Instrumentation Laboratory
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Digital Development Memo #254, Revision B

To: Eldon Hall
From: Albert Hopkins
Subject: Block II Channel Assignments
Date: April 27, 1966

Channel 0 - Vacant.

Channel 1 - Identical to Register 1 (L).

Channel 2 - Identical to Register 2 (Q).

Channel 3 - High-order scaler channel. Furnishes a 14 bit positive number whose least significant bit has a weight of 5.12 seconds. The period of the number is 23.30 hours. Because of logic propagation delays, this channel should be interrogated more than once to resolve erroneous reads at the time of transition.

Channel 4 - Low-order scaler channel. Furnishes a 14 bit positive number whose least significant bit has a weight of 1/3200 second. The period of the number is 5.12 seconds. Because of logic propagation delays, this channel should be interrogated more than once to resolve erroneous reads at the time of transition.

Channel 5 - Outbits, pitch and yaw RCS.

BIT	S/M	C/M	LEM
1	RCS +X +P	+P -X +YW	#1 RCS 4U
2	RCS -X -P	-P +Z	#2 RCS 4D
3	RCS -X +P	+P -X -YW	#5 RCS 3U
4	RCS +X -P	-P +Z	#6 RCS 3D
5	RCS +X +Y	+YW -X +P	#9 RCS 2U
6	RCS -X -Y	-YW -X -P	#10 RCS 2D
7	RCS -X +Y	+YW -X -P	#13 RCS 1U
8	RCS +X -Y	-YW -X +P	#14 RCS 1D

Channel 6 - Outbits, roll RCS.

BIT	S/M	C/M	LEM
1	RCS +Z +R	+R +Y +Z	#7 RCS 3F
2	RCS -Z -R	-R -Y -Z	#3 RCS 4F
3	RCS -Z +R	+R +Y -Z	#15 RCS 1F
4	RCS +Z -R	-R -Y +Z	#11 RCS 2F
5	RCS +Y +R		#12 RCS 2S
6	RCS -Y -R		#8 RCS 3S
7	RCS -Y +R		#4 RCS 4S
8	RCS +Y -R		#16 RCS 1S

Channel 7 - Fixed Extension Bits (not reset by Restart).

BIT	C/M	LEM
5	FE5	* (Same as C/M)
6	FE6	*
7	FE7	*

FE7	FE6	FE5	High Banks
0	x	x	30-37
1	0	0	40-43
1	0	1	Empty
1	1	0	Empty
1	1	1	Empty

Channel 10 - Outbits, R relays.

BIT	C/M	LEM
1	RELAY BIT 1	* (Same as C/M)
2	RELAY BIT 2	*
3	RELAY BIT 3	*
4	RELAY BIT 4	*
5	RELAY BIT 5	*
6	RELAY BIT 6	*
7	RELAY BIT 7	*
8	RELAY BIT 8	*
9	RELAY BIT 9	*
10	RELAY BIT 10	*
11	RELAY BIT 11	*
12	RELAY ADDRESS 1	*
13	RELAY ADDRESS 2	*
14	RELAY ADDRESS 3	*
15/16	RELAY ADDRESS 4	*

Channel 11 - Outbits, A relays.

	BIT	C/M	LEM
A relay	1	ISS WARNING	* (Same as C/M)
A relay	2	LIGHT COMPUTER ACTIVITY LAMP	*
A relay	3	LIGHT UPLINK ACTIVITY LAMP	*
A relay	4	LIGHT TEMP CAUTION LAMP	*
A relay	5	LIGHT KEYBOARD RELEASE LAMP (FLASH)	*
A relay	6	FLASH VERB AND NOUN LAMPS	*
A relay	7	LIGHT OPERATOR ERROR LAMP (FLASH)	*
	8	Spare	
	9	TEST CONNECTOR OUTBIT	*
	10	CAUTION RESET	*
	11	Spare	
	12	Spare	
	13	ENGINE ON	*
	14	ENGINE OFF	*
	15/16	Spare	

Channel 12 - Outbits, GN&C.

