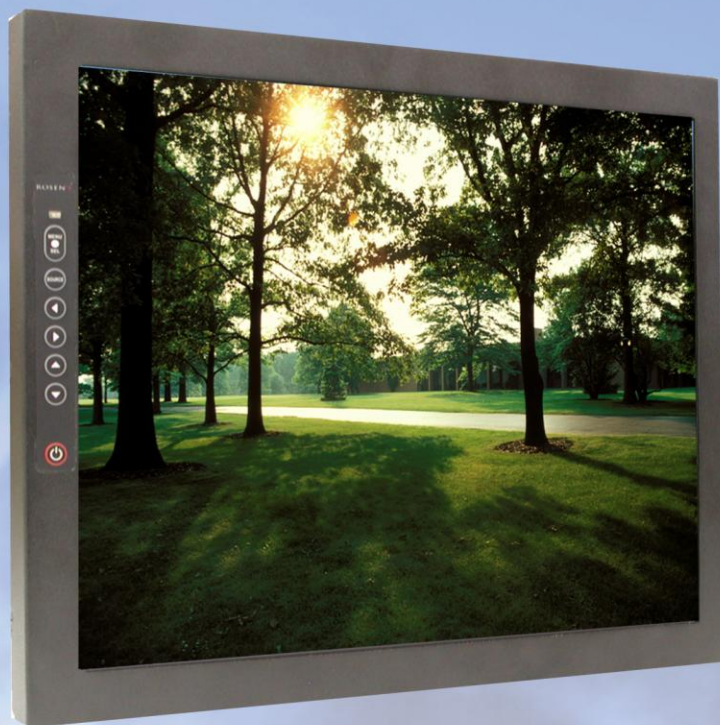


"Unrivaled Customer Satisfaction"

ROSEN  
AVIATION

# 20" SlimLine II Display



## Technical Manual

Model 2002 Series

**ELECTRONIC REVISION  
CONTROLLED**

Document Number: 9002645 Rev K

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## 1. INTRODUCTION AND DISPLAY OVERVIEW

This manual describes how to install the Rosen 20" SlimLine II Display onto your aircraft. It contains everything you need to know to wire the display and confirm that it is functioning correctly.

**Note:** Only trained and qualified personnel should perform installation and service.

### 1.1. Unpacking

Parts shipped with the 20" SlimLine II Display:

Outline & Installation drawing

20" SlimLine II Display

Main Interface connector kit (P/N **0300-025**)

Optional controllers sold separately:

External 7-button Controller (P/N **0300-408**)

Universal Color Remote (P/N **0500-015**) shipped with *Remote Controller Technical Information* (P/N **100434**)

Optional connectors sold separately:

S-Video connector kit (P/N **0300-028**)

DVI connector kit (P/N **0300-029**)



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For help with *Outline & Installation* drawings, please contact Rosen Aviation Customer Service at (541) 342-3802.

---

## 2. INSTALLATION GUIDELINES

There are several ways to connect the 20" SlimLine II Display to an aircraft's entertainment system.

Use the pinout descriptions on page 2 of the *Outline & Installation* drawing to assist in the wiring process. Pay close attention to the pinout information while completing wiring connections.

Once you access the home page, click on **Products→Displays→20 In SlimLine**. Select a drawing by model number from the drop-down menu in the middle of the page.

Drawings are provided to assist in the installation process. Pay close attention to dimensions and rotations when considering installation requirements.

**Note:** This display is for entertainment purposes only; connect to the non-critical power bus.



---

Touching the LCD with excessive force may leave pressure spots that show in video display. Handle with care.

---

### 2.1. Monitor Diagrams

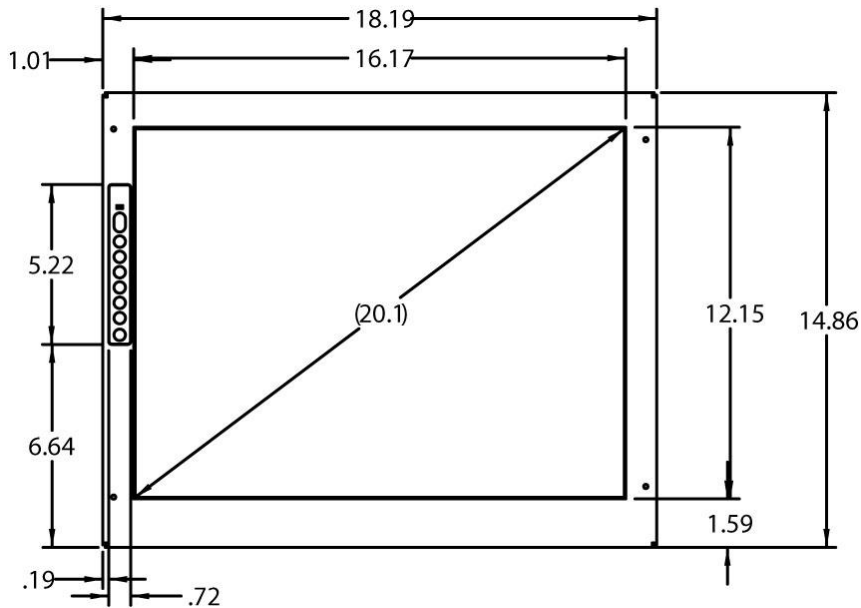


Figure 1 2002 outline dimensions (inches)

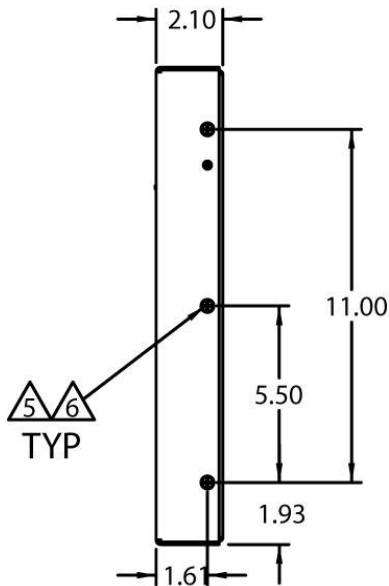


Figure 2 Side view dimensions (inches)

### 2.2. Cooling and Ventilation

The display is cooled by the flow of air, or natural convection. Special care must be taken with the installation to provide a proper environment for air flow.

Monitor vents: The unit is designed with vent openings on the top, bottom, and rear surfaces. The entire top vent, and either the entire bottom or entire rear vent must be

unobstructed for a minimum of one (1) inch. The vents must also be ducted to free air.

Ducting: The installation must provide for an inlet duct (at bottom or rear), and an exhaust duct at the top. Each of these ducts must have a minimum of four (4) square inches of cross-sectional area.

**Note:** The display backlight will shut down if internal temperature reaches 140° F. It will not come back on until the temperature drops 10 degrees below the threshold.

**Note:** Each mounting hole includes a 10-32 screw. To install the display, remove only the screws that will be used to install the display. Do not remove the 4-40 flathead screws.

