NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

APOLLO 14
CSM 110
FINAL
CSM SYSTEMS DATA

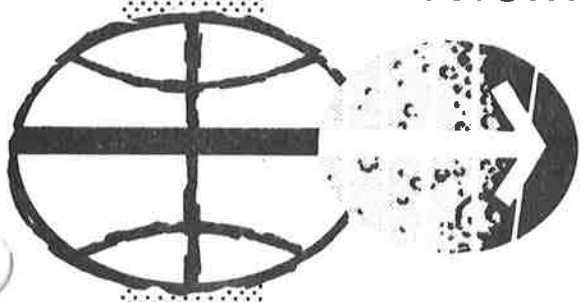
CHANGES A → D

PREPARED BY

FLIGHT DATA SECTION

FLIGHT PLANNING BRANCH

FLIGHT CREW SUPPORT DIVISION



MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

NOVEMBER 30, 1970

APOLLO 14

CSM SYSTEMS DATA BOOK

JANUARY 21, 1971

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APOLLO 14

CSM SYSTEMS DATA BOOK

LIST OF EFFECTIVE PAGES

BASIC DATE 6/24/70
FINAL DATE 11/30/70
CHANGE DATE 12/18/70
CHANGE DATE 1/11/71
CHANGE DATE 1/18/71
CHANGE DATE 1/21/71

* INDICATES CURRENT CHANGE

LIST OF EFFECTIVE PAGES (CONT)

29	(DWG 4.3)	(BASIC)	11/3/70
30	(DWG 4.4)	(BASIC)	11/3/70
31	(DWG 4.5)	(BASIC)	11/3/70
32	. . . . .	12/18/70	
33	(DWG 5.2)	(BASIC-A)	1/11/71
34	(DWG 5.3)	(BASIC)	11/5/70
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38	(DWG 7.1)	(BASIC-A)	1/11/71
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45	(DWG 8.7)	(BASIC)	11/2/70
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**Schematic issue and dates shown are those shown in
in the Table of Contents of the CSM Systems Handbook.
In parentheses are the revision letter and DCN number.

CONTENTS

CONTENTS (CONT)

DATE 1/11/71

CSM EECOM GO CRITERIA
12/1/70, REV A

	EARTH ORBIT			TLC						POWERED DESCENT		LUNAR STAY		LUNAR ORBIT (POST RNDZ)	POST DOCK
	CONT BOOST	CONT E.O.	TLI	TD & E	CONT TLC	NFR/LOI	CONT L.O./DOI	UNDOCK AND SEP	CIRC	PDI	PDI TO T/D	PAST T_1	PAST T_3 & SUBS		LM JETT
ECS															
CABIN INTEGRITY	← (7) CABIN INTEGRITY →				← CABIN INTEGRITY					← (2)			← CABIN INTEGRITY		→
NO FIRE OR SMOKE IN CABIN	← NO F OR S IN CABIN →				← NO FIRE OR SMOKE IN CABIN					← (2)			← NO F OR S IN CAB		→
NO O_2 MANIFOLD LEAKS	← (7*) NO O_2 LEAKS →				← NO O_2 MANIFOLD LEAKS →									NO O_2 MANIF 2 LEAK	
MAIN O_2 REGULATORS	← (7*) 1 OF 2 →	BOTH (3)			← 1 OF 2 →									1 OF 2	
ECS COOLANT LOOPS		1 OF 2 (5)	BOTH		← BOTH →		← PRIMARY			← (2)			1 OF 2 (5)	PRIMARY	
ECS RADIATORS		1 OF 2 (5)	BOTH		← BOTH →		← (1) (1)-PRIMARY-(1)			← (1)			1 OF 2 (5)	PRIMARY (1)	
ECS GLYCOL EVAPS															
SUIT INTEGRITY	SI (7*)							SI							
NO GLYCOL LEAK		← NO LEAK →			← NO GLYCOL LEAK					→			← NO GLY LEAK		→
NO EXCESS CAB HUMIDITY		← NO HUMID →			← NO EXCESSIVE CABIN HUMIDITY					← (2)			← NO HUMID		→
POTABLE H_2O TANK		POT												POT	
WASTE H_2O TANK															
SUIT COMPRESSORS	← (7*) 1 OF 2 (12)	BOTH			←		1 OF 2 →	(12)	(12)	(12) (2)			(12) 1 OF 2 (12)		(12) →
SUIT CIRCUIT	← (7*)	SUIT CIRCUIT →			←		SUIT CIRCUIT →			← (2)			← SUIT CIRCUIT		→
OVBD DUMPS		← 1 OF 2			← 1 OF 2 →									← 1 OF 2	
CRYO															
O_2 TANKS		1 OF 3	ALL		← (10)	(10)	(10) ALL	(10)	(10)	(10) →			← (10) ALL		2 OF 3
H_2 TANKS		1 OF 2	BOTH		←		BOTH →						← BOTH		1 OF 2
EPS															
FUEL CELLS	1 OR 0	2 OF 3	ALL		← (6)	(6)	(6) ALL	(6)	(6)	(6) →			← (6) ALL (6)		2 OF 3 (11)
AUX BATTERY	1 OR 0														
ENTRY BATTERIES	1 + 1 OR 3	2 OF 3	ALL		← (6)	(6)	(6) ALL	(6)	(6)	(6) →			← (6) ALL (6)		
MAIN BUSES	1 OF 2	← BOTH →			←		BOTH →			← (2)			← BOTH		→
BATTERY BUSES	1 OF 2	← BOTH →			←		BOTH →			← (2)			← BOTH		
AC BUSES	1 OF 2 (9)	← BOTH →			←		BOTH →			← (2)			← BOTH		→
BAT RELAY BUSES		← BAT RELAY BUS →			← BAT RELAY BUS →									← BAT RELAY BUS	→
INVERTERS	1 OF 3 (9)	← 2 OF 3 →			←		2 OF 3 →			← (2)			← 2 OF 3		→
AC ΦA (1 AND 2)	1 OF 2	← BOTH →			←		BOTH →			← (2)			← BOTH		→
DOCKING															
DOCKING LATCHES						9 OF 12									
GN_2 BOTTLES								2 OF 4 (8)							
SEQ															
SMJC NOT ACTIVATED		(4) SMJC NOT ACT (4)			(4) SMJC NOT ACT (4)										
SEQUENTIAL SYSTEMS		← BOTH →			← BOTH →										

COLUMN NOT APPLICABLE FOR APOLLO 14

(1) BASED ON AMOUNT OF WATER AVAILABLE, CONSIDERATION WILL BE GIVEN TO CONTINUING THE MISSION WITH SECONDARY RADIATORS AND PRIMARY EVAPORATORS

(2) LM DESCENT STAGE WILL BE RETAINED FOR TEI IF CONDITION NOT MET

(3) IF ONE MAIN REG HAS FAILED OPEN AND THE OTHER IS FUNCTIONING NORMALLY, TLI WILL BE PERFORMED

(4) NO REQUIREMENT IF SOURCE OF ACTIVATION CAN BE ISOLATED

(5) MUST HAVE EITHER PRIMARY OR SECONDARY SYSTEM COMPOSED OF FUNCTIONING LOOP AND CORRESPONDING RADIATORS

(6) BASED ON FAILURE MODE, CONSIDERATION WILL BE GIVEN TO CONTINUING WITH TWO REMAINING

(7) MUST HAVE CABIN INTEGRITY OR SUIT LOOP CAPABLE OF SUPPORTING LIFE. ITEMS MARKED BY * ARE REQUIRED TO MAINTAIN SUIT LOOP

(8) BASED ON FAILUTE MODE, CONSIDERATION WILL BE GIVEN TO UNDOCKING WITH ONE GN_2 BOTTLE REMAINING IN AN OPERABLE SYSTEM

(9) MODE I AND II REGIONS ONLY, 0 THEREAFTER

(10) CONSIDERATION WILL BE GIVEN TO CONTINUING AFTER LOSS OF A TANK IF OTHER 2 TANKS MEET REDLINE CRITERIA

(11) BASED ON FAILURE MODE CONSIDERATION WILL BE GIVEN TO JETT LM WITH 1 REMAINING

(12) 1 OF 2 SUIT COMPRESSORS OR VACUUM CLEANER

LEGEND: ■ NO REQUIREMENTS

NOTE: A. T_2 NO STAY CONDITIONS · NONE

CSM GNC GO CRITERIA
12/1/70, REV A

GO/NO-GO ITEM	EARTH ORBIT			TLC			LUNAR ORBIT (BEFORE UNDOCKING)			UNDOCK	CIRC	POWERED DESCENT		LUNAR STAY		LUNAR ORBIT (P RNDZ)	POST DOCK
	CONT BOOST	CONT EO	TLI	TD&E	CONT TLC	NFR / LOI	CONT LOI	CONT LO	DOI			PDI	PDI TO TD	PAST T1	PAST T3 & SUBS	CONT L. O.	LM JETT
GNCS/SCS																	
DEORBIT CAPABILITY		SPS+B/U METHOD															
AUTO ATTITUDE CONTROL		← 3 AXIS		(1)	3 AXIS →			←		3-AXIS		→			2-AXIS	3-AXIS	(1)
RATE DAMPING		← 3 AXIS		(1)	3 AXIS →			←		3-AXIS		→			2-AXIS	3-AXIS	(1)
DIRECT RCS		← 3 AXIS		(1)	3 AXIS →			←		3-AXIS		→			2-AXIS	3-AXIS	(1)
BMAGS P,Y		← 1 OF 2	→			1 OF 2		←		1 OF 2		→			← 1 OF 2		
BMAGS R			1 OF 2			1 OF 2										1 OF 2	
FDAI		← 1 OF 2	→			1 OF 2		←		1 OF 2		→				1 OF 2	
THC		←	THC →					←		THC		→					
RHC		←	1 OF 2 →			1 OF 2		←		1 OF 2		→				1 OF 2	
EMS																	
CMC			CMC			CMC		←		CMC		→			← CMC		CMC
ISS			ISS			ISS		←		ISS		→			← ISS		ISS
OSS			OSS			(3)				← OSS OR VHF		→					
OPTICS DAC			O-DAC			O-DAC		←		O-DAC		→			← O-DAC		
NO SOLENOID DR GND																	
TVC SERVO LOOP		1 OF 2	BOTH			BOTH		←		BOTH		→			← BOTH		
DSKY			1 OF 2			1 OF 2	REFER TO MR 3-86	←		1 OF 2		→			← 1 OF 2		1 OF 2
SPS																	
FU/OX TANK (W/O LEAK)		← FU/OX	→			FU/OX		←		FU/OX TANK		→	← FU/OX TNK				
GN_2 TANK (W/O LEAK)		1 OF 2	BOTH			BOTH		←		BOTH		→			← BOTH		
BALL VALVE BANK		1 OF 2	BOTH			BOTH		←		BOTH		→			← BOTH		
FEEDLINE TEMP >40° F		← >40°	→			>40°		←		>40°		→			← >40°		
FU/OX ΔP < 20 PSI		← < 20	→					←		< 20		→			← < 20		
FLANGE TEMP < 480° F		< 480°	N/A			< 480°		←		< 480		→					
Pc > 70 PSI		> 70	N/A			> 70		←		> 70		→					
ULLAGE CAPABILITY			BOTH			1 OF 2		←		1 OF 2		→					
HE TANK (W/O LEAK)		(2)	HE TNK			← HE TNK				← HE TNK		→					
SM RCS																	
HE TANK (W/O LEAK)		3 OF 4	ALL			3 OF 4		3OF4 ←		ALL		→ 3 OF 4			← 3 OF 4		3 OF 4
NO LEAK BELOW ISO VLV		3 OF 4	ALL	← 3 OF 4 →		4 OF 4		3OF4 ←		ALL		→			← 3 OF 4		4 OF 4
PKG TEMP >55°		3 OF 4	ALL	← 3 OF 4 →		3 OF 4		3OF4 ←		ALL		→ 3 OF 4			← 3 OF 4		3 OF 4
THRUSTERS		ALL ROT AXES+X TRANS	3 OF 4 P,Y 6 OF 8 R	(1)		3 OF 4 P,Y 6 OF 8 R		6OF8 ←		3 OF 4 P,Y ALL R		→ 6 OF 8 R			← 3 OF 4 P,Y 6 OF 8 R	(	(1)
CM RCS																	
HE TANK (W/O LEAK)	1 OF 2 MODE 1	←		BOTH →				←		BOTH		→			← BOTH	BOTH	ONE
MANIFOLD (W/O LEAK)	1 OF 2 MODE 1	←		BOTH →				←		BOTH		→			← BOTH	BOTH	ONE
NOT ARMED		←		NOT ARMED →				←				→				NOT ARMED	

(1) REQUIRES 3-AXIS ATTITUDE CONTROL AND TRANSLATION 3-AXIS (ONE LATERAL AXIS MAY BE DEGRADED)

(2) MUST HAVE SUFFICIENT ULLAGE FOR DEORBIT

(3) ASSUME LM CAN PROVIDE A GOOD ALIGNMENT

NOTE
1 T_2 NO STAY CONDITIONS
2 NONE

LEGEND: ■ NO REQUIREMENT

FUNCTIONS POWERED THRU CB

4

SPS GAUGING

AC1
OFF
AC2

TELCOM

GROUP 1 | GROUP 2

AC1
OFF
AC2

ECS GLYCOL PUMPS

1 AC1 OFF AC1 2
AC2 AC2

SUIT COMPRESSOR

1 2

AC1
OFF
AC2

SUIT COMPRESSORS

AC1			AC2		
ϕA	ϕB	ϕC	ϕA	ϕB	ϕC
PWR TO SUIT COMPRESSOR 1 AND/OR 2	PWR TO SUIT COMPRESSOR 1 AND/OR 2	PWR TO SUIT COMPRESSOR 1 AND/OR 2	PWR TO SUIT COMPRESSOR 1 AND/OR 2	PWR TO SUIT COMPRESSOR 1 AND/OR 2	PWR TO SUIT COMPRESSOR 1 AND/OR 2

(SWITCH SELECT OUTPUT)

ECS GLYCOL PUMPS

AC1			AC2		
ϕA	ϕB	ϕC	ϕA	ϕB	ϕC
PWR TO GLYCOL PUMP 1 OR 2	PWR TO GLYCOL PUMP 1 OR 2	PWR TO GLYCOL PUMP 1 OR 2	PWR TO GLYCOL PUMP 1 OR 2	PWR TO GLYCOL PUMP 1 OR 2	PWR TO GLYCOL PUMP 1 OR 2
AUTO CONTROL GLY EVAP INLET TEMP	AUTO CONTROL GLY VLV TO SUIT HEAT EXCHANGER	MANUAL CONTROL EVAP STEAM PRESS VLV	AUTO CONTROL GLY EVAP H_2O & STEAM PRESS		

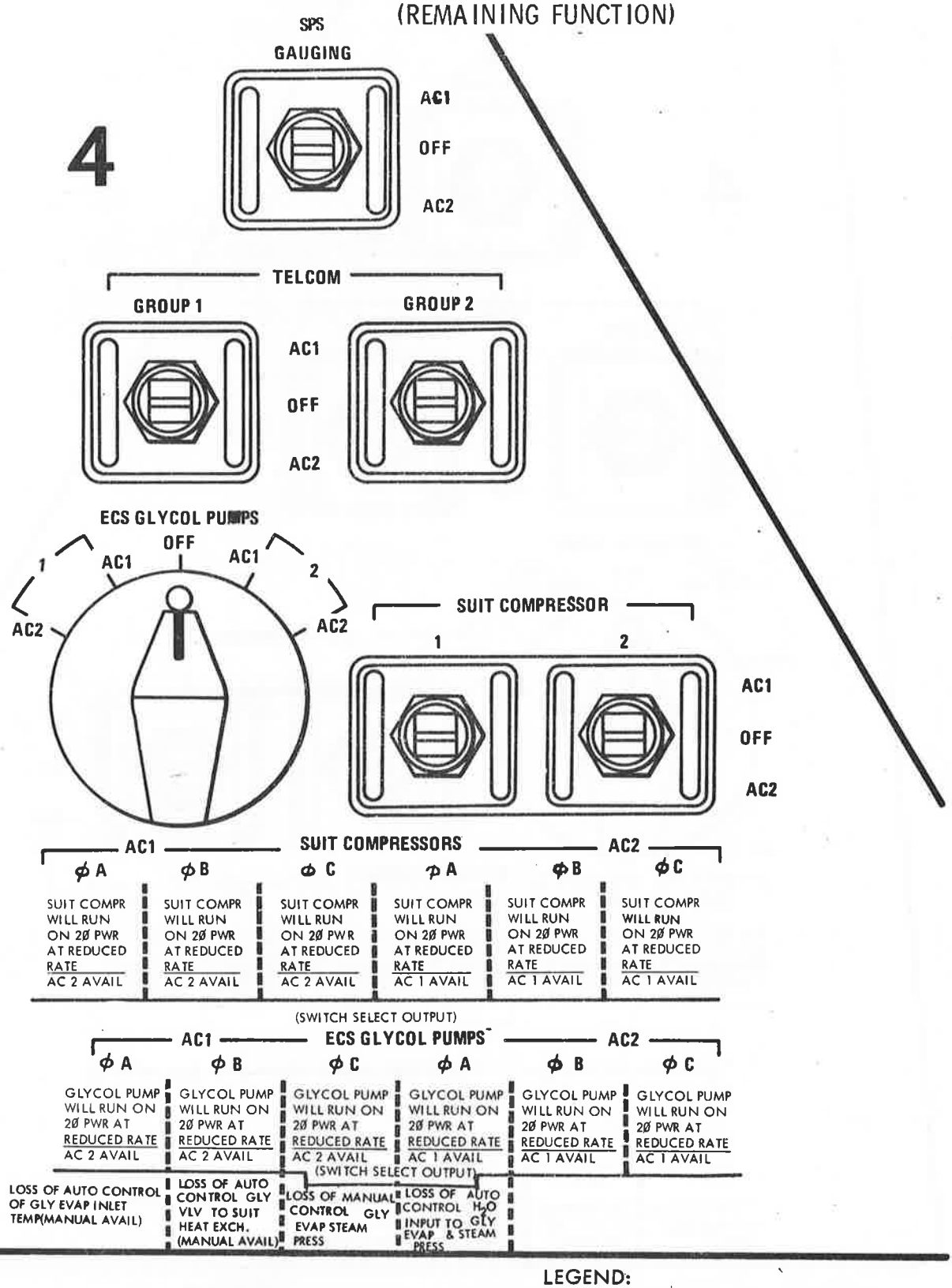
(SWITCH SELECT OUTPUT)

