WEIGH SYSTEM TECHNOLOGY

VISHAY PRECISION GROUP

BLH

DXp-40
Interface Manual
Allen-Bradley Remote I/O

TM014
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SECTION 1. Introduction

This manual describes an Allen-Bradley Remote I/O (RIO) communication link between a BLH DXp-40 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 type of weight data, status and diagnostic information as well as the retrieval and download of filter and other set-up parameters. Refer to the standard DXp-40 manual, TM008, for DXp-40 operating procedures and parameter definitions.

1.1 RIO OVERVIEW

The Allen-Bradley Remote I/O (RIO) interface is a communications link that supports remote, time critical VO control communications between a master processor and a remote I10 slave. It is typically used to transfer I/O bit images between the master and slave. The DXp-40 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. Block transfers are used to upload and download non-time critical information such as diagnostic, status, and individual load cell data.

1.2 THE DXp-40 WEIGHT TRANSMITTER

The DXp-40 is a high performance weight transmitter with features that make it suitable for both inventory and process weighing applications. The transmitter includes individual analog to digital conversion channels 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-40 is available with on-line diagnostics, digital calibration, and Dynamic Digital Filtering. Units also are available with Factory Mutual Approval for installation in a Class I, II, III Division 2 hazardous locations.

Set-up and calibration procedures are accomplished using a series of internal switches and the LCD display (reference TM008). In operation, it provides up to three million counts of weight resolution at an update rate of 50 milliseconds.

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.

1.4 FIELD ENGINEERING

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-40 transmitters and/or train factory personnel to do so. The field service department at BLH is the most important tool to assure the best performance from your application. Field service phone numbers are listed below.

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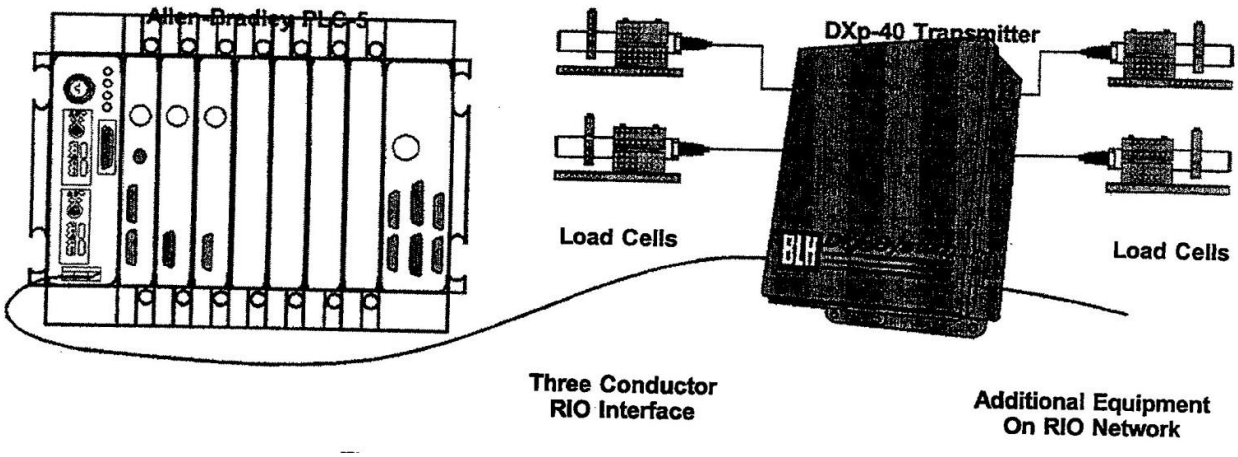


Figure 1-1. Allen-Bradley Remote I/O Network Interface

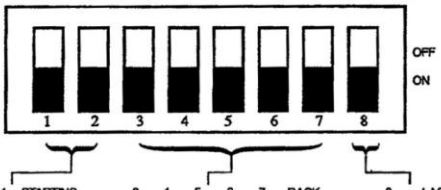
SECTION 2. The Remote I/O Interface

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-40 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 I/O, 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-40 also communicates status information, diagnostics, and calibration data to the PLC.

CONFIGURATIONS:

Quarter Designations and Rack Addressing



3	4	STARTING QUARTER
ON	ON	- FIRST
OFF	ON	- SECOND
ON	OFF	- THIRD
OFF	OFF	- FOURTH

3	4	5	6	7	RACK ADDRESS
ON	ON	ON	ON	ON	32
OFF	ON	ON	ON	ON	1
ON	OFF	ON	ON	ON	2
OFF	OFF	ON	ON	ON	3
ON	ON	OFF	ON	ON	4
- Continue Sequence Through 31 -					
OFF	OFF	OFF	OFF	OFF	31

8	LAST QUARTER?
ON	NO
OFF	YES*

* If the DXp is the last used quarter on a rack, YES must be selected.

Cable Lengths, Terminations, and Maximum # Of DXp-40s

BAUD RATE	MAXIMUM CABLE LENGTH	TERMINATION FOR LAST DXP ON CABLE	MAXIMUM DXPs PER SCANNER
57.6K	10,000 FEET	150 OHMS	16
115.2K	5,000 FEET	150 OHMS	16
230.4K	2,500 FEET	82 OHMS	32

Figure 2-1. RIO Communication DIP Switch Settings

One Quarter Rack. The DXp-40 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-40 addressing supports racks 1-32. Four DXp-40s constitute 1 full rack, each using a different starting quarter. Discrete Transfer, Weight data and operating status information transmitted through discrete transfer using the PLC's Remote I10 image table.

Block Transfer, Block data transfers are initiated by the PLC ladder logic program to obtain more in depth status, diagnostic, and individual load cell data.

Word Integrity Is Ensured. The DXp-40 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 CONFIGURATIONS

Rack address and starting quarter designations are all configured using a row of DIP switches in the DXp-40 (Figure 2-1). The DXp-40 is able to be addressed up to rack number 32. Whenever the DIP switch settings are changed, the unit must be reset to allow the processor to read the new switch settings.

RIO interface baud rate selections are available through the DXp-40 main menu (Figure 2-2). Recommended cable lengths are presented in Figure 2-1.

Main Menu (Accessed from Operation Mode)

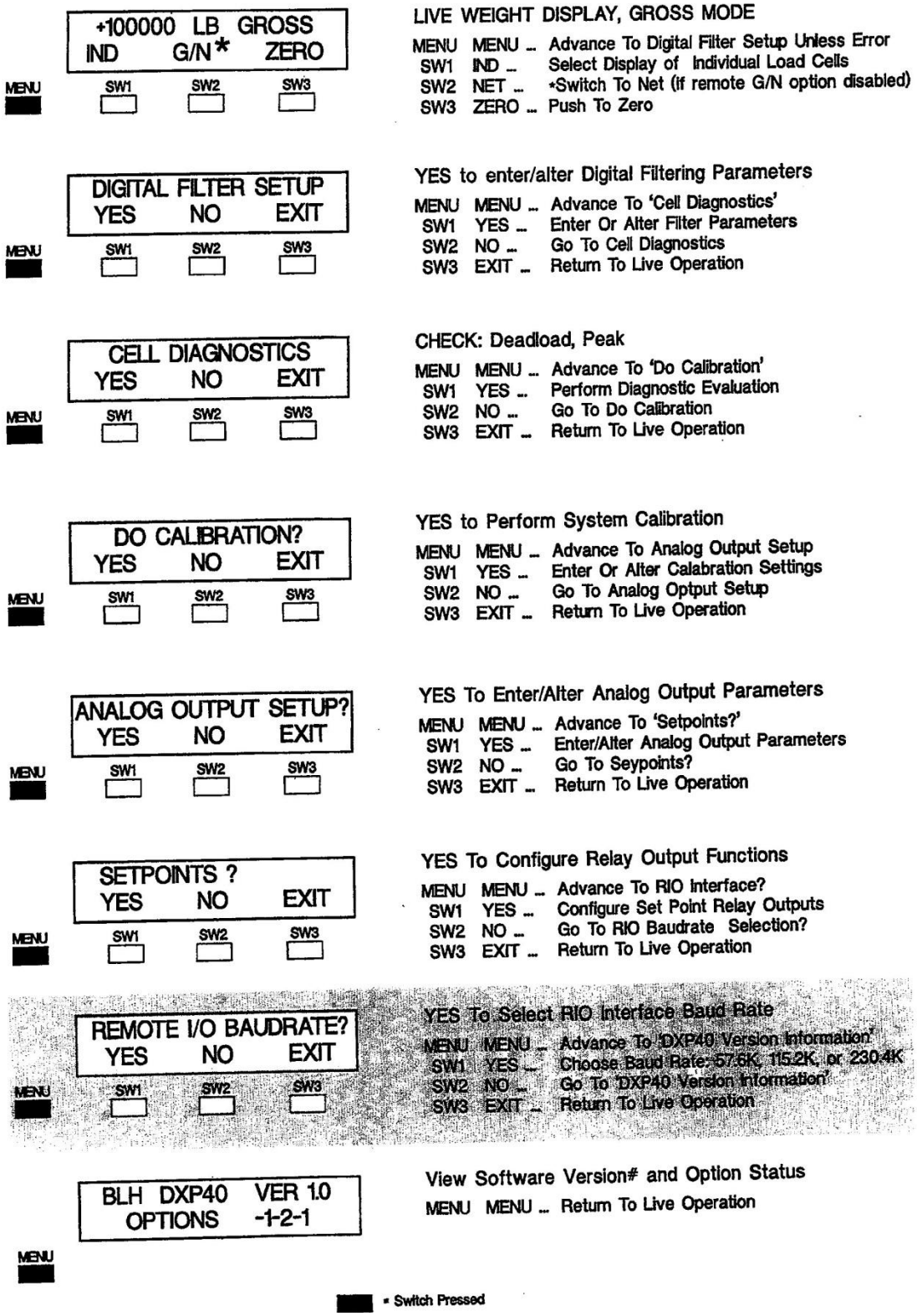


Figure 2-2. Revised DXp-40 Main Menu w/Baud Rate Selection

2.3 DISCRETE DATA TRANSFER

2.3.1 OUTPUT IMAGE TABLE

The PLC-5 initiates the communication interface by transmitting two words from the output image table (Figure 2-3). The first word is regarded as a 'spare' by the DXp-40.

The second word contains the commands that the PLC-5 expects the DXp-40 to perform. Word 2 controls set points, filter selection, filter operation, and DXp-40 operating mode status.

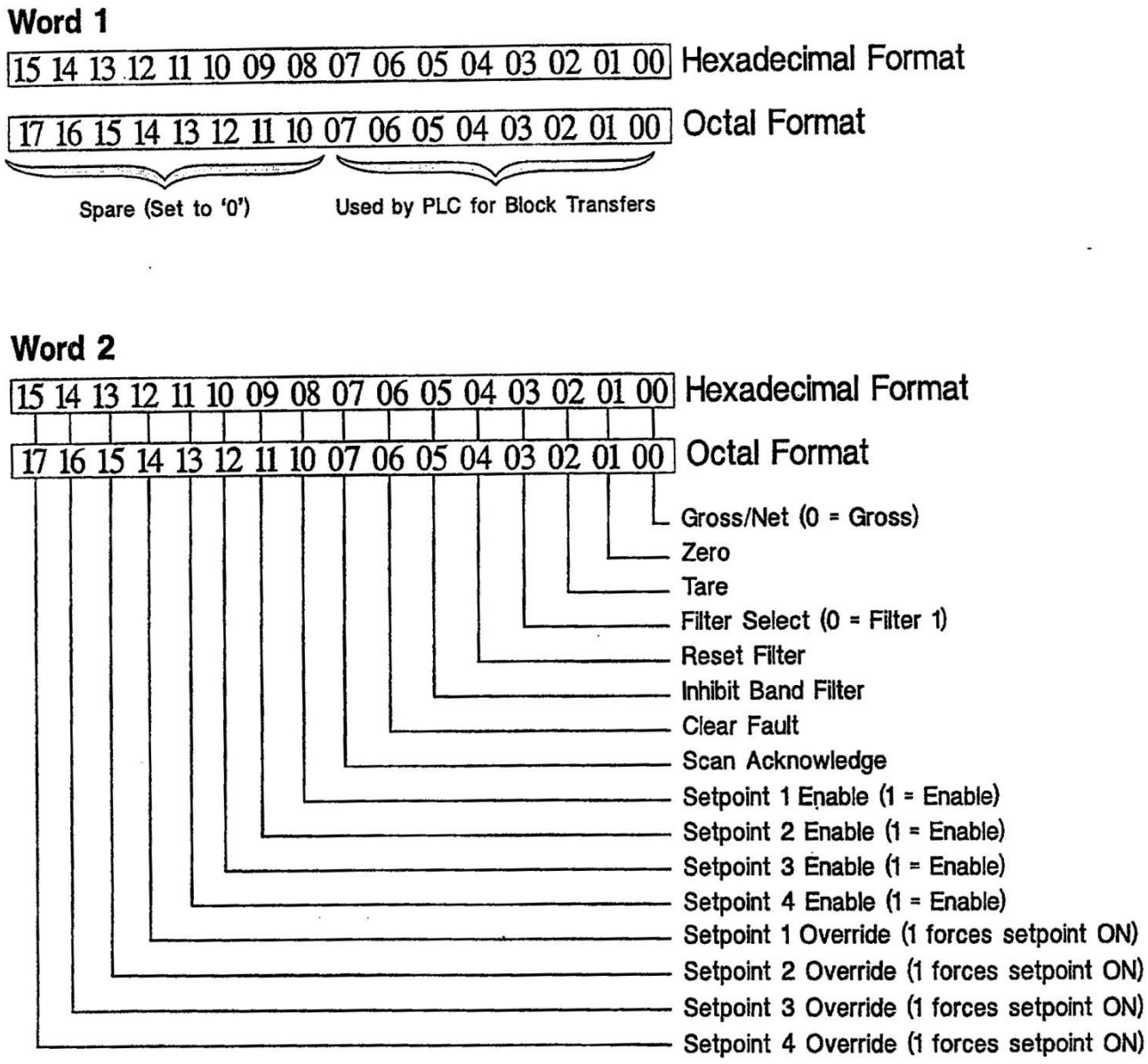


Figure 2-3. The Output Image Table

NOTE: Octal and hexadecimal address formats are shown to cover PLC-5 and SLC-500 devices

2.3.2 Input Image Table

After evaluating the contents of the output image table, the DXp-40 responds by transmitting two words to the input image table (Figure 2-4). The first word contains signed integer weight data. The second word contains the upper order data bits, system status, error condition, and set point status information.

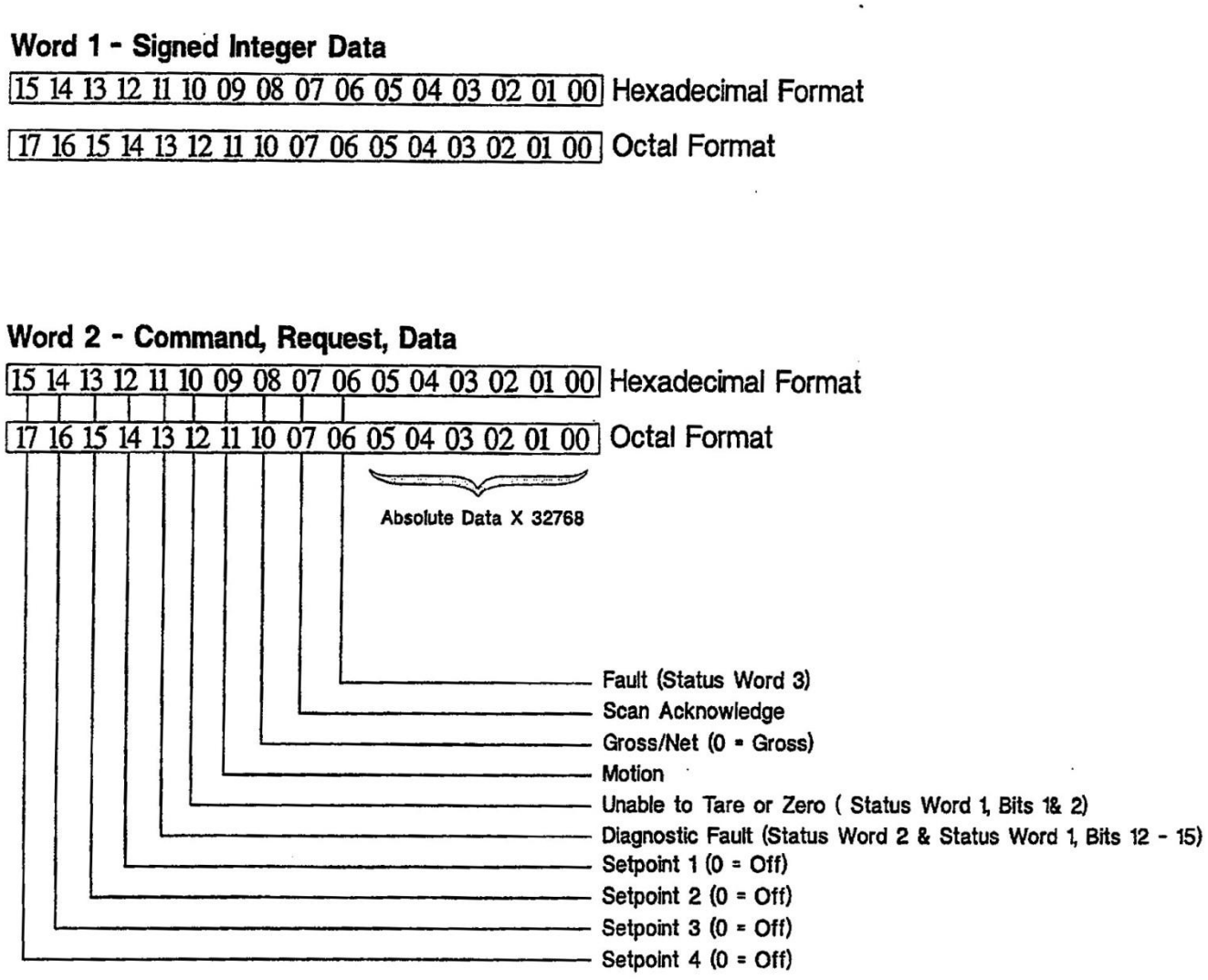


Figure 2-4. The Input Image Table

NOTE: Octal and hexadecimal address formats are shown to cover PLC-5 and SLC-500 devices

2.4 BLOCK DATA TRANSFERS

2.4.1 INTERFACE BASICS

Block data transfers are initiated by the ladder logic program write (BTW) and read (BTR) commands. The transfer sequence begins when the PLC sends the DXp40 a one word (16 bit integer) write command containing a register location pointer. This pointer is the 16 bit integer value of the first register the PLC wishes to read (factory default upon shipment is register 1).

Table 2-1 presents all available single and double word register locations. After establishing the starting register location, the PLC then transmits a read transfer block command telling the DXp--40 how many words of information are needed.

