This ATM is a statement of the magnetometer procesing currently included in the DPS 2000 computer programs being written for the ALSEP System Test Set. There is one magnetometer program used two ways:

1. Process magnetometer data with no other experiments operating.
2. Process magnetometer data with other experiments operating. (This would include systems integration, cross talk, integrated systems test.)

The magnetometer programs operate under control of the real time executive program; the purpose of which is to permit experiment data decommutation, control processing and input/output. The executive also decommutates the main frame sync pattern, housekeeping count, mode ID, and addtionally processes word 33 (Central Station Housekeeping) and word 46 (command verification).

Executive processing of words 33 and 46 is as follows:

1. Word 33 (for data not explicitly related to LSM in the executive):

   A. May be continuously printed under sense switch control.
   B. When the housekeeping subcom is in lock, (after two complete 90 word passes), automatic printing will occur when either out of spec, or changed from the most recent previous values.
   C. Whenever a command has been received at word 46, the next immediate 90 housekeeping words will be printed.

2. Word 46: Whenever not equal to zero, it is printed. With unsuccessful parity, a "p" is printed along side the command. A comparison is made between the command transmitted and the command received in word 46.

There is provision for sending uplink commands by manual insertion.

The magnetometer program decommutates its own data, organizes it, processes it and prepares it for output. There is provision (using sense switches) for enabling or inhibiting data output.

The following main frame words (arranged in the order received) are of interest to the magnetometer programs:

Word 2 - main frame housekeeping identification

Word 5 - magnetometer housekeeping data
Bit 9 - sync bit
Bits 2-8 - housekeeping value
Bits 0-1 - flag bits

Words 17, 19, 21 - magnetometer scientific data
Bit 9 - sign bit (1=+, 0=-)
Bits 0-8 - magnitude

