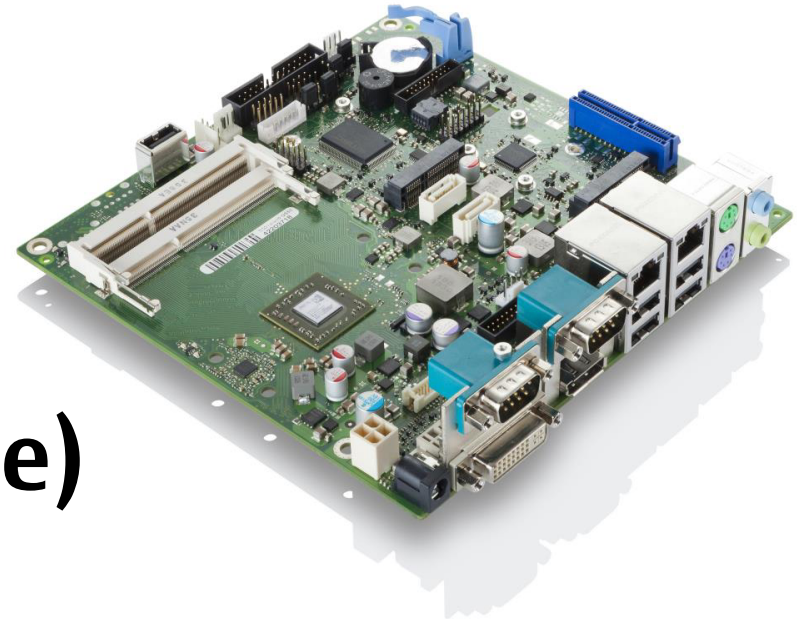
TechNotes V1.4

Mini-ITX Industrial Mainboard



D3313-S1/-S2/-S3 (eKabini)
D3313-S4/-S5/-S6 (SteppeEagle)

(12/2015)

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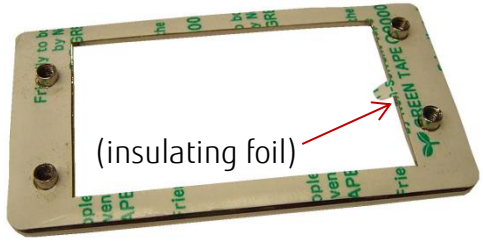
1 Safety Instructions

Do not connect or disconnect any cables or modules to or from any onboard connectors (except for the rear I/O connectors) until the mainboard is completely powered down.

Any damage caused to the mainboard by misuse of the onboard connectors is excluded from the standard warranty. Fujitsu Technology Solutions cannot be held liable for any damage that results from incorrect use of any onboard connectors.

The system integrator is fully responsible for the usage of appropriate connectors and cables in order to fulfill the technical requirements (electrical contact, durability, power/current levels, signal integrity etc.)



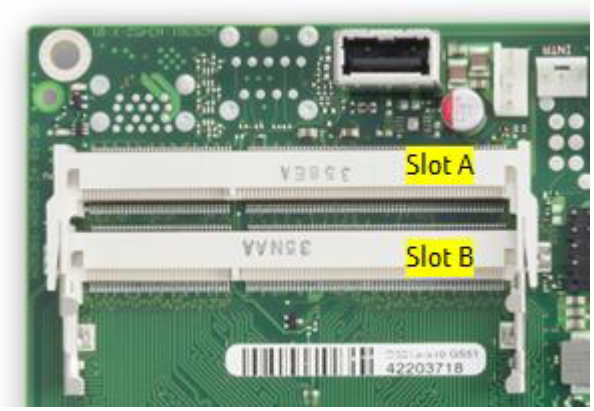
Heatsink Backplate

Important Note:

Insulating foil of backplate must NOT be removed,
otherwise mainboard may be damaged due to possible short circuit.

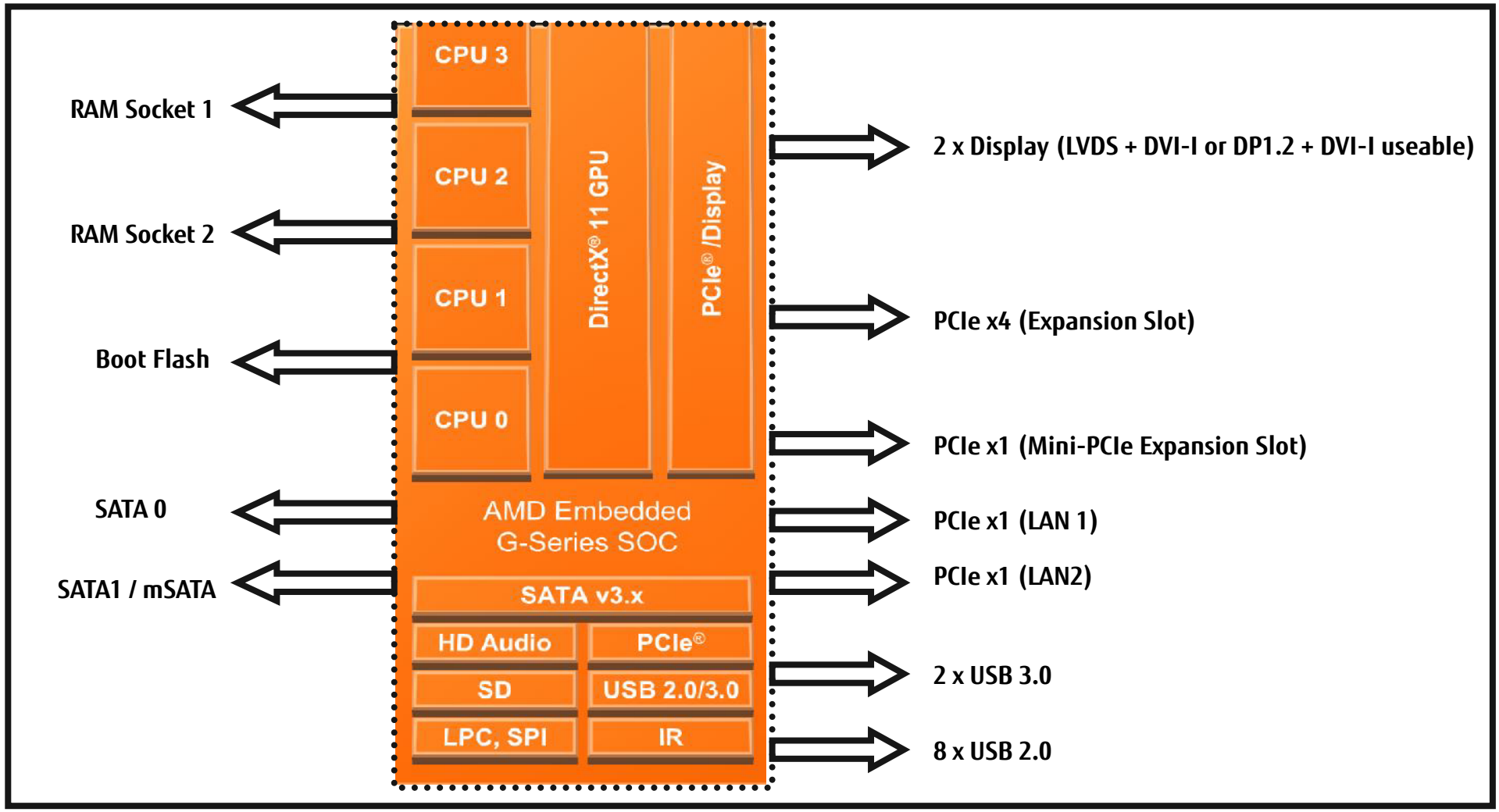
2 Important Note: System Memory Configuration

Please note that memory slot “A” (upper slot) must be installed first
if only one module is used.
Otherwise the mainboard will not operate.



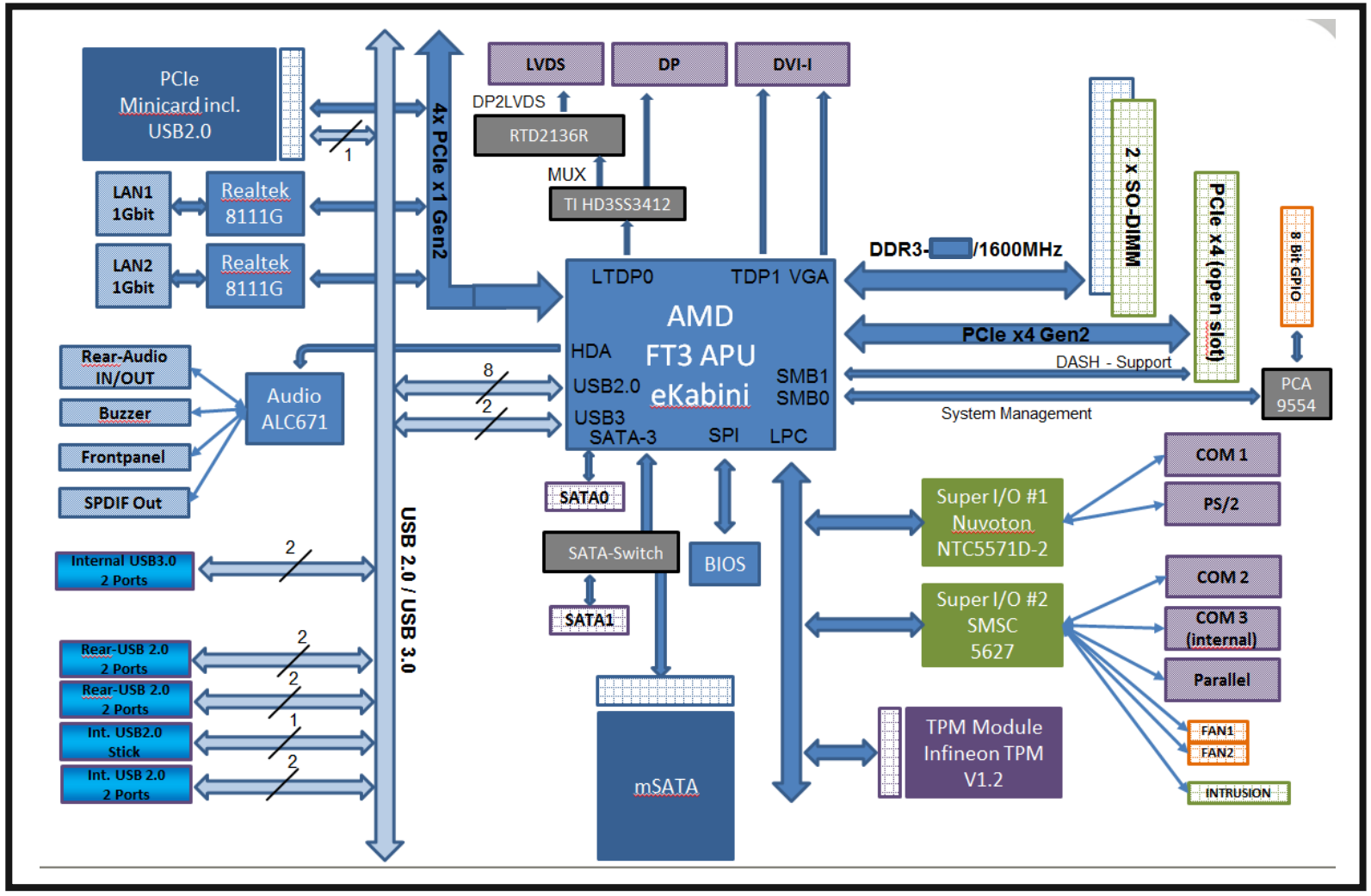
3 Feature Overview D3313-S

3.1 Architecture Overview



Feature Overview D3313-S

3.2 Block Diagram



Feature Overview D3313-S

3.3 Mainboard Versions [Updated]

	Processor	Graphics	Memory [iii]	Display Options
D3313-S1 eKabini	GX-210HA 1.0 GHz Dual Core 9W TDP	Radeon™ HD 8210E 300 MHz	DDR3 / 1333	for all versions: 1 x DVI-I max . 1920 x 1200 1 x DP V1.2 max. 3840 x 2160 1 x LVDS 24Bit Dual Channel max. 1920 x 1200 max. 2 independent displays (DVI-I & DP or DVI-I & LVDS) Supports DirectX11 / DirectX11.1
D3313-S2 eKabini	GX-217GA 1.65 GHz Dual Core 15W TDP	Radeon™ HD 8280E 450 MHz	DDR3 / 1600	
D3313-S3 eKabini	GX-420CA 2.0 GHz Quad Core 25W TDP	Radeon™ HD 8400E 600 MHz	DDR3 / 1600	
D3313-S4 SteppeEagle	GX-222GC 2.2 - 2.4 GHz [i] Dual Core 10/15W TDP [ii]	Radeon™ R5E 655/800 MHz	DDR3 / 1600	
D3313-S5 SteppeEagle	GX-412HC 1.2 – 1.6 GHz [i] Quad Core 5/7W TDP [ii]	Radeon™ R3E 267/350 MHz	DDR3 / 1333	
D3313-S6 SteppeEagle	GX-424CC 2.4 GHz Quad Core 25W TDP [ii]	Radeon™ R3E 655/800 MHz	DDR3 / 1600 DDR3 / 1866	

i) Supports Turbo Mode ii) Configurable max. TDP (BIOS Option)

iii) Max. supported memory clock. For all mainboard versions modules DDR3-1333 (CL9) or DDR3-1600 (CL11) can be installed.
Up to 16GB SDRAM (unbuffered, no ECC) possible. Two memory sockets (single channel mode).
Compliant with JEDEC DDR3 1.5V, DDR3L 1.35V and DDR3U 1.25V
D3313-S6 supports up to 1866MHz

Feature Overview D3313-S

3.4 USB Structure

USB Port #	Location	USB Version	USB Controller D3313-S1/2/3	USB Controller D3313-S4/5/6 [2]	USB Fuse [1]
0-3	Rear USB ports (IO-Shield)	1.1	OHCI 1	EHCI 1	common fuse 5V/2A
		2.0	EHCI 1		
4-7	Pin Header (4,7) Internal „Stick" Port (5) Mini-PCIe (6)	1.1	OHCI 2	EHCI 2	common fuse 5V/2A
		2.0	EHCI 2		
8-9	USB3 Header (xHCI disabled)	1.1	OHCI 3	EHCI 3	common fuse 5V/2A
		2.0	EHCI 3		
	USB3 Header (xHCI enabled)	1.1	xHCI	xHCI	
		2.0			
		3.0			

1) Specified max. USB supply current: 0.5A/5V for each USB2.0 port; 0.9A/5V for each USB3.0 port
2) Note: D3313-S4/-S5/-S6 – no separate OHCI controller, but EHCI controller + integrated hub

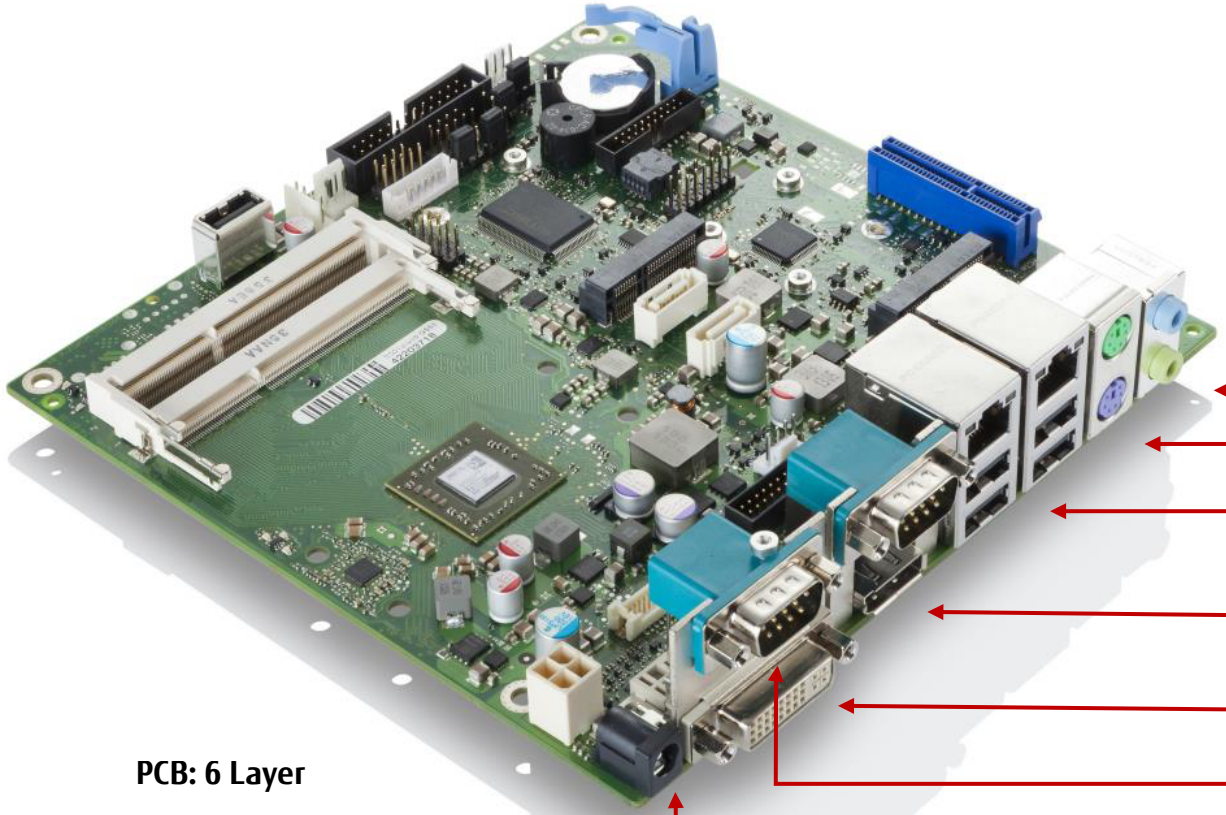
Internal USB Cable Length:

USB 2.0: Board will only support USB Specification compliant cables with a maximum length of 12 inches for USB 2.0. . The cables must have an impedance of 90 ohms. Furthermore the cables must have a twisted signaling pair for each individual port. That means each port has two twisted signaling pairs and one GND cable and one power cable in one jacket with inner and outer shield. The shield of the cable must be connected with GND cable of the connector. These cables can be connected to the internal dual channel connector. For further details see chapter 6 in USB 2.0 specification.

USB 3.0: Board will only support USB 3.0 compliant cables with a maximum length of 16 inches (internal USB cable to the USB connector type A). The differential characteristic impedance for the SDP pairs is recommended to be within 90 Ω +/- 7 Ω. USB 3.0 cables have eight primary conductors: three twisted signal pairs for USB data paths and a power pair. In addition to the twisted signal pair for USB 2.0 data path, two twisted signal pairs are used to provide the SuperSpeed data path, one for the transmit path and one for the receive path.
USB 3.0 receptacles (both upstream and downstream) are backward compatible with USB 2.0 connector plugs. USB 3.0 cables and plugs are not intended to be compatible with USB 2.0 upstream receptacles.

Feature Overview D3313-S

3.5 External Connectors D3313-S

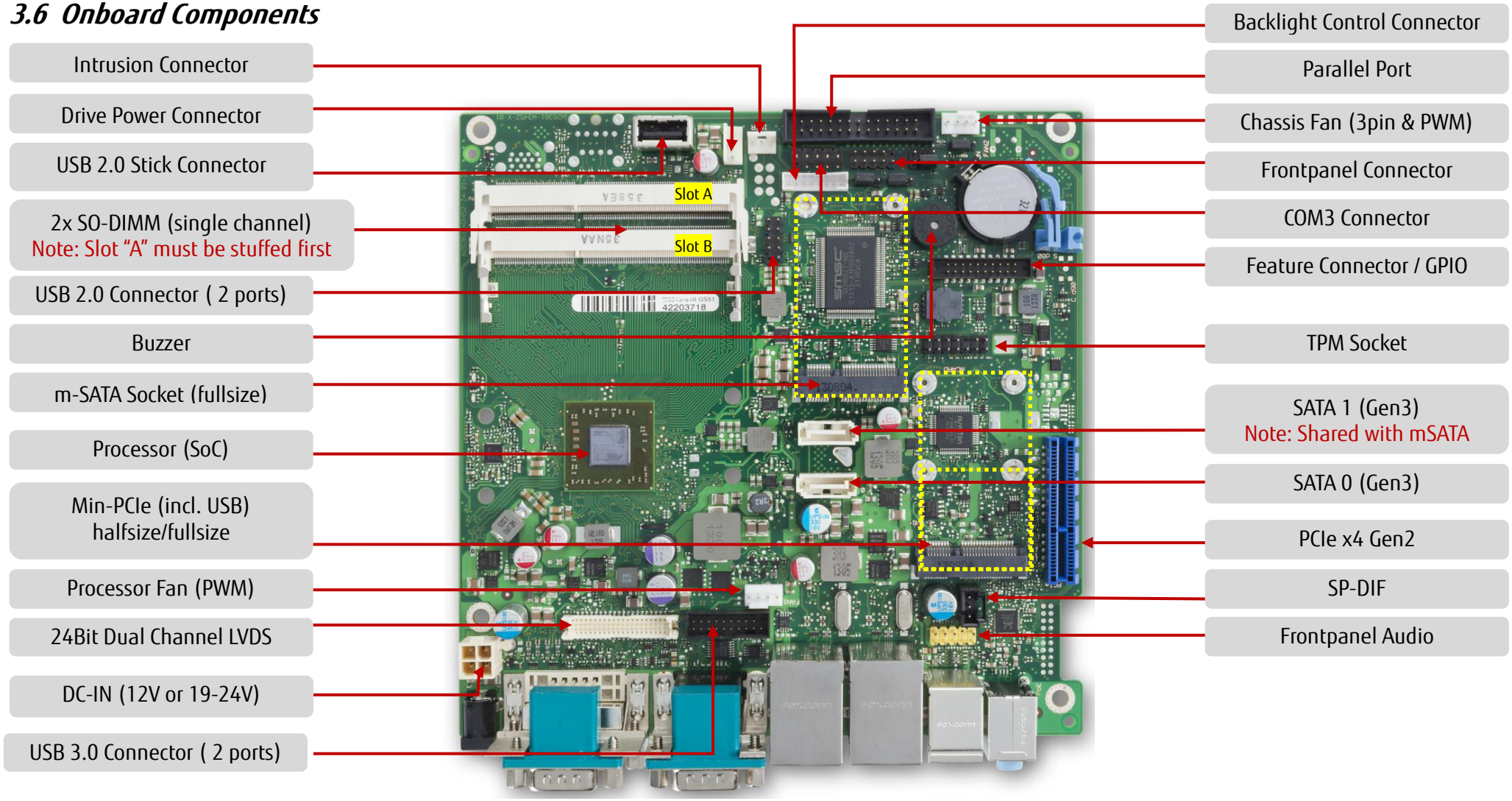


PCB: 6 Layer

- Stereo Audio I/O
- 2x PS/2
- Dual LAN / 4x USB
- Display Port
- DVI-I
- 2x RS232
- DC-IN (12V or 19-24V)

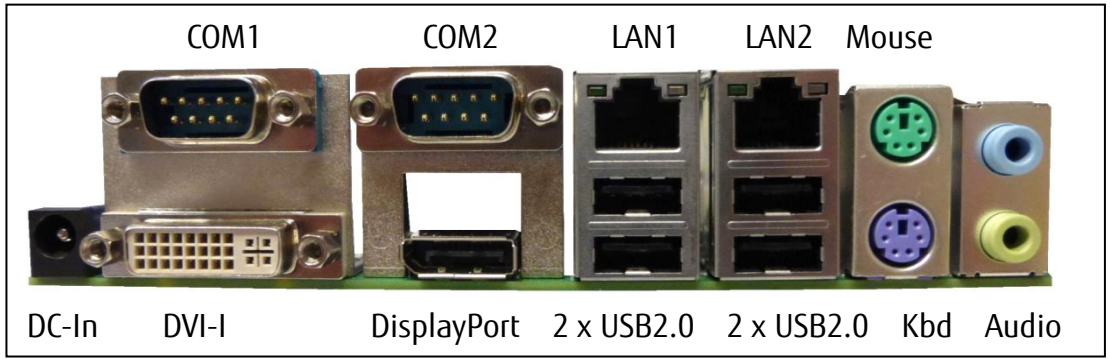
Feature Overview D3313-S

3.6 Onboard Components



Feature Overview D3313-S

3.7 I/O-Shield



Spring Steel Sheet

Enforcement Sheet

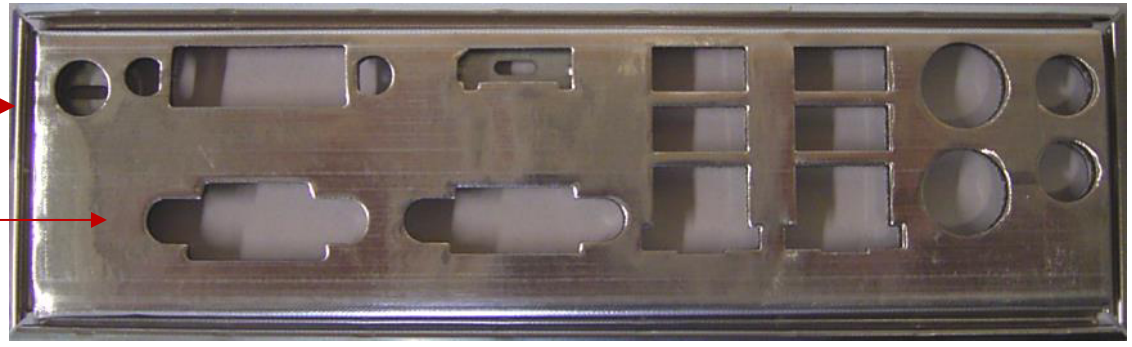
Removable Cover (DC-In)

Removable Cover (DisplayPort)

Spring Steel Sheet

Gasket = Foam with Aluminium

(front view)



(rear view)

Fujitsu IO-Shield: Best-in-class steadiness and EMI/ESD protection

Feature Overview D3313-S

I/O-Shield

Nominal I/O shield insertion force: ~ 75 N
for specified ATX IO “letterbox”

ATX Chassis “letterbox” for I/O shield:
Nom. size = 158.75 x 44.45mm
Tolerance = +/- 0.2mm

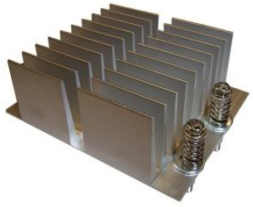
Mechanical Notes

Note: Minor change of DC connector location on D3313-S vs. predecessor: DC connector center moved 0.5mm to the left side. Position of all other connectors is still identical. I/O shield of D3003-S fits to D3313-S.

