File System Demonstrations

MPLAB Harmony Integrated Software Framework

File System Demonstrations

This section provides descriptions of the File System demonstrations.

MPLAB Harmony is available for download from the Microchip website by visiting: http://www.microchip.com/mplabharmony. Once you are on the site, click the Downloads tab to access the appropriate download for your operating system. For additional information on this demonstration, refer to the “Applications Help” section in the MPLAB Harmony Help.

Description

Introduction

MPLAB Harmony File System Demonstration Help.

Description

This help file contains instructions and associated information about MPLAB Harmony File System demonstration applications, which are contained in the MPLAB Harmony Library distribution.

Demonstrations

Provides instructions on how to run the demonstration applications.

nvm_fat_single_disk

This demonstration uses a FAT12 image of a file on NVM Flash memory and demonstrates the working of all file system functions.

Description

This demonstration shows an example of implementing a FAT12 disk in device Flash memory. The demonstration contains a FAT12 disk image consisting of a Master Boot Record (MBR) sector, Logical Boot Sector, File Allocation Table, and Root Directory Area.

The demonstration opens an existing file named `FILE.TXT` and performs all file system related function calls on the file: SYS_FS_FileStat, SYS_FS_FileSize, SYS_FS_FileSeek, and SYS_FS_FileEOF. Finally, the string "Hello World" is written to this file. The string is then read and compared with the string that was written to the file. If the string compare is successful, LED indication is provided.

Building the Application

This section identifies the MPLAB X IDE project name and location and lists and describes the available configurations for the NVM FAT Single Disk Demonstration.

Description

To build this project, you must open the `nvm_fat_single_disk.X` project in MPLAB X IDE, and then select the desired configuration.

The following tables list and describe the project and supported configurations. The parent folder for these files is `<install-dir>/apps/fs/nvm_fat_single_disk`.

MPLAB X IDE Project

This table lists the name and location of the MPLAB X IDE project folder for the demonstration.

Project Name	Location
`nvm_fat_single_disk.X`	`<install-dir>/apps/fs/nvm_fat_single_disk/firmware`

MPLAB X IDE Project Configurations

This table lists and describes the supported configurations of the demonstration, which are located within `./firmware/src/system_config`.

Project Configuration Name	BSP Used	Description
pic32mx_bt_sk_int_dyn	pic32mx_bt_sk	This configuration runs on PIC32 Bluetooth Starter Kit. The media drivers are configured for Interrupt mode and dynamic operation.
pic32mx_usb_sk_int_dyn	pic32mx_usb_sk2	This configuration runs on the PIC32 USB Starter Kit II. The media drivers are configured for Interrupt mode and dynamic operation.
pic32mx_usb_sk_int_dyn_freertos	pic32mx_usb_sk2	This configuration runs on the PIC32 USB Starter Kit II and makes use of FreeRTOS as the underlying RTOS. The media drivers are configured for Interrupt mode and dynamic operation.
pic32mx_usb3_sk_int_dyn	pic32mx_usb_sk3	This configuration runs on PIC32 USB Starter Kit III. The media drivers are configured for Interrupt mode and dynamic operation.
pic32mz_ec_sk_int_dyn	pic32mz_ec_sk	This configuration runs on the PIC32MZ EC Starter Kit. The media drivers are configured for Interrupt mode and dynamic operation.
pic32mz_ef_sk_int_dyn	pic32mz_ef_sk	This configuration runs on the PIC32MZ EF Starter Kit. The media drivers are configured for Interrupt mode and dynamic operation.

pic32mz_ef_sk_int_dyn_freertos	pic32mz_ef_sk	This configuration runs on the PIC32MZ EF Starter Kit and makes use of FreeRTOS as the underlying RTOS. The media drivers are configured for Interrupt mode and dynamic operation.

nvm_mpfs_single_disk

This demonstration uses a MPFS image of two files on NVM Flash memory and demonstrates the working of all file system functions.

Description

This demonstration shows an example of implementing a MPFS disk in device Flash memory. The demonstration contains a MPFS disk image in the internal Flash memory. The disk image contains two files named:

- `FILE.txt`, Size = 11 Bytes. The content of the file is: "Hello World".
- `TEST.txt`, Size = 72 Bytes. The content of the file is: "This file contains a test string and it is meant for testing. 1234567890".

The demonstration performs all file system related function calls on the file: SYS_FS_FileRead, SYS_FS_FileStat, SYS_FS_FileSize, SYS_FS_FileSeek, SYS_FS_FileEOF. If all tests are successful, LED indication is provided.

