PLUS

MOBILE

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A20-MC Hardware Manual
Rev 8

Release Date: July 15, 2008

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A20-MC Theory of Operation

You will notice that this computer doesn't crash except when software is buggy. That is because the CPU and system *ALWAYS* has clean power available. It knows when you have main power or not and if the computer is running or not. If you turn the computer off through the Windows shutdown box on the main screen and the main power is still up, the A20 will just reboot the system in a few seconds. Conversely, if the system senses the main power is down, after a short delay, it will shut down Windows orderly as if you had shut it down yourself. The A20 system will go to sleep waiting for main power to come back up for a few seconds and then it will boot again. It will finish booting no matter what the power state and then check main power again to see if it needs to stay up or it needs to shutdown Windows.

Glossary of Abbreviations

A20-DH	Aplus Mobile Harsh Remote Drive Interface with DVD/RW Slot Load Drive and USB Ports
A20-HH	Aplus Mobile Harsh USB 2.0 Hub, Aluminum Chassis
A20-MC	Aplus Mobile Harsh Environment DC Powered Computer
APM-I/O	Aplus Mobile Input/Output Cable
BIOS	Basic Input Output System
BV	Breakdown Voltage
CF	Compact Flash
CPU	Central Processing Unit
DSK	Disk
HD	Hard Drive
LED	Light Emitting Diode
OS	Operating System
PWR	Power
SATA	Serial-ATA
UPS	Uninterruptible Power Supply
USB	Universal Serial Bus

A20-MC 3-Dimensional Images

Mounting Holes

A20-MC Personal Computer

Battery Cover

Key

Key Switch

To turn the computer on, turn key **counterclockwise** to ON position. Key can be removed in either position.

The key switch is a true power disconnect. When the key is in the OFF position, the computer is physically disconnected from the outside world and internal UPS battery. When the computer is OFF, the computer cannot be powered.

Cautions:

DO NOT USE KEY TO TURN A20-MC ON OR OFF. Key is used for connecting or disconnecting power only. Use power supply to turn A20-MC ON or OFF.

Do not leave the KEY in the ON position while not in use for extended periods. Extended periods could be defined as 5 days or more. This time may be shortened depending on temperature and age of the battery. Leaving the key switch ON leaves the battery engaged and will discharge the battery over time. When not in use, turn key clockwise to OFF position.

Start Up Sequence

1. Connect peripheral cables required for your application.
2. Connect unit to DC power source.
3. Turn key counterclockwise to ON position.
4. Apply DC power to turn unit ON.
5. Red PWR LED should come ON and depending on your configuration, yellow UPS LED may flash detecting UPS or may remain OFF indicating power system status good.
6. If the yellow UPS LED is quickly flashing or if the blue CPU LED is quickly flashing, then the power system has identified an error and requires a reboot in the form of power cycling.
7. During normal operation, if the main power as indicated by the red PWR LED is interrupted, the yellow UPS LED will come ON to indicate UPS status is active.
8. The green DSK LED may remain lit or may flash indicating disk activity depending on HD or SATA configuration.

Operating Systems

- Some OS will require disabling the CF or HD in order to load your OS.
- Some OS will require the boot order & HD configuration screens to be set up specifically. Please consult your software literature or you may need to try several configurations if your OS hangs during installation.
- Enter BIOS by hitting DELETE key during boot up.
- The motherboard type is LV677.
- If your OS hangs during normal shut down sequence, please cycle power with key switch or unit will force the OS to shut down after a period of time and kill all system power. This is in order to save the UPS battery from excessive UPS discharge. If this is the case, it is normal to expect high inrush current when you turn it back ON due to the UPS battery's depleted state. This will be limited by the power control, which may go into pulse charge condition to limit peak currents during this time. Slow flashing yellow UPS LED is normal. This indicates pulse charge.

You must select hard drive boot order in BIOS. You must move your boot device to the front of the list on the boot order screen as well as setup the typical boot order in the Main BIOS screen.

You will need to setup the configuration for your CF & SATA HD in the following BIOS screens.
   a. Go to BIOS
   b. Go to Integrated Peripherals
   c. Go to OnChip IDE Device and press Enter
   d. See the Boot Device Configuration Screen. You may choose system configuration or disable CF here.

Next setup your boot drive order on a different BIOS screen and move your boot drive to the top of the list.
   a. Go to BIOS
   b. Go to Advanced BIOS Features
   c. Go to (2nd choice) Hard Disk Boot Priority and press Enter
   d. See selection of Boot Drives and move your Boot Drive to the top of the list.

