

Space Shuttle Systems Handbook

Volume II - Sections 12 through 20

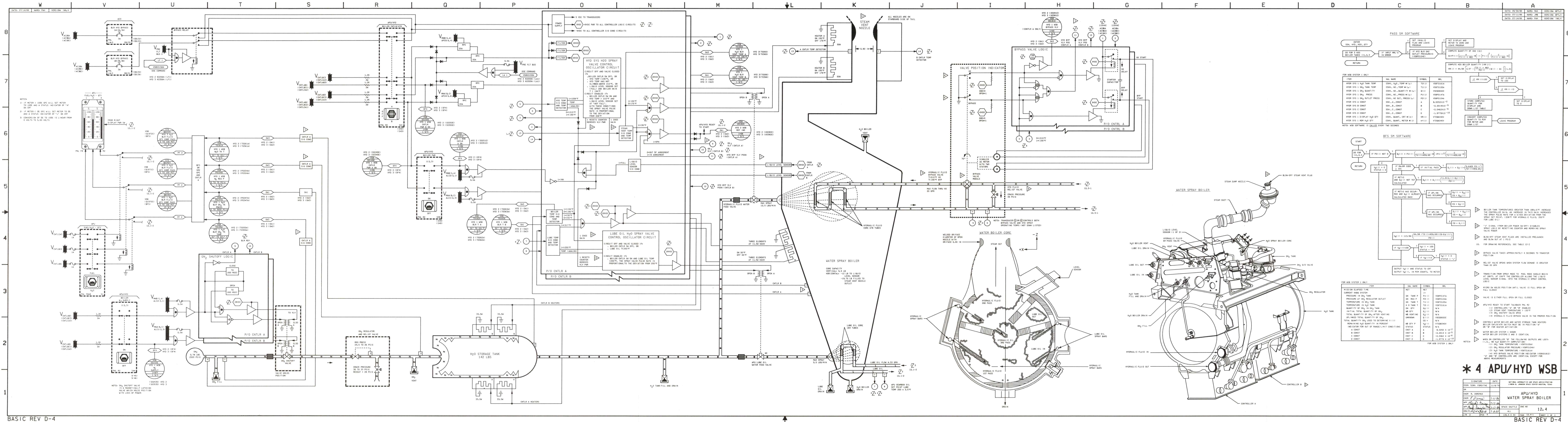
Mission Operations Directorate Systems
Division

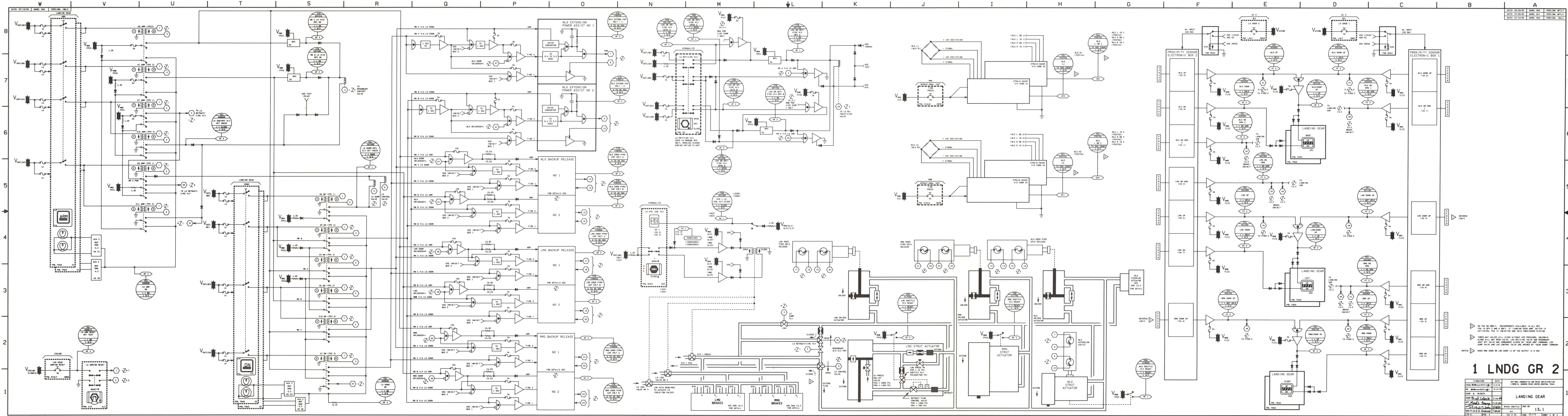
Revision D, DCN-4
July 28, 1989



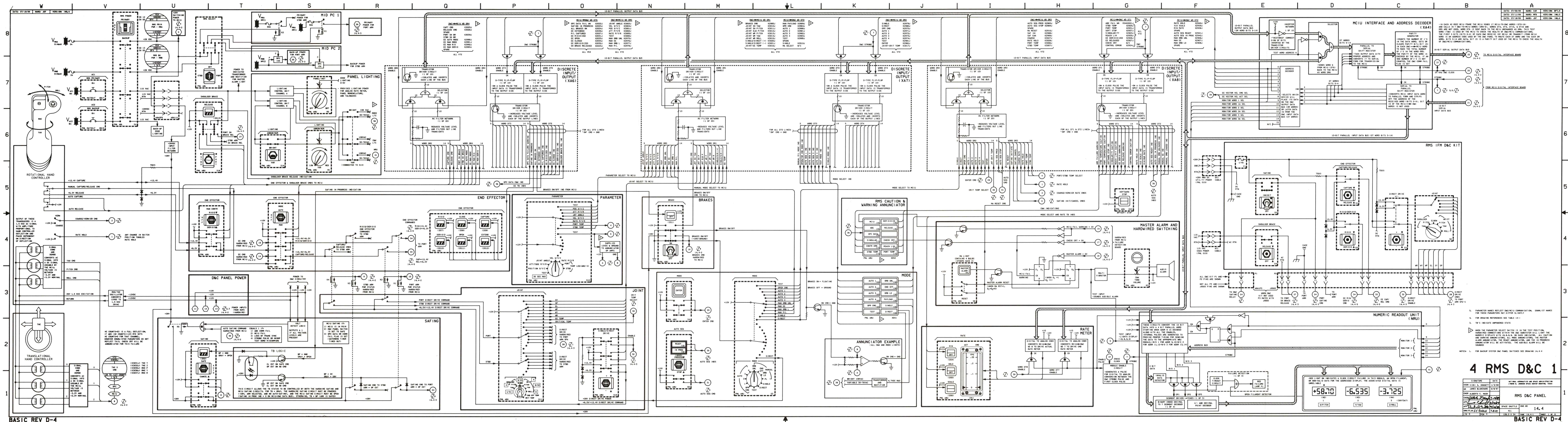
National Aeronautics and
Space Administration

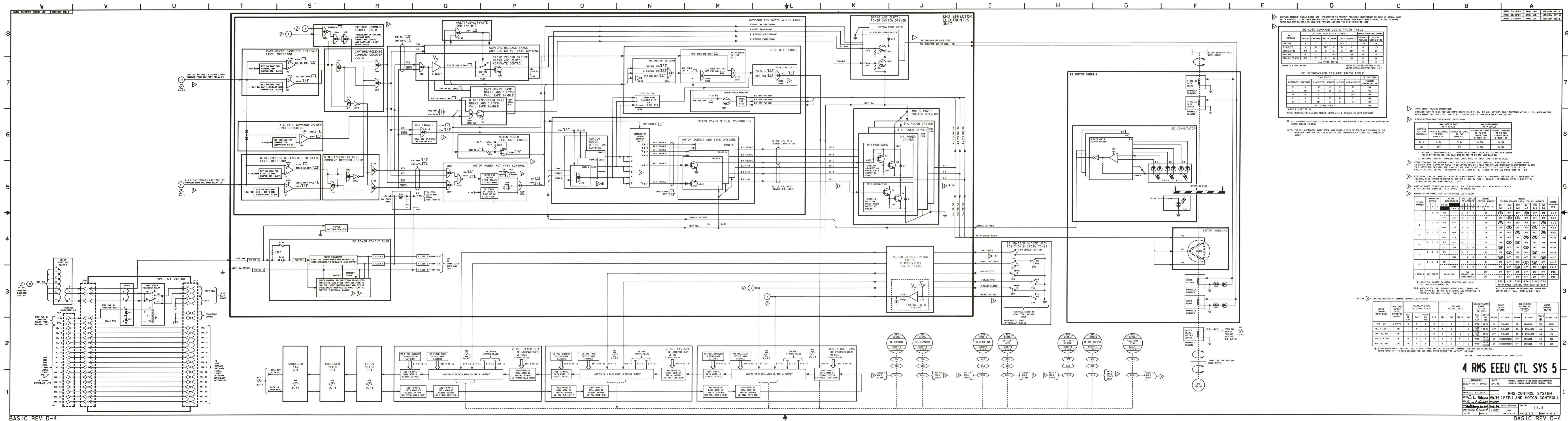
Lyndon B. Johnson Space Center
Houston, Texas



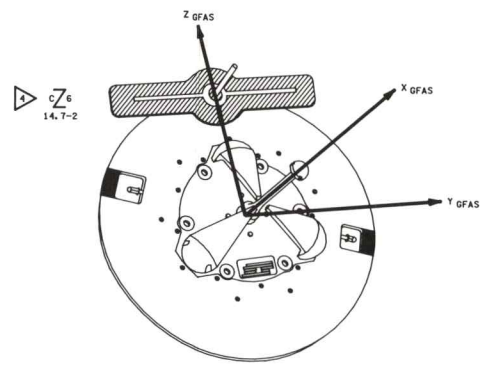
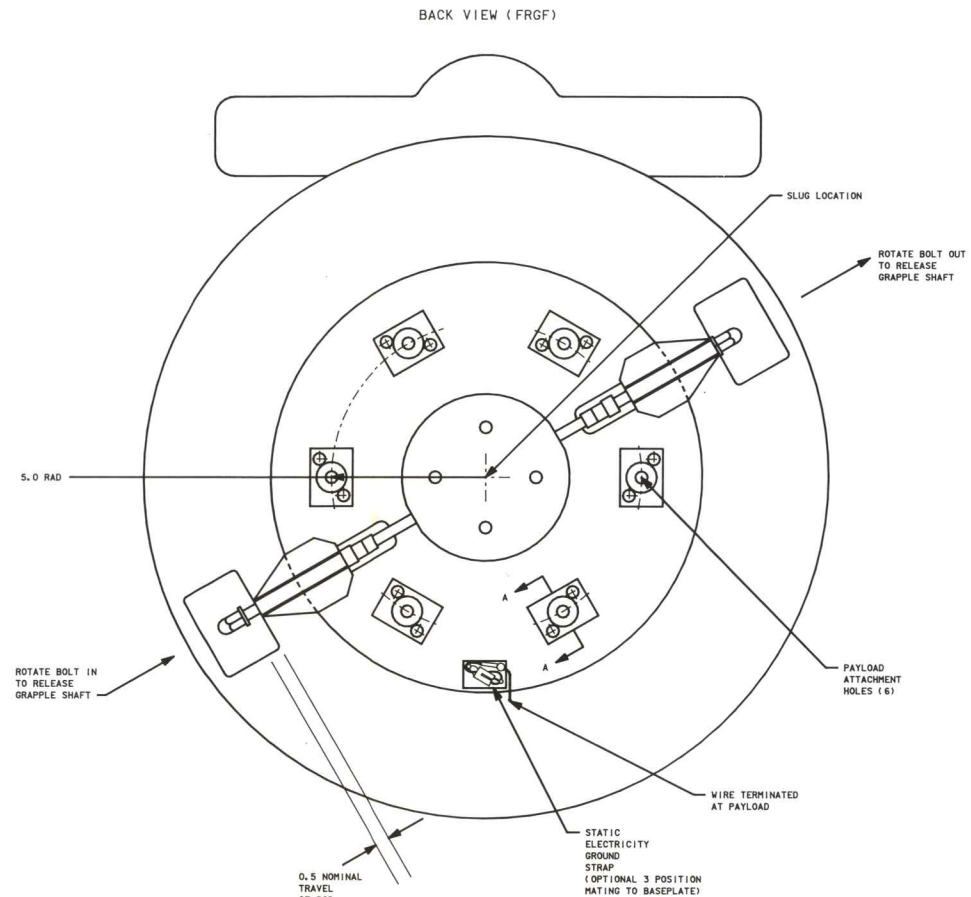
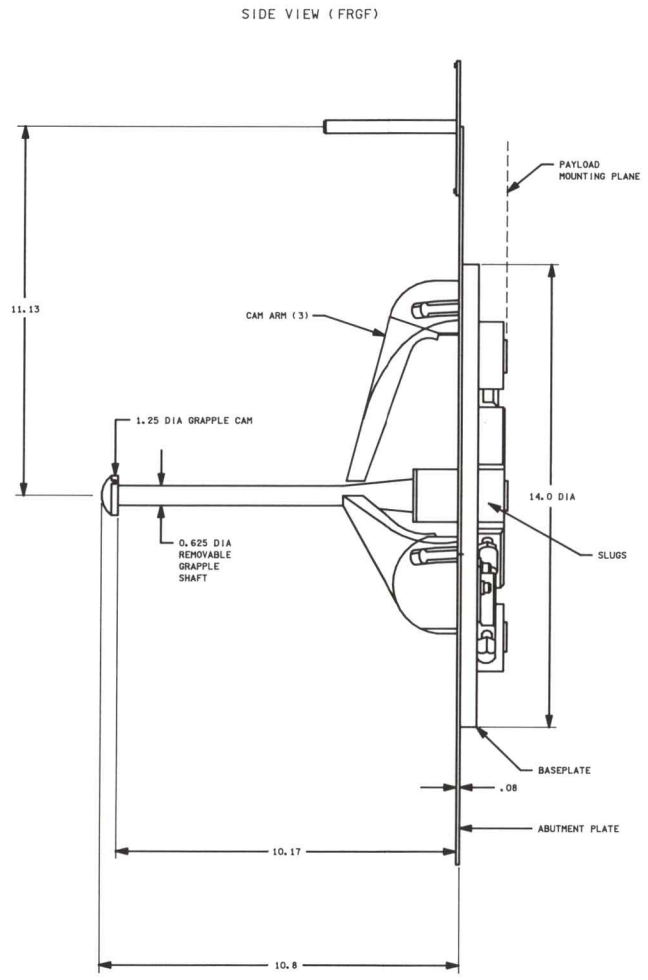
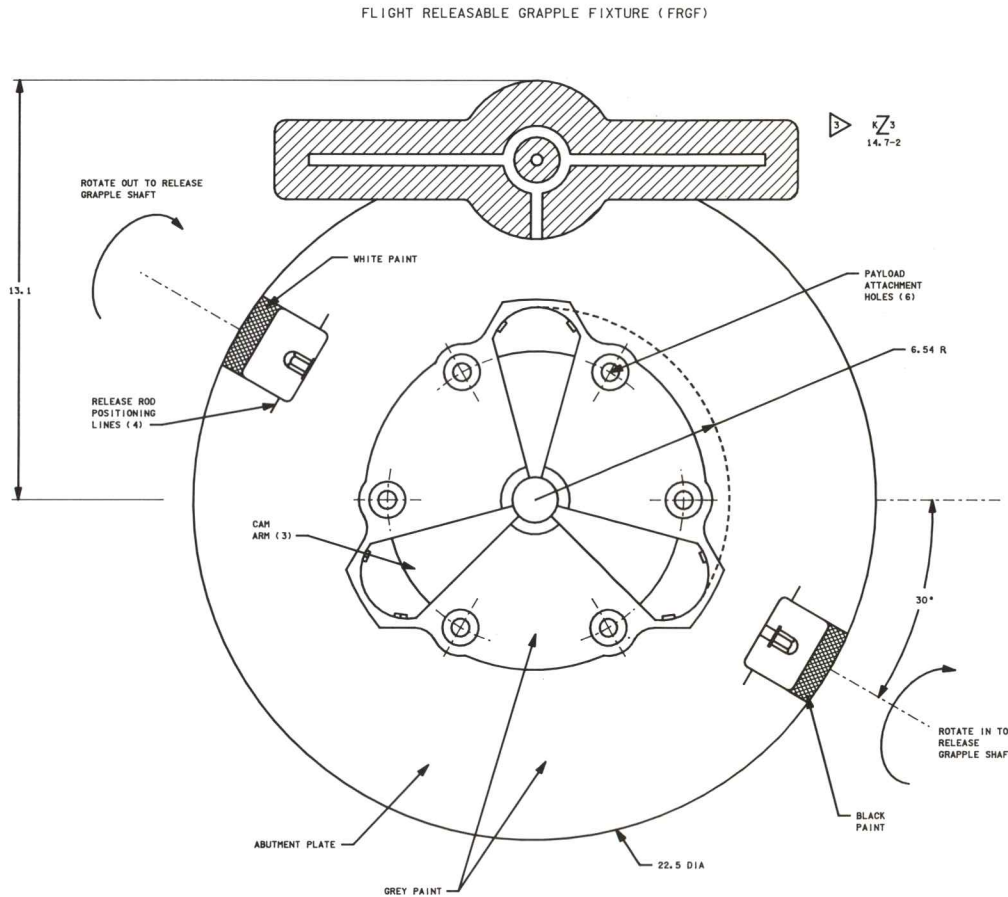




