

LM-1

DATA BOOK

DECEMBER 15, 1967

REVISION A

THE LM-1 DATA BOOK IS A COMPILATION OF ESSENTIAL MATERIAL EXTRACTED FROM FLIGHT CONTROL AND CONTRACTOR ENGINEERING DOCUMENTATION. THIS BOOK IS PRIMARILY DESIGNED TO BE OF ASSISTANCE TO LM SYSTEMS ENGINEERS IN THEIR SUPPORT OF THE APOLLO 5 MISSION, ALTHOUGH MUCH OF THE DATA IS APPLICABLE TO ALL MISSION SUPPORT PERSONNEL. IN THE EVENT OF A CONFLICT BETWEEN THIS DOCUMENT AND ANY OFFICIAL MISSION DOCUMENTATION, THE OFFICIAL DOCUMENTATION MUST TAKE PRECEDENCE. ANY COMMENTS OR QUESTIONS SHOULD BE REFERRED TO THE LM SYSTEMS BRANCH, HU-34576.

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LM-1 DATA BOOK COORDINATOR

PREPARED BY FLIGHT CONTROL DIVISION

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1. Site Coverage vs MR PER-MP-POST Flt Test

REVOLUTIONS		REV 1							REV 2						
SITES		AOS TIME	LOS TIME	DURATION	TIME TO NEXT SITE	OVERLAP COVERAGE	PER	MP	AOS TIME	LOS TIME	DURATION	TIME TO NEXT SITE	OVERLAP COVERAGE	PER	MP
CAPE & CHAIN	MIL	00:00:00	00:09:04	9:04		23:43	1 00 09 00	2	01:35:47	01:42:16	6:29		19:19	4	
	GBI	00:00:59	00:09:25	8:26					01:36:30	01:42:39	6:09				
	BDA	00:05:46	00:12:00	6:14					01:39:13	01:45:54	6:41				
	ANT							6							
	RED	00:11:35	00:18:02	6:27					01:44:34	01:51:18	6:44				
	CYI	00:16:57	00:23:43	6:46	24:03		00 54 00		01:51:17	01:55:06	3:49	26:01			
	CSQ	00:47:46	00:55:21	7:34		11:22	7 8		02:21:17	02:28:40	7:23		11:34	4	
	CRO	00:52:13	00:59:08	6:55	28:04				02:25:31	02:32:51	7:20	18:21			
	HAW								02:51:12	02:57:19	6:07	2:03			
	RKV	01:27:12	01:32:28	5:16		24:06	3		02:59:22	03:06:00	6:38		23:38	03 08 58	
	GYM	01:28:57	01:35:39	6:42					03:02:15	03:08:43	6:28				
	TEX	01:31:55	01:38:31	6:36					03:05:22	03:11:43	6:21				
	CAPE & CHAIN	01:35:47	01:51:18	15:31					03:08:58	03:23:00	14:02	31:29			

REVOLUTIONS		REV 3							REV 4						
SITES		AOS TIME	LOS TIME	DURATION	TIME TO NEXT SITE	OVERLAP COVERAGE	PER	MP		LOS TIME	DURATION	TIME TO NEXT SITE	OVERLAP COVERAGE	PER	MP
CAPE & CHAIN	MIL	03:08:58	03:15:39	6:41		14:02	5		04:41:38	04:51:02	9:24		17:35	7 04 49 00	11
	GBI	03:09:41	03:16:14	6:33					04:42:19	04:51:39	9:20				
	BDA	03:12:25	03:18:34	6:09					04:45:23	04:54:07	8:44				
	ANT	03:14:42	03:20:15	5:33					04:47:18	04:55:46	8:28				
	RED	03:18:31	03:23:00	4:29	31:29				04:51:24	04:59:13	7:49	30:13			
	CYI						03 55 25								
	CSQ	03:54:29	04:02:09	7:40		11:45	9		05:28:50	05:38:32	9:42		13:56	8	
	CRO	03:58:38	04:06:14	7:36	17:07				05:33:07	05:42:46	9:39	16:06			
	HAW	04:23:21	04:32:03	8:42			6		05:58:52	06:08:21	9:29				
	RKV	04:31:45	04:41:05	9:20		35:52	11		06:07:44	06:17:07	9:23		37:01	06 20 43	13
	GYM	04:34:54	04:44:01	9:07					06:10:47	06:20:13	9:26				
	TEX	04:37:55	04:47:07	9:12					06:13:57	06:23:21	9:24				
	CAPE & CHAIN	04:41:38	04:59:13	17:35	30:13				06:17:51	06:35:53	18:02	1:01			

1. Site Coverage vs MR PER-MP-POST Flt Test (Cont'd)

SITES		REV 5							REV 6						
		AOS TIME	LOS TIME	DURATION	TIME TO NEXT SITE	OVERLAP COVERAGE	PER	MP-F/T	AOS TIME	LOS TIME	DURATION	TIME TO NEXT SITE	OVERLAP COVERAGE	PER	F/T
CAPE & CHAIN	MIL	06:17:51	06:27:18	9:27		18:02	8	13	07:52:56	08:02:12	9:16		14:56		E F G H A
	GBI	06:18:30	06:27:53	9:23					07:53:34	08:02:55	9:21				
	BDA	06:21:37	06:30:36	8:59					07:57:05	08:04:22	7:17				
	ANT	06:23:32	06:31:44	8:12					07:58:18	08:07:32	9:14				
	RED	06:27:23	06:35:53	8:30	1:01				08:04:42	08:07:42	3:00	32:47			
CYI		06:36:54	06:37:13	0:19	28:16	12:03	06 20 43						11:19		I
CSQ		07:05:29	07:13:19	7:50					08:40:29	08:48:07	7:38				
CRO		07:09:40	07:17:32	7:52	6:59				08:44:58	08:51:48	6:50	17:35			
HAW		07:34:31	07:43:16	8:45					09:09:23	09:18:25	9:02				
RKV		07:43:02	07:52:13	9:11					09:17:51	09:27:11	9:20				
GYM		07:45:56	07:55:19	9:23		33:11	A C D		09:20:58	09:30:22	9:24		32:27		J K
TEX		07:49:03	07:58:29	9:26					09:24:08	09:33:18	9:10				
CAPE & CHAIN		07:52:56	08:07:42	14:56	32:47				09:28:27	09:41:50	13:23	39:39			

SITES		REV 7							REV 8						
		AOS TIME	LOS TIME	DURATION	TIME TO NEXT SITE	OVERLAP COVERAGE	PER	F/T	AOS TIME	LOS TIME	DURATION	TIME TO NEXT SITE	OVERLAP COVERAGE	PER	F/T
CAPE & CHAIN	MIL	09:28:27	09:36:07	7:40		13:23		E L T							
	GBI	09:29:04	09:36:58	7:54											
	BDA														
	ANT	09:33:46	09:41:50	8:04	39:39										
	RED														
CYI						16:55	Q M N						16:50		N T R S
CSQ		10:16:23	10:21:29	5:06	23:22										
CRO															
HAW		10:44:51	10:53:35	8:44					12:20:05	12:29:07	9:02				
RKV		10:52:55	11:01:46	8:51					12:28:50	12:35:01	6:11				
GYM		10:56:13	11:04:48	8:35	4:52	01:13:13			12:33:15	12:36:55	3:40	1:18:10			
TEX		10:59:56	11:06:52	6:56											
CAPE & CHAIN															

1. Site Coverage vs MR PER-MP-POST Flt Test (Concluded)

SITES		REV 9							REV 10						
		AOS TIME	LOS TIME	DURATION	TIME TO NEXT SITE	OVERLAP COVERAGE	PER	FT	AOS TIME	LOS TIME	DURATION	TIME TO NEXT SITE	OVERLAP COVERAGE	PER	FT
CAPE & CHAIN	MIL														
	GBI														
	BDA														
	ANT														
	RED														
CYI															
CSQ															
CRO															
HAW		13:55:05	14:04:25	9:20	01:26:18				15:30:43	15:38:25	7:42				
RKV															
GYM															
TEX															
CAPE & CHAIN															

SITES		REV							REV						
		AOS TIME	LOS TIME	DURATION	TIME TO NEXT SITE	OVERLAP COVERAGE			AOS TIME	LOS TIME	DURATION	TIME TO NEXT SITE	OVERLAP COVERAGE		
CAPE & CHAIN	MIL														
	GBI														
	BDA														
	ANT														
	RED														
CYI															
CSQ															
CRO															
HAW															
RKV															
GYM															
TEX															
CAPE & CHAIN															

2. Go/No Go's (Condition F ⁿ vs MR-TM)

ITEM	CONDITION		LM SLA SEP	DPS 1	DPS 2	APS 2	M/R	TM	
1	PGNS SELECTED		X	X	X	X	11-3	H1621X	
2	NO ISS WARNING DISCRETE		X	X	X	X	11-3	G9002X	
3	NO LGC WARNING DISCRETE		X	X	X	X	11-3	G9001X	
4	NO PROGRAM CAUTION DISCRETE		X	X	X	X	4-63	G9003X EC00205	
5	NO CES DC PWR FAILURE			X	X		14-39	L4027X Q6806H	
6 6A	RCS PROP QTY > 19% (ASC FEEDS CLOSED) EITHER RCS A OR B PRESS		X X	X X	X X	X X	13-28 13-29	R1085Q R1095Q	
7	NO MORE THAN 1 FAILED RCS THRUSTER PAIR		X	X	X	X	13-30	R9661U THRU R9668U	
8	NO FAILED ON RCS THRUSTER		X				13-5	H1418V THRU H1433V	
9	THROTTLE NOT STUCK AT > 60%			X	X		14-27	Q6806H	
10	DPS FU AND/OR OX P $\geq$ 105 PSI				X		15-8C	Q3611P Q4111P	
11	APS FU AND OX P $>$ 100 PSI			X	X		16- 8 5	P1501P P1503P	
12	VEH RATES < 10°/SEC			X	X	X	14-30 4-57	H1462V H1463V	H14 61V
13	CDR SE BUS VOLTS $\geq$ 26.5		X	X			7-12	C0301V C0302V	
14	TOTAL BUS CUR < 100 AMPS		X	X			7-5	C1201 THRU C1206C	
15	MIN OF 3F ¹ DESC BAT.		X	X			7-3C	C1201-04C	
16	GLY PUMP P $\geq$ 8.5 & Δ P > 0 PSI		X	X			9-7	F2021P F9997U	
17	GLY T < 93 °F 67		X	X			9-9	F9998U	
18	NO STAGING RLY DISCRETE		X	X			8-6, 7	Y0121X Y0122X	
19	ED ARM DISCRETE			X			8-4	Y0111X Y0112X	

3. MISSION PHASES (MP) SUMMARY

MP NO.	MISSION PHASE TITLE	PROG NO.	PROGRAM TITLE	FROM	TO	TOTAL TIME
1	PRELAUNCH ALIGNMENT	01	PRELAUNCH INITIALIZATION	T-08:45:00	-	-
		02	PRELAUNCH GYROCOMPASS			
		04	TERMINATE GYROCOMPASS			
2	GUID REF RELEASE & BOOST	07	PRELAUNCH INERTIAL	T-00:00:00.1	T+00:10:01	00:10:01
		11	PRE LET JET BOOST MON			
		12	POST LET JET BOOST MON			
3	SUBORBITAL ABORT	71	SUBORBITAL ABORT	Ta (Tnt > Ta+10s)	Tnt+181s	3:11
4	CONTINGENCY ORBIT INSERT	72	CONTINGENCY ORBIT INSERT	Ta (Tnt > Ta+10s)	Tnt+107s	1:57
6	COAST: S-IVB ATTACHED	13	COAST: S-IVB ATTACHED	T+00:09:55	T+00: 21:57	11:56
7	S-IVB/LM SEP	14	S-IVB/LM SEP	T+00:50:00	T+00:54:15	4:15
8	DPS COLD SOAK	15	DPS COLD SOAK	T+00:54:23	T+00:56:53	2:30
9	DPS #1	31	PRE DPS 1	T+03:55:25	T+04:02:18	6:53
		41	DPS 1 BURN			
11	DPS 2/FITH/APS 1	32	PRE DPS 2	T+04:32:53	T+ 04:49:38	16:46
		42	DPS 2 BURN BRAKING			
		43	DPS 2 BURN APPROACH			
		44	DPS 2 BURN RANDOM			
		74	FITH/APS 1			
13	APS 2	34	PRE APS 2	T+06:10:45	T+06:21:20	10:35
		46	APS 2 BURN			

MISSION PHASE 1 (WD 74A) PRELAUNCH ALIGNMENT ($\Delta T =$)

GET	MISSION PHASE TIME	FUNCTION	PRIME OCTAL	PRIME DECIMAL	RTC AVAILABLE	TM/LGC WD-BIT	TM/BIT VALUE	TM OR LGC WD-BIT TITLE	VERIFICATION		BURNS		
									MCC-H	SITE	RCS	DPS	APS
T-08:45:00		DO PRELAUN. GYRO COMPASS PROGRAM (P02)				50A (100A)		DSPTAB + 10D					
T _{LIFT OFF}		TERMINATE GYRO COMP UPON RECEIPT OF GRR VIA UPLINK (V65E) OR DETECTION OF ACCELERATION ABOVE 1.1G				39B-2	1	FW1-B2 GRR					

MISSION PHASE 2 (WD74A) GUIDANCE REFERENCE AND BOOST MONITOR ($\Delta T = 10:01$)

T+00:00:00.1	00:00	START PRELAUNCH INERTIAL PROGRAM (P07)				50A (100A)		DSPTAB + 10D			30MS ULL		
		DISABLE PLATFORM COMPENSATION				40A-1 5	0	FW2-B15 (DRIFT)					
		AVERAGE G ON				39B-1	1	FW1-B1 (AVE G)					
		START PRE-LET JET BOOST MONITOR PROGRAM (P11)				50A (100A)		DSPTAB + 10D					
		SET LGC CLOCK TO ZERO				51A,B	ZEROS	LGC TIME 1, TIME 2					
00:00:10	00:10	SLV PITCH AND ROLL MANEUVER INITIATE											
00:00:29	00:29	SLV ROLL COMPLETE											
00:01:45	01:45	CMD +X TRANS ON (30MS)/OFF				GH1419, 23X GH1427, 31X, 053U	1/0 1/0 1/0	JD 4D/3D OUTPUT JD 2D/1D OUTPUT ULLAGE CMD					
00:02:26	02:26	S-IVB IGNITION											
00:02:29	02:29	START POST-LET JET BOOST MONITOR PROGRAM (P12)				50A (100A)		DSPTAB + 10D					
		ENABLE ABORT CMD MONITOR				40A-9	1	FW2-B9 (ABORT MONITOR)					
		ENABLE TUMBLE MONITOR				39B-14	1	FW1-B14 (TUMBLE MONITOR)					
00:02:39	02:39	START S-IVB SHUTDOWN MONITOR											
00:03:00	03:00	ECS PRI H ₂ O VLV-OPEN	272	186	24A	GF4101P	.75PSI	PRI H ₂ O REG ΔP					
00:03:02	03:02	ECS PRI H ₂ O VLV-OPEN RST	273	187	25A								
00:09:58	09:58	S-IVB SHUTDOWN											
00:10:01	10:01	DV MONITOR DETECTS S-IVB SHUTDOWN											

MISSION PHASE 6 (LGC WD74A) - S-IVB ATTACHED ($\Delta T = 11:56$)

GET	MISSION PHASE TIME	FUNCTION	PRIME OCTAL	PRIME DECIMAL	RTC AVAIL- ABLE	TM/LGC WD-BIT	TM/BIT VALUE	TM OR LGC WD-BIT TITLE	VERIFICATION		BURNS		
									MCC-H	SITE	RCS	DPS	APS
00:10:01 (NOM)	00:00	START COAST - S-IVB ATTACHED PROGRAM(P13)				50A (100A)		DSPTAB + 10D					
00:10:38	00:37	NOSE CONE SEP				K141,2-900 K143,4-900	1 0	CAP/SLA PHYS 1,2 NOSE CAP RLY A,B					
00:11:01	01:00	TERMINATE ABORT CMD MONITOR				40A-9	0	FW2-B9 (ABORT MONITOR)					
		TERMINATE TUMBLE MONITOR				39B-14	0	FW1-B14 (TUMBLE MONITOR)					
00:19:40	09:39	SLA PANELS DEPLOY				K147,8-900 K149-900	1 1	SLA DPLY CMD A,B SLA PANEL DEPLOY					
00:21:57	11:56	C-BND TRANSPONDER - ON	152	106	53A		TRACKING SITE						
		AVERAGE G OFF				39B-1	0	FW1-B1 (AVE G)					
		ENABLE MISSION TIMERS				40A-5	1	FW2-B5 (MTIMR)					
		ENABLE PLATFORM COMPENSATION				40A-15	1	FW2-B15 (DRIFT)					
		ENTER IDLING STATE PROGRAM (P00)				50A (100A)		DSPTAB + 10D					

MISSION PHASE 7 (LGC WD 74A) S-IVB/LM SEPARATION ($\Delta T = 4:15$)

GET	MISSION PHASE TIME	FUNCTION	PRIME OCTAL	PRIME DECIMAL	RTC AVAIL- ABLE	TM/LGC WD-BIT	TM/BIT VALUE	TM OR LGC WD-BIT TITLE	VERIFICATION		BURNS		
									MCC-H	SITE	RCS	DPS	APS
00:50:00	00:00	TIMERS DISABLED EXECUTE V34E (KILLS UPDATE POSSIBLY IN PROGRESS)				40A-5	0	FW2-B5 (MTMR)			30 MS UL- LAGE		
		START S-IVB/LM SEP PROG (P14)				50A(100A)		DSPTAB +100					
		CMD +X TRANS - ON (30MS)/ OFF				GH1419,23V GH1427,31V 053U	1/0 1/0 1/0	JD 4D/3D OUTPUT JD 2D/1D OUTPUT ULLAGE CMD					
00:50:44	00:44	RCS MAIN S/O VLV, SYS A, OPEN	274	188	50A	GR9609U	0	RCS MAIN A CLSD					
		RCS MAIN S/O VLV, SYS B, OPEN	276	190	60A	GR9610U	0	RCS MAIN B CLSD					
00:50:45	00:45	ED BAT. ACT. - ON	004	004	64B	GY0111,2X	0	ED ARM A/B ON					
00:50:46	00:46	RCS MAIN S/O VLV, SYS A, OPEN RST	275	189	51A								
		RCS MAIN S/O VLV, SYS B, OPEN RST	277	191	61A								
00:50:55	00:55	RCS PRESS. - FIRE	006	006	70B	GR2201,2P GR3201,2P GR1101,2P GR1201,2P	179 PSI 179 PSI 2925 PSI 179 PSI	A,B FUEL MFLD PRESS. A,B OX MFLD PRESS. RCS (A,B) HE. PRESS. RCS (A,B) REG PRESS.					
00:50:57	00:57	RCS PRESS - FIRE RST	007	007	71B								
00:51:25	01:25	ED BAT. ACTIVATION - SAFE	005	005	65B	GY0111,2X	1	ED ARM A,B ON					
00:53:25	03:25	DISABLE PLATFORM COMPENSATION				40A-15	0	FW2-B15 (DRIFT)					
		AVERAGE G ON				39B-1	1	FW1-B1 (AVE G)					
00:53:55	03:55												
		CMD +X TRAN-ON				GH1419,23V GH1427,31V 053U 40B-6	1 1 1 1	JD 4D/3D OUTPUT JD 2D/1D OUTPUT ULLAGE CMD DAP-B6 (ULLAGER)					

MISSION PHASE 7 (CONCLUDED)

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A. MISSION PHASE DETAILS (Cont'd)

GET	MISSION PHASE TIME	FUNCTION	PRIME OCTAL	PRIME DECIMAL	RTC AVAIL- ABLE	TM/LGC WD-BIT	TM/BIT VALUE	TM OR LGC WD-BIT TITLE	VERIFICATION		BURNS		
									MCC-H	SITE	RCS	DPS	APS
00:53:56	03:56	XMTR/RCVR (S-BAND) - PRIM	212	138	31A	GT0994V GT0992B GT0201E	4V VAR 16W	S-BND SIG STR S-BND ST PH S-BND PWR AMP			10 SEC		
00:53:59	03:59	LM/S-IVB SEP ARM ON	072	058	46A								
00:53:59.5	03:59.5	TURN DAP ON				40B - 11	1	DAP - B11 (GO DAP GO)					
00:54:00	04:00	LM/S-IVB SEP - CMD	132	090	62A	GL4222X K145,6-900 GH1204X 39B-4	0 1 0 1	LM/SLA SEP LM/SLA SEP RLY A,B OUT OF DETENT FW1-B4 (S-IVB GONE)			5 SEC		
		SET MIN DEADBAND IN DAP				40B-7	0	DAP-B7 (DBSLMX)					
00:54:01	04:01	LM/S-IVB SEP ARM - OFF	073	059	47A								
00:54:02	04:02	LM/S-IVB SEP - CMD RST	133	091	63A								
00:54:05	04:05	CMD +X TRAN-OFF				GH1419,23V GH1427,31V 053V 40B-6	0 0 0 0	JD 40/30 OUTPUT JD 20/10 OUTPUT ULLAGE CMD DAP-B6 (ULLAGER)			5 SEC		
00:54:10	04:10	CMD +X TRAN-ON				GH1419,23V GH1427,31V 053V 40B-6	1 1 1 1	JD 40/30 OUTPUT JD 20/10 OUTPUT ULLAGE CMD DAP-B6 (ULLAGER)					
00:54:15	04:15	CMD +X TRAN-OFF				GH1419,23V GH1427,31V 053V 40B-6	0 0 0 0	JD 40/30 OUTPUT JD 20/10 OUTPUT ULLAGE CMD DAP - B6 (ULLAGER)					
		SET MAX DEADBAND IN DAP				40B-14	0	DAP-B7 (DBSLMX)					
		AVERAGE G OFF				39B-1	0	FW1-B1 (AVE G)					
		ENABLE TIMERS				40A-5	1	FW2-B5 (MT IMR)					
		ENABLE PLATFORM COMPENSATION				40A-15	1	FW2-B15 (DRIFT)					
		ENTER IDLING STATE PROG (POO)				50A (100A)		DSPTAB + 10D					

A. MISSION PHASE DETAILS (Cont'd)

MISSION PHASE 8 (LGC WD 74A) DPS COLD SOAK ($\Delta T = 02:30$)

GET	MISSION PHASE TIME	FUNCTION	PRIME OCTAL	PRIME DECIMAL	RTC AVAIL-ABLE	TM/LGC WD-BIT	TM/BIT VALUE	TM OR LGC WD-BIT TITLE	VERIFICATION		BURNS		
									MCC-H	SITE	RCS	DPS	APS
00:54:23	00:00	START COAST DPS COLD SOAK PROGRAM (P15)				50A (100A)		DSPTAB + 10D					
		TIMERS DISABLED				40A-5	0	FW2-B5 (MTIMR)					
		EXECUTE V34E (KILLS UPDATE POSSIBLY IN PROGRESS)											
		DFI TM CALIBRATE - ON	354	236	54B	GL4221X	1	DFI CAL ON					
00:54:35	00:12	DFI TM CALIBRATE - OFF	355	237	55B	GL4221X	0	DFI CAL ON					
		MASTER C&W ALARM RST-CMD	306	198									
00:54:37	00:14	MASTER C&W ALARM RST-CMD	307	199									
00:54:38	00:15	LDG RDR PWR - ON	266	182									
		RDR SELF TEST - ON	032	026									
		START MANEUVER ROUTINE TO DPS COLD SOAK ATTITUDE				GH1418-H1433 40A-11 40B-7	1/0 1 0	JET DRIVERS FW2-B11 (KALC MANU) DAP-B7 (SET MIN DEADBANDS IN DAP)					
00:55:32 (APPROX)	01:09	END MANEUVER TO DPS COLD SOAK ATTITUDE				GH1418-H1433 40A-11	0/1 0	JET DRIVERS FW2-B11 (KALC MANU)					
00:55:38	01:15	RDR SELF TEST - OFF	033	027									
00:56:38	02:15	LDG RDR PWR-OFF	267	183									
00:56:53	02:30	SET MAX DEADBAND IN DAP				40B-7	1	DAP-B7 (DBSLMX)					
		MISSION TIMERS ENABLE				40A-5	1	FW2-B5 (MTIMR)					
		ENTER IDLING STATE PROG (P00)				50A (100A)		DSPTAB + 10D					

MISSION PHASE 9 (LGC WD 74A) - DPS 1 [$\Delta T = 6:53$]

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A. MISSION PHASE DETAILS (Cont'd)

GET	MISSION PHASE TIME	FUNCTION	PRIME OCTAL	PRIME DECIMAL	RTC AVAIL- ABLE	TM/LGC WD-BIT	TM/BIT VALUE	TM OR LGC WD-BIT TITLE	VERIFICATION		BURNS		
									MCC-H	SITE	RCS	DPS	APS
03:55:25	00:00	TIMERS DISABLE				40A-5	0	FW2-B5 (MTIMR)					
		EXECUTE V34E (KILLS UPDATE POSSIBLY IN PROGRESS)											
		START PRE-DPS 1 PROG (P31)				50A (100A)		DSPTAB + 10D					
03:55:45	00:20	START DPS 1 ATTITUDE MANEUVER ROUTINE				GH1418-H1433 40A-11 40B-7	1,0 1 0	JET DRIVERS FW2-B11 (KALCMANU) DAP-B7 (SET MIN DEADBAND IN DAP)					
03:56:25	01:00	END DPS 1 ATT MANEUVER				GH1418-H1433 40A-11	0,1 0	JET DRIVERS FW2-B11 (KALCMANU)					
03:56:55	01:30	DFI TM CAL-ON	354	236	54B	GL4221X	1	DFI CAL ON					
03:57:07	01:42	DFI TM CAL-OFF	355	237	55B	GL4221X	0	DFI CAL ON					
		MASTER C AND W ALARM RST-ON	306	198									
03:57:09	01:44	MASTER C AND W ALARM RST-ON RST	307	199									
03:57:20	01:55	LDG RDR PWR - ON	266	182									
		RDR SELF TEST - ON	032	026									
03:58:09	02:44	ED BAT, ACT - ON	004	004	64B	GY0111,2X	0	ED ARM A,B ON					
03:58:14	02:49	LDG GEAR DEPLOY-FIRE	010	008									
03:58:16	02:51	LDG GEAR DEPLOY - FIRE RST	011	009									
03:58:20	02:55	RDR SELF TEST - OFF	033	027									
03:58:55 [TIG - 66S]	03:30	START DPS 1 BURN PROG (P41)				50A (100A)		DSPTAB + 10D					
		ENG SEL - DESC ARM	226	150	00B	43A-3 GH1348X	0 1	CH30-B3 ENG ARM DPS ARM					
		MAN, THROTTLE - ON (10%)	126	086		G06806H GH1311V	10% 10%	DPS VAR INJ ACT POS MAN, THRUST CMD					
03:59:31	04:06	DISABLE PLATFORM COMPENSATION				40A-15	0	FW2 - B15 (DRIFT)					
		AVERAGE G ON				39B-1	1	FW1 - B1 (AVE G)					
03:59:45	04:20	DPS PQGS ARM 1 - ENABLE	344	228									
		DPS PQGS ARM 2 - ENABLE	304	196									
03:59:46	04:21	DPS PQGS 1 - ON	364	244		GQ4103Q GQ3603Q	MAYBE A CHANGE FROM OFF TO ON	DPS OX 1 QTY DPS FU 1 QTY					
		DPS PQGS 2 - ON	324	212		GQ4104Q GQ3604Q		DPS OX 2 QTY DPS FU 2 QTY					

MISSION PHASE 9 (CONCLUDED)

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A. MISSION PHASE DETAILS (Cont'd)

GET	MISSION PHASE TIME	FUNCTION	PRIME OCTAL	PRIME DECIMAL	RTC AVAIL- ABLE	TM/LGC WD-BIT	TM/BIT VALUE	TM OR LGC WD-BIT TITLE	VERIFICATION		BURNS		
									MCC-H	SITE	RCS	DPS	APS
03:59:53.5	04:28.5	CMD +X TRAN - ON				GH1419,23X GH1427,31X 053U 40B-6	1 1 1 1	JD 4D/3D OUTPUT JD 2D/1D OUTPUT ULLAGE CMD DAP - B6 (ULLAGER)			8 SEC	26 SEC (10%)	13 SEC (100%)
04:00:01	04:36	CMD ENG ON				39B-5 41A, 91A - 13, 14 GH1301X/H1214 GQ6510P	1 1,0 1 8 PSIA	FW1-B5 (ENG DVM) CH11 - B13,14 (ENG ON, ENG OFF) DPS ON AND AUTO ON DPS TCP					
04:00:01.5	04:36.5	CMD +X TRAN - OFF				GH1419,23X GH1427,31X 053U 40B-6	0 0 0 0	JD 4D/3D OUTPUT JD 2D/1D OUTPUT ULLAGE CMD DAP - B6 (ULLAGER)					
04:00:04	04:39	ED BAT. ACTIVATION - SAFE	005	005	65B	GY0111,2X	1	ED ARM A,B ON					
04:00:27	05:02	INCREASE THROTTLE TO MAX				GH1331V GH6806,6510P	100 % 92.5 %	AUTO THRUST CMD DPS VAR INJ ACT POS AND DPS TCP					
04:00:40	05:15	CMD ENG OFF				39B-5 41A, 91A - 13, 14 GH1301X,1217X GQ6510P	0 0, 1 0, 1 0 PSIA	FW1-B5 (ENG DUM) CH11-B13,14 (ENG ON,ENG OFF) DPS ON AND AUTO OFF DPS TCP					
04:00:46	05:21	DV MON DETECTS ENG SHUTDOWN											
04:00:51	05:26	MAN. THROTTLE - RST (30%)	127	087		GH1311V	30%	MAN. THROTTLE CMD					
		ENG SEL - DESC ARM OFF	227	151	01B	43A-3 GH1348X	1 0	ENG ARM DPS ARM					
04:01:01	05:36	DPS PQGS 1 OFF	365	245		GQ4103Q GQ3603Q	MAYBE A CHANGE FROM ON TO OFF	DPS OX 1 QTY DPS FU 1 QTY					
		DPS PQGS 2 OFF	325	213		GQ4104Q GQ3604Q		DPS OX 2 QTY DPS FU 2 QTY					
04:01:02	05:37	DPS PQGS ARM 1 - DISABLE	345	229									
		DPS PQGS ARM 2 - DISABLE	305	197									
04:01:16	05:51	SET MAX DEADBAND IN DAP				40B-7	1	DAP-B7 (DBSLMX)					
		RDR SELF TEST - ON	032	026									
04:02:16	06:51	RDR SELF TEST - OFF	033	027									
		LDR RDR PWR - OFF	267	183									
		AVERAGE G OFF				39B-1	0	FW1-B1 (AVE G)					
		ENABLE TIMERS				40A-5	1	FW2-B5 (MTMR)					
04:02:18	06:53	ENABLE PLATFORM COMPENSATION				40A-15	1	FW2-B15 (DRIFT)					
		ENTER IDLING STATE PROG (POO)				50A (100A)		DSPTAB +10D					

MISSION PHASE 11 (LGC NO. 74A) DPS 2/FITH/APS 1 ($\Delta T = 17:40$)

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GET	MISSION PHASE TIME	FUNCTION	PRIME OCTAL	PRIME DECIMAL	RTC AVAIL- ABLE	TM/LGC WD-BIT	TM/BIT VALUE	TM OR LGC WD- BIT TITLE	VERIFICATION		BURNS		
									MCC-H	SITE	RCS	DPS	APS
04:32:53	00:00	DISABLE TIMERS				40A-5	0	FW2-B5 (MTMR)					
		EXECUTE V34E (KILLS UPDATES)											
		START PRE DPS PROGRAM (P32)				50A (100A)		DSPTAB + 10D					
04:32:54	00:01	DFI TM CAL-ON	354	236	54B	GL4221X	1	DFI CAL ON					
04:33:02 (APPROX)	00:09	BURN PARAMETERS ON DOWNLINK				75 THRU 81A AND B		BURN DATA					
04:33:06	00:13	DFI TM CAL-OFF	355	237	55B	GL4221X	0	DFI CAL ON					
		C&W ALARM RST-CMD	306	198									
04:33:08	00:15	C&W ALARM RST-CMD RST	307	199									
04:33:09	00:16	LDG RDR PWR - ON	266	182									
		RDR SELF TEST - ON	032	026									
04:33:17	00:24	START MANEUVER ROUTINE TO DPS 2 BURN ATTITUDE				GH1418-33V 40A-B11 40B-7	1/0	JET DRIVERS FW2-B11 (KALCMANU) DAP-B7 DAP-B7 (SET MIN DB IN DAP)					
04:33:51 (APPROX)	00:58	END MANEUVER TO DPS 2 BURN ATTITUDE				GH1418 THRU 1433V 40A-11	0/1 0	JET DRIVERS FW2-B11 (KALCMANU)					
04:34:09	01:16	RDR SELF TEST - OFF	033	027									
04:36:23	03:30	START DPS 2 BURN BRAKING PROGRAM (P42)				50A (100A)		DSPTAB + 10D					
		CMD ENG OFF				41A-13,14 39B-5 GH1217X	0,1 0 1	CH11-B13,14 (ENG OFF, ENG ON) FW1-B5 (ENG DVM) AUTO OFF					
		ENG SEL - DESC ARM	226	150	00B	43A-3 GH1348X	0 1	CH30-B3 (ENG ARM) DPS ARM					
04:36:33	03:40	MAN THROTTLE - ON (10%)	126	086		GQ6806H GH1311V	10% 10%	DPS VAR INJ ACT POS MAN THRUST CMD					
04:36:37	03:44	DPS PQGS ARM 1 - ENABLE	344	228									
		DPS PQGS ARM 2 - ENABLE	304	196									
04:36:38	03:45	DPS PQGS 1 - ON	364	244		GQ4103Q GQ3603Q	MAYBE A CHANGE FROM OFF TO ON	DPS OX 1 QTY DPS FU 1 QTY					
		DPS PQGS 2 - ON	324	212		GQ4104Q GQ3604Q		DPS OX 2 QTY DPS FU 2 QTY					
04:36:42 (APPROX)	03:49	AVERAGE G - ON				40A-15	0	FW2-B15 (DRIFT)					
		DISABLE PLATFORM COMPENSATION				39B-1	1	FW1-B1 (AVE G)					

MISSION PHASE 11 (CONT'D)

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A. MISSION PHASE DETAILS (Cont'd)

GET	MISSION PHASE TIME	FUNCTION	PRIME OCTAL	PRIME DECIMAL	RTC AVAIL-ABLE	TM/LGC WD-BIT	TM/BIT VALUE	TM OR LGC WD-BIT TITLE	VERIFICATION		BURNS		
									MCC-H	SITE	RCS	DPS	APS
04:36:45.5	03:52.5	START ABORT STAGE DISCRETE MONITOR											
		CMD +X TRAN - ON				H1419,23X H1427,31X 053U 40B-6	1 1 1 1	JD 4D/3D OUTPUT JD 2D/1D OUTPUT ULLAGE COMMAND DAP-B6 (ULLAGER)					
						39B-5 GH1301X,1214X 41A-13,14 GQ6510P	1 1 1,0 8 PSIA	FW1-B5 (ENG DUM) DPS ON/AUTO ON CH11-B13,14 (ENG OFF, ENG ON) DPS TCP					
						GH1419,23X GH1427,31X 053U 40B-6	0 0 0 0	JD 4D/3D OUTPUT JD 2D/1D OUTPUT ULLAGE COMMAND DAP-B6 (ULLAGER)					
04:36:53	04:00	CMD ENG ON											
04:36:53.5	04:00.5	CMD +X TRAN - OFF											
04:37:19	04:26	INCREASE THROTTLE TO MAX				GH1331V GQ6806H GQ6510P	100% 92.5% 92.5%	AUTO THRUST CMD DPS VAR INJ ACT POS DPS TCP					
04:40:06	07:13	TURN DAP OFF				40B-11	0	DAP-B11 (GO DAP GO)					
		CHANGE TO CDU DOWNLIST											
04:40:10	07:17	TURN DAP ON				40B-11	1	DAP-B11 (GO DAP GO)					
		RESTORE FLT DOWNLIST											
04:44:51	11:58	START APPROACH PROG (P43)				50A (100A)		DSPTAB + 10D					
04:48:02 (NOMINAL)	15:09	START RANDOM THROTTLE PROG (P44)				50A (100A)		DSPTAB + 10D					
		SET THROTTLE TO 10 %				GH1331V GQ6806H GQ6510P	10%	AUTO THRUST COMMAND DPS VAR INJ ACT POS DPS TCP					
04:48:12	15:19	SET THROTTLE TO 50 %				GQ6806H GH1331V GQ6510P	50%	AUTO THRUST COMMAND DPS VAR INJ ACT POS DPS TCP					
04:48:22	15:29	SET THROTTLE TO 30 %				GQ6806H GH1331V GQ6510P	30%	DPS VAR INJ ACT POS AUTO THRUST COMMAND DPS TCP					
04:48:24	15:31	ASC H ₂ O COOLANT VLV OPEN	336	222									
04:48:26	15:33	ASC H ₂ O COOLANT VLV OPEN-RST	337	223									
04:48:32	15:39	SET THROTTLE TO 40 %				GH1331V GH6806H GQ6510P	40%	AUTO THRUST CMD DPS VAR INJ ACT POS DPS TCP					
04:48:42	15:49	SET THROTTLE TO 20 %				GH1331V GH6806H GQ6510P	20%	AUTO THRUST COMMAND DPS VAR INJ ACT POS DPS TCP					
04:48:52	15:59	SET THROTTLE TO MAX				GH1331V GH6806H GQ6510P	100%	AUTO THRUST COMMAND DPS VAR INJ ACT POS DPS TCP					

8 SEC

26 SEC
(10%)

12:01

10:43
(100%)

10 SEC

(10%)

10 SEC

(50%)

10 SEC

30%

10 SEC
(40%)10 SEC
(20%)

MISSION PHASE 11 (CONCLUDED)

