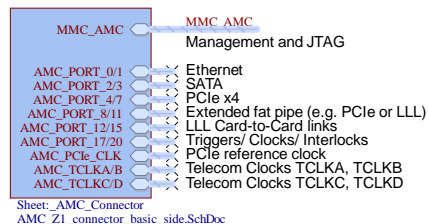


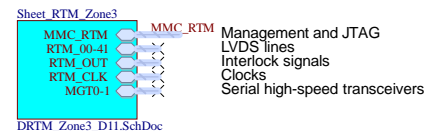
DESY MicroTCA™.4 / 4.1 AMC Implementation Proposal

Draft

AMC Connector (Backplane)

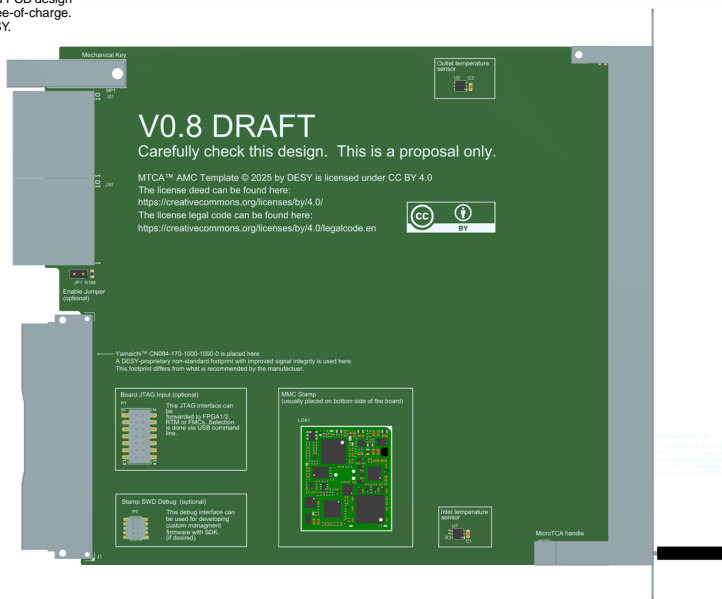


RTM Connector



Altium Designer® Board Template

The schematics and PCB design files are provided free-of-charge. Please contact DESY.



Information

This is an example AMC implementation proposal according to MicroTCA™.4 / 4.1

By publishing recommendations, DESY aims to ease the design of custom MicroTCA™ boards. This solution bases on the DESY MMC Stamp, which was designed to allow fast development of MicroTCA™ boards with maximum interoperability between different components.

The MMC Stamp is delivered pre-programmed and is intended to avoid any management firmware development by the user. If AMC developers wish to vendor-specific management extensions, they can be realized by licensing the MMC Software Development Kit.

Always cross-check with the MicroTCA™ standard. If in doubt, higher priority shall be given to the standard.

The user is responsible to verify that all implementation details fit to his design requirements.

Disclaimers apply for warranties and limitation of liability. Please check the license terms for more information.

License

MTCA™ AMC Template © 2024 by DESY is licensed under CC BY 4.0

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The license legal code can be found here:

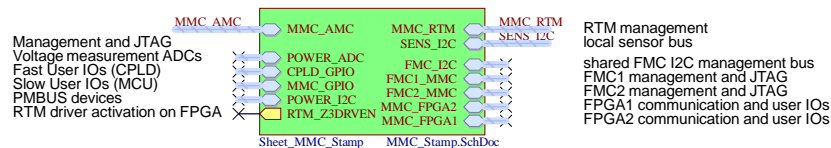
<https://creativecommons.org/licenses/by/4.0/legalcode.en>



DMMC-STAMP LGA Module

Detailed information about DMMC-STAMP can be found here:

https://innovation.desy.de/technologies/microtca/mmc/index_eng.html



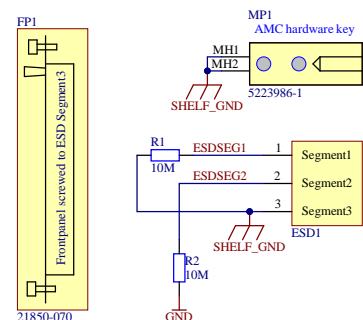
Fiducials (recommended)



List of Changes

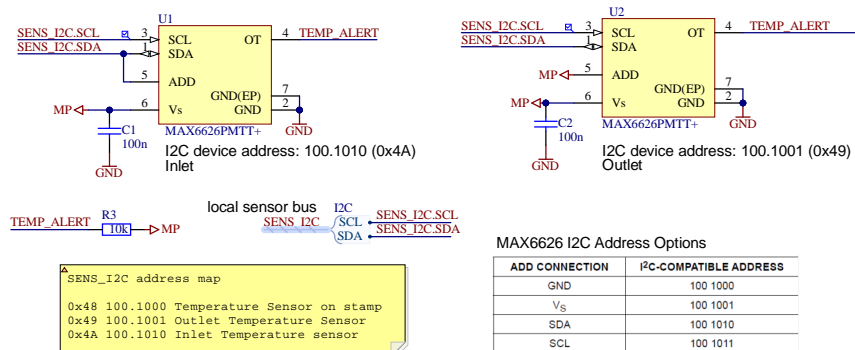
- V0.1 - initial revision
- V0.2 - spelling corrections; license set to "TBD"
- V0.3 - modified FPGA CS pin direction, added comments for FPGA SPI and 3V3_MMC_OUT signals.
- V0.4 - general visual beautifications; added note regarding Harting/ITB obsolescence; updated PCB components from valut database, improved front panel mechanics; updated PCB rules to pass DRC
- V0.5 - introduction of Yamaichi™ connector; modification of PCB outline
- V0.6 - Place outline dimensioning as defined in standard; unify arcs and corners in outline milling. (diff. with standard was approx. 0.006mm)
- V0.7pre - Add gold plating requirements from Yamaichi™; update URLs of Z3 Class definitions; remove 3D models; add 4.1 wording; apply CC BY License
- V0.7 - add CC-license compatible 3D modes to all parts.
- V0.8 - Change Yamaichi™ layout (improved signal integrity); add milling instructions; add more info on FMC I2C; correct blue LED 3D model; correct I2C address table for inlet/outlet sensors

MicroTCA™ Mechanics



Temperature Sensors (mandatory according to MTCA™ standard)

DMMC-STAMP already contains one MAX6626 temperature sensor.



Project Title:
MTCA_AMC-Template.PrjPcb
Schematic Title:
AMC Template Top
DATE: 24.01.2025 22:56:08



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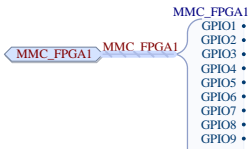
Engineer 1: Michael Fenner
Engineer 2: Robert Wedel

Rev: 0.8
Size: A3
Sheet:
1 of 4

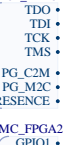
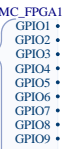
FILENAME: MTCA_AMC-Template_Top.SchDoc