Feature Overview D3313-S

3.8 Heatsink Installation Notes

Fujitsu offers following heatsinks for D3313-S series:

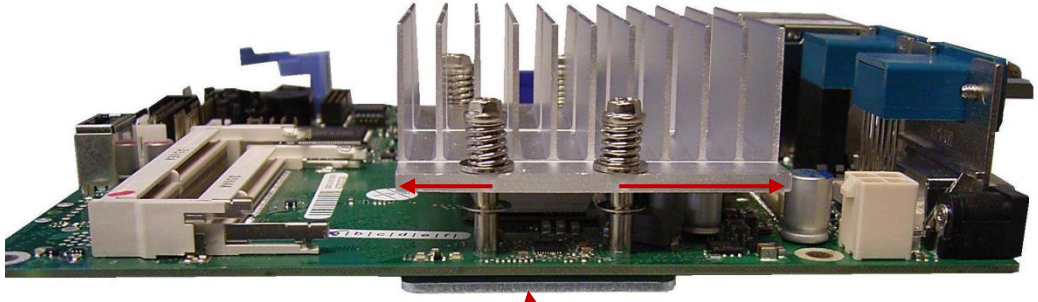


Passive Heatsink
for D3313-S1/-S5 (max. 10W)

Passive Heatsink with Heatpipes
for D3313-S1/-S2/-S4/-S5 (max. 15W)

Active Heatsink with Fan
for all D3313-S (max. 25W)

Heatsink positioning:



Feature Overview D3313-S

3.9 Heatsink Installation Notes

One of the following mounting backplates is included:

(V26898-B883-V10)

(V26898-B883-V100)

Recommended torque for heatsink screws: 0.6Nm

Assembly Notes:

- Hold the heatsink with one hand so that it doesn't tilt while tightening the screws
- Screw in all 4 screws only a little bit, so that they hold the heat sink in place. Start with one screw and then continue with the one across. All the time keep holding the heat sink straight with one hand.
- Now fully tighten the screws, again starting with one and then continuing with the one across. All the time keep holding the heat sink straight with one hand.

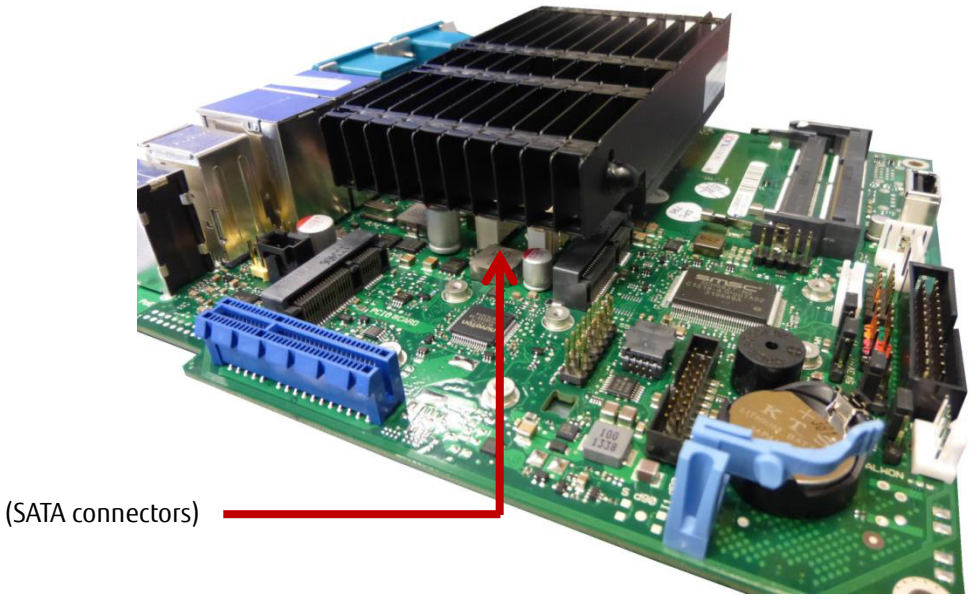
Important Note:

Insulating foil of backplate –B883-V100 must NOT be removed, otherwise the mainboard may be damaged due to possible short circuit.

Both backplates are fully approved and compliant with D3313-S series.

Feature Overview D3313-S

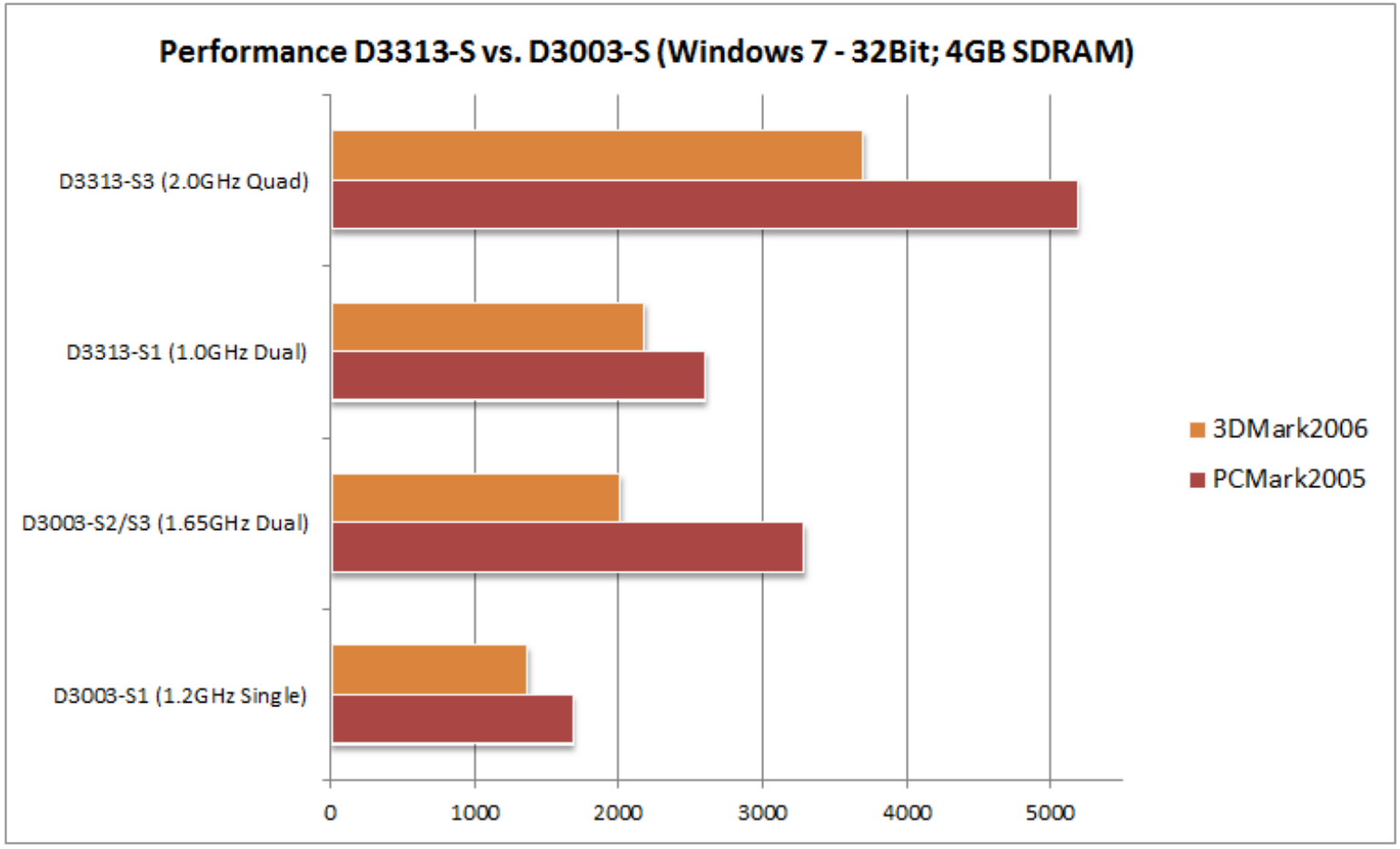
3.10 Heatsink/Heatpipe Installation Notes



Due to the required dimensions of the 15W heatpipe cooler, the onboard SATA ports are covered when the heatsink is installed. Please note that SATA cables with angle connectors can be used, but they must be installed before mounting the heatsink.

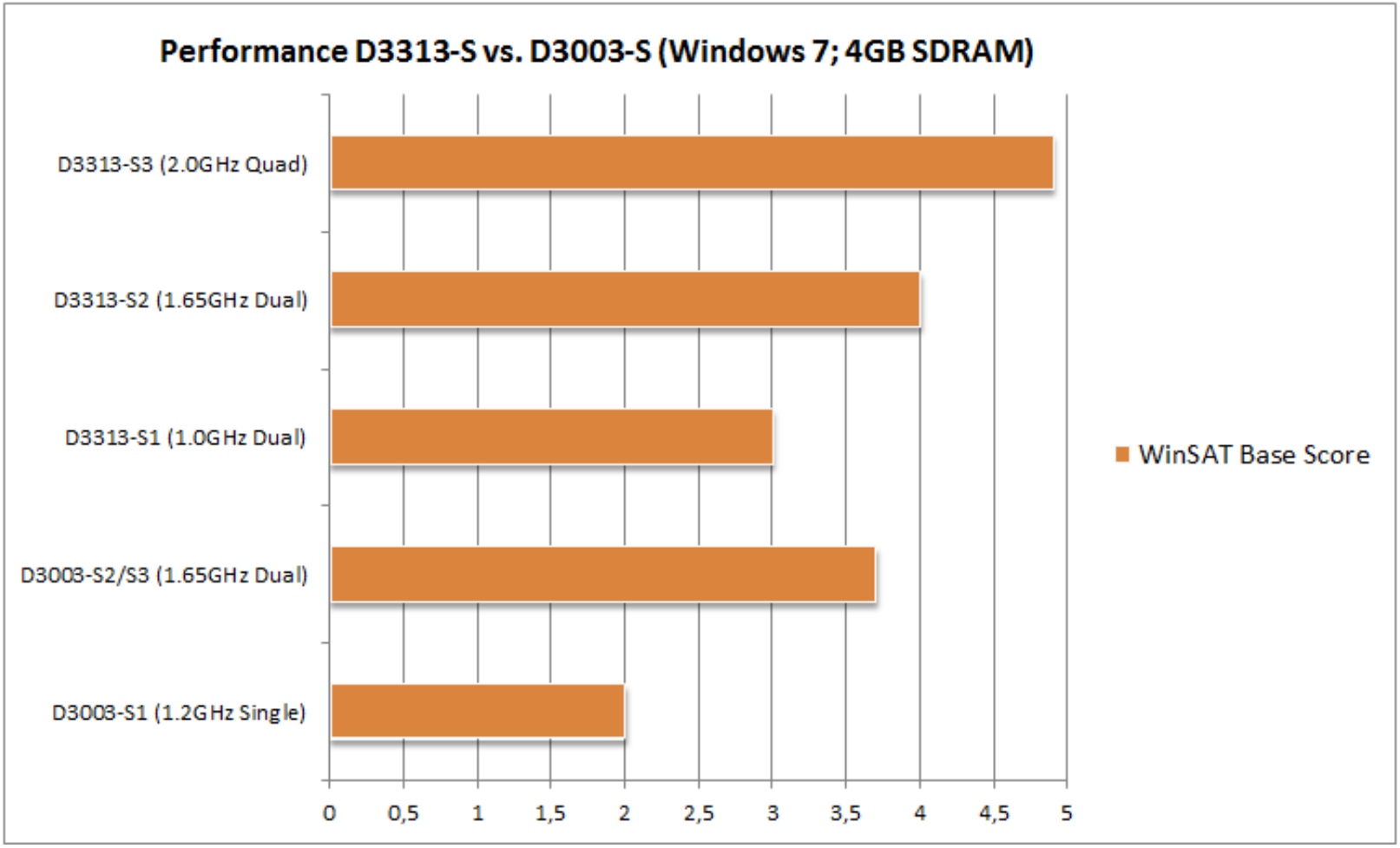
4 Benchmarks

4.1 D3313-S vs. D3003-S (3DMark2006, PCMark2005)



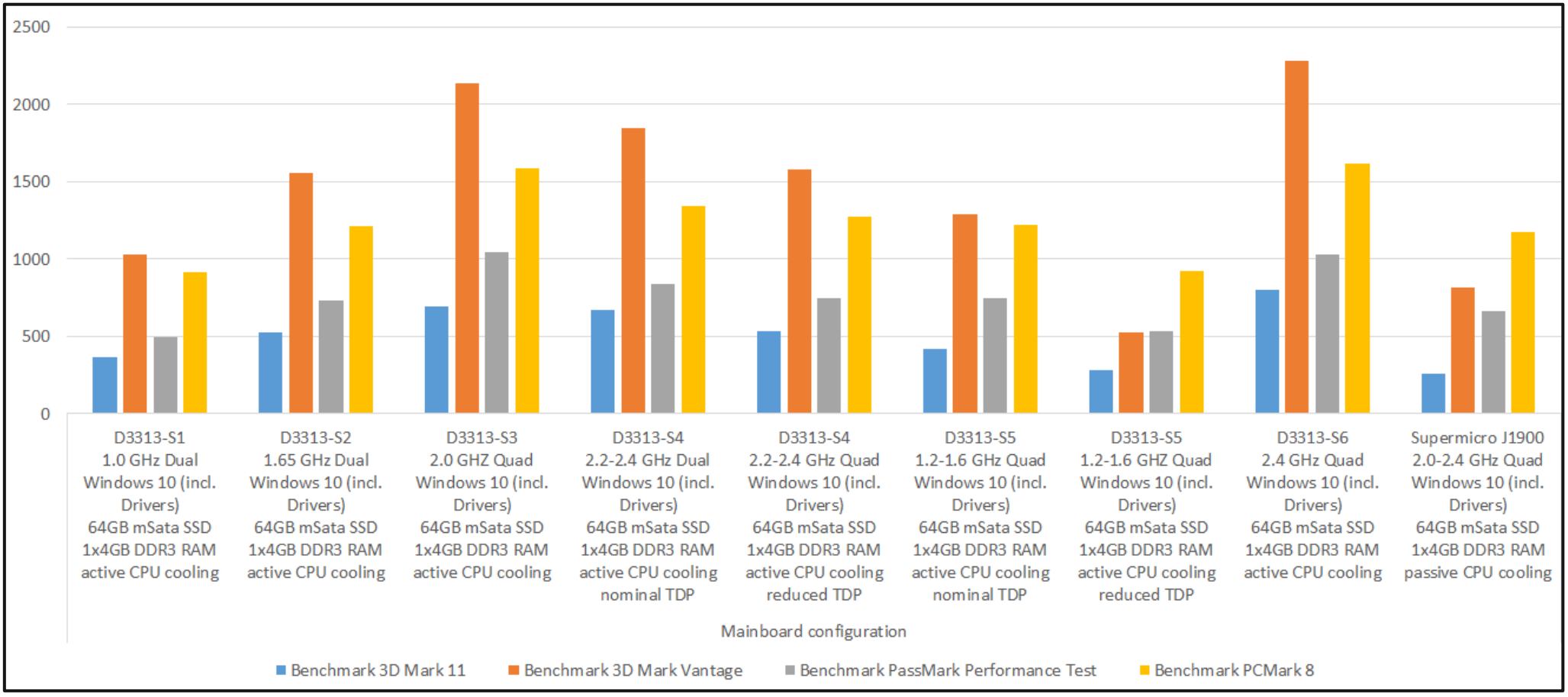
Benchmarks

4.2 D3313-S vs. D3003-S (WinSAT)



Benchmarks

4.3 D3313-Sx (Benchmark Overview) ***[New]***



5 Display Options

5.1 Basic Display Features

The graphics engine of D3313-S supports max. 2 independent displays, following combinations are possible

Config#	**DisplayPort V1.2** max. 3840 x 2160	**LVDS** max. 1920 x 1200	**DVI-I (digital)** max. 1920 x 1200	**DVI-I (analog VGA)** [1] max. 1920 x 1200
1	X		X	
2	X			X
3		X	X	
4		X		X

1) Via DVI-I to VGA converter

Notes:

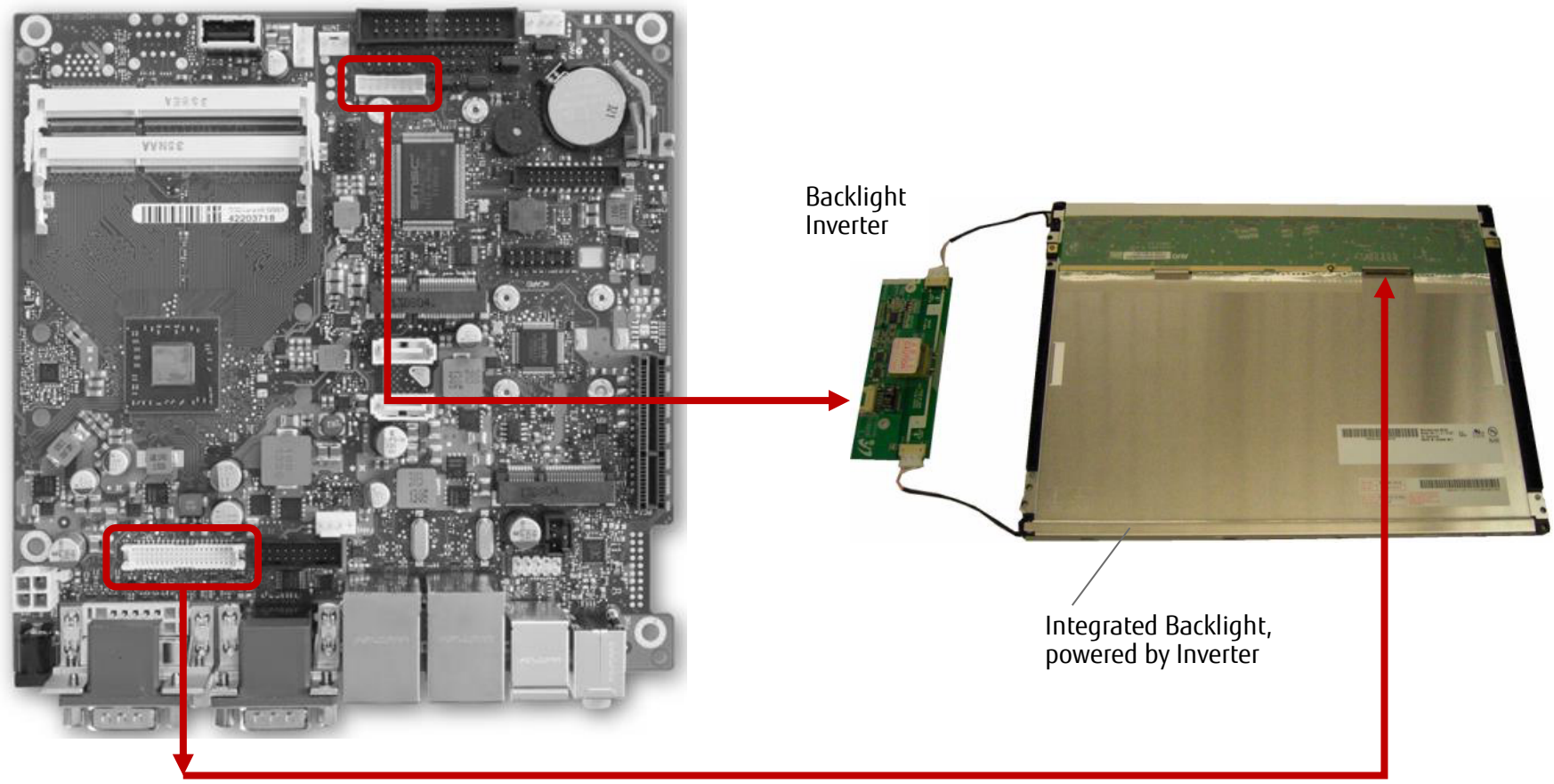
- Simultaneous use of DisplayPort and onboard LVDS is not possible; the appropriate G-series video channel can only be used exclusively for DisplayPort (=LVDS disabled in BIOS Setup) or for LVDS (=LVDS enabled in BIOS Setup)

- The DisplayPort output can be converted to a HDMI output, VGA output or (second) DVI output (appropriate converter required)

- For D3313-S1/2/3:
  Windows 8 mode (= Secure Boot enabled) & LVDS support should only be used for BIOS > R1.1.0, otherwise any graphics output may be disabled. In case this happens, Setup Defaults should be enabled (see chapter Miscellaneous - BIOS/CMOS Reset)

Display Options

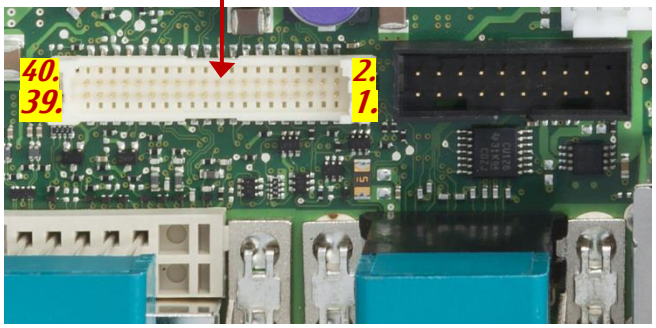
5.2 LVDS Display & Backlight Inverter



Display Options

5.3 LVDS Connector details

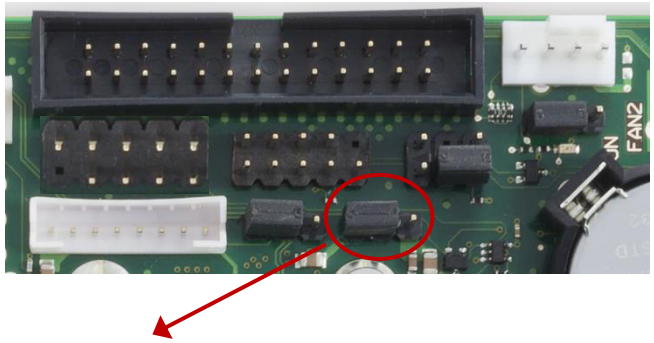
LVDS Connector: Hirose DF13-40 (or compatible)



PIN	SIGNAL	SIGNAL	PIN
2	Ground	Ground	1
4	LVDS_H3+ (EVEN_3+)	LVDS_L3+ (ODD_3+)	3
6	LVDS_H3- (EVEN_3-)	LVDS_L3- (ODD_3-)	5
8	Ground	Ground	7
10	LVDS_H2+ (EVEN_2+)	LVDS_L2+ (ODD_2+)	9
12	LVDS_H2- (EVEN_2-)	LVDS_L2- (ODD_2-)	11
14	Ground	Ground	13
16	LVDS_H1+ (EVEN_1+)	LVDS_L1+ (ODD_1+)	15
18	LVDS_H1- (EVEN_1-)	LVDS_L1- (ODD_1-)	17
20	Ground	Ground	19
22	LVDS_H0+ (EVEN_0+)	LVDS_L0+ (ODD_0+)	21
24	LVDS_H0- (EVEN_0-)	LVDS_L0- (ODD_0-)	23
26	Ground	Ground	25
28	LVDS_CLK_H+ (CLK_EVEN_+)	LVDS_CLK_L+ (CLK_ODD_+)	27
30	LVDS_CLK_H- (CLK_EVEN_-)	LVDS_CLK_L- (CLK_ODD_-)	29
32	Ground	Ground	31
34	DDC-Data	DDC-Clock	33
36	LCD-Power 1)	LCD-Power 1)	35
38	Ground	LCD-Power 1)	37
40	LCD_Power_Enable	Ground	39

1) Selectable via Jumper

LVDS operating voltage selector jumper



3.3V = default

Pin	Signal
1	VCC 5V
2	Power LVDS
3	VCC 3.3V

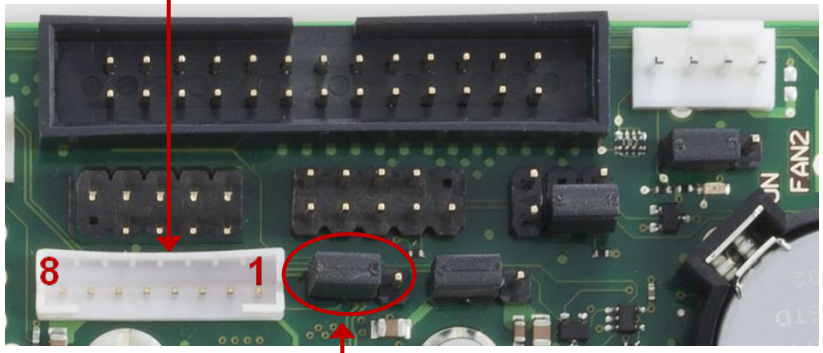
max. load: 1A per pin!

