

VLBA Technical Report No. 5

**List of Current Monitor and Control Points
Rev. February 1996
Revised by W. Zamora**

D.S. Bagri

DEVICE NAME	NOMEN- CLATURE	ID (HEX)	BASE ADDRESS (HEX)	BLOCK LENGTH (HEX)	PAGE NUMBERS
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4m(75MHz)	FRONTEND INTERFACE		00	100	40
90/50cm	FRONTEND INTERFACE	F118	01	180	40
20cm(1.5GHz)	FRONTEND INTERFACE	F117	02	200	40
13cm(2.3GHz)	FRONTEND INTERFACE	F117	03	280	40
6cm (4.8GHz)	FRONTEND INTERFACE	F117	04	300	40
4cm (8.4GHz)	FRONTEND INTERFACE	F117	05	380	40
3cm(10.7GHz)	FRONTEND INTERFACE	F117	06	400	40
2cm(14.9GHz)	FRONTEND INTERFACE	F117	07	480	40
1.3cm(23GHz)	FRONTEND INTERFACE	F117	08	500	40
7 mm (43GHz)	FRONTEND INTERFACE	F117	09	580	40
4 mm (86GHz)	FRONTEND INTERFACE	F117	0A	600	40
2-16 GHz SYNTHESIZER #1	L104	10	1000	20	5
2-16 GHz SYNTHESIZER #2	L104	11	1100	20	5
2-16 GHz SYNTHESIZER #3	L104	12	1200	20	5
LO/IF/RF SWITCH CONTROLLER	L107	14	1400	30	6-7
ROUND TRIP PHASE MONITOR	L103	15	1500	30	8
MASER INTERFACE	M104	16	1600	40	9
WEATHER STATION		18	1800	80	10-11
D - RACK INTERFACE	M105	19	1900	40	12
DAR1- BASEBAND CONVERTER: #1	T122	20	2000	30	13-14
DAR1- BASEBAND CONVERTER: #2	T122	21	2040	30	13-14
DAR1- BASEBAND CONVERTER: #3	T122	22	2080	30	13-14
DAR1- BASEBAND CONVERTER: #4	T122	23	20C0	30	13-14
DAR1- BASEBAND CONVERTER: #5	T122	24	5000	30	13-14
DAR1- BASEBAND CONVERTER: #6	T122	25	5040	30	13-14
DAR1- BASEBAND CONVERTER: #7	T122	26	5080	30	13-14
DAR1- BASEBAND CONVERTER: #8	T122	27	50C0	30	13-14
DAR1- IF DISTRIBUTOR: #1	T121	28	2100	30	15
DAR1- IF DISTRIBUTOR: #2	T121	29	2180	30	15
RECORDER TRANSPORT #1		2A	2200	100	16-21
DAR1- FORMATTER		2C	2300	100	22-36
DAR2- BASEBAND CONVERTER: #1	T122	30	2400	30	13-14
DAR2- BASEBAND CONVERTER: #2	T122	31	2440	30	13-14
DAR2- BASEBAND CONVERTER: #3	T122	32	2480	30	13-14
DAR2- BASEBAND CONVERTER: #4	T122	33	24C0	30	13-14
DAR2- BASEBAND CONVERTER: #5	T122	34	5100	30	13-14
DAR2- BASEBAND CONVERTER: #6	T122	35	5140	30	13-14
DAR2- BASEBAND CONVERTER: #7	T122	36	5180	30	13-14
DAR2- BASEBAND CONVERTER: #8	T122	37	51C0	30	13-14
DAR2- IF DISTRIBUTOR: #1	T121	38	2600	30	15
DAR2- IF DISTRIBUTOR: #2	T121	39	2680	30	15
RECORDER TRANSPORT #2		3A	2B00	100	16-21
DAR2- FORMATTER		3C	3C00	100	22-36
B - RACK INTERFACE	M102	40	4000	40	37
PEDASTAL ROOM UTILITY MODULE		41	4100	80	38
BUILDING UTILITY MODULE		42	4200	80	39
INCLINOMETER INTERFACE (ONLY AT PT)	M101	43	4300	80	40
MKII INTERFACE		44	4400	90	41
ANTENNA CONTROL UNIT (ACU)		70	7000	40	42-45
FOCUS ROTATION DRIVE		72	7200	70	46-48

330/610 MHz FRONT-END MONITOR/CONTROL INTERFACE (F118)

ID (HEX) = 01 BLOCK LENGTH = 40
 STARTING ADDRESS (HEX) = 180

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REL. ADD. #(HEX)	ANALOG/ DIGITAL	ACCESS MON/CON	DESCRIPTION(VOLTAGE=COUNTS/3276.8) BIT POS. FUNCTION VALUE MEANING	MULT.	UNITS	RANGE	COMMENTS
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00-03			NOT USED				
04	ANALOG	MON	LO CAL DIODE CURRENT	120	mA		
05	ANALOG	MON	HI CAL DIODE CURRENT	120	mA		
06	ANALOG	MON	LO CAL DIODE VOLTAGE	4	VOLTS		
07	ANALOG	MON	HI CAL DIODE VOLTAGE	4	VOLTS		
08	ANALOG	MON	RACK A TEMP. SENSOR #1 (BOTTOM): 100mV/deg C	10	deg C		
09	ANALOG	MON	HELIUM PRESSURE SENSOR #4	1	VOLTS		
0A	ANALOG	MON	+28V POWER SUPPLY MONITOR	4	VOLTS		
0B	ANALOG	MON	-5V POWER SUPPLY MONITOR	1	VOLTS		
0C-0F			NOT USED				
10	ANALOG	MON	-15V POWER SUPPLY MONITOR	2	VOLTS		
11	ANALOG	MON	330/610 MHz FE BOX TEMP. MONITOR	100	KELVIN		
12	ANALOG	MON	+5V POWER SUPPLY MONITOR	1	VOLTS		
13	ANALOG	MON	+15V POWER SUPPLY MONITOR	2	VOLTS		
14	ANALOG	MON	HELIUM PRESSURE SENSOR #1	1	VOLTS		
15	ANALOG	MON	HELIUM PRESSURE SENSOR #2	1	VOLTS		
16	ANALOG	MON	HELIUM PRESSURE SENSOR #3	1	VOLTS		
17	ANALOG	MON	RACK A TEMP. SENSOR #2 (TOP): 100mV/deg C	10	deg C		
18	ANALOG	MON	330/610 FE SERIAL NUMBER (ANALOG)	2.5			
19	ANALOG	MON	FRONT PANEL AUX. INPUT #1(*)	1	VOLTS		
1A	ANALOG	MON	FRONT PANEL AUX. INPUT #2(*)	1	VOLTS		
1B	ANALOG	MON	FRONT PANEL AUX. INPUT #3(*)	1	VOLTS		
1C	ANALOG	MON	FRONT PANEL AUX. INPUT #4(*)	1	VOLTS		
1D	ANALOG	MON	FRONT END +15V MONITOR	2	VOLTS		
1E	ANALOG	MON	+15V(1) POWER SUPPLY MONITOR	2	VOLTS		
1F	ANALOG	MON	+15V(2) POWER SUPPLY MONITOR	2	VOLTS		
22	DIGITAL	MON/CON	0-3 NOISE CAL CONTROL	0000	NOISE CAL OFF		
				0001	LO CAL MODULATED		
				0010	LO CAL CONTINUOUS		
				0100	HI CAL MODULATED		
				1000	HI CAL CONTINUOUS		

COOLED FRONT-END INTERFACES (F117)

	BLOCK LENGTH = 40								
FREQ(GHz):	1 5	2.3	4.8	8 4	10.7	14 9	23	43	86
BAND(CM):	20	13	6	4	3	2	1.3	7mm	3mm
ID (HEX):	2	3	4	5	6	7	8	9	A
START.ADD (HEX):	200	280	300	380	400	480	500	580	600

REL. ADD. #(HEX)	ANALOG/ DIGITAL	ACCESS MON/CON	DESCRIPTION(VOLTAGE=COUNTS/3276.8) BIT POS. FUNCTION	VALUE	MEANING	MULT.	UNITS	RANGE	COMMENTS
00 TO 03			NOT USED						
04	ANALOG	MON	LO CAL DIODE CURRENT			100	mA	10	(ON)
05	ANALOG	MON	HI CAL DIODE CURRENT			100	mA	10	(ON)
06	ANALOG	MON	LO CAL DIODE VOLTAGE			4	VOLTS	28	(ON)
07	ANALOG	MON	HI CAL DIODE VOLTAGE			4	VOLTS	28	(ON)
08	ANALOG	MON	PUMP VACUUM SENSOR; SCALE NON LINEAR: .161V/MICRO METER, FOR LESS THAN A FEW MICRO METERS 9.652V AT 1000 MICRO METERS, AND 10V AT 1 ATMOSPHERE.						
09	ANALOG	MON	AC CURRENT TO THE FE REFRIGERATOR etc.			0.1	A		
			CTI MODEL	22 (*1)	350 (*2)				
			REFRIGERATOR MOTOR:	0.7	0.76				
			VAC. SOLONOID(*):	0.25(*3)	0.25(*3)				
			HEATERS(HEAT MODE):	0.20	.040				
			HEATERS(STRESS MODE):	0.03	0.03				
			*1 = CRYO SYSTEMS USED FOR FE FREQUENCIES OF 2.3GHz AND HIGHER						
			*2 = CRYO NSYSTEM USED FOR FE FREQUENCY OF 1.5GHz						
			*3 = 0.4A , IF SOLONOID POWERED BUT NOT ACTUATED DUE TO A FAULT.						
0A	ANALOG	MON	HEMT LED VOLTAGE			1	VOLTS		
0B	ANALOG	MON	SENSOR VOLTAGE (15K STAGE TEMP. SENSSE-A): NON LINEAR						
0C	ANALOG	MON	7.5V REFERENCE			1	VOLTS		
0D	ANALOG	MON	HI QUALITY GROUND			1	VOLTS		
0E-0F			NOT USED						
10	ANALOG	MON	LCP FET #1 GATE BIAS VOLTAGE			1	VOLTS	-2 TO 0	
11	ANALOG	MON	RCP FET #1 GATE BIAS VOLTAGE			1	VOLTS	-2 TO 0	
12	ANALOG	MON	LCP FET #2 GATE BIAS VOLTAGE			1	VOLTS	-2 TO 0	
13	ANALOG	MON	RCP FET #2 GATE BIAS VOLTAGE			1	VOLTS	-2 TO 0	
14	ANALOG	MON	15K STAGE CRYO TEMP.(10mV/deg C)			100	deg C		
15	ANALOG	MON	50K STAGE CRYO TEMP.(10mV/deg C)			100	deg C		
16	ANALOG	MON	(300K) AMBIENT TEMP. SENSOR (10mV/deg C)			100	deg C		
17	ANALOG	MON	DEWAR VAC. SENSOR; SCALE NON LINEAR (SEE MON. WORD #08)						
18-1F			EXTERNAL MULTIPLEXER						
20	DIGITAL	MON/CON	0-2 FE CRYO STATE COMMAND						
				000	START UP RESET STATE				
				010	PUMP				
				100	STRESS				
				101	OFF				
				110	HEAT				
				111	COOL				
21	DIGITAL	MON	0-2 FE CRYO STATE MONITOR						
				000	STRESS AFTER POWER FAILURE				
				010	PUMP				
				100	STRESS				
				101	OFF				
				110	HEAT				
				111	COOL				
			3 MANUAL/COMPUTER SWITCH POSITION						
				0	MANUAL				
				1	COMPUTER				
			4 PUMP REQUEST CONDITION						
				0	OFF				
				1	ON				
			5 PUMP VALVE POSITION						
				0	CLOSED				
				1	OPEN				
22	DIGITAL	MON/CON	0-3 NOISE CALIBRATION CONTROL						
				0000	CAL OFF				
				0001	LO CAL SWITCHED				
				0010	LO CAL CONTINUOUS				
				0100	HI CAL SWITCHED				
				1000	HI CAL CONTINUOUS				
23	DIGITAL	MON	ID WORD						
			0-3 FREQ. ID	0	75MHz				
				1	327/610 MHz FE				

REL. ADD. #(HEX)	ANALOG/ DIGITAL	ACCESS MON/CON	DESCRIPTION(VOLTAGE=COUNTS/3276.8) BIT POS	FUNCTION	VALUE	MEANING	MULT	UNITS	RANGE	COMMENTS
					2	1.5GHz FE				
					3	2.3GHz FE				
					4	4.8GHz FE				
					5	8.4GHz FE				
					6	10.7GHz FE				
					7	14.9GHz FE				
					8	23GHz FE				
					9	43GHz FE				
					A	86GHz FE				
					B-F	NOT ASSIGNED				
			4-5	MODIFICATION (BIT 5= MSB)						
			8-13	FE SERIAL NUMBER (BIT 13 = MSB)						
24	DIGITAL	MON	0-7	SERIAL NUMBER OF F117 (FE INTERFACE) MODULE						

2-16 GHz SYNTHESIZER (L104)

	ID (HEX)	STARTING ADD.(HEX)	BLOCK LENGTH = 20
SYN. #1	10	1000	
SYN. #2	11	1100	
SYN. #3	12	1200	

REL. ADD. #(HEX)	ANALOG/ DIGITAL	ACCESS MON/CON	DESCRIPTION(VOLTAGE=COUNTS/3276.8) BIT POS. FUNCTION	VALUE	MEANING	MULT.	UNITS	RANGE	COMMENTS
00	ANALOG	MON	D/A CONVERTER OUTPUT:1600MHz/V			1	VOLTS		
01	ANALOG	MON	YIG MAIN TUNNING VOLTAGE			1	VOLTS	1.96 TO 8.1	
02	ANALOG	MON	YIG FM TUNNING VOLTAGE			1	VOLTS	-.4 TO +.4	
03	ANALOG	MON	PHASE LOCK AND 100 MHz SIGNAL			1	VOLTS	2.9 TO 5.5	
04	ANALOG	MON	SIDEBAND FOR PHASE LOCKING; (+ve = upper, -ve = lower)						
05	ANALOG	MON	100 MHz REFERENCE LEVEL			1	VOLTS	3.2 TO 5.0	
06	ANALOG	MON	500 MHz POWER TO COMB GENERATOR			1	VOLTS	3.1 TO 5.1	
07	ANALOG	MON	SYNTHESIZER POWER OUTPUT LEVEL			1	VOLTS	1.5 TO 8.2	
08	DIGITAL	MON	0 PHASE LOCK STATUS:	0	LOCKED				
				1	UNLOCKED				
			1-2 BAND STATUS	00	8-16 GHz				
				01	ERROR				
				10	ERROR				
				11	2-8 GHz				
			8-14 MODULE SERIAL NUMBER						
08	DIGITAL	CON	SET FREQUENCY n ; 1024 < n <= 8192; freq.= n * 1.953 MHz						

LO/IF/RF SWITCH CONTROLLER (L107)

 ID (HEX) = 14 BLOCK LENGTH = 30
 STARTING ADDRESS (HEX) = 1400
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REL. ADD. #(HEX)	ANALOG/ DIGITAL	ACCESS MON/CON	DESCRIPTION(VOLTAGE=COUNTS/3276.8) BIT POS. FUNCTION	VALUE	MEANING	MULT.	UNITS	RANGE	COMMENTS
00	ANALOG	MON	+5 VOLTS SUPPLY			1	VOLTS		
01	ANALOG	MON	+28 VOLTS SUPPLY			4	VOLTS		
02	ANALOG	MON	+15 VOLTS SUPPLY			2	VOLTS		
03	ANALOG	MON	-5 VOLTS SUPPLY			1	VOLTS		
04	ANALOG	MON	-15 VOLTS SUPPLY			2	VOLTS		
05	ANALOG	MON	REAR PANEL AUX. INPUT #1			1	VOLTS		
06	ANALOG	MON	REAR PANEL AUX. INPUT #2			1	VOLTS		
07	ANALOG	MON	+15 VOLTS SUPPLY (2)			2	VOLTS		
08	DIGITAL	MON	0-5 S1 SWITCH I OFF	000000					
			POS.1	000001	BIN B SPARE				
			POS.2	000010	10.7 GHz IF				
			POS.3	000100	8.4/23 GHz IF				
			POS.4	001000					
			POS.5	010000	.33/.61 GHz IF				
			POS.6	100000	15 GHz IF				
			6 S5 SWITCH POS.	0	IFS C/D NORMAL				
				1	IFS C/D INTERCHANGED				
			7 S6 SWITCH POS.	0	IFS A/B NORMAL				
				1	IFS A/B INTERCHANGED				
09	DIGITAL	MON	0-5 S2 SWITCH I OFF	000000					
			POS.1	000001	BIN B SPARE				
			POS.2	000010	10.7 GHz IF				
			POS.3	000100	8.4/23 GHz IF				
			POS.4	001000					
			POS.5	010000	.33/.61 GHz IF				
			POS.6	100000	15 GHz IF				
			6-7 S102A/B	POS.1 01	610 RCP FILTER IN				
				POS.2 10	610 RCP FILTER OUT				
0A	DIGITAL	MON	0-5 S3 SWITCH I OFF	000000					
			POS.1	000001	BIN C SPARE				
			POS.2	000010	1.5/43 GHz IF				
			POS.3	000100	2.3 GHz IF				
			POS.4	001000	4.8 GHz IF				
			POS.5	010000					
			POS.6	100000					
			6-7 S106A/B	POS.1 01	8.4 GHz FE SELECT				
				POS.2 10	23 GHz FE SELECT				
0B	DIGITAL	MON	0-5 S4 SWITCH	OFF 000000					
			POS.1	000001	BIN C SPARE				
			POS.2	000010	1.5/43 GHz IF				
			POS.3	000100	2.3 GHz IF				
			POS.4	001000	4.8 GHz IF				
			POS.5	010000					
			POS.6	100000					
			6-7 S102C/D	POS.1 01	610 MHz LCP FILTERS IN				
				POS.2 10	610 MHz LCP FILTERS OUT				
0C	DIGITAL	MON	0-3 S7 SW.	OFF 0000					
			POS.1	0001	LO TO 15 GHz CONVERTER				
			POS.2	0010	LO TO 8.4/23 GHz CONVERTER				
			POS.3	0100	LO TO 10.7 GHz CONVERTER				
			POS.4	1000	LO BIN B SPARE				
			4-7 S8 SW	OFF 0000					
			POS.1	0001	LO BIN C SPARE				
			POS.2	0010	LO TO 2.3 GHz CONVERTER				
			POS.3	0100	LO TO 4.8 GHz CONVERTER				
			POS.4	1000	LO TO 1.5 GHz CONVERTER				
0D	DIGITAL	MON	0 S9 SW.	POS.1 0	2-16 GHz SYN: #1 TO S7, #2 TO S8				
				POS.2 1	INTERCHANGE S7/S8 INPUTS				
			1-4 S10 SW.	OFF 0000					
				POS.1 0001					
				POS.2 0010	ALT. LO TO 8.4/23 GHz CONVERTER				
				POS.3 0100	LO (SYN.#3) TO 23 GHz FE				
				POS.4 1000					
			5-6 S1112 SW.	POS.1 01	1.5 GHz FE SELECT				
				POS.2 10	43 GHz FE SELECT				
			7 S106C SW.	POS.0 0	SINGLE LO INPUT TO 8.4/23 GHz CONVERTER				
				POS.1 1	DUAL LO INPUT TO 8.4/23 GHz CONVERTER:				
					RCP FROM S7,LCP FROM S10(SYN#3)				
0E	DIGITAL	MONITOR	0-7 SWITCH MODULE SERIAL NUMBER						

REL. ADD. #(HEX)	ANALOG/ DIGITAL	ACCESS MON/CON	DESCRIPTION(VOLTAGE=CCUNTS/3276.8) BIT POS.	FUNCTION	VALUE	MEANING	MULT.	UNITS	RANGE	COMMENTS
10	DIGITAL	CON	0-5	S1 SWITCH	POS.1 POS.2 POS.3 POS.4 POS.5 POS.6	000001 000010 000100 001000 010000 100000				BIN B SPARE 10.7 GHz IF 8.4/23 GHz IF .33/.61 GHz IF 15 GHz IF
11	DIGITAL	CON	0-5	S2 SWITCH	POS.1 POS.2 POS.3 POS.4 POS.5 POS.6	000001 000010 000100 001000 010000 100000				BIN B SPARE 10.7 GHz IF 8.4/23 GHz IF .33/.61 GHz IF 15 GHz IF
12	DIGITAL	CON	0-5	S3 SWITCH	POS.1 POS.2 POS.3 POS.4 POS.5 POS.6	000001 000010 000100 001000 010000 100000				BIN C SPARE 1.5/43 GHz IF 2.3 GHz IF 4.8 GHz IF
13	DIGITAL	CON	0-5	S4 SWITCH	POS.1 POS.2 POS.3 POS.4 POS.5 POS.6	000001 000010 000100 001000 010000 100000				BIN C SPARE 1.5/43 GHz IF 2.3 GHz IF 4.8 GHz IF
14	DIGITAL	CON	0	S5 SWITCH	POS. POS.	0 1				IFS C/D NORMAL IFS C/D INTERCHANGED
15	DIGITAL	CON	0	S6 SWITCH	POS. POS.	0 1				IFS A/B NORMAL IFS A/B INTERCHANGED
16	DIGITAL	CON	0-3	S7 SW	POS.1 POS.2 POS.3 POS.4	0001 0010 0100 1000				LO TO 15 GHz CONVERTER LO TO 8.4/23 GHz CONVERTER LO TO 10.7 GHz CONVERTER LO BIN B SPARE
17	DIGITAL	CON	0-3	S8 SW	POS.1 POS.2 POS.3 POS.4	0001 0010 0100 1000				LO BIN C SPARE LO TO 2.3 GHz CONVERTER LO TO 4.8 GHz CONVERTER LO TO 1.5 GHz CONVERTER
18	DIGITAL	CON	0	S9 SW	POS.1 POS.2	0 1				2-16 GHz SYN: #1 TO S7. #2 TO S8 INTERCHANGE S7/S8 INPUTS
19	DIGITAL	CON	0-3	S10 SW	POS.1 POS.2 POS.3 POS.4	0001 0010 0100 1000				ALT. LO TO 8.4/23 GHz CONVERTER LO (SYN.#3) TO 23 GHz FE
1A	DIGITAL	CON	0-1	S1112 SW	POS.1 POS.2	01 10				1.5 GHz FE SELECT ALTERNATE INPUT (FE FREQ=?) SELECT
1B	DIGITAL	CON	0-1	S102 A/B	POS.1 POS.2	01 10				610 MHz RCP FILTERS IN 610 MHz RCP FILTERS OUT
1C	DIGITAL	CON	0-1	S102 C/D	POS.1 POS.2	01 10				610 MHz LCP FILTERS IN 610 MHz LCP FILTERS OUT
1D	DIGITAL	CON	0-1	S106 AB	POS.1 POS.2	01 10				8.4 GHz FE SELECT 23 GHz FE SELECT
1E	DIGITAL	CON	0	S106 C	POS.	0 1				SINGLE LO INPUT TO 8.4/23 GHz CONVERTER DUAL LO INPUT TO 8.4/23 GHz CONVERTER; RCP FROM S7, LCP FROM S10 (SYN #3)

500 MHz LO ROUND TRIP PHASE MONITOR (L103)

 ID (HEX) = 15 BLOCK LENGTH = 30
 STARTING ADDRESS (HEX) = 1500
 =====

REL. ADD. #(HEX)	ANALOG/ DIGITAL	ACCESS MON/CON	DESCRIPTION(VOLTAGE=COUNTS/3276.8) BIT POS. FUNCTION VALUE MEANING	MULT.	UNITS	RANGE	COMMENTS
00	DIGITAL	MON	500 MHz ROUND TRIP; IN-PHASE DETECTOR- WORD 1				
01	DIGITAL	MON	500 MHz ROUND TRIP; IN-PHASE DETECTOR- WORD 2 (ONLY BITS 0-7 ARE USED)				
02	DIGITAL	MON	500 MHz ROUND TRIP; QUAD. DETECTOR- WORD 1				
03	DIGITAL	MON	500 MHz ROUND TRIP; QUAD. DETECTOR- WORD 2 (ONLY BITS 0-7 ARE USED)				
			WORD 1, BIT 0 = LSB; WORD 2, BIT 7 = MSB PHASE SCALE: 5x10**6 COUNTS = 180°, CAUTION-NEED RESOLVE AMBIGUITY PROBLEMS(!) TO FIND THE ACTUAL VALUE OF THE RT PHASE				
04	DIGITAL	MON	0-7 MODULE SERIAL NUMBER				
05	DIGITAL	MON/CON	0 SIGNAL/REFERENCE (130 Hz) SELECT (1 = TEST REF., 0 = ANTENNA SIGNAL, NORMAL) Comment: Presently connections are reversed. Sr. Nos. 1 thru 7 need to be modified (mod dated 89mar30) to confirm to the above command arrangement. Unmodified modules need opposite commands to perform the phase measurement.				BIT 0=0 IS NORMAL
06	ANALOG	MON	100MHz POWER FROM MASER IN THE LO TRANSMITTER	1	VOLTS	-1.5V to -0.5 (MOD A)	
08	DIGITAL	MON	0 500.002083MHz PLL (IN LO TRANSMITTER) LOCK INDICATOR (LOW = LOCKED, HIGH = UNLOCKED)				
10	ANALOG	MON	NOT USED, AVAILABLE				
11	ANALOG	MON	+15V POWER SUPPLY	2	VOLTS		
12	ANALOG	MON	-15V POWER SUPPLY	2	VOLTS		
13	ANALOG	MON	+5V POWER SUPPLY	1	VOLTS		
14	ANALOG	MON	500 MHz VCXO CONTROL VOLTAGE	2	VOLTS		0 TO 6 VOLTS
15	ANALOG	MON	NOT USED, AVAILABLE				
16	ANALOG		ADDR. 6 = ADDR.16				
17	ANALOG		NOT USED, AVAILABLE				

