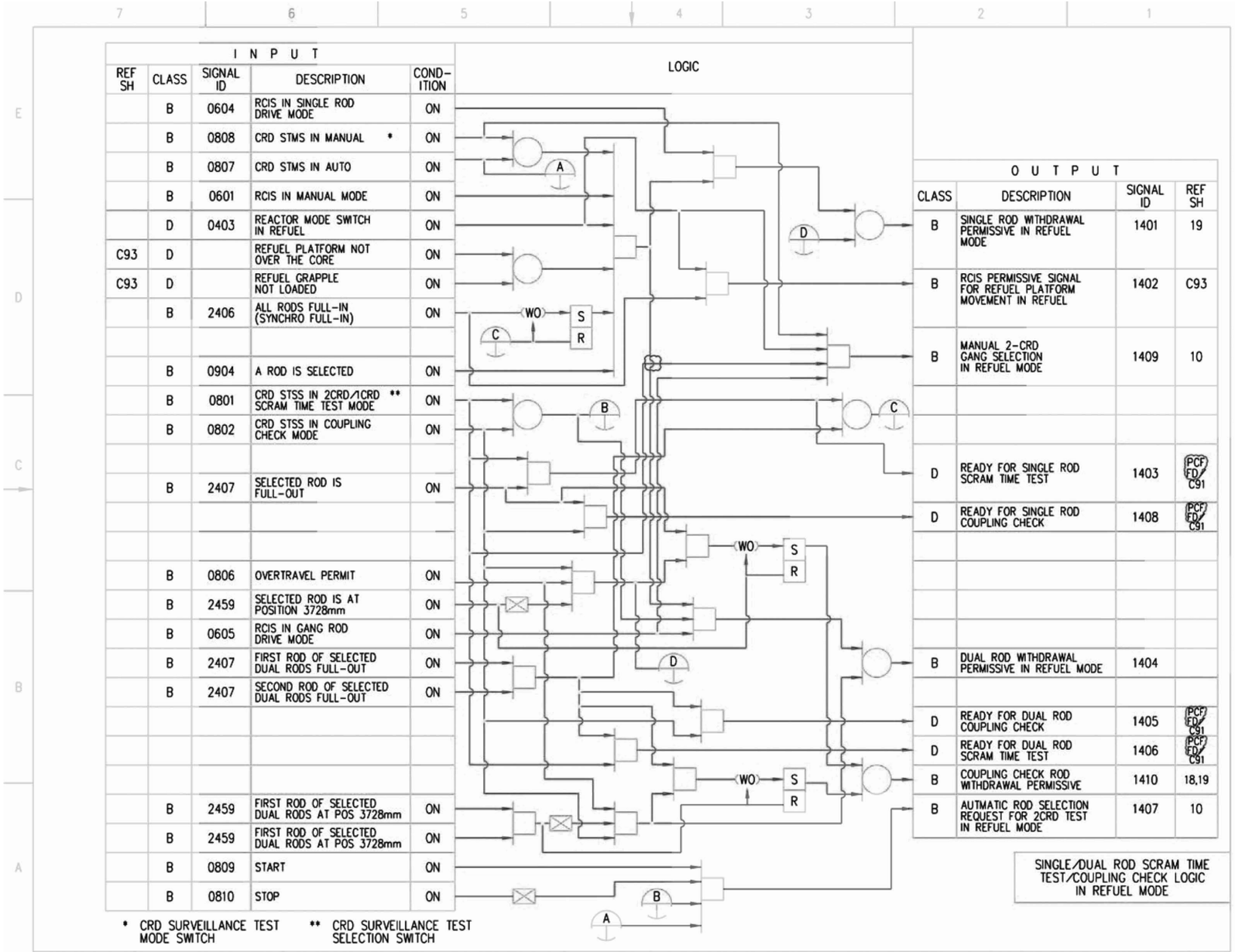
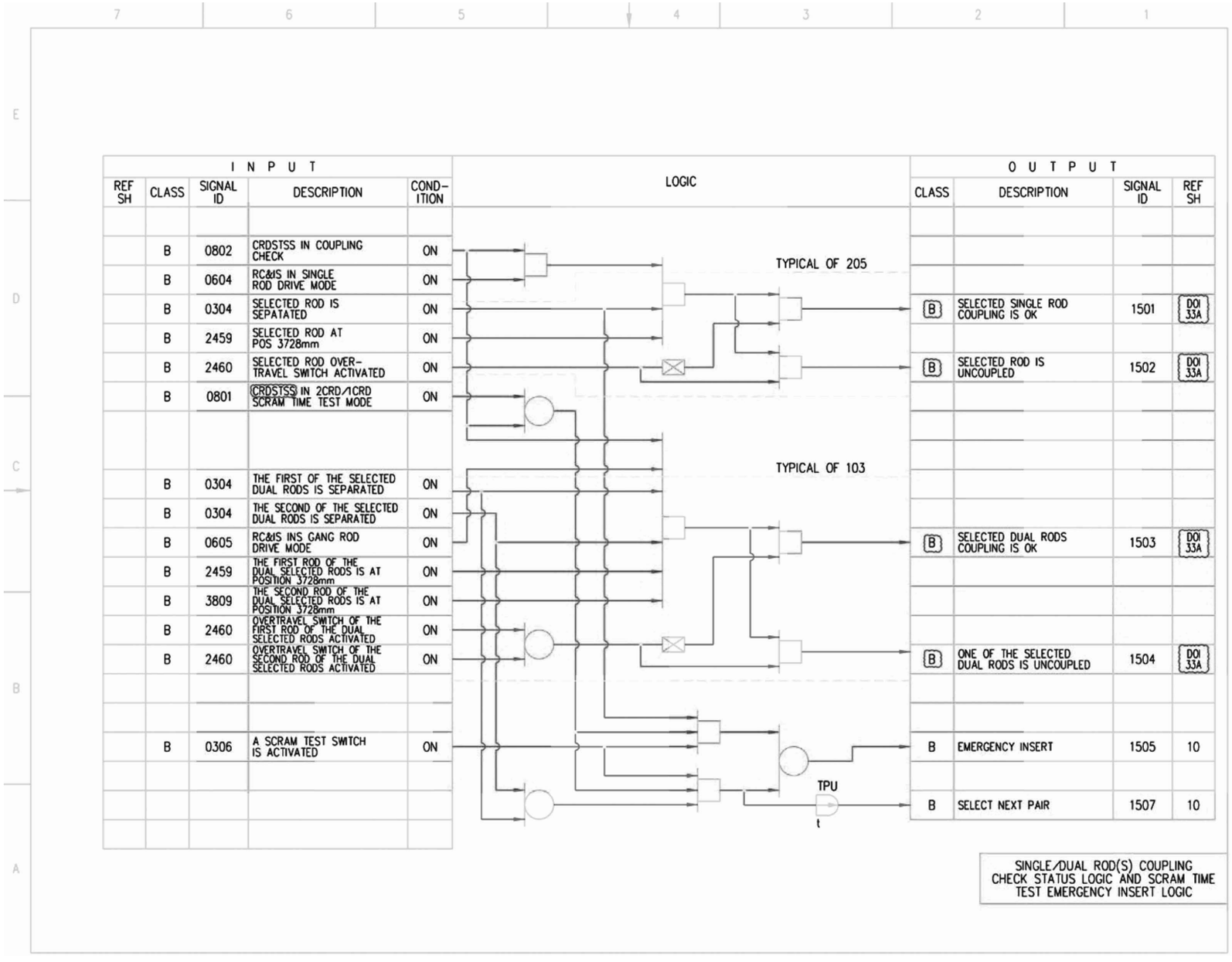


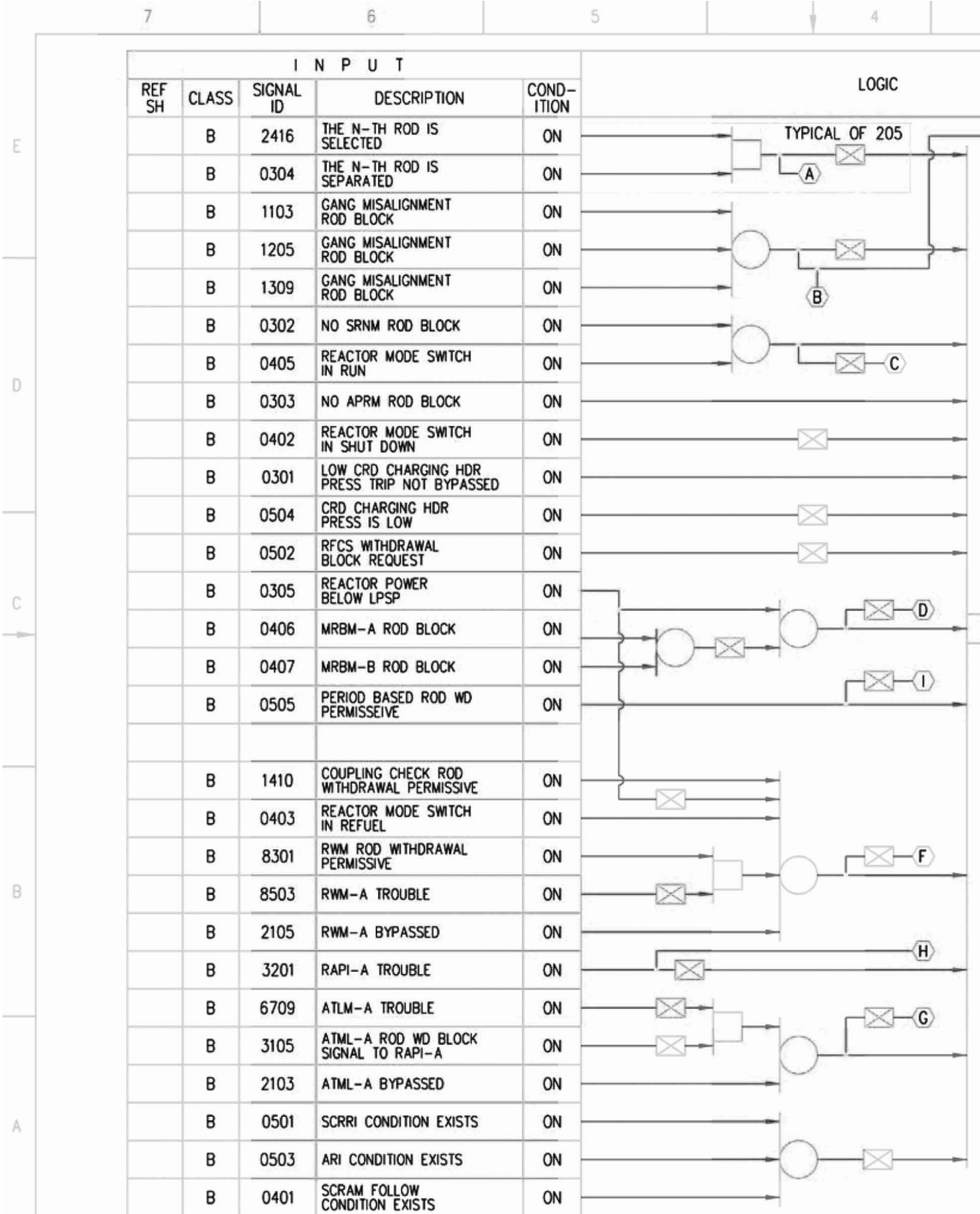
Figure 7.7-3 – Rod Control and Information System IBD (Sheet 14 of 87)