### 2.3. Mounting Options

Mounting options for this display are as follows:

Mount using all side mounting holes, or

Mount using all top and bottom mounting holes, or

Mount using all rear mounting holes

(Dimensions in inches)

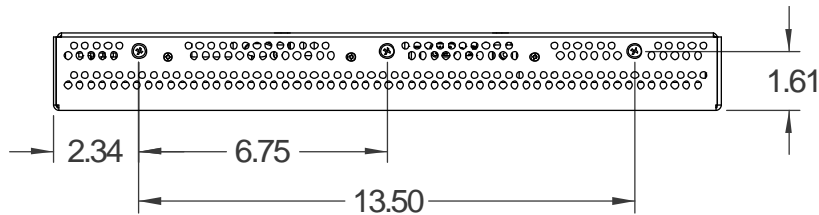


Figure 3 Top view with mounting holes

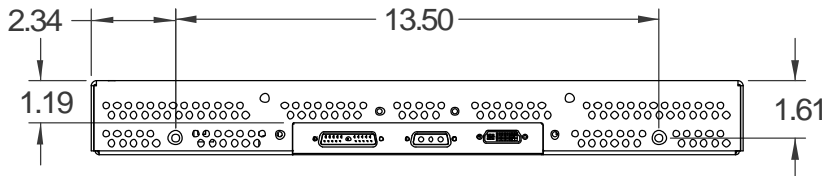
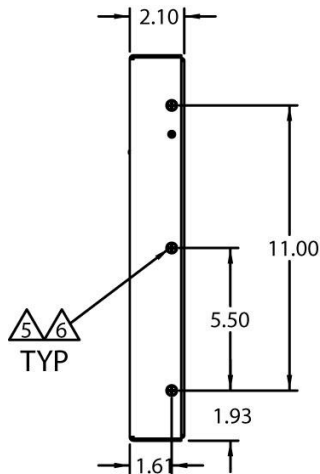


Figure 4 Bottom view with mounting holes



<b>Warning!</b>  <b>!</b>	Maximum screw penetration depth:
	Top .75 inches
	Bottom .75 inches
	Sides .75 inches
	Rear .50 inches

Figure 5 Side view with mounting holes

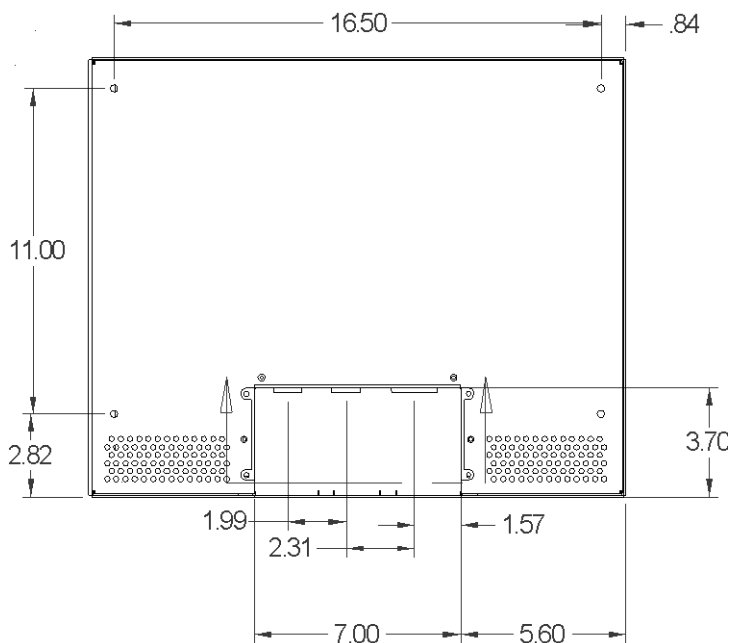


Figure 6 Rear view with mounting holes

### 3. VIDEO CONNECTIONS

The three interface connectors for this display are:

21W1 Male Combo D-subminiature with 20 signal inputs for power, control, and IR inputs, and one (1) shielded coaxial input for composite video

3W3 Male Combo D, Coax for S-Video input

DVI connector for analog RGB and DVI inputs



Mating connector kit included with purchase:

Rosen connector kit (P/N **0300-025**)

Recommended additional mating connectors (optional)

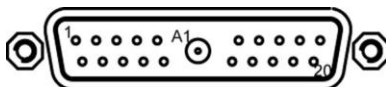
S-Video connector kit, 3W3 Male Coax Combo D (P/N **0300-028**)

DVI connector kit for analog RGB and DVI inputs (P/N **0300-029**)

**Note:** The main connector backshell is chassis ground.

**Warning!** Do not plug or unplug display while power is applied!

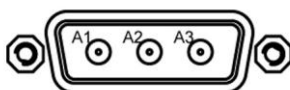
### 3.1. Main Interface Connector, 21W1 Male Combo D



Pin #	Signal	Input/Output	Description
1	28V return	Input	Aircraft power supply
2	28VDC	Input	Aircraft power supply
3	IR +5V	Output	5V for IR receiver
4	IR signal	Input	Data from IR receiver
5	IR GND	Output	Ground for IR receiver
6	RGB/Video Select (LVTTTL)	Input	Source select switch input internally pulled up to +3.3V – short to ground to switch
7	Status output (LVTTTL)	Output	LVTTTL level output (+3.3V) indicates display is on when logic is high – maximum current. (draw is 10 milliamps ,0V when display is off)
8	Power on/off (LVTTTL)	Input	Power toggle switch – internally pulled up to +3.3V. Controls the on/off state of the display.
9	RS-232 GND	N/A	Ground for serial control lines
10	28V RTN	Input	Aircraft power supply
11	28VDC	Input	Aircraft power supply
12	RS-232 RX	Input	Connects to serial switch/cabin management (9600 baud)
13	RS-232 TX	Output	
14	RS-485 (A out)	Output	RS-485 serial A out
15	RS-485 (B out)	Output	RS-485 serial B out
16	RS-485 (A in)	Input	RS-485 serial A in
17	RS-485 (B in)	Input	RS-485 serial B in
18	RS-485 GND	N/A	Ground for RS-485 lines
19	Reserved	Reserved	Reserved

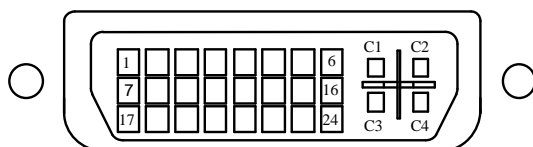
Pin #	Signal	Input/Output	Description
20	Reserved	Reserved	Reserved
A1-signal	Composite video	Input	Composite video input, 1 Vpp, 75 ohm
A1-shield	Composite video return	Input	Shield for composite video
Shell	Chassis ground		

### 3.2. S-Video Connector, 3W3 Male Coax Combo D



Pin #	Signal	Input/Output	Description
A1 Signal	S-Video luminance	Input	S-Video luminance signal
A1 Shield	S-Video luminance shield	Input	S-Video return
A2 Signal	S-Video chrominance	Input	S-Video chrominance signal
A2 Shield	S-Video chrominance shield	Input	S-Video return
A3 Signal	Reserved	Reserved	Reserved
A3 Shield	Reserved	Reserved	Reserved

