

Space Shuttle Systems Handbook

Volume I - Sections 1 through 11

Mission Operations Directorate Systems
Division

Revision D, DCN-4
July 28, 1989



National Aeronautics and
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Lyndon B. Johnson Space Center
Houston, Texas

SPACE SHUTTLE SYSTEMS HANDBOOK

REVISION D
DCN-4

DOCUMENT CHANGE INSTRUCTION PAGE

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SPACE SHUTTLE SYSTEMS HANDBOOK

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PREFACE

This document has been prepared by the Systems Division, NASA Lyndon B. Johnson Space Center, Houston, Texas, with technical support by Rockwell Space Operations Company and Omniplan Corporation.

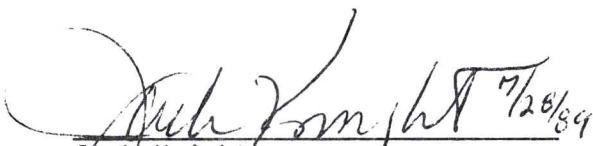
For a complete definition of symbols and nomenclature used in this document, consult MOD Drafting Standards, Rev C, DCN-1 drafted January 1989. A letter on the drawing number (B = 102, C = 103, and D = 104) denotes the specific vehicle. No suffix letter means that that particular drawing is valid for all vehicles. The appearance of asterisks (*) after drawing numbers denotes drawings which are carried in the onboard Flight Data Files.

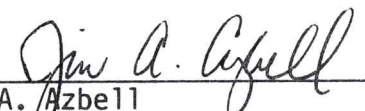
Major emphasis is on material for use by the flight crew and flight controllers during the STS operations. Caution should be exercised in using the systems drawings for other purposes.

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DWG 14.1* (Sheet 3 of 3)	RADIATORS DEPLOY/STOW	REV D	9/14/87	14.1-3
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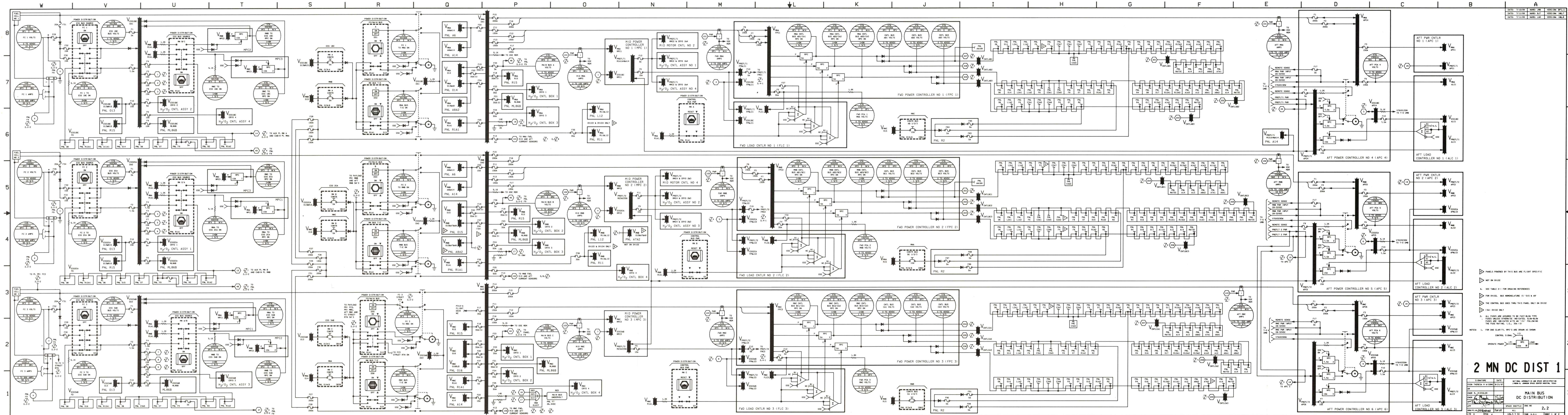
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DWG 16.22 (Sheet 3 of 3)	COMMUNICATIONS INTERFACE EQUIPMENT (TELEMETRY)	REV D-1	6/22/87	DELETED
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DWG 17.6	(RESERVED)			
DWG 17.7	(RESERVED)			
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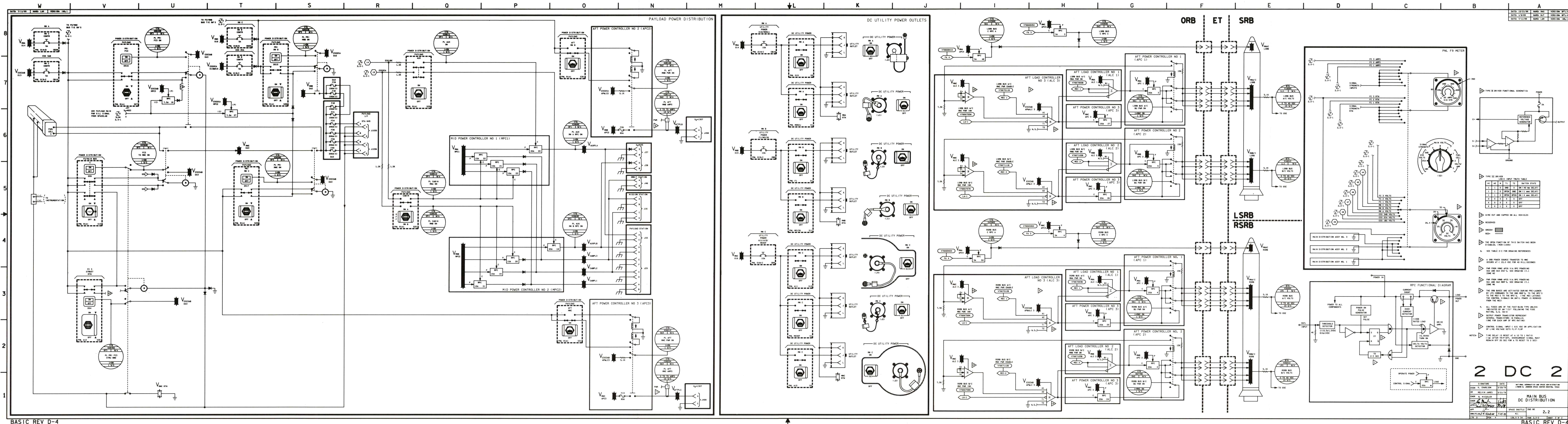
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FOR DETAILED COMPONENT AND LOGIC INFORMATION REFER TO:

SSSH DWG NO.	SSSH DWG TITLE	VENDOR NAME	VENDOR DWG NO.	VENDOR SHEET NO.	REV	DATE	VENDOR DRAWING TITLE
2.1	EPS OV	R.I.	VS70-760322	1 - 14	E	11/21/88	MAIN DC POWER DIST SUBSYSTEM (OV-102)
		R.I.	VS70-760309	1-14	G	11/21/88	MAIN DC POWER DIST SUBSYSTEM
		R.I.	VS70-976099		A14	3/23/89	INTEGRATED SCHEMATIC - ELECTRICAL POWER DIST & CONTROL
		R.I.	VS70-976102		G16	6/1/89	INTEGRATED SCHEMATIC - ELECTRICAL POWER DIST & CONTROL (OV-102)
2.2 (SHEETS 1-2)	MAIN BUS DC DISTRIBUTION	R.I.	VS70-760309	1 - 14	G	11/21/88	MAIN DC POWER DISTRIBUTION SUBSYSTEM - OV-103, OV-104, OV-105
2.2 (SHEETS 1-2)	MAIN BUS DC DISTRIBUTION	R.I.	VS70-760322	1 - 14	E	11/21/88	MAIN DC POWER DISTRIBUTION SUBSYSTEM - OV-102
2.2 (SHEET 2)	MAIN BUS DC DISTRIBUTION	R.I.	VS70-760209	2 OF 3	D	11/13/84	COAS SEAT/SUIT CONTROLS CREW SYSTEMS - OV-103, OV-104, OV-105
2.2 (SHEET 2)	MAIN BUS DC DISTRIBUTION	R.I.	VS70-760202	2 OF 3	G	1/14/83	COAS SEAT/SUIT CONTROLS CREW SYSTEMS - OV-102
2.2 (SHEETS 1-2)	MAIN BUS DC DISTRIBUTION	R.I.	VS70-760503	4 OF 14 5 OF 14 12 OF 14	B	4/8/88	EVCON SUBSYSTEM - OV-103, OV-104, OV-105
2.2 (SHEET 2)	MAIN BUS DC DISTRIBUTION	R.I.	VS70-760502	4 OF 14 5 OF 14 12 OF 14	L	7/17/87	EVCON SUBSYSTEM - OV-102
2.2 (SHEET 2)	MAIN BUS DC DISTRIBUTION	R.I.	VS70-710179	1 - 2	D	4/6/88	SOLID RKT BSTR RATE GYRO GDNC & NAV SUBSYSTEM - OV-103, OV-104, OV-105
2.2 (SHEET 2)	MAIN BUS DC DISTRIBUTION	R.I.	VS70-710172	1 - 2	G	5/18/87	SOLID RKT BSTR RATE GYRO GDNC & NAV SUBSYSTEM - OV-102
2.2 (SHEET 2)	MAIN BUS DC DISTRIBUTION	R.I.	VS70-733619	1		12/10/80	SCHEMATIC DIAGRAM PANEL F9A2 MAIN DISPLAY CONSOLE
2.2 (SHEET 2)	MAIN BUS DC DISTRIBUTION	R.I.	VS70-760809	20 of 24	P	6/22/88	PAYLOAD SUBSYSTEM INTERFACE - ALL VEHICLE

DWG	SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LYNDON B. JOHNSON SPACE CENTER HOUSTON, TEXAS	
2.1	ENGR J. AZBELL		VENDOR DRAWING REFERENCES	
	ENGR <i>J. Azbell</i>	7-20-89		
2.2-1,2	ENGR R. MESSLER			
	ENGR <i>R. Messler</i>	7/21/89		
	APP <i>Paulm Joyce</i>	7/27/89	SPACE SHUTTLE TBL NO 2-1	
	APP			
	OMNIPLAN			
	LTR D	PCN 4		
			PAGE 2.1-1	SHEET 1 OF 2

