

Space Shuttle Systems Handbook

Volume III – Sections 16 through 20

Mission Operations Directorate
Systems Division

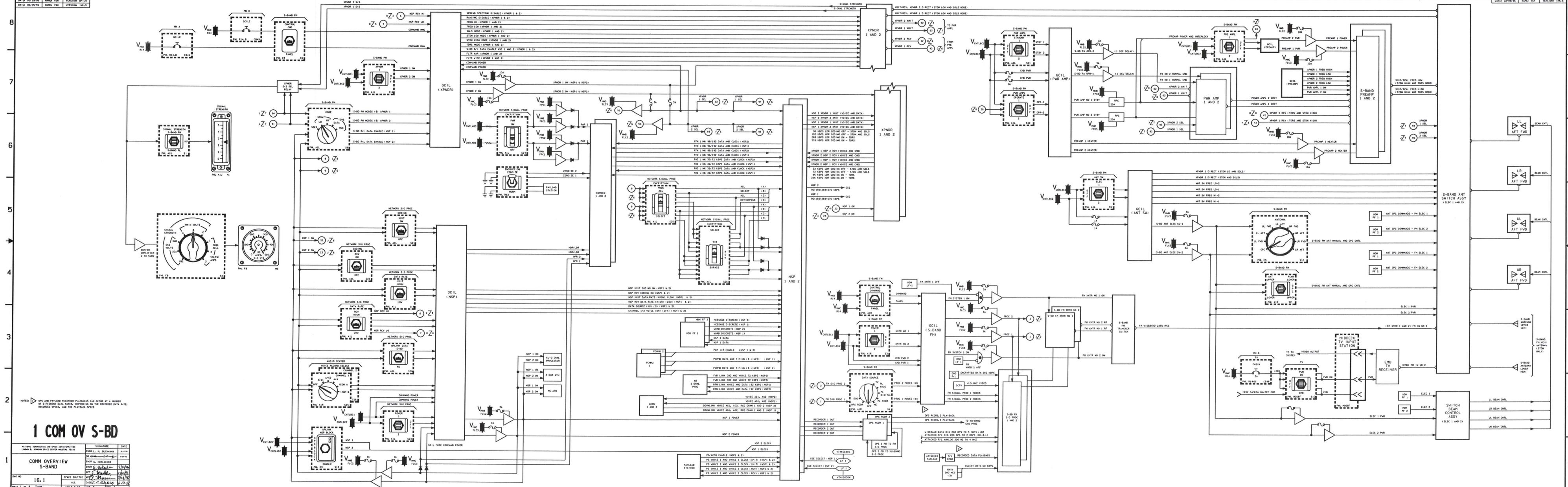
Revision E, DCN-6
August 14, 1996



National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas



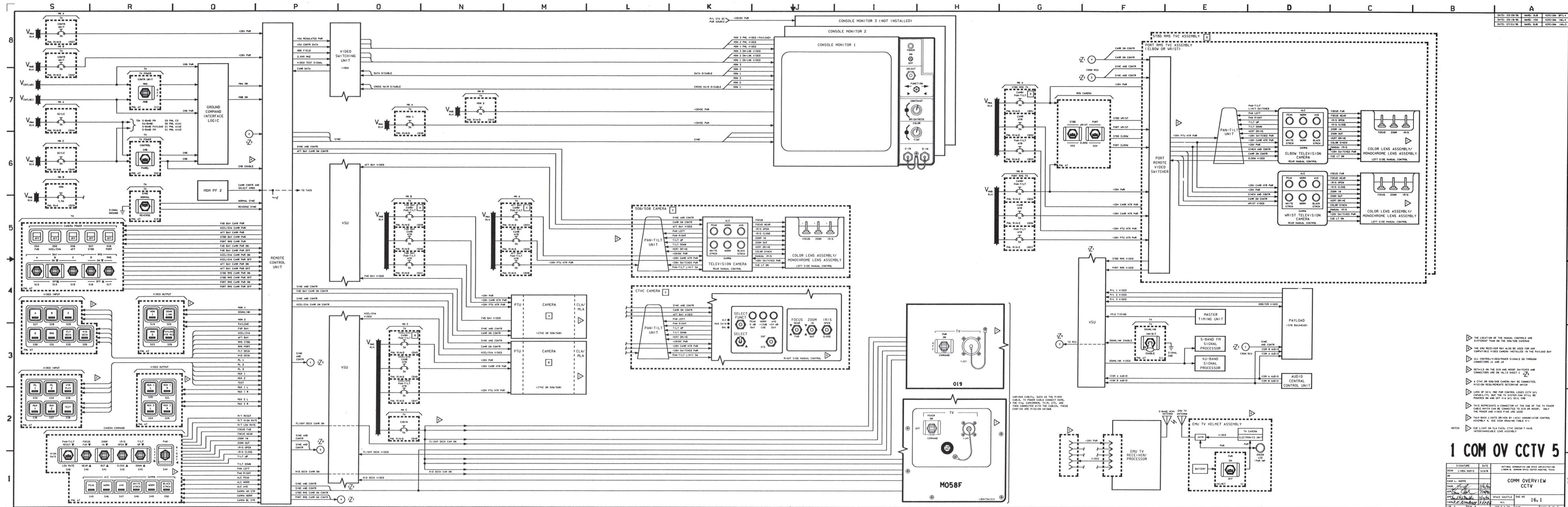


NOTES: OPS AND PAYLOAD RECORDER PLAYBACKS CAN OCCUR AT A NUMBER OF DIFFERENT DATA RATES, DEPENDING ON THE RECORDED DATA RATE, RECORDED SPEED, AND THE PLAYBACK SPEED.

1 COM OV S-BD

DATE	BY	REVISION
10/24/90	DAVID W. BUCHANAN	1
01/29/91	DAVID W. BUCHANAN	2
02/09/91	DAVID W. BUCHANAN	3

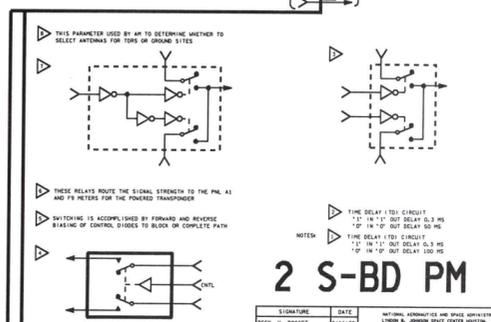
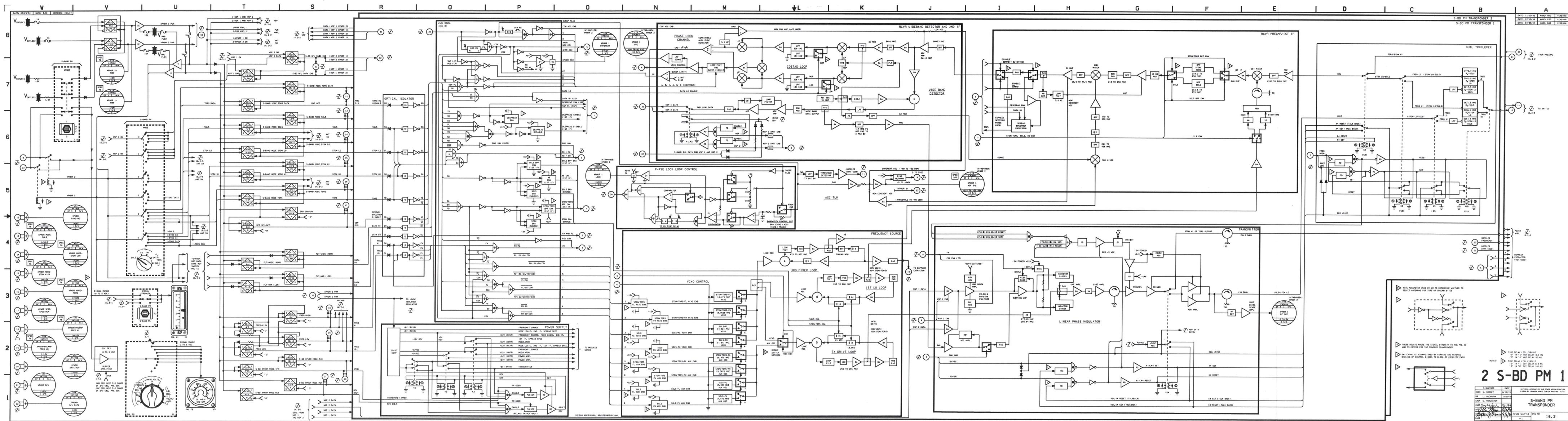
DATE	BY	REVISION
02/09/91	DAVID W. BUCHANAN	4
02/09/91	DAVID W. BUCHANAN	5
02/09/91	DAVID W. BUCHANAN	6



BASIC REV E-6

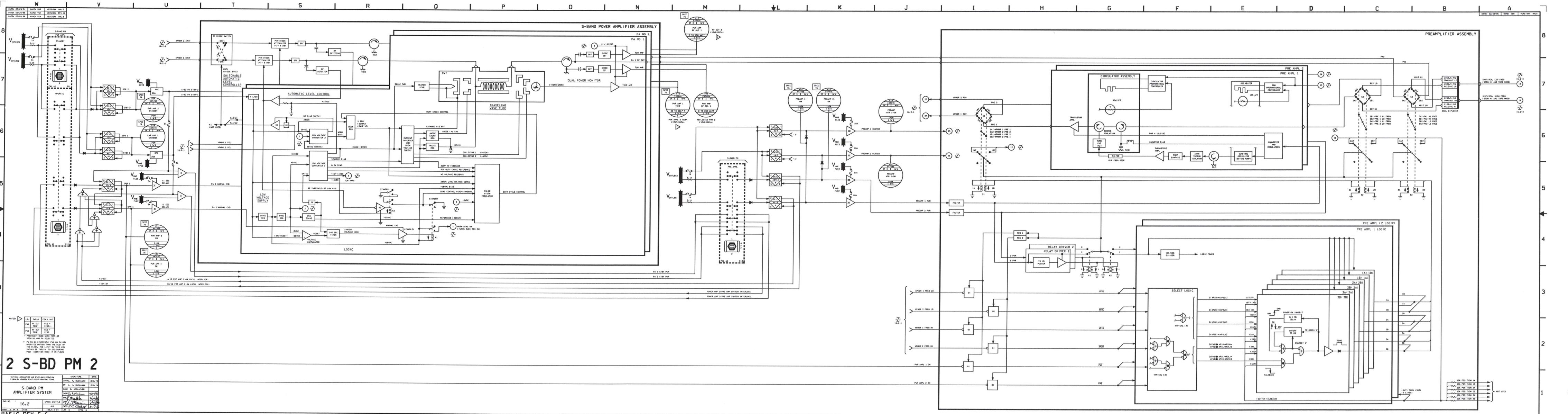
1 COM OV CCTV 5

SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
DRON LINDA DUBIS	10/19/93	LINDA L. JOHNSON SPACE CENTER GRAPHICS DIVISION
DAIR L. HOPPE		
ENGR. J. C. HARRIS	7/16/94	COMM OVERVIEW
APPC. C. J. HARRIS	7/16/94	CCTV
APPC. S. C. BARNETT	7/16/94	
DATE: 03/04/96	NAME: BJB	VERSION: 001.1
DATE: 03/18/96	NAME: VSH	VERSION: 100.1
DATE: 03/01/96	NAME: BJB	VERSION: 100.5



2 S-BD PM 1

DATE	VERSION	REVISION
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05/13/83	3	1
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2 S-BD PM 2

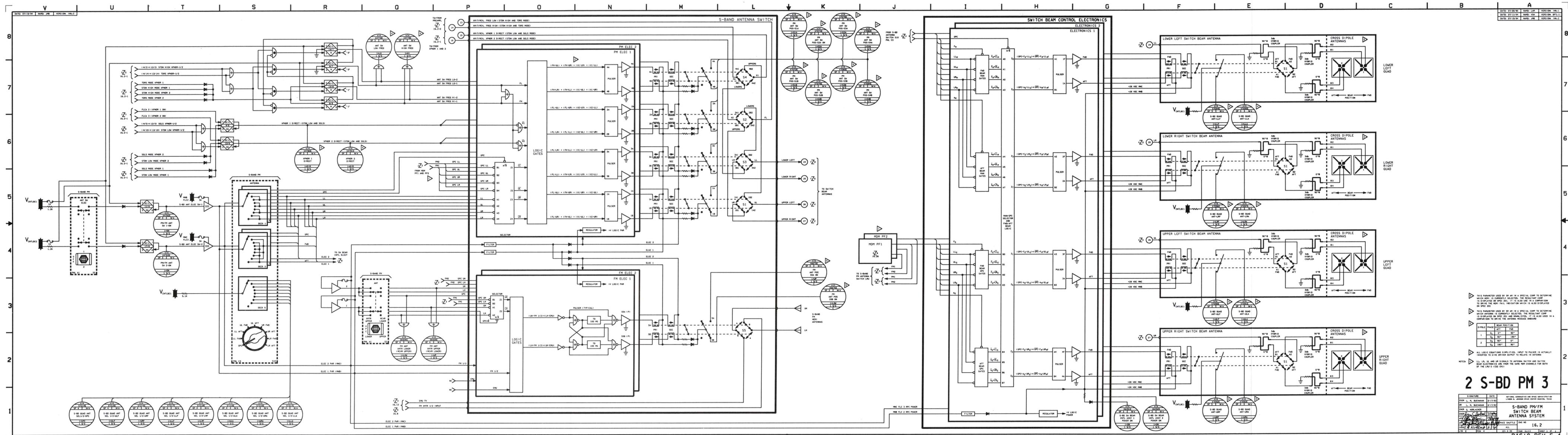
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DATE: 02/09/76	NAME: VSH	VERSION: 16A.8

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DATE: 07/29/74	NAME: BJR	VERSION: 16.1
DATE: 07/29/74	NAME: VSH	VERSION: 16.1.1
DATE: 02/09/76	NAME: VSH	VERSION: 16A.8

BASIC REV E-6

BASIC REV E-6



BASIC REV E-4

DATE: 07/20/60	NAME: LHM	VERSION: 1001.1
DATE: 07/13/64	NAME: VSH	VERSION: 1001.11
DATE: 07/18/64	NAME: JWB	VERSION: 1001.2

THIS PARAMETER USED BY SR IN A SPECIAL COPY TO DETERMINE WHICH ANTENNA IS CURRENTLY SELECTED. THE RESULTANT COPY IS DISPLAYED ON SPEC 201. IT IS ALSO USED IN A COMPANION COPY TO DRIVE THE BEAM POSITION INDICATOR WHICH IS ALSO DISPLAYED ON SPEC 201.

THIS PARAMETER USED BY SR IN A SPECIAL COPY TO DETERMINE WHICH ANTENNA IS CURRENTLY SELECTED. THE RESULTANT COPY IS DISPLAYED ON SPEC 202 AND 203. IT IS ALSO USED IN A COMPANION COPY TO DRIVE THE ANTENNA MESSAGE OVERBOARD.

ALL LOGIC QUANTITIES SHOWN IN THIS DRAWING TO BE ACTUALLY OPERATED TO DRIVE THE ANTENNA SWITCH AND SWITCH BEAM ELECTRONICS ARE FROM THE SAME PM CHANNELS FOR BOTH OF THE LRU'S (SEE CH1).

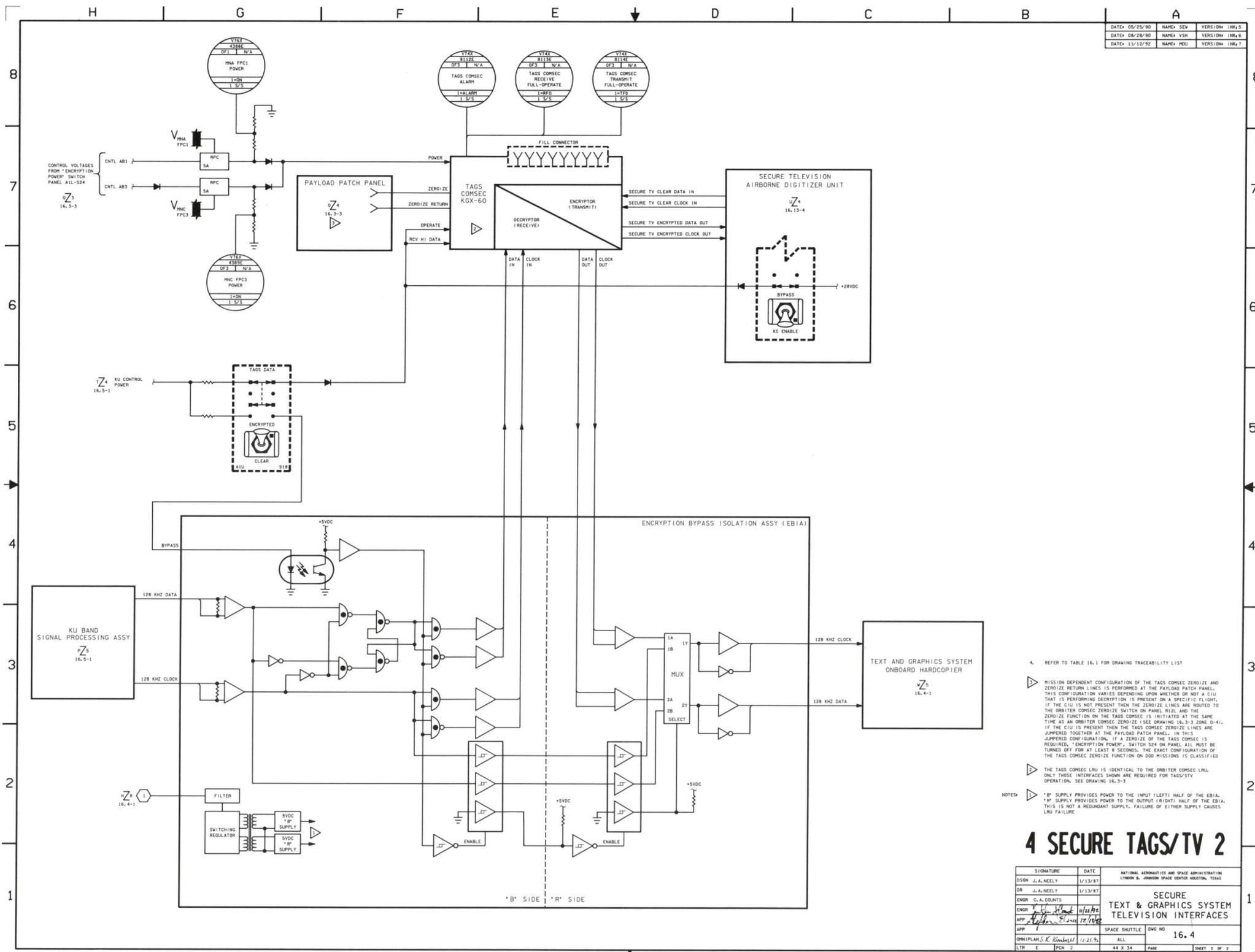
DIPLOLE	BEAM POSITION	ANT	PM
1	90°	180°	180°
2	0°	180°	0°

2 S-BD PM 3

SIGNATURE: _____ DATE: 07/17/62
 BY: L. M. BOGARDUS
 CHECKED BY: M. H. LARSEN
 TITLE: PROJECT ENGINEER
 S-BAND PM/FM SWITCH BEAM ANTENNA SYSTEM
 PART NO: 16.2
 REV: 16.2
 SHEET 1 OF 1

BASIC REV E-4

DATE: 05/25/90	NAME: DEW	VERSION: 1064.5
DATE: 08/29/90	NAME: VSH	VERSION: 1064.6
DATE: 11/12/92	NAME: HDU	VERSION: 1064.7



4. REFER TO TABLE 16.1 FOR DRAWING TRACEABILITY LIST
- MISSION DEPENDENT CONFIGURATION OF THE TAGS COMSEC ZEROIZE AND ZEROIZE RETURN LINES IS PERFORMED AT THE PAYLOAD PATCH PANEL. THIS CONFIGURATION VARIES DEPENDING UPON WHETHER OR NOT A CIU THAT IS PERFORMING DECRYPTION IS PRESENT ON A SPECIFIC FLIGHT. IF THE CIU IS NOT PRESENT THEN THE ZEROIZE LINES ARE ROUTED TO THE ORBITER COMSEC ZEROIZE SWITCH ON PANEL 16.2, AND THE ZEROIZE FUNCTION ON THE TAGS COMSEC IS INITIATED AT THE SAME TIME AS AN ORBITER COMSEC ZEROIZE (SEE DRAWING 16.3-3 ZONE 0-4). IF THE CIU IS PRESENT THEN THE TAGS COMSEC ZEROIZE LINES ARE JUMPED TOGETHER AT THE PAYLOAD PATCH PANEL. IN THIS JUMPED CONFIGURATION, IF A ZEROIZE OF THE TAGS COMSEC IS REQUIRED, "ENCRYPTION POWER" SWITCH S24 ON PANEL 16.1 MUST BE TURNED OFF FOR AT LEAST 8 SECONDS. THE EXACT CONFIGURATION OF THE TAGS COMSEC ZEROIZE FUNCTION ON OOD MISSIONS IS CLASSIFIED
- THE TAGS COMSEC LRU IS IDENTICAL TO THE ORBITER COMSEC LRU. ONLY THOSE INTERFACES SHOWN ARE REQUIRED FOR TAGS/STV OPERATION. SEE DRAWING 16.3-3.
- *B* SUPPLY PROVIDES POWER TO THE INPUT (LEFT) HALF OF THE EBIA. *R* SUPPLY PROVIDES POWER TO THE OUTPUT (RIGHT) HALF OF THE EBIA. THIS IS NOT A REDUNDANT SUPPLY. FAILURE OF EITHER SUPPLY CAUSES LRU FAILURE.

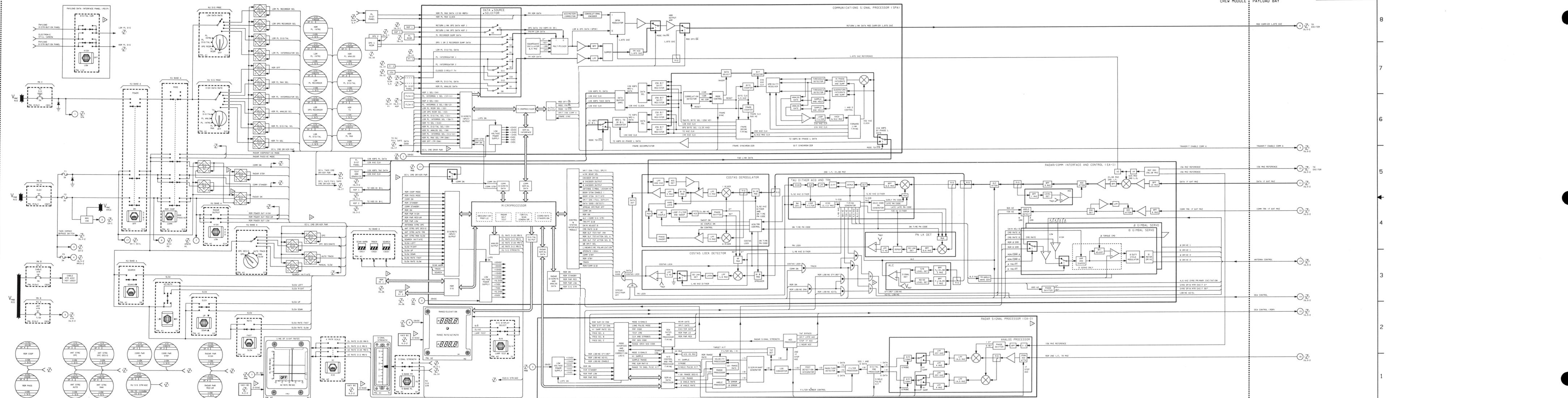
4 SECURE TAGS/TV 2

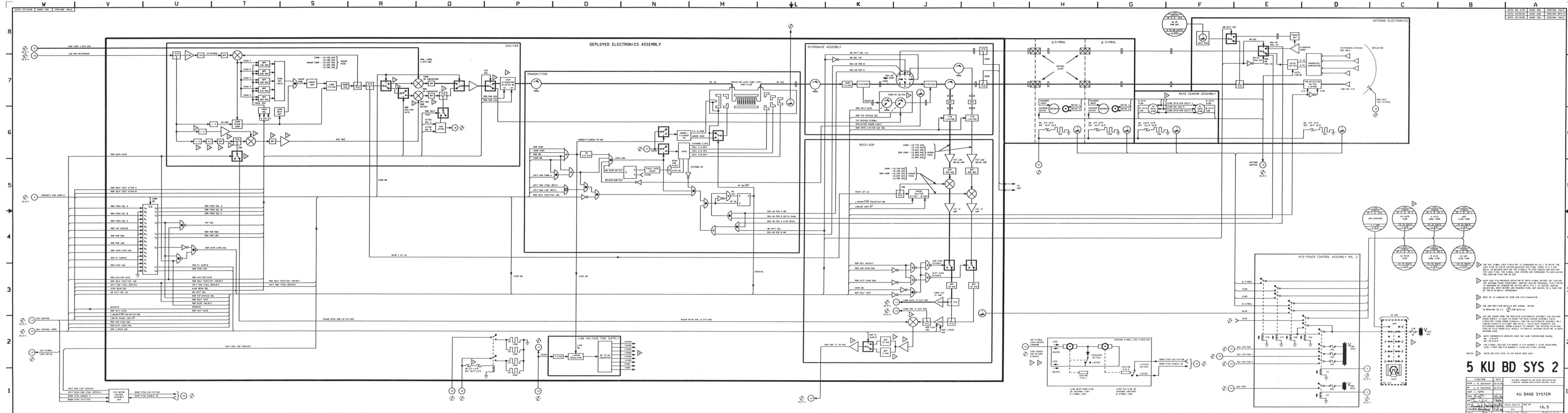
SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LINDON B. JOHNSON SPACE CENTER HOUSTON, TEXAS
DR J.A. NEELY	11/13/87	
ENGR G.A. COULTS	11/13/87	
APP V.L. [Signature]	10/21/87	
APP [Signature]	12/15/87	
DRN/PLANS K. [Signature]	11/21/87	
LTR E [Signature]	11/21/87	
		SECURE TEXT & GRAPHICS SYSTEM TELEVISION INTERFACES
		SPACE SHUTTLE
		DWG NO 16.4
		ALL
		44 X 34 PAGE
		SHEET 2 OF 2

5 KU BD SYS 1

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
LORAIN L. BUCKHAM
DATE: 05/20/83

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100	05/20/83	L.B.	REVISED





DATE	BY	REV	DESCRIPTION
07/10/96	NAME VSR	VERSION 16A.1	
07/10/96	NAME JLB	VERSION 16A.2	
07/10/96	NAME VSR	VERSION 16A.3	

SIGNATURE		DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
DR. L. M. BUCHANAN		07/25/96	LYNN B. JOHNSON SPACE SYSTEMS DIVISION
ENR L. HOPPE		07/16/96	
APP. [Signature]		07/16/96	
CHECKED [Signature]		07/25/96	
DATE	BY	REV	DESCRIPTION
07/10/96	NAME VSR	VERSION 16.5	
07/10/96	NAME VSR	VERSION 16A.1	

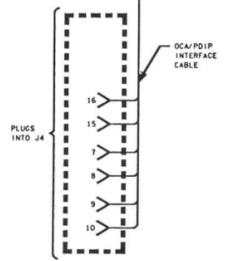
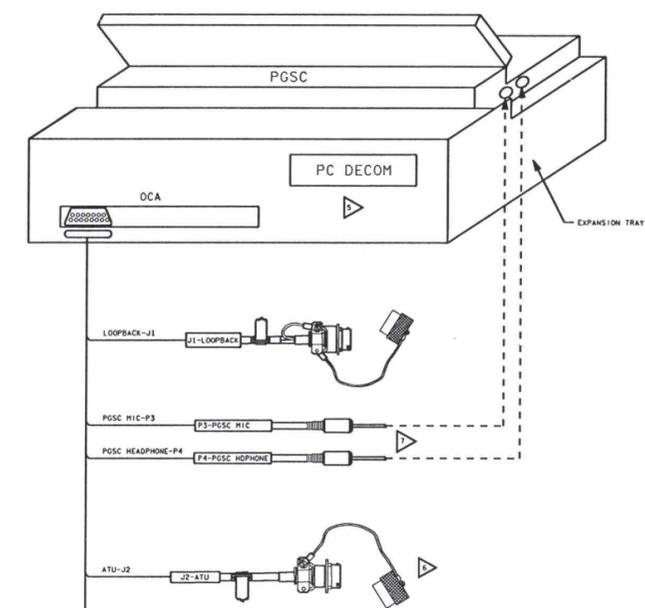
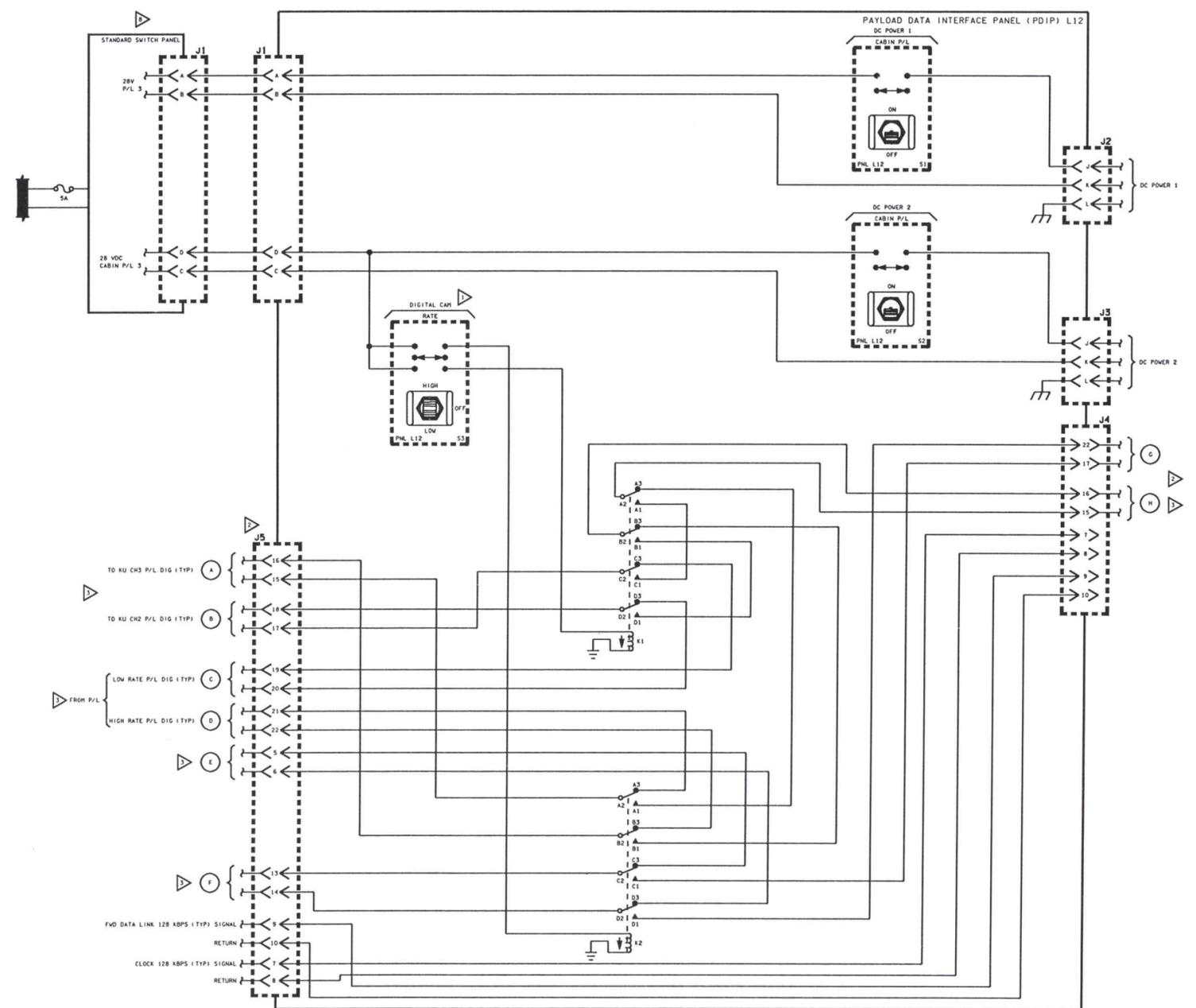
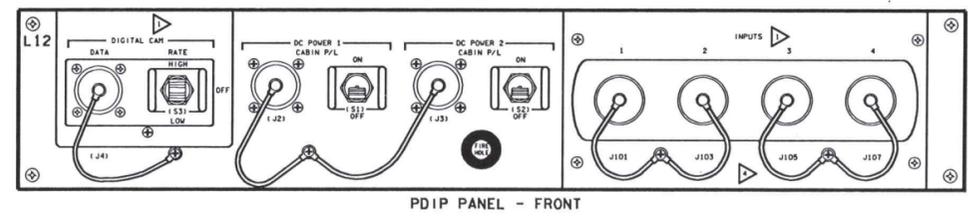
5 KU BD SYS 2

16.5

BASIC REV E-6

- THE ANT SIGNAL LOCK CIRCUITRY IS COMPLETED BY CA-1 TO DRIVE THE LOCK PIN TO THEIR LOCKED/UNLOCKED POSITION. THERE IS A 4 SEC DELAY IN BETWEEN DRIVING THE SIGNALS TO STOW ANGLES AND DRIVING THE LOCK PIN. THE SIGNAL LOCK MOTORS ARE COMPLETED TO LOCK/UNLOCK THE LOCKING PIN FOR 30 SEC.
- EACH LOCK PIN PREVENTS ROTATION OF BOTH GIMBAL MOTORS BY LOCKING THE ANTENNA FRAME STRUCTURE. DURING LOCKING SEQUENCE, PIN 2 MOTOR IS LOCKED BY DRIVING THE SIGNALS TO STOW ANGLES AND DRIVING THE LOCKING PIN. THE SIGNAL LOCK MOTORS ARE COMPLETED TO LOCK/UNLOCK THE LOCKING PIN FOR 30 SEC.
- SPEC 76 IS LABELED PA TEMP FOR THIS PARAMETER
- THE ARM POSITION DETAILS NOT SHOWN. REFER TO DRAWING 16.1-1 FOR DETAILS
- 415 VDC POWER FROM THE DEPLOYED ELECTRONICS ASSEMBLY LOW VOLTAGE POWER SUPPLY IS USED TO POWER THE RATE SENSOR ASSEMBLY LOCKING CIRCUITRY (DRIVE MOTOR SIGNALS), AND THE ELECTRONICS ASSEMBLY LOCKING CIRCUITRY (DRIVE MOTOR SIGNALS AND AZ/EL), WHICH HELP GENERATE THE DIFFERENCE CHANNEL ERROR SIGNALS TO CORRECT THE ANTENNA POINTING. LOSS OF THIS POWER WILL RESULT IN ERRATIC ANTENNA POINTING IN BOTH ANTENNA AXES.
- BOTH THERMOSTATS OPERATE OVER THE SAME TEMPERATURE RANGE ON 5V 15W OFF 30W 15W
- THE SIGNAL LOCKING PIN DRIVER IS PIN NUMBER 1. WIDE BEAM/WHISKEY BEAM MOTORS ARE PROVIDED. PIN 1 IS LOCKED DURING UNLOCKING. BOTH MOTORS ARE PROVIDED. PIN 1 IS LOCKED AS A FUNCTION OF THE IN-AS-BUILT INTERFERES.
- THESE DEVICES USED IN THE RADAR HOOD ONLY

DATE: 03/04/96	NAME: SVJ	VERSION: 001.3
DATE: 03/07/96	NAME: BJB	VERSION: 100.2
DATE: 03/13/96	NAME: SVJ	VERSION: 100.3



- ▷ THE SSP AND POWER SOURCE ARE MISSION-SPECIFIC. CONSULT MISSION-SPECIFIC INTEGRATED SCHEMATICS. J3 AND THE DIGI CAM COULD SHARE THE SAME FUSE IN THE SSP. IF THE FUSE BLOWS, DIGI CAM RATE WILL BE FORCED OFF.
- ▷ THE 2 PGSC CABLES, ALONG WITH A VIDEO-TELECONFERENCING CARD, ALLOW MIC AUDIO FROM THE PGSC AND HEADPHONE AUDIO TO THE PGSC FROM THE OCA, BYPASSING THE ADS.
- ▷ THE ATU CABLE STUB CONNECTS WITH THE PADM/ATU CABLE, THEN TO A CCU TO ACCESS THE ADS.
- ▷ THIS SLOT IS INTERCHANGEABLE WITH OTHER CARDS SUCH AS A VIDEO TELECONFERENCING CARD.
- ▷ CONNECTORS USED FOR MISSION-SPECIFIC ROUTING OF VIDEO, TELEMETRY, COMMAND, SYNC, AND/OR POWER. CONSULT MISSION-SPECIFIC SCHEMATICS FOR DETAILS.
- ▷ TABLE BELOW SHOWS INTERNAL PDIP ROUTING. THIS LOGIC IS STANDARD FOR ALL MISSIONS.

PDIP INTERNAL ROUTING

SWITCH POSITION	CONNECTIONS				W/C
HIGH	(A)	(B)	(C)	(D)	(C, D)
OFF	(A)	(B)	(C)	(D)	(C, D)
LOW	(A)	(C)	(D)	(C, D)	(C, D)

- ▷ EXTERNAL ROUTING OF J5 AND J4 IS MISSION-SPECIFIC. CONSULT MISSION-SPECIFIC INTEGRATED SCHEMATICS. THE CONNECTIONS SHOWN ARE OF A TYPICAL CONFIGURATION.
- NOTES: ▷ PANEL LABELING MAY VARY WITH MISSION CONFIGURATION (TYPICAL SHOWN)

6 PDIP/OCA

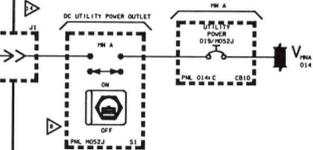
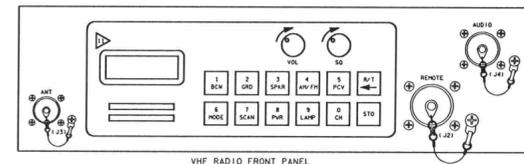
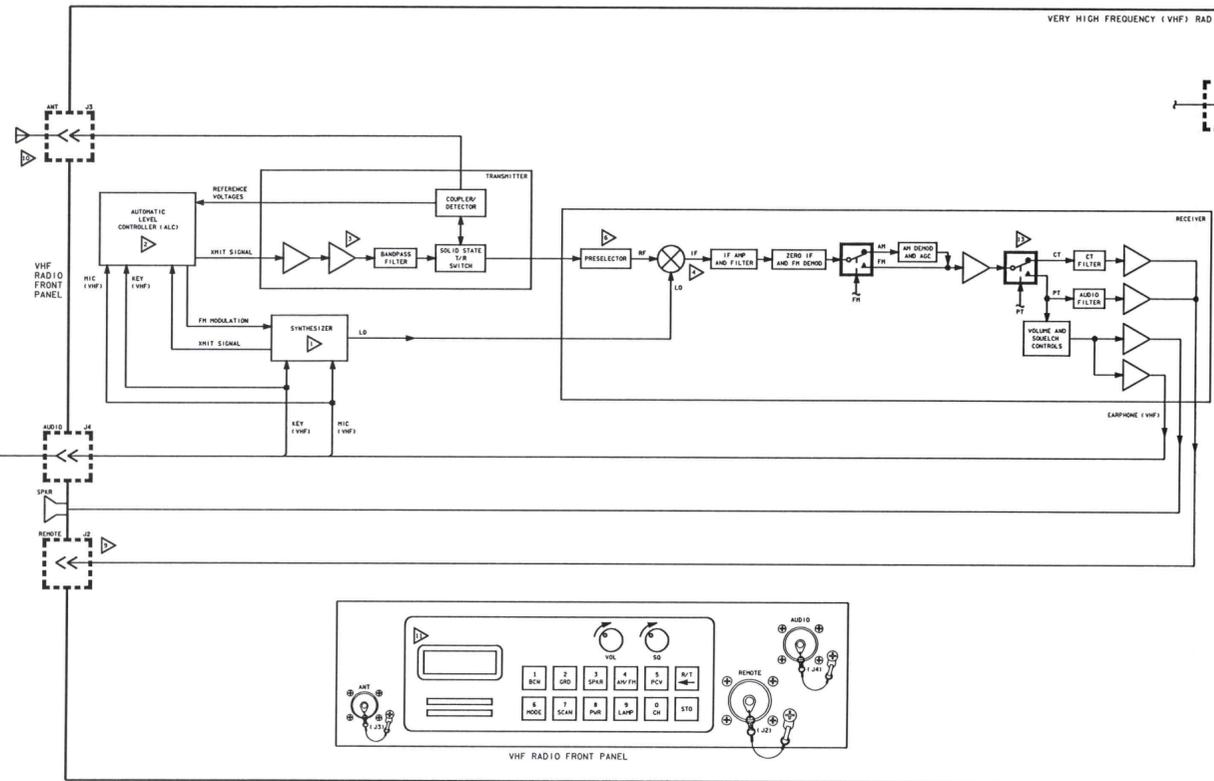
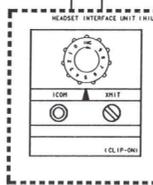
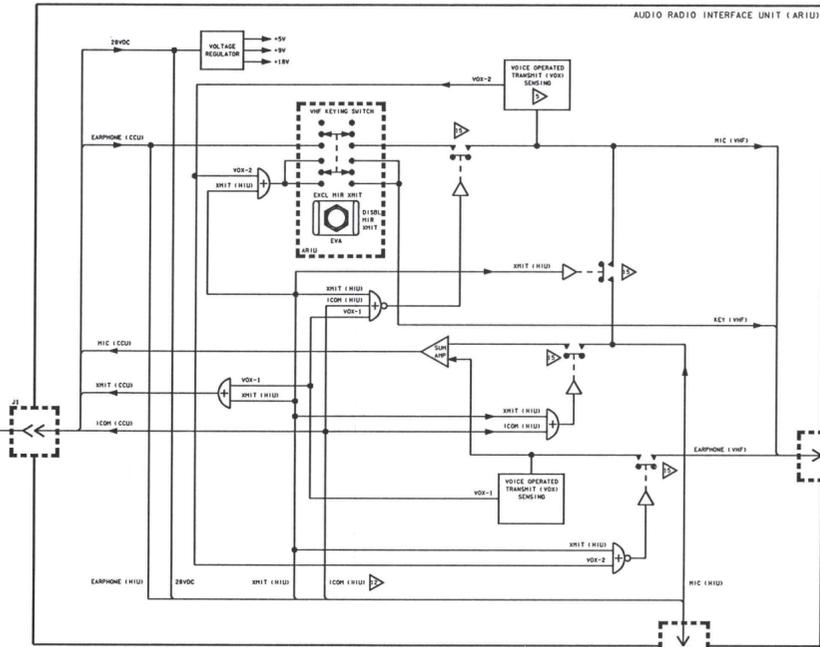
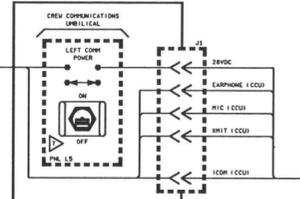
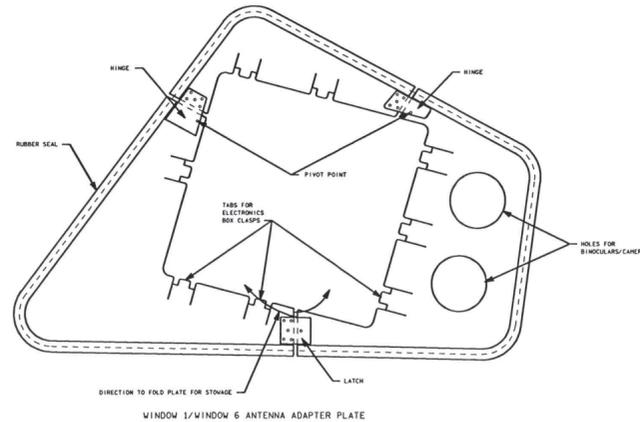
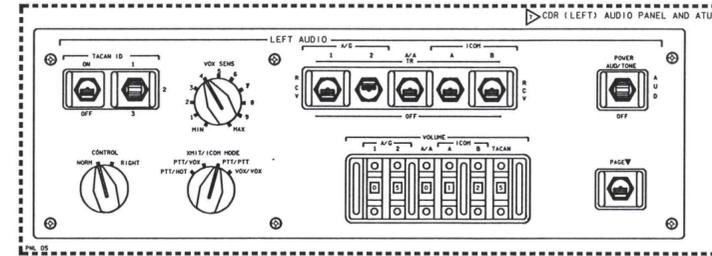
SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LYNN B. JOHNSON SPACE CENTER HOUSTON, TEXAS
DR		
ENGR L. HOPPE		
ENGR <i>[Signature]</i>	6/25/96	
APP <i>[Signature]</i>	8/1/96	
APP <i>[Signature]</i>	6-13-96	
CADS <i>[Signature]</i>	6-13-96	
TR E	PCN 6	66 X 34 PAGE SHEET 1 OF 1

