flags show the flags as chosen in the previously issued RDO command block.

Figure 4.41
Random Data Open Status Block (ROS)

Word / Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	DT		0	CE	0	DC			Block Identification							
2	0				0				Station Address							
3	0				0				0				0			
4	0				Number of Values											
5	CMD1								CMD2							
6	Data 1								Data 0							
7	Data 3								Data 2							
	⇓ ⇓ ⇓ · ⇓															
64	Data 117								Data 116							

Figure 4.42
Random Data Command Block Word/Bit Definitions

Word	Description	Data	Range
1	Block Identification	Bits 0-7	00100000 to 11111111
	DC	Bits 8-10	011 = Random data open
	Not used	Bit 11	
	CE	Bits 12	Bit 12 = 0 - Command not executed Bit 12 = 1 - Command executed
	Not used	Bit 13	
	DT	Bits 14-15	00 = ASCII byte data 01 = Numeric word pair data 10 = Bit word data
2	Station Address	Bits 0-7 BCD or TCB	32 to 99 BCD 20 to FF (32 to 255) TCB
	Not used	Bits 8-15	
3	Diagnostic Word	Bits 0-15 BCD or TCB	0 to 9999 BCD 0 to 9999 TCB
4	Number of Values	Bits 0-12	If DT = 00 1 to 118 BCD 1 to 76 (1 to 118) TCB If DT = 01 1 to 59 BCD 1 to 3B (1 to 59) TCB If DT = 10 1 to 29 BCD 1 to 1D (1 to 29) TCB
5	CMD2	Bits 0-7	00100000 to 11111111
	CMD1	Bits 8-15	00100000 to 11111111
6 to 64	Control Data	Bits 0-7 Bits 8-15	If DT = 00 ASCII data set If DT = 01 0000000000000000 to 1111111111111111 If DT = 10 0 to 9999 BCD 0 to ±32767) TCB $\pm 1.1754944e^{-38}$ to $3.4028237e^{+38}$

Chapter Summary

In this chapter you learned about the SPI module defined I/O status blocks returned by the module to the programmable controller. This included word/bit descriptions.

Chapter 5

Troubleshooting

Chapter Objectives

In this chapter you will learn how to troubleshoot your interface module using the:

- indicators on the front of the module
- diagnostic codes returned by the module in word 3 of the status block.

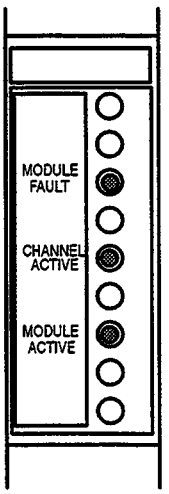
Diagnostic Indicators

Three indicators on the front of the module indicate the operating status of the module. Use these indicators to aid in troubleshooting your module. Refer to Figure 5.1. These indicators are:

- RED -Module fault indicator - lights when a communication problem exists on the SPI link
- GREEN - Module active indicator - lights when module is powered up and passes its power up test
- YELLOW - Channel active indicator - blinks during normal operation. It is on when the module receives data and is off when it sends data on the SPI link

Refer to Table 5.A below for indications, possible causes and corrections.

Figure 5.1
Diagnostic Indicators on the 1771-SPI/C Interface Module



10581-I

Table 5.A
Diagnostic Indicator Troubleshooting

Indicator	Possible Cause	Correction
Red OFF Green ON Yellow FLASHING	Module is operating correctly. It has powered up and communications have been established with the SPI communications link.	
Red OFF Green OFF Yellow OFF	Module has failed to power up correctly. Possible RAM or PROM failure.	Turn power off. Reseat module in chassis. Recycle power. If problem persists, replace module.
Red ON Green ON Yellow ON or FLASHING	Communications have been lost with the SPI link.	Check field wiring arm connections. Check D-shell connectors on primary machine.
Red OFF Green FLASHING Yellow OFF	Module has powered up correctly but has not been configured.	Transmit a valid MCC block(s) to the module.
Red FLASHING Green ON Yellow ON or OFF	Communication could not be established with a device on the SPI communications link.	Check field wiring arm connections. Check D-shell connectors on primary machine.

Diagnostic Error Codes

Word 3 in each status block is reserved for use by the module to return diagnostic error codes to the host processor. The diagnostic error codes returned by the module are 4-digit hexadecimal and limited to values between 0001 and FFFF.

These diagnostic error codes consist of 4 groups:

- MCC diagnostic error codes (Table 5.B)
- RDO command error codes (Table 5.C)
- Custom data configuration error codes (Table 5.D)
- RDC command error codes (Table 5.E)
- SPI device returned error codes (Table 5.F)
- SPI communication error codes (Table 5.G)

Table 5.B
MCC Diagnostic Error Codes

Error Code	Description	Definition
9000	MCC page number error	The value received in the page number nibble of the MCC was greater than 9
9001	MCC page number error	The value received in the page number nibble of the MCC was greater than the total pages nibble.
9002	Queued station address BCD error	An invalid BCD digit (A-F) was received in one of the station address bytes of an MCC.

Error Code	Description	Definition
9003	Queued station address error	An invalid station address less than 32 BCD or 20 TCB was received in one of the station address bytes of an MCC.
9004	Queued device type error	An invalid device type code less than 32 TCB was received in one of the device type seven0bit codes of an MCC
9005	Duplicate address error	Different device type codes were associated with identical station address bytes in an MCC.
9006	Unsupported device type	One of the device type eight-bit codes received in an MCC indicates a peripheral device that is not supported by the module firmware.
9007	MCC page sequence error	The value received in the page number nibble of an MCC indicates that the MCC download is not in sequential page order.
9008	MCC total page error	The value received in the total pages nibble of an MCC was greater than 9.
9009	Baud rate selection error	The requested baud rate in "Baud SEL" does not match the allowed selections.
900A	Device ID error	The device ID received from the MCC configuration does not match any device ID stored in the custom configuration.
900B	Zone address error	The zone address received in the MCC configuration command is less then 31H. A zone address of 30H is only applicable to select commands.