DESY SoM LGA DMMC-STAMP

A



Connect to FPGA1
All pins run on the voltage provided on pin VCC_FPGA1

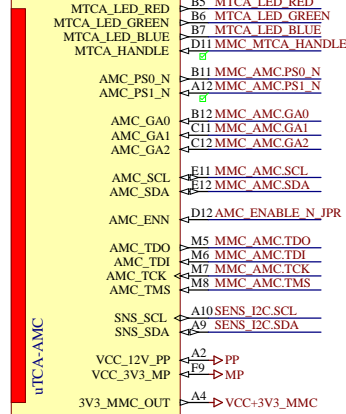


D

Connect to FPGA2
All pins run on the voltage provided on pin VCC_FPGA2

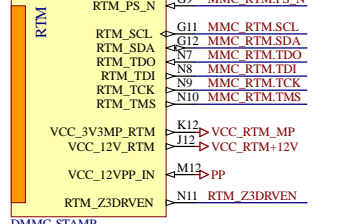


LGA1A



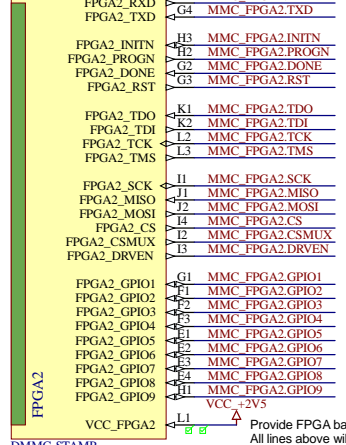
DMMC-STAMP

LGA1C



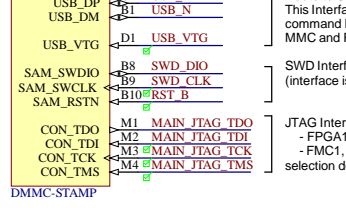
DMMC-STAMP

LGA1E



DMMC-STAMP

LGA1G



DMMC-STAMP

Attach resistors and LEDs to GND
Attach handle
Direct connection to AMC connector

Sensor I2C bus for MMC connect on-board sensors
+12V in from AMC connector
+3V3MP in from AMC connector
VCC+3V3_MMC provides up to 250mA current.
This rail is only available after +12V power has been enabled. Sensors should be powered from 3V3_MP, if MP power budget permits. The sensors on the target board should not exceed 10mA current. VCC+3V3_OUT can deliver higher current, but is derived from 12V_PP (switched on and off by MCH, available late after MP)

Direct connection to Zone 3 connector
+12V Power input for RTM. Connect to +12V PP
Signal to FPGA: activate all drivers (RTM up and ready)

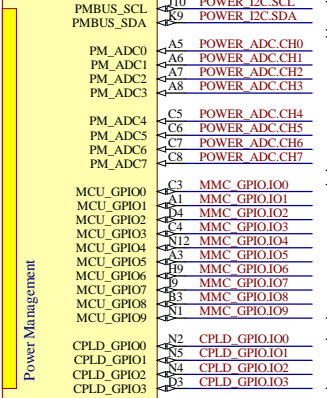
UART (via USB)
Connect to FPGA

Connect to tri-state buffer SCK, CS, MOSI: STAMP out MISO: STAMP in
Primary/ redundant SPI select
Buffer activate signal (to buffer between STAMP and FLASH) DRIVEN: Enables/ tri-states SCK/CS/MOSI drivers "leaves FPGA SPI bus alone" CS_MUX: Select CS routing to FLASH1 / FLASH2
User signals

Provide FPGA bank voltage (1V2 - 3V3) here
All lines above will run on that voltage

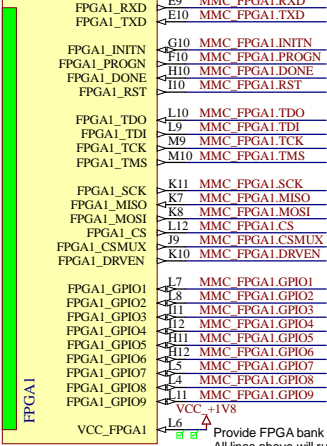
Route to USB connector. This interface provides command line access to MMC and FPGAs
SWD Interface for MMC reprogramming; optional (interface is also available via test points on Stamp)
JTAG Interface (3.3V) with access to - FPGA1, FPGA2 - FMC1, FMC2, RTM selection done via command-line interface (USB)

LGA1B



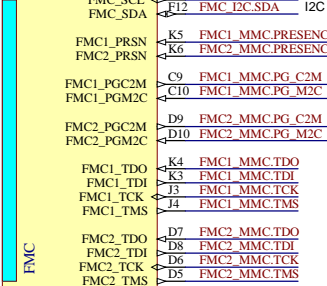
DMMC-STAMP

LGA1D



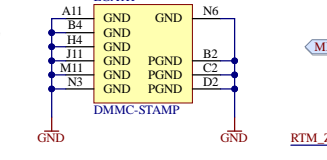
DMMC-STAMP

LGA1F



DMMC-STAMP

LGA1H



DMMC-STAMP

AMC PMBUS
ADC inputs for supervision

low-speed GPIOs for use with SDK

high-speed GPIOs for use with SDK

UART (via USB)
Connect to FPGA

Connect to buffer
see FPGA2
see FPGA2

User signals

connect directly to FMCs

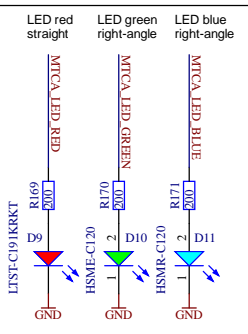
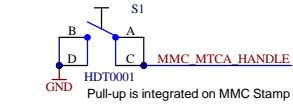
FMC shared I2C bus:
FMCs shall contain an EEPROM on this bus. FMCs shall use this bus ONLY for management. Do not connect any user logic here! FMC EEPROM shall be powered from 3P3AUX. DESY connects 3P3AUX to +3V3MP.

MMC_RTM
SCL
SDA
TDO
TDI
TCK
TMS
PS_N

MTCA™ components - mandatory

Handle and LEDs are mandatory according to AMC Standard.

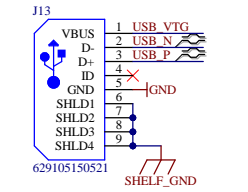
MTCA Handle



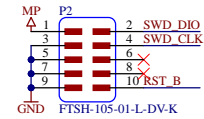
USB Virtual COM Port - highly recommended

The virtual COM port is highly recommended. It provides a command-line interface to the MMC Stamp via this interface board configuration is done. The UART of up to two FPGAs are accessible using this interface.

In addition, this interface can be accessed in a Serial-over-LAN-like mode via IPMI.



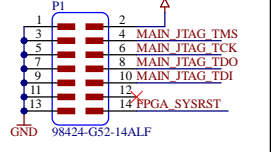
MCU Debug (ARM) - optional (mandatory when using SDK)



MMC Stamp Debug connector is recommended. When designing own firmware via SDK, it is mandatory. The MMC stamp always contains SWD test points on the module.

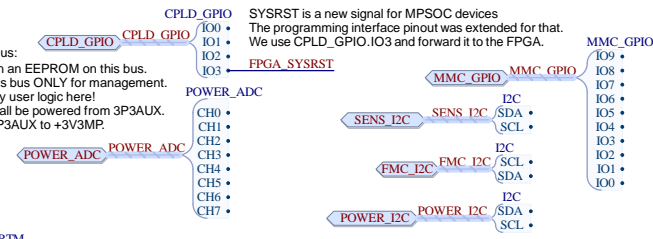
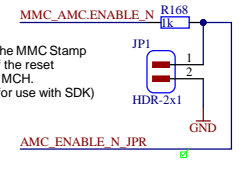
Xilinx™ JTAG IN - recommended

Access to 2 FPGAs, RTM and FMC.