LEGEND:
LINE BETWEEN CIRCUIT BREAKERS
DESIGNATES DUAL POWER TO FUNCTION
DESIGNATES SIMILAR FUNCTIONS
DESIGNATES DIFFERENT FUNCTIONS

SOURCE NR/TODD
DATE 11/30/70

EFFECT OF CB OPENING
(REMAINING FUNCTION)

4

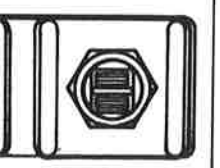


LEGEND:
LINE BETWEEN CIRCUIT BREAKERS
DESIGNATES DUAL POWER TO FUNCTION
DESIGNATES SIMILAR FUNCTIONS
DESIGNATES DIFFERENT FUNCTIONS

DATE 11/30/70
SOURCE NR/TODD

NS POWERED THRU CB

NONESS BUS
MNA



OFF

MNB

EPS SENSOR SIGNAL

MNA: U/V SNSR VOLTMETER (MAIN BUS A) PCM — MN A VOLTS

MNB: U/V SNSR VOLTMETER (MAIN BUS B) PCM — MAIN B VOLTS

AC1: O/V-U/V SNSR VOLTMETER (AC BUS 1-ØA-ØB-ØC) PCM — AC BUS 1 VOLTS (ØA)

AC2: O/V-U/V SNSR VOLTMETER (AC BUS 2-ØA-ØB-ØC) PCM — AC BUS 2 VOLTS (ØA)

C/W

MNA: C/W

MNB: C/W

LM PWR-1
MNB: CONTROL OF TRNSFR & PWR TO LM (1 OF 2)

INVERTER CONTROL

1: BAT RLY BUS TO INV 1-DC / INV 1-AC 1 / INV 3-AC 2

2: BAT RLY BUS TO INV 2-DC / INV 2-AC 1 / INV 1-AC 2

3: BAT RLY BUS TO INV 3-DC / INV 3-AC 1 / INV 2-AC 2

EPS SENSOR UNIT

A DC BUS B

BAT RLY BUS TO MN A U/V SNSR (AFTER TRIP)

BAT RLY BUS TO MN B U/V SNSR (AFTER TRIP)

1 AC BUS 2

BAT RLY BUS TO AC 1 O/V-U/V SNSR &O/V DIS-CONNECT RELAY

BAT RLY BUS TO AC 2 O/V-U/V SNSR &O/V DIS-CONNECT RELAY

BAT RLY BUS

BAT A: BAT BUS A TO BAT RLY BUS

BAT B: BAT BUS B TO BAT RLY BUS

LM PWR-2
MNB: CONTROL OF TRNSFR & PWR TO LM (2 OF 2)

CONTROL OF RESET

NVIRONMENTAL CONTROL SYSTEM RADIATORS

CONT/HTRS

MNA: PRIM 2 RAD HTR CONTROL CKT / AUTO TRNSFR CKT / 1 & 2 AUTO FLOW PROPORTIONING / MANUAL 1 FLOW PROPORTIONING CONTROL / MANUAL SEL RAD 1 & 2

MNB: PRIM 1 RAD HTR CONTROL CKT / MANUAL 2 FLOW PROPORTIONING CONTROL / RAD PRIM INLET TEMP METER & PCM

HTRS OVLD

BAT A: PRI 1 RAD HTR O/L SNSR

BAT B: PRI 2 & SEC RAD HTR O/L SNSRS

BATTERY CHARGER

BAT A CHG: CHGR TO BAT BUS A / BAT A/C MN BUS TIE / BAT BUS A VM & PCM

BAT B CHG: CHGR TO BAT BUS B / BAT B/C MN BUS TIE / BAT BUS B VM & PCM

MNA: BAT CHGR

MNB: BAT CHGR

AC PWR: BAT CHGR (SWITCH SELECT INPUT)

ENVIRONMENTAL CONTROL SYSTEM

TRANSDUCER

WASTE/POT H_2O

MNA: WASTE & POT H_2O QTY METER & PCM

MNB: WASTE & POT H_2O QTY METER & PCM

1 PRESS GROUPS

MNA: PRESS METERS & PCM FOR - SUIT COMPR ΔP (C/W) / SUIT PRESS / ACCUM PRIM GLY QTY / GLY DISCH PRIM

MNB: PRESS METERS & PCM FOR - SUIT COMPR ΔP (C/W) / SUIT PRESS / ACCUM PRIM GLY QTY / GLY DISCH PRIM

2 PRESS GROUPS

MNA: PRESS METERS & PCM FOR - O_2 FLOW / CABIN / GLY EVAP PRIM / STEAM / O_2 REG OUT (PCM ONLY) / CO_2 PART PRESS

MNB: PRESS METERS & PCM FOR - O_2 FLOW(& C&W) / CABIN / GLY EVAP PRIM / STEAM / O_2 REG OUT (PCM ONLY)

TEMP

MNA: TEMP METERS & PCM FOR - SUIT / CABIN / RAD PRIM OUTLET (& C/W) / GLY EVAP PRIM & SEC OUTLET

MNB: TEMP METERS & PCM FOR - SUIT / CABIN / RAD PRIM OUTLET (& C/W) / GLY EVAP PRIM & SEC OUTLET

B

CH
ROL OF
M 2
AND
CT)

ENTAL CONTROL SYSTEM

H_2O/URINE

P HTR

MNB: MANUAL CONTROL OF WASTE H_2O & URINE DUMP HTRS B

F
S
ELECT OUTPUT)

MP: STEAM DUCT HTR 2 & WASTE H_2O & URINE DUMP STRIP HTRS 2 (CONTINUOUS)

TICS

MNB: OPTICS

CABIN FAN

1 AC1

ϕA: CABIN FAN 1

ϕB: CABIN FAN 1

ϕC: CABIN FAN 1

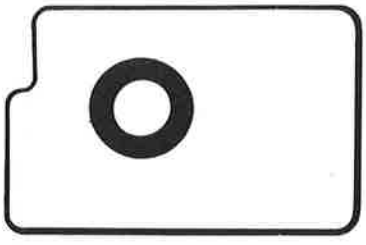
2 AC2

ϕA: CABIN FAN 2 / AC UTILITY OUTLET ON PANEL 201

ϕB: CABIN FAN 2 / AC UTILITY OUTLET ON PANEL 201

ϕC: CABIN FAN 2 / AC UTILITY OUTLET ON PANEL 201 / AUTO CABIN TEMP CONTROL

AC UTIL PWR



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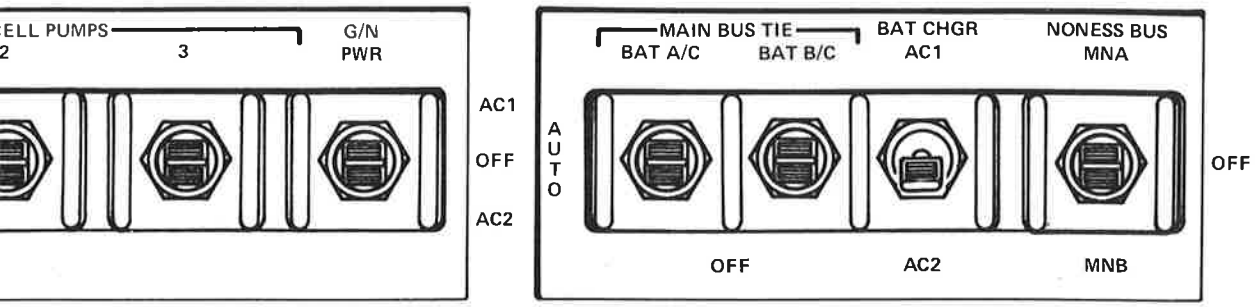
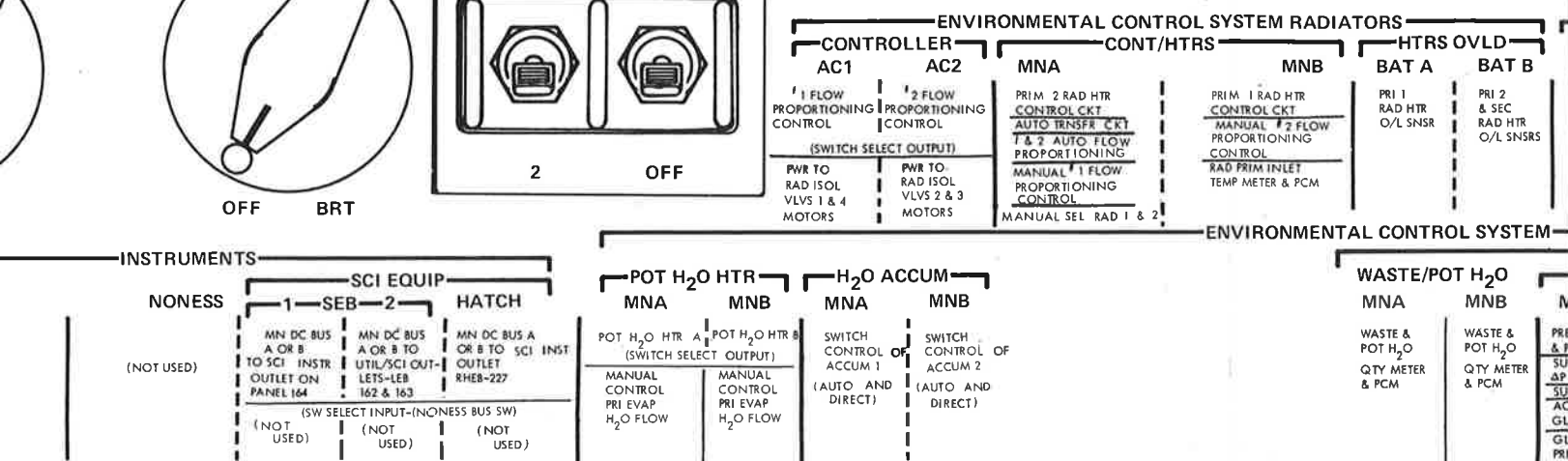
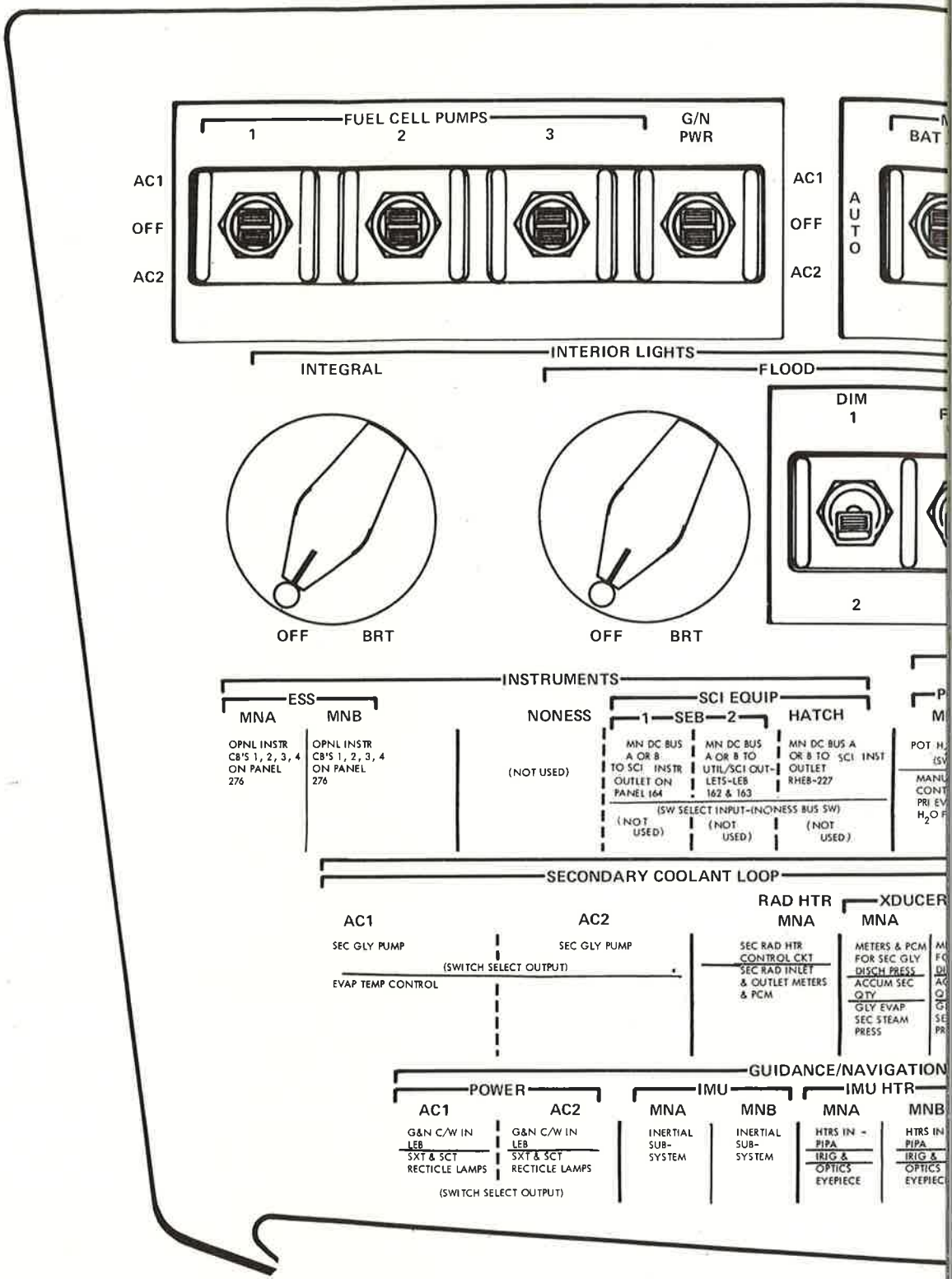




IT BREAKERS
OWER TO FUNCTION
R FUNCTIONS
NT FUNCTIONS

CSM SYSTEMS DATA

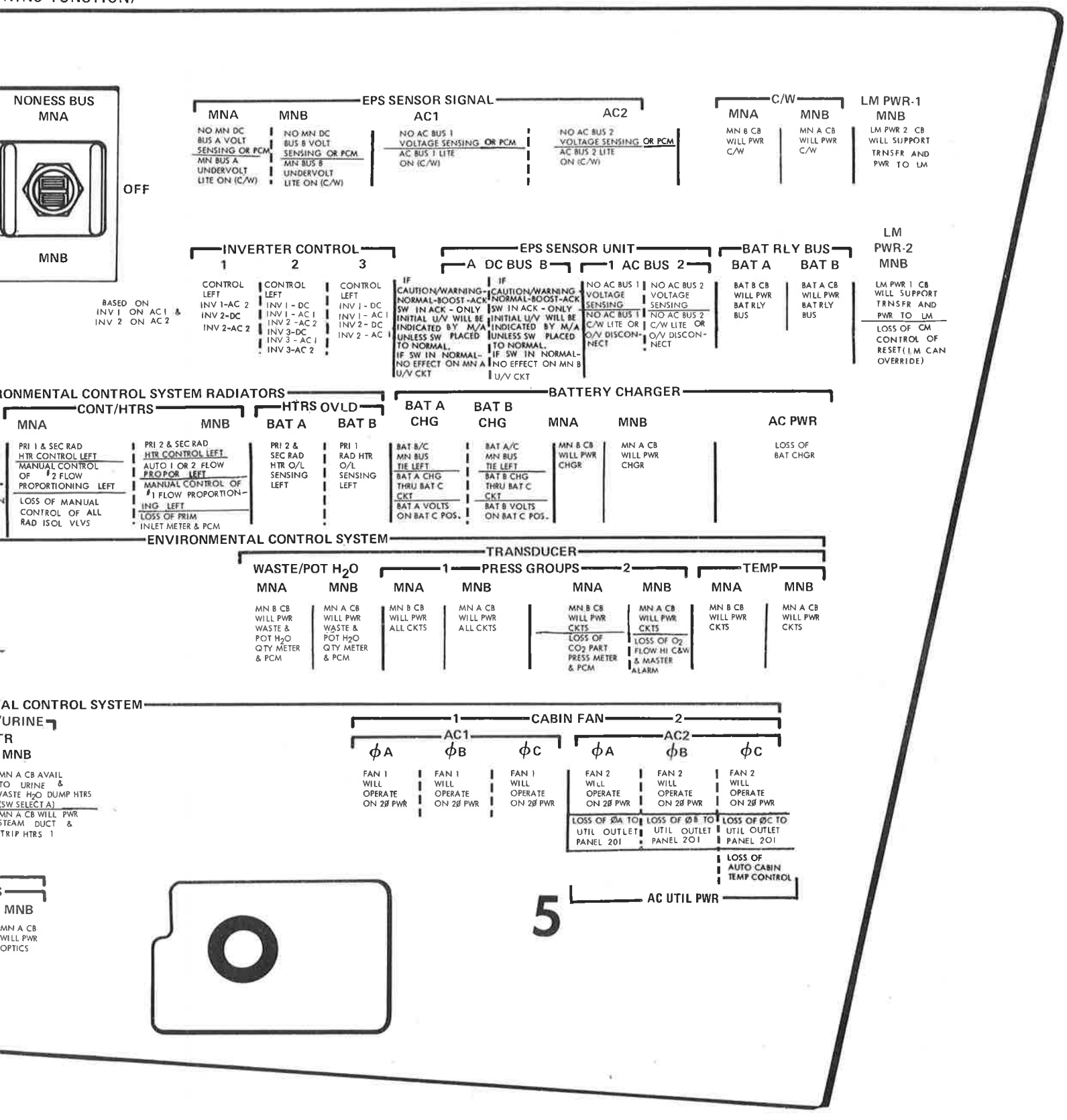
SOURCE NR/TODD
DATE 11/30/70



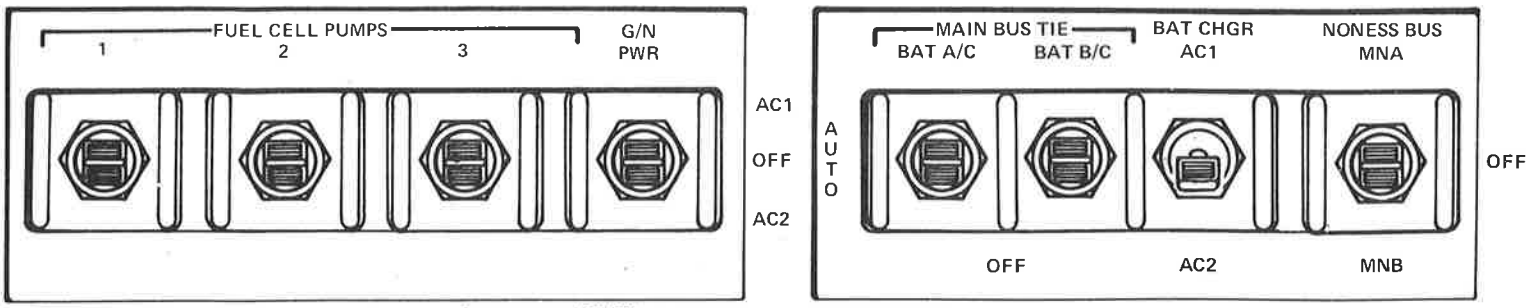
LEGEND:

