COMPIT™
ELECTRONICS

2.5" SATA SSD DATASHEET

CMPTSSD25256GB

CMPTSSD25512GB

CMPTSSD251TB

CMPTSSD252TB

Version: 1.0

Contents

I. Introduction

1 Overview

COMPIT SATA SSD (Solid State Drive) is a high performance and high reliability storage device based on NAND Flash technology that designed to solve the bottleneck of computing system by traditional hard disk drives. Our SATA SSD doesn't have a moving parts and it has a same host interface and same physical dimension with Hard Disk Drive, so it can be drop-in replaced with the hard disk drives without anything. With a high performance and low power consumption, Our SATA SSD can be a good storage device for NB and Tabletop PC.

COMPIT SATA SSD purely consists of semiconductor devices and NAND flash memories, which give rugged features against shock and vibration, used in extreme environment such as industrial PC to increase MTBF. Furthermore, Our SATA SSD has highly advanced flash memory management algorithm to guarantee higher performance and data integrity.

2 Part Type Introduction

This chapter is about the specifications of the 2.5" SATA Solid State Drive SSD with SATA III interface.

Model No.	Capacity	Interface	TBW
CMPTSSD25256GB	256GB	SATAIII	150 TBW
CMPTSSD25512GB	512GB	SATAIII	240 TBW
CMPTSSD251TB	1TB	SATAIII	480 TBW
CMPTSSD252TB	2TB	SATAIII	960 TBW

Table 1 Capacity Specifications

Capacity	Available Capacity	R / W(MB/s)
256GB	238GB	537/505
512GB	477GB	553/513
1TB	954GB	545/517
2TB	1098GB	550/505

Note: the maximum Read & Write performance test with CrystalDiskMark 8.0.4.

Outline

Based spec	Interface	SATAIII
	Dimension	100*70*7 mm
	Weight①	62~72 g
	Capacity	256GB / 512GB / 1TB / 2TB
	SDram	NA
	Flash type	TLC NAND Flash
Read/Write Performance②	Sequential Read	Up to 550MB/s
	Sequential Write	Up to 517MB/s
	4KB Random Read IOPS	Up to 44K
	4KB Random Write IOPS	Up to 26K
	Response Time	0.2ms
Power Consumption	Power Supply	5V±5%
	Standby	0.3W
	4KB Random Write	4W
Endurance	Write（TBW）	150TBW / 240TBW / 480TBW / 960TBW
	Read	Unlimited
Reliability	MTBF: >2,000,000 hours	
	Data retention: >20years @ 25℃	
	Data destroy do not support	
	Sudden power-off recovery support	
	S.M.A.R.T,NCQ,Trim and dynamic power management support	
	Static and dynamic wear-leveling	
	Bad block management algorithm	
	ECC: Supports BCH ECC 66 bits in 1024 bytes	
Environment	Storage temperature: -55~95 ℃	
	Operation temperature: 0~75℃	
	Humidity: 5%~95%	
	Vibration	15G (10 to 2000Hz)
	Shock	350G at 0.5ms
Warranty	3 years and within guaranteed TBW	

Table 2 outline of the driver

①, ②: The Read/Write performance and weight vary with different capacity of products.

The testing environment is below:

OS: Windows 10 64bit

CPU: AMD Ryzen 3100 3.60GHz

Memory: 8GB

Motherboard: X570

Test program: ATTOBenchMark V4.00 (sequential R/W speed)

HD Tune Pro V5.75 (sustainably R/W speed, access time)