MASER

 ID (HEX) = 16 BLOCK LENGTH = 40
 STARTING ADDRESS (HEX) = 1600
 =====

REL. ADD. # (HEX)	ANALOG/ DIGITAL	ACCESS MON/CON	DESCRIPTION(VOLTAGE=COUNTS/3276.8) BIT POS. FUNCTION VALUE MEANING	MULT.	UNITS	RANGE	COMMENTS
00	ANALOG	MON	405.7 kHz SECOND IF POWER	1	VOLTS	2.5 to 6.5	
01	ANALOG	MON	CAVITY REGISTER VOLTAGE	1	VOLTS	1 to 8	
02	ANALOG	MON	10 MHz VCXO CONTROL VOLTAGE	1	VOLTS	-1.5 to 1.5	
03	ANALOG	MON	RIGHT ION PUMP CURRENT (1V/mA)	1	mA	.01 to .15	
04	ANALOG	MON	LEFT ION PUMP CURRENT (1V/mA)	0.1	mA	.01 to .15	
05	ANALOG	MON	UPPER ION PUMP CURRENT (1V/mA)	0.1	mA	.015 to .2	
06	ANALOG	MON	1400 MHz MULTIPLIER OUTPUT POWER MONITOR	0.1	VOLTS	.1 to .75	
07	ANALOG	MON	BATTERY CHARGING CURRENT (Ich): (1V/AMP) Typ. charging current (when fully charged)~.05A Maximum charging current ~2 A	1	A	.01 to 1.8	
08	ANALOG	MON	10 MHz VCXO HEATER MONITOR	1	A?	1.0 to 2.5	
09	ANALOG	MON	SOURCE (HYDROGEN) PRESSURE CONTROL	1	VOLTS?	5.5 to 7.0	
0A	ANALOG	MON	SOURCE DISCHARGE OSC. CURRENT(Is), (1V/A)	1	A	0.35 to .75	
0B	ANALOG	MON	MAIN MAGNETIC FIELD COIL CURRENT (H), (7.5V/mG)		VOLTS	+(2 to 7.5)	
0C	ANALOG	MON	CAVITY AUTO TUNE CORRECTION AVERAGER	1	VOLTS	0 to 2.4	
0D	ANALOG	MON	+5 VOLTS SUPPLY TO RECEIVER	1	VOLTS	4.8 to 5.2	
0E	ANALOG	MON	+15 VOLTS SUPPLY TO RECEIVER	0.1	VOLTS	14.5 to 15.5	
0F	ANALOG	MON	-15 VOLTS SUPPLY TO RECEIVER	0.1	VOLTS	-14.5 to -15.5	
10	ANALOG	MON	CAVITY HEATER VOLTAGE	10	VOLTS	2.5-4.5	
11	ANALOG	MON	OUTER OVEN HEATER VOLTAGE	10	VOLTS	7 to 16	
12	ANALOG	MON	LOWER SUPPORT HEATER VOLTAGE	10	VOLTS	8 to 15	
13	ANALOG	MON	TOP PLATE HEATER VOLTAGE	10	VOLTS	1.5 to 11	
14	ANALOG	MON	PIRANI GAUGE SENSOR HEATER VOLTAGE	10	VOLTS	7 to 14	
15	ANALOG	MON	PALLADIUM HEATER VOLTAGE	10	VOLTS	8 to 19	
16	ANALOG	MON	RIGHT VAC. ION PUMP VOLTAGE (AFTER FUSE)	10	VOLTS	22.5 to 23.5	
17	ANALOG	MON	LEFT VAC. ION PUMP VOLTAGE (AFTER FUSE)	10	VOLTS	22.5 to 23.5	
18	ANALOG	MON	UPPER VAC. ION PUMP VOLTAGE (AFTER FUSE)	10	VOLTS	22.5 to 23.5	
19	ANALOG	MON	+23.7 VOLTS RECEIVER REGULATED VOLTAGE	10	VOLTS	22.5 to 24.2	
1A	ANALOG	MON	+18 VOLTS RECEIVER REGULATED VOLTAGE	10	VOLTS	17 to 19	
1B	ANALOG	MON	BATTERY VOLTAGE; READS 27.5V WHEN FULLY CHARGED AND DROPS TO 22V WHEN FULLY DISCHARGED	10	VOLTS	27.0 to 28.3	
1C	ANALOG	MON	DC OUT FROM RIGHT (AC1) SUPPLY	10	VOLTS	23.8 to 24.2	
1D	ANALOG	MON	DC OUT FROM LEFT (AC2) SUPPLY	10	VOLTS	23.8 to 24.2	
1E	ANALOG	MON	EXTERNALLY SUPPLIED DC INPUT VOLTAGE; USED WHEN TRANSPORTING OR BACKUP	10	VOLTS	24 to 28	
1F	ANALOG	MON	INTER SHIELD MAGNETIC FIELD SERVO CURRENT	10	VOLTS	3 to -3	
SYNTHESIZER FREQUENCY CONTROL							
20	DIGITAL	MON/CON	0-3 EXTERNAL FREQ. CONTROL DIGIT (0-9) IN STEP 4.66*10**-17 OF f (MASER FREQ.) 4-7 INTERNAL FREQ. CONTROL DIGIT (0-9) IN STEP 4.66*10**-17 OF f (MASER FREQ.)				
21	DIGITAL	MON/CON	0-3 EXTERNAL FREQ. CONTROL DIGIT (0-9) IN STEP 4.66*10**-16 OF f (MASER FREQ.) 4-7 INTERNAL FREQ. CONTROL DIGIT (0-9) IN STEP 4.66*10**-16 OF f (MASER FREQ.)				
22	DIGITAL	MON/CON	0-3 EXTERNAL FREQ. CONTROL DIGIT (0-9) IN STEP 4.66*10**-15 OF f (MASER FREQ.) 4-7 INTERNAL FREQ. CONTROL DIGIT (0-9) IN STEP 4.66*10**-15 OF f (MASER FREQ.)				
23	DIGITAL	MON/CON	0-3 EXTERNAL FREQ. CONTROL DIGIT (0-9) IN STEP 4.66*10**-14 OF f (MASER FREQ.) 4-7 INTERNAL FREQ. CONTROL DIGIT (0-9) IN STEP 4.66*10**-14 OF f (MASER FREQ.)				
24	DIGITAL	MON/CON	0-3 EXTERNAL FREQ. CONTROL DIGIT (0-9) IN STEP 4.66*10**-13 OF f (MASER FREQ.) 4-7 INTERNAL FREQ. CONTROL DIGIT (0-9) IN STEP 4.66*10**-13 OF f (MASER FREQ.)				
25	DIGITAL	MON/CON	0-3 EXTERNAL FREQ. CONTROL DIGIT (0-9) IN STEP 4.66*10**-12 OF f (MASER FREQ.) 4-7 INTERNAL FREQ. CONTROL DIGIT (0-9) IN STEP 4.66*10**-12 OF f (MASER FREQ.)				
26	DIGITAL	MON/CON	0-3 EXTERNAL FREQ. CONTROL DIGIT (0-9) IN STEP 4.66*10**-11 OF f (MASER FREQ.) 4-7 INTERNAL FREQ. CONTROL DIGIT (0-9) IN STEP 4.66*10**-11 OF f (MASER FREQ.)				
27	DIGITAL	MON/CON	0-3 EXTERNAL FREQ. CONTROL DIGIT (0-9) IN STEP 4.66*10**-10 OF f (MASER FREQ.) 4-7 INTERNAL FREQ. CONTROL DIGIT (0-9) IN STEP 4.66*10**-10 OF f (MASER FREQ.)				
28	DIGITAL	MON CON	0-7 MASER SERIAL NUMBER (NOTE- Sr # DISPLAYED ON MASER SCREEN IS IN BCD FORM) 0 SELECT SYNTHESIZER SETTING EXTERNAL/INTERNAL; (0=EXTERNAL,1=INTERNAL) TO READ THE SETTING SEE MON WORD #29 BIT 13				
29	DIGITAL	MON	8 MASER RUNNING ON BATTERY POWER (1=TRUE) 9 10 MHz VCXO LOCK INDICATOR; (1=LOCK,0=UNLOCK) 10 CAVITY TUNNING REGISTER LOWER LIMIT; (1=IN RANGE,0=AT LIMIT) 11 CAVITY TUNNING REGISTER UPPER LIMIT; (1=IN RANGE,0=AT LIMIT) 12 HARDWARE SWITCH TO CONTROL SYNTHESIZER; (1=INTERNAL,0=EXTERNAL) 13 SOFTWARE CONTROL OF SYNTHESIZER; (1=EXTERNAL,0=INTERNAL)				

WEATHER STATION

 ID (HEX) = 18 BLOCK LENGTH = 80
 STARTING ADDRESS (HEX) = 1800

REL. ADD. #(HEX)	ANALOG/ DIGITAL	ACCESS MON/CON	DESCRIPTION(VOLTAGE=COUNTS/3276.8) BIT POS. FUNCTION VALUE MEANING	MULT.	UNITS	RANGE	COMMENTS
00	ANALOG	MON	GROUND REFERENCE	1	VOLTS		
01			NOT USED				
02			NOT USED				
03	ANALOG	MON	AIR TEMP.(Ta):100mV/deg C	10	deg C		
04	ANALOG	MON	DEW Pt. TEMP.(Td):100mV/deg C	10	deg C		
05	ANALOG	MON	WEATHER STATION BOX TEMP.:100mV/deg C	10	deg C		
06	ANALOG	MON	WIND SPEED(W/S):100mV/MPH; MPH/2.2369= meters/sec	10	MPH		
07	ANALOG	MON	WIND AZ.DIR.(W/D):28mV/deg	36	DEG		
08	ANALOG	MON	+5 VOLTS POWER SUPPLY	1	VOLTS	+5 ± .1	
09	ANALOG	MON	-15 POWER SUPPLY	2	VOLTS	-15 ± .2	
0A	ANALOG	MON	+15 VOLTS POWER SUPPLY	2	VOLTS	+15 ± .2	
0B	ANALOG	MON	+12 VOLTS POWER SUPPLY,WIND MONITOR	2	VOLTS	+12 ± .4	
0C	ANALOG	MON	+15 VOLTS POWER SUPPLY,BAROMETER MONITOR	3	VOLTS	+15 ± .5	
0D	ANALOG	MON	+10V REF SUPPLY	2	VOLTS	+10 ± .1	
0E	ANALOG	MON	-10V REF SUPPLY	2	VOLTS	-10 ± .1	
0F	ANALOG	MON	NOT USED				
10	ANALOG	MON	TSL-HEAT PUMP;The control voltage to the chilled mirror heat pump/cooling circuit used for diagnostics only;Negative indicates mirror heating,positive for cooling.				
11	ANALOG	MON	TSL -12 VOLTS SUPPLY:	2	VOLTS	-12 ± .4	
12	ANALOG	MON	TSL +12 VOLTS POWER SUPPLY:	2	VOLTS	+12 ± .4	
13	ANALOG	MON	TSL +5V POWER SUPPLY	1	VOLTS	+5 ± .2	
14	ANALOG	MON	NOT USED				
15	ANALOG	MON	NOT USED				
16	ANALOG	MON	NOT USED				
17	ANALOG	MON	NOT USED				
18	DIGITAL	MON	BAROMETER WD1: 15 BAROMETER ERROR 14 BAROMETER ERROR 13 BOX TEMP. COLD(HEATER TURNED ON) <10°C = 1 12 BOX TEMP. HOT(FAN TURNED ON) > 30°C = 1 11 NOT USED 10 LOW TEMP. WARN = 0 AMBIENT TEMP <-20°f(-29°C) 9 WIND WARN (> 55MPH) = 0 8 WIND WARN (> 35MPH) = 0 0 - 7 B1 BAROMETER DATA				
19	DIGITAL	MON	BAROMETER WD2 8-15 B2 BAROMETER DATA 0-7 B3 BAROMETER DATA NORMAL BAROMETER PRESSURE:VALUE DEPENDS ON ST.HT. ABOVE MSL; BP(mb)=[(B1*256+B2)*256+B3]/1000 Ps (millibars) (1013.25**n - 8.41727 x 10**-5 x H) **1/n where n = .190263 and H = Height in meters			± 25 mb	
1A	DIGITAL	MON	AIR TEMP. (Ta) deg C BIT#: 10 9 8 7 6 5 4 3 2 1 0 IF 10, 9, 8, = >70, SET 10° 0 TEMP.: 40 20 10 8 4 2 1 .8 .4 .2 .1 IF 7, 6, 5, 4, = > F (hex) SET 1° = 0 11-13 NOT USED 14 STATUS HIGH= ERROR, SUSPECT ACCURACY 15 SIGN 1 = NEG 0 = POS				
1B	DIGITAL	MON	DEW POINT Td deg C, BITS MEAN SAME AS IN MONITOR WORD #1A				
1C	DIGITAL	MON	WEATHER STATION SERIAL NUMBER 0-4 SERIAL NUMBER (BIT 4 IS MSB) 5-7 LOW 8-15 NOT USED				
1D	DIGITAL	MON	MIN/MAX TEMP. MONITOR,BCD FORMAT,deg C.; RESET USING CONTROL WORD #22 VALUES LATCHED USING CURRENT Ta DATA 0-7 LO MIN TEMP. 8-15 HI MAX TEMP. 7/15 SIGN 1 = NEG, 0 = POS BIT #: 6/14 5/13 4/12 3/11 2/10 1/9 0/8 IF 6/14, 5/13, 4/12, = >70, SET 10° = 0 VALUE: 40 20 10 8 4 2 1 IF 3/11, 2/10, 1/9, 0/8 = > F (hex) SET 1° = 0				

REL. ADD. #(HEX)	ANALOG/ DIGITAL	ACCESS MON/CON	DESCRIPTION(VOLTAGE=COUNTS/3276.8) BIT POS.	FUNCTION	VALUE	MEANING	MULT.	WEATHER STATION UNITS	RANGE	PAGE 11 COMMENTS
1E	DIGITAL	MON		WIND SPEED/ WIND GUST; RESET USING CONTROL WORD #23						
			0-7	WIND GUST						
			8-15	CURRENT WIND SPEED	(available, not used)					
			BITS #:	0/8 1/9 2/10 3/11 4/12 5/13 6/14 7/15						
			VALUE:	1 2 4 8 16 32 64 128						
				N = 8 BIT = 0/255 WS(MPH) = Nx100/256						
1F	DIGITAL	MON	16 BIT	PRECIPITATION (RAIN OR SNOW) UNSIGNED INTEGER - COUNTS SINCE LAST RESET RESET USING CONTROL WORD #24 EACH COUNT = 0.1 MM PRECIPITATION						

NOTE: RA #20 TO #27 ARE CONTROL WORDS OUT DATA OUT IGNORED

20	DIGITAL	CONTROL	NOT USED
21	DIGITAL	CONTROL	NOT USED
22	DIGITAL	CONTROL	RESET TSL MIN/MAX TO CURRENT TEMP
23	DIGITAL	CONTROL	RESET WIND GUST READING TO ZERO
24	DIGITAL	CONTROL	RESET RAIN GUAGE COUNTER TO ZERO
25	DIGITAL	CONTROL	NOT USED
26	DIGITAL	CONTROL	NOTUSED
27	DIGITAL	CONTROL	NOTUSED

D - RACK INTERFACE

ID (HEX) = 19

BLOCK LENGTH = 40

STARTING ADDRESS (HEX) = 1900

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REL. ADD. #(HEX)	ANALOG/ DIGITAL	ACCESS MON/CON	DESCRIPTION BIT POS. FUNCTION	VALUE	MEANING	MULT.	UNITS	RANGE	COMMENTS
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
00	ANALOG	MON	LOCK DETECT (L123)						
01	ANALOG	MON	VCO CONT. VOLTAGE (L123)						
02	ANALOG	MON	VCO CONT. VOLTAGE (L122)						
03	ANALOG	MON	5 MHz POWER LEVEL (L121)						
04	ANALOG	MON	-5 VOLTS (P103)			1	VOLTS		
05	ANALOG	MON	+5VOLTS (P105)			1	VOLTS		
06	ANALOG	MON	+5VOLTS (P103)			1	VOLTS		
07	ANALOG	MON	+15 VOLTS (P107)			2	VOLTS		
08	ANALOG	MON	-15 VOLTS (P101)			2	VOLTS		
09	ANALOG	MON	NOT USED, AVAILABLE						
0A	ANALOG	MON	NOT USED, AVAILABLE						
0B	ANALOG	MON	NOT USED, AVAILABLE						
0C	ANALOG	MON	NOT USED, AVAILABLE						
0D	ANALOG	MON	NOT USED, AVAILABLE						
0E	ANALOG	MON	NOT USED, AVAILABLE						
0F	ANALOG	MON	NOT USED, AVAILABLE						
10	ANALOG	MON	NOT AVAILABLE, USED INTERNALLY						
11	ANALOG	MON	NOT AVAILABLE, USED INTERNALLY						
12	ANALOG	MON	+5 VOLTS (INTERNALLY)			1	VOLTS		
13	ANALOG	MON	+15 VOLTS (INTERNALLY)			2	VOLTS		
14	ANALOG	MON	-15 VOLTS (INTERNALLY)			2	VOLTS		
15	ANALOG	MON	GND			1	VOLTS		
16	ANALOG	MON	GND			1	VOLTS		
17	ANALOG	MON	GND			1	VOLTS		
18	DIGITAL	MON	TTL MON 16 BIT WORD, AVAILABLE						
19	DIGITAL	MON	TTL MON 16 BIT WORD, AVAILABLE						
1A	DIGITAL	CMD/MON	SERIAL MUNBER, BIT 0 - 7						
1B	DIGITAL	CMD/MON	NOT AVAILABLE						
1C	DIGITAL	CMD/MON	NOT AVAILABLE						
1D	DIGITAL	CMD/MON	NOT AVAILABLE						
1E	DIGITAL	CMD/MON	NOT AVAILABLE						
1F	DIGITAL	CMD	TTL CMD 16 BIT WORD, AVAILABLE						
20	DIGITAL	MON	TTL MON 16 BIT WORD, AVAILABLE						
21	DIGITAL	MON	TTL MON 16 BIT WORD, AVAILABLE						
22	DIGITAL	MON	TTL MON 16 BIT WORD, AVAILABLE						
23	DIGITAL	MON	TTL MON 16 BIT WORD, AVAILABLE						
24	DIGITAL	MON	TTL MON 16 BIT WORD, AVAILABLE						
25	DIGITAL	MON	TTL MON 16 BIT WORD, AVAILABLE						
26	DIGITAL	MON	TTL MON 16 BIT WORD, AVAILABLE						
27	DIGITAL	MON	TTL MON 16 BIT WORD, AVAILABLE						

BASE BAND CONVERTER (T122)

REL. ADD. #(HEX)	ANALOG/ DIGITAL	ACCESS MON/CON	DESCRIPTION(VOLTAGE=COUNTS/3276.8) BIT POS. FUNCTION	VALUE	MEANING	MULT.	UNITS	RANGE	COMMENTS
DAR1	ID(HEX)	BBC1	BBC2	BBC3	BBC4	BBC5	BBC6	BBC7	BBC8
	START ADD.	2000	2040	2080	20C0	5000	5040	5080	50C0
DAR2	ID(HEX)	30	31	32	33	34	35	36	37
	START ADD.	2400	2440	2480	24C0	5100	5140	5180	51C0
BLOCK LENGTH = 30									
00	DIGITAL	MON/CON	BAND WIDTH SELECTION 0-7 LSB BANDWIDTH (LOWER BYTE) 8-15 USB BADWIDTH (HIGHER BYTE)	VALUE	MEANING				
				#00	62.5kHz				
				#01	125kHz				
				#02	250kHz				
				#04	500kHz				
				#08	1MHz				
				#11	2MHz				
				#24	4MHz				
				#6B	8MHz				
				#F0	16MHz				
01			BANDWIDTH GAIN COMPENSATION 0-7 LSB BW GAIN COMPENSATION (LOWER BYTE) 8-15 USB BW GAIN COMPENSATION (HIGHER BYTE)	VALUE	MEANING				
				#2B	62.5kHz	POSITION			
				#29	125kHz	POSITION			
				#01	250kHz	POSITION			
				#02	500kHz	POSITION			
				#04	1MHz	POSITION			
				#08	2MHz	POSITION			
				#10	4MHz	POSITION			
				#20	8MHz	POSITION			
				#40	16MHz	POSITION			
02	DIGITAL	MON/CON	0-3 LO FREQ.-MOST SIGNIFICANT 4BITS; SEE MO. WORD #03 BELOW 4-5 NOT USED 6-7 IF INPUT SELECTION	00 01 10 11	IF A IF B IF C IF D				
			8-15 MODE CONNTROL: 8 MANUAL GAIN/AGC	0 1	APPLY FIXED VALUE TO GAIN CONTROL AGC THE OUTPUT				
			9 USB GAIN- WHEN THIS BIT IS TOGGLED FROM 0 TO 1, THE USB GAIN IS CHANGED IN MANUAL MODE						
			10 LSB GAIN (SAME AS BIT 9)						
			11 GAIN DECREMET/INCREMET:	0 1	DECREMENNT GAIN WHEN BIT 9/10 TOGGLED INCREMENT GAIN WHEN BIT 9/10 TOGGLED				
02(CONT)			12-14 AVERAGING PERIOD SELECTION	000 001 010 011 100 101 110 111	1/80 SEC 1 SEC 2 SEC 4 SEC 10 SEC 20 SEC 40 SEC 60 SEC				
03	DIGITAL	MON/CON	15 NOT ASSIGNED LO FREQ.: 4 NUMBERS OF 4 BIT BYTES, SEE MON WORD #02; COMMENTS: The LO synthesizer is programmed with 20 BITS. The coding of these 5 4-BIT bytes is psuedo 15s compliment as follows: FREQ. = ((15-U4)*40960 + (15-U3)*2560 + (15-U2)*160 + (16-U1)*10 + (15-U0)) *10 kHz where U0 -U4 are 4 BIT bytes						
04	DIGITAL	MON/CON	0-11 12 BIT MODULE SERIAL NUMBER, SET BY HARDWARE DIP ON THE INTERFACE BOARD 12-13 MICROPROCESSOR STATUS (RADIOMETRY FIRMWARE STATUS): 12 SYSTEM TIMING CHECK	0 1	1 SEC TIC IS ABSENT OR INCOMENSURATE WITH THE 80Hz 1 SEC TIC IS OK				
			13 NOT ASSIGNED						
			14 RADIOMETRY DUTY CYCLE						
			15 LO LOCK	0 1	OUT OF LOCK LO LOCKED				

REL. ADD. #(HEX)	ANALOG/ DIGITAL	ACCESS MON/CON	DESCRIPTION(VOLTAGE=COUNTS/32768)	MULT.	UNITS	BBC RANGE	PAGE 14 COMMENTS
-----	-----	-----	BIT POS. FUNCTION VALUE MEANING	-----	-----	-----	-----
05	DIGITAL	MON/CON	GAIN CONTROL 0-7 LSB GAIN 8-15 USB GAIN Comments: The values currently being applied to the 8 BIT gain controls. The voltage gain is set by the 8751 microprocessor and can only be read not directly set by MCB communications. The full scale (#FF) gain is +12 dB while zero (#00) completely turns off the baseband signals. The initial (default) value set by the 8751 is #B4. When the 8751 radiometry software is running in the unleveled mode (mode bit 0 not set) it is possible for the station computer to increment or decrement the gain in 0.07 dB steps per handshake.				
06	DIGITAL	MON	USB TOTAL POWER; NOMINAL VALUE = #3FC0 TO # 4040				
07	DIGITAL	MON	LSB TOTAL POWER; NOMINAL VALUE = #3FC0 TO 34040				
0E	DIGITAL	MON	USB SWITCHED POWER; NOMINAL VALUE = +/- (205 TO 2500 DECIMAL)				
0F	DIGITAL	MON	LSB SWITCHED POWER; NOMINAL VALUE = +/- (205 TO 2500 DECIMAL) Comments: The total power is measured by counters in the 8751 microprocessor which count the voltage to freq. converter output from the square law detectors on the baseband outputs. However the 16-BIT values appearing on addresses 6 & 7 depend on the mode control bits. The nominal baseband power level is 0 dBm. The samplers have fixed voltage thresholds that make 0 dBm nominally the optimum for the 4 level continuum encoding. The 0 dBm level corresponds to one volt out of the square law detector and 50 kHz from the voltage to frequency converter. The 8751 firmware will normalize numbers so that #4000 correspond to 0 dBm, #FFFF to +6 dBm. Switched power will be normalized in the same way so that #0001 corresponds to 1.22×10^{-4} times the system temperature. MSB is the sign bit. $AVT = \text{SUM} (CS(k) + CC(k)) * (16384/625) / K$ $AVD = \text{SUM} (CS(k) - CC(k)) * (16384/625) / K$ WHERE AVT = TOTAL POWER AVERAGE AVD = SWITCHED POWER AVERAGE CS(k)= COUNT FOR THE SIGNAL PORTION OF THE kth 80 Hz CYCLE CC(k)= COMPARISON K = TOTAL NUMBER OF 80 Hz CYCLES IN RADIOMETRY AVERAGE AND IS OBTAINED (K = 1 FOR NON AVERAGE MODE - MODE BIT 6 = 0) USING AVERAGING PERIOD FROM MON-WORD 02 BITS 12-14 :e.g. Bits 14-12 K SEE VLBA ACQ. MEMO #82				
						000 1	
						001 80	
						111 4800	

In the unleveled mode the control computer should adjust the gain controls (by incrementing/decrementing in 0.07dB steps) until the total power values are satisfactory. In the auto-leveled mode the 8751 will make the total power equal to #4000 on average by performing adjustments to the gain controls.