GET	MISSION PHASE TIME	FUNCTION	PRIME OCTAL	PRIME DECIMAL	RTC AVAIL-ABLE	TM/LGC WD-BIT	TM/BIT VALUE	TM OR LGC WD-BIT TITLE	VERIFICATION		BURNS		
									MCC-H	SITE	RCS	DPS	APS
04:48:53	16:00	ABORT STAGE - ARM	046	038	70A	GY0111,2X GP0025P GP1501,3P GP0001,2P	0 184PSI 184PSI ≈ 3025PSIA	ED ARM A,B ON APS HE REG APS FU, OX PRESS APS HE 1 AND 2 PRESS					
04:48:54	16:01	ABORT STAGE - CMD	026	022	40A	GC1201 THRU 4C GC1205, 6C GH1283X GH1301 43A - B4 43A - B2 ELEC CKT INTERR TM	0 30A 1 0 0 0	BAT 1 THRU 4 CUR BAT 5,6 CURRENT ABORT STAGE DPS ON CH30 B4 (ABORT STAGE) CH30 B2 (STAGING VERIFIED) SEE LSH, PYRO SYS.,					
04:48:54.5	16:01.5	ABORT STAGE MON DETECTS (STAGE VERIFY)											
		START FITH PROG (P74)				50A (100A)		DSPTAB + 10D					
		APS ON				40B-8 GP2010P GH1260X GH1214X	1 118PSI 1 1	DAP-B8 (APS GOING) APS TCP APS ON AUTO ON					
04:48:55.5	16:02.5	ENG SEL - DESC ARM OFF	227	151	01B	GH1348X 43A-3	0 1	DPS ARM CH30-B3 (ENG ARM)					
04:48:59.5	16:07.5	CMD ENG OFF				39B-5 40A-13,14 GP2010P GH1260X GH1217X 40B-8	0 0,1 0PSI 0 1 0	FW1-B5 (ENG DVM) CH11-B13,14 (ENG ON, ENG OFF) APS TCP APS ON AUTO OFF DAP-B8 (APS GOING)					
04:49:06 (APPROX)	16:14	DV MON DETECTS ENG SHUTDOWN											
04:49:07	16:15	ABORT STAGE - CMD RST	047	039	71A	43A-B4	1	CH30-B4 (ABORT STAGE)					
04:49:08	16:16	LDR RDR PWR - OFF	267	183									
04:49:16	16:24	DPS PQGS 1 - OFF	365	245		GQ4103Q GQ3603Q	MAYBE A CHANGE FROM ON TO OFF	DPS OX 1 QTY DPS FU 1 QTY					
		DPS PQGS 2 - OFF	325	213		GQ4104Q GQ3604Q		DPS OX 2 QTY DPS FU 2 QTY					
04:49:17	16:25	DPS PQGS ARM 1 DISABLE	345	229									
		DPS PQGS ARM 2 DISABLE	305	197									
04:49:36	16:44	AVERAGE G OFF				39B-1	0	FW1-B1 (AVE G)					
		SET MAX DEADBAND IN DAP				40B-7	1	DAP-B7 (DBSLMN)					
		TIMERS - ENABLE				40A-1	1	FW2-B15 (DRIFT)					
04:49:38	16:46	ENABLE PLATFORM COMPENSATION				40A-15	1	FW2-B15 (DRIFT)					
		ENTER IDLING STATE PROG (P00)				50A (100A)		DSPTAB - 10D					

2 SEC
(100%)

00:05

MISSION PHASE 13 (LGC WD74A) - APS 2 ($\Delta T=10:35$)

GET	MISSION PHASE TIME	FUNCTION	PRIME OCTAL	PRIME DECIMAL	RTC AVAIL- ABLE	TM/LGC WD-BIT	TM/BIT VALUE	TM OR LGC WD-BIT TITLE	VERIFICATION		BURNS		
									MCC-H	SITE	RCS	DPS	APS
06:10:45	00:00	TIMERS DISABLED				40A-5	0	FW2-B5(MTIMR)					
		EXECUTE V34E (KILLS UPDATE)											
		START PRE-APS 2 PROG (P34)				50A (100A)		DSPTAB + 10D					
		DFI TM CAL - ON	354	236	54B	GL4221X	1	DFI CAL ON					
06:10:56 (APPROX)	00:11	START MANEUVER ROUTINE TO APS 2 BURN ATTITUDE				40B-7 40A-11 GH1418 THRU 1433V	0 1 1,0	DAP-B7 (SET MIN DB IN DAP FW2-B11 (KALCMANU) JET DRIVERS					
06:10:57	00:12	DFI TM CAL - OFF	355	237	55B	GL4221X	0	DFI CAL ON					
		MASTER C&W ALARM RST-CMD	306	198									
06:10:59	00:14	MASTER C&W ALARM RST-CMD RST	307	199									
06:12:26	01:27	END MANEUVER TO APS 2 BURN ATTITUDE				40A-11 GH1418 THRU 1433V	0 0, 1	FW2-B11 JET DRIVERS					
06:13:05	02:20	START APS 2 BURN PROG (P46)				50A (100A)		DSPTAB + 10D					
		AVERAGE G - ON				39B-1	1	FW1-B1 (AVE G)					
		CMD ENG OFF				39B-5 41A, 91A -13, 14 GH1217X	0 0, 1 1	FW1-B5 (ENG DVM) CH11-B13, 14 (ENG OFF, ENG ON) AUTO OFF					
		DISABLE PLATFORM COMPENSATION				40A-15	0	F2-B15 (DRIFT)					
		ENG SEL - ASC ARM	206	134		GH1230X 43A-B3	1 0	APS ARM CH30-B3 (ENG ARM)					
06:13:22.5	02:37.5	CMD +X TRAN - ON				GH1419, 23X	1	JD 4D/3D OUTPUT					
						GH1427, 31X	1	JD 2D/1D OUTPUT					
						053U	1	ULLAGE COMMAND					
						40B-6	1	DAP-B6 (ULLAGER)					

MISSION PHASE 13 (CONT'D)

A. MISSION PHASE DETAILS (Cont'd)

GET	MISSION PHASE TIME	FUNCTION	PRIME OCTAL	PRIME DECIMAL	RTC AVAIL- ABLE	TM/LGC WD-BIT	TM/BIT VALUE	TM OR LGC WD-BIT TITLE	VERIFICATION		BURNS		
									MCC-H	SITE	RCS	DPS	APS
06:13:35	02:50	CMD ENG ON				39B-5 40B-8 GP2010P GH1260X GH1214X 41A, 91A -13, 14	1 1 118PSI 1 1 1, 0	FW1-B5 (ENG DVM) DAP-B8 (APS GOING) APS TCP APS ON AUTO ON CH11-B13, 14 (ENG ON, ENG OFF)			13 SEC ↓		↑
06:13:35.5	02:50.5	CMD +X TRAN - OFF				GH1419, 23X GH1427, 31X 053U 40B-6	0 0 0 0 0	JD40/3D OUTPUT JD20/1D OUTPUT ULLAGE COMMAND DAP - B6 (ULLAGE)					
06:13:44	02:59	SET "FEED TEST" FLAG				40A-8	1	FW2-B8 (ASC FEED)					
		RCS ASC FEED VLV - ARM	176	126									
06:13:45	03:00	RCS ASC FEED VLV, SYS A, OPEN	074	060		GR9611U	1	ASC FEED OPN					
		RCS MAIN S/O VLV, SYS A - CLOSE	254	172	44A	GR9609U	1	RCS MAIN A CLSD					
06:13:47	03:02	RCS ASC FEED VLV, SYS A - OPEN RST	075	061									
		RCS MAIN S/O VLV, SYS A, - CLOSE RESET	255	173	45A								
06:13:55	03:10	RCS ASC FEED VLV, SYS B, - OPEN	076	062		GR9612U	1	ASC FEED B OPN					
		RCS MAIN S/O VLV, SYS B, - CLOSE	256	174	54A	GR9610U	1	RCS MAIN B CLSD					
06:13:57	03:12	RCS ASC FEED VLV, SYS B, - OPEN RST	077	063									
		RCS MAIN S/O VLV, SYS B - CLOSE RST	257	175	55A								
06:14:05	03:20	RCS MANIFOLD X-FEED VLV - OPEN	374	252		GR9613U	1	A/B X-FEED OPN					
06:14:07	03:22	RCS MANIFOLD X-FEED VLV - OPEN RST	375	253									
06:19:49	09:04	RESET "FEED TEST" FLAG				40A-8	0	FW2-B8 (ASC FEED)					
		RCS MANIFOLD X-FEED VLVS - CLOSE	376	254		GR9613U	0	A/B X-FEED OPN					
06:19:50	09:05	RCS MAIN S/O VLV, SYS A, - OPEN	274	188	50A	GR9609U	0	RCS MAIN A CLSD					
		RCS ASC FEED VLV, SYS A, - CLOSE	114	076		GR9611U	0	ASC FEED A OPN					
06:19:51	09:06	RCS MAINFOLD X-FEED VLVS - CLOSE RESET	377	255									
06:19:52	09:07	RCS MAIN S/O VLV, SYS A - OPEN RESET	275	189	51A								
		RCS ASC FEED VLV, SYS A - CLOSE RESET	115	077									

7:07

GET	MISSION PHASE TIME	FUNCTION	PRIME OCTAL	PRIME DECIMAL	RTC AVAIL- ABLE	TM/LGC WD-BIT	TM/BIT VALUE	TM OR LGC WD-BIT TITLE	VERIFICATION		BURNS		
									MCC-H	SITE	RCS	DPS	APS
06:20:00	09:15	RCS MAIN S/O VLV, SYS B, - OPEN	276	190	60A	GR9610U	0	RCS MAIN B CLSD					
		RCS ASC FEED VLV, SYS B, - CLOSE	116	078		GR9611U	0	ASC FEED B OPN					
06:20:01	09:16	RCS ASC FEED VLV - SAFE	177	127									
06:20:02	09:17	RCS MAIN S/O VLV, SYS B, - OPEN RESET	277	191	61A								
		RCS ASC FEED VLV, SYS B, CLOSE RESET	117	079									
06:20:42 (APPROX)	09:57	TIME OF PROPELLANT DEPLETION											
		DV MONITOR DETECTS ENGINE FAILURE AND ISSUES PROG ALARM				50A (100A) -9	1	DSPTAB + 11D - B9					
		ISSUE 315 ERROR CODE (FOR GET IT ROUTINE)				55A, 55B, 56A		FAIL REG +0, +1, +2					
		ISSUE 1405 ERROR CODE (ENG FAIL)				55A, 55B, 56A		FAIL REG +0, +1, +2					
		DISPLAY V15N50 (MONITOR FAIL REGISTERS)											
		CMD ENG OFF				39B-5 41A, 91A- 13, 14 40B-8 GP2010P GH1260X GH1217X	0 0, 1 0 0 0 1	FW1-B5 (ENG DVM) CH11-B13, 14 (ENG ON, ENG OFF) DAP-B8 (APS GOING) APS TCP APS ON AUTO OFF					
06:20:48	10:03	ΔV MONITOR DETECTS SHUTDOWN											
		SET MAX DEADBAND IN DAP				40B-7	1	DAP-B7 (DBSLMX)					
06:20:49	10:04	ENG SEL - ASC ARM OFF	207	135		GH1230X 43A-B3	0 1	APS ARM CH30-B3 (ENG ARM)					
06:21:18	10:33	AVERAGE G OFF				39B-1	0	FW1-B1 (AVE G)					
06:21:20	10:35												
		ENABLE PLATFORM COMPENSATION				40A-15	1	FW2-B15 (DRIFT)					
		ENABLE TIMERS				40A-5	1	FW2-B5 (MTIMR)					
		ENTER IDLING STATE PROG (P00)				50A, 100A		DSPTAB + 10D					

MISSION PHASE 3 (LGC WD74A) SUBORBITAL ABORT ($\Delta T = 3:11$)

GET	MISSION PHASE TIME	FUNCTION	PRIME OCTAL	PRIME DECIMAL	RTC AVAIL- ABLE	TM/LGC WD-BIT	TM/BIT VALUE	TM OR LGC WD-BIT TITLE	VERIFICATION		BURNS		
									MCC-H	SITE	RCS	DPS	APS
T _a (TIME OF ABORT)	00:00	START MP 3 WHEN ABORT CMD MONITOR DETECTS "SUBORBITAL ABORT" CMD FROM GND SENT UP VIA LGC UPLINK (KC23)				40A-10	1	FW1-B10 (ABORT CMD RX AND ACCEPTED)					
		TERMINATE ABORT CMD MONITOR				40A-9	0	FW2-B9 (ABORT CMD MON)					
		START SUB-ORBITAL ABORT PROG (P71)				50A (100A)		DSPTAB + 10D					
T _a + 0:01	00:01	RCS MAIN S/O VLV, SYS A, B - OPEN	274 276	188 190	50A 60A	GR9609U GR9610U	0 0	RCS MAIN A CLSD RCS MAIN B CLSD					
T _a + 0:02	00:02	ED BAT ACTIVATION - ON	004	004	64B	GY0111,2X	0	ED ARM A,B ON					
T _a + 0:03	00:03	RCS MAIN S/O VLV, SYS A,B - OPEN RESET	275 277	189 191	51A 61A								
T _a + 0:04	00:04	RCS PRESS - FIRE	006	006	70B	GR2201,2P GR3201,2P GR1101,2P GR1201,2P	179PSI 179PSI 2925PSI 179PSI	A,B FU MFLD PRESS A,B OX MFLD PRESS RCS (A,B) HE PRESS RCS (A,B) REG PRESS					
T _a + 0:05	00:05	ED BAT ACTIVATION - SAFE	005	005	65B	GY0111,2X	1	ED ARM A AND B ON					
T _a + 0:06	00:06	RCS PRESS - FIRE RESET	007	007	71B								
T _{nt} (nt > T _a + 10 SEC)	00:10	TEST FOR TUMBLE				39B-13	0	FW1-B13 (TUMBL)					
T _{nt}	00:11	TERMINATE TUMBLE MONITOR				39B-14	0	FW1-B14 (DISABLE TUMBLE MON)					
		CMD +X TRAN - ON				GH1419,23X GH1427,31X 053U 40B-6	1 1 1 1	JD 4D/3D OUTPUT JD 2D/1D OUTPUT ULLAGE CMD DAP-B6 (ULLAGER)					
		LM/S-IVB SEP ARM - ON	072	058	46A								
T _{nt} + .5	00:11.5	TURN ON DAP				40B-11	1	DAP-B11 (GO DAP GO)					
		SET MAX DEADBAND IN DAP				40B-7	1	DAP-B7 (DBSLMX)					
T _{nt} + 1	00:12	LM/S-IVB SEP CMD	132	090	62A	GL4222X K145,6-900 GH1204X 39B-4	0 1 0 1	LM/SLA SEP LM/SLA SEP RLY A,B OUT OF DETENT FW1-B4 (S-IVB GONE)					
		ED BAT ACTIVATION - ON	004	004	64B	GY0111,2X	0	ED ARM A AND B ON					
		SET MIN DEADBAND IN DAP				40B-7	0	DAP-B7 (DBSLMX)					

MISSION PHASE 3 (CONT'D)

A. MISSION PHASE DETAILS (Cont'd)

GET	MISSION PHASE TIME	FUNCTION	PRIME OCTAL	PRIME DECIMAL	RTC AVAIL-ABLE	TM/LGC WD-BIT	TM/BIT VALUE	TM OR LGC WD-BIT TITLE	VERIFICATION		BURNS		
									MCC-H	SITE	RCS	DPS	APS
$T_{nt} + 2$	00:13	LM/S-IVB SEP ARM - OFF	073	059	47A						26 SEC		
		ENG SEL - DESC ARM	226	150	00B	GH1348X 43A-3	1 0	DPS ARM CH30-B3 (ENG ARM)					
		MAN THROTTLE - ON (10%)	126	086		GH1311V GQ6806H	10% 10%	MAN THROTTLE CMD DPS VAR INJ ACT POS					
$T_{nt} + 3$	00:14	LM/SLA SEP CMD - RST	133	091	63A						5 SEC (10%)		
$T_{nt} + 7$	00:18	START ABORT STG DISCRETE MON											
$T_{nt} + 13$	00:24	LDG GEAR DEPLOY - FIRE	010	008							23 SEC (10%)		
$T_{nt} + 14$	00:25	CMD ENG ON				39B-5 GH1301,1214X 41A,91A-13,14 GQ6510P	1 1 1,0 8PSIA	FW1-B5 (ENG DVM) DPS ON, AUTO ON CH11-B13,14 (ENG ON, OFF) DPS TCP					
$T_{nt} + 15$	00:26	ED BAT ACTIVATION - SAFE	005	005	65B	GY0111,2X	1	ED ARM A,B ON					
		LDG GEAR DEPLOY - FIRE RST	011	009									
$T_{nt} + 19$	00:30	CMD ENG OFF				39B-5 GH1301,1217X 41A,91A-13,14 GQ6510P	0 0 0,1 0	FW1-B5 (ENG DVM) DPS ON, AUTO OFF CH11-B13,14 (ENG OFF, ON) DPS TCP			28 SEC		
$T_{nt} + 24$	00:35	CMD ENG ON				39B-5 GH1301,1214X 41A,91A-13,14 GQ6510P	1 1 1,0 8PSIA	FW1-B5 (ENG DVM) DPS ON, AUTO ON CH11-B13,14 (ENG ON, OFF) DPS TCP					
$T_{nt} + 26$	00:37	CMD +X TRAN - OFF				GH1419,23X GH1427,31X 053W 40B-6	0 0 0 0	JD 40/30 OUTPUT JD 20/10 OUTPUT ULLAGE CMD DAP-B6 (ULLAGER)					
$T_{nt} + 50$	00:58	INCREASE THROTTLE TO MAX				GH1331V GQ6806 GQ6510P	100 % 92.5 % 92.5 %	AUTO THRUST CMD DPS VAR INJ ACT POS DPS TCP			5 SEC 100%		
$T_{nt} + 54$	01:02	ABORT STAGE - ARM	046	038	70A	GY0111,2X GP0025P GP1501,3P GP0001,2P	0 184PSI 184PSI 3025PSI	ED ARM A,B ON APS HE REG APS FU, OX PRESS APS HE 1,2 PRESS					
$T_{nt} + 55$	01:03	ABORT STAGE - CMD	026	022	40A	GC1201 THRU 4C GC1205,6C GH1283X GH1301 43A-B4 43A-B2 ELEC CKT INTERR TM	0 30A 1 0 0 0	BAT 1 THRU 4 CUR BAT 5,6 CUR ABORT STAGE DPS ON CH30-B4 (ABORT STAGE) CH30-B2 (STAGING VERIFIED) LSH PYROSYS					
$T_{nt} + 56$	01:04	STAGING VERIFIED				43A-2	0	CH30-B2 (STAGING VERIFIED)					
		ABORT STAGE MON DETECTS STG VERIFIED											
		APS ON				40B-8 GP2010P GH1260X GH1214X	1 118PSI 1 1	DAP-B8 (APS GOING) APS TCP APS ON AUTO ON					

MISSION PHASE 3 (Concluded)

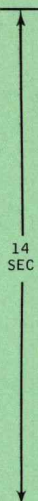
GET	MISSION PHASE TIME	FUNCTION	PRIME OCTAL	PRIME DECIMAL	RTC AVAIL-ABLE	TM/LGC WD-BIT	TM/BIT VALUE	TM OR LGC WD-BIT TITLE	VERIFICATION		BURNS		
									MCC-H	SITE	RCS	DPS	APS
T _{nt} + 57	01:05	ENG SEL - DESC ARM OFF	227	151	01B	GH1348X 43A-3	0 1	DPS ARM CH30-B3 (ENG ARM)					5 SEC ↓
T _{nt} + 1:01	01:09	CMD ENG OFF				39B-5 41A,91A-13,14 GP2010P GH1260X GH1219X 40B-8	0 0,1 0 0 1 0	FW1-B5 (ENG DVM) CH11-B13,14 (ENG ON, OFF) APS TCP APS ON AUTO OFF DAP-B8 (APS GOING)					
T _{nt} + 1:03	01:10	ABORT STG - CMD RST	027	023	41B		1	CH30 B4 (ABORT STAGE)					
		ENG SEL - ASC ARM	206	134		GH1230X 43A-3	1 0	APS ARM CH30 B3 ENG ARM					
T _{nt} + 1:30	01:37	CMD +X TRAN - ON				GH1419,23X GH1427,31X 053U 40B-6	1 1 1 1	JD 4D/3D OUTPUT JD 2D/1D OUTPUT ULLAGE CMD DAP-B6 (ULLAGER)					
T _{nt} + 1:32	01:39	CMD ENG ON				39B-5 40B-8 GP2010P GH1260X GH1214X	1 1 118PSI 1 1	FW1-B5 (ENG DVM) DAP-B8 (APS GOING) APS TCP APS ON AUTO ON					
T _{nt} + 1:34	01:41	CMD +X TRAN - OFF				GH1419,23X GH1427,31X 053U 40B-6	0 0 0 0	JD 4D/3D OUTPUT JD 2D/1D OUTPUT ULLAGE CMD DAP-B6 (ULLAGER)					
T _{nt} + 2:32	02:39	CMD ENG OFF				39B-5 41A,91A-13,14 40B-8 GP2010P GH1260X GH1217X	0 0,1 0 0 0 1	FW1-B5 (ENG DVM) CH11-B13,14 (ENG ON, OFF) DAP-B8 (APS GOING) APS TCP APS ON AUTO OFF					
T _{nt} + 2:33	02:40	ENG SEL - ASC ARM OFF	207	135		GH1230X 43A-3	0 1	APS ARM CH30 B3 (ENG ARM)					
T _{nt} + 3:02	3:09	AVERAGE G OFF				39B-1	0	FW1-B1 (AVE G)					
		SET MAX DEADBAND IN DAP				40B-7	1	DAP-B7 (DBSLMX)					
T _{nt} + 3:04	3:11	ENABLE PLATFORM COMPENSATION				40A-15	1	FW2-B15 (DRIFT)					
		ENABLE TIMERS				40A-5	1	FW2-B5 (MTIMR)					
		ENTER IDLING STATE PROG (P00)				50A, 100A		DSPTAB - 10D					

4
SEC
↑
↓

01:00
↑
↓

MISSION PHASE 4 (LGC WD74A) CONTINGENCY ORBIT INSERTION ($\Delta T = 01:57$)

GET	MISSION PHASE TIME	FUNCTION	PRIME OCTAL	PRIME DECIMAL	RTC AVAIL- ABLE	TM/LGC WD -BIT	TM/BIT VALUE	TM OR LGC WD-BIT TITLE	VERIFICATION		BURNS		
									MCC-H	SITE	RCS	DPS	APS
Ta (TIME OF ABORT)	00:00	START MP4 WHEN ABORT CMD MONITOR DETECTS "COI" CMD (KC24) VIA GND LGC UPLINK				40A-10	1	FW2-B10 (ABORT SIG)					
		TERMINATE ABORT CMD MONITOR				40A-9	0	FW2-B9 (ABORT MON)					
		START COI PROG (P72)				50A (100A)		DSPTAB + 10D					
		AVERAGE G OFF				39B-1	0	FW1-B1 (AVE G)					
		POOH FLAG				39B-6	1	FW1-66 (NO P00 AG)					
		ENABLE TUMBLE MONITOR											
Ta + 1	00:01	RCS MAIN S/O VLV, SYS A, B OPEN	274 276	188 190	50A 60A	GR9609U GR9610U	0 0	RCS MAIN A CLSD RCS MAIN B CLSD					
Ta + 2	00:02	ED BAT. ACTIVATION - ON	004	004	64B	GY0111,2X	0	ED ARM A,B ON					
		DISABLE PLATFORM COMPENSATION				40A-15	0	FW2-B15 (DRIFT)					
Ta + 3	00:03	RCS MAIN S/O VLV, SYS A, B OPEN RESET	275 277	189 191	51A 61A								
Ta + 4	00:04	RCS PRESS - FIRE	006	006	70B	GR2201,2P	179 PSI	A,B FU MFLD PRESS					
						GR3201,2P	179 PSI	A,B OX MFLD PRESS					
						GR1101,2P	2925 PSI	RCS (A,B) HE PRESS					
						GR1201,2P	179 PSI	RCS (A,B) REG PRESS					
Ta + 5	00:05	ED BAT ACTIVATION SAFE	005	005	65B	GY0111,2X	1	ED ARM A, B ON					
Ta + 6	00:06	RCS PRESS - FIRE RESET	007	007	71B								
Tnt > Ta+10 SEC	00:10	TEST FOR TUMBLE				39B-13	0	FW1-B13 (TUMBL)					

GET	MISSION PHASE TIME	FUNCTION	PRIME OCTAL	PRIME DECIMAL	RTC AVAIL- ABLE	TM/LGC WD -BIT	TM/BIT VALUE	TM OR LGC WD-BIT TITLE	VERIFICATION		BURNS		
									MCC-H	SITE	RCS	DPS	APS
T_{nt}	00:11	TERMINATE TUMBLE MONITOR				39B-14	0	FW1-B14 (TUMON)			 14 SEC		
		CMD +X TRAN - ON				GH1419, 23X	1	JD 4D/3D OUTPUT					
						GH1427, 31X	1	JD 2D/1D OUTPUT					
						053U	1	ULLAGE CMD					
						40B-6	1	DAP-B6 (ULLAGER)					
		LM/S-IVB SEP ARM ON	072	058	46A								
		S-IVB SEP FLAG SET				39B-4	1	FW1-B4 (S-IVB GONE)					
$T_{nt} + .5$	0011:5	TURN DAP ON				40B-11	1	DAP-B11 (GO DAP GO)					
		SET MAX DEADBAND IN DAP				40B-7	1	DAP-B7 (DBSLMX)					
$T_{nt} + 1$	00:12	LM/S-IVB SEP-CMD	132	090	62A	GL4222X	0	LM/SLA SEP					
						K145,6-900	1	LM/SLA SEP RLY A,B					
						GH1204X	0	OUT OF DETENT					
		SET MIN DEADBAND IN DAP				40B-7	0	DAP-B7 (DBSLMX)					
$T_{nt} + 2$	00:13	LM/S-IVB SEP ARM OFF	073	059	47A								
$T_{nt} + 3$	00:14	LM/S-IVB SEP - CMD RESET	133	091	63A								
$T_{nt} + 10$	00:21	ED BAT. ACTIVATION - ON	004	004	64B	GY0111,2X	0	ED ARM A,B ON					
$T_{nt} + 14$	00:25	CMD +X TRAN - OFF				GH1419, 23X	0	JD 4D/3D OUTPUT					
						GH1427, 31X	0	JD 2D/1D OUTPUT					
						053U	0	ULLAGE CMD					
						40B-6	0	DAP-B6 (ULLAGER)					
$T_{nt} + 15$	00:26	START MANEUVER TO BURN ATTITUDE				GH1418 THRU 1433X 40A-11	0,1 1	JET DRIVERS FW2-B11 (KALCMANU)					
		LDG GEAR DEPLOY - FIRE	010	008									
$T_{nt} + 17$	00:28	LDC GEAR DEPLOY - FIRE RST	011	009									

GET	MISSION PHASE TIME	FUNCTION	PRIME OCTAL	PRIME DECIMAL	RTC AVAIL- ABLE	TM/LGC WD-BIT	TM/BIT VALUE	TM OR LGC WD-BIT TITLE	VERIFICATION		BURNS		
									MCC-H	SITE	RCS	DPS	APS
T _{nt} + 21	00:32	AVERAGE G - ON				39B-1	0	FW1-B1 (AVE G)					
		DISABLE PLATFORM COMPENSATION				40A-15	0	FW2-B15 (DRIFT)					
		ENG SEL - DESC ARM	226	150	00B	GH1348X 43A-3	1 0	DPS ARM CH30-B3 ENG ARM					
		MAN THROTTLE - ON (10%)	126	086		GH1311V GQ6806H	10% 10%	MAN THRUST CMD DPS VAR INJ ACT POS.					
T _{nt} + 35	00:46	DPS PQGS ARM 1 - ENABLE	344	228									
		DPS PQGS ARM 2 - ENABLE	304	196									
T _{nt} + 36	00:47	DPS PQGS 1 - ON	364	244		GQ4103Q GQ3603Q	MAYBE A CHANGE FROM OFF TO ON	DPS OX 1 QTY DPS FU 1 QTY					
		DPS PQGS 2 - ON	324	212		GQ4104Q GQ3604Q		DPS OX 2 QTY DPS FU 2 QTY					
T _{nt} + 39	00:50	END MANEUVER TO BURN ATTITUDE				GH1418 THRU 1433X 40A-11	1,0 0	JET DRIVERS FW2-B11 (KALCMANU)					
T _{nt} + 43.5	00:54.5	CMD +X TRAN - ON				GH1419, 23X	1	JD 4D/3D OUTPUT			11.5 SEC		
						GH1427, 31X	1	JD 2D/1D OUTPUT					
						053U	1	ULLAGE CMD					
						40B-6	1	DAP-B6 (ULLAGER)					
T _{nt} + 51	01:02	CMD ENG ON				39B-5	1	FW1-B5 (ENG DVM)			11.5 SEC		
						GH1301X	1	DPS ON					
						GH1204X	1	AUTO ON					
						41A,91A -13,14	1,0	CH11-B13,14 (ENG ON, OFF)					
T _{nt} + 54	01:05	CMD +X TRAN - OFF				GQ6510P	8 PSIA	DPS TCP			11.5 SEC		
						GH1419, 23X	0	JD 4D/3D OUTPUT					
						GH1427, 31X	0	JD 2D/1D OUTPUT					
						053U	0	ULLAGE CMD					
						40B-6	0	DAP - B6 (ULLAGER)					
		ED BAT ACTIVATION - SAFE	005	005	65B	GY0111,2X	1	ED ARM A,B ON					

26
SEC
(10%)
T_{CO}
01:02

MISSION PHASE 4 (Concluded)

A. MISSION PHASE DETAILS (Concluded)

GET	MISSION PHASE TIME	FUNCTION	PRIME OCTAL	PRIME DECIMAL	RTC AVAIL- ABLE	TW/LGC WB-BIT	TM/BIT VALUE	TM OR LGC WD-BIT TITLE	VERIFICATION		BURNS		
									MCC-H	SITE	RCS	DPS	APS
$T_{nt} + 1:17$	01:28	INCREASE THROTTLE TO MAX				GH1331X GH6806 GQ6510P	100 % 92.5 % 92.5 %	AUTO THRUST CMD DPS VAR INJACT POS DPS TCP					
$T_{nt} + T_{co}$	T_{co} (TIME OF CUTOFF)	ENG OFF				39B-5 GH1301X GH1217X 41A, 91A -13, 14 GQ6510P	0 0 1 0.1 0	FW1-B5 (ENG DVM) DPS ON AUTO OFF CH11-B13,14 (ENG ON, OFF) DPS TCP					
$T_{nt} + (T_{co} + 2)$	$T_{co} + 00:02$	DV MONITOR DETECTS ENG OFF											
$T_{nt} (T_{co} + 5)$	$T_{co} + 00:05$	ENG SEL - DESC ARM OFF	227	151	01B	GH1348X 43A-B3	0 1	DPS ARM CH30-B3 (ENG ARM)					
		MAN THROTTLE RST (30%)	127	087		GH1311X	30%	MAN THRUST CMD					
$T_{nt} (T_{co} + 6)$	$T_{co} + 00:06$	SET MAX DEADBAND IN DAP				40B - 7	1	DAP-B7 (DBSLMX)					
$T_{nt} (T_{co} + 15)$	$T_{co} + 00:15$	DPS PQGS ARM 1 - OFF	365	245		GQ4103Q GQ3603Q	MAYBE A CHANGE FROM ON TO OFF	DPS OX 1 QTY DPS FU 1 QTY					
		DPS PQGS ARM 2 - OFF	325	213		GQ4104Q GQ3604Q		DPS OX 2 QTY DPS FU 2 QTY					
$T_{nt} (T_{co} + 16)$	$T_{co} + 00:16$	DSP PQGS ARM #1 - DISABLE	345	229									
		DSP PQGS ARM #2 - DISABLE	305	197									
$T_{nt} (T_{co} + 30)$	$T_{co} + 00:30$	AVERAGE G OFF				39B-1	0	FW1 - B1 (AVG)					
		POOH FLAG				39B-6	0	FW1 - B6 (POOH)					
		ENABLE PLATFORM COMPENSATION				40A-15	1	FW2 - B15 (DRIFT)					
		ENABLE TIMERS				40A-5	1	FW2 - B5 (MTI MR)					
		ENTER IDLING STATE PROG (POO)				50A (100A)		DSPTAB + 10D					

T_{co}
 1.05
 (10%)

4. LM-1 POST APS-2 FLIGHT TESTS (F/T) SUMMARY

TEST ACTIVITY	PRIORITY	Δ TIME
A. COMBINED SCS STABILITY/DIGITAL AUTO PILOT TESTS	2	
B. NAV VECTOR UPDATE	P	
C. TARGET UPDATE	P	
D. CLOCK UPDATE	P	
E. CMD. DESIRED ATT. (LGC) CONTROL	P	
F. BATTERY SELECT	5	
G. SWITCH S-BAND XMITTER	5	
H. SWITCH INVERTERS	5	
I. RCS DEPLETION *	1	
J. SCS STABILITY TESTS *	3	
K. TIMER UPDATE	P	
L. RCS +X HE. INGESTION/DAP TESTS *	3	
M. PRA OPERATION SEQ 16	7	
N. RCS THRUSTER COLD SOAK	4	
O. RCS HE./PROP CYCLE TEST *	4	
P. RCS THRUSTER HEAT SOAKBACK TEST	4	
Q. SECONDARY H2O FEED SELECT	6	
R. DCA TEST	8	
S. RTC DPS COMMANDS	9	
T. DAP MASS SENSITIVITY TEST	2	
U. CONSUMABLES DEPLETION	1	
V. SELECT LMP CONTROL	P	
<u>NOTE</u> "P" INDICATES THE ACTIVITY IS A GUIDO/GNC NORMAL PROCEDURE PROVIDED BY THE FCOH *DEPLETION OF PROPULSION ELECTRICAL AND ENVIRONMENTAL CONSUMABLES IS A PRIMARY TEST OBJECTIVE		

A. POST MISSION FLIGHT TEST DETAILS

REV	SITE	GET	APPROX SITE TEST START TIME	CMD INITIATOR	TEST NO.	FUNCTION/CMD	LMP CMD		RTC CMD'S	TM NUMBER	TM VALUE	TM TITLE	VERIFICATION		NOTES	COMMENTS
							OCT	DEC					MCC-H	SITE		
5	CRO		00:00	GUIDO	B	NAV VECTOR UPDATE										
			02:00		W	DEADBANDS UPDATE										
			03:30		V	SEL LMP CONTROL	044	036		GH1603X	0	DEADBAND SEL WIDE				
			04:15			RCS B1 CLSD	154	108		GR9668U	1	1B ISO CLSD				
			05:00		A	RCS B1 CLSD RESET	155	109								
			05:45			RCS B1 OPEN	034	028		GR9668U	0	1B ISO OPEN				
	HAW		06:30	GUIDO		RCS B1 OPEN RESET	035	029								
			00:00		A	RCS B 4 CLSD	310	200		GR9662U	1	4B ISO CLSD				
			00:45			RCS B 4 CLSD RESET	311	201								
			01:45			SEARCH PRA SEQ 7										
			03:15		C	TARGET UPDATE										
			04:45		D	CLOCK UPDATE										
6	STATES		00:00	EECOM	F	BAT 6 B/U SE			27A	GC4372X	1	BAT 6 B/U SE				
			00:10		G	PRI S-BAND OFF			30A	GT0992B, 4V GT0201E	0/-15* 0	S-BND ST PH/SG STR S-BND PWR AMP				
			00:20			SEC S-BND ON			20A	GT0992B, 4V GT0201E	4/VAR 16W	S-BND ST PH/SG STR S-BAND PWR AMP				
			00:30		H	INVERTER #2 SEL			16A	GC0071V GC0155V	115V 400 CPS	AC BUS VOLT AC BUS FREQ				
			02:00	GUIDO		KAL ATT MANU FLAG 2 UPDATE										
			03:00			ACCESS KALC ROUTINE										
			04:00			UPDATE DESIRE ATT/EXEC										
			05:00	GNC		GUIDANCE SEL AGS			40B	GH1621X	1	AGS SEL				
			06:00			GUIDANCE SEL PCWS			41B	GH1621X	0	AGS SEL				
			07:30	GUIDO		RCS A2 CLSD	250	168		GR9665U	1	2 A ISO CLSD				
			08:15		A	RCS A2 CLSD RESET	251	169								
			10:15			RCS B4 OPEN	270	184		GR9662U	0	4B ISO CLSD				
			11:00			RCS B4 OPEN RESET	271	185								
			12:00			ENABLE CAP DEADBAND 1* UPDATE										
			13:00			KAL ATT MANU FLAG 2 UPDATE										
			14:00			ACCESS KALC ROUTINE										
			15:00			UPDATE DESIRE ATT/EXEC										
	CRO		00:00	GUIDO		+ X TRANSLATION ON	200	128								
			04:00			+ X TRANSLATION OFF	201	129								
			04:15	GNC		MAIN B CLOSED			54A	GR9610	1	RCS MAIN B CLSD				
			04:30		I	MAIN B CLOSED RESET			55A							
			05:15	GUIDO		X-FEED OPEN	374	252		GR9613	1	A/B X-FEED OPEN				
			06:00			X-FEED OPEN RESET	375	253								

Page 2 of 3

A. POST MISSION FLIGHT TEST DETAILS (CONT'D)

REV	SITE	GET	APPROX SITE TEST TIME	CMD INITIATOR	TEST NO.	FUNCTION/COMMAND	LMP CMD		RTC CMD	TM NO.	TM VALUE	TM TITLE	VERIFICATION		NOTES	COMMENTS
							OCT	DEC					MCC-H	REMOTE SITE		
6	HAW	GUIDO	00:00			RCS B 1 CLOSE	154	100		GR9600U		RCS B 1 CLOSE				
			00:45			RCS B 1 CLOSE RESET	155	100								
			02:15			EXECUTE KALC MANUEVER										
			03:15			GUIDANCE SEL AGS			400	GH1621X	1	AGS SEL				
			04:15			GUIDANCE SEL PGMS			410	GH1621X	0	AGS SEL				
		CNC	05:00			RCS B1 OPEN	034	020								
			05:45			RCS B 1 OPEN RESET	035	020								
			06:45			DEADBAND 1" UPDATE										
			08:15			LOC CLOCK UPDATE										
			09:45													
7	STATES	GUIDO	00:00			X-FEED CLSD	376	254		GR9613U	0	A/B X-FEED OPN				PHASE I: LOW PROP PRESS - NO H ₂ O INGESTION
			00:45			X-FEED CLSD RST	377	255								
			01:30			X-FEED OPN	374	252		GR9613U	1	A/B X-FEED OPN				PHASE II: RCS OPERATION WITH H ₂ O INGESTION ON HEAVY DUTY CYCLE
			02:15			X-FEED OPN RST	375	253								
			03:00			X-FEED CLSD	376	254		GR9613U	0	A/B X-FEED OPN				
			03:45			X-FEED CLSD RST	377	255								
			04:30			ASC FEED ARM	176	126								
			05:15			ASC FEED B OPN	076	062		GR9612U	1	ASC FEED B OPN				
			06:00			ASC FEED B OPN RST	077	063								
			06:45			ASC B FEED CLSD	116	070		GR9612U	0	ASC FEED B OPN				PHASE III: RCS OPERATION WITH H ₂ O INGESTION ON HEAVY DUTY CYCLE
		CNC	07:30			ASC B FEED CLSD RST	117	070								
			08:15			X-FEED OPN	374	252		GR9613U	1	A/B X-FEED OPN				
			09:00			X-FEED OPN RST	375	253								
			09:45			+ X TRAN ON	200	120		GH1419,23X GH1427,31V GH1419,23V GH1427,31V	1 1 0 0	J/D 40/30 OUTPUT J/D 20/10 OUTPUT J/D 40/30 OUTPUT J/D 20/10 OUTPUT				RCS PROP REQ'D: 37 LBS
			10:30			+ X TRAN OFF	201	120								
		GUIDO	12:30			MASS UPDATE #1						JET DRIVERS				
			14:00			MASS UPDATE #2						JET DRIVERS				
			15:30			MASS UPDATE #3						JET DRIVERS				
			17:00			MASS UPDATE #4						JET DRIVERS				
			18:00			MASS UPDATE #5						JET DRIVERS				
		CNC	00:00			GUIDANCE SEL AGS			400	GH1621X	1	AGS SEL				
			00:15			DEADBAND SELECT (MAX)			750							
			01:30			DEADBAND SELECT (MIN)			740							
			02:30			GUIDANCE SEL PGMS			410	GH1621X	0	AGS SEL				
			03:30			RCS B2 CLSD	170	120		GR9665U	1	RCS B 2 CLOSE				
8	HAW	ECON	04:15			RCS B2 CLSD RST	171	121								
			05:00			SEC H ₂ O FEED			600							
			05:45			SEC H ₂ O ENABLE			440							
			06:30			SEC H ₂ O RESET			450							
			07:15			SEC H ₂ O ENABLE RESET			610							