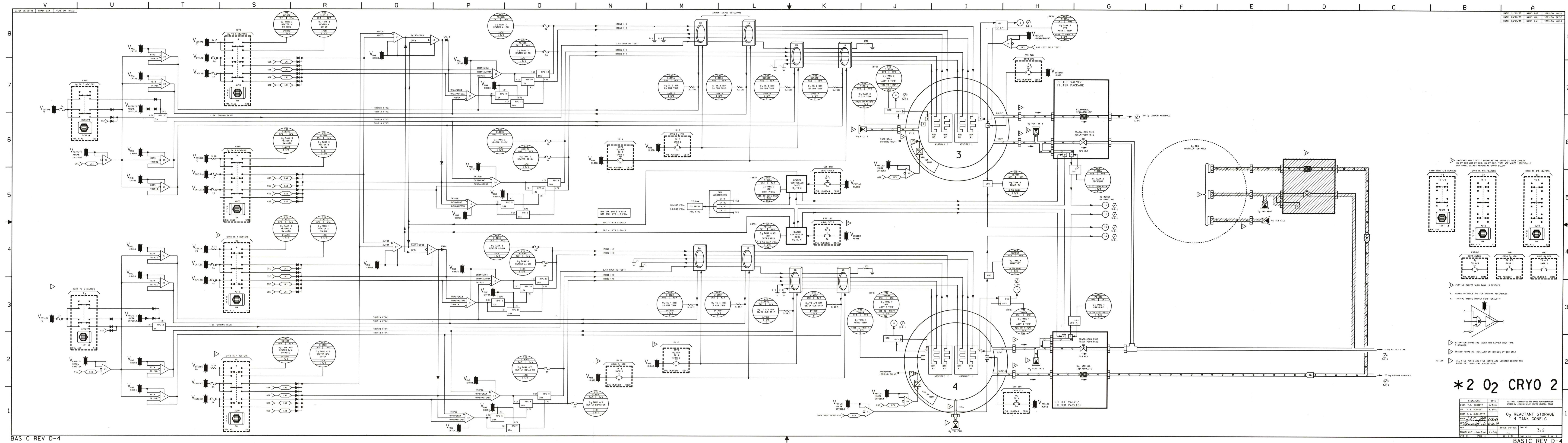
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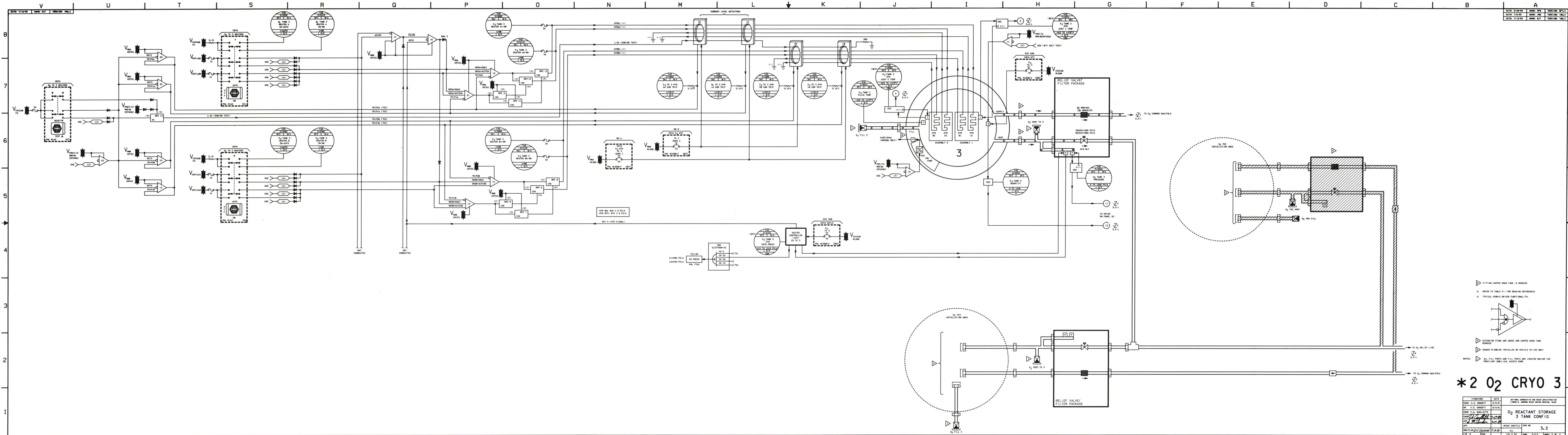
FOR DETAILED COMPONENT AND LOGIC INFORMATION REFER TO:

SSSH DWG NO.	SSSH DWG TITLE	VENDOR NAME	VENDOR DWG NO.	VENDOR SHEET NO.	REV	DATE	VENDOR DRAWING TITLE
2.3	AC GENERATION AND DISTRIBUTION	R. I.	VS70- 760402	1-9	L	12/9/88	AC PWR DIST AND CONTROL - SUBSYSTEM
		R. I.	VS70- 760409	1-9	D	1/19/89	AC PWR DIST AND CONTROL - SUBSYSTEM
		WESTING- HOUSE ELECTRIC CORP.	947F480	—	A	10/22/75	INVERTER SCHEMATIC
		WESTING- HOUSE ELECTRIC CORP.	9009D37	—	A	10/22/75	CONTROL PWR SUPPLY AND ERC
		WESTING- HOUSE ELECTRIC CORP.	9009D36	—		4/8/75	CCFT STEERING CIRCUIT
		WESTING- HOUSE ELECTRIC CORP.	947F494	—		10/14/75	COMPARITOR SCHEMATIC
		WESTING- HOUSE ELECTRIC CORP.	947F493	—		10/27/75	SINE WAVE SCHEMATIC
2.4 (SHEETS 1-3)	MCA DISTRIBUTION	R.I.	VS70-540302	1 OF 8	J	6/6/86	PAYLOAD BAY DOOR CONTS SUBSYSTEM
		R.I.	VS70-540309	1 OF 8	E	6/6/86	PAYLOAD BAY DOOR CONTS SUBSYSTEM
		R.I.	VS70-760709	1 OF 11	D	8/25/86	MOTOR CONTROL ASSY POWER DISTRIBUTION
		R.I.	VS70-760702	1 OF 12	H	8/25/86	MOTOR CONTROL ASSY POWER DISTRIBUTION
		R.I.	VS70-590119	1 OF 3	B	11/27/85	KU-BAND ANTENNA DEPLOYMENT

DWG	SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LYNDON B. JOHNSON SPACE CENTER HOUSTON, TEXAS	
2.3	ENGR J. AZBELL		VENDOR DRAWING REFERENCES	
	ENGR <i>J. Azbell</i>	7-20-89		
2.4	ENGR J. AZBELL			
	ENGR <i>J. Azbell</i>	7-20-89		
	APP <i>P. O. M. Joyce</i>	7-27-89		
	APP		SPACE SHUTTLE	TBL NO 2-1
	OMNIPLAN		ALL	
LTR D	PCN 4		PAGE 2-1-2	SHEET 2 OF 2

