# BrightSign Tech Note

## Selecting Compact Flash Cards

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**Summary**

When using a BrightSign Product, your content and scripts are loaded onto a Compact Flash (CF) card. Although the CF interface is standardized, there are a wide range of performance, compatibility, and reliability issues with different CF card brands and models. Roku strongly recommends that you use "industrial rated" CF cards with BrightSign.

**Avoiding CF Card Corruption due to "Read Fatigue"**

Failure to use an Industrial CF card can result in files on the CF card becoming corrupt after a period of time. CF cards use NAND flash memory chips. These chips are rated at a certain number of "block reads" before a particular block may have a read error. Different types of NAND flash are more susceptible to these read errors than others. For example, "multi-level" flash chips are much more susceptible to this read issue than "single level". CF card controllers (the chip inside the CF card that controls the flash memory and interfaces with the CF connector) are responsible for eliminating these read errors as well as write errors through various strategies. These include "wear leveling" when writing, automatic error correction on read, re-writing a block that is becoming susceptible to read errors, and moving blocks around in the NAND chip that are repeatedly read over and over. If the CF card is designed correctly for repeated use, the CF card user will never notice read or write issues. However, not all CF cards are designed this way: in particular, certain models of consumer CF cards are not designed for repeated read use.

In a typical BrightSign application, there might be an "attract video loop". If this video is fairly short, then a small number of flash blocks will be repeatedly read. Over a month or so, the number of times the attract loop is read can be enough to trigger the "fatigue read errors" if the CF card's controller chip is not designed correctly to handle and eliminate them. "Industrial rated" CF cards are designed with this high-repeated use in mind. Consumer CF cards may be designed in lower cost or quality ways that assume a digital camera is the typical usage scenario.

**Update.rok CF card errors**

There is a small bug in the 1.0 BrightSign software related to using the "update.rok" upgrade method. The issue does not always show itself, but when it does, a CF card may fail 'chkdsk' on a PC after use. This failure will not cause the card to fail in a BrightSign use and is innocuous. However, if you wish to avoid it, use the "update_save.rok" upgrade method with a separate update card than the card your digital sign content and scripts are on. This issue will be fixed in the 1.1 BrightSign software update. Upgrade files are discussed in the BrightSign User Guide.

**Speed**
We have not found a modern CF card that did not have sufficient read speed for digital sign and kiosk applications with standard definition video. In general you want a card that can sustain over 3 megabytes per second read rates, with 4 megabytes per second easy to find and recommended. You can test a card's speed with BrightSign by placing a file on it, and using the shell "readperf" command (see the BrightSign User Guide on shell instructions).

**BrightSign Compatibility**
BrightSign is compatible with most CF cards, but may not be 100% compatible with every model. As of the 1.0.73 software version, we are aware of two incompatible cards: "Dane-elec 133xs 1Gb" and "Kingston 133x 1Gb". Although there are standards for CF card interfaces, most chips are slightly different. We have tested with a large number of chips, and at this point have high compatibility. Earlier BrightSigns were less compatible, and if you have one of these you may want to upgrade your software. See the BrightSign user guide for a discussion of the two ROMs in a BrightSign (boot vs. run mode), and the upgrade and CF card compatibility issues with each ROM.

When deploying a group of BrightSigns into the field, Roku **strongly** recommends that you test the CF card with the BrightSign software version you will use before deployment, and insist your CF card duplicator not change CF brands or model numbers from the model number you have approved.