



MMC overview



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A quality version of this page, approved on *16 September 2019*, was based off this revision.

SUMMARY

The MMC (MultiMediaCard) / SD (secure digital) / SDIO (secure digital input/output) subsystem implements a standard Linux[®] host driver to interface with MMC / SD memory cards or SDIO cards.

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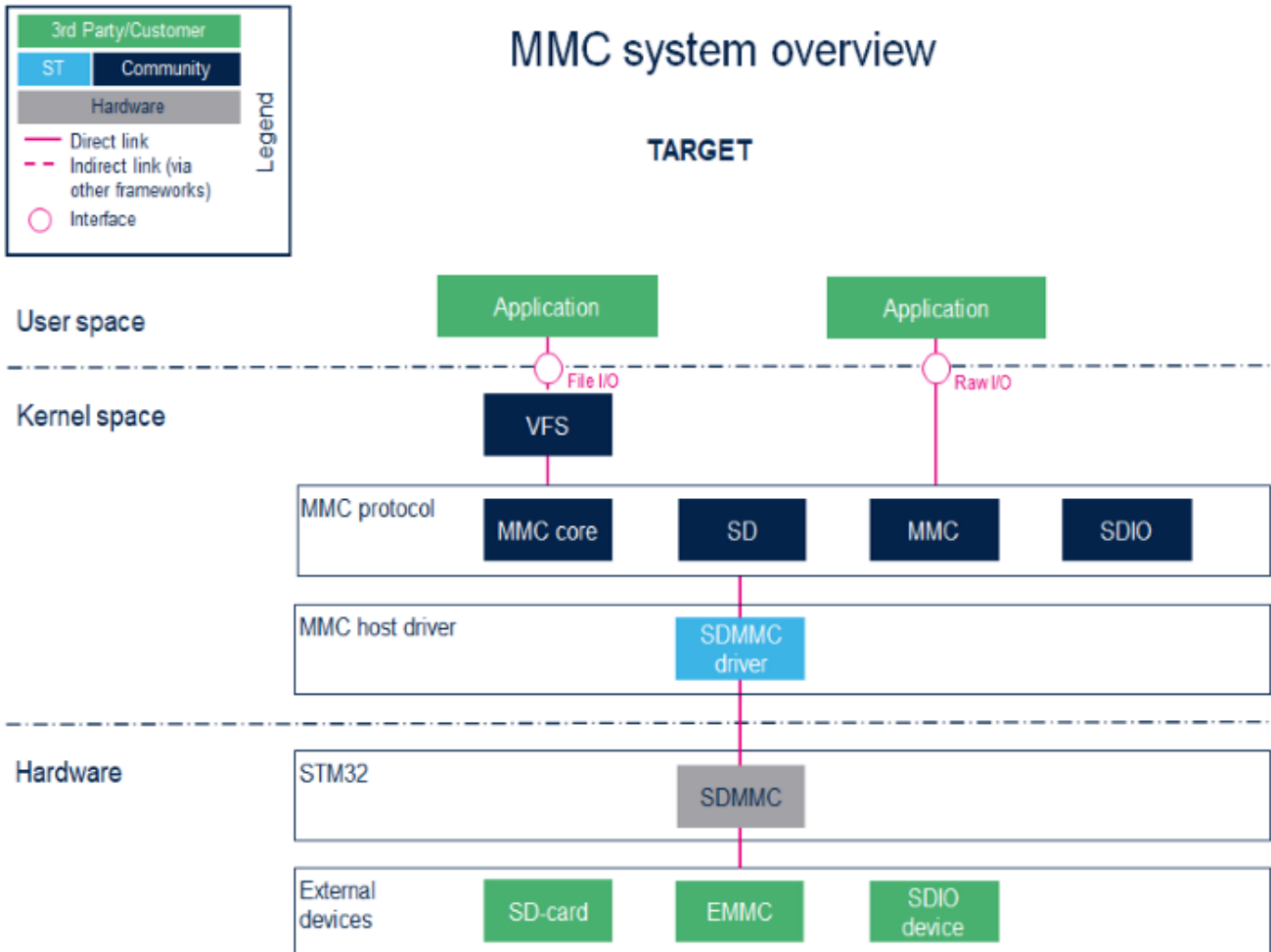
1 Framework purpose

The purpose of this article is to introduce the MMC Linux[®] subsystem (MMC / SD) by:

- providing general information
- describing the main components/stakeholders

The SDIO is addressed in the [WLAN overview](#).