PAYLOAD DATA INTERFACE PANEL (PDIP)

SPACE SHUTTLE DUG NO 16.6
ALL FLIGHTS

DATE: 05/20/96 NAME: VSH VERSION: 16A.5

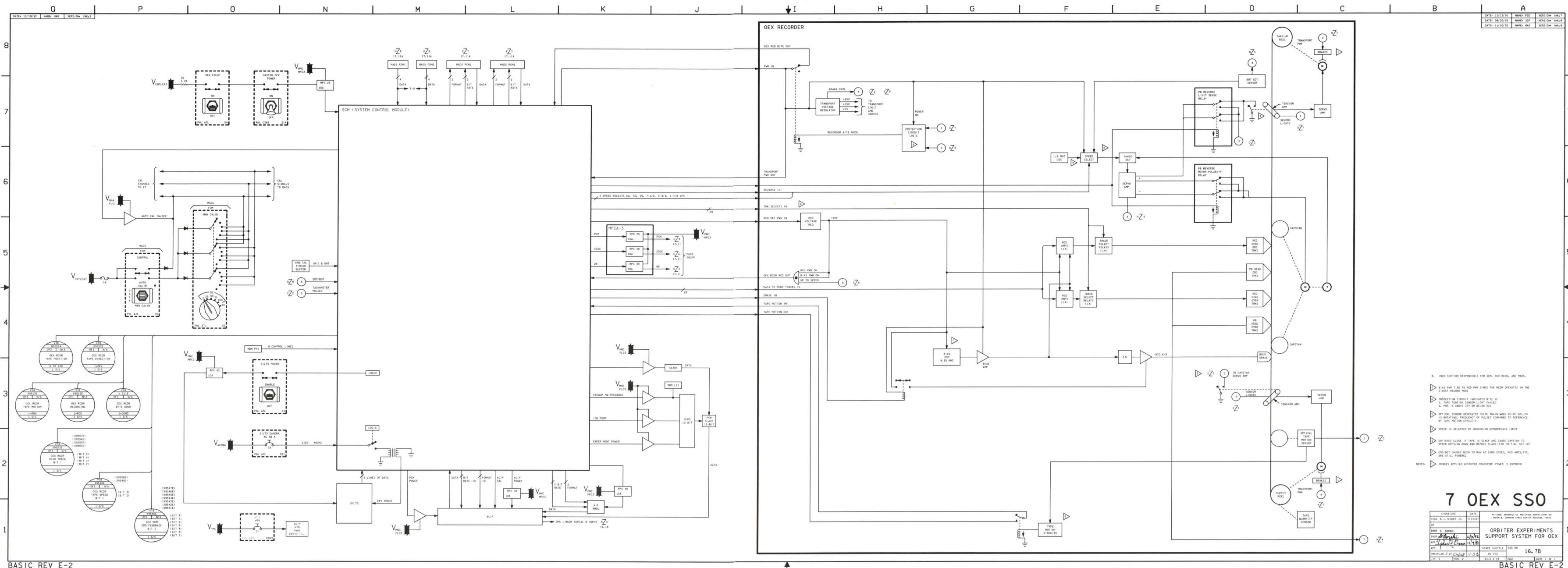
8
7
6
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2
1



- △ CONTROL INPUT CLOSURES SWITCH WHEN ENABLED
- △ THIS CASE HAS BEEN MODIFIED FOR EXTERNAL POWER INSTEAD OF BATTERY POWER
- △ CT AND PT REPRESENT THE CIPHER TEXT AND PLAIN TEXT MODES OF THE VHF RADIO, RESPECTIVELY. THESE MODES ARE REGULATED USING THE FRONT PANEL KEYS/INDICATORS. NORMALLY, ALL TRANSMISSIONS OCCUR IN PLAIN TEXT MODE
- △ PRESSED THE MIU ICON WILL NOT KEY THE VHF RADIO, HOWEVER, ANY LOOP I/COM INCLUDING COMBINED FOR T/R AT THE ATU MAY KEY THE VHF RADIO
- △ THERE ARE SIX POSSIBLE ERROR MESSAGES:
 - *ERR-EEPROM = DATA CANNOT BE WRITTEN TO EEPROM
 - *ERR-FACT = FACTORY INITIALIZATION HAS NOT BEEN COMPLETED
 - *ERR-TEMP = THE VFO VOLTAGE IN THE POWER APP IS BELOW THE CALCULATED THRESHOLD VALUE
 - *100 HOT = THE TRANSMITTER POWER AMPLIFIER TEMP IS ABOVE NORMAL RANGE. THE RADIO WILL AUTOMATICALLY REDUCE POWER BY HALF UNTIL THE TEMP RETURNS TO NORMAL RANGE
 - *ERR-HOSC = THE RADIO CANNOT ENTER SCAN MODE BECAUSE THE SCAN LIST CONTAINS LESS THAN TWO CHANNELS
 - *ERR-VOLT = THE 10-VOLT SUPPLY IS OUT OF ITS NORMAL RANGE EITHER LOW OR HIGH
- △ THE CENTER FREQUENCY OF THE VHF WINDOW ANTENNA IS 127.75 MHz. IF FOLDING, THE CENTER FREQUENCY OF THE SAME ANTENNA IS TUNED FLIGHT SPECIFIC BETWEEN 144 TO 146 MHz APPROX
- △ REMOTE IS NOT PRESENTLY CONNECTED IN VHF SETUP. REMOTE CONNECTS THE VHF RADIO TO THE COMSEC. REMOTE CONTROL UNIT AND TEST EQUIPMENT
- △ ANY DC UTILITY POWER OUTLET WHICH RECEIVES CURRENT THROUGH A CB MAY BE USED, DUE TO THE FURIOUS CURRENT OF 30 AMPS
- △ THE ARIU MAY BE CONNECTED TO ANY CCO/ATU
- △ THE SIGNAL IS FILTERED AND AMPLIFIED WITHIN THE RANGE OF 115 TO 174 MHz FOR A VHF SETTING AND WITHIN THE RANGE OF 225 TO 400 MHz FOR A HF SETTING. THE RADIO OPERATES IN TUNING INCREMENTS OF 0.250 MHz AND 0.125 MHz
- △ AN ATU VOLUME THRESHOLD SETTING OF 5 IS THE RECOMMENDED MINIMUM SETTING TO CONSISTENTLY TRIGGER THE VOX-2 SENSING
- △ THE IF SIGNAL IS A 45 MHz SIGNAL
- △ THE SIGNAL IS AMPLIFIED TO A MAXIMUM OF 10 WATTS OUTPUT POWER, HOWEVER, DO NOT OPERATE THE VHF RADIO IN HI POWER 10 WATTS. IT EXCEEDS ALLOWABLE CABIN RADIATION LEVELS AND CAN DAMAGE THE WINDOW ANTENNA
- △ THE ALC REGULATES THE TRANSMITTER OUTPUT POWER TO WITHIN 2 DB OF THE DESIRED OUTPUT POWER

7 VHF & ARIU

SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ISSN V. NUMBER	07/20/96	LYNN A. JOHNSON SPACE CENTER HOUSTON, TEXAS
DR		
ENGR L. SIEG		VHF RADIO AND AUDIO RADIO INTERFACE UNIT (ARIU)
ENGR C. J. STELL	5/21/96	
APP C. J. STELL	5/21/96	
APP C. J. STELL	5/21/96	SPACE SHUTTLE DWG NO 16.7
ENGR P. KIMBLE	5/21/96	ALL
ENGR P. KIMBLE	5/21/96	ALL
REV E	ISSUE 4	DATE: 05/20/96



BASIC REV E-2

BASIC REV E-2

7 OEX SSO

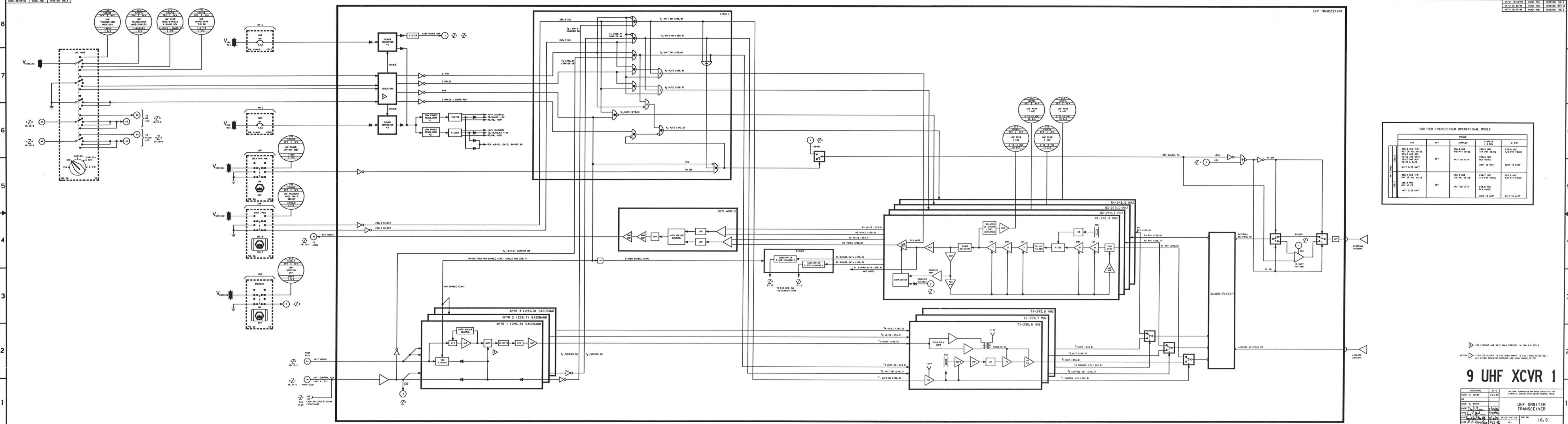
DATE: 12/15/82	NAME: PFD	VERSION: 16.7B
DATE: 08/20/82	NAME: JDF	VERSION: 16.7A
DATE: 12/10/82	NAME: MAG	VERSION: 16.7A

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
 NASA - JOHNS HOPKINS SPACE CENTER BALTIMORE, MARYLAND

ORBITER EXPERIMENTS
 SUPPORT SYSTEM FOR OEX

SPACE SHUTTLE
 ORBITER: 16.7B
 DATE: 12/15/82
 SHEET: 1 OF 1

- △ INCO SECTION RESPONSIBLE FOR SCH, OEX REC, AND MAGS.
 - △ BIAS PWR TIED TO RCD PWR SINCE THE RCD OPERATES IN THE DIRECT RECORD MODE
 - △ PROTECTION CIRCUIT INDICATES BITE IF
 1. TAPE TENSION SENSOR LIGHT FAILED
 2. PWR IS ABOVE 37V OR BELOW 22V
 - △ OPTICAL SENSOR GENERATES PULSE TRAIN WHEN GUIDE ROLLER IS ROTATING. FREQUENCY OF PULSES COMPARED TO REFERENCE BY TAPE MOTION CIRCUITS
 - △ SPEED IS SELECTED BY GROUNDING APPROPRIATE INPUT
 - △ SWITCHES CLOSE IF TAPE IS SLACK AND CAUSE CAPSTAN TO SPEED UP/SLOW DOWN AND REMOVE SLACK FROM INITIAL SET UP!
 - △ EOT/BOT CAUSES RCD TO RUN AT ZERO SPEED, RCD AMPS, ETC. ARE STILL POWERED
- NOTES: △ BRAKES APPLIED WHENEVER TRANSPORT POWER IS REMOVED

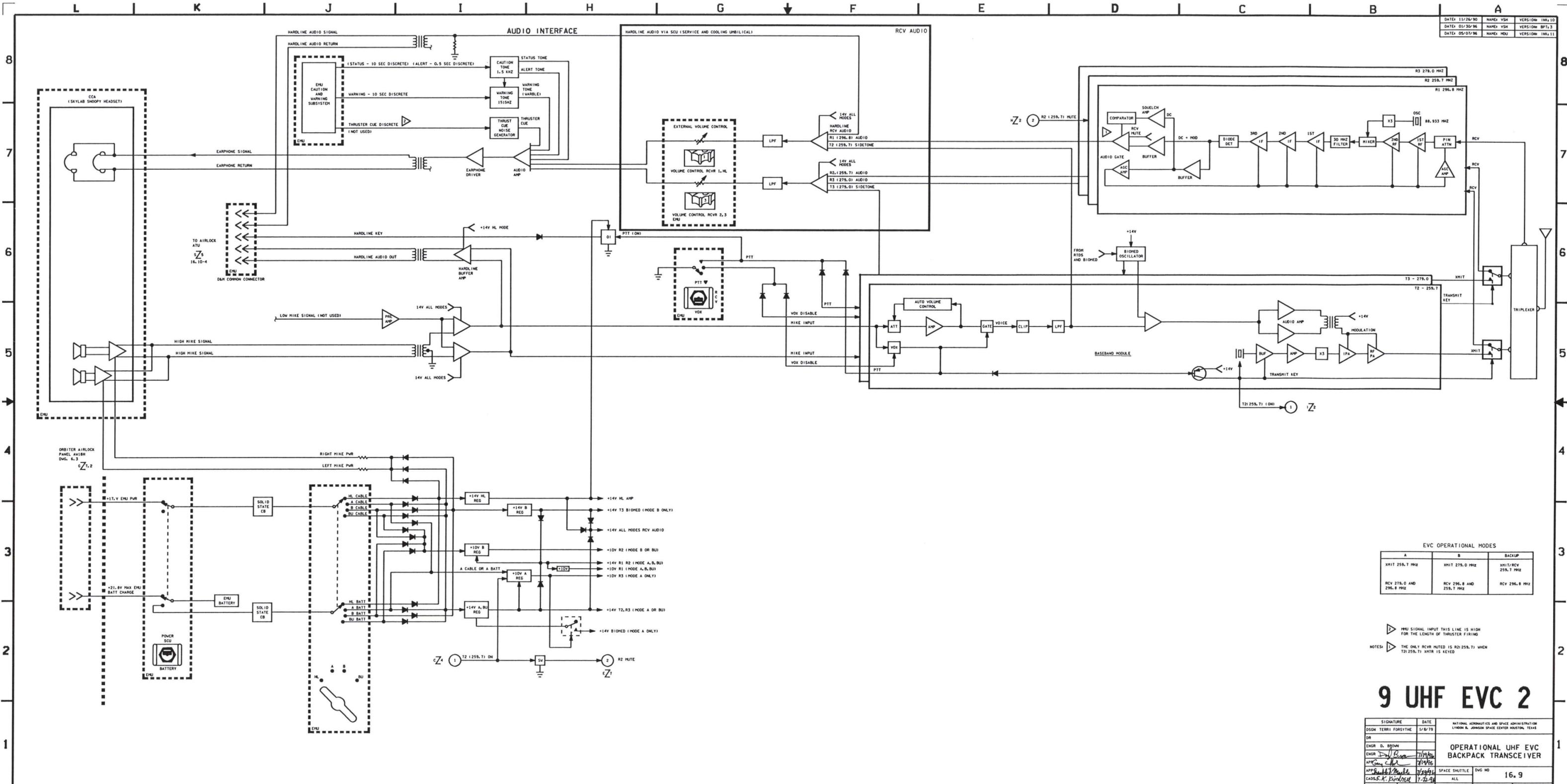


ORBITER TRANSCIVER OPERATIONAL MODES

MODE	MODE			
	EVA	OFF	SIMPLEX	SIMPLEX + G RCV
296.8 MHz T/R PTT ON VOX VOICE AND DATA	OFF	296.8 MHz T/R PTT VOICE	296.8 MHz T/R PTT VOICE	243.0 MHz T/R PTT VOICE
296.8 MHz RCV VOICE	OFF	SHIT 10 WATT	SHIT 10 WATT	SHIT 10 WATT
296.8 MHz T/R PTT ON VOX VOICE AND DATA	OFF	296.8 MHz T/R PTT VOICE	296.8 MHz T/R PTT VOICE	243.0 MHz T/R PTT VOICE
296.8 MHz RCV VOICE	OFF	SHIT 10 WATT	SHIT 10 WATT	SHIT 10 WATT

9 UHF XCVR 1

SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
DRON R. COLBY	12/25/80	L. W. JOHNSON SPACE CENTER HOUSTON, TEXAS
ENGR D. BROWN		
APP. [Signature]	7/19/80	SPACE SHUTTLE
CHK. [Signature]	7/19/80	DWG NO. 16. 9
DATE 12/25/80		SHEET 1 OF 2



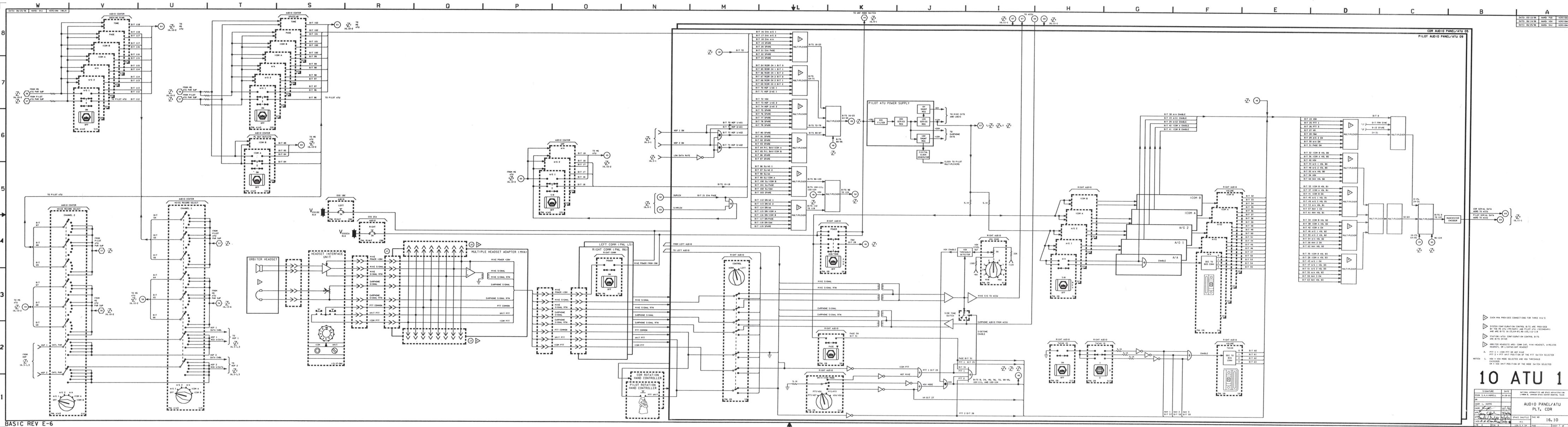
EVC OPERATIONAL MODES

A	B	BACKUP
XH1T 259.7 MHz	XH1T 279.0 MHz	XH1T/RCV 259.7 MHz
RCV 279.0 AND 296.8 MHz	RCV 296.8 AND 259.7 MHz	RCV 296.8 MHz

NOTES:
 ▷ PRU SIGNAL INPUT THIS LINE IS HIGH FOR THE LENGTH OF THRUSTER FIRING
 ▷ THE ONLY RCV MUTED IS R2 259.7 Hz WHEN T2 259.7 Hz XHTR IS KEYS

9 UHF EVC 2

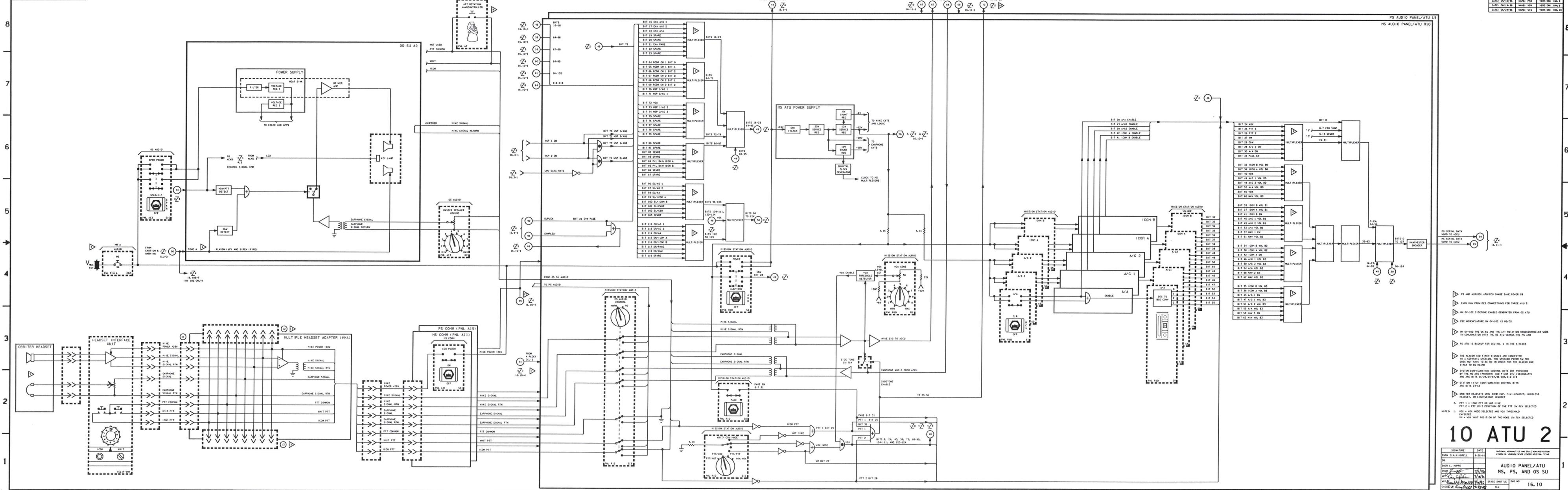
SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
DR	1/8/79	LYNN B. JOHNSON SPACE CENTER HOUSTON, TEXAS
ENGR D. BROWN		
ENGR J. G. GARR	7/19/90	
APPC C. B. BROWN	7/19/90	
APP. S. K. KIRNHEIL	7/29/90	SPACE SHUTTLE DVG NO
LTR E	PCN 6	ALL 16.9
		66 X 34 PAGE SHEET 2 OF 2



- △ EACH PHA PROVIDES CONNECTIONS FOR THREE HIU'S
 - △ SYSTEM CONFIGURATION CONTROL BITS ARE PROVIDED BY THE MS ATU (PRIMARY) AND PILOT ATU (SECONDARY) AND ARE BITS 16-24, 36-44, 56-64, 76-84, 96-104
 - △ STATION STATUS CONFIGURATION CONTROL BITS ARE BITS 24-31
 - △ OVER THE HEADSETS ARE: COM, CAP, MINI-HEADSET, WIRELESS HEADSET, OR LIGHT/FLIGHT HEADSET
2. PTT 1 = ICOM PTT ON HOT MIKE
 PTT 2 = PTT UNIT POSITION OF THE PTT SWITCH SELECTED (EXCEEDED)
1. VOR = VOR MODE SELECTED AND VOR THRESHOLD EXCEEDED
 M = VOR UNIT POSITION OF THE MODE SWITCH SELECTED

10 ATU 1

SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
RODR L. L. HOPPE	8-28-81	LORAIN B. JOHNSON SPACE CENTER, HEATON, TEXAS
ENCL 1		
ENCL 2		
ENCL 3		
ENCL 4		
ENCL 5		
ENCL 6		
ENCL 7		
ENCL 8		
ENCL 9		
ENCL 10		
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ENCL 98		
ENCL 99		
ENCL 100		



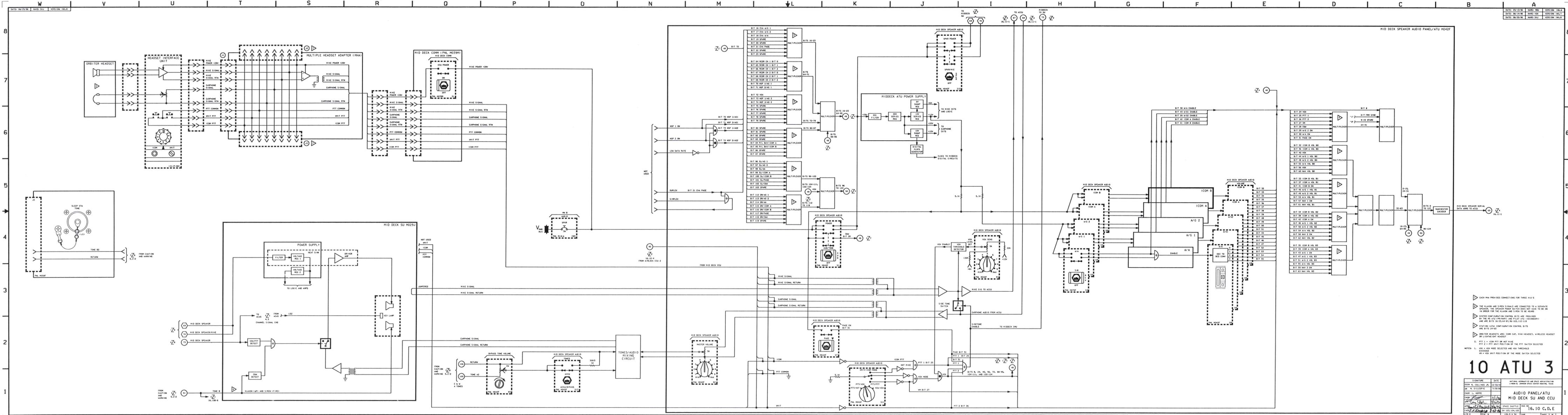
BASIC REV E-6

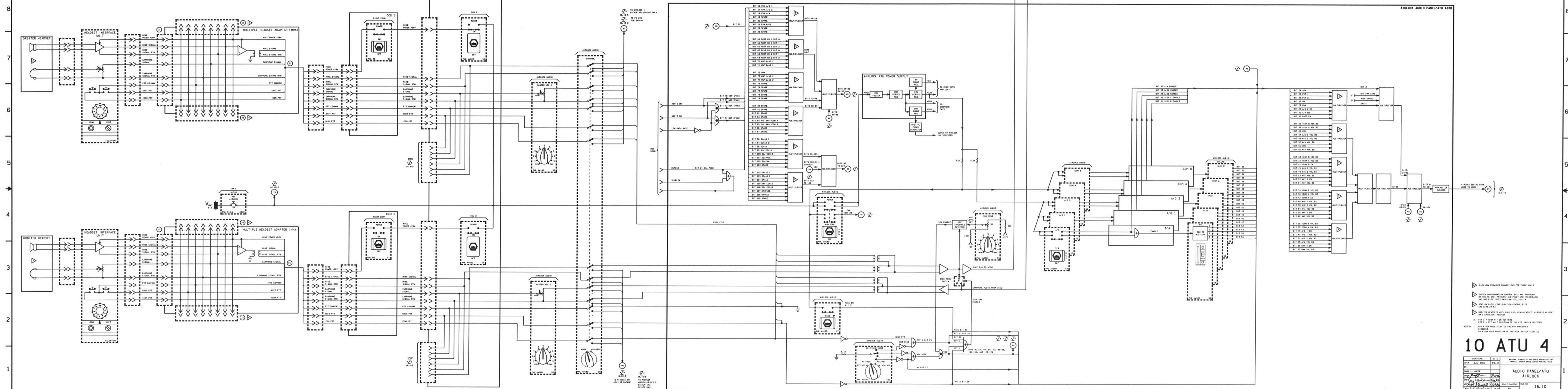
DATE: 06/10/96	NAME: PSJ	VERSION: 1M1.4
DATE: 06/10/96	NAME: VSR	VERSION: 1M1.9
DATE: 06/24/96	NAME: SVZ	VERSION: 1M1.10

DESIGN: S.L.K. HIRRELL	DATE: 9-28-81	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LINDSEY B. JOHNSON SPACE CENTER HOUSTON, TEXAS
DR: ENGR L. HOPPE	DATE: 7/10/96	AUDIO PANEL/ATU MS, PS, AND OS SU
APP: G. R. ANDERSON	DATE: 12/10/96	16.10
CHK: R. ANDERSON	DATE: 12/10/96	16.10
DATE: 12/10/96	DATE: 12/10/96	DATE: 12/10/96

10 ATU 2

PS AND A/BLOCK ATU/CCU SHARE SAME POWER CB
EACH HMA PROVIDES CONNECTIONS FOR THREE HIU'S
ON 0V-100 SIDETONE ENABLE GENERATED FROM OS ATU
C82 HOMECLAMPER ON 0V-100 IS H/O/S
ON 0V-100 THE OS SU AND THE A/T ROTATION HANDCONTROLLER WORK IN CONJUNCTION WITH THE OS ATU VERSUS THE MS ATU
PS ATU IS BACKUP FOR CCU NO. 1 IN THE A/BLOCK
THE FLAVON AND SIREN SIGNALS ARE CONNECTED TO A SEPARATE SPEAKER, THE SPEAKER POWER SWITCH DOES NOT HAVE TO BE ON IN ORDER FOR THE FLAVON AND SIREN TO BE HEARD
SYSTEM CONFIGURATION CONTROL BITS ARE PROVIDED BY THE MS ATU (PRIMARY) AND PILOT ATU (SECONDARY) AND ARE BITS 16-23, 84-87, 96-100, 112-119
STATION AUDIO CONFIGURATION CONTROL BITS ARE BITS 24-43
ORBITER HEADSETS ARE CORN CAP, MINI-HEADSET, WIRELESS HEADSET, OR LIGHTWEIGHT HEADSET
PTT 1 = ICOM PTT OR HOT MIKE
PTT 2 = PTT UNIT POSITION OF THE PTT SWITCH SELECTED
NOTES: 1. VOR = VOR MODE SELECTED AND VOR THRESHOLD
VR = VOR XMIT POSITION OF THE MODE SWITCH SELECTED



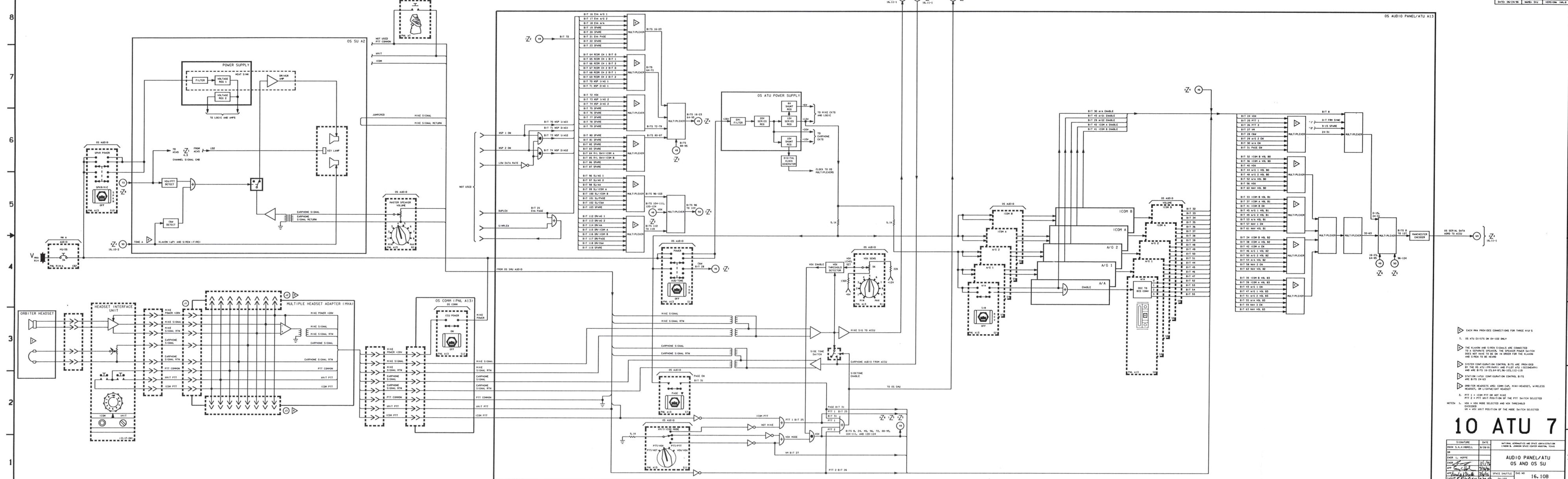


DATE: 02/26/76	NAME: VSH	VERSION: 0PT 1
DATE: 04/08/76	NAME: SVJ	VERSION: 0M 1.1
DATE: 05/12/76	NAME: PSD	VERSION: 0M 1.4

- △ EACH MA PROVIDES CONNECTIONS FOR THREE HSP'S
- ▽ STATION CONFIGURATION CONTROL BITS ARE PROVIDED BY THE HG ATU (PRIMARY) AND PILOT ATU (SECONDARY) AND ARE BITS 16-23, 44-47, 100-111, 115-119.
- ▽ STATION ATU/STATION CONFIGURATION CONTROL BITS ARE BITS 24-43
- ▽ ORBITER HEADSETS AND COMPN CAP, HMI-HEADSET, WIRELESS HEADSET OR LISTENING HEADSET
- 2. PTT 1 = ICOM PTT OR HOT MIKE
PTT 2 = PTT HMI POSITION OF THE PTT SWITCH SELECTED
- NOTES: 1. VOL = VOL MODE SELECTED AND VOL THRESHOLD EXCEEDED
VR = VR UNIT POSITION OF THE MODE SWITCH SELECTED

10 ATU 4

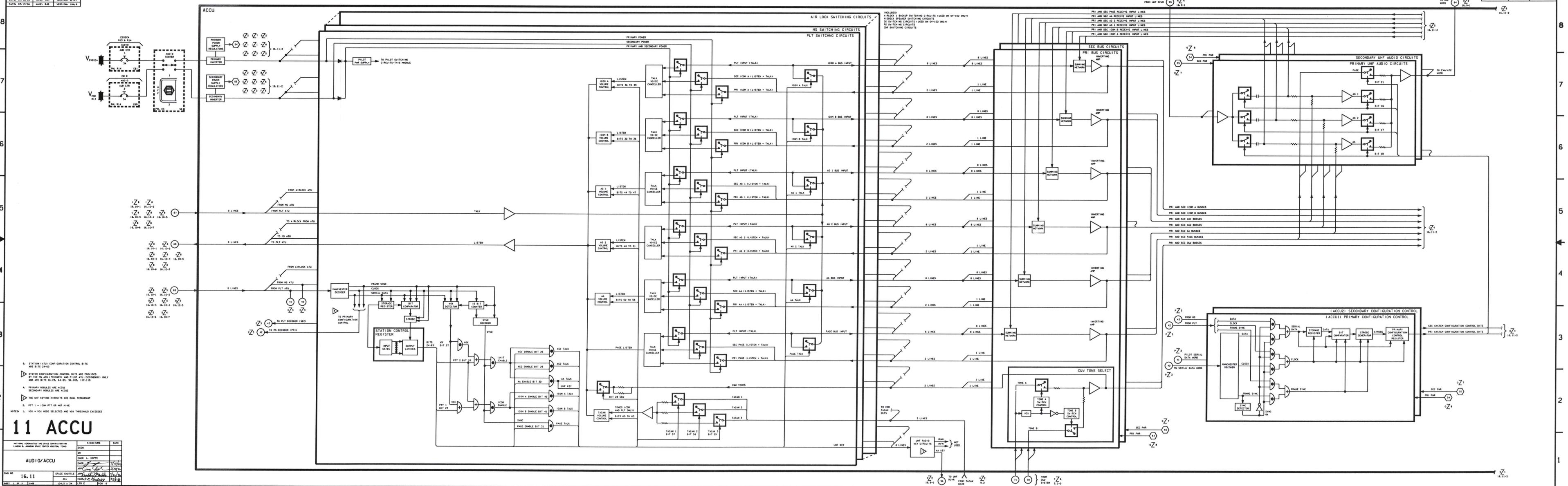
SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
CSOM S. N. ORSH	5/2/82	LINDSEY R. JOHNSON SPACE CENTER HOUSTON, TEXAS
DESIGNER: L. HOPPE		
CHKD BY: J. H. HARRIS	5/17/82	
APP. BY: J. H. HARRIS	5/17/82	
CHKD BY: J. H. HARRIS	5/17/82	
DATE: 02/26/76	NAME: VSH	VERSION: 0PT 1
DATE: 04/08/76	NAME: SVJ	VERSION: 0M 1.1
DATE: 05/12/76	NAME: PSD	VERSION: 0M 1.4



10 ATU 7

SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ENGR S. A. IRELL	8/26/81	14000 B. JOHNSON SPACE CENTER HOUSTON, TEXAS
ENGR L. HOPPE	7/1/90	
APP. C. L. H. H.	7/1/90	
APP. S. R. KIMMEL	7/27/90	
ENGR S. R. KIMMEL	7/27/90	

- △ EACH HIA PROVIDES CONNECTIONS FOR THREE HIU'S
- 7. OS ATU EXISTS ON OV-102 ONLY
- △ THE KLAXON AND SIREN SIGNALS ARE CONNECTED TO A SEPARATE SPEAKER. THE SPEAKER POWER SWITCH DOES NOT HAVE TO BE ON IN ORDER FOR THE KLAXON AND SIREN TO BE HEARD
- △ SYSTEM CONFIGURATION CONTROL BITS ARE PROVIDED BY THE OS ATU (PRIMARY) AND PILOT ATU (SECONDARY) AND ARE BITS 16-23, 48-55, 80-102, 112-119
- △ STATION (ATU) CONFIGURATION CONTROL BITS ARE BITS 24-31
- △ ORBITER HEADSETS ARE: COMB CAP, MINI-HEADSET, WIRELESS HEADSET, OR LIGHTHOUSE HEADSET
- 2. PTT 1 = ICOM PTT OR HOT MIKE
PTT 2 = PTT WHIT POSITION OF THE PTT SWITCH SELECTED
- NOTES: 1. VOL = VOL MODE SELECTED AND VOL THRESHOLD EXCEEDED
WH = VOL WHIT POSITION OF THE MODE SWITCH SELECTED



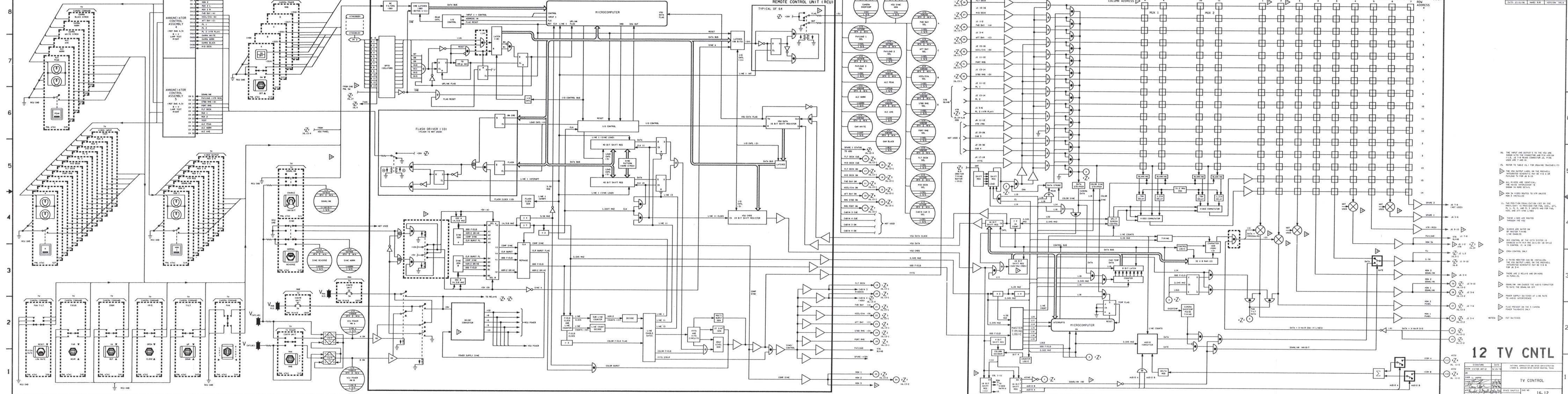
6. STATION (ATU) CONFIGURATION CONTROL BITS ARE BITS 24-43
7. SYSTEM CONFIGURATION CONTROL BITS ARE PROVIDED BY THE MS ATU (PRIMARY) AND PILOT ATU (SECONDARY) ONLY AND ARE BITS 18-23, 64-67, 96-103, 112-119
8. PRIMARY MODULES ARE ACCU SECONDARY MODULES ARE ATU
9. THE UHF KEYING CIRCUITS ARE DUAL REDUNDANT
10. PTT 1 = ICOM PTT OR HOT WIRE
- NOTES: 1. VOV = VOV MODE SELECTED AND VOV THRESHOLD EXCEEDED

11 ACCU

DATE: 07/10/96	NAME: VSH	VERSION: BPT.7
DATE: 07/10/96	NAME: VSH	VERSION: BPT.7
DATE: 07/17/96	NAME: BJB	VERSION: 16A.1

DESIGN NO	SPACE SHUTTLE	ALL
16.11		

DATE	SIGNATURE	DATE
	ENGR L. HOPPE	
	ENGR J. HOPPE	7/17/96
	ENGR J. HOPPE	7/17/96
	ENGR J. HOPPE	7/17/96



12 TV CNTL

SIGNATURE: _____ DATE: _____
 DESIGN: VICTOR 0812 5/15/78
 DRAWN: _____
 CHECKED: _____
 APPROVED: _____

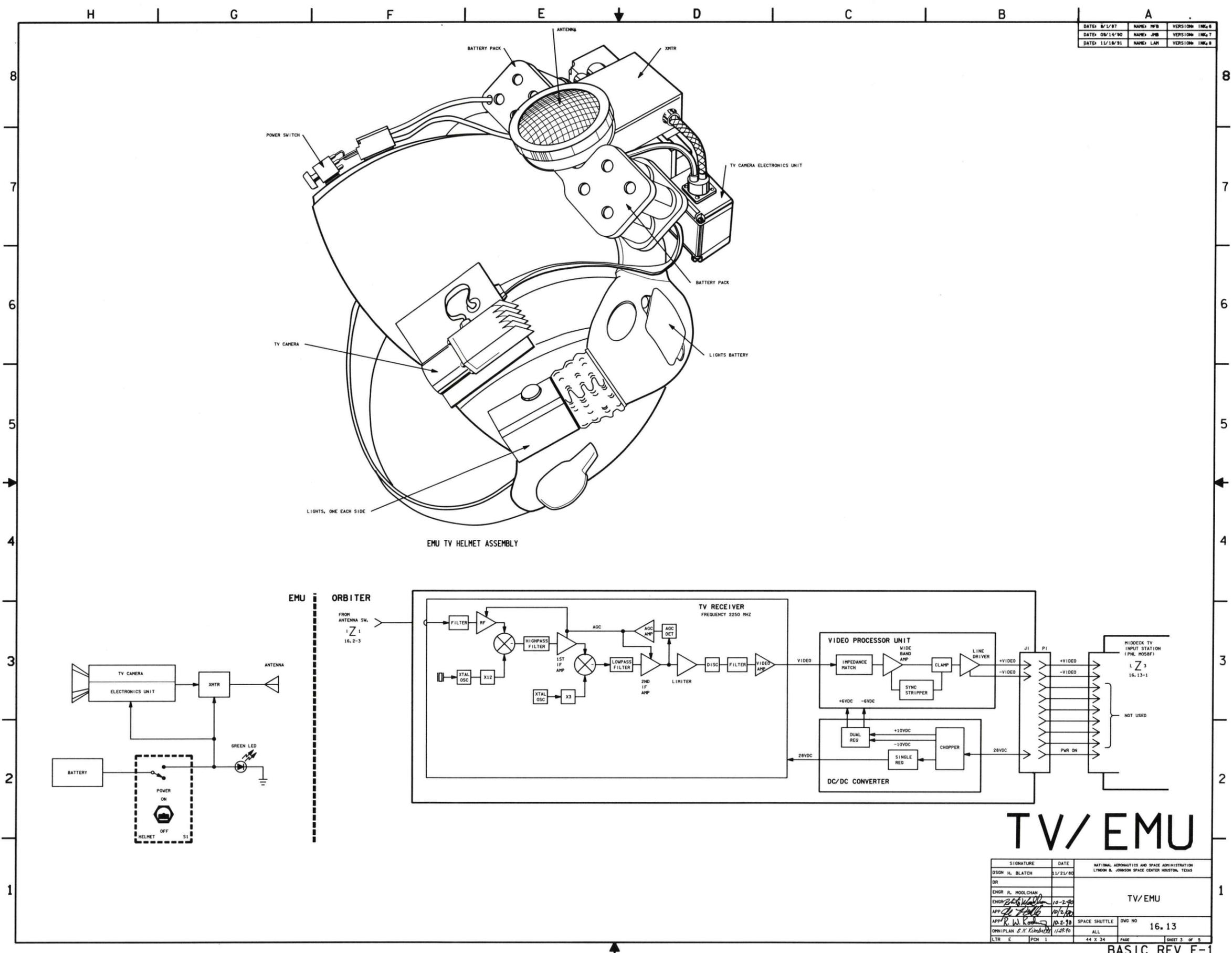
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
 14000 N. GORDON STREET HOUSTON, TEXAS

TV CONTROL

SPACE SHUTTLE
 16.12
 126.5 X 34 INCH (SERIES 1 OF 1)

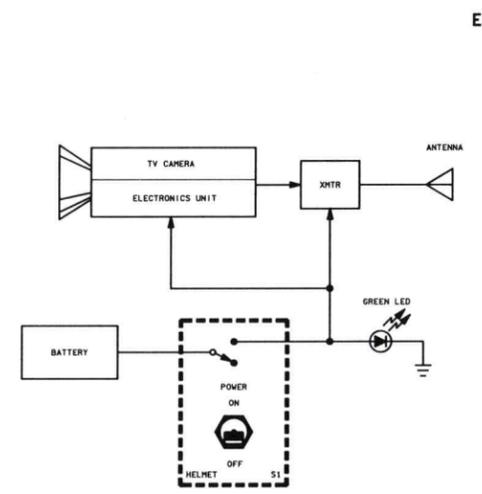
BASIC REV E-6

- 10. THE INPUT AND OUTPUT S TO THE VSU ARE SHOWN WITH THE CONNECTOR AND PIN ASSIGN (I.E., J2 1-8 REAR CONNECTOR, J3, PIN 1-8 FRONT CONNECTOR, J4, PIN 1-8 FRONT CONNECTOR, J5, PIN 1-8 FRONT CONNECTOR).
- 11. THE POSITION EQUALIZATION (SET BY USE PFLIGHT) IS PROVIDED FOR PFL, KEEL, APT, PL 1, PL 2, AND PL 3. SWITCHES AND FOR PFL, KEEL, AND APT SWITCHES.
- 12. THESE LINES ARE ROUTED THROUGH THE VSU.
- 13. CLOCKS ARE GATED ON BY MASTER TIMING LINE ENABLES.
- 14. HCC CONTROL OF THE CCTV SYSTEM IS ENABLED WITH THE HCC CONTROL IN THE HCC CONTROL UNIT.
- 15. A THIRD MONITOR CAN BE INSTALLED. THE VSU OUTPUT LABEL ON THE REARWELL INTERFACED SCHEMATIC MAY BE VIO 4 OR VIO 5.
- 16. THERE ARE 2 RELAYS AND DRIVERS IN PARALLEL.
- 17. POWER SUPPLIES IS SWITCHED AT LINE RATE TO AVOID INTERFERENCE.
- 18. FLAG PRESENT ON THE CAMERA POWER TABLETS ONLY.