IF DISTRIBUTOR (T121)

ID (HEX)	STARTING ADDRESS (HEX)	BLOCK LENGTH = 30
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DAR1 IF DISTRIBUTOR 1
DAR1 IF DISTRIBUTOR 2
DAR2 IF DISTRIBUTOR 1
DAR2 IF DISTRIBUTOR 2

28	2100
29	2180
38	2600
39	2680

[illegible]

TAPE RECORDER (TRANSPORT)

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          ID (HEX)   START ADD.(HEX)   BLOCK LENGTH = 100
TRANSPORT #1      2A       2200
TRANSPORT #2      3A       2B00
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REL. ADD. #(HEX)	ANALOG/ DIGITAL	ACCESS MON/CON	DESCRIPTION(VOLTAGE=COUNTS/3276.8) BIT POS. FUNCTION VALUE MEANING	MULT.	UNITS	RANGE	COMMENTS
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WRITE MODULE:

00	DIGITAL	MON	FORMATTER SELECT (=011 FOR FMTR1IFMTR2)	GROUP	RECORDER TRACK #'S
			0	GROUP 0 IN HEAD 1	0,2,4,.....,14,16
			1	GROUP 1 IN HEAD 1	1,3,5,.....,15,17
			2	GROUP 2 IN HEAD 1	18,20,22,.....,32,34
			3	GROUP 3 IN HEAD 1	19,21,23,.....,33,35
			4	GROUP 0 IN HEAD 2	0,2,4,.....,14,16
			5	GROUP 1 IN HEAD 2	1,3,5,.....,15,17
			6	GROUP 2 IN HEAD 2	18,20,22,.....,32,34
			7	GROUP 3 IN HEAD 2	19,21,23,.....,33,35

COMMENTS: CORRESPONDENCE BETWEEN VLBA FORMATTER TRACKS, VLBA RECORDER TRACKS AND VLBI MKIII TRACK NUMBERS ARE GIVEN BELOW.

VLBA FORMATTER TRACK No.	VLBA RECORDER TRACK No.	MKIII TRACK No.	VLBA FORMATTER TRACK No.	VLBA RECORDER TRACK No.	MKIII TRACK No.
32=SYS.0	1	-	34=SYS.2	0	-
0	3	-	16	2	-
1	5	2	17	4	1
2	7	4	18	6	3
3	9	6	19	8	5
4	11	8	20	10	7
5	13	10	21	12	9
6	15	12	22	14	11
7	17	14	23	16	13
8	19	16	24	18	15
9	21	18	25	20	17
10	23	20	26	22	19
11	25	22	27	24	21
12	27	24	28	26	23
13	29	26	29	28	25
14	31	28	30	30	27
15	33	-	31	32	-
33=SYS.1	35	-	35=SYS.3	34	-

01	DIGITAL	MON	OUTPUT GROUP ENABLE: (=011 FOR DISABLE/ENABLE)
			0 GROUP 0 IN HEAD 1 (SEE MON WORD #00 FOR RECORDER TRACK NUMBERS)
			1 GROUP 1 IN HEAD 1 (SEE MON WORD #00 FOR RECORDER TRACK NUMBERS)
			2 GROUP 2 IN HEAD 1 (SEE MON WORD #00 FOR RECORDER TRACK NUMBERS)
			3 GROUP 3 IN HEAD 1 (SEE MON WORD #00 FOR RECORDER TRACK NUMBERS)
			4 GROUP 0 IN HEAD 2 (SEE MON WORD #00 FOR RECORDER TRACK NUMBERS)
			5 GROUP 1 IN HEAD 2 (SEE MON WORD #00 FOR RECORDER TRACK NUMBERS)
			6 GROUP 2 IN HEAD 2 (SEE MON WORD #00 FOR RECORDER TRACK NUMBERS)
			7 GROUP 3 IN HEAD 2 (SEE MON WORD #00 FOR RECORDER TRACK NUMBERS)
			SYSTEM TRACK SELECT: (RECORDER TRACK No. = 0-35)

02	DIGITAL	MON	0-5 RECORDER TRACK 0 OF HEAD 1
03	DIGITAL	MON	0-5 RECORDER TRACK 1 OF HEAD 1
04	DIGITAL	MON	0-5 RECORDER TRACK 34 OF HEAD 1
05	DIGITAL	MON	0-5 RECORDER TRACK 35 OF HEAD 1
06	DIGITAL	MON	0-5 RECORDER TRACK 0 OF HEAD 2
07	DIGITAL	MON	0-5 RECORDER TRACK 1 OF HEAD 2
08	DIGITAL	MON	0-5 RECORDER TRACK 34 OF HEAD 2
09	DIGITAL	MON	0-5 RECORDER TRACK 35 OF HEAD 2

MONITOR MODULE:

TRACK SELECT- BOTH READ AND BYPASS (RECORDER TRACK No. = 0-35)			
10	DIGITAL	MON	0-5 HEAD 1, OUTPUT A
11	DIGITAL	MON	0-5 HEAD 1, OUTPUT B
12	DIGITAL	MON	0-5 HEAD 2, OUTPUT A
13	DIGITAL	MON	0-5 HEAD 2, OUTPUT B
READ MODULE EQUALIZER SELECT (011/2 = NT160,NT135,NT270)			
14	DIGITAL	MON	0-1 HEAD 1, OUTPUT A
15	DIGITAL	MON	0-1 HEAD 1, OUTPUT B

REL. ADD. #(HEX)	ANALOG/ DIGITAL	ACCESS MON/CON	DESCRIPTION(VOLTAGE=COUNTS/3276.8) BIT POS. FUNCTION VALUE MEANING	MULT.	RECORDER UNITS	RANGE	PAGE 17 COMMENTS
16	DIGITAL	MON	0-1	HEAD 2, OUTPUT A			
17	DIGITAL	MON	0-1	HEAD 2, OUTPUT B			
18	DIGITAL	MON	0-2	OUTPUT TO FORMATTER #1, CHANNEL A; SEE OUTPUT SELECT CODE BELOW			
19	DIGITAL	MON	0-2	OUTPUT TO FORMATTER #1, CHANNEL B; SEE OUTPUT SELECT CODE BELOW			
1A	DIGITAL	MON	0-2	OUTPUT TO FORMATTER #2, CHANNEL A; SEE OUTPUT SELECT CODE BELOW			
1B	DIGITAL	MON	0-2	OUTPUT TO FORMATTER #2, CHANNEL B; SEE OUTPUT SELECT CODE BELOW			
			OUTPUT SELECT CODE: 000	HEAD 1 OUTPUT A, READ			
			001	HEAD 1 OUTPUT A, BYPASS			
			010	HEAD 1 OUTPUT B, READ			
			011	HEAD 1 OUTPUT B, BYPASS			
			100	HEAD 2 OUTPUT A, READ			
			101	HEAD 2 OUTPUT A, BYPASS			
			110	HEAD 2 OUTPUT B, READ			
			111	HEAD 2 OUTPUT B, BYPASS			
			MONITOR MODULE MINI DECODER:				
1C	DIGITAL	MON	0-1	DATA TO BE EXTRACTED BY ON BOARD MINI DECODER (THE TRACK SELECTIONS FOR CHANNEL A AND B OUTPUTS TO FORMATTERS 1 AND 2 ARE SHOWN IN ADDRESSES 18-1B ABOVE)			
			00	OUTPUT TO FORMATTER #1, CHANNEL A IS SELECTED			
			01	OUTPUT TO FORMATTER #1, CHANNEL B IS SELECTED			
			10	OUTPUT TO FORMATTER #2, CHANNEL A IS SELECTED			
			11	OUTPUT TO FORMATTER #2, CHANNEL B IS SELECTED			
1D	DIGITAL	MON		DATA EXTRACT BIT DELAY VALUE (=0 CAPTURES SYNC. BITS 63-32)			
			BIT 31 OF THE EXTRACTED DATA IS THE EARLIST BIT TO BE RECEIVED				
1E	DIGITAL	MON	0-15	EXTRACTED DATA BITS 31-16			
1F	DIGITAL	MON	0-15	EXTRACTED DATA BITS 15-0			
20	DIGITAL	MON	0-6	CLOCK RECOVERY RANGE SELECT			
			#24	8.8617-9.6360 MHZ			
			#34	4.4308-4.8180 MHZ			
			#44	2.2154-2.4090 MHZ			
21	DIGITAL	MON	0-3	BUTTON CLOSEURE MAP (0/1 WASN'T PUSHED I WAS PUSHED)			
			0	BUTTON #0			
			1	BUTTON #1			
			2	BUTTON #2			
			3	BUTTON #3			
			TRANSPORT MODULE:				
30	DIGITAL	MON	0-15	TRANSPORT MODULE FOOTAGE COUNTER (FEET)			
31	DIGITAL	MON	0-15	TRANSPORT MODULE SUPPLY REEL PACK (FEET)			
32	DIGITAL	MON	0-15	TRANSPORT MODULE TAKEUP REEL PACK (FEET)			
33	DIGITAL	MON	0	LOW TAPE SENSE (0/1 = NO/YES)			
			BAR CODE READER				
			THE BAR CODE READ IS LEFT JUSTIFIED - THE FIRST CHARACTER IS IN BITS 15-8 OF LOCATION 35. ALL CHARACTERS ARE IN ASCII FORMAT.				
34	DIGITAL	MON	0-15	BAR CODE LENGTH (CHARACTERS)			
35-3A	DIGITAL	MON	0-15	LAST BAR CODE READ			
			HEAD POSITIONER:				
40	DIGITAL	MON	0-15	CURRENT HEAD BLOCK PARAMETER VALUE- THIS VALUE IS FOR THE HEAD SELECTED IN C3 AND THE PARAMETER NUMBER SELECTED IN C4.			
41	DIGITAL	MON	0-15	TOTAL POSITION COMMAND (kA)			
42	DIGITAL	MON	0-15	ACTUAL POSITION LAST READ (kA)			
			THIS ADDRESS IS UPDATED WHEN A COMMAND IS SENT TO CE TO MEASURE THE HEAD POSITION				
43	DIGITAL	MON	0-15	RAW LVDT VOLTAGE LAST READ (MV)			
			A/D BOARD:				
50-5F	ANALOG	MON	0-11	RAW A/D CHANNEL #n(0-15) OUTPUTS; n=0: HEAD 1- LVDT VOLTAGE n=1: HEAD 1- TEMP. n=2: TOTAL POWER HEAD 1 n=3-5: NOT USED N=6: VACUUM COLUMN PRESSURE (0.1" OF WATER/COUNT)	1	VOLTS	
60	DIGITAL	MON	0-11	TOTAL POWER HEAD 1 (0.01V)			
61	DIGITAL	MON	0-11	TOTAL POWER HEAD 2 (0.01V)			

REL. ADD. #(HEX)	ANALOG/ DIGITAL	ACCESS MON/CON	DESCRIPTION(VOLTAGE=COUNTS/3276.8) BIT POS. FUNCTION VALUE MEANING	MULT.	RECORDER UNITS	RANGE	PAGE 18 COMMENTS
62	DIGITAL	MON	0-11 HEAD-1 TEMPERATURE (0.1 deg C)				
63	DIGITAL	MON	0-11 HEAD-2 TEMPERATURE (0.1 deg C)				
64	DIGITAL	MON	0-11 VACUUM (0.1" OF WATER)				
			VME BOARDS:				
70	DIGITAL	MON	0-15 READ PARAMETER VALUES IN RAM/ROM				
71	DIGITAL	MON	0-15 SOFTWARE REVISION NUMBER				
72	DIGITAL	MON	0-7 CHASSIS SERIAL NUMBER				
73	DIGITAL	MON	0-15 GENERAL STATUS WORD: (0i1 = FALSEITRUE)				
			0 ERROR EXISTS				
			1 TAPE MOVING				
			2 HEAD STACK MOVING				
			3 RAMPING				
			4 HEAD POSITIONING				
			5 TAPE POSITIONING				
			6 VACUUM OK AND SERVO READY				
			7 5MHz PRESENT				
			8 1 PPS PRESENT				
			9 HEAD PEAKING				
			10 HEAD TRACKING				
			11 FORWARD DIRECTION				
			12 BAR CODE VALID				
			13 SLEWING				
			14 BUTTON PRESSED				
74	DIGITAL	MON	0-15 ERROR FLAGS (0i1 =FALSEITRUE)				
			0 DATA OUT OF RANGE				
			1 UNUSED				
			2 FAILURE TO ATTAIN VACUUM WITH LOAD				
			3 UNABLE TO CHANGE TO THE DESIRED ACTIVE HEAD STACK				
			4 HEAD INDEX OUT OF RANGE				
			5 HEAD BLOCK PARAMETER # OUT OF RANGE				
			6 A/D CONVERSION TIMEOUT				
			7 COMMAND ATTEMPT AT READ ONLY ADDRESS				
			8 ATTEMPTED TAPE MOTION WITHOUT TAPE LOADED				
			9 HEAD MOVEMENT TIMED OUT (>15SEC)				
			10 UNSUCCESSFUL BAR CODE READ				
			11-13 UNUSED				
			14 SPURIOUS INTERRUPT				
			15 SOFTWARE ERROR				
75	DIGITAL	MON	SOFTWARE ERROR CODE				
			CODE ERROR				
			5 MCIO failed to configure system to pass along the M&C bus interrupts.				
			6 MCIO failed to WAKEUP another task, for which there was a command.				
			7 TAPE failed to configure system to intercept one of the three possible interrupts.				
			8 HEAD failed to configure system to intercept the head move completion interrupts.				
			9 HEAD failed to WAKEUP the A/D task				
			10 RSIO failed to WAKEUP a task				
			1001 - 1008. task n-1000 failed to START in MSTR				
76	DIGITAL	MON	0-15 SPURIOUS INTERRUPT VECTOR				
			IF A SPURIOUS INTERRUPT OCCURS, THE VECTOR IS REPORTED IN THIS LOCATION.				
77	DIGITAL	MON	0-15 GENERAL STATUS WORD EXTENSION (0i1 = FALSEITRUE)				
			0 MINI DECODER HAS SUCCESSFULLY DETECTED SYNC WORD AND EXTRACTED DATA. (1 = DETECTION)				
			WRITE MODULE:				
80	DIGITAL	MON/CON	FORMATTER SELECT (=0i1 FOR FMTR1\FMTR2)				
			GROUP RECORDER TRACK #'S				
			0 GROUP 0 IN HEAD 1 0 0,2,414,16				
			1 GROUP 1 IN HEAD 1 1 1,3,5, 15,17				
			2 GROUP 2 IN HEAD 1 2 19,21 33,35				
			3 GROUP 3 IN HEAD 1 3 18,20,22,32, 34				
			4 GROUP 0 IN HEAD 2 0 0,2,414,16				
			5 GROUP 1 IN HEAD 2 1 1,3,5, 15,17				
			6 GROUP 2 IN HEAD 2 2 19,21 33,35				
			7 GROUP 3 IN HEAD 2 3 18,20,22,32, 34				
81	DIGITAL	MON/CON	OUTPUT GROUP ENABLE (0i1 FOR DISABLE\ENABLE)				
			0 GROUP 0 IN HEAD 1				
			1 GROUP 1 IN HEAD 1				
			2 GROUP 2 IN HEAD 1				
			3 GROUP 3 IN HEAD 1				

REL. ADD. #(HEX)	ANALOG/ DIGITAL	ACCESS MON/CON	DESCRIPTION(VOLTAGE=COUNTS/3276.8) BIT POS. FUNCTION VALUE MEANING	MULT.	RECORDER UNITS	RANGE	PAGE 19 COMMENTS
			4 GROUP 0 IN HEAD 2				
			5 GROUP 1 IN HEAD 2				
			6 GROUP 2 IN HEAD 2				
			7 GROUP 3 IN HEAD 2				
(RECORDER TRACK NO. = 0-35) (EACH SYSTEM TRACK CAN SELECT AS ITS INPUT ANY ONE OF THE AVAILABLE 36 FORMATTER OUTPUT TRACKS AS SELECTED BY ADDRESS 80) SYSTEM TRACK SELECT: (RECORDER TRACK No. = 0-35)							
82	DIGITAL	MON/CON	0-5 RECORDER TRACK 0 OF HEAD 1				
83	DIGITAL	MON/CON	0-5 RECORDER TRACK 1 OF HEAD 1				
84	DIGITAL	MON/CON	0-5 RECORDER TRACK 34 OF HEAD 1				
85	DIGITAL	MON/CON	0-5 RECORDER TRACK 35 OF HEAD 1				
86	DIGITAL	MON/CON	0-5 RECORDER TRACK 0 OF HEAD 2				
87	DIGITAL	MON/CON	0-5 RECORDER TRACK 1 OF HEAD 2				
88	DIGITAL	MON/CON	0-5 RECORDER TRACK 34 OF HEAD 2				
89	DIGITAL	MON/CON	0-5 RECORDER TRACK 35 OF HEAD 2				
8C	DIGITAL	MON/CON	0-15 SET ACCELERATION (UNITS: 0.01 IPS/S)				
8D	DIGITAL	MON/CON	0-15 SET TOP SPEED (UNIT: 0.01 IPS)				
MONITOR MODULE:							
TRACK SELECT- BOTH READ AND BYPASS (RECORDER TRACK No. = 0-35)							
90	DIGITAL	MON/CON	0-5 HEAD 1, OUTPUT A				
91	DIGITAL	MON/CON	0-5 HEAD 1, OUTPUT B				
92	DIGITAL	MON/CON	0-5 HEAD 2, OUTPUT A				
93	DIGITAL	MON/CON	0-5 HEAD 2, OUTPUT B				
READ MODULE EQUALIZER SELECT (0112 = NT160, NT135, NT270)							
94	DIGITAL	MON/CON	0-1 HEAD 1, OUTPUT A				
95	DIGITAL	MON/CON	0-1 HEAD 1, OUTPUT B				
96	DIGITAL	MON/CON	0-1 HEAD 2, OUTPUT A				
97	DIGITAL	MON/CON	0-1 HEAD 2, OUTPUT B				
98	DIGITAL	MON/CON	0-2 OUTPUT TO FORMATTER #1, CHANNEL A; SEE OUTPUT SELECT CODE BELOW				
99	DIGITAL	MON/CON	0-2 OUTPUT TO FORMATTER #1, CHANNEL B; SEE OUTPUT SELECT CODE BELOW				
9A	DIGITAL	MON/CON	0-2 OUTPUT TO FORMATTER #2, CHANNEL A; SEE OUTPUT SELECT CODE BELOW				
9B	DIGITAL	MON/CON	0-2 OUTPUT TO FORMATTER #2, CHANNEL B; SEE OUTPUT SELECT CODE BELOW				
OUTPUT SELECT CODE:				000	HEAD 1 OUTPUT A, READ		
				001	HEAD 1 OUTPUT A, BYPASS		
				010	HEAD 1 OUTPUT B, READ		
				011	HEAD 1 OUTPUT B, BYPASS		
				100	HEAD 2 OUTPUT A, READ		
				101	HEAD 2 OUTPUT A, BYPASS		
				110	HEAD 2 OUTPUT B, READ		
				111	HEAD 2 OUTPUT B, BYPASS		
MONITOR MODULE MINI DECODER:							
9C	DIGITAL	MON/CON	0-1 DATA TO BE EXTRACTED BY ON BOARD MINI DECODER (THE TRACK SELECTIONS FOR CHANNEL A AND B OUTPUT TO FORMATTERS 1 AND 2 ARE SHOWN IN ADDRESSES 18-1B ABOVE)				
				00	OUTPUT TO FORMATTER #1, CHANNEL A IS SELECTED		
				01	OUTPUT TO FORMATTER #1, CHANNEL B IS SELECTED		
				10	OUTPUT TO FORMATTER #2, CHANNEL A IS SELECTED		
				11	OUTPUT TO FORMATTER #2, CHANNEL B IS SELECTED		
9D	DIGITAL	MON/CON	DATA EXTRACT BIT DELAY VALUE (=0 CAPTURES SYNC. BITS 63-32)				
9E	DIGITAL	MON/CON	0-7 SYNC. THRESHOLD				
9F	DIGITAL	MON/CON	0 INITIATE DATA EXTRACT (1 = INITIATE)				
A0-A3	DIGITAL	MON/CON	0-15 SYNC WORD (BITS 63-0; #A3 TRIGGERS DOWN LOAD; A0 BIT 15 IS MSB OF THE SYNC WORD)				
A4-A7	DIGITAL	MON/CON	0-15 SYNC MASK (BITS 63-0; #A7 TRIGGERS); #A4 BIT 15 IS MSB OF SYNC. MASK				
A8	DIGITAL	MON/CON	0-6 CLOCK RECOVERY RANGE SELECT #24 8.8617-9.6360 MHZ #34 4.4308-4.8180 MHZ #44 2.2154-2.4090 MHZ				
INDICATOR LIGHTS EACH OF THE 4 INDICATOR LIGHTS CAN BE PROGRAMMED TO FOLLOW ANY BIT IN THE MCB ADDRESS SPACE - THE LIGHT IS ON WHEN THE BIT IS SET.							
A9	DIGITAL	MON/CON	0-11 INDICATOR LIGHT #1 0-7 MCB ADDRESS 8-11 BIT NUMBER				
AA	DIGITAL	MON/CON	0-11 INDICATOR LIGHT #2 0-7 MCB ADDRESS 8-11 BIT NUMBER				

REL. ADD. #(HEX)	ANALOG/ DIGITAL	ACCESS MON/CON	DESCRIPTION(VOLTAGE=COUNTS/3276.8) BIT POS. FUNCTION VALUE MEANING	MULT.	RECORDER UNITS	RANGE	PAGE 20 COMMENTS
AB	DIGITAL	MON/CON	0-11 INDICATOR LIGHT #3 0-7 MCB ADDRESS 8-11 BIT NUMBER				
AC	DIGITAL	MON/CON	0-11 INDICATOR LIGHT #3 0-7 MCB ADDRESS 8-11 BIT NUMBER				
AD	DIGITAL	MON/CON	0 CLEAR BUTTON CLOSURE MAP (1 = CLEAR)				
TRANSPORT MODULE COMMANDS:							
B0	DIGITAL	MON/CON	0 STOP DRIVE (1 = STOP)				
B1	DIGITAL	MON/CON	0 START DRIVE (011 = REVERSEIFORWARD)				
B2	DIGITAL	MON/CON	0 FAST MOVE TO LOW TAPE POINT (=011 FOR REVERSEIFORWARD)				
B3	DIGITAL	MON/CON	0 LOAD TAPE INTO VACUUM COLUMN (011 DOIDO NOT READ BAR CODE)				
B4	DIGITAL	MON/CON	0 REWIND AND UNLOAD TAPE				
B5	DIGITAL	MON/CON	0-15 SET CAPSTAN SPEED (IN UNITS OF 0.01 INCHES/SEC)				
B6	DIGITAL	MON/CON	0 ENABLE LOW TAPE (=011 FOR DISABLEIENABLE)				
B7	DIGITAL	MON/CON	0-15 POSITION TAPE TO FOOTAGE # (0-65535)				
B8	DIGITAL	MON/CON	0-15 FORCE FOOTAGE COUNTER TO VALUE (FEET)				
B9	DIGITAL	MON/CON	0-15 SET CAPSTAN SIZE CONSTANT				
BA	DIGITAL	MON/CON	0 RELEASE BRAKES AND SERVOS (1 = RELEASE)				
BB	DIGITAL	MON/CON	0-15 SET OFF-SET SPEED FOR THE PERIOD GIVEN IN CONTROL WORD #BC (UNITS OF 0.01"/SEC)				
BC	DIGITAL	MON/CON	0-15 OFF-SET SLEW PERIOD (INITIATES; UNITS:0.01SEC)				
BD	DIGITAL	MON/CON	0-15 TAPE THICKNESS (kA)				
BE	DIGITAL	MON/CON	0-1 BAR CODE PRIMITIVE 0 0 READ (011 DO NOTIDO) 1 1 VERIFY CHECKSUM (011 DISABLEIENABLE)				
BF	DIGITAL	MON/CON	0-15 0-15 SET LOW TAPE POINT				
HEAD POSITIONER COMMANDS:							
C0	DIGITAL	MON/CON	0-15 SET INDEX NUMBER				
C1	DIGITAL	MON/CON	0-15 DOWN LOAD INDEX POSITION (kA)				
C2	DIGITAL	MON/CON	0 SET TAPE DIRECTION FOR OFFSET (=011 FOR REVERSEIFORWARD)				
C3	DIGITAL	MON/CON	0-1 ACTIVE HEAD NUMBER (1 TO 4)				
C4	DIGITAL	MON/CON	0-3 SET HEAD BLOCK PARAMETER NUMBER (0-10) PARAMETER 0: SETS INCHWORM MOTOR FAST OUT SPEED (kA/s) PARAMETER 1: SETS INCHWORM MOTOR SLOW OUT SPEED (kA/s) PARAMETER 2: SETS INCHWORM MOTOR FAST IN SPEED (kA/s) PARAMETER 3: SETS INCHWORM MOTOR SLOW IN SPEED (kA/s) PARAMETER 4: SETS THE LVDT POSITIVE SCALE FACTOR (kA/v) PARAMETER 5: SETS THE LVDT NEGATIVE SCALE FACTOR (kA/v) PARAMETER 6: SETS THE LVDT POSITIVE QUADRATIC FACTOR (kA/v ²) PARAMETER 7: SETS THE LVDT NEGATIVE QUADRATIC FACTOR (kA/v ²) PARAMETER 8: SETS HEADSTACK FORWARD MOTION OFFSET (kA) PARAMETER 9: SETS HEADSTACK REVERSE MOTION OFFSET (kA) PARAMETER 10: SETS TEMPERATURE COEFFICIENT				
C5	DIGITAL	MON/CON	0-15 DOWN LOAD HEAD BLOCK PARAMETER VALUE				
C6	DIGITAL	MON/CON	0-15 MOVE HEAD TO ABSOLUTE VALUE (kA)				
C7	DIGITAL	MON/CON	0-15 MOVE HEAD RELATIVE TO CURRENT POSITION (kA)				
C8	DIGITAL	MON/CON	0-15 MOVE ACTIVE HEAD TO INDEX POSITION + OFFSET (kA)				
C9	DIGITAL	MON/CON	0-15 PEAK UP ON MONITOR CHANNEL A WITHIN +/- kA				
CA	DIGITAL	MON/CON	0-15 SET UP AND ENABLE AUTO TRACKING INTERVAL (SEC)				
CB	DIGITAL	MON/CON	0 ABORT MOTION OF ACTIVE HEAD (1 = ABORT)				
CC	DIGITAL	MON/CON	0 HEAD MOTION PRIMITIVE: SPEED (011 = SLOW I FAST) 1 HEAD MOTION PRIMITIVE: DIRECTION (011 = IN I OUT)				
CD	DIGITAL	MON/CON	0-15 DELAY (UNITS OF 40 uSEC)				
CE	DIGITAL	MON/CON	0 MEASURE ACTIVE HEAD POSITION (1 = MEASURE)				
CF	DIGITAL	MON/CON	0-15 SET MINIMUM AUTO TRACKING POWER COMMENT: WHEN THE POWER LEVEL IN ADDRESS 60 FALLS BELOW THIS LEVEL, AUTO TRACKING STOPS. AUTO TRACKING RESUMES WHEN THE POWER RETURNS TO A VALUE ABOVE THE THRESHOLD.				
D0	DIGITAL	MON/CON	0-13 A/D BOARD: SELECT D/A CH. #0 IN mV (0-10000);(VACUUM MOTOR)				
D1	DIGITAL	MON/CON	0-13 A/D BOARD: SELECT D/A CH. #1 IN mV (0-10000);(NOT PRESENTLY USED)				
D2	DIGITAL	MON/CON	0-13 A/D BOARD: SELECT D/A CH. #2 IN mV (0-10000);(NOT PRESENTLY USED)				
D3	DIGITAL	MON/CON	0-13 A/D BOARD: SELECT D/A CH. #3 IN mV (0-10000);(WRITE VOLTAGE)				
D4	DIGITAL	MON/CON	0-15 ENABLE VACUUM MOTOR (011 DISABLEIENABLE)				
D5	DIGITAL	MON/CON	0-15 SET VACUUM SENSOR Y INTERCEPT (UNITS OF .1" H2O)				
D6	DIGITAL	MON/CON	0-15 SET VACUUM SENSOR SLOPE (UNITS OF .1" H2O/V)				
E0	DIGITAL	MON/CON	0-7 VME BOARDS: SET ADDRESS FOR RAM/ROM READ/WRITE (BITS 23-16)				
E1	DIGITAL	MON/CON	0-15 VME BOARDS: SET ADDRESS FOR RAM/ROM READ/WRITE (BITS 15-0)				
E2	DIGITAL	MON/CON	0-15 VME BOARDS: OVERWRITE PARAMETER VALUE IN RAM				
E3	DIGITAL	MON/CON	0-15 VME BOARDS: OR MASK INTO RAM LOCATION				
E4	DIGITAL	MON/CON	0-15 VME BOARDS: AND MASK INTO RAM LOCATION				
E5	DIGITAL	MON/CON	0-7 INPUT BUTTON #1 COMMAND ADDRESS				
E6	DIGITAL	MON/CON	0-15 INPUT BUTTON #1 DATA				

