

**TechNotes V1.0**

**Extended Lifecycle Mainboard**

**D3162-B**



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# 1 Safety Instructions

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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.)

## 2 Feature Overview D3162-B

- Based on latest Intel *Pantherpoint* single-chip technology (iQ77)
- Support for full range of latest LGA1155 processors (gen2 / gen3; up to 95W)

- Intel® Core™ i7 – 2xxx / i7-37xx processor series
- Intel® Core™ i5 – 2xxx / i5-3xxx processor series
- Intel® Core™ i3 – 2xxx / i3-32xx processor series
- Intel® Pentium® – G6xx / G8xx processor series
- Intel® Celeron® – G4xx / G5xx processor series



- **iAMT 8.0 / VPro 2012 Manageability Support**

Note: Available feature set depends on installed processor



- **Four memory sockets DDR3/1066/1333/1600 supporting up to 32GB**

- **Intel Gbit LAN 82579LM onboard**

- iAMT support



# Feature Overview D3162-B

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- **Trusted Platform Module TPM V1.2 (Infineon) onboard**
- **Latest Intel® HD Graphics (integrated in processor)**
  - Simultaneous use of integrated graphics and PCIe graphics possible
- **PCI Express Gen3**
- **5.1 multichannel audio onboard**
- **4-Layer PCB**



# Feature Overview D3162-B

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Designed & approved for 24/7 continuous operation

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High Efficiency core voltage regulator design (80-85%)



Extended lifecycle up to 3 years

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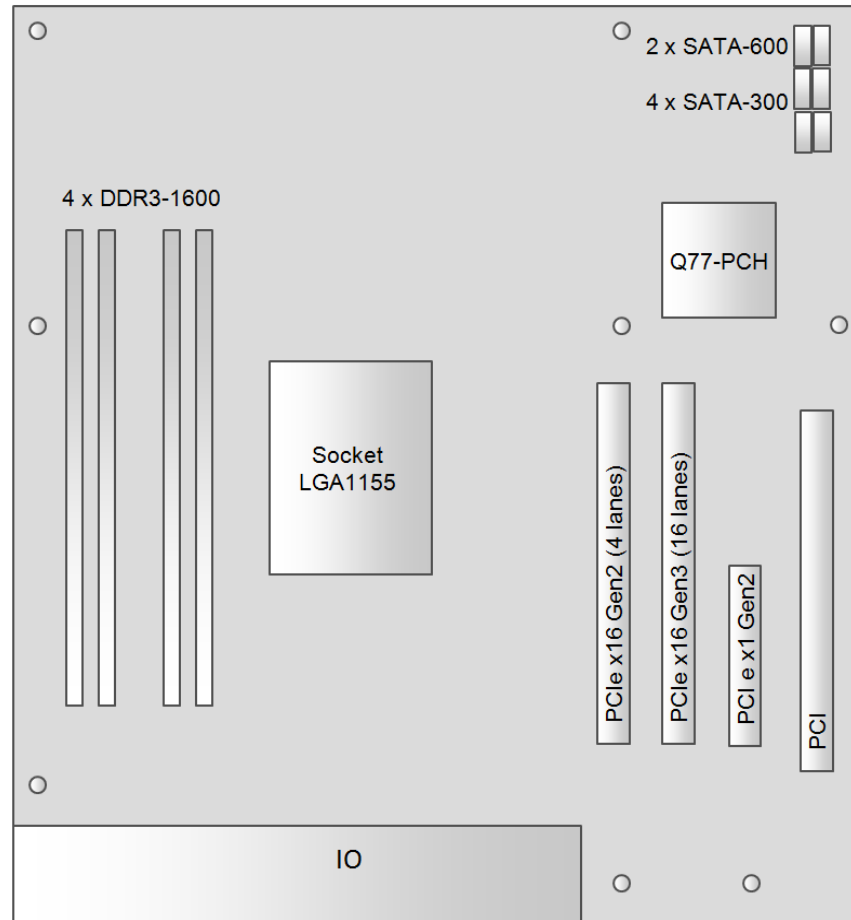