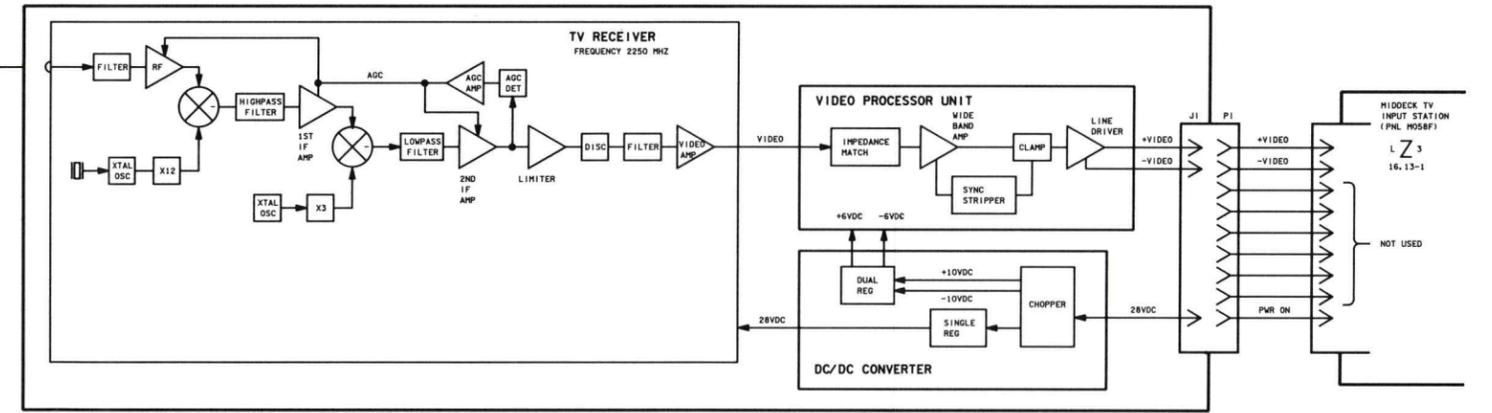


DATE: 8/1/87	NAME: MFB	VERSION: INCL 6
DATE: 05/14/90	NAME: JMB	VERSION: INCL 7
DATE: 11/18/91	NAME: LAH	VERSION: INCL 8

EMU TV HELMET ASSEMBLY

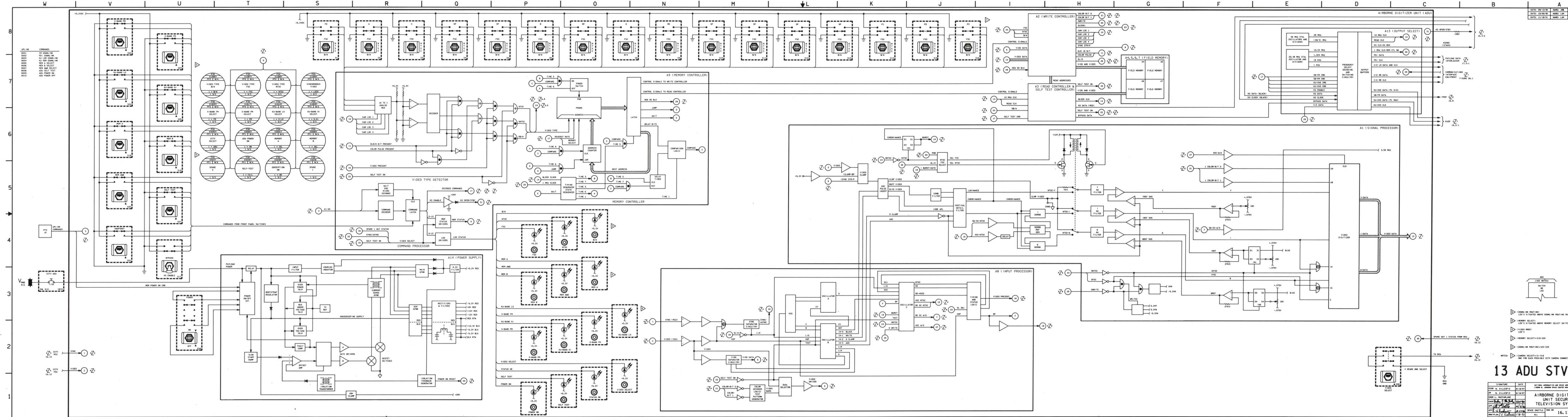


EMU ORBITER



TV/EMU

SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
DR	01/21/80	LYNDON B. JOHNSON SPACE CENTER HOUSTON, TEXAS
ENGR. R. MOOLCHAN		
ENGR. <i>[Signature]</i>	10-2-78	
APP. <i>[Signature]</i>	10/2/78	
APP. <i>[Signature]</i>	10-2-78	
OPN/PLAN. S. N. Kumbhkar	11/22/90	
LTR E	PCH 1	44 X 34



DATE	BY	REVISION
10/15/90	MANO, LAM	1001
10/05/90	MANO, LAM	1002
11/18/91	MANO, LAM	1003

DATE	BY	REVISION
08/13/90	MANO, LAM	1001
10/05/90	MANO, LAM	1002
11/18/91	MANO, LAM	1003

DATE	BY	REVISION
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11/18/91	MANO, LAM	1003

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11/18/91	MANO, LAM	1003

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11/18/91	MANO, LAM	1003

DATE	BY	REVISION
08/13/90	MANO, LAM	1001
10/05/90	MANO, LAM	1002
11/18/91	MANO, LAM	1003

DATE	BY	REVISION
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10/05/90	MANO, LAM	1002
11/18/91	MANO, LAM	1003

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11/18/91	MANO, LAM	1003

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DATE	BY	REVISION
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11/18/91	MANO, LAM	1003

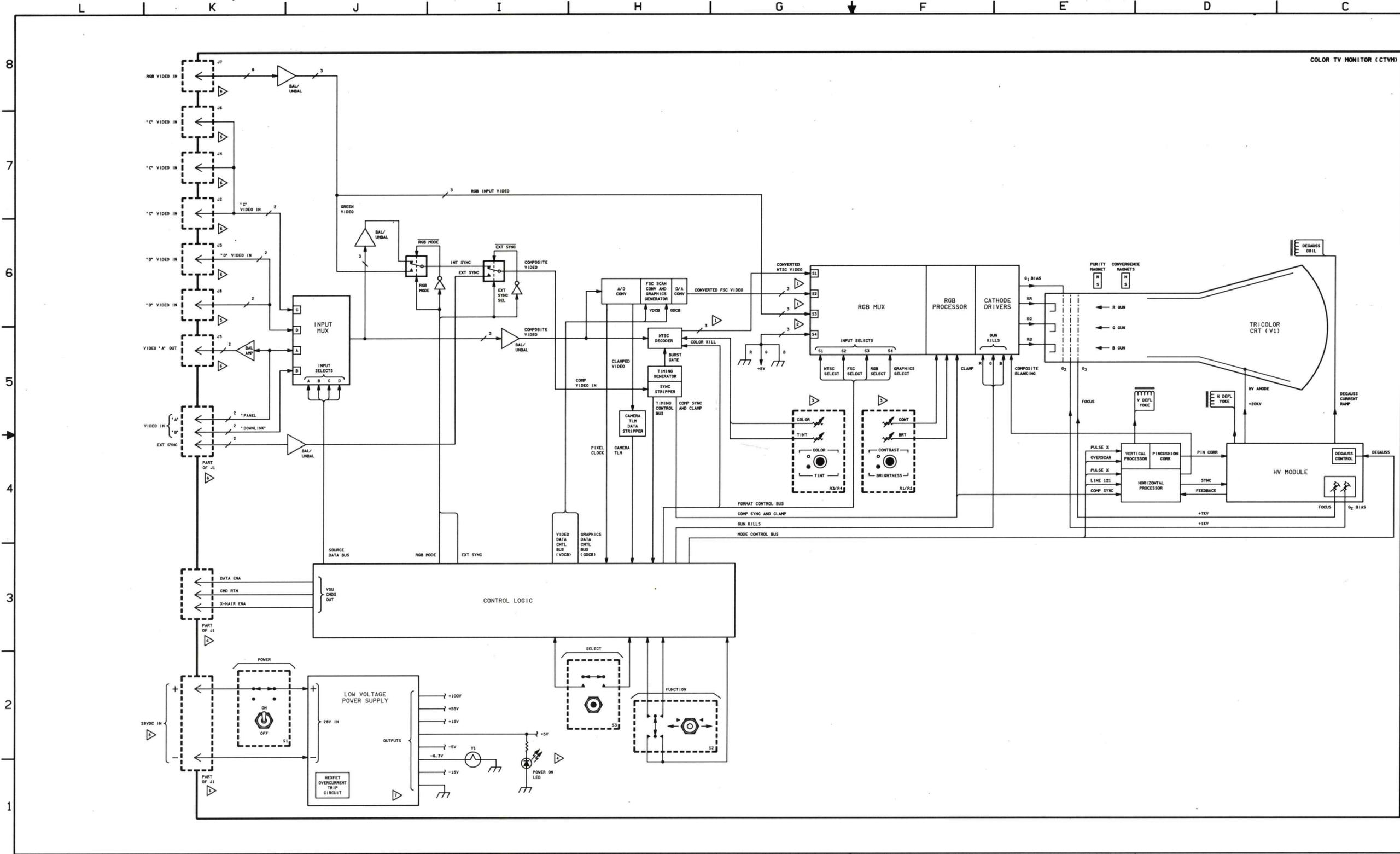
DATE	BY	REVISION
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10/05/90	MANO, LAM	1002
11/18/91	MANO, LAM	1003

DATE	BY	REVISION
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DATE	BY	REVISION
08/13/90	MANO, LAM	1001
10/05/90	MANO, LAM	1002
11/18/91	MANO, LAM	1003

DATE: 11/07/91	NAME: HAD	VERSION: 0PT.4
DATE: 11/14/91	NAME: HSD	VERSION: 1M2.1
DATE: 11/21/91	NAME: JDF	VERSION: 1M2.2



- ▶ MONITOR POWER DEPENDS ON WHICH TV POSITION THE MONITOR IS LOCATED IN. PNL A3, PNL 1 IS 115V PNL A15, PNL A3, PNL 2 IS 115V PNL A15. SSSN 16.13-2 078 TO 076
 - ▶ HEFET OVC TRIP CIRCUIT MONITORS HEFET SWITCH SOURCE CURRENTS AND SHUTS DOWN ALL POWER OUTPUTS FOR OVERCURRENT
 - ▶ REAR PANEL CONNECTOR
 - ▶ FRONT PANEL CONNECTOR
 - ▶ NO TITLE ON PANEL
 - ▶ CONCENTRIC CONTROLS PLAN VIEW
-
- ▶ WHEN THE CONTROL LOGIC CALLS FOR A GRAPHICS PIXEL, S4 IS SELECTED TURNING RED AND BLUE OFF, AND GREEN ON. THIS FUNCTION IS NOT USED TO GENERATE THE ONSCREEN MENU, BUT IS USED TO GENERATE "GREEN" CAMERA DATA AND X-HAIR
- NOTES
 ▶ 3 LINES, ONE EACH RED, GREEN, AND BLUE VIDEO

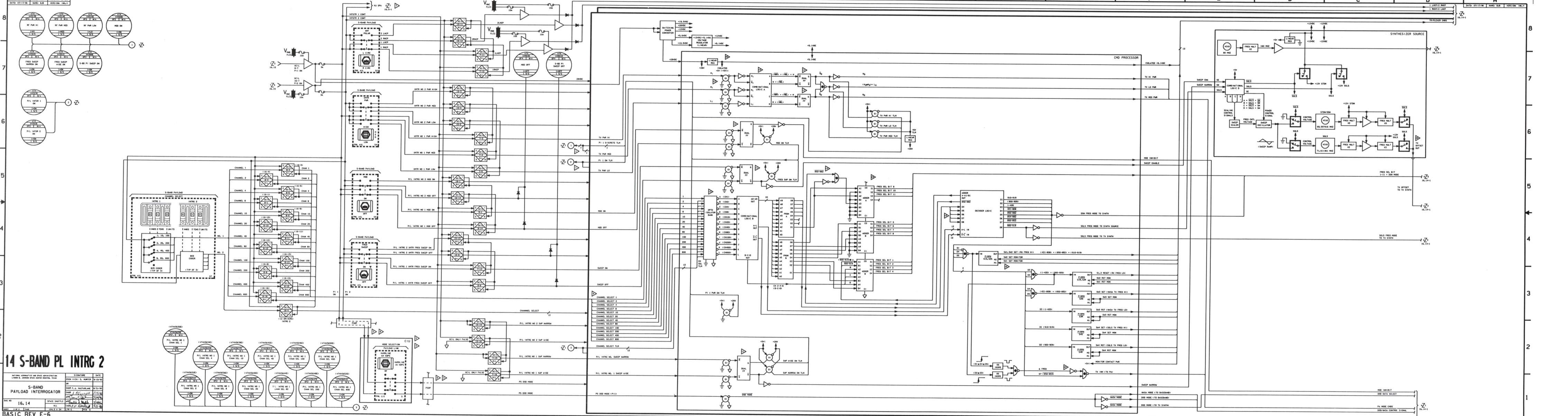
13 COLOR TV MON 5

SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LYNN B. JOHNSON SPACE CENTER HOUSTON, TEXAS
DRN VICKI S. HEATER	7/21/91	
DRN F. J. ROSEBLANK		
DRN [Signature]	20/04/91	
APP [Signature]	8-20-91	
DRN/PLAN S. E. [Signature]	11-21-91	
CTR 6	PCB 1	

COLOR TV MONITOR (CTVM)

SPACE SHUTTLE DWG NO 16.13

ALL 66 X 34 SHEET 5 OF 4



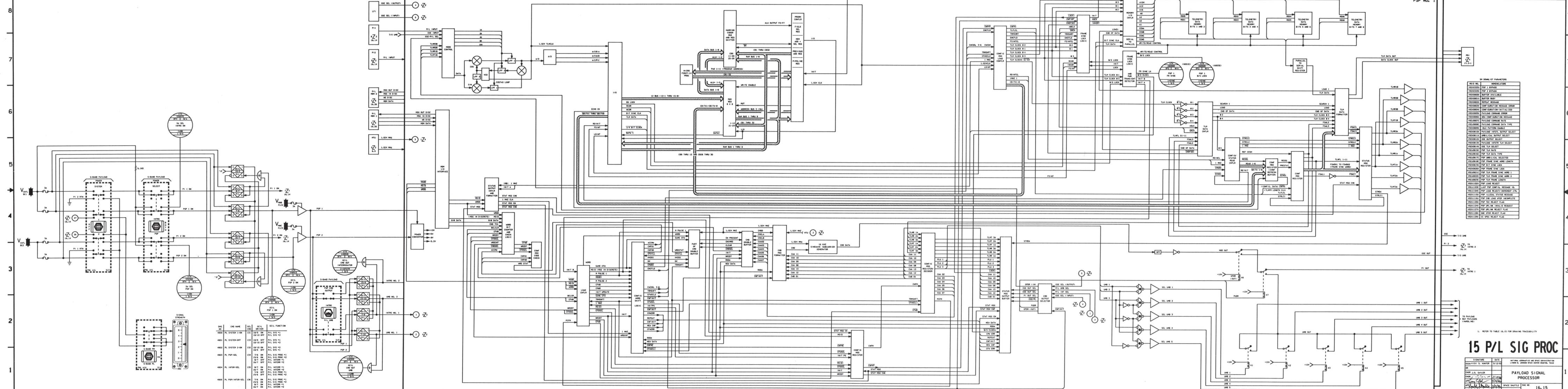
14 S-BAND PL INTRC 2

S-BAND PAYLOAD INTERGATOR

DATE: 03/29/90
 VERSION: 16.1
 DATE: 03/29/90
 VERSION: 16.1
 DATE: 03/29/90
 VERSION: 16.1

DESIGNED BY: J. MACFARLANE
 DATE: 03/29/90
 CHECKED BY: J. MACFARLANE
 DATE: 03/29/90

NO. 16.14
 SHEET 2 OF 3



15 P/L SIG PROC

DATE: 9/10/80 NAME: HMG VERSION: BPT112
 DATE: 8/10/80 NAME: VSH VERSION: BPT113
 DATE: 10/17/79 NAME: GJB VERSION: 104-10

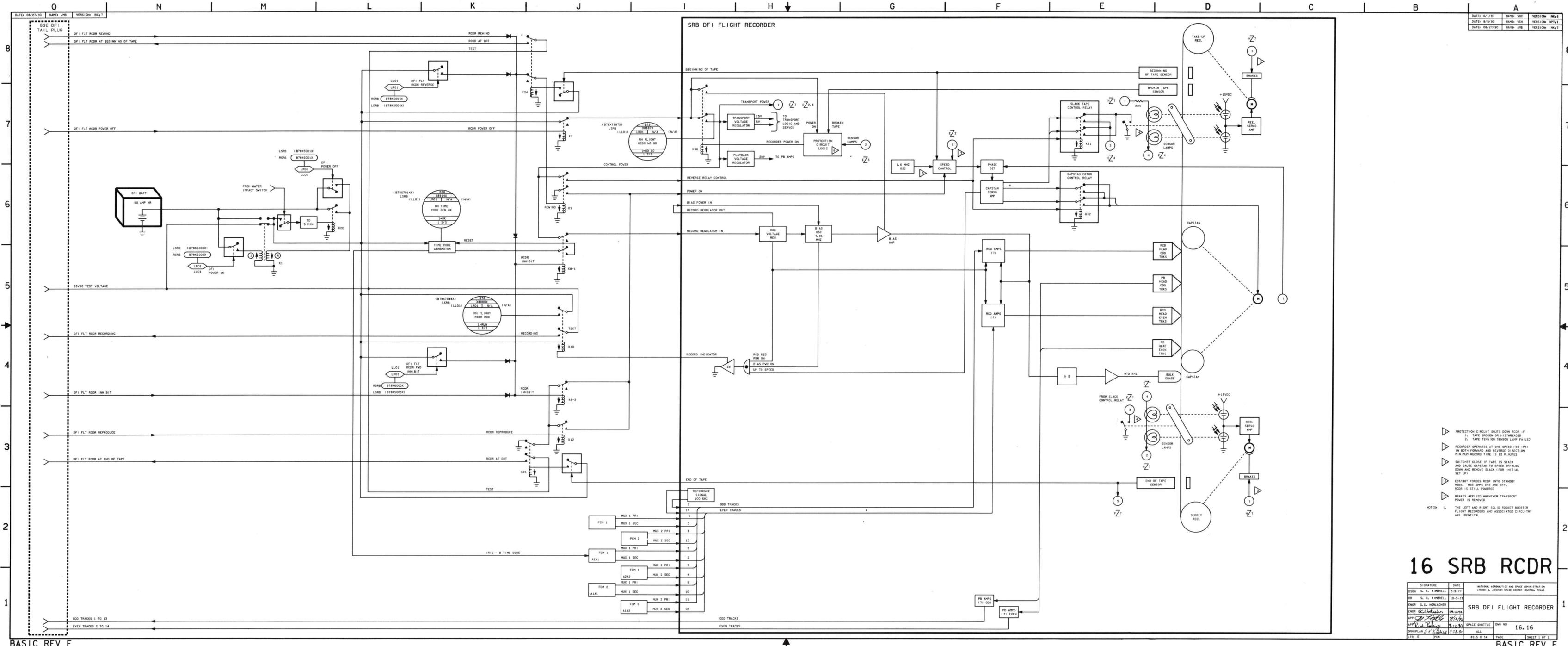
SIGNATURE: _____ DATE: _____ NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
 LINDA L. JOHNSON SPACE OPERATIONS TALENT

OR: _____

NAME: J.S. SAYER DATE: 11/17/80
 NAME: J. J. BENTLEY DATE: 11/17/80
 NAME: C. J. BENTLEY DATE: 11/17/80
 NAME: R. J. BENTLEY DATE: 11/17/80

SPACE SHUTTLE DOG NO: 16, 15
 DATE: 12-1-81 PAGE: 16 OF 16

1. REFER TO TABLE 16.15 FOR DRAWING TRACEABILITY.



BASIC REV E

16 SRB RCDR

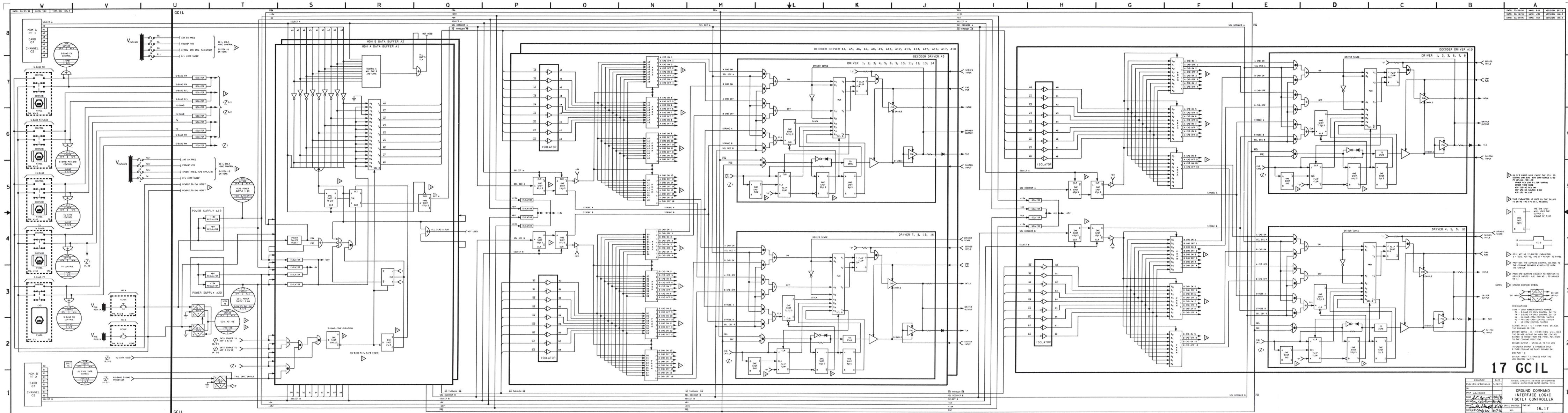
SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
DR S. K. KIMBLELL	2-9-77	LYNCH & JOHNSON SPACE CENTER HOUSTON, TEXAS
ENGR G.L. HORNACHER	10-5-76	
APP <i>[Signature]</i>	09-13-76	
APP <i>[Signature]</i>	07-14-76	
APP PLAN <i>[Signature]</i>	11-22-76	
UTR E	10-28-76	

DATE	NAME	VERSION
6/17/87	VOC	16.6
8/3/90	VSH	BPT&1
08/27/92	JFB	16K7

DESCRIPTION	DATE	ENGR NO
SRB DF1 FLIGHT RECORDER		
SPACE SHUTTLE		16.16
ALL		
82.5 X 34		SHEET 1 OF 1

BASIC REV E

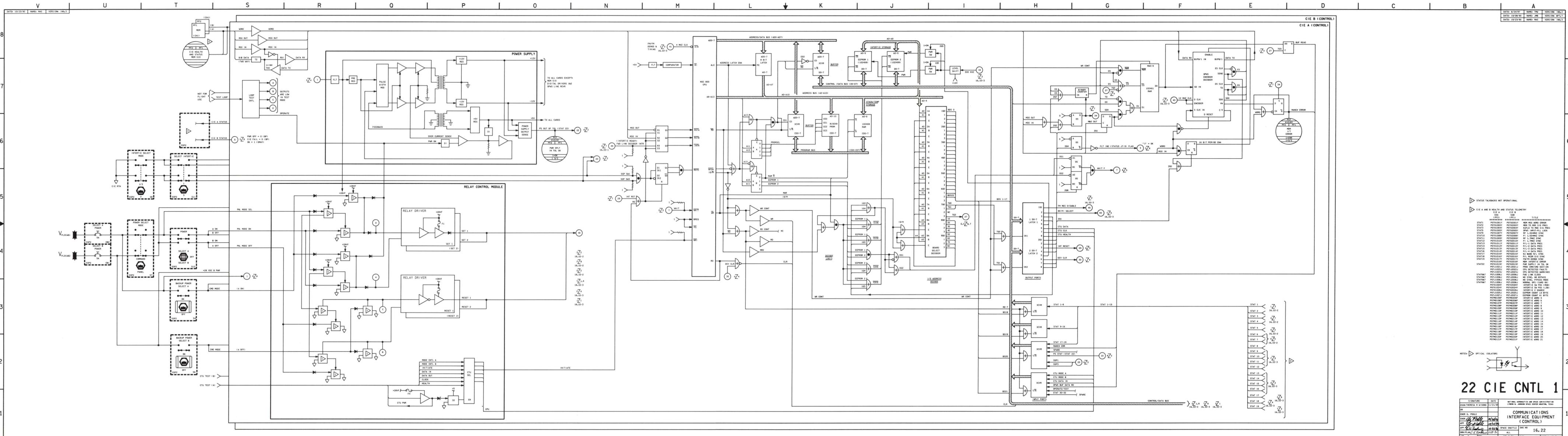
- ▷ PROTECTION CIRCUIT SHUTS DOWN RCDR IF
 1. TAPE BROKEN OR MISHHEADED
 2. TAPE TENSION SENSOR LAMP FAILED
 - ▷ RECORDER OPERATES AT ONE SPEED (60 FPS) IN BOTH FORWARD AND REVERSE DIRECTION MINIMUM RECORD TIME IS 12 MINUTES
 - ▷ SWITCHES CLOSE IF TAPE IS SLACK AND CAUSE CAPSTAN TO SPEED UP/SLOW DOWN AND REMOVE SLACK (FOR INITIAL SET UP)
 - ▷ EDT/ROT FORCES RCDR INTO STANDBY MODE - RCD AMPS ETC ARE OFF - RCDR IS STILL POWERED
 - ▷ BRAKES APPLIED WHENEVER TRANSPORT POWER IS REMOVED
- NOTES: 1. THE LEFT AND RIGHT SOLID ROCKET BOOSTER FLIGHT RECORDERS AND ASSOCIATED CIRCUITRY ARE IDENTICAL.



DATE: 02/21/86	MANU: VSH	VERSION: IMV.4
DATE: 02/21/86	MANU: JMB	VERSION: IMV.1
DATE: 02/21/86	MANU: JMB	VERSION: IMV.2
DATE: 02/21/86	MANU: VSH	VERSION: IMV.4

17 GCIL

SIGNATURE	DATE	INITIALS
DESIGNER: J. L. COMBER	5/24/79	
CHKD: J. L. COMBER	5/24/79	
APP'D: J. L. COMBER	5/24/79	
CHKD: J. L. COMBER	5/24/79	
APP'D: J. L. COMBER	5/24/79	
DATE: 02/21/86	MANU: VSH	VERSION: IMV.4



STATUS TALKBACKS NOT OPERATIONAL

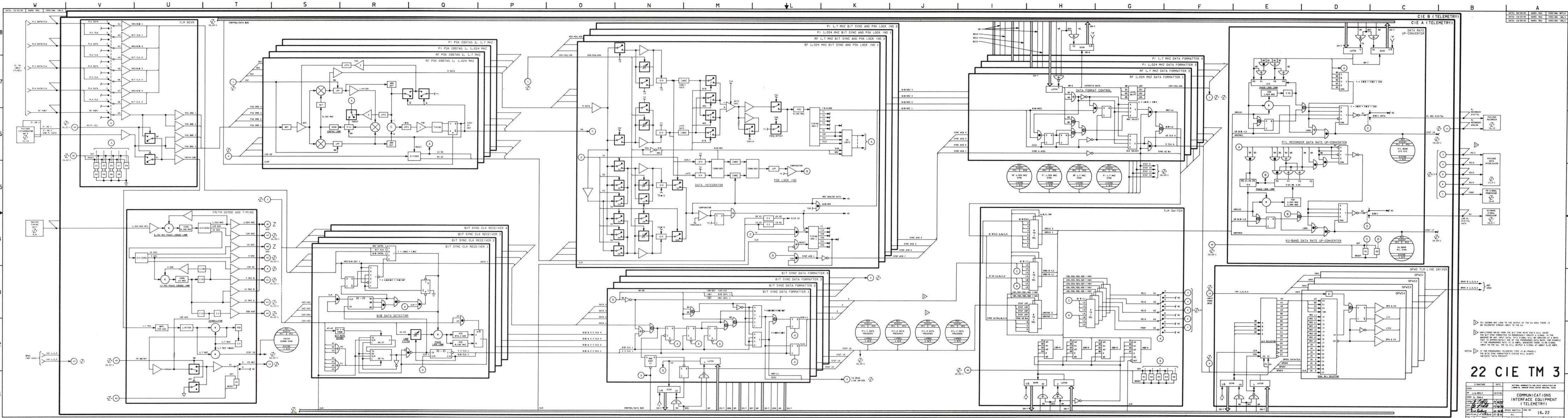
STATUS A AND B HEALTH AND STATUS TELEMETRY

STAT#	POT#	DESCRIPTION
STAT1	POT20001	NO SYNC NO OFFRES
STAT2	POT20002	NO SYNC PIPASS MODE
STAT3	POT20003	NO SYNC NO OFFRES
STAT4	POT20004	NO SYNC PIPASS MODE
STAT5	POT20005	NO SYNC NO OFFRES
STAT6	POT20006	NO SYNC PIPASS MODE
STAT7	POT20007	NO SYNC NO OFFRES
STAT8	POT20008	NO SYNC PIPASS MODE
STAT9	POT20009	NO SYNC NO OFFRES
STAT10	POT20010	NO SYNC PIPASS MODE
STAT11	POT20011	NO SYNC NO OFFRES
STAT12	POT20012	NO SYNC PIPASS MODE
STAT13	POT20013	NO SYNC NO OFFRES
STAT14	POT20014	NO SYNC PIPASS MODE
STAT15	POT20015	NO SYNC NO OFFRES
STAT16	POT20016	NO SYNC PIPASS MODE
STAT17	POT20017	NO SYNC NO OFFRES
STAT18	POT20018	NO SYNC PIPASS MODE
STAT19	POT20019	NO SYNC NO OFFRES
STAT20	POT20020	NO SYNC PIPASS MODE

NOTED: OFFICAL ISOLATORS

22 CIE CNTL 1

SYMBOL	DATE	REVISION
1	11/27/76	1
2	11/27/76	2
3	11/27/76	3
4	11/27/76	4
5	11/27/76	5
6	11/27/76	6
7	11/27/76	7
8	11/27/76	8
9	11/27/76	9
10	11/27/76	10
11	11/27/76	11
12	11/27/76	12
13	11/27/76	13
14	11/27/76	14
15	11/27/76	15
16	11/27/76	16
17	11/27/76	17
18	11/27/76	18
19	11/27/76	19
20	11/27/76	20
21	11/27/76	21
22	11/27/76	22



22 CIE TM 3

COMMUNICATIONS
INTERFACE EQUIPMENT
(TELEMETRY)

16.22

BASIC REV E

NOTE: P/L-1 DATA PRESENCE INDICATES THE BIT SYNC FORMATTER'S STATUS WILL ALWAYS INDICATE DATA PRESENT.

NOTE: IF THE PROGRAMMED TELEMETRY TYPE IS BI-PHASE, THE BIT SYNC FORMATTER'S STATUS WILL ALWAYS INDICATE DATA PRESENT.

NOTE: AMPLIFIED NOISE FROM THE BIT SYNC RCVR VCO'S WILL CAUSE THE BIT SYNC FORMATTER TO ERRONEOUSLY DETECT A SIGNAL IN THE ABSENCE OF ANY INPUT DATA. THIS SIGNAL WILL BE CREATED AT A RATE THAT IS APPROXIMATELY 40% OF THE PROGRAMMED DATA RATE. FOR EXAMPLE, IF THE PROGRAMMED RATE IS 10 MBPS, WHEN THERE IS NO SIGNAL INPUT TO THE EA, THE EA WILL OUTPUT A SIGNAL AT ABOUT 6.0 MBPS.

NOTE: P/L-1 DATA PRESENCE INDICATES THE BIT SYNC FORMATTER'S STATUS WILL ALWAYS INDICATE DATA PRESENT.

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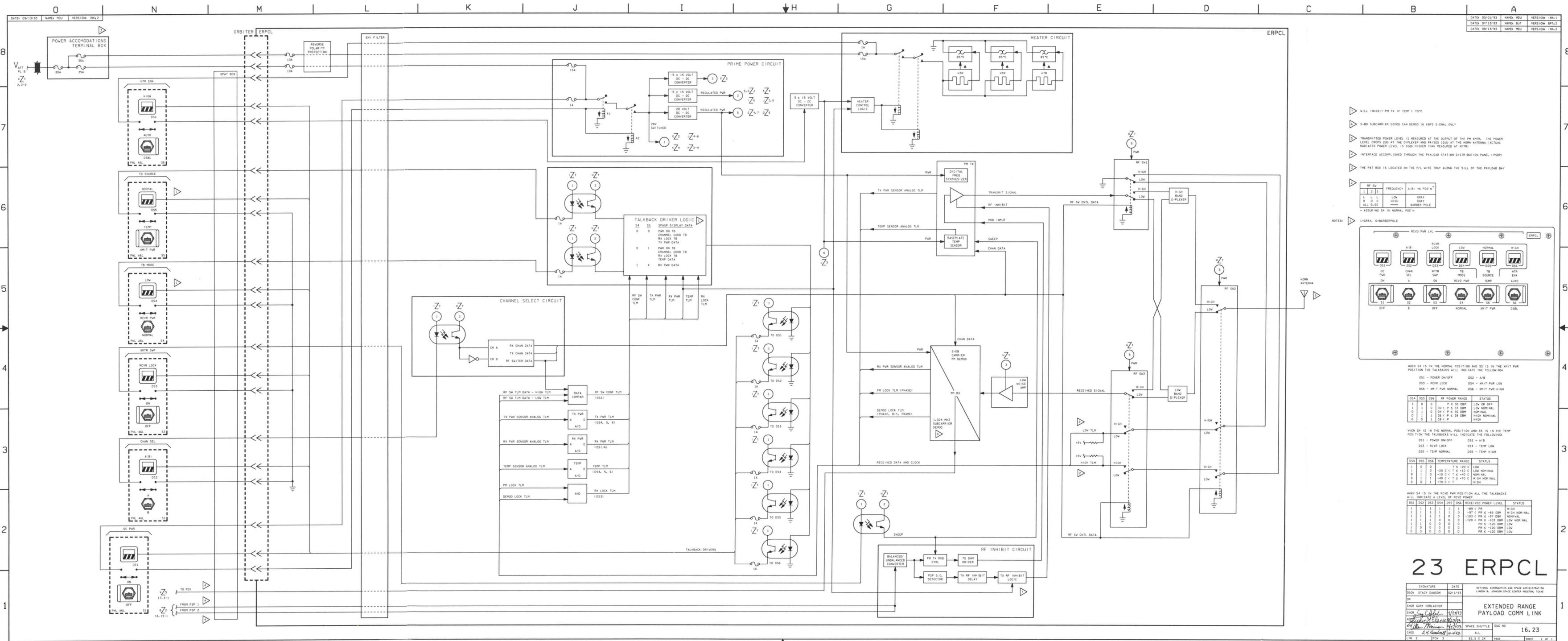
NOTE: P/L-1 DATA PRESENCE INDICATES THE BIT SYNC FORMATTER'S STATUS WILL ALWAYS INDICATE DATA PRESENT.