REL. ADDR. #(HEX)	ANALOG/ DIGITAL	ACCESS MON/CON	DESCRIPTION(VOLTAGE=COUNTS/3276.8)				MULT.	RECORDER UNITS	RANGE	PAGE 21 COMMENTS
			BIT POS.	FUNCTION	VALUE	MEANING				
E7	DIGITAL	MON/CON	0-7	INPUT BUTTON #2 COMMAND ADDRESS						
E8	DIGITAL	MON/CON	0-15	INPUT BUTTON #2 DATA						
E9	DIGITAL	MON/CON	0-7	INPUT BUTTON #3 COMMAND ADDRESS						
EA	DIGITAL	MON/CON	0-15	INPUT BUTTON #3 DATA						
EB	DIGITAL	MON/CON	0-7	INPUT BUTTON #4 COMMAND ADDRESS						
EC	DIGITAL	MON/CON	0-15	INPUT BUTTON #4 DATA						
ED	DIGITAL	MON/CON	0-15	ERROR FLAGS - CLEARED UPON COMMAND						
EE	DIGITAL	MON/CON	0-15	ERROR CODE - CLEARED UPON COMMAND						
EF	DIGITAL	MON/CON	0-15	MASTER RESET (SEND DATA #AE51)						

FORMATTER

ID (HEX) STARTING ADDRESS

DAR1- FORMATTER 2C 2300 BLOCK LENGTH = 100
 DAR2- FORMATTER 3C 3C00

REL. ADD. #(HEX)	ANALOG/ DIGITAL	ACCESS MON/CON	DESCRIPTION(VOLTAGE=COUNTS/3276.8) BIT POS. FUNCTION	VALUE	MEANING	MULT.	UNITS	RANGE	COMMENTS
01	DIGITAL	MON	INITIALIZE FORMATTER	#8000 #8001	FORMATTER IS DONE INITIALIZING FORMATTER IS BUSY INITIALIZING				
02	DIGITAL	MON	CONFIGURE FORMATTER	#8000 #8001	FORMATTER IS DONE CONFIGURING FORMATTER IS BUSY CONFIGURING				
03	DIGITAL	MON	CONFIGURE AUXILIARY DATA	#8000 #8001 #8002	FORMATTER IS BUSY CHECKING VLBA TIME AUX. DATA IS DONE CONFIGURING AUX. DATA BUSY CONFIGURING BUFFER 'A' AUX. DATA BUSY CONFIGURING BUFFER 'B'				
04	DIGITAL	MON	AUXILIARY DATA FIELD IN USE	#8001 #8002	BUFFER 'A' IN USE BUFFER 'B' IN USE				
05	DIGITAL	MON	FRINGE CHECK BUFFER	#8000 #8001 #8002 #8003	FRINGE BUFFER IS READY FRINGE BUFFER IS ARMED FRINGE BUFFER IS RUNNING FRINGE BUFFER IS WAITING				
06	DIGITAL	MON	PCAL STATUS 0 0 = PCAL EXTRACTOR RAM TABLES ARE CURRENT 1 = CONFIGURE NEEDED TO UPDATE PCAL EXTRACTOR RAM TABLES 1 0 = COUNTERS ARE CURRENTLY STOPPED 1 = COUNTERS ARE CURRENTLY RUNNING NOT USED						
07									
08	DIGITAL	MON	QUALITY ANALYSIS	#8000 #8001	ANALYSIS IS STOPPED ANALYSIS IS RUNNING				
09	DIGITAL	MON	QUAL. ANALYSIS DATA CAPTURE	#8000 #8001	FIELD IS CAPTURED (DONE) FIELD IS NOT CAPTURED (BUSY)				
0D	DIGITAL	MON	0-15 TRACK ENABLE MASK - ODD RECORDER TRACKS RECORDER ODD TRACKS 3-33 CAN BE INDIVIDUALLY ENABLED AND DISABLED A HIGH (1) ENABLES THE CORRESPONDING TRACK SAMPLE CODES ARE:	#0000 #0001 #8000 #FFFF	ALL ODD TRACKS DISABLED TRACK 3 ENABLED TRACK 33 ENABLED ALL ODD TRACKS ENABLED				
0E	DIGITAL	MON	0-15 TRACK ENABLE MASK - EVEN RECORDER TRACKS RECORDER EVEN TRACKS 2 - 32 CAN BE INDIVIDUALLY ENABLED OR DISABLED A HIGH (1) ENABLES THE CORRESPONDING TRACK SAMPLE CODES ARE:	#0000 #0001 #8000 #FFFF	ALL EVEN TRACKS DISABLED TRACK 2 ENABLED TRACK 32 ENABLED ALL EVEN TRACKS ENABLED				
0F	DIGITAL	MON	0-3 SYSTEM TRACKS (PHYSICAL 32-35 TRACKS) ENABLE MASK; A HIGH (1) ENABLES THE CORRESPONDING TRACK 15 ALWAYS HIGH SAMPLE CODES:	#8000 #8001 #8002 #8004 #8008 #800F	ALL SYSTEM TRACKS DISABLED SYSTEM TRACK #0 ENABLED SYSTEM TRACK #1 ENABLED SYSTEM TRACK #2 ENABLED SYSTEM TRACK #3 ENABLED ALL SYSTEM TRACKS ENABLED				
10	DIGITAL	MON	FORMAT SPEC.CODE:(DR = DATA REPLACE, NDR = NON DATA REPLACE)	#8000 #8001 #8002 #8003 #8004 #8005 #8006 #8007 #8008 #8009 #800A #800B #800C #800D #800E #800F #8110 #8111 #F000 #F100	MKIII-DR-FRINGE DETECTION TESTS MKIII-DR-CORRELATION TESTS MKIII-DR-MARK 3 COMPATIBLE MKIII-DR-PSEUDO-RANDOM CODE-ALL TRACKS MKIII-DR- HIGH TRACK DRIVE TEST MKIII-DR- LOW TRACK DRIVE TEST MKIII-DR- TRACK 0,2,4,6,... DRIVE TEST MKIII-DR- TRACK 4,4,8,12,... DRIVE TEST MKIII-NDR- FRINGE DETECTION TESTS MKIII-NDR-CORRELATION TESTS MKIII-NDR-MARK 3 COMPATIBLE MKIII-NDR-PSEUDO-RANDOM CODE-ALL TRACKS MKIII-NDR- HIGH TRACK DRIVE TEST MKIII-NDR- LOW TRACK DRIVE TEST MKIII-NDR- TRACK 0,2,4,6,... DRIVE TEST MKIII-NDR- TRACK 4,4,8,12,... DRIVE TEST VLBA FORMAT VLBA FORMAT WITHOUT MOD INVERT IMPLEMENTED ACCEPT DOWNLOADED FORMAT (MARK III FORMAT TYPE TIMECODE) ACCEPT DOWNLOADED FORMAT (VLBA FORMAT TYPE TYPE TIMECODE)				

REL. ADD. #(HEX)	ANALOG/ DIGITAL	ACCESS MON/CON	DESCRIPTION(VOLTAGE=COUNTS/3276.8)			MULT.	FORMATTER UNITS	RANGE	PAGE 23 COMMENTS
-----	-----	-----	BIT POS.	FUNCTION	VALUE	MEANING	-----	-----	-----
11	DIGITAL	MON	SAMPLE RATE SELECT:			#8000	250 KHz		
					#8001	500 KHz			
					#8002	1 MHz			
					#8003	2 MHz			
					#8004	4 MHz			
					#8005	8 MHz			
					#8006	16 MHz			
					#8007	32 MHz			
12	DIGITAL	MON	MULTIPLEX MODE SELECTION			#8000	RESERVED FOR EXPANSION		
					#8001	RESERVED FOR EXPANSION			
					#8002	4:1 (4 BITSTREAMS TO 1 TRACK)			
					#8003	2:1 (2 BITSTREAMS TO 1 TRACK)			
					#8004	1:1 (1 BITSTREAM TO 1 TRACK)			
					#8005	1:2 (1 BITSTREAM TO 2 TRACKS)			
					#8006	1:4 (1 BITSTREAM TO 4 TRACKS)			
					#8007	RESERVED FOR EXPANSION			
LEGAL COMBINATION OF SAMPLE RATE AND MULTIPLEX MODE ARE:									
			SAMPLE RATE	MULTIPLEX MODES					
			250 KHz	1:1 OR 2:1 OR 4:1					
			500 KHz	1:2 OR 1:1 OR 2:1 OR 4:1					
			1 KHz	1:4 OR 1:2 OR 1:1 OR 2:1 OR 4:1					
			2 KHz	1:4 OR 1:2 OR 1:1 OR 2:1 OR 4:1					
			4 KHz	1:4 OR 1:2 OR 1:1 OR 2:1 OR 4:1					
			8 KHz	1:4 OR 1:2 OR 1:1					
			16 KHz	1:4 OR 1:2					
			32 KHz	1:4					
13	DIGITAL	MON	TRACK BARREL ROLLER MODE:			#8000	DISABLE TRACK BARREL ROLLER		
					#8001	ROLL IN 8 TRACK GROUPS - STEP 1 TRACK PER FRAME			
					#8002	ROLL IN 8 TRACK GROUPS - STEP 2 TRACKS PER FRAME			
					#8003	ROLL IN 8 TRACK GROUPS - STEP 4 TRACKS PER FRAME			
					#8004	DISABLE TRACK BARREL ROLLER			
					#8005	ROLL IN 16 TRACK GROUPS - STEP 1 TRACK PER FRAME			
					#8006	ROLL IN 16 TRACK GROUPS - STEP 2 TRACKS PER FRAME			
					#8007	ROLL IN 16 TRACK GROUPS - STEP 4 TRACKS PER FRAME			
14	DIGITAL	MON	TIME CODE CONTROL IN USE: VLBA FORMAT			#8000	SECONDS * 10		
					#8001	MINUTES * 1000			
					#8002	MJD * 1			
					#8003	MJD * 100			
			MARK III FORMAT			#8000	SECONDS * 10		
					#8001	MINUTES * 10			
					#8002	HOURS * 10			
					#8003	DAYS * 10			
					#8004	DAYS * 100			
					#8005	YEARS * 1			
					#8006	YEARS * 10			
					#8007	YEARS * 100			
15	DIGITAL	MON	FRINGE CHECK DATA BUFFER ACQUISITION MODE			1 TRACK CAPTURE MODES:			
					#8100	CAPTURE DATA	TRACK	0	
					#8101	CAPTURE DATA	TRACK	1	
					#8102	CAPTURE DATA	TRACK	2	
					THRU				
					#811E	CAPTURE DATA	TRACK	30	
					#811F	CAPTURE DATA	TRACK	31	
					#8120	CAPTURE SYSTEM	TRACK	0	
					#8121	CAPTURE SYSTEM	TRACK	1	
					#8122	CAPTURE SYSTEM	TRACK	2	
					#8123	CAPTURE SYSTEM	TRACK	3	
					2 TRACK CAPTURE MODES:				
					#8200	CAPTURE DATA	TRACKS	0, 1	
					#8202	CAPTURE DATA	TRACKS	2, 3	
					#8204	CAPTURE DATA	TRACKS	4, 5	
					#8206	CAPTURE DATA	TRACKS	6, 7	
					#8208	CAPTURE DATA	TRACKS	8, 9	
					#820A	CAPTURE DATA	TRACKS	10,11	
					#820C	CAPTURE DATA	TRACKS	12,13	
					#820E	CAPTURE DATA	TRACKS	14,15	
					#8210	CAPTURE DATA	TRACKS	16,17	
					#8212	CAPTURE DATA	TRACKS	18,19	
					#8214	CAPTURE DATA	TRACKS	20,21	
					#8216	CAPTURE DATA	TRACKS	22,23	

REL. # (HEX)	ADD. DIGITAL	ANALOG/ MON/CON	ACCESS MON/CON	DESCRIPTION BIT POS.	(VOLTAGE=COUNTS/3276.8) FUNCTION	MULT. VALUE	FORMATTER UNITS	RANGE	PAGE 24 COMMENTS
						#8218	CAPTURE DATA TRACKS	24,25	
						#821A	CAPTURE DATA TRACKS	26,27	
						#821C	CAPTURE DATA TRACKS	28,29	
						#821E	CAPTURE DATA TRACKS	30,31	
						#8220	CAPTURE SYSTEM TRACKS	0, 1	
						#8220	CAPTURE SYSTEM TRACKS	2, 3	
						4 TRACK CAPTURE MODES:			
						#8400	CAPTURE DATA TRACKS	0, 1, 2, 3	
						#8404	CAPTURE DATA TRACKS	4, 5, 6, 7	
						#8408	CAPTURE DATA TRACKS	8, 9,10,11	
						#840C	CAPTURE DATA TRACKS	12,13,14,15	
						#8410	CAPTURE DATA TRACKS	16,17,18,19	
						#8414	CAPTURE DATA TRACKS	20,21,22,23	
						#8418	CAPTURE DATA TRACKS	24,25,26,27	
						#841C	CAPTURE DATA TRACKS	28,29,30,31	
						#8420	CAPTURE SYSTEM TRACKS	0, 1, 2, 3	
16	DIGITAL	MON		FRINGE CHECK TEST MODE		#8000	DISABLED		
						#8001	DISABLED		
						#8002	DISABLED		
						#8003	DISABLED		
						#8004	MODE 0		
						#8005	MODE 1		
						#8006	MODE2		
						#8007	MODE3		
17	DIGITAL	MON		PARITY MODE IN USE			ALONG-TRACK	CROSS-TRACK	
						#8000	EVEN	EVEN	
						#8001	EVEN	ODD	
						#8002	ODD	EVEN	
						#8003	ODD	ODD	
18	DIGITAL	MON		CRCC MODE IN USE			INITIALIZE TO:	CRCC POLYNOMIAL	
						#8000	ZERO	16-15-2-0	
						#8010	ONES	16-15-2-0	
						#8001	ZERO	16-15-1-0	
						#8011	ONES	16-15-1-0	
						#8002	ZERO	16-15-13-7-4-2-1-0	
						#8012	ONES	16-15-13-7-4-2-1-0	
						#8003	ZERO	12-11-3-2-1-0	
						#8013	ONES	12-11-3-2-1-0	
						#8004	ZERO	8-7-5-4-1-0	
						#8014	ONES	8-7-5-4-1-0	
						#8005	ZERO	8-0	
						#8015	ONES	8-0	
						#8006	ZERO	16-12-5-0	
						#8016	ONES	16-12-5-0	
						#8007	ZERO	16-11-4-0	
						#8017	ONES	16-11-4-0	
19	DIGITAL	MON		QUAL. ANALYSIS RECORDER SELECTION		#8001	SELECT RECORDER #1		
						#8002	SELECT RECORDER #2		
1A	DIGITAL	MON		QUAL ANALYSIS DATA		#8000	TIMECODE - CHANNEL 'A' - BITS 1 THRU 32		
						#8001	TIMECODE - CHANNEL 'A' - BITS 33 THRU 64		
						#8002	TIMECODE - CHANNEL 'A' - BITS 65 THRU 96		
						#8003	AUX DATA - CHANNEL 'A' - BITS 1 THRU 32		
						#8004	TIMECODE - CHANNEL 'B' - BITS 1 THRU 32		

REL. ADD #(HEX)	ANALOG/ DIGITAL	ACCESS MON/CON	DESCRIPTION(VOLTAGE=COUNTS/3276.8) BIT POS. FUNCTION VALUE MEANING	MULT.	FORMATTER UNITS RANGE	PAGE 26 COMMENTS
			11 TIMING CONTROL MANAGER REPORTED ERROR - ILLEGAL COMBINATION OF SAMPLE RATE AND MULTIPLEX MODE			
			12 FORMAT MANAGER REPORTED ERROR - ILLEGAL FORMAT SPECIFICATION ATTEMPTED - REPORTED VIA f-setfmt()			
			13 SYSTEM MANAGER REPORTED ERROR- TIMED OUT WAITING FOR STATION 1 PPS INTERRUPT			
			14 INTERRUPT MANAGER REPORTED ERROR - EXAMINE ADDRESS #24 FOR DETAILS			
			15 ANY ERROR			
24	DIGITAL	MON	INTERRUPT SYSTEM ERRORS, HIGH (=1) = ON/ERROR			
			00 BUS ERROR			
			01 ADDRESS ERROR			
			02 ILLEGAL INSTRUCTION			
			03 ZERO DIVIDE			
			04 PRIVILEGE VIOLATION			
			05 TRACE MODE ERROR			
			06 68010 STACK FORMAT ERROR			
			07 UNINITIALIZED INTERRUPT			
			08 SPURIOUS INTERRUPT			
			09 ABORT COMMAND TO CPU BOARD			
			10 SYSTEM FAIL			
			11 AC FAIL			
			12 ILLEGAL VECTOR			
			13 UNDEFINED			
			14 UNDEFINED			
			15 ANY ERROR DETECTED			
26	DIGITAL	MON	CURRENT SERIAL STATUS REGISTER, MSB'S; SEE CON WORDS #C0 TO #C3 SEE DOC 54200D03.TXT & 54200D10.TXT			
27	DIGITAL	MON	CURRENT SERIAL STATUS REGISTER, LSB'S;			
28	DIGITAL	MON	CURRENT FORMATTER TIME-YEARS, Y Y Y Y			
29	DIGITAL	MON	CURRENT FORMATTER TIME-DAYS, 0 D D D			
2A	DIGITAL	MON	CURRENT FORMATTER TIME-HOURS, 0 0 : H H			
2B	DIGITAL	MON	CURRENT FORMATTER MIN:SEC M M : S S			
2D	DIGITAL	MON	OUTPUT SYNTHESIZER RATE; ONLY THE LEAST SIGNIFICANT 4 BITS ARE USED AS FOLLOWS:			
			VALUE MEANING			
			#1 UNUSED			
			#2 9.072/32 MHz (NON DATA REPLACEMENT MODES)			
			#3 9.072/16 MHz (NON DATA REPLACEMENT MODES)			
			#4 9.072/8 MHz (NON DATA REPLACEMENT MODES)			
			#5 9.072/4 MHz (NON DATA REPLACEMENT MODES)			
			#6 9.072/2 MHz (NON DATA REPLACEMENT MODES)			
			#7 9.072/1 MHz (NON DATA REPLACEMENT MODES)			
			#8 UNUSED			
			#9 UNUSED			
			#A 9/32 MHz (DATA REPLACEMENT MODES)			
			#B 9/16 MHz (DATA REPLACEMENT MODES)			
			#C 9/8 MHz (DATA REPLACEMENT MODES)			
			#D 9/4 MHz (DATA REPLACEMENT MODES)			
			#E 9/2 MHz (DATA REPLACEMENT MODES)			
			#F 9/1 MHz (DATA REPLACEMENT MODES)			
30	DIGITAL	MON	LAST MONITOR ADDRESS ACCESSED			
31	DIGITAL	MON	LAST MONITOR DATA FIELD RETURNED			
32	DIGITAL	MON	LAST CONTROL ADDRESSED ACCESSED			
33	DIGITAL	MON	LAST CONTROL DATA FIELD ACCEPTED			
34	DIGITAL	MON	SYSTEM TRACK 0 MODE SELECTION, SEE DOC 54200D05.TXT			
35	DIGITAL	MON	SYSTEM TRACK 1 MODE SELECTION, SEE DOC 54200D05.TXT			
36	DIGITAL	MON	SYSTEM TRACK 2 MODE SELECTION, SEE DOC 54200D05.TXT			
37	DIGITAL	MON	SYSTEM TRACK 3 MODE SELECTION, SEE DOC 54200D05.TXT			
			EACH SYSTEM TRACK CAN DUPLICATE A DATA TRACK, OR IT CAN ACCESS ONE OF THE SIX CROSS TRACK PARITY GENERATORS (OR, A COMBINATION OF BOTH, AS DETERMINED BY THE FORMAT DEFINITION ARRAY).			
			CROSS TRACK PARITY GENERATORS			
			#8000 PARITY OVER FORMATTER TRACKS 0 THROUGH 7			
			#8100 PARITY OVER FORMATTER TRACKS 8 THROUGH 15			
			#8200 PARITY OVER FORMATTER TRACKS 16 THROUGH 23			
			#8300 PARITY OVER FORMATTER TRACKS 24 THROUGH 31			
			#8400 PARITY OVER FORMATTER TRACKS 0 THROUGH 15			
			#8500 PARITY OVER FORMATTER TRACKS 8 THROUGH 23			
			#8600 PARITY OVER FORMATTER TRACKS 16 THROUGH 31			
			#8700 CROSS TRACK PARITY UNUSED			
			DATA DUPLICATION EXAMPLE			
			#8704 TO SYSTEM TRACK 0 . . . DUPLICATE DATA FROM FORMATTER TRACK 4			
			MIXED MODE EXAMPLE			
			#8510 TO SYSTEM TRACK 2 . . . DUPLICATE DATA FROM FORMATTER TRACK 16 AND CARRY CROSS TRACK PARITY OVER TRACKS 8 THROUGH 23			