2 System overview



2.1 Component description

- User space applications handle **file I/O** management to view the card memory as a disk, whereas programs that perform **raw I/O** accesses see the memory as a block device^[1].
- **VFS** (Kernel space)

Virtual File System. Please refer to the VFS documentation^[2].

- **MMC core/SD/MMC/SDIO** (Kernel space)

The **MMC core** ensures compliance with MultiMediaCard (**MMC**)^[3] / secure digital (**SD**)^[4] / secure digital input/output (**SDIO**)^[5].

- **SDMMC driver** (Kernel space) / **SDMMC** (hardware)

The **SDMMC driver** handles:

- the registers, the clock, the interrupt and the IDMA control.
- the communications over the bus based on command/response and data transfers.

Please refer to the SDMMC internal peripheral.



2.2 API description

The MMC core handles the file system read/write calls.



3 Configuration

3.1 Kernel configuration

The MMC framework is activated by default in ST deliveries. If a specific configuration is needed, this section indicates how the MMC framework can be activated/inactivated in the kernel.

The MMC framework can be activated in the kernel configuration via Linux[®] Menuconfig tool: [Menuconfig or how to configure kernel](#)

```
[*] Device Drivers
  [*] MMC/SD/SDIO card support
    <*> HW reset support for eMMC
    <*> Simple HW reset support for MMC
    <*> MMC block device driver
        (16) Number of minors per block device
    . . .
    <*> ARM AMBA Multimedia Card Interface support
  [*] STMicroelectronics STM32 SDMMC Controller
```

3.2 Device tree configuration

DT configuration can be done thanks to [STM32CubeMX](#).

Please refer to the [SDMMC device tree configuration](#).



4 How to use the framework

A file system, which handles read/write/erase operations, can be used with the MMC framework. Please refer to the [EXT4](#) support through MMC.



5 How to trace and debug the framework

5.1 How to monitor

The sysfs interface provides detailed information on each mmc device:

```
root:~# cat /sys/kernel/debug/mmc0/ios
clock:          50000000 Hz
vdd:            21 (3.3 ~ 3.4 V)
bus mode:       2 (push-pull)
chip select:    0 (don't care)
power mode:     2 (on)
bus width:      2 (4 bits)
timing spec:    2 (sd high-speed)
signal voltage: 0 (3.30 V)
driver type:    0 (driver type B)
```

5.2 How to trace

For details on dynamic trace usage, refer to [How to use the kernel dynamic debug](#).

```
root:~# echo "file drivers/mmc/* +p" > /sys/kernel/debug/dynamic_debug/control
```



6 Source code location

The MMC framework is available [here](#) .



7 References

Please refer to the following links for a full description of the MMC framework:

- https://en.wikipedia.org/wiki/Device_file#Block_devices
- VFS
- MultiMediaCard, embedded MultiMediaCard specification
- Secure Digital, secure digital specification
- Secure Digital Input Output, Secure Digital Input Output specification

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SUMMARY

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1 Framework purpose

The purpose of this article is to introduce the MMC Linux[®] subsystem (MMC / SD) by:

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The SDIO is addressed in the [WLAN overview](#).

2 System overview



2.1 Component description

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The **SDMMC driver** handles:

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    <*> ARM AMBA Multimedia Card Interface support
  [*] STMicroelectronics STM32 SDMMC Controller
```

3.2 Device tree configuration

DT configuration can be done thanks to [STM32CubeMX](#).

Please refer to the [SDMMC device tree configuration](#).



4 How to use the framework

A file system, which handles read/write/erase operations, can be used with the MMC framework. Please refer to the [EXT4 support through MMC](#).



5 How to trace and debug the framework

5.1 How to monitor

The sysfs interface provides detailed information on each mmc device:

```
root:~# cat /sys/kernel/debug/mmc0/ios
clock:          50000000 Hz
vdd:            21 (3.3 ~ 3.4 V)
bus mode:       2 (push-pull)
chip select:    0 (don't care)
power mode:     2 (on)
bus width:      2 (4 bits)
timing spec:    2 (sd high-speed)
signal voltage: 0 (3.30 V)
driver type:    0 (driver type B)
```

5.2 How to trace

For details on dynamic trace usage, refer to [How to use the kernel dynamic debug](#).

