WEIGH SYSTEM TECHNOLOGY

VISHAY PRECISION GROUP

BLH

DXP-15 Interface Manual
Allen-Bradley Remote I/O

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SECTION 1. Introduction

This technical manual describes an Allen-Bradley Remote I/O (RIO) communication link between a BLH DXp-15 weight transmitter and an Allen-Bradley PLC-5 (Figure 1-1). This interface method uses technologies licensed by BLH from Allen-Bradley. Functionally this digital communication method provides a simple method of transferring various types of weight data, status, and diagnostic information as well as the retrieval and download of calibration, filter and other set-up parameters.

1.1 RIO OVERVIEW

The Allen-Bradley Remote I/O (RIO) interface is a communications link that supports remote, time critical I/O control communications between a master processor and a remote I/O slave. It is typically used to transfer I/O bit images between the master and slave. The DXp-15 represents a quarter (1/4) Rack of discrete I/O with 32 bits of input and output image files to the scanning PLC. All weight data and status information uses discrete reads and writes to communicate scale information to the PLC in the shortest time possible. Discrete transfers are also used to upload and download non-time critical information such as calibration and lower priority diagnostic data.

1.2 THE DXp-15 WEIGHT TRANSMITTER

The DXp-15 is a high performance weight transmitter with features that make it suitable for both inventory and process weighing applications. The transmitter includes an integral analog summing circuit for up to four load cells, microprocessor based electronics to digitize the load cell signals, and a serial RS-485 or Allen-Bradley Remote I/O communication port. For field mount applications, standard units are housed in a NEMA 4 epoxy painted steel enclosure.

Optionally the DXp-15 is available with a Dynamic Digital Filtering feature which makes it possible to accurately weigh and control severely agitated process vessels. Units also are available with Factory Mutual Approval for installation in a Class I, II, III Division 2 hazardous locations.

Set-up and calibration is accomplished using a series of internal switches. In operation it provides up to 50,000 counts of weight resolution at an update rate of 50 msec.

1.3 ALLEN-BRADLEY PLC-5 PROGRAMMABLE CONTROLLER

The Allen Bradley PLC-5 series of mid-size programmable controllers are used as part of distributed process automation architecture. A variety of 1771 series racks and I/O modules are available for local or remote discrete and analog process control. The PLC-5 can digitally communicate to other devices using a conventional RS 232 or 423 serial port in addition to special interface ports such as Data Highway Plus Scanner Communications and Remote I/O Adapter.

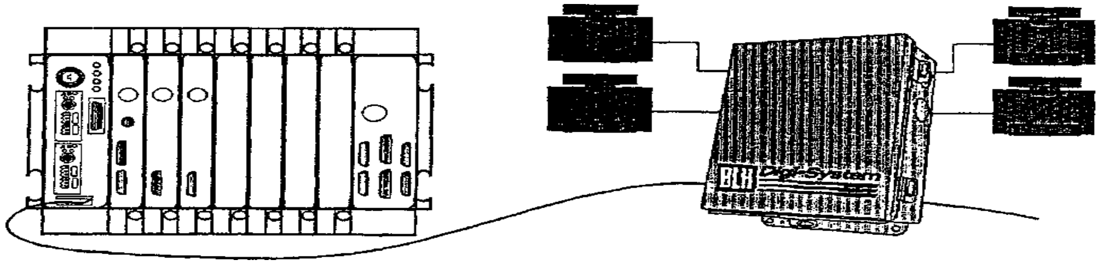

Figure 1-1. Allen-Bradley Remote I/O Network Interface

1.4 FIELD ENGINEERING

Improper installation or operation may result in module, vessel, or factory damage. Please follow instructions carefully. BLH will not accept any liability for faulty installation and/or misuse of this product. Authorized BLH Field Service Engineers are available around the world to install DXp-15 transmitters and/or train factory personnel to do so. The field service department at BLH is the most important toot to assure the best performance from your application. Field service phone numbers are listed below.

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Canada
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SECTION 2. The Remote I/O Interface

2.1 OPERATIONAL OVERVIEW

The Allen-Bradley Remote I/O (RIO) interface is standard on many PLC-2, 3, and 5 series programmable logic controllers. The technology used in the interface and licensed by Allen-Bradley to BLH enables the DXp-15 transmitter to communicate weight information to the PLC as if it were a 1/4 rack of discrete I/O. By using the standard RIO interface port and representing weight data as simple discrete I10, a low cost reliable communication link between the PLC and weigh system is established. Standard PLC ladder logic instructions convert binary weight data to an integer or floating point weight value without special software drivers and scan delays that occur when data block transfers are used. The DXp-15 also communicates status information, diagnostics, and calibration data to the PLC.

CONFIGURATIONS: One Quarter Rack, The DXp-15 is configured to act as 1/4 rack of I/O using 2 input words and 2 output words in the PLC's I/O image table. DXp-15 addressing supports racks 1-8 only. Four DXp-15s constitute 1 full rack, each using a different starting quarter.

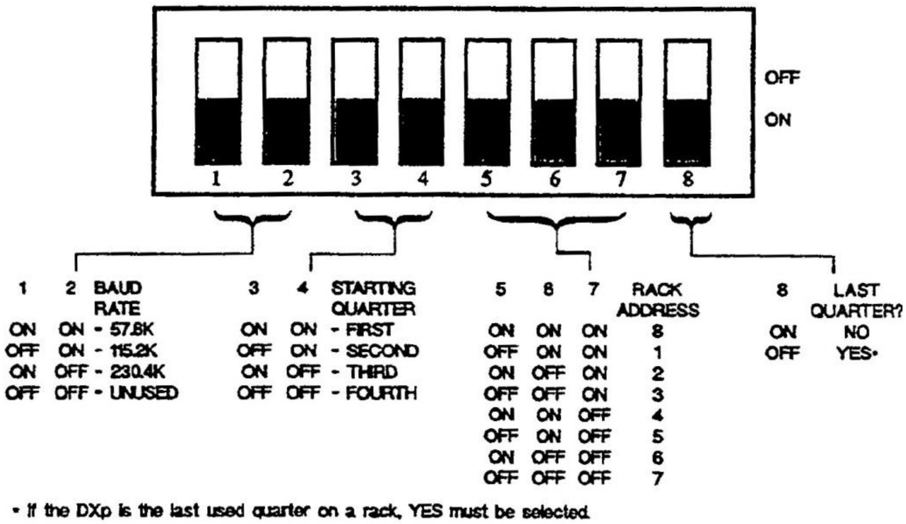
Discrete-Transfer Only, All data and control is through discrete transfer using the PLC's I/O image table. Block transfer is not supported.

Word Integrity Is Ensured. The DXp-15 will always transmit both input image table words intact. To ensure word integrity on the PLC side, immediate writes to the output image table should be written low word first.

2.2 HARDWARE CONFIGURATION AND WRITING

The communication baud rate, rack address, and starting quarter within the rack are all configured using a row of DIP switches in the DXp-15 (Figure 2-1). The DXp-15 is able to be addressed ***up*** to rack number 8. For systems that may require the DXp-15 to be addressed at a rack location higher than 8; special versions are available. Whenever the DIP switch settings are changed, the unit must be reset to allow the processor to read the new switch settings.

Baud Rates and Addressing



Cable Lengths, Terminations, and Maximum # Of DXp-15s

BAUD RATE	MAXIMUM CABLE LENGTH	TERMINATION FOR LAST DXP ON CABLE	MAXIMUM DXPs PER SCANNER
57.6K	10,000 FEET	150 OHMS	150 OHMS
115.2K	5,000 FEET	150 OHMS	150 OHMS
230.4K	2,500 FEET	82 OHMS	82 OHMS

Figure 2-1. RIO Communication DIP Switch Settings

2.3 OUTPUT IMAGE TABLE

The PLC-5 initiates the communication interface by transmitting two words from the output image table. The first word contains an alarm, filter, zero, tare, or calibration value if a download is taking place.

If no download is taking place, the first word is ignored. The second word contains the commands and/or data requests that the PLC-5 expects the DXp-15 to perform. Note that bit 05 determines whether or not a download is in progress.

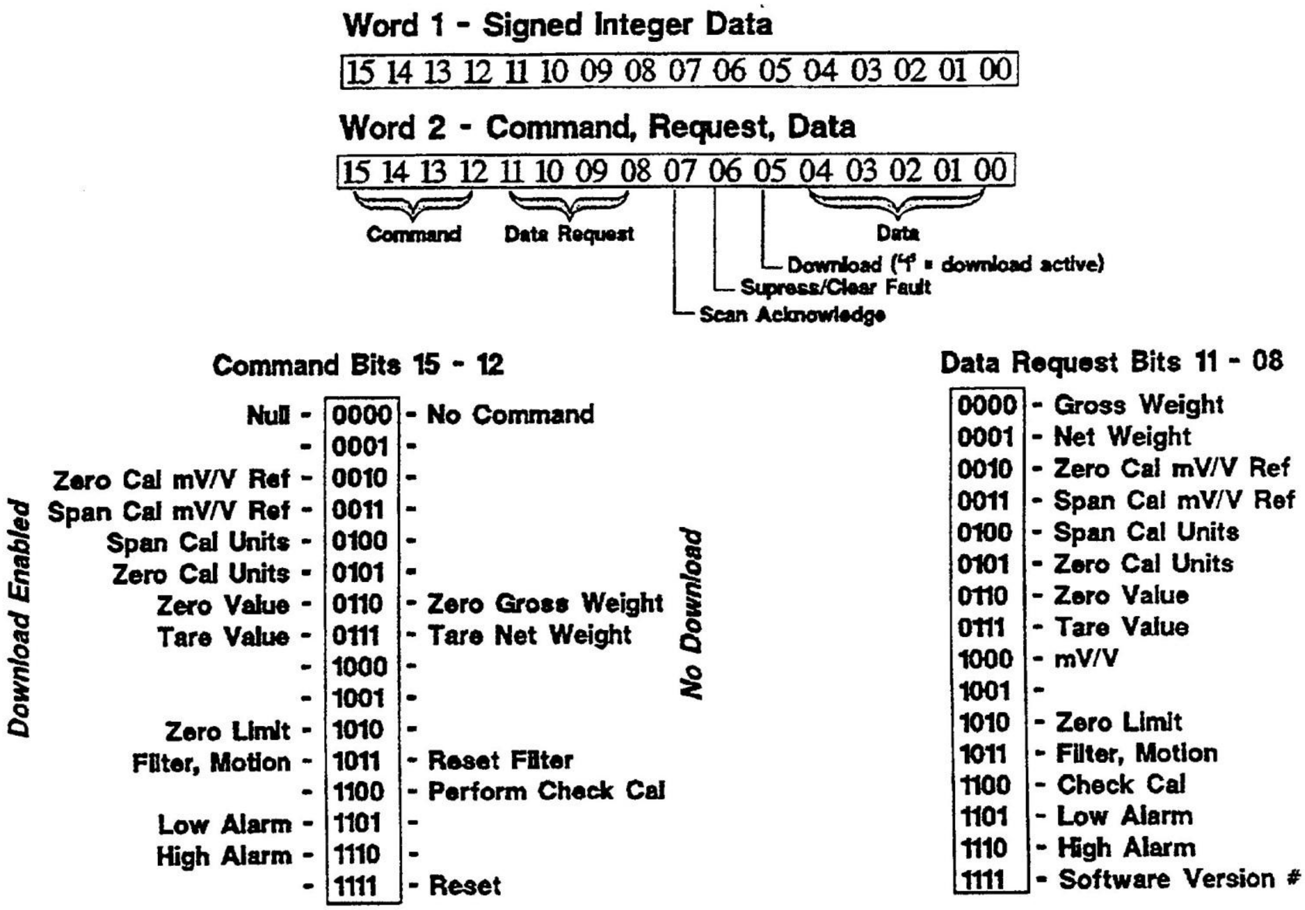
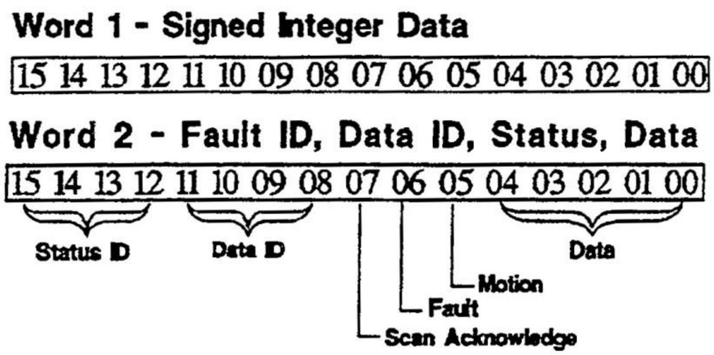


Figure 2-2 The Output Image Table

2.4 INPUT IMAGE TABLE

After evaluating the contents of the output image table, the DXp-15 responds by transmitting two words to the input image table. The first word contains signed integer weight data. The second word contains the upper order data bits, system status, and error condition information.



Status ID 15 - 12

0000	- Null
0001	- In Analog Cal
0010	- In Digital Cal
0011	- Acquiring Cal Data
0100	- Filter Being Changed
0101	- Low Alarm
0110	- High Alarm
0111	-
1000	- Unrecognized Command
1001	- Command Data Outside Limit
1010	- Motion, No Tare/Zero
1011	- Zero Limit
1100	- Check Cal
1101	-
1110	-
1111	-

Data ID Bits 11 - 08

0000	- Gross Weight
0001	- Net Weight
0010	- Zero Cal mV/V Ref
0011	- Span Cal mV/V Ref
0100	- Span Cal Units
0101	- Zero Cal Units
0110	- Zero Value
0111	- Tare Value
1000	- mV/V Ref
1001	-
1010	- Zero Limit
1011	- Filter, Motion
1100	- Check Cal
1101	- Low Alarm
1110	- High Alarm
1111	- Software Version #

Figure 2-3. The Input Image Table

2.5 DIAGNOSTICS MODE

The DXp-15 is equipped with extensive diagnostic capabilities that transmit fault information to the PLC when an error is detected. The DXp-15 will automatically switch from a weighing mode into the diagnostic transmission mode when a fault is detected and begin transmitting codes to the PLC in the format presented in Figure 2-4. When a fault condition is corrected, the DXp-15 automatically returns to the weighing mode. To clear the fault registers, power the unit down and then power it up again.

