

2. To: (Receiving Organization) DISTRIBUTION		3. From: (Originating Organization) F. M. Maiden		4. Related EDT No.: N/A							
5. Proj./Prog./Dept./Div.: Interim Stabilization		6. Design Authority/Design Agent/Cog. Engr.: W. F. Zuroff/J. Lamphere		7. Purchase Order No.: N/A							
8. Originator Remarks:  Transmitted for release of the S-106 Skid "B" Software. This Documents Changes to the PLC Software Made Since the Completion of the OTP and Prior to the Release of the Software Configuration Management Plan (HNF-5034).				9. Equip./Component No.: N/A							
				10. System/Bldg./Facility: Single Shell Tank Farm							
				12. Major Assem. Dwg. No.: N/A							
				13. Permit/Permit Application No.: N/A							
11. Receiver Remarks:  11A. Design Baseline Document? <input checked="" type="radio"/> Yes <input type="radio"/> No				14. Required Response Date: N/A							
15. DATA TRANSMITTED											
(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	(F) Approval Designator	(G) Reason for Trans- mittal	(H) Origina- tor Dispo- sition	(I) Receiv- er Dispo- sition			
1	RPP-5961	ALL	0	S-106 Skid "B" PLC Software (Ladder Diagram)	N/A	1	1	1			
16. KEY											
Approval Designator (F)		Reason for Transmittal (G)			Disposition (H) & (I)						
E, S, Q, D OR N/A (See WHC-CM-3-5, Sec. 12.7)		1. Approval 2. Release 3. Information 4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)			1. Approved 2. Approved w/comment 3. Disapproved w/comment		4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged				
17. SIGNATURE/DISTRIBUTION (See Approval Designator for required signatures)											
(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN
2		Design Authority W. F. Zuroff	<i>[Signature]</i>	3/14/00	57-24						
2		Design Agent F. M. Maiden	<i>[Signature]</i>	3/14/00	57-24						
2		Cog. Eng. J. E. Lamphere	<i>[Signature]</i>	3/14/00	57-24						
2		Cog. Mgr. M. R. Koch	<i>[Signature]</i>	3/14/00	57-24						
		QA									
		Safety									
		Env.									
18. <i>[Signature]</i> FM Maiden Signature of EDT Originator			19. <i>[Signature]</i> MR Koch Authorized Representative for Receiving Organization			20. <i>[Signature]</i> MR Koch Design Authority/ Cognizant Manager			21. DOE APPROVAL (if required) Ctrl No. _____ <input type="radio"/> Approved <input type="radio"/> Approved w/comments <input type="radio"/> Disapproved w/comments		
3/14/00 Date			3/14/00 Date			3/14/00 Date					

by 3/23/00

# PLC SOFTWARE PROGRAM FOR S-106 PUMPING, INSTRUMENTATION AND CONTROL (PIC) SKID "B"

**Mike Koch**

Prepared by CH2MHILL Hanford Group, Inc.

Richland, WA 99352

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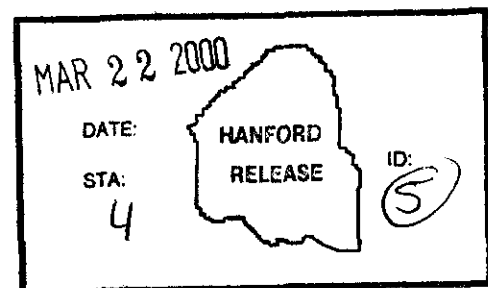
**Key Words:** S-106, SALT WELL, SOFTWARE, LADDER DIAGRAM, PLC, SKID,  
INTERIM STABILIZATION, PIC

**Abstract:** This document is a printout of the S-106 software for the Programmable Logic Controller (PLC) for Pumping, Instrumentation and Control Skid "B".

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Release Approval Date 3/24/00



Release Stamp

**Approved For Public Release**

**S106NEW.RSS**

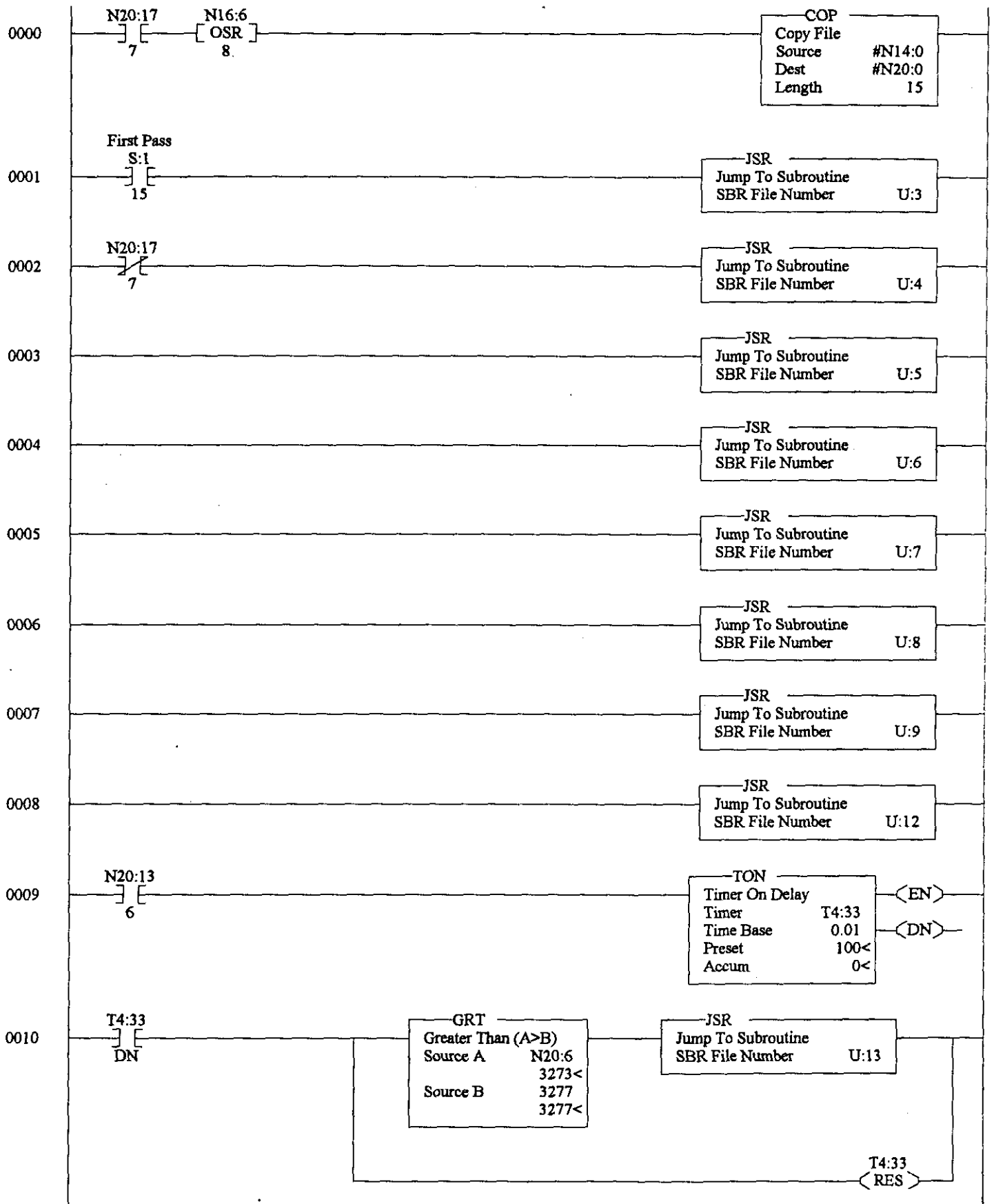
## Program File List

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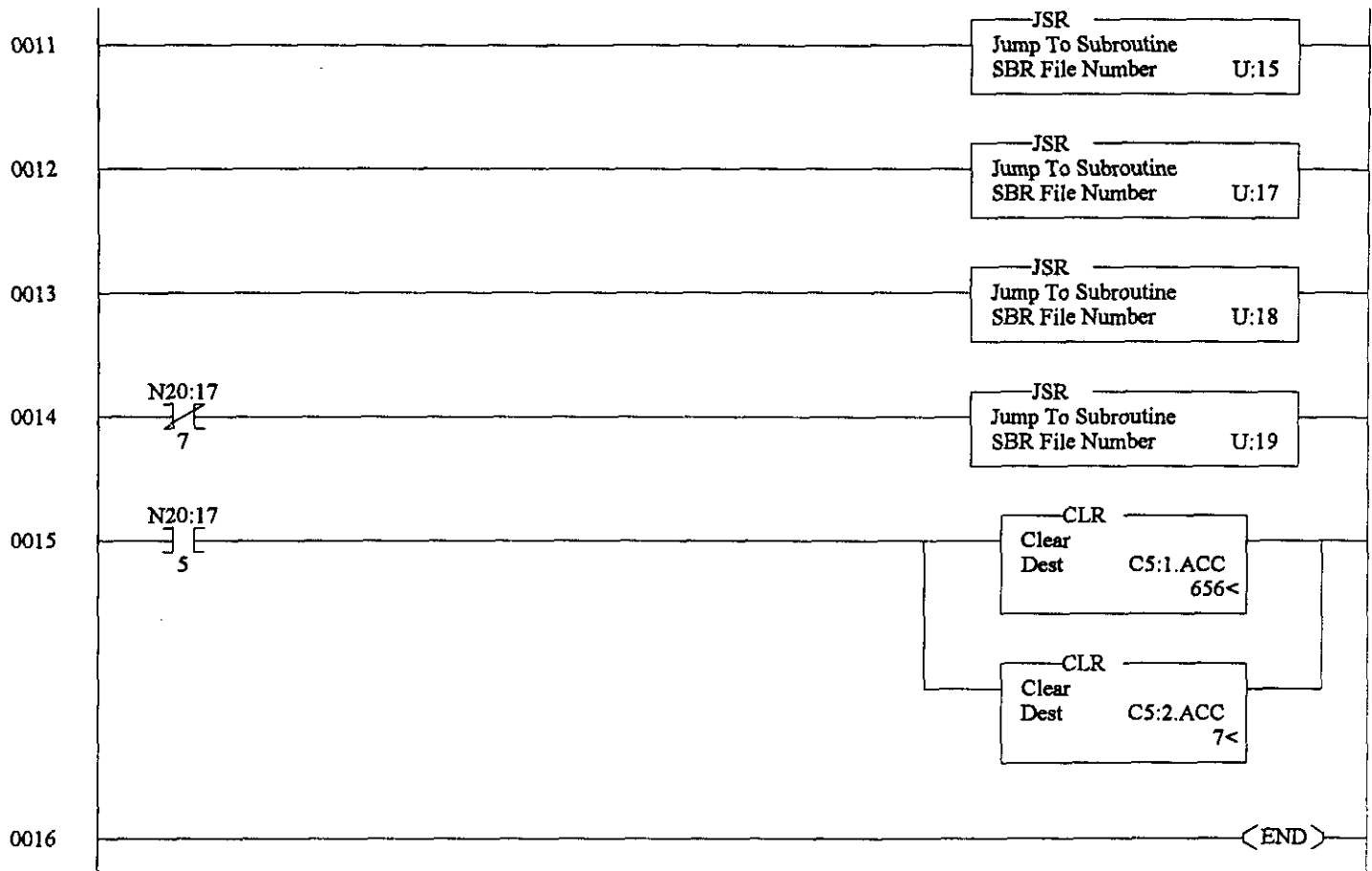
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	3	LADDER	16	No	344
	4	LADDER	6	No	275
	5	LADDER	119	No	3623
	6	LADDER	7	No	353
	7	LADDER	20	No	468
	8	LADDER	6	No	197
	9	LADDER	6	No	140
	10	LADDER	11	No	94
	11	LADDER	3	No	43
	12	LADDER	10	No	447
	13	LADDER	6	No	212
	14	LADDER	11	No	1688
	15	LADDER	16	No	329
	16	LADDER	6	No	212
	17	LADDER	66	No	1031
	18	LADDER	70	No	1556
	19	LADDER	7	No	139

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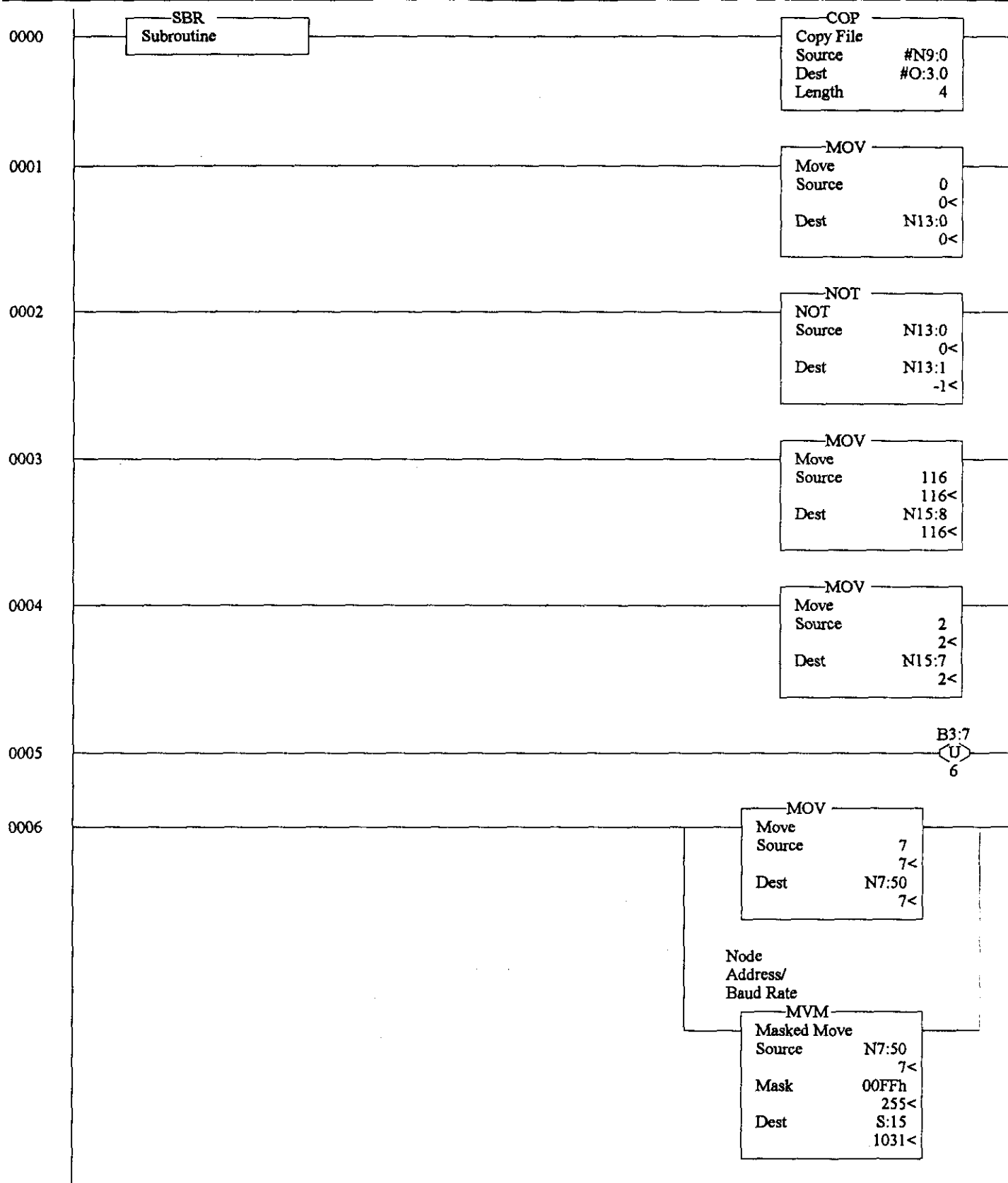
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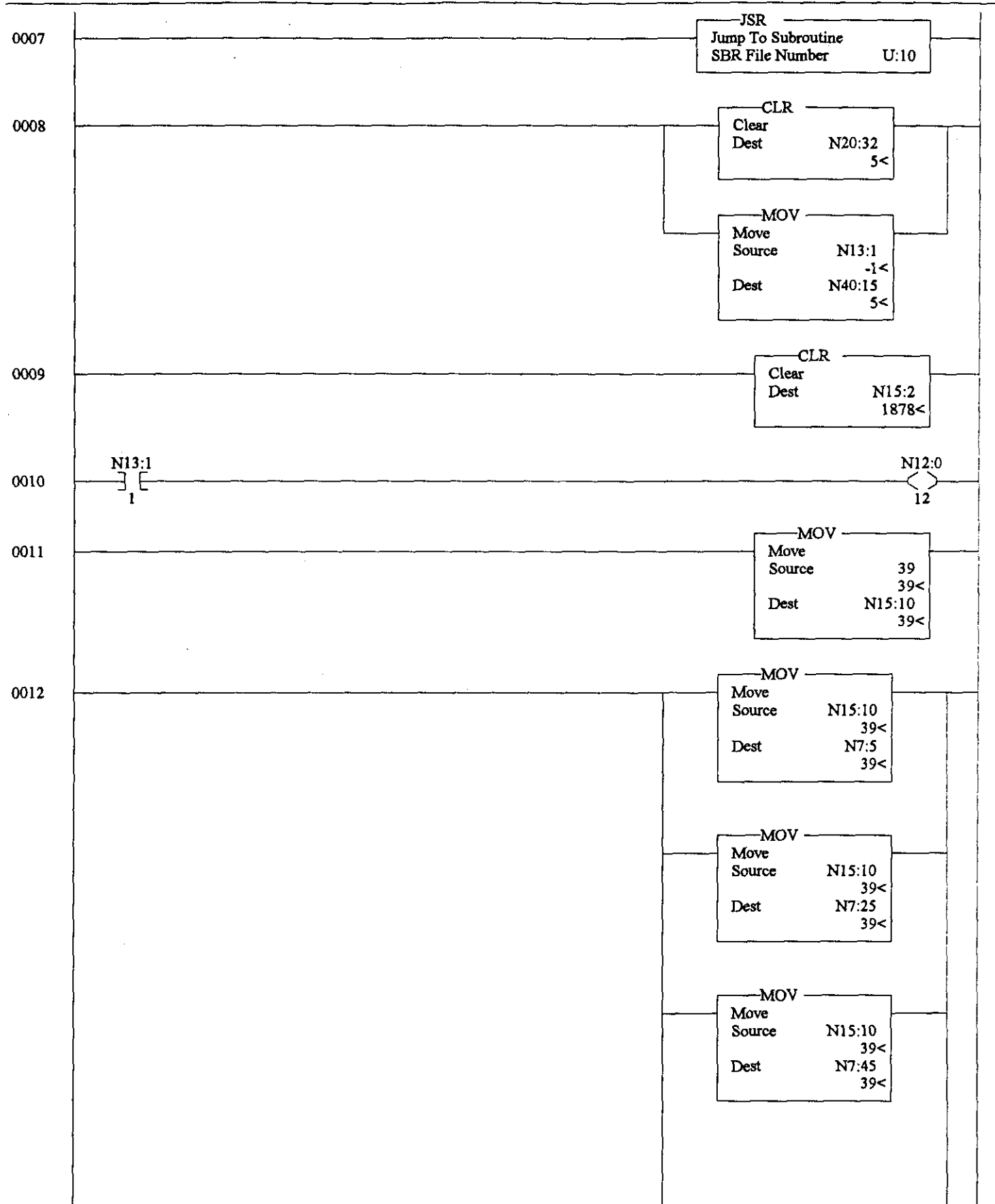


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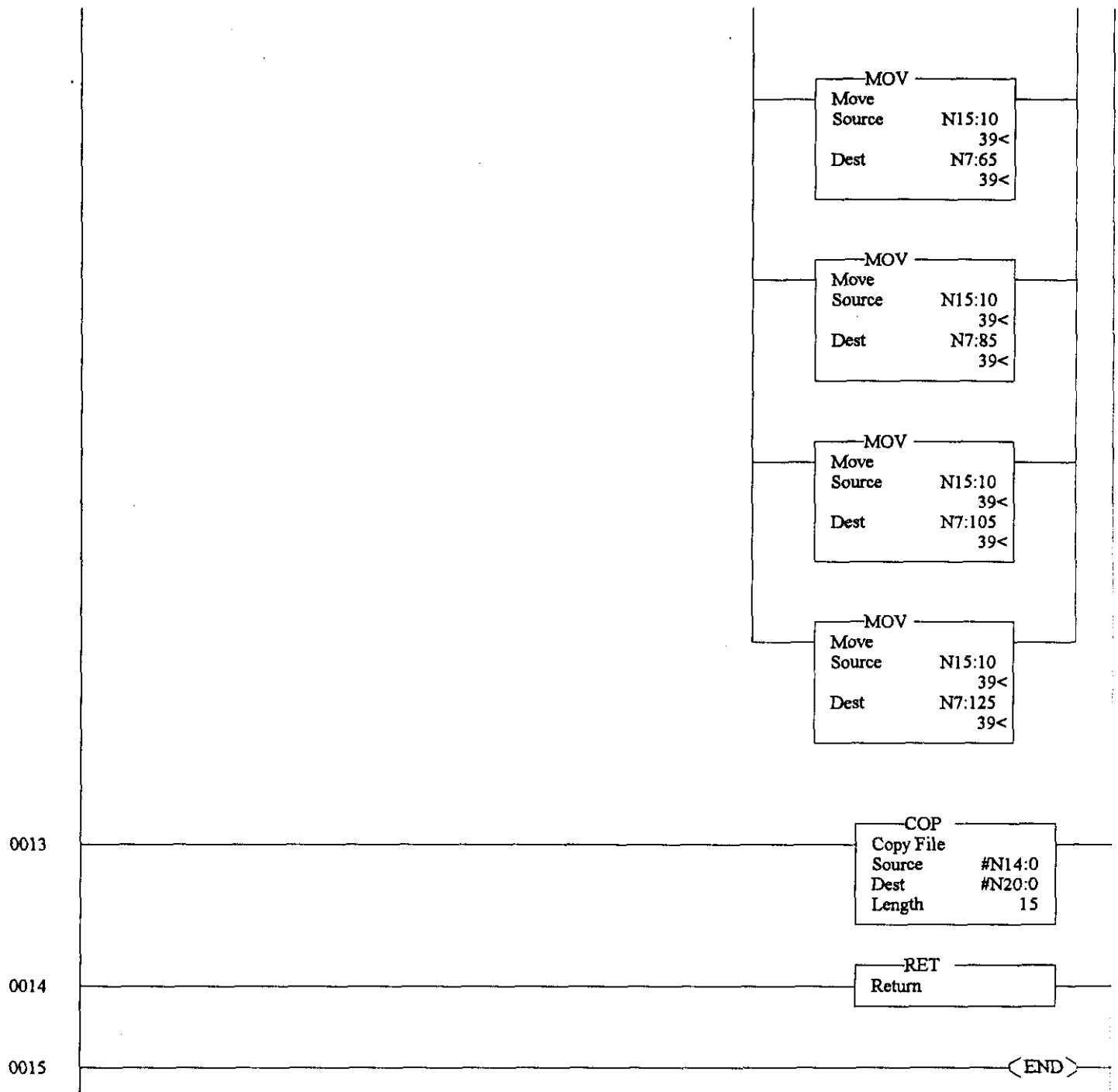
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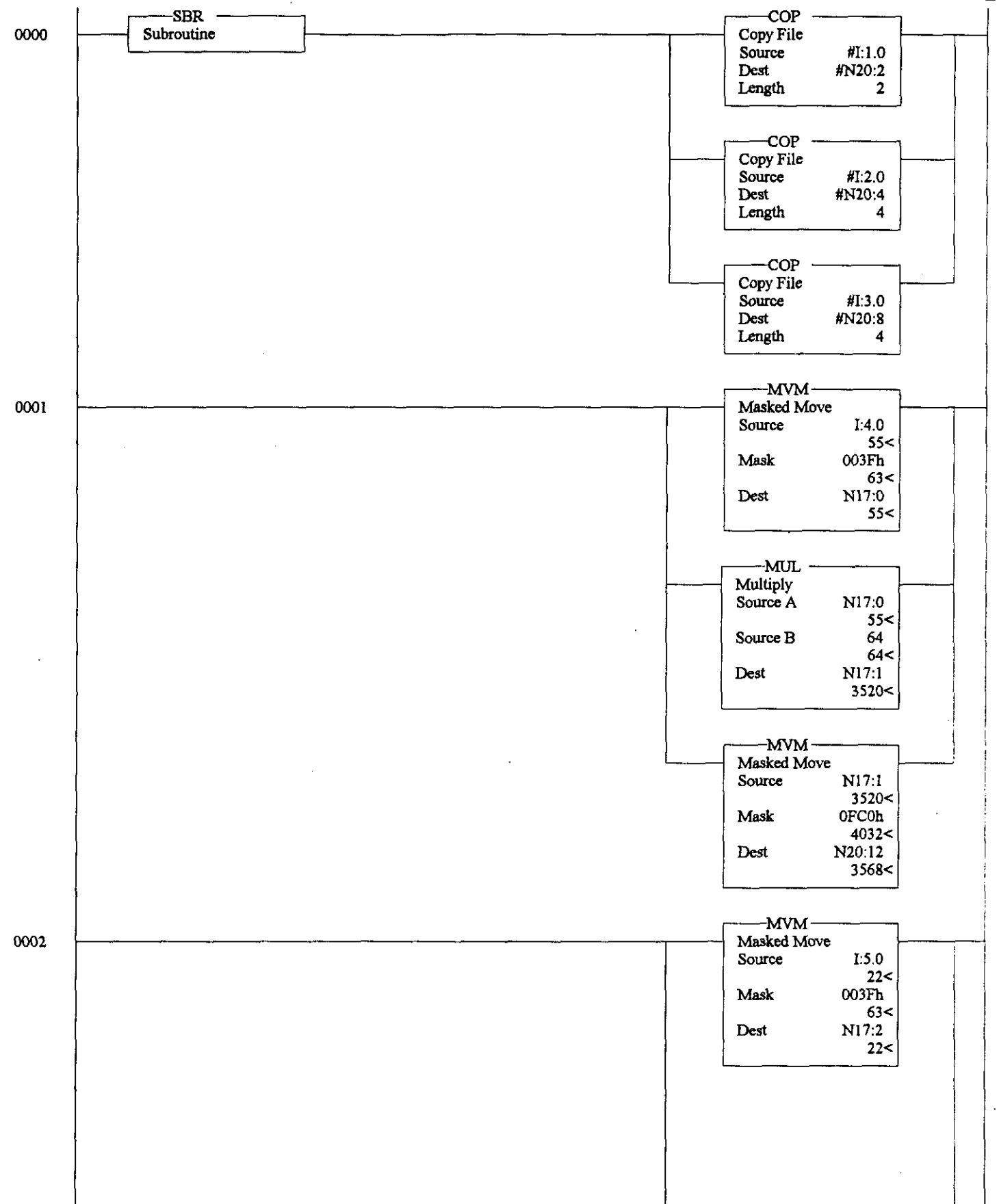






LAD 3 - --- Total Rungs in File = 16





LAD 4 - --- Total Rungs in File = 6

0003

MUL  
Multiply  
Source A N17:2  
22<  
Source B 64  
64<  
Dest N17:3  
1408<

MVM  
Masked Move  
Source N17:3  
1408<  
Mask 0FC0h  
4032<  
Dest N20:13  
1416<

