Parker Factory Display Hardware User Guide

Parker

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Product Warranty Information

Parker Hannifin provides top quality products through rigid testing and the highest quality control standards.   Should a problem occur with your hardware, Parker's standard product warranty covers these items for 24 months from the date of shipment from the factory.   Exceptions appear below:

- For all Parker PFD Monitors, image retention (persistence) is not covered by warranty. Please refer to the monitor manufacturer's manual supplied on the PFD Documentation and Utilities CD for information to help avoid image retention.
- Software revisions that occur within 60 days after purchase are available under warranty upon request. Please review Parker's Software License Agreement for additional software warranty information.

Technical Assistance

The Product Technical Support department welcomes any questions that might arise as you develop or run your applications. We offer complimentary support for all customers, including end users, original equipment manufacturers (OEM), system integrators or distributors.

If you have questions regarding the Parker Factory Display, please complete the following steps:

- Check any release notes that may have shipped with the unit. These notes provide important information about the product.
- Consult the documentation and other printed materials included with the product.

Or, for direct technical assistance contact Parker using the following information:

> **Parker Hannifin**
> *5500 Business Park Drive*
> *Rohnert Park, CA 94928*
>
> *Telephone: (800) 358-9070 or (707) 584-7558*
> *Fax: (707) 584-3793*
> *Email: emn_support@parker.com*
> *Internet: http://www.parkermotion.com*

INTRODUCTION

Thank you for purchasing the Parker Factory Display! This product integrates Parker Hannifin's experience in visualization software, hardened industrial PC design and manufacturing, with large format LCD displays to create a plant floor digital Electronic Signage solution.

The Parker Factory Display (PFD) is a next generation solution that brings Andon, or Lean Information to the production environment by providing instant, visible and/or audible warning to the operations or support team when there is an abnormality within the area. It promotes immediate reaction to the causes of waste, with consequent downtime reduction and quality improvement. As a total solution, the PFD can:

- Display Lean metrics, production status, OEE Data and Safety information.
- Identify abnormalities (losses) in the workplace.
- Ask for help from production or maintenance support areas.
- Communicate the work condition with visual signals such as graphic color indicators and data.
- Can be used in both manufacturing and business processes.
- Provide non-production related messages and announcements.
- Is fully user configurable.

The PFD as a system provides unique capabilities to the Lean Visualization marketplace:

- Impressive and intuitive wide format, high definition graphics capability.
- Provides direct connectivity to Parker and over 40 device drivers to PLC's and controllers - included with each system.
- Remote access Web Publishing capability via most desktop, laptop or handheld PC browsers.
- Continuous Improvement Database Log that is distributable across the Internet.
- Includes a selection of common Lean templates that can be used with little-to-no modifications or customized to suit the customer's unique needs.

As shipped, the PFD product consists of three major components:

- **PFD Controller**
  The PFD Controller is a compact industrial computer that includes three serial ports for communication to machine or process controls, two Ethernet ports for local or Internet LAN connectivity, audio output jack for audible alerts, and four USB ports. In addition to DVI and analog VGA video outputs, a DVI-to-HDMI adapter is provided for a wide variety of connections to large format, high definition monitors.

- **Parker Factory Display Software**
  The embedded PFD software included with each PFD Controller employs unique embedded client/server architecture and HMI inspired development environment that contains easy, intuitive tools for screen development and also allows easy customization. All plant floor information can be published to any network connected web browser where a user can view or change information remotely. Sophisticated security is built-in to provide six different access levels including View Only for the most secure applications.

- **Large Format, 16x9 High Definition LCD Monitor**
  The visualization component of the PFD system is a striking, high definition LCD 32″, 40″, 46″ or 55″ diagonal graphic display rendering 1920x1080 (1366x768 with the 32″ Monitor) graphic resolution. Features include, automatic power on/off according to your unique weekly schedules, internal cooling fans with thermal sensors, built-in screen savers, VESA mounting and CE, UL, and FCC approvals.

Model Number Configurations

The model number configuration of the Parker Factory Display provides a good overview of the model options available to customers. The full model configurator is as follows:

PFD 32NT – B A 3

Parker Factory Display Series
> PFD Series with controller, software & monitor

Monitor Size
> NNNT – Controller only, no monitor included
> 32NT – 32" monitor (1360 x 768 resolution)
> 40NT – 40" monitor (1920 x 1080 resolution)
> 46NT – 46" monitor (1920 x 1080 resolution)
> 55NT – 55" monitor (1920 x 1080 resolution)

Controller Type
> B – "B" Series

Reserved
> A – Reserved

Agency Approval Option
> 3 – UL/CUL/CE Approvals

INSTALLATION

Verifying Components

Upon receipt of the PFD system, verify all components arrived in sound condition. In general, there are two boxes that make up a total Parker PFD system; a PFD Monitor container and a container that holds the PFD Controller assembly.

Open the Monitor package as per the directions on the shipping container. Remove all packing materials and documentation. If there are any missing components from the PFD Monitor container, please contact Parker Automation Customer Service at 800-358-9070.

Keep all documentation that comes within the PFD Monitor container for future reference. You will need to refer to the PFD Monitor user guide when installing the PFD system in its final location within the plant.

Typical components within the PFD Monitor container include a remote, AC power cord, and the monitor documentation set.

The PFD Controller assembly container comes with the following components:
- PFD Controller
- AC power cord
- 6′ HDMI Cable
- DVI-M to HDMI-F Adapter
- PFD Documentation and Utilities CD

Selecting a Location

The first step when installing the PFD is to select an appropriate location for the unit. This is the most important aspect of the installation process because the location selected can affect performance, ease-of-use, and life-expectancy. This section provides some guidelines to follow when selecting a location. It is recommended that the PFD Monitor be installed first and then locate the PFD Controller so that it can be installed in a suitable location within cable distance from the Monitor.

Underwriters Laboratories UL508 Approval

In order to obtain Underwriters Laboratories (UL508) approval for the installation, it must meet the following criteria:

- The PFD Controller is suitable for mounting on the flat surface of a Type 4X Indoor Use Only or Type 12 enclosure.

- The equipment is to be provided with a branch circuit protection rated no greater than 20 A.

- The AC input to the IPC/IPX PowerStation is 100-240 Vac 50-60 Hz. A NEMA 5-15P power cord is included with each unit for 125 Vac operation. A NEMA 6-15P power cord (not included) is required for operation above 125 Vac.

Warning — A NEMA 6-15P power cord (not supplied with the PFD Controller) is required for operation greater than 125 Vac. The NEMA 6-15P power cord is used for 208 Vac and 240 Vac circuits and is rated to 250 Vac maximum.

Environmental Guidelines

The environment is the surrounding area where the PFD Monitor and Controller will be located. In general, you should select a place that limits exposure to adverse conditions such as dust, oil, moisture, and corrosive vapors.

Please review all manufacturer safety and maintenance precautions listed in the Monitor user guide. These precautions contain important information regarding the safe handling, installation, and use of the monitor.

The Monitor user guides are shipped with the Monitor and are also available from the Parker Automation web site at www.parkermotion.com. Select the product link on the left of the page, and then select the documentation from the PFD product page.

Electrical Grounding Guidelines

To minimize unwanted electrical interference, select a location away from machinery that produces intense electrical noise (arc welders, for example). If you cannot avoid electrical noise, isolate input power to the unit and separate all data communication cables from AC power lines.

All communication cables should be 100% shielded to avoid interference from power circuits, motors, welders and other noise generating devices.

See *PFD Controller Specifications,* Table A-4 for a list of the PFD's electrical specifications. Make sure that your power source is compatible with the Controller and Monitor before starting the unit.

Important

Use the Controller ground screw to connect the unit to a suitable ground reference, such as earth ground or building steel. This ensures the unit is in compliance with immunity and emissions requirements necessary for proper operation.

Operating Temperature Guidelines

You can safely operate the PFD Controller within the temperature range of 0° to $50^{o}C$. Remember that the temperature within an enclosure is generally higher than the external temperature. If the PFD Controller is operating inside an enclosure at temperature levels above its rated ambient temperature, you must cool the enclosure.

- It is strongly recommended that the PFD Controller be mounted in a separate, suitable enclosure to protect the Controller from elements in the environment.

- Limit the PFD Controller's exposure to adverse conditions, such as dust, oil, moisture, and corrosive vapors in order to minimize maintenance and repair costs.

- Be sure to choose an area for the PFD Controller that is free from moisture or condensing humidity.

The various hardware components that comprise the PFD system each have different environmental ratings. The overall <u>system</u> (PFD Monitor and Controller) has a maximum environment operating temperature range of

41°F to 104°F (5°C to 40°C)

due to the thermal limitations of the PFD Monitor. Although the system will operate outside these limits, elevated operating temperatures can have a negative effect on the life of electronics. It is wise to assess the thermal considerations of the intended location of the PFD system before mounting and installation. To prevent overheating of the PFD Monitor, consider enabling the use of the internal fan cooling feature.

A special note regarding mounting the PFD Controller in a separately sealed enclosure:
The PFD Controller has been tested for use in 50°C ambient, still air locations. This means that when installed, the ambient air surrounding the PFD Controller is not expected to exceed 50°C.

If the PFD Controller is mounted in a protective, sealed industrial enclosure, the temperature inside the enclosure can rise above safe operational limits without proper ventilation. The most commonly overlooked aspect of this type of installation is that heat generated by the device becomes trapped inside the enclosure and increases the ambient temperature surrounding the PFD Controller. This increase in temperature inside the enclosure can sometimes exceed 15°C or more. Although the thermal dynamics are not always linear, a temperature rise of 15°C would imply that the environment outside the sealed enclosure could not exceed 35°C (95°F), or the Controller would surpass its maximum operating temperature.

Since elevated operating temperatures can have negative effect on the life of electronics, do not mount the Controller into a sealed enclosure without considering the affects of the internal heat buildup. Passive venting for thermal convection, internal air circulation fans, filtered exhaust fans with filtered inlets, air conditioners, and other products are available in the market to assist in reducing overheating.

Points to consider when performing a site review are:

1. What is the expected maximum outside ambient temperature that the industrial enclosure will experience?

2. Are there any additional heat-generating components inside the enclosure?

3. What is the size of the enclosure? Larger enclosures dissipate more thermal energy than smaller ones.

4. In what kind of environment will the enclosure be installed - clean, water-tight, dust-tight? Can the enclosure be convection cooled or is active cooling required?

In summary, it is a wise investment to thermally plan the installation by anticipating, and eliminating, the heat build up inside a sealed enclosure. Not only will this extend the life of the electronics, but it will also reduce costly equipment downtime.

Enclosure Guidelines

Select an enclosure that is large enough to allow free airflow in and around the Controller.

You should allow a <u>minimum</u> of 2 inches between the inside of the enclosure and the top, bottom, sides, and back of the PFD Controller, greater clearance would be better. Preferably the larger the enclosure, the more heat will be dissipated via the enclosure walls and surrounding air. Make sure that the surface of the enclosure on which the PFD Controller is mounted is flat and free of raised or depressed areas.

Refer to [Table A1](#) or the CD that came with the PFD Controller for dimensional drawings.

Radiated Emissions Guidelines

Both the PFD Controller and the PFD Monitors have been tested to comply with international electromagnetic and emission standards. To reduce radiated emissions, ensure that there is a good earth connection to the PFD Controller, which can be accomplished by utilizing the grounding stud located on the side of the Controller chassis near the AC power connector. This connection must be made with the shortest possible, heavy gage wire or braided cable. Low-resistance (<0.5 ohms) continuity should be verified with an ohmmeter for proper grounding. In addition, all communication cables should be shielded and grounded, preferably only on one end.

Installing the Parker Factory Display System

Once all components have been received and verified that they are in good condition and an installation location has been selected, you are ready to install the PFD Monitor and the PFD Controller assembly.

It is recommended that the PFD Monitor be installed in the desired location first and then locate the PFD Controller so that it can be mounted in a suitable location within a reasonable cable distance of the Monitor.

Mounting the PFD Monitor

Carefully move the PFD Monitor to the final installation location within the plant. Observe all 2-person lift requirements when moving equipment. Refer to the included PFD Monitor user guide along with any commercial VESA mounting kit instructions.

Warning!

Read the following safety precautions prior to attempting the installation. Failure to follow proper mounting procedures could result in damage to the equipment or injury to the user or installer.