Hardware Watchdog

→ Easy SW integration via Windows API & Linux Driver

# Feature Overview D3162-B

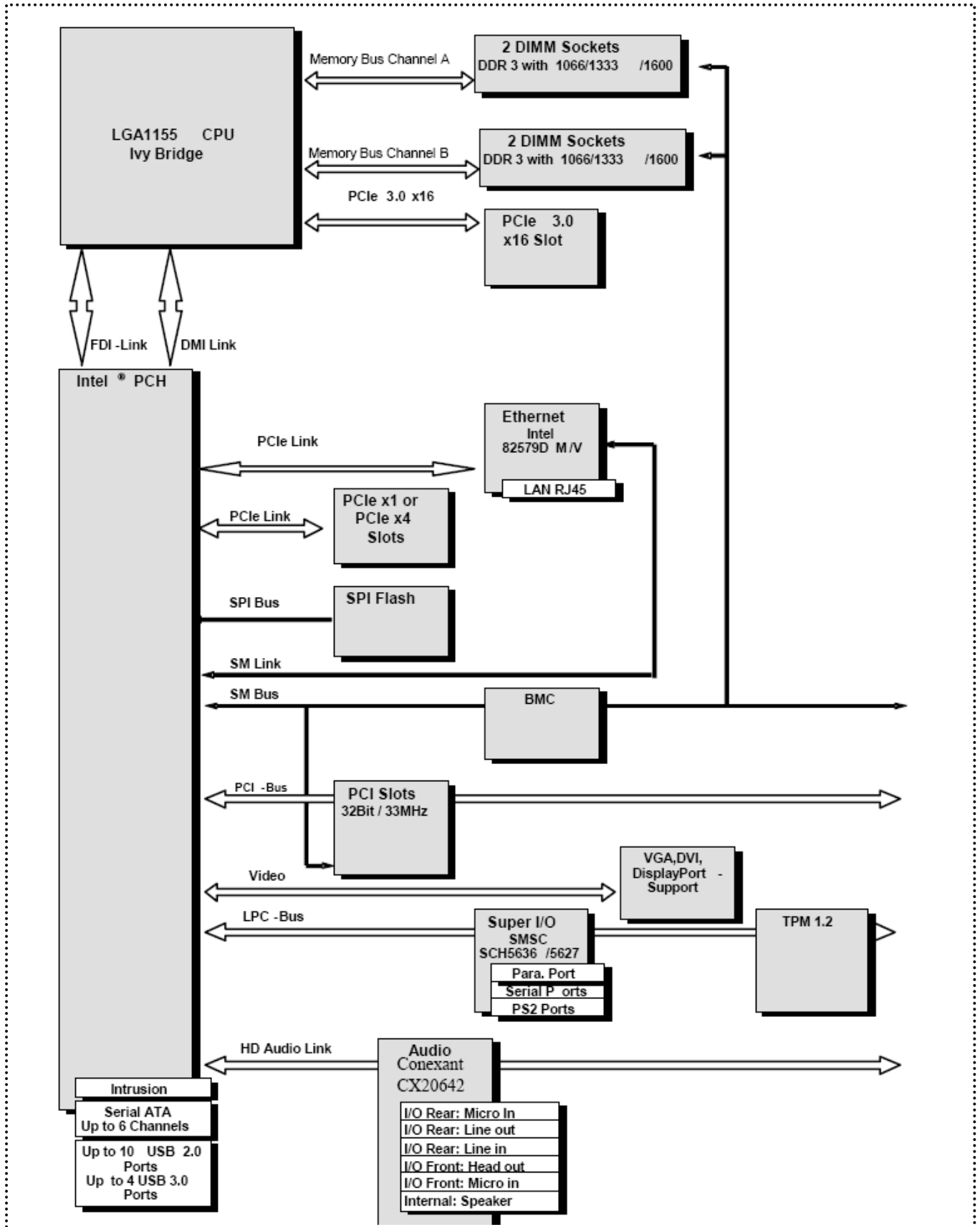
## 2.1 Basic Layout





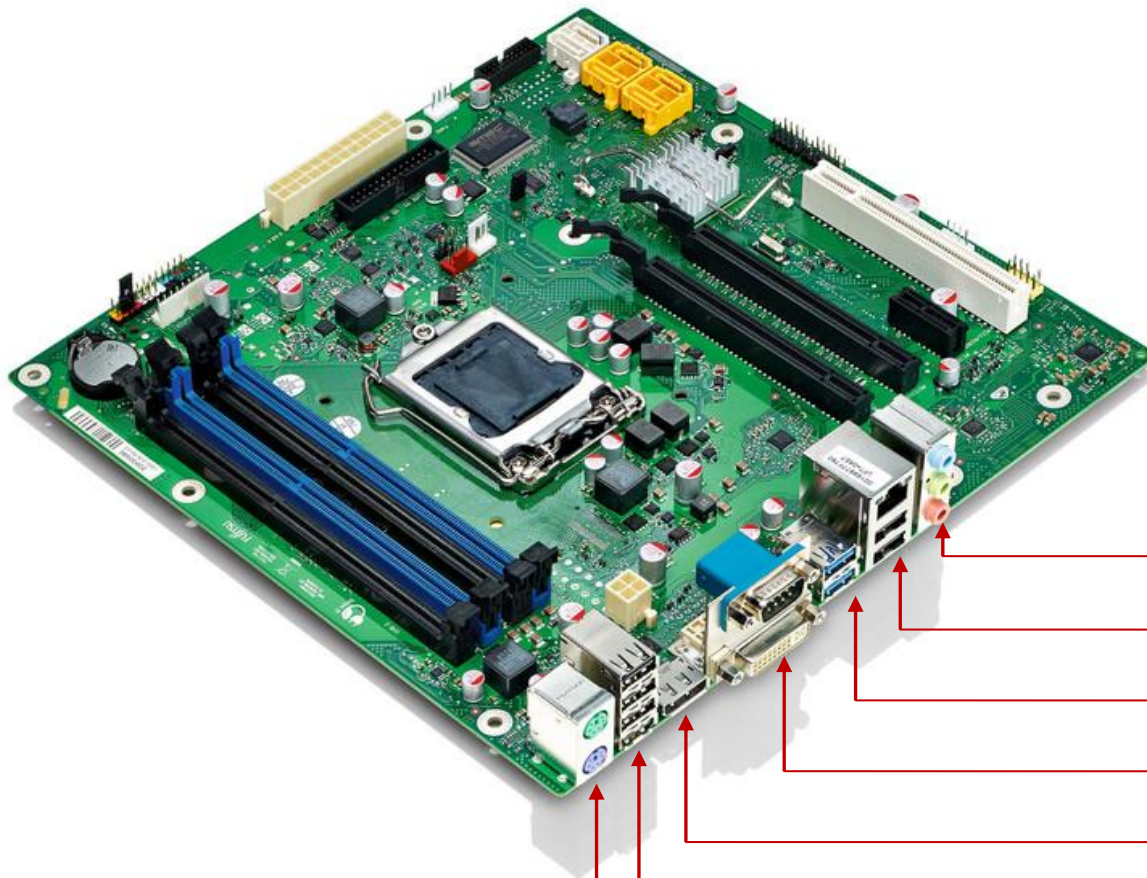
# Feature Overview D307x-S

## 2.2 Block Diagram



# Feature Overview D3162-B

## 2.3 External Connectors D3162-B



Audio

LAN1; 2 x USB 2.0

2 x USB 3.0

COM; DVI-I

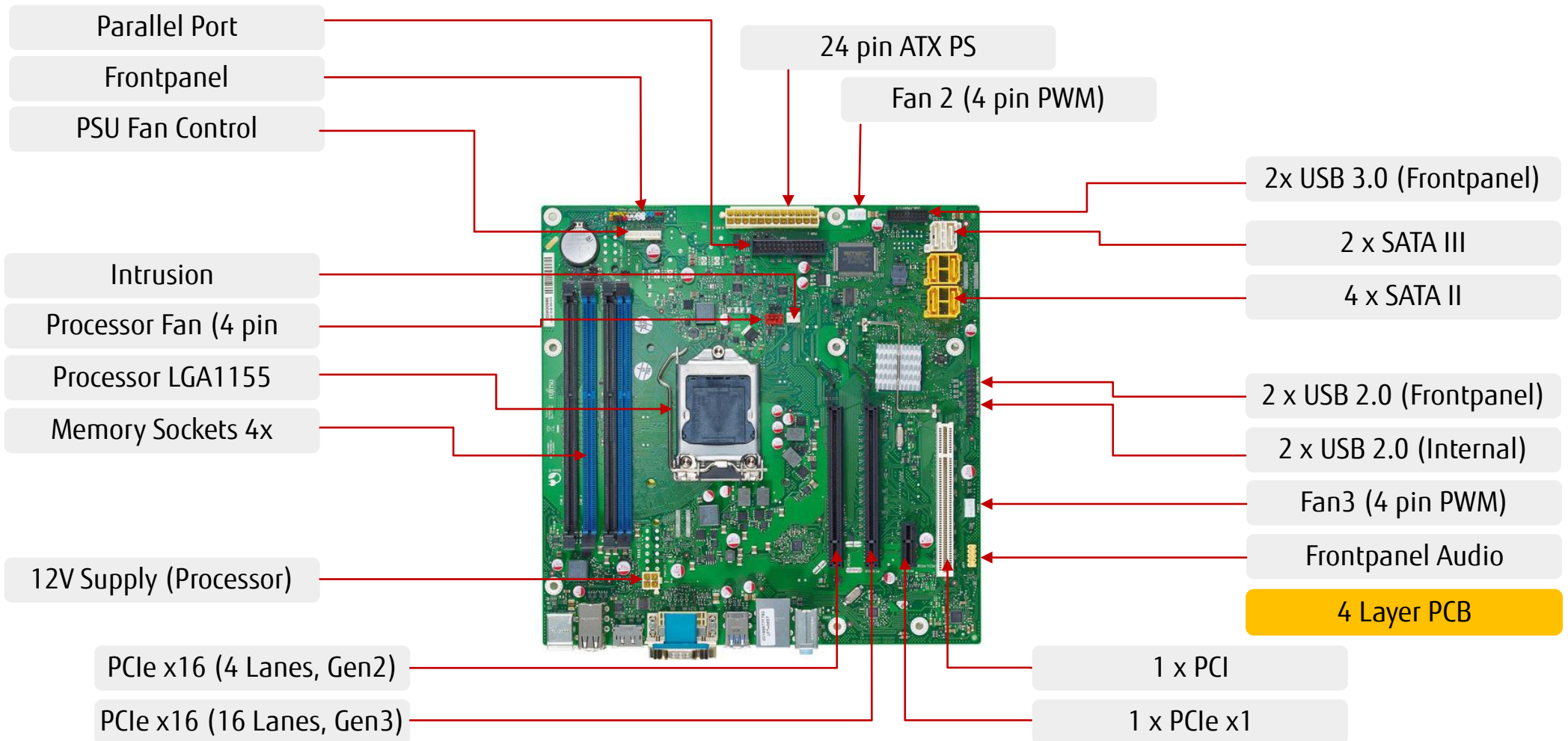
DisplayPort

4 x USB 2.0

PS/2 Kbd / Mouse

# Feature Overview D3162-B

## 2.4 Onboard components D3162-B



# Feature Overview

## 2.5 I/O-Shield



(front view)

Spring Steel Sheet

Enforcement Sheet

Rear Side: EMI Gasket  
(Foam with Aluminium)



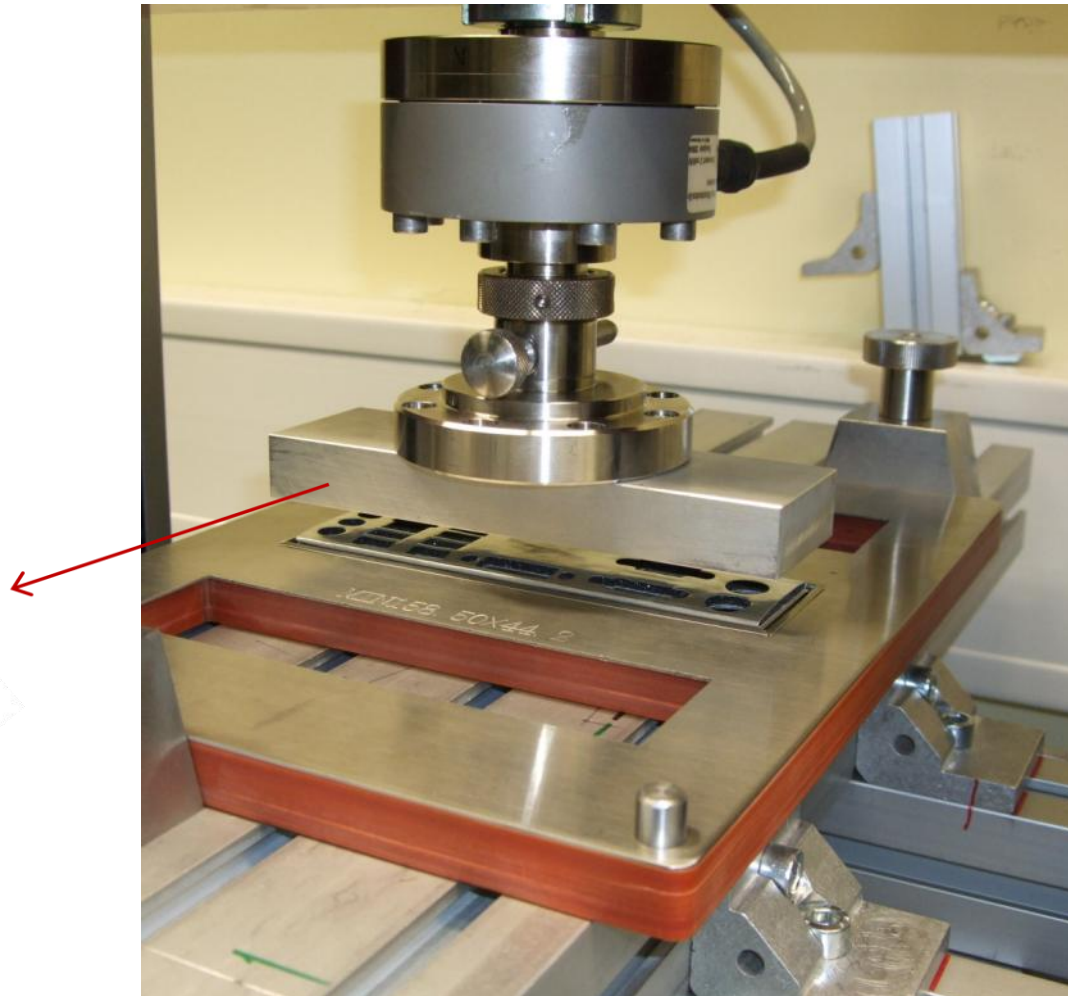
# Feature Overview

## I/O-Shield

Apparatus to evaluate and specify insertion force of FTS IO shield.