Table 5.C
RDO Command Error Codes

Error Code	Description	Definition
3000	Station address BCD error	An invalid BCD digit (A-F) was received in the station address byte of a specific command block using RDA format.
3001	Station address error	An invalid station address less than 32 BCD was received in the station address byte of a device specific command block using RDO format.
3002	Number of values BCD error	An invalid BCD digit (A-F) was received in the number of values byte of a device specific command block using RDO format.

Error Code	Description	Definition
3003	Number of values range error	The number of values byte in word 4 is either less than 1 or greater than 118 for ASCII data.
	Number of values range error	The number of values byte in word 4 is either less than 1 or greater than 59D for bit word data.
	Number of values range error	The number of values byte in word 4 is either less than 1 or greater than 29D for word pair data.
3004	Device type error	An invalid device type code less than 32D or greater than 254D was received in the device type 8-bit code of a device specific command block using RDO format.

Table 5.D
Custom Data Configuration Error Codes

Error Code	Description	Definition
5000	Number of select or poll commands BCD error	An invalid BCD digit (A-F) was received in the number of select or poll bytes of a device specific command block.
5001	Number of select or poll commands range error	A number of select or poll command bytes received in words 2 thru 4 are greater than 60D.
5002	ID not in custom configuration	The ID sent from the host processor is not currently stored in the custom configuration.
5003	Matching ID	The ID sent from the host processor has a matching ID already stored in the custom configuration.
5004	No more storage	The custom configuration sent from the host processor cannot be stored due to no more storage in the 1771-SPI/C RAM.
5005	Total select or poll command words greater then 60D	A total of select or poll command types requested for storage in the custom configuration will require greater then 60 words of data when executing the CDC command or returning status to the host processor. This violates the total of 60 words that can be transferred in one block transfer.
5006	Device type error	An invalid device type code less than 32D or greater then 254D was received in the device type 8-bit code of a device specific command block.

Table 5.E
RDC Command Error Codes

Error Code	Description	Definition
6000	Station address BCD error	An invalid BCD digit (A-F) was received in the station address byte of a specific command block using RDC format.
6001	Station address error	An invalid station address less than 32 BCD was received in the station address byte of a device specific command block using RDC format.
6002	Number of command groups BCD error	An invalid BCD digit (A-F) was received in the number of command groups byte of a device specific command block using RDC format.
6003	Number of command groups range error	The number of command groups received in word 4 is either less then 1 or greater then 15.
6004	Device type error	An invalid device type code less than 32D or greater than 254D was received in the device type 8-bit code of a device specific command block using RDC format.

SPI Link Errors

When the module detects an error from the referenced station on the SPI communication link in response to a status or command data string, it returns an error code. Each "XY" bit in this error code byte has an SPI definition as shown in Table 5.F.

Table 5.F
SPI Specific Error Codes

Error Code	Description	Definition
70XY	Bit 07 = invalid data	The station received the data correctly but the data was not appropriate for the command issued.
	Bit 06 = Reserved for future use	Always returned Reset
	Bit 05 = Reserved for future use	Always returned Set
	Bit 04 = Reserved for future use	Always returned Reset
	Bit 03 = Command not supported	The transmitted command was received correctly by the station, but the device at the station does not support the transmitted command.
	Bit 02 = Command not executed	The transmitted command was received correctly by the station, but the device at the station is reporting that no action was taken.
	Bit 01 = Invalid preamble	The transmitted command was not received correctly by the station due to an invalid preamble length on the message. This error will normally result from noise problems on the SPI communication link.
	Bit 00 = Communication error	The transmitted command was not received correctly by the station due to a framing error, a CRC error or a protocol violation.

Table 5.G
1771-SPI/C Communication Error Codes

Error Code	Description	Definition
8000	No response error	The referenced station is not responding to command strings on the SPI communication link within the allowable 1000ms time limit.
8003	Buffer overrun	The module has exceeded its allowable buffer storage while receiving data from the SPI communication link.
8004	General communication error	The module has detected a non-determinable communication error on the SPI communication link.
8005	Checksum error	The module has detected a checksum failure in a polled status response from the referenced station.
8006	Device termination error	The module has detected an early termination of the polled status transmission from the referenced station.
8007	Station address BCD error	An invalid BCD digit (A-F) was received in the station address byte of a device specific command block using SDC format.
8009	Illegal address/ID error	The station address/ID bytes of a device specific command block received at the module does not match any of the station address/ID bytes stored in the module's configuration.
800A	Numeric range error	An invalid BCD digit (A-F) was received in the numeric word of a device specific command block.
800B	Illegal ID error	The ID sent from the host processor is not currently stored in the custom configuration.
800C	Illegal ID error	The ID sent from the host processor is not currently defined in SPI I/O device list.
800D	No communication on link error	The 1771-SPI/C has determined that there is no active communication on the link within a 1200ms time period.

Chapter Summary

In this chapter you learned how to use your module's indicators for troubleshooting, and the diagnostic codes used by your module and host processor.

Appendix A

Specifications

Module	
Module Location	Any slot in a 1771 I/O chassis
Maximum Number of Connected Devices on the SPI Link	32
Electrical Interface	RS-485 multi-drop Field wiring arm connector
Backplane Current	1.3A @ 5V dc
Environmental Conditions Operating Temperature Storage Temperature Relative Humidity	 0° to 60°C (32° to 140°F) -40° to 85°C (-40° to 185°F) Operating: 5 to 95% (without condensation) Non-Operating: 5 to 85% (without condensation)
Field Wiring Arm	Cat. No. 1771-WA
Wiring Arm Screw Torque	7-9 inch-pounds
Keying	Between 12 and 14 Between 16 and 18
Protocol	
Physical	RS-485, 2-wire, multi-drop configuration 1200 to 19200 bits/sec (1200 required, 9600 most common)
SPI Protocol Specifications	
Protocol Format	Asynchronous, half duplex IEEE floating point number presentation Block data transfer
Command Set	As specified per SPI protocol Designated "open" command range for vendor specific commands
Number of Possible Logical Device Addresses	128+

Appendix B

Sample Program

Sample Program for PLC-5 Family Programmable Controllers

This sample is a basic Block Transfer Read/Block Transfer Write program. It is intended to get you started on your specific application programming. Varying levels of additional programming will be required based on your application's requirements.

