

RunBMC

Eric Shobe, HW Technologist, Dropbox Jared Mednick, HW Engineer, Salesforce





Hardware Interface for BMC







Agenda

- Overview
- Background
- High Level Specification
- Mechanical
- Connector Overview
- Benefits
- Design Files Contribution













Overview

"RunBMC specification defines the interface between the Baseboard Management Controller(BMC) subsystem and OCP hardware platforms, such as network or compute motherboards."











Background

- Released a prototype at OCP2018 to drive discussion forward
- Deep platform analysis went into the design
- Feedback from the community received.... A lot..
- Lets recap a little!





2018: In-depth analysis of currently available OCP Server platforms to compare BMC implementations













мміт

Wedge

- Standard DDR3 layout, redesigned
- Unique voltage regulation for BMC,
 - design effort in using SMPS
 - Boot ROM reused
- Uses SGMII for BMC network connection (not shown)











Tioga Pass

- Standard DDR4 chip, but custom layout
- Unique voltage regulation for BMC
- Layout / placement requirement for Flash on an otherwise crowded design
- Layout effort on routing RMII to Intel I210 (not shown)











Zaius

- DDR4 layout effort!
- Unique voltage regulation for BMC (same voltage rails as others) Not shown: RGMII to PHY (for dedicated BMC connection). Used
 - in all designs, but each design replicates this



Olympus

DDR3 layout effort! Almost same design as Wedge but a redesign Unique voltage regulation for BMC, to use Olympus Stackup Not shown: RGMII to PHY (for dedicated BMC connection). Used in all designs, but each design replicates this

Platform Analysis - Summary

	GPIO (Resets, etc)	IRQ or Error	Total (GPIO / IRQ + others)	I2C (busses)	UART
Tioga Pass	58	32	103	13	3
Zaius	71	20	98	15	1
Olympus	92	8	111	10	2

Background Finale – OCP 2018 2018 Prototype

RunBMC	2018	
Pins	300 pins	
Connector	Board to Board	
Spec	?? What spec ??	

Fast Forward to 2019

- RunBMC specification
- Collaboration
- More reference boards, more prototypes

High Level Specification

Overview				
Overview	RunBMC specification defines the interface to the Baseboard Management Controller(BMC subsystem and OCP hardware platforms			
Connector and Form Factor				
Connector/FF	260pin DDR4 SO-DIMM Connector. MO-31 JEDEC registration in two different heights. S (32mm) and Large (50mm) allowed. Right A Vertical Supported			
I/O Connectivity				
I/O	1x PCIe Gen2, 1x VGA, 1xRMII, 16x T PWM, 3x SPI, 1x LPC/ESPI, 1x JTAG, 2x U I2C, 4x SGPIO, 36x GPIO, 2x RST/PW UART, 8x ADC, 2x WDO, 1x PECI, 1GbT/F ADC			
Flexible Functionality				
Flexible	Dual Functions for majority of the I/O is support multiplexing. Provides system flexibility			

Mechanical Form Factor

Connector

- 260 Pin DDR4 SODIMM, .50mm Pitch DIMM Registration
- Form factor, defined by MO-310C
- Exception is <u>height</u> and <u>component keepout</u> requirements

Card Types	"A" height denoted in Figure 7-1
Standard	32mm
Large	50mm

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Function Power 3.3V VDD_RGMII_REF LPC 3.3v or ESPI 1.8v Power 12 V Ground ADC **GPI/ADC** PCle **RGMII/1GT PHY** VGA / GPIOs **RMII/NC-SI** Master JTAG/GPIO USB host **USB** device SPI1: SPI for host - quad capable **SPI2: SPI for host FWSPI: SPI for Boot - quad capable** SYSSPI: System SPI LPC/eSPI I2C / GPIOs **GPIOs / I2C I2C** UARTs (TxD, RxD) CONSOLE (Tx, Rx) PWM Tacho/GPIOs PECI **GPIOs**

GPIO/GPIO Expanders (Serial GPIO) Reset and Power Good Watchdogs/GPIO **BOOT_IND# / GPIO RESERVED/KLUDGE**

Signal Count for	Number of	Number of used	
Interface	Interfaces	pins	lotal Signals
		5	5
		1	1
		1	1
		1	1
4	2	38	38
1	8	8	8
1	8	8	8
7	1	7	7
14	1	14	14
7	1	7	7
10	1	10	10
6	1	6	6
4	1	4	4
3	1	3	3
7	1	7	7
5	1	5	5
7	1	7	7
4	1	4	4
8	1	8	8
2	12	24	24
2	3	6	6
2	1	2	2
2	4	8	8
2	1	2	2
1	8	8	8
1	16	16	16
2	1	2	2
1	37	37	37
4	1	4	4
1	2	2	2
1	2	2	2
1	1	1	1
1	2	2	2
	_	4	4

Benefits

- Improved Security
 - cycle then server
 - Physically easier to control fabrication
- Supply Chain
 - Pick your own BMC to fit server needs
- Manageability
 - Managing platform code
 - Consistent interfaces drive consistent code
- Agile
 - Move fast to market don't redesign your BMC.

- Hardened modular BMC acts as Root of Trust. Design is more stable, slower cadence

Big Thanks

Hyve, QCT, Nuvoton, Microsoft, Google, Facebook, Aspeed

> Questions? Come see us at the MSFT booth!

Contributions and Call to Action

- RunBMC Specification V1.0 NOT READY
- RunBMC Pinout Spreadsheet Specification V1.0 NOT READY

Subgroup:

MANAGEMENT

Link Here: http://files.opencompute.org/oc/public.php?service=files&t=e398a2e8b3475a681acfc735889c4c5e

Link Here: http://files.opencompute.org/oc/public.php?service=files&t=80c449134dd35610e05e478754f337a9

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