

Collezione SIRIO Italian Team

Prontuario da banco prova

Usato dal personale CIA anche durante il conto alla rovescia.

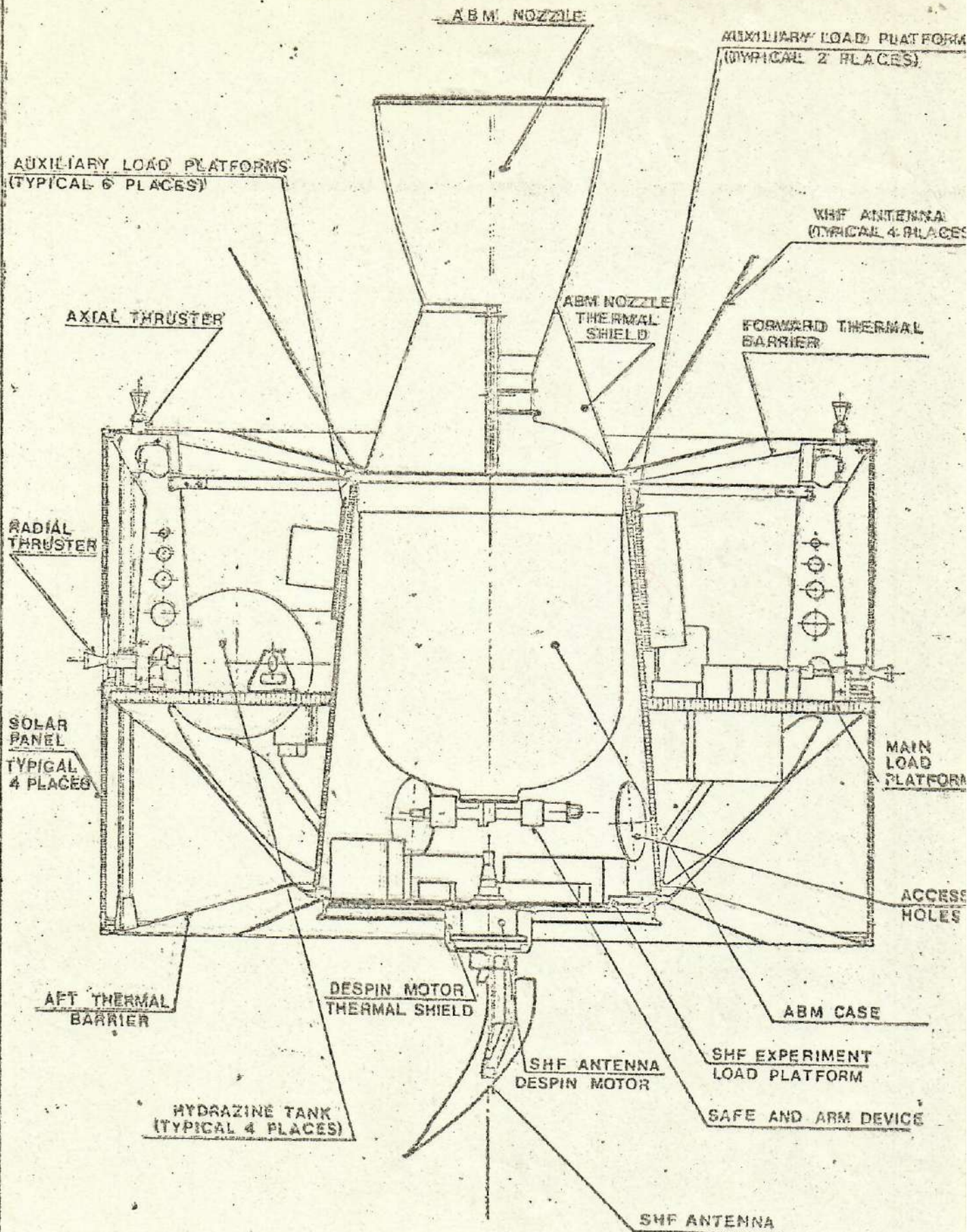

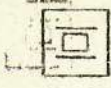





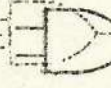



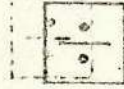
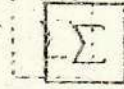




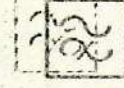

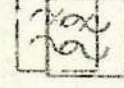

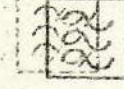



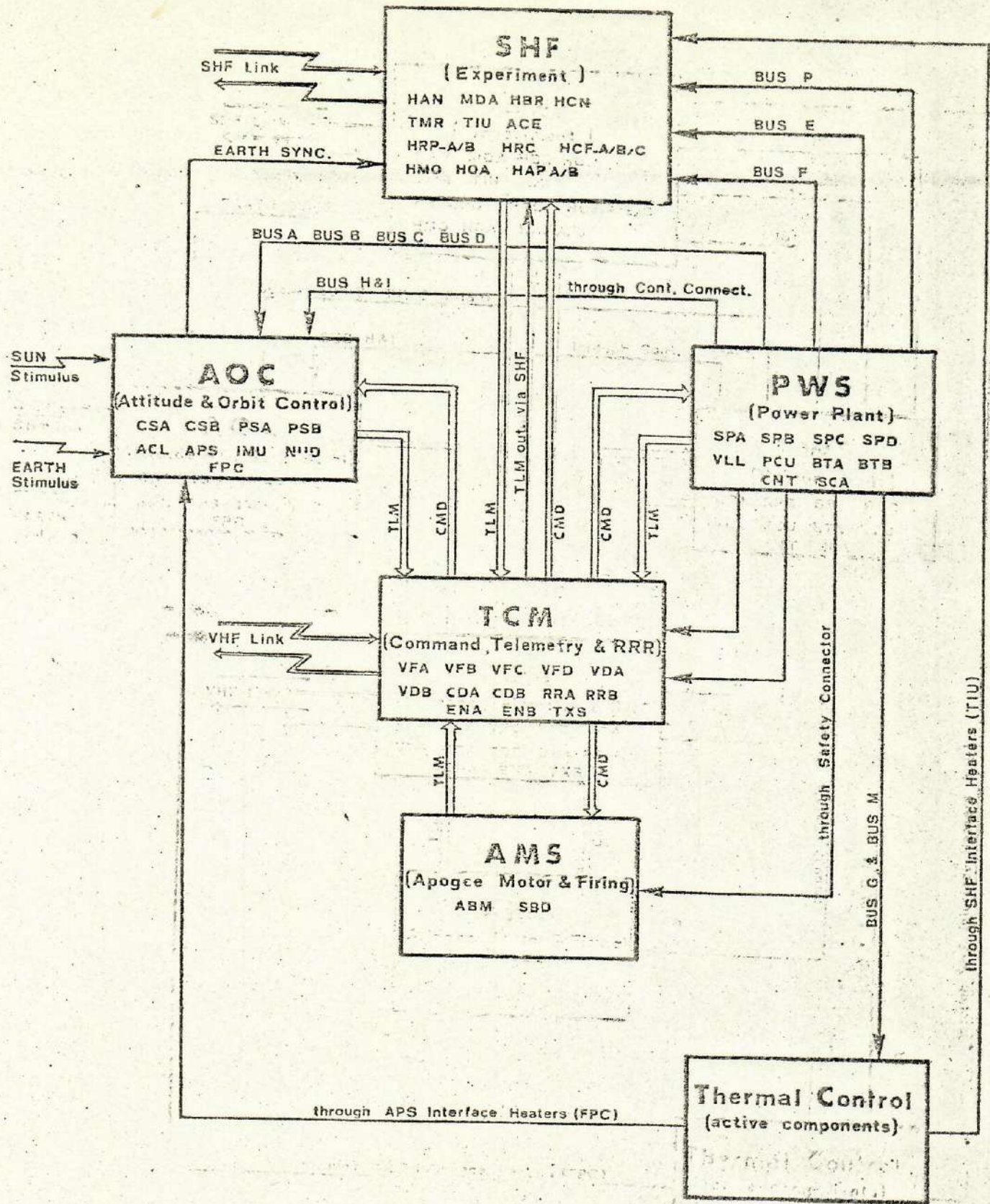


FIG. 1-1 SIRIG SATELLITE CROSS SECTION VIEW

SYMBOLS

	AMPLIFIER		QUARTZ OSCILLATOR
	ATTENUATOR		MIXER
	VARIABLE ATTENUATOR		FERRITE CIRCULATOR
	COUPLER		OR CIRCUIT
	DETECTOR		AND CIRCUIT
	DISCRIMINATOR		
	DIVIDING NETWORK		
	SUMMING NETWORK		
	LIMITER		COMMAND
	STEP CIRCUIT		POWER BUS
	HIGH-PASS FILTER		TELEMETRY
	LOW-PASS FILTER		TEST POINT
	BAND-PASS FILTER		TEST CONNECTOR
	REJECTION FILTER		UMBILICAL CONNECTOR

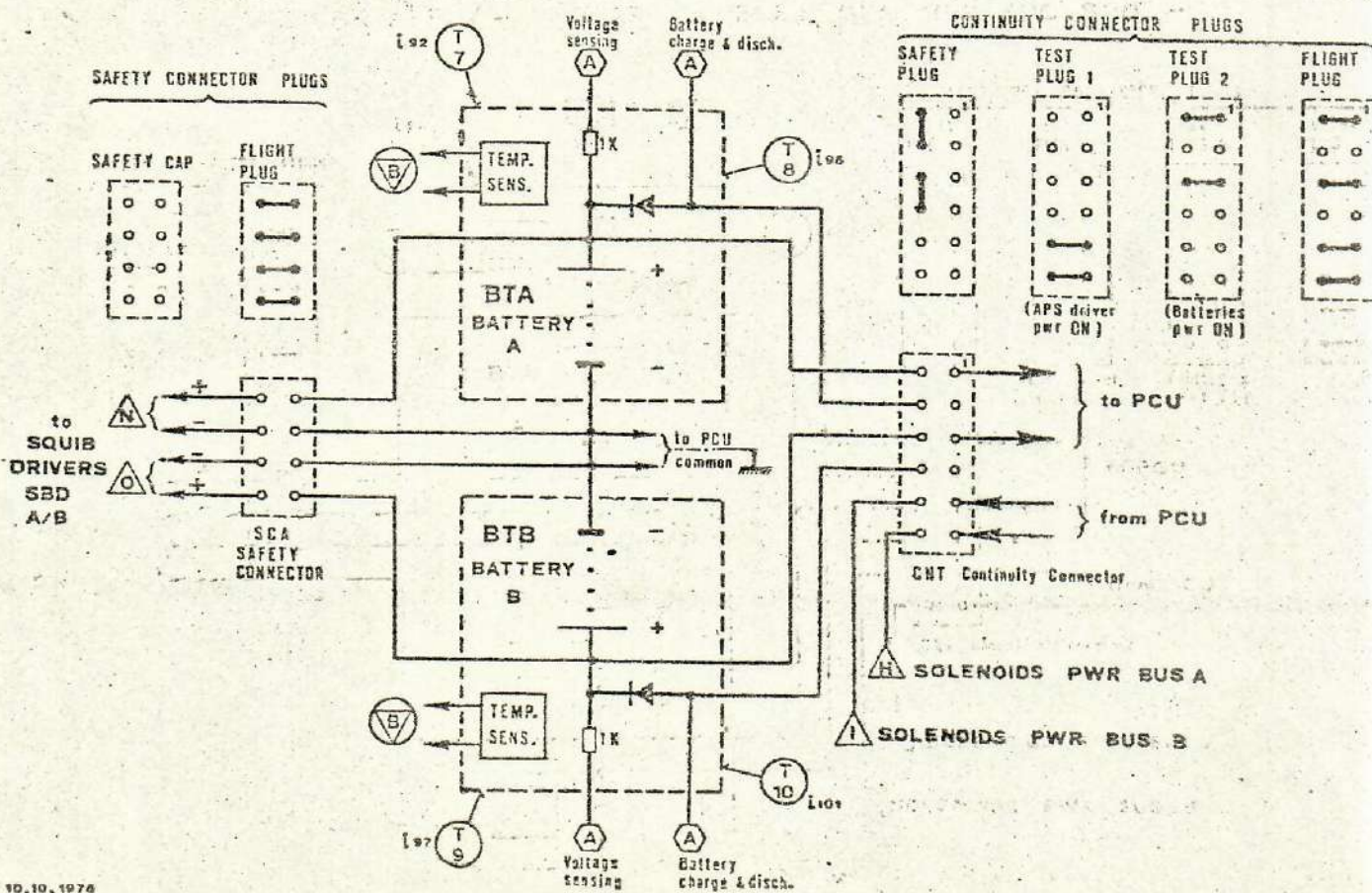
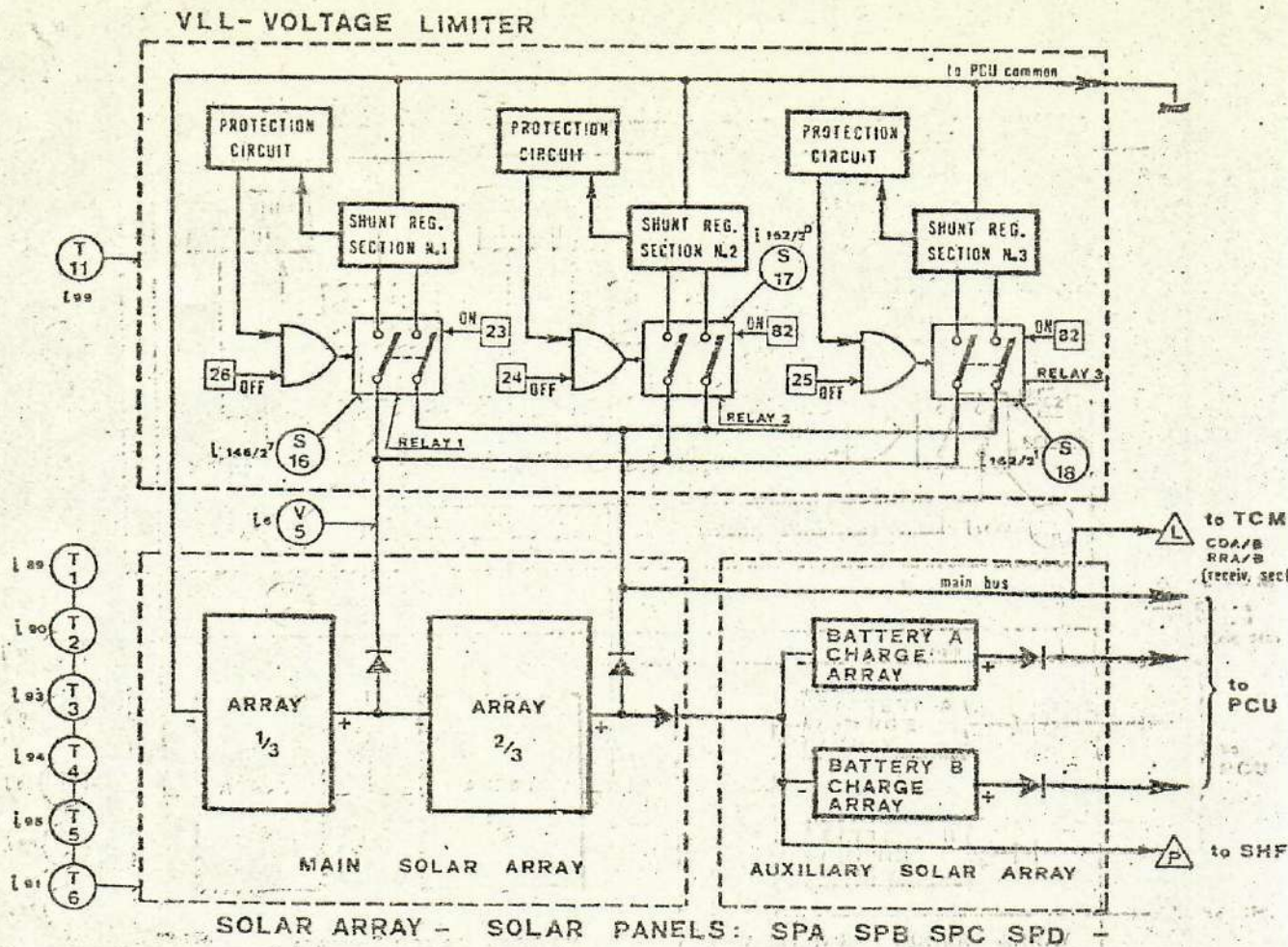
A = Acceleration
 I = Current
 E = AGC Level
 P = Pressure
 S = Status of switch
 T = Temperature
 V = Voltage
 W = Power
 X = Miscellaneous data



10.10.1976

Fig. 2-1-1

SIRIO SUBSYSTEMS : ELECTRICAL INTERFACE



10.10.1976

Fig. 2-3-2 VLL-VOLTAGE LIMITER, SOLAR ARRAY & BATTERIES

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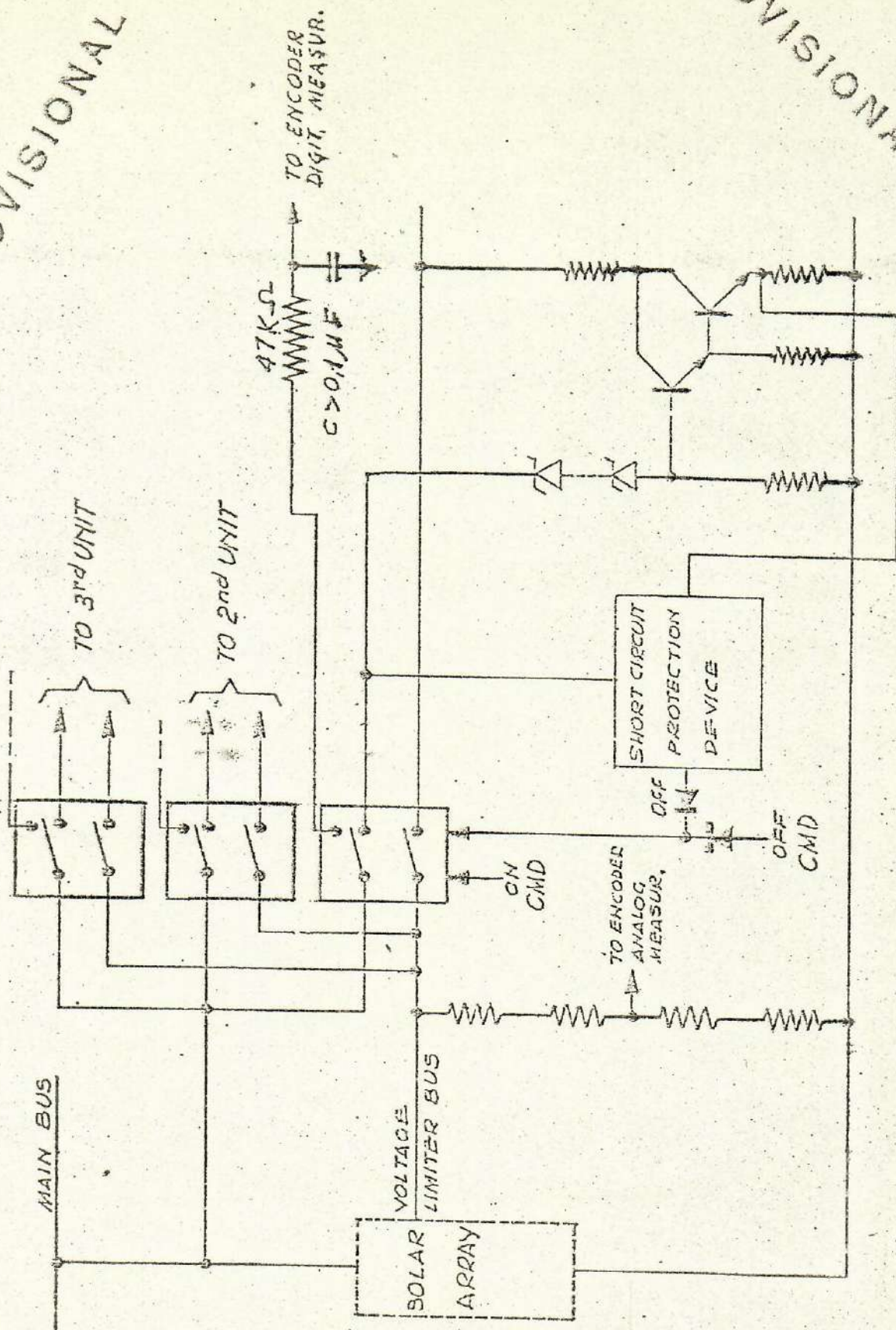


FIGURE 2.3-3 SOLAR ARRAY VOLTAGE LIMITER
SIMPLIFIED ELECTRIC DIAGRAM

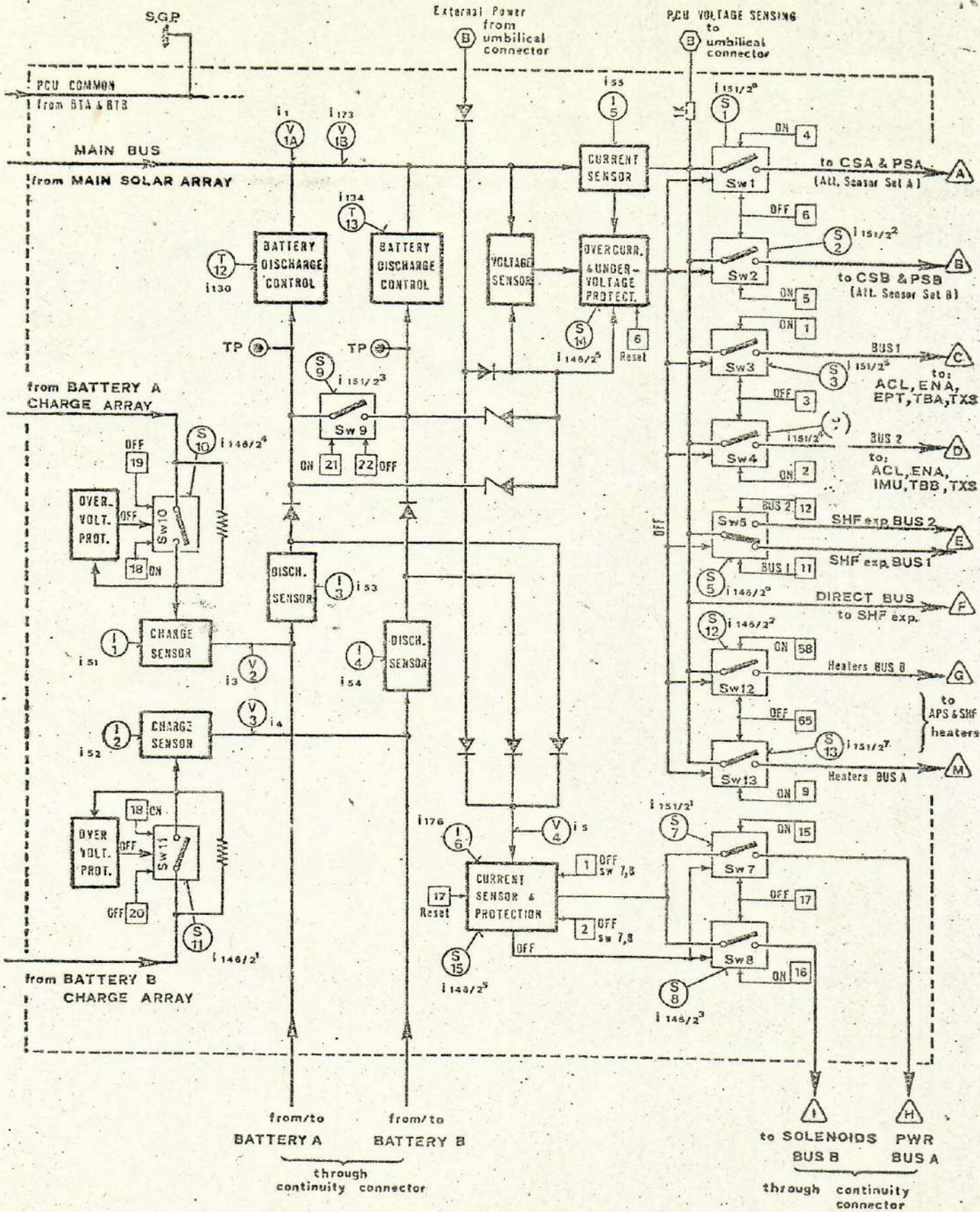


Fig. 2-3-4 PCU - POWER CONTROL UNIT

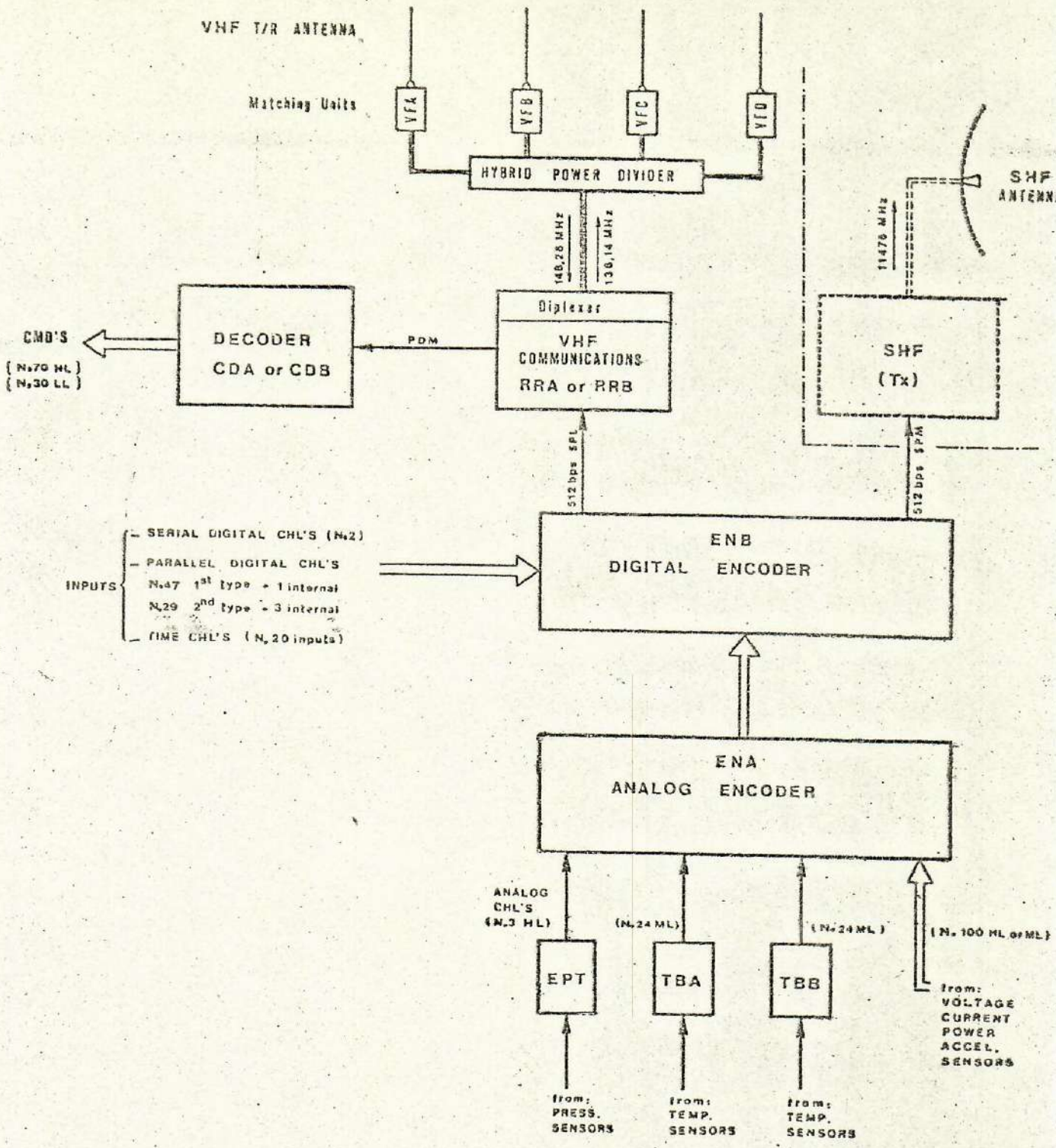
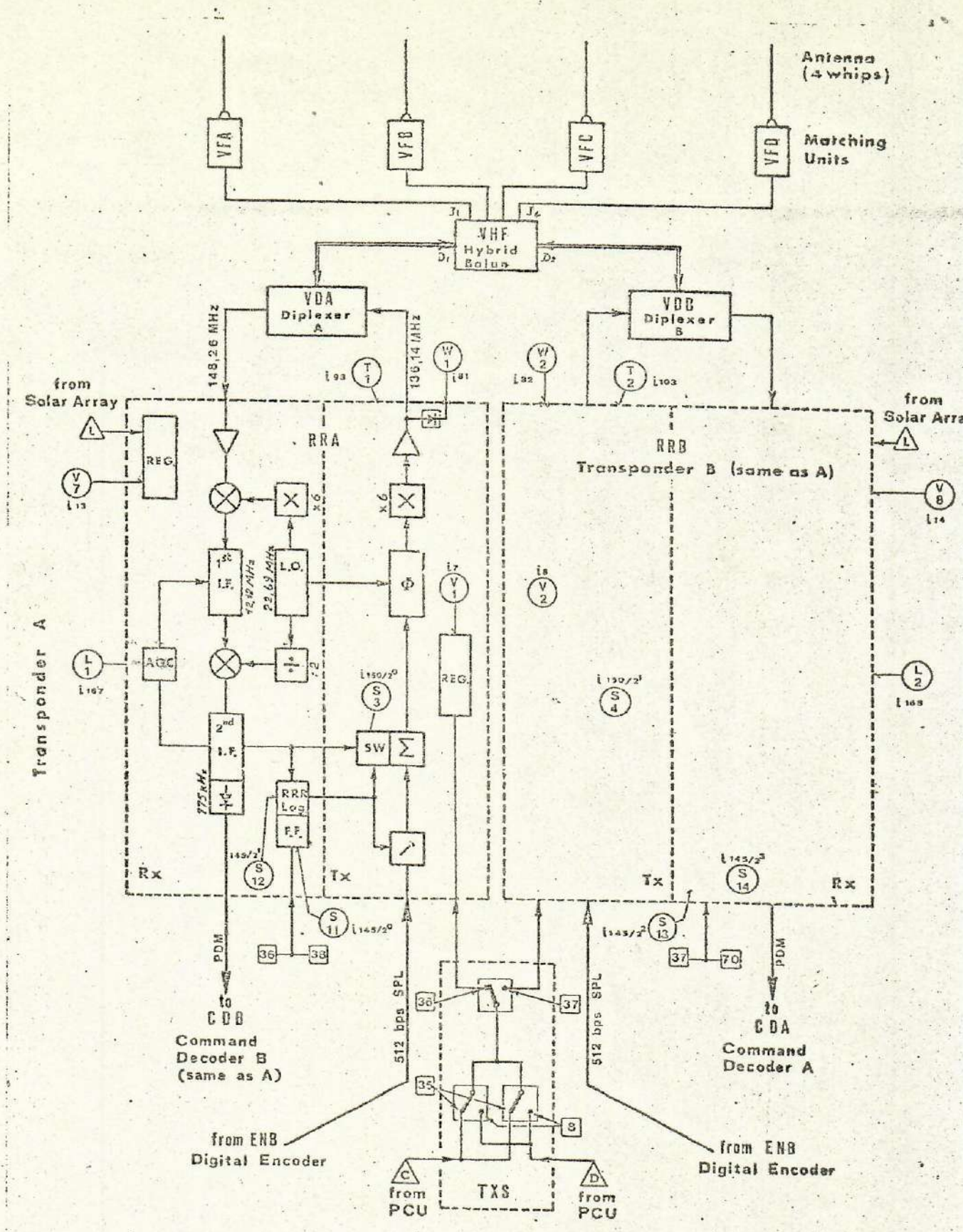