REL. ADD. #(HEX)	ANALOG/ DIGITAL	ACCESS MON/CON	DESCRIPTION(VOLTAGE=COUNTS/3276.8) BIT POS FUNCTION VALUE MEANING	MULT.	FORMATTER UNITS RANGE	PAGE 27 COMMENTS
38	DIGITAL	MON	FORMATTER TAPE CLOCK SELECTION			
			#8000 TAPE - TRANSPORT #1			
			#8001 TAPE - TRANSPORT #2			
			#8002 LOCAL SYNTHESIZER			
			#8003 EXTERNAL JACK			
			#8004 OFF - NO CLOCK			
			#8005 4 MHz VME STSTEM XTAL			
			#8006 8 MHz VME SYSTEM XTAL			
			#8007 10 MHz INTERNAL XTAL			
39	DIGITAL	MON	SAMPLER TO FORMATTER OUTPUT MAPPING			
			#8000 NORMAL MAPPING - USED FOR OPERATIONS			
			#8001 NO MAPPING - USED FOR DIAGNOSTICS			
			#8002 COMMON MAPPING - USED FOR DIAGNOSTICS			
			#8003 1 PPS MAPPING - USED FOR DIAGNOSTICS			
			COMMON MAPPING: ROUTES TRACK 0 SAMPLES TO TRACKS 0 THRU 7			
			ROUTES TRACK 8 SAMPLES TO TRACKS 8 THRU 15			
			ROUTES TRACK 16 SAMPLES TO TRACKS 16 THRU 23			
			ROUTES TRACK 24 SAMPLES TO TRACKS 24 THRU 31			
			1 PPS MAPPING: ROUTES NORMAL ONE PPS SAMPLE TO ALL ODD TRACKS 1,3,5,7,....			
			ROUTES INVERTED ONE PPS SAMPLE TO ALLEVEN TRACKS 0,2,4,6,....			
3A-3F 40	DIGITAL	MON/CON	NOT USED TIMING/CONTROL MODULE STATUS REGISTER			
			4 ENABLE FRINGE CHECK BUFFER ACQUISITION - MCB COMMAND TO ACQUIRE DATA IN THE FRINGE BUFFER, ACQUISITION STARTS SYNCHRONOUS WITH THE 1 SEC EPOCH			
			5 RELEASE FORMAT - ALLOWS MODULE FORMAT RAM TO PROVIDE TEMPLATE TO SYSTEM, STEPPING ONE LOCATION PER TRANSPORT CLOCK, OTHERWISE, RAM CONTROLLED BY FIRMWARE FOR LOADING AND VERIFICATION			
			7 FIFO'S ARE LOADED W/SAMPLES AND THE FORMT IS RUNNING, OTHERWISE-WAITING FOR FIFO'S TO FILL BEFORE STARTING OUTPUTS			
			8 AUX DATA BUFFER 'B' SELECTED - BUFFER 'B' IS BEING OUTPUT TO THE TRANSPORT, OTHERWISE BUFFER 'A' BEING OUTPUT, UPDATES ON THE ONE SECOND EPOCH			
			13 FORMAT RAM ACCESS ERROR - ATTEMPT TO ACCESS RAM BY FIRMWARE WHILE IT WAS GENERATING FORMAT CONTROL CODE			
			14 VME BUS ACCESS ERROR			
41	DIGITAL	MON	15 ANY ERROR DETECTED DIGITAL SWITCH MODULE STATUS REGISTER			
			0 INIT MODULE			
			1 INIT ERRORS			
			2 INIT FPGAS			
			3 INHIBIT PCAL COUNT			
			4 BACKPLANE STATION SYNC DRIVER ENABLE			
			5 ENABLE DS ACQUISITION			
			6 PCAL RUN COMMAND			
			7 DS ACQUISITION RUNNING			
			8 PCAL RUNNING			
			9 FPGA READY			
			11 ONE PPS MARKER MISALIGNMENT ERROR			
			12 SAMPLE CLOCK DROPOUT ERROR - 1ST A/D MODULE IN SYSTEM			
			13 SAMPLE CLOCK DROPOUT ERROR - SECOND A/D MODULE IN SYSTEM			
			14 VME BUS ACCESS ERROR			
			15 ANY ERROR DETECTED			
42	DIGITAL	MON	HEADER CONTROL MODULE STATUS REGISTER			
			4 BACKPLANE FIFO HALF FULL DRIVER ENABLE			
			7 FIFO'S HALF FULL LATCH			
			8 FORMAT IS RUNNING			
			9 AUX DATA RAM 'B' IS SELECTED FOR OUTPUT			
			12 FIFO ERRORS - REFER TO ERROR REGISTER #43 FOR CAUSE			
			13 AUX DATA RAM ACCESS ERROR - ATTEMPT TO ACCESS RAM BY FIRMWARE WHILE IT IS GENERATING AUX DATA OUTPUT PATTERN			
			14 VME BUS ACCESS ERROR - ATTEMPT TO ACCESS MODULE WHILE STILL BUSY			
			15 ANY ERROR DETECTED			
43	DIGITAL	MON	FIFO ERROR REGISTER			
			00 FIFO 0 EMPTY ERROR			
			1 FIFO 1 EMPTY ERROR			
			2 FIFO 2 EMPTY ERROR			
			3 FIFO 3 EMPTY ERROR			
			4 FIFO 0 FULL ERROR			
			5 FIFO 1 FULL ERROR			

REL. ADD. #(HEX)	ANALOG/ DIGITAL	ACCESS MON/CON	DESCRIPTION(VOLTAGE=COUNTS/3276.8)	MULT.	UNITS	RANGE	COMMENTS
BIT POS.	FUNCTION	VALUE	MEANING				
6	FIFO 2 FULL ERROR						
7	FIFO 3 FULL ERROR						
8	FIFO 0 ONE PPS MARKER DETECTED						
9	FIFO 1 ONE PPS MARKER DETECTED						
10	FIFO 2 ONE PPS MARKER DETECTED						
11	FIFO 3 ONE PPS MARKER DETECTED						
12	BACKPLANE ONE PPS MARKER DETECTED						
44	DIGITAL	MON	TRANSPORT DRIVER MODULE STATUS REGISTER				
3	ENABLE FRINGE CHECK DRIVERS						
4	ENABLE TRANSPORT #1 CLOCK						
5	ENABLE TRANSPORT #2 CLOCK						
8	CRCC POLYNOMIAL SELECT - LSB						
9	CRCC POLYNOMIAL SELECT						
10	CRCC POLYNOMIAL SELECT- MSB						
11	CRCC INITIALIZE TO ONES						
12	CROSS TRACK PARITY ODD						
13	ALONG TRACK PARITY ODD						
14	VME BUS ACCESS ERROR - ATTEMPT TO ACCESS MODULE WHILE STILL BUSY						
15	ANY ERROR DETECTED						
45	DIGITAL	MON	FRINGE CHECK MODULE STATUS REGISTER				
7	MOD/VME_BAR						
8	RUN/STOP_BAR						
15	ANY ERROR						
	RUN/STOP_BAR	MOD/VME_BAR					
0	0	0	IDLE - VME MAY ACCESS RAM				
0	1	1	ARMED - VME DENIED RAM ACCES				
1	1	1	RUN IN PROGRESS				
46	DIGITAL	MON	QUALITY ANALYSIS MODULE STATUS REGISTER				
2	SELECT RECORDER #2						
3	ALONG TRACK PARITY EVEN						
4	CRCC POLYNOMIAL SELECT -LSB						
5	CRCC POLYNOMIAL SELECT -						
6	CRCC POLYNOMIAL SELECT - MSB						
7	CRCC INITIALIZE TO ONES						
8	RELEASE FORMAT RAM						
9	RUN ANALYSIS						
10	CAPTURE DATA SELECT CODE - LSB						
11	CAPTURE DATA SELECT CODE -						
12	CAPTURE DATA SELECT CODE - MSB						
13	CAPTURE DATA REQUEST						
14	CAPTURE DATA READY						
15	ANY ERROR DETECTED - REFER TO ERROR REGISTER #47 FOR CAUSE						
47	DIGITAL	MON	QUALITY ANALYSIS MODULE ERROR REGISTER				
12	CHANNEL 'B' CLOCK ERROR						
13	CHANNEL 'A' CLOCK ERROR						
14	FORMAT RAM ACCESS ERROR - ATTEMPT TO ACCESS RAM BY FIRMWARE WHILE IT WAS GENERATING FORMAT FOR ANALYSIS						
15	VME BUS ACCESS ERROR - ATTEMPT TO ACCESS MODULE WHILE STILL BUSY						
48	DIGITAL	MON	Q/A CAPTURED DATA MSB'S				
49	DIGITAL	MON	Q/A CAPTURED DATA LSB'S				
4A	DIGITAL	MON	Q/A CAPTURED TIME MSB'S				
4B	DIGITAL	MON	Q/A CAPTURED TIME LSB'S				
			THE CAPTURED DATA OR TIME IN ADDRESSES 48 - 4B IS SELECTED IN ADDRESS 9A.				
4C-4E			UNASSIGNED				
4F	DIGITAL	MON	SYSTEM CONFIGURATION SWITCHES:				
0	T/C MODULE SWITCH 1- NOT DEFINED AT PRESENT						
1	T/C MODULE SWITCH 2- NOT DEFINED AT PRESENT						
2	T/C MODULE SWITCH 3- NOT DEFINED AT PRESENT						
3	T/C MODULE SWITCH 4- NOT DEFINED AT PRESENT						
4	T/C MODULE SWITCH 5- NOT DEFINED AT PRESENT						
5	T/C MODULE SWITCH 6- NOT DEFINED AT PRESENT						
6	T/C MODULE SWITCH 7- NOT DEFINED AT PRESENT						
7	T/C MODULE SWITCH 1- FORMATTER REMOTE RESET ENABLE/DISABLE;1=ENABLE,SEE ADD.#EF						
8	MVME-117 SWITCH 1- NOT DEFINED AT PRESENT						
9	MVME-117 SWITCH 2- NOT DEFINED AT PRESENT						
10	MVME-117 SWITCH 3- NOT DEFINED AT PRESENT						
11	MVME-117 SWITCH 4- NOT DEFINED AT PRESENT						
12	MVME-117 SWITCH 5- NOT DEFINED AT PRESENT						
13	MVME-117 SWITCH 6- NOT DEFINED AT PRESENT						
14	MVME-117 SWITCH 7- NOT DEFINED AT PRESENT						
15	MVME-117 SWITCH 8- NOT DEFINED AT PRESENT						
50-5F			NOT USED				
60	DIGITAL	MON	FIRMWARE VERSION NUMBER SAMPLE #0123 IS VERSION 1.23				
61	DIGITAL	MON	FIRM WARE DATE (DDMM) SAMPLE #2307 IS 23 JULY				
62	DIGITAL	MON	FIRMWARE DATE (YYYY) SAMPLE #1988 IS THE YEAR 1988				
63-69			UNASSIGNED				

REL. ADD. #(HEX)	ANALOG/ DIGITAL	ACCESS MON/CON	DESCRIPTION(VOLTAGE=COUNTS/32768) BIT POS. FUNCTION VALUE MEANING	MULT.	FORMATTER UNITS RANGE	PAGE 29 COMMENTS
6A	DIGITAL	MON	MCB ERROR TRAP - MONITOR ADDRESS RETURNS RELATIVE ADDRESS OF LAST MONITOR REGISTER ERROR			
6B	DIGITAL	MON	MCB ERROR TRAP - MONITOR REGISTER ATTEMPT COMMAND RETURNS LAST ATTEMPTED COMMAND DATA WHICH WAS INTENDED FOR A MONITOR ONLY REGISTER			
6C	DIGITAL	MON	MBC ERROR TRAP - LAST ILLEGAL COMMAND ADDRESS RETURNS RELATIVE ADDRESS OF LAST ILLEGAL COMMAND WHICH WAS SENT			
6D	DIGITAL	MON	MCB ERROR TRAP LAST ILLEGAL COMMAND DATA RETURNS DATA OF LAST ILLEGAL COMMAND			
6E	DIGITAL	MON	MCB ERROR TRAP - LAST ILLEGAL ARRAY POINTER MSBs			
6F	DIGITAL	MON	RETURNS BITS 16-31 OF LAST ILLEGAL ARRAY POINTER MCB ERROR TRAP - LAST ILLEGAL ARRAY POINTER LSBs RETURNS BITS 0 - 15 OF LAST ILLEGAL ARRAY POINTER			
70	DIGITAL	MON/CON	PCAL A/D ASSIGNMENT HIGH ADDRESS BITS (16-31)		ILLEGAL ADDRESS	
71	DIGITAL	MON/CON	LOW ADDRESS BITS (0-15)		ILLEGAL ADDRESS	
72	DIGITAL	MON/CON	DATA TRANSFER REGISTER		NONE	
73	DIGITAL	MON/CON	CHECKSUM REGISTER		NONE	
DATA TRANSFER REGISTER (SEE CHART BELOW FOR INPUT CODE) THE TRACK DATA ASSIGNMENT ARRAY CODE BITS 0-7: A/D INPUT CODE FOR B INPUT: SIGN INPUT IF NORMAL MODE OR ANY INPUT IN DOUBLING MODE BITS 8-15: A/D INPUT CODE FOR A INPUT: MAGNITUDE INPUT IN NORMAL MODE OR ANY INPUT IN DOUBLING MODE						
CHART FOR INPUT CODES 00 lower sideband 1 (magnitude bit) 01 lower sideband 1 (sign bit) 02 upper sideband 1 (magnitude bit) 03 upper sideband 1 (sign bit) 04 lower sideband 2 (magnitude bit) 05 lower sideband 2 (sign bit) 06 upper sideband 2 (magnitude bit) 07 upper sideband 2 (sign bit) 08 lower sideband 3 (magnatude bit) 09 lower sideband 3 (sign bit) 10 upper sideband 3 (magnitude bit) 11 upper sideband 3 (sign bit) 12 lower sideband 4 (magnitude bit) 13 lower sideband 4 (sign bit) 14 upper sideband 4 (magnitude bit) 15 upper sideband 4 (sign bit) 16 lower sideband 5 (magnitude bit) 17 lower sideband 5 (sign bit) 18 upper sideband 5 (magnitude bit) 19 upper sideband 5 (sign bit) 20 lower sideband 6 (magnatude bit) 21 lower sideband 6 (sign bit) 22 upper sideband 6 (magnitude bit) 23 upper sideband 6 (sign bit) 24 lower sideband 7 (magnitude bit) 25 lower sideband 7 (sign bit) 26 upper sideband 7 (magnitude bit) 27 upper sideband 7 (sign bit) 28 lower sideband 8 (magnatude bit) 29 lower sideband 8 (sign bit) 30 upper sideband 8 (magnitude bit) 31 upper sideband 8 (sign bit)						
INDIRECT ADDRESS TO PCAL SETUP						
74	DIGITAL	MON/CON	HIGH ADDRESS BITS (16-31)		ILLEGAL ADDRESS	
75	DIGITAL	MON/CON	LOW ADDRESS BITS (0-15)		ILLEGAL ADDRESS	
76	DIGITAL	MON/CON	DATA TRANSFER REGUSTER		NONE	
77	DIGITAL	MON/CON	CHECKSUM REGISTER		NONE	

LOW ADDRESS REGISTER
 EXTRACTOE NUMBER 0-7 (8-15 FOR DOUBLING MODE
 MATES - CONNECTED TO CHANNEL TO CHANNEL A INPUTS)

DATA TRANSFER REGISTER
 BITS 0-10: PCAL FREQUENCY IN UNITS OF 10 KHz
 0 = STATE COUNTING

REL. ADD. #(HEX)	ANALOG/ DIGITAL	ACCESS MON/CON	DESCRIPTION(VOLTAGE=COUNTS/32768) BIT POS. FUNCTION VALUE MEANING	MULT.	FORMATTER UNITS RANGE	PAGE 30 COMMENTS
			1-1600 = PCAL FREQUENCY IN UNITS OF 10 KHZ FOR THIS EXTRACTOR BIT 11: 0 = NORMAL NUMBER OF EXTRACTORS (8) 1 = DOUBLE NUMBER OF EXTRACTORS (16) 0 = NORMAL - NO TEST PATTERN 1 = LOAD TEST PATTERN FOR THIS EXTRACTOR (FREQUENCY MUST BE SET TO ZERO IF TEST PATTERN IS USED) BIT 13: 0 = TEST PATTERN ALL ZEROS 1 = TEST PATTERN ALL ONES BIT 14: UNASSIGNED BIT 15: 0 = 1-BIT DATA (IGNORED IN DOUBLING MODE) 1 = 2-BIT DATA			
			INDIRECT ACCESS TO PCAL COUNTERS			
78	DIGITAL	MON/CON	HIGH ADDRESS BITS (16-31)	ILLEGAL ADDRESS		
79	DIGITAL	MON/CON	LOW ADDRESS BITS (0-15)	ILLEGAL ADDRESS		
7A	DIGITAL	MON/CON	DATA TRANSFER REGISTER	NONE		
7B	DIGITAL	MON/CON	CHECKSUM REGISTER	NONE		
			LOW ADDRESS REGISTER INDEX = EXTRACTOR NUMBER * 8 + COUNTER NUMBER * 2 + HILOW (0 = LOW BITS, 1 = HIGH BITS)			
			DATA TRANSFER REGISTER NORMAL MODE STATE COUNTING COUNTER 0 COUNT OF STATE 00 COUNTER 1 COUNT OF STATE 01 COUNTER 2 COUNT OF STATE 10 COUNTER 3 COUNT OF STATE 11 NORMAL MODE TONE EXTRACTION COUNTER 0 COUNT OF SINE LSBs COUNTER 1 COUNT OF SINE MSBs COUNTER 2 COUNT OF COSINE LSBs COUNTER 3 COUNT OF COSINE MSBs DOUBLING MODE STATE COUNTING COUNTER 0 COUNT OF STATE 0 FOR CH. B COUNTER 1 COUNT OF STATE 1 FOR CH. B COUNTER 2 COUNT OF STATE 0 FOR CH. A COUNTER 3 COUNT OF STATE 1 FOR CH. A DOUBLING MODE TONE EXTRACTION COUNTER 0 COUNT OF SINE CH. B COUNTER 1 COUNT OF COSINE CH. B COUNTER 2 COUNT OF SINE CH. A COUNTER 3 COUNT OF SINE CH. A			
81	DIGITAL	MON/CON	INITIALIZE FORMATTER	#8001 - INITIALIZE FORMATTER		
82	DIGITAL	MON/CON	CONFIGURE FORMATTER	#8001 CONFIGURE FORMATTER #8002 COMPARE MCB TIME WITH VLBA TIME ADDRESS 02 SHOULD BE MONITORED FOR "DONE" STATUS BEFORE A COMMAND IS SENT		
83	DIGITAL	MON/CON	CONFIGURE AUX.DATA BUFFER A/B	#8001 - CONFIGURE AUX BUFFER 'A' #8002 - CONFIGURE AUX BUFFER 'B' ADDRESS 03 SHOULD BE MONITORED FOR "DONE" STATUS BEFORE A COMMAND IS SENT THIS COMMAND CAN TAKE UP TO 300 MILLISECONDS TO COMPLETE.		
84	DIGITAL	MON/CON	SELECT AUX.DATA OUTPUT A/B	#8001 - SELECT BUFFER 'A' #8002 - SELECT BUFFER 'B'		
85	DIGITAL	MON/CON	CHECK MONITOR ADDRESS 03 FOR "DONE" STATUS OF THE AUXILIARY DATA CONFIGURE BEFORE SENDING THIS COMMAND START FRINGE CHECK DATA BUFFER	#8001 - START ACQUISITION		
86	DIGITAL	MON/CON	PCAL CONTROL BIT 0 UNASSIGNED BIT 1 0=STOP PCAL 1 = START PCAL (STOPPED BY CONFIGURE) BITS 2-3 UNASSIGNED BITS 4-7 PCAL MODE 0 = 9 SECOND INTEGRATION RUNNING SECONDS 0-8, BLANKED ON SECONDS 9 1 = 1 SECOND INTEGRATION RUNNING EVEN SECONDS, BLANKED ODD SECONDS 8 = COUNTERS ALWAYS RUNNING BIT 8 RELOAD XILINX CONFIGURATION			

REL. ADD. #(HEX)	ANALOG/ DIGITAL	ACCESS MON/CON	DESCRIPTION(VOLTAGE=COUNTS/32768) BIT POS. FUNCTION VALUE	MULT.	FORMATTER UNITS RANGE	PAGE 31 COMMENTS
			CODE DURING NEXT CONFIGURE UNASSIGNED BITS 9-14 BIT 15 MUST BE SET FOR ANY COMMAND			
87			UNASSIGNED			
88	DIGITAL	MON/CON	START/STOP QUALITY ANALYSIS			
			#8000 STOP QUALITY ANALYSIS			
			#8001 START QUALITY ANALYSIS			
89	DIGITAL	MON/CON	START Q/A DATA CAPTURE			
			#8001 START DATA CAPTURE SYSTEM			
8A-8C			UNASSIGNED			
8D	DIGITAL	MON/CON	0 - 15 TRACK ENABLE MASK - ODD RECORDER TRACKS RECORDER ODD TRACKS 3-33 CAN BE INDIVIDUALLY ENABLED AND DISABLED A HIGH (1) ENABLES THE CORRESPONDING TRACK SAMPLES CODES ARE:			
			#0000 ALL ODD TRACKS DISABLED			
			#0001 TRACK 3 ENABLED			
			#8000 TRACK 33 ENABLED			
			#FFFF ALL ODD TRACKS ENABLED			
8E	DIGITAL	MON/CON	0-15 TRACK ENABLE MASK - EVEN RECORDER TRACKS RECORDER EVEN TRACKS 2-32 CAN BE INDIVIDUALLY ENABLED OR DISABLED A HIGH (1) ENABLES THE CORRESPONDING TRACK SAMPLE CODES ARE:			
			#0000 ALL EVEN TRACKS DISABLED			
			#0001 TRACK 2 ENABLED			
			#8000 TRACK 32 ENABLED			
			#FFFF ALL EVEN TRACKS ENABLED			
90	DIGITAL	MON/CON	FORMAT SPEC. CODE (DR = DATA REPLACE, NDR = NON DATA REPLACE)			
			#8000 MKIII-DR-FRINGE DETECTION TESTS			
			#8001 MKIII-DR-CORRELATION TESTS			
			#8002 MKIII-DR-MARK 3 COMPATIBLE			
			#8003 MKIII-DR-PSUEDO-RANDOM CODE-ALL TRACKS			
			#8004 MKIII-DR- HIGH TRACKS DRIVE TEST			
			#8005 MKIII-DR- LOW TRACKS DRIVE TEST			
			#8006 MKIII-DR- TRACK 0, 2, 4, 6, . . . DRIVE TEST			
			#8007 MKIII-DR- TRACK 0, 4, 8, 12 DRIVE TEST			
			#8008 MKIII-NDR- FRINGE DETECTION TESTS			
			#8009 MKIII-NDR-CORRELATION TESTS			
			#800A MKIII-NDR-MARK 3 COMPATIBLE			
			#800B MKIII-NDR-PSUEDO-RANDOM CODE-ALL TRACKS			
			#800C MKIII-NDR- HIGH TRACK DRIVE TEST			
			#800D MKIII-NDR- LOW TRACK DRIVE TEST			
			#800E MKIII-NDR- TRACK 0, 2, 4, 6, . . . DRIVE TEST			
			#8110 VLBA FORMAT			
			#8111 VLBA FORMAT WITHOUT MOD INVERT IMPLEMENTED			
			#F000 ACCEPT DOWNLOAD FORMAT (MARK III FORMAT TYPE TIMECODE)			
			#F100 ACCEPT DOWNLOAD FORMAT (VLBA FORMAT TYPE TIMECODE)			
91	DIGITAL	MON/CON	SAMPLE RATE SELECTION			
			#8000 250 KHZ			
			#8001 500 KHZ			
			#8002 1 MHZ			
			#8003 2 MHZ			
			#8004 4 MHZ			
			#8005 8 MHZ			
			#8006 16 MHZ			
			#8007 32 MHZ			
92	DIGITAL	MON/CON	SAMPLE MULTIPLEX MODE SELECTION			
			#8000 RESERVED FOR EXPANSION			
			#8001 RESERVED FOR EXPANSION			
			#8002 4:1 (4 BITSTREAM TO 1 TRACK)			
			#8003 2:1 (2 BITSTREAM TO 1 TRACK)			
			#8004 1:1 (1 BITSTREAM TO 1 TRACK)			
			#8005 1:2 (1 BITSTREAM TO 4 TRACKS)			
			#8006 1:4 (1 BITSTREAM TO 4 TRACKS)			
			#8007 RESERVED FOR EXPANSION			
93	DIGITAL	MON/CON	TRACK ROLLER CONTROL			
			#8000 DISABLE TRACK ROLLER			
			#8001 ROLL IN 8 TRACK GROUPS - STEP 1 TRACK PER FRAME			
			#8002 ROLL IN 8 TRACK GROUPS - STEP 2 TRACKS PER FRAME			
			#8003 ROLL IN 8 TRACK GROUPS - STEP 3 TRACKS PER FRAME			
			#8004 DISABLE TRACK ROLLER			
			#8005 ROLL IN 16 TRACK GROUPS - STEP 1 TRACK PER FRAME			
			#8006 ROLL IN 16 TRACK GROUPS - STEP 2 TRACKS PER FRAME			
			#8007 ROLL IN 16 TRACK GROUPS - STEP 4 TRACKS PER FRAME			

