# Flash Memory Best Practice

*MAEN344, 2020-11*

English

**User's Guide for Flash Memory Best Practice**

# Foreword

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Products described or referenced in this document are designed to be connected, and to communicate information and data via a secure network. It is the sole responsibility of the system/product owner to provide and continuously ensure a secure connection between the product and the system network and/or any other networks that may be connected.

This manual describes best practice for flash memory.

For information and updates, see *https://www.beijerelectronics.com*.

Order no: MAEN344

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# 1 Introduction

This document describes how the flash memory of X2 panels should be used in the best way to reduce unneccessary wear and possible premature failure.

As for all memory types they have an expected lifetime. The purpose for this document is to point out the best methods to reduce the risk for data loss or even potential failure for the built-in flash memory.

# 2 Recommendations

iX Developer 2.40 SP5 introduces the capability to use external SD card on X2 devices with SD card support. An SD card is easy to replace compared to a built-in memory.

- Beijer Electronics AB recommends you to use SD card instead of the built-in flash memory when extensive data logging is performed.
- Scripting towards the database can cause an increase in write and affect the general sustainability and performance of the database.

## 2.1 SD card and USB

Recommendations of use:

- Always use Industrial Grade both for SD card and USB.
- Use SD/USB with memory transfer rate x32/4.8 or higher.
- Avoid filing USB and SD card to above 90% as it may affect permanence.

Tested brands:

- Trancend Industrial 2GB.
- SanDisk Ultra 4GB C:10.
- SanDisk Extreme 64 GB C:4
- Inodisk Industrial 2GB C:10.

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**Note:**
SD card and USB must be formatted with FAT / FAT32, not NTFS.

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## 2.2 Optimizing Performance in iX Developer

The following section present a couple of issues to consider in order to optimize the iX Developer project.

### 2.2.1 Maximizing the Lifetime of the Storage Media

The storage media in the iX panel is based on NAND flash. Flash SSD's have no moving parts, which give high and reliable performance. The flash SSD can handle data very fast and efficiently and the data is controlled by the drive manufacturers' confidential algorithm.
As the algorithm is intellectual property it is not possible to calculate the lifetime. The drive manufacturers only publish the numbers of reads and writes.
Best practice is to minimize the number of writes to maximize the lifetime of the flash SSD. Follow the advice below to reduce the risk of premature wearout (before the estimated lifetime). A non working flash SSD stops the panel from operating.

- Do not log values with higher accuracy than needed. For example, avoid logging of floating point values.
- Reduce high fluctuating values by using the hysteresis functionality in the connected controller.

- Collect values with high fluctuating values in the same logger and do not mix with stable values. Collect slow changing values in other loggers.
- Do not log with higher refresh rate than needed.
- Disable logging completely when information is not needed, for example when the machine is not running.
- Use the default setting "Log changes only" in the property setting of the Data logger.
- Keep the log size to a minimum, as few rows as needed.
- Avoid extensive filewriting when controlling storage via script.

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**Note:**
For applications with extensive data logging using a external SD card has several benefits.

1. SD card size is larger than the built in flash.
2. SD cards can be purchased in different types of flash with different write cycle counts.

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