MVM  
Masked Move  
Source I:6.0  
63<  
Mask 003Fh  
63<  
Dest N17:4  
63<

MUL  
Multiply  
Source A N17:4  
63<  
Source B 64  
64<  
Dest N17:5  
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Masked Move  
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Mask 0FC0h  
4032<  
Dest N20:14  
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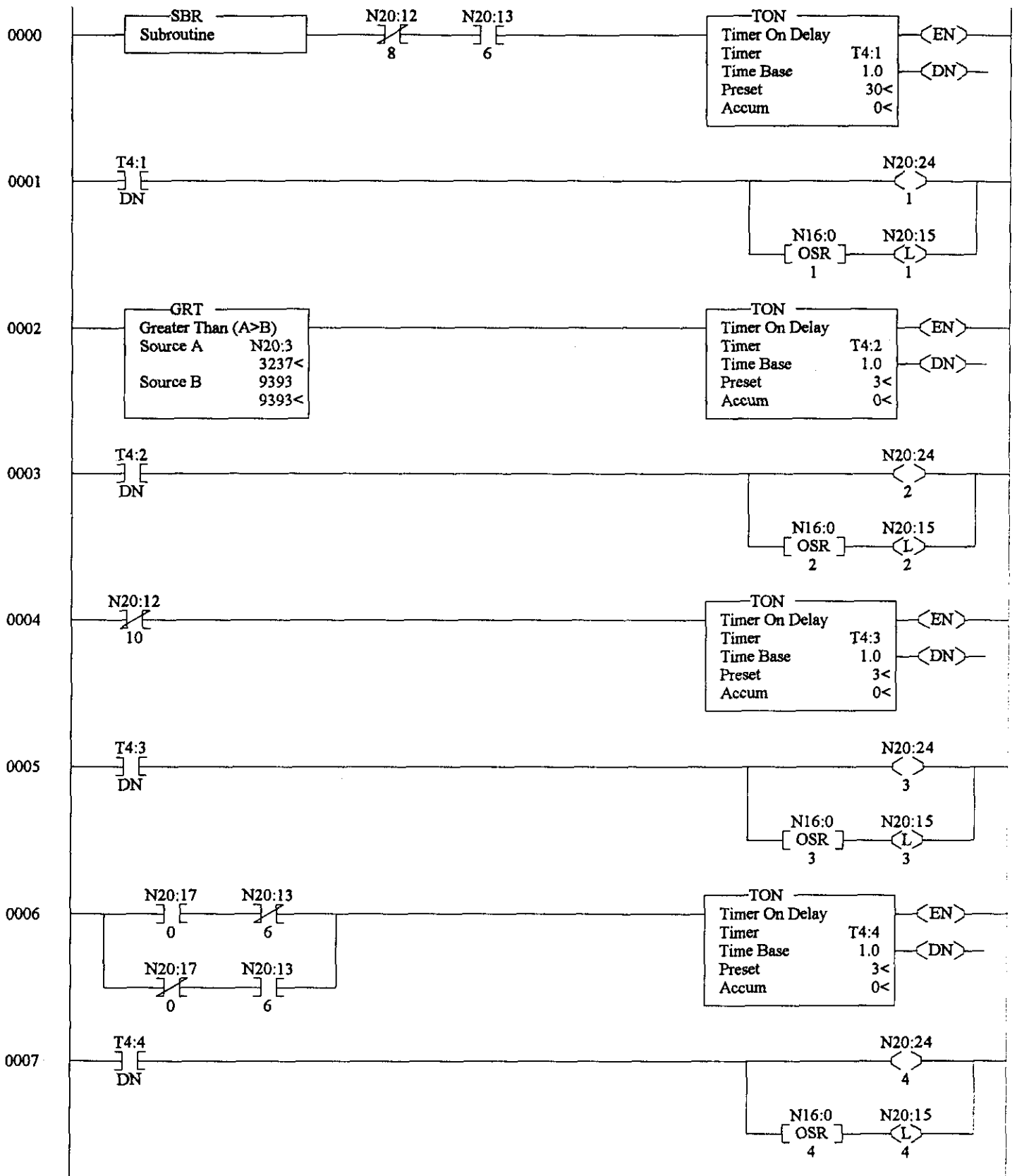
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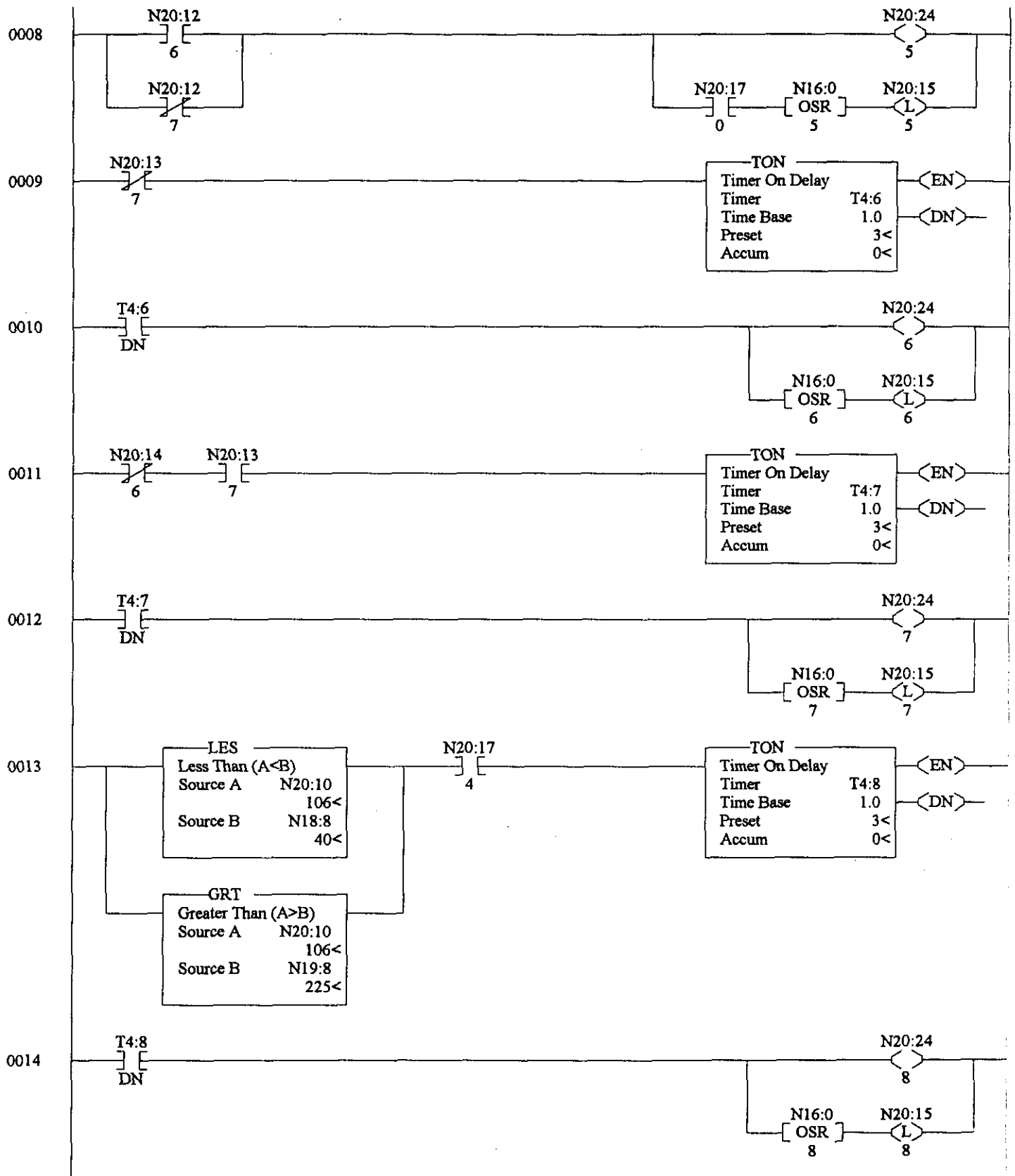
RET  
Return

0005

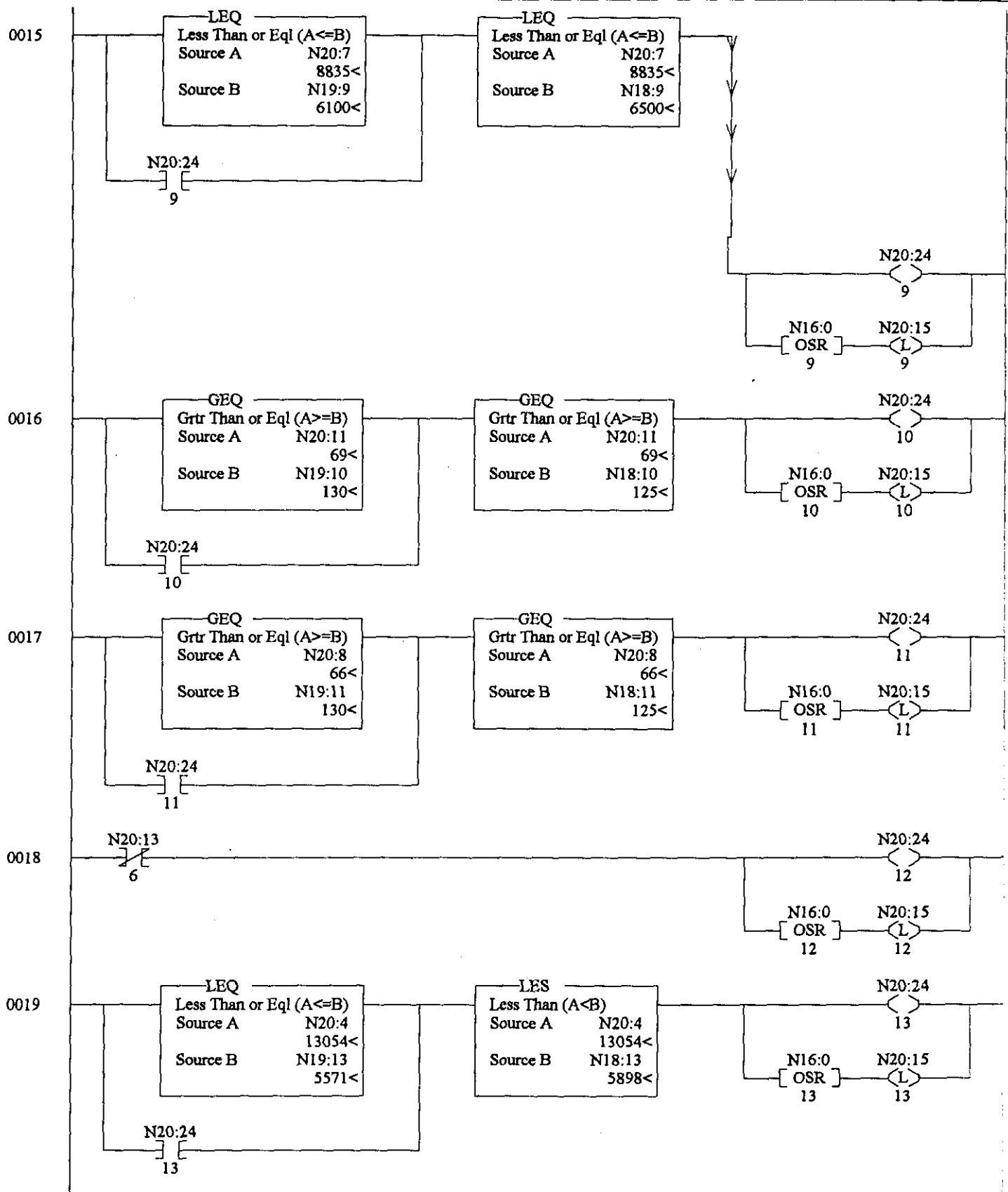
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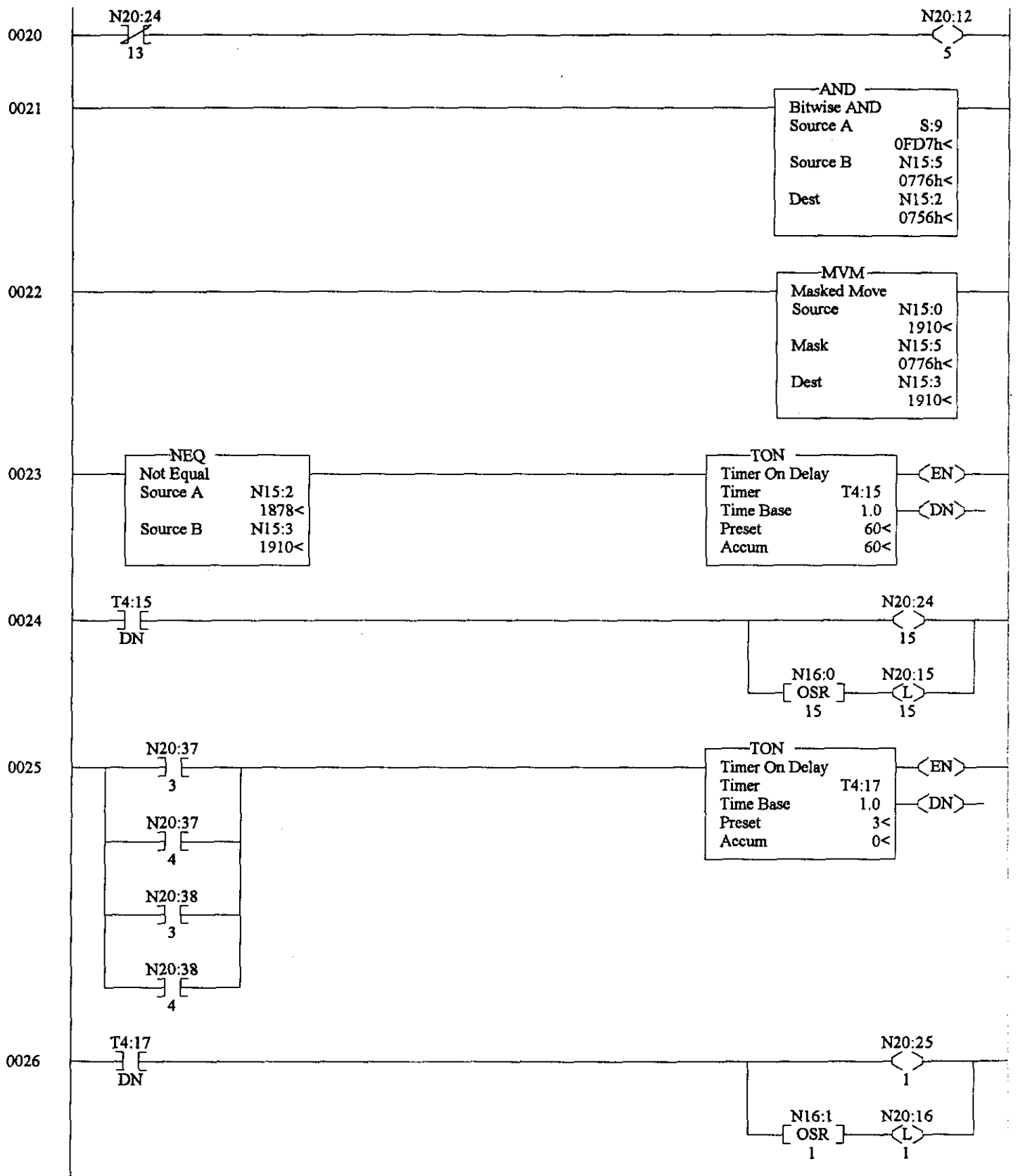




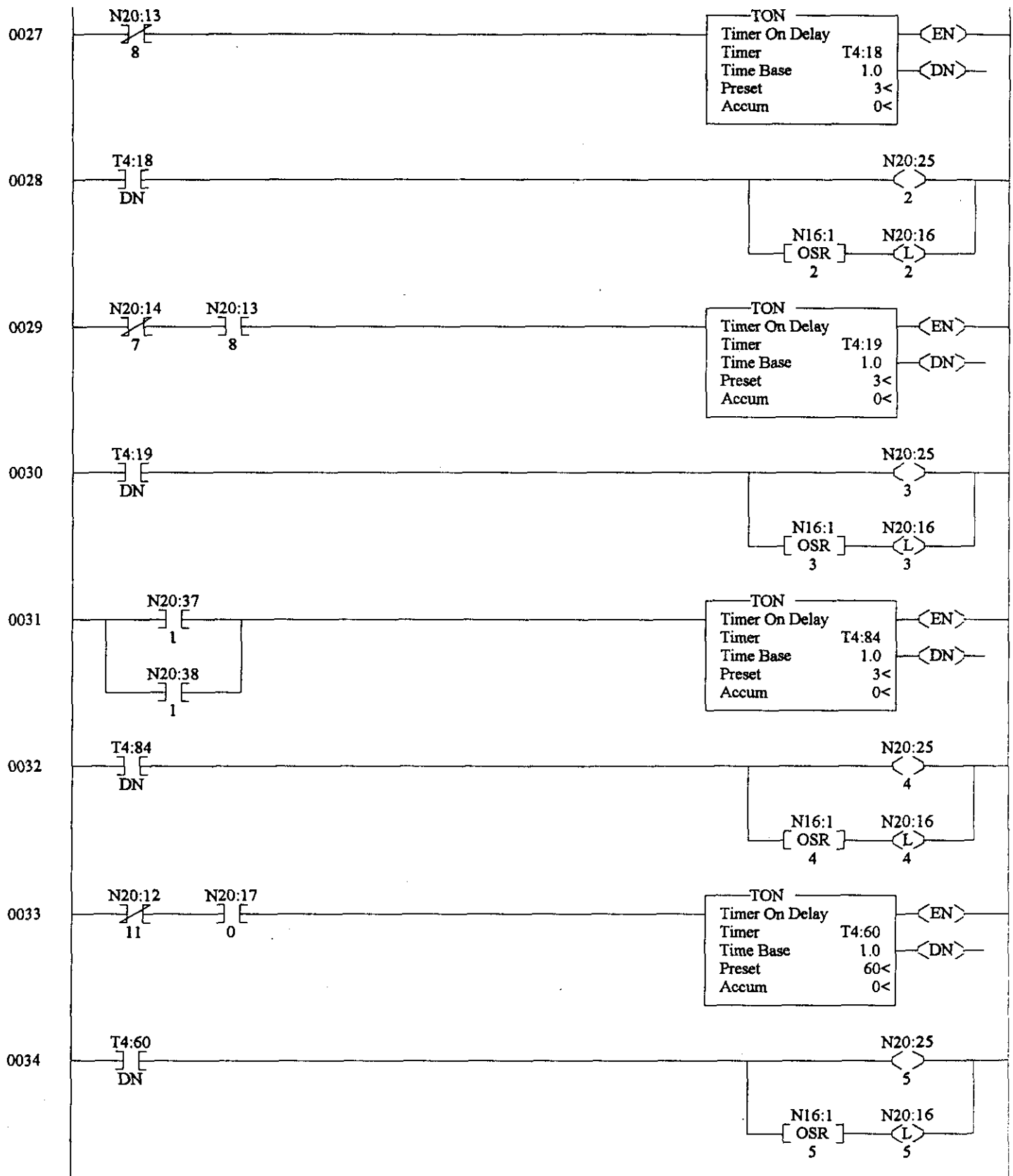
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LAD 5 - --- Total Rungs in File = 119

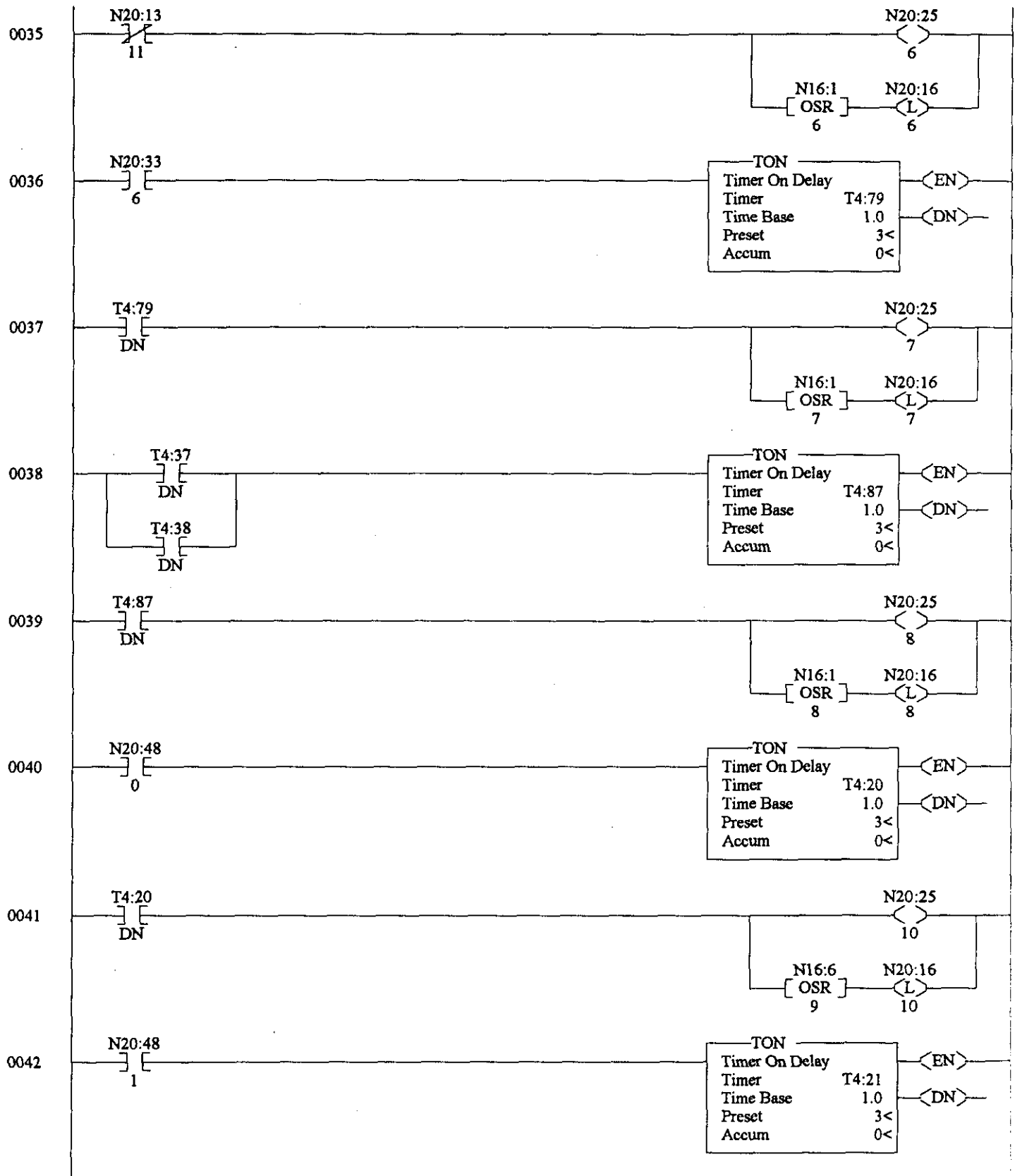


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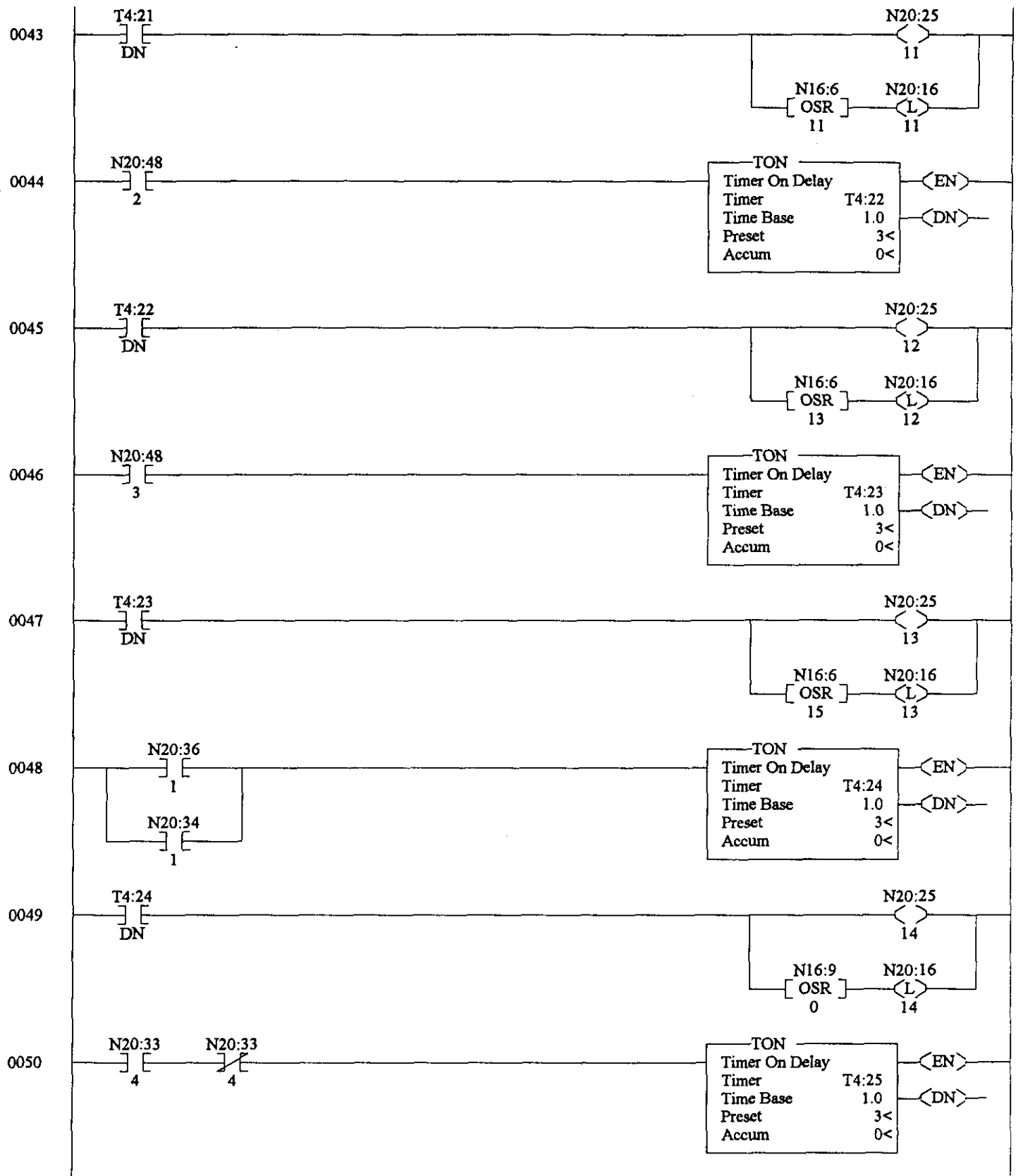




