

Rapid Prototyping Environment For Climate Control Development



ECE480
Design Team 4

Application Note

Flash Memory Access

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Introduction

The flash memory of MicroAutoBox and DS821 board can be used to save simulation data and parameters and reload them the next time the real time application is executed. By enabling flash memory and flight recorder, we can run applications in local addresses of our hardware device, MicroAutoBox. That makes it possible to implement operation we need in vehicles without computer.

Flash Memory Setup Block Demo

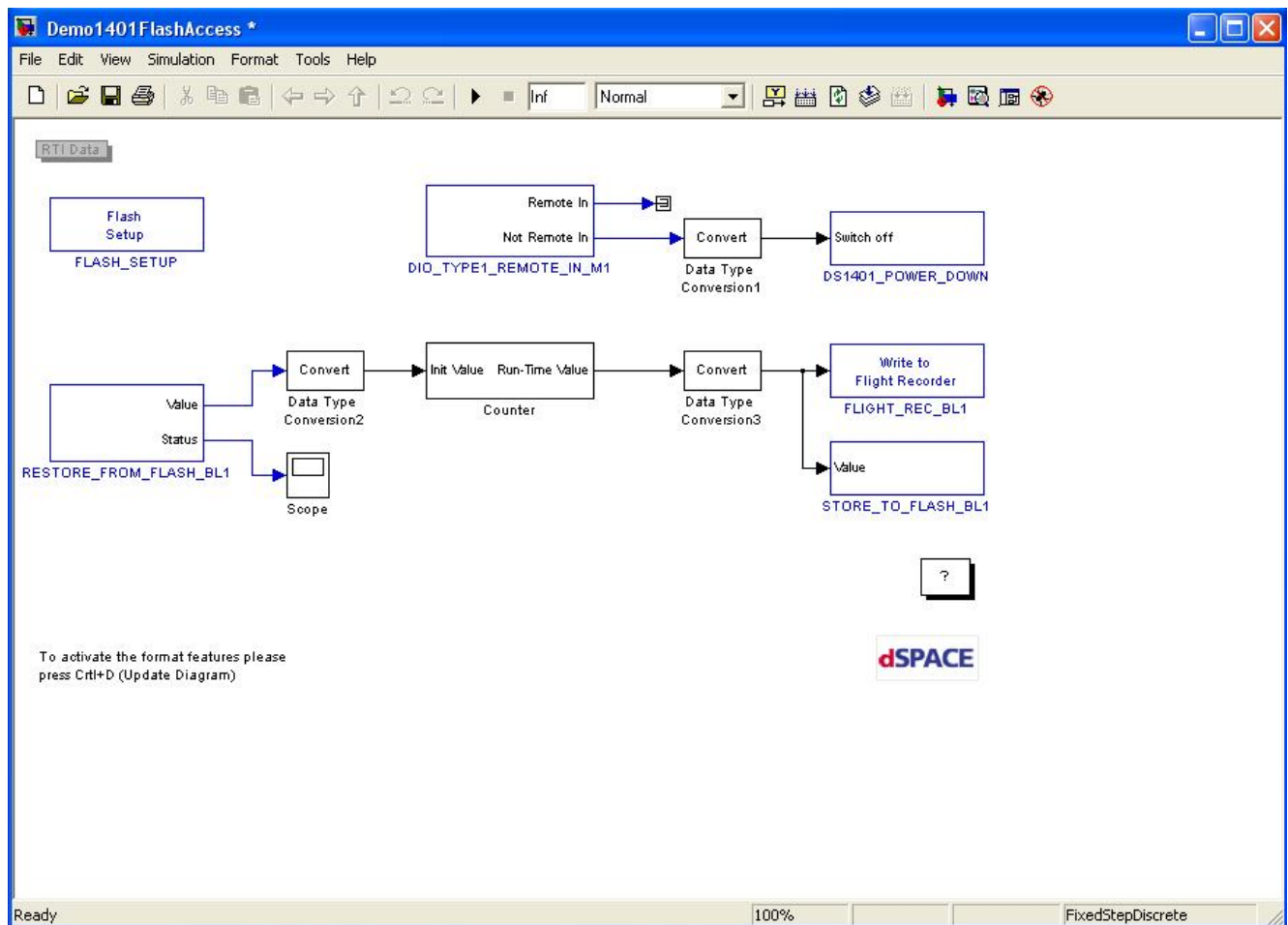


Figure 1: Flash Access Demo

Search for Blocks

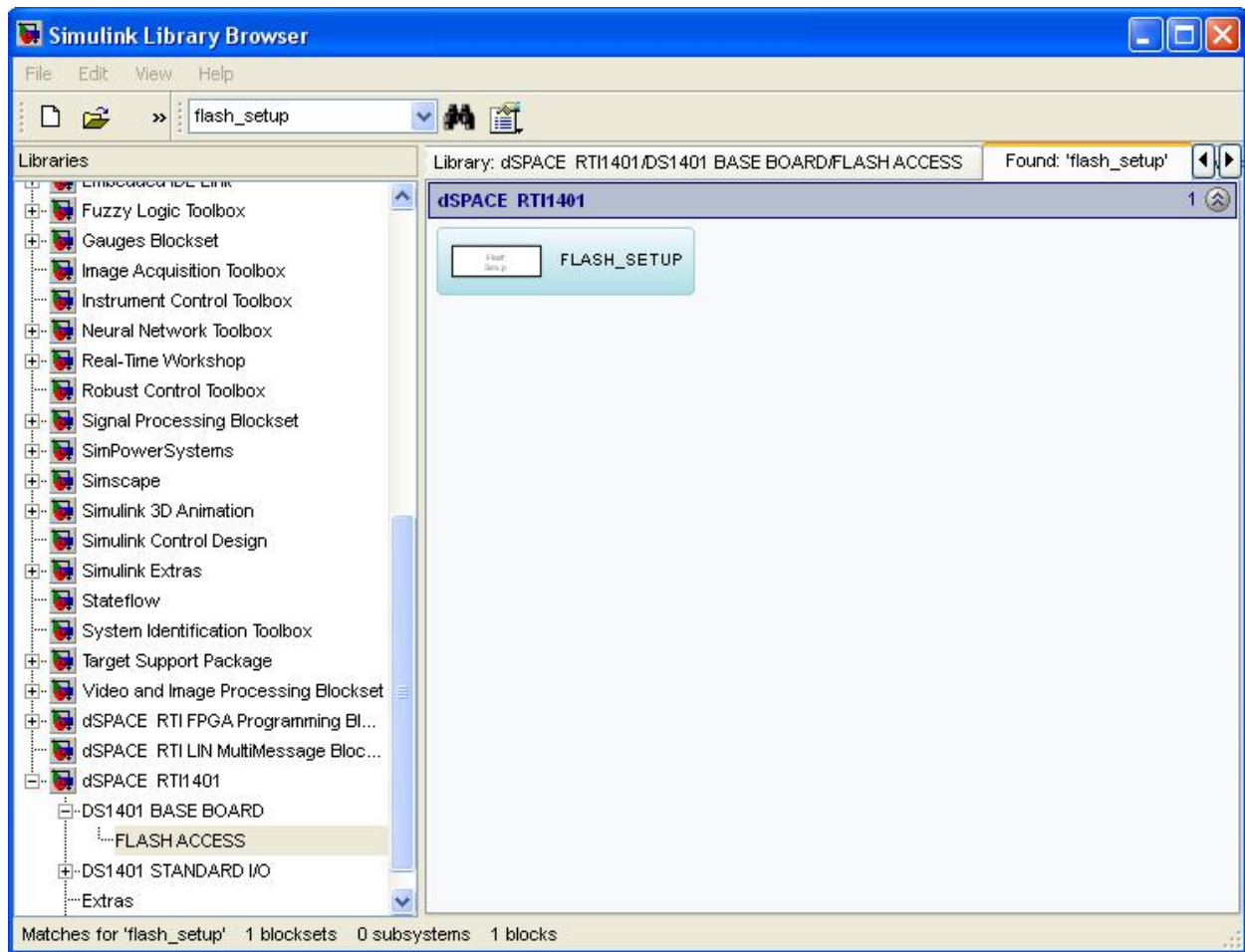


Figure 2: Simulink Library Browser

To search blocks you may need, type the name of block into the search box(see figure below) in Simulink Library Browser (figure above).