LM-1 DATA BOOK R-A

07:30 | RCS ZA OPEN | 230(152)
 08:15 | RCS ZA OPEN RST | 231(153)

PRIME RLY RST | 34B
 PRIME RLY OFF | 35B

05:00 | RCS A2 CLOSE | 250(168)
 05:45 | RCS A2 CLOSE RST | 251(169)

A. POST MISSION FLIGHT TEST DETAILS (CONCLUDED)

REV	SITE	GET	APPROX SITE TEST START TIME	CMD INITIATOR	TEST NO.	FUNCTION/COMMAND	LMP CMD'S		RTC CMD'S	TM NUMBER	TM VALUE	TM TITLE	VERIFICATION		NOTE	COMMENTS
							OCT	DEC					MCC-H	SITE		
8	STATES		00:00	GUIDO	0	ASC B FEED OPEN	076	062		GR9612V	1	ASC FEED B OPN				
		00:45	ASC B FEED OPEN RESET			077	063									
		01:30	+ X TRANSLATION ON			200	128		GH1419, 23X GH1427, 31V	1	JET DRIVERS JET DRIVERS					
		02:00 01:45	PRIME RELAY RESET					348	GH1419, 23X GH1427, 31V	0 0	JET DRIVERS JET DRIVERS					
		02:15	GNC		PRIME RELAY OFF			358								
		03:00			ASC B FEED CLOSE	116	078		GR9612V	0	ASC FEED B OPN					
		03:45	GUIDO		ASC B FEED CLOSE RESET	117	079									
		04:45			+ X TRANSLATION ON	200	128		GH1419, 23X GH1427, 31V 053U	1 1 1	JET DRIVERS JET DRIVERS ULLAGE CMD					
		05:00			PRIME RELAY RESET			348	GH1419, 23X GH1427, 31V 053U	0 0 0	JET DRIVERS JET DRIVERS ULLAGE CMD					
		05:30			PRIME RELAY OFF			358								
		06:15	GUIDO		ASC FEED RESET ARM	176	128									
8	HAW		00:00	GNC	N	GUIDANCE SEL AGS			408	GH1621X	1	AGS SEL				PCNS SEL REMOVES PRA FROM LINE BUT ALLOWS PRA TO RUN THRU SEQUENCE END
		00:30	GUIDO	PRA 7 START												
		00:45	GNC	GUIDANCE SEL PNGS				418	GH1621X	0	AGS SEL					
		01:00		SELECT AGS				408	GH 1621X	1	AGS SEL					
		01:45	GUIDO		+ X TRANSLATION ON	200	126		GH1419, 23X GH1427, 31V 053U	1 1 1	JET DRIVER JET DRIVER ULLAGE CMD					
		02:00	GNC		PRIME RELAY RESET			348	GH1419, 23X GH1427, 31V	0 0	JET DRIVER JET DRIVER					
		02:15			PRIME RELAY OFF			358								
		03:15			MASS UPDATE #1											
		04:15			MASS UPDATE #2											
		05:15			MASS UPDATE #3											
		06:15			MASS UPDATE #4											
		07:00			DPS REG 1 CLSD			14A	GQ3309X	1	DPS He 1 CLSD					
		07:15			DPS REG 1 CLSD RESET			15A								
		07:30			DPS REG 2 OPEN			42A	GQ3310X	1	DPS He 2 OPN					
		07:45			DPS REG 2 OPN RESET			43A								
		08:00			DPS ARM			00B	GH1348X	1	DPS ARM					
		08:15			ENGINE START			14B	GQ0510P GH1301X, 1286X	1 1	DPS TCP DPS ON, ENG FIRE OVERRIDE					
		08:30			DPS ARM RESET			01R	GH1348X	0	DPS ARM					
		08:45			ENGINE START RESET			15B	GQ0510P GH1301X GH1286X	0 0 0	DPS TCP DPS ON ENG FIRE OVERRIDE					
		09:00			DCA SELF TEST			514	GT0441X	TST MAP	DCA STATUS					
		09:15			DECODER A INHIBIT			504								
		09:30			DFICAL ON			54B	GL4221X	1	DFICAL					
		09:45			DFICAL OFF			55B	GL4221X	0	DFICAL					
		10:00			DCA ENABLE			500	GT0441X	TST MAP	DCA STATUS					
		10:15			DECODER B INHIBIT			510	GT0441X	TST MAP	DCA STATUS					
		10:30			DFICAL ON			54B	GL4221X	1	DFICAL					
		10:45			DFICAL OFF			55B	GL4221X	0	DFICAL					
		11:00			DECODER A INHIBIT			504	GT0441X	TST MAP	DCA STATUS					
		11:15			DCA ENABLE			500	GT0441X	TST MAP	DCA STATUS					
11:30	DCA SELF TEST					514	GT0441X	TST MAP	DCA STATUS							

LM-1 DATA BOOK R-A

02:15 ASC FEED ARM
176 (126)

A. POST MISSION F/T DETAILS (Concluded)

II. CONTINGENCY

1. ALTERNATE MISSIONS AND TEST PLAN ALPHA

ALT MISS NO.	ALTERNATE MISSION FUNCTIONS	ALT MISS NO.	ALTERNATE MISSION FUNCTIONS	ALT MISS NO.	ALTERNATE MISSION FUNCTIONS
A (LM/SLA SEP FAILURE UNDER PGNS)	A. SEND GUID SEL AGS 40B B. UTILIZE APPROPRIATE PRA SEP SEQUENCE OR SEPARATE WITH PGNS, IF FEASIBLE, AT BEST OPPORTUNITY: 1. SEQ I, IF RCS PRESS, HAS <u>NOT</u> BEEN COMPLETED. 2. SEQ II, IF RCS PRESS, <u>HAS</u> BEEN COMPLETED. C. CONTINUE MISSION	G (PCA PWR FAIL)	A. STAY IN LGC CONTROL B. LGC PRIME & PRA CMD CAPABILITY IS LOST & THE MISSION MUST BE PERFORMED BY BACKING UP LGC CMD'S BY RTC'S. LOSS OF PCA RESULTS IN THE FOLLOWING: 1. NO PGGS 2. DPS ENG STARTS AT 30% THROTTLE 3. NO INTERCONNECT FEED ROUTINE LAUNCH PHASE C. 1. AT 00:03:00 SEND: a. PRI H ₂ O FEED 24A b. PRI H ₂ O FEED RST 25A D. MP7, S-IVB/LM SEP 1. PRIOR TO SEP SEND: a. RCS MAIN A OPEN 50A b. RCS MAIN A RST 51A c. RCS MAIN B OPEN 60A d. RCS MAIN B RST 61A e. MASTER ARM ON 64B f. RCS PRESS FIRE 70B g. RCS PRESS RST 71B h. MASTER ARM OFF 65B 2. DURING MP-7 AND PRIOR TO +X ON SEND: a. LM/SLA SEP ARM 46A 3. AT +X TRANS ON SEND: a. LM/SLA FIRE 62A b. LM/SLA SEP ARM RST 47A c. LM/SLA SEP FIRE RST 63A E. MP9, DPS 1 1. IN MP9 & PRIOR TO "ENG ON" SEND: a. MASTER ARM ON 64B b. DPS ARM 00B 2. AT BURN TERMINATION SEND: a. MASTER ARM OFF 65B b. DPS RST 01B F. MP 11, DPS 2/FITH/APS-1 1. IN MP 11 & PRIOR TO "ENG ON" SEND: a. BAT. 5 B/U CDR 36A b. DPS ARM 00B c. ABORT STAGE ARM 70A 2. AT END OF RANDOM THROTTLE SEND: a. ABORT STAGE FIRE 40A 3. AT APS 1 BURN TERMINATION SEND: a. ABORT STAGE ARM RST 71A b. ABORT STAGE FIRE RST 41A c. DPS RST - 01B G. MP-13, APS 2 1. IN MP 13 AND PRIOR TO "ENG ON" SEND: a. ABORT STAGE ARM 70A b. ABORT STAGE FIRE 40A 2. AT APS-2 BURN TERMINATION SEND: a. ABORT STAGE ARM RST 71A b. ABORT STAGE FIRE RST 41A	H (CES PWR FAIL)	A. STAY IN LGC CONTROL AND ATTEMPT TO RETARGET MP-13. B. LOAD VEH MASS. C. CALL UP MP-13 (P46). D. SEND: ABORT STAGE ARM 70A ABORT STAGE FIRE 40A E. WHEN +X TRAN IS DETECTED SEND: ENG START O/R 14B 15B ENG RST F. ASC ENG WILL BURN TO DEPLETION AND INTERCONNECT TEST WILL BE PERFORMED.
B (LIFETIME CON-STRAINT)	A. SEND GUID SEL AGS 40B B. EXECUTE PRA SEQ IV, ASAP C. IF SYS ARE STILL "GO, EXECUTE PRA SEQ V, ASAP.			I	A. CONTINUE MISSION THRU MP 11 B. IMMEDIATELY FOLLOWING MP 11, CALL PRA SEQ V, C. SEND GUID SEL AGS 40B D. EXECUTE PRA SEQ V
C	A. CONTINUE MISSION THRU NORMAL SEP IF POSSIBLE. NOTE: IF LGC "NO GO" REMAIN ATTACHED TO S-IVB UNTIL TIME FOR EXECUTION OVER CONUS. B. CALL PRA SEQ III, AT FIRST OPPORTUNITY C. SEND GUID SEL AGS 40B D. EXECUTE PRA SEQ III, AT BEST OPPORTUNITY			J	A. CALL PRA SEQ XV, AT FIRST OPPORTUNITY B. SEND GUID SEL AGS 40B C. EXECUTE PRA SEQ XV ASAP D. CONTINUE MISSION: 1. APS BURN TO DEPLETION UNDER LGC CONTROL, IF POSSIBLE 2. CALL AND EXECUTE PRA SEQUENCE V, IF LGC CANNOT BE USED
D (SLA DEPLOY/ RCS PRESS FAILURE)	A. SEND MISSION IDLE B. CONTINUE MISSION IN UNSEP CONDITION C. EXECUTE SYSTEMS TEST PLAN ALPHA			K	A. CALL PRA SEQ V, AT FIRST OPPORTUNITY B. SEND GUID SEL AGS 40B C. EXECUTE PRA SEQ V, ASAP
E (LM/SLA SEP FAILURES)	A. SEND MISSION IDLE B. BSE CMD "EARTH RATE POSIGRADE" FOLLOWING PASSIVATION TEST C. SEND GUID SEL AGS 40B D. CALL AND EXECUTE PRA SEQ XV, OVER CONUS E. PERFORM APS BURN TO DEPLETION ON NEXT CONUS PASS AS APPLICABLE: 1. UNDER LGC CONTROL IF POSSIBLE 2. CALL AND EXECUTE PRA SEQUENCE V, IF LGC CANNOT BE USED.			L (DPS/RCS PRESS CON-STRAINT)	A. CONTINUE MISSION THRU MP-9 B. RETARGET DPS 2 FOR NOMINAL EXECUTION C. 15 SECONDS AFTER DPS 2 THRUST REACHES MAXIMUM SEND: * 1. ABORT STAGE ARM 70A 2. ABORT STAGE FIRE 40A D. PERFORM APS BURN TO DEPLETION ON NEXT CONUS PASS AS APPLICABLE: 1. UNDER LGC CONTROL IF POSSIBLE 2. a. CALL PRA SEQ V b. SEND GUID SEL AGS 40B c. EXECUTE PRA SEQ V
F (H _p < 75 N.M.)	A. CONTINUE MISSION THRU NORMAL SEPARATION B. SEND MISSION IDLE C. EXECUTE MP9 (DPS-1) ASAP D. RETARGET DPS 2 FOR EXECUTION AT NOMINAL TIME E. CONTINUE MISSION			FTA (LIFETIME CON-STRAINT)	BETWEEN T + 7:20 AND T + 9:00, FIDO CMD. A. SLV ABORT B. S/C SOS (LGC SOS, IF POSSIBLE)

* NOTE: FOR RULE 15-8B, ABORT STAGE ARM 70A AND ABORT STAGE 40A COMMANDS WILL BE SENT PRIOR TO DPS IGNITION.

TEST PLAN ALPHA is used if either the nose cap fails to deploy or the SLA panels fail to open by either primary or alternate modes. It is intended to accomplish tests possible while remaining within the SLA followed by a fith within the SLA.

Page 1 of 2

REV 1

1. PRIOR TO SEP AND RCS PRESS. - INHIBIT NORMAL MP-7 BY:
 - A. GUIDANCE SELECT AGS ☐ 40B
2. AFTER MP-7 TIME COMPLETED FORCE LGC INTO DAP IDLE BY:
 - A. AUTO ON ☐ 30B
 - B. ATT HOLD ☐ 24B
 - C. GUIDANCE SELECT PGNS ☐ 41B

REV 2

1. THE S-IVB PASSIVATION EXPERIMENT WILL BE EXECUTED.
2. ON THE SECOND STATESIDE PASS THE LGC DAP IS ENABLED BY:
 - A. AUTO ENABLE ☐ 25B (IF ISS FAILED OMIT THIS STEP)
3. CALL UP AND EXECUTE PRA SEQ VII, RCS ISOLATION ROUTINES (3) GUID SELECT AGS ☐ 40B
 - A. DFI AND PCM IS RECORDED DURING THIS MODE FOR POSTFLIGHT ANALYSIS.
 - B. THE OPERATION OF THE PRA IS TESTED.
 - C. GUID SEL PGNS ☐ 41B
 - D. THE LGC RESPONSE TO JET FAIL ISOLATION INPUTS IS CHECKED.
 - E. CALL UP AND EXECUTE 1ST ROUTINE OF PRA SEQ VII, RCS ISOLATION ROUTINES (3) GUID SELECT AGS ☐ 40B
 - F. GUID SELECT PGNS ☐ 41B
4. PRIOR TO LOS RETURN THE LGC TO DAP IDLE BY:
 - A. ATT HOLD ON ☐ 24B

REV 3

TO END OF MISSION

1. ON THE THIRD STATESIDE PASS PERFORM DSC ENG GIMBAL DRIVE TEST: (THIS TEST IS MORE VALID IF S-IVB HAS A SMALL TUMBLE RATE SINCE THE GDA IS DRIVEN IN THIS TEST BY THE RATE GYROS IN THE CES)
 - A. GUIDANCE SELECT AGS ☐ 40B
 - B. ENG STOP O/R ☐ 10B
 - C. DPS ARM ☐ 00B
 - D. OBSERVE GDA DRIVE RESPONSE.
 - E. INVERT 2 SEL ☐ 16A IS SENT TO OBSERVE GIMBAL FAIL INDICATIONS
2. PRIOR TO LOS RETURN TO PGNS CONTROL AND DEARM THE DSC ENG.
 - A. GUIDANCE SELECT PGNS ☐ 41B
 - B. DPS ARM OFF ☐ 01B
3. IF TIME PERMITS PERFORM DSC ENG THROTTLE TEST. CANNOT BE PERFORMED WITHOUT LGC.
 - A. ENG STOP O/R ☐ 10B
 - B. DPS ARM ☐ 00B
 - C. TRANSMIT VIA V67E LGC UPLINK THE FOLLOWING THROTTLE CMDS:
 - (1) MANUAL THROTTLE -100% ON ☐ 346
 - (2) MANUAL THROTTLE -100% OFF ☐ 347
 - (3) MANUAL THROTTLE -50% ON ☐ 146
 - (4) MANUAL THROTTLE -50% OFF ☐ 147
 - (5) MANUAL THROTTLE -30% ON ☐ 277
 - (6) MANUAL THROTTLE -10% ON ☐ 126
 - D. DPS ARM OFF ☐ 01B

4. PERFORM THE FOLLOWING ELECTRICAL SYSTEM TEST.

A. ARM AND DEARM THE PYRO BUS

- (1) PRIME RLY RST 34B 35B
- (2) MASTER ARM ON 64B
- (3) MASTER ARM OFF 65B

B. REMOVE BAT. #2 FROM CDR BUS

- (1) BAT. #2 OFF 22A

C. PUT BAT. #5 ON CDR BUS

- (1) BAT. #5 B/U CDR 36A

D. REMOVE BAT. #3 FROM CDR BUS

- (1) BAT. #3 OFF 37A

5. PERFORM THE FOLLOWING COMM TEST.

A. CYCLE THE DFI CAL ON AND OFF

- (1) DFI CAL ON 54B
- (2) DFI CAL OFF 55B

6. PERFORM THE FOLLOWING PROPULSION TESTS

A. DISABLE PRA +X CAPABILITY

- (1) +X INHIBIT 21B

B. VERIFY TM AND SYSTEM RESPONSE TO RTC'S ON THE FOLLOWING CMDs.

- (1) DPS REG 1 CLSD 34A
- (2) DPS REG 1 CLSD RST 35A
- (3) DPS REG 2 OPEN 42A
- (4) DPS REG 2 OPEN RST 43A

7. THE LAST TEST OF TEST PLAN ALPHA WILL BE THE ACTIVE FIRING PHASE FOR DFI AND POSTFLIGHT DATA.

A. SET UP LGC FOR ON/OFF DAP CONTROL

- (1) AUTO ON 30B
- (2) ATT HOLD 24B
- (3) GUIDANCE SELECT PGMS 41B

B. CONFIGURE THE RCS SYSTEM

- (1) RCS MAIN A OPEN 50A
- (2) RCS MAIN A OPEN RST 51A
- (3) RCS MAIN B OPEN 60A
- (4) RCS MAIN B OPEN RST 61A
- (5) MASTER ARM ON 64B
- (6) RCS PRESS. FIRE 70B

C. FIRE THE RCS SYSTEM AT 1 SEC INTERVALS FOR TEST DATA BY CYCLING THE DAP ON AND OFF. CANNOT BE PERFORMED WITHOUT LGC.

- (1) ATT HOLD 24B
- (2) AUTO ENABLE 25B
- (3) REPEAT SETS (1) AND (2) AS TIME ALLOWS

D. RECONFIGURE THE RCS SYSTEM

- (1) RCS MAIN A CLSD 44A
- (2) RCS MAIN A CLSD RST 45A
- (3) RCS MAIN B CLSD 54A
- (4) RCS MAIN B CLSD RST 55A

E. FIRE THE RCS SYSTEM AT 1 SEC INTERVALS TO TEST RCS FIRING AT LOW MANIFOLD PRESSURES

- (1) ATT HOLD 24B
- (2) AUTO ENABLE 25B
- (3) REPEAT SETS (1) AND (2) AS TIME ALLOWS

F. RECONFIGURE RCS SYSTEM

- (1) RCS MAIN A OPEN 50A
- (2) RCS MAIN A OPEN RST 51A
- (3) RCS MAIN B OPEN 60A
- (4) RCS MAIN B OPEN RST 61A

G. INHIBIT PRESSURIZING THE APS HE.

- (1) APS HE. 1 INHIBIT 74A NO TM VERIFICATION ON THIS CMD.
- (2) APS HE. 2 INHIBIT 75A NO TM VERIFICATION ON THIS CMD.

H. CALL UP AND EXECUTE PRA SEQ XV, 60 SEC APS, TO DO A FIFTH BLOWDOWN BURN IN THE SLA.

- (1) DPS ARM OFF 001B IF NECESSARY

2. PRA SEQUENCES SUMMARY

SEQUENCE NO.	I	II	III	IV	V	VII	XV	XVI	TEST
SEARCH TIME (ΔT) (SECONDS)	1.62	1.00	6.40	3.10	3.40	2.10	0.75	1.50	10
* OF FRAMES	13	8	51	25	27	17	6	12	80
SEQUENCE TITLE	NOMINAL SEP	NO PRESS SEP	MRS (SEP)	SOS	NO DPS/ FIFTH APS DEPL	RCS ISO ROUT(3)	60 SEC APS	INTERCONNECT CLOSE	
TIME DURATION	01:04	01:02	5:25	01:24	02:57	02:24	01:17	00:10	
FUNCTIONS									
1. S-BAND RANGE	X	X	X		X		X		
2. RCS PRESS ROUTINE	X		X	X					
3. STD SEP/TRANS MANV	X	X	X	X					
4. DPS BURN 1/COAST			33/32 SEC	26/5 SEC					
5. DPS BURN 2			28 SEC	10 SEC			6 SEC		
6. ULLAGE					12 SEC				
7. ABORT STAGE			X	X	X		X		
8. APS BURN 1/COAST			60/40 SEC	10/3 SEC	60/10 SEC		60 SEC		
9. ULLAGE					16 SEC				
10. APS BURN 2			RTC TERM	5 SEC	TO DEPLETION				
11. ASC INTERCONNECT TEST			X		X				
12. RCS MANIFOLD RECONFIG								X	
13. S-BAND ENABLE	X	X	X	X	X		X		
14. RCS A/B OPEN						X			
15. RCS A CLOSE						X			
16. RCS B CLOSE						X			

PRA SUMMARY NOTES

PRA STATE	COMMAND RECEIVED	PRA RESPONSE
READ	FWD OR REV SEARCH	NO CHG - PRA IGNORES SEARCH CMDS IN READ MODE
FWD OR REV SEARCH	READ	NO CHG - PRA IGNORES SEARCH CMDS IN SEARCH CAN REV DIRECTION BY SENDING OTHER SEARCH CMD
FWD SEARCH	STOP	TAPE CONTINUES TO START OF TAPE, NO COMPARE PULSE GENERATED
REV SEARCH	STOP	TAPE CONTINUES TO START OF TAPE, NO COMPARE PULSE GENERATED
NO SEARCH ALL ZEROS SET WORD	NONE	PRA STOPS AT END OF TAPE, IN ALL OTHER CONDITIONS PRA WILL REWIND TO START OF TAPE.
STATE	INITIATE INFO RE 7 = 1	TIME WORD IN PRA WILL NOW HAVE WHAT IS IN INFO BITS 1-6

A. PRA DETAILS

2.4 RTC COMMAND BACKUP

A. NO LIFETIME CONSTRAINT:

1. NO BACKUP RTC'S WILL BE TRANSMITTED DURING THE SEQUENCE.
2. INHIBIT LINES, SPECIFIED IN EACH SEQUENCE, WILL BE USED TO DETERMINE POINTS AT WHICH A SEQUENCE WILL BE TERMINATED.
3. TERMINATION OF A SEQUENCE WILL BE ACCOMPLISHED BY SENDING:
 - a. GUID SEL AGS 40B
 - b. PRIME RLY RESET 34B
 - c. PRIME RLY OFF 35B
4. AFTER TERMINATION OF A SEQUENCE AT AN INHIBIT LINE, AN EVALUATION WILL BE CONDUCTED AS TO THE CAUSE OF THE FAILURE AND A COMMAND PLAN WILL BE GENERATED AND IMPLEMENTED AS MISSION OBJECTIVES DICTATE.

B. LIFETIME CONSTRAINT:

1. BACKUP COMMANDS WILL BE TRANSMITTED DURING THE SEQUENCE AS SPECIFIED IN THE CONTINGENCY B/U RTC'S COLUMN. PROCEDURES WILL BE COVERED IN THE NOTES.
2. INHIBIT LINES SPECIFIED IN EACH SEQUENCE WILL NOT BE USED.

2.5 GENERAL NOTES

A. TO ESTABLISH S-BAND COMMUNICATIONS SEND:

1. PRI S-BND OFF 30A
2. SEC S-BND ON 20A
3. S-BND RNG ON 042

B. TO RESET A PRIME RELAY SEND AFTER THE SEQUENCE:

1. PRIME RLY RESET 34B
2. PRIME RLY OFF 35B

C. TO RESET A RTC, THE CORRESPONDING RESET RTC MUST BE SENT.

A. PRA DETAILS (Cont'd)

I NOMINAL SEPARATION

(111111) (17:55:12)

NOTES FOR PRA SEQUENCE I	
1. LM/SLA SEP ARM AND LM/SLA SEPFIRE COMMANDS WILL NOT BE BACKED UP DURING THIS SEQUENCE. IF THESE COMMANDS FAIL TO OPERATE SEND: (A) GUID SEL AGS 40B (B) PRIME RLY RESET 34B (C) PRIME RLY OFF 35B (D) PRA SEQ II INITIATE (E) PRA FORWARD SEARCH (F) LM/SLA SEP ARM 46A (G) PRA START (H) AT CONFIRMATION OF +X TRANS ON SEND: LM/SLA SEP FIRE 52A	2. ONLY TWO OF THE RCS PRESSURIZATION COMMANDS WILL BE BACKED UP. IF MORE THAN TWO LMI COMMANDS FAIL TO FUNCTION SEND: (A) GUID SEL AGS 40B (B) RCS MAIN A OPEN 50A (C) RCS MAIN B OPEN 60A (D) MASTER ARM ON 64B (E) RCS PRESS FIRE 70B (F) PRA START

TIME	FUNCTION	CONTINGENCY		AVAILABLE RTC'S	LMP CMD NO.	TM VERIFICATION			BURNS		
		B/U RTC'S	NOTES			MEAS ID	TITLE	CUE	RCS	DPS	APS
00:00	PRI S-BND ENABLE			31A	212	GT0994V	RCVR SIG	-4V			
00:01	RCS MAIN A OPEN RCS MAIN B OPEN MASTER ARM ON	50A 60A 64B	2 2 2	50A 60A 64B	274 276 004	GR9609U GR9610U GY0111X GY0112X	A MAIN CL B MAIN CL ED ARM A ON ED ARM B ON	0 0 0 0			
00:02	RCS MAIN A OPEN RESET RCS MAIN B OPEN RESET			51A 61A	275 277						
00:03	RCS PRESS FIRE	70B	2	70B	006	GR2201P GR2202P GR3201P GR3202P	A FU P B FU P A OX P B OX P	179 P 179 P 179 P 179 P			
00:04	RCS PRESS RESET	NO PRESS		71B	007						
00:33	MASTER ARM OFF	39 SEC TO +X TRANS		65B	005						
00:43	+X TRANS ON			---	200	GH1419V GH1423V GH1427V GH1431V	JD 4D OUT JD 3D OUT JD 2D OUT JD 1D OUT	1 1 1 1			
00:47	LM/SLA SEP ARM		1	46A	072						
00:48	LM/SLA SEP FIRE		1	62A	132	GL4222X KL45-900 KL46-900	LM/SLA SEP LM/S SEP A LM/S SEP B	0 1 1			
00:53	+X TRANS OFF LM/SLA SEP ARM RESET LM/SLA SEP FIRE RESET			---	201 073 133		+X JD'S	0			
00:58	+X TRANS ON			---	200		+X JD'S	1			
01:03	+X TRANS OFF	34B PRIME RLY RESET		---	201		+X JD'S	0			
01:04	S-BND RNG ON			---	042						

A. PRA DETAILS (Cont'd)

II NO VENT SEPARATION

(111110) (17:38:08)

NOTES FOR PRA SEQUENCE II

1. LM/SLA SEP ARM AND LM/SLA SEP FIRE COMMANDS WILL NOT BE BACKED UP DURING THIS SEQUENCE. IF THESE COMMANDS FAIL TO OPERATE SEND:

- (A) GUID SEL AGE 40B
- (B) PRIME RLY RESET 34B
- (C) PRIME RLY OFF 35B
- (D) PRA SEQ II INITIATE
- (E) PRA REVERSE SEARCH
- (F) LM/SLA SEP ARM 46A
- (G) PRA START
- (H) AT CONFIRMATION OF +X TRANS ON SEND:
LM/SLA SEP FIRE 62A

TIME	FUNCTION	CONTINGENCY		AVAILABLE RTC'S	LMP CMD NO.	TM VERIFICATION			BURNS		
		B/U RTC'S	NOTES			MEAS ID	TITLE	CUE	RCS	DPS	APS
00:00	+X TRANS ON			---	200	GH1419V GH1423V GH1427V GH1431V	JD 4D OUT JD 3D OUT JD 2D OUT JD 1D OUT	1 1 1 1	↑ 10 SEC ↓		
00:01	PRI S-BND ENABLE			---	212	GT0994V	RCVR SIG	-4 VDC			
00:04	LM/SLA SEP ARM		1	46A	072						
00:05	LM/SLA SEP FIRE		1	62A	132	GL4222X KL45-900 KL46-900	LM/SLA SEP LM/SLA SEP A LM/SLA SEP B	0 1 1			
00:10	+X TRANS OFF LM/SLA SEP ARM RESET LM/SLA SEP FIRE RESET			---	201 47A 63A		+X JD'S	0	↑ 5 SEC ↓		
00:15	+X TRANS ON			---	200		+X JD'S	1			
00:20	+X TRANS OFF	34B PRIME RLY RESET		---	201		+X JD'S	0			
01:02	S-BND RANGE ON			---	042						

III MINIMUM REQUIREMENTS SEQUENCE (INCLUDING SEPARATION)

(111101) (17:21:04)

NOTES FOR PRA SEQUENCE III	
1. IF TIME PERMITS, RCS PRESSURIZATION AND LM/SLA SEPARATION WILL BE ACCOMPLISHED PRIOR TO STARTING THIS SEQUENCE.	(E) FOR SEPARATION
2. IF TIME PERMITS SEND PRIOR TO PRA START:	(1) PRA SEQ II INITIATE
(A) LAT 5 B/U CDR 56A	(2) PRA REVERSE SEARCH
(B) MASTER ARM ON 64B	(3) LM/SLA SEP ARM 46A
3. IF PRESSURIZATION AND SEPARATION HAVE NOT BEEN CONFIRMED PRIOR TO 00:35 SEND:	(4) PRA START
(A) GUID SEL AGC 40B	(5) AT CONFIRMATION OF +X TRANS ON SEND: LM/SLA SEP FIRE 62A
(B) PRIME RLY RESET 54B	(F) INITIATE AND START PRA SEQUENCE III MRS OR SEQUENCE IV SOS AS TIME ALLOWS.
(C) PRIME RLY OFF 55B	4. THESE FUNCTIONS ARE NOT APPLICABLE TO THE LM-1 VEHICLE
(D) AS REQUIRED FOR PRESSURIZATION:	5. IF NO INDICATION OF TCP DURING FIRST DPS BURN, AT VERIFICATION OF +X TRANS ON DURING THE SECOND DPS BURN, SEND:
(1) RCS MAIN A OPEN 50A	(A) ENG STOP DIS 72A
(2) RCS MAIN B OPEN 60A	(B) ENG START 14B
(3) MASTER ARM ON 64B	(C) ENG RESET 15B
(4) RCS PRESS FIRE 70B	6. IF EITHER ASC FEED VALVE A OR B FAILS TO OPEN, SEND AS APPROPRIATE:
	(A) RCS MAIN A OPEN 50A
	(B) RCS MAIN B OPEN 60A

TIME	FUNCTION	CONTINGENCY		AVAILABLE RTC'S	LMP CMD NO.	TM VERIFICATION			BURNS		
		B/U RTC'S	NOTES			MEAS ID	TITLE	CUE	RCS	DPS	APS
00:00	PRI S-BND ENABLE			31A	212	GT0994V	RCVR SIG	-4V			
00:01	MASTER ARM ON		2	64B	004	GY0111X	ED ARM A ON	0			
	RCS MAIN A OPEN			50A	274	GR9609U	A MAIN CL	0			
	RCS MAIN B OPEN			60A	276	GR9610U	B MAIN CL	0			
00:03	RCS PRESS FIRE		3	70B	006	GR2201P	A FU P	179 P			
						GR2202P	B FU P	179 P			
						GR3201P	A OX P	179 P			
						GR3202P	B OX P	179 P			
00:04	RCS PRESS RST			71B	007						
00:05	+X TRANS ON			---	200	GHL19V	JD 4D OUTPUT	1			
						GHL23V	JD 3D OUTPUT	1			
						GHL27V	JD 2D OUTPUT	1			
						GHL31V	JD 1D OUTPUT	1			
00:10	LM/SLA SEP ARM		3	46A	072						
	LM/SLA SEP FIRE			62A	132	GL4222X	LM/SLA SEP	0			
						K145-900	LM/SLA SEP A	1			
						K146-900	LM/SLA SEP B	1			
	RCS MAIN A OPEN RST			51A	275						
	RCS MAIN B OPEN RST			61A	277						
00:15	LM/SLA SEP ARM RST			47A	073						
	LM/SLA SEP FIRE RST			63A	133						
	+X TRANS OFF			---	201		+X JD'S	0			
00:16	DPS HE PREPRESS FIRE		4	64A	030						
00:17	DPS HE PREPRESS OFF		4	65A	031						
00:20	+X TRANS ON			---	200		+X JD'S	1			
00:21	PQGS 1 ARM			---	344						
	PQGS 2 ON			---	324						
00:22	PQGS 1 ON			---	364						
	PQGS 2 ARM			---	304						
00:23	DPS ARM	NO PRESS/SEP 16 SEC TO ENG START		00B	226	GHL348X	DPS ARM	1			
00:25	+X TRANS OFF			---	201		+X JD'S	0			
00:31	+X TRANS ON			---	200		+X JD'S	1			
	MAN THROTTLE - 10% ON			---	126	GHL311V	MAN THRUST	10%			
00:39	ENG START		3,5	14B	326	GHL286X	FIRE O/R	1			
00:40	ENG START RESET			15B	327						

A. PRA DETAILS (Cont'd)

Page 2 of 2

III. MRS (INCL SEP) (CONT'D)

TIME	FUNCTION	CONTINGENCY		AVAILABLE RTC'S	LMP CMD NO.	TM VERIFICATION			BURNS		
		B/U RTC'S	NOTES			MEAS ID	TITLE	CUE	RCS	DPS	APS
00:44	+X TRANS OFF			---	201		+X JD'S	0			
01:05	MAN THROTTLE - 100% ON			---	346	GH1311V	MAN THRUST	100%			
01:12	ENG STOP O/R			10B	246	GH1286X	FIRE O/R	0			
01:14	ENG STOP RESET			11B	247						
	MAN THROTTLE - 100% OFF			---	347	GH1311V	MAN THRUST	10%			
	MAN THROTTLE - 30% ON			---	127	GH1311V	MAN THRUST	30%			
01:17	DPS RESET	NO DPS 1 BURN		01B	227	GH1348X	DPS ARM	0			
		27 SEC TO ENG START									
01:35	DPS ARM			00B	226	GH1348X	DPS ARM	1			
01:36	+X TRANS ON	72A ENG STOP DISABLE	5	---	200		+X JD'S	1			
		14B ENG START									
	MAN THROTTLE - 10% ON	15B ENG RESET		---	126	GH1311V	MAN THRUST	10%			
01:44	ENG START			14B	326	GH1286X	FIRE O/R	1			
01:45	ENG RESET			15B	327						
01:49	+X TRANS OFF	NO DPS 2 BURN		---	201		+X JD'S	0			
		23 SEC TO ABT STG									
02:10	MAN THROTTLE - 100% ON			---	346	GH1311V	MAN THRUST	100%			
02:11	ABORT STG ARM			70A	046	GP1501P GP1503P	APS FU PRESS APS OX PRESS	184 P 184 P			
02:12	ABORT STG FIRE			40A	026	GH1283X	ABORT STGD	1			
	DPS RESET			01B	227	GH1348X	DPS ARM	0			
	APS ARM			---	206	GH1230X	APS ARM	1			
03:12	ENG STOP O/R			10B	246	GH1286X	FIRE O/R	0			
03:13	MAN THROTTLE - 100% OFF			---	347	GH1311V	MAN THRUST	10%			
	MAN THROTTLE - 30% ON			---	127	GH1311V	MAN THRUST	30%			
	PQGS 1 OFF			---	365						
	PQGS 2 RESET			---	305						
	PQGS 1 RESET			---	345						
	PQGS 2 OFF			---	325						
03:14	ABORT STG FIRE RESET	NO ABT STG		41A	027						
	ENG STOP RESET	38 SEC TO ENG START		11B	247						
	ABORT STG RESET			71A	047						
03:39	+X TRANS ON			---	200		+X JD'S	1			
03:52	ENG START	14B		14B	326	GH1286X	FIRE O/R	1			
03:53	ENG START RESET	15B		15B	327						
03:57	+X TRANS OFF			---	201		+X JD'S	0			
04:01	ASC FEED ARM			---	176						
04:02	ASC FEED A OPEN	50A RCS MAIN A OPEN	6	---	074	GR9611U	A A/FEED	1			
	RCS MAIN A CLSD			44A	254	GR9609U	A MAIN CL	1			
04:03	ASC FEED A OPEN RESET			---	075						
	RCS A CLSD RESET			45A	255						
04:12	ASC FEED B OPEN	60A RCS MAIN B OPEN	6	---	076	GR9612U	B A/FEED	1			
	RCS MAIN B CLSD			54A	256	GR9610U	B MAIN CL	1			
04:13	ASC FEED B OPEN RESET			---	077						
	RCS MAIN B CLSD RESET			55A	257						
04:22	X FEED OPEN			---	374	GR9613U	X FEED OP	1			
04:23	X FEED OPEN RESET			---	375						
05:11	X FEED CLSD			---	376	GR9613U	X FEED OP	0			
05:12	X FEED CLSD RESET	50A		---	377						
	RCS MAIN A OPEN			50A	274	GR9609U	A MAIN CL	0			
	ASC FEED A CLSD			---	114	GR9611U	A A/FEED	0			
05:13	RCS A OPEN RESET			51A	275						
	ASC FEED A CLSD RESET			---	115						
05:22	RCS MAIN B OPEN	60A		60A	276	GR9610U	B MAIN CL	0			
	ASC FEED B CLSD			---	116	GR9612U	B A/FEED	0			
05:23	RCS B OPEN RESET			61A	277						
	ASC FEED B CLSD RESET			---	117						
05:24	ASC FEED RESET			---	177						
05:25	S-BND RNG ON			---	042						

A. PRA DETAILS (Cont'd)

IV SUBORITAL ORBIT SEQUENCE

(111100) (17:04:00)