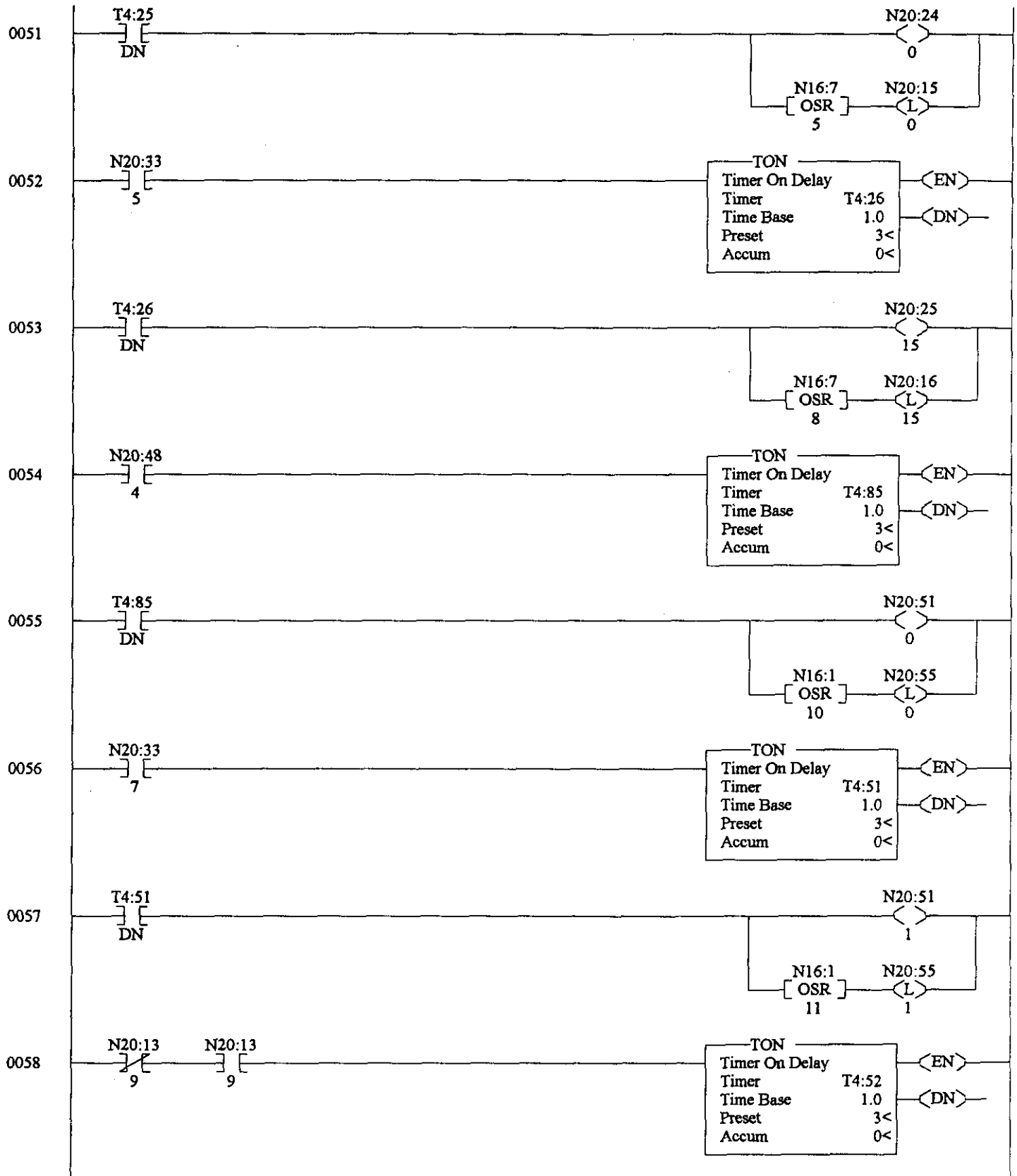
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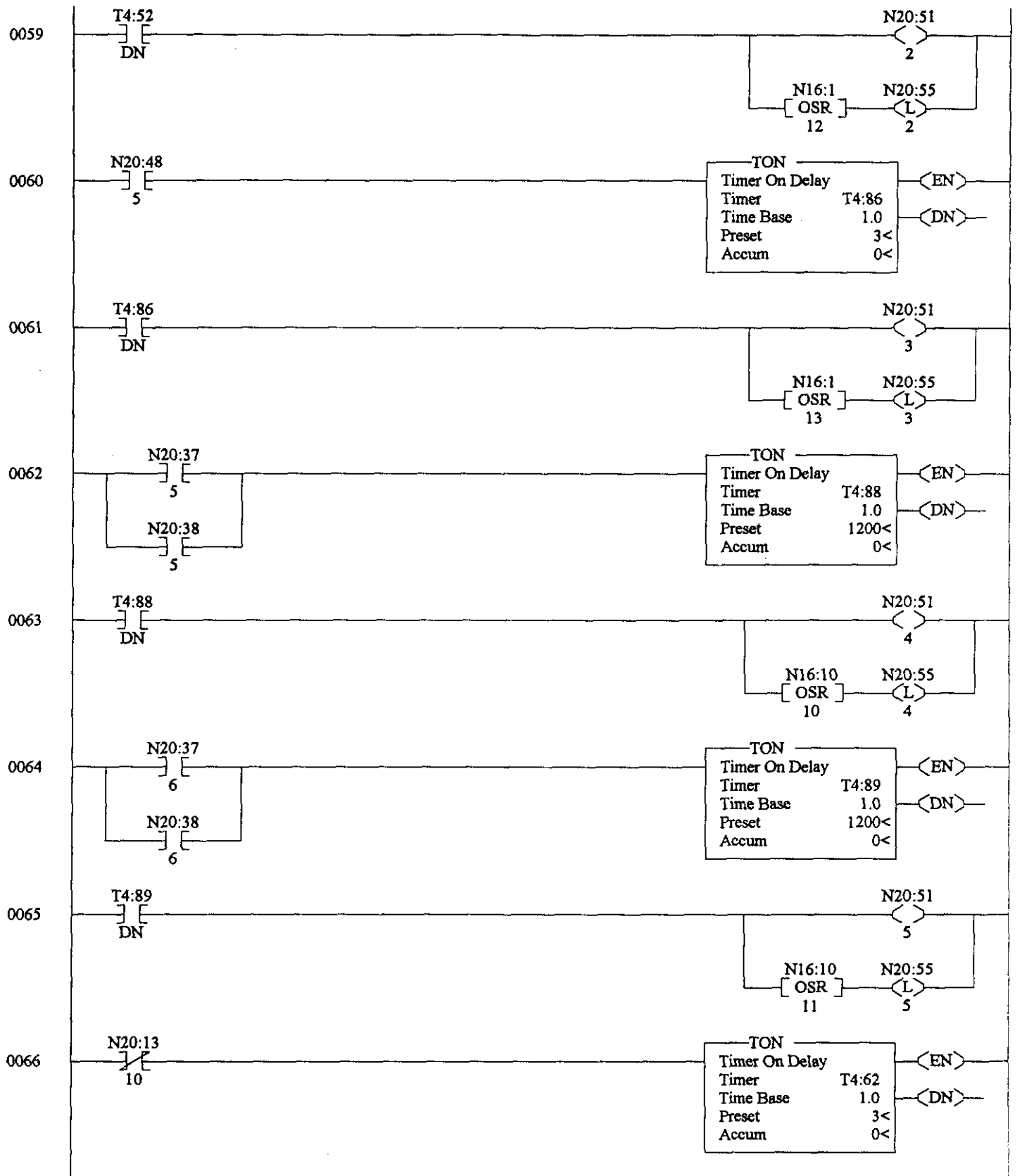
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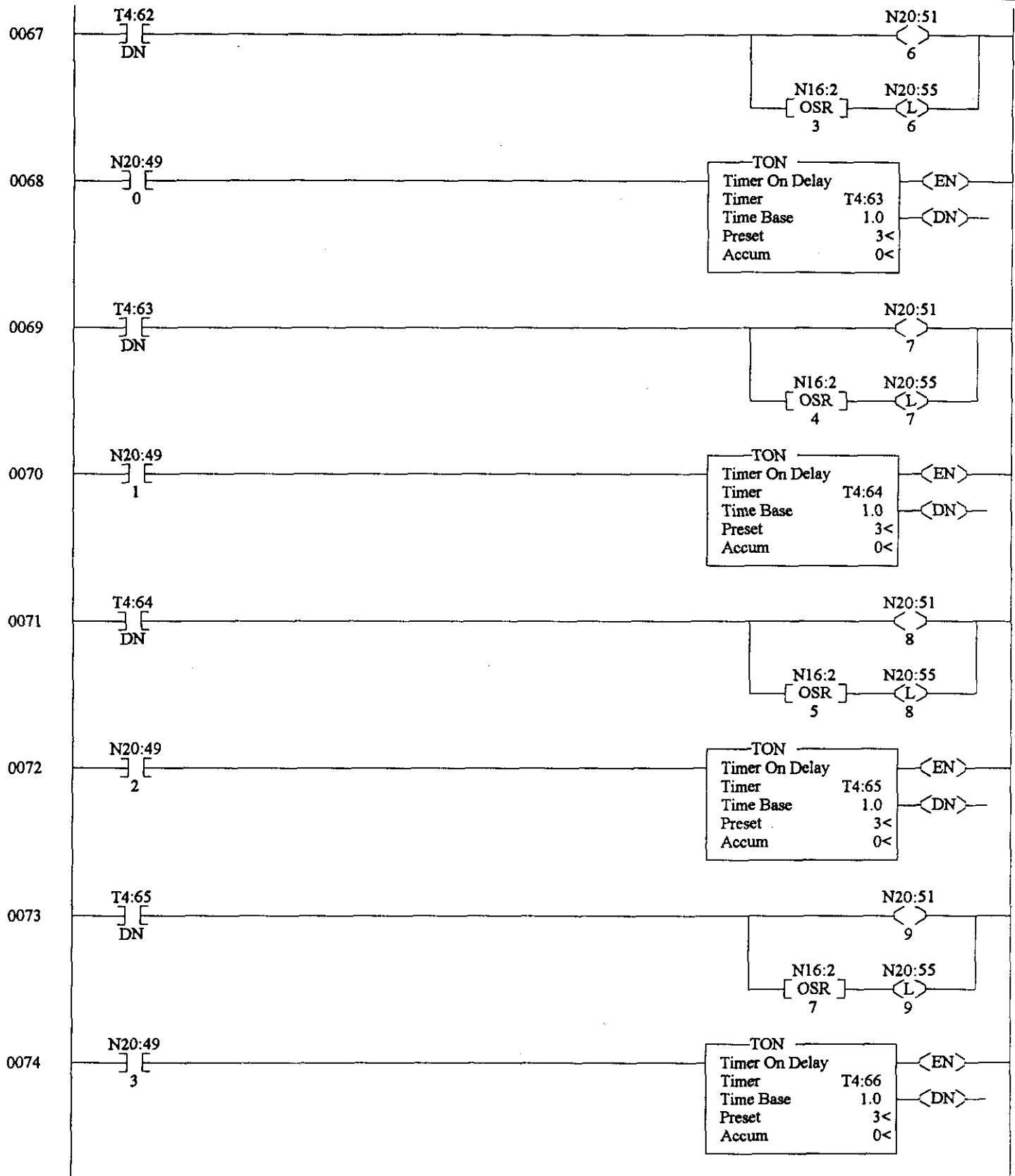
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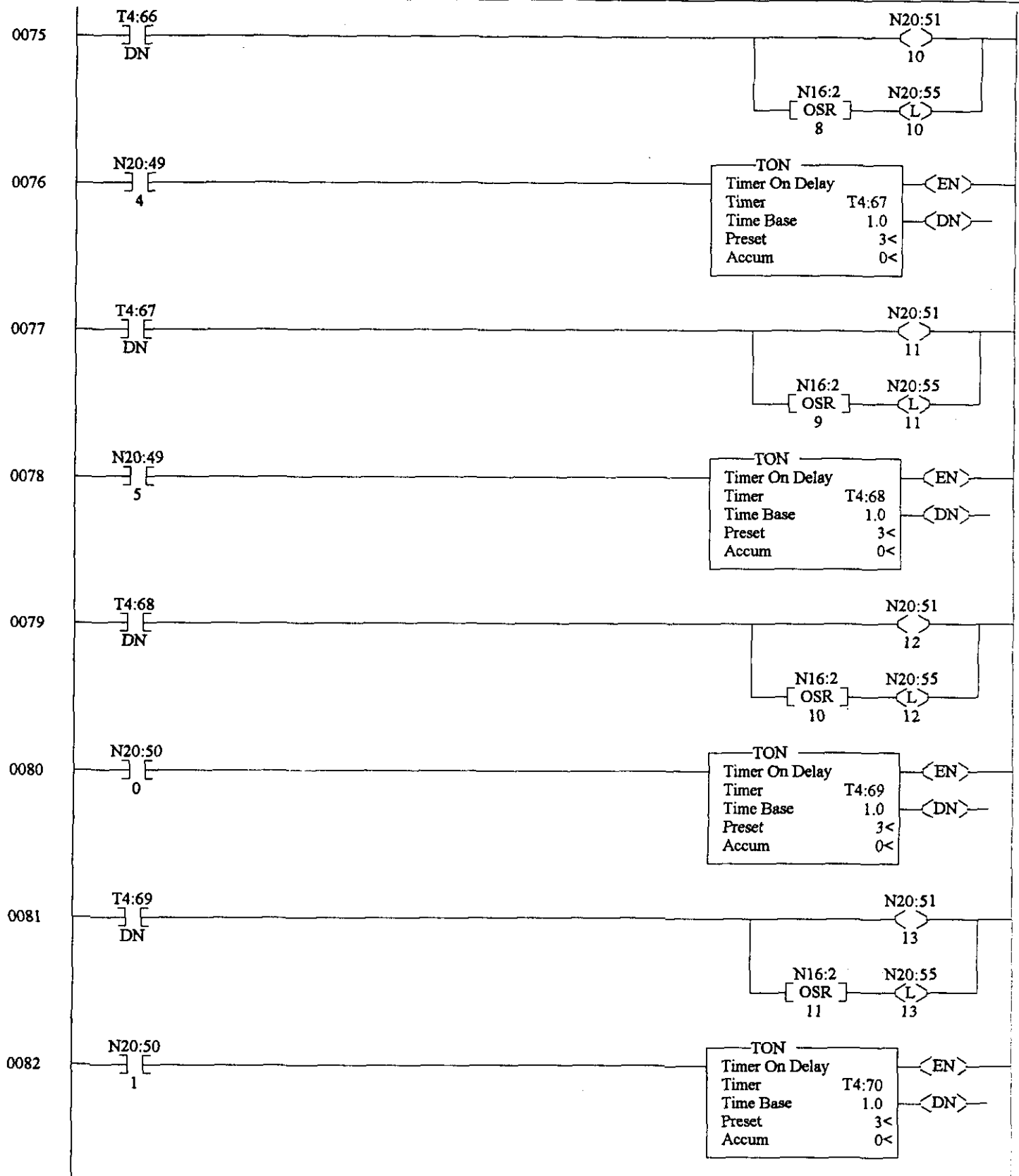


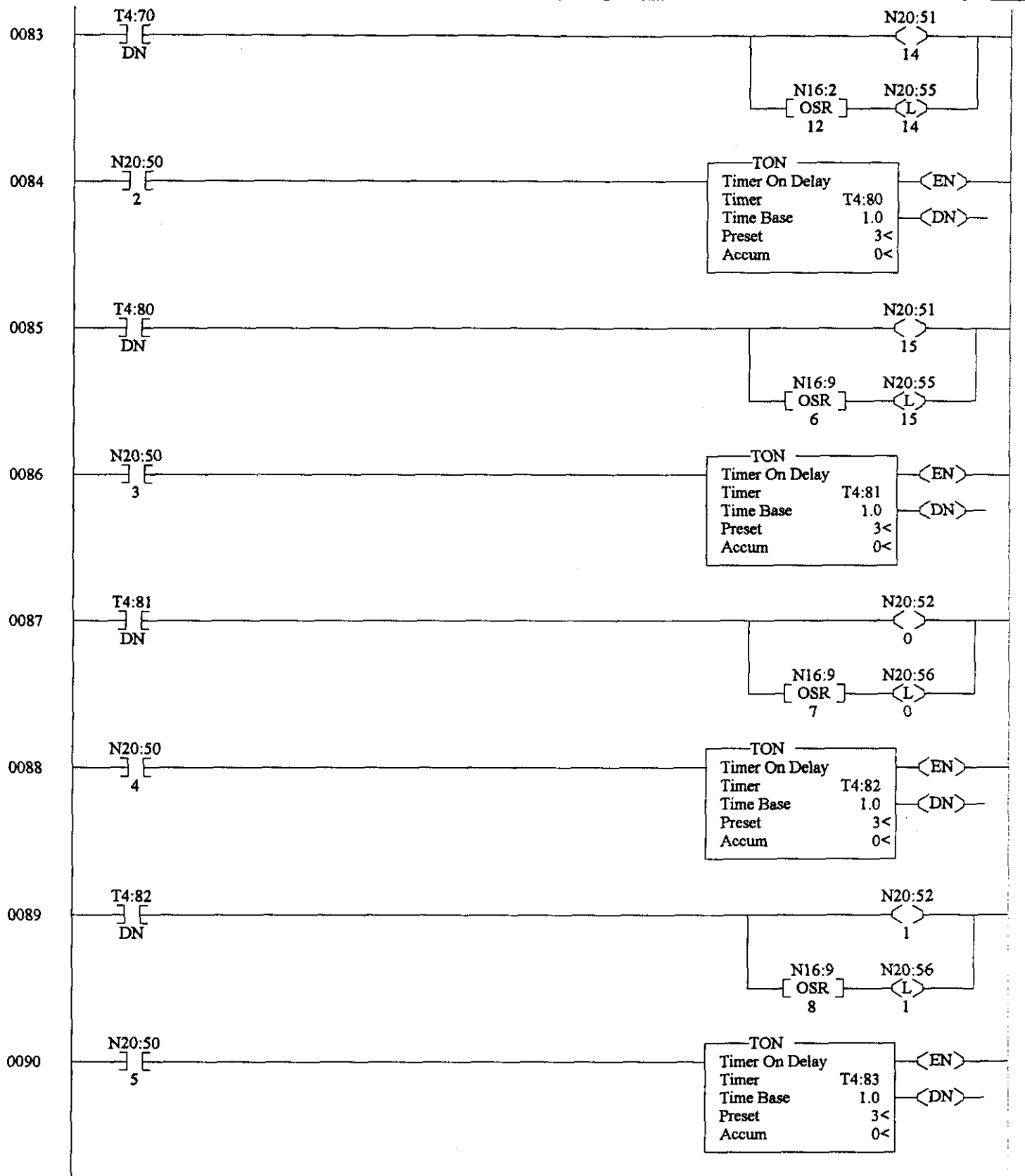
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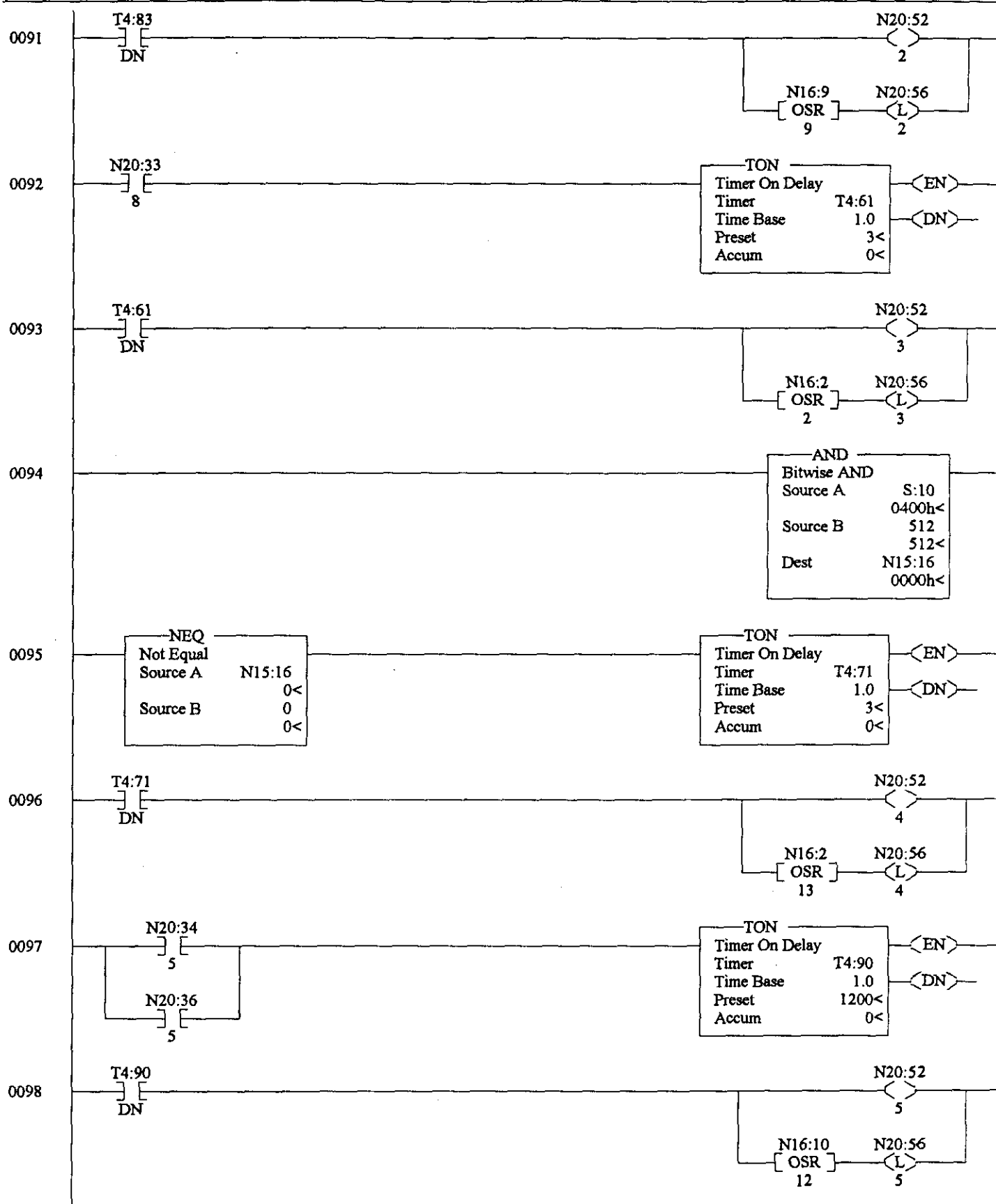
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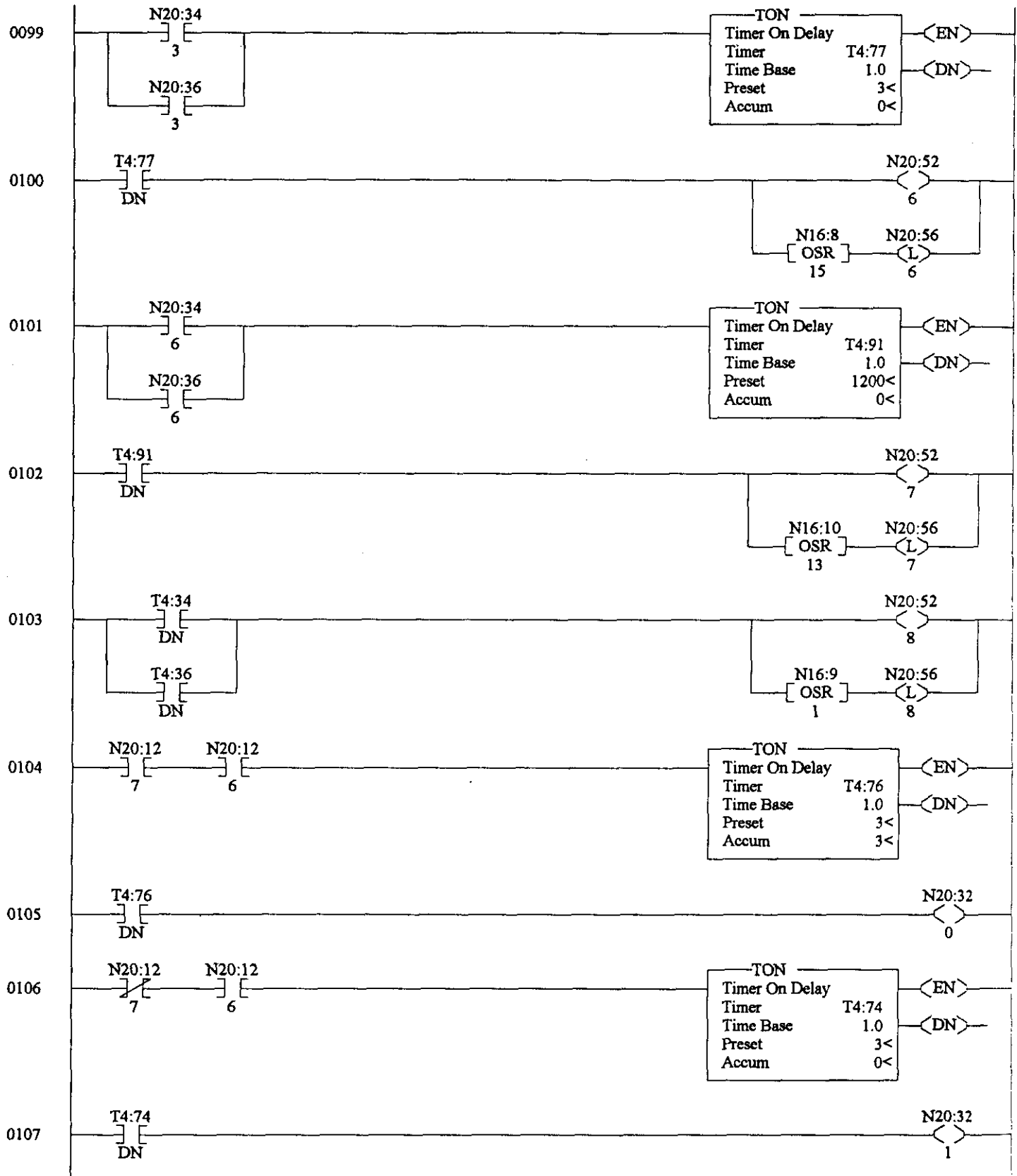