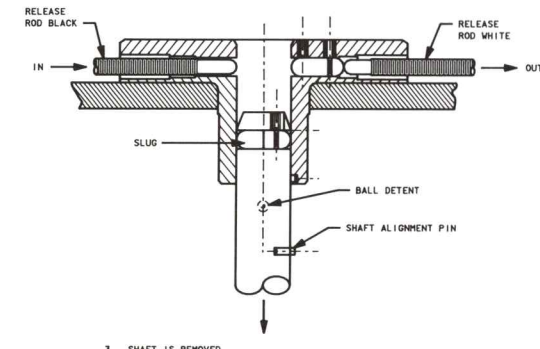
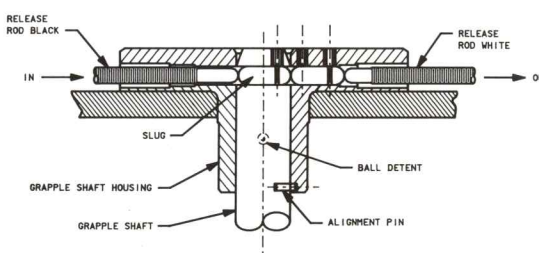
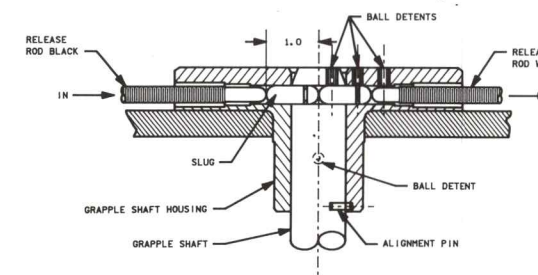
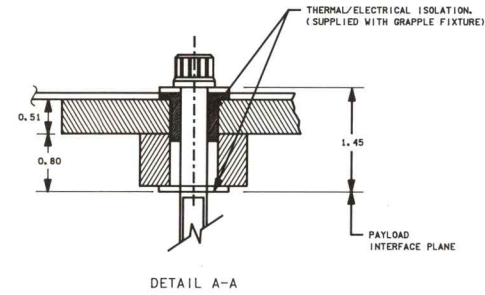
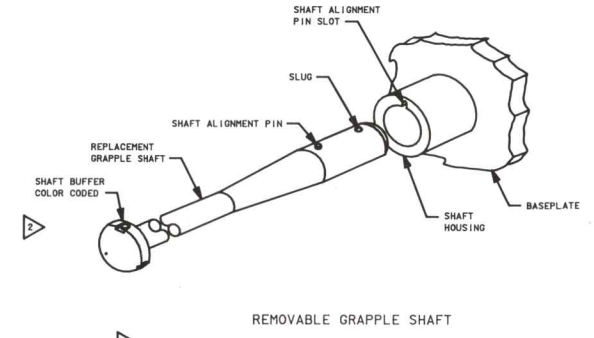
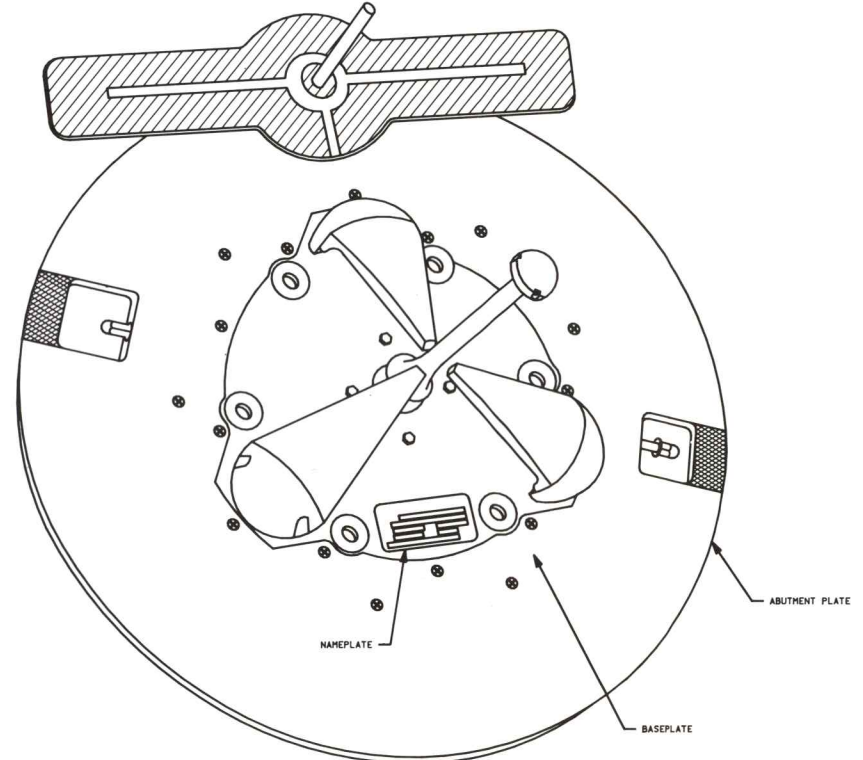








GRAPPLE FIXTURE AXIS SYSTEM (GFAS)
(ALL GRAPPLE FIXTURES USE THE SAME AXIS SYSTEM)
ORIGIN: AT THE BASE OF THE GRAPPLE SHAFT,
ON THE ABUTMENT PLATE PLANE.
POSITIVE Z: IS OUT THE CENTERLINE OF GRAPPLE PIN
POSITIVE Y: IS UP THROUGH THE CENTER OF GRAPPLE TARGET
POSITIVE X: COMPLETES RIGHT HANDED
COORDINATE SYSTEM



- OPERATION OF FRGF EVA RELEASE
1. 1/2" RATCHET WRENCH IS USED
 2. A) ROTATE WHITE RELEASE ROD OUT (COUNTERCLOCKWISE) UNTIL IT HITS MECHANICAL HARD STOP (APPROX 0.5")
B) RELEASE RODS HAVE POSITIONING LINES TO INDICATE LIMIT OF TRAVEL
C) 32 90° TURNS
D) COMPLETE 0.5" OF TRAVEL
E) IN (CLOCKWISE)
 3. A) ROTATE BLACK RELEASE ROD IN (CLOCKWISE)
B) THIS POSITIONS THE SLUGS TO RELEASE THE GRAPPLE SHAFT
C) SHAFT IS RELEASED FROM FIXTURE
 4. SHAFT IS RELEASED FROM FIXTURE
 5. FOR VENDOR REFERENCES, SEE TABLE 14-1
 6. REPLACEMENT SHAFT IS INSTALLED IN REVERSE ORDER FROM RELEASE SEQUENCE
 7. DURING THE SAME EVA TO RELEASE THE GRAPPLE SHAFT, A CREWMEMBER PUTS A REPLACEMENT GRAPPLE SHAFT BACK INTO THE FIXTURE FOR FUTURE RETRIEVALS. THE REPLACEMENT SHAFT HAS A RED COLOR CODED CAP TO INDICATE IT HAS BEEN REPLACED
 8. THE GRAPPLE SHAFT REMAINS SHARDED IN THE END EFFECTOR (EE) AND A COVER IS PLACED OVER THE EE TO CONTAIN THE SHAFT IN THE EE SHOULD IT JAR LOOSE OF THE SHARDES DURING RE-ENTRY

- NOTES:
1. DIMENSIONS ARE IN INCHES
- ▽ BALL DETENT PREVENTS THE SLUG FROM MOVING WHEN IN THE GRAPPLE SHAFT
- ▽ SEE "GFAS" DWG 14.7-2
- ▽ SEE "TARGET ASSEMBLY" (DWG 14.7-2)
- ▽ REPLACEMENT SHAFTS HAVE A RED COLOR CODED CAP ON THE SHAFT. REGULAR SHAFTS HAVE A WHITE CAP

7 FRGF 1

SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
DESIGN L.A. MARTINDALE	1/20/89	LYNN B. JOHNSON SPACE CENTER HOUSTON, TEXAS
DR L.A. MARTINDALE	1/20/89	
ENGR DANIEL GOODWIN	7/1/89	
APP [Signature]	7/20/89	
DR [Signature]	7/20/89	
LTJ [Signature]	7/20/89	

SPACE SHUTTLE DWG NO 14.7

ALL

82.5 X 34 PAGE 14.7-1 SHEET 1 OF 2

SS	ROUTE NAME	DESCRIPTION

DESCRIPTION
.....

7A	ADR7	AUTO BRAXES RING FLAUS
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2. THE POWER-
(POTAB) IS
USED CASE

DESCRIPTION	FW ADDRESS
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CE	DESCRIPTION
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END EFFECTOR

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7. THE DEVICE SELECT TABLE (NOT DETAILED HERE) IS LOADED INTO PAGES 6 AND 7 DURING "POST".

