



# TECH 2009

## **ION HARDWARE**

### Motherboard:

#### ECS

CPU: AMD 1.8 GHz

#### ASUS

CPU: AMD 1.8 GHz

Memory: 128MB \ 256MB PC2700 DDR 333MHz (DDR – Double Data Rate)

**TechTip:** The motherboard does not emit an audio tone when DDR DIMM is defective or not seated correctly.

**TechTip:** No video or sound? Try reseating DDR DIMM and CPU on the motherboard.

**Kernel Panic:** Possible defective motherboard or IDE ribbon cable. (Most cases defective hard drive.)

### I/O board (Titan I/O board)

- 4 LEDs: D1, D2, D3 & D8
- Setup and calibration buttons are located on the I/O board and OSD board.

### OSD Board (On Screen Display)

#### Features:

- Setup & calibrate buttons.
- Program security key.
- LCD video control buttons.

## **ION SOFTWARE**

### ION 2006

Version: V20.00 – V20.27

Security Key: SA3505-XX

### ION 2006.5

Version: V21.51

Security Key: SA3505-XX

### ION 2007

Version: V22.00 – V22.10

Security Key: SA3522-XX // SA3523-XX

### ION 2007.5

Version: V23.00

Security Key: SA3522-XX // SA3523-XX

### ION 2008

Version: V24.05

Security Key: SA3547-XX // SA3548-XX

### ION 2008.5

Version: V25.00

Security Key: SA3547-XX // SA3548-XX

### ION 2009

Version: 29.00

Security Key: SA3559-XX // SA3560-XX

## FORCE HARDWARE

### Motherboard: ECS

CPU: Intel Celeron 533\566 MHz

Memory: DIMM – Dual Inline Memory Module (PC133)

- **Invalid motherboard configuration:** Proper CMOS configuration needs to be performed. See Force ECS configuration.

### I/O Board 3 in 1 I/O & USB I/O Board

#### 3 in 1 I/O board (T-Shaped I/O board)

- Used in eVo, Edge, Walleette & Fusion systems and it is not interchangeable with the USB I/O board.

### USB I/O Board (square I/O board)

- Used in the Radion, Elite, Vibe, Classic, 19" Upright, and Mr. VIPs.
- USB I/O jumper settings for the FORCE Series games:

J5B - USB port setting for Elite & Upright games.

J5A - USB port setting for Radion & Classic games.



**TechTip:** If the jumpers are not set correctly, the I/O board will display an "Invalid Key" error.

**TechTip:** Check I/O board LEDs for voltages: Diodes D1: +3vdc; D2: +5vdc; D4: VSS; D3: USB VCC.

All four LEDs should be lit red. If not, an "Invalid Key" error will appear.

Setup and calibration buttons are located on the I/O board and OSD board.

### OSD Board: On Screen Display

Features:

- Setup & calibrate buttons.
- Program security key.
- LCD video control buttons.