Nominal force: ~ 150 – 200 N (tbd)  
for specified ATX IO "letterbox"

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

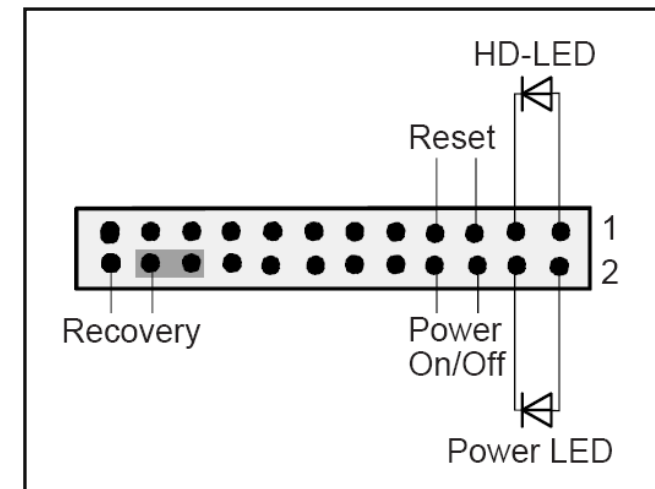
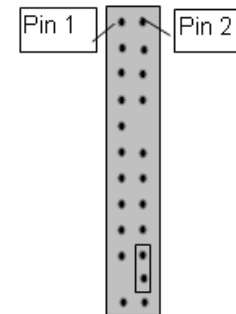


# 3 Interfaces & Connectors

## 3.1 Frontpanel Connector

Pin	Signal
1	HD-LED +
3	HD-LED -
5	GND
7	Reset_L
9	reserved
11	reserved
13	reserved
15	reserved
17	Speaker +
19	GND
21	Key
23	Speaker -

Pin	Signal
2	Power LED +
4	Power LED -
6	Power Button
8	GND
10	Key
12	GND
14	reserved
16	reserved
18	Password Skip
20	GND (0.1K)
22	GND (0.1K)
24	BIOS Recovery



**Power LED:**

Anode: Pin 2 – 80R Pullup to 5V\_AUX

Cathode: Pin 4 – output (12mA)

**HDD LED:**

Anode: Pin 1 – 365R Pullup to 5V

Cathode: Pin 3 – output (6mA ; ~ 0.7V low level)

**Speaker Output:**

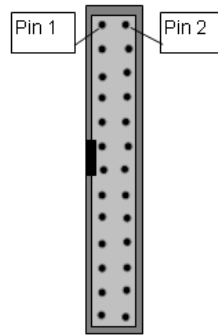
Differential audio signal; max. 0.5W / 80hm

# Interfaces & Connectors

## 3.2 Internal Parallel Port Connector

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	Se1_L
10	GND
12	GND
14	GND
16	GND
18	GND
20	GND
22	GND
24	GND
26	GND

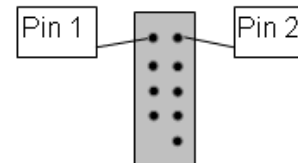


optional Parallelport cable with ATX bracket

## 3.3 Internal USB2.0 Connector (2 x 2 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

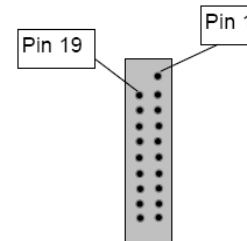


# Interfaces & Connectors

## 3.4 Internal USB3.0 Connector (1 x 2 Ports)

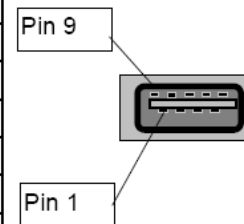
Pin	Signal
1	VCC AUX
3	USB3_RX positive (P2)
5	USB3_TX negative (P2)
7	GND
9	Data positive (P2)
11	Data positive (P3)
13	GND
15	USB3_TX negative (P3)
17	USB3_RX positive (P3)
19	VCC AUX

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)



## 3.5 External USB3.0 Connector

Pin	Signal
1	VCC auxiliary (polyswitch fused and power supervision with over current detection)
2	Data negative
3	Data positive
4	GND
5	USB3_RX negative
6	USB3_RX positive
7	GND
8	USB3_TX negative
9	USB3_TX positive

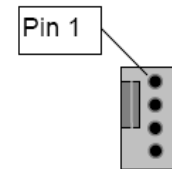




# Interfaces & Connectors

## 3.6 Fan Connector

Pin	Signal
1	GND
2	12V
3	FAN Sense
4	FAN PWM

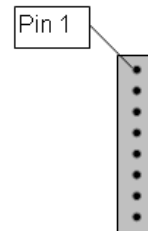


Fan speed control is only supported for 4 pin (PWM) fans.  
 3-pin fans (voltage controlled) can be connected, but they will always operate at full speed resp. 12V supply voltage!  
 Fan current: Max. 1A continuous

**Note:**  
**Fans must never be attached or removed while the system is powered. Mainboard may be damaged!**

## 3.7 Power Supply Fan Connector

Pin	Signal
1	Not connected
2	PS Fan PWM
3	Not connected
4	PS FAN Sense
5	Not connected
6	Not connected
7	Not connected
8	GND



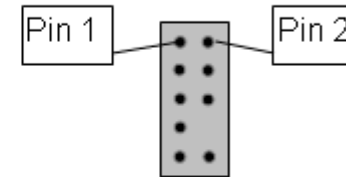
**Note:** This feature is not supported by standard ATX power supplies!

# Interfaces & Connectors

## 3.8 High Definition Frontpanel Audio Connector (HD Audio)

Pin	Signal
1	HDA Port 1 Left
3	HDA Port 1 Right
5	HDA Port 2 Left
7	Jack Sense common
9	HDA Port 2 Right

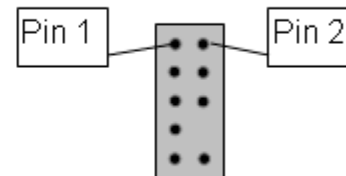
Pin	Signal
2	Analog GND
4	FP Presence Detect
6	Jack Sense Port 1
8	Key
10	Jack Sense Port 2



## 3.9 AC97 Frontpanel Audio Connector (Legacy Audio)

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



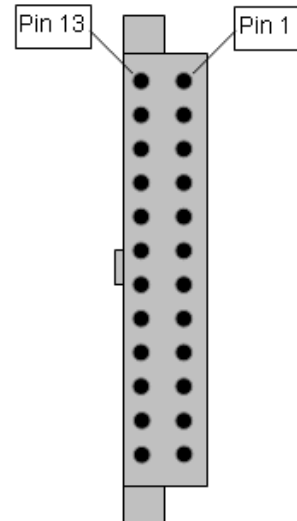
**Note:** In case of using this connector in AC97 = Legacy mode (BIOS Setting) take care for pin 7. This pin is tied to GND. HP\_ON# signaling on this pin is not supported.

# Interfaces & Connectors

## 3.10 Power Supply Connector

Pin	Signal
13	+ 3.3V (P3V3P)
14	- 12V (P12VN)
15	GND
16	PS on (low asserted)
17	GND
18	GND
19	GND
20	NC
21	+ 5V (VCC)
22	+ 5V (VCC)
23	+ 5V (VCC)
24	GND

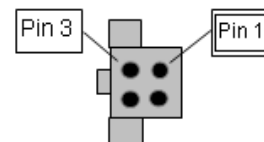
Pin	Signal
1	+ 3.3V (P3V3P)
2	+ 3.3V (P3V3P)
3	GND
4	+ 5V (VCC)
5	GND
6	+ 5V (VCC)
7	GND
8	Powergood (high asserted)
9	+ 5V Auxiliary (VCC Aux)
10	+ 12V (P12VP)
11	+ 12V (P12VP)
12	+ 3.3V (P3V3P)



## 3.11 Additional Power Supply Connector

Pin	Signal
3	+ 12V
4	+ 12V

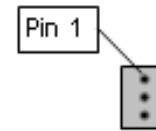
Pin	Signal
1	GND
2	GND



# Interfaces & Connectors

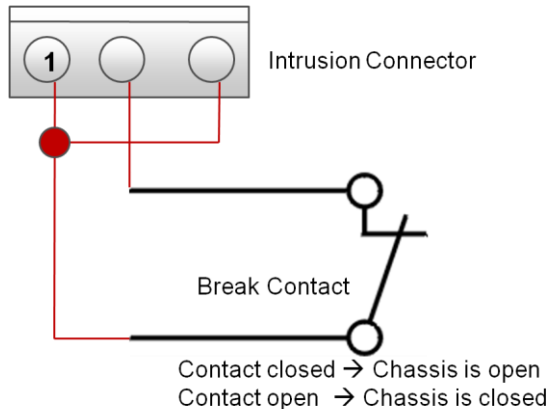
## 3.12 Chassis Intrusion

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!



**Note:**

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 (PCH) 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 BMC API (Windows):

[ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Products/Mainboards/Industrial&ExtendedLifetime/D3162-B/IndustrialTools\\_D3162-B/](ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Products/Mainboards/Industrial&ExtendedLifetime/D3162-B/IndustrialTools_D3162-B/)

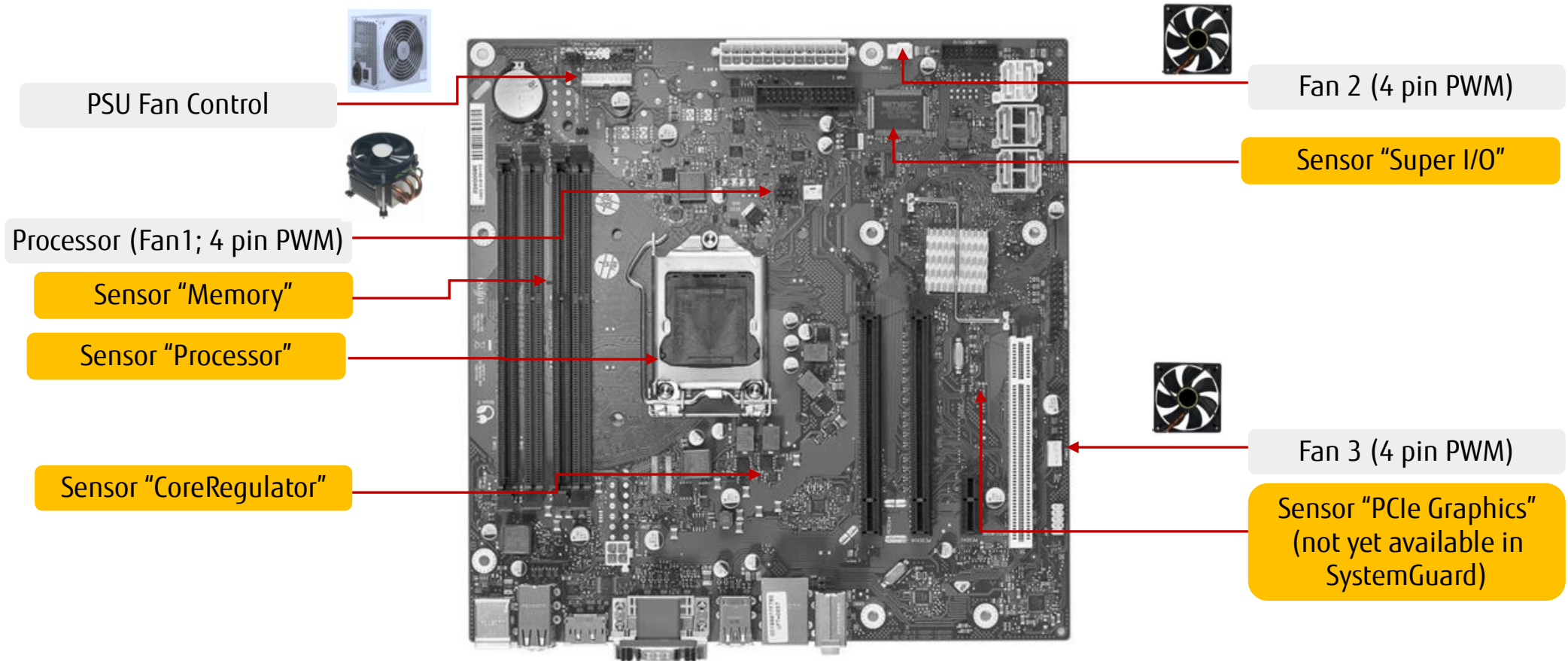
## 4 System Monitoring

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- Temperature Sensors and Fans
- SystemGuard: Fan / Temperature Monitor
- SilentFanConfig-Manager
- Temperature Reference Points