INPUT					LOGIC	OUTPUT			
REF SH	CLASS	SIGNAL ID	DESCRIPTION	COND-ITION		CLASS	DESCRIPTION	SIGNAL ID	REF SH
	B	0802	CRDSTSS IN COUPLING CHECK	ON					
	B	0604	RC&IS IN SINGLE ROD DRIVE MODE	ON					
	B	0304	SELECTED ROD IS SEPATATED	ON		B	SELECTED SINGLE ROD COUPLING IS OK	1501	DOI 33A
	B	2459	SELECTED ROD AT POS 3728mm	ON					
	B	2460	SELECTED ROD OVER-TRAVEL SWITCH ACTIVATED	ON		B	SELECTED ROD IS UNCOUPLED	1502	DOI 33A
	B	0801	CRDSTSS IN 2CRD/1CRD SCRAM TIME TEST MODE	ON					
	B	0304	THE FIRST OF THE SELECTED DUAL RODS IS SEPARATED	ON					
	B	0304	THE SECOND OF THE SELECTED DUAL RODS IS SEPARATED	ON					
	B	0605	RC&IS INS GANG ROD DRIVE MODE	ON		B	SELECTED DUAL RODS COUPLING IS OK	1503	DOI 33A
	B	2459	THE FIRST ROD OF THE DUAL SELECTED RODS IS AT POSITION 3728mm	ON					
	B	3809	THE SECOND ROD OF THE DUAL SELECTED RODS IS AT POSITION 3728mm	ON					
	B	2460	OVERTRAVEL SWITCH OF THE FIRST ROD OF THE DUAL SELECTED RODS ACTIVATED	ON					
	B	2460	OVERTRAVEL SWITCH OF THE SECOND ROD OF THE DUAL SELECTED RODS ACTIVATED	ON		B	ONE OF THE SELECTED DUAL RODS IS UNCOUPLED	1504	DOI 33A
	B	0306	A SCRAM TEST SWITCH IS ACTIVATED	ON		B	EMERGENCY INSERT	1505	10
						B	SELECT NEXT PAIR	1507	10

Figure 7.7-3 – Rod Control and Information System IBD (Sheet 15 of 87)

INPUT				
REF SH	CLASS	SIGNAL ID	DESCRIPTION	COND-ITION
	B	2416	THE N-TH ROD IS SELECTED	ON
	B	0304	THE N-TH ROD IS SEPARATED	ON
	B	1103	GANG MISALIGNMENT ROD BLOCK	ON
	B	1205	GANG MISALIGNMENT ROD BLOCK	ON
	B	1309	GANG MISALIGNMENT ROD BLOCK	ON
	B	0302	NO SRNM ROD BLOCK	ON
	B	0405	REACTOR MODE SWITCH IN RUN	ON
	B	0303	NO APRM ROD BLOCK	ON
	B	0402	REACTOR MODE SWITCH IN SHUT DOWN	ON
	B	0301	LOW CRD CHARGING HDR PRESS TRIP NOT BYPASSED	ON
	B	0504	CRD CHARGING HDR PRESS IS LOW	ON
	B	0502	RFCS WITHDRAWAL BLOCK REQUEST	ON
	B	0305	REACTOR POWER BELOW LPSP	ON
	B	0406	MRBM-A ROD BLOCK	ON
	B	0407	MRBM-B ROD BLOCK	ON
	B	0505	PERIOD BASED ROD WD PERMISSEIVE	ON
	B	1410	COUPLING CHECK ROD WITHDRAWAL PERMISSIVE	ON
	B	0403	REACTOR MODE SWITCH IN REFUEL	ON
	B	8301	RWM ROD WITHDRAWAL PERMISSIVE	ON
	B	8503	RWM-A TROUBLE	ON
	B	2105	RWM-A BYPASSED	ON
	B	3201	RAPI-A TROUBLE	ON
	B	6709	ATLM-A TROUBLE	ON
	B	3105	ATML-A ROD WD BLOCK SIGNAL TO RAPI-A	ON
	B	2103	ATML-A BYPASSED	ON
	B	0501	SCRRI CONDITION EXISTS	ON
	B	0503	ARI CONDITION EXISTS	ON
	B	0401	SCRAM FOLLOW CONDITION EXISTS	ON



OUTPUT			
CLASS	DESCRIPTION	SIGNAL ID	REF SH
ANN	GANG MISALIGNMENT ROD WD BLOCK	1802	
D	ROD SEPARATION ROD WD BLOCK CONDITION IDENT	1803	PCF FD/C91
D	GANG MISALIGNMENT ROD WD BLOCK CONDITION IDENT	1804	PCF FD/C91
D	SRNM ROD WD BLOCK CONDITION IDENT	1805	PCF FD/C91
D	MRBM ROD WD BLOCK CONTDITION IDENT	1806	PCF FD/C91
D	RWM ROD WD BLOCK CONDITION IDENT	1808	PCF FD/C91
B	ROD WITHDRAWAL PERMISSIVE NO.1	1801	19
D	ATLM-A TROUBLE/ROD WD BLOCK CONDITION IDENT	1809	PCF FD/C91
D	RAPI-A TROUBLE ROD WD BLOCK CONDITION IDENT	1810	PCF FD/C91
D	PERIOD BASED ROD WD BLOCK CONDITION IDENT	1811	PCF FD/C91

ROD WITHDRAWAL PERMISSIVE LOGIC 1/2

Figure 7.7-3 – Rod Control and Information System IBD (Sheet 18 of 87)

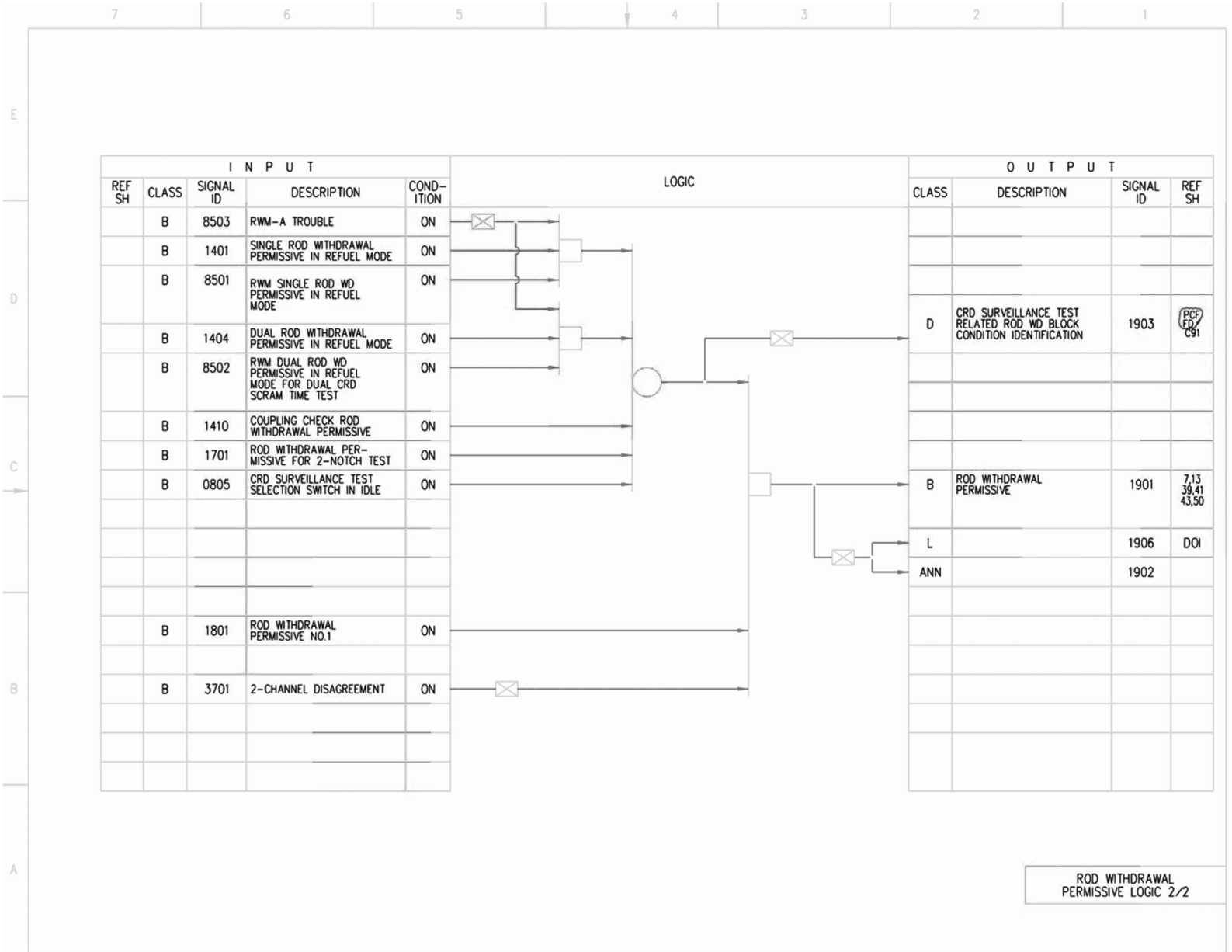
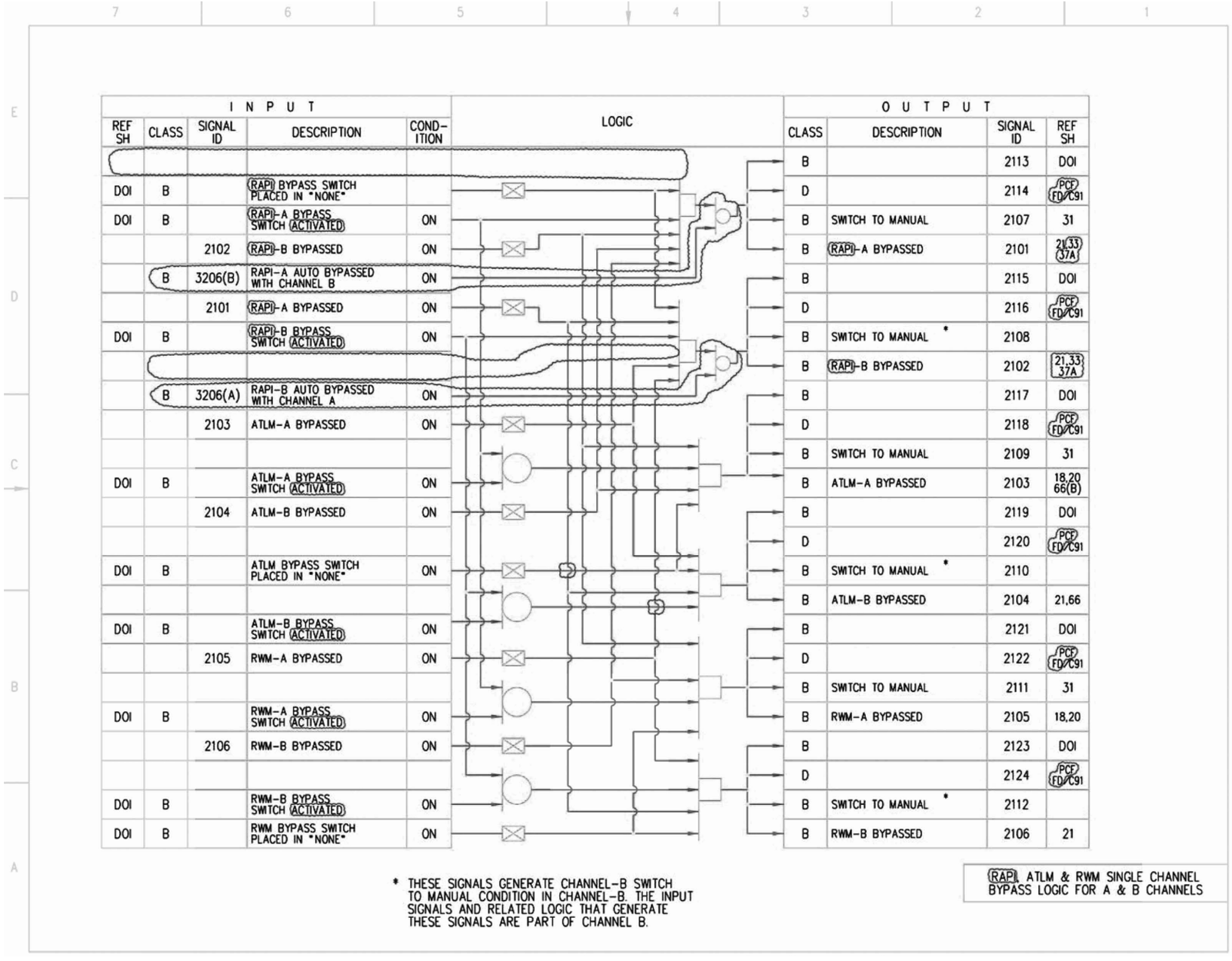