**TechTip:** OSD board is only used on eVo, Edge, Walleette, and Fusion cabinets.

**TechTip:** Security key socket on the OSD board was not operational on Force Fusion games.

## FORCE SOFTWARE

### FORCE 2002

Version: V8.00 - V8.06

Security Key: SA3050-XX

### FORCE 2002.5

Version: V9.00 - V9.01

Security Key: SA3050-XX

### FORCE 2003

Version: V10.00 - V10.09

Security Key: SA3059-XX

### FORCE 2003.5

Version: V11.00 - V11.05

Security Key: SA3059-XX

### FORCE 2004

Version: V12.00 - V12.10

Security Key: SA3068-XX

### FORCE 2004.5

Version: 13.00 - V13.10

Security Key: SA3068-XX

### FORCE 2005

Version: V14.00 - V14.22

Security Key: SA3083-XX

### FORCE 2005.5

Version: V15.02

Security Key: SA3083-XX

### FORCE 2006

Version: V20.00 – V20.27

Security Key: SA3501-XX // SA3504-XX

### FORCE 2006.5

Version: V21.05

Security Key: SA3501-XX // SA3504-XX

### FORCE 2007

Version: V22.00 - V22.10

Security Key: SA3526-XX

### FORCE 2007.5

V23.00 - V23.02

Security Key: SA3526-XX

### FORCE 2008

Version: V24.04

Security Key: SA3542-XX // SA3543-XX

### FORCE 2008.5

Version: V25.00

Security Key: SA3542-XX // SA3543-XX

### FORCE 2009

Version: V26.01

Security Key: SA3570-XX // SA3572-XX

64 MB of DIMM (64512K) is required for Force 2002(5), 2003(5), 2004(5) 2005(5), 2006(5), 2007(5), and 2008 (5).

## CMOS CONFIGURATIONS

CMOS stores information such as the date, time, and system configuration settings on the motherboard.  
CMOS battery: CR2032 (3.0 VDC lithium battery)

### ASUS (ION)

- 1 - Plug the keyboard into PS2 (purple) port or the USB port on the motherboard.
- 2 - Power the game on. Press and hold the **Del** key to enter the **BIOS SETUP UTILITY** screen.
- 3 - Once you're at the **BIOS SETUP UTILITY** screen, arrow over to **EXIT**.
- 4 - Arrow down to **LOAD SETUP DEFAULTS**.
- 5 - Press **Enter**. Select **OK**.
- 6 - Arrow back to **MAIN**, and adjust the **System Time** and **System Date**.
- 7 - Arrow back over the **EXIT** screen.
- 8 - With the **EXIT & SAVE CHANGES** already highlighted, press **Enter**. Select **OK**.
- 9 - The game should reboot. Unplug the keyboard.

### ECS (ION)

- 1 - Plug the keyboard into PS2 (purple) port or the USB port on the motherboard.
- 2 - Power the game on. Press **Del** to enter **SETUP**.
- 3 - Arrow over and down to **Load Optimized Defaults**.
- 4 - Press **Enter**. Press **Y** for **Yes**, then press **Enter**.
- 5 - Arrow back up and over to **Standard CMOS features**, then press **Enter**.
- 6 - Adjust the date and time, then press **Esc**.
- 7 - Press **F10**, then press **Y** for **Yes**. Then press **Enter**.
- 8 - The system should reboot. Unplug the keyboard.

### ECS (FORCE)

- 1 - Plug the keyboard into PS2 (purple) port or the USB port on the motherboard.
- 2 - Power the game on. Press **Del** to enter **SETUP**.
- 3 - Arrow over and down to **Load Fail-Safe Defaults**.
- 4 - Press **Enter**, then select **Y** for **Yes**.
- 5 - Arrow over and down to **Load Optimized Defaults**.
- 6 - Press **Enter**. Then press **Y** for **Yes**.
- 7 - Arrow back over to **Standard CMOS features**, then press **Enter**.
- 8 - Adjust the date and time, then press **Esc**.
- 9 - Press **Enter**. Press **F10** and then press **Enter**.
- 10 - The system will reboot. Unplug the keyboard.

Instructions to change the date and time are normally right in the Date\Time area.

Keyboards: Both the USB port or PS2 port (purple port) will work with Force and Ion version motherboards.

**TechTip:** DIP switch 8 (DS8) should be tried first before doing a keyboard CMOS.

## CMOS ERRORS

\*\* Corrupted motherboard

### Possible causes

- Outside influences: Electrical disturbance or thunderstorms.
- Inside influences: Reverse polarity or AC outlet problems.
- Defective CR2032 lithium 3.0-volt battery.
- Defective motherboard.

### Symptoms:

#### Serial port or USB port

- No touch controller found. (Verify that the green LED on the controller is active by touching the screen.)
- Fatal error, cannot access I/O board (2006, 2007, 2008, & 2009 software).
- Invalid key error: Motherboard not USB port.