	BIT	C/M	LEM
	1	ZERO OPTICS CDU	ZERO RR CDU
	2	ENABLE OPT ERR CTR	ENABLE RR ERR CTR
	3	STAR TRACKERS ON	HORIZ VELOCITY LO SCALE
	4	COARSE ALIGN ENABLE	* (Same as C/M)
	5	ZERO IMU CDUS	*
	6	ENABLE IMU ERROR COUNTER	*
	7	Spare	
	8	TVC ENABLE	DISPLAY INERTIAL DATA
	9	SIVB TAKE OVER ENABLE	+ PITCH GIMBAL TRIM
	10	ZERO OPTICS	- PITCH GIMBAL TRIM
	11	DISENGAGE OPTICS DAC	+ ROLL GIMBAL TRIM
	12	-	- ROLL GIMBAL TRIM
A relay	13	SIVB INJ. SEQ. START	LR POS COMMAND
A relay	14	SIVB CUTOFF	RE ENABLE AUTO TRACK
	15/16	ISS TURN ON DELAY COMPLETE	*

Channel 13 - Outbits, Radar and AGC.

BIT	C/M	LEM
1	RADAR SELECT c	* (Same as C/M)
2	RADAR SELECT b	*
3	RADAR SELECT a	*
4	RADAR ACTIVITY	*
5	INHIBIT UPLINK, ENABLE CROSSLINK	*
6	BLOCK INLINK	*
7	DOWNLINK WORD ORDER	*
8	BMAG CTR ENABLE	RHC CTR ENABLE
9	-	START RHC READ
10	TEST ALARMS	*
11	ENABLE STANDBY	*
12	RESET TRAP 31-A	*
13	RESET TRAP 31-B	*
14	RESET TRAP 32	*
15/16	ENABLE T6 RUPT	*

Radar selection:

a b c	Function
0 0 0	-
0 0 1	RR range
0 1 0	RR range rate
0 1 1	-
1 0 0	LR X velocity
1 0 1	LR Y velocity
1 1 0	LR Z velocity
1 1 1	LR range

Channel 14 - Outbits, IMU.

BIT	C/M	LEM
1	OUTLINK ACTIVITY	* (Same as C/M)
2	-	ALTITUDE RATE SELECT
3	-	ALTITUDE METER ACTIVITY
4	-	THRUST DRIVE
5	(ENTRY VELOCITY DRIVE SPARE)	(MONITOR INCR DRIVE SPARE)
6	GYRO ENABLE	*
7	GYRO SELECT b	*
8	GYRO SELECT a	*
9	GYRO SIGN MINUS	*
10	GYRO ACTIVITY	*
11	DRIVE CDU S	*
12	DRIVE CDU T	*
13	DRIVE CDU Z	*
14	DRIVE CDU Y	*
15/16	DRIVE CDU X	*

Gyro selection:

a b	gyro
0 0	-
0 1	X
1 0	Y
1 1	Z

Channel 15 - Inbits - main keyboard.

BIT	C/M	LEM	TRAP	RUPT
1	KEY 1M	* (Same as C/M)	15	5
2	KEY 2M	*	15	5
3	KEY 3M	*	15	5
4	KEY 4M	*	15	5
5	KEY 5M	*	15	5

Channel 16 - Inbits - navigation keyboard.

BIT	C/M	LEM	TRAP	RUPT
1	KEY 1N	-	16A	6
2	KEY 2N	-	16A	6
3	KEY 3N	LEM MARK X	16A	6
4	KEY 4N	LEM MARK Y	16A	6
5	KEY 5N	LEM MARK REJECT	16A	6
6	MARK	DESCENT +	16B	6
7	MARK REJECT	DESCENT -	16B	6

Channel 17 - Vacant.

Channels 20 - 27 - Vacant.

Channel 30 - Inbits, GN&C.

IMPORTANT: All of the input signals in channels 30 - 33 are inverted.