Note: LVDS pinning is compatible to D2703-S / D2963-S and D3003-S
For single channel displays the ODD channel should be used!

Display Options

5.4 Backlight Inverter Connector Details

Backlight Inverter Connector: JST PHR-8



Ground	GND	1
Ground	GND	2
Backlight Brightness CTRL	0-4V or PWM	3
Power 5V	VCC	4
Power 5V	VCC	5
Backlight On/Off Control	BL On/Off	6
Power 12V	+12V	7
Power 12V	+12V	8

max. load: 2A per pin!

LVDS Backlight Brightness Control Jumper
(Select analog or PWM output)

Analog = default

Pin	Signal
1	PWM
2	BL Brightn. Contr.
3	VCC 3.3V

Backlight Brightness Control:
Provides a variable DC voltage between 0V and 4V via an RC filter (10kOhm / 20uF; buffered output).
Alternatively a 3.3V PWM signal is available, please see related jumper setting.
Basically the LVDS brightness level can be selected by BIOS Setup, but it is also accessible from Windows OS (Control Panel – Power Options – Screen Brightness).
Access depends on appropriate setting in BIOS Setup!

If this control signal is used, the system integrator is responsible for the implementation of a backlight converter that fits to the control output voltage range.

Backlight On/Off Control:
Active High, 3.3V Note: Polarity can be changed via BIOS Setup

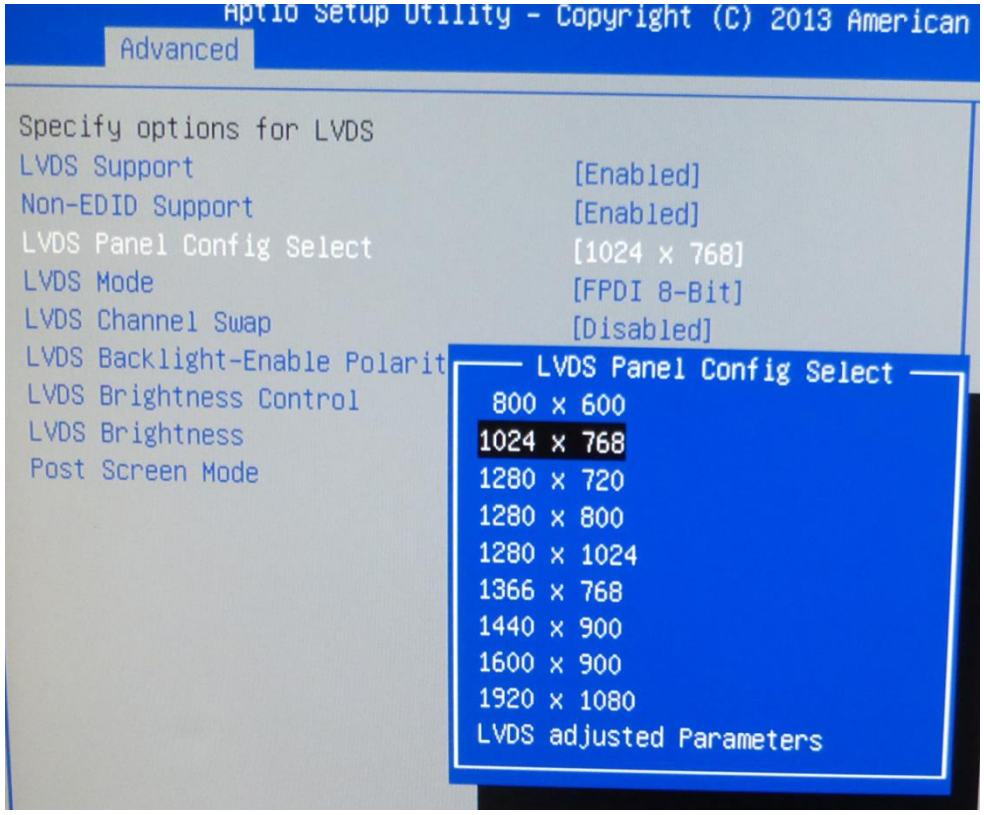
Display Options

5.5 LVDS Timing & Screen Resolution

There are 9 default LVDS settings available
→ BIOS Setup – Advanced –LVDS Config Select

Note: Option 10 (LVDS adjusted Parameters) becomes visible after running the "LVDS Tool" for implementing customized LVDS settings once.

Important note:
"Non-EDID Support" must be set to <Enabled> for standard LVDS displays w/o DDC (EDID) interface!



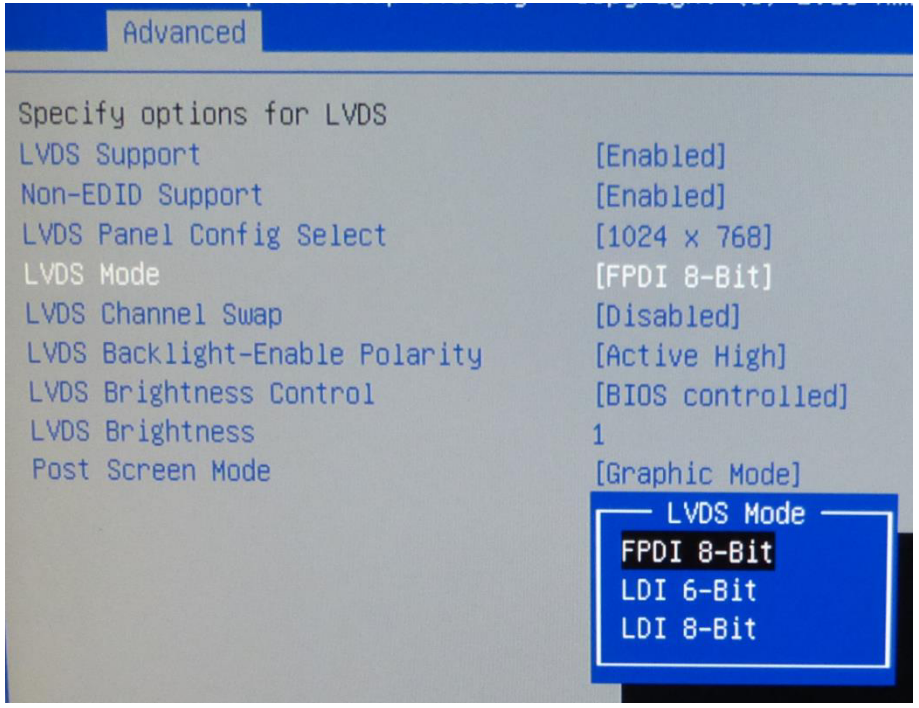
Display Options

LVDS Timing & Screen Resolution

LVDS Mode:

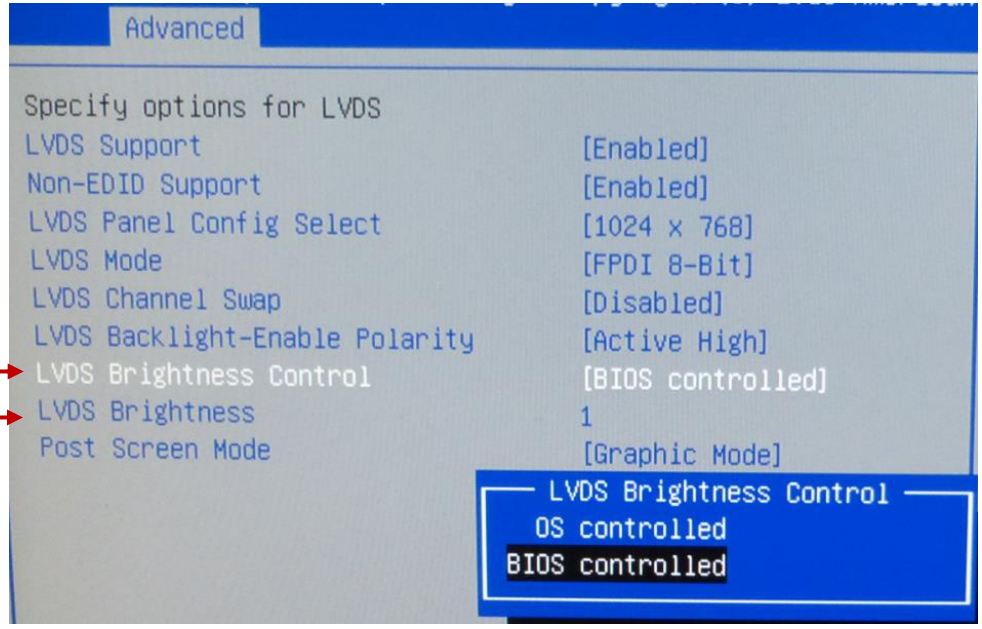
The correct mode (FPDI / LDI) must be set for the attached LVDS panel.

Note: This setting is also required if customized LVDS timings are implemented (LVDS tool)!



Display Options

LVDS Timing & Screen Resolution



LVDS Brightness Control:
Select if the LVDS backlight brightness is controlled by BIOS or by the OS.

LVDS Brightness:
Set the level for the LVDS backlight brightness for "BIOS controlled" mode.
1 = min. voltage level (0V) resp. min. PWM level
255 = max. voltage level (4V) resp. max. PWM level

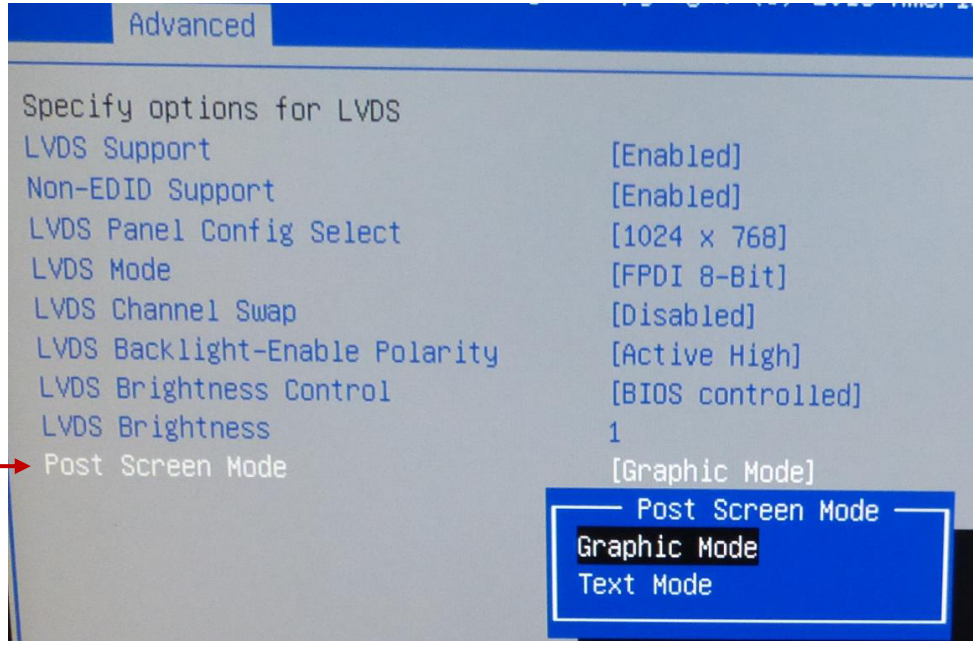
Display Options

LVDS Timing & Screen Resolution

POST Screen Mode:

Default setting = Graphic Mode (800 x 600).

For panels < 800 x 600 mode should be changed to <Text Mode> in order to enable full BIOS POST screen resp. full BIOS Setup screen (otherwise some portion of the screen may be cut off)



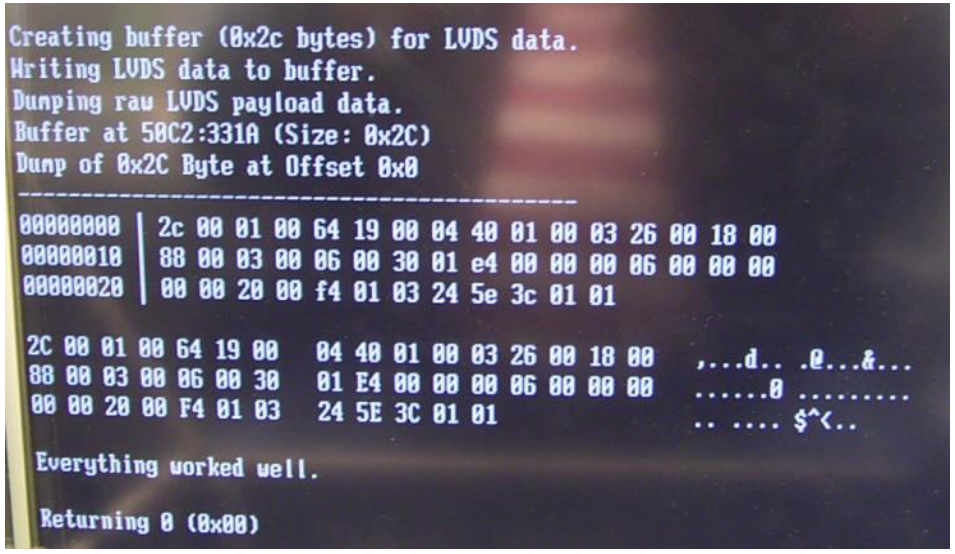
Display Options

5.6 LVDS Tool

The LVDS tool (DOS-based) allows to flash specific LVDS settings to the system BIOS of D3313-S.

The LVDS tool needs a panel-specific EDID configuration file based on the spec data of the LVDS panel.

Note: Sample configuration EDID files are available in the LVDS Tool kit.
For adjusting EDID files the "Phoenix EDID tool" Is required (see link below).



(Sample screen message after running LVDS tool)

Download-Link for LVDS Tool:
ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Products/Mainboards/Industrial&ExtendedLifetime/D3313-S/IndustrialTools_D3313/LVDS-Tool/

Note:
The onboard LVDS converter switches automatically between single channel and dual channel mode.
The reference resolution is 1366 x 800 pixels. If H > 1366 or V > 800, the scaler switches to dual channel mode.
Otherwise, LVDS will operate in single channel mode.
The scaler supports clock rates up to 105Mhz; LVDS displays with clock rates > 105Mhz are not supported

Display Options

5.7 LVDS Cabling Reference

Sample cabling diagrams for following LVDS displays & related inverters are available:

Display Size	TFT	Pixel	Inverter
10.4"	NEC NL6448BC33-63D	640 x 480	NEC 104PW201
12.1"	AUO G121SN01-V0	800 x 600	Green-C&C GH093A-ROHS
12.1"	LG-Philips LB121S03-TL01	800 x 600	Green-C&C GH001HB-ROHS
15"	Sharp LQ150X1LW71N	1024 x 768	TDK CXA-0349
15"	AUO G150XG01V0	1024 x 768	Green-C&C GH001A-ROHS
17"	AUO M170EG01-VD	1280 x 1024	Green-C&C GH053A-ROHS
19"	Sharp LQ190E1LW01	1280 x 1024	Power Systems PS-DA0412-05
19"	AUO M190EG01	1280 x 1024	GH053(A1)-ROHS

ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Products/Mainboards/Industrial&ExtendedLifetime/D3313-S/Documentation/LVDS_Cabling-Samples/

Display Options

5.8 LVDS Sample Cabling for AuO-G150

FSC D2703-S; Hirose DF13-40, straight, SMT LVDS-Connector				AUO-G150XG01; DF-14H-20P-1.25H (Hirose) or CWY20G-A0D1T (PTWO)	
SIGNAL	**SYMBOL**	**PIN**		**Pin No.**	**Symbol**
Ground	GND	1			
Ground	GND	2		**20**	**GND**
LVDS_Out3+ **(ODD_3+)**	LO3+	3		**18**	**RxIN3+**
LVDS_Out7+ **(EVEN_3+)**	LO7+	4			
LVDS_Out3- **(ODD_3-)**	LO3-	5		**17**	**RxIN3-**
LVDS_Out7- **(EVEN_3-)**	LO7-	6			
Ground	GND	7		3	GND
Ground	GND	8		4	GND
LVDS_Out2+ **(ODD_2+)**	LO2+	9		12	RxIN2+
LVDS_Out6+ **(EVEN_2+)**	LO6+	10			
LVDS_Out2- **(ODD_2-)**	LO2-	11		11	RxIN2-
LVDS_Out6- **(EVEN_2-)**	LO6-	12			
Ground	GND	13			
Ground	GND	14		7	GND
LVDS_Out1+ **(ODD_1+)**	LO1+	15		9	RxIN1+
LVDS_Out5+ **(EVEN_1+)**	LO5+	16			
LVDS_Out1- **(ODD_1-)**	LO1-	17		8	RxIN1-
LVDS_Out5- **(EVEN_1-)**	LO5-	18			
Ground	GND	19			
Ground	GND	20	↔	10	GND
LVDS_Out0+ **(ODD_0+)**	LO0+	21		6	RxIN0+
LVDS_Out4+ **(EVEN_0+)**	LO4+	22			
LVDS_Out0- **(ODD_0-)**	LO0-	23		5	RxIN0-
LVDS_Out4- **(EVEN_0-)**	LO4-	24			
Ground	GND	25			
Ground	GND	26		13	GND
LVDS_CLK1+ **(CLK_ODD+)**	CLK1+	27		15	CKIN+
LVDS_CLK2+ **(CLK_EVEN+)**	CLK2+	28			
LVDS_CLK1- **(CLK_ODD-)**	CLK1-	29		14	CKIN-
LVDS_CLK2- **(CLK_EVEN-)**	CLK2-	30			
Ground	GND	31		16	GND
Ground	GND	32		19	GND
DDC-Clock	DDCCLK	33			
DDC-Data	DDCDATA	34			
LCD-Power [1]	+3.3V / +5V	35		1	VDD
LCD-Power [1]	+3.3V / +5V	36		2	VDD
LCD-Power [1]	+3.3V / +5V	37			
Ground	GND	38			
Ground	GND	39			
LCD_PowerOn	LCD_On	40			

1) selectable via Jumper

Cable Length: 500mm

LVDS-Connector AuO_G150 based on Panel Datasheet

DF-14H-20P-1.25H (Hirose) or CWY20G-A0D1T (PTWO)		
Pin No.	**Symbol**	**Description**
1	VDD	Power Supply, 3.3V (typical)
2	VDD	Power Supply, 3.3V (typical)
3	VSS	Ground
4	VSS	Ground
5	Rin0-	- LVDS differential data input (R0-R5, G0)
6	Rin0+	+ LVDS differential data input (R0-R5, G0)
7	VSS	Ground
8	Rin1-	- LVDS differential data input (G1-G5, B0-B1)
9	Rin1+	+ LVDS differential data input (G1-G5, B0-B1)
10	VSS	Ground
11	Rin2-	- LVDS differential data input (B2-B5, HS, VS, DE)
12	Rin2+	+ LVDS differential data input (B2-B5, HS, VS, DE)
13	VSS	Ground
14	ClkIN-	- LVDS differential clock input
15	ClkIN+	+ LVDS differential clock input
16	VSS	Ground
17	Rin3-	NC
18	Rin3+	NC
19	VSS	Ground
20	NC	Please "floating" and don't connect to ground.

LVDS-Extension für Philips LM150X08

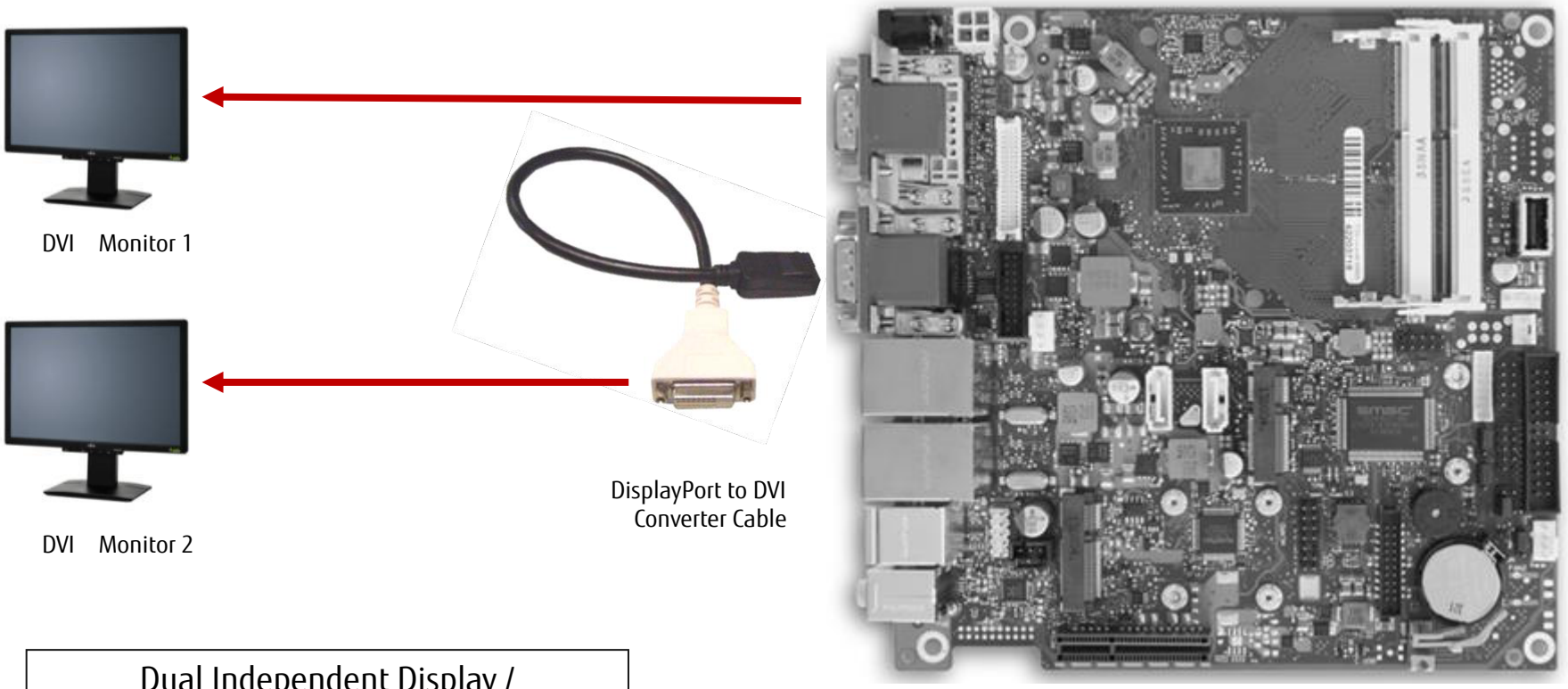
LCD (CN1):DF14H-20P-1.25H (Hirose)

Pin No	Symbol
1	VLCD
2	VLCD
3	GND
4	GND
5	RXIN0-
6	RXIN0+
7	GND
8	RXIN1-
9	RXIN1+
10	GND
11	RXIN2-
12	RXIN2+
13	GND
14	RXCLK IN-
15	RXCLK IN+
16	GND
17	RXIN3-
18	RXIN3+
19	GND
20	GND

Symbol	Parameter	Min	Typ	Max	Unit	Condition
VDD	LCD Drive Voltage	3.0	3.3	3.6	[V]	
IDD	LCD Drive Current	-	1.0	1.3	[A]	VDD=3.3V, All Black Pattern
PDD	LCD Drive power consumption	-	3.3	4.3	[Watt]	VDD=3.3V, All Black Pattern
VDDns	Allowable LCD Drive Ripple Noise	-	-	100	[mV] P-P	