#### Primary IDE port (Hard Drive)

- Disc boot failure or operating system not found.
- Bad Command or File Name: hard drive related issue.

#### Secondary IDE port: (CD\DVD Drive)

- Loading problem: CD\DVD drive cannot be accessed.

### Other

- No modem detected: MegaNet (international) or Tournamaxx (US & Canada).
- No sound or audio.

## **I/O BOARD**

### Problem:

**Fatal error cannot access I/O board:** Communication problem between the motherboard and I/O board.

### Possible causes

- Software: Corrupt hard drive - reload software.
- Motherboard: CMOS corruption - perform CMOS configuration.
- Motherboard: Defective motherboard.
- I/O board: Defective I/O board - 4 red LEDs need to be active or lit for correct I/O board function.
- Harness problem: Broken wire at pin connector harness.
- Power connection: Check power supply connector.

**TechTip:** Related to 2006, 2007, 2008, & 2009 versions of software.

### 2006

- Possible touch controller related problem.

### Printer error

- Defective I/O board. Printers are used in games manufactured for Germany.

**TechTip:** The DIP switches will not function if the I/O board is not communicating with the motherboard.

## **VIDEO ERROR MESSAGES**

### No video being displayed

- D-Sub cable disconnect
- D-Sub Powersave Mode
- No Input signal, check connector
- No Video
- Auto Test

The error messages are being generated by the LCD panel or the video monitor, and not by the motherboard. This indicates that the motherboard is not turning on. The following may help resolve this problem.

- **Video Cables:** Try reseating the VGA cable to and motherboard and LCD panel.
- **DIMM:** Reseating the DIMM on the motherboard.
- **Power supply:** Weak power supply.
- **Motherboard:** Defective motherboard. Replace motherboard.
- **CPU:** Reseat the CPU chip on the ECS motherboard (purple).  
Simply open the lever on the side of the socket a little bit and then close it.

**TechTip:** Ion ECS and ASUS motherboards do not emit an audio tone if the DIMM is not seated or has dirty edge pins.

## **NO SOUND**

The game operates correctly, but no sound is being produced – provided that the volume level up is at the midway point in the “Volume Control” setting under “System” , which can be accessed through Operator Setup.

### Troubleshooting procedure:

#### DIP switches:

Using the DIP switches (DS) try a DS6 (device drivers) first and then DS8 (CMOS configuration), or directly going to the DS4 & 7 (factory default).

#### Tools

- MP3 player and headphones with 1/4” (3.5mm) stereo plug.

#### Motherboard:

With the game turned off, unplug the 1/4” (3.5mm) stereo plug from the green port on the motherboard. Connect the headphone set into the green port on the motherboard, and turn the game back on.

Allow the game to boot up completely. When touching the touchscreen is there any sound being produced through the headphones?

- Positive for sound: Then this would that the motherboard is functioning correctly. Possible I/O board problem.
- Negative for sound: Then this would indicate a motherboard problem.

#### I/O Board:

With the game turned off and the 1/4” (3.5mm) stereo plug still disconnected from the green port on the motherboard. Connect into the 1/4” (3.5mm) stereo plug into the MP3 player.

Turn the game and the MP3 player on. With MP3 turned on and the game turned back on. Is the MP3 producing sound?

- Positive for sound: I/O board is functioning correctly.
- Negative for sound: This would indicate a defective I/O board.

**TechTip:** Verify that the speakers and wiring are connected and not damaged.

## **COIN JAM ERROR**

Problem: Coin jam error message.

Possible causes:

- Coin acceptor.
- Bill acceptor (note acceptor)
- I/O board
- Opto board (Radion \\ Select \\ Slim)
- Jumper settings

Problem: Coin jam error message appears on the screen with annoying audio tone after the game boots up.

Procedure: Once the "Coin jam" error message stops (about 30-40 seconds) press the **SETUP** button.

Select the **DIAGNOSTICS** icon. Touch the **I/O Test** icon. Located on the left side of the screen are the Coin Input Channels. Depending on the platform, the channels can range from Channels 1-6 or 1-8. Observe what channels are running.