NOTES FOR PRA SEQUENCE IV

1. IF TIME PERMITS SEND PRIOR TO PRA START:

(A) BAT 5 B/U CDR 36A

(B) MASTER ARM ON 64B

2. THESE FUNCTIONS ARE NOT APPLICABLE TO THE LM-1 VEHICLE

TIME	FUNCTION	CONTINGENCY		AVAILABLE RTC'S	LMP CMD NO.	TM VERIFICATION			BURNS		
		B/U RTC'S	NOTES			MEAS ID	TITLE	CUE	RCS	DPS	APS
00:00	MASTER ARM ON		1	64B	004	GY0111X GY0112X	ED ARM A ON ED ARM B ON	0 0			
	RCS MAIN A OPEN			50A	274	GR9609U	A MAIN CL	0			
	RCS MAIN B OPEN			60A	276	GR9610U	B MAIN CL	0			
00:01	PRI S-BND ENABLE			31A	212	GT0994V	RCVR SIG	-4V			
00:02	RCS PRESS FIRE			70B	006	GR2201P GR2202P GR3201P GR3202P	A FU P B FU P A OX P B OX P	179 P 179 P 179 P 179 P			
	DPS HE PREPRESS FIRE		2	64A	030						
00:03	RCS PRESS RESET		2	71B	007						
	DPS HE PREPRESS OFF			65A	031						
00:04	+X TRANS ON			---	200	GH1419V GH1423V GH1427V GH1431V	JD 4D OUT JD 3D OUT JD 2D OUT JD 1D OUT	1 1 1 1			
00:05	MAN THROTTLE - 10% ON			---	126	GH1311V	MAN THRUST	10%			
00:06	LM/SLA SEP ARM			46A	072			0			
	LM/SLA SEP FIRE			62A	132	GL4222X KL45-900 KL46-900	LM/SLA SEP LM/S SEP A LM/S SEP B	1 1 1			
	RCS MAIN A OPEN RESET			51A	275						
	RCS MAIN B OPEN RESET			61A	277						
00:07	DPS ARM			00B	226	GH1348X	DPS ARM	1			
00:16	ENG START			14B	326	GH1286X	FIRE O/R	1			
00:17	ENG START RESET			15B	327						
00:42	MAN THROTTLE - 100% ON			---	346	GH1311V	MAN THRUST	100%			
00:49	ENG STOP O/R			10B	246	GH1286X	FIRE O/R	0			
00:50	ENG STOP RESET			11B	247						
	MAN THROTTLE - 100% OFF			---	347	GH1311V	MAN THRUST	10%			
00:54	ENG START			14B	326	GH1286X	FIRE O/R	1			
00:55	ENG START RESET			15B	327						
00:59	MAN THROTTLE - 100% ON			---	346	GH1311V	MAN THRUST	100%			
01:03	ABORT STG ARM			70A	046	GP1501P GP1503P	APS FU P APS OX P	184 P 184 P			
01:04	ABORT STG FIRE			40A	026	GH1283X	ABORT STGD	1			
	DPS RESET			01B	207	GH1348X	DPS ARM	0			
	APS ARM			---	206	GH1230X	APS ARM	1			
01:14	ENG STOP O/R			10B	246	GH1286X	FIRE O/R	0			
01:16	ENG STOP RESET			11B	247						
01:17	ENG START			14B	326	GH1286X	FIRE O/R	1			
01:18	ENG START RESET			15B	327						
01:22	ENG STOP O/R	.10B		10B	246	GH1286X	FIRE O/R	0			
01:23	ENG STOP RESET			11B	247						
01:24	+X TRANS OFF			---	201		+X JD'S	0			

A. PRA DETAILS (Cont'd)

V NO DPS/FITH -APS DEPLETION

(111011) (16:46:56)

NOTES FOR PRA SEQUENCE V

1. IF TIME PERMITS PRIOR TO PRA START SEND:

(A) BAT 5 B/U CDR 36A

2. IF EITHER ASC FEED VALVE A OR B FAILS TO OPEN, SEND AS APPROPRIATE:

(A) RCS MAIN A OPEN 50A

(B) RCS MAIN B OPEN 60A

Cabin Press

mayhoss C Band Beacon

TIME	FUNCTION	CONTINGENCY		AVAILABLE RTC'S	LMP CMD NO.	TM VERIFICATION			BURNS		
		B/U RTC'S	NOTES			MEAS ID	TITLE	CUE	RCS	DPS	APS
00:00	MASTER ARM ON			64B	004	GY0111X GY0112X	ED ARM A ON ED ARM B ON	0 0			
	PRI S-BND ENABLE			31A	212	GT0994V	ROVR SIG	-4'			
00:01	DPS RESET			01B	227	GH1348X	DPS ARM	0			
00:02	+X TRANS ON			---	200	GH1419W GH1423V GH1427W GH1431V	JD 4D OUT JD 3D OUT JD 2D OUT JD 1D OUT	1 1 1 1			
00:07	ABORT STG ARM			70A	046	GP1501P GP1503P	AFS FU P AFS OX P	184 P 184 P			
00:14	ABORT STG FIRE			40A	026	GH1283X	ABORT STGD	1			
	AFS ARM			---	206	GH1230X	AFS ARM	1			
	ENG START	14B		14B	326	GH1286X	FIRE O/R	1			
00:16	ENG START RESET	15B		15B	327						
00:19	+X TRANS OFF			---	201		+X JD'S	0			
01:13	+X TRANS ON		NO APT STG 54 SEC TO +X TRANS	---	200		+X JD'S	1			
01:14	ENG STOP O/R			10B	246	GH1286X	FIRE O/R	0			
01:15	ABORT STG FIRE RESET			41A 11B 71A	027 247 047						
01:24	ENG START	14B		14B	326	GH1286X	FIRE O/R	1			
01:25	ENG START RESET	15B		15B	327						
01:29	+X TRANS OFF			---	201		+X JD'S				
01:33	ASC FEED ARM			---	176						
01:34	ASC FEED A OPEN			---	074	GR9611U	A A/FEED	1			
	RCS MAIN A CLSD	50A RCS MAIN A OPEN	2	44A	254	GR9609U	A MAIN CL	1			
01:35	ASC FEED A OPEN RESET			---	075						
	RCS MAIN A CLSD RESET			45A	255						
01:44	ASC FEED B OPEN			---	076	GR9612U	B A/FEED	1			
	RCS MAIN B CLSD	60A RCS MAIN B OPEN	2	54A	256	GR9610U	B MAIN CL	1			
01:45	ASC FEED B OPEN RESET			---	077						
	RCS MAIN B CLSD RESET			55A	257						
01:54	X FEED OPEN			---	374	GR9613U	X FEED OP	1			
01:55	X FEED OPEN RESET			---	375						
02:43	X FEED CLSD			---	376	GR9613U	X FEED OP	0			
02:44	X FEED CLSD RESET			---	377						
	RCS MAIN A OPEN	50A		50A	274	GR9609U	A MAIN CL	0			
	ASC FEED A CLSD			---	114	GR9611U	A A/FEED	0			
02:45	RCS A OPEN RESET			51A	275						
	ASC FEED A CLSD RESET			---	115						
02:54	RCS MAIN B OPEN			60A	276	GR9610U	B MAIN CL	0			
	ASC FEED B CLSD	60A		---	116	GR9612U	B A/FEED	0			
02:55	RCS MAIN B OPEN RESET			61A	277						
	ASC FEED B CLSD RESET			---	117						
02:56	ASC FEED RESET			---	177						
02:57	S-BND RNG ON			---	042						

17 SEC

60 SEC

16 SEC

TO
DEP-
LETION

A. PRA DETAILS (Cont'd)

VII RCS ISOLATION ROUTINE (3)

(111001) (16:12:48)

NOTES FOR SEQUENCE VII

1. TO OPEN RCS SYSTEM A AND B QUAD ISOLATION VALVES WHILE IN PGNS CONTROL SEND:

(A) GUID SEL AGS ☒ 40B

(B) PRA START

(C) AT PRA START +30 SEC OR QUAD 4B OPEN SEND:

(1) GUID SEL AGS ☒ 40B

(2) GUID SEL PGNS ☒ 41B

2. TO CLOSE RCS SYSTEM A QUAD ISOLATION VALVES WHILE IN PGNS CONTROL SEND:

(A) PRA START (1)

(B) AT PRA START +30 SEC SEND:

(1) GUID SEL AGS ☒ 40B

(C) PRA START (2)

(D) AT SECOND PRA START +60 SEC OR QUAD 4A CLOSED SEND:

(1) GUID SEL AGS ☒ 40B

(2) GUID SEL PGNS ☒ 41B

3. TO CLOSE RCS SYSTEM B QUAD ISOLATION VALVES WHILE IN PGNS CONTROL SEND:

(A) PRA START (1)

(B) AT PRA START +1 MIN 30 SEC SEND:

(1) GUID SEL AGS ☒ 40B

(C) PRA START (2)

(D) AT SECOND PRA START +60 SEC OR QUAD 4B CLOSED, SEND:

(1) GUID SEL AGS ☒ 40B

(2) GUID SEL PGNS ☒ 41B

TIME	FUNCTION	CONTINGENCY		AVAILABLE RTC'S	LMP CMD NO.	TM VERIFICATION			BURNS		
		B/U RTC'S	NOTES			MEAS ID	TITLE	CUE	RCS	DPS	APS
00:00	RCS 1A OPEN RCS 1B OPEN		1	---	014 034	GR9667U GR9668U	1A ISO CLSD 1B ISO CLSD	0 0			
00:02	RCS 1A OPEN RST RCS 1B OPEN RST RCS 2A OPEN RCS 2B OPEN			---	015 035 230 210	GR9665U GR9666U	2A ISO CLSD 2B ISO CLSD	0 0			
00:04	RCS 2A OPEN RST RCS 2B OPEN RST RCS 3A OPEN RCS 3B OPEN			---	231 211 016 036	GR9663U GR9664U	3A ISO CLSD 3B ISO CLSD	0 0			
00:06	RCS 3A OPEN RST RCS 3B OPEN RST RCS 4A OPEN RCS 4B OPEN			---	017 037 330 270	GR9661U GR9662U	4A ISO CLSD 4B ISO CLSD	0 0			
00:08	RCS 4A OPEN RST RCS 4B OPEN RST			---	331 271						
00:30			1,2								
01:08	RCS 1A CLSD			---	134	GR9667U	1A ISO CLSD	1			
01:10	RCS 1A CLSD RST RCS 2A CLSD			---	135 250	GR9665U	2A ISO CLSD	1			
01:12	RCS 2A CLSD RST RCS 3A CLSD			---	251 136	GR9663U	3A ISO CLSD	1			
01:14	RCS 3A CLSD RST RCS 4A CLSD			---	137 350	GR9661U	4A ISO CLSD	1			
01:16	RCS 4A CLSD RST			---	351						
01:30			2,3								
02:16	RCS 1B CLSD			---	154	GR9668U	1B ISO CLSD	1			
02:18	RCS 1B CLSD RST RCS 2B CLSD			---	155 170	GR9666U	2B ISO CLSD	1			
02:20	RCS 2B CLSD RST RCS 3B CLSD			---	171 156	GR9664U	3B ISO CLSD	1			
02:22	RCS 3B CLSD RST RCS 4B CLSD			---	157 310	GR9662U	4B ISO CLSD	1			
02:24	RCS 4B CLSD RST			---	311						

A. PRA DETAILS (Concluded)

XV

60 SEC. APS

(110001) (13:56:16)

NOTES FOR SEQUENCE XV

1. IF TIME PERMITS PRIOR TO PRA START SEND:

(A) BAT 5 E/U CDR $\triangleleft$ 36A

2. IF A PRIME RELAY DPS ARM [226] EXISTS PRIOR TO SEQUENCE START, THE DPS WILL IGNITE; THE APS WILL FUNCTION NORMALLY. ENG STOP O/R $\triangleleft$ 10B WILL INHIBIT THE DPS IGNITION.

3. IF RTC DPS ARM $\triangleleft$ 00B EXISTS PRIOR TO SEQUENCE START, THE DPS WILL IGNITE; THE APS ENG WILL NOT IGNITE. DPS RESET $\triangleleft$ 01B WILL ALLOW THE SEQUENCE TO FUNCTION NORMALLY.

TIME	FUNCTION	CONTINGENCY		AVAILABLE RTC'S	LMP CMD NO.	TM VERIFICATION			BURNS		
		B/U RTC'S	NOTES			MEAS ID	TITLE	CUE	RCS	DPS	APS
00:00	+X TRANS ON			---	200	GHL19V GHL23V GHL27V GHL31V	JD 4D OUT JD 3D OUT JD 2D OUT JD 1D OUT	1 1 1 1	↑ 1:13 ↓	↑ 4 SEC + 6 SEC ↑ (100%) 2 SEC ↓	↑ 60 SEC ↓
00:01	PRI S-END ENABLE			31A	212	GT094V	RCVR SIG	-4			
00:07	ENG START		2	14B	326	GHL286X	FIRE O/R	1			
00:08	ENG START RST			15B	327						
00:11	MAN THROTTLE - 100% ON			---	346	GHL311V	MAN THRUST	100%			
	MASTER ARM ON			64B	004	GY0111X GY0112X	ED ARM A ON ED ARM B ON	0 0			
00:12	ABORT STG ARM			70A	046	GFL501P GFL503P	APS FU P APS OX P	184 P 184 P			
00:13	ABORT STG FIRE		2,3	40A	026	GHL238X	ABORT STGD	1			
	DPS RESET			01B	227	GHL348X	DPS ARM	0			
	APS ARM			---	206	GHL230X	APS ARM	1			
01:13	ENG STOP O/R			10B	246	GHL286X	FIRE O/R	0	↑ ↓		
	+X TRANS OFF			---	201		+X JD'S	0			
01:14	APS RESET			---	207	GHL230X	APS ARM	0			
	ENG STOP RESET			11B	247						
01:15	ABORT STG FIRE RESET			41A	027						
	ABORT STG RESET			71A	047						
01:16	MASTER ARM OFF			---	005	GY0111X GY0112X	ED ARM A ON ED ARM B ON	1 1			
	MAN THROTTLE - 100% OFF			---	347	GHL311V	MAN THRUST	30%			
01:17	S-END RING ON			---	042						

XVI

INTERCONNECT CLOSEOUT

(110000) (13:39:12)

TIME	FUNCTION	CONTINGENCY		AVAILABLE RTC'S	LMP CMD NO.	TM VERIFICATION			BURNS		
		B/U RTC'S	NOTES			MEAS ID	TITLE	CUE	RCS	DPS	APS
00:00	+X TRANS ON			---	200	GHL19V GHL23V GHL27V GHL31V	JD 4D OUT JD 3D OUT JD 2D OUT JD 1D OUT	1 1 1 1	↑ ↓	↑ 10 SEC ↓	
00:01	ASC FEED ARM			---	176	GR9613U	X FEED OF	0			
	X FEED CLSD			---	376	GR9609U	A MAIN CL	0			
	RCS MAIN A OPEN	50A		50A	274	GR9611U	A A/FEED	0			
	ASC FEED A CLSD			---	114	GR9611U	A A/FEED	0			
	RCS MAIN B OPEN	60A		60A	276	GR9610U	B MAIN CL	0			
	ASC FEED B CLSD			---	116	GR9612U	B A/FEED	0			
00:02	X FEED CLSD RESET			---	377						
	RCS MAIN A OPEN RESET			51A	275						
	ASC FEED A CLSD RESET			---	115						
00:03	RCS MAIN B OPEN RESET			61A	277				↑ ↓		
	ASC FEED B CLSD RESET			---	117						
00:04	ASC FEED RESET			---	177						
00:10	+X TRANS OFF			---	201		+X JD'S	0	↑ ↓		

III. NETWORK INFORMATION

I. HIGH-SPEED DATA FORMATS

A. HSD FORMATS vs TM NOT ON FORMAT*

HSD FORMATS	ALDS	1	2	3	4	5	6	7	8	9	10
DOWNLINK RATE (KBPS)	51.2										
OUTPUT RATE (KBPS)	40.8	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
OUTPUT CONTEXT	LM	LM	LM	LM	LM (EECOM CONTING)	LM (PGNS CONTING)	LM (CES CONTING)	LM(PAM GATE 1 FAIL)	LM (PAM GATE 2 FAIL)	LM (PAM GATE 3 FAIL)	LM (PAM GATE 4 FAIL)
PERIOD OF MISSION USED	PRELAUN TO MISS. TERM	LAUN. TO INSERT.	INSERT TO END OF IU MON. LM MANEUVER AND UPDATE TO MISSION TERMINATION								
TM NOT ON FORMAT *	GH1240	GH1204	GH1240		GPO908	GPO908	GPO908	GC0201	GC0205	GC0071	GF3582
	GH1247	GH1217	GH1249		GPL408	GPL408	GPL408	GC0202	GC0206	GC0155	GF3583
	GH1248	GH1240						GC0203		GC0301	GF4511
	GH1249	GH1247	GPO908		GQ3603	GQ3603		GC0204	GG1201	GC1204	
	GH1313	GH1248	GPL408		GQ3604	GQ3604	GQ3603	GC0302	GG1331		GG1513
	GH1314	GH1249	GP2010		GQ4103	GQ4103	GQ4103		GG1513	GF3591	GG1523
	GH1896	GH1313			GQ4104	GQ4104	GQ4104	GF3592	GG1523	GF9997	GG2219
	GH1204	GH1314	GQ3603		GQ4455	GQ4455	GQ4455		GG2279	GF9998	GG2249
	GH1217	GH1418	GQ3604		GQ6510	GQ6510	GQ6510	GG1513			
		THRU	GQ4103		GQ6806	GQ6806	GQ6806	GG1523	GH1204	GG1513	GH1204
		GH1433	GQ4104					GG2021	GH1217	GG1523	GH1217
		GH1896	GQ4455		053U	053U		GG2143	GR2121	GG2112	GH1311
			GQ6510					GG2173	GR2122	GG2113	GQ3018
		GW5151	GQ6806					GG6020	GR2140	GG2140	GQ6806
		GW5153	053U						GT0619	GG2170	
								GH1204	GT0992	GG2172	GR6001
								GH1217		GG2301	GR6002
								GH1240			GR6003
										GH1204	GR6004
								GR2121		GH1217	
								GR2122			
								GT0201		GP0025	
								GT0202			
								GT0993		GT0994	

*GG0001X: SEE (4) PGNS, PAGE 1 THROUGH 4 OF 6

B. HSD FORMATS: TM vs FORMATS

(1). EPS/PYRO

MEAS NUMBER	OPERATIONAL DESCRIPTION	VEH TM LINK H/L	VEH TM S/S	MSFN OUTPUT FORMATS										REOD BY RTCC	COMMENTS	
				ALDS 1	HIGH-SPEED DATA FORMATS											
					1 S/S	2 S/S	3 S/S	4 S/S	5 S/S	6 S/S	7 S/S	8 S/S	9 S/S			10 S/S
<u>LM ANALOGS</u>															<u>FR/WD</u>	
GC0071V	AC BUS VOLT	H	1	1.	.2	.2	.2	1.	.2	.2	.2	.2	-	.2	X	022/069
GC0155F	AC BUS FREQ	H	1	1.	.2	.2	.2	1.	.2	.2	.2	.2	-	.2	X	041/069
GC0201V	BAT 1 VOLT	H	1	1.	.2	.2	.2	1.	.2	.2	-	.2	.2	.2	X	019/101
GC0202V	BAT 2 VOLT	H	1	1.	.2	.2	.2	1.	.2	.2	-	.2	.2	.2	X	011/101
GC0203V	BAT 3 VOLT	H	1	1.	.2	.2	.2	1.	.2	.2	-	.2	.2	.2	X	021/101
GC0204V	BAT 4 VOLT	H	1	1.	.2	.2	.2	1.	.2	.2	-	.2	.2	.2	X	015/101
GC0205V	BAT 5 VOLT	H	1	1.	.2	.2	.2	1.	.2	.2	.2	-	.2	.2	X	003/037
GC0206V	BAT 6 VOLT	H	1	1.	.2	.2	.2	1.	.2	.2	.2	-	.2	.2	X	010/037
GC0301V	CDR BUS VOLT	H	1	1.	.5	1.	1.	1.	1.	1.	1.	-	1.	-	X	033/069
GC0302V	SE BUS VOLT	H	1	1.	.5	1.	1.	1.	1.	1.	-	1.	1.	-	X	033/101
GC1201C	BAT 1 CUR	H	1	1.	.5	1.	1.	1.	1.	1.	-	1.	1.	-	X	024/101
GC1201C	BAT 1 CUR	H	-	-	-	-	-	-	-	-	-	-	-	-	X	028/069
GC1202C	BAT 2 CUR	H	1	1.	.5	1.	1.	1.	1.	1.	1.	-	1.	-	X	032/069
GC1202C	BAT 2 CUR	H	-	-	-	-	-	-	-	-	-	-	1.	-	X	043/101
GC1203C	BAT 3 CUR	H	1	1.	.5	1.	1.	1.	1.	1.	1.	-	1.	-	X	017/069
GC1203C	BAT 3 CUR	H	-	-	-	-	-	-	-	-	-	-	1.	-	X	025/101
GC1204C	BAT 4 CUR	H	1	1.	.5	1.	1.	1.	1.	1.	1.	-	1.	-	X	018/069
GC1205C	BAT 5 CUR	H	1	1.	.5	1.	1.	1.	1.	1.	-	1.	1.	-	X	018/101
GC1205C	BAT 5 CUR	H	-	-	-	-	-	-	-	-	-	-	-	-	X	027/069
GC1206C	BAT 6 CUR	H	1	1.	.5	1.	1.	1.	1.	1.	1.	-	1.	-	X	020/069
GC1206C	BAT 6 CUR	H	-	-	-	-	-	-	-	-	-	-	1.	-	X	023/101
<u>LM BILEVELS</u>																
GC4361X	BAT 1 HI TAP	H	1	1.	.2	.2	.2	1.	.2	.2	.2	.2	.2	.2	X	035/098
GC4362X	BAT 1 LOW TAP	H	1	1.	.2	.2	.2	1.	.2	.2	.2	.2	.2	.2	X	035/098
GC4363X	BAT 2 HI TAP	H	1	1.	.2	.2	.2	1.	.2	.2	.2	.2	.2	.2	X	035/098
GC4364X	BAT 2 LOW TAP	H	1	1.	.2	.2	.2	1.	.2	.2	.2	.2	.2	.2	X	035/098
GC4365X	BAT 3 HI TAP	H	1	1.	.2	.2	.2	1.	.2	.2	.2	.2	.2	.2	X	035/098
GC4366X	BAT 3 LOW TAP	H	1	1.	.2	.2	.2	1.	.2	.2	.2	.2	.2	.2	X	035/098
GC4367X	BAT 4 HI TAP	H	1	1.	.2	.2	.2	1.	.2	.2	.2	.2	.2	.2	X	035/098
GC4368X	BAT 4 LOW TAP	H	1	1.	.2	.2	.2	1.	.2	.2	.2	.2	.2	.2	X	035/098
GC4369X	BAT 5 B/U CDR	H	1	1.	.2	.2	.2	1.	.2	.2	.2	.2	.2	.2	X	039/098
GC4370X	BAT 6 NORM CDR	H	1	1.	.2	.2	.2	1.	.2	.2	.2	.2	.2	.2	X	039/098
GC4371X	BAT 5 NORM SE	H	1	1.	.2	.2	.2	1.	.2	.2	.2	.2	.2	.2	X	039/098
GC4372X	BAT 6 B/U SE	H	1	1.	.2	.2	.2	1.	.2	.2	.2	.2	.2	.2	X	039/098
GC9961U	BAT 1 MAL	H	1	1.	.2	.2	.2	1.	.2	.2	.2	.2	.2	.2	X	034/100
GC9962U	BAT 2 MAL	H	1	1.	.2	.2	.2	1.	.2	.2	.2	.2	.2	.2	X	034/100
GC9963U	BAT 3 MAL	H	1	1.	.2	.2	.2	1.	.2	.2	.2	.2	.2	.2	X	034/100
GC9964U	BAT 4 MAL	H	1	1.	.2	.2	.2	1.	.2	.2	.2	.2	.2	.2	X	034/100
GC9965U	BAT 5 MAL	H	1	1.	.2	.2	.2	1.	.2	.2	.2	.2	.2	.2	X	034/100
GC9966U	BAT 6 MAL	H	1	1.	.2	.2	.2	1.	.2	.2	.2	.2	.2	.2	X	034/100
GY0111X	ED ARM A ON	H	1	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	014/098
GY0112X	ED ARM B ON	H	1	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	014/098
GY0121X	STG RLY A FIRE	H	1	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	014/098
GY0122X	STG RLY B FIRE	H	1	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	014/098

MSC FORM 806A (OCT 66) (OT)

B. HSD FORMATS: TM vs FORMATS (Cont'd)

(2). COMM/INST and (3) ECS

MEAS NUMBER	OPERATIONAL DESCRIPTION	VEH TM LINK H/L	VEH TM S/S	MSFN OUTPUT FORMATS										REOD BY RTCC	COMMENTS	
				ALDS 1	HIGH-SPEED DATA FORMATS											
					1 S/S	2 S/S	3 S/S	4 S/S	5 S/S	6 S/S	7 S/S	8 S/S	9 S/S			10 S/S
GL0302	LBR	H	1.											X	FR/WD	
GL0501W	MET	H	10	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	NOT USED IN AS-206	
															001/033 1 S/S	
															001/034 PER	
															001/035 FR/WD	
															001/036	
															32 BIT WORD	
GL0401V	CAL 85 PCT	H	10	1.	.1	.1	.1	.1	.1	.1	.1	-	.1	X	003/099	
GL0401V	CAL 85 PCT	H			-	-	-	-	-	-	-	.1	-	X	005/065	
GL0402V	CAL 15 PCT	H	10	1.	.1	.1	.1	1.	.1	.1	.1	-	.1	X	004/099	
GL0402V	CAL 15 PCT	H		-	-	-	-	-	-	-	-	.1	-	X	003/100	
GL4054X	C AND W PWR FAIL	H	1	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	009/098	
GL4069X	MASTER ALARM ON	H	1	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	009/098	
GL4221X	DFI CAL ON	H	1	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	044/100	
GL4222X	LM/SLA SEP	H	1	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	044/100	
GT0201E	S-BND PWR AMP PO	H	1	1.	.2	.2	.2	1.	.2	.2	-	.2	.2	X	048/101	
GT0202E	S-BND RFLT PWR	H	1	1.	.2	.2	.2	1.	.2	.2	-	.2	.2	X	041/101	
GT0619V	UHF SIG STR	H	1	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	001/037	
GT0992B	S-BND ST PH ERR	H	10	1.	.2	.2	.2	1.	.2	.2	.2	-	.2	X	001/066	
GT0993E	S-BND XMTR PO	H	1	1.	.2	.2	.2	1.	.2	.2	-	.2	.2	X	050/101	
GT0994V	S-BND RCVR SIG	H	10	1.	.2	.2	.2	1.	.2	.2	.2	.2	-	X	001/067	
GT0441X	DCA STATUS	H	50	-	1.	1.	1.	-	1.	1.	1.	1.	1.	X	001/097	
GT0441X	DCA STATUS	H	50	40	-	-	-	40	-	-	-	-	-	X	BEGIN AT 001/ 097 FOR 40 FRAMES AT 1 S/S 8-BIT WORD	
LM ANALOGS																
GF2021P	PRI GLY PUMP ΔP	H	1	1.	1.	1.	1.	1.	1.	1.	1.	-	1.	X	016/069	
GF2021P	PRI GLY PUMP ΔP	H		-	-	-	-	-	-	-	-	1.	-	X	026/101	
GF3571P	CABIN PRESS.	H	1	1.	.5	1.	1.	1.	1.	1.	-	1.	1.	X	022/101	
GF3571P	CABIN PRESS.	H		-	-	-	-	-	-	-	1.	-	-	X	026/069	
GF3582P	ASC 1 O ₂ PRESS.	H	1	1.	.2	.2	.2	1.	.2	.2	.2	.2	-	X	049/101	
GF3583P	ASC 2 O ₂ PRESS.	H	1	1.	.2	.2	.2	1.	.2	.2	.2	.2	-	X	041/037	
GF3591P	U/H RLF PRESS.	H	1	1.	.2	.2	1.	1.	.2	.2	.2	.2	-	X	050/069	
GF3592P	F/H RLF PRESS.	H	1	1.	.2	.2	1.	1.	.2	.2	-	.2	.2	X	047/101	
GF4101P	PRI H ₂ O REG ΔP	H	1	1.	.2	.2	.2	1.	.2	.2	.2	-	.2	X	037/037	
GF4101P	PRI H ₂ O REG ΔP	H		-	-	-	-	-	-	-	-	.2	-	X	044/005	
GF4511T	PRI W/B H ₂ O TEMP	H	1	1.	.1	.1	.1	1.	.1	.1	.1	.1	-		050/005	
GF4582Q	ASC 1 H ₂ O QTY	H	1	1.	.2	.2	.2	1.	.2	.2	.2	-	.2	X	006/037	
GF4582Q	ASC 1 H ₂ O QTY	H		-	-	-	-	-	-	-	-	.2	-	X	015/005	
GF4583Q	ASC 2 H ₂ O QTY	H	1	1.	.2	.2	.2	1.	.2	.2	.2	-	.2	X	007/037	
GF4583Q	ASC 2 H ₂ O QTY	H		-	-	-	-	-	-	-	-	.2	-	X	014/005	
GF9997U	GLY PUMP PRESS.	H	1	1.	.2	.2	.2	1.	.2	.2	.2	.2	-	X	003/069	
GF9998U	GLY TEMP.	H	1	1.	.2	.2	.2	1.	.2	.2	.2	.2	-	X	030/069	
LM WILEVELS																
GF2041X	GLY LVL LOW	H	1	1.	.2	.2	.2	1.	.2	.2	.2	.2	.2	X	004/098	

MSC FORM 806A (OCT 66) (OT)

B. HSD FORMATS: TM vs FORMATS (Cont'd)

(4). PGNS Page 1 of 6

MEAS NUMBER	OPERATIONAL DESCRIPTION	VEH TM LINK H/L	VEH TM S/S	MSFN OUTPUT FORMATS										REQD BY RTCC	COMMENTS	
				AUX 1	HIGH-SPEED DATA FORMATS											
					1 S/S	2 S/S	3 S/S	4 S/S	5 S/S	6 S/S	7 S/S	8 S/S	9 S/S			10 S/S
GG0001X	FIRST REGISTER															
1	DOWNLIST I.D.				-	-	-	-	-	-	-	-	-	-		
2	LAST CALC STATE VEC X POS	MSB			1.	.5	.2	1.	.2	.2	.2	.2	.2	.2		
3	LAST CALC STATE VEC Y POS	MSB			1.	.5	.2	1.	.2	.2	.2	.2	.2	.2		
4	LAST CALC STATE VEC Z POS	MSB			1.	.5	.2	1.	.2	.2	.2	.2	.2	.2		
5	LAST CALC STATE VEC X VEL	MSB			1.	.5	.2	1.	.2	.2	.2	.2	.2	.2		
6	LAST CALC STATE VEC Y VEL	MSB			1.	.5	.2	1.	.2	.2	.2	.2	.2	.2		
7	LAST CALC STATE VEC Z VEL	MSB			1.	.5	.2	1.	.2	.2	.2	.2	.2	.2		
8	STATE VECTOR TIME MSB				1.	.5	.2	1.	.2	.2	.2	.2	.2	.2		
9	GARBAGE				-	-	-	-	-	-	-	-	-	-		
10	DESIRED CDU Y				1.	.5	.5	.5	.5	.5	.5	.5	.5	.5		
11	DELV X MSB				-	-	-	.5	.5	.5	.5	.5	.5	.5		
12	DELV Y MSB				-	-	-	.5	.5	.5	.5	.5	.5	.5		
13	DELV Z MSB				-	-	-	.5	.5	.5	.5	.5	.5	.5		
14	OUTPUT TO LMP	}			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5		
15	OUTPUT TO LMP		1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5			
16	OUTPUT TO LMP		1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5			
17	OUTPUT TO LMP		1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5			
18	SPARE				-	-	-	-	-	-	-	-	-	-		
19	SPARE				-	-	-	-	-	-	-	-	-	-		
20	UPVERB				1.	.5	.5	.5	.5	.5	.5	.5	.5	.5		
21	STATE COUNT				-	-	-	-	-	-	-	-	-	-		
22	STATE BUFFER +0				1.	-	.5	.5	.5	.5	.5	.5	.5	.5		
23	STATE BUFFER +2				1.	-	.5	.5	.5	.5	.5	.5	.5	.5		
24	STATE BUFFER +4				1.	-	.5	.5	.5	.5	.5	.5	.5	.5		
25	STATE BUFFER +6				1.	-	.5	.5	.5	.5	.5	.5	.5	.5		
26	STATE BUFFER +8D				1.	-	.5	.5	.5	.5	.5	.5	.5	.5		
27	STATE BUFFER +10D				1.	-	.5	.5	.5	.5	.5	.5	.5	.5		
28	STATE BUFFER +12D				1.	-	.5	.5	.5	.5	.5	.5	.5	.5		
29	I MODE 30				1.	.5	.5	.5	.5	.5	.5	.5	.5	.5		
30	TIME OF EVENT MSB*				1.	.5	.5	.5	.5	.5	.5	.5	.5	.5		
31	GUIDANCE THRUST CMD MSB				-	-	-	.5	-	-	-	.5	.5	.5		
32	MOMENT OFFSET (Q)				-	-	-	.5	-	-	-	.5	.5	.5		
33	PREDICTED ENGINE ON TIME	MSB			-	-	-	.5	-	-	-	.5	.5	.5		
34	REDO COUNTER				1.	-	.5	.5	.5	.5	.5	.5	.5	.5		
35	GARBAGE				-	-	-	-	-	-	-	-	-	-		
36	ACTUAL CDU Y				1.	.5	.5	.5	.5	.5	.5	.5	.5	.5		
37	DERIVED RATE (P)				1.	.5	.5	.5	.5	.5	.5	.5	.5	.5		
38	GARBAGE				-	-	-	-	-	-	-	-	-	-		
39	FLAGWORD 0				1.	-	.5	.5	.5	.5	.5	.5	.5	.5		
40	FLAGWORD 2				1.	-	.5	.5	.5	.5	.5	.5	.5	.5		
41	CHANNEL 11				1.	.5	.5	.5	.5	.5	.5	.5	.5	.5		
42	CHANNEL 13				1.	-	.5	.5	.5	.5	.5	.5	.5	.5		
43	CHANNEL 30				1.	.5	.5	.5	.5	.5	.5	.5	.5	.5		
44	CHANNEL 32				1.	.5	.5	.5	.5	.5	.5	.5	.5	.5		
45	DSPTAB +0				1.	.5	.5	.5	.5	.5	.5	.5	.5	.5		
46	DSPTAB +2				1.	.5	.5	.5	.5	.5	.5	.5	.5	.5		
47	DSPTAB +4				1.	.5	.5	.5	.5	.5	.5	.5	.5	.5		
48	DSPTAB +6				1.	.5	.5	.5	.5	.5	.5	.5	.5	.5		
49	DSPTAB +8D				1.	.5	.5	.5	.5	.5	.5	.5	.5	.5		
50	DSPTAB +10D				1.	.5	.5	.5	.5	.5	.5	.5	.5	.5		

*TIME OF GRR,
ENGINE ON, OR
ENGINE OFF

MSC FORM 806A (OCT 66) (OT)

B. HSD FORMATS: TM vs FORMATS (Cont'd)

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MEAS NUMBER	OPERATIONAL DESCRIPTION	VEH TM LINK H/L	VEH TM S/S	MSFN OUTPUT FORMATS										REQD BY RTCC	COMMENTS	
				ALDS 1	HIGH-SPEED DATA FORMATS											
					1 S/S	2 S/S	3 S/S	4 S/S	5 S/S	6 S/S	7 S/S	8 S/S	9 S/S			10 S/S
GG0001X	FIRST REGISTER															
51	TIME 2			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
52	SPARE			-	-	-	-	-	-	-	-	-	-	-		
53	SPARE			-	-	-	-	-	-	-	-	-	-	-		
54	SPARE			-	-	-	-	-	-	-	-	-	-	-		
55	SPARE			-	-	-	-	-	-	-	-	-	-	-		
56	SPARE			-	-	-	-	-	-	-	-	-	-	-		
57	SPARE			-	-	-	-	-	-	-	-	-	-	-		
58	SPARE			-	-	-	-	-	-	-	-	-	-	-		
59	SPARE			-	-	-	-	-	-	-	-	-	-	-		
60	SPARE			-	-	-	-	-	-	-	-	-	-	-		
61	SPARE			-	-	-	-	-	-	-	-	-	-	-		
62	SPARE			-	-	-	-	-	-	-	-	-	-	-		
63	SPARE			-	-	-	-	-	-	-	-	-	-	-		
64	OUTPUT TO LMP			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
65	OUTPUT TO LMP			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
66	OUTPUT TO LMP			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
67	OUTPUT TO LMP			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
68	SPARE			-	-	-	-	-	-	-	-	-	-	-		
69	SPARE			-	-	-	-	-	-	-	-	-	-	-		
70	MISSION PHASE REGISTER 4			1.	.2	.5	.5	.5	.5	.5	.5	.5	.5	.5		
71	MISSION PHASE REGISTER 2			1.	.2	.5	.5	.5	.5	.5	.5	.5	.5	.5		
72	MISSION TIME REGISTER 4			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
73	MISSION TIME REGISTER 2			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
74	PRESENT MISSION PHASE			1.	.2	.5	.5	.5	.5	.5	.5	.5	.5	.5		
75	TIME TO GO MSB			1.	.5	-	.5	.5	.5	.5	.5	.5	.5	.5		
76	BURN DATA VGX VELOCITY TO BE GAINED			1.	.5	-	.5	.5	.5	.5	.5	.5	.5	.5		
77	BURN DATA VGY VELOCITY TO BE GAINED			1.	.5	-	.5	.5	.5	.5	.5	.5	.5	.5		
78	BURN DATA VGZ VELOCITY TO BE GAINED			1.	.5	-	.5	.5	.5	.5	.5	.5	.5	.5		
79	BURN DATA VDX			1.	.5	-	.5	.5	.5	.5	.5	.5	.5	.5		
80	BURN DATA VDY			1.	.5	-	.5	.5	.5	.5	.5	.5	.5	.5		
81	BURN DATA VDZ			1.	.5	-	.5	.5	.5	.5	.5	.5	.5	.5		
82	BURN DATA RBOX			1.	.5	-	.5	.5	.5	.5	.5	.5	.5	.5		
83	BURN DATA RBOY			1.	.5	-	.5	.5	.5	.5	.5	.5	.5	.5		
84	BURN DATA RBOZ			1.	.5	-	.5	.5	.5	.5	.5	.5	.5	.5		
85	GARBAGE			-	-	-	-	-	-	-	-	-	-	-		
86	ACTUAL CDU Y			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
87	DERIVED RATE (P)			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
88	ALPHA Q			-	-	-	-	-	-	-	-	-	-	-		
89	FLAGWORD 0			1.	-	.5	.5	.5	.5	.5	.5	.5	.5	.5		
90	FLAGWORD 2			1.	-	.5	.5	.5	.5	.5	.5	.5	.5	.5		
91	CHANNEL 11			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
92	CHANNEL 13			1.	-	.5	.5	.5	.5	.5	.5	.5	.5	.5		
93	CHANNEL 30			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
94	CHANNEL 32			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
95	DSPTAB +0			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
96	DSPTAB +2			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
97	DSPTAB +4			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
98	DSPTAB +6			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
99	DSPTAB +8D			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
100	DSPTAB +10D			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		