Windows
- With Windows pre-loaded on your machine, the Administrator password is: "aplusmobile"
- The CF is disabled in BIOS. It is a SLAVE on IDE1. Please go to BIOS to enable if used.

Linux
- The CF will be disabled in BIOS. It is a MASTER on IDE1. If you require a different configuration to load your OS, please alter BIOS configuration for CF & HD.
- You may need to disable SATA HD if you are loading your OS on CF during installation. Also, you may need to disable CF if you are loading your OS on SATA HD during installation. You may enable either CF or HD after your OS is loaded.

QNX
- QNX may not shut down properly and hang. Check your QNX configuration if this is an issue.

Environmental Specifications

Storage Temperature	-20 ~ 85°C (-4 ~ 185°F)
Operational Temperature	0 ~ 60°C (32 ~ 140°F)
Storage Shock (half sine wave)	1000 G / 1 ms
Operational Shock (half sine wave)	300 G / 2ms, 160G / 1ms

Input Protection Clamp

This unit has an input protection clamp to protect from voltage transients induced by lightning and other transient voltage events.

Features
- Bi-directional
- 5000W Peak Pulse Power capability on 10/1000µS waveform
- Repetition rate (duty cycle): 0.05%
- Response time: typically less than 1.0pS from 0 Volts to BV

Power Input Clamp Maximum Ratings and Characteristics @ 25°C Ambient Temperature			
Rating	**Symbol**	**Value**	**Unit**
Peak Pulse Power Dissipation on 10/1000µS waveform	P_{PPM}	Min 5000	Watts
Peak Pulse Current of on 10/1000µS waveform	I_{PPM}	129	Amps
Steady State Power Dissipation at T_L=75°C, Lead Lengths .375", (9.5mm)	$P_M(AV)$	8	Watts
Peak Forward Surge Current, 8.3mS Single Half Sine-Wave Superimposed on Rated Load, (JEDEC Method)	I_{FSM}	400	Amps

Power Input Clamp Electrical Specification @ T_{AMB} 25°C						
Reverse Stand off Voltage V_R (Volts)	Breakdown Voltage V_{BR} (Volts) @ I_T		Test Current I_T (mA)	Maximum Clamping Voltage VC @ I_{PP} (Volts)	Maximum Peak Pulse Current I_{PP} (A)	Maximum Reverse Leakage I_R @ V_R (µA)
	MIN	MAX				
24.0	26.70	29.50	5	38.9	129.0	10

The transient voltage suppression specifications above are subject to change depending on the required input clamp voltage for the application. System can operate on voltages of up to 48VDC under special circumstances. Consult the factory. The input is 60V transient capable past the input clamp. Different clamp voltages are available for specific applications.

APM-I/O Connector Cable

*COMP Y C
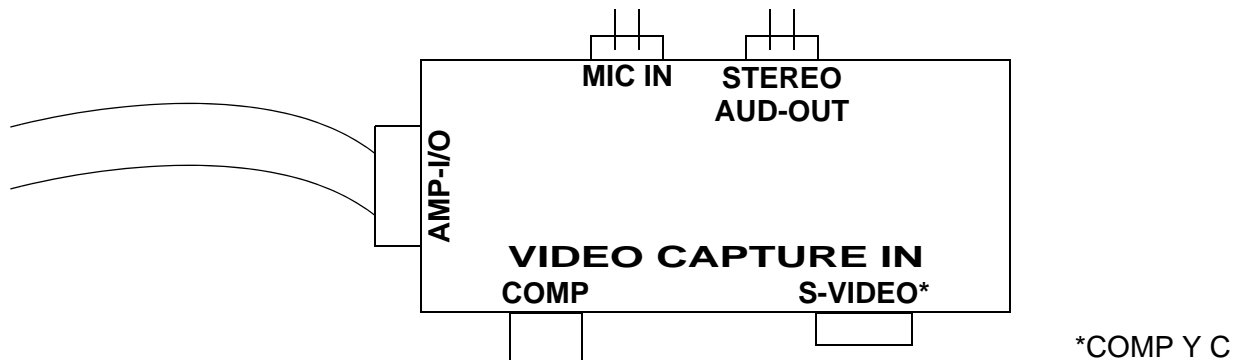
The APM-I/O connector cable will bring AUDIO-OUT, MIC-IN and other options as specified in your system configuration, such as Video Capture.

Input Voltage Considerations

Nominal Operational Voltages   12 - 29VDC

Operational voltages   0 - 30VDC (System runs on Internal UPS under 12V)

Your unit may have a different input clamp depending on your application.

The A20-MC power system is capable of regulating up to 60VDC, however this presents excessive power dissipation and is not recommended. This power front end also provides a +60 / -50VDC transient capability along with reverse battery protection and electronic fuse. You must provide an additional fused input to the unit for a catastrophic event. 10 - 20A fuse should be sufficient to prevent false tripping.

