MMC v1.0 brief status

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DESY

MMC1.0 Facts.

- The basic version is 100% defined* (FW, schematic, parts etc.)
- The advanced version is an extension of the basic version
- The advanced version is not 100% defined. However, certain sections should be 100% defined in order to be compliant with point 2. There is a table of required functionalities that are related to specific IO pins on a specific MC.
- The FW talks to a local EEPROM where a mapping table is stored. In this table device specific information are stored. This allows for the following:

  a. addresses of devices on the I2C bus do NOT need to be fixed

  b. devices on the I2C bus do NOT need to be defined

  c. command/addressing structure of the devices on the I2C bus does NOT need to be fixed.

  d. Including or removing devices if not needed

- The EEPROM table stores information whether a design is advanced/basic. In the basic variant, the EEPROM table is not needed and therefore the FW has not such structure.
- On the RTM-MMC the basic functionality equals to the current basic functionality proposed in the MTCA.4 specification + an additional temperature sensor.
- On the RTM-MMC the advanced functionality equals to the basic functionality proposed in 5. + a microcontroller that is connected to the same I2C bus.

Current Status

- Define functionalities that are needed and synchronize with experts/users.
- Define the components.
- Define the schematic.
- Define the structure of the FW.
- Implement the FW.

Current Status

- MMC-RTM
  - Functionalities defined
  - Components defined
  - Schematic for the basic variant is defined
  - Schematic for the advanced variant equals to uVM MMC schematic
  - FW structure not yet defined
- MMC-AMC
  - Functionalities defined
  - Components not defined
- MMC-eRTM
  - Functionalities not defined
- MMC-eRTM slot #15
  - Functionalities not defined

Functionality Table - RTM

Functionality RTM-MMC	Basic	Advanced	Resources	Comment
Power Enable	Not Present	6	6 IO	On-board measurement – MC
Power Good	Not Present	4	4 IO	On-board measurement – MC
ADC for Voltage Reading	Not Present	8	8 ADC_in	On-board measurement – MC
Temperature Sensors	1	4	I2C #1	On-board measurement
Alerts from Temp. Sensors	Not Present	Not Present	Not Present	On-board measurement
EEPROM	Present	Present	I2C #1	FRU info
ID EEPROM	Present	Present	I2C #1	On-board measurement
Serial Debugging Link	Not Present	Present	1 UART #1	Basic option should have only raw RX/TX pins available on PCB Advanced option should have USB-Serial converter
PG	Present	Present	1 IO	Connected through the expander
Reset	Present	Present	1 IO	Connected through the expander
WP	Present	Present	1 IO	Connected through the expander
MTCA LEDs	Present	Present	3 IO	Connected through the expander
MTCA Handle	Present	Present	1 IO	Connected through the expander
RTM I2C	Present	Present	I2C #1	Connected through the expander
EN	Present	Present	1 IO	Connected through the expander
Firmware upgrade/readback	Not Present	Present	1 SPI #1	to SPI Memory etc.
SPI Select	Not Present	Present	1 IO	To select where the SPI goes (EEPROM or user FPGA)
GP Control	Not Present	Present	1 IO	e.g. RESET
Payload status	Not Present	Present	1 IO	DONE pin in Xilinx FPGAs to FPGA
Force payload reconfig.	Not Present	Present	1 IO	PROG_B pin in Xilinx FPGAs to FPGA
Payload soft reset	Not Present	Present	1 IO	INIT_B to FPGA
General Purpose Pins	Not Present	Present	8 IO	e.g. Analog Vol.1/2, Interlock etc.

uVM and uDWC are compatible

Functionality Table - AMC

Functionality AMC-MMC	Basic	Advanced	Resources on MCU	Comment
Power Enable	1	8	1/8 IO	On-board measurement
Power Good	1	8	1/8 IO – I2C#1	On-board measurement - Expander
ADC for Voltage Reading	1	8	1/8 ADC inputs	On-board measurement
Temperature Sensors	2	4	I2C #1	On-board measurement
Alerts from Temp. Sensors	Not Present	1 – common for all sensors	1 IO	On-board measurement
EEPROM	Internal	Internal	Not Present	FRU will be stored in the internal EEPROM of MCU
ID EEPROM	Present	Present	I2C #1	On-board measurement
DAC - V_adj	Present	Present optional	I2C #1	On-board measurement
Serial Debugging Link	Present	Present	1 UART #1	Basic option should have only raw RX/TX pins available on PCB Advanced option should have USB-Serial converter
MTCA LEDs	Present	Present	3 IO	*(amc standard)*
MTCA Handle	Present	Present	1 IO	*(amc standard)*
IPMB-L	Present	Present	I2C #2	*(amc standard)*
GA0,1,2	Present	Present	4 IO	*(amc standard)*
PS1, PS0	Present	Present	2 IO	*(amc standard)*
EN-MMC Reset	Present	Present	1 IO	*(amc standard)*
Isolation/Output EN	Present	Present	4 IO	RTM
I2C RTM EN, Ready	Present	Present	2 IO	RTM
RTM I2C	Present	Present	I2C #3	RTM
RTM HP Controller I2C	Present	Present	I2C #1	RTM
RTM HP Controller IOs	Present	Present	6 IO	RTM
FMC I2C	Present	Present	I2C (#4)	One common I2C bus for all FMC modules or can be used for application specific purposes (e.g. PMB).
Firmware upgrade/readback	Not Present	Present	1 SPI #1 or UART #2 (same pins)	To load EEPROM and user SPI to the FPGA
Upgrade mode	Not Present	Present	1 IO	1 bit – upgrade or normal operation
Firmware Rev. sel	Present	Present	1 IO	1bit for rev. selection
Payload status	Present	Present	1 IO	DONE pin in Xilinx FPGAs to FPGA
Force payload reconfig.	Present	Present	1 IO	PROG_B pin in Xilinx FPGAs to FPGA
Payload soft reset	Present	Present	1 IO	User RESET to FPGA
~~Payload user read~~	~~Not Present~~	~~Present~~	~~1 SPI #2~~	~~User communication with FPGA (protocol t.b.d.)~~
GPIO get/set	Not Present	Present	Expander on I2C(#1)	8 user lines, that logic states can set or get via IPMI command. Directions of the lines must protected by software
FMC Presence	Present	Present	2 IO	
RTM Presence	Present	Present	1 IO	

uTC is compatible

Next Steps.

- The uTC MMC schematic will be the base for the AMC-MMC basic version.
  - Define the components
- The uTC MMC schematic will be the base for the AMC-MMC advanced version.
  - Define the components
- We need to identify the functionality list for the eRTM and eRTM slot #15

The End

Thank You