NEXCOM International Co., Ltd.

Industrial Computing Solutions

Applied Panel PC

APPC 1220T/1221T/1520T/1521T/1720T/1721T

User Manual

NEXCOM International Co., Ltd.
Published April 2011

www.nexcom.com

CONTENTS

Chapter 3: System Setup

Chapter 4: BIOS Setup

Appendix A: Watchdog Timer

Appendix B: GPIO Programming Guide

Appendix C: Power Consumption

PREFACE

Copyright

Disclaimer

The information in this document is subject to change without prior notice and does not represent commitment from NEXCOM International Co., Ltd. However, users may update their knowledge of any product in use by constantly checking its manual posted on our website: http://www.nexcom.com. NEXCOM shall not be liable for direct, indirect, special, incidental, or consequential damages arising out of the use of any product, nor for any infringements upon the rights of third parties, which may result from such use. Any implied warranties of merchantability or fitness for any particular purpose is also disclaimed.

Acknowledgements

APPC 1220T/1221T/1520T/1521T/1720T/1721T is a trademark of NEXCOM International Co., Ltd. All other product names mentioned herein are registered trademarks of their respective owners.

Regulatory Compliance Statements

This section provides the FCC compliance statement for Class A devices and describes how to keep the system CE compliant.

Declaration of Conformity

FCC

This equipment has been tested and verified to comply with the limits for a Class A digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area (domestic environment) is likely to cause harmful interference, in which case the user will be required to correct the interference (take adequate measures) at their own expense.

CE

The product(s) described in this manual complies with all applicable European Union (CE) directives if it has a CE marking. For computer systems to remain CE compliant, only CE-compliant parts may be used. Maintaining CE compliance also requires proper cable and cabling techniques.

RoHS Compliance

NEXCOM RoHS Environmental Policy and Status Update

NEXCOM is a global citizen for building the digital infrastructure. We are committed to providing green products and services, which are compliant with European Union RoHS (Restriction on Use of Hazardous Substance in Electronic Equipment) directive 2002/95/EU, to be your trusted green partner and to protect our environment.

RoHS restricts the use of Lead (Pb) < 0.1% or 1,000ppm, Mercury (Hg) < 0.1% or 1,000ppm, Cadmium (Cd) < 0.01% or 100ppm, Hexavalent Chromium (Cr6+) < 0.1% or 1,000ppm, Polybrominated biphenyls (PBB) < 0.1% or 1,000ppm, and Polybrominated diphenyl Ethers (PBDE) < 0.1% or 1,000ppm.

In order to meet the RoHS compliant directives, NEXCOM has established an engineering and manufacturing task force in to implement the introduction of green products. The task force will ensure that we follow the standard NEXCOM development procedure and that all the new RoHS components and new manufacturing processes maintain the highest industry quality levels for which NEXCOM are renowned.

The model selection criteria will be based on market demand. Vendors and suppliers will ensure that all designed components will be RoHS compliant.

How to recognize NEXCOM RoHS Products?

For existing products where there are non-RoHS and RoHS versions, the suffix "(LF)" will be added to the compliant product name.

All new product models launched after January 2006 will be RoHS compliant. They will use the usual NEXCOM naming convention.

Warranty and RMA

NEXCOM Warranty Period

1. NEXCOM makes products in accordance with the Industry standard and, NEXCOM warrants that all her Industry-grade IPC and System products will be free from defect in neither material nor workmanship for twenty-four (24) months from the day of invoice issued.

2. For NEXCOM Panel PC product lines (the APPC, MPPC series), they are also guaranteed against defect in materials and workmanship for the period of twenty-four (24) months in their motherboard design. For 3rd party parts, it follows with original suppliers' standard: 12 months for battery pack and LCD, 24 months for adaptor / add on modules (including GSM module, RFID module, and antenna).

3. If NEXCOM determines customer's warranty claim is valid, NEXCOM will repair or replace product(s) without additional charge for parts and labor. An extended Warranty Program will extend the warranty period of the product accordingly.

Warranty Coverage

The warranty applies only to products manufactured or distributed by NEXCOM and her subsidiaries. This warranty covers all the products/shipments except for:

1. Any claimed defect, products that have been repaired or modified by persons who have not been authorized by NEXCOM or, products which have been subjected to misuse, abuse, accident, improper installation, or usage not in accordance with the product instruction. NEXCOM assumes no liability as a consequence of such events under the term of this warranty.

   One example is the replacement of Tablet's or Hand-held's LCD display due to scratching stains or other degradation; these will not be covered under this warranty.

2. Damages caused by customers' delivery/shipping of the product or, product failure resulted from electrical power/voltage shock, or, installation of parts/components which are not supplied/approved by NEXCOM in advance.

3. Third-party products:

   a. Software, such as the device drivers,

   b. External devices such as HDD, printer, scanner, mouse, LCD panel, battery, and so on,

   c. Accessory/parts that were not approved by NEXCOM and,

   d. Accessory/parts were added to products after they were shipped from NEXCOM.

Product will be treated as "Out of Warranty " if:

a. It expires the warranted 24 months period from the day it was purchased.

b. It had been altered by persons other than an authorized NEXCOM service person or, which have been subjected to misuse, abuse, accident, or improper installation.

c. It doesn't have the original NEXCOM Serial Number labeling for NEXCOM's warranty period identification or, tracking.

RMA that NEXCOM has determined not to be covered by the warranty will be charged the NEXCOM Standard Repair Fee for the repairing. If a RMA is determined to be not repairable, customer will be notified and product(s) may be returned to customer at their request; a minimum service fee may be charged however.

NEXCOM Return Merchandise Authorization (RMA) Procedure

For the RMA (Return Merchandise Authorization) shipment, customer is responsible for packaging and shipping the product to the designated NEXCOM service sites, with shipping charges prepaid by the customer. The original NEXCOM shipping box should be used whenever possible. NEXCOM shall pay for the return of the product to the customer's location. In case of expedited shipping request, an extra service charge shall be assessed and the customer is responsible for this extra return shipping charge.

1. Customers should enclose the "NEXCOM RMA Service Form" with the returned products.

2. Customers need to write down all the information related to the problem on the " NEXCOM RMA Service Form " when applying for the RMA service; information will help to understand the problem, including the fault description, on-screen messages, and pictures if possible.

3. Customers could send back the faulty product with or without the accessories and key parts such as the CPU and DIMM. If the key parts are included, please be noted clearly within the return form. NEXCOM takes no responsibility for the parts which are not listed in the return form.

4. Customers hold the responsibility to ensure that the packing of defective products is durable enough to be resistant against further damage due to the transportation; damage caused by transportation is treated as " Out of Warranty " under our Warranty specification.

5. RMA product(s) returned by NEXCOM to any location other than the customer registered delivery address will incur an extra shipping charge, the customer is responsible for paying the extra shipping charges, duties, and taxes of this shipment.

Product Repairing

1. NEXCOM will repair defective products covered under this limited warranty that are returned to NEXCOM; if products do prove to be defective, they will be repaired during their warranty period unless other warranty terms have been specified.

2. NEXCOM owns all parts removed from repaired products.

3. NEXCOM will use parts made by various manufacturers in performing the repair.

4. The repaired products will be warranted subjected to the original warranty coverage and period only.

5. For products returned as defective but, proved to be no defect/fault after the RMA process, NEXCOM reserves the right to claim for a NDF (No Defect Found) Service Charge.

6. NEXCOM will issue RMA Report which included Repair Detailed Information to the customer when the defective products were repaired and returned.

7. In addition to the above, NEXCOM may authorize Independent/Third-party suppliers to repair the defective products for NEXCOM.

Out Of Warranty Service

There will be a service charge from NEXCOM for the "Out Of Warranty" product service; they are the Basic Diagnostic Service Fee and the Advanced Component Replacement Fee respectively. And, if the product can not be repaired, NEXCOM will either return the product to the customer or, just scrap it, followed by customer's instruction.

1. Testing and Parts Replacement

   NEXCOM will have the following Handling Charges for those OoW products that returned:

   a. Basic Labor Cost and Testing Fee: as Table listed.

   b. Parts Fee: NEXCOM will charge for main IC chipsets such as the N.B., S.B., Super-IO, LAN, Sound, Memory, and so on.

   c. 3rd-party Device Fee: products replacement for CPU, DIMM, HDD, Chassis, and UPS.

2. Out of Warranty product will have a three months warranty for the fixed issues. If the product failed with different problem within 3 months, they will still incur the service charge of "Out of Warranty".

3. Out of Warranty "products will not be repaired without a signed PI from the customer, the agreement of the repair process.

   Add-on card, 3rd Party Device and board level repair cost higher than new product prices, customer can abandon to sign PI to repair and, please contact with sales to buy new products.

Warnings

Read and adhere to all warnings, cautions, and notices in this guide and the documentation supplied with the chassis, power supply, and accessory modules. If the instructions for the chassis and power supply are inconsistent with these instructions or the instructions for accessory modules, contact the supplier to find out how you can ensure that your computer meets safety and regulatory requirements.

Cautions

Electrostatic discharge (ESD) can damage system components. Do the described procedures only at an ESD workstation. If no such station is available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the computer chassis.

Safety Information

Before installing and using the device, note the following precautions:

- Read all instructions carefully.
- Do not place the unit on an unstable surface, cart, or stand.
- Follow all warnings and cautions in this manual.
- When replacing parts, ensure that your service technician uses parts specified by the manufacturer.
- Avoid using the system near water, in direct sunlight, or near a heating device.
- The load of the system unit does not solely rely for support from the rackmounts located on the sides. Firm support from the bottom is highly necessary in order to provide balance stability.
- The computer is provided with a battery-powered real-time clock circuit. There is a danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

Installation Recommendations

Ensure you have a stable, clean working environment. Dust and dirt can get into components and cause a malfunction. Use containers to keep small components separated.

Adequate lighting and proper tools can prevent you from accidentally damaging the internal components. Most of the procedures that follow require only a few simple tools, including the following:

- A Philips screwdriver
- A flat-tipped screwdriver
- A grounding strap
- An anti-static pad

Using your fingers can disconnect most of the connections. It is recommended that you do not use needlenose pliers to disconnect connections as these can damage the soft metal or plastic parts of the connectors.

Safety Precautions

1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a stable surface during installation. Dropping it or letting it fall may cause damage.
7. Do not leave this equipment in either an unconditioned environment or in a above 40°C storage temperature as this may damage the equipment.
8. The openings on the enclosure are for air convection to protect the equipment from overheating. DO NOT COVER THE OPENINGS.
9. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
10. Place the power cord in a way so that people will not step on it. Do not place anything on top of the power cord. Use a power cord that has been approved for use with the product and that it matches the voltage and current marked on the product's electrical range label. The voltage and current rating of the cord must be greater than the voltage and current rating marked on the product.
11. All cautions and warnings on the equipment should be noted.
12. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
13. Never pour any liquid into an opening. This may cause fire or electrical shock.
14. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
15. If one of the following situations arises, get the equipment checked by service personnel:

    a. The power cord or plug is damaged.

    b. Liquid has penetrated into the equipment.

    c. The equipment has been exposed to moisture.

    d. The equipment does not work well, or you cannot get it to work according to the user's manual.

    e. The equipment has been dropped and damaged.

    f. The equipment has obvious signs of breakage.
16. Do not place heavy objects on the equipment.
17. The unit uses a three-wire ground cable which is equipped with a third pin to ground the unit and prevent electric shock. Do not defeat the purpose of this pin. If your outlet does not support this kind of plug, contact your electrician to replace your obsolete outlet.
18. CAUTION: DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER. DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.
19. The computer is provided with CD drives that comply with the appropriate safety standards including IEC 60825.

Technical Support and Assistance

1. For the most updated information of NEXCOM products, visit NEXCOM's website at www.nexcom.com.

2. For technical issues that require contacting our technical support team or sales representative, please have the following information ready before calling:
   - Product name and serial number
   - Detailed information of the peripheral devices
   - Detailed information of the installed software (operating system, version, application software, etc.)
   - A complete description of the problem
   - The exact wordings of the error messages

Warning!

1. Handling the unit: carry the unit with both hands and handle it with care.
2. Maintenance: to keep the unit clean, use only approved cleaning products or clean with a dry cloth.
3. CompactFlash: Turn off the unit's power before inserting or removing a CompactFlash storage card.

Conventions Used in this Manual

Warning: Information about certain situations, which if not observed, can cause personal injury. This will prevent injury to yourself when performing a task.

Caution: Information to avoid damaging components or losing data.

Note: Provides additional information to complete a task easily.

Global Service Contact Information

Headquarters
Taiwan
18F, No. 716, Chung-Cheng Rd., Zhonghe Dist., New Taipei City 235,
Taiwan, R.O.C.
Tel: +886-2-8228-0606
Fax: +886-2-8228-0501
http://www.nexcom.com.tw

USA
3758 Spinnaker Court,
Fremont, CA 94538, USA
Tel: +1-510-656-2248
Fax: +1-510-656-2158
http://www.nexcom.com

France
Z.I. des Amandiers, 17, Rue des entrepreneurs
78420 Carrières sur Seine, France
Tel: +33 (0)1 71 51 10 20
Fax: +33 (0)1 71 51 10 21
http://www.nexcom.eu

Germany
Leopoldstrase Business Centre, Leopoldstrase 244 80807
Munich, Germany
Tel: +49-89-208039-278
Fax: +49-89-208039-279
http://www.nexcom.eu

Italy
Via Gaudenzio Ferrari 29, 21047 Saronno (VA) Italia
Tel: +39 02 9628 0333
Fax: +39 02 9619 8846
http://www.nexcom.eu

United Kingdom
10 Vincent Avenue, Crownhill Business Centre
Milton Keynes, Buckinghamshire, MK8 0AB
United Kingdom
Tel: +44-1908-267121
Fax: +44-1908-262042
http://www.nexcom.eu

China-Beijing

Room 301, Block E, Power Creative Building, No. 1
Shangdi East Rd. Haidian Dist., Beijing, 100085, China
Tel: +86-10-5885-6655
Fax: +86-10-5885-1066
http://www.nexcom.cn

China-Shanghai Office

Room 1505, Greenland He Chuang Building, No. 450
Caoyang Rd. Shanghai, 200063, China
Tel: +86-21-6150-8008
Fax: +86-21-3251-6358
http://www.nexcom.cn

China-Nanjing Office

Room 1206, Hongde Building, No. 20 Yunnan Rd.
Nanjing, 210018, China
Tel: +86-25-8324-9606
Fax: +86-25-8324-9685
http://www.nexcom.cn

China-Shenzhen Office

Western Room 708, Block 210, Tairan Industry & Trading Place,
Futian Area, Shenzhen, China 518040
TEL: +86-755-833 27203
FAX: +86-755-833 27213
http://www.nexcom.cn

Japan

9F, Tamachi Hara Bldg.,
4-11-5, Shiba Minato-ku Tokyo,
Japan 108-0014
Tel: +81-3-5419-7830
Fax: +81-3-5419-7832
http://www.nexcom-jp.com

Package Contents

Before continuing, verify that the package you received is complete. Your package should have all the items listed in the table.

APPC 1220T/1221T/1520T/1521T

Item	Name	Qty
1	PS/2 Y Cable	1
2	Panel Mount Kit	10
3	Driver CD	1
4	Touch Pen	1
5	DC Power Cable	1
6	Flat Head for HDD Installation	4

APPC 1720T/1721T

Item	Name	Qty
1	PS/2 Y Cable	1
2	Panel Mount Kit	12
3	Driver CD	1
4	Touch Pen	1
5	DC Power Cable	1
6	Flat Head for HDD Installation	4

PS/2 Y Cable

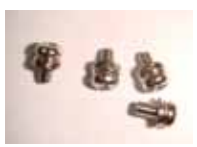
Panel Mount Kit
APPC 1220T/1221T
APPC 1520T/1521T

Panel Mount Kit
APPC 1720T/1721T

Driver CD

Touch Pen

DC Power Cable



Flat Head for
HDD Installation

Ordering Information

The following provides ordering information for the Applied Panel PC series.

- **Barebone**

  APPC 1220T (P/N: 10IA1220T00X0)
  - 12.1" TFT LED Panel PC with Intel® Atom™ D525 1.8GHz, touch screen, 1GB DDR3, COM#1/#2

  APPC 1221T (P/N: 10IA1221T00X0)
  - 12.1" TFT LED Panel PC with Intel® Atom™ D525 1.8GHz, touch screen, 1GB DDR3, COM#1/#2 w/ isolation, COM#3/#4, GPIO (CAN bus optional)

  APPC 1520T (P/N: 10IA1520T00X0)
  - 15" TFT LED Panel PC with Intel® Atom™ D525 1.8GHz, touch screen, 1GB DDR3, COM#1/#2

  APPC 1521T (P/N: 10IA1521T00X0)
  - 15" TFT LED Panel PC with Intel® Atom™ D525 1.8GHz, touch screen, 1GB DDR3, COM#1/#2 w/ isolation, COM#3/#4, GPIO (CAN bus optional)

  APPC 1720T (P/N: 10IA1720T00X0)
  - 17" TFT LED Panel PC with Intel® Atom™ D525 1.8GHz, touch screen, 1GB DDR3, COM#1/#2

  APPC 1721T (P/N: 10IA1721T00X0)
  - 17" TFT LED Panel PC with Intel® Atom™ D525 1.8GHz, touch screen, 1GB DDR3, COM#1/#2 w/ isolation, COM#3/#4, GPIO (CAN bus optional)

- **Option**
  12V, 60W AC/DC power adapter w/o power cord (P/N:7400060002X00)

Chapter 1: Product Introduction

APPC 1220T/1221T

Overview

Key Features

- 4:3 12.1" Fanless LED Panel Computer
- Intel® Atom™ D525, Dual Core, Low Consumption CPU
- Full Flat 5-wire Touch Screen
- Dual GbE, 2nd Display VGA, Line-in, Line-out, Mic-in, PS/2 KB/MS
- 4 x USB, 2 x mini-PCIe, 1 x CF, 2 x RS232/422/485
- Optional Wi-Fi Module, 2.5" HDD, 2 x COMs, GPIO, CAN Bus
- DDR3 1GB, 2.5" HDD Bracket
- IP65 Compliant Front Panel
- Mounting Support: Panel/Wall/Stand/VESA 100mm x 100mm
- Wide Range Power Input: 12V~ 30V DC

- LED Size: 12.1", 4:3
- Resolution: SVGA, 800x600
- Luminance: 350 cd/m2
- Contrast ratio: 300
- LCD color: 262K
- Viewing angle: 50(U), 60(D), 70(L), 70(R)
- Backlight: LED
- Touch screen: Full flat 5-wire resistive
- Touch light transmission: 80%
- Touch interface: USB