T4L/*AR1L*	*T5L*/*AR2L*	*T8L*/*AR5L*	*T11L*/*AR8L*	*T13L*/*ARAL*
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6	(12-B1) 2'S COMP	6	6	6	6	(12-B1) 2'S COMP
7		7	7	7	7	

SAME FORMAT FOR	SAME FORMAT FOR	SAME FORMAT FOR
8.7.71 (A. 10.41) (10.00)	8.7.71 (A. 10.41) (10.00)	8.7.71 (A. 10.41) (10.00)

[illegible]

· 116M · 7 · ARQM ·		· 119M · 7 · ARQM ·		· 120M · 7 · ARQM ·		· 129M · 7 · DRQM ·		· 130M · 7 · DRQM ·	
SIT	PARAMETER	SIT	PARAMETER	SIT	PARAMETER	SIT	PARAMETER	SIT	PARAMETER

BIT	PARAMETER	BIT	PARAMETER	BIT	PARAMETER	BIT	PARAMETER	BIT	PARAMETER
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Country	Year	Population (millions)	GDP (billion USD)	Life expectancy (years)
USA	2010	310	14,500	78
China	2010	1,340	5,800	73
India	2010	1,100	1,800	67
Japan	2010	127	4,500	82
Germany	2010	82	3,500	79
France	2010	65	2,800	79
UK	2010	61	2,500	79
Italy	2010	60	2,100	79
Spain	2010	45	1,800	81
Canada	2010	34	1,500	80
South Africa	2010	49	1,800	54
Brazil	2010	190	1,800	72
Mexico	2010	115	1,200	72
Argentina	2010	40	500	74
Colombia	2010	42	200	73
Venezuela	2010	27	200	73
Peru	2010	29	150	73
Ecuador	2010	14	50	73
Bolivia	2010	10	40	70
Paraguay	2010	7	30	72
Uruguay	2010	3.5	15	75
Chile	2010	17	120	76
Costa Rica	2010	4.5	10	75
Panama	2010	3.1	10	76
Dominican Republic	2010	7.1	10	74
Honduras	2010	6.9	10	71
Nicaragua	2010	5.6	10	70
Guatemala	2010	15.6	10	69
El Salvador	2010	5.3	10	69
Belize	2010	0.4	10	71
Jamaica	2010	1.1	10	72
Trinidad and Tobago	2010	1.2	10	73
Grenada	2010	0.1	10	73
St. Vincent and the Grenadines	2010	0.1	10	73
Barbados	2010	0.2	10	74
Dominica	2010	0.07	10	74
St. Kitts and Nevis	2010	0.04	10	74
Antigua and Barbuda	2010	0.07	10	74
St. Lucia	2010	0.1	10	74
Guyana	2010	0.7	10	73
Suriname	2010	0.4	10	73
French Guiana	2010	0.7	10	75
Guadeloupe	2010	0.1	10	75
Martinique	2010	0.1	10	75
Reunion	2010	0.8	10	75
Macao	2010	0.6	10	78
Macau	2010	0.5	10	78
Hong Kong	2010	7.0	10	78
Armenia	2010	2.9	10	72
Azerbaijan	2010	8.7	10	71
Georgia	2010	4.5	10	70
Albania	2010	3.0	10	72
Bosnia and Herzegovina	2010	3.5	10	71
Serbia	2010	7.1	10	71
Croatia	2010	4.3	10	73
Slovenia	2010	2.1	10	74
Poland	2010	38.0	10	74
Czech Republic	2010	10.5	10	74
Slovakia	2010	5.4	10	74
Hungary	2010	10.1	10	74
Romania	2010	21.5	10	72
Bulgaria	2010	7.6	10	71
Greece	2010	11.2	10	77
Turkey	2010	73.0	10	72
Israel	2010	7.1	10	76
Cyprus	2010	0.8	10	77
Malta	2010	0.4	10	78
San Marino	2010	0.03	10	80
Vatican City	2010	0.005	10	80

BIT	PARAMETER	BIT	PARAMETER	BIT	PARAMETER	BIT	PARAMETER	BIT	PARAMETER
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				1	0	1	0	0	0			1	0	0	1	0	0	0	0					28	90
				1	0	1	0	0	1			1	0	0	1	1	0	0	0					29	98
				-	-	-	-	-	-			-	-	-	-	-	-	-	-					-	-

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THE BITS HAVE BEEN SHIFTED TWO PLACES TO THE RIGHT TO CLEAR BITS 7 AND 8 (SEE 'DTS1').
THE DERIGID MSW HAS ALREADY BEEN INVERTED IN 'EPER'.

2. THE DEVICE SELECT TABLE (NOT DETAILD HERE) IS LOADED INTO PAGES 6 AND 7 DURING "POTR".

4611. VODD NOMENCLATURE:

1ST LETTER	2ND LETTER	3RD LETTER	4TH LETTER	5TH LETTER	EXAMPLES
------------	------------	------------	------------	------------	----------

CW - GPC COMMAND WORD
CDW - GPC COMMAND DATA WORD (DATA FROM CPU)

SIGNATURE	DATE
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APP R. L. Jett 7/14/89

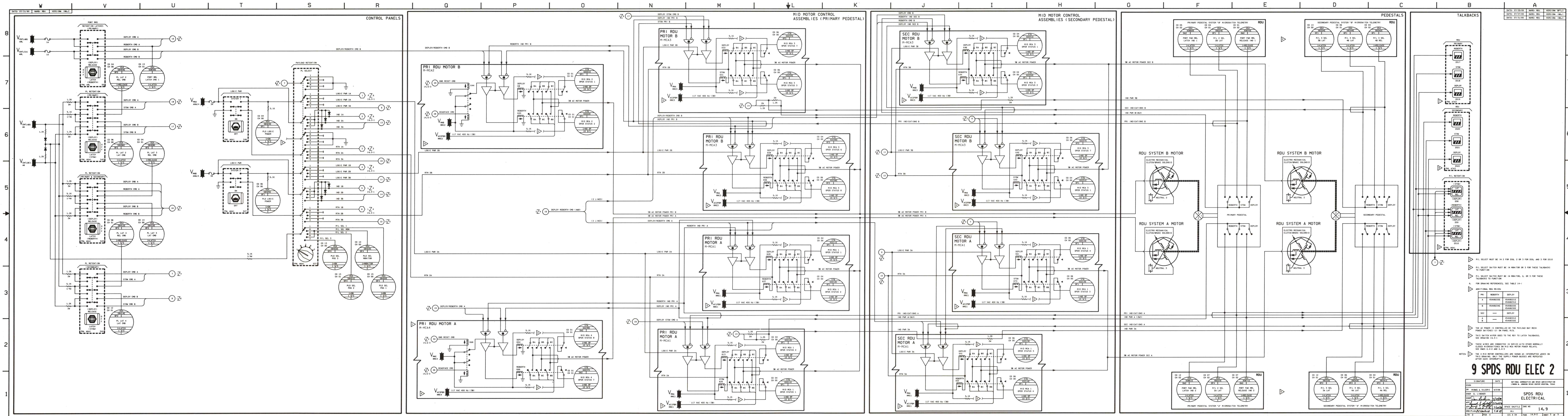
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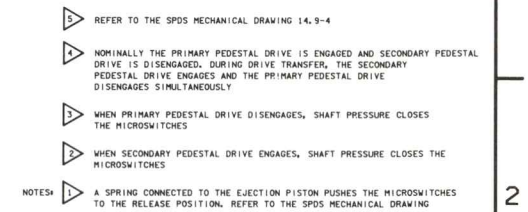
[illegible]

LTR D	PCN 4	93.5 X 34	PAGE 14.8-3	SHEET 3
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SPACE SHUTTLE	DWG NO	14.9
ALL		





SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LPHD R. JOHNSON SPACE CENTER HOUSTON TEXAS
DRON S. EGAN-YETER	5/16/69	
DRON S. EGAN-YETER	5/16/69	
ENGR R. FOALE		
ENGR <i>Handwritten Signature</i>	7/13/69	
APP <i>Handwritten Signature</i>	9/17/69	
APP <i>Handwritten Signature</i>	7/16/69	
ORIGIN PLAN R. FOALE	7-17-69	
CTR. D	PCN 4	SPACE SHUTTLE DWG NO. 14.9
		ALL
	121.1.34	PAGE 14.9-3
		SHEET 3 OF 4



SIGNATURE		DATE		NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LINCOLN & JOHNSON SPACE CENTER HOUSTON, TEXAS	
OSON R. J. TEDDOR JR.		5/31/89			
OR					
ENGR R.B. FOALE				STABILIZED PAYLOAD DEPLOYMENT SYSTEM DECOMMISSION OVERVIEW	
ENGR <i>Phurda Foale</i>		7/1/89			
APP <i>James E. Hoff</i>		7/1/89			
APP <i>W. S. S. S. S. S.</i>		7/1/89			
APP <i>William S. S. S. S.</i>		7/1/89			
ISSN		DWD NO		14.9	
ALL					
LTH F. <i>W. S. S. S.</i>		82, 83, 84		85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 7	



- BASIC REV D-4

BASIC REV D-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
14.1 (SHEET 1)	PAYLOAD BAY DOORS/ RADIATOR OVERVIEW	ROCKWELL	VO70- 370002	ALL	H	10/8/87	PAYLOAD BAY DOORS ASSY-COMplete
			VO70- 594125	ALL	D	5/3/80	ACTUATION MECHANISM INSTALLATION, PAYLOAD BAY DOOR
			VO70- 594126	ALL	-	10/13/77	BELLCRANK - ACTUATING MECHANISM, PAYLOAD BAY DOOR, ASSY OF
			VO70- 594145	ALL	-	12/26/83	UPPER ROD INSTL - ACTUATION MECHANISM, PAYLOAD BAY DOOR
			VO70- 594160	ALL	C	8/20/82	FWD LATCHING MECHANISM INSTALLATION - PAYLOAD BAY DOOR
			VO70- 594185	ALL	D	2/22/83	FWD LATCHING MECHANISM INSTALLATION - BULKHEAD, PAYLOAD BAY DOOR
			VO70- 594186	ALL	A	5/5/75	ROLLER ASSY - BULKHEAD, FWD LATCHING MECHANISM, PAYLOAD BAY DOOR
			VO70- 594222	ALL	A	8/5/82	SWITCH MODULE, PAYLOAD BAY DOOR, ASSY
			VO70- 594250	ALL	-	10/21/75	AFT LATCHING MECHANISM INSTALLATION - PAYLOAD BAY DOOR
			VO70- 594260	ALL	D	8/31/82	AFT LATCHING MECHANISM INSTALLATION - PAYLOAD BAY DOOR
			VO70- 594263	ALL	A	3/26/80	BELLCRANK - ACTUATING LATCH NO. 2, AFT LATCHING MECH, PAYLOAD BAY DOOR, ASSY OF
			VO70- 594265	ALL	A	4/9/80	BELLCRANK, ACTUATING, LATCH NO. 3, AFT LATCHING MECH, PAYLOAD BAY DOOR, ASSY OF
			VO70- 594276	ALL	A	3/13/80	BELLCRANK-LOCKING, LATCH NO. 1, AFT LATCHING MECH, PAYLOAD BAY DOOR, ASSY OF
			VO70- 594281	ALL	A	2/12/80	BELLCRANK, LOCKING, LATCH 1 FWD LATCHING MECHANISM PAYLOAD BAY DOOR, ASSY OF
			VO70- 594285	ALL	D	8/9/82	AFT LATCHING MECHANISM INSTL., BULKHEAD-PAYLOAD BAY DOOR
			VO70- 594300	ALL	-	11/17/75	CENTER LINE LATCHING MECHANISM INSTALLATION - PAYLOAD BAY DOOR
			VO70- 594302	ALL	-	9/15/76	SHEAR FITTING ASSY - CENTERLINE LATCHING MECHANISM, PAYLOAD BAY DOOR
			VO70- 594330	ALL	B	9/16/82	HANGER ASSY - LATCH, CENTERLINE LATCHING MECHANISM, PAYLOAD BAY DOOR
			VO70- 594360	ALL	E	8/16/82	CENTERLINE LATCHING MECHANISM INSTALLATION - PAYLOAD BAY DOORS
			VO70- 594370	ALL	A	11/23/77	CENTER LINE LATCHING MECHANISM INSTALLATION - PAYLOAD BAY DOOR
14.1 (SHEET 2)	PL BAY DOOR LATCH CLEAR TO OPEN/CLOSE INDICATIONS	ROCKWELL	VO70- 594380	ALL	-	6/13/78	CENTER LINE LATCHING MECHANISM INSTALLATION - PAYLOAD BAY DOORS
			VO70- 594400	ALL	A	4/28/80	DEPLOYMENT INSTALLATION, RADIATOR MECHANISM
			VO70- 594401	ALL	-	3/23/84	LINK INSTALLATION - RADIATOR DEPLOYMENT
			VO70- 594450	ALL	A	2/7/80	LATCH MECHANISM INSTALLATION - RADIATOR
			VO70- 362003	ALL	D	1/17/86	MARKING-PAYLOAD BAY INTERIOR, INSTALLATION

DWG	SIGNATURE	DATE	DWG	SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LYNDON B. JOHNSON SPACE CENTER HOUSTON, TEXAS		
	ENGR		14.1-1, 2	ENGR W. C. ANDERSON		VENDOR DRAWING REFERENCES		
	ENGR			ENGR <i>W. C. Anderson</i>	7/19/85			
	ENGR			ENGR				
	ENGR			ENGR				
	ENGR			APP <i>Mark J. Fanning</i>	7-20-84	SPACE SHUTTLE TBL NO 14-1		
	ENGR			APP <i>Mark J. Fanning for RNF</i>	7-20-84			
	ENGR			OMNIPLAN				
	ENGR			LTR D	PCN 4			
						PAGE 14.1-1	SHEET 1 OF 9	