Figure 7.7-3 – Rod Control and Information System IBD (Sheet 19 of 87)

INPUT					LOGIC	OUTPUT			
REF SH	CLASS	SIGNAL ID	DESCRIPTION	COND-ITION		CLASS	DESCRIPTION	SIGNAL ID	REF SH
	B	3201	RAPI-A TROUBLE	ON		L		2007	DOI
						ANN		2008	
	B	0305	REACTOR POWER IS BELOW LPSP	ON		B	ROD INSERT PERMISSIVE	2001	7
	B	8401	RWM ROD INSERT PERMISSIVE	ON					
	B	2105	RWM-A BYPASSED	ON		D	RAPI-A TROUBLE INSERT BLOCK CONDITION IDENTIFICATION	2003	PCF FD C91
	B	8503	RWM-A TROUBLE	ON		D	RWM-A TROUBLE INSERT BLOCK CONDITION IDENTIFICATION	2004	PCF FD C91
	B	2103	ATLM-A BYPASSED	ON		D	ATLM-A TROBLE INSERT BLOCK CONDITION IDENTIFICATION	2005	PCF FD C91
	B	6709	ATLM-A TROUBLE	ON					
	B	6703	ATLM-A ROD BLOCK SIGNAL TO RAPI-A	ON					
	B	3701	2-CHANNEL DISAGREEMENT	ON					

ROD INSERT PERMISSIVE LOGIC

Figure 7.7-3 – Rod Control and Information System IBD (Sheet 20 of 87)



INPUT					LOGIC	OUTPUT			
REF SH	CLASS	SIGNAL ID	DESCRIPTION	COND-ITION		CLASS	DESCRIPTION	SIGNAL ID	REF SH
						B		2113	DOI
DOI	B		(RAPI) BYPASS SWITCH PLACED IN "NONE"			D		2114	(PCF) FD/C91
DOI	B		(RAPI)-A BYPASS SWITCH (ACTIVATED)	ON		B	SWITCH TO MANUAL	2107	31
		2102	(RAPI)-B BYPASSED	ON		B	(RAPI)-A BYPASSED	2101	21,33 37A
	B	3206(B)	RAPI-A AUTO BYPASSED WITH CHANNEL B	ON		B		2115	DOI
		2101	(RAPI)-A BYPASSED	ON		D		2116	(PCF) FD/C91
DOI	B		(RAPI)-B BYPASS SWITCH (ACTIVATED)	ON		B	SWITCH TO MANUAL *	2108	
						B	(RAPI)-B BYPASSED	2102	21,33 37A
	B	3206(A)	RAPI-B AUTO BYPASSED WITH CHANNEL A	ON		B		2117	DOI
		2103	ATLM-A BYPASSED	ON		D		2118	(PCF) FD/C91
						B	SWITCH TO MANUAL	2109	31
DOI	B		ATLM-A BYPASS SWITCH (ACTIVATED)	ON		B	ATLM-A BYPASSED	2103	18,20 66(B)
		2104	ATLM-B BYPASSED	ON		B		2119	DOI
						D		2120	(PCF) FD/C91
DOI	B		ATLM BYPASS SWITCH PLACED IN "NONE"	ON		B	SWITCH TO MANUAL *	2110	
						B	ATLM-B BYPASSED	2104	21,66
DOI	B		ATLM-B BYPASS SWITCH (ACTIVATED)	ON		B		2121	DOI
		2105	RWM-A BYPASSED	ON		D		2122	(PCF) FD/C91
						B	SWITCH TO MANUAL	2111	31
DOI	B		RWM-A BYPASS SWITCH (ACTIVATED)	ON		B	RWM-A BYPASSED	2105	18,20
		2106	RWM-B BYPASSED	ON		B		2123	DOI
						D		2124	(PCF) FD/C91
DOI	B		RWM-B BYPASS SWITCH (ACTIVATED)	ON		B	SWITCH TO MANUAL *	2112	
DOI	B		RWM BYPASS SWITCH PLACED IN "NONE"	ON		B	RWM-B BYPASSED	2106	21

* THESE SIGNALS GENERATE CHANNEL-B SWITCH TO MANUAL CONDITION IN CHANNEL-B. THE INPUT SIGNALS AND RELATED LOGIC THAT GENERATE THESE SIGNALS ARE PART OF CHANNEL B.

(RAPI) ATLM & RWM SINGLE CHANNEL BYPASS LOGIC FOR A & B CHANNELS

Figure 7.7-3 – Rod Control and Information System IBD (Sheet 21 of 87)

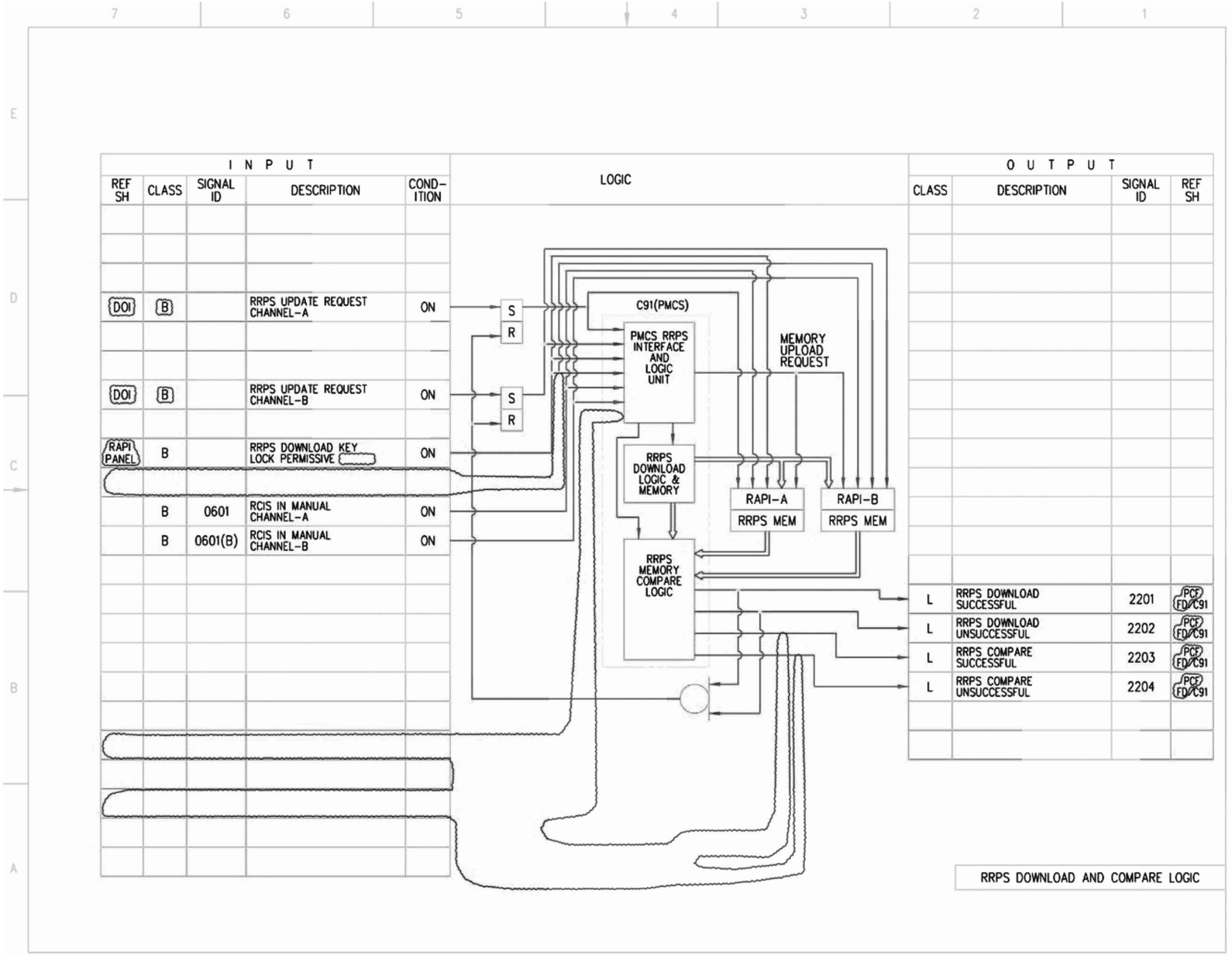


Figure 7.7-3 – Rod Control and Information System IBD (Sheet 22 of 87)