DEBUG Enable - optional

Using this jumper, the MMC Stamp can be taken out of the reset independent of the MCH. (On-bench-debug for use with SDK)



microTCA
TECHNOLOGY LAB
Notkestrasse 85
22607 Hamburg
mtca-techlab@desy.de

Project Title:
MTCA_AMC-Template.PrjPcb
Schematic Title:
DMMC-STAMP SoM
DATE: 23.01.2025 22:56:08



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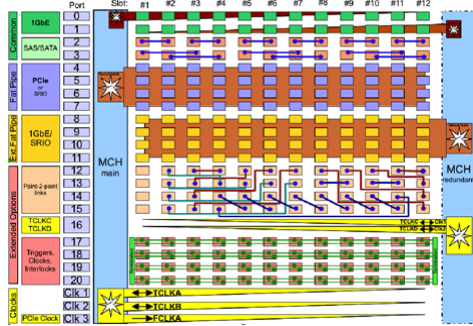
Engineer 1: Michael Fenner
Engineer 2: Robert Wedel

Rev: 0.8
Size: A3
Sheet:
2 of 4

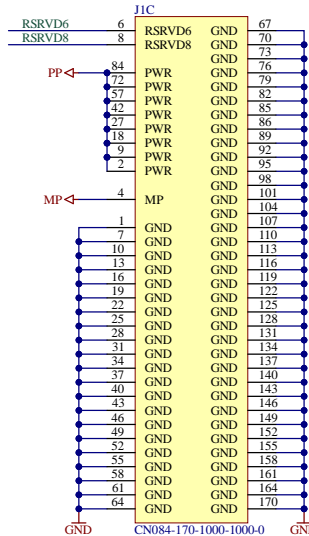
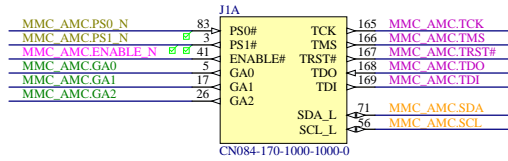
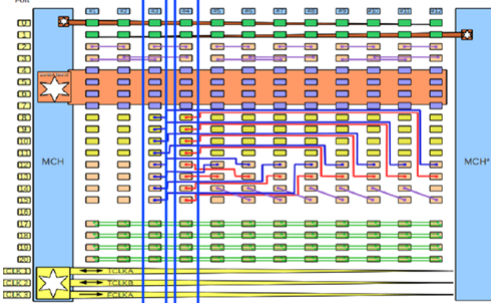
FILENAME: MMC_Stamp.SchDoc

Backplane Connector

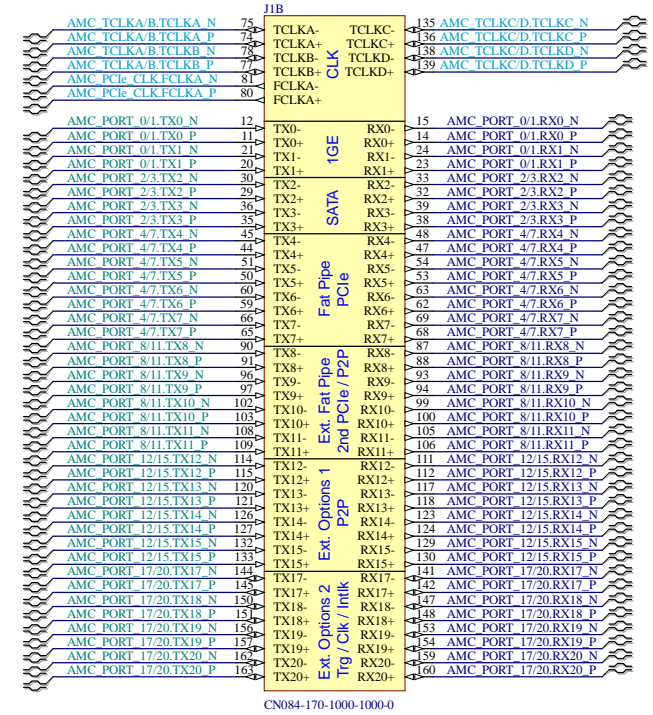
Dual-Star Backplane ("Standard")



Data aggregation backplane (Introduced by DESY)

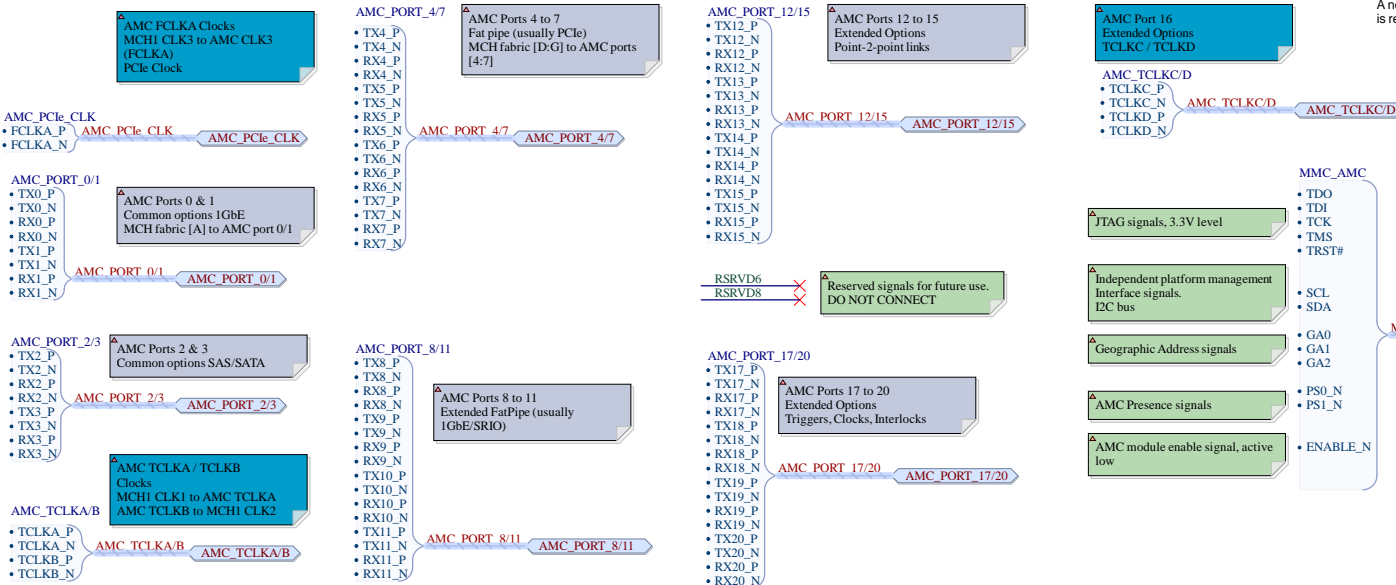


GND: Logic Ground
PP : Payload Power +12V
MP : Management Power +3.3V



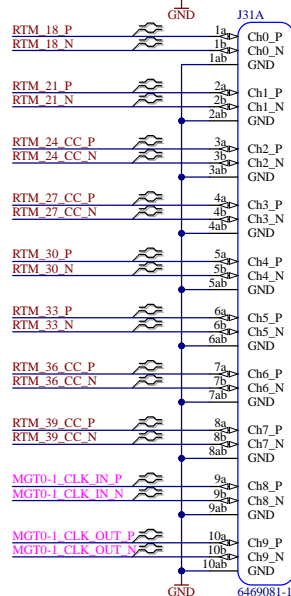
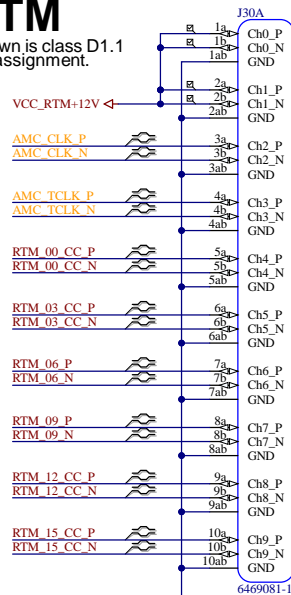
DESY uses a backplane connector made by Yamaichi®. This connector provides perfect mating, less strict requirements for board thickness and usually lower wear of the connectors on the backplane. Compared to a through-hole connector, it has a lower impact on signal integrity. Data rates of 10Gbps are common to use and show good eye diagrams. This connector has identical delays for P and N pins. Pay attention to precise P/N matching and FPGA package pin length compensation (flight time matching).

A non-standard footprint is used here. This footprint has optimized signal integrity but is different from what is recommended by the component manufacturer.

