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# Dual Blu-ray DVD Player



# Technical Manual

**Model 0602-20x series**

**Technical Manual, 0602-20x, Dual Blu-ray DVD Player****© 2011–2015 by Rosen Aviation, LLC**

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Rosen Aviation, LLC  
1020 Owen Loop South  
Eugene, OR 97402  
541.342.3802  
888.668.4955  
Fax: 541.342.4912

[www.rosenaviation.com](http://www.rosenaviation.com)

## Contents

<b>1. INTRODUCTION</b>	<b>5</b>
1.1. Additional System Equipment	5
1.1.1. IR Remote	5
1.1.2. Dual Blu-ray Connector Kits	5
1.1.3. System Documentation	5
<b>2. SYSTEM DIAGRAMS</b>	<b>6</b>
<b>3. INSTALLATION GUIDELINES</b>	<b>8</b>
3.1. Cooling and Ventilation	9
3.2. Electrical Requirements	9
<b>4. FRONT PANEL TOUCH CONTROLS</b>	<b>9</b>
4.1. Button Controls	10
4.2. USB Service Inputs	11
4.2.1. Reset	11
4.2.2. Ethernet	11
<b>5. INPUTS AND OUTPUTS</b>	<b>12</b>
5.1. Control Inputs / Outputs	12
5.2. Audio/Video Outputs	12
5.3. Video Output	13
5.4. Dual Blu-ray DVD Control Setup	14
5.4.1. IR Control	14
5.4.2. RS-485	15
5.4.3. RS-232	16
5.4.4. Communication Protocol	16
5.4.5. Restore Defaults	16
5.5. Changing DVD and Blu-ray Regions	17
<b>6. INITIAL POWER UP</b>	<b>18</b>
<b>7. OSD MAIN MENU</b>	<b>19</b>
7.1. Settings Menu	20
7.1.1. System Submenu	20
7.1.2. Network Submenu	21
7.1.3. Info Submenu	22
7.1.4. Display Submenu	23
7.1.5. Audio	27
7.1.6. Speaker (7.1 Multi-channel analog audio only)	29
7.1.7. Language	30
<b>8. MEDIA SHARE</b>	<b>31</b>
8.1. File Browser	32
8.1.1. Action Menu	33
8.1.2. Playing All Files on a Drive	34
8.2. About Page	34

**9. TECHNICAL REFERENCES AND SUPPORT .....35**  
    9.1. Troubleshooting .....35  
        9.1.1. Manually Ejecting Disc Drive .....36  
    9.2. RTCA DO-160F Qualifications .....37  
    9.3. Specifications.....39  
**10. DEFINITIONS.....39**  
**11. REVISION HISTORY .....41**

## 1. INTRODUCTION

Rosen's Dual Blu-ray DVD player accepts content from high-definition Blu-ray™ discs, standard-definition DVDs, and audio CDs on two independent drives. Various video and audio output configurations are available for connecting to displays and sound systems.

Models with the Media Share option can also store 160GB of internal media per drive.

- Dual Blu-ray Player with Media Share – (P/N **0602-200**)
- Dual Blu-ray Player with Media Share and internal 160GB drive – (P/N **0602-205**, and **0602-201**)

This manual provides general instructions about how to install the Dual Blu-ray player and configure it with your aircraft's entertainment system.

### 1.1. Additional System Equipment

#### 1.1.1. IR Remote

The Dual Blu-ray provides 5V @100mA output to power an external IR receiver, and each disc drive has its own internal IR receiver. A universal remote control (sold separately) enables remote inputs with the Dual Blu-ray players and adjusts the on-screen display (OSD) settings:

- Universal color display remote control – contact Rosen Sales for P/N availability

**Note:** For directions on operating the optional universal remote control, refer to the User's Guide enclosed with the remote.

#### 1.1.2. Dual Blu-ray Connector Kits

Rosen recommends using the following connector kits (sold separately). You will need one for each drive:

- Main Interface connector kit—5W5 female, 44 HD female (P/N **0300-038**)
- SDI/CVBS/SPDIF connector kit—5W5 female (P/N **0300-040**)
- Component/RGB, digital HDMI/DVI connector kit (P/N **0300-029**)

#### 1.1.3. System Documentation

Documentation for the Rosen Dual Blu-ray DVD players, including the *Outline and Installation Drawings* and *User's Guide*, is available on the Rosen Aviation website at [www.rosenaviation.com](http://www.rosenaviation.com). For support information, please contact Technical Support at 541.342.3802.