2.4.2 TRANSFER READS (BTRS)

Once the register location pointer value is established, the PLC logic program must issue a block transfer read command to obtain DXp-40 information. A BTR can request up to 64 words of DXp-40 information (see Table 2-1). The DXp-40 will respond to the BTR by transmitting the number of words requested, starting at the pointer location. NOTE: The first word transmitted by the DXp-40 will be the register pointer value. The DXp-40 adds this word at the beginning of the transmission to 'echo' the pointer value prior to transmitting requested data. Therefore, the BTR command MUST add 1 to the number of words requested. If the PLC needs four words of DXP information, the BTR request must be for five words (Figure 2-5).

2.4.3 BLOCK TRANSFER WRITES (13-1111S)

Some of the DXp-40 registers may be written to by the PLC (indicated by an '" in table 2-1). This allows parameters such as filter, set point, and diagnostic values to be down loaded on-the-fly by the PLC ladder logic program. When writing to the DXp-40, the first word must be the register location pointer. Therefore, the program MUST always add 1 to the BTW command length (Figure 2-6). For example, to change a set point value, the BTW length must equal 2 with the first word being the set point register location pointer and the second word being the new set point value. Parameter guidelines for writing data to the DXp-40 are presented in Table 2-2.

2.4.4 A PERPETUAL POINTER

One advantage to DXp-40 block transfers is that the register pointer is retained in DXp-40 EEPROM. When a write block selects (points to) a register location, that location may be accessed (read) repeatedly without having to re-write the register location word. Of course the register pointer can be changed as often as needed, but the last written location will always be remembered, even during power down. This feature saves a lot of BTWs when the PLC is monitoring a particular register or block of registers over a period of time.

2.4.5 FAULT EVALUATION

Three status words, register locations 1, 2, and 3, provide detailed explanations of error conditions encountered by the DXp. When a fault is detected, either bit 6 (fault) or bit 11 (diagnostic fault) in word 2 of the input image table is set to a '1' to alert the PLC of an error condition. The PLC must then perform a BTR of the appropriate status register to evaluate and correct the error. If bit six (fault) is set, check status word 3 for the error explanation. If bit 11 (diagnostic fault) is active, check status word 2 and status word 1 bits 12 - 15 for the error explanation. Table 2-3 gives the status word bit definitions.

2.4.6 REMOTE FILTER CONFIGURATION

DXp-40 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. Filter parameters are stored at register locations 59-70 (Table 2-1). Table 2-2 defines the filter parameters that can be written to these registers in the DXp-40. Request BLH technical note TD-071 for a detailed description of Dynamic Digital Filtering.

WORD 1	WORD 2	WORD 3	WORD 4	WORD 5
Register Address 4	Gross Weight Cell 1	Gross Weight Cell 2	Gross Weight Cell 3	Gross Weight Cell 4

Figure 2.5. Block Transfer Read

WORD 1	WORD 2
Register Address 55	Set Point Value

Block Transfer Write Sample: One word desired (set point#1 weight value) requires two word write command (1st word is set point #1 address).

Figure 2-6. Block Transfer Write (BTW) Sample

Table 2-1. Single & Double Word Register Pointer Locations

Single Word Registers		Double Word Registers	
01	STATUS 3	100	GROSS TOTAL
02	STATUS 2	102	GROSS CELL 1
03	STATUS 1	104	GROSS CELL 2
04	GROSS CELL 1	106	GROSS CELL 3
05	GROSS CELL 2	108	GROSS CELL 4
06	GROSS CELL 3	110	NET TOTAL
07	GROSS CELL 4	112	NET CELL 1
08	NET CELL 1	114	NET CELL 2
09	NET CELL 2	116	NET CELL 3
10	NET CELL 3	118	NET CELL 4
11	NET CELL 4	120	MV/V CELL 1
12	MV/V/10 CELL 3	122	MV/V CELL 2
13	MV/V/10 CELL 2	124	MV/V CELL 3
14	MV/V/10 CELL 3	126	RAVN CELL 4
15	MV/V/10 CELL 4	128	PEAK TOTAL
16	% LOAD CELL 1	130	PEAK CELL 1
17	% LOAD CELL 2	132	PEAK CELL 2
18	% LOAD CELL 3	134	PEAK CELL 3
19	% LOAD CELL 4	136	PEAK CELL 4
20	PEAK TOTAL	138	TARE
21	PEAK CELL 1	140	TARE CELL 1
22	PEAK CELL 2	142	TARE CELL 2
23	PEAK CELL 3	144	TARE CELL 3
24	PEAK CELL 4	146	TARE CELL 4
25	TARE	148	ZERO
26	TARE CELL 1	150	ZERO CELL 1
27	TARE CELL 2	152	ZERO CELL 2
28	TARE CELL 3	154	ZERO CELL 3
29	TARE CELL 4	156	ZERO CELL 4
30	ZERO	158*	SETPOINT 1
31	ZERO CELL 1	160*	SETPOINT 2
32	ZERO CELL 2	162*	SETPOINT 3
33	ZERO CELL 3	164*	SETPOINT 4
34	ZERO CELL 4	166*	OVERLOAD CELL 1
35	% SENSITIVITY CELL 1	168*	OVERLOAD CELL 2
36	% SENSITIVITY CELL 2	170*	OVERLOAD CELL 3
37	% SENSITIVITY CELL 3	172*	OVERLOAD CELL 4
38	V. SENSITIVITY CELL 4		
39	1 LOAD SHIFT CELL 1		
40	% LOAD SHIFT CELL 2		
41	1 LOAD SHIFT CELL 3		
42	1 LOAD SHIFT CELL 4		
43	POS DRIFT CELL 1		
44	POS DRIFT CELL 2		
45	POS DRIFT CELL 3		
46	POS DRIFT CELL 4		
47	MEG DRIFT CELL 1		
48	NEG DRIFT CELL 2		
49	NEG DRIFT CELL 3		
50	NEG DRIFT CELL 4 NOISE CELL 1		
52	NOISE CELL 2		
53	NOISE CELL 3		
54	NOISE CELL 4		
55*	SETPOINT 1		
56*	SETPOINT 2		

*** Word(s) can be written to by PLC**

Table 2-1 Notes:

1).Single word register integer data = -32768 to + 32767

2). Double word integer data must be converted to floating point using the following equation:

57*	**SETPOINT 3**	
58*	**SETPOINT 4**	
59*	**FILTER 1 LENGTH**	***((word 2) x 32768.0) + word 1***
60*	**FILTER 1 BAND**	
61*	**FILTER 1 RESPONSE**	range = -9,999,999 to 9,999,999
62*	**FILTER 1 BAND AVERAGE**	
63*	**FILTER 1 MOTION**	
64*	**FILTER 1 MOTION TIMER**	
65*	**FILTER 2 LENGTH**	
66*	**FILTER 2 BAND**	
67*	**FILTER 2 RESPONSE**	
68*	**FILTER 2 BAND AVERAGE**	
69*	**FILTER 2 MOTION**	
70*	**FILTER 2 MOTION TIMER**	
71*	**DIAG SHIFT UMIT**	
72*	**DIAG ZERO SHIFT UMIT**	
73*	**DIAG DRIFT UMIT**	
74*	**DLAG NOISE UMIT**	
75*	**OVERLOAD CELL 1**	
76*	**OVERLOAD CELL 2**	
77*	**OVERLOAD CELL 3**	
78*	**OVERLOAD CELL 4**	

Table 2-2. Block Transfer Write Parameters

Set Point Entries - 0 to 9,999,999

Diagnostic Entries											
Diagnostic Shift Limit			0 **to 99 (0%** to 99%)								
Zero Shift Limit			0 to 9,999,999								
Drift Limit			0 to 99								
Noise Limit			counts* 0 to 99 counts								
Filter Parameter Entries Filter Length						Motion			Motion Timer		
00	=	50ms	00	=	2	00	=	OFF	00	=	1/2 sec
01	=	100 ms	01	=	4	01	=	1 count	01	=	1 sec
02	=	200 ms	02	=	8	02	=	2 counts	02	=	2 sec
03	=	400 ms	03	=	16	03	=	3 counts	03	=	3 sec
04	=	800 ms	04	=	32	04	=	5 counts			
05	=	1600 ms	05	=	64	05	=	10 counts			
06	=	3200 ms	06	=	128	06	=	20 counts			
07	=	6400 ms	07	=	256	07	=	50 counts			

Band Filter - 0 to 250 counts

Filter Response - 0 to 250 counts

Overload - 0 to 9,999,999

* Counts refers to displayed counts. If displayed weight is counting by 2 lb increments, then a selection of nine counts will equal 18 lb.

NOTE: Refer to the standard DXp-40 manual, TM008, for DXp-40 parameter definitions.

Table 2-3. Status Word Bit Definitions

STATUS 1 (GENERAL STATUS)

BIT	0	ACTIVE FILTER, (0) = FILTER 1, (1) = FILTER 2
BIT	1	UNABLE TO TARE/ZERO BECAUSE OF MOTION
BIT	2	UNABLE TO ZERO BECAUSE OF LIMIT
BIT	3	GROSS ZERO JUST ACQUIRED
BIT	4	NET TARE JUST ACQUIRED
BIT	5	IN CAL
BIT	6	SPARE
BIT	7	SPARE
BIT	8	INPUT 1
BIT	9	INPUT 2
BIT	10	INPUT 3
BIT	11	INPUT 4
BIT	12	OVERLOAD LIMIT CELL 1
BIT	13	OVERLOAD LIMIT CELL 2
BIT	14	OVERLOAD LIMIT CELL 3
BIT	15	OVERLOAD LIMIT CELL 4

STATUS 2 (DIAGNOSTIC *ERRORS)*

BIT	0	LOAD SHIFT CELL 1
BIT	1	LOAD SHIFT CELL 2
BIT	2	LOAD SHIFT CELL 3
BIT	3	LOAD SHIFT CELL 4
BIT	4	ZERO SHIFT CELL 1
BIT	5	ZERO SHIFT CELL 2
BIT	6	ZERO SHIFT CELL 3
BIT	7	ZERO SHIFT CELL 4
BIT	8	DRIFT CELL 1
BIT	9	DRIFT CELL 2
BIT	10	DRIFT CELL 3
BIT	11	DRIFT CELL 4
BIT	12	NOISE CELL 1
BIT	13	NOISE CELL 2
BIT	14	NOISE CELL 3
BIT	15	NOISE CELL 4

STATUS 3 (FAULTS)

BIT	0	POWERUP
BIT	1	2EEPROM CODE ERROR - DEFAULT DATA OVERLOAD
BIT	2	EEPROM READ ERROR
BIT	3	EEPROM WRITE ERROR
BIT	4	LOST ZERO
BIT	5	LOST TARE
BIT	6	
BIT	7	
BIT	8	A/D UNDERLOAD[1] CELL 1
BIT	9	A/D OVERLOAD[2] CELL 1
BIT	10	A/D UNDERLOAD CELL 2
BIT	11	A/D OVERLOAD CELL 2
BIT	12	A/D UNDERLOAD CELL 3
BIT	13	/D OVERLOAD CELL 3
BIT	14	A/D UNDERLOAD CELL 4
BIT	15	A/D OVERLOAD CELL 4

1 Underload = input signal too low

2 Overload = input signal too high

SECTION 3. Definitions and Explanations

3.1 INPUT IMAGE TABLE BITS

A table is provided to explain the Input Image Table presented in Figure 2-4. 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 (signed integer, -32768 to + 32767)
Signed integer.

Word 2

BITS 0 - 5 ABSOLUTE OVERFLOW DATA x 32768
Word 2 bits 0-5 is absolute overflow data from word 1 used if absolute 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- 5 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 6 FAULT
Is set if there is a fault causing weigh data to be incorrect. This bit is cleared or suppressed by setting the 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 D440 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 I/O DXp40 has received the last write to the output image table.

BIT 8 G/N, GROSS/NET DATA ID.
If this bit = 0 the weigh data in word 1 and bits 0-5 of word 2 is gross data. If this bit = 1 the weigh data is net weigh data.

BIT 9 MOTION
Is set If the weigh data is in motion as determined by the motion settings.

BIT 10 UNABLE TO TARE OR ZERO
Is set if the dxp40 is unable to tare or zero the data after receiving a zero or tare command from bits 1 or 2 of word 2 of the output image table. The reasons for not being able to zero of tare are found in status #1 register bits 1 8, 2. This status register is accessible through a block transfer read.

BIT 11 DIAGNOSTIC FAULT
Is set if any of the diagnostic fault bits are satin the status #1 register bits 12 -15 or status #2 register bits 0 -15. These status registers are accessible through a block transfer read.

BIT 12 SETPOINT #1
Is set if setpoint #1 output is on. If word 2 bit 8 of the output image table = 1 the setpoint #1 output is controlled by the dxp40. ff word 2 bit 8 of the output image table = 0 the setpoint #1 output is controlled by word 2 bit 12 of the output image table.

BIT 13 SETPOINT # 2
Is set if setpoint #2 output is on. If word 2 bit 9 of the output image table = 1 the setpoint #2 output is controlled by the dxp40. If word 2 bit 9 of the output image table = 0 the setpoint #2 output is controlled by word 2 bit 13 of the output image table.

BIT 14 SETPOINT #3
Is set if setpoint #3 output Is on. If word 2 bit 10 of the output image table = 1 the setpoint #3 output is controlled by the dxp40. If word 2 bit 10 of the output image table = 0 the setpoint #3 output Is controlled by word 2 bit 14 of the output image table.

BIT 15 SETPOINT # 4
Is set if setpolnt #4 output is on. If word 2 bit 11 of the output image table = 1 the setpoint #4 output is controlled by the cbq340. If word 2 bit 11 of the output image table = 0 the setpoint #4 output is controlled by word 2 bit 15 of the output image table.

3.2 OUTPUT IMAGE TABLE BITS

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

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

Word 1 Unused

Word 2

BIT 0 GROSS/NET (0= GROSS)

Used for requesting total gross or net weigh data. If = 0 gross weigh data will be returned to the input image table. If = 1 net weigh data will be returned.

BIT 1 ZERO

If this bit changes from 0 to 1 the dxp40 will zero the gross weight If not currently in "motion" as determined by the motion status bit or if not outside the settable zero band. If the zero function is successful the GROSS ZERO JUST ACQUIRED bit (3) in the status 1 register will be set for approx. 2 seconds. If not successful bit 10, UNABLE TO TARE OR ZERO, in word 2 of the input image table and either bit 1, UNABLE TO TARE/ZERO BECAUSE OF MOTION, or bit 2, UNABLE TO ZERO BECAUSE OF LIMIT, of the status 1 register will be set for approx 2 seconds.

BIT 2 TARE

If this bit changes from 0 to 1 the dxp40 will tare the net weight if not currently in "motion- as determined by the motion status bit. If the tare function is successful the NET TARE JUST ACQUIRED bit (4) in the status 1 register will be set for approx. 2 seconds. If not successful bit 10, UNABLE TO TARE OR ZERO, in word 2 of the input image table and bit 1 UNABLE TO TARE/ZERO BECAUSE OF MOTION, of the status 1 register will be set for approx 2 seconds.

BIT 3 FILTER SELECT (0= FILTER 1, 1 = FILTER 2)

This bit is ored with the discrete filter select input as shown in the following table:

INPUT SELECT	**BIT 3**	**FILTER SELECTED**
FILTER 1	0	FILTER 1
FILTER **1**	1	FILTER 2
FILTER 2	0	FILTER 2
FILTER 2	1	FILTER 2

BIT 4 RESET FILTER

If this bit changes from 0 to 1 the dxp40 win reset or restart the filter using data from the current aid conversion. This may be helpful in overcoming time lags caused by heavy averaging.

BIT 5 INHIBIT BAND FILTER

When this bit is set to 1 the band filter Is inhibited. Set to 1 for a minimum of 50 milliseconds and then reset to 0 resets the band filter. If the band is wide, and heavy averaging is applied this will quicken the response to small signal changes which fall within the band width. When the band fitter is reset quick centering algorithms will rapidly find the center of a noisy input signal.

BIT 6 CLEAR FAULT

Setting this bit will clear all fault bits in status register 3 except for eeprom faults. Eeprom faults require the dxp40 to be reset. If the a/c1 over/under-range faults persist the corresponding fault flags will be set again when this bit returns to 0.

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 DXp40 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 i/o DXp40 has received the last write to the output image table.

BIT 8 SETPOINT #1 ENABLE (1= ENABLE)

Setting this bit to 1 enables the dxp40 setpoint #1 output to be controlled by the cbcp40. If reset to 0 the setpoint #1 output is controlled by BIT 12.

BIT 9 SETPOINT #2 ENABLE (1= ENABLE)

Setting this bit to 1 enables the dxp40 setpoint #2 output to be controlled by the dxp40. If reset to 0 the setpoint #2 output is controlled by BIT 13.

BIT 10 SETPOINT #3 ENABLE (1= ENABLE)

Setting this bit to 1 enables the dxp40 setpoint #3 output to be controlled by the cbcp40. If reset to 0 the setpoInt #3 output is controlled by BIT 14.

Table 3-2 (Cont.) Output Image Table Bit Definitions

BIT 11 SETPOINT #4 ENABLE (1 = ENABLE)
Setting this bit to 1 enables the dxp40 setpoint #4 output to be controlled by the dxp40. If reset to 0 the setpoint #4 output is controlled by BIT 15.

BIT 12 SETPOINT # 1 OVERRIDE
If BIT 8 = 0 the state of this bit controls the setpolnt # I output. A 1 turns on the setpoint #1 output.

BIT 13 SETPOINT #2 OVERRIDE
If BIT 9 = 0 the state of this bit controls the setpoint #2 output. Al turns on the setpoint #2 output.

BIT 14 SETPOINT #3 OVERRIDE
If BIT 10 = 0 the state of this bit controls the setpoint #3 output. A 1 turns on the setpoint #3 output.

BIT 15 SETPOINT #4 OVERRIDE
If BIT 11 = 0 the state of this bit controls the setpoint #4 output. A 1 turns on the setpoint #4 output

SECTION 4. Sample Ladder Logic Programs

4.1 INTRODUCTION

This section provides several sample programs (page 4-2) that show how the Allen-Bradley PLC communicates with the DXp-40 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 4-3 and continues to page 4-7. 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 ATA READS, WRITES, AND TRANSFERS

Following 'MAIN PROG' are several smaller program segments that deal with data reads, writes, and block transfers. Read, write, and block transfer programs run from page 4-8 to page 9-22. These programs define both single and double register transactions.

4.1.3 REFERENCE TABLES

Pages 4-23 to 4-27 provide reference tables to be used in conjunction with the sample programs. Use these tables to clarify program references.