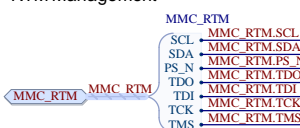


microTCA TECHNOLOGY LAB Notkestrasse 85 22607 Hamburg mtca-techlab@desy.de	Project Title: MTCA_AMC-Template.PrjPcb Schematic Title: AMC connector DATE: 23.01.2025 22:56:08	
	Engineer 1: Robert Wedel Engineer 2: Michael Fenner	Rev: 0.8 Size: A3 Sheet: 3 of 4

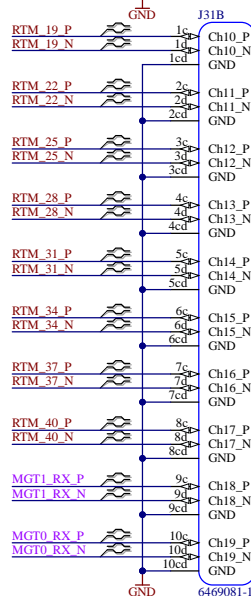
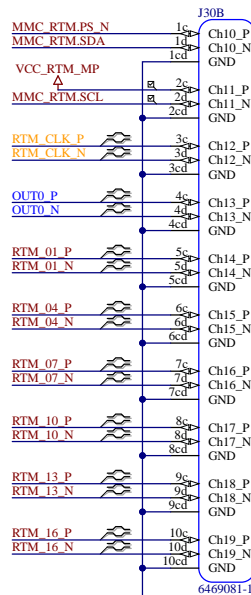
Shown is class D1.1
pin assignment.



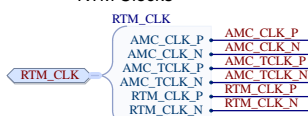
RTM Management



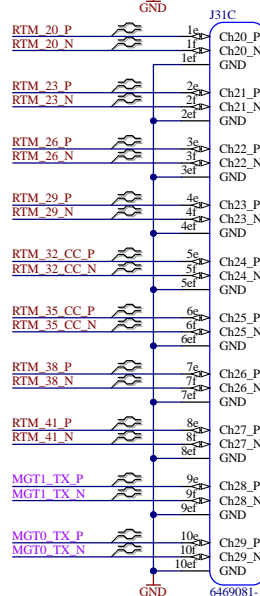
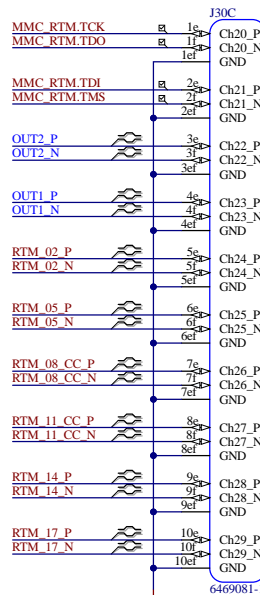
Typical assignment on D1.x DESY boards:
All the signals are to be connected to MMC Stamp. JTAG signal level is 3.3V. TDI, TMS, TCK are are AMC outputs going the RTM. TDO is an input on the AMC (output of the RTM). PS_N signals RTM presence (Pull-up inside DMMC-STAMP).



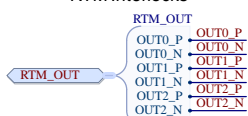
RTM Clocks



Typical assignment on D1.x DESY boards:
 AMC_Clock is a clock generated by the clock tree of the AMC.
 AMC_TCLK is a clock that is forwarded from the AMC connector to the RTM (e.g. by using a multiplexer to select between TCLKA or TCLKB). RTM_CLK is a clock output of the RTM, going to the FPGA or Clock tree of the AMC.



RTM Interlocks



Typical assignment on D1.x DESY boards:
OUT0-2 are fast Interlock signals with LVDS levels. These signals are directly forwarded trigger signals derived from AMC backplane R19_RX, TX19_RX and RX20_RX signals. Signal selection is done via MMC Stamp CLI. Forwarding is done by a CPLD on the MMC Stamp, independent of the user FPGA state.

DESY has published Zone 3 pinouts for analog, digital and RF applications:

https://innovation.desy.de/technologies/microtca/support/index_eng.html

Class D1.0 - D1.4

[Class A1](#)

Class A2
Class RF1

Class RFI

Zone 3 Connector Pin Assignment Recommendation for Digital Applications for AMC/μRTM Boards in the MTCA.4 standard (excerpt)

[illegible]