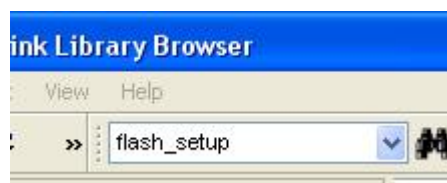


Figure 3: Search Box

Flash_Setup

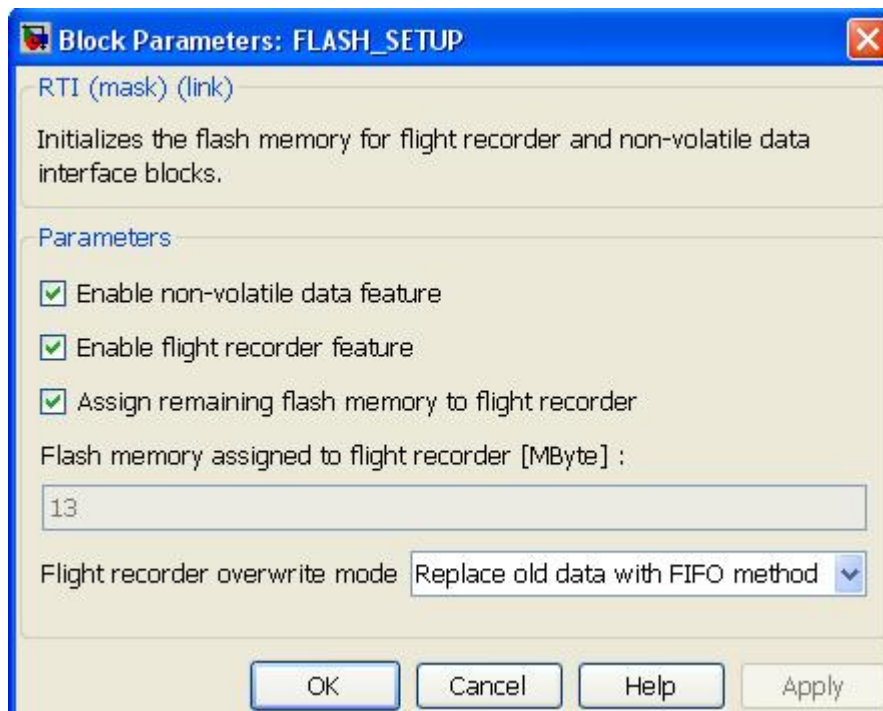


Figure 4: Flash_Setup

Flash setup block is used to initialize and configure the flash memory for flight recording and nonvolatile data blocks. This flash memory can be used to store applications and flight recorder data. Additionally, it can be used as a nonvolatile user RAM. You can configure how much memory space you want to use for the application, the nonvolatile data, and for flight recording.

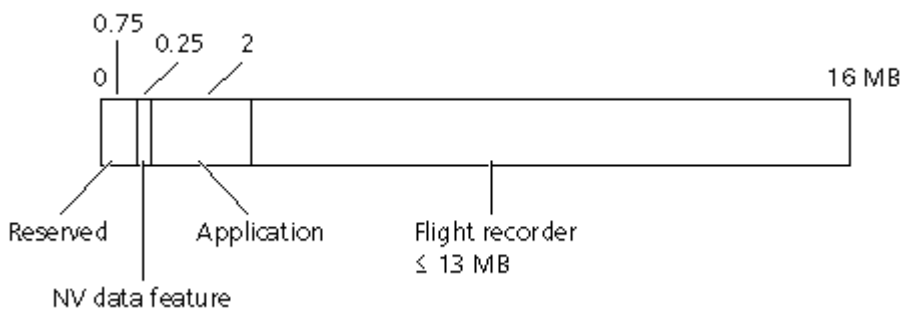


Figure 5: Flash Memory

Enable non-volatile data feature.