# System Monitoring

## 4.1 D3162-B: Temperature Sensors and Fan Connectors



**Note: Do not attach more than one fan per connector!  
Remove or connect fans only when unit is powered off!**

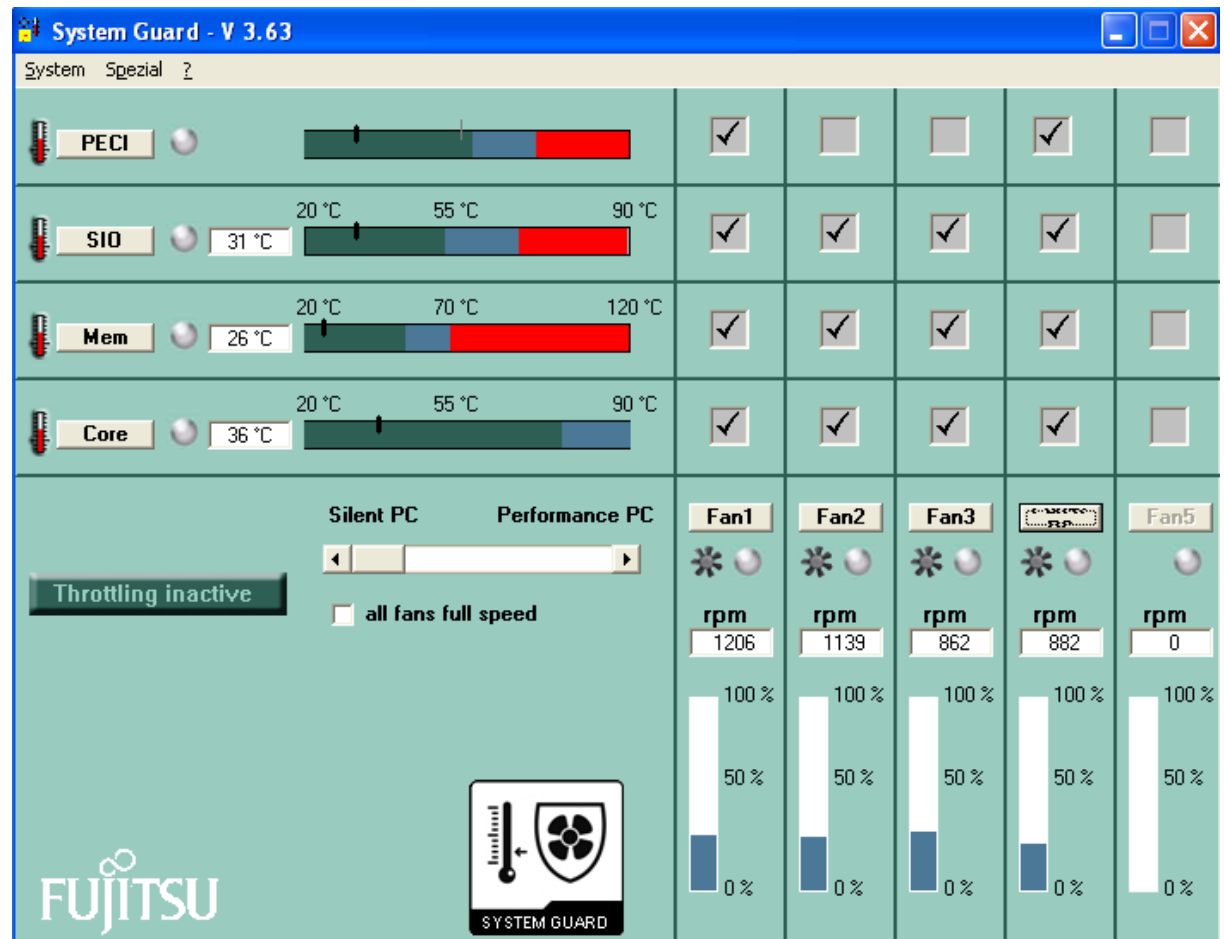
# System Monitoring

## 4.2 D3162-B: SystemGuard

### System Monitoring Tool:

- Visualize processor and sensor temperature data
- Display current speed for all attached fans
- User can configure fan aging control (menu "Special")
- User can configure system watchdog (menu "Special")

User can adjust system behaviour via "Silent PC / Performance PC" slider by forced processor throttling



# System Monitoring

## 4.3 D3162-B: SystemGuard - Details

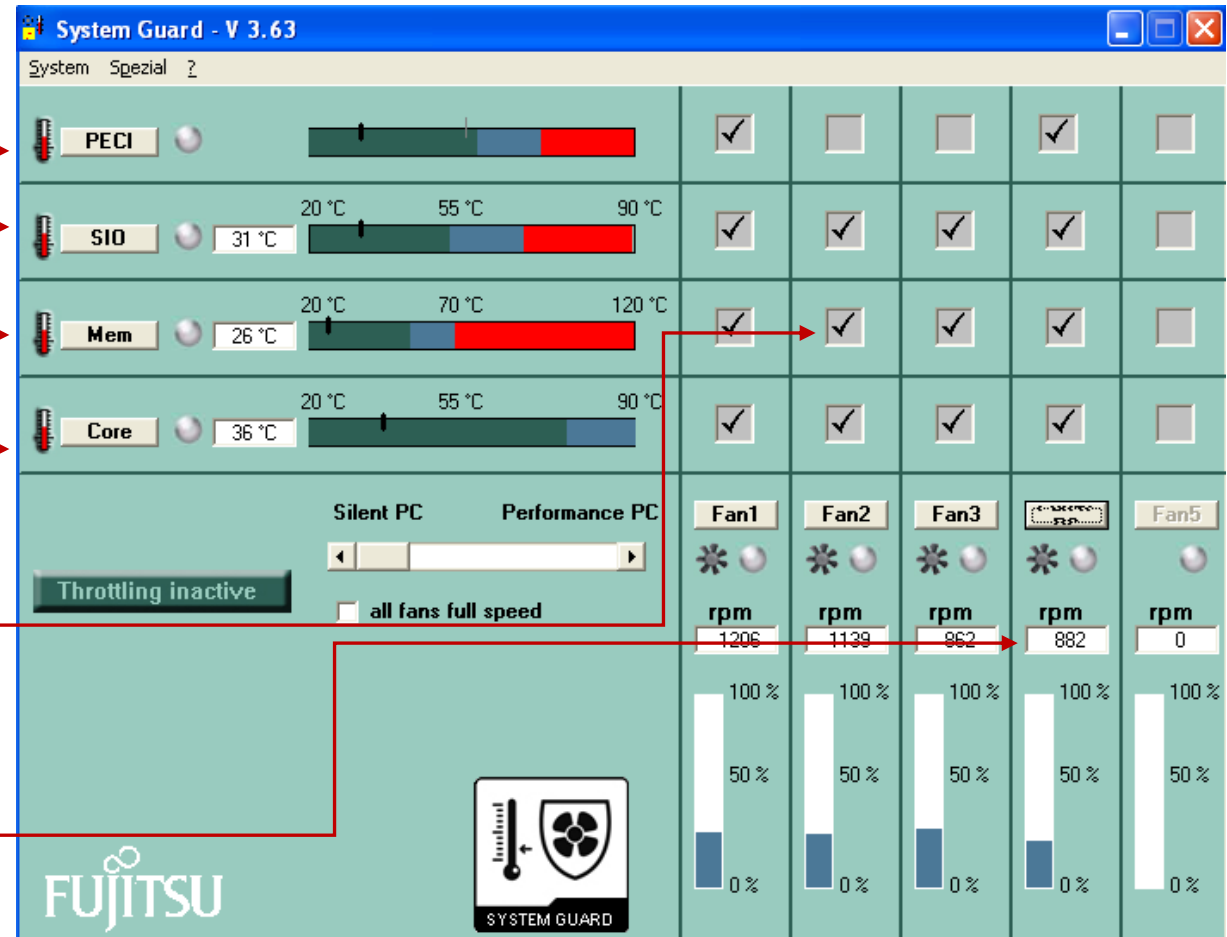
### Temperature Sensors

Processor Sensor <sup>1)</sup>

Super I/O Sensor

Memory Sensor

Core Voltage Regulator Sensor



#### Sensor / Fan Matrix

→ Indicates which sensor influences the specific fan speed  
 → Note: Characteristics for FAN1 is always dependent on the CPU temperature – fully controlled by the system BIOS.  
 Due to safety reasons the influence of the CPU sensor for FAN1 cannot be disabled!