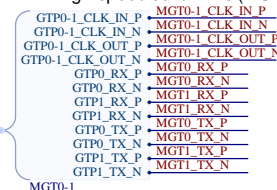
GPIO Pin / Zone		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
GPIO A management	200	1	PWRA1	PWRA2	PWRA3	PWRA4	PWRA5	PWRA6	PWRA7	PWRA8	PWRA9	PWRA10	PWRA11	PWRA12	PWRA13	PWRA14	PWRA15	PWRA16	PWRA17	PWRA18	PWRA19	PWRA20	PWRA21	PWRA22	PWRA23	PWRA24	PWRA25	PWRA26	PWRA27	PWRA28	PWRA29	PWRA30	PWRA31																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
		2	AMC_L0A1	AMC_L0A2	AMC_L0A3	AMC_L0A4	AMC_L0A5	AMC_L0A6	AMC_L0A7	AMC_L0A8	AMC_L0A9	AMC_L0A10	AMC_L0A11	AMC_L0A12	AMC_L0A13	AMC_L0A14	AMC_L0A15	AMC_L0A16	AMC_L0A17	AMC_L0A18	AMC_L0A19	AMC_L0A20	AMC_L0A21	AMC_L0A22	AMC_L0A23	AMC_L0A24	AMC_L0A25	AMC_L0A26	AMC_L0A27	AMC_L0A28	AMC_L0A29	AMC_L0A30	AMC_L0A31																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Digital core fixed I/O	201	1	PB0A	PB0B	PB0C	PB0D	PB0E	PB0F	PB0G	PB0H	PB0I	PB0J	PB0K	PB0L	PB0M	PB0N	PB0O	PB0P	PB0Q	PB0R	PB0S	PB0T	PB0U	PB0V	PB0W	PB0X	PB0Y	PB0Z	PB0AA	PB0AB	PB0AC	PB0AD	PB0AE	PB0AF	PB0AG	PB0AH	PB0AI	PB0AJ	PB0AK	PB0AL	PB0AM	PB0AN	PB0AO	PB0AP	PB0AQ	PB0AR	PB0AS	PB0AT	PB0AU	PB0AV	PB0AW	PB0AX	PB0AY	PB0AZ	PB0BA	PB0BB	PB0BC	PB0BD	PB0BE	PB0BF	PB0BG	PB0BH	PB0BI	PB0BJ	PB0BK	PB0BL	PB0BM	PB0BN	PB0BO	PB0BP	PB0BQ	PB0BR	PB0BS	PB0BT	PB0BU	PB0BV	PB0BW	PB0BX	PB0BY	PB0BZ	PB0CA	PB0CB	PB0CC	PB0CD	PB0CE	PB0CF	PB0CG	PB0CH	PB0CI	PB0CJ	PB0CK	PB0CL	PB0CM	PB0CN	PB0CO	PB0CP	PB0CQ	PB0CR	PB0CS	PB0CT	PB0CU	PB0CV	PB0CW	PB0CX	PB0CY	PB0CZ	PB0DA	PB0DB	PB0DC	PB0DD	PB0DE	PB0DF	PB0DG	PB0DH	PB0DI	PB0DJ	PB0DK	PB0DL	PB0DM	PB0DN	PB0DO	PB0DP	PB0DQ	PB0DR	PB0DS	PB0DT	PB0DU	PB0DV	PB0DW	PB0DX	PB0DY	PB0DZ	PB0EA	PB0EB	PB0EC	PB0ED	PB0EE	PB0EF	PB0EG	PB0EH	PB0EI	PB0EJ	PB0EK	PB0EL	PB0EM	PB0EN	PB0EO	PB0EP	PB0EQ	PB0ER	PB0ES	PB0ET	PB0EU	PB0EV	PB0EW	PB0EX	PB0EY	PB0EZ	PB0FA	PB0FB	PB0FC	PB0FD	PB0FE	PB0FF	PB0FG	PB0FH	PB0FI	PB0FJ	PB0FK	PB0FL	PB0FM	PB0FN	PB0FO	PB0FP	PB0FQ	PB0FR	PB0FS	PB0FT	PB0FU	PB0FV	PB0FW	PB0FX	PB0FY	PB0FZ	PB0GA	PB0GB	PB0GC	PB0GD	PB0GE	PB0GF	PB0GG	PB0GH	PB0GI	PB0GJ	PB0GK	PB0GL	PB0GM	PB0GN	PB0GO	PB0GP	PB0GQ	PB0GR	PB0GS	PB0GT	PB0GU	PB0GV	PB0GW	PB0GX	PB0GY	PB0GZ	PB0HA	PB0HB	PB0HC	PB0HD	PB0HE	PB0HF	PB0HG	PB0HH	PB0HI	PB0HJ	PB0HK	PB0HL	PB0HM	PB0HN	PB0HO	PB0HP	PB0HQ	PB0HR	PB0HS	PB0HT	PB0HU	PB0HV	PB0HW	PB0HX	PB0HY	PB0HZ	PB0IA	PB0IB	PB0IC	PB0ID	PB0IE	PB0IF	PB0IG	PB0IH	PB0II	PB0IJ	PB0IK	PB0IL	PB0IM	PB0IN	PB0IO	PB0IP	PB0IQ	PB0IR	PB0IS	PB0IT	PB0IU	PB0IV	PB0IW	PB0IX	PB0IY	PB0IZ	PB0JA	PB0JB	PB0JC	PB0JD	PB0JE	PB0JF	PB0JG	PB0JH	PB0JI	PB0JJ	PB0JK	PB0JL	PB0JM	PB0JN	PB0JO	PB0JP	PB0JQ	PB0JR	PB0JS	PB0JT	PB0JU	PB0JV	PB0JW	PB0JX	PB0JY	PB0JZ	PB0KA	PB0KB	PB0KC	PB0KD	PB0KE	PB0KF	PB0KG	PB0KH	PB0KI	PB0KJ	PB0KK	PB0KL	PB0KM	PB0KN	PB0KO	PB0KP	PB0KQ	PB0KR	PB0KS	PB0KT	PB0KU	PB0KV	PB0KW	PB0KX	PB0KY	PB0KZ	PB0LA	PB0LB	PB0LC	PB0LD	PB0LE	PB0LF	PB0LG	PB0LH	PB0LI	PB0LJ	PB0LK	PB0LL	PB0LM	PB0LN	PB0LO	PB0LP	PB0LQ	PB0LR	PB0LS	PB0LT	PB0LU	PB0LV	PB0LW	PB0LX	PB0LY	PB0LZ	PB0MA	PB0MB	PB0MC	PB0MD	PB0ME	PB0MF	PB0MG	PB0MH	PB0MI	PB0MJ	PB0MK	PB0ML	PB0MM	PB0MN	PB0MO	PB0MP	PB0MQ	PB0MR	PB0MS	PB0MT	PB0MU	PB0MV	PB0MW	PB0MX	PB0MY	PB0MZ	PB0NA	PB0NB	PB0NC	PB0ND	PB0NE	PB0NF	PB0NG	PB0NH	PB0NI	PB0NJ	PB0NK	PB0NL	PB0NM	PB0NN	PB0NO	PB0NP	PB0NQ	PB0NR	PB0NS	PB0NT	PB0NU	PB0NV	PB0NW	PB0NX	PB0NY	PB0NZ	PB0OA	PB0OB	PB0OC	PB0OD	PB0OE	PB0OF	PB0OG	PB0OH	PB0OI	PB0OJ	PB0OK	PB0OL	PB0OM	PB0ON	PB0OO	PB0OP	PB0OQ	PB0OR	PB0OS	PB0OT	PB0OU	PB0OV	PB0OW	PB0OX	PB0OY	PB0OZ	PB0PA	PB0PB	PB0PC	PB0PD	PB0PE	PB0PF	PB0PG	PB0PH	PB0PI	PB0PJ	PB0PK	PB0PL	PB0PM	PB0PN	PB0PO	PB0PP	PB0PQ	PB0PR	PB0PS	PB0PT	PB0PU	PB0PV	PB0PW	PB0PX	PB0PY	PB0PZ	PB0QA	PB0QB	PB0QC	PB0QD	PB0QE	PB0QF	PB0QG	PB0QH	PB0QI	PB0QJ	PB0QK	PB0QL	PB0QM	PB0QN	PB0QO	PB0QP	PB0QQ	PB0QR	PB0QS	PB0QT	PB0QU	PB0QV	PB0QW	PB0QX	PB0QY	PB0QZ	PB0RA	PB0RB	PB0RC	PB0RD	PB0RE	PB0RF	PB0RG	PB0RH	PB0RI	PB0RJ	PB0RK	PB0RL	PB0RM	PB0RN	PB0RO	PB0RP	PB0RQ	PB0RR	PB0RS	PB0RT	PB0RU	PB0RV	PB0RW	PB0RX	PB0RY	PB0RZ	PB0SA	PB0SB	PB0SC	PB0SD	PB0SE	PB0SF	PB0SG	PB0SH	PB0SI	PB0SJ	PB0SK	PB0SL	PB0SM	PB0SN	PB0SO	PB0SP	PB0SQ	PB0SR	PB0SS	PB0ST	PB0SU	PB0SV	PB0SW	PB0SX	PB0SY	PB0SZ	PB0TA	PB0TB	PB0TC	PB0TD	PB0TE	PB0TF	PB0TG	PB0TH	PB0TI	PB0TJ	PB0TK	PB0TL	PB0TM	PB0TN	PB0TO	PB0TP	PB0TQ	PB0TR	PB0TS	PB0TT	PB0TU	PB0TV	PB0TW	PB0TX	PB0TY	PB0TZ	PB0UA	PB0UB	PB0UC	PB0UD	PB0UE	PB0UF	PB0UG	PB0UH	PB0UI	PB0UJ	PB0UK	PB0UL	PB0UM	PB0UN	PB0UO	PB0UP	PB0UQ	PB0UR	PB0US	PB0UT	PB0UU	PB0UV	PB0UW	PB0UX	PB0UY	PB0UZ	PB0VA	PB0VB	PB0VC	PB0VD	PB0VE	PB0VF	PB0VG	PB0VH	PB0VI	PB0VJ	PB0VK	PB0VL	PB0VM	PB0VN	PB0VO	PB0VP	PB0VQ	PB0VR	PB0VS	PB0VT	PB0VU	PB0VV	PB0VW	PB0VX	PB0VY	PB0VZ	PB0WA	PB0WB	PB0WC	PB0WD	PB0WE	PB0WF	PB0WG	PB0WH	PB0WI	PB0WJ	PB0WK	PB0WL	PB0WM	PB0WN	PB0WO	PB0WP	PB0WQ	PB0WR	PB0WS	PB0WT	PB0WU	PB0WV	PB0WW	PB0WX	PB0WY	PB0WZ	PB0XA	PB0XB	PB0XC	PB0XD	PB0XE	PB0XF	PB0XG	PB0XH	PB0XI	PB0XJ	PB0XK	PB0XL	PB0XM	PB0XN	PB0XO	PB0XP	PB0XQ	PB0XR	PB0XS	PB0XT	PB0XU	PB0XV	PB0XW	PB0XX	PB0XY	PB0XZ	PB0YA	PB0YB	PB0YC	PB0YD	PB0YE	PB0YF	PB0YG	PB0YH	PB0YI	PB0YJ	PB0YK	PB0YL	PB0YM	PB0YN	PB0YO	PB0YP	PB0YQ	PB0YR	PB0YS	PB0YT	PB0YU	PB0YV	PB0YW	PB0YX	PB0YY	PB0YZ	PB0ZA	PB0ZB	PB0ZC	PB0ZD	PB0ZE	PB0ZF	PB0ZG	PB0ZH	PB0ZI	PB0ZJ	PB0ZK	PB0ZL	PB0ZM	PB0ZN	PB0ZO	PB0ZP	PB0ZQ	PB0ZR	PB0ZS	PB0ZT	PB0ZU	PB0ZV	PB0ZW	PB0ZX	PB0ZY	PB0ZZ
		2	PB0A	PB0B	PB0C	PB0D	PB0E	PB0F	PB0G	PB0H	PB0I	PB0J	PB0K	PB0L	PB0M	PB0N	PB0O	PB0P	PB0Q	PB0R	PB0S	PB0T	PB0U	PB0V	PB0W	PB0X	PB0Y	PB0Z	PB0AA	PB0AB	PB0AC	PB0AD	PB0AE	PB0AF	PB0AG	PB0AH	PB0AI	PB0AJ	PB0AK	PB0AL	PB0AM	PB0AN	PB0AO	PB0AP	PB0AQ	PB0AR	PB0AS	PB0AT	PB0AU	PB0AV	PB0AW	PB0AX	PB0AY	PB0AZ	PB0BA	PB0BB	PB0BC	PB0BD	PB0BE	PB0BF	PB0BG	PB0BH	PB0BI	PB0BJ	PB0BK	PB0BL	PB0BM	PB0BN	PB0BO	PB0BP	PB0BQ	PB0BR	PB0BS	PB0BT	PB0BU	PB0BV	PB0BW	PB0BX	PB0BY	PB0BZ	PB0CA	PB0CB	PB0CC	PB0CD	PB0CE	PB0CF	PB0CG	PB0CH	PB0CI	PB0CJ	PB0CK	PB0CL	PB0CM	PB0CN	PB0CO	PB0CP	PB0CQ	PB0CR	PB0CS	PB0CT	PB0CU	PB0CV	PB0CW	PB0CX	PB0CY	PB0CZ	PB0DA	PB0DB	PB0DC	PB0DD	PB0DE	PB0DF	PB0DG	PB0DH	PB0DI	PB0DJ	PB0DK	PB0DL	PB0DM	PB0DN	PB0DO	PB0DP	PB0DQ	PB0DR	PB0DS	PB0DT	PB0DU	PB0DV	PB0DW	PB0DX	PB0DY	PB0DZ	PB0EA	PB0EB	PB0EC	PB0ED	PB0EE	PB0EF	PB0EG	PB0EH	PB0EI	PB0EJ	PB0EK	PB0EL	PB0EM	PB0EN	PB0EO	PB0EP	PB0EQ	PB0ER	PB0ES	PB0ET	PB0EU	PB0EV	PB0EW	PB0EX	PB0EY	PB0EZ	PB0FA	PB0FB	PB0FC	PB0FD	PB0FE	PB0FF	PB0FG	PB0FH	PB0FI	PB0FJ	PB0FK	PB0FL	PB0FM	PB0FN	PB0FO	PB0FP	PB0FQ	PB0FR	PB0FS	PB0FT	PB0FU	PB0FV	PB0FW	PB0FX	PB0FY	PB0FZ	PB0GA	PB0GB	PB0GC	PB0GD	PB0GE	PB0GF	PB0GG	PB0GH	PB0GI	PB0GJ	PB0GK	PB0GL	PB0GM	PB0GN	PB0GO	PB0GP	PB0GQ	PB0GR	PB0GS	PB0GT	PB0GU	PB0GV	PB0GW	PB0GX	PB0GY	PB0GZ	PB0HA	PB0HB	PB0HC	PB0HD	PB0HE	PB0HF	PB0HG	PB0HH	PB0HI	PB0HJ	PB0HK	PB0HL	PB0HM	PB0HN	PB0HO	PB0HP	PB0HQ	PB0HR	PB0HS	PB0HT	PB0HU	PB0HV	PB0HW	PB0HX	PB0HY	PB0HZ	PB0IA	PB0IB	PB0IC	PB0ID	PB0IE	PB0IF	PB0IG	PB0IH	PB0II	PB0IJ	PB0IK	PB0IL	PB0IM	PB0IN	PB0IO	PB0IP	PB0IQ	PB0IR	PB0IS	PB0IT	PB0IU	PB0IV	PB0IW	PB0IX	PB0IY	PB0IZ	PB0JA	PB0JB	PB0JC	PB0JD	PB0JE	PB0JF	PB0JG	PB0JH	PB0JI	PB0JJ	PB0JK	PB0JL	PB0JM	PB0JN	PB0JO	PB0JP	PB0JQ	PB0JR	PB0JS	PB0JT	PB0JU	PB0JV	PB0JW	PB0JX	PB0JY	PB0JZ	PB0KA	PB0KB	PB0KC	PB0KD	PB0KE	PB0KF	PB0KG	PB0KH	PB0KI	PB0KJ	PB0KK	PB0KL	PB0KM	PB0KN	PB0KO	PB0KP	PB0KQ	PB0KR	PB0KS	PB0KT	PB0KU	PB0KV	PB0KW	PB0KX	PB0KY	PB0KZ	PB0LA	PB0LB	PB0LC	PB0LD	PB0LE	PB0LF	PB0LG	PB0LH	PB0LI	PB0LJ	PB0LK	PB0LL	PB0LM	PB0LN	PB0LO	PB0LP	PB0LQ	PB0LR	PB0LS	PB0LT	PB0LU	PB0LV	PB0LW	PB0LX	PB0LY	PB0LZ	PB0MA	PB0MB	PB0MC	PB0MD	PB0ME	PB0MF	PB0MG	PB0MH	PB0MI	PB0MJ	PB0MK	PB0ML	PB0MM	PB0MN	PB0MO	PB0MP	PB0MQ	PB0MR	PB0MS	PB0MT	PB0MU	PB0MV	PB0MW	PB0MX	PB0MY	PB0MZ	PB0NA	PB0NB	PB0NC	PB0ND	PB0NE	PB0NF	PB0NG	PB0NH	PB0NI	PB0NJ	PB0NK	PB0NL	PB0NM	PB0NN	PB0NO	PB0NP	PB0NQ	PB0NR	PB0NS	PB0NT	PB0NU	PB0NV	PB0NW	PB0NX	PB0NY	PB0NZ	PB0OA	PB0OB	PB0OC	PB0OD	PB0OE	PB0OF	PB0OG	PB0OH	PB0OI	PB0OJ	PB0OK	PB0OL	PB0OM	PB0ON	PB0OO	PB0OP	PB0OQ	PB0OR	PB0OS	PB0OT	PB0OU	PB0OV	PB0OW	PB0OX	PB0OY	PB0OZ	PB0PA	PB0PB	PB0PC	PB0PD	PB0PE	PB0PF	PB0PG	PB0PH	PB0PI	PB0PJ	PB0PK	PB0PL	PB0PM	PB0PN	PB0PO	PB0PP	PB0PQ	PB0PR	PB0PS	PB0PT	PB0PU	PB0PV	PB0PW	PB0PX	PB0PY	PB0PZ	PB0QA	PB0QB	PB0QC	PB0QD	PB0QE	PB0QF	PB0QG	PB0QH	PB0QI	PB0QJ	PB0QK	PB0QL	PB0QM	PB0QN	PB0QO	PB0QP	PB0QQ	PB0QR	PB0QS	PB0QT	PB0QU	PB0QV	PB0QW	PB0QX	PB0QY	PB0QZ	PB0RA	PB0RB	PB0RC	PB0RD	PB0RE	PB0RF	PB0RG	PB0RH	PB0RI	PB0RJ	PB0RK	PB0RL	PB0RM	PB0RN	PB0RO	PB0RP	PB0RQ	PB0RR	PB0RS	PB0RT	PB0RU	PB0RV	PB0RW	PB0RX	PB0RY	PB0RZ	PB0SA	PB0SB	PB0SC	PB0SD	PB0SE	PB0SF	PB0SG	PB0SH	PB0SI	PB0SJ	PB0SK	PB0SL	PB0SM	PB0SN	PB0SO	PB0SP	PB0SQ	PB0SR	PB0SS	PB0ST	PB0SU	PB0SV	PB0SW	PB0SX	PB0SY	PB0SZ	PB0TA	PB0TB	PB0TC	PB0TD	PB0TE	PB0TF	PB0TG	PB0TH	PB0TI	PB0TJ	PB0TK	PB0TL	PB0TM	PB0TN	PB0TO	PB0TP	PB0TQ	PB0TR	PB0TS	PB0TT	PB0TU	PB0TV	PB0TW	PB0TX	PB0TY	PB0TZ	PB0UA	PB0UB	PB0UC	PB0UD	PB0UE	PB0UF	PB0UG	PB0UH	PB0UI	PB0UJ	PB0UK	PB0UL	PB0UM	PB0UN	PB0UO	PB0UP	PB0UQ	PB0UR	PB0US	PB0UT	PB0UU	PB0UV	PB0UW	PB0UX	PB0UY	PB0UZ	PB0VA	PB0VB	PB0VC	PB0VD	PB0VE	PB0VF	PB0VG	PB0VH	PB0VI	PB0VJ	PB0VK	PB0VL	PB0VM	PB0VN	PB0VO	PB0VP	PB0VQ	PB0VR	PB0VS	PB0VT	PB0VU	PB0VV	PB0VW	PB0VX	PB0VY	PB0VZ	PB0WA	PB0WB	PB0WC	PB0WD	PB0WE	PB0WF	PB0WG	PB0WH	PB0WI	PB0WJ	PB0WK	PB0WL	PB0WM	PB0WN	PB0WO	PB0WP	PB0WQ	PB0WR	PB0WS	PB0WT	PB0WU	PB0WV	PB0WW	PB0WX	PB0WY	PB0WZ	PB0XA	PB0XB	PB0XC	PB0XD	PB0XE	PB0XF	PB0XG	PB0XH	PB0XI	PB0XJ	PB0XK	PB0XL	PB0XM	PB0XN	PB0XO	PB0XP	PB0XQ	PB0XR	PB0XS	PB0XT	PB0XU	PB0XV	PB0XW	PB0XX	PB0XY	PB0XZ	PB0YA	PB0YB	PB0YC	PB0YD	PB0YE	PB0YF	PB0YG	PB0YH	PB0YI	PB0YJ	PB0YK	PB0YL	PB0YM	PB0YN	PB0YO	PB0YP	PB0YQ	PB0YR	PB0YS	PB0YT	PB0YU	PB0YV	PB0YW	PB0YX	PB0YY	PB0YZ	PB0ZA	PB0ZB	PB0ZC	PB0ZD	PB0ZE	PB0ZF	PB0ZG	PB0ZH	PB0ZI	PB0ZJ	PB0ZK	PB0ZL	PB0ZM	PB0ZN	PB0ZO	PB0ZP	PB0ZQ	PB0ZR	PB0ZS	PB0ZT	PB0ZU	PB0ZV	PB0ZW	PB0ZX	PB0ZY	PB0ZZ
User configuration	202	1	PB0A	PB0B	PB0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											

