

154 PULL OUTS

1/11/72

MSC-07274  
8/23/72



NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

# \* COMMAND/SERVICE MODULE SYSTEMS HANDBOOK

used on  
CSM 114 (Apollo 17)

AUGUST 23, 1972

PREPARED BY

FLIGHT CONTROL DIVISION

MANNED SPACECRAFT CENTER  
HOUSTON, TEXAS



- 1 STANDARDS
- 2 SEQUENTIAL EVENTS SYSTEM
- 3 ELECTRICAL SYSTEM
- 4 ENVIRONMENTAL CONTROL SYS
- 5 FUEL CELL/CRYOGENICS SYSTEM
- 6 COMMUNICATIONS SYSTEM
- 7 INSTRUMENTATION
- 8 GUIDANCE AND CONTROL SYSTEM
- 9 SERVICE PROPULSION SYSTEM
- 10 REACTION CONTROL SYSTEM
- 11 MISCELLANEOUS
- 12 LUNAR ORBIT EXPERIMENTS

INDEXING DATA

DATE	OPR	F	T	PGM	SUBJECT	SIGNATOR	LOC
8-23-72	MSC	MSC-07274	R	APD	*	Brooks	031-22A

TABLE 6-XXIV.- DATA STORAGE EQUIPMENT (DSE)

ITEM	FUNCTION and/or PARAMETERS
1. Weight	42.5 pounds
2. Cooling	ECS primary glycol loop
3. Electrical Power	
a. DC Voltage	$28^{+2}_{-3}$ Vdc
b. AC Voltage	115/200 Vac, 400 Hz, 3-phase
c. Total Power Consumption	50 watts
4. Operational Stability	
a. Record Speed	3 seconds (max) from activation
b. Playback Speed	5 seconds (max) from activation
c. Tape Speed	The speeds will be within $\pm 0.5\%$ of specification with a 400 Hz absolute power frequency
d. Flutter	
(1) 7.5 ips Record and Playback	3% peak-to-peak (max) with no vibration present; flutter bandwidth will be from 0.2 to 1250 Hz.
(2) 1.875 ips Record and 60 ips Playback	3% peak-to-peak (max) with no vibration present; flutter bandwidth will be from 0.2 to 2500 Hz.
5. CSM PCM Input	
a. Bit Rate	1.6 or 51.2 kbps
b. Level	"1" = $6 \pm 0.8$ Vdc "0" = $0^{+0.8}_{-0.0}$ Vdc
c. Type	NRZ-L
d. Frequency Stability	5 parts in $10^4$
6. CSM PCM Output	
a. Bit Rate	51.2 kbps.
b. Level	"1" = $6 \pm 0.6$ Vdc "0" = $0^{+0.5}_{-0.0}$ Vdc
c. Type	NRZ-L

TABLE 6-XXIV.- DATA STORAGE EQUIPMENT (DSE) - Continued

ITEM	FUNCTION and/or PARAMETERS
d. Bit Error Rate (1) HBR Dump (2) LBR Dump	1 in $10^5$ (max) 3 in $10^5$ (max)
7. CSM PCM Data Rate Timing a. Wave Form b. Frequency c. Level	Square 1.6 or 51.2 kHz "1" = $6 \pm .8$ V "0" = $0 \begin{matrix} +.8 \\ -.0 \end{matrix}$ V
8. SIM PCM Input a. Bit Rate b. Level c. Type	64 kbps "1" = $5 \pm 1$ Vdc "0" = $0 \pm .6$ Vdc NRZ-L
9. SIM PCM Output a. Bit Rate b. Level c. Type d. Error Rate	64 kbps "1" = $6 \pm .6$ Vdc "0" = $0 \begin{matrix} +.5 \\ -.0 \end{matrix}$ Vdc NRZ-L 3 in $10^5$ (max)
10. SIM PCM Data Rate Timing a. Wave Form b. Frequency c. Level	Positive "Rectangular" Pulse $64 \pm 1\%$ kHz "1" = $5 \pm 1$ V "0" = $0 \pm .6$ V
11. LM PCM Data a. Bit Rate b. Type	1.6 kbps Serial, Manchester Code
12. Analog Inputs a. Level b. Frequency (1) 1.875 ips	0 to 5 Vdc 12.5 to 2500 Hz

TABLE 6-XXIV.- DATA STORAGE EQUIPMENT (DSE) - Continued

ITEM	FUNCTION and/or PARAMETERS
(2) 7.5 ips	50 Hz to 10 kHz
c. Frequency Response	
(1) 7.5 ips Record and Playback	4 dB (max) between 50 and 5000 Hz, 6 dB (max) between 50 and 10,000 Hz.
(2) 1.875 ips Record and 60 ips Playback	6 dB (max) between 12.5 and 2500 Hz.
d. Playback Voltage	Within 2 dB of the input at 1000 Hz.
e. Distortion	2% (max)
f. Signal-to-Noise Ratio (SNR)	
(1) 1000 Hz output of 5 volts peak-to-peak	35 dB (min)
(2) 10,000 Hz output of 5 volts peak-to-peak	30 dB (min)
g. Output Voltage	5 Vdc $\pm$ 5% peak-to-peak at 1000 Hz
13. Capabilities and Characteristics	
a. Tape Length	2262 ft (min)
b. Tape Width	1 inch
c. Record Times	4 hrs, at 1.875 ips 60 min, at 7.5 ips
d. Playback Times	7.5 min LBR at 60 ips 60 min HBR at 7.5 ips
e. Rewind Time	7.5 min (full tape) at 60 ips
f. Record/Playback Tracks	
(1) 6-Analog	3 active and 3 spare
(2) 1-CSM PCM	1.6 or 51.2 kbps, NRZ-L
(3) 1-SDS PCM	64 kbps, NRZ-L
(4) 1-LM PCM	1.6 kbps, Manchester split-phase
(5) 1-Voice	CSM/LM
(6) 1-Timing	500 Hz in LBR No Timing in HBR

TABLE 6-XXIV.- DATA STORAGE EQUIPMENT (DSE) - Concluded

ITEM		FUNCTION and/or PARAMETERS				
1b. Tape Recorder Mode:						
Data Source	Record			Playback		
	Speed	Control	Data	Speed	Control	Data
CSM	1.875 ips	Bit Rate Select Switch	Voice 1.6 kbps	60 ips (2:1)	Auto Speed Select ②	Voice 51.2 kbps
	7.5 ips		Voice 51.2 kbps	7.5 ips (1:1)		Voice 51.2 kbps
SDS ①	7.5 ips	Bit Rate Select Switch	64 kbps Analog	7.5 ips	Auto Speed Select ②	64 kbps Analog
LM	1.875 ips	Bit Rate Select Switch	1.6 kbps	60 ips	Tape Recorder LM PCM Switch (S49)	51.2 kbps
	7.5 ips					12.8 kbps

NOTES: ① Requires CSM HBR selection.  
② Auto Speed Select circuitry is controlled by the presence (LBR) or absence (HBR) of a 500 Hz signal on track NBR. 1 of the tape.