Display Options

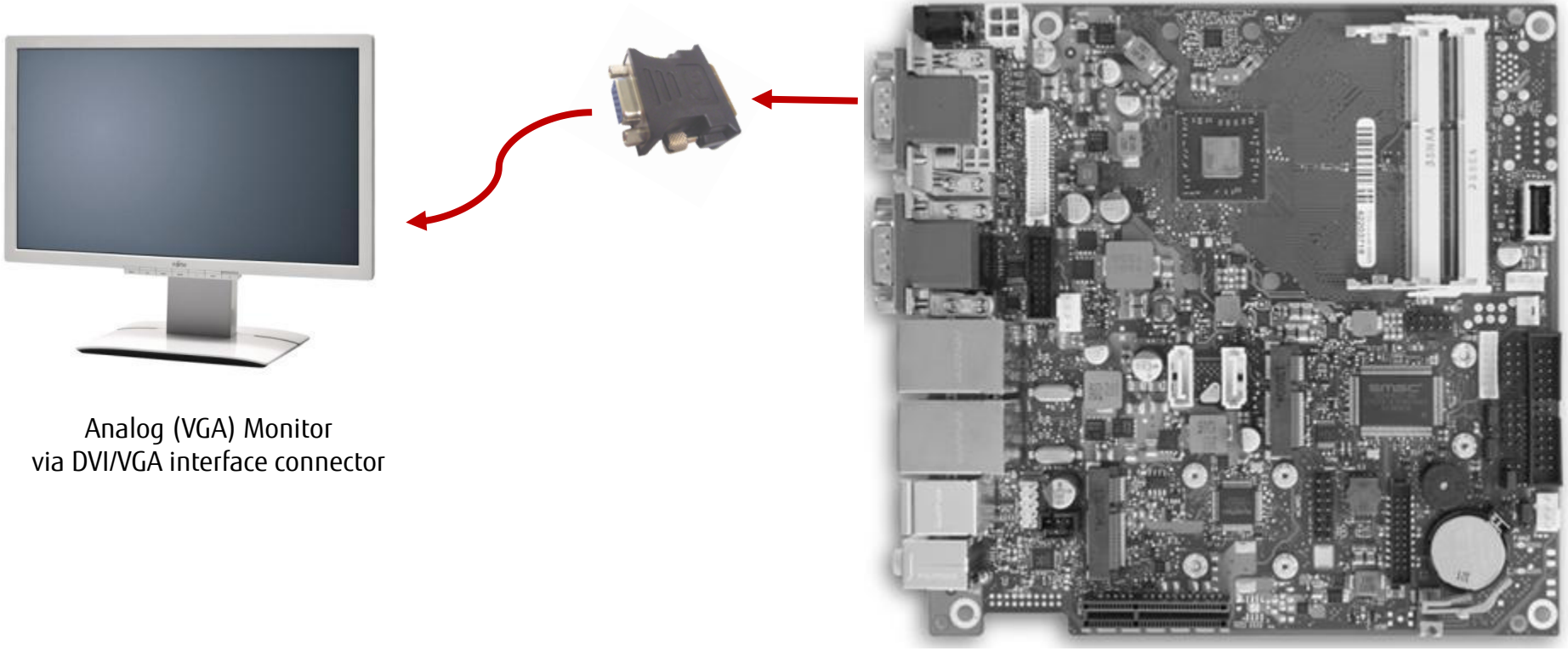
5.9 Dual-DVI Output



Dual Independent Display /
Extended Desktop

Display Options

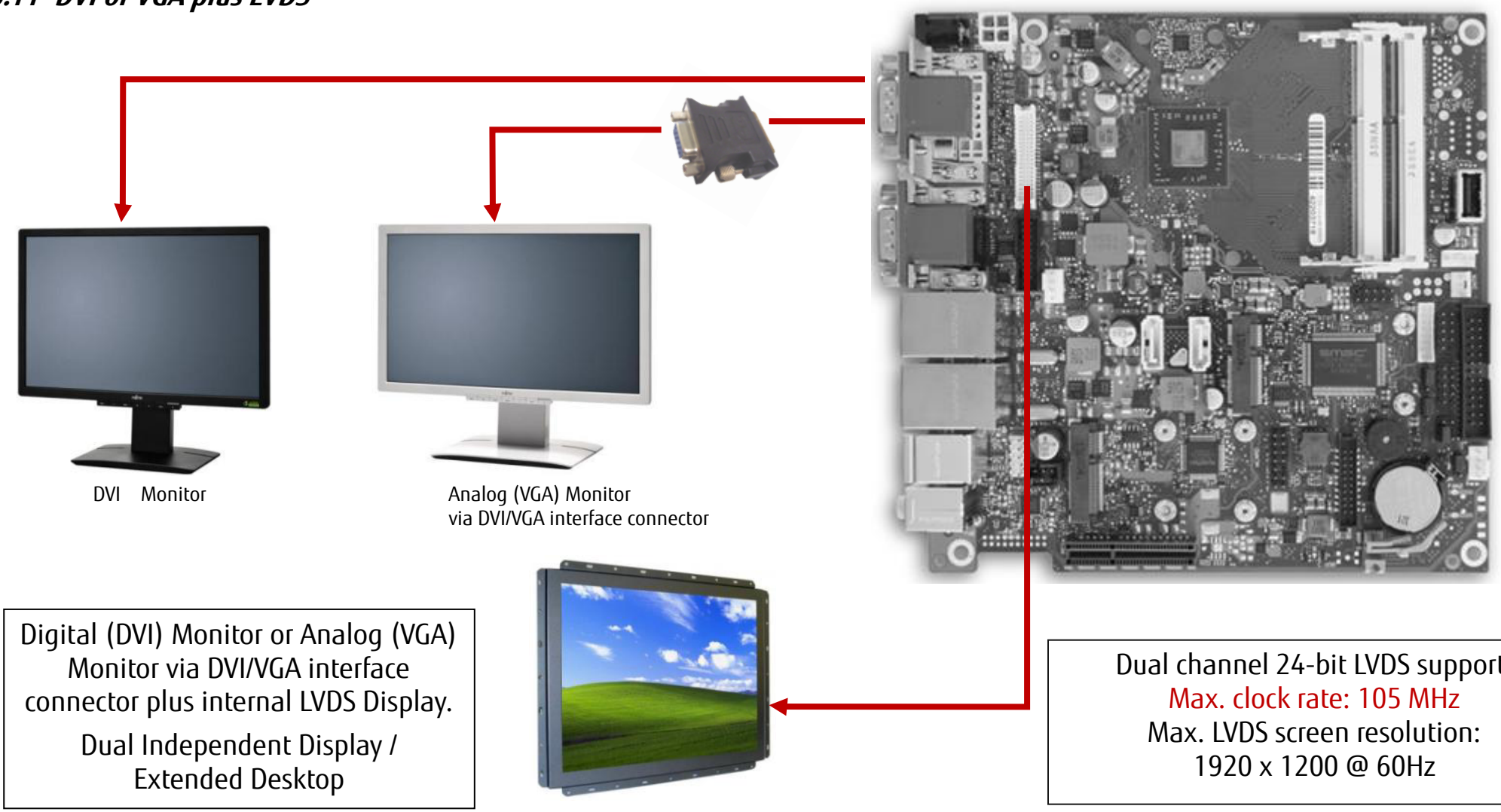
5.10 VGA Output



Analog (VGA) Monitor
via DVI/VGA interface connector

Display Options

5.11 DVI or VGA plus LVDS



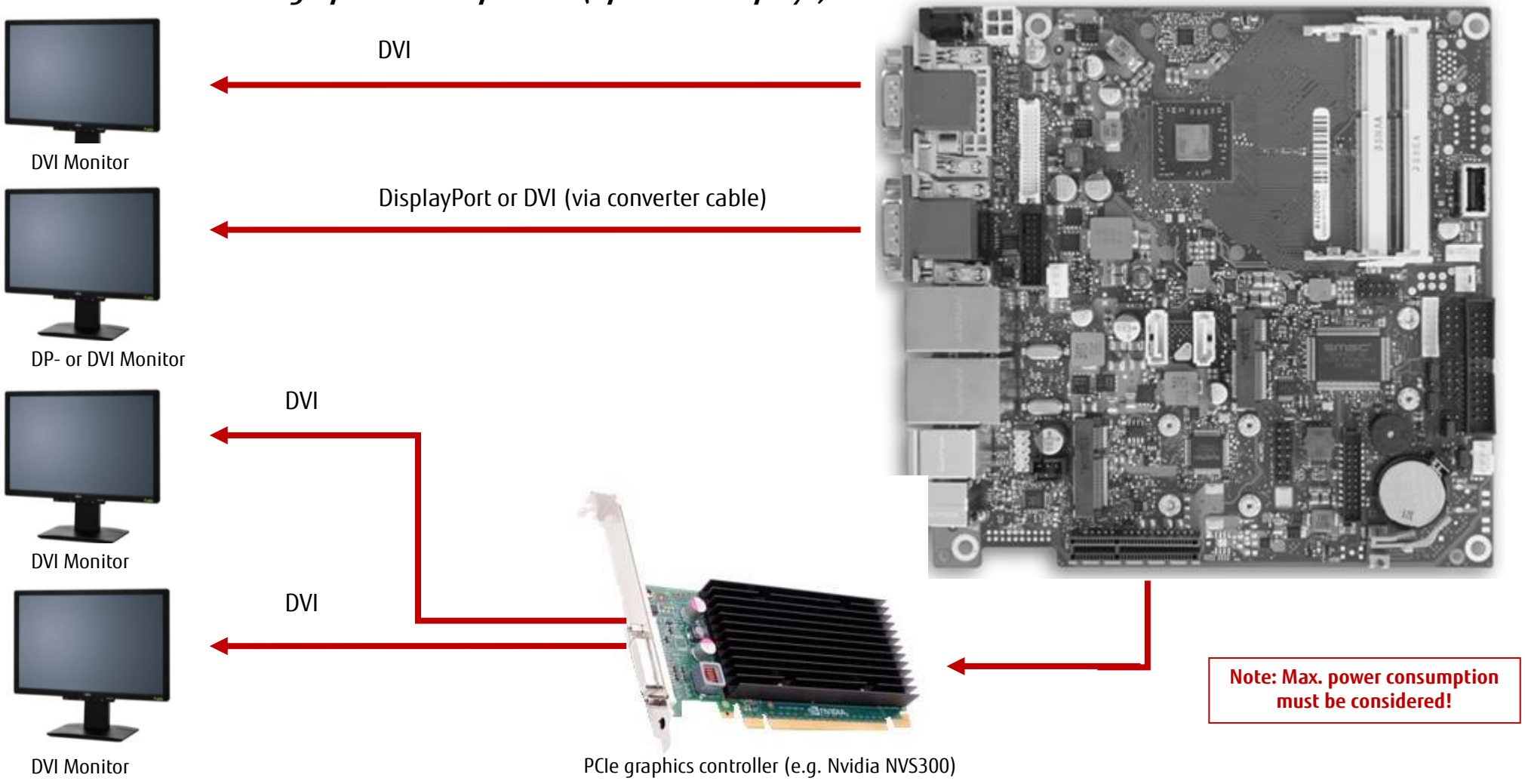
Digital (DVI) Monitor or Analog (VGA) Monitor via DVI/VGA interface connector plus internal LVDS Display.

Dual Independent Display / Extended Desktop

Dual channel 24-bit LVDS support.
Max. clock rate: 105 MHz
Max. LVDS screen resolution:
1920 x 1200 @ 60Hz

Display Options

5.12 Internal & External graphics use in parallel (up to four displays)



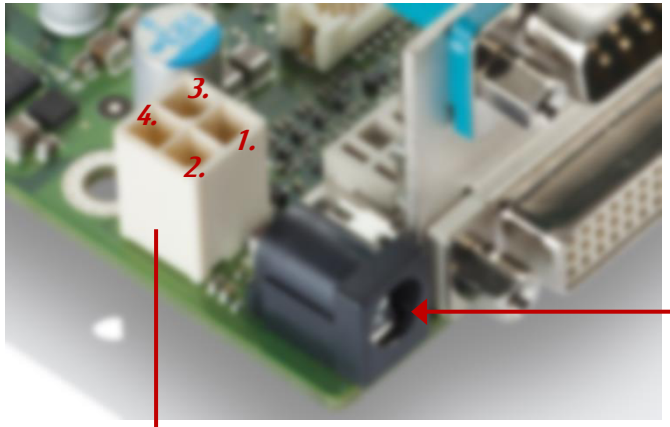
6 Power Supply Features

6.1 12V / 19-24V DC Connector

Internal and external DC input can be powered by 12V or 19-24V (auto range switching).

Internal and external DC input must never be powered simultaneously!

Note: Power plug must only be attached to D3313-S while the external power source it switched off!



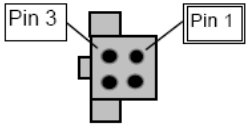
GND (Ø 6.4mm)

+ DC In (Ø 2.5mm)

Input current for external DC connector: max. 5A

➔ Max. 60W @ 12V

➔ Max. 100W @ 19-24V



Pin 1, 2: GND

Pin 3, 4: DC In

Recommended plug for external AC adapter:

Ø 2.5mm / 5.5mm

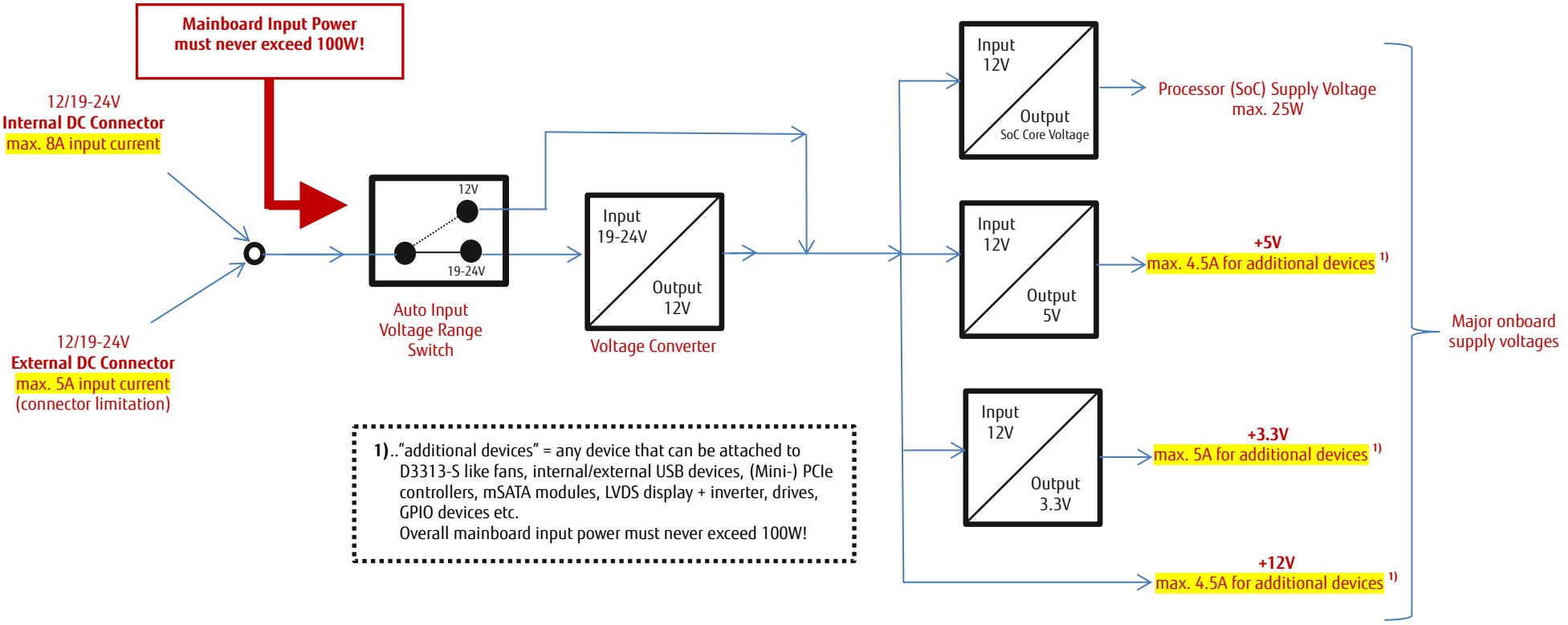
contact length ~ 10-11mm

Angle plug or straight plug

Power Supply Features

6.2 Requirements for 12V / 19-24V operation

Simplified functional diagram for major onboard voltage converters



Power Supply Features

Requirements for 12V / 19-24V operation

Requirements for DC operation

Nominal operating range 12V or 19 - 24V
Max. operating range 12V [+/- 10%] or
19 - 24V [+ 10% - 15%]
Ripple / noise max. 400mV (PP)
Max. input current: 5A (external) / 8A (internal)
The DC power supply input provides
a capacitive load of 700µF which has to be
covered by the AC adapter respectively the
DC source during power ramp-up.

Limited mainboard output current:

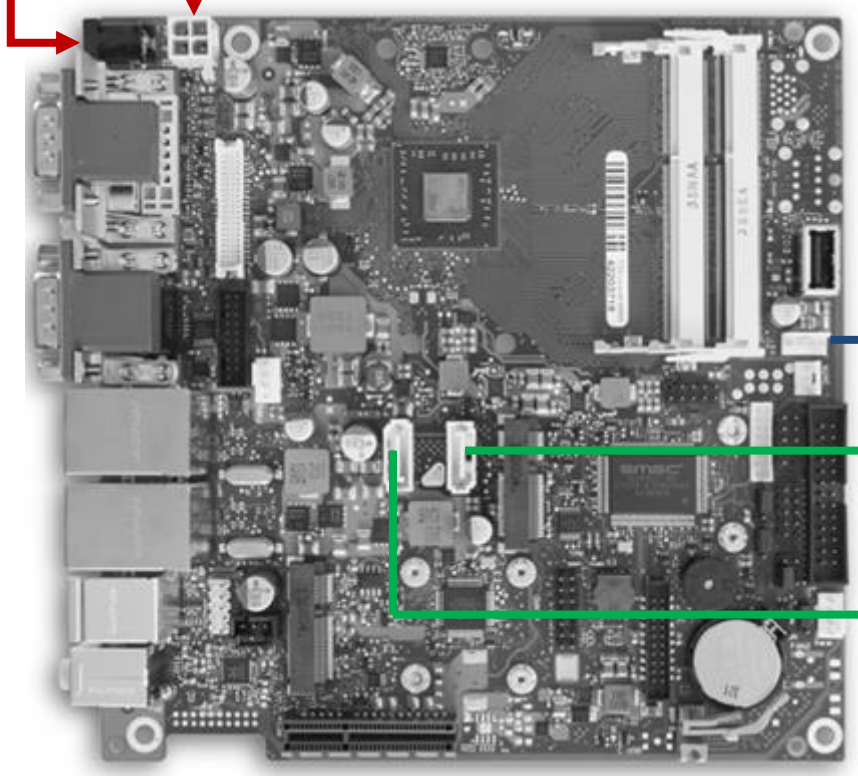
The max. mainboard output power
available via (Mini-) PCIe- connector, fan-connectors, USB-connectors, GPI/O, LVDS/backlight-connector, and drive power connector is limited!
Max. overall output current for each voltage:

+3.3V / 5A
+5V / 4.5A
+12V / 4.5A

Mainboard input power must never exceed 100W!

Power Supply Features

6.3 Power option for internal devices



12/19-24V
Supply
(internal)

or

12/19-24V AC
Adapter
(external)

Drive Power
Connector

2.5" HDD

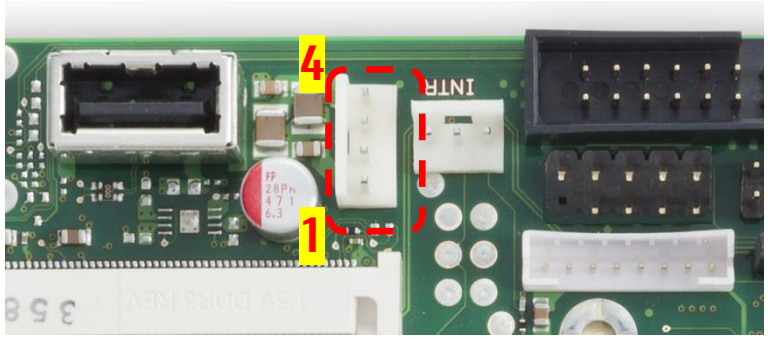
optional:
SATA CD/DVD

Max. rating via Drive Power Connector: +5V/2A ; +12V/2A

Green = data
BLUE = power

Power Supply Features

6.4 Drive Power Connector



Drive Power Connector

1	VCC (+5V)	max. 2A
2	GND	
3	GND	
4	+12V	max. 2A

Note:
Onboard connector is compliant to standard floppy power supply connector.

Power Supply Features

6.5 Fujitsu Drive Power Cable

Connector 1
(to mainboard)

171822-4 AMP
or equivalent

Connector 2
(for SATA harddisk 2.5“ / 3.5“)

15 1
COMAX C1212K32
or equivalent

Connector 3
(for slimeline SATA optical drive)

6 5 4 3 2 1
Molex SD-47328-100
or equivalent

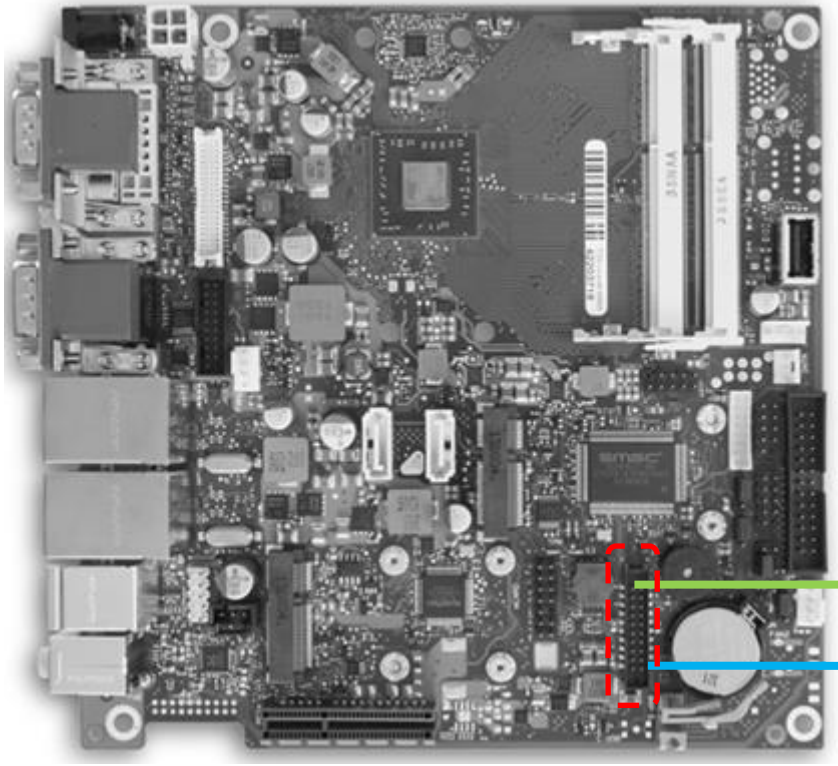
Note:
overall max. current via connector 1 limited to
+5V / 2A and
+12V / 2A

connector pinning			
Conn. 1	**Conn. 2**	**Conn. 3**	**Note**
1	7, 8, 9	2, 3	**+5V, red**
2	4, 5, 6	5, 6	**GND, black**
3	10, 11, 12		**GND, black**
4	13, 14, 15		**+12V, yellow**

Cable Ordercode:
S26361-F5000-K001
(Previous ordercode: T26139-Y1500-V700)

7 Internal Connectors

7.1 Optional Devices and Power via Feature Connector



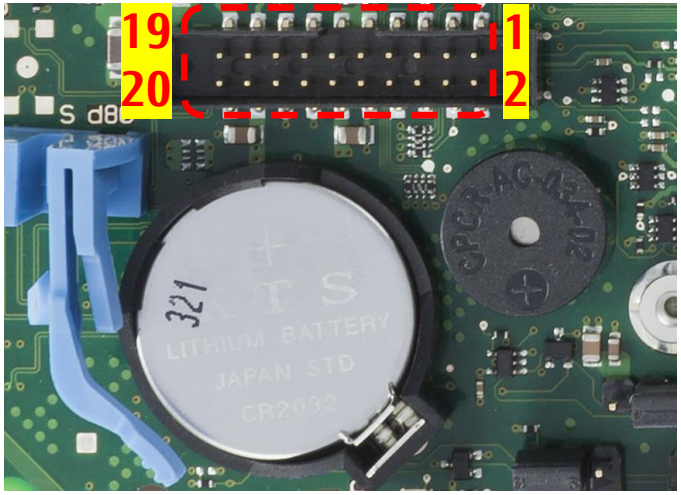
Feature
Connector

Feature Connector provides additional power for internal devices (3.3V; 5V; 12V; 5Vaux; max. 1.5A per pin!)