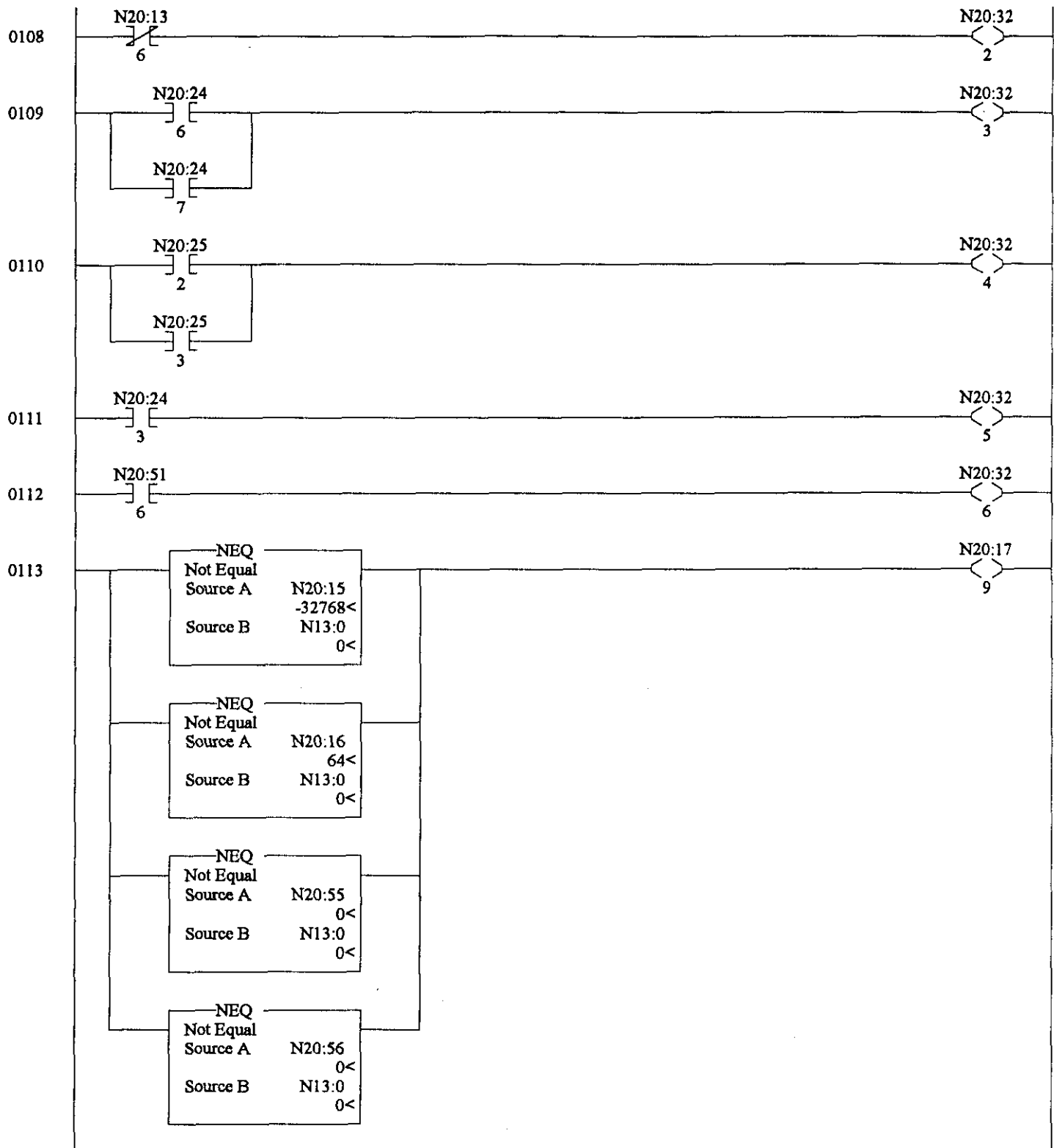
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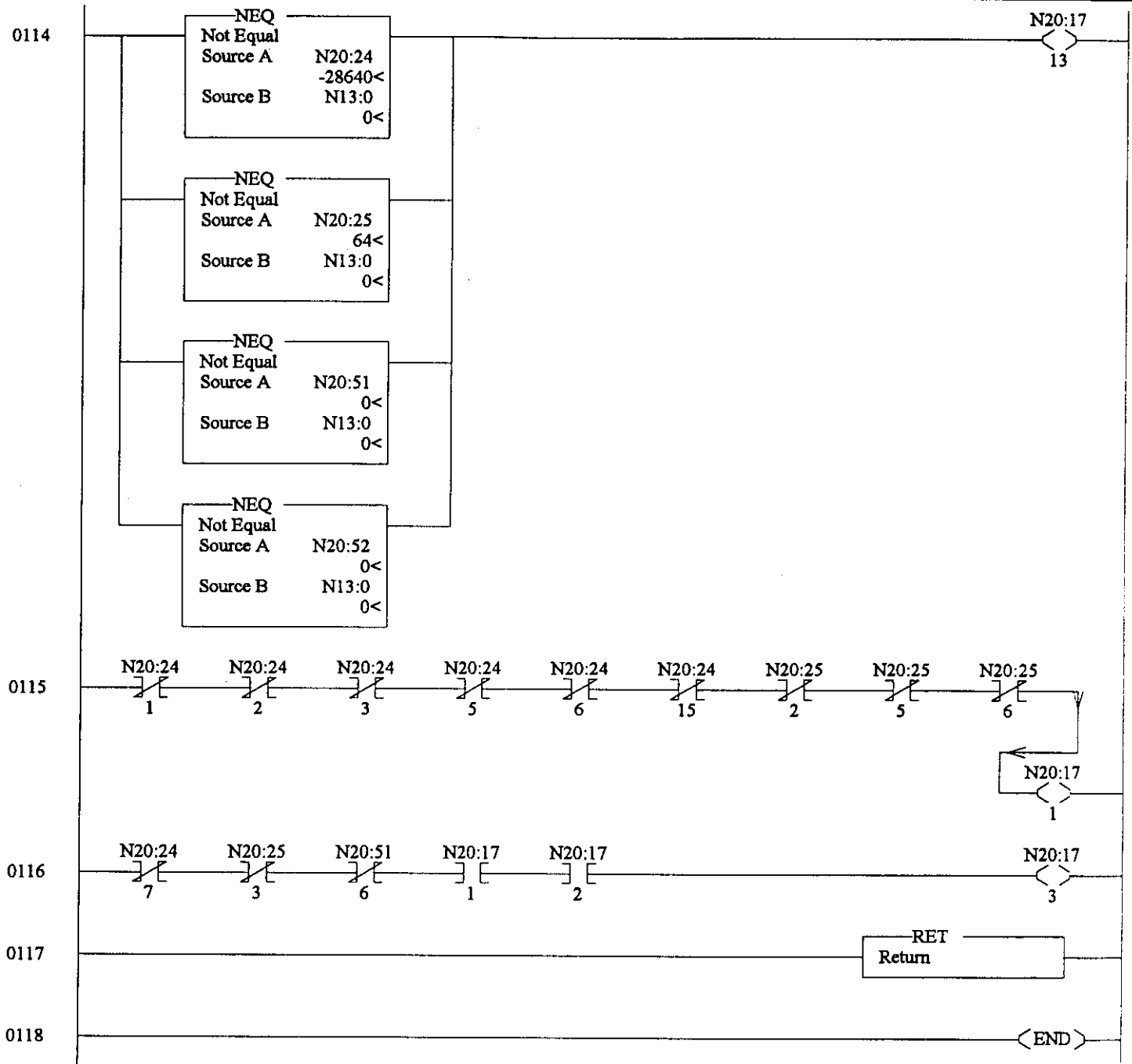




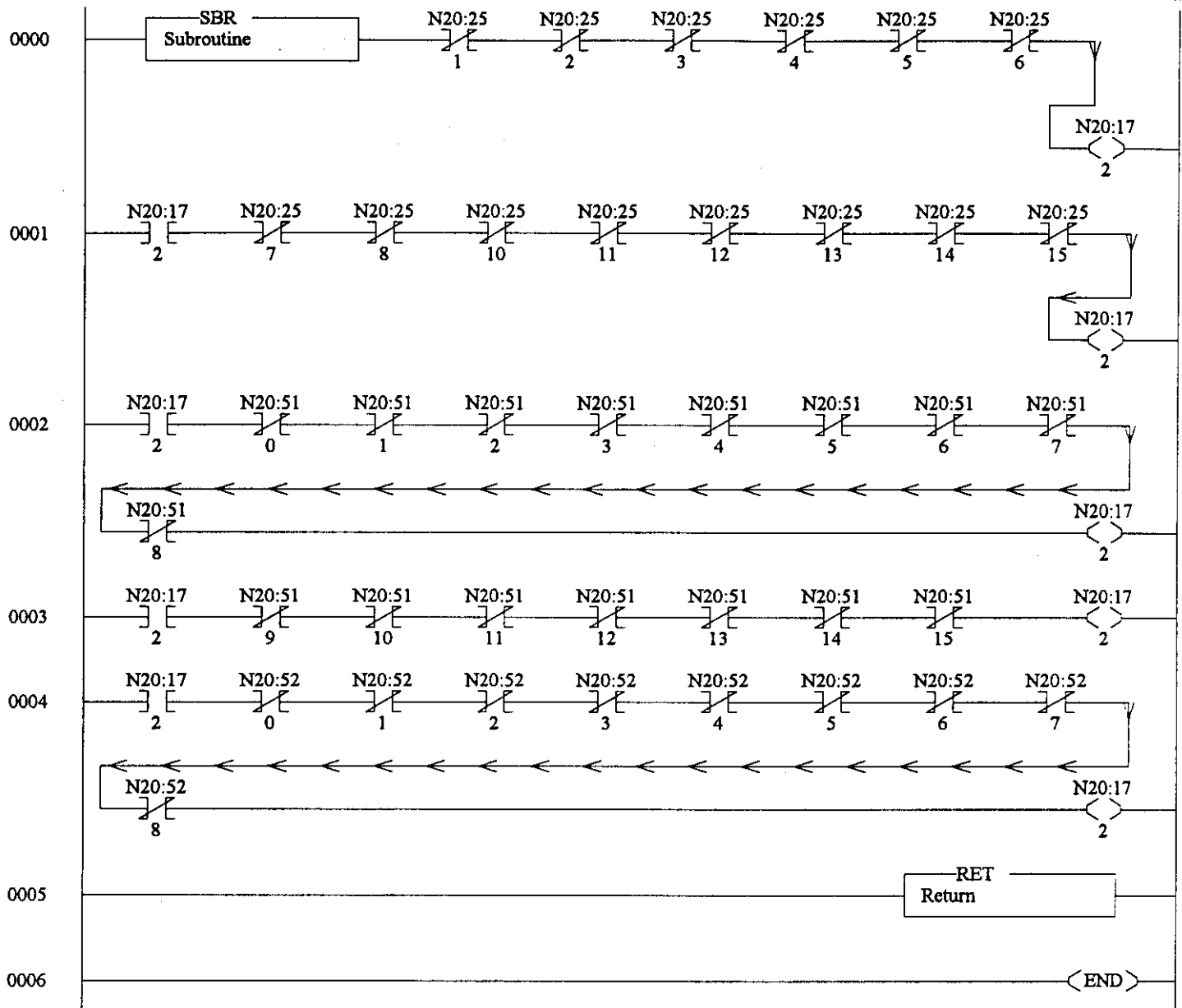
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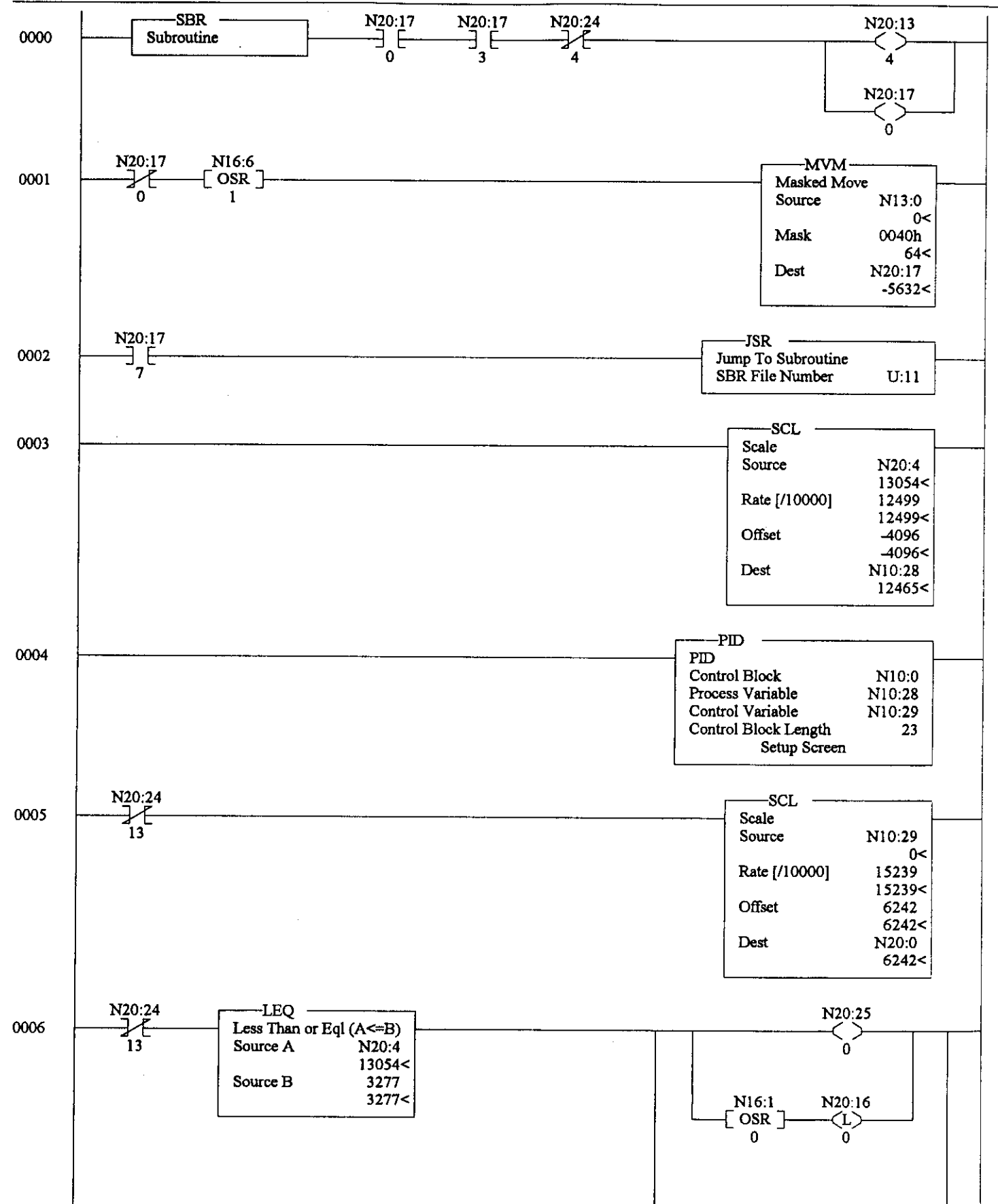


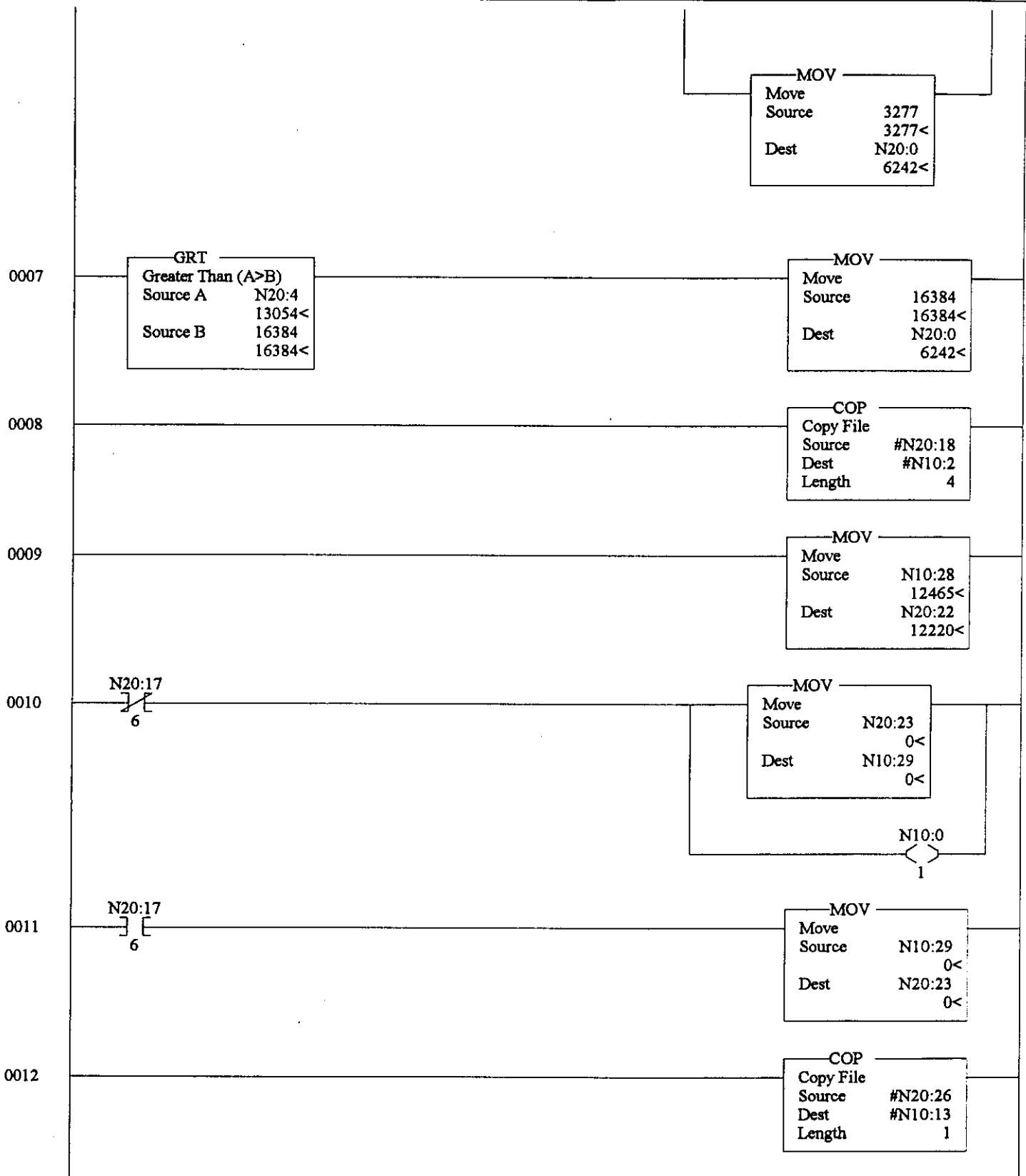


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LAD 7 - --- Total Rungs in File = 20

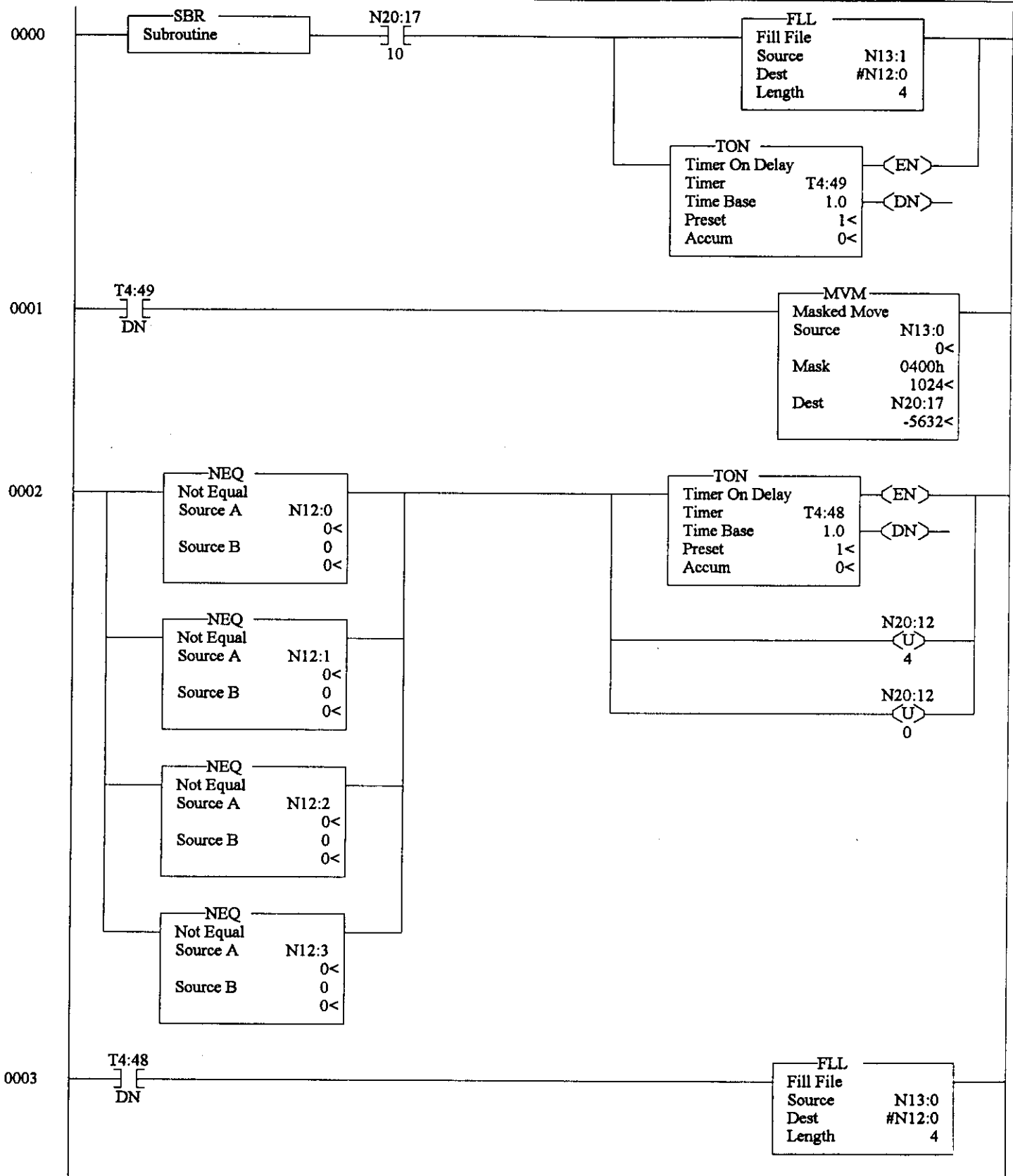




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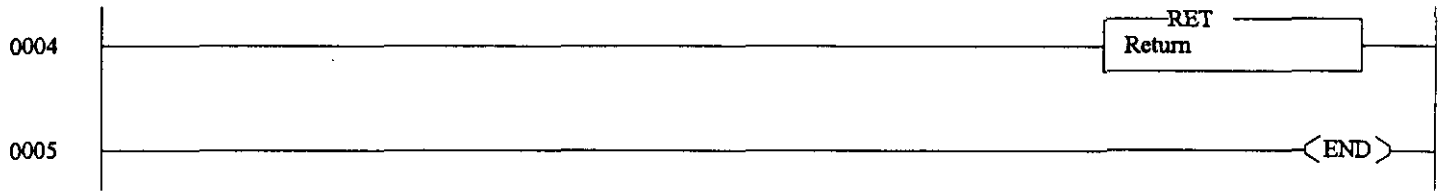
0013	<div>MOV Move Source S:9 4055&lt; Dest N20:27 4055&lt;</div>
0014	<div>MOV Move Source N20:28 1910&lt; Dest N15:0 1910&lt;</div>
0015	<div>MOV Move Source N20:29 1910&lt; Dest N15:5 1910&lt;</div>
0016	<div>MOV Move Source C5:1.ACC 656&lt; Dest N20:30 656&lt;</div>
0017	<div>MOV Move Source C5:2.ACC 7&lt; Dest N20:31 7&lt;</div>
0018	<div>RET Return</div>
0019	<END>