### 3.3. DVI Input Connector



Pin #	Signal	Input/Output	Description
1	T.M.D.S. Data2-	Input	Digital video serial channel 2 data
2	T.M.D.S. Data2+	Input	Digital video serial channel 2 data
3	T.M.D.S. Data2/4 shield	Input	Digital video serial channel 2 and 4 shield
4	T.M.D.S. Data4-	Input	Digital video serial channel 4 data
5	T.M.D.S. Data4+	Input	Digital video serial channel 4 data
6	DDC clock	Input	Display data channel clock signal

Pin #	Signal	Input/Output	Description
7	DDC data	Output	Display data channel data signal
8	Analog VSync	Input	Analog RGB VSync input 0-5V
9	T.M.D.S. data1-	Input	Digital video serial channel 1 data
10	T.M.D.S. data1+	Input	Digital video serial channel 1 data
11	T.M.D.S. data1/3 shield	Input	Digital video serial channel 1 and 3 shield
12	T.M.D.S. data3-	Input	Digital video serial channel 3 data
13	T.M.D.S. data3+	Input	Digital video serial channel 3 data
14	5V power	Input	5V power for display data circuit
15	GND for 5V, HSync, VSync	Input	Ground for analog sync signals and 5V power
16	Hot plug detect	Output	Indicates to source that display is connected
17	T.M.D.S. data0-	Input	Digital video serial channel 0 data
18	T.M.D.S. data0+	Input	Digital video serial channel 0 data
19	T.M.D.S. data0/5 shield	Input	Digital video serial channel 0 and 5 shield
20	T.M.D.S. data5 -	Input	Digital video serial channel 5 data
21	T.M.D.S. data5+	Input	Digital video serial channel 5 data
22	T.M.D.S. clock shield	Input	Shield for digital video serial clock signal
23	T.M.D.S. clock+	Input	Digital video serial channel clock signal
24	T.M.D.S. clock-	Input	Digital video serial channel clock signal
C1	Analog red	Input	Analog RGB red input, 0.7V, 75 ohm
C2	Analog green	Input	Analog RGB green input, 0.7V, 75 ohm
C3	Analog blue	Input	Analog RGB blue input, 0.7V, 75 ohm
C4	Analog HSync	Input	Analog RGB HSync input, 0-5V
C5	Analog Ground	Input	Analog RGB ground

## 4. TECHNICAL SETUP – TECHNICIAN ON-SCREEN DISPLAY

The display receives Composite, Analog RGB, S-Video, and Digital Video Input (DVI). DVI input is shown as Digital RGB in the on-screen display when switching between video sources.

### 4.1. Enabling the On-Screen Display

To access the on-screen display (OSD) configuration for advanced settings, use the front-panel keys or an IR remote to access the Technician Menu. On the front panel, press the following button sequence:

◀, ▶, ▲, ▼, ◀, ▶, ▲, ▼, ▲, ▲, ▲, and then press **Menu**.

This sequence prevents passengers from accidentally accessing the configuration on-screen display mode.



---

On-screen display will not function if the special filter is enabled. To disable special filter, go to [Section 5.5 Utility Submenu](#)

---

### 4.2. Menu Navigation

Use the front-panel keys or an IR remote to move through menu selections. The current menu screen title is always shown at the top of the screen.

Use up and down (▲▼) arrow keys to move the menu cursor to a different menu option line.

Press the Menu key to select a menu option, or to accept an adjusted or changed menu option.

Use left and right arrow keys (◀▶) to adjust or change menu options.

Menu selections that have a submenu option have >> shown at the right side of the menu option line.

Menu selections that return you to the previous menu have << shown at the right side of the menu option line.

When > is shown at the left side of a menu option line, the cursor is on that line. This does not mean that the menu option line is currently selected. A menu option line is selected by pressing the Menu key.

**Note:** Most menus have help text at the bottom of the screen indicating which keys navigate that menu.

### 4.3. Main Menu Configuration

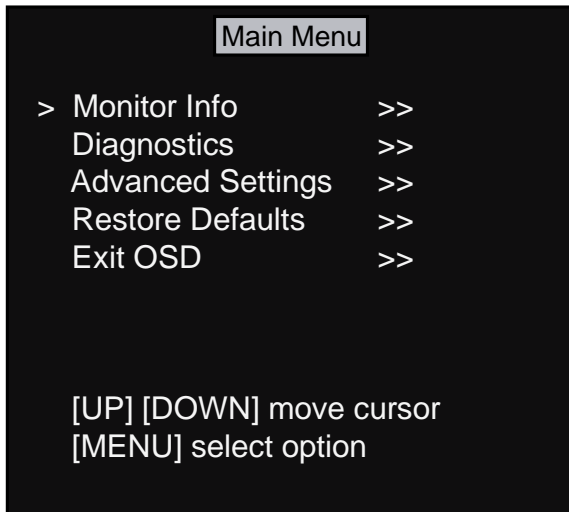


Figure 7 Main Menu options

The Main Menu has a time-out setting that automatically returns the monitor to normal operation if no keys are pressed for one (1) minute. The submenus do not have this time-out setting.

To manually exit the Main Menu, move the cursor to the Exit OSD menu line and then press the Menu key.

#### 4.3.1. Monitor Info

Select the Monitor Info submenu to view information on the current status of the display. The example below shows the Monitor Info submenu selection:

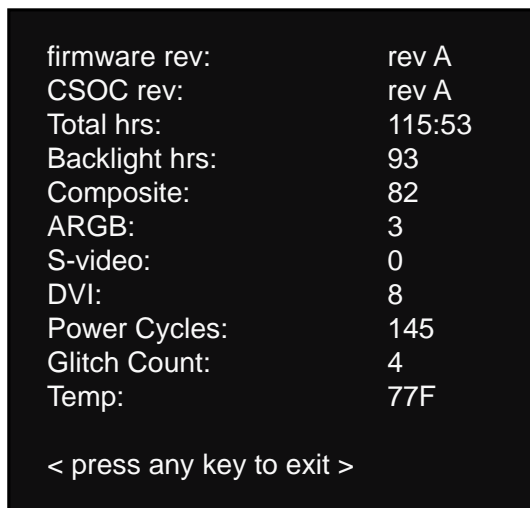


Figure 8 Monitor Info submenu

### 4.3.2. Diagnostic Submenu

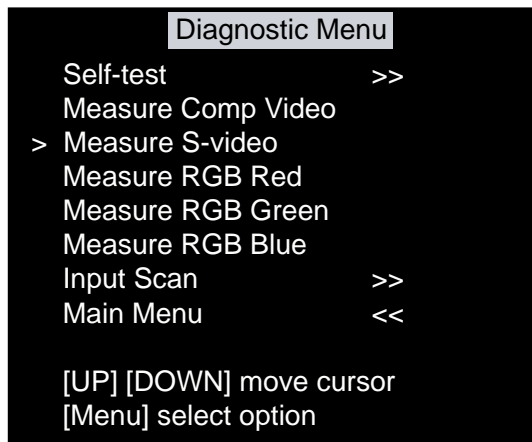


Figure 9 Diagnostic submenu option

#### 4.3.2.1. Self-test

Select the Self-test menu to initiate a test that determines and then displays the status for some of the monitor's internal components. This test runs automatically when power is applied to the monitor, but it can be run manually from this menu selection. A sample Self-test result is shown below.