Building the Application

This section identifies the MPLAB X IDE project name and location and lists and describes the available configurations for the NVM MPFS Single Disk Demonstration.

Description

To build this project, you must open the `nvm_mpfs_single_disk.X` project in MPLAB X IDE, and then select the desired configuration.

The following tables list and describe the project and supported configurations. The parent folder for these files is `<install-dir>/apps/fs/nvm_mpfs_single_disk`.

MPLAB X IDE Project

This table lists the name and location of the MPLAB X IDE project folder for the demonstration.

Project Name	Location
`nvm_mpfs_single_disk.X`	`<install-dir>/apps/fs/nvm_mpfs_single_disk/firmware`

MPLAB X IDE Project Configurations

This table lists and describes the supported configurations of the demonstration, which are located within `./firmware/src/system_config`.

Project Configuration Name	BSP Used	Description
pic32mx_bt_sk_int_dyn	pic32mx_bt_sk	This configuration runs on PIC32 Bluetooth Starter Kit. The media drivers are configured for Interrupt mode and dynamic operation.
pic32mx_usb_sk_int_dyn	pic32mx_usb_sk2	This configuration runs on the PIC32 USB Starter Kit II. The media drivers are configured for Interrupt mode and dynamic operation.
pic32mx_usb_sk_int_dyn_freertos	pic32mx_usb_sk2	This configuration runs on the PIC32 USB Starter Kit II and makes use of FreeRTOS as the underlying RTOS. The media drivers are configured for Interrupt mode and dynamic operation.
pic32mx_usb3_sk_int_dyn	pic32mx_usb_sk3	This configuration runs on PIC32 USB Starter Kit III. The media drivers are configured for Interrupt mode and dynamic operation.
pic32mz_ec_sk_int_dyn	pic32mz_ec_sk	This configuration runs on the PIC32MZ EC Starter Kit. The media drivers are configured for Interrupt mode and dynamic operation.

pic32mz_ef_sk_int_dyn	pic32mz_ef_sk	This configuration runs on the PIC32MZ EF Starter Kit. The media drivers are configured for Interrupt mode and dynamic operation.
pic32mz_ef_sk_int_dyn_freertos	pic32mz_ef_sk	This configuration runs on the PIC32MZ EF Starter Kit and makes use of FreeRTOS as the underlying RTOS. The media drivers are configured for Interrupt mode and dynamic operation.

nvm_sdcard_fat_mpfs_multi_disk

This demonstration uses NVM and a Secure Digital (SD) Card with MPFS and FAT image of file and performs a read/write/verify operation from file of one media to another media.

Description

This demonstration shows an example of using the MPLAB Harmony File System to access files across multiple disks and multiple file system. The demonstration contains a MPFS disk image in the internal Flash memory. The disk image contains a file named `abc.txt` with content "Hello World". Another disk is a SD card, which is formatted to FAT (FAT16 or FAT32). The demonstration reads the contents of `abc.txt` from the disk implemented on internal Flash memory and writes the contents to `FILE.TXT` on the SD card. A successful write is indicated by an illuminated LED.

Building the Application

This section identifies the MPLAB X IDE project name and location and lists and describes the available configurations for the NVM SD Card FAT MPFS Multi-disk Demonstration

Description

To build this project, you must open the `nvm_sdcard_fat_mpfs_multi_disk.X` project in MPLAB X IDE, and then select the desired configuration.

The following tables list and describe the project and supported configurations. The parent folder for these files is `<install-dir>/apps/fs/nvm_sdcard_fat_mpfs_multi_disk`.

MPLAB X IDE Project

This table lists the name and location of the MPLAB X IDE project folder for the demonstration.

Project Name	Location
`nvm_sdcard_fat_mpfs_multi_disk.X`	`<install-dir>/apps/fs/nvm_sdcard_fat_mpfs_multi_disk/firmware`

MPLAB X IDE Project Configurations

This table lists and describes the supported configurations of the demonstration, which are located within `./firmware/src/system_config`.