Fig. 2-4-1 TELEMETRY, COMMAND & RRR SUBSYSTEM
BLOCK DIAGRAM

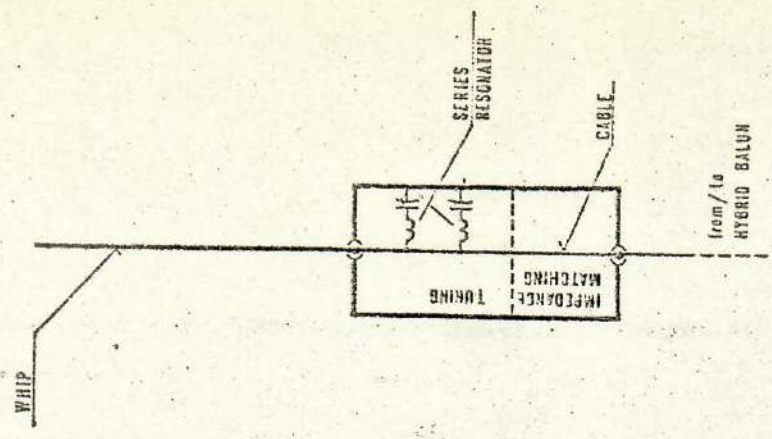
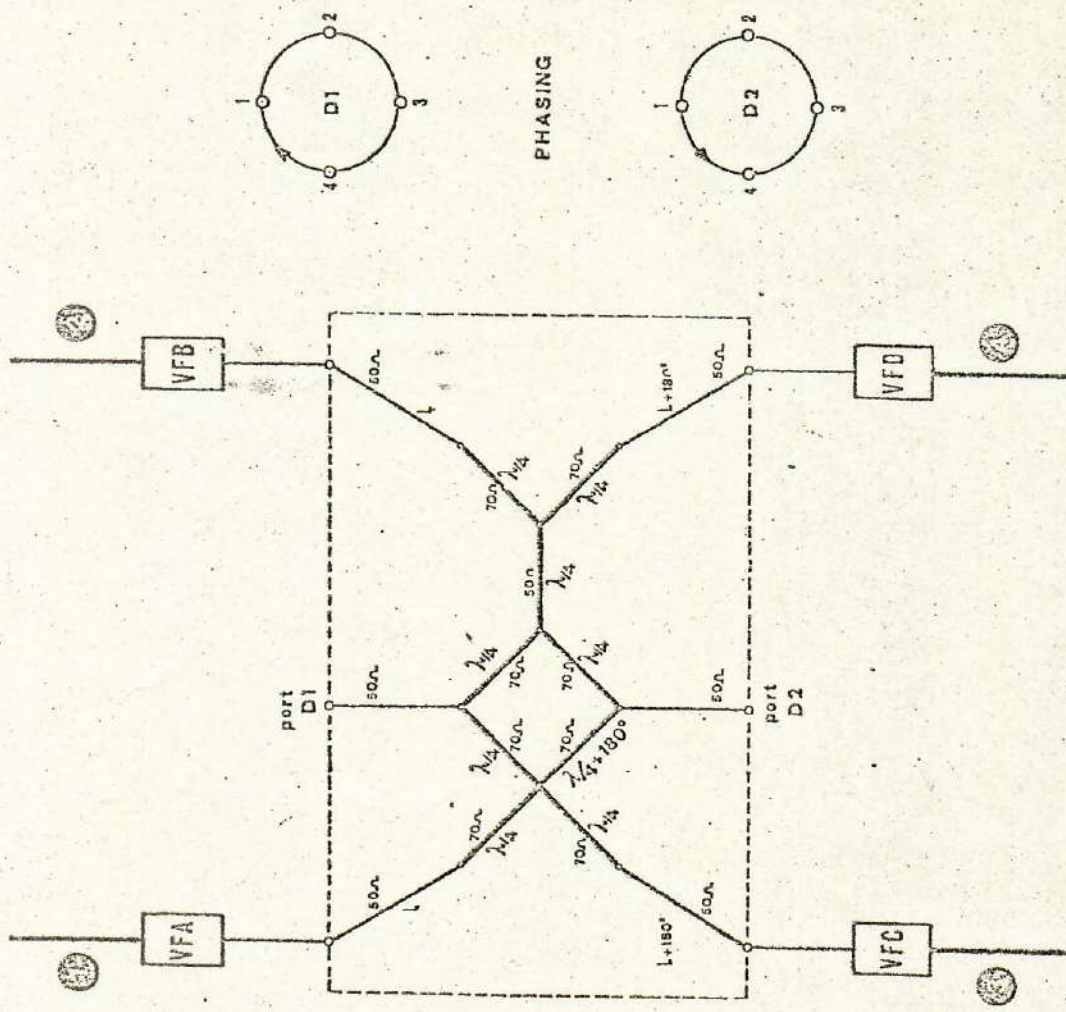
3-3-1976
53



VHF TRANSPONDER RRA & RRB

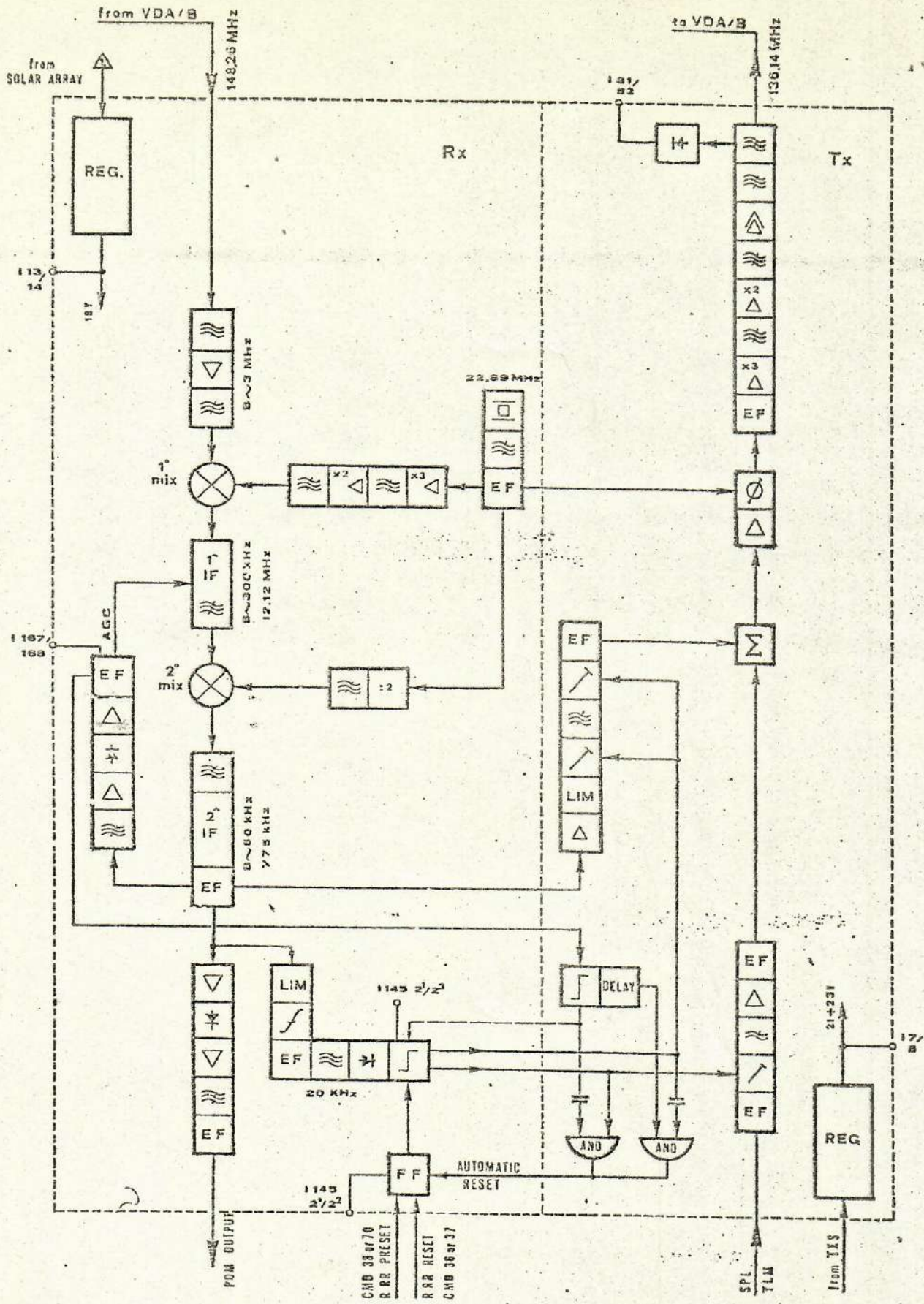
Fig. 2.4-2

SB



MATCHING UNIT (VFA/B/C/D) AND WHIP

Fig. 2-4-3 HYBRID BALUN, MATCHING UNITS AND WHIPS (Schematic)

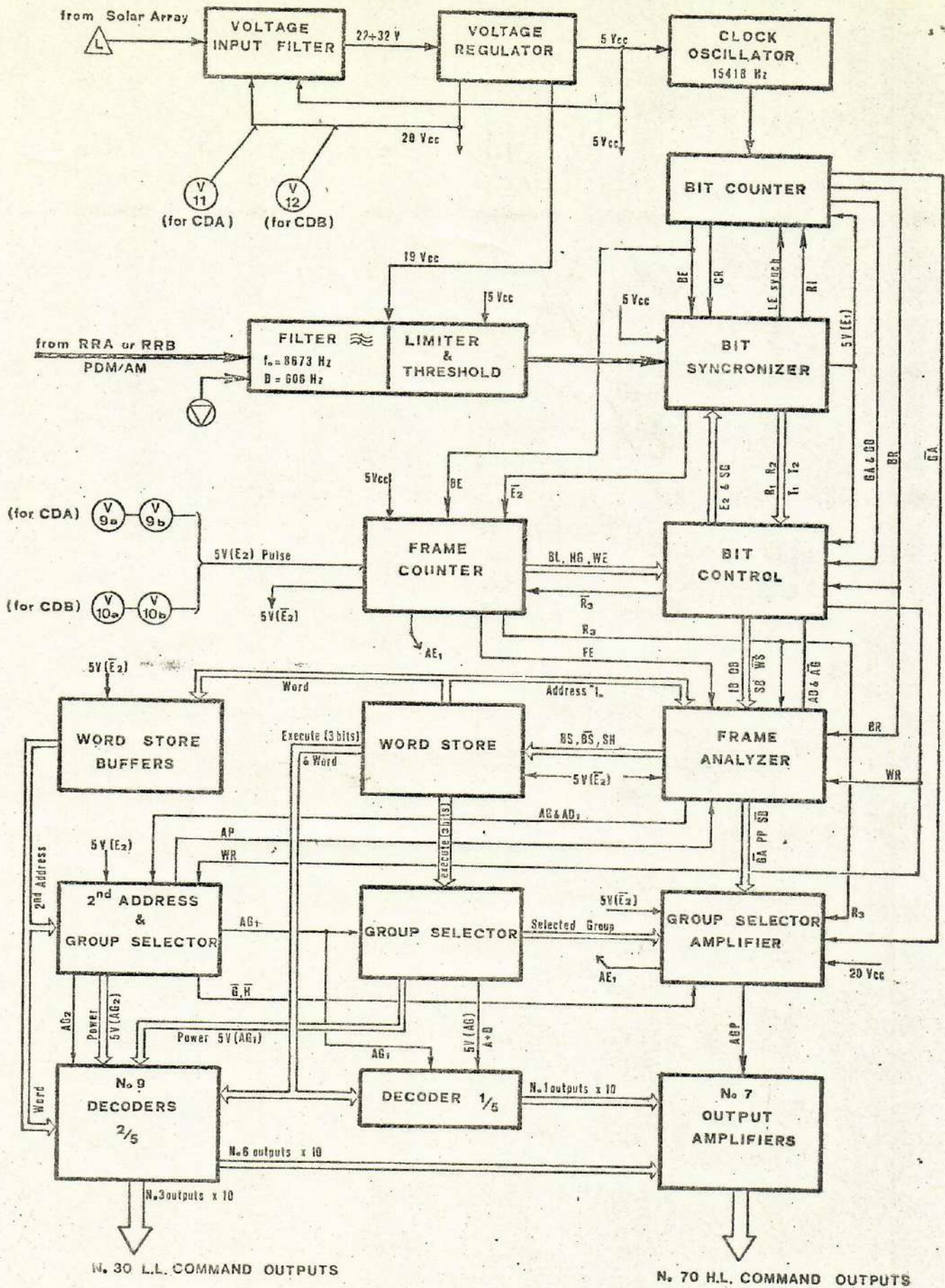


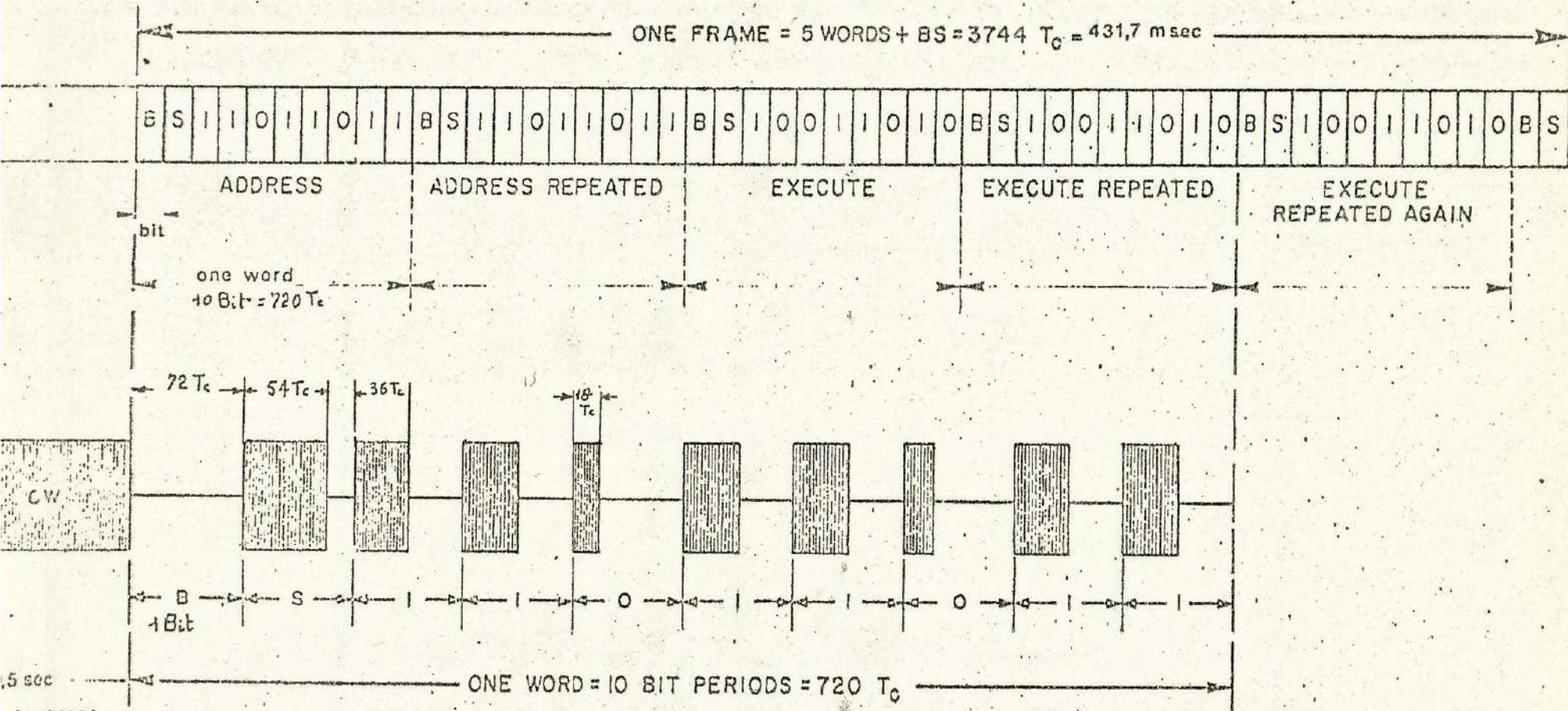
8-8-1978

8

Fig. 2.4-9

VHF TRANSPONDER RRA or RRB





1.5 sec

g/o CMD)

$$T_c = \text{SUBCARRIER PERIOD} = \frac{1}{8673} \text{ sec} = 115,3 \mu\text{sec}$$

BIT PERIOD : $72 T_c = 8302 \mu\text{sec}$ BIT RATE = 120.4 bps

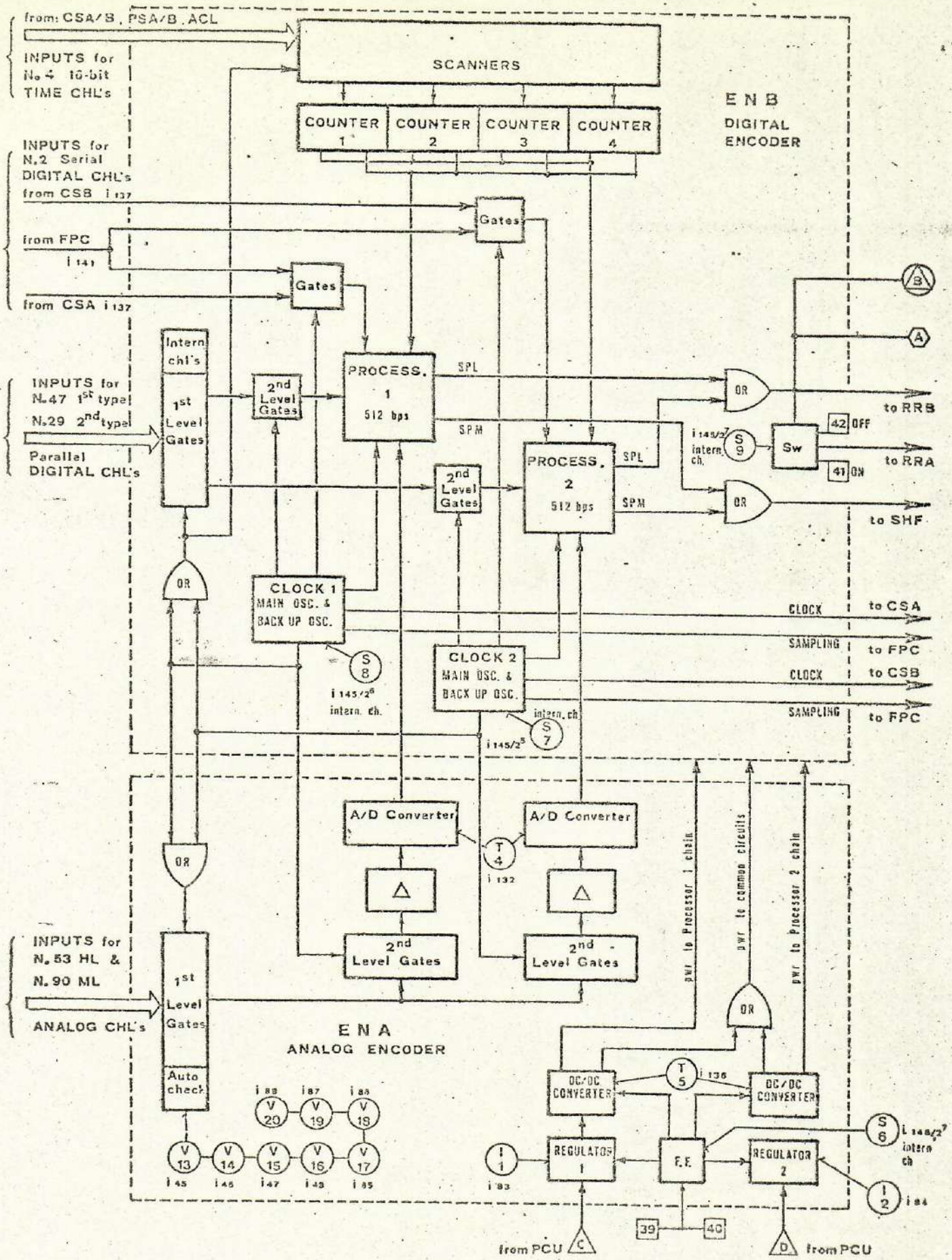
B (Blank) : OFF 1 Bit period

S (Sync) : ON $\frac{3}{4}$ Bit period = 6224 μsec

1 (One) : ON $\frac{1}{2}$ Bit period = 4151 μsec

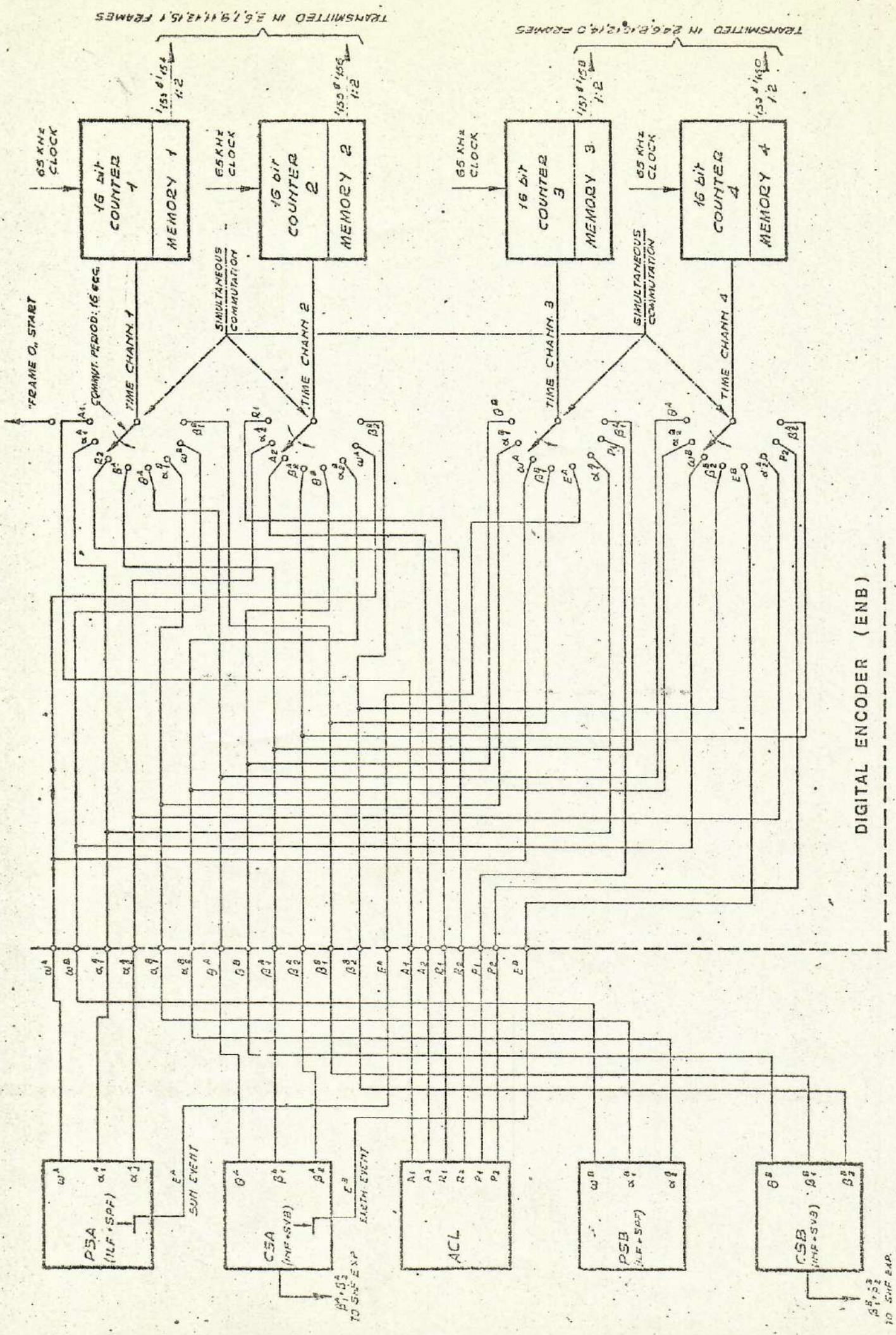
0 (Zero) : ON $\frac{1}{4}$ Bit period = 2075 μsec

Fig. 2.4-11 COMMAND FRAME STANDARD



9.9.1978
93

Fig. 2-4-12 TELEMETRY ENCODER



DIGITAL ENCODER (ENB)

TRANSMITTED IN 26.6, 10.2, 14.0 FRAMES

TRANSMITTED IN 26.6, 10.2, 14.0 FRAMES

TO SWF EXP.

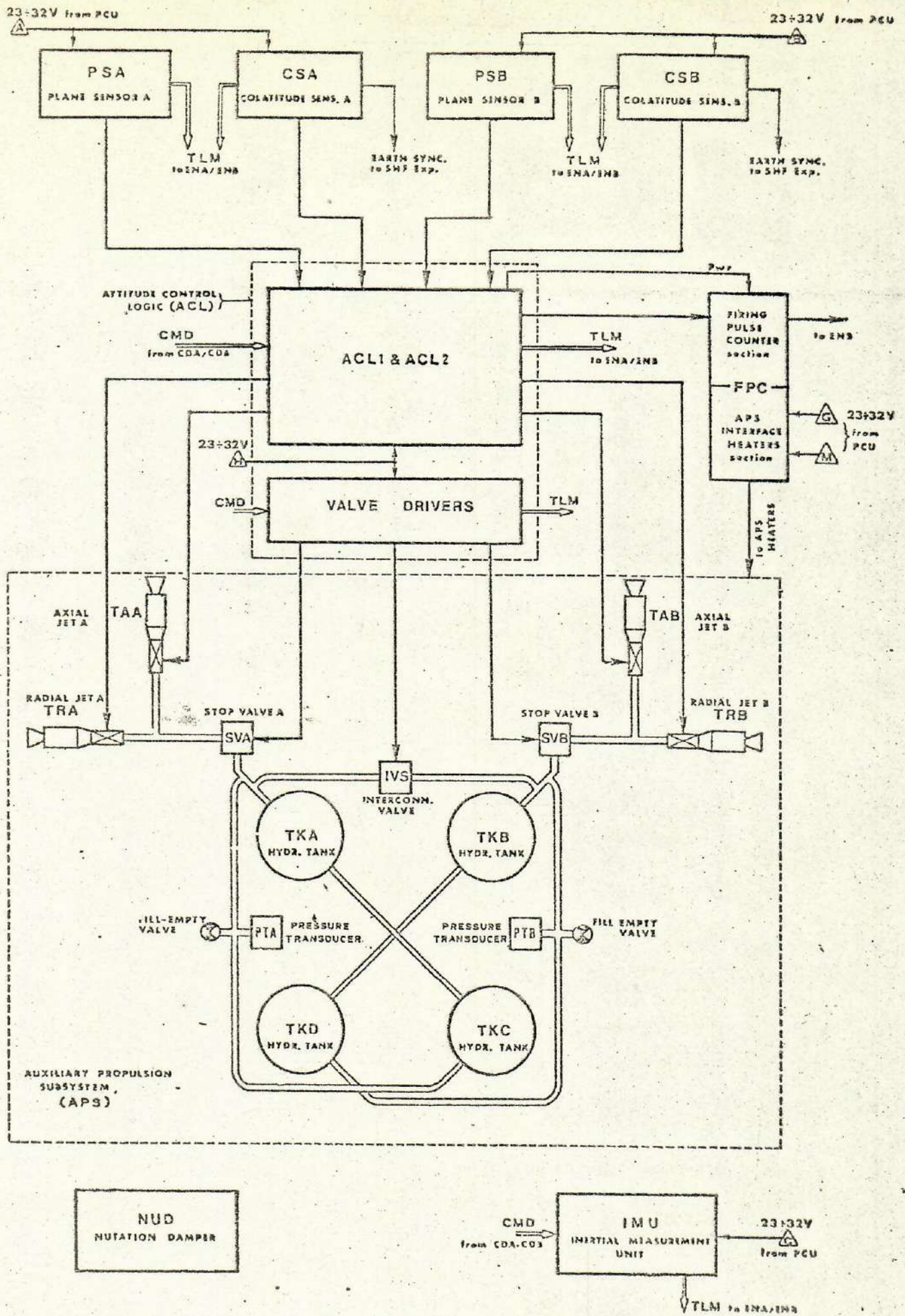
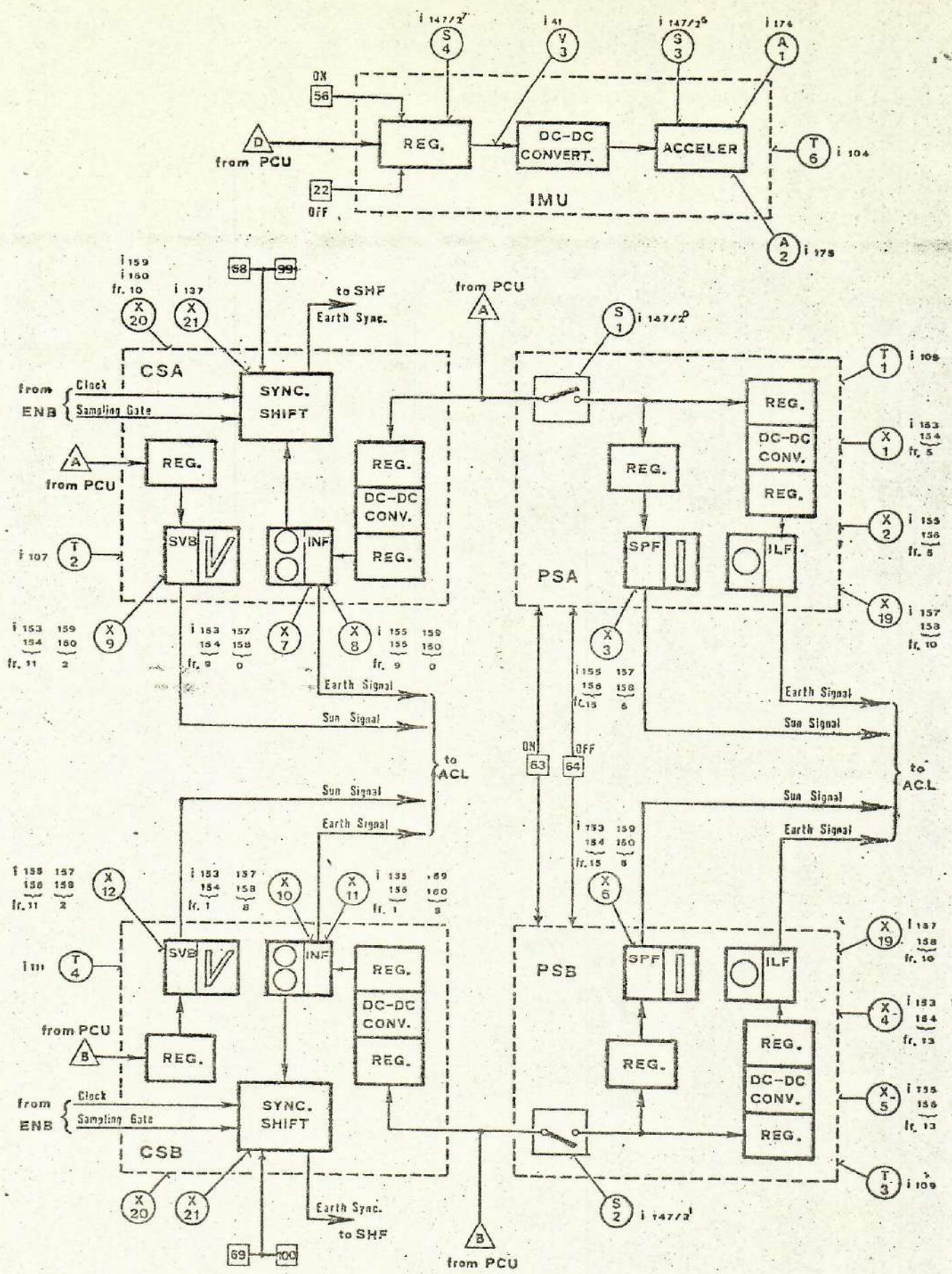
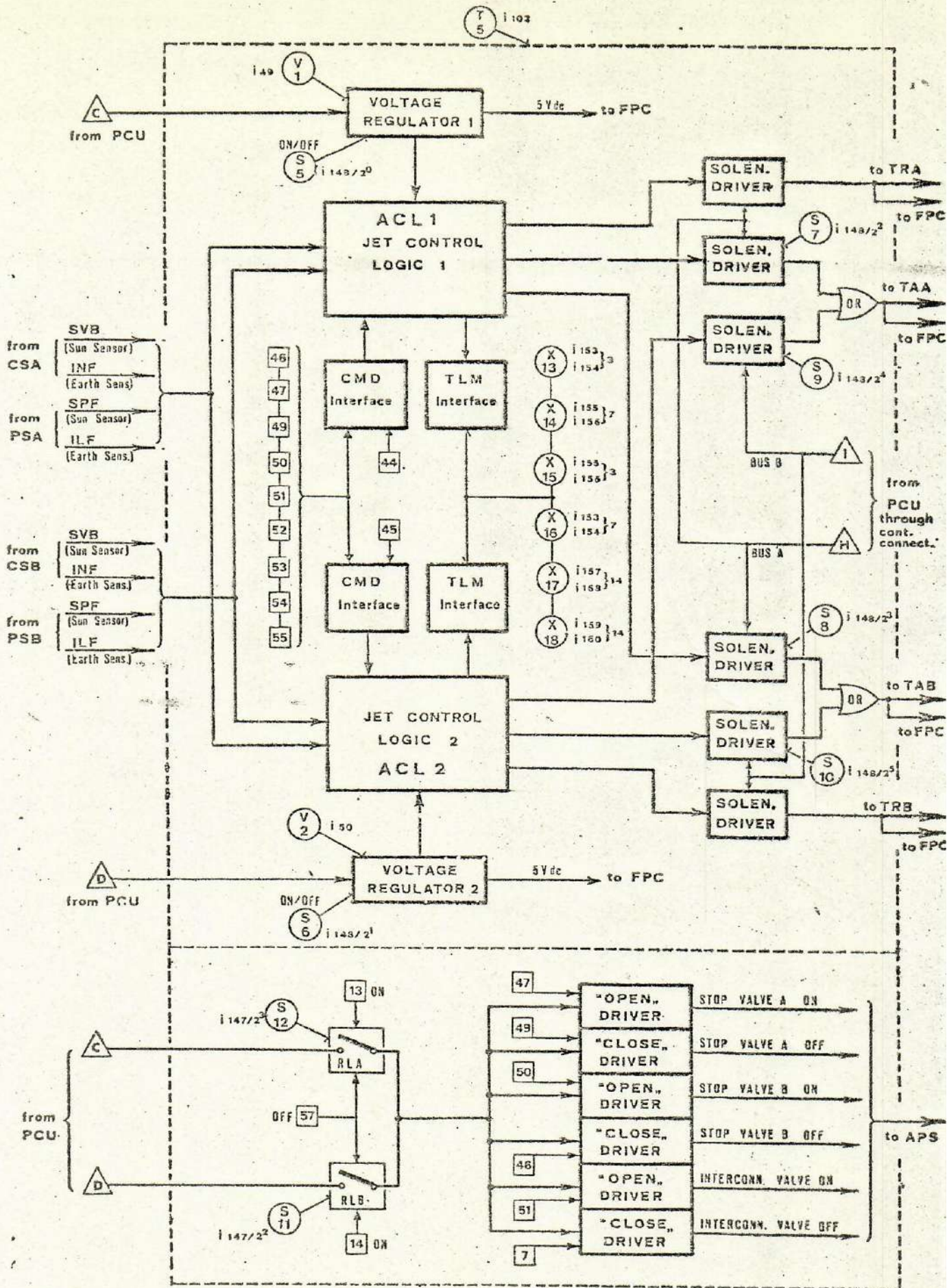