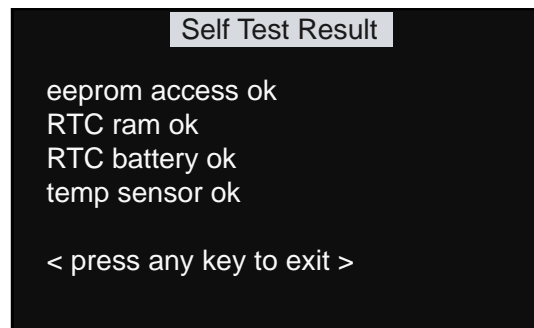


Figure 10 Self-test submenu example

#### 4.3.2.2. Video Level Test

There are five tests for video signal levels:

- Measure Composite Video
- Measure S-Video
- Measure RGB Red
- Measure RGB Green
- Measure RGB Blue

Each video level test measures the average voltage level of a particular video input signal. Select the desired video signal to initiate a test. See below for a Video Level Test result example.



Figure 11 Video Level Test result example

#### 4.3.2.3. Input Scan

Select the input scan menu to initiate a short test that determines if the monitor can detect any valid video input signals. The status of each input signal displays when the test completes.

**Note:** Input scan tests are based on detecting the sync signals from each signal.

It is possible for a video signal to be physically connected to the monitor but still fail this scan test if the voltage level is too high or too low.

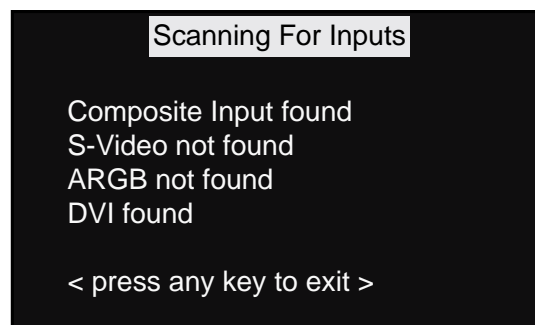


Figure 12 Input Scan result example

### 4.3.3. Advanced Menu

The Advanced Menu is extensive. Use the following pages for guidance when selecting Advanced Menu options and submenus.

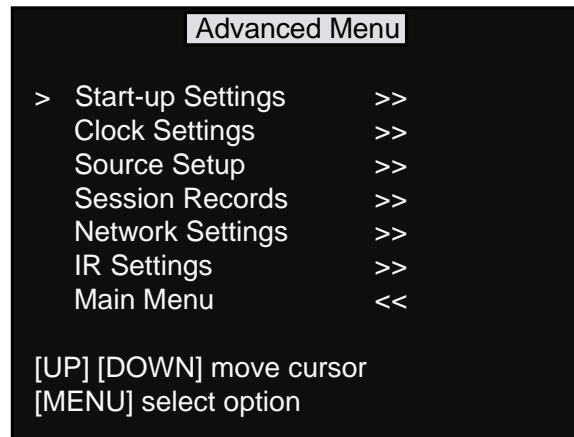


Figure 13 Advanced Settings submenu options

#### 4.3.3.1. Start-up Settings

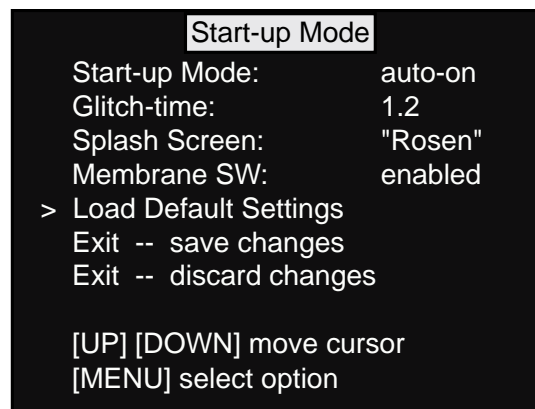


Figure 14 Start-up Mode settings example

#### Start-up Mode

There are four settings available for the Start-up Mode:

- **Auto-on:** The monitor always starts up in the ON state when 28V is applied. The default mode is Auto-on.
- **Auto-off:** The monitor always starts up in the STANDBY state when 28V is applied.
- **Restore Last:** The monitor returns to the previous power and video settings after any power interruption.
- **Constant SW Mode:** See "Start-up Mode below.

#### Start-up Mode - Power On/Off Input Signal

The Power On/Off Input Signal pin (pin 8) can be used to control the Monitor's On/Off state. When Start-up Mode is set to Auto-on, Auto-off or Restore Defaults, the On/Off



signal is activated by a momentary ground input. The monitor will toggle the On/Off state in response to this momentary ground signal. When the Start-up Mode is set to Constant SW, the power state is controlled directly by the voltage level on the pin. Zero volts will turn the monitor Off, and 3V will turn it On. Note that when in Constant SW Mode, the membrane switch, external controller and IR remote power buttons have no effect.

### **Glitch-time**

Glitch-time settings help control the monitor state when power is first applied in Auto-on or Auto-off modes. For example, during a normal power-up sequence, when 28V power has been off for several hours, the initial state of the monitor is set by the Start-up mode selection. If 28V power is briefly interrupted while the monitor is on, the monitor will respond by restoring the previous state and ignoring the Start-up mode setting. (One example of a brief power interruption is when an aircraft switches from auxiliary power unit (APU) to engine power.)

**Note:** The Glitch-time setting controls the length of time that the monitor uses to choose between a normal power-up sequence and a power interruption sequence. The range of this setting is from .5 seconds to 25.5 seconds, in increments of .1 seconds. The default value is 1 second. The Glitch-time setting has no effect in "Restore Last" Start-up mode.

### **Splash Screen**

There are two splash screens available on this monitor; one is a solid blue background, and the other is a white background with the Rosen Aviation Displays logo. The splash screen appears for approximately 8 seconds when 28V power is first applied to the unit. Use the Splash Screen menu option to choose the splash screen desired.

### **Front Panel Keys (Membrane SW)**

The Front Panel Keys can be disabled for situations where the monitor is installed in a bulkhead. If the possibility exists of the keys being inadvertently held in by the mounting bezel in front of the monitor, select "disabled" for this setting.

**Note:** Disabling Front Panel Keys only takes effect after the on-screen Main Menu display is exited. While the on-screen display is active, the keys will still operate. Once the keys become inoperable, you may still enter the technician sequence to access the technical setup OSD.

### Load Default Settings

Use this menu option to restore start-up settings to the factory configuration. This option does not change other monitor settings. The factory start-up configuration is as follows:

- Start-up mode = auto-on
- Glitch-time = 1.0 seconds
- Splash screen = Rosen Aviation Displays
- Front Panel Keys = enabled

#### 4.3.3.2. Clock Settings

This monitor contains a battery-backed real-time clock. The clock is set during monitor production and should not need adjustment during the monitor's life. If the clock setting needs adjustment for any reason, access the Clock Menu to make adjustments.