4.2 SAMPLE PROGRAM AVAILABI LITY

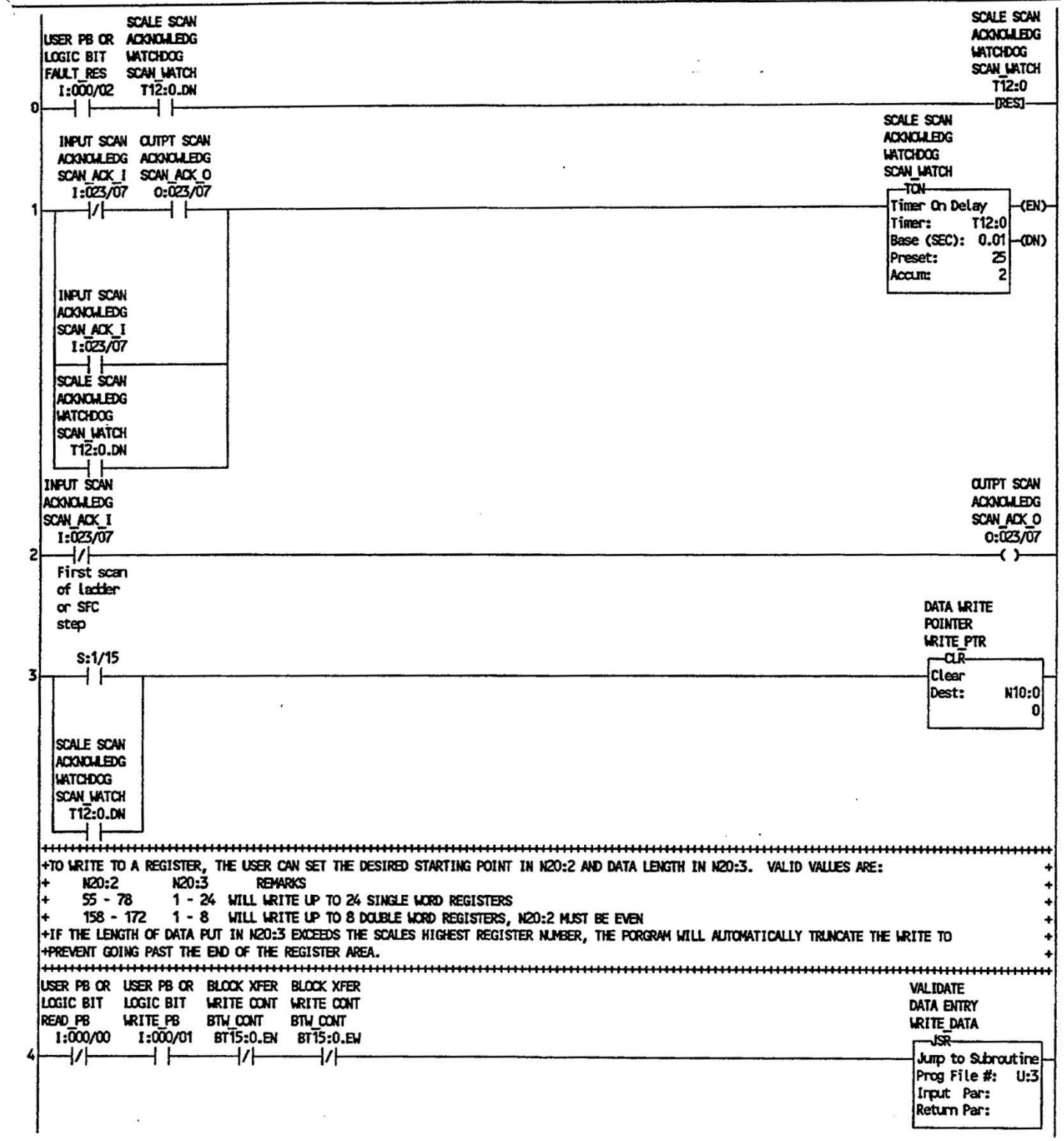
Sample programs are available on disk in either AB 6200 or ICOM format. Contact BLH at (781) 289-2000 for disk copies and/or application assistance, if needed.

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.

Number of Program Files:9

Name	File	Sub-Program Description	Size: Elems	Bytes
	0	[SYSTEM DATA STORAGE HEADER]	45	90
MAIN_PROG	2		140	779
WRITE_SET	3	SETUP FOR DATA WRITE	43	302
READ_SET	4	SETUP FOR READING DATA	41	297
SING_WRITE	5	TRANSFER DATA FOR SINGLE REGISTER WRITES	8	84
DOUB_WRITE	6	TRANSFER DATA FOR SINGLE REGISTE WRITES	46	464
SING_READ	7	TRANSFER DATA FOR SINGLE REGISTER READS	9	91
DOUB_READ	8	TRANSFER DATA FOR DOUBLE REGISTER READS	37	348


0
USER PB OR LOGIC BIT FAULT_RES I:000/02
SCALE SCAN ACKNOWLEDG WATCHDOG SCAN_WATCH T12:0.DN
SCALE SCAN ACKNOWLEDG WATCHDOG SCAN_WATCH T12:0 [RES]
1
INPUT SCAN ACKNOWLEDG SCAN_ACK_I I:023/07
OUTPT SCAN ACKNOWLEDG SCAN_ACK_O O:023/07
SCALE SCAN ACKNOWLEDG WATCHDOG SCAN_WATCH TON
Timer On Delay
Timer: T12:0
Base (SEC): 0.01
Preset: 25
Accum: 2
(EN)
(DN)
INPUT SCAN ACKNOWLEDG SCAN_ACK_I I:023/07
SCALE SCAN ACKNOWLEDG WATCHDOG SCAN_WATCH T12:0.DN
2
INPUT SCAN ACKNOWLEDG SCAN_ACK_I I:023/07
OUTPT SCAN ACKNOWLEDG SCAN_ACK_O O:023/07
First scan of ladder or SFC step
3
S:1/15
DATA WRITE POINTER WRITE_PTR CLR
Clear
Dest: N10:0
0
SCALE SCAN ACKNOWLEDG WATCHDOG SCAN_WATCH T12:0.DN
+TO WRITE TO A REGISTER, THE USER CAN SET THE DESIRED STARTING POINT IN N20:2 AND DATA LENGTH IN N20:3. VALID VALUES ARE:
+ N20:2 N20:3 REMARKS
+ 55 - 78 1 - 24 WILL WRITE UP TO 24 SINGLE WORD REGISTERS
+ 158 - 172 1 - 8 WILL WRITE UP TO 8 DOUBLE WORD REGISTERS, N20:2 MUST BE EVEN
+IF THE LENGTH OF DATA PUT IN N20:3 EXCEEDS THE SCALES HIGHEST REGISTER NUMBER, THE PORGRAM WILL AUTOMATICALLY TRUNCATE THE WRITE TO
+PREVENT GOING PAST THE END OF THE REGISTER AREA.
4
USER PB OR LOGIC BIT READ_PB I:000/00
USER PB OR LOGIC BIT WRITE_PB I:000/01
BLOCK XFER WRITE CONT BTW_CONT BT15:0.EN
BLOCK XFER WRITE CONT BTW_CONT BT15:0.EW
VALIDATE DATA ENTRY WRITE_DATA JSR
Jump to Subroutine
Prog File #: U:3
Input Par:
Return Par:

```
+TO READ FROM A REGISTER, THE USER CAN SET THE DESIRED STARTING POINT IN N20:0 AND DATA LENGTH IN N20:1.  VALID VALUES ARE:  +
+     N20:0        N20:1        REMARKS                                                                                      +
+     1 - 78       1 - 62   WILL READ UP TO 62 SINGLE WORD REGISTERS                                                        +
+     100 - 172    1 - 31   WILL READ UP TO 31 DOUBLE WORD REGISTERS, N20:0 MUST BE EVEN                                    +
+IF THE LENGTH OF DATA PUT IN N20:1 EXCEEDS THE SCALES HIGHEST REGISTER NUMBER, THE PORGRAM WILL AUTOMATICALLY TRUNCATE THE WRITE TO +
+PREVENT GOING PAST THE END OF THE REGISTER AREA.                                                                           +
```

5
USER PB OR LOGIC BIT READ_PB I:000/00 — XIC
USER PB OR LOGIC BIT WRITE_PB I:000/01 — XIO
BLOCK XFER READ CONT BTR_CONT BT15:1.EN — XIO
BLOCK XFER READ CONT BTR_CONT BT15:1.EN — XIO
VALIDATE DATA ENTRY READ_DATA — JSR: Jump to Subroutine, Prog File #: U:4, Input Par:, Return Par:

6
SINGLE REQUEST READ_1_REQ B16/0 — XIC
DOUBLE REQUEST READ_2_REQ B16/1 — XIO
INDEX CHNG REQUEST READ_I_REQ B16/2 — XIO
SINGLE COMMAND READ_1_CMD B16/3 — OTE

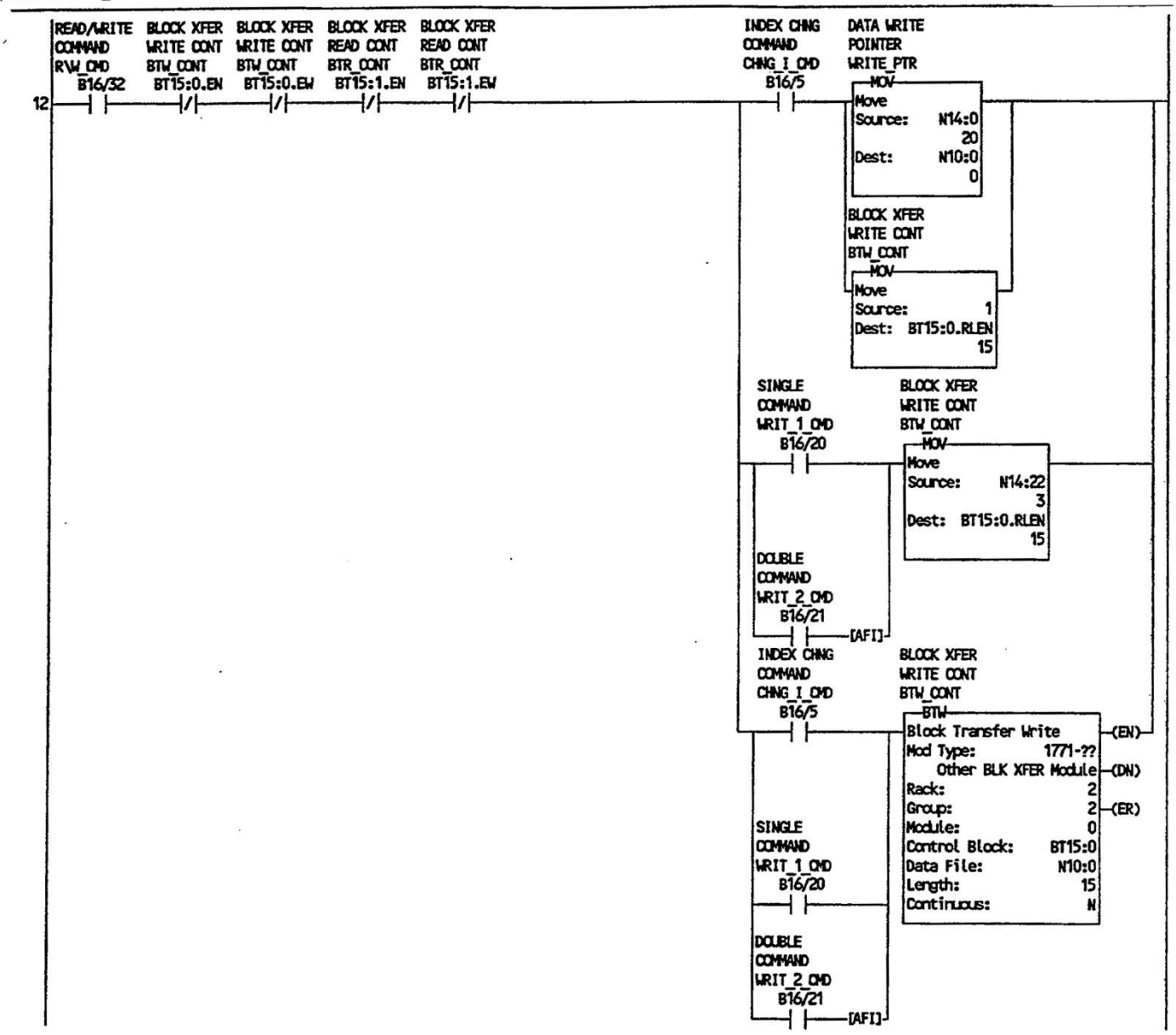
7
SINGLE REQUEST READ_1_REQ B16/0 — XIO
DOUBLE REQUEST READ_2_REQ B16/1 — XIC
INDEX CHNG REQUEST READ_I_REQ B16/2 — XIO
DOUBLE COMMAND READ_2_CMD B16/4 — OTE

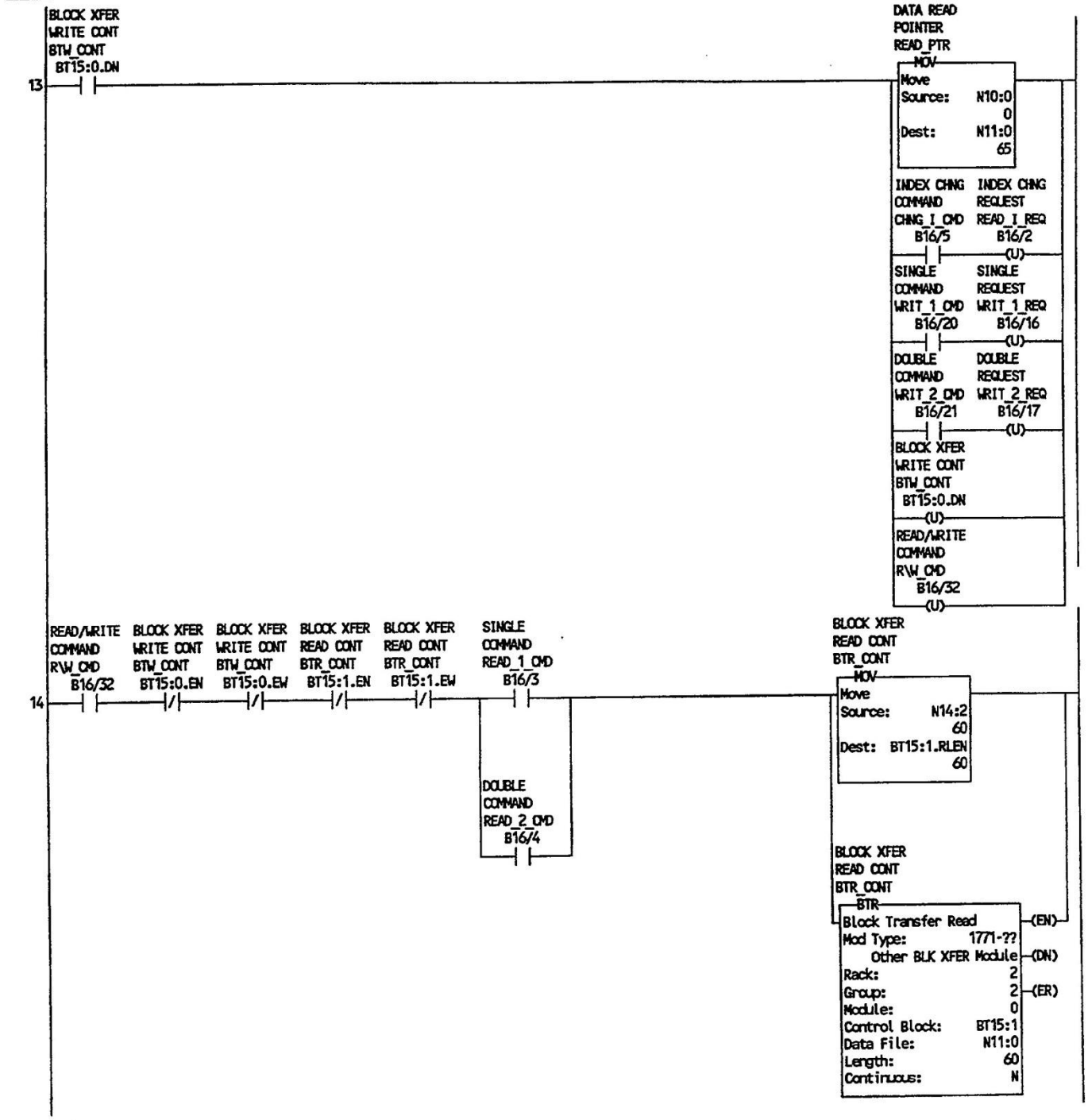
8
INDEX CHNG REQUEST READ_I_REQ B16/2 — XIC
INDEX CHNG COMMAND CHNG_I_CMD B16/5 — OTE

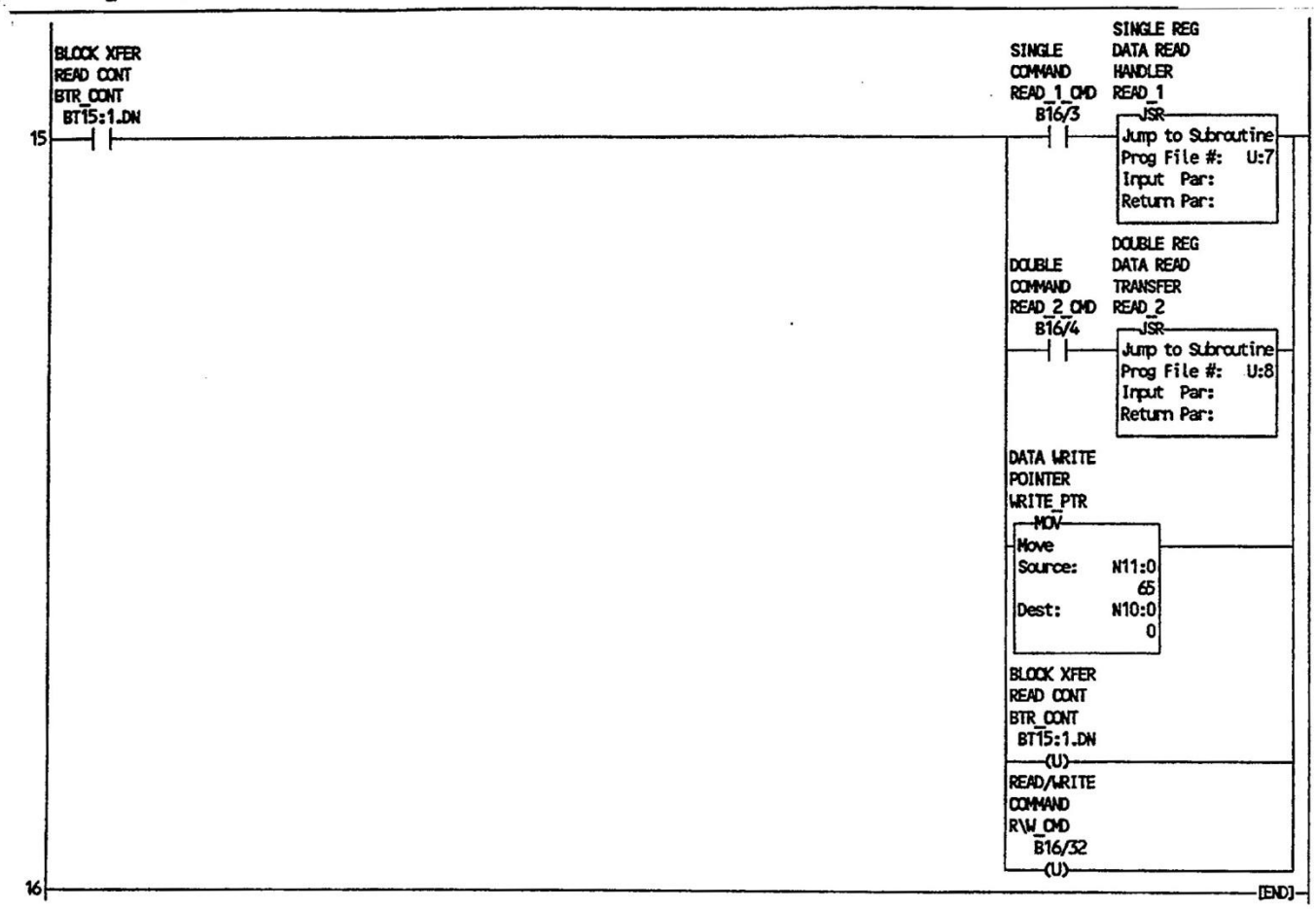
9
SINGLE REQUEST READ_1_REQ B16/0 — XIO
DOUBLE REQUEST READ_2_REQ B16/1 — XIO
INDEX CHNG REQUEST READ_I_REQ B16/2 — XIO
SINGLE REQUEST WRIT_1_REQ B16/16 — XIC
DOUBLE REQUEST WRIT_2_REQ B16/17 — XIO
SINGLE COMMAND WRIT_1_CMD B16/20 — OTE