Even though the A20-MC is fused internally, you must provide an additional 10 - 20A fused input.

The unit may exhibit pulse charging continuously if ran at low line voltage (12.0VDC) due to current availability on the main power line.

If mounting more than one system, please connect the power cable directly to the battery or main switch from battery in a star configuration to reduce power loss.

Battery System Capabilities

Replace with Panasonic LC-R121R3P battery only. Seal cover with GE RTV-133 or sensor safe silicone only.

The battery is a sealed lead acid, non-spillable gel cell and is certified for air shipment. The battery uses a solid gel matt electrolyte and is available from Panasonic distributors. This is the same type of battery that is used in emergency lights.

Operation

- Applying power will turn ON the computer and boot your OS automatically.
- Power control system is always checking for the presence of main power and if the computer is running.
- If main power is present, the power control will check to see if the OS is booted. If not, it will attempt to boot OS. If it is unsuccessful after 25 attempts, the power control will put the system to sleep and you must cycle main power in order to boot OS again.
- If the power control senses main power is down for 8-14 seconds continuously, then it will initiate OS shutdown on UPS power.
- If main power comes back anytime during shutdown sequence and before it goes to sleep, it will attempt to reboot OS without requiring you to recycle the power. Power recycling is only required if system is fully asleep, otherwise the system will be fully automatic and should not require power cycling during normal operation. This is a rare situation.
- Once system has shutdown and gone to sleep (all front panel LEDs OFF), you must cycle main power to reboot system.
- The system will always try to boot OS if main power is present at any time, except when system has gone fully to sleep (i.e.: all front panel LEDs are OFF).

    1. Turn ON main power.
    2. System will boot itself and remain ON until main power is turned OFF.

Turning OFF main power for a short period of time will initiate OS shutdown on UPS and sleep mode. Do not use the key switch to turn the unit ON and OFF. This will disconnect the UPS from the computer and will cause the computer not to shut down properly.

Repairs

The A20 is a sealed case and is very difficult to open. It is not recommended. All repairs should be done at the Aplus Mobile, Inc. factory or in extreme cases serviced by a qualified super-technician capable of aircraft system-level work.

There are no user serviceable or replaceable parts inside the system. The CPU cannot be replaced without total disassembly of the case. Please consult the factory for any upgrades.

Frequently Asked Questions

Q: What is the bottleneck that seems to limit us to 3 Gig of available RAM even though 4 Gig is installed?

A: It is the chipset's address limitations. The processor is capable. However Intel's mobile chipset has not caught up yet. We should see this in the next chipset release. It has been unclear when this bottleneck is going to be removed. We had anticipated that with the introduction of the Core 2 Duo, we would see a chipset upgrade as well, but it hasn't quite happened yet. Since there are no such things as 1.5GB memory modules, we have to use 2GB memory modules and charge accordingly. Intel is aware of this.

Q: The system settings indicate that IDE 1 slave is a Transcend 2 Gig device. Is this a normal configuration for these things? Are most of your other customers using this CF drive as a boot device?

A: Yes. The 2GB CF is standard in all systems and can be upgraded to 4GB or 8GB as required. The Linux customers are using this as a boot device but you do not have to. It's simply there for your convenience. You may disable it in BIOS if you like. It is blank as delivered from the factory.

Q: Should I assume that there is no data on this CF device and go ahead and format it?

A: Yes. It is already formatted from the factory but you may format it any way you like. Also, the hard drive is raw and not formatted to avoid hassles between disk format variations.

Q: The A20-MC spec sheet indicates that there are three external USB 2.0 ports but I only see two. Am I missing something or do we only have two ports due to some other configuration choice?

A: Yes. The third port will come out of the APM-I/O connector and it is used for specific applications. Typically, customers will plug any standard hub into either USB port for their keyboards and mice. You can use any standard USB hub and it will be powered as normal by either harsh USB port. Only the A20-DH requires the APM-I/O cable for power.

Q: Since the PS/2 ports and other four USB ports are not accessible outside the case, are most of your customers using this device a) without keyboards and mice, b) with USB keyboards and mice (but no free USB ports) or c) with an add on USB hub for keyboard, mouse and additional USB devices?