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MIPS C3 / Zione									
MIPS C3 / Zione	200	1	PWBAT1	PWBAT1	PWR	SDA	IOK	IOK	IOK
		2	PWBAT2	PWBAT2	SRP				
		3	ABC_CLK1	ABC_CLK1	STM_CLK1A		OUT0A		OUT0A
		4	ABC_CLK2	ABC_CLK2	OUT0B				OUT0B
		5	PBD0A / CC1	PBD0A / CC1	PBD0A		PBD0A		PBD0A
		6	PBD0B / CC2	PBD0B / CC2	PBD0B		PBD0B		PBD0B
		7	PBD0C / CC3	PBD0C / CC3	PBD0C		PBD0C		PBD0C
		8	PBD0D / CC4	PBD0D / CC4	PBD0D		PBD0D		PBD0D
		9	PBD0E / CC5	PBD0E / CC5	PBD0E		PBD0E		PBD0E
		10	PBD0F / CC6	PBD0F / CC6	PBD0F		PBD0F		PBD0F
User Configuration	201	1	PBD0A / CC1	PBD0A / CC1	PBD0A		PBD0A		PBD0A
		2	PBD0B / CC2	PBD0B / CC2	PBD0B		PBD0B		PBD0B
		3	PBD0C / CC3	PBD0C / CC3	PBD0C		PBD0C		PBD0C
		4	PBD0D / CC4	PBD0D / CC4	PBD0D		PBD0D		PBD0D
		5	PBD0E / CC5	PBD0E / CC5	PBD0E		PBD0E		PBD0E
		6	PBD0F / CC6	PBD0F / CC6	PBD0F		PBD0F		PBD0F
		7	PBD0G / CC7	PBD0G / CC7	PBD0G		PBD0G		PBD0G
		8	PBD0H / CC8	PBD0H / CC8	PBD0H		PBD0H		PBD0H
		9	PBD0I / CC9	PBD0I / CC9	PBD0I		PBD0I		PBD0I
		10	PBD0J / CC10	PBD0J / CC10	PBD0J		PBD0J		PBD0J
User Configuration	202	1	PBD0A / CC1	PBD0A / CC1	PBD0A		PBD0A		PBD0A
		2	PBD0B / CC2	PBD0B / CC2	PBD0B		PBD0B		PBD0B
		3	PBD0C / CC3	PBD0C / CC3	PBD0C		PBD0C		PBD0C
		4	PBD0D / CC4	PBD0D / CC4	PBD0D		PBD0D		PBD0D
		5	PBD0E / CC5	PBD0E / CC5	PBD0E		PBD0E		PBD0E
		6	PBD0F / CC6	PBD0F / CC6	PBD0F		PBD0F		PBD0F
		7	PBD0G / CC7	PBD0G / CC7	PBD0G		PBD0G		PBD0G
		8	PBD0H / CC8	PBD0H / CC8	PBD0H		PBD0H		PBD0H
		9	PBD0I / CC9	PBD0I / CC9	PBD0I		PBD0I		PBD0I
		10	PBD0J / CC10	PBD0J / CC10	PBD0J		PBD0J		PBD0J
Standard GPIO Lines	203	1	GPIOA_IN0	GPIOA_IN0	GPIOA_OUT0		GPIOA_OUT0		GPIOA_OUT0
		2	GPIOA_IN1	GPIOA_IN1	GPIOA_OUT1		GPIOA_OUT1		GPIOA_OUT1
		3	GPIOA_IN2	GPIOA_IN2	GPIOA_OUT2		GPIOA_OUT2		GPIOA_OUT2
		4	GPIOA_IN3	GPIOA_IN3	GPIOA_OUT3		GPIOA_OUT3		GPIOA_OUT3
		5	GPIOA_IN4	GPIOA_IN4	GPIOA_OUT4		GPIOA_OUT4		GPIOA_OUT4
		6	GPIOA_IN5	GPIOA_IN5	GPIOA_OUT5		GPIOA_OUT5		GPIOA_OUT5
		7	GPIOA_IN6	GPIOA_IN6	GPIOA_OUT6		GPIOA_OUT6		GPIOA_OUT6
		8	GPIOA_IN7	GPIOA_IN7	GPIOA_OUT7		GPIOA_OUT7		GPIOA_OUT7
		9	GPIOA_IN8	GPIOA_IN8	GPIOA_OUT8		GPIOA_OUT8		GPIOA_OUT8
		10	GPIOA_IN9	GPIOA_IN9	GPIOA_OUT9		GPIOA_OUT9		GPIOA_OUT9