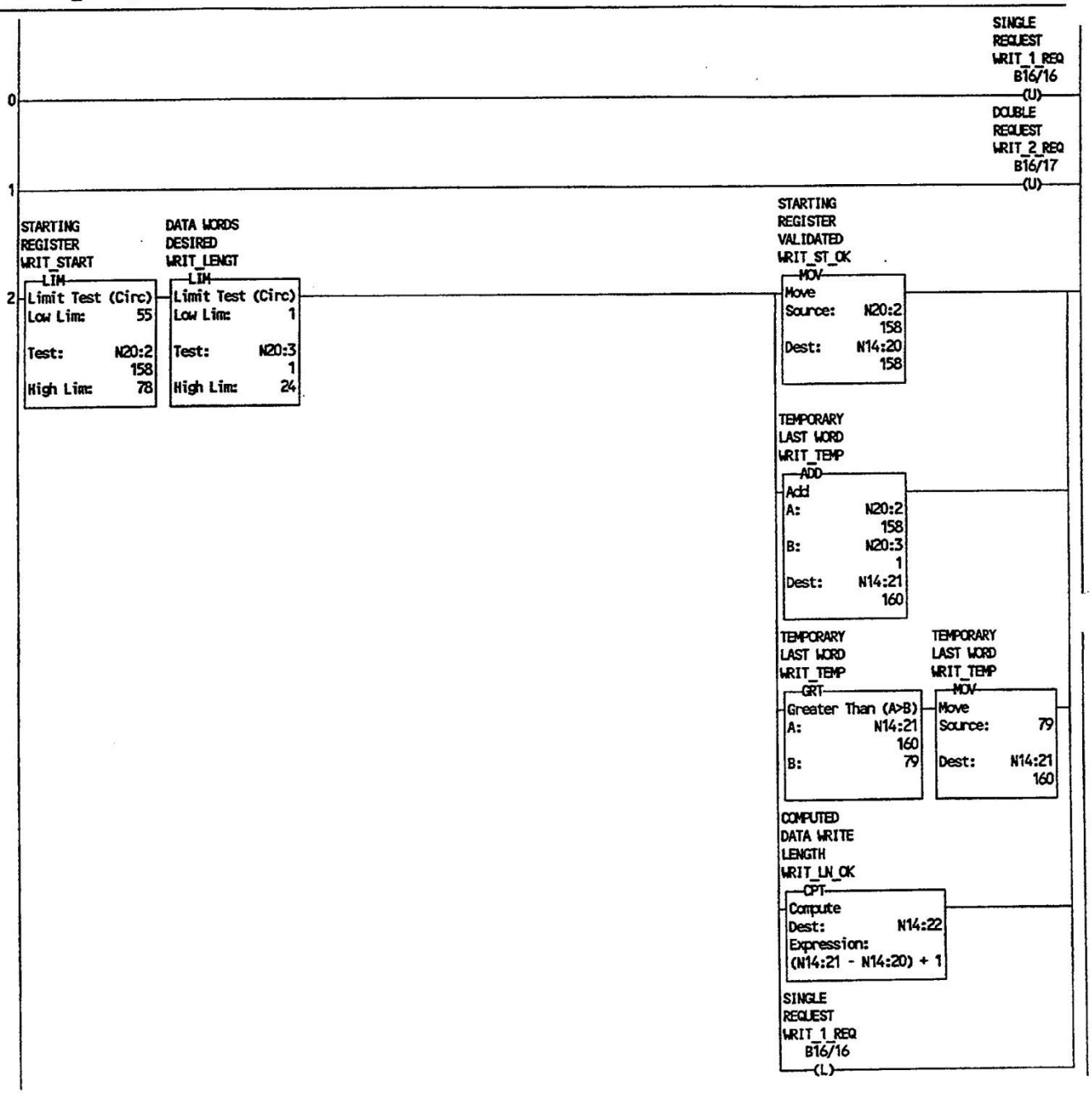
10
SINGLE REQUEST READ_1_REQ B16/0 — XIO
DOUBLE REQUEST READ_2_REQ B16/1 — XIO
INDEX CHNG REQUEST READ_I_REQ B16/2 — XIO
SINGLE REQUEST WRIT_1_REQ B16/16 — XIO
DOUBLE REQUEST WRIT_2_REQ B16/17 — XIC
DOUBLE COMMAND WRIT_2_CMD B16/21 — OTE

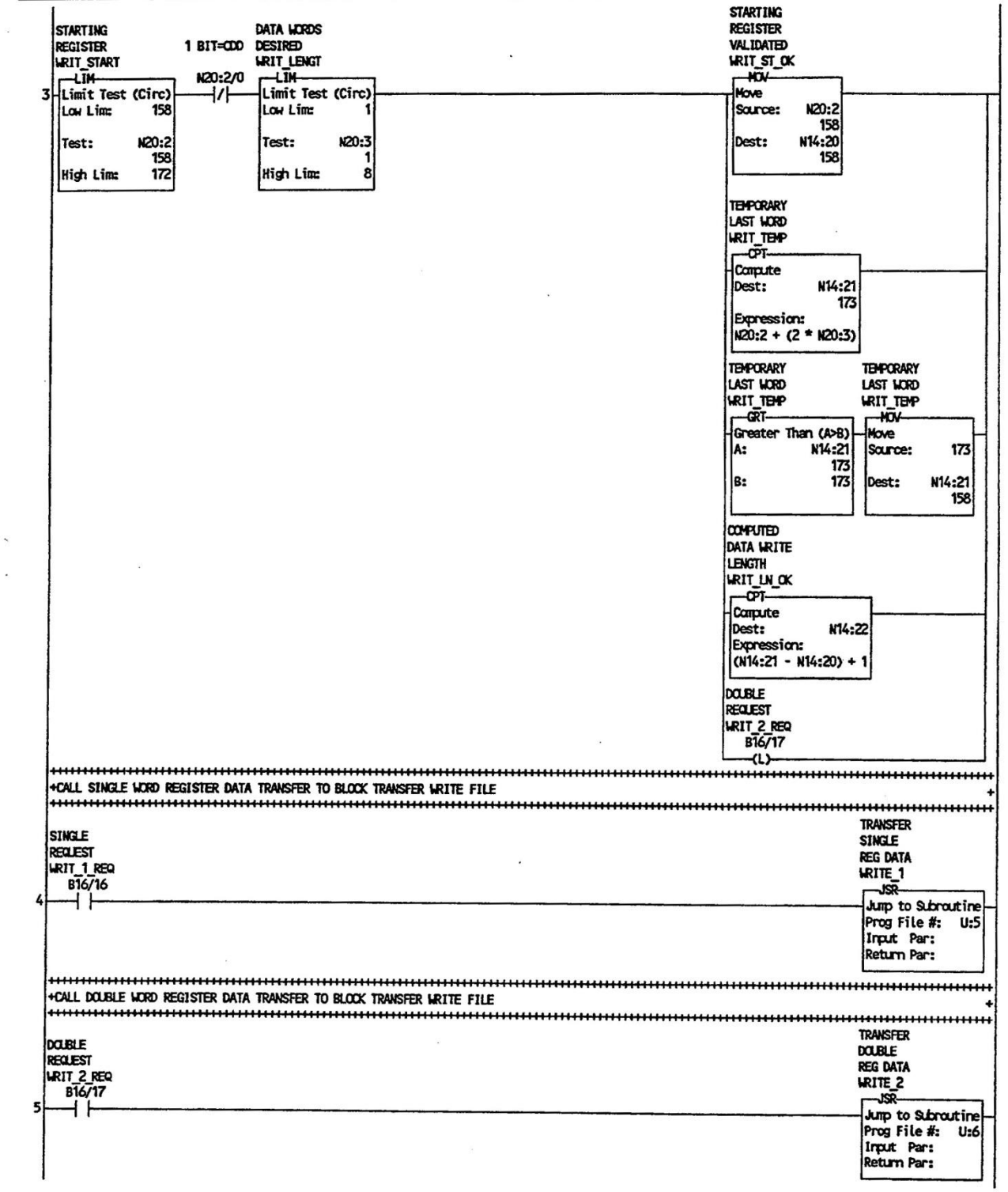
11
SINGLE COMMAND READ_1_CMD B16/3 — XIC
BLOCK XFER WRITE CONT BTW_CONT BT15:0.EN — XIO
BLOCK XFER READ CONT BTR_CONT BT15:1.EN — XIO
READ/WRITE COMMAND R\W_CMD B16/32 — OTL
DOUBLE COMMAND READ_2_CMD B16/4 — XIC
INDEX CHNG COMMAND CHNG_I_CMD B16/5 — XIC
SINGLE COMMAND WRIT_1_CMD B16/20 — XIC
DOUBLE COMMAND WRIT_2_CMD B16/21 — XIC


12
READ/WRITE COMMAND R\W_CMD B16/32
BLOCK XFER WRITE CONT BTW_CONT BT15:0.EN
BLOCK XFER WRITE CONT BTW_CONT BT15:0.EW
BLOCK XFER READ CONT BTR_CONT BT15:1.EN
BLOCK XFER READ CONT BTR_CONT BT15:1.EW
INDEX CHNG COMMAND CHNG_I_CMD B16/5
DATA WRITE POINTER WRITE_PTR
MOV
Move
Source: N14:0 20
Dest: N10:0 0
BLOCK XFER WRITE CONT BTW_CONT
MOV
Move
Source: 1
Dest: BT15:0.RLEN 15
SINGLE COMMAND WRIT_1_CMD B16/20
BLOCK XFER WRITE CONT BTW_CONT
MOV
Move
Source: N14:22 3
Dest: BT15:0.RLEN 15
DOUBLE COMMAND WRIT_2_CMD B16/21
[AFI]
INDEX CHNG COMMAND CHNG_I_CMD B16/5
BLOCK XFER WRITE CONT BTW_CONT
BTW
Block Transfer Write
Mod Type: 1771-??
Other BLK XFER Module
Rack: 2
Group: 2
Module: 0
Control Block: BT15:0
Data File: N10:0
Length: 15
Continuous: N
(EN)
(DN)
(ER)
SINGLE COMMAND WRIT_1_CMD B16/20
DOUBLE COMMAND WRIT_2_CMD B16/21
[AFI]

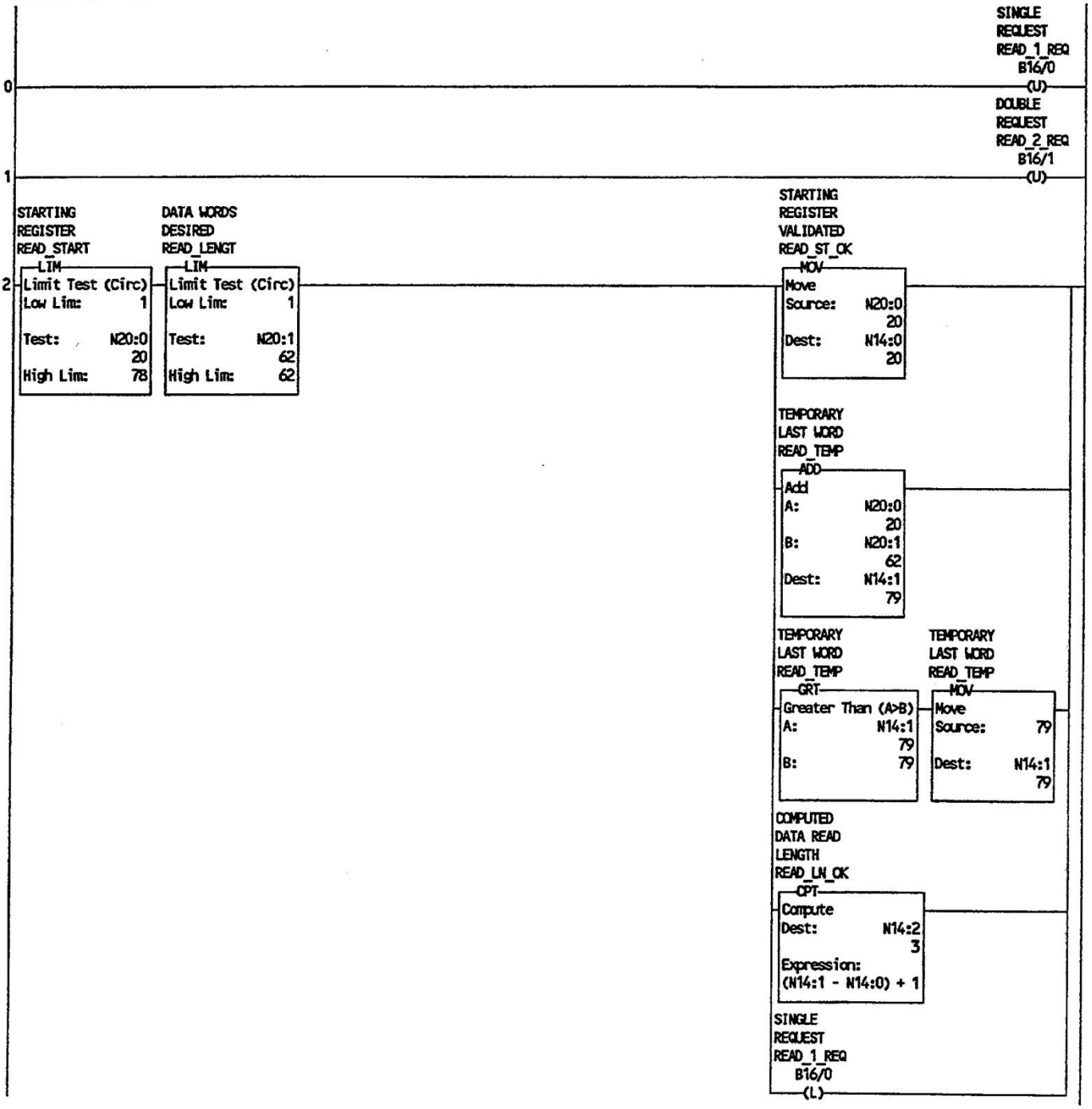

13
BLOCK XFER WRITE CONT BTW_CONT BT15:0.DN
DATA READ POINTER READ_PTR
MOV
Move
Source: N10:0 0
Dest: N11:0 65
INDEX CHNG COMMAND CHNG_I_CMD B16/5
INDEX CHNG REQUEST READ_I_REQ B16/2
SINGLE COMMAND WRIT_1_CMD B16/20
SINGLE REQUEST WRIT_1_REQ B16/16
DOUBLE COMMAND WRIT_2_CMD B16/21
DOUBLE REQUEST WRIT_2_REQ B16/17
BLOCK XFER WRITE CONT BTW_CONT BT15:0.DN
READ/WRITE COMMAND R\W_CMD B16/32
(U)
14
READ/WRITE COMMAND R\W_CMD B16/32
BLOCK XFER WRITE CONT BTW_CONT BT15:0.EN
BLOCK XFER WRITE CONT BTW_CONT BT15:0.EW
BLOCK XFER READ CONT BTR_CONT BT15:1.EN
BLOCK XFER READ CONT BTR_CONT BT15:1.EW
SINGLE COMMAND READ_1_CMD B16/3
DOUBLE COMMAND READ_2_CMD B16/4
BLOCK XFER READ CONT BTR_CONT
MOV
Move
Source: N14:2 60
Dest: BT15:1.RLEN 60
BLOCK XFER READ CONT BTR_CONT
BTR
Block Transfer Read
Mod Type: 1771-??
Other BLK XFER Module
Rack: 2
Group: 2
Module: 0
Control Block: BT15:1
Data File: N11:0
Length: 60
Continuous: N
(EN)
(DN)
(ER)

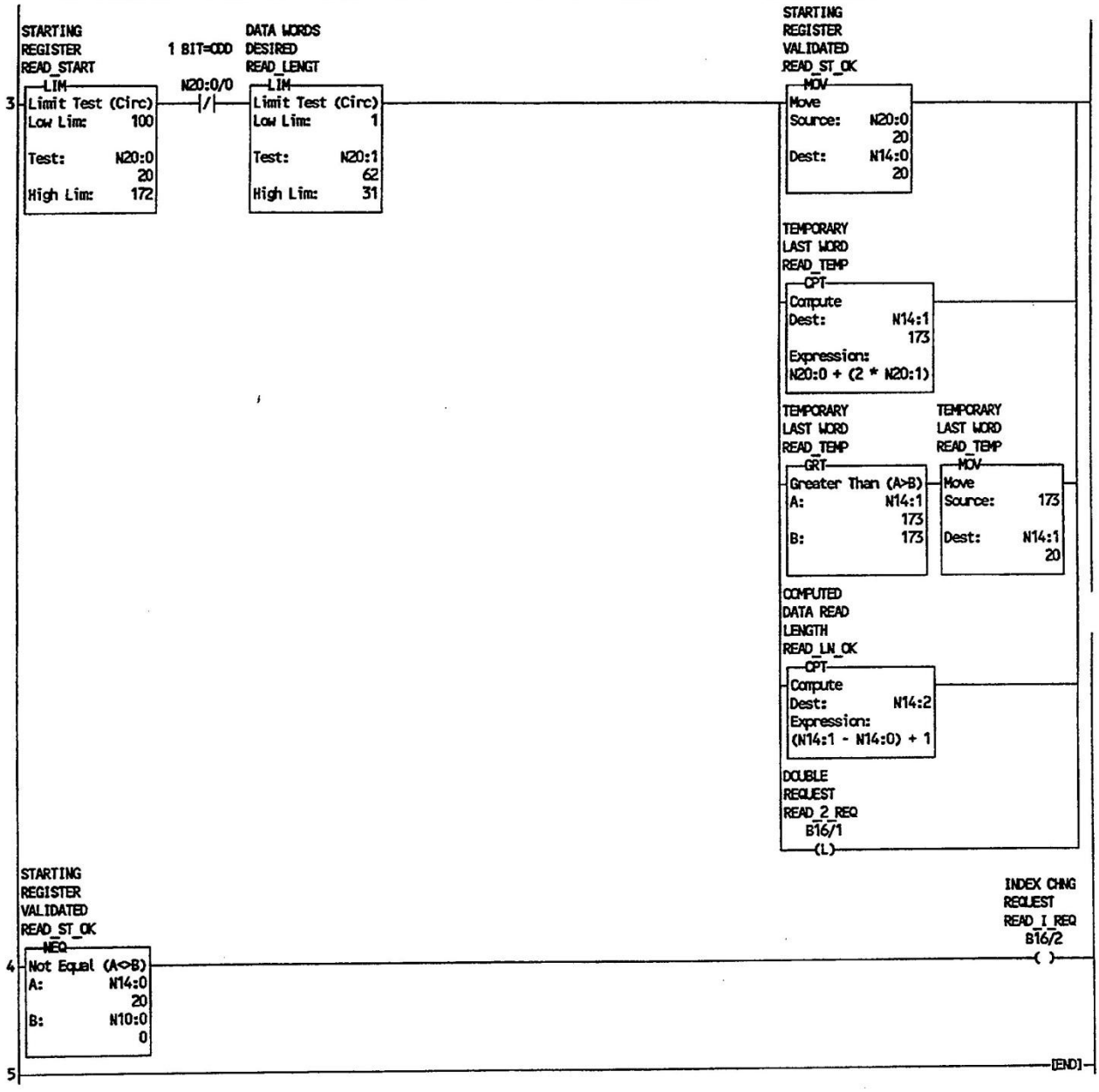

BLOCK XFER
READ CONT
BTR_CONT
BT15:1.DN
15
SINGLE
COMMAND
READ_1_CMD
B16/3
SINGLE REG
DATA READ
HANDLER
READ_1
JSR
Jump to Subroutine
Prog File #: U:7
Input Par:
Return Par:
DOUBLE
COMMAND
READ_2_CMD
B16/4
DOUBLE REG
DATA READ
TRANSFER
READ_2
JSR
Jump to Subroutine
Prog File #: U:8
Input Par:
Return Par:
DATA WRITE
POINTER
WRITE_PTR
MOV
Move
Source: N11:0
65
Dest: N10:0
0
BLOCK XFER
READ CONT
BTR_CONT
BT15:1.DN
(U)
READ/WRITE
COMMAND
R\W_CMD
B16/32
(U)
16
[END]