LAD 8 - --- Total Rungs in File = 6

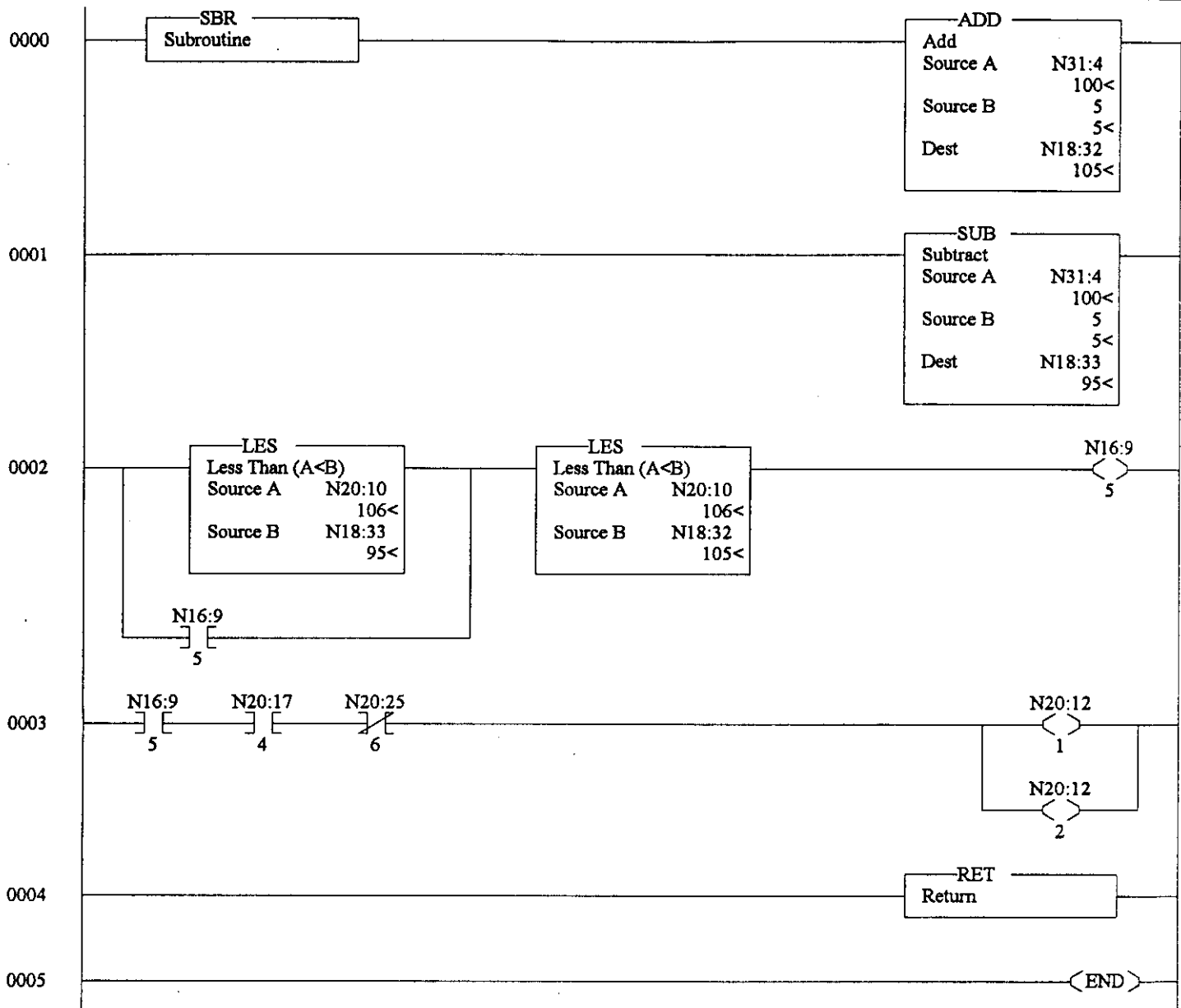




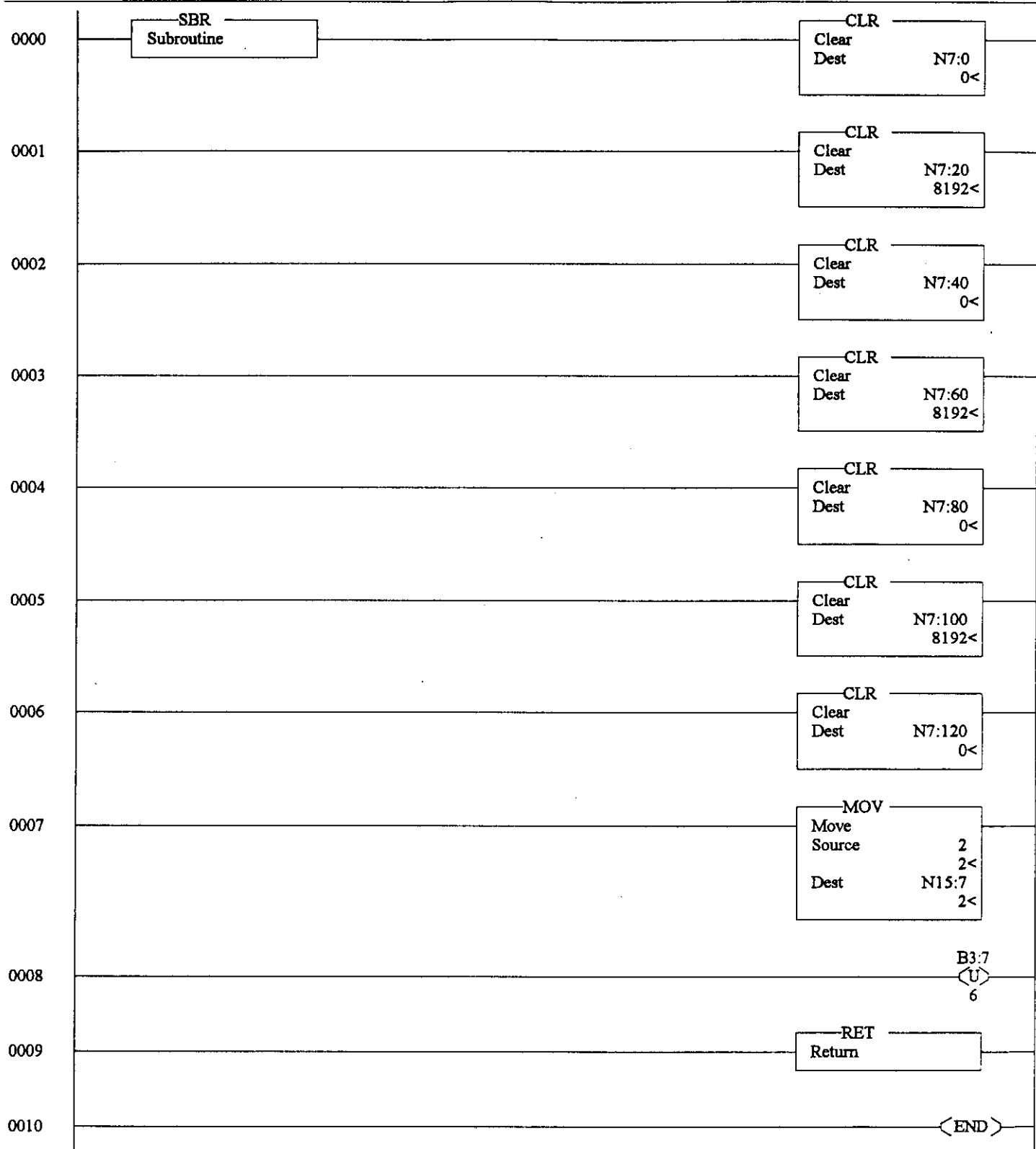
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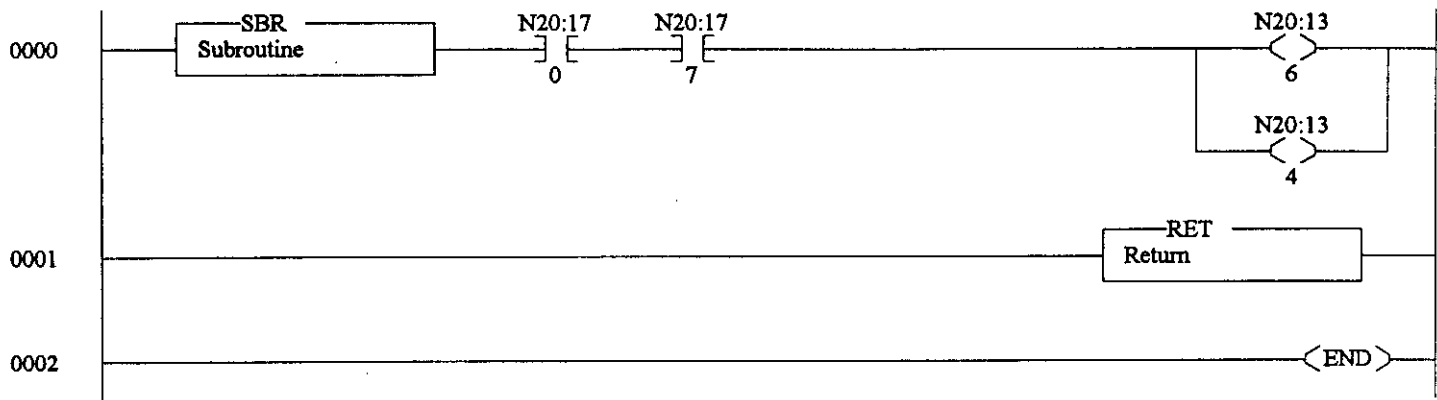
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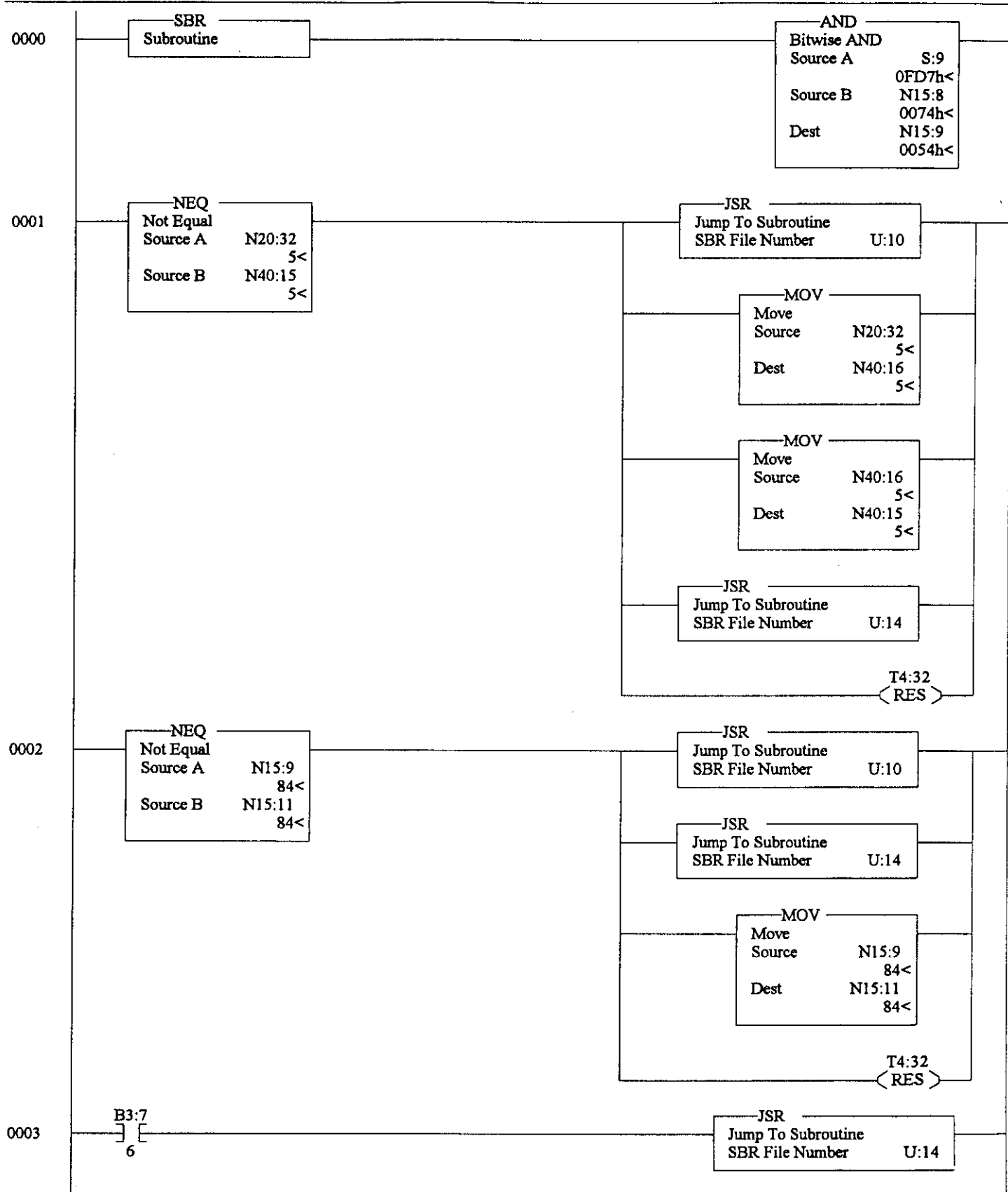
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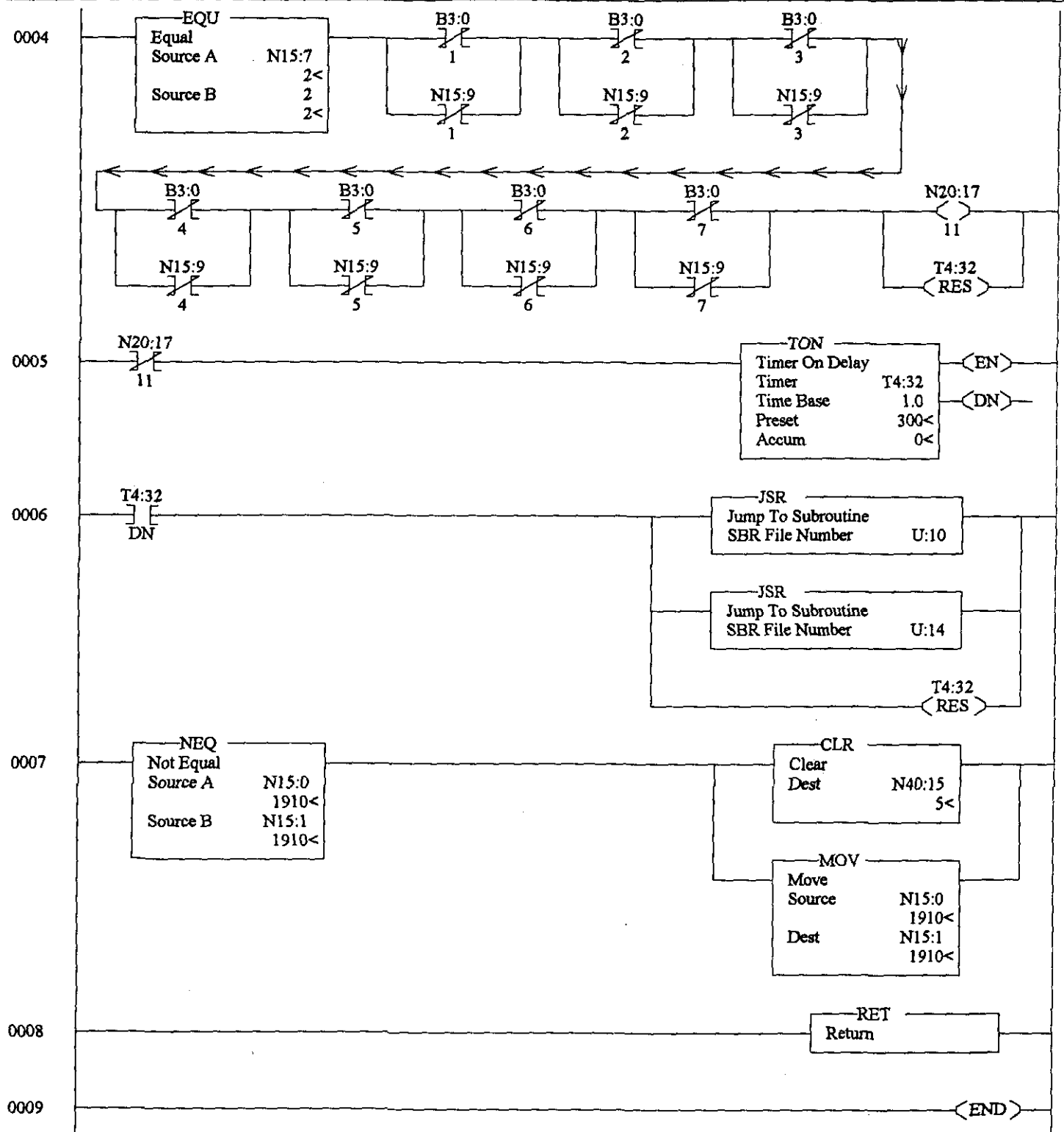
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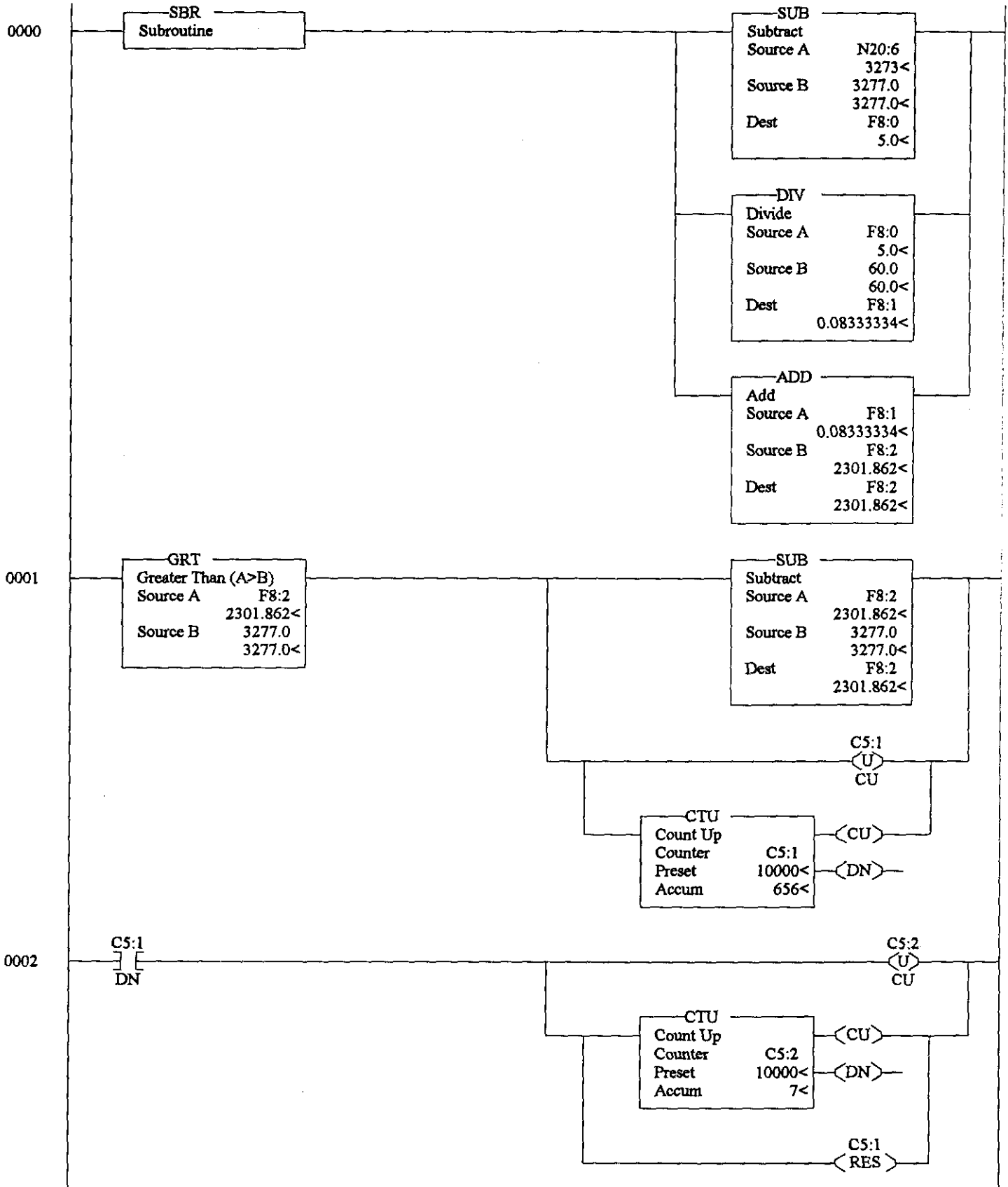


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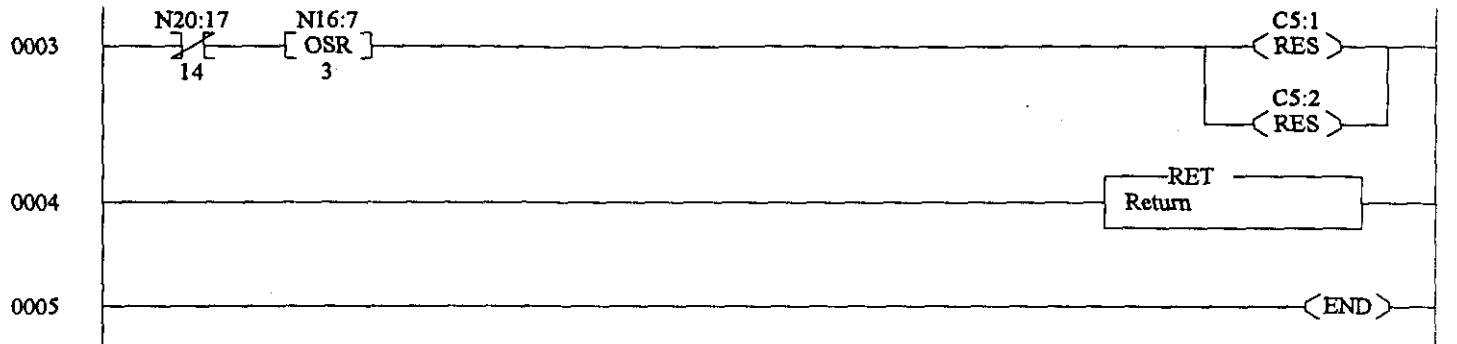


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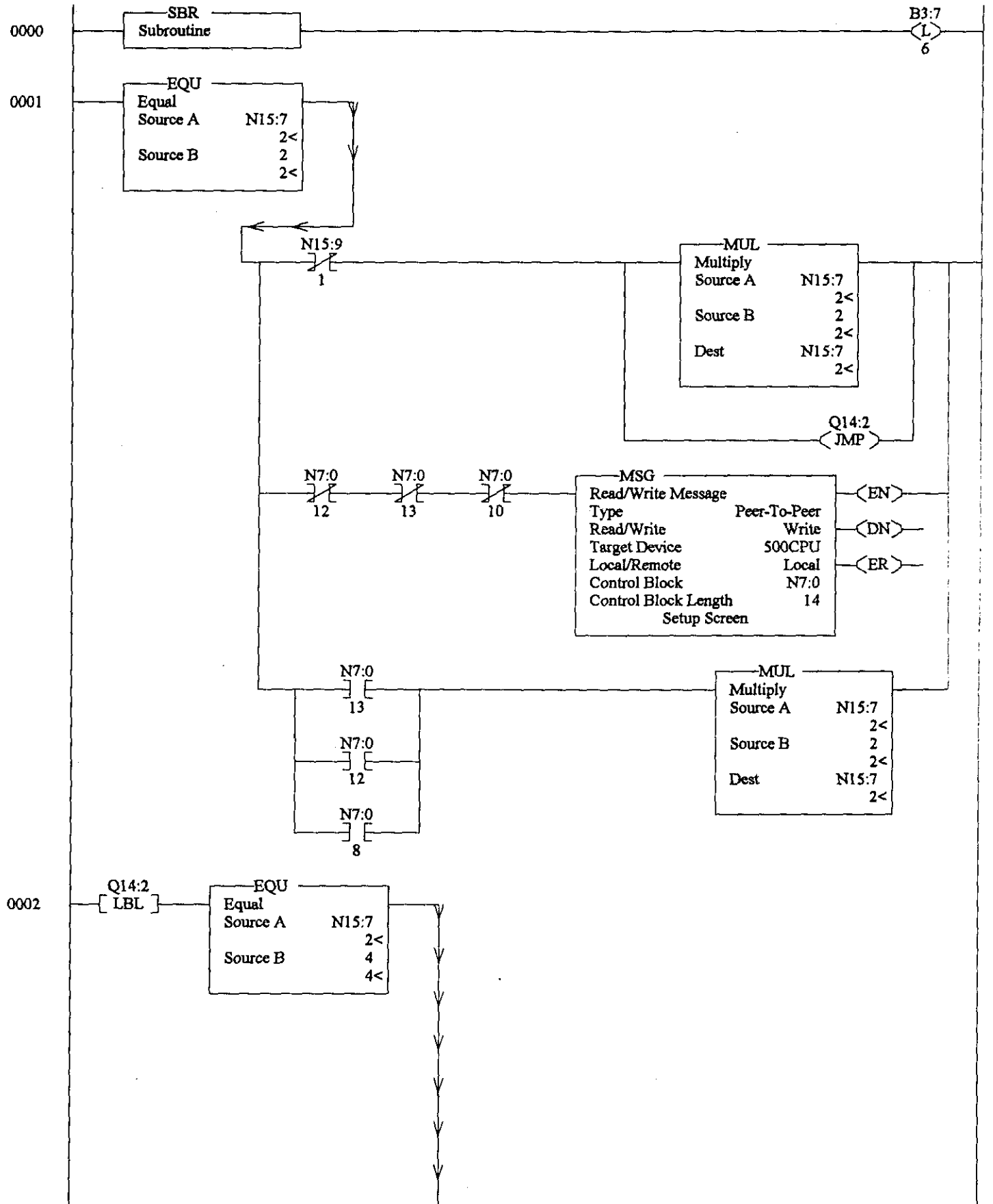


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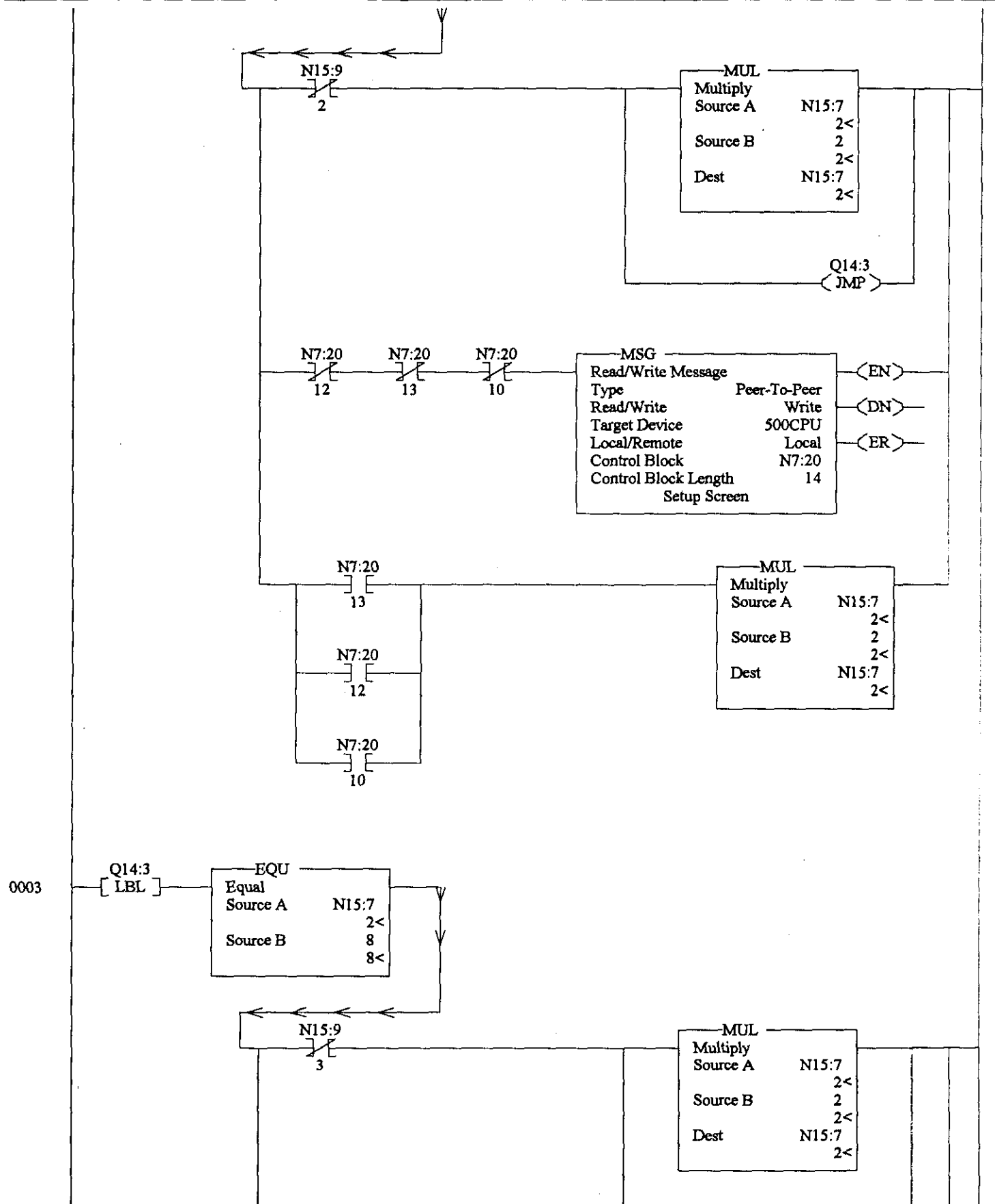




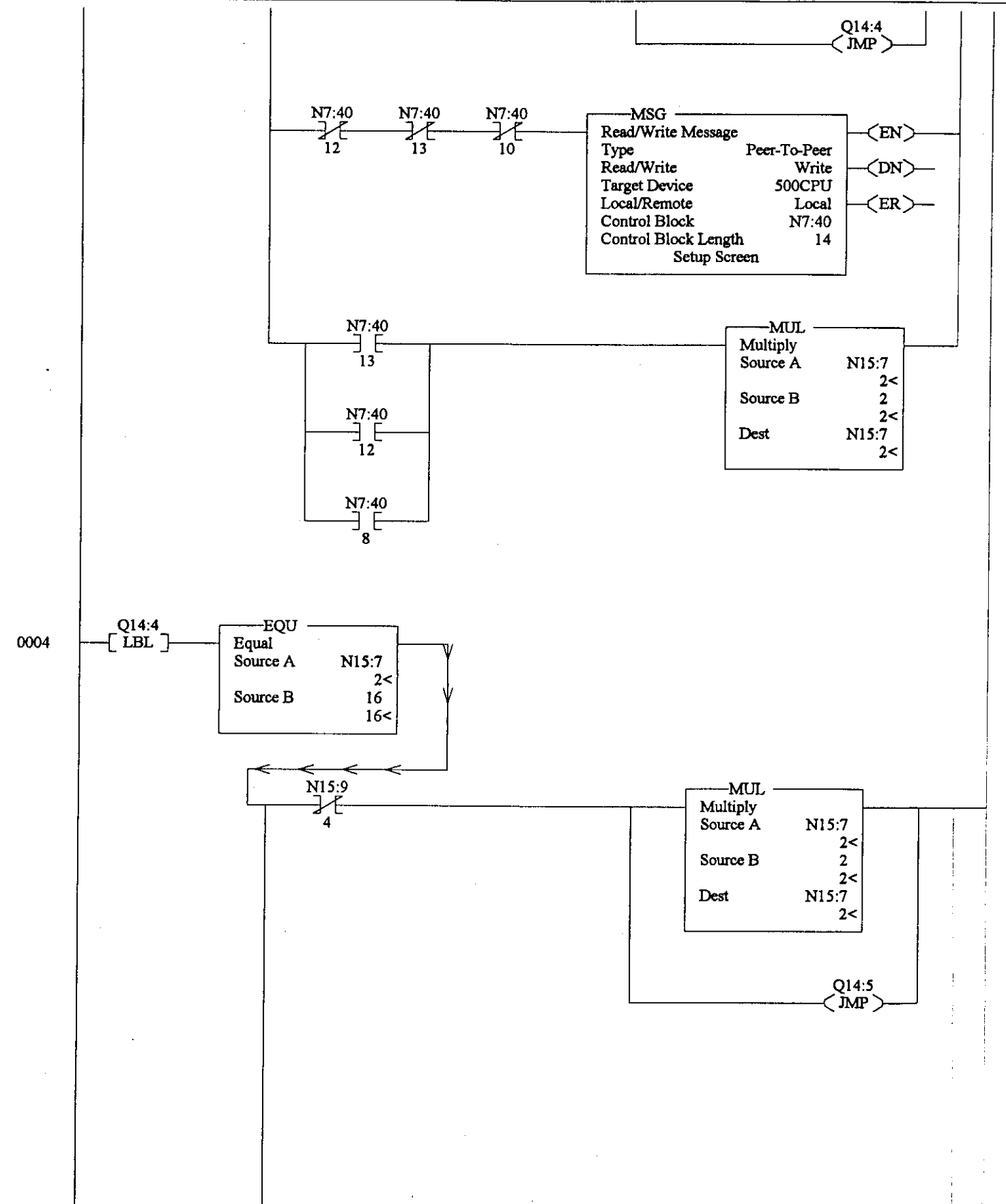
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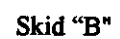