8 bit 3.3V General Purpose Input/Output (GPIO) in order to attach any digital device (sample picture) or just some LEDs.

Internal Connectors

7.2 Feature Connector (GPIO) Details



Limited mainboard output current:
The max. mainboard output power available via (Mini-) PCIe- connector, fan-connectors, USB-connectors, GPI/O, LVDS/backlight-connector, and drive power connector is limited!
Max. overall output current for each voltage:

+3.3V / 5A
+5V / 4.5A
+12V / 4.5A

Feature Connector: CompuPack R-DRK2-20-S3-SMT
(Note: Any 2mm pitch ribbon cable standard parts can be used)

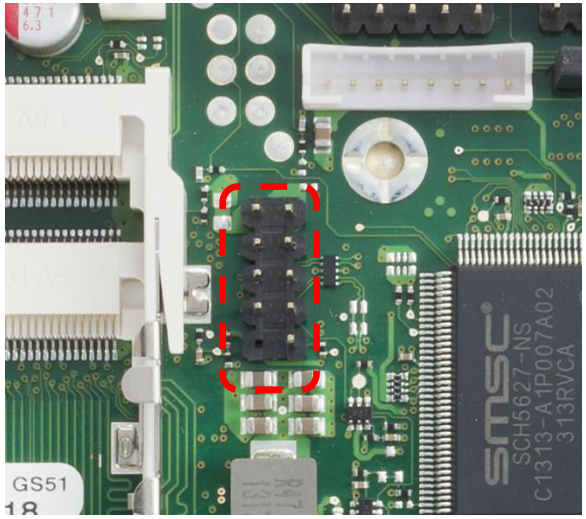
1	GPI/O_0	GPI/O_1	2
3	GPI/O_2	GPI/O_3	4
5	GPI/O_4	GPI/O_5	6
7	GPI/O_6	GPI/O_7	8
9	VCC_3.3V	GND	10
11	VCC_3.3V	VCC_5Vaux	12
13	reserved	GND	14
15	reserved	GND	16
17	GND	VCC_5V	18
19	VCC_12V	VCC_12V	20

Parameter	Range
GPI/O Input Low Voltage	-0.5V ... 0.8V
GPI/O Input High Voltage	2V ... 3.3V
GPI/O Output Low Voltage	max. 0.7V
GPI/O Output High Voltage	min. 2.5V
Note: max. load per GPI/O pin: 10mA (overall current for all GPI/O pins must be < 85mA) **Each GPI/O pin has an integrated serial resistor of 150 Ohm** **Current max. 1.5A per power pin!**	

GPIO access is provided via the SM-Bus controller PCA9554A
ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Products/Mainboards/Industrial&ExtendedLifetime/D3313-S/Documentation/Specifications/GPIO_Chip_PCA9554a.pdf
Note: SM-Bus address: 0x78h (8-bit)
For Windows OS, the Fujitsu BMC API provides easy access to the GPIO:
ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Products/Mainboards/Industrial&ExtendedLifetime/D3313-S/IndustrialTools_D3313/

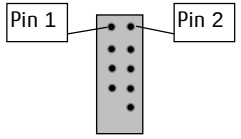
Internal Connectors

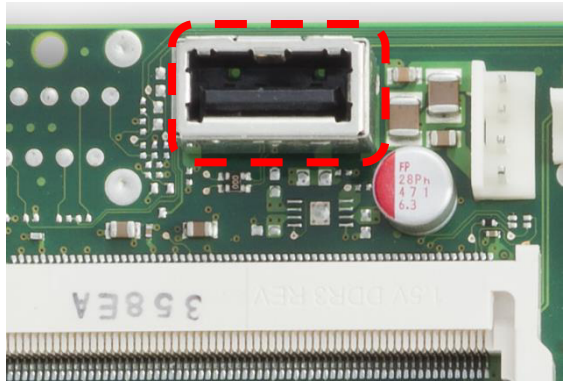
7.3 Internal USB 2.0 Ports



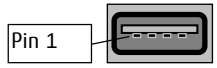
Pin	Signal
1	VCC AUX
3	Data negative Port X
5	Data positive Port X
7	GND
9	Key

Pin	Signal
2	VCC AUX
4	Data negative Port Y
6	Data positive Port Y
8	GND
10	Not connected





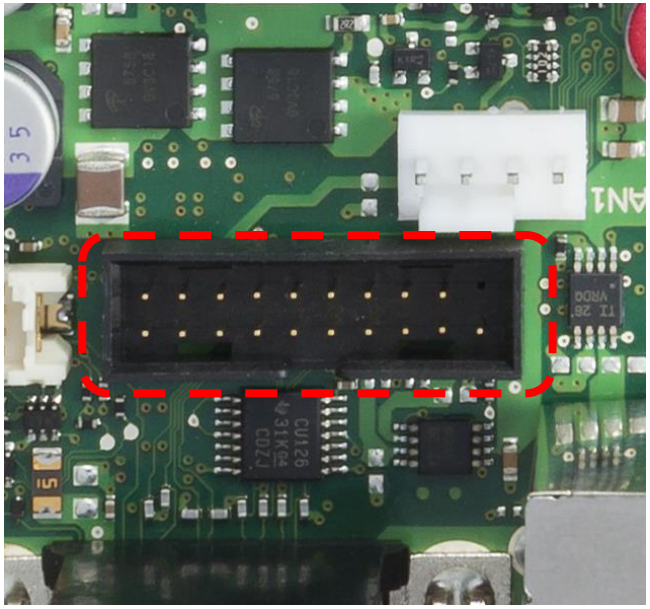
Pin	Signal
1	VCC auxiliary (polyswitch fused and power supervision with over current detection)
2	Data negative
3	Data positive
4	GND



Note: External USB sticks may cause EMI/ESD issues. This can be avoided by using the internal USB port for the affected stick!

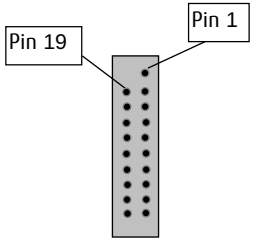
Internal Connectors

7.4 Internal USB 3.0 Ports [Updated]



Pin	Signal
1	VCC AUX
3	USB3_RX positive (P2)
5	USB3_TX negative (P2)
7	GND
9	Data positive (P2)
11	Data positive (P3)
13	GND
15	USB3_TX negative (P3)
17	USB3_RX positive (P3)
19	VCC AUX

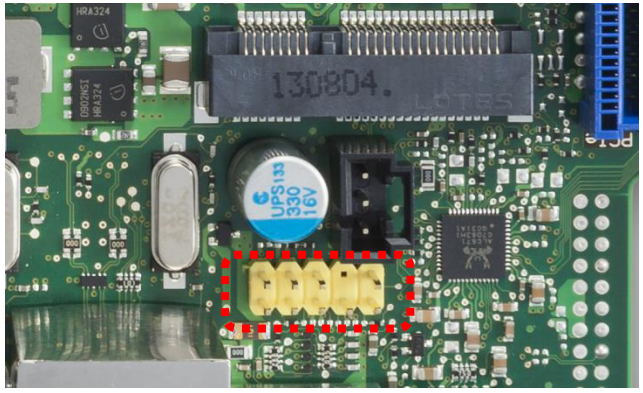
Pin	Signal
2	USB3_RX negative (P2)
4	GND
6	USB3_TX positive (P2)
8	Data negative (P2)
10	FP Detect
12	Data negative (P3)
14	USB3_TX positive (P3)
16	GND
18	USB3_RX negative (P3)
20	<Key>



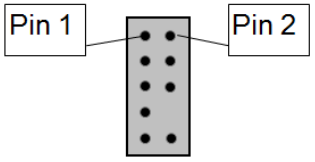
The USB3 connector type, it is according to the Intel standard. Please see following link (page 17) for mechanical details:
http://www.intel.com/content/dam/doc/technical-specification/usb3-internal-connector-cable-specification.pdf

Internal Connectors

7.5 Internal Audio Ports – Frontpanel Audio



Note: Operating mode (High Definition Audio or Legacy Audio) selectable in BIOS Setup



High Definition Audio (corrected):

Pin	Signal
1	Mic Left
3	Mic Right
5	Headphone Out Right
7	Analog GND
9	Headphone Out Left

Pin	Signal
2	Analog GND
4	FP Presence Detect
6	Jack Detect Mic
8	Key
10	Jack Detect Headphone

Legacy Audio (AC97):

Pin	Signal
1	Mic Left
3	Mic Right
5	Headphone out Right
7	Analog GND
9	Headphone out Left

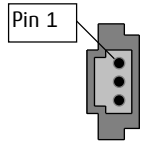
Pin	Signal
2	Analog GND
4	reserved
6	reserved
8	Key
10	reserved

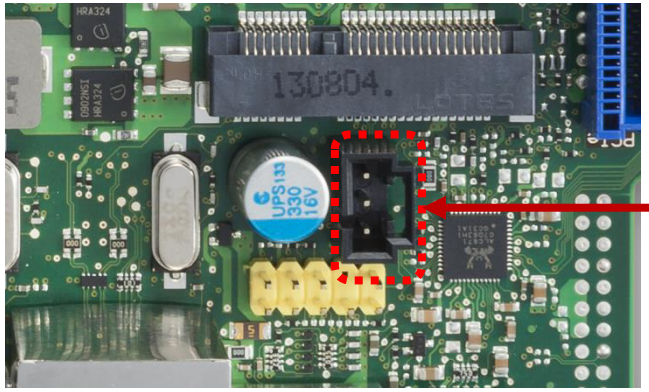
Note: In case of using this connector in AC97/Legacy mode take care for pin 7. This pin is tied to GND. HP_ON# signaling on this pin is not supported.

Internal Connectors

7.6 Internal Audio Ports - SPDIF

Pin	Signal
1	VCC
2	SPDIF out
3	GND





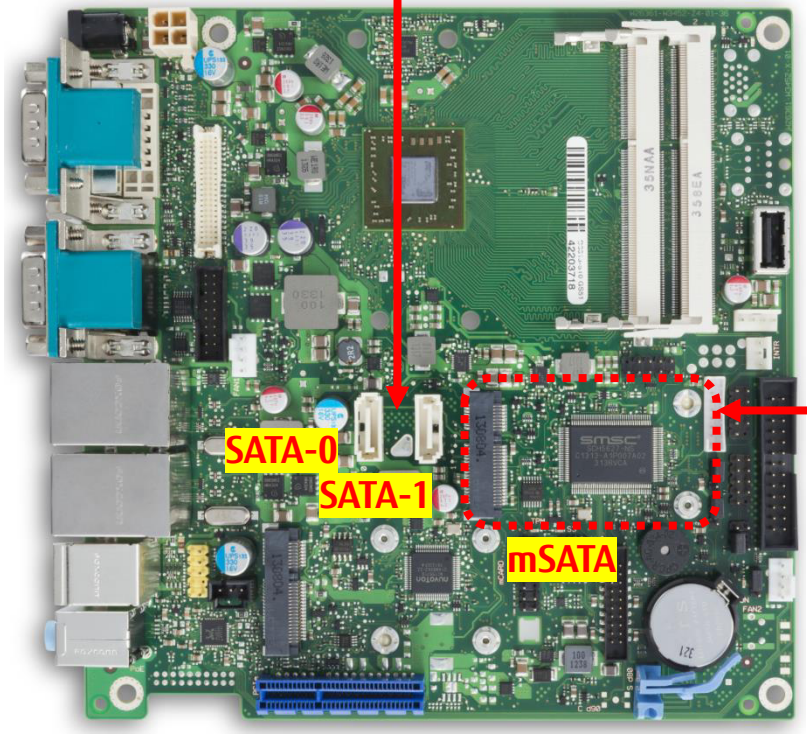
Internal SPDIF - connector

Sample S/PDIF Connector Bracket

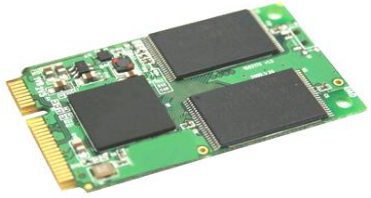
Note:
Standard connector bracket should directly connect to SPDIFout and GND pins (no signal converter required)

Internal Connectors

7.7 m-SATA / SATA



Two SATA 3.0 connectors (up to 6Gb/s)
Layout prepared for SATA DOM (powered via external power cable only!)

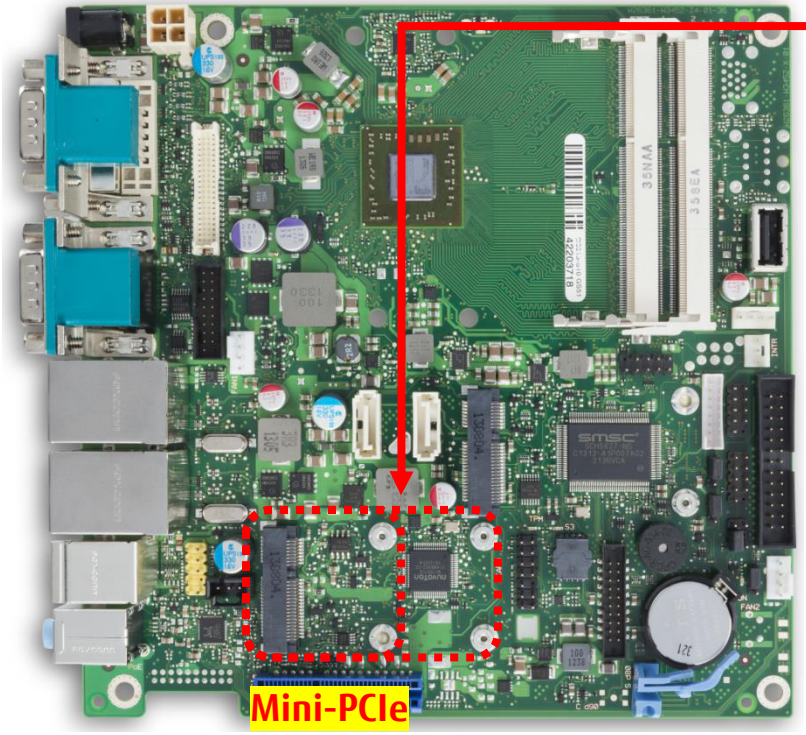


Fullsize m-SATA socket
Supports modules with SATA interface.
Note: Mini-PCI-Express or USB is NOT supported by this interface!

Important note:
SATA-1 and mSATA are shared and can not be used simultaneously!

Internal Connectors

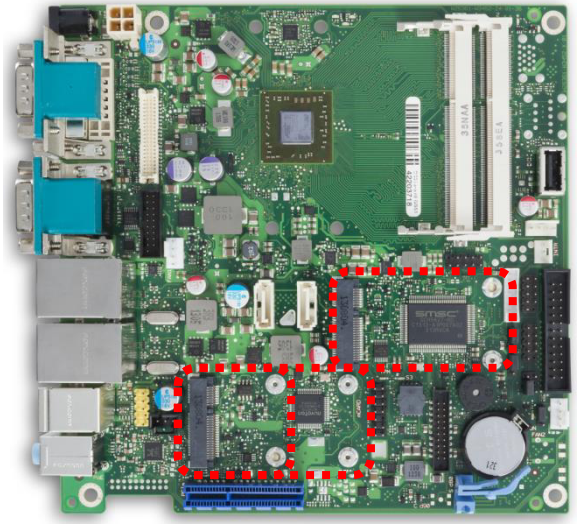
7.8 Mini-PCIe Connector



Mini-PCI Express (Gen2) connector
Prepared for halfsize and fullsize modules,
Incl. USB 2.0 interface

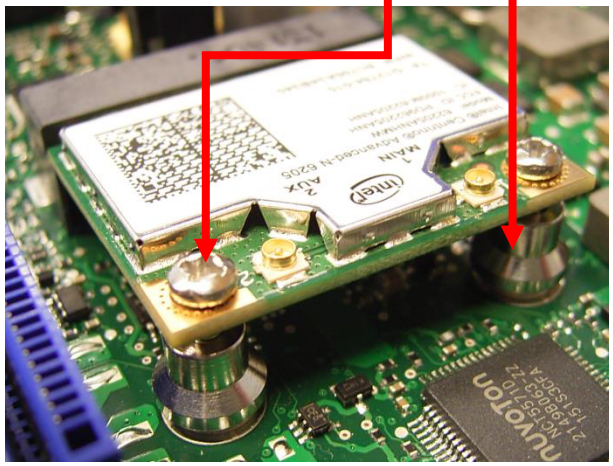
Internal Connectors

7.9 m-SATA / Mini-PCIe Assembly Notes



Module Assembly Kit (included in mainboard shipment) contains 4 metal spacers and 4 mounting screws.

(mounting screw) (spacer)



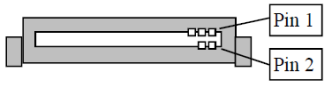
Mandatory torque for mounting screws: 0.25Nm +/- 0.05Nm

Max. torque must never be exceeded, otherwise the mainboard (solder nuts) may be damaged.

Note: Damaged solder nuts are **not** covered by any warranty!

Internal Connectors

7.10 mSATA Pinout / Mini-PCIe Pinout



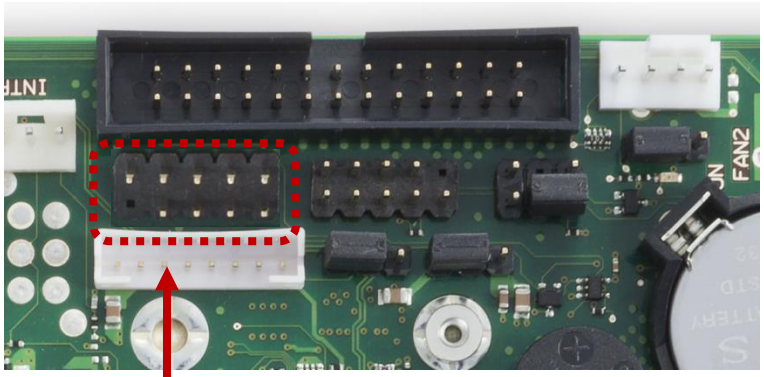
(NC = pin not connected to mainboard)

Pin	Signal Assignment	
	Mini SATA	Mini PCIe
1	NC	WAKE#
2	+3.3V	+3.3V STBY
3	NC	
4	GND	
5	NC	
6	+1.5V	+ 1.5V STBY
7	NC	
8	NC	
9	GND	
10	NC	
11	NC	REFCLK-
12	NC	
13	NC	REFCLK+
14	NC	
15	GND	
16	NC	Wake_3G_low
17	NC	
18	GND	
19	NC	
20	NC	EN_WLAN
21	GND	
22	NC	PERST#
23	SATA TX+	PCIe TX-
24	+3.3V	+3.3V STBY
25	SATA TX-	PCIe TX+
26	GND	

Pin	Signal Assignment	
	Mini SATA	Mini PCIe
27	GND	
28	+1.5V	+ 1.5V STBY
29	GND	
30	SMBus CLK	NC
31	SATA RX-	PCIe RX-
32	SMBus Data	NC
33	SATA RX+	PCIe RX+
34	GND	
35	GND	
36	NC	USB Data -
37	GND	
38	NC	USB Data +
39	+3.3V	+3.3V
40	GND	
41	+3.3V	+3.3V
42	NC	
43	GND	
44	NC	
45	NC	
46	NC	
47	NC	
48	+1.5V	+ 1.5V STBY
49	NC	
50	GND	
51	MSATA Present low	NC
52	+3.3V	+3.3V STBY

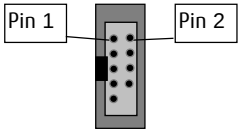
Internal Connectors

7.11 Internal Serial Connector (COM3)



Pin	Signal
1	DCD 3
3	SIN 3
5	SOUT 3
7	DTR 3
9	GND

Pin	Signal
2	DSR 3
4	RTS 3
6	CTS 3
8	RI 3
10	Key



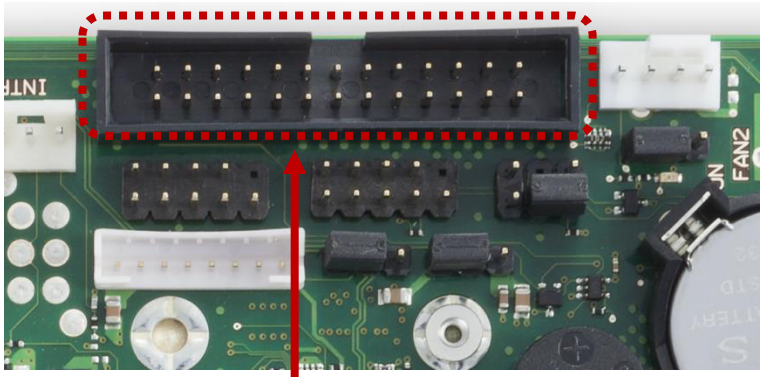
Note: Pinning according Fujitsu standard!

External I/O Bracket

Note:
Internal serial port = COM3

Internal Connectors

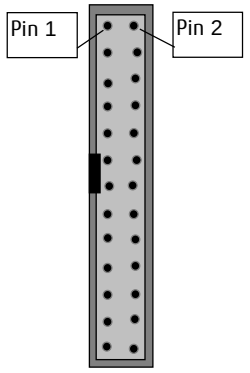
7.12 Internal Parallel Port Connector



optional parallel port cable

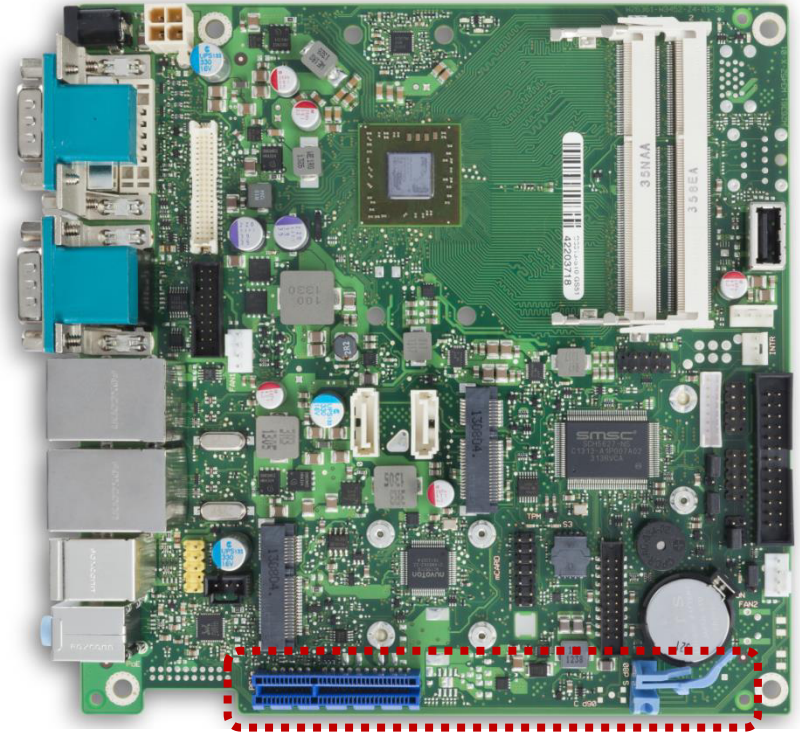
Pin	Signal
1	Strobe
3	Data0
5	Data1
7	Data2
9	Data3
11	Data4
13	Data5
15	Data6
17	Data7
19	ACK
21	Busy
23	Empty
25	Select

Pin	Signal
2	AutoFD
4	Error
6	Init
8	Sel_L
10	GND
12	GND
14	GND
16	GND
18	GND
20	GND
22	GND
24	GND
26	GND



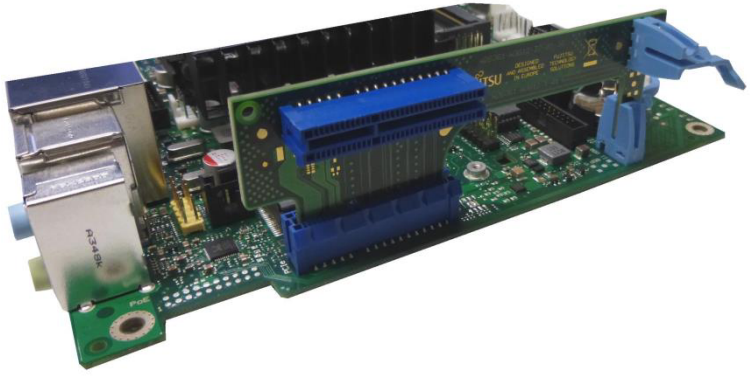
Internal Connectors

7.13 PCI Express Extension Slot



PCIe x4 (Gen2)

- supports up to four PCIe lanes
- "open slot" incl. card mount for PCIe x16 cards



D3313-S with optional x4-risercard D3318

Internal Connectors

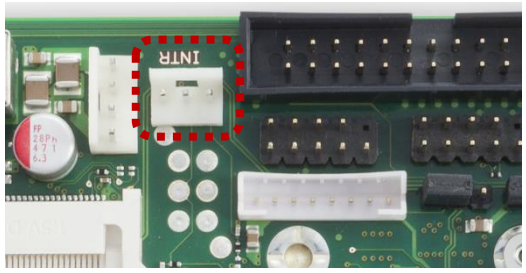
PCI Express Extension Slot

Pin	Signal Assignment
A1	NC
A2	+12V
A3	+12V
A4	GND
A5	NC
A6	NC
A7	Riser Present#
A8	NC
A9	+3.3V
A10	+3.3V
A11	PCIE RST#
A12	GND
A13	CLK +
A14	CLK -
A15	GND
A16	RX Data 0 +
A17	RX Data 0 -
A18	GND
A19	NC
A20	GND
A21	RX Data 1 +
A22	RX Data 1 -
A23	GND
A24	GND
A25	RX Data 2 +
A26	RX Data 2 -
A27	GND
A28	GND
A29	RX Data 3 +
A30	RX Data 3 -
A31	GND
A32	NC

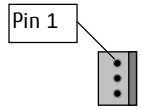
Pin	Signal Assignment
B1	+12V
B2	+12V
B3	+12V
B4	GND
B5	SMBus CLK
B6	SMBus Data
B7	GND
B8	+3.3V
B9	NC
B10	+3.3V STBY
B11	Wake#
B12	NC
B13	GND
B14	TX Data 0 +
B15	TX Data 0 -
B16	GND
B17	NC
B18	GND
B19	TX Data 1 +
B20	TX Data 1 -
B21	GND
B22	GND
B23	TX Data 2 +
B24	TX Data 2 -
B25	GND
B26	GND
B27	TX Data 3 +
B28	TX Data 2 -
B29	GND
B30	NC
B31	NC
B32	GND

Internal Connectors

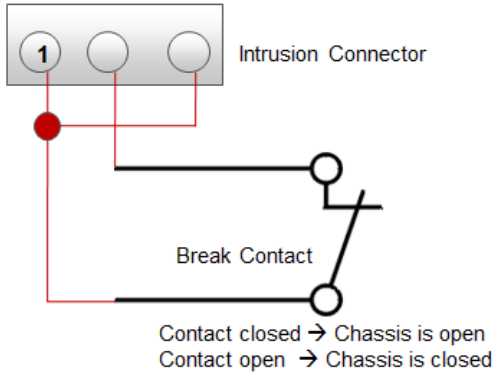
7.14 Intrusion Connector



Pin	Signal
1	GND
2	Case open (low asserted)
3	Intrusion switch present (low asserted)



Note: The intrusion supervision feature needs to be enabled in BIOS Setup first (Menu „Security" → „Cabinet Monitoring"). This BIOS option is only available if pin 3 („Intrusion Switch Present") is connected to GND!