A: Yes, most people use this as an embedded controller and only use keyboards and mice for initial installation. Most people will use choice c) and simply plug a hub in for other peripherals.
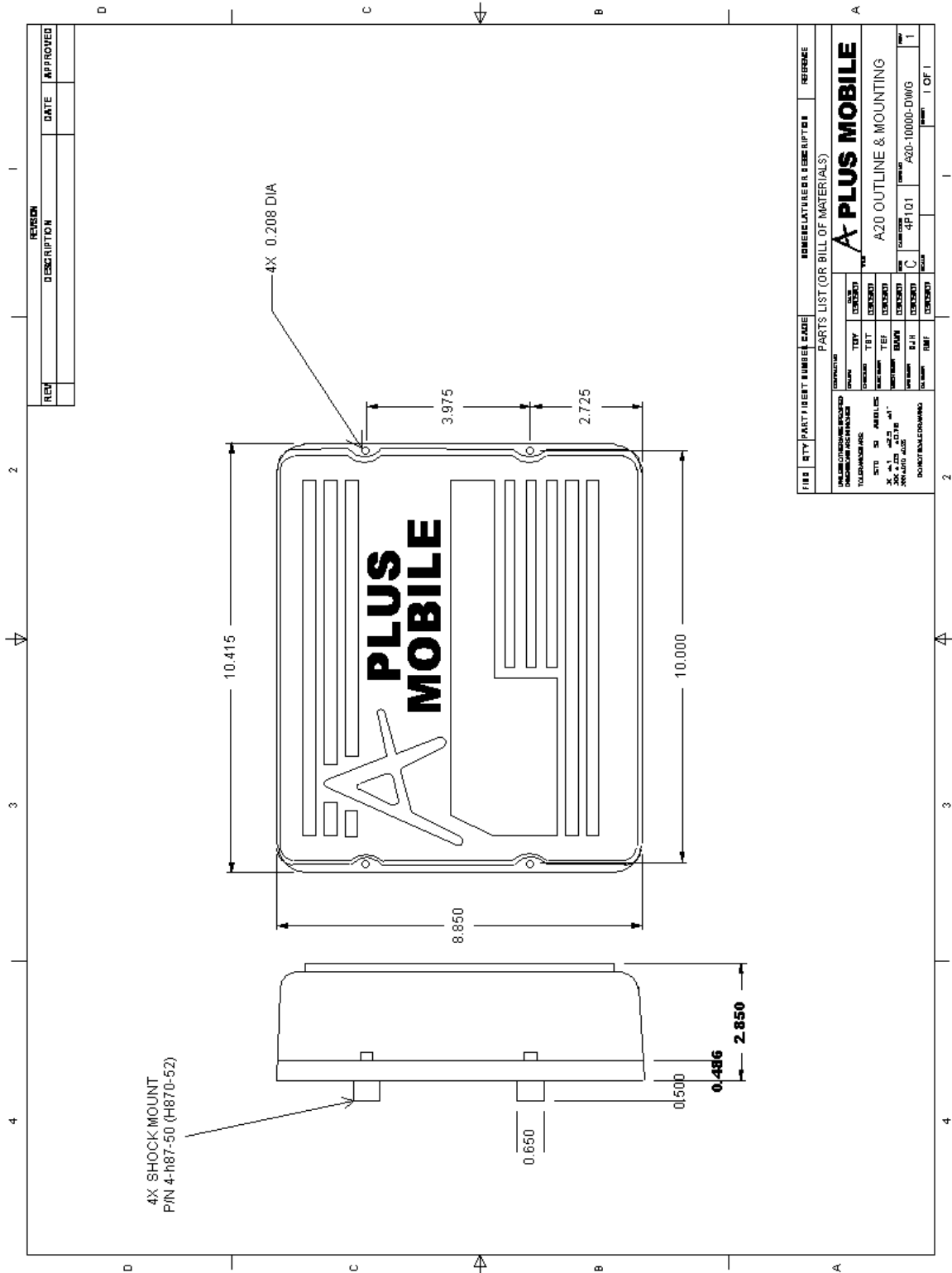
