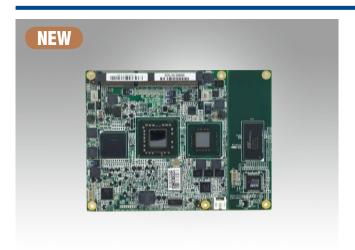
SOM-5787

Intel® Core™2 Duo Processor **GS45 COM-Express Basic Module**



Features

- Embedded Intel® Core™2Duo/Celeron® M processor
- Intel GMA X4500 Gen 5 DX10, HW support for H.264, VC-1 and MPEG2
- Supports 2 DDR3 SODIMM up to 8 GB
- Supports PCle x16, 5 PCle x1, 4 PCl, LPC, 3 SATAII, 8 USB2.0
- Supports embedded software APIs and Utilities

Software APIs:























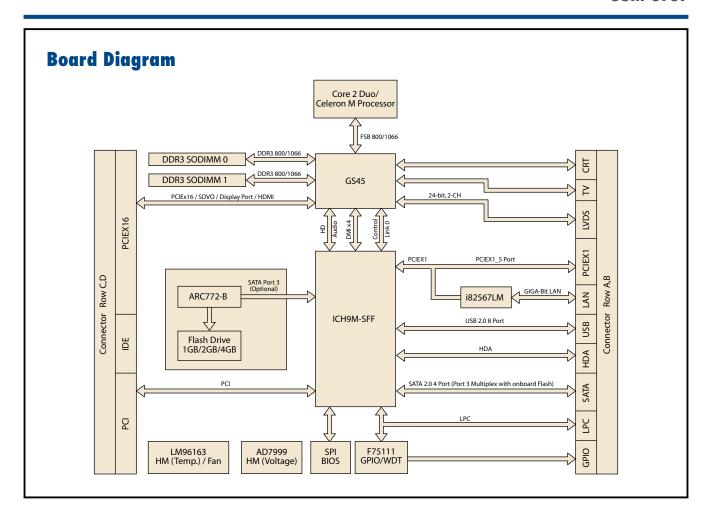


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Specifications

| Processor System Front Side Bus b00/1066 MHz b1 | Form Factor | | COM-Express Basic Module, Type II Pin-out |
|--|--------------------|-----------------------|--|
| Processor System System Chipset Intel AMT 4.0 Intel GS45/ICH9M SFF (10tal AMT 4.0 Memory Technology DDR3 800/1066 MHz Memory Max. Capacity up to 8 GB Scoket 2 x 204-pin SDDIMM sockets Lobipset Intel GS45 VRAM DVMT 5.0 supports up to 1024 MB Graphics Engine Mobile Intel GMA x4500 30/2D engine, HDMI, Displayport, SDVO shared with PCIe x16 (PEG) LCD Single and dual channel 24/48-bit LVDS VGA up to QXGA (2048 x 1536) SDVO 2 SDVO Ports Ethernet Chipset Intel 82567 Gigabit Ethernet Ethernet Chipset Intel 82567 Gigabit Ethernet Expansion LPC, PCIe x16, 5 PCIe x1, 4 PCI master Expansion LPC, PCIe x16, 5 PCIe x1, 4 PCI master Expansion SSD 2 GB SSD Flash on board IVO USB 8 x USB 2.0 ports x AXTAII (1 SATA port used for 2G onboard flash) Audio Hold edinition audio interface CPIO ATIA, ATIA (15 SATA port used for 2G onboard flash) Power Consumption (Typical) CPOwer Consumption (Max test in HTC) (1 GB DDR3 1066) SP9 | | CPU | |
| Intel IAMT 4,0 Yes Intel IAMT 4,0 Post Po | D | Front Side Bus | 800/1066 MHz |
| Memory Technology DDR3 80/1066 MHz | Processor System | System Chipset | Intel GS45/ICH9M SFF |
| Memory | | Intel AMT 4.0 | Yes |
| Memory Max. Capacity up to 8 GB Socket 2 x 204-pin SODIMM sockets Chipset Intel GS45 VRAM DVMT 5.0 supports up to 1024 MB Graphics Engine Mobile Intel GMA X4500 30/2D engine, HDMI, Displayport, SDVO shared with PCle x16 (PEG) LCD Single and dual channel 24/48-bit LVDS VGA up to 0XGA (2048 x 1536) SDVO 2 SDVO Ports Bual Display Intel 82567 Gigabit Ethernet Speed 10/100/1000 Mbps WatchDog Timer 2 56 timer intervals, from 0 to 255 sec or min setup by software, jumperless selection, generates system reset Expansion LPC, PCle x16, 5 PCle x1, 4 PCl master Expansion LPC, PCle x16, 5 PCle x1, 4 PCl master Expansion LPC, PCle x16, 5 PCle x1, 4 PCl master Expansion LPC, PCle x16, 5 PCle x1, 4 PCl master Expansion LPC, PCle x16, 5 PCle x1, 4 PCl master Expansion LPC, PCle x16, 5 PCle x1, 4 PCl master Expansion LPC, PCle x16, 5 PCle x1, 4 PCl master Expansion LPC, PCle x16, 5 PCle x1, 4 PCl master Fower Consumption (Prico and Controller) Respective to a prico and controller) | | BIOS | AMI 32 Mbit |
| Socket | | Technology | DDR3 800/1066 MHz |