MSC FORM 806A (OCT 66) (OT)

B. HSD FORMATS: TM vs FORMATS (Cont'd)

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MEAS NUMBER	OPERATIONAL DESCRIPTION	VEH TM LINK H/L	VEH TM S/S	ALDS 1	MSFN OUTPUT FORMATS										REQD BY RTCC	COMMENTS
					HIGH-SPEED DATA FORMATS											
					1 S/S	2 S/S	3 S/S	4 S/S	5 S/S	6 S/S	7 S/S	8 S/S	9 S/S	10 S/S		
GG0001X	SECOND REGISTER															
1	SYNC BITS (00437-OCTAL)			-	-	-	-	-	-	-	-	-	-	-		
2	LAST CALC STATE VEC X POS LSB			1.	.5	.2	1.	.2	.2	.2	.2	.2	.2	.2		
3	LAST CALC STATE VEC Y POS LSB			1.	.5	.2	1.	.2	.2	.2	.2	.2	.2	.2		
4	LAST CALC STATE VEC Z POS LSB			1.	.5	.2	1.	.2	.2	.2	.2	.2	.2	.2		
5	LAST CALC STATE VEC X VEL LSB			1.	.5	.2	1.	.2	.2	.2	.2	.2	.2	.2		
6	LAST CALC STATE VEC Y VEL LSB			1.	.5	.2	1.	.2	.2	.2	.2	.2	.2	.2		
7	LAST CALC STATE VEC Z VEL LSB			1.	.5	.2	1.	.2	.2	.2	.2	.2	.2	.2		
8	STATE VECTOR TIME LSB			1.	.5	.2	1.	.2	.2	.2	.2	.2	.2	.2		
9	DESIRED CDU X			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
10	DESIRED CDU Z			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
11	DELV X LSB			-	-	-	-	-	-	-	-	-	-	-		
12	DELV Y LSB			-	-	-	-	-	-	-	-	-	-	-		
13	DELV Z LSB			-	-	-	-	-	-	-	-	-	-	-		
14	OUTPUT TO LMP			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
15	OUTPUT TO LMP			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
16	OUTPUT TO LMP			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
17	OUTPUT TO LMP			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
18	SPARE			-	-	-	-	-	-	-	-	-	-	-		
19	SPARE			-	-	-	-	-	-	-	-	-	-	-		
20	COMPNUMB			-	-	-	-	-	-	-	-	-	-	-		
21	UPOLDMOD			-	-	-	-	-	-	-	-	-	-	-		
22	STATE BUFFER +1			1.	-	.5	.5	.5	.5	.5	.5	.5	.5	.5		
23	STATE BUFFER +3			1.	-	.5	.5	.5	.5	.5	.5	.5	.5	.5		
24	STATE BUFFER +5			1.	-	.5	.5	.5	.5	.5	.5	.5	.5	.5		
25	STATE BUFFER +7			1.	-	.5	.5	.5	.5	.5	.5	.5	.5	.5		
26	STATE BUFFER +9D			1.	-	.5	.5	.5	.5	.5	.5	.5	.5	.5		
27	STATE BUFFER +11D			1.	-	.5	.5	.5	.5	.5	.5	.5	.5	.5		
28	STATE BUFFER +13D			1.	-	.5	.5	.5	.5	.5	.5	.5	.5	.5		
29	I MODE 33			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
30	TIME OF EVENT * LSB			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
31	GUIDANCE THRUST, CMD LSB			-	-	-	.5	-	-	-	.5	.5	.5	.5		
32	MOMENT OFFSET (R)			-	-	-	.5	-	-	-	.5	.5	.5	.5		
33	PREDICTED ENGINE ON TIME LSB			-	-	-	.5	-	-	-	.5	.5	.5	.5		
34	GARBAGE			-	-	-	-	-	-	-	.5	.5	.5	.5		
35	ACTUAL CDU X			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
36	ACTUAL CDU Z			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
37	DERIVED RATE (Q)			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
38	DERIVED RATE (R)			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
39	FLAGWORD 1			1.	-	.5	.5	.5	.5	.5	.5	.5	.5	.5		
40	DAP BOOLS			1.	-	.2	.2	.2	.2	.2	.2	.2	.2	.2		
41	CHANNEL 12			1.	.2	.5	.5	.5	.5	.5	.5	.5	.5	.5		
42	CHANNEL 14			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
43	CHANNEL 31			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
44	CHANNEL 33			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
45	DSPTAB +1			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
46	DSPTAB +3			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
47	DSPTAB +5			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
48	DSPTAB +7			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
49	DSPTAB +9D			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
50	DSPTAB +11D			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		

MSC FORM 806A (OCT 66) (OT)

B. HSD FORMATS: TM vs FORMATS (Cont'd)

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MEAS NUMBER	OPERATIONAL DESCRIPTION	VEH TM LINK H/L	VEH TM S/S	MSFN OUTPUT FORMATS										READ BY RTCC	COMMENTS	
				ALDS 1	HIGH-SPEED DATA FORMATS											
					1 S/S	2 S/S	3 S/S	4 S/S	5 S/S	6 S/S	7 S/S	8 S/S	9 S/S			10 S/S
GG0001X	SECOND REGISTER															
51	TIME 1			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
52	SPARE			-	-	-	-	-	-	-	-	-	-	-		
53	SPARE			-	-	-	-	-	-	-	-	-	-	-		
54	SPARE			-	-	-	-	-	-	-	-	-	-	-		
55	SPARE			-	-	-	-	-	-	-	-	-	-	-		
56	SPARE			-	-	-	-	-	-	-	-	-	-	-		
57	SPARE			-	-	-	-	-	-	-	-	-	-	-		
58	SPARE			-	-	-	-	-	-	-	-	-	-	-		
59	SPARE			-	-	-	-	-	-	-	-	-	-	-		
60	SPARE			-	-	-	-	-	-	-	-	-	-	-		
61	SPARE			-	-	-	-	-	-	-	-	-	-	-		
62	SPARE			-	-	-	-	-	-	-	-	-	-	-		
63	SPARE			-	-	-	-	-	-	-	-	-	-	-		
64	OUTPUT TO LMP			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
65	OUTPUT TO LMP			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
66	OUTPUT TO LMP			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
67	OUTPUT TO LMP			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
68	SPARE			-	-	-	-	-	-	-	-	-	-	-		
69	SPARE			-	-	-	-	-	-	-	-	-	-	-		
70	MISSION PHASE REGISTER 3			1.	.2	.5	.5	.5	.5	.5	.5	.5	.5	.5		
71	MISSION PHASE REGISTER 1			1.	.2	.5	.5	.5	.5	.5	.5	.5	.5	.5		
72	MISSION TIME REGISTER 3			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
73	MISSION TIME REGISTER 1			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
74	GARBAGE			-	-	-	-	-	-	-	-	-	-	-		
75	TIME TO GO LSB			1.	.5	-	.5	.5	.5	.5	.5	.5	.5	.5		
76	BURN DATA VGX VEL TO BE GAINED			1.	.5	-	.5	.5	.5	.5	.5	.5	.5	.5		
77	BURN DATA VGX VEL TO BE GAINED			1.	.5	-	.5	.5	.5	.5	.5	.5	.5	.5		
78	BURN DATA VGZ VEL TO BE GAINED			1.	.5	-	.5	.5	.5	.5	.5	.5	.5	.5		
79	BURN DATA VDX			1.	.5	-	.5	.5	.5	.5	.5	.5	.5	.5		
80	BURN DATA VDY			1.	.5	-	.5	.5	.5	.5	.5	.5	.5	.5		
81	BURN DATA VDZ			1.	.5	-	.5	.5	.5	.5	.5	.5	.5	.5		
82	BURN DATA RBOX			1.	.5	-	.5	.5	.5	.5	.5	.5	.5	.5		
83	BURN DATA RBOY			1.	.5	-	.5	.5	.5	.5	.5	.5	.5	.5		
84	BURN DATA RBOZ			1.	.5	-	.5	.5	.5	.5	.5	.5	.5	.5		
85	ACTUAL CDU X			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
86	ACTUAL CDU Z			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
87	DERIVED RATE (Q)			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
88	DERIVED RATE (R)			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
89	FLAGWORD 1			1.	-	.5	.5	.5	.5	.5	.5	.5	.5	.5		
90	DAP BOOLS			1.	-	.2	.2	.2	.2	.2	.2	.2	.2	.2		
91	CHANNEL 12			1.	.2	.5	.5	.5	.5	.5	.5	.5	.5	.5		
92	CHANNEL 14			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
93	CHANNEL 31			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
94	CHANNEL 33			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
95	DSPTAB +1			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
96	DSPTAB +3			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
97	DSPTAB +5			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
98	DSPTAB +7			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
99	DSPTAB +9D			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		
100	DSPTAB +11D			1.	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5		

MSC FORM 806A (OCT 66) (OT)

B. HSD FORMATS: TM vs FORMATS (Cont'd)

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MEAS NUMBER	OPERATIONAL DESCRIPTION	VEH TM LINK H/L	VEH TM S/S	MSFN OUTPUT FORMATS										REQD BY RTCC	COMMENTS	
				ALDS 1	HIGH-SPEED DATA FORMATS											
					1 S/S	2 S/S	3 S/S	4 S/S	5 S/S	6 S/S	7 S/S	8 S/S	9 S/S			10 S/S
LM ANALOGS																
GG1040V	PLS TORQ REF	H	1	1.	.2	.2	.2	.2	.2	.2	.2	.2	-	.2	X	001/069
GG1040V	PLS TORQ REF	H		-	-	-	-	-	-	-	-	-	.2	-	X	013/101
GG1110V	2.5 VDC TM BIAS	H	1	1.	.2	.2	.2	.2	.2	.2	.2	.2	.2	-	X	007/005
GG1110V	2.5 VDC TM BIAS	H		-	-	-	-	-	-	-	-	-	-	.2	X	014/037
GG1201V	IMU 28 VAC 800	H	1	1.	.2	.2	.2	.2	.2	.2	.2	-	.2	.2	X	032/037
GG1331V	IRIG SUSP 3.2 KC	H	1	1.	.2	.2	.2	.2	.2	.2	.2	-	.2	.2	X	002/037
GG2001V	X PIPA OUT IN ϕ	H	50	1.	.2	.2	.2	.2	-	.2	.2	-	.2	.2	X	001/058
GG2001V	X PIPA OUT IN ϕ	H	50	-	-	-	-	-	-	-	.2	-	-	-	X	001/061
GG2001V	X PIPA OUT IN ϕ	H	50	-	-	-	-	-	10	-	-	-	-	-	X	001/058
																006/058
																011/058
																016/058
																021/058
																026/058
																031/058
																036/058
																041/058
																046/058
GG2021V	Y PIPA OUT IN ϕ	H	50	1.	.2	.2	.2	.2	-	.2	-	.2	.2	.2	X	001/057
GG2021V	Y PIPA OUT IN ϕ	H	50	-	-	-	-	-	10	-	-	-	-	-	X	001/057
																006/057
																011/057
																016/057
																021/057
																026/057
																031/057
																036/057
																041/057
																046/057
GG2041V	Z PIPA OUT IN ϕ	H	50	1.	.2	.2	.2	.2	-	.2	.2	.2	-	.2	X	001/059
GG2041V	Z PIPA OUT IN ϕ	H	50	-	-	-	-	-	-	-	-	-	.2	-	X	001/062
GG2041V	Z PIPA OUT IN ϕ	H	50	-	-	-	-	-	10	-	-	-	-	-	X	001/059
																006/059
																011/059
																016/059
																021/059
																026/059
																031/059
																036/059
																041/059
																046/059
GG2107V	IG SVO ERR IN ϕ	H	10	1.	1.	1.	-	1.	-	1.	-	1.	1.	.1	X	001/017
GG2107V	IG SVO ERR IN ϕ	H	10	-	-	-	-	-	-	-	1.	-	-	-	X	001/026
GG2107V	IG SVO ERR IN ϕ	H	10	-	-	-	2.	-	10	-	-	-	-	-	X	001/017
																006/017
																011/017
																016/017
																021/017
																026/017
																031/017
																036/017
																041/017
																046/017

MSC FORM 806A (OCT 66) (OT)

B. HSD FORMATS: TM vs FORMATS (Cont'd)

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MEAS NUMBER	OPERATIONAL DESCRIPTION	VEH TM LINK H/L	VEH TM S/S	ALDS 1	MSFN OUTPUT FORMATS										REQD BY RTCC	COMMENTS
					HIGH-SPEED DATA FORMATS											
					1 S/S	2 S/S	3 S/S	4 S/S	5 S/S	6 S/S	7 S/S	8 S/S	9 S/S	10 S/S		
GG2110C	IG TORQ MTR CUR	H	100	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	001/055	
GG2112V	IG RSVR OUT SIN	H	10	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	002/099	
GG2113V	IG RSVR OUT COS	H	10	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	002/067	
GG2137V	MG SVO ERR IN Ø	H	100	1.	1.	-	1.	-	1.	1.	1.	1.	1.	X	001/019	
GG2137V	MG SVO ERR IN Ø	H	100	-	-	-	-	-	-	-	-	1.	-	X	001/050	
GG2137V	MG SVO ERR IN Ø	H	100	-	-	-	2.	-	10	-	-	-	-	X	001/019	
															006/019	
															011/019	
															016/019	
															021/019	
															026/019	
															031/019	
															036/019	
															041/019	
															046/019	
GG2140C	MG TORQ MTR CUR	H	100	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	001/031	
GG2142V	MG RSVR OUT SIN	H	10	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	002/034	
GG2142V	MG RSVR OUT SIN	H	-	-	-	-	-	-	-	-	-	1.	-	X	005/036	
GG2143V	MG RSVR OUT COS	H	10	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	002/101	
GG2167V	OG SVO ERR IN Ø	H	100	1.	1.	1.	-	1.	-	1.	1.	-	1.	X	001/030	
GG2167V	OG SVO ERR IN Ø	H	-	-	-	-	-	-	-	-	-	1.	-	X	001/053	
GG2167V	OG SVO ERR IN Ø	H	-	-	-	2.	-	10	-	-	-	-	-	X	001/030	
															S-	
															006/030	
															011/030	
															016/030	
															021/030	
															026/030	
															031/030	
															036/030	
															041/030	
															046/030	
GG2170C	OG TORQ MTR CUR	H	100	1.	1.	1.	1.	1.	1.	1.	1.	-	1.	X	001/023	
GG2172V	OG RSVR OUT SIN	H	10	1.	1.	1.	1.	1.	1.	1.	1.	-	1.	X	003/067	
GG2173V	OG RSVR OUT COS	H	10	1.	1.	1.	1.	1.	1.	1.	-	1.	1.	X	004/033	
GG2219V	PITCH ATT ERR	H	10	1.	.5	.5	.5	.5	1.	.5	.5	.5	.5	X	004/068	
GG2249V	YAW ATT ERR	H	10	1.	.5	.5	.5	.5	1.	.5	.5	.5	.5	X	002/100	
GG2279V	ROLL ATT ERR	H	10	1.	.5	.5	.5	.5	1.	.5	.5	-	.5	X	003/066	
GG2300T	PIPA TEMP	H	1	1.	.1	.1	.1	.1	.1	.1	-	.1	.1	X	032/101	
GG2300T	PIPA TEMP	H	-	-	-	-	-	-	-	.1	-	-	-	X	043/069	
GG2301T	IRIG TEMP	H	1	1.	.1	.1	.1	.1	.1	.1	.1	.1	.1	X	031/069	
GG6020T	PIPA CAL TEMP	H	1	1.	.5	1.	1.	1.	1.	1.	-	1.	1.	X	029/101	
LM BILEVELS																
GG1513X	IMU STBY	H	1	1.	.1	.1	.1	.1	.1	.1	-	-	-	X	008/098	
GG1523X	LGC OPR	H	1	1.	.1	.1	.1	.1	.1	.1	-	-	-	X	008/098	
GG9001X	LGC WARNING	H	1	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	032/098	
GG9002X	ISS WARNING	H	1	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	032/098	
GG9003X	PGNS CAUTION	H	1	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	032/098	

MSC FORM 806A (OCT 66) (OT)

B. HSD FORMATS: TM vs FORMATS (Cont'd)

(5). CES/LMP Page 1 of 3

MEAS NUMBER	OPERATIONAL DESCRIPTION	VEH. TM LINK H/L	VEH TM S/S	MSFN OUTPUT FORMATS												REOD BY RTCC	COMMENTS
				HIGH-SPEED DATA FORMATS													
				1 S/S	2 S/S	3 S/S	4 S/S	5 S/S	6 S/S	7 S/S	8 S/S	9 S/S	10 S/S				
LM ANALOGS																FR/WD	
GH1240V	X TRANS CMD	H	10	-	-	-	1.	1.	1.	1.	-	1.	1.	1.	X	001/065	
GH1247V	YAW ERR CMD	H	10	-	-	1.	-	1.	1.	-	1.	1.	1.	-	X	003/068	
GH1274V	YAW ERR CMD	H		-	-	-	-	-	-	-	-	-	-	1.	X	036/101	
GH1247V	YAW ERR CMD	H		-	-	-	2.	-	-	10	-	-	-	-	X	003/068	
																008/068	
																013/068	
																018/068	
																023/068	
																028/068	
																033/068	
																038/068	
																043/068	
																048/068	
GH1248V	PITCH ERR CMD	H	10	-	-	1.	-	1.	1.	-	1.	-	1.	1.	X	004/066	
GH1248V	PITCH ERR CMD	H		-	-	-	-	-	-	-	-	1.	-	-	X	040/101	
GH1248V	PITCH ERR CMD	H		-	-	-	2.	-	-	10	-	-	-	-	X	004/066	
																009/066	
																014/066	
																019/066	
																024/066	
																029/066	
																034/066	
																039/066	
																044/066	
																049/066	
GH1249V	ROLL ERR CMD	H	10	-	-	-	-	1.	1.	-	1.	-	1.	1.	X	001/098	
GH1249V	ROLL ERR CMD	H		-	-	-	-	-	-	-	-	1.	-	-	X	045/101	
GH1249V	ROLL ERR CMD	H		-	-	-	2.	-	-	10	-	-	-	-	X	001/098	
																006/098	
																011/098	
																016/098	
																021/098	
																026/098	
																031/098	
																036/098	
																041/098	
																046/098	
GH1311V	MAN THRUST CMD	H	1	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	-	X	035/005	
GH1313V	PITCH GDA POS	H	10	-	-	1.	1.	1.	1.	1.	1.	1.	-	1.	X	004/035	
GH1313V	PITCH GDA POS	H		-	-	-	-	-	-	-	-	-	-	1.	X	006/101	
GH1314V	ROLL GDA POS	H	10	-	-	1.	1.	1.	1.	1.	1.	1.	1.	-	X	004/036	
GH1314V	ROLL GDA POS	H		-	-	-	-	-	-	-	-	-	-	1.	X	003/101	
GH1331V	AUTO THRUST CMD	H	10	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	-	X	003/036	
GH1331V	AUTO THRUST CMD	H		-	-	-	-	-	-	-	-	-	-	1.	X	048/069	

MSC FORM 806A (OCT 66) (OT)

B. HSD FORMATS: TM vs FORMATS (Cont'd)

(5). CES/LMP

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MEAS NUMBER	OPERATIONAL DESCRIPTION	VEH TM LINK H/L	VEH TM S/S	MSFN OUTPUT FORMATS										REQD BY RTCC	COMMENTS	
				ALDS 1	HIGH-SPEED DATA FORMATS											
					1 S/S	2 S/S	3 S/S	4 S/S	5 S/S	6 S/S	7 S/S	8 S/S	9 S/S			10 S/S
LM ANALOGS																
GH1461V	RGA YAW RATE	H	10	1.	1.	1.	-	1.	1.	-	1.	-	1.	1.	X	FR/WD 003/034
GH1461V	RGA YAW RATE	H		-	-	-	-	-	-	-	-	1.	-	-	X	005/067
GH1461V	RGA YAW RATE	H	10	-	-	-	10	-	-	10	-	-	-	-	X	003/034 008/034 013/034 018/034 023/034 028/034 033/034 038/034 043/034 048/034
GH1462V	RGA PITCH RATE	H	10	1.	1.	1.	-	1.	1.	-	1.	-	1.	1.	X	004/034
GH1462V	RGA PITCH RATE	H		-	-	-	-	-	-	-	-	1.	-	-	X	005/099
GH1462V	RGA PITCH RATE	H	10	-	-	-	10	-	-	10	-	-	-	-	X	004/034 009/034 014/034 019/034 024/034 029/034 034/034 039/034 044/034 049/034
GH1463V	RGA ROLL RATE	H	10	1.	1.	1.	-	1.	1.	-	1.	-	1.	1.	X	005/034
GH1463V	RGA ROLL RATE	H		-	-	-	-	-	-	-	-	1.	-	-	X	004/067
GH1463V	RGA ROLL RATE	H	10	-	-	-	10	-	-	10	-	-	-	-	X	005/034 010/034 015/034 020/034 025/034 030/034 035/034 040/034 045/034 050/034

MSC FORM 806A (OCT 66) (OT)

B. HSD FORMATS: TM vs FORMATS (Cont'd)

(5). CES/LMP

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MEAS NUMBER	OPERATIONAL DESCRIPTION	VEH TM LINK H/L	VEH TM S/S	MSFN OUTPUT FORMATS										REOD BY RTCC	COMMENTS	
				ALDS 1	HIGH-SPEED DATA FORMATS											
					1 S/S	2 S/S	3 S/S	4 S/S	5 S/S	6 S/S	7 S/S	8 S/S	9 S/S			10 S/S
LM BILEVELS																
GH1204X	OUT DET	H	1	-	-	1.	1.	1.	1.	1.	-	-	-	-	X	037/098
GH1214X	AUTO ON	H	1	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	029/098
GH1217X	AUTO OFF	H	1	-	-	1.	1.	1.	1.	1.	-	-	-	-	X	037/098
GH1230X	APS ARM	H	1	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	047/098
GH1260X	APS ON	H	50	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	001/024
GH1283X	ABORT STAGE	H	50	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	001/024
GH1286X	ENG FIRE OVERRIDE	H	1	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	037/098
GH1301X	DPS ON	H	1	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	029/098
GH1323X	P TRM FAIL	H	1	1.	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	X	029/098
GH1330X	R TRM FAIL	H	1	1.	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	X	029/098
GH1348X	DPS ARM	H	1	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	047/098
GH1418V	JD 4U OUTPUT	H	200	-	-	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	RSDP SPEC PROC
GH1419V	JD 4D OUTPUT	H	200	-	-	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	RSDP SPEC PROC
GH1420V	JD 4F OUTPUT	H	200	-	-	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	RSDP SPEC PROC
GH1421V	JD 4S OUTPUT	H	200	-	-	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	RSDP SPEC PROC
GH1422V	JD 3U OUTPUT	H	200	-	-	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	RSDP SPEC PROC
GH1423V	JD 3D OUTPUT	H	200	-	-	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	RSDP SPEC PROC
GH1424V	JD 3F OUTPUT	H	200	-	-	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	RSDP SPEC PROC
GH1425V	JD 3S OUTPUT	H	200	-	-	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	RSDP SPEC PROC
GH1426V	JD 2U OUTPUT	H	200	-	-	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	RSDP SPEC PROC
GH1427V	JD 2D OUTPUT	H	100	-	-	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	RSDP SPEC PROC
GH1428V	JD 2F OUTPUT	H	200	-	-	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	RSDP SPEC PROC
GH1429V	JD 2S OUTPUT	H	200	-	-	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	RSDP SPEC PROC
GH1430V	JD 1U OUTPUT	H	200	-	-	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	RSDP SPEC PROC
GH1431V	JD 1D OUTPUT	H	200	-	-	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	RSDP SPEC PROC
GH1432V	JD 1F OUTPUT	H	200	-	-	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	RSDP SPEC PROC
GH1433V	JD 1S OUTPUT	H	200	-	-	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	RSDP SPEC PROC
GH1603X	MIN DBND (REVERSE LOGIC)	H	1	1.	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	X	047/098
GH1608X	AUTO MODE	H	1	1.	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	X	037/098
GH1609X	ATT HOLD	H	1	1.	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	X	037/098
GH1621X	AGS SEL	H	1	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	029/098
GH1896X	UNBAL CPLS	H	1	-	-	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	037/098
GL4026X	CES AC PWR FAIL	H	1	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	009/098
GL4027X	CES DC PWR FAIL	H	1	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	009/098
GW5151V	PRA COMPARE	H	50	1.	-	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	RSDP/ALDS PROC'D
GW5153V	PRA CLOCK ON	H	10	1.	-	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	RSDP/ALDS PROC'D
GW5158X	PUMP SWITCHOVER	H		1.	.1	.1	1.	1.	.1	.1	.1	.1	.1	.1	X	044/100

MSC FORM 806A (OCT 66) (OT)

B. HSD FORMATS: TM vs FORMATS (Cont'd)

(6). APS/DPS/RCS

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MEAS NUMBER	OPERATIONAL DESCRIPTION	VEH TM LINK H/L	VEH TM S/S	MSFN OUTPUT FORMATS										REOD BY RTCC	COMMENTS	
				1 ALDS	HIGH-SPEED DATA FORMATS											
					1 S/S	2 S/S	3 S/S	4 S/S	5 S/S	6 S/S	7 S/S	8 S/S	9 S/S			10 S/S
LM ANALOGS																
GP0001P	APS HE 1 PRESS.	H	1	1.	.2	.2	.2	.2	.2	.2	-	.2	.2	X	FR/WD 040/037	
GP0001P	APS HE 1 PRESS.	H	1	-	-	-	-	-	-	-	.2	-	-	X	046/101	
GP0002P	APS HE 2 PRESS.	H	1	1.	.2	.2	.2	.2	.2	.2	-	.2	.2	X	025/037	
GP0002P	APS HE 2 PRESS.	H	1	-	-	-	-	-	-	-	.2	-	-	X	027/005	
GP0025P	APS HE REG PRESS.	H	1	1.	.5	1.	1.	1.	1.	1.	1.	-	1.	X	010/069	
GP0201T	APS HE 1 TEMP	H	1	1.	.1	.1	.1	.1	.1	.1	-	.1	.1	X	035/101	
GP0201T	APS HE 1 TEMP	H	1	-	-	-	-	-	-	-	.1	-	-	X	044/069	
GP0202T	APS HE 2 TEMP	H	1	1.	.1	.1	.1	.1	.1	.1	-	.1	.1	X	004/037	
GP0202T	APS HE 2 TEMP	H	1	-	-	-	-	-	-	-	.1	-	-	X	008/005	
GP0718T	APS FUEL TEMP	H	1	1.	.1	.1	.1	.1	.1	.1	.1	.1	-	X	032/005	
GP0718T	APS FUEL TEMP	H	1	-	-	-	-	-	-	-	-	-	.1	X	044/037	
GP1218T	APS OX TEMP	H	1	1.	.1	.1	.1	.1	.1	.1	-	.1	.1	X	034/037	
GP1218T	APS OX TEMP	H	1	-	-	-	-	-	-	-	.1	-	-	X	038/005	
GP1501P	APS FUEL PRESS.	H	1	1.	.2	.2	.2	.2	.2	.2	-	.2	.2	X	017/037	
GP1501P	APS FUEL PRESS.	H	1	-	-	-	-	-	-	-	.2	-	-	X	025/005	
GP1503P	APS OX. PRESS.	H	1	1.	.2	.2	.2	.2	.2	.2	.2	.2	-	X	017/005	
GP1503P	APS OX. PRESS.	H	1	-	-	-	-	-	-	-	-	-	.2	X	028/037	
GP2010P	APS TCP	H	1	1.	.5	-	1.	1.	1.	1.	-	1.	1.	X	045/037	
GP2010P	APS TCP	H	1	-	-	-	-	-	-	-	1.	-	-	X	046/069	
BILEVELS																
GP0318X	APS HE 1 CLSD	H	1	1.	.1	.1	.1	.1	.1	.1	.1	.1	.1	X	049/098	
GP0320X	APS HE 2 CLSD	H	1	1.	.1	.1	.1	.1	.1	.1	.1	.1	.1	X	049/098	
GP0908X	APS FUEL LO	H	1	1.	1.	-	1.	-	-	-	1.	1.	1.	X	029/100	
GP1408X	APS OX LO	H	1	1.	1.	-	1.	-	-	-	1.	1.	1.	X	029/100	
GP2997U	APS PROP VLVS Δ POS (A)	H	1	1.	.1	.1	.1	.1	.1	.1	.1	.1	.1	X	038/098	
GP2998U	APS PROP VLVS Δ POS (B)	H	1	1.	.1	.1	.1	.1	.1	.1	.1	.1	.1	X	038/098	
LM ANALOGS																
GQ3018P	DPS HE REG PRESS.	H	1	1.	.5	1.	1.	1.	1.	1.	1.	1.	-	X	012/005	
GQ3435P	DPS HE PRESS.	H	1	1.	.2	.2	.2	.2	.2	.2	.2	.2	-	X	002/069	
GQ3435P	DPS HE PRESS.	H	1	-	-	-	-	-	-	-	-	.2	-	X	008/101	
GQ3603Q	DPS FUEL 1 QTY	H	1	1.	.2	-	.2	-	-	-	.2	.2	.2	-	X	028/005
GQ3603Q	DPS FUEL 1 QTY	H	1	-	-	-	-	-	-	-	-	-	.2	X	021/037	
GQ3604Q	DPS FUEL 2 QTY	H	1	1.	.2	-	.2	-	-	-	.2	-	.2	X	027/037	
GQ3604Q	DPS FUEL 2 QTY	H	1	-	-	-	-	-	-	-	.2	-	-	X	019/005	
GQ3611P	DPS FUEL PRESS.	H	1	1.	.5	1.	1.	1.	1.	1.	1.	-	1.	X	024/069	
GQ3611P	DPS FUEL PRESS.	H	1	-	-	-	-	-	-	-	-	1.	-	X	027/101	
GQ3718T	DPS FUEL 1 TEMP	H	1	1.	.1	.1	.1	.1	.1	.1	.1	.1	-	X	002/005	
GQ3718T	DPS FUEL 1 TEMP	H	1	-	-	-	-	-	-	-	-	-	.1	X	013/037	
GQ3719T	DPS FUEL 2 TEMP	H	1	1.	.1	.1	.1	.1	.1	.1	-	.1	.1	X	031/037	
GQ3719T	DPS FUEL 2 TEMP	H	1	-	-	-	-	-	-	-	.1	-	-	X	039/005	
GQ4103Q	DPS OX 1 QTY	H	1	1.	.2	-	.2	-	-	-	.2	-	.2	X	043/037	
GQ4103Q	DPS OX 1 QTY	H	1	-	-	-	-	-	-	-	.2	-	-	X	031/005	
GQ4104Q	DPS OX 2 QTY	H	1	1.	.2	-	.2	-	-	-	.2	-	.2	X	035/037	
GQ4104Q	DPS OX 2 QTY	H	1	-	-	-	-	-	-	-	.2	-	-	X	046/005	
GQ4111P	DPS OX PRESS.	H	1	1.	.5	1.	1.	1.	1.	1.	-	1.	1.	X	005/101	
GQ4111P	DPS OX PRESS.	H	1	-	-	-	-	-	-	-	1.	-	-	X	008/069	
GQ4218T	DPS OX 1 TEMP	H	1	1.	.1	.1	.1	.1	1.	1.	-	.1	.1	X	001/101	
GQ4218T	DPS OX 1 TEMP	H	1	-	-	-	-	-	-	-	.1	-	-	X	013/069	
GQ4219T	DPS OX 2 TEMP	H	1	1.	.1	.1	.1	.1	.1	.1	-	.1	.1	X	009/101	
GQ4219T	DPS OX 2 TEMP	H	1	-	-	-	-	-	-	-	.1	-	-	X	015/069	
GQ6510P	DPS TCP	H	1	1.	1.	-	1.	-	-	-	-	1.	1.	X	020/101	
GQ6510P	DPS TCP	H	1	-	-	-	-	-	-	-	1.	-	-	X	023/069	
GQ6806H	VAR INJ ACT POS	H	1	1.	.5	-	1.	-	-	-	1.	1.	1.	X	001/060	
LM BILEVELS																
GQ3309X	DPS HE 1 CLSD	H	1	1.	.1	.1	.1	.1	.1	.1	.1	.1	.1	X	044/098	
GQ3310X	DPS HE 2 OPN	H	1	1.	.1	.1	.1	.1	.1	.1	.1	.1	.1	X	044/098	
GQ4455U	DPS PROP LO	H	1	1.	1.	-	1.	-	-	-	1.	1.	1.	X	038/098	
GQ7498U	DPS PROP VLVS Δ POS (A/B)	H	1	1.	.1	.1	.1	.1	.1	.1	.1	.1	.1	X	038/098	
GQ7499U	DPS PROP VLVS Δ POS (C/D)	H	1	1.	.1	.1	.1	.1	.1	.1	.1	.1	.1	X	038/098	

MSC FORM 805A (OCT 66) (OT)

B. HSD FORMATS: TM vs FORMATS (Cont'd)

(6). APS/DPS/RCS

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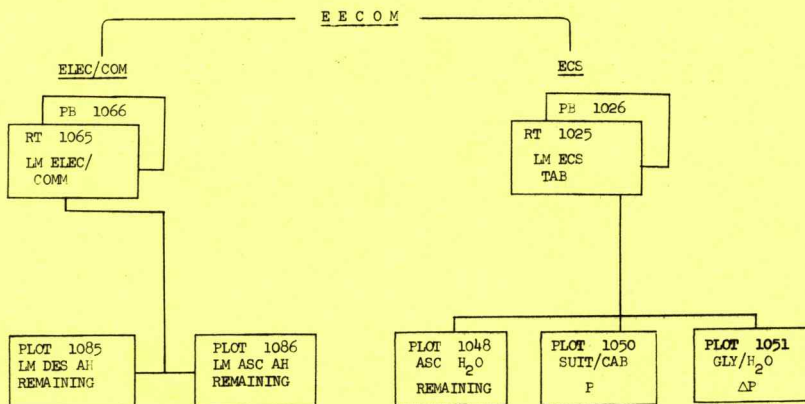
MEAS NUMBER	OPERATIONAL DESCRIPTION	VEH LINK H/L	VEH TM S/S	ALDS 1	MSFN OUTPUT FORMATS										REOD BY RTCC	COMMENTS
					HIGH-SPEED DATA FORMATS											
					1 S/S	2 S/S	3 S/S	4 S/S	5 S/S	6 S/S	7 S/S	8 S/S	9 S/S	10 S/S		
LM ANALOGS																
GR1085Q	RCS PROP A QTY	H	1.	1.	.2	.2	.2	.2	.2	.2	.2	.2	-	.2	X	042/69
GR1085Q	RCS PROP A QTY	H	1.	-	-	-	-	-	-	-	-	-	.2	-	X	039/101
GR1089T	RCS A HE TEMP	H	1.	1.	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	X	035/069
GR1089T	RCS A HE TEMP	H	1.	-	-	-	-	-	-	-	-	-	.1	-	X	037/101
GR1095Q	RCS PROP B QTY	H	1.	1.	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	X	038/69
GR1095Q	RCS PROP B QTY	H	1.	-	-	-	-	-	-	-	-	-	.2	-	X	031/101
GR1099T	RCS B HE TEMP	H	1.	1.	.1	.1	.1	.1	.1	.1	.1	.1	-	.1	X	040/069
GR1099T	RCS B HE TEMP	H	1.	-	-	-	-	-	-	-	-	-	.1	-	X	042/101
GR1101P	RCS A HE PRESS.	H	1.	1.	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	X	033/037
GR1101P	RCS A HE PRESS.	H	1.	-	-	-	-	-	-	-	-	-	.2	-	X	042/005
GR1102P	RCS B HE PRESS.	H	1.	1.	.2	.2	.2	.2	.2	.2	.2	.2	.2	-	X	033/005
GR1102P	RCS B HE PRESS.	H	1.	-	-	-	-	-	-	-	-	-	.2	-	X	038/037
GR1201P	RCS A REG PRESS.	H	1.	1.	.5	1.	1.	1.	1.	1.	1.	1.	1.	1.	X	030/005
GR1201P	RCS A REG PRESS.	H	1.	-	-	-	-	-	-	-	-	-	-	1.	X	029/069
GR1202P	RCS B REG PRESS.	H	1.	1.	.5	1.	1.	1.	1.	1.	1.	1.	-	1.	X	036/069
GR1202P	RCS B REG PRESS.	H	1.	-	-	-	-	-	-	-	-	-	1.	-	X	037/005
GR2121T	RCS A FU TEMP	H	1.	1.	.1	.1	.1	.1	.1	.1	.1	-	.1	.1	X	018/037
GR2122T	RCS B FU TEMP	H	1.	1.	.1	.1	.1	.1	.1	.1	.1	-	.1	.1	X	020/037
GR2201P	A FU MFLD PRESS.	H	1.	1.	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	X	004/069
GR2201P	A FU MFLD PRESS.	H	1.	-	-	-	-	-	-	-	-	-	.2	-	X	012/101
GR2202P	B FU MFLD PRESS.	H	1.	1.	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	X	004/101
GR2202P	B FU MFLD PRESS.	H	1.	-	-	-	-	-	-	-	.2	-	-	-	X	012/069
GR3201P	A OX. MFLD PRESS.	H	1.	1.	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	X	006/069
GR3201P	A OX. MFLD PRESS.	H	1.	-	-	-	-	-	-	-	-	-	.2	-	X	014/101
GR3202P	B OX. MFLD PRESS.	H	1.	1.	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	X	010/101
GR3202P	B OX. MFLD PRESS.	H	1.	-	-	-	-	-	-	-	.2	-	-	-	X	014/069
GR6001T	QUAD 4 TEMP.	H	1.	1.	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	X	003/005
GR6002T	QUAD 3 TEMP.	H	1.	1.	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	X	010/005
GR6003T	QUAD 2 TEMP.	H	1.	1.	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	X	022/005
GR6004T	QUAD 1 TEMP.	H	1.	1.	.1	.1	.1	.1	.1	.1	.1	.1	.1	-	X	023/005
BILEVELS																
GR9609U	RCS MAIN A CLSD	H	1.	1.	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	X	013/098
GR9610U	RCS MAIN B CLSD	H	1.	1.	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	X	013/098
GR9611U	ASC FEED A OPEN	H	1.	1.	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	X	013/098
GR9612U	ASC FEED B OPEN	H	1.	1.	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	X	013/098
GR9613U	A/B XFEED OPEN	H	1.	1.	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	X	013/098
GR9661U	4A ISO CLSD	H	1.	1.	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	X	048/098
GR9662U	4B ISO CLSD	H	1.	1.	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	X	048/098
GR9663U	3A ISO CLSD	H	1.	1.	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	X	048/098
GR9664U	3B ISO CLSD	H	1.	1.	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	X	048/098
GR9665U	2A ISO CLSD	H	1.	1.	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	X	048/098
GR9666U	2B ISO CLSD	H	1.	1.	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	X	048/098
GR9667U	1A ISO CLSD	H	1.	1.	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	X	048/098
GR9668U	1B ISO CLSD	H	1.	1.	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	X	048/098