- CPU: Intel® Atom™ D525, 1.8GHz
- BIOS: AMI BIOS
- System chipset: Intel® ICH8M
- System memory: 1x 204-pin DDR3 SODIMM socket, 1G DDR3 (default), Supports up to 2GB DDR3 800, Non-ECC and Unbuffered
- SSD: one external locked CF socket by IDE; supports Type I/II CompactFlash card
- Hard drive bay: optional 2.5" SATA HDD or SATA DOM
- Watchdog timer: Watchdog timeout can be programmable by software from 1 second to 255 seconds and from 1 minute to 255 minutes (Tolerance 15% under room temperature 25°C)
- H/W status monitor: monitors system temperature and voltage
- Expansion: 2 x mini-PCIe sockets
- NEXCOM Xcare platform system management supported

Rear I/O

- CAN BUS (optional for APPC 1221T only)
- GPIO: 4 x digital in / 4 x digital out (APPC 1221T only)
- COM1: RS232/422/485 (APPC 1221T w/ 2.5kv isolated)
- COM2: RS232/422/485 (APPC 1221T w/ 2.5kv isolated)
- COM3 and COM4: RS232 (APPC 1221T only)
- Ethernet: 2 x RJ45
- 2nd display VGA port: 1 x DB15
- Audio port: 1 x Line-out, 1 x Line-in, 1 x Mic-in
- USB: 4 x USB 2.0
- PS2 keyboard/ mouse
- Power switch
- Reset button

Audio

- AC97 codec: Realtek ALC888
- Audio interface: Line-out, Line-in and Mic-in audio jacks

Ethernet

- LAN chip: Dual Intel 82574L Gigabit LAN
- Ethernet interface: 10/100/1000 Based-Tx Ethernet compatible

Mechanical and Environment

- Color: Pantone black
- IP protection: IP65 front
- Mounting: Panel/Wall/Stand/VESA 100mm x 100mm
- Power input: 12V~30V DC
- Power adapter: Optional AC to DC power adapter (+12V, 60W)

- Vibration
  - IEC 68 2-64 (w/ HDD)
  - 0.5Grms @sine, 5~500Hz, 1hr/axis (HDD operating)
  - 2.2Grms @ random condition, 5~500Hz, 0.5hr/axis (Non-operating)
- Shock
  - IEC 68 2-27
  - HDD: 20G@wall mount, half sine, 11ms
- Operating Temperature: -5°C to 50°C
- Storage temperature: -20 to 75°C
- Operating humidity: 10%~90% relative humidity, non-condensing
- Dimensions: 317 x 243 x 65mm
- Weight: 3.8kg

Certifications

- CE approval
- FCC Class A

APPC 1520T/1521T

Key Features

- 4:3 15" Fanless LED Panel Computer
- Intel® Atom™ D525, Dual Core, Low Consumption CPU
- Full Flat 5-wire Touch Screen
- Dual GbE, 2nd Display VGA, Line-in, Line-out, Mic-in, PS2 KB/ MS
- 4 x USB, 2 x mini-PCIe, 1 x CF, 2 x RS232/422/485
- Optional Wi-Fi Module, 2.5"HDD, 2 x COMs, GPIO, CAN Bus
- DDR3 1GB, 2.5" HDD Bracket
- IP65 Compliant Front Panel
- Mounting Support: Panel/Wall/Stand/VESA 100mm x 100mm
- Wide Range Power Input: 12V~ 30V DC

Specifications

Panel
- LED Size: 15", 4:3
- Resolution: XGA 1024x768
- Luminance: 350cd/m2
- Contrast ratio: 500
- LCD color: 16.2M
- Viewing Angle: 65(U), 55(D), 65(L), 65(R)
- Backlight: LED
- Touch screen: Full Flat 5-wire resistive
- Touch light transmission: 80%
- Touch interface: USB

System
- CPU: Intel® Atom™ D525, 1.8GHz
- BIOS: AMI BIOS
- System chipset: Intel® ICH8M
- System memory: 1x 204-pin DDR3 SODIMM socket, 1G DDR3 (default), Supports up to 2GB DDR3 800, Non-ECC and Unbuffered
- SSD: one external locked CF socket by IDE; supports Type I/II CompactFlash card
- Hard drive bay: optional 2.5" SATA HDD or SATA DOM
- Watchdog timer: Watchdog timeout can be programmable by software from 1 second to 255 seconds and from 1 minute to 255 minutes (Tolerance 15% under room temperature 25°C)
- H/W status monitor: monitors system temperature and voltage
- Expansion: 2 x mini-PCIe sockets
- NEXCOM Xcare platform system management supported

Rear I/O
- CAN BUS (optional for APPC 1521T only)
- GPIO: 4 x digital in / 4 x digital out (APPC 1521T only)
- COM1: RS232/422/485 (APPC 1521T w/ 2.5kv isolated)
- COM2: RS232/422/485 (APPC 1521T w/ 2.5kv isolated)
- COM3 and COM4: RS232 (APPC 1521T only)
- Ethernet: 2 x RJ45
- 2nd display VGA port: 1 x DB15
- Audio port: 1 x Line-out, 1 x Line-in, 1 x Mic-in
- USB: 4 x USB 2.0
- PS2 keyboard/ mouse
- Power switch
- Reset button

Audio
- AC97 codec: Realtek ALC888
- Audio interface: Line-out, Line-in, Mic-in audio jacks

Ethernet
- LAN chip: Dual Intel 82574L Gigabit LAN
- Ethernet interface: 10/100/1000 Based-Tx Ethernet compatible

Mechanical and Environment
- Color: Pantone black
- IP protection: IP65 front
- Mounting: Panel/Wall/Stand/VESA 100mm x 100mm
- Power input: 12V~30V
- Power adapter: Optional AC to DC power adapter (+12V, 60W)

- Vibration
  - IEC 68 2-64 (w/ HDD)
  - 0.5Grms @sine, 5~500Hz, 1hr/axis (HDD operating)
  - 2.2Grms @ random condition, 5~500Hz, 0.5hr/axis (Non-operating)
- Shock
  - IEC 68 2-27
  - HDD: 20G@wall mount, half sine, 11ms
- Operating Temperature: -5°C to 50°C
- Storage temperature: -20 to 75°C
- Operating humidity: 10%~90% relative humidity, non-condensing
- Dimensions: 409 x 309 x 62.5mm
- Weight: 5.3kg

Certifications

- CE approval
- FCC Class A

APPC 1720T/1721T

Key Features

- 4:3 17" Fanless Panel Computer
- Intel® Atom™ D525, Dual Core, Low Consumption CPU
- Flush Panel by 5-wire Touch Screen
- Dual GbE, 2nd Display VGA, Line-in, Line-out, Mic-in, PS2 KB/ MS
- 4 x USB, 2 x mini-PCIe, 1 x CF, 2 x RS232/422/485
- Optional Wi-Fi Module, 2.5"HDD, 2 x COMs, GPIO, CAN Bus
- DDR3 1GB, 2.5" HDD Bracket
- IP65 Compliant Front Panel
- Mounting Support: Panel/Wall/Stand/VESA 100mm x 100mm
- Wide Range Power Input: 12V~ 30V DC

Specifications

Panel
- LED Size: 17”, 4:3
- Resolution: SXGA 1280x1024
- Luminance: 380cd/m2
- Contrast ratio: 1000
- LCD color: 16.7M
- Viewing Angle: 80(U), 80(D), 85(L), 85(R)
- Backlight: CCFL
- Touch screen: 5-wire resistive (flush panel type)
- Touch light transmission: 81%
- Touch interface: USB

System
- CPU: Intel® Atom™ D525, 1.8GHz
- BIOS: AMI BIOS
- System chipset: Intel® ICH8M
- System memory: 1x 204-pin DDR3 SODIMM socket, 1G DDR3 (default), Supports up to 2GB DDR3 800, Non-ECC and Unbuffered
- SSD: one external locked CF socket by IDE; supports Type I/II CompactFlash card
- Hard drive bay: optional 2.5” SATA HDD or SATA DOM
- Watchdog timer: Watchdog timeout can be programmable by software from 1 second to 255 seconds and from 1 minute to 255 minutes (Tolerance 15% under room temperature 25°C)
- H/W status monitor: monitors system temperature and voltage
- Expansion: 2 x mini-PCIe sockets
- NEXCOM Xcare platform system management supported

Rear I/O
- CAN BUS (optional for APPC 1721T only)
- GPIO: 4 x digital in / 4 x digital out (APPC 1721T only)
- COM1: RS232/422/485 (APPC 1721T w/ 2.5kv isolated)
- COM2: RS232/422/485 (APPC 1721T w/ 2.5kv isolated)
- COM3 and COM4: RS232 (APPC 1721T only)
- Ethernet: 2 x RJ45
- 2nd display VGA port: 1 x DB15
- Audio port: 1 x Line-out; 1 x Line-in; 1 x Mic-in
- USB: 4 x USB 2.0
- PS2 keyboard/ mouse
- Power switch
- Reset button

Audio
- AC97 codec: Realtek ALC888
- Audio interface: Line-out, Line-in, Mic-in audio jacks

Ethernet
- LAN chip: Dual Intel 82574L Gigabit LAN
- Ethernet interface: 10/100/1000 Based-Tx Ethernet compatible

Mechanical and Environment
- Color: Pantone black
- IP protection: IP65 front
- Mounting: Panel/Wall/Stand/VESA 100mm x 100mm
- Power input: 12V~30V
- Power adapter: Optional AC to DC power adapter (+12V, 60W)

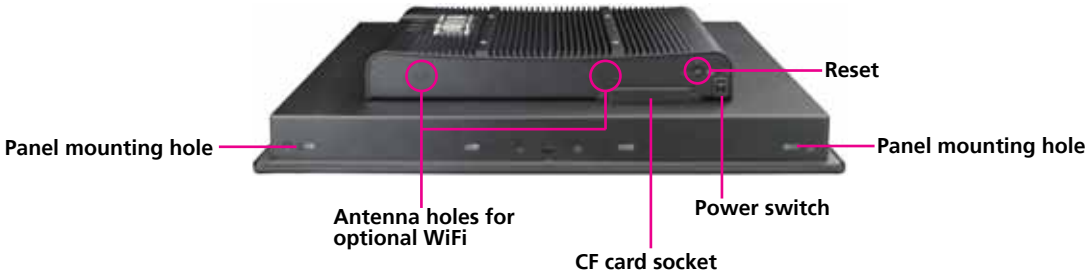
- Vibration
  - IEC 68 2-64 (w/ HDD)
  - 0.5Grms @sine, 5~500Hz, 1hr/axis (HDD operating)
  - 2.2Grms @ random condition, 5~500Hz, 0.5hr/axis (Non-operating)
- Shock
  - IEC 68 2-27
  - HDD: 20G@wall mount, half sine, 11ms
- Operating Temperature: -5°C to 50°C
- Storage temperature: -20 to 75°C
- Operating humidity: 10%~90% relative humidity, non-condensing
- Dimensions: 410.4 x 340.4 x 75.79mm
- Weight: 6.3 kg

Certifications

- CE approval
- FCC Class A

Getting to Know the APPC Series

Rear Top



Antenna Holes for Optional WiFi
The 2 external antenna mounting holes are used to mount and connect optional WiFi antennas.

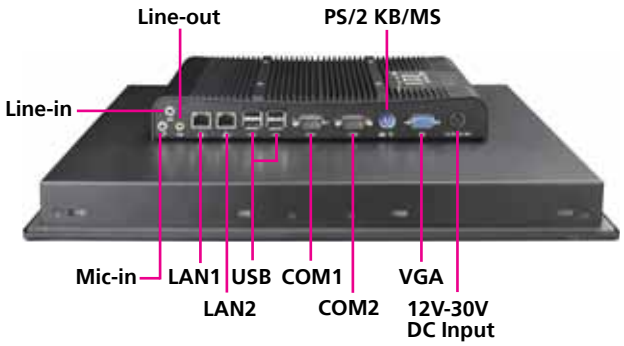
CF Card Socket
Used to insert a CompactFlash card.

Reset Button
Press this button to restart the system.

Power Switch
Press to power-on or power-off the system.

Panel Mounting Hole
These are mounting holes for Panel Mount with panel mount kit.

Rear Bottom



Used to connect an audio device, such as a CD player.Used to connect a headphone or a speaker.

Used to connect an external microphone.

Used to connect the system to a local area network.

Used to connect USB 2.0/1.1 devices.

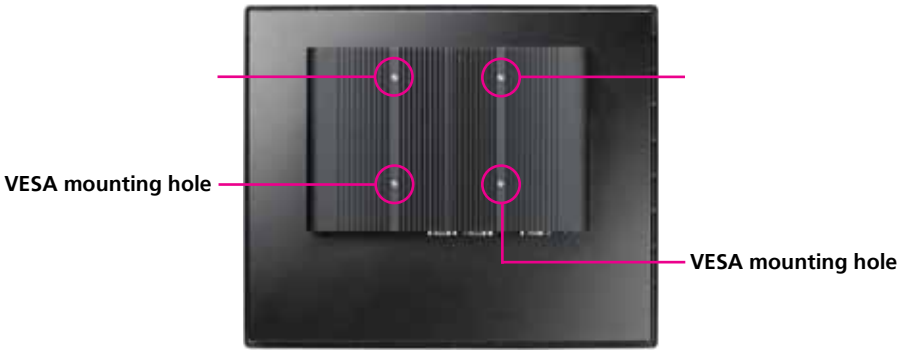
These COM ports support RS232/422/485 compatible serial devices. APPC 1221T/1521T/1721T are with 2.5kV isolation.

Used to connect a PS/2 keyboard and a PS/2 mouse via a cable.

Used to connect an analog VGA monitor.

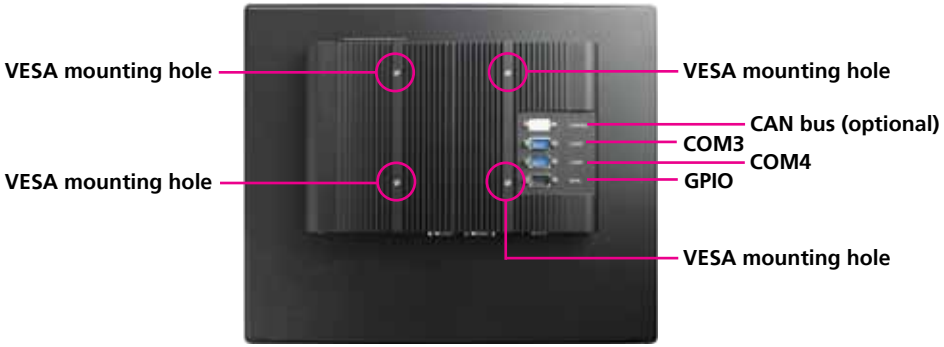
Used to plug a DC power cord.

Rear (APPC 1220T/1520T/1720T only)



VESA Mounting Holes
These are mounting holes for VESA mount.

Rear (APPC 1221T/1521T/1721T only)



CAN Bus (optional)
Used to connect CAN devices.

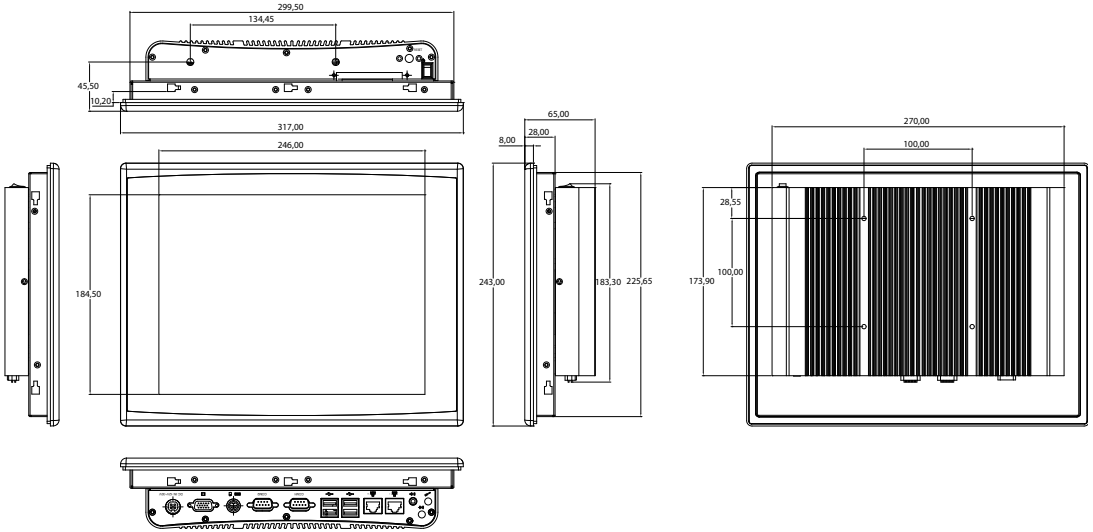
COM3 and COM4
These COM ports support RS232 compatible serial devices.

GPIO
General Purpose I/O for digital input/output control.

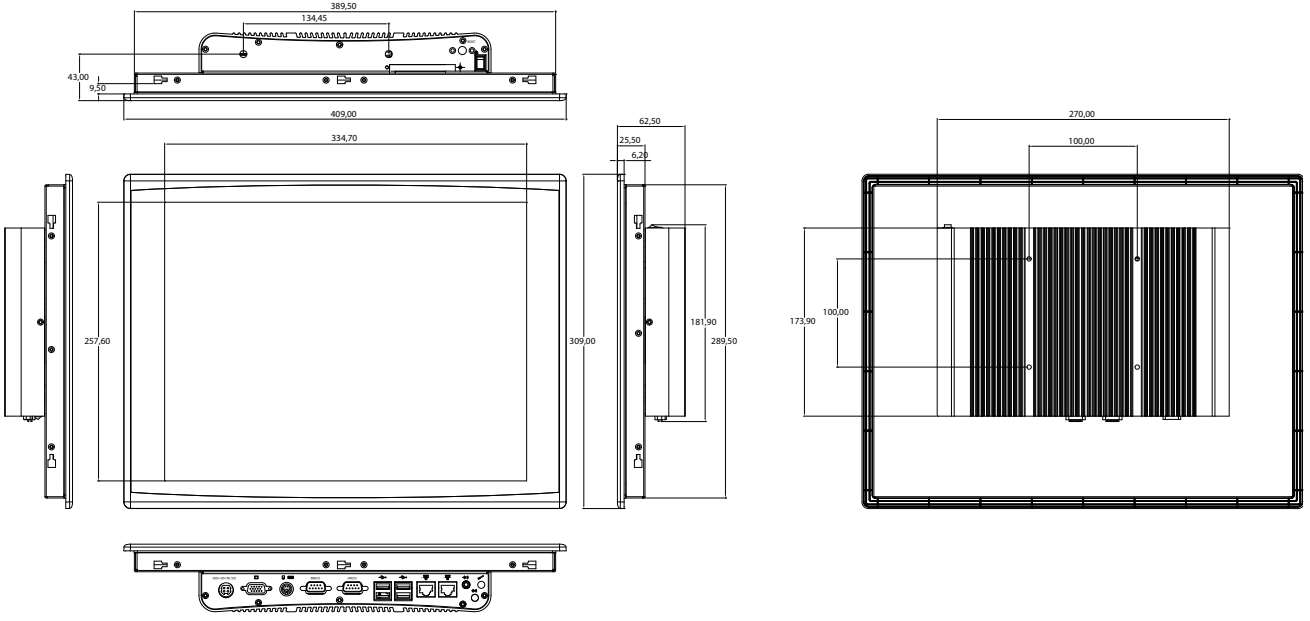
VESA Mounting Holes
These are mounting holes for VESA mount.