Fig. 2-5-1 ADC - ATTITUDE DETECTION & CONTROL
BLOCK DIAGRAM



9.0.1970

Fig. 2-5-2 IMU - INERTIAL MEASUREMENT UNIT
 CSA/B; PSA/B - COLATITUDE & PLANE SENSORS

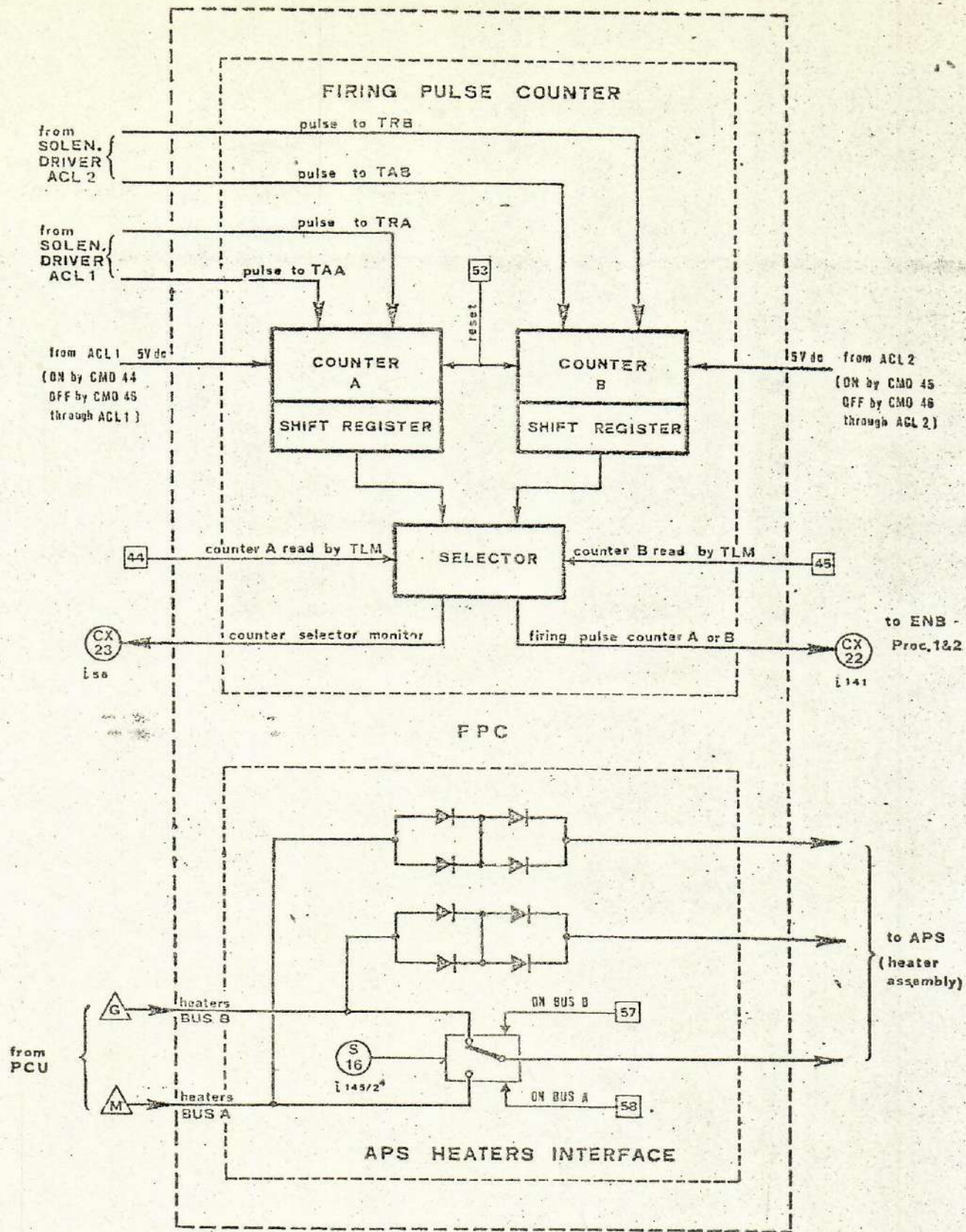


9.9.1978

93

Fig. 2-5-3

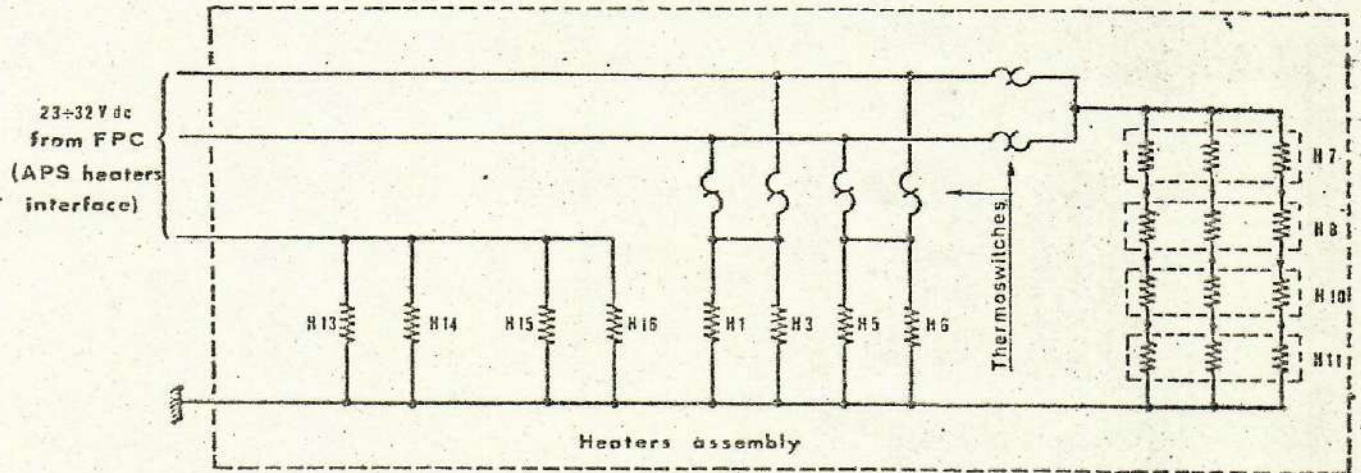
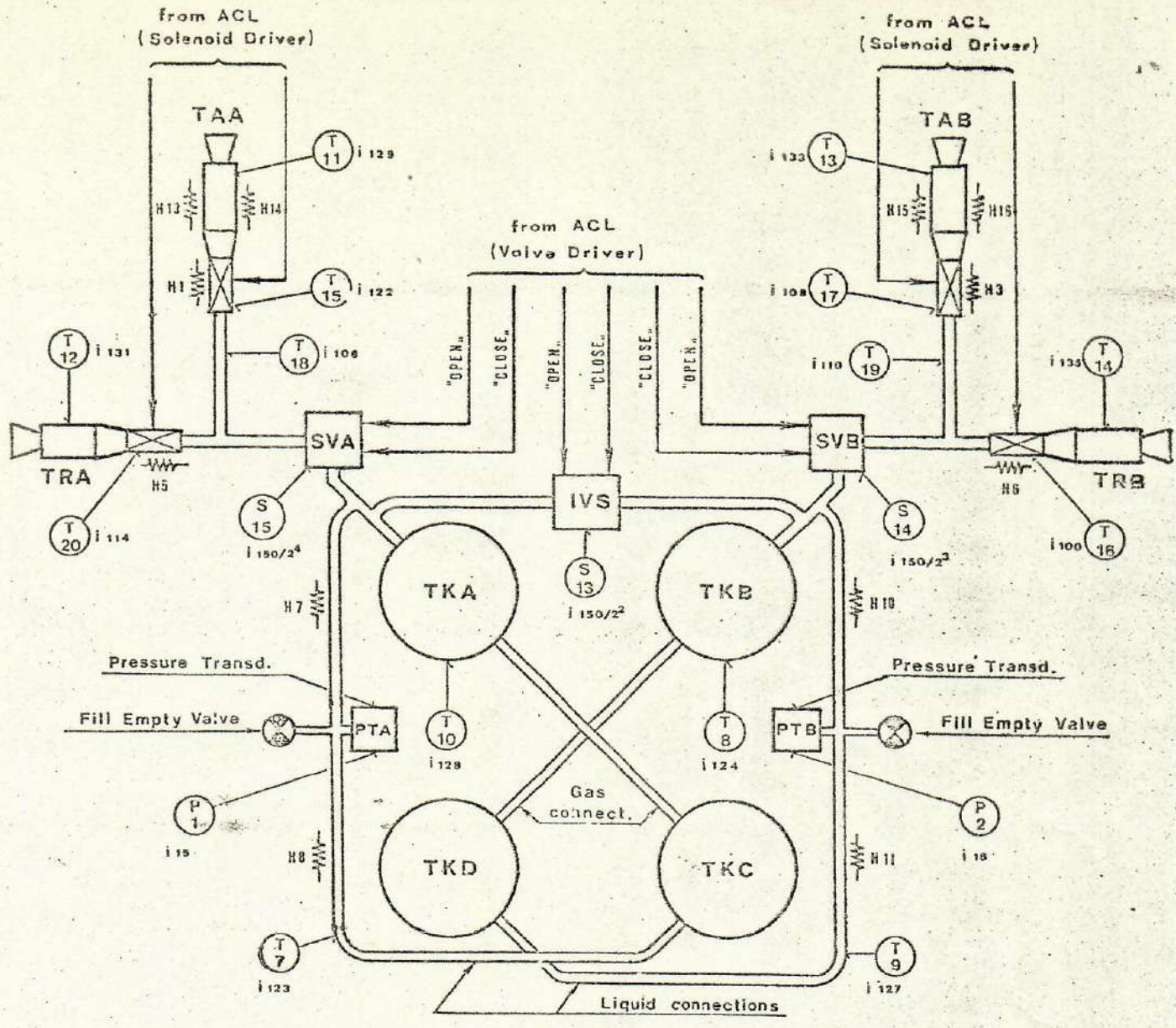
ACL - ATTITUDE CONTROL LOGIC



10,10,1978

B

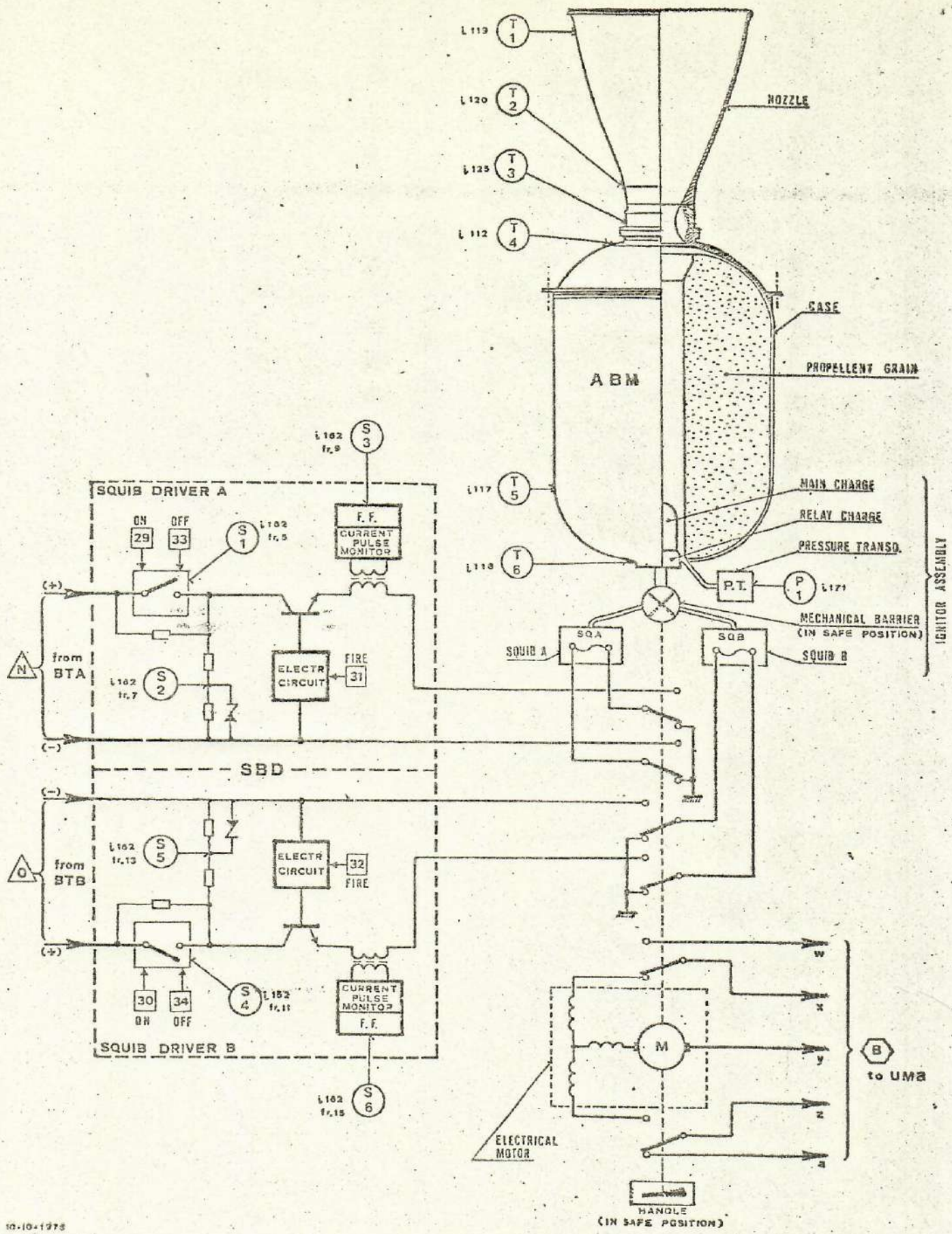
Fig. 2-5-4 FPC - FIRING PULSE COUNTER SECTION & APS HEATERS INTERFACE SECTION



9.9.1970
F

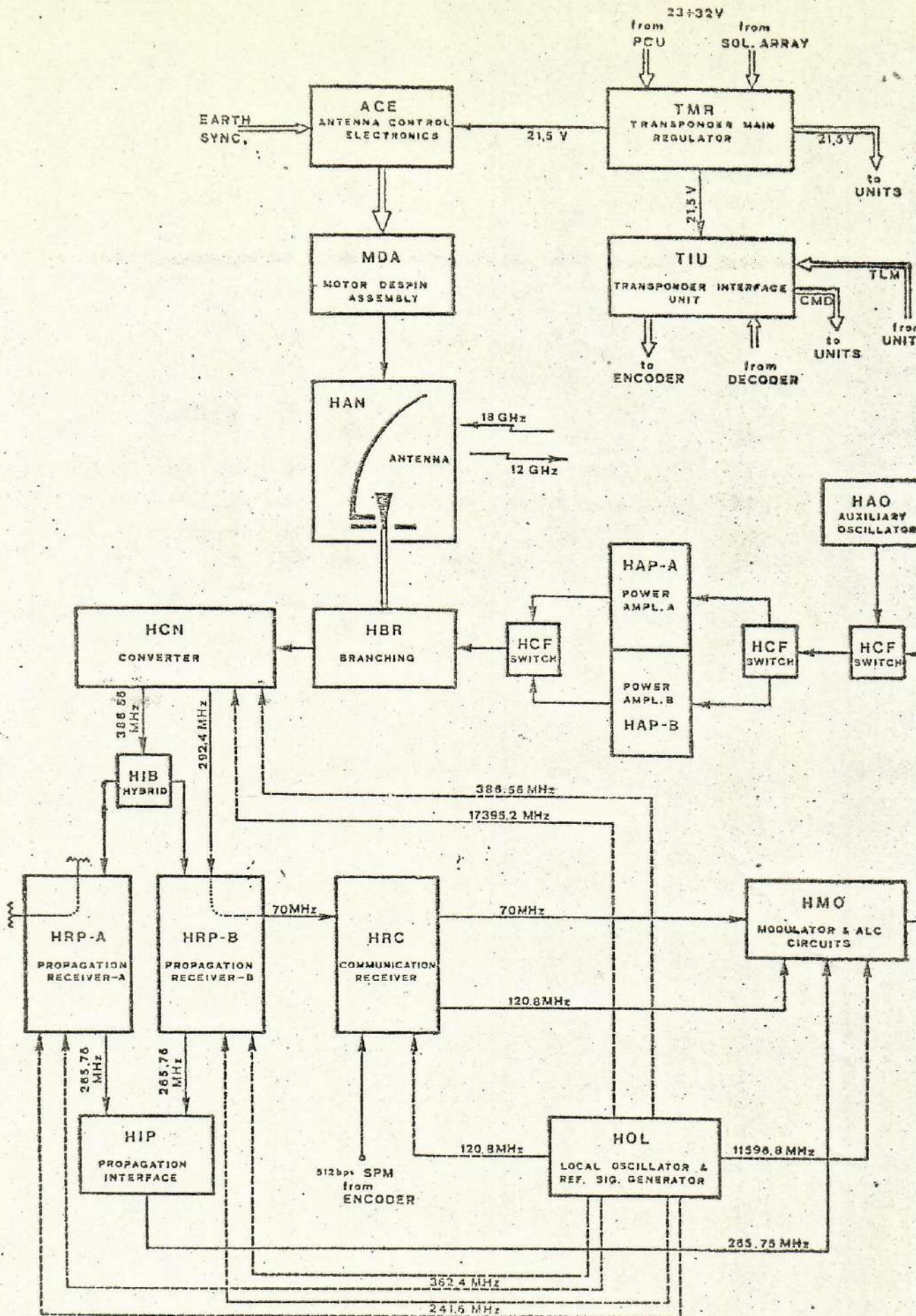
Fig. 2-5-5 APS - AUXILIARY PROPULSION SYSTEM

PROVISIONAL



10-10-1978

Fig. 2-6-1 AMS - APGEE MOTOR & FIRING SUBSYSTEM



SHF EXPERIMENT SUBSYSTEM

Fig. 2-7-10

BLOCK DIAGRAM

NOVEMBER 1976

CS 1-1-1976

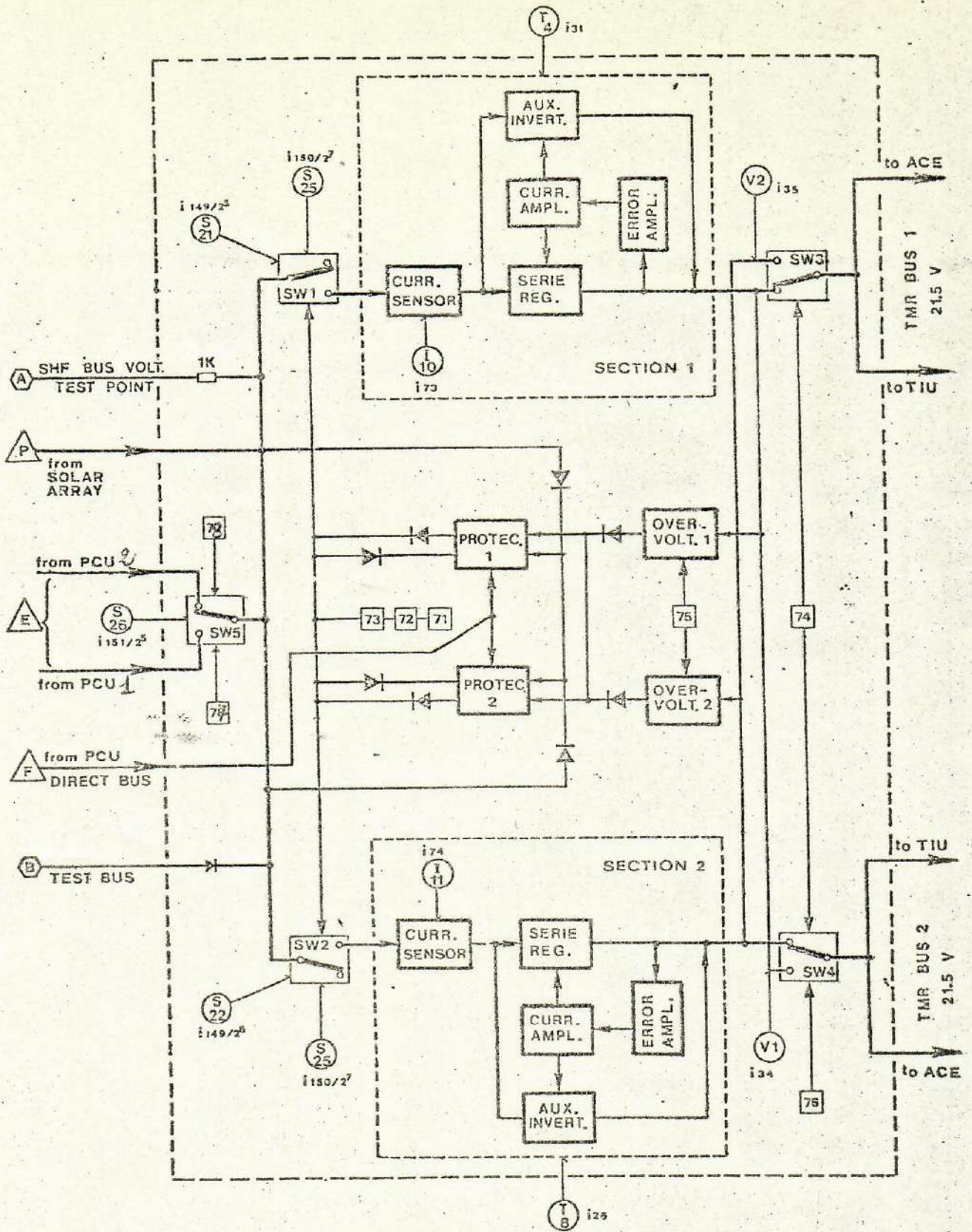
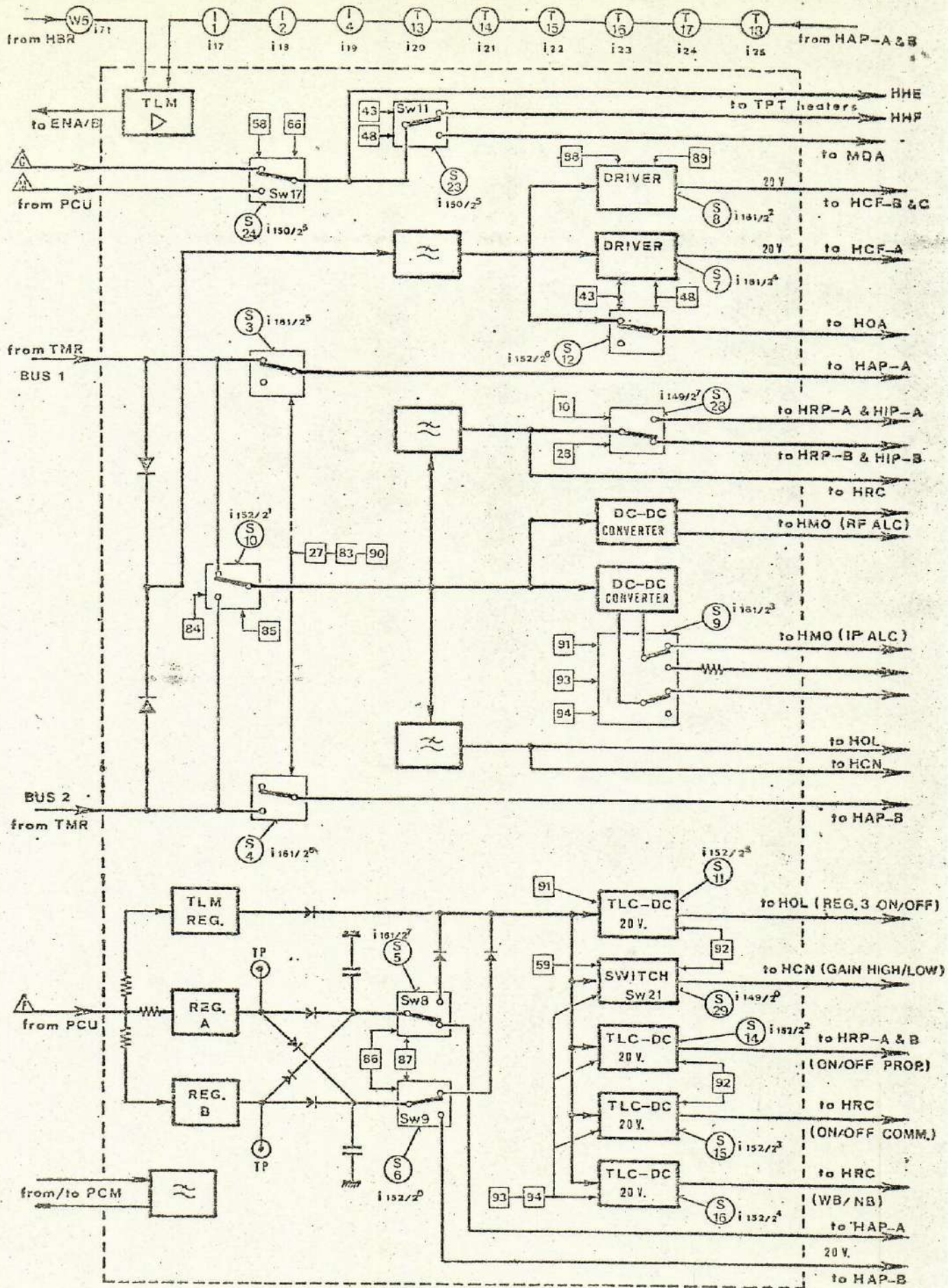
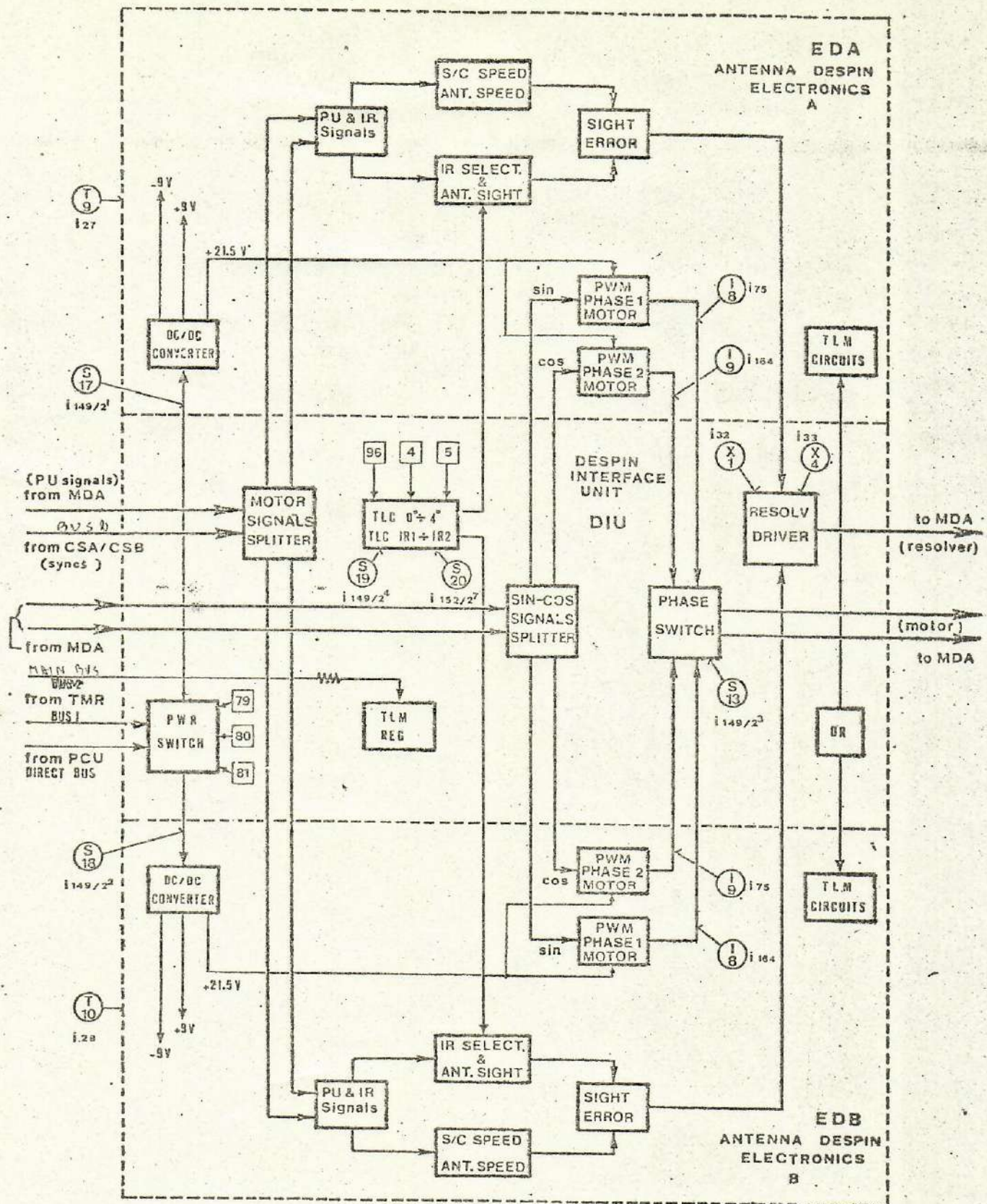