#### FanPS

→ Displays the fan speed of the power supply fan (specific PSU option)

1) Note: As Intel has replaced the analogue processor „diode“ temperature measurement by the digital „PECI“ measurement (Platform Environment Control Interface) which does no longer provide the absolute processor



# System Monitoring

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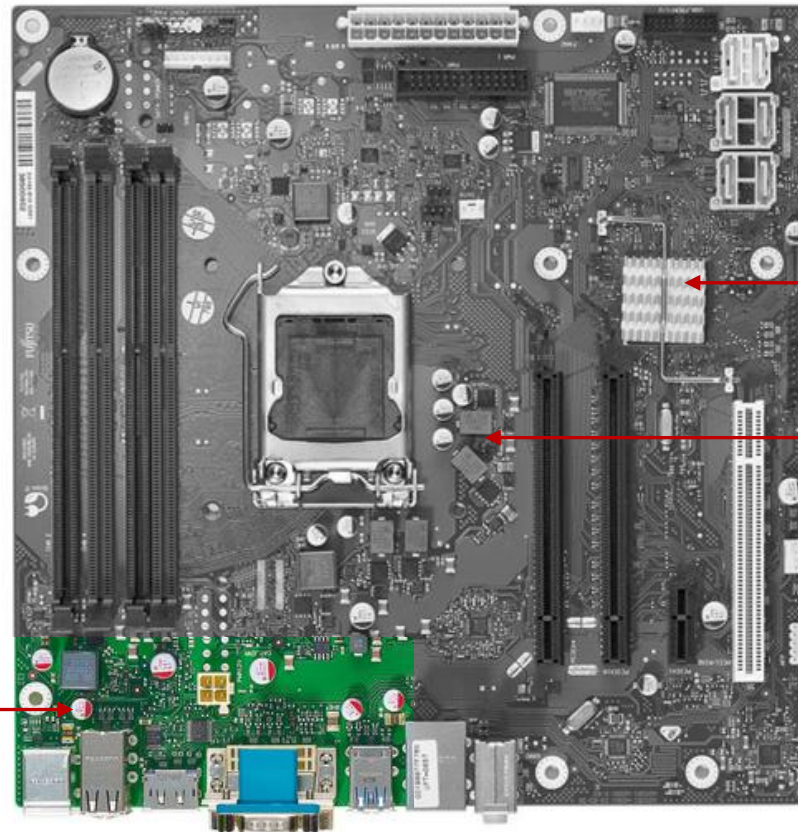
## ***4.4 SilentFanConfigManager – Customize System Monitoring Settings***

Note: This option is not yet supported for D3062-B. Support may be possible upon request!

# System Monitoring

## 4.5 Components for continuous 24/7 operation @ +45°C

**Operating Conditions:**  
 Circulating air  
 (mainboard) max. 45°C  
 Usage 24h / 7 days



**All onboard electrolyte capacitors: Polymer type only (= solid electrolyte)**

**Extra Heatsink on PCH (Q77)**

**High Efficiency Processor Core Voltage Regulator for reduced thermal dissipation loss**

Note: Power Consumption  
 PCH → P max ~ 6W  
 → P idle < 3W

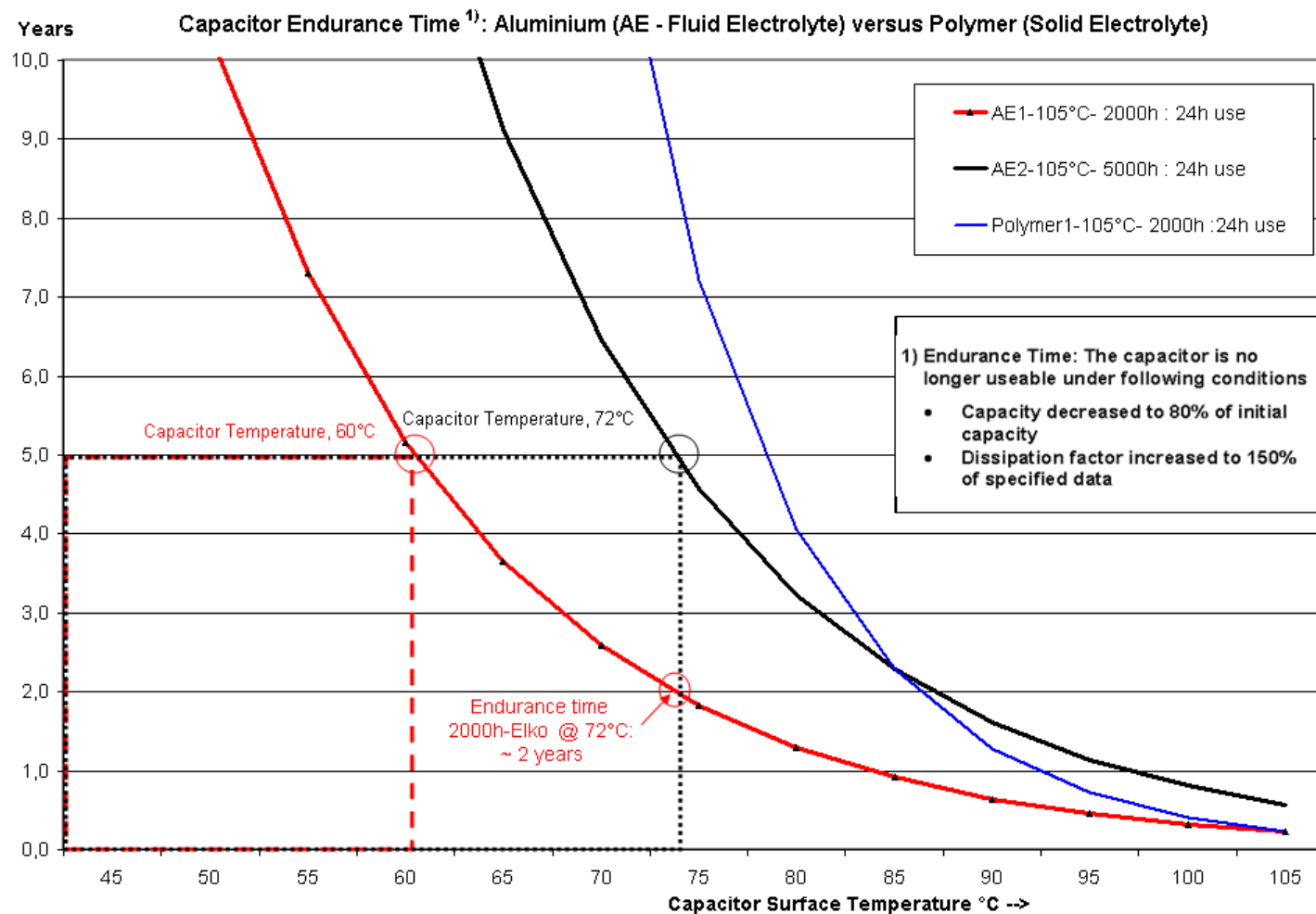
$$\text{Solid Electrolyte: } L_x = L_o * 10^{\left(\frac{t_x - t_o}{20}\right)}$$

$$\text{Fluid Electrolyte: } L_x = L_o * 2^{\left(\frac{t_o - t_x}{10}\right)}$$

Lx = effective endurance time  
 Lo = endurance time @ 105°C (e.g. 2,000hrs)  
 to = 105°C  
 tx = capacitor surface temperature (e.g. 75°C)

# System Monitoring

## 4.6 Capacitor Endurance Time Comparison



# System Monitoring

## 4.7 Temperature Reference Points D3162-B

**Operating Conditions:**  
**Circulating air**  
**(mainboard) max. 45°C**  
**Usage 24h / 7 days**

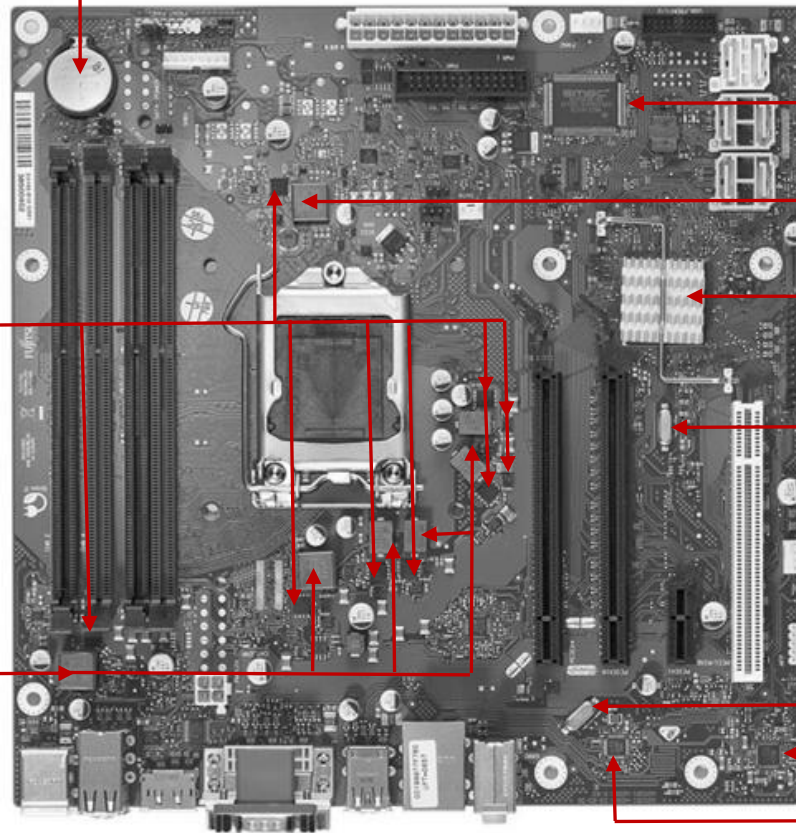
**Battery max. 60/70°C<sup>1)</sup>**

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

**Power MOS-FET / MOS-FET Driver max. 90°C**

**All capacitors max. 60°C**

**Inductor max. 90°C**



**Super I/O max. 70°C**

**Inductor max. 90°C**

**PCH max. 75°C (chip surface)**

**Quartz max. 70°C**

**Quartz max. 70°C**

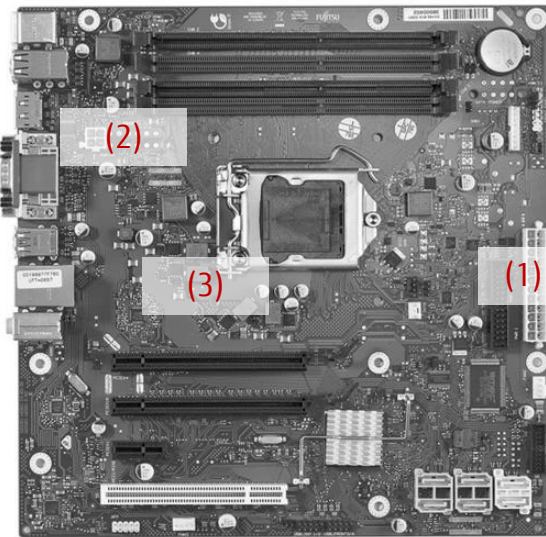
**Audio Codec max. 70°C**

**LAN max. 75°C**

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

## 5 Power Supply

### 5.1 ATX Power Supply



#### Connectors for ATX Power Supply

(1) 24 pin connector (ATX layout)

(2) 4 pin connector (+12V, GND)

Note: The +12V supply (up to 12A) for processor and chipset is provided via the 4 pin connector! Onboard voltage regulators convert the +12V input power to the appropriate processor / chipset supply voltages.