US standard games: Channel 1 = Coins (US quarters) and Channel 2 = Note acceptor (US dollar bills)

Example1: Channel 3 indicator is running active in the I/O board test; in this scenario this indicates that the I/O board is the problem. Since the Channel 3 indicator on the I/O board test is running active, this would eliminate the coin mech and note acceptor as possible problems. Had Channels 1 or 2 indicators been running active, this could indicate that the coin mech, note acceptor, or the I/O board could be at fault. It's also a possible harness problem.

Jumper Settings

Ion: Titan I/O board jumper setting:

US domestic games

Aurora games: SN: 043007XXXXXXXX or greater

- JP1 shunt removed - using Imonex V92 series coin mechs
- JP1 shunt in-place - all other Aurora games

Ion eVo & Edge: Ion eVo (SN:100107XXXXXXXX or greater) & Ion Edge (SN: 092507XXXXXXXX or greater)

- JP1 shunt removed - using Imonex V92 coin mechs
- JP1 shunt place - all other Ion eVo and Ion Elite Edge games

Games with Imonex Coin Mechs

Shunt must be removed from:

- JP8 (for I/O boards with the part numbers SA10068-01, -02, -03, and -04)
- JP7 (for I/O boards with the part numbers SA10068-05, -06, -08, -09 and -10)

Games without Imonex Coin Mechs

Shunt must be in place at:

- JP8 (I/O boards with the part numbers: SA10068-01, -02, -03, and -04)
- JP7 (I/O boards with the part number: SA10068-05, -06, -08, -09 and -10)

Force: 3 in 1 I/O board (eVo)

- Coin mech: JP7 - Open
- No coin mech: JP7 – Closed (shorted)
- JP1 & JP8 must be shorted; if not, coin jam error will occur.

Force: USB I/O board (square I/O board)

- JP1 must be shorted; if not, coin jam will occur.

**TechTip:** If "Coin jam" appears on the screen after a replacement I/O board was installed, compare the jumper settings on the I/O board that was removed to the settings on the installed I/O board. All shipped I/O boards are loaded and may need to have a jumpers changed due to different configurations involving the coin mech.

**TechTip:** US Ion Aurora games are configured with three coin input channels.

Channel 1: US quarters \\ Channel 6: US dollar coins \\ Channel 2: US notes acceptor (Mars AE 2411)

**TechTip:** International games normally have a Mars Cashflow 330 for coin currency, and the Smylie note acceptor. Depending on the country some channels are used.

## SECURITY KEY

The security key is a copyright protection device. Security keys can be programmed for different versions of software depending on laws or requirements for particular state or country.

**SA3523-01** is an Ion 2007 security key. The **SA3523** is the base number. The **-01** represents US standard.

### Invalid key error

#### All Games

- Check for a defective security key.
- Invalid key for version: Software does not match key version.
- Corrupted hard drive: Reload software CDs/DVDs.
- Corrupted CMOS configuration: Reconfigure motherboard CMOS configuration and check time & date.  
*Check CMOS configuration section Tech 2009 notes.*

### Force & Ion 2007, 2008, & 2009

- Force key detected in Ion system for version PG3002-01 V2X.XX
- Ion key detected in Force system for version PG3002-01 V2X.XX
- No security key detected for version PG3002-01 V2X.XX - no security key present.
- Invalid key for version PG3002-01 V2X.00 - software does not match key version.
- Key Range Mismatch - key and software do not match completely.

**TechTip:** "Fatal I/O error cannot access I/O board" indicates no communication between motherboard and I/O board.

### Force & Ion

- **LEDs:** Check LEDs on the I/O board. All four LEDs must be lit in order for the I/O board to function correctly.
- **USB cable:** Make sure the USB cable is seated all the way at the I/O board and motherboard.
- Check for a defective I/O board, or if the I/O board was replaced, check the jumpers.  
*Refer to FORCE Series on Tech 2009 notes for I/O board (USB port).*
- **DIP switch DS4 & 7:** Memory clear. Corrupted hard drive. *Check Memory Clear section / DIPswitches.*
- **I/O-OSD boards:** Invalid key error will occur if there is a security key in the OSD board and a security key I/O board.