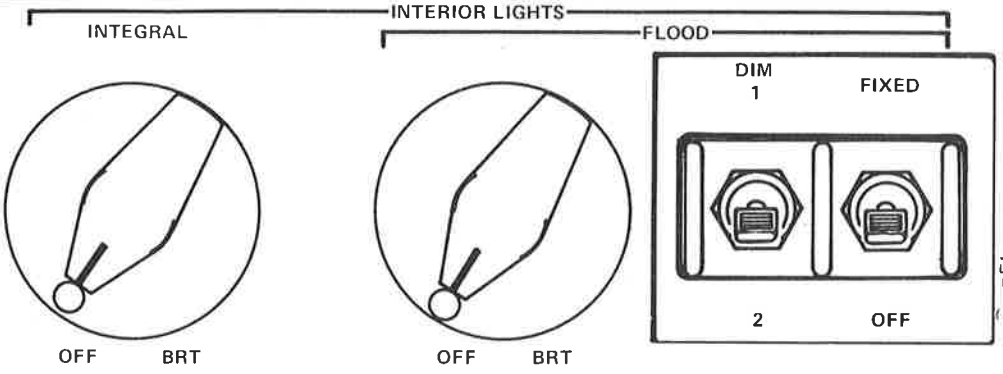
LINE BETWEEN CIRCUIT BREAKERS
——— DESIGNATES DUAL POWER TO FUNCTION
- - - - DESIGNATES SIMILAR FUNCTIONS
▬▬▬ DESIGNATES DIFFERENT FUNCTIONS

OF CB OPENING
NING FUNCTION)

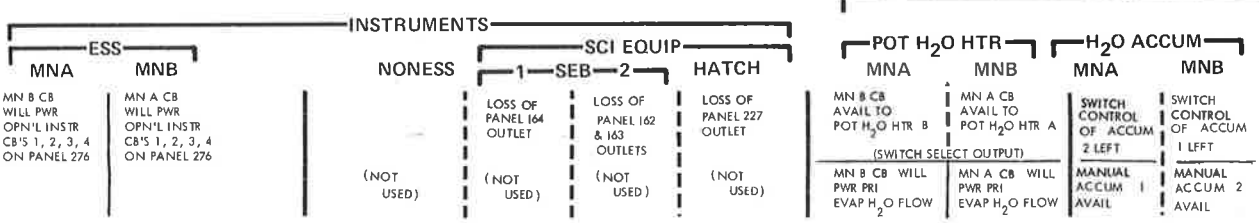


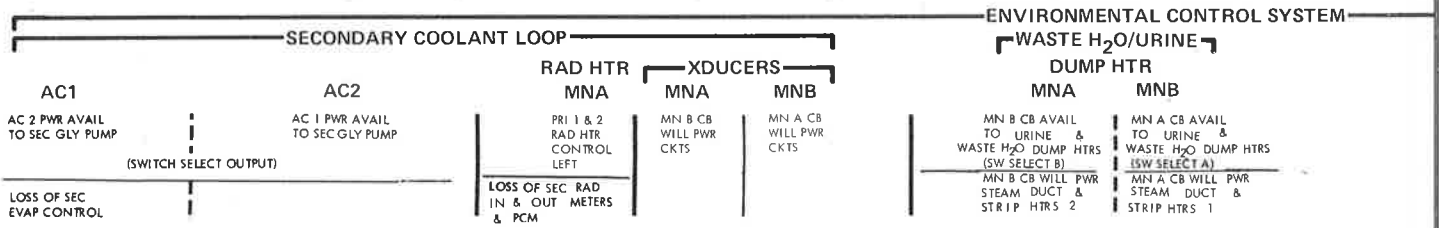
EFFECT OF CB OPENING (REMAINING FUNCTION)

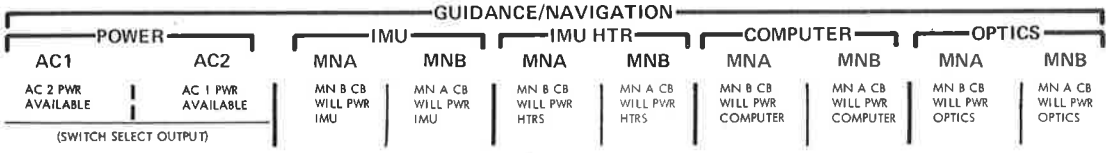




BASED ON INV 1 ON AC 1 & INV 2 ON AC 2



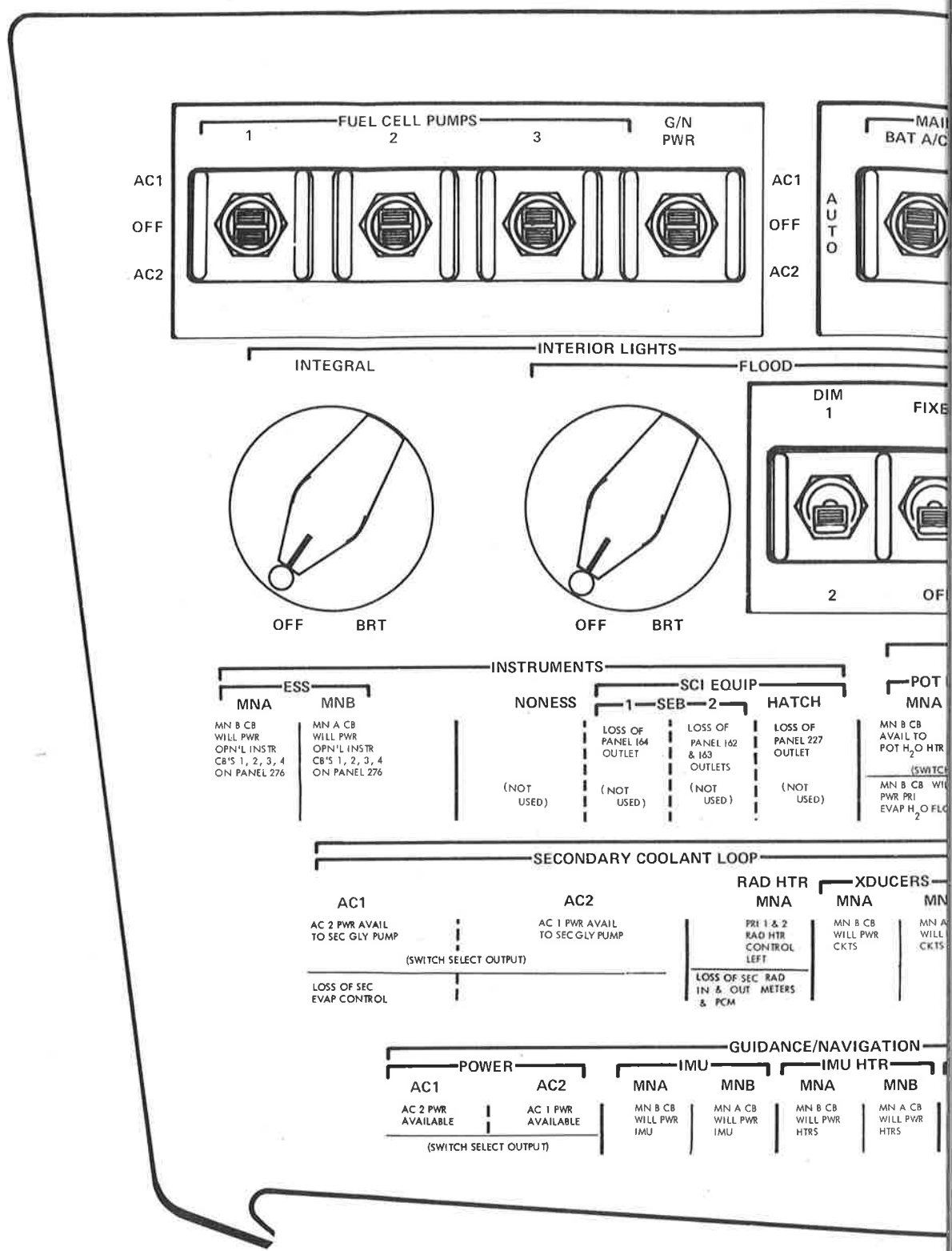




LEGEND:
LINE BETWEEN CIRCUIT BREAKERS
——— DESIGNATES DUAL POWER TO FUNCTION
▬ ▬ ▬ DESIGNATES SIMILAR FUNCTIONS
▬▬▬ DESIGNATES DIFFERENT FUNCTIONS

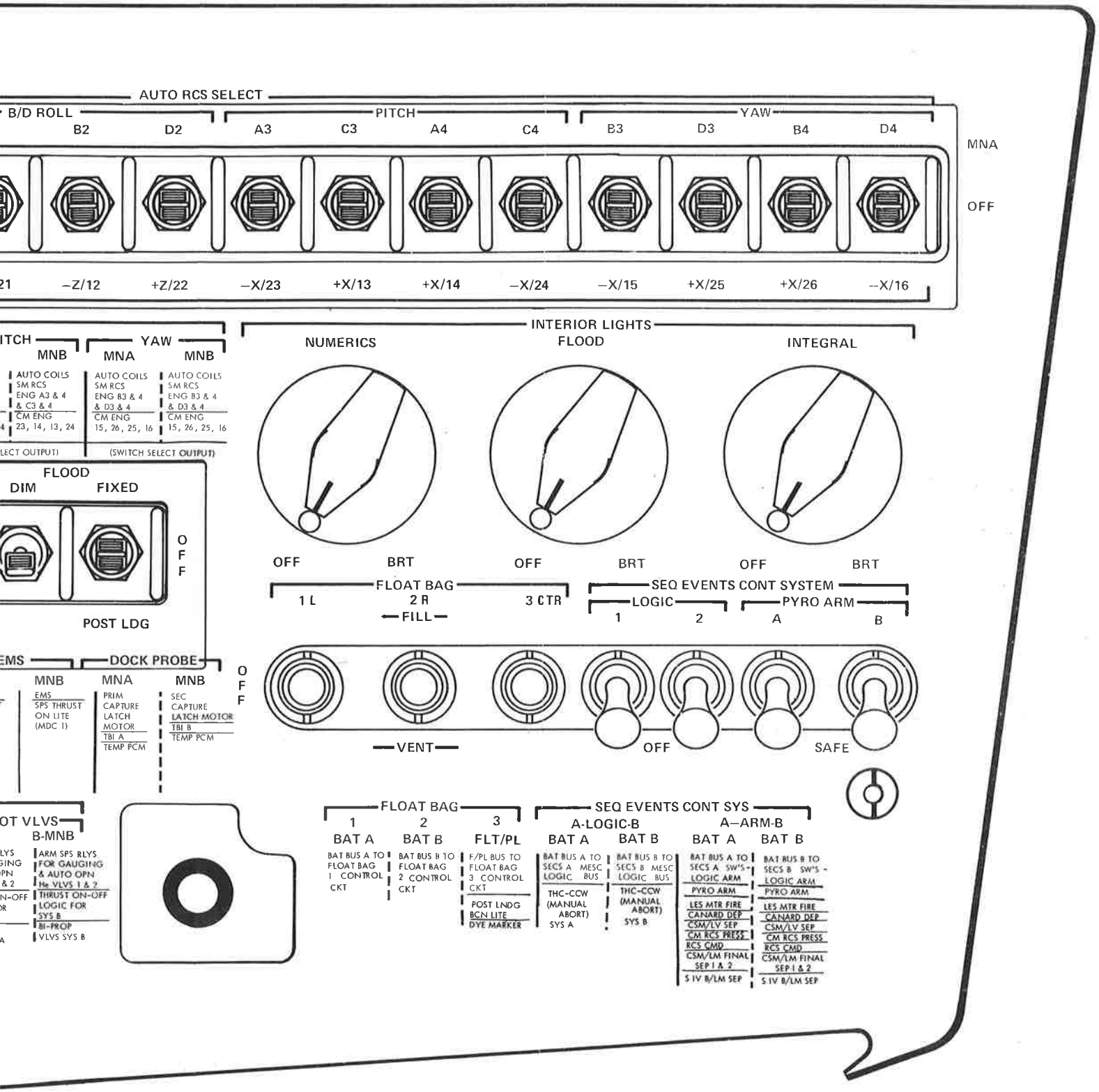
CSM SYSTEMS DATA

SOURCE NR/TODD
DATE 11/30/70

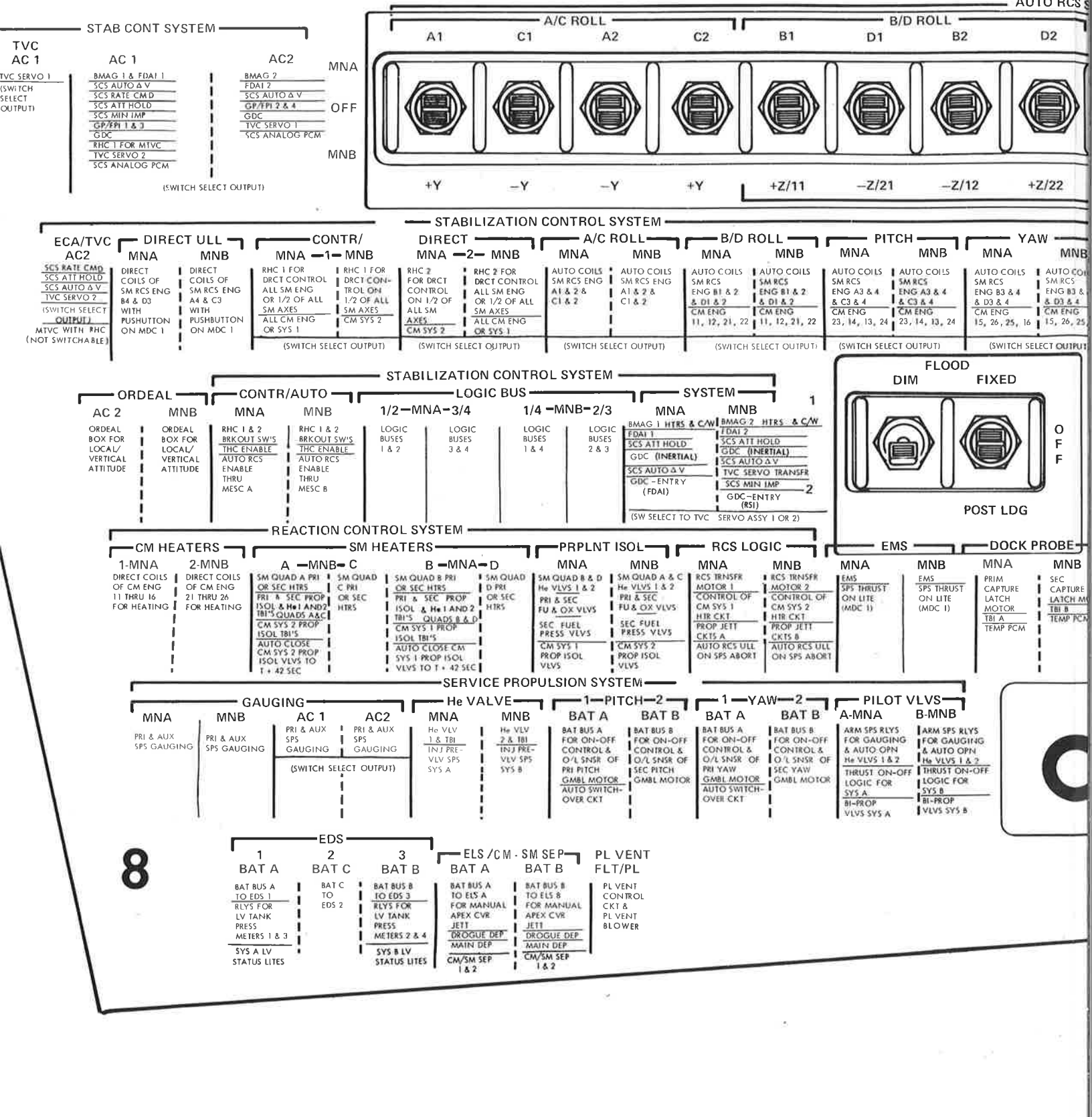


LEGEND:
LINE BETWEEN CIRCUIT BREAKERS
DESIGNATES DUAL POWER TO FUNCTION
DESIGNATES SIMILAR FUNCTIONS
DESIGNATES DIFFERENT FUNCTIONS