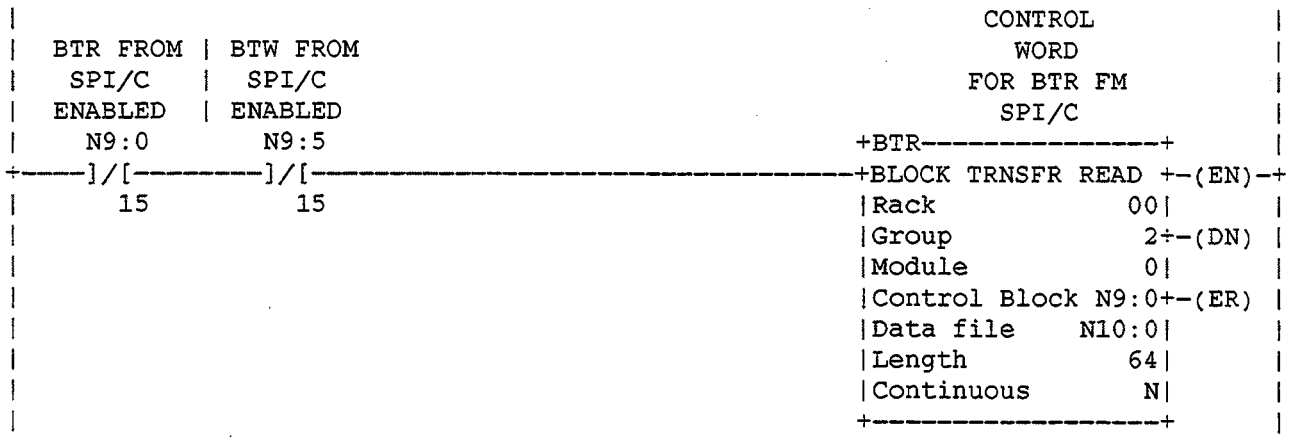
Rung 2:0

This rung latches the download bits for the MCC and COMMAND Block to the SPI/C on powerup of the PLC or when the PLC is switched from program to run. The MCC block is the SPI/C Module's configuration block and is needed before any specific Command block is downloaded to the SPI/C. The COMMAND block is any specific command block which the SPI/C Module will accept.

```
|   PLC-5                                                          MCC       |
|  SOLVING                                                        DOWNLOAD   |
|  PROGRAM                                                        REQUIRED   |
|   DURING                                                                   |
| FIRST SCAN                                                                 |
|    S:1                                                            B3       |
+----] [-----------------------------------------------------------+---(L)----+-+
|      15                                                         |      0    | |
|                                                                 | COMMAND   | |
|                                                                 |  BLOCK    | |
|                                                                 | DOWNLOAD  | |
|                                                                 | REQUIRED  | |
|                                                                 |    B3     | |
|                                                                 +---(L)----+ |
|                                                                        1     |
  B3/0
       -] [- 2:9
       -]/[- 2:5
       -(L)- 2:0 2:3
       -(U)- 2:11
  B3/1
       -] [- 2:8 2:9
       -(L)- 2:0
       -(U)- 2:12
  S:1/15
       -] [- 2:0
```

Rung 2:1

The following two rungs enable the BTR to the SPI/C and unlatch the enable bit whenever the BTR errors or is completed.



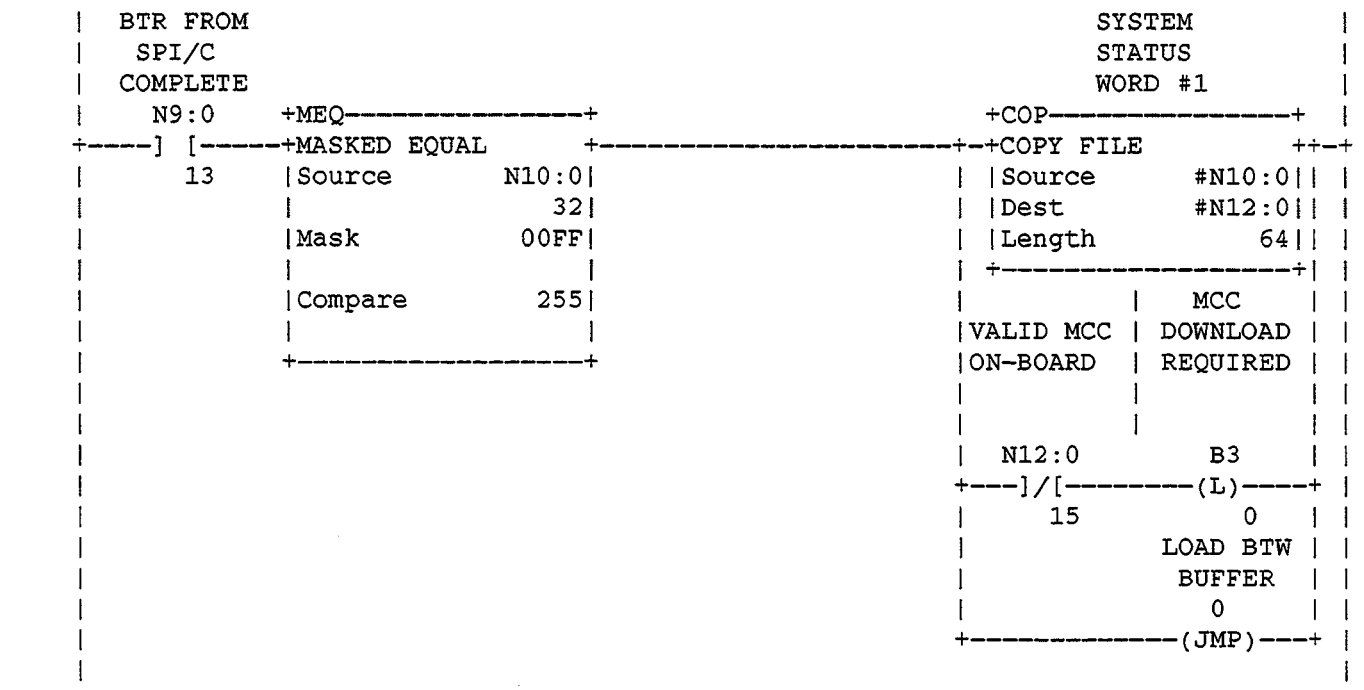

```
N9:0
     -BTR- 2:1


N9:0/15
     -]/[- 2:1 2:9
     -(U)- 2:2
N9:5/15
     -]/[- 2:1 2:9
     -(U)- 2:10
N10:0
     -BTR- 2:1
     -COP- 2:3 2:4
     -MEQ- 2:3
```