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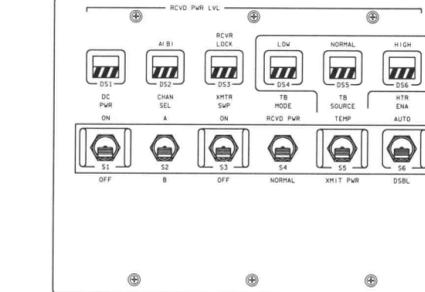


- ▽ WILL INHIBIT PH TX IF TEMP > 70°C
- ▽ 5-DB SUBCARRIER DEMOD CAN DEMOD 16 Kbps SIGNAL ONLY
- ▽ TRANSMITTED POWER LEVEL IS MEASURED AT THE OUTPUT OF THE PH HTS. THE POWER LEVEL DROPS 20dB AT THE DIPLEXER AND RAISES 120dB AT THE HORN ANTENNA (ACTUAL RADIATED POWER LEVEL IS 100dB HIGHER THAN MEASURED AT HTS)
- ▽ INTERFACE ACCOMPLISHED THROUGH THE PAYLOAD STATION DISTRIBUTION PANEL (PSPD)
- ▽ THE PAT BOX IS LOCATED ON THE P/L WIRE TRAY ALONG THE SILL OF THE PAYLOAD BAY

RF SW	FREQUENCY	A/B: PH POS 'N'
L	L	LOW
H	H	HIGH
ALL ELSE		GRAY BARBER POLE

* ASSUMING S4 IN NORMAL POS 'N'

NOTES:
1-GRAY, OVERBARBERPOLE



WHEN S4 IS IN THE NORMAL POSITION AND DS IS IN THE WHIT PWR POSITION THE TALKBACKS WILL INDICATE THE FOLLOWING:

DS1	DS2	DS3	DS4	DS5	DS6	RF POWER RANGE	STATUS
1	0	0	0	0	0	P < S 30 DBM	LOW OR OFF
1	1	0	0	0	0	P < S 33 DBM	LOW NOMINAL
0	1	0	0	0	0	S < P S 36 DBM	NOMINAL
0	0	1	0	0	0	S < P S 39 DBM	HIGH NOMINAL
0	0	0	1	0	0	P < S 28 C	HIGH

WHEN S4 IS IN THE NORMAL POSITION AND DS IS IN THE TEMP POSITION THE TALKBACKS WILL INDICATE THE FOLLOWING:

DS1	DS2	DS3	DS4	DS5	DS6	TEMPERATURE RANGE	STATUS
1	0	0	0	0	0	T < S -20 C	LOW
1	1	0	0	0	0	-20 C < T < S +10 C	LOW NOMINAL
0	1	0	0	0	0	+10 C < T < S +40 C	NOMINAL
0	0	1	0	0	0	+40 C < T < S +70 C	HIGH NOMINAL
0	0	0	1	0	0	+70 C < T	HIGH

WHEN S4 IS IN THE RCVR PWR POSITION ALL THE TALKBACKS WILL INDICATE A LEVEL OF RCVR POWER

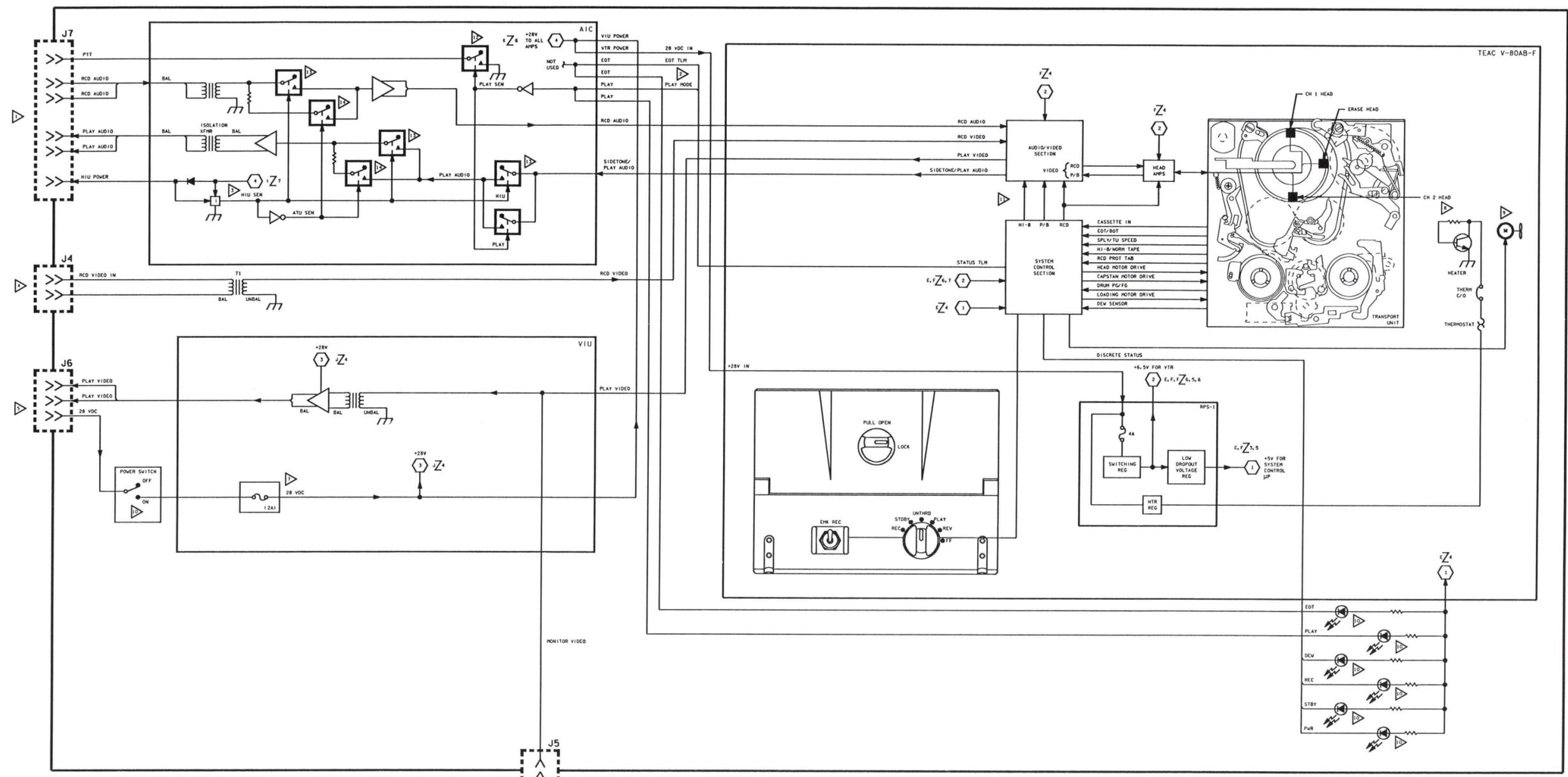
DS1	DS2	DS3	DS4	DS5	DS6	RECEIVED POWER LEVEL	STATUS
1	1	1	1	1	1	-89 < PR	HIGH
1	1	1	1	1	0	-97 < PR < S -89 DBM	HIGH NOMINAL
1	1	1	1	0	0	-103 < PR < S -97 DBM	NOMINAL
1	1	1	0	0	0	-109 < PR < S -103 DBM	LOW NOMINAL
1	1	0	0	0	0	PR < S -120 DBM	LOW
0	0	0	0	0	0	PR < S -120 DBM	LOW

23 ERPCL

SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
DESIGN: STACY DAWSON	02/1/93	LINDEN R. JOHNSON SPACE CENTER HOUSTON, TEXAS
ENGR: GARY HORLACHER		
ENGR: <i>[Signature]</i>	9/27/93	
APPROVED: <i>[Signature]</i>	10/1/93	
CAOS: <i>[Signature]</i>	10/1/93	
CTR: E	PCN: 3	82-5 X 34

EXTENDED RANGE
PAYLOAD COMM LINK
SPACE SHUTTLE
DWC NO
16, 23
PAGE 1 OF 1

DATE: 02/13/96	NAME: VSH	VERSION: BPT, 1
DATE: 02/27/96	NAME: VSH	VERSION: BPT, 2
DATE: 03/15/96	NAME: VSH	VERSION: 1RM, 2



- ▽ W/O HIU POWERED, RELAYS CLOSE (ATU USED)
 - ▽ WHEN HIU POWERED, RELAYS CLOSE
 - ▽ PROVIDES KEY TO ATU FOR PLAYBACK AUDIO
 - ▽ WHEN NOT IN PLAY MODE, AUDIO AND VIDEO ARE TURNED AROUND AND OUTPUT TO THE PLAY VIDEO AND SIDETONE/PLAY AUDIO LINES
 - ▽ ON FRONT PANEL
 - ▽ SMALL FAN MOVES AIR AROUND WITHIN VTR TRANSPORT UNIT
 - ▽ FOUR POWER TRANSISTOR ASSEMBLIES MAKE UP THE HEATER
 - ▽ THE 2A FUSE IS ACCESSIBLE BY THE CREW AFTER VTR HOUSING REMOVAL ON OUTSIDE OF VIU IS A SLOT WHERE FUSE IS INSERTED
 - ▽ CONNECTS TO AN LCD 3" MONITOR USING A SPECIAL CABLE. 3" LCD MONITOR USUALLY STOWED WITH VTR, USES 6 SIZE "AA" BATTERIES
 - ▽ CONNECTS TO PANEL 019 OR 058F VIA THE TV POWER CABLE OR VIA THE PIGGY CABLE. ANY STUB OF THE PIGGY PROVIDES POWER, BUT NOT ALL HAVE SYNC + VIDEO CAPABILITY
 - ▽ WHEN THIS DEVICE SENSES CURRENT FLOW OUT OF THE HIU POWER LINE, IT SETS "HIU SEN" HIGH
 - ▽ THESE LINES PULLED LOW IN PLAY MODE
- NOTES
- ▽ REAR PANEL, CONNECTS TO EITHER HIU AND VLANS OR ADS-VTR CABLE AND ATU. BOTH CONFIGS SUPPORT RCD AND PLAY OF AUDIO. SWITCH ON ADS-VTR CABLE SHOULD BE LEFT IN "PLAY"

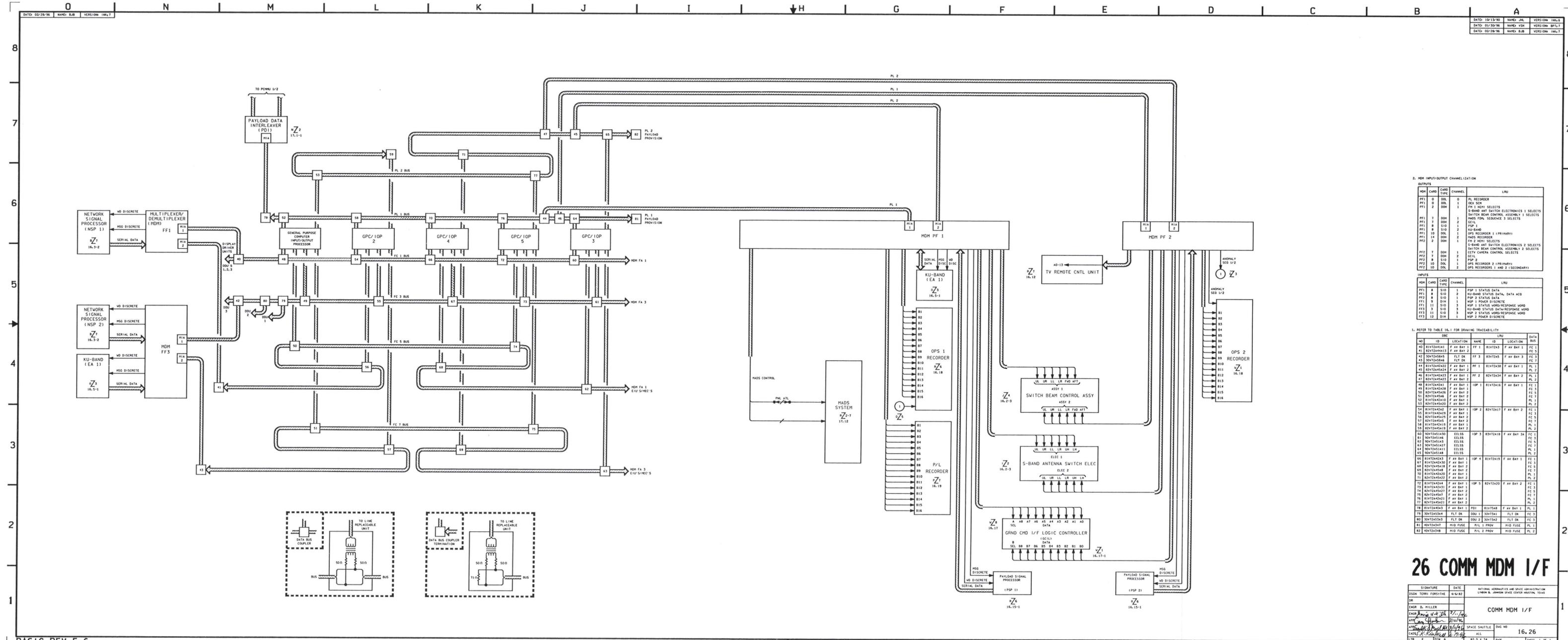
24 8MM VTR

SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LYNCH R. JOHNSON SPACE CENTER HOUSTON, TEXAS
DR		
ENGR L. HOPPE		
ENGR <i>[Signature]</i>	11/1/96	
APP <i>[Signature]</i>	5/19/96	
APP <i>[Signature]</i>	5/19/96	
APP <i>[Signature]</i>	6/17/96	
CTR	PCN	66-334

8MM VIDEO
TAPE RECORDER

SPACE SHUTTLE DWS NO
ALL FLIGHTS 16, 24

BASIC REV E-6



BASIC REV E-6

2. MDM INPUT/OUTPUT CHANNELIZATION

MDM CARD	CARD TYPE	CHANNEL	LRU
PP1 0	DOL	0	PL RECORDER
PP1 0	DOL	1	DEX SCR
PP1 2	DOL	1	PP1 1 MENU SELECTS
PP1 7	DOL	2	5-BAND ANT SWITCH ELECTRONICS 1 SELECTS
PP1 8	SIO	1	SWITCH BEAM CONTROL ASSEMBLY 1 SELECTS
PP1 8	SIO	2	SCN
PP1 14	DOL	2	PP1 2 MENU SELECTS
PP1 10	DOL	1	PP1 3 MENU SELECTS
PP1 14	DOL	2	PP1 4 MENU SELECTS
PP2 7	DOL	1	OPS RECORDER 1 (PRIMARY)
PP2 7	DOL	2	OPS RECORDER 1 (SECONDARY)
PP2 8	SIO	1	OPS RECORDER 2 (PRIMARY)
PP2 8	SIO	2	OPS RECORDER 2 (SECONDARY)
PP2 10	DOL	2	OPS RECORDER 1 AND 2 (SECONDARY)

3. REFER TO TABLE 16.1 FOR DRAWING TRACEABILITY

ID	LOC	NAME	LRU	DATA BUS
40	FF 1	FF 1	FF 1	FC 1
41	FF 2	FF 2	FF 2	FC 1
42	FF 3	FF 3	FF 3	FC 1
43	FF 4	FF 4	FF 4	FC 1
44	FF 5	FF 5	FF 5	FC 1
45	FF 6	FF 6	FF 6	FC 1
46	FF 7	FF 7	FF 7	FC 1
47	FF 8	FF 8	FF 8	FC 1
48	FF 9	FF 9	FF 9	FC 1
49	FF 10	FF 10	FF 10	FC 1
50	FF 11	FF 11	FF 11	FC 1
51	FF 12	FF 12	FF 12	FC 1
52	FF 13	FF 13	FF 13	FC 1
53	FF 14	FF 14	FF 14	FC 1
54	FF 15	FF 15	FF 15	FC 1
55	FF 16	FF 16	FF 16	FC 1
56	FF 17	FF 17	FF 17	FC 1
57	FF 18	FF 18	FF 18	FC 1
58	FF 19	FF 19	FF 19	FC 1
59	FF 20	FF 20	FF 20	FC 1
60	FF 21	FF 21	FF 21	FC 1
61	FF 22	FF 22	FF 22	FC 1
62	FF 23	FF 23	FF 23	FC 1
63	FF 24	FF 24	FF 24	FC 1
64	FF 25	FF 25	FF 25	FC 1
65	FF 26	FF 26	FF 26	FC 1
66	FF 27	FF 27	FF 27	FC 1
67	FF 28	FF 28	FF 28	FC 1
68	FF 29	FF 29	FF 29	FC 1
69	FF 30	FF 30	FF 30	FC 1
70	FF 31	FF 31	FF 31	FC 1
71	FF 32	FF 32	FF 32	FC 1
72	FF 33	FF 33	FF 33	FC 1
73	FF 34	FF 34	FF 34	FC 1
74	FF 35	FF 35	FF 35	FC 1
75	FF 36	FF 36	FF 36	FC 1
76	FF 37	FF 37	FF 37	FC 1
77	FF 38	FF 38	FF 38	FC 1
78	FF 39	FF 39	FF 39	FC 1
79	FF 40	FF 40	FF 40	FC 1
80	FF 41	FF 41	FF 41	FC 1
81	FF 42	FF 42	FF 42	FC 1
82	FF 43	FF 43	FF 43	FC 1
83	FF 44	FF 44	FF 44	FC 1
84	FF 45	FF 45	FF 45	FC 1
85	FF 46	FF 46	FF 46	FC 1
86	FF 47	FF 47	FF 47	FC 1
87	FF 48	FF 48	FF 48	FC 1
88	FF 49	FF 49	FF 49	FC 1
89	FF 50	FF 50	FF 50	FC 1
90	FF 51	FF 51	FF 51	FC 1
91	FF 52	FF 52	FF 52	FC 1
92	FF 53	FF 53	FF 53	FC 1
93	FF 54	FF 54	FF 54	FC 1
94	FF 55	FF 55	FF 55	FC 1
95	FF 56	FF 56	FF 56	FC 1
96	FF 57	FF 57	FF 57	FC 1
97	FF 58	FF 58	FF 58	FC 1
98	FF 59	FF 59	FF 59	FC 1
99	FF 60	FF 60	FF 60	FC 1
100	FF 61	FF 61	FF 61	FC 1

26 COMM MDM I/F

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SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
DR	4/16/81	LINDA B. JOHNSON SPACE CENTER HOUSTON, TEXAS
ENGR D. MILLER		COMM MDM I/F
DATE	4/16/81	SPACE SHUTTLE
NO.	41	FIG NO
REV	1	PAGE
REV	1	REV

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
16.1 (SHEET 1)	COMM OVERVIEW S-BAND						REFERENCE SSSHB SCHEMATIC TRACEABILITY LIST FOR THE FOLLOWING DRAWINGS: S-BAND PM TRANSPONDER, 16.2-1 S-BAND PM AMPLIFIER SYSTEM, 16.2-2 S-BAND PM/FM SWITCH BEAM ANTENNA SYSTEM, 16.2-3 NETWORK SIGNAL PROCESSOR RETURN LINK, 16.3-1 NETWORK SIGNAL PROCESSOR FORWARD LINK, 16.3-2 NETWORK SIGNAL PROCESSOR COMSEC 1/2, 16.3-3
16.1B (SHEET 2) 16.1C,D (SHEET 3)	COMM OVERVIEW AUDIO (102) COMM OVERVIEW AUDIO (103/104)						REFERENCE SSSHB SCHEMATIC TRACEABILITY LIST FOR THE FOLLOWING DRAWINGS: AUDIO PANEL/ATU PLT, CDR, 16.10-1 AUDIO PANEL/ATU MS, PS AND OS SMU, 16.10-2 AUDIO PANEL/ATU MIDDECK SMU & CCU, 16.10-3 AUDIO PANEL/ATU AIRLOCK, 16.10-4 AUDIO PANEL/ATU MIDDECK, 16.10-5 AUDIO PANEL/MIDDECK SMU, 16.10-6 AUDIO PANEL/ATU OS AND SMU, 16.10-7 AUDIO/ACCU, 16.11-1,2
16.1 (SHEET 4)	COMM OVERVIEW KU-BAND						REFERENCE SSSHB SCHEMATIC TRACEABILITY LIST FOR THE FOLLOWING DRAWINGS KU-BAND SYSTEM, 16.5-1,2:
16.1 (SHEET 5)	COMM OVERVIEW CCTV						REFERENCE SSSHB SCHEMATIC TRACEABILITY LIST FOR THE FOLLOWING DRAWINGS: TV CONTROL, 16.12 TV/CAMERA MONITOR, 16.13-1,2 TV/EMU, 16.13 TV/SECURE, 16.13-4
16.1 (SHEET 6)	PAYLOAD SYSTEM OVERVIEW						REFERENCE SSSHB SCHEMATIC TRACEABILITY LIST FOR THE FOLLOWING DRAWINGS: S-BAND PAYLOAD INTERROGATOR, 16.14 S-BAND PAYLOAD SIGNAL PROCESSOR, 16.15

DWG	SIGNATURE	DATE	DWG	SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LYNDON B. JOHNSON SPACE CENTER HOUSTON, TEXAS	
16.1-1	ENGR R. E. LABRODE		16.1-5	ENGR D. BROWN		VENDOR DRAWING REFERENCES	
	ENGR <i>R. E. Labrode</i>	11/5/90		ENGR <i>D. Brown</i>			
16.1B-2	ENGR A. COUNTS		16.1-6	ENGR F. J. MACFARLANE			
16.1C,D-3	ENGR <i>A. Counts</i>	11/5/90		ENGR <i>F. J. MacFarlane</i>	5 NOV 90		
	ENGR			APP			
16.1-4	ENGR F. J. MACFARLANE			APP			
	ENGR <i>F. J. MacFarlane</i>	5 NOV 90		OMNIPLAN		SPACE SHUTTLE	TBL NO 16-1
	ENGR			LTR E	PCN	ALL	PAGE 16.1-1 SHEET 1 OF 13

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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	
16.2 (SHEET 1)	S-BAND PM TRANSPONDER	R. I.	V570-740129		E	9/18/84	ORBITER SCHEMATIC LIST SCHEMATIC DIAGRAM, C&T NETWORK S-BAND TRANSPONDER SCHEMATIC DIAGRAM, C&T GCIL LRU SCHEMATIC LIST TRIPLEXER ASSEMBLY TRANSPONDER PWR CONVERTER INPUT SWITCH SGLS BPF STDN/TDRS BPF OUTPUT SWITCH AGC NETWORK POST AGC BPF SECOND AND THIRD MIXER NONCOHERENT AGC POWER AMP AND SWITCH X6 AND X7 MULTIPLIER INTERCONNECT DIAGRAM SSPI AND COHERENT AGC 31 MHz BPF PHASE DETECTOR AND CAD REFERENCE SOURCE WIDEBAND DETECTOR 62 MHz BPF 31 MHz AMPLIFIER COSTAS AND PHASELOCK INTERCONNECT DIAGRAM - DUAL DUPLEXER INTERCONNECT DIAGRAM - S-BAND TRANSPONDER INTERCONNECT DIAGRAM - FREQ SOURCE 300 MHz ANALOG CIRCUIT 500 MHz ANALOG CIRCUIT REGULATOR AND SWITCH 500 MHz DIGITAL CIRCUIT 300 MHz DIGITAL + 15/16 CIRCUIT 300 MHz DIGITAL + 14/15 CIRCUIT INTERCONNECT DIAGRAM SPREAD SPEC RF SECTION CODE ACQUISITION AND PN GENERATOR TRACKING AND ACQUISITION CHANNEL INTERCONNECT DIAGRAM INTERFACE AND LOGIC NO. 1 INTERFACE AND LOGIC NO. 2 CAD CHANNEL WIDEBAND CHANNEL X2 MULTIPLIER INTERCONNECT DIAGRAM, MODULATOR MULTIPLIER UHF BUFFER, LINEAR PHASE MOD, X4 MULTIPLIER AMPLIFIER, BUFFER, S-BAND RANGING TONE AMP AND AGC MODULATOR BASEBAND FIRST IF PREAMPLIFIER DRIVER POWER AMPLIFIER POWER AMPLIFIER TLS AMPLIFIER CONTROL/REGULATOR	
		R. I.	V570-240299		F	4/29/88		
		TRW	D292167					
		TRW	D292029					
		TRW	D292096					
		TRW	D292197					
		TRW	D292099					
		TRW	D292104					
		TRW	D292091					
		TRW	D292093					
		TRW	D292087					
		TRW	D292089					
		TRW	D292111			NC		1-19-77
		TRW	D292117					
		TRW	D292119					
		TRW	D292121					
		TRW	D292123m					
		TRW	D292107					
		TRW	D292109					
		TRW	D292595			B		12-19-77
		TRW	D292126			NC		1-23-78
		TRW	D293658			B		11-21-77
		TRW	D292003			A		7-26-77
		TRW	D292131					
		TRW	D292139					
		TRW	D292142					
		TRW	D292145					
		TRW	D292148					
		TRW	D292136					
		TRW	D292635					
		TRW	D292161			A		7-26-77
		TRW	D292171					
		TRW	D292174					
		TRW	D292177					
TRW	D292181			A	1-23-78			
TRW	D292199							
TRW	D292202							
TRW	D292188							
TRW	D292191							
TRW	D292071							
TRW	D292061			A	7-26-77			
TRW	D292067							
TRW	D292069							
TRW	D292076							
TRW	D292079							
TRW	D292081			A	7-8-77			
TRW	D292050							
TRW	D292045							
TRW	D292047							
TRW	D292031							
TRW	D292059							
TRW	D292056							
16.2 (SHEET 2)	S-BAND PM AMPLIFIER SYSTEM	R. I.	V570-740139		E	2/19/88	ORBITER SCHEMATIC LIST SCHEMATIC DIAGRAM, C&T POWER AMP SUBSYSTEM SCHEMATIC DIAGRAM, C&T GCIL LRU SCHEMATIC LIST SCHEM DIAG, LOW VOLTAGE SCHEM DIAG, S-BAND AMPLIFIER SCHEM DIAG, HIGH VOLTAGE WIRE LIST, EMI FILTER	
		R. I.	V570-740299		F	4/29/88		
		WATKINS	701271		E	12-30-77		
		JOHNSON	701252		F	11-30-77		
		WATKINS	701287		E	8-1-84		
		JOHNSON	701255		C	11-17-77		

DWG	SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LYNDON B. JOHNSON SPACE CENTER HOUSTON, TEXAS	
6.2-1,2	ENGR E. B. WALTERS		VENDOR DRAWING REFERENCES	
	ENGR <i>[Signature]</i>	11/6/90		
	ENGR			
	ENGR			
	APP			
	APP			
	OMNIPLAN		SPACE SHUTTLE	TBL NO
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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
16.2 (SHEET 3)	S-BAND PM/FM SW BEAM ANT SYS	R. I.	VS70-740259		H	5/6/88	ORBITER SCHEMATIC LIST SCHEMATIC DIAGRAM, S-BAND ANTENNA SWITCH SUBSYSTEM SCHEMATIC DIAGRAM, C&T GCIL LRU SCHEMATIC LIST S-BAND SWITCH ASSY SCHEMATIC S-BAND SWITCH ASSY LOGIC CIRCUITRY TRUTH TABLE SCHEMATIC, SWITCH BEAM CNTL, MODEL 4292
		R. I.	VS70-740299		F	4/29/88	
		TELEDYNE MICROWAVE	2701349		A	4/4/77	
		TELEDYNE MICROWAVE	2701349		NC	10/28/77	
		TELEDYNE MICROWAVE	2702502		NC	1/12/81	
16.3 (SHEET 1)	NETWORK SIGNAL PROCESSOR RETURN LINK	R. I.	VS70-740229		F	4/29/88	ORBITER SCHEMATIC LIST SCHEMATIC DIAGRAM, C&T NETWORK SIGNAL PROCESSOR
16.3 (SHEET 2)	NETWORK SIGNAL PROCESSOR FORWARD LINK	R. I.	VS70-740299		F	4/29/88	SCHEMATIC DIAGRAM, C&T GCIL LRU SCHEMATIC LIST NSP LRU
16.3 (SHEET 3)	NETWORK SIGNAL PROCESSOR COMSEC 1/2	TRW	29299	1-9	NC	9/18/88	RETURN LINK PROCESSOR RECORD MODE PROC. RETURN LINK PROC. CONVOLUTION A DEC. BIT SYNC ANALOG PHASE DET. (ETC.) MODE CNTL & SUM. BITE FRM DET. & DELTA DEMOD FWD LINK PROC NSP INTERCONNECT DIAG COMSEC LRU ELWELL 11 PRELIMINARY DESIGN REVIEW, JANUARY 29-31, 1980
		TRW	292311	1-8	NC		
		TRW	292301	1-10	NC		
		TRW	292281	1-9	NC		
		TRW	292341	1-6	NC		
		TRW	292351	1-8	NC		
		TRW		1-8	NC		
		TRW	292321	1-8	NC		
		TRW	292291	1-9	NC		
			MOTOROLA				

DWG	SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LYNDON B. JOHNSON SPACE CENTER HOUSTON, TEXAS	
16.2-3	ENGR E. B. WALTERS		VENDOR DRAWING REFERENCES SPACE SHUTTLE TBL NO 16-1 ALL PAGE 16.I-3 SHEET 3 OF 13	
	ENGR <i>E. B. Walters</i>	11/5/90		
16.3-1,2,3	ENGR T. A. KALVELAGE			
	ENGR <i>T. A. Kalvelage</i>	11/5/90		
	APP			
	APP			
	OMNIPLAN			
	LTR E	PCN		

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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
16.4 (SHEET 1)	TAGS SYS HARDCOPIER	NAVAL AVIONICS CTR	AV14424	1		TBS	BOARD, LED LARGE 1A1A1A1
		NAVAL AVIONICS CTR	AV14426	1		TBS	BOARD, LED SMALL 1A1A1A2
		NAVAL AVIONICS CTR	AV14443	1-4	E	TBS	SLIP RING ASSEMBLY
		NAVAL AVIONICS CTR	AV14451	1-2		TBS	BULKHEAD, REAR INTERMEDIATE POWER COMPONENTS
		NAVAL AVIONICS CTR	AV14453	1-16	H	TBS	UPLINK TEXT AND GRAPHICS HARDCOPIER FINAL ASSEMBLY 1A1
		NAVAL AVIONICS CTR	AV14459	1		TBS	HEATER, FLEXIBLE, ETCHED FOIL WITH THERMOMETERS
		NAVAL AVIONICS CTR	AV14463	1-8	E	TBS	DRIVE ASSEMBLY, ELECTRO/MECHANICAL
		NAVAL AVIONICS CTR	AV14465	1-8	D	TBS	POWER SUPPLY, MODULAR, +28 VDC INPUT TO +1.2 kV OUTPUT
		NAVAL AVIONICS CTR	AV14469	1-9	B	TBS	POWER SUPPLY, MODULAR, +28 VDC INPUT TO +17.5 kV OUTPUT
		NAVAL AVIONICS CTR	AV14474	1-11		TBS	MICROCIRCUIT, DIGITAL, CMOS, HEX OPEN DRAIN N-CHANNEL BUFFER
		NAVAL AVIONICS CTR	AV14475	1-13		TBS	MICROCIRCUIT, DIGITAL, CMOS, 8 BIT INPUT/OUTPUT PORT
		NAVAL AVIONICS CTR	AV14476	1-15		TBS	MICROCIRCUIT, DIGITAL, 8192 BIT, SCHOTTKY, BIPOLAR, ROM
		NAVAL AVIONICS CTR	AV14477	1-11		TBS	MICROCIRCUIT, DIGITAL, QUAD 2-INPUT NAND GATE, CMOS
		NAVAL AVIONICS CTR	AV14478	1-24		TBS	MICROCIRCUIT, DIGITAL, COSMAC MICROPROCESSOR CPU
		NAVAL AVIONICS CTR	AV14479	1-12		TBS	MICROCIRCUIT, DIGITAL, TYPE D FLIP-FLOP, DUAL, CMOS
		NAVAL AVIONICS CTR	AV14480	1-12		TBS	MICROCIRCUIT, DIGITAL, BCD TO DECIMAL DECODER,
		NAVAL AVIONICS CTR	AV14481	1-12		TBS	MICROCIRCUIT, DIGITAL, QUAD D LATCH, MOS
		NAVAL AVIONICS CTR	AV14482	1-12		TBS	MICROCIRCUIT, DIGITAL, CMOS, STATIC RAM, 1024 x 4 BIT
		NAVAL AVIONICS CTR	AV14483	1-11		TBS	MICROCIRCUIT, DIGITAL, CMOS, QUAD 2-INPUT OR GATE
		NAVAL AVIONICS CTR	AV14484	1-11		TBS	MICROCIRCUIT, DIGITAL, CMOS, 3 STATE HEX NON-INVERT BUFFER
		NAVAL AVIONICS CTR	AV14485	1-11		TBS	MICROCIRCUIT, DIGITAL, 3 STATE HEX INVERT BUFFER
		NAVAL AVIONICS CTR	AV14486	1-12		TBS	MICROCIRCUIT, DIGITAL, 8-BIT, D-TYPE LATCH, 3-STATE OUTPUT
		NAVAL AVIONICS CTR	AV14487	1-13		TBS	MICROCIRCUIT, DIGITAL, TTL 8 TO 3 LINE PRIORITY ENCODER
		NAVAL AVIONICS CTR	AV14488	1-11		TBS	MICROCIRCUIT, DIGITAL, QUAD 2-INPUT POSITIVE-AND GATE, OC OUTPUT
		NAVAL AVIONICS CTR	AV14500	1-5	B	TBS	CIRCUIT CARD ASSEMBLY, SYNC GENERATOR 1A1A8A1
		NAVAL AVIONICS CTR	AV14502	1-4	A	TBS	CIRCUIT CARD ASSEMBLY, CPU 1A1A8A2
		NAVAL AVIONICS CTR	AV14504	1-4		TBS	CIRCUIT CARD ASSY, VIDEO PROCESSING INTERFACE 1A1A8A3
		NAVAL AVIONICS CTR	AV14506	1-3	E	TBS	CIRCUIT CARD ASSEMBLY, ANALOG VIDEO 1A1A8A4
		NAVAL AVIONICS CTR	AV14508	1-9	C	TBS	CIRCUIT CARD ASSEMBLY, MDM AND FRONT INT 1A1A8A5
		NAVAL AVIONICS CTR	AV14510	1-5	D	TBS	CIRCUIT CARD ASSEMBLY, CRT CONTROL 1A1A8A6
		NAVAL AVIONICS CTR	AV14512	1-4	D	TBS	CIRCUIT CARD ASSEMBLY, HEATER CONTROL
		NAVAL AVIONICS CTR	AV14514	1-3	F	TBS	CIRCUIT CARD ASSEMBLY, MOTOR CONTROL 1A1A8A8
NAVAL AVIONICS CTR	AV14516	1-3	C	TBS	MOTHER BOARD ASSEMBLY 1A1A8		
NAVAL AVIONICS CTR	AV14525	1-12		TBS	MICROCIRCUIT, DIGITAL, 8-INPUT NAND GATE, CMOS		
NAVAL AVIONICS CTR	AV14527	1-12		TBS	MICROCIRCUIT, DIGITAL, 8-INPUT NOR GATE, CMOS		
NAVAL AVIONICS CTR	AV14528	1-7		TBS	MICROCIRCUIT, DIGITAL, DUAL MONOSTABLE MULTIVIBRATOR		
NAVAL AVIONICS CTR	AV14529	1-14		TBS	MICROCIRCUIT, DIGITAL, CMOS SEVEN STAGE BINARY RIPPLE COUNTER		

DWG	SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LYNDON B. JOHNSON SPACE CENTER HOUSTON, TEXAS	
16.4-1	ENGR <i>C.A. COUNTS</i>		VENDOR DRAWING REFERENCES	
	ENGR <i>Charles Counts</i>	11/5/90		
	ENGR			
	ENGR			
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SSSH DWG NO.	SSSH DWG TITLE	VENDOR NAME	VENDOR DWG NO.	VENDOR SHEET NO.	REV	DATE	VENDOR DRAWING TITLE
16.4 (SHEET 1) (CONT'D)	TAGS SYS HARDCOPIER	AV14530	1-11				MICROCIRCUIT, DIGITAL, CMOS HEX NON-INVERTING BUFFER
		AVIONICS CTR NAVAL	AV14531	1-11			MICROCIRCUIT, DIGITAL, HEX INVERTER, CMOS
		AVIONICS CTR NAVAL	AV14532	1-13			MICROCIRCUIT, DIGITAL, SHIFT REGISTER, 4-BIT, BIDIRECTIONAL
		AVIONICS CTR NAVAL	AV14533	1-13			MICROCIRCUIT, DIGITAL, 4-BIT BINARY COUNTER W/SYNCHRONOUS CLOCK
		AVIONICS CTR NAVAL	AV14535	1-11			MICROCIRCUIT, DIGITAL, CMOS DUAL 4-INPUT NOR GATE
		AVIONICS CTR NAVAL	AV14538	1-12			MICROCIRCUIT, DIGITAL, 8-CHANNEL DATA SELECTOR, 3-STATE OUTPUT
		AVIONICS CTR NAVAL	AV14539	1-12			MICROCIRCUIT, DIGITAL, DUAL 4-BIT STATIC SHIFT REGISTER, CMOS
		AVIONICS CTR NAVAL	AV14540	1-12			MICROCIRCUIT, DIGITAL, CMOS HEX INVERTING BUFFER
		AVIONICS CTR NAVAL	AV14541	1-3		C	SWITCH, THERMOSTATIC
		AVIONICS CTR NAVAL	AV14543	1		A	BOARD, LED LARGE ASSY 1A1A1A1
		AVIONICS CTR NAVAL	AV14544	1			BOARD, LED SMALL ASSY 1A1A1A2
		AVIONICS CTR NAVAL	AV14550	1-18			MICROCIRCUIT, DIGITAL, PHASE-LOCKED LOOP, MICROPOWER, CMOS
		AVIONICS CTR NAVAL	AV14551	1-11			MICROCIRCUIT, LINEAR, QUAD OPERATIONAL AMPLIFIER, HIGH PERFORMANCE
		AVIONICS CTR NAVAL	AV14552	1-11			MICROCIRCUIT, LINEAR, OPERATIONAL AMPLIFIER, HIGH VOLTAGE
		AVIONICS CTR NAVAL	AV14553	1-12			MICROCIRCUIT, DIGITAL, BINARY TO 1 OF 4 DECODER/DEMUX, DUAL
		AVIONICS CTR NAVAL	AV14554	1-12			MICROCIRCUIT, DIGITAL, HEX SCHMITT TRIGGER, CMOS
		AVIONICS CTR NAVAL	AV14555	1-12			MICROCIRCUIT, DIGITAL, 8-BIT ADDRESSABLE LATCH, CMOS
		AVIONICS CTR NAVAL	AV14556	1-13			MICROCIRCUIT, LINEAR, TRANSISTOR ARRAY, NPN, SILICON, QUAD
		AVIONICS CTR NAVAL	AV14559	1-13			MICROCIRCUIT, LINEAR, 8-BIT MULTIPLYING D/A CONVERTER
		AVIONICS CTR NAVAL	AV14560	1-12			MICROCIRCUIT, DIGITAL, CMOS, DUAL 4-CHANNEL ANALOG MULTIPLEXER
		AVIONICS CTR NAVAL	AV14562	1-12		A	MICROCIRCUIT, DIGITAL, ANALOG SWITCH, QUAD, SPST, CMOS
		AVIONICS CTR NAVAL	AV14563	1-14			MICROCIRCUIT, LINEAR, CONTROL, SWITCH MODE REGULATOR
		AVIONICS CTR NAVAL	AV14564	1-12			MICROCIRCUIT, LINEAR, CURRENT AMPLIFIER, THICK FILM HYBRID
		AVIONICS CTR NAVAL	AV14565	1-13		A	MICROCIRCUIT, DIGITAL, CMOS HEX SCHMITT TRIGGER
		AVIONICS CTR NAVAL	AV14567	1-14			MICROCIRCUIT, DIGITAL, CMOS QUAD R/S LATCH W/3-STATE OUTPUTS
		AVIONICS CTR NAVAL	AV14569	1-3		D	CIRCUIT CARD ASSEMBLY, POWER SUPPLY 1A1A7A1
		AVIONICS CTR NAVAL	AV14572	1-3		B	CIRCUIT CARD ASSEMBLY, POWER REGULATOR 1A1A7A2
		AVIONICS CTR NAVAL	AV14573	1-6		B	ELECTRICAL SCHEMATIC INTERCONNECTION & WIRING DIAGRAM
		AVIONICS CTR NAVAL	AV14579	1-12			MICROCIRCUIT, LINEAR, DUAL CHANNEL OPTOCOUPLER
		AVIONICS CTR NAVAL	AV14580	1-11			MICROCIRCUIT, LINEAR, HERMETICALLY SEALED, 4-CHANNEL, OPTOCOUPLER
		AVIONICS CTR NAVAL	AV14582	1-11			MICROCIRCUIT, LINEAR, OPERATIONAL, AMPLIFIER, THICK FILM HYBRID
		AVIONICS CTR NAVAL	AV14583	1-20			MICROCIRCUIT, LINEAR, SWITCHMODE REGULATOR CONTROL
		AVIONICS CTR NAVAL	AV14584	1-11			MICROCIRCUIT, LINEAR, PRECISION VOLTAGE REFERENCE, +5 VDC
		AVIONICS CTR NAVAL	AV14592	1-11			MICROCIRCUIT, LINEAR, POSITIVE VOLTAGE REGULATOR, ADJUSTABLE
		AVIONICS CTR NAVAL	AV14593	1-11			MICROCIRCUIT, LINEAR, NEGATIVE VOLTAGE REGULATOR, ADJUSTABLE
AVIONICS CTR NAVAL	AV14620	1-4		B	ASSEMBLY, POWER SUPPLY :A1A7		

DWG	SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LYNDON B. JOHNSON SPACE CENTER HOUSTON, TEXAS	
16.4-1	ENGR <i>C.A. GOUNTS</i>		VENDOR DRAWING REFERENCES	
	ENGR <i>Charles A. Gounts</i>	11/5/90		
	ENGR			
	ENGR			
	APP		SPACE SHUTTLE	TBL NO
	APP			16-1
	OMNIPLAN		ALL	
	LTR E	PCN	PAGE 16.1-5	SHEET 5 OF 13

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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		
16.4 (SHEET 1) (CONC'D)	TAGS SYS HARDCOPIER	AV14633 AVIONICS CTR NAVAL	1-11			TBS	MICROCIRCUIT, DIGITAL, HMOS, STATIC RAM, 1024 x 4 BIT		
		AV14660 AVIONICS CTR NAVAL	1-12			TBS	MICROCIRCUIT, TRANSISTOR ARRAY, DARLINGTON, 7-CHANNEL		
		AV14661 AVIONICS CTR NAVAL	1-11			TBS	MICROCIRCUIT, INTERFACE, 8-CHANNEL DRIVER		
		AV14669 AVIONICS CTR NAVAL	1	B		TBS	CIRCUIT CARD ASSEMBLY, TRANSFORMER MOUNT		
		AV14680 AVIONICS CTR NAVAL	1-4			TBS	CIRCUIT CARD ASSY, VIDEO PROCESSING INTERFACE 1A1A8A11		
		AV14696 AVIONICS CTR NAVAL	1-4			TBS	CIRCUIT CARD ASSEMBLY, CPU 1A1A8A2		
		AV14698 AVIONICS CTR NAVAL	1-3	B		TBS	FILTER ASSEMBLY, UPLINK GRAPHIC HARDCOPIER 1A1A9		
		AV14732 AVIONICS CTR NAVAL	1			TBS	CAPSTAN/DEVELOPER MOTOR ASSY		
		AV14733 AVIONICS CTR NAVAL	1-2	A		TBS	CRT ASSY		
		AV14740 AVIONICS CTR NAVAL	1-2			TBS	PROGRAM MEMORY SPECIFICATION, U27		
		AV14741 AVIONICS CTR NAVAL	1-2			TBS	PROGRAM MEMORY SPECIFICATION, U28		
		AV14742 AVIONICS CTR NAVAL	1-2			TBS	PROGRAM MEMORY SPECIFICATION, U29		
		AV14743 AVIONICS CTR NAVAL	1-2			TBS	PROGRAM MEMORY SPECIFICATION, U30		
		AV14744 AVIONICS CTR NAVAL	1-2			TBS	PROGRAM MEMORY SPECIFICATION, U1		
		AV14745 AVIONICS CTR NAVAL	1-2			TBS	PROGRAM MEMORY SPECIFICATION, U2		
		AV14746 AVIONICS CTR NAVAL	1-2			TBS	PROGRAM MEMORY SPECIFICATION, U3		
		AV14747 AVIONICS CTR NAVAL	1	A		TBS	PROGRAM MEMORY SPECIFICATION, MOTOR CONTROL, U11-U12		
		AV14776 AVIONICS CTR NAVAL	1-3			TBS	CIRCUIT CARD ASSEMBLY, MOTOR CONTROL, 1A1A8A8		
		AV14778 AVIONICS CTR NAVAL	1-3	A		TBS	CIRCUIT CARD ASSEMBLY, ANALOG VIDEO 1A1A8A4		
		16.4 (SHEET 2)	SECURE TAGS/TV I/F	R. I.-DOWNEY	VS70-740199	1-2	D	3/11/88	SCHEMATIC DIAGRAM
				R.I.-ANAHEIM DEFENSE ELECTRONICS OPERATIONS	25851-514	1		11/5/85	TEXT AND GRAPHICS SUBSYSTEM SCHEMATIC-ENCRYPTION BYPASS ISOLATION ASSY

DWG	SIGNATURE	DATE	DWG	SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LYNDON B. JOHNSON SPACE CENTER HOUSTON, TEXAS	
16.4-1	ENGR CHRISTOPHER A. COUNTS			ENGR		VENDOR DRAWING REFERENCES SPACE SHUTTLE TBL NO 16-1 ALL PAGE 16.1-6 SHEET 6 OF 13	
	ENGR <i>Christopher Counts</i>	11/13/90		ENGR			
16.4-2	ENGR CHRISTOPHER A. COUNTS			ENGR			
	ENGR <i>Christopher Counts</i>	11/13/90		ENGR			
	ENGR			APP <i>De Folla</i>	11/24/90		
	ENGR			APP <i>Richard W. Kelly</i>	11-21-90		
	ENGR			OMNIPLAN			
				LTR E	PCN		