```
root:~# echo "file drivers/mmc/* +p" > /sys/kernel/debug/dynamic_debug/control
```



6 Source code location

The MMC framework is available [here](#) .



7 References

Please refer to the following links for a full description of the MMC framework:

- https://en.wikipedia.org/wiki/Device_file#Block_devices
- VFS
- MultiMediaCard, embedded MultiMediaCard specification
- Secure Digital, secure digital specification
- Secure Digital Input Output, Secure Digital Input Output specification

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SUMMARY

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1 Framework purpose

The purpose of this article is to introduce the MMC Linux[®] subsystem (MMC / SD) by:

- providing general information
- describing the main components/stakeholders

The SDIO is addressed in the [WLAN overview](#).

2 System overview



2.1 Component description

- User space applications handle **file I/O** management to view the card memory as a disk, whereas programs that perform **raw I/O** accesses see the memory as a block device^[1].
- **VFS** (Kernel space)

Virtual File System. Please refer to the VFS documentation^[2].

- **MMC core/SD/MMC/SDIO** (Kernel space)

The **MMC core** ensures compliance with MultiMediaCard (**MMC**)^[3] / secure digital (**SD**)^[4] / secure digital input/output (**SDIO**)^[5].

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The **SDMMC driver** handles:

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The MMC core handles the file system read/write calls.



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3.1 Kernel configuration

The MMC framework is activated by default in ST deliveries. If a specific configuration is needed, this section indicates how the MMC framework can be activated/inactivated in the kernel.

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```

3.2 Device tree configuration

DT configuration can be done thanks to [STM32CubeMX](#).

Please refer to the [SDMMC device tree configuration](#).



4 How to use the framework

A file system, which handles read/write/erase operations, can be used with the MMC framework. Please refer to the [EXT4](#) support through MMC.



5 How to trace and debug the framework

5.1 How to monitor

The sysfs interface provides detailed information on each mmc device:

```
root:~# cat /sys/kernel/debug/mmc0/ios
clock:          50000000 Hz
vdd:            21 (3.3 ~ 3.4 V)
bus mode:       2 (push-pull)
chip select:    0 (don't care)
power mode:     2 (on)
bus width:      2 (4 bits)
timing spec:    2 (sd high-speed)
signal voltage: 0 (3.30 V)
driver type:    0 (driver type B)
```

5.2 How to trace

For details on dynamic trace usage, refer to [How to use the kernel dynamic debug](#).

```
root:~# echo "file drivers/mmc/* +p" > /sys/kernel/debug/dynamic_debug/control
```



6 Source code location

The MMC framework is available [here](#) .



7 References

Please refer to the following links for a full description of the MMC framework:

- https://en.wikipedia.org/wiki/Device_file#Block_devices
- VFS
- MultiMediaCard, embedded MultiMediaCard specification
- Secure Digital, secure digital specification
- Secure Digital Input Output, Secure Digital Input Output specification

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SUMMARY

The MMC (MultiMediaCard) / SD (secure digital) / SDIO (secure digital input/output) subsystem implements a standard Linux[®] host driver to interface with MMC / SD memory cards or SDIO cards.

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1 Framework purpose

The purpose of this article is to introduce the MMC Linux[®] subsystem (MMC / SD) by:

- providing general information
- describing the main components/stakeholders

The SDIO is addressed in the [WLAN overview](#).

2 System overview



2.1 Component description

- User space applications handle **file I/O** management to view the card memory as a disk, whereas programs that perform **raw I/O** accesses see the memory as a block device^[1].
- **VFS** (Kernel space)

Virtual File System. Please refer to the VFS documentation^[2].

- **MMC core/SD/MMC/SDIO** (Kernel space)

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- **SDMMC driver** (Kernel space) / **SDMMC** (hardware)

The **SDMMC driver** handles:

- the registers, the clock, the interrupt and the IDMA control.
- the communications over the bus based on command/response and data transfers.

Please refer to the SDMMC internal peripheral.



2.2 API description

The MMC core handles the file system read/write calls.



3 Configuration

3.1 Kernel configuration

The MMC framework is activated by default in ST deliveries. If a specific configuration is needed, this section indicates how the MMC framework can be activated/inactivated in the kernel.

The MMC framework can be activated in the kernel configuration via Linux[®] Menuconfig tool: [Menuconfig](#) or [how to configure kernel](#)

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[*] Device Drivers
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        (16) Number of minors per block device
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    <*> ARM AMBA Multimedia Card Interface support
  [*] STMicroelectronics STM32 SDMMC Controller
```

3.2 Device tree configuration

DT configuration can be done thanks to [STM32CubeMX](#).