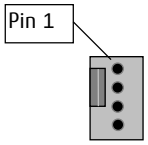
Chassis intrusion is active even if the system is switched off (S5 state) or disconnected from mains power.
The intrusion event is monitored by the chipset and stored in the BIOS Eventlog during the next Boot.
A timestamp (Boot date/time) will be added then.
Note: This timestamp does not represent date/time of the intrusion event!
If a Supervisor Password is enabled in BIOS Setup, the system will stop during BIOS POST if an intrusion event has been detected. In order to continue, the Supervisor Password must be entered to confirm the intrusion event.

The intrusion status can be easily monitored by using the BMCAPI (Windows):
ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Products/Mainboards/Industrial&ExtendedLifetime/D3313-S/IndustrialTools_D3313/BMC_Management-Controller-API/

Internal Connectors

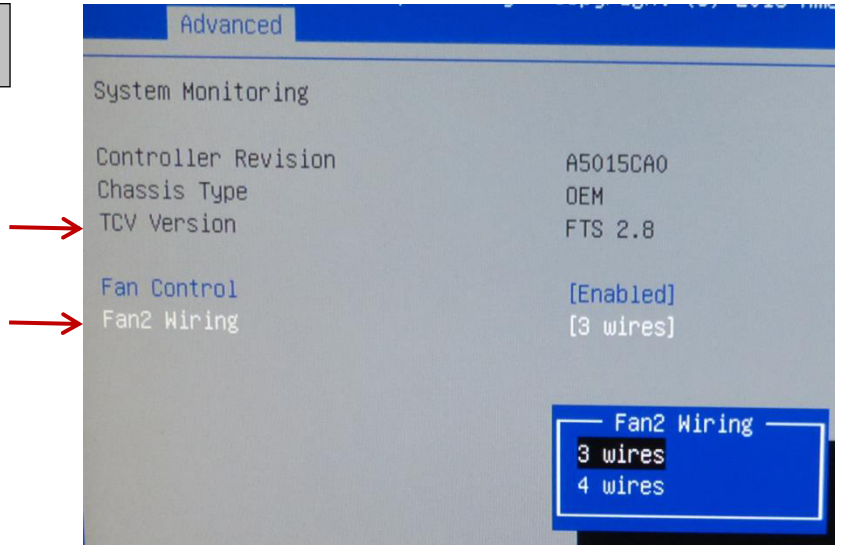
7.15 Fan Connector

Pin	Signal
1	GND
2	12V in PWM mode / 4V-12V in 3-Pin mode
3	FAN Sense
4	FAN PWM



Note:
Fan 1 (Processor) supports 4-wire "PWM" only.
Fan 2 (Chassis) can be used in 4-wire or 3-wire mode (BIOS Setup)

If a 3-wire fan is connected, but BIOS Setup is set to "4 wires" (= Default) the fan will operate at full speed (12V).
In 3-wire mode, the default minimum operating voltage is set to ~ 4V.
Fan current must not exceed 1A per connector.

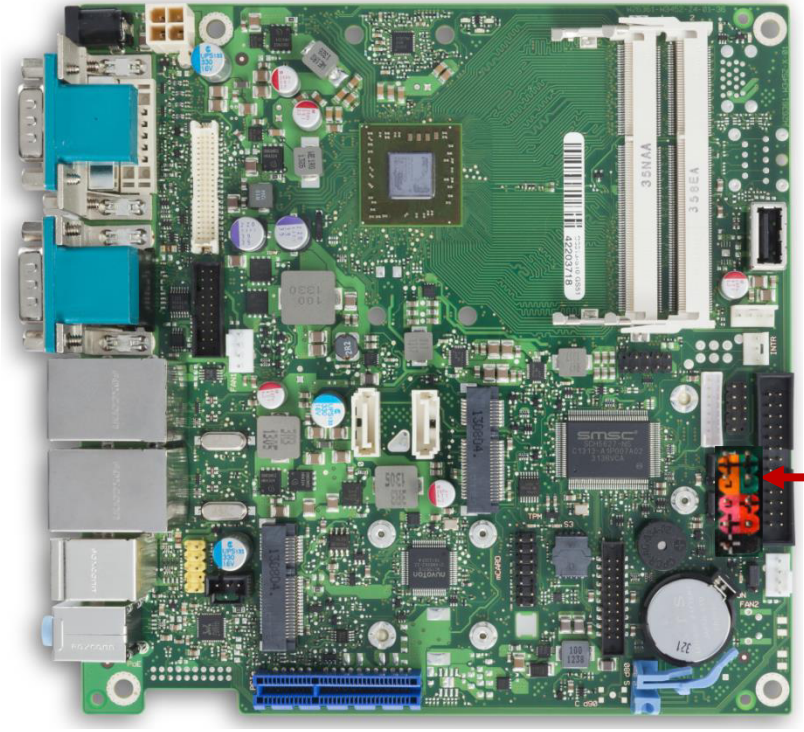


→ Minimum fan speed can be customized via SilentFanConfig-Manager tool
ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Products/Mainboards/Industrial&ExtendedLifetime/D3313-S/IndustrialTools_D3313/

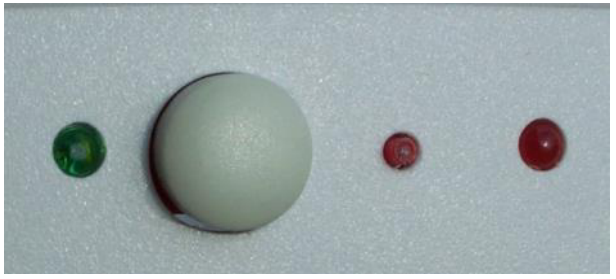
Note: TCV Version shows the BIOS internal version of the System Monitoring parameters. After they have been customized by the SilentFanConfig tool, the TCV Version in BIOS Setup is automatically changed to "OEM".

Internal Connectors

7.16 Frontpanel Connector



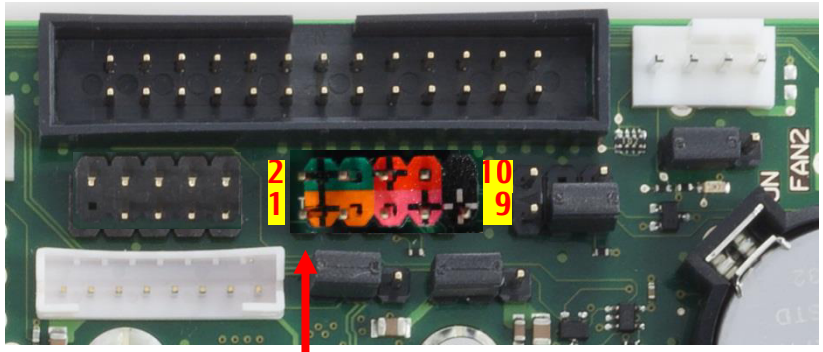
Frontpanel Connector (coloured)



Frontpanel providing
- Powerswitch
- Power/HDD-LED
- Reset-Switch

Internal Connectors

Frontpanel Connector



Frontpanel Connector

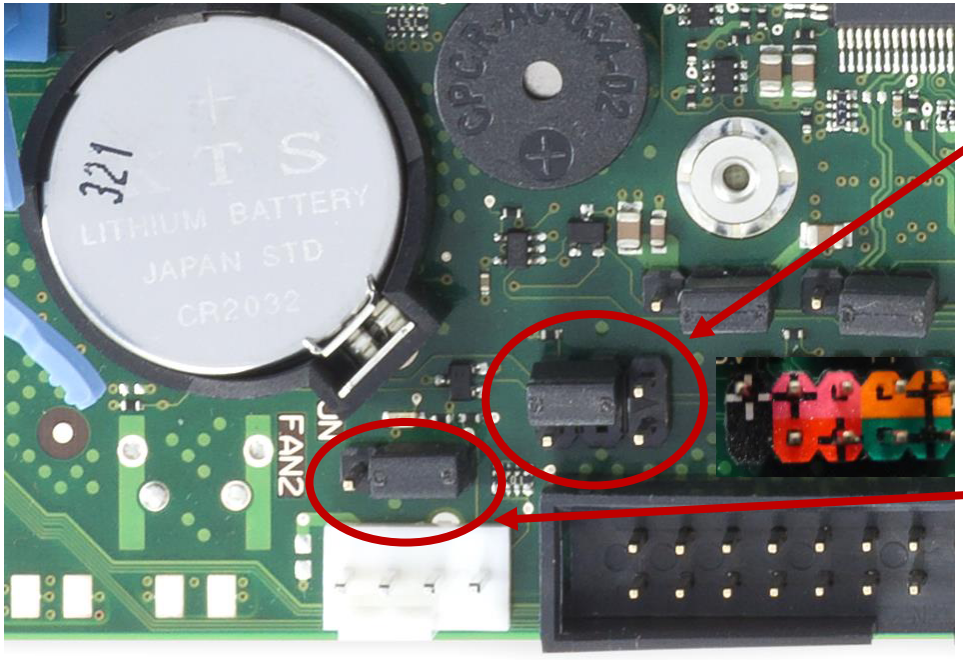
10	(KEY)	Reserved (NC)	9
8	PowerSwitch_GND	ResetSwitch_P	7
6	PowerSwitch_P	ResetSwitch_GND	5
4	Power_LED_GND	HDD_LED-	3
2	Power_LED+	HDD_LED+	1

Note: Pinning is compatible to
Intel 10 pin header

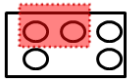
Power LED / HDD LED:
Constant current, typ. 3mA

Internal Connectors

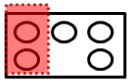
7.17 Additional Jumper Settings



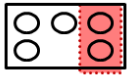
BIOS Recovery Jumper:



Default Setting

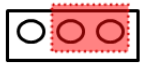


BIOS Recovery / Reset BIOS Setup to Defaults

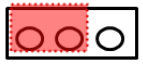


BIOS Reserved Mode

System Power-On Jumper ("ALWON"):



Default Setting



Forced "Always-Power-On" Setting
--> System will switch on automatically when connected to power even if the battery is empty or damaged (no explicit need for system power button).

Note: Power-on may be delayed for several seconds!

8 System Monitoring

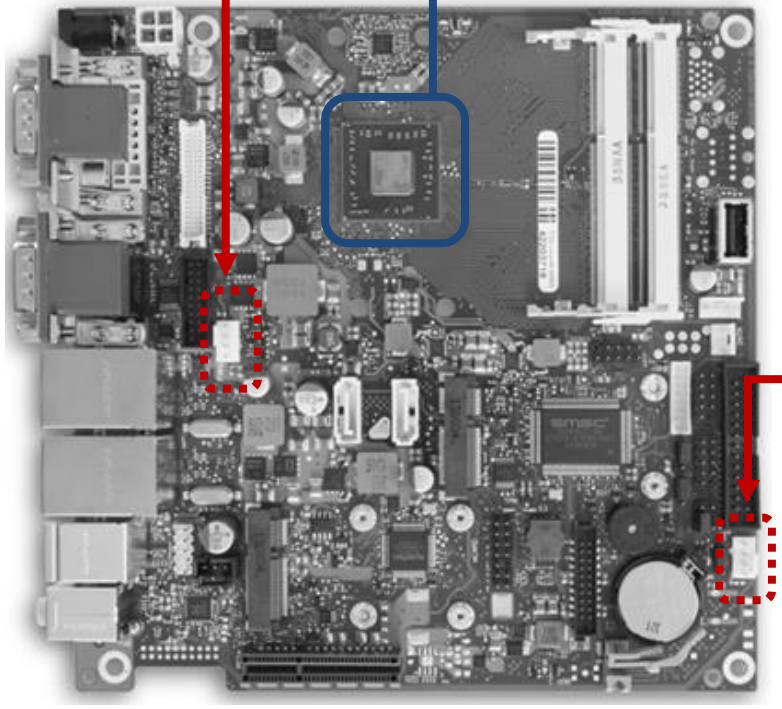
8.1 D3313-S: Fans

FAN 1
(CPU Fan)

TDPmax - Processor (SoC):

9W	(D3313-S1)	10/15W (D3313-S4)
15W	(D3313-S2)	5/7W (D3313-S5)
25W	(D3313-S3)	25W (D3313-S6)

Note: Processor Throttling is enabled @ 108°C and disabled again below 105°C.
Above 115°C the processor shuts down the system.
The onboard System Monitoring implementation provides a processor Alert above 105°C.



Fans must NOT be attached or removed while the system is powered! Mainboard may be damaged!

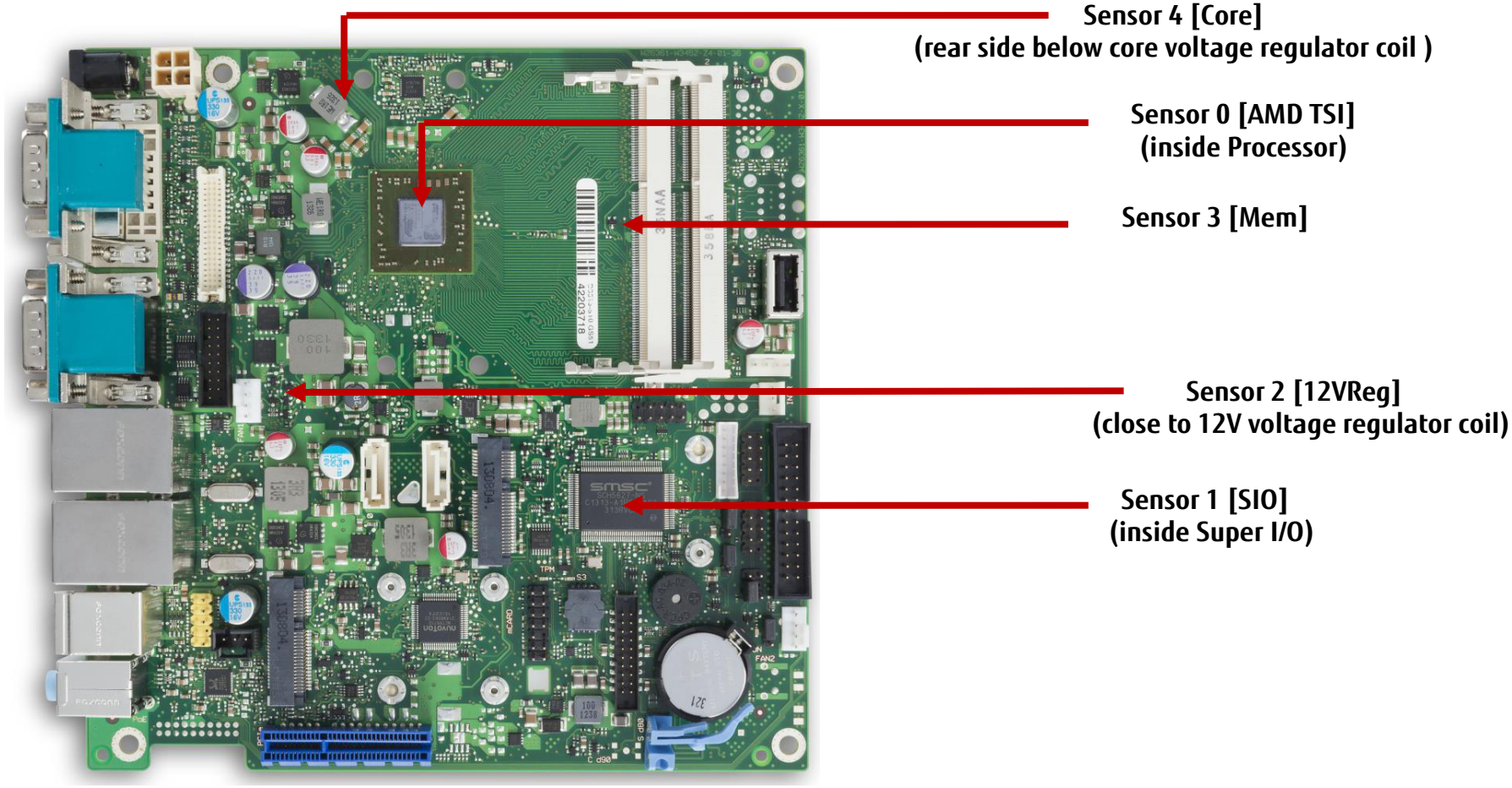
FAN 2
(Chassis)

Note:
Fan1 PWM (4-wire) only!
Fan2: PWM (4-wire) or voltage controlled (3-wire) possible.
Selectable via BIOS Setup

Note: Do not attach more than one fan per connector (max. 1A per connector)!

System Monitoring

8.2 D3313-S: Sensors



System Monitoring

8.3 SystemGuard: Fan/Temperature Monitor

Windows-based Monitoring Tool

Download link to latest version:
ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Services/Software&Tools/Common-Mainboard-Tools/SystemGuard/

Note: Version 4.04 or higher required for D3313-S

System Guard offers several options like “LogFile- feature” and “No Adjustments- mode”
Details are available here:
ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Services/Software&Tools/Common-Mainboard-Tools/SystemGuard/Documentation/

Note: Windows-based and Linux-based APIs resp. drivers for easy implementation of the System Monitoring features like fan speed, sensor temperatures, Watchdog access etc. are available here:
ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Products/Mainboards/Industrial&ExtendedLifetime/D3313-S/IndustrialTools_D3313/

System Monitoring

8.4 D3313-S: SystemGuard Details

Temperature Sensors

Processor Sensor

Super I/O Sensor

12V Coil Sensor

Memory Sensor

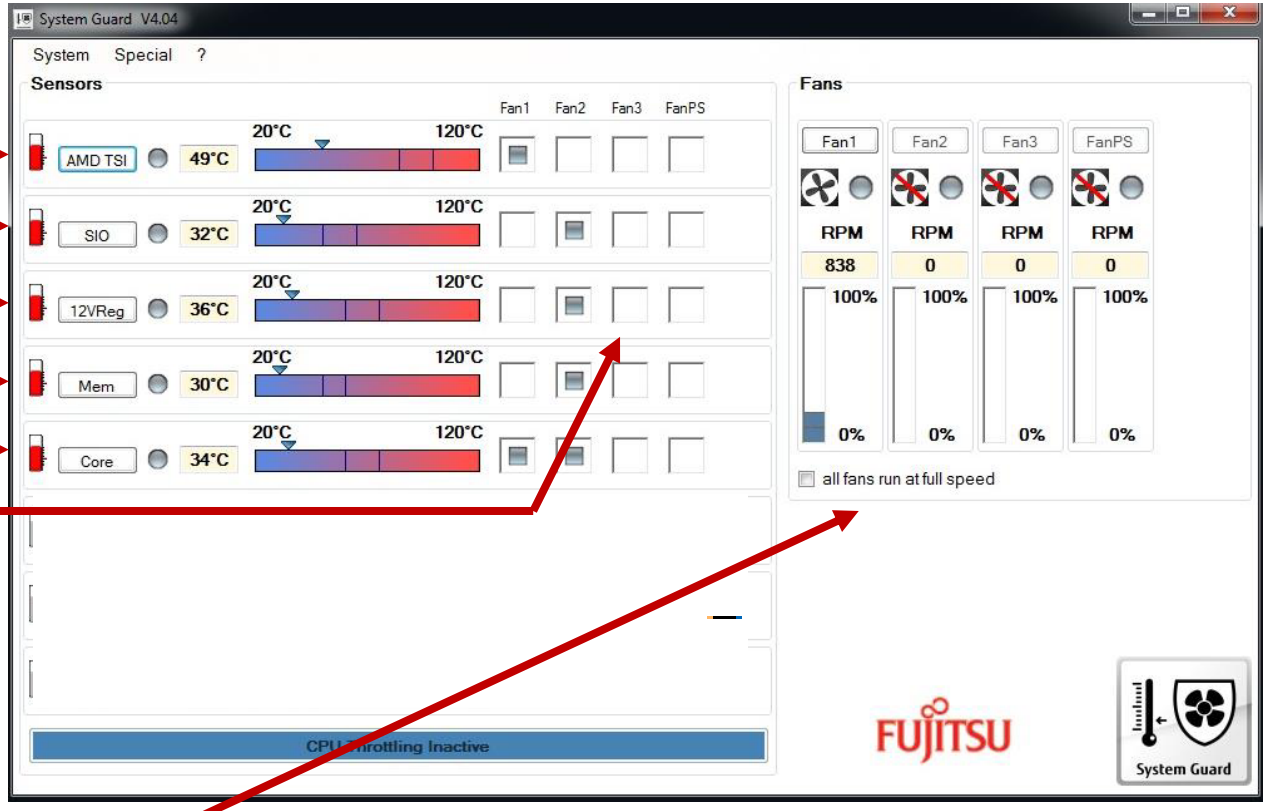
Core Regulator Sensor

Sensor / Fan Matrix

Factory default setting:

- FAN1 (CPU) controlled by Processor temperature 1)
- FAN2 controlled by vaious sensors

Current Fan Speed



1) Note: Characteristics for FAN1 is always dependent on CPU temperature – fully controlled by the system BIOS. Due to safety reasons this influence cannot be disabled!

All relevant System Monitoring parameters can be customized via SilentFanConfig-Tool!

System Monitoring

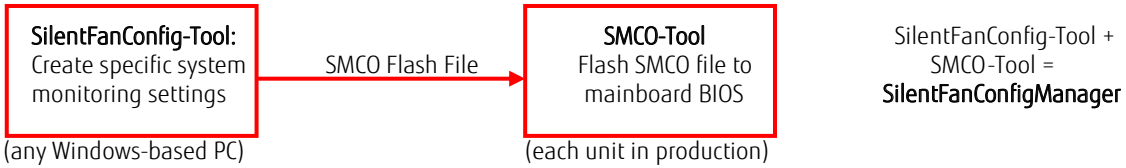
8.5 SilentFanConfigManager – Customize System Monitoring Settings

Windows-based System Management Configuration Tool

ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Products/Mainboards/Industrial&ExtendedLifetime/D3313-S/IndustrialTools_D3313/SilentFanConfig-Manager/

1. Windows-based configuration tool (SilentFanConfig) to create customized system monitoring settings like minimum fan speed and temperature sensor influence. These customized settings are stored in a specific "SMCO" flash file.

2. DOS-based tool "SMCO" to flash the customized system monitoring settings (SMCO file) to the system BIOS of the target unit.