Input Image Buffer Contents If Word 2, Bit 6 Is Set To A '1'

Word 1 Faults

00	-	Power Up
01	-	EEPROM Code Error - Default Data Loaded
02	-	EEPROM Read Error
03	-	EEPROM Write Error
04	-	EEPROM Data Error - Faulted Data Replaced With Default
05	-	Zero Cal Raw Count Checksum Error
06	-	Zero CAI Unit Checksum Error
07	-	Span Cal Raw Count Checksum Error
08	-	Span Cal Unit' Checksum Error
09	-	Zero Ref Cal Checksum Error
10	-	Span Ref Cal Checksum Error
11	-	Zero D/A Cal Raw Count Checksum Error
12	-	Span D/A Cal Raw Count Checksum Error
13	-	Zero D/A Cal Adjust Checksum Error
14	-	Span D/A Cal Adjust Checksum Error
15	-	Temperature Cal Ref Checks= Error

Word 2 Faults

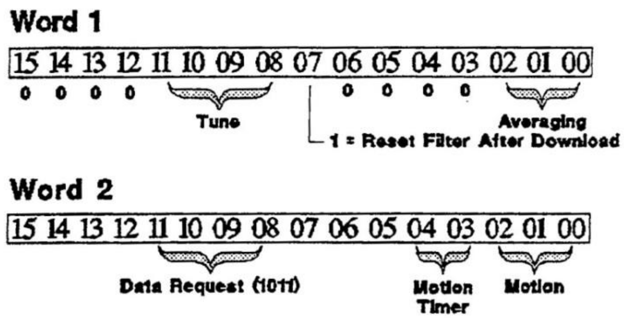
00	-	Zero Temperature Ref Out Of Limits
01	-	Span Temperature Ref Out Of Limits
02	-	A/D in Underrange
03	-	A/D in Overrange
04	-	
05	-	
06	-	Fault
07	-	Scan Acknowledge
08	-	Tare Checksum Error
09	-	Zero Checksum Error
10	-	Zero Limit Checksum Error
11	-	Averaging Checksum Error
12	-	Digital Filter Checksum Error
13	-	Motion Checksum Error
14	-	Low Alarm Checksum Error
15	-	High Alarm Checksum Error

Figure 2-4. Fault Codes Transmitted By DXp-15

2.6 REMOTE FILTER CONFIGURATION

DXp-15 transmitters equipped with the optional Dynamic Digital Filter can be instructed by the PLC to change filter settings on-the-fly. This unique feature allows optimal, pre-determined filtering parameters to be implemented at critical moments during a dynamic weigh process.

Changing filter parameters throughout the process ensures data stability and maximum system response to actual weight changes. Figure 2-5 shows the filter data bit positions for read and write commands. Request BLH technical note TD-071 for a detailed description of Dynamic Digital Filtering.



Word 1 - Tune (+/- band Counts)

0000	- Off
0001	- 1/4
0010	- 1/2
0011	- 1
0100	- 2
0101	- 4
0110	- 6
0111	- 8
1000	- 12

Word 1 - Averaging

000	- 1
001	- 2
010	- 3
011	- 4
100	- 16
101	- 32
110	- 64
111	- 128

Word 2 - Motion Timer

00	- 0.5 sec
01	- 1 sec
10	- 2 sec
11	- 3 sec

Word 2 - Motion (Counts)

000	- Off
001	- 1
010	- 2
011	- 3
100	- 4
101	- 6
110	- 10
111	- 16

Figure 2-5. Filter Data Bits Selections

2.7 CALIBRATION INFORMATION STORAGE

Another powerful feature of the RIO interface is the ability to upload calibration data to the PLC for storage and possible future retrieval. Should the DXp-15 be damaged or need replacement, simply download system calibration data into the repaired/replaced unit and resume normal operation.

The DXp-15 also uploads identity information such as serial number and software/hardware specifications. Figure 2-6 defines the word data positions for version number communication.

NOTE: DXp-15 filter parameters are not retained during power-down periods. To save parameters, upload to PLC prior to power-down and then download from PLC after power-up.

Word 1

15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Special Version# In BCD 0=Standard 1-99=Special								Version# In BCD 1.0 thru 9.9							

Word 2

15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
				Data Request (1111)							0	0	0	0	0

Word 1 Examples

Standard Version 1.0

15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
0	0	0	0	0	0	0	0	0	0	0	1.	0	0	0	0

Special Version 3, Version 1.1

15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
0	0	0	0	0	0	1	1	0	0	0	1.	0	0	0	1

Figure 2-6. Version Number Data Position

SECTION 3. Definitions and Explanations

3.1 INPUT IMAGE TABLE BIT DEFINITIONS

A table is provided to explain the Input Image Table presented in Figure 2-3. Table 3-1 defines the bit structure of both input words

.

Table 3-1. Input Image Table Word 'Bit' Definitions

Word 1 BITS 0-15 WEIGH DATA

Word 1 for both the input and output image tables is always a signed integer except for FILTER, SOFTWARE *VER #* , and FAULT data.

Word 2 BITS 0 - 4 ABSOLUTE OVERFLOW DATA - 32768

Word 2 bits 0-4 is absolute overflow data from word 1 used if weigh data is greater than 32,767. These 5 bits are combined with the word 1 integer in a floating point register by the following steps.

1. Do a Masked move of Word 2 bits 0 -4 to an integer register.
2. Multiply the integer register by 32768.0 and put the result in a floating point register.
3. Negate the floating point result if the word 1 integer is negative.
4. Add the word 1 integer to the floating point result.

BIT 5 –MOTION

Is set if the weigh data is in motion as determined by the motion settings.

BIT 6 – FAULT

Is set if there is a fault rendering weigh data incorrect. When this bit is set all other bits in word 1 & 2 are redefined except for SCAN ACKNOWLEDGE Word 2 bit 7. See paragraph 3.3. This bit is cleared or suppressed by setting the suppress/ clear fault bit in word 2 of the output image table.

BIT 7- SCAN ACKNOWLEDGE

This bit is a copy of the same bit in the output image table. When the D4-15 receives the output image table data it copies this bit to the same location in the input image table. The pic can thus know if the remote I/O DXp-15 has received the last write to the output image table.

Table 3-1 (cont.) Input Image Table Bit Definitions

Word 2 BITS 8 - 11 (11 - 8) DATA ID (Bits presented in decimal equivalent, 0- 15)

0. GROSS WEIGHT - Scale live gross weight
1. NET WEIGHT. Gross weight less tare weight. The DXp-15 is tared using the tare command in word 2 of the output image table.
2. ZERO CAL MVN REF - A transferable zero cal reference point. This value should be stored in the plc. If the DXp-15 is damaged or fails this calibration value can be downloaded to another DXp-15 making re-calibration unnecessary.
3. SPAN CAL *MN* REF - A transferable span cal reference point This value should be stored in the plc. If the DXp-15 is damaged or fails this calibration value can be downloaded to another DXp-15 making re-calibration unnecessary.
4. SPAN CAL UNITS - The span calibration point in engineering units.
5. ZERO CAL. UNITS - The zero calibration point in engineering units.
6. ZERO VALUE - The amount of weight added or subtracted from the gross weight to get zero. It is acquired using the zero command in word 2 of the output image table.
7. TARE VALUE - The amount of weight added or subtracted from the gross weight to get net weight. It is acquired using the tare command in word 2 of the output image table.
8. MVN REF -A mv/v reference value not a true mil/ output. Any DXp-15 hooked up to the same scale will output the same mv/v reference value at the same scale signal level.
9. SPARE
10. ZERO LIMIT -A downloaded limit to the zero command in word 2 of the output image table. The DXp-15 will not perform the zero command if the resulting ZERO VALUE (S.) will be greater than the ZERO UMIT.
11. FILTER, MOTION - Filter and motion setup as defined in paragraph 2.6.
12. CHECK CAL - Calibration check value. The last CHECK CAL value can always be recalled. See the DXp-15 operator's manual.
13. LOW ALARM - Low alarm setting. Used to monitor low gross weight when operating in net mode.
14. HIGH ALARM - High alarm setting. Used to monitor high gross weight when operating in net mode.
15. SOFTWARE VER # - Resident software version number as defined in paragraph 2.7.

Table 3-1 (cont.) Input Image Table Bit Definitions

Word 2 BITS 12 - 15 (15 - 12) STATUS ID (Bits presented in decimal equivalent, 0 - 15)
NOTE: The status id with the highest binary count takes precedence.

0. 0. NULL - Everything ok
1. IN ANALOG CAL - The DXp-15 analog cal switch is activated.
2. IN DIGITAL CAL - The DXp-15 digital cal switch is activated.
3. ACQUIRING CAL DATA - Calibration data is being acquired. Input image table weigh data is not valid.
4. FILTER BEING CHANGED - The DXp-15 filter is being change using the DXp-15 filter switches.
5. 6. LOW ALARM - DXp-15 gross weight is equal to or below low alarm setting.
6. HIGH ALARM - DXp-15 gross weight is equal to or above high alarm setting.
7. SPARE
8. UNRECOGNIZED COMMAND - Word 2 output image table corrrnand not recognized by DXp-15.
9. COMMAND DATA OUTSIDE UMIT - Data being download is outside limit.
10. CAN'T TARE/ZERO - MOTION - Set for 1 second if scale is in motion and TARE or ZERO command is received.
11. ZERO UMIT - Zero command would result in a zero value greater zero limit. Status stays set for 1 second after
12. zero command received.
13. CHECK CAL - DXp-15 has received a check cal command and is in check cal.
14. SPARE
15. SPARE
16. SPARE

3.2 OUTPUT IMAGE TABLE BIT DEFINITIONS

Table 3-2 shows the structure and bit definition of each Output Image Table word. Reference Figure 2-2 to view word breakouts.

Table 3-2. Output Image Table Word/Bit Definitions

Word 1 BITS 0 - 4 ABSOLUTE OVERFLOW DATA – 32768

Word 1 for both the input and output image tables is always a signed integer except for FILTER, SOFTWARE VER # and FAULT data. Used for downloading data to DXp-15.

Word 2 BITS 0 - 4 ABSOLUTE DATA - 32768

Used for downloading data to DXp-15. Remember that bit 1 of word2 is equal to 32768 not 65536 (See same input image table bits, see paragraph 2.4).

BIT 5 – DOWNLOAD

This bit set tells the DXp-15 that the data in word 1 & word 2 bits 0 -4 is to be downloaded to the value pointed to by the command in bits 12 -15 of word 2.

BIT 6 SUPPRESS/CLEAR FAULT

Setting this bit will clear most DXp-15 faults. As long as this bit is set the remaining bits in words 1 & 2 will be restored to their normal non-fault definition. When the bit is reset (0) most faults should be cleared. See paragraph 2.6.

BIT 7 SCAN ACKNOWLEDGE

This bit is set or reset by the plc to achieve data transfer synchronization between the plc's program scan and the remote I/O scan. When the DXp-15 receives the output image table data it copies this bit to the same location in the input image table. The PLC can thus know if the remote 110 DXp-15 has received the last write to the output image table.

BITS 8-11 DATA REQUEST

The binary sum of these bits point to the data requested by the PLC. The OXp-15 writes the requested data to the input image table word I and word 2 bits 0 -4.

Table 3-2 (cont.) Output Image Table Word/Bit Definitions

BITS 12 - 15 (15 - 12) COMMAND (Bits presented in decimal equivalent, 0 - 15)

The binary sum of these bits defines commands to the DXp-15. The commands are treated like a one shot, they are performed once when first received. When the command bit sum change the DXp-15 performs the new command. The commands are in two categories, downloading and non-downloading. Downloading commands require word 2 bit 6 to be set to 1. Non-downloading commands require word 2 bit 5 to be reset to 0. Downloading commands download the signed integer in word 1 plus the binary sum of bits 0 - 4 in word2 32,768. The exception to this is filter & motion data.

0. NULL - no command
1. SPARE - no command
2. ZERO CAL MVN REF - Download cal zero. Used mainly for transferring calibration from one unit to another. This command is not used for initial calibration which is performed by the DXp-15 cal switches. See paragraph 2.7.
3. SPAN CAL MVN REF - Download cal span. Used mainly for transferring calibration from one unit to another. This command is not used for initial calibration which is performed by the D4-15 cal switches. See paragraph 2.7.
4. SPAN CAL UNITS - Cal span in engineering units. Once signal span has been established using the OXp-15 cal switches this value may be downloaded/changed at any time. Keep in mind that all cal data is stored in eeproms which have a limit of 100,000 write cycles.
5. 6. ZERO CAL UNITS - Cal zero in engineering units. Once signal zero has been established using the DXp-15 cal switches this value may be downloaded/changed at any time. Normally this value is zero, however, some calibrations are performed with a known amount of product in the weigh vessel. That amount can be downloaded to offset zero. Again keep in mind that all cal data is stored in eeproms which have a limit of 100,000 write cycles.
6. ZERO VALUE - The amount of weight added or subtracted from the gross weight to get zero. It is acquired using the non-downloading zero command or downloaded using this command. This value is stored in battery backed ram so there is no limit on the number of times the command is performed.
7. TARE VALUE - The amount of weight added or subtracted from the gross weight to get net weight. It is acquired using the non-downloading tare command or downloaded using this command. This value is stored in battery backed ram so there is no limit on the number of times the command is performed
8. NOT USED
9. SPARE
10. ZERO UMIT -A downloaded limit to the zero command. The DXp-15 will not perform the zero command if the resulting ZERO VALUE will be greater than the ZERO UMIT.
11. FILTER, MOTION - Filter and motion setup as defined in paragraph 2.6. The DXp-15 stores the latest 256 conversions. When the filter is changed it applies real data in the calculations. For example if averaging is changed from 1 to 128 the last 128 conversions are used to calculate the result.
12. SPARE
13. LOW ALARM - Low alarm setting.
14. HIGH ALARM - High alarm setting.
15. SPARE

Table 3-2 (cont.) Output Image Table Word/Bit Definitions

BITS 15 - 12 Non-Downloading commands:

6. ZERO GROSS WEIGHT - Add to or subtract current gross weight from zero value to get output zero. Command will not be performed if data is in motion or greater than zero limit.
7. TARE NET WEIGHT - Add or subtract current gross weight to get zero net weight. Command will not be performed if data is in motion.
11. RESET FILTER - Restart fitter from an averaging of 1, conversion by conversion, until the current averaging setting is reached. For example if the filter is reset and the current setting is 8 the next 8 weight updates will be averaged using 1 conversion then 2 conversions then 3 conversions on up until 8 conversions.
12. PERFORM CHECK CAL - See definition in manual. The check cal command switches in check cal resistors in parallel to the input signal lines for 6 seconds. When active the check cal value can be monitored looking at the gross weight or check cal data. The check cal value is stored in battery backed ram and can be recalled at any time by requesting check cal data.