BASIC REV E

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		
16.5 (SHEETS 1 & 2)	KU-BAND SYSTEM	R. I.	VS70-740102		J	2/16/88	ORBITER SCHEMATIC LIST		
		R. I.	VS70-740109		E	2/15/88	SCHEMATIC, KU-BAND COMM (OV102)		
		R. I.	VS70-590119		B	11/18/85	SCHEMATIC, KU-BAND COMM (OV103/4)		
								SCHEMATIC, KU-BAND ANTENNA DEPLOYMENT MMCA 2 & 4	
		R. I.	VS70-740299		F	4/29/88		SCHEMATIC, C&T GCIL	
		R. I.	VS70-764359		C	11/03/87		SCHEMATIC, MID POWER CONTROL ASSY-2	
		R. I.	VS70-763362		K	10/29/88		SCHEMATIC, FWD POWER CONTROL ASSY-3	
								LRU SCHEMATIC LIST	
				HUGHES	3526150-410				SIGNAL PROCESSOR ASSEMBLY
				HUGHES	3582632				SIGNAL PROC. ASSY I/F DIAGRAM
				HUGHES	3582651				LVPS (SPA) SCHEMATIC
				HUGHES	3555411				LINEAR REG/LOGIC SCHEMATIC
				HUGHES	3555441				CONVOLUTIONAL ENCODER SCHEMATIC
				HUGHES	3555431				MGT./HANDOVER SCHEMATIC
				HUGHES	3555080				FM SWITCH/GENERATOR SCHEMATIC
				HUGHES	3555461				FM MODULE INTERCONNECT
				HUGHES	3555451				QPSK MODULATOR INTERCONNECT
				HUGHES	3555561				BIT SYNC SCHEMATIC
				HUGHES	3555571				BIT SYNC SCHEMATIC
				HUGHES	3555571				BIT/FRAME/DECOMM SCHEMATIC
				HUGHES	3555131				ELECTRONIC ASSEMBLY NO. 1
				HUGHES	3555141				SERVO LOOP SHAPING SCHEMATIC
				HUGHES	3555151				RATE INTEGRATING GYRO SCHEMATIC
				HUGHES	3555161				MOTOR DRIVER SCHEMATIC
				HUGHES	3555171				MDM INTERFACE SCHEMATIC
				HUGHES	3555181				PN DESPREADER (BD #2) SCHEMATIC
				HUGHES	3555191				PN DESPREADER (BD #1) SCHEMATIC
				HUGHES	3555201				PSK DEMODULATOR (BD #1) SCHEMATIC
				HUGHES	3555231				PSK DEMODULATOR (BD #2) SCHEMATIC
				HUGHES	3582672				GYRO HTR/LOOP ELECTRONICS
				HUGHES	3582685				LVPS SCHEMATIC
				HUGHES	3680761				LINEAR REG/LOGIC SCHEMATIC
				HUGHES	3680750				I/O PROCESSOR (BD #1) SCHEMATIC
				HUGHES	3680755				I/O PROCESSOR (BD #2) SCHEMATIC
				HUGHES	3707579				MICROCOMPUTER (BD #2) SCHEMATIC
				HUGHES	3680767				MICROCOMPUTER (BD #1) SCHEMATIC
				HUGHES	3680799				MDM INTERFACE (BD #2) SCHEMATIC
				HUGHES	3526101-410				MDM INTERFACE (BD #1) SCHEMATIC
				HUGHES	3526140-210				EA-1 BLOCK DIAGRAM
				HUGHES	3555692				ELECTRONIC ASSEMBLY NO. 2
		HUGHES	3582615				EA-2 SCHEMATIC		
		HUGHES	3555615				LVPS (EA-2) SCHEMATIC		
		HUGHES	3555625				LINEAR REG/LOGIC SCHEMATIC		
		HUGHES	3555635				ANALOG PROC. SCHEMATIC		
		HUGHES	3555645				PREPROCESSOR SCHEMATIC		
		HUGHES	3555655				MASTER TIMING/CONTROL SCHEMATIC		
		HUGHES	3555665				FILTER PROC. SCHEMATIC		
		HUGHES	3555675				PDI & SEQUENCE DATA SCHEMATIC		
		HUGHES	3555685				DETECTION/AGC SCHEMATIC		
		HUGHES	3526180-310				RANGE/VELOCITY SCHEMATIC		
		HUGHES	3561952				ANGLE/SERIAL DATA SCHEMATIC		
		HUGHES	3561962				DEPLOYED ASSEMBLY		
		HUGHES	3555811				DEA SCHEMATIC		
		HUGHES	3555821				LVPS SCHEMATIC		
		HUGHES	3555831				LINEAR REG/LOGIC SCHEMATIC		
		HUGHES	3555841				STANDBY CONTROL LOGIC SCHEMATIC		
		HUGHES	3555851				PULSE WIDTH MODULATOR SCHEMATIC		
		HUGHES	3555861				RF ENABLE LOGIC SCHEMATIC		
		HUGHES	3555871				MICROWAVE LOGIC SCHEMATIC		
		HUGHES	3555881				PWM REG SCHEMATIC		
		HUGHES	3555891				FILAMENT REG/CONVERTER SCHEMATIC		
		HUGHES	3561801				D.C. MOTOR DRIVE SCHEMATIC		
		HUGHES	3561811				TRANSMITTER PWR/REG SCHEMATIC		
		HUGHES	3561826				HIGH VOLTAGE RECT/REG SCHEMATIC		
		HUGHES	3561831				EXCITER SCHEMATIC		
		HUGHES	3561841				HARMONIC PHASE COMPARATOR SCHEMATIC		
		HUGHES	3561851				SELF TEST LOGIC I/F SCHEMATIC		
		HUGHES	3561891				BUFF/DIV/27dB AMPL SCHEMATIC		
		HUGHES	3561868				FREQ SYNTHESIZER SCHEMATIC		
		HUGHES	3561868				FET LIMITING AMPL SCHEMATIC		
		HUGHES	3561868				GUNN VLT. REG. SCHEMATIC		
		HUGHES	3561868				RCVR BLANKING LOGIC SCHEMATIC		

DWG	SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LYNDON B. JOHNSON SPACE CENTER HOUSTON, TEXAS	
16.5-1, 2	ENGR MARTIN T. O'HARE		VENDOR DRAWING REFERENCES	
	ENGR <i>Walter D. Rife</i>	11/21/90		
	ENGR			
	ENGR			
	APP <i>[Signature]</i>	11/21/90	SPACE SHUTTLE	TBL NO
	APP <i>[Signature]</i>	11-21-90	ALL	16-1
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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	
16.5 (SHEETS 1 & 2)		HUGHES	3599951				ECL LOGIC I/F SCHEMATIC ML LOGIC I/F SCHEMATIC MICROWAVE ASSY SCHEMATIC RECEIVER SCHEMATIC IF AMPL (COMM) SCHEMATIC IF AMPL (RADAR) SCHEMATIC 2ND IF AMPL (RADAR) SCHEMATIC BUFFER AMPL (RADAR) SCHEMATIC RECEIVE TRK LOGIC SCHEMATIC TRANSMITTER INTERCONNECTION DMA WIRING DIAGRAM DA WIRING DIAGRAM DEA BLOCK DIAGRAM	
		HUGHES	3599961					
		HUGHES	3555901					
		HUGHES	3574801					
		HUGHES	3574811					
		HUGHES	3574821					
		HUGHES	3574831					
		HUGHES	3574841					
		HUGHES	3574851					
		HUGHES	3555802					
16.7B	ORBITER EXPERIMENTS SUPPORT SYSTEM FOR OEX	JSC				9/82	SSO ICD LEVEL III (OEX SCM MODULE INTERFACES)	
		LEMSCO			PRELIM	6/87	PRELIMINARY SCM INTERFACE DRAWINGS	
16.8	S-BAND FM SYSTEM	R. I.	V570-740262		D	9/13/84	ORBITER SCHEMATIC LIST SCHEMATIC, S-BAND FM SIGNAL PROCESSOR (OV102) SCHEMATIC, S-BAND FM SIGNAL PROCESSOR (OV103 & SUBS) SCHEMATIC, S-BAND FM TRANSMITTER (OV102) SCHEMATIC, S-BAND FM TRANSMITTER (OV103 & SUBS) LRU SCHEMATIC LIST FM TRANSMITTER MODULATOR/EXCITER POWER SUPPLY TLM PROCESSOR RF POWER AMPLIFIER INTERCONNECTION DIAGRAM FM SIGNAL PROCESSOR POWER SUPPLY LOGIC TV, ANLG & ME OUTPUT MAIN ENGINE PROCESSING INTERCONNECTION DIAGRAM DIGITAL DATA PROCESSING	
		R. I.	V570-740269		B	9/13/84		
		R. I.	V570-740272		D	9/13/84		
		R. I.	V570-740279		D	11/13/84		
		TELEDYNE	SK2008736					
		TELEDYNE	SK2008748					
		TELEDYNE	SK2008750					
		TELEDYNE	SK2008763					
		TELEDYNE	SK2008925					
		CONRAC	7905345					
CONRAC	7905348							
CONRAC	7905351							
CONRAC	7905354							
CONRAC	7905360							
16.9 (SHEETS 1 & 2)	UHF TRANSCEIVER/ EVC TRANSCEIVER	R. I.	V570-740119		A	12/18/81	ORBITER SCHEMATIC LIST SCHEMATIC DIAGRAM, UHF EVA/ATC TRANSCEIVER WIRNG DIAGRAM UHF EVA/ATC TRANSCEIVER SCHEMATIC DIAGRAM - COMM & TRACK UHF EVA/ATC TRANSCEIVER SCHEMATIC DIAGRAM - PAYLOAD SUBSYSTEM INTERFACE LRU SCHEMATIC LIST UHF CDR NO. 552-1021 SHUTLE ORBITER EVA ATC TRANSCEIVER	
		R. I.	W5330-102-74.5					
		R. I.	V570-740112			E		11/18/82
		R. I.	V570-760802			K		4/5/82
		RCA	ICD-3-0061-03			A		

DWG	SIGNATURE	DATE	DWG	SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LYNDON B. JOHNSON SPACE CENTER HOUSTON, TEXAS
16.5-1.2	ENGR MARTIN T. O'HARE		16.8	ENGR MARTIN T. O'HARE		
	ENGR <i>Martin T. O'Hare</i>	11/21/82		ENGR <i>Martin T. O'Hare</i>	11/21/82	
	ENGR		16.9-1.2	ENGR D. R. BROWN		
	ENGR			ENGR		
16.7B	ENGR S. M. KAKADELIS			APP <i>S. M. Kakadelis</i>	11/21/82	
	ENGR <i>S. Kakadelis</i>	11-21-82		APP <i>Robert W. Rood</i>	11-21-90	
	ENGR					SPACE SHUTTLE
	ENGR					TBL NO
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						ALL
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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		
16.13 (SHEET 4)	TV/SECURE	RCA				9/10/85	ORBITER SCHEMATIC LIST SECURE TELEVISION SYSTEM (STV) CRITICAL DESIGN REVIEW DATA PACKAGE		
		RCA	2623127	1-6		2/2/85	SCHEMATIC ADU A1 SIGNAL PROCESSOR		
		RCA	2623147	1-21		2/12/85	LOGIC DIAGRAM ADU A2 WRITE CONTROLLER		
		RCA	2623143	1-14		4/2/85	LOGIC DIAGRAM ADU A3 BOARD READ CONTROLLER AND OUTPUT MUX		
		R.I.	V738-740002	1-3	B	4/15/88	LRU SCHEMATIC LIST SCHEMATIC DIAGRAM- CCTV AIRBORNE DIGITIZER UNIT SUBSYSTEM		
		R.I.	NAS9-14000 IRD-TM453C WBS 5.9.68	1-73		5/30/85	SECURED CCTV SYSTEM (STVS) INTEGRATION HARDWARE PDR DATAPACK		
		16.14	S-BAND PAYLOAD INTERROGATOR	R.I.	V570-740239	1-4	D	5/10/88	ORBITER SCHEMATIC LIST SCHEMATIC DIAGRAM, C&T PAYLOAD INTERROGATOR
				R.I.	V570-740299		F	4/29/88	SCHEMATIC DIAGRAM, C&T GCIL
				TRW	700651		A	3/11/82	LRU SCHEMATIC LIST INTERCONNECT DRAWING, POWER AMP
				TRW	700673		A	2/24/81	SCHEMATIC DIAGRAM, DETECTOR, DOD (A10)
TRW	700677				B	9/22/81	SCHEMATIC DIAGRAM, FINAL AMP A&B (DOD)		
TRW	700681				B	9/22/81	SCHEMATIC DIAGRAM, FINAL AMP A&B (NASA)		
TRW	700688				A	2/24/81	SCHEMATIC DIAGRAM, DETECTOR NASA (A9)		
TRW	700691				B	10/12/81	SCHEMATIC DIAGRAM, WIDEBAND PREAMP & SWITCH PWR AMP MODULE		
TRW	700694				A	8/12/80	SCHEMATIC DRAWING, TLM & SWITCH DRIVER		
TRW	700711				A	10/8/81	SCHEMATIC DIAGRAM, FIRST LO DRIVER		
TRW	700719				A	12/11/81	SCHEMATIC DIAGRAM, 1ST BAND PASS FILTER		
TRW	700723				A	1/14/81	SCHEMATIC DIAGRAM, RCVR AGC NETWORK		
TRW	700727				A	12/3/81	SCHEMATIC DIAGRAM, 2ND BAND PASS FILTER		
TRW	700731				A	3/13/80	SCHEMATIC DIAGRAM, SECOND MIXER		
TRW	700735				A	5/13/81	SCHEMATIC DIAGRAM, AGC AMPLIFIER		
TRW	700739				B	1/14/81	SCHEMATIC DIAGRAM, IF AMP		
TRW	700743				A	4/25/80	SCHEMATIC DIAGRAM, 184 MHz BPF		
TRW	700747				A	12/1/80	SCHEMATIC DIAGRAM, X5, X2 MULTIPLIER		
TRW	700751				C	4/6/82	INTERCONNECT DIAGRAM, 2ND IF		
TRW	700761				B	8/31/81	SCHEMATIC DIAGRAM, VCX0 2ND IF MODULE		
TRW	700765				B	3/11/81	SCHEMATIC DIAGRAM, PHASE DETECTOR AND COHERENT AMPLITUDE DETECTOR		
TRW	700769				A	6/10/80	SCHEMATIC DIAGRAM, REFERENCE SOURCE		
TRW	700773				A	5/16/80	SCHEMATIC DIAGRAM, RCVR W/B DETECTOR		
TRW	700781				C	2/4/81	SCHEMATIC DIAGRAM, PHASELOCK & TLM		
TRW	700793				C	9/16/81	SCHEMATIC DIAGRAM, AGC/TLM		
TRW	700815				B	10/5/81	SCHEMATIC DIAGRAM, X3/X5 MULTIPLIER BOARD FREQ SOURCE MODULE		
TRW	700843				A	8/28/80	SCHEMATIC DIAGRAM, GAIN NORMALIZER & FILTER RCVR SYNTHESIZER MODULE		
TRW	700851				A	8/4/81	INTERCONNECT DIAGRAM, RCVR SYNTHESIZER		
TRW	700861				A	11/21/80	SCHEMATIC DIAGRAM, RX SYNTHESIZER BOARD		
TRW	700865				B	1/6/81	SCHEMATIC DIAGRAM, REF X2 & PWR DIVIDER		
TRW	700873		A	2/5/81	SCHEMATIC DIAGRAM, RF AMP & DN CONVERTER				
TRW	700881		C	1/13/82	SCHEMATIC DIAGRAM, RCVR OFFSET, X2				
TRW	700885		A	1/12/81	SCHEMATIC DIAGRAM, UP CONVERTER AMP				
TRW	700888		A	1/29/81	SCHEMATIC DIAGRAM, LOOP IF AMP & FILTER				
TRW	700891		B	11/26/80	SCHEMATIC DIAGRAM, UP CONVERTER, X4				
TRW	700901		B	10/5/81	INTERCONNECT DIAGRAM, XMTR SYNTHESIZER MODULE				
TRW	700911		A	11/25/81	SCHEMATIC DIAGRAM, XMTR SYN MODULE				
TRW	700915		C	1/16/82	SCHEMATIC DIAGRAM, BASEBAND BOARD				
TRW	700920		B	12/7/81	SCHEMATIC DIAGRAM, XMTR LOOP VCO & POWER DIVIDER				
TRW	700927		A	3/13/80	SCHEMATIC DIAGRAM, LOOP IF AMP & FILTER				
TRW	700931		B	10/21/80	SCHEMATIC DIAGRAM, LINEAR PHASE MODULATOR				
TRW	700939		B	11/25/80	SCHEMATIC DIAGRAM, UPCONVERTER, X4				
TRW	700948		A	10/5/81	SCHEMATIC DIAGRAM, GAIN NORMALIZER & FILTER				
TRW	700961		A	1/30/80	SCHEMATIC DIAGRAM, CMD PROCESSOR (A1)				
TRW	700965		A	8/22/80	SCHEMATIC DIAGRAM, CMD PROCESSOR (A2)				
TRW	700969		A	12/3/80	SCHEMATIC DIAGRAM, CMD PROCESSOR (A3)				
TRW	700973		B	2/16/81	SCHEMATIC DIAGRAM, CMD PROCESSOR (A4)				
TRW	700982		C	3/22/82	SCHEMATIC DIAGRAM, RCVR LOOP VCO & PWR DIVIDER				
TRW	701001		A	9/27/82	INTERCONNECT DIAGRAM, PI				
TRW	701006		D	5/1/80	SCHEMATIC DIAGRAM, TRIPLEXER/SWITCH-SRU				
TRW	701043		A	1/14/81	SCHEMATIC DIAGRAM, VOLT REG (+ 5.1v/+ 12v)				
TRW	701034		A	4/29/80	SCHEMATIC DIAGRAM, RF PWR SWITCH (DOD)				

DWG	SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LYNDON B. JOHNSON SPACE CENTER HOUSTON, TEXAS	
6.13-4	ENGR F. MACFARLANE		VENDOR DRAWING REFERENCES	
	ENGR <i>F. MacFarlane</i>	5 NOV 90		
6.14	ENGR F. MACFARLANE			
	ENGR <i>F. MacFarlane</i>	5 NOV 90		
	APP			
	APP			
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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			
16.14 (CONCD)		TRW	701037		A	4/29/80	SCHEMATIC DIAGRAM, RF PWR SWITCH (NASA) SCHEMATIC DIAGRAM, PWR CONVERTER INTERCONNECT DIAGRAM, BASEBAND MODULE SCHEMATIC DIAGRAM, VIDEO AMP & SWITCHES SCHEMATIC DIAGRAM, AGC ASSEMBLY SCHEMATIC DIAGRAM, REF TCXO FREQ SOURCE SCHEMATIC DIAGRAM, STDN VCXO ASSY SCHEMATIC DIAGRAM, SGLS VCXO ASSY SCHEMATIC DIAGRAM, LOOP IF AMP & FILTER SCHEMATIC DIAGRAM, TCXO X2 SCHEMATIC DIAGRAM, DOD X2 STDN X2 SCHEMATIC DIAGRAM, OUTPUT AMP "A" SCHEMATIC DIAGRAM, OUTPUT AMP "B" SCHEMATIC DIAGRAM, UPCONVERTER AMP SCHEMATIC DIAGRAM, FET SWITCH PRESET			
		TRW	701051		A	11/4/80				
		TRW	701086		B	1/15/81				
		TRW	701094		C	6/8/81				
		TRW	701100		C	3/10/81				
		TRW	709176		A	11/9/81				
		TRW	709184		A	11/9/81				
		TRW	709191		A	11/9/81				
		TRW	709195		A	10/5/81				
		TRW	709199		A	1/14/81				
		TRW	709206		B	4/9/81				
		TRW	709227		A	11/24/80				
		TRW	709235		A	11/21/80				
		TRW	709509			12/4/80				
		TRW	709516			4/9/81				
16.15	PAYLOAD SIGNAL PROCESSOR	R. I.	V570-740239	1-4	D	5/10/88	ORBITER SCHEMATIC LIST SCHEMATIC DIAGRAM, C&T PAYLOAD INTERROGATOR SCHEMATIC DIAGRAM, C&T GCIL LRU SCHEMATIC LIST LABELED SNEAK CIRCUIT ANALYSIS SCHEMATIC DIAGRAM, PSP CMD PROCESSOR A SCHEMATIC DIAGRAM, PSP CMD PROCESSOR B SCHEMATIC DIAGRAM, PSP GENERAL, BOX INTERCONNECT DIAGRAM, PSP SCHEMATIC DIAGRAM, PSP TLM PROC A SCHEMATIC DIAGRAM, PSP TLM PROC B SCHEMATIC DIAGRAM, PSP BIT SYNC A SCHEMATIC DIAGRAM, PSP BIT SYNC B SCHEMATIC DIAGRAM, PSP PSK DEMODULATOR			
		R. I.	V570-740299		F	4/29/88				
		TRW	704231			2/24/81				
		TRW	704241			5/2/79				
		TRW	704162			6/20/79				
		TRW	704164			NO DATA				
		TRW	704211			2/28/79				
		TRW	704221			3/1/79				
		TRW	704191			NO DATA				
		TRW	704201			NO DATA				
		TRW	704181			1/11/79				
		16.16	RECORDER	SRB DFI FLIGHT						ORBITER SCHEMATIC LIST LSRB DFI CABLE INTERCONNECT LSRB DFI ELECT SCHEMATIC RSRB DCI CABLE INTERCONNECT LRU SCHEMATIC LIST BASIC RECORDER/TAPE TRANSPORT, TECHNICAL MANUAL FLIGHT TAPE RECORDER (19A02050)
				MSFC	16A10242			L		
				MSFC	16A10243			F		
				MSFC	16A10244			L		
BELL & HOWELL	PN 533001					5/77				
MSFC	19A01050									
16.17	GROUND COMMAND INTERFACE LOGIC	R. I.	V570-740299		F	4/29/88	ORBITER SCHEMATIC LIST SCHEMATIC, C&T GROUND COMMAND INTERFACE LOGIC CONTROLLER LRU SCHEMATIC LIST WIRE RUN LIST GCIL CONTROLLER DRIVER BOARD PARTITIONING TABLE DOCUMENT LOGIC DIAGRAM, MDM A DATA BUFFER A1 LOGIC DIAGRAM, MDM B DATA BUFFER A2 LOGIC DIAGRAM, DECODER DRIVER A3 THRU A9, A11 THRU A18 LOGIC DIAGRAM, COMPLEX DECODER DRIVER A10 SCHEMATIC DIAGRAM POWER SUPPLY A19 & A20			
		CONRAC, INC.	7954927-001		A					
		CONRAC, INC.	7102889		A	9/30/82				
		CONRAC, INC.	7906817		A	7/7/81				
		CONRAC, INC.	7906819		A	7/6/81				
		CONRAC, INC.	7906821		A	7/7/81				
		CONRAC, INC.	7906823		A	7/6/81				
CONRAC, INC.	7906825		A	7/7/81						
16.18	OPS RECORDERS	R. I.	V570-750119		E	4/11/83	ORBITER SCHEMATIC LIST SCHEMATIC DIAGRAM, RECORDERS - OPS1/OPS2 LRU SCHEMATIC LIST INTERMEDIATE AMP SCHEMATIC INTERCONNECT DIAGRAM, ELECTRONICS UNIT PARALLEL/SERIAL REPRO AMP SCHEMATIC SERVO POWER SUPPLY SCHEMATIC DIGITAL REPRO SCHEMATIC SERIAL DATA REPRO PWR SUPPLY/TLMY SCHEMATIC ERASE OSCILLATOR SCHEMATIC TRANSPORT UNIT SERVO SCHEMATIC DIRECTION SENSOR SCHEMATIC BIAS OSCILLATOR SCHEMATIC RECORD HEAD SWITCHER SCHEMATIC 7 CHANNEL PREAMPLIFIER (TRKS 1-7) 7 CHANNEL PREAMPLIFIER (TRKS 8-14) DIGITAL RECORD COMPENSATION SCHEMATIC DIGITAL REPRO SCHEMATIC			
		ODEETICS, INC.	4410651		E	5/12/77				
		ODEETICS, INC.	4410701	2	E	5/10/77				
		ODEETICS, INC.	4410941	2	C	6/30/76				
		ODEETICS, INC.	4410961		C	6/30/79				
		ODEETICS, INC.	4410971	2	C	3/2/76				
		ODEETICS, INC.	4410976	6	C	5/3/76				
		ODEETICS, INC.	4411016		C	4/26/76				
		ODEETICS, INC.	4411034	3	C	5/7/79				
		ODEETICS, INC.	4411056			6/10/76				
		ODEETICS, INC.	4411716		C	5/9/78				
		ODEETICS, INC.	4411721		B	11/2/77				
		ODEETICS, INC.	4410709			3-5-76				
		ODEETICS, INC.	4411051			1/15/76				
		ODEETICS, INC.	4411111		A	6/12/85				
ODEETICS, INC.	4411916		B	7/15/85						

DWG	SIGNATURE	DATE	DWG	SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LYNDON B. JOHNSON SPACE CENTER HOUSTON, TEXAS					
16.14	ENGR F. MACFARLANE		16.17	ENGR J. CONNER		VENDOR DRAWING REFERENCES					
	ENGR <i>F. MacFarlane</i>	5 NOV 90		ENGR <i>J. P. Conner</i>	11-5-90						
16.15	ENGR J. O. SAYLER		16.18	ENGR R. E. LABRODE							
	ENGR <i>J. O. Sayler</i>	5 NOV 90		ENGR <i>R. E. Labrode</i>	11-5-90						
16.16	ENGR MARTIN T. O'HARE			APP					SPACE SHUTTLE	TBL NO	16-1
	ENGR <i>Martin T. O'Hare</i>	11/5/90		APP					ALL		
	ENGR			LTR E	PCN	PAGE 16.1-11	SHEET 11 OF 13				

BASIC REV E

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
16.19	P/L RECORDERS	R. I.	V570-750142		K	4/9/83	ORBITER SCHEMATIC LIST SCHEMATIC DIAGRAM, PAYLOAD RECORDER SUBSYSTEM LRU SCHEMATIC LIST RECORDER COMPONENTS SCHEMATIC
		ODETICS, INC.	4410651		E	5/12/77	INTERMEDIATE AMP SCHEMATIC
		ODETICS, INC.	4410701	2	E	5/10/77	INTERCONNECT DIAGRAM, ELECTRONICS UNIT
		ODETICS, INC.	4410941	2	C	6/30/76	PARALLEL SERIAL REPRO AMP SCHEMATIC
		ODETICS, INC.	4410961		C	6/30/79	SERVO POWER SUPPLY SCHEMATIC
		ODETICS, INC.	4410971	2	C	3/2/76	DIGITAL REPRO SCHEMATIC
		ODETICS, INC.	4410976	6	C	5/3/76	SERIAL DATA REPRO PWR SUPPLY/TLMY SCHEMATIC
		ODETICS, INC.	4411016		C	4/26/76	ERASE OSCILLATOR SCHEMATIC
		ODETICS, INC.	4411034	3	C	5/7/79	TRANSPORT UNIT SERVO SCHEMATIC
		ODETICS, INC.	4411056		C	6/10/76	DIRECTION SENSOR SCHEMATIC
		ODETICS, INC.	4411716		C	5/9/79	BIAS OSCILLATOR SCHEMATIC
		ODETICS, INC.	4411721		B	11/2/77	RECORD HEAD SWITCHER SCHEMATIC
		ODETICS, INC.	4410709			3/5/76	7 CHANNEL PREAMPLIFIER (TRKS 1-7)
		ODETICS, INC.	4411051			1/15/76	7 CHANNEL PREAMPLIFIER (TRKS 8-14)
		ODETICS, INC.	4411111		A	6/12/85	DIGITAL RECORD COMPENSATION SCHEMATIC
		ODETICS, INC.	4411916		B	7/15/85	DIGITAL REPRO SCHEMATIC
16.20 (SHEET 1)	WIRELESS CCU AIU	GTE GOV SYS	00-1388301		-	1/16/86	ORBITER SCHEMATIC LIST NONE - SEE 16.10-1 THRU 7 FOR AUDIO INTERFACE LRU SCHEMATIC LIST
		GTE GOV SYS	00-1380321		C	7/25/83	INTERCONNECT DIAGRAM - AIU
		GTE GOV SYS	00-1388111		A	11/14/85	SCHEMATIC UHF RECEIVER MODULE
		GTE GOV SYS	00-1388141		B	11/14/85	SCHEMATIC UHF TRANSMIT MODULE
		GTE GOV SYS	00-1388151		A	11/14/85	SCHEMATIC IF AMP/DEMOM MODULE
		GTE GOV SYS	00-1388161		-	11/14/85	SCHEMATIC RECEIVE AUDIO MODULE
		GTE GOV SYS	00-1388191		B	11/14/85	SCHEMATIC TRANSMIT AUDIO MODULE
		GTE GOV SYS	00-1388351		-	7/27/85	SCHEMATIC AUDIO SUMMER MODULE SCHEMATIC AMP/REG MODULE
16.20 (SHEET 2)	WIRELESS CCU CRU	GTE GOV SYS	00-1388201		-	1/16/86	INTERCONNECT DIAGRAM - CRU
		GTE GOV SYS	00-1380321		C	7/25/83	SCHEMATIC UHF RECEIVER MODULE
		GTE GOV SYS	00-1388111		A	11/14/85	SCHEMATIC UHF TRANSMIT MODULE
		GTE GOV SYS	00-1388141		B	11/14/85	SCHEMATIC IF AMP/DEMOM MODULE
		GTE GOV SYS	00-1388151		A	11/14/85	SCHEMATIC RECEIVE AUDIO MODULE
		GTE GOV SYS	00-1388161		-	11/14/85	SCHEMATIC TRANSMIT AUDIO MODULE
		GTE GOV SYS	00-1388171		-	11/14/85	SCHEMATIC FREQUENCY PROGRAMMING MODULE
16.23	EXTENDED RANGE PAYLOAD COMM LINK	NASA JSC	SID39123695	1	-	1/28/93	ERPCL RF INTERCONNECTION DIAGRAM
		NASA JSC	SIDE9123389	1	A	10/01/92	ERPCL WIRING DIAGRAM
		NASA JSC	SED39123773	1	-	10/01/92	ERPCL CONNECTOR KEY ASSEMBLY
		NASA JSC	SID39123359	1	-	9/28/92	ERPCL POWER BOARD SCHEMATIC DIAGRAM
		NASA JSC	SID39123363	1-4	-	9/28/92	ERPCL LOGIC BOARD #1 SCHEMATIC DIAGRAM
		NASA JSC	SID39123367	1-5	-	9/29/92	ERPCL LOGIC BOARD #2 SCHEMATIC DIAGRAM
		NASA JSC	SID39123371	1-4	-	9/29/92	ERPCL INTERCONNECT BOARD SCHEMATIC DIAGRAM
		NASA JSC	SID39122415	1	C	8/12/92	ERPCL EMI ENCLOSURE SCHEMATIC DIAGRAM
		NASA JSC	SID39123394	1	-	1/28/93	ERPCL TEST CONNECTOR HOUSING SCHEMATIC DIAGRAM
		AACOM	33011	1-3	B	9/26/91	L BAND EXCITER BOARD SCHEMATIC
		AACOM	33389	1	B	12/16/91	POWER AMPLIFIER BOARD SCHEMATIC
		AACOM	33015	1-2	C	5/-/92	AT27055 TRANSMITTER FINAL ASSEMBLY

DWG	SIGNATURE	DATE	DWG	SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LYNDON B. JOHNSON SPACE CENTER HOUSTON, TEXAS	
16.19	ENGR R. E. LABRODE			ENGR		VENDOR DRAWING REFERENCES	
	ENGR <i>R. E. Labrode</i>	10/7/93		ENGR			
16.20-1,2	ENGR G. C. HORLACHER			ENGR			
	ENGR <i>G. C. Horlach</i>	10/07/93		ENGR		SPACE SHUTTLE TBL NO 16-1	
16.23	ENGR G. C. HORLACHER			APP <i>Stephen J. Elmer</i>	10/7/93		
	ENGR <i>G. C. Horlach</i>	10/07/93		APP <i>Allen J. Morris</i>	10/17/93	ALL	
	ENGR			OMNIPLAN		PAGE 16.1-12 SHEET 4 OF 4	
	ENGR			LTR E	PCN 3		

BASIC REV E-3

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
16.24 (Sheet 1)	INTERIM VIDEO TAPE RECORDER	R. I.	VS70-740182		-	10/31/84	ORBITER SCHEMATIC LIST SCHEMATIC DIAGRAM, TV COMM AND TRACKING SUBSYSTEM
		NASA JSC	SID16101765	1-2	B		LRU SCHEMATIC LIST
		NASA JSC	SED16101767	1-2	B		WIRING DIAGRAM, SWITCHBOX, VTR CABLE ASSEMBLY, INTERCONNECTION DIAGRAM, VTR/SWITCHBOX - VTR HOUSING
		NASA JSC	SID16101769	1-2	B		INTERCONNECTION WIRING DIAGRAM, VTR
		NASA JSC	SID16101772	1	B		SCHEMATIC DIAGRAM, SIDETONE AMPLIFIER, VTR
		NASA JSC	SID16101775	1	-		SCHEMATIC DIAGRAM, SV-10 BOARD, VTR
		NASA JSC	SID16101776	1	A		SCHEMATIC DIAGRAM, COL BOARD, VTR
		NASA JSC	SID16101798	1	-		SCHEMATIC DIAGRAMS, LM-3/BS BOARD, VTR
		NASA JSC	SID16101777	1	A		SCHEMATIC DIAGRAM, SV-2A BOARD VTR
		NASA JSC	SID16101779	1	B		DRAWING TREE, VTR HOUSING
		NASA JSC	SID16101780	1	A		DRAWING TREE, RECORDER ASSEMBLY, VTR
		NASA JSC	SID16101782	1	B		SCHEMATIC, MD BOARD, VTR
		NASA JSC	SID16101786	1	B		SCHEMATIC, VIDEO OUTPUT AMPLIFIER, VTR HOUSING
		NASA JSC	SID16101791	1	B		SCHEMATIC, VIDEO INTERFACE/AUDIO-AGC-COLOR, VTR
		NASA JSC	SID16101797	1	A		SCHEMATIC DIAGRAM, AV BOARD, VTR
		NASA JSC	SID16101799	1	-		SCHEMATIC DIAGRAMS, PD/FR/MA-1/RL BOARDS, VTR
NASA JSC	SID16101801	1	A		SCHEMATIC, CO BOARD		
16.24 (Sheet 2)	8MM VIDEO TAPE RECORDER	NASA JSC	SID33104526	1	-	6/12/92	SCHEMATIC DIAGRAM, VTR V-80AB-F
		NASA JSC	SID33104450	1	-	6/30/92	SCHEMATIC DIAGRAM, AUDIO INTERFACE - TEAC
		NASA JSC	SID33104458	1-2	-	1/15/92	VIDEO TAPE RECORDER ASSEMBLY - VTR V-80AB-F
16.25 (Sheet 1)	COMM POWER DISTRIBUTION						REFERENCE SSSHB SCHEMATIC TRACEABILITY LIST FOR THE FOLLOWING DRAWINGS: S-BD PM TRANSPONDER, 16.2-1 S-BD PM AMPLIFIER SYS, 16.2-2 S-BD PM/FM SW BEAM ANT SYS, 16.2-3 NSP RTN LINK, 16.3-1 NSP COMSEC 1/2, 16.3-3 TAGS/SECURE TAGS, 16.4-1,2 KU-BD SYSTEM, 16.5-1,2 S-BD FM SYS, 16.8-1 UHF XCVR, 16.9-1 AUDIO PANEL, 16.10-1,2,3,4,5,6,7 AUDIO/ACCU, 16.11-2 TV CONTROL, 16.12-1 TV/CAMERA MONITOR, 16.13-1,2 TV/SECURE, 16.13-4 S-BD PI, 16.14-1 PSP, 16.15-1 GCIL, 16.17-1 OPS RCDRS, 16.18-1 P/L RCDR, 16.19-1 CIE, 16.22-1 IVTR, 16.24-1 OI PCMMU, 17.2-1 PDI, 17.3-1
16.26 (Sheet 1)	COMM MDM I/F	RI RI	VS70-720569 VS70-720599		A	5/18/81 11/14/80	ORBITER SCHEMATIC LIST DP&S DATA BUSES, FC 1-8 DATA BUS PLB01 AND PLB02 REFERENCE SSSHB SCHEMATIC TRACEABILITY LIST FOR THE FOLLOWING DRAWINGS: NSP FWD LINK, 16.3-2 KU-BD SYS, 16.5-1 OI DSC/MDM, 17.1-1 CIE CNTL, 16.22-1 MADS RCDR, 17.12 OPS RCDRS, 16.18 P/L RCDR, 16.19 P/L SIG PROC, 16.15 GCIL, 16.17 S-BD PM, 16.2-3 TV CNTL, 16.12 ADU STV, 16.3-4 TAGS/OHC, 16.4-1

DWG	SIGNATURE	DATE	DWG	SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LYNDON B. JOHNSON SPACE CENTER HOUSTON, TEXAS	
16.24-1.2	ENGR F. J. MACFARLANE			ENGR		VENDOR DRAWING REFERENCES	
	ENGR <i>F. J. MacFarlane</i>	11/25/83		ENGR			
16.25	ENGR A. MORRISON			ENGR			
	ENGR <i>Allen Morrison</i>	2/18/93		ENGR			
16.26	ENGR S. M. KAKADELIS			APP <i>Stephen P. Elson</i>	2/19/83	SPACE SHUTTLE	TBL NO 16-1
	ENGR <i>S. M. Kakadelis</i>	11/5/81		APP		ALL	
	ENGR			OMNIPLAN			
	ENGR			LTR E	PCN 2		PAGE 16.1-13 SHEET 13 OF 13