### Force 2006

- **ERROR 1: INVALID KEY FOR VERSION** - This error message is directly related to the 2006 version only.  
*Refer to the above Force & Ion heading for troubleshooting.*

### Force

The game displays "**MAXX loading**" then "**invalid key**".

To test whether the I/O board is being detected by the motherboard, turn the game off and put DIP switch 6 (DS6) to the ON position. Turn the game back on. If "**Maxx loading**" is followed by "**invalid key**" again, this would indicate that the motherboard is not detecting the I/O board.

### DIP Switch Response: Negative

#### Hardware

- DC power: Check for the four red LEDs on the I/O board.
- Defective USB cable: Check and reseal the USB cable.
- Defective I/O board.
- Defective motherboard.

#### Software

- Corrupted CMOS configuration on motherboard.

### DIP Switch Response: Positive

#### Hardware

- Wrong hard drive.
- Wrong touchscreen controller.

#### Software

- Memory corruption: Try DIP switch 4 & 7 procedure.
- Corrupted CMOS: Try resetting CMOS on the motherboard.

**TechTip:** The Force software 2002 through 2005 requires a custom hard drive.

**TechTip:** Force 2006 through 2009 will display different security key error messages.

**TechTip:** The SMT-2 (XL) and SMT-3 (Maxx) (white box) will not function. The Force is a controller SMT-4 (black box).

**TechTip:** If an invalid key error occurs when attempting to download newer software, chances are that the new security key was installed first and the attempted download failed. This would indicate a loading problem.

Refer to DOWNLOADING page of TECH 2009 for possible solution.

## **HARD DRIVES**

### Ion \ Force

- **Disc Boot Failure:** Indicates a defective hard drive. Related to ECS motherboards.
- **Reboot and select proper boot device or insert boot media in selected boot device and press a key:** Indicates a defective hard drive. Related to ASUS motherboard.
- **Operating System Not Found:** Check the IDE ribbon cable from the hard drive to the motherboard. May indicate a defective hard drive.

**IDE ribbon cable:** Possibly damaged or defective IDE ribbon cable.

**HDD adapter:** Laptop style hard drives use a 2.5" HDD adapter. Possible defective adapter.

### Corrupted Hard Drive

- **Bad Command or File Name:** This may indicate a corrupted hard drive or motherboard (corrupt CMOS).  
Hard Drive: Reloading the CDs/DVDs may help correct the "BAD COMMAND or FILE NAME" error.  
Motherboard: Performing a CMOS configuration may also help correct a "BAD COMMAND or FILE NAME" error.

### Ion

- **LiLo-Keytable read/check sum error:** Indicates a corrupted hard drive. Try reloading software.
- **Kernel panic:** System crash. Problem is related to hard drive. Try reseating IDE ribbon cable for the hard drive.

### Force

- **Interrupt 18H Check cable...:** Indicates a defective hard drive.

### Ion \ Force \ Maxx

- **Error 64, 67, & 97:** Indicates a defective hard drive (seen during download of new software).
- **Error 94:** May indicate that the hard drive is connected to the Secondary IDE.
  - Hard drive** must be connected to the Primary IDE connector.
  - CD/DVD-ROM drive** must be connected to the Secondary IDE port.

### Corrupted hard drive error messages

- **Checking for bad blocks:** Possible corrupted hard drive.
- **Mounting other file system – failed:** Possible corrupted hard drive.
- **Rebooting to perform maintenance:** Possible corrupted hard drive.