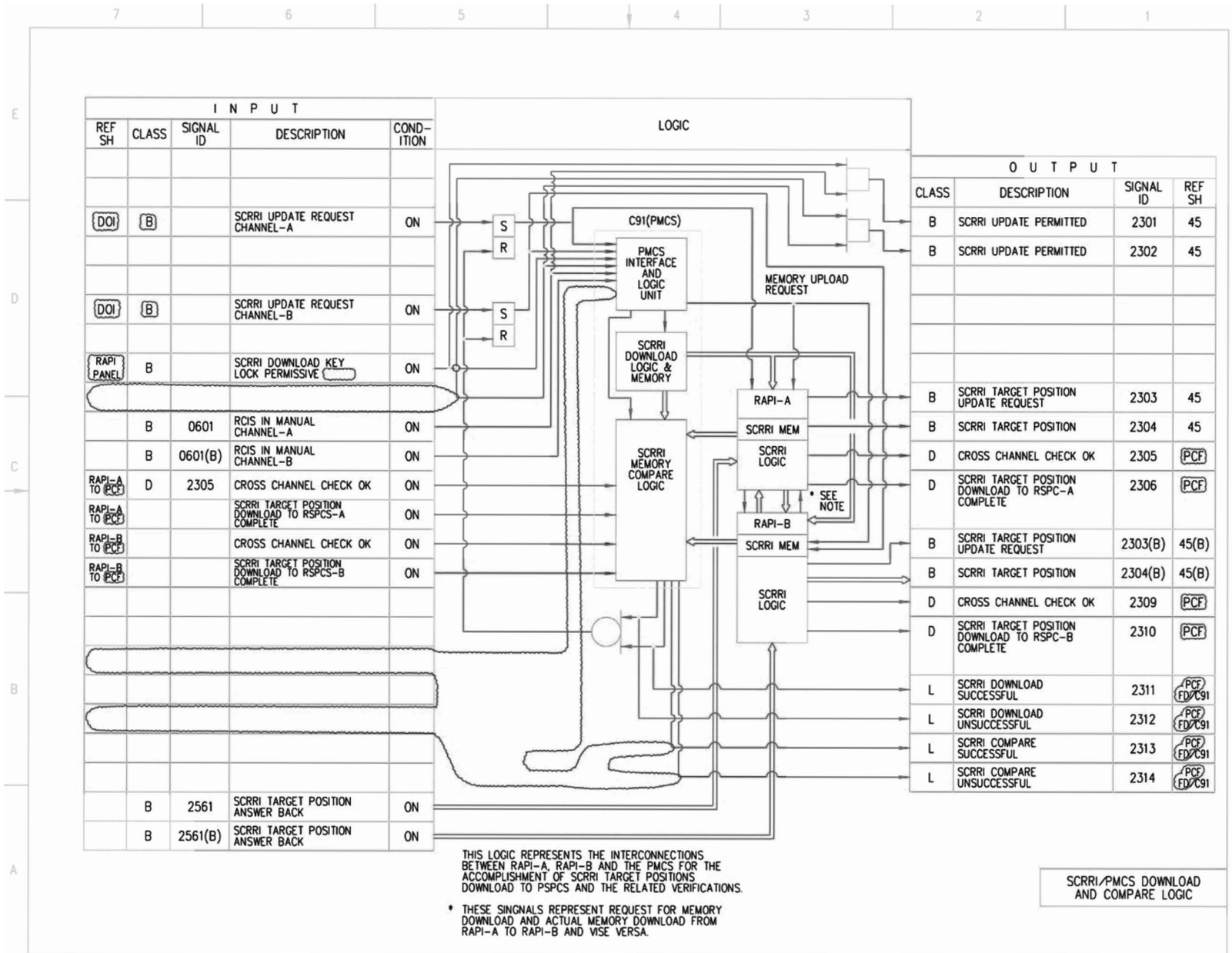


Figure 7.7-3 – Rod Control and Information System IBD (Sheet 23 of 87)

INPUT					LOGIC	OUTPUT			
REF SH	CLASS	SIGNAL ID	DESCRIPTION	COND-ITION		CLASS	DESCRIPTION	SIGNAL ID	REF SH
					TYP OF 205	D		2423	(PCF) FD/C91
	B	3802	SYNCHRO-A FAILURE	ON		B	ALL RODS POSITIONS	2401	10,63 64,71
	B	3803	ROD FULL-IN	ON		B	AGGREGATE PERCENT WITHDRAWAL	2402	DOI
	B	3804	ROD POSITION	ON	RAPI-A AND (RSPC)-A INTERFACE AND LOGIC UNIT	B	SELECTED ROD POSITION	2403	11 DOI
	B	3805	ROD FULL-OUT (SYNCHRO FULL-OUT)	ON		B	SELECTED GANG POSITIONS	2404	11,12,13 DOI
	B	3806	SYNCHRO ERROR	ON		B	SELECTED GANG SETTLING	2409	11
	B	3807	SELECT ACK.	ON		B	ALL RODS FULL-IN	2406	14
	B	3808	ROD SELECTED	ON		B	SELECTED GANG SETTLING	2410	11,12,13
	B	3809	ROD AT 3728mm	ON		B	SELECTED ROD(S) FULL-OUT	2407	14
	B	4804	LATCH FULL-IN	ON					
	B	4805	COUPLING CHECK (OVER-TRAVEL SW ACTIVATED)	ON		D	SYNCHRO FAILURE	2414	(PCF) FD/C91
	B	4806	BUFFER CONTACT	ON		D	SYNCHRO ERROR	2462	(PCF) FD/C91
	B	4807	ROD SCRAM TIME DATA	ON		B	SELECT ACK.	2415	9,10
	B	4901	DRIFT DETECTION	ON	TYP OF 205	B		2456	DOI
	B	4903	ROD MOVEMENT FAILURE	ON		B	ROD SELECTED	2416	18,71
						D		2457	(PCF) FD/C91
						D	ROD LATCHED FULL-IN	2417	(PCF) FD/C91
	B	5101	RSPC-A SELF TEST FAILURE	ON		B	NUMBER OF RODS LATCHED FULL-IN	2418	DOI
	B	5103	ABNORMAL BRAKE ENERGIZATION	ON	TYP OF 205	D	ROD FULL-IN	2419	(PCF) FD/C91
	B	5104	BRAKE DISENGAGEMENT FAILURE	ON		B	NUMBER OF RODS FULL-IN	2420	DOI
					TYP OF 205	D	ROD FULL-OUT	2421	(PCF) FD/C91
						B	NUMBER OF RODS FULL-OUT	2422	DOI
					TYP OF 205	D	SELECTED ROD AT 3728mm	2424	(PCF) FD/C91
						B		2459	14,15
						D	ROD OVERTRAVEL SWITCH ACTIVATED	2425	(PCF) FD/C91
						B		2460	15

RAPI-A AND (RSPC)-A INTERFACE & LOGIC UNIT

Figure 7.7-3 – Rod Control and Information System IBD (Sheet 24 of 87)

INPUT					LOGIC	OUTPUT			
REF SH	CLASS	SIGNAL ID	DESCRIPTION	COND-ITION		CLASS	DESCRIPTION	SIGNAL ID	REF SH
	B	4509	SCRRI TARGET POSITION ANSWER BACK	ON	RAPI-A AND RSPC-A INTERFACE & LOGIC UNIT	D	BUFFER CONTACT REED SWITCH ACTIVATED	2526	PCF FD/C91
	B	5201	STEP	ON		D	ROD ACRAM TIME DATA	2527	PCF FD/C91
	B	5202	NOTCH	ON		D	ROD IS DRIFTING	2528	PCF FD/C91
	B	5203	CONTINUOUS	ON		B		2552	32
	B	5204	SETTLE	ON		D	ROD MOVEMENT FAILURE	2529	PCF FD/C91
	B	5205	EMERGENCY INSERT	ON		B		2553	32
	B	5206	INSERT	ON					
	B	5207	WITHDRAW	ON					
	B	5208	STOP	ON		D	PSPC-A SELF TEST FAILURE	2532	PCF FD/C91
	B	5209	INVERTER TROUBLE	ON		B		2533	32
	B	5210	INVERTER CONTROLLER TROUBLE	ON		D	ABNORMAL BRAKE ENERGIZATION	2534	PCF FD/C91
						B		2554	32
						D	BRAKE DISENGAGEMENT FAILURE	2535	PCF FD/C91
						B		2555	32
						B	SCRRI TARGET POSITION ANSWER BACK	2561	23
						D	STEP	2536	PCF FD/C91
						D	NOTCH	2537	PCF FD/C91
						D	CONTINUOUS	2538	PCF FD/C91
						D	SETTLE	2539	PCF FD/C91
						D	EMERGENCY INSERT	2540	PCF FD/C91
						D	INSERT	2541	PCF FD/C91
						D	WITHDRAW	2542	PCF FD/C91
							STOP	2543	PCF FD/C91

ROD POSITION INTERFACE LOGIC

Figure 7.7-3 – Rod Control and Information System IBD (Sheet 25 of 87)