BASIC REV D-4

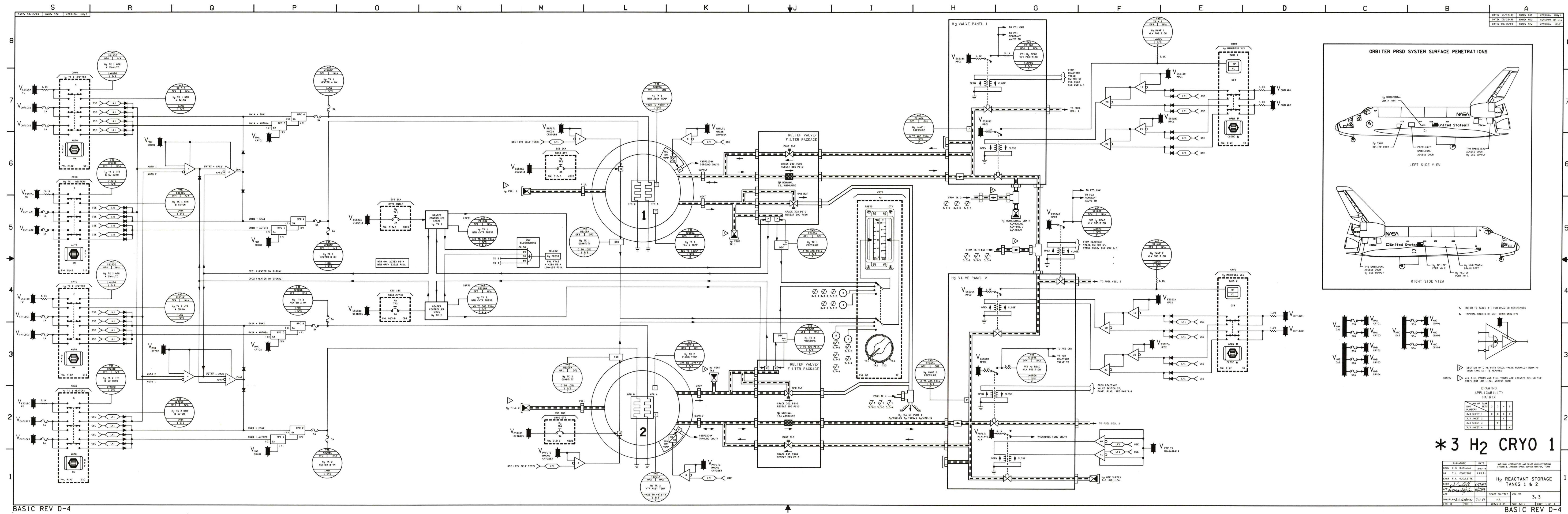


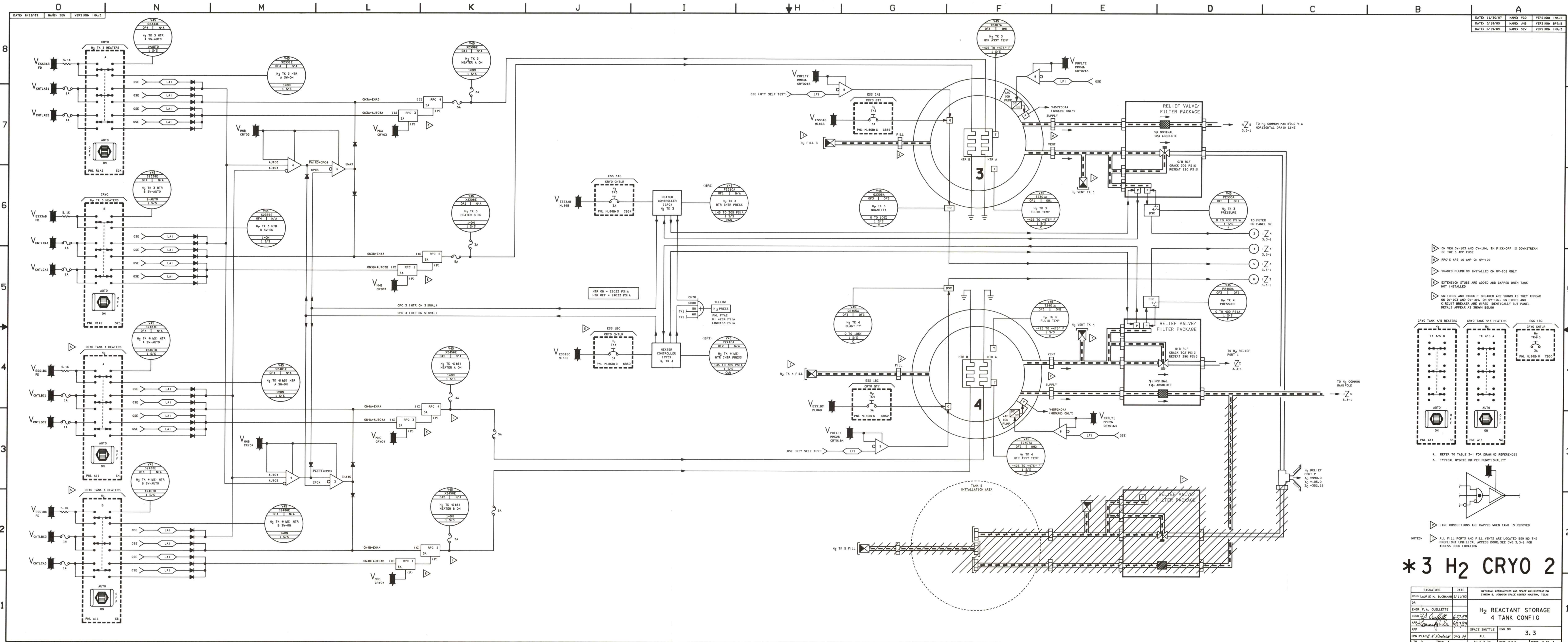


- 1. FITTING CAPPED WHEN TANK IS REMOVED
- 2. REFER TO TABLE 3-1 FOR DRAWING REFERENCES
- 3. TYPICAL HYBRID DRIVER FUNCTIONALITY
- 4. EXTENSION STUBS ARE ADDED AND CAPPED WHEN TANK REMOVED
- 5. SHADED PIPING IS INSTALLED ON VEHICLE (OV-10) ONLY
- 6. ALL FILL PORTS AND FILL VENTS ARE LOCATED BEHIND THE PRELIT LIGHT UNLESS LOCAL ACCESS DOOR

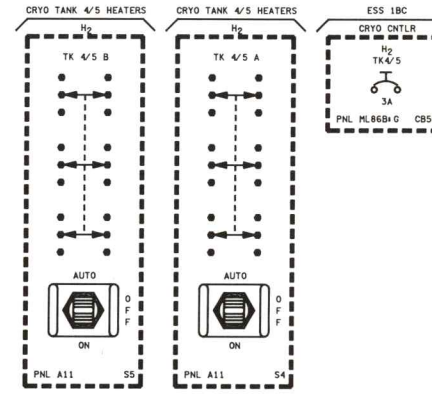
* 2 O₂ CRYO 3

SIGNATURE	DATE	REVISION
DESIGN: V. S. DODGETT	6/2/81	1
CHIEF: F. A. QUELLETTE	6/2/81	2
APP: M. J. L. L. L.	6/2/81	3
CHIEF: M. J. L. L.	6/2/81	4
APP: M. J. L. L.	6/2/81	5
CHIEF: M. J. L. L.	6/2/81	6
APP: M. J. L. L.	6/2/81	7
CHIEF: M. J. L. L.	6/2/81	8
APP: M. J. L. L.	6/2/81	9
CHIEF: M. J. L. L.	6/2/81	10
APP: M. J. L. L.	6/2/81	11
CHIEF: M. J. L. L.	6/2/81	12
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CHIEF: M. J. L. L.	6/2/81	14
APP: M. J. L. L.	6/2/81	15
CHIEF: M. J. L. L.	6/2/81	16
APP: M. J. L. L.	6/2/81	17
CHIEF: M. J. L. L.	6/2/81	18
APP: M. J. L. L.	6/2/81	19
CHIEF: M. J. L. L.	6/2/81	20
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APP: M. J. L. L.	6/2/81	85
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APP: M. J. L. L.	6/2/81	89
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CHIEF: M. J. L. L.	6/2/81	94
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CHIEF: M. J. L. L.	6/2/81	98
APP: M. J. L. L.	6/2/81	99
CHIEF: M. J. L. L.	6/2/81	100





- ON VEN 0V-103 AND 0V-104, TH PICK-OFF IS DOWNSTREAM OF THE 5 AMP FUSE
- RPC'S ARE 10 AMP ON 0V-102
- SHADED PLUMBING INSTALLED ON 0V-102 ONLY
- EXTENSION STUBS ARE ADDED AND CAPPED WHEN TANK NOT INSTALLED
- SWITCHES AND CIRCUIT BREAKER ARE SHOWN AS THEY APPEAR ON 0V-103 AND 0V-104, ON 0V-102, SWITCHES AND CIRCUIT BREAKER ARE WIRING IDENTICALLY BUT PANEL DECALS APPEAR AS SHOWN BELOW

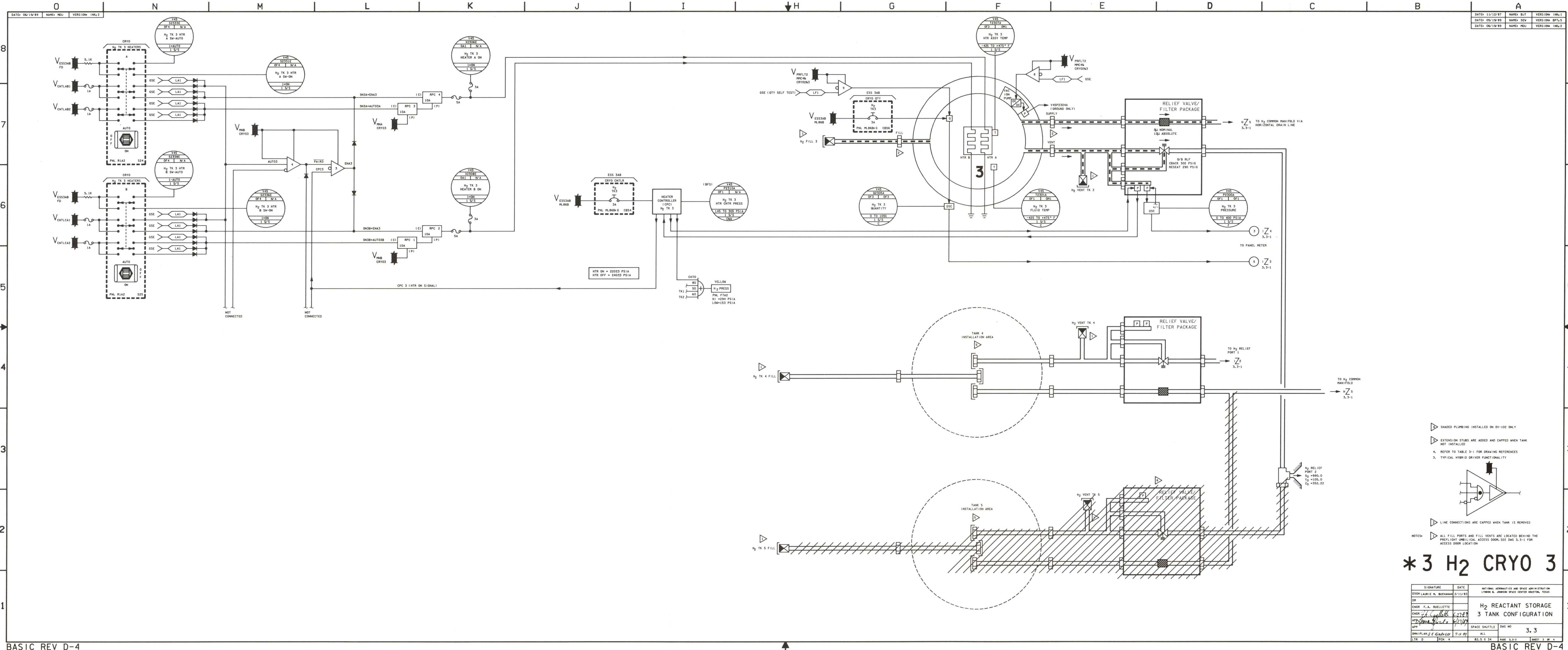


- 4. REFER TO TABLE 3-1 FOR DRAWING REFERENCES
- 3. TYPICAL HYBRID DRIVER FUNCTIONALITY
- LINE CONNECTIONS ARE CAPPED WHEN TANK IS REMOVED
- ALL FILL PORTS AND FILL VENTS ARE LOCATED BEHIND THE PRELIMINARY ACCESS DOOR, SEE DWG 3-3-1 FOR ACCESS DOOR LOCATION

*3 H2 CRYO 2	
SIGNATURE	DATE
DR	2/11/83
ENGR F. A. OUELLETTE	
APP	6/27/83
APP	6/27/83
DRY/PLANS	7/22/83
CTN	PCN 4
H2 REACTANT STORAGE 4 TANK CONFIG	
SPACE SHUTTLE	DWG NO
ALL	3, 3
82.5 X 34	PAGE 3-3-1
82.5 X 34	82.5 X 34