Mechanical Dimensions

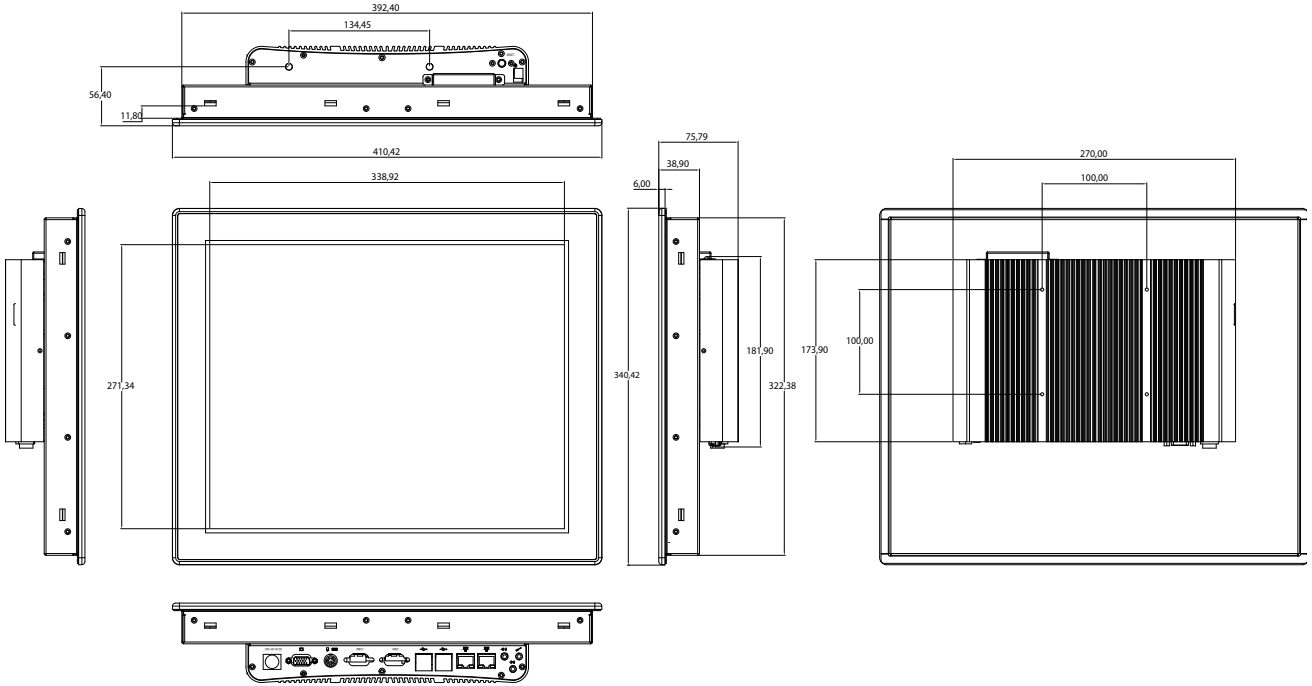
APPC 1220T/1221T



APPC 1520T/1521T



APPC 1720T/1721T



Chapter 2: Jumpers and Connectors

This chapter describes the jumpers and connectors on the motherboard. Note that information in this chapter applies to APPC 1220T/1221T/1520T/1521T/1720T/1721T.

Before You Begin

- Ensure you have a stable, clean working environment. Dust and dirt can get into components and cause a malfunction. Use containers to keep small components separated.
- Adequate lighting and proper tools can prevent you from accidentally damaging the internal components. Most of the procedures that follow require only a few simple tools, including the following:
  - A Philips screwdriver
  - A flat-tipped screwdriver
  - A set of jewelers Screwdrivers
  - A grounding strap
  - An anti-static pad
- Using your fingers can disconnect most of the connections. It is recommended that you do not use needle-nosed pliers to disconnect connections as these can damage the soft metal or plastic parts of the connectors.
- Before working on internal components, make sure that the power is off. Ground yourself before touching any internal components, by touching a metal object. Static electricity can damage many of the electronic components. Humid environment tend to have less static electricity than dry environments. A grounding strap is warranted whenever danger of static electricity exists.

Precautions

Computer components and electronic circuit boards can be damaged by discharges of static electricity. Working on the computers that are still connected to a power supply can be extremely dangerous.

Follow the guidelines below to avoid damage to your computer or yourself:

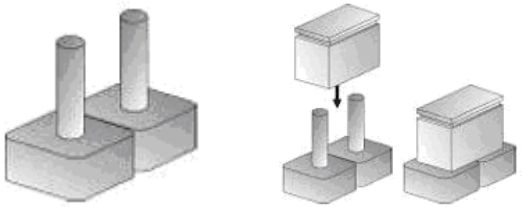
- Always disconnect the unit from the power outlet whenever you are working inside the case.
- If possible, wear a grounded wrist strap when you are working inside the computer case. Alternatively, discharge any static electricity by touching the bare metal chassis of the unit case, or the bare metal body of any other grounded appliance.
- Hold electronic circuit boards by the edges only. Do not touch the components on the board unless it is necessary to do so. Don't flex or stress the circuit board.
- Leave all components inside the static-proof packaging that they shipped with until they are ready for installation.
- Use correct screws and do not over tighten screws.

Jumper Settings

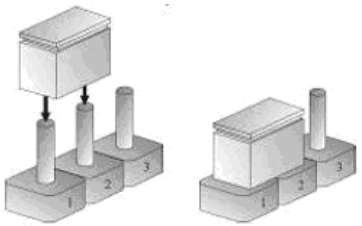
A jumper is the simplest kind of electric switch. It consists of two metal pins and a cap. When setting the jumpers, ensure that the jumper caps are placed on the correct pins. When the jumper cap is placed on both pins, the jumper is **short**. If you remove the jumper cap, or place the jumper cap on just one pin, the jumper is **open**.

Refer to the illustrations below for examples of what the 2-pin and 3-pin jumpers look like when they are short (on) and open (off).

Two-Pin Jumpers: Open (Left) and Short (Right)

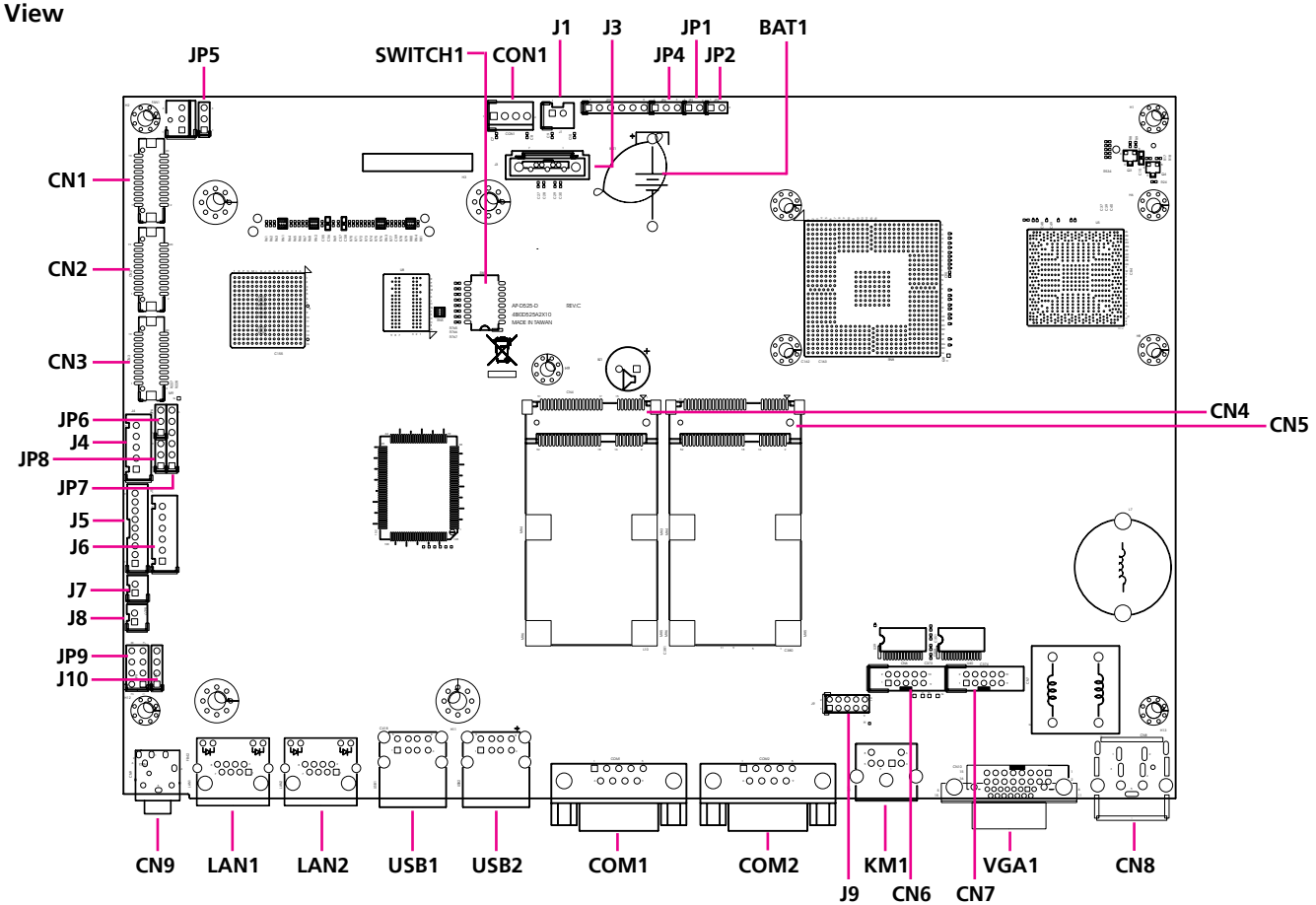


Three-Pin Jumpers: Pins 1 and 2 Are Short

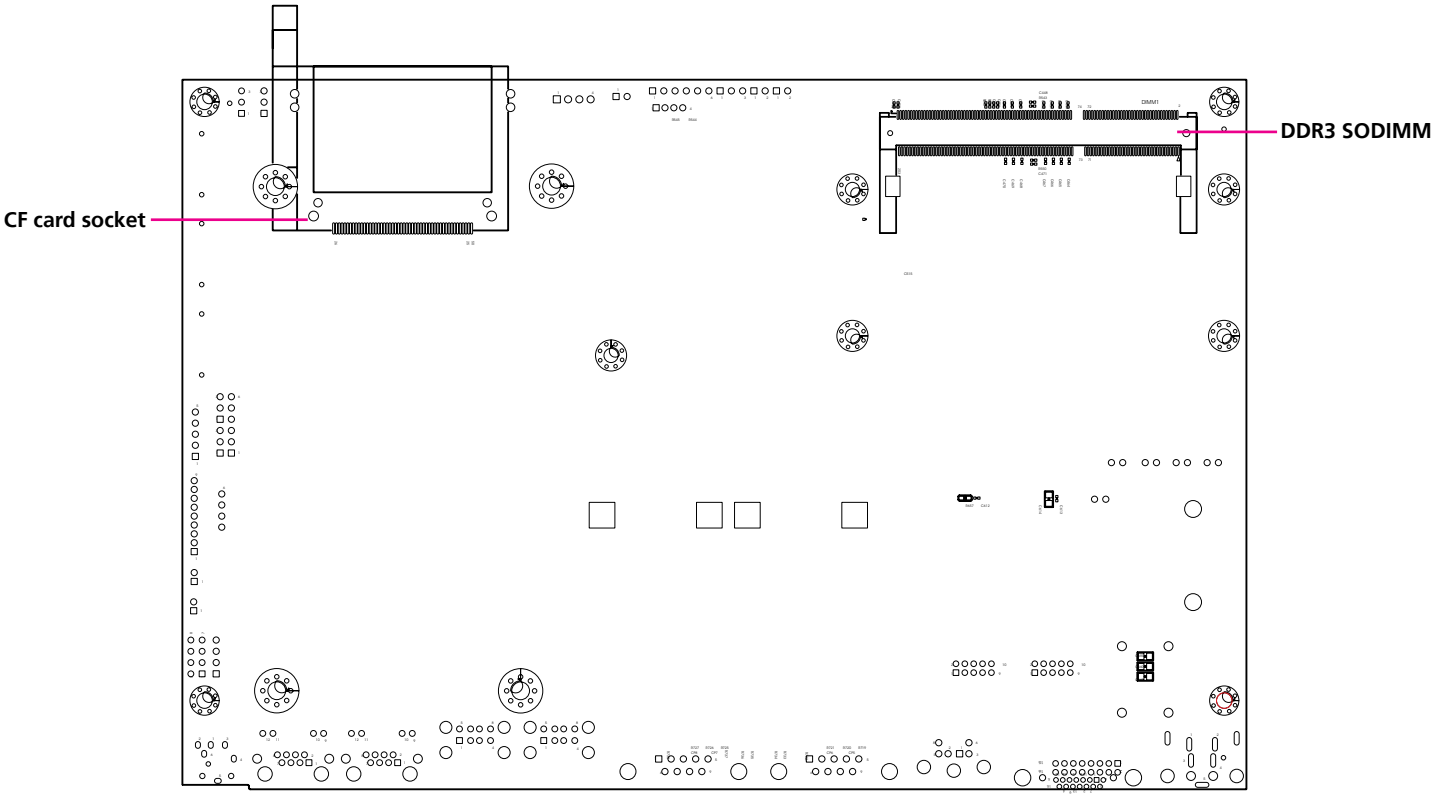


Locations of the Jumpers and Connectors

Top View



Bottom View



Jumpers

RTC Clear

Connector type: 1x3 3-pin header, 2.54 mm pitch
Connector location: JP4

Pin	Settings
1-2 On	Normal
2-3 On	CMOS Clear

1-2 On: default

Pin	Definition
1	NC
2	RTC Power
3	GND

Power Type Select

Connector type: 1x3 3-pin header, 2.54 mm pitch
Connector location: JP5

Pin	Definition
1-2 On	AT Mode
2-3 On	ATX Mode

2-3 On: default

Pin	Definition
1	AUTO (AT MODE)
2	PWRBT In
3	Manual (ATX MODE)

LCD Panel Power Select

Connector type: 1x3 3-pin header, 2.54 mm pitch
Connector location: JP6

1-2 On	3.3V
2-3 On	5V

1-2 On: default

Pin	Definition
1	VCC3
2	Power for VDD
3	VCC5

Touch 4/5/8 Wire Select

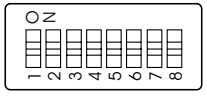
Connector type: 1x3 3-pin header, 2.54 mm pitch
Connector location: JP8

Pin	Definition
1-2 On	5 wire
2-3 On	4/8 wire

1-2 On: default

Panel Resolution Select

Connector type: 8-pin On/Off Switch
Connector location: SWITCH1



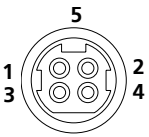
Model	Resolution	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
APPC1220T APPC1221T	800x600	ON	ON	ON	OFF	OFF	OFF	OFF	OFF
APPC1520T APPC1521T	1024x768	OFF	OFF	ON	OFF	ON	ON	OFF	OFF
APPC1720T APPC1721T	1280x1024	OFF	OFF	OFF	OFF	ON	ON	ON	OFF

Connector Pin Definitions

External I/O Interface

12V-30V DC Power Input

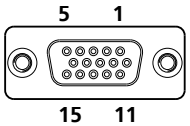
Connector size: DC 4-pin DIN Power Jack with Shield
Connector location: CN8



Pin	Definition
1	DC+
2	DC+
3	DC-
4	DC-
5	GND

VGA Port

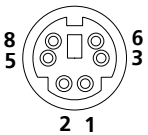
Connector type: DB-15 port, 15-pin D-Sub
Connector location: VGA1



Pin	Definition	Pin	Definition
1	Red	9	+5V
2	Green	10	GND
3	Blue	11	N/C
4	N/C	12	DDC Data
5	GND	13	HSYNC
6	GND	14	VSYNC
7	GND	15	DDC Clock
8	GND	16	N/C

PS/2 Keyboard/Mouse Port

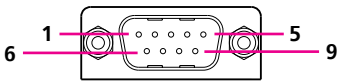
Connector type: PS/2, Mini-DIN-6, JST-2.0mm-M-180
Connector location: KM1



Pin	Definition
1	KB_DATA
2	MS_DATA
3	GND
4	NC
5	VCC5
6	KB_CLK
7	NC
8	MS_CLK

COM1 Port (Isolation with RS422/485)

Connector type: DB-9
Connector location: COM1



RS232

Pin	Definition	Pin	Definition
1	DCD#: Data Carrier Detect	2	RXD#: Receive Data
3	TXD: Transmit Data	4	DTR#: Data Terminal Ready
5	GND	6	DSR#: Data Set Ready
7	RTS#: Request To Send	8	CTS#: Clear To Send
9	RI#: Ring Indicator (could be a 5V or 12V power pin)		

RS422

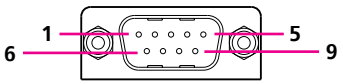
Pin	Definition	Pin	Definition
1	TXD-: Transmit Data Negative	2	TXD+: Transmit Data Positive
3	RXD+: Receive Data Positive	4	RXD-: Receive Data Negative
5	GND DCD#: Data Carrier Detect	6	RTS-: Request To Send Negative
7	RTS+: Request To Send Positive	8	CTS+: Clear to Send Positive
9	CTS-: Clear To Send Negative (could be a 5V or 12V power pin)		

RS485

Pin	Definition	Pin	Definition
1	TXD-: Transmit Data Negative RXD-: Receive Data Negative	2	TXD+: Transmit Data Positive RXD+: Receive Data Positive
3	Reserved	4	Reserved
5	Reserved	6	Reserved
7	Reserved	8	Reserved
9	Reserved (could be a 5V or 12V power pin)		

COM2 Port (Isolation with RS422/485)

Connector type: DB-9
Connector location: COM2



RS232

Pin	Definition	Pin	Definition
1	DCD#: Data Carrier Detect	2	RXD#: Receive Data
3	TXD: Transmit Data	4	DTR#: Data Terminal Ready
5	GND	6	DSR#: Data Set Ready
7	RTS#: Request To Send	8	CTS#: Clear To Send
9	RI#: Ring Indicator (could be a 5V or 12V power pin)		

RS422

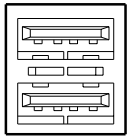
Pin	Definition	Pin	Definition
1	TXD-: Transmit Data Negative	2	TXD+: Transmit Data Positive
3	RXD+: Receive Data Positive	4	RXD-: Receive Data Negative
5	GND DCD#: Data Carrier Detect	6	RTS-: Request To Send Negative
7	RTS+: Request To Send Positive	8	CTS+: Clear to Send Positive
9	CTS-: Clear To Send Negative (could be a 5V or 12V power pin)		