Please refer to the [SDMMC device tree configuration](#).



4 How to use the framework

A file system, which handles read/write/erase operations, can be used with the MMC framework. Please refer to the [EXT4 support through MMC](#).



5 How to trace and debug the framework

5.1 How to monitor

The sysfs interface provides detailed information on each mmc device:

```
root:~# cat /sys/kernel/debug/mmc0/ios
clock:          50000000 Hz
vdd:            21 (3.3 ~ 3.4 V)
bus mode:       2 (push-pull)
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bus width:      2 (4 bits)
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signal voltage: 0 (3.30 V)
driver type:    0 (driver type B)
```

5.2 How to trace

For details on dynamic trace usage, refer to [How to use the kernel dynamic debug](#).

```
root:~# echo "file drivers/mmc/* +p" > /sys/kernel/debug/dynamic_debug/control
```



6 Source code location

The MMC framework is available [here](#) .



7 References

Please refer to the following links for a full description of the MMC framework:

- https://en.wikipedia.org/wiki/Device_file#Block_devices
- VFS
- MultiMediaCard, embedded MultiMediaCard specification
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SUMMARY

The MMC (MultiMediaCard) / SD (secure digital) / SDIO (secure digital input/output) subsystem implements a standard Linux[®] host driver to interface with MMC / SD memory cards or SDIO cards.

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1 Framework purpose

The purpose of this article is to introduce the MMC Linux[®] subsystem (MMC / SD) by:

- providing general information
- describing the main components/stakeholders

The SDIO is addressed in the [WLAN overview](#).

2 System overview



2.1 Component description

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- **VFS** (Kernel space)

Virtual File System. Please refer to the VFS documentation ^[2].

- **MMC core/SD/MMC/SDIO** (Kernel space)

The **MMC core** ensures compliance with MultiMediaCard (**MMC**)^[3] / secure digital (**SD**)^[4] / secure digital input/output (**SDIO**)^[5].

- **SDMMC driver** (Kernel space) / **SDMMC** (hardware)

The **SDMMC driver** handles:

- the registers, the clock, the interrupt and the IDMA control.
- the communications over the bus based on command/response and data transfers.

Please refer to the SDMMC internal peripheral.



2.2 API description

The MMC core handles the file system read/write calls.



3 Configuration

3.1 Kernel configuration

The MMC framework is activated by default in ST deliveries. If a specific configuration is needed, this section indicates how the MMC framework can be activated/inactivated in the kernel.

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```

3.2 Device tree configuration

DT configuration can be done thanks to [STM32CubeMX](#).

Please refer to the [SDMMC device tree configuration](#).



4 How to use the framework

A file system, which handles read/write/erase operations, can be used with the MMC framework. Please refer to the [EXT4 support through MMC](#).



5 How to trace and debug the framework

5.1 How to monitor

The sysfs interface provides detailed information on each mmc device:

```
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power mode:     2 (on)
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timing spec:    2 (sd high-speed)
signal voltage: 0 (3.30 V)
driver type:    0 (driver type B)
```

5.2 How to trace

For details on dynamic trace usage, refer to [How to use the kernel dynamic debug](#).

```
root:~# echo "file drivers/mmc/* +p" > /sys/kernel/debug/dynamic_debug/control
```



6 Source code location

The MMC framework is available [here](#) .



7 References

Please refer to the following links for a full description of the MMC framework:

- https://en.wikipedia.org/wiki/Device_file#Block_devices
- VFS
- MultiMediaCard, embedded MultiMediaCard specification
- Secure Digital, secure digital specification
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SUMMARY

The MMC (MultiMediaCard) / SD (secure digital) / SDIO (secure digital input/output) subsystem implements a standard Linux[®] host driver to interface with MMC / SD memory cards or SDIO cards.