CrystalDiskMark 8.0.4

Test Drive: CMPTSSD25256GB
CMPTSSD25512GB
CMPTSSD251TB
CMPTSSD252TB

II. Block Diagram

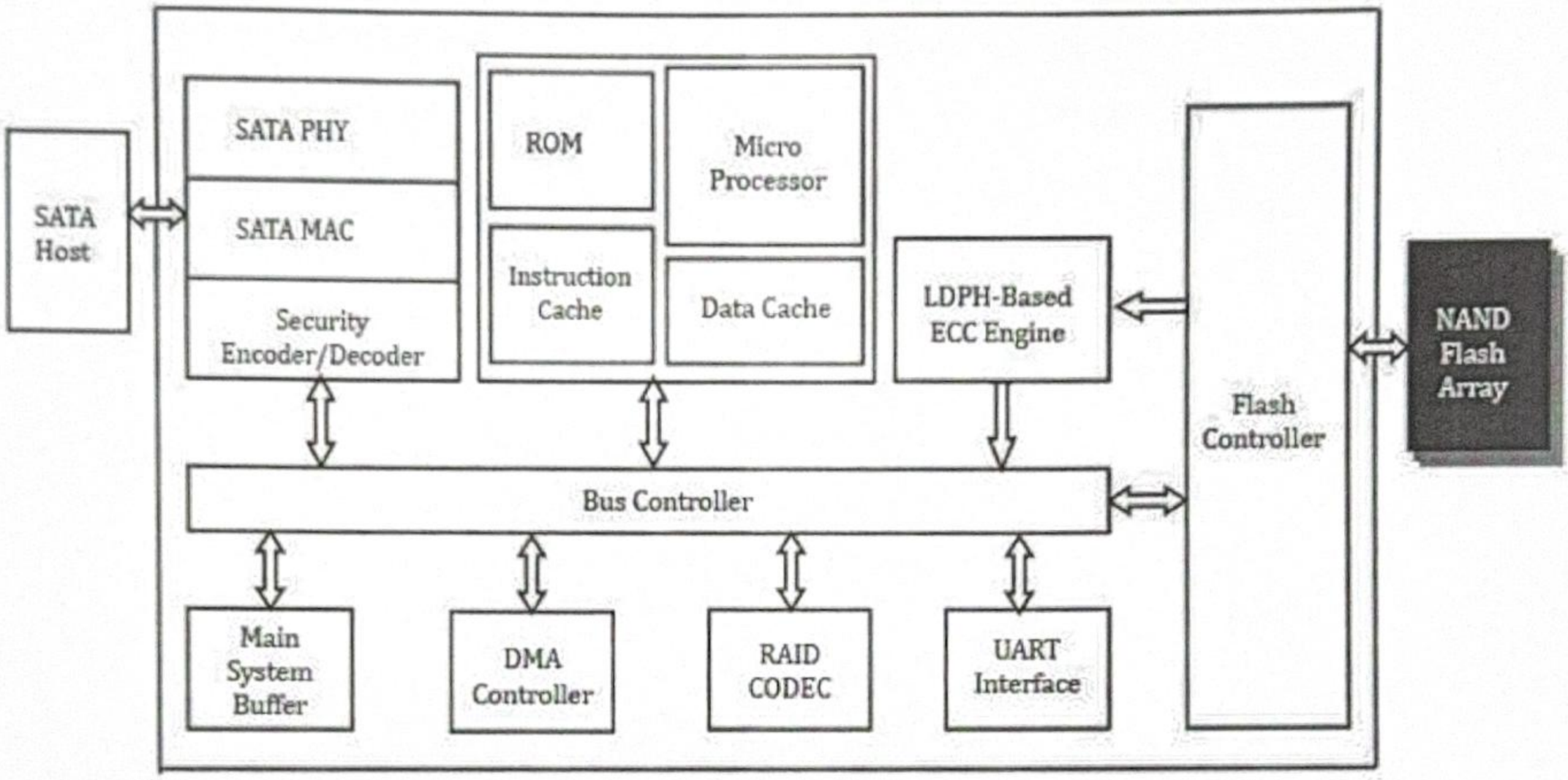

Figure 2 Block Diagram

IV. Product Specifications

4.1 Physical Dimensions

Parameter	Value
Length	100±0.1 mm
width	70±0.1 mm
height	7±0.1 mm

Table 3 Physical dimensions of the driver

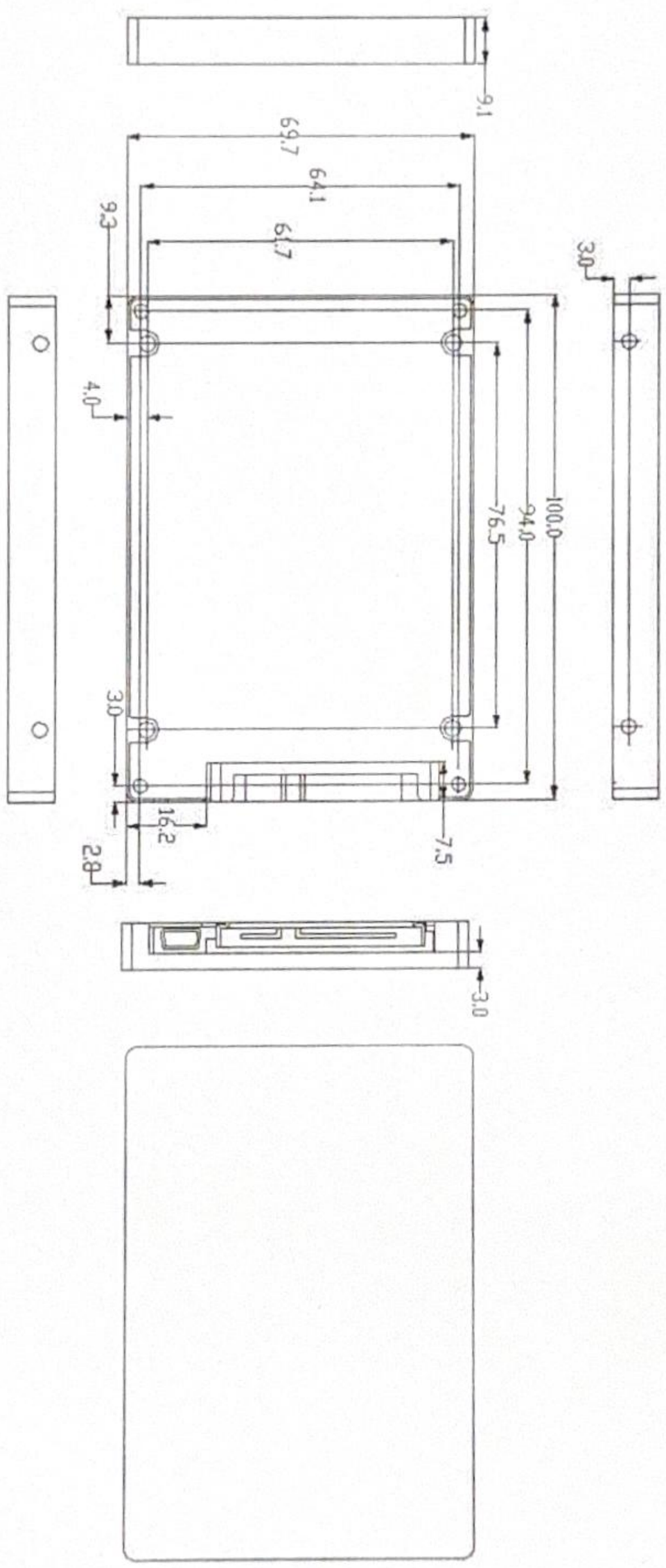

Figure 3 Physical dimensions

4.2 Interface Specification

4.2.1 Pin Assignr

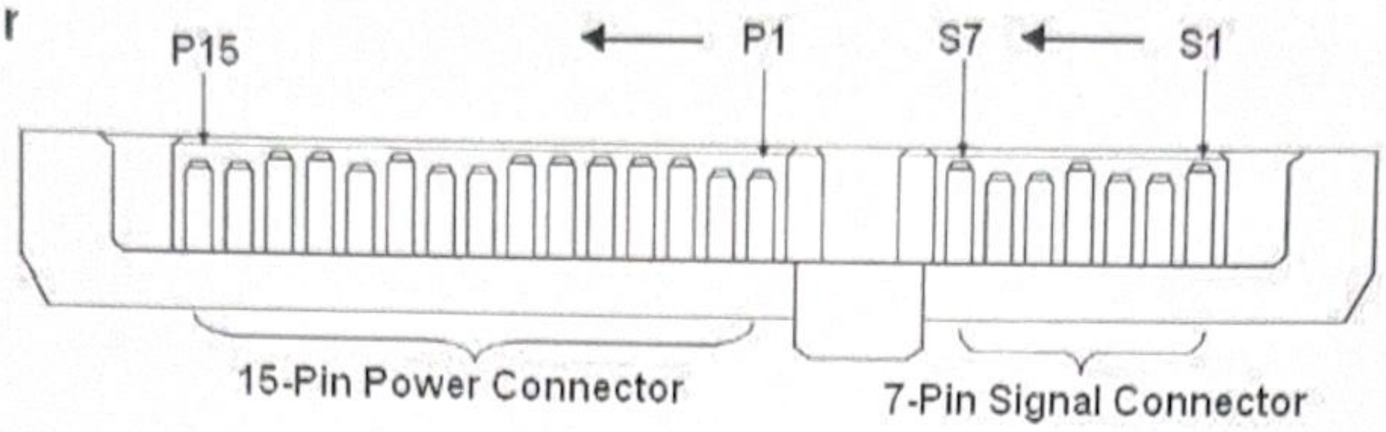

Figure 4 Pin connector

Pin number	Signal name	Description
S1	GND	2nd mate
S2	A+	Differential signal pair A
S3	A-	From physical layer electronics
S4	GND	2nd mate
S5	B-	Differential signal pair B
S6	B+	From physical layer electronics
S7	GND	2nd mate
P1	V33	3.3V power (unused)