Q: Which type of form factor are the mini-PCI ports? Are they the older mini-PCI (IA, IB, IIA, IIB, IIIA, or IIIB) or the newer PCI express mini?
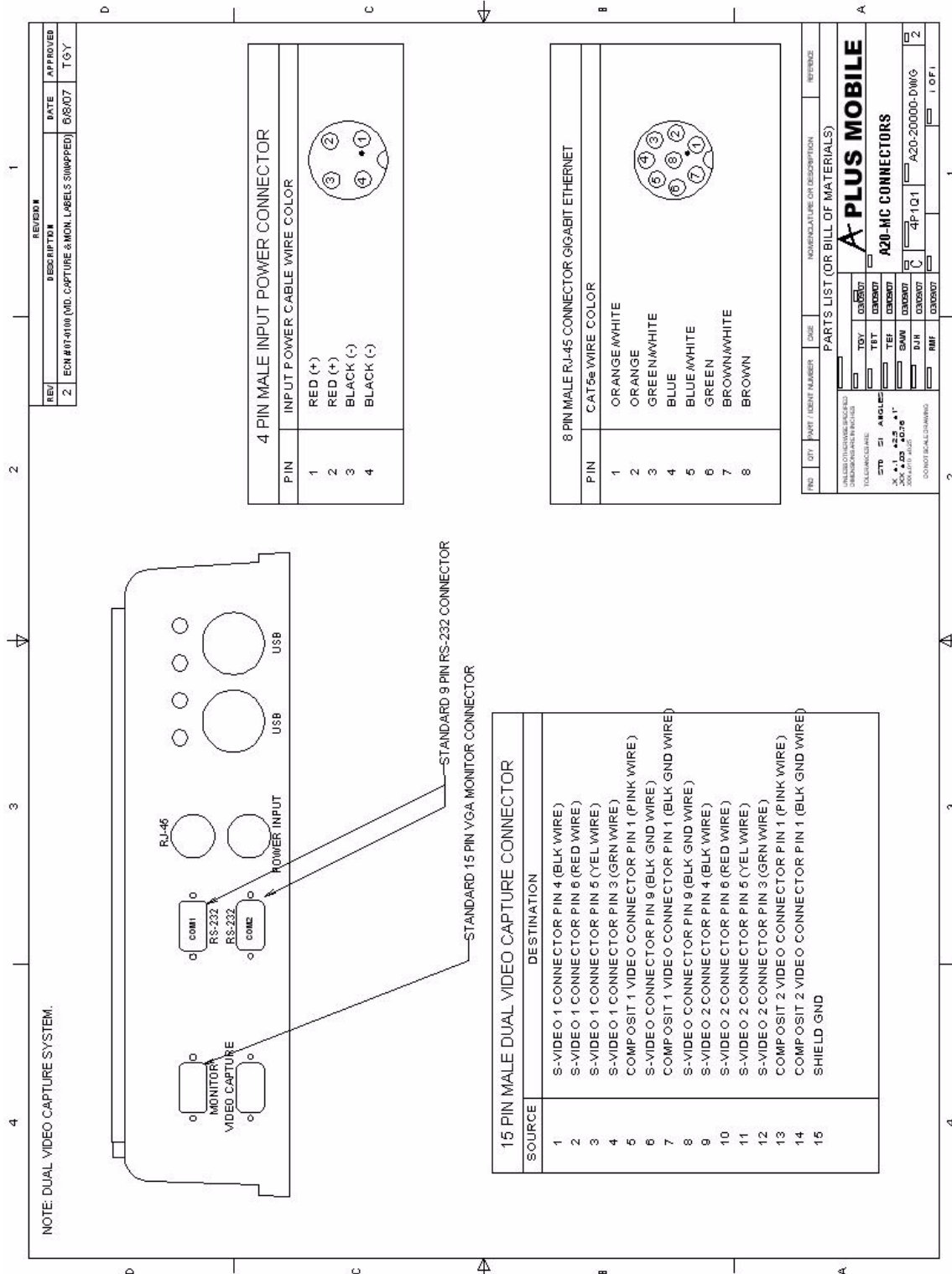
A: Mini-PCI ports are IIIB.