For proper installation it is strongly recommended to use a trained, qualified technician knowledgeable in mounting large LCD monitors - particularly if overhead of equipment or personnel.

Failure to follow standard mounting procedures could result in damage to the equipment or injury to the user or installer. Please inspect the location where the unit is to be mounted. Not all walls or ceilings are capable of supporting the weight of the PFD monitor.

Product warranty does not cover damage caused by improper installation, remodeling or natural disasters. Failure to follow these recommendations could result in voiding the warranty. Parker Hannifin is not responsible for damage to equipment or personnel as a result of improper installations.

Also adhere to the following safety considerations:

- **DO NOT** block ventilated Monitor openings with mounting accessories or other components such as the PFD Controller.

- Use mounting apparatus that comply with VESA-compatible mounting methods.

- Use size M6 screws to secure the mounting bracket (10mm + thickness of bracket, in screw length). If using screws longer than 10mm, check depth of mounting hole on the display. Recommended fastening force is 3.5 to 4.7 ft-lbs (470 to 635 N-cm). If is recommended to use mounting interfaces that comply with UL1678.

- Refer to instructions provided with the mounting apparatus used to support the PFD monitor.

- **DO NOT** install in locations where a door or gate can hit the PFD monitor.

- **DO NOT** install in areas where the unit will be subjected to strong vibrations or dust.

- **DO NOT** install near a location where the main power lines enter the building.

- **DO NOT** install where personnel can easily grab or hang on to the unit or mounting apparatus. • When mounting in a recessed area, as in a wall, leave at least 4 inches (10cm) of space between the PFD monitor and the wall for proper ventilation.

- Allow adequate ventilation around the PFD monitor so that heat can dissipate away from the unit and mounting apparatus.

- Ensure that the ceiling is sturdy enough to support the weight of the unit and mounting apparatus over time, against earthquakes, unexpected vibrations, and other external forces.

- Ensure that the unit is mounted to a solid structure within the ceiling, such as a support beam. Secure the PFD monitor using bolts, spring lock washers, washer and nut.

- **DO NOT** mount to areas that have no supporting internal structure. **DO NOT** use wood screws or anchor screws for mounting. **DO NOT** mount the unit to trim or to hanging fixtures.

- Periodically check for loose screws, gaps, distortions, or other problems that may occur with the mounting apparatus. If a problem is detected, please refer to qualified personnel for service.

- Regularly check the mounting location for signs of damage or weakness that may occur over time.

Mounting the PFD Controller

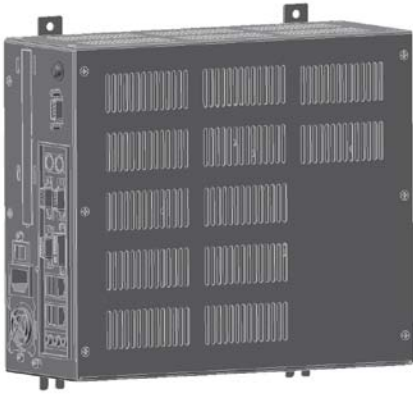To install the PFD Controller, complete the instructions below:

1) Drill four mounting holes according to the PFD Controller mounting drawing supplied on the PFD Documentation & Utilities CD supplied with unit.

2) Mount the PFD Controller using and four supplied #10-32 screws and #10-32 nuts through the four mounting flanges shown in the following figure:

4 Mounting ears – 2 on top and 2 on bottom of unit

Mount the Controller either vertically or horizontally to allow for proper ventilation. Refer to the following illustrations for correct mounting orientations. Failure to following these guidelines may result in overheating of the Controller.

✔ **Correct**

X **Incorrect**

✔ **Correct**


X **Incorrect**

Warning!

If mounting the PFD Controller overhead, ensure that the mounting surface can support the weight of the controller. Failure properly install the Controller could result in damage to the equipment or injury to the user or installer.

Connecting the PFD Controller to the Monitor

To properly connect the PFD Controller to a PFD Monitor, digital television or commercial monitor, refer to the illustration below:

DVI to HDMI Adapter

Connect to Controller DVI Output

Connect to Monitor HDMI Input
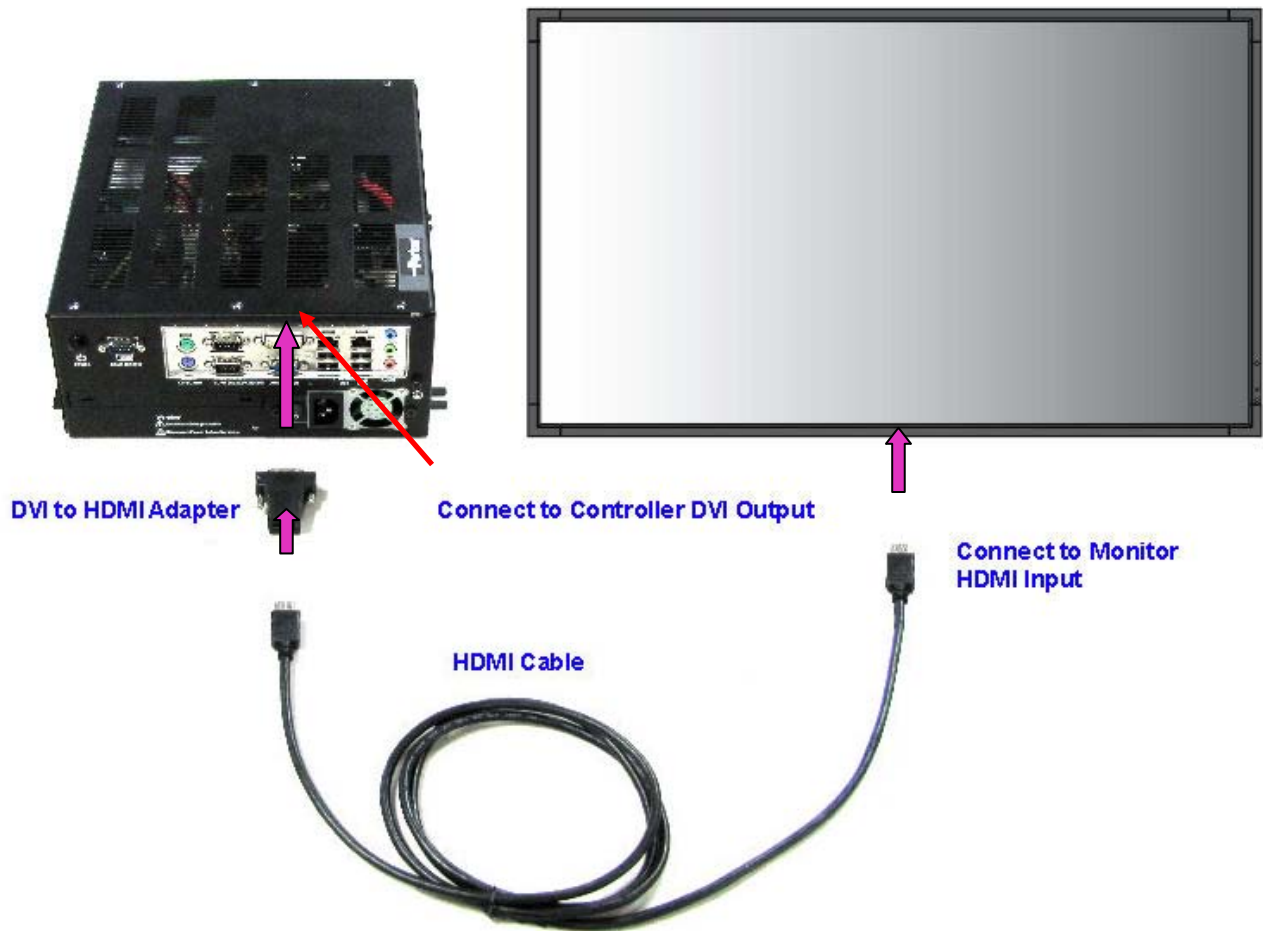
HDMI Cable

Connecting the PFD Controller to a monitor is best performed using the supplied DVI-to-HDMI Adapter and HDMI cable. This method supports the best possible video resolution (1920x1080) and takes full advantage of the PFD video system performance.

Alternatively, if the digital television or commercial monitor only allows for a direct DVI video input, it is acceptable to obtain and use a DVI-to-DVI cable without any loss of display resolution.

It is not recommended that the PFD controller be connected to the display device via the analog VGA port since the analog interface does not take advantage of full HD video quality.

PFD Monitor On-Screen-Display (OSD) Settings

Refer to the PFD Monitor User Guides located on the PFD Documentation and Utilities CD or, if you are using a digital television or commercial monitor, to the supplied operating manual for detailed information regarding the display settings and configuration options.

Although the PFD Monitor is properly set for use with the PFD Controller when it ships from the factory, the following sections provide basic Monitor setup information.

Note!

Perform the following steps with the PFD Controller and PFD Monitor HDMI video cable and adapter connected and power applied to both units.

Press the **MENU** button on the Parker PFD Monitor Remote Controller to invoke the On-Screen-Display (OSD) menu. Refer to the following PFD Monitor OSD Main Menu Icons when following these procedures:
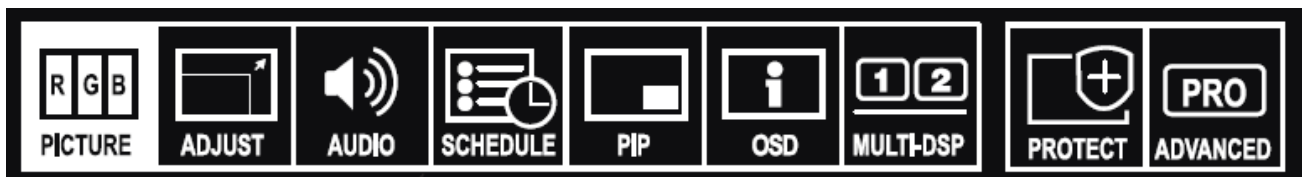
There are a few special features incorporated into the PFD Monitor that, when configured properly, can enhance the PFD system performance:

Power ON/OFF Scheduling

To save the life of the PFD Monitor, and as a power savings feature, the PFD Monitor contains a schedule function that allows the display to be set to power on and off at different times. Up to seven different schedules can be programmed. For example, the monitor can be programmed to automatically turn on every Monday through Friday at 8:00AM and switch off at 5:00PM. Don't forget to set the correct date and time in the OSD as well, so that this feature can function on time properly. These features are found under the SCHEDULE menu icon.

Internal Thermal Cooling Fans

Each Monitor contains internal cooling fans and thermal control settings to indicate at what ambient temperature the fans will turn on. The default mode is set to have the fans turn ON automatically at a certain thermal set point. This feature is found under the PROTECT menu icon. It is recommended that these thermal settings be reviewed and set to prolong the life of the Monitor.

Image Persistence Prevention

Note that LCD technology used in most monitors may experience a phenomenon known as Image Persistence. Image Persistence occurs when a residual or "ghost" image of a previous image remains visible on the screen. Unlike CRT monitors, image persistence on LCD monitors is rarely permanent, but constant images being displayed for a long period of time should be avoided.

Recommendations

To prevent Image Persistence, and for longer life usage of the LCD PFD Monitors, the following preventive measures are recommended:

1. To alleviate image persistence, cycle the PFD data panels at regular intervals and avoid leaving any image stationary for long periods of time.
2. When not in use, turn off the monitor, or use the Schedule Functions (see Power ON/OFF Scheduling).
3. Lower environmental temperatures to prolong the lifespan of the monitor (see Internal Cooling Fans).

HARDWARE OVERVIEW

The PFD Controller includes a PFD Documentation and Utilities CD which contains all of the dimensional drawings, user documentation, and links to software needed. If any of the software on the PFD Controller becomes lost or corrupted, you can recover the factory installed image from a protected zone on the system hard drive (see Acronis Backup and Recovery Software) or download and install a recovery file from www.parkermotion.com (see Recovering PFD Software Images to the PFD Controller).