P2	V33	3.3V power (unused)
P3	V33	3.3V power,pre-charge,2nd mate(unused)
P4	GND	1st mate
P5	GND	2nd mate
P6	GND	2nd mate
P7	V5	5V power,pre-charge,2nd mate
P8	V5	5V power
P9	V5	5V power
P10	GND	2nd mate
P11	DAS/DSS	Device activity signal/Disable staggered spinal(unused)
P12	GND	1st mate
P13	V12	12V power,pre-charge,2nd mate(unused)
P14	V12	12V power(unused)
P15	V12	12V power(unused)

Table 4 SATAIII interface pin assignment

4.2.2 Interface Mode

The interface of the 2.5" SATA SSD complies with the standard Serial ATA version 3.1:

① Host Transfer Rate is 600MB/s(6.0Gb/s)
② PIO mode 0,1,2,3,4
③ DMA mode 0,1,2
④ UDMA mode 0,1,2,3,4,5,6

V. Reliability

5.1 ECC Descriptions

Please refer to FIG. 5 that is a diagram illustrating an allocating method of a spare area in each page of a NAND flash memory, where in the specific ECC algorithm utilizes a Bose, Chaudhuri and Hocquengham (BCH) ECC algorithm. When a BCH 16 ECC algorithm encodes the data in the NAND flash memory, the parity code generated in the encoding process may occupy 28 bytes of the spare area in each page. When a BCH 24 ECC algorithm encodes the data in the NAND flash memory, the parity code generated in the encoding process may occupy 42 bytes of the spare area in each page. When a BCH 16 algorithm decodes the data in the NAND flash memory, the data can be decoded correctly if the error bit happened in two sectors (1024Bytes) is 16. When a BCH 24 algorithm decodes the data in the NAND flash memory, the data can be decoded correctly if the error bit happened in two sectors is 24.