Rung 2:2


```
N9:0/12
     -] [- 2:2
N9:0/13
     -] [- 2:2 2:3 2:4
N9:0/15
     -]/[- 2:1 2:9
     -(U)- 2:2
```

Rung 2:3

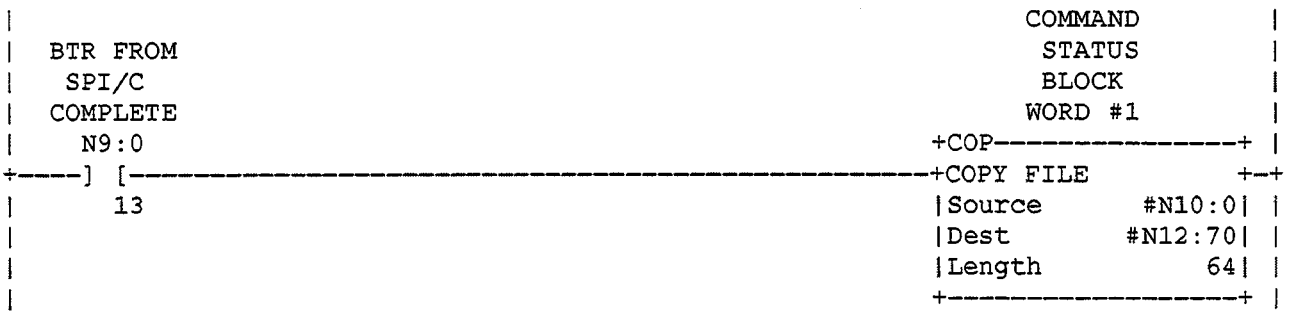
This rung checks to see if the block read back from the SPI/C, when the BTR is completed, is the System Status block. If the block is the System Status block it then copies it to file N12 words 0-63. It also checks to see if the SPI/C still needs a valid MCC block.




```
2:LBL0
     -JMP- 2:3
     -LBL- 2:5
B3/0
     -] [- 2:9
     -]/[- 2:5
     -(L)- 2:0 2:3
     -(U)- 2:11
N9:0/13
     -] [- 2:2 2:3 2:4
N10:0
     -BTR- 2:1
     -COP- 2:3 2:4
     -MEQ- 2:3
N12:0
     -COP- 2:3
N12:0/15
     -] [- 2:8
     -]/[- 2:3
```

Rung 2:4

This rung copies any Command Status block recieved from the SPI/C to file N12 words 70-133.



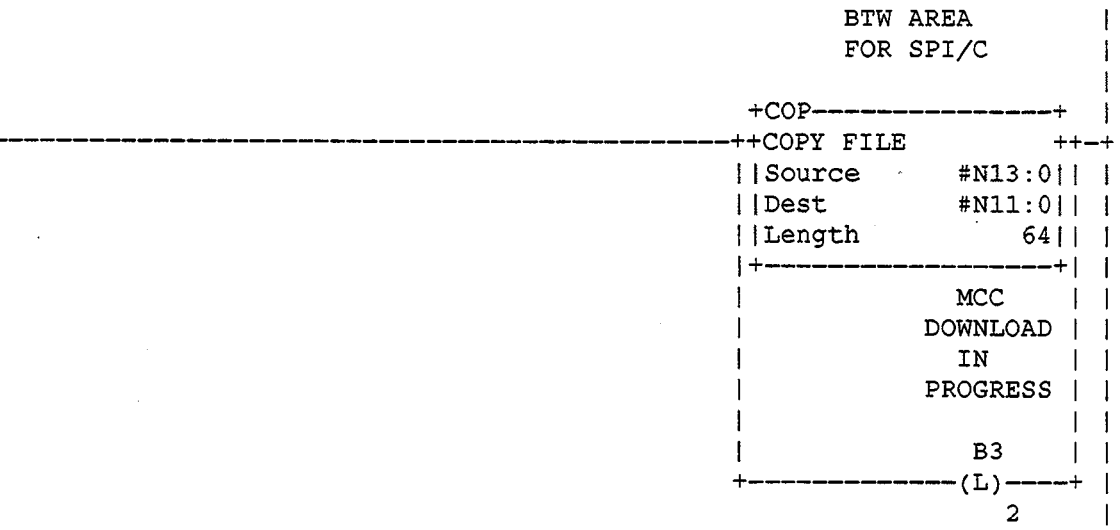

```
N9:0/13
     -] [- 2:2 2:3 2:4
N10:0
     -BTR- 2:1
     -COP- 2:3 2:4
     -MEQ- 2:3
N12:70
     -COP- 2:4
```

Rung 2:5


```
2:LBL0
     -JMP- 2:3
     -LBL- 2:5
2:LBL1
     -JMP- 2:5
     -LBL- 2:8
B3/0
     -] [- 2:9
     -]/[- 2:5
     -(L)- 2:0 2:3
     -(U)- 2:11
```

Rung 2:6

This rung loads the MCC or Command block into the BTW area for the SPI/C when either the MCC or Command block download required bit is on and latches the coresponding download in progress bit.
(The data table area for the MCC block is N13 words 0-63 and for the Command block it is N13 words 70-133. Note: To download the Command block requires the latching of B3/1 in your ladder logic.)