RS485

Pin	Definition	Pin	Definition
1	TXD-: Transmit Data Negative RXD-: Receive Data Negative	2	TXD+: Transmit Data Positive RXD+: Receive Data Positive
3	Reserved	4	Reserved
5	Reserved	6	Reserved
7	Reserved	8	Reserved
9	Reserved (could be a 5V or 12V power pin)		

USB Ports

Connector type: Dual USB port
Connector location: USB1 and USB2



USB1

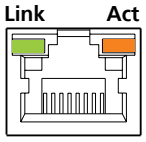
Pin	Definition	Pin	Definition
1	VCC5	5	VCC5
2	USB0-	6	USB1-
3	USB0+	7	USB1+
4	GND	8	GND

USB2

Pin	Definition	Pin	Definition
1	VCC5	5	VCC5
2	USB2-	6	USB3-
3	USB2+	7	USB3+
4	GND	8	GND

LAN1 Port

Connector type: RJ45 port with LEDs
Connector location: LAN1



Link	Status
Green Always Lighted	1000M
Orange Always Lighted	100M
Off	10M or No Link

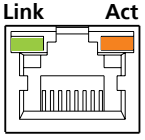
Act	Status
Orange Blinking	Data Activity
Off	No Acitivity

Pin	Definition	Pin	Definition
1	MDI0+	5	MDI2-
2	MDI0-	6	MDI1-
3	MDI1+	7	MDI3+
4	MDI2+	8	MDI3-

LAN2 Port

Connector type: RJ45 port with LEDs
Connector location: LAN2

Note: LAN2 supports Wake On LAN (WOL)



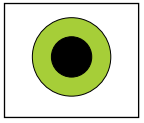
Link	Status
Green Always Lighted	1000M
Orange Always Lighted	100M
Off	10M or No Link

Act	Status
Orange Blinking	Data Activity
Off	No Acitivity

Pin	Definition	Pin	Definition
1	MDI0+	5	MDI2-
2	MDI0-	6	MDI1-
3	MDI1+	7	MDI3+
4	MDI2+	8	MDI3-

Line-out Jack

Connector type: 1x5 5-pin header, 2.0 mm pitch
Connector location: CN9



Pin	Definition
1	LOUT_R
2	JD
3	NC
4	LOUT_L
5	GND
6	GND

Internal Connectors

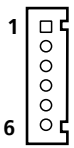
Xilinx Programming Connector (APPC 1720T/1721T/1520T/1521T only)

Connector type: 1x6 6-pin header, 2.54 mm pitch
Connector location: JP7

Pin	Definition
1	VCC3
2	GND
3	TCK
4	TDO
5	TDI
6	TMS

Panel Backlight Connector

Connector size: 1x6 6-pin JST, 2.54 mm pitch
Connector location: J4



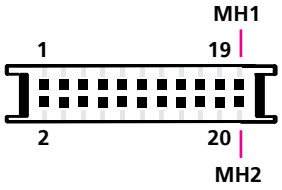
Pin	Definition
1	BKCTRL
2	GND
3	12V
4	GND
5	BKLEN
6	VCC5

Pin 1 BKCTRL Functional Status

Percentage	Voltage Level
100%	3.4V
80%	2.7V
60%	1.9V
40%	1.1V

LVDS Panel Backlight Connector (APPC 1220T/1221T only)

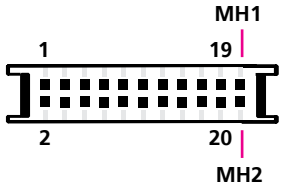
Connector type: 2x10 20-pin, LCD-1.25mm-M-180
Connector location: CN1 (from Pineview)



Pin	Definition	Pin	Definition
1	NC	11	RXCLK+
2	NC	12	RX1-
3	VDD	13	RXCLK-
4	RX0+	14	GND
5	NC	15	GND
6	RX0-	16	12V
7	NC	17	RX2+
8	VDD	18	12V
9	GND	19	RX2-
10	RX1+	20	GND

LVDS Panel Backlight Connector (APPC 1720T/1721T/1520T/1521T only)

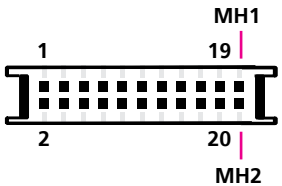
Connector type: 2x10 20-pin, LCD-1.25mm-M-180
Connector location: CN2 (from Xilinx)



Pin	Definition	Pin	Definition
1	NC	11	RXCLK+ (ODD)
2	NC	12	RX1- (ODD)
3	VDD	13	RXCLK- (ODD)
4	RX0+ (ODD)	14	GND
5	RX3+ (ODD)	15	GND
6	RX0- (ODD)	16	12V
7	RX3- (ODD)	17	RX2+ (ODD)
8	VDD	18	12V
9	GND	19	RX2- (ODD)
10	RX1+ (ODD)	20	GND

LVDS Panel Backlight Connector (APPC 1720T/1721T/1520T/1521T only)

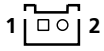
Connector type: 2x10 20-pin, LCD-1.25mm-M-180
Connector location: CN3 (from Xilinx)



Pin	Definition	Pin	Definition
1	NC	11	RXCLK+ (EVEN)
2	NC	12	RX1- (EVEN)
3	VDD	13	RXCLK- (EVEN)
4	RX0+ (EVEN)	14	GND
5	RX3+ (EVEN)	15	GND
6	RX0- (EVEN)	16	12V
7	RX3+ (EVEN)	17	RX2+ (EVEN)
8	VDD	18	12V
9	GND	19	RX2- (EVEN)
10	RX1+ (EVEN)	20	GND

Power Button Connector

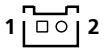
Connector type: 1x2 2-pin header, JST 2.0 mm pitch
Connector location: J7



Pin	Definition
1	PWRBT
2	GND

Reset Button

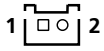
Connector type: 1x2 2-pin header, 2.0 mm pitch
Connector location: J8



Pin	Definition
1	PWRBT
2	GND

SATA DOM Power Connector

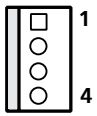
Connector type: 1x2 2-pin header, JST 2.0 mm pitch
Connector location: J1



Pin	Definition
1	PWRBT
2	GND

SATA Power Connector

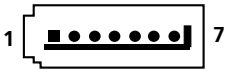
Connector type: 1x4 4-pin Wafer, 2.54 mm pitch
Connector location: CON1



Pin	Definition
1	+12V
2	GND
3	GND
4	VCC5

SATA Port

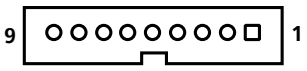
Connector type: Standard Serial ATAII 7P (1.27mm, SATA-M-180)
Connector location: J3



Pin	Definition
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

Touch Sensor Connector

Connector type: 1x9 9-pin boxed header, JST-2.0mm-M-180
Connector location: J5



	Touch Screen Lines		
	8-Wire	4-Wire	5-Wire
9	Right Sense	N/A	N/A
8	Left Sense	N/A	N/A
7	Bottom Sense	N/A	N/A
6	Top Sense	N/A	Sense (S)
5	Right Excite	Right	LR (X)
4	Left Excite	Left	LL (L)
3	Bottom Excite	Bottom	UR (H)
2	Top Excite	Top	UL (Y)
1	GND	GND	GND

USB Connector

Connector size: 1x6 6-pin JST wafer, 2.54 mm pitch
Connector location: J6

Pin	Definition
1	+5V
2	USB4-
3	USB4+
4	USB5-
5	USB5+
6	GND

CompactFlash

Connector type: 1x50 50-pin with Ejector, CompactFlash Type 2
Connector location: IDE1

Pin	Description	Pin	Description
1	GND	26	CF_DETECT
2	PD Data3	27	PD Data11
3	PD Data4	28	PD Data12
4	PD Data5	29	PD Data13
5	PD Data6	30	PD Data14
6	PD Data7	31	PD Data15
7	-PCS0	32	-PCS1
8	GND	33	N/C
9	GND	34	-PDIOR
10	GND	35	-PDIOW
11	GND	36	+5V
12	GND	37	IRQ14
13	+5V	38	+5V
14	GND	39	GND

Pin	Description	Pin	Description
15	GND	40	N/C
16	GND	41	CF_RESET#
17	GND	42	+3.3V
18	PDAddress2	43	PDDREQ
19	PDAddress1	44	PDDACK
20	PDAddress0	45	IDE_ACT#
21	PDData0	46	N/C
22	PDData1	47	PD Data8
23	PDData2	48	PD Data9
24	N/C	49	PD Data10
25	GND	50	GND

Power LED Connector

Connector type: 1x2 2-pin header, 2.54 mm pitch
Connector location: JP2

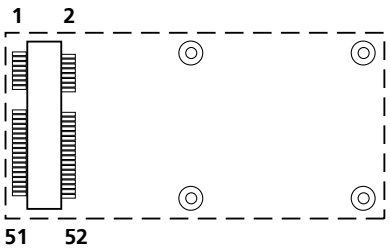
Pin	Definition
1	+5V
2	GND

Connector type: 1x2 2-pin header, 2.54 mm pitch
Connector location: JP1

Pin	Definition
1	+5V
2	HD_LED#

Mini-PCIe Slots

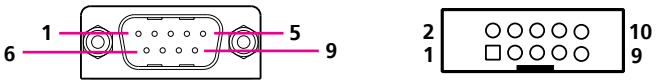
Connector location: CN4 and CN5



Pin	Definition	Pin	Definition
1	WAKE0#	2	+V3.3_MINI
3	NC	4	GND
5	NC	6	+V1.5S_MINI
7	NC	8	NC
9	GND	10	NC
11	GPP_CLK0_N	12	NC
13	GPP_CLK0_P	14	NC
15	GND	16	NC
17	NC	18	GND
19	NC	20	MINICARD1_DIS#
21	GND	22	PCIE_RST#
23	PCIE_RX2N	24	+V3.3A_MINI
25	PCIE_RX2P	26	GND
27	GND	28	+V1.5S_MINI
29	GND	30	SMB_CLK
31	PCIE_TX2N	32	SMB_DAT
33	PCIE_TX2P	34	GND
35	GND	36	USB_6N
37	GND	38	USB_6P
39	+V3.3A_MINI	40	GND
41	+V3.3A_MINI	42	NC
43	GND	44	NC
45	NC	46	NC
47	NC	48	+V1.5S_MINI
49	NC	50	GND
51	NC	52	+V3.3A_MINI

COM3 Connectors (APPC 1721T/1521T/1221T only)

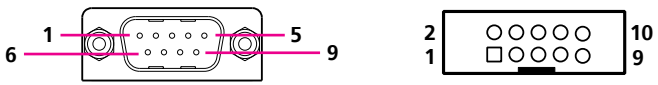
Connector type: DB-9; 2x5 10-pin boxed header, 2.0 mm pitch
Connector location: CN6



Pin	Definition	Pin	Definition
1	COM3_DCD	6	COM3_DSR
2	COM3_RXD	7	COM3_RTS
3	COM3_TXD	8	COM3_CTS
4	COM3_DTR	9	COM3_RI
5	COM3_GND	10	COM3_GND

COM4 Connectors (APPC 1721T/1521T/1221T only)

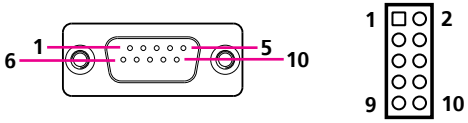
Connector type: DB-9; 2x5 10-pin boxed header, 2.0 mm pitch
Connector location: CN7



Pin	Definition	Pin	Definition
1	COM4_DCD	6	COM4_DSR
2	COM4_RXD	7	COM4_RTS
3	COM4_TXD	8	COM4_CTS
4	COM4_DTR	9	COM4_RI
5	COM4_GND	10	COM4_GND

GPIO Connector
4 digital input and 4 digital output
(APPC 1721T/1521T/1221T only)

Connector type: DB-15; 2x5 10-pin header, 2.0 mm-M-180
Connector location: J9



Pin	Definition	Pin	Definition
1	+5V	2	GND
3	GPIO24 (GPO)	4	GPIO20 (GPI)
5	GPIO25 (GPO)	6	GPIO21 (GPI)
7	GPIO26 (GPO)	8	GPIO22 (GPI)
9	GPIO27 (GPO)	10	GPIO23 (GPI)

Line-in/Mic-in Connector

Connector type: 2x4 8-pin header, 2.54 mm
Connector location: JP9

Pin	Definition	Pin	Definition
1	LINE IN-LP	2	MIC1_L3
3	LINE IN -JD	4	MIC_JD
5	GND	6	GND
7	LINE IN-RP	8	MIC1_R3

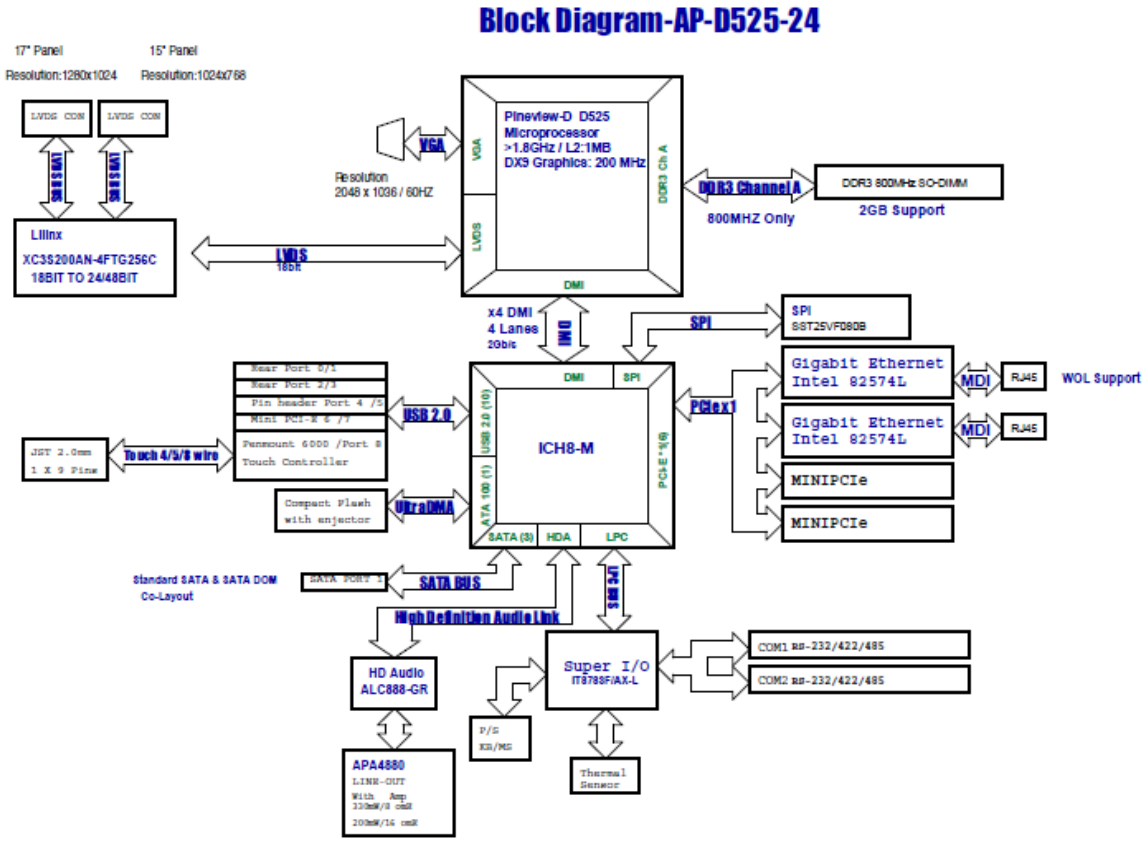
Speaker-out Connector

Connector type: 1x4 4-pin header, 2.54 mm pitch
Connector location: J10

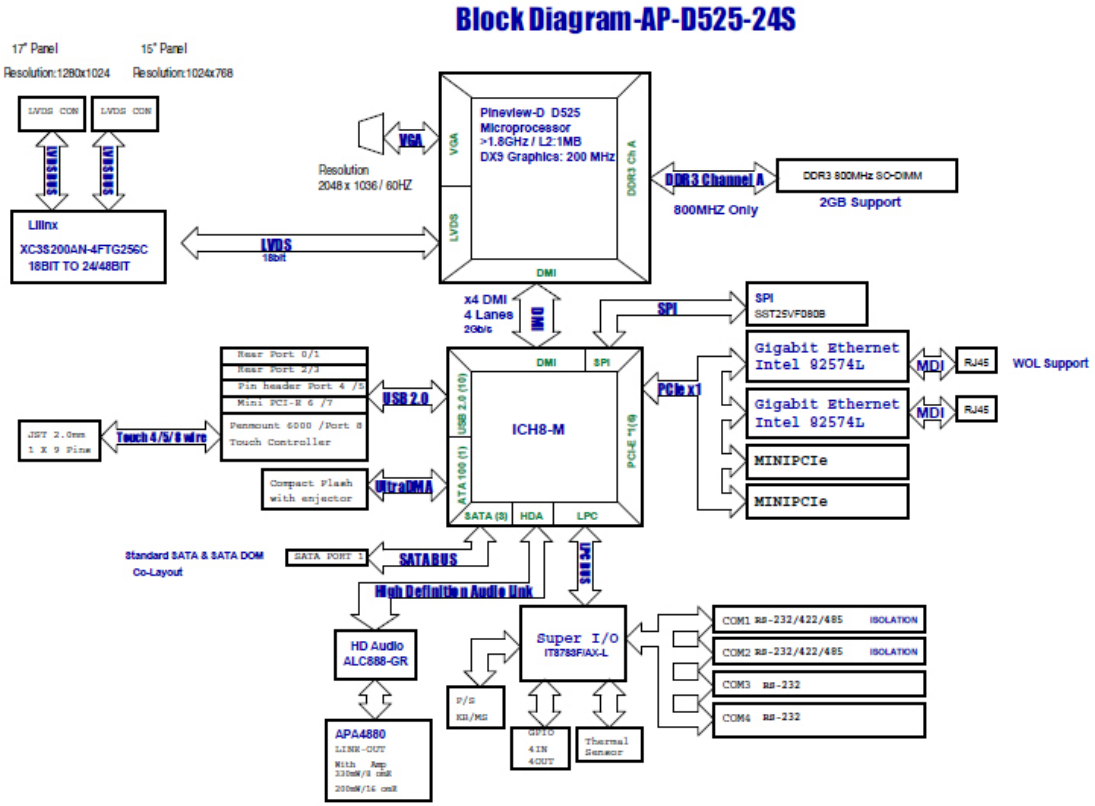
Pin	Definition
1	OUT-L+
2	OUT-L-
3	OUT-R+
4	OUT-R-