Fig. 2-7-11 TMR - TRANSPONDER MAIN REGULATOR



88 1976

Fig 2.7-12 TIU - TRANSPONDER INTERFACE UNIT



9.9.1975

73

Fig 2-7-13 ACE - ANTENNA CONTROL ELECTRONICS

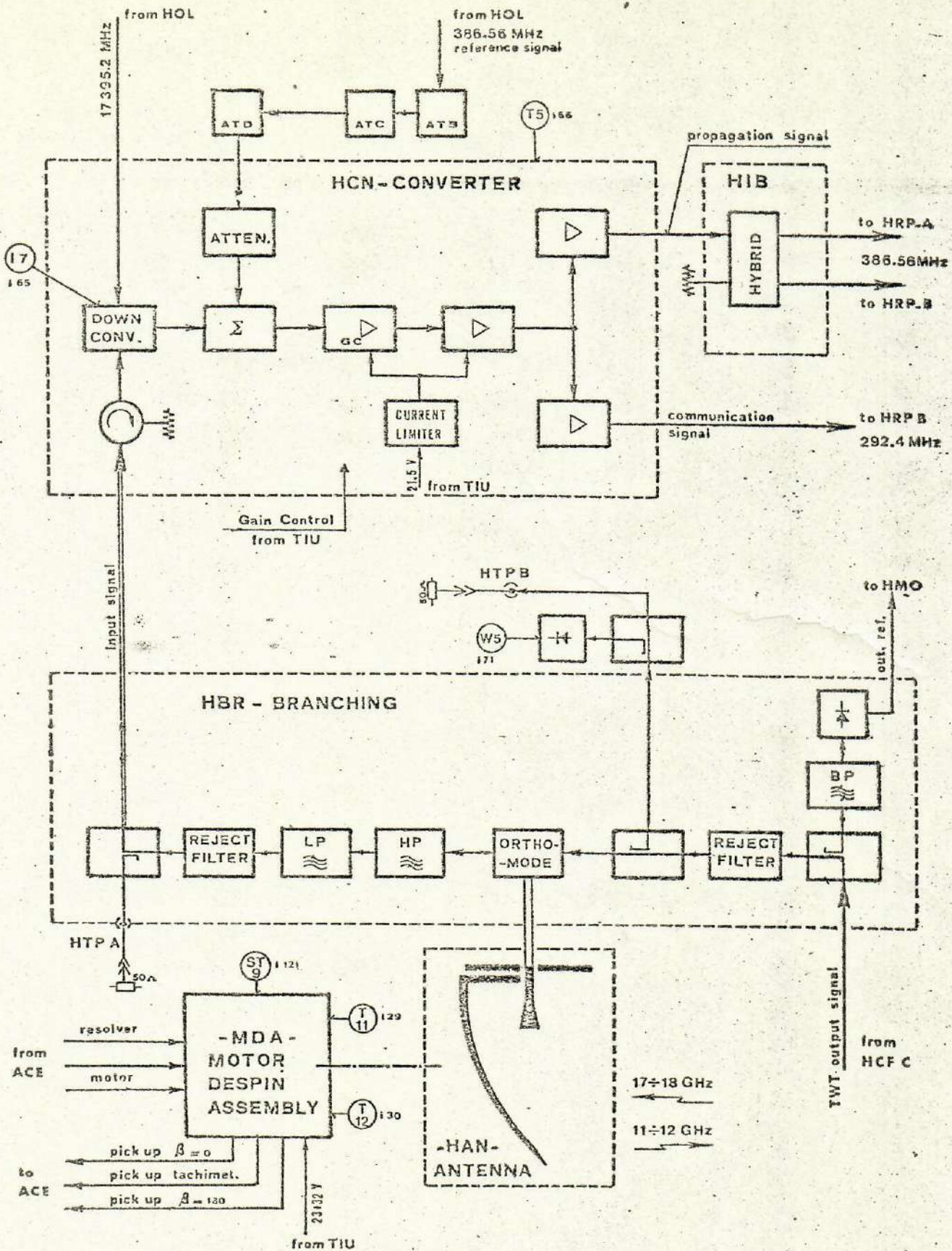
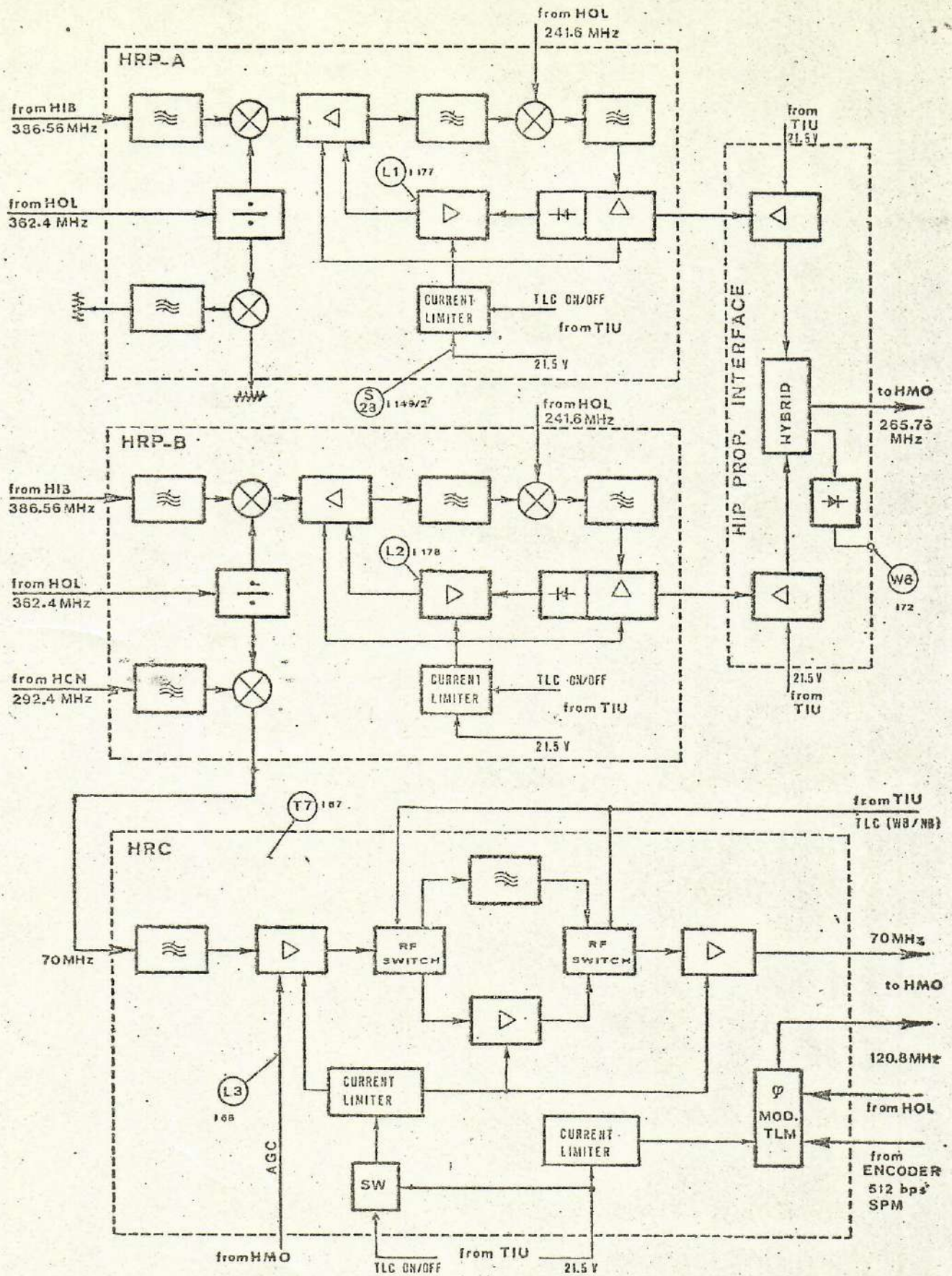


Fig. 2-7-14 MDA-MOTOR DESPIN, HAN-ANTENNA, HBR-BRANCHING & HCN-CONVERTER



8.8.1978
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Fig. 2-7-15 HRP-A, HRP-B - PROPAGATION RECEIVERS & HRC-COMMUNICATION RECEIVER

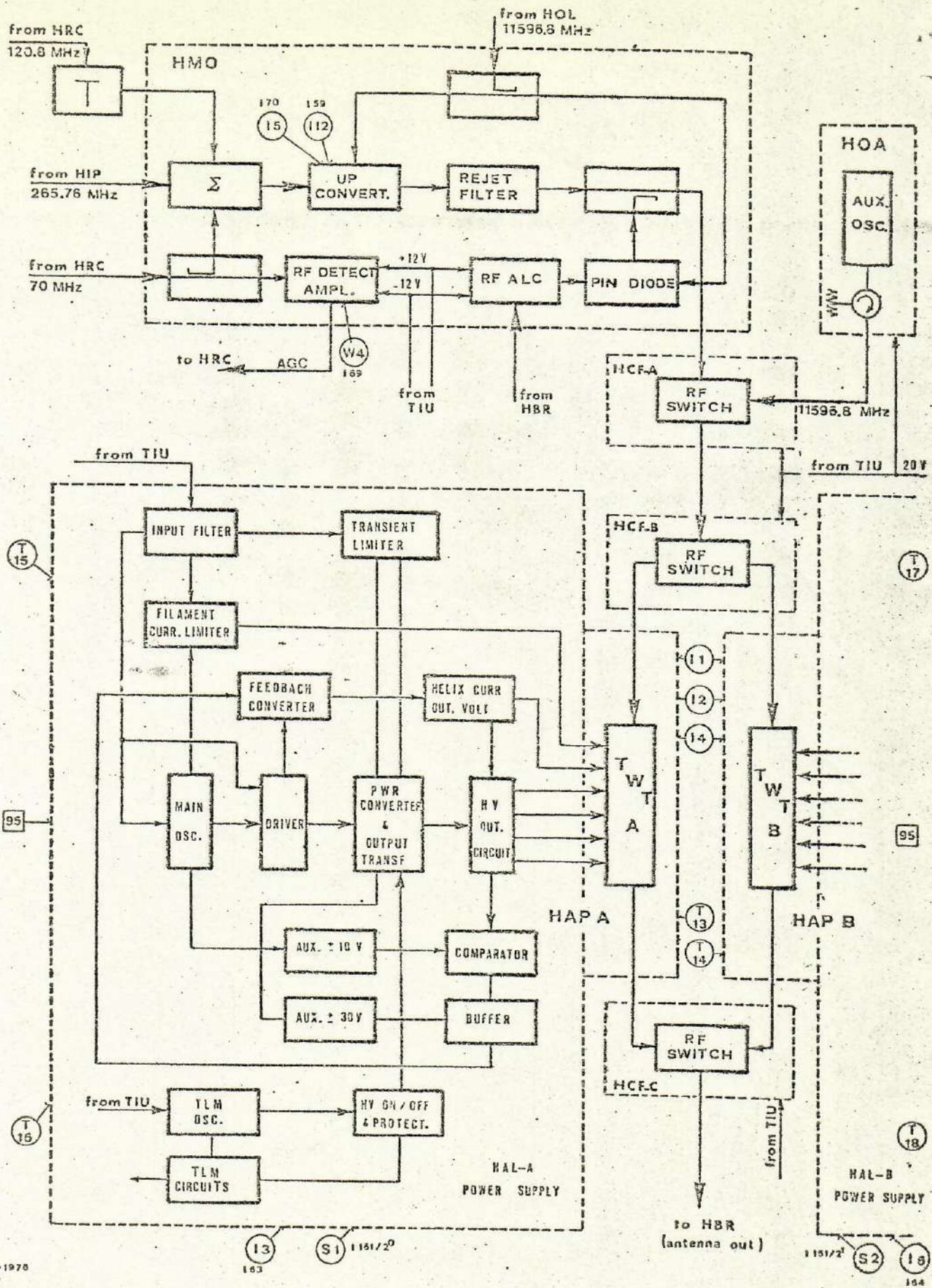
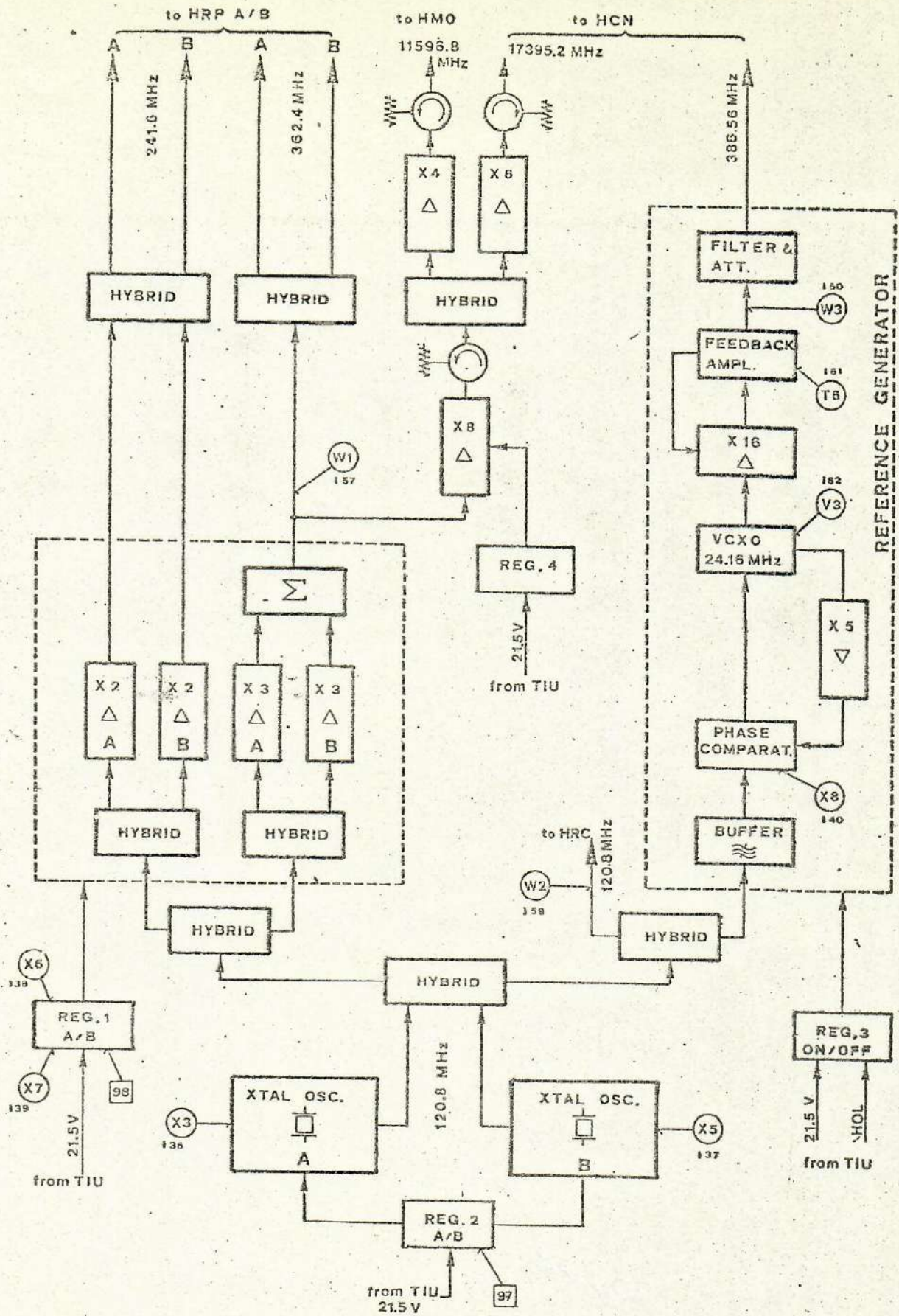
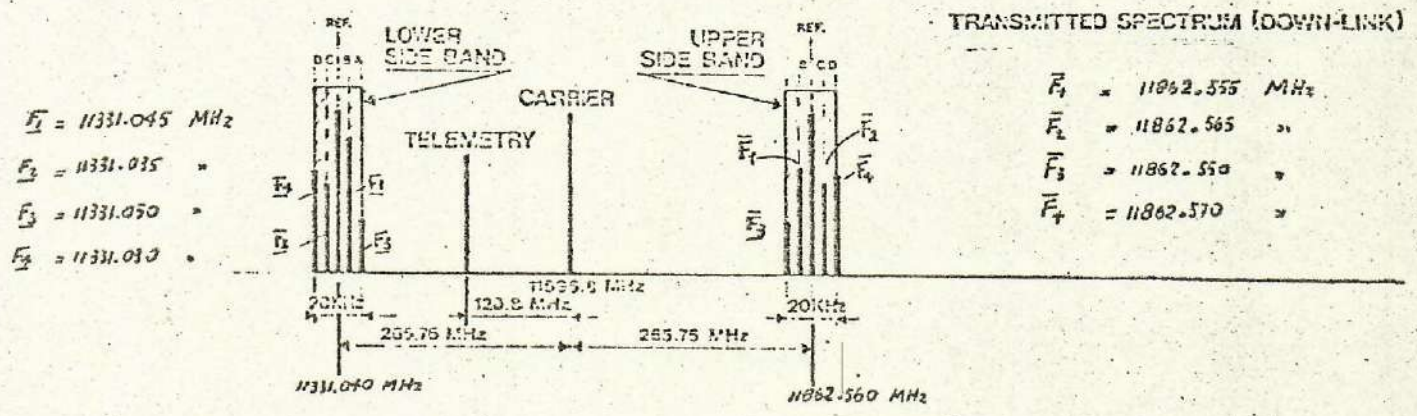
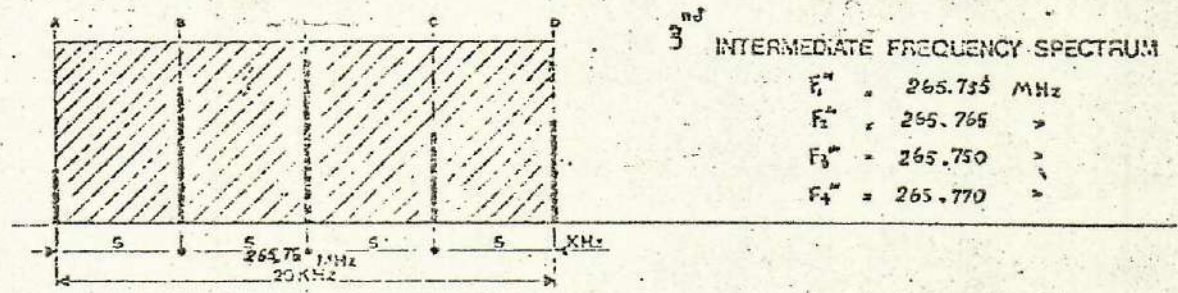
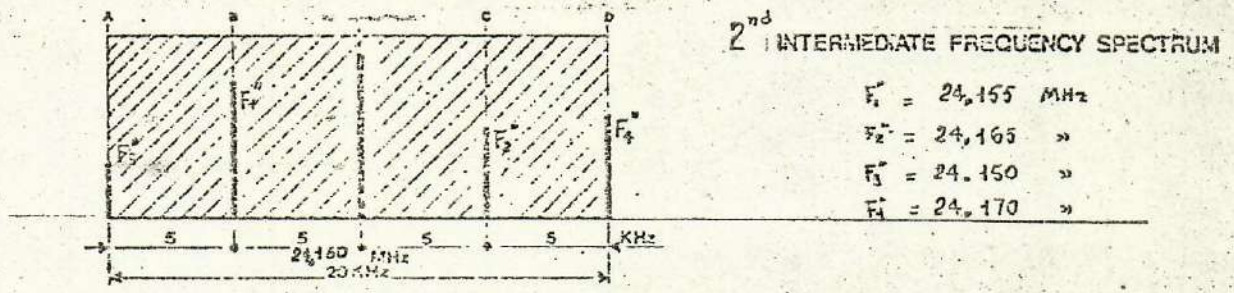
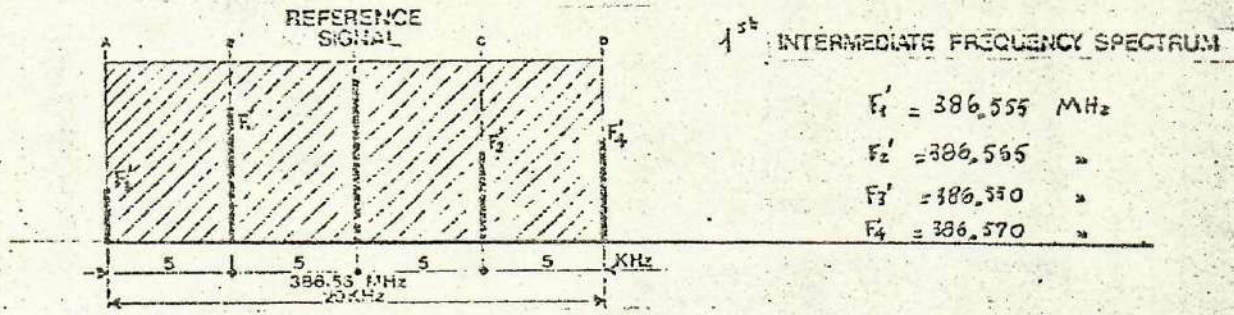
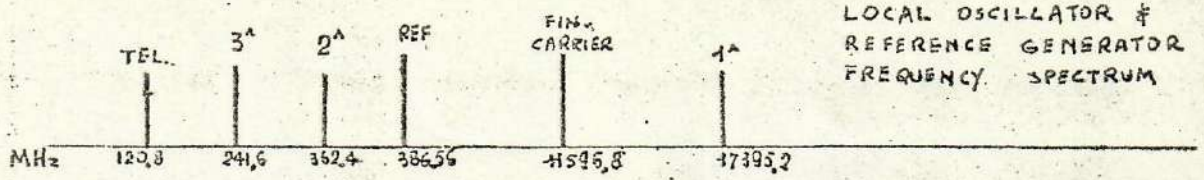
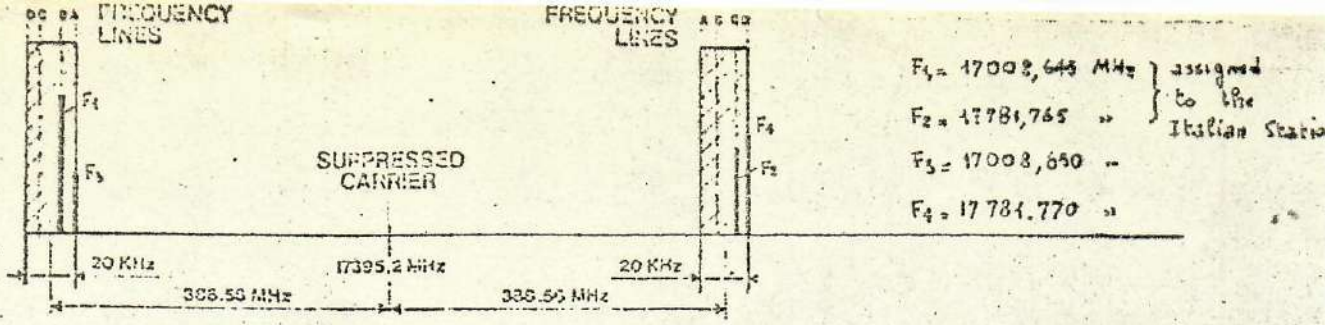


Fig. 2.7-16 HMO-MODULATOR, HOA-AUX. OSCILLATOR & HAPA/B-RF POWER AMPLIFIERS



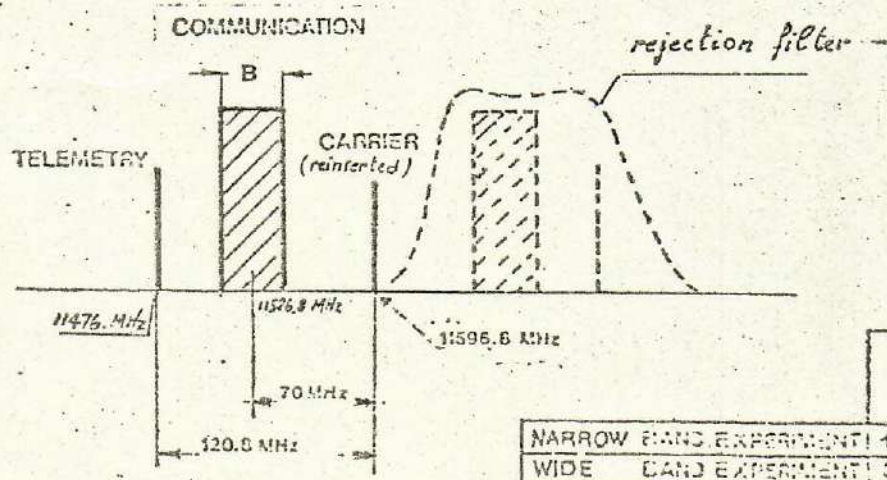
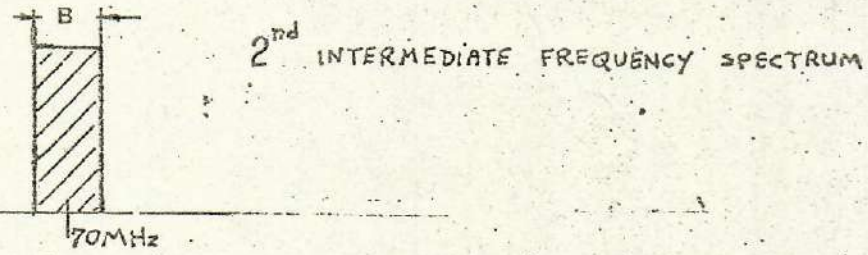
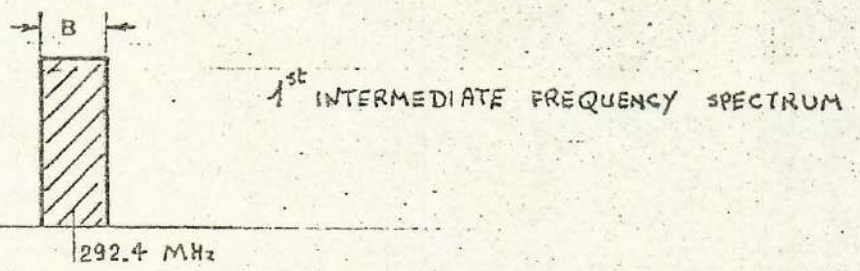
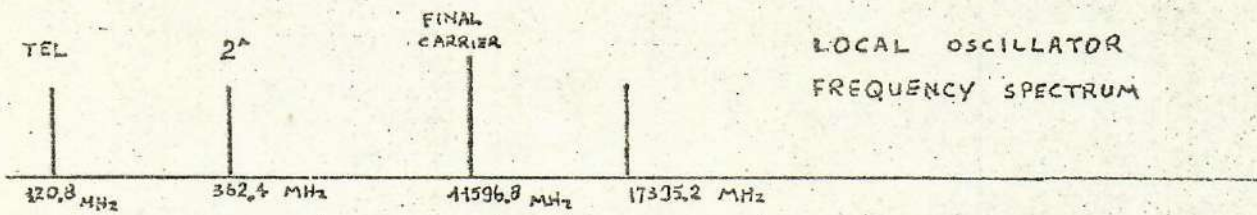
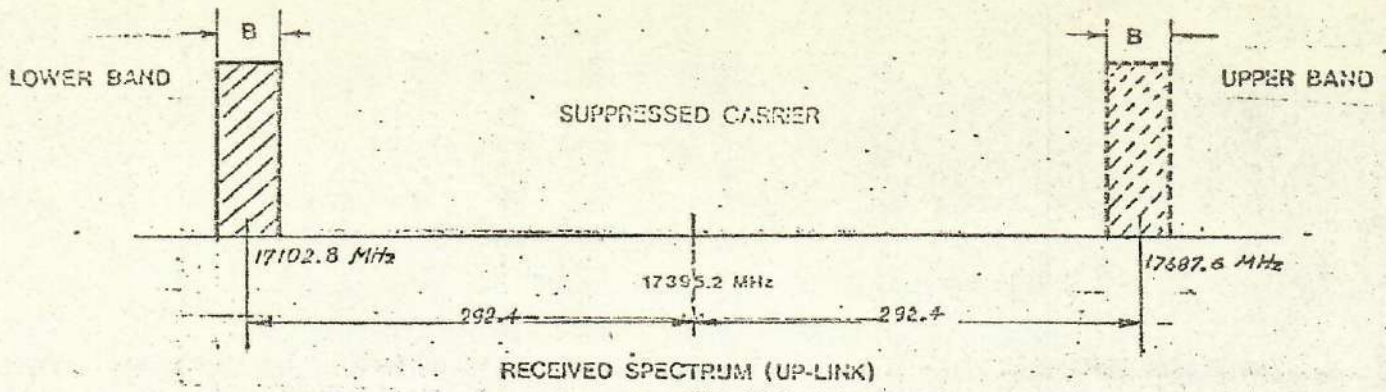
8.9.1976
7

Fig. 2.7-17 HOL-LOCAL OSCILLATOR



Propagation Experiment Spectra.

Fig. 2.7-5



B	TRANSPONDER PWR AT ANTENNA INPUT
NARROW BAND EXPERIMENT! 1.5 MHz!	2.5 W rms
WIDE BAND EXPERIMENT! 35 MHz!	6.0 W rms

TRANSMITTED SPECTRUM (DOWN-LINK)

COMMAND LIST

CMD No.	SUB-SYST.	UNIT	FUNCTIONS	EXECUTE		TLM STATUS
				Hex.	Binary	Channels/Bits/Levels
①	PWS	PCU	Unreg. BUS 1 (Sw. 3) ON Solenoids pwr BUS A & B (Sw. 7, 8) OFF	02-14	0010 1110	151/2 ⁶ /1 - 151/2 ¹ /0 - 146/2 ³ /0
②	PWS	PCU	Unreg. BUS 2 (Sw. 4) ON Solenoids pwr BUS A & B (Sw. 7, 8) OFF	00-15	0000 1111	151/2 ⁴ /1 - 151/2 ¹ /0 - 146/2 ³ /0
③ ☆	PWS	PCU	Unreg. BUS 1 & 2. (Sw. 3, 4) OFF	11-08	1011 1000	151/2 ⁶ /0 - 151/2 ⁴ /0
④	PWS SHF	PCU ACE	Attitude sensor set A (Sw. 1) ON Synchronism from att. sensor A	03-10	0011 1010	151/2 ⁰ /1 - 149/2 ⁴ /1
⑤	PWS SHF	PCU ACE	Attitude sensor set B (Sw. 2) ON Synchronism from att. sensor B	01-14	0001 1110	151/2 ² /1 - 149/2 ⁴ /0
⑥ ☆	PWS	PCU	Attitude sensor set A & B (Sw. 1, 2) OFF Main BUS protection RESET	15-00	1111 0000	151/2 ⁰ /0 - 151/2 ³ /0 - 146/2 ⁶ /0
⑦ ☆	AOC	ACL	Interconnecting valve (IVS) OFF	04-11	0100 1011	150/2 ² /0
⑧ ☆	TCM	TXS	RRR-Tx switch input from BUS 2	11-04	1011 0100	-
⑨	PWS	PCU	Heaters BUS A (Sw. 13) ON	04-13	0100 1101	151/2 ⁷ /1
⑩	SHF	TIU	Prop. interface sect. A ON Prop. receiver A ON	11-02	1011 0010	-
⑪	PWS	PCU	Supply to SHF Exp. BUS 1 (Sw. 5)	04-14	0100 1110	146/2 ⁰ /1
⑫	PWS	PCU	Supply to SHF Exp. BUS 2 (Sw. 5)	11-01	1011 0001	146/2 ⁰ /0
⑬	AOC	ACL	Valve driver relay A (RLA) ON	12-06	1100 0110	147/2 ³ /1
⑭	AOC	ACL	Valve driver relay B (RLB) ON	10-12	1010 1100	147/2 ² /1
⑮ ☆	PWS	PCU	Solenoids pwr BUS A (Sw. 7) ON	04-07	0100 0111	151/2 ¹ /1
⑯ ☆	PWS	PCU	Solenoids pwr BUS B (Sw. 8) ON	05-05	0101 0101	146/2 ³ /1
⑰ ☆	PWS	PCU	Solenoids pwr BUS A & B (Sw. 7, 8) OFF Valve BUS protection RESET	10-10	1010 1010	151/2 ¹ /0 - 146/2 ³ /0 - 146/2 ⁵ /0
⑱	PWS	PCU	Batteries A & B charge (Sw. 10, 11) ON	10-09	1010 1001	146/2 ⁴ /1 - 146/2 ¹ /1
⑲ ☆	PWS	PCU	Battery A charge (Sw. 10) OFF	05-06	0101 0110	146/2 ⁴ /0
⑳ ☆	PWS	PCU	Battery B charge (Sw. 11) OFF	02-07	0010 0111	146/2 ¹ /0
㉑	PWS	PCU	Batteries paralleling (Sw. 9) ON	10-06	1010 0110	151/2 ³ /1
㉒	PWS AOC TCM	PCU IMU EPT	Batteries paralleling (Sw. 9) OFF IMU OFF; EPT OFF	12-03	1100 0011	151/2 ³ /0 - 147/2 ⁷ /1 - 146/2 ⁶ /1
㉓	PWS	VLL	Voltage limiter sect. 1 ON	13-08	1101 1000	146/2 ⁷ /1
㉔	PWS	VLL	Voltage limiter sect. 2 OFF	13-04	1101 0100	162/2 ⁰ /0
㉕	PWS	VLL	Voltage limiter sect. 3 OFF	13-02	1101 0010	162/2 ¹ /0
㉖	PWS	VLL	Voltage limiter sect. 1 OFF	13-01	1101 0001	146/2 ⁷ /0
㉗	SHF	TIU	H.V. pwr PRESET HTW-A filament ON (HTW-B filam. OFF)	12-12	1100 1100	161/2 ⁰ /0 - 161/2 ⁵ /0 - 161/2 ⁶ /1
㉘	SHF	TIU	HRP-B ON and HiP sect. B ON	12-10	1100 1010	-
㉙ ☆	AMS	SBD/A	Squib driver arming A	14-08	1110 1000	162/2 ² /1
㉚ ☆	AMS	SBD/B	Squib driver arming B	14-04	1110 0100	162/2 ⁵ /1
㉛	AMS	SBD/A	Apogee motor FIRE (Sq. A)	02-11	0010 1011	162/2 ⁴ /1
㉜	AMS	SBD/B	Apogee motor FIRE (Sq. B)	02-13	0010 1101	162/2 ⁷ /1
㉝	AMS	SBD/A	Squib driver A DISARMING	01-07	0001 0111	162/2 ² /0
㉞	AMS	SBD/B	Squib driver B DISARMING	01-11	0001 1011	162/2 ⁵ /0
㉟ ☆	TCM	TXS	RRR-Tx switch: input from BUS 1	03-03	0011 0011	-
㊱ ☆	TCM	TXS RRA	TXS on RRA RRR mode RESET (TLM mode)	10-03	1010 0011	- 145/2 ⁰ /0 - 145/2 ¹ /0

ADDRESS: DECODER A (CDA), 13-11 Hex. 1101 1011; DECODER B (CDB), 15-10 Hex. 1111 1010; Binary

