

Flash Stream File Format

1. Introduction

This document describes the file format for the TI BMS FlashStream (.bqfs) files. These files contain instructions for I²C or HDQ operations required for updating a device's instruction flash (IF) or data flash (DF). The only difference between the I²C commands and the HDQ commands is that the HDQ commands do not include the i2cAddr parameters. Unless noted otherwise, this document references the I²C commands. To determine the corresponding HDQ commands, simply remove the i2cAddr parameter if present.

2. File Structure

The .bqfs file is an ASCII text file which contains both commands and data. Each line of the file represents one command and potentially XX bytes of data, as described below. No line will contain more than 96 data bytes. The first two characters of each line represent the command, followed by a ":".

"W:" – indicates the line is a command to write one or more bytes of data.

"R:" – indicates the line is a command to read one or more bytes of data.

"C:" – indicates the line is a command to read and compare one or more bytes of data.

"X:" – indicates the line is a command to wait a given number of milliseconds before proceeding.

"D:" – indicates the line is a command to create a "dynamic data space".

"T:" – indicates the line is a command to reset the checksum calculation to 0.

"A:" – indicates the line is a command to add data to the current checksum calculation.

"K:" – indicates the line is a command to write the current checksum to a register.

White space is used to separate fields within the .bqfs file. Each line contains one and only one of the above commands.

3. Dynamic Data Space

Some of the Flash Stream commands interact with "dynamic" or "volatile" data from the device. To support this, Flash Stream makes use of a "dynamic data space" that acts as a storage location for dynamic data.

The "create data space" command "D:" instructs the host to allocate an array of bytes that will serve as this dynamic data space. Some commands, such as the Read and Write commands can address data in the dynamic data space using the following syntax: %X, where X is a decimal integer representing the offset of a data byte in the dynamic data space.

4. Write Command

The write command "W:" instructs the host to write one or more bytes to a given I²C address and given register address. The format of this sequence is:

"W: i2cAddr RegAddr Byte0 Byte1 Byte2...".

For example, the following:

W: AA 55 AB CD EF 00

indicates the host should write the byte sequence 0xAB 0xCD 0xEF 0x00 to register 0x55 of the device addressed at 0xAA.

Or more precisely, it indicates to write the following data to the device address 0xAA:

0xAB to register 0x55
0xCD to register 0x56
0xEF to register 0x57
0x00 to register 0x58

The write command can also be used to write data from the “dynamic data space” to the device by specifying the dynamic data space offset instead of an actual data byte as indicated above.

For example,

W: AA 55 %1 %2 %3

indicates that the host should write the bytes located in the dynamic data space at offsets 1, 2, and 3 to the device registers 0x55, 0x56, and 0x57.

5. Read Command

The read command “R:” instructs the host to read a given number of bytes from a given I²C address and given register address and store that data in the “dynamic data space”. The format of this sequence is:

“R: i2cAddr RegAddr NumBytes DDSOffset”

For example, the following:

R: AA 55 100 %5

indicates the host should read 100 (decimal) bytes of data from register address 0x55 of device address 0xAA and store it in the dynamic data space starting at offset 5 (decimal).

6. Read and Compare Command

The read and compare command is formatted identically to the write command. The data presented with this command should match the data read exactly, or the operation should cease with an error indication to the user. The format of this sequence is:

“C: i2cAddr RegAddr Byte0 Byte1 Byte2...”

An example of this command is as follows:

C: AA 55 AB CD EF 00

7. The Wait Command

The wait command indicates that the host should wait a minimum of the given number of milliseconds before continuing to the next row of the flash stream. For example, the following:

X: 200

indicates that the host must wait at least 200ms before continuing.

8. Reset Checksum Command

The “reset checksum” command “T:” instructs the host to reset its internal 16-bit checksum register to 0. There are no parameters for this command.

T:

9. Add To Checksum Command

The “add to checksum” command “A:” instructs the host to add the specified data to its internal 16-bit checksum register. This data can either be a constant value, in which case it will be a 2 digit hexadecimal number, or it can represent a value from the “dynamic data space”, which will be represented by %X, where X is the offset in the dynamic data space.

For example,

A: AB

indicates that the value 0xAB should be added to the checksum register.

A: %3

indicates that the value stored in the dynamic data space at offset 3 (decimal) should be added to the checksum register.

10. Write Checksum Command

The “write checksum” command “K:” instructs the host to finalize the checksum calculation and write it to the specified hardware register. The value to be written is the result of the following formula.

result = 255 – x, where x is the least significant byte of the internal checksum register.

The format of the command is “K: i2cAddr RegAddr”.

For example,

K: AA 60

instructs the host to write the 8-bit result of the above calculation to hardware register 0x60 of the device addressed at 0xAA.