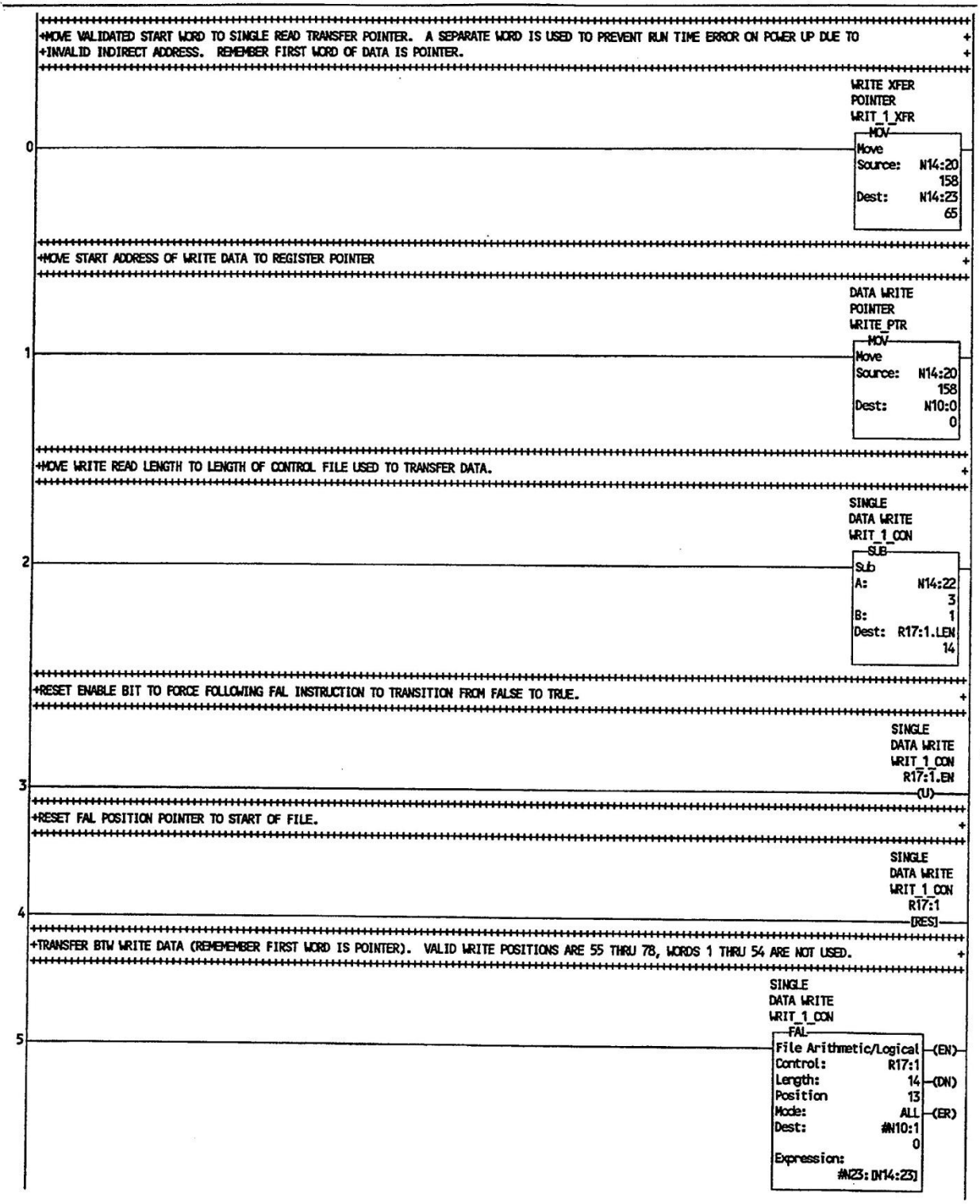

0
SINGLE REQUEST WRIT_1_REQ B16/16 (U)
1
DOUBLE REQUEST WRIT_2_REQ B16/17 (U)
2
STARTING REGISTER WRIT_START
LIM Limit Test (Circ) Low Lim: 55 Test: N20:2 158 High Lim: 78
DATA WORDS DESIRED WRIT_LENGT
LIM Limit Test (Circ) Low Lim: 1 Test: N20:3 1 High Lim: 24
STARTING REGISTER VALIDATED WRIT_ST_OK
MOV Move Source: N20:2 158 Dest: N14:20 158
TEMPORARY LAST WORD WRIT_TEMP
ADD Add A: N20:2 158 B: N20:3 1 Dest: N14:21 160
TEMPORARY LAST WORD WRIT_TEMP
GRT Greater Than (A>B) A: N14:21 160 B: 79
TEMPORARY LAST WORD WRIT_TEMP
MOV Move Source: 79 Dest: N14:21 160
COMPUTED DATA WRITE LENGTH WRIT_LN_OK
CPT Compute Dest: N14:22 Expression: (N14:21 - N14:20) + 1
SINGLE REQUEST WRIT_1_REQ B16/16 (L)


STARTING REGISTER WRIT_START
LIM
Limit Test (Circ)
Low Lim: 158
Test: N20:2 158
High Lim: 172
1 BIT=CDD
N20:2/0
DATA WORDS DESIRED WRIT_LENGT
LIM
Limit Test (Circ)
Low Lim: 1
Test: N20:3 1
High Lim: 8
STARTING REGISTER VALIDATED WRIT_ST_OK
MOV
Move
Source: N20:2 158
Dest: N14:20 158
TEMPORARY LAST WORD WRIT_TEMP
CPT
Compute
Dest: N14:21 173
Expression:
N20:2 + (2 * N20:3)
TEMPORARY LAST WORD WRIT_TEMP
GRT
Greater Than (A>B)
A: N14:21 173
B: 173
TEMPORARY LAST WORD WRIT_TEMP
MOV
Move
Source: 173
Dest: N14:21 158
COMPUTED DATA WRITE LENGTH WRIT_LN_OK
CPT
Compute
Dest: N14:22
Expression:
(N14:21 - N14:20) + 1
DOUBLE REQUEST WRIT_2_REQ B16/17
(L)
4
+CALL SINGLE WORD REGISTER DATA TRANSFER TO BLOCK TRANSFER WRITE FILE
SINGLE REQUEST WRIT_1_REQ B16/16
TRANSFER SINGLE REG DATA WRITE_1
JSR
Jump to Subroutine
Prog File #: U:5
Input Par:
Return Par:
5
+CALL DOUBLE WORD REGISTER DATA TRANSFER TO BLOCK TRANSFER WRITE FILE
DOUBLE REQUEST WRIT_2_REQ B16/17
TRANSFER DOUBLE REG DATA WRITE_2
JSR
Jump to Subroutine
Prog File #: U:6
Input Par:
Return Par:

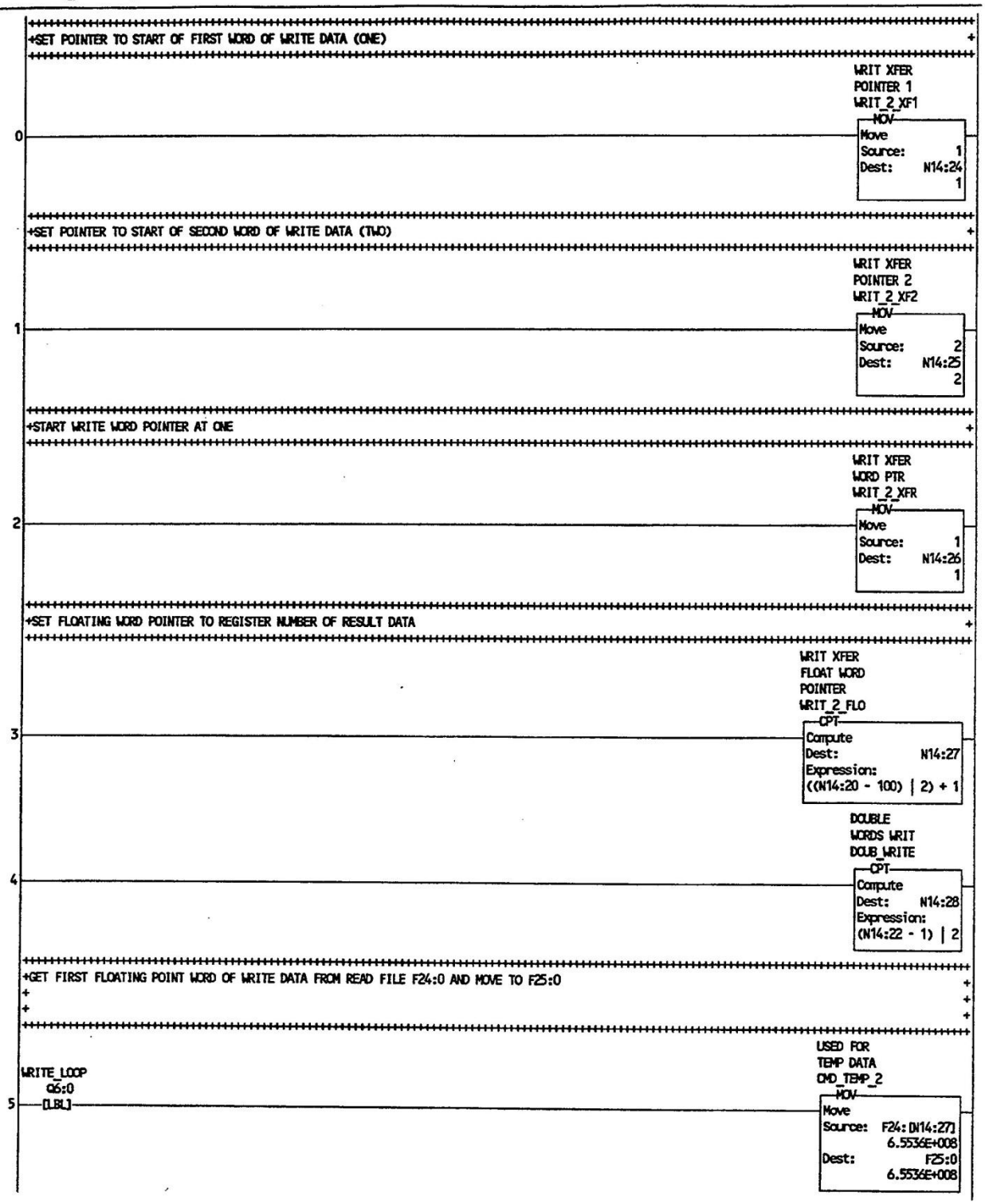
6 —— END

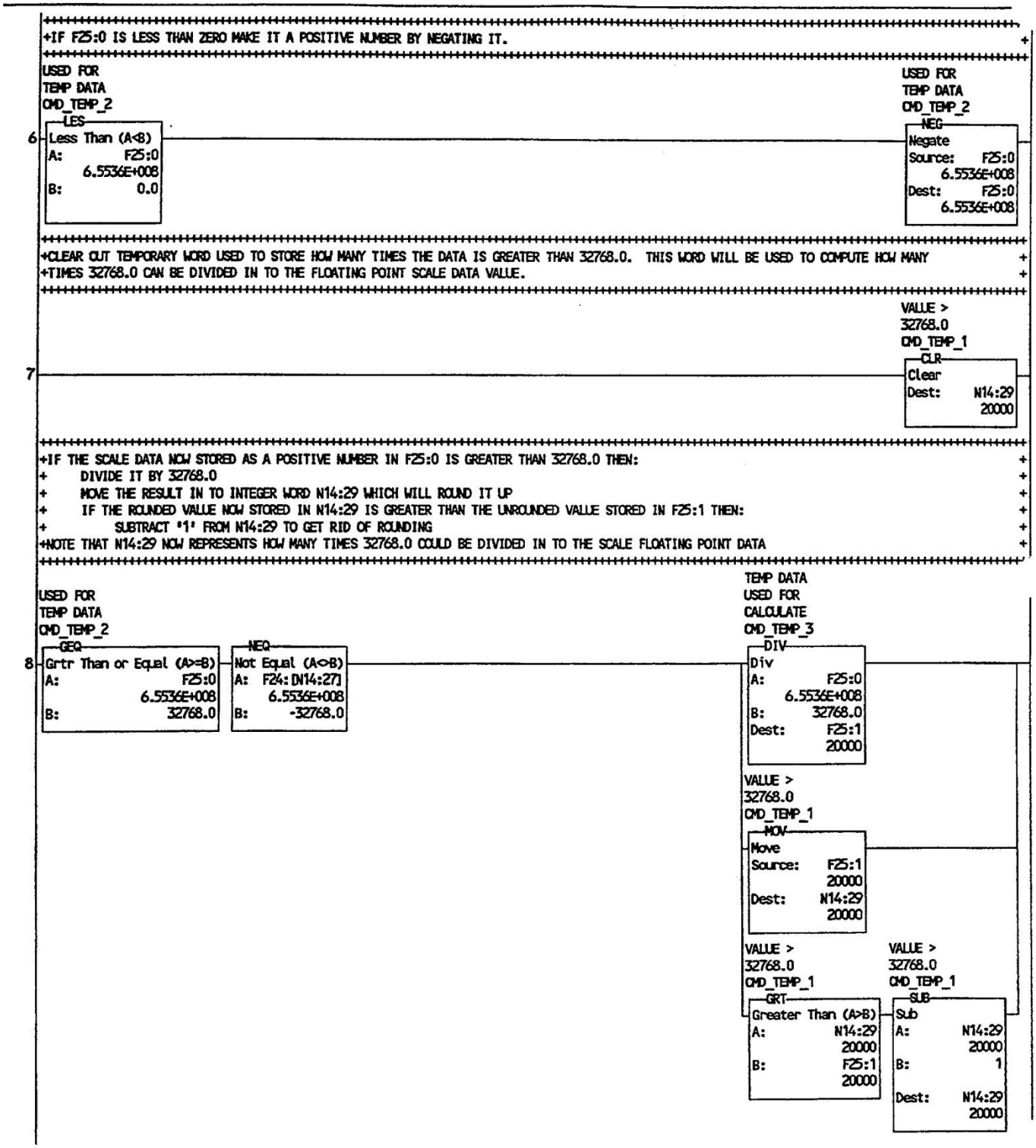

SINGLE REQUEST READ_1_REQ B16/0 (U)
DOUBLE REQUEST READ_2_REQ B16/1 (U)
STARTING REGISTER READ_START
LIM Limit Test (Circ) Low Lim: 1 Test: N20:0 20 High Lim: 78
DATA WORDS DESIRED READ_LENGT
LIM Limit Test (Circ) Low Lim: 1 Test: N20:1 62 High Lim: 62
STARTING REGISTER VALIDATED READ_ST_OK
MOV Move Source: N20:0 20 Dest: N14:0 20
TEMPORARY LAST WORD READ_TEMP
ADD Add A: N20:0 20 B: N20:1 62 Dest: N14:1 79
TEMPORARY LAST WORD READ_TEMP
GRT Greater Than (A>B) A: N14:1 79 B: 79
TEMPORARY LAST WORD READ_TEMP
MOV Move Source: 79 Dest: N14:1 79
COMPUTED DATA READ LENGTH READ_LN_OK
CPT Compute Dest: N14:2 3 Expression: (N14:1 - N14:0) + 1
SINGLE REQUEST READ_1_REQ B16/0 (L)