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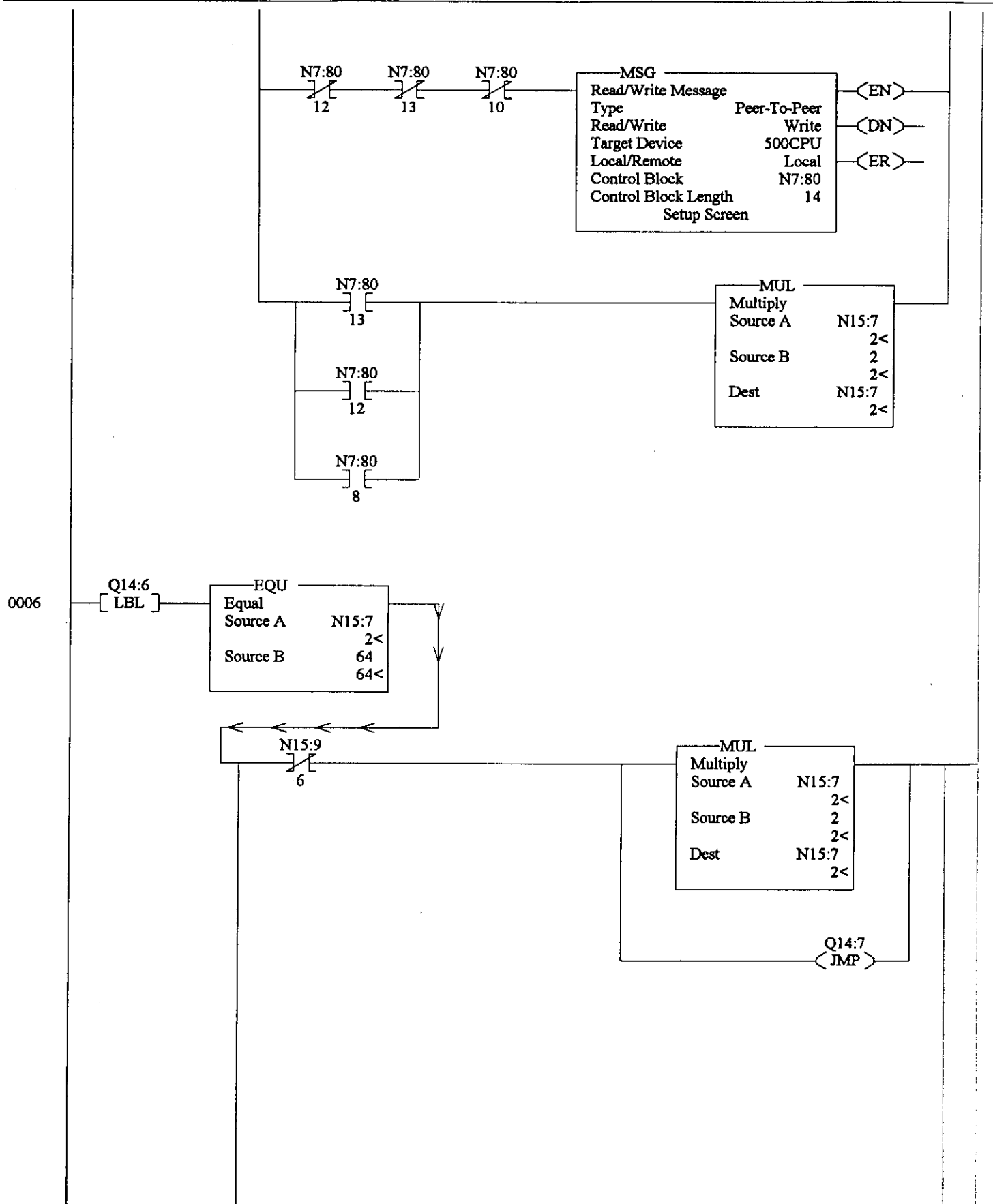


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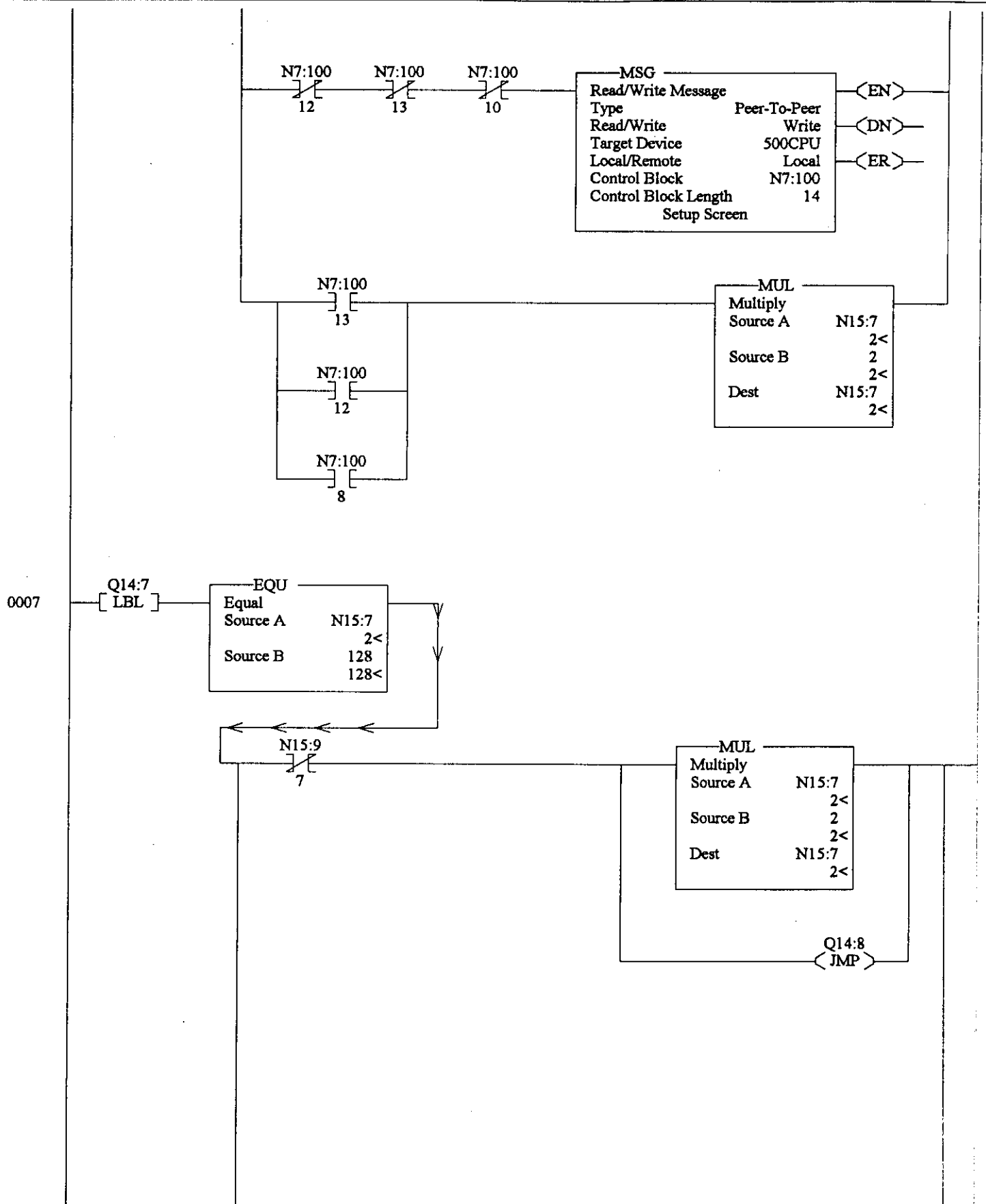




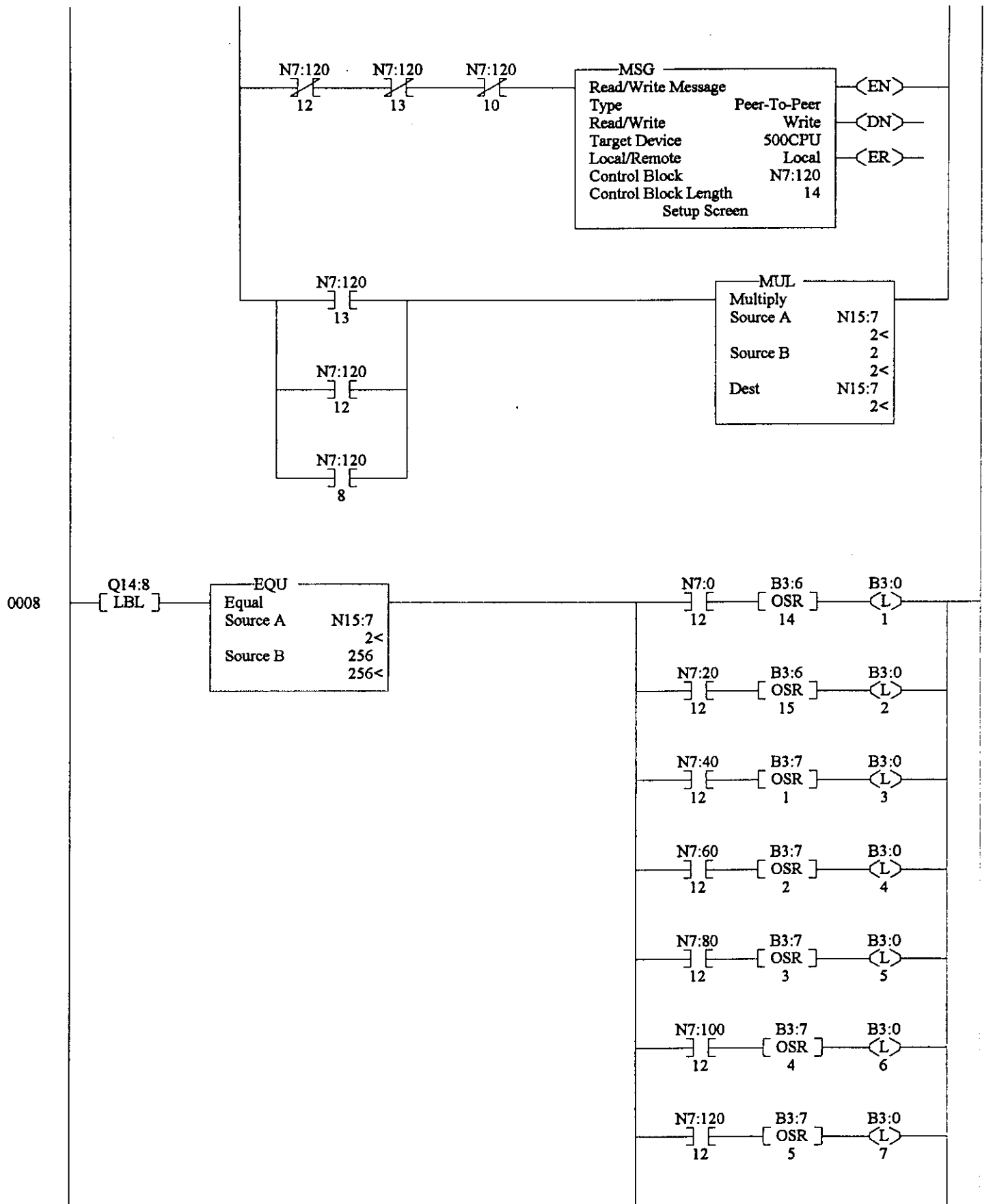
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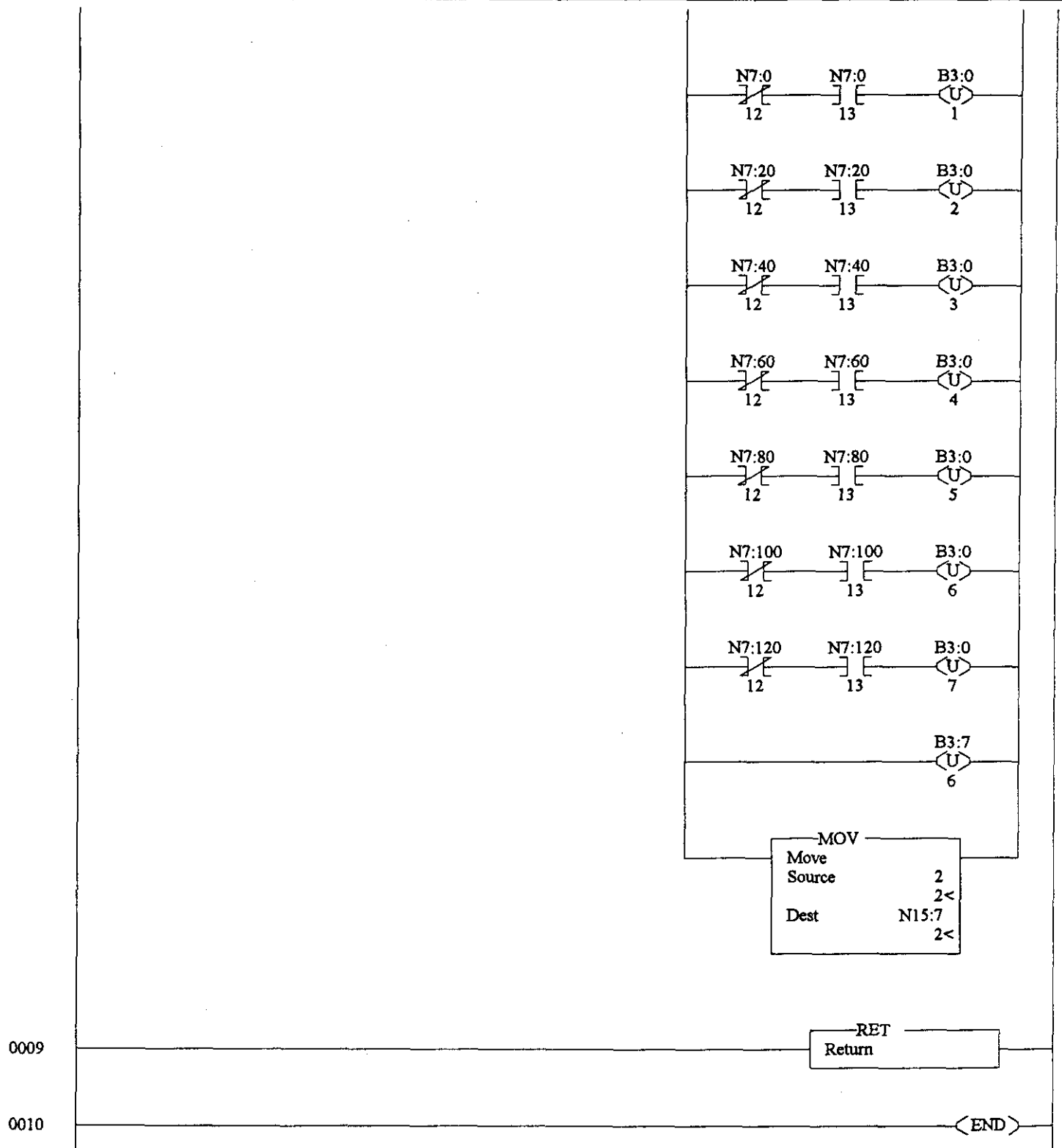
LAD 14 - --- Total Rungs in File = 11



LAD 14 - --- Total Rungs in File = 11

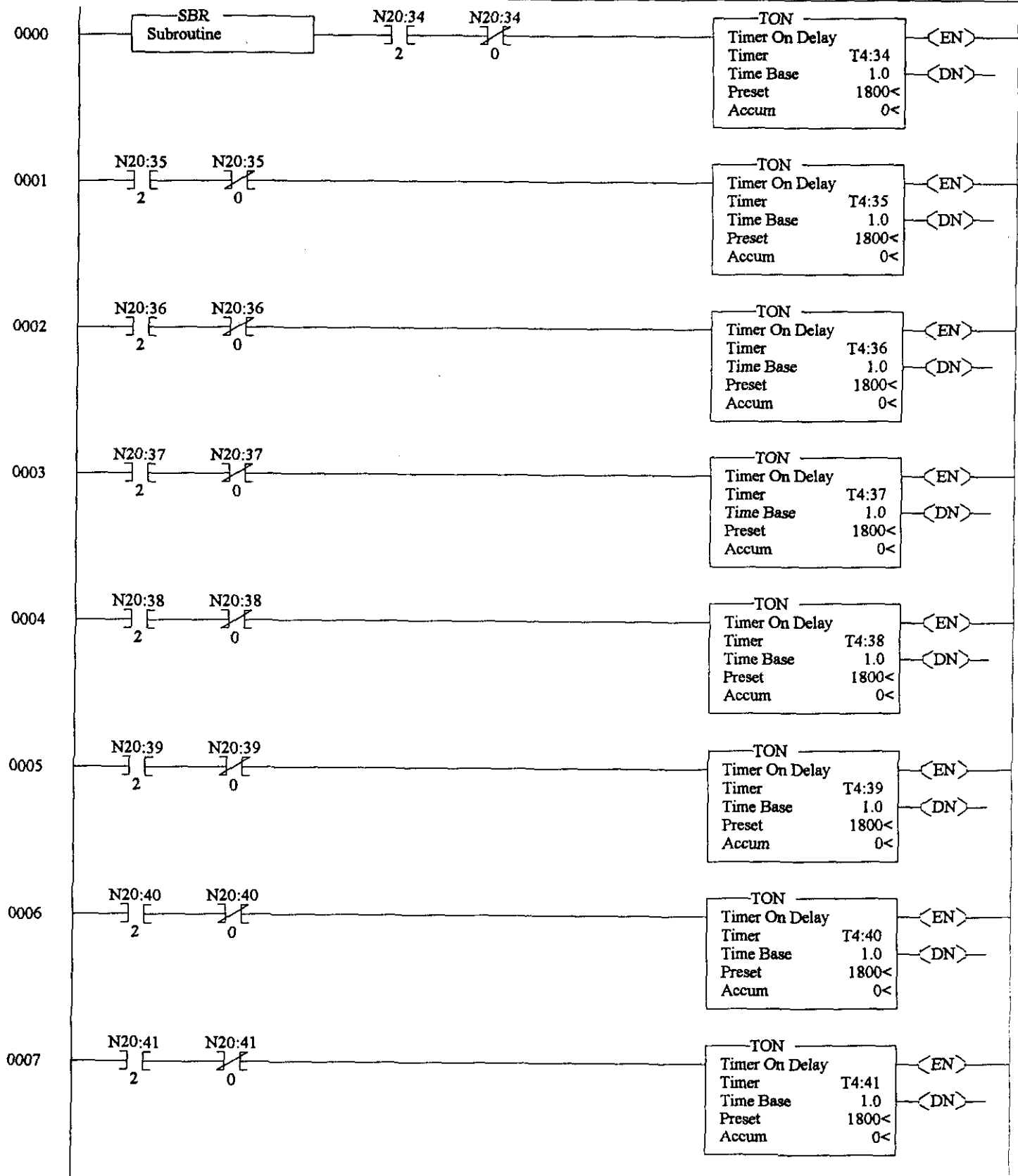


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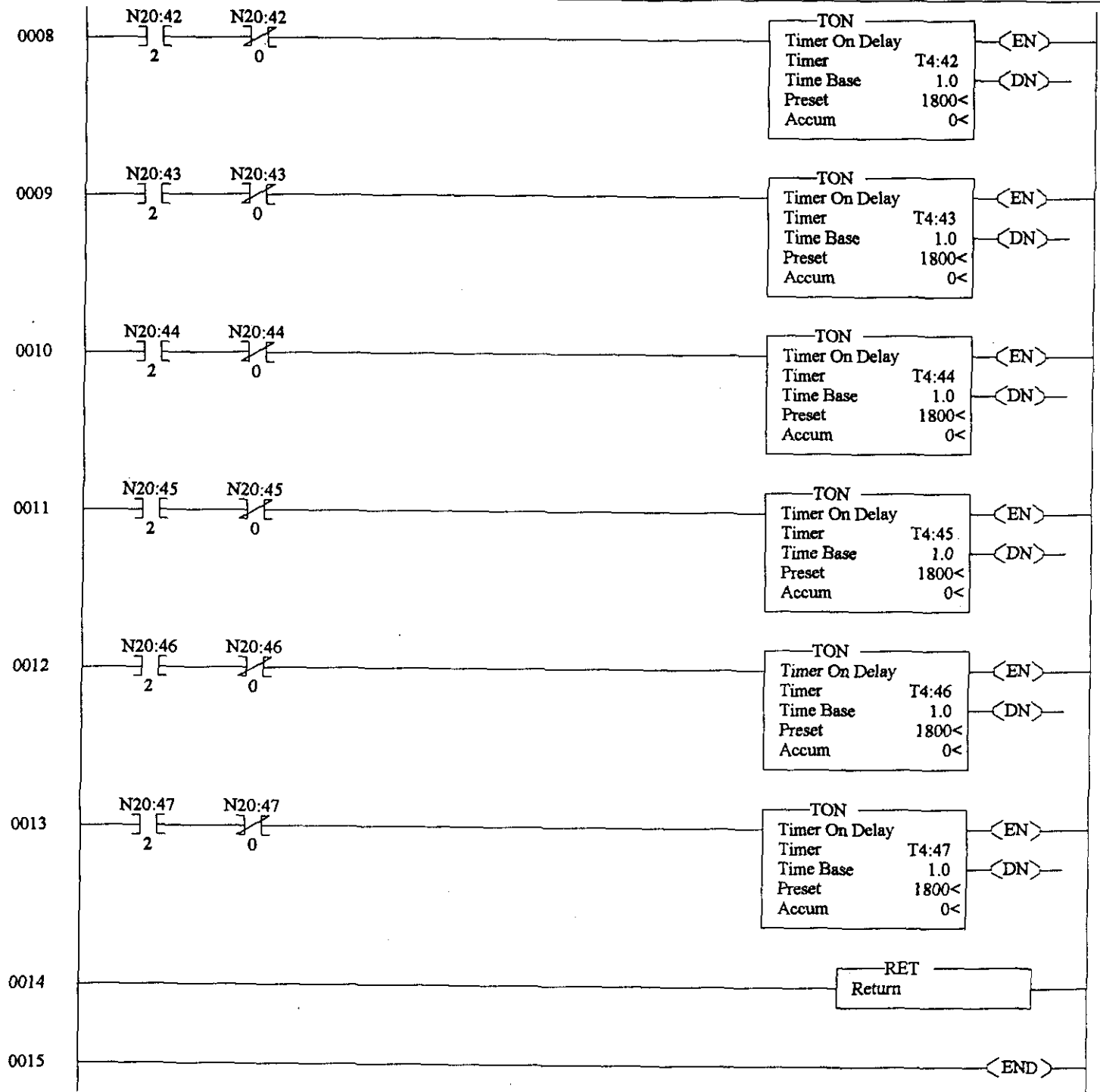