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
14.1 (SHEET 3)	RADIATORS DEPLOY/ STOW	ROCKWELL	VS70- 590402	ALL	G	3/24/83	SCHEMATIC DIAGRAM - FREON RADIATOR DEPLOYMENT SUBSYSTEM (OV-102)
			VS70- 590409	ALL	A	7/9/81	SCHEMATIC DIAGRAM - FREON RADIATOR DEPLOYMENT SUBSYSTEM (OV-103 & SUBS)
			VS70- 760702	ALL	H	8/15/86	SCHEMATIC DIAGRAM - MOTOR CONTROL ASSY POWER DISTRIBUTION (OV-102)
			VS70- 760709	ALL	D	8/15/86	SCHEMATIC DIAGRAM - MOTOR CONTROL ASSY POWER DISTRIBUTION (OV-103 & SUBS)
14.2 (SHEET 1)	PLBD OPEN/CLOSE H/W OVERVIEW	ROCKWELL	VS70- 540302	ALL	J	5/27/86	SCHEMATIC DIAGRAM - PAYLOAD BAY DOOR CONTS SUBSYSTEM (OV-102)
			VS70- 540309	ALL	E	5/19/86	SCHEMATIC DIAGRAM - PAYLOAD BAY DOOR CONTS SUBSYSTEM (OV-103 & SUBS)
			VS70- 760702	ALL	H	8/15/86	SCHEMATIC DIAGRAM - MOTOR CONTROL ASSY POWER DISTRIBUTION (OV-102)
			VS70- 760709	ALL	D	8/15/86	SCHEMATIC DIAGRAM - MOTOR CONTROL ASSY POWER DISTRIBUTION (OV-103 & SUBS)
14.2 (SHEET 2)	PLBD SOFTWARE OVERVIEW (PASS AND BFS)	IBM	SS-P-0002- 580G	PAYLOAD BAY DOOR SEQUENCE	G		SPACE SHUTTLE PROGRAM ORBITER PROJECT COMPUTER PROGRAM DEVELOPMENT SPECIFICATION, VOLUME V, BOOK 8: SYSTEMS MANAGEMENT LEVEL B SOFTWARE REQUIREMENTS
		ROCKWELL	MG038101	PAYLOAD BAY DOOR SEQUENCE	L	10/14/88	BFS PROGRAM REQUIREMENTS DOCUMENT
		IBM	OF350100. APPL. SSBPLBAY. LIT. T7314212	ALL		11/10/87	PAYLOAD BAY DOOR HAL CODE
		IBM	NAS 9-16920	PAYLOAD BAY DOOR SEQUENCE	1	9/9/87	SPACE SHUTTLE PROGRAMS ORBITER AVIONICS SOFTWARE OPERATIONAL DETAILED DESIGN SPECIFICATION VOL III PART 2 SM
14.3 (SHEET 1)	PAYLOAD RETENTION LATCH ELECTRICAL	R.I.	VS70 764412	2,4,5,6	G	9/17/82	SCHEMATIC DIAGRAM - MID MOTOR CONT ASSY NO. 1 RIGHT FWD MID FUSELAGE
			VS70- 760702	ALL	H	8/15/86	SCHEMATIC DIAGRAM MOTOR CONTROL ASSY POWER DISTRIBUTION
			VS70- 733199	1 & 2	C	9/30/86	SCHEMATIC DIAGRAM D&C PANEL R13A2 RIGHT HAND CONSOLE
			VS70- 733709	4	D	5/10/84	SCHEMATIC DIAGRAM PANEL A6A1 AFT ON ORBIT STA
			VS70- 733897	1&2	B	5/8/85	SCHEMATIC DIAGRAM D&C PANEL MA73C MID DECK BAY 3B
			VS70- 540229	1 - 4	C	4/1/85	SCHEMATIC DIAGRAM PAYLOAD RETENTION SUBSYS (STS-23)
			VS70- 540202	1 - 17	J	10/30/86	SCHEMATIC DIAGRAM PAYLOAD RETENTION SUBSYSTEM
14.3 (SHEET 2)	PAYLOAD RETENTION LATCH - MECH	R. I.	V073-340101	1	A	6/29/82	FITTING - LONGERON BRIDGE, X0 636.00 TO X0 693.00, MID FUSELAGE, ASSY OF
			V073-544100	1	-	2/28/84	LATCH ASSY - LIGHTWEIGHT LONGERON ((COMPLETE)
			V073-544210	1	-	7/27/83	GEARBOX ASSEMBLY - MECHANISM DRIVE, LIGHTWEIGHT LONGERON LATCH

DWG	SIGNATURE	DATE	DWG	SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LYNDON B. JOHNSON SPACE CENTER HOUSTON, TEXAS	
14.1-3	ENGR W. C. ANDERSON		14.3-1, 2	ENGR A. SIMON			
	ENGR <i>[Signature]</i>	7/14/89		ENGR <i>[Signature]</i>	7/19/89	VENDOR DRAWING REFERENCES	
14.2-1, 2	ENGR W. C. ANDERSON			ENGR			
	ENGR <i>[Signature]</i>	7/6/89		ENGR			
	ENGR			APP <i>[Signature]</i>	7-26-89		
	ENGR			APP <i>[Signature]</i>	7-26-89	SPACE SHUTTLE	TBL NO
	ENGR			OMNIPLAN		ALL	14-1
	ENGR			LTR D	PCN 4	PAGE 14.1-2	SHEET 2 OF 9

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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
14.3 (SHEET 2) (CONC'D)	PAYLOAD RETENTION LATCH - MECH		V073-544230	1	-	4/18/84	LATCH ASSY - MIDDLEWEIGHT LONGERON COMPLETE
			V073-544300	1	A	12/14/84	LATCH ASSEMBLY - KEEL, LIGHTWEIGHT
			V073-544100	1 - 4	-	4/20/83	DESIGN LAYOUT - LIGHT WT LONGERON RETENTION LATCH
			V073-340330	1 & 2	-	9/15/82	BRIDGE FITTING - KEEL LT WT. BAY NO 2 ASSY OF
		R. I.	V073-544110	1 - 3	-	8/12/83	FRAME SET - LIGHTWEIGHT LONGERON LATCH, ASSEMBLY
			V073-544221	1	-	3/1/83	GUIDE - EXTENDED LIGHTWEIGHT LONGERON LATCH
		R. I.	V073-544227	1 - 3	A	12/7/84	FRAME - MIDDLEWEIGHT LONGERON LATCH ASSY
		R. I.	V073-544302	1	A	1/23/85	GUIDE, SHORT END FINISHED
			V073-544552	1 & 2	A	10/10/88	GUIDE ASSY - 18 INCH, SHORT END, PRLA
			V073-544301	1	-	2/5/81	GUIDE, LONG END FINISHED
			V073-544302	1	A	1/23/88	GUIDE, SHORT END FINISHED
			V073-544580	1	-	2/84	GUIDE ASSY - SHORT END, PRLA
			V776-544600	1	-	3/15/84	LATCH ASSEMBLY - MODIFIED MIDDLE WEIGHT (COMPLETE)
			V073-544240	1 & 2	-	4/27/84	GUIDE ASSY - LIGHTWEIGHT LONGERON LATCH
14.4 (SHEET 1)	RMS D&C PANEL	CAE	ED85511.01. 1.300	1-3	E	1/79	POWER AND GROUNDING SRMS D&C SUBSYSTEM
		CAE	ED87300.01. 1.268	1-2	C	5/82	PRINTED WIRING ASSEMBLY DISCRETE INPUT/OUTPUT
		CAE	ED87305.01. 1.268	1-2	D	5/82	CIRCUIT CARD ASSEMBLY MCIU INTERFACE AND ADDRESS DECODER
		CAE	ED87310.01. 1.268	1	B	5/82	PRINTED WIRING ASSEMBLY NUMERIC READ OUT DRIVE
		CAE	ED87315.01. 1.268	1	A	10/78	CIRCUIT CARD ASSEMBLY D/A CONVERTER A1
		CAE	ED87325.51. 1.268	1	D	11/77	PRINTED WIRING BOARD HAND CONTROLLER DEMOD INTERFACE
		CAE	ED87775.01. 1.835	1	B	2/80	TRANSLATION HAND CONTROLLER (THC) A2A2
		CAE	ED87899.51. 1.840	1	B	6/77	CIRCUIT CARD ASSEMBLY R.H.C. & T.H.C. OSCILLATOR CIRCUIT
		CAE	ED92020.01. 1.834	1-7	C	5/82	SRMS D&C SUBSYSTEM
		CAE	ED94385.01. 1.268	1	C	5/82	CIRCUIT CARD ASSEMBLY MASTER ALARM & HARD WIRED SWITCHING CIRCUIT
		CAE	ED96400.01. 1.268	1	C	1/81	CIRCUIT CARD ASSEMBLY MONITOR A1A2A6
		CAE	ED96402.01. 1.268	1-3	C	8/79	CIRCUIT CARD ASSEMBLY INTERFACE A1A2A2
		CAE	ED96404.01. 1.268	1-2	A	6/81	CIRCUIT CARD ASSEMBLY D&C PROTECTION A1A2A8
		NASA	SIE33103307	1	-	3/84	WIRING DIAGRAM RMS D&C IFM

DWG	SIGNATURE	DATE	DWG	SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LYNDON B. JOHNSON SPACE CENTER HOUSTON, TEXAS		
14.3-2	ENGR A. SIMON	7/19/89	14.4-1	ENGR A. MAGH	7-19-89	VENDOR DRAWING REFERENCES		
	ENGR			ENGR				
	ENGR			ENGR				
	ENGR			ENGR				
	ENGR			APP Engr E. Smith	7-20-89	SPACE SHUTTLE	TBL NO	14-1
	ENGR			APP Engr D. Keweenaw	7-20-89			
	ENGR			APP Mark G. Ferry for RNF	7-20-89			
	ENGR			OMNIPLAN		ALL		
	ENGR			LTR D	PCN 4	PAGE 14.1-3	SHEET 3 OF 9	

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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
14.4 (SHEET 2)	RMS MCIU	SPAR	2563740	1 OF 1	6A	2/10/78	CONDITIONER, POWER MANIPULATOR CONTROLLER SCHEMATIC DIAGRAM
			2563743	1 & 2	-	1/30/78	INTERFACE UNIT, MANIPULATOR CONTROLLER SCHEMATIC DIAGRAM
			2563749	1 OF 1	-	1/30/78	INTERFACE UNIT, MANIPULATOR CONTROLLER BLOCK DIAGRAM
			2563751	1 OF 1	7	1/25/78	DETECTOR, FAILURE SCHEMATIC DIAGRAM
			2563752	1 OF 1	3	1/25/78	INTERFACE, ANALOG SCHEMATIC DIAGRAM
			2563754	1 OF 1	9	7/1/78	INTERFACE, COMPUTER SCHEMATIC DIAGRAM
			2563755	1 OF 1	3	1/19/78	INTERFACE, DIGITAL SCHEMATIC DIAGRAM
			2563756	1 OF 2	24	2/10/78	MEMORY, COMPUTER SCHMATIC DIAGRAM
			2563756	2 OF 2	24	2/10/78	MEMORY, COMPUTER SCHEMATIC DIAGRAM
			2567757	1 OF 1	-	2/10/78	COMPUTER, MICROPROCESSOR SCHEMATIC DIAGRAM
14.4 (SHEET 3)	RMS SPA	SPAR	2558977	1/1	2	7-81	GENERATOR, PULSE-WIDTH MODULATOR
			2563712	1/1	1	7-78	ELECTRONICS SUB-ASSY. PWR SWITCH
			2563717	1 & 2/2	7B	11-82	CONTROLLER, PWR SIGNAL
			2563718	1/1	3	4-81	LIMITER, CURRENT
			2563719	1/1	5	6-81	DRIVER, INDUCTOSYN TIMER
			2563721	1/1	3A	11-82	COMPARATOR, RATE
			2563722	1/FIN	3A	11-82	INTERFACE ELECTRONICS
			2563723	1/1	5	3-82	ENCODER, PHASE LOCKED LOOP
			51140E2120	1/1	P	9-84	ENCODER, JOINT
			51140E2121	1/2	P	9-84	JOINT, COMMUTATOR SCANNER ASSY.
14.4 (SHEET 4)	RMS BDA	SPAR	2559029	1/FIN	2	4-81	PROCESSOR, ANALOG
			2559039	1/1	0	10-82	GENERATOR, PULSE-WIDTH MODULATOR
			2559044	1 & 2/2	7	4-81	CONTROLLER, POWER CONDITIONER
			2563712	1/1	1	7-78	ELECTRONICS SUB-ASSY. PWR SWITCH
			2563735	1/1	0A	11-82	AMPLIFIER, BACKUP DRIVE
			2563737	1/FIN	0B	10-82	CONTROLLER, PWR SIGNAL
			2563739	1/1	7	8-78	CONVERTER, POWER
			51140E2121	2/2	P	9-84	JOINT, COMMUTATOR SCANNER ASSY
			ED92020	1-3/7	B	6-80	SRMS D&C SUBSYSTEM
			2559082		2A	7/81	POWER CONDITIONER SUBASSEMBLY
14.4 (SHEET 5)	RMS CONTROL SYSTEM (EEEE AND MOTOR CONTROL)	SPAR	2563764		5B	12/81	EE ELECTRONIC UNIT SCHEMATIC DIAGRAM
			2563765		5B	12/81	COMMAND AND COMMUTATION LOGIC SCHEMATIC DIAGRAM
			2571253- 5501			10/82	POWER CONDITIONER
			2571253- 5502			10/82	EEEE FUNCTIONAL DIAGRAM