COMMAND LIST

CMD No.	SUB-SYSTEM	UNIT	FUNCTIONS	EXECUTE		TLM STATUS
				Hex.	Binary	Channels/Bits/Levels
(37) ☆	TCM	TXS RRB	TXS on RRB RRR mode RESET (TLM mode)	05-12	0101 1100	145/2 ² /0 - 145/2 ³ /0
38	TCM	RRR	RRR mode PRESET	07-08	0111 1000	145/2 ⁰ /1 - 145/2 ¹ /0
39	TCM	ENA	Processor 1 ON/ Processor 2 OFF	07-04	0111 0100	148/2 ⁷ /0
40	TCM	ENA	Processor 2 ON/ Processor 1 OFF	07-02	0111 0010	148/2 ⁷ /1
41 ☆	TCM	ENS	PCM to RRA: ON	07-01	0111 0001	145/2 ⁷ /1
42 ☆	TCM	ENB	PCM to RRA: OFF	06-12	0110 1100	145/2 ⁷ /0
(43)	SHF	TIU	Heaters: REDUCED (4+4W) Sw. 11 Aux. osc. OFF; RF line: NORMAL	03-05	0011 0101	150/2 ⁵ /0 - 152/2 ⁵ /0 - 161/2 ⁴ /0
44	AOC	ACL	ACL 1 ON; Earth sync.: II or IV quadr., III or IV quadr., Pulse train & cont. firing OFF; Ax. jets select. (pulsed firing)	06-10	0110 1010	148/2 ⁰ /0 56 (0 to 100 mV) 141 (0 to 255 ser. dig. ch.)
		FPC	Both ax. jets firing (continuous firing) FPC counter A ON; FPC counter A read by TLM			
45	AOC	ACL	ACL 2 ON; Earth sync.: I or II quadr., II or IV quadr., Pulse train & cont. firing OFF; Ax. jets select. (pulsed firing)	06-09	0110 1001	148/2 ¹ /0 56 (300 to 500 mV) 141 (0 to 255 ser. dig. ch.)
		FPC	Both ax. jets firing (continuous firing) FPC counter B ON; FPC counter B read by TLM			
(46) ☆ ☆	AOC	ACL	ACL 1 & 2 OFF; Stop valve B OFF FPC counters A & B OFF	03-06	0011 0110	148/2 ⁰ /1 - 148/2 ¹ /1 - 150/2 ³ /0
(47)	AOC	ACL	Stop valve A ON; SUN sync. select	14-02	1110 0010	150/2 ⁴ /1
(48)	SHF	TIU	Heaters: FULL (4+16W) Sw. 11 Aux. osc. ON; RF line: AUX. OSC.	14-01	1110 0001	150/2 ⁵ /1 - 152/2 ⁴ /1 - 161/2 ⁶ /1
49 *	AOC	ACL	I or III quadrant select; stop valve A OFF	08-07	1000 0111	150/2 ⁴ /0
50	AOC	ACL	I or II for Logic 1; III or IV for Logic 2 quadr. select. - Stop valve B ON	08-11	1000 1011	150/2 ³ /1
51	AOC	ACL	Interc. valve ON; Radial jet select (Pulsed fir.); single Axial jet (cont. fir.)	08-13	1000 1101	150/2 ² /1
52	AOC	ACL	Single pulse firing	03-14	1000 1110	-
53	AOC	ACL FPC	Pulse train firing Firing pulse counters A & B RESET	09-03	1001 0011	-
54	AOC	ACL	Counter reset	09-05	1001 0101	-
55	AOC	ACL	Continuous firing	09-06	1001 0110	-
(56)	AOC	IMU	Inertial measurement unit ON	03-09	0011 1001	147/2 ⁷ /0
(57)	AOC	ACL FPC	Valve driver relay A & B OFF Axial motor heaters (Sw. 1 FPC) on BUS B	12-09	1100 1001	147/2 ³ /0 - 147/2 ² /0 - 145/2 ⁴ /1
(58) ☆	PWS	PCU TIU FPC	Heaters BUS B (Sw. 12) ON; SHF heater on BUS A (Sw. 17); Axial motor heaters (Sw. 1 FPC) on BUS A	03-12	0011 1100	146/2 ² /1 - 150/2 ⁶ /1 - 145/2 ⁴ /0
(59)	SHF	TIU	Converter: low gain	05-03	0101 0011	149/2 ⁰ /1 ? 0
60	TCM	TBA	Temperature bridges A ON	06-06	0110 0110	147/2 ⁴ /0
61	TCM	TBB	Temperature bridges B ON	06-05	0110 0101	147/2 ⁵ /0
(62)	TCM	TBA TBB	Temperature bridges A & B OFF	01-13	0001 1101	147/2 ⁴ /1 - 147/2 ⁵ /1
(63)	AOC	PSA PSB	Plane sensor A & B ON	05-10	0101 1010	147/2 ⁰ /0 - 147/2 ¹ /0
(64)	AOC	PSA PSB	Plane sensor A & B OFF	10-05	1010 0101	147/2 ⁰ /1 - 147/2 ¹ /1
(65)	PWS	PCU	Heaters BUS A & B (Sw. 12, 13) OFF	12-05	1100 0101	151/2 ⁷ /0 - 146/2 ² /0
(66)	SHF	TIU	SHF heaters on BUS B (Sw. 17)	05-09	0101 1001	150/2 ⁶ /0
67	TCM	EPT	Pressure transd. electronics ON	06-03	0110 0011	148/2 ⁶ /0
68	AOC	CSA	SHF antenna shift RESET	09-09	1001 1001	137 0 reading (serial dig. ch.)
69	AOC	CSB	SHF antenna shift RESET	09-10	1001 1010	137 0 reading (serial dig. ch.)
70	TCM	RRR	RRR mode PRESET	09-12	1001 1100	145/2 ² /1

ADDRESS: DECODER A (CDA) 13-11 Hex. 1101 1011 Binary; DECODER B (CDB) 15-10 Hex. 1111 1010 Binary

COMMAND LIST

CMD No.	SUB-SYSTEM	UNIT	FUNCTIONS	EXECUTE		TLM STATUS
				Hex.	Binary	Channels/Bits/Levels
71 ☆	SHF	TMR	Regulator 1 (Sw. 1) ON Regulator 2 (Sw. 2) OFF	08-07	1000 0111	149/2 ⁵ /1 - 149/2 ⁶ /0
72 ☆	SHF	TMR	Regulator 2 (Sw. 2) ON Regulator 1 (Sw. 1) OFF	07-08	0111 1000	149/2 ⁶ /1 - 149/2 ⁵ /0
73 *	SHF	TMR	Regulators 1 & 2 (Sw. 1,2) OFF Prot. RESET	08-14	1000 1110	149/2 ⁵ /0 - 149/2 ⁶ /0 - 150/2 ⁷ /0
74	SHF	TMR	TMR BUS 1 on Reg. 1 (Sw. 3) TMR BUS 2 on Reg. 2 (Sw. 4)	08-13	1000 1101	-
75	SHF	TMR	TMR BUS 1 on Reg. 2 (Sw. 3)	07-04	0111 0100	-
76	SHF	TMR	TMR BUS 2 on Reg. 1 (Sw. 4)	07-02	0111 0010	-
77	SHF	TMR	TMR on SHF exp. BUS 1 (Sw. 5)	08-11	1000 1011	151/2 ⁵ /1 (eclipse)
78	SHF	TMR	TMR on SHF exp. BUS 2 (Sw. 5)	07-01	0111 0001	151/2 ⁵ /0
79	SHF	ACE	EDA section ON (EDB section OFF) sighting A	09-06	1001 0110	149/2 ¹ /0 - 152/2 ⁷ /1
80	SHF	ACE	EDB section ON (EDA section OFF) sighting A	06-09	0110 1001	149/2 ² /0 - 152/2 ⁷ /1
81	SHF	ACE	EDA and EDB OFF	09-10	1001 1010	149/2 ¹ /1 - 149/2 ² /1
82	PWS	VLL	Voltage limiter section 2 & 3 ON	09-12	1001 1100	162/2 ⁰ /1 - 162/2 ⁴ /1
83	SHF	TIU	HTW-B filam. ON & HTW-A filam. OFF and H.V. pwr PRESET	06-03	0110 0011	161/2 ⁶ /0 - 161/2 ⁵ /1
84	SHF	TIU	TPT on TMR BUS 1 (Sw. 10)	09-03	1001 0011	152/2 ¹ /1
85	SHF	TIU	TPT on TMR BUS 2 (Sw. 10)	06-12	0110 1100	152/2 ¹ /0
86	SHF	TIU	HAP-A aux. BUS (Sw. 8) ON HAP-B aux. BUS (Sw. 9) OFF	09-05	1001 0101	161/2 ⁷ /1 - 152/2 ⁰ /0
87	SHF	TIU	HAP-B aux. BUS (Sw. 9) ON HAP-A aux. BUS (Sw. 8) OFF	06-10	0110 1010	161/2 ⁷ /0 - 151/2 ⁰ /1
88	SHF	TIU	RF lines on HTW-A	09-09	1001 1001	161/2 ² /1
89	SHF	TIU	RF lines on HTW-B	06-06	0110 0110	161/2 ² /0
90	SHF	TIU	HTW-A and HTW-B H.V. and filam. (Sw. 6, 7) OFF	06-05	0110 0101	161/2 ⁰ /0 - 161/2 ¹ /0 161/2 ⁵ /1 - 161/2 ⁶ /1
91	SHF	TIU	IF ALC OFF; reference signal OFF	13-02	1101 1000	161/2 ³ /0 - 152/2 ⁵ /0
92	SHF	TIU	Prop. exp. ON; conv. high gain Comm. exp. OFF; refer. signal ON	13-04	1101 0100	152/2 ² /1 - 149/2 ⁰ /0 152/2 ³ /0 - 152/2 ³ /1
93	SHF	TIU	W.B. comm. exp. ON; conv. high gain Prop. exp. OFF; IF ALC ON	13-02	1101 0010	152/2 ³ /0 - 149/2 ⁰ /0 152/2 ² /0 - 161/2 ³ /1
94	SHF	TIU	P.B. comm. exp. ON; conv. high gain Prop. exp. OFF; IF ALC ON	13-01	1101 0001	152/2 ³ /1 - 149/2 ² /0 152/2 ² /0 - 161/2 ³ /1
95 ☆	SHF	TIU	HTW-A H.V. ON or HTW-B H.V. ON	12-12	1100 1100	161/2 ⁰ /1 - 161/2 ¹ /1
96	SHF	ACE	Antenna sighting B	12-10	1100 1010	152/2 ⁷ /0
97	SHF	HOL	L.O. selection (sequential)	12-09	1100 1001	-
98	SHF	HOL	Multiplier chain selection (sequential)	12-06	1100 0110	-
99	AOC	CSA	SHF antenna shift set (sequential)	12-05	1100 0101	i 137 depending on the actual shift
100	AOC	CSB	SHF antenna shift set (sequential)	12-03	1100 0011	i 137 depending on the actual shift

NOTES: CHANNELS MARKED ○ ARE HIGH LEVEL CHANNELS
 CHANNELS NOT MARKED ARE LOW LEVEL CHANNELS
 ☆ CRITICAL COMMAND
 * PRIORITY COMMAND

ANALOG TELEMETRY CHANNELS

sheet 1 of 4

TLM ch.	Word No	Frame No	SPS	Level	UNIT	TAG	MEASUREMENT	Ranges	CAL. FIB	OPERATION LIMITS			Accur. %
										Measur.	Sensor	BCD accur. incl'd	
1	17	0,8	1/8	HL	PCU	AV1 ₀	MAIN BUS VOLTAGE	0 + 40V	27	23 + 32V	2,87 + 4V	139+205	±2
2	17	1,9	"	"	"	"	SPARE						
3	17	2,1	"	"	PCU	AV2	BATTERY A VOLTAGE	0 + 40V	27	23 + 35V	2,87 + 4,37	139+224	±2
4	17	3,11	"	"	"	AV3	BATTERY B VOLTAGE	" "	27	" "	" "	" "	" "
5	17	4,12	"	"	"	AV4	BATTERY A & B VOLT.	" "	27	22 + 34V	2,75 + 4,25	132+218	"
6	17	5,13	"	"	VLL	AV5	VOLT. LIMITER VOLT.	0 + 15V	28	0 + 10V	0+3,33V	0 + 172	"
7	17	6,14	"	"	RRA	DV1	Tx REGULATED VOLT.	0 + 30V	-	20,6 + 21,4V	3,43 + 3,57	156+182	"
8	17	7,15	"	"	RRB	DV2	Tx REGULATED VOLT.	" "	-	20,1 + 21,1	3,35 + 3,51	162 + 181	"
9	18	0,8	"	"	TBA	DV3	REG. SUPPLY VOLT.	" "	-	16,7 + 17,3V	2,83 + 2,91	139 + 148	±1
10	18	1,9	"	"	TBB	DV4	REG. SUPPLY VOLT.	" "	-	" "	" "	" "	" "
11	18	2,1	"	"	EPT	DV5	SUPPLY VOLT. to AMPL.	0 + 39,1V	-	17,7 + 18,3	2,33 + 2,4	114 + 123	±1
12	18	3,11	"	"	EPT	DV6	SUPPLY VOLT. to TRANSD.	0 + 20V	-	9,8 + 10,2	2,46 + 2,53	120 + 129	"
13	18	4,12	"	"	RRA	DV7	Rx REGULATED VOLT.	0 + 30V		16,8 + 17,4V	2,8 + 2,9	135 + 150	±2
14	18	5,13	"	"	RRB	DV8	Rx REGULATED VOLT.	" "		" "	" "	" "	" "
15	18	6,14	"	"	TKA TKC	CP1	TANKS A & C PRESS.	0 + 35 kg/cm ²	7	8 + 25 kg/cm ²	1,14 + 3,57 V	44 + 491	±5
16	18	7,15	"	"	TKB TKD	CP2	TANKS B & D PRESS.	" "	7	" "	" "	" "	" "
17	19	0,8	"	"	HAP A/B	FI1	TWT HELIX CURR.		19				
18	19	1,9	"	"	"	FI2	TWT COLLECT CURR.	5,7 + 53 mA	16				
19	19	2,1	"	"	"	FI4	INPUT CURR.	0 + 3 A	15				
20	19	3,11	"	"	HAP A	FT13	TWT/A TEMPERATURE	-27 + 60°C	22				
21	19	4,12	"	"	HAP B	FT14	TWT/B TEMPERATURE	" "	22				
22	19	5,13	"	"	HAP A	FT15	TWT/A pwr supply TEMP. 1	-20 + 80°C	22				
23	19	6,14	"	"	"	FT16	TWT/A pwr supply TEMP. 2	" "	22				
24	19	7,15	"	"	HAP B	FT17	TWT/B pwr supply TEMP. 1	" "	22				
25	49	0,8	"	"	"	FT18	TWT/B pwr supply TEMP. 2	" "	22				
26	49	1,9	"	"	TMR	FT8	CASE TEMP. 2	-20 + 60°C	14				
27	49	2,1	"	"	ACE	FT9	EDA section TEMP.	-29 + 60°C	9				
28	49	3,11	"	"	"	FT10	EDB section TEMP.	" "	9				
29	49	4,12	"	"	"	FT11	DESPIN MOTOR TEMP. 1	" "	9				
30	49	5,13	"	"	"	FT12	DESPIN MOTOR TEMP. 2	" "	9				
31	49	6,14	"	"	TMR	FT4	CASE TEMP. 1	-20 + 60°C	14				
32	49	7,15	"	"	ACE	FX1	SIGHT ERROR ψ	-0,5° - 0,5°	10				
33	50	0,8	"	"	"	FX4	SPIN RATE ω	50 + 110 rpm	12				
34	50	1,9	"	"	TMR	FV1	BUS1 OUTPUT VOLT.	0 + 25V	23				±3
35	50	2,1	"	"	"	FV2	BUS2 OUTPUT VOLT.	" "	23				"
* 36	50	3,11	"	"	HOL	FX3	XTAL OSC. 1 ON/OFF	0 + 5V	-	0. Level: 0 + 400mV 1. Level: 35 + 5V	OFF ON		-
* 37	50	4,12	"	"	"	FX5	XTAL OSC. 2 ON/OFF	" "	-	" "	" "		
* 38	50	5,13	"	"	"	FX6	MULTIPLIER 1 ON/OFF	" "	-	" "	" "		

Nov. 1976

93

NOTE: HOUSEKEEPING VOLTAGE, OR ANYWAY MEANINGFUL CHANNEL.
* ANALOG CHANNEL UTILIZED AS STATUS CHANNEL

ANALOG TELEMETRY CHANNELS

sheet 2 of 4

TLM ch.	Word No	Frame No	SPS	Level	UNIT	TAG	MEASUREMENT	Ranges	CAL. FIG.	OPERATION LIMITS			Accur.
										Measur.	Sensor	BCD accur. incl'd	
*30	50	0,14	1/8	HL	HOL	FX7	MULTIPLIER 2 ON/OFF	0 ÷ 5V	-	0 Level: 0 ÷ 400 mV 1 Level: 35 ÷ 6V	OFF		
*40	50	7,15	»	»	»	FX8	VCXO LOCK/UNLOCK	» »	-	0 Level: 0 ÷ 600 mV 1 Level: 35 ÷ 5V	LOCK	UNLOCK	
41	51	0,8	»	»	IMU	CV3	REGULATED VOLT.	0 ÷ 24 V	-	18 ÷ 20V	3,75 ÷ 4,16V	105 ÷ 211	±1
42	51	1,9	»	»	CDA	DV11	DECODER A REG. VOLT.	0 ÷ 40V	-	19,2 ÷ 20,3 V	2,4 ÷ 2,5 V	115 ÷ 122	±2
43	51	2,10	»	»	CDB	DV12	DECODER B REG. VOLT.	» »	-	» »	» »	» »	»
44	51	3,11	»	»	-	-	SPARE						
45	51	4,12	»	»	ENA	DV13	HL AUTOCHECK CH. Low value	0 ÷ 5V	-	520 ÷ 533 mV	520 ÷ 533 mV	23 ÷ 29	±1
46	51	5,13	»	»	»	DV14	HL AUTOCHECK CH. Low value -1bit	» »	-	497 ÷ 511 mV	497 ÷ 511 mV	22 ÷ 28	»
47	51	6,14	»	»	»	DV15	HL AUTOCHECK CH. High value	» »	-	425 ÷ 435 V	425 ÷ 435 V	218 ÷ 229	»
48	51	7,15	»	»	»	DV16	HL AUTOCHECK CH. High value -1bit	» »	-	405 ÷ 450 V	405 ÷ 450 V	217 ÷ 228	»
49	20	0,8	»	ML	ACL	CV1	LOGIC 1 REG. VOLT.	0 ÷ 10 V	-	4,5 ÷ 5,5 V	2,25 ÷ 2,75	107 ÷ 143	±2
50	20	1,9	»	»	»	CV2	LOGIC 2 REG. VOLT.	» »	-	» »	» »	» »	»
51	20	2,10	»	»	PCU	A11	BATT. A CHARGE CURR.	0 ÷ 0,4 A	29	0 ÷ 250 mA	0 ÷ 312,5 mV	0 ÷ 169	±5
52	20	3,11	»	»	»	A12	BATT. B CHARGE CURR.	» »	29	» »	» »	» »	»
53	20	4,12	»	»	»	A13	BATT. A DISCH. CURR.	0 ÷ 6 A	30	0 ÷ 3 A	0 ÷ 250 mV	0 ÷ 138	»
54	20	5,13	»	»	»	A14	BATT. B DISCH. CURR.	» »	30	» »	» »	» »	»
55	20	6,14	»	»	»	A15	MAIN BUS CURRENT	0 ÷ 0,5 A	31	0,3 ÷ 3 A	23 ÷ 231 mV	0 ÷ 128	»
56	20	7,15	»	»	FPC	CX23	FIRING COUNTER SELECTOR STATUS A/B			A = (0 ÷ 100 mV) B = (300 ÷ 500 mV)			
57	21	0,8	»	»	HOL	FW1	OUT. pwr 362,4 MHz						
58	21	1,9	»	»	»	FW2	OUT. pwr 120,8 MHz						
59	21	2,10	»	»	HMO	FI12	MOD. DIODE 2 CURR.						
60	21	3,11	»	»	HOL	FW3	OUT. pwr 386,56 MHz						
61	21	4,12	»	»	»	FT6	LOC. OSC. TEMP.	-20 ÷ 70°C					
62	21	5,13	»	»	»	FV3	VCXO VOLTAGE						
63	21	6,14	»	»	HAP A	FI3	TWT-A FILAMENT CURR.		17				
64	21	7,15	»	»	HAP B	FI6	TWT-B FILAMENT CURR.		17				
65	28	0,8	»	»	HGN	FI7	DIODES CURR.	0 ÷ 2 mA	18				
66	28	1,9	»	»	»	FT5	CONVERTER TEMP.		21				
67	28	2,10	»	»	HRC	FT7	COMM. RECEIVER TEMP.		20				
68	28	3,11	»	»	»	FL3	COMM. RECEIVER GAIN						
69	28	4,12	»	»	HMO	FW4	OUT. pwr 70 MHz						
70	28	5,13	»	»	»	FI5	MOD. DIODE 1 CURR.						
71	28	6,14	»	»	HBR	FW5	TWT OUT. pwr		25				
72	28	7,15	»	»	HIP	FW6	DETECT. pwr 265 MHz						
73	29	0,8	»	»	TMR	FI10	INPUT CURR. 1	0 ÷ 4 A	8				±5
74	29	1,9	»	»	»	FI11	INPUT CURR. 2	» »	8				
75	29	2,10	»	»	ACE	FI8	MOTOR PHASE 1 CURR.	40 ÷ 250 mA	13				
76	29	3,11	»	»	-	-	SPARE						

Nov. 1976

93

NOTE: * ANALOG CHANNEL UTILIZED AS STATUS CHANNEL

ANALOG TELEMETRY CHANNELS

sheet 3 of 4

TLM ch.	Word No	Frame No	SPS	Level	UNIT	TAG	MEASUREMENT	Ranges	CAL. FIG.	OPERATION LIMITS			ACCUR.
										Measur.	Sensor	BCD accur. incl'd	
77	29	4,12	1/8	ML			SPARE						
78	29	5,13	"	"			"						
79	29	6,14	"	"			"						
80	29	7,15	"	"			"						
81	30	0,8	"	"	RRA	DW1	Tx OUTPUT POWER	0+10W	35	55+88W	352+410 mV	176+210	+2
82	30	1,9	"	"	RRB	DW2	" " "	" "	36	55+67W	362+400 mV	176+205	"
83	30	2,10	"	"	ENA	DI1	PROCESSOR 1 CURR.	0+0,5A	-	145+180 mA	145+180 mV	67+85	"
84	30	3,11	"	"	"	DI2	PROCESSOR 2 CURR.	" "	-	" "	" "	" "	"
85	30	4,12	"	"	"	DV17	ML AUTOCHECK CH. Low value	0+500 mV	-	54+57 mV	54+57 mV	24+31	+1
86	30	5,13	"	"	"	DV18	ML AUTOCHECK CH. Low value-1bit	" "	-	52+55 mV	52+55 mV	23+30	"
87	30	6,14	"	"	"	DV19	ML AUTOCHECK CH. High value	" "	-	445+467 mV	445+467 mV	220+238	"
88	30	7,15	"	"	"	DV20	ML AUTOCHECK CH. High value-1bit	" "	-	443+465 mV	443+465 mV	219+235	"
89	52	0,8	"	"	SPD	AT1	SOLAR PANEL D TEMP	0+50°C	1	0+30°C	0+300 mV	0+155	+2
90	52	1,9	"	"	"	AT2	" " " "	-100+100°C	4	-70+30°C	75+325 mV	32+168	"
91	52	2,10	"	"	"	AT6	" " " "	" "	4	" "	" "	" "	"
92	52	3,11	"	"	BTA	AT7	BATTERY A TEMP.	-20+80°C	2	-5+25°C	75+225 mV	32+118	"
93	52	4,12	"	"	SPD	AT3	SOLAR PANEL D TEMP	0+50°C	1	0+30°C	0+300 mV	0+155	"
94	52	5,13	"	"	"	AT4	" " " "	-100+100°C	4	-70+30°C	75+325 mV	32+168	"
95	52	6,14	"	"	"	AT5	" " " "	0+50°C	1	0+30°C	0+300 mV	0+155	"
96	52	7,15	"	"	BTA	AT8	BATTERY A TEMP.	20+80°C	2	-5+25°C	75+225 mV	32+118	"
97	53	0,8	"	"	BTB	AT9	" B "	" "	"	" "	" "	" "	"
98	53	1,9	"	"	RRA	DT1	Tx TEMPERATURE	" "	"	-10+60°C	50+400 mV	20+205	"
99	53	2,10	"	"	VLL	AT11	VOLT. LIMITER TEMP.	" "	"	-10+70°C	50+450 mV	20+230	"
100	53	3,11	"	"	TRB	CT16	RAD. JET B VALVE TEMP.	-5+120°C	2a	5+40°C	40+180 mV	15+95	"
101	53	4,12	"	"	BTB	AT10	BATTERY B TEMP.	-20+80°C	2	-5+25°C	75+225 mV	32+118	"
102	53	5,13	"	"	ACL	CT5	CONTROL LOGIC TEMP.	" "	"	-10+50°C	50+350 mV	20+160	"
103	53	6,14	"	"	RRB	DT2	Tx TEMPERATURE	" "	"	-10+60°C	50+400 mV	20+205	"
104	53	7,15	"	"	IMU	CT6	INERTIAL PACK TEMP.	" "	"	-10+50°C	50+350 mV	20+180	"
105	54	0,8	"	"	PSA	CT1	ILF SENSOR TEMP.	" "	"	0+35°C	100+275 mV	45+183	"
106	54	1,9	"	"	APS	CT18	AX. JET A TUBING TEMP.	-50+80°C	3	5+40°C	211+346 mV	100+178	"
107	54	2,10	"	"	CSA	CT2	INF SENSOR TEMP.	-20+80°C	2	0+35°C	100+275 mV	45+143	"
108	54	3,11	"	"	IAB	CT17	AX. JET B VALVE TEMP.	-5+120°C	2a	5+40°C	40+180 mV	15+95	"
109	54	4,12	"	"	PSB	CT3	ILF SENSOR TEMP.	-20+80°C	2	0+35°C	100+275 mV	45+143	"
110	54	5,13	"	"	APS	CT19	AX. JET B TUBING TEMP.	-50+80°C	3	0+35°C	192+327 mV	91+169	"
111	54	6,14	"	"	CSB	CT4	INF SENSOR TEMP.	-20+80°C	2	0+35°C	100+275 mV	45+143	"
112	54	7,15	"	"	ABM	BT4	APOGEE MOTOR TEMP.	-50+200°C	5	10+150°C	120+400 mV	55+205	"
113	60	0,8	"	"	-	ST5	MAIN PLATFORM TEMP.	-50+80°C	3	-10+50°C	153+385 mV	72+197	"
114	60	1,9	"	"	TRA	CT20	RAD. JET A VALVE TEMP.	-5+120°C	2a	5+40°C	40+180 mV	15+95	"

NOTE: HOUSEKEEPING VOLTAGE, OR ANYWAY MEANINGFUL, CHANNEL.

Nov. 1976
93

ANALOG TELEMETRY CHANNELS

sheet 4 of 4

TLM ch.	Word No	Frame No	SPS	Level	UNIT	TAG	MEASUREMENT	Ranges	CAL. FIG.	OPERATION LIMITS			Accur. %
										Measur.	Sensor	BCD accur. incl'd	
115	60	2,10	1/8	ML	-	ST7	AUX. PLATFORM TEMP.	-50+80°C	3	-10+50°C	133+385 mV	72+197	+2
116	60	3,11	"	"	-	ST8	SHF PLATFORM TEMP. (near HCF)	-50+80°C	3	0+50°C	192+385 mV	91+197	"
117	60	4,12	"	"	ABM	BT5	APOGEE MOTOR TEMP.	-50+200°C	5	10+150°C	120+400 mV	55+205	"
118	60	5,13	"	"	"	BT6	" " "	" " "	" " "	" " "	" " "	" " "	"
119	60	6,14	"	"	"	BT1	NOZZLE TEMP.	-100+500°C	6a	-60+480°C	33+483 mV	11+247	"
120	60	7,15	"	"	"	BT2	" " "	" " "	" " "	" " "	" " "	" " "	"
121	61	0,8	"	"	-	ST9	DESPIN MOTOR TEMP. (Flange)	-50+80°C	3	-15+50°C	134+385 mV	62+197	"
122	61	1,9	"	"	TAA	CT15	AX. JET A VALVE TEMP.	-5+120°C	2a	5+40°C	40+180 mV	15+95	"
123	61	2,10	"	"	AP5	CT7	TUBING TEMP. (Main platform)	-20+80°C	2	5+40°C	125+300 mV	57+155	"
124	61	3,11	"	"	TKB	CT8	TANK TEMP.	" " "	" " "	" " "	" " "	" " "	"
125	61	4,12	"	"	ABM	BT3	NOZZLE TEMP.	-100+500°C	6a	60+480°C	33+483 mV	11+247	"
126	61	5,13	"	"	-	ST10	SHF PLATFORM TEMP. (near HOL)	-50+80°C	3	0+50°C	192+385 mV	91+197	"
127	61	6,14	"	"	AP5	CT9	TUBING TEMP. (Main platform)	-20+80°C	2	5+40°C	125+300 mV	57+155	"
128	61	7,15	"	"	TKA	CT10	TANK TEMP.	" " "	" " "	" " "	" " "	" " "	"
129	62	0,8	"	"	TAA	CT11	AX. JET A MOTOR TEMP.	-100+1000°C	6	50+850°C	63+432 mV	29+221	"
130	62	1,9	"	"	PCU	AT12	PCU NODAL TEMP. Battery A disch. control	-20+80°C	2	-10+50°C	50+350 mV	20+180	"
131	62	2,10	"	"	TRA	CT12	RAD. JET A MOTOR TEMP.	-100+1000°C	6	15+850°C	52+432 mV	21+221	"
132	62	3,11	"	"	ENA	DT4	ENA NODAL TEMP.	-20+80°C	2	-10+50°C	50+350 mV	20+180	"
133	62	4,12	"	"	TAB	CT13	AX. JET B MOTOR TEMP.	-100+1000°C	6	50+850°C	63+432 mV	29+221	"
134	62	5,13	"	"	PCU	AT13	PCU NODAL TEMP. Battery B disch. control	-20+80°C	2	-10+50°C	50+350 mV	20+180	"
135	62	6,14	"	"	TRB	CT14	RAD. JET B MOTOR TEMP.	-100+1000°C	6	15+850°C	52+432 mV	21+221	"
136	62	7,15	"	"	ENA	DT5	ENA NODAL TEMP.	-20+80°C	2	-10+50°C	50+350 mV	20+180	"
from 137 to 163 see DIGITAL and TIME CHANNELS													
154	22	ALL	1/1	ML	ACE	FI9	DESPIN MOTOR CURR. (Phase 2)	40+260 mA	13				
155	9.41	"	2/1	HL	CDA	DV9a	REG. VOLT. (Pulse)	0+10V	-	4.4+5.6V	2.2+2.8V	105+145	+2
156	10.42	"	"	"	CDB	DV10a	" " "	" " "	" " "	" " "	" " "	" " "	"
157	11.43	"	"	"	RRA	DL1	AGC VOLT (Rx side)	0+15V	37				+1
158	16.48	"	"	"	RRB	DL2	" " "	" " "	38				"
159	25.57	"	"	"	CDA	DV9b	REG. VOLT. (Pulse)	0+10V	-	4.4+5.6V	2.2+2.8V	105+145	+2
170	26.58	"	"	"	CDB	DV10b	" " "	" " "	" " "	" " "	" " "	" " "	"
171	27.59	"	"	"	ABM	BP1	APOGEE MOTOR PRESS	0+50 Kg/cm ²	7a	0+36 Kg/cm ²	0+3.6 V	0+193	+5
172	8.40	"	"	"	ACE	FX2	DESPIN MOTOR TACH.	50+110 RPM	11				
173	24.56	"	"	"	PCU	AV1b	MAIN BUS VOLTAGE	0+40 V	27	23+32 V	2.8+4 V	139+205	+2
174	12.44	"	"	ML	IMU	CA1	INERTIAL PACK. ACCEL. (Nutat. & Aux. Prop. Accel.)	0+0.25 g's	32	0+0.25 g	0+500 mV	0+255	+1
175	13.45	"	"	"	IMU	CA2	INERTIAL PACK. ACCEL. (3 rd stage & ABM accel.)	0+15 g's	33	0+15 g	" " "	" " "	"
176	14.46	"	"	"	PCU	A16	SOLENOID VALVE CURR.	0+3.5 A	34	0+2 A	0+285 mV	0+156	+5
177	7.23 39.55 15.31	"	4/1	"	HRP A	FL1	AGC LEVEL.		24				
178	47.63	"	"	"	HRP B	FL2	" " "		24				

NOTE:

Nov. 1976

3

DIGITAL TELEMETRY CHANNELS

Sheet 1 of 2

TLM ch.	Word No	Frame No	SPS	BIT	UNIT	SENSOR TAG	MEASUREMENT	TLM INPUT	DECOMM. Q ₁ LEVEL
137	5	all	1/1	-	CSA CSB	CX21	SYNC. SHIFT A (CSA Processor 1) SYNC. SHIFT B (CSB Processor 2)	2 nd Type ch.	
141	6	all	1/1	-	FPC	CX22	FIRING COUNTER A or B with Processor 1 & 2	"	
145 **	37	0 4 8 12	1/4	2 ⁰	RRA	DS11	PRESET/RESET	"	RESET
				2 ¹	RRA	DS12	RRR/TLM MODE	"	TLM MODE
				2 ²	R RB	DS13	PRESET/RESET	"	RESET
				2 ³	R RB	DS14	RRR/TLM MODE	"	TLM MODE
				2 ⁴	FPC	CS16	SWITCH 1 on BUS A/B	"	BUS A
				2 ⁵	ENB	DS7	ENCODER-INTERN. OSC. CHECK #1	"	Proc. 1 ON & Back-up osc
				2 ⁶	ENB	DS8	ENCODER-INTERN. OSC. CHECK #2	"	Proc. 2 ON & Back-up osc
				2 ⁷	ENB	DS9	PCM to RRA ON/OFF	"	OFF
146 **	37	1 5 9 13	1/4	2 ⁰	PCU	AS5	SHF EXP. BUS 1/2 RELAY (Sw.5)	1 st Type ch.	BUS2
				2 ¹	PCU	AS11	BATTERY B CHARGE RELAY (Sw.11)	"	OFF
				2 ²	PCU	AS12	HEATERS BUS B RELAY (Sw.12)	"	OFF
				2 ³	PCU	AS8	SOLENOIDS BUS B RELAY (Sw.8)	"	OFF
				2 ⁴	PCU	AS10	BATTERY A CHARGE RELAY (Sw.10)	"	OFF
				2 ⁵	PCU	AS15	SOLENOIDS PROTECT.	"	RESET
				2 ⁶	PCU	AS14	MAIN BUS PROTECT.	"	RESET
				2 ⁷	VLL	AS16	VOLTAGE LIMITER-RELAY 1 STATUS	"	OFF
147 **	37	2 5 10 14	1/4	2 ⁰	P5A	CS1	PLANE ATT. SENS.A ON/OFF	"	ON
				2 ¹	P5B	CS2	PLANE ATT. SENS.B ON/OFF	"	ON
				2 ²	ACL	CS11	VALVE DRIVER RELAY B STATUS	"	OFF
				2 ³	ACL	CS12	VALVE DRIVER RELAY A STATUS	"	OFF
				2 ⁴	TBA	DS1	TEMP. BRIDGES A ON/OFF	"	ON
				2 ⁵	TBB	DS2	TEMP. BRIDGES B ON/OFF	"	ON
				2 ⁶	IMU	CS3	INERTIAL PACK-ACCELERATION SIGN	"	POSITIVE ACC.
				2 ⁷	IMU	CS4	INERTIAL PACK-ON/OFF	"	ON
148 **	37	3 7 11 15	1/4	2 ⁰	ACL	CS5	CONTROL LOGIC1 ON/OFF	"	ON
				2 ¹	ACL	CS6	CONTROL LOGIC2 ON/OFF	"	ON
				2 ²	ACL	CS7	(ACL1) AXIAL A (TAA) DRIVER ON/OFF	"	ON
				2 ³	ACL	CS8	(ACL1) AXIAL B (TAB) DRIVER ON/OFF	"	ON
				2 ⁴	ACL	CS9	(ACL2) AXIAL A (TAA) DRIVER ON/OFF	"	ON
				2 ⁵	ACL	CS10	(ACL2) AXIAL B (TAB) DRIVER ON/OFF	"	ON
				2 ⁶	EPT	DS10	PRESSURE TRANSDUCERS ELECT. ON/OFF	"	ON
				2 ⁷	ENA	DS6	PROCESSOR 1 ON/OFF ; PROCESSOR 2 ON/OFF	"	PROC. 1 ON 2 OFF
149 **	38	0 4 8 12	1/4	2 ⁰	TIU	FS29	CONVERTER GAIN HIGH/LOW	2 nd Type ch.	HIGH
				2 ¹	ACE	FS17	ELECT. DESPIN ANTENNA SECT.A ON/OFF	"	ON
				2 ²	ACE	FS18	ELECT. DESPIN ANTENNA SECT.B ON/OFF	"	ON
				2 ³	ACE	FS13	EDA/EDB SECT.	"	EDB
				2 ⁴	ACE	FS19	IR SYNC. CSA/CSB	"	CSB
				2 ⁵	TMR	FS21	REG. 1 ON/OFF	"	OFF
				2 ⁶	TMR	FS22	REG. 2 ON/OFF	"	OFF
				2 ⁷	HRP	FS28	PROPAGATION RECEIVER A/B	"	A B