| Chipset Intel GS45 VRAM DVMT 5.0 supports up to 1024 MB Graphics Engine Mobile Intel GMA X4500 3D/2D engine, HDMI, Displayport, SDVO shared with PCle x16 (PEG) Single and dual channel 24/48-bit LVDS TV-out Yes VGA up to 0XGA (2048 x 1536) SDVO 2 SDVO Ports Dual Display of VGA, LVDS, TV-out, HDMI, Displayport, SDVO (Note: SDVO function is supported by customized BIOS) BiOS Dual Display of VGA, LVDS, TV-out, HDMI, Displayport, SDVO (Note: SDVO function is supported by customized BIOS) BiOS Dual Display of VGA, LVDS, TV-out, HDMI, Displayport, SDVO (Note: SDVO function is supported by customized BIOS) BiOS Dual Display of VGA, LVDS, TV-out, HDMI, Displayport, SDVO (Note: SDVO function is supported by customized BIOS) BiOS Dual Display of VGA, LVDS, TV-out, HDMI, Displayport, SDVO (Note: SDVO function is supported by customized BIOS) BIOS Dual Display of VGA, LVDS, TV-out, HDMI, Displayport, SDVO (Note: SDVO function is supported by customized BIOS) Dual Display of VGA, LVDS, TV-out, HDMI, Displayport, SDVO (Note: SDVO function is supported by customized BIOS) Dual Display of VGA, LVDS, TV-out, HDMI, Displayport, SDVO (Note: SDVO function is supported by customized BIOS) Dual Display of VGA, LVDS, TV-out, HDMI, Displayport, SDVO (Note: SDVO function is supported by customized BIOS) Dual Display of VGA, LVDS, TV-out, HDMI, Displayport, SDVO (Note: SDVO function is supported by customized BIOS) Dual Display of VGA, LVDS, TV-out, HDMI, Displayport, SDVO (Note: SDVO function is supported by customized BIOS) Dual Display Display of VGA, LVDS, TV-out, HDMI, Displayport, SDVO (Note: SDVO function is supported by customized BIOS) Dual Display Display Display of VGA, LVDS, TV-out, HDMI, Displayport, SDVO (Note: SDVO function is supported by customized BIOS, Dual Display BIOS, Displayport, SDVO (Note: SDVO function is supported by customized BIOS, Dual Display BIOS, SDVO function is supported by customized BIOS, Dual Display BIOS, SDVO function is supported by cus | Memory | Max. Capacity | up to 8 GB |
| VRÁM | | Socket | 2 x 204-pin SODIMM sockets |
| Display | | Chipset | Intel GS45 |
| Display | | VRAM | |
| TV-out | | | |
| VGA SDV0 2 SDV0 Ports Dual Display Dual Display of VGA, LVDS, TV-out, HDMI, Displayport, SDV0 (Note: SDV0 function is supported by customized BIOS) | | | Single and dual channel 24/48-bit LVDS |
| SDV0 2 SDV0 Ports Dual Display bual Display of VGA, LVDS, TV-out, HDMI, Displayport, SDV0 (Note: SDV0 function is supported by customized BIOS) Intel 82567 Gigabit Ethernet Speed 10/100/1000 Mbps | Display | | |
| Dual Display Dual Display bright of VGA, LVDS, TV-out, HDMI, Displayport, SDVO (Note: SDVO function is supported by customized BIOS) Ethernet Chipset Intel 82567 Gigabit Ethernet Speed 10/100/1000 Mbps WatchDog Timer Expansion LPC, PCIe x16, 5 PCIe x1, 4 PCI master SATA 3 x SATAII (1 SATA port used for 2G onboard flash) SSD 2 GB SSD Flash on board VOBB 8 x USB 2.0 ports Audio High definition audio interface GPIO 8-bit GPIO Power Type ATX, AT Power Supply Voltage +12 V and +5 VSB for ATX, +12V for AT Power Consumption (Typical) Power Consumption (Max. test in HTC) Operating Temperature O ~ 60° C (32 ~ 140° F) Operating Humidity O% ~ 90% relative humidity, non-condensing | | | |
| BIOS BIOS | | SDV0 | = |
| Speed 10/100/1000 Mbps 256 timer intervals, from 0 to 255 sec or min setup by software, jumperless selection, generates system reset | | Dual Display | |
| WatchDog Timer 256 timer intervals, from 0 to 255 sec or min setup by software, jumperless selection, generates system reset Expansion 26 | Ethernet | | Intel 82567 Gigabit Ethernet |