BASIC REV E-2

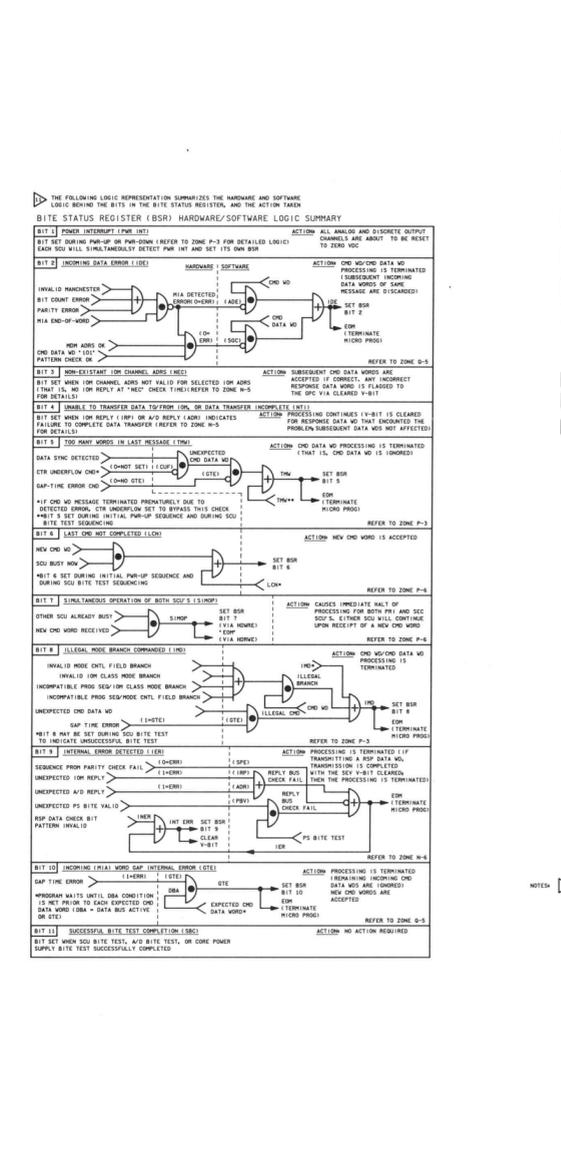
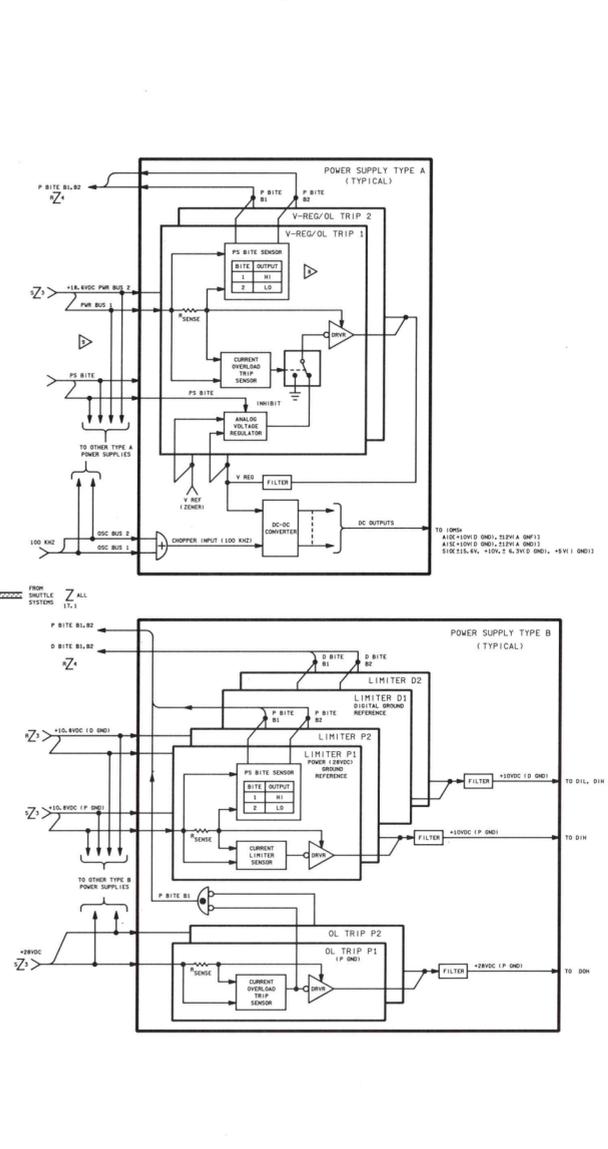
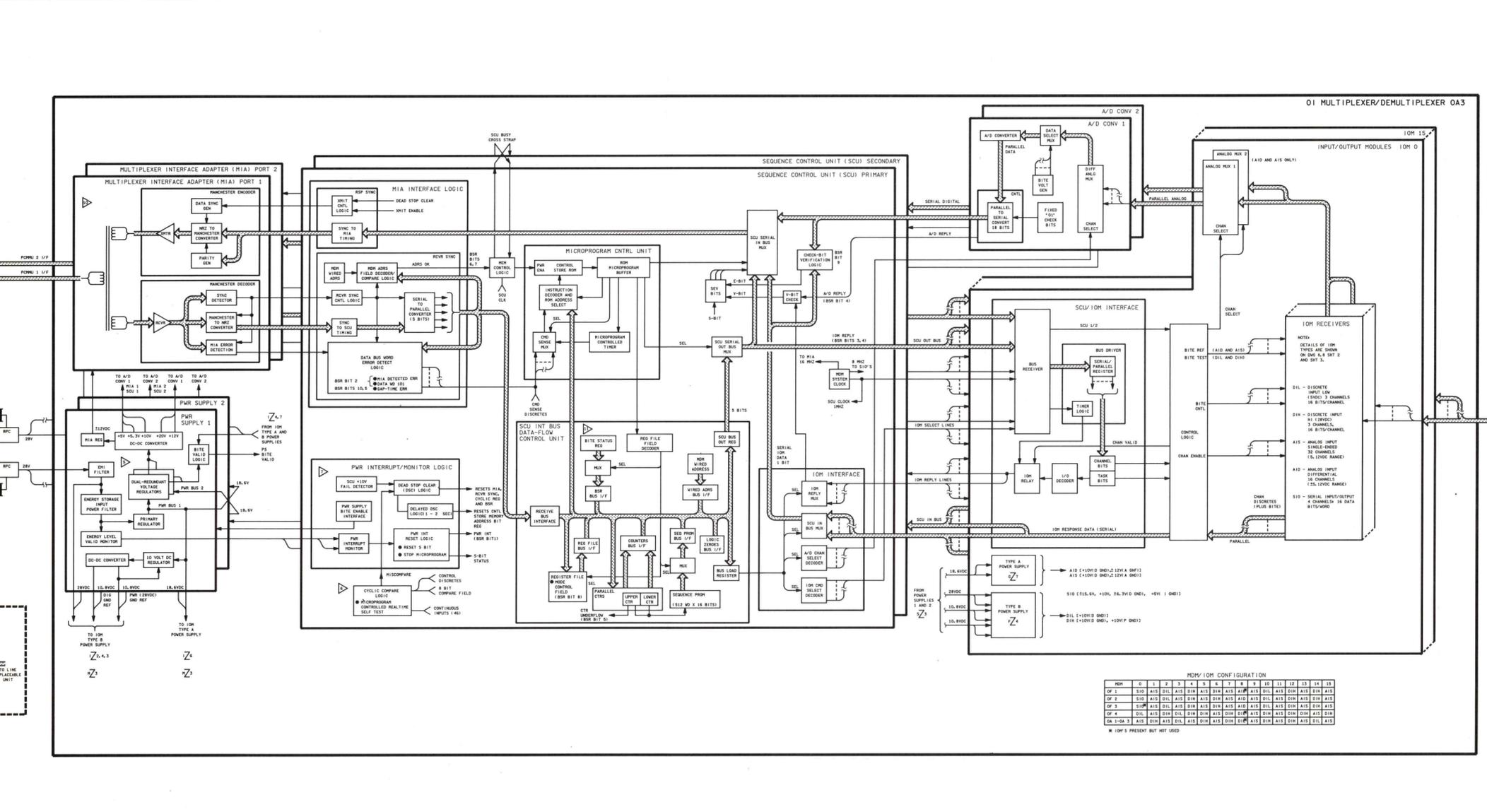
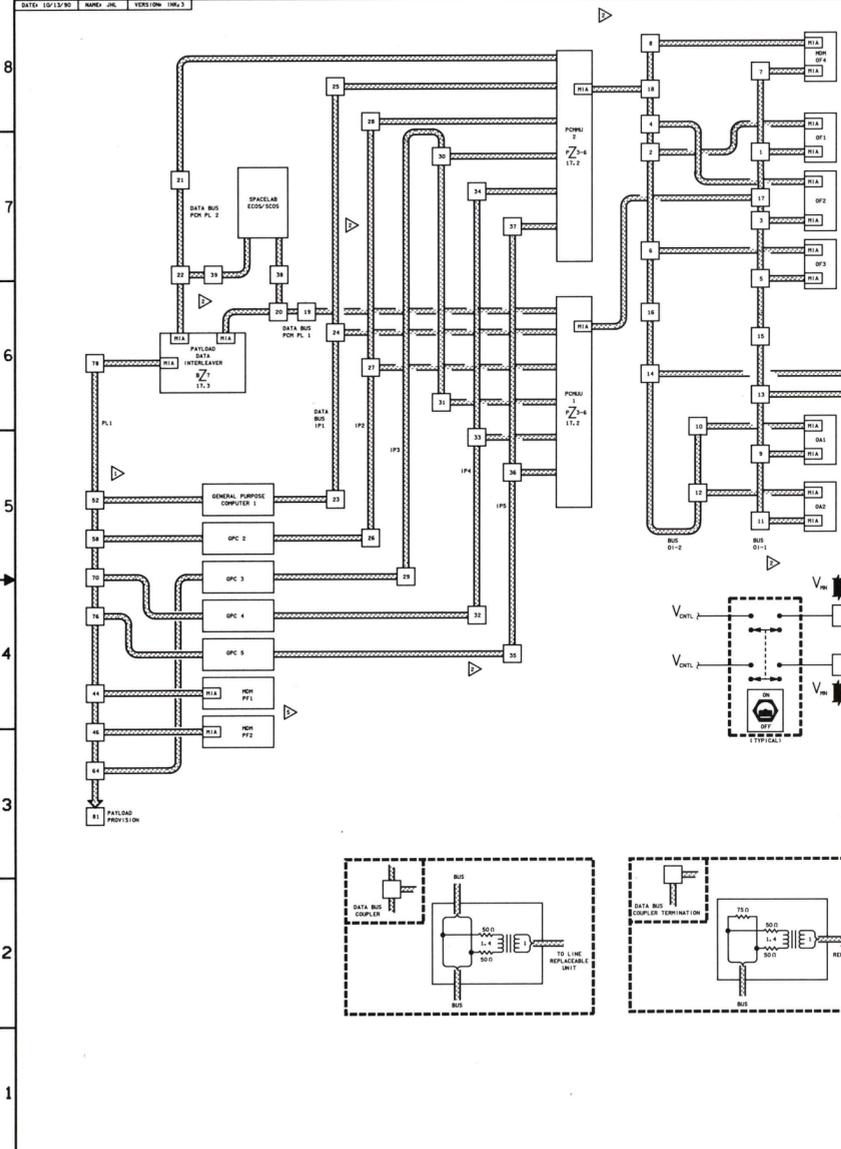
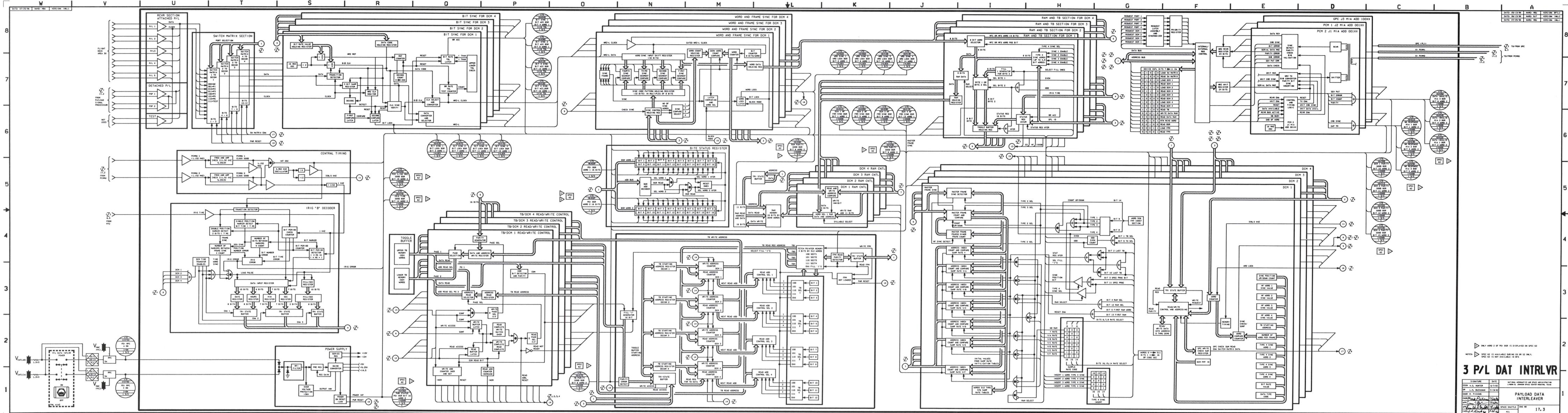


Table with columns: ID, LOCATION, NAME, LRU, LOCATION, DATA. Lists various error codes and their locations.

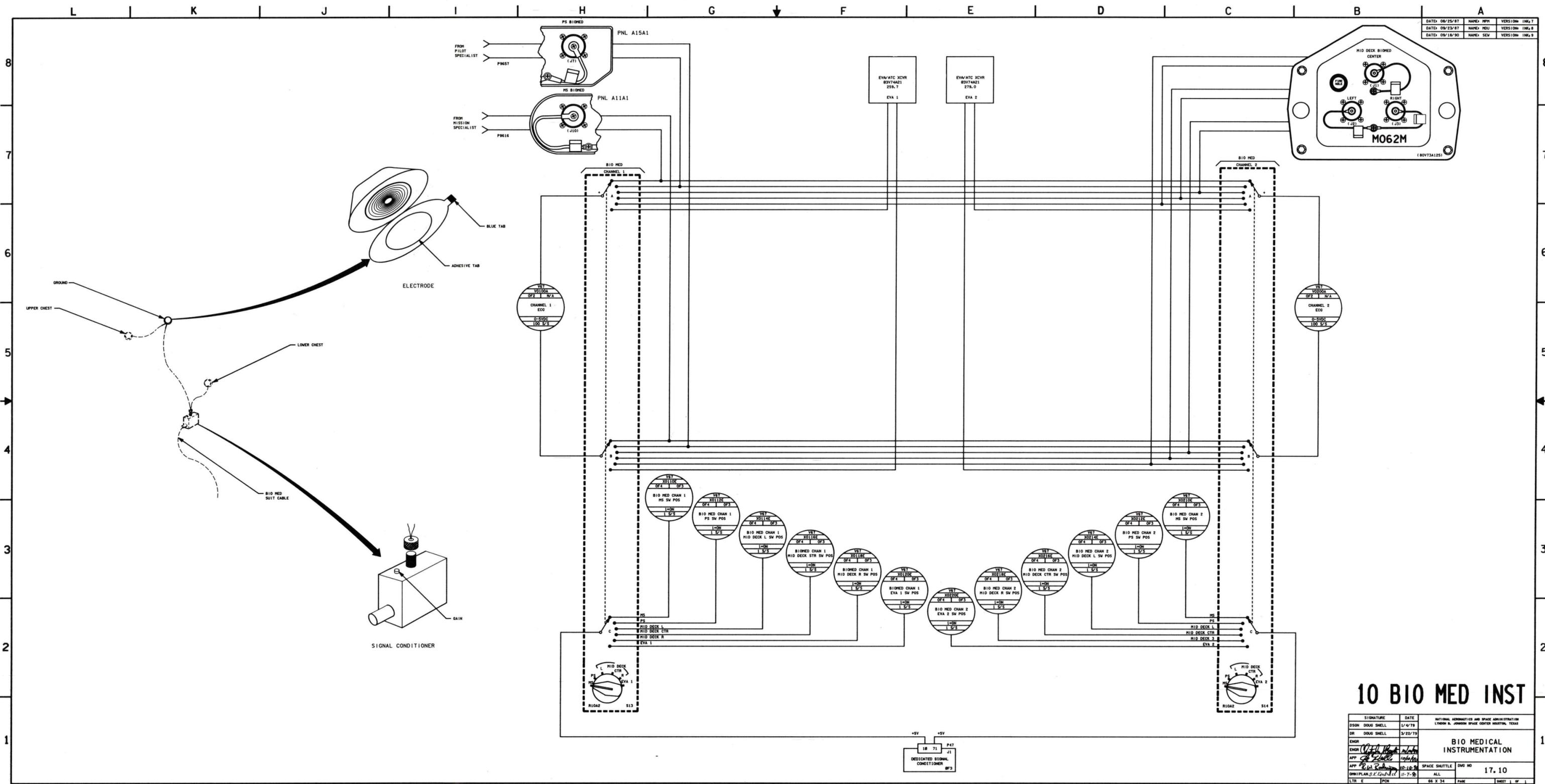
1 INST MDM 3
SIGNATURE DATE
DATE: 10/13/70
NAME: J.R.
VERSION: 100.3



3 P/L DAT INTRLV

DATE	BY	REVISION	DESCRIPTION
05/13/66	L.S. BUCHANAN	1	INITIAL DESIGN
06/13/66	L.S. BUCHANAN	2	REVISED FOR PRODUCTION
07/25/66	L.S. BUCHANAN	3	REVISED FOR PRODUCTION
08/15/66	L.S. BUCHANAN	4	REVISED FOR PRODUCTION
09/15/66	L.S. BUCHANAN	5	REVISED FOR PRODUCTION
10/15/66	L.S. BUCHANAN	6	REVISED FOR PRODUCTION
11/15/66	L.S. BUCHANAN	7	REVISED FOR PRODUCTION
12/15/66	L.S. BUCHANAN	8	REVISED FOR PRODUCTION

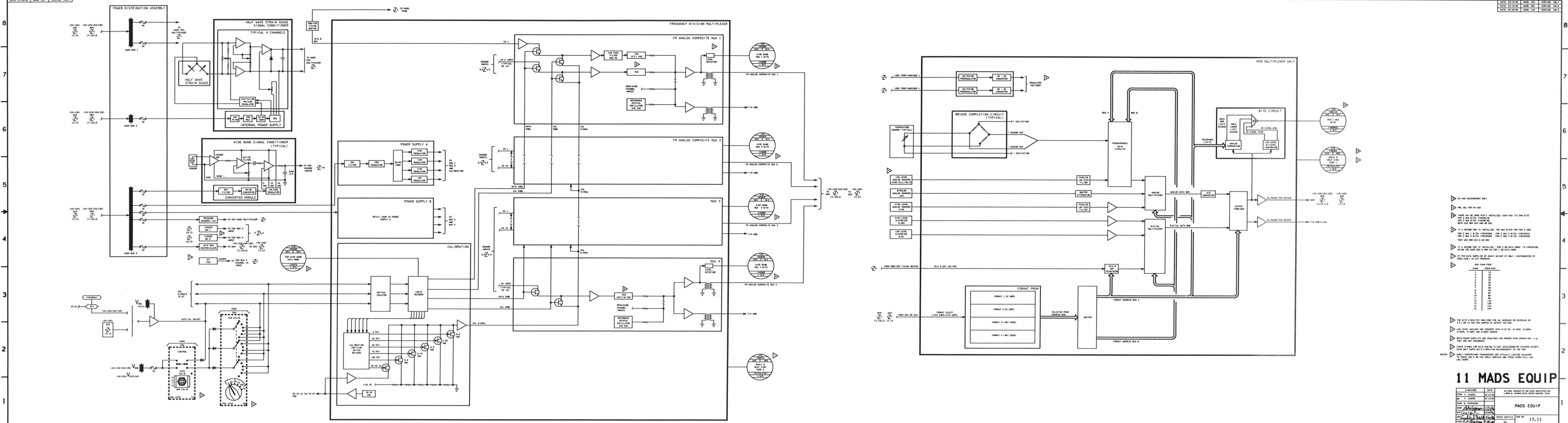
DATE: 05/13/66 NAME: L.S. BUCHANAN VERSION: 17.3
 DATE: 06/13/66 NAME: L.S. BUCHANAN VERSION: 17.3
 DATE: 07/25/66 NAME: L.S. BUCHANAN VERSION: 17.3
 DATE: 08/15/66 NAME: L.S. BUCHANAN VERSION: 17.3
 DATE: 09/15/66 NAME: L.S. BUCHANAN VERSION: 17.3
 DATE: 10/15/66 NAME: L.S. BUCHANAN VERSION: 17.3
 DATE: 11/15/66 NAME: L.S. BUCHANAN VERSION: 17.3
 DATE: 12/15/66 NAME: L.S. BUCHANAN VERSION: 17.3



DATE: 06/25/87	NAME: PPH	VERSION: 1MG.1
DATE: 08/22/87	NAME: HCU	VERSION: 1MG.8
DATE: 09/18/90	NAME: SEV	VERSION: 1MG.9

10 BIO MED INST

SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
DR: DOUG SHELL	1/4/79	LINDON B. JOHNSON SPACE CENTER HOUSTON, TEXAS
ENGR: <i>[Signature]</i>	5/22/79	BIO MEDICAL INSTRUMENTATION
APP: <i>[Signature]</i>	10-10-90	SPACE SHUTTLE DWS NO 17.10
DRW: PLAN S. K. <i>[Signature]</i>	11-7-90	ALL
LTR: E	PCH	66 X 34 PAGE SHEET 1 OF 1



- NOTES:
- 0V-10V MEASUREMENT ONLY
 - THE AGL FOR 0V-10V
 - THERE MAY BE MORE PDS'S INSTALLED. EACH HAS ITS OWN BITE
 - FOR 2 MUX BITS: VIBR/SHOCK; FOR 3 MUX BITS: VIBR/SHOCK; BOTH USE HW 033 AND NO SSC
 - IF A SENSOR FOR 15 IS INSTALLED, THE MUX BITS FOR PDS 2 AND 3 ARE 2 MUX 1 BITS; VIBR/SHOCK; FOR 2 MUX 2 BITS: VIBR/SHOCK; FOR 2 MUX 3 BITS: VIBR/SHOCK; FOR 2 MUX 4 BITS: VIBR/SHOCK; THEY USE HW 033 & NO SSC
 - IF A SENSOR FOR 15 IS INSTALLED, "FOR 3 MUX DATA MODE" IS VIBR/SHOCK. USING THE SAME SSC & HW AS FOR 1 MUX DATA MODE
 - ET FOR DATA SUPPLIED BY HEAVY WEIGHT ET ONLY. INSTRUMENTED ET USED EARLY IN STS PROGRAM
- | CHAN | FREQ (HZ) |
|------|-----------|
| 1 | 12 |
| 2 | 16 |
| 3 | 20 |
| 4 | 24 |
| 5 | 28 |
| 6 | 32 |
| 7 | 36 |
| 8 | 40 |
| 9 | 44 |
| 10 | 48 |
| 11 | 52 |
| 12 | 56 |
| 13 | 60 |
| 14 | 64 |
| 15 | 68 |
- THE BITE CIRCUIT MONITORS FOR AN INCREASE OR DECREASE OF 1.1 OR IN THE FPM COMPOSITE OUTPUT VOLTAGE
- LOW LEVEL ANALOGS ARE GROUPED INTO 0-10 MV, 0-150MV, 0-200MV, 0-300V, 0-HVNY AND 0-GOVNY RANGES
- BOTH POWER SUPPLIES ARE REQUIRED FOR PROPER PDS OPERATION. I. & II. THEY ARE NOT REDUNDANT
- FASCO STANES FOR MAIN ENGINE FLIGHT ACCELEROMETER SYSTEMS (C/OT/F). EACH UNIT SUPPLIES 6 VIBRATION MEASUREMENTS TO THE FPM
- SELF TEMPERATURE TRANSDUCERS ARE ACTUALLY LOCATED ADJACENT TO THESE WDG'S ON THE SELF SURFACE AND THESE TEMPS WILL LOG LRU TEMPS

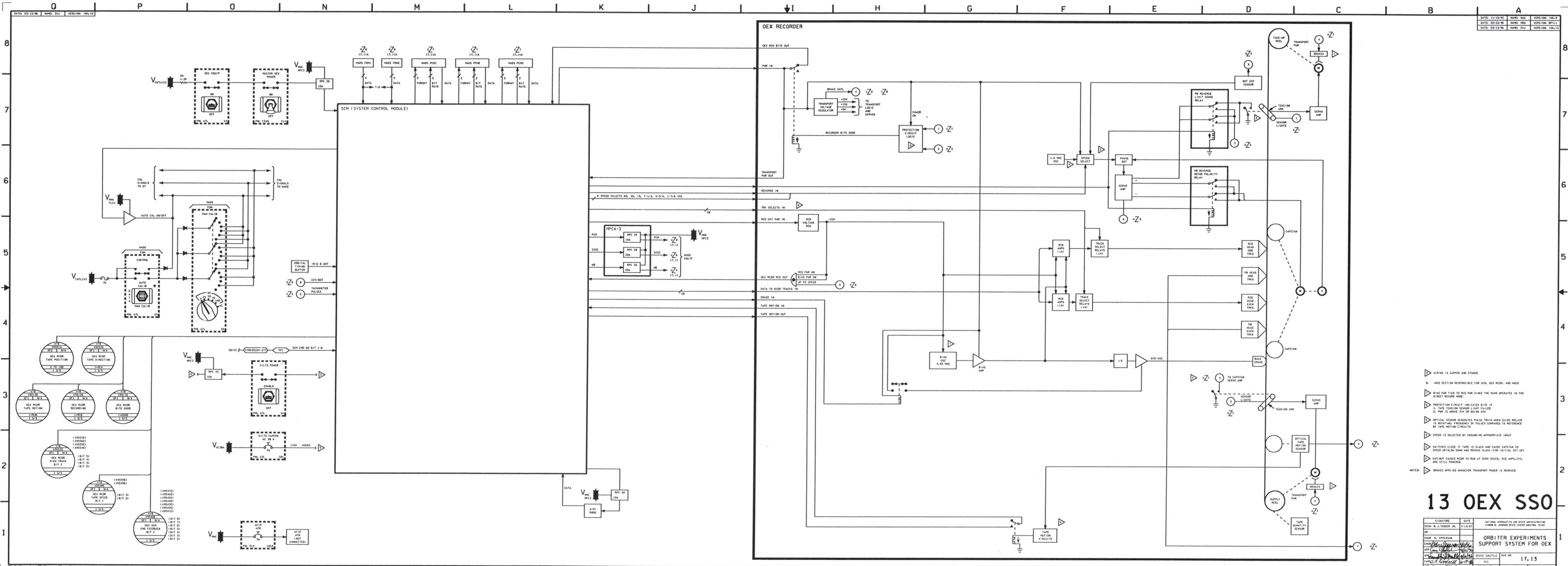
11 MADS EQUIP

SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
DRON T. LINDEN	8/13/82	LINDEN & JOHNSON SPACE CENTER HOUSTON, TEXAS
DRGR D. EMERSON	8/13/82	
DRGR D. EMERSON		
APP. C. C. CLAY	7/12/82	
DRGR D. EMERSON	7/12/82	

MADS EQUIP

SPACE SHUTTLE DWG NO. 17.11

121 2 24



BASIC REV E-6

13 OEX SSO

SIGNATURE		DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION	
DESIGN BY: J. TEDDER, JR.		7/13/87	HOOPER & JOHNSON SPACE CENTER HOUSTON, TEXAS	
DRAWN BY: EPPERSON				
CHECKED BY: [Signature]				
APP'D BY: [Signature]				
APPROVED BY: [Signature]				
TITLE: OEX RECORDER			SPACE SHUTTLE DUG NO	
REV E		REV 2	ALL	17.13
PAGE 2		PAGE	25.2.34	SHEET 1 OF 1

BASIC REV E-6

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		
17.1 (SHEET 1)	OI DSC'S AND MDM'S	RI	V070-751061-003		C/C3	10/20/82	SIGNAL CONDITIONER ASSEMBLY		
			V070-753261-007	1 OF 1	C/C3	10/22/82	Forward RCS Oper		
			V070-753261-009	1 OF 1	C/C3	10/22/82	Fwd Av Bay		
			V070-753261-010	1 OF 1	C/C3	10/22/82	Fwd Av Bay		
			V070-753262-003	2 OF 2	C/C3	10/22/82	Fwd Av Bay		
			V070-753262-005	2 OF 2	C/C3	10/22/82	Fwd Av Bay		
			V070-753263-007	3 OF 3	C/3D	11/76	Fwd Av Bay		
			V070-753263-008	3 OF 3	C/3D	11/76	Fwd Av Bay		
			V070-754161-002		D	6/16/87	Fuel-Cell A Mid1		
			V070-754163-010		D	6/16/87	Fuel-Cell B Mid2		
			V070-755261-005		C	4/29/83	Avionics Bay4-AFT		
			V070-755261-009		C/3D	12/76	Avionics Bay4-AFT		
			V070-755262-005		C/3D	12/76	Avionics Bay6-AFT		
			V070-755262-008		C/3D	12/76	Avionics Bay6-AFT		
			V070-755263-005		C/3D	12/76	Avionics Bay 6-AFT		
			V070-755263-008		C/3D	12/76	Avionics Bay6-AFT		
					SCAP/Shuttle Data Tape				LH OMS Pod-1
									RH OMS Pod-1
									LH OMS Pod-2
									RH OMS Pod-2
17.1 (SHEET 2)	OI DED. SIG. COND.	ELDEC LYNNWOOD WASH.	S7-040300		-	1/4/75	POWER CONDITIONER/CMIB		
			S7-040400		-	10/15/74	BITE CMIB		
			S7-043		-	11/13/74	Converter Pulse to DC		
			S7-044		-	10/16/74	Concenter Variable Res. to DC		
			S7-047		-	12/03/74	Converter AC to DC		
			S7-049		-	04/07/75	Converter Voltage Discrete AC		
			S7-051		-	10/23/74	Buffer 5 VDC Discrete		
			S7-052		-	08/10/74	DC Amplifier, Buffer, Attenuator		
17.1 (SHEET 3)	TBD								
17.2	OI PCM MASTER UNIT	ROCKWELL	V570-750129	1 - 3	F	6/8/88	SCHEMATIC DIAGRAM PCM MASTER, VEH 103/104		
			V570-750122	1 - 3	H	5/24/88	SCHEMATIC DIAGRAM PCM MASTER, VEH 102		

DWG	SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LYNDON B. JOHNSON SPACE CENTER HOUSTON, TEXAS	
17.1-1,2	ENGR S. M. KAKADELIS		VENDOR DRAWING REFERENCES	
	ENGR <i>S. Kakadelis</i>	11-15-90		
17.2	ENGR A. MORRISON			
	ENGR <i>A. Morrison</i>	9/15/82		
	APP <i>[Signature]</i>	11-15-90	SPACE SHUTTLE	TBL NO 17-1
	APP		ALL	
	OMNIPLAN			
	LTR E	PCN		

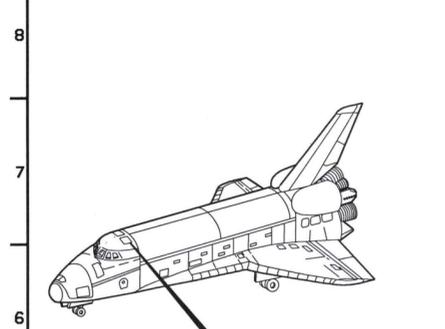
BASIC REV E

FOR DETAILED COMPONENT AND LOGIC INFORMATION REFER TO:

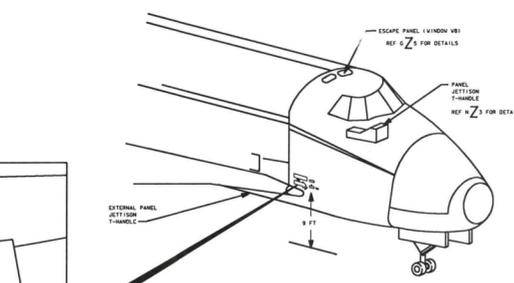
SSSH DWG NO.	SSSH DWG TITLE	VENDOR NAME	VENDOR DWG NO.	VENDOR SHEET NO.	REV	DATE	VENDOR DRAWING TITLE
17.3 (SHEETS 1-3)	PAYLOAD DATA INTERLEAVER	ROCKWELL	V570-750169		H	5/24/88	PAYLOAD DATA INTERLEAVER
		Harris	619105	1	A	9/14/76	Logic Diagram, Electrical-I/O Buffer Decoder, Chip 5
		Harris	620341	1	A	9/14/76	I/O Buffer, First Stage I/O, Chip 1
		Harris	620342	1	A	9/14/76	I/O Buffer, Second Stage I/O, Chip 2
		Harris	620343	1	A	9/14/76	I/O Buffer, First Stage I/O, Chip 3
		Harris	620344	1	A	9/14/76	I/O Buffer Control, Chip 4
		Harris	622141	1	N/C	7/20/78	Schematic Diagram, Electrical-Power Supply
		Harris	622143	1	N/C	7/20/78	Logic Diagram, Electrical-I/O Buffer
		Harris	622146	1	A	4/13/78	Logic Diagram, Electrical-Memory Module
		Harris	622147	1-4	N/C		Logic Diagram, Electrical-Priority, Buss Control
		Harris	622148	1-4	N/C		Logic Diagram, Electrical-Timing & Irig
		Harris	622149	1-2	N/C	2/12/79	Logic Diagram, Electrical-Rcvr & Scom
		Harris	622150	1-5	N/C	2/26/79	Logic Diagram, Electrical-Bit/Word Sync
		Harris	622151	1-4	N/C	2/26/79	Logic Diagram, Electrical-Decom T-1
		Harris	622152	1-4	N/C	2/26/79	Logic Diagram, Electrical-Decom Control - Type II
		Harris	622153	1-3	N/C	2/26/79	Logic Diagram, Electrical-Decom Control, Type 3
		Harris	622154	1-4	N/C	2/26/79	Logic Diagram, Electrical-Decom Type 4
		Harris	622155	1-5	N/C	2/26/79	Logic Diagram, Electrical-Fpm, Tb Cont
		Rockwell	V570-750169	1-2	H	5/24/88	Schematic Diagram - Payload Data Interleaver
		Harris	138693	1-304	N/C	5/16/79	Run List, PDI Motherboard
		17.4 THRU 17.9	RESERVED				
17.10	BIO MEDICAL INSTRUMENTATION	R.I.	V570-974099	31	A-13	11/17/86	COMM. 7 TRACKING INTEGRATED SCHEMATICS PART I
17.11	TBD						
17.12C, D	TBD						

DWG	SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LYNDON B. JOHNSON SPACE CENTER HOUSTON, TEXAS	
17.3	ENGR A. MORRISON		VENDOR DRAWING REFERENCES	
	ENGR <i>[Signature]</i>	11/2/90		
17.10	ENGR C. SOUNTS			
	ENGR <i>[Signature]</i>	11/2/90		
	APP <i>[Signature]</i>	11/2/90		
	APP <i>[Signature]</i>	11/2/90	SPACE SHUTTLE	TBL NO
	OMNIPLAN		ALL	17-1
	LTR E	PCN	PAGE 17.1-2	SHEET 2 OF 2

DATE: 03/13/84 NAME: SEV VERSION: 11A.1



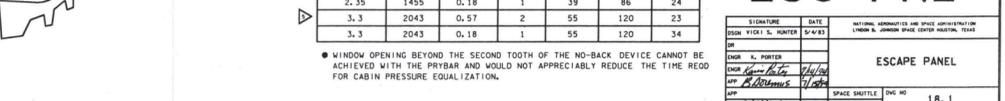
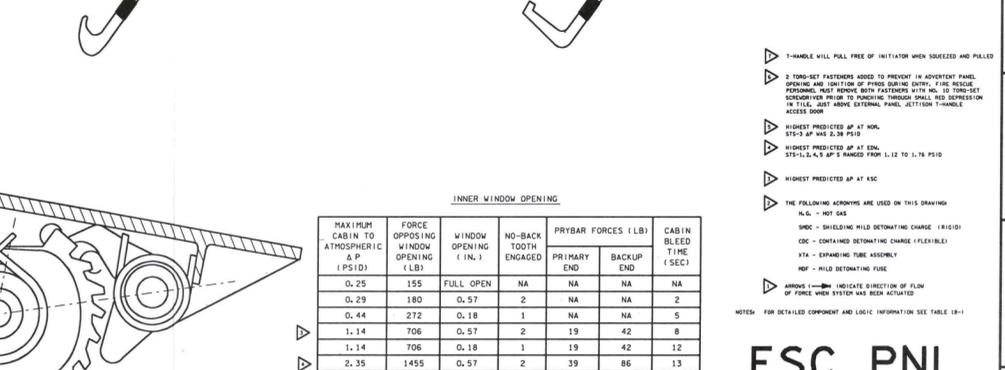
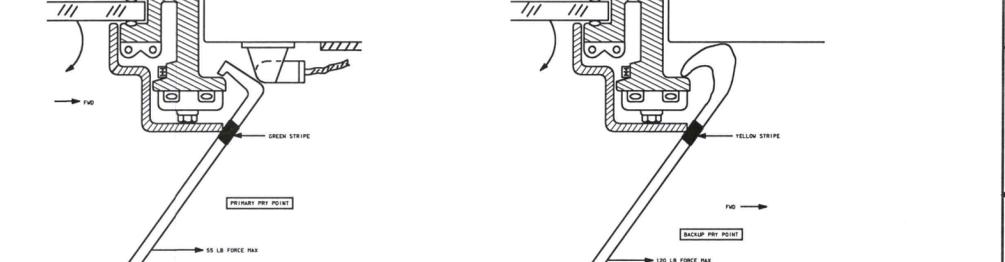
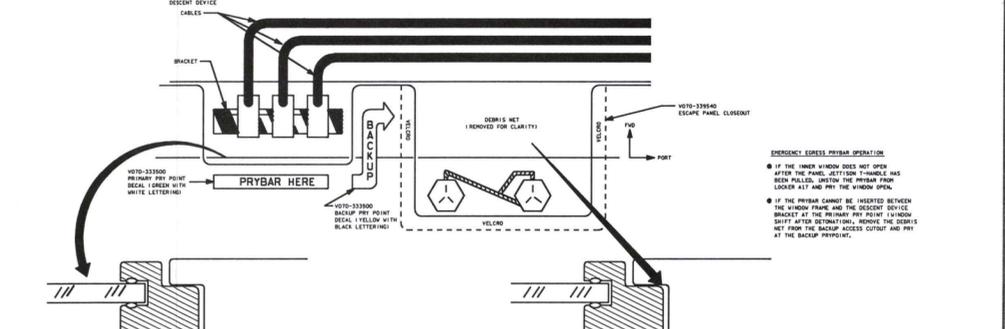
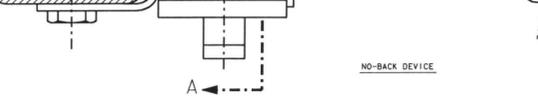
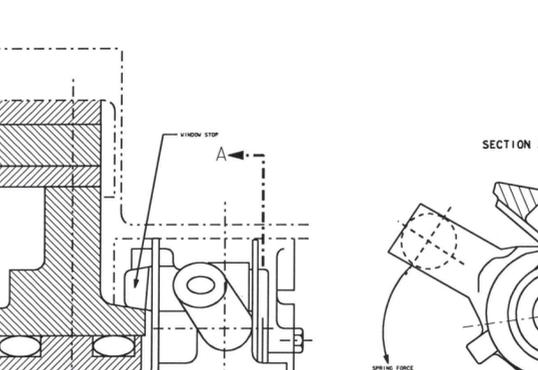
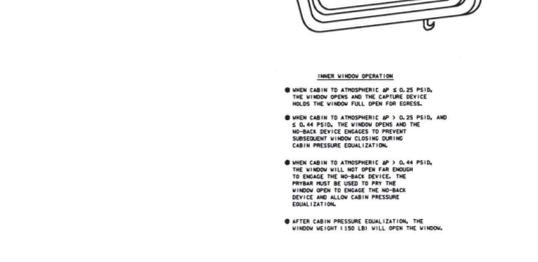
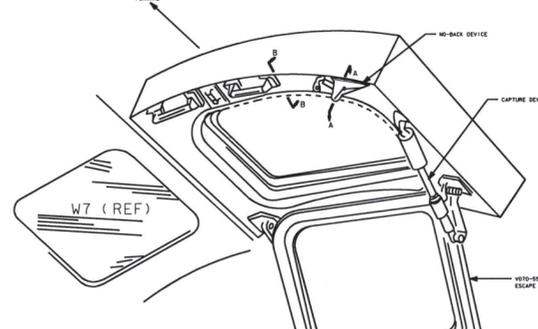
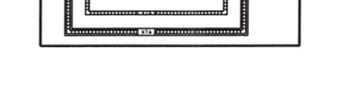
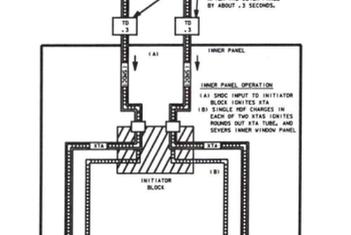
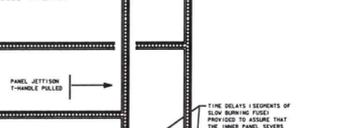
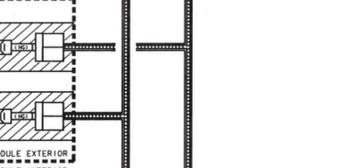
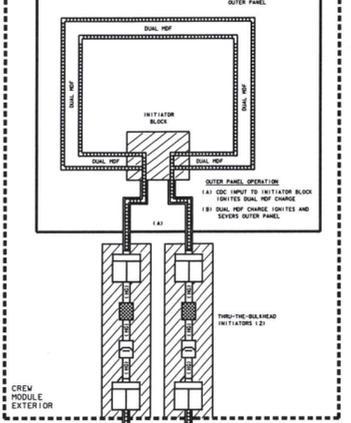
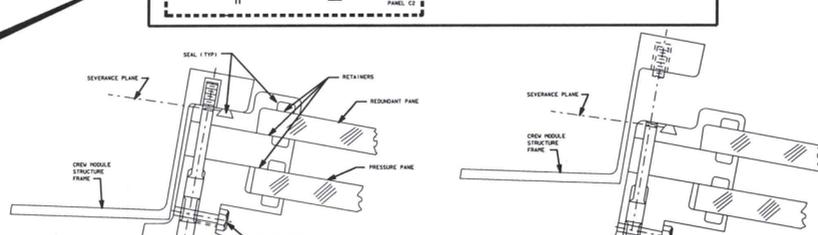
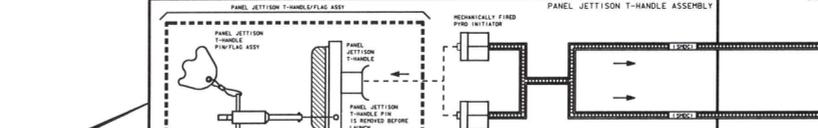
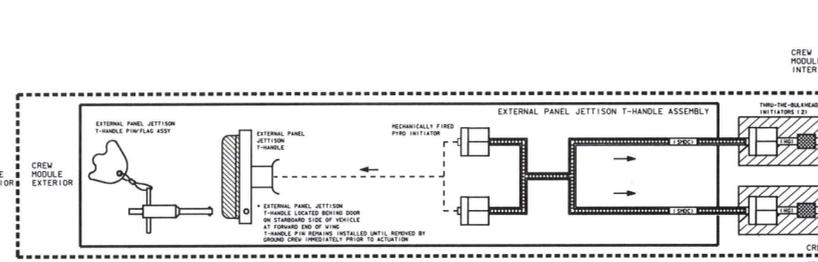
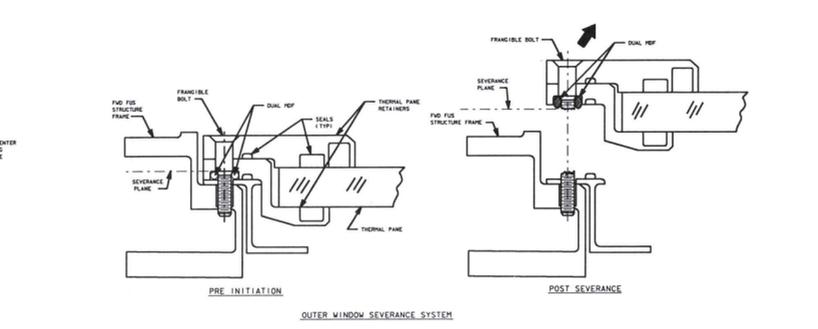
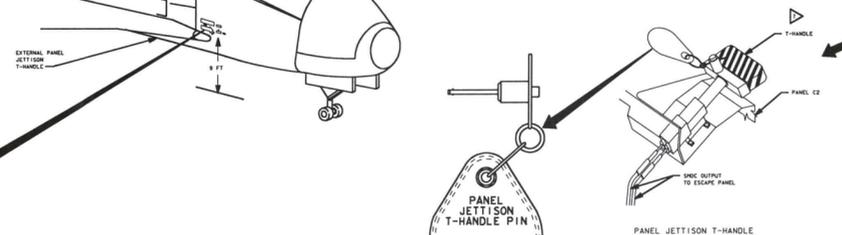
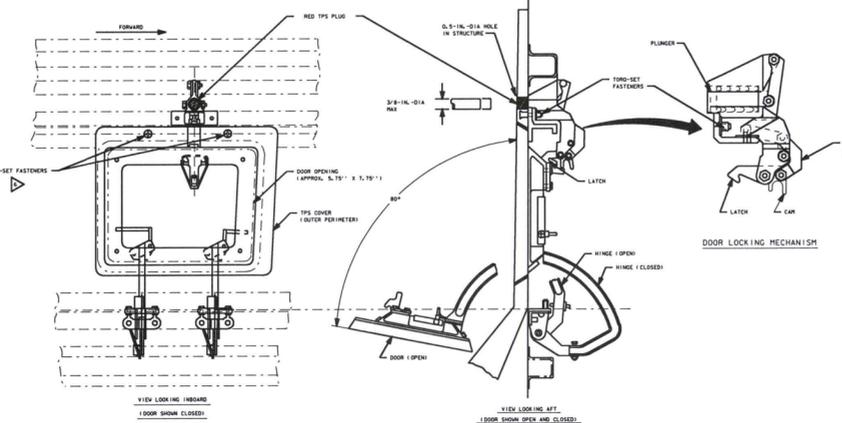
EGRESS WINDOW DANGER NOMENCLATURE



1. REMOVE TWO FASTENERS
2. PUSH BUTTON TO OPEN DOOR
3. SQUEEZE AND PULL "T" HANDLE TO JETTISON EGRESS WINDOW

OVERHEAD
RESCUE

ORBITER ESCAPE SYSTEM EXTERIOR MARKINGS



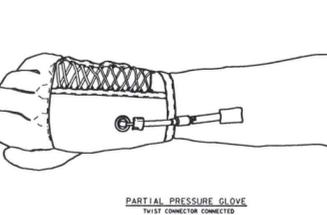
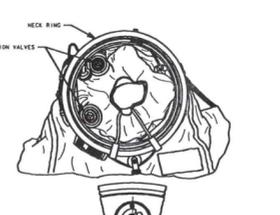
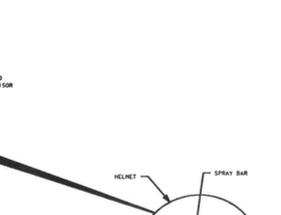
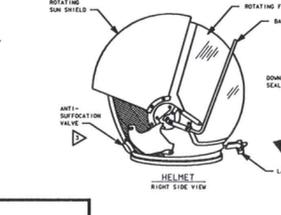
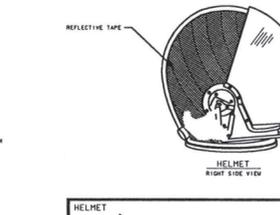
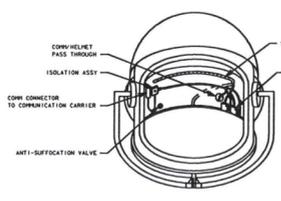
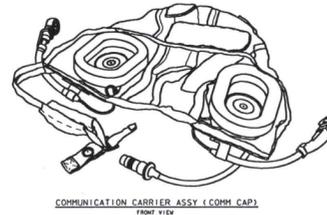
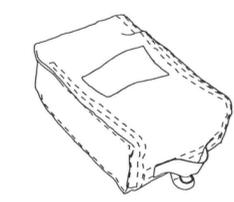
INNER WINDOW OPENING

MAXIMUM CABIN TO ATMOSPHERIC ΔP (PSID)	FORCE OPPOSING WINDOW OPENING (LB)	WINDOW OPENING (IN.)	NO-BACK TOOTH ENGAGED	PRYBAR FORCES (LB)	CABIN BLEED TIME (SEC)
0.25	155	FULL OPEN	NA	NA	NA
0.29	180	0.57	2	NA	2
0.44	272	0.18	1	NA	5
1.14	706	0.57	2	19	42
1.14	706	0.18	1	19	42
2.35	1455	0.57	2	39	86
2.35	1455	0.18	1	39	86
3.3	2043	0.57	2	55	120
3.3	2043	0.18	1	55	120