Block Diagram

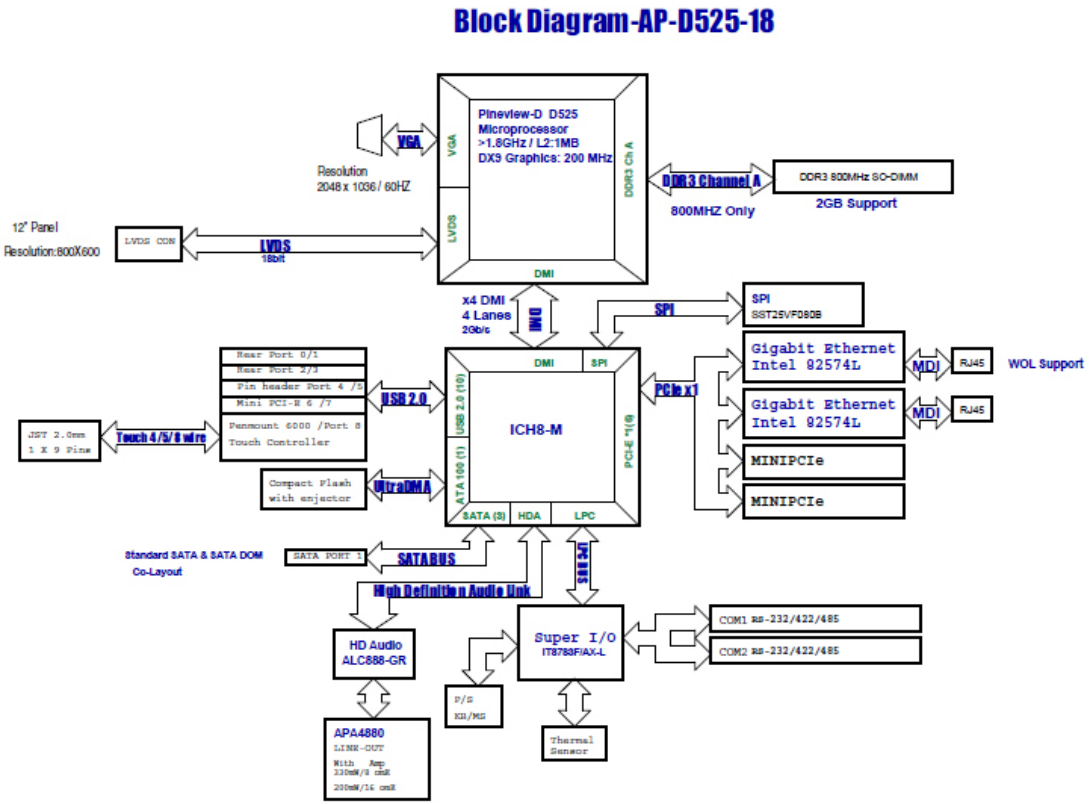
APPC 1720T/1520T



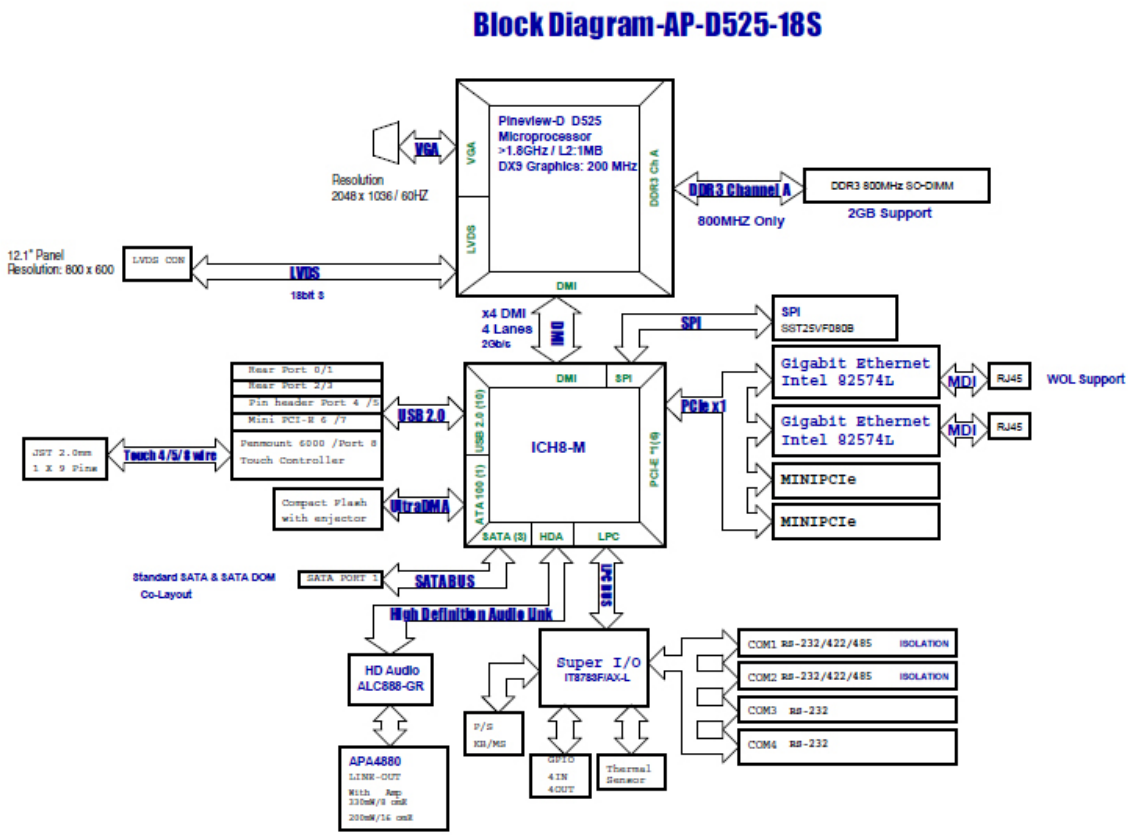
APPC 1721T/1521T



APPC 1220T



APPC 1221T



Chapter 3: System Setup

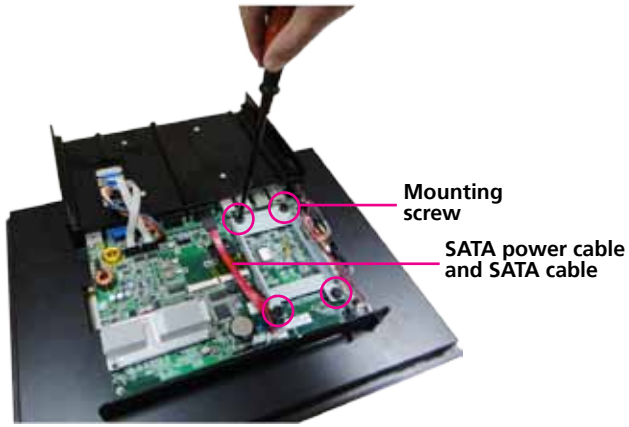
Installing a SATA Hard Drive

Prior to removing the chassis cover, make sure the unit's power is off and disconnected from the power sources to prevent electric shock or system damage.

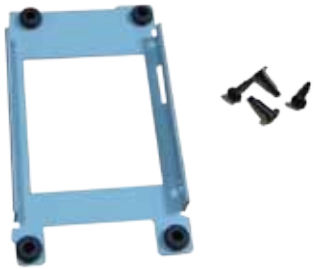
1. Remove the mounting screws around the chassis cover and then remove the cover.

The dots denote the locations of the screws.

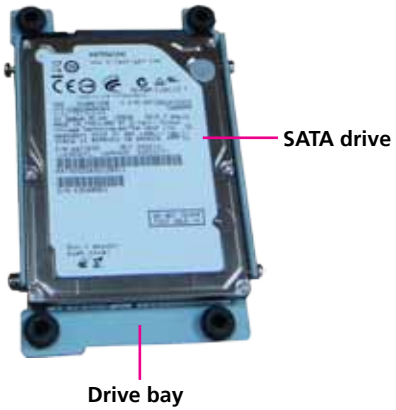
2. Remove the mounting screws of the drive bay.



3. Remove the drive bay. The drive bay is used to hold a SATA hard drive.



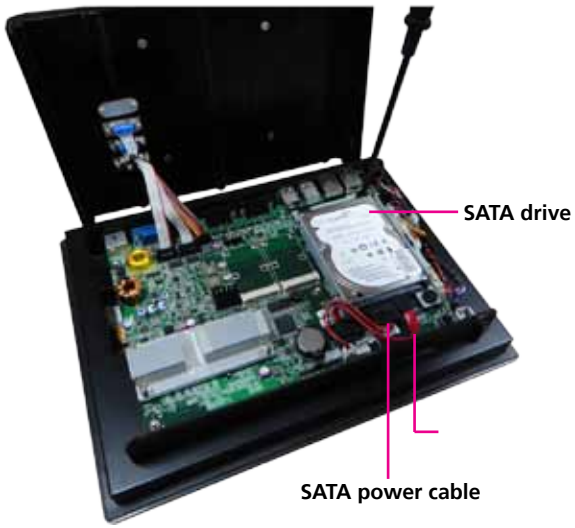
4. Place the SATA hard drive on the drive bay.



5. Align the mounting holes that are on the sides of the SATA drive with the mounting holes on the drive bay and then use the provided mounting screws to secure the drive in place.

6. Place the SATA drive in the chassis and then use the provided mounting screws to secure the drive in the chassis.

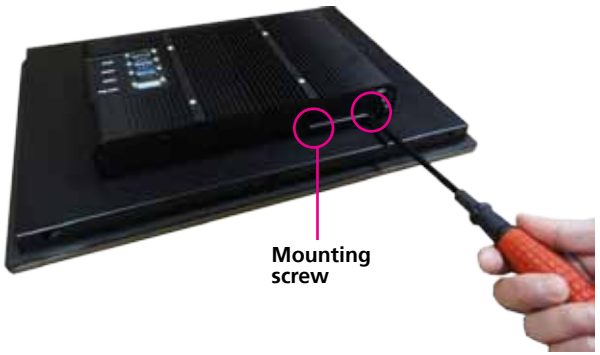
   Connect the SATA data cable and SATA power cable to the connectors on the SATA drive.



Installing a CompactFlash Card

1. The CompactFlash card socket is located on the rear top side of the chassis.

2. Remove the mounting screws of the CompactFlash socket's cover.



3. With the CompactFlash card's label facing up, insert the card until it is completely seated in the socket.

4. Push the Eject button to remove the CompactFlash card.

Installing a SODIMM

1. Remove the mounting screws around the panel and then remove the panel cover.

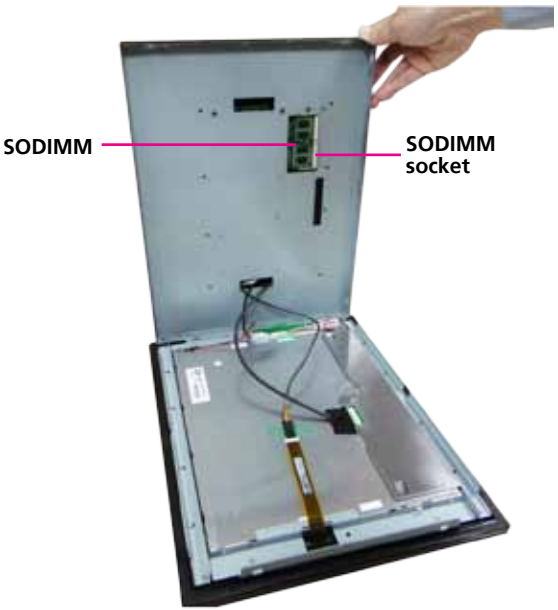
APPC 1220T/1221T

APPC 1520T/1521T

APPC 1720T/1721T

2. Insert the module into the socket at an approximately 30 degrees angle. Apply firm even pressure to each end of the module until it slips into the socket. The gold-plated connector on the edge of the module will almost completely disappear inside the socket.

3. Push the module down until the clips on both sides of the socket lock into position. You will hear a distinctive "click", indicating the module is correctly locked into position.

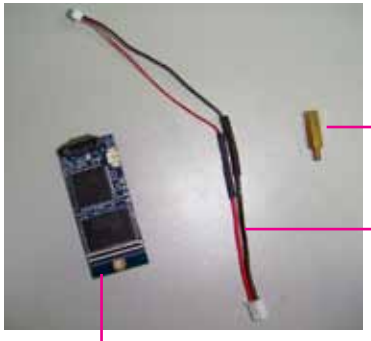


Installing a SATA DOM

1. Remove the drive bay bracket. The SATA connector is readily accessible upon removing the bracket.

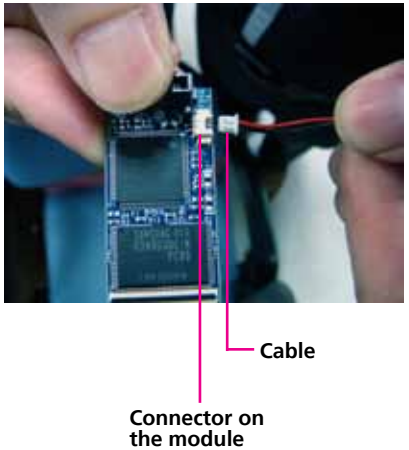
2. Remove the screw.

3. The SATA DOM package includes a supporting stud. The stud is used to stabilize the SATA DOM module.



4. Install the supporting stud. Make sure the stud is fastened in place.

5. Connect one end of the provided cable to the connector on the module.



6. Install the module to the SATA port via the connector at the solder side of the module and then secure the module using the mounting screw you removed in step 2.

7. Connect the other end of the cable to the connector on the board.

Installing a Mini PCIe Module

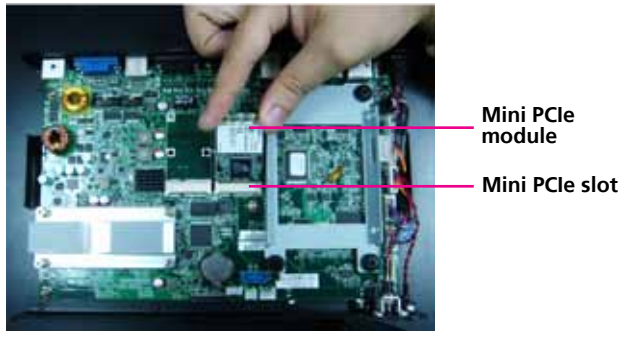
1. The Mini PCIe module package includes the following items.

Mini PCIe Module

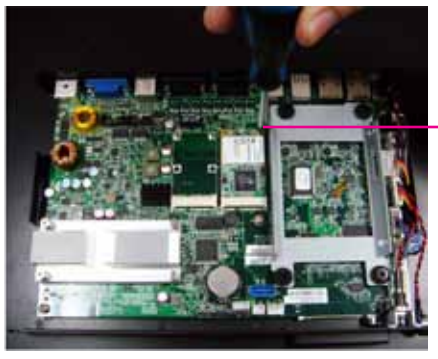
Antennas

RF Cables

2. Insert the Mini PCIe module into the Mini PCIe slot at a 45 degrees angle until the gold-plated connector on the edge of the module completely disappears inside the slot.



3. Secure the module with mounting screws.

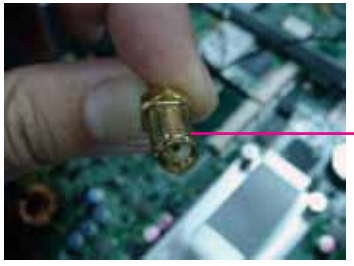


4. Attach one end of the RF cables onto the module.

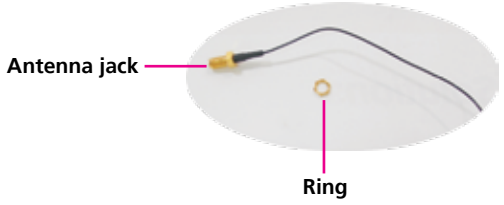
5. Push the antenna hole cover.

6. Remove the antenna hole covers.

7. Insert the antenna jack end of the cable through the antenna hole.



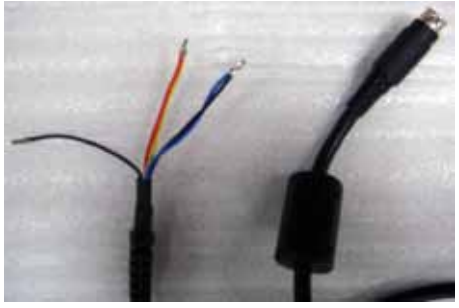
8. Insert the ring onto the antenna jack end of the cable.



9. Connect external antennas to the antenna jacks.

Plugging the DC Power Cable

1. Plug the DC 4-pin DIN power jack (male) into the DC 4-pin DIN power jack (female) that is on the system.



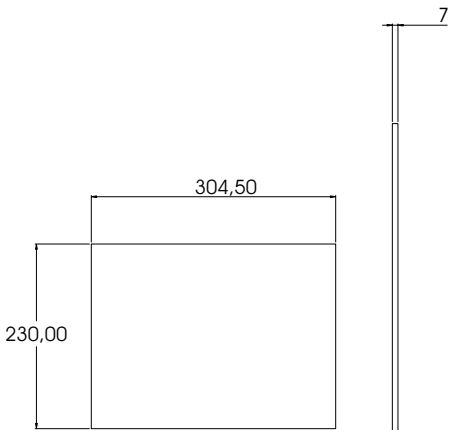
2. The table below shows the pin definition of the cable.

Color	Pin Definition
Black	GND
Red&Yellow	DC+
Blue&Black	DC-

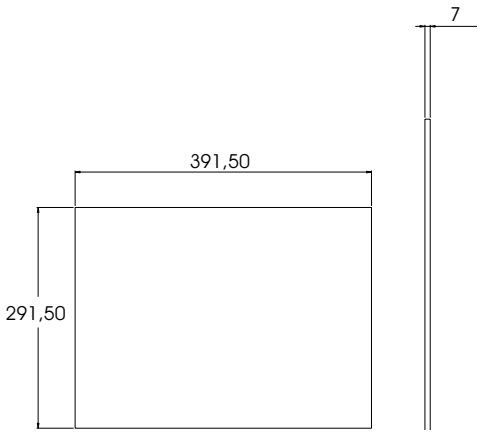
Panel Mounting

1. Select a place on the panel where you will mount the Panel PC.
2. Cut out a shape on the panel that corresponds to the Panel PC's rear dimensions.

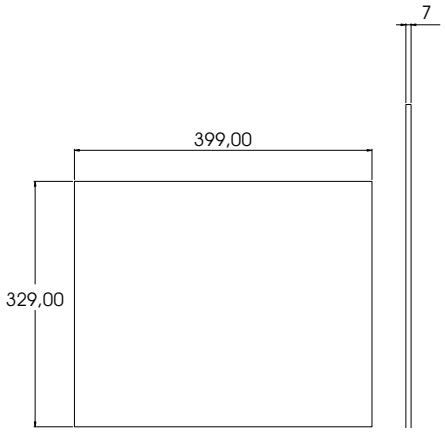
   The thickness of the panel (e.g. steel board, plank, acrylic board, wall, etc.) where you will mount the Panel PC must not exceed 7mm. If the distance between the front bezel and panel mount hole is too wide, it will not fit the panel mount kit.