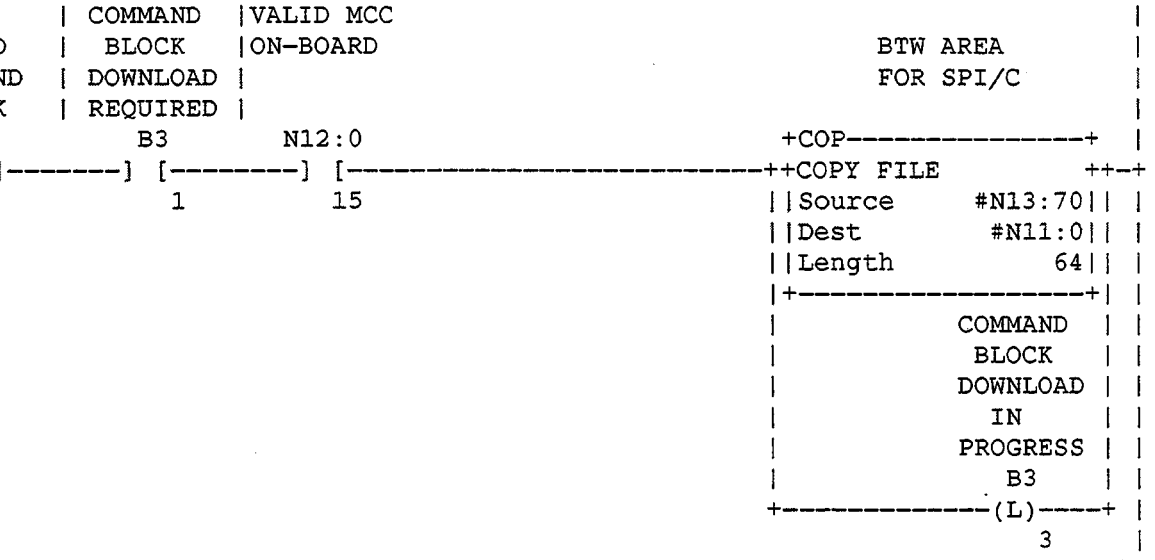

```
B3/2
     -] [- 2:11
     -(L)- 2:6
     -(U)- 2:11
N11:0
     -BTW- 2:9
     -COP- 2:6 2:8
N13:0
     -COP- 2:6
```

Rung 2:7


```
2:LBL2
     -JMP- 2:7
     -LBL- 2:9
```

Rung 2:8

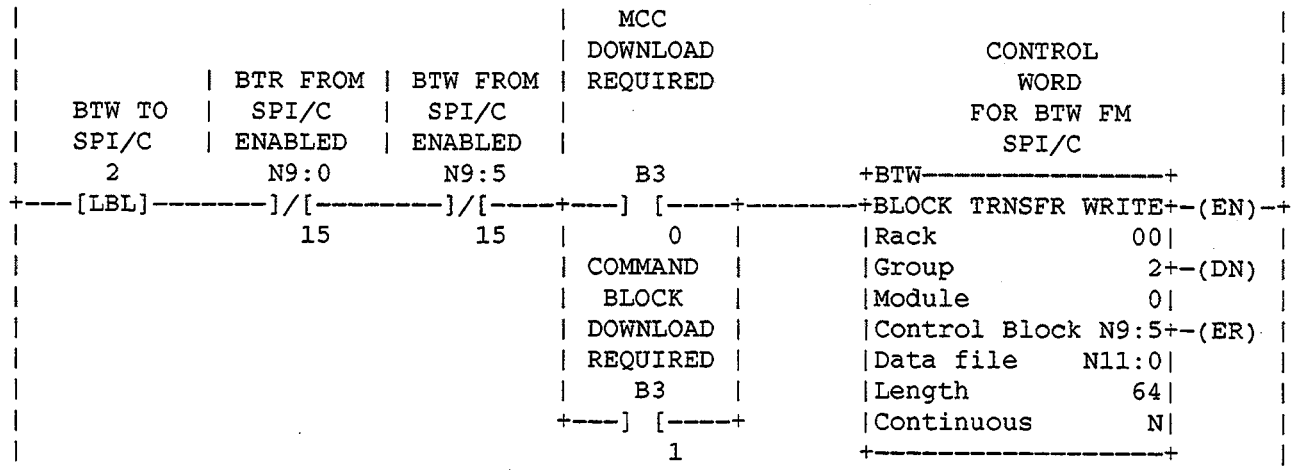
This rung loads the MCC or Command block into the BTW area for the SPI/C when either the MCC or Command block download required bit is on and latches the coresponding download in progress bit.
(The data table area for the MCC block is N13 words 0-63 and for the Command block it is N13 words 70-133. Note: To download the Command block requires the latching of B3/1 in your ladder logic.)




```
2:LBL1
     -JMP- 2:5
     -LBL- 2:8
B3/1
     -] [- 2:8 2:9
     -(L)- 2:0
     -(U)- 2:12
B3/3
     -] [- 2:12
     -(L)- 2:8
     -(U)- 2:12
N11:0
     -BTW- 2:9
     -COP- 2:6 2:8
N12:0/15
     -] [- 2:8
     -]/[- 2:3
N13:70
     -COP- 2:8
```

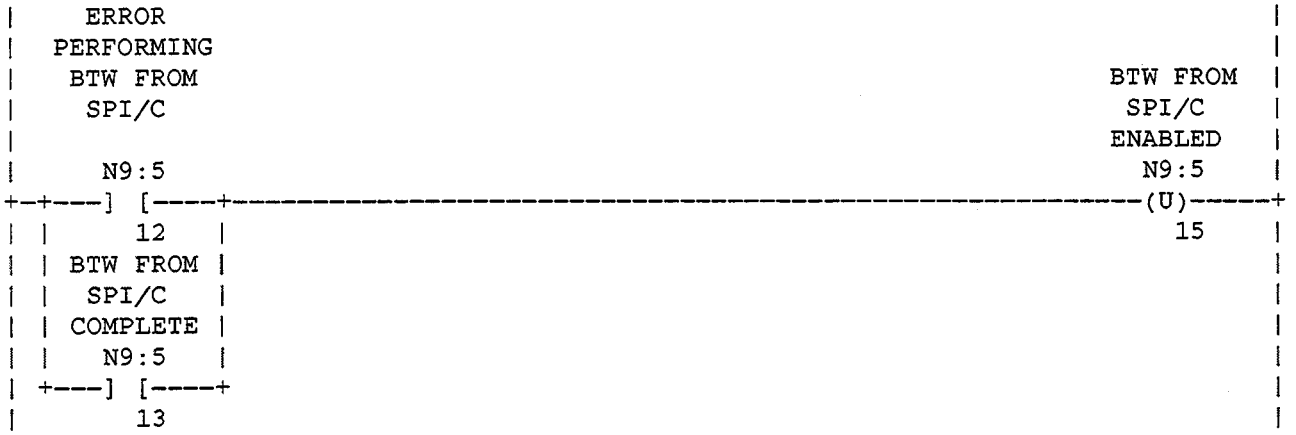
Rung 2:9

The following two rungs enable the BTW to the SPI/C and unlatch the enable bit when ever the BTW errors or is completed.