ESC PNL

ESCAPE PANEL

18.1



- ▶ THIS FITTING IS NOT A QUICK DISCONNECT. INSTEAD, IT IS AN ELBOW FITTING
- ▶ QUICK DON MASKS STORED FOR ASCENT AND ENTRY DEPLOYED DURING POST-INSERTION ACTIVITIES LOCATED IN VOL. 28
- ▶ PVS MAY BE MOUNTED ON OPPOSITE SIDE IF HIDECAK ACCOMMODATIONS BACK 1 INCH IS MANIFESTED. ON/OFF SWITCH IS RAISED FOR EASE OF ACCESS
- ▶ BID INSTRUMENTATION PASS-THROUGH (BIP) AND PLUS: PLUS IS USED WHEN PORT IS NOT REQUIRED. TO REMOVE BIP, SLIDE RED LEVERS UP AND IN OPPOSITE DIRECTION OF THE ARROW, LIFT UP, TO REPLACE, SNAP IN AND SLIDE RED LEVERS TO THE LOCKED POSITION
- ▶ HELMET COVERED WITH REFLECTIVE TAPE
- ▶ SUIT VENTILATION FAN POWER CABLE LENGTHS
COR: 1.51H 8 FT. 3 IN.
PLT: 1.52H 11 FT. 0 IN.
MSL: 1.52H 7 CARB. 11 FT. 0 IN.
HEE: 1.51H 8 FT. 6 IN.
HEE: 1.51H 8 FT. 6 IN.
HEE: 1.51H 15 FT. 0 IN. (1.17 FT. WHEN PWR IS MANIFESTED)
HEE: 1.51H 8 FT. 6 IN. (1.17 FT. FROM BELT TO "F")
HEE/PSD: 15 FT. 6 IN. (1.4 FT. 6 IN. FROM "F" TO PVS)
- ▶ SUIT VENTILATION FAN HOSE LENGTHS
COR AND PLT: 30 INCHES
HEE: 24 INCHES
- ▶ SLIDE RED TAB AWAY FROM SUIT AND TURN COX TO UNLOCK AND DISCONNECT NOZZLE. TO ATTACH NOZZLE, RED TAB IN UNLOCK POSITION, PRESS NOZZLE INTO SUIT VENTILATION PORT AND TURN RED TAB CW TO LOCK
- ▶ 3 SUIT VENTILATION UNITS. 1 AT CHEST, 2 AT LOWER G/L
- ▶ THE MICROPHONES IN THE COMM CAP ARE DYNAMIC WHICH REQUIRE NO POWER FOR OPERATION
- ▶ ACTIVATION OF GREEN APPLE TURNS O₂ FLOW RELEASE SCREW ARROUND TO THE ON POSITION
- ▶ EACH FAN DRIVES A CURRENT OF 1.4 AMPS WHEN RUNNING AT 110 AMP STARTS AND POWER OF 38.2 WATTS. EACH FAN PROVIDES AN AIR FLOW OF 9 LPM
- ▶ COMMANDER, PILOT, AND MISSION SPECIALIST 1 ORBITER O₂ HOSE IS 7 FEET IN LENGTH. ALL OTHER POSITIONS HAVE 14 FOOT ORBITER O₂ HOSES
- ▶ DELETED
- ▶ REFER TO J-1, L-1, Z-1, 7, 8 FOR ADDITIONAL HELMET DETAIL
- ▶ REFER TO TABLE 18-1 FOR DRAWING TRACEABILITY
- ▶ SHUT OFF VALVE WHICH IS ACTIVATED BY THE CONTROLLER CLIP
- ▶ CLIP IN - MANUAL REGULATION OF O-SUIT PRESSURE WITH PRESSURE DIAL FROM BOTTOM FLOW WITH OP OF VALVE BODY
- ▶ CLIP OUT - PUSH BUTTON POPS UP ABOVE VALVE BODY AND LIFT-TIALED IN IN PRESSURE 4.5 PSIG. RELIEF PRESSURE IS RETAINED IN O-SUIT BLADDERS
- ▶ MAX FLOW RATE 90 LPM
- ▶ RESEATS AT 3.2 PSIG
- ▶ O₂ SUPPLY PROVIDES 38 LPM FLOW FOR 10 MINUTES, NORMALLY.
- ▶ MANUAL DIAL FOR O-SUIT PRESSURE CONTROL. CA "CLICK" INTO RETEN + 0.5 PSIG ADJUSTABLE RANGE 0-5 PSIG
- ▶ NEUTRAL PRESSURE RELIEF VALVE WHICH CRACKS WHEN 8-1.5" H₂O
- ▶ AMBIENT PRESSURE AT OR BELOW 3.2-2.5 PSIG CAUSES PRIMARY ANDROID TO EXTEND AND CONTROL OFFICE FLOW IN VALVE BODY WHICH CHARGES THE SUIT BLADDER SHELL TO RETAIN PRESSURE
- ▶ MANUAL PRES-TO-TEST PRESSURE
- ▶ ADJUSTABLE DIAL IS MANUAL CAPABILITY TO CONTROL OFFICE FLOW IN ORDER TO PRESURIZE SUIT BELOW ANDROID ACTIVATED ALTITUDE (35,500 - 38,200 FT)
- ▶ SPRING LOADED RELIEF VALVE, MANUALLY OPERATED, USED TO TEST SUIT PRESURIZATION ON THE GROUND AND AT ALTITUDE

CHARACTERISTICS	PRIMARY SYSTEM	SECONDARY SYSTEM
ABSOLUTE SUIT PRESSURE	3.2H - 2.5 PSIA	3.0 - 2.5 PSIA
MANUAL PRES-TO-TEST PRESSURE	38,200 FT	40,000 FT
DIAL-TO-TEST PRESSURE	3.0 PSIG	2.5 PSIG

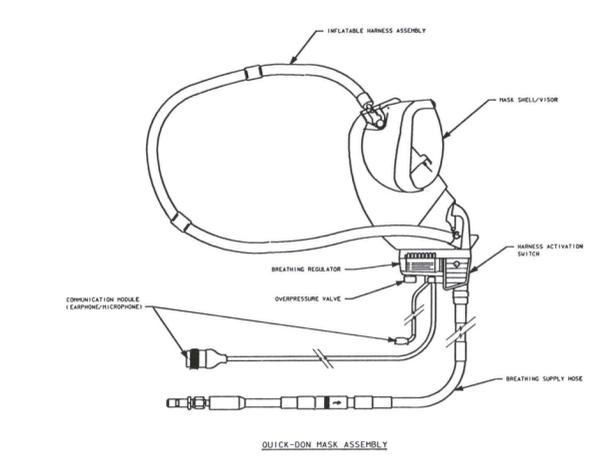
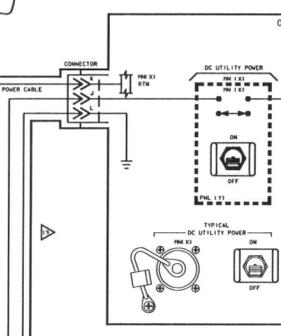
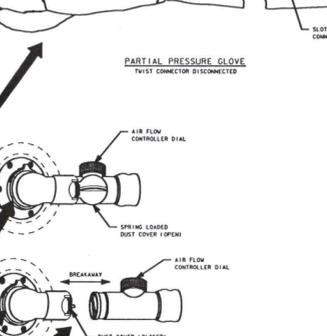
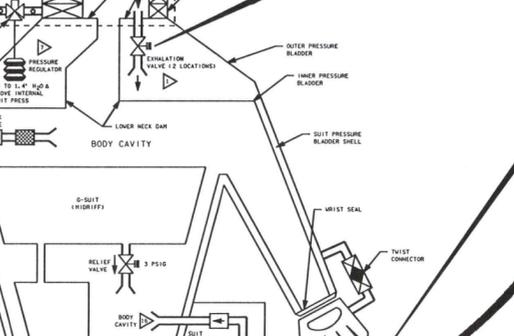
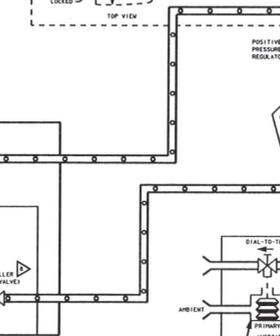
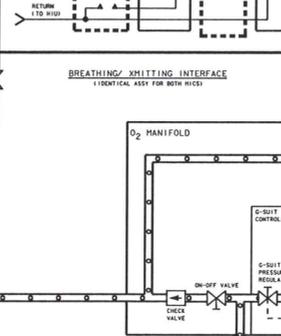
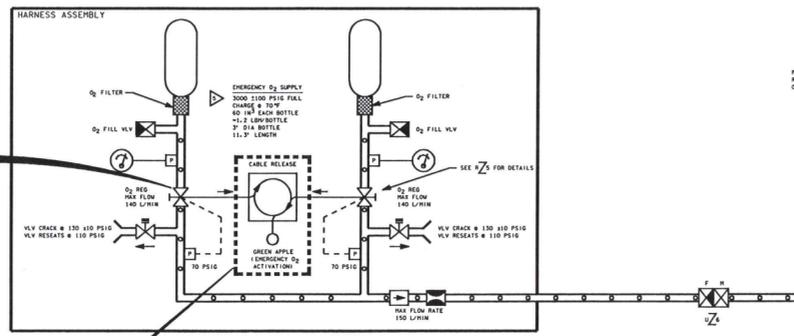
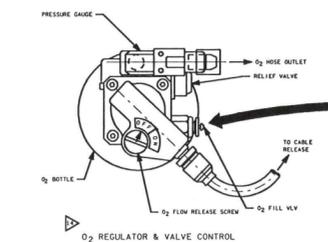
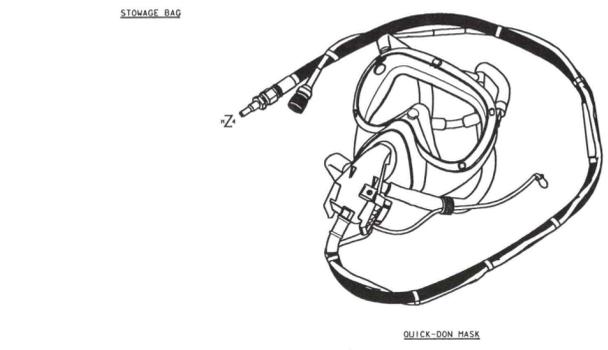
NOTES:
 ▶ EXHALATION VALVE - 1.65 TO 1.8 INCHES H₂O ABOVE SUIT BLADDER PRESSURE AT MAXIMUM INPUT FLOW 6.75 CO/MINUTE

4 LES/ODM

SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
DR. TERRY K. KELLEY	8/28/84	MANAGER, SPACE OPERATIONS, TEXAS
DR. S. EDWARDS		
DR. SCOTT GILL		
DR. G. J. GIBSON	5/18/86	
DR. J. L. HARRIS	8/19/86	
DR. J. C. HARRIS	8/19/86	
DR. J. C. HARRIS	8/19/86	
DR. J. C. HARRIS	8/19/86	
DR. J. C. HARRIS	8/19/86	

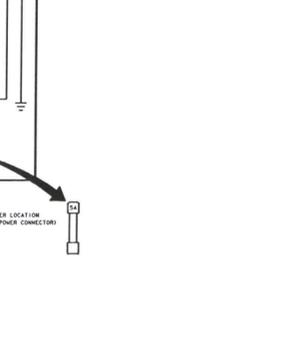
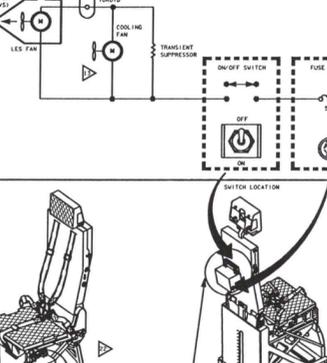
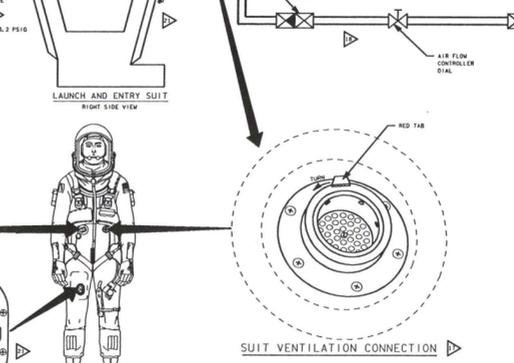
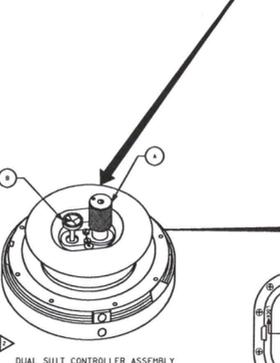
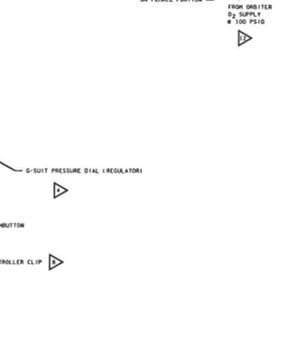
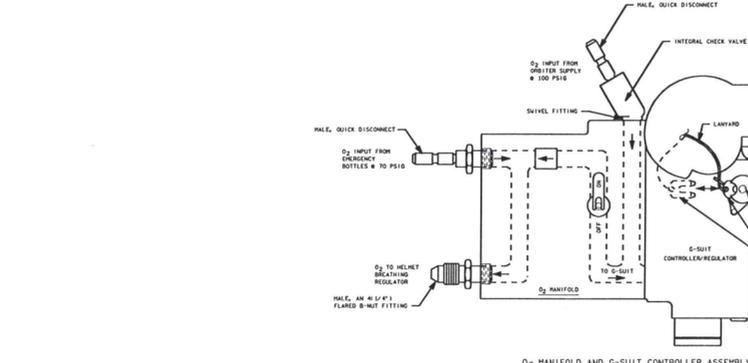
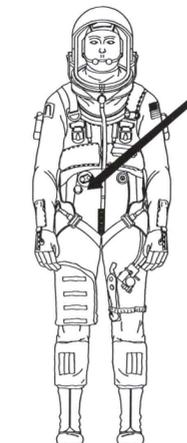
LAUNCH/ENTRY SUIT AND QUICK-DON MASK

18.4



QUICK-DON MASK

PANEL LOCATIONS	OR - 1.5H 02 - 1.5 - 1.4
MSL - 1.5H 02 - 1.5 - 1.4	
HEE - 1.5H 02 - 1.5 - 1.4	
STORAGE LOCATIONS	HEE - 1.5H 02 - 1.5 - 1.4
REFER TO FLIGHT SPECIFIC REFERENCE DATA BOOK	
SUPPLY HOSE LENGTH	40 INCHES



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
18.1	ESCAPE PANEL	ROCKWELL	V070- 553303	ALL	C	10-12-84	WINDOW INSTL-CM, EMERG EGRESS SYSTEM

DWG	SIGNATURE	DATE	DWG	SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LYNDON B. JOHNSON SPACE CENTER HOUSTON, TEXAS	
18.1	ENGR J. KREYKES					VENDOR DRAWING REFERENCES	
	ENGR <i>James R. Rayken</i>	11-6-90		ENGR			
	ENGR			ENGR			
	ENGR			ENGR			
	ENGR		/	APP <i>Paul We</i>	8 Nov 90	VENDOR DRAWING REFERENCES	
	ENGR		/	APP <i>RT Neal</i>	11/9/90		
	ENGR		/	OMNIPLAN		SPACE SHUTTLE	TBL NO
	ENGR		/	LTR E	PCN	ALL	18-1
	ENGR					PAGE 18.1-1	SHEET 1 OF 2

BASIC REV E

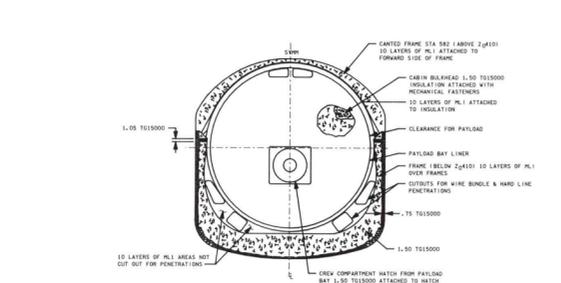
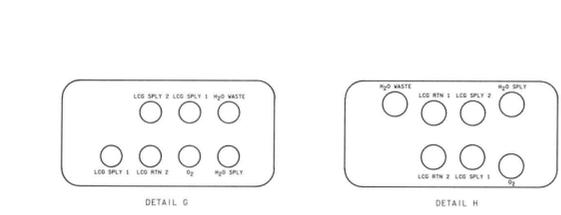
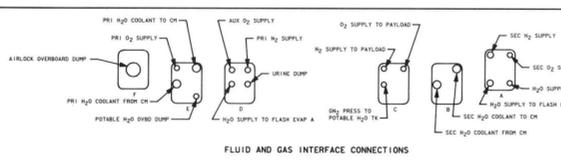
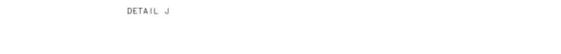
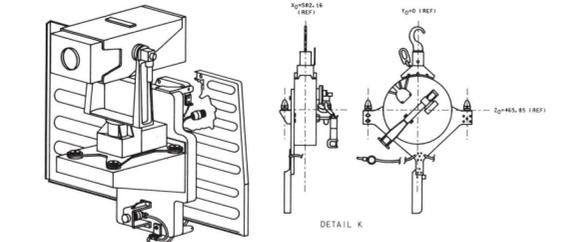
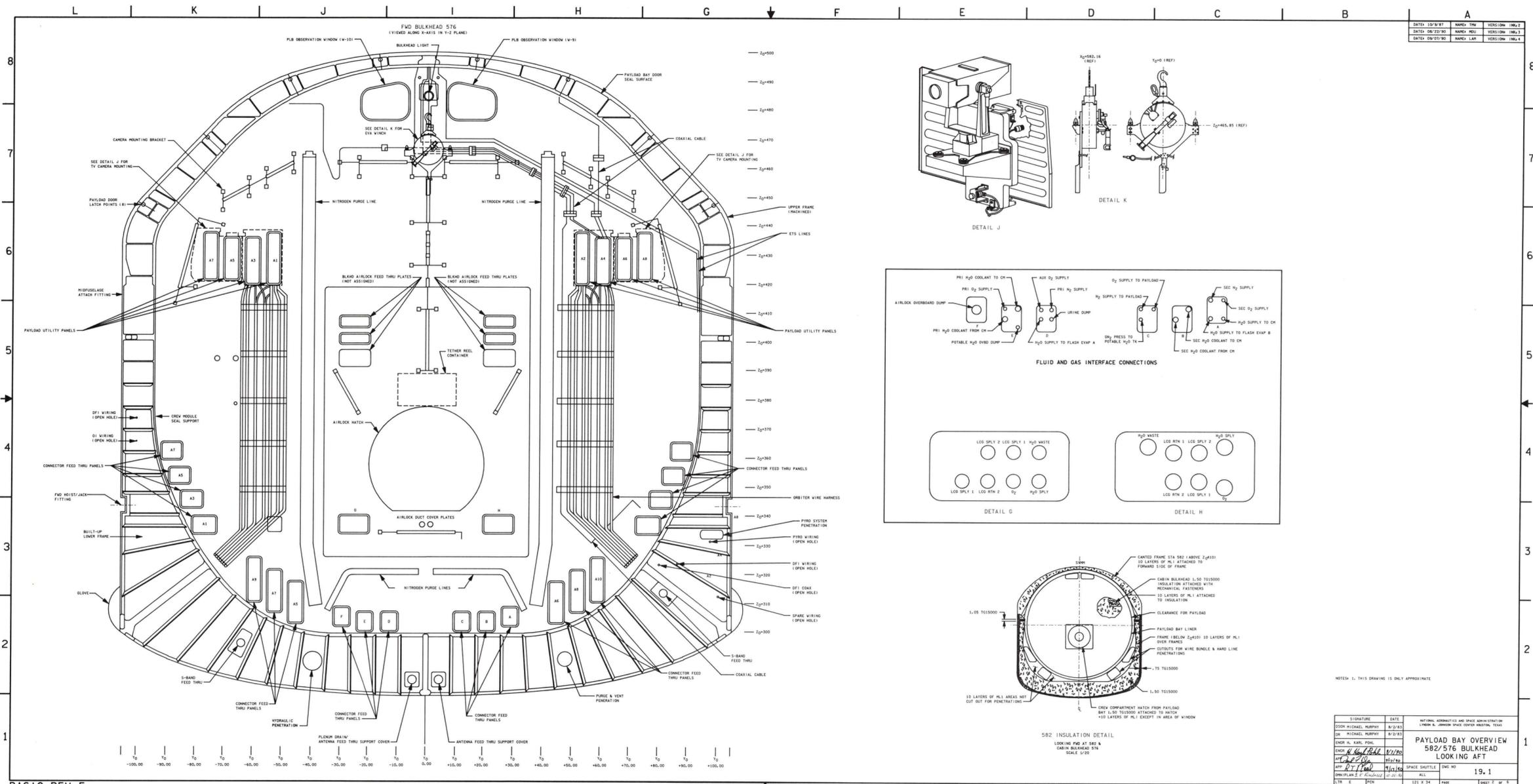
FOR DETAILED COMPONENT AND LOGIC INFORMATION REFER TO:

SSSH DWG NO.	SSSH DWG TITLE	VENDOR NAME	VENDOR DWG NO.	VENDOR SHEET NO.	REV	DATE	VENDOR DRAWING TITLE
18.2	POLE CREW ESCAPE SYSTEM	NASA/JSC (LOCKHEED)	SID 27101410ALL	ALL	D	7-11-88	DRAWING TREE, POLE CREW ESCAPE SYSTEM
18.3	EMERGENCY EGRESS SLIDE/SKYGENIE	INFLATABLE SYSTEMS INTERNATIONAL	D102900	ALL	D	3-11-88	EGRESS SLIDE TOP ASSEMBLY
		ROCKWELL	V651-000002	ALL	D	3-88	MISSION KIT
		NASA	JSC-12770	3.5-10	B	8-14-87	SHUTTLE FLIGHT OPERATIONS MANUAL VOL 12
18.4	LAUNCH AND ENTRY SUIT	NASA/JSC (DAVID CLARK)	SED 39120495	ALL	D	9-22-88	LAUNCH & ENTRY SUIT ASSEMBLY/CREW ESCAPE SYSTEM
		(AIRLOCK, INC.)	SED 39120496			10-27-88	PERSONAL SUIT VENTILATION SYSTEM ASSEMBLY
18.5 (SHEETS 1-3)	SURVIVAL GEAR	NASA-JSC	S88-37773 S88-37775 S88-37778 S88-39725 S88-39751 S88-39753 S88-39754 S88-44404 S88-53741 S88-53742				
18.6	PERSONAL PARACHUTE ASSEMBLY	NAVAL AIR SYSTEMS COMMAND	SX 1102410187	ALL		6-89	DRAWING TREE, PERSONAL PARACHUTE ASSEMBLY
18.7	SIDE HCH JETT	ROCKWELL	CONTRACT NAS9-14000 IRD MA335T3 WBS 9.8.8.5	13-30		3/6/87	SIDE HATCH CREW ESCAPE SYSTEM PRELIMINARY DESIGN REVIEW (PDR) FINAL BOARD REPORT
				21-40 175-215		2/24/87	SIDE HATCH CREW ESCAPE SYSTEM PRELIMINARY DESIGN REVIEW (PDR) INTRODUCTORY BRIEFING

DWG	SIGNATURE	DATE	DWG	SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LYNDON B. JOHNSON SPACE CENTER HOUSTON, TEXAS	
18.2	ENGR K. TRUJILLO		18.6	ENGR K. TRUJILLO		VENDOR DRAWING REFERENCES SPACE SHUTTLE TBL NO 18-1 ALL PAGE 18.1-2 SHEET 2 OF 2	
	ENGR <i>Kenneth D. Trujillo</i>	11/25/91		ENGR <i>Kenneth D. Trujillo</i>	11/25/91		
18.3	ENGR K. TRUJILLO		18.7	ENGR J. KREYKES			
	ENGR <i>Kenneth D. Trujillo</i>	11/25/91		ENGR <i>Jennifer Kreykes</i>	11/25/91		
18.4	ENGR K. TRUJILLO			APP			
	ENGR <i>Kenneth D. Trujillo</i>	11/25/91		APP			
18.5.1-3	ENGR K. TRUJILLO			OMNIPLAN			
	ENGR <i>Kenneth D. Trujillo</i>	11/25/91		LTR E	PCN 1		

BASIC REV E-1

DATE: 10/9/87	NAME: TM	VERSION: 19.1
DATE: 08/22/90	NAME: MDL	VERSION: 19.1
DATE: 09/01/90	NAME: LAM	VERSION: 19.1



NOTE 1: THIS DRAWING IS ONLY APPROXIMATE

SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
DR: MICHAEL HUBERT	8/2/83	LOOKING AFT
DR: MICHAEL HUBERT	8/2/83	582/576 BULKHEAD
DR: K. KARL POOL	11/7/80	PAYLOAD BAY OVERVIEW
DR: [Signature]	11/7/80	LOOKING AFT
DR: [Signature]	11/7/80	SPACE SHUTTLE
DR: [Signature]	11/7/80	19.1
DR: [Signature]	11/7/80	19.1

BASIC REV E

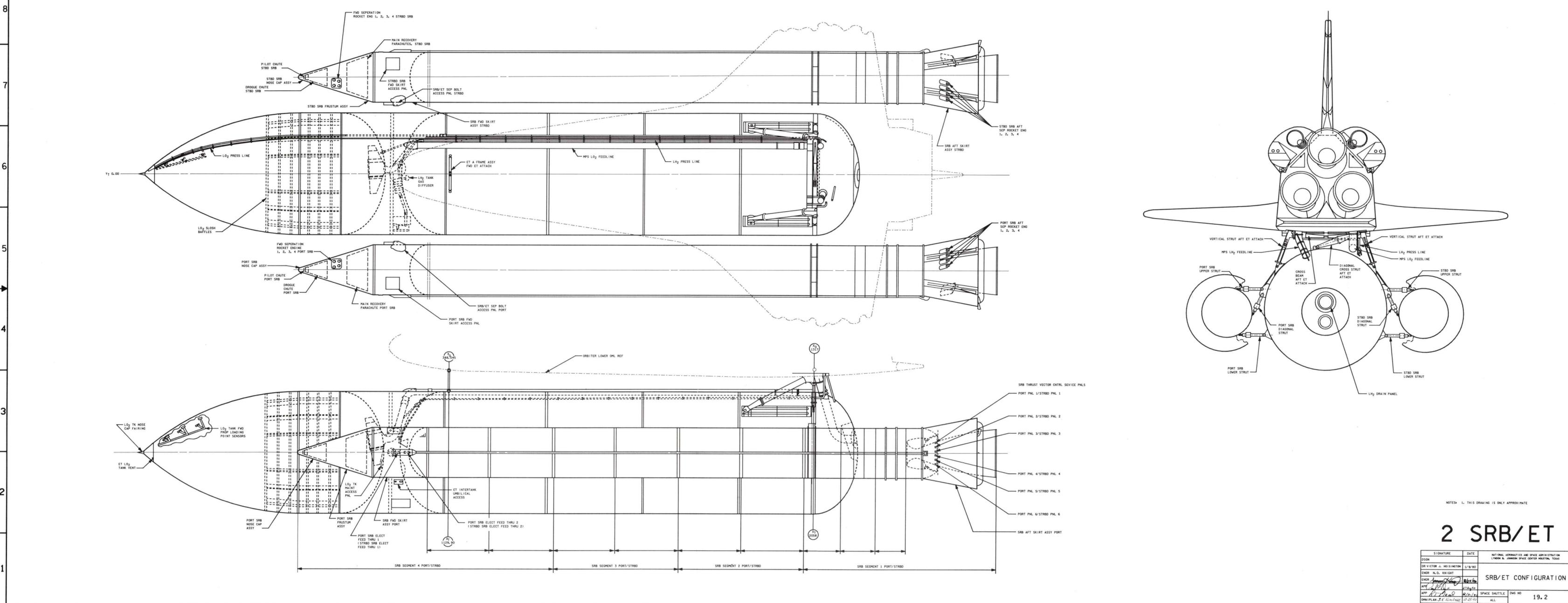
BASIC REV E

DATE: 08/17/90 NAME: VSH VERSION: 1 IN 2

DATE: 11/18/87 NAME: BJT VERSION: 1 IN 1

DATE: 04/26/90 NAME: JMB VERSION: BPT 2

DATE: 08/17/90 NAME: VSH VERSION: 1 IN 2



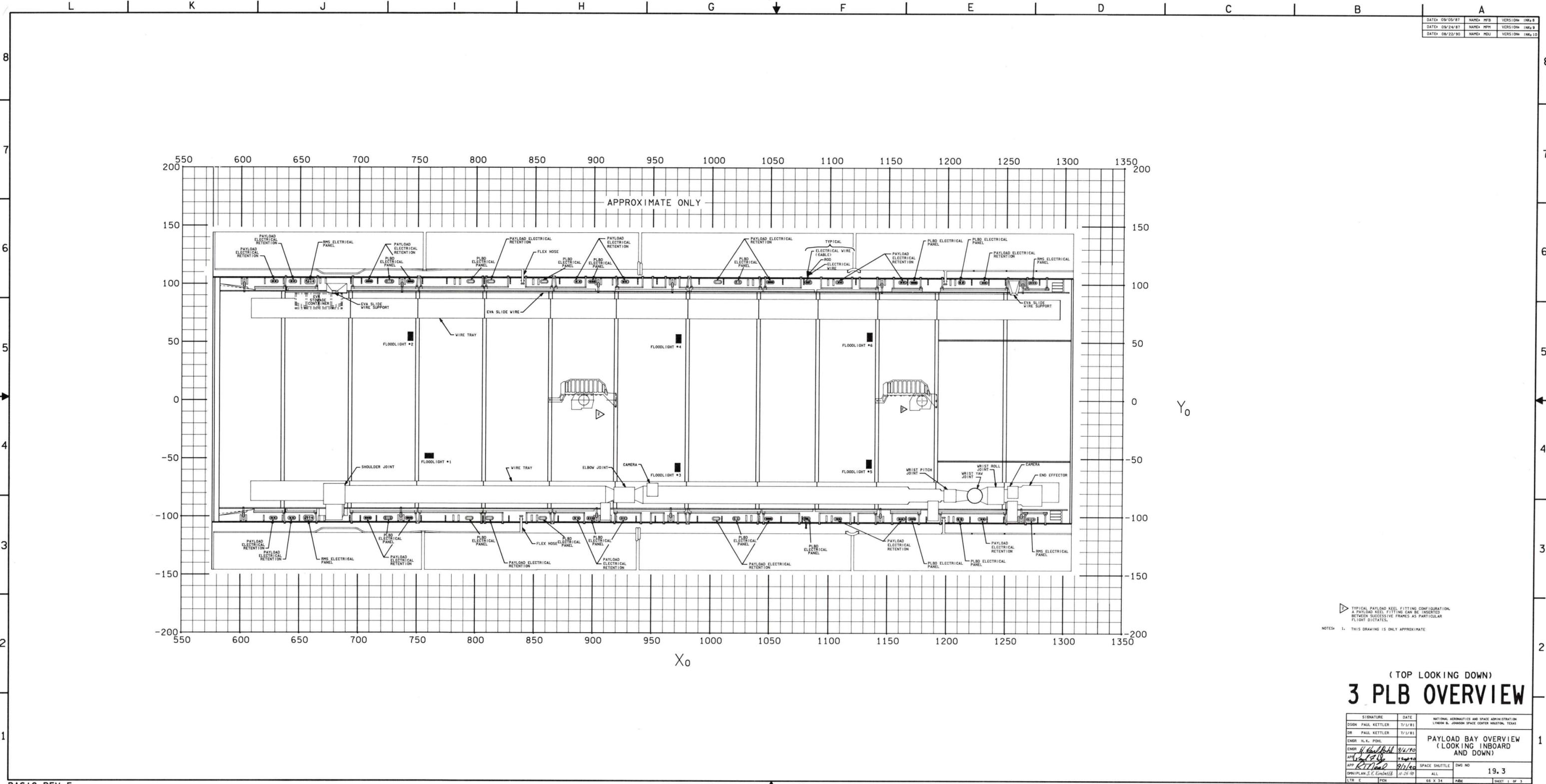
BASIC REV E

BASIC REV E

2 SRB/ET

NOTES: 1. THIS DRAWING IS ONLY APPROXIMATE

SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ORBITER & SHUTTLE SPACE CENTER REVISION TEAM
DR VICTOR A. HOUSTON	1/3/90	
ENGR. N.D. KNIGHT		
ENGR. [Signature]		SRB/ET CONFIGURATION
APP. [Signature]	07/29/90	
APP. [Signature]	08/17/90	SPACE SHUTTLE DWG NO. 19.2
DRN/PLAN. [Signature]	07/27/90	ALL
CHK. [Signature]		RD. 9 X 34



DATE: 09/05/81	NAME: MFB	VERSION: INK.8
DATE: 08/24/87	NAME: MPM	VERSION: INK.9
DATE: 08/22/90	NAME: MDU	VERSION: INK.10

NOTES: 1. THIS DRAWING IS ONLY APPROXIMATE

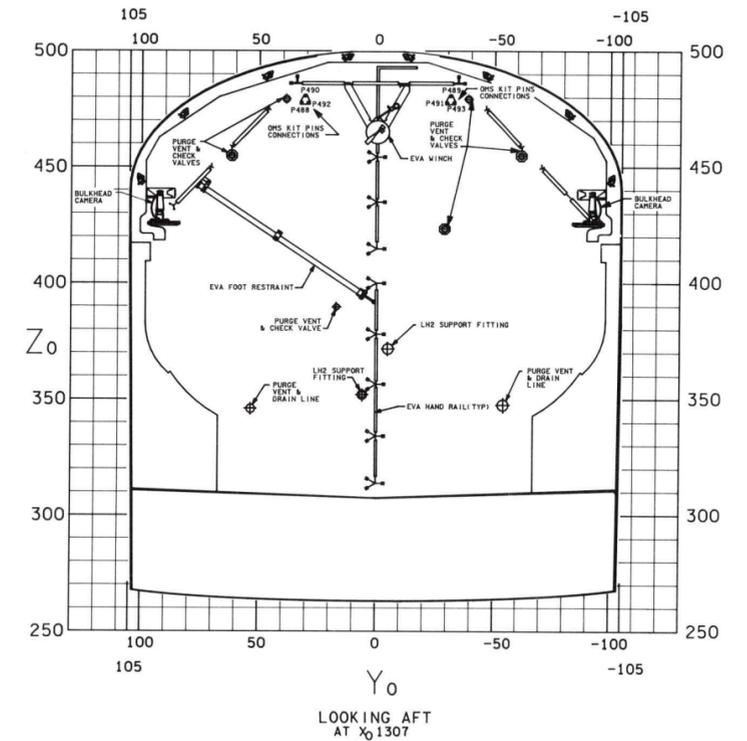
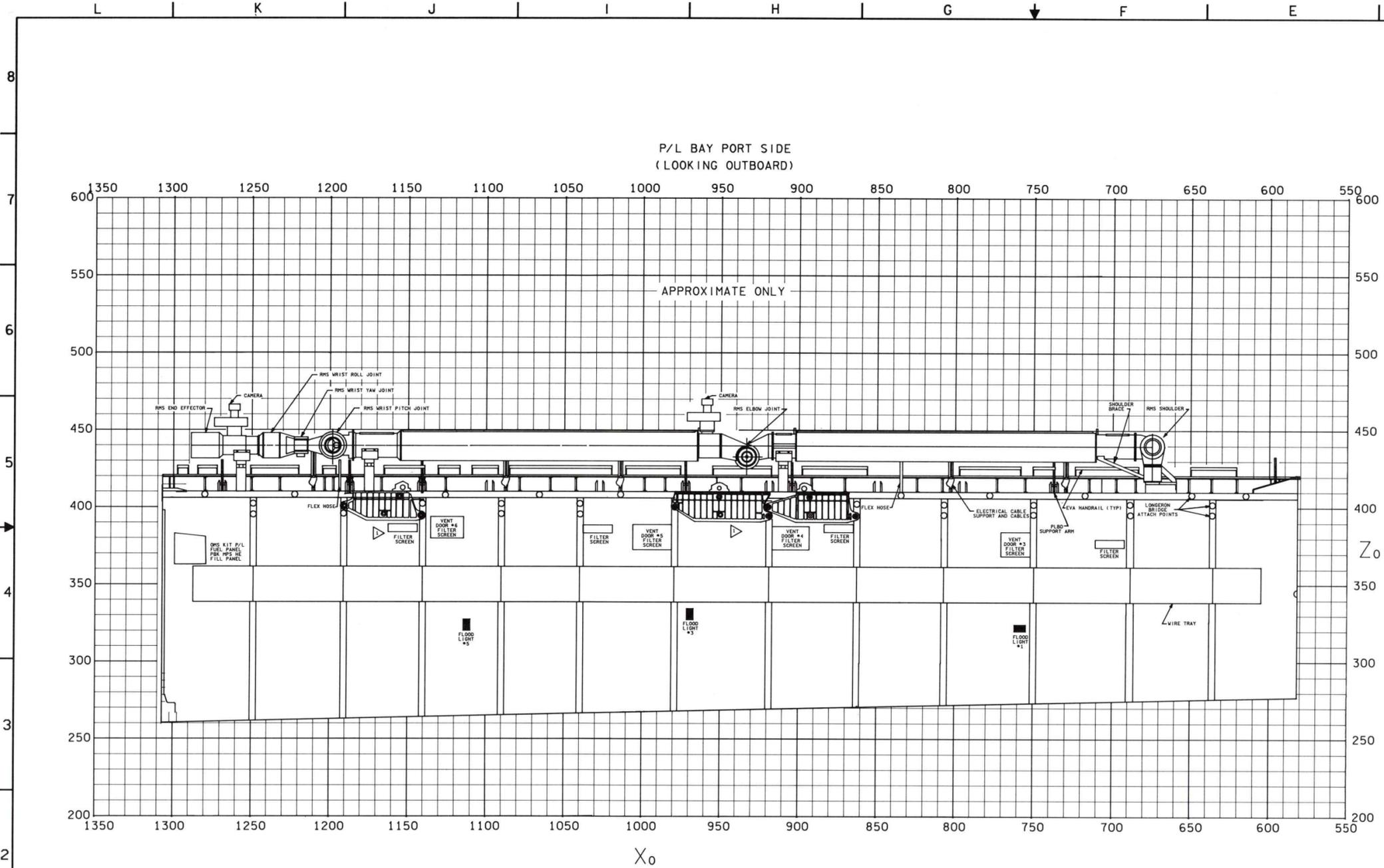
(TOP LOOKING DOWN)
3 PLB OVERVIEW

SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
DSGN PAUL KETTLER	7/1/81	LYNN B. JOHNSON SPACE CENTER HOUSTON, TEXAS
DR PAUL KETTLER	7/1/81	PAYLOAD BAY OVERVIEW (LOOKING INBOARD AND DOWN)
EMR R. R. POHL		
APP <i>[Signature]</i>	9/1/80	
APP <i>[Signature]</i>	9/1/80	
OPN PLAN S. C. CORNELL	10-25-80	SPACE SHUTTLE
LTN E	PEN	ALL
		19.3
		68 X 34
		PAGE
		SHEET 1 OF 3

BASIC REV E

BASIC REV E

DATE: 08/04/87	NAME: MDU	VERSION: INK.7
DATE: 08/28/87	NAME: MDU	VERSION: INK.8
DATE: 08/28/87	NAME: MDU	VERSION: INK.9



2. THIS DRAWING IS ONLY APPROXIMATE.
 NOTES: TYPICAL PAYLOAD LONGERON BRIDGE CONFIGURATION. PAYLOAD LONGERON BRIDGES CAN BE LOCATED BETWEEN ADJACENT FRAMES.