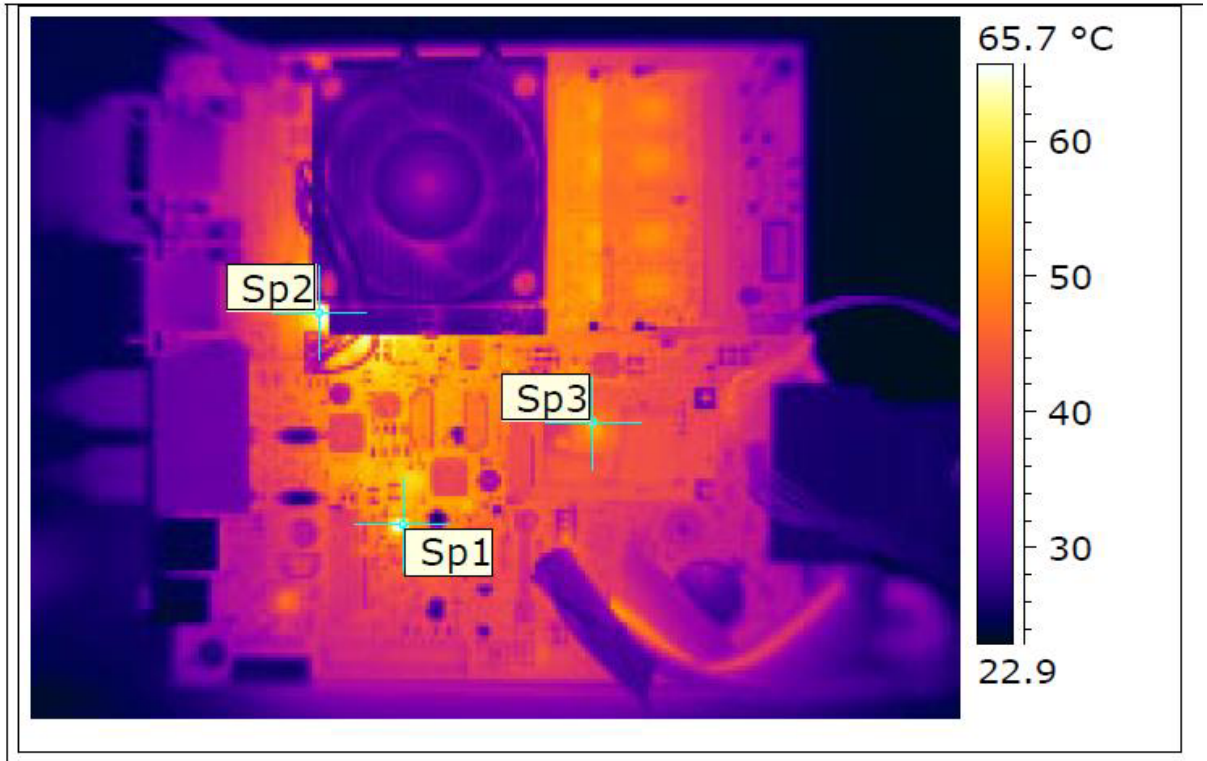
SilentFanConfig-Tool +
SMCO-Tool =
SilentFanConfigManager

Note: New settings are written permanently to system BIOS.
Any BIOS update or BIOS Recovery will not reset the new settings

SilentFanConfig ≥ **V1.81** recommended for D3313-S

System Monitoring

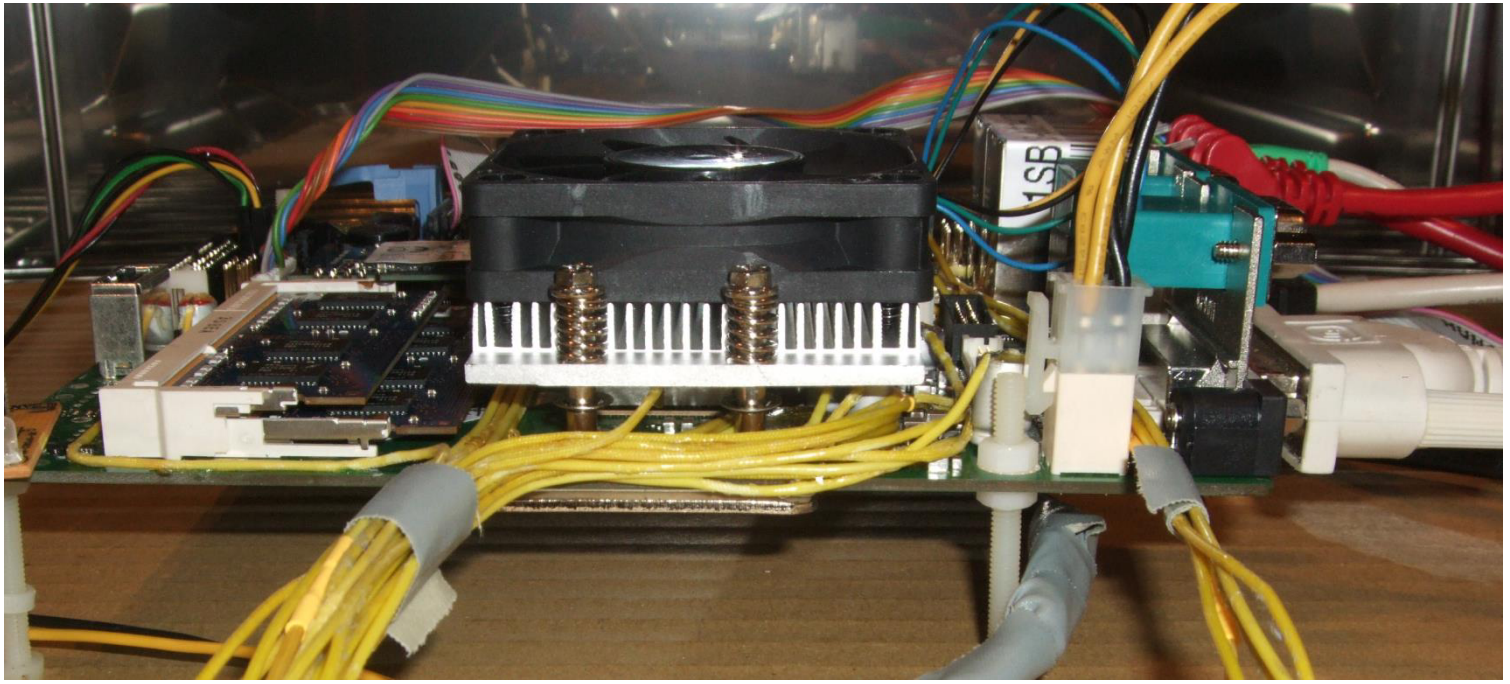
8.6 Thermography D3313-S



Sp1 Temperatur	63.6 °C
Sp2 Temperatur	65.2 °C
Sp3 Temperatur	52.3 °C

System Monitoring

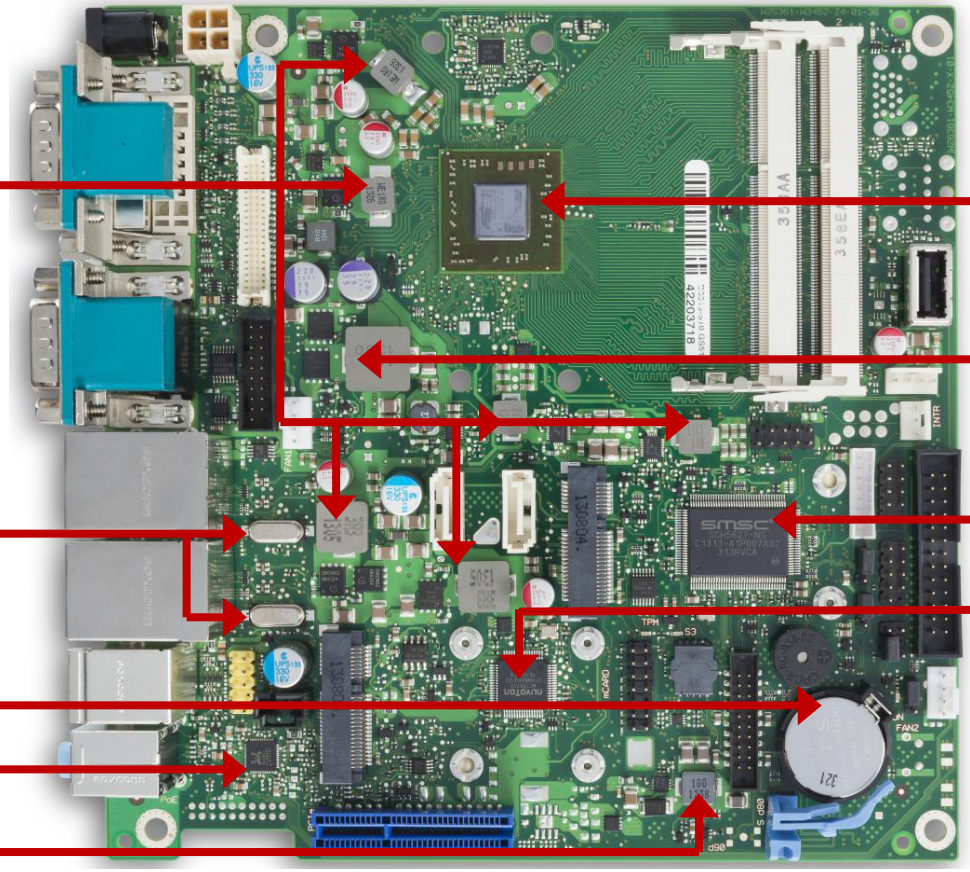
8.7 Climatic Test D3313-S



System Monitoring

8.8 Temperature Reference Points D3313-S

Operating Conditions:
Circulating air max. 60°C
Usage 24h / 7 days



All voltage regulators (FETs) max. 90°C

All capacitors max. 68°C

Inductors max. 90°C

SoC max. 90°C (chip surface)

12V Inductor max. 100°C

Quartz max. 70°C

Super I/O (SMSC) max. 70°C

Super I/O (Nuvoton) max. 70°C

Battery max. 60/70°C [1)]

Audio Codec max. 70°C

Inductor max. 90°C

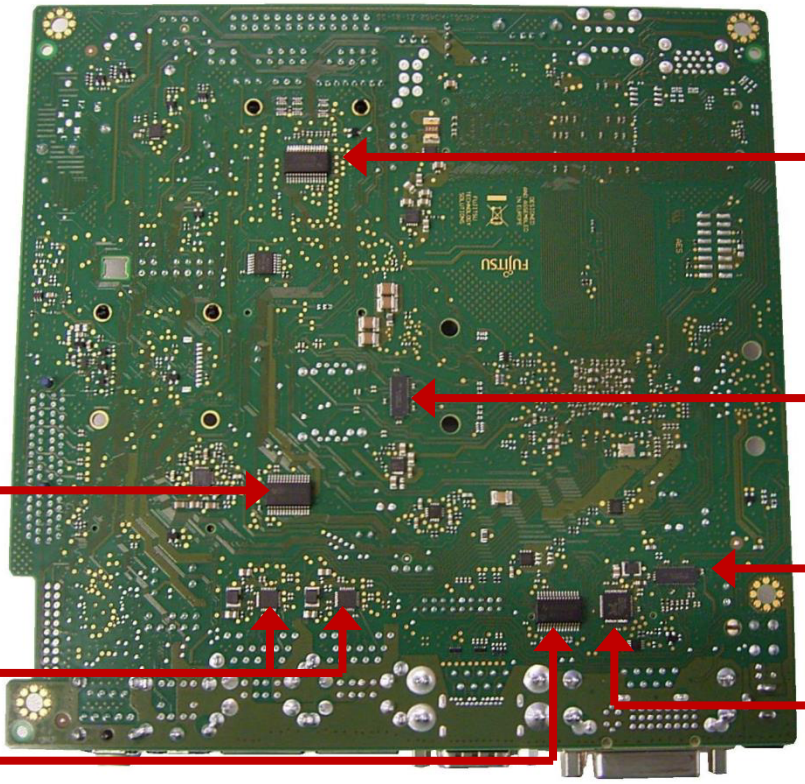
Reference Point Limit Temperatures (Component Surface) must not be exceeded!

1) Note: Battery operation is specified in temperature range up to 60°C.
Operation between 60°C and 70°C may result in:
- Higher self discharge rate
- Decline of specified characteristics
- Danger of leakage increases

System Monitoring

8.9 Temperature Reference Points D3313-S (Rear View)

Operating Conditions:
Circulating air max. 60°C
Usage 24h / 7 days



COM Driver max. 70°C

SATA Switch max. 80°C

DisplayPort/LVDS Switch max. 80°C

LVDS Converter max. 70°C

COM Driver max. 70°C

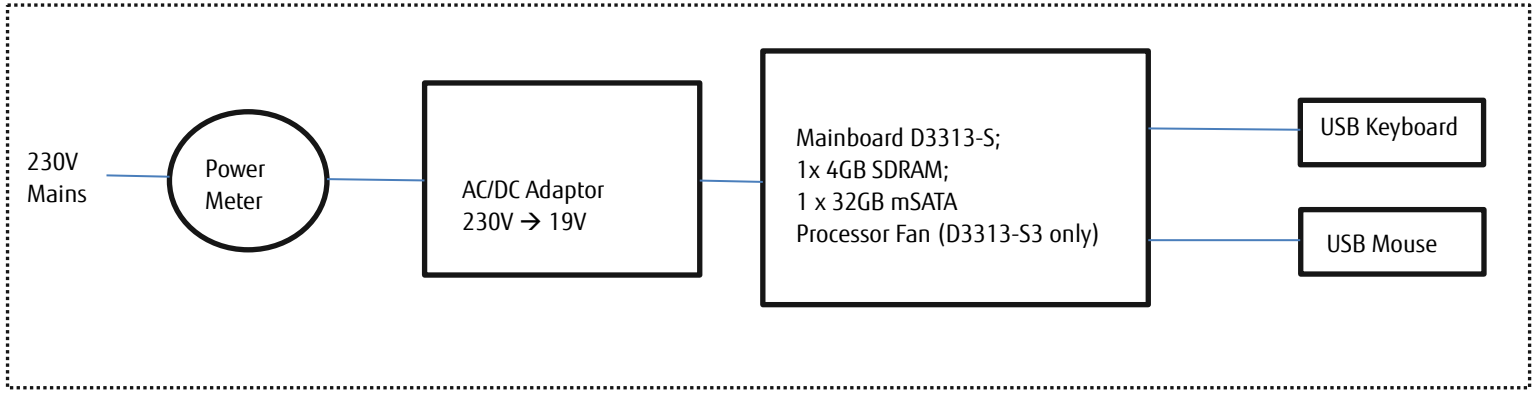
LAN Controller max. 70°C

COM Driver max. 70°C

Reference Point Limit Temperatures (Component Surface) must not be exceeded!

9 Power Consumption

9.1 Sample Configuration [Updated]



Typical mains power consumption (all data = indicative values only):

	Windows 7 - Idle	Windows 7 – 100% Processor Load
D3313-S1	~4-6W *)	~ 13W
D3313-S2	~4-6W *)	~ 19W
D3313-S3	~4-6W	~ 30W
D3313-S4	~4-6W *)	~22W **) / ~15W ***)
D3313-S5	~4-6W *)	~11W **) / ~9W ***)
D3313-S6	~4-6W	~25W **) / ~15W ***)

*) fanless **) cTDP = nominal ***) cTDP = reduced

10 Operating System Support

10.1 MS Windows / MS Windows Embedded Compact

MS Windows

- MS Windows XP32 (limited driver support available)
- Windows 7 32bit / 64bit
- Windows 8.1 64bit
- Support for MS Windows 10-64bit
- Mainboard D3313-S is designed according to the Microsoft Guidelines for MS Windows 7, Windows 8.1 and Windows 10
- MS certified drivers are available via OEM DU-DVD and OEM FTP Server:

  ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Products/Mainboards/Industrial&ExtendedLifetime/D3313-S/Drivers_D3313-S/

MS Windows Embedded CE / Embedded Compact

- AMD plans to support Embedded CE6.0, Embedded Compact 7.0 and Embedded Compact 2013
- Evaluation drivers / SDK
  ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Products/Mainboards/Industrial&ExtendedLifetime/D3313-S/Drivers_D3313-S/Drivers_Win-EmbCompact_CE_For-Evaluation/

Operating System Support

10.2 Linux Support (eKabini)

Following distributions have been tested with “out of box”-drivers:

- **Fedora 19 ✓**
- **Debian 7 ✓**
- **Ubuntu LTS 12.04 ✓**
- **OpenSUSE 13.1 ✓**

→ **Redhat 6.5**

USB keyboard/mouse issue during installation → Solved by kernel parameter "iommu=soft"

→**Ubuntu Desktop 13.10**

USB keyboard/mouse issue during installation → Solved by kernel parameter "iommu=soft"

Graphics issues (X server) → Workaround: Fallback vesa/fbdev or usage of AMD/ATI graphics driver

Operating System Support

10.3 Linux Support (SteppeEagle) [New]

Following 64bit-distributions have been tested with “out of box”-drivers (D3313-S4):

- **Fedora 22**
  Note: System switches off but boots instead of resuming from hibernate.
- **Debian 8** ✓
- **Ubuntu 14.04** ✓
- **OpenSUSE 13.2** ✓
- **SLES 11 SP4**
  Hibernate seems to work, but after returning from hibernate the background image shows "strange colors". You need to logout and login again to fix this.
  System cannot be set to Standby.
- **SLES 12**
  No way to set SLES 12 to hibernate, option missing in the UI.
  System can be set to Standby, but doesn't come back after wakeup.
- **RHEL 6.7**
  Note: SCH5627 (BMC- sensors/fan controller) not supported!
  System switches off but boots instead of resuming from hibernate.
- **RHEL 7.1**
  Note: Sensors-detect recognizes the SCH5627 BMC; sensors execution forces the system to reboot.
  System switches off but boots instead of resuming from hibernate.

11 Mainboard Tools

Common Mainboard Tools

Note: Make sure to not use any DOS memory manager like *himem.sys* oder *emm386!*

11.1 BIOS Boot Logo Tool

- Tool to integrate a customized boot logo
ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Services/Software&Tools/Common-Mainboard-Tools/BootLogo_4_UEFI/

11.2 EditCMOS

- DOS-based production tool to change BIOS settings
and freeze customized BIOS settings (= customized default settings)
ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Services/Software&Tools/Common-Mainboard-Tools/EditCMOS_UEFI/

11.3 OEMIDENT

- Production tool to add MS OEM licence data (SLP1 for Windows XP and SLP2.x for Windows Vista & Windows 7, OA3 for Windows 8, supports Windows 10)
- Add an individual customer serial no / add a chassis asset tag, and some more DMI data

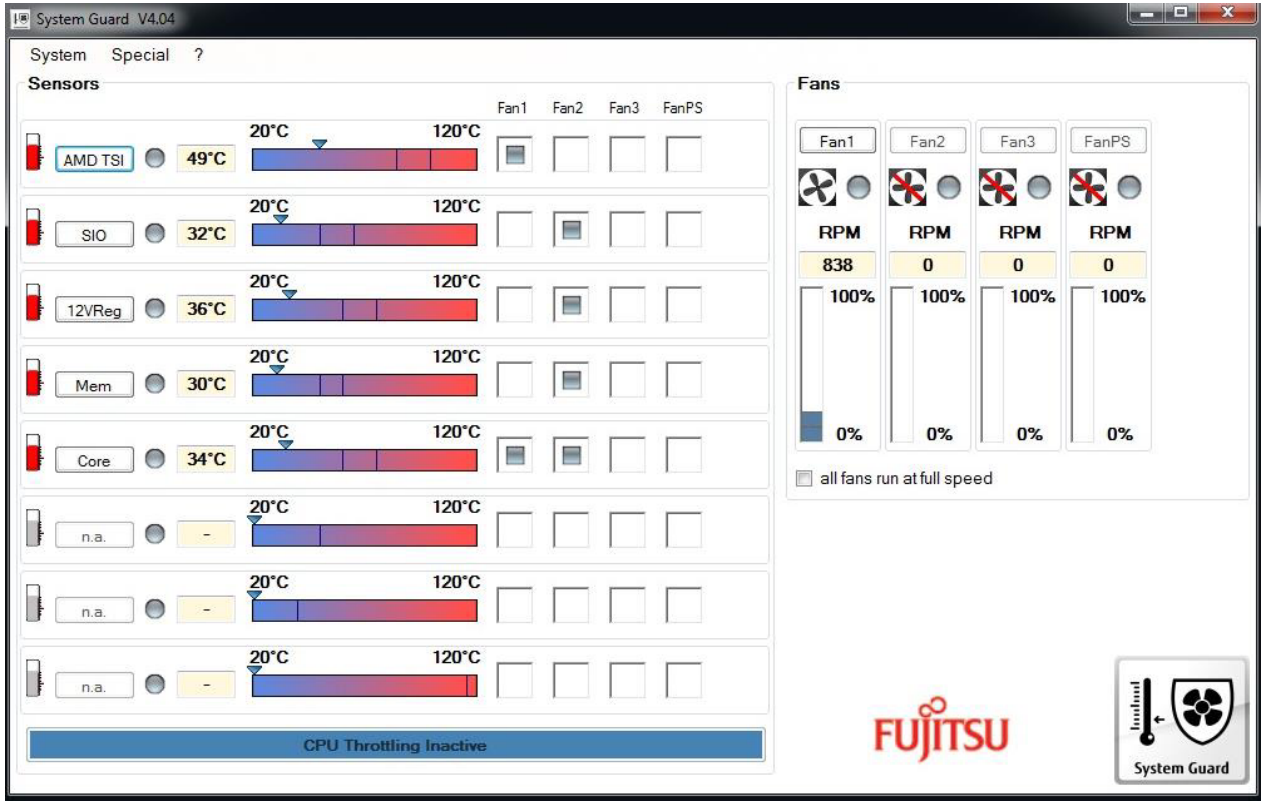
ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Services/Software&Tools/Common-Mainboard-Tools/OEM-Ident/

Mainboard Tools

11.4 SystemGuard

- Windows-based tool to monitor temperatures and fan speed of Fujitsu mainboards
- Option to configure automatic fan ageing supervision
- Provides access to the System Watchdog

ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Services/Software&Tools/Common-Mainboard-Tools/SystemGuard/



Mainboard Tools

Industrial Tools

11.5 SilentFanConfig-Manager

- Windows-based configuration tool to implement customized fan characteristics and temperature parameters. Includes DOS-based tool "SMCO" to flash the configuration file permanently into the system BIOS.

ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Products/Mainboards/Industrial&ExtendedLifetime/D3313-S/IndustrialTools_D3313/SilentFanConfig-Manager/

11.6 Windows System-Monitoring API (BMCAPI)

- BMC-Management-Controller to access and adjust System Monitoring parameters like fan speed and temperatures. This API also provides access to the mainboard watchdog, the 8Bit GPIO interface and the intrusion feature of the mainboard.

ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Products/Mainboards/Industrial&ExtendedLifetime/D3313-S/IndustrialTools_D3313/BMC_Management-Controller-API/

11.7 Linux System-Monitoring Driver ("LM-Sensors")

- BMC-Management-Controller to access and adjust System Monitoring parameters like fan speed and temperatures. This driver also provides access to the mainboard watchdog.

ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Products/Mainboards/Industrial&ExtendedLifetime/D3313-S/IndustrialTools_D3313/

Mainboard Tools

11.8 LVDS Tool

Tool to adjust LVDS-timings for mainboard D3313-S. Adjusted data are flashed into the system BIOS permanently.

Download-Link for LVDS Tool:
ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Products/Mainboards/Industrial&ExtendedLifetime/D3313-S/IndustrialTools_D3313/LVDS-Tool/

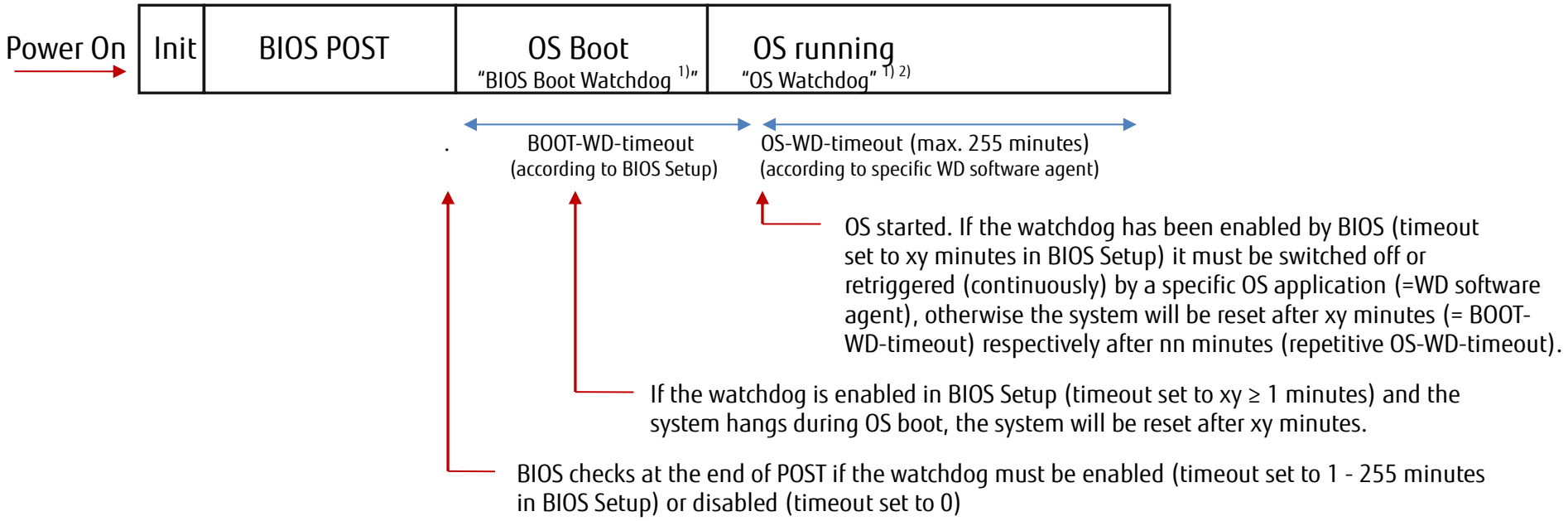
See chapter 5.5 for more details.