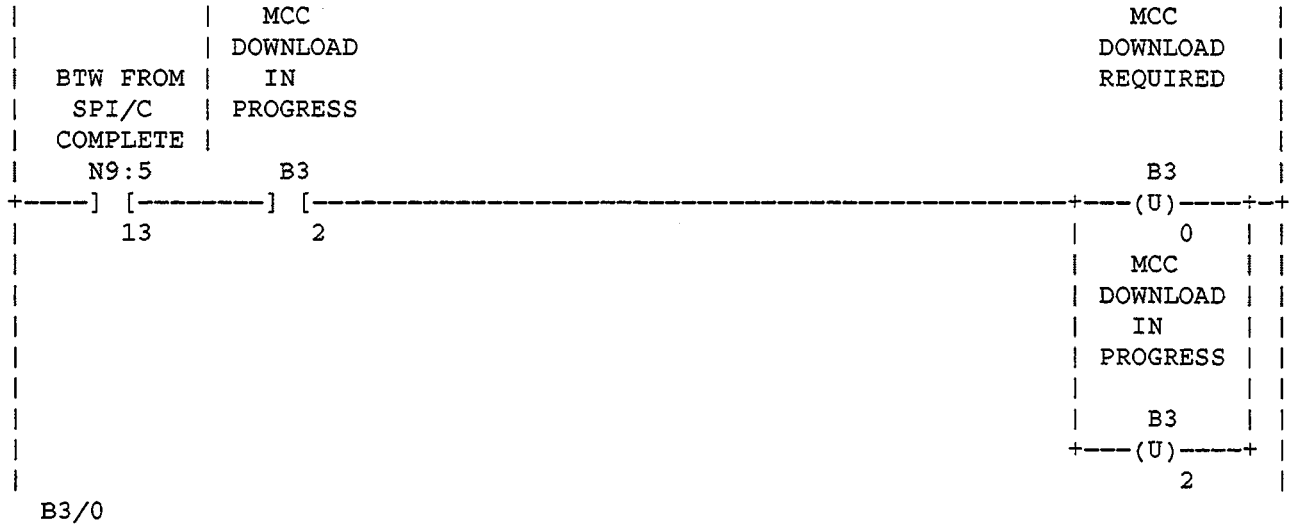

```
2:LBL2
     -JMP- 2:7
     -LBL- 2:9
B3/0
     -] [- 2:9
     -]/[- 2:5
     -(L)- 2:0 2:3
     -(U)- 2:11
B3/1
     -] [- 2:8 2:9
     -(L)- 2:0
     -(U)- 2:12
N9:0/15
     -]/[- 2:1 2:9
     -(U)- 2:2
N9:5
     -BTW- 2:9
N9:5/15
     -]/[- 2:1 2:9
     -(U)- 2:10
N11:0
     -BTW- 2:9
     -COP- 2:6 2:8
```

Rung 2:10


ERROR
PERFORMING
BTW FROM
SPI/C
N9:5
12
BTW FROM
SPI/C
COMPLETE
N9:5
13
BTW FROM
SPI/C
ENABLED
N9:5
15
N9:5/12
-] [- 2:10
N9:5/13
-] [- 2:10 2:11 2:12
N9:5/15
-]/[- 2:1 2:9
-(U)- 2:10

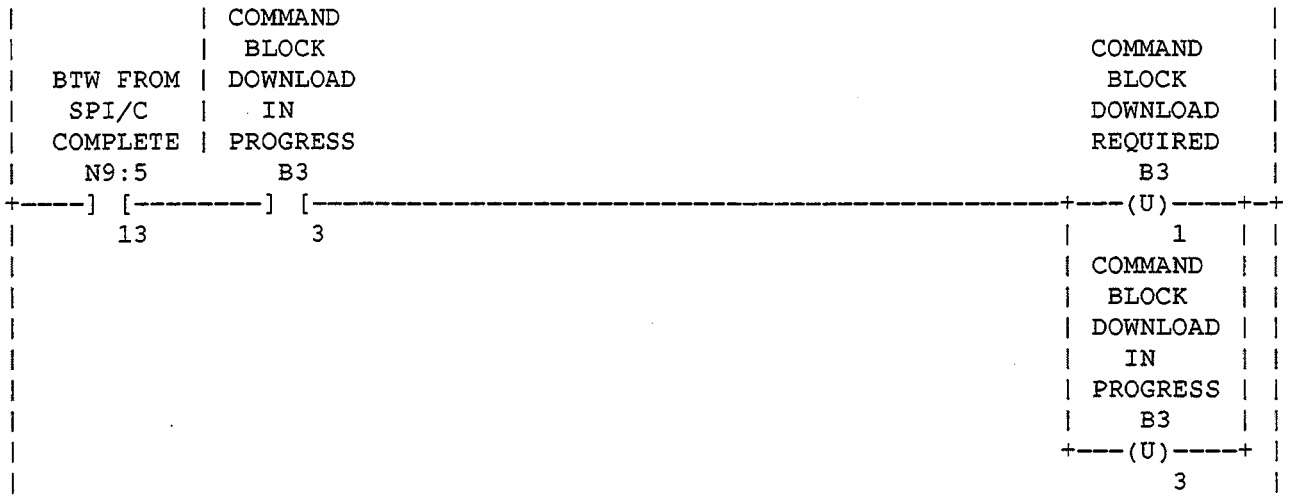
Rung 2:11

The following two rungs check to see if the BTW to the SPI/C is complete and then unlatches the correct download required and download in progress bit.




```
B3/0
     -] [- 2:9
     -]/[- 2:5
     -(L)- 2:0 2:3
     -(U)- 2:11
B3/2
     -] [- 2:11
     -(L)- 2:6
     -(U)- 2:11
N9:5/13
     -] [- 2:10 2:11 2:12
```