Project Configuration Name	BSP Used	Description
pic32mx795_pim_e16_int_dyn	pic32mx795_pim+e16	This configuration runs on the Explorer 16 Development Board using the PIC32MX795F512L PIM and PICtail Daughter Board for SD and MMC. The media drivers are configured for Interrupt mode and dynamic operation.
pic32mx795_pim_e16_int_dyn_freertos	pic32mx795_pim+e16	This configuration runs on the Explorer 16 Development Board using the PIC32MX795F512L PIM and PICtail Daughter Board for SD and MMC and makes use of FreeRTOS as the underlying RTOS. The media drivers are configured for Interrupt mode and dynamic operation.

pic32mx470_pim_e16_int_dyn	pic32mx470_pim+e16	This configuration runs on the Explorer 16 Development Board using the PIC32MX470F512L PIM and PICtail Daughter Board for SD and MMC. The media drivers are configured for Interrupt mode and dynamic operation.
pic32mz_ec_sk_int_dyn	pic32mz_ec_sk+meb2	This configuration runs on the PIC32MZ EC Starter Kit connected to the MEB II. The media drivers are configured for Interrupt mode and dynamic operation.
pic32mz_ef_sk_int_dyn	pic32mz_ef_sk+meb2	This configuration runs on the PIC32MZ EF Starter Kit connected to the MEB II. The media drivers are configured for Interrupt mode and dynamic operation.
pic32mz_ef_sk_int_dyn_freertos	pic32mz_ef_sk+meb2	This configuration runs on the PIC32MZ EF Starter Kit connected to the MEB II and makes use of FreeRTOS as the underlying RTOS. The media drivers are configured for Interrupt mode and dynamic operation.

nvm_sdcard_fat_multi_disk

This demonstration uses NVM and a Secure Digital (SD) card as media, searches a file from the NVM media, opens and reads the file, and then writes the data into another file in the SD card media.

Description

This demonstration shows an example of using the MPLAB Harmony File System to access files across multiple media. The demonstration contains a FAT12 disk image consisting of a Master Boot Record (MBR) sector, Logical Boot Sector, File Allocation Table, and Root Directory Area, placed in the internal Flash memory (NVM). Also, a SD card is used as another disk, which might have FAT16 or FAT32 implemented on it (dependent on the formatting of SD card). The demonstration searches the NVM media for a named `FILE.TXT`, opens and reads the contents of the file in NVM and copies the contents to the file, `FILE.TXT`, in the SD card. Once the copy is successful, an addition string "Test is successful" is added to the file. If the write operation is successful, LED indication is provided.

Building the Application

This section identifies the MPLAB X IDE project name and location and lists and describes the available configurations for the NVM SD Card FAT Multi-disk Demonstration.

Description

To build this project, you must open the `nvm_sdcard_fat_multi_disk.X` project in MPLAB X IDE, and then select the desired configuration.

The following tables list and describe the project and supported configurations. The parent folder for these files is `<install-dir>/apps/fs/nvm_sdcard_fat_multi_disk`.

MPLAB X IDE Project

This table lists the name and location of the MPLAB X IDE project folder for the demonstration.

Project Name	Location
`nvm_sdcard_fat_multi_disk.X`	`<install-dir>/apps/fs/nvm_sdcard_fat_multi_disk/firmware`

MPLAB X IDE Project Configurations

This table lists and describes the supported configurations of the demonstration, which are located within `./firmware/src/system_config`.

Project Configuration Name	BSP Used	Description
pic32mx795_pim_e16_int_dyn	pic32mx795_pim+e16	This configuration runs on the Explorer 16 Development Board using the PIC32MX795F512L PIM and PICtail Daughter Board for SD and MMC. The media drivers are configured for Interrupt mode and dynamic operation.
pic32mx795_pim_e16_int_dyn_freertos	pic32mx795_pim+e16	This configuration runs on the Explorer 16 Development Board using the PIC32MX795F512L PIM and PICtail Daughter Board for SD and MMC and makes use of FreeRTOS as the underlying RTOS. The media drivers are configured for Interrupt mode and dynamic operation.
pic32mx470_pim_e16_int_dyn	pic32mx470_pim+e16	This configuration runs on the Explorer 16 Development Board using the PIC32MX470F512L PIM and PICtail Daughter Board for SD and MMC. The media drivers are configured for Interrupt mode and dynamic operation.
pic32mz_ec_sk_int_dyn	pic32mz_ec_sk+meb2	This configuration runs on the PIC32MZ EC Starter Kit connected to the MEB II. The media drivers are configured for Interrupt mode and dynamic operation.
pic32mz_ef_sk_int_dyn	pic32mz_ef_sk+meb2	This configuration runs on the PIC32MZ EF Starter Kit connected to the MEB II. The media drivers are configured for Interrupt mode and dynamic operation.
pic32mz_ef_sk_int_dyn_freertos	pic32mz_ef_sk+meb2	This configuration runs on the PIC32MZ EF Starter Kit connected to the MEB II and makes use of FreeRTOS as the underlying RTOS. The media drivers are configured for Interrupt mode and dynamic operation.

sdcard_fat_single_disk

This demonstration uses a Secure Digital (SD) card with a FAT file system as media, performs a read/write/verify operation on the files using long file names (LFN), and performs directory creation.