POWERED THRU CB

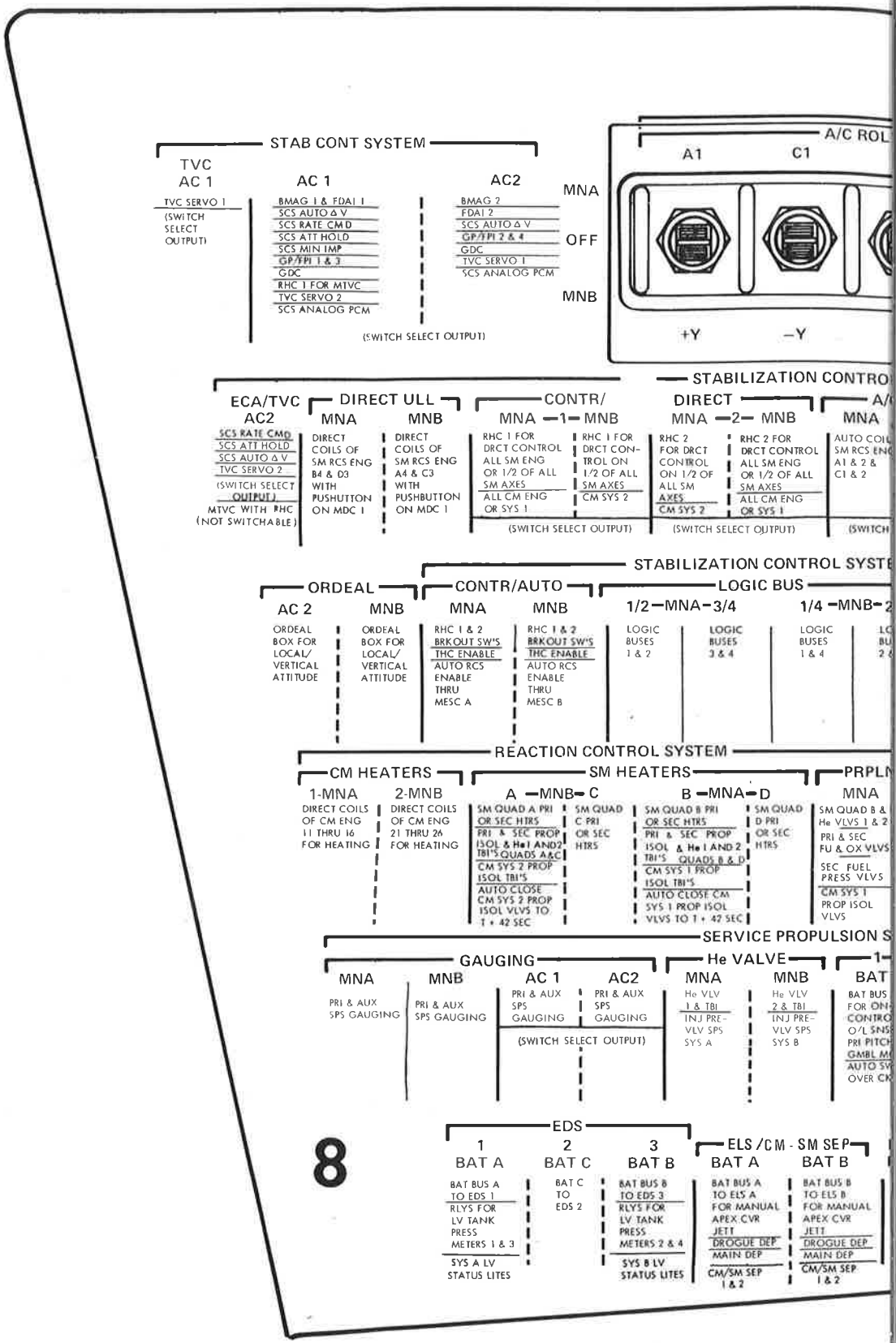


LEGEND:
LINE BETWEEN CIRCUIT BREAKERS
DESIGNATES DUAL POWER TO FUNCTION
DESIGNATES SIMILAR FUNCTIONS
DESIGNATES DIFFERENT FUNCTIONS

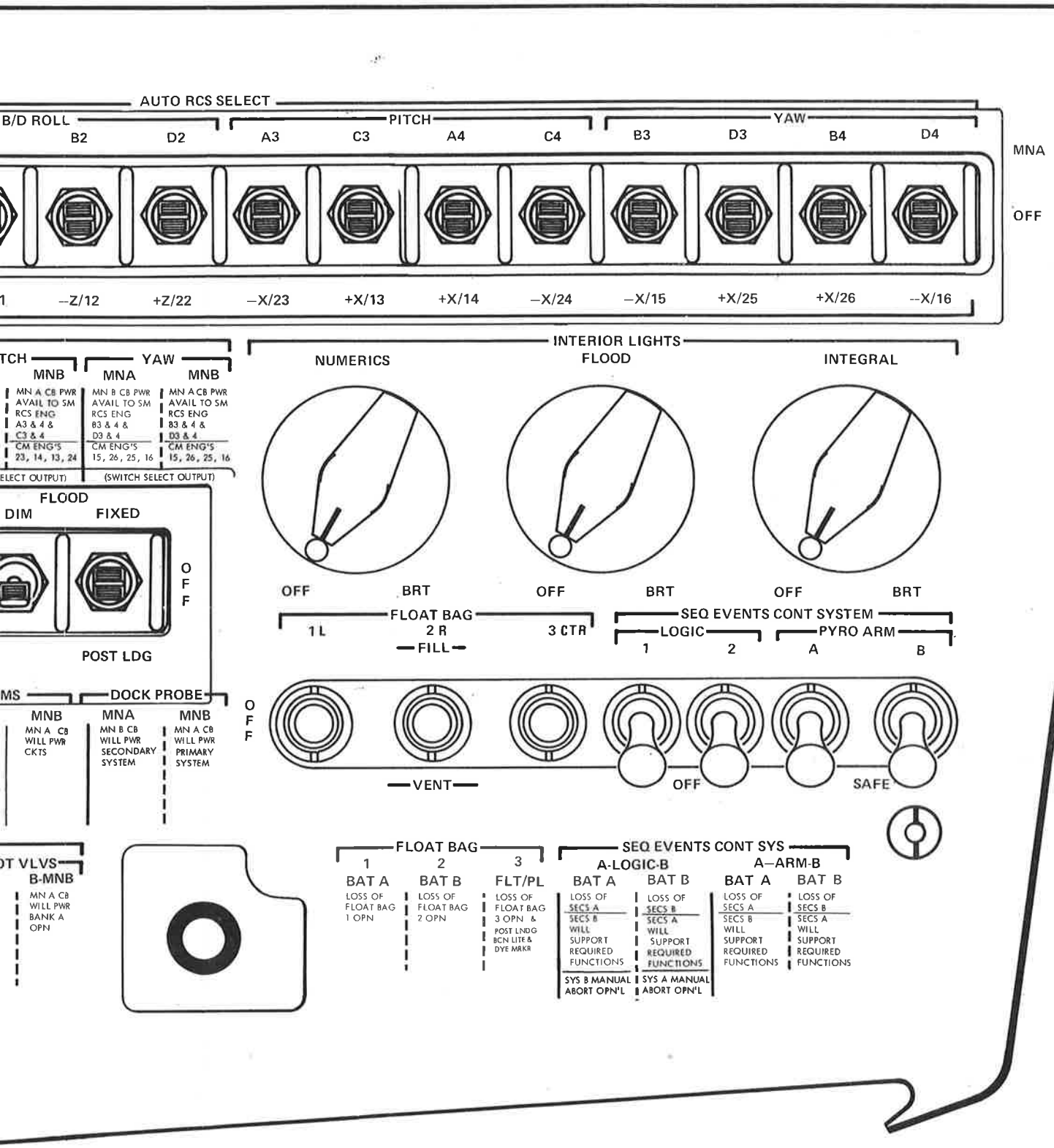

AUTO RCS
A/C ROLL
B/D ROLL
A1
C1
A2
C2
B1
D1
B2
D2
+Y
−Y
−Y
+Y
+Z/11
−Z/21
−Z/12
+Z/22
STAB CONT SYSTEM
TVC
AC 1
TVC SERVO 1
(SWITCH SELECT OUTPUT)
AC 1
BMAG 1 & FDAI 1
SCS AUTO Δ V
SCS RATE CMD
SCS ATT HOLD
SCS MIN IMP
GP/FPI 1 & 3
GDC
RHC 1 FOR MTVC
TVC SERVO 2
SCS ANALOG PCM
AC2
BMAG 2
FDAI 2
SCS AUTO Δ V
GP/FPI 2 & 4
GDC
TVC SERVO 1
SCS ANALOG PCM
MNA
OFF
MNB
(SWITCH SELECT OUTPUT)
STABILIZATION CONTROL SYSTEM
ECA/TVC
AC2
SCS RATE CMD
SCS ATT HOLD
SCS AUTO Δ V
TVC SERVO 2
(SWITCH SELECT OUTPUT)
MTVC WITH RHC (NOT SWITCHABLE)
DIRECT ULL
MNA
DIRECT COILS OF SM RCS ENG B4 & D3 WITH PUSHBUTTON ON MDC 1
MNB
DIRECT COILS OF SM RCS ENG A4 & C3 WITH PUSHBUTTON ON MDC 1
CONTR/
MNA −1− MNB
RHC 1 FOR DRCT CONTROL ALL SM ENG OR 1/2 OF ALL SM AXES
ALL CM ENG OR SYS 1
RHC 1 FOR DRCT CONTROL ON 1/2 OF ALL SM AXES
CM SYS 2
(SWITCH SELECT OUTPUT)
DIRECT
MNA −2− MNB
RHC 2 FOR DRCT CONTROL ON 1/2 OF ALL SM AXES
CM SYS 2
RHC 2 FOR DRCT CONTROL ALL SM ENG OR 1/2 OF ALL SM AXES
ALL CM ENG OR SYS 1
(SWITCH SELECT OUTPUT)
A/C ROLL
MNA
AUTO COILS SM RCS ENG A1 & 2 & C1 & 2
MNB
AUTO COILS SM RCS ENG A1 & 2 & C1 & 2
(SWITCH SELECT OUTPUT)
B/D ROLL
MNA
AUTO COILS SM RCS ENG B1 & 2 & D1 & 2
CM ENG 11, 12, 21, 22
MNB
AUTO COILS SM RCS ENG B1 & 2 & D1 & 2
CM ENG 11, 12, 21, 22
(SWITCH SELECT OUTPUT)
PITCH
MNA
AUTO COILS SM RCS ENG A3 & 4 & C3 & 4
CM ENG 23, 14, 13, 24
MNB
AUTO COILS SM RCS ENG A3 & 4 & C3 & 4
CM ENG 23, 14, 13, 24
(SWITCH SELECT OUTPUT)
YAW
MNA
AUTO COILS SM RCS ENG B3 & 4 & D3 & 4
CM ENG 15, 26, 25, 16
MNB
AUTO COILS SM RCS ENG B3 & 4 & D3 & 4
CM ENG 15, 26, 25
(SWITCH SELECT OUTPUT)
STABILIZATION CONTROL SYSTEM
ORDEAL
AC 2
ORDEAL BOX FOR LOCAL/ VERTICAL ATTITUDE
MNB
ORDEAL BOX FOR LOCAL/ VERTICAL ATTITUDE
CONTR/AUTO
MNA
RHC 1 & 2 BRKOUT SW'S
THC ENABLE
AUTO RCS ENABLE THRU MESC A
MNB
RHC 1 & 2 BRKOUT SW'S
THC ENABLE
AUTO RCS ENABLE THRU MESC B
LOGIC BUS
1/2 −MNA− 3/4
LOGIC BUSES 1 & 2
LOGIC BUSES 3 & 4
1/4 −MNB− 2/3
LOGIC BUSES 1 & 4
LOGIC BUSES 2 & 3
SYSTEM
MNA
BMAG 1 HTRS & C/W
FDAI 1
SCS ATT HOLD
GDC (INERTIAL)
SCS AUTO Δ V
GDC −ENTRY (FDAI)
MNB
1
BMAG 2 HTRS & C/W
FDAI 2
SCS ATT HOLD
GDC (INERTIAL)
SCS AUTO Δ V
TVC SERVO TRANSFR
SCS MIN IMP
2
GDC−ENTRY (RSI)
(SW SELECT TO TVC SERVO ASSY 1 OR 2)
FLOOD
DIM
FIXED
OFF
POST LDG
REACTION CONTROL SYSTEM
CM HEATERS
1-MNA
DIRECT COILS OF CM ENG 11 THRU 16 FOR HEATING
2-MNB
DIRECT COILS OF CM ENG 21 THRU 26 FOR HEATING
SM HEATERS
A −MNB− C
SM QUAD A PRI OR SEC HTRS
PRI & SEC PROP ISOL & He1 AND2 TBI'S QUADS A&C
CM SYS 2 PROP ISOL TBI'S
AUTO CLOSE CM SYS 2 PROP ISOL VLVS TO T + 42 SEC
SM QUAD C PRI OR SEC HTRS
B −MNA− D
SM QUAD B PRI OR SEC HTRS
PRI & SEC PROP ISOL & He1 AND 2 TBI'S QUADS B & D
CM SYS 1 PROP ISOL TBI'S
AUTO CLOSE CM SYS 1 PROP ISOL VLVS TO T + 42 SEC
SM QUAD D PRI OR SEC HTRS
PRPLNT ISOL
MNA
SM QUAD B & D He VLVS 1 & 2
PRI & SEC FU & OX VLVS
SEC FUEL PRESS VLVS
CM SYS 1 PROP ISOL VLVS
MNB
SM QUAD A & C He VLVS 1 & 2
PRI & SEC FU & OX VLVS
SEC FUEL PRESS VLVS
CM SYS 2 PROP ISOL VLVS
RCS LOGIC
MNA
RCS TRNSFR MOTOR 1
CONTROL OF CM SYS 1 HTR CKT
PROP JETT CKTS A
AUTO RCS ULL ON SPS ABORT
MNB
RCS TRNSFR MOTOR 2
CONTROL OF CM SYS 2 HTR CKT
PROP JETT CKTS B
AUTO RCS ULL ON SPS ABORT
EMS
MNA
EMS
SPS THRUST ON LITE (MDC 1)
MNB
EMS
SPS THRUST ON LITE (MDC 1)
DOCK PROBE
MNA
PRIM CAPTURE LATCH MOTOR
TBI A
TEMP PCM
MNB
SEC CAPTURE LATCH M
TBI B
TEMP PCM
SERVICE PROPULSION SYSTEM
GAUGING
MNA
PRI & AUX SPS GAUGING
MNB
PRI & AUX SPS GAUGING
AC 1
PRI & AUX SPS GAUGING
AC2
PRI & AUX SPS GAUGING
(SWITCH SELECT OUTPUT)
He VALVE
MNA
He VLV 1 & TBI
INJ PRE-VLV SPS SYS A
MNB
He VLV 2 & TBI
INJ PRE-VLV SPS SYS B
1−PITCH−2
BAT A
BAT BUS A FOR ON-OFF CONTROL & O/L SNSR OF PRI PITCH GMBL MOTOR
AUTO SWITCH-OVER CKT
BAT B
BAT BUS B FOR ON-OFF CONTROL & O/L SNSR OF SEC PITCH GMBL MOTOR
1−YAW−2
BAT A
BAT BUS A FOR ON-OFF CONTROL & O/L SNSR OF PRI YAW GMBL MOTOR
AUTO SWITCH-OVER CKT
BAT B
BAT BUS B FOR ON-OFF CONTROL & O/L SNSR OF SEC YAW GMBL MOTOR
PILOT VLVS
A-MNA
ARM SPS RLYS FOR GAUGING & AUTO OPN He VLVS 1 & 2
THRUST ON-OFF LOGIC FOR SYS A
BI-PROP VLVS SYS A
B-MNB
ARM SPS RLYS FOR GAUGING & AUTO OPN He VLVS 1 & 2
THRUST ON-OFF LOGIC FOR SYS B
BI-PROP VLVS SYS B
EDS
1
BAT A
BAT BUS A TO EDS 1
RLYS FOR LV TANK PRESS METERS 1 & 3
SYS A LV STATUS LITES
2
BAT C
BAT C TO EDS 2
3
BAT B
BAT BUS B TO EDS 3
RLYS FOR LV TANK PRESS METERS 2 & 4
SYS B LV STATUS LITES
ELS/CM-SM SEP
BAT A
BAT BUS A TO ELS A FOR MANUAL APEX CVR JETT
DROGUE DEP
MAIN DEP
CM/SM SEP 1 & 2
BAT B
BAT BUS B TO ELS B FOR MANUAL APEX CVR JETT
DROGUE DEP
MAIN DEP
CM/SM SEP 1 & 2
PL VENT FLT/PL
PL VENT CONTROL CKT & PL VENT BLOWER
8

CSM SYSTEMS DATA

SOURCE NR/TODD
DATE 11/30/70



F CB OPENING
ING FUNCTION)

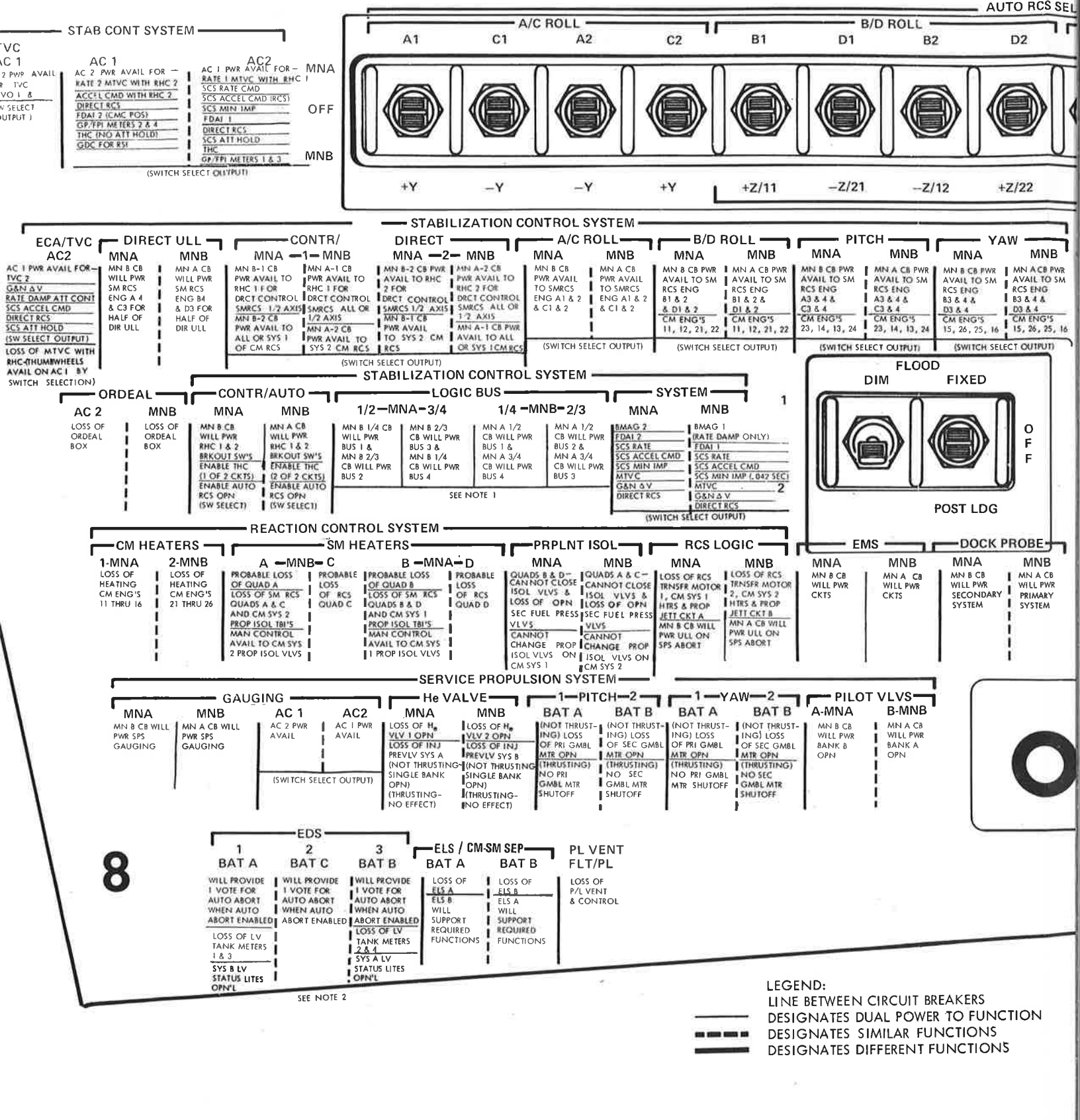


I CIRCUIT BREAKERS
DUAL POWER TO FUNCTION
SIMILAR FUNCTIONS
DIFFERENT FUNCTIONS

NOTE: 1. (SCS-LOGIC BUS) - IF FAULT OCCURS IN BUS, TWO BREAKERS FOR A COMMON BUS WILL PROBABLY OPEN INDICATING THE FAULTED BUS