Word 33 - Main frame housekeeping

Word 46 - command verification

Words 49, 51, 21 - magnetometer scientific data

Bit 9 - sign bit (1=+, 0=-)
Bits 0-8 magnitude

This data is processed into the following format:

```
M  CC  FF  HHH  NN  ±XXX  ±YYY  ±ZZZ
      VVV  RRR       ±XXX  ±YYY  ±ZZZ
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M - Magnetometer ID
C - Magnetometer Housekeeping Count
F - Flag Bits
H - Magnetometer Housekeeping (printed only when out of range)
N - Main frame count
X, Y, Z - Magnetometer Data
V - Command verification
R - Central Station Housekeeping

The accompaning functional flow chart is intended only to provide interested parties with an outline of program flow. As program debugging progresses, detailed flow charts just above the coding level will be drawn. These charts and annotated assembly listings will be appended to this document when they are available.

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ALSEP MAIN FRAME (MF) WORD NUMBER 5 DATA FORMAT LSM

SUB-FRAME WORD NUMBER	ASSIGNMENT OF BITS 9	8 7 6 5 4 3 2	1	0	DATA IN OCTAL NOM	TOL	PROCESSING
	SYNC	ENGINEERING DATA	STATUS FLAG BITS ②				PRINT OUT SUBFRAME WORD NUMBER EACH MF TIME
1	1	TEMP #1	X, FLIP POSITION	X_0 FLIP POSITION			X [illegible] TEMP
2	0	TEMP #2	Y, FLIP POSITION	Y_0 FLIP POSITION			Y [illegible] TEMP
3	0	TEMP #3	Z, FLIP POSITION	Z_0 FLIP POSITION			Z [illegible] TEMP
4	0	TEMP #4	X GIMBAL POS.	Y GIMBAL POS.			[illegible] FLIP OF [illegible] BASE
5	0	TEMP #5	Z GIMBAL POS.	THERMAL CONTROL			[illegible] ELECTRONICS
6	0	LEVEL SENSOR #1	SPARE	SPARE			
7	0	LEVEL SENSOR #2	R_1 RANGE	R_0 RANGE			
8	0	SUPPLY VOLTAGE	BLANK	BLANK			
9	0	①	X_3 FIELD OFFSET	X_1 FIELD OFFSET			
10	0	①	Y_1 FIELD OFFSET	X_2 FIELD OFFSET			
11	0	①	Y_3 FIELD OFFSET	Y_2 FIELD OFFSET			
12	0	①	Z_2 FIELD OFFSET	Z_1 FIELD OFFSET			
13	0	①	Z_3 FIELD OFFSET	CAL. MODE STATE			
14	0	①	OFFSET RATCHET ADD.	OFFSET RATCHET ADD.			
15	0	①	FIELD STATUS	CAL. ENABLE STATUS			
16	0	①	BLANK	BLANK			

NOTES

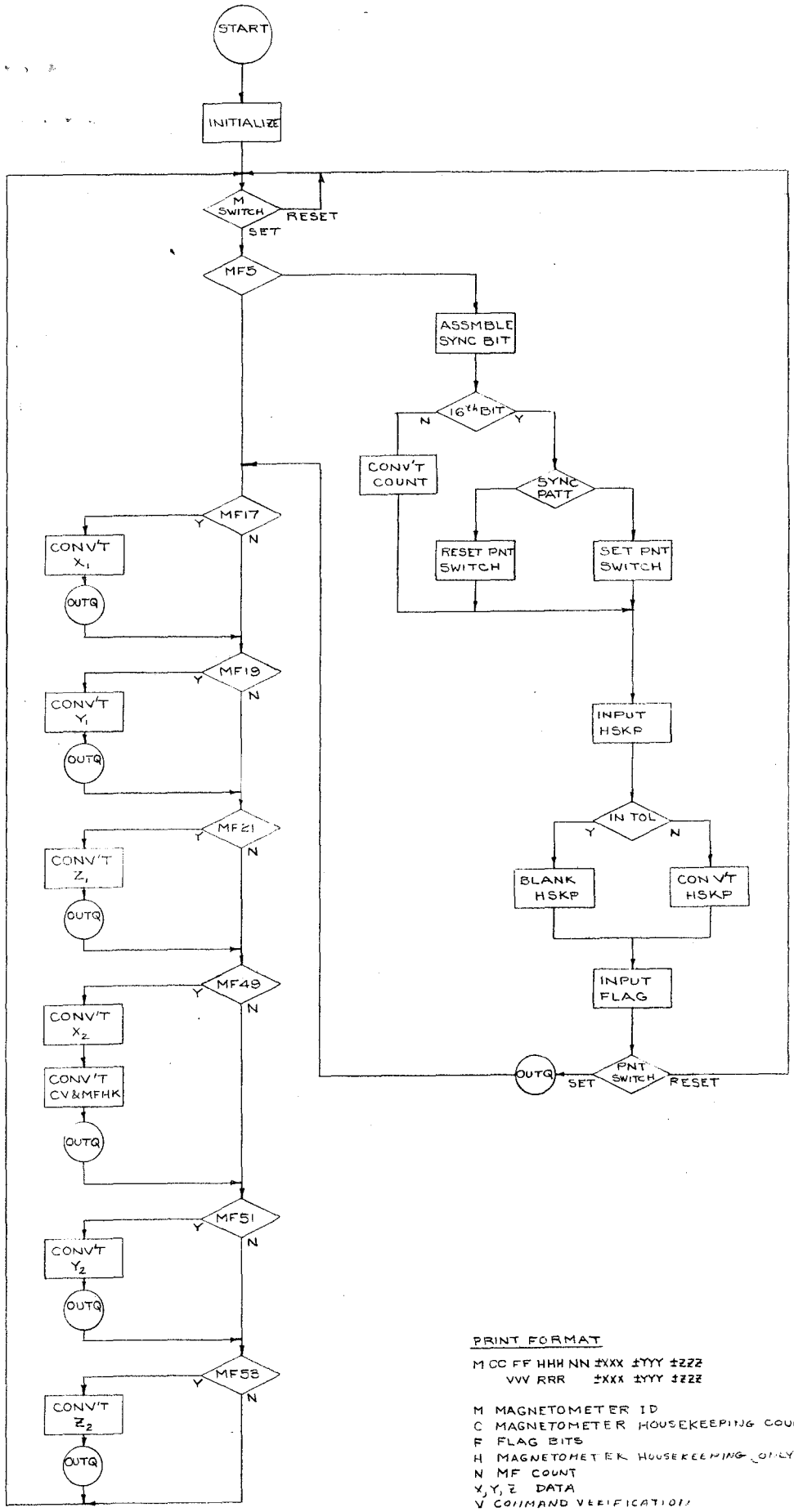
① ENGINEERING DATA REPEATS EVERY EIGHTH SUB-FRAME WORD

② SEE PAGE FOR FURTHER INFORMATION ON BEHAVIOR OF THESE BITS

③ ENGINEERING DATA IS PRINTED EVERY MAIN FRAME OCCURRENCE OF MF WD #5 (WHEN OUT OF TOLERANCE)

LSM ALSEP MAIN FRAME WORD NUMBERS 17, 19, 21, 49, 51, 53 DATA FORMAT

MAIN FRAME WORD #	ASSIGNMENT OF BITS 9	8	7	6	5	4	3	2	1	0	PROCESSING
17, 49	SIGN	X SCIENTIFIC DATA									PRINT IN X COLUMN
19, 51	SIGN	Y SCIENTIFIC DATA									PRINT IN Y COLUMN
21, 53	SIGN	Z SCIENTIFIC DATA									PRINT IN Z COLUMN



PRINT FORMAT

M CC FF HHH NN ±XXX ±YYY ±ZZZ
VVV RRR ±XXX ±YYY ±ZZZ

M MAGNETOMETER ID
C MAGNETOMETER HOUSEKEEPING COUNT
F FLAG BITS
H MAGNETOMETER HOUSEKEEPING (ONLY WHEN OUT OF RANGE)
N MF COUNT
X, Y, Z DATA
V COMMAND VERIFICATION
R MF HOUSEKEEPING

MAGNETOMETER EXPERIMENT
FLOW DIAGRAM