3.3 FAULT BIT DEFINITIONS

If the DXp-15 detects an error condition, it sets word 2, bit 6 of the input image table to a 'I' (reference Figure 2-3). Table 3-3 provides definitions for the input image table fault bits.

To clear or suppress an error condition, the PLC must set word 2, bit 6 of the output image table to a '1' (reference Figure 2-2).

Table 3-3. Input Image Table Fault Bit Definitions

WORD 1 FAULTS (Numbers represent actual bit locations, not decimal equivalents)

00 POWER UP - set only if power up or reset. Self cleared at end of power up sequence
01 EEPROM CODE ERROR - DEFAULT DATA LOADED - first time power up of eeprom. DXp-15 must be manually reset.
02 EEPROM READ ERROR - eeprom read failure, DXp-15 must be manually reset to clear fault and retry eeprom read.
03 EEPROM WRITE ERROR - eeprom write failure, DX9-15 must be manually reset to clear fault and retry eeprom write.
04 EEPROM DATA ERROR - Power up checksum error of calibration data. Set in conjunction with cal data that faulted. If analog output data is faulted default data is loaded into eeprom and DXp-15 must be manually reset to clear fault. With all other calibration data default values are loaded into ram and the fault is cleared by setting bit 6 in the output image word 2, however, the unit must be recalibrated. If failure persists CPU pc board should be replaced.
05 ZERO CAL RAW COUNT CHECKSUM ERROR - If bit 4 is not set the DXp-15 should be manually reset to reload zero cal from eeprorm.
06 ZERO CAL. UNIT CHECKSUM ERROR - If bit 4 is not set the DXp-15 should be manually reset to reload zero cal from eeprom.
07 SPAN CAL RAW COUNT CHECKSUM ERROR - If bit 4 is not set the DXp-15 should be manually reset to reload span cal from eeprom.
08 SPAN CAL UNIT CHECKSUM ERROR - If bit 4 is not set the DXp-15 should be manually reset to reload span cal from eeprom.
09 ZERO REF CAL CHECKSUM ERROR - If bit 4 is not set the DXp-15 should be manually reset to reload zero ref cal from eeprom.
10 SPAN REF CAL CHECKSUM ERROR - If bit 4 is not set the DXp-15 should be manually reset to reload span ref cal from eeprorm.
11 ZERO D/A CAL RAW COUNT CHECKSUM ERROR - If bit 4 is set default data has been loaded into eeprom and the DXp-15 should be reset manually. The d/a option will have to be recalibrated.
12 SPAN D/A CAL. RAW COUNT CHECKSUM ERROR-See bit 11.
13 ZERO D/A CAL ADJUST CHECKSUM ERROR - See bit 11.
14 SPAN D/A CAL ADJUST CHECKSUM ERROR - See bit 11.
16 TEMPERATURE CAL REF CHECKSUM ERROR -If bit 4 is not set the DXp-15 should be manually reset to reload temp cal from eeprom.

Table 3-3. (cont.) Input Image Table Fault Bit Definitions

WORD 2 FAULTS (Numbers represent actual bit locations, not decimal equivalents)

00 ZERO TEMPERATURE REF OUT OF UMIT - Could be caused by excitation lines shorted, sense lines not connected (if used), ND pc board failure.
01 SPAN TEMPERATURE REF OUT OF LIMIT - Could be caused by excitation lines shorted, sense lines not connected (if used), ND pc board failure.
02 A/D IN UNDERRANGE - Input signal level too low to run ND. Self-cleared if signal level is corrected.
03 AID IN OVERRANGE - Input signal level too high to run AID. Self-cleared if signal level is corrected.
04 Spare
05 Spare
06 FAULT- Set if any of the word 1 or word 2 faults are set. Is cleared of suppressed if word 2 bit 6 of the output image table is set
07 SCAN ACKNOWLEDGE
08 TARE CHECKSUM ERROR - If set the tare value is cleared. Can be cleared by setting word 2 bit 6 of the output image table. Error occurring during power up indicates ram battery failure.
09 ZERO CHECKSUM ERROR - If set the zero value is cleared. See Tare checksum error, bit 8, for error handling.
10 ZERO LIMIT CHECKSUM ERROR - If set the zero limit value is cleared. See Tare checksum error, bit 8, for error handling.
11 AVERAGING CHECKSUM ERROR - If set averaging is turned off. See Tare checksum error, bit 8, for error handling.
12 DIGIT FILTER CHECKSUM ERROR - If set digit filter is turned off. See Tare checksum error, bit 8, for error handling.
13 M0110N CHECKSUM ERROR - If set motion is turned off. See Tare checksum error, bit 8, for error handling.
14 LOW ALARM CHECKSUM ERROR - If set low alarm value is cleared. See Tare checksum error, bit 8, for error handling.
15 HIGH ALARM CHECKSUM ERROR - If set high alarm value is cleared. See Tare checksum error, bit 8, for error handling.

SECTION 4. Sample Ladder Logic Programs

4.1 INTRODUCTION

This section provides two sample programs that show how the Allen-Bradley PLC communicates with the DXp-15 through the RIO interface. These programs are presented as guides to simplify the development of customer PLC programs.

4.1.1 SCALE TRAINING PROGRAM

The first sample program, MAIN PROG', begins on page 4-2 and continues to page 4-13. MAIN PROG is a scale training program designed to “exercise” most of the RIO interface actions and responses. Each block of the program defines the function being performed and then shows individual register and bit allocations.

4.1.2 CALIBRATION DOWNLOAD

The second sample program, DNLD CALC, begins on page 4-14 and runs through page 4-16. DNLD CALC shows how to download calibration information from the PLC host to a DXp-15 node. Calibration downloading ensures quick start-up when replacing a DXp-15 node, or on-line reconfiguration of an existing DXp-15 unit.

4.1.3 REFERENCE TABLES

Pages 4-17 to 4-21 provide reference tables to be used in conjunction with the sample programs. Use these tables to clarify program references.

4.2 SAMPLE PROGRAM AVAILABILITY

Sample programs are available on disk in either AB 6200 or ICOM format. Contact BLH at (781) 298-2000 for disk copies and/or application assistance, if needed.

4.2.1 SAMPLE PROGRAM DISCLAIMER

The sample programs presented in this section were developed and tested by an authorized Allen-Bradley systems integrator for BLH. BLH makes no warranty or claim that these programs are without faults or suitable for a particular purpose. Always consult the appropriate Allen-Bradley systems programming documentation as the final authority on programming issues.

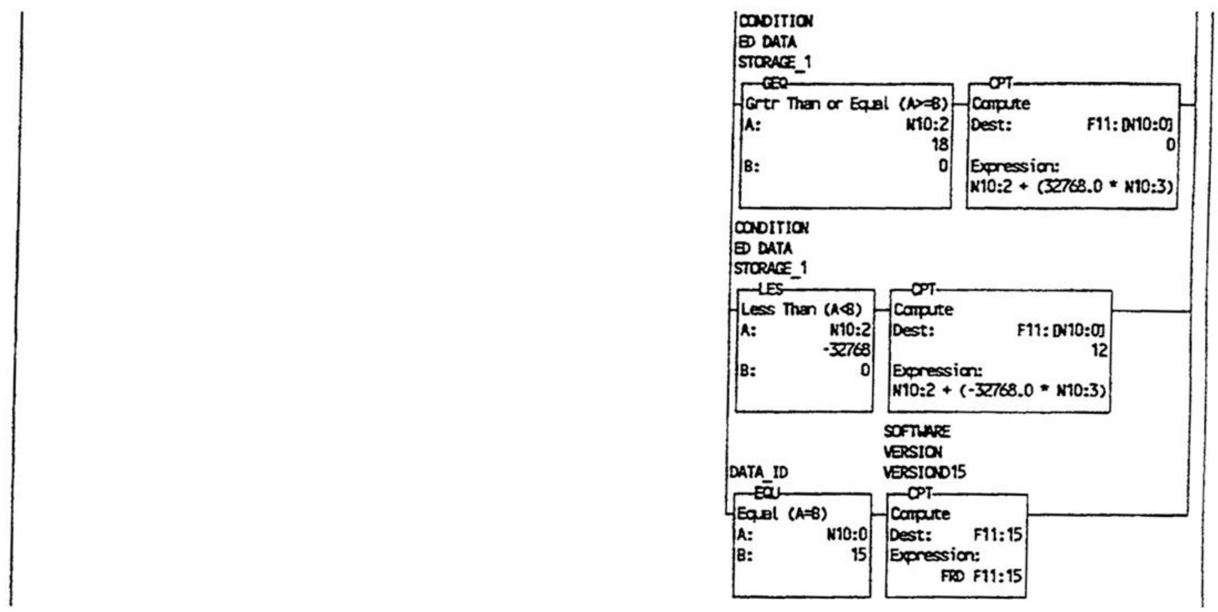
```
SHIFT DATA ID BITS FROM INPUT WORD 2 (BITS 08-11 DECIMAL or 10-13 OCTAL) TO GENERATE THE DATA ID CODE (00-15):

    00 = GROSS WEIGHT            08 = mV/V REF
    01 = NET WEIGHT              09 = unused
    02 = ZERO CAL mV/V REF       10 = ZERO LIMIT
    03 = SPAN CAL mV/V REF       11 = FILTER, MOTION
    04 = SPAN CAL UNITS          12 = CHECK CAL
    05 = ZERO CAL UNITS          13 = LOW ALARM
    06 = ZERO VALUE              14 = HIGH ALARM
    07 = TARE VALUE              15 = SOFTWARE VERSION

THIS VALUE IS USED AS A POINTER IN THE PLC-5 PROGRAM.

BTD - Bit Field Distributor:

This output instruction, when its rung is true, copies specified bits from one word location to a specified location in another
word (or bits may be moved within a word).

Up to sixteen bits may be moved from within one word to within another. Note however that word boundries will not be overwritten;
excess data will be lost.

Sample:        BIT DISTRIBUTOR             Beginning with the fifth bit in I:0,
               SOURCE:          I:0        eight bits will be copied to O:0
               SOURCE BIT:        5        starting with bit three. Source
               DEST:            O:0        bits remain unchanged by the
               DEST BIT:          3        operation as well as unaffected bits
               LENGTH             8        in the destination.
```

```
                                                          FROM SCALE
                                                          INP_WORD_2
                                                          -BTD-----------------
0 --------------------------------------------------------|Bit Field Distributor|-
                                                          |Source:        I:021|
                                                          |                2847|
                                                          |Source Bit:        8|
                                                          |Dest:          N10:0|
                                                          |                  15|
                                                          |Dest Bit:          0|
                                                          |Length:            4|
```

```
SHIFT STATUS ID BITS FROM INPUT WORD 2 (BITS 12-15 DECIMAL or 14-17 OCTAL) TO GENERATE THE STATUS ID CODE (00-15):

    00 = NULL                    08 = UNRECOGNIZED COMMAND
    01 = IN ANALOG CAL           09 = COMMAND DATA OUTSIDE LIMIT
    02 = IN DIGITAL CAL          10 = MOTION, NO TARE/ZERO
    03 = ACQUIRING CAL DATA      11 = ZERO LIMIT
    04 = FILTER BEING CHANGED    12 = CHECK CAL
    05 = LOW ALARM               13 = unused
    06 = HIGH ALARM              14 = unused
    07 = unused                  15 = unused

THIS VALUE IS USED AS A POINTER IN THE PLC-5 PROGRAM.
```

```
                                                          FROM SCALE
                                                          INP_WORD_2
                                                          -BTD-----------------
1 --------------------------------------------------------|Bit Field Distributor|-
                                                          |Source:        I:021|
                                                          |                2847|
                                                          |Source Bit:       12|
                                                          |Dest:          N10:1|
                                                          |                   0|
                                                          |Dest Bit:          0|
                                                          |Length:            4|
```

```
+IF SCALE IS NOT IN FAULT (WORD 2, BIT 6 SET TO A '0'), MOVE INTEGER DATA FROM INPUT WORD 1 (INTEGER DATA) (BITS 00 - 15 DECIMAL or
+00 - 17 OCTAL) AND LOWER 5 BITS OF INPUT WORD 2 (INTEGER DATA OVERFLOW) (BITS 00 - 04) TO STORAGE WORDS 1 AND 2.  DATA FROM SCALE
+IS CALCULATED BY THE FORMULAS:
+
+ STORAGE WORD 1 >= 0:
+     STORAGE WORD 1 + (32768 * STORAGE WORD 2).
+
+ STORAGE WORD 1 <0:
+     STORAGE WORD 1 - (32768 * STORAGE WORD 2)
+
+WHERE N10:2 IS USED FOR STORAGE WORD 1 (CONTAINS SIGN) AND N10:3 IS USED FOR STORAGE WORD 2.
+
+ MVM - Masked Move:
+
+ Moves information from a SOURCE word to a DEST word (destination) through a mask.
+
+ This output instruction will execute when its rung is true.  It will execute each scan if it is the only instruction of the rung.
+ Bits in the SOURCE are passed through bits in the MASK and the results are placed in the DEST.
+
+      SOURCE          1111000011110101 - - -  is passed through the MASK
+      MASK            1000111100001111 - - -  and stored in the DEST.
+      DEST            1000000000000101
+
+ This result (stored in the DEST) assumes that the original value stored in the DEST was 0000000000000000).  All bits corresponding
+ to reset bits (0) in the MASK retain their original status (zero in this case).
+
+ MVM Sample Entry
+
+      MASKED MOVE
+      SOURCE          N7:4     The source may be an address or a
+                         0     program constant.
+      MASK            N7:5     The MASK may be an address or a hex value.
+                         0     for a hex value, enter a leading zero.
+      DEST            N7:6     The DEST is the address where you want the
+                         0     results of the operation stored.
+
+ The current value stored in each address (or entry) will be displayed below the entry.
+
+THE CPT (COMPUTE) INSTRUCTION PERFORMS THE DATA CALCULATION AND STORE THE RESULT IN A POSITION IN FILE F11:0 IN FLOATING POINT
+FORMAT.  THE VALUE IN N10:0 (DATA_ID) DETERMINES THE POSITION IN THE FILE WHERE THE DATA IS STORED.
+
+DATA_ID VALUE = 11 IS FOR FILTER AND MOTION.  ALTHOUGH A VALUE IS CALCULATED AND STORED IN F11:11, THE ACTUAL PARAMETERS FOR TUNE,
+AVERAGING AND MOTION ARE STORED IN FILE B14:0.
+
+DATA_ID VALUE = 15 COMES FROM THE SCALE IN BCD FORMAT.  A CONVERSION IS MADE IF DATA_ID = 15 TO EXTRACT THE SPECIAL & STANDARD
+VERSION SOFTWARE NUMBERS:
+
+     eg.  12 = STANDARD VERSION 1.2  311 = SPECIAL VERSION 3, VERSION 1.1
+

 FROM SCALE                                     CONDITION
 FAULT_INP                                      ED DATA
  I:021/06                                      STORAGE_1
                                                +-MOV----------+
2|---|/|-----------------------------------------+-Move         +---------------
                                                |Source: I:020 |
                                                |            0 |
                                                |Dest:   N10:2 |
                                                |           18 |
                                                +--------------+
                                                CONDITION
                                                ED DATA
                                                STORAGE_2
                                                +-MVM----------+
                                               -+Masked Move   +---------------
                                                |Source: I:021 |
                                                |         2847 |
                                                |Mask:     1fh |
                                                |Dest:   N10:3 |
                                                |            0 |
                                                +--------------+
```