MSC FORM 806A (OCT 66) (OT)

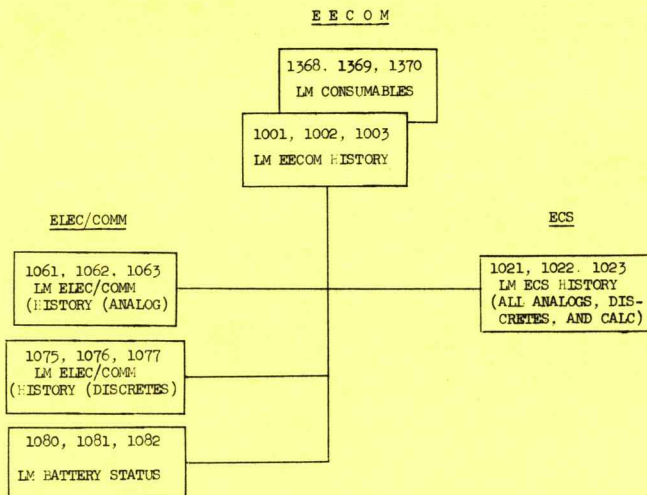
2. DISPLAYS (D/TV)

A. ELECTRICAL, ENVIRONMENTAL AND COMMUNICATIONS (EECOM) (LM-1)

1. MOCR/SSR REALTIME (RT), PLAYBACK (PB), AND PLOT DISPLAYS (PD)



2. MOCR/SSR SUMMARIES



3. MISCELLANEOUS DISPLAYS

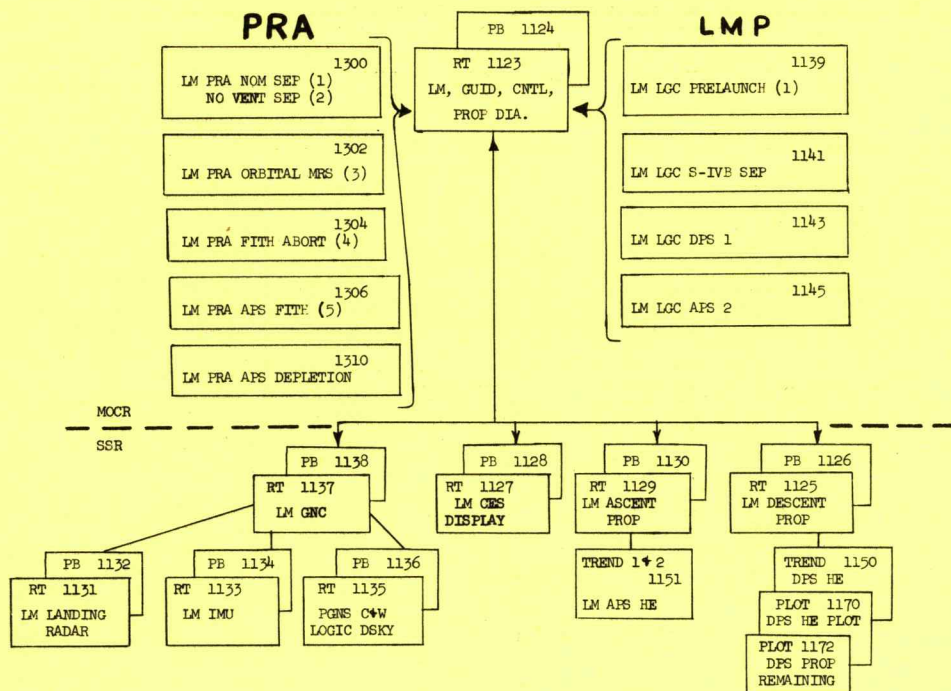
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 0047 FDO MISSION PLAN TABLE
 0056 PREDICTED SITE ACQ TABLE
 1605 TV GUIDE
 1622 LOW-SPEED MSG LOG
 2000 RTCC/FCS STATUS TABLE
 2001 TM STATUS
 1625 LM MED INPUTS
 2014 LM HEXIDEcimal

4. TV CHANNEL

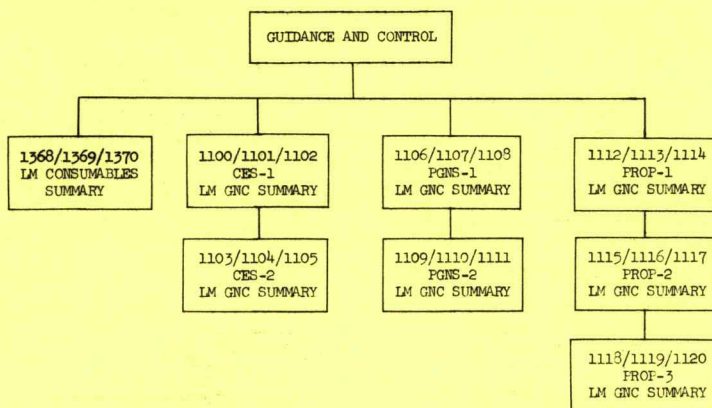
0035 LM FAILURE DIAGNOSTIC
 0036 NETWORK STATUS BOARD
 0055 WORLD MAP
 0058 ECS TRENDS
 0060 OVERALL MISSION TIMELINE
 0064 PRIME RELAY MATRIX
 0065 EPS PWR PROFILE

B. GUIDANCE AND CONTROL (G AND C) (LM-1)

1. MOCR/SSR REALTIME (RT), PLAYBACK (PB), AND PLOT DISPLAYS (PD)



2. MOCR/SSR SUMMARIES



IV. LM SYSTEMS

1. COMMAND INFORMATION

A. PRIME COMMANDS BY NUMERICAL ORDER vs TM Page 1 of 2

PRIME OCTAL NOT ACTED UPON IN LM 1	PRIME OCTAL NO.	PRIME DECIMAL NO.	RTC NO.	COMMAND TITLE	TM NO.	CUE	TM TITLE
010-011	002	2	24B*/31B	ATT HOLD ON/ ATT HOLD ENABLE	GH1608X	0	AUTO MODE
	003	3	30B*/25B	AUTO ON/ AUTO ENABLE	GH1609X	1	ATT HOLD
	004	005	4 5 64B	65B MASTER ARM (ON/OFF)	GH1608X	1	AUTO MODE
	006	007	6 7 70B	71B RCS PRESS (FIRE/RESET)	GH1609X	0	ATT HOLD
	014*	015	12 13	RCS 1A OPEN/ RESET	GY0111X	0/1	ED ARM A ON
	016*	017	14 15	RCS 3A OPEN/ RESET	GY0112X	0/1	ED ARM B ON
	026	027	22 23 40A	41A ABORT STG FIRE/RESET	GR2201,2P	179PSI	A,B FUEL MFLD PRESS
					GR3201,2P	179PSI	A,B OX MFLD PRESS
					GR1101,2P	2925PSI	RCS (A,B) He PRESS
					GR1201,2P	179PSI	RCS (A,B) REG PRESS
					GR9667U	0	1A ISO CLSD
					GR9663U	0	3A ISO CLSD
					GC0201-4V	0	BAT 1,2,3,4V
					GC1201-4C	0	BAT 1,2,3,4 CUR
					GC1205-6C	30A	BAT 5,6 CUR
030-033	034*	035	28 29	RCS 1B OPEN/ RESET	GH1283/60X	1	ABORT STAGE/APS ON
	036*	037	30 31	RCS 3B OPEN/ RESET	GH1301/48X	0	DPS ON/DPS ARM
	042	043	34 35	S-BND RNG (ON/OFF)	GP2010P	118PSI	APS TCP
	044	045	36 37 75B	74B DEADBAND LMP CNTL/MIN			
	046	047	38 39 70A	71A ABORT STG ARM/RESET	ELEC CKT INTERR TM		SEE LSH, PYRO SYS
040-041	054	055	44 45 72A	73A ENG STOP(DISABLE/ ENABLE)	GR9668U	0	1B ISO CLSD
	072	073	58 59 46A	47A LM/SLA SEP ARM/ RESET	GR9664U	0	3B ISO CLSD
	074*	075	60 61	ASC FEED A OPEN/ RESET	TKG SITE		
	076*	077	62 63	ASC FEED B OPEN/ RESET	GH1603X	0	DEADBAND SEL WIDE
	114	115	76 77	ASC FEED A CLSD/ RESET	GY0111, 2X	0	ED ARM A/B ON
100-107	116*	117	78 79	ASC FEED B CLSD/ RESET	P0001,2P	3025PSI	APS He 1/2 PRESS
	126	86		MAN THROTTLE-10% ON	GP0025P	184PSI	APS He REG PRESS
	127	87		MAN THROTTLE-30% ON	GP1501,3P	184PSI	APS FUEL/OX PRESS
	132	133	90 91 62A	63A LM/SLA SEP FIRE/ RESET	NO TM		
	134*	135	92 93	RCS 1 A CLSD/ RESET	NO TM		
120-125	136*	137	94 95	RCS 3 A CLSD/ RESET	GR9611U	1	ASC FEED A OPN
	146	147	102 103	MAN THROTTLE 50%(ON/OFF)	GR9612U	1	ASC FEED B OPN
	152	153	106 107 53A	52A C- BND (ON/OFF)	GR9611U	0	ASC FEED A OPN
	154*	155	108 109	RCS 1 B CLSD/ RESET	GR9612U	0	ASC FEED B OPN
	156*	157	110 111	RCS 3 B CLSD/ RESET	GH1311V	10%	MAN, THRUST CMD
160-165	170*	171	120 121	RCS 2 B CLSD/ RESET	GH1311V	30%	MAN, THRUST CMD
	176*	177	126 127	ASC FEED (ARM/RESET)	GL4222X	0	LM/SLA SEP
	200	201	128 129	+X TRANS (ON/OFF)	GH1204X	0	OUT OF DETENT
	206	207	134 135	APS (ARM/RESET)	K145,6-900	1	LM/SLA SEP RLY A/B
	210*	211	136 137	RCS 2B OPEN/RESET	GR9667U	1	1A ISO CLSD
202-205	212*	213	138 139 31A	30A PRI S- BND (ENABLE/OFF)	GR9663U	1	3A ISO CLSD
	226	227	150 151 00B	01B DPS (ARM/RESET)	GH1311V	50%	MAN, THRUST CMD
	230*	231	152 153	RCS 2A OPEN/RESET	TRACKING SITE		
	246	247	166 167 10B	11B ENG STOP (O/R-RESET)	GR9668U	1	1B ISO CLSD
	250*	251	168 169	RCS 2A CLSD/RESET	GR9664U	1	3B ISO CLSD
	254*	255	172 173 44A*	45A RCS MAIN A CLSD/ RESET	GR9665U	1	2A ISO CLSD
	256*	257	174 175 54A*	55A RCS MAIN B CLSD/ RESET	NO TM		
					GH1419 23V	1/0	JD 4D/3D OUTPUT
					GH1427,31V	1/0	JD 2D/1D OUTPUT
					053U	1/0	ULLAGE CMD
	206	207	134 135	APS (ARM/RESET)	GH1230X	1	APS ARM
	210*	211	136 137	RCS 2B OPEN/RESET	GR9666U	0	2B ISO CLSD
	212*	213	138 139 31A	30A PRI S- BND (ENABLE/OFF)	GT0994V	4V/0	S-BND SIG STR
					GT0992B	VAR/-15*	S-BND ST PH
					GT0201E	16W/0	S-BND PWR AMP
	226	227	150 151 00B	01B DPS (ARM/RESET)	GH1348X	1/0	DPS ARM
	230*	231	152 153	RCS 2A OPEN/RESET	GR9665U	0	2A ISO CLSD
	246	247	166 167 10B	11B ENG STOP (O/R-RESET)	GH1286X	1	ENG FIRE OVERRIDE
	250*	251	168 169	RCS 2A CLSD/RESET	GR9665U	1	2A ISO CLSD
	254*	255	172 173 44A*	45A RCS MAIN A CLSD/ RESET	GR9609U	1	RCS MAIN A CLSD
	256*	257	174 175 54A*	55A RCS MAIN B CLSD/ RESET	GR9610U	1	RCS MAIN B CLSD

B. RTC COMMANDS BY NUMERICAL ORDER

Page 1 of 2

<u>RTC</u>	<u>PRIME OCTAL</u>	<u>TITLE</u>	<u>COMMAND STRUCTURE</u>
00B	226	DPS ARM	3300
01B	227	DPS RESET	3301
10B	246	ENG STOP O/R	3310
11B	247	ENG STOP RESET	3311
14A	332	DPS REG 1 CLSD	3414
14B	326	ENG START	3314
15A	333	DPS REG 1 CLSD RESET	3415
15B	327	ENG RESET	3315
16A		INVERT 2 SEL	3416
17A		BAT 1 OFF	3417
20A		SEC S- BND ON	3420
21A		SEC S- BND OFF	3421
21B		+X DISABLE	3321
22A		BAT 2 OFF	3422
23A		BAT 6 OFF	3423
24A	272	PRI H ₂ O FEED	3424
24B	002	ATT HOLD ON	3324
25A	273	PRI H ₂ O RESET	3425
25B		AUTO ENABLE	3325
26A		BAT 5 OFF	3426
27A		BAT 6 B/U SE	3427
30A	213	PRI S- BND OFF	3430
30B	003	ATT ON (AUTO)	3330
31A	212	PRI S- BND ENABLE	3431
31B	002	ATT HOLD ENABLE	3331
32A		BAT 3 OFF	3432
34B		PRIME RLY RESET	3334
35B		PRIME RLY OFF	3335
36A		BAT 5 B/U CDR	3436
37A		BAT 4 OFF	3437
40A	026	ABORT STG FIRE	3440
40B		GUID SEL AGS	3340
41A	027	ABORT STG FIRE RESET	3441
41B		GUID SEL PNGS	3341

B. RTC COMMANDS BY NUMERICAL ORDER

Page 2 of 2

<u>RTC</u>	<u>PRIME OCTAL</u>	<u>TITLE</u>	<u>COMMAND STRUCTURE</u>
42A		DPS REG 2 OPEN	3442
43A		DPS REG 2 OPEN RESET	3443
44A	254	RCS MAIN A CLSD	3444
44B	336	SEC H ₂ O FEED	3344
45A	255	RCS MAIN A CLSD RESET	3445
45B	337	SEC H ₂ O RESET	3345
46A	072	LM/SLA SEP ARM	3446
47A	073	LM/SLA SEP ARM RESET	3447
50A	274	RCS MAIN A OPEN	3450
51A	275	RCS MAIN A OPEN RESET	3451
52A	153	C- BND OFF	3452
53A	152	C- BND ON	3453
54A	256	RCS MAIN B CLSD	3454
54B	354	DFI CAL ON	3354
55A	257	RCS MAIN B CLSD RESET	3455
55B	355	DFI CAL OFF	3355
60A	276	RCS MAIN B OPEN	3460
60B		SEC H ₂ O FEED ENABLE	3360
61A	277	RCS MAIN B OPEN RESET	3461
61B		SEC H ₂ O ENABLE RESET	3361
62A	132	LM/SLA SEP FIRE	3462
63A	133	LM/SLA SEP FIRE RESET	3463
64B	004	MASTER ARM ON	3364
65B	005	MASTER ARM OFF	3365
70A	046	ABORT STG ARM	3470
70B	006	RCS PRESS FIRE	3370
71A	047	ABORT STG ARM RESET	3471
71B	007	RCS PRESS RESET	3371
72A	054	ENG STOP DISABLE	3472
73A	055	ENG STOP ENABLE	3473
74A		APS HE 1 INHIBIT	3474
74B	045	DEADBAND MIN	3374
75A		APS HE 2 INHIBIT	3475
75B	044	DEADBAND LMP CNTL	3375

RTC	PRIME	ON OR OPEN	SYSTEM	PRIME	OFF OR CLOSE	RTC
			<u>FLIGHT CONTROLS</u>			
25B	(AUTO EN)		ATT ENABLE		(ATT HD EN)	31B
30B	(AUTO ON)	003	ATT ON	002	(ATT HOLD ON)	24B
75B	(LMP CTR)	004	DEADBAND	045	◇ (MIN)	74B
41B	(PNGS)	N/A	GUID SEL	N/A	(AGS)	40B
*** 34B	(RESET)	N/A	PRIME RELAY	N/A	(OFF)	35B
70A	(ARM)	046	ABORT STAGE	047	◇ (RESET)	71A
40A/41A	(FIRE/FIRE RESET)	026/027	ABORT STAGE	N/A		N/A
<u>EECOM</u>						
			<u>PYRO</u>			
64B	(ON)	004	MASTER ARM	005	◇ (OFF)	65B
46A	(ARM)/(ARM RESET)	072/073	LM/SLA SEP	N/A		47A
62A/63A	FIRE/FIRE RESET	132/133	LM/SLA SEP	N/A	-	N/A
			<u>ELECTRICAL</u>			
N/A	-	N/A	BAT. 1	N/A	(OFF)	17A
N/A	-	N/A	BAT. 2	N/A	(OFF)	22A
N/A	-	N/A	BAT. 3	N/A	(OFF)	32A
N/A	-	N/A	BAT. 4	N/A	(OFF)	37A
N/A	-	N/A	BAT. 5	N/A	(OFF)	26A
36A	B/U COR	N/A	BAT. 5	N/A	-	N/A
N/A	-	N/A	BAT. 6	N/A	(OFF)	23A
27A	B/U SE	N/A	BAT. 6	N/A	-	N/A
16A	SEL	N/A	INVERT 2	N/A	-	N/A
			<u>ENVIRONMENT</u>			
24A/25A	(FEED/ RESET)	272/273	PRI H ₂ O	N/A	-	N/A
44B/45B	(FEED/ RESET)	336/337	SEC H ₂ O	N/A	-	N/A
60B	ENABLE		SEC H ₂ O FEED	61B	(RESET)	
			<u>COMM</u>			
N/A	(ON)	042	S-BAND RANGE	043	◇ (OFF)	N/A
31A	(ENABLE)	212	PRI S-BND	213	◇ (OFF)	30A
20A	(ON)	N/A	SEC S-BND	N/A	(OFF)	21A
53A	(ON)	152	***C-BND	153	(OFF)	+52A
54B	(ON)	354	DFI CAL	355	◇ (OFF)	+55B

***CMD AVAILABILITY DEPENDS ON COCKPIT SW.

***WARNING - DON'T SEND MASTER RELAY RESET DURING ASC ENG OPERATION.

*PERMANENTLY INHIBITS FUNCTION

◇ INDICATES POSITION AFTER MASTER RELAY RESET IS GIVEN.

EN - ENABLE

L - INTERLOCK - UNLESS RESET CMD IS SENT, OTHER CMDS ARE INHIBITED

+ RTC - PERMANENTLY INHIBITS PRIME CMD CONTROL

C. COMMANDS BY SUBSYSTEM ORDER

Page 2 of 2

RTC	PRIME	ON OR OPEN	SYSTEM	PRIME	OFF OR CLOSE	RTC
			PROPULSION			
			<u>THROTTLE CONTROL</u>			
N/A	100% ON	346	MAN THROTTLE	347	OFF	N/A
N/A	(50% ON)	146	MAN THROTTLE	147	50% OFF	N/A
N/A	(30% ON)	127 $\diamond$	MAN THROTTLE	N/A		N/A
	(10% ON)	126	MAN THROTTLE			
			<u>TRANSLATION CNTR</u>			
N/A	(ON)	200	+X TRANSLATION	201 $\diamond$	(OFF)	N/A
N/A	---	N/A	+X		(DISABLE)	21B**
			<u>ENG ON-OFF</u>			
N/A	L (ARM)	206	APS	207 $\diamond$	(RESET)	N/A
L 00B	L (ARM)	226	DPS	227 $\diamond$	(RESET)	01B
14B/15B	(START/RESET)	326/327	ENG	N/A	---	N/A
10B	(OVERRIDE)	246	ENG STOP	247 $\diamond$	(RESET)	11B
L 72A	(DISABLE)	054	ENG STOP	055 $\diamond$	(ENABLE)	73A
74A	(INHIBIT)	N/A	APS HE. 1	N/A	---	N/A
75A	(INHIBIT)	N/A	APS HE. 2	N/A	---	N/A
			<u>DE REG VAL CNTR</u>			
N/A	(OPEN/RESET) L	312/313	DPS REG 1	332/333	(CLOSED/RESET)	14A**/15A
N/A	-----	N/A	DPS REG 2	N/A	(OPEN/RESET)	42A/43A
			<u>DPS PQGS</u>			
N/A	(ARM)	344	PQGS #1	345	(RESET)	N/A
N/A	(ON)	364	PQGS #1	365	(OFF)	N/A
N/A	(ARM)	304	PQGS #2	305	(RESET)	N/A
N/A	(ON)	324	PQGS #2	325	(OFF)	N/A
			<u>RCS VALVES</u>			
70B/71B	(FIRE/RESET)	006/007	RCS PRESS.	N/A		N/A
N/A	(ARM)	176	ASC FEED	177 $\diamond$	(RESET)	N/A
N/A	L (OPEN/RESET)	074/075	ASC FEED "A"	114/115	(CLOSE/RESET)	N/A
N/A	L (OPEN/RESET)	076/077	ASC FEED "B"	116/117	(CLOSE/RESET)	N/A
N/A	L (OPEN/RESET)	374/375	CROSSFEED	376/377	(CLOSE/RESET)	N/A
50A+/51A	L (OPEN/RESET)	274/275	RCS MAIN "A"	254/255	(CLOSE/RESET)	44A+/45A
60A+/61A	L (OPEN/RESET)	276/277	RCS MAIN "B"	256/257	(CLOSE/RESET)	54A+/55A
N/A	L (OPEN/RESET)	014/015	RCS 1 "A"	134/135	(CLOSE/RESET)	N/A
N/A	L (OPEN/RESET)	034/035	RCS 1 "B"	154/155	(CLOSE/RESET)	N/A
N/A	L (OPEN/RESET)	230/231	RCS 2 "A"	250/251	(CLOSE/RESET)	N/A
N/A	L (OPEN/RESET)	210/211	RCS 2 "B"	170/171	(CLOSE/RESET)	N/A
N/A	L (OPEN/RESET)	016/017	RCS 3 "A"	136/137	(CLOSE/RESET)	N/A
N/A	L (OPEN/RESET)	036/037	RCS 3 "B"	156/157	(CLOSE/RESET)	N/A
N/A	L (OPEN/RESET)	330/331	RCS 4 "A"	350/351	(CLOSE/RESET)	N/A
N/A	L (OPEN/RESET)	270/271	RCS 4 "B"	310/311	(CLOSE/RESET)	N/A

**PERMANENTLY INHIBITS FUNCTION. $\diamond$ INDICATES POSITION AFTER MASTER RELAY RESET IS GIVEN.

NOTE: ON ALL VALUES WITH (OPEN/RESET) LISTED THE CMD IS OPEN AND OPEN RESET OR CLOSE AND CLOSE RESET.

D. EFFECT OF INADVERTENT COMMANDS

Page 1 of 2

COMMAND TITLE	PRELAUNCH LM READY FOR L/O	LAUNCH L/O - 5-IVB C/O	ORBIT
GRR V65E (LGC UPLINK WORDS - 4 EA) (MOCR BUTTONS)	LGC CLOCKS ZEROED GRR + 1M 45S RCS PURGE GRR + 3M ECS WATER VALVE OPENED	GRR LATE >10S STABLE MEMBER MISALIGNMENT.	NOT APPLICABLE
LGC SUBORBIT SEQUENCE (MOCR SWITCH)	LGC WILL REJECT SOS UNTIL ABORT FLAG BIT IS SET IN LGC L/O + 1M 45S	LM EXECUTES SOS INSIDE SLA.	LM EXECUTES SOS INSIDE SLA IF RECEIVED PRIOR TO 5-IVB C/O + 60S
CONTINGENCY ORBIT INSERTION (MOCR SWITCH)	LGC WILL REJECT COI UNTIL ABORT FLAG BIT SET IN LGC L/O + 1M 45S	LM EXECUTES COI INSIDE SLA.	LM EXECUTES COI INSIDE SLA IF RECEIVED PRIOR TO 5-IVB C/O + 60S
PRA START WITH LM IN AGC SELECT (LGC OR ISS FAIL WILL AUTOMATICALLY SLEECT AGS) (MOCR BUTTON)	PRA SEQUENCE WILL EXECUTE INSIDE SLA ALL PRA SEQUENCES ARE CATASTROPHIC FOR LM IF EXECUTED ON PAD.	PRA SEQUENCE WILL EXECUTE IN SLA. 1. LM/S-IVB MAY SEPARATE 2. LM APS OR DPS MAY FIRE IN SLA 3. RCS QUAD MAY EXPLODE IF FIRED AT LOW MANI- FOLD PRESSURES.	PRA SEQUENCE WILL EXECUTE
PRA START WITH LM IN PNGS SELECT (MOCR BUTTON)	PRA COMMANDS INHIBITED	PRA COMMANDS INHIBITED	PRA COMMANDS INHIBITED
PRA SEQUENCE CMD OR FORWARD SEARCH OR REVERSE SEARCH (MOCR BUTTON)	PRA WILL EXECUTE CMD AND WAIT FOR AN RTC TO START	PRA WILL EXECUTE COMMAND AND WAIT FOR RTC START	PRA WILL EXECUTE COMMAND AND WAIT FOR AN RTC TO START
LGC INADVERTENT PRIME RELAY CMDS	EXECUTED IN LM IS IN PNGS SELECT	EXECUTED IF IN PNGS SELECT	EXECUTED IF IN PNGS SELECT
• CMD DEC CODE 2. ATT HOLD	NO EFFECT	NO EFFECT	DIGITAL AUTO PILOT MAY BE UNSTABLE.
4. MASTER BATTERY ARM	PYRO BUS HOT	PYRO BUS HOT	PYRO BUS HOT
6. RCS HELIUM PRESS.	NO EFFECT WITHOUT CMD NO. 2 ABOVE	NO EFFECT WITHOUT CMD NO. 2	NO EFFECT WITHOUT COMMAND NO. 2.
12, 184, 14, 216, 28, 152, 30, 136 RCS THRUSTER PAIR ISOLATION	ISOLATES RCS THRUSTER PAIR	ISOLATES RCS THRUSTER PAIR	ISOLATES RCS THRUSTER PAIR
22. ABORT STAGE ARM	ARMS PYRO BUS PRESS. RCS TANKS	ARM PYRO BUS PRESS. RCS MANIFOLD	ARMS PYRO BUS PRESS. RCS MANIFOLD
38. ABORT STAGE FIRE	NO EFFECT	NO EFFECT	NO EFFECT
22 PLUS 38 WITHOUT LGC ENGINE ON	ARMS PYRO BUS PRESS. RCS TANKS ARMS ASCENT ENGINE DISCRETE LGC (NO ACTION FROM LGC) NO. 5 AND 6 ASCENT BAT. ON BUS. DESCENT ENG ON INHIBITED	SAME AS PRELAUNCH	SAME AS PRELAUNCH
22. PLUS 38 LGC WITH ENGINE ON	FIFTH IN SLA	FIFTH IN SLA	FIFTH
58. LM/S-IVB SEP	NO EFFECT	NO EFFECT	NO EFFECT
90. LM/S-IVB FIRE	NO EFFECT	NO EFFECT	NO EFFECT
58 PLUS 90	HOLD DOWN STRAP RELEASE	HOLD DOWN STRAPS RELEASE	HOLD DOWN STRAPS RELEASE
60 OR 62 ASCENT INTERCONNECT OPEN	NO EFFECT	NO EFFECT	NO EFFECT
126 ASCENT FEED ENABLE PLUS 60 OR 62	RCS MANIFOLD OPENED TO ASCENT TANKS	RCS MANIFOLD OPENED TO ASCENT TANKS	RCS MANIFOLD OPENED TO ASCENT TANKS
128 +X TRANS ON	RCS PURGES	RCS PURGES	LGC EXECUTES +X TRANS
134 ASC ENGINE ARM	NO EFFECT	NO EFFECT	NO EFFECT
134 PLUS LGC ENGINE ON	ASC ENGINE FIRE IN SLA	ASCENT ENGINE FIRE IN SLA	ASCENT ENGINE FIRES WITH OR WITHOUT BEING STAGED
150 DESCENT ENG ARM	DECA POWERED GIMBAL FOR DPS ACTIVE THROTTLE FOR DPS ACTIVE	SAME AS LAUNCH	SAME AS LAUNCH
150 + LGC ENG ON	DPS FIRES IN SLA	DPS FIRES IN SLA	DPS FIRES
166 ENG STOP	DPS CANNOT BE STARTED NO EFFECT	DPS CANNOT BE STARTED NO COI	DPS CANNOT BE STARTED
186 H2O PRIM VALVE OR 222 OPEN	POSSIBLE WATER BOILER FAIL	NO EFFECT AFTER GRR + 3M	NO EFFECT
214 ENG START OVRD	ENG START OVERRIDE NO EFFECT	NO EFFECT	NO EFFECT
214 PLUS ENG ARM	ENGINE FIRES	ENGINE FIRES	ENGINE FIRES
102 THROTTLE 50% 230 MAX	NO EFFECT	NO EFFECT	DPS STARTS AT 50% OR MAX
252 RCS MANIFOLD X-FEED OPEN	NO EFFECT	NO EFFECT	NO EFFECT APS 2 MANIFOLD RCS ROUTINE INVALID.
CLOSED AND OFF FUNCTIONS ISSUED BY LGC	NO EFFECT	NO EFFECT	INHIBIT OPEN FUNCTIONS IF NOT REMOVED SUCH AS RCS MGNV X-FEED ASCENT INTERCONNECT
188 AND 190 RCS MAIN SHUTOFF VALVES OPEN	PROPELLANT AT LOW PRESS. IN RCS MANIFOLD HOLD MANDATORY	POSSIBLE LOSS OF RCS ENGINE AT PURGE	NO EFFECT

D. EFFECT OF INADVERTENT COMMANDS

Page 2 of 2

COMMAND TITLE	PRELAUNCH LM READY FOR L/O	LAUNCH L/O - S-IVB C/O	ORBIT
REAL-TIME COMMANDS (MOCR BUTTONS)	RTC WILL EXECUTE	RTC WILL EXECUTE	RTC WILL EXECUTE
CODE 14A DPS HE, REG CLOS NO. 1	NO EFFECT	NO COT	BLOW DOWN BURN OF DPS IF NO. 2 HE. REG IS NOT SELECTED.
16A INVERTER #2 SELECT	NO EFFECT	NO EFFECT	NO. 1 INVERTER DISABLED
17A, 22A, 32A, 37A DPS BATTERY OFF	REMOVES #1, 2, 3 OR 4 RESP. FROM BUS, CANNOT BE RESET WITHOUT GSE INPUT	SAME AS PRELAUNCH	SAME AS PRELAUNCH
24A PRIM H ₂ O VALVE OPEN	MAY CAUSE WATER BOILER FAILURE	NORMAL AFTER GRR + 3M	NOT APPLICABLE
40A, 70A ABORT STAGE ARM & FIRE	SAME AS #22 AND 38 ABOVE	SAME AS PRELAUNCH	SAME AS PRELAUNCH
44A, 54A RCS MSOV	SAME AS #188 AND 190 ABOVE	SAME AS PRELAUNCH	SAME AS PRELAUNCH
46A AND 62A LM/S-IVB SEP	SAME AS #58 AND 90	SAME AS PRELAUNCH	SAME AS PRELAUNCH
74A AND 75A ASC HE. TANK INHIBIT	INHIBITS HE. PRESS. TANK 1 OR 2 GSE RESET ONLY	SAME AS PRELAUNCH	NO. APS 2 BURN IF BOTH SENT
00B DPS ARM	SAME AS 150	SAME AS PRELAUNCH	SAME AS PRELAUNCH
10B STOP OVERRIDE	SAME AS 166	SAME AS PRELAUNCH	SAME AS PRELAUNCH
14B START OVERRIDE	SAME AS 214	SAME AS PRELAUNCH	SAME AS PRELAUNCH
24B ATT HOLD	SAME AS #2	SAME AS #2	SAME AS #2
34B PRIME RELAY RESET	INHIBIT ALL PRA AND LGC PRIME RELAY CMDS AND RESETS PRIME RELAYS.	SAME AS PRELAUNCH	SAME AS PRELAUNCH
40B AGS SELECT	STOPS PRA MANUAL THROTTLE SELECTED ENABLES PRA CMDS INHIBITS LGC PCA CMDS AGS SELECTED	SAME AS PRELAUNCH	SAME AS PRELAUNCH STOPS LGC BURNS
64B MASTER ARM SAME AS #4	PYRO BUS HOT	PYRO BUS HOT	PYRO BUS HOT
70B RCS PRESS.	SAME AS NO. 6	SAME AS NO. 6	SAME AS NO. 6
36A AND 27A ASC BAT. #5 AND #6 ON	BAT. 5 AND 6 TO ALT FEED	SAME AS PRELAUNCH	SAME AS PRELAUNCH
21B +X TRANS INHIBIT GSE RESET	DISABLES +X TRANS FROM PRIME RELAY FUNCTION NO PRA CONTROL OF +X	SAME AS PRELAUNCH	SAME AS PRELAUNCH
72A ENG STOP OVERRIDE	DISABLES CMD 10B	SAME AS PRELAUNCH	SAME AS PRELAUNCH
ALL CLOSED AND OFF RTC (RESET)	NO EFFECT IF POWER IS OFF (RESET)	NO EFFECT IF POWER IS OFF (RESET)	NO EFFECT (RELAY RESET)
ALL CLOSED AND OFF RTC (SET)	AS NOTED ABOVE OVERRIDES PRIME RELAYS	AS NOTED ABOVE OVERRIDES PRIME RELAYS	AS NOTED ABOVE OVERRIDES PRIME RELAYS

2. INSTRUMENTATION -

PCM TM vs LIMITS (CRIT./COMP) - LOGIC - SOURCE

NOTE

IN THE "GROUND SOURCE" COLUMN
THROUGHOUT THIS SECTION, THE
FOLLOWING DETONATIONS APPLY:

D - Data to TV Display

M - Meter

IE - Event Light Driven by A "1"

OE - Event Light Driven by A "0"

AE - Event Light Driven by an Analog

RE - Recorder, Event

RA - Recorder, Analog

A. SUBSYSTEM ELECTRICAL POWER										GROUND SOURCE				SEPTEMBER 8.			
MEAS	I	MEASUREMENT DESCRIPTION	TELEMETERED DATA						MCC-H			REMOTE SITE	NORMAL LOW	OPERATING LIMITS		CRITICAL LIMITS	
			MEASURED RANGE LOW	HIGH	UNITS	SAMP RATE	ACC	PCT	ENG UNITS	RTCC	GND STATION			CCATS	NORM	HIGH	LOW
GC0071V		AC BUS VOLT	0	125	VRMS	1/1	1.3	1.59	D,IE			M	113	116.3	118.2	110	120
GC0155F		AC BUS FREQ	380	470	CPS	1	1.7	0.69	D,IE			M	398	400	402	390	410
GC0201V		BAT 1 VOLT	0	40	VDC	1	1.1	0.45	D,IE			M	32.0		37.0	32.0	37.2
GC0201V													28.5	29.5	30.5	27.5	32.5
GC0202V		BAT 2 VOLT	0	40	VDC	1	1.1	0.45	D,IE			M	32.0		37.0	32.0	37.2
GC0202V													28.5	29.5	30.5	27.5	32.5
GC0203V		BAT 3 VOLT	0	40	VDC	1	1.1	0.45	D,IE			M	32.0		37.0	32.0	37.2
GC0203V													28.5	29.5	30.5	27.5	32.5
GC0204V		BAT 4 VOLT	0	40	VDC	1	1.1	0.45	D,IE			M	32.0		37.0	32.0	37.2
GC0204V													28.5	29.5	30.5	27.5	32.5
GC0205V		BAT 5 VOLT	0	40	VDC	1/1	1.1	0.45	D,IE	RA		M	32.0		37.0	32.0	37.2
GC0205V													28.0	29.0	30.0	27.5	32.5
GC0206V		BAT 6 VOLT	0	40	VDC	1/1	1.1	0.45	D,IE	RA		M	32.0		37.0	32.0	37.2
GC0206V													28.0	29.0	30.0	27.5	32.5
GC0301V		CDR BUS VOLT	0	40	VDC	1/1	1.1	0.45	D,IE	RA		M	27.0	28.0	29.0	26.5	32.5
GC0301V													27.5	28.5	29.5	26.5	32.5
GC0302V		SE BUS VOLT	0	40	VDC	1/1	1.1	0.45	D,IE	RA		M	27.0	28.0	29.0	26.5	32.5
GC0302V													27.5	28.5	29.5	26.5	32.5
GC1201C		BAT1 CUR	0	50	AMP	1/1	1.6	0.95	D,IE	RA		M	15		25		
GC1201C													20		33		

2. INSTRUMENTATION (Cont'd)

A. SUBSYSTEM ELECTRICAL POWER (CONT'D)

SEPTEMBER 8,

A. SUBSYSTEM ELECTRICAL POWER (CONT'D)										GROUND SOURCE				SEPTEMBER 8			
MEAS	I	MEASUREMENT DESCRIPTION	TELEMETERED DATA						MCC-H			REMOTE SITE	NORMAL OPERATING LIMITS			CRITICAL LIMITS	
			MEASUREMENT RANGE LOW	RANGE HIGH	UNIT	SAMPLE RATE	ACC. PCT	ENG. UNIT	RTCC	GND STATION	CCATS		LOW	NORM	HIGH	LOW	HIGH
GC1202C		BAT2 CUR	0	60	AMP	1/1	1.6	0.95	D,1E	RA		M	15		25		
GC1202C													20		33		
GC1203C		BAT3 CUR	0	60	AMP	1/1	1.6	0.95	D,1E	RA		M	15		25		
GC1203C													20		33		
GC1204C		BAT4 CUR	0	60	AMP	1/1	1.6	0.95	D,1E	RA		M	15		25		
GC1204C													20		33		
GC1205C		BAT5 CUR	0	120	AMP	1/1	1.6	1.90	D,1E	RA		M	15	45	55	0	65
GC1206C		BAT6 CUR	0	120	AMP	1/1	1.6	1.90	D,1E	RA		M	15	45	55	0	65
GC4361X		BAT 1 HI TAP	OFF	ON			1		D,1E	RE							
GC4362X		BAT 1 LOW TAP	OFF	ON			1		D,1E	RE							
GC4363X		BAT 2 HI TAP	OFF	ON			1		D,1E	RE							
GC4364X		BAT 2 LOW TAP	OFF	ON			1		D,1E	RE							
GC4365X		BAT 3 HI TAP	OFF	ON			1		D,1E	RE							
GC4366X		BAT 3 LOW TAP	OFF	ON			1		D,1E	RE							
GC4367X		BAT 4 HI TAP	OFF	ON			1		D,1E	RE							
GC4368X		BAT 4 LOW TAP	OFF	ON			1		D,1E	RE							
GC4369X		BAT 5 BUS COR	OFF	ON			1		D,1E	RE		1E,RE					
GC4370X		BAT 6 BUS COR	OFF	ON			1		D,1E	RE		RE					
GC4371X		BAT 5 BUS SE	OFF	ON			1		D,1E	RE		RE					
GC4372X		BAT 6 BUS SE	OFF	ON			1		D,1E	RE		1E,RE					
GC9961U		BAT 1 MAL	ABS	PRS			1		D,1E	RE		1E,RE					PRS
GC9962U		BAT 2 MAL	ABS	PRS			1		D,1E	RE		1E,RE					PRS
GC9963U		BAT 3 MAL	ABS	PRS			1		D,1E	RE		1E,RE					PRS
GC9964U		BAT 4 MAL	ABS	PRS			1		D,1E	RE		1E,RE					PRS
GC9965U		BAT 5 MAL	ABS	PRS			1		D,1E	RE		1E,RE					PRS
GC9966U		BAT 6 MAL	ABS	PRS			1		D,1E	RE		1E,RE					PRS