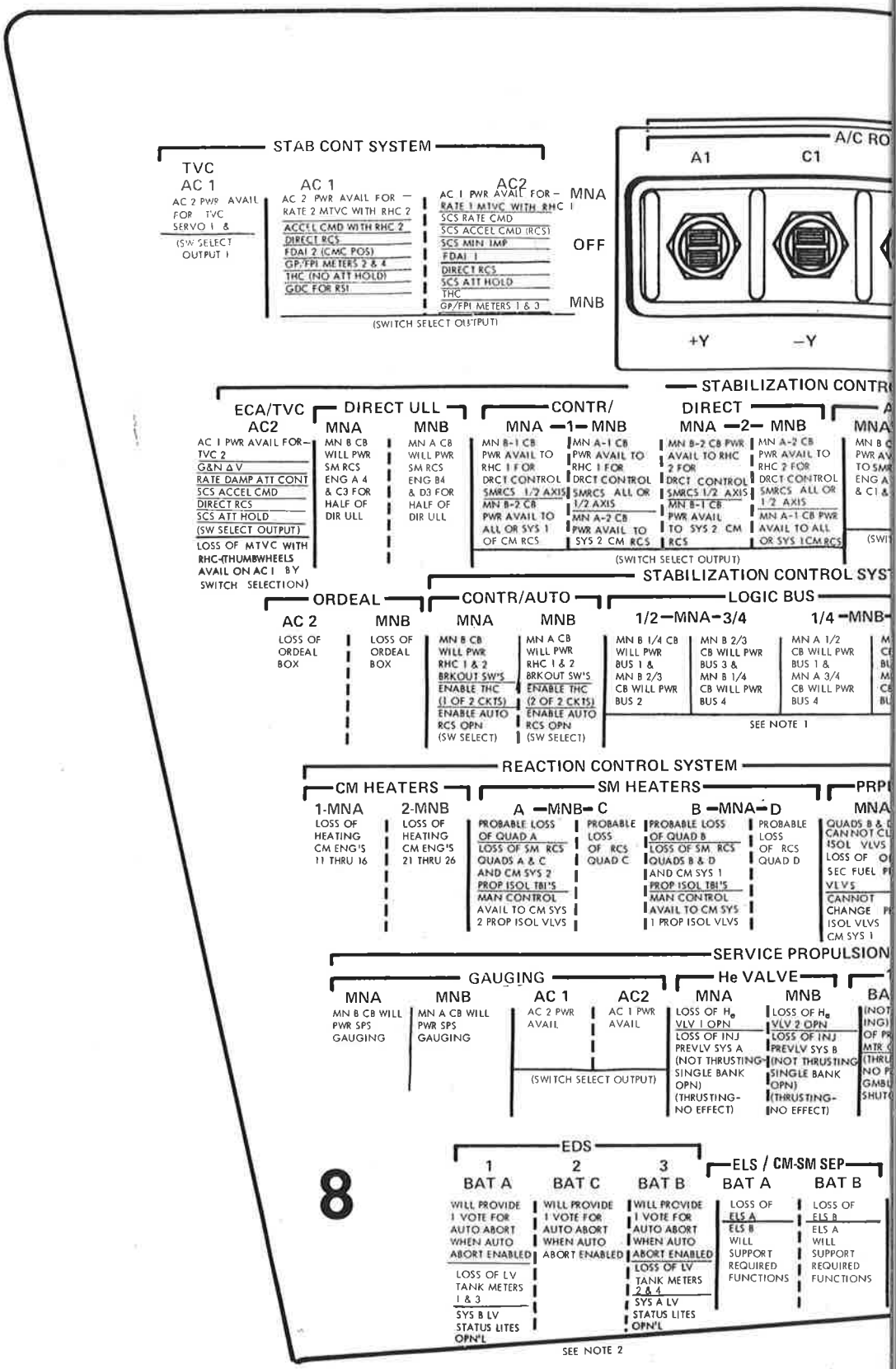
2. TWO CB'S OPEN WILL INITIATE AN AUTO ABORT (WHEN EDS AUTO ENABLED)

EFFECT OF CB OPENING (REMAINING FUNCTION)

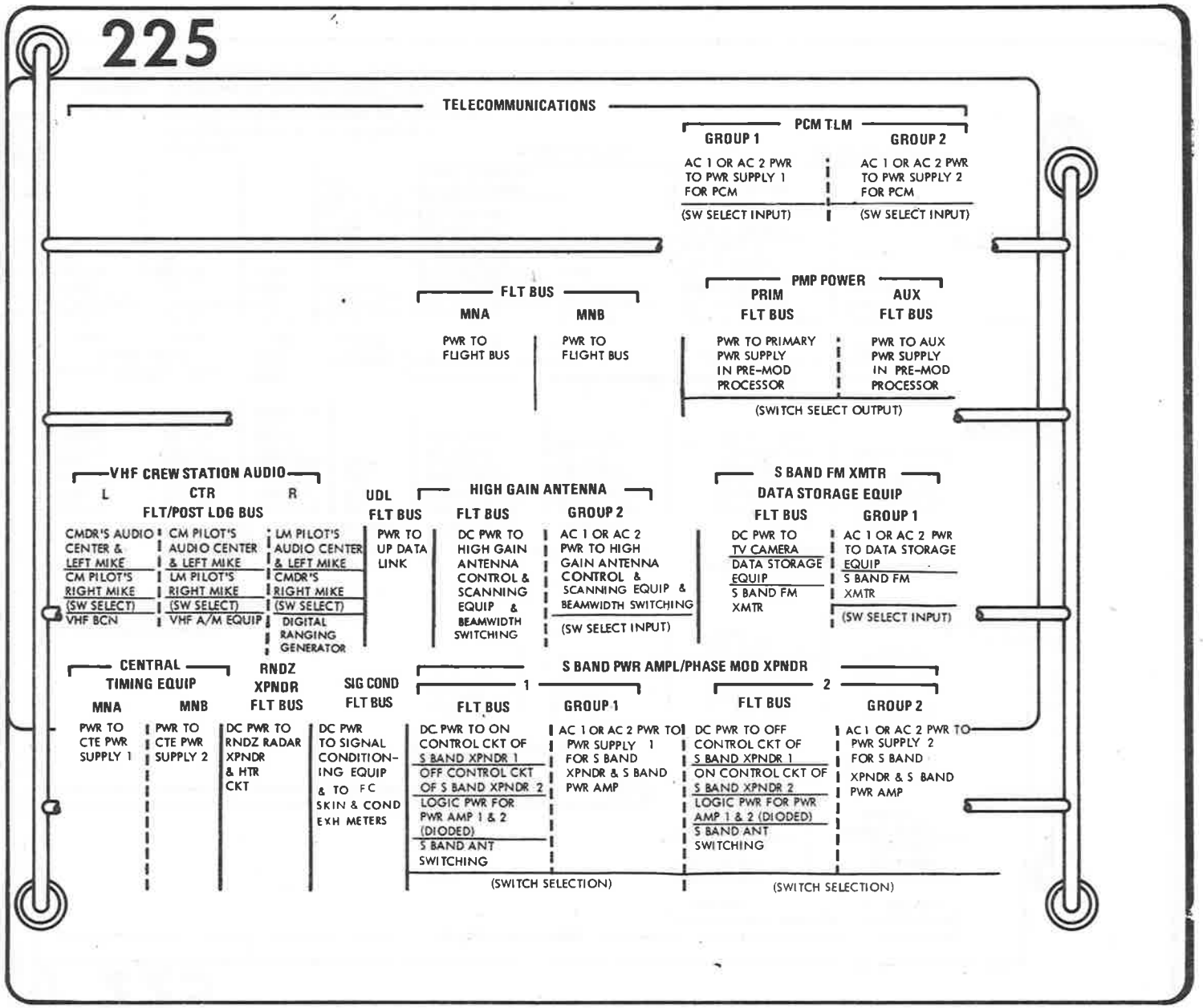


CSM SYSTEMS DATA

SOURCE NR/TODD
DATE 11/30/70

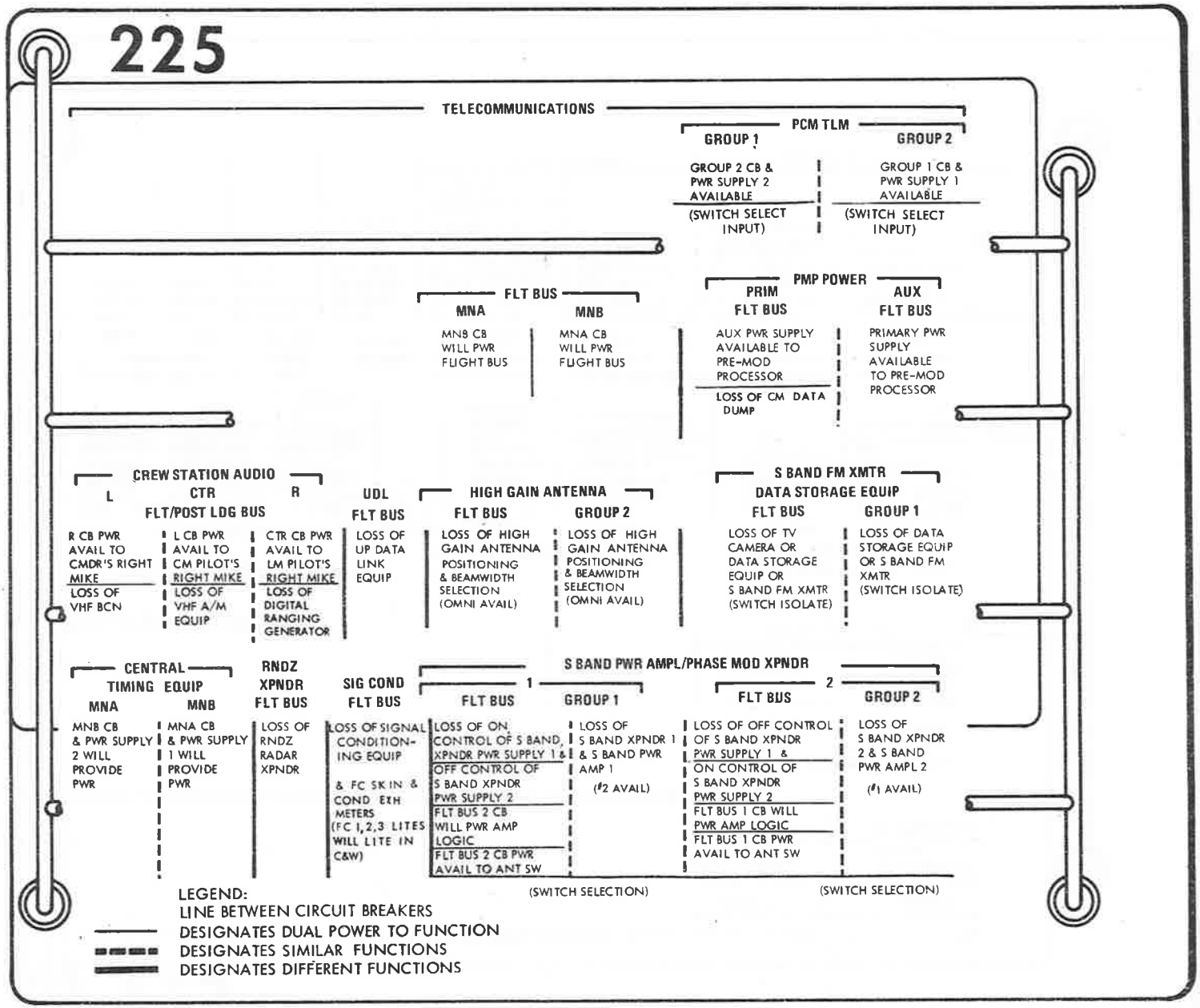


FUNCTIONS POWERED THRU CB



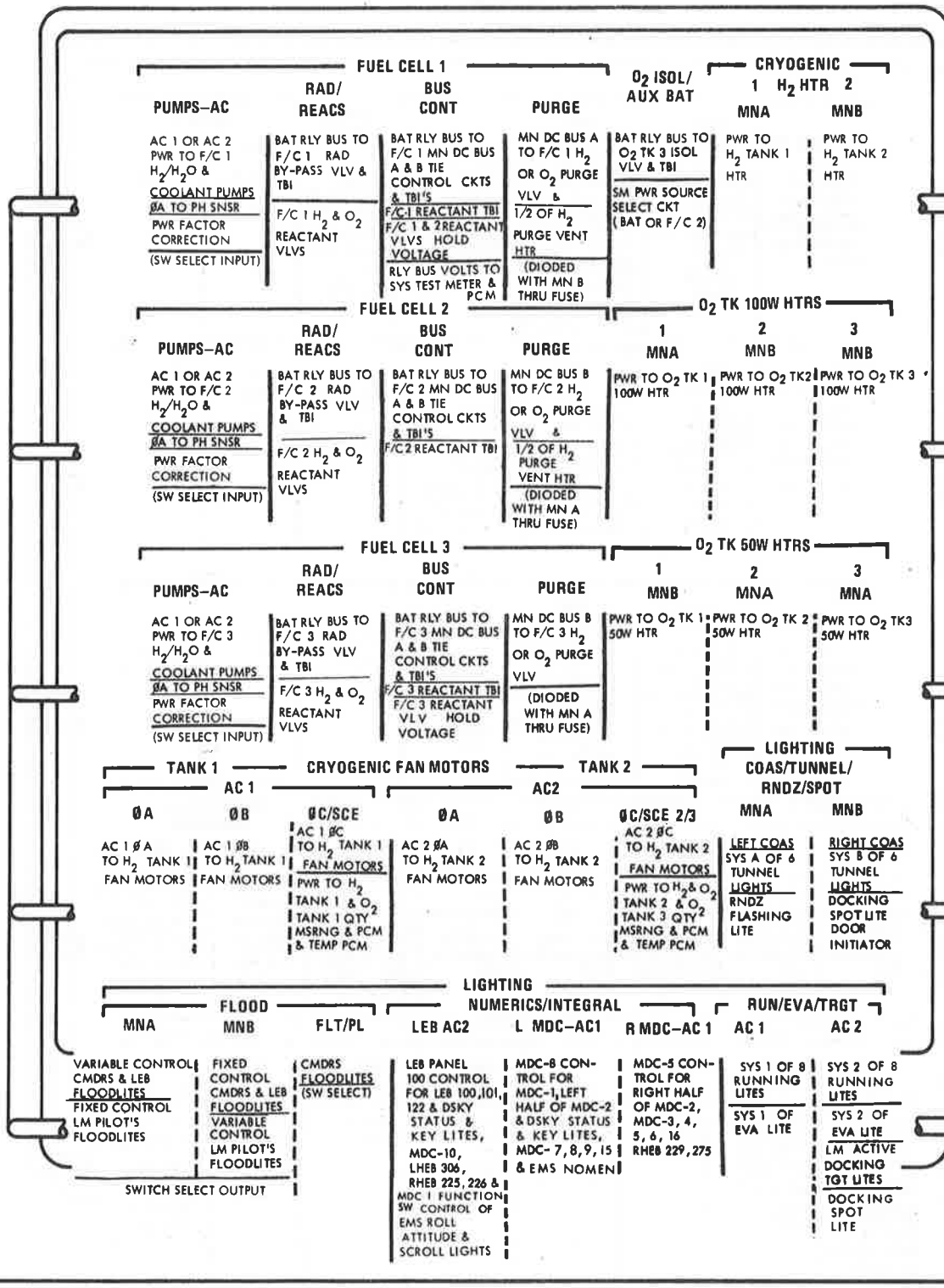
LEGEND:
LINE BETWEEN CIRCUIT BREAKERS
——— DESIGNATES DUAL POWER TO FUNCTION
▬ ▬ ▬ DESIGNATES SIMILAR FUNCTIONS
▬▬▬ DESIGNATES DIFFERENT FUNCTIONS

EFFECT OF CB OPENING
(REMAINING FUNCTION)



FUNCTIONS POWERED THRU CB

226



LEGEND:
LINE BETWEEN CIRCUIT BREAKERS
——— DESIGNATES DUAL POWER TO FUNCTION
– – – – DESIGNATES SIMILAR FUNCTIONS
▬▬▬ DESIGNATES DIFFERENT FUNCTIONS

SOURCE NR/TODD
DATE 11/30/70

EFFECT OF CB OPENING
(REMAINING FUNCTION)

226

FUEL CELL 1

PUMPS–AC	RAD/ REACS	BUS CONT	PURGE
LOSS OF F/C 1 PUMPS & PH SNSR & PWR FACTOR CORR (F/C 2 PWR FACTOR CORR AVAIL)	LOSS OF F/C 1 REACTANT VLVS CONTROL & OF F/C 1 RAD BYPASS VLV CONTROL (TBI WILL NOT GO STRIPED)	LOSS OF F/C 1 MN A & B TIE CONTROL CKTS (TBI'S WILL NOT GO STRIPED) F/C 1 REACTANT TBI WILL NOT GO STRIPED LOSS OF REAC VLVS HOLD VOLTAGE TO F/C 1 & 2 RLY BUS VOLTS TO SYS TEST METER &PCM	PROBABLE LOSS OF CONTROL (MN B FUSE PROBABLY OPENED FIRST) F/C 2 PURGE CB WILL PWR 1/2 OF H_2 VENT HTR