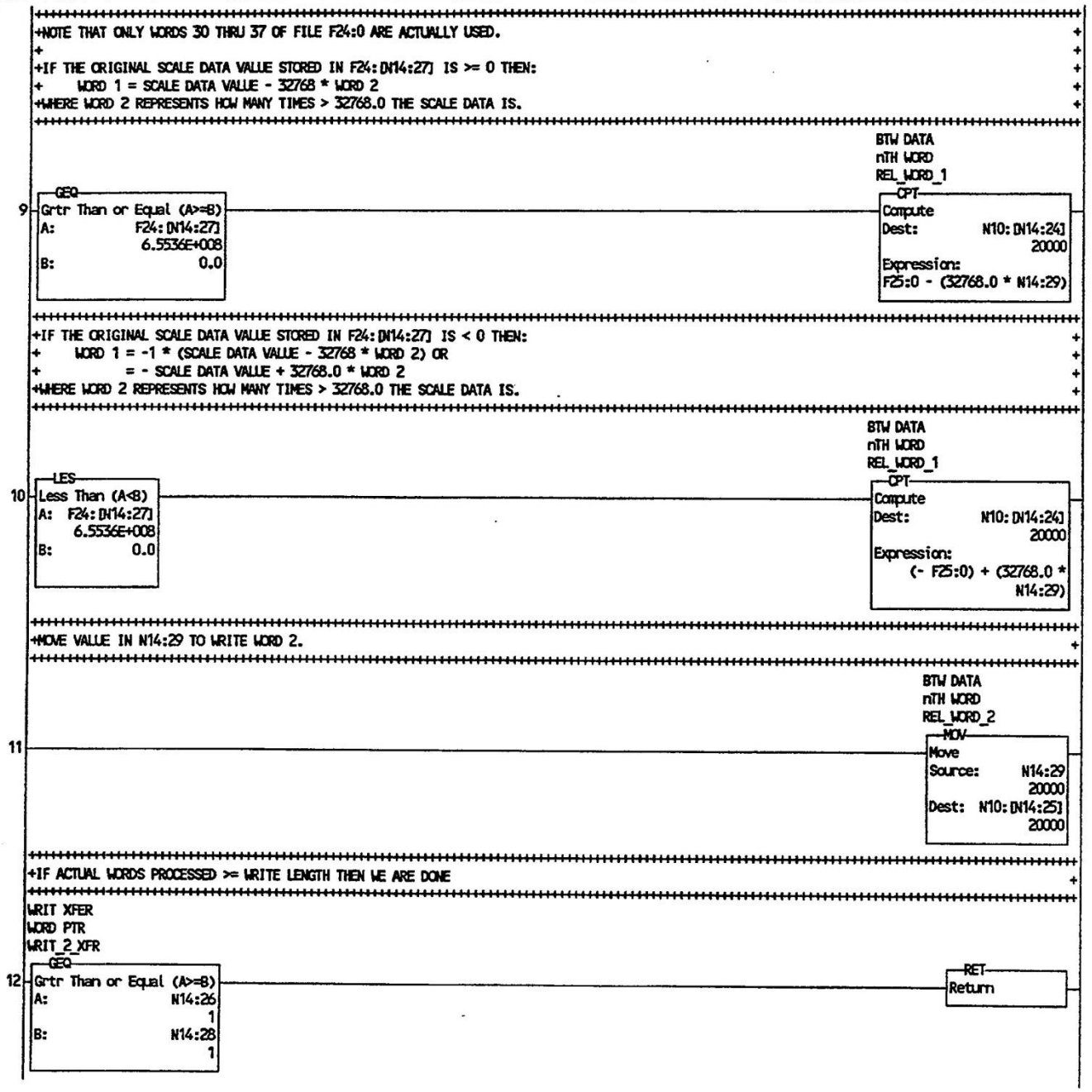

3
STARTING REGISTER READ_START
LIM
Limit Test (Circ)
Low Lim: 100
Test: N20:0 20
High Lim: 172
1 BIT=ODD N20:0/0
DATA WORDS DESIRED READ_LENGT
LIM
Limit Test (Circ)
Low Lim: 1
Test: N20:1 62
High Lim: 31
STARTING REGISTER VALIDATED READ_ST_OK
MOV
Move
Source: N20:0 20
Dest: N14:0 20
TEMPORARY LAST WORD READ_TEMP
CPT
Compute
Dest: N14:1 173
Expression: N20:0 + (2 * N20:1)
TEMPORARY LAST WORD READ_TEMP
GRT
Greater Than (A>B)
A: N14:1 173
B: 173
TEMPORARY LAST WORD READ_TEMP
MOV
Move
Source: 173
Dest: N14:1 20
COMPUTED DATA READ LENGTH READ_LN_OK
CPT
Compute
Dest: N14:2
Expression: (N14:1 - N14:0) + 1
DOUBLE REQUEST READ_2_REQ B16/1
(L)
4
STARTING REGISTER VALIDATED READ_ST_OK
NEQ
Not Equal (A<>B)
A: N14:0 20
B: N10:0 0
INDEX CHNG REQUEST READ_I_REQ B16/2
( )
5
[END]

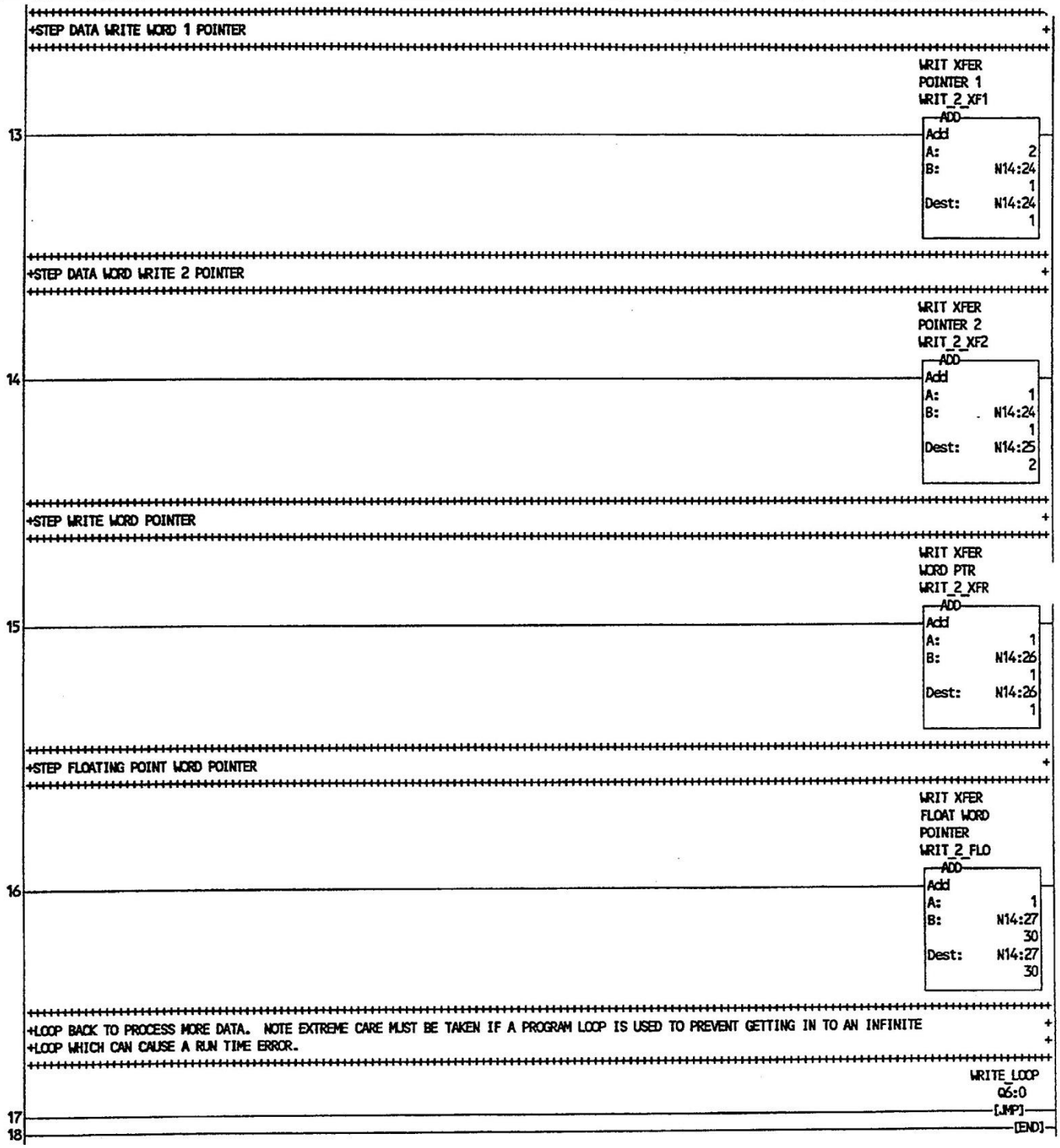

+MOVE VALIDATED START WORD TO SINGLE READ TRANSFER POINTER. A SEPARATE WORD IS USED TO PREVENT RUN TIME ERROR ON POWER UP DUE TO +INVALID INDIRECT ADDRESS. REMEMBER FIRST WORD OF DATA IS POINTER.
WRITE XFER POINTER WRIT_1_XFR
MOV
Move
Source: N14:20 158
Dest: N14:23 65
0
+MOVE START ADDRESS OF WRITE DATA TO REGISTER POINTER
DATA WRITE POINTER WRITE_PTR
MOV
Move
Source: N14:20 158
Dest: N10:0 0
1
+MOVE WRITE READ LENGTH TO LENGTH OF CONTROL FILE USED TO TRANSFER DATA.
SINGLE DATA WRITE WRIT_1_CON
SUB
Sub
A: N14:22 3
B: 1
Dest: R17:1.LEN 14
2
+RESET ENABLE BIT TO FORCE FOLLOWING FAL INSTRUCTION TO TRANSITION FROM FALSE TO TRUE.
SINGLE DATA WRITE WRIT_1_CON R17:1.EN
(U)
3
+RESET FAL POSITION POINTER TO START OF FILE.
SINGLE DATA WRITE WRIT_1_CON R17:1
[RES]
4
+TRANSFER BTW WRITE DATA (REMEMBER FIRST WORD IS POINTER). VALID WRITE POSITIONS ARE 55 THRU 78, WORDS 1 THRU 54 ARE NOT USED.
SINGLE DATA WRITE WRIT_1_CON
FAL
File Arithmetic/Logical (EN)
Control: R17:1
Length: 14 (DN)
Position 13
Mode: ALL (ER)
Dest: #N10:1 0
Expression: #N23:[N14:23]
5

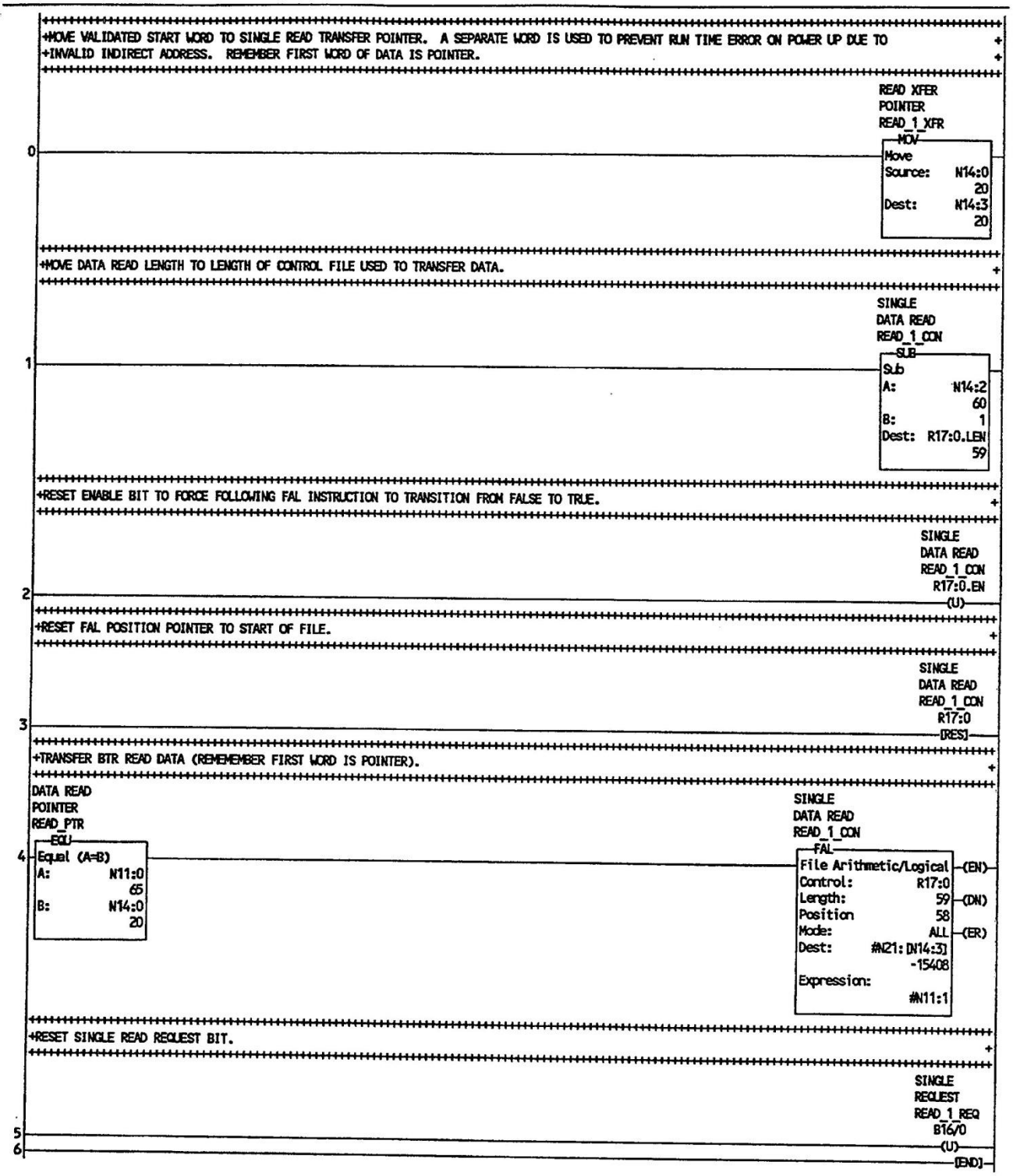
6 [END]

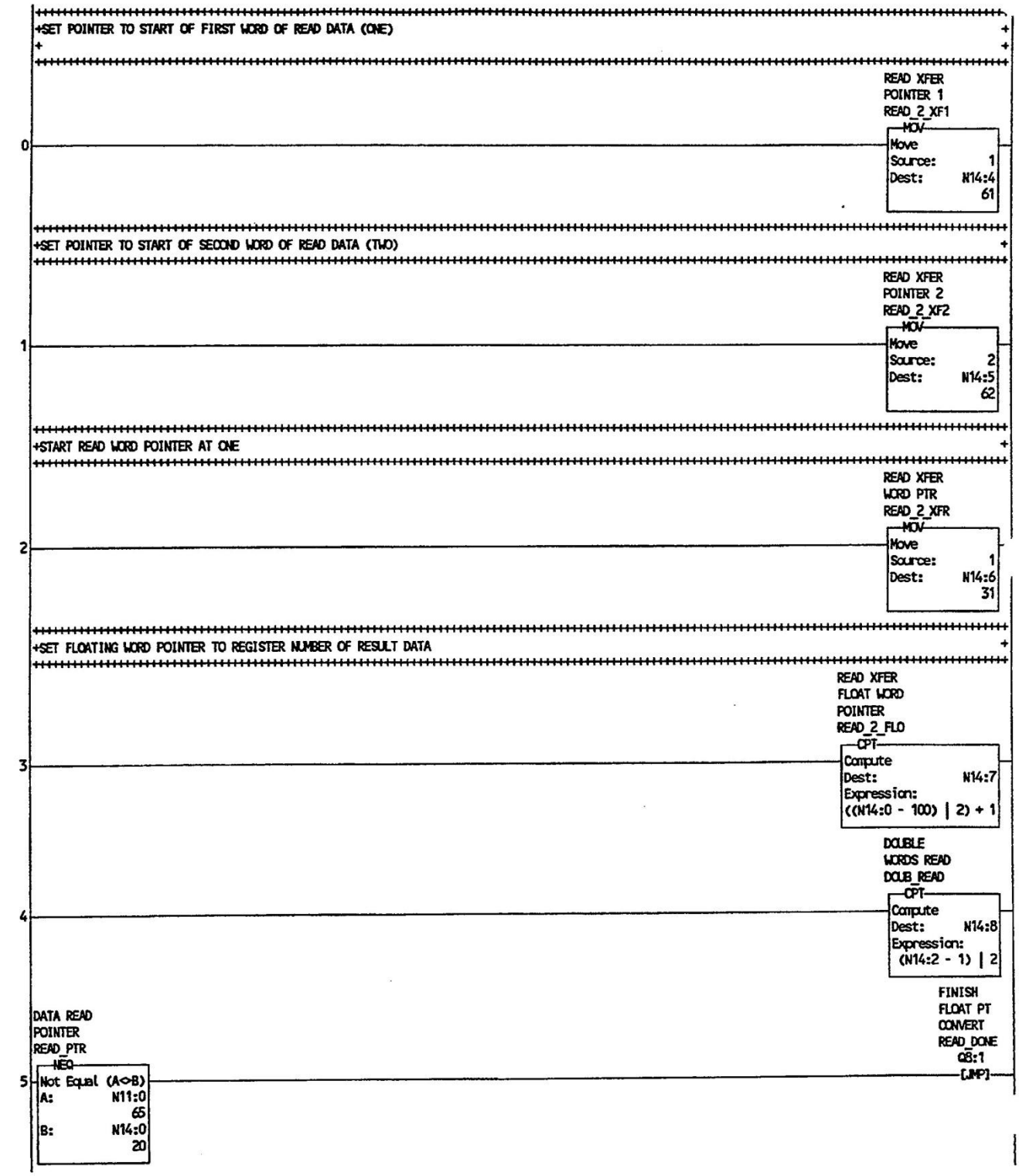

+SET POINTER TO START OF FIRST WORD OF WRITE DATA (ONE)
WRIT XFER
POINTER 1
WRIT_2_XF1
MOV
Move
Source: 1
Dest: N14:24
1
0
+SET POINTER TO START OF SECOND WORD OF WRITE DATA (TWO)
WRIT XFER
POINTER 2
WRIT_2_XF2
MOV
Move
Source: 2
Dest: N14:25
2
1
+START WRITE WORD POINTER AT ONE
WRIT XFER
WORD PTR
WRIT_2_XFR
MOV
Move
Source: 1
Dest: N14:26
1
2
+SET FLOATING WORD POINTER TO REGISTER NUMBER OF RESULT DATA
WRIT XFER
FLOAT WORD
POINTER
WRIT_2_FLO
CPT
Compute
Dest: N14:27
Expression:
((N14:20 - 100) | 2) + 1
3
DOUBLE
WORDS WRIT
DOUB_WRITE
CPT
Compute
Dest: N14:28
Expression:
(N14:22 - 1) | 2
4
+GET FIRST FLOATING POINT WORD OF WRITE DATA FROM READ FILE F24:0 AND MOVE TO F25:0
WRITE_LOOP
O6:0
LBL
USED FOR
TEMP DATA
CMD_TEMP_2
MOV
Move
Source: F24:[N14:27]
6.5536E+008
Dest: F25:0
6.5536E+008
5