DWG	SIGNATURE	DATE	DWG	SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LYNDON B. JOHNSON SPACE CENTER HOUSTON, TEXAS		
14.4-2	ENGR <i>F. FERRARA</i>	7/20/89	14.4-5	ENGR <i>D. PALLESEN</i>	7/20/89	VENDOR DRAWING REFERENCES		
	ENGR <i>Robert L. Ferrara</i>	7/20/89		ENGR <i>Don Pallesen</i>	7/20/89			
14.4-3	ENGR <i>A. LEE</i>	7-19-89		ENGR				
	ENGR <i>Albert Y. Lee</i>	7-19-89		ENGR				
14.4-4	ENGR <i>A. LEE</i>	7-19-89		APP <i>Emmet E. Smith</i>	7/20/89	SPACE SHUTTLE	TBL NO	14-1
	ENGR <i>Albert Y. Lee</i>	7-19-89		APP <i>Paul A. Tenny</i>	7-20-89			
	ENGR			OMNIPLAN			ALL	
	ENGR			LTR D	PCN 4	PAGE	14.1.4	SHEET 4 OF 9

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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
14.4 (SHEET 6)	RMS THERMOSTAT/ HEATER ELEMENTS	SPAR	2572811- 5501			10/82	POWER CONDITIONER CONTROLLER
		"	2572980- 5502			10/82	COMMAND AND COMMUTATION LOGIC, FUNCTIONAL DIAGRAM
		"	2578223			10/82	MCIU SOFTWARE DOCUMENTATION
		SPAR	SPAR-RMS-M- 1140-1		2	5/2/83	INTERMEDIATE MAINTENANCE MANUAL, MANIPULATOR ARM
			SPAR-RMS-M- 1140-3		1	5/30/83	DEPOT, REPAIR, AND OVERHAUL MANUAL ELBOW JOINT SRU
			SPAR-RMS-M- 1140-4			2/28/83	DEPOT, REPAIR, AND OVERHAUL MANUAL, SHOULDER JOINT SRU
14.4 (SHEET 7)	RMS MECHANICAL OVERVIEW		SPAR-RMS-M- 1140-7			10/25/83	DEPOT, REPAIR, AND OVERHAUL MANUAL, END EFFECTOR LRU
		R.I.	VS72-956099 56NA		A	11/22/85	ELECTRICAL SCHEMATIC, REMOTE MANIPULATOR ARM
			VS72-956102 56NA		E	6/9/86	ELECTRICAL SCHEMATIC, REMOTE MANIPULATOR ARM
		SPAR	RMS-M-1140- 3-052	SHEET 1		5/83	ELBOW JOINT MECHANICAL ASSEMBLY
		SPAR	RMS-M-1140- 3-053	SHEET 2		5/83	ELBOW JOINT MECHANICAL ASSEMBLY
		SPAR	RMS-M-1140- 3-054	SHEET 3		5/83	ELBOW JOINT MECHANICAL ASSEMBLY
			RMS-M-1140- 3-055			5/83	ELBOW JOINT G1 GEARBOX
		SPAR	RMS-M-1140- 1-004			5/83	MANIPULATOR ARM OVERALL DIMENSIONS
		SPAR	RMS-M-1140- 2-001			3/82	JOINT MOTOR MODULE FRONT/PIECE
		SPAR	RMS-M-1140- 2-002			3/82	MAIN COMPONENTS OF TYPICAL JOINT MOTOR MODULE
		SPAR	RMS-M-1140- 2-018			3/82	MOTOR MODULE ASSEMBLY
		SPAR	RMS-M-1140- 3-003			5/83	ELBOW JOINT OVERALL DIMENSIONS
		SPAR	RMS-M-1140- 3-004			5/83	ELBOW JOINT MAJOR COMPONENTS (PORT VIEW)
		SPAR	RMS-M-1140- 3-005			5/83	ELBOW JOINT MAJOR COMPONENTS (STARBOARD VIEW)
		SPAR	RMS-M-1140- 3-026			5/83	ASSEMBLY OF POSITION ENCODER
		SPAR	RMS-M-1140- 3-050			5/83	ELBOW JOINT SRU
		SPAR	RMS-M-1140- 4-014	SHEET 2 OF 6		2/83	SHOULDER JOINT SRU
		SPAR	RMS-M-1140- 4-041			2/83	SHOULDER JOINT OVERALL DIMENSIONS
		SPAR	RMS-M-1140- 4-042			2/83	SHOULDER JOINT (PORT VIEW)

DWG	SIGNATURE		DATE	DWG	SIGNATURE		DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LYNDON B. JOHNSON SPACE CENTER HOUSTON, TEXAS VENDOR DRAWING REFERENCES		
14.4-5	ENGR	D. PALLESEN			ENGR					
	ENGR	<i>D. Pallesen</i>	<i>7/20/89</i>		ENGR					
14.4-6	ENGR	D. CULP			ENGR					
	ENGR	<i>DRCulp</i>	<i>7/19/89</i>		ENGR			TBL NO 14-1		
14.4-7	ENGR	J. HUGHES			APP <i>James E. Hughes</i>	<i>7-20-89</i>				
	ENGR	<i>J. Hughes</i>	<i>7/20/89</i>		APP <i>Mark J. Tunney for RNF</i>	<i>7-20-89</i>	SPACE SHUTTLE			
	ENGR				OMNIPLAN		ALL			
	ENGR				LTR D	PCN 4		PAGE 14.1-5	SHEET 5 OF 9	

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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
14.4 (SHEET 7) (CONC'D)	RMS ELEC OV	SPAR	RMS-M-1140-4-049			2/83	SECTIONAL VIEW OF SHOULDER YAW ASSEMBLY
		SPAR	RMS-M-1140-5-002			5/84	WRIST JOINT (PORT VIEW)
		SPAR	RMS-M-1140-5-023	SHEET 1		5/84	WRIST PITCH/YAW ASSEMBLY
		SPAR	RMS-M-1140-5-024	SHEET 2		5/84	WRIST PITCH/YAW ASSEMBLY
		SPAR	RMS-M-1140-5-025	SHEET 3		5/84	WRIST PITCH/YAW ASSEMBLY
		SPAR	RMS-M-1140-5-026	SHEET 4		5/84	WRIST PITCH/YAW ASSEMBLY
		SPAR	RMS-M-1140-5-032	SHEET 1		5/84	WRIST ROLL ASSEMBLY
		SPAR	RMS-M-1140-5-033	SHEET 2		5/84	WRIST ROLL ASSEMBLY
		SPAR	RMS-M-1140-5-035			5/84	WRIST G1 DRIVE ASSEMBLY
		SPAR	RMS-M-1140-7-024			1/85	END EFFECTOR MAJOR COMPONENTS
		SPAR	RMS-M-1140-7-026			1/85	END EFFECTOR SNARE AND RIGIDIZE GEAR TRAIN
		SPAR	31140-D-456			7/78	PRECAPTURE MISALIGNMENT ENVELOPE
		SPAR	GRS-0046			7/87	ELBOW JOINT GEAR TRAIN
		SPAR	RMS ICD 17, F, FIG 3-3		F	6/82	CCTV AND LIGHT DESIGN CONFIGURATION
		NASA	FIG. 3.1.2.1.3-1	SHEET 2 AND 3		1/88	ON-ORBIT DEPLOYMENT/RETRIEVAL CLEARANCES SHUTTLE ORBITER/CARGO STANDARD INTERFACES (ICD 2-19001, VOL XIV, ATT 1)
		NASA	FIG. 3.1.2.1.4-1	SHEET 7 OF 8		1/88	PAYLOAD CLEARANCE ENVELOPE INTRUSIONS SHUTTLE ORBITER/CARGO STANDARD INTERFACES (ICD 2-19001, VOL XIV, ATT 1)
		ROCKWELL	VS70-540552	1-5	B	11/30/85	SCHEMATIC DIAGRAM - REMOTE MANIPULATOR ARM SUBSYSTEM
14.4 (SHEET 8)	RMS ELEC OV		VS70-540559	1-5	-	1/31/84	SCHEMATIC DIAGRAM - REMOTE MANIPULATOR ARM SUBSYSTEM
			VS72-956099	56NA	A	2/23/88	ELECTRICAL SCHEMATIC REMOTE MANIPULATOR ARM
			VS72-956102	56NA	E	8/15/87	ELECTRICAL SCHEMATIC REMOTE MANIPULATOR ARM
			VS70-764512	1-8	A	7/21/86	SCHEMATIC DIAGRAM - MID MCA #1 RIGHT FWD MID FUS
			VS70-764419	1-8	C	6/20/86	SCHEMATIC DIAGRAM - MID MCA #1 RIGHT FWD MID FUS
			VS70-764522	1-13	B	7/21/86	SCHEMATIC DIAGRAM - MID MCA #2 RIGHT FWD MID FUS
			VS70-764429	1-13	F	6/20/86	SCHEMATIC DIAGRAM - MID MCA #2 RIGHT FWD MID FUS
			VS70-764532	1-11	B	7/21/86	SCHEMATIC DIAGRAM - MID MCA #3 MID FUSELAGE

DWG	SIGNATURE	DATE	DWG	SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LYNDON B. JOHNSON SPACE CENTER HOUSTON, TEXAS		
14.4-7	ENGR J. HUGHES			ENGR		VENDOR DRAWING REFERENCES		
	ENGR <i>J. Hughes</i>	7/20/89		ENGR				
14.4-8	ENGR D. WAGNER			ENGR				
	ENGR <i>D. Wagner</i>	7/19/89		ENGR				
	ENGR			APP <i>James E. Smith</i>	7-20-89			
	ENGR			APP <i>Paul K. Smith</i>	7-20-89	SPACE SHUTTLE	TBL NO	14-1
	ENGR			OMNIPLAN		ALL		
	ENGR			LTR D	PCN 4	PAGE	14.1-6	SHEET 6 OF 9

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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
14.5 (SHEET 1)	RMS SW OV	IBM	VS70-764439	1-11	E	6/20/86	SCHEMATIC DIAGRAM - MID MCA #3 MID FUSELAGE
			VS70-764442	1-12	J	7/23/86	SCHEMATIC DIGRAM - MID MICA #4 RIGHT FWD MID FUS
			VS70-764449	1-12	F	6/20/86	SCHEMATIC DIAGRAM - MID MCA #4 RIGHT FWD MID FUS
			VS70-976099	76AS	A	3/23/89	PRE-FLT BUS 1 & 2 CONT, MONITOR, AND DISTRIBUTION
			VS70-976102	76AS	G	6/5/87	PRE-FLT BUS 1 & 2 CONT, MONITOR, AND DISTRIBUTION
14.5 (SHEET 2)	RMS SW OV	IBM	NAS9- 14444		O18A	10/3/86	OPERATIONAL DETAILED DESIGN SPECIFICATION
							RMS SOFTWARE CODE LISTING
							CPDS LEVEL A
14.6-1 (SHEET 1)	RMS MPM/MRL ELEC	IBM	NAS9-14444		O18A	10/3/86	OPERATIONAL DETAILED DESIGN SPECIFICATION
							RMS SOFTWARE CODE LISTING
		ROCKWELL	VS70-540512	1 & 2	B	6/5/84	SCHEMATIC DIAGRAM-PORT MANIPULATOR DEPLMT CONTROL SUBSYSTEM
		ROCKWELL	VS70-540519	1 & 2	A	5/11/84	SCHEMATIC DIAGRAM PORT MANIPULATOR DEPLMT CONTROL SUBSYSTEM
		ROCKWELL	VS72-956099	56 HA & 56 HB	A	2/23/88	PORT MANIPULATOR DEPLOYMENT SYSTEM 1
		ROCKWELL	VS72-956102	56 HA & 56 HB	E	4/22/85	PORT MANIPULATOR DEPLOYMENT SYSTEM 1
		ROCKWELL	VS70-540702	1-3	L	5/3/84	SCHEMATIC DIAGRAM PORT MANIP RETTN LATCH CONTROL SUBSYSTEM
		ROCKWELL	VS70-540709	1-2	A	3/16/81	SCHEMATIC DIAGRAM PORT MANIP RETTN LATCH CONTROL SUBSYSTEM
		ROCKWELL	VS72-956099	56 KA & 56 KB	A	2/11/85	SCHEMATIC DIAGRAM PORT MANIP RETTN LATCH CONTROL SUBSYSTEM
		ROCKWELL	VS72-956102	56 KA & 56 KB	E	4/22/85	SCHEMATIC DIAGRAM PORT MANIP RETTN LATCH CONTROL SUBSYSTEM
		ROCKWELL	V082- 544600	1	A	5/1/79	MECHANISM ASSEMBLY - MPM SHOULDER
		ROCKWELL	V082- 544601	1, 2	A	8/4/81	FITTING ASSEMBLY - LOWER SHOULDER, MPM
		ROCKWELL	V082- 544650	2, 3	A	6/14/79	MECHANISM ASSEMBLY - RETENTION PEDESTAL
		ROCKWELL	V082- 544651	1	A	8/25/81	FITTING ASSEMBLY - LOWER RETENTION, MPM
		ROCKWELL	V082- 544835			10/23/79	MECHANISM ASSEMBLY - SWITCH MANIPULATOR LATCH MECHANISM
14.6 (SHEET 2)	MPM/MRL MECH 2	ROCKWELL	V082- 544851	1		7/26/79	BASE ASSEMBLY - RETENTION, MPM
		ROCKWELL	V082- 544800	1	A	2/16/81	MANIPULATOR POSITIONING MECHANISM ASSEMBLY - UPPER
		ROCKWELL	V082- 544740	1	NC	2/19/80	SWITCH ASSEMBLY - MODULE, READY TO LATCH, MPM
		ROCKWELL	V082- 544850	1	A	8/25/81	BASE ASSEMBLY - SHOULDER, MANIPULATOR POSITIONING MECHANISM

