



## Paxton10 Video storage – MicroSD cards

### Overview

Many IP cameras contain inbuilt memory for storing video footage directly onto the camera – this is known as ‘Edge storage’. Edge storage has a number of benefits, including: scalability, no single point of failure, network bandwidth optimisation, and offline recording.

When storing footage onto the camera, it is important to know the differences between memory cards, their limitations, and their life span. This document highlights the most common types of memory card that you will come across, and how to decide which one is right for your cameras.

### Memory cards

#### SD cards

Firstly, to clarify some basic card types and abbreviations:

**SD cards (Secure Digital)**, also referred to as TF cards (Trans Flash), are today the most common type of memory card – SD cards are available in different physical sizes and technologies.

**SDHC cards (Secure Digital High Capacity)**, and **SDXC cards (Secure Digital Extended Capacity)** are enhancements to the original SD card, each providing different capacities.

Card Type	Memory	File system formatting
SD	Up to 2GB	FAT12 and FAT16
SDHC	2GB to 32GB	FAT32
SDXC	32GB to 2TB	EXFAT

SD cards are available in different physical sizes, most commonly full size (**SD**), and Micro (**MicroSD**). Each size card can exist as any of the above types, for example, a MicroSDHC card is simply an SDHC card in the ‘micro’ size format. Paxton10 cameras each contain a MicroSDXC card.

For the purpose of this document, the memory cards are referred to simply as SD cards, and the contents of this document applies to all of the above types of SD card.

## Capacity

The capacity of a card determines how much data can be stored on the card at any given time. The capacity required for video storage is largely determined by the below factors:

- The video quality and resolution of the camera
- The video frame rate
- The amount of days you want to store footage for

Use the Paxton video storage calculator < [www.paxton.info/5570](http://www.paxton.info/5570) > to estimate the capacity required.

## Class and Read/Write speed

The read/write speed of an SD card determines the speed that data can be written to, or read from, the card. The minimum, or sustained, read/write speed of a card is categorised by class:

	Minimum read/write speed	Advise usage
Class 2	2MB/s	Low resolution or low frame rate video recording
Class 4	4MB/s	
Class 6	6MB/s	High definition (HD) video recording
Class 10	10MB/s	Ultra-high definition (UHD) or 4K video recording
UHS Class 1 (U1)	10MB/s	
UHS Class 3 (U3 or UIII)	30MB/s	

Some cards may also specify a read/write speed that is different from its class. This speed is typically its momentary speed – the read/write speed if used in short successions.

Additionally, UHS classes can have different bus interfaces – the bus interface used may determine the card’s maximum read/write speed. A UHS-I bus has a maximum read speed of 104MB/s, and a UHS-II bus has a maximum read speed of 312MB/s.

**When choosing a memory card for video storage, the class (table above) is the most important factor to go by when considering read/write speed. Ensure an SD card is chosen that has a class of 6 or above for HD recording, or a class of 10, U1 or U3 for 4K recording.**

## Read/Write cycles

All memory cards have a life span – the life span of a memory card is typically determined by its number of P/E (Program / Erase) cycles, that is, the number of times each memory cell can be written to.

The number of P/E cycles a memory card has is determined largely by the technology used.

SLC (Single Level Cell), is the most robust technology, containing a single ‘bit’ of data per memory cell. Most commonly used in high end electronics and industrial uses, SLC is very reliable and usually comes with the highest life span.

MLC (Multi Level Cell), similar to SLC, however containing 2 bits of data per memory cell. MLC is cheaper than SLC, however is not as durable or reliable, with a reduced life span.

TLC (Triple Level Cell), contains 3 bits of data per memory cell. TLC is the most commonly used in consumer electronics, however, it trades larger capacity with shorter life span than the other technologies.

	SLC	MLC	TLC
P/E cycles	50,000 to 100,000	1,500 to 10,000	300 to 1,000

Example: an MLC memory card may be filled up, erased, then filled up again, up to 10,000 times. Other types not specified here include 3D TLC (3-Dimensional TLC), eMLC (Enterprise Multi Level Cell), QLC (Quad Level Cell), and more.

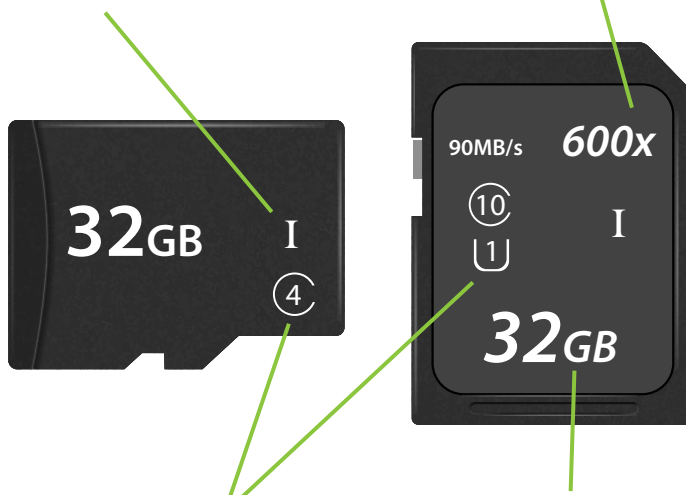
For video recording, the type of card used will determine the expected life span of the card and therefore how often you must swap the SD cards for reliable performance.

## Know your SD card

Most SD cards will contain the critical detail printed onto them:

**Bus interface:** There are currently 2 bus interfaces, 'I', which has speeds up to 104MB/s, and 'II', which has speeds up to 312MB/s.

**Speed multiplication:** It is common for a number with an 'x' to be printed, such as 10x, or 533x, this is simply a multiplication of how much faster the SD card is compared to a standard CD-ROM



**Class:** The speed class can be identified as a number in a C, or for UHS a number in a U.

**Capacity:** How much data the card can store.

## Paxton10 cameras

Paxton10 Pro series cameras come inbuilt with a 256GB Class 10 TLC MicroSDXC card. Paxton10 Core series cameras come inbuilt with a 64GB Class 10 TLC MicroSDXC card.

This memory card is considered a consumable and is not covered by Paxton's 5-year warranty.

## Replacing the SD card

Where required, the internal memory card can be replaced with a new card.

When replacing the SD card in a Paxton10 camera, you should consider the amount of data you require to store and understand that the technology of the card you choose will determine the longevity. The replacement card must be no bigger than 256GB. We recommend using a Class 10 TLC U3 MicroSDXC card.

To replace the internal SD card:

- 1) Disconnect the camera from the network
- 2) Using the tool provided, remove the outer security fixings which cover the SD card slot

For the Paxton10 Core Mini-Bullet, Pro Mini-Bullet, Core Turret, Pro Turret and Pro Vari-focal Bullet cameras this will be a small panel with 2 security screws.

For the Paxton10 Core Mini-Dome cameras, the Dome housing should be removed using the 3 security screws. The SD card will be visible on the circuit board.

- 3) Push the memory card inwards to release it from its socket
- 4) Carefully remove the memory card, then insert the new MicroSD memory card
- 5) Push the memory card firmly until it clips in
- 6) Re-secure the outer casing, then plug back into the network
- 7) Format the SD card within the Paxton10 software

Alternatively, video can be recorded to a network location. No internal memory card is required.