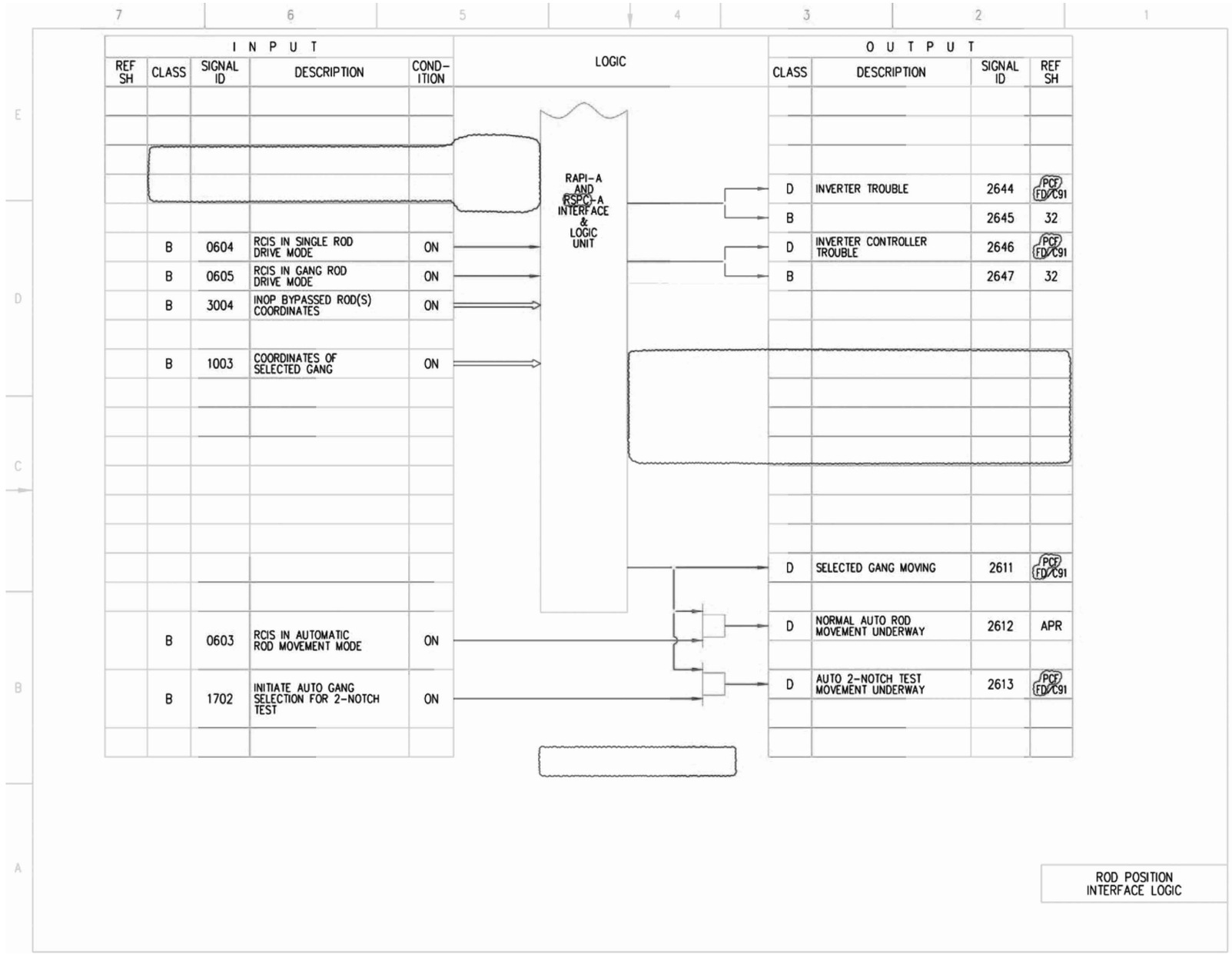


Figure 7.7-3 – Rod Control and Information System IBD (Sheet 26 of 87)

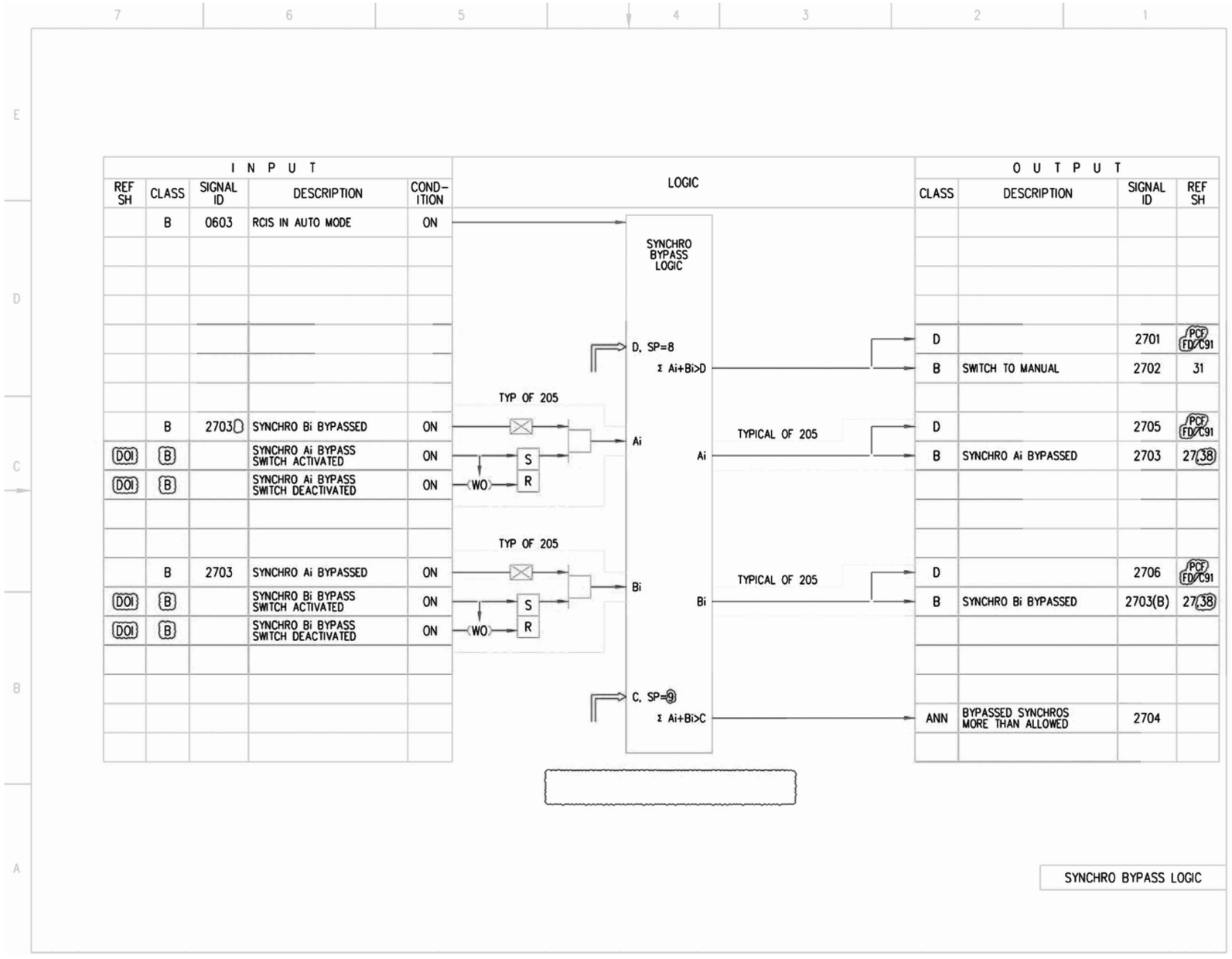


Figure 7.7-3 – Rod Control and Information System IBD (Sheet 27 of 87)

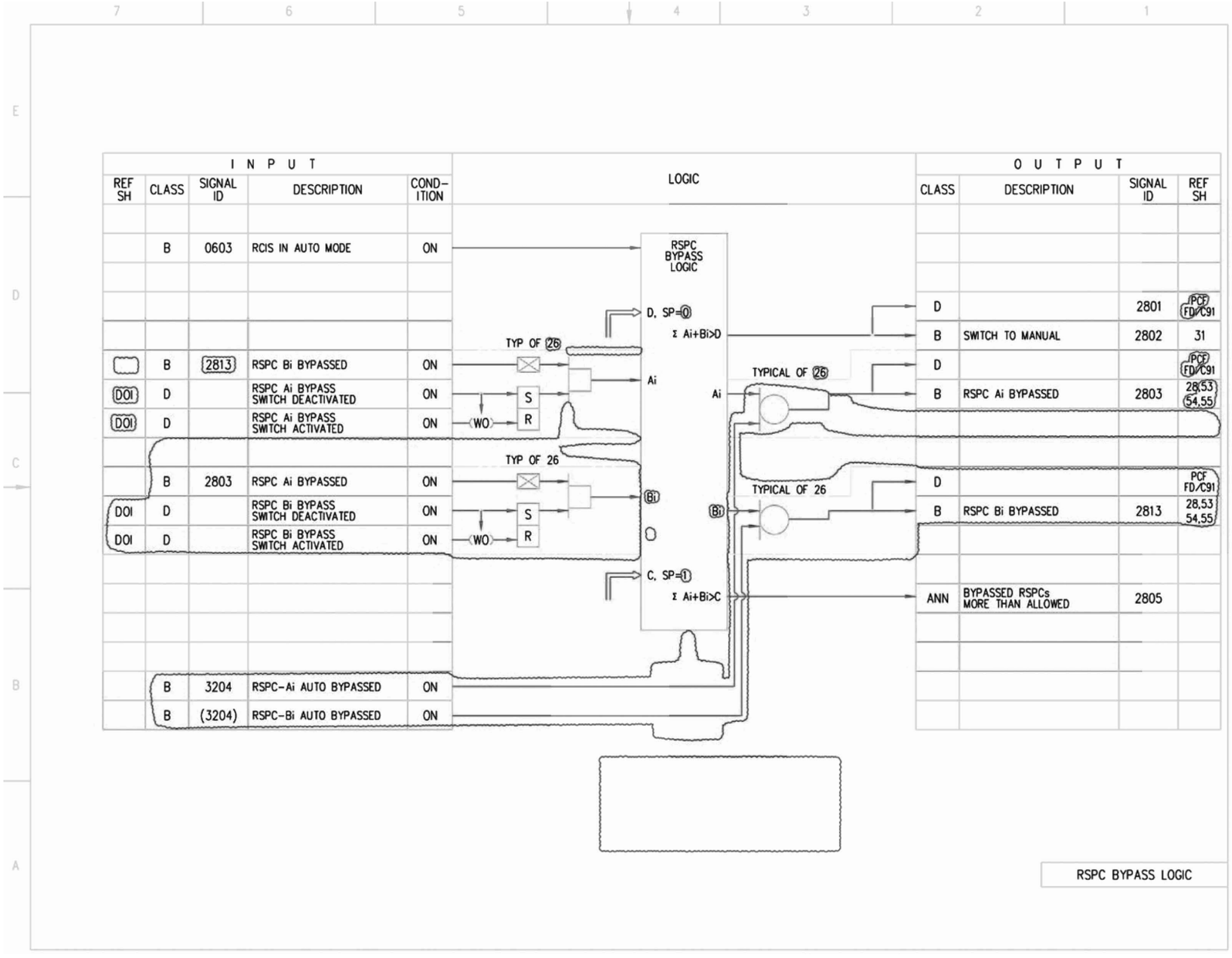


Figure 7.7-3 – Rod Control and Information System IBD (Sheet 28 of 87)