REL. ADD. #(HEX)	ANALOG/ DIGITAL	ACCESS MON/CON	DESCRIPTION(VOLTAGE=COUNTS/32768) BIT POS. FUNCTION	VALUE	MEANING	MULT.	FORMATTER UNITS RANGE	PAGE 32 COMMENTS
94	DIGITAL	MON/CON	TIME CODE CONTROL IN USE					
				VLBA FORMAT				
				#8000 SECONDS * 10				
				#8001 SECONDS * 100				
				#8002 MJD * 1				
				#8003 MJD * 100				
				MARK III FORMAT				
				#8000 SECONDS * 10				
				#8001 MINUTES * 10				
				#8002 HOURS * 10				
				#8003 DAYS * 100				
				#8004 DAYS * 100				
				#8005 YEARS * 1				
				#8006 YEARS * 10				
				#8007 YEARS * 100				
95	DIGITAL	MON/CON	FRINGE CHECK DATA BUFFER ACQUISITION MODE					
				1 TRACK CAPTURE MODES				
				#8100 CAPTURE DATA	FORMATTER TRACK 0			
				#8101 CAPTURE DATA	FORMATTER TRACK 1			
				#8102 CAPTURE DATA	FORMATTER TRACK 2			
				THRU				
				#811E CAPTURE DATA	FORMATTER TRACK 30			
				#811F CAPTURE DATA	FORMATTER TRACK 31			
				#8120 CAPTURE DATA	SYSTEM TRACK 0			
96	DIGITAL	MON/CON	FRINGE CHECK TEST MODE					
				#8000 DISABLED				
				#8001 DISABLED				
				#8002 DISABLED				
				#8003 DISABLED				
				#8004 MODE 0				
				#8005 MODE 1				
				#8006 MODE 2				
				#8007 MODE 3				
97	DIGITAL	MON/CON	PARITY MODE CONTROL					
				#8000	ALONG-TRACK		CROSS-TRACK	
				#8001	EVEN		EVEN	
				#8002	ODD		ODD	
				#8003	ODD		EVEN	
					ODD		ODD	
98	DIGITAL	MON/CON	CRCC MODE CONTROL					
				#8000	INITIALIZE TO:		CRCC POLYNOMIAL	
				#8010	ZERO		16-15-2-0	
				#8001	ONES		16-15-2-0	
				#8011	ZERO		16-15-1-0	
				#8012	ONES		16-15-1-0	
				#8002	ZERO		16-15-13-7-4-2-1-0	
				#8013	ONES		16-15-13-7-4-2-1-0	
				#8003	ZERO		12-11-3-2-1-0	
				#8014	ONES		12-11-3-2-1-0	
				#8004	ZERO		8-7-5-4-1-0	
				#8015	ONES		8-7-5-4-1-0	
				#8005	ZERO		8-0	
				#8016	ONES		8-0	
				#8006	ZERO		16-12-5-0	
				#8017	ONES		16-12-5-0	
				#8007	ZERO		16-11-4-0	
				#8008	ONES		16-11-4-0	
99	DIGITAL	MON/CON	Q/A RECORDER SELECTION CONTROL					
				#8001	SELECT RECORDER #1			
				#8002	SELECT RECORDER #2			
9A	DIGITAL	MON/CON	Q/A DATA CAPTURE MODE CONTROL					
				#8000	TIMECODE - CHANNEL 'A' BITS 1 THRU 32			
				#8001	TIMECODE - CHANNEL 'A' BITS 33 THRU 64			
				#8002	TIMECODE - CHANNEL 'A' BITS 65 THRU 96			
				#8003	AUX DATA - CHANNEL 'A' BITS 1 THRU 32			
				#8004	TIMECODE - CHANNEL 'B' BITS 1 THRU 32			
				#8005	TIMECODE - CHANNEL 'B' BITS 33 THRU 64			
				#8006	TIMECODE - CHANNEL 'B' BITS 65 THRU 96			
				#8007	AUX DATA - CHANNEL 'B' BITS 1 THRU 32			
9B	DIGITAL	MON/CON	QUAL. ANALYSIS SYNC. DETECTOR THRESHOLD SELECTION IN USE					
				#8001	1 ALIGNED BIT REQUIRED FOR SYNC DETECTION			
				#8002	2 ALIGNED BITS REQUIRED FOR SYNC DETECTION			
				#8003	3 ALIGNED BITS REQUIRED FOR SYNC DETECTION			
					THRU			
				#803F	63 ALIGNED BITS REQUIRED FOR SYNC DETECTION			
				#8040	64 ALIGNED BITS REQUIRED FOR SYNC DETECTION			

REL. ADD. #(HEX)	ANALOG/ DIGITAL	ACCESS MON/CON	DESCRIPTION(VOLTAGE=COUNTS/3276 8) BIT POS. FUNCTION ERROR MESMEANING	MULT.	FORMATTER UNITS RANGE	PAGE 33 COMMENTS
9C	DIGITAL	MON/CON	QUAL. ANALYSIS PHASE CAL MODE IN USE #8002 #8003		2 LEVEL ROTATION 3 LEVEL ROTATION	
9D	DIGITAL	MON/CON	QUAL. ANALYSIS PHASE CAL PERIOD IN USE CODE #8001 #8002 #8003 #8004 THRU #FFFD #FFFE #FFFF		2 - LEVEL ROTATIONS 3 - LEVEL ROTATIONS 8 CLOCKS/CYCLE 16 CLOCKS/CYCLE 24 CLOCKS/CYCLE 32 CLOCKS/CYCLE THRU 262,120 CLOCKS/CYCLE 524,240 CLOCKS/CYCLE 262,128 CLOCKS/CYCLE 524,256 CLOCKS/CYCLE 262,136 CLOCKS/CYCLE 524,272 CLOCKS/CYCLE	
9E	DIGITAL	MON/CON	FRINGE CHECK TEST SEED LEGAL SEED VALUES ARE 0000 - FFFF			
9F-A0			UNASSIGNED			
A1	DIGITAL	MON/CON	MCB ERROR REGISTER BITS WHICH ARE SET IN MCB ERROR REGISTER 21 CAN SELECTIVELY BE CLEARED BY WRITING TO REGISTER A1. 00 NON-EXISTING MONITOR REGISTER ACCESS ATTEMPT 01 NON-EXISTING CONTROL REGISTER ACCESS ATTEMPT 02 FORMATTER WAS BUSY DURING MONITOR ACCESS TO A REGISTER 03 FORMATTER WAS BUSY DURING CONTROL ACCESS TO A REGISTER 04 ILLEGAL CONTROL PARAMETER RECEIVED 05 CONTROL ACCESS ATTEMPTED TO A MONITOR-ONLY REGISTER 06 ATTEMPT TO CHECK VLBA TIME WHILE BUSY SETTING VLBA TIME 07 UNDEFINED 08 ARRAY POINTER WENT OUT OF LIMITS 09 UNDEFINED 10 FORMATTER WAS BUSY DURING MONITOR ACCESS TO AN ARRAY 11 FORMATTER WAS BUSY DURING CONTROL ACCESS TO AN ARRAY 12 UNDEFINED 13 COMMAND CONFLICT - ATTEMPT TO CONFIGURE THE ACTIVE AUX DATA 14 BUFFER OR START AN OPERATION WHICH IS ALREADY RUNNING 15 TIMING CONFLICT - INITIALIZE CONFIGURE, OR CHECK TIME ATTEMPTED WHILE BUSY WITH LAST OPERATION. 15 ANY ERROR			
A2-A5			UNASSIGNED			
A6	DIGITAL	MON/CON	SERIAL STATUS REGISTER MSB'S			
A7	DIGITAL	MON/CON	SERIAL STATUS REGISTER LSB'S THE SERIAL STATUS REGISTER INSERTS DATA WHICH IS COMMON TO ALL TRACKS IN THE FRAME HEADERS. THIS DATA IS ONLY INSERTED IF SELECTED BY THE FORMAT DEFINITION ARRAY, OUT CODE 3.			
A8	DIGITAL	MON/CON	CURRENT STATION TIME - YEARS: Y Y Y Y			
A9	DIGITAL	MON/CON	CURRENT STATION TIME - DAYS: 0 D D D			
AA	DIGITAL	MON/CON	CURRENT STATION TIME - HOURS: 0 0 : H H			
AB	DIGITAL	MON/CON	CURRENT STATION TIME - MIN,SEC MM:SS			
AC			UNASSIGNED			kHz (SEE BELOW FOR PRESENT
AD	DIGITAL	MON/CON	CURRENT OUTPUT SNYTHESIZER RATE ONLY THE LEAST SIGNIFICANT 4 BITS ARE USED AS FOLLOWS: VALUE MEANING ----- #1 UNUSED #2 9.072/32 MHZ (NON DATA REPLACEMENT MODES) #3 9.072/16 MHZ (NON DATA REPLACEMENT MODES) #4 9.072/8 MHZ (NON DATA REPLACEMENT MODES) #5 9.072/4 MHZ (NON DATA REPLACEMENT MODES) #6 9.072/2 MHZ (NON DATA REPLACEMENT MODES) #7 9.072/1 MHZ (NON DATA REPLACEMENT MODES) #8 UNUSED #9 UNUSED #A 9/32 MHZ (DATA REPLACEMENT MODES) #B 9/16 MHZ (DATA REPLACEMENT MODES) #C 9/8 MHZ (DATA REPLACEMENT MODES) #D 9/4 MHZ (DATA REPLACEMENT MODES) #E 9/2 MHZ (DATA REPLACEMENT MODES)			

REL. ADD. #(HEX)	ANALOG/ DIGITAL	ACCESS MON/CON	DESCRIPTION(VOLTAGE=COUNTS/3276.8) BIT POS FUNCTION ERROR MES/MEANING	MULT.	FORMATTER UNITS	RANGE	PAGE 34 COMMENTS
AE-B3			#F 9/1 MHZ (DATA REPLACEMENT MODES) UNASSIGNED				
B4	DIGITAL	MON/CON	SYSTEM TRACK 0 MODE CONTROL				
B5	DIGITAL	MON/CON	SYSTEM TRACK 1 MODE CONTROL				
B6	DIGITAL	MON/CON	SYSTEM TRACK 2 MODE CONTROL				
B7	DIGITAL	MON/CON	SYSTEM TRACK 3 MODE CONTROL				
EACH SYSTEM TRACK CAN DUPLICATE A DATA OR IT CAN ACCESS ONE OF THE SIX CROSS TRACK PARITY GENERATORS (OR, A COMBINATION OF BOTH, AS DETERMINED BY THE FORMAT DEFINITION ARRAY).							
			#8000 PARITY OVER FORMATTER TRACKS 0 THRU 7				
			#8100 PARITY OVER FORMATTER TRACKS 8 THRU 15				
			#8200 PARITY OVER FORMATTER TRACKS 16 THRU 23				
			#8300 PARITY OVER FORMATTER TRACKS 24 THRU 31				
			#8400 PARITY OVER FORMATTER TRACKS 00 THRU 15				
			#8500 PARITY OVER FORMATTER TRACKS 08 THRU 23				
			#8600 PARTIY OVER FORMATTER TRCKS 16 THRU 31				
			#8700 CROSS TRACK PARTIY UNUSED				
DATA DUPLICATION EXAMPLE #8704 TO SYSTEM TRACK 0...DUPLICATE DATA FROM FORMATTER TRACK 4							
MIXED MODE EXAMPLE #8510 TO SYSTEM TRACK 2 . . . DUPLICATED DATA FROM FORMATTER TRACK 16 AND CARRY CROSS TRACK PARITY OVER TRACKS 8 THROUGH 23							
B8	DIGITAL	MON/CON	FORMATTER - TAPE CLOCK SELECTION				
			#8000 TAPE - TRANSPORT #1				
			#8001 TAPE - TRANSPORT #2				
			#8002 LOCAL SYNTHESIZER				
			#8003 EXTERNAL JACK				
			#8004 OFF - NO CLOCK				
			#8005 4 MHZ VME SYSTEM XTAL				
			#8006 8 MHZ VME SYSTEM XTAL				
			#8007 10 MHZ VME SYSTEM XTAL				
B9	DIGITAL	MON/CON	SAMPLER OUTPUT MAPPING - SEE MON.WORD #39 ABOVE				
			#8000 NORMAL MAPPING - USED FOR OPERATIONS				
			#8001 NO MAPPING - USED FOR DIAGNOSTICS				
			#8002 COMMON MAPPING - USED FOR DIAGNOSTICS				
			#8003 1 PPS MAPPING - USED FOR DIAGNOSTICS				
			COMMON MAPPING: ROUTES TRACK 0 SAMPLES TO TRACKS 0 THRU 7 ROUTES TRACK 8 SAMPLES TO TRACKS 8 THRU 15 ROUTES TRACK 16 SAMPLES TO TRACKS 16 THRU 23 ROUTES TRACK 24 SAMPLES TO TRACKS 24 THRU 31				
			1PPS MAPPING ROUTES NORMAL ONE PPS SAMPLES TO ALL ODD TRACKS 1, 3, 5, 7, ROUTES INVERTED ONE PPS SAMPLES TO ALL EVEN TRACKS 0, 2, 4, 6,				
BA-BF			UNASSIGNED				
INDIRECT ACCESS TO FORMAT DEFINITION ARRAY - REF:54200D10.TXT							
C0	DIGITAL	MON/CON	HIGH ADDRESS BITS (16-31)				ILLEGAL ADDRESS
C1	DIGITAL	MON/CON	LOW ADDRESS BITS (00-15)				ILLEGAL ADDRESS
C2	DIGITAL	MON/CON	DATA TRANSFER REGISTER				COMMAND ATTEMPT WHILE INITIALIZING
C3	DIGITAL	MON/CON	CHECKSUM REGISTER				NONE
THIS ARRAY DEFINES THE FORMAT TO BE GENERATED. EACH ADDRESS OF THE ARRAY DEFINES ONE BIT IN THE DATA FRAME.							
DATA TRANSFER REGISTER							
			BIT 0 OUTPUT CODE BIT 0				
			BIT 1 OUTPUT CODE BIT 1				
			BIT 2 OUTPUT CODE BIT 2				
			BIT 3 OUTPUT CODE BIT 3				
			BIT 4 CALCULATE CRCC GENERATOR B				
			BIT 5 INITIALIZE CRCC GENERATOR B				
			BIT 6 CALCULATE CRCC GENERATOR A				
			BIT 7 INITIALIZE CRCC GENERATOR A				
			BIT 8 CALCULATE ALONG TRACK PARITY				
			BIT 9 INITIALIZE ALONG TRACK PARITY				
			BIT 10 CROSS TRACK PARITY ENABLE				
			BIT 11 SYNC FIELD OR END OF FIELD				
			BIT 12 DISCARD DATA SAMPLE				
			BIT 13 MODULATION INVERT				
			BIT 14 START OF FIELD				
			BIT 15 END OF FRAME				

REL. ADD. #(HEX)	ANALOG/ DIGITAL	ACCESS MON/CON	DESCRIPTION(VOLTAGE=COUNTS/3276.8) BIT POS. FUNCTION ERROR MESSAGE/MEANING	MULT.	FORMATTER UNITS RANGE	PAGE 35 COMMENTS
			OUTPUT CODING IS AS FOLLOWS: CODE = 0 OUTPUT LOGIC 0 CODE = 1 OUTPUT LOGIC 1 CODE = 2 OUTPUT TIMECODE BIT CODE = 3 OUTPUT SERIAL STATUS BIT CODE = 4 OUTPUT TRACK IDENTITY BIT CODE = 5 OUTPUT A/D IDENTITY BIT CODE = 6 OUT AUX DATA BIT CODE = 7 OUTPUT TRACK ROLL POSITION BIT CODE = 8 OUTPUT DATA SAMPLE CODE = 9 OUTPUT ALONG TRACK PARITY CODE = 10 OUTPUT CRCC B CODE = 11 OUTPUT CRCC A CODE = 12 UNDEFINED SPARE CODE = 13 UNDEFINED SPARE CODE = 14 UNDEFINED SPARE CODE = 15 UNDEFINED SPARE			
			INDIRECT ACCESS TO FRINGE CHECK DATA BUFFER MONITOR ARRAY REF:54200D11.TXT			
C4	DIGITAL	MON/CON	HIGH ADDRESS BITS (16-31)	ILLEGAL ADDRESS		
C5	DIGITAL	MON/CON	LOW ADDRESS BITS (00-15)	ILLEGAL ADDRESS		
C6	DIGITAL	MON/CON	DATA TRANSFER REGISTER	COMMAND ATTEMPT WHILE D/B RUNNING		
C7	DIGITAL	MON/CON	CHECKSUM REGISTER	NONE		
			INDIRECT ACCESS TO QUALITY ANALYSIS RESULT REGISTERS REF:54200D09.TXT			
C8	DIGITAL	MON/CON	HIGH ADDRESS BITS (16-31)	ILLEGAL ADDRESS		
C9	DIGITAL	MON/CON	LOW ADDRESS BITS (00-15)	ILLEGAL ADDRESS		
CA	DIGITAL	MON/CON	DATA TRANSFER REGISTER	COMMAND ATTEMPT WHILE Q/A RUNNING		
CB	DIGITAL	MON/CON	CHECKSUM REGISTER	NONE		
			THE ERROR COUNTERS ARE POSITIONED IN THE ARRAY AS FOLLOWS:			
			array[00] = RECORDER CHANNEL A PARITY ERRORS (msb's)			
			array[01] = RECORDER CHANNEL A PARITY ERRORS (lsb's)			
			array[02] = RECORDER CHANNEL B PARITY ERRORS (msb's)			
			array[03] = RECORDER CHANNEL B PARITY ERRORS (lsb's)			
			array[04] = RECORDER CHANNEL A CRCC - 'A' ERRORS (msb's)			
			array[05] = RECORDER CHANNEL A CRCC - 'A' ERRORS (lsb's)			
			array[06] = RECORDER CHANNEL B CRCC - 'A' ERRORS (msb's)			
			array[07] = RECORDER CHANNEL B CRCC - 'A' ERRORS (lsb's)			
			array[08] = RECORDER CHANNEL A CRCC - 'B' ERRORS (msb's)			
			array[09] = RECORDER CHANNEL A CRCC - 'B' ERRORS (lsb's)			
			array[10] = RECORDER CHANNEL B CRCC - 'B' ERRORS (msb's)			
			array[11] = RECORDER CHANNEL B CRCC - 'B' ERRORS (lsb's)			
			array[12] = RECORDER CHANNEL A RESYNC ERRORS (msb's)			
			array[13] = RECORDER CHANNEL A RESYNC ERRORS (lsb's)			
			array[14] = RECORDER CHANNEL B RESYNC ERRORS (msb's)			
			array[15] = RECORDER CHANNEL B RESYNC ERRORS (lsb's)			
			array[16] = RECORDER CHANNEL A NOSYNC ERRORS (msb's)			
			array[17] = RECORDER CHANNEL A NOSYNC ERRORS (lsb's)			
			array[18] = RECORDER CHANNEL B NOSYNC ERRORS (msb's)			
			array[19] = RECORDER CHANNEL B NOSYNC ERRORS (lsb's)			
			INDIRECT ACCESS TO LOCAL PROCESSOR'S PHYSICAL MEMORY SPACE			
CC	DIGITAL	MON/CON	HIGH ADDRESS BITS (16-31)	ILLEGAL ADDRESS		
CD	DIGITAL	MON/CON	LOW ADDRESS BITS (00-15)	ILLEGAL ADDRESS		
CE	DIGITAL	MON/CON	DATA TRANSFER REGISTER	COMMAND ATTEMPT WHILE FORMATTER RUNNING		
CF	DIGITAL	MON/CON	CHECKSUM REGISTER	NONE		
			LOCATIONS #D0 THRU #DF RESERVED FOR FORMATTER TRACK AND AUX DATA CONTROLS			
			INDIRECT ACCESS TO TRACK DATA ASSIGNMENT ARRAY REF:54200D04.TXT			
D0	DIGITAL	MON/CON	HIGH ADDRESS BITS (16-31)	ILLEGAL ADDRESS		
D1	DIGITAL	MON/CON	LOW ADDRESS BITS (00-15)	ILLEGAL ADDRESS		
D2	DIGITAL	MON/CON	DATA TRANSFER REGISTER	COMMAND ATTEMPT WHILE INITIALIZING		
D3	DIGITAL	MON/CON	CHECKSUM REGISTER	NONE		
			INDIRECT ACCESS TO AUXILIARY DATA FIELD ARRAY 'A' REF:54200D08.TXT			
D4	DIGITAL	MON/CON	HIGH ADDRESS BITS (16-31)	ILLEGAL ADDRESS		
D5	DIGITAL	MON/CON	LOW ADDRESS BITS (00-15)	ILLEGAL ADDRESS		
D6	DIGITAL	MON/CON	DATA TRANSFER REGISTER	COMMAND ATTEMPT WHILE INITIALIZING		
D7	DIGITAL	MON/CON	CHECKSUM REGISTER	NONE		
			INDIRECT ACCESS TO AUXILIARY DATA FIELD ARRAY 'B' REF:54200D08.TXT			
D8	DIGITAL	MON/CON	HIGH ADDRESS BITS (16-31)	ILLEGAL ADDRESS		
D9	DIGITAL	MON/CON	LOW ADDRESS BITS (00-15)	ILLEGAL ADDRESS		
DA	DIGITAL	MON/CON	DATA TRANSFER REGISTER	COMMAND ATTEMPT WHILE INITIALIZING		
DB	DIGITAL	MON/CON	CHECKSUM REGISTER	NONE		

REL. ADD. #(HEX)	ANALOG/ DIGITAL	ACCESS MON/CON	DESCRIPTION(VOLTAGE=COUNTS/3276.8) BIT POS. FUNCTION	MULT.	FORMATTER UNITS RANGE	PAGE 36 COMMENTS
DC		NONE	UNASSIGNED			NON-EXISTING REGISTER
DD		NONE	UNASSIGNED			NON-EXISTING REGISTER
DE		NONE	UNASSIGNED			NON-EXISTING REGISTER
DF		NONE	UNASSIGNED			NON-EXISTING REGISTER
INDIRECT ACCESS TO TRACK DATA ASSIGNMENT ARRAY - EXPANSION						
E0	DIGITAL	MON/CON	HIGH ADDRESS BITS (16-31)			ILLEGAL ADDRESS
E1	DIGITAL	MON/CON	LOW ADDRESS BITS (00-15)			ILLEGAL ADDRESS
E2	DIGITAL	MON/CON	DATA TRANSFER REGISTER			COMMAND ATTEMPT WHILE INITIALIZING
E3	DIGITAL	MON/CON	CHECKSUM REGISTER			NONE
INDIRECT ACCESS TO AUXILIARY DATA FIELD ARRAY 'A' - EXPANSION						
E4	DIGITAL	MON/CON	HIGH ADDRESS BITS (16-31)			ILLEGAL ADDRESS
E5	DIGITAL	MON/CON	LOW ADDRESS BITS (00-15)			ILLEGAL ADDRESS
E6	DIGITAL	MON/CON	DATA TRANSFER REGISTER			COMMAND ATTEMPT WHILE INITIALIZING
E7	DIGITAL	MON/CON	CHECKSUM REGISTER			NONE
INDIRECT ACCESS TO AUXILIARY DATA FIELD ARRAY 'B' - EXPANSION						
E8	DIGITAL	MON/CON	HIGH ADDRESS BITS (16-31)			ILLEGAL ADDRESS
E9	DIGITAL	MON/CON	LOW ADDRESS BITS (00-15)			ILLEGAL ADDRESS
EA	DIGITAL	MON/CON	DATA TRANSFER REGISTER			COMMAND ATTEMPT WHILE INITIALIZING
EB	DIGITAL	MON/CON	CHECKSUM REGISTER			NONE
EC		NONE	UNASSIGNED			NON-EXISTING REGISTER
ED		NONE	UNASSIGNED			NON-EXISTING REGISTER
EE		NONE	UNASSIGNED			NON-EXISTING REGISTER
EF		NONE	RESET FORMATTER [ACCESS CODE #AE51]			ILLEGAL ACCESS CODE
F0		NONE	RESERVED FOR MCB SYSTEM USE			NON-EXISTING REGISTER
F1		NONE	RESERVED FOR MCB SYSTEM USE			NON-EXISTING REGISTER
F2		NONE	RESERVED FOR MCB SYSTEM USE			NON-EXISTING REGISTER
F3		NONE	RESERVED FOR MCB SYSTEM USE			NON-EXISTING
F4		NONE	RESERVED FOR MCB SYSTEM USE			NON-EXISTING REGISTER
F5		NONE	RESERVED FOR MCB SYSTEM USE			NON-EXISTING REGISTER
F6		NONE	RESERVED FOR MCB SYSTEM USE			NON-EXISTING
F7		NONE	RESERVED FOR MCB SYSTEM USE			NON-EXISTING REGISTER
F8		NONE	RESERVED FOR MCB SYSTEM USE			NON-EXISTING REGISTER
F9		NONE	RESERVED FOR MCB SYSTEM USE			NON-EXISTING REGISTER
FA		NONE	RESERVED FOR MCB SYSTEM USE			NON-EXISTING REGISTER
FB		NONE	RESERVED FOR MCB SYSTEM USE			NON-EXISTING
FC		NONE	RESERVED FOR MCB SYSTEM USE			NON-EXISTING REGISTER
FD		NONE	RESERVED FOR MCB SYSTEM USE			NON-EXISTING REGISTER
FE		NONE	RESERVED FOR MCB SYSTEM USE			NON-EXISTING REGISTER
FF		NONE	RESERVED FOR MCB SYSTEM USE			NON-EXISTING REGISTER

B-RACK INTERFACE (M102)