CONDITION
ED DATA
STORAGE_1
GEQ
Grtr Than or Equal (A>=B)
A: N10:2
18
B: 0
CPT
Compute
Dest: F11:[N10:0]
0
Expression:
N10:2 + (32768.0 * N10:3)
CONDITION
ED DATA
STORAGE_1
LES
Less Than (A<B)
A: N10:2
-32768
B: 0
CPT
Compute
Dest: F11:[N10:0]
12
Expression:
N10:2 + (-32768.0 * N10:3)
DATA_ID
SOFTWARE
VERSION
VERSION015
EQU
Equal (A=B)
A: N10:0
B: 15
CPT
Compute
Dest: F11:15
Expression:
FRD F11:15

EXTRACT REMOTE FILTER DATA:

B14:0 - AVERAGING	B14:1 - TUNE	B14:2 - MOTION	B14:3 - MOTION TIMER
000 = 1	0000 = OFF	000 = OFF	00 = 0.5 SEC
001 = 2	0001 = 1/4	001 = 1	01 = 1.0 SEC
010 = 3	0010 = 1/2	010 = 2	10 = 2.0 SEC
011 = 4	0011 = 1	011 = 3	11 = 3.0 SEC
100 = 16	0100 = 2	100 = 4	
101 = 32	0101 = 4	101 = 6	
110 = 64	0110 = 6	110 = 10	
111 = 128	0111 = 8	111 = 16	
	1000 = 12		

```
Rung 3:
FROM SCALE
FAULT_INP      DATA_ID
I:021/06       EQU
--|/|--        Equal (A=B)
               A:   N10:0
                    15
               B:   11

AVERAGING AFTER DOWNLOAD FILTER_I00
MVM  Masked Move
     Source: I:020
             0
     Mask:   7h
     Dest:   B14:0
             0

FROM SCALE INP_WORD_1
BTD  Bit Field Distributor
     Source:     I:020
                 0
     Source Bit: 8
     Dest:       B14:1
                 0
     Dest Bit:   0
     Length:     4

MOTION FILTER_I02
MVM  Masked Move
     Source: I:021
             2847
     Mask:   7h
     Dest:   B14:2
             7

FROM SCALE INP_WORD_2
BTD  Bit Field Distributor
     Source:     I:021
                 2847
     Source Bit: 3
     Dest:       B14:3
                 3
     Dest Bit:   0
     Length:     2

Rung 4:
MOTION                          USER PILOT LIGHT OR INDICATOR
I:021/05                        MOTION_IND
--| |---------------------------0:000/00
                                --( )--
```

IF SCALE INDICATES A FAULT, SET BITS OF B13:0 AND B13:1. EXCEPT FOR B13:1/06 (FAULT), THESE BITS ARE RETENTATIVE AND MUST BE RESET BY THE USER PROGRAM.

OR - Logical Or Operation:

This instruction compares data in two words (or files) according to the logical "or" operation and stores the results in a third word or file.

Can also be performed as a component of a CPT or FAL instruction.

It is necessary to enter three addresses: SOURCE A and SOURCE B (the two addresses to be compared) as well as DEST (destination) where the results of the operation will be stored.

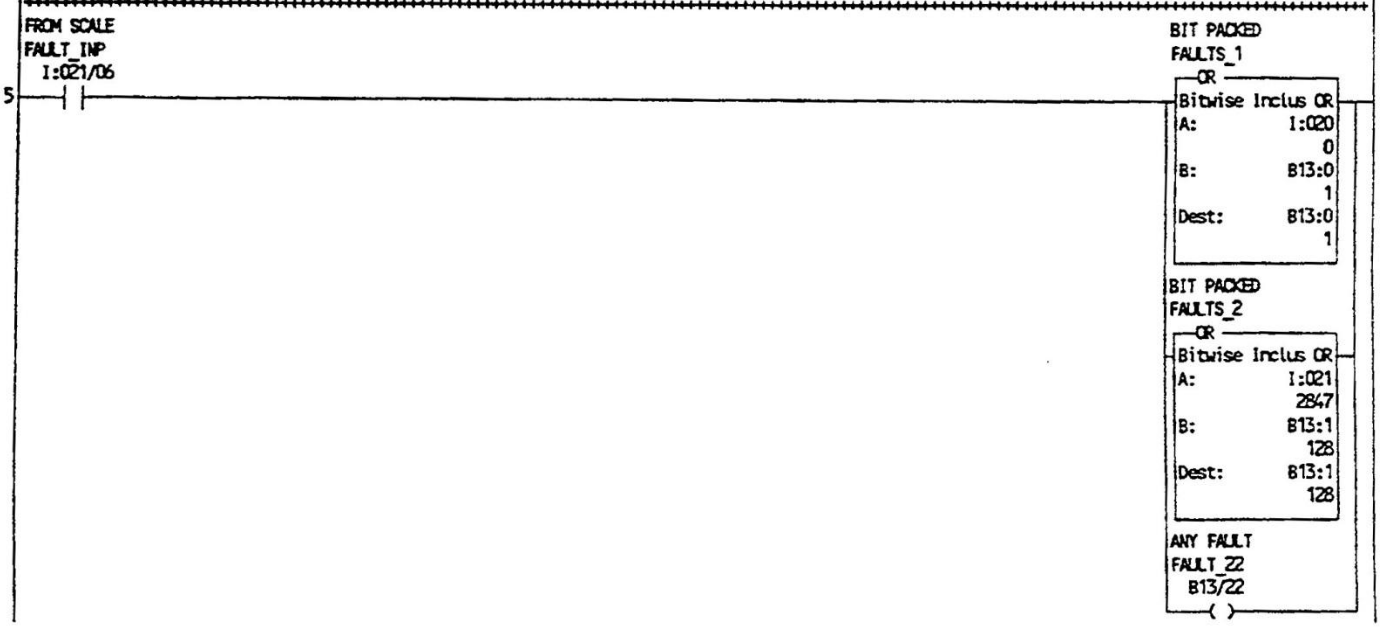
OR Truth Table

SOURCE A	SOURCE B	DEST
0	0	0
1	0	1
0	1	1
1	1	1

Sample: BITWISE OR

SOURCE A	B3:1
SOURCE B	B3:2
DEST	B3:3

The three addresses in the sample represent specific word addresses in Bit File number three. Word one will be compared with word two and the results will be stored in word three, all in Bit File number three.



+MONITOR TOGGLING OF INPUT AND OUTPUT SCAN ACKNOWLEDGE BITS, IF THE INPUT BIT FAILS TO TOGGLE SCALE COMMUNICATIONS HAVE CEASED OR THERE IS AN INTERNAL PROBLEM WITH THE SCALE. THE USER SHOULD VERIFY PROPER SCALE OPERATION IN THEIR SPECIFIC APPLICATION.

6

INPUT SCAN ACKNOWLEDG SCAN_ACK_I I:021/07 —|/|—
OUTPT SCAN ACKNOWLDEG SCAN_ACK_O O:021/07 —| |—

INPUT SCAN ACKNOWLEDG SCAN_ACK_I I:021/07 —| |—

SCALE SCAN ACKNOWLEDG SCAN_WATCH T12:0.DN —| |—

SCALE SCAN ACKNOWLEDG SCAN_WATCH
TON
Timer On Delay —(EN)—
Timer: T12:0
Base (SEC): 0.01 —(DN)
Preset: 25
Accum: 25

+FORCE TOGGLE OF OUTPUT SCAN ACKNOWLEDGE BIT. WHEN SCALE ACKNOWLEDGES SCAN IT WILL SET SCAN_ACK_I BIT TO '1'. THE PLC-5 WILL RESET (TO '0') THE SCAN_ACK_O BIT. THE SCALE WILL THEN RESET (SET TO '0') THE SCAN_ACK_I BIT. WHEN THE PLC-5 SEE THIS IT WILL THEN SET THE SCAN_ACK_O BIT TO '1'.

7

INPUT SCAN ACKNOWLEDG SCAN_ACK_I I:021/07 —|/|—

OUTPT SCAN ACKNOWLDEG SCAN_ACK_O O:021/07 —( )—

+IF EITHER B13:0 OR B13:1 CONTAINS A NON-ZERO VALUE A USER SUPPLIED INDICATION OR ALARM CAN BE ACTIVATED. THIS ALSO MONITORS THAT THE SCALE HAS BEEN POWERED UP (B13/0 or FAULT_00). THE USER CAN RESET THE POWER UP BIT.

+ADDITIONALLY THE USER SHOULD MONITOR THE I/O RACK STATUS IN THE PROCESSOR STATUS FILE TO ENSURE THE I/O RACK ASSIGNED TO THE SCALE IS ACTIVE AND PROPERLY COMMUNICATING. USE THE APPROPRIATE WORD AND BIT FOR THE RACK ASSIGNED. THIS EXAMPLE SHOWS USING S:7/2 TO MONITOR I/O RACK 2.

8

SCALE SCAN ACKNOWLEDG SCAN_WATCH T12:0.DN —| |—

BIT PACKED FAULTS_1
NEQ
Not Equal (A<>B)
A: B13:0
1
B: 0

BIT PACKED FAULTS_2
NEQ
Not Equal (A<>B)
A: B13:1
128
B: 0

Rack 2 Faulted S:7/2 —| |—

USER PILOT LIGHT OR INDICATOR FAULT_IND O:000/01 —( )—

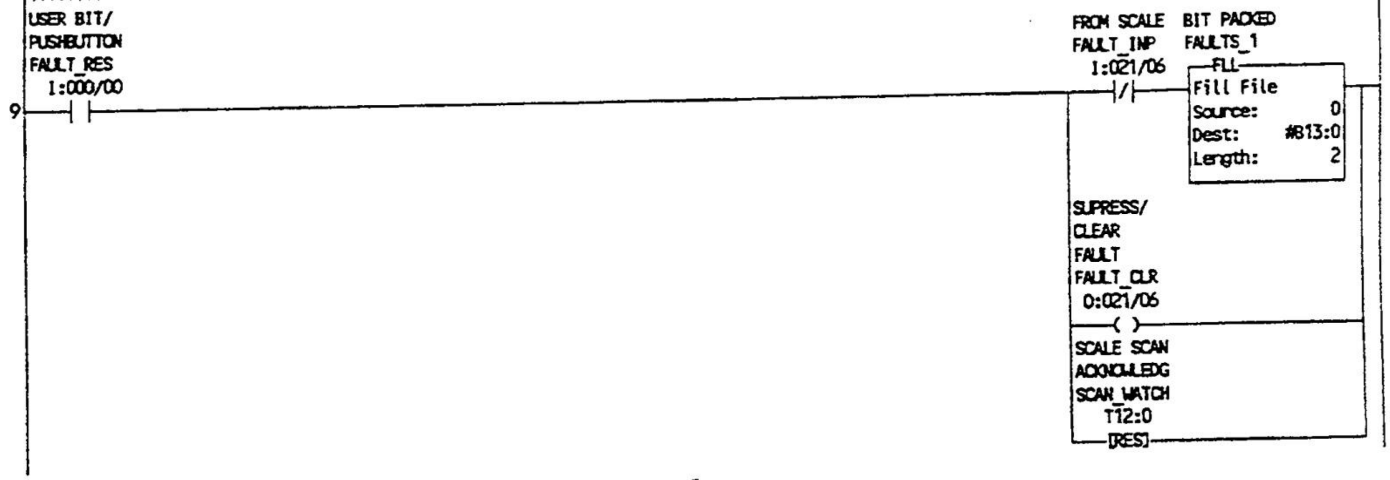
+CLEAR SCALE RETENTATIVE FAULTS WITH USER SUPPLIED PUSHBUTTON OR LOGIC BY FILLING THE FAULT BIT FILE WITH ZEROES. THE USER SHOULD
+MONITOR ALL FAULTS AND USE THIS STATUS INFORMATION IN THEIR APPLICATION PROGRAM TO ENSURE SAFE SYSTEM OPERATION.