O_2 ISOL/ AUX BAT

LOSS OF CONTROL OF O_2 TK 3 ISOL VLV & OF SM PWR SOURCE SELECT CKT (BAT OR F/C 2)

CRYOGENIC 1 H_2HTR 2

MNA	MNB
LOSS OF H_2 TANK 1 HTRS	LOSS OF H_2 TANK 2 HTRS

FUEL CELL 2

PUMPS–AC	RAD/ REACS	BUS CONT	PURGE
LOSS OF F/C 2 PUMPS & PH SNSR & PWR FACTOR CORR (F/C 3 PWR FACTOR CORR AVAIL)	LOSS OF F/C 2 REACTANT VLVS CONTROL & OF F/C 2 RAD BYPASS VLV CONTROL (TBI WILL NOT GO STRIPED)	LOSS OF F/C 2 & AUX BAT MN A & B TIE CONTROL CKTS (TBI'S WILL NOT GO STRIPED) F/C 2 REACTANT TBI WILL NOT GO STRIPED	PROBABLE LOSS OF CONTROL (MN A FUSE PROBABLY OPENED FIRST) F/C 1 PURGE CB WILL PWR 1/2 OF H_2 VENT HTR

O_2 TK 100 W HTRS

1 MNA	2 MNB	3 MNB
LOSS OF O_2 TK 1 100W HTR	LOSS OF O_2 TANK 2 100W HTR	LOSS OF O_2 TANK 3 100W HTR

FUEL CELL 3

PUMPS–AC	RAD/ REACS	BUS CONT	PURGE
LOSS OF F/C 3 PUMPS & PH SNSR & PWR FACTOR CORR (F/C 2 PWR FACTOR CORR AVAIL)	LOSS OF F/C 3 REACTANT VLVS CONTROL & OF F/C 3 RAD BYPASS VLV CONTROL (TBI WILL NOT GO STRIPED)	LOSS OF F/C 3 MN A & B TIE CONTROL CKTS (TBI'S WILL NOT GO STRIPED) F/C 3 REACTANT TBI WILL NOT GO STRIPED LOSS OF F/C 3 REAC VLV HOLD VOLTAGE	PROBABLE LOSS OF CONTROL (MN A FUSE PROBABLY OPENED FIRST)

O_2 TK 50 W HTRS

1 MNB	2 MNA	3 MNA
LOSS OF O_2 TK 1 50W HTR	LOSS OF O_2 TANK 2 50W HTR	LOSS OF O_2 TANK 3 50W HTR

TANK 1 — CRYOGENIC FAN MOTORS — TANK 2

AC 1

ϕA	ϕB	ϕC/SCE
H_2 TANK 1 FAN MOTORS WILL RUN ON 2ϕ PWR AT REDUCED RATE	H_2 TANK 1 FAN MOTORS WILL RUN ON 2ϕ PWR AT REDUCED RATE	H_2 TANK 1 FAN MOTORS WILL RUN ON 2ϕ PWR AT REDUCED RATE LOSS OF H_2&O_2 TK 1 QTY METERS & PCM & TEMP PCM

AC 2

ϕA	ϕB	ϕC/SCE 2/3
H_2 TANK 2 FAN MOTORS WILL RUN ON 2ϕ PWR AT REDUCED RATE	H_2 TANK 2 FAN MOTORS WILL RUN ON 2ϕ PWR AT REDUCED RATE	H_2 TANK 2 FAN MOTORS WILL RUN ON 2ϕ PWR AT REDUCED RATE LOSS OF H_2 & O_2 TANK 2 & O_2 TANK 3 QTY MSRNG & PCM & TEMP PCM

LIGHTING

COAS/TUNNEL/ RNDZ/SPOT

MNA	MNB
LOSS OF LEFT COAS & RNDZ FLASHING LITE MN B CB WILL PWR SYS B OF 6 TUNNEL LITES	LOSS OF RIGHT COAS & DOCKING SPOT LITE & DOOR INITIATOR MN A CB WILL PWR SYS A OF 6 TUNNEL LITES

LIGHTING

FLOOD

MNA	MNB	FLT/PL
MN B CB PWR AVAIL TO FIXED CONTROL OF CMDR'S & LEB FLOODLITES FLT/PL CB PWR AVAIL TO CMDR'S FLOODLITES MN B CB PWR AVAIL TO VARIABLE CONTROL LM PILOT'S FLOODS	MN A CB PWR AVAIL TO VARIABLE CONTROL OF CMDR'S & LEB FLOODS MN A CB PWR AVAIL TO FIXED CONTROL OF LM PILOT'S FLOODLITES	LOSS OF FLT/PL PWR TO CMDR'S FLOODLITES

NUMERICS/INTEGRAL

LEB AC2	L MDC–AC1	R MDC – AC1
LOSS OF LIGHTING ON APPLICABLE PANELS & LEB DSKY STATUS & KEY LITES	LOSS OF LIGHTING ON APPLICABLE PANELS & MDC-1 DSKY STATUS & KEY LITES	LOSS OF LIGHTING ON APPLICABLE PANELS

RUN/EVA/TRGT

AC 1	AC 2
AC 2 CB WILL PWR SYS 2 OF 8 RUNNING LITES & SYS 2 OF EVA LITE	AC 1 CB WILL PWR SYS 1 OF 8 RUNNING LITES & SYS 1 OF EVA LITE LOSS OF LM ACTIVE DOCKING TRGT LITES & SPOT LITE

LEGEND:
LINE BETWEEN CIRCUIT BREAKERS
——— DESIGNATES DUAL POWER TO FUNCTION
– – – – DESIGNATES SIMILAR FUNCTIONS
▬▬▬ DESIGNATES DIFFERENT FUNCTIONS

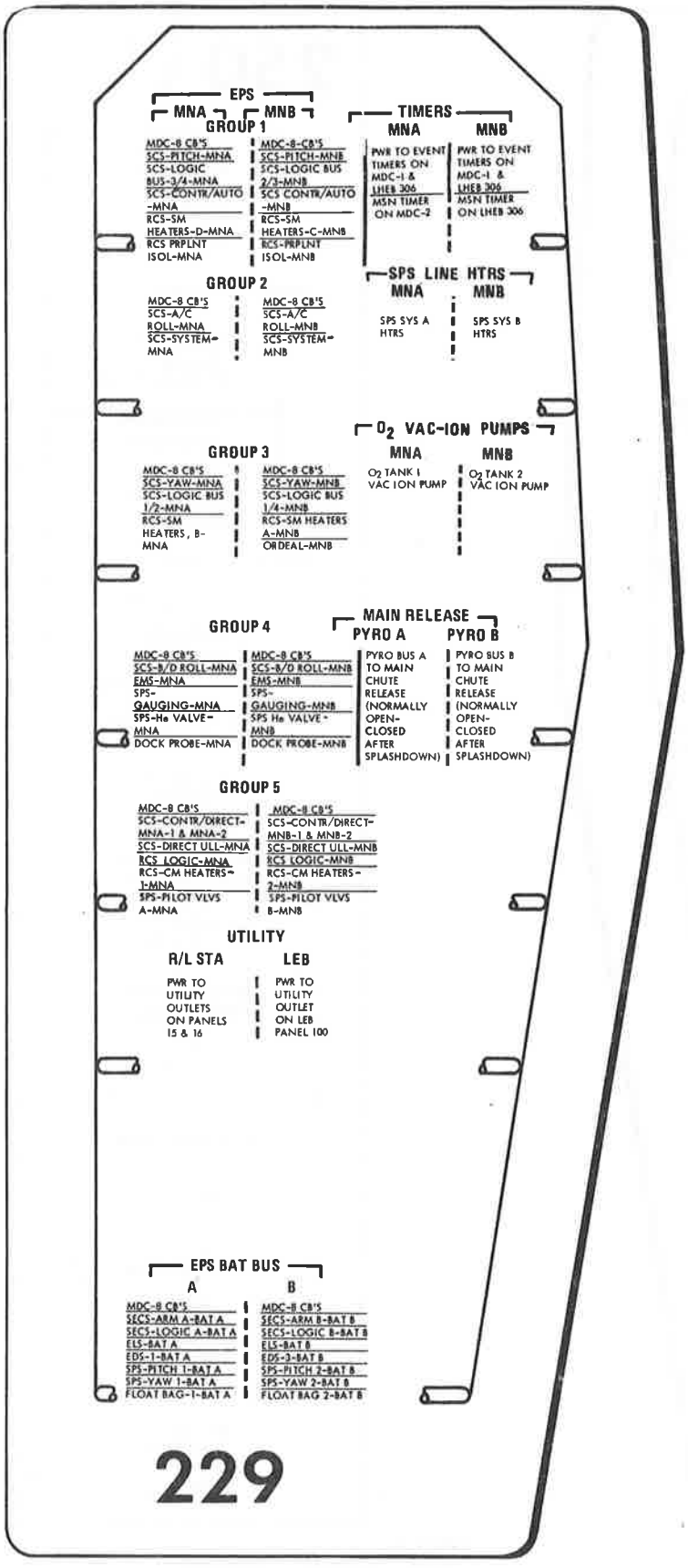
DATE 11/30/70
SOURCE NR/TODD

CSM SYSTEMS DATA

SOURCE NR/TODD
DATE 11/30/70

CB FUNCTION
PNLS 229 & 250

FUNCTIONS POWERED THRU CB



250

BAT BUS A TO PYRO BUS TIE

BAT BUS A BACK-UP TO PYRO BUS A (NORMALLY OPEN-CLOSED IF PYRO BAT A FAILS)

PYRO A SEQ A

PYRO BAT A TO PYRO BUS A (NORMALLY USED - OPEN IF PYRO BAT A FAILS)

BAT BUS B TO PYRO BUS TIE

BAT BUS B BACK-UP TO PYRO BUS B (NORMALLY OPEN-CLOSED IF PYRO BAT B FAILS)

PYRO B SEQ B

PYRO BAT B TO PYRO BUS B (NORMALLY USED - OPEN IF PYRO BAT B FAILS)

BAT A PWR ENTRY / POST LANDING

E/PL BAT A PWR TO BAT BUS A

BAT B PWR ENTRY / POST LANDING

E/PL BAT B PWR TO BAT BUS B

BAT C PWR ENTRY / POST LANDING

E/PL BAT C PWR TO ALL BAT C CKTS

BAT C TO BAT BUS A

BAT C BACKUP TO BAT BUS A (NORMALLY OPEN-CLOSED IF E/PL BAT A FAILS)

BAT C TO BAT BUS B

BAT C BACKUP TO BAT BUS B (NORMALLY OPEN-CLOSED IF E/PL BAT B FAILS)

BAT C BAT CHGR / EDS2

BAT CHGR TO BAT C
BAT C TO EDS 2

LEGEND:
LINE BETWEEN CIRCUIT BREAKERS
DESIGNATES DUAL POWER TO FUNCTION
DESIGNATES SIMILAR FUNCTIONS
DESIGNATES DIFFERENT FUNCTIONS

EFFECT OF CB OPENING
(REMAINING FUNCTION)

CB FUNCTION
PNLS 229 & 250

CSM SYSTEMS DATA

DATE 11/30/70
SOURCE NR/TODD

229

EPS

GROUP 1

MNA	MNB
LOSS OF PWR TO LISTED CB'S ON MDC-8	LOSS OF PWR TO LISTED CB'S ON MDC-8

TIMERS

MNA	MNB
MN B CB WILL PWR EVENT TIMERS LOSS OF MSN TIMER ON MDC-2(LHEB 306 AVAIL)	MN A CB WILL PWR EVENT TIMERS LOSS OF MSN TIMER ON LHEB 306 (MDC-2 AVAIL)

GROUP 2

LOSS OF PWR TO LISTED CB'S ON MDC-8	LOSS OF PWR TO LISTED CB'S ON MDC-8

SPS LINE HTRS

MNA	MNB
LOSS OF SPS SYS A HTRS (SYS B AVAIL)	LOSS OF SPS SYS B HTRS (SYS A AVAIL)

GROUP 3

LOSS OF PWR TO LISTED CB'S ON MDC-8	LOSS OF PWR TO LISTED CB'S ON MDC-8

O_2 VAC-ION PUMPS

MNA	MNB
LOSS OF O_2 TANK 1 VAC ION PUMP	LOSS OF O_2 TANK 2 VAC ION PUMP

GROUP 4

LOSS OF PWR TO LISTED CB'S ON MDC-8	LOSS OF PWR TO LISTED CB'S ON MDC-8

MAIN RELEASE

PYRO A	PYRO B
PYRO B CB WILL PWR REQUIRED FUNCTION	PYRO A CB WILL PWR REQUIRED FUNCTION

GROUP 5

LOSS OF PWR TO LISTED CB'S ON MDC-8	LOSS OF PWR TO LISTED CB'S ON MDC-8

UTILITY

R/L STA	LEB
LEB PANEL 100 UTILITY OUTLET AVAILABLE	MDC-15 & 16 UTILITY OUTLETS AVAILABLE

EPS BAT BUS

A	B
LOSS OF PWR TO LISTED CB'S ON MDC-8	LOSS OF PWR TO LISTED CB'S ON MDC-8

250

BAT BUS A TO PYRO BUS TIE

LOSS OF BACKUP TO PYRO BUS A (SEQ B WILL PWR REQUIRED FUNCTIONS)

PYRO A **SEQ A**

(IF FAULT IN PYRO A SYSTEM) SEQ B CB WILL PWR REQUIRED FUNCTIONS

BAT BUS B TO PYRO BUS TIE

LOSS OF BACKUP TO PYRO BUS B (SEQ A WILL PWR REQUIRED FUNCTIONS)

PYRO B **SEQ B**

(IF FAULT IN PYRO B SYSTEM) SEQ A CB WILL PWR REQUIRED FUNCTIONS

BAT A PWR ENTRY / POST LANDING

(IF FAULT ON BAT BUS A) LOSS OF BAT BUS A

BAT B PWR ENTRY / POST LANDING

(IF FAULT ON BAT BUS B) LOSS OF BAT BUS B

BAT C PWR ENTRY / POST LANDING

LOSS OF BAT C PWR TO CKTS

BAT C TO BAT BUS A

LOSS OF BACKUP TO BAT BUS A

BAT C TO BAT BUS B

LOSS OF BACKUP TO BAT BUS B

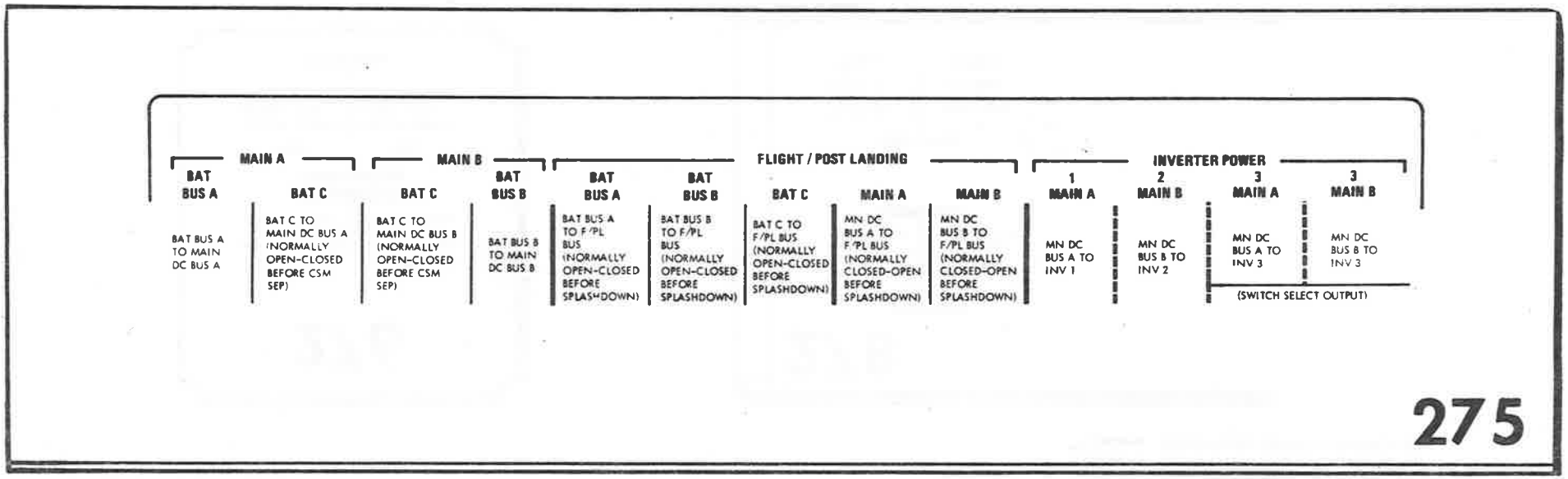
BAT C BAT CHGR / EDS2

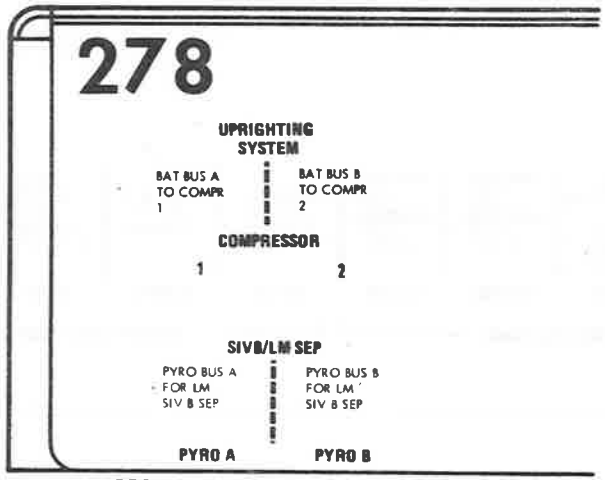
BAT C CAN BE CHARGED THRU BAT A OR BAT B CKT

1 VOTE FOR EDS AUTO ABORT

LEGEND:
LINE BETWEEN CIRCUIT BREAKERS
——— DESIGNATES DUAL POWER TO FUNCTION
- - - - DESIGNATES SIMILAR FUNCTIONS
═══ DESIGNATES DIFFERENT FUNCTIONS