## 2. SYSTEM DIAGRAMS

The following system diagrams show various configurations of audio and video connections. Audio line-level control is available through the OSD.

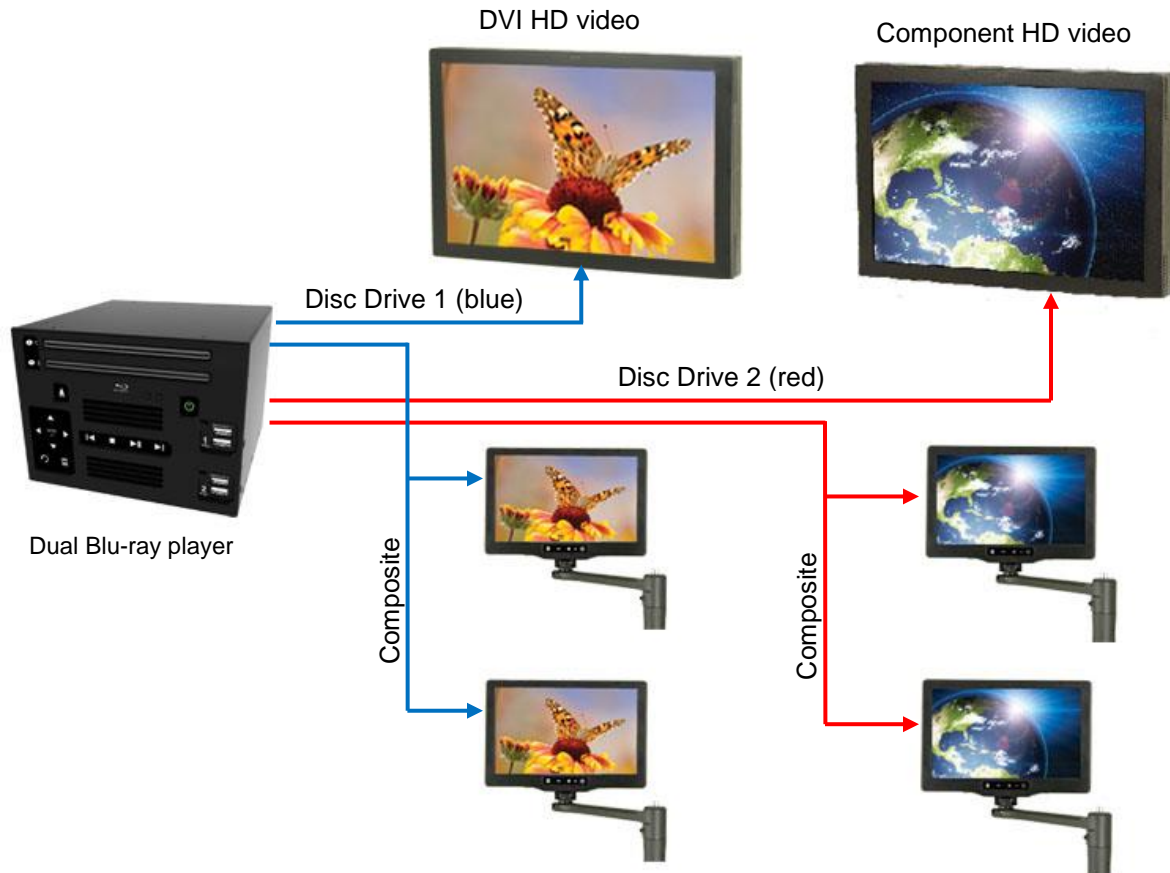


Figure 1 Composite video system diagram

Figure 2 shows an SDI system with two SDI outputs and SPDIF digital audio output configurable to 5.1 or stereo.