PFD Controller I/O Ports

Each PFD Controller contains the following I/O ports located on the side of the unit:

- 3 serial ports (two RS232, one configurable RS232/422/485)
- 2 PS/2 ports (mouse, keyboard)
- 2 Gigabit Ethernet ports
- 4 USB 2.0 ports
- 1 analog VGA video port
- 1 DVI-I video port
- 1 audio port (5.1 channel)

PFD Controller I/O Ports:
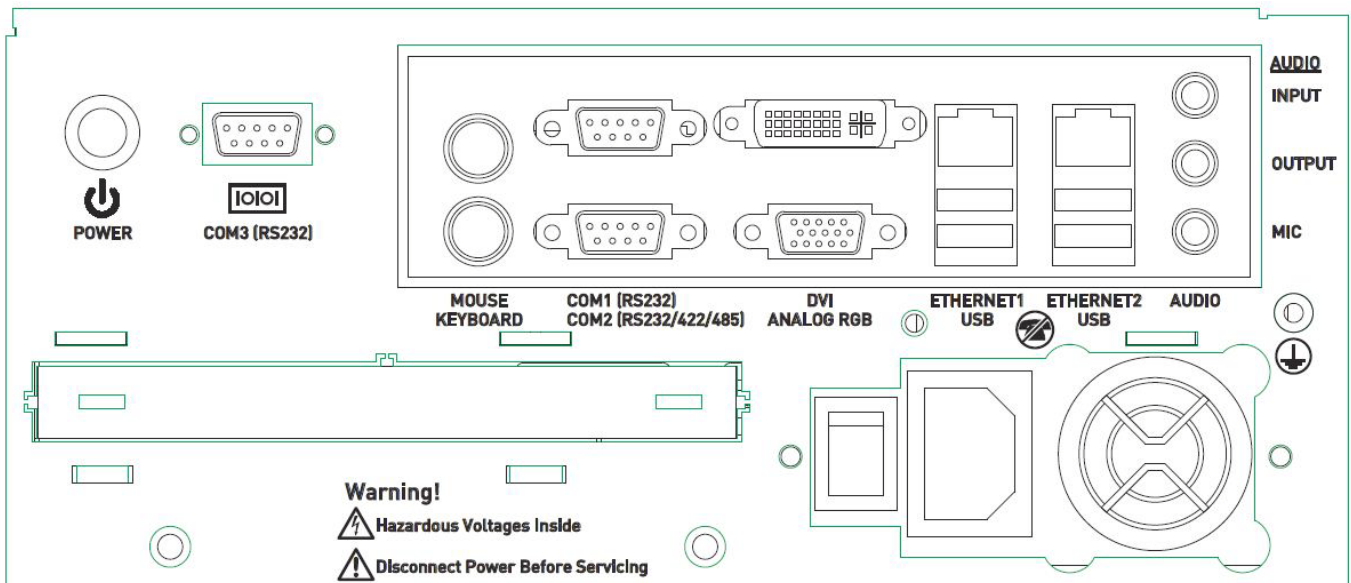
Configuring the RS232/422/485 Serial Port

The COM2 serial port supports RS232, RS422, or RS485 communications.

The pinout for RS232 is the same as a standard 9 pin DSUB connector as shown below:

Pin	Signal	Pin	Signal
1	DCD	2	RXD
3	TXD	4	DTR
5	GND	6	DSR
7	RTS	8	CTS
9	RI		

For RS422 or RS485, the pinouts are as follows:

Pin	Signal	Pin	Signal
1	422TXD- or 485DATA-	2	422RXD+
3	422TXD+ or 485DATA+	4	422RXD-
5	GND	6	DSR
7	RTS	8	CTS
9	RI		

This port communications type is configured by a BIOS setting in the CMOS setup as shown below:
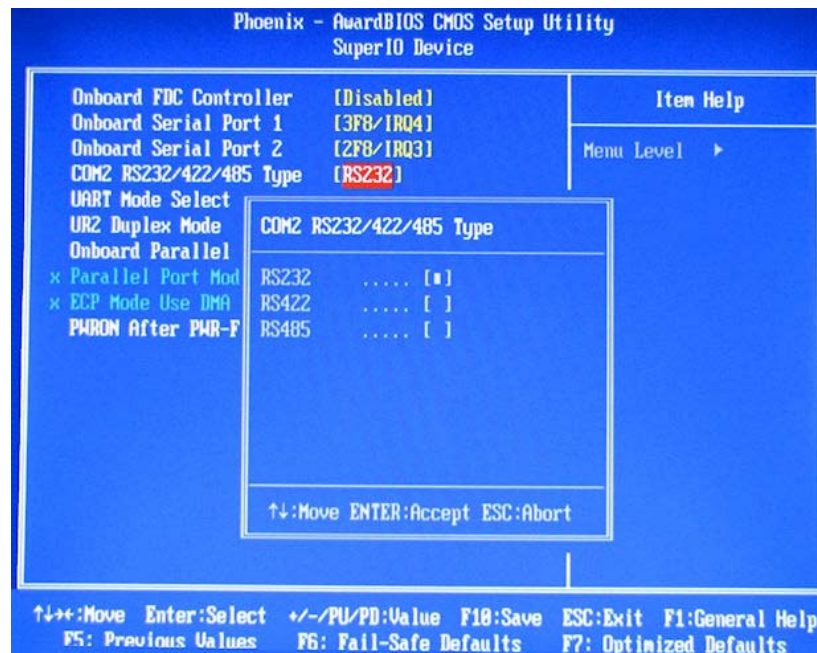
The BIOS CMOS setup can be accessed by clicking the *"Delete"* key during the initial boot sequence.   The COM2 configuration is located under *"Integrated Peripherals"* -> *"Super I/O Device"* -> *"COM2 RS232/422/485 Type"*.

PFD Controller AC Power Connections

All power connections, switches, and buttons are located on the side of the unit.

Caution!
- The main power supply has internal protection, but no serviceable fuse.
- The AC input to the PFD Controller is 100-240 Vac 50-60 Hz. A NEMA 5-15P power cord is included with each unit for 125 Vac operation.
- A NEMA 6-15P power cord (not supplied with the Controller) is required for operation greater than 125 Vac. The NEMA 6-15P po cord is used for 208 Vac and 240 Vac circuits and is rated to 250 maximum.
- Proper installation of the Controller for use in European Union countries requires the use of a harmonized power cord. (The power cord must be identified with the <HAR> symbol.)   Make sure that the Controller is only connected to the main supply with a harmonized power cord for use in these countries.

AC Power Switch

This main switch turns power ON/Off to the main power supply. When this switch is cycled **OFF** and then **ON**, the Controller will initiate its normal boot sequence. It has the same effect as removing and restoring power at the AC service panel. This behavior is controlled in the BIOS by the CMOS setup parameter *"Power On After PWR-Fail"* where the default setting is *"ON"* as shown below:
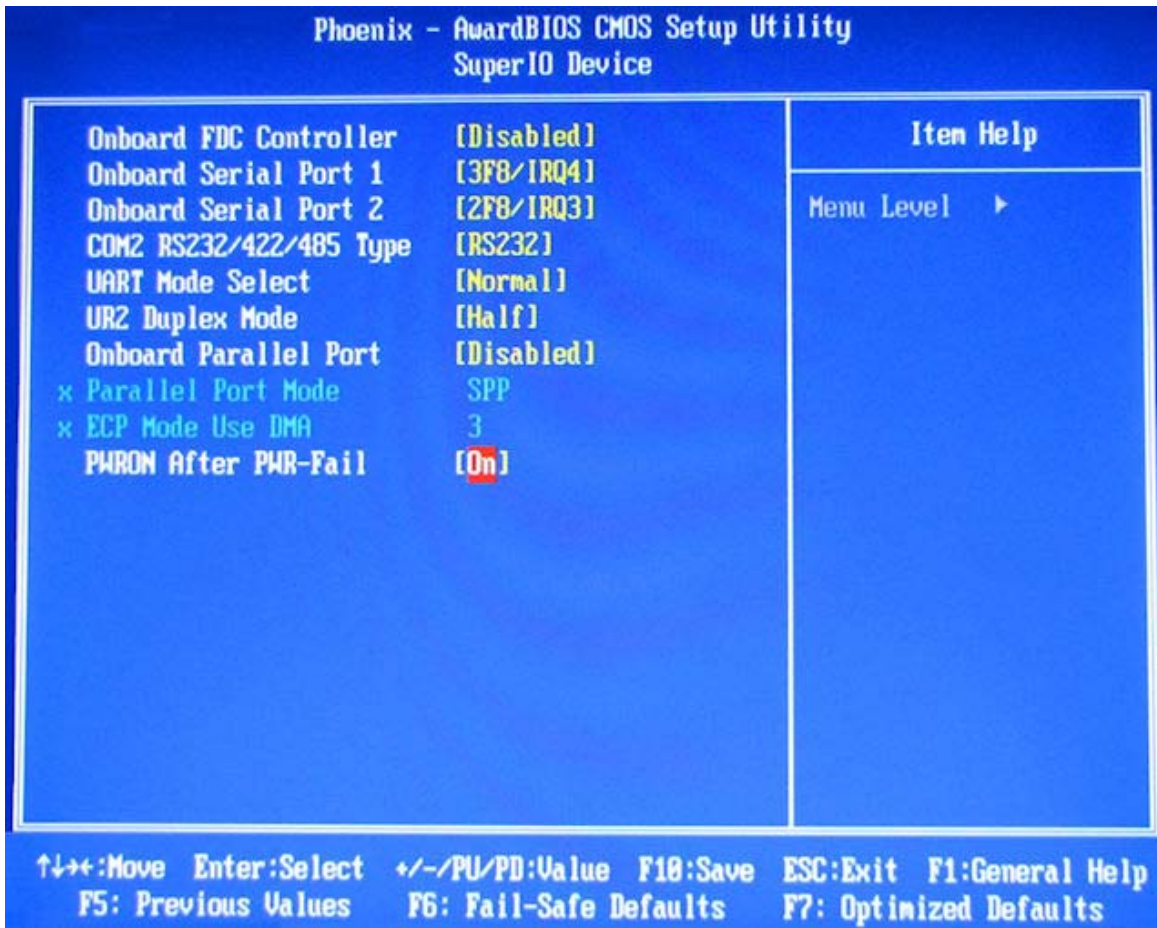
The BIOS CMOS setup can be accessed by clicking the *"Delete"* key during the initial boot sequence. The "*Power On After PWR-Fail"* setting is located under *"Integrated Peripherals"* -> *"Super I/O Device"* -> *"PWRON After PWR-Fail"*.

Soft On/Off Power Button

This button, labeled **POWER** and is located next to the COM3 serial connector, can be used to wake the Controller from standby or after a Windows shutdown in situations where AC power is still present and the AC power switch has been left in the ON position. It functions identically to the power button found on the front of most desktop PCs.

STARTING THE PARKER FACTORY DISPLAY

Starting the PFD

Once the PFD Controller and the PFD Monitor have been mounted, the system can be started. This procedure is described below.

1. Connect the PFD Controller power cord to a voltage source. Voltage input to the unit should be within the range specified in Table A-4, the *PFD Controller Electrical Specifications*.

2. Connect the PFD Monitor, digital television, or commercial monitor to a voltage source. For the PFD Monitor family, the Voltage input to the unit should be within the range specified in Table A-7, the *PFD Monitor Specifications*. If using a digital television or monitor, follow the manufacturers' power input specifications.

3. Turn on the PFD Controller by switching the Power switch to **"ON"** located on the side of the Controller. Or, if the power switch is already **"ON"**, briefly depress the **POWER** button.

4. Turn on the PFD Monitor by switching Power switch to **"ON"** located on the bottom of the PFD Monitor. If using a digital television or monitor, refer to the documentation for location of the power switch.