NOTE: □ = Decomm. 1 Level: PROC. 1 ON & Main Osc.; or PROC. 1 OFF
 □□ = Decomm. 1 Level: PROC. 2 ON & Main Osc.; or PROC. 2 OFF

Nov. 1976

93

DIGITAL TELEMETRY CHANNELS

Sheet 2 of 2

TLM ch.	Word No	Frame No	SPS	BIT	UNIT	SENSOR TAG	MEASUREMENT	TLM INPUT	DECOMM. 'O. LEVEL
150 ***	38	1 5 9 13	1/4	2 ⁰	RR A	DS3	RANGE & RANGE RATE A Tx SECT. ON/OFF	1 st Type ch.	ON
				2 ¹	RR B	DS4	RANGE & RANGE RATE B Tx SECT. ON/OFF	"	ON
				2 ²	AP5	CS13	INTERCONNECT VALVE STATUS	"	ON
				2 ³	AP5	CS14	STOP VALVE B STATUS	"	ON
				2 ⁴	AP5	CS15	STOP VALVE A STATUS	"	ON
				2 ⁵	TIU	FS23	HEATING HIGH/LOW	1 st Type ch.	LOW
				2 ⁶	TIU	FS24	HEATERS BUS A/B	"	B
				2 ⁷	TMR	FS25	UNDER VOLT. PROTEC.: ALARM/RESET	"	RESET
151 **	38	2 8 10 14	1/4	2 ⁰	PCU	AS1	ATT. SENS. A BUS RELAY	"	OFF
				2 ¹	PCU	AS7	SOLENOIDS BUS A RELAY	"	OFF
				2 ²	PCU	AS2	ATT. SENS. B BUS RELAY	"	OFF
				2 ³	PCU	AS9	BATT. A&B PARALL. RELAY	"	OFF
				2 ⁴	PCU	AS4	BUS 2 RELAY	"	OFF
				2 ⁵	TMR	FS26	SHF EXP. BUS1 MONITOR	"	OFF
				2 ⁶	PCU	AS3	BUS1 RELAY	"	OFF
				2 ⁷	PCU	AS13	HEATERS BUS A RELAY	"	OFF
152 **	38	3 7 11 15	1/4	2 ⁰	TIU	FS6	HAF-B AUX. BUS ON/OFF	2 nd Type ch.	OFF
				2 ¹	TIU	FS10	BUS TMR1/TMR2	"	TMR2
				2 ²	TIU	FS14	PROPAG. EXP. ON/OFF	"	OFF
				2 ³	TIU	FS15	COMMUNIC. EXP. ON/OFF	"	OFF
				2 ⁴	TIU	FS16	COMMUNIC. EXP. NARROW/WIDE BAND	"	WIDE BAND
				2 ⁵	TIU	FS11	REFERENCE SIGNAL ON/OFF	"	OFF
				2 ⁶	TIU	FS12	AUX. OSCILLATOR ON/OFF	"	OFF
				2 ⁷	ACE	FS20	SIGHTING A/B	"	B
161 **	36	0 2 4 6 8 10 12 14	1/2	2 ⁰	HAP A	FS1	TWT A H.V. ON/OFF	"	OFF
				2 ¹	HAP B	FS2	TWT B H.V. ON/OFF	"	OFF
				2 ²	TIU	FS8	RF LINES: TWT A/TWT B	"	TWT B
				2 ³	TIU	FS9	IF ALC ON/OFF	"	OFF
				2 ⁴	TIU	FS7	RF LINES: NORMAL/AUX.OSC.	"	NORMAL
				2 ⁵	TIU	FS3	TWT A FILAMENT ON/OFF	"	ON
				2 ⁶	TIU	FS4	TWT B FILAMENT ON/OFF	"	ON
				2 ⁷	TIU	FS5	HAP-A AUX. BUS ON/OFF	"	OFF
				2 ⁰	VLL	AS17	VOLT. LIMITER RELAY 2 STATUS	1 st Type ch.	OFF
				2 ¹	VLL	AS18	VOLT. LIMITER RELAY 3 STATUS	"	OFF
162 **	36	5 7 9 11 13 15	1/2	2 ²	SBD	BS1	SQUIB DRIVER A ARMED/DISARMED	"	DISARMED
				2 ³	SBD	BS2	SQUIB DRIVER A OUTPUT VOLT. { YES NO	"	YES
				2 ⁴	SBD	BS3	SQUIB DRIVER A FIRING IF ARM. { YES NO	"	BEFORE FIRE A IF ARMED (NO) DISARMED
				2 ⁵	SBD	BS4	SQUIB DRIVER B ARMED/DISARMED	"	DISARMED
				2 ⁶	SBD	BS5	SQUIB DRIVER B OUTPUT VOLT. { YES NO	"	YES
				2 ⁷	SBD	BS6	SQUIB DRIVER B FIRING IF ARM. { YES NO	"	BEFORE FIRE A IF ARMED (NO)

Nov. 1976

NOTE

Δ: yes for level 1

*: 8 BIT SERIAL DIGITAL CHANNEL

***: PARALLEL DIGITAL CHANNEL

5

16-bit TIME & EVENT TELEMETRY CHANNELS

TLM ch.	Word	Channel sampling rate (pps)	Frame	Input SPS	UNIT	SENSOR TAG	MEASUREMENT	OPERATION LIMITS		
								MIN. msec.	MAX. msec.	
153 & 154	32 & 33	1/2	Counter No. 1 (subcomm on 8 input)	3	1/15	ACL	CX13	A ₁ AXIAL JET A (TAA) PULSE LENGTH	0	250
				5	"	PSA	CX1	α_1^A SUN to EARTH IN DIHED. ANGLE	0	1000
				7	"	ACL	CX15	R ₂ RADIAL JET B (TRB) PULSE LENGTH	0	250
				9	"	CSA	CX7	β_1^A EARTH COLATITUDE (telescope 1)	0	500
				11	"	CSA	CX9	θ^A SUN COLATITUDE	0	250
				13	"	PSB	CX4	α_1^B SUN to EARTH IN DIHED. ANGLE	0	1000
				15	"	PSB	CX6	ω^B S/C SPIN PERIOD	0	1000
155 & 156	34 & 35	1/2	Counter No. 2 (subcomm on 8 input)	1	"	CSB	CX10	β_1^B EARTH COLATITUDE (telescope 1)	0	500
				3	"	ACL	CX15	R ₁ RADIAL JET A (TRA) PULSE LENGTH	0	250
				5	"	PSA	CX2	α_2^A SUN to EARTH-OUT DIHED. ANGLE	0	1000
				7	"	ACL	CX14	A ₂ AXIAL JET B (TAB) PULSE LENGTH	0	250
				9	"	CSA	CX8	β_2^A EARTH COLATITUDE (telescope 2)	0	500
				11	"	CSB	CX12	θ^B SUN COLATITUDE	0	250
				13	"	PSB	CX5	α_2^B SUN to EARTH-OUT DIHED. ANGLE	0	1000
157 & 158	32 & 33	1/2	Counter No. 3 (subcomm on 8 input)	15	"	PSA	CX3	ω^A S/C SPIN PERIOD	0	1000
				1	"	CSB	CX11	β_2^B EARTH COLATITUDE (telescope 2)	0	500
				2	"	CSB	CX12	θ^B SUN COLATITUDE	0	250
				4	"	PSB	CX4	α_1^B SUN to EARTH IN DIHED. ANGLE	0	1000
				6	"	PSA	CX3	ω^A S/C SPIN PERIOD	0	1000
				8	"	CSB	CX10	β_1^B EARTH COLATITUDE (telescope 1)	0	500
				10	"	PSA	CX19	E ^A PSA SUN EVENT	0	1000
159 & 160	34 & 35	1/2	Counter No. 4 (subcomm on 8 input)	12	"	PSA	CX1	α_1^A SUN to EARTH IN DIHED. ANGLE	0	1000
				14	"	ACL	CX17	P ₁ PULSE PHASE L1	0	1000
				0	"	CSA	CX7	β_1^A EARTH COLATITUDE (telescope 1)	0	500
				2	"	CSA	CX9	θ^A SUN COLATITUDE	0	250
				4	"	PSB	CX5	α_2^B SUN to EARTH-OUT DIHED. ANGLE	0	1000
				6	"	PSB	CX6	ω^B S/C SPIN PERIOD	0	1000
				8	"	CSB	CX11	β_2^B EARTH COLATITUDE (telescope 2)	0	500
163	4	1/4	ALL	TIMING CHANNEL (see Fig. 4.1-2)					0	1000
									0	1000
									0	500

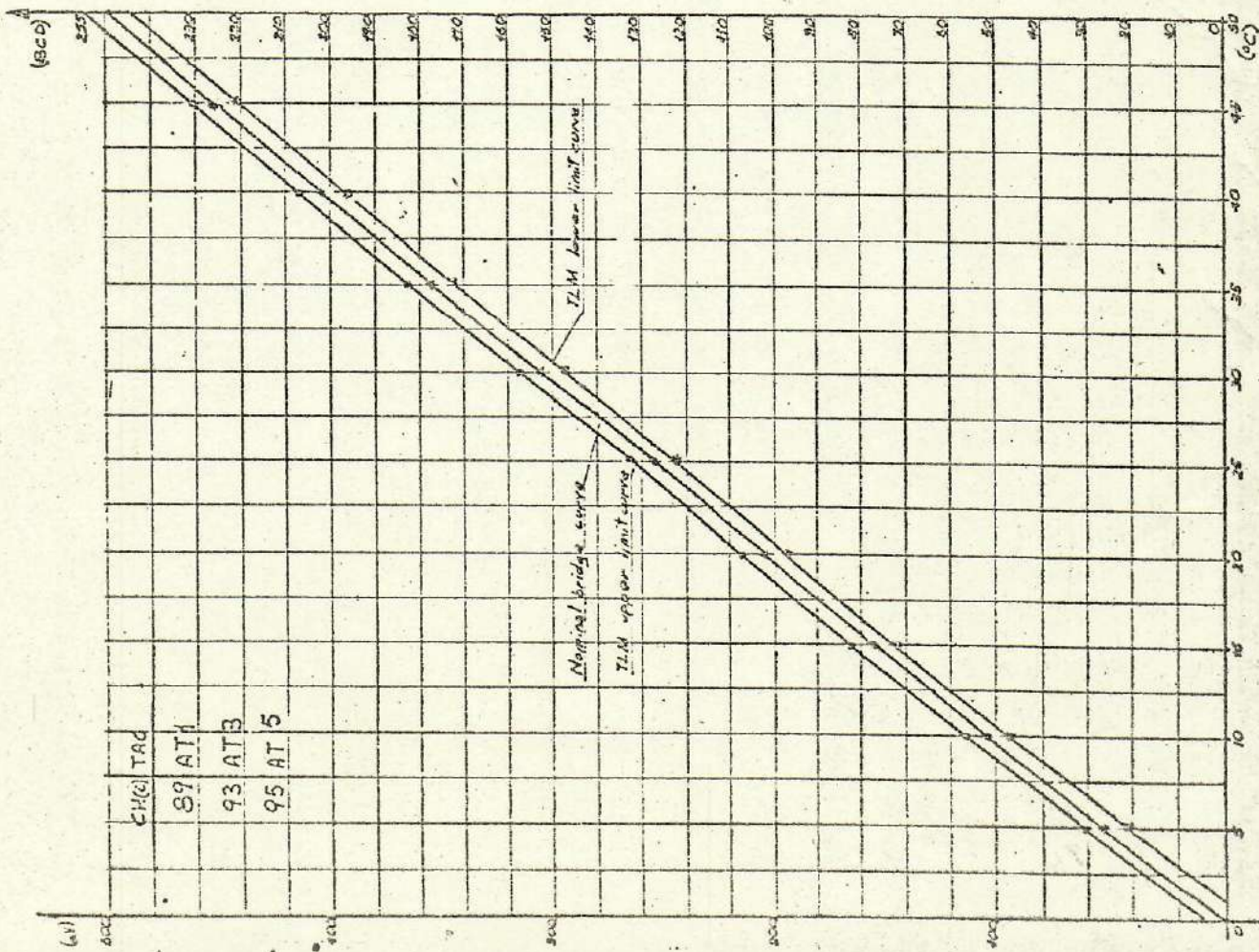
Nov 1976

SIRIO S/C

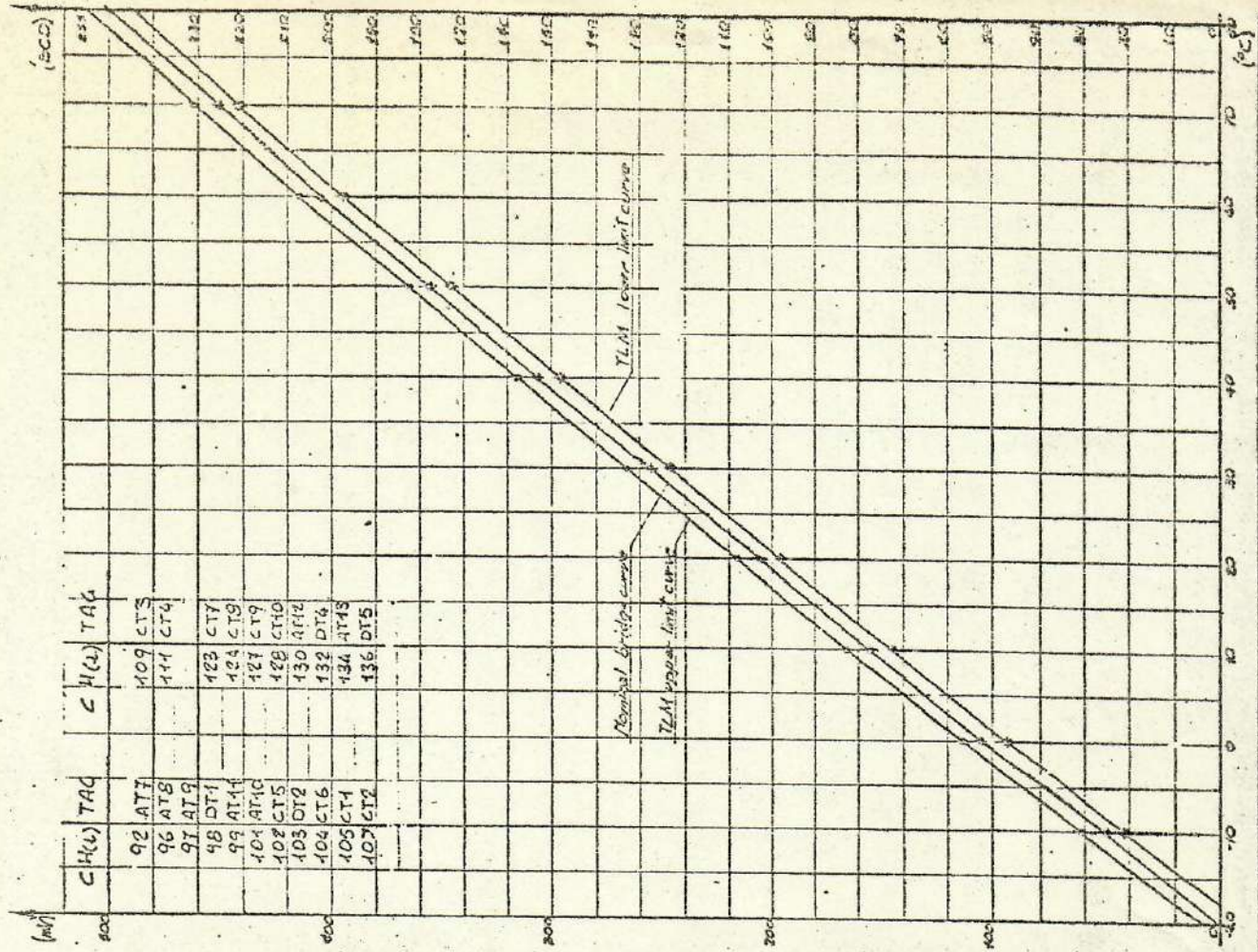
Date: 17. 11. 71
Sheet 7 of 7

PARALLEL DIGITAL CHANNELS OVERALL STATUS

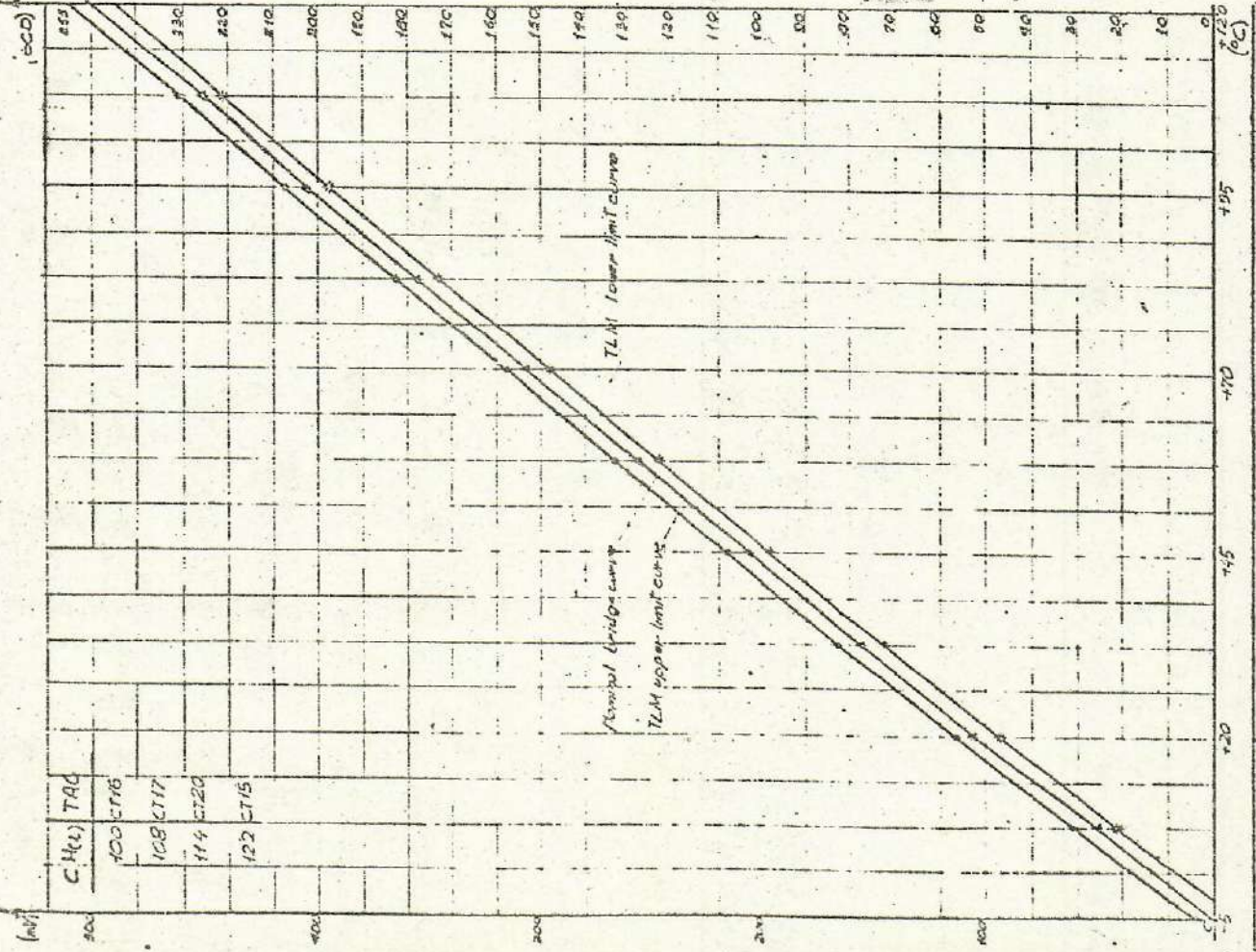
N° bit	2 ⁰	2 ¹	2 ²	2 ³	2 ⁴	2 ⁵	2 ⁶	2 ⁷
145	RRA PRESET 1	RRA RRA MODE 1	RRB PRESET 1	RRB RRA MODE 1	SPARE 1	ENB PROG. 2 OFF OR ON WITH MAIN CLOCK 1	ENB PROG. 1 OFF OR ON WITH MAIN CLOCK 1	ENB ON 1
	0 RESET	0 TLM MODE	0 RESET	0 TLM MODE	0	0 PROG. 2 ON WITH BACK UP CLOCK	0 PROG. 1 ON WITH BACK UP CLOCK	0 MOD. TO RRA OFF
146	PCU SHF BUS 1 1	PCU BTR CHARGE ON 1	PCU HEATERS BUS B ON 1	PCU ON 1	PCU BTR CHARGE ON 1	PCU OFF 1	PCU OFF 1	VLL ON 1
	0 BUS 2	0 CHARGE OFF	0 BUS B OFF	0 SOLENOID BUS B OFF	0 BTR CHARGE OFF	0 SOLENOID PROT. RESET	0 MAIN BUS PROT. RESET	0 ALERT 1 STATUS OFF
147	PSA OFF 1	PSB OFF 1	ACL VALVE DRIVER REL B ON 1	ACL VALVE DRIVER REL A 1	TBA OFF 1	TBB OFF 1	IMU (-) 1	IMU OFF 1
	0 ON	0 ON	0 OFF	0 OFF	0 ON	0 ON	0 ACCEL SIGN (+)	0 ON
148	ACL OFF 1	ACL OFF 1	TAA OFF 1	TAB OFF 1	TAA OFF 1	TAB OFF 1	EPT OFF 1	ENA PROG. 2 ON 1
	0 LOGIC 1 ON	0 LOGIC 2 ON	0 DRIVER AXIAL A LOG. 1 ON	0 DRIVER AXIAL B LOG. 2 ON	0 DRIVER AXIAL A LOG. 2 ON	0 DRIVER AXIAL B LOG. 2 ON	0 ON	0 PROG. 1 ON
149	HCM 1	ACE OFF 1	ACE OFF 1	ACE EDA 1	ACE IR SYNC. CSA 1	TMR ON 1	TMR ON 1	HRP 1
	0 SAM HIGH/LOW	0 EDA ON	0 EDB ON	0 EDB	0 IR SYNC. CSB	0 RES. 1 OFF	0 RES. 2 OFF	0 A
150	RRA OFF 1	RRB OFF 1	ACL INTERCONNECT VALVE 1	APS STOP VALVE B 1	APS STOP VALVE A 1	TIU FULL 1	TIU A 1	TMR PROT. RESET 1
	0 TX ON	0 TX ON	0 OFF	0 OFF	0 OFF	0 HEATING: REDUCED	0 HEATERS BV. B	0 ALARM
151	PCU ON 1	PCU ON 1	PCU ON 1	PCU BTR-BTR PARALL. 1	PCU ON 1	TMR SHF BUS 1 ON (BUS 2 OFF) 1	PCU ON 1	PCU ON 1
	0 ATT. SENS. SET A OFF	0 SOLENO. BUS A OFF	0 ATT. SENS. B OFF	0 BTR-BTR UNPARALL. (OFF)	0 BUS 2 OFF	0 SHF BUS 1 OFF BUS 2 ON	0 BUS 1 OFF	0 HEATERS BUS A OFF
152	TIU ON 1	TIU TMR 1 1	TIU ON 1	TIU ON 1	TIU COMPL. EXP. N.B. 1	TIU ON 1	TIU ON 1	ACE EAST (A) 1
	0 HAP-B AUX. BUS OFF	0 BUS TMR 2	0 PROP. EXP. OFF	0 COMPL. EXP. OFF	0 COMM. EXP. W.B.	0 REF. SIGNAL OFF	0 AUX. OSC. OFF	0 SIGHTING WEST (B)
161	HAP-A ON 1	HAP-B ON 1	TIU TWT A 1	TIU ON 1	TIU AUX. OSC. 1	TIU OFF 1	TIU OFF 1	TIU ON 1
	0 TWT-A HV OFF	0 TWT-B HV OFF	0 R.F. LINE TWT B	0 IF ALC OFF	0 R.F. LINE NORMAL	0 TWT-A FILAMENT ON	0 TWT-B FILAMENT ON	0 HAP-A AUX BUS OFF
162	VLL ON 1	VLL ON 1	SBD-A ARMED 1	SBD-A SAFE 1 (NO)	SBD-A FIRE OR DISARMED 1	SBD-B ARMED 1	SBD-B FAILURE 1 (NO)	SBD-B FIRED OR DISARMED 1 (YES)
	0 RELAY 2 OFF	0 RELAY 3 OFF	0 DISARMED	0 OUT VOLTAGE O.K. (YES)	0 BEFORE FIRE IS ARMED	0 DISARMED	0 OUT VOLTAGE O.K. (YES)	0 BEFORE TIME IS ARMED (NO)



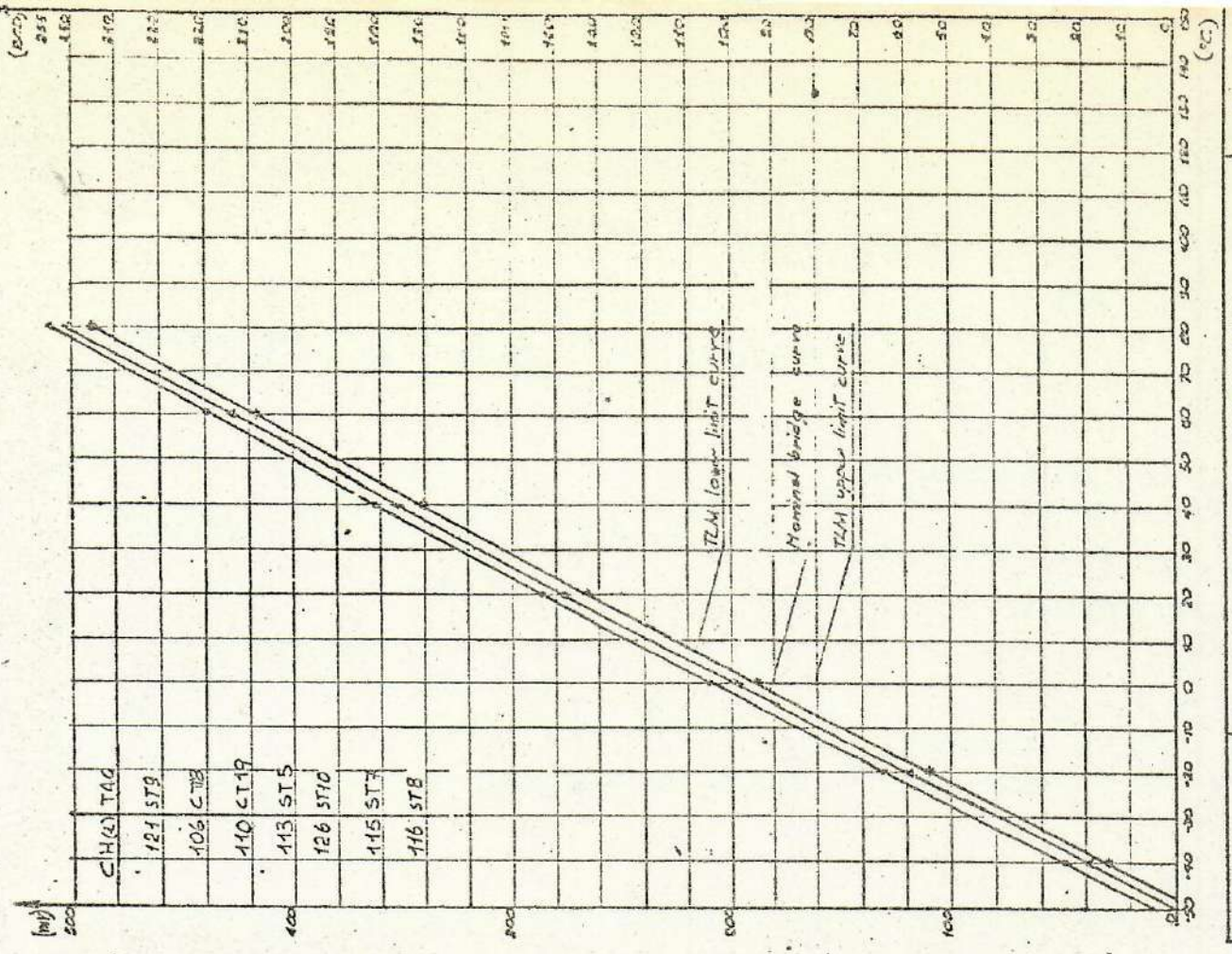
DATE: NOVEMBER 1976
 "ML" TEMPERATURE TELEMETRY
 Bridge type E110-L1000 (0 to 50°C)
 Fig. 1



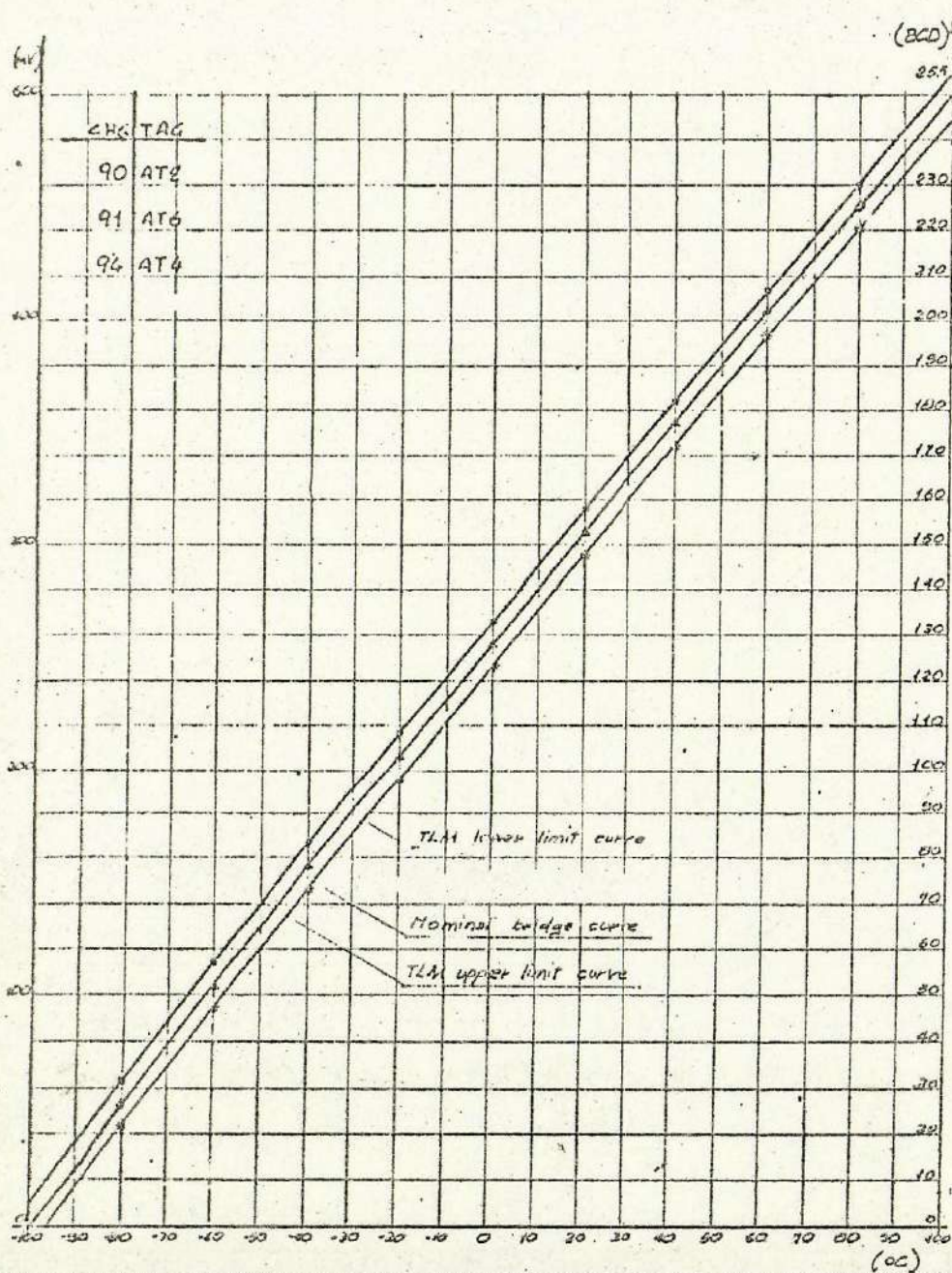
DATE: NOVEMBER 1976
 "ML" TEMPERATURE TELEMETRY
 Bridge type E112-L1000 (-20 to 80°C)
 Fig. 2