+FLL - File Fill:

+ This output instruction takes either a value stored in a word or a program constant and fills a "file" (data block) with the
+ value.

+ Sample	FILE FILL		
+ Entry:	SOURCE:	N7:50	(Can be decimal program constant)
	DEST:	#N10:0	(DEST file size determined by LENGTH)
	LENGTH:	10	

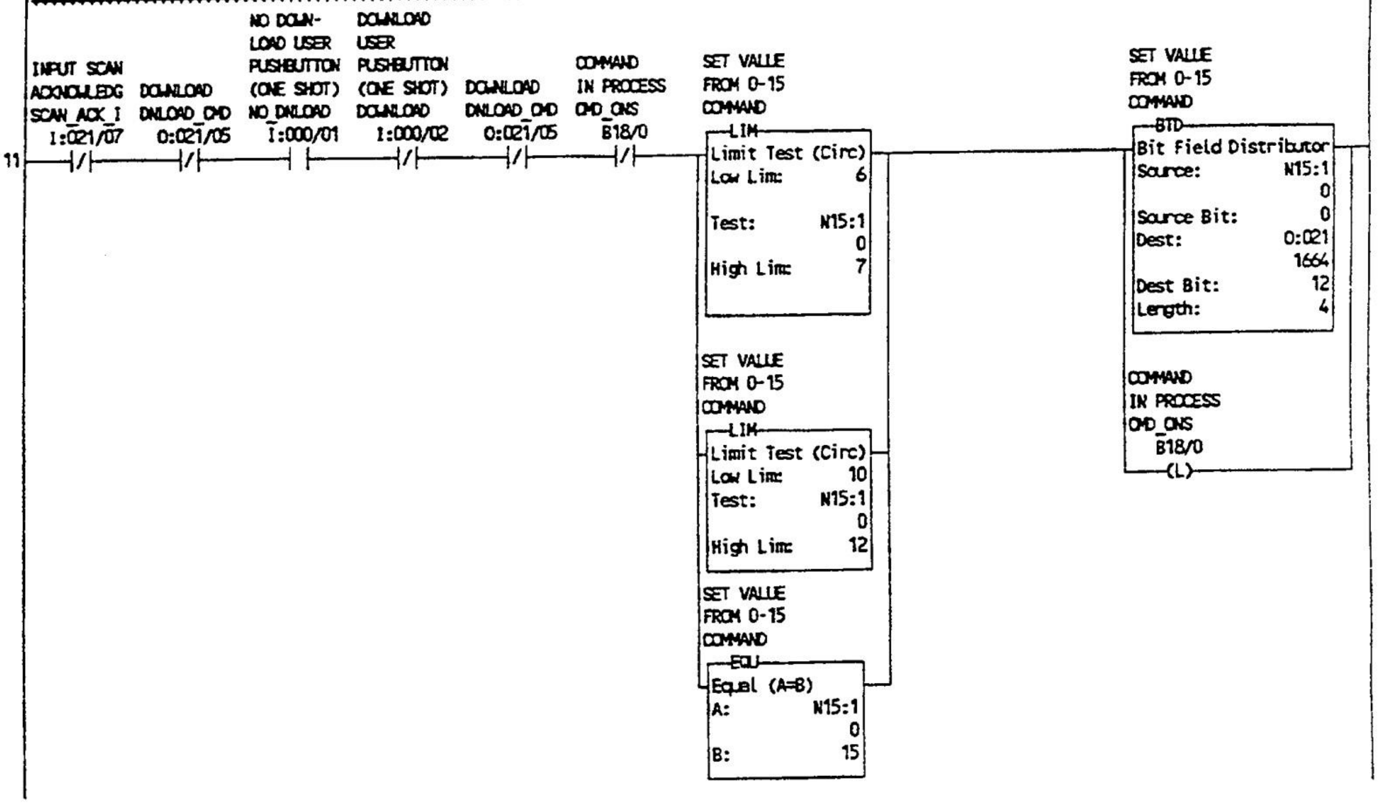
+ Upon a false to true rung transition, the value stored in the SOURCE will be moved to all words in the DEST file. In the example
+ above, each word in the file N10:0 through N10:9 will be filled with the value stored in N7:50.



```
+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+ENTERING A VALUE IN N15:0 BETWEEN 0 AND 15 WILL CHANGE THE DATA REQUESTED AS LISTED BELOW:                              +
+                                                                                                                        +
+     00 = GROSS WEIGHT               08 = mV/V REF                                                                      +
+     01 = NET WEIGHT                 09 = unused                                                                        +
+     02 = ZERO CAL mV/V REF          10 = ZERO LIMIT                                                                    +
+     03 = SPAN CAL mV/V REF          11 = FILTER, MOTION                                                                +
+     04 = SPAN CAL UNITS             12 = CHECK CAL                                                                     +
+     05 = ZERO CAL UNITS             13 = LOW ALARM                                                                     +
+     06 = ZERO VALUE                 14 = HIGH ALARM                                                                    +
+     07 = TARE VALUE                 15 = SOFTWARE VERSION                                                              +
+                                                                                                                        +
+THE DATA WILL APPEAR IN FLOATING POINT FORMAT IN FILE F11:0 EXCEPT FOR ITEM 11 WHICH APPEARS IN BIT FORMAT IN FILE B14:0 AND ITEM +
+15 WHICH IS CONVERTED TO BCD FORMAT.                                                                                    +
+                                                                                                                        +
+THE USER CAN MANUALLY ENTER DATA IN TO N15:0 OR PROVIDE A MEANS WITHIN THE APPLICATION PROGRAM TO CHANGE N15:0.  IT IS A GOOD IDEA +
+TO ALWAYS BE AWARE OF WHICH PARAMETERS ARE ACTIVELY BEING SHOWN BY THE SCALE.  N10:0 PROVIDES A READOUT OF WHAT DATA THE SCALE IS +
+ACTUALLY TRANSMITTING.                                                                                                  +
+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
SET VALUE                                                                                    SET VALUE
FROM 0-15                                                                                    FROM 0-15
DATA_REQ                                                                                     DATA_REQ
 LIM                                                                                          BTD
10-Limit Test (Circ)|-------------------------------------------------------------------------|Bit Field Distributor|-
 Low Lim:        0                                                                            Source:         N15:0
                                                                                                                  2
 Test:       N15:0                                                                            Source Bit:         0
                 2                                                                            Dest:          O:021
 High Lim:      15                                                                                             1664
                                                                                              Dest Bit:           8
                                                                                              Length:             4
```

NO DOWNLOAD: IF A VALUE IS PLACED IN N15:1 AND USER PUSHBUTTON "NO_DNLOAD" IS DEPRESSED. THE VALUE IN N15:1 WILL BE PUT IN THE APPROPRIATE BITS OF SCALE OUTPUT WORD 2 FOR THE COMMAND. VALID VALUES AND FUNCTIONS ARE:

N15:1	DESCRIPTION
6	ZERO GROSS WEIGHT
7	TARE NET WEIGHT
10	RESET FILTER
11	PERFORM CAL CHECK
15	RESET



DOWNLOAD: IF A VALUE IS PLACED IN N15:1 AND USER PUSHBUTTON "DOWNLOAD" IS DEPRESSED. THE VALUE IN N15:1 WILL BE PUT IN THE APPROPRIATE BITS OF SCALE OUTPUT WORD 2 FOR THE COMMAND. VALID VALUES AND FUNCTIONS ARE:

N15:1	DESCRIPTION
3	ZERO CAL mV/V REF
4	SPAN CAL mV/V REF
5	ZERO VALUE
6	TARE VALUE
10	ZERO LIMIT
11	FILTER, MOTION
13	LOW ALARM
14	HIGH ALARM

THE JSR INSTRUCTION CALL A SUBROUTINE WHICH TAKES THE DOWNLOAD COMMAND VALUES STORED IN FILE F16:0 AND MAPS THEM IN TO THE CORRECT BITS OF SCALE WORDS 1 & 2.

JSR - Jump to Subroutine:

In PLC-5 family processors, subroutines are programmed and stored in separate program files from the main ladder logic file.

JSR instructions tell the scanner which program file to "jump" to and can be used to move values to and from the designated subroutine file.

It is possible for more than one JSR to "jump" to the same SBR. Note that the transferred values could vary from JSR to JSR while the subroutine would remain the same.

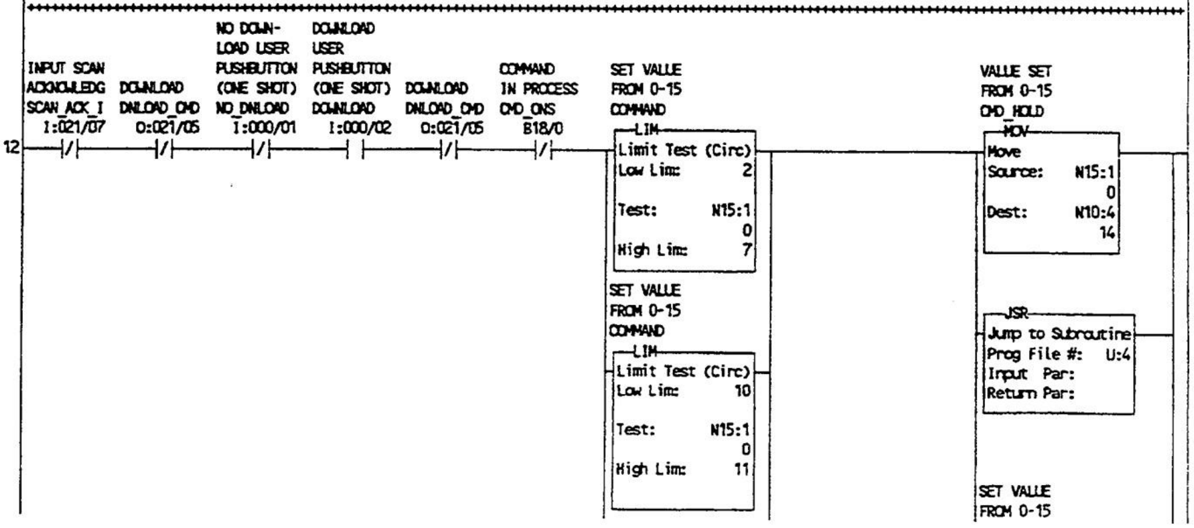
It is possible to "nest" up to eight subroutines. A JSR instruction can be entered into a subroutine and "jump" the scanner to another program file containing another subroutine. The scanner will return from the nested subroutines back through the subroutines in the same order in which they were entered.

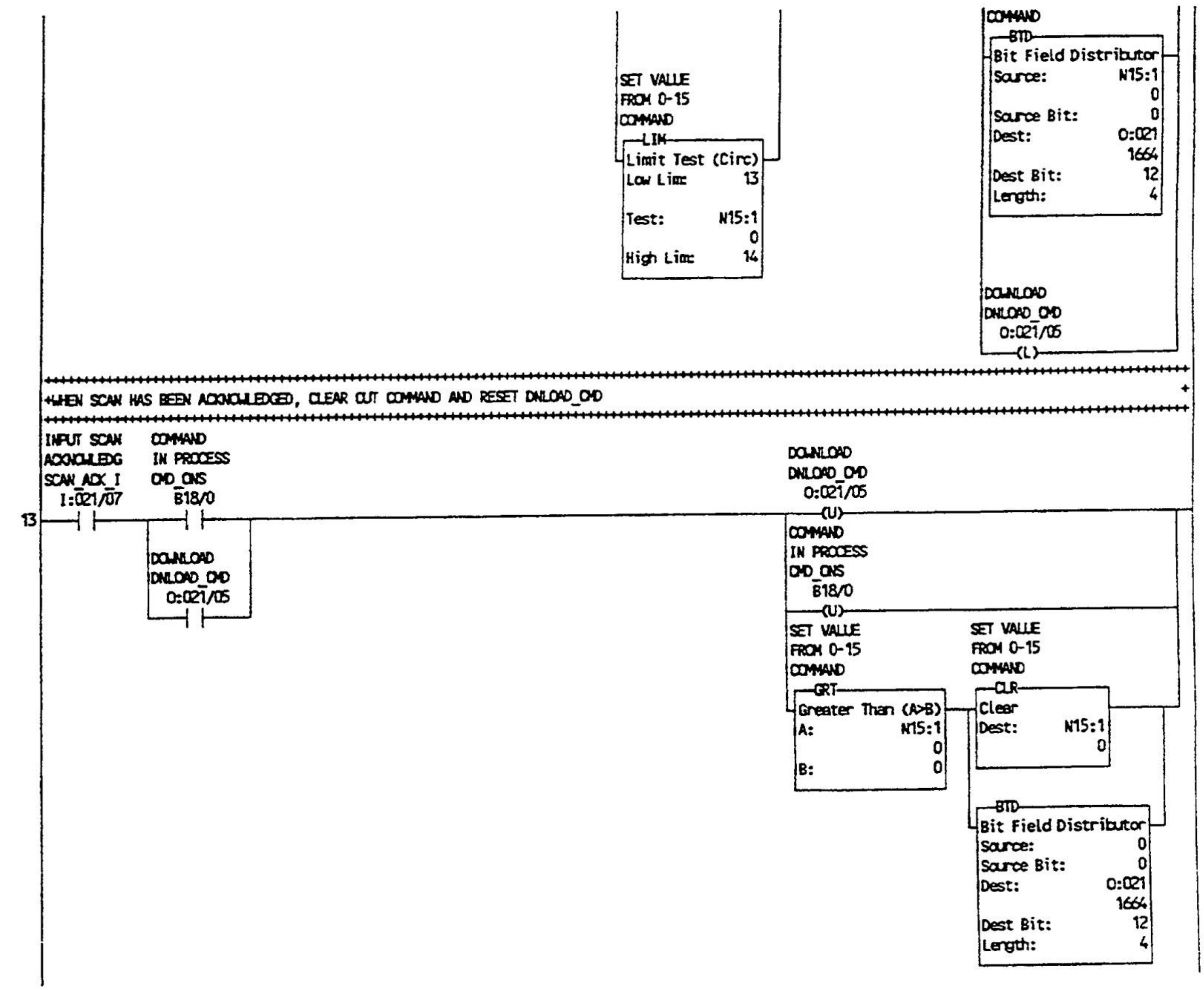
JSR - Sample Entry with SBR (SBR not used in scale example)