DWG	SIGNATURE	DATE	DWG	SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LYNDON B. JOHNSON SPACE CENTER HOUSTON, TEXAS		
14.4-8	ENGR D. WAGNER		14.6-1	ENGR D. LINDNER		VENDOR DRAWING REFERENCES		
	ENGR <i>D. Wagner</i>	7/19/89		ENGR <i>D. Lindner</i>	7/19/89			
14.5-1	ENGR C. BOLE		14.6-2	ENGR D. LINDNER				
	ENGR <i>C. Bole</i>	7/20/89		ENGR <i>D. Lindner</i>	7/19/89			
14.5-2	ENGR C. BOLE			APP <i>Ernest E. Lindner</i>	7/20/89			
	ENGR <i>C. Bole</i>	7/20/89		APP <i>Mark J. Jensen for RNF</i>	7-20-89	SPACE SHUTTLE	TBL NO	14-1
	ENGR			OMNIPLAN		ALL		
	ENGR			LTR D	PCN 4		PAGE 14.1-7	SHEET 7 OF 9

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
14.6 (SHEET 3)	PORT RMS JETTISON ELECT	ROCKWELL	M072- 544501	3	B	7/5/84	MECHANICAL INSTALLATION - MPM TECH ORDER INSTALLATION
		ELLANEF	A1059A010	2 & 3	E	7/14/78	LATCH ASSEMBLY - MANIPULATOR RETENTION
		ELLANEF	A1059C010	1	D	7/20/78	MANIPULATOR RETENTION LATCH ASSEMBLY
		ROCKWELL INTER- NATIONAL	VS70- 540809	1-5	C	4/23/87	STARBD MANIP ARM SHLDR JTSN & RETTN* LATCH SUBSYSTEM
		ROCKWELL INTER- NATIONAL	VS70- 540822	1-5	A	3/24/83	STARBD MANIP ARM SHLDR JTSN & RETTN* LATCH SUBSYSTEM
		ROCKWELL NATIONAL	VS72-	45-48	E/EOFO6		INTEGRATED SYSTEM SCHEMATIC-ORBITER OV-102 MECHANICAL & PAYLOAD SYSTEMS
		ROCKWELL INTER- NATIONAL	VS70- 540909	1-5	A	2/2/83	PORT MANIP ARM SHLDR JTSN & RETTN LCH JTSN SUBSYSTEM
		ROCKWELL INTER- NATIONAL	VS70- 540922	1-5	B	3/24/83	PORT MANIP ARM SHLDR JTSN & RETTN LCH JTSN SUBSYSTEM
14.7 (SHEET 1)	FRGF	ROCKWELL	VS72-	54-57	A/EOB08		INTEGRATED SYSTEM SCHEMATIC-ORBITER OV-299
		ROCKWELL	VS70-764372	1, 2	C	6/28/79	SCHEMATIC DIAGRAM - MIDBODY JETTISON CONTROLLER ASSEMBLY
		SPAR	S1450F1	1 TO 2 OF 2	C	9/86	OUTLINE AND INSTALLATION FLIGHT RELEASABLE GRAPPLE FIXTURE
14.7 (SHEET 2)	RSGF	SPAR	SPAR-RMS- R.950	PG 14.15	-	6/84	OPERATION ANALYSIS REPORT OPERATION OF A FRGF BY A SUITED CREWMEMBER
		SPAR	S1450D114	1 OF 1	-	11/83	TARGET PLATE (FRGF)
		SPAR	S1574E100	1 OF 2	A	9/85	OUTLINE AND INSTALLATION RIGIDIZE SENSING GRAPPLE FIXTURE
		SPAR	S1574E101	1 OF 2	C	9/87	GRAPPLE FIXTURE/EVA RELEASE ASSY
		SPAR	SPAR-RMS- PA.1064 (A)	PG 7	-	9/86	HAZARD ANALYSIS FOR RSGF

DWG	SIGNATURE	DATE	DWG	SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LYNDON B. JOHNSON SPACE CENTER HOUSTON, TEXAS		
14.6-2	ENGR D. LINDNER		14.7-1	ENGR D. GOODWIN		VENDOR DRAWING REFERENCES		
	ENGR <i>D. Lindner</i>	7/19/89		ENGR <i>Daniel Goodwin</i>	7/19/89			
14.6-3	ENGR R. FOALE		14.7-2	ENGR D. GOODWIN				
	ENGR <i>R. Foale</i>	7/19/89		ENGR <i>Daniel Goodwin</i>	7/19/89			
	ENGR			APP <i>Ernest E. Smith</i>	7/20/89			
	ENGR			APP <i>Mark J. Young for RNF</i>	7-20-89	SPACE SHUTTLE	TBL NO	14-1
	ENGR			OMNIPLAN		ALL		
	ENGR			LTR D	PCN 4	PAGE 14.1-8	SHEET 8 OF 9	

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
14.8 (SHEET 1)	FIRMWARE OV	SPAR	2571302		2		MCIU PERFORMANCE SPEC
		SPAR	2578223				MCIU SOFTWARE DOCUMENTATION
		SPAR	RMS-PA.1067				SHUTTLE RMS FMEA AND CIL. (VOL I)
14.8 (SHEET 2)	SYNCIR	R.I.	201640N40				PPS MICROCOMPUTER BASIC DEVICES PRODUCT
14.8 (SHEET 3)	FW MEMORY	SPAR	2571302		2		MCIU PERFORMANCE SPEC
		SPAR	2578223				MCIU SOFTWARE DOCUMENTATION
14.9 (SHEET 1)	YO ELEC	ROCKWELL	V790-54001	1, 2, 6, 7, 11, 12	B	3/22/88	SCHEMATIC DIAGRAM SPDS DEPLOYMENT SUBSYSTEM
14.9 (SHEET 2)	RDU ELEC	ROCKWELL	V790-54001	1, 2, 3, 4, 5, 11, 12	B	3/22/88	SCHEMATIC DIAGRAM SPDS DEPLOYMENT SUBSYSTEM
14.9 (SHEET 3)	P.L RELEASE & DRIVE TRANSFER	ROCKWELL	V790-54001	8, 9, 10, 11, 12	B	3/22/88	SCHEMATIC DIAGRAM SPDS DEPLOYMENT SUBSYSTEM
14.9 (SHEET 4)	SPDS MECH 1	ROCKWELL	V790- 544002	1		8/8/88	SCHEMATIC DIAGRAM SPDS PRIMARY AND SECONDARY PEDESTAL ASSY.
14.9 (SHEET 5)	SPDS MECH 2	ROCKWELL	V790- 544002	1		8/8/88	SCHEMATIC DIAGRAM SPDS PRIMARY AND SECONDARY PEDESTAL ASSY

DWG	SIGNATURE	DATE	DWG	SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LYNDON B. JOHNSON SPACE CENTER HOUSTON, TEXAS		
14.8-1-3	ENGR R. KERR		14.9-4	ENGR R. FOALE		VENDOR DRAWING REFERENCES		
	ENGR <i>R. Kerr</i>	7/19/89		ENGR <i>R. Foale</i>	7/19/89			
14.9-1	ENGR D. LINDNER		14.9-5	ENGR R. FOALE				
	ENGR <i>D. Lindner</i>	7/19/89		ENGR <i>R. Foale</i>	7/19/89			
14.9-2	ENGR D. LINDNER			APP <i>Ernest E. Smith, Jr.</i>	7/24/89	SPACE SHUTTLE	TBL NO	14-1
	ENGR <i>D. Lindner</i>	7/19/89		APP <i>Mark J. Gering for RNF</i>	7-28-89			
14.9-3	ENGR R. FOALE			OMNIPLAN		ALL		
	ENGR <i>R. Foale</i>	7/19/89		LTR D	PCN 4	PAGE 14.1-9	SHEET 9 OF 9	

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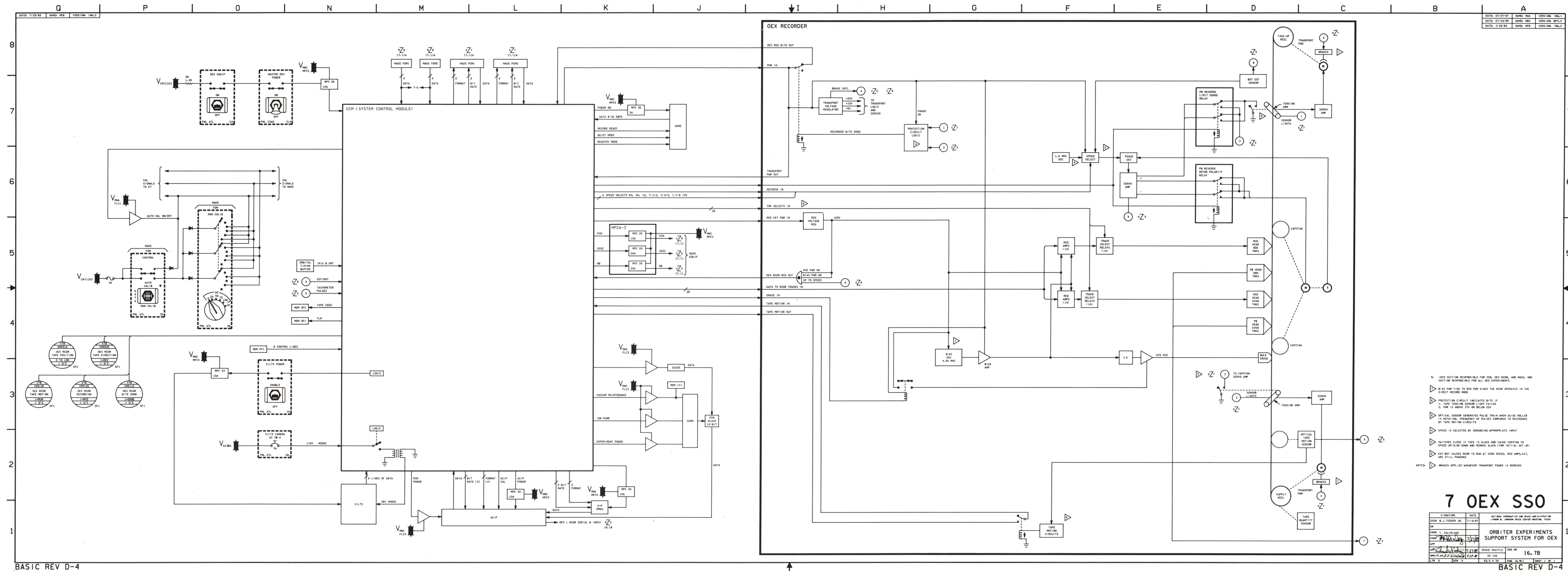


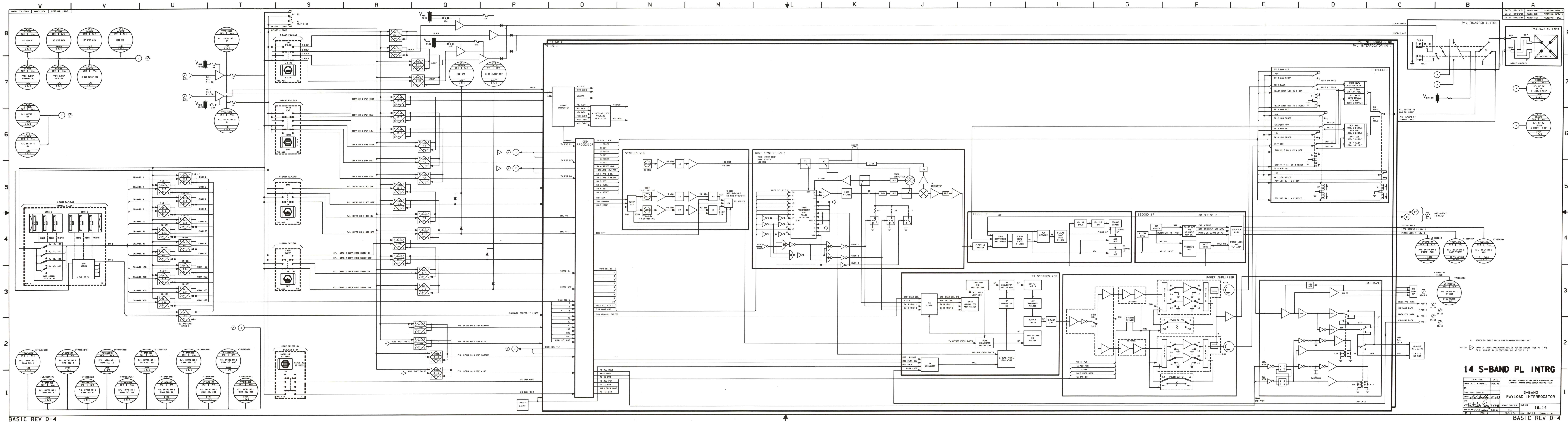
FOR DETAILED COMPONENT AND LOGIC INFORMATION REFER TO:

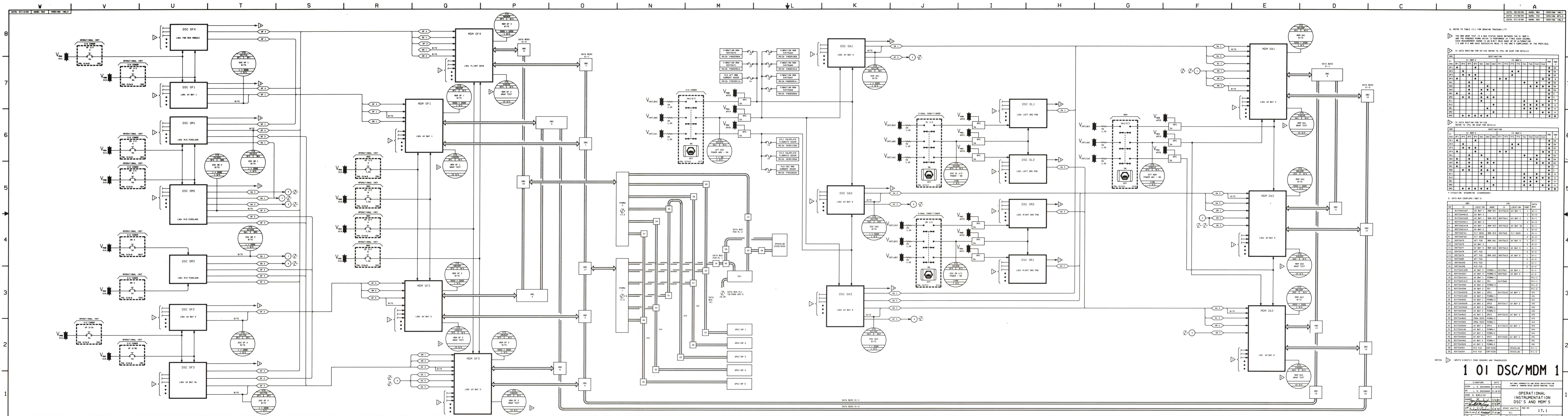
SSSH DWG NO.	SSSH DWG TITLE	VENDOR NAME	VENDOR DWG NO.	VENDOR SHEET NO.	REV	DATE	VENDOR DRAWING TITLE
15.5-2	HATCHES (AIRLOCK AND SPACELAB)	ROCKWELL	332603	ALL		4/75	AIRLOCK HATCH ASSY
			593301	ALL		4/75	AIRLOCK MECH PROVISIONS
			PHOTO #'s S80-28029 28041 25152				
			S83-35399				
			S79-38393				
15.6 Sheet 1 and 2	CREW SEATS	ROCKWELL	VS70-760209	1	D	10/15/84	SCHEMATIC DIAGRAM - COAS SEAT/SUIT CONTROLS CREW SYSTEMS
		ROCKWELL	VS70-760252	1	C	5/14/84	SCHEMATIC DIAGRAM - COAS SEAT/SUIT CONTROLS CREW SYSTEMS
		AMI	1172	ALL	Y	7/14/83	FINAL ASSEMBLY CREW SEAT, SPACE SHUTTLE
		AMI	3172	ALL	AC	10/20/83	FINAL ASSEMBLY PASSENGER SEAT, SPACE SHUTTLE
		AMI	1172-2250	ALL	V	6/30/83	CARRIAGE ASSEMBLY, VERTICAL TRAVEL, SEAT BASE
		AMI	RT1172-2070	ALL	E	1/11/82	ACTIVATOR ASSY - CREW SEAT
		ROCKWELL	MC621-0069	ALL	C	8/15/83	SEATS - OPERATIONAL ORBITER CREW AND PASSENGER
		ROCKWELL	V610-333010	ALL		1/16/89	SEAT SUPPORT - MISSION SPECIALIST NO. 1 ASSY OF
15.7-1	KU BAND ANTENNA DEPLOY/STOW/ JETTISON	ROCKWELL	VS70-760709	1-11	D	8/29/86	SCHEMATIC DIAGRAM - MOTOR CONTROL ASSEMBLY POWER DISTRIBUTION
		ROCKWELL	VS70-760702	1-12	H	8/29/86	SCHEMATIC DIAGRAM - MOTOR CONTROL ASSY POWER DISTRIBUTION
		ROCKWELL	VS70-590119	1,2,3	B	12/3/85	SCHEMATIC DIAGRAM - KU BAND ANTENNA DEPLOYMENT
		ROCKWELL	VS70-590112	1,2,3	A	6/84	SCHEMATIC DIAGRAM - KU BAND ANTENNA DEPLOYMENT
		ROCKWELL	VS70-740102	1-9	H	5/13/87	SCHEMATIC DIAGRAM - KU BAND COMMUNICATIONS SUBSYSTEM
		ROCKWELL	VS70-740109	1-7	D	5/13/87	SCHEMATIC DIAGRAM - KU BAND COMMUNICATIONS SUBSYSTEM
15.7-2	KU BAND MECHANICAL	ROCKWELL	V070-544902	1,2,3	C	1/29/87	MECHANISM ASSEMBLY - KU BAND DEPLOYMENT
		ROCKWELL	V070-744008	1,2,3	A	1/24/78	INSTALLATION, COAXIAL CABLES - KU BAND COMM A RH AND B LH MID FUSELAGE
		ROCKWELL	V070-794041	1	B	5/25/79	HARNESSE INSTALLATION - MID-FUSELAGE UPPER WIRING X _O - 582.00 TO X _O 933.00 RH

DWG	SIGNATURE	DATE	DWG	SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LYNDON B. JOHNSON SPACE CENTER HOUSTON, TEXAS		
15.7	ENGR J. KLING		15.5	ENGR W. C. ANDERSON		VENDOR DRAWING REFERENCES		
	ENGR <i>Jeffrey V. Kling</i>	7/21/89		ENGR <i>William C. Anderson</i>	7/21/89			
	ENGR		15.6-1,2	ENGR T. MALKASIAN				
	ENGR			ENGR <i>Joseph Malkasian</i>	7/20/89			
	ENGR			APP <i>Robert C. Trevino</i>	7/21/89			
	ENGR			APP		SPACE SHUTTLE	TBL NO	15-I
	ENGR			APP		ALL		
	ENGR			LTR D	PCN 4	PAGE	15-I-3	SHEET 3 OF 3

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4. REFER TO TABLE 17.1 FOR DRAWING TRACEABILITY

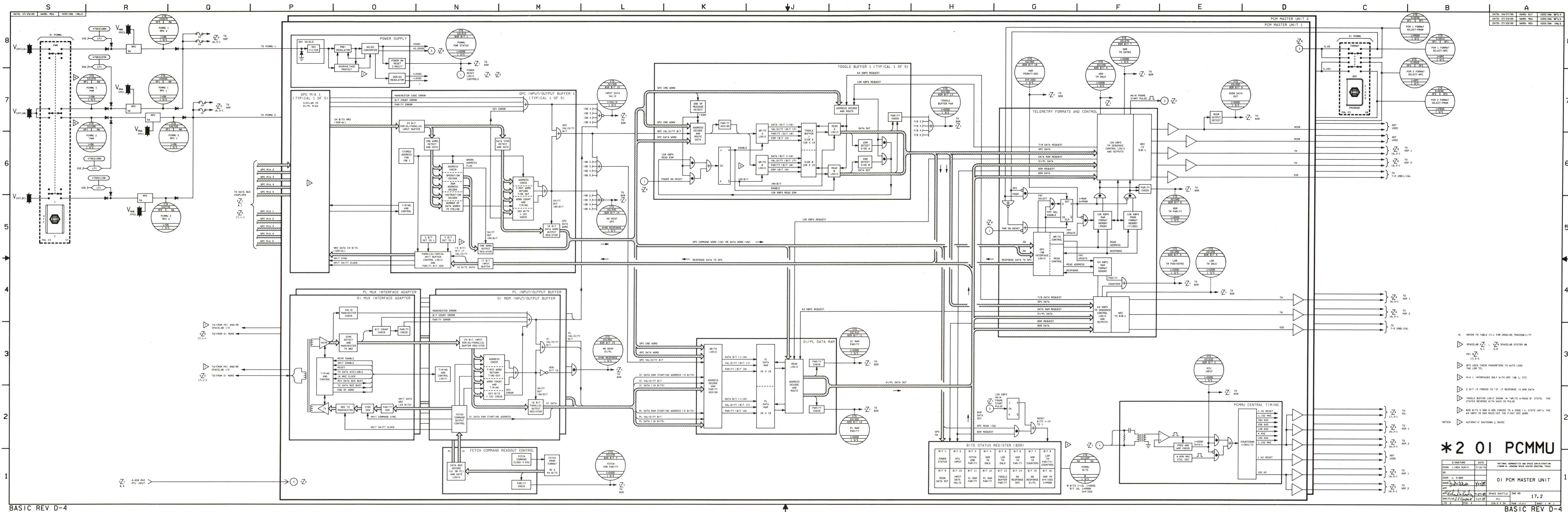
THE MDM WRAP TEST IS A BUS STATUS CHECK BETWEEN THE D1 MDM'S AND THE POWERED POWER MDM'S. IT IS PERFORMED 10 TIMES EACH SECOND. EACH MEASUREMENT SHOWN IS A BIT HEAD MADE OF 10 ALTERNATING 1'S AND 0'S AND EACH SUCCESSIVE HEAD IS THE ONE'S COMPLEMENT OF THE PREVIOUS.

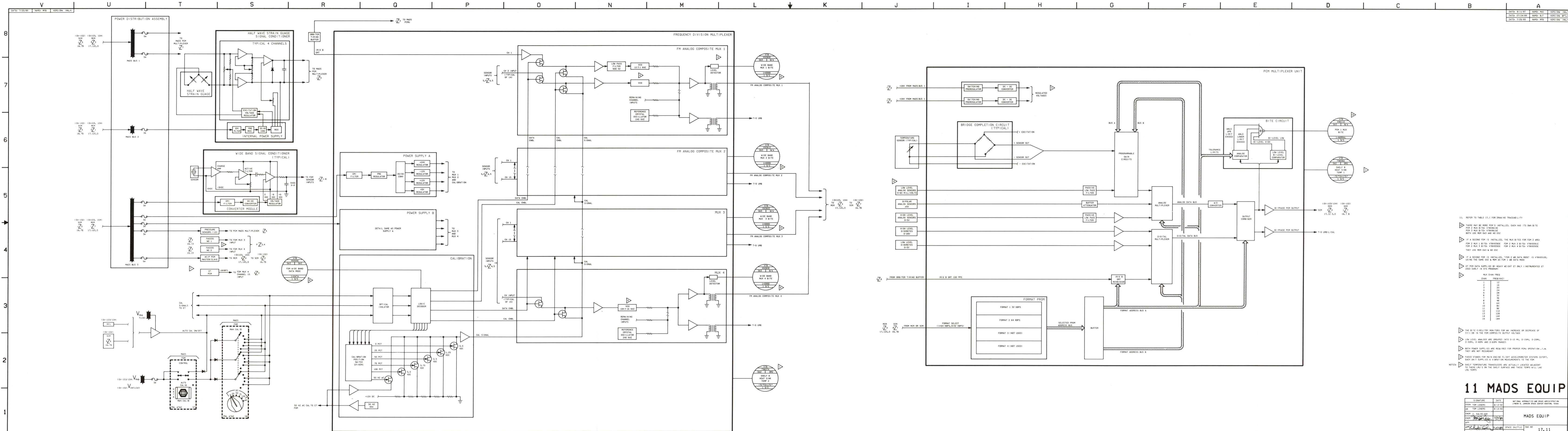
1. DATA ROUTING FOR D1-D10 REFER TO IPOL ON SCAP FOR DETAILS

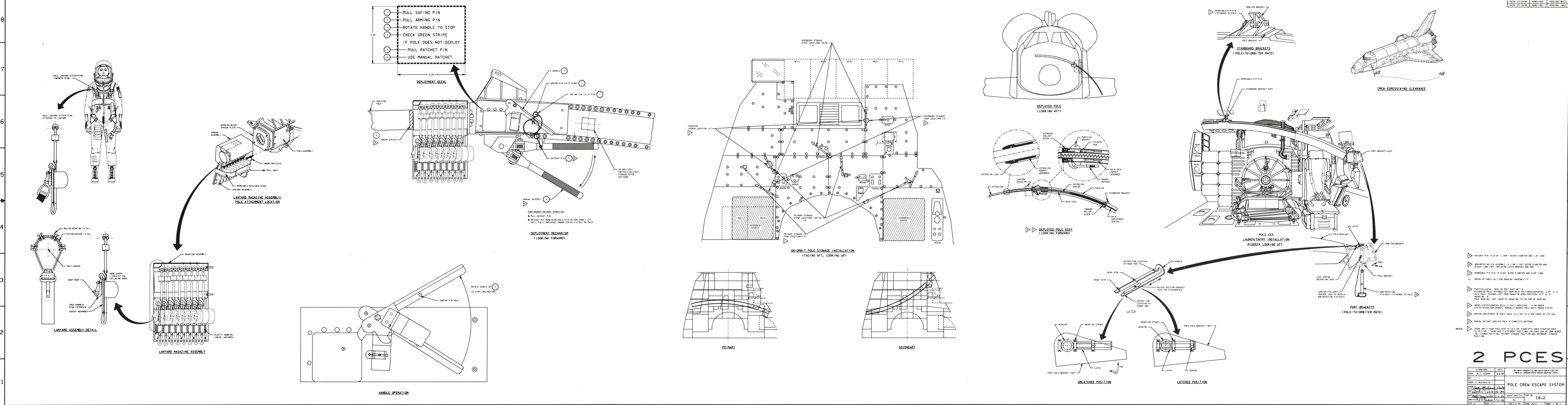
2. DATA BUS COUPLERS (DSC'S)