IOFS-4 / Zone		a	b	c	d	e	f
IOFS-4 management	1	P0V0A3	P0V0B1	P0A	SDA	ACK	IOO
	2	P0V0A2	P0V0B0	P0V0B1	IOO	IOO	IOO
	3	AMC_OU_Cx	AMC_OU_Cx	IOH2_OU_Cx	IOH2_OU_Cx	IOU2x	IOU2x
	4	AMC_OU_Cx	AMC_OU_Cx	IOH2_OU_Cx	IOH2_OU_Cx	IOU2x	IOU2x
Digital clocks feed IO	1	PSD_OU_Cx	PSD_OU_Cx	IOH2_OU_Cx	IOH2_OU_Cx	IOU2x	IOU2x
	2	PSD_OU_Cx	PSD_OU_Cx	IOH2_OU_Cx	IOH2_OU_Cx	IOU2x	IOU2x
	3	PSD_OU_Cx	PSD_OU_Cx	IOH2_OU_Cx	IOH2_OU_Cx	IOU2x	IOU2x
	4	PSD_OU_Cx	PSD_OU_Cx	IOH2_OU_Cx	IOH2_OU_Cx	IOU2x	IOU2x
Standard GDS Links	1	PSD_OU_Cx	PSD_OU_Cx	IOH2_OU_Cx	IOH2_OU_Cx	IOU2x	IOU2x
	2	PSD_OU_Cx	PSD_OU_Cx	IOH2_OU_Cx	IOH2_OU_Cx	IOU2x	IOU2x
	3	PSD_OU_Cx	PSD_OU_Cx	IOH2_OU_Cx	IOH2_OU_Cx	IOU2x	IOU2x
	4	PSD_OU_Cx	PSD_OU_Cx	IOH2_OU_Cx	IOH2_OU_Cx	IOU2x	IOU2x
IOFS-4 management	1	PSD_OU_Cx	PSD_OU_Cx	IOH2_OU_Cx	IOH2_OU_Cx	IOU2x	IOU2x
	2	PSD_OU_Cx	PSD_OU_Cx	IOH2_OU_Cx	IOH2_OU_Cx	IOU2x	IOU2x
	3	PSD_OU_Cx	PSD_OU_Cx	IOH2_OU_Cx	IOH2_OU_Cx	IOU2x	IOU2x
	4	PSD_OU_Cx	PSD_OU_Cx	IOH2_OU_Cx	IOH2_OU_Cx	IOU2x	IOU2x
Standard GDS Links	1	PSD_OU_Cx	PSD_OU_Cx	IOH2_OU_Cx	IOH2_OU_Cx	IOU2x	IOU2x
	2	PSD_OU_Cx	PSD_OU_Cx	IOH2_OU_Cx	IOH2_OU_Cx	IOU2x	IOU2x
	3	PSD_OU_Cx	PSD_OU_Cx	IOH2_OU_Cx	IOH2_OU_Cx	IOU2x	IOU2x
	4	PSD_OU_Cx	PSD_OU_Cx	IOH2_OU_Cx	IOH2_OU_Cx	IOU2x	IOU2x