Note: Further details regarding mainboard tools can be found in the related “Mainboard Tools Datasheet”
ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Services/Software&Tools/Common-Mainboard-Tools/$$_DS_UEFI-Tools.pdf

12 Miscellaneous

12.1 System Watchdog (WD)

D3313-S provides full Operating System Boot- and Operating System-Runtime HW Watchdog supervision.



1) Note: Both watchdogs are physical identical, but they are handled from different application levels
2) As the SystemGuard tool offers access to the watchdog it can be used as "WD software agent" to retrigger the watchdog during OS runtime

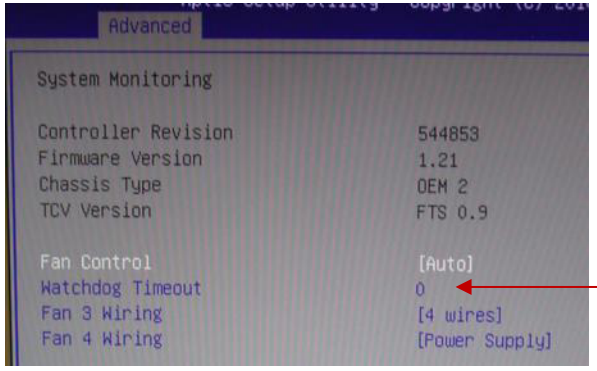
For D3313-S1/2/3: BIOS ≥ R1.4.0 required for Watchdog Support!

Miscellaneous

System Watchdog (WD)

How to handle the two watchdog levels

- **BIOS Boot Watchdog**
  - Set Watchdog in BIOS Setup



0 = WD disabled
1 – 255 = WD enabled (timeout = 1 – 255 minutes)

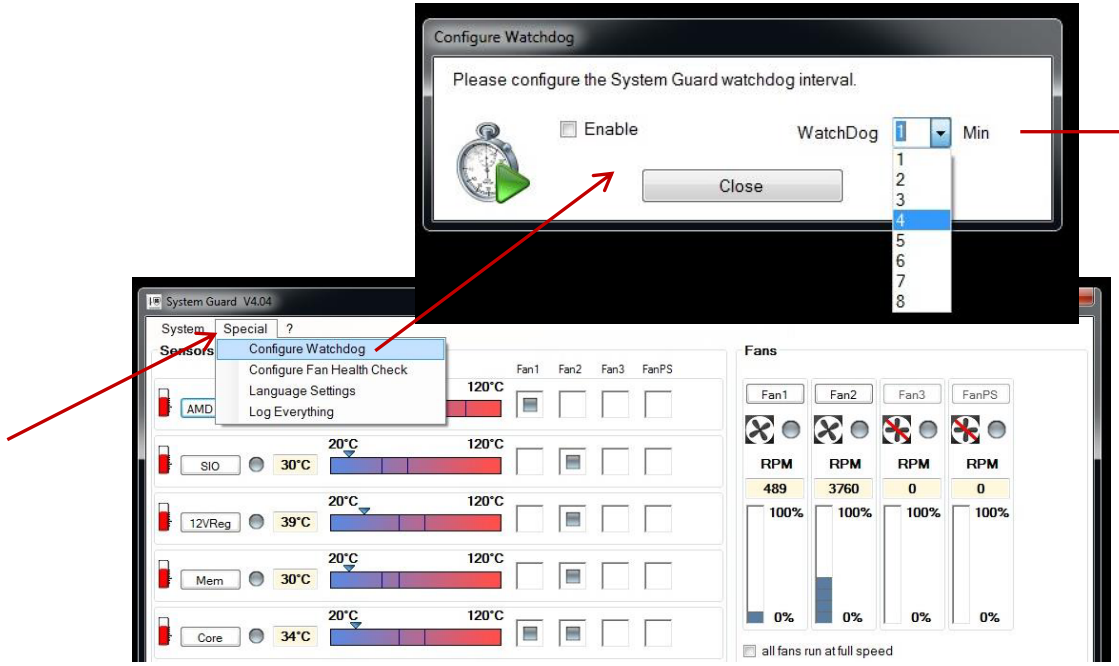
BIOS ≥ R1.4.0 required for Watchdog Support!

Miscellaneous

System Watchdog (WD)

- **OS Watchdog**
  - Use “WD software agent” to stop or retrigger the watchdog during OS runtime
    Note: This “agent” needs to be provided by the customer, dependent on his needs.
    For easy access to the watchdog functions, the Windows API (BMCAPI) or the related Linux driver (lm-sensors) can be used:
    ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Products/Mainboards/Industrial&ExtendedLifetime/D3313-S/IndustrialTools_D3313/

  - For easy testing, the SystemGuard tool provides access to the OS Watchdog. After enabling the Watchdog, SystemGuard retriggers the WD continuously. In case the system freezes, SystemGuard does no longer provide the retrigger signal and the watchdog resets the system after the timeout.
    Note: When SystemGuard is closed, the WD is stopped in order to avoid a unwanted system reset!

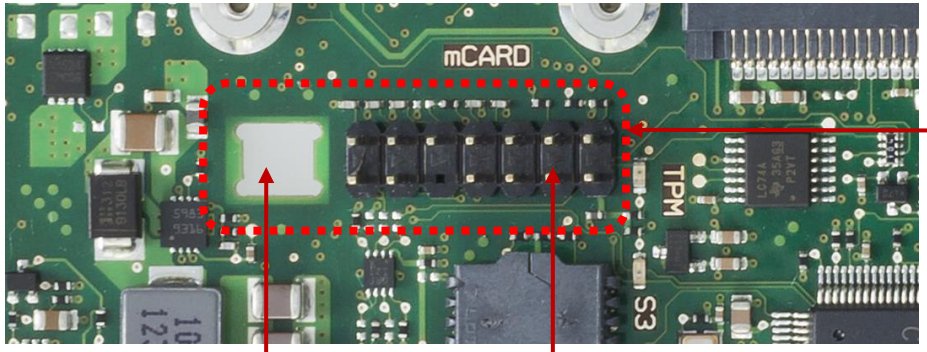


Menu “Special”:
→ Enable Watchdog
→ Set timeout to 1 – 8 minutes

Miscellaneous

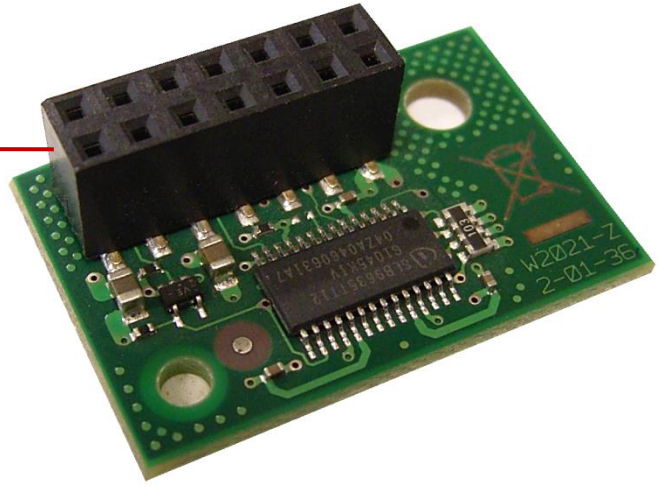
12.2 Trusted Platform Module (TPM)D3127

Optional module: Infineon TPM V1.2



TPM mounting hole
(nondetachable screw)

Socket for TPM option



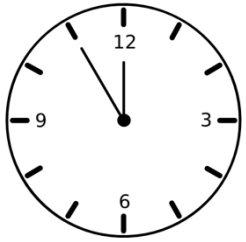
optional TPM module D3127

Miscellaneous

12.3 RealTime Clock (RTC) Accuracy

The onboard realtime clock is approved for an accuracy of +/-35ppm (= max. 91sec deviation per month).

The RTC crystal itself is specified with +/-20ppm (= max. 52 second deviation per month).
Each year of ageing adds around +/-3ppm on top of this.



Miscellaneous

12.4 Battery Lifetime

The typical battery lifetime is designed for 5 years.

This is based on following usage profile:

- G3 → 28% / two days per week
  (System Off, Power disconnected)
- Deep S5/S4/S3 → 48% / 17 hrs per working day
  (System Off, Power connected)
- S0 → 24% / 8 hrs per working day
  (System Working)

On-Temperature (S0): 70°C
Off-Temperature (G3, S5/S4/S3): 23°C

Notes:
If the system is never in G3 mode or if the S0 "working" temperature is lower than 70°C, this may result in much higher battery lifetime.

If the mainboard is just stored (no operating voltage attached), the typical battery lifetime is also 5 years.
Due to tolerances of the installed battery, the effective battery lifetime may be in the range of 4.5 years – 6 years

Miscellaneous

12.5 BIOS/CMOS Reset ("BIOS Setup Defaults"):

In order to set the BIOS Setup to the default settings: Power off system, set related Jumper to "BIOS Recovery", power on system and wait until picture appears on screen. Power off again and set jumper to previous position. BIOS Setup should now be reset to default settings. For this procedure no BIOS update is required!.
(see next page for jumper details)

12.6 BIOS Update / BIOS Recovery

Link to related BIOS files (OEM FTP Server):
ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Products/Mainboards/Industrial&ExtendedLifetime/D3313-S/BIOS_D3313-S/

DOS-based BIOS Update (DOS-bootable USB stick)

Required BIOS files:

- EfiFlash.exe (DOS flash tool)
- DosFlash.bat (batch file)
- D3313-Sx.upd (flash file)

Copy unzipped files to a DOS-bootable USB stick, boot system from stick and run *DosFlash.bat*
Note: The parameter /NORESET (EfiFlash.exe) allows to flash the BIOS w/o automatic Reboot!

Link to a Fujitsu Windows tool to create a bootable Free-DOS USB stick ("Basic BootStick"):

ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Products/Mainboards/Industrial&ExtendedLifetime/D3313-S/BIOS_D3313-S

Miscellaneous

BIOS Update / BIOS Recovery

- **Windows-based BIOS Update (Deskflash tool)**

  Required BIOS file:

  - D3313-Sx.R1.x.y.**DFI.exe** (Windows executable flash tool)

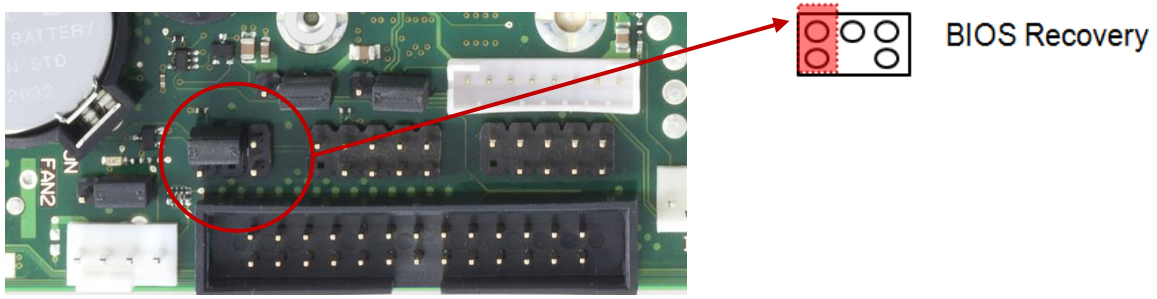
  Copy file from FTP (link see above), rename *filename.**$xe*** to *filename.**exe*** and copy to target system (e.g. Windows desktop).
  Doubleclick to start BIOS update and follow instructions on the screen.

- **DOS-based BIOS Recovery (DOS-bootable USB stick)**

  Required BIOS files:

  - EfiFlash.exe (DOS flash tool)
  - DosFlash.bat (batch file)
  - D3313-Sx.upd (flash file)
  - D3313-Sx.rom --> Important: This file must be located in the root directory of the USB stick!

  Copy the *.ROM file (included in the ZIP file) to the root directory of a FAT32 formatted bootable USB stick.
  Power off the mainboard, insert the USB stick, set the jumper to Recovery Mode (see picture), then turn on the mainboard.
  You will hear short beeps while the BIOS is recovered. Wait until you hear a series of "long-long-short-short" beeps. Then turn off the mainboard and move the jumper back to the standard position.
  The Recovery process can take a few minutes.

  Note:
  BIOS Recovery should only be used to repair a corrupted BIOS.
  All customized data except for OEM SLP data will be reset.

Miscellaneous

12.7 Configurable TDP (cTDP) [Updated]

D3313-S4 and D3313-S5 ("SteppeEagle") provide the option to reduce the max. TDP (Thermal Design Power).

	Nominal TDP (= BIOS Default)	Reduced TDP
D3313-S4 GX-222GC	15W	10W
D3313-S5 GX-412HC	7W	5W

The TDP setting is a hidden BIOS feature; it can be changed by the EditCMOS tool only!

Parameters for EditCMOS:

Common Setup Item ID:

0193h = SoC Power (cTDP)

Common Possible Setting Strings:

013Ch = Nominal [= BIOS Default]

013Bh = Reduced

Note 1: BIOS ≥ R1.0.0 required to support cTDP!

Note 2: Although the new mainboard version D3313-S6 provides the cTDP option via EditCMOS, this is not recommended for this model.

13 Known Issues and Important Notes

13.1 Support for MS Windows XP

XP drivers provided by AMD are available on the OEM FTP Server.
Note: There will be no official release or support from Fujitsu for these drivers!
For full Microsoft SLP1 support latest BIOS version should be installed.
ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Products/Mainboards/Industrial&ExtendedLifetime/D3313-S/Drivers_D3313-S/Drivers_WinXP32_For-Evaluation/

13.2 Graphics Memory

In BIOS Setup, the graphics memory is set to 256MB (default). If there are 4GB Ram installed Windows 7 (32Bit) provides only 2.69 GB system memory.
In order to increase the available system memory, the graphics memory can be reduced to e.g. 128MB in BIOS Setup.
In order to increase the graphics perfomance (e.g. Blueray playback) the graphics memory can be increased to e.g. 512MB in BIOS Setup
For improved handling of the system memory, BIOS ≥ R1.4.0 is recommended. Graphics memory should be set to a fixed value.

13.3 AMD „Eyefinity" Support

The latest AMD driver kit (available on the OEM FTP Server) includes support for Eyefinity (e.g. combine two displays).

13.4 Watchdog Support

BIOS ≥ R1.16.0 (D3313-S1/2/3) recommended for full Watchdog support.
See BIOS release notes for further details:
ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Products/Mainboards/Industrial&ExtendedLifetime/D3313-S/ECN_D3313-S/BIOS-ECN/Info_BIOS_D3313-S_R1_16_0.txt

Known Issues and Important Notes

13.5 HDMI Audio Support

~~HDMI audio transmission is not yet supported by the released driver.~~
~~An appropriate driver incl. HDMI support is expected from beginning of June 2014 (Driver version ≥14.20).~~
~~In oder to use HDMI audio in advance, AMD provides a specific DVI-HMDI dongle (OPN: 199-999269)~~
The latest AMD driver kit (available on the OEM FTP Server) includes support for HDMI audio

13.6 Support for MS Windows 8.1

For MS Windows 8.1 BIOS R1.3.0 or higher is required.
Note: With BIOS R1.1.0 installed and LVDS enabled, Windows 8 mode ("Secure Boot") must not be enabled, otherwise no display output may be possible after next Boot.
In case this happens, the mainboard should be reset to BIOS Setup default settings (see chapter 12.3 for details).
If Secure Boot is enabled (BIOS > R1.1.0) and LVDS is enabled, then the BIOS POST / BIOS Setup screen is only visible on the LVDS screen.
After the OS has booted, both screens (if available) are usable.

13.7 Simultaneous use of onboard graphics and PCIe graphics

For D3313-S1/2/3: Simultaneous graphics usage is supported from BIOS R1.4.0
Note: Primary display must be set to "IGD" (onboard graphics) in BIOS Setup!

Known Issues and Important Notes

13.8 LAN PXE

With BIOS 1.11.0 or later PXE boot with legacy operating systems could fail on LAN1. One symptom could be failing to get an IP address by DHCP under DOS.
Solution: Latest BIOS version should be used!

See BIOS release notes for further details:
ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Products/Mainboards/Industrial&ExtendedLifetime/D3313-S/ECN_D3313-S/BIOS-ECN/Info_BIOS_D3313-S_R1_16_0.txt

13.9 DASH Remote Manageability Support

The required BIOS support for DASH is expected for late Q2/2014
Note: Additional PCIe DASH LAN controller D2907 required for DASH feature.
DASH support has been implemented from BIOS R1.15.0

Note: D3313-S4 / -S5 / -S6 ("SteppeEagle") do NOT provide DASH support!

13.10 Audio: Recording Level via HDA Frontpanel

Recording via HDA audio frontpanel is very quiet on the first mass production version (D313-S1/2/3 only).
This hardware-related issue has been solved with the mainboard versions D3313-Sx3 (-S13 / -S23 / -S33)

Known Issues and Important Notes

13.11 External USB Devices: Power Consumption

Attached USB devices that consume more input current during power-on than specified for USB devices may fail on the first mass production version.
This hardware-related issue has been solved with the mainboard versions D3313-Sx3 (-S13 / -S23 / -S33).
They provide a workaround to enable the usage of such out-of-spec USB devices
(D3313-S4/-S5 are not affected by this issue)

13.12 Enable/Disable USB Power

For the rear USB ports and the internal USB 3.0 port (pin connector) the USB supply power can be disabled in S3/S4/S5 mode via BIOS Setup.
This setting does not affect the internal USB 2.0 ports (pin connector) and the internal USB stick socket.
But: If the option "Low Power Soft Off" is enabled, all USB ports are powered off in S5 mode.

13.13 LVDS Resolution / Supported Clock Rate

The onboard LVDS converter switches automatically between single channel and dual channel mode.
The reference resolution is 1366 x 800 pixels. If H > 1366 or V > 800, the scaler switches to dual channel mode.
Otherwise, LVDS will operate in single channel mode.
The scaler supports clock rates up to 105Mhz; LVDS displays with clock rates > 105Mhz are not supported.
Note: LVDS Hsync/Vsync is NOT supported on D3313-S

13.14 LVDS Backlight Control

Possible Issue with D3313-Sx3 (-S13 / -S23 / -S33).**GS1** mainboards:
„Backlight Enable"-Signal: Low level ~ 1.2V during System Reset which may be too high for certain inverters (may result in noise visible on the LVDS screen during Reset). Issue solved with **GS2** mainboard version.

Known Issues and Important Notes

13.15 Windows Eventlog Messages

The BIOS implementation may cause Windows Eventlog entries "ID 56 Error"
→ Driver PCI returned invalid ID for a child device (0100000000000000100)
These messages do not have any functional impact.

13.16 General BIOS Issues

See BIOS release documentation for known issues / limitations of the specific BIOS versions.
ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Products/Mainboards/Industrial&ExtendedLifetime/D3313-S/BIOS_D3313-S/

Note: Urgent issues may be solved by a "Customer Service Release BIOS" (CSR). These BIOS versions are not installed ex factory but must be installed by the system assembler.
Please see BIOS link above for possibly available CSR BIOS releases.

14 Accessories for D3313-S

14.1 Industrial PC Chassis

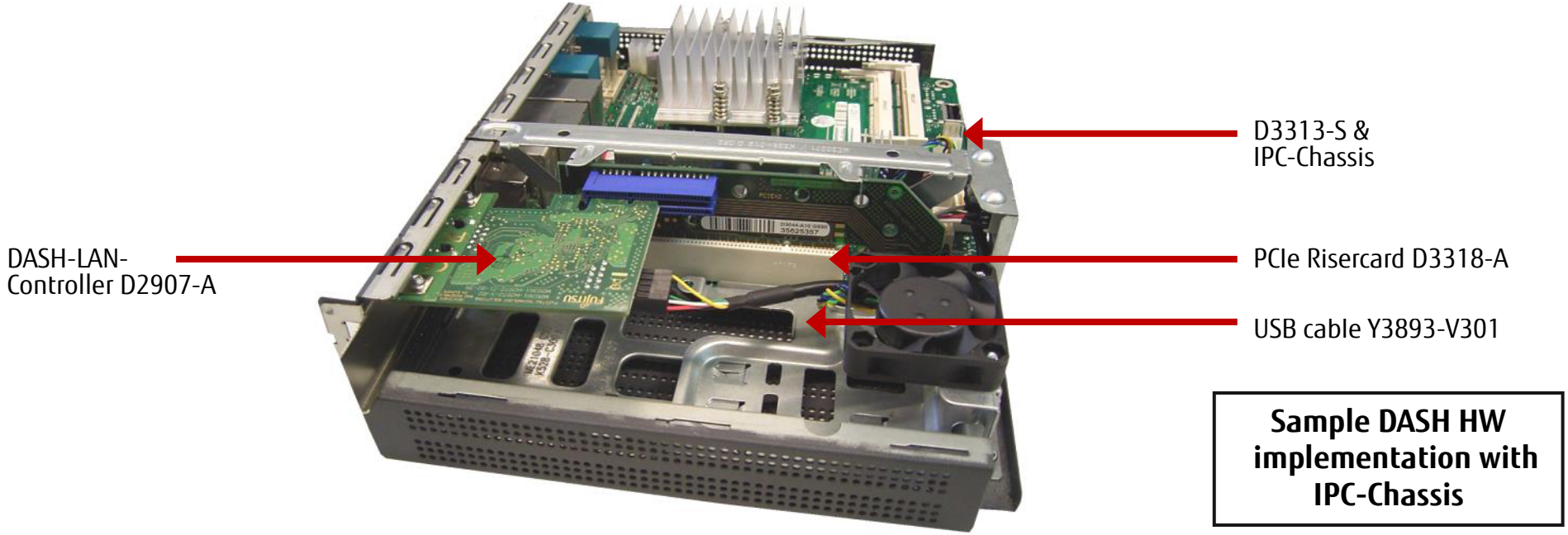
- Cost-effective industrial box solution für D3313-S
- Approved according CE (EMI) requirements
- Tested and approved for enhanced operating temperature range
- FTP link (datasheet, approvals, 3D-file etc.)

  ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Products/Accessories/Industrial-Mini-ITX-Chassis/

Accessories for D3313-S

14.2 DASH Mangeability Extension

- DASH-LAN-controller D2907-A (DASH kit = S26361-F5000-L001)
- Internal USB cable Y3893-V301 (included in DASH kit)
- Mainboard D3313-S1/2/3 with related DASH BIOS implementation
  Not supported on D3313-S4 / -S5 / -S6!



Sample DASH HW implementation with IPC-Chassis

Accessories for D3313-S

DASH Mangeability Extension

- Provides cost-effective solution for Out-of-Band Management
- Supports DASH V1.1
- Features like Remote Power-On / Power-Off / System Reset,

  Remote Access to BIOS Setup, Remote OS Boot (e.g. for Service SW Image)
- DASH configuration tools are available for MS Windows OS

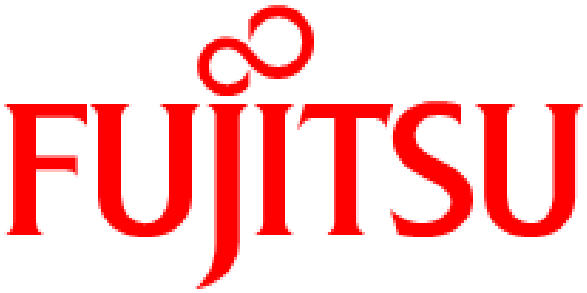
  (Easy FTP download)

  ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Products/Mainboards/Industrial&ExtendedLifetime/D3003-S/IndustrialTools_D3003-S/DASH_Manageability/

Accessories

14.3 DisplayPort to DVI Converter Cable

- Ordercode CFO:E003-R150-RS (S26361-F5000-A003)
- Converts the DisplayPort output to a (second) DVI-D output
- Cable length: 40 cm



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