Rung 2:12

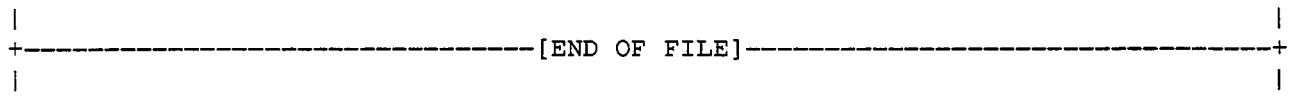


B3/1
-] [- 2:8 2:9
-(L)- 2:0
-(U)- 2:12

B3/3
-] [- 2:12
-(L)- 2:8
-(U)- 2:12

N9:5/13
-] [- 2:10 2:11 2:12

Rung 2:13



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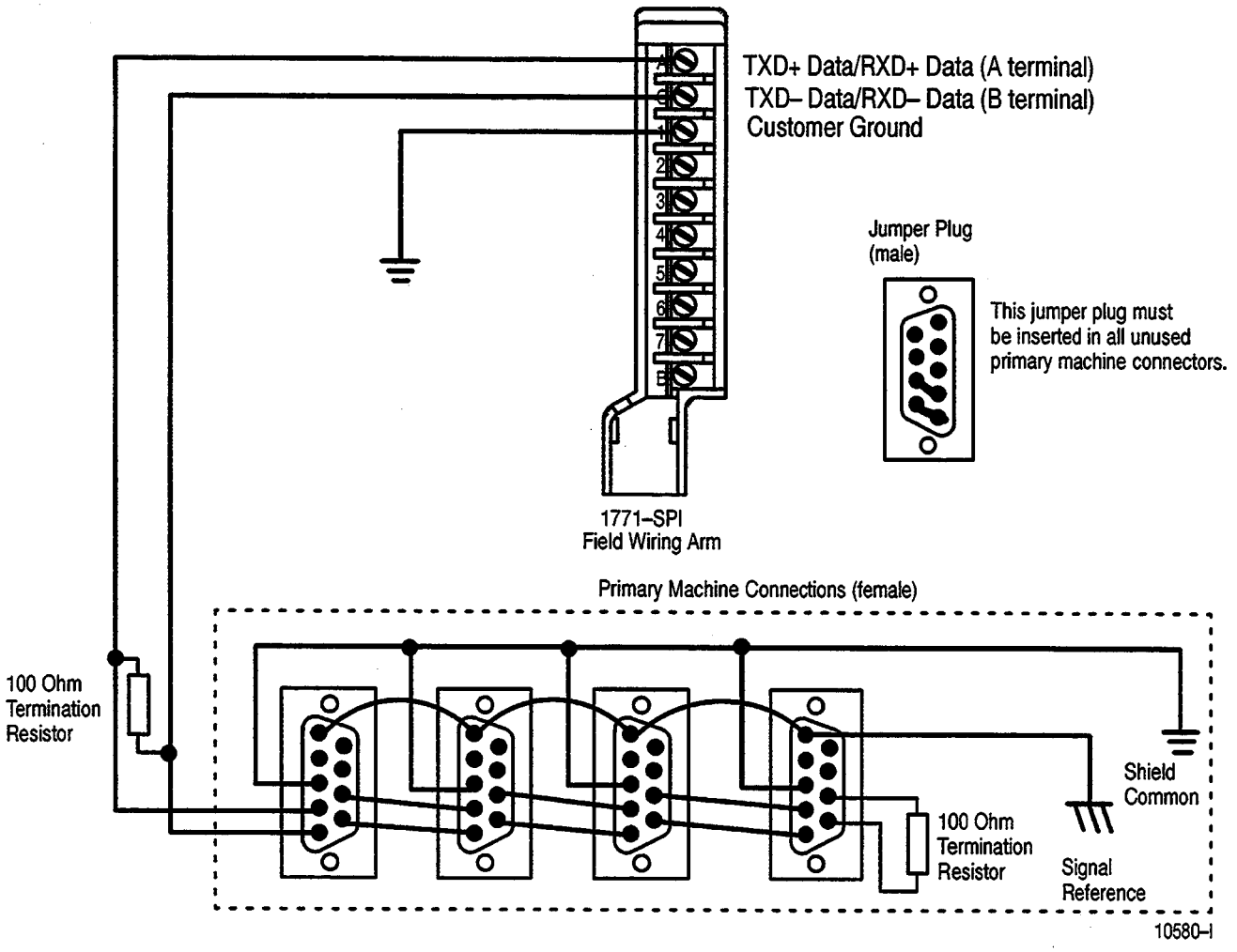
Appendix C

Series A and B 1771-SPI Protocol Interface Modules

Correctly Terminating Your SPI Series A Communications Network

Use a 100 ohm termination resistor on each end of the RS-485 network. Refer to Figure C.1.

Figure C.1
Wiring for the SPI Protocol Interface Module, Cat. No. 1771-SPI Series A