A. SUBSYSTEM PYROTECHNICS

SEPTEMBER 8,

MEAS	I D	MEASUREMENT DESCRIPTION	TELEMETERED DATA									NORMAL OPERATING LIMITS			CRITICAL LIMITS	
			MEASURED LOW	RANGE HIGH	SAMP UNITS	ACC RATE	ENG PCT					UNITS	LOW	NORM	HIGH	LOW
GY0050X		ABORT CMD	OFF	ON		1/1										
GY0111X		ED ARM A UN	DPN	CLD		1/1		D,OE	RE			OE,RE				
GY0112X		ED ARM B ON	DPN	CLD		1/1		D,OE	RE			OE,RE				
GY0121X		STG RLY A FIRE	DPN	CLD		1/1		D,OE	RE			OE,RE				
GY0122X		STG RLY B FIRE	DPN	CLD		1/1		D,OE	RE			OE,RE				

2. INSTRUMENTATION (Cont'd)

B. SUBSYSTEM INSTRUMENTATION										GROUND SOURCE			SEPTEMBER 8					
MEAS	I	MEASUREMENT DESCRIPTION	TELEMETRY DATA		RANGE	SAMP RATE	ACC PCT	ENI UNITS	MCC-H			REMOTE SITE	NORMAL LIMITS		OPERATING LIMITS		CRITICAL LIMITS	
			LOW	HIGH					RTCC	GND STATION	GCATS		LOW	NORM	HIGH	LOW	HIGH	
GL0300		FRAME SYNCH & ID				50/1												ABS
GL0302		FORMAT ID				1/1												
GL0401V		CAL RS PCT	0.0	5.0	VDC	10/1	.5	.02	D, 1E				4.23		4.27			
GL0402V		CAL LS PCT	0.0	5.0	VDC	10/1	.5	.02	D, 1E				0.73		0.77			
GL0501W		MET				10/1			D									ABS
GL026X		CES AC PWR FAIL	NO	YES		1/1				RE		1E						YES
GL027X		CES DC PWR FAIL	NO	YES		1/1				RE		1E						YES
GL028X		AGS PWR FAIL	NO	YES		1/1												YES
GL054X		CGM PWR FAIL	NO	YES		1/1			D, 1E	RE		1E, RE						YES
GL069X		MASTER ALARM ON	NO	YES		1/1			D, 1E	RE		1E, RE						YES
GL4221X		DFT CAL ON	OFF	ON		1			D, 1E	RE		1E, RE						
GL4222X		LMPSLA SEP	YES	NO		1			1E	RE, RA		1E, RE						
B. SUBSYSTEM COMMUNICATIONS																		
GT0201E		S-BAND PWR AMP PD				1/1			D, 1E			M						
GT0202E		S-BAND RFLT PWR				1			D, 1E									
GT0441X		DCA STATUS	DIGITAL	WORD		50			1E	RA, RE								
GT0619V		UHF SIG STR	-99	-10	DBM	1			D, 1E	RA		AE, M	-99		-55	-100	-54	
GT0992B		S-BAND ST PH RRR	-5	5	DBS	1/1			D, 1E				-5		5			
GT0992B													-15		15			
GT0993E		S-BAND XMTR PD				1/1			D, 1E			AE						ABS
GT0994V		S-BAND RCVR SIG	0	4.6	VDC	10			D, 1E	RA			3.4		4.25	1.1	4.25	
GT0994V													3.35		4.4	2.65	4.4	
GT0994V													3.35		4.4	1.05	4.4	
GT0994V													3.4		4.25	2.8	4.25	

2. INSTRUMENTATION (Cont'd)

C. SUBSYSTEM ENVIRONMENTAL CONTROL										GROUND SOURCE				SEPTEMBER 8.								
NEWS	I 0	MEASUREMENT DESCRIPTION	TELEMETERED DATA						MCC-H			REMOTE SITE	NORMAL			OPERATING			CRITICAL			
			MEASURED	RANGE	SAMP	ACC	ENG	RTCC			GND STATION		CCATS	LOW	LIMITS NORM	HIGH	LOW	LIMITS NORM	HIGH	LOW	LIMITS NORM	HIGH
GF2020P	PRI	GLY PMP DEL P	0	50	PSID	1/1	1.9	.93	D,1E	RA		M		25.2	28.5	32.4						
GF2020P														30.0	33.0	35.2						
GF2021P														31.6	34.0	35.2	3.0	36.8				
GF2041X	GLY	LEVEL LOW	ABS	PRS		1/1			D,1E	RE		AE							PRS			
GF3571P	CABIN	PRESS	0	10	PSIA	1/1	2.6	.25	D,1E	RA				2.4		6.1		7.7				
GF3582P	ASC 1	HP PRESS	0	25	PSIA	1	1.9	.47	D,1E			M		4.1	4.8	5.4						
GF3583P	ASC 2	HP PRESS	0	25	PSIA	1	2.6	.64	D,1E	RA		M		4.1	4.8	5.4						
GF3591P	U/H	RLF PRESS	0	25	PSIA	1/1	1.9	.47	D,1E	RA				2.4		6.1		7.7				
GF3592P	F/H	RLF PRESS	0	25	PSIA	1/1	1.9	.47	D,1E	RA				2.4		6.1		7.7				
GF4101P	PRI	H2O REG DEL P	0	2	PSID	1/1	3.0	.06	D,1E	RA		M		0.5	0.75	1.0						
GF4511T	PRI	W/B H2O TEMP	20	160	DEGF	1/1	2.4	3.36	D,1E	RA				61.0	68.0	96.0	33.0	120.0				
GF4541T	SUIT	W/B INLET	20	160	DEGF	1								56.0	70.0	96.0	33.0	120.0				
GF4582Q	ASC 1	H2O QTY	0	100	PCT	1/1	2.9	2.9	D			M		50.0		100.0	52.0					
GF4583Q	ASC 2	H2O QTY	0	100	PCT	1/1	2.9	2.9	D			M		50.0		100.0	52.0					
GF9997U	GLY	PUMP PRESS	0	67	PSIA	1/1	2.1	1.24	D,1E			M		48.9	52.7	57.0						
GF9997U														53.7	57.2	59.7						
GF9997U										RA				38.6	41.5	43.0	8.2	45.8				
GF9998U	GLY	TEMP	20	120	DEGF	1/1	1.2	1.18	D,1E	RA		M		33.0	42.0	56.0	32.0	69.0				

2. INSTRUMENTATION (Cont'd)

SEPTEMBER 8,

SUBSYSTEM NAVIGATION + GUIDANCE										GROUND SOURCE			REMOTE SITE	NORMAL LOW	OPERATING LIMITS		CRITICAL LIMITS	
MEAS. D	I	MEASUREMENT DESCRIPTION	TELEMETERED DATA RANGE		DATA SAMP RATE	ACC PCT	ENG UNITS	RTCC	GND STATION	CGATS	LOW	NORM			HIGH	LOW	HIGH	
			LOW	HIGH														
GG0001X		PGNS DOWN LINK DATA																
GG1040V		PLS TORQ REF	85	135	VDC			D										
GG1040V																		
GG1110V		2.5 VDC TM BIAS	0	5	VDC			D	RA			M						
GG1110V																		
GG1201V		IMU 28 VAC 800	0	31.1	VRMS			D	RA			M						
GG1331V		IRIG SUSP 3.2 KC	0	31.1	VRMS			D	RA			M						
GG1513X		IMU STBY	OFF	ON				D	1E,RE									
GG1513X																		
GG1523X		LGC OPR	OFF	ON				D	1E,RE			AE						
GG1523X																		
GG2001V		X PIPA OUT IN PHSE	-2.5	+2.5	VRMS			D	RA									
GG2001V																		
GG2021V		Y PIPA OUT IN PHSE	-2.5	+2.5	VRMS			D	RA									
GG2041V		Z PIPA OUT IN PHSE	-2.5	+2.5	VRMS			D	RA									
GG2041V																		
GG2107V		IG SVO ERP IN PHSE	-3	+3	VRMS			D	RA									
GG2107V																		
GG2110C		IG TORQ MTR CUR	-0.5	+0.5	AMP			D	RA									
GG2112V		IG RSVR OUT SIN	-20.25	+20.25	VRMS			D				M,RA						
GG2113V		IG RSVR OUT COS	-20.25	+20.25	VRMS			D				M,RA						
GG2121V		IG 1X RSVR SIN X	-5	+5	VRMS													
GG2137V		MG SVO ERR IN PHSE	-3	+3	VRMS			D	RA									
GG2137V																		
GG2137V																		
GG2140C		MG TORQ MTR CUR	-0.5	+0.5	AMP			D	RA									
GG2142V		MG RSVR OUT SIN	-20.25	+20.25	VRMS			D				M,RA						
GG2142V																		
GG2143V		MG RSVR OUT COS	-20.25	+20.25				D				M,RA						
GG2143V																		
GG2151V		MG 1X RSVR SIN X	-5	+5	VRMS													
GG2167V		OG SVO ERR IN PHSE	-3	+3	VRMS			D	RA									
GG2167V																		
GG2167V																		
GG2170C		OG TORQ MTR CUR	-0.9	+0.9	AMP			D	RA									
GG2172V		OG RSVR OUT SIN	-20.25	+20.25	VRMS			D				M,RA						
GG2173V		OG RSVR OUT COS	-20.25	+20.25	VRMS			D				M,RA						
GG2181V		OG 1X RSVR SIN X	-5	+5	VRMS													
GG2219V		PITCH ATT ERR	-5	+5	VRMS													
GG2249V		YAW ATT ERR	-5	+5	VRMS													
GG2279V		ROLL ATT ERR	-5	+5	VRMS													
GG2300T		PIPA TEMP	120	140	DEGF			D				M						
GG2300T																		
GG2301T		IRIG TEMP	123	140	DEGF			D				M						
GG6020T		PIPA CAL TEMP	0	150	DEGF			D,1E	RA			M						
GG9001X		LGC WARNING	ABS	PRS				D	1E,RE			RE,1E						
GG9002X		ISS WARNING	ABS	PRS				D	1E,RE			RE,1E						
GG9003X		PGNS CAUTION	ABS	PRS				D	1E,RE			RE,1E						

2. INSTRUMENTATION (Cont'd)

SEPTEMBER 8, 1964

E. SUBSYSTEM STAB. + CONTROL - CES															GROUND SOURCE				SEPTEMBER 01, 1964			
MEAS ID		MEASUREMENT DESCRIPTION	TELEMETRY DATA				MCC-H			REMOTE SITE	NORMAL OPERATING LIMITS			CRITICAL LIMITS								
			MEASURED RANGE LOW	HIGH	UNITS	SAMP RATE	ACC PCT	ENG UNITS	RTCC		GND STATION	CCATS	LOW	NORM	HIGH	LOW	HIGH					
GH1204X	OUT DET		NO	YES		1		D	1E, RE			NO		YES								
GH1214X	AUTO ON		NO	YES		1/1		D	1E, RE		AE											
GH1217X	AUTO OFF		NO	YES		1		D	1E, RE		1E, RE											
GH1230X	APS ARM		NO	YES		1		D	1E, RE		1E											
GH1240V	X TRANS CMD		-10	+10	VDC	10		D				LLL	0	UUU								
GH1247V	YAW ERR CMD		-13	+13	VDC	10/1 1.1	.29	D				-13	.5	+13								
GH1248V	PITCH ERR CMD		-13	+13	VDC	10/1 1.1	.29	D				-13	.5	+13								
GH1249V	ROLL ERR CMD		-13	+13	VDC	10/1 1.1	.29	D				-13	.5	+13								
GH1260X	APS ON		OFF	ON		50/1		D	1E, RE		1E, RE											
GH1283X	ABORT STAGE		OFF	ON		50/1		D	1E, RE		1E, RE											
GH1286X	ENG FIRE OVERRIDE		OFF	ON		1			1E, RE		1E, RE											
GH1301X	DPS ON		OFF	ON		1/1		D	1E, RE		1E, RE											
GH1311V	MAN THRUST CMD		0	14.6	VDC	1/1 1.2	.175	D	RA		M, RA	2.6		2.6	2.8							
GH1311V												5.1		4.8	5.4							
GH1313V	PITCH GOA POS		-15	+15	VDC	10/1 1.5	.45	D	RA		M, RA	-15		+15								
GH1314V	ROLL GOA POS		-15	+15	VDC	10/1 1.5	.45	D	RA		M, RA	-15		+15								
GH1323X	P TRM FAIL		NO	YES		1/1		D	1E, RE		1E, RE				YES							
GH1330X	R TRM FAIL		NO	YES		1/1		D	1E, RE		1E, RE				YES							
GH1331V	AUTO THRUST CMD		0	12	VDC	10/1 5.8	.70	D	RA		M, RA	0	0	0	0							
GH1331V												11.4	12.0	12.6	11.4							
GH1331V												0		6.13								
GH1348X	DPS ARM		NO	YES		1		D	1E, RE		1E, RE											
GH1418V	JD 4U OUTPUT		OFF	ON		200			RE	1E	1E, RE											
GH1419V	JD 4D OUTPUT		OFF	ON		200			1E, RE		1E, RE											
GH1420V	JD 4F OUTPUT		OFF	ON		200			RE	1E	1E, RE											
GH1421V	JD 4S OUTPUT		OFF	ON		200			RE	1E	1E, RE											
GH1422V	JD 3U OUTPUT		OFF	ON		200			RE	1E	1E, RE											
GH1423V	JD 3D OUTPUT		OFF	ON		200			1E, RE		1E, RE											
GH1424V	JD 3F OUTPUT		OFF	ON		200			RE	1E	1E, RE											
GH1425V	JD 3S OUTPUT		OFF	ON		200			RE	1E	1E, RE											
GH1426V	JD 2U OUTPUT		OFF	ON		200			RE	1E	1E, RE											
GH1427V	JD 2D OUTPUT		OFF	ON		200			RE	1E	1E, RE											
GH1428V	JD 2F OUTPUT		OFF	ON		200			RE	1E	1E, RE											
GH1429V	JD 2S OUTPUT		OFF	ON		200			RE	1E	1E, RE											
GH1430V	JD 1U OUTPUT		OFF	ON		200			RE	1E	1E, RE											
GH1431V	JD 1D OUTPUT		OFF	ON		200			RE	1E	1E, RE											
GH1432V	JD 1F OUTPUT		OFF	ON		200			RE	1E	1E, RE											
GH1433V	JD 1S OUTPUT		OFF	ON		200			RE	1E	1E, RE											
GH1461V	RGA YAW RATE		-3.5	+3.5	VRMS	10/1 2.7	.19	D	RA		M, RA	-3.5		+3.5								
GH1462V	RGA PITCH RATE		-3.5	+3.5	VRMS	10/1 2.7	.19	D	RA		M, RA	-3.5		+3.5								
GH1463V	RGA ROLL RATE		-3.5	+3.5	VRMS	10/1 2.7	.19	D	RA		M, RA	-3.5		+3.5								
GH1603X	DEADBAND		NAR	WIDE		1		D	1E, RE						WIDE							
GH1608X	AUTO MODE		OFF	ON		1		D	1E, RE		RE, OE											
GH1609X	ATT HOLD		OFF	ON		1		D	1E, RE		RE, 1E											
GH1621X	AGS SEL		PGNS	AGS		1/1		D	1E, RE	1E	RE, 1E				AGS (RGA)							
GH1896X	UNBAL CPLS		NO	YES		1			1E, RE													
E. SUBSYSTEM STAB. + CONTROL - LWP																						
GH5151V	PRA COMPARE		ABS	PRS		50		1E			RE, 1E				ABS							
GH5153V	PRA CLOCK ON		ABS	PRS		10		1E			RE, 1E				ABS							

2. INSTRUMENTATION (Cont'd)

F. SUBSYSTEM PROPULSION/ASCENT STAGE										GROUND SOURCE				SEPTEMBER 8,				
MEAS	I D	MEASUREMENT DESCRIPTION	TELEMETERED DATA					MCC-H			REMOTE SITE	NORMAL LIMITS			OPERATING LIMITS		CRITICAL LIMITS	
			MEASURED LOW	RANGE HIGH	UNITS	SAMP RATE	ACC PCT	ENG UNITS	RTCC	GND STATION		CCATS	LOW	NORM	HIGH	LOW	HIGH	
GP0001P		APS HE 1 PRESS	0	4000	PSIA	1/1	2.4	112.4	D			M, RA	2700		3500	1000	3500	
GP0001P															3500	1000	3500	
GP0001P													400		3500	250	3500	
GP0002P		APS HE 2 PRESS	0	4000	PSIA	1/1	2.8	112.4	D			M, RA	2700		3500	1000	3500	
GP0002P															3500	1000	3500	
GP0002P													400		3500	250	3500	
GP0025P		APS HE REG PRESS	0	300	PSIA	1/1	2.0	5.89	D			RA	0	15	200		250	
GP0025P													172		205	172	205	
GP0025P													172	184	188	150	205	
GP0025P															205		250	
GP0201T		APS HE 1 TEMP	-200	+200	DEGF	1/1	1.8	7.20	D				30	70	140	30	140	
GP0201T													30		140	30	140	
GP0201T													-120		140	-120	140	
GP0201T														70	140			
GP0202T		APS HE 2 TEMP	-200	+200	DEGF	1/1	1.8	7.20	D				30	70	140	30	140	
GP0202T													30		140	30	140	
GP0202T													-120		140	-120	140	
GP0202T														70	140			
GP0318X		APS HE 1 CLSD	UPN	CLD			1		D	1E,OE,RE								
GP0320X		APS HE 2 CLSD	UPN	CLD			1		D	1E,OE,RE								
GP0718T		APS FUEL TEMP	20	120	UEGF	1/1	2.8	2.80	D				50	70	90	40	100	
GP0908X		APS FUEL LO	OFF	ON		1/1			D,1E,OE	1E,RE		AE					ON	
GP1218T		APS OX TEMP	20	120	DEGF	1/1	2.8	2.80	D				50	70	90	40	100	
GP1408X		APS OX LO	OFF	ON		1			D,1E,OE	1E,RE		AE					ON	
GP1501P		APS FUEL PRESS	0	250	PSIA	1/1	2.2	5.50	D			RA, M	100		190	100	190	
GP1501P													172		205	172	205	
GP1501P													155	165	187	115	225	
GP1501P													178		205	172	250	
GP1503P		APS OX PRESS	0	250	PSIA	1/1	2.2	5.50	D			M, RA	100		190	100	190	
GP1503P													172		205	172	205	
GP1503P													155	165	187	115	225	
GP1503P													172		205	172	250	
GP2010P		APS TGP	0	150	PSIA	1/1	2.1	3.09	D	RA		M, RA	115	120	125	90	155	
GP2997U		PROP VLVS DEL P CLD/OPN MTD					100		D,1E,OE	RE		1E, RE						
GP2998U		PROP VLVS DEL P CLD/OPN MTD					100		D,1E,OE	RE		1E, RE						

2. INSTRUMENTATION (Cont'd)

		SUBSYSTEM PROPULSION/DESCENT STAGE							GROUND SOURCE				SEPTEMBER 8,				
MEAS	I D	MEASUREMENT DESCRIPTION	TELEMETERED DATA						MCC-H			REMOTE SITE	NORMAL LOW	OPERATING LIMITS		CRITICAL LIMITS	
			MEASURED LOW	RANGE HIGH	UNITS	SAMP RATE	ACC PCT	ENG UNITS	RTCC	GND STATION	GCATS			LOW	NORM	HIGH	LOW
GQ3018P		DPS HE PEG PRESS	0	300	PSIA	1/1	2.0	5.89	D			M,RA	50		253		300
GQ3018P													242		253	242	253
GQ3018P													242	246	253	220	253
GQ3309X		DPS HE 1 CLD	OPN	CLD			1		D	1E,OE,RE		AE					
GQ3310X		DPS HE 2 OPEN	CLD	OPN			1		D	1E,OE,RE		AE					
GQ3435P		DPS HE PRESS	0	2000	PSIA	1	1.7	31.24	D	RA		RA,M	500		1380	350	1560
GQ3435P													350		1550		1960
GQ3435P													350		1550	300	1960
GQ3603Q		DPS FUEL 1 QTY	0	95	PCT	1/1	1.1	1.32	D			RA				95	5.6
GQ3603Q							.7	.66									
GQ3604Q		DPS FUEL 2 QTY	0	95	PCT	1/1	1.1	1.02	D							95	5.6
GQ3604Q							.7	.66									
GQ3611P		DPS FUEL PRESS	0	300	PSIA	1/1	1.9	5.60	D			M,RA	190		235	160	235
GQ3611P													214	220	224	T80	240
GQ3611P													229	235	239	T80	260
GQ3611P													242		253	T80	253
GQ3718T		DPS FUEL 1 TEMP	20	120	DEGF	1	2.4	2.80	D				50	70	90	40	100
GQ3719T		DPS FUEL 2 TEMP	20	120	DEGF	1	2.8	2.90	D				50	70	90	40	100
GQ4103Q		DPS OX 1 QTY	0	95	PCT	1/1	1.1	1.02	D			RA				95	5.6
GQ4103Q							.7	.66									
GQ4104Q		DPS OX 2 QTY	0	95	PCT	1/1	1.1	1.02	D							95	5.6
GQ4104Q							.7	.66									
GQ4111P		DPS OX PRESS	0	300	PSIA	1/1	2.0	5.95	D			M,RA	110		230	100	230
GQ4111P													214	220	224	T80	240
GQ4111P													229	235	239	T80	260
GQ4111P													242		253	T80	253
GQ4218T		DPS OX 1 TEMP	20	120	DEGF	1	2.8	2.80	D				50	70	90	40	100
GQ4219T		DPS OX 2 TEMP	20	120	DEGF	1	2.8	2.90	D				50	70	90	40	100
GQ4455X		DPS PROP LO		LO			1		D	1E,OE,RE		AE					LO
GQ6510P		DPS TCP	0	200	PSIA	1/1	1.9	2.70	D	RA		M,RA	100	104	108	95	110
GQ6510P													9		12	7	14
GQ6806H		VAR ING ACT POS	0	100	PCT	50/1	1.1	1.10	D	RA		M,RA					
GQ7498U		PROP VLVS DEL P	CLD/OPN	MID			100		D,1E,OE	RE		1E,RE					
GQ7499U		PROP VLVS DEL P	CLD/OPN	MID			100		D,1E,OE	RE		1E,RE					

2. INSTRUMENTATION (Cont'd)

F. SUBSYSTEM REACTION CONTROL										GROUND SOURCE				SEPTEMBER 8,				
MEAS	I D	MEASUREMENT DESCRIPTION	TELEMEASURED RANGE		DATA HIGH UNITS	SAMP RATE	ACC PCT	ENG UNITS	MCC-H			REMOTE SITE	NORMAL LIMITS		OPERATING LIMITS		CRITICAL LIMITS	
			LOW	HIGH					RTCC	GND STATION	CCATS		LOW	NORM	LOW	HIGH	LOW	HIGH
GR1085Q		RCS PROP A QTY	0	100	PCT	1/1	3.0	3.04	D			M	0		100			
GR1089T		HE TANK A SURF	20	120	DEGF	1/1	3.0	3.04	D				40		100		120	
GR1089T																	120	
GR1095Q		RCS PROP B QTY	0	100	PCT	1/1	3.0	3.04	D			M			100			
GR1099T		HE TANK B SURF	20	120	DEGF	1/1	3.0	3.04	D				40		100		120	
GR1099T																	120	
GR1101P		RCS A HE PRESS	0	3500	PSIA	1/1	2.8	93.37	D			M	1240		3000	500	3500	
GR1101P																	3500	
GR1102P		RCS B HE PRESS	0	3500	PSIA	1/1	2.0	63.67	D			M	1240		3000	500	3500	
GR1102P																	3500	
GR1202P		RCS B REG PRESS	0	350	PSIA	1/1	2.8	3.84	D			M	178		188	150	213	
GR2121T		RCS A FUEL TEMP	20	120	DEGF	1/1	2.8	2.8	D				50		90	40	100	
GR2122T		RCS B FUEL TEMP	20	120	DEGF	1/1	2.8	2.8	D				50		90	40	100	
GR2201P		A FUEL MFLD PRES	0	350	PSIA200/1	2.3	9.61		D			M	165		185	140	210	
GR2202P		B FUEL MFLD PRES	0	350	PSIA200/1	1.9	6.54		D			M	165		185	140	210	
GR3201P		A OX MFLD PRESS	0	350	PSIA200/1	1.9	6.54		D			M	165		185	140	210	
GR3202P		B OX MFLD PRESS	0	350	PSIA200/1	1.9	6.54		D			M	165		185	140	210	
GR6001T		QUAD 4 TEMP	20	200	DEGF	1/1	2.2	3.96	D			AE	122	126	130	120	190	
GR6002T		QUAD 3 TEMP	20	200	DEGF	1/1	2.2	3.96	D			AE	122	126	130	120	190	
GR6003T		QUAD 2 TEMP	20	200	DEGF	1/1	2.2	3.96	D			AE	122	126	130	120	190	
GR6004T		QUAD 1 TEMP	20	200	DEGF	1/1	2.2	3.96	D				122	126	130	120	190	
GR9609U		RCS MAIN A CLSD	OPN	CLD		1/1			D	1E,OE,RE		RE,1E						
GR9610U		RCS MAIN B CLSD	OPN	CLD		1/1			D	1E,OE,RE		RE,1E						
GR9611U		ASC FEED A UPEN	CLD	OPN		1/1			D	1E,OE,RE		1E,RE						
GR9612U		ASC FEED B OPEN	CLD	OPN		1/1			D	1E,OE,RE		RE,1E						
GR9613U		A/B XFEED UPEN	CLD	OPN		1/1			D	1E,OE,RE		RE,1E						
GR9661U		4A ISO CLSD	OPN	CLD		1			D	1E,RE		RE,1E						
GR9662U		4B ISO CLSD	OPN	CLD		1			D	1E,RE		RE,1E						
GR9663U		3A ISO CLSD	OPN	CLD					D	1E,RE		RE,1E						
GR9664U		3B ISO CLSD	OPN	CLD		1			D	1E,RE		1E,RE						
GR9665U		2A ISO CLSD	OPN	CLD		1			D	1E,RE		1E,RE						
GR9666U		2B ISO CLSD	OPN	CLD		1			D	1E,RE		1E,RE						
GR9667U		1A ISO CLSD	OPN	CLD		1			D	1E,RE		1E,RE						
GR9668U		1B ISO CLSD	OPN	CLD		1			D	1E,RE		1E,RE						

3. LM SUBSYSTEM INFORMATION

A. PGNS - Alarm Error Codes

IMU SUBSYSTEM

00205 SATURATED-PIPA ALARM
00206 ZERO CDU NOT ALLOWED WITH COARSE ALIGN AND GIMBAL LOCK
00207 ISS TURN-ON REQUEST NOT PRESENT FOR 90 SECONDS
00210 IMU NOT OPERATING WHEN ICDC ZERO REQUESTED
00211 COARSE ALIGN ERROR. GIMBAL ANGLES NOT WITHIN 2 DEGREES OF DESIRED ANGLES
00212 PIPA FAIL WITH PIPA FAIL INHIBIT BIT SET
00213 ISS TURN-ON REQUEST WITH ISS OPERATIVE DISCRETE NOT PRESENT
00214 PROGRAM USING IMU WHEN TURNED OFF

DISPLAY ALARMS (PART 1)

00300 ABORT COMMAND RECEIVED BUT ABORT NOT ENABLED
00310 CURTAINS ALARM (BADEND IN ATTSTALL, IMUSTALL, ETC., USUALLY)
00312 DAP MANEUVER PREVENTED BY FAILURE OF JETS
00315 FORGETTIT ALARM
00316 RESTART OCCURRED BUT PROGRAM WASN'T RESTARTABLE (FAKESTRT)

PROCEDURAL DIFFICULTY

00401 DESIRED GIMBAL ANGLES YIELD GIMBAL LOCK
00404 COMPUTED DT FOR WAITLIST TOO BIG OR NEGATIVE (TASKSETR - MP 9). ABORT (LGC)
00405 LAMBERT ITERATIONS NOT CONVERGING - MISSION PHASE 13
00410 OVERFLOW PRIOR TO OR DURING COMPUTATION OF ACS OR AFC5 (MP 11)
00411 OVERFLOW IN ANG MOMENTUM CMD (COMPUTATION OF AFC51) (MP 11)
00412 OVERFLOW AFTER COMPUTATION OF AFC51 (MP 11)

MISSION SCHEDULER ERRORS

00601 MISSION PHASE DUE BUT PHASE REGISTER = 0

COMPUTER HARDWARE MALFUNCTIONS

01102 AGC SELF TEST ERROR
01103 UNUSED CCS BRANCH EXECUTED. ABORT (LGC)
01105 DOWNLINK TOO FAST
01106 UPLINK TOO FAST
01107 PHASE TABLE ENTRIES DO NOT AGREE - DO A FRESH START
01110 RESTART BUT NO GROUPS ACTIVE

LIST OVERFLOWS (ALL COMPUTER ABORTS)

01201 EXECUTIVE OVERFLOW - NO VAC AREAS
01202 EXECUTIVE OVERFLOW - NO CORE SETS
01203 WAITLIST OVERFLOW - TOO MANY TASKS
01205 KEYBOARD AND DISPLAY WAITING LINE OVERFLOW
01207 NO VAC AREA FOR MARKS
01210 MORE THAN ONE IMU, RR, AOT, OR ATTITUDE PROGRAM ATTEMPTING TO USE STALL ROUTINES AT SAME TIME

INTERPRETER ERRORS

01301 ARCSIN-ARCCOS INPUT ANGLE TOO LARGE. ABORT (LGC)
01302 SQRT CALLED WITH NEGATIVE ARGUMENT. ABORT (LGC)

DISPLAY ALARMS (PART 2)

01405 DV ALARM. ENGINE ON BUT NO THRUST
01410 JET FAIL DURING FCS TEST
01411 CDU DOES NOT AGREE WITH COMMAND TO 1 DEGREE
01412 CDU DOES NOT AGREE WITH COMMAND TO 5 DEGREES

KEYBOARD AND DISPLAY PROGRAM

01501 KEYBOARD AND DISPLAY ERROR DURING INTERNAL USE. ABORT (LGC)

SYSTEM TEST ALARMS

01600 DRIFT TEST OVERFLOW
01601 BAD IMU TORQUE IN DRIFT OR IN GYROCOMPASS

CAUTION

THE FOLLOWING ERROR CODES SHOULD NOT BE
DISPLAYED ANYTIME DURING THE MISSION.

OPTICS SUBSYSTEM

00105 MARK SYSTEM CURRENTLY IN USE
00111 MARK IS MISSION AFTER V53 ENTER
00112 AOTMARK SYSTEM HAS NOT BEEN INITIALIZED TO ACCEPT THIS MARK
00113 NO BIT 3, 4, 5, 6, OR 7 (INBITS) IN CHANNEL 16
00114 REQUESTED MARK NOT MADE
00115 NO MARK TO REJECT

RADAR ERRORS

00501 RADAR ANTENNA OUT OF LIMITS OF EACH MODE
00502 DESIRED RADAR GIMBAL ANGLES OUT OF LIMITS OF EACH MODE
00505 NO RENDEZVOUS RADAR DATA GOOD SIGNAL WITHIN 30 SECONDS WITH LOCKON REQUESTED
00510 RENDEZVOUS ZERO CDU REQUESTED WITH RENDEZVOUS RADAR NOT IN AUTO MODE
00514 RADAR RENDEZVOUS AUTO POWER OFF WITH PROGRAM USING THE RENDEZVOUS RADAR
00520 RADAR RUPT OCCURRED BUT NOT EXPECTED
00521 RADAR DATA COULD NOT BE READ
00522 LANDING RADAR NOT IN DESIRED POSITION
00523 LANDING RADAR DID NOT ACHIEVE POSITION 2 UPON REQUEST IN DESIRED TIME INTERVAL
00524 TARGET VECTOR REQUIRES RENDEZVOUS RADAR ANGLES NOT WITHIN LIMITS OF EITHER MODE

*COMPLETE LISTING BASED UPON REV 0 OF SUNBURST 116, MAR. 29, 1967.