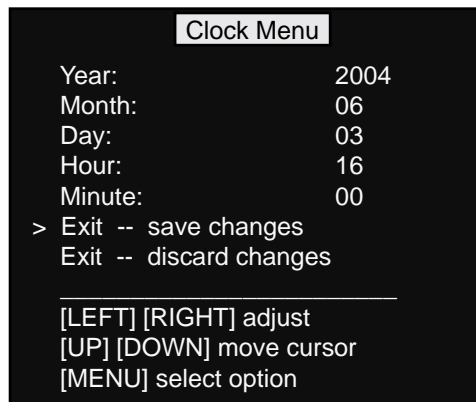


Figure 15 Clock settings example

#### 4.3.3.3. Source Setup

Use the Source Setup menu selections to determine how the monitor selects video sources. There are four modes available for selecting video sources:

- ◆ Auto-Detect Mode
- ◆ Constant Switch Mode
- ◆ Momentary Switch Mode
- ◆ Manual Mode

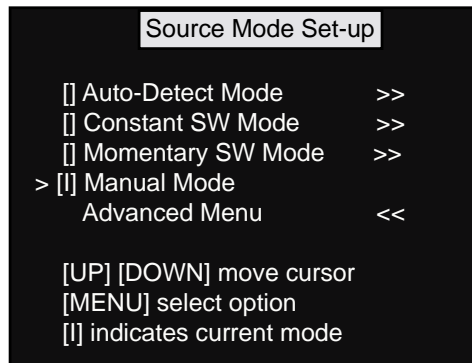


Figure 16 Source Mode Set-up menu

A line is shown between the brackets of the currently selected mode. Note that the Manual Mode option has no other settings options, while the other three modes have separate setup menus.

##### 4.3.3.3.1. Auto-Detect Mode

Auto-Detect mode automatically switches the Video Source based on a priority level assigned to each source. The priority levels are assigned, with level 1 being the highest priority level and level 4 being the lowest level. The monitor always displays the highest priority input that is available.

**Note:** To have a valid configuration, there must be unique sources assigned to priority levels 1 and 2; levels 3 and 4 are optional.

For example, a typical configuration would be to have composite video as priority 2, and analog RGB as priority 1. This would cause the monitor to automatically switch to the analog RGB input whenever a user attached a laptop computer to the analog RGB input.

**Note:** The menu will not allow an invalid configuration to be saved. If an invalid setup is listed in the menu, the “save” option is automatically replaced by an “Invalid Setup!” warning.

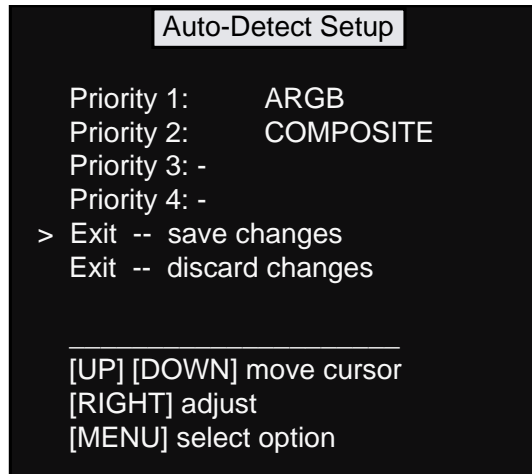


Figure 17 Auto-Detect Mode submenu example

#### 4.3.3.3.2. Constant Switch Mode

Constant Switch mode selects one of two video sources based on the state of a single pole switch connected between ground and the select switch input pin (pin 6 on the 21W1 main interface connector). You can select any of the available sources for the two switch conditions.

When the select switch pin is connected to ground, the monitor switches to the video source indicated in the “Switch Closed” menu setting. When the select switch pin is open (not connected to ground), the monitor selects the video source indicated in the “Switch Open” menu setting.

**Note:** The two sources selected must be different to be considered a valid configuration. The menu will not allow you to save an invalid configuration.

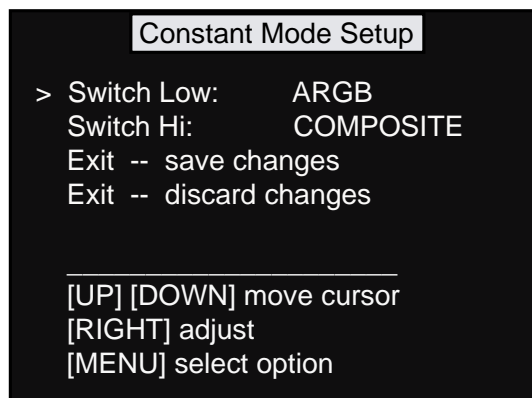


Figure 18 Constant Switch Mode submenu example

#### 4.3.3.3.3. Momentary Switch Mode

Use the Momentary Switch mode to select video modes in a predefined sequence each time the source key is pressed, or each time an external momentary switch connected to the select switch input is pressed.

The sequence list can contain two or more video sources, but there can be no duplicated entries. There are no restrictions on where each video source can appear in the sequence. The monitor defaults to the first source in the list upon start-up. The menu will not allow you to save an invalid configuration.

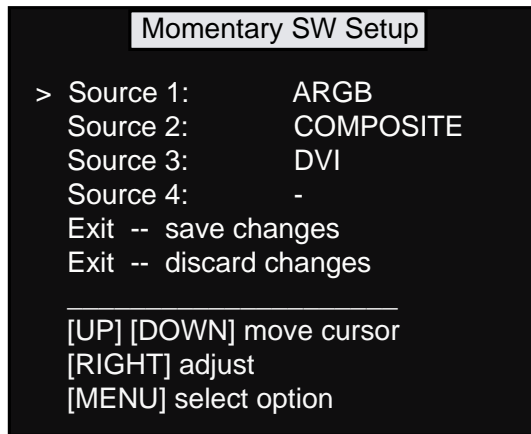


Figure 19 Momentary Switch Mode submenu example

#### 4.3.3.3.4. Manual Mode

Use Manual Mode to change the input source by pressing the front panel source key. There is no auto-detection or skipping of modes in this configuration. The monitor will power up in the same video mode that it was in prior to being shut down.

#### 4.3.3.4. Session Records

Use Session Records to access past configuration information. As a diagnostic tool, this monitor stores a brief record of the last 25 times that the monitor was turned on. The information contained in each record is as follows:

- ◆ The starting time and date
- ◆ Video modes used
- ◆ The maximum internal temperature
- ◆ The minimum internal temperature.
- ◆ The source selection mode
- ◆ The power-up mode used
- ◆ The self-test flag results (00 = normal)
- ◆ The ending time and date

```
Index 1
Start: Dec 15 04 08:53
Video modes:
DVI, S-Video
Max temp: 96
Min temp: 75
Constant mode
Start up: normal start
Self test flag: 00
Stop: Dec 15 04 11:24

-----
[MENU] to exit
[DOWN] show next record
```

Figure 20 Session Records menu example

#### 4.3.3.5. Network Settings

Use Network Settings if you are using RS-485. The Search Network setting looks for other attached Rosen products. It lists either the products or states “No other devices found.” See Section [7 RS-485 Information](#) on page [29](#) for more information about controlling.

```
Network Menu

> Network Address: 1
Status: NO-CONNECT
Search Network >>
Exit – save changes
Exit – discard changes

-----
[UP] [DOWN] move cursor
[RIGHT] adjust
[MENU] select option
```

#### 4.3.3.6. IR (Remote Control) Settings

This monitor uses standard Rosen remote control codes, and it also has the ability to learn new codes from a different remote. The new remote must have an “NEC- style” 32-bit IR output.

