Data Logging Storage and Bandwidth

Storage needed, data rate and recording time on a card or disk for a data logger from channels, sampling rate, sample size, overhead and logging period.

Method: Data volume arithmetic

Input parameters

Unit system: SI

Parameter	Value	Unit
Channels	16.000	
Samples per second per channel	100.00	Hz
Bytes per sample	4.0000	
Overhead (timestamps, headers) as a share of the data	25.000	%
Logging period	30.000	d
Storage capacity (GB)	32.000	

Calculated results

Parameter	Value	Unit
Data rate (kB/s)	8.0000	
Data per day (MB)	691.20	
Data for the logging period (GB)	20.736	
Time to fill the storage	46.296	d

Notes for this case

• The raw data rate is channels × samples per second × bytes per sample, increased by the overhead for timestamps, file headers and the file system. Storage here uses decimal units (1 GB = 10^9 bytes) as card makers do. Compression, event-triggered logging or storing averages instead of raw samples cut storage by large factors; vibration waveforms at kHz rates fill cards in days while 1 s process trends last for years.

Formula and method

$$R = n_c f_s b(1 + k_o), \quad D = Rt, \quad t_{full} = \frac{C}{R}$$

Variables

n_c	Channels	-
f_s	Samples per second per channel	1/s
b	Bytes per sample	-
k_o	Overhead (timestamps, headers) as a share of the data	-
t	Logging period	s
C	Storage capacity (GB)	-
R	Data rate (kB/s)	-
D_{day}	Data per day (MB)	-
D	Data for the logging period (GB)	-
t_{full}	Time to fill the storage	s

Method and standards

Data logging.

Assumptions and limits

- Constant sampling; no compression.

References

Data volume arithmetic

Report details

Report reference	FCC-92W2-4BHN (the same inputs always give the same reference)
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Calculator	Data Logging Storage and Bandwidth
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Software release	FireCAD Calc, release of 22 November 2026
Release checks	3 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/instrumentation/signals-calibration/data-logging-storage

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.