RTM high-speed serial links (MGTs)



Typical assignment on D1.x DESY boards:
Usually all RX/TX pins have AC coupling capacitors on the AMC.
RX is connected to FPGA MGT RX pin, TX is connected to FPGA
MGT TX pin. CLK_IN is a clock output of the RTM, usually going to
FPGA MGT reference clock input. CLK_OUT is usually generated
by AMC clock tree and synchronous to the MGT reference clock
which is used for driving the Zone 3 MGTS.

LVDS Interface

For information see RTM
implementation proposal.

RTM_00-41

RTM_00_01	RTM_00_CC_P
RTM_00_CC_N	RTM_00_CC_N
RTM_01_P	RTM_01_P
RTM_01_N	RTM_02_P
RTM_02_P	RTM_02_N
RTM_03_P	RTM_03_CC_N
RTM_03_CC_N	RTM_03_CC_N
RTM_04_P	RTM_04_P
RTM_04_N	RTM_05_P
RTM_05_P	RTM_05_N
RTM_05_N	RTM_06_P
RTM_06_P	RTM_06_N
RTM_07_P	RTM_07_P
RTM_07_N	RTM_07_N
RTM_08_CC_P	RTM_08_CC_P
RTM_08_CC_N	RTM_08_CC_N
RTM_09_P	RTM_09_P
RTM_09_N	RTM_09_P
RTM_10_P	RTM_10_N
RTM_10_N	RTM_11_CC_N
RTM_11_CC_N	RTM_11_CC_P
RTM_11_CC_P	RTM_12_CC_P
RTM_12_P	RTM_12_CC_N
RTM_12_CC_N	RTM_13_P
RTM_13_P	RTM_13_N
RTM_14_P	RTM_14_P
RTM_14_N	RTM_14_N
RTM_15_P	RTM_15_CC_P
RTM_15_CC_N	RTM_15_CC_N
RTM_16_P	RTM_16_P
RTM_16_N	RTM_16_N
RTM_17_P	RTM_17_P
RTM_17_N	RTM_17_N
RTM_18_P	RTM_18_P
RTM_18_N	RTM_18_N
RTM_19_P	RTM_19_P
RTM_19_N	RTM_19_N
RTM_20_P	RTM_20_P
RTM_20_N	RTM_20_N
RTM_21_P	RTM_21_P
RTM_21_N	RTM_21_N
RTM_22_P	RTM_22_P
RTM_22_N	RTM_22_N
RTM_23_P	RTM_23_P
RTM_23_N	RTM_23_N
RTM_24_CC_P	RTM_24_CC_P
RTM_24_CC_N	RTM_24_CC_N
RTM_25_P	RTM_25_P
RTM_25_N	RTM_25_N
RTM_26_P	RTM_26_P
RTM_26_N	RTM_26_N
RTM_27_CC_P	RTM_27_CC_P
RTM_27_CC_N	RTM_27_CC_N
RTM_28_P	RTM_28_P
RTM_28_N	RTM_28_N
RTM_29_P	RTM_29_P
RTM_29_N	RTM_29_N
RTM_30_P	RTM_30_P
RTM_30_N	RTM_30_N
RTM_31_P	RTM_31_P
RTM_31_N	RTM_31_N
RTM_32_CC_P	RTM_32_CC_P
RTM_32_CC_N	RTM_32_CC_N
RTM_33_P	RTM_33_P
RTM_33_N	RTM_33_N
RTM_34_P	RTM_34_P
RTM_34_N	RTM_34_N
RTM_35_CC_P	RTM_35_CC_P
RTM_35_CC_N	RTM_35_CC_N
RTM_36_CC_P	RTM_36_CC_P
RTM_36_CC_N	RTM_36_CC_N
RTM_37_P	RTM_37_P
RTM_37_N	RTM_37_N
RTM_38_P	RTM_38_P
RTM_38_N	RTM_38_N
RTM_39_CC_P	RTM_39_CC_P
RTM_39_CC_N	RTM_39_CC_N
RTM_40_P	RTM_40_P
RTM_40_N	RTM_40_N
RTM_41_P	RTM_41_P
RTM_41_N	RTM_41_N



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FILENAME: DRTM_Zone3_D11.SchDoc

Project Title:

MTCA_AMC-Template.PrjPcb

Schematic T

BTM Zone 2

DATE: 23.01.2025 22:56:09

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