**Note:** Learning new codes for a function will not erase the standard codes. The default Rosen IR codes will always work, regardless of any learned codes.

#### 4.3.3.6.1. Programming a New IR Code:

The following information details an example of programming a new IR code. In this example, a new IR code will be added for the Power key.

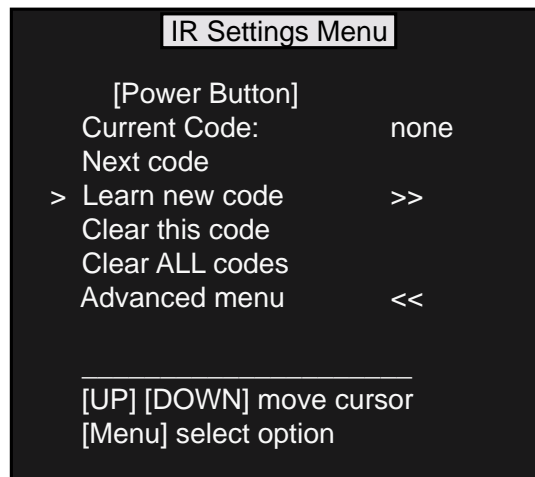


Figure 21 IR Settings Submenu Option

Access the IR Settings Menu by Navigating from the Main Menu to Advanced Settings to IR Settings Menu.

Move the cursor to the Next Code selection, use the arrow keys to set the cursor on the first line of the menu, and then find and press the remote control Power button.

Move the cursor down to the Next Code option line and then press the Menu key.

Move the cursor down to the Learn New Code option line and then press the Menu key; this activates the IR learning menu as shown below.

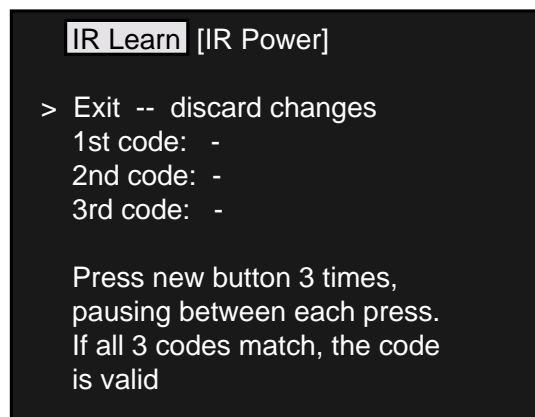


Figure 22 IR Settings Submenu Option

Once the IR Learn menu is activated, press the remote control button that you want to program as the new Power Button three (3) times, pausing slightly between each press.

A code should appear each time you press the remote control button. If the codes are identical, which they should be, the submenu will change as shown below.

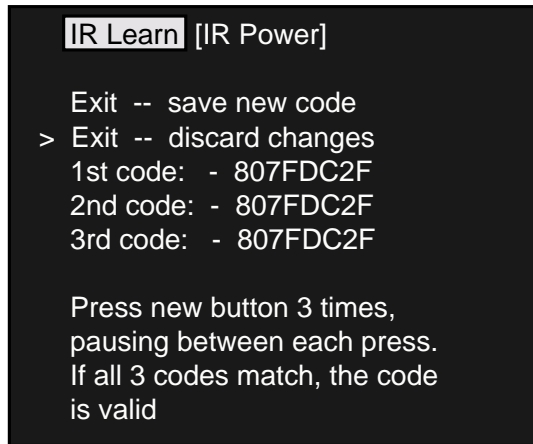


Figure 23 IR Learn (IR Power menu and options)

**Note:** If the codes do not match, or do not change when you press the remote control button, make sure that the remote is pointed directly at the IR sensor. If codes still do not match or do not update when you press the remote control button, your remote control may not be compatible with this monitor. Try using a different remote control.

If you press a remote control button that is already stored in the monitor while in Learn mode, it will be ignored.

Move the cursor to the Exit – Save New Code option line and press the Menu key to add the change to the remote control database for this monitor. The new remote control button will work (however, the original remote code will also still work).

When a new IR code is saved, the IR Settings Menu returns to the display, and the new code is shown on the Current Code line. To store more codes from a remote, repeat the operation described above for each function desired. The list of available buttons and functions appears below:

#### IR remote functions and buttons list

- |                 |                          |
|-----------------|--------------------------|
| ◆ Power button  | ◆ Right button           |
| ◆ Menu button   | ◆ OSD on                 |
| ◆ Source button | ◆ Select Composite Video |
| ◆ Up button     | ◆ Select S-Video         |
| ◆ Down button   | ◆ Select Analog RGB      |
| ◆ Left button   | ◆ Select DVI             |

#### 4.3.4. Clearing Codes

To clear one stored code, use the Next Code option to select the function to be cleared. Move the cursor to the Clear This Code option and press the menu key. The current code line will now read “none” for this function. To clear all stored codes at once, move the cursor to the Clear All Codes option and press the Menu key. The current code line will now read “none” for all stored codes.

**Note:** To return to the Advanced Menu, move the cursor to the Advanced Menu option and press the menu button.



#### 4.3.5. Restore Defaults

The Restore Defaults Submenu restores factory default settings for the monitor. It does not erase maintenance data or change the internal time and date.

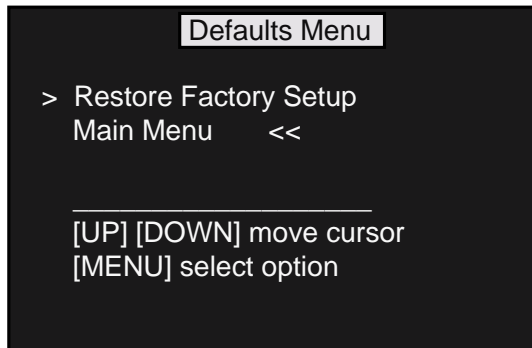


Figure 24 Restore Defaults Submenu Option

The following conditions will be set by selecting this option:

- ◆ The front panel membrane switch will be enabled
- ◆ The network settings will be cleared
- ◆ The start-up splash screen will be set to show the Rosen Aviation Displays logo screen
- ◆ The power glitch time setting will be set to 1 second
- ◆ All stored IR codes will be cleared
- ◆ The start-up mode will be set to auto-on, auto-detect RGB

## 5. OPERATION

### 5.1. Front Switch Panel Features

To operate the 20" SlimLine II display, use the front switch panel buttons shown below. (External controller or IR remote control options are available separately.)