Q: Do the RS-232/422/485 ports eat up any of the PCI slots, or are they slotted separately?

A: RS-232/422/485 ports do not use any mini-PCI slots. Both ports are on the motherboards.

Outline Drawing

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Custom Connector Pin Out

NOTE: DUAL VIDEO CAPTURE SYSTEM.

4 PIN MALE INPUT POWER CONNECTOR

INPUT POWER CABLE WIRE COLOR

PIN	
1	RED (+)
2	RED (+)
3	BLACK (-)
4	BLACK (-)

8 PIN MALE RJ-45 CONNECTOR GIGABIT ETHERNET

CAT5e WIRE COLOR

PIN	
1	ORANGE /WHITE
2	ORANGE
3	GREEN /WHITE
4	BLUE
5	BLUE /WHITE
6	GREEN
7	BROWN /WHITE
8	BROWN

15 PIN MALE DUAL VIDEO CAPTURE CONNECTOR

SOURCE	DESTINATION
1	S-VIDEO 1 CONNECTOR PIN 4 (BLK WIRE)
2	S-VIDEO 1 CONNECTOR PIN 6 (RED WIRE)
3	S-VIDEO 1 CONNECTOR PIN 5 (YEL WIRE)
4	S-VIDEO 1 CONNECTOR PIN 3 (GRN WIRE)
5	COMPOSIT 1 VIDEO CONNECTOR PIN 1 (PINK WIRE)
6	S-VIDEO CONNECTOR PIN 9 (BLK GND WIRE)
7	COMPOSIT 1 VIDEO CONNECTOR PIN 1 (BLK GND WIRE)
8	S-VIDEO 2 CONNECTOR PIN 9 (BLK GND WIRE)
9	S-VIDEO 2 CONNECTOR PIN 4 (BLK WIRE)
10	S-VIDEO 2 CONNECTOR PIN 6 (RED WIRE)
11	S-VIDEO 2 CONNECTOR PIN 5 (YEL WIRE)
12	S-VIDEO 2 CONNECTOR PIN 3 (GRN WIRE)
13	COMPOSIT 2 VIDEO CONNECTOR PIN 1 (PINK WIRE)
14	COMPOSIT 2 VIDEO CONNECTOR PIN 1 (BLK GND WIRE)
15	SHIELD GND

STANDARD 9 PIN RS-232 CONNECTOR
STANDARD 15 PIN VGA MONITOR CONNECTOR

USB
USB
RJ-46
POWER INPUT
COM1 RS-232
COM2 RS-232
MONITOR
VIDEO CAPTURE

REVISION

REV	DESCRIPTION	DATE	APPROVED
2	ECN #07-0100 (MD. CAPTURE & MON. LABELS SWAPPED)	6/8/07	TGY

A20-MC CONNECTORS

A20-20000-DWG

PARTS LIST (OR BILL OF MATERIALS)

BIOS Reset Key Sequence

Resets BIOS fail safe default setting.

1. Turn **ON** power
2. Wait for **BEEP**
3. WAIT one (1) second
4. Press **DEL** key
5. Press **DOWN ARROW** key one (1) time
6. Press **RIGHT ARROW** key one (1) time
7. Press **RETURN** key one (1) time
8. Press **Y** key one (1) time
9. Press **RETURN** key
10. Press **DOWN ARROW** key four (4) times
11. Press **RETURN** key two (2) times
12. System should reset and reboot

BIOS Video Setup Screen

```
         Phoenix - AwardBIOS CMOS Setup Utility
                 Advanced Chipset Features

   DRAM Timing Selectable    [By SPD]        ┌──────────────────┐
   CAS Latency Time          [2.5]           │    Item Help     │
   Active to Precharge Delay [7]             ├──────────────────┤
   DRAM RAS# to CAS# Delay   [3]             │ Menu Level    ►  │
   DRAM RAS# Precharge       [3]             │                  │
   DRAM Data Integrity Mode  [ECC]           │                  │
   System BIOS Cacheable     [Enabled]       │                  │
   Video  BIOS Cacheable     [Enabled]       │                  │
   Memory Hole At 15M-16M    [Disabled]      │                  │
   Delayed Transaction       [Enabled]       │                  │
   Delay Prior to Thermal    [16 Min]        │                  │
   AGP Aperture Size (MB)    [64]            │                  │
                                             │                  │
   ** On-Chip UGA Setting **                 │                  │
   On-Chip UGA               [Enabled]       │                  │
   On-Chip Frame Buffer Size [32MB]          │                  │
   Boot Display              [AUTO]          │                  │
   LCD Type                  [1]             │                  │
   TV Standard               [NTSC]          └──────────────────┘

↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
     F5: Previous Values    F6: Fail-Safe Defaults  F7: Optimized Defaults
```

Do not change Boot Display to LCD. This setting must remain on AUTO.

Set LCD Type according to LCD monitor Type panel setting (see **LCD Monitor Panel Type BIOS Setting**).

TV Standard is not used.

On Chip VGA should remain enabled.

If screen is not viewable at Boot, use **BIOS Reset Key Sequence** to restore BIOS defaults.

LCD Monitor Panel Type BIOS Setting

The panel type mapping is list below:

BIOS panel type selection form			
Single channel		Dual channel	
NO.	Output format	NO.	Output format
1	640 x 480	9	1024 x 768
2	800 x 600	10	1280 x 768
3	1024 x 768	11	1280 x 1024
4	1280 x 768	12	1366 x 768
5	1280 x 1024	13	1400 x 1050 @ 108Mhz
6	1366 x 768	14	1400 x 1050 @ 122Mhz
7	1280 x 800	15	1600 x 1200
8	1600 x 1200		

A20 System Watchdog Timer

System reset programmable watchdog timer with
1 ~ 255 sec./min. of timeout value

Programming Watchdog Timer
The watchdog timer makes the system auto-reset while it stops to work for a period. The integrated watchdog timer can be setup as system reset mode by program.