5. Using the PFD Monitor Remote Controller, select the HDMI Input video source by pressing the **HDMI** button.

After allowing the PFD Controller several minutes to complete the boot process, the factory installed PFD demo application should launch. Verify that the demo properly fills the entire native display area. If the demo image is smaller or larger than the native display area, please refer to the setup instructions in the following sections.
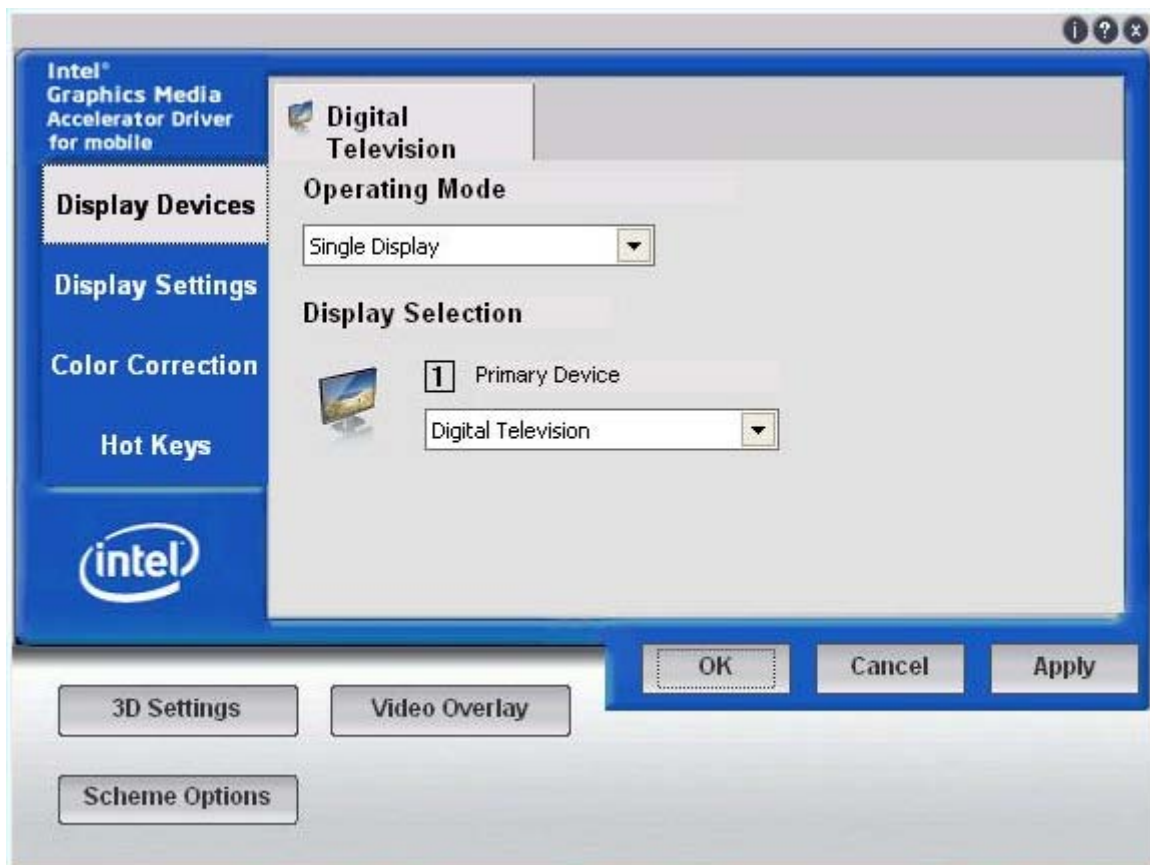
PFD Controller Intel Graphics Driver Configuration & Operation

Preinstalled on the PFD Controller is an Intel Graphics Media Accelerator Driver that configures the video output to a Parker PFD Monitor, commercial monitor or digital television. The exact settings for connecting various video devices can vary due to the technical nature of the product and the interface method. The following guidelines will help you make a proper video connection.

Setup for all monitors or digital TV's is accomplished by accessing the Intel Graphics Driver configuration tool. Invoking the tool can either be accomplished by right-clicking on the Window's Desktop and selecting *"Graphics Properties"* or by clicking on the icon in the Windows Tool Tray:


Once the Driver configuration tool has been opened, it appears as follows:

Factory Shipped Intel Graphics Driver Settings

This section describes the Intel Graphics Driver configuration as shipped from the factory. These settings have been specifically identified to work properly with a wide range of Parker PFD Monitors, digital televisions and commercial monitors. Refer to the following details once the Intel Graphics Driver configuration tool has been opened:

• The Intel Graphics Driver in PFD controller is factory set to output 1920 x 1024 graphics resolution from the digital HDMI port.

• Although the PFD 32″ Monitor has a native resolution of 1366 x 768 it will reduce the 1920 x 1024 video output from the PFD Controller automatically, so that the entire image will fill the display. It is not necessary to adjust the PFD 32″ Monitor to the native 1366 x 768 resolution but it will cause no harm if changed.

• It is recommended that the PFD Controller is connected to the HMDI input of a monitor or digital TV by using the supplied DVI-to-HMDI adapter and HDMI cable. This type of connection method supports the best possible video resolution (1920x1080) and takes full advantage of the PFD video system performance.

• Note that the Intel Graphics Driver's *"Primary Device"* must be set to "*Digital Television"* and not *"Monitor"* for the Controller to properly output video from the HDMI port. *"Monitor"* in the Graphic driver refers to the analog VGA output port. *"Notebook"* is an internal video setting in the Controller and should not be selected.
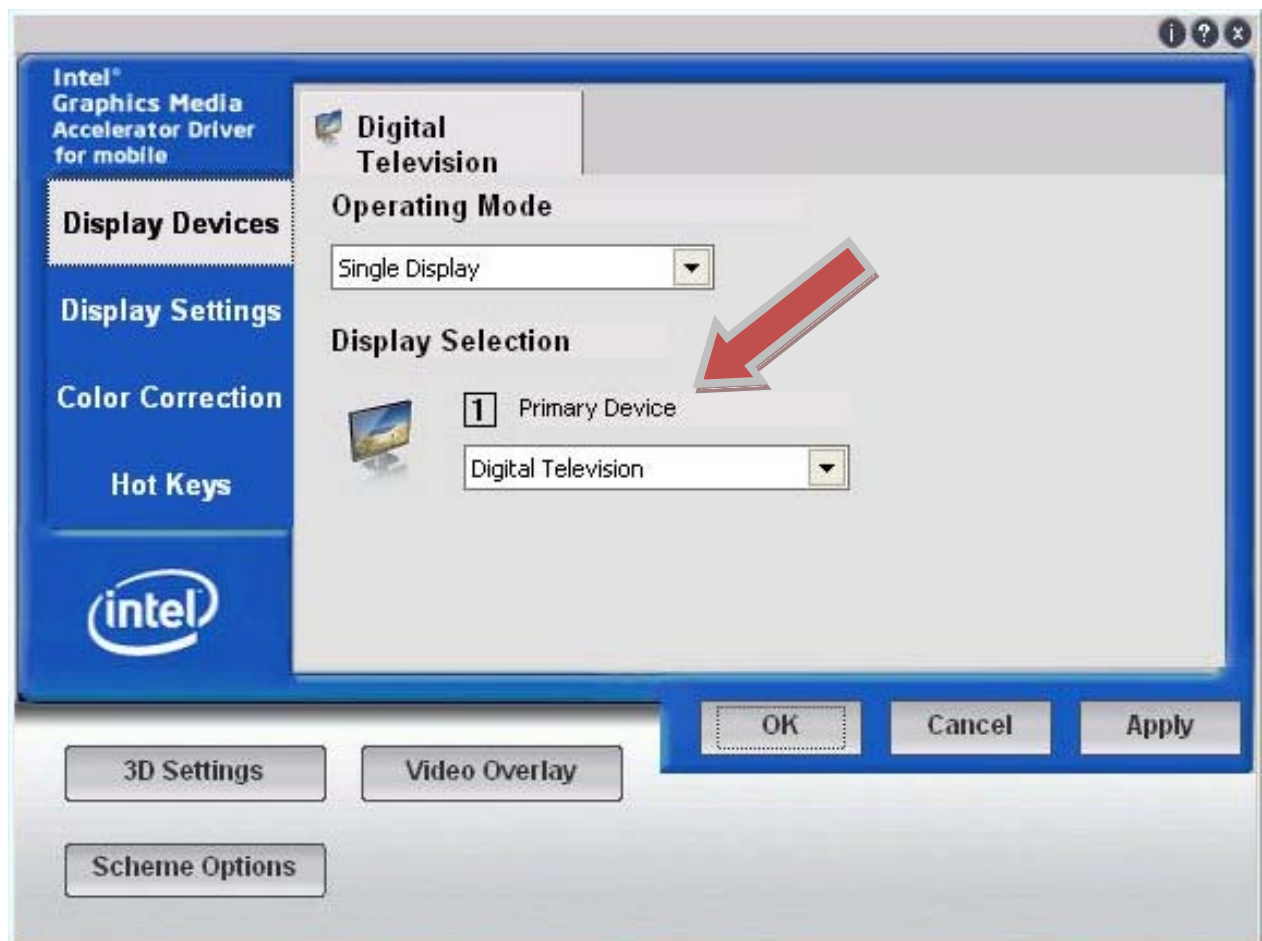

⚠️ **Hint!**

If the Primary Device is inadvertently set to *"Monitor"* or *"Notebook"*, and video on the connected display device can no longer be seen, the driver can be blindly switched back via the keyboard Hot Keys.