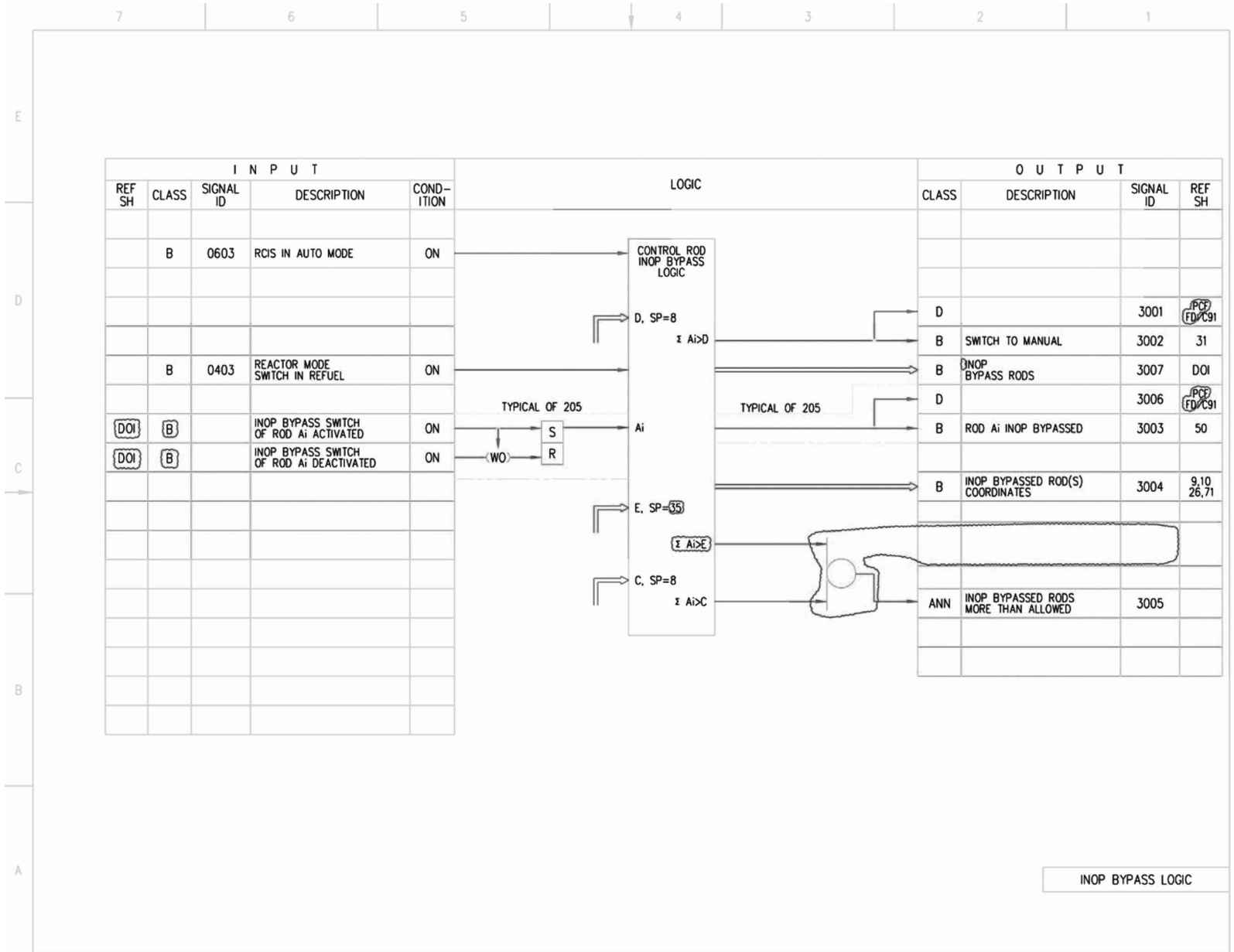


Figure 7.7-3 – Rod Control and Information System IBD (Sheet 30 of 87)

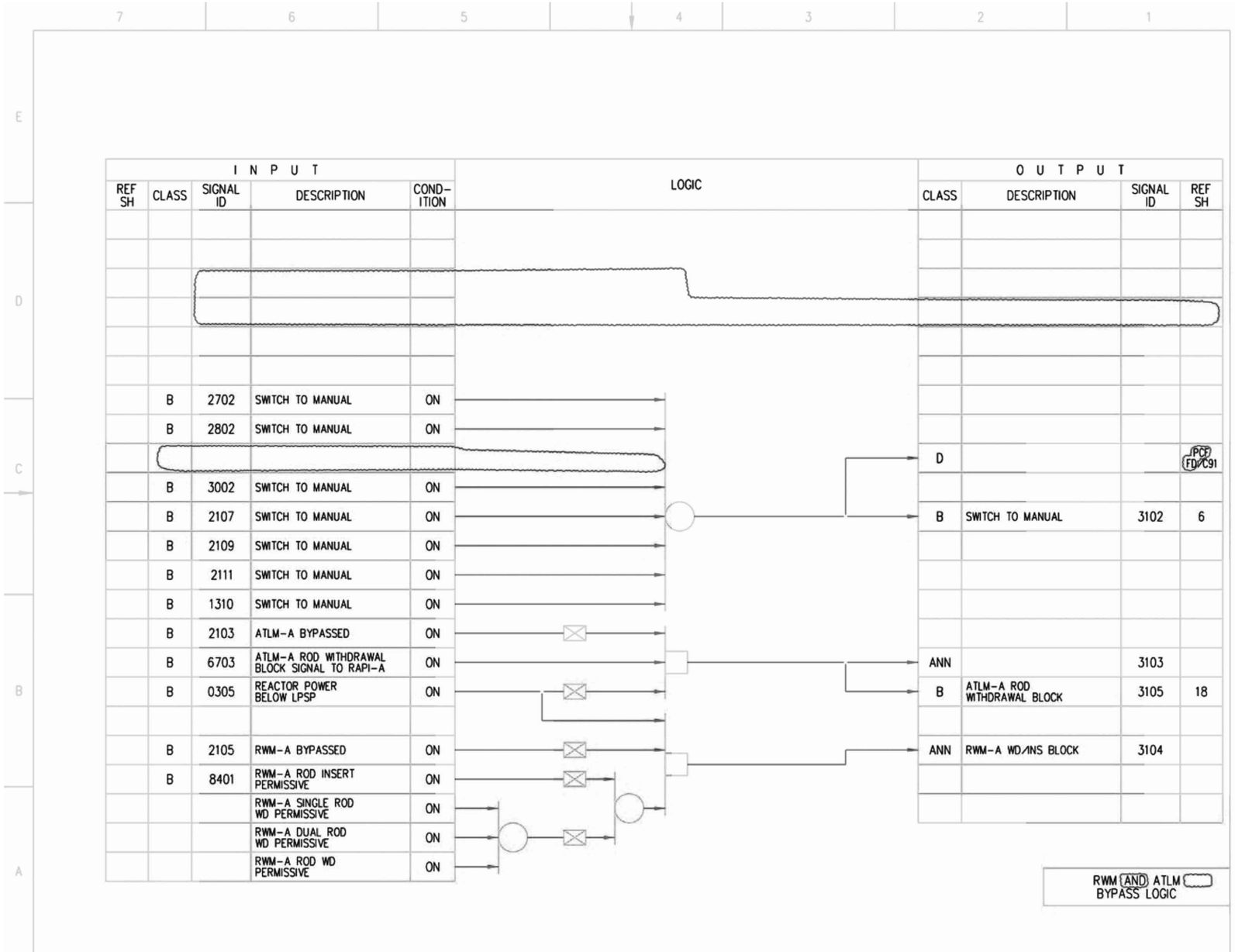


Figure 7.7-3 – Rod Control and Information System IBD (Sheet 31 of 87)