Description

This demonstration shows an example of using the MPLAB Harmony File System to access and modify the contents of a SD card. The demonstration opens a file named `FILE_TOO_LONG_NAME_EXAMPLE_123.JPG` on the SD card, reads the content of the file, creates a directory named `Dir1` and inside the directory, writes the content into another file `FILE_TOO_LONG_NAME_EXAMPLE_123_1.JPG` (creates a copy of one file into another file, inside a directory).

The input file `FILE_TOO_LONG_NAME_EXAMPLE_123.JPG` is not provided along with the release package. It could be any arbitrary JPEG (image) file chosen by the user and then renamed to `FILE_TOO_LONG_NAME_EXAMPLE_123.JPG`. The reason for choosing a JPEG file for test purposes is that the duplicate file, `FILE_TOO_LONG_NAME_EXAMPLE_123_1.JPG`, created by the FS demonstration could be easily verified for correctness by inserting the SD card into a computer and opening the `FILE_TOO_LONG_NAME_EXAMPLE_123_1.JPG` file. If the file opens for viewing on the computer, the test is deemed to have passed. Otherwise, if the file does not open (i.e., is corrupted), the test will be considered to have failed. Since the demonstration creates a directory named `Dir1`, it is important that the a folder with the same name does not exist on the SD card. If a directory named `Dir1` is already present on the SD card, the demonstration will fail.

Building the Application

This section identifies the MPLAB X IDE project name and location and lists and describes the available configurations for the SD Card FAT Single Disk Demonstration.

Description

To build this project, you must open the `sdcard_fat_single_disk.X` project in MPLAB X IDE, and then select the desired configuration.

The following tables list and describe the project and supported configurations. The parent folder for these files is `<install-dir>/apps/fs/sdcard_fat_single_disk`.

MPLAB X IDE Project

This table lists the name and location of the MPLAB X IDE project folder for the demonstration.

Project Name	Location
`sdcard_fat_single_disk.X`	`<install-dir>/apps/fs/sdcard_fat_single_disk/firmware`

MPLAB X IDE Project Configurations

This table lists and describes the supported configurations of the demonstration, which are located within `./firmware/src/system_config`.

Project Configuration Name	BSP Used	Description
pic32mx795_pim_e16_int_dyn	pic32mx795_pim+e16	This configuration runs on the Explorer 16 Development Board using the PIC32MX795F512L PIM and PICtail Daughter Board for SD and MMC. The media drivers are configured for Interrupt mode and dynamic operation.
pic32mx795_pim_e16_int_dyn_freertos	pic32mx795_pim+e16	This configuration runs on the Explorer 16 Development Board using the PIC32MX795F512L PIM and PICtail Daughter Board for SD and MMC and makes use of FreeRTOS as the underlying RTOS. The media drivers are configured for Interrupt mode and dynamic operation.
pic32mx470_pim_e16_int_dyn	pic32mx470_pim+e16	This configuration runs on the Explorer 16 Development Board using the PIC32MX470F512L PIM and PICtail Daughter Board for SD and MMC. The media drivers are configured for Interrupt mode and dynamic operation.
pic32mz_ec_sk_int_dyn	pic32mz_ec_sk+meb2	This configuration runs on the PIC32MZ EC Starter Kit connected to the MEB II. The media drivers are configured for Interrupt mode and dynamic operation.
pic32mz_ef_sk_int_dyn	pic32mz_ef_sk+meb2	This configuration runs on the PIC32MZ EF Starter Kit connected to the MEB II. The media drivers are configured for Interrupt mode and dynamic operation.
pic32mz_ef_sk_int_dyn_freertos	pic32mz_ef_sk+meb2	This configuration runs on the PIC32MZ EF Starter Kit connected to the MEB II and makes use of FreeRTOS as the underlying RTOS. The media drivers are configured for Interrupt mode and dynamic operation.
pic32mz_da_sk_adma	pic32mz_da_sk_intddr	This configuration runs on the PIC32MZ Embedded Graphics with Internal DRAM (DA) Starter Kit. The media driver is configured to use SD Host Controller ADMA2 Transfer mode operation.

sdcard_msd_fat_multi_disk

This demonstration uses a USB Flash drive and a Secure Digital (SD) card as media. The application searches for a file on the USB Flash drive, opens and reads the file, and then writes the data into another file in the SD card media.