**TechTip:** Reloading the software will reformat the hard drive and restore it to factory default level.

**TechTip:** Ion 2007 – DIP switch 4 & 7 procedure may restore an Ion hard drive.

## **DOWNLOADING**

### CD \ DVD

- Check the CD/DVD for scratches or defects. Try a different set of CDs or DVDs.

### DVD Disc

- **Error Detected #96:** Defective DVD (disc). Problem occurs during download of software.

### CD \ DVD-ROM Drive

- Jumper setting: CD/DVD-ROM drive must be set to MASTER (MA).
- **Error 13.9:** This error can indicate either a defective set of CD/DVDs or a defective CD/DVD-ROM drive.
- Rebooting: Game reboots after software is loaded.  
The age and condition of the CD/DVD-ROM drive are factors in downloading problems. Try a newer drive.

### CMOS Configuration

- A problem with CMOS configuration can cause the motherboard to not recognize the CD/DVD-ROM drive. See **CMOS Configuration** page.

### Connection Problem

- Make sure that the Centronics cable is connected correctly and pushed all the way down and into place. Try another Centronics cable.
- IDE ribbon cable: Use the IDE ribbon cable connected between the CD/DVD-ROM drive and the motherboard. Use the fan power connector to power the CD-ROM drive. The IDE ribbon cable going to the motherboard will go to the Secondary IDE connector on the CD/DVD-ROM drive.
- **CD-ROM error:** CD/DVD-ROM must be to Secondary IDE port.
  - Hard drive IDE ribbon cable must be connected to the Primary IDE Port (top port) on the motherboard.
  - CD/DVD-ROM drive IDE ribbon cable connects to Secondary IDE port (bottom port) on the motherboard.

### Loading problem

During a download, the tray on the CD/DVD drive opens and the screen indicates to install the next disc, but there is no next disc to install. This would indicate the disc that was loading is defective.

Example 1: Force 2005 is a 4 CD set. If CD4 is ejected and CD5 is requested, then CD4 is defective.

Example 2: Force 2003 is a 2 CD set. If CD1 is ejected directly after touching the green ACCEPT icon, then CD1 is defective.



## LOCKUPS \ REBOOTS

### All games

Fans: Make sure fans are clean and clear of dirt – on the CPU chip, the power supply (if any), the hood, etc.

### Screen Message

- Game boot ups to the “**Merit Industries, Inc**” on the screen and does not change:  
This may indicate a defective EIDE ribbon cable for the hard drive or Centronics IDE cable.  
Start with disconnecting both ribbon cables to the motherboard and power up the game.  
Disc boot failure (for example) should appear on the screen, depending on motherboard.  
Procedure: Connect each ribbon cable independently to motherboard, and observe the end results.

### Hardware

- Motherboard: A defective motherboard can be responsible for lockups and reboots.
- Hard drive: Problems with age and physical condition are factors in 24/7 operations.
- A weak power supply can create problems with lockups and reboots.

**TechTip:** If the fan in the power supply has failed, it is recommended that the power supply be replaced.

### Memory: Physical Memory – Ion (DDR) \ Force (DIMMs)

- Defective DIMMs can cause games to lock up or reset and can also create graphics problems.
- Continuous repeating tone or tones may indicate a hardware memory problem with the DIMM.  
Try reseating or replacing the DIMM(s).

### Memory corruption: Corrupted software or missing files on the hard drive.

- Corrupted software on a hard drive can also be responsible for games rebooting and locking up.
- Clearing memory or reloading the CDs may help correct the problem. *Refer to memory clear section.*
- Some software versions had problems with lockups and reboots. *Refer to Tech 2009 for software revision.*

### Voltage: Location / wall outlet / grounding.

- Heavy devices: A refrigeration unit (beer box) or compressors on the same line will cause lockups.
- Poor line voltage: The location may have a problem with poor wall voltage or grounding with their electrical system.
- Reversed polarity at the wall outlet will effect game operation.
- Improper wall voltage or low voltage can be a factor.
- Neon Lights can produce disruptive line noise.
- Proper grounding is necessary for normal game and touchscreen operation. Proper grounding is also a safety issue.