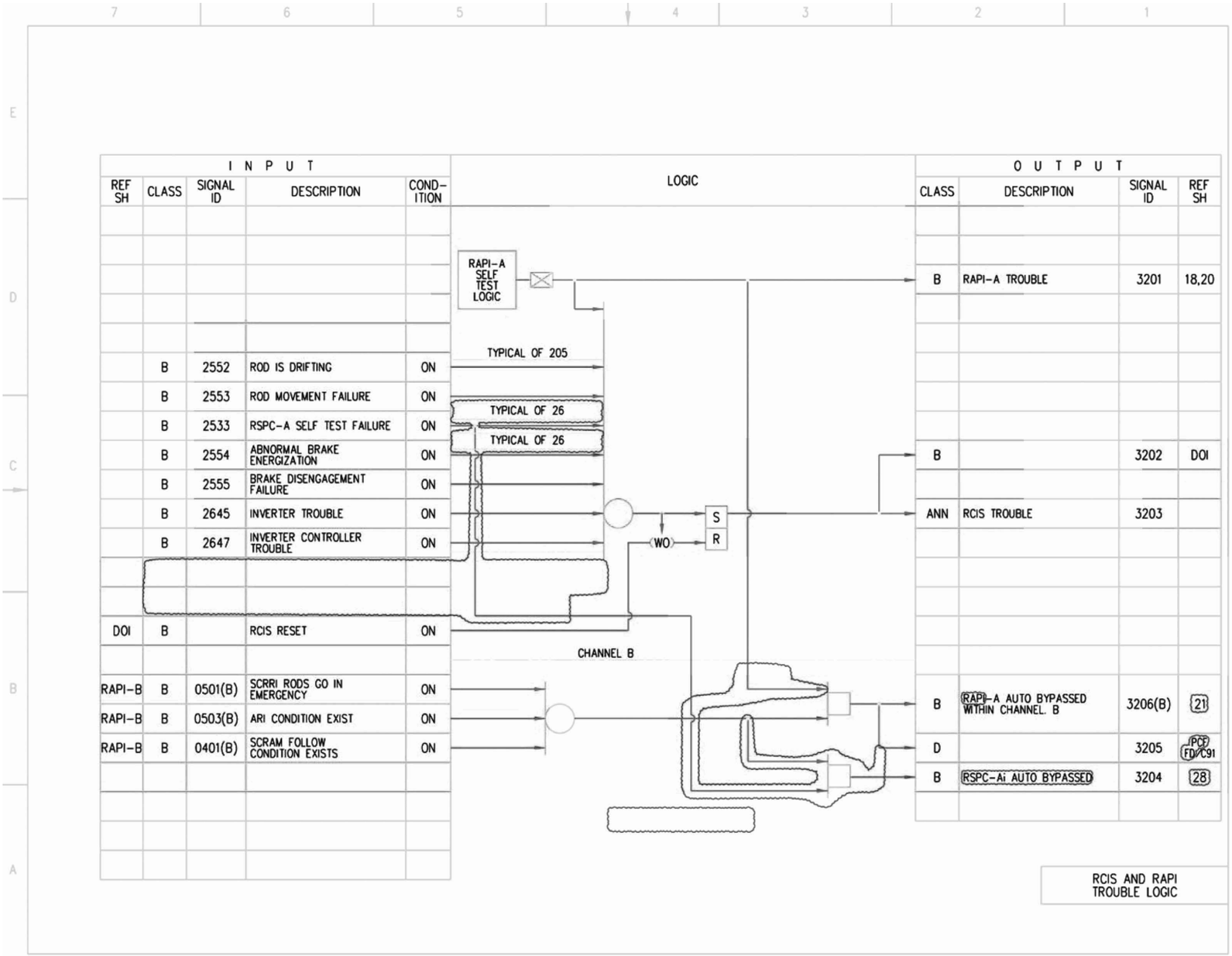


Figure 7.7-3 – Rod Control and Information System IBD (Sheet 32 of 87)

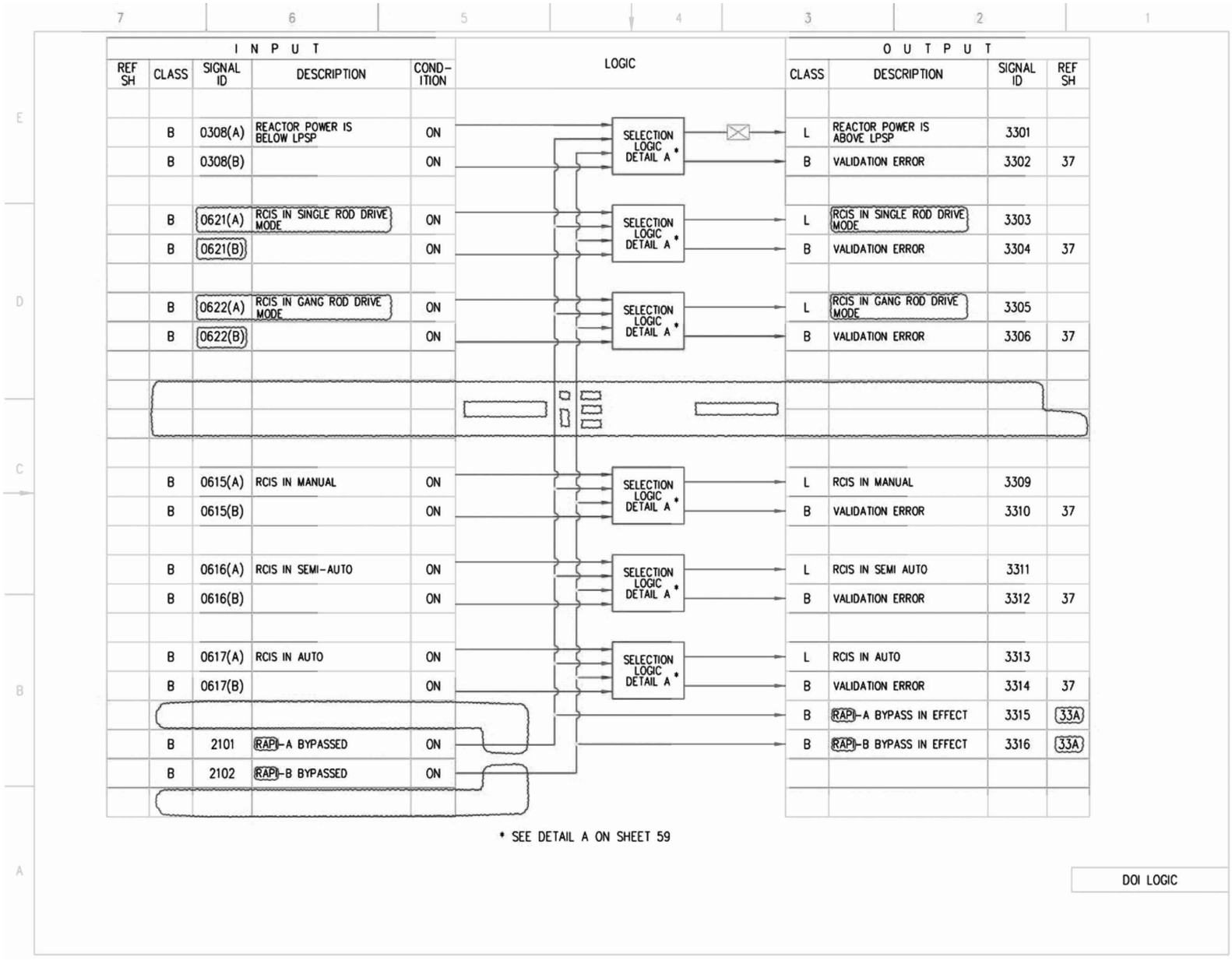


Figure 7.7-3 – Rod Control and Information System IBD (Sheet 33 of 87)

INPUT					LOGIC	OUTPUT			
REF SH	CLASS	SIGNAL ID	DESCRIPTION	CONDITION		CLASS	DESCRIPTION	SIGNAL ID	REF SH
	B	0720(A)	RCIS IN STEP DRIVE MODE	ON	SELECTION LOGIC DETAIL A *	L	RCIS IN STEP DRIVE MODE	33A01	
	B	0720(B)		ON		B	VALIDATION ERROR	33A02	37
	B	0721(A)	RCIS IN NOTCH DRIVE MODE	ON	SELECTION LOGIC DETAIL A *	L	RCIS IN NOTCH DRIVE MODE	33A03	
	B	0721(B)		ON		B	VALIDATION ERROR	33A04	37
	B	0722(A)	RCIS IN CONTINUOUS DRIVE MODE	ON	SELECTION LOGIC DETAIL A *	L	RCIS IN CONTINUOUS DRIVE MODE	33A05	
	B	0722(B)		ON		B	VALIDATION ERROR	33A06	37
	B	1501(A)	SELECTED SINGLE ROD COUPLING IS OK	ON	SELECTION LOGIC DETAIL A *	L	SELECTED SINGLE ROD COUPLING IS OK	33A07	
	B	1501(B)		ON		B	VALIDATION ERROR	33A08	37
	B	1502(A)	SELECTED SINGLE ROD IS UNCOUPLED	ON	SELECTION LOGIC DETAIL A *	L	SELECTED SINGLE ROD IS UNCOUPLED	33A09	
	B	1502(B)		ON		B	VALIDATION ERROR	33A10	37
	B	1503(A)	SELECTED DUAL RODS COUPLING IS OK	ON	SELECTION LOGIC DETAIL A *	L	SELECTED DUAL RODS COUPLING IS OK	33A11	
	B	1503(B)		ON		B	VALIDATION ERROR	33A12	37
	B	1504(A)	ONE OF THE SELECTED DUAL RODS IS UNCOUPLED	ON	SELECTION LOGIC DETAIL A *	L	ONE OF THE SELECTED DUAL RODS IS UNCOUPLED	33A13	
	B	1504(B)		ON		B	VALIDATION ERROR	33A14	37
						B	RAPI-A BYPASS IN EFFECT	33A15	34,35,36
	B	3315	RAPI-A BYPASS IN EFFECT	ON		B	RAPI-B BYPASS IN EFFECT	33A16	34,35,36
	B	3316	RAPI-B BYPASS IN EFFECT	ON					

* SEE DETAIL A ON SHEET 59

DOI LOGIC

Figure 7.7-3 – Rod Control and Information System IBD (Sheet 33a of 87)

INPUT					LOGIC	OUTPUT			
REF SH	CLASS	SIGNAL ID	DESCRIPTION	COND-ITION		CLASS	DESCRIPTION	SIGNAL ID	REF SH
	B	0812(A)	CRDSTSS IN 1CRD/2CRD	ON	SELECTION LOGIC DETAIL A *	L	CRDSTSS IN 1CRD/2CRD	3401	
	B	0812(B)		ON		B	VALIDATION ERROR	3402	37
	B	0814(A)	CRDSTSS IN COUPLING TEST	ON	SELECTION LOGIC DETAIL A *	L	CRDSTSS IN COUPLING CHECK	3403	
	B	0814(B)		ON		B	VALIDATION ERROR	3404	37
	B	0818(A)	CRDSTSS IN 2-NOTCH TEST	ON	SELECTION LOGIC DETAIL A *	L	CRDSTSS IN STEP TEST	3407	
	B	0818(B)		ON		B	VALIDATION ERROR	3408	37
	B	0820(A)	CRDSTSS IN IDLE	ON	SELECTION LOGIC DETAIL A *	L	CRDSTSS IN IDLE	3409	
	B	0820(B)		ON		B	VALIDATION ERROR	3410	37
	B	0824(A)	CRDSTMS IN AUTO	ON	SELECTION LOGIC DETAIL A *	L	CRDSTMS IN AUTO	3411	
	B	0824(B)		ON		B	VALIDATION ERROR	3412	37
	B	0826(A)	CRDSTMS IN IDLE	ON	SELECTION LOGIC DETAIL A *	L	CRDSTMS IN IDLE	3413	
	B	0826(B)		ON		B	VALIDATION ERROR	3414	37
	B	3315	RAPI-A BYPASS IN EFFECT	ON					
	B	3316	RAPI-B BYPASS IN EFFECT	ON					

* SEE DETAIL A ON SHEET 59

DOI LOGIC

Figure 7.7-3 – Rod Control and Information System IBD (Sheet 34 of 87)