FUNCTIONS POWERED THRU CB

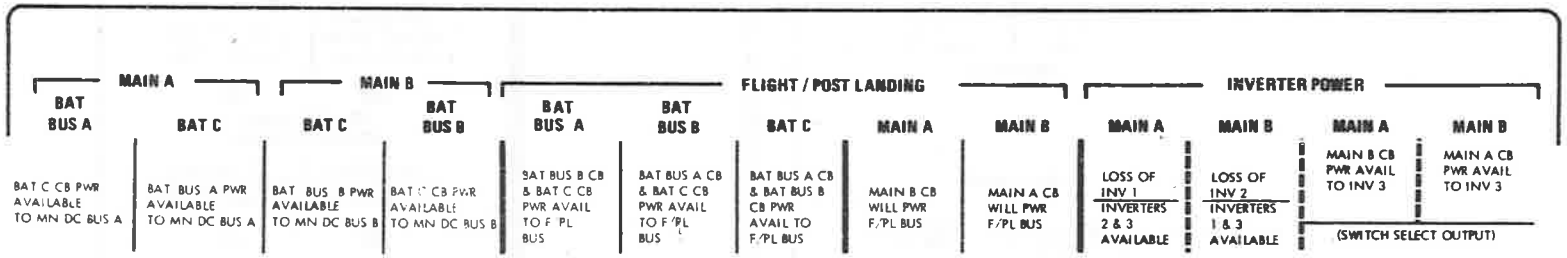




LEGEND:
LINE BETWEEN CIRCUIT BREAKERS
DESIGNATES DUAL POWER TO FUNCTION
DESIGNATES SIMILAR FUNCTIONS
DESIGNATES DIFFERENT FUNCTIONS

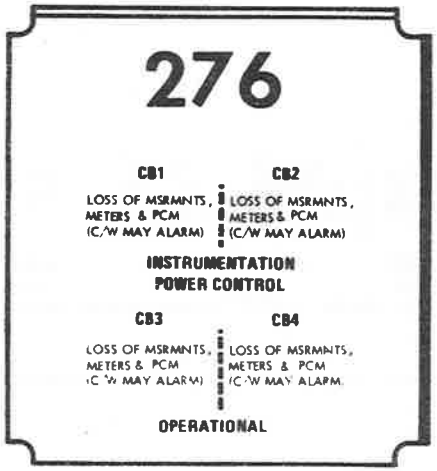
CB FUNCTION
PNLS 275, 276 & 278

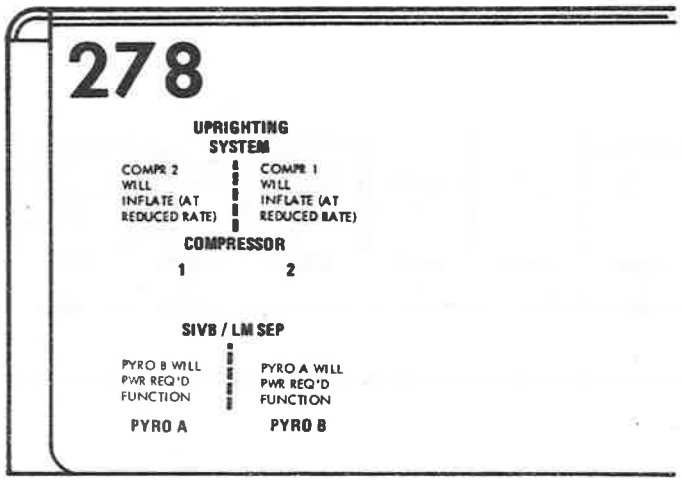
EFFECT OF CB OPENING
(REMAINING FUNCTION)



275

LEGEND:
LINE BETWEEN CIRCUIT BREAKERS
DESIGNATES DUAL POWER TO FUNCTION
DESIGNATES SIMILAR FUNCTIONS
DESIGNATES DIFFERENT FUNCTIONS





DATE 11/30/70
SOURCE NR/TODD

CSM SYSTEMS DATA

RIGHT HAND EQUIPMENT BAY PANEL 276

MSRMNT TITLE	MSRMNT NO.	O.B. DISPLAY
CB 1		
Main dc bus A & B power to following measurements:		
H_2O Dump Temp	CF 0461T	
CM He Tk 1 Press	CR 0001P	SM
CM He Tk 1 Temp	CR 0003T	SM
CM He Manif 1 Press	CR 0035P	*
CM He Manif 2 Press	CR 0038P	SM*
Temp 16 Eng Inj Sys 1	CR 2103T	SM
Temp 12 Eng Inj Sys 1	CR 2114T	SM
CB 2		
Main dc bus A & B power to following measurements:		
Temp Crew Ablator Surf Loc 1A	CA 1820T	
Temp Crew Ablator Surf Loc 4A	CA 1821T	
Temp Crew Ablator Surf Loc 7A	CA 1822T	
Temp Crew Ablator Surf Loc 10A	CA 1823T	
Press Batt Comprtmnt (Manif)	CC 0188P	SM
Drogue Dep Relay A	CE 0001X	
Drogue Dep Relay B	CE 0002X	
Main Dep Relay A	CE 0003X	
Main Dep Relay B	CE 0004X	
Main Chute Disc Relay A	CE 0321X	
Main Chute Disc Relay B	CE 0322X	
Suit Cabin Delta Press	CF 0003P	M
Surge Tank Press	CF 0006P	SM
H_2O Tank-Glycol Res Press	CF 0120P	
Pri Glycol Flow Rate	CF 0157R	
Pri Evap Inlet Temp	CF 0181T	
Urine Dump Nozzle Temp	CF 0460T	
Astro 1 EKG Axis 1	CJ 0060J	
Astro 2 EKG Axis 1	CJ 0061J	
Astro 3 EKG Axis 1	CJ 0062J	
Astro 1 Respir	CJ 0200R	
Astro 2 Respir	CJ 0201R	
Astro 3 Respir	CJ 0202R	
CM X Axis Accel	CK 0026A	
CM Y Axis Accel	CK 0027A	
CM Z Axis Accel	CK 0028A	
Dosimeter 1 Radiation	CK 1051K	
Dosimeter 2 Radiation	CK 1052K	
Dosimeter Rate	CK 1053K	

MSRMNT TITLE	MSRMNT NO.	O.B. DISPLAY
CB 2 cont'd.		
CM He Tk 2 Press	CR 0002P	SM
CM He Tk 2 Temp	CR 0004T	SM
CM He Manif 2 Press	CR 0036P	*
CM He Manif 1 Press	CR 0037P	SM*
Temp 14 Eng Inj Sys 1	CR 2100T	SM
Temp 24 Eng Inj Sys 2	CR 2110T	SM
Temp 25 Eng Inj Sys 2	CR 2116T	SM
Temp 21 Eng Inj Sys 2	CR 2119T	SM
Docking Probe Temp	CS 0220T	
CB 3		
Main dc bus A & B power to following measurements:		
Skin Temp 1A	SA 1830T	
Temp Bay 2 Ox Tk Surf	SA 2377T	
Temp Bay 5 Fuel Tk Surf	SA 2379T	
O_2 Tk 2 Press	SC 0038P	SM
H_2 Tk 2 Press	SC 0040P	M*
FC 2 O_2 Press	SC 2067P	SM
FC 3 O_2 Press	SC 2068P	SM
FC 2 H_2 Press	SC 2070P	SM
FC 3 H_2 Press	SC 2071P	SM
FC 2 Rad Out Temp	SC 2088T	SMB*
FC 3 Rad Out Temp	SC 2089T	SMB*
FC 2 Rad In Temp	SC 2091T	
FC 3 Rad In Temp	SC 2092T	
FC 2 H_2 Flow	SC 2140R	SM*
FC 3 H_2 Flow	SC 2141R	SM*
FC 2 O_2 Flow	SC 2143R	SM*
FC 3 O_2 Flow	SC 2144R	SM*
He Tk Press	SP 0001P	
Ox Tks Press	SP 0003P	M*
Position Fu/Ox Vlv 1 Pot B	SP 0022H	
Position Fu/Ox Vlv 3 Pot B	SP 0024H	
Position Fu/Ox Vlv 2 Pot A	SP 0027H	M
Position Fu/Ox Vlv 4 Pot A	SP 0029H	M
Temp Fuel Eng Feed Line	SP 0048T	M
Temp 1 Oxidizer Distr Line	SP 0054T	
SPS Prplnt Tanks N_2 A Press	SP 0600P	SM
Eng Chamber Press	SP 0661P	SM

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MSRMNT TITLE	MSRMNT NO.	O.B. DISPLAY
CB 3 cont'd.		
Fuel SM/Eng Interface Press	SP 0930P	
SM He Tk A Press	SR 5001P	SM
SM He Tk C Press	SR 5003P	SM
SM He Tk A Temp	SR 5013T	SM
SM He Tk C Temp	SR 5015T	SM
Qty SM Propellant Sys A	SR 5025Q	SM
Qty SM Propellant Sys C	SR 5027Q	SM
SM Eng Package A Temp	SR 5065T	SM*
SM Eng Package C Temp	SR 5067T	SM*
SM He Manf Sys A Press	SR 5729P	
SM Ox Manf Sys A Press	SR 5733P	
SM Fuel Manf Sys A Press	SR 5737P	SM*
SM He Manf Sys C Press	SR 5817P	
SM Ox Manf Sys C Press	SR 5820P	
SM Fuel Manf Sys C Press	SR 5822P	SM*
Proton Ct Rate Chan 1	ST 0820K	
Proton Ct Rate Chan 2	ST 0821K	
Proton Ct Rate Chan 3	ST 0822K	
Proton Ct Rate Chan 4	ST 0823K	
Alpha Ct Rate Chan 1	ST 0830K	
Alpha Ct Rate Chan 2	ST 0831K	
Alpha Ct Rate Chan 3	ST 0832K	
Proton Integ Ct Rate	ST 0838K	
CB 4		
Main dc bus A & B power to following instrumentation:		
Temp Bay 3 Ox Tk Surf	SA 2378T	
Temp Bay 6 Fuel Tk Surf	SA 2380T	
O_2 Tk 1 Press	SC 0037P	SM*
H_2 Tk 1 Press	SC 0039P	M*
FC 1 O_2 Press	SC 2066P	SM
FC 1 H_2 Press	SC 2069P	SM
FC 1 Rad Out Temp	SC 2087T	SMB*
FC 1 Rad In Temp	SC 2090T	
FC 1 H_2 Flow	SC 2139R	SM*
FC 1 O_2 Flow	SC 2142R	SM*
He Tk Temp	SP 0002T	
Fu Tks Press	SP 0006P	M*
Position Fu/Ox Vlv 2 Pot B	SP 0023H	
Position Fu/Ox Vlv 4 Pot B	SP 0025H	
Position Fu/Ox Vlv 1 Pot A	SP 0026H	M
Position Fu/Ox Vlv 3 Pot A	SP 0028H	M

MSRMNT TITLE	MSRMNT NO.	O.B. DISPLAY
CB 4 cont'd.		
He Tk Press Display	SP 0035P	SM
Temp Eng Vlv Body	SP 0045T	
Temp Ox Eng Feed Line	SP 0049T	SM
Temp 1 Fuel Distr Line	SP 0057T	
SPS Prplnt Tanks N_2B Press	SP 0601P	SM
Ox SM/Eng Interface Press	SP 0931P	
SM He Tk B Press	SR 5002P	SM
SM He Tk D Press	SR 5004P	SM
SM He Tk B Temp	SR 5014T	SM
SM He Tk D Temp	SR 5016T	SM
Qty SM Propellant Sys B	SR 5026Q	SM
Qty SM Propellant Sys D	SR 5028Q	SM
SM Eng Package B Temp	SR 5066T	SM*
SM Eng Package D Temp	SR 5068T	SM*
SM He Manf Sys B Press	SR 5776P	
SM Ox Manf Sys B Press	SR 5780P	
SM Fuel Manf Sys B Press	SR 5784P	SM*
SM Ox Manf Sys D Press	SR 5821P	
SM Fuel Manf Sys D Press	SR 5823P	SM*
SM He Manf Sys D Press	SR 5830P	
Nuclear Particle Det Temp	ST 0840T	
Nuclear Particle Anal Temp	ST 0841T	

LEGEND:

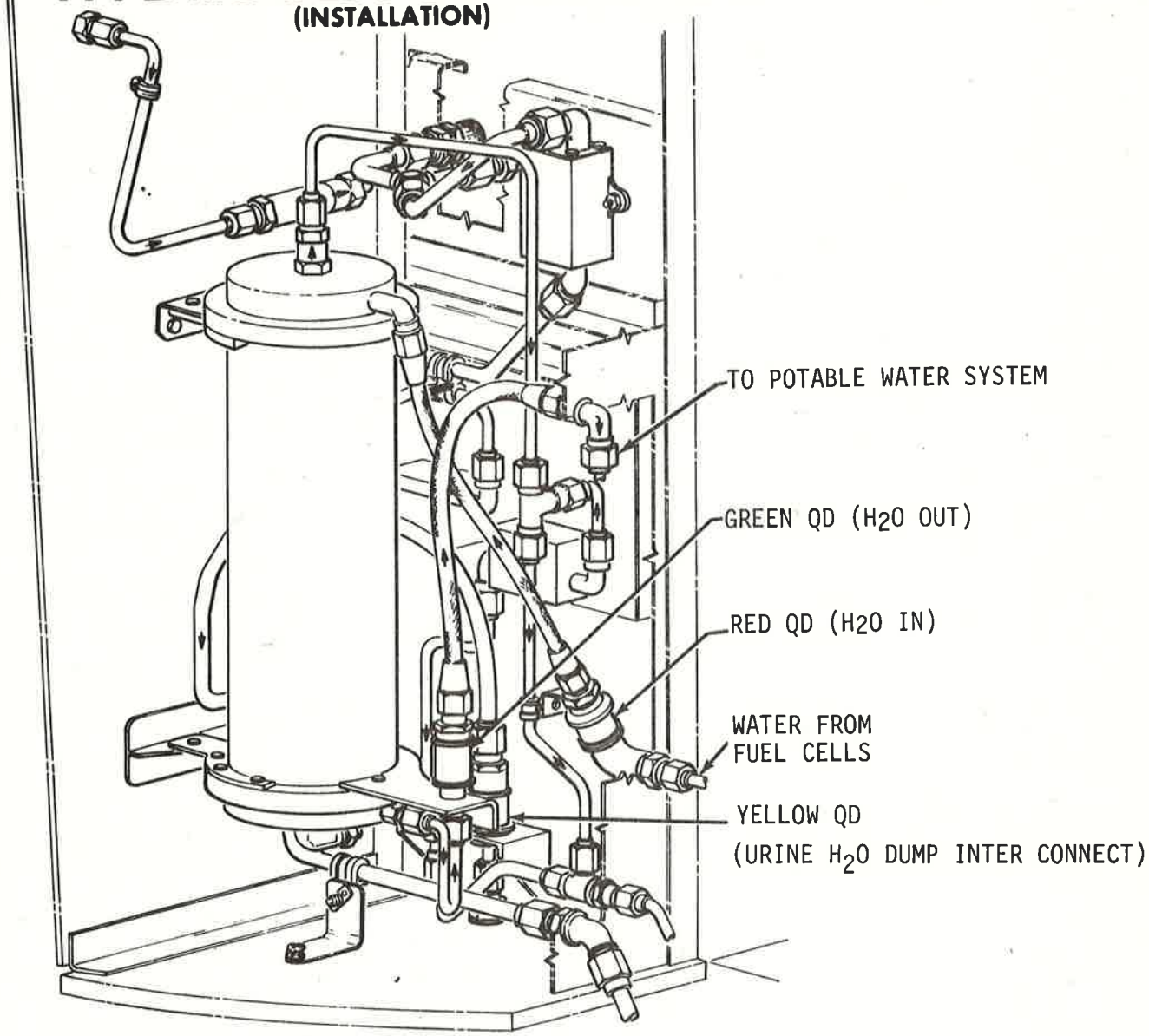
O.B. Display = On Board Display
M = Meter
SM = Selectable Meter
B = Talk Back Indicator
* = Input to Caution/Warning

DATE 11/30/70
SOURCE NR/TODD

SYSTEMS SCHEMATICS
THE CONTENTS WILL CONSIST OF REPRINTS OF THE FOLLOWING DRAWINGS FROM THE FOD SYSTEMS HANDBOOK

2.1	SEQUENTIAL OVERVIEW
2.2	SEQUENTIAL POWER DISTR
2.7	DOCKING PROBE
2.8	CSM-LM ELEC INTERFACE
3.2	ELEC DC DIST & CONTROL
3.3	ELEC AC DIST & CONTROL
FIG.	3.1 PWR DIST - MAIN
FIG.	3.2 PWR DIST - AC
FIG.	3.3 PWR DIST - MISC
4.2	SUIT & CABIN PRESS
4.3	PRIMARY GLYCOL LOOP
4.4	SECONDARY GLYCOL LOOP
4.5	WATER AND WASTE MGT
(NONE)	HYDROGEN SEPARATOR
5.2	CRYO GAS STORAGE
5.3	FUEL CELL
6.1	COMM SYSTEM OVERVIEW
6.2	UNIFIED S-BAND SYS RF
6.4	PREMOD PROCESSOR
7.1	INSTR PWR AND CONTROL
7.3	C&W SYSTEM
8.2	SCS OVERVIEW (PWR)
8.3	SCS OVERVIEW
8.4	G&N PWR DISTR
8.5	INERTIAL SUBSYSTEM
8.6	OPTICS SUBSYSTEM
8.7	SCS PWR DISTR
9.1	SERVICE PROPULSION SYS
10.1	SM RCS
10.2	CM RCS
11.2	LIGHTING - INTERIOR AND EXTERIOR