ID (HEX) = 40

BLOCK LENGTH = 40

STARTING ADDRESS (HEX) = 4000

REL. ADD. #(HEX)	ANALOG/ DIGITAL	ACCESS MON/CON	DESCRIPTION(VOLTAGE=COUNTS/3276.8) BIT POS. FUNCTION VALUE MEANING	MULT.	UNITS	RANGE	COMMENTS
00	ANALOG	MON	100 MHz LO RECEIVER INPUT POWER	1	VOLTS	-1.5 to -0.5	
01	ANALOG	MON	500MHz LO RECEIVER INPUT POWER		VOLTS	-1.5 to -0.5	
02	ANALOG	MON	100MHz LO RECEIVER OUTPUT POWER		VOLTS	-1.2 to 0.8	
03	ANALOG	MON	500MHz LO RECEIVER OUTPUT POWER		VOLTS	-1.2 to 0.8	
04	ANALOG	MON	TEMP. SENSOR #3- VR DOWN SIDE(10 DEG C/VOLT)	10	deg C		
05	ANALOG	MON	TEMP. SENSOR #4- FC DOWN SIDE(10 DEG C/VOLT)		deg C		
06	ANALOG	MON	TEMP. SENSOR #5- VR UP SIDE(10 DEG C/VOLT)		deg C		
07	ANALOG	MON	TEMP. SENSOR #6- FC UPSIDE(10 DEG C/VOLT)		deg C		
08	ANALOG	MON	NOT USED		VOLTS		
09	ANALOG	MON	1.5GHz IF CONVERTER (T103) LO POWER		VOLTS	0.23V	
0A	ANALOG	MON	HOT GAS BY PASS		VOLTS		LABEL AV11
0B	ANALOG	MON	HEATER CONTROL		VOLTS		LABEL AV12
0C	ANALOG	MON	DIFFERENTIAL ANALOG MONITOR, NOT USED		VOLTS		LABEL AV13
0D	ANALOG	MON	DIFFERENTIAL ANALOG MONITOR, NOT USED		VOLTS		LABEL AV14
0E	ANALOG	MON	TEMP. SENSOR #1- B-RACK TOP		deg C	26deg C	
0F	ANALOG	MON	TEMP. SENSOR #2- B-RACK BOTTOM		deg C	23deg C	
10	DIGITAL	MON/CON	0 .33GHz (T101)CONV. 0 NORMAL				
			1 INPUTS 1 INTERCHANGED				
11	DIGITAL	MON/CON	0 1 BIT RELAY DRIVER- NOT USED				LABEL RD2
12	DIGITAL	MON/CON	0 1.5GHz (T103)CONV. 0 NORMAL				
			1 INPUTS 1 INTERCHANGED				
13	DIGITAL	MON/CON	0 2.3 GHz(T104) 0 NORMAL				
			1 INTER-CHANGE				
14	DIGITAL	MON/CON	0 4.8GHz (T105)CONV. 0 NORMAL				
			1 INPUTS 1 INTERCHANGED				
15	DIGITAL	MON/CON	0 SWITCH S106D 0 8.4GHz CONVERTER RCP & LCP MIXERS INPUTS NORMAL				
			1 RCP DIVIDED TO BOTH RCP & LCP				
16	DIGITAL	MON/CON	0 10.7GHz CONV. S107 0 NORMAL				
			1 INPUTS 1 INTERCHANGED				
17	DIGITAL	MON/CON	0 15GHz CONV. S108 0 NORMAL				
			1 INPUTS 1 INTERCHANGED				
18	DIGITAL	MON/CON	0 S109A SPARE CONVERTER				LABEL RD9
19	DIGITAL	MON/CON	0 S110 C (T110)				LABEL RD10
1A	DIGITAL	MON/CON	0 S110 AB - 1, S110AB-2				LABEL RD11
1B	DIGITAL	MON/CON	0 1 BIT RELAY DRIVER, NOT USED				LABEL RD12
1C	DIGITAL	MON/CON	BIT 1 DICHROIC CONTROL 0 EXTEND				LABEL C9
			1 RETRACT				
1D	DIGITAL	MON/CON	0 1 BIT TTL LEVEL, NOT USED				LABEL C10
1E	DIGITAL	MON/CON	0 1 BIT TTL LEVEL, NOT USED				LABEL C11
1F	DIGITAL	MON/CON	0 1 BIT TTL LEVEL, NOT USED				LABEL C12
20	DIGITAL	MON/CON	0-7 8 BIT WORD: TTL LEVEL, NOT USED				LABEL C1-8
21	DIGITAL	MON	BIT 1 LO RCVR 500MHz LOCK 0 LOCKED				
			1 INDICATOR 1 NOT LOCKED				
			DICHROIC STATUS				
			BIT 2 1 REMOTE & COMPUTER				
			0 MANUAL OR LOCAL				
			BIT 3 1 NOT IN RETRACT LIMIT				
			0 RETRACT LIMIT				
			BIT 4 1 NOT IN EXTEND LIMIT				
			0 EXTEND LIMIT				
			BIT 5 1 E STOP SET				
			0 E STOP RELEASED				
			BIT 6 1 CONTROLLER POWER OFF				
			0 CONTROLLER POWER ON				
			HVAC COMPRESSOR MONITOR				
			BIT 7 0 OFF				
			1 ON				
22	DIGITAL	MON/CON	MODULE (M102) SERIAL NUMBER ANY COMMAND TO THIS ADDRESS WILL CLEAR THE 1 BIT COMMANDS TO ADDRESSES 4010 THRU 401F				
23	DIGITAL	MON	BIT 0-12 MONITORS RELAY DRIVERS ADDRESSES 0 - S101 A 1 - RD2 2 - S103A 3 - S104A 4 - S105A 5 - S106A 6 - S107A 7 - S108A 8 - S109A 9 - S110C 10 - S110AB-1 11 - RD12 12 - S110 AB-2				

PEDASTAL ROOM UTILITY MODULE

ID (HEX) = 41 BLOCK LENGTH = 80
 STARTING ADDRESS (HEX) = 4100
 =====

REL. ADD. #(HEX)	ANALOG/ DIGITAL	ACCESS MON/CON	DESCRIPTION(VOLTAGE=COUNTS/3276.8) BIT POS. FUNCTION VALUE MEANING	MULT.	UNITS	RANGE	COMMENTS
00	ANALOG	MON	EXTERNAL,NOT USED, AVAILABLE	1	VOLTS		
01	ANALOG	MON	NOT AVAILABLE, USED INTERNALLY				
02	ANALOG	MON	NOT AVAILABLE, USED INTERNALLY				
03	ANALOG	MON	NOT AVAILABLE, USED INTERNALLY				
04	ANALOG	MON	EXTERNAL,NOT USED, AVAILABLE	1	VOLTS		
05	ANALOG	MON	EXTERNAL,NOT USED, AVAILABLE	1	VOLTS		
06	ANALOG	MON	EXTERNAL,NOT USED, AVAILABLE	1	VOLTS		
07	ANALOG	MON	ANALOG GND (A/D)	1	VOLTS		
08	ANALOG	MON	FEED HEATER CURRENT 10V=20A				
09	ANALOG	MON	M106 +5V	1	VOLTS		
0A	ANALOG	MON	M106 EAST WS	.1V/MPH	MPH		
0B	ANALOG	MON	M106 WEST WS	.1V/MPH	MPH		
0C	ANALOG	MON	EXTERNAL, NOT USED, AVAILABLE				
0D	ANALOG	MON	EXTERNAL, NOT USED, AVAILABLE				
0E	ANALOG	MON	EXTERNAL, NOT USED, AVAILABLE				
0F	ANALOG	MON	EXTERNAL, NOT USED, AVAILABLE				
10	ANALOG	MON	-15V POWER SUPPLY VOLTAGE	2	VOLTS		
11	ANALOG	MON	+10V POWER SUPPLY VOLTAGE	1.5	VOLTS		
12	ANALOG	MON	ANALOG GROUND	1	VOLTS		
13	ANALOG	MON	-15V SUPPLY VOLTAGE	2	VOLTS		
14	ANALOG	MON	+5V SUPPLY VOLTAGE	1	VOLTS		
15	ANALOG	MON	+28V POWER SUPPLY VOLTAGE	4	VOLTS		
16	ANALOG	MON	ANALOG GROUND	1	VOLTS		
17	ANALOG	MON	ANALOG GROUND	1	VOLTS		
18	ANALOG	MON	PEDASTAL ROOM AIR TEMP.	.1V/deg C	deg C		
19	ANALOG	MON	ACU RACK TEMP.	.1V/deg C	deg C		
1A	ANALOG	MON	SERVO CABINET TEMP.	.1V/deg C	deg C		
1B	ANALOG	MON	OUTSIDE TEMP	.1V/deg C	deg C		
1C	ANALOG	MON	T5: TEMP. MONITOR; NOT USED, AVAILABLE	.1V/deg C	deg C		
1D	ANALOG	MON	T6: TEMP. MONITOR; NOT USED, AVAILABLE	.1V/deg C	deg C		
1E	ANALOG	MON	T7: TEMP. MONITOR; NOT USED, AVAILABLE	.1V/deg C	deg C		
1F	ANALOG	MON	T8: TEMP. MONITOR; NOT USED, AVAILABLE	.1V/deg C	deg C		
20	DIGITAL	MON	0 SMOKE DETECTOR TROUBLE CONTACT (1 = TROUBLE)				
			1 UPS BATTERY ALARM 1-LOW BETTER, 0=ON (OK)				
			2 UPS INVERTER ON (1=ON)				
			3 WW EAST #1				
			4 WW EAST #2				
			5 WW WEST #1				
			6 WW WEST #2				
			9 DRY AIR LOW PRESSURE				
			12 +15V MONITOR; NOT USED				
			13 +15V MONITOR; NOT USED				
			14 +15V MONITOR; NOT USED				
			15 NOT IMPLEMENTED				
21-27			NOT IMPLEMENTED				
28	DIGITAL	MON/CON	0 FEED HEATER POWER (HIGH = ON)				
29	DIGITAL	MON/CON	TTL COMMAND; NOT USED, AVAILABLE				
2A	DIGITAL	MON/CON	TTL COMMAND; NOT USED, AVAILABLE				
2B	DIGITAL	MON/CON	TTL COMMAND; NOT USED, AVAILABLE				
2C	DIGITAL	MON/CON	TTL COMMAND; NOT USED, AVAILABLE				
2E	DIGITAL	MON/CON	TTL COMMAND; NOT USED, AVAILABLE				
2E	DIGITAL	MON/CON	+15V COMMAND,NOT USED, AVAILABLE				
2F	DIGITAL	MON/CON	+15V COMMAND,NOT USED, AVAILABLE				
30	DIGITAL	MON/CON	+28V COMMAND,NOT USED, AVAILABLE				
31	DIGITAL	MON/CON	+28V COMMAND,NOT USED, AVAILABLE				
32	DIGITAL	MON/CON	UPS (PED ROOM) SHUTDOWN=1				
33	DIGITAL	MON/CON	RELAY CONTACT COMMAND; NOT USED, AVAILABLE				
34			NOT IMPLEMENTED				
35			NOT IMPLEMENTED				
36			NOT IMPLEMENTED				
37	DIGITAL	MON/CON	ACU/NPL RESET COMMAND;2SEC 28V RELAY DRIVER				

BUILDING UTILITY MODULE

 ID (HEX) = 42 BLOCK LENGTH = 30
 STARTING ADDRESS (HEX) = 4200
 =====

REL. ADD. #(HEX)	ANALOG/ DIGITAL	ACCESS MON/CON	DESCRIPTION(VOLTAGE=COUNTS/3276.8) BIT POS. FUNCTION VALUE MEANING	MULT.	UNITS	RANGE	COMMENTS
00	ANALOG	MON	ROOM 103 HUMIDITY	10	%RH		
01	ANALOG	MON	NOT AVAILABLE,USED INTERNALLY				
02	ANALOG	MON	NOT AVAILABLE,USED INTERNALLY				
03	ANALOG	MON	NOT AVAILABLE,USED INTERNALLY				
04	ANALOG	MON	EXTERNAL SIGNAL, AVAILABLE FOR USE	1	VOLTS		
05	ANALOG	MON	EXTERNAL SIGNAL, AVAILABLE FOR USE	1	VOLTS		
06	ANALOG	MON	EXTERNAL SIGNAL, AVAILABLE FOR USE	1	VOLTS		
07	ANALOG		GND S/D				
08-0F	ANALOG	MON	NOT IMPLEMENTED				
10	ANALOG	MON	-15 VOLTS POWER SUPPLY	2	VOLTS		
11	ANALOG	MON	10 VOLTS POWER SUPPLY	1.5	VOLTS		
12	ANALOG	MON	ANALOG GROUND	1	VOLTS		
13	ANALOG	MON	+15 VOLTS POWER SUPPLY	2	VOLTS		
14	ANALOG	MON	+5 VOLTS POWER SUPPLY	1	VOLTS		
15	ANALOG	MON	+28 VOLTS POWER SUPPLY	4	VOLTS		
16	ANALOG	MON	ANALOG GROUND	1	VOLTS		
17	ANALOG	MON	ANALOG GROUND	1	VOLTS		
18	ANALOG	MON	C RACK TEMP. (100mV/deg C)	10	deg C		
19	ANALOG	MON	DAR-1 TEMP. (100mV/deg C)	10	deg C		
1A	ANALOG	MON	ELECTRONICS ROOM (100mV/deg C)	10	deg C		
1B	ANALOG	MON	COMPUTER RACK TEMP. (100mV/deg C)	10	deg C		
1C	ANALOG	MON	CONTEMPO OUTPUT AIR TEMP. (100mV/deg C)	10	deg C		
1D	ANALOG	MON	CONTROL ROOM AIR (100mV/deg C)	10	deg C		
1E	ANALOG	MON	AUX. ROOM AIR (100mV/deg C)	10	deg C		
1F	ANALOG	MON	TEMP. MONITOR T8: NOT USED, AVAILABLE (100mV/deg C)	10	deg C		
20	DIGITAL	MON	0 UPS ALARM (1=ALARM)				
			1 UPS INVERTER ON (1=TRUE)				
			2 POWER TRANSFER SWITCH POS. (1= ON GEN POWER)				
			3 ANTENNA NON CRITICAL CB CONTACT; (1= TRIPPED)				
			4 ANTENNA CRITICAL CB CONTACT; (1= TRIPPED)				
			5 SC ONLY 150KW POWER TRANSFER SWITCH POS (1= ON GEN POWER)				
			6 ANTENNA FIRE ALARM; (1= ALARM)				
			7 AIR HANDLER #2 ALARM (1=FAULT)				
			8 AIR HANDLER #1 ALARM (1=FAULT)				
			9 ACU FAULT; (1=FAULT)				
			10 BUILDING FIRE ALARM TROUBLE; (1= TROUBLE)				
			11 AVAILABLE, NOT USED				
			12 +15V MONITOR, NOT USED				
			13 +15V MONITOR, NOT USED				
			14 +15 VOLT MONITOR				
			15 NOT USED, NOT IMPLEMENTED				
21-27			NOT IMPLEMENTED				
28	DIGITAL		TTL CMD. #0, AVAILABLE, NOT USED				
29	DIGITAL		TTL CMD. #1, AVAILABLE, NOT USED				
2A	DIGITAL		TTL CMD. #2, AVAILABLE, NOT USED				
2B	DIGITAL		TTL CMD. #3, AVAILABLE, NOT USED				
2C	DIGITAL		TTL CMD. #4, AVAILABLE, NOT USED				
2D	DIGITAL		TTL CMD. #5, AVAILABLE, NOT USED				
2E	DIGITAL		CMD. #6: +15V COMMAND, AVAILABLE, NOT USED				
2F	DIGITAL		CMD. #7: +15V COMMAND, AVAILABLE, NOT USED				
30	DIGITAL		CMD. #8: +28V COMMAND, AVAILABLE, NOT USED				
31	DIGITAL		CMD. #9: +28V COMMAND, AVAILABLE, NOT USED				
32	DIGITAL	CON	RELAY CONTACT COMMAND: UPS SHUT DOWN				
33	DIGITAL	CON	RELAY CONTACT COMMAND, NOT USED				
34-36			NOT USED, NOT AVAILABLE				
37	DIGITAL	CON	NOT USED				

INCLINOMETER INTERFACE (M101)- ONLY AT PIE TOWN

ID (HEX) = #43

BLOCK LENGTH = 80

STARTING ADDRESS (HEX) = #4300

REL. ADD. #(HEX)	ANALOG/ DIGITAL	ACCESS MON/CON	DESCRIPTION(VOLTAGE=COUNTS/3276.8) BIT POS. FUNCTION VALUE MEANING	MULT.	UNITS	RANGE	COMMENTS
00	ANALOG	MON	ANALOG GROUND				
01	ANALOG	MON	NOT USED				
02	ANALOG	MON	NOT USED				
03	ANALOG	MON	NOT USED				
04	ANALOG	MON	NOT USED				
05	ANALOG	MON	+10V POWER SUPPLY #1 MONITOR	2	VOLTS		
06	ANALOG	MON	+10V POWER SUPPLY #2 MONITOR	2	VOLTS		
07	ANALOG	MON	DIGITAL GROUND				
08	ANALOG	MON	-15V POWER SUPPLY MONITOR	2			
09	ANALOG	MON	+15V POWER SUPPLY MONITOR	2			
0A	ANALOG	MON	TILT A #2, NOT USED, SCALE 10mV/ARCSEC				
0B	ANALOG	MON	TILT A #1, NOT USED, SCALE 10mV/ARCSEC				
0C	ANALOG	MON	TILT W #2, SCALE 10mV/ARCSEC, tilt parallel to EL axis				
0D	ANALOG	MON	TILT W #1, SCALE 10mV/ARCSEC, tilt perpendicular to EL axis				
0E	ANALOG	MON	TILT E #2, SCALE 10mV/ARCSEC, tilt parralel to EL axis				
0F	ANALOG	MON	TILT E #1, SCALE 10mV/ARCSEC, tilt perpendicular to EL axis				
			NOTE - SIGN FOR EAST AND WEST TILT ARE OPPOSIT, BOXES ORIENTED 180d				
10	ANALOG	MON	TEMP MONOTOR, TPA1; SCALE 100mV/deg C				
11	ANALOG	MON	TEMP MONOTOR, TPA2; SCALE 100mV/deg C				
12	ANALOG	MON	TEMP MONOTOR, TPA3; SCALE 100mV/deg C				
13	ANALOG	MON	TEMP MONOTOR, TPA4; SCALE 100mV/deg C				
14	ANALOG	MON	TEMP MONOTOR, TPA5; SCALE 100mV/deg C				
15	ANALOG	MON	TEMP MONOTOR, TPA6; SCALE 100mV/deg C				
16	ANALOG	MON	TEMP MONOTOR, TPA7; SCALE 100mV/deg C				
17	ANALOG	MON	TEMP MONOTOR, TPA8; SCALE 100mV/deg C				
18	ANALOG	MON	TEMP MONOTOR, TPA9; SCALE 100mV/deg C				
19	ANALOG	MON	TEMP MONOTOR, TPA10; SCALE 100mV/deg C				
1A	ANALOG	MON	TEMP MONOTOR, TPA11; SCALE 100mV/deg C				
1B	ANALOG	MON	TEMP MONOTOR, TPA12; SCALE 100mV/deg C				
1C	ANALOG	MON	TEMP MONOTOR, TPA13; SCALE 100mV/deg C				
1D	ANALOG	MON	TEMP MONOTOR, TPA14; SCALE 100mV/deg C				
1E	ANALOG	MON	TEMP MONOTOR, TPA15; SCALE 100mV/deg C				
1F	ANALOG	MON	TEMP MONOTOR, TPA16; SCALE 100mV/deg C				
20	ANALOG	MON	TEMP MONOTOR, TPA17; SCALE 100mV/deg C				
21	ANALOG	MON	TEMP MONOTOR, TPA18; SCALE 100mV/deg C				
22	ANALOG	MON	TEMP MONOTOR, TPA19; SCALE 100mV/deg C				
23	ANALOG	MON	TEMP MONOTOR, TPA20; SCALE 100mV/deg C				
24	ANALOG	MON	TEMP MONOTOR, TPA21; SCALE 100mV/deg C				
25	ANALOG	MON	TEMP MONOTOR, TPA22; SCALE 100mV/deg C				
26	ANALOG	MON	TEMP MONOTOR, TPA23; SCALE 100mV/deg C				
27	ANALOG	MON	TEMP MONOTOR, TPA24; SCALE 100mV/deg C				

BLOCK LENGTH = 90

BLOCK LENGTH 90

NOTE MONITOR WORDS #11 TO #17 RETURN VALUE #BD IF NO AUDIO DETECTED

11	DIGITAL	MON	BTT 0 NOT USED BIT 1 1= FRAME LENGTH 66001 0= FRAME LENGTH 66000 BITS 2-6 FRAME COUNT
12	DIGITAL	MON	TIME SECONDS; BITS 0-3: UNITS OF SECONDS, BITS 4-7: TENS OF SECONDS
13	DIGITAL	MON	TIME MINUTES; BITS 0-3: UNITS OF MINUTES, BITS 4-7: TENS OF MINUTES
14	DIGITAL	MON	TIME HOURSS; BITS 0-3: UNITS OF HOURS, BITS 4-7: TENS OF HOURS
15	DIGITAL	MON	BITS 0-3: UNITS OF POWER, BITS 4-7 TENS OF POWER
16	DIGITAL	MON	BITS 0-3: HUNDREDS OF POWER, BITS 4-7 RETURN 0'S
17	DIGITAL	MON	BIT 1 1= CALIBRATION ON BIT 2 1= NO DATA BIT 3 1= NEW FORMAT BIT 0 NOT USED, BITS 4-7 RETURN 0'S
18			NOT USED
19			NOT USED
1A	DIGITAL	MON	FORMATTER STATUS BITS, HIGH= OK BIT 5 FORMATTER LOCK LIGHT ON = 1 BIT 6 FORMATTER TIME LIGHT ON = 1 BIT 7 FORMATTER DATA LIGHT ON = 1
1B	DIGITAL	CON/MON	BBC SIDE BAND (COAXIAL RELAY) CONTROL: BIT 3 HIGH= USB, LOW= LSB

ANTENNA CONTROL UNIT

ID (HEX) = 70 BLOCK LENGTH = 40
 STARTING ADDRESS (HEX) = 7000
 =====

REL. ADD. #(HEX)	ANALOG/ DIGITAL	ACCESS MON/CON	DESCRIPTION(VOLTAGE=COUNTS/3276.8) BIT POS. FUNCTION VALUE MEANING	MULT.	UNITS	RANGE	COMMENTS
00	ANALOG	MON	AZ 1 MOTOR CURRENT (9 A/V)	0.1	A	±62A}	Range for
01	ANALOG	MON	AZ 2 MOTOR CURRENT(9 A/V)	0.1	A	±62A}	100% Motor
02	ANALOG	MON	EL 1 MOTOR CURRENT(6.4 A/V)	0.1	A	±43A}	Current
03	ANALOG	MON	EL 2 MOTOR CURRENT(6.4 A/V)	0.1	A	±43A}	rating
04	ANALOG	MON	AZ VELOCITY COMMAND (.15deg/SEC/V)		deg/SEC	-10 TO +10	
05	ANALOG	MON	EL VELOCITY COMMAND (.05deg/SEC/V)		deg/SEC	-10 TO +10	
06	ANALOG	MON	DRIVE CABINET POWER (SUPPLY VOLTAGE SUM 1)	1	VOLTS	8.5 TO -7.16	
07	ANALOG	MON	ACU POWER SUPPLY (VOLTAGE SUM)	1	VOLTS	-6 TO -4.5	
08-0F			NOT USED				
10	DIGITAL	MON	AZ ENCODER POSITION HIGH WORD SEE BELOW				
11	DIGITAL	MON	AZ ENCODER POSITION LOW WORD SEE BELOW				
12	DIGITAL	MON	EL ENCODER POSITION HIGH WORD SEE BELOW				
13	DIGITAL	MON	EL ENCODER POSITION LOW WORD SEE BELOW				
14	DIGITAL	MON	AZ SYNCHRO POSITION HIGH WORD SEE BELOW				
15	DIGITAL	MON	AZ SYNCHRO POSITION LOW WORD SEE BELOW				
16	DIGITAL	MON	EL SYNCHRO POSITION HIGH WORD SEE BELOW				
17	DIGITAL	MON	EL SYNCHRO POSITION LOW WORD SEE BELOW				
18	DIGITAL	MON	AZ POSITION ERROR HIGH WORD SEE BELOW				
19	DIGITAL	MON	AZ POSITION ERROR LOW WORD SEE BELOW				
1A	DIGITAL	MON	EL POSITION ERROR HIGH WORD SEE BELOW				
1B	DIGITAL	MON	EL POSITION ERROR LOW WORD SEE BELOW				
1C	DIGITAL	MON/CON	AZ POSITION COMMAND HIGH WORD SEE BELOW				
1D	DIGITAL	MON/CON	AZ POSITION COMMAND LOW WORD SEE BELOW				
1E	DIGITAL	MON/CON	EL POSITION COMMAND HIGH WORD SEE BELOW				
1F	DIGITAL	MON/CON	EL POSITION COMMAND LOW WORD SEE BELOW				

Comments: Position Designation command summary:
 HIGH WORD LOW WORD

15	360 *	0.005493
14	180	0.002747
13	90	0.001373
12	45	0.000687
11	22.5	0.000343
10	11.25	0.000172 **
9	5.625	0.000086 **
8	2.8125	NOT USED
7	1.40625	NOT USED
6	0.703125	NOT USED
5	0.351563	NOT USED
4	0.175781	NOT USED
3	0.087891	NOT USED
2	0.043945	NOT USED
1	0.021973	NOT USED
0	0.010986	NOT USED

* = The 360 BIT (bit 15 of the high word) is not used in elevation

**= Not used on Synchro information

NOTE: To obtain the angle value displayed at the ACU do the following:

If high word bit 15 is set (1) obtain the two's compliment value of high and low words and move that amount in degrees counterclockwise in the CCW path.

If high word bit 15 is cleared (0) move in the CW path clockwise the high/low word amount in degrees.

EXAMPLE:

HIGH+LOW WORD = 1010 0000 0000 0000 0000 000X XXXX XXXX

TWO'S COMPLIMENT = 0110 0000 0000 0000 0000 000X XXXX XXXX

OR 180 + 90 = 270 degrees in the CCW path (-270 deg.)