Timeout Value Range
- 1 to 255
- Second or Minute

Program Sample
Watchdog timer setup as system reset with 5 second of timeout
-o 2E 87 ;enter configuration
-o 2E 87
-o 2E 07
-o 2F 08 ;enter Logical Device 8
-o 2E F5
-o 2F 00 ;set as Second* Minute: bit 3 = 1; Second: bit 3 = 0
-o 2E F6
-o 2F 05 ;set as 5 Second

NOTE: Watchdog Timer not active unless set by user.

Memory Address Map

```
[00000000 - 0009FFFF]  System board
[000A0000 - 000BFFFF]  Mobile Intel(R) 945GM Express Chipset Family
[000A0000 - 000BFFFF]  PCI bus
[000C0000 - 000DFFFF]  PCI bus
[000D1000 - 000D3FFF]  System board
[000E0000 - 000EFFFF]  System board
[000F0000 - 000F7FFF]  System board
[000F8000 - 000FBFFF]  System board
[000FC000 - 000FFFFF]  System board
[00100000 - 7F6DFFFF]  System board
[7F6E0000 - 7F6FFFFF]  System board
[7F700000 - FEBFFFFF]  PCI bus
[D0000000 - DFFFFFFF]  Mobile Intel(R) 945GM Express Chipset Family
[E0000000 - EFFFFFFF]  Motherboard resources
[FDB00000 - FDBFFFFF]  Intel(R) 82801G (ICH7 Family) PCI Express Root Port - 27D0
[FDDFF000 - FDDFFFFF]  OHCI Compliant IEEE 1394 Host Controller
[FDE00000 - FDEFFFFF]  Intel(R) 82801G (ICH7 Family) PCI Express Root Port - 27D0
[FDEE0000 - FDEFFFFF]  Intel(R) PRO/1000 PL Network Connection
[FDF00000 - FDF7FFFF]  Mobile Intel(R) 945GM Express Chipset Family
[FDF80000 - FDFBFFFF]  Mobile Intel(R) 945GM Express Chipset Family
[FDFF8000 - FDFFBFFF]  Microsoft UAA Bus Driver for High Definition Audio
[FDFFE000 - FDFFE3FF]  Intel(R) 82801GBM/GHM (ICH7-M Family) Serial ATA Storage Controller - 27C4
[FDFFF000 - FDFFF3FF]  Intel(R) 82801G (ICH7 Family) USB2 Enhanced Host Controller - 27CC
[FEB80000 - FEBFFFFF]  Mobile Intel(R) 945GM Express Chipset Family
[FEC00000 - FEC00FFF]  System board
[FED13000 - FED1DFFF]  System board
[FED20000 - FED8FFFF]  System board
[FEE00000 - FEE00FFF]  System board
[FFB00000 - FFB7FFFF]  System board
[FFB80000 - FFBFFFFF]  Intel(R) 82802 Firmware Hub Device
[FFF00000 - FFFFFFFF]  System board
```

I/O Port Address Map

[00000000 - 0000000F] Direct memory access controller
[00000000 - 00000CF7] PCI bus
[00000010 - 0000001F] Motherboard resources
[00000020 - 00000021] Programmable interrupt controller
[00000022 - 0000003F] Motherboard resources
[00000040 - 00000043] System timer
[00000044 - 0000005F] Motherboard resources
[00000060 - 00000060] Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
[00000061 - 00000061] System speaker
[00000062 - 00000063] Motherboard resources
[00000064 - 00000064] Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
[00000065 - 0000006F] Motherboard resources
[00000070 - 00000073] System CMOS/real time clock
[00000074 - 0000007F] Motherboard resources
[00000080 - 00000090] Direct memory access controller
[00000091 - 00000093] Motherboard resources
[00000094 - 0000009F] Direct memory access controller
[000000A0 - 000000A1] Programmable interrupt controller
[000000A2 - 000000BF] Motherboard resources
[000000C0 - 000000DF] Direct memory access controller
[000000E0 - 000000EF] Motherboard resources
[000000F0 - 000000FF] Numeric data processor
[000001F0 - 000001F7] Primary IDE Channel
[00000200 - 00000200] Standard Game Port
[00000201 - 00000207] Standard Game Port
[00000274 - 00000277] ISAPNP Read Data Port
[00000279 - 00000279] ISAPNP Read Data Port
[000002F8 - 000002FF] Communications Port (COM2)
[00000378 - 0000037F] Printer Port (LPT1)
[000003B0 - 000003BB] Mobile Intel(R) 945GM Express Chipset Family
[000003C0 - 000003DF] Mobile Intel(R) 945GM Express Chipset Family
[000003F0 - 000003F5] Standard floppy disk controller
[000003F6 - 000003F6] Primary IDE Channel
[000003F7 - 000003F7] Standard floppy disk controller
[000003F8 - 000003FF] Communications Port (COM1)
[00000400 - 000004BF] Motherboard resources