APPC 1220T/1221T



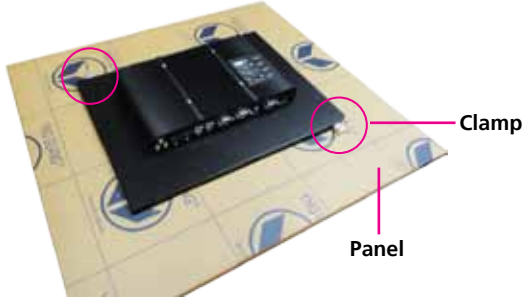
APPC 1550T/1551T



APPC 1770T/1771T

3. Slide the Panel PC through the hole until it is properly fitted against the panel.

4. Position the mounting clamps along the rear edges of the Panel PC. The first and second clamps must be positioned and secured diagonally prior to mounting the rest of the clamps. Tighten the clamp's screw until it touches the panel. Do not overtighten the screws to prevent damaging the Panel PC.



5. The illustration below shows all clamps properly mounted.

Chapter 4: BIOS Setup

This chapter describes how to use the BIOS setup program for the APPC Series. The BIOS screens provided in this chapter are for reference only and may change if the BIOS is updated in the future.

To check for the latest updates and revisions, visit the NEXCOM Web site at www.nexcom.com.tw.

About BIOS Setup

The BIOS (Basic Input and Output System) Setup program is a menu driven utility that enables you to make changes to the system configuration and tailor your system to suit your individual work needs. It is a ROM-based configuration utility that displays the system's configuration status and provides you with a tool to set system parameters.

These parameters are stored in non-volatile battery-backed-up CMOS RAM that saves this information even when the power is turned off. When the system is turned back on, the system is configured with the values found in CMOS.

With easy-to-use pull down menus, you can configure such items as:

- Hard drives, diskette drives, and peripherals
- Video display type and display options
- Password protection from unauthorized use
- Power management features

The settings made in the setup program affect how the computer performs. It is important, therefore, first to try to understand all the Setup options, and second, to make settings appropriate for the way you use the computer.

When to Configure the BIOS

This program should be executed under the following conditions:

- When changing the system configuration
- When a configuration error is detected by the system and you are prompted to make changes to the Setup program
- When resetting the system clock
- When redefining the communication ports to prevent any conflicts
- When making changes to the Power Management configuration
- When changing the password or making other changes to the security setup

Normally, CMOS setup is needed when the system hardware is not consistent with the information contained in the CMOS RAM, whenever the CMOS RAM has lost power, or the system features need to be changed.

Default Configuration

Most of the configuration settings are either predefined according to the Load Optimal Defaults settings which are stored in the BIOS or are automatically detected and configured without requiring any actions. There are a few settings that you may need to change depending on your system configuration.

Entering Setup

When the system is powered on, the BIOS will enter the Power-On Self Test (POST) routines. These routines perform various diagnostic checks; if an error is encountered, the error will be reported in one of two different ways:

- If the error occurs before the display device is initialized, a series of beeps will be transmitted.
- If the error occurs after the display device is initialized, the screen will display the error message.

Powering on the computer and immediately pressing <Del> allows you to enter Setup. Another way to enter Setup is to power on the computer and wait for the following message during the POST:

```
TO ENTER SETUP BEFORE BOOT
PRESS <CTRL-ALT-ESC>
Press the <Del> key to enter Setup:
```

Legends

Key	Function
Right and Left arrows	Moves the highlight left or right to select a menu.
Up and Down arrows	Moves the highlight up or down between sub-menus or fields.
<Esc>	Exits to the BIOS Setup Utility.
+ (plus key)	Scrolls forward through the values or options of the highlighted field.
- (minus key)	Scrolls backward through the values or options of the highlighted field.
Tab	Selects a field.
<F1>	Displays General Help.
<F10>	Saves and exits the Setup program.
<Enter>	Press <Enter> to enter the highlighted sub-menu.

Scroll Bar

When a scroll bar appears to the right of the setup screen, it indicates that there are more available fields not shown on the screen. Use the up and down arrow keys to scroll through all the available fields.

Submenu

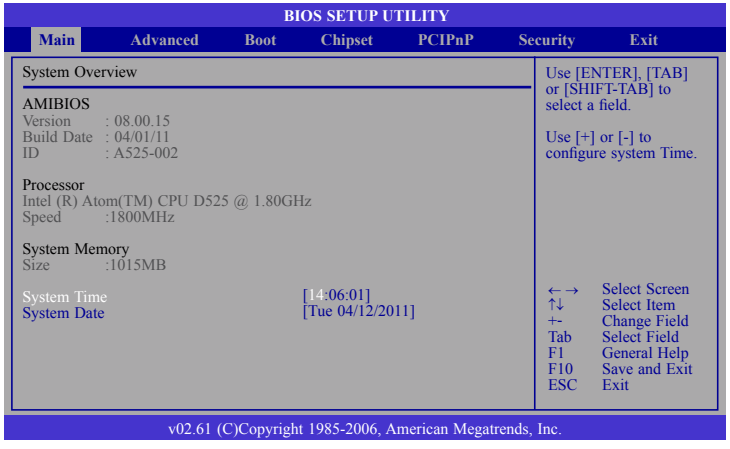
When "▶" appears on the left of a particular field, it indicates that a submenu which contains additional options are available for that field. To display the submenu, move the highlight to that field and press <Enter>.

BIOS Setup Utility

Once you enter the AMI BIOS Setup Utility, the Main Menu will appear on the screen. The main menu allows you to select from six setup functions and one exit choices. Use arrow keys to select among the items and press <Enter> to accept or enter the submenu.

Main

The Main menu is the first screen that you will see when you enter the BIOS Setup Utility.



AMI BIOS

Displays the detected BIOS information.

Processor

Displays the detected processor information.

System Memory

Displays the detected system memory information.

System Time

The time format is <hour>, <minute>, <second>. The time is based on the 24-hour military-time clock. For example, 1 p.m. is 13:00:00. Hour displays hours from 00 to 23. Minute displays minutes from 00 to 59. Second displays seconds from 00 to 59.

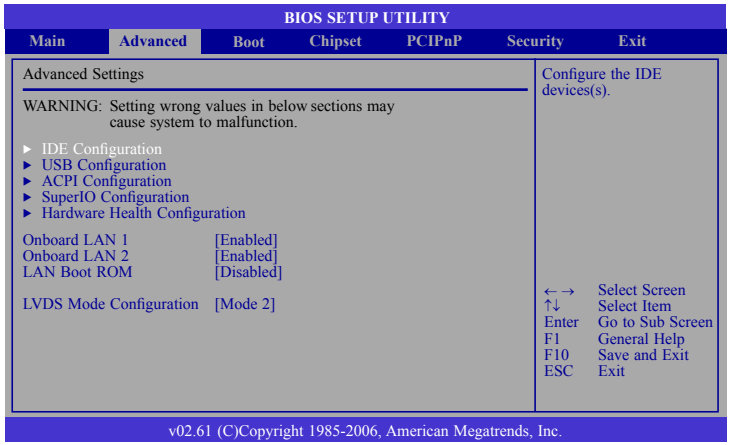
System Date

The date format is <day>, <month>, <date>, <year>. Day displays a day, from Sunday to Saturday. Month displays the month, from January to December. Date displays the date, from 1 to 31. Year displays the year, from 1980 to 2099.

Advanced

The Advanced menu allows you to configure your system for basic operation. Some entries are defaults required by the system board, while others, if enabled, will improve the performance of your system or let you set some features according to your preference.

Setting incorrect field values may cause the system to malfunction.



IDE Configuration

This section is used to configure the IDE drives.

USB Configuration

This section is used to configure USB devices.

ACPI Configuration

This section is used to configure the ACPI function.

Super IO Configuration

This section is used to configure the I/O functions supported by the onboard Super I/O chip.

Hardware Health Configuration

This section is used to configure the hardware monitoring events such as the temperature, fan speed and voltages.

Onboard LAN 1 and Onboard LAN 2

Enables or disables the onboard LAN.

LAN Boot ROM

Enable this field if you want to use the boot ROM (instead of a disk drive) to boot-up the system and access the local area network directly. If you wish to change the boot ROM's settings, type the <Shift> and <F10> keys simultaneously when prompted during boot-up. Take note: you will be able to access the boot ROM's program (by typing <Shift> + <F10>) only when this field is enabled.

LVDS Mode Configuration

Displays the LVDS mode from Xilinx. The BIOS will automatically detect the mode.

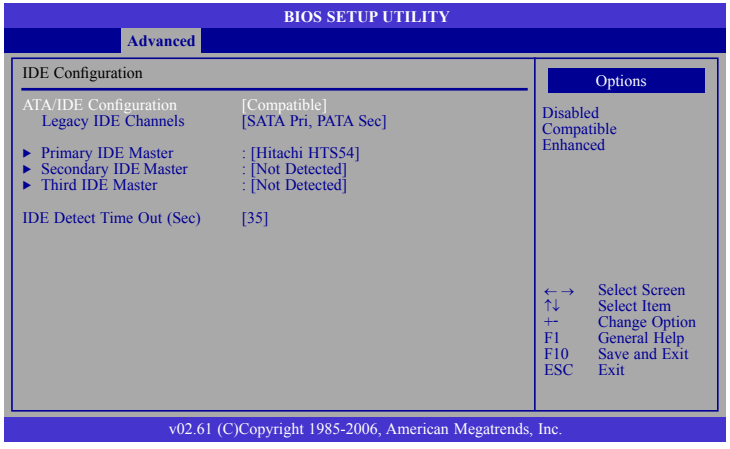
Mode 1 refers to APPC 1720T/1721T.
Mode 2 refers to APPC 1520T/1521T.

LCD Mode Configuration

Mode	Input Display	Output Display
0	1280x800	Scaling mode for 1280x1024 48 bit
1	1280x1024	Bypass mode for 1280x1024 48 bit
2	Depends on Source solution	Bypass mode for 24bit x2
3	Depends on Source solution	Bypass mode for 18bit x2

IDE Configuration

This section is used to configure the IDE drives.



ATA/IDE Configuration

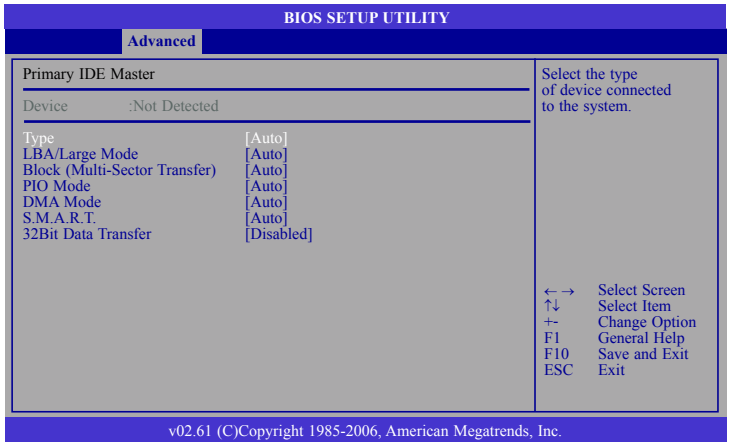
Sets the SATA device to Disabled, Compatible or Enhanced mode.

If you selected Compatible, the **Legacy IDE Channels** field will appear. The options are SATA Only, SATA Pri, PATA Sec, and PATA Only.

If you selected Enhanced, the **Configure SATA As** field will appear. The option displayed is IDE. This will configure the Serial ATA drives as Parallel ATA physical storage device.

Primary IDE Master to Third IDE Master

When you enter the BIOS Setup Utility, the BIOS will auto detect the existing IDE devices then displays the status of the detected devices. To configure an IDE drive, move the cursor to a field then press <Enter>.



Type

Selects the type of IDE drive connected to the system.

LBA/Large Mode

Auto	The LBA mode will automatically be enabled, that is, if the LBA mode was not previously disabled.
Disabled	Disables the LBA mode.

Block (Multi-Sector Transfer)

Auto	Data transfer to and from the device occurs multiple sectors at a time.
Disabled	Data transfer to and from the device occurs one sector at a time.

PIO Mode

Selects the data transfer mode. PIO means Programmed Input/Output. Rather than have the BIOS issue a series of commands to effect a transfer to or from the disk drive, PIO allows the BIOS to tell the controller what it wants and then let the controller and the CPU perform the complete task by themselves. Your system supports five modes, 0 (default) to 4, which primarily differ in timing. When Auto is selected, the BIOS will select the best available mode after checking your drive.

Auto	The BIOS will automatically set the system according to your hard disk drive's timing.
Mode 0-4	You can select a mode that matches your hard disk drive's timing. Caution: Do not use the wrong setting or you will have drive errors.

DMA Mode

Selects the DMA mode.

Auto	Automatically detects the DMA mode.
SWDMAn	SingleWord DMAn.
MWDMAn	MultiWord DMAn.
UDMAn	Ultra DMAn.

S.M.A.R.T.

The system board supports SMART (Self-Monitoring, Analysis and Reporting Technology) hard drives. SMART is a reliability prediction technology for ATA/IDE and SCSI drives. The drive will provide sufficient notice to the system or user to backup data prior to the drive's failure. SMART is supported in ATA/33 or later hard drives. The options are Auto (default), Enabled and Disabled.

32Bit Data Transfer

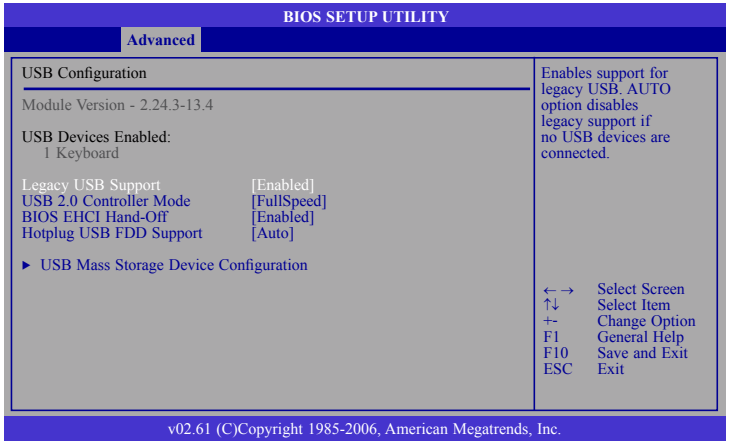
Enables or disables 32-bit data transfer.

IDE Detect Time Out (Sec)

Selects the time out value for detecting ATA/ATAPI devices.

USB Configuration

This section is used to configure USB devices.



Legacy USB Support

Due to the limited space of the BIOS ROM, the support for legacy USB keyboard (in DOS mode) is by default set to Disabled. With more BIOS ROM space available, it will be able to support more advanced features as well as provide compatibility to a wide variety of peripheral devices.

If a PS/2 keyboard is not available and you need to use a USB keyboard to install Windows (installation is performed in DOS mode) or run any program under DOS, set this field to Enabled.

USB 2.0 Controller Mode

Sets the USB 2.0 controller mode to HiSpeed (480 Mbps) or FullSpeed (12 Mbps).

BIOS EHCI Hand-Off

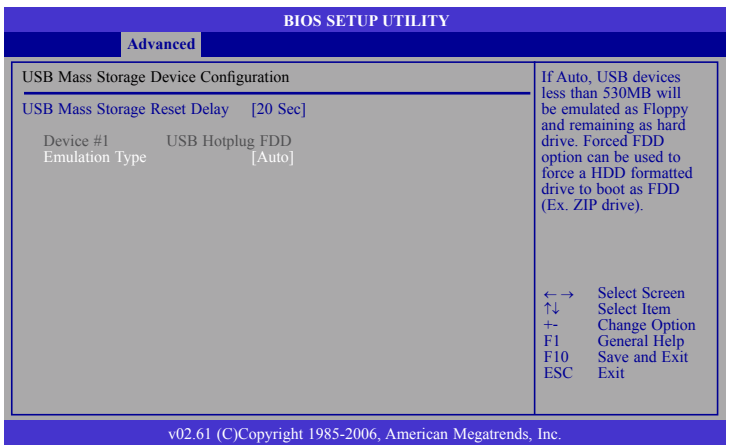
Enable this field when using operating systems without the EHCI hand-off support.

Hotplug USB FDD Support

Enables or disables the USB FDD function.

USB Mass Storage Device Configuration

Configures the USB mass storage class devices.



Device #1

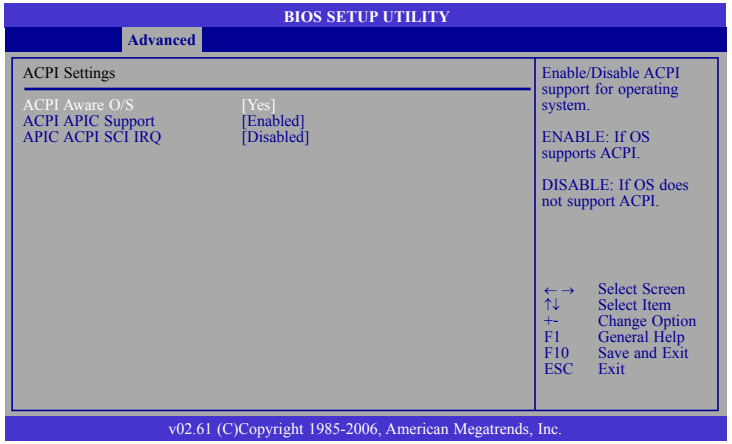
Displays the connected device.

Emulation Type

Auto	USB devices that are less than 530MB will be emulated as a floppy drive and the remaining as hard drives.
Forced FDD	Forces an HDD formatted drive to boot as FDD (e.g. ZIP drive)
Floppy	The USB device will be emulated as a floppy drive.
CDROM	The USB device will be emulated as a CD-ROM drive.
Hard Disk	The USB device will be emulated as a hard disk drive.

ACPI Configuration

This section is used to configure the ACPI configuration.



ACPI Aware OS

Enables or disables the ACPI function of the operating system.

ACPI APIC Support

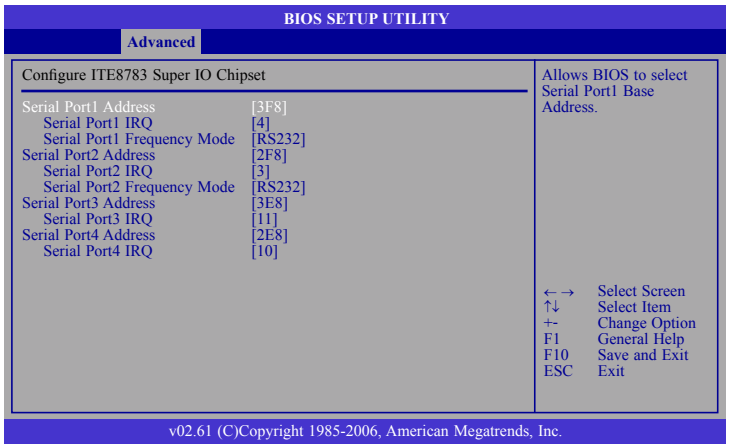
Enables or disables the ACPI APIC function.