20	DIGITAL	MON	MODULE REVISION NUMBER
21	DIGITAL	MON	ACU STATUS REPORT WORD 0; SEE STATUS/MESSAGE CODING BELOW
22	DIGITAL	MON	ACU STATUS REPORT WORD 1; SEE STATUS/MESSAGE CODING BELOW
23	DIGITAL	MON	ACU STATUS REPORT WORD 2; SEE STATUS/MESSAGE CODING BELOW
24	DIGITAL	MON	ACU STATUS REPORT WORD 3; SEE STATUS/MESSAGE CODING BELOW
25	DIGITAL	MON	ACU STATUS REPORT WORD 4; SEE STATUS/MESSAGE CODING BELOW
26	DIGITAL	MON	ACU STATUS REPORT WORD 5; SEE STATUS/MESSAGE CODING BELOW
27	DIGITAL	MON	ACU STATUS REPORT WORD 6; SEE STATUS/MESSAGE CODING BELOW
28	DIGITAL	MON	ACU STATUS REPORT WORD 7; SEE STATUS/MESSAGE CODING BELOW
29	DIGITAL	MON	ACU STATUS REPORT WORD 8; SEE STATUS/MESSAGE CODING BELOW
2A	DIGITAL	MON	ACU STATUS REPORT WORD 9; SEE STATUS/MESSAGE CODING BELOW

REL. ADD #(HEX)	ANALOG/ DIGITAL	ACCESS MON/CON	DESCRIPTION(VOLTAGE=COUNTS/3276 8) BIT POS. FUNCTION VALUE MEANING	MULT.	UNITS	ACU RANGE	PAGE 43 COMMENTS
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STATUS MESSAGE CODING (SEE TABLE OF MESSAGES BELOW):

Status	BIT BIT BIT BIT BIT BIT BIT BIT BIT BIT BIT BIT BIT BIT BIT BIT
Word no.	15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
0	- M23 M16 M59 M5 M21 M10 - M6 M24 M18 M19 M36 M22 M12 M13
1	M39 M37 M15 M60 M29 M27 M9 - M44 M42 M17 M80 M34 M32 M11 M41
2	M26 M38 M50 M53 M14 M28 M48 M52 M31 M43 M51 M54 M20 M33 M49 M58
3	- M35 M8 - - M25 M7 M56 - M40 - M55 - M30 - M57
4	- - - - - M61 - - - - - M62 M67
5	- - - - - M63 - - - - - S1 M1
6	- - - - - S2 - - - - - S3 -
7	- - - - - - - - - - M74 -
8	M2 - M3 M4 M65 M64 M46 M45 M72 M70 - M71 M66 M69 M68 M47
9	- - M79 M78 M73 M77 M76 M75 - - - - -

2B	DIGITAL	MON	ACU CURRENT MODE:	#0000	LOCAL CONTROL, MANUAL
				#0101	LOCAL CONTROL, STANDBY
				#0404	LOCAL CONTROL, STOW
				#0505	LOCAL CONTROL, POSITION A
				#0606	LOCAL CONTROL, POSITION B
				#0707	LOCAL CONTROL, POSITION DESIGNATE
				#0A0A	LOCAL CONTROL, MANUAL POSITION
				#0B0B	LOCAL CONTROL, PORTABLE CONTROL BOX
				#8181	COMPUTER CONTROL, STANDBY
				#8484	COMPUTER CONTROL, STOW
				#8585	COMPUTER CONTROL, POSITION A
				#8686	COMPUTER CONTROL, POSITION B
				#8787	COMPUTER CONTROL, POSITION DESIGNATE
2C	DIGITAL	MON/CON	AZ AXIS DISABLE/ ENABLE:	#1111	DISABLE
				#1212	ENABLE
2D	DIGITAL	MON/CON	EL AXIS DISABLE/ ENABLE:	#1111	DISABLE
				#1212	ENABLE
2E	DIGITAL	MON/CON	SYNCHRO/ ENCODER SELECT:	#2121	ENCODER SELECT
				#2222	SYNCHRO SELECT
2F	DIGITAL	MON/CON	ACU MODE SELECT:	#0101	AUTO STANDBY
				#0404	STOW
				#0505	POSITION A
				#0606	POSITION B
				#0707	POSITION DESIGNATE
				#0909	STOW RELEASE
30	DIGITAL	MON/CON	ALARM SET:	#3131	ACTIVATE ALARM
				#3232	DEACTIVATE ALARM

MESSAGE NUMBER	FUNCTION MONITORED	ALARM	*DISABLE	MESSAGE AT ACU
1	ENCODER COARSE FAULT	X		ENCODER PWR FLT
2	INTERNAL CLOCK	X		CHECK TIME
3	ACU RAM	X		RAM ERROR
4	AUI COMMUNICATION LINK	X		AUI COMM DEAD
5	PORTABLE CONTROL STATUS	X		REMOTE ENABLED
6	EL MOTOR ENABLE STATUS	X		NO MESSAGE
7	AZ BRAKE FAULT	X	AZ	AZ BRAKE FAULT
8	EL BRAKE FAULT	X	EL	EL BRAKE FAULT
9	AZ CW PRE LIMIT	X	AZ	AZ CW PRE LIMIT
10	AZ CW LIMIT	X	AZ	AZ CW LIMIT
11	AZ CCW PRE LIMIT	X	AZ	AZ CCW PRE LIMIT
12	AZ CCW LIMIT	X	AZ	AZ CCW LIMIT
13	AZ BRAKE CB/INTERLOCK	X	AZ	AZ BRAKE INTRLK
14	AZ CW 1ST LIMIT	X	AZ	AZ CW 1ST LIMIT
15	EL UP PRE LIMIT	X	EL	EL UP PRE LIMIT
16	EL UP LIMIT	X	EL	EL UP LIMIT
17	EL DOWN PRE LIMIT	X	EL	EL DOWN PRE LIMIT
18	EL DOWN LIMIT	X	EL	EL DOWN LIMIT
19	EL BRAKE CB/INTERLOCK	X	EL	EL BRAKE INTERLK
20	AZ CCW 1ST LIMIT	X	AZ	AZ CCW 1ST LIMIT
21	AZ #1 ARMATURE CURRENT	X	AZ1	AZ1 CURRENT FAULT
22	AZ #2 ARMATURE CURRENT	X	AZ2	AZ2 CURRENT FAULT
23	EL #1 ARMATURE CURRENT	X	EL1	EL1 CURRENT FAULT
24	EL #1 ARMATURE CURRENT	X	EL2	EL2 CURRENT FAULT
25	AZ #1 ARM/ELECTRONICS CB	X	AZ1	AZ1 MTR CONTROL
26	EL UP 1ST LIMIT	X	EL	EL UP 1ST LIMIT
27	AZ #1 FIELD CURRENT	X	AZ1	AZ1 FIELD FAULT
28	AZ #1 MOTOR THERMOSTAT	X	AZ1	AZ1 MTR OVERTEMP
29	AZ #1 BLOWER/LUBE PUMP CB	X		AZ1 BLOW/LUBE CB
30	AZ #2 ARM/ELECTRONICS CB	X	AZ2	AZ2 MTR CONTROL
31	EL DOST 1ST LIMIT	X	EL	EL DOWN 1ST LIMIT
32	AZ #2 FIELD CURRENT	X	AZ2	AZ2 FIELD FAULT
33	AZ #2 MOTOR THERMOSTAT	X	AZ2	AZ2 MTR CONTROL
34	AZ #2 BLOWER/LUBE PUMP CB	X		AZ2 BLOW/LUBE CB
35	EL #1 ARM/ELECTRONICS CB	X	EL1	EL1 MTR CONTROL
36	AZ MOTOR THERMOSTAT	X		NO MESSAGE
37	EL #2 FIELD CURRENT	X	EL1	EL1 FIELD FAULT
38	EL #1 MOTOR THERMOSTAT	X	EL1	EL1 MTR CONTROL
39	EL #1 BLOWER/LUBE PUMP CB	X		EL1 BLOW/LUBE CB
40	EL #2 ARM/ELECTRONICS CB	X	EL2	EL2 MTR CONTROL
41	AZ MOTOR VELOCITY	X	AZ	AZ MTR OVERSPEED
42	EL #2 FIELD CURRENT	X	EL2	EL2 FIELD FAULT
43	EL #2 MOTOR THERMOSTAT	X	EL2	EL2 MTR OVERTRMP
44	EL #2 BLOWER/LUBE PUMP CB	x	EL2	EL2 BLOW/LUBE CB
45	AZIMUTH DATA GEARBOX	x		AZ DGB FAULT
46	ELEVATION DATA GEARBOX	x		EK DGB FAULT
47	AZ DISABLE VIA SUPERVISORY		AZ	AZ CMD DISABLE
48	AZ #1 LUBE PRESSURE	x		AZ1 LUBE PRESSURE
49	AZ #2 LUBE PRESSURE	x		AZ2 LUBE PRESSURE
50	EL #1 LUBE PRESSURE	x		EL1 LUBE PRESSURE
51	EL #2 LUBE PRESSURE	x		EL2 LUBE PRESSURE
52	CONSOLE EMERGENCY SWITCH	x	SYN	ACU EMERGENCY
53	VERTEX EMERGENCY SWITCH	x	SYN	VERTEX EMERG
54	PEDESTAL EMERGENCY SWITCH	x	SYN	PEDISTAL EMERG
55	EL DRIVE EMERGENCY SWITCH	x	SYN	PEDESTAL EMERG
56	AZ DRIVE #1 EMERGENCY SWITC	x	SYN	EL EMERGENCY
57	AZ DRIVE #2 EMERGENCY SWITC	x	SYN	AZ 1 EMERGENCY
58	AZ STAIRWAY EMERGENCY SWIT	x	SYN	AZ1 EMERGENCY
59	EL STOW LOCK ENGAGING		EL	EL STOW ENGAGING
60	EL STOW LOCK ENGAGED	x		EL STOW
61	HIGH WINDS (ABOVE 55 MPH)	x		55 MPH WINDS

MESSAGE NUMBER	FUNCTION MONITORED	ALARM	*DISABLE	MESSAGE AT ACU
62	LOW TEMPWEATURE (BELOW -20x			LOW TEMP
63	HIGH WINDS (ABOVE 30 MPH)	x		30 MPH WINDS
64	COMMAND RELATIVE ADDRESS	x		CMD RA BAD
65	ENCODER/SYCHRO DIFFERENCE	x		ENCODE/SYN ERROR
66	DRIVE CABINET ELECT POWER	x		SERVO PWR FLT
67	WARNING HORN COMMAND	x		WARNING HORN
68	EL DISABLE VIA SUPERVISORY	x	EL	EL CMD DISABLE
69	SUPERVISORY MODE COMMAND	x		MODE CMD ERROR
70	SUPERVISORY AZ DISABLE/ ENABLE Cmd	x		AZ DISABLE CMD ERR
71	ENCODER/SYNCHRO SELECT Cm	x		ENCODER CMD ERR
72	SUPERVISORY EL DISABLE/ ENABLE Cmd	x		EL DISABLE CMD ERR
73	ENCODER SELECTED			No associated mes
74	COMPUTER SELECTED			No associated mes
75	PROM A2U17	x		Prom A2U17
76	PROM A3U32	x		Prom A3U32
77	PROM A3U33	x		Prom A3U33
78	AUI ISIATED ALARM	x		AUI INIATED ALARM
79	ALARM COMMAND FAULT	x		Alarm CMD ERR
80	EL MOTOR VELOCITY	x	EL	E1 MTR OVERSPEED

* DISABLE column represented as follows:

Blank - no motor disable
 SYS - both axis disable
 AZ - AZ axis disable
 EL - EL axis disable
 AZ1, AZ2, EL1, EL2 - one motor disabled

FOCUS ROTATION DRIVE SYSTEM

 ID (HEX) = 72 BLOCK LENGTH = 70
 STARTING ADDRESS (HEX) = 7200
 =====

REL. ADD. #(HEX)	ANALOG/ DIGITAL	ACCESS MON/CON	DESCRIPTION(VOLTAGE=COUNTS/3276.8) BIT POS. FUNCTION VALUE MEANING	MULT.	UNITS	RANGE	COMMENTS
00	ANALOG	MON	SYSTEM DIGITAL GROUND	1	VOLTS		
01	ANALOG	MON	SYSTEM +15V POWER SUPPLY	2	VOLTS		
02	ANALOG	MON	SYSTEM -15V POWER SUPPLY	2	VOLTS		
03	ANALOG	MON	SYSTEM +5V POWER SUPPLY	1	VOLTS		
04	ANALOG	MON	WEST ROTATION SERVO (BDS3) +12V POWER	2	VOLTS		
05	ANALOG	MON	WEST ROTATION SERVO (BDS3) -12V POWER	2	VOLTS		
06	ANALOG	MON	EAST ROTATION SERVO (BDS3) +12V POWER	2	VOLTS		
07	ANALOG	MON	EAST ROTATION SERVO (BDS3) -12V POWER	2	VOLTS		
08	ANALOG	MON	SYSTEM DIGITAL GROUND (REPEAT OF ADD. 00)	1	VOLTS		
09	ANALOG	MON	(RDP2) BACKLASH CONTROLLER +12V POWER	2	VOLTS		
0A	ANALOG	MON	(RDP2) BACKLASH CONTROLLER -12V POWER	2	VOLTS		
0B	ANALOG	MON	FOCUS SERVO (BDS3) +12V POWER	2	VOLTS		
0C	ANALOG	MON	FOCUS SERVO (BDS3) -12V POWER	2	VOLTS		
0D	ANALOG	MON	GROUND (SPARE)	1	VOLTS		
0E	ANALOG	MON	GROUND (SPARE)	1	VOLTS		
0F	ANALOG	MON	GROUND (SPARE)	1	VOLTS		
10	DIGITAL	MON/CON	FOCUS COMMAND; 2300COUNTS/INCH. TOTAL TRAVEL=28.5 INCHES, LIMITS:#0A00 TO #F200 (MAX. OUT)				
11	DIGITAL	MON	FOCUS POSITION				
		CON	NAP COMMAND SET/RESET; 1=SET, 0=RESET				
12	DIGITAL	MON	FOCUS ERROR = COMMAND - ACTUAL				
		CON	MANUAL COMMAND OVER-RIDE SET/RESET; 1 = SET, 0 = RESET				
13	DIGITAL	MON	FOCUS SYSTEM PARAMETERS				
			0 NAP FLAG: HIGH = IN NAP				
			1 MODE: 0 = COMPUTER, 1 = MANUAL				
			2 BRAKE STATUS: 0 = ENGAGE, 1 = RELEASE				
		CON	FOCUS SERVO AMPLIFIER (BDS3) RESET, ANY VALUE RESETS				
14	DIGITAL	MON	FOCUS FAULT INFORMATION (BIT VALUE = 1 INDICATES FOLLOWING)				
			0 APEX INTERFACE NOT RESPONDING				
			1 FIRST LOWER LIMIT				
			2 SECOND LOWER LIMIT				
			3 FIRST UPPER LIMIT				
			4 SECOND UPPER LIMIT				
			5 COMMAND FAULT FLAG- M&C REQUEST OUT OF RANGE				
			6 MONITOR FAULT FLAG- M&C REQUEST OUT OF RANGE				
			7 OPERATOR FAULT FLAG- POSITION COMMAND OUT OF RANGE				
			8 BRAKE FAULT FLAG- BRAKES DID NOT RELEASE/ENGAGE WHEN THEY SHOULD HAVE				
			9 DRIVE FAULT FLAG- COMMAND POSITION NOT REACHED BEFORE MOTORS STOPPED				
			10 MOTION ANALYSIS FAULT (FAULT=1)				
			11 EMERGENCY STOP				
			12 DRIVE LOCKOUT				
			15 SECOND SCREW FAULT- OCCURES WHEN SECOND SCREW IS NOT ROTATING				
		CON	FOCUS SOFTWARE RESET; ANY VALUE RESETS				
			RESET CLEARS NAP,MANUAL OVERRIDE AND MEMORY				
15	DIGITAL	MON	FOCUS SERVO AMPLIFIER FAULT INFORMATION (BIT VALUE =1 INDICATES FOLLOWING):				
			0 BUS FAULT: 300 VDC HAS DISAPPEARED				
			1 FOLD BACK:THE CONDITION THE MOTOR IS IN IF IT REACHED ITS PEAK TORQUE LIMIT AND IT HAD TO SLOW DOWN				
			2 OVER TEMPERATURE- TEMP. SENSOR INDICATES MOTOR HOT				
			3 DRIVE DOWN- SERVO AMPLIFIER NOT READY TO RUN				
			4 OVER CURRENT- MOTOR TAKING TOO MUCH CURRENT				
			5 POWER LOSS- POWER SUPPLY ON SERVO AMPLIFIER IS OUT				
			6 REMOTE INHIBITED- F/R CONTROLLER HAS NOT RELEASED THE SERVO AMPLIFIER INHIBIT				
			7 OVER SPEED- MOTOR RUNNING FASTER THAN IT IS COMMANDED				
16	DIGITAL	MON	ANALOG FAULT- APEX ANALOG FAULT FLAGS (BIT VALUE = 1 MEANS FAULT CONDITION)				
			0 GROUND FAULT NOT IMPLEMENTED				
			1 GROUND FAULT NOT IMPLEMENTED				
			2 GROUND FAULT NOT IMPLEMENTED				
			3 VELOCITY NOT IMPLEMENTED				
			4 +15V NOT IMPLEMENTED				
			5 -15V NOT IMPLEMENTED				
			6 +5V NOT IMPLEMENTED				
			7 +10V NOT IMPLEMENTED				
			8 MOUNT TEMP.1 NOT IMPLEMENTED				
			9 -10V NOT IMPLEMENTED				
			10 MOUNT TEMP.2 NOT IMPLEMENTED				
			11 BIN TEMP. NOT IMPLEMENTED				
			12 SPARE BIT NOT IMPLEMENTED				
			13 SPARE BIT NOT IMPLEMENTED				
			14 SPARE BIT NOT IMPLEMENTED				
			15 SPARE BIT NOT IMPLEMENTED				

REL. ADD. #(HEX)	ANALOG/ DIGITAL	ACCESS MON/CON	DESCRIPTION(VOLTAGE=COUNTS/3276.8) BIT POS. FUNCTION VALUE MEANING	MULT.	FOCUS ROTATION UNITS RANGE	PAGE 47 COMMENTS
17	ANALOG	MON	SPARE	1	VOLTS	
18	ANALOG	MON	SPARE	1	VOLTS	
19	ANALOG	MON	SPARE	1	VOLTS	
1A	ANALOG	MON	FOCUS VELOCITY (FROM RESOLVER)			
1B	ANALOG	MON	APEX +15V POWER SUPPLY	2	VOLTS	
1C	ANALOG	MON	APEX -15V POWER SSUPPLY	2	VOLTS	
1D	ANALOG	MON	APEX +5V POWER SUPPLY	1	VOLTS	
1E	ANALOG	MON	APEX +10V REF. POWER SUPPLY	1	VOLTS	
1F	ANALOG	MON	MOUNT TEMP.1 (100mV/deg C) NOT USED	10	deg C	
20	ANALOG	MON	APEX -10V REF POWER SUPPLY	1	VOLTS	
21	ANALOG	MON	MOUNT TEMP.2 (100mV/deg C) NOT USED	10	deg C	
22	ANALOG	MON	BIN TEMP. (100mV/deg C)	10	deg C	
23	DIGITAL	MON	0-7 FOCUS SOFTWARE REVISION NUMBER (BIT 7 IS MSB) 8-15 MODULE SERIAL NUMBER (BIT 15 IS MSB)			
24	DIGITAL	MON	FOCUS MOTION COUNT			
25	ANALOG	MON	SPARE,NOT USED, AVAILABLE			
26	ANALOG	MON	SPARE,NOT USED, AVAILABLE			
27	ANALOG	MON	SPARE,NOT USED, AVAILABLE			
28	ANALOG	MON	SPARE,NOT USED, AVAILABLE			
29	ANALOG	MON	SPARE,NOT USED, AVAILABLE			
2A	ANALOG	MON	SPARE,NOT USED, AVAILABLE			
2B	ANALOG	MON	SPARE,NOT USED, AVAILABLE			
2C	ANALOG	MON	SPARE,NOT USED, AVAILABLE			
2D	ANALOG	MON	SPARE,NOT USED, AVAILABLE			
2E	ANALOG	MON	SPARE,NOT USED, AVAILABLE			
2F	ANALOG	MON	SPARE,NOT USED, AVAILABLE			
30	DIGITAL	MON/CON	ROTATION COMMAND; 156COUNTS/deg 2048 COUNT/REV TOTAL TRAVEL =420 deg, LIMITS: #0A00 TO #F200.			
31	DIGITAL	MON/CON	ROTATION POSITION;NAP COMMAND SET/RESET (1=SET,0=RESET)			
32	DIGITAL	MON	ROTATION ERROR = COMMAND - ACTUAL			
32	DIGITAL	CON	MANUAL COMMAND OVER-RIDE SET/RESET; 1 = SET, 0 = RESET			
33	DIGITAL	MON	ROTATION SYSTEM PARAMETERS: 0 NAP FLAG: HIGH = IN NAP 1 MODE: 0 = COMPUTER, 1 = MANUAL 2 BRAKE STATUS: 0 = ENGAGE, 1 = RELEASE			
34	DIGITAL	CON	ROTATION SERVO AMPLIFIER (BDS3) RESET; ANY VALUE RESETS			
34	DIGITAL	MON	ROTATION FAULT INFORMATION (BIT VALUE = 1 INDICATES FOLLOWING) 1 FIRST CW LIMIT 2 SECOND CW LIMIT 3 FIRST CCW LIMIT 4 SECOND CCW LIMIT 5 COMMAND FAULT FLAG- M&C REQUEST OUT OF RANGE 6 MONITOR FAULT FLAG- M&C REQUEST OUT OF RANGE 7 OPERATOR FAULT FLAG- POSITION COMMAND OUT OF RANGE 8 BRAKE FAULT FLAG- BRAKES DID NOT RELEASE/ENGAGE WHEN THEY SHOULD HAVE 9 DRIVE FAULT FLAG- COMMAND POSITION NOT REACHED BEFORE MOTORS STOPPED 10 MOTION ANALYSIS FAULT (FAULT=1) 11 EMERGENCY STOP 12 DRIVE LOCKOUT 15 SECOND SCREW FAULT- OCCURES WHEN SECOND SCREW IS NOT ROTATING			
35	DIGITAL	CON	ROTATION SOFTWARE RESET; ANY VALUE RESETS;RESET CLEARS NAP,MANUAL OVERRIDE AND MEMORY			
35	DIGITAL	MON	ROTATION SERVO AMPLIFIER FAULT INNFORMATION (BIT VALUE =1 INDICATES FOLLOWING): (BITS 0-7 PERTAIN TO WEST ROTATION MOTOR, AND BITS 8-15 PERTAIN TO EAST ROTATION MOTOR) 0/8 BUS FAULT: 300 VDC HAS DISAPPEARED 1/9 FOLD BACK:THE CONDITION THE MOTOR IS IN IF IT REACHED ITS PEAK TORQUE LIMIT AND IT HAD TO SLOW DOWN 2/10 OVER TEMPERATURE- TEMP. SENSOR INDICATES MOTOR HOT 3/11 DRIVE DOWN- SERVO AMPLIFIER NOT READY TO RUN 4/12 OVER CURRENT- MOTOR TAKING TOO MUCH CURRENT 5/13 POWER LOSS- POWER SUPPLY ON SERVO AMPLIFIER IS OUT 6/14 REMOTE INHIBITED- F/R CONTROLLER HAS NOT RELEASED THE SERVO AMPLIFIER INHIBIT 7/15 OVER SPEED- MOTOR RUNNING FASTER THAN IT IS COMMANDED			
36	DIGITAL	MON	ANALOG FAULT- APEX ANALOG FAULT FLAGS (BIT VALUE = 1 MEANS FAULT CONDITION) 0 GROUND FAULT NOT IMPLEMENTED 1 GROUND FAULT NOT IMPLEMENTED 2 GROUND FAULT NOT IMPLEMENTED 3 VELOCITY NOT IMPLEMENTED 4 +15V NOT IMPLEMENTED 5 -15V NOT IMPLEMENTED 6 +5V NOT IMPLEMENTED 7 +10V NOT IMPLEMENTED 8 MOUNT TEMP.1 NOT IMPLEMENTED 9 -10V NOT IMPLEMENTED 10 MOUNT TEMP.2 NOT IMPLEMENTED			

REL. ADD. #(HEX)	ANALOG/ DIGITAL	ACCESS MON/CON	DESCRIPTION(VOLTAGE=COUNTS/3276.8)				MULT.	UNITS	RANGE	COMMENTS
-----	-----	-----	BIT POS.	FUNCTION	VALUE	MEANING	-----	-----	-----	-----
			11	BIN TEMP.	NOT IMPLEMENTED					
			12	SPARE BIT	NOT IMPLEMENTED					
			13	SPARE BIT	NOT IMPLEMENTED					
			14	SPARE BIT	NOT IMPLEMENTED					
			15	SPARE BIT	NOT IMPLEMENTED					
37	ANALOG	MON	APEX GROUND: 0V				1	VOLTS		
38	ANALOG	MON	SPARE				1	VOLTS		
39	ANALOG	MON	SPARE				1	VOLTS		
3A	ANALOG	MON	ROTATION VELOCITY (FROM RESOLVER)							
3B	ANALOG	MON	APEX +15V POWER SUPPLY				2	VOLTS		
3C	ANALOG	MON	APEX -15V POWER SSUPPLY				2	VOLTS		
3D	ANALOG	MON	APEX +5V POWER SUPPLY				1	VOLTS		
3E	ANALOG	MON	APEX +10V REF. POWER SUPPLY				1	VOLTS		
3F	ANALOG	MON	MOUNT TEMP.1 (100mV/deg C)				10	deg C		
40	ANALOG	MON	APEX -10V REF POWER SUPPLY				1	VOLTS		
41	ANALOG	MON	MOUNT TEMP.2 (100mV/deg C)				10	deg C		
42	ANALOG	MON	BIN TEMP. (100mV/deg C)				10	deg C		
43	DIGITAL	MON	0-7 FOCUS SOFTWARE REVISION NUMBER (BIT 7 IS MSB)							
			8-15 MODULE SERIAL NUMBER (BIT 15 IS MSB)							
44	DIGITAL	MON	ROTATION MOTION COUNT							
45	ANALOG	MON	SPARE,NOT USED, AVAILABLE							
46	ANALOG	MON	SPARE,NOT USED, AVAILABLE							
47	ANALOG	MON	SPARE,NOT USED, AVAILABLE							
48	ANALOG	MON	SPARE,NOT USED, AVAILABLE							
49	ANALOG	MON	SPARE,NOT USED, AVAILABLE							
4A	ANALOG	MON	SPARE,NOT USED, AVAILABLE							
4B	ANALOG	MON	SPARE,NOT USED, AVAILABLE							
4C	ANALOG	MON	SPARE,NOT USED, AVAILABLE							
4D	ANALOG	MON	SPARE,NOT USED, AVAILABLE							
4E	ANALOG	MON	SPARE,NOT USED, AVAILABLE							
4F	ANALOG	MON	SPARE,NOT USED, AVAILABLE							
50-5F	DIGITAL	CON	MASTER CLEAR- HARDWARE RESET; BOTH AXES ARE RESET							
			YOU ONLY HAVE TO SEND COMMAND TO ONE ADDRESS							