BASIC REV D-4

BASIC REV D-4



BASIC REV D-4

DATE: 11/15/87	NAME: BUT	VERSION: 1INX.1
DATE: 05/15/89	NAME: SEW	VERSION: BPT.5
DATE: 06/15/89	NAME: MDU	VERSION: 1INX.2

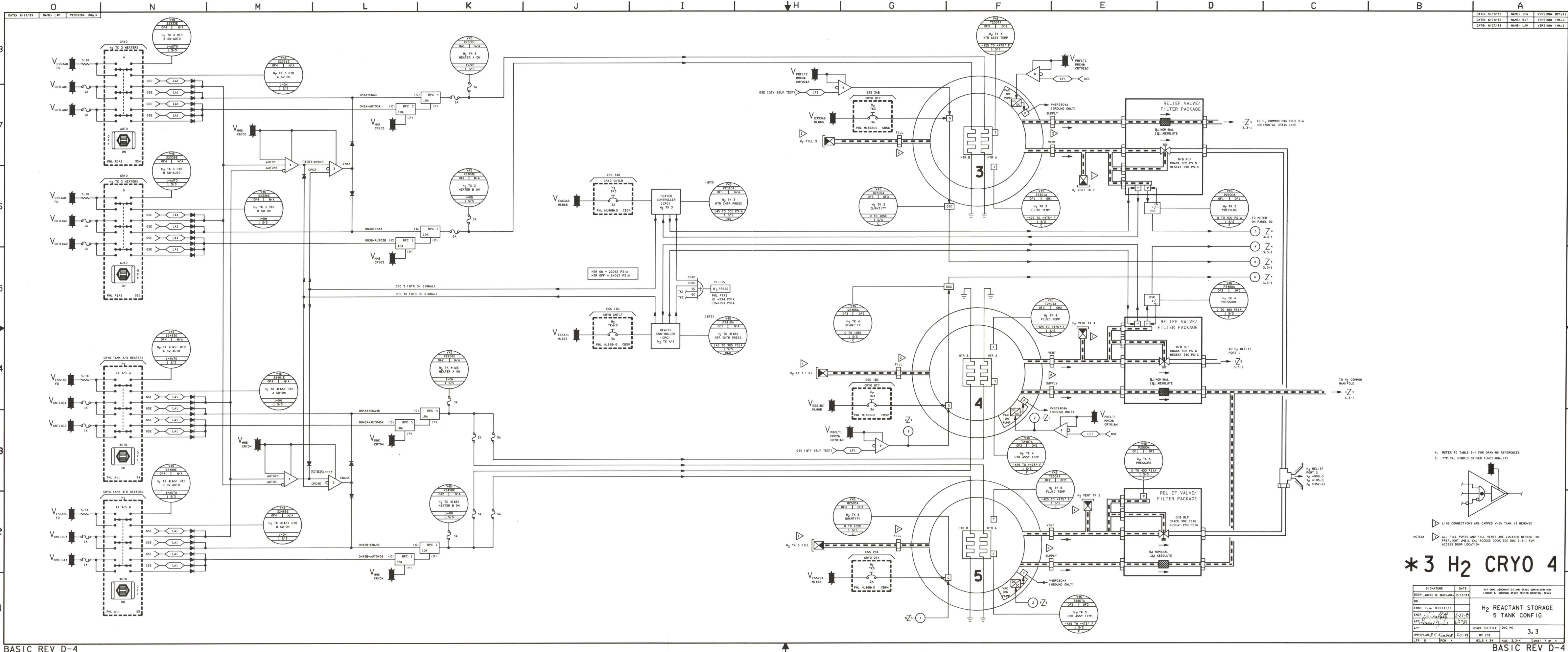
- NOTES:
- SHADED PLUMBING INSTALLED ON OV-102 ONLY
 - EXTENSION STUBS ARE ADDED AND CAPPED WHEN TANK NOT INSTALLED
 - REFER TO TABLE 3-1 FOR DRAWING REFERENCES
 - TYPICAL HYBRID DRIVER FUNCTIONALITY
 - LINE CONNECTIONS ARE CAPPED WHEN TANK IS REMOVED
 - ALL FILL PORTS AND FILL VENTS ARE LOCATED BEHIND THE PREFLIGHT UMBILICAL ACCESS DOOR. SEE DWG 3.3-1 FOR ACCESS DOOR LOCATION

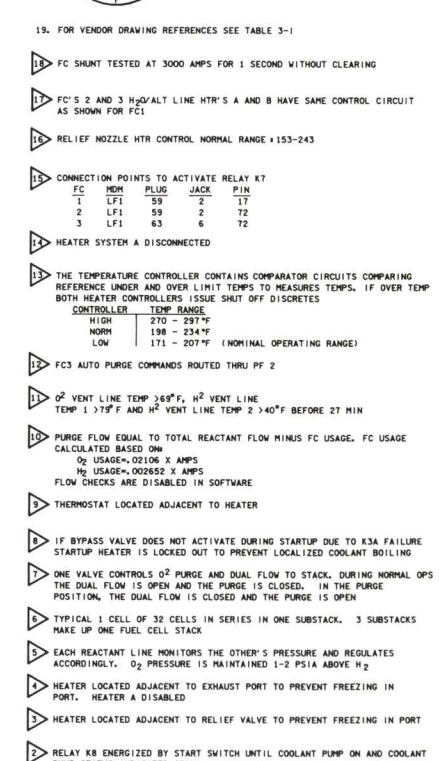
*3 H2 CRYO 3

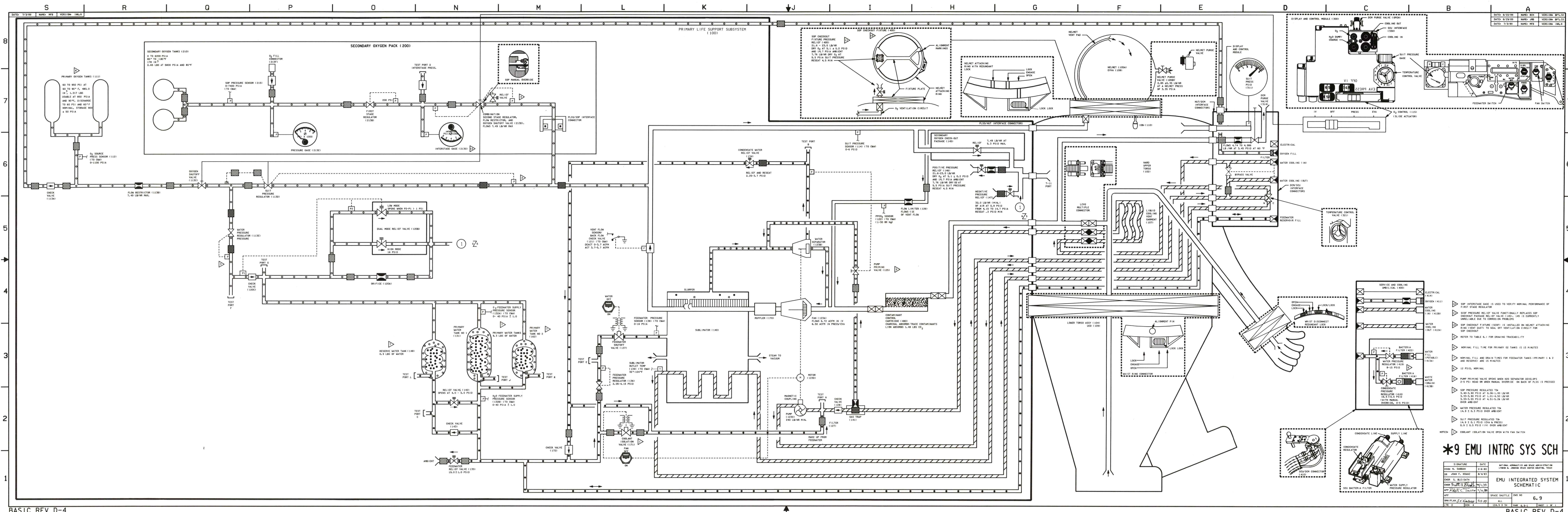
SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
DR	05/11/89	LYNCH & JOHNSON SPACE CENTER HOUSTON, TEXAS
ENGR	C.A. OUELLETTE	
ENGR	C.A. OUELLETTE	
APP	C.A. OUELLETTE	
OPN/PLAN	C.A. OUELLETTE	
CTR	D	PCN 4

H2 REACTANT STORAGE	DWG NO
3 TANK CONFIGURATION	3.3
SPACE SHUTTLE	ALL
82.5 X 34	PAGE 3.3-3
	SHEET 3 OF 4

BASIC REV D-4







FOR DETAILED COMPONENT AND LOGIC INFORMATION REFER TO:

SSSH DWG NO.	SSSH DWG TITLE	VENDOR NAME	VENDOR DWG NO.	VENDOR SHEET NO.	REV	DATE	VENDOR DRAWING TITLE
6.9, 6.10	EMU INTEGRATED SYSTEM SCHEMATIC, EMU ELECTRICAL SCHEMATIC	HS BRUNSWICK/ ARDE CONRAC/ GULTON CARELTON CONTROLS	SV789200 SV778895/ SV784099 SV778528 SV778873		A	10/27/88	PRIMARY LIFE SUPPORT SUBSYSTEM PRIMARY OXYGEN BOTTLE PRIMARY OXYGEN PRESSURE SENSOR PRIMARY PRESSURE CONTROL MODULE CHECK VLV FLOW RESTRICTOR SHUTOFF VLV SUIT PRESSURE REGULATOR WATER TANK PRESSURE REGULATOR SUIT PRESSURE SENSOR (psid) SHEAR PLATE ASSY EVA POSITION SWITCH DUAL MODE RELIEF VLV BLEED ORIFICE DUAL MODE RELIEF VLV FEEDWATER CHECK VLV FLOW RESTRICTOR UNIT VENT FLOW SENSOR CARBON DIOXIDE SENSOR FAN/PUMP/WATER SEPARATOR ASSY FAN ROTARY WATER SEPARATOR WATER PUMP BRUSHLESS MOTOR PITOT ACTUATED VLV CO2 TRANSDUCER FILTER AND ORIFICE CHECK VLV PUMP INLET FILTER CHECK VLV AND HOUSING PRIMARY WATER TANK #1 FEEDWATER SUPPLY PRESSURE SENSOR OXYGEN SIDE WATER SIDE CONDENSATE WATER RELIEF VLV FEEDWATER RELIEF VLV FEEDWATER PRESSURE REGULATOR FEEDWATER SHUTOFF VLV FEEDWATER PRESSURE SENSOR SUBLIMATOR AND HARNESS TEMPERATURE SENSOR HARNESS SUBLIMATOR GAS TRAP WATER RELIEF VLV WATER CHECK VLV RELIEF VLV AND ORIFICE POSITIVE PRESSURE RELIEF VLV NEGATIVE PRESSURE RELIEF VLV RESERVE WATER TANK CAUTION AND WARNING ELECTRICAL POWER HARNESS ELECTRICAL SIGNAL HARNESS CAUTION AND WARNING HARNESS FIBER OPTIC CONVERTER AND CONNECTOR REAL - TIME DATA SYSTEM HARNESS PLSS/SOP THERMAL COVER PRIMARY WATER TANK #2 MUFFLER COOLANT ISOLATION VLV ASSY WATER SHUTOFF VLV COOLANT RELIEF VLV SIGNAL CONDITIONER (RTDS) COMMUNICATIONS CARRIER ASSY (CCA) HARD UPPER TORSO (HUT) HARD TORSO SHELL EXTRA SMALL SMALL MEDIUM LARGE EXTRA LARGE
		CONRAC/ GULTON HS MICROSWITCH HS	SV767788 SV778540 SV789111 SV785844				
		HS SENSORMEDICS HS	SV771836 SV767798 SV787994				
		HS/MAG TECH HS HS HS HS HS HS CONRAC/ GULTON	SV785900 SV769480 SV772158 SV784996 SV778543 SV767699 SV769592 SV767793-5,-7				
		HS HS HS ECKEL CONRAC/ GULTON HS RDF HS HS HS HS HS AIR-LOCK AIR-LOCK HS HS HS HS HS HS ILC HS HUGHES/ TRIETLER/HS HS ECKEL HS HS ILC ILC ILC ILC ILC	SV769403 SV769404 SV792528 SV767660-5,-4 SV767793-6,-8 SV792500 SV792503 SV783850 SV784943 SV769405 SV769406 SV785860 SV787036 SV785927 SV769592 SV785970 SV789151 SV789152 SV789153 SV777266 SV789134 SV772168 SV769592 SV785890 SV784998 SV784982 SV784985 SV791230 0101-10001 0102-10002 SV772325 SV772335 SV772345 SV772375 SV772385		N BL	11-21-85 2-6-88	

DWG	SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LYNDON B. JOHNSON SPACE CENTER HOUSTON, TEXAS	
6.9	ENGR S. BLEISATH		VENDOR DRAWING REFERENCES	
	ENGR <i>[Signature]</i>	7-21-89		
6.10	ENGR E. RUBIO			
	ENGR <i>[Signature]</i>	7-24-89		
	APP <i>[Signature]</i>	7/24/89	SPACE SHUTTLE TBL NO 6-1	
	APP			
	OMNIPLAN			
LTR D	PCN 4		PAGE 6.1-4	SHEET 4 OF 6

BASIC REV D-4

FOR DETAILED COMPONENT AND LOGIC INFORMATION REFER TO:

SSSH DWG NO.	SSSH DWG TITLE	VENDOR NAME	VENDOR DWG NO.	VENDOR SHEET NO.	REV	DATE	VENDOR DRAWING TITLE
6.9, 6.10 (CONT'D)		ILC	0103-10003		AW	3-26-87	ARMS
		ILC	0103-84025				UPPER ARM ASSY
		ILC	0103-84026				LOWER ARM ASSY
		ILC	0104-10004		CE	10-19-87	LOWER TORSO ASSY
		ILC	0104-82347				WAIST RESTRAINT/BLADDER ASSY
		ILC	0104-84402				WAIST RESTRAINT/BLADDER ASSY
		ILC	0104-84811				WAIST RESTRAINT AND BLADDER
		ILC	0104-82692				WAIST TMG
		ILC	0104-84386				WAIST TMG
		ILC	0104-84905				WAIST TMG
		ILC	0104-84027				TROUSER
		ILC	0104-84028				BOOT ASSY
		ILC	0104-82664				BOOT SIZING INSERT
		ILC	9785, 9787				BODY SEAL CLOSURE
			9789, 9791				
		ILC	9698, 9699, 9714				WAIST BEARING
		ILC	0105-10005		T	10-19-87	HELMET
		ILC	0106-10006/ 1600		BJ	12-8-87	GLOVES
					K	10-19-87	
		ILC	0107-10007		AU	2-19-85	LIQUID COOLING AND VENT GARMENT (LCVG)
		ILC	0107-81057				BOOT LEG VENT DUCT
		ILC	0107-84029				GARMENT ASSY
		ILC	0108-10008		W	09-24-86	EXTRAVEHICULAR VISOR ASSY
		ILC	0110-10010		AF	10-19-87	IN SUIT DRINK BAG
		HS	SV767710		E	10-4-88	SECONDARY OXYGEN PACK
		FANSTEEL	SV778880				SECONDARY OXYGEN BOTTLE
		CARELTON	SV778475				SOP PRESSURE CONTROL MODULE
		CONTROLS					
		KULITE	SV778473				SOP PRESSURE TRANSDUCER
		HS	SV792294		A	10-4-88	DISPLAYS AND CONTROLS MODULE
		KRATOS	SV767706				SUIT PRESSURE GAUGE
		AIR-LOCK	SV787027				PURGE VLV
		HS	SV789693				TEMP CONTROL VLV
		AIR-LOCK	SV778872-10				COMMON MULTIPLE CONNECTOR
		HS	SV792294				ELECTRONIC ASSY
		LITTON	SV767784				VOLUME CONTROL
		LITTON	SV767785				DISPLAY INTENSITY CONTROL
		ARMTEC	SV767786				EVC MODE SELECTION SWITCH
		HEWLETT	SV789695				BITE INDICATOR
		PACKARD					
		HS	SV792293				INTERNAL WIRING ASSY
		HS	SV774161				EXTERNAL WIRING ASSY
		HAYDON	SV778596				POWER MODE SELECTION SWITCH
		ARMTEC	SV767794				PUSH TO TALK SWITCH
		ARMTEC	SV771887-2				FAN SWITCH
		ARMTEC	SV767795-2				FEEDWATER VALVE SWITCH
		ARMTEC	SV767792				CAUTION AND WARNING SYSTEM SWITCH
		HEWLETT	SV791145				ALPHANUMERIC DISPLAY (LCD)
		HS	SV779301				OXYGEN, WATER MANIFOLD ASSY
		ILC	SV771987-11				DCM THERMAL COVER
		HS	SV767730			2-7-85	SERVICE AND COOLING UMBILICAL
		AIR-LOCK	SV778872-11				COMMON MULTIPLE CONNECTOR
		TITEFLEX	SV778865				O2 HIGH PRESSURE LINE
		TITEFLEX	SV771722				WATER LINE
		TITEFLEX					POTABLE WATER LINE
		TITEFLEX					COOLING WATER LINE
		TITEFLEX					COOLING WATER OUT-LINE
		IMPQUA	SV767709				BACTERIA FILTER
		HS	SV771717				CONDENSATE WATER REGULATOR
		HS	SV772150				WATER SUPPLY PRESSURE REGULATOR
		HS	SV778504				OXYGEN FILTER AND ORIFICE
		HS	SV784967				BACTERIA CARTRIDGE
		HS	SV784959				POTABLE WATER FILTER
		HS	SV771763				SCU ELECTRICAL HARNESS
		DEUTSCH	SV764255				VEHICLE ELECTRICAL CONNECTOR
		GLENAIR	SV787944				CONNECTOR BACKSHELL
		AIRCLOCK	SV785003				SCU ELECTRICAL CONNECTOR
		GFP	SV771749				SHEATH ASSY
		GFP	SV729617				SHEATH HOOK
		GFP	SV772134				TETHER SHACKLE
		HS	SV767690				EMU ELECTRICAL HARNESS (EEH)
		HS	SV767680				AIRLOCK ADAPTER
		HS	SV792600		J	11-30-87	CONTAMINANT CONTROL CARTRIDGE (CCC)

DWG	SIGNATURE		DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LYNDON B. JOHNSON SPACE CENTER HOUSTON, TEXAS		
6.9	ENGR	S. BLEISATH		VENDOR DRAWING REFERENCES		
	ENGR	<i>Santa Bleisath</i>	7-21-89			
6.10	ENGR	E. RUBIO				
	ENGR	<i>Edward R. Rubio</i>	7-24-89			
	APP	<i>Robert C. Travin</i>	7/24/89			
	APP			SPACE SHUTTLE	TBL NO 6-1	
	OMNIPLAN			ALL		
	LTR D	PCN	4		PAGE 6.1-5	SHEET 5 OF 6