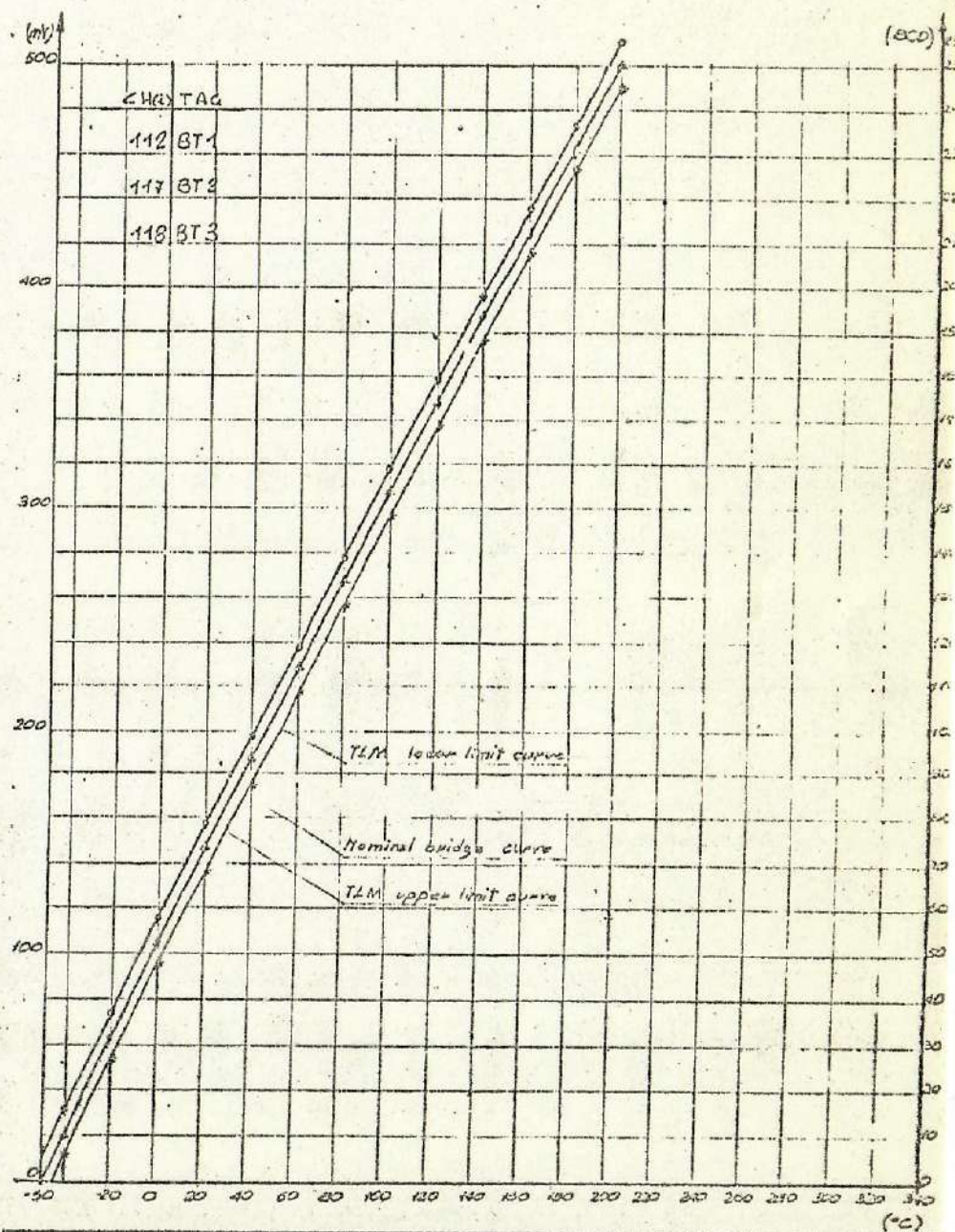
DATE: NOVEMBER 1976 73
 "ML" TEMPERATURE TELEMETRY
 Bridge type 2 Sensor type E110 MF1000 (-5 to 120°C)
 Fig. 2a



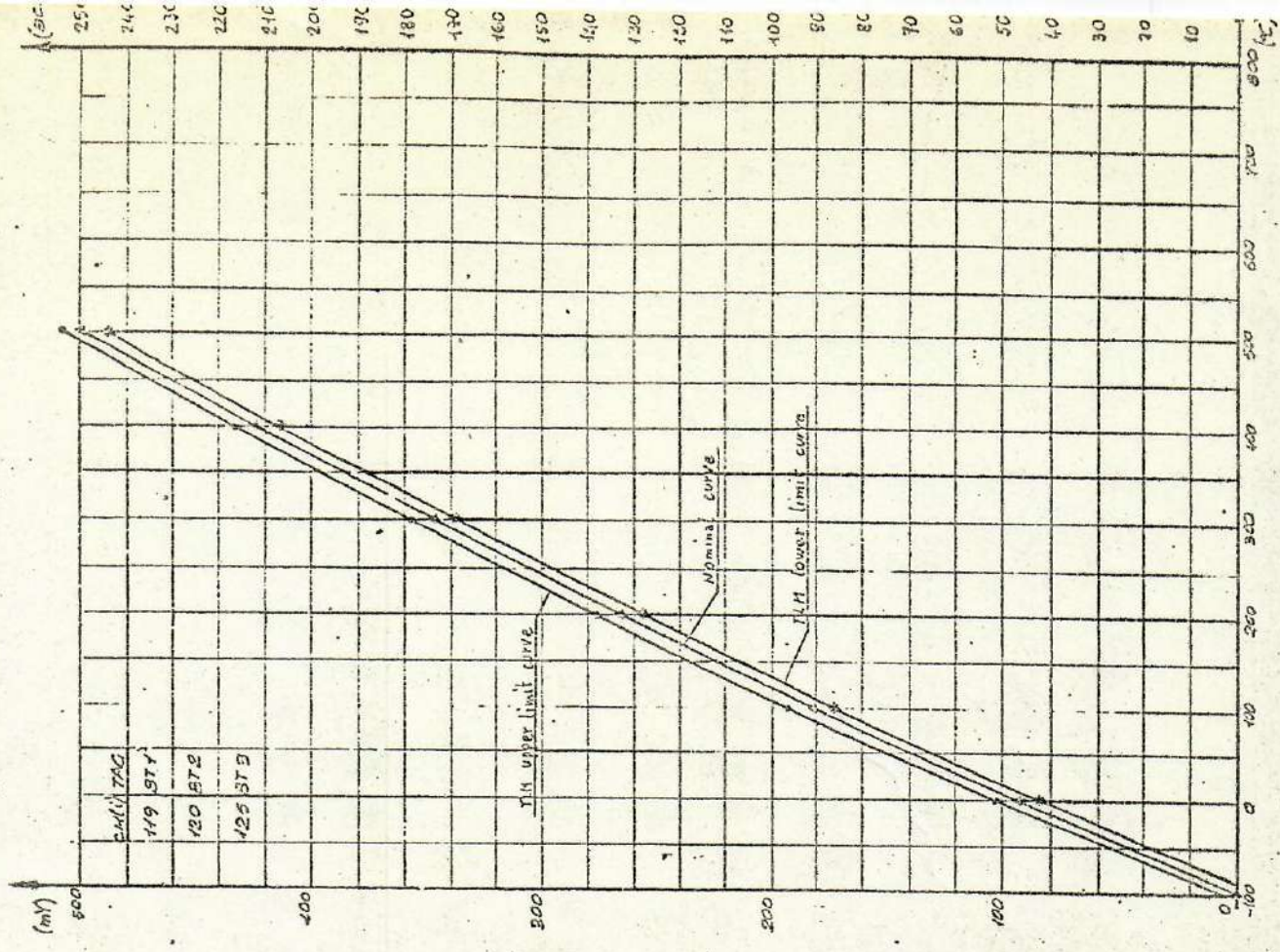
DATE: NOVEMBER 1976 73
 "ML" TEMPERATURE TELEMETRY
 Bridge type 3 Sensor type E110-L1000 (-50 to 80°C)
 Fig. 3



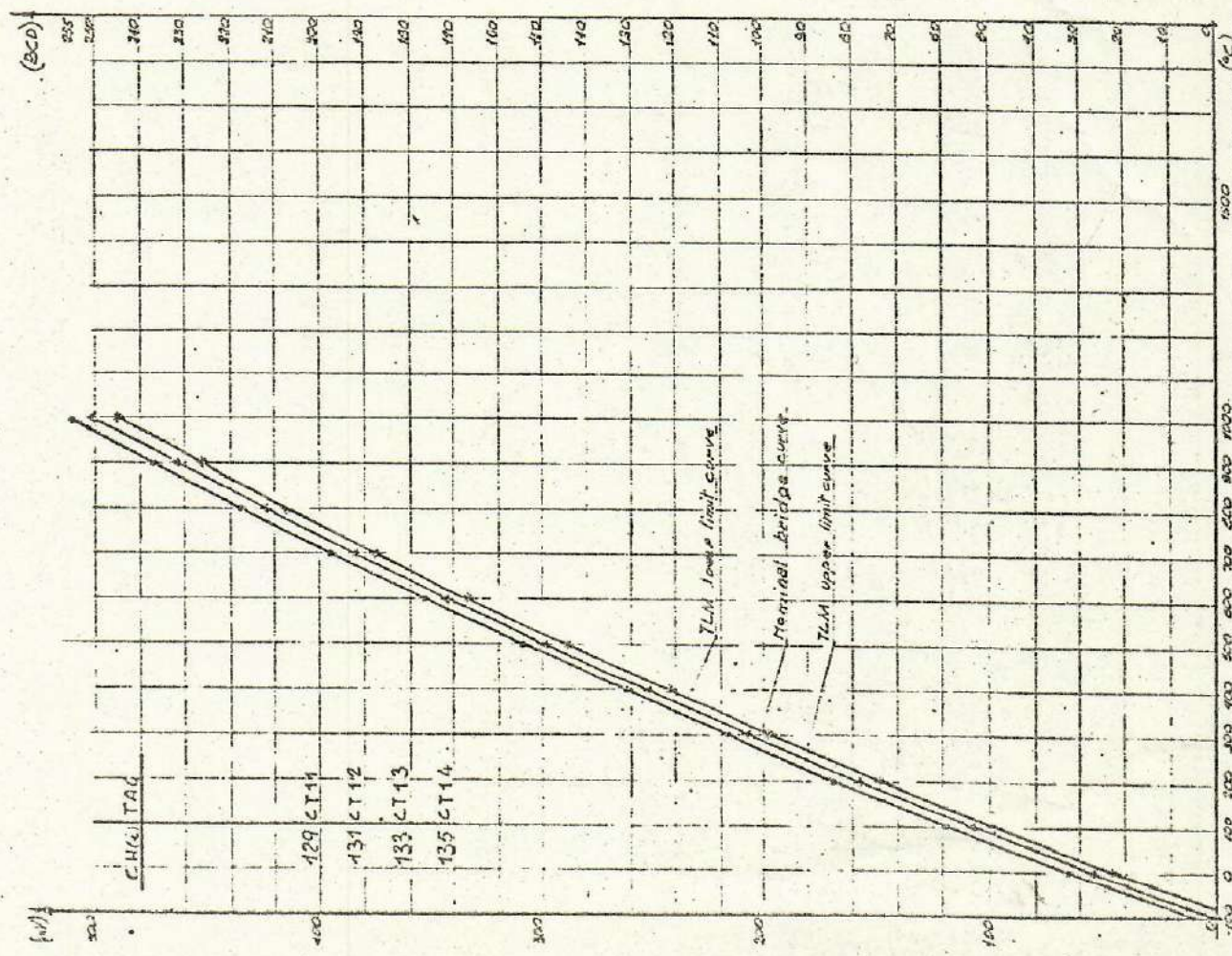
DATE: NOVEMBER 1976
 "ML" TEMPERATURE TELEMETRY
 Bridge type 4 Sensor type E118-L1000 (-100 to 100°C)
 Fig. 4



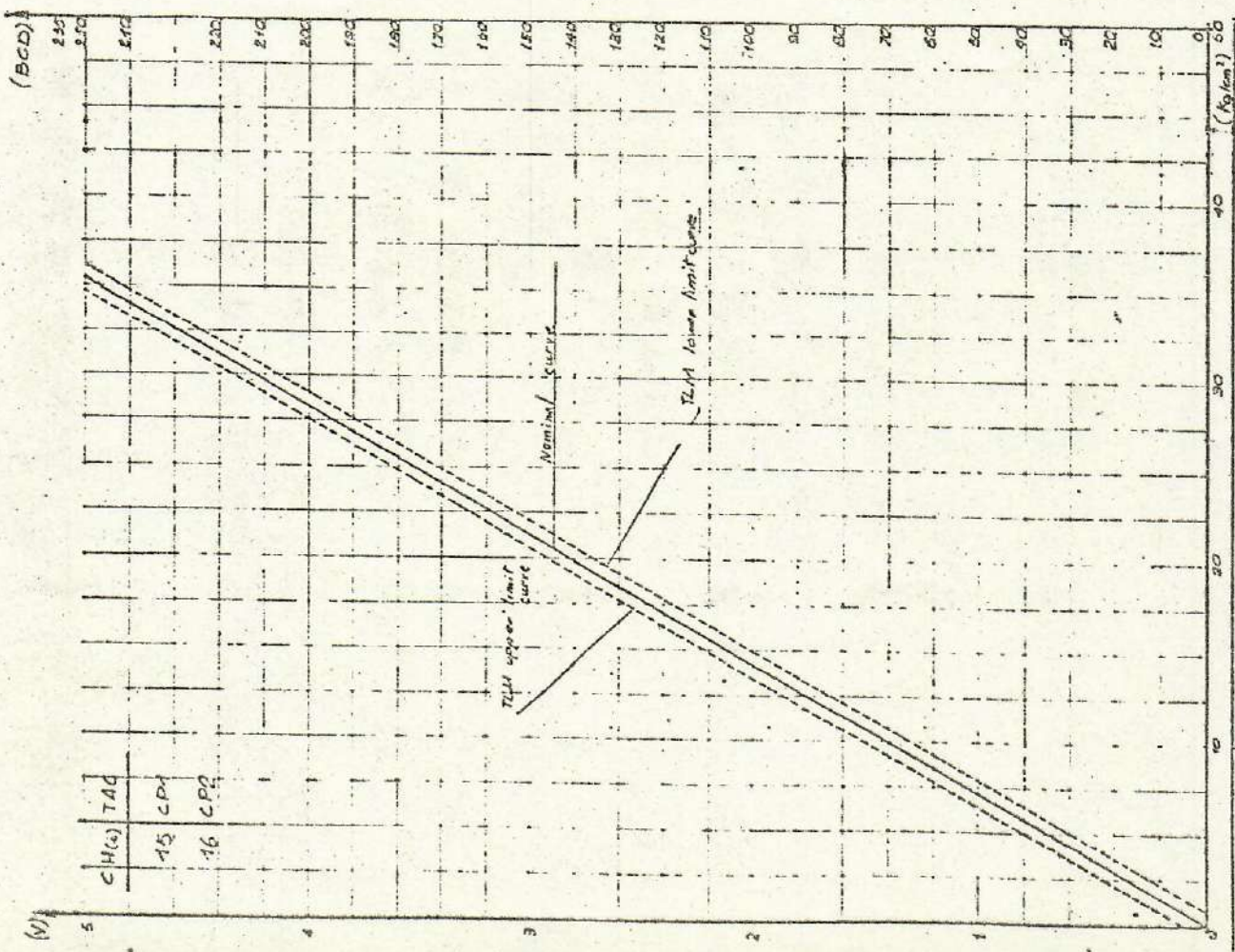
DATE: NOVEMBER 1976
 "ML" TEMPERATURE TELEMETRY
 Bridge type 5 Sensor type E758 (-50 to 200°C)
 Fig. 5



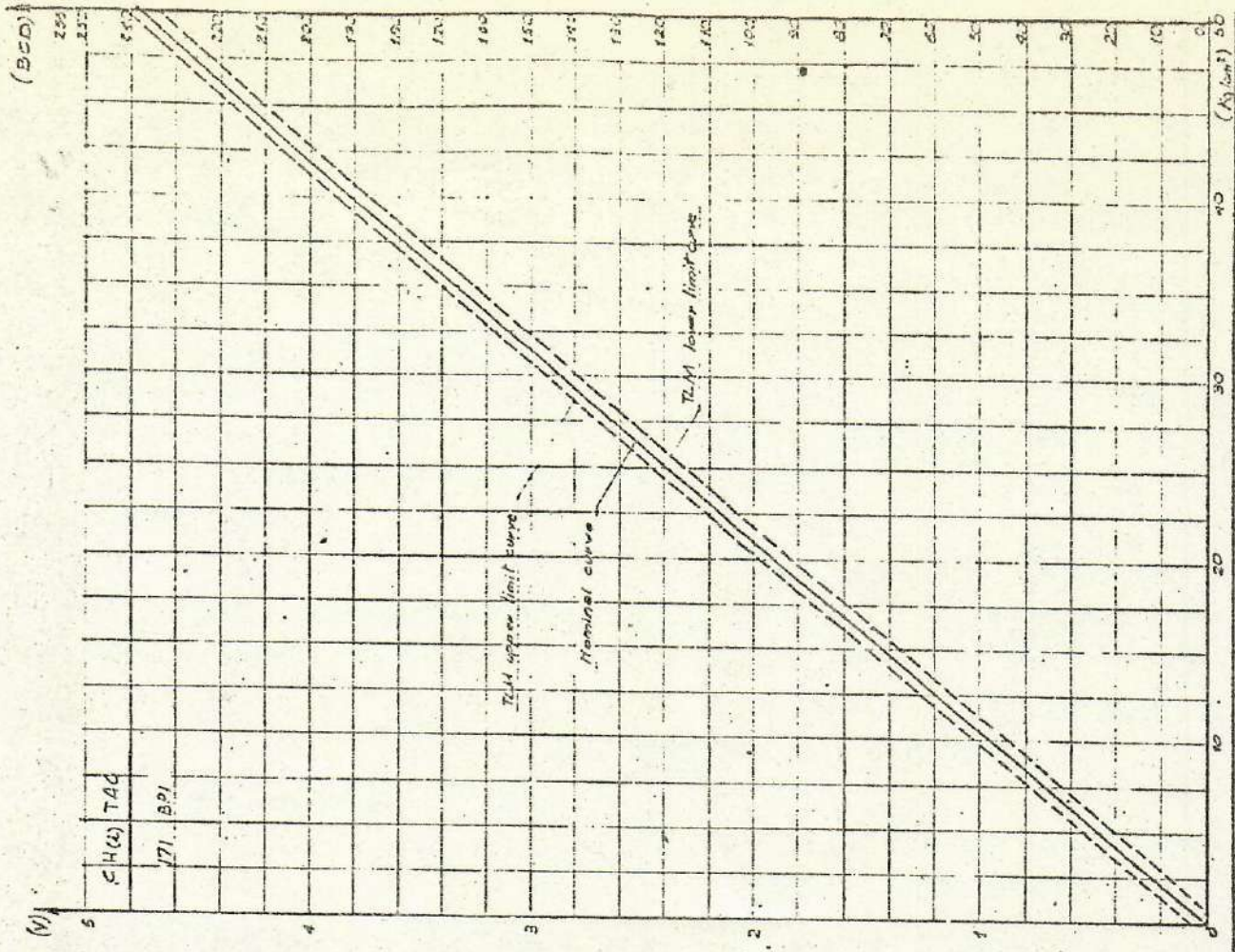
DATE: NOVEMBER 1976
 ML TEMPERATURE TELEMETRY Bridge type E118G (-100 to 500°C)
 Fig. 6a



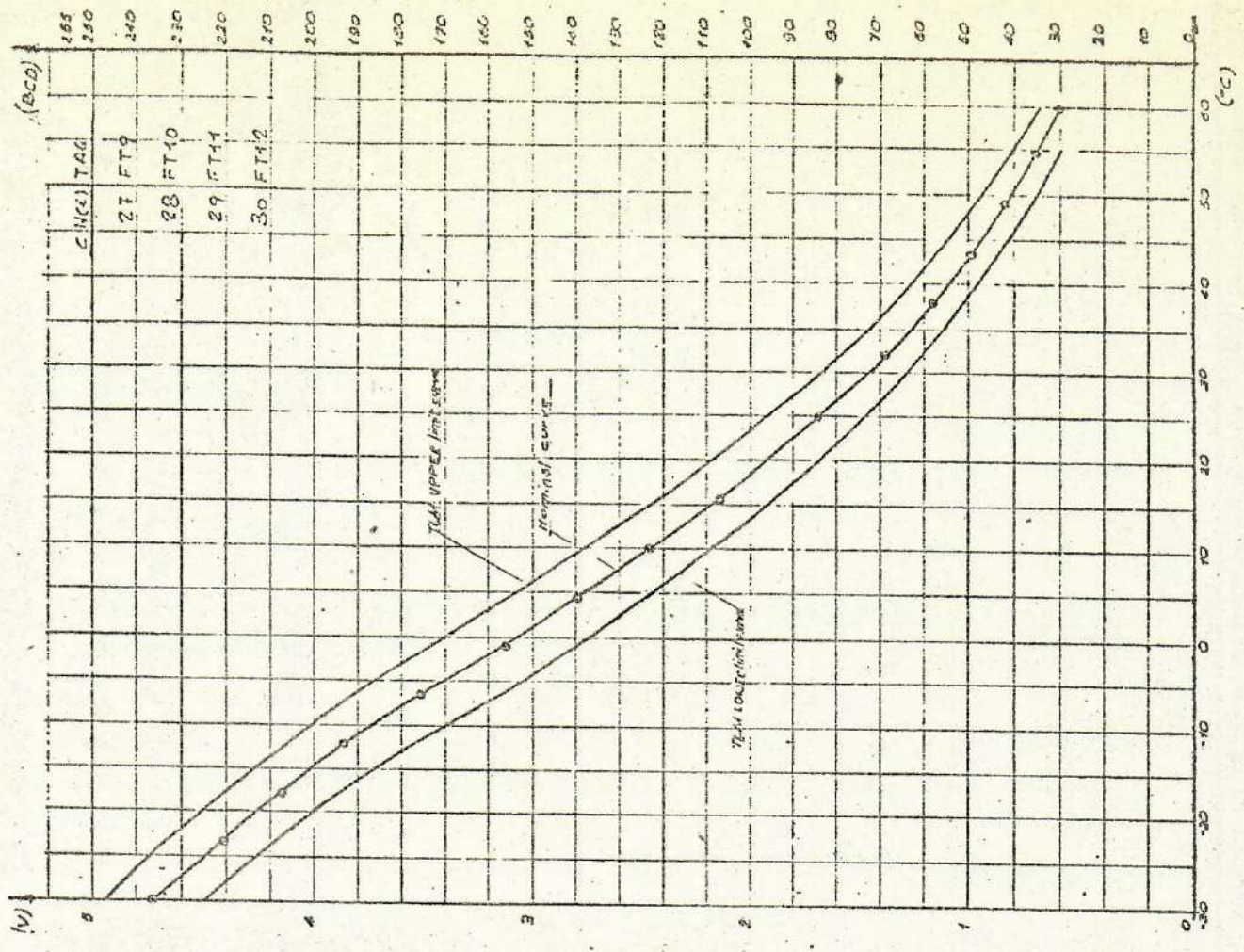
DATE: NOVEMBER 1976
 ML TEMPERATURE TELEMETRY Bridge type E118G (-100 to 1000°C)
 Fig. 6



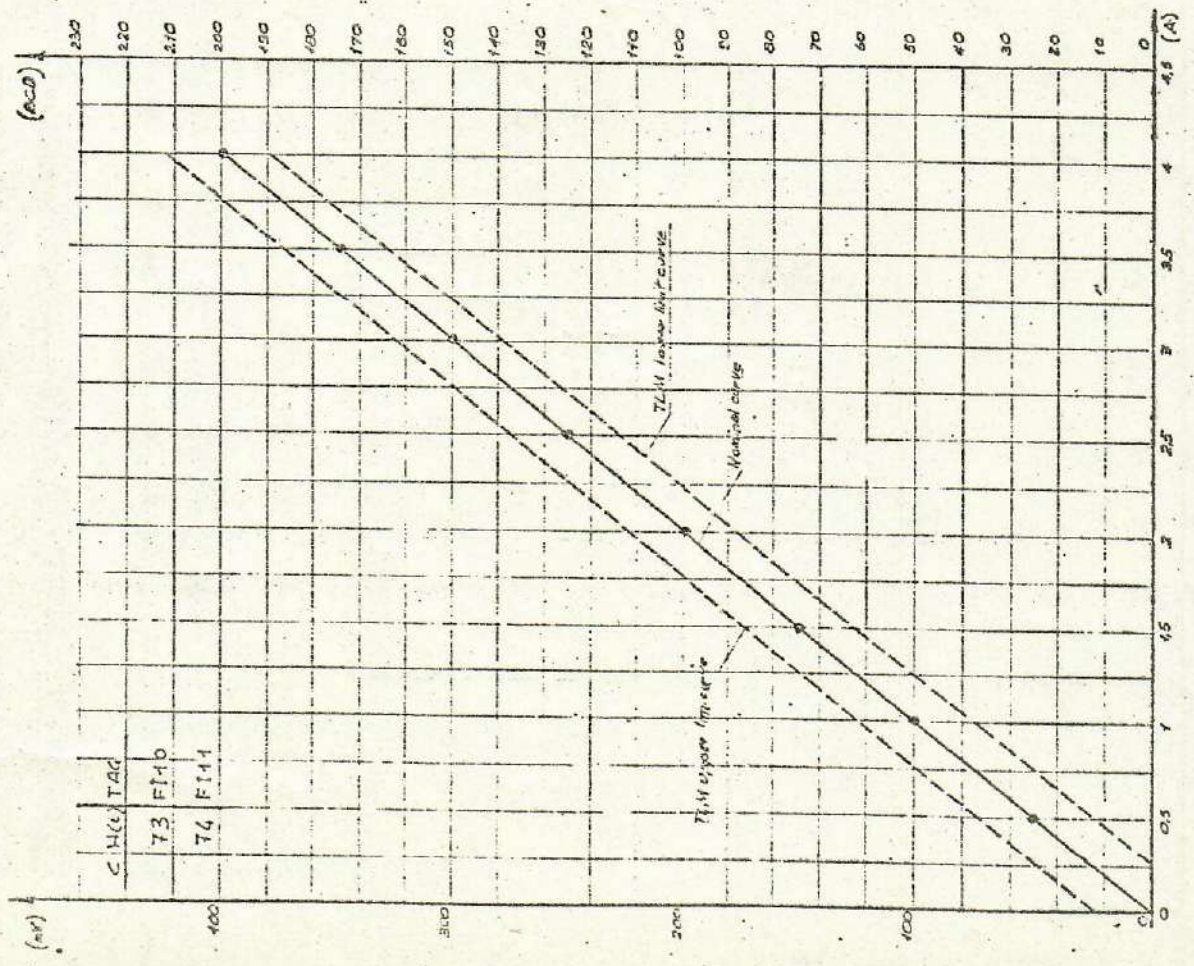
DATE: JULY 1975
 "HL. PRESSURE TELEMETRY Transducer Taber 2210 & EPT Ampl. 2-517"
 Fig. 7



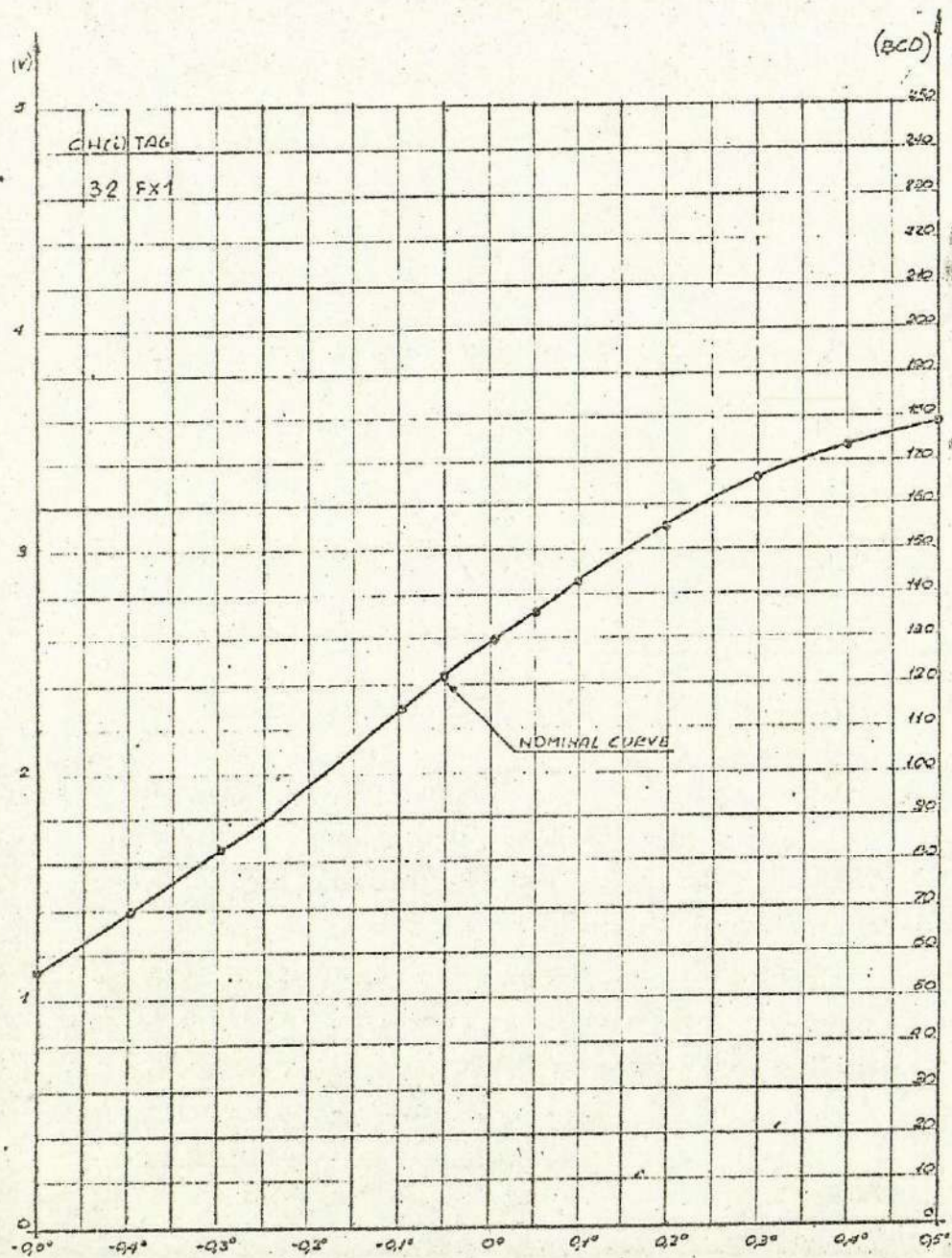
DATE: JULY 1975
 "HL. PRESSURE TELEMETRY Transducer Taber 2201 & EPT Ampl. 2-517"
 Fig. 7a