This option enables the space in flash memory for non-volatile data

Enable flight recorder feature.

The flight recorder is used to store time histories of real-time variables in nonvolatile memory.

This option enables the feature of flight recorder in flash memory.

Assign remaining flash memory to flight recorder

This option enables those empty spaces in flash memory to work as flight recorder.

Flash memory assigned to flight recorder.

The default size of flight recorder in flash memory is 13 Mbytes. Additionally, the size of flight recorder should be equal to or less than 13 Mbytes.

Flight recorder overwrite mode.

This option provides two methods when the flight recorder is full.

Replace old data with FIFO method. The oldest entries will be replaced.

Discard new data. There is no further data will be recorded.

Convert

This block is used to convert input to data type and scaling of the output.

The conversion has two possible goals. One goal is to have the real world values of the input and the output be equal. The other goal is to have the stored integer values of the input and the output be equal. Overflows and quantization errors can prevent the goal from being fully achieved.

DIO_Type1_Remote_In_M1

This block monitors the hardware input "Remote in"

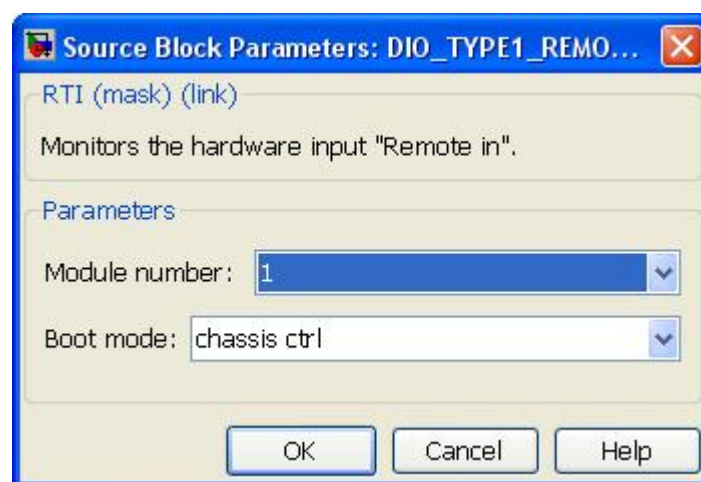


Figure5 : DIO_Type1_Remote_In_M1

DS1401_POWER_DOWN

If the hardware input “remote in” is switched off, the MicroAutoBox powers down.

RESTORE_FROM_FLASH_BL1

Restoring data from non-volatile flash memory.

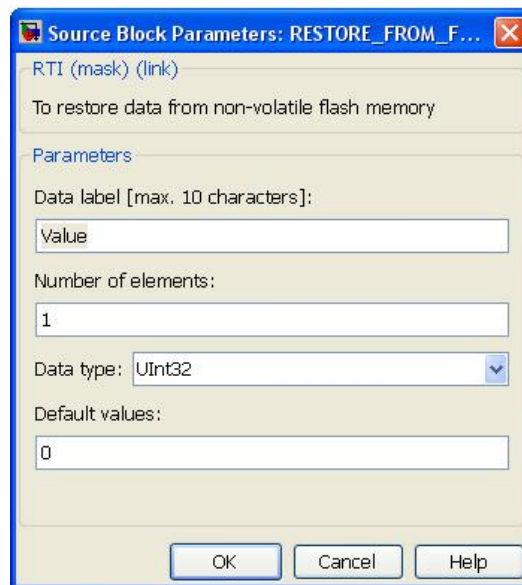


Figure 6: RESTORE_FROM_FLASH_BL1

FLIGHT_REC_BL1

Write input to the flight recorder. Recorded data can be referenced by the specified variable.