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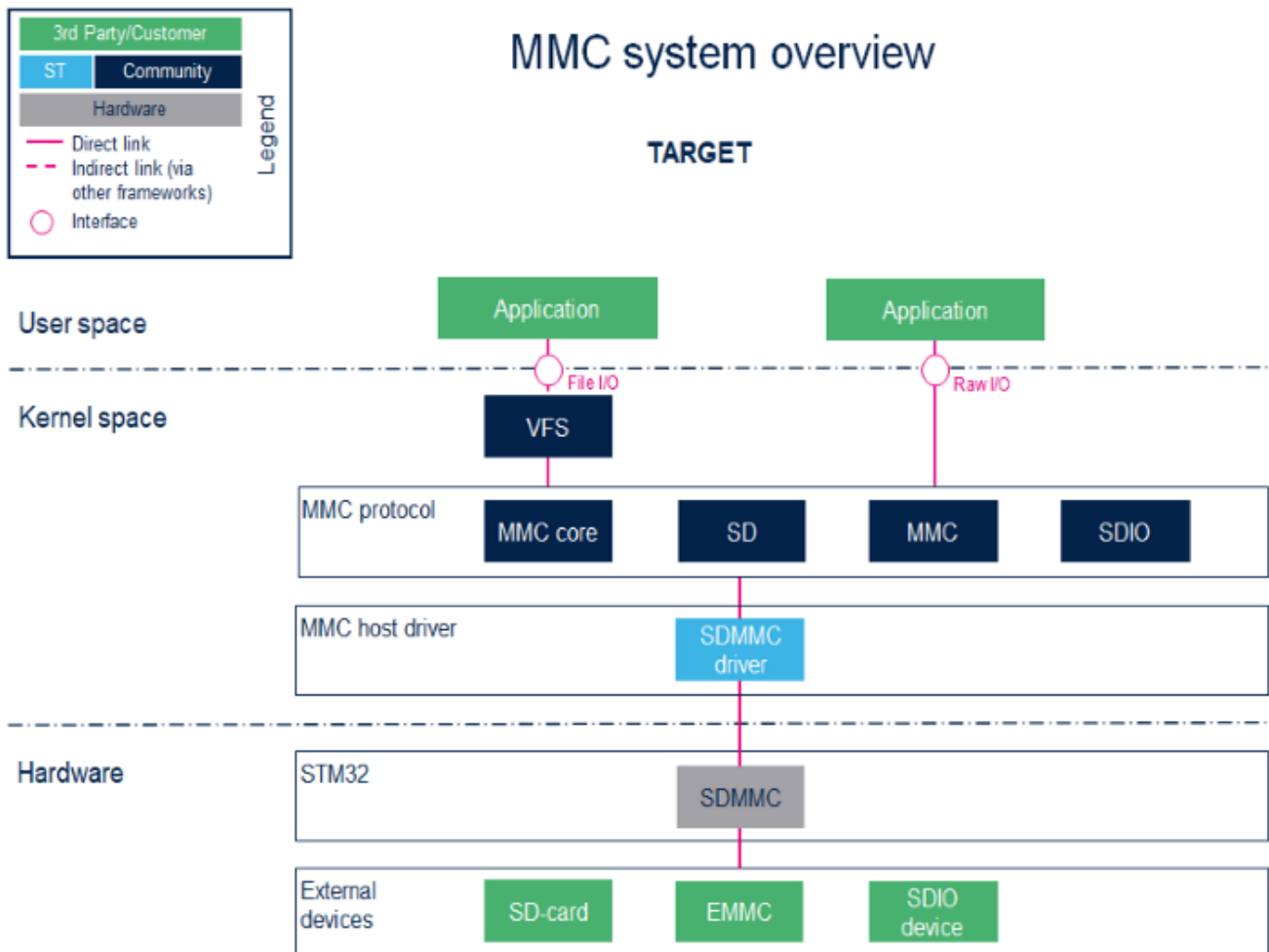
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The MMC framework is available [here](#) .



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SUMMARY

The MMC (MultiMediaCard) / SD (secure digital) / SDIO (secure digital input/output) subsystem implements a standard Linux[®] host driver to interface with MMC / SD memory cards or SDIO cards.