JSR				
FILE #	7		SBR	
INPUT PAR	N7:0	->	INPUT PAR	N13:10
INPUT PAR	N7:1	->	INPUT PAR	N13:11
INPUT PAR	100	->	INPUT PAR	N13:12
RETURN PAR	N7:2			

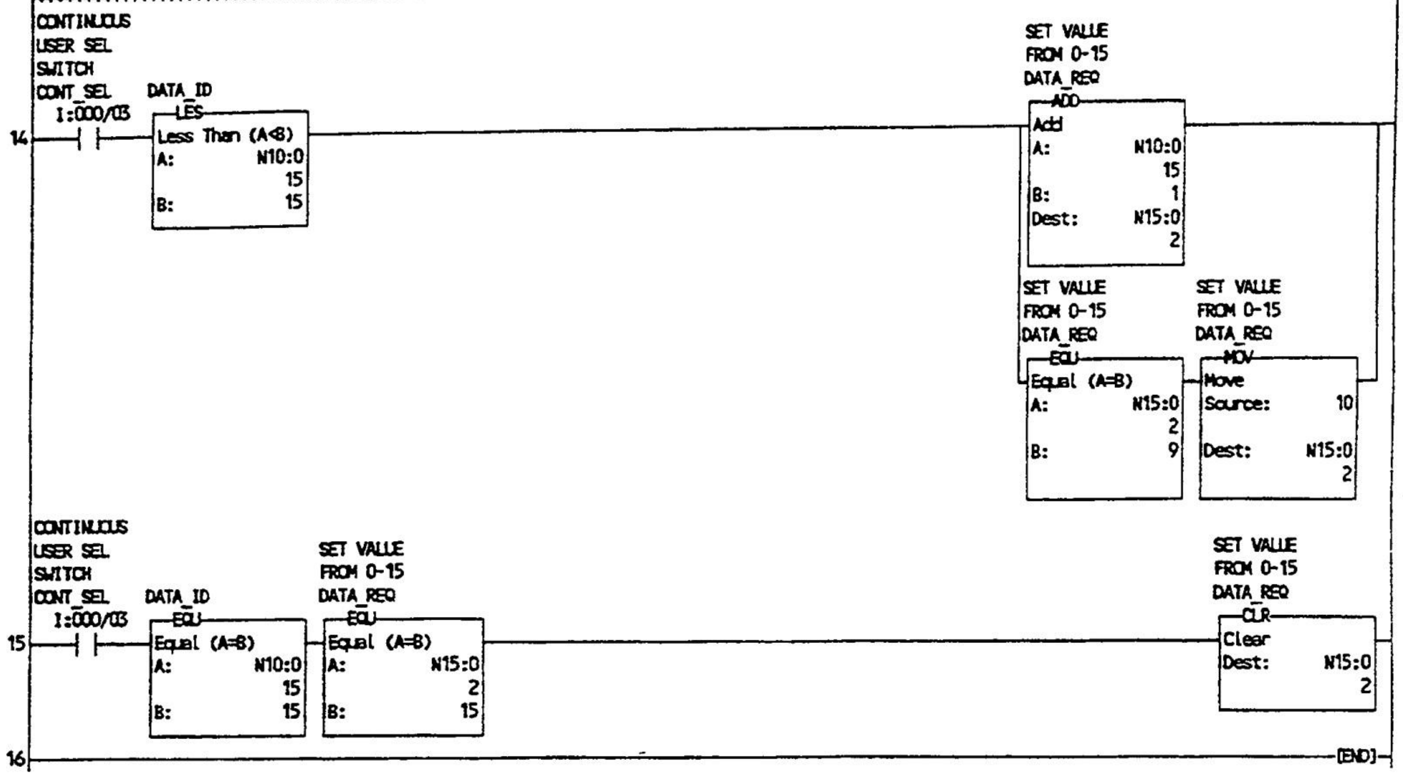
In the above example, the value stored in the first JSR INPUT PAR (N7:0) would be transferred to the first SBR INPUT PAR (N13:10). The second JSR INPUT PAR vaule would be transferred to the second SBR INPUT PAR and so on. Note that the third JSR INPUT PAR is a program constant (decimal 100) whose value would be transferred to the third SBR INPUT PAR. The RETURN PAR (N7:2) would accept the value transferred from an RET instruction.

Enter up to seven INPUT or RETURN parameters for a total of eight parameters.




SET VALUE
FROM 0-15
COMMAND
LIM
Limit Test (Circ)
Low Lim: 13
Test: N15:1
0
High Lim: 14
COMMAND
BTD
Bit Field Distributor
Source: N15:1
0
Source Bit: 0
Dest: O:021
1664
Dest Bit: 12
Length: 4
DOWNLOAD
DNLOAD_CMD
O:021/05
(L)
+WHEN SCAN HAS BEEN ACKNOWLEDGED, CLEAR OUT COMMAND AND RESET DNLOAD_CMD
INPUT SCAN
ACKNOWLEDG
SCAN_ACK_I
I:021/07
COMMAND
IN PROCESS
CMD_ONS
B18/0
13
DOWNLOAD
DNLOAD_CMD
O:021/05
DOWNLOAD
DNLOAD_CMD
O:021/05
(U)
COMMAND
IN PROCESS
CMD_ONS
B18/0
(U)
SET VALUE
FROM 0-15
COMMAND
GRT
Greater Than (A>B)
A: N15:1
0
B: 0
SET VALUE
FROM 0-15
COMMAND
CLR
Clear
Dest: N15:1
0
BTD
Bit Field Distributor
Source: 0
Source Bit: 0
Dest: O:021
1664
Dest Bit: 12
Length: 4

+ACTIVATING THIS AND THE FOLLOWING RUNG WILL CAUSE THE PLC-5 TO POLL THE SCALE FOR ALL TYPE OF DATA AS RAPIDLY AS POSSIBLE. THIS IS DONE BY INCREMENTING N15:0 WHEN N10:0 (READ FROM SCALE) HAS CHANGED. NOTE THAT N15:0 = 9 IS SKIPPED SINCE THIS IS NOT USED AND CAUSES THE SCALE TO DEFAULT TO GROSS WEIGHT.



+IN THE SPECIAL CASE OF FILTER & MOTION, USER DATA IS STORED IN FILE B17:0 FOR EASE OF DISPLAY AND MONITOR. THIS IS TRANSFERRED TO
+F16:11 PRIOR TO DOWNLOAD TO THE SCALE.
+THE FORMULA IN THE COMPUTE INSTRUCTION HANDLES SHIFTING BITS IN TO THE PROPER PLACE WITHIN F16:11 BY WEIGHTING EACH VALUE IN B17:0
+THRU B17:3 DEPENDING UPON THE BIT POSITION WHERE THE DATA SHOULD BE PLACED.

```
Rung 0
  VALUE SET FROM 0-15 / CMD_HOLD
  EQU  Equal (A=B)   A: N10:4 = 14   B: 11
  --> Packed Filter, Motion SEE B17:0 / FILTER_C11
  CPT  Compute   Dest: F16:11 = 0
       Expression:
       ((B17:0 + (256.0 * B17:1))
       + (32768.0 * B17:2)) +
       (262144.0 * B17:3)
```

+IN THE SPECIAL CASE OF FILTER & MOTION THE DATA VALUES IN FILE B17:0 MUST BE CHECKED TO SEE IF THE ARE IN LIMITS. AN OUT OF RANGE
+VALUE IN ANY OF THESE WORDS WOULD CAUSE IMPROPER OPERATION WHEN DOWLOADED TO THE SCALE.

```
Rung 1
  VALUE SET FROM 0-15 / CMD_HOLD
  EQU  Equal (A=B)   A: N10:4 = 14   B: 11
  (branch, any of:)
    AVERAGING AFTER DOWNLOAD / FILTER_C00
    GRT  Greater Than (A>B)   A: B17:0 = 0   B: 7
    TUNE / FILTER_C01
    GRT  Greater Than (A>B)   A: B17:1 = 0   B: 15
    MOTION / FILTER_C02
    GRT  Greater Than (A>B)   A: B17:2 = 7   B: 7
    MOTION TIMER / FILTER_C03
    GRT  Greater Than (A>B)   A: B17:3 = 3   B: 3
  --> SET VALUE FROM 0-15 COMMAND
  CLR  Clear   Dest: N15:1 = 0
  RET  Return
```

+GET DATA VALUE FROM FILE F16:0 DEFINED BY POSITION (VALUE OF N10:4) AND PUT IN TEMPORARY FLOATING POINT WORD.

```
Rung 2
  --> TEMP DATA USED FOR CALCULATE / CMD_TEMP_2
  MOV  Move   Source: F16:[N10:4] = 21
              Dest:   F19:0 = 21
```

IF F19:0 IS LESS THAN ZERO MAKE IT A POSITIVE NUMBER BY NEGATING IT.

```
    TEMP DATA                                                      TEMP DATA
    USED FOR                                                       USED FOR
    CALCULATE                                                      CALCULATE
    CMD_TEMP_2                                                     CMD_TEMP_2
    -LES-                                                          -NEG-
3  Less Than (A<B)                                                 Negate
    A:        F19:0                                                Source:   F19:0
                 21                                                             21
    B:          0.0                                                Dest:     F19:0
                                                                                21
```

CLEAR OUT TEMPORARY WORD USED TO STORE HOW MANY TIMES THE DATA IS GREATER THAN 32768.0. THIS WORD WILL BE USED TO COMPUTE HOW MANY TIMES 32768.0 CAN BE DIVIDED IN TO THE FLOATING POINT SCALE DATA VALUE.

```
                                                                   VALUE >
                                                                   32768
                                                                   CMD_TEMP_1
                                                                   -CLR-
4                                                                  Clear
                                                                   Dest:     N10:5
                                                                                 0
```

shouldbe GEQ +++++++++++++
IF THE SCALE DATA NOW STORED AS A POSITIVE NUMBER IN F19:0 IS GREATER THAN 32768.0 THEN:
DIVIDE IT BY 32768.0
MOVE THE RESULT IN TO INTEGER WORD N10:5 WHICH WILL ROUND IT UP
IF THE ROUNDED VALUE NOW STORED IN N10:5 IS GREATER THAN THE UNROUNDED VALUE STORED IN F19:1 THEN:
SUBTRACT '1' FROM N10:5 TO GET RID OF ROUNDING
NOTE THAN N10:5 NOW REPRESENTS HOW MANY TIMES 32768.0 COULD BE DIVIDED IN TO THE SCALE FLOATING POINT DATA.

```
    TEMP DATA                 COMMAND                          TEMP DATA
    USED FOR                  DATA 0th -                       USED FOR
    CALCULATE                 15tH WORD                        CALCULATE
    CMD_TEMP_2                CMD_DATA                         CMD_TEMP_3
    -GEQ-                     -NEQ-                            -DIV-
5  Grtr Than or Equal (A>=B)  Not Equal (A<>B)                 Div
    A:              F19:0     A:   F16:[N10:4]                 A:          F19:0
                       21                   21                                21
    B:            32768.0     B:      -32768.0                 B:        32768.0
                                                               Dest:       F19:1
                                                                        1.159668

                                                               VALUE >
                                                               32768
                                                               CMD_TEMP_1
                                                               -MOV-
                                                               Move
                                                               Source:     F19:1
                                                                        1.159668
                                                               Dest:       N10:5
                                                                               0

                                                               VALUE >              VALUE >
                                                               32768                32768
                                                               CMD_TEMP_1           CMD_TEMP_1
                                                               -GRT-                -SUB-
                                                               Greater Than (A>B)   Sub
                                                               A:          N10:5    A:      N10:5
                                                                               0                0
                                                               B:          F19:1    B:          1
                                                                        1.159668
                                                                                    Dest:   N10:5
                                                                                                0
```

```
+IF THE ORIGINAL SCALE DATA VALUE WHICH IS STORED IN F19:0 IS >= 0 THEN:
+      WORD 1 = SCALE DATA VALUE - 32768.0 * WORD 2
+WHERE WORD 2 REPRESENTS HOW MANY TIMES > 32768.0 THE SCALE DATA IS.

COMMAND
DATA 0th -
15tH WORD                                              TO SCALE
CMD_DATA                                               OUT_WORD_1
 GEQ                                                   CPT
6 Grtr Than or Equal (A>=B)                            Compute
  A:              F16:[N10:4]                          Dest:               O:020
                           21                                                  0
  B:                      0.0                          Expression:
                                                       F19:0 - (32768.0 * N10:5)

+IF THE ORIGINAL SCALE DATA VALUE WHICH IS STORED IN F19:0 IS < 0 THEN:
+      WORD 1 = -1 * (SCALE DATA VALUE - 32768.0 * WORD 2) OR
+             = - SCALE DATA VALUE + 32768.0 * WORD 2
+WHERE WORD 2 REPRESENTS HOW MANY TIMES > 32768.0 THE SCALE DATA IS.

COMMAND
DATA 0th -
15tH WORD                                              TO SCALE
CMD_DATA                                               OUT_WORD_1
 LES                                                   CPT
7 Less Than (A<B)                                      Compute
  A:   F16:[N10:4]                                     Dest:               O:020
                21                                                      1.159668
  B:           0.0                                     Expression:
                                                          (- F19:0) + (32768.0 *
                                                                          N10:5)

+MOVE VALUE IN N10:5 TO BITS OF SCALE WORD 2.  NOTE THAT N10:5 CONTAINS HOW MANY TIMES SCALE PARAMETER WAS CALCULATED AS BEING
+GREATER THAN 32768.0. REMEMBER HOW THE SCALE DATA WAS CALCULATED. ==> WORD 1 + 32768.0 TIMES WORD 2
+

                                                       TO SCALE
                                                       OUT_WORD_2
                                                       MVM
8                                                      Masked Move
                                                       Source:       N10:5
                                                                         0
                                                       Mask:           1fh
                                                       Dest:         O:021
                                                                      1664

9                                                                  [END]
```