APIC ACPI SCI IRQ

Enables or disables the APIC ACPI SCI IRQ.

Super IO Configuration

This section is used to configure the I/O functions supported by the on-board Super I/O chip.



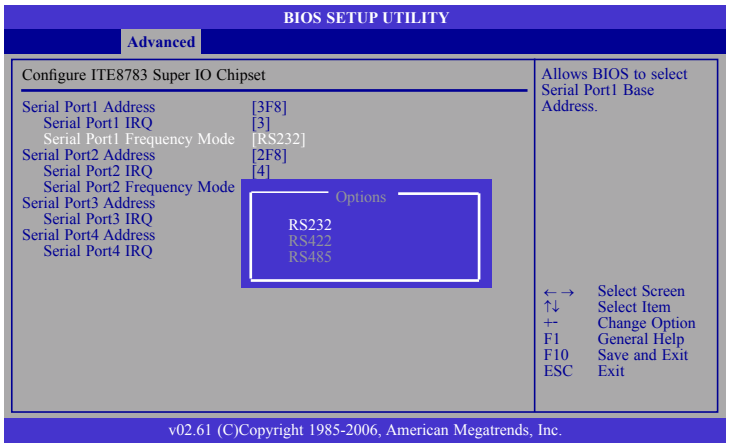
Serial Port1 Address to Serial Port4 Address

3F8, 3E8, 2E8	Allows you to manually select an I/O address for the on board serial port.
Disabled	Disables the onboard serial port.

Serial Port1 IRQ to Serial Port4 IRQ

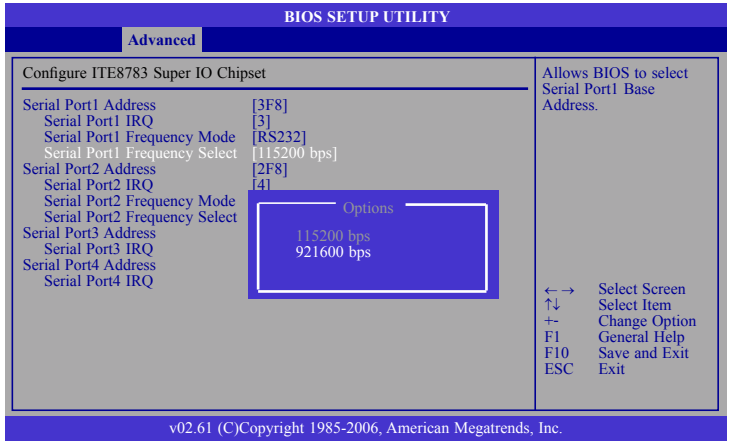
These fields are used to select an IRQ for the onboard serial port 3, 4, 10 or 11.

Serial Port1 Frequency Mode

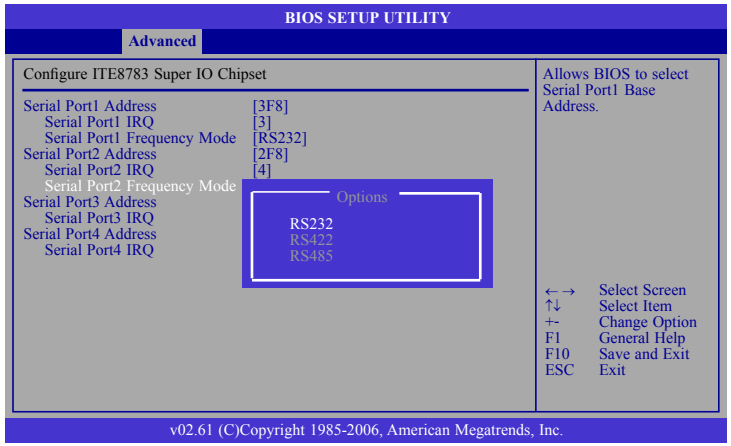


This field is used to select the frequency mode of serial port 1. The options are RS232, RS422 and RS485.

If you selected RS485 in the "Serial Port1 Frequency Mode", the "Serial Port1 Frequency Select" field will appear prompting you to select the frequency setting. The options are 115200 bps and 921600 bps.

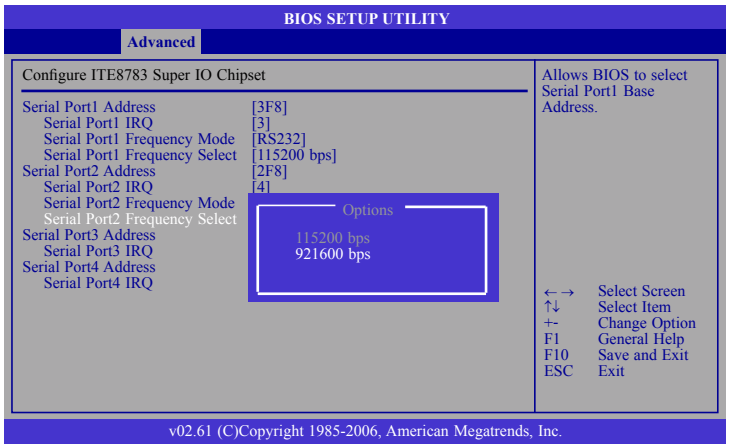


Serial Port2 Frequency Mode



This field is used to select the frequency mode of serial port 2. The options are RS232, RS422 and RS485.

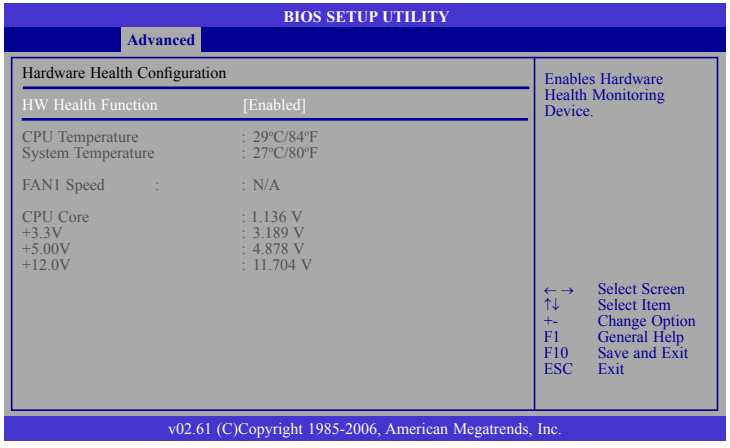
If you selected RS422 or RS485 in the "Serial Port1 Frequency Mode" and/or "Serial Port2 Frequency Mode" field, the "Serial Port1 Frequency Select" and/or "Serial Port2 Frequency Select" field will appear prompting you to select the frequency setting. The options are 115200 bps and 921600 bps.



Hardware Health Configuration

HW Health Function

This field is used to enable or disable the hardware monitoring events such as temperature, fan speed and voltages.



CPU Temperature and System Temperature

Detects and displays the current temperature of the CPU, chipset and the internal temperature of the system.

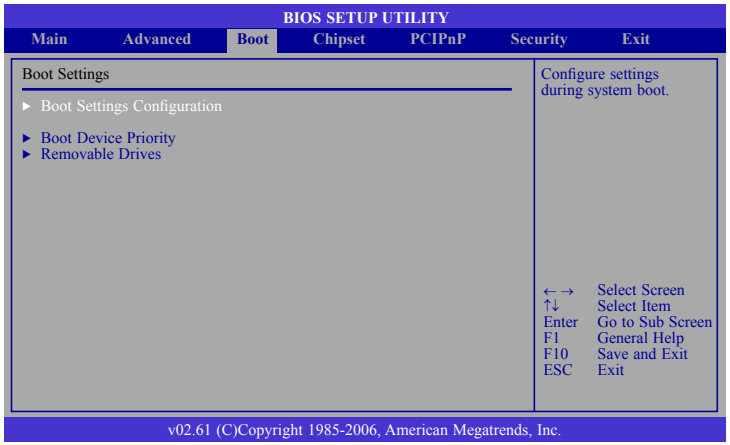
Fan1 Speed

Detects and displays the current fan speed in RPM (Revolutions Per Minute).

CPU Core to +12.0V

Detects and displays the output voltages.

Boot



Boot Settings Configuration

This section is used to configure settings during system boot.

Boot Device Priority

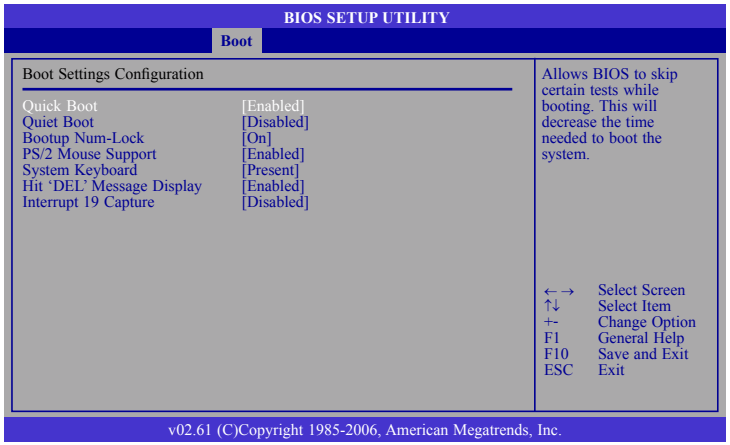
This section is used to select the boot priority sequence of the devices.

Removable Drives

This section is used to select the boot priority sequence of the hard disk drives.

Boot Settings Configuration

This section is used to configure settings during system boot.



Quick Boot

When Enabled, the BIOS will shorten or skip some check items during POST. This will decrease the time needed to boot the system.

Quiet Boot

Enabled Displays OEM logo instead of the POST messages.
Disabled Displays normal POST messages.

Bootup Num-Lock

This allows you to determine the default state of the numeric keypad. By default, the system boots up with NumLock on wherein the function of the numeric keypad is the number keys. When set to Off, the function of the numeric keypad is the arrow keys.

PS/2 Mouse Support

Enables or disables the PS/2 mouse.

System Keyboard

Detects the presence or absence of the system keyboard.

Hit 'DEL' Message Display

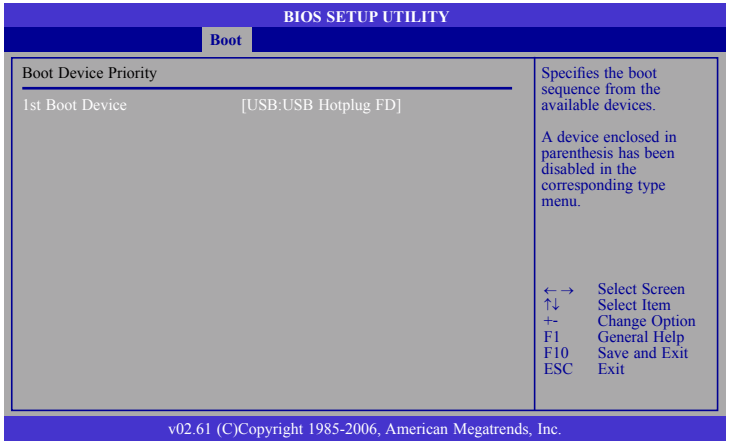
When enabled, the system displays the "Press DEL to run Setup" message during POST.

Interrupt 19 Capture

When enabled, it allows the optional ROM to trap interrupt 19.

Boot Device Priority

This section is used to select the boot priority sequence of all available devices.

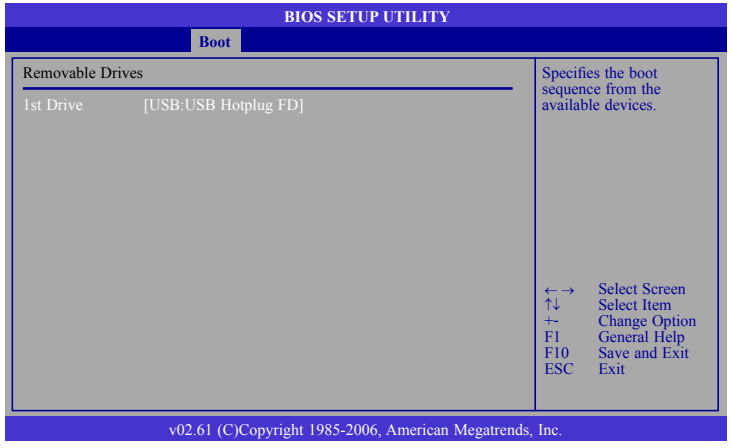


1st Boot Device

The BIOS will boot the operating system according to the sequence of the drive selected.

Removable Drives

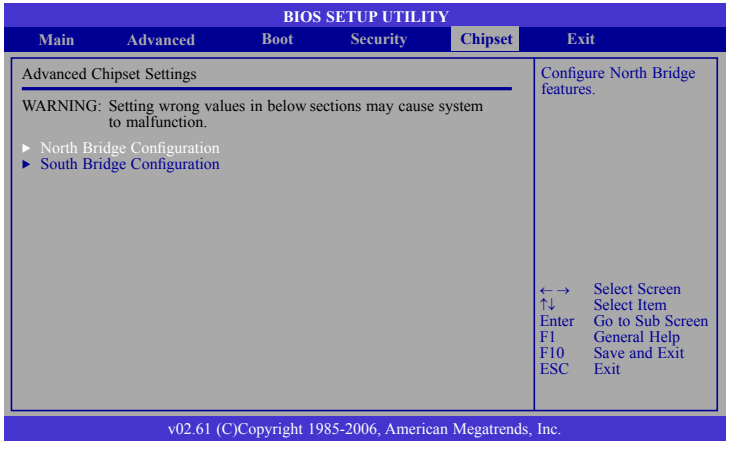
This section is used to select the boot priority sequence of the removable drives.



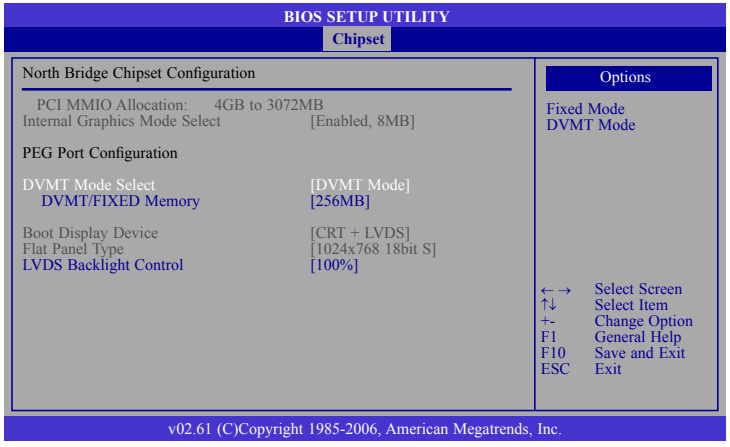
Chipset

This section is used to configure the system based on the specific features of the chipset.

Setting incorrect field values may cause the system to malfunction.



North Bridge Configuration



DVMT Mode Select

Selects the DVMT mode.

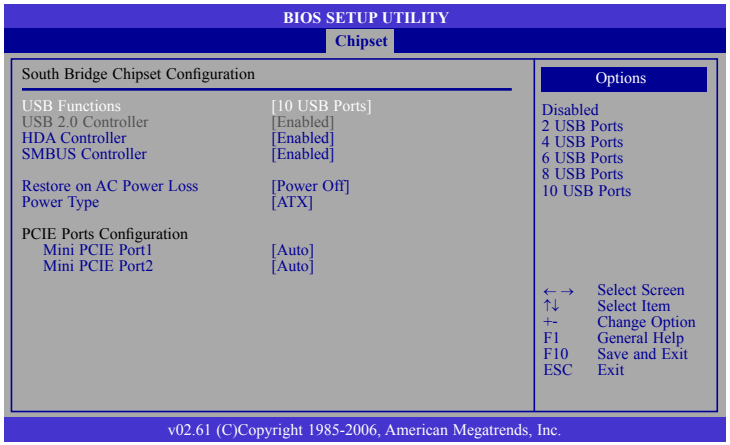
DVMT/Fixed Memory

This field is used to select the graphics memory size used by DVMT/Fixed mode. The options are 128MB, 256MB and Maximum DVMT.

LVDS Backlight Control

Configures the LVDS backlight. The options are 40%, 60%, 80% and 100%.

South Bridge Configuration



USB Functions

Enables or disables the selected USB ports. The options are 2 USB Ports, 4 USB Ports, 6 USB Ports, 8 USB Ports and 10 USB Ports.

USB 2.0 Controller

This field is used to enable or disable the Enhanced Host Controller Interface controller.

HDA Controller

Enables or disables the onboard audio.

SMBUS Controller

Enables or disables the SMBUS controller.

Restore On AC Power Loss

Power Off When power returns after an AC power failure, the system's power is off. You must press the Power button to power-on the system.

Power On When power returns after an AC power failure, the system will automatically power-on.

Last State When power returns after an AC power failure, the system will return to the state where you left off before power failure occurs. If the system's power is off when AC power failure occurs, it will remain off when power returns. If the system's power is on when AC power failure occurs, the system will power-on when power returns.

Power Type

Selects the type of power supply. The options are AT and ATX.

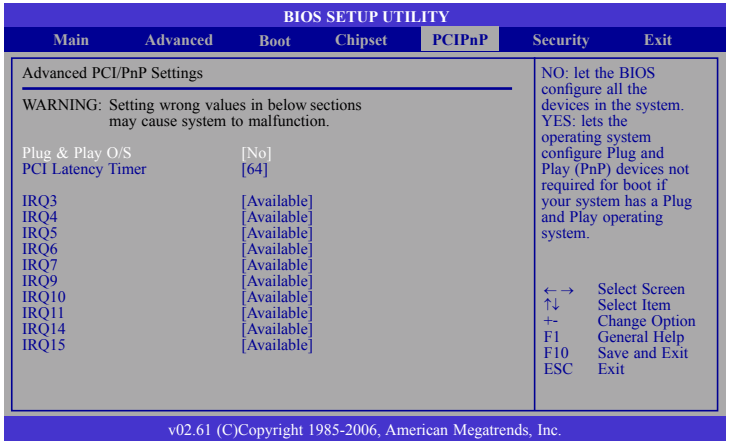
Mini PCIE Port1 and Mini PCIE Port2

Configures the Mini PCIE ports.

PCIPnP

This section is used to configure settings for PCI/PnP devices.

Setting incorrect field values may cause the system to malfunction.



Plug & Play O/S

Yes Configures Plug and Play (PnP) devices that are not required to boot in a Plug and Play supported operating system.
No The BIOS configures all the devices in the system.