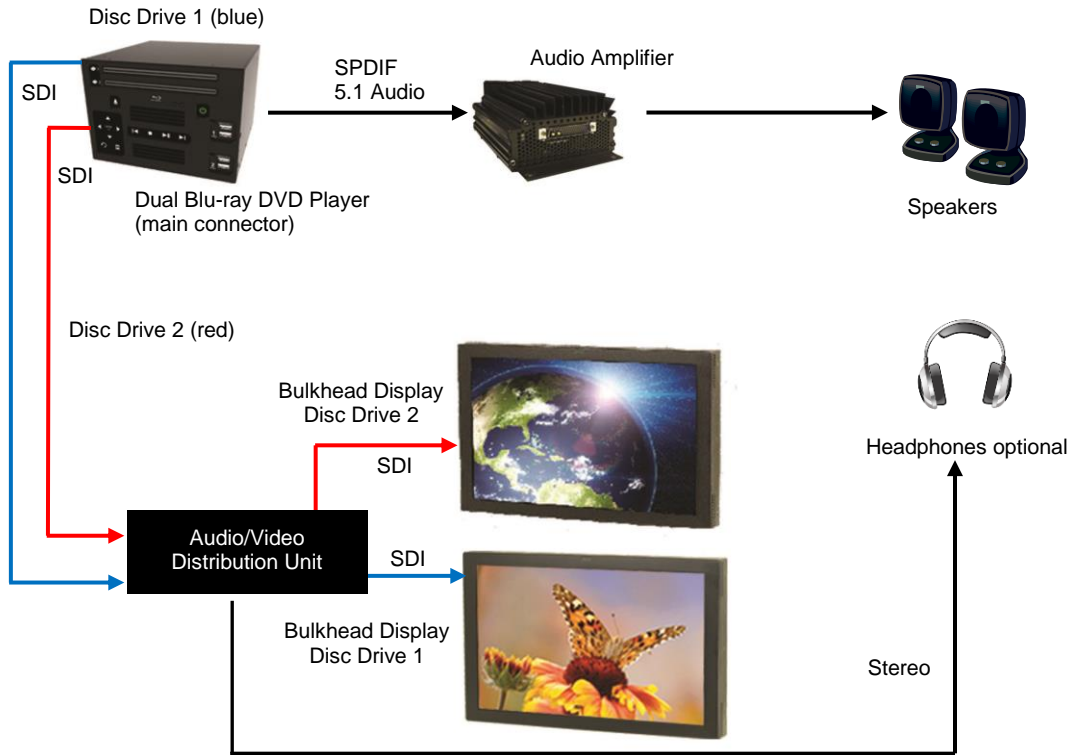


Figure 2 SDI video system

Figure 3 shows the Dual Blu-ray DVD player for 7.1 analog audio output configurable to 5.1, 2.1, or stereo.

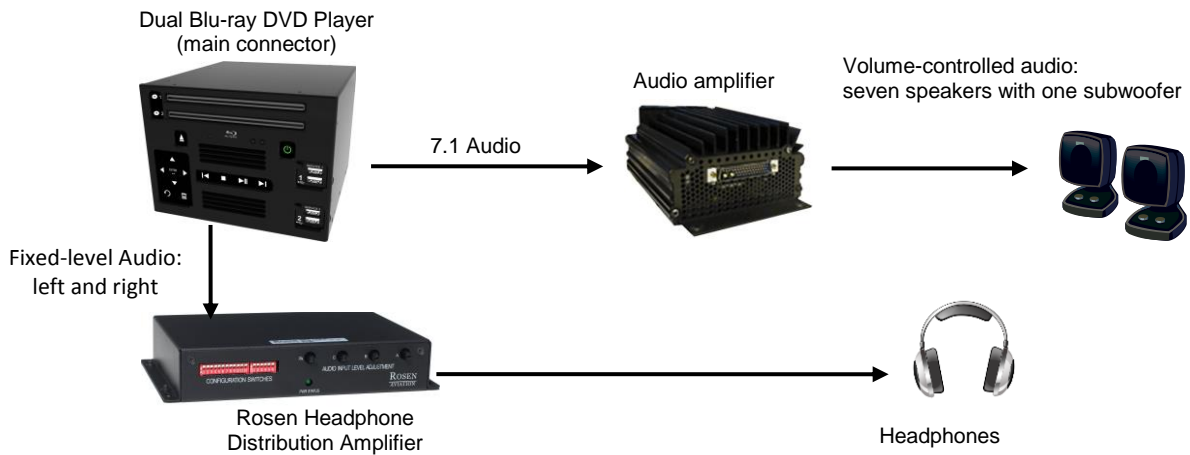


Figure 3 Audio system example for 7.1 audio

### 3. INSTALLATION GUIDELINES

You can mount the Dual Blu-ray DVD player from either side by removing the #10-32 screws