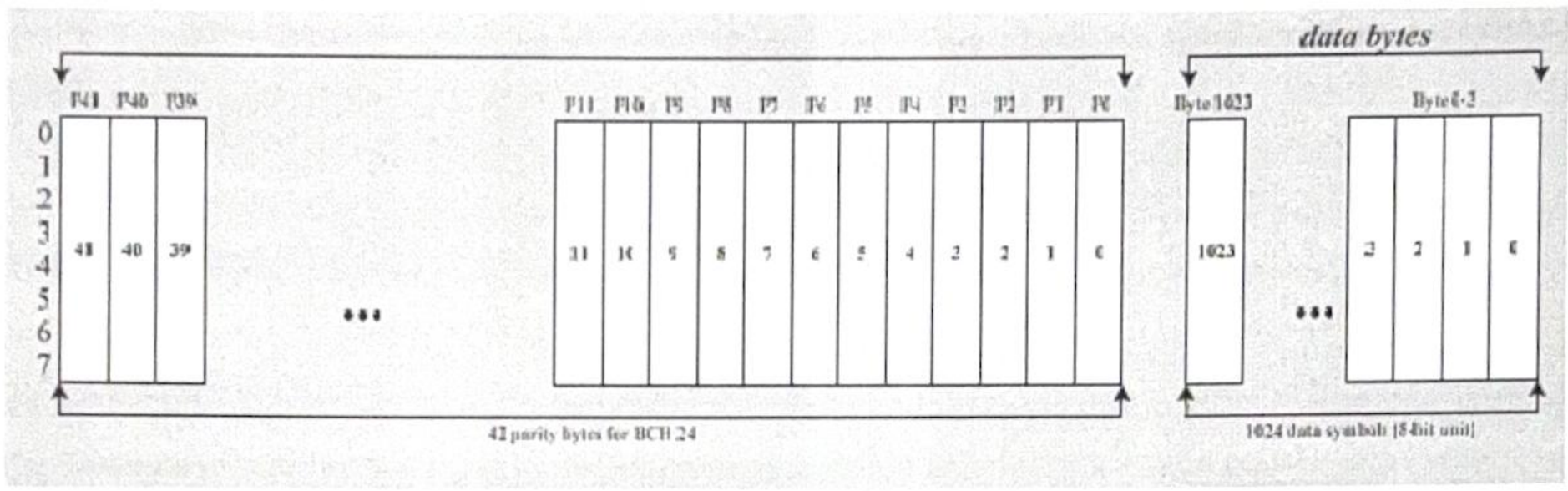

Figure 5 Allocation for ECC algorithm BCH in Nand Flash

5.2 Advance Wear-Leveling Algorithm

The NAND flash devices are limited by a certain number of write cycles. When using a file system, frequent file table updates is mandatory. If some area on the flash wears out faster than others, it would significantly reduce the lifetime of the whole device, even if the erase counts of others are far from the write cycle limit. Thus, if the write cycles can be distributed evenly across the media, the lifetime of the media can be prolonged significantly. The scheme is achieved both via buffer management and specific advanced wear leveling to ensure that the lifetime of the flash media can be increased, and the disk access performance is optimized as well.

5.3 S.M.A.R.T Function

S.M.A.R.T. is an acronym for Self-Monitoring, Analysis and Reporting Technology, an open standard allowing disk drives to automatically monitor their own health and report potential problems. It protects the user from unscheduled downtime by monitoring and storing critical drive performance and calibration parameters. Ideally, this should allow taking proactive actions to prevent impending drive failure. SMART feature adopts the standard SMART command B0h to read data from the drive. When the SMART Utility running on the host, it analyzes and reports the disk status to the host before the device is in critical condition.

VI. Ordering Information

Model No.	Capacity
CMPTSSD25256GB	256GB
CMPTSSD25512GB	512GB
CMPTSSD251TB	1TB
CMPTSSD252TB	2TB

Ⅷ. Serial production

Products in this series with serial production, a specific batch of goods is produced, followed by a downtime. After the downtime, the machines may be prepared to produce brand-new components and be restarted or stopped altogether until the next order comes in.

Ⅸ. Related documentation

For more information, visit https://compit.pro/