BIT	C/M	LEM
1	ULLAGE THRUST PRES	ABORT
2	SM SEPARATE	STAGE VERIFY
3	SPS READY	ENGINE ARMED
4	SIVB SEPARATE, ABORT	ABORT STAGE
5	LIFTOFF	AUTO THROTTLE
6	GUID REF RELEASE	DISPLAY INERTIAL DATA
7	OPTICS CDU FAIL	RR CDU FAIL
8	Spare	
9	IMU OPERATE	* (Same as C/M)
10	S/C CONTROL OF SAT	G/N CONTROL OF S/C
11	IMU CAGE	*
12	IMU CDU FAIL	*
13	IMU FAIL	*
14	ISS TURN ON REQUEST	*
15/16	TEMP IN LIMITS	*

Channel 31 - Inbits, Translation and Rotation.

IMPORTANT: All of the input signals in channels 30 - 33 are inverted.

BIT	C/M	LEM	TRAP	RUPT
1	+ PITCH MAN ROT	+ EL (LPD), + PMI	31A	10
2	- PITCH MAN ROT	- EL (LPD), - PMI	31A	10
3	+ YAW MAN ROT	+ YMI	31A	10
4	- YAW MAN ROT	- YMI	31A	10
5	+ ROLL MAN ROT	+ AZ (LPD), + RMI	31A	10
6	- ROLL MAN ROT	- AZ (LPD), -RMI	31A	10
7	+ X TRANS	* (Same as C/M)	31B	10
8	- X TRANS	*	31B	10
9	+ Y TRANS	*	31B	10
10	- Y TRANS	*	31B	10
11	+ Z TRANS	*	31B	10
12	- Z TRANS	*	31B	10
13	HOLD FUNCTION	ATTITUDE HOLD		
14	FREE FUNCTION	AUTO STABILIZATION		
15/16	G/C AUTO PILOT CONTROL	ATTITUDE CONTROL OUT OF DETENT		

Channel 32 - Inbits, impulse.

IMPORTANT: All of the input signals in channels 30 - 33 are inverted.

BIT	C/M	LEM	TRAP	RUPT
1	+ PITCH MIN IMP	THRUSTER 2 - 4 FAIL	32	10
2	- PITCH MIN IMP	THRUSTER 5 - 8 FAIL	32	10
3	+ YAW MIN IMP	THRUSTER 1 - 3 FAIL	32	10
4	- YAW MIN IMP	THRUSTER 6 - 7 FAIL	32	10
5	+ ROLL MIN IMP	THRUSTER 14 - 16 FAIL	32	10
6	- ROLL MIN IMP	THRUSTER 13 - 15 FAIL	32	10
7	-	THRUSTER 9 - 12 FAIL	32	10
8	-	THRUSTER 10 - 11 FAIL	32	10
9	-	PITCH GIMBAL OFF	32	10
10	-	ROLL GIMBAL OFF	32	10
11	LEM ATTACHED	Spare		
12	Spare			
13				
14				
15/16				

Channel 33 - Inbits, Optics and AGC.

IMPORTANT: All of the input signals in channels 30 - 33 are inverted.

	BIT	C/M	LEM
	1	Spare	
	2	-	RR POWER ON/AUTO
	3	-	RR RANGE LOW SCALE
	4	ZERO OPTICS	RR DATA GOOD
	5	AGC CONTROL (OPT MODE 2)	LR DATA GOOD
	6	STAR TRACKER ON (OPT MODE 3)	LR POS1
	7	STAR PRESENT	LR POS2
	8	-	LR VEL DATA GOOD
	9	-	LR RANGE LOW SCALE
	10	BLOCK UPLINK INPUT **	* (Same as C/M)
(FLIP-FLOP)	11	UPLINK TOO FAST	*
(FLIP-FLOP)	12	DOWNLINK TOO FAST	*
(FLIP-FLOP)	13	PIPA FAIL	*
(FLIP-FLOP)	14	WARNING	*
(FLIP-FLOP)	15/16	OSC ALARM	*

** This bit reads "1" when accept uplink signal is present at interface.

Channel 34 - Downlink 1
First of two words serialized.

Channel 35 - Downlink 2
Second of two words serialized.

CHANGES: Channels 5
6
7
11
12
30
31
32
33 (names only)

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