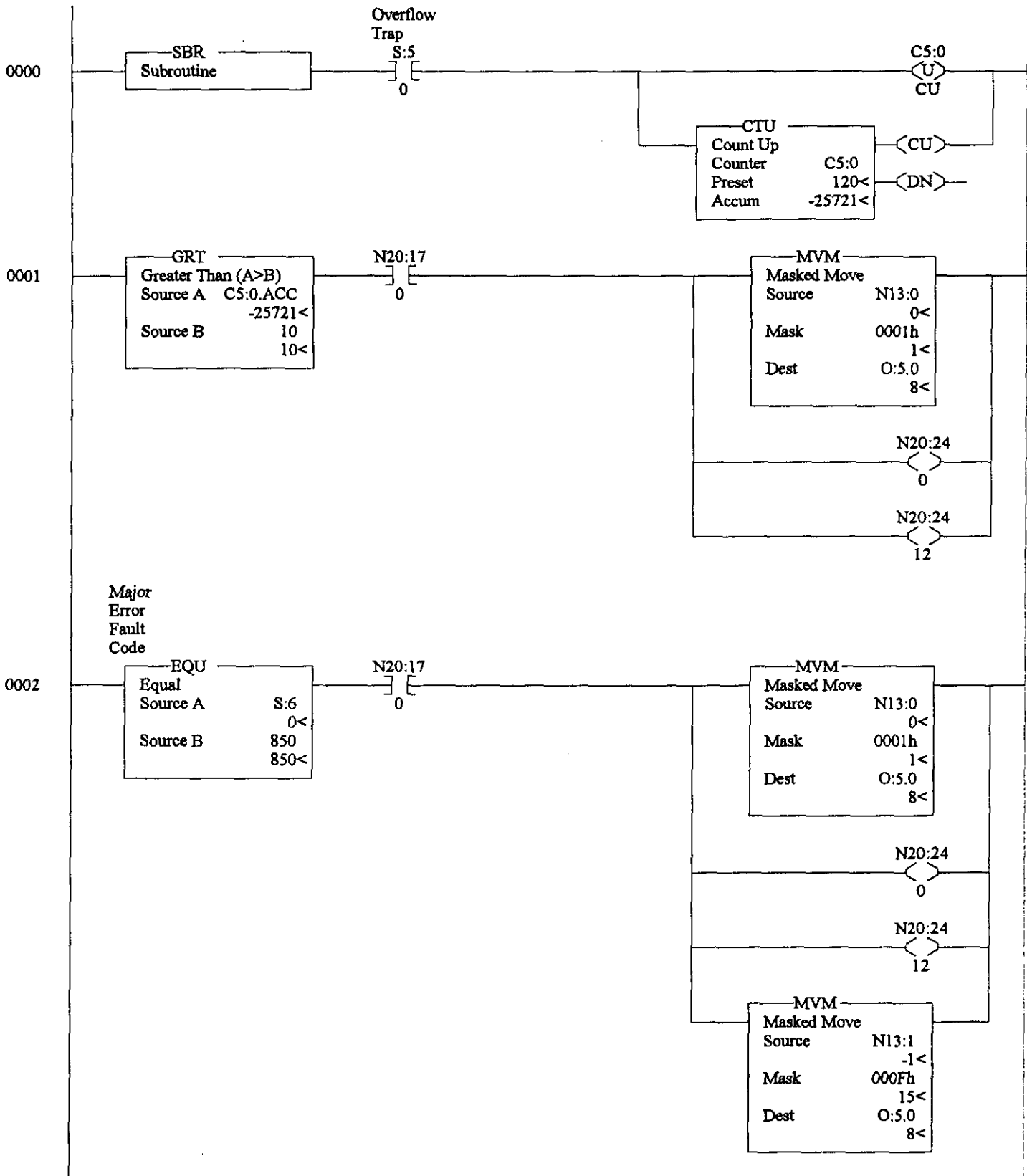
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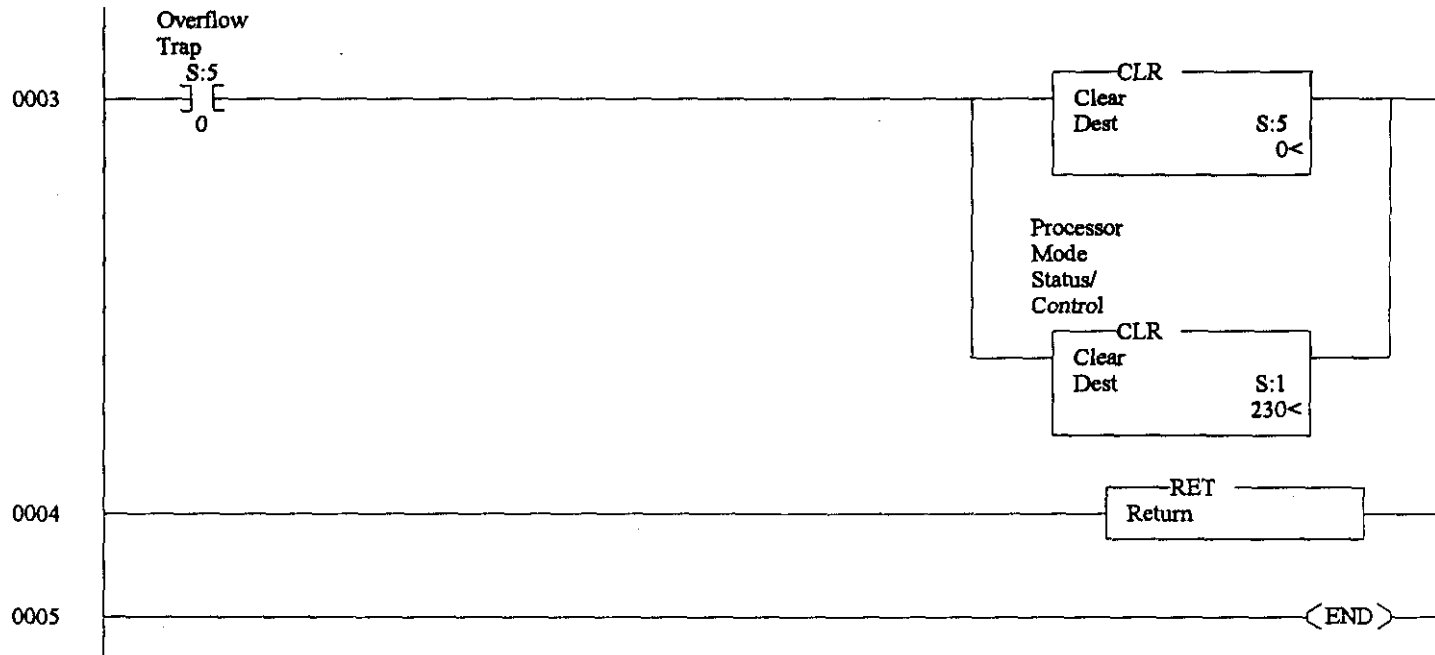
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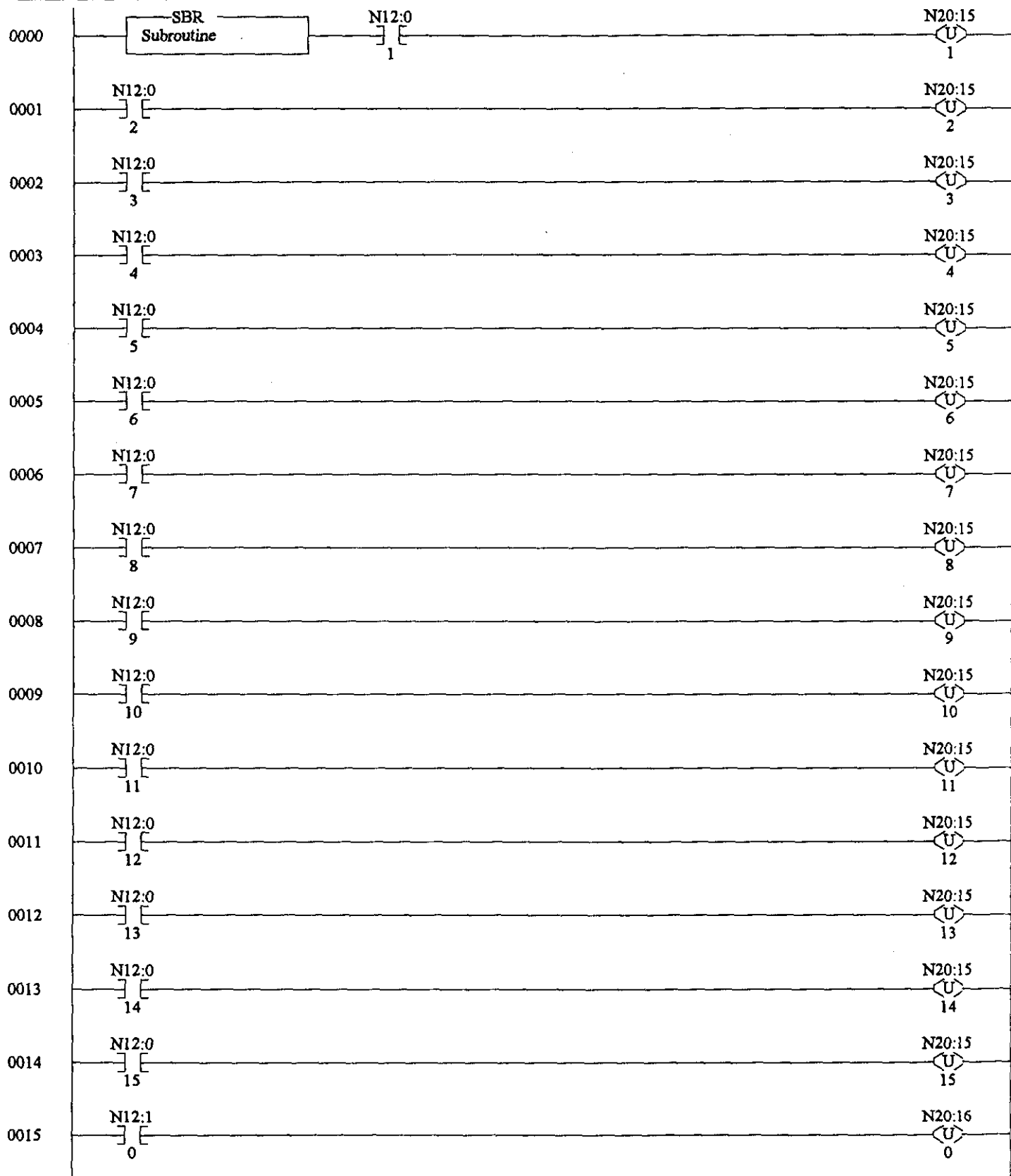
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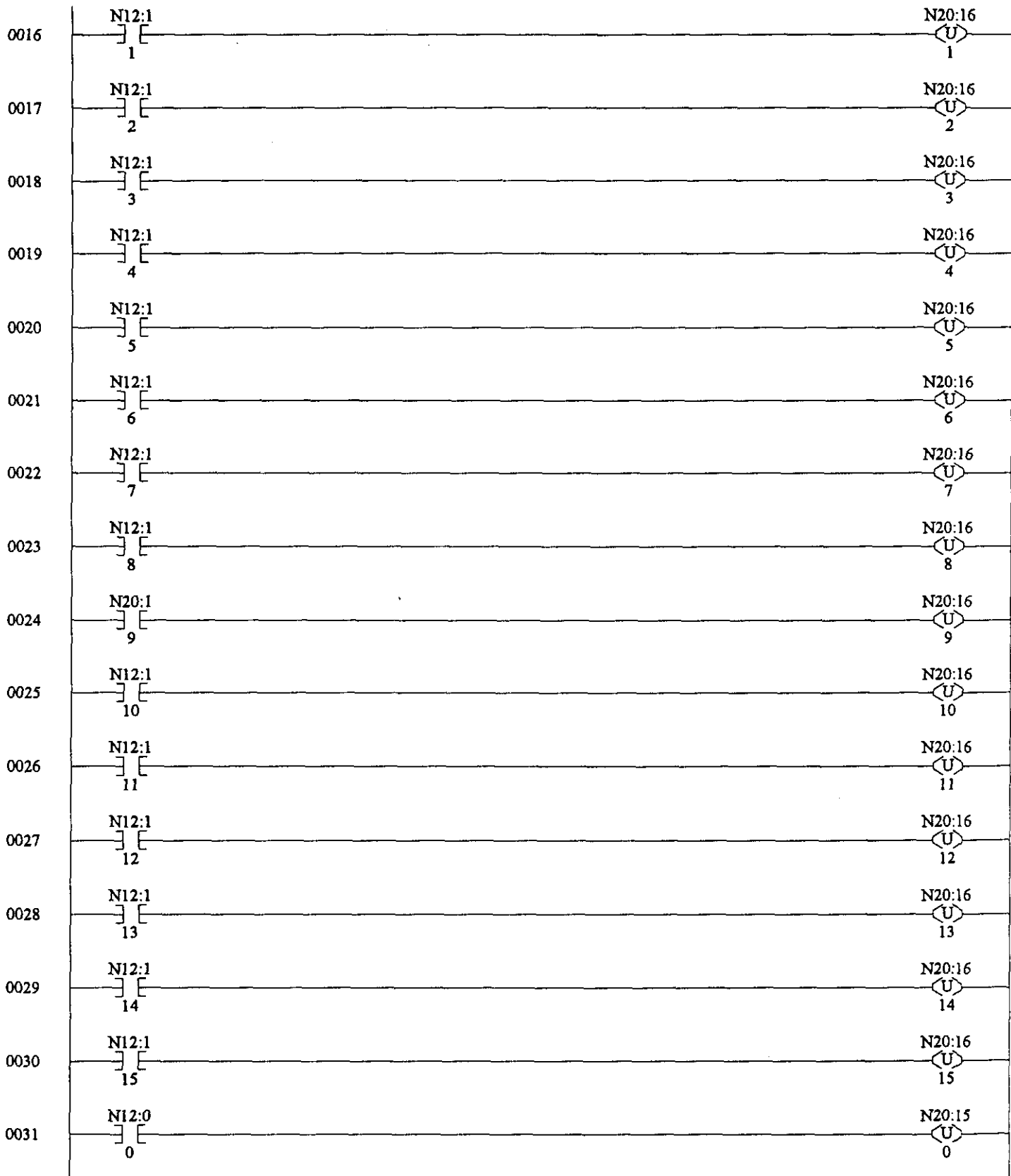
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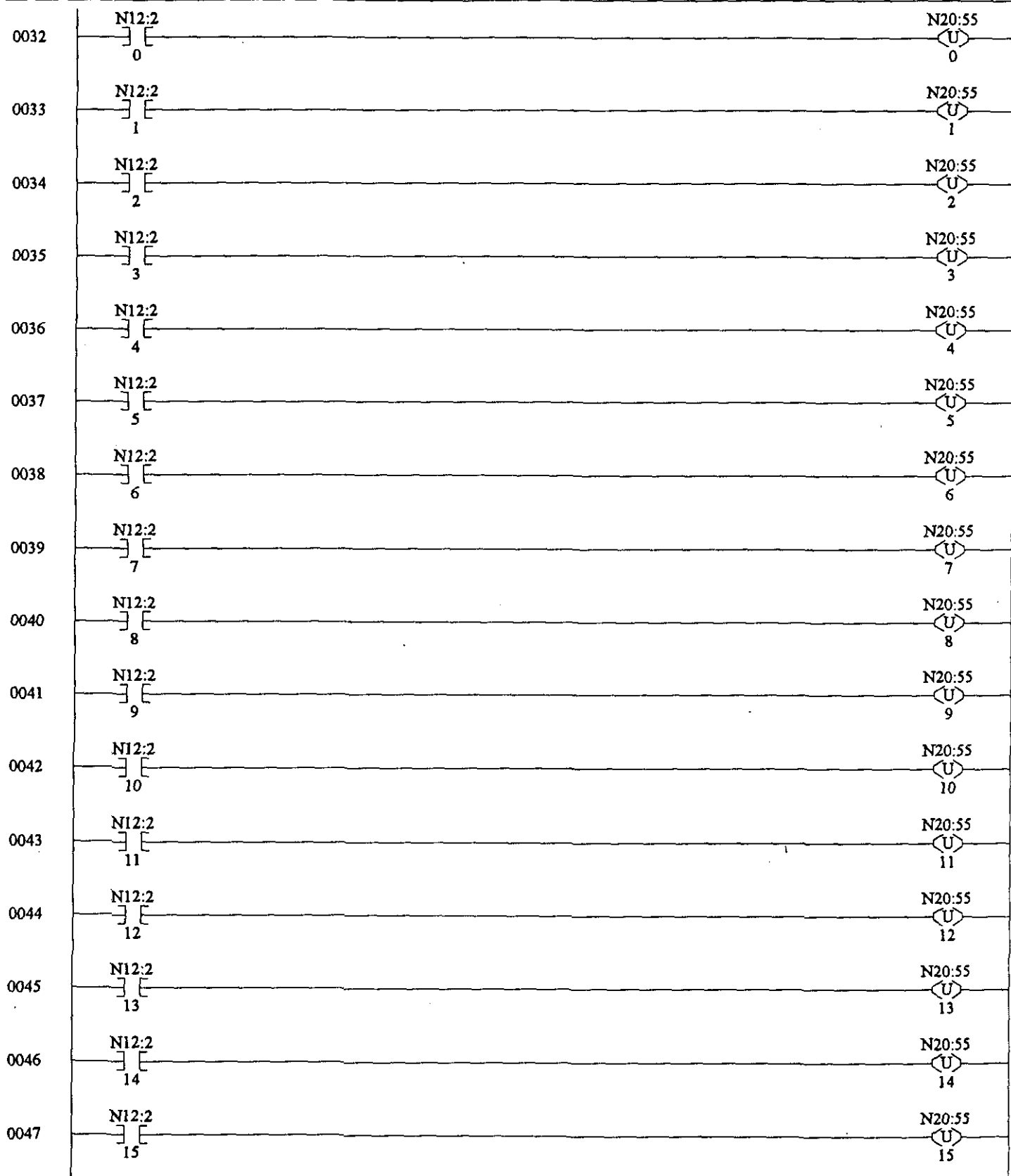
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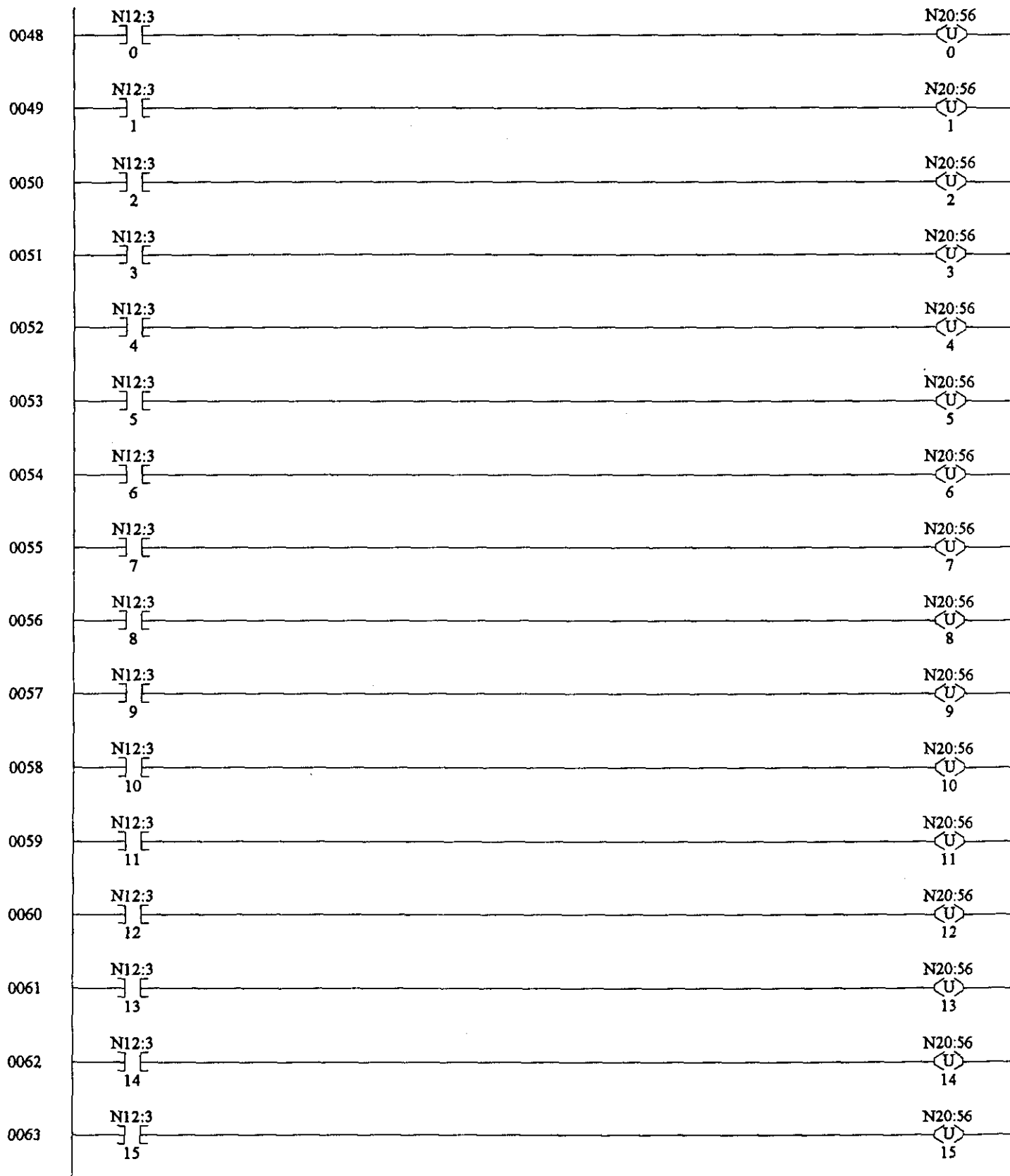
LAD 17 - --- Total Rungs in File = 66



LAD 17 - --- Total Rungs in File = 66

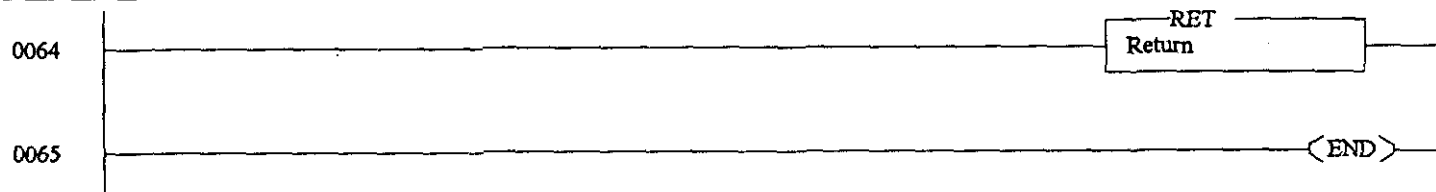


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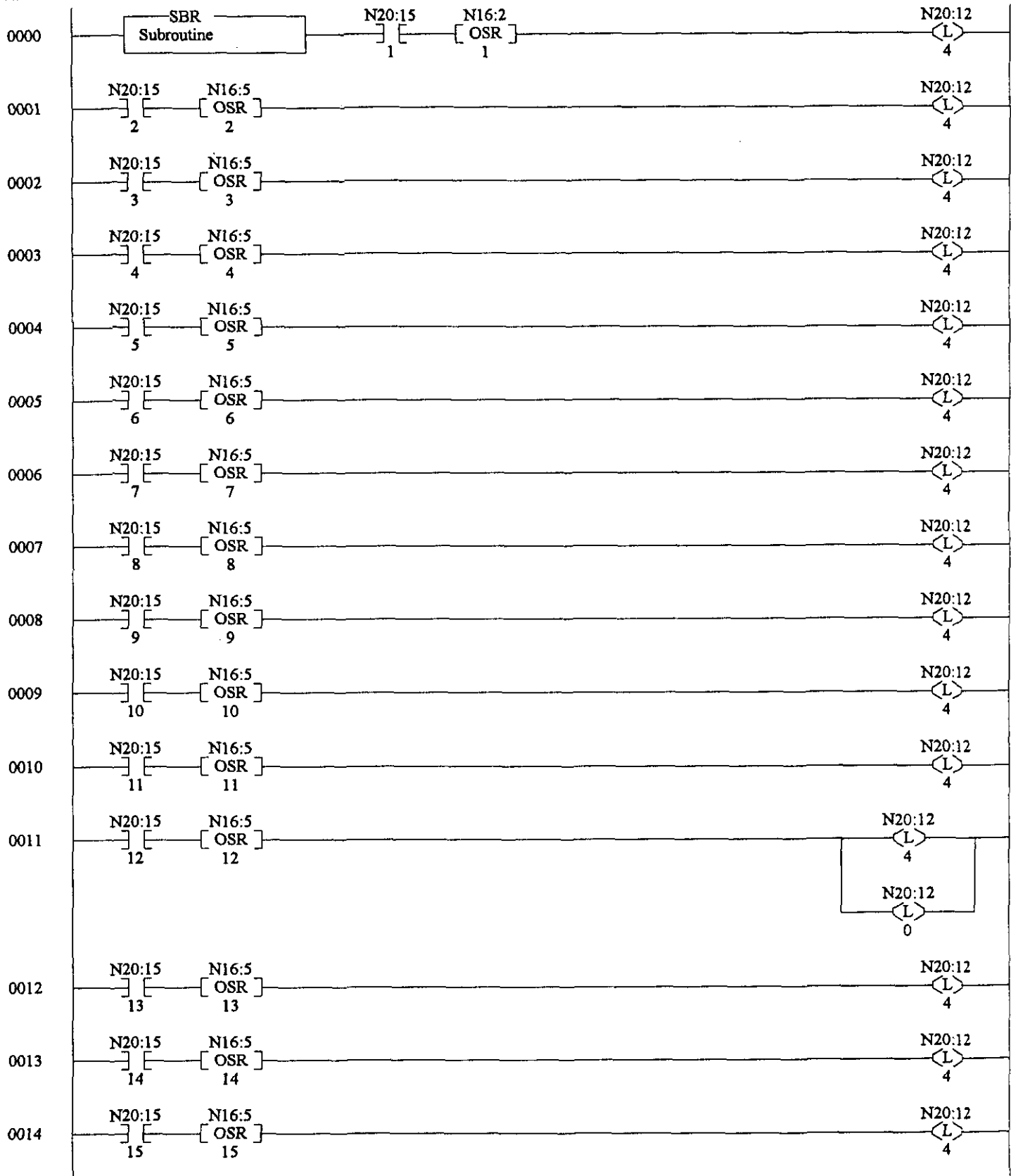