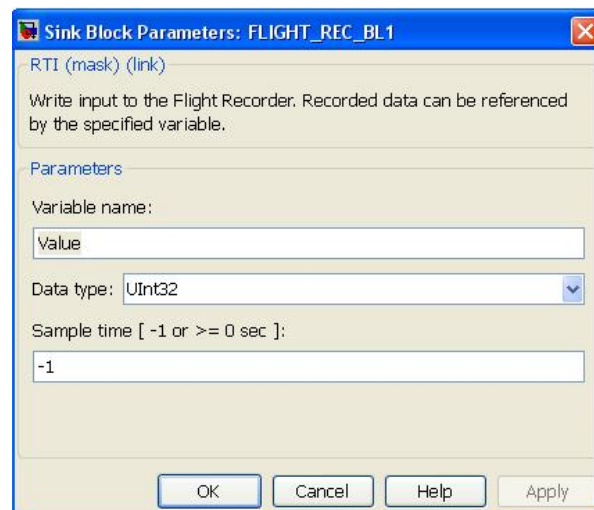


Figure7: FLIGHT_REC_BL1

RESTORE_TO_FLASH_BL1

Restoring data to non-volatile flash memory.

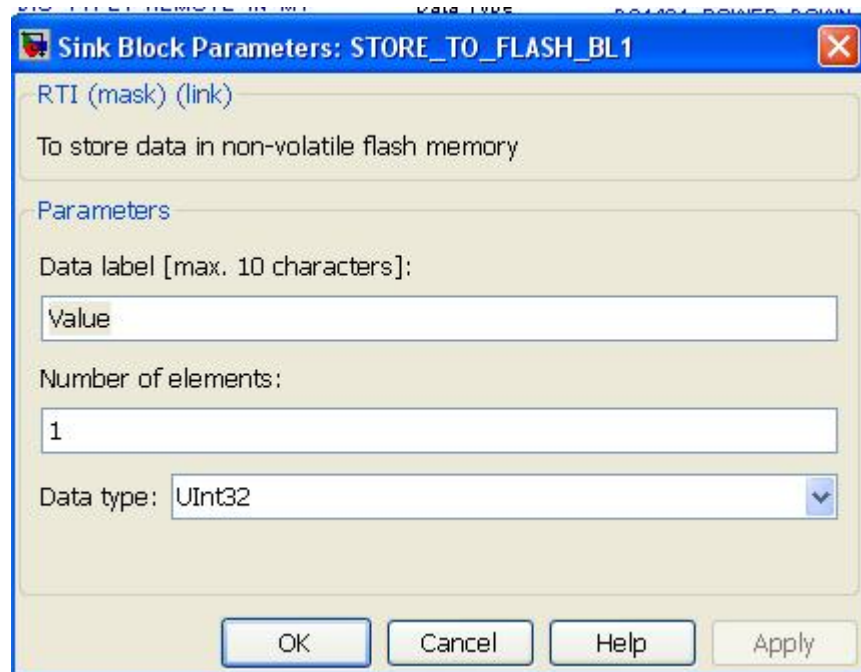


Figure8: RESTORE_TO_FLASH_BL1

Build a Counter

The Figure9 shows the structure of a Counter Block. Figure10 and Figure11 respectively give the structure of blocks “Run time calculation” and “Control start switch” in Counter.