Select the *"Aspect Ratio Options"* under *"Display Expansion"* and confirm that the Horizontal and Vertical Ratio controls are set as show in the following two figures. These are the proper settings so that the output image will fill to the visible display edges.
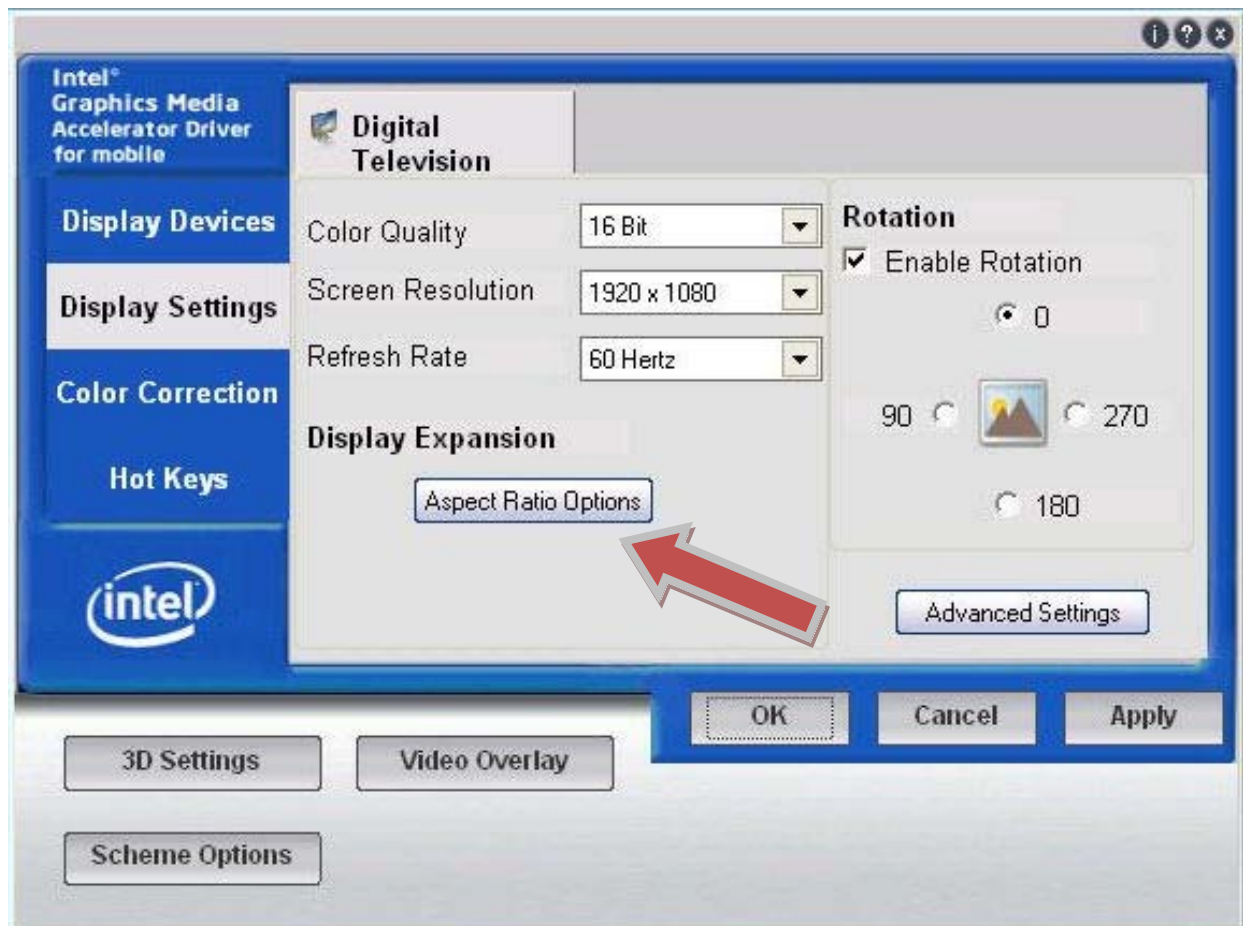
Select the *"Aspect Ratio Options"* button and move the *"Horizontal"* and *"Vertical"* slider controls **8** positions from the right, *"Maximum"* position.
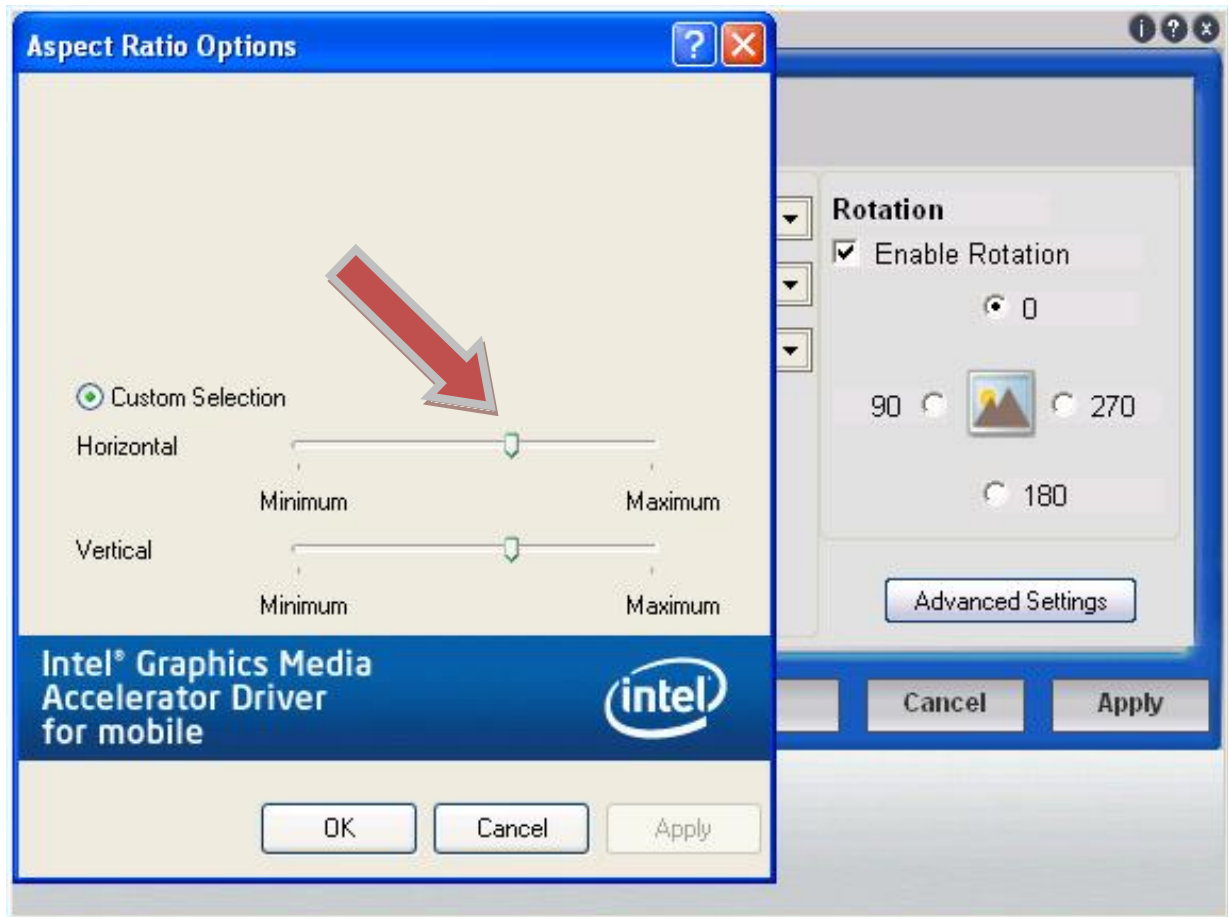
Important!

The above settings were specifically set due to differences in **Overscan**; the extra image area around the video image that may not be seen reliably on all digital televisions and commercial monitors.

Note that a method to turn Overscan *"ON"* or *"OFF"* is a feature not found in all digital televisions and commercial monitors. For this reason, the Parker PFD Monitors ship with Overscan *"ON"* in the PFD Monitor OSD and with the *"Horizontal"* and *"Vertical"* Aspect Ratio adjustments in the PFD Controller as shown above. We have found that most digital televisions and commercial monitors will properly work with these PFD Controller settings.

Conversely, all Parker PFD monitors and some digital televisions and commercial monitors have the ability to turn Overscan *"OFF"* (note that some PFD Monitors indicate Overscan *"OFF"* as *"Underscan"*) and will exhibit a more crisp visual quality if disabled. Follow the procedure in the next section to disable Overscan in the PFD Monitor OSD and to set the Controller properly if a slightly better visual quality is desired.

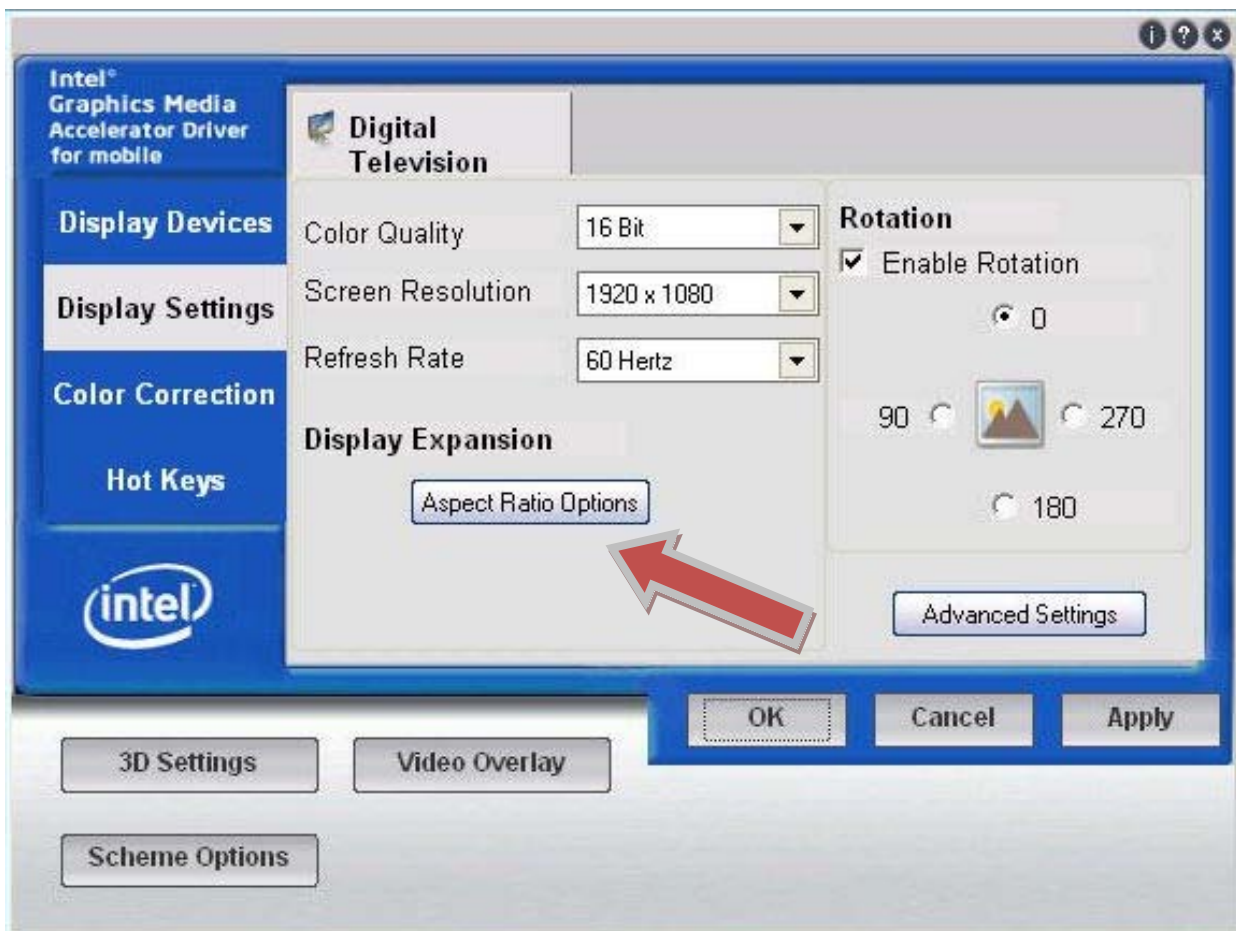## Disabling Overscan in the Parker PFD Monitor OSD and Controller

The following steps will guide you through the proper configuration settings in the Intel Graphics Driver within the PFD Controller and disabling Overscan in the Parker PFD Monitor. Although it is not a requirement to perform this procedure, doing so can slightly improve image quality.

> ### Note!
>
> The PFD Controller DVI video output must be connected to the PFD Monitor HDMI input by using the supplied DVI-to-HMDI adapter and HDMI cable. Overscan can only be turned OFF in the Parker PFD Monitors when operating in HDMI video mode.

1) To configure the proper Intel Graphics Driver settings, refer to the following settings once the Intel Graphics Driver configuration tool has been opened (for instructions, see PFD Controller Intel Graphics Driver Configuration & Operation):

- Once the Intel Graphics Driver window has been opened, in *"Display Settings"* go to the *"Aspect Ratio Options"* panel and slide the *"Horizontal"* and *"Vertical"* Aspect Ratio sliders fully to the right, *"Maximum"* settings. The following illustration indicates the proper settings:

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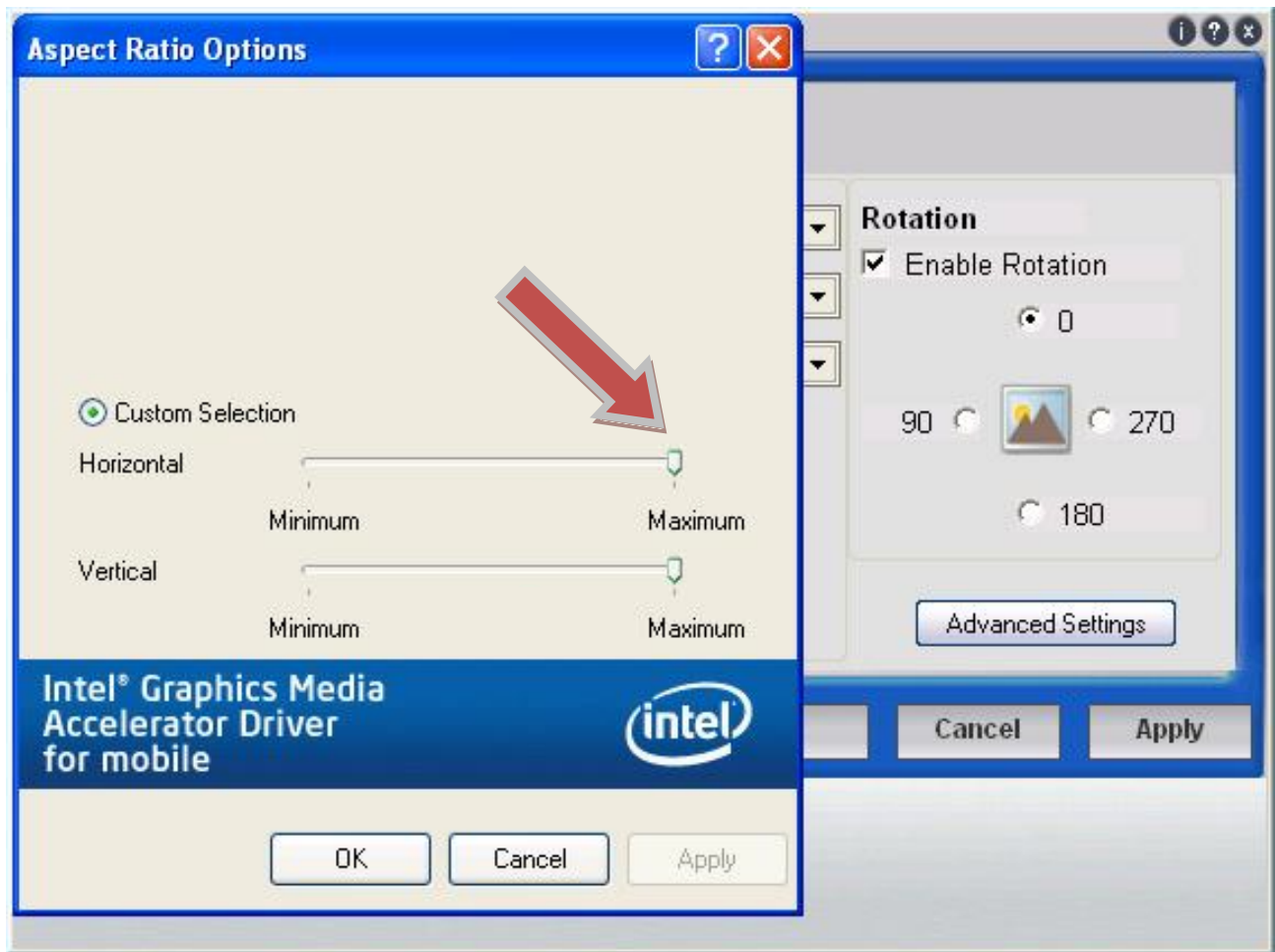
2) Next, disable Overscan in the Parker PFD Monitor:
   • Press the **MENU** button on the Parker PFD Monitor Remote Controller and refer to the following PFD Monitor OSD Main Menu Icons to invoke the On-Screen-Display (OSD) menu:
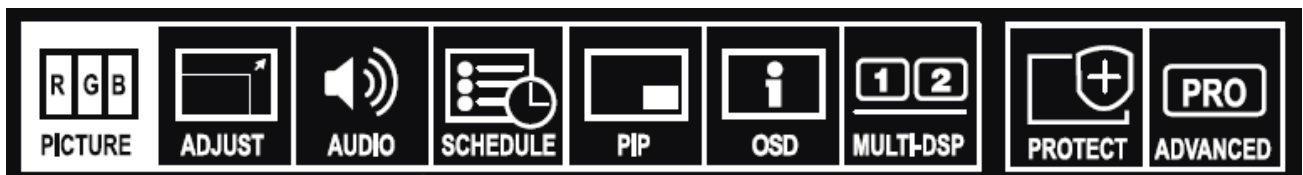
   • Use the **Arrow** buttons and the **SET** button to select the *"ADVANCED"* Main Menu Icon. Arrow down and select *"SCAN MODE"*. Using the right Arrow button, highlight *"UNDERSCAN"* (or set *"OVERSCAN"* to *"OFF"* on some models) and then press the **SET** button to select this mode. Use the **MENU** or **EXIT** buttons to exit the OSD.

Intel Graphics Driver Hot Keys

On occasion, especially after connecting and then removing a monitor from the analog VGA port on the PFD Controller, the Intel Graphics driver may not automatically revert video output to a monitor or digital television connected to the HDMI port. There are two hot keys that can be used blindly to switch back and forth between the analog VGA port and the HDMI port:

- Pressing **<ctrl><alt>F1** simultaneously, will instruct the driver to direct output video from the analog VGA port.
- Pressing **<ctrl><alt>F4** simultaneously, will instruct the driver to direct output video from the digital HDMI port.

These hotkeys can be useful to toggle the Intel Graphics driver output ports in the event that video can no longer be seen on a connected monitor or digital TV.

Once the video output from the PFD Controller to the display devices has been properly established, you are now ready to create and download a project to the PFD Controller. Refer to the Parker Factory Display Quick Start Guide or User Guide for detailed information regarding downloading projects. For an overall understanding of the software components that comprise the Parker Factory Display system, the following section provides a brief overview.

PFD Software Components

The PFD Controller ships with a Microsoft Windows XP Professional operating system and is preinstalled with Parker's Factory Display Shell, Designer and Runtime software. The PFD Manager must be installed on a separate PC and is used to create PFD projects that are downloaded to the PFD Controller runtime system.

Overall, the PFD software system is made up of the following components:

- **Server Manager** – resides on the PFD Controller and is used to manages the PFD service and configure the web server ports such as setting the IP addresses.

- **Shell Environment** – resides on the PFD Controller and is where you setup your initial project, manage users, as well as change properties and settings as needed.

- **PFD Manager** – resides on a PC or laptop computer and allows you to create and edit projects offline, as well as deploy them to PFD platforms.

- **Design Environment** – resides on a PC or laptop computer and is where you build all of your message tables, lists and panels using tools, graphics, tags, and alarms. The bulk of your development is spent in the design environment.

- **Runtime Environment -** resides on a PC or laptop computer and is where you test your project and simulate it running on the PFD device.

Downloading Projects to a PFD Controller

The PFD is both a development and a runtime system. For most of your application work you will develop your projects on a development PC or laptop computer with PFD Manager and download the project to the PFD Controller, although you do have the capability to develop directly on the PFD Controller if desired.

Refer to the documentation that came with the Parker Factory Display Manager, such as the PFD Quick Start Guide or PFD User Guide for information about how to develop projects and download them to the PFD Controller.

MAINTENANCE

PFD Controller Utilities

Acronis OEM Zone Backup Partition

The PFD Controller comes with Acronis True Image OEM backup and recovery software preinstalled. This software allows for the backup and restoration of selected files and folders or entire disks and partitions.

The PFD controller also provides the Acronis Recovery Manager that allows the original factory image to be restored in the event that the Operating System is unable to boot properly.   This can be invoked during a PFD Controller reboot by pressing **F11** when the option to start the Acronis OEM Zone software is displayed directly after the Parker BIOS splash screen.

For further information regarding Acronis backup and recovery software, its features and use, please refer to the Help documentation provided in the Acronis True Image OEM software installed on the Controller.

It is recommended that once the Controller has been configured with the PFD application project, an Acronis hard drive backup image be created and saved to a USB drive or back to the Acronis OEM Zone.

Parker PowerSmart Software

The PFD Controller also contains Parker PowerSmart software. This software allows you to keep track of various system parameters, such as:

- Minimum, maximum, and current CPU temperature

- Minimum, maximum, and current internal ambient temperature

- CPU fan speed

- Total number of power cycles

- Total number of hours of operation

Use the PowerSmart icon in the C:\Parker\PowerSmart directory to display these parameters in real time. The PowerSmart window also has a temperature trend graph for CPU and ambient temperatures, as well as an indicator that lets you know if the monitoring microcontroller is working properly.

\Parker Directory

The installation files for all PFD Controller device drivers can be found in the C:\Parker directory. This directory also contains the PowerSmart application and the Intel SSD Toolbox for managing the Intel Solid State Drive performance.

Recovering PFD Software Images to the PFD Controller Hard Drive

This section describes the steps required to recover a preconfigured Microsoft Windows XP operating system and PFD runtime software image created to specifically run on a PFD Controller, onto the system Solid State Drive (SSD). Use this procedure when the factory supplied bootable SSD becomes corrupted or unusable or you wish to update the drive to a newer released version.

Warning!

Restoring the system SSD image will overwrite any PFD runtime projects currently residing on the drive. Be sure to backup the PFD projects before performing this procedure!

The method of restoring the Windows operating system and PFD runtime software involves using Acronis True Image OEM to copy the recovery image from a Parker USB Recovery flash drive to the SSD. The process begins with downloading the Acronis PFD image from the Parker website to a Parker USB Recovery flash drive and then using the included Acronis software located on the drive to restore the image to the SSD in the PFD Controller.

The downloaded recovery image is a large (>4GB), single file with a *.tib* file extension. The Parker USB flash drive contains the licensed Acronis True Image OEM software preinstalled and can be used to accept one or multiple downloaded *Filename.tib* recovery images configured specifically for the target hardware. Parker has adopted this technique to recover Microsoft Windows operating system images such as Windows XP, Windows Embedded Standard, Windows 7 and future operating systems to Parker storage devices.

The following items are required to recover the Windows XP Professional operating system with PFD runtime preinstalled:

- A PC or laptop with a USB port and an active internet connection to obtain the *Filename.tib* recovery image.
- A Parker USB Flash drive factory preconfigured with Acronis recovery software (Parker Model Number USB-08RCV, USB 8GB Recovery drive or larger).
- A PFD Controller with a valid Microsoft Windows XP Professional License label containing the 25 character Product Key affixed to the PFD Controller.
- A USB or PS/2 style mouse and keyboard

Complete the following steps:

1) Insert the Parker USB Flash drive containing the factory configured Acronis recovery software into a PC or laptop computer.

2) Navigate to www.Parkermotion.com and locate and download the latest Parker Factory Display, *Filename.tib* file to the Parker USB Flash drive. The *Filename.tib* file is a compressed image of the complete Microsoft Windows XP Professional operating system with PFD runtime software specifically configured to run on the PFD controller.

3) When the download is complete, remove the Parker USB drive from the PC or laptop. While the PFD Controller is <u>unpowered</u>, insert the USB drive into one of the four available USB ports.

4) Connect a USB mouse and keyboard to the PFD Controller.

5) Switch power **ON** to boot the PFD Controller. When the BIOS splash screen appears, continually press the **DELETE** key to enter the CMOS setup portion of the BIOS.

6) Using the **DOWN** Arrow key, select *"Advanced BIOS Features"* and press **ENTER**. The *"Hard Disk Boot Priority"* will be highlighted, press **ENTER**. Using the **DOWN** Arrow, highlight *"USB-HDD0"* and press the **+** key on the keypad to move the *"USB-HDD0"*

selection to the top of the boot order. Finally, press the **F10** key to *"Save to CMOS and Exit (Y/N)"* and then press **ENTER** to save the settings and reboot.

7) Acronis True Image OEM recovery software will begin to load and requires about 2 minutes to fully boot from the USB Flash drive. Initially, the message *"Starting Acronis loader…"* will be displayed at the beginning of boot process. Be patient as Acronis begins and the screen flashes a couple times while the software loads. Recovering the image to the target SSD will require the following steps:

a. Once the Acronis True Image OEM environment is loaded and running, the following Home screen will be displayed. Click on the *"Manage and Restore"* selection as shown:
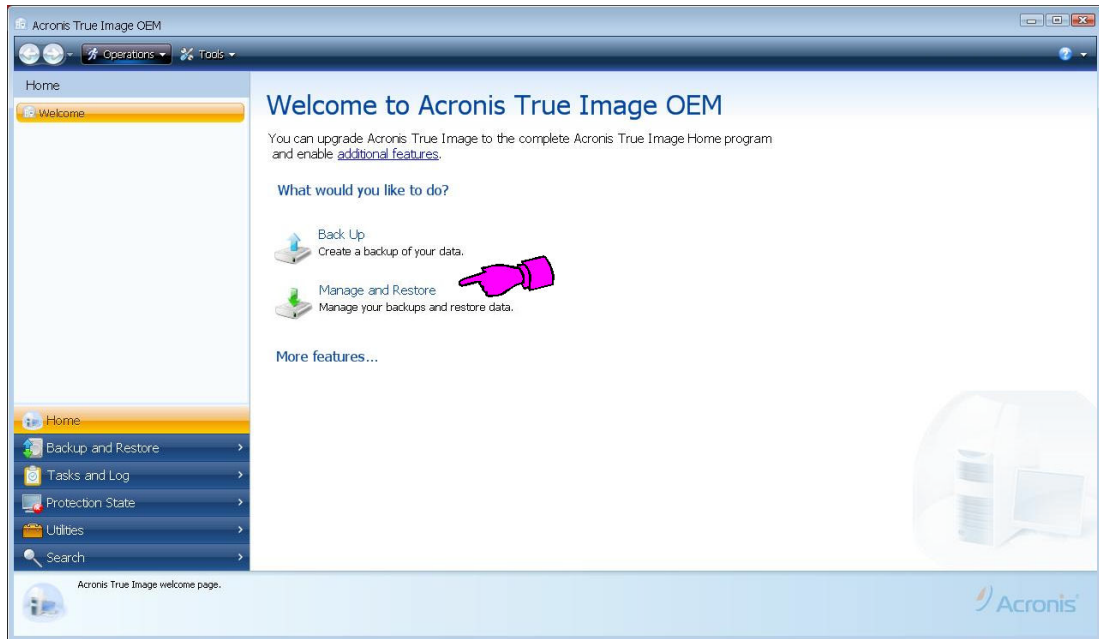

b. To load the *Filename.tib* file recovery image, click the *"Browse for backup…"* button.