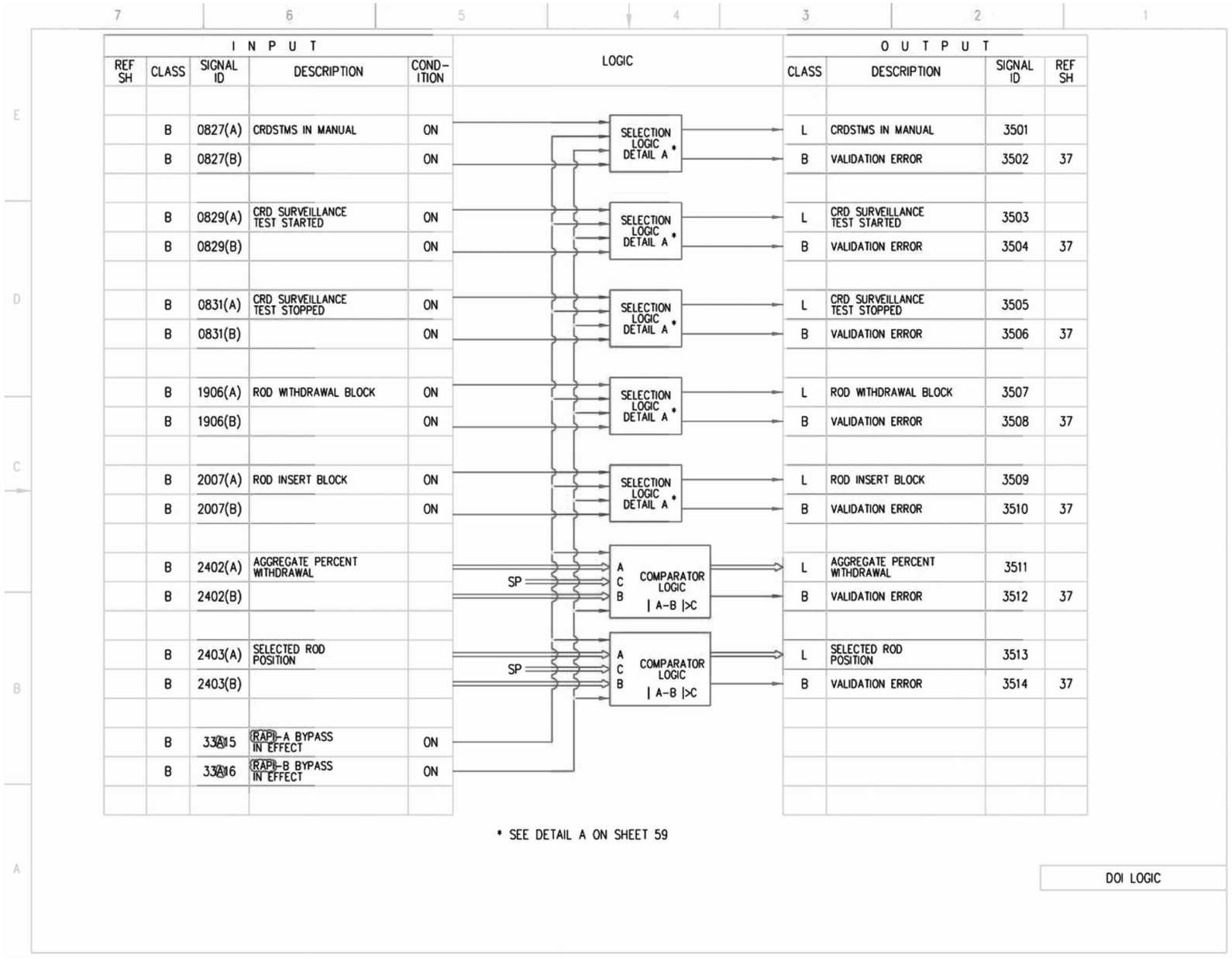


Figure 7.7-3 – Rod Control and Information System IBD (Sheet 35 of 87)

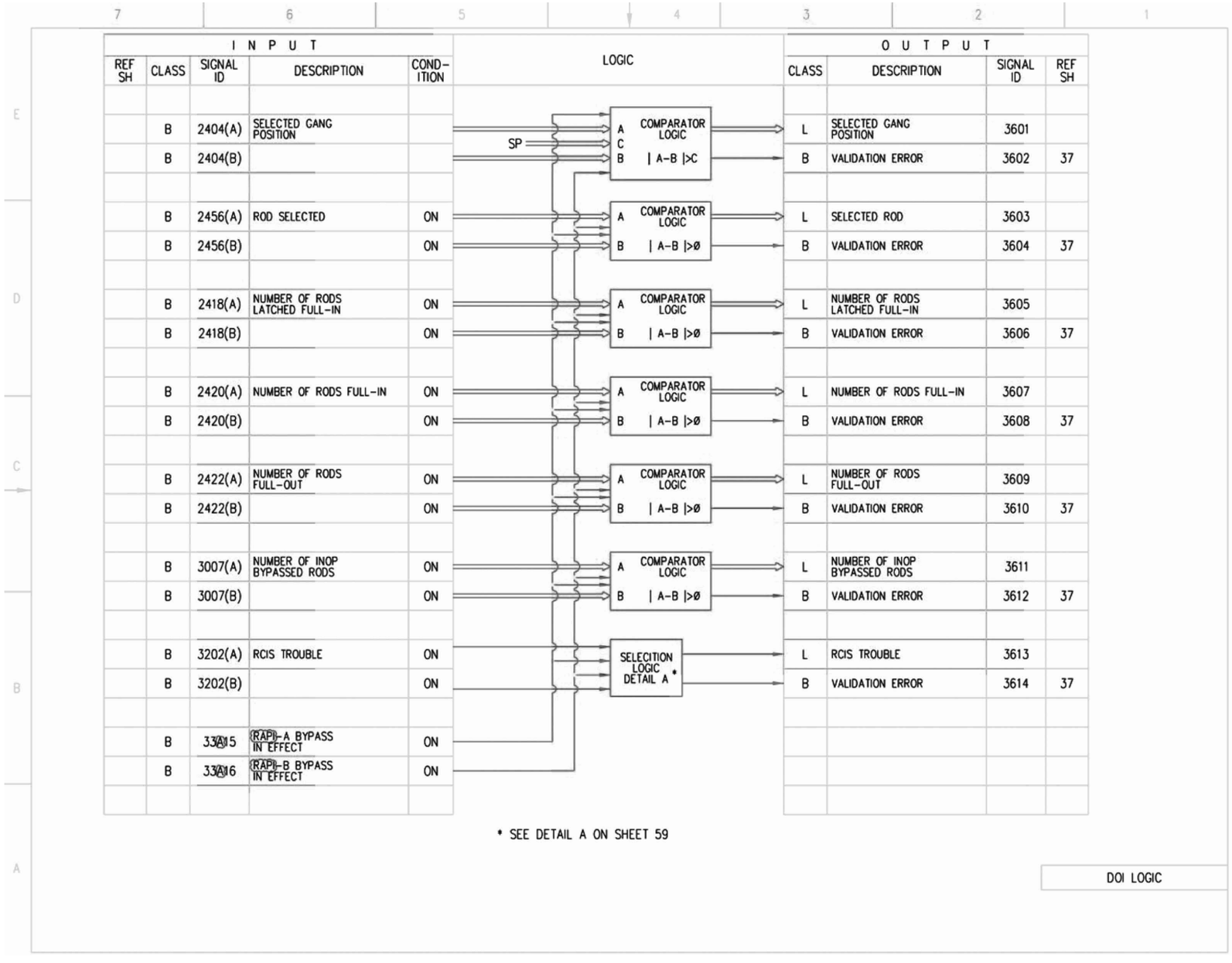


Figure 7.7-3 – Rod Control and Information System IBD (Sheet 36 of 87)

INPUT					LOGIC	OUTPUT			
REF SH	CLASS	SIGNAL ID	DESCRIPTION	COND-ITION		CLASS	DESCRIPTION	SIGNAL ID	REF SH
	B	3302	VALIDATION ERROR	ON					
	B	3304	VALIDATION ERROR	ON					
	B	3306	VALIDATION ERROR	ON					
	B	3310	VALIDATION ERROR	ON					
	B	3312	VALIDATION ERROR	ON					
	B	3314	VALIDATION ERROR	ON					
	B	33A02	VALIDATION ERROR	ON					
	B	33A04	VALIDATION ERROR	ON					
	B	33A06	VALIDATION ERROR	ON					
	B	33A08	VALIDATION ERROR	ON					
	B	33A10	VALIDATION ERROR	ON					
	B	33A12	VALIDATION ERROR	ON					
	B	33A14	VALIDATION ERROR	ON					
	B	3402	VALIDATION ERROR	ON					
	B	3404	VALIDATION ERROR	ON					
	B	3408	VALIDATION ERROR	ON					
	B	3410	VALIDATION ERROR	ON	DOI SELF TEST NOT FAILED	ANN	DOI SELF TEST FAILURE	3702	
	B	3412	VALIDATION ERROR	ON					
	B	3414	VALIDATION ERROR	ON	TPU	B	2-CHANNEL DISAGREEMENT	3701	19,20
	B	3502	VALIDATION ERROR	ON	t	B		3703	PCF FD/C91
	B	3504	VALIDATION ERROR	ON		ANN		3704	
	B	3506	VALIDATION ERROR	ON					
	B	3508	VALIDATION ERROR	ON					
	B	3510	VALIDATION ERROR	ON					
	B	3512	VALIDATION ERROR	ON					
	B	3514	VALIDATION ERROR	ON					
	B	3602	VALIDATION ERROR	ON					
	B	3604	VALIDATION ERROR	ON					
	B	3606	VALIDATION ERROR	ON					
	B	3608	VALIDATION ERROR	ON					
	B	3610	VALIDATION ERROR	ON					
	B	3612	VALIDATION ERROR	ON					
	B	3614	VALIDATION ERROR	ON					

2-CHANNEL DISAGREEMENT LOGIC
(PART OF DOI)

Figure 7.7-3 – Rod Control and Information System IBD (Sheet 37 of 87)

INPUT					LOGIC	OUTPUT			
REF SH	CLASS	SIGNAL ID	DESCRIPTION	COND-ITION		CLASS	DESCRIPTION	SIGNAL ID	REF SH
			INPUT SIGNAL FROM RAPI-A	ON	TYPICAL OF 26	B	VALIDATED SIGNAL *		
			INPUT SIGNAL FROM RAPI-B	ON					
	B	2101	RAPI-A BYPASSED	ON					
	B	2102	RAPI-B BYPASSED	ON					

* EACH INPUT SIGNALS ARE VALIDATED BY THIS LOGIC.

VALIDATION SELECTION LOGIC (RSPC)

Figure 7.7-3 – Rod Control and Information System IBD (Sheet 37a of 87)