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1 Framework purpose

The purpose of this article is to introduce the MMC Linux[®] subsystem (MMC / SD) by:

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The SDIO is addressed in the [WLAN overview](#).

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Please refer to the SDMMC internal peripheral.



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  [*] STMicroelectronics STM32 SDMMC Controller
```

3.2 Device tree configuration

DT configuration can be done thanks to [STM32CubeMX](#).

Please refer to the [SDMMC device tree configuration](#).



4 How to use the framework

A file system, which handles read/write/erase operations, can be used with the MMC framework. Please refer to the [EXT4 support through MMC](#).



5 How to trace and debug the framework

5.1 How to monitor

The sysfs interface provides detailed information on each mmc device:

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root:~# cat /sys/kernel/debug/mmc0/ios
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For details on dynamic trace usage, refer to [How to use the kernel dynamic debug](#).

```
root:~# echo "file drivers/mmc/* +p" > /sys/kernel/debug/dynamic_debug/control
```



6 Source code location

The MMC framework is available [here](#) .



7 References

Please refer to the following links for a full description of the MMC framework:

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SUMMARY

The MMC (MultiMediaCard) / SD (secure digital) / SDIO (secure digital input/output) subsystem implements a standard Linux[®] host driver to interface with MMC / SD memory cards or SDIO cards.

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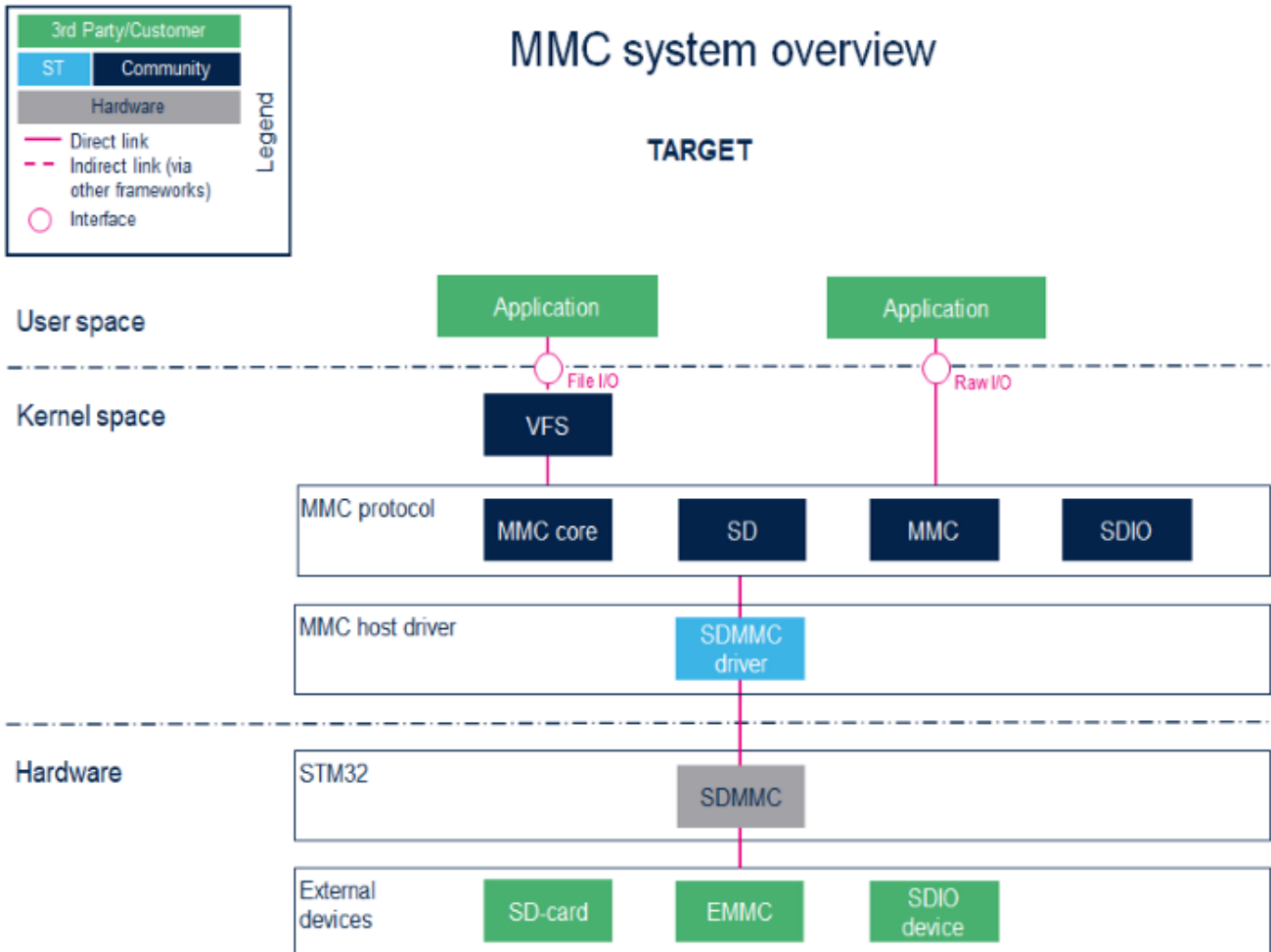
1 Framework purpose

The purpose of this article is to introduce the MMC Linux[®] subsystem (MMC / SD) by:

- providing general information
- describing the main components/stakeholders

The SDIO is addressed in the [WLAN overview](#).

2 System overview



2.1 Component description

- User space applications handle **file I/O** management to view the card memory as a disk, whereas programs that perform **raw I/O** accesses see the memory as a block device^[1].
- **VFS** (Kernel space)

Virtual File System. Please refer to the VFS documentation^[2].

- **MMC core/SD/MMC/SDIO** (Kernel space)

The **MMC core** ensures compliance with MultiMediaCard (**MMC**)^[3] / secure digital (**SD**)^[4] / secure digital input/output (**SDIO**)^[5].

- **SDMMC driver** (Kernel space) / **SDMMC** (hardware)

The **SDMMC driver** handles:

- the registers, the clock, the interrupt and the IDMA control.
- the communications over the bus based on command/response and data transfers.

Please refer to the SDMMC internal peripheral.



2.2 API description

The MMC core handles the file system read/write calls.



3 Configuration

3.1 Kernel configuration

The MMC framework is activated by default in ST deliveries. If a specific configuration is needed, this section indicates how the MMC framework can be activated/inactivated in the kernel.

The MMC framework can be activated in the kernel configuration via Linux[®] Menuconfig tool: [Menuconfig](#) or [how to configure kernel](#)