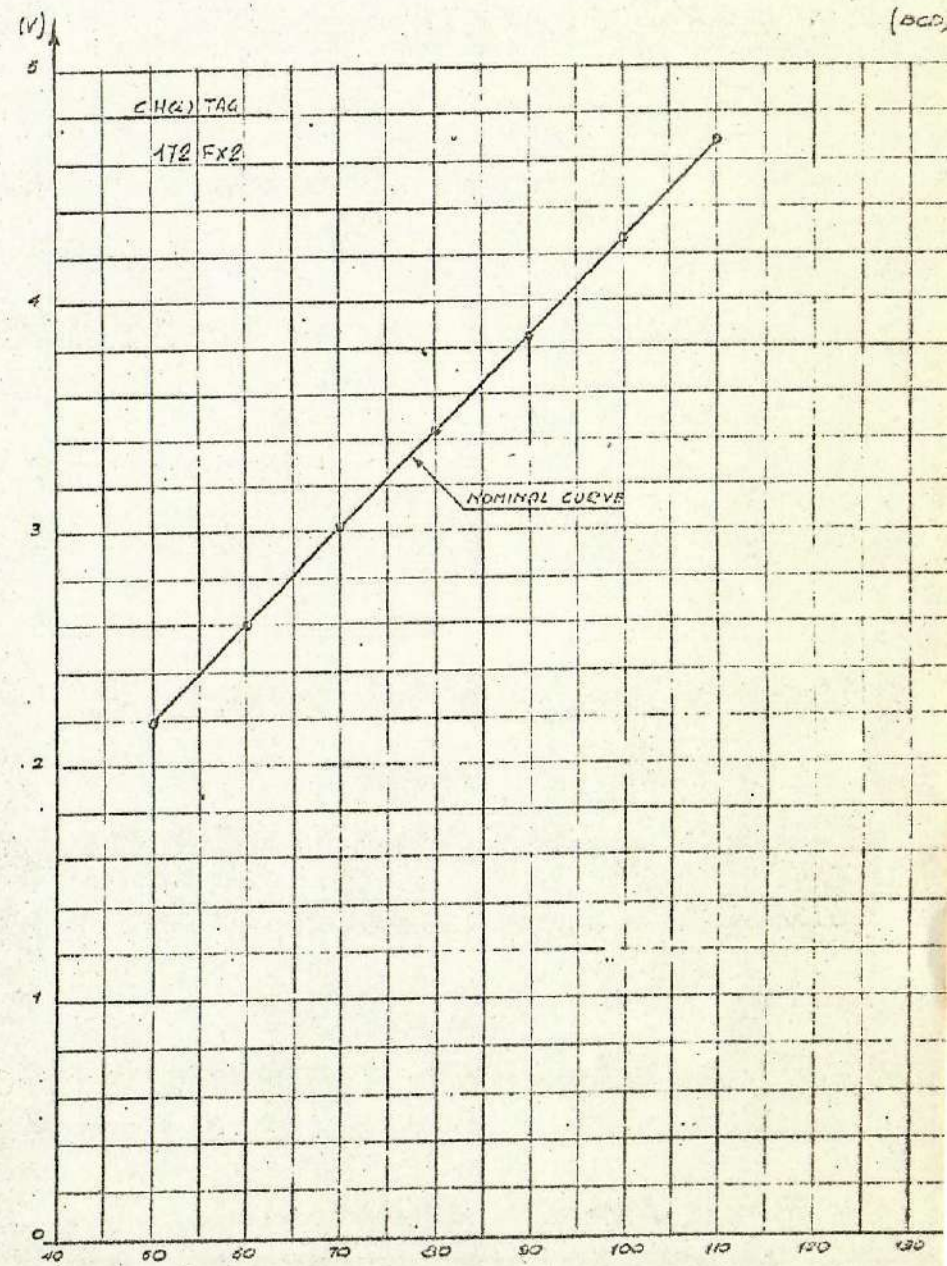
DATE: JULY 1975
 "ML. TEMPERATURE TELEMETRY" Fig. 9



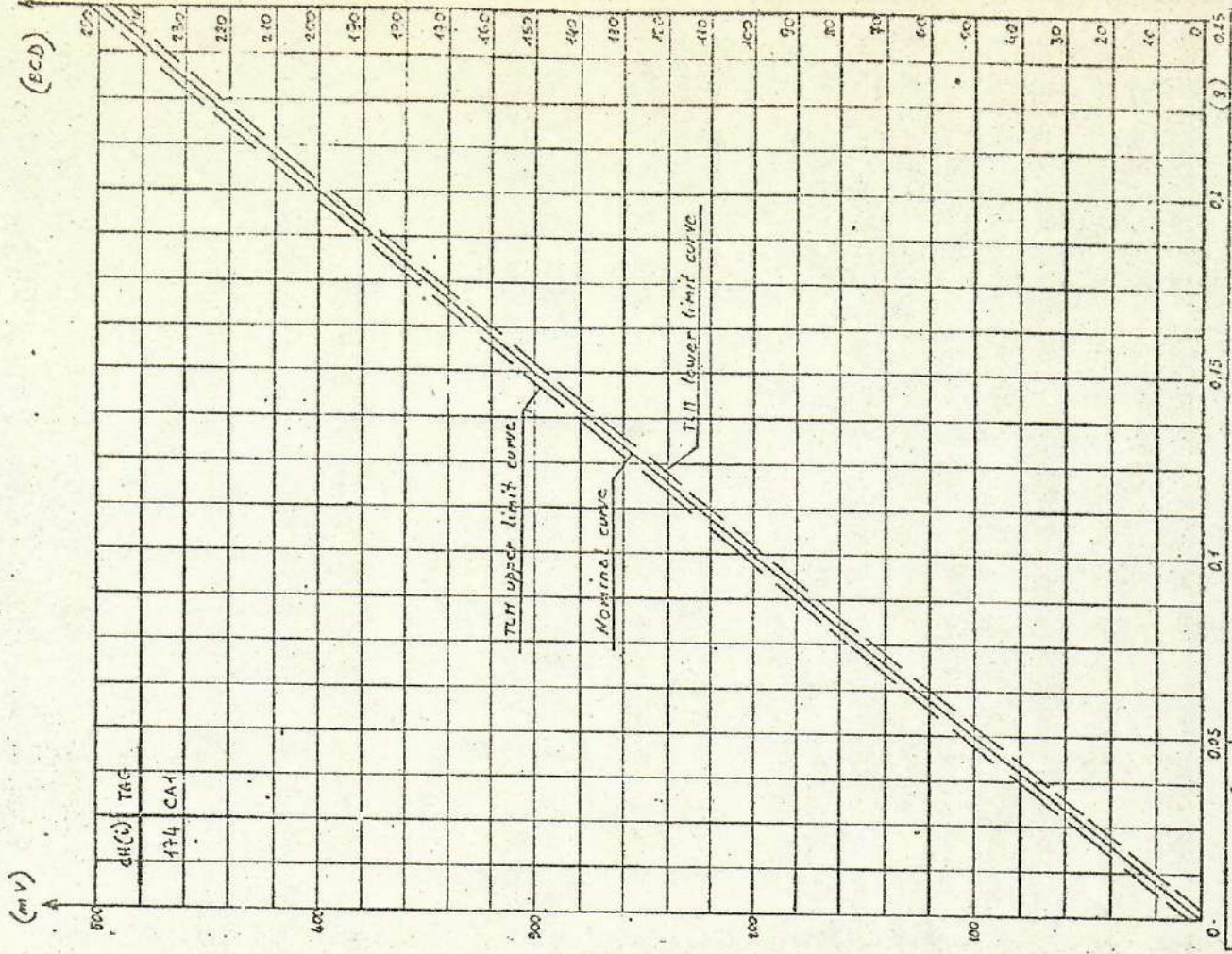
DATE: JULY 1975
 "ML. CURRENT TELEMETRY" Fig. 8



DATE: SEPTEMBER 1975	HL. TELEMETRY Antenna Sight Error (SHF Exp.)	Fig. 10
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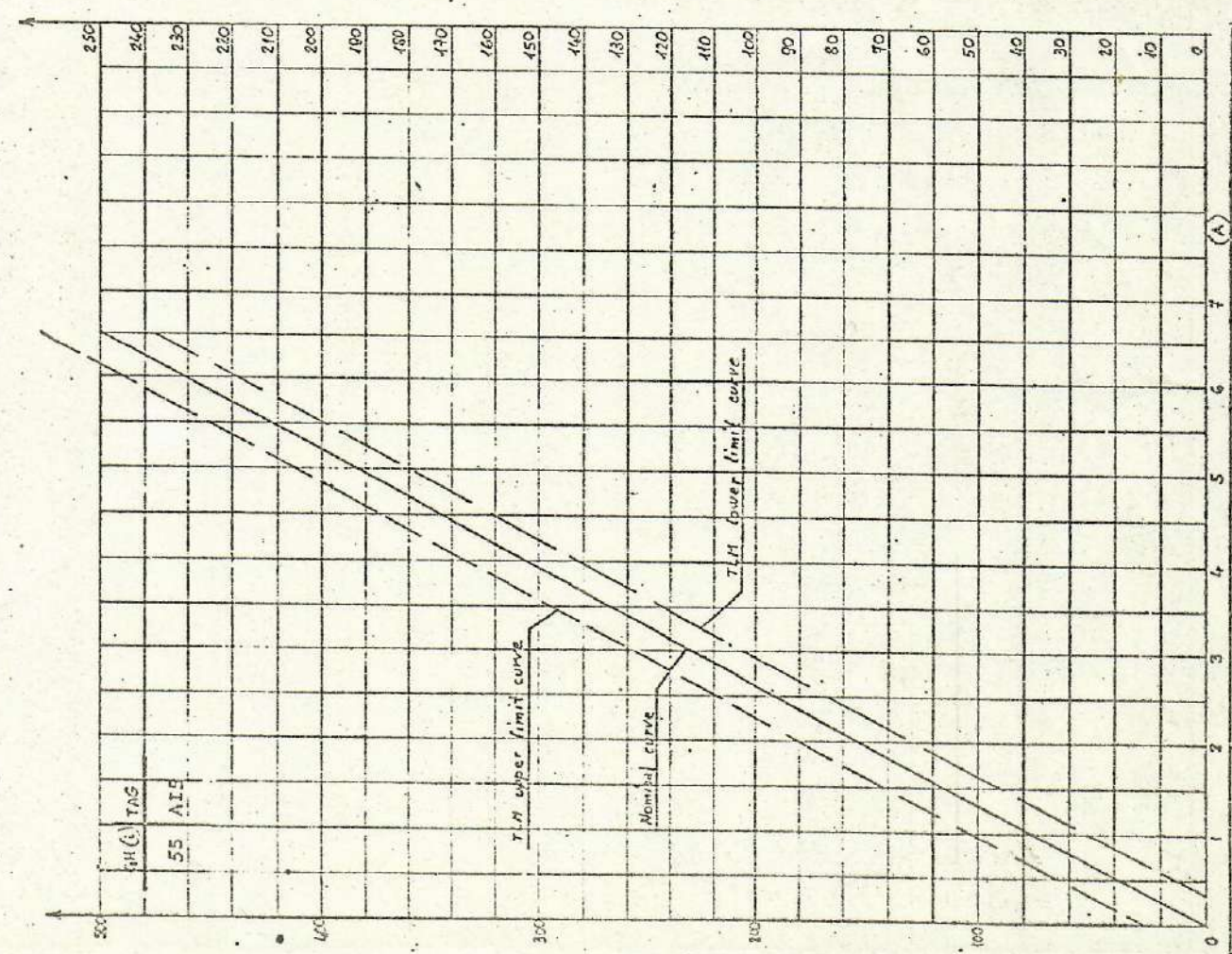


DATE: SEPTEMBER 1975	HL. TELEMETRY Despin Motor Tachimetry (SHF Exp.)	Fig.
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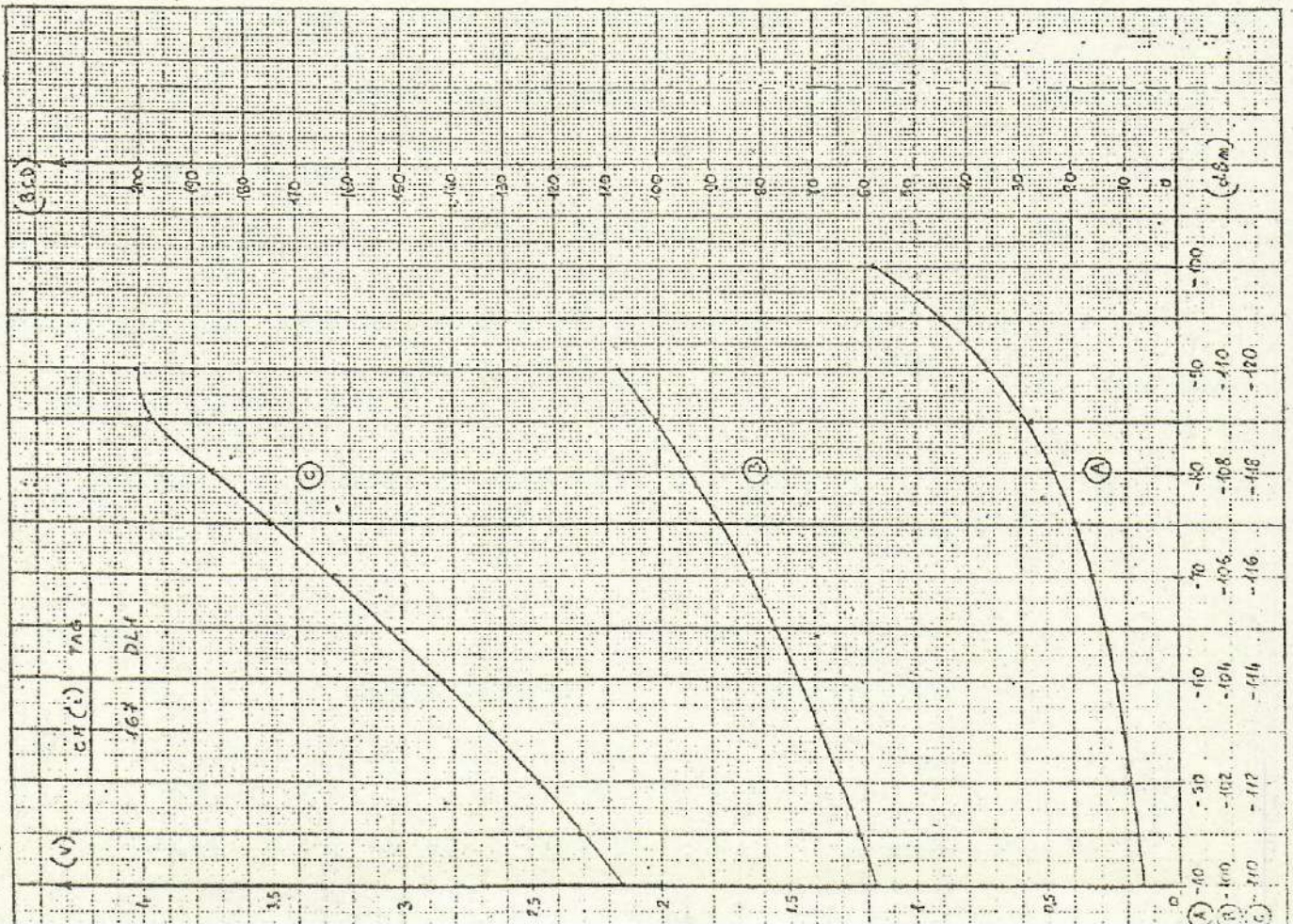
DATE: NOVEMBER 1976
 "ML" ACCELERATION TELEMETRY (0 to 0.25g)
 IMU - Nutat. & Aux. Prod. Accel

Fig. 32



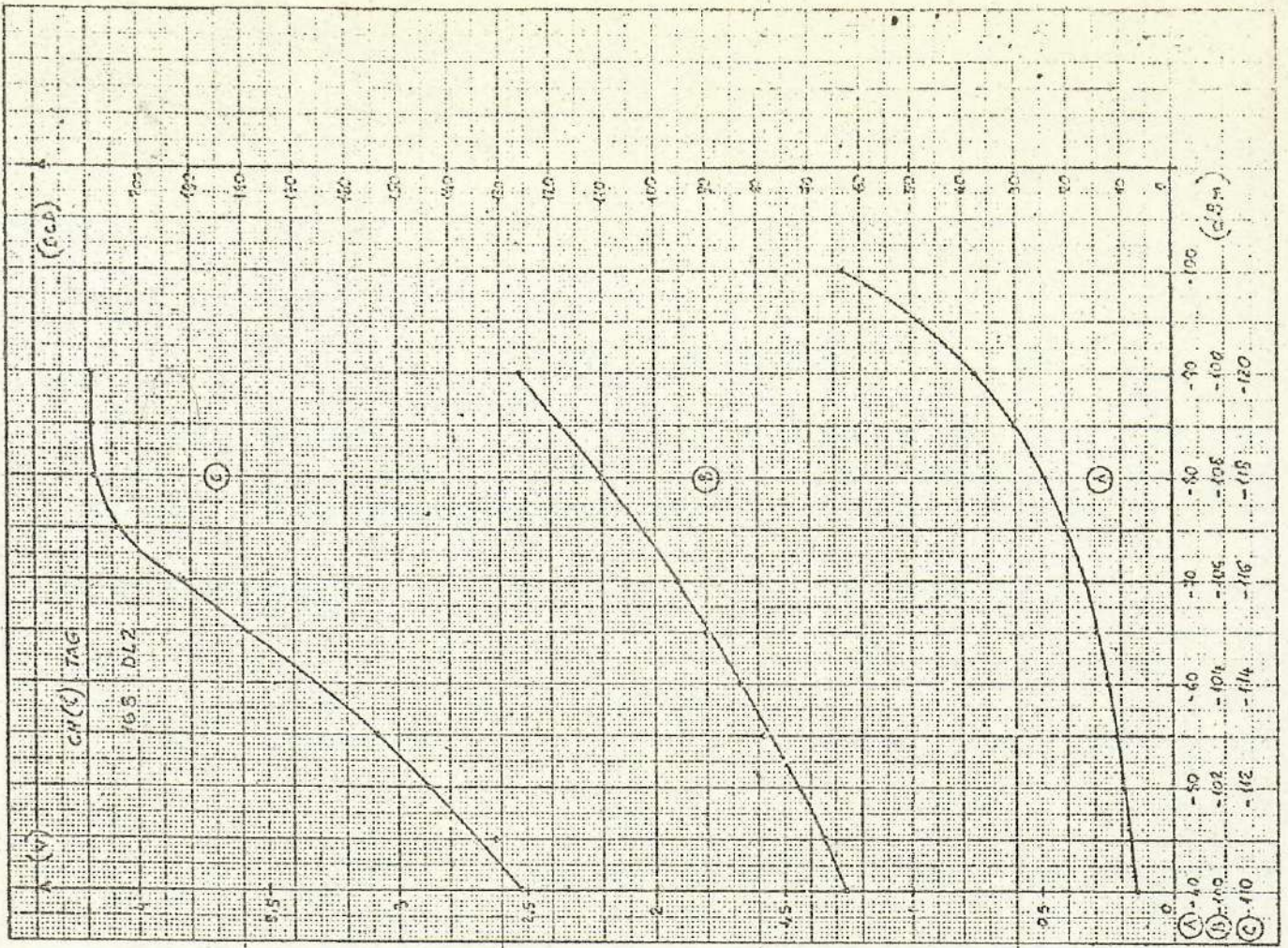
DATE: NOVEMBER 1976
 "ML" CURRENT TELEMETRY
 PCU - Main Bus current

Fig. 31



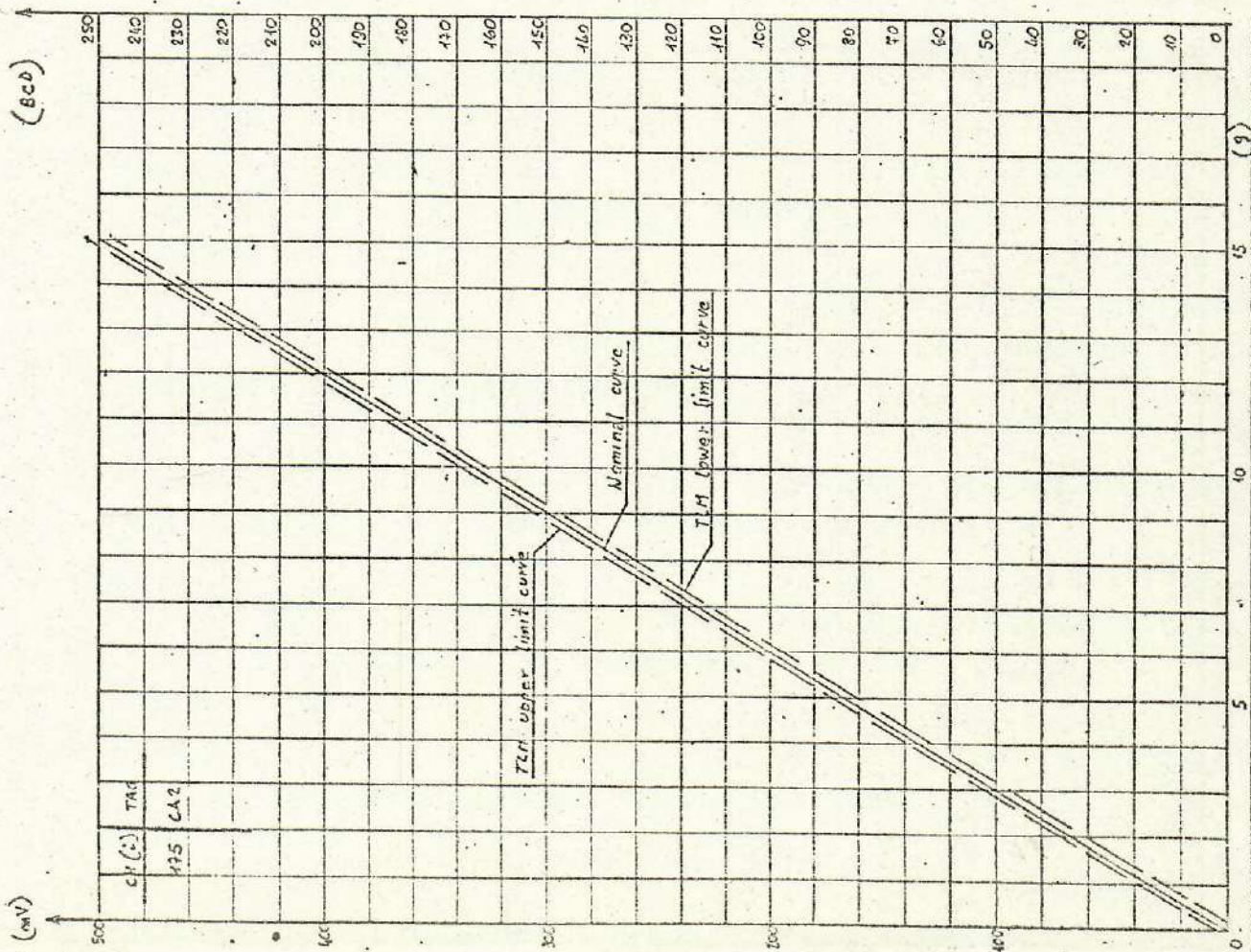
DATE: NOVEMBER 1975
 PRA - Rx side -

Fig. 37

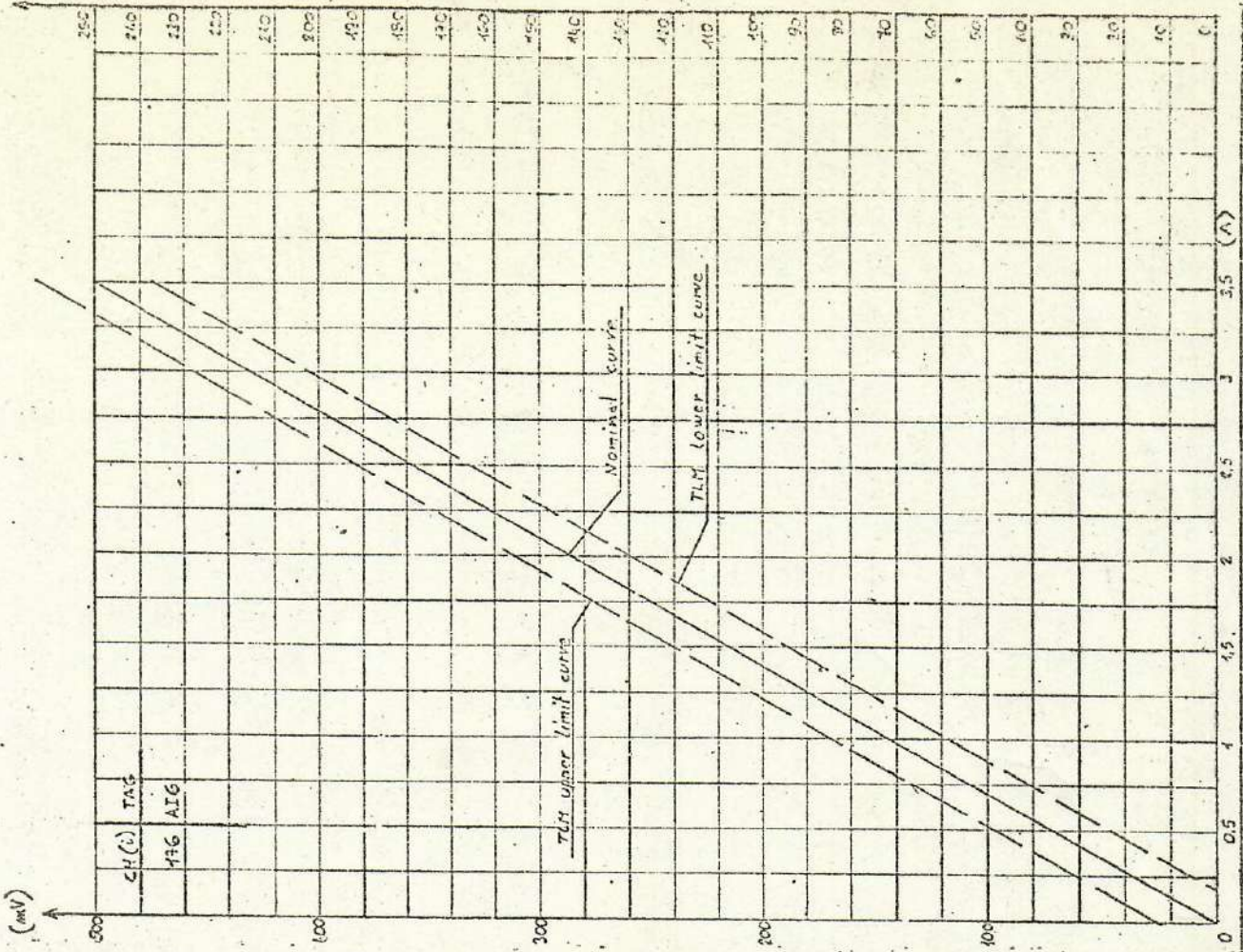


DATE: NOVEMBER 1976
 RRB - Rx side -

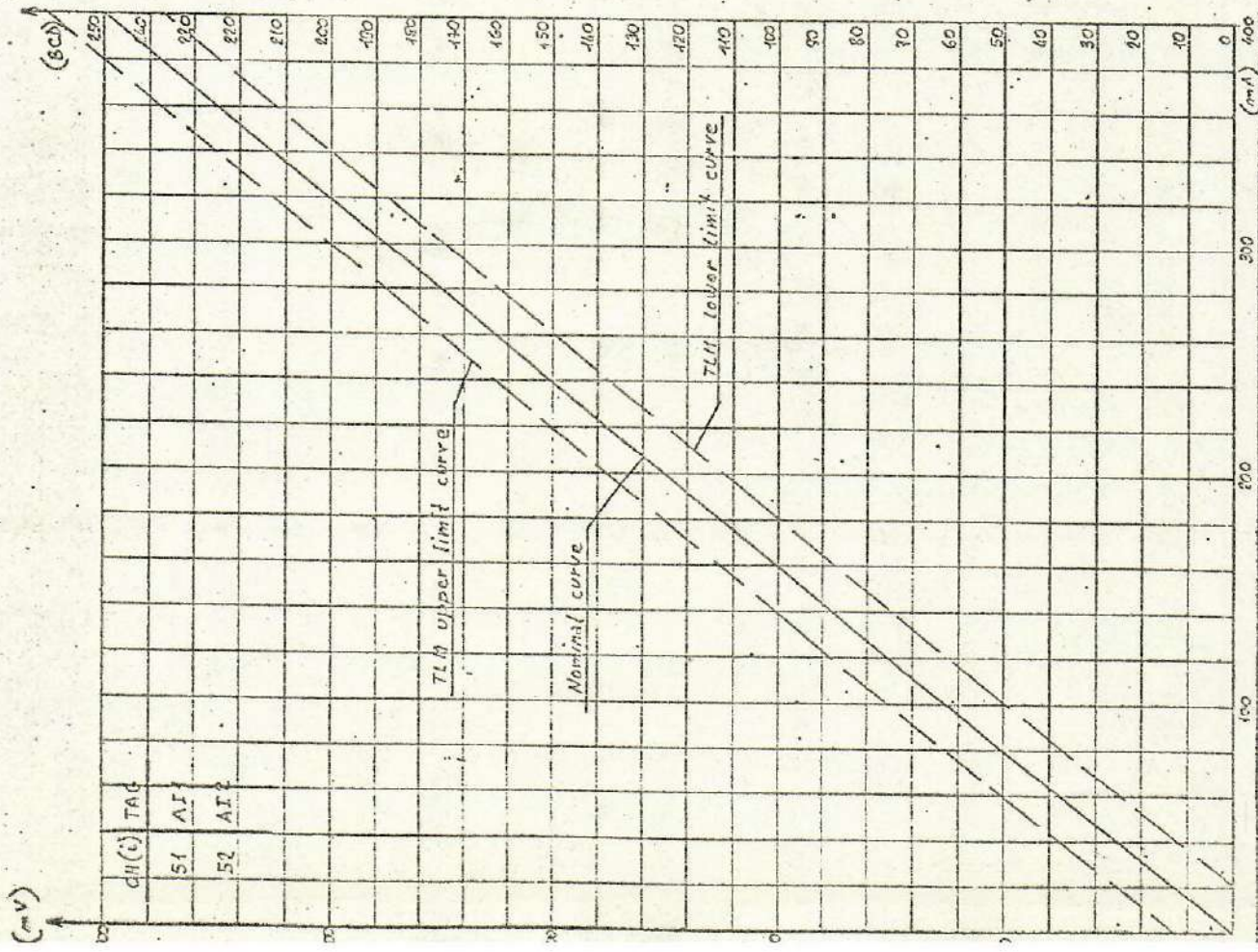
Fig. 38



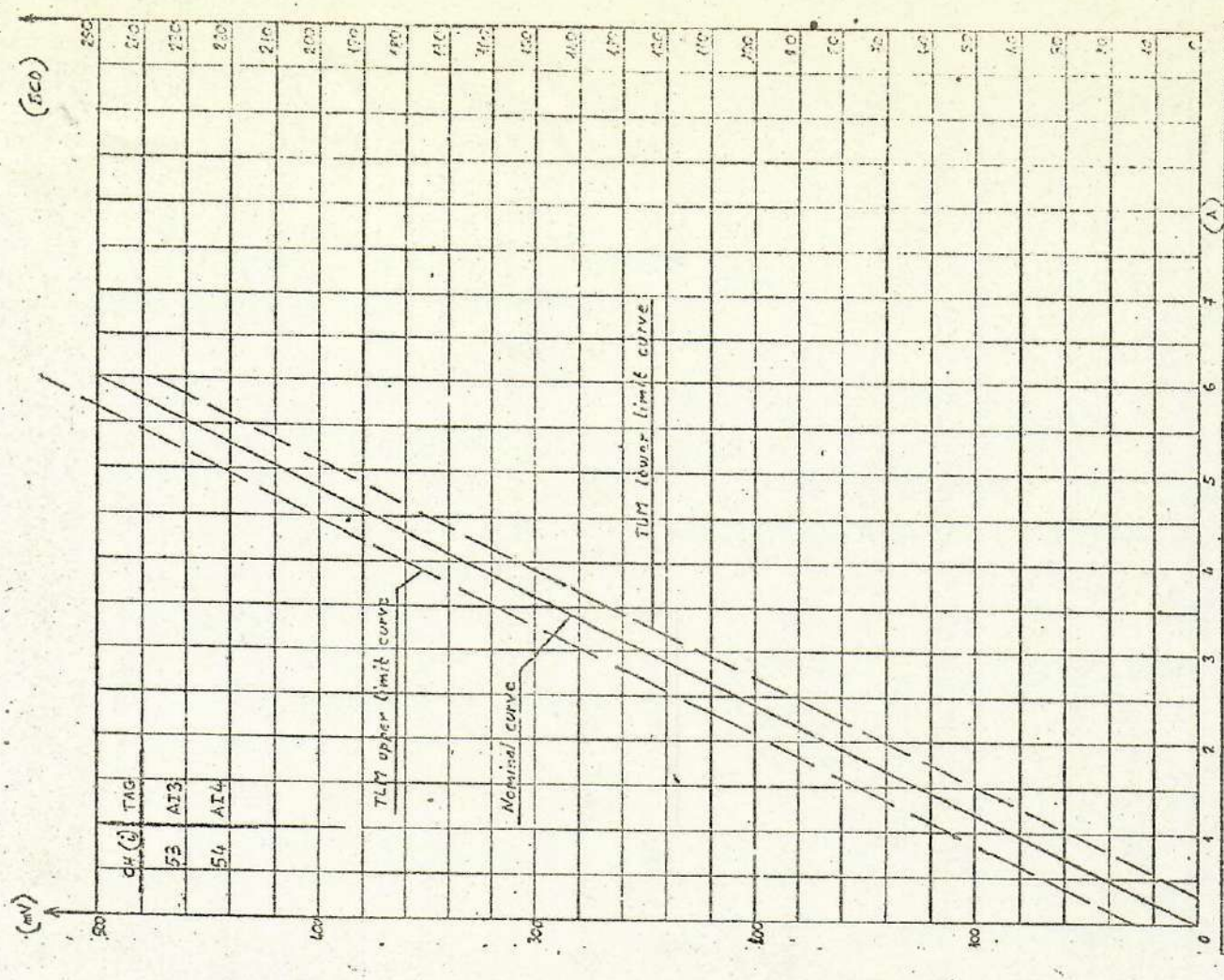
DATE: NOVEMBER 1976 "ML" ACCELERATION TELEMETRY Fig. 33



DATE: NOVEMBER 1976 "ML" CURRENT TELEMETRY (0 to 3.5A) Fig. 34



DATE: NOVEMBER 1976
 "ML" CURRENT TELEMETRY (0 to 400 mA)
 PCU Battery A & B charge current
 Fig. 29



DATE: NOVEMBER 1976
 "ML" CURRENT TELEMETRY
 PCU - Battery A & B discharge current
 Fig. 30