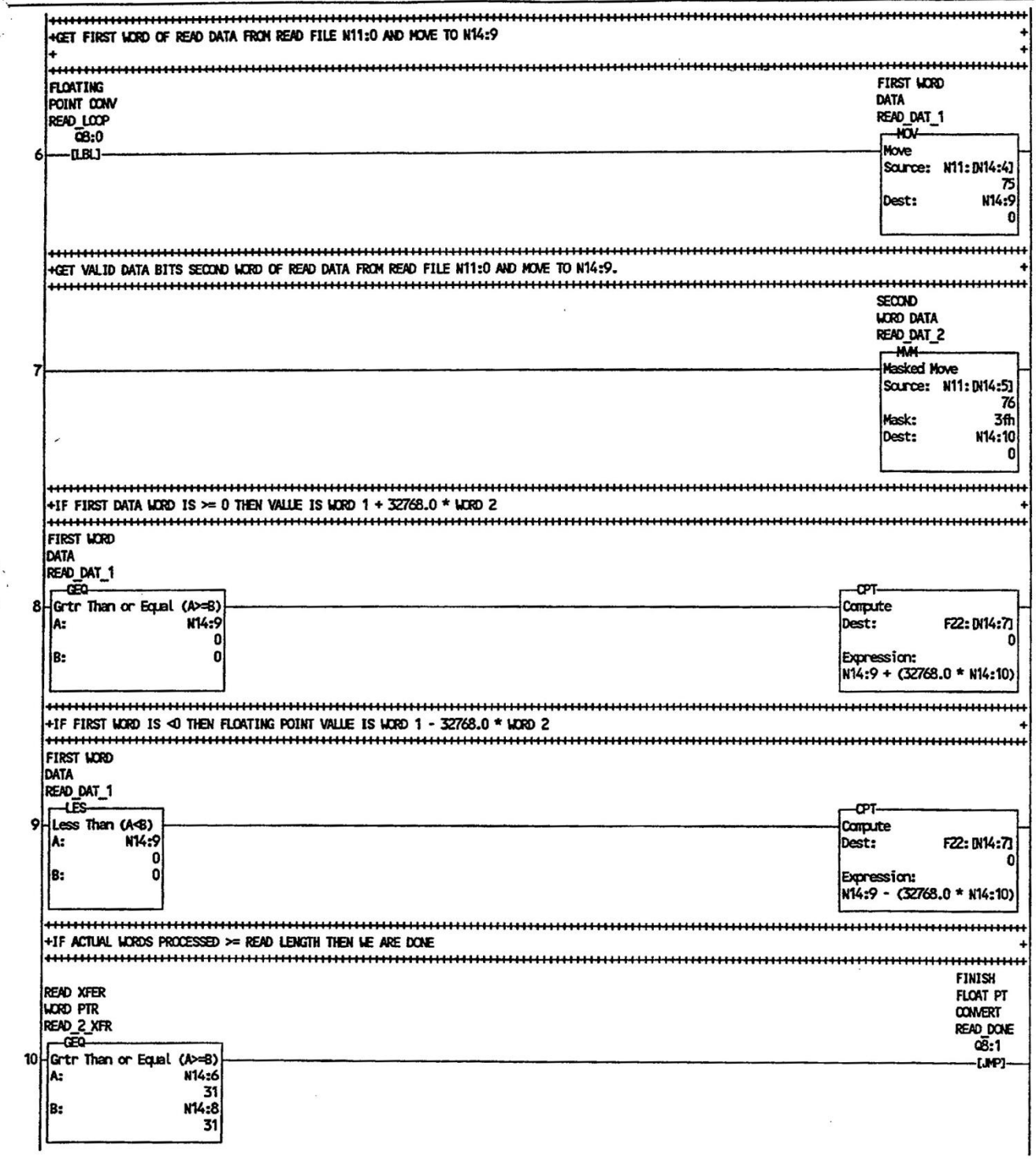

+IF F25:0 IS LESS THAN ZERO MAKE IT A POSITIVE NUMBER BY NEGATING IT.
USED FOR TEMP DATA CMD_TEMP_2
LES
Less Than (A<B)
A: F25:0 6.5536E+008
B: 0.0
6
USED FOR TEMP DATA CMD_TEMP_2
NEG
Negate
Source: F25:0 6.5536E+008
Dest: F25:0 6.5536E+008
+CLEAR OUT TEMPORARY WORD USED TO STORE HOW MANY TIMES THE DATA 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 > 32768.0 CMD_TEMP_1
CLR
Clear
Dest: N14:29 20000
7
+IF THE SCALE DATA NOW STORED AS A POSITIVE NUMBER IN F25:0 IS GREATER THAN 32768.0 THEN:
+ DIVIDE IT BY 32768.0
+ MOVE THE RESULT IN TO INTEGER WORD N14:29 WHICH WILL ROUND IT UP
+ IF THE ROUNDED VALUE NOW STORED IN N14:29 IS GREATER THAN THE UNROUNDED VALUE STORED IN F25:1 THEN:
+ SUBTRACT '1' FROM N14:29 TO GET RID OF ROUNDING
+NOTE THAT N14:29 NOW REPRESENTS HOW MANY TIMES 32768.0 COULD BE DIVIDED IN TO THE SCALE FLOATING POINT DATA
USED FOR TEMP DATA CMD_TEMP_2
GEQ
Grtr Than or Equal (A>=B)
A: F25:0 6.5536E+008
B: 32768.0
NEQ
Not Equal (A<>B)
A: F24:[N14:27] 6.5536E+008
B: -32768.0
8
TEMP DATA USED FOR CALCULATE CMD_TEMP_3
DIV
Div
A: F25:0 6.5536E+008
B: 32768.0
Dest: F25:1 20000
VALUE > 32768.0 CMD_TEMP_1
MOV
Move
Source: F25:1 20000
Dest: N14:29 20000
VALUE > 32768.0 CMD_TEMP_1
GRT
Greater Than (A>B)
A: N14:29 20000
B: F25:1 20000
VALUE > 32768.0 CMD_TEMP_1
SUB
Sub
A: N14:29 20000
B: 1
Dest: N14:29 20000

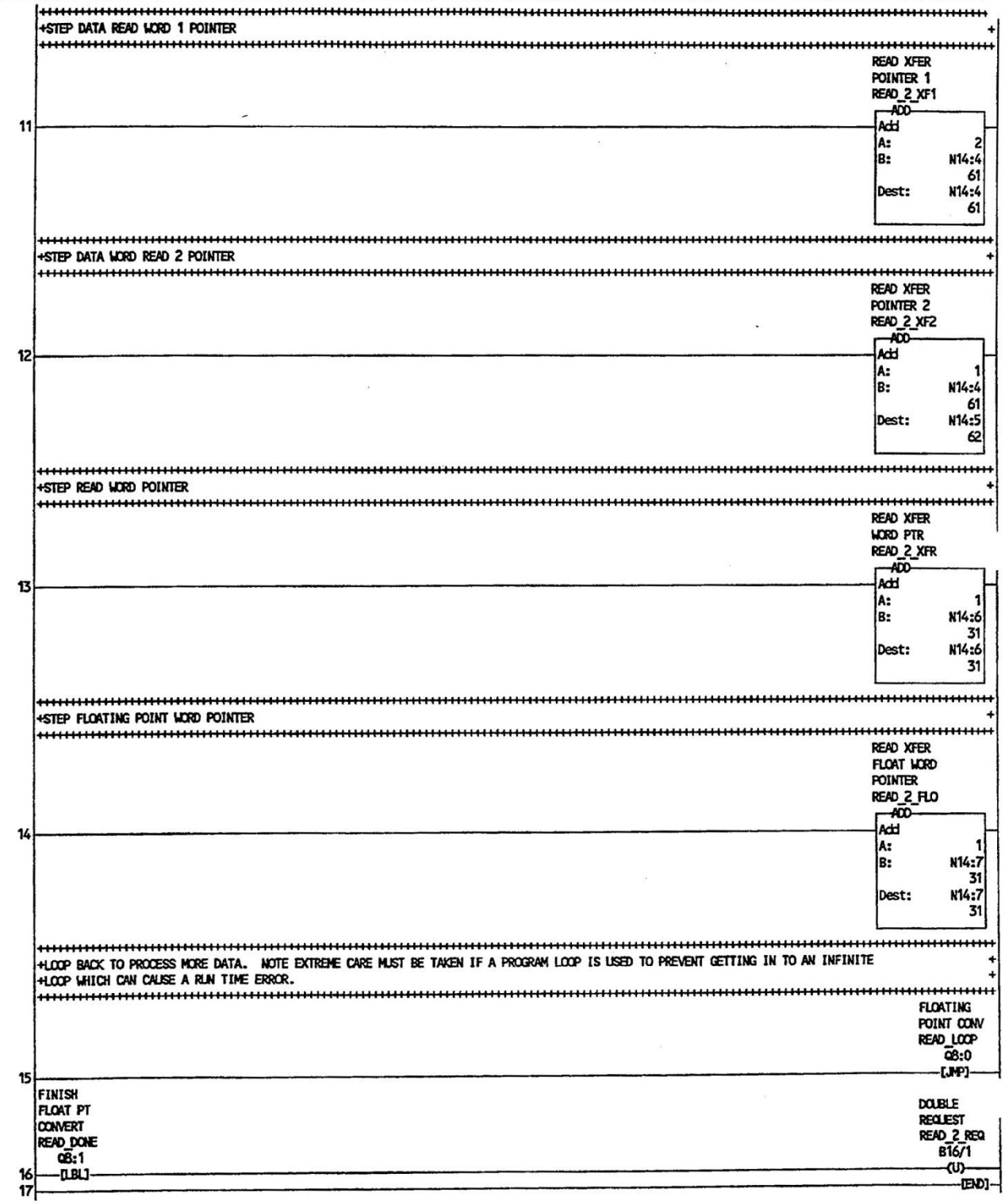

+NOTE THAT ONLY WORDS 30 THRU 37 OF FILE F24:0 ARE ACTUALLY USED.
+IF THE ORIGINAL SCALE DATA VALUE STORED IN F24:[N14:27] IS >= 0 THEN:
+ WORD 1 = SCALE DATA VALUE - 32768 * WORD 2
+WHERE WORD 2 REPRESENTS HOW MANY TIMES > 32768.0 THE SCALE DATA IS.
BTW DATA
nTH WORD
REL_WORD_1
9
GEQ
Grtr Than or Equal (A>=B)
A: F24:[N14:27]
6.5536E+008
B: 0.0
CPT
Compute
Dest: N10:[N14:24]
20000
Expression:
F25:0 - (32768.0 * N14:29)
+IF THE ORIGINAL SCALE DATA VALUE STORED IN F24:[N14:27] IS < 0 THEN:
+ WORD 1 = -1 * (SCALE DATA VALUE - 32768 * WORD 2) OR
+ = - SCALE DATA VALUE + 32768.0 * WORD 2
+WHERE WORD 2 REPRESENTS HOW MANY TIMES > 32768.0 THE SCALE DATA IS.
BTW DATA
nTH WORD
REL_WORD_1
10
LES
Less Than (A<B)
A: F24:[N14:27]
6.5536E+008
B: 0.0
CPT
Compute
Dest: N10:[N14:24]
20000
Expression:
(- F25:0) + (32768.0 *
N14:29)
+MOVE VALUE IN N14:29 TO WRITE WORD 2.
BTW DATA
nTH WORD
REL_WORD_2
11
MOV
Move
Source: N14:29
20000
Dest: N10:[N14:25]
20000
+IF ACTUAL WORDS PROCESSED >= WRITE LENGTH THEN WE ARE DONE
WRIT XFER
WORD PTR
WRIT_2_XFR
12
GEQ
Grtr Than or Equal (A>=B)
A: N14:26
1
B: N14:28
1
RET
Return


+STEP DATA WRITE WORD 1 POINTER
WRIT XFER
POINTER 1
WRIT_2_XF1
ADD
Add
A: 2
B: N14:24
1
Dest: N14:24
1
13
+STEP DATA WORD WRITE 2 POINTER
WRIT XFER
POINTER 2
WRIT_2_XF2
ADD
Add
A: 1
B: N14:24
1
Dest: N14:25
2
14
+STEP WRITE WORD POINTER
WRIT XFER
WORD PTR
WRIT_2_XFR
ADD
Add
A: 1
B: N14:26
1
Dest: N14:26
1
15
+STEP FLOATING POINT WORD POINTER
WRIT XFER
FLOAT WORD
POINTER
WRIT_2_FLO
ADD
Add
A: 1
B: N14:27
30
Dest: N14:27
30
16
+LOOP BACK TO PROCESS MORE DATA. NOTE EXTREME CARE MUST BE TAKEN IF A PROGRAM LOOP IS USED TO PREVENT GETTING IN TO AN INFINITE
+LOOP WHICH CAN CAUSE A RUN TIME ERROR.
WRITE_LOOP
O6:0
[JMP]
17
[END]
18


+MOVE VALIDATED START WORD TO SINGLE READ TRANSFER POINTER. A SEPARATE WORD IS USED TO PREVENT RUN TIME ERROR ON POWER UP DUE TO +INVALID INDIRECT ADDRESS. REMEMBER FIRST WORD OF DATA IS POINTER.
READ XFER POINTER READ_1_XFR
MOV
Move
Source: N14:0 20
Dest: N14:3 20
0
+MOVE DATA READ LENGTH TO LENGTH OF CONTROL FILE USED TO TRANSFER DATA.
SINGLE DATA READ READ_1_CON
SUB
Sub
A: N14:2 60
B: 1
Dest: R17:0.LEN 59
1
+RESET ENABLE BIT TO FORCE FOLLOWING FAL INSTRUCTION TO TRANSITION FROM FALSE TO TRUE.
SINGLE DATA READ READ_1_CON R17:0.EN
(U)
2
+RESET FAL POSITION POINTER TO START OF FILE.
SINGLE DATA READ READ_1_CON R17:0
[RES]
3
+TRANSFER BTR READ DATA (REMEMBER FIRST WORD IS POINTER).
DATA READ POINTER READ_PTR
EQU
Equal (A=B)
A: N11:0 65
B: N14:0 20
4
SINGLE DATA READ READ_1_CON
FAL
File Arithmetic/Logical
Control: R17:0
Length: 59
Position 58
Mode: ALL
Dest: #N21:[N14:3] -15408
Expression: #N11:1
(EN)
(DN)
(ER)
+RESET SINGLE READ REQUEST BIT.
SINGLE REQUEST READ_1_REQ B16/0
(U)
5
[END]
6


+SET POINTER TO START OF FIRST WORD OF READ DATA (ONE)
READ XFER POINTER 1 READ_2_XF1
MOV
Move
Source: 1
Dest: N14:4 61
0
+SET POINTER TO START OF SECOND WORD OF READ DATA (TWO)
READ XFER POINTER 2 READ_2_XF2
MOV
Move
Source: 2
Dest: N14:5 62
1
+START READ WORD POINTER AT ONE
READ XFER WORD PTR READ_2_XFR
MOV
Move
Source: 1
Dest: N14:6 31
2
+SET FLOATING WORD POINTER TO REGISTER NUMBER OF RESULT DATA
READ XFER FLOAT WORD POINTER READ_2_FLO
CPT
Compute
Dest: N14:7
Expression:
((N14:0 - 100) | 2) + 1
3
DOUBLE WORDS READ DOUB_READ
CPT
Compute
Dest: N14:8
Expression:
(N14:2 - 1) | 2
4
DATA READ POINTER READ_PTR
NEQ
Not Equal (A<>B)
A: N11:0 65
B: N14:0 20
FINISH FLOAT PT CONVERT READ_DONE
OSR:1
JMP
5


+GET FIRST WORD OF READ DATA FROM READ FILE N11:0 AND MOVE TO N14:9
FLOATING POINT CONV READ_LOOP
B3:0
6
[LBL]
FIRST WORD DATA READ_DAT_1
MOV
Move
Source: N11:[N14:4] 75
Dest: N14:9 0
+GET VALID DATA BITS SECOND WORD OF READ DATA FROM READ FILE N11:0 AND MOVE TO N14:9.
SECOND WORD DATA READ_DAT_2
MVM
Masked Move
Source: N11:[N14:5] 76
Mask: 3ffh
Dest: N14:10 0
7
+IF FIRST DATA WORD IS >= 0 THEN VALUE IS WORD 1 + 32768.0 * WORD 2
FIRST WORD DATA READ_DAT_1
GEQ
Grtr Than or Equal (A>=B)
A: N14:9 0
B: 0
8
CPT
Compute
Dest: F22:[N14:7] 0
Expression:
N14:9 + (32768.0 * N14:10)
+IF FIRST WORD IS <0 THEN FLOATING POINT VALUE IS WORD 1 - 32768.0 * WORD 2
FIRST WORD DATA READ_DAT_1
LES
Less Than (A<B)
A: N14:9 0
B: 0
9
CPT
Compute
Dest: F22:[N14:7] 0
Expression:
N14:9 - (32768.0 * N14:10)
+IF ACTUAL WORDS PROCESSED >= READ LENGTH THEN WE ARE DONE
READ XFER WORD PTR READ_2_XFR
GEQ
Grtr Than or Equal (A>=B)
A: N14:6 31
B: N14:8 31
10
FINISH FLOAT PT CONVERT READ_DONE
B3:1
[JMP]


+STEP DATA READ WORD 1 POINTER
READ XFER
POINTER 1
READ_2_XF1
ADD
Add
A: 2
B: N14:4
61
Dest: N14:4
61
11
+STEP DATA WORD READ 2 POINTER
READ XFER
POINTER 2
READ_2_XF2
ADD
Add
A: 1
B: N14:4
61
Dest: N14:5
62
12
+STEP READ WORD POINTER
READ XFER
WORD PTR
READ_2_XFR
ADD
Add
A: 1
B: N14:6
31
Dest: N14:6
31
13
+STEP FLOATING POINT WORD POINTER
READ XFER
FLOAT WORD
POINTER
READ_2_FLO
ADD
Add
A: 1
B: N14:7
31
Dest: N14:7
31
14
+LOOP BACK TO PROCESS MORE DATA. NOTE EXTREME CARE MUST BE TAKEN IF A PROGRAM LOOP IS USED TO PREVENT GETTING IN TO AN INFINITE
+LOOP WHICH CAN CAUSE A RUN TIME ERROR.
FLOATING
POINT CONV
READ_LOOP
B8:0
[JMP]
15
FINISH
FLOAT PT
CONVERT
READ_DONE
B8:1
[LBL]
16
DOUBLE
REQUEST
READ_2_REQ
B16/1
(U)
17
[END]

Number of Data Files:26

Name	Description	File	Type		Mode	Size:Elems	Words
		0	O	output	Global	128	128
		1	I	input	Global	128	128
		2	S	status	Global	128	128
		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
IOSTAT	I/O Status File	9	N	integer	Global	48	48
BTW_BUFFER	BLOCK TRANSFER WRITE BUFFER	10	N	integer	Global	64	64
BTR_BUFFER	BLOCK TRANSFER READ DATA BUFFER	11	N	integer	Global	64	64
FAULT_TMR	WATCHDOG FOR SCALE ACKNOWLDGEMENT	12	T	timer	Global	1	3
SCALE_INT	SCALE CONTROL INTEGER STORAGE	14	N	integer	Global	40	40
BLOCK_XFER	BLOCK DATA TRANSFER CONTROL	15	BT	Block Transfer	Global	2	12
SCALE_BITS	SCALE MISC STORAGE BITS	16	B	binary	Global	3	3
SCALE_CONT	SCALE FAL INSTRUCTION CONTROL WORDS	17	R	control	Global	2	6
SCALE_CMD	SCALE COMMAND PARAMETERS *USER ENTERED*	20	N	integer	Global	4	4
SING_READ	SINGLE WORD REGISTER READ FILE	21	N	integer	Global	79	79
DOUB_READ	DOUBLE WORD READ REGISTER FILE	22	F	float	Global	38	76
SING_WRIT	SINGLE WORD REGISTER WRITE *USER DATA*	23	N	integer	Global	79	79
DOUB_WRIT	DOUBLE WORD REGISTER WRITE *USER DATA*	24	F	float	Global	38	76
SCALE_FLO	MISC SCALE FLOATING POINT STORAGE	25	F	float	Global	2	4

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PLC-5 Data Base Form
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Data Base Form Sorted by:Address Page:00023

O:023/07	SCAN_ACK_O	OUTPT SCAN	ACKNOWLEDG			
I:000/00	READ_PB	USER PB OR	LOGIC BIT			
I:000/01	WRITE_PB	USER PB OR	LOGIC BIT			
I:000/02	FAULT_RES	USER PB OR	LOGIC BIT			
I:023/07	SCAN_ACK_I	INPUT SCAN	ACKNOWLEDG			
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		
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		
S:83		Main	control	program B	file	number
S:84		Program B	scan time			