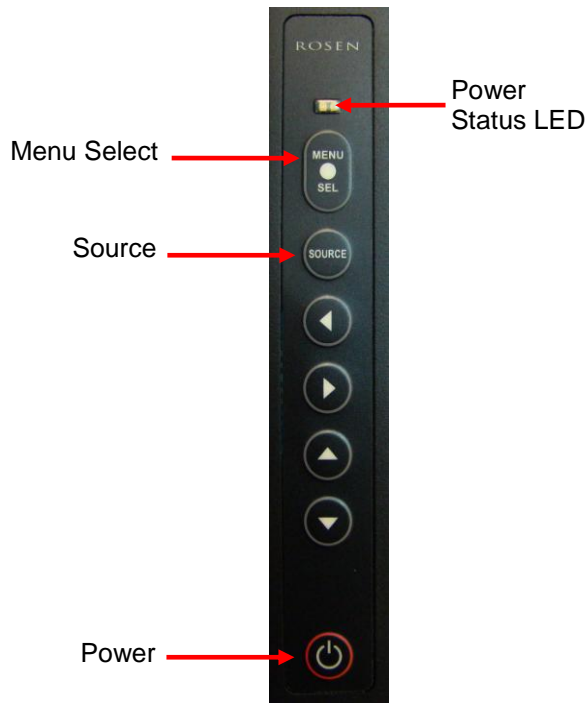


Figure 25 Front Switch panel

Front Switch Panel Features

Feature	How it Works
Power Status LED	When the LED is green, display is on. When the LED is red, display is in Standby Mode.
Menu/Sel	Press to view the OSD Main Menu and to select the highlighted Main Menu option.
Source	Press to toggle the video source between Analog RGB, Digital RGB, S-Video, and Composite video. <b>Note:</b> This only functions when the Advanced Menu's Source Setup is set to Momentary Ground or Manual Mode.
▼▲▶◀	Press to select a menu option or to increase or decrease a value.
Power	Press to power the display on or off.

### 5.2. On-Screen Display Main Menu

The On-Screen Display (OSD) provides a set of menus that enable you to adjust or view the display's features. Main Menu selections lead to submenus with additional choices. Press the **Menu Select** button on the switch panel to open the Main Menu.



Figure 26 Main Menu for analog and digital RGB modes (left) and for composite mode (right)

To switch to different Main Menus (OSD, Utility, and Auto), press the ◀ ▶ buttons on the front switch panel.

To highlight a submenu, press the ▼ button on the switch panel. When submenus are highlighted, press the ◀ ▶ buttons to adjust up or down.

To return to the Main Menu, press the ▶ button on the switch panel to highlight **Return** in the submenu.

To exit Main Menu, press ▶ button until **Exit** is highlighted and then press the **Menu Select** button.

**Note:** It takes ten seconds for changes to be stored into memory.

### 5.3. Picture Submenu

Menu Option	How it Works
Brightness	Adjusts picture brightness
Contrast	Adjusts picture contrast
Hue	Shifts the color balance or tint
Saturation	Intensifies the image colors
Filter Select	Increases the clarity of the picture
Phase	Removes noise in analog RGB
Frequency	Adjusts the picture size in RGB mode
H Position	Adjusts horizontal position adjustment
V Position	Adjusts vertical position
Sharpness	Adjusts picture sharpness
Return	Returns OSD to the Main Menu

These options available only in Composite mode

These options are not available in digital RGB (DVI/1080p) mode

**Note:** Phase, Frequency, H Position and V Position appear only in analog RGB mode. If you change frequency in RGB mode, the H Position, V Position and Phase are automatically reset to default.

#### 5.4. OSD Submenu

Menu Option	How it Works
H Position	Adjusts OSD horizontal position
V Position	Adjusts OSD vertical position
OSD Timeout	Adjusts time in which OSD turns off if left alone
Return	Returns OSD to the Main Menu

#### 5.5. Utility Submenu

Menu Option	How it Works
Freeze Frame	Freezes picture frame
Reset	Returns options to default settings
Special Filter	Slow/fast motion picture filter
Color Temperature	Opens Color Adjustment submenu, where you can adjust red, green, and blue values
Information	Provides monitor info
Return	Returns OSD to the Main Menu

**Note:** Tech menu will not function when special filter is enabled and the digital RGB mode (DVI/1080p) will not display correctly with special filter enabled. Special filter can only be enabled in composite mode.

#### 5.6. Auto Submenu

Menu Option	How it Works
Auto	Automatically adjusts image size in analog and digital RGB modes

#### 5.7. Exit Submenu

Menu Option	How it Works
Exit	Closes the screen. To exit menu, press ◀.

### 6. HOT KEYS

Hot keys are a quick way of adjusting brightness, contrast, picture-in-picture (PIP), and the scaling modes. To activate the hot keys, press the ▲ ▼ buttons on the front switch panel to cycle through these modes, and then use the ► ◀ buttons to change values. The hot keys will not work if an OSD menu is open.

Hot Key Option	How it Works
Scaling mode	<p>The scaling mode will adjust the picture depending on the type of formatted DVD disc you are using. <b>Note:</b> If picture looks stretched, adjust the scaling mode.</p> <p>Fill All            Fill Aspect Ratio            One To One            Letterbox 16:9 fill (tall) [Composite Only]            Anamorphic [Composite Only]</p>
Picture-in-Picture (PIP) [RBG/DVI only]	<p>The small screen in the upper left-hand corner will display composite video in small, medium, and large PIP when in RGB/DVI modes. <b>Note:</b> PIP will only function correctly with progressive video signals. It will not function with interlacing video signals (480i/1080i).</p>

## 7. RS-485 INFORMATION

This section defines the type, formats and timing of serial message packets that can be used to control the 2002 display through a daisy-chained RS-485 serial connection. All RS-485-enabled Rosen Aviation displays and other Rosen Aviation equipment will fully implement the applicable messages in this document. A maximum of 31 devices may be connected on a half-duplex network. Each device should be assigned a unique address from 1 to 31.




---

The Rosen 2002 is set to address 1 by default.

---

Please note that Rosen Aviation equipment is not specifically designed to operate as part of a network with other manufacturers' equipment unless the other equipment meets the requirements defined in this document.

### 7.1. Communication Protocol

9600 Baud  
 8 data bits  
 1 stop bit  
 no parity

### 7.2. Packet Format

There are typically 3 bytes per message. The first byte is a header byte and the second identifies the specific command. The third byte is the network address. A network address byte of 0 is reserved as the "global" address, in other words all slave units should respond to that command.

### 7.3. Packet Timing

Within a message packet, there is a maximum time of 20mSec between bytes. Messages with bytes sent more than 20mSec apart will not be recognized by the receiving unit.

There should be a minimum elapsed time of 50mSec between any 2-message packets. This allows the given processor sufficient time to process the previous message.

Messages sent less than 50mSec apart are not guaranteed to be processed by the receiving unit.

## 7.4. Wiring

Rosen Aviation equipment uses a half-duplex wiring layout. Only two RS-485 wires need to be run between each individual unit. On the 20" SL II monitor, the two sets of RS-485 A and B wires must be externally connected together. For proper operation, connect pin 14 to pin 16 and connect pin 15 to pin 17 on the 21W1 connector.