3. LM SUBSYSTEM INFORMATION (Cont'd)

A. PGNS - Nouns

NORMAL NOUNS		SCALE AND DECIMAL POINT
00	NOT IN USE	
01	SPECIFY MACHINE ADDRESS (FRACTIONAL)	(.XXXXX)
02	SPECIFY MACHINE ADDRESS (WHOLE)	(XXXXX.)
03	SPECIFY MACHINE ADDRESS (DEGREES)	(XXX.XX DEGREES)
04	SPECIFY MACHINE ADDRESS (HOURS)	(XXX.XX HOURS)
05	SPECIFY MACHINE ADDRESS (SECONDS)	(XXX.XX SECONDS)
06	SPECIFY MACHINE ADDRESS (GYRO DEGREES)	(XX.XXX DEGREES)
07	SPARE	
10	CHANNEL TO BE SPECIFIED	
11	SPARE	
12	SPARE	
13	SPARE	
14	SPARE	
15	INCREMENT MACHINE ADDRESS	(OCTAL ONLY)
16	TIME SECONDS	(XXX.XX SECONDS)
17	TIME HOURS	(XXX.XX HOURS)
20	ICDU	(XXX.XX DEGREES)
21	PIPAS	(XXXXX. PULSES)
22	NEW ANGLES 1	(XXX.XX DEGREES)
23	DELTA ANGLES 1	(XXX.XX DEGREES)
24	DELTA TIME (SECONDS)	(XXX.XX SECONDS)
25	CHECKLIST	(XXXXX.)
26	PRIO/DELAY, ADRES, BBON	(OCTAL ONLY)
27	SELF TEST ON/OFF SWITCH	(XXXXX.)
30	STAR NUMBERS	(XXXXX.)
31	ALMCADR, ALMCADR +1, ERCOUNT	(OCTAL ONLY)
32	DECISION TIME (MIDCOURSE)	(XXX.XX HOURS (INTERNAL UNITS = WEEKS))
33	EPHEMERIS TIME (MIDCOURSE)	(XXX.XX HOURS (INTERNAL UNITS = WEEKS))
34	MEASURED QUANTITY (MIDCOURSE)	(XXXX.XX KILOMETERS)
35	INBIT MESSAGE	(OCTAL ONLY)
36	LANDMARK DATA 1	(OCTAL ONLY)
37	LANDMARK DATA 2	(OCTAL ONLY)
40	RENDEZVOUS RADAR ANGLES (TRUNION, SHAFT)	(XXX.XX DEGREES) (UNUSED IN LM-1)
41	NEW RENDEZVOUS RADAR ANGLES (TRUNION, SHAFT)	(XXX.XX DEGREES) (UNUSED IN LM-1)
42	AOT ROTATION ANGLES	(XXX.XX DEGREES)
43	AOT DETENT CODE	(XXXXX.)
44	FORWARD VELOCITY, LATERAL VELOCITY	(XXXXXX. FEET/SEC)
45	ROTATIONAL HAND CONTROLLER ANGLE RATES	(XXXXXX. DEG/SEC) (NOT USED IN LM-1)
46	SPARE	
47	SPARE	
50	FAILREG, FAILREG +1, FAILREG +2	(OCTAL ONLY)
51	SPARE	
52	GYRO BIAS DRIFT	(.BBXXXXX (MILLIRAD/SEC))
53	GYRO INPUT AXIS ACCELERATION DRIFT	(.BBXXXXX (MILLIRAD/SEC)/ (CM/SEC SEC)
54	GYRO SPIN AXIS ACCELERATION DRIFT	(.BBXXXXX (MILLIRAD/SEC) (CM/SEC SEC)
END OF NORMAL NOUNS		
MIXED NOUNS		SCALE AND DECIMAL POINT
55	LANDING RADAR ALTITUDE, TIME (SECONDS)	(XXXXX. FEET, XXX.XX SEC) (UNUSED IN LM-1)
56	LANDING RADAR VEL X, TIME (SECONDS)	(XXXXX. FEET/SEC, XXX.XX SEC) (UNUSED IN LM-1)
57	LANDING RADAR VEL Y, TIME (SECONDS)	(XXXXX. FEET/SEC, XXX.XX SEC) (UNUSED IN LM-1)
60	LANDING RADAR VEL Z, TIME (SECONDS)	(XXXXX. FEET/SEC, XXX.XX SEC) (UNUSED IN LM-1)
61	TARGET AZIMUTH AND ELEVATION	(XXX.XX DEG, XX.XXX DEG)
62	RENDEZVOUS RADAR RANGE, TRUNION, SHAFT	(XXXXX B.FEET, XXX.XX DEG, XXX.XX DEG) (UNUSED IN LM-1)
63	RENDEZVOUS RADAR RANGE RATE, TRUNION, SHAFT	(XXXXX. FEET/SEC, XXX.XX DEG, XXX.XX DEG) (UNUSED IN LM-1)
64	INITIAL ALTITUDE, FINAL ALTITUDE, ALT. RATE	(XXXXX. FEET, XXXXX. FEET, XXXXX. FEET/SEC)
65	SAMPLED TIME (HOURS AND SECONDS) (FETCHED IN INTERRUPT)	(XXX.XX HOURS, XXX.XX SEC)
66	SYSTEM TEST RESULTS	(XXXXX., .XXXXX, XXXXX.)
67	DELTA GYRO ANGLES	(XX.XXX DEG FOR EACH)
70	SPARE	
71	SPARE	
72	DELTA POSITION	(XXXXX.X KILOMETERS FOR EACH)
73	DELTA VELOCITY	(XXXXX.X METERS/SEC FOR EACH)
74	MEASUREMENT DATA (MIDCOURSE)	(XXX.XX HOURS (INTERNAL UNITS= WEEKS), XXXX.X KILOMETERS, XXXXX.)
75	MEASUREMENT DEVIATIONS (MIDCOURSE)	(XXXXX.X KILOMETERS, XXXXX.X METERS/ SEC, XXXXX.X KILOMETERS)
76	POSITION VECTOR	(XXXXX.X KILOMETERS FOR EACH)
77	VELOCITY VECTOR	(XXXXX.X METERS/SEC FOR EACH)

3. LM SUBSYSTEM INFORMATION (Cont'd)

A. PGNS - Verbs

REGULAR VERBS

<u>VERB CODE</u>	<u>FUNCTION</u>	<u>DISPLAY LOCATION</u>
00	ILLEGAL	
01	DISPLAY (IN OCTAL) 1ST COMPONENT OF:	R1
02	DISPLAY (IN OCTAL) 2ND COMPONENT OF:	R1
03	DISPLAY (IN OCTAL) 3RD COMPONENT OF:	R1
04	DISPLAY (IN OCTAL) 1ST AND 2ND COMPONENTS OF:	R1, R2
05	DISPLAY (IN OCTAL) 1ST, 2ND, 3RD COMPONENTS OF:	R1, R2, R3
06	DISPLAY (IN DECIMAL) ALL COMPONENTS OF:	AS APPROPRIATE
07	DOUBLE PRECISION DECIMAL DISPLAY	R1, R2
08	SPARE	
09	SPARE	
10	SPARE	
11	MONITOR (IN OCTAL) 1ST COMPONENT OF:	R1
12	MONITOR (IN OCTAL) 2ND COMPONENT OF:	R1
13	MONITOR (IN OCTAL) 3RD COMPONENT OF:	R1
14	MONITOR (IN OCTAL) 1ST, 2ND COMPONENT OF:	R1, R2
15	MONITOR (IN OCTAL) 1ST, 2ND, 3RD COMPONENTS OF:	R1, R2, R3
16	MONITOR (IN DECIMAL) ALL COMPONENTS OF:	AS APPROPRIATE
17	MONITOR DOUBLE PRECISION DECIMAL	R1, R2
18	SPARE	
19	SPARE	
20	SPARE	
21	LOAD 1ST COMPONENT INTO:	R1
22	LOAD 2ND COMPONENT INTO:	R2
23	LOAD 3RD COMPONENT INTO:	R3
24	LOAD 1ST, 2ND COMPONENTS INTO:	R1, R2
25	LOAD 1ST, 2ND, 3RD COMPONENTS INTO:	R1, R2, R3
26	SPARE	
27	FIXED MEMORY DISPLAY	
28	SPARE	
29	SPARE	
30	REQUEST EXECUTIVE	
31	REQUEST WAITLIST	
32	CONTENTS OF R2 INTO R3, CONTENTS OF R1 INTO R2	
33	PROCEED WITHOUT DATA	
34	TERMINATE CURRENT TEST OR LOAD REQUEST	
35	TEST LIGHTS	
36	FRESH START	
37	CHANGE MAJOR MODE TO:	
38	SPARE	
39	SPARE	

EXTENDED VERBS

<u>VERB CODE</u>	<u>FUNCTION</u>
40	ZERO (USED WITH NOUN 20, 1CDU ANGLES)
41	COARSE ALIGN (USED WITH NOUN 20, 1CDU ANGLES)
42	FINE ALIGN IMU
43	LOAD IMU ATTITUDE ERROR METERS
44	ILLEGAL VERB
45	COMMAND LR TO POSITION 2 (UNUSED IN 204/LM-1)
46	SAMPLE RADAR ONCE PER SECOND (UNUSED IN 204/LM-1)
47	PERFORM LM FLIGHT CONTROL SYSTEMS (FCS) TEST
48	SPARE
49	SPARE
50	PLEASE PERFORM
51	PLEASE MARK
52	PLEASE MARK Y
53	PLEASE MARK X OR Y
54	PULSE TORQUE GYROS
55	ALIGN TIME
56	PERFORM BANKSUM
57	PERFORM SYSTEM TEST
58	SPARE
59	SPARE
60	ILLEGAL VERB
61	ILLEGAL VERB
62	SCAN LM IMBITS
63	TURN OFF DAP AND SEND CDU'S ONLY ON DOWNLINK
64	SET TIMER TO GROUND ELAPSED TIME
65	SET GUIDANCE REFERENCE RELEASE DISCRETE
66	INITIATE LGC DFI TM CALIBRATE ROUTINE
67	SEND COMMAND TO LMP
68	SPARE
69	SPARE
70	SET MISSION TIMER
71	SET MISSION PHASE REGISTER
72	SET MISSION PHASE REGISTER AND TIMER
73	RESET DPS OR RCS COLD SOAK DISCRETE
74	STOP MISSION TIMERS (MISSION IDLE)
75	TARGET PARAMETER UPDATE
76	STATE VECTOR UPDATE
77	ILLEGAL VERB
78-99	SPARE

3. LM SUBSYSTEM INFORMATION (Cont'd)

A. PGNS - CH-Flag Wds

Page 1 of 2

LGC BIT ASSIGNMENTS

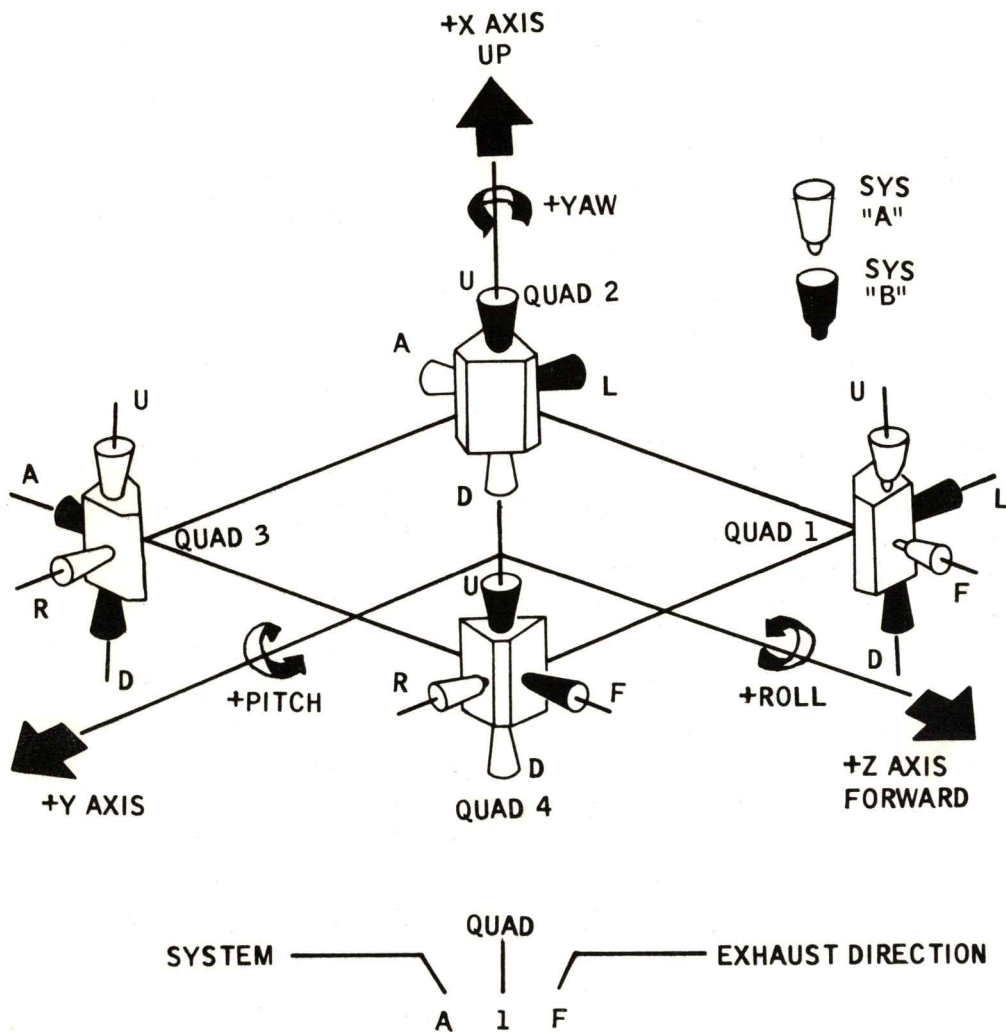
WORD REGISTER	CHANNEL	NAME	BIT POSITIONS															CHANNEL
			15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
	1	L	CP REGISTER L, BITS 16-1															1
	2	Q	CP REGISTER Q, BITS 16-1															2
	3	SCALER2		HIGH - ORDER SCALER CHANNEL, BITS 14-1														3
	4	SCALER1		LOW - ORDER SCALER CHANNEL, BITS 14-1														4
	5	PITCH YAW								14 RCS ID	13 RCS IU	10 RCS 2D	9 RCS 2U	6 RCS 3D	5 RCS 3U	2 RCS 4D	1 RCS 4U	5
	6	ROLL								16 RCS IS	4 RCS 4S	8 RCS 3S	12 RCS 2S	11 RCS 2F	15 RCS IF	3 RCS 4F	7 RCS 3F	6
	7	FEXT									E7	E6	E5					7
	10	DSKY R	RELAY ADRS 4	RELAY ADRS 3	RELAY ADRS 2	RELAY ADRS 1	RELAY BIT 11	RELAY BIT 10	RELAY BIT 9	RELAY BIT 8	RELAY BIT 7	RELAY BIT 6	RELAY BIT 5	RELAY BIT 4	RELAY BIT 3	RELAY BIT 2	RELAY BIT 1	10
W41R1	11	DSKY A		ENGINE OFF	ENGINE ON		SMART JOB RUNNING	CAUTION RESET	TEST CONNEC		OP ERROR	VN FLASH	KEY RLSE	TEMP CAUTION	UPLINK ACTV	COMP ACT	ISS WARN	11
W41R2	12	GN&C	ISS T ON DEL COMP	RR ENAB AUTO TR	LR POS COMM	- ROLL TRIM	+ROLL TRIM	-PITCH TRIM	+PITCH TRIM	DISPLAY 1 DATA		ENABL IMU ERR	ZERO ICDU	COARS ALIGN	H VEL LO SCL	ENABL RR ERR	ZERO RRCDU	12
W42R1	13	AGC	ENABL T6 RUPT	RESET TRAP 32	RESET TRAP 31B	RESET TRAP 31A	ENABL STANDBY	TEST ALARMS	RHC READ	ENABL RHC CTR	DNLNK WD ORD	BLOCK INLINK	INHIBIT UPLINK	RADAR ACT	RADAR a	RADAR b	RADAR c	13
W42R2	14	IMU	DRIVE CDUX	DRIVE CDUY	DRIVE CDUZ	DRIVE OCDUT	DRIVE OCDUS	GYRO ACT	GYRO MINUS	GYRO a	GYRO b	GYRO ENABL		THRUST DRIVE	ALT METER	ALT RATE	OUTLINK ACTV	14
	15	MAIN DSKY											KEY 5M	KEY 4M	KEY 3M	KEY 2M	KEY 1M	15
	16	NAV DSKY									DESCENT -	DESCENT +	MARK REJECT	MARK Y	MARK X			16
W43R1	30	GN&C	TEMP IN LIM	ISS T ON REQUEST	IMU FAIL	ICDU FAIL	IMU CAGE	G/C CONT OF S/C	IMU OPRAT		RRCDU FAIL	DISPLAY 1 DATA	AUTO THROTL	ABORT STAGE	ENGINE ARMED	STAGE VERIFY	ABORT	30
			15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	

LGC BIT ASSIGNMENTS

WORD REGISTER	CHANNEL	NAME	BIT POSITIONS															CHANNEL
			15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
			CP REGISTER L, BITS 16-1															
			CP REGISTER Q, BITS 16-1															
				HIGH - ORDER SCALER CHANNEL, BITS 14-1														
				LOW - ORDER SCALER CHANNEL, BITS 14-1														
W43R2	31	TRANS ROT	ATT CONT OUT OF D	AUTO STAB	ATT HOLD	-Z TRANS	+Z TRANS	-Y TRANS	+Y TRANS	-X TRANS	+X TRANS	-AZ (LPD) -RMI	+AZ (LPD) +RMI	-YMI	+YMI	-EL (LPD) -PMI	+EL (LPD) +PMI	31
W44R1	32	IMPULSE						ROLL GIMBAL OFF	PITCH GIMBAL OFF	T 10-11 FAIL	T 9-12 FAIL	T 13-15 FAIL	T 14-16 FAIL	T 6-7 FAIL	T 1-3 FAIL	T 5-8 FAIL	T 2-4 FAIL	32
W44R2	33	OPTICS AGC	OSC ALARM	AGC WARNING	PIPA FAIL	DNLNK TOO FAST	UPLNK TOO FAST	BLOCK UPLNK	LR RANG LO SCL	LR VEL DAT GOOD	LR POS 2	LR POS 1	LR DATA GOOD	RR DATA GOOD	RR RANG LO SCL	RR PWR ON AUTO		33
	34	DNLNK1																34
	35	DNLNK2																35
W39R1		FW0	WMAT FLAG	J SWITCH	MID FLAG	MOON FLAG	NBSM BIT	COAROFIN		IMU IN USE	RENDZ RDR IN USE	RRNBSW	RADAR LOCK ON REQUEST					
W39R2		FW1		TUMBLE MONITOR ON	EXCESSIVE TUMBLING	NORMAL RESTART ALLOWED				FINE ALIGN INHIBITED		NO P00AG	ENG ΔV MONITOR	S4B GONE	CCC FAILURE	GUID REFERENCE RELEASE	AVE G INTEGRATE	
W40R1		FW2	GYRO BIAS COMP	NO FINAL YAW	START UPDATE FOR DCU	IGNORE FINAL YAW	KALCMANU IN PROGRESS	ABORT CMD ACCEPTED	ABORT MONITOR ENABLED	ASC FEED IN PROGRESS	ORBITAL INTEGRATE ON	V33 VERIFY UPDATE	MISSION PHASE TIMERS ENABLED	NO TRIM GIMBAL	RCS TESTING INHIBIT	DPS COLD SOAK INHIBIT	RCS COLD SOAK INHIBIT	
W60R1		FW4	LAMBERT NON-CONVERGE	LAMBERT COMPLETION	FIRST LAMBERT ITERATION	GUESS AVAILABLE	TRANSFER ANGLE > 180°	MOON SW, ESCPSW, SMANGLSW	TGO EST MP4	ASC EQ SET MP13	BYPASS TCO CALC IN ASC	RCO NOT CONTROLLED	IGNITION STATE DELAYED	ENG OFF CMD SET UP				
W40R2		DAPBOOLS	NOT IN SPS DAP MODE	AUTO RATE HOLD		MASS PROBABLY CORRECT	DAP ENABLED	MIN INPUTSE RHC MODE	DSC VISIBILITY PHASE	ASC ENG ON	MAX DEADBAND	INTERNAL ULLAGE	P-FORCE COUPLES LV3	4-JET X-TRANS	RECIP ACCEL CORRECT	TRIM GMBL NOT POSSIBLE	RATE CMD ACTY	
W29R1		I MODES 30	ISS TEMP NOT IN LIMITS	NO ISS TURN-ON	NO IMU FAIL	NO CDU FAILS	NO IMU CAGE	NO PIPA FAILS	ISS NOT OPERATING	WAIT ONE SAMPLE	ISS INITIL	IMU INITIL	INHIBIT PIPA FAIL ALARMS	INHIBIT IMU FAIL	INHIBIT ICDO FAIL	ISS DELAY	INHIBIT PIPA FAIL WARN	
W29R2		I MODES 33			NO PIPA FAILS	DWNLK NOT TOO FAST	UPLINK NOT TOO FAST										LAMP TEST	
			15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	

3. LM SUBSYSTEM INFORMATION (Cont'd)

B. VEHICLE ATTITUDE MOTION ANALYSIS Page 1 of 2



3. LM SUBSYSTEM INFORMATION (Cont'd)

C. RCS/DPS/APS-Propulsion RTCC Limits

APS	LIMIT CHANGES							
	PRELAUNCH		PRIOR TO SEP		PRIOR TO DPS 1 & 2		PRIOR TO APS 2	
	LOW	HI	LOW	HI	LOW	HI	LOW	HI
GP0001P	2970	3150					500	-
GP0002P	2970	3150					500	-
GP0201T	60°	85°					-150°	-
GP0202T	60°	85°					-150°	-
GP0025P	110	130					175	190
GP0718T	60°	80°						
GP1218T	60°	80°						
GP1501P	170	190					155	175
GP1503P	170	190					155	175
DPS								
GQ3435P	600	800			-	1000		
GQ3018P	40	60			235	255		
GQ3718T	60°	80°						
GQ3719T	60°	80°						
GQ3611P	200	215			218	252		
GQ4218T	60°	80°						
GQ4219T	60°	80°						
GQ4111P	200	215			218	252		
COMP DPSTHRTL	-5%	+5%						
COMP DPSTOP	-5%	+10%						
RCS								
GR1101P	3000	3100	CHANGE LIMITS PRIOR TO EACH PASS					
GR1102P	3000	3100						
GR1089T	60°	30°						
GR1099T	60°	30°						
GR1201P	0	300						
GR1202P	45	60	172	186				
GR2121T	60°	80°						
GR2122T	60°	80°						
GR2201P	7	30	170	186				
GR2202P	7	30	170	186				
GT3201P	7	30	170	186				
GR3202P	7	30	170	186				
GR6001T	120°	190°						
GR6002T	120°	190°						
GR6003T	120°	190°						
GR6004T	120°	190°						
CALC AFU Q								
CALC BFU Q								
CALC AOX Q								
CALC BOX Q								

3. LM SUBSYSTEM INFORMATION (Cont'd)

D. EECOM - RTCC LIMITS

LIMITS IN MISSION OPERATIONS COMPUTER

MEAS NO.	TITLE	PRELAUNCH TO T-30		T-30 TO SEP		CLF TO DFC COLD COAK		DFC COLD SOAK TO DIS 1		- DIS 1 TO DIS 2		DIS 2 TO AFC 1		AFC 1 C/O TO END	
		LO	HI	LO	HI	LO	HI	LO	HI	LO	HI	LO	HI	LO	HI
GF3582P	ASC 1 O ₂ PRESS.	3.5	5.3												
GF3583P	ASC 2 O ₂ PRESS.	3.5	5.3												
GF3571P	CABIN PRESS.	4.0	6.5			3.0	6.2								
GF3591P	U/H RLF PRESS.	4.0	20.7			3.0									
GF3592P	F/H RLF PRESS.	4.0	20.7			3.0									
GF2021P	PRI FLY PMP ΔP	32.0	35.0												
GF2041X	GLY LEVEL LOW	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GF9998U	GLY TEMP	32.0	45.0		50.0										
GF9997U	GLY PMP PRESS.	55.5	60.0	39.0	43.0										
GF4511T	PRI W/B H ₂ O TEMP	60.0	80.0												
GG6020T	PIPA CAL TEMP	40.0	55.0												
GF4582Q	ASC 1 H ₂ O QTY	97.0	100.0	90.0				80.0		70.0		50.0		40.0	
GF4583Q	ASC 2 H ₂ O QTY	97.0	100.0	90.0				80.0		70.0		50.0		40.0	
CLC 17	A/1 H ₂ O Q̇	0.0	7.0												
CLC 18	A/2 H ₂ O Q̇	0.0	7.0												
GC1201C	BAT. 1 CUR	10.0	20.0												
GC1202C	BAT. 2 CUR	10.0	20.0												
GC1203C	BAT. 3 CUR	10.0	20.0												
GC1204C	BAT. 4 CUR	10.0	20.0												
GC1205C	BAT. 5 CUR	-1.0	40.0												
GC1206C	BAT. 6 CUR	-1.0	40.0												
GC0301V	CDR BUS V	28.0	35.0												
GC0302V	SE BUS V	28.0	35.0												
GC0201V	BAT. 1 V	29.0	35.0												
GC0202V	BAT. 2 V	29.0	35.0												
GC0203V	BAT. 3 V	29.0	35.0												
GC0204V	BAT. 4 V	29.0	35.0												
GC0205V	BAT. 5 V	32.0	37.5												
GC0206V	BAT. 6 V	32.0	37.5												
GC0071V	AC BUS V	115.0	118.2												
GC0155F	AC BUS FREQ	398.0	402.0												
GT0201	S-BND PWR AMP PO	10.0	20.0												
GT0202	S-BND RFLT PWR	0.0	10.0												
GT0993	S-BND XMTR PO	0.6	1.5												
GT0992	S-BND ST PH ERR	-5.0	5.0												
GT0994	S-BND RCVR SIG	1.0	4.0												
GT0619	UHF SIG STR	-99.0	-40.0												
GL0401	CAL 85%	4.23	4.27												
GL0402	CAL 15%	0.73	0.77												

APOLLO INSTRUMENTATION CONVERSION TABLE

**Greater than 5.000 volts overscale.

V. PROCEDURES

SOP - 13 - I

POSITION: ACTION OR REQUEST

GNC: REQUEST GUIDO XEQ SOP 13-I AND LOAD LMP 374

GUIDO: AFTER SEPARATION COMPLETED

1. XEQ V74
2. VERIFY V74 IN VERB REGISTER
3. XEQ E
4. VERIFY POO AND TIMERS ENABLED
5. XEQ V67
6. VERIFY V67 IN VERB REGISTER
7. XEQ E
8. VERIFY V21 NO1 FLASHING
9. XEQ 374 E
10. VERIFY 374 IN ST. BUFF.
11. XEQ V33
12. VERIFY V33 IN VERB REGISTER
13. XEQ E
14. INFORM GNC LMP 374 LOADED

GNC: 1. XEQ RTC 44A
 2. XEQ RTC 45A
 3. REQUEST GUIDO LOAD LMP 375

GUIDO: 1. VERIFY POO AND TIMERS ENABLED
 2. XEQ V67
 3. VERIFY V67 IN VERB REGISTER
 4. XEQ E
 5. VERIFY V21 NO1 FLASHING
 6. XEQ 375 E
 7. VERIFY 375 IN ST. BUFF.
 8. XEQ V33
 9. VERIFY V33 IN VERB REGISTER
 10. XEQ E
 11. INFORM GNC LMP 375 LOADED
 12. LOAD MP9 AT FIRST OPPORTUNITY

SOP - 13 - II

POSITION: ACTION OR REQUEST

GNC: REQUEST GUIDO XEQ SOP 13-II AND LOAD LMP 374

GUIDO: AFTER SEPARATION COMPLETED

1. XEQ V74
2. VERIFY V74 IN VERB REGISTER
3. XEQ E
4. VERIFY POO AND TIMERS ENABLED
5. XEQ V67
6. VERIFY V67 IN VERB REGISTER
7. XEQ E
8. VERIFY V21 NO1 FLASHING
9. XEQ 374 E
10. VERIFY 374 IN ST. BUFF.
11. XEQ V33
12. VERIFY V33 IN VERB REGISTER
13. XEQ E
14. INFORM GNC LMP 374 LOADED

GNC: 1. XEQ RTC 54A
 2. XEQ RTC 55A
 3. REQUEST GUIDO LOAD LMP 375

GUIDO: 1. VERIFY POO AND TIMERS ENABLED
 2. XEQ V67
 3. VERIFY V67 IN VERB REGISTER
 4. XEQ E
 5. VERIFY V21 NO1 FLASHING
 6. XEQ 375 E
 7. VERIFY 375 IN ST. BUFF.
 8. XEQ V33
 9. VERIFY V33 IN VERB REGISTER
 10. XEQ E
 11. INFORM GNC LMP 375 LOADED
 12. LOAD MP9 AT FIRST OPPORTUNITY

SOP - 13 - III A

POSITION: ACTION OR REQUEST

GNC: REQUEST GUIDO XEQ SOP 13-III AND LOAD LMP 374

GUIDO: OVER CONUS PASS

1. VERIFY POO AND TIMERS ENABLED
2. XEQ V67
3. VERIFY V67 IN VERB REGISTER
4. XEQ E
5. VERIFY V21 NO1 FLASHING
6. XEQ 374 E
7. VERIFY 374 IN ST. BUFF.
8. XEQ V33
9. VERIFY V33 IN VERB REGISTER
10. INFORM GNC STANDING BY TO SEND "ENTER"

GNC: 1. XEQ RTC 44A
2. XEQ RTC 45A
3. XEQ RTC 54A
4. XEQ RTC 55A
5. REQUEST GUIDO SEND "ENTER"

GUIDO: 1. XEQ "ENTER"
2. INFORM GNC LMP 374 LOADED

GNC: 1. XEQ RTC 60A
2. XEQ RTC 61A
3. REQUEST GUIDO LOAD LMP 375

GUIDO: 1. VERIFY POO AND TIMERS ENABLED
2. XEQ V67
3. VERIFY V67 IN VERB REGISTER
4. XEQ E
5. VERIFY V21 NO1 FLASHING
6. XEQ 375 E
7. VERIFY 375 IN ST. BUFF.
8. XEQ V33
9. VERIFY V33 IN VERB REGISTER
10. XEQ E
11. INFORM GNC LMP 375 LOADED

SOP - 13 - III B

POSITION: ACTION OR REQUEST

GNC: REQUEST GUIDO XEQ SOP 13-III B AND LOAD LMP 374

GUIDO: AFTER SEP COMPLETED OVER CRO

1. XEQ V74
2. VERIFY V74 IN VERB REGISTER
3. XEQ E
4. VERIFY POO AND TIMERS ENABLED
5. XEQ V67
6. VERIFY B67 IN VERB REGISTER
7. XEQ E
8. VERIFY V21 NO1 FLASHING
9. XEQ 374E
10. VERIFY 374 IN ST. BUFF.
11. XEQ V33
12. VERIFY V33 IN VERB REGISTER
13. INFORM GNC STANDING BY TO SEND "ENTER"

GNC: 1. XEQ RTC 44A
2. XEQ RTC 45A
3. XEQ RTC 54A
4. XEQ RTC 55A
5. REQUEST GUIDO SEND "ENTER"

GUIDO: 1. XEQ "ENTER"
2. INFORM GNC LMP 374 LOADED

GNC: 1. XEQ RTC 60A
2. XEQ RTC 61B
3. XEQ RTC 34B
4. XEQ RTC 35B
5. INFORM GUIDO LMP 374 RESET

GUIDO: 1. LOAD MP9 AT FIRST OPPORTUNITY

SOP - 13 - IV A

POSITION: ACTION OR REQUEST

GNC: REQUEST GUIDO XEQ SOP 13-IV AND LOAD LMP 374

GUIDO: OVER CONUS PASS

1. VERIFY P00 AND TIMERS ENABLED
2. XEQ V67
3. VERIFY V67 IN VERB REGISTER
4. XEQ E
5. VERIFY V21 NO1 FLASHING
6. XEQ 374E
7. VERIFY 374 IN ST. BUFF.
8. XEQ V33
9. VERIFY V33 IN VERB REGISTER
10. INFORM GNC STANDING BY TO SEND "ENTER"

GNC:

1. XEQ RTC 44A
2. XEQ RTC 45A
3. XEQ RTC 54A
4. XEQ RTC 55A
5. REQUEST GUIDO SEND "ENTER"

GUIDO:

1. XEQ "ENTER"
2. INFORM GNC LMP 374 LOADED

GNC:

1. XEQ RTC 50A
2. XEQ RTC 51A
3. REQUEST GUIDO LOAD LMP 375

GUIDO:

1. VERIFY P00 AND TIMERS ENABLED
2. XEQ V67
3. VERIFY V67 IN VERB REGISTER
4. XEQ E
5. VERIFY V21 NO1 FLASHING
6. XEQ 375E
7. VERIFY 375 IN ST. BUFF.
8. XEQ V33
9. VERIFY V33 IN VERB REGISTER
10. XEQ E
11. INFORM GNC LMP 375 LOADED

SOP - 13 - IV B

POSITION: ACTION OR REQUEST

GNC: REQUEST GUIDO XEQ SOP 13-IVB AND LOAD LMP 374

GUIDO: AFTER SEP COMPLETED OVER CRO

1. XEQ V74
2. VERIFY V74 IN VERB REGISTER
3. XEQ E
4. VERIFY POO AND TIMERS ENABLED
5. XEQ V67
6. VERIGY V67 IN VERB REGISTER
7. XEQ E
8. VERIFY V21 NO1 FLASHING
9. XEQ 374E
10. VERIFY 374 IN ST. BUFF.
11. XEQ V33
12. VERIFY V33 IN VERB REGISTER
13. INFORM GNC STANDING BY TO SEND "ENTER"

- GNC:
1. XEQ RTC 44A
 2. XEQ RTC 45A
 3. XEQ RTC 54A
 4. XEQ RTC 55A
 5. REQUEST GUIDO SEND "ENTER"

- GUIDO:
1. XEQ "ENTER"
 2. INFORM GNC LMP 374 LOADED

- GNC:
1. XEQ RTC 50A
 2. XEQ RTC 51A
 3. XEQ RTC 34B
 4. XEQ RTC 35B
 5. INFORM GUIDO LMP 374 RESET

- GUIDO:
1. LOAD MP9 AT FIRST OPPORTUNITY

SOP - 13 - V

POSITION: ACTION OR REQUEST

GNC: REQUEST GUIDO XEQ SOP 13-V
B.1.(C) OR B.2 (C)

SOP 13-V-B.1(C)

GUIDO: 1. VERIFY POO AND TIMERS ENABLED
2. XEQ V67 UPDATE FOR FOLLOWING LMP 374

GNC: 1. XEQ RTC 44A
WITHIN 10 SEC
2. XEQ RTC 45A

GUIDO: 1. VERIFY POO AND TIMERS ENABLED
2. XEQ V67 UPDATE FOR FOLLOWING LMP 375

SOP 13-V-B.2(C)

1. XEQ ISO VALVES CLOSED A SECTION OF PRA SEQ 7
XEQ PRA SEQ 7
XEQ FWD SEARCH
XEQ PROGRAM START (NOTE: MUST BE IN PGNS
AT THIS TIME)
XEQ AGS SELECT (NOTE: XEQ WHEN TAPE IS
BETWEEN 00:08 AND 01:08
XEQ PROGRAM START

GNC: XEQ PGNS SELECT (NOTE: XEQ WHEN TAPE IS
BETWEEN 01:16 AND 02:16)

OR

GUIDO: 2. VERIFY POO AND TIMERS ENABLED
3. XEQ V67 UPDATE FOR FOLLOWING:
(A) LMP 134
(B) LMP 135
(C) LMP 250
(D) LMP 251
(E) LMP 136
(F) LMP 137
(G) LMP 350
(H) LMP 351

SOP - 13 - VI

POSITION: ACTION OR REQUEST

GNC: REQUEST GUIDO XEQ
SOP-13-VI B.1(C) OR B.2(C)

SOP 13-VI-B.1(C)

GUIDO: 1. VERIFY POO AND TIMERS ENABLED
2. XEQ V67 UPDATE FOR FOLLOWING LMP 374

GNC: 1. XEQ RTC 54A
WITHIN 10 SEC
2. XEQ RTC 55A

GUIDO: 1. VERIFY POO AND TIMERS ENABLED
2. XEQ V67 UPDATE FOR FOLLOWING LMP 375

SOP 13-VI-B.2(C)

1. XEQ ISO VALVES CLOSED B SECTION OF PRA SEQ 7
XEQ PRA SEQ 7
XEQ FWD SEARCH
XEQ PROGRAM START (NOTE: MUST BE IN PGNS
AT THIS TIME)
XEQ AGS SELECT (NOTE: XEQ WHEN TAPE IS
BETWEEN 01:16 AND 02:16)
XEQ PROGRAM START

GNC: XEQ PGNS SELECT (NOTE: XEQ AT END OF TAPE)

OR

GUIDO: 2. VERIFY POO AND TIMERS ENABLED
3. XEQ V67 UPDATE FOR FOLLOWING:
(A) LMP 154
(B) LMP 155
(C) LMP 170
(D) LMP 171
(E) LMP 156
(F) LMP 157
(G) LMP 310
(H) LMP 311

SOP - 13 - VII

POSITION: ACTION OR REQUEST

GNC: REQUEST GUIDO XEQ SOP 13-VII AND LOAD LMP 374

GUIDO: 1. VERIFY P00 AND TIMERS ENABLED
 2. XEQ V67
 3. VERIFY V67 IN VERB REGISTER
 4. XEQ E
 5. VERIFY V21 N01 FLASHING
 6. XEQ 374E
 7. VERIFY 374 IN ST. BUFF.
 8. XEQ V33
 9. VERIFY V33 IN VERB REGISTER
 10. XEQ E
 11. INFORM GNC LMP 374 LOADED

GNC: 1. XEQ RTC 44A
 2. XEQ RTC 45A
 3. REQUEST GUIDO LOAD LMP 375

GUIDO: 1. VERIFY P00 AND TIMERS ENABLED
 2. XEQ V67
 3. VERIFY V67 IN VERB REGISTER
 4. XEQ E
 5. VERIFY V21 N01 FLASHING
 6. XEQ 375E
 7. VERIFY 375 IN ST. BUFF.
 8. XEQ V33
 9. VERIFY V33 IN VERB REGISTER
 10. XEQ E
 11. INFORM GNC LMP 375 LOADED

SOP - 13 - VIII

POSITION: ACTION OR REQUEST

GNC: REQUEST GUIDO XEQ SOP 13-VIII AND LOAD LMP 374

GUIDO: 1. VERIFY P00 AND TIMERS ENABLED
 2. XEQ V67
 3. VERIFY V67 IN VERB REGISTER
 4. XEQ E
 5. VERIFY V21 NO1 FLASHING
 6. XEQ 374E
 7. VERIFY 374 IN ST. BUFF.
 8. XEQ V33
 9. VERIFY V33 IN VERB REGISTER
 10. XEQ E
 11. INFORM GNC LMP 374 LOADED

GNC: 1. XEQ RTC 54A
 2. XEQ RTC 55A
 3. REQUEST GUIDO LOAD LMP 375

GUIDO: 1. VERIFY P00 AND TIMERS ENABLED
 2. XEQ V67
 3. VERIFY V67 IN VERB REGISTER
 4. XEQ E
 5. VERIFY V21 NO1 FLASHING
 6. XEQ 375E
 7. VERIFY 375 IN ST. BUFF.
 8. XEQ V33
 9. VERIFY V33 IN VERB REGISTER
 10. XEQ E
 11. INFORM GNC LMP 375 LOADED

SOP - 13 - IX, X, XI, XII

POSITION: ACTION OR REQUEST

GNC: REQUEST GUIDO XEQ SOP 13-__ FOR RCS QUAD__

- GUIDO:
1. VERIFY POO AND TIMERS ENABLED
 2. XEQ V67 UPDATES FOR SPECIFIED QUAD AS FOLLOWS:

QUAD 1 LMP 134

LMP 135

LMP 154

LMP 155

QUAD 2 LMP 250

LMP 251

LMP 170

LMP 171

QUAD 3 LMP 136

LMP 137

LMP 156

LMP 157

QUAD 4 LMP 350

LMP 351

LMP 310

LMP 311

SOP - 13 - XIII

POSITION: ACTION OR REQUEST

GNC: REQUEST GUIDO XEQ SOP 13-XIII

1. XEQ ISO VALVES OPEN SECTION OF PRA SEQ 7

GUIDO: XEQ PRA SEQ 7
 XEQ FWD SEARCH
 XEQ AGS SELECT
 XEQ PROGRAM START

GNC: XEQ PGNS SELECT (NOTE: XEQ WHEN TAPE IS
 BETWEEN 00:08 AND 01:08)

OR

- GUIDO: 2. VERIFY POO AND TIMERS ENABLED
 3. XEQ V67 UPDATE TO OPEN THE SPECIFIED PAIR(S)

<u>PAIR 1A</u>	LMP 014	<u>PAIR 3A</u>	LMP 016
	LMP 015		LMP 017
<u>PAIR 1B</u>	LMP 034	<u>PAIR 3B</u>	LMP 036
	LMP 035		LMP 037
<u>PAIR 2A</u>	LMP 230	<u>PAIR 4A</u>	LMP 330
	LMP 231		LMP 331
<u>PAIR 2B</u>	LMP 210	<u>PAIR 4B</u>	LMP 270
	LMP 211		LMP 271

SOP - 13 - XIV

POSITION: ACTION OR REQUEST

GNC: REQUEST GUIDO XEQ SOP 13-XIV AND QUE PRA SEQ ____.

GUIDO:

1. XEQ PRA SEQ _____
2. VERIFY RECEIPT OF VERIFY MAP FOR PRA SEQ
3. XEQ PRA SEARCH (FWD OR REV)
4. VERIFY RECEIPT OF PRA COMPARE PULSE
5. INFORM GNC PRA SEQ _____ CALLED UP

GNC:

1. XEQ RTC 30B
2. XEQ RTC 24B
3. REQUEST GUIDO OPEN PAIR _____ AND _____
ISOLATED RCS THRUSTER PAIRS

GUIDO:

1. VERIFY POO AND TIMERS ENABLED
2. XEQ V67 UPDATE FOR PAIR _____ AND _____

IF PAIR 1B: 034
 035

IF PAIR 2A: 230
 231

IF PAIR 3B: 036
 037

IF PAIR 4A: 330
 331

3. VERIFY WITH GNC ALL REQUIRED PAIRS OPEN
4. XEQ AGS SELECT
5. XEQ PRA START

SOP - 13 - XV

POSITION: ACTION OR REQUEST

GNC: REQUEST GUIDO XEQ SOP 13-XV

1. XEQ RTC 70A
2. XEQ RTC 71A

GUIDO: 1. VERIFY POO AND TIMERS ENABLED
 2. XEQ V67 UPDATE FOR FOLLOWING:

LMP 176

LMP 074

LMP 076

GNC: 1. XEQ RTC 44A
 2. XEQ RTC 54A

WITHIN 10 SEC

3. XEQ RTC 45A
4. XEQ RTC 55A

GUIDO: 1. VERIFY POO AND TIMERS ENABLED
 2. XEQ V67 UPDATE FOR FOLLOWING:

LMP 075

LMP 077

LMP 177

SOP - 13 - XVI

POSITION: ACTION OR REQUEST

GNC: REQUEST GUIDO XEQ SOP 13-XVI

1. XEQ RTC 70A
2. XEQ RTC 71A

GUIDO: 1. VERIFY P00 AND TIMER ENABLED
 2. XEQ V67 UPDATE FOR FOLLOWING:

LMP 176

LMP 074

GNC: 1. XEQ RTC 44A

WITHIN 10 SEC

2. XEQ RTC 45A

GUIDO: 1. VERIFY P00 AND TIMER ENABLED
 2. XEQ V67 UPDATE FOR FOLLOWING:

LMP 075

LMP 177

SOP - 13 - XVII

POSITION: ACTION OR REQUEST

GNC: REQUEST GUIDO XEQ SOP 13-XVII

1. XEQ RTC 70A
2. XEQ RTC 71A

GUIDO: 1. VERIFY POO AND TIMERS ENABLES
2. XEQ V67 UPDATE FOR FOLLOWING:

LMP 176

LMP 076

GNC: 1. XEQ RTC 54A

WITHIN 10 SEC

2. XEQ RTC 55A

GUIDO: 1. VERIFY POO AND TIMERS ENABLED
2. XEQ V67 UPDATE FOR FOLLOWING:

LMP 077

LMP 177