(3) Processor Core Voltage Regulator: High Efficiency Design for enhanced power saving and less thermal dissipation loss.



#### Requirements for ATX Power Supply

Source	Voltage	Min. PS Load	Max. Voltage Tolerance	Mainboard Capacitive Load	Max. Mainboard Current
Main Power Supply	+ 12V	0.1A	± 5 %	10.000µF	14A/18A <sup>1)</sup>
	- 12V	0A	± 10 %	500µF	0.1A
	+ 5V	0.2A	± 5 %	10.000µF	5A
Aux. Power Supply	+ 3.3V	0A	± 5 %	6.000µF	2A
	+ 5Vaux	0A	+5 % / -3%	7.000µF	2.5A

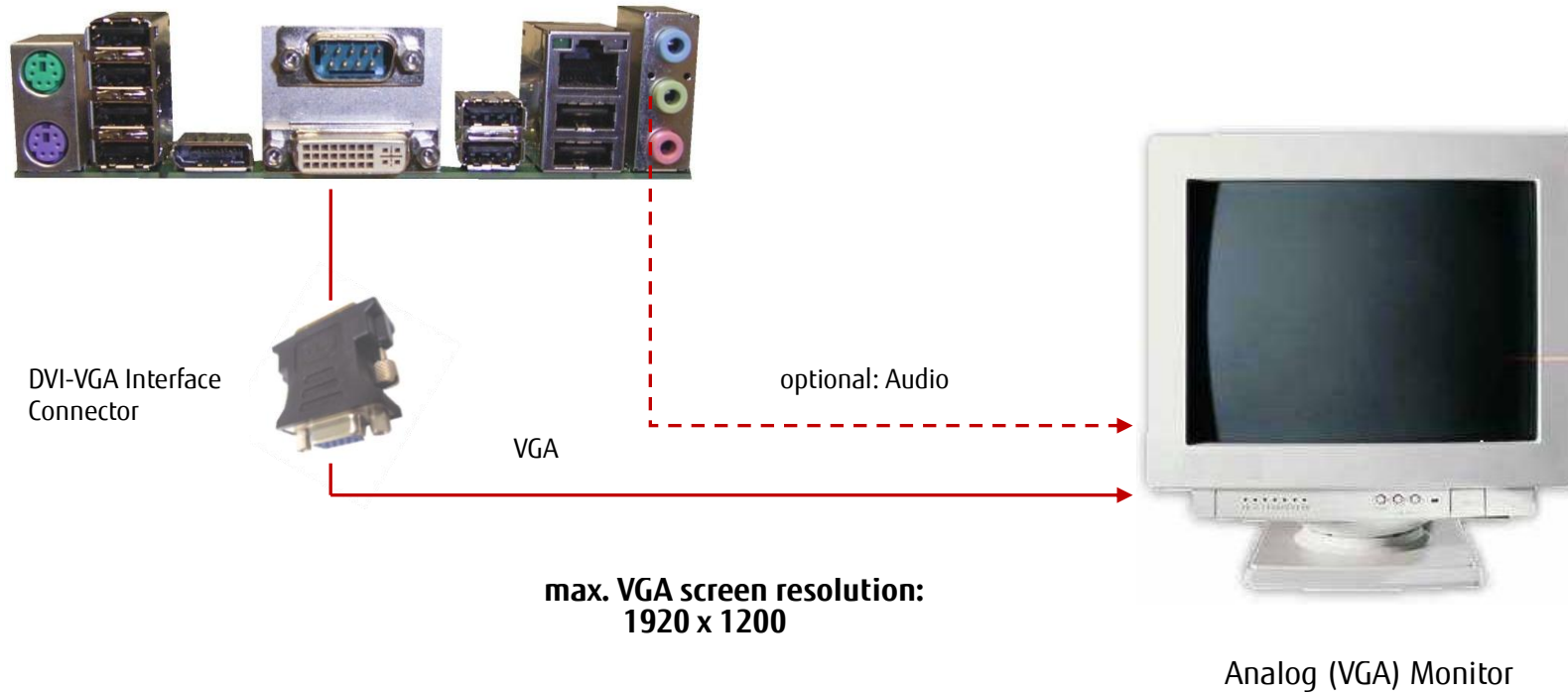
The ATX power supply should support the minimum load conditions as mentioned in the chart.

Note: The max. mainboard current in the chart doesn't include the power for optional adapters and drives!

<sup>1)</sup> 18A = Surge Current for 20 sec!