## 7.5. Packet Format Description for 2002 Display Commands

### Power

- **Power On**

Byte 1:	0x81	Power Message Header
Byte 2:	0x0f	Power on command
Byte 3:	network id	
	0x00	reserved for global id (all power slave units respond)

- **Power Off**

Byte 1:	0x81	Power Message Header
Byte 2:	0xf0	Power off command
Byte 3:	network id	
	0x00	reserved for global id (all power slave units respond)

### Input Source Selection

- **Source Composite Video**

Byte 1:	0x82	Video Source Header
Byte 2:	0x01	Select source composite 1 command
Byte 3:	network id	
	0x00	reserved for global id (all video slave units respond)

- **Source Analog RGB (ARGB)**

Byte 1:	0x82	Video Source Header
Byte 2:	0x04	Source ARGB command
Byte 3:	network id	
	0x00	reserved for global id (all video slave units respond)
		*not all displays support an analog RGB input.

- **Source S-Video**

Byte 1:	0x82	Video Source Header
Byte 2:	0x03	Source S-Video command
Byte 3:	network id	
	0x00	reserved for global id (all video slave units respond)
		*not all displays support an S-Video input.

- **Source Digital RGB (DVI)**

Byte 1:	0x82	Video Source Header
Byte 2:	0x06	Source DVI command
Byte 3:	network id	
	0x00	reserved for global id (all video slave units respond)
		*not all displays support a DVI input.

## 7.6. Network Setup/Ping Address

The ping address message is used by a "master" device to identify all the attached devices on a network.

Byte 1: 0x88 Ping Message Header  
 Byte 2: 0x55 Filler byte  
 Byte 3: network id (value between 1-31) 0 is not a valid id for this command.

### Response:

Byte 1: 0x77 Ping Response Header

Byte 2: bits 0-3 Device Identification

0000 = 5.6" monitor  
 0001 = 8.4" monitor  
 0010 = 12" monitor  
 0011 = 15" monitor  
 0100 = 17" monitor  
 0101 = 17"WS monitor  
 0110 = 20" SL II monitor  
 0111 = 24"WS monitor  
 1000 = 7" monitor  
 1001 = 6.5" monitor  
 1100 = Universal Lift  
 1101 = DVD player  
 1111 = RosenView unit

bits 4-7

0001 = Display, power slave only  
 0010 = Display, video slave only  
 0011 = Display, power and video slave  
 0100 = RS-485 Master  
 0000 = other (DVD, Universal Lift or RosenView )

Byte 3: ( for display )

bits 0-3 = current source  
 0001 = composite 1  
 0010 = S-Video  
 0011 = ARGB  
 0100 = DVI  
 0101 = Component  
 0110 = Composite 2  
 bit 4 1 = power on, 0 = power Off

*Example: If the responding unit is a 20" display set as a video slave, with the power on and analog RGB video selected, the ping response bytes would be 0x77, 0x26, and 0x13.*

## 8. TECHNICAL REFERENCES AND SUPPORT

If the display does not function properly, refer to the following troubleshooting table for symptoms and possible solutions before contacting Rosen field support.

Always use an oscilloscope to verify the video signal

Always use a multimeter to verify voltages

Check actual results against the requirements described in this manual

Problem	Possible Solutions
No video	Verify that the video source is on and has a tape or DVD installed. Verify that a signal is reaching the display by using an oscilloscope or another display. Verify that the display is turned on (LED is green). Verify that the pinout is correct. Verify that the video input (Analog RGB/DVI/Composite) and video standard (NTSC/PAL/SECAM/RS170) match your application.
Screen is black	Verify that the display is receiving power. Verify that the pinout is correct. Verify that the video source is on and has a tape or DVD installed. Verify all connections.
Screen is blue	Verify that a signal is reaching the display by using an oscilloscope or another display. Verify that the pinout is correct. Verify that the video source is on and has a tape or DVD installed.
Color is Out of Adjustment	Refer to the OSD Main Menu options described on page <a href="#">27</a> .

Problem	Possible Solutions
Image flickers	Verify that the signal cable is secure. Verify that the vertical frame frequency is 75 Hz or less. If using the display with a PC in Windows, go to Control Panel→Display Properties and change the Display Control Panel to 60 Hz to achieve the best performance.
Image is distorted	Verify pinouts. Verify that a signal is reaching the display by using an oscilloscope or another display. Examine the display for pinched or damaged cables.

### 8.1. Technical Support

For field support or to order parts, contact Rosen Aviation at 888.668.4955, or visit [www.rosenaviation.com](http://www.rosenaviation.com).



## 9. DO-180D QUALIFICATIONS

DO-160D Test criteria to which we test the 2002 series displays

Description	DO-160D Section	DO-160D Category
Temperature and Altitude	4.0	A1
Temperature Variation	5.0	C
Humidity	6.0	A
Operational Shock & Crash Safety	7.0	B
Vibration	8.0	SB
Explosion Proofness	9.0	N/A
Waterproofness	10.0	N/A
Fluids Susceptibility	11.0	N/A
Sand & Dust	12.0	N/A
Fungus Resistance	13.0	N/A
Salt Spray	14.0	N/A
Magnetic Effect	15.0	A
Power Input	16.0	AB
Voltage Spike	17.0	B
Audio Frequency Susceptibility — Power Inputs	18.0	Z
Induced Signal Susceptibility	19.0	Z
Radio Frequency Susceptibility (Radiated & Conducted)	20.0	TT
Emission of Radio Frequency Energy	21.0	M
Lightning Induced Transient Susceptibility	22.0	N/A
Lightning Direct Effects	23.0	N/A
Icing	24.0	N/A
Electrostatic Discharge	25.0	A

## 9.1. Specifications

Size	16.17 x 12.15 inches [410.7 x 308.6 mm]
Resolution	1600 w x 1200 h (UXGA)
Viewing Angle (H/V)	±85/85°
Brightness	300cd/m <sup>2</sup> typical
Contrast Ratio	600:1 typical
Backlight Lamp Life	50,000 hours
Weight	12.85 lbs ± 5% [5.83 kg]
Dimensions	18.19" (W) x 14.86" (H) x 2.10" (D) [462.03 mm (W) x 377.44 mm (H) x 53.34 mm (D)]
Power Requirements	1.9A ± 5% 28VDC
Video Performance	
Video Standards	NTSC, PAL, SECAM, RS170
Graphics Standards	VGA, through UXGA (75 Hz max)
Video Input	1Vp-p, 75 ohms
Operating Temperature	0°C - 50°C
Warranty	2-year

## 10. REVISION HISTORY

Revision	Date	Revision Description	EC
H	12/31/08	Update format, add OSD changes to match firmware	08534
J	6/8/09	Change time taken to store memory to 10 seconds, add note that special filter, when enabled, disables OSD menu, add note to Section 5.3 picture submenu, Section 5.5 utility submenu, and update Section 6 PIP info.	09205
K	9/24/09	Replace incorrect controller number 0300-402 with 0300-408, Section 1.1 Unpacking	09387