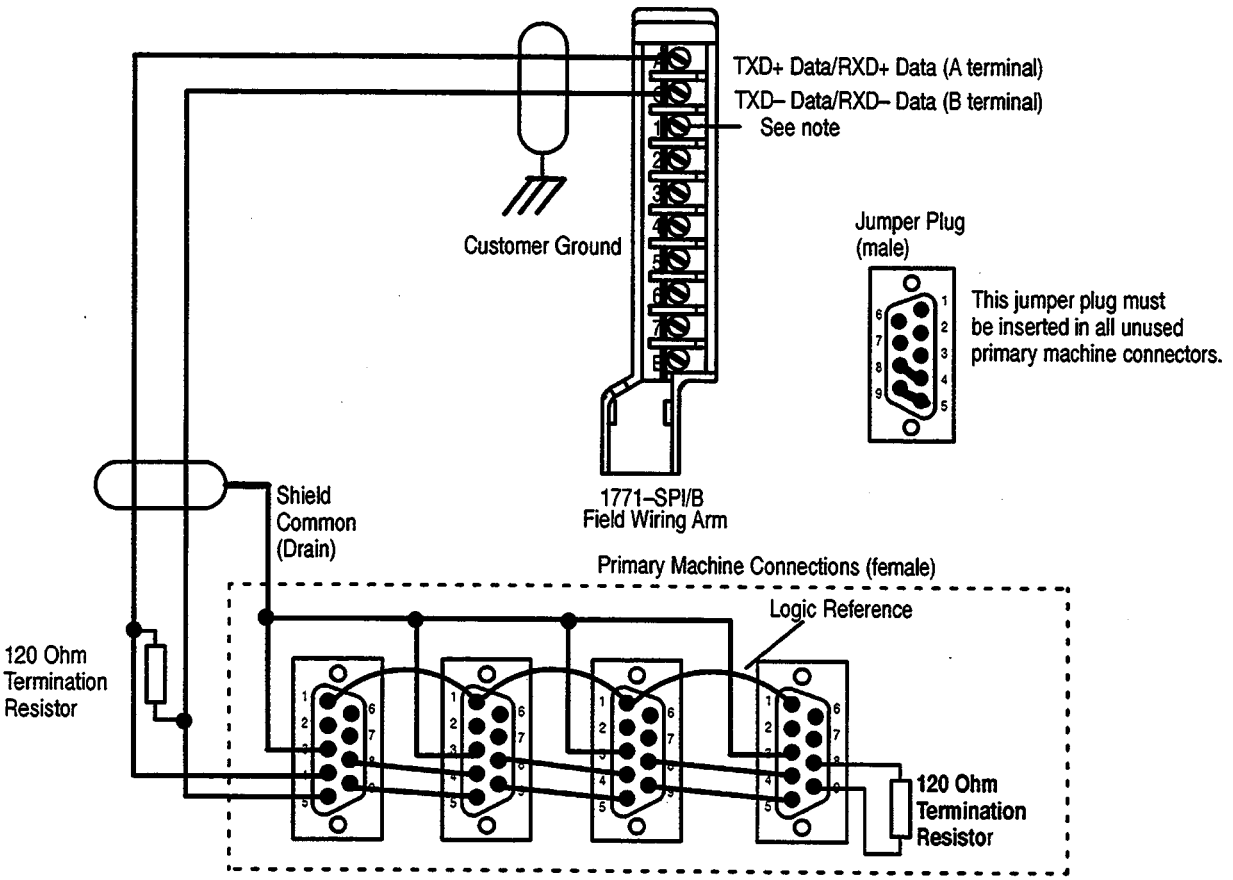
Correctly Terminating Your SPI Series B Communications Network

Use a 120 ohm termination resistor on each end of the RS-485 network.

Ideally, termination resistors should match the impedance of the cable you are running from device to device. Typically, a 120 ohm resistor on each end is sufficient. If you experience problems with data integrity on your network, experiment with resistors that have a slightly higher impedance.

Important: Some peripheral devices may have an on-board resistor that you can connect to provide the second termination resistance. Make sure you only connect two resistors on the SPI serial link.

Figure C.2
Wiring for the SPI Protocol Interface Module, Cat. No. 1771-SPI Series B



Note: A wire may optionally be run from terminal 1 of the 1771-SPI wiring arm to pin 1 of the first Primary Machine Connection if recommended by the SPI device manufacturer and performance increases.

Command Block Summary – Series A

On power up, the module initializes and prepares the input/output port. The module command blocks (block transfer write) and status blocks (block transfer read) are listed in Table C.A and Table C.B.

Table C.A
Command (Block Transfer Write) Block Summary

Acronym	Description	Block ID (Device Type)
—	Reserved for future use	0000000
....	....	....
—	Reserved for future use	0011111
MTC	Mold Temperature Controller Command Block	0100000
CHC	Chiller Command Block	0100001
DRC	Dryer Command Block	0100010
LDC	Loader Command Block	0100011
MPC	Melt Pump Command Block	0100100
AFC	Additive Feeder Command Block	0100101
—	Future	0100110
....	....	....
—	Future	1111110
MCC	Module Configuration Command Block	1111111

Table C.B
Status (Block Transfer Read) Block Summary

Acronym	Description	Block ID (Device Type)
—	Reserved for future use	0000000
....	....	....
—	Reserved for future use	0011111
MTS	Mold Temperature Controller Status Block	0100000
CHS	Chiller Status Block	0100001
DRS	Dryer Status Block	0100010
LDS	Loader Status Block	0100011
MPS	Melt Pump Status Block	0100100
AFS	Additive Feeder Status Block	0100101

Acronym	Description	Block ID (Device Type)
—	Future	0100110
....	....	....
—	Future	1111110
SYS	System Status Block	1111111

Command Block Summary – Series B

On power up, the module initializes and prepares the input/output port. The module command blocks (block transfer write) and status blocks (block transfer read) are listed in Table C.C and Table C.D.

Table C.C
Command (Block Transfer Write) Block Summary

Acronym	Description	Block ID (Device Type)
—	Reserved for future use	00000000
....	....	....
—	Reserved for future use	00011111
MTC	Mold Temperature Controller Command Block	00100000
CHC	Chiller Command Block	00100001
DRC	Dryer Command Block	00100010
LDC	Loader Command Block	00100011
MPC	Melt Pump Command Block	00100100
AFC	Additive Feeder Command Block	00100101
STC	Self Tuning Temperature Controller	00100110
GPC	General Purpose Temperature Controller	00100111
BVC	Blender Volumetric Controller	00101000
BCW	Blender Continuous Weigh Controller	00101001
BBW	Blender Batch Weigh Controller	00101010
—	Optional Custom Configuration	00101011
....	....	....
—	Optional Custom Configuration	11111110
MCC	Module Configuration Command Block	11111111

Table C.D
Status (Block Transfer Read) Block Summary

Acronym	Description	Block ID (Device Type)
—	Reserved for future use	00000000
....	....	....
—	Reserved for future use	00011111
MTS	Mold Temperature Controller Status Block	00100000
CHS	Chiller Status Block	00100001
DRS	Dryer Status Block	00100010
LDS	Loader Status Block	00100011
MPS	Melt Pump Status Block	00100100
AFS	Additive Feeder Status Block	00100101
STS	Self Tuning Temperature Controller Status	00100110
GPS	General Purpose Temperature Controller Status	00100111
BVS	Blender Volumetric Controller Status	00101000
BCS	Blender Continuous Weigh Controller Status	00101001
BBS	Blender Batch Weigh Controller Status	00101010
—	Optional Custom Configuration	00101011
....	....	....
—	Optional Custom Configuration	11111110
SYS	System Status Block	11111111

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