## 6 Display Options

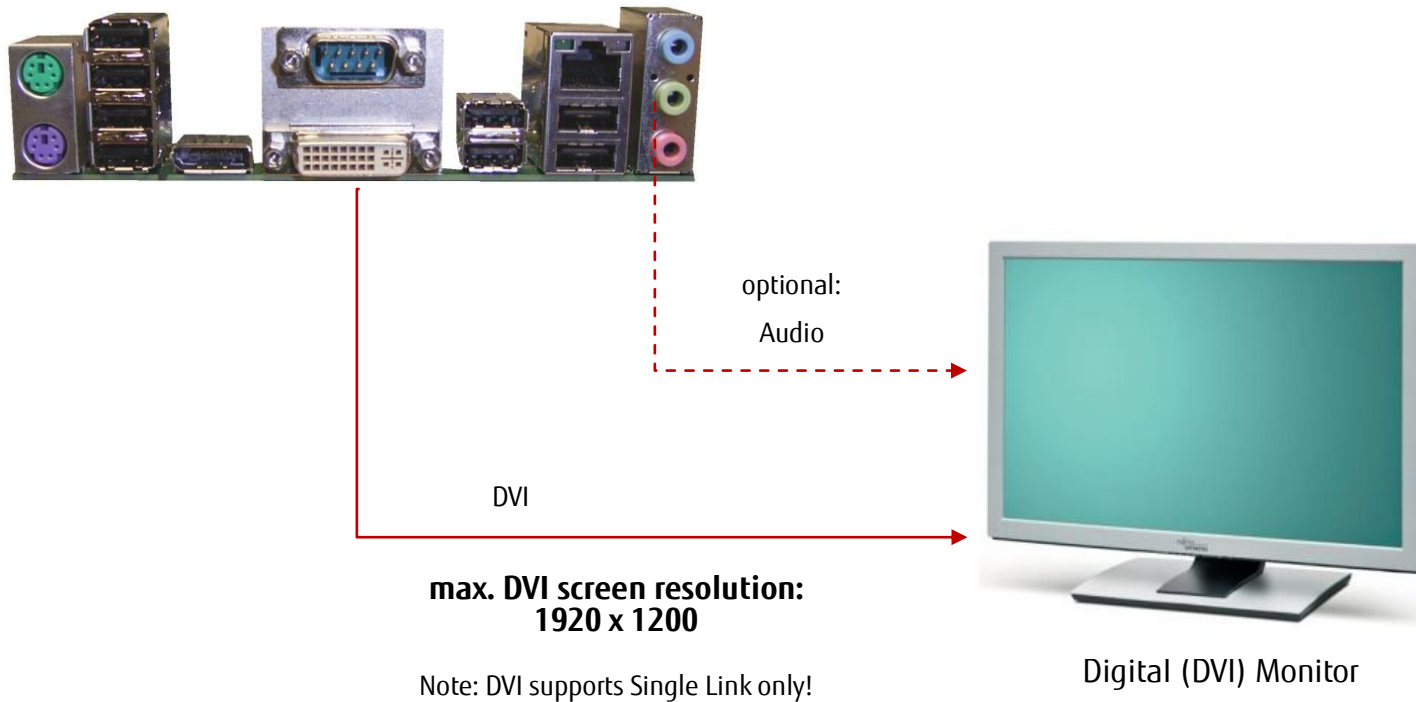
### 6.1 VGA Output





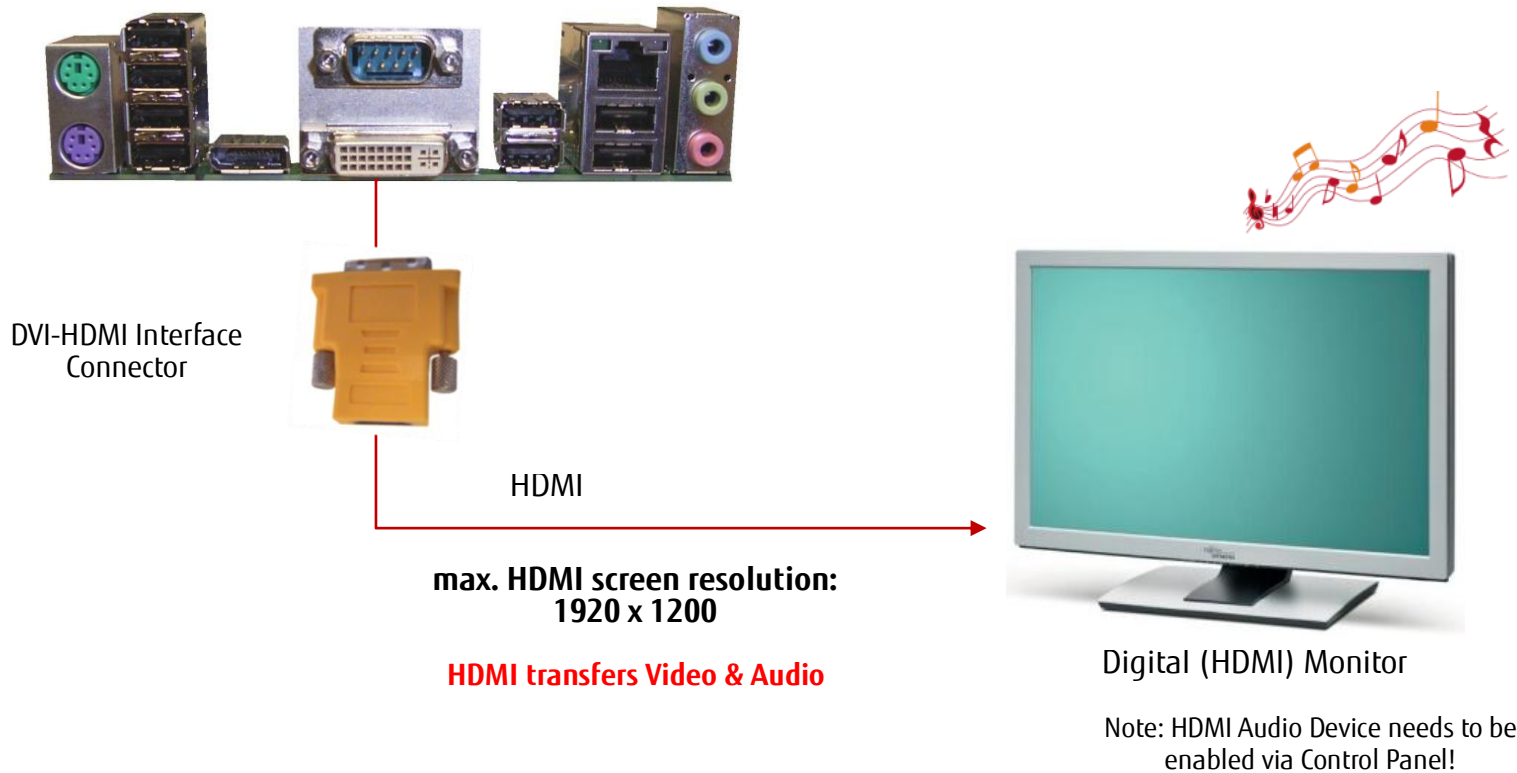
# Display Options

## 6.2 DVI Output



# Display Options

## 6.3 HDMI Output





# Display Options

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## 6.4 DisplayPort Output



Display Port

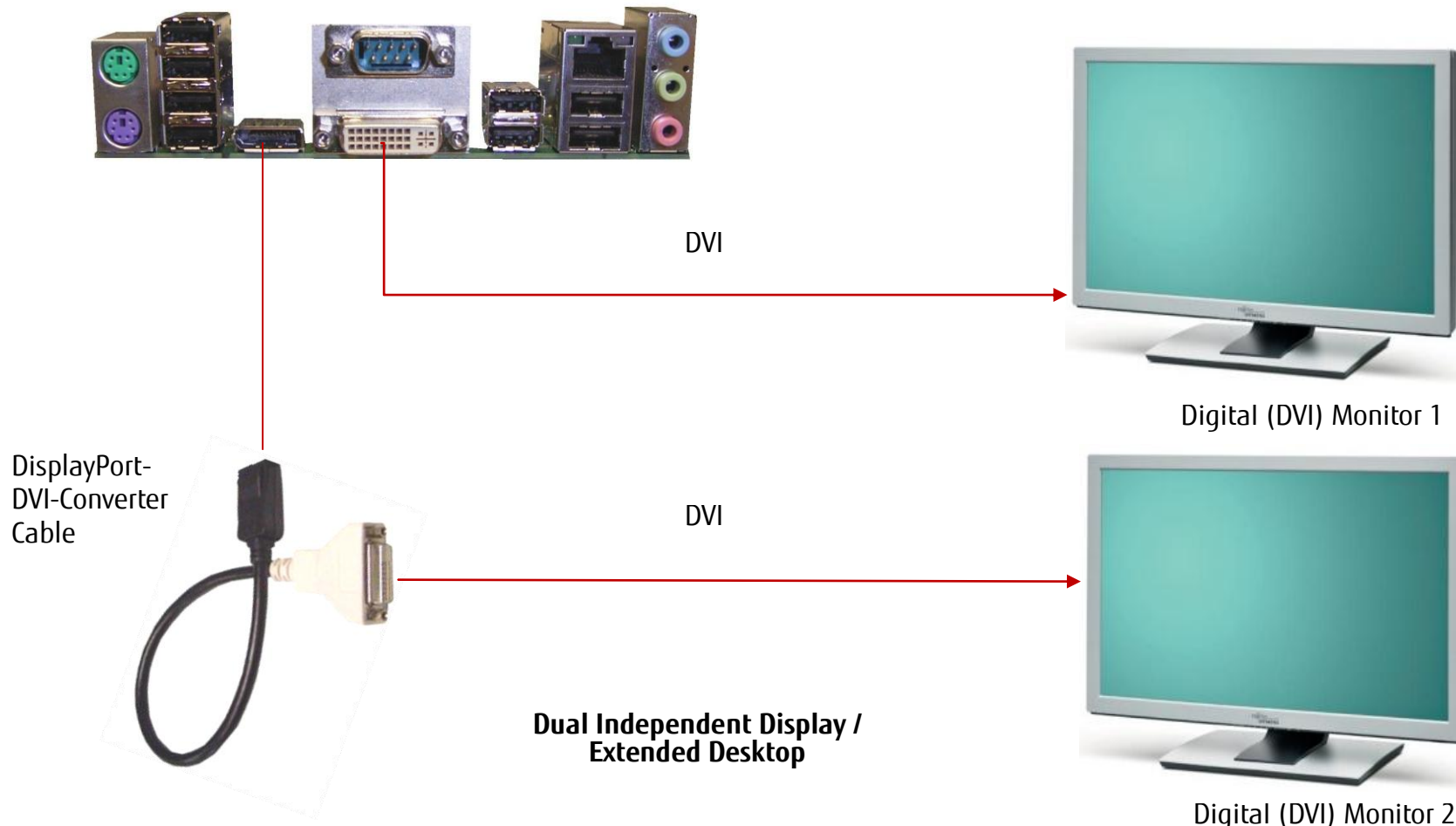
**max. DP screen resolution:  
2560 x 1600**



Digital (DisplayPort) Monitor

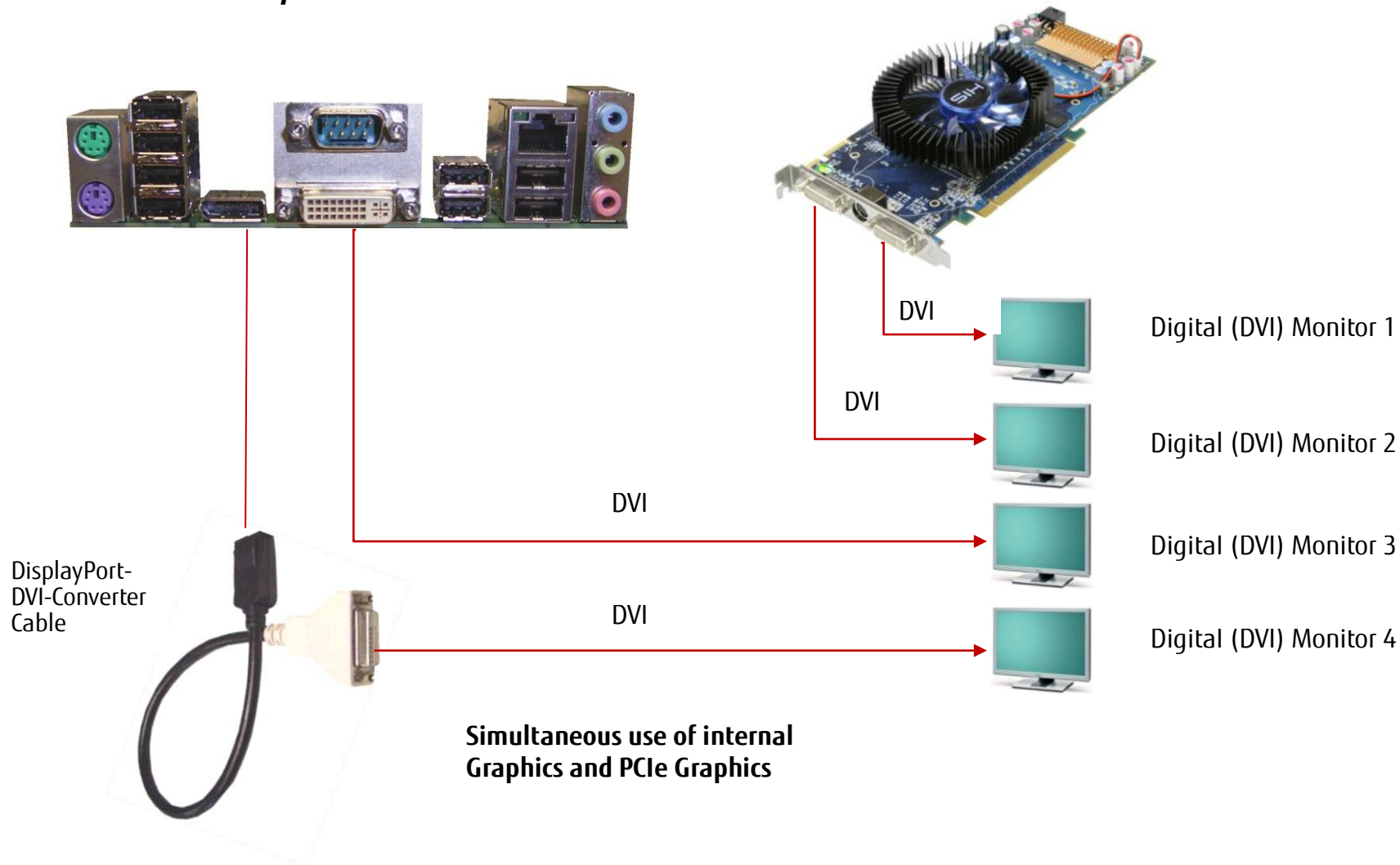
# Display Options

## 6.5 Dual DVI Output



# Display Options

## 6.6 Multi Monitor Output



## 7 Operating System Support

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- Windows® XP
- Windows® 7

# Operating System Support

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## 7.1 Support for Windows XP / Windows 7