```
[*] Device Drivers
  [*] MMC/SD/SDIO card support
    <*> HW reset support for eMMC
    <*> Simple HW reset support for MMC
    <*> MMC block device driver
        (16) Number of minors per block device
    . . .
    <*> ARM AMBA Multimedia Card Interface support
  [*] STMicroelectronics STM32 SDMMC Controller
```

3.2 Device tree configuration

DT configuration can be done thanks to [STM32CubeMX](#).

Please refer to the [SDMMC device tree configuration](#).



4 How to use the framework

A file system, which handles read/write/erase operations, can be used with the MMC framework. Please refer to the [EXT4 support through MMC](#).



5 How to trace and debug the framework

5.1 How to monitor

The sysfs interface provides detailed information on each mmc device:

```
root:~# cat /sys/kernel/debug/mmc0/ios
clock:          50000000 Hz
vdd:            21 (3.3 ~ 3.4 V)
bus mode:       2 (push-pull)
chip select:    0 (don't care)
power mode:     2 (on)
bus width:      2 (4 bits)
timing spec:    2 (sd high-speed)
signal voltage: 0 (3.30 V)
driver type:    0 (driver type B)
```

5.2 How to trace

For details on dynamic trace usage, refer to [How to use the kernel dynamic debug](#).

```
root:~# echo "file drivers/mmc/* +p" > /sys/kernel/debug/dynamic_debug/control
```



6 Source code location

The MMC framework is available [here](#) .



7 References

Please refer to the following links for a full description of the MMC framework:

- https://en.wikipedia.org/wiki/Device_file#Block_devices
- VFS
- MultiMediaCard, embedded MultiMediaCard specification
- Secure Digital, secure digital specification
- Secure Digital Input Output, Secure Digital Input Output specification