Number of Data Files:23

Name	Description	File	Type		Mode	Size:Elems	Words
OUTPUTS	PHYSICAL OUTPUTS	0	O	output	Global	32	32
INPUTS	PHYSICAL INPUT	1	I	input	Global	32	32
STATUS	PROCESSOR STATUS	2	S	status	Global	128	128
BITS	MISC STORAGE BITS	3	B	binary	Global	1	1
		4	T	timer	Global	1	3
		5	C	counter	Global	1	3
		6	R	control	Global	1	3
		7	N	integer	Global	1	1
		8	F	float	Global	1	2
INP_CODES	INPUT DATA, STATUS & CONDITONED DATA	10	N	integer	Global	10	10
INP_VALUES	SCALE DATA INPUT VALUES (FROM SCALE)	11	F	float	Global	16	32
FAULT_TMR	WATCHDOG FOR SCALE ACKNOWLEDGEMENT	12	T	timer	Global	1	3
FAULT_BITS	BIT MAP OF SCALE FAULTS	13	B	binary	Global	2	2
FILTER_IN	REMOTE FILTER DATA MONITOR (FROM SCALE)	14	B	binary	Global	4	4
OUT_CODES	OP CODES FOR DATA REQUEST AND COMMANDS	15	N	integer	Global	2	2
OUT_VALUES	SCALE DATA OUTPUT VALUES (TO SCALE)	16	F	float	Global	16	32
FILTER_OUT	REMOTE FILTER DATA STORAGE (TO SCALE)	17	B	binary	Global	4	4
SCALE_MISC	MISC SCALE PROGRAM CONTROL BITS	18	B	binary	Global	1	1
SCALE_FLT	MISC SCALE FLOATING POINT STORAGE	19	F	float	Global	2	4
IOSTAT	I/O Status File	20	N	integer	Global	48	48
CONFIG	5/40,60 Configuration/Status File	21	N	integer	Global	40	40
CONFIG	5/40,60 Configuration/Status File	22	N	integer	Global	40	40

O:000/00	MOTION_IND	USER PILOT	LIGHT OR	INDICATOR		
O:000/01	FAULT_IND	USER PILOT	LIGHT OR	INDICATOR		
O:020	OUT_WORD_1	TO SCALE				
O:021	OUT_WORD_2	TO SCALE				
O:021/05	DNLOAD_DND	DOWNLOAD				
O:021/06	FAULT_CLR	SUPRESS/	CLEAR	FAULT		
O:021/07	SCAN_ACK_O	OUTPT SCAN	ACKNOWLDEG			
O:030	MISC_OUTPT	MISC USER	PROVIDED			
O:2000:115		*BLH DXP/1	O DIGITAL	SCALE		
I:000/00	FAULT_RES	USER BIT/	PUSHBUTTON			
I:000/01	NO_DNLOAD	NO DOWN-	LOAD USER	PUSHBUTTON	(ONE SHOT)	
I:000/02	DOWNLOAD	DOWNLOAD	USER	PUSHBUTTON	(ONE SHOT)	
I:000/03	CONT_SEL	CONTINUOUS	USER SEL	SWITCH		
I:020	INP_WORD_1	FROM SCALE				
I:021	INP_WORD_2	FROM SCALE				
I:021/05	MOTION					
I:021/06	FAULT_INP	FROM SCALE				
I:021/07	SCAN_ACK_I	INPUT SCAN	ACKNOWLEDG			
I:021/10	DATA_ID_1	BIT 00				
I:021/11	DATA_ID_2	BIT 01				
I:021/12	DATA_ID_4	BIT 02				
I:021/13	DATA_ID_8	BIT 03				
I:021/14	STAT_ID_1	BIT 00				
I:021/15	STAT_ID_2	BIT 01				
I:021/16	STAT_ID_4	BIT 02				
I:021/17	STAT_ID_8	BIT 03				
S:0/0		Processor	arithmetic	carry	flag	
S:0/1		Processor	arithmetic	underflow/	overflow	flag
S:0/2		Processor	arithmetic	zero	flag	
S:0/3		Processor	arithmetic	sign	flag	
S:1/0		Bad RAM	CHECKSUM	at power	up	
S:1/1		PLC-5 in	RUN mode			
S:1/2		PLC-5 in	TEST mode			
S:1/3		PLC-5 in	PROG mode			
S:1/4		PLC-5 is	burning an	EEPROM		
S:1/5		Download-	ing in	progress		
S:1/6		Test edits	enabled			
S:1/7		Mode	switch	in REMOTE		
S:1/8		Forces	enabled			
S:1/9		Forces	present			
S:1/10		EEPROM	success-	fully	Burned	
S:1/11		Perform-	ing online	program-	ming	
S:1/12		Processor	is in	DEBUG mode		
S:1/13		User	program	CHECKSUM	done	
S:1/14		Last scan	of ladder	or SFC	step	
S:1/15		First scan	of ladder	or SFC	step	
S:7/0		Rack 0	Faulted			
S:7/1		Rack 1	Faulted			
S:7/2		Rack 2	Faulted			
S:7/3		Rack 3	Faulted			
S:7/4		Rack 4	Faulted			
S:7/5		Rack 5	Faulted			
S:7/6		Rack 6	Faulted			
S:7/7		Rack 7	Faulted			
S:7/8		Block Xfer	queue to	rack 0 is	full	
S:7/9		Block Xfer	queue to	rack 1 is	full	
S:7/10		Block Xfer	queue to	rack 2 is	full	
S:7/11		Block Xfer	queue to	rack 3 is	full	
S:7/12		Block Xfer	queue to	rack 4 is	full	
S:7/13		Block Xfer	queue to	rack 5 is	full	
S:7/14		Block Xfer	queue to	rack 6 is	full	
S:7/15		Block Xfer	queue to	rack 7 is	full	
S:8		Last	program	scan time	ladder &	SFC
S:9		Maximum	program	scan time	ladder &	SFC
S:10/0		Battery	is bad or	missing		
S:10/1		DH+ active	node table	changed		
S:10/2		STI	overlap			
S:10/3		EEPROM	trans-	ferred		