| Expansion LPC, PCle x16, 5 PCle x1, 4 PCl master I/O SATA 3 x SATAII (1 SATA port used for 2G onboard flash) SSD 2 GB SSD Flash on board I/O USB 8 x USB 2.0 ports Audio High definition audio interface GPIO 8-bit GPIO Power Type ATX, AT Power Supply Voltage +12 V and +5 VSB for ATX, +12V for AT Power Consumption (Typical) (1 GB DDR3 1066) SP9300: +12V @ 0.66A Power Consumption (Max. test in HTC) (1 GB DDR3 1066) SP9300: +12V @ 2.1A Environment Operating Temperature Operating Humidity 0 ~ 60° C (32 ~ 140° F) Operating Humidity 0% ~ 90% relative humidity, non-condensing | | Speed | |
| SATA 3 x SATAII (1 SATA port used for 2G onboard flash) SSD 2 GB SSD Flash on board USB 8 x USB 2.0 ports Audio High definition audio interface GPIO 8-bit GPIO Power Type ATX, AT Power Supply Voltage +12 V and +5 VSB for ATX, +12V for AT Power Consumption (Typical) Power Consumption (Max. test in HTC) Poperating Temperature Operating Humidity O% ~ 90% relative humidity, non-condensing | | | |
| SSD 2 GB SSD Flash on board USB 8 x USB 2.0 ports Audio High definition audio interface GPIO 8-bit GPIO Power Type ATX, AT Power Supply Voltage +12 V and +5 VSB for ATX, +12V for AT Power Consumption (Typical) Power Consumption (Max. test in HTC) Poperating Temperature Operating Humidity Operating Humidity O% ~ 90% relative humidity, non-condensing | Expansion | | -1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 |
| VSB | | | |
| Audio High definition audio interface GPIO 8-bit GPIO Power Type ATX, AT Power Supply Voltage +12 V and +5 VSB for ATX, +12V for AT Power Consumption (Typical) (1 GB DDR3 1066) SP9300: +12V @ 0.66A Power Consumption (Max. test in HTC) (1 GB DDR3 1066) SP9300: +12V @ 2.1A Environment Operating Temperature O ~ 60° C (32 ~ 140° F) Operating Humidity O% ~ 90% relative humidity, non-condensing | | | = |
| Power Supply Voltage Power Consumption (Typical) (1 GB DDR3 1066) SP9300: +12V @ 0.66A Power Consumption (Max. test in HTC) (1 GB DDR3 1066) SP9300: +12V @ 2.1A Environment Operating Temperature Operating Humidity 0 ~ 60° C (32 ~ 140° F) Operating Humidity 0 % ~ 90% relative humidity, non-condensing | 1/0 | | ! |
| Power Type | | | 0 |
| Power Supply Voltage +12 V and +5 VSB for ATX, +12V for AT Power Consumption (Typical) (1 GB DDR3 1066) SP9300: +12V @ 0.66A Power Consumption (Max. test in HTC) (1 GB DDR3 1066) SP9300: +12V @ 2.1A Environment Operating Temperature Operating Humidity Own relative humidity, non-condensing | | 4 | |
| Power Consumption (Typical) (1 GB DDR3 1066) SP9300: +12V @ 0.66A Power Consumption (Max. test in HTC) (1 GB DDR3 1066) SP9300: +12V @ 2.1A Environment Operating Temperature Operating Humidity 0% ~ 90% relative humidity, non-condensing | | | • |
| (Typical) Power Consumption (Max. test in HTC) Operating Temperature Operating Humidity Operating Humidity Overating Humidity Overating Humidity Overating Humidity Overating Humidi | Power | | +12 V and +5 VSB for ATX, +12V for AT |
| (Max. test in HTC) (FGB DDR3 1066) SP9300: +12V @ 2.1A Operating Temperature Operating Humidity 0 ~ 60° C (32 ~ 140° F) 0% ~ 90% relative humidity, non-condensing | | (Typical) | (1 GB DDR3 1066) SP9300: +12V @ 0.66A |
| Operating Humidity 0% ~ 90% relative humidity, non-condensing | | | (1 GB DDR3 1066) SP9300: +12V @ 2.1A |
| Uperating Humidity 0% ~ 90% relative humidity, non-condensing | Environment | Operating Temperature | 0 ~ 60° C (32 ~ 140° F) |
| Mechanical Dimensions 125 x 95 mm (4.92" x 3.74") | Operating Humidity | | 0% ~ 90% relative humidity, non-condensing |
| | Mechanical | Dimensions | 125 x 95 mm (4.92" x 3.74") |