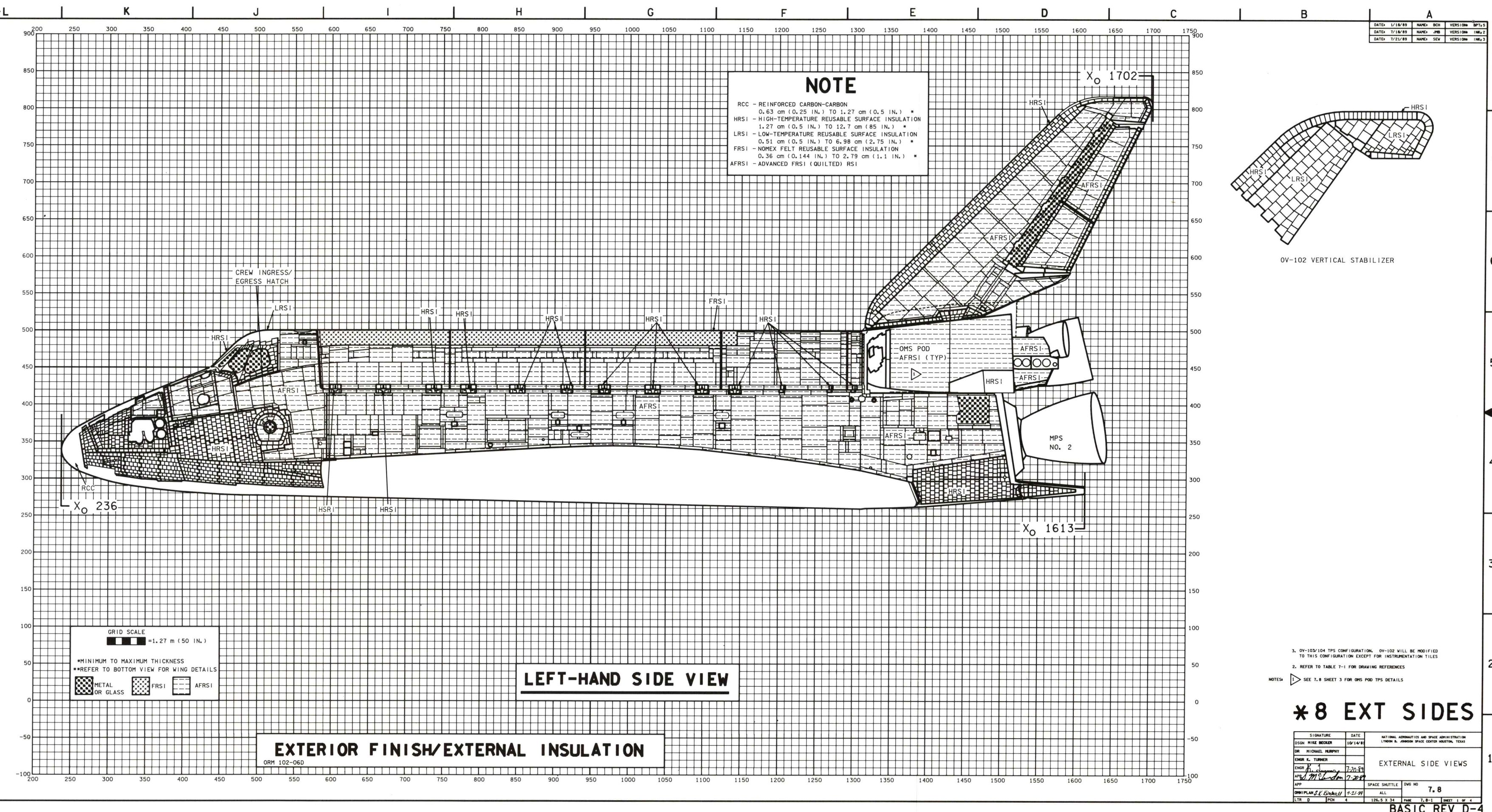
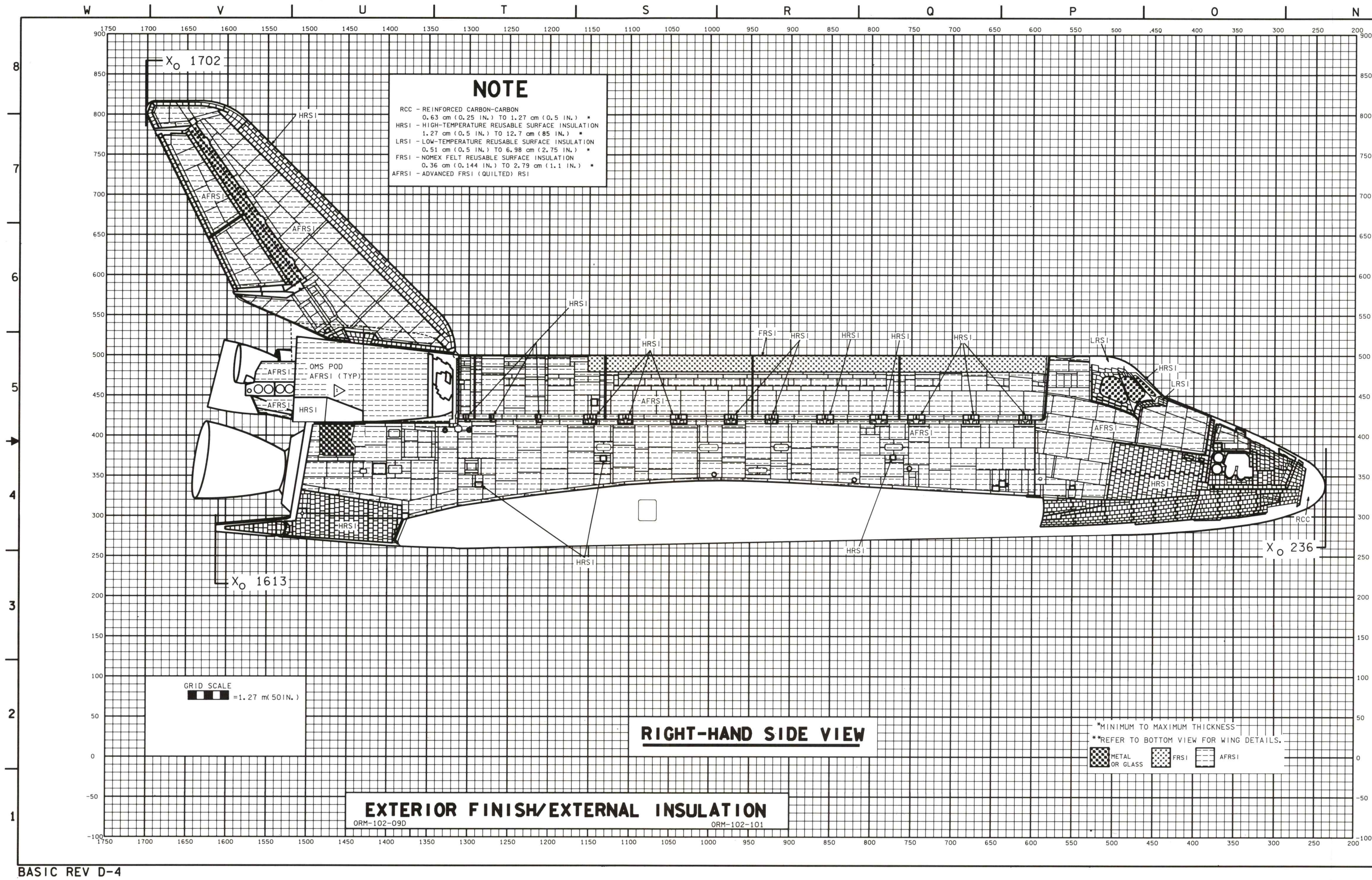
BASIC REV D-4

FOR DETAILED COMPONENT AND LOGIC INFORMATION REFER TO:

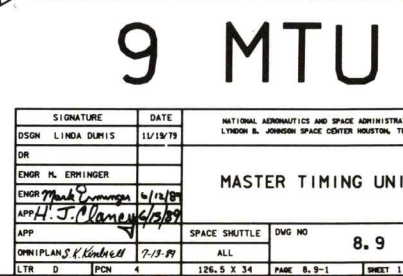
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6.9 6.10 (CONT'D)		YARDNEY HS	SV767789 SVSK94600 SV792740 SV792695 SV792696		F G	10-21-86 8-31-88	BATTERY DCM: ELECTRICAL SCHEMATIC DRAWING (BLUE PRINT) BENDS TREATMENT ADAPTER PRESSURE GAUGE PRESSURE RELIEF VALVE

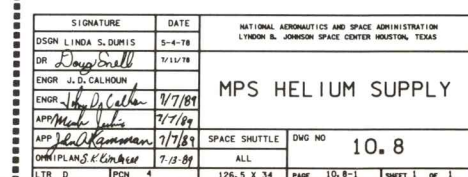
DWG	SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LYNDON B. JOHNSON SPACE CENTER HOUSTON, TEXAS	
6.9	ENGR S. BLEISATH		VENDOR DRAWING REFERENCES	
	ENGR <i>Robert C. Bleisath</i>	7-21-89		
6.10	ENGR E. RUBIO			
	ENGR <i>Edward R. Rubio</i>	7-24-89		
	APP <i>Robert C. Bleisath</i>	7/24/89	SPACE SHUTTLE TBL NO ALL 6-1	
	APP			
	OMNIPLAN			
LTR D	PCN	4	PAGE 6.1-6	SHEET 6 OF 6