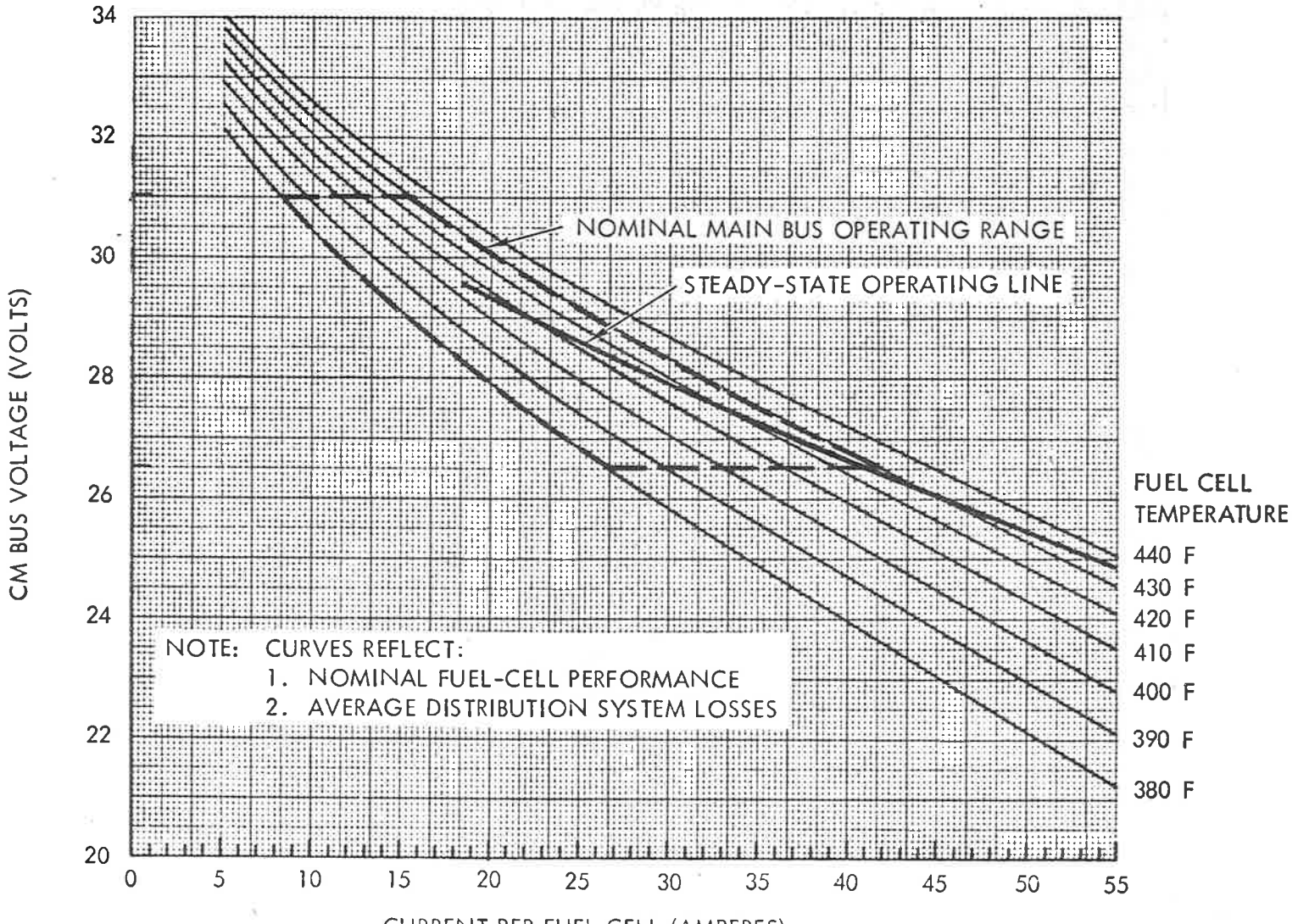
HYDROGEN SEPARATOR
(INSTALLATION)

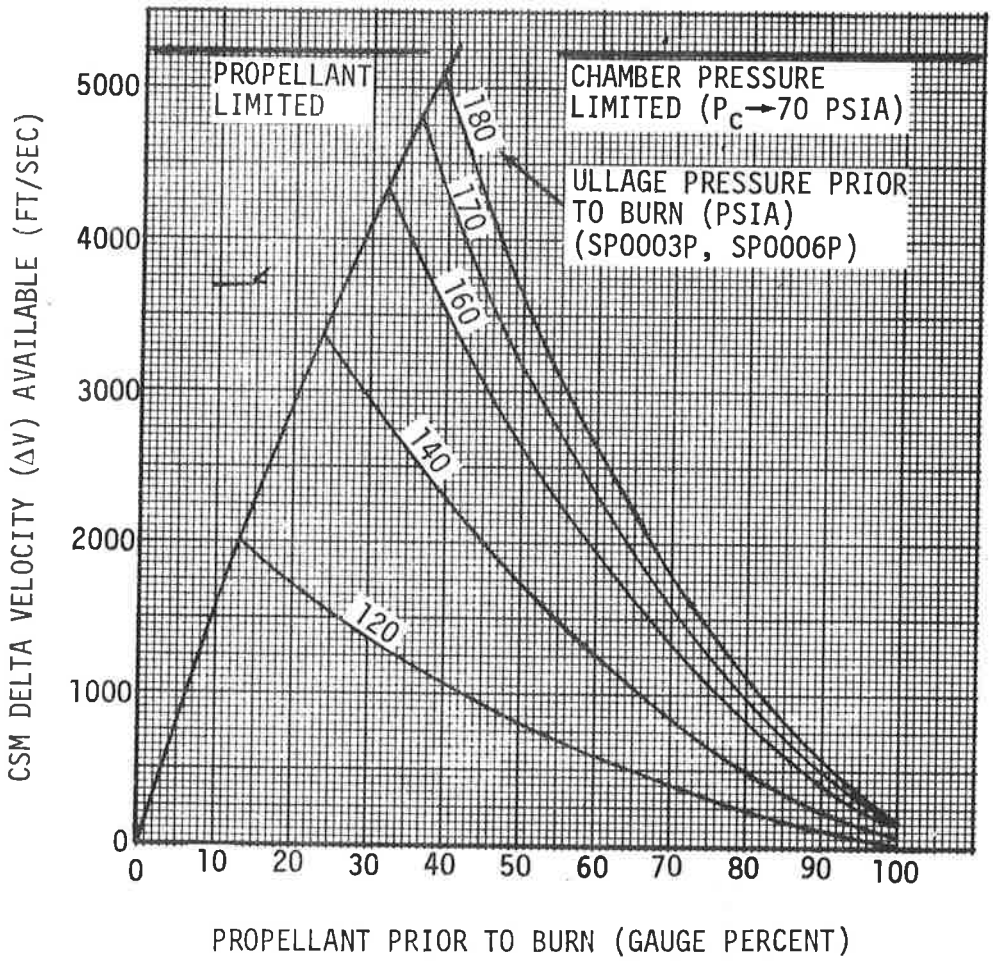


VIEW LOOKING FROM BEHIND PANEL

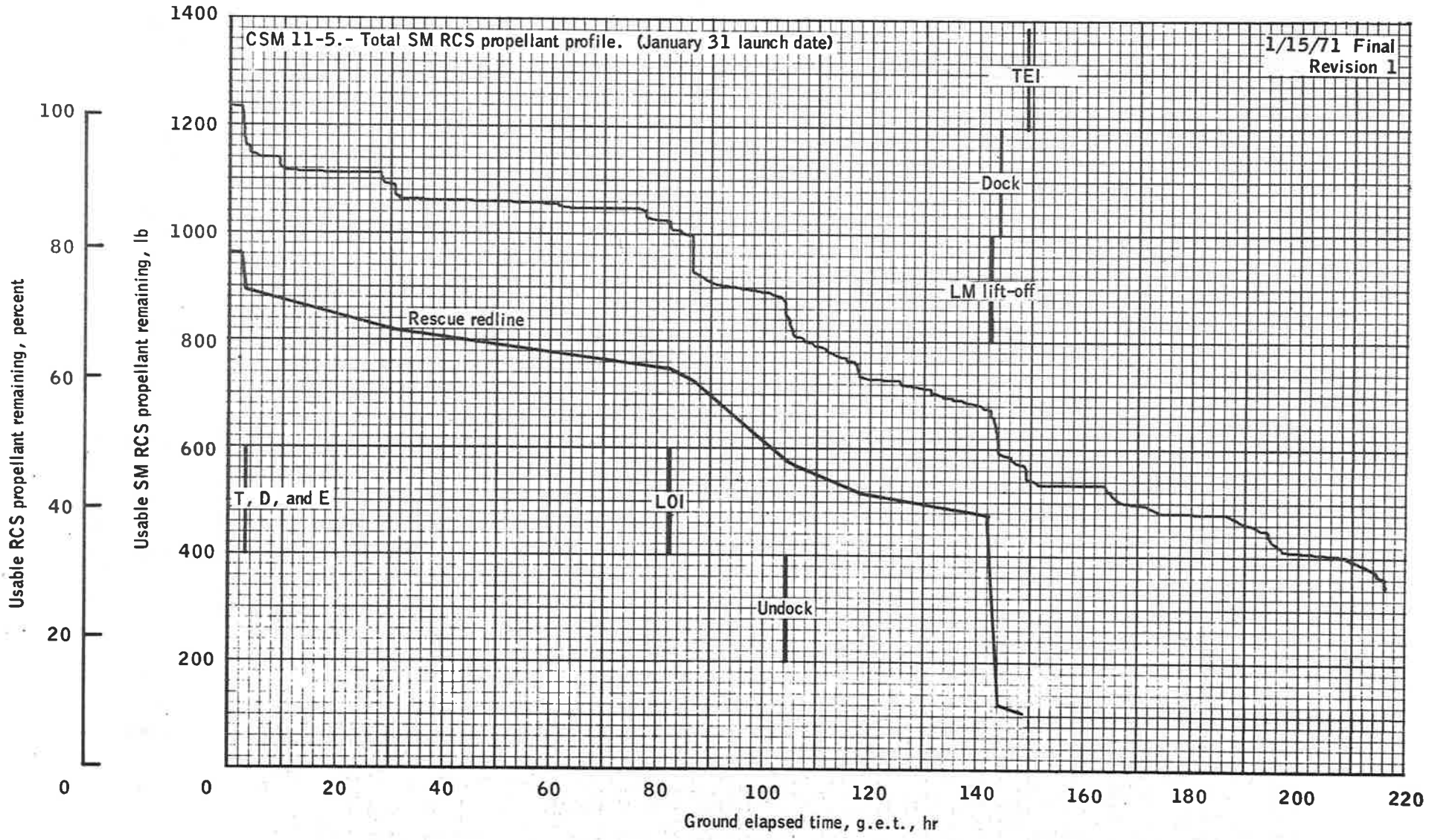
DATE 12/18/70

HYDROGEN SEPARATOR

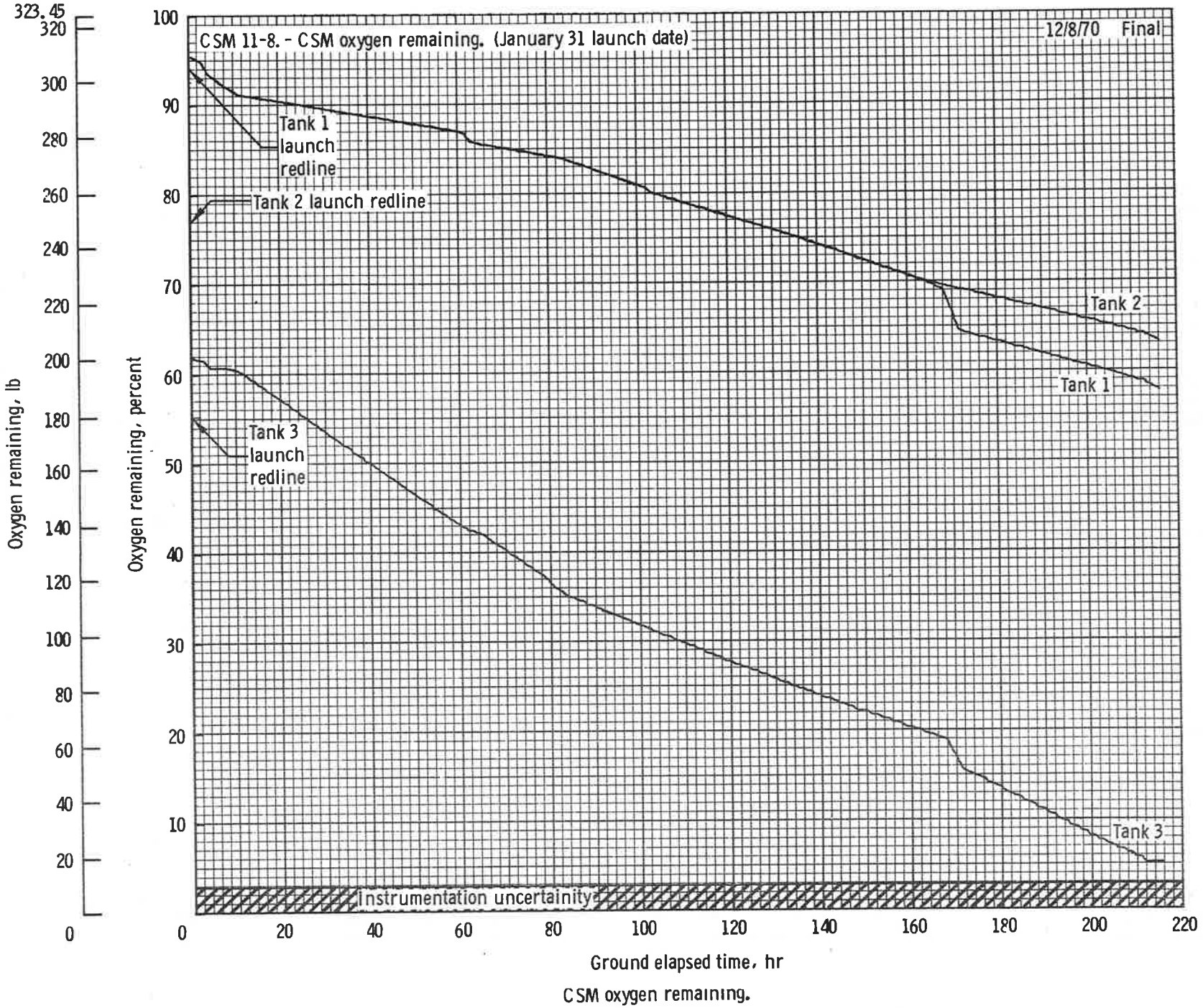

34
32
30
28
26
24
22
20
CM BUS VOLTAGE (VOLTS)
NOMINAL MAIN BUS OPERATING RANGE
STEADY-STATE OPERATING LINE
NOTE: CURVES REFLECT:
1. NOMINAL FUEL-CELL PERFORMANCE
2. AVERAGE DISTRIBUTION SYSTEM LOSSES
FUEL CELL TEMPERATURE
440 F
430 F
420 F
410 F
400 F
390 F
380 F
0
5
10
15
20
25
30
35
40
45
50
55
CURRENT PER FUEL CELL (AMPERES)



Approximate SPS Blowdown Delta Velocity Capability



Total SM RCS propellant usage profile.



CSM oxygen remaining.

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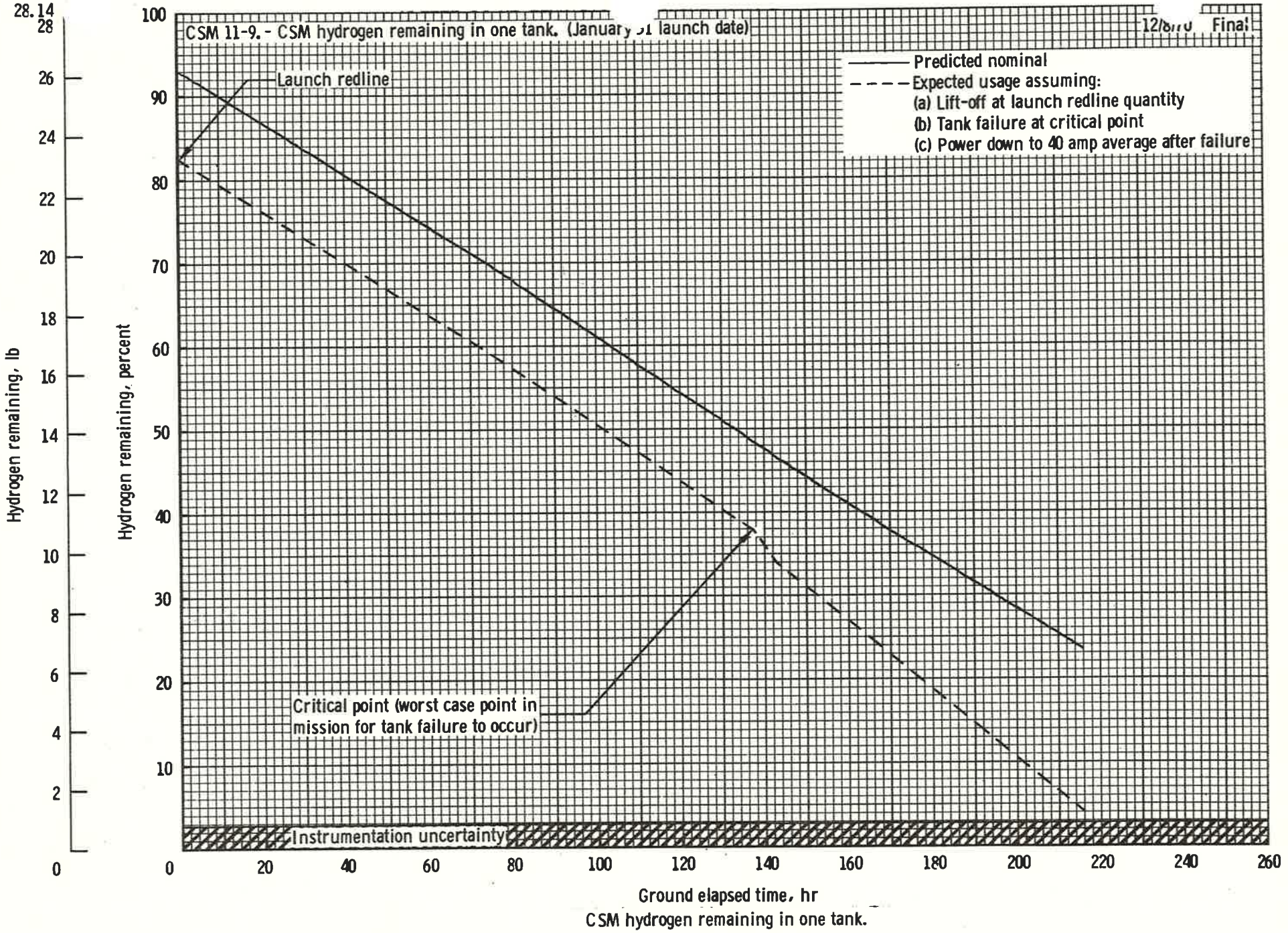

CSM hydrogen remaining in one tank.

CSM H_2 - ONE TANK