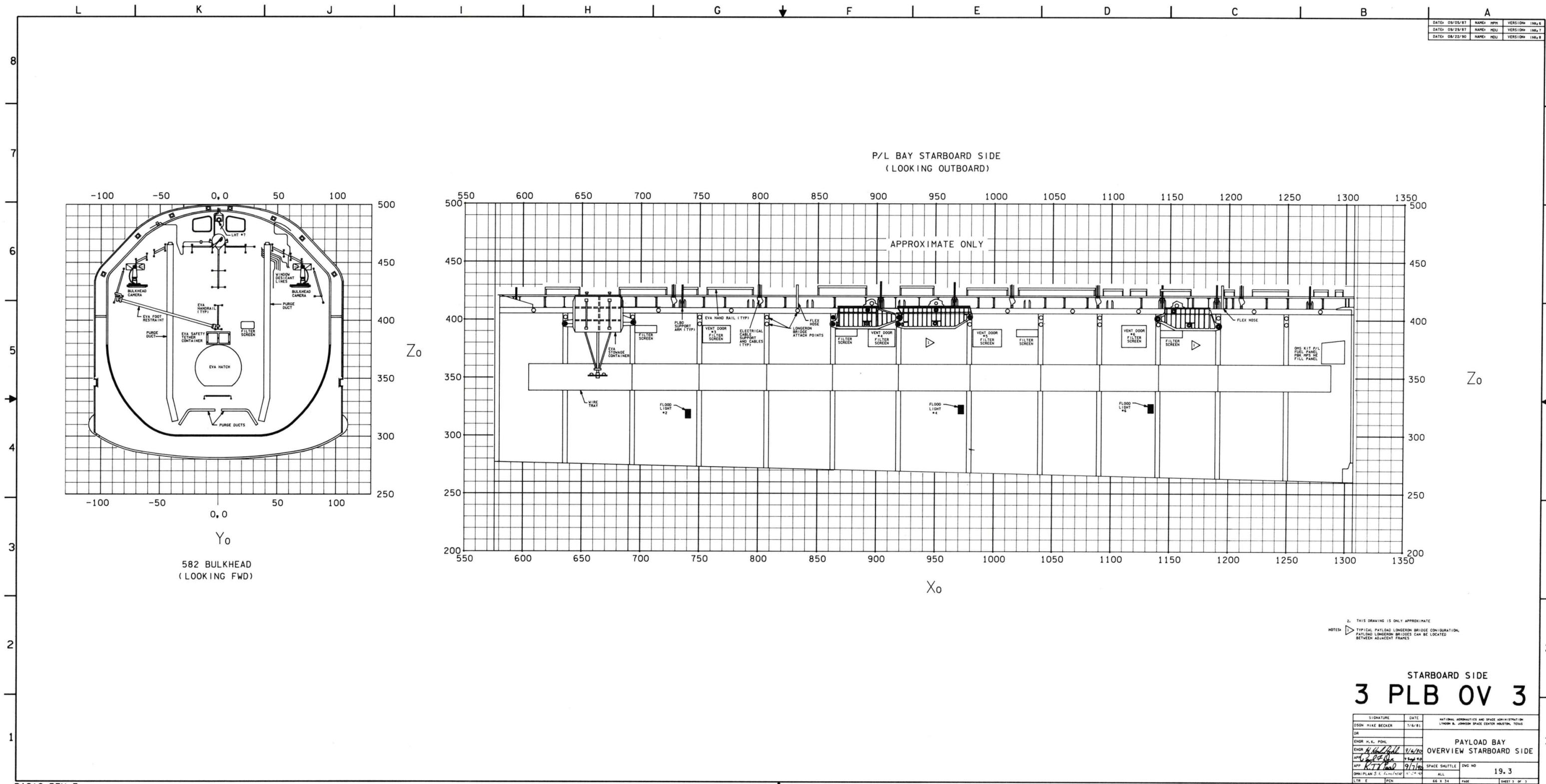
PORT SIDE
3 P/L BAY 2

SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LYNN B. JOHNSON SPACE CENTER HOUSTON, TEXAS
DR. THOMAS LEMERS	7/13/81	
DR. JACK HEBERLIG JR.	7/27/81	
ENGR. H. K. POH		
ENGR. <i>[Signature]</i>	9/6/80	
APP. <i>[Signature]</i>	7/28/80	
APP. <i>[Signature]</i>	9/1/80	
DRN/PLAN S. C. <i>[Signature]</i>	07-25-80	
LTR. E	PCN	SPACE SHUTTLE ALL 66 X 34
		DWG NO. 19.3 PAGE SHEET 2 OF 3

BASIC REV E

BASIC REV E

DATE: 09/05/87	NAME: RPH	VERSION: 198.6
DATE: 09/23/87	NAME: RDU	VERSION: 198.7
DATE: 08/22/90	NAME: RDU	VERSION: 198.8



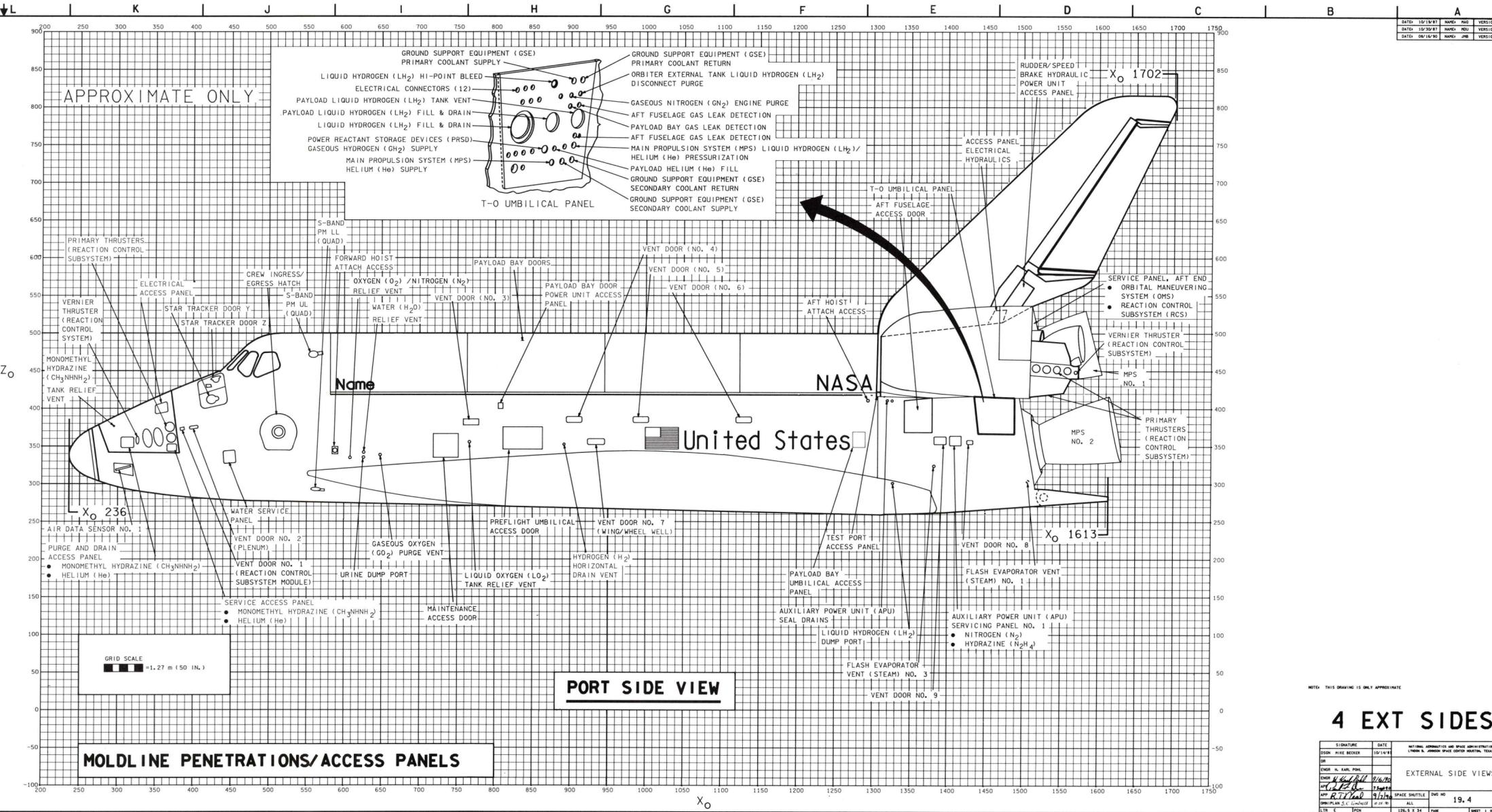
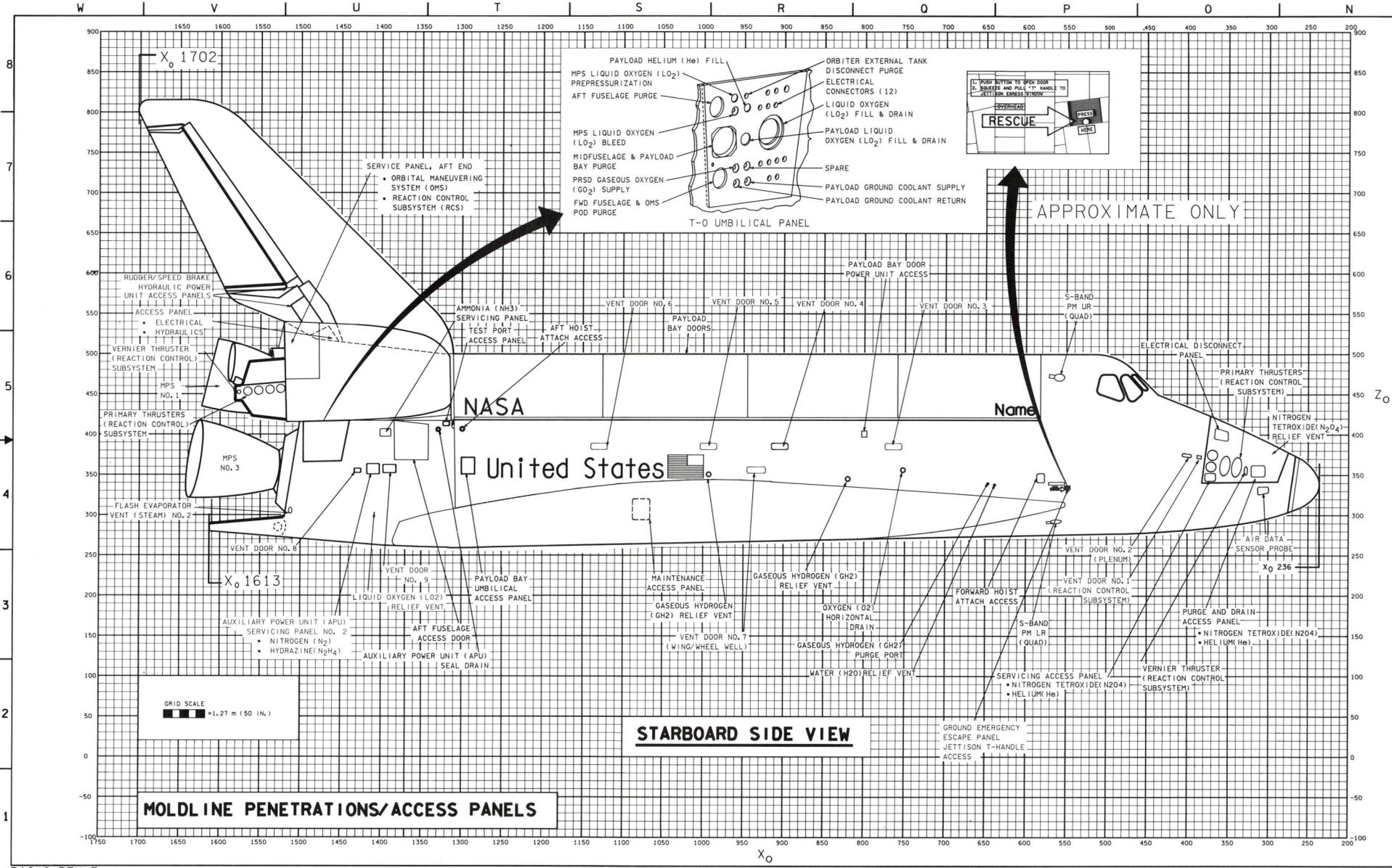
2. THIS DRAWING IS ONLY APPROXIMATE
 NOTES: TYPICAL PAYLOAD LONGERON BRIDGE CONFIGURATION. PAYLOAD LONGERON BRIDGES CAN BE LOCATED BETWEEN ADJACENT FRAMES

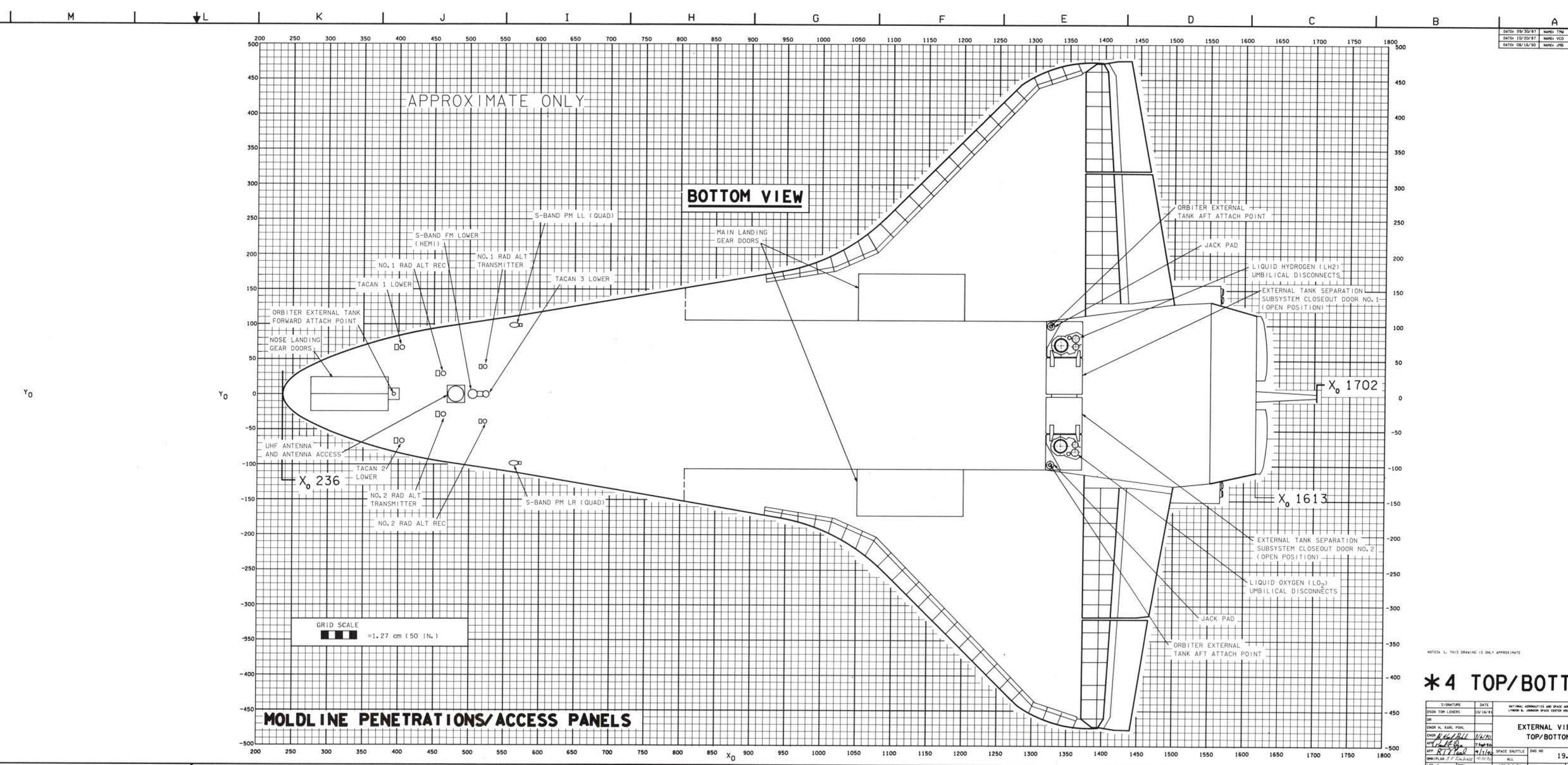
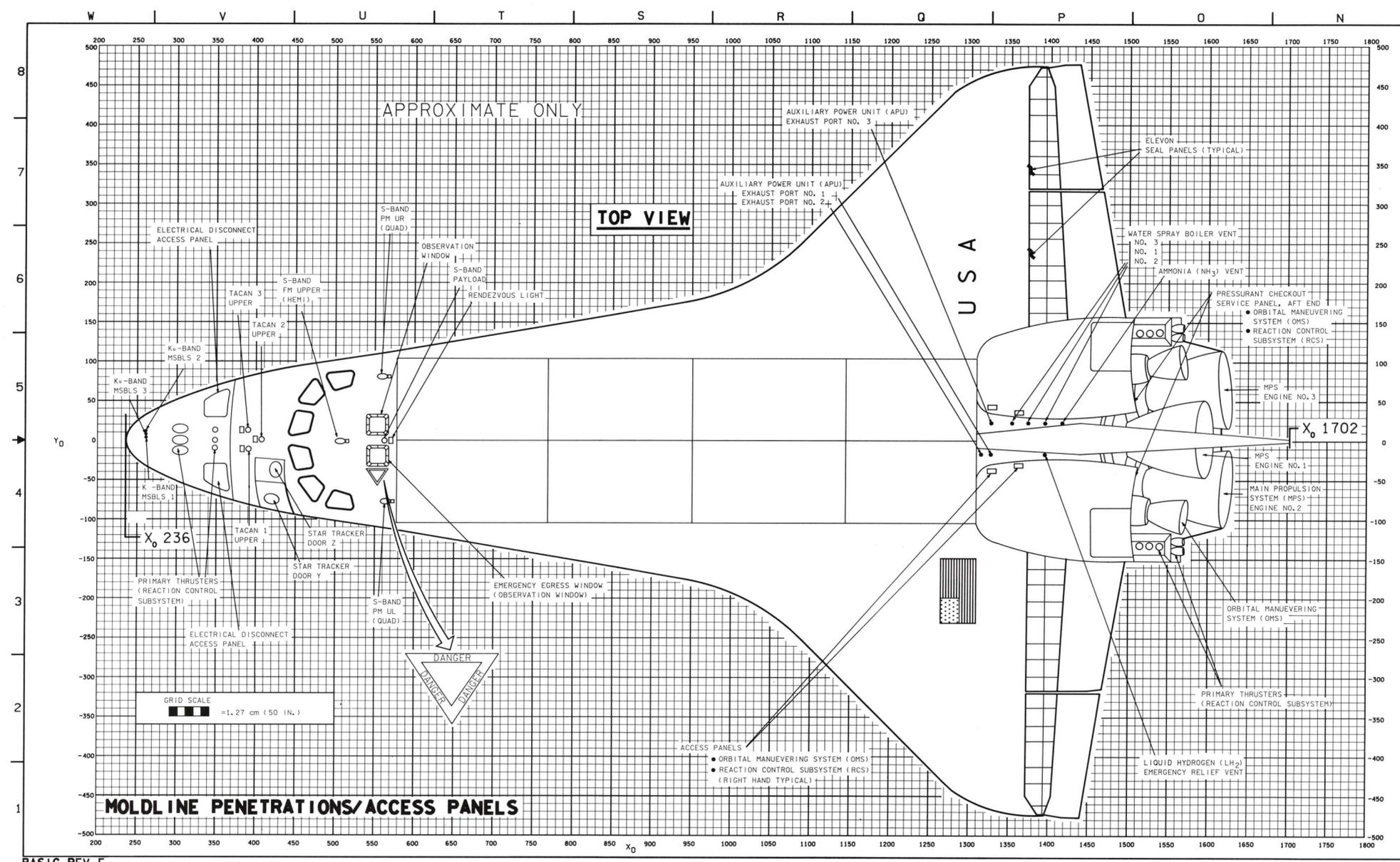
STARBOARD SIDE
3 PLB OV 3

SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LYNN B. JOHNSON SPACE CENTER HOUSTON, TEXAS
DR		
ENGR. H. K. POHL	9/6/90	PAYLOAD BAY OVERVIEW STARBOARD SIDE
ENGR. H. K. POHL	9/6/90	
APP. R. J. BAKER	9/7/90	SPACE SHUTTLE DWG NO.
APP. R. J. BAKER	9/7/90	ALL 19.3
DRW/PLAN S. C. TROTT/SCALE 1" = 1'-0"		
CTR. E	PCN	66 X 34 PAGE

BASIC REV E

BASIC REV E





DATE: 09/20/87 NAME: TMM VERSION: BPT.4
 DATE: 10/20/87 NAME: YCO VERSION: INK.1
 DATE: 08/16/90 NAME: JWB VERSION: INK.2

NOTE: 1. THIS DRAWING IS ONLY APPROXIMATE.

***4 TOP/BOTTOM**

DESIGN TITLE	DATE	DESIGNER	DATE	APPROVED	DATE	SCALE	FIG. NO.
SPACE SHUTTLE EXTERNAL TANK AND ORBITER	09/20/87	TMM	10/20/87	YCO	08/16/90	1:1	19.4

FIG. NO. 19.4
 SHEET NO. 3
 TOTAL SHEETS 3

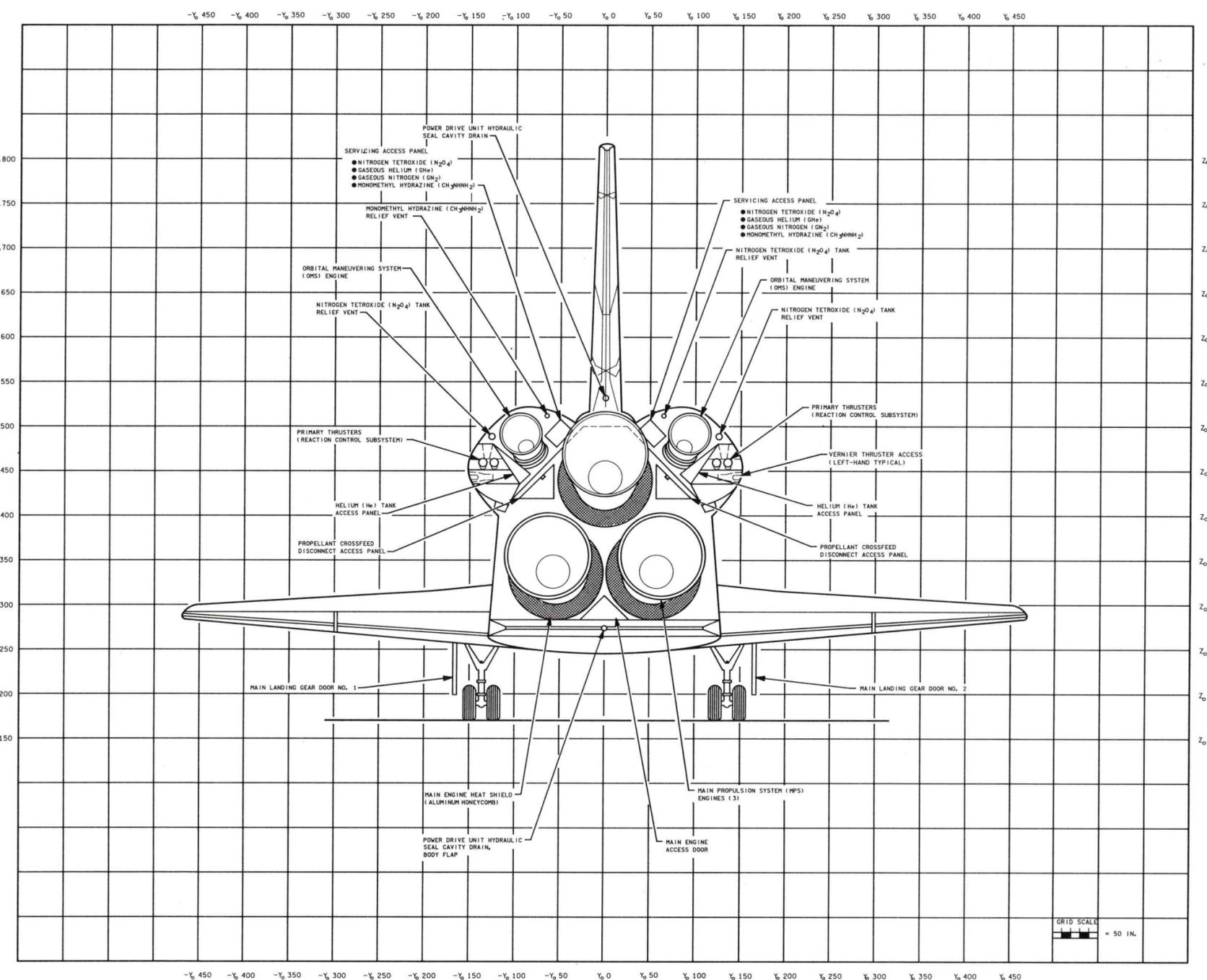
L | K | J | I | H | G | F | E | D | C | B | A

DATE: 08/28/87	NAME: MDJ	VERSION: INR. 2
DATE: 06/16/90	NAME: JNB	VERSION: INR. 3
DATE: 10/26/90	NAME: BJT	VERSION: INR. 4

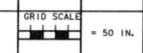
APPROXIMATE ONLY

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AFT FUSELAGE (LOOKING FWD)

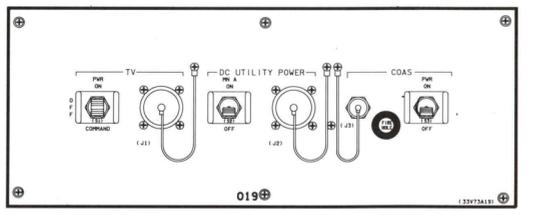
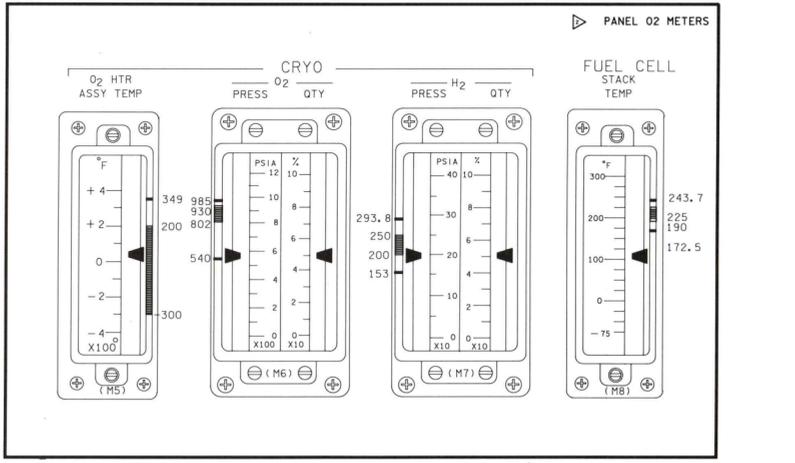
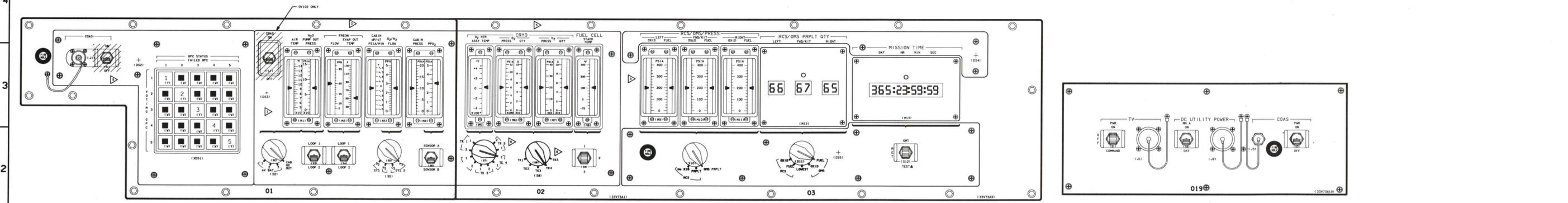
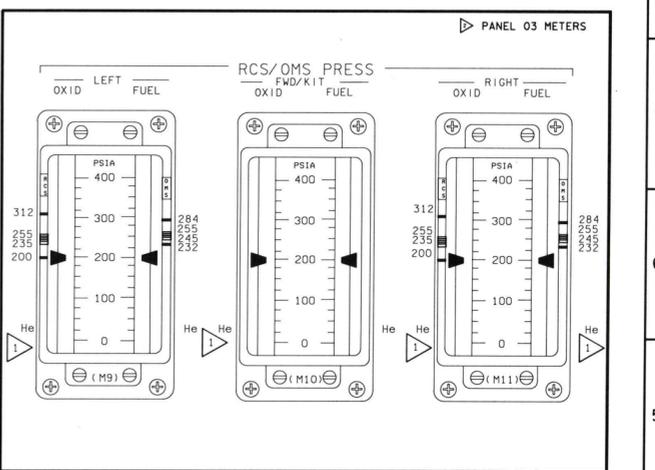
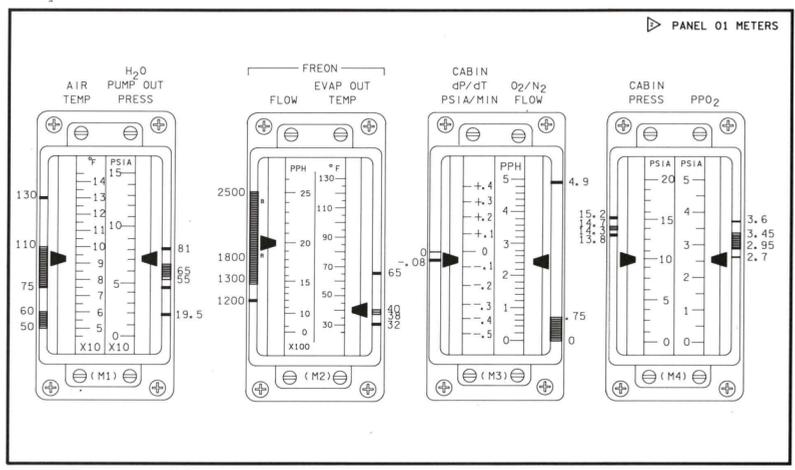
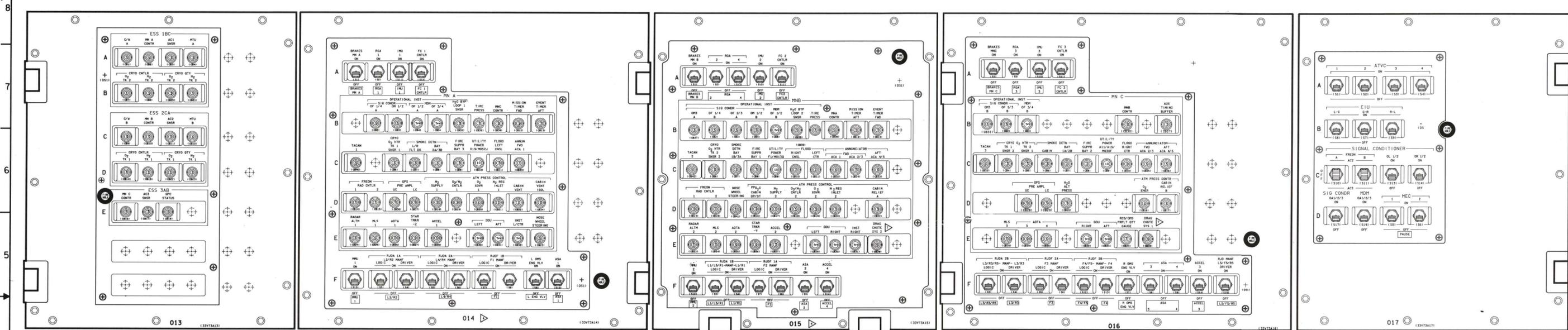


NOTE: THIS DRAWING IS ONLY APPROXIMATE

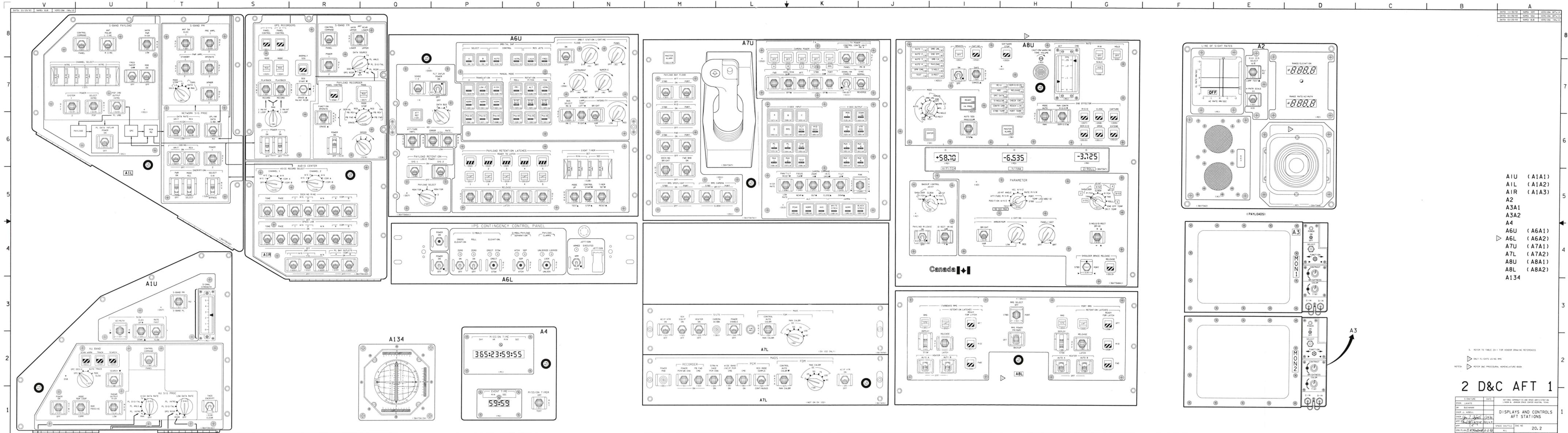
BASIC REV E

BASIC REV E

SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LYNN B. JOHNSON SPACE CENTER HOUSTON, TEXAS EXTERNAL PENETRATIONS/TILE (AFT) SPACE SHUTTLE DWG NO. 19.4 ALL 66 X 34 PAGE SHEET 3 OF 3
DESIGN	10/31/88	
DR	10/31/88	
ENGR	10/31/88	
APP	10/31/88	



- ▽ YES ON 01-105 ONLY
 - ▽ 01-105 AND MAJOR REV VEHICLES ONLY
 - ▽ REFER TO TABLE 20-1 VENDOR DRAWING REFERENCES
 - ▽ MOVED FOR 0102
 - ▽ 0102 PANEL DIFFERENT SHAPE
 - ▽ EXPANDED VIEW ON FRONT OF DRAWING
 - ▽ G = GREEN
 - ▽ Y = YELLOW
 - ▽ R = RED
 - ▽ ITEM# - No. IS SELECTED AS NO. 100
- | |
|-----|
| 01 |
| 02 |
| 03 |
| 013 |
| 014 |
| 015 |
| 016 |
| 017 |
| 019 |



DATE: 1/17/92	NAME: NEW	VERSION: OPT.11
DATE: 01/26/93	NAME: SEM	VERSION: OPT.12
DATE: 01/26/93	NAME: BLW	VERSION: OPT.13

- A1U (A1A1)
- A1L (A1A2)
- A1R (A1A3)
- A2
- A3A1
- A3A2
- A4
- A6U (A6A1)
- A6L (A6A2)
- A7U (A7A1)
- A7L (A7A2)
- A8U (A8A1)
- A8L (A8A2)
- A134

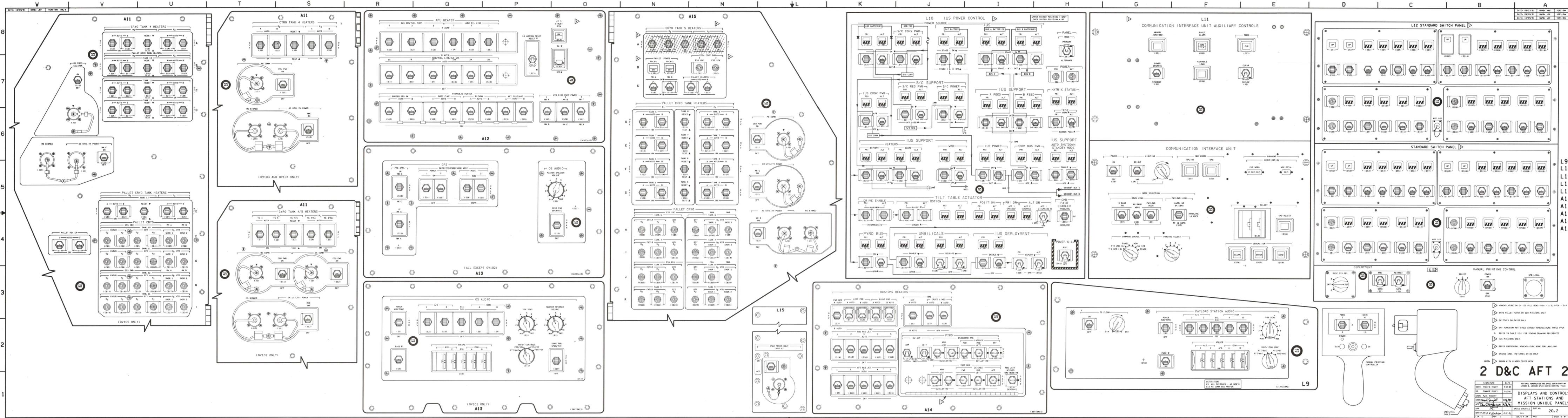
3. REFER TO TABLE 20-1 FOR VENDOR DRAWING REFERENCES

NOTES:
 1. ONLY FLIGHTS USING RMS
 2. REFER TO PROCEDURE Nomenclature-BOOK

2 D&C AFT 1

SIGNATURE	DATE	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION LYNN B. JOHNSON SPACE CENTER HOUSTON, TEXAS
DESIGN	DATE	REVISION
ENGR	NAME	DATE
APP	NAME	DATE
DATE	SPACE SHUTTLE	DATE NO
1/17/92	20.2	20.2

PAGE 1 OF 3



DATE	BY	CHKD	APP'D	REVISION
08/28/91	CONNIE RILEY			1
08/28/91	CONNIE RILEY			2
08/28/91	CONNIE RILEY			3
08/28/91	CONNIE RILEY			4
08/28/91	CONNIE RILEY			5
08/28/91	CONNIE RILEY			6
08/28/91	CONNIE RILEY			7
08/28/91	CONNIE RILEY			8

DATE: 11/12/91 NAME: MUI VERSION: 1006.10

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BASIC REV E-1

DATE: 09/26/91 NAME: MUI VERSION: 0013.10
DATE: 10/18/91 NAME: MUI VERSION: 0016.10
DATE: 11/12/91 NAME: MUI VERSION: 1006.10

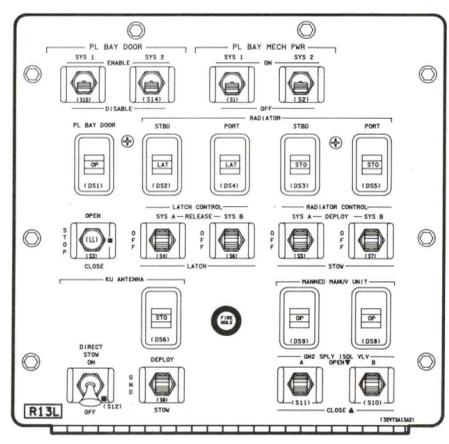
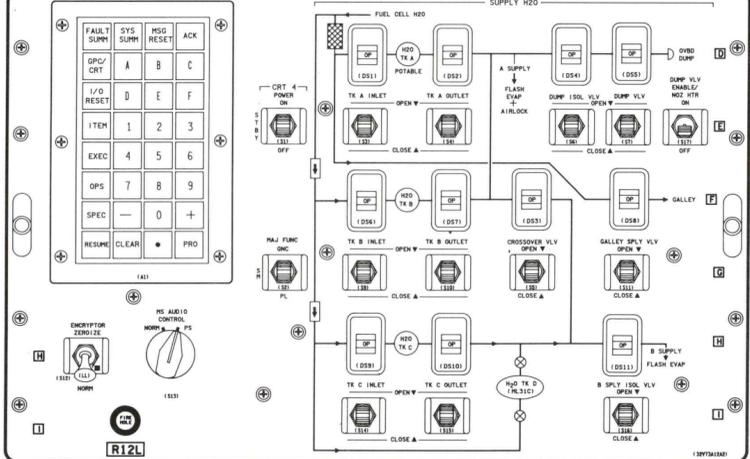
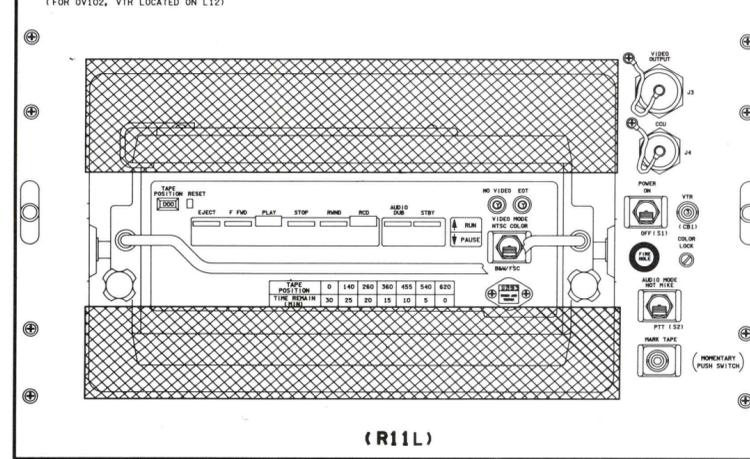
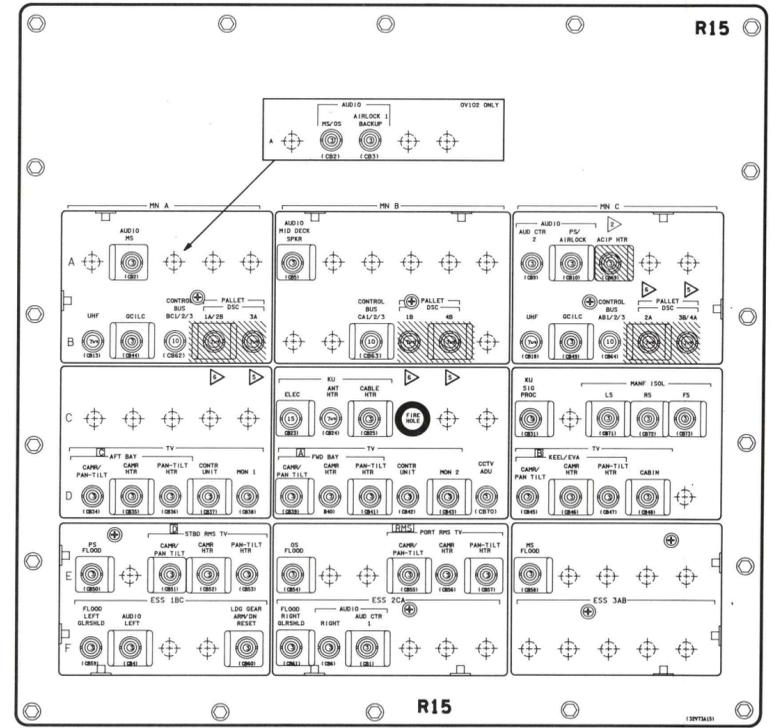
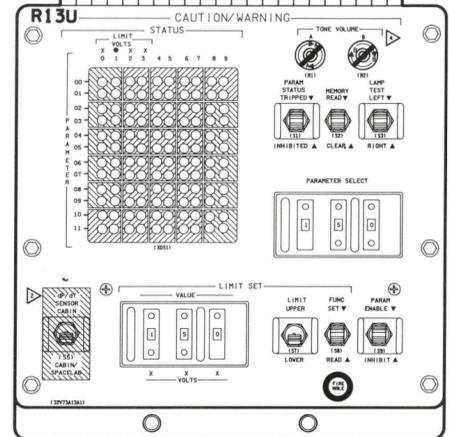
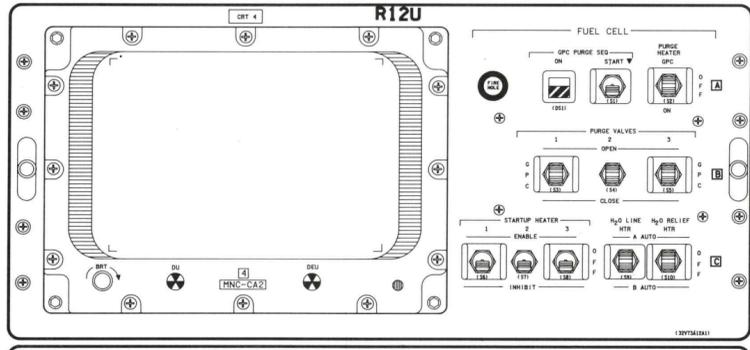
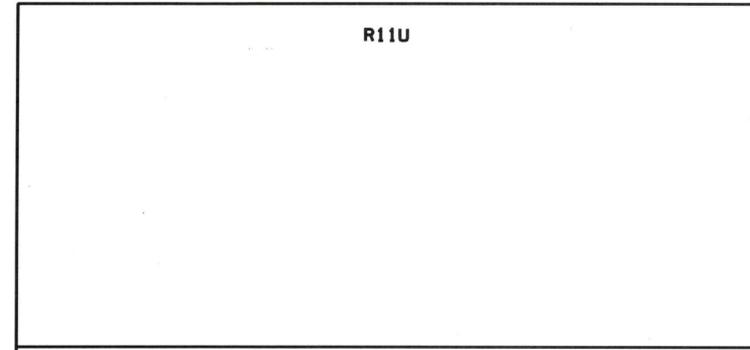
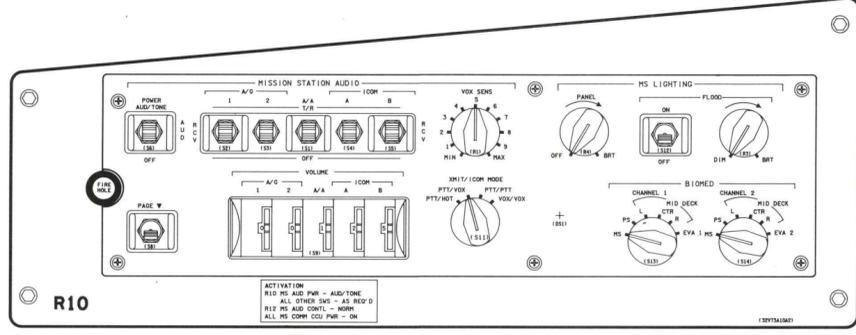
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2 D&C AFT 3

DISPLAYS AND CONTROLS
AFT STATIONS

SPACE SHUTTLE DWS NO 20.2
ALL
REV. 2.34 DATE: 08.2.91

BASIC REV E-1



- ▷ R7
- R10
- R11U
- R11L
- (R12A1) R12U
- (R12A2) R12L
- (R13A1) R13U
- (R13A2) R13L
- R15

- ▷ PANELS R10 & R12L MOVED OVER INTO R11 SLOT ON SPACELAB MISSIONS UNDER A DWS-15 FLOWN IN THE R12 CONFIGURATION
- ▷ PALLET DISC 1&2 CR'S ON DV-102 & DV-105 ONLY
- ▷ PALLET DISC 3&4 CR'S ON DV-102 ONLY
- ▷ ON DV-102, B CHANNEL LOCATED ON THE LEFT
- ▷ REFER TO TABLE 20-1 FOR VENDOR DRAWING REFERENCES
- ▷ DV-102 ONLY
- ▷ SPACELAB ONLY, REFER TO SPACELAB SYSTEMS HANDBOOK

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
20.1 (SHEETS 1-4)	D&C FWD STATIONS	ROCKWELL	VS70-973099	1-13	A/B03	4/25/90	ORB D&C PANEL CONFIG.
20.2 (SHEETS 1-3)	D&C AFT STATIONS	ROCKWELL	VS70-973102	1-13	F/G04	10/1/90	ORB D&C PANEL CONFIG.
20.3	D&C MIDDECK STATIONS						
20.4	D&C AIRLOCK						

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