## MEMORY CLEAR PROCEDURE

DIP Switches – Linux operating system: Maxx Ruby, Sapphire, Jade, Crown (2003 through 2009).

- DS6: Hardware configuration – identifies system hardware and reconfigures the device drivers for the motherboard.
- DS4 & 7: Complete memory clear – resets the game to the factory defaults. Clears ALL memory on hard drive.  
Resets CMOS on the motherboard and resets device drivers for the hardware devices.

### DIP Switch 1

- DS1: Four selection icons – DS6, DS8, DS4 & 7, DS5 & 7 for 2007, 2008, and 2009 only.

### Reloading Software – CDs or DVDs

Reloading the discs will reformat the hard drive and restore the software to an original default level.

**TechTip:** If the DIP switch 4 & 7 procedure and the reloading of the software does not resolve a problem, then the actual hard drive maybe the problem with a bad sector.

## TOUCHSCREENS

### Microtouch

- SMT-4 Controller: Force games only (black box).
- USB Controller: Ion only (open face)

### Function

- The green LED on controller is lit at half brightness and goes to full brightness when the screen is touched.
- Overlay functions on capacitance.

**TechTip:** Green LED is flashing from 1 to 5 times – possible defective touchscreen or controller.

**TechTip:** Green LED is not lit – check +12 vdc. The touchscreen and/or controller may be defective.

### Calibration

1. Locate and press the **CALIBRATE** button.
2. Touch the first dot or the center of the cross that appears on the screen for 2 seconds, then pull your finger away.
3. Touch the second dot or the center of the cross that appears on the screen for 2 seconds, then pull your finger away.
4. During the touchscreen test, the cursor should follow your finger anywhere you touch the screen.

## CALIBRATION \ LOCKUP PROBLEMS

### Touchscreen

- Problem with the entire screen: Recalibrate the touchscreen. If calibration is still off, replace the touchscreen.
- Problem in one area of screen: Check for scratches or nicks on the screen. Replace the touchscreen.
- Loses calibration: Check the ground pin on the line cord. Replace the AC line cord. Check the AC wall outlet.
- Calibration off: DIP switch 6 will reload the device drivers for Linux operating systems.

### USB controller

USB cable: No green LED lit – check the USB cable going to motherboard. Possibility defective or disconnected.

### Grounding

- Improper grounding will affect the operation of the touchscreen.
- Double-touch problem: Taking two or three cards away as in Tri-Towers & 11 Up after only one touch. Make sure the A/C plug and wall outlets are properly grounded.

**TechTip:** Microwave ovens and neon lights will interfere with the calibration of the touchscreen and should not be within 6 feet (approx. 2 meters) of the game.

### CRT Monitor (Force Classic 13" CRT, Radion 15" CRT, and Upright 19" CRT)

- The touchscreen cable should not be positioned under or on top of the yoke of the monitor.
- The touchscreen controller cable should not be positioned near the flyback transformer.

**TechTip:** If the cable is not properly installed, the touchscreen response will be 180 degrees out of sync.

Removal: Waxed dental floss // Cleaning: Use only a soft cloth with water or denatured alcohol.

**Symptom:** No green LED or green LED is dim and not responding to touch.

## **Warning!!!** Do not install another touch controller.

**There is a strong possibility of damaging the replacement controller.**

**Procedure:** With game turned off, start by checking the resistance across connector points 4 & 5. If the resistance measures from 0 to 180 ohms (could possibly be higher) then the touchscreen cable is defective and the controller damaged. At this point, the touchscreen and controller will both need to be replaced. There should about 2 to 3 MB ohms across connector points 4 & 5. Should the resistance measure good across connector points 4 & 5, then only the touchscreen controller will need to be replaced. Refer to the diagram for the connector points.

**TechTip:** This procedure will not apply to Ion platform.

TOUCHSCREEN OVERLAY CONNECTOR