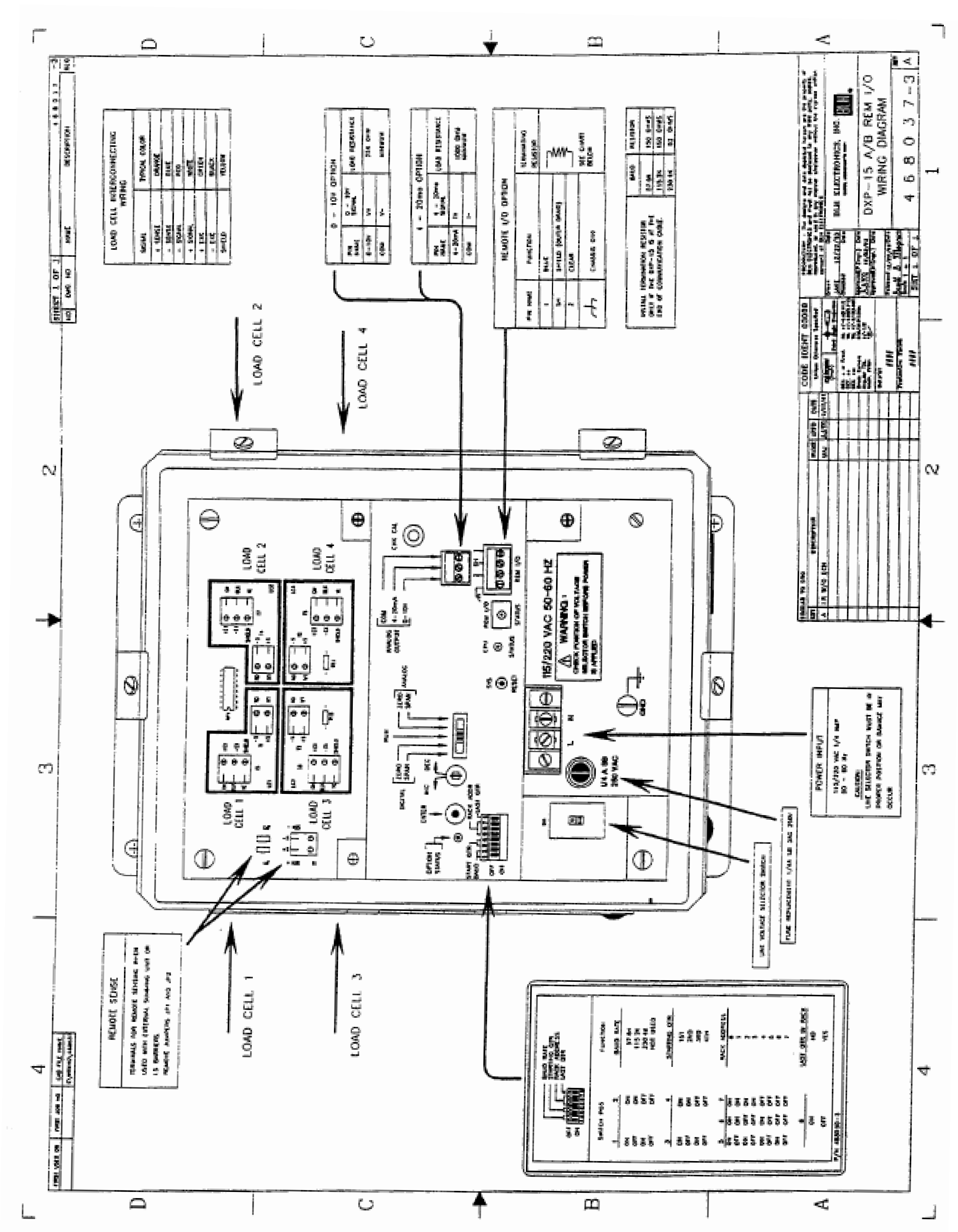
Data Base Form Sorted by:Address

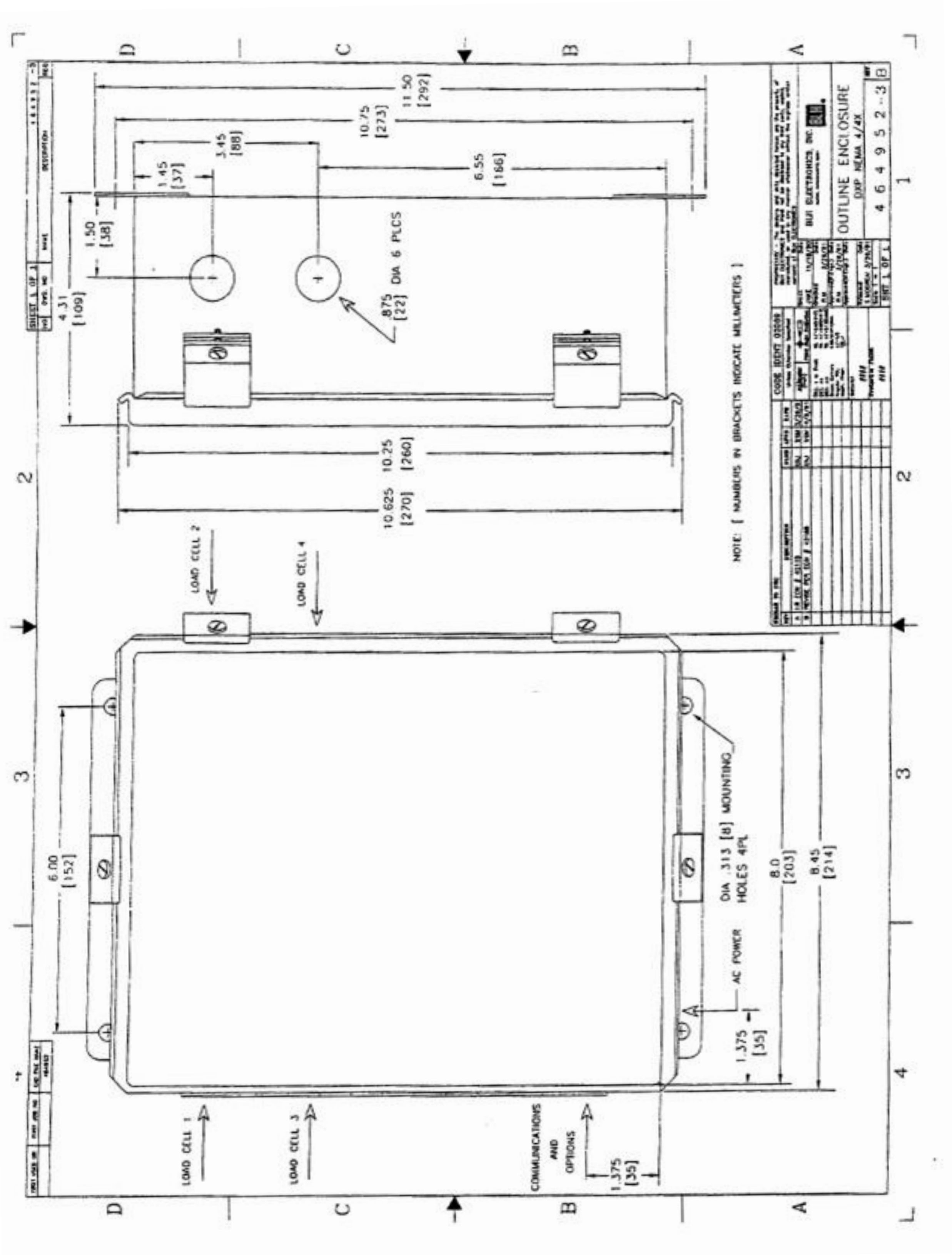
S:10/4		Edits	prevent	SFC	continuing	
S:10/5		Invalid	I/O status	file		
S:10/6		Memory	cartridge	battery	low	
S:10/7		No more	command	blocks	exist	
S:10/9		No MCP was	configured	to run		
S:10/10		MCP not	allowed			
S:10/11		PII word	number	isn't in	local rack	
S:10/12		User PII	routine	overlap		
S:10/13		No command	block	exists to	get PII	
S:10/14		Arithmetic	overflow	occurred		
S:10/15		SFC	lingering	action	overlap	
S:11/0		Bad	program	file		
S:11/1		Bad	address	in ladder	program	
S:11/2		Programmer	error			
S:11/3		SFC Fault				
S:11/4		Program	assembly	error		
S:11/5		Powerup	protection	fault		
S:11/6		Error not	defined			
S:11/7		User	generated	fault		
S:11/8		Watchdog	timer	fault		
S:11/9		Bad system	config-	uration		
S:11/10		Hardware	Error			
S:11/11		MCP file	does not	exist or	is not	ladder
S:11/12		PII file	does not	exist or	is not	ladder
S:11/13		STI file	does not	exist or	is not	ladder
S:11/14		Fault file	does not	exist or	is not	ladder
S:11/15		Non ladder	file			
S:12		Fault Code				
S:13		Program	file where	fault	occurred	
S:14		Rung	number	where	fault	occurred
S:16		I/O status	file			
S:17/0		Queue full	between	local and	remote I/O	
S:17/1		Queue full	servicing	channel 1A		
S:17/2		Queue full	servicing	channel 1B		
S:17/3		Queue full	servicing	channel 2A		
S:17/4		Queue full	servicing	channel 2B		
S:17/5		No modem	on serial	port		
S:17/6		Remote I/O	is greater	than image	size	
S:17/8		ASCII	instruct-	ion error		
S:17/9		Duplicate	node	address		
S:18		Real time	clock YEAR			
S:19		Real time	clock	MONTH		
S:20		Real time	clock DAY			
S:21		Real time	clock HOUR			
S:22		Real time	clock	MINUTE		
S:23		Real time	clock	SECOND		
S:24		Indexed	Addressing	Offset		
S:25		Adapter	Image	File		
S:26/0		SFC	Restart/	Continue		
S:26/1		Start-up	protect-	ion after	power loss	
S:26/2		Local rack	is 1 if	set or 0	if bit = 0	
S:27/0		Rack 0	Inhibit			
S:27/1		Rack 1	Inhibit			
S:27/2		Rack 2	Inhibit			
S:27/3		Rack 3	Inhibit			
S:27/4		Rack 4	Inhibit			
S:27/5		Rack 5	Inhibit			
S:27/6		Rack 6	Inhibit			
S:27/7		Rack 7	Inhibit			
S:27/8		Rack 0	Reset			
S:27/9		Rack 1	Reset			
S:27/10		Rack 2	Reset			
S:27/11		Rack 3	Reset			
S:27/12		Rack 4	Reset			
S:27/13		Rack 5	Reset			
S:27/14		Rack 6	Reset			
S:27/15		Rack 7	Reset			
S:28		Watchdog	Timer	Setpoint		

S:29		Fault	routine	file	number	
S:30		STI	setpoint	(interval)		
S:31		STI	file	number		
S:46		PII	file	number		
S:47		PII	module	group to	examine	
S:48		PII bit	mask			
S:48/0		PII Module	Bit	1=Monitor	0=Ignore	
S:49		PII	compare	value		
S:49/0		PII Bit	1=false to	true, 0=	true to	false
S:50		PII down	count			
S:51		PII return	mask			
S:52		PII accum-	ulator			
S:53		STI last	scan time			
S:54		STI max	scan time			
S:55		PII last	scan time			
S:56		PII max	scan time			
S:80		Main	control	program A	file	number
S:81		Program A	scan time			
S:82		Program A	maximum	scan time		
B3:0	MISC_BITS	MISCELLAN-	EOUS			
N10:0	DATA_ID					
N10:1	STATUS_ID					
N10:2	STORAGE_1	CONDITION	ED DATA			
N10:3	STORAGE_2	CONDITION	ED DATA			
N10:4	CMD_HOLD	VALUE SET	FROM 0-15			
N10:5	CMD_TEMP_1	VALUE >	32768			
F11:0	GR_WT__D00	GROSS	WEIGHT			
F11:1	NET_WT_D01	NET WEIGHT				
F11:2	ZERO_MVD02	ZERO CAL	mV/V REF			
F11:3	SPAN_MVD03	SPAN CAL	mV/V REF			
F11:4	SPN_CALD04	SPAN CAL	UNITS			
F11:5	ZER_CALD05	ZERO CAL	UNITS			
F11:6	ZERO_VLD06	ZERO VALUE				
F11:7	TARE_VLD07	TARE VALUE				
F11:8	MVV_REFD08	mV/V REF				
F11:9	UNUSED_D09	unused				
F11:10	ZER_LIMD10	ZERO LIMIT				
F11:11	FILTER_D11	See FILTER	& MOTION			
F11:12	CHK_CALD12	CHECK CAL				
F11:13	LOW_ALMD13	LOW ALARM				
F11:14	HI_ALM_D14	HIGH ALARM				
F11:15	VERSIOND15	SOFTWARE	VERSION			
T12:0	SCAN_WATCH	SCALE SCAN	ACKNOWLEDG			
B13:0	FAULTS_1	BIT PACKED				
B13/0	FAULT_00	POWER ON				
B13/1	FAULT_01	EEPROM	CODE ERROR			
B13/2	FAULT_02	EEPROM	READ ERROR			
B13/3	FAULT_03	EEPROM	WRITE ERR			
B13/4	FAULT_04	EEPROM	DATA ERROR			
B13/5	FAULT_05	ZERO CAL	RAW COUNT	CHECKSUM		
B13/6	FAULT_06	ZERO CAL	UNIT COUNT	CHECKSUM		
B13/7	FAULT_07	SPAN CAL	RAW COUNT	CHECKSUM		
B13/8	FAULT_08	SPAN CAL	UNIT COUNT	CHECKSUM		
B13/9	FAULT_09	ZERO REF	CAL	CHECKSUM		
B13/10	FAULT_10	SPAN REF	CAL	CHECKSUM		
B13/11	FAULT_11	ZERO D/A	RAW COUNT	CHECKSUM		
B13/12	FAULT_12	SPAN D/A	RAW COUNT	CHECKSUM		
B13/13	FAULT_13	ZERO D/A	CAL ADJUST	CHECKSUM		
B13/14	FAULT_14	SPAN D/A	CAL ADJUST	CHECKSUM		
B13/15	FAULT_15	TEMPERATUR	CAL REF	CHECKSUM		
B13:1	FAULTS_2	BIT PACKED				
B13/16	FAULT_16	ZERO TEMP	REF OUT OF	LIMITS		
B13/17	FAULT_17	SPAN TEMP	REF OUT OF	LIMITS		
B13/18	FAULT_18	A/D IN	UNDERRANGE			
B13/19	FAULT_19	A/D IN	OVERRANGE			
B13/20	FAULT_20	Unused				
B13/21	FAULT_21	Unused				
B13/22	FAULT_22	ANY FAULT				

B13/23	FAULT_23	Not Mapped	(SCAN ACK)			
B13/24	FAULT_24	TARE	CHECKSUM			
B13/25	FAULT_25	ZERO	CHECKSUM			
B13/26	FAULT_26	ZERO LIMIT	CHECKSUM			
B13/27	FAULT_27	AVERAGING	CHECKSUM			
B13/28	FAULT_28	DIGITAL	FILTER	CHECKSUM		
B13/29	FAULT_29	MOTION	CHECKSUM			
B13/30	FAULT_30	LOW ALARM	CHECKSUM			
B13/31	FAULT_31	HIGH ALARM	CHECKSUM			
B14:0	FILTER_I00	AVERAGING	AFTER	DOWNLOAD		
B14:1	FILTER_I01	TUNE				
B14:2	FILTER_I02	MOTION				
B14:3	FILTER_I03	MOTION	TIMER			
N15:0	DATA_REQ	SET VALUE	FROM 0-15			
N15:1	COMMAND	SET VALUE	FROM 0-15			
F16:0	UNUSED_C00	unused				
F16:1	UNUSED_C01	unused				
F16:2	ZERO_MVC02	ZERO CAL	mV/V RE			
F16:3	SPAN_MVC03	SPAN CAL	mV/V REF			
F16:4	SPN_CALC04	SPAN CAL	UNITS			
F16:5	ZER_CALC05	ZERO CAL	UNITS			
F16:6	ZERO_VLC06	ZERO VALUE				
F16:7	TARE_VLC07	TARE VALUE				
F16:8	UNUSED_C08	unused				
F16:9	UNUSED_C09	unused				
F16:10	ZER_LIMC10	ZERO LIMIT				
F16:11	FILTER_C11	Packed	Filter,	Motion	SEE B17:0	
F16:12	UNUSED_C12	unused				
F16:13	LOW_ALMC13	LOW ALARM				
F16:14	HI_ALM_C14	HIGH ALARM				
F16:15	UNUSED_C15	unused				
B17:0	FILTER_C00	AVERAGING	AFTER	DOWNLOAD		
B17:1	FILTER_C01	TUNE				
B17:2	FILTER_C02	MOTION				
B17:3	FILTER_C03	MOTION	TIMER			
B18/0	CMD_ONS	COMMAND	IN PROCESS			
F19:0	CMD_TEMP_2	TEMP DATA	USED FOR	CALCULATE		
F19:1	CMD_TEMP_3	TEMP DATA	USED FOR	CALCULATE		
DFILE:000		OUTPUTS	PHYSICAL O	UTPUTS		
DFILE:001		INPUTS	PHYSICAL I	NPUT		
DFILE:002		STATUS	PROCESSOR	STATUS		
DFILE:003		BITS	MISC STORA	GE BITS		
DFILE:010		INP_CODES	INPUT DATA	, STATUS &	CONDITONE	D DATA
DFILE:011		INP_VALUES	SCALE DATA	INPUT VAL	UES (FROM	SCALE)
DFILE:012		FAULT_TMR	WATCHDOG F	OR SCALE A	CKNOWLEDGE	MENT
DFILE:013		FAULT_BITS	BIT MAP OF	SCALE FAU	LTS	
DFILE:014		FILTER_IN	REMOTE FIL	TER DATA M	ONITOR (FR	OM SCALE)
DFILE:015		OUT_CODES	OP CODES F	OR DATA RE	QUEST AND	COMMANDS
DFILE:016		OUT_VALUES	SCALE DATA	OUTPUT VA	LUES (TO S	CALE)
DFILE:017		FILTER_OUT	REMOTE FIL	TER DATA S	TORAGE (TO	SCALE)
DFILE:018		SCALE_MISC	MISC SCALE	PROGRAM C	ONTROL BIT	S
DFILE:019		SCALE_FLT	MISC SCALE	FLOATING	POINT STOR	AGE
DFILE:020		IOSTAT	I/O Status	File		
DFILE:021		CONFIG	5/40,60 Co	nfiguratio	n/Status F	ile
DFILE:022		CONFIG	5/40,60 Co	nfiguratio	n/Status F	ile
F16:[N10:4]	CMD_DATA	COMMAND	DATA Oth -	15tH WORD		
PFILE:002		MAIN BODY	OF SCALE T	RAINING PR	OGRAM	
PFILE:004		TRANSFER F	LOATING PO	INT DATA F	OR DOWNLOA	D
O4:0						
O4:1						

SECTION 5. Appendix: Outline and Wiring Drawings




OUTLINE ENCLOSURE
DXP NEMA 4/4X
4 6 4 9 5 2 - 3
NOTE: [NUMBERS IN BRACKETS INDICATE MILLIMETERS]
LOAD CELL 1
LOAD CELL 2
LOAD CELL 3
LOAD CELL 4
COMMUNICATIONS AND OPTIONS
AC POWER
DIA .313 [8] MOUNTING HOLES 4PL
.875 [22] DIA 6 PLCS
6.00 [152]
8.0 [203]
8.45 [214]
1.375 [35]
10.625 [270]
10.25 [260]
4.31 [109]
1.50 [38]
1.45 [37]
3.45 [88]
6.55 [166]
10.75 [273]
11.50 [292]
SHEET 1 OF 1

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