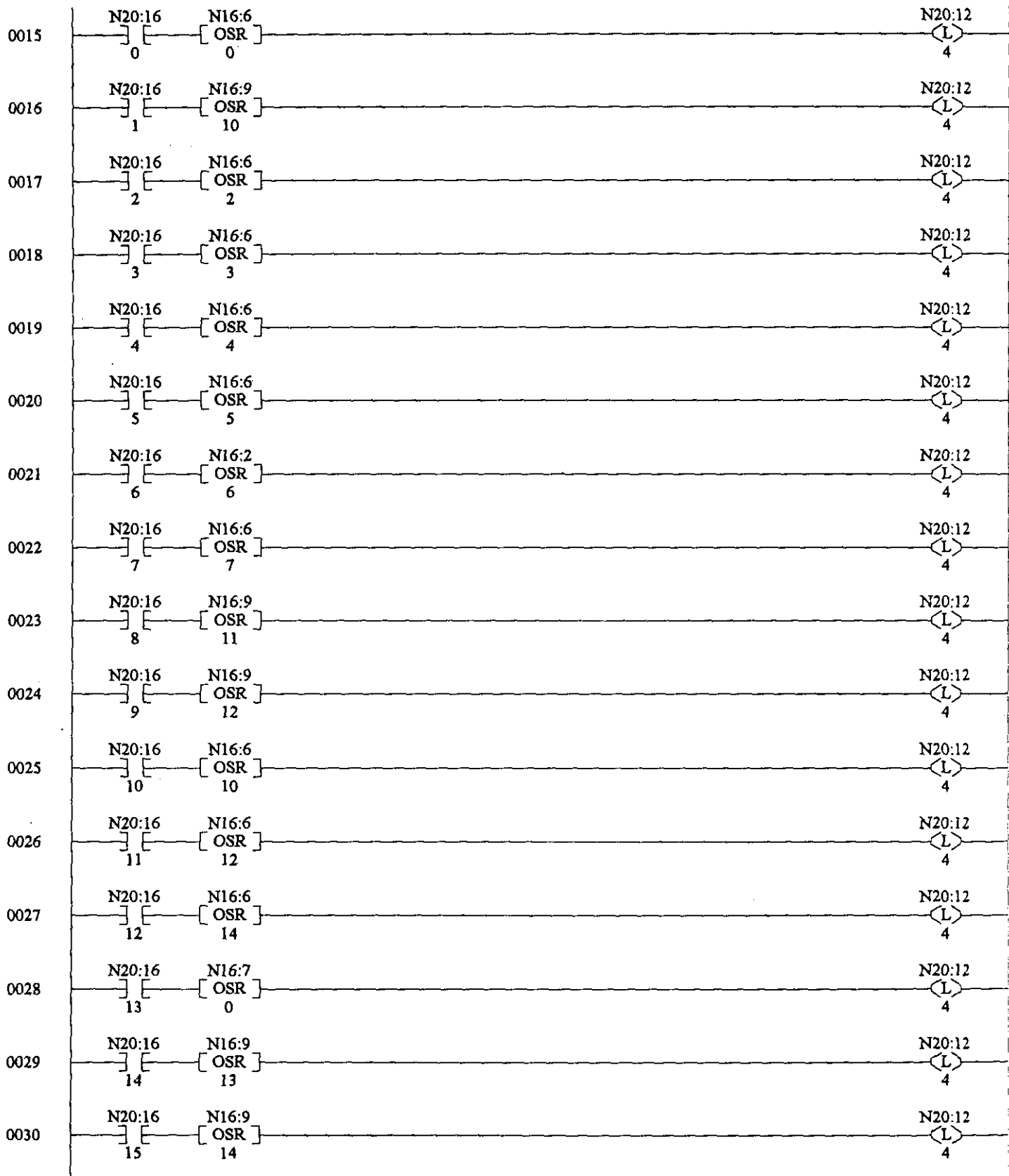
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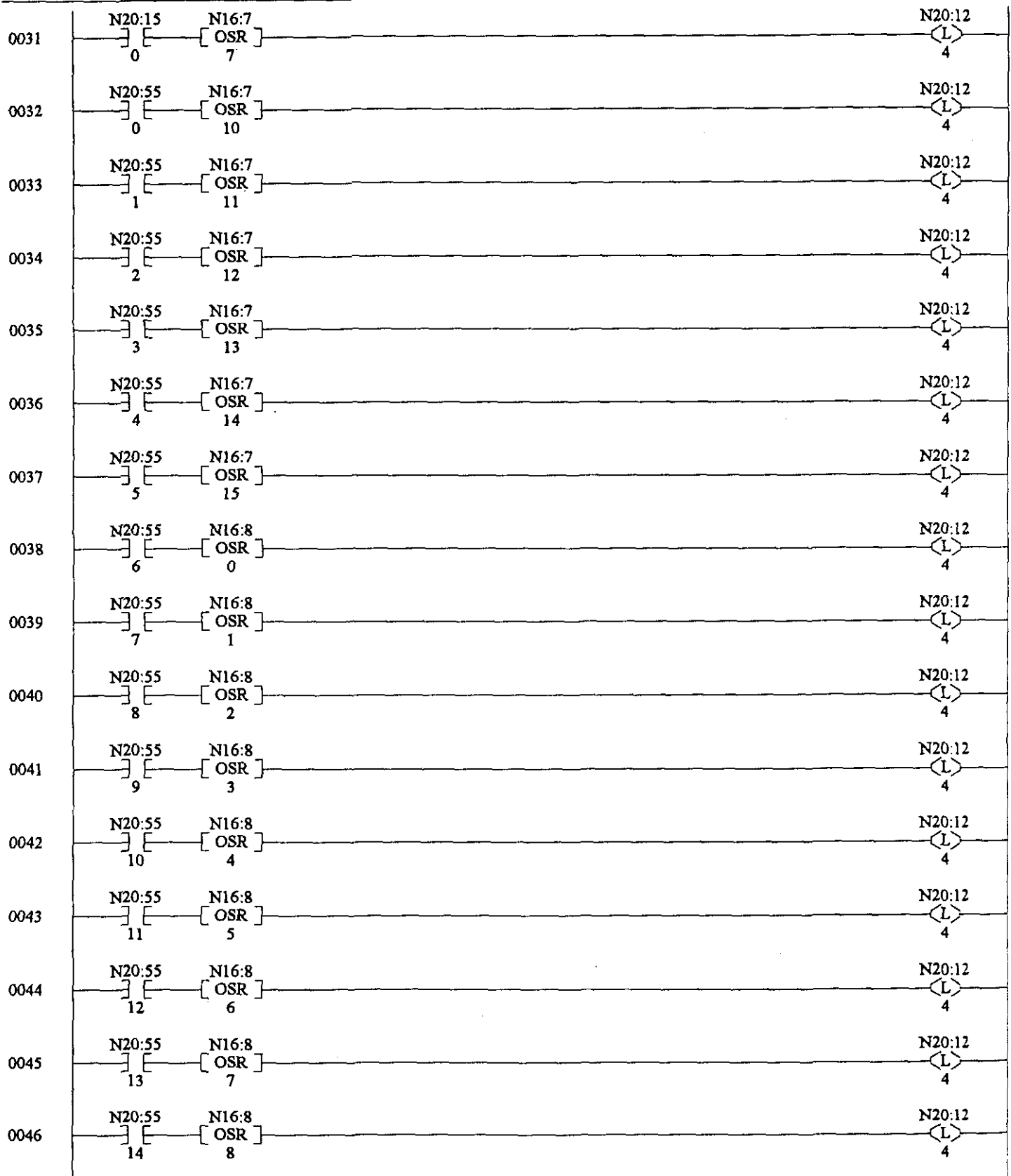
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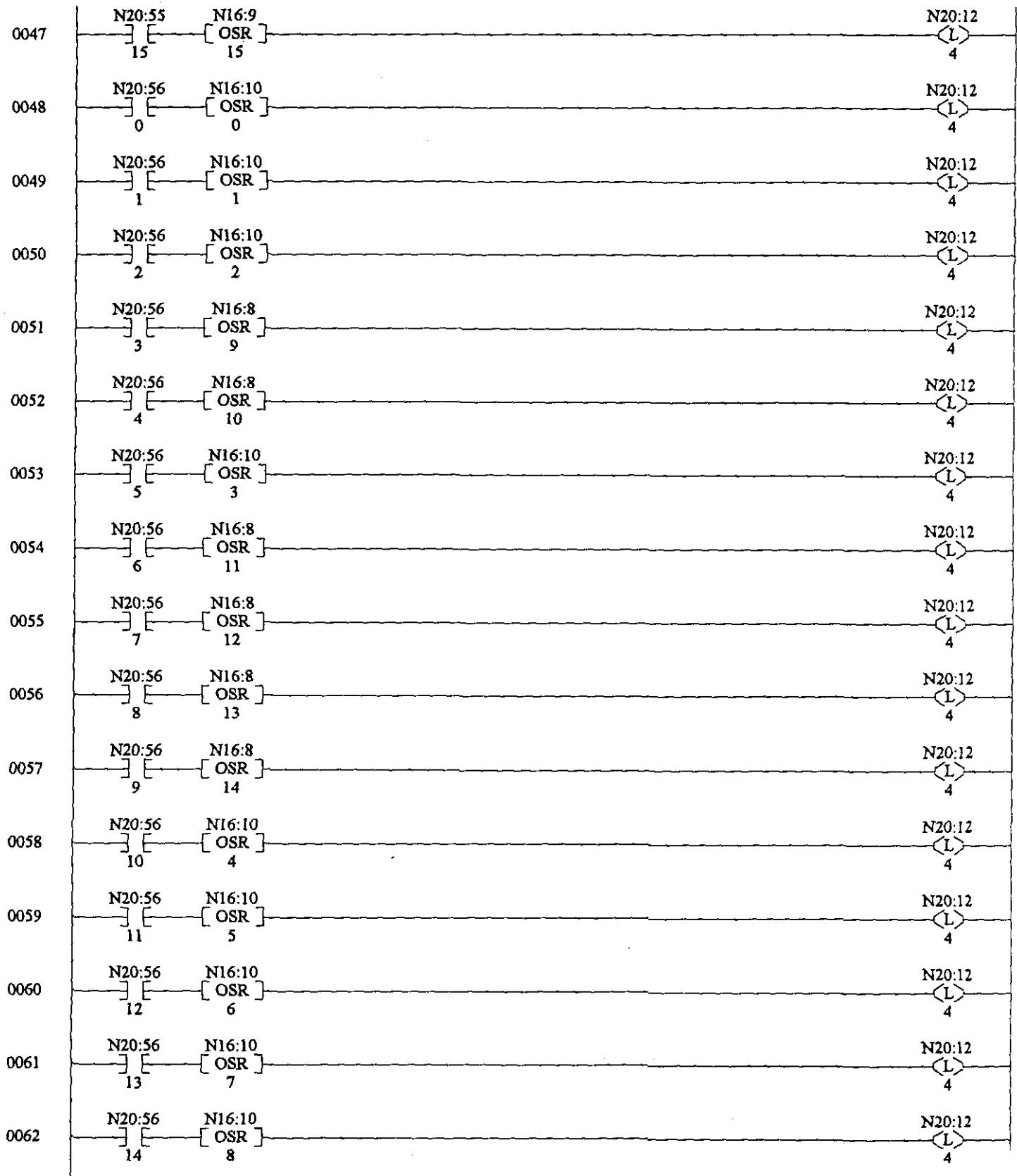
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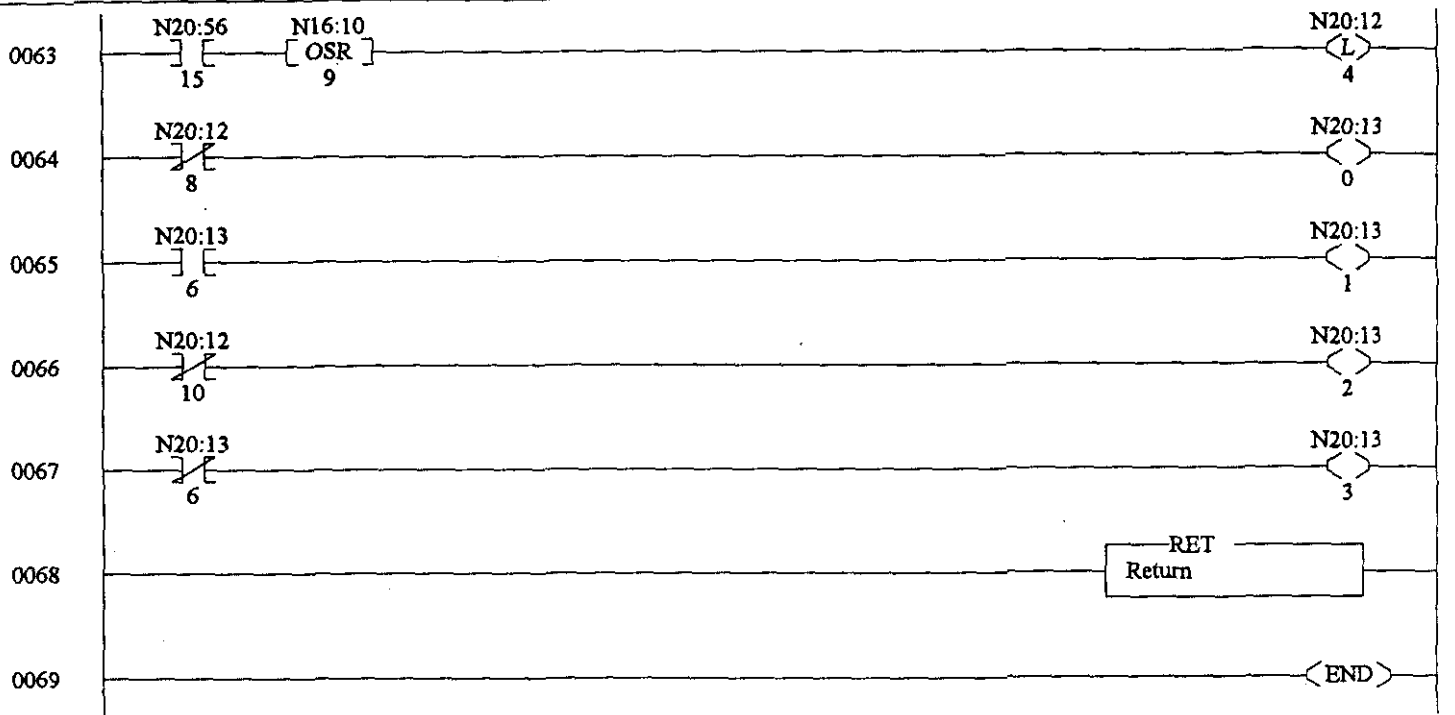
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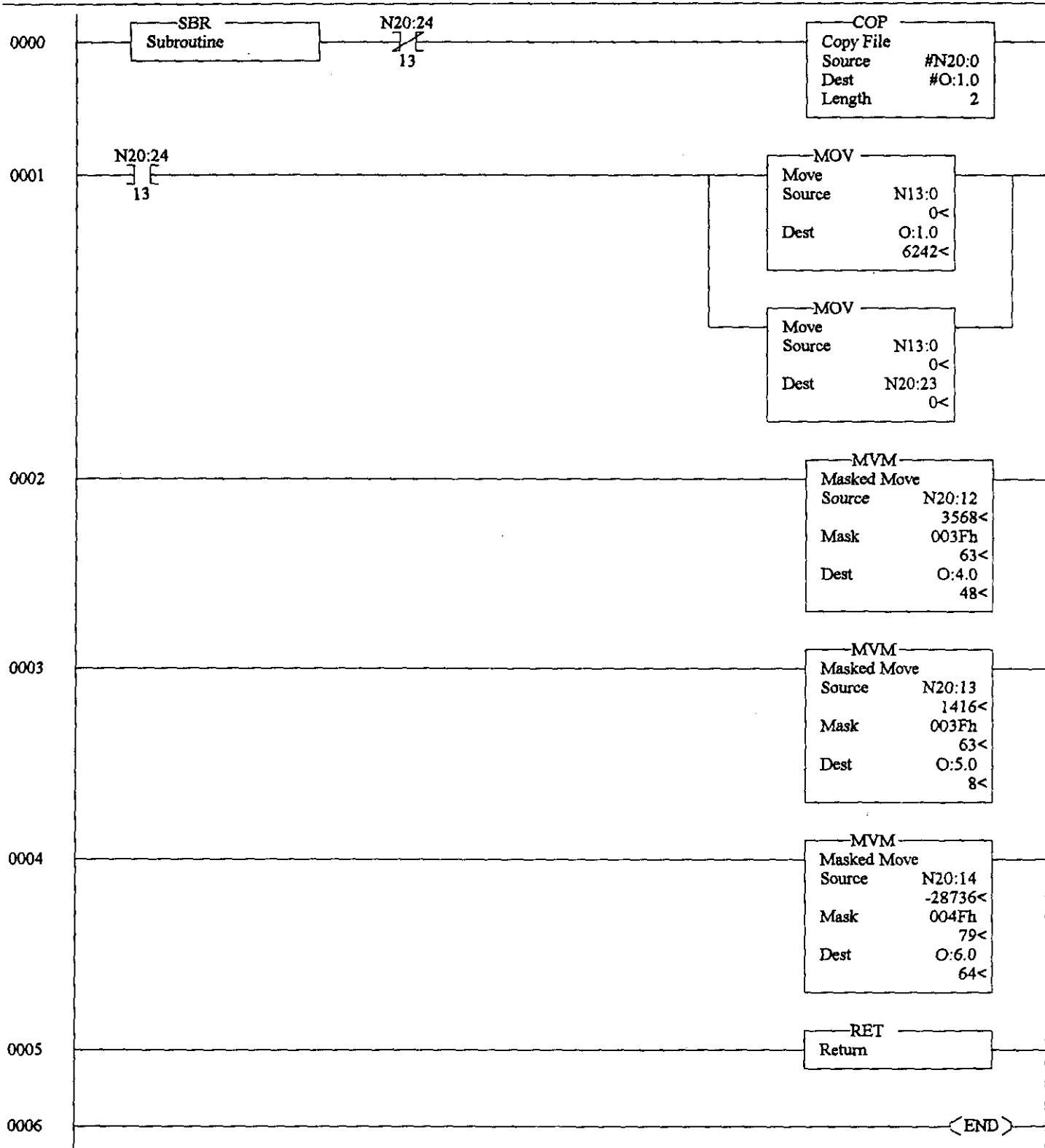
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LAD 18 - --- Total Rungs in File = 70



LAD 19 - --- Total Rungs in File = 7



term	sig	tag	move	description	Message		
O:1.0	AO	DOV	N20:0	DOV output			
O:1.1	AO	DILUTION	N20:1	Dilution control (future)			
I:1.0	AI	FGM	N20:2	FGM (analog)			
I:1.1	AI	Discharge	N20:3	PUMP DISCHARGE PRES.			
I:2.0	SGT	N20:4	N20:4	SGT specific grav 0-20 in H2O			
I:2.1	WFT	N20:5	N20:5	WFT weight factor tank 0-500 in H2O			
I:2.2	CVT	N20:6	N20:6	CVT flow meter (0 to 4 gpm)			
I:2.3	WTL	N20:7	N20:7	WTL water tank level 0-50 in H2O			
I:3.0	T/C	TE-6001A	N20:8	Instrument Enclosure Temp	Air Comper enclos temp Hi		
I:3.1	T/C	TE-6001J	N20:9	Pump Temp			
I:3.2	T/C	TE-6002J	N20:10	Jumper Temp			
I:3.3	T/C	TE-6004A	N20:11	Instrument Cab Temp	Cmptr Enclsr tmp Hi		
O:4.0	DO	HORN	N20:12/0	Horn			
O:4.1	DO	DO-2	N20:12/1	Jumper Heat trace On	Self regulate heat trace		
O:4.2	DO	DO-3	N20:12/2	Jumper Heat trace Hi shutoff	Self regulate heat trace		
O:4.3	DO	DILPMP	N20:12/3	Dilution pump, sol valve (spare)			
O:4.4	DO	ST-1	N20:12/4	Strobe light			
O:4.5	DO	EV-1	N20:12/5	True if Air to DOV (spare)			
I:4.0	DI	LS-1	N20:12/6	Limit switch 1 (LS-1)			
I:4.1	DI	LS-2	N20:12/7	JR-1 in flush Pos. (LS-2)			
I:4.2	DI	PS-1	N20:12/8	Lo Press xfer shut down			
I:4.3	DI	PS-1-1	N20:12/9	Hi Press xfer shut down			
I:4.4	DI	PS-2	N20:12/10	Hi Press flush shut down			
I:4.5	DI	REC-ALR	N20:12/11	Recirc Alarm			
O:5.0	DO	PL-1	N20:13/0	Light 1 LT-1			
O:5.1	DO	LN-1	N20:13/1	Light 3 LT-3			
O:5.2	DO	FPH-1	N20:13/2	Light 2 LT-2			
O:5.3	DO	XPH-1	N20:13/3	Light 4 LT-4			
O:5.4	DO	MS-1	N20:13/4	Pump motor switch On			
O:5.5	DO	SPARE	N20:13/5	SPARE			
I:5.0	DI	MR-1	N20:13/6	power monitor			
I:5.1	DI	LD-1	N20:13/7	Leak detector 1			
I:5.2	DI	LD-2	N20:13/8	Leak detector 2			
I:5.3	DI	DILWTR	N20:13/9	Oil tank water LOW (spare)			
I:5.4	DI	Recirc-prs	N20:13/10	Recirc Flush pressure alarm			
I:5.5	DI	FGM	N20:13/11	FGM			
O:6.0	DO	SPARE	N20:14/0				
O:6.1	DO	SPARE	N20:14/1				
O:6.2	DO	SPARE	N20:14/2				
O:6.3	DO	SPARE	N20:14/3				
O:6.4	DO	SPARE	N20:14/4				
O:6.5	DO	SPARE	N20:14/5				
I:6.0	DI	LDC1	N20:14/6	Leak detect TROUBLE 1			
I:6.1	DI	LDC2	N20:14/7	Leak detect TROUBLE 2			
I:6.2	DI	SPARE	N20:14/8	Reserve for PS-2 (ask Chuck for detail)			
I:6.3	DI	Seimic	N20:14/9	Seimic Switch (spare)			
I:6.4	DI	SSC	N20:14/10	Safety Shutdown Circuit (spare)			
I:6.5	DI	DOME	N20:14/11	Dome Pressure (spare)			
		ALARM	ALARM ACKNOWLEDGE				DTAM
		1=alarm	1=ACK				1=Ack
		0=no alarm	0=NOT ACK				0=No ack
		N20:24/0	N20:15/0	(spare)	MPSD		N12:0/0
		N20:24/1	N20:15/1	PS-1 Low Press Xfer	PS-1	I:4.2	N12:0/1
		N20:24/2	N20:15/2	PS-1-1 Hi Press Xfer	PS-1-1	I:4.3	N12:0/2
		N20:24/3	N20:15/3	PS-2 Hi Press Flush	PS-2	I:4.4	N12:0/3
		N20:24/4	N20:15/4	Pump Trouble	PUMP PROBLEM	I:5.0/0	N12:0/4
		N20:24/5	N20:15/5	JR-1 in Flush	FLUSH	I:4.1	N12:0/5
		N20:24/6	N20:15/6	Pump pit Leak	Pump pit Leak	I:5.0/1	N12:0/6
		N20:24/7	N20:15/7	Pump pit Leak Trouble	Pump pit Trouble	I:6.0/0	N12:0/7
		N20:24/8	N20:15/8	Jmpr heat trace Trouble	Heat trace Trouble		N12:0/8





		N20:17/5	Clear Counter	node 6= SX106	
		N20:17/6	auto/manual	node 7= S106	
		N20:17/7	SIMULATE	node 8= Leak dect station#2, s farm	
				node 9= Leak dect station#3, sx farm	
		N20:17/8	Send Message	node 10= Leak dect station#1, s farm	
		N20:17/9			
		N20:17/10	Master Acknowledge		
		N20:17/11	Transmit Trouble		
		N20:17/12	Retry Message		
		N20:17/13			
		N20:17/14			
		N20:17/15	Reset Counter		
	N10:2	N20:18	PID SET POINT		
	N10:3	N20:19	PID GAIN		
	N10:4	N20:20	PID RESET		
	N10:5	N20:21	PID RATE		
	N10:28	N20:22	PROCESS VARIABLE		
	N10:29	N20:23	PID OUTPUT		
	N10:13	N20:26	LOOP UPDATE		
	S:9	N20:27	STATION ON DH485		
	S:10		Watch for Exhaust skid		
	N15:0	N20:28			
	N15:5	N20:29			
	C5:1.ACC	N20:30	TOTAL 1		
	C5:2.ACC	N20:31	TOTAL 2		
		N20:32/0	PRIME		
		N20:32/1	FLUSH		
		N20:32/2	SHUTDOWN		
		N20:32/3	LEAK1		
		N20:32/4	LEAK2		
		N20:32/5	Flush Press HI		
		N20:32/6	Recirc Press HI		
		N20:32/7			
		N20:32/8			
		N20:32/9			
		N20:32/10			
		N20:32/11			
		N20:32/12			
		N20:32/13			
		N20:32/14			
		N20:32/15			
			242S SLC NODE #1		
		N20:33/0			
		N20:33/1			
		N20:33/2			
		N20:33/3			
		N20:33/4	MASTER PUMP SHUTDOWN		
		N20:33/5	Leak Station Trouble (Station2 node 8)		
		N20:33/6	Leak Station Trouble (Station3 node 9)		
		N20:33/7	Leak Station Trouble (station1 node 10)		
		N20:33/8	SY Leak	sy-02a input 0	
		N20:33/9		sy-a input 1	
		N20:33/10		sy-b input 5	
		N20:33/11			
		N20:33/12			
		N20:33/13			
		N20:33/14			
		N20:33/15			
			S-102 SLC NODE #2		
		N20:34/0	NODE #2 PRIME		
		N20:34/1	NODE #2 FLUSH		
		N20:34/2	NODE #2 SHUTDOWN		

		N20:34/3	NODE #2 LEAK 1			
		N20:34/4	NODE #2 LEAK 2			
		N20:34/5	Node #2 Flush Press Hi			
		N20:34/6	Node #2 Recirc Press Hi			
		N20:34/7				
		N20:34/8				
		N20:34/9				
		N20:34/10				
		N20:34/11				
		N20:34/12				
		N20:34/13				
		N20:34/14				
		N20:34/15				
			EM-2 SLC NODE #3			
		N20:35/0	NODE #3 PRIME			
		N20:35/1	NODE #3 FLUSH			
		N20:35/2	NODE #3 SHUTDOWN			
		N20:35/3	NODE #3 LEAK 1			
		N20:35/4	NODE #3 LEAK 2			
		N20:35/6				
		N20:35/7				
		N20:35/8				
		N20:35/9				
		N20:35/10				
		N20:35/11				
		N20:35/12				
		N20:35/13				
		N20:35/14				
		N20:35/15				
			S-103 NODE #4			
		N20:36/0	NODE #4 PRIME			
		N20:36/1	NODE #4 FLUSH			
		N20:36/2	NODE #4 SHUTDOWN			
		N20:36/3	NODE #4 LEAK1			
		N20:36/4	NODE #4 LEAK 2			
		N20:36/5	Node #4 Flush Press Hi			
		N20:36/6	Node #4 Recirc Press Hi			
		N20:36/7				
		N20:36/8				
		N20:36/9				
		N20:36/10				
		N20:36/11				
		N20:36/12				
		N20:36/13				
		N20:36/14				
		N20:36/15				
			SX-104 NODE #5			
		N20:37/0	NODE #5 PRIME			
		N20:37/1	NODE #5 FLUSH			
		N20:37/2	NODE #5 SHUTDOWN			
		N20:37/3	NODE #5 LEAK 1			
		N20:37/4	NODE #5 LEAK 2			
		N20:37/5	Node #5 Flush Press Hi			
		N20:37/6	Node #5 Recirc Press Hi			
		N20:37/7				
		N20:37/8				
		N20:37/9				
		N20:37/10				
		N20:37/11				
		N20:37/12				
		N20:37/13				
		N20:37/14				

		N20:37/15			
		N20:37/16			
		N20:37/17			
			SX-106 NODE #6		
		N20:38/0	NODE #6 PRIME		
		N20:38/1	NODE #6 FLUSH		
		N20:38/2	NODE #6 SHUTDOWN		
		N20:38/3	NODE #6 LEAK 1		
		N20:38/4	NODE #6 LEAK 2		
		N20:38/5	Node #6 Flush Press Hi		
		N20:38/6	Node #6 Recirc Press Hi		
		N20:38/7			
		N20:38/8			
		N20:38/9			
		N20:38/10			
		N20:38/11			
		N20:38/12			
		N20:38/13			
		N20:38/14			
		N20:38/15			
			S-106 NODE #7		
		N20:39/0	NODE #7 PRIME		
		N20:39/1	NODE #7 FLUSH		
		N20:39/2	NODE #7 SHUTDOWN		
		N20:39/3	NODE #7 LEAK 1		
		N20:39/4	NODE #7 LEAK 2		
		N20:39/5	Node #7 Flush Press Hi		
		N20:39/6	Node #7 Recirc Press Hi		
		N20:39/7			
		N20:39/8			
		N20:39/9			
		N20:39/10			
		N20:39/11			
		N20:39/12			
		N20:39/13			
		N20:39/14			
		N20:39/15			
			241S Leak detector station NODE #8		
		N20:48/0	SC Valve Pit Leak (input 0)		
		N20:48/1	SC Valve Pit Leak Trouble (input 1)		
		N20:48/2	SD Valve Pit/OGT Leak (input 2)		
		N20:48/3	SD Valve Pit/OGT Trouble (input 3)		
		N20:48/4	COB (odd) Leak (input 4)		
		N20:48/5	COB (odd) Trouble (input 5)		
		N20:48/6	S107 Leak (input 6)		
		N20:48/7	S107 Leak Trouble (input 7)		
		N20:48/8			
		N20:48/9			
		N20:48/10			
		N20:48/11			
		N20:48/12			
		N20:48/13			
		N20:48/14			
		N20:48/15			
			241SX Leak detector station NODE #9		
		N20:49/0	SX-A Leak (input 0)		
		N20:49/1	SX-A Leak trouble (input 1)		
		N20:49/2	SX-B Leak (input 2)		
		N20:49/3	SX-B Leak trouble (input 3)		
		N20:49/4	Cob #16,18,20,22 Leak (input 6)		
		N20:49/5	Cob #16,18,20,22 Leak trouble (input 7)		
		N20:49/6			

			N20:49/7				
			N20:49/8				
			N20:49/9				
			N20:49/10				
			N20:49/11				
			N20:49/12				
			N20:49/13				
			N20:49/14				
			N20:49/15				
				Leak Detector Station 4 NODE #10			
			N20:50/0	SA valve pit LEAK (input 0)			
			N20:50/1	SA valve pit TROUBLE (input 1)			
			N20:50/2	SB valve pit LEAK (input 2)			
			N20:50/3	SB valve pit TROUBLE (input 3)			
			N20:50/4	OGT (SBvp) LEAK (input 4)			
			N20:50/5	OGT (SBvp) TROUBLE (input 5)			
			N20:50/6				
			N20:50/7				
			N20:50/8				
			N20:50/9				
			N20:50/10				
			N20:50/11				
			N20:50/12				
			N20:50/13				
			N20:50/14				
			N20:50/15				

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