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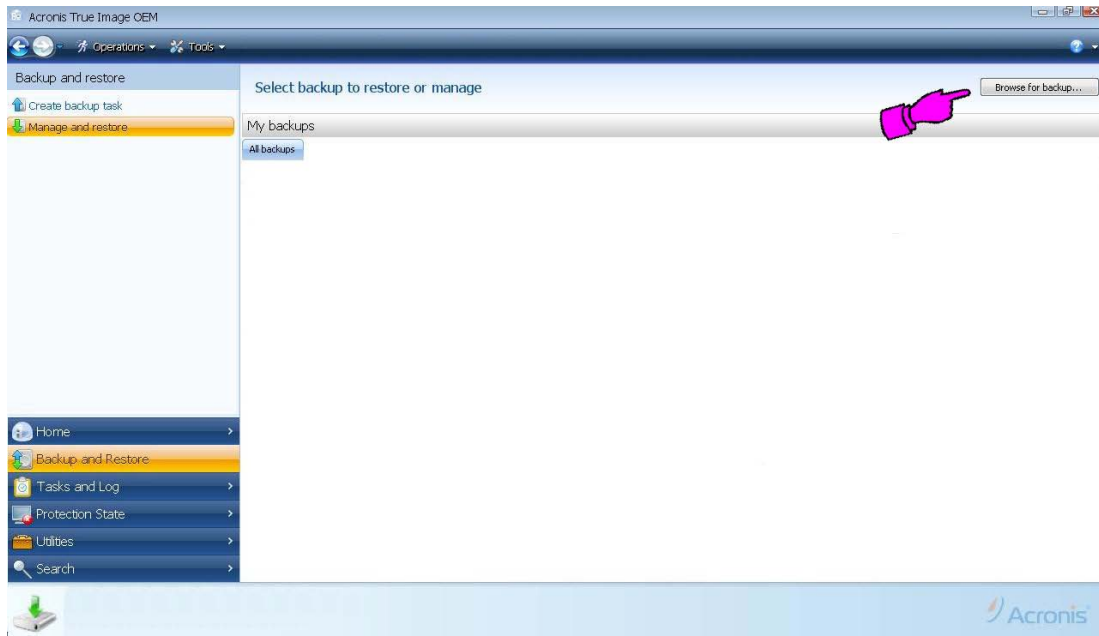
c. In the *"Browse for Location"* window, locate and select the *Filename.tib* recovery image file that was downloaded and copied to the Parker USB drive in Step 2 above. Locate this file by double-clicking on the "*Removable Drive"* (D:). Click on the file to select it, then click the *"OK"* button.

d. Now, carefully highlight the *Filename.tib* file image to be restored by clicking on the image file. Note that there may be multiple images if the USB drive has been used previously to restore previous images.
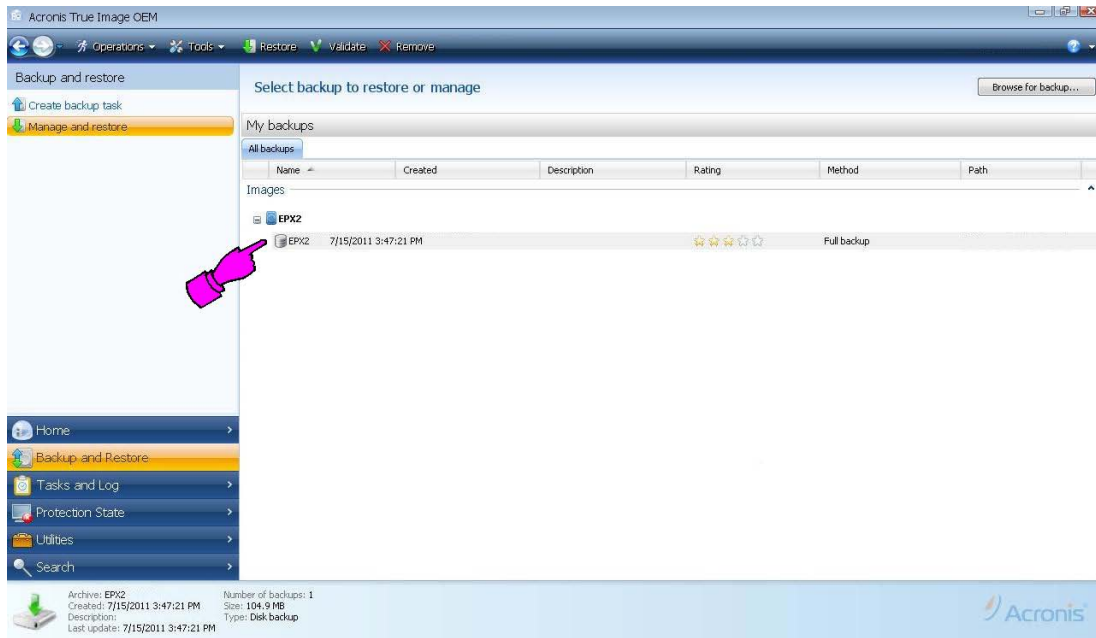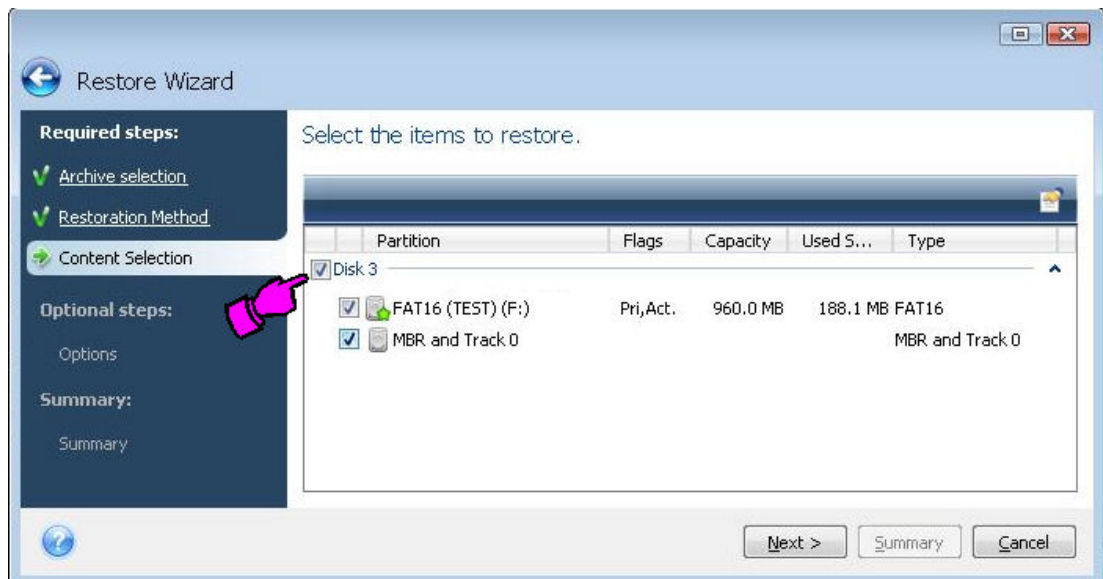


e. Next, click the *"Restore"* button located on the menu bar:
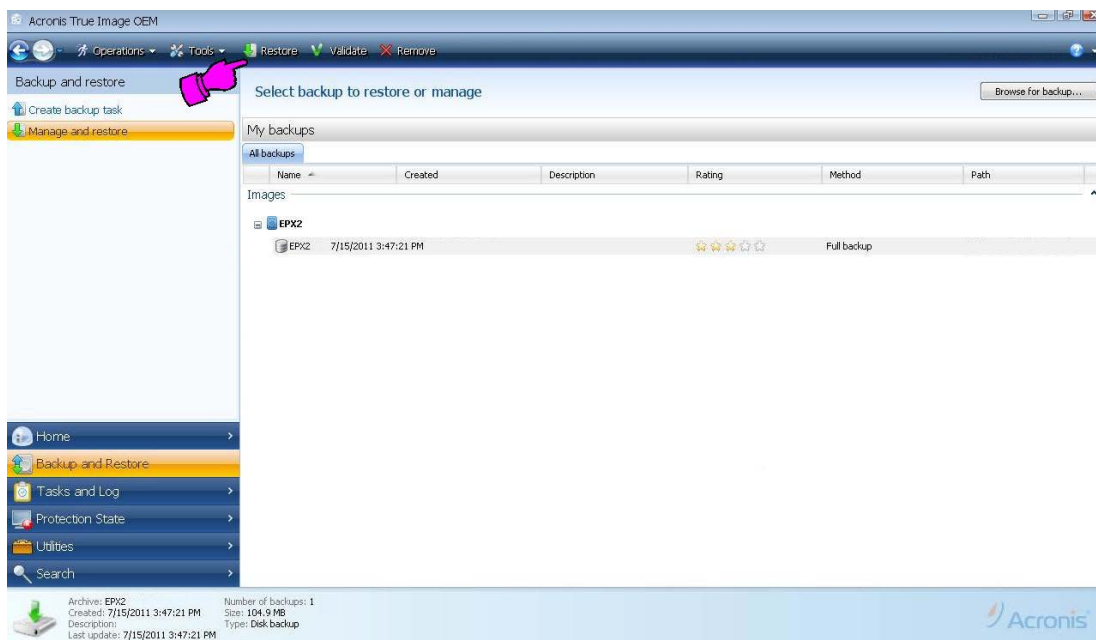
f. Select the Restoration Method, *"Restore whole disks and partitions"* and then click the *"Next"* button. Note: you may have to click the Window Minimize button to be able to see the *"Next"* button at the bottom of the Window:
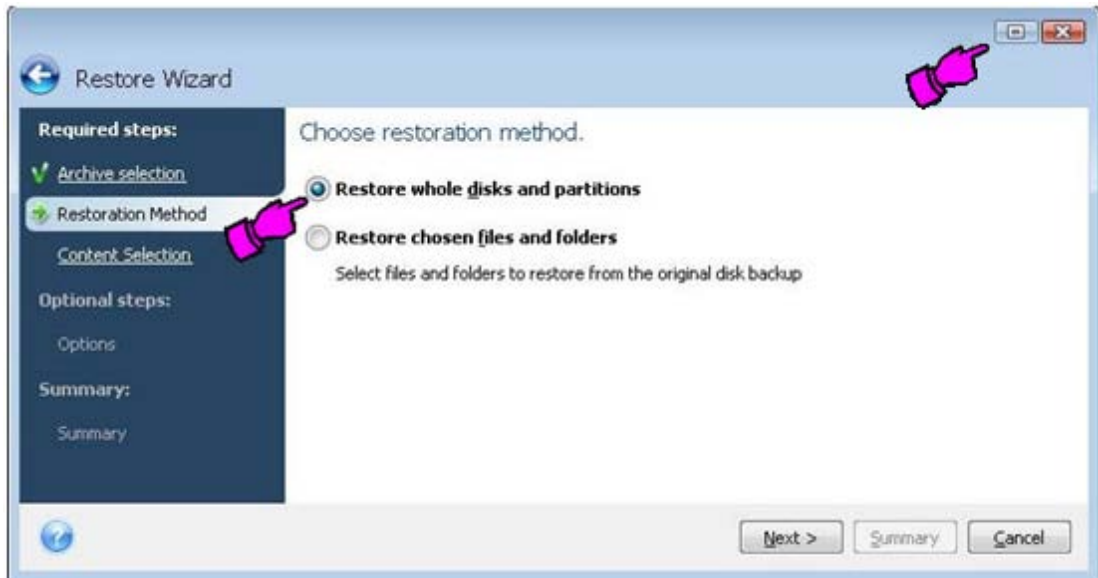
g. Now, select the items to be restored (be sure to select all items) and then click *"Next"*:

h. Select the target drive to be restored to, and then click *"Next":*
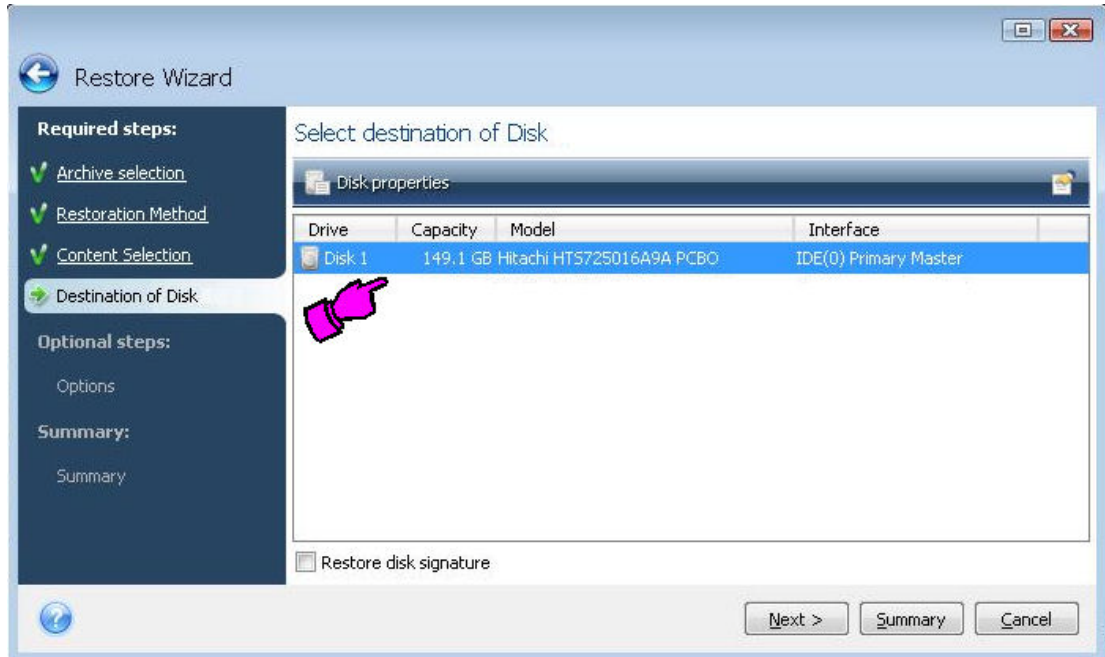
i. If the target drive is not blank and has any prior data on it, then the following message may appear. Click *"OK"*.
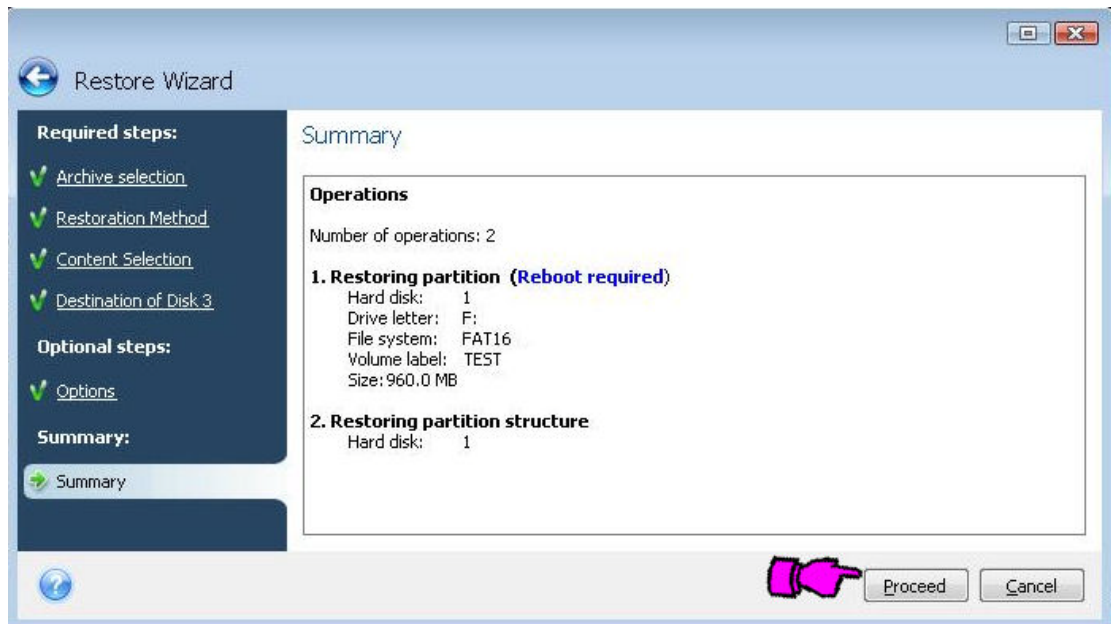

j. On the *"Options"* screen, no Additional settings are required, click *"Next"*.

k. On the *"Summary"* screen, click *"Proceed"* to recover the selected image to the target drive.

Warning!

After this point in the process, any data residing on the target recovery drive will be overwritten.

---

l. Progress bars will appear as the recovery image is copied to the target drive. This process will require several minutes (>4 minutes) to complete depending on the size of recovery image to be restored.

m. Once the *"Restore operation succeeded."* message appears, click *"OK"*.

n. Click the red *"X"* button in the extreme upper right corner of the screen to close Acronis. The PFD Controller will automatically reboot.

⚠️ **Note:**

During the reboot and at the moment of the reset beep, remove the USB drive from the system to prevent the Acronis Recovery software from booting to the USB drive and executing again.

Space permitting, the Parker USB Flash drive can be used to restore additional PFD Controllers or retained for future system recoveries.

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8) After the reboot, Acronis will now automatically create the OEM Zone Backup Partition. Creating the OEM Zone partition will take approximately 5 minutes and afterwards, the system will automatically reboot.

9) After the reboot, Microsoft Windows XP Professional will begin loading and then the Windows XP Setup Wizard will be displayed. Click *"Next"*, select *"I accept this agreement"* and then click *"Next"*, type *"Next"* again, enter a *"User Name"* and *"Organization"* (optional) in the appropriate fields and then click *"Next"*. You will then be asked to enter the a valid Microsoft Windows XP Professional, 25 character Product Key located on the License label affixed to the side of the PFD Controller. Next, enter a *"Computer Name"* and *"Administrator Password"* if desired, and then click *"Next"*. Enter the appropriate *"Time"*, *"Date"* and *"Time Zone"*, click *"Next"* and complete the remaining setup fields as appropriate. Finally, click *"Finish"* when prompted to complete the setup process. The unit will reboot and then settle to the Windows desktop.

You can now download a custom PFD project to the PFD Controller.

PFD SPECIFICATIONS

PFD Controller Physical Specifications

Table A-1: Physical Specifications

Category	Specifications
Operating System	• Microsoft XP Professional
BIOS	• Award BIOS
CPU/Chipset	• 2.0Ghz Celeron M550 processor • Intel GME965 + ICH8M chipset
Memory	• 200 pin SODIMM DDRII 533/667Mhz DRAM sockets x 2 • Supports PC2-4200 or PC2-5300 memory modules • 4GB maximum memory (the Controller ships with 2GB, standard)
I/O Ports	• Gigabit Ethernet x 2 • RS232 serial x 3 • USB 2.0 x 4 • DVI-I • Analog VGA • PS/2 keyboard • PS/2 mouse
Audio	• Intel HD 5.1 channel
Storage	• SATA solid state drive (80GB minimum)
Dimensions (H x W x D)	• Controller Only - 10.9" x 11.3" x 4.3" (277mm x 287mm x 109mm)
Weight	• Controller Only — 11.3 lbs. (5.1Kg)

Controller Environmental Specifications

Table A-3: Environmental Specifications

Category	Specifications
Surrounding air operating temperature	0° to 50°C (32 to 122°F) PFD Controller Only (air temperature outside of backshell)
Storage temperature	-20° to 65°C (-4 to 149°F)
Relative humidity	5 - 95% non-condensing
Operating vibration	Operating — 0.5 Grms 5-500Hz Grms Non-operating — MIL-STD-810D 1 Grms
Shock rating	Operating — 10g 11ms pulse Non-operating — 30g 11ms pulse

Caution!

Temperature within a protective enclosure is generally higher than the unit external temperature. If the Controller is installed inside an enclosure at temperature levels above its rated ambient temperature (measured at the vents on the unit), you must actively cool the enclosure. (See Operating Temperature Guidelines).

Limit the Controller's exposure to adverse conditions, such as dust, oil, moisture, and corrosive vapors in order to minimize maintenance and repair costs.

Controller Electrical Specifications

Table A-4: Electrical Specifications

Category	Specifications
AC Input Power Requirements	100 - 240 VAC, 4 - 2A (50 - 60 Hz)
Thermal Power (Heat) Dissipation	System total heat dissipation (approximate) for thermal enclosure sizing considerations: Controller Only: 30 Watts, maximum

Controller Test Specifications

Table A-5: European Community Immunity and Emission Standards

Test	Specification
EMC Testing, Emissions	• EC Generic EN61000-6-4 (2007) / EN55011:2007+A1 (2010)
EMC Testing, Immunity	• EC Generic EN 61000-6-2 (2005)/AC:2005 • EN 61000-3-2 (2006)+A1+A2:2009 Harmonic Current Emissions • EN 61000-3-3 (2008) Voltage Fluctuations and Flicker • EN 61000-4-2 (1995) Electrostatic Discharge • EN 61000-4-3 (2002) Radiated Immunity • EN 61000-4-4 (2004) Fast Transient/Burst Susceptibility • EN 61000-4-5 (1995) Surge Immunity • EN 61000-4-6 (1996) Radio-Frequency Common Mode Immunity • EN 61000-4-8 (1993) Power-Frequency Magnetic Field Immunity • EN 61000-4-11 (2004) Voltage Dip Interrupt Immunity
Safety	• EN60950-1:2006 with A1:2009+AC:2011
Regulatory Agencies	• UL 508 Ordinary Location • CE • RoHS

Table A-6: Mechanical Testing Specifications

Test	Specification
Operating vibration	• Operating: 0.5 Grms/MIL-STD-810F 514.3 • Non-operating: 1.0 Grms/MIL-STD-810F 514.3
Mechanical shock	• Operating — 10g 11ms pulse IEC-68-2-27/MIL-STD-810F 514.3 • Non-operating — 30g 11ms pulse IEC-68-2-27/MIL-STD-810F 514.3

PFD Monitor Specifications

The specifications in the following table include a brief overview of key Parker PFD Monitor characteristics. Note that these specifications are subject to change without notice. Refer to the Parker Factory Display Documentation and Drawings CD for the monitor manufacturer's documentation and more detailed technical specifications.

Table A-7: Parker PFD Monitor Specification Summary

Property	32" PFD Monitor	40" PFD Monitor	46" PFD Monitor	55" PFD Monitor
Brightness	• 450 cd /m^2 (max)	• 650 cd /m^2 (max)	• 650 cd /m^2 (max)	• 700 cd /m^2 (max)
Native Resolution	• 1366 x 768	• 1920 x 1080	• 1920 x 1080	• 1920 x 1080
Net Weight	• 27.3 lbs./12.4 kg	• 45.9 lbs. / 20.8 kg	• 52.5 lbs. / 23.8 kg	• 88.2 lbs./40.0 kg
Power Consumption On (typ)	• 2.0 - 0.8 A @ 100-240V AC, 50/60Hz	• 3.5 – 1.45 A @ 100-240V AC, 50/60Hz	• 3.6 – 1.5 A @ 100-240V AC, 50/60Hz	• 5 – 2.0 A @ 100-240V AC, 50/60Hz
VESA Hole Pattern	• 200mm x 200mm (M6 - 4 holes)	• 300mm x 300mm (M6 - 4 holes)	• 300mm x 300mm (M6 - 4 holes)	• 400mm x 400mm (M6 - 4 holes)
Environmental Operating Temp Operating Humidity Storage Temp Storage Humidity	• 5 to 40°C (41 to 104°F) • 20% to 80% • -20 to 60°C (-4 to 140°F) • 10% to 90%	• 5 to 40°C (41 to 104°F) • 20% to 80% • -20 to 60°C (-4 to 140°F) • 10% to 90%	• 5 to 40°C (41 to 104°F) • 20% to 80% • -20 to 60°C (-4 to 140°F) • 10% to 90%	• 5 to 40°C (41 to 104°F) • 20% to 80% • -20 to 60°C (-4 to 140°F) • 10% to 90%