- Mainboard D3162-B is designed according to the Microsoft Guidelines for Windows XP and Windows 7
- MS certified drivers (32/64 Bit) are available via OEM DU-DVD and OEM FTP Server



<ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Products/Mainboards/Industrial&ExtendedLifetime/D3162-B/Drivers/>

# 8 Mainboard Tools

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## **Common Mainboard Tools**



### **8.1 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/](ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Services/Software&Tools/Common-Mainboard-Tools/BootLogo_4_UEFI/)

### **8.2 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/](ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Services/Software&Tools/Common-Mainboard-Tools/EditCMOS_UEFI/)

### **8.3 OEMIDENT**

- DOS-based production tool to add MS OEM licence data (SLP1 for Windows XP and SLP2.x for Windows Vista & Windows 7)
- Add an individual customer serial no / add a chassis asset tag
- Disable and hide TPM feature in BIOS Setup

Link to DOS-based tool and evaluation version of 32Bit tool (Win PE):

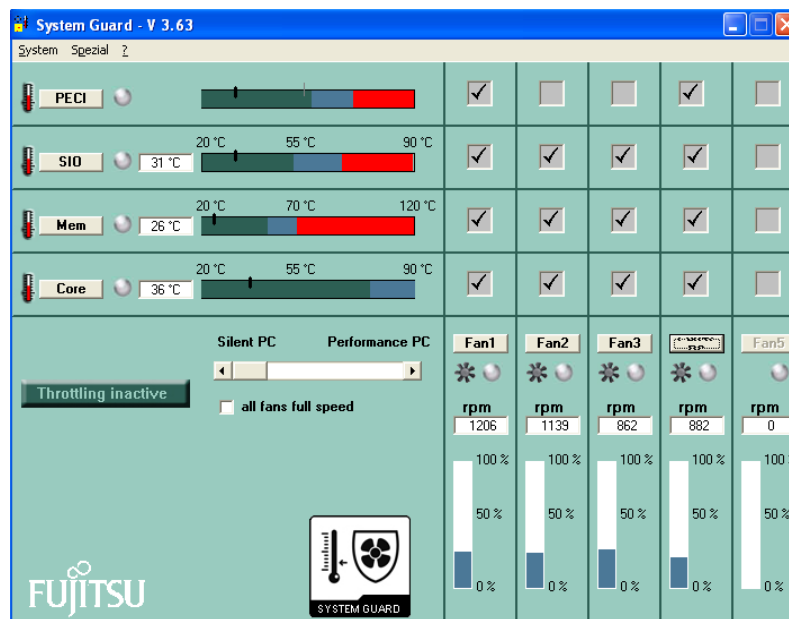
<ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Services/Software&Tools/Common-Mainboard-Tools/OEM-Ident/>

# Mainboard Tools

## 8.4 SystemGuard

- Windows-based tool to monitor temperatures and fan speed of FTS 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/>



**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](ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Services/Software&Tools/Common-Mainboard-Tools/$$ DS UEFI-Tools.pdf)

# 9 Known Issues & Important Notes

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## 9.1 Windows XP Installation in AHCI mode – necessary adjustments

- Choose BIOS AHCI-mode (ADVANCED – SATA Configuration)
- Download F6 SATA Driver Disk  
<ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Products/Mainboards/Industrial&ExtendedLifetime/D3162-B/Drivers>
- Start the Installation of Win XP – press F6 to install SATA drivers
- Use the following Drivers for D3162-B:



- Continue the installation



# Known Issues & Important notes

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## ***9.2 RAID / AHCI driver disk installation (Windows XP) from floppy disk***

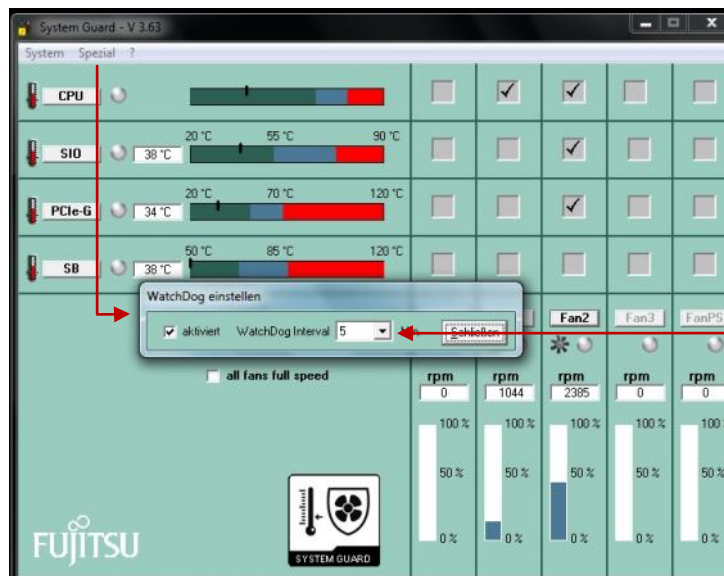
- D3162-B doesn't offer a legacy floppy interface
- Windows XP has some limitations regarding USB floppy support, for details see link below  
<http://support.microsoft.com/kb/916196>
- Alternative option: Use nLite-tool to create customized XP installation CD incl. RAID/AHCI driver  
[www.nliteos.com/nlite.html](http://www.nliteos.com/nlite.html)

# 10 Miscellaneous

## 10.1 System Watchdog (WD)

D3162-B provides a HW Watchdog for Operating System Runtime supervision.

- Use “WD software agent” to start, 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 (BMC-API) or the related Linux driver (lm-sensors) can be used:  
[ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Products/Mainboards/Industrial&ExtendedLifetime/D3162-B/IndustrialTools\\_D3162-B/](ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Products/Mainboards/Industrial&ExtendedLifetime/D3162-B/IndustrialTools_D3162-B/)
- 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 WD  
 --> Set timeout to 1 – 8 minutes

# Miscellaneous

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## 10.2 BIOS Update / BIOS Recovery

### BIOS update options

Link to related BIOS files (OEM FTP Server):

[ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Products/Mainboards/Industrial&ExtendedLifetime/D3162-B/BIOS\\_D3162-B/](ftp://ftp.ts.fujitsu.com/pub/Mainboard-OEM-Sales/Products/Mainboards/Industrial&ExtendedLifetime/D3162-B/BIOS_D3162-B/)

#### **DOS-based BIOS update (DOS-bootable USB stick)**

Required BIOS files:

- EfiFlash.exe (DOS flash tool)
- DosFlash.bat (batch file)
- D3162-B.upd (flash file)

Copy unzipped files to a DOS-bootable USB stick, boot system from stick and run *DosFlash.bat*

Links to bootable Free-DOS images to create a bootable USB stick:

- 24MB: <http://support.ts.fujitsu.com/Download/ShowDescription.asp?SoftwareGUID=35ac1143-a178-4609-82f2-8bd3a5d2f23d>
- 64MB: <http://support.ts.fujitsu.com/Download/ShowDescription.asp?SoftwareGUID=6d835be5-24d0-482b-bbb0-1a3f125e808e>
- 128MB: <http://support.ts.fujitsu.com/Download/ShowDescription.asp?SoftwareGUID=3514c169-ac85-44f5-a858-08bdcb38df0e>
- 256MB: <http://support.ts.fujitsu.com/Download/ShowDescription.asp?SoftwareGUID=c409d7f4-2494-417f-82ed-395dc850de4d>
- 512MB: <http://support.ts.fujitsu.com/Download/ShowDescription.asp?SoftwareGUID=ad35b93d-46f9-4c6a-98ed-7116b86344ff>
- 1GB: <http://support.ts.fujitsu.com/Download/ShowDescription.asp?SoftwareGUID=847bbc67-b135-4a95-a173-00cb0c4ecc27>
- 2GB: <http://support.ts.fujitsu.com/Download/ShowDescription.asp?SoftwareGUID=c95bc7d7-6fa1-4178-8a61-f55f4bc30706>
- 4GB: <http://support.ts.fujitsu.com/Download/ShowDescription.asp?SoftwareGUID=d0ee4c75-14fa-4bdc-a436-099901860e8f>

# Miscellaneous

## BIOS Update / BIOS Recovery

### Windows-based BIOS update (Deskflash tool)

Required BIOS file:

- D3162-Bx.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)
- D3162-Bx.upd (flash file)
- D3162-Bx.rom --> **Important: This file must be located in the root directory of the USB stick!**

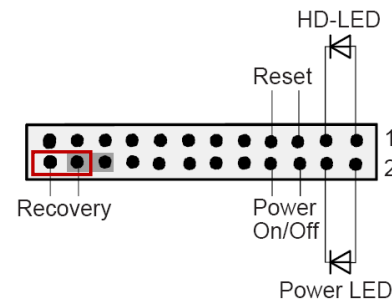
Set onboard jumper to Recovery Mode

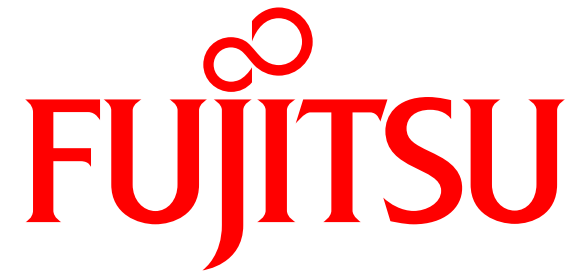
Copy unzipped files to a DOS-bootable USB stick,  
 boot system from stick and run *DosFlash.bat*

Follow instructions on the screen and set jumper to default position

Note:

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





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