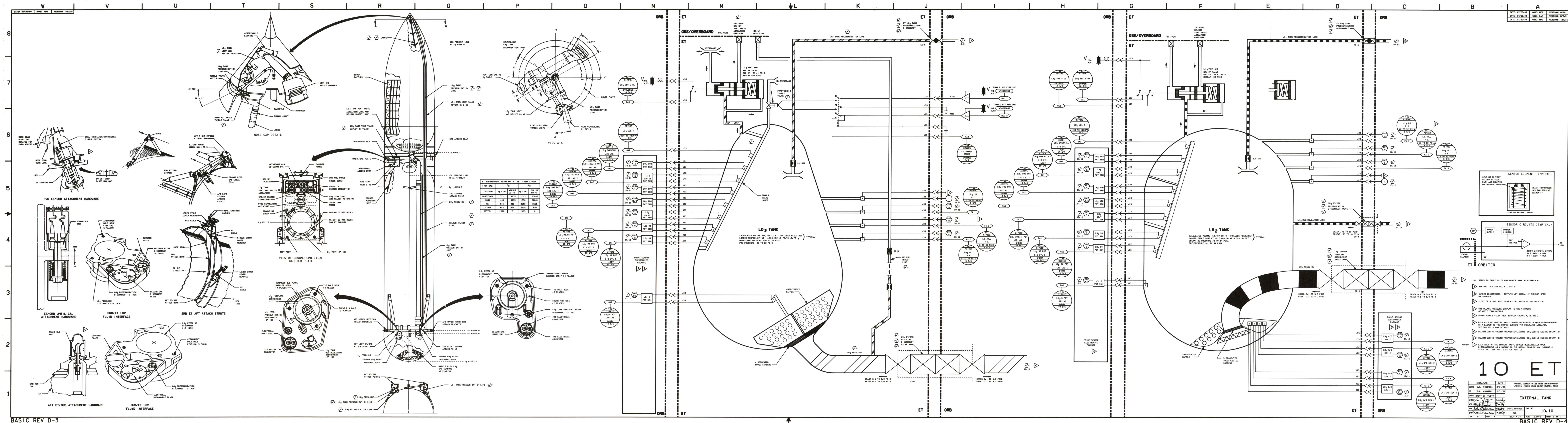
BASIC REV D-4

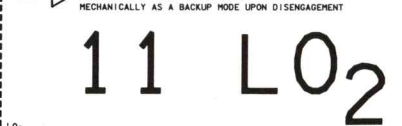












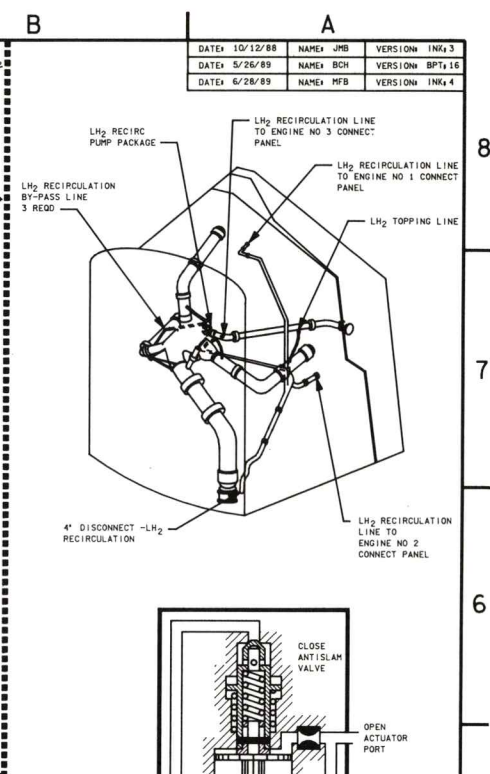


Diagram illustrating the components of a prefill and fill/drain valve assembly:

- LM2 FILL AND DRAIN
- CLOSE ACTUATOR PORT
- VALVE ATTACH POINT
- PREFILL AND FILL/DRAIN VALVE
- ANTI-SLAM ACTUATOR

USE/OVERBOARD

ET LOW TANK

PRE PRESS (HEI)

PRESS

RPS HIGH POINT

BLEED (PST)

4

3

TEST POINTS

RELIEF (S FOR PRESSURE TRAPPED
BEFORE CLOSED DISCONNECT)

REFER TO TABLE (Z) FOR FLOW/LOW FLOW INDICATORS

SINGLE ORIFICE HIGH FLOW/LOW FLOW VALVE

FIRM DETAILS OF ACTUATOR SEE (Z)

THE PRELATIVE HAS TWO REASONS OF
INTERNAL RELIEF, THE MAIN VENT
AND A FLOW REVERSAL POCKET. WITH
THE CLOSED SOLENOID VENTED
THE MAIN VENT WILL CRACK A RELEASE
MAX IS 15 PSI. THE POCKET WILL CRACK
A RELEASE IS TO 50 PSI. UNDER CERTAIN
CONDITIONS AND WHEN THE P1 CRACK
RELEASES BY 7 PSI TO 10 PSI - 150 MM

HELIUM DURING DOWN PRE-PRESSURATION, SH₂ DURING
ENGINE OPERATION

4

3

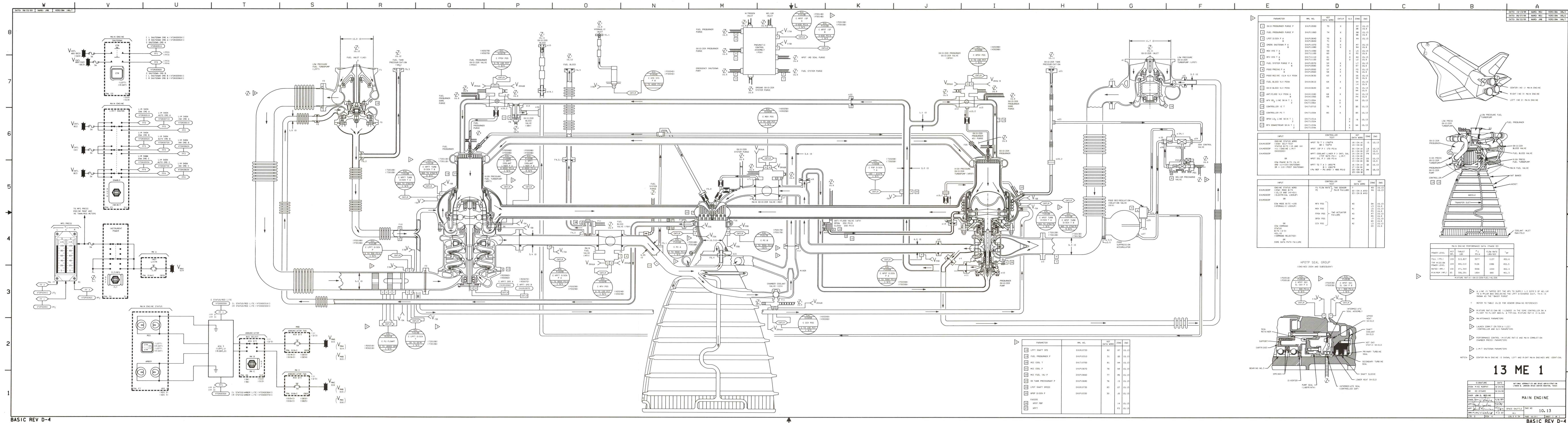
12 LH2

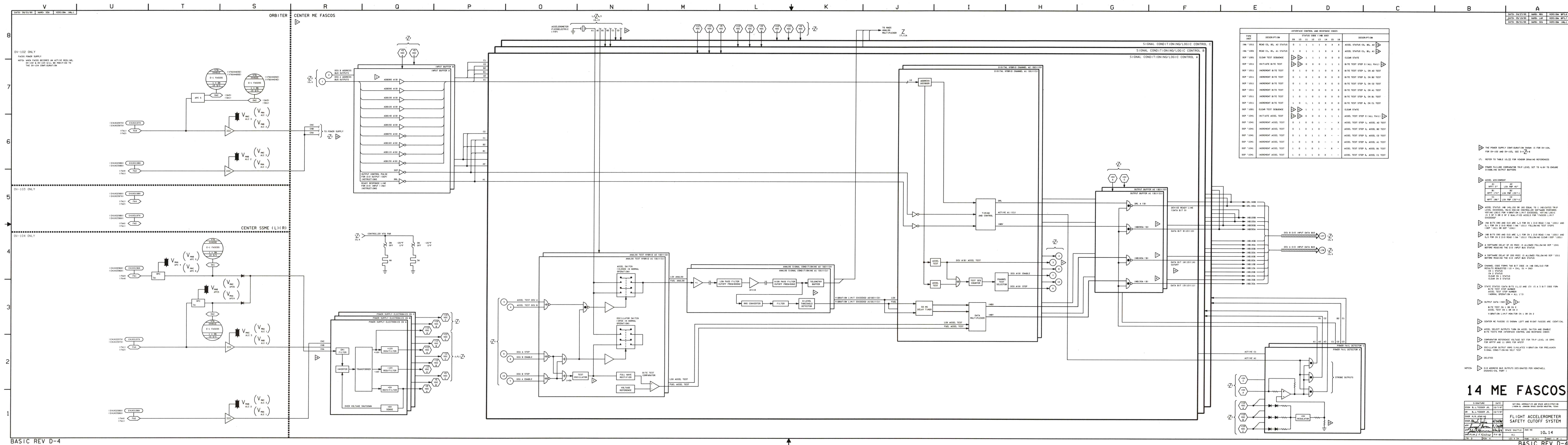
MECHANICALLY AS A BACKUP MODE UPON DISENGAGEMENT

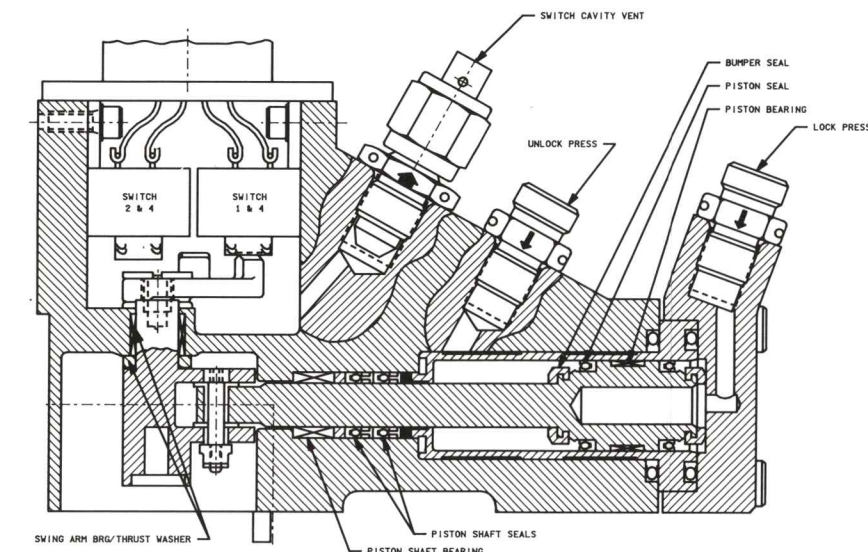
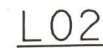
SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION	MAIN ENGINE LH2 SYSTEM
ENDR	7/10/79	L'ROCK 8, JENNISON SPACE CENTER HUNTSVILLE, TEXAS	
ENDR	7/10/79		
APP	7/10/79		
APP	7/10/79		