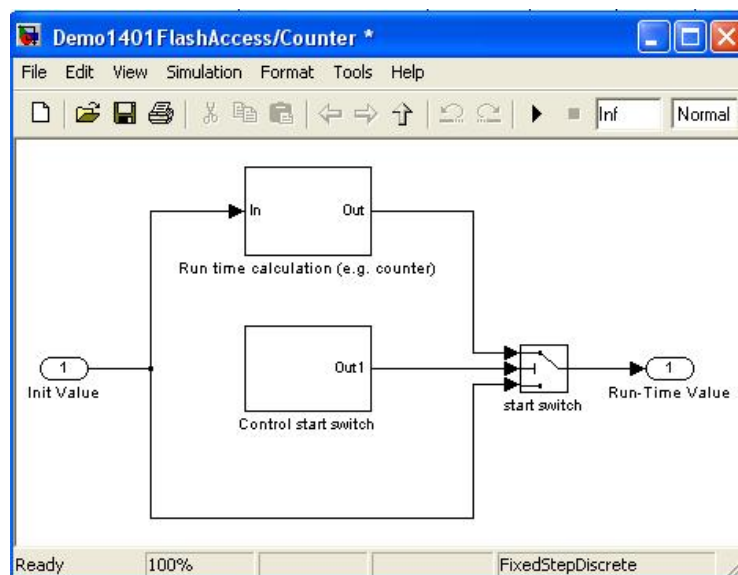


Figure9: Counter

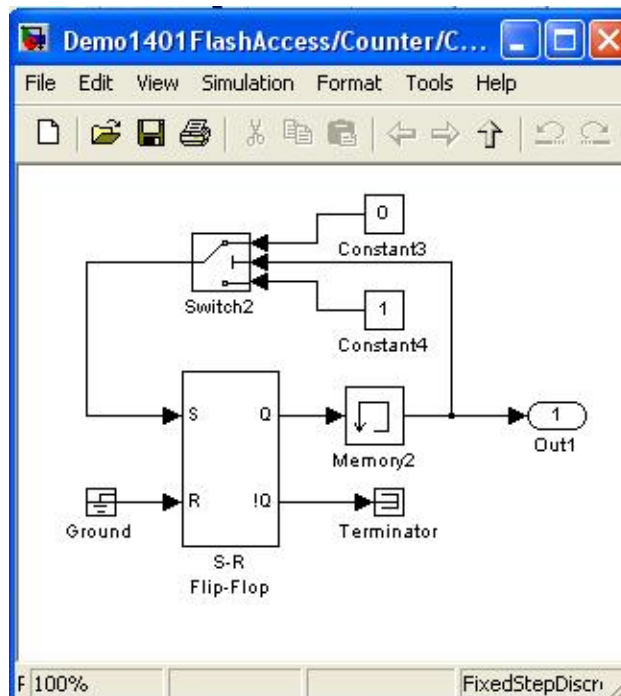


Figure10: Control Start Switch

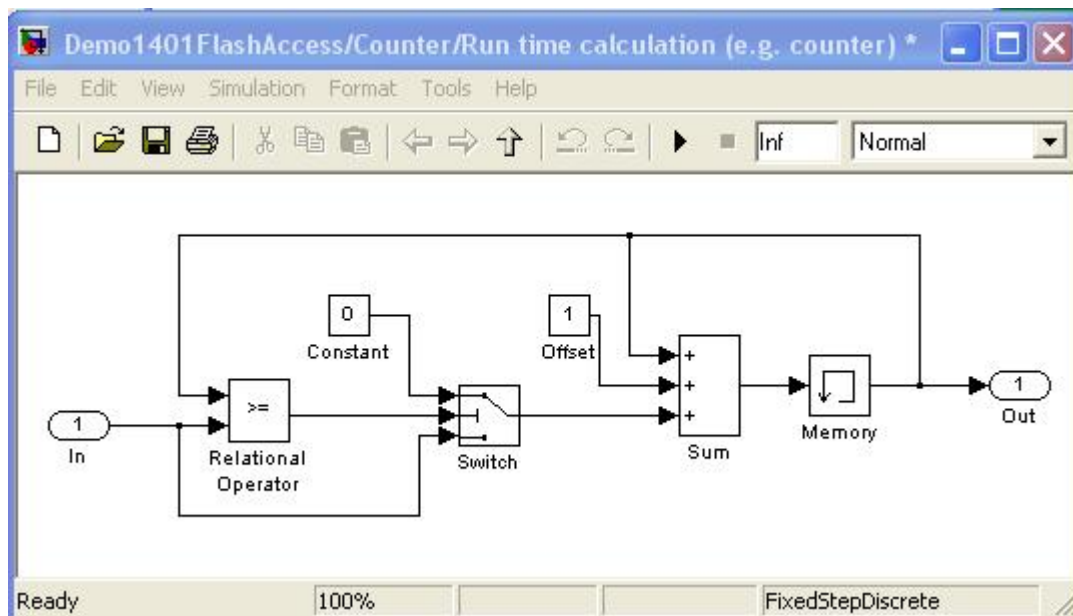


Figure11: Run time calculation