Ordering Information

| Part No. | СРИ | L2 Cache | Chipset | LVDS | VGA | SDVO | Giga LAN | HD Audio | PCle x 16 | PCle x 1 | PCI | USB 2.0 | SATA | LPC | Onboard flash | ATX Power | AT Power | Thermal Solution | Operating Temp. |
|------------------|---|-------------|---------------|--------|-----|------|-------------|-------------|--------------|-------------|-----|------------|------------|-----|---------------|--------------|-------------|------------------|-----------------|
| SOM-5787FG-S1A1E | Intel ULV Celeron M 723 1.2 GHz | 1 MB | Intel GS45 | 48-bit | Yes | 2 | 1 | Yes | 1 | 5 | 4 | 8 | 3 x SATAII | 1 | 2G | Yes | Yes | Active | 0 ~ 60° C |
| SOM-5787FG-S2A1E | Intel ULV Celeron M 722 1.2 GHz | 1 MB | Intel GS45 | 48-bit | Yes | 2 | 1 | Yes | 1 | 5 | 4 | 8 | 3 x SATAII | 1 | 2G | Yes | Yes | Passive | 0 ~ 60° C |
| SOM-5787FG-S3A1E | Intel ULV Core 2 Duo SU9300, 1.2 GHz | 3 MB | Intel GS45 | 48-bit | Yes | 2 | 1 | Yes | 1 | 5 | 4 | 8 | 3 x SATAII | 1 | 2G | Yes | Yes | Active | 0 ~ 60° C |
| SOM-5787FG-S9A1E | Intel LV Core 2 Duo SL9400, 1.86 GHz | 6 MB | Intel GS45 | 48-bit | Yes | 2 | 1 | Yes | 1 | 5 | 4 | 8 | 3 x SATAII | 1 | 2G | Yes | Yes | Active | 0 ~ 60° C |
| SOM-5787FG-U3A1E | Intel Core 2 Duo SP9300, 2.26 GHz | 6 MB | Intel GS45 | 48-bit | Yes | 2 | 1 | Yes | 1 | 5 | 4 | 8 | 3 x SATAII | 1 | 2G | Yes | Yes | Active | 0 ~ 60° C |