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Data Base Form Sorted by:Address Page:00025

S:85		Program B	maximum	scan time		
S:86		Main	control	program C	file	number
N10:0	WRITE_PTR	DATA WRITE	POINTER			
N11:0	READ_PTR	DATA READ	POINTER			
T12:0	SCAN_WATCH	SCALE SCAN	ACKNOWLEDG	WATCHDOG		
N14:0	READ_ST_OK	STARTING	REGISTER	VALIDATED		
N14:1	READ_TEMP	TEMPORARY	LAST WORD			
N14:2	READ_LN_OK	COMPUTED	DATA READ	LENGTH		
N14:3	READ_1_XFR	READ XFER	POINTER			
N14:4	READ_2_XF1	READ XFER	POINTER 1			
N14:5	READ_2_XF2	READ XFER	POINTER 2			
N14:6	READ_2_XFR	READ XFER	WORD PTR			
N14:7	READ_2_FLO	READ XFER	FLOAT WORD	POINTER		
N14:8	DOUB_READ	DOUBLE	WORDS READ			
N14:9	READ_DAT_1	FIRST WORD	DATA			
N14:10	READ_DAT_2	SECOND	WORD DATA			
N14:20	WRIT_ST_OK	STARTING	REGISTER	VALIDATED		
N14:21	WRIT_TEMP	TEMPORARY	LAST WORD			
N14:22	WRIT_LN_OK	COMPUTED	DATA WRITE	LENGTH		
N14:23	WRIT_1_XFR	WRITE XFER	POINTER			
N14:24	WRIT_2_XF1	WRIT XFER	POINTER 1			
N14:25	WRIT_2_XF2	WRIT XFER	POINTER 2			
N14:26	WRIT_2_XFR	WRIT XFER	WORD PTR			
N14:27	WRIT_2_FLO	WRIT XFER	FLOAT WORD	POINTER		
N14:28	DOUB_WRITE	DOUBLE	WORDS WRIT			
N14:29	CMD_TEMP_1	VALUE >	32768.0			
B16:0	READ_CONT	READ BITS	(CONTROL)			
B16/0	READ_1_REQ	SINGLE	REQUEST			
B16/1	READ_2_REQ	DOUBLE	REQUEST			
B16/2	READ_I_REQ	INDEX CHNG	REQUEST			
B16/3	READ_1_CMD	SINGLE	COMMAND			
B16/4	READ_2_CMD	DOUBLE	COMMAND			
B16/5	CHNG_I_CMD	INDEX CHNG	COMMAND			
B16:1	WRIT_CONT	WRITE BITS	(CONTROL)			
B16/16	WRIT_1_REQ	SINGLE	REQUEST			
B16/17	WRIT_2_REQ	DOUBLE	REQUEST			
B16/20	WRIT_1_CMD	SINGLE	COMMAND			
B16/21	WRIT_2_CMD	DOUBLE	COMMAND			
B16:2	RW_CONT	MISC	CONTROL			
B16/32	RW_CMD	READ/WRITE	COMMAND			
R17:0	READ_1_CON	SINGLE	DATA READ			
R17:1	WRIT_1_CON	SINGLE	DATA WRITE			
N20:0	READ_START	STARTING	REGISTER			
N20:0/0		1 BIT=DDD				
N20:1	READ_LENGT	DATA WORDS	DESIRED			
N20:2	WRIT_START	STARTING	REGISTER			
N20:2/0		1 BIT=DDD				
N20:3	WRIT_LENGT	DATA WORDS	DESIRED			
F25:0	CMD_TEMP_2	USED FOR	TEMP DATA			
F25:1	CMD_TEMP_3	TEMP DATA	USED FOR	CALCULATE		
DFILE:009		IOSTAT	I/O Status	File		
DFILE:010		BTW_BUFFER	BLOCK TRAN	SFER WRITE	BUFFER	
DFILE:011		BTR_BUFFER	BLOCK TRAN	SFER READ	DATA BUFFE	R
DFILE:012		FAULT_TMR	WATCHDOG F	OR SCALE A	CKNOWLDGEM	ENT
DFILE:014		SCALE_INT	SCALE CONT	ROL INTEGE	R STORAGE	
DFILE:015		BLOCK_XFER	BLOCK DATA	TRANSFER	CONTROL	
DFILE:016		SCALE_BITS	SCALE MISC	STORAGE B	ITS	
DFILE:017		SCALE_CONT	SCALE FAL	INSTRUCTIO	N CONTROL	WORDS
DFILE:020		SCALE_CMD	SCALE COMM	AND PARAME	TERS *USER	ENTERED*
DFILE:021		SING_READ	SINGLE WOR	D REGISTER	READ FILE	
DFILE:022		DOUB_READ	DOUBLE WOR	D READ REG	ISTER FILE	
DFILE:023		SING_WRIT	SINGLE WOR	D REGISTER	WRITE *US	ER DATA*
DFILE:024		DOUB_WRIT	DOUBLE WOR	D REGISTER	WRITE *US	ER DATA*
DFILE:025		SCALE_FLO	MISC SCALE	FLOATING	POINT STOR	AGE
F24: [N14:24]	CMD_DATA	COMMAND	DATA nTH			
N10: [N14:24]	REL_WORD_1	BTW DATA	nTH WORD			
N10: [N14:25]	REL_WORD_2	BTW DATA	nTH WORD			
PFILE:003		SETUP FOR	DATA WRITE			

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PLC-5 Data Base Form
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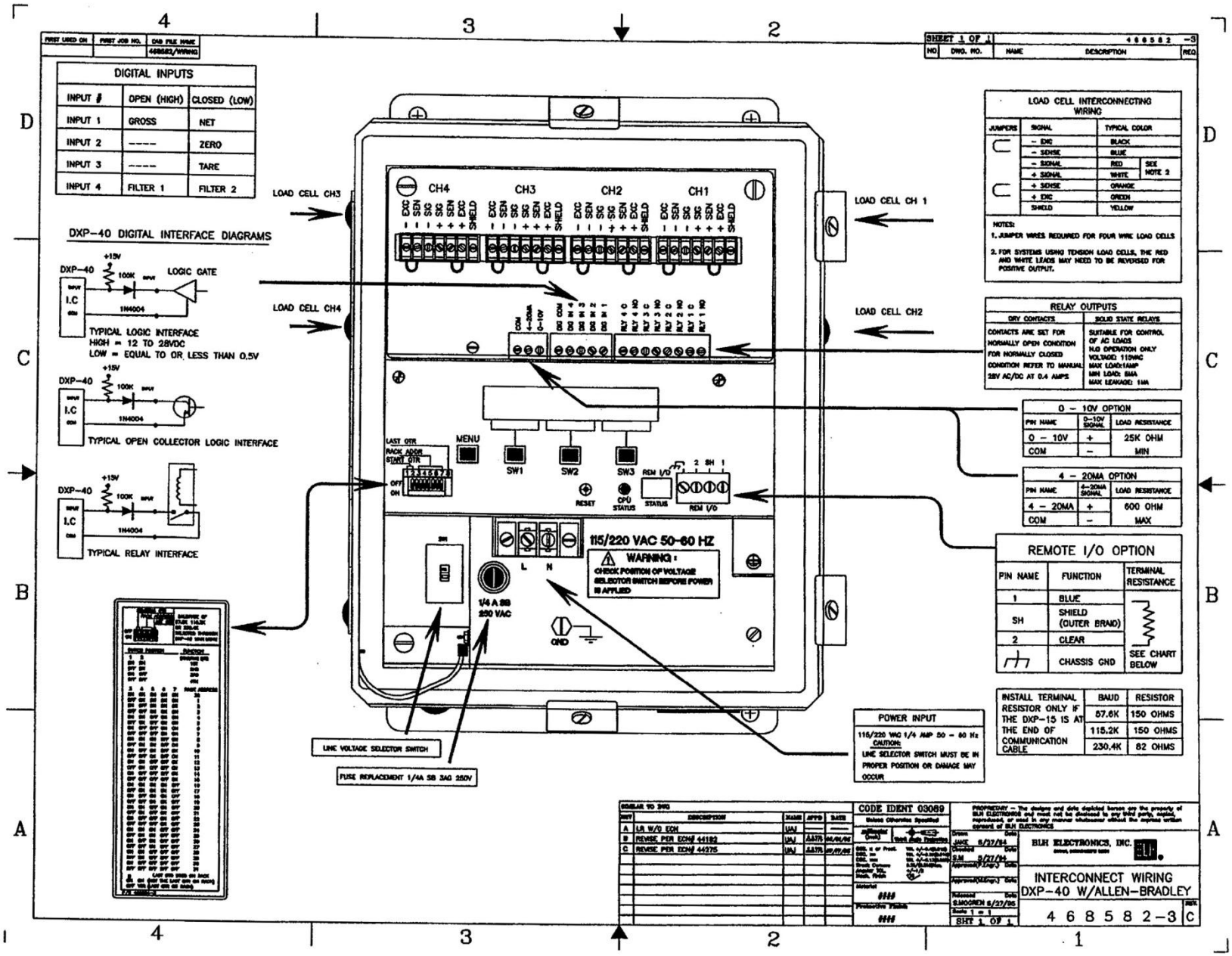
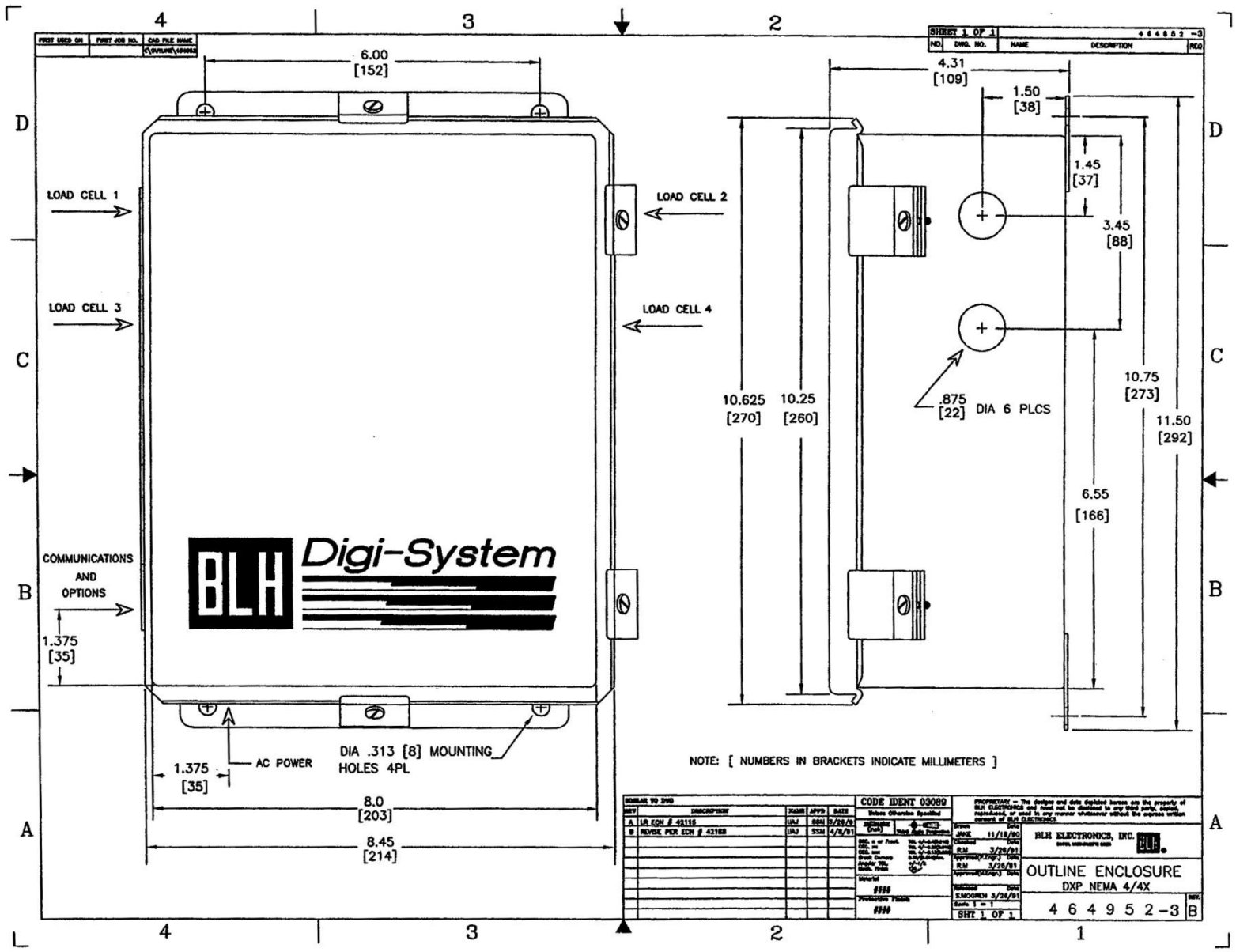
Data Base Form Sorted by:Address Page:00026

FILE:004		SETUP FOR	READING DA	TA		
FILE:005		TRANSFER D	ATA FOR SI	NGLE REGIS	TER WRITES	
FILE:006		TRANSFER D	ATA FOR SI	NGLE REGIS	TE WRITES	
FILE:007		TRANSFER D	ATA FOR SI	NGLE REGIS	TER READS	
FILE:008		TRANSFER D	ATA FOR DO	UBLE REGIS	TER READS	
Q6:0	WRITE_LOOP					
Q6:1						
Q8:0	READ_LOOP	FLOATING	POINT CONV			
Q8:1	READ_DONE	FINISH	FLOAT PT	CONVERT		
BT15:0	BTW_CONT	BLOCK XFER	WRITE CONT			
BT15:1	BTR_CONT	BLOCK XFER	READ CONT			
U:3	WRITE_DATA	VALIDATE	DATA ENTRY			
U:4	READ_DATA	VALIDATE	DATA ENTRY			
U:5	WRITE_1	TRANSFER	SINGLE	REG DATA		
U:6	WRITE_2	TRANSFER	DOUBLE	REG DATA		
U:7	READ_1	SINGLE REG	DATA READ	HANDLER		
U:8	READ_2	DOUBLE REG	DATA READ	TRANSFER		

APPENDIX A

Outline and Wiring Drawings


DIGITAL INPUTS
INPUT # | OPEN (HIGH) | CLOSED (LOW)
INPUT 1 | GROSS | NET
INPUT 2 | ----- | ZERO
INPUT 3 | ----- | TARE
INPUT 4 | FILTER 1 | FILTER 2
DXP-40 DIGITAL INTERFACE DIAGRAMS
TYPICAL LOGIC INTERFACE
HIGH = 12 TO 28VDC
LOW = EQUAL TO OR LESS THAN 0.5V
TYPICAL OPEN COLLECTOR LOGIC INTERFACE
TYPICAL RELAY INTERFACE
LOAD CELL CH3
LOAD CELL CH4
LOAD CELL CH 1
LOAD CELL CH2
CH4
CH3
CH2
CH1
EXC SEN SIG SIG SEN EXC SHIELD
MENU
SW1
SW2
SW3
RESET
CPU STATUS
STATUS
RDM I/O
115/220 VAC 50-60 HZ
WARNING :
CHECK POSITION OF VOLTAGE SELECTOR SWITCH BEFORE POWER IS APPLIED
1/4 A SB 250 VAC
GND
LINE VOLTAGE SELECTOR SWITCH
FUSE REPLACEMENT 1/4A SB 3AG 250V
LOAD CELL INTERCONNECTING WIRING
JUMPERS | SIGNAL | TYPICAL COLOR
- EXC BLACK
- SENSE BLUE
- SIGNAL RED SEE NOTE 2
+ SIGNAL WHITE
+ SENSE ORANGE
+ EXC GREEN
SHIELD YELLOW
NOTES:
1. JUMPER WIRES REQUIRED FOR FOUR WIRE LOAD CELLS
2. FOR SYSTEMS USING TENSION LOAD CELLS, THE RED AND WHITE LEADS MAY NEED TO BE REVERSED FOR POSITIVE OUTPUT.
RELAY OUTPUTS
DRY CONTACTS | SOLID STATE RELAYS
CONTACTS ARE SET FOR NORMALLY OPEN CONDITION FOR NORMALLY CLOSED CONDITION REFER TO MANUAL 28V AC/DC AT 0.4 AMPS
SUITABLE FOR CONTROL OF AC LOADS N.O. OPERATION ONLY VOLTAGE: 110VAC MAX LOAD:1AMP MIN LOAD: 5MA MAX LEAKAGE: 1MA
0 - 10V OPTION
PIN NAME | 0-10V SIGNAL | LOAD RESISTANCE
0 - 10V | + | 25K OHM
COM | - | MIN
4 - 20MA OPTION
PIN NAME | 4-20MA SIGNAL | LOAD RESISTANCE
4 - 20MA | + | 600 OHM
COM | - | MAX
REMOTE I/O OPTION
PIN NAME | FUNCTION | TERMINAL RESISTANCE
1 | BLUE
SH | SHIELD (OUTER BRAID)
2 | CLEAR
CHASSIS GND
SEE CHART BELOW
INSTALL TERMINAL RESISTOR ONLY IF THE DXP-15 IS AT THE END OF COMMUNICATION CABLE
BAUD | RESISTOR
57.6K | 150 OHMS
115.2K | 150 OHMS
230.4K | 82 OHMS
POWER INPUT
115/220 VAC 1/4 AMP 50 - 60 Hz
CAUTION:
LINE SELECTOR SWITCH MUST BE IN PROPER POSITION OR DAMAGE MAY OCCUR
SHEET 1 OF 1
NO | DWG. NO. | NAME | DESCRIPTION | REQ
A LR W/O ECN
B REVISE PER ECN# 44182
C REVISE PER ECN# 44375
CODE IDENT 03089
BLH ELECTRONICS, INC.
INTERCONNECT WIRING
DXP-40 W/ALLEN-BRADLEY
4 6 8 5 8 2 - 3 C
SHT 1 OF 1


6.00
[152]
LOAD CELL 1
LOAD CELL 2
LOAD CELL 3
LOAD CELL 4
COMMUNICATIONS
AND
OPTIONS
1.375
[35]
BLH Digi-System
AC POWER
1.375
[35]
DIA .313 [8] MOUNTING
HOLES 4PL
8.0
[203]
8.45
[214]
4.31
[109]
1.50
[38]
1.45
[37]
3.45
[88]
10.625
[270]
10.25
[260]
.875
[22] DIA 6 PLCS
10.75
[273]
11.50
[292]
6.55
[166]
NOTE: [NUMBERS IN BRACKETS INDICATE MILLIMETERS]
SHEET 1 OF 1
NO. DWG. NO. NAME DESCRIPTION REQ
4 6 4 9 5 2 -3
CODE IDENT 03089
BLH ELECTRONICS, INC.
OUTLINE ENCLOSURE
DXP NEMA 4/4X
4 6 4 9 5 2 -3
B
SHT 1 OF 1

BLH

3 Edgewater Drive
Norwood, MA 02062 U.S.A
Phone (781) 298-2200
Fax (781) 762-3988
www.vishaypg.com