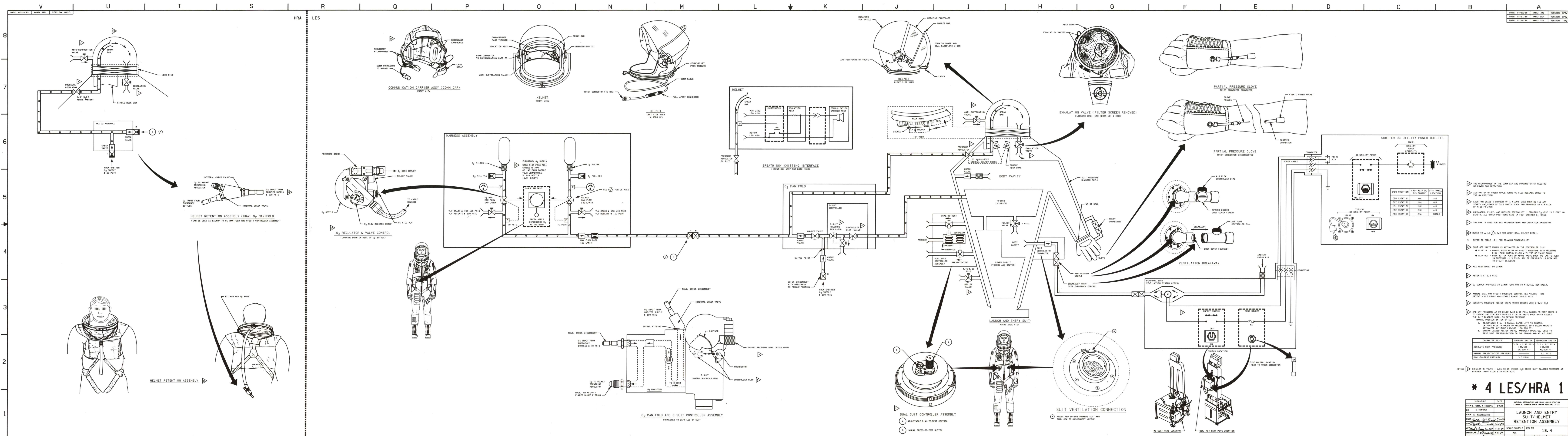
3. INPUTS DIRECTLY FROM SENSORS AND TRANSDUCERS

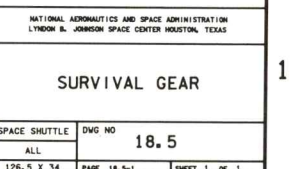
NO	ID	LOCATION	NAME	LOC	LOCATION	DATA
1	8172441A27	AV BAY 1	MDM OF1	8172441A	AV BAY 1	01-1
2	8172441A12	AV BAY 2	MDM OF2	8172441A	AV BAY 2	01-2
3	8172441A08	AV BAY 3	MDM OF3	8172441A	AV BAY 3	01-3
4	8172441A11	AV BAY 4	MDM OF4	8172441A	AV BAY 4	01-4
5	8172441A18	AV BAY 5	MDM OF5	8172441A	AV BAY 5	01-5
6	8172441A13	AV BAY 6	MDM OF6	8172441A	AV BAY 6	01-6
7	8172441A14	AV BAY 7	MDM OF7	8172441A	AV BAY 7	01-7
8	8172441A15	AV BAY 8	MDM OF8	8172441A	AV BAY 8	01-8
9	8172441A16	AV BAY 9	MDM OF9	8172441A	AV BAY 9	01-9
10	8172441A17	AV BAY 10	MDM OF10	8172441A	AV BAY 10	01-10
11	8172441A19	AV BAY 11	MDM OF11	8172441A	AV BAY 11	01-11
12	8172441A20	AV BAY 12	MDM OF12	8172441A	AV BAY 12	01-12
13	8172441A21	AV BAY 13	MDM OF13	8172441A	AV BAY 13	01-13
14	8172441A22	AV BAY 14	MDM OF14	8172441A	AV BAY 14	01-14
15	8172441A23	AV BAY 15	MDM OF15	8172441A	AV BAY 15	01-15
16	8172441A24	AV BAY 16	MDM OF16	8172441A	AV BAY 16	01-16
17	8172441A25	AV BAY 17	MDM OF17	8172441A	AV BAY 17	01-17
18	8172441A26	AV BAY 18	MDM OF18	8172441A	AV BAY 18	01-18
19	8172441A27	AV BAY 19	MDM OF19	8172441A	AV BAY 19	01-19
20	8172441A28	AV BAY 20	MDM OF20	8172441A	AV BAY 20	01-20
21	8172441A29	AV BAY 21	MDM OF21	8172441A	AV BAY 21	01-21
22	8172441A30	AV BAY 22	MDM OF22	8172441A	AV BAY 22	01-22
23	8172441A31	AV BAY 23	MDM OF23	8172441A	AV BAY 23	01-23
24	8172441A32	AV BAY 24	MDM OF24	8172441A	AV BAY 24	01-24
25	8172441A33	AV BAY 25	MDM OF25	8172441A	AV BAY 25	01-25
26	8172441A34	AV BAY 26	MDM OF26	8172441A	AV BAY 26	01-26
27	8172441A35	AV BAY 27	MDM OF27	8172441A	AV BAY 27	01-27
28	8172441A36	AV BAY 28	MDM OF28	8172441A	AV BAY 28	01-28
29	8172441A37	AV BAY 29	MDM OF29	8172441A	AV BAY 29	01-29
30	8172441A38	AV BAY 30	MDM OF30	8172441A	AV BAY 30	01-30
31	8172441A39	AV BAY 31	MDM OF31	8172441A	AV BAY 31	01-31
32	8172441A40	AV BAY 32	MDM OF32	8172441A	AV BAY 32	01-32
33	8172441A41	AV BAY 33	MDM OF33	8172441A	AV BAY 33	01-33
34	8172441A42	AV BAY 34	MDM OF34	8172441A	AV BAY 34	01-34
35	8172441A43	AV BAY 35	MDM OF35	8172441A	AV BAY 35	01-35
36	8172441A44	AV BAY 36	MDM OF36	8172441A	AV BAY 36	01-36
37	8172441A45	AV BAY 37	MDM OF37	8172441A	AV BAY 37	01-37
38	8172441A46	AV BAY 38	MDM OF38	8172441A	AV BAY 38	01-38
39	8172441A47	AV BAY 39	MDM OF39	8172441A	AV BAY 39	01-39
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41	8172441A49	AV BAY 41	MDM OF41	8172441A	AV BAY 41	01-41
42	8172441A50	AV BAY 42	MDM OF42	8172441A	AV BAY 42	01-42
43	8172441A51	AV BAY 43	MDM OF43	8172441A	AV BAY 43	01-43
44	8172441A52	AV BAY 44	MDM OF44	8172441A	AV BAY 44	01-44
45	8172441A53	AV BAY 45	MDM OF45	8172441A	AV BAY 45	01-45
46	8172441A54	AV BAY 46	MDM OF46	8172441A	AV BAY 46	01-46
47	8172441A55	AV BAY 47	MDM OF47	8172441A	AV BAY 47	01-47
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49	8172441A57	AV BAY 49	MDM OF49	8172441A	AV BAY 49	01-49
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53	8172441A61	AV BAY 53	MDM OF53	8172441A	AV BAY 53	01-53
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55	8172441A63	AV BAY 55	MDM OF55	8172441A	AV BAY 55	01-55
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57	8172441A65	AV BAY 57	MDM OF57	8172441A	AV BAY 57	01-57
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61	8172441A69	AV BAY 61	MDM OF61	8172441A	AV BAY 61	01-61
62	8172441A70	AV BAY 62	MDM OF62	8172441A	AV BAY 62	01-62
63	8172441A71	AV BAY 63	MDM OF63	8172441A	AV BAY 63	01-63
64	8172441A72	AV BAY 64	MDM OF64	8172441A	AV BAY 64	01-64
65	8172441A73	AV BAY 65	MDM OF65	8172441A	AV BAY 65	01-65
66	8172441A74	AV BAY 66	MDM OF66	8172441A	AV BAY 66	01-66
67	8172441A75	AV BAY 67	MDM OF67	8172441A	AV BAY 67	01-67
68	8172441A76	AV BAY 68	MDM OF68	8172441A	AV BAY 68	01-68
69	8172441A77	AV BAY 69	MDM OF69	8172441A	AV BAY 69	01-69
70	8172441A78	AV BAY 70	MDM OF70	8172441A	AV BAY 70	01-70
71	8172441A79	AV BAY 71	MDM OF71	8172441A	AV BAY 71	01-71
72	8172441A80	AV BAY 72	MDM OF72	8172441A	AV BAY 72	01-72
73	8172441A81	AV BAY 73	MDM OF73	8172441A	AV BAY 73	01-73
74	8172441A82	AV BAY 74	MDM OF74	8172441A	AV BAY 74	01-74
75	8172441A83	AV BAY 75	MDM OF75	8172441A	AV BAY 75	01-75
76	8172441A84	AV BAY 76	MDM OF76	8172441A	AV BAY 76	01-76
77	8172441A85	AV BAY 77	MDM OF77	8172441A	AV BAY 77	01-77
78	8172441A86	AV BAY 78	MDM OF78	8172441A	AV BAY 78	01-78
79	8172441A87	AV BAY 79	MDM OF79	8172441A	AV BAY 79	01-79
80	8172441A88	AV BAY 80	MDM OF80	8172441A	AV BAY 80	01-80
81	8172441A89	AV BAY 81	MDM OF81	8172441A	AV BAY 81	01-81
82	8172441A90	AV BAY 82	MDM OF82	8172441A	AV BAY 82	01-82
83	8172441A91	AV BAY 83	MDM OF83	8172441A	AV BAY 83	01-83
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88	8172441A96	AV BAY 88	MDM OF88	8172441A	AV BAY 88	01-88
89	8172441A97	AV BAY 89	MDM OF89	8172441A	AV BAY 89	01-89
90	8172441A98	AV BAY 90	MDM OF90	8172441A	AV BAY 90	01-90
91	8172441A99	AV BAY 91	MDM OF91	8172441A	AV BAY 91	01-91
92	8172441A00	AV BAY 92	MDM OF92	8172441A	AV BAY 92	01-92
93	8172441A01	AV BAY 93	MDM OF93	8172441A	AV BAY 93	01-93
94	8172441A02	AV BAY 94	MDM OF94	8172441A	AV BAY 94	01-94
95	8172441A03	AV BAY 95	MDM OF95	8172441A	AV BAY 95	01-95
96	8172441A04	AV BAY 96	MDM OF96	8172441A	AV BAY 96	01-96
97	8172441A05	AV BAY 97	MDM OF97	8172441A	AV BAY 97	01-97
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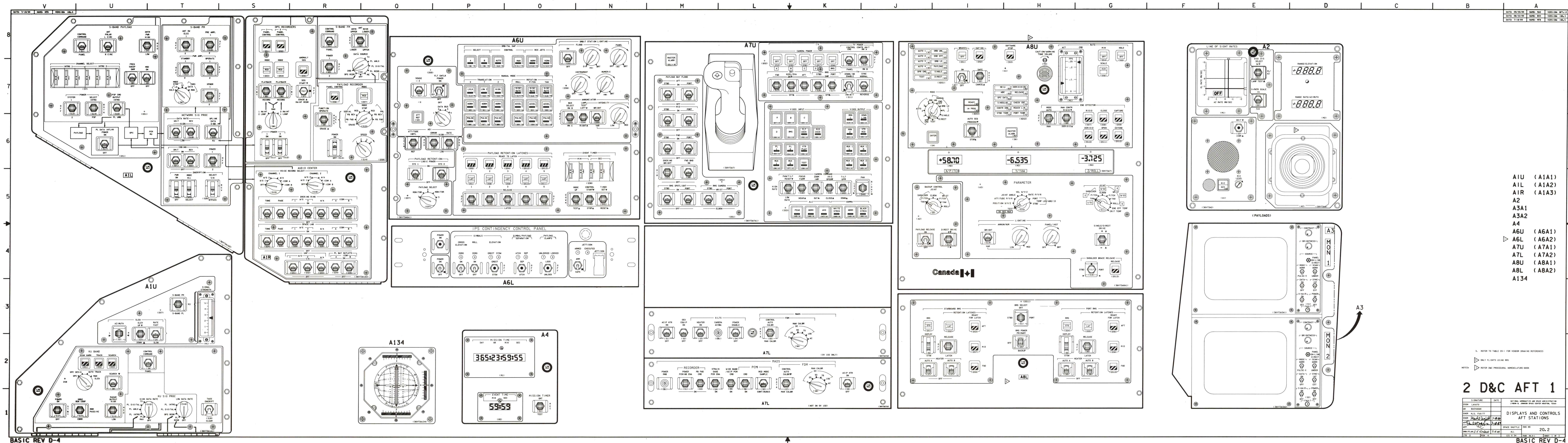












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