I/O Port Address Map (continued)

```
[000004D0 - 000004D1]  Motherboard resources
[00000500 - 0000051F]  Intel(R) 82801G (ICH7 Family) SMBus Controller - 27DA
[00000778 - 0000077B]  Printer Port (LPT1)
[00000800 - 0000087F]  Motherboard resources
[00000880 - 0000088F]  Motherboard resources
[00000A79 - 00000A79]  ISAPNP Read Data Port
[00000D00 - 0000FFFF]  PCI bus
[0000D000 - 0000DFFF]  Intel(R) 82801G (ICH7 Family) PCI Express Root Port - 27D0
[0000DF00 - 0000DF1F]  Intel(R) PRO/1000 PL Network Connection
[0000F500 - 0000F50F]  Intel(R) 82801GBM/GHM (ICH7-M Family) Serial ATA Storage Controller - 27C4
[0000F600 - 0000F603]  Intel(R) 82801GBM/GHM (ICH7-M Family) Serial ATA Storage Controller - 27C4
[0000F700 - 0000F707]  Intel(R) 82801GBM/GHM (ICH7-M Family) Serial ATA Storage Controller - 27C4
[0000F800 - 0000F803]  Intel(R) 82801GBM/GHM (ICH7-M Family) Serial ATA Storage Controller - 27C4
[0000F900 - 0000F907]  Intel(R) 82801GBM/GHM (ICH7-M Family) Serial ATA Storage Controller - 27C4
[0000FA00 - 0000FA0F]  Intel(R) 82801G (ICH7 Family) Ultra ATA Storage Controllers - 27DF
[0000FB00 - 0000FB1F]  Intel(R) 82801G (ICH7 Family) USB Universal Host Controller - 27CB
[0000FC00 - 0000FC1F]  Intel(R) 82801G (ICH7 Family) USB Universal Host Controller - 27CA
[0000FD00 - 0000FD1F]  Intel(R) 82801G (ICH7 Family) USB Universal Host Controller - 27C9
[0000FE00 - 0000FE1F]  Intel(R) 82801G (ICH7 Family) USB Universal Host Controller - 27C8
[0000FF00 - 0000FF07]  Mobile Intel(R) 945GM Express Chipset Family
```

IRQ

```
(ISA)  0   System timer
(ISA)  1   Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
(ISA)  3   Communications Port (COM2)
(ISA)  4   Communications Port (COM1)
(ISA)  6   Standard floppy disk controller
(ISA)  8   System CMOS/real time clock
(ISA)  9   Microsoft ACPI-Compliant System
(ISA) 12   PS/2 Compatible Mouse
(ISA) 13   Numeric data processor
(ISA) 14   Primary IDE Channel
(PCI) 15   Intel(R) 82801G (ICH7 Family) SMBus Controller - 27DA
(PCI) 16   Intel(R) 82801G (ICH7 Family) PCI Express Root Port - 27D0
(PCI) 16   Intel(R) 82801G (ICH7 Family) USB Universal Host Controller - 27CB
(PCI) 16   Intel(R) PRO/1000 PL Network Connection
(PCI) 16   Microsoft UAA Bus Driver for High Definition Audio
(PCI) 16   Mobile Intel(R) 945GM Express Chipset Family
(PCI) 16   OHCI Compliant IEEE 1394 Host Controller
(PCI) 18   Intel(R) 82801G (ICH7 Family) USB Universal Host Controller - 27CA
(PCI) 19   Intel(R) 82801G (ICH7 Family) USB Universal Host Controller - 27C9
(PCI) 19   Intel(R) 82801GBM/GHM (ICH7-M Family) Serial ATA Storage Controller - 27C4
(PCI) 23   Intel(R) 82801G (ICH7 Family) USB Universal Host Controller - 27C8
(PCI) 23   Intel(R) 82801G (ICH7 Family) USB2 Enhanced Host Controller - 27CC
```

DMA

```
2   Standard floppy disk controller
4   Direct memory access controller
```

Aplus Mobile Contact Information

Address:

Aplus Mobile, Inc.
19629 S. McCord Rd.
Oregon City, OR 97045

Contacts:

General   503-656-5759

Customer Support   503-265-9325   info@AplusMobile.com

Find Aplus Mobile on the web at: www.AplusMobile.com

CAGE Code: 4P1Q1
Pronet Supplier Code: P0843918