Development Board

| Part No. | Description |
|-------------------|---|
| SOM-DB5700G-00A2E | Development Board for COM-Express with GLAN |

Optional Accessories

| Part No. | Description |
|----------------|---|
| 1960019182T10B | Semi- Cooler 95 x 125 x 22 mm with 12 V Fan |

Packing List

| Part No. | Description | Quantity |
|----------------|---------------------|----------|
| | SOM-5787 CPU Module | 1 |
| | Utility CD | 1 |
| 1960046888H001 | Heatspreader | 1 |

Embedded OS

| 08 | Part No. | Description |
|--------------|------------|---------------------------------|
| Win XPE 2008 | 2070009650 | XPE WES2009 SOM-5787 V4.0 MUI24 |

Value-Added Software Services

Software API: An interface that defines the ways by which an application program may request services from libraries and/or operating systems. Provides not only the underlying drivers required but also a rich set of user-friendly, intelligent and integrated interfaces, which speeds development, enhances security and offers add-on value for Advantech platforms. It plays the role of catalyst between developer and solution, and makes Advantech embedded platforms easier and simpler to adopt and operate with customer applications.

Software APIs

Control



General Purpose Input/Output is a flexible parallel interface that allows a variety of custom connections. It allows users to monitor the level of signal input or set the output status to switch on/off a device. Our API also provides Programmable GPIO, which allows developers to dynamically set the GPIO input or output status.



SMBus is the System Management Bus defined by Intel® Corporation in 1995. It is used in personal computers and servers for low-speed system management communications. The SMBus API allows a developer to interface a embedded system environment and transfer serial messages using the SMBus protocols, allowing multiple simultaneous device control.



I²C

I²C is a bi-directional two wire bus that was developed by Philips for use in their televisions in the 1980s. The I²C API allows a developer to interface with an embedded system environment and transfer serial messages using the I²C protocols, allowing multiple simultaneous device control.

Monitor



A watchdog timer (WDT) is a device that performs a specific operation after a certain period of time if something goes wrong and the system does not recover on its own.

A watchdog timer can be programmed to perform a warm boot (restarting the system) after a certain number of seconds.



Hardware Monitor

The Hardware Monitor (HWM) API is a system health supervision API that inspects certain condition indexes, such as fan speed, temperature and voltage.



Control

Power Saving

The Hardware Control API allows developers to set the PWM (Pulse Width Modulation) value to adjust fan speed or other devices; it can also be used to adjust the LCD brightness.

Display



Brightness Control The Brightness Control API allows a developer to interface with an embedded device to easily control brightness.



Make use of Intel SpeedStep technology to reduce power power consumption. The system will automatically adjust the CPU Speed depending on system loading.



Backlight

The Backlight API allows a developer to control the backlight (screen) on/off in an embedded device.



System Throttling

Refers to a series of methods for reducing power consumption in computers by lowering the clock frequency. These APIs allow the user to lower the clock from 87.5% to 12.5%.

Software Utilities



BIOS Flash

The BIOS Flash utility allows customers to update the flash ROM BIOS version, or use it to back up current BIOS by copying it from the flash chip to a file on customers' disk. The BIOS Flash utility also provides a command line version and API for fast implementation into customized applications.



Embedded Security ID

The embedded application is the most important property of a system integrator. It contains valuable intellectual property, design knowledge and innovation, but it is easily copied! The Embedded Security ID utility provides reliable security functions for customers to secure their application data within embedded RIOS



The Monitoring utility allows the customer to monitor system health, including voltage, CPU and system temperature and fan speed. These items are important to a device; if critical errors happen and are not solved immediately, permanent damage may be caused.



eSOS

The eSOS is a small OS stored in BIOS ROM. It will boot up in case of a main OS crash. It will diagnose the hardware status, and then send an e-mail to a designated administrator. The eSOS also provides remote connection: Telnet server and FTP server, allowing the administrator to rescue the system.



Flash Lock

Flash Lock is a mechanism that binds the board and CF card (SQFlash) together. The user can "Lock" SQFlash via the Flash Lock function and "Unlock" it via BIOS while booting. A locked SQFlash cannot be read by any card reader or boot from other platforms without a BIOS with the "Unlock" feature.