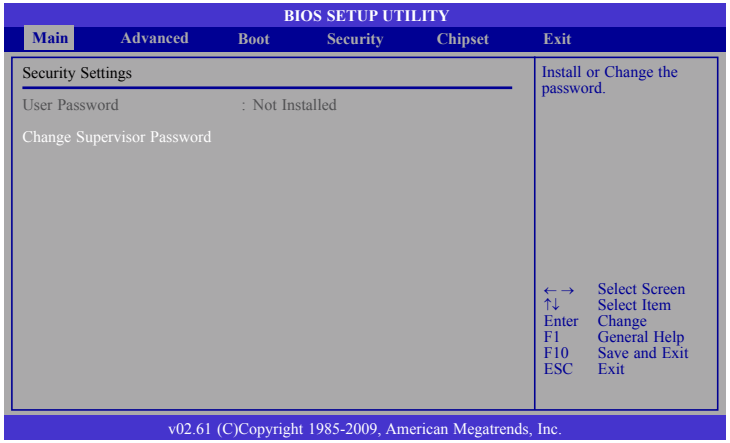
PCI Latency Timer

This feature is used to select the length of time each PCI device will control the bus before another takes over. The larger the value, the longer the PCI device can retain control of the bus. Since each access to the bus comes with an initial delay before any transaction can be made, low values for the PCI Latency Timer will reduce the effectiveness of the PCI bandwidth while higher values will improve it.

IRQ3 to IRQ15

Available The specified IRQ is available for PCI/PnP devices.
Reserved The specified IRQ is reserved for Legacy ISA devices.

Security

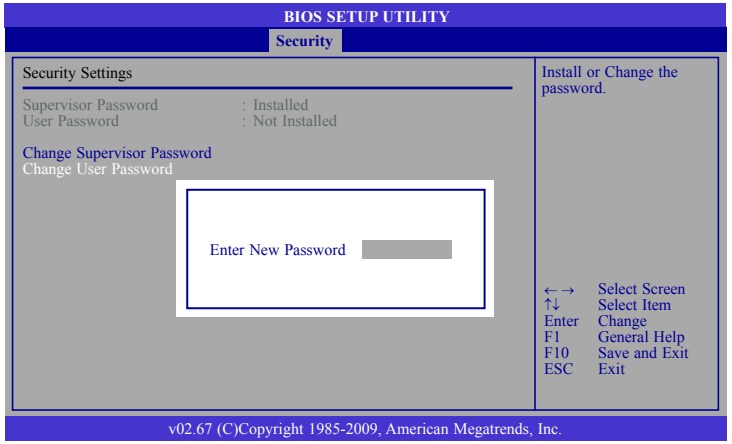


Change User Password

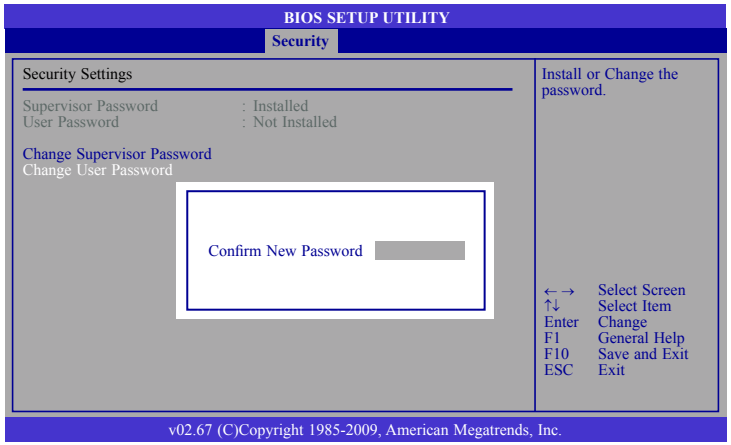
This field is used to set or change the user password.

To set a new password:

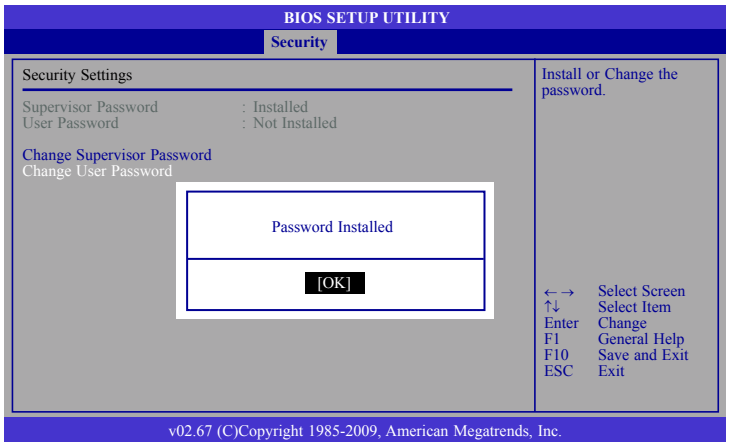
1. Select the Change User Password field then press <Enter>.
2. Type your password in the dialog box then press <Enter>. You are limited to eight letters/numbers.



3. Press <Enter> to confirm the new password.



4. When the Password Installed dialog box appears, select OK.

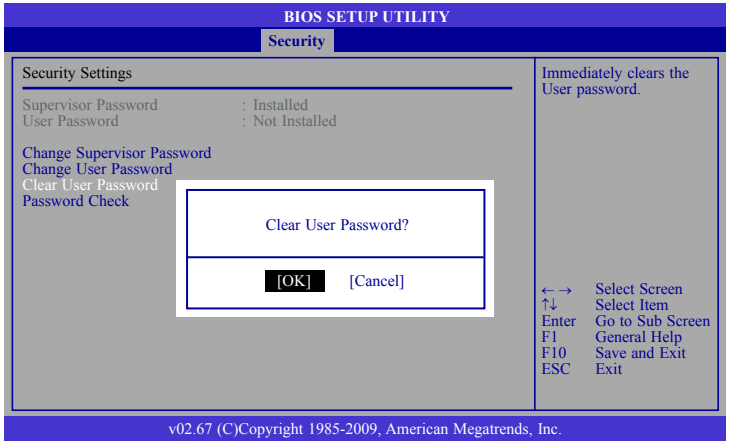


To change the password, repeat the same steps above.

After you have set the user password, the Clear User Password and Password Check fields will appear.

Clear User Password

To clear the password, select Clear User Password then press <Enter>. Click OK.

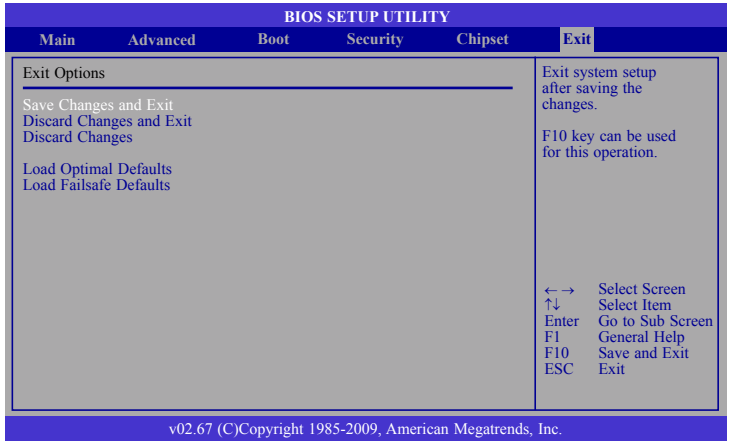


Password Check

Setup
The BIOS checks for the user password whenever accessing the Setup utility.

Always
The BIOS checks for the user password when accessing the Setup utility and booting the system.

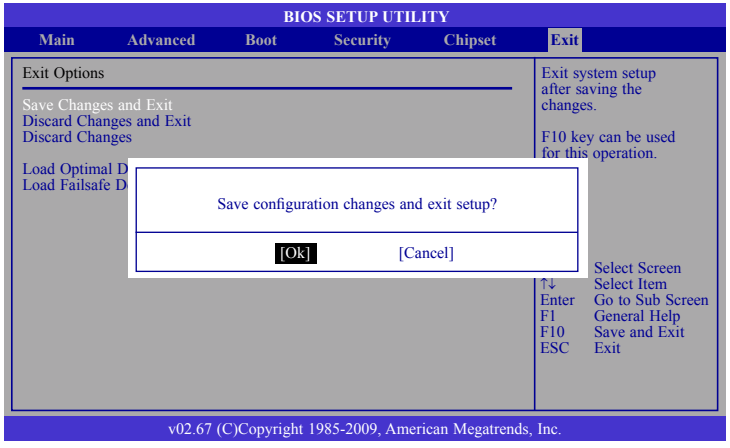
Exit



Save Changes and Exit

To save the changes and exit the Setup utility, select this field then press <Enter>. A dialog box will appear. Confirm by selecting OK.

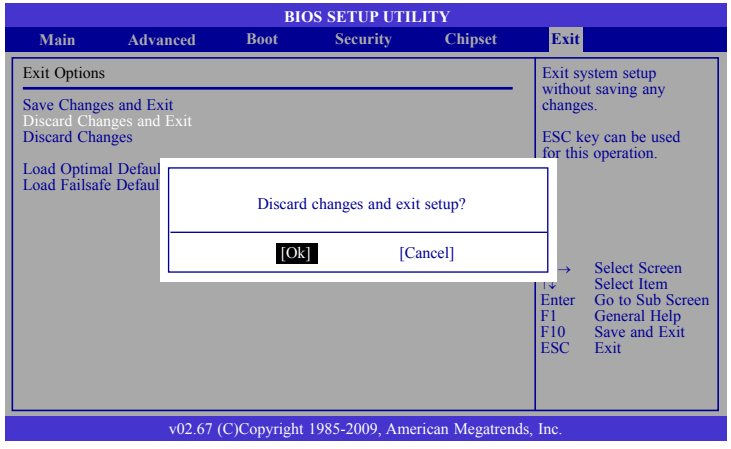
You can also press <F10> to save and exit Setup.



Discard Changes and Exit

To exit the Setup utility without saving the changes, select this field then press <Enter>. A dialog box will appear. Confirm by selecting OK.

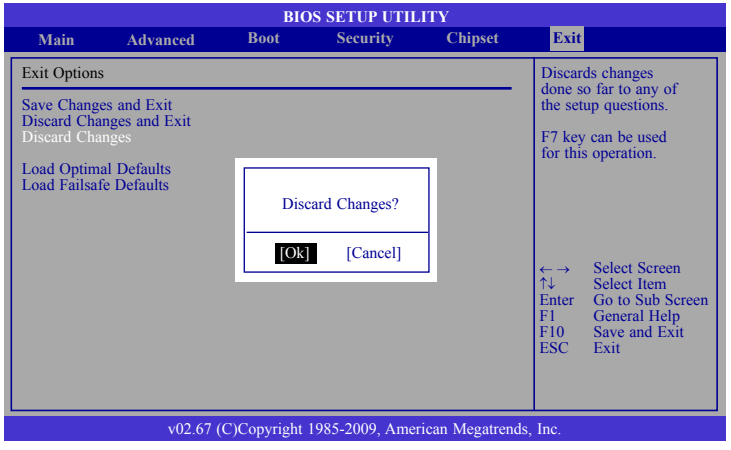
You can also press <ESC> to exit without saving the changes.



Discard Changes

To discard the changes, select this field then press <Enter>. A dialog box will appear. Confirm by selecting OK to discard all changes made and restore the previously saved settings.

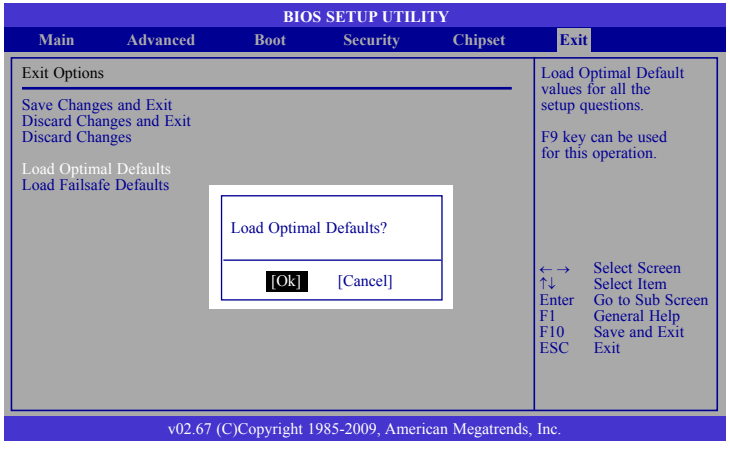
You can also press <F7> to discard the changes.



Load Optimal Defaults

To load optimal default values from the BIOS ROM, select this field then press <Enter>. A dialog box will appear. Confirm by selecting OK.

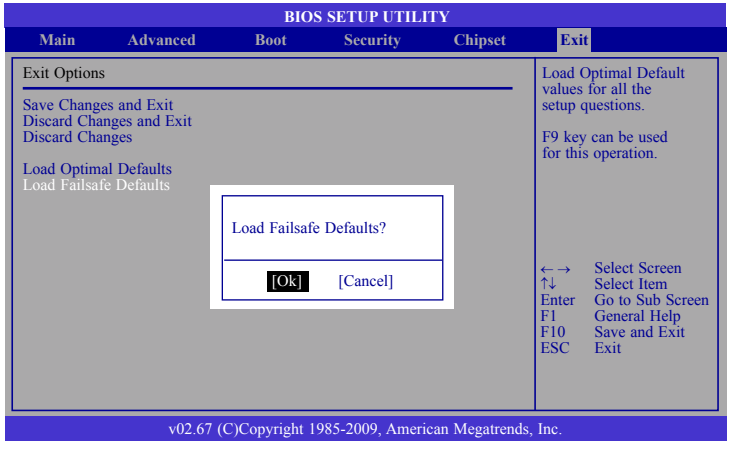
You can also press <F9> to load optimal default values.



Load Failsafe Defaults

To load failsafe default values from the BIOS ROM, select this field then press <Enter>. A dialog box will appear. Confirm by selecting OK.

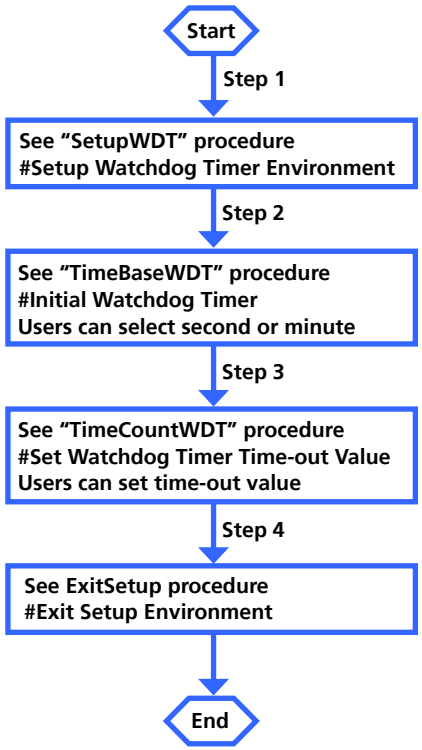
You can also press <F9> to load failsafe default values.



Appendix A: Watchdog Timer

WDT Programming Guide

APPC Series Watchdog Function Configuration Sequence Description:



Watch Dog Sample Code

```
#define SUPERIO_PORT    0x2E
#define WDT_SET         0x72
#define WDT_VALUE 0x73

void main(void)
{
  #Enter SuperIO Configuration
        outportb(SUPERIO_PORT, 0x87);
        outportb(SUPERIO_PORT, 0x01);
        outportb(SUPERIO_PORT, 0x55);
        outportb(SUPERIO_PORT, 0x55);

  # Set LDN
        outportb(SUPERIO_PORT,0x07);
        outportb(SUPERIO_PORT+1 ,0x07);

  # Set WDT setting
        outportb(WDT_SET,0xC0);          # Use the second to come down
                                         # If choose the Minute, change
value to 0x40
  # Set WDT sec/min
        outportb(WDT_VALUE,0x05);                #Set 5 seconds
}
```

Appendix B: GPI/O Programming Guide

GPI/O (General Purpose Input/Output) pins are provided for custom system design. This appendix provides definitions and default settings for the ten GPI/O pins in the APPC series. The pin definition is shown in the following table:

J9 - GPIO Connector

Pin	Definition	Pin	Definition
1	+5V	2	GND
3	GPIO24 (GPO)	4	GPIO20 (GPI)
5	GPIO25 (GPO)	6	GPIO21 (GPI)
7	GPIO26 (GPO)	8	GPIO22 (GPI)
9	GPIO27 (GPO)	10	GPIO23 (GPI)

Pin	GPI/O Mode	PowerOn Default	Address	Pin	GPI/O Mode	PowerOn Default	Address
1	VCC	-	-	2	GND	-	-
3	GPO	Low	284h (Bit4)	4	GPI	High	284h (Bit0)
5	GPO	Low	284h (Bit5)	6	GPI	High	284h (Bit1)
7	GPO	Low	284h (Bit6)	8	GPI	High	284h (Bit2)
9	GPO	Low	284h (Bit7)	10	GPI	High	284h (Bit3)

Control the GPO pin (3/5/7/9) level from I/O port 284h bit (4/5/6/7).

The bit Set/Clear indicates output High/Low.

GPIO Programming Sample Code

```
#define GPIO_PORT       0x284
#define GPO3                    (0x01 << 4)
#define GPO5                    (0x01 << 5)
#define GPO7                    (0x01 << 6)
#define GPO9                    (0x01 << 7)

#define GPO3_HI         outportb(GPIO_PORT, 0x10)
#define GPO3_LO         outportb(GPIO_PORT, 0x00)
#define GPO5_HI         outportb(GPIO_PORT, 0x20)
#define GPO5_LO         outportb(GPIO_PORT, 0x00)
#define GPO7_HI         outportb(GPIO_PORT, 0x40)
#define GPO7_LO         outportb(GPIO_PORT, 0x00)
#define GPO9_HI         outportb(GPIO_PORT, 0x80)
#define GPO9_LO         outportb(GPIO_PORT, 0x00)
void main(void)
{
  GPO3_HI;
  GPO5_LO;
  GPO7_HI;
  GPO9_LO;
}
```

Appendix C: Power Consumption

Power Consumption Measurement

Purpose

The purpose of the power consumption test is to verify the power dissipation of the system and the load of the power supply.

Test Equipment

1. PROVA CM-07 AC/DC CLAMP METER
2. Burn-in test ver: 2.0

Device Under Test

DUT: Sys #1

Test Procedure

1. Power up the DUT and then boot Windows XP.
2. Enter the standby mode (HDD power down).
3. Measure the power consumption and record it.
4. Run the Burn-in test program to apply 100% full loading.
5. Measure the power consumption and record it.

APPC 1720T/1721T

	+12V	+24V	+30V
Full-Loading Mode	3.31A	1.66A	1.36A
Total	39.72W	39.84W	40.8W
Standby Mode	1.06A	0.57A	0.47A
Total	12.72W	13.68W	14.1W

APPC 1520T/1521T

	+12V	+24V	+30V
Full-Loading Mode	2.7A	1.4A	1.13A
Total	32.4W	33.6W	33.9W
Standby Mode	1.04A	0.54A	0.44A
Total	12.48W	12.96W	13.2W

APPC 1220T/1221T

	+12V	+24V	+30V
Full-Loading Mode	1.84A	0.93A	0.75A
Total	22.08W	22.32W	22.5W
Standby Mode	0.93A	0.49A	0.4A
Total	11.16W	11.76W	12W