Description

This demonstration searches for a file using wildcard characters "`mch*.*`", reads the content of the file, and then writes the contents of the file to the SD card.

The demonstration application logic is implemented as a state machine in the APP_USB_MSDTasks and APP_SDCardTasks functions in the file `app.c`.

Building the Application

This section identifies the MPLAB X IDE project name and location and lists and describes the available configurations for the SD Card MSD FAT Multi-disk Demonstration.

Description

To build this project, you must open the `sdcard_msd_fat_multi_disk`.X project in MPLAB X IDE, and then select the desired configuration.

The following tables list and describe the project and supported configurations. The parent folder for these files is `<install-dir>/apps/fs/sdcard_msd_fat_multi_disk`.

MPLAB X IDE Project

This table lists the name and location of the MPLAB X IDE project folder for the demonstration.

Project Name	Location
`sdcard_msd_fat_multi_disk.X`	`<install-dir>/apps/fs/sdcard_msd_fat_multi_disk/firmware`

MPLAB X IDE Project Configurations

This table lists and describes the supported configurations of the demonstration, which are located within `./firmware/src/system_config`.

Project Configuration Name	BSP Used	Description
pic32mz_ec_sk_meb2	pic32mz_ec_sk+meb2	This configuration runs on PIC32MZ EC Starter Kit with the MEB II. The media drivers are configured for Interrupt mode and dynamic operation.
pic32mz_ef_sk_meb2	pic32mz_ef_sk+meb2	This configuration runs on PIC32MZ EF Starter Kit with the MEB II. The media drivers are configured for Interrupt mode and dynamic operation.
pic32mz_ef_sk_meb2_freertos	pic32mz_ef_sk+meb2	This configuration runs on the PIC32MZ EF Starter Kit connected to the MEB II and makes use of FreeRTOS as the underlying RTOS. The media drivers are configured for Interrupt mode and dynamic operation.

sst25_fat

This application demonstrates the use of the MPLAB Harmony File System with SST25 Flash media.

Description

This application demonstrates the use of the MPLAB Harmony File System with SST25 Flash media. The application formats the SST25 Flash media, opens a file named “newFile.txt”, and writes the string “Hello World” to the file. The string is then read and compared with the string that was written to the file. If the string comparison is successful, LED indication is provided.

Building the Application

This section identifies the MPLAB X IDE project name and location and lists and describes the available configurations for the SST25 Flash Demonstration.

Description

To build this project, you must open `sst25_fat.X` project in MPLAB X IDE, and then select the desired configuration.

The following tables list and describe the project and supported configurations. The parent folder for these files is `<install-dir>/apps/fs/sst25_fat`.

MPLAB X IDE Project

This table lists the name and location of the MPLAB X IDE project folder for the demonstration.

Project Name	Location
`sst25_fat.X`	`<install-dir>/apps/fs/sst25_fat/firmware`

MPLAB X IDE Project Configurations

This table lists and describes the supported configurations of the demonstration, which are located within `./firmware/src/system_config`.

Project Configuration Name	BSP Used	Description
bt_audio_dk_int_dyn	bt_audio_dk	This configuration runs on PIC32 Bluetooth Audio Development Kit.

sqi_fat

This application demonstrates the use of the MPLAB Harmony File System with SQI Flash media.

Description

This application demonstrates the use of the MPLAB Harmony File System with SQI Flash media. The application formats the SQI Flash media, opens a file named “newFile.txt”, and writes the string “Hello World” to the file. The string is then read and compared with the string that was written to the file. If the string comparison is successful, LED indication is provided.

Building the Application

This section identifies the MPLAB X IDE project name and location and lists and describes the available configurations for the SQI Flash Demonstration.

Description

To build this project, you must open `sqi_fat.X` project in MPLAB X IDE, and then select the desired configuration.

The following tables list and describe the project and supported configurations. The parent folder for these files is `<install-dir>/apps/fs/sqi_fat`.

MPLAB X IDE Project

This table lists the name and location of the MPLAB X IDE project folder for the demonstration.

Project Name	Location
`sqi_fat.X`	`<install-dir>/apps/fs/sqi_fat/firmware`

MPLAB X IDE Project Configurations

This table lists and describes the supported configurations of the demonstration, which are located within `./firmware/src/system_config`.

Project Configuration Name	BSP Used	Description
pic32mz_ef_sk	pic32mz_ef_sk	This configuration runs on PIC32MZ EF Starter Kit.

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