12 SEP 79

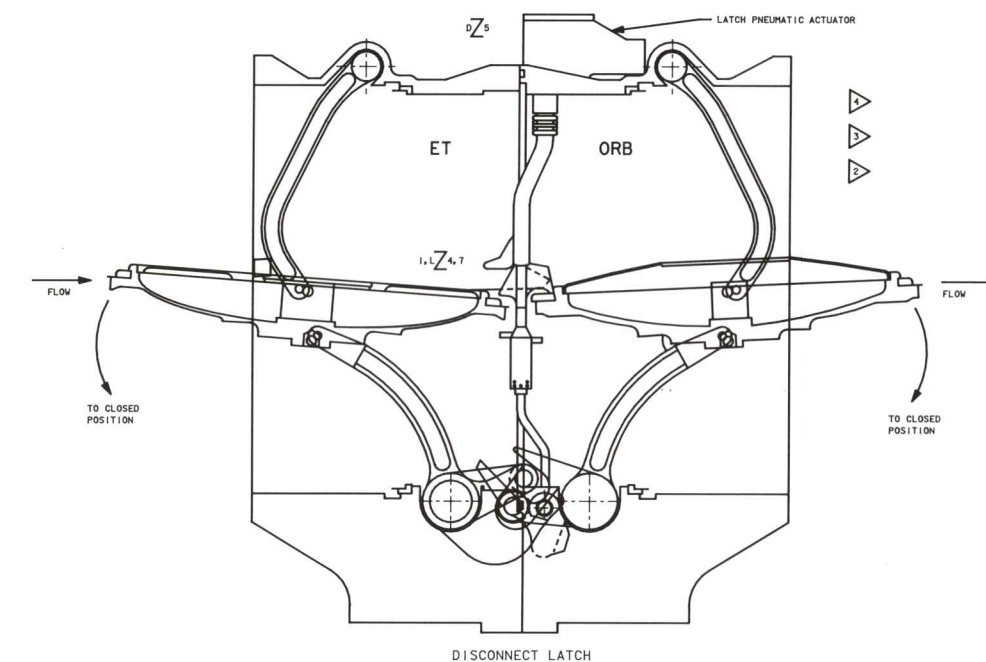
BASIC REV D-4







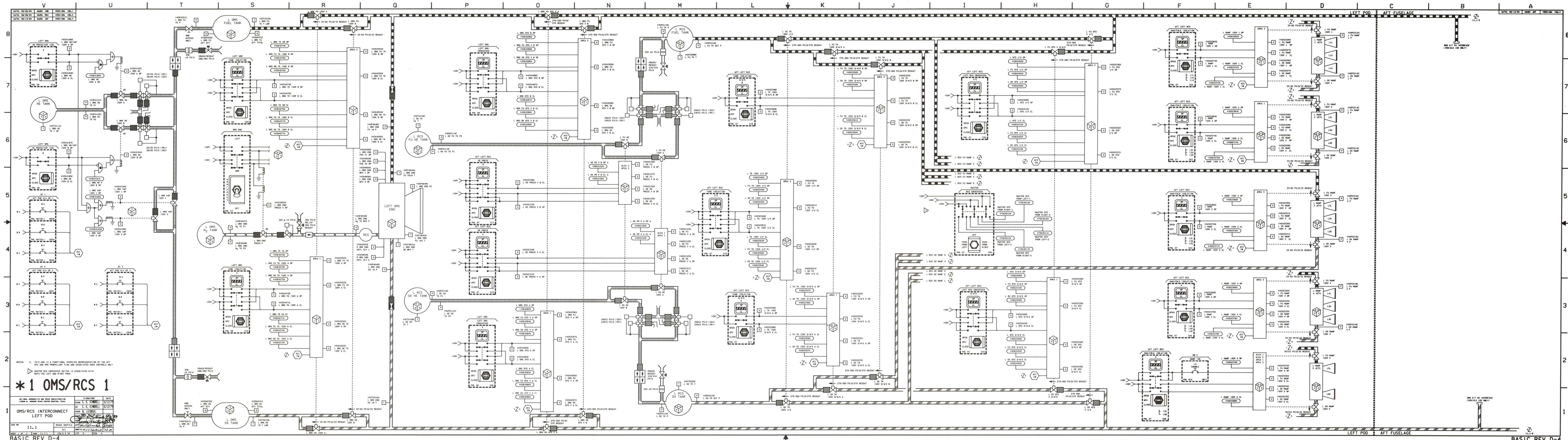
17-INCH DISCONNECT LATCH ACTUATOR ASSEMBLY

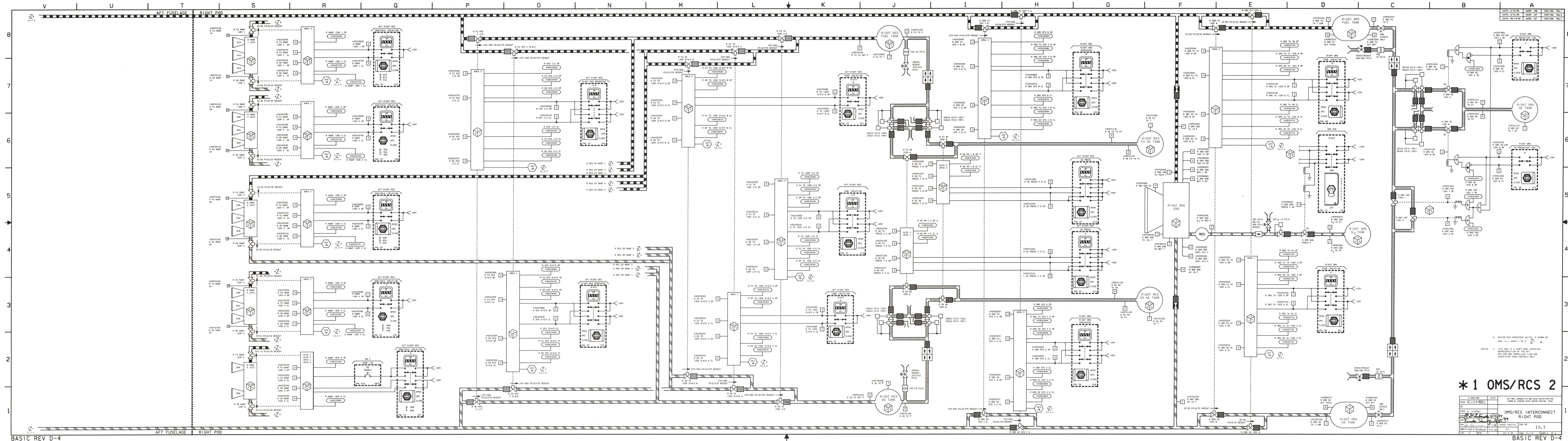


DISCONNECT LATCH

- NOTES:  LATCH IS INSIDE 17 INCH DISCONNECT VALVE BODY. FOR DETAIL SEE OVERVIEW DRAWING AT BOTTOM OF SHEET

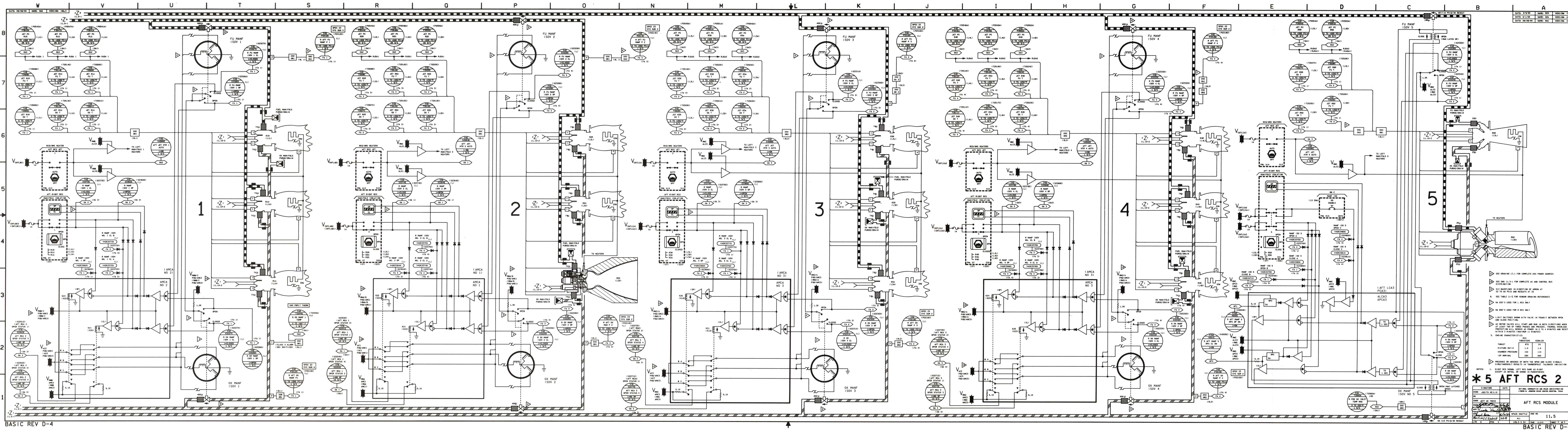
SIGNATURE		DATE		NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LYNN B. JOHNSON SPACE CENTER HOUSTON, TEXAS	
DR B. J. TEDDER JR.		1/7/88			
DR					
ENGR R.E. HAZLE				LO2 AND LH2 17-INCH DISCONNECT LATCH	
ENGR <i>RE Hazle</i>		<i>6/6/88</i>			
APP <i>James G. ...</i>		<i>5/5/87</i>			
APP <i>John ...</i>		<i>5/5/87</i>			
CONTR PLANS BY <i>K. Kinslow</i>		<i>9/2/89</i>			
DTP DR D		PCN 4		SPACE SHUTTLE	DWG NO
				82.5 X 34	10.15
				PAGE 10.15-1	SHEET 5





* 1 OMS/RCS 2

ENGR M. LUTOMSKI		OMS/RCS INTERCONNECT	
5/15/89		RIGHT POD	
APP	5/15/89	SPACE SHUTTLE	DWG NO 11.1
APP	5/15/89	ALL	
COMPILED S. K. KOSKINEN 7-13-89			
LTR D	PCN 4	121 X 34	PAGE 11.1-2 SHEET 2 OF
BASIC REV D			



*** 5 AFT RCS 2**

DATE	12/15/89
REVISION	11.5
BY	11.5
CHKD	11.5
APP'D	11.5
DATE	12/15/89
REVISION	11.5
BY	11.5
CHKD	11.5
APP'D	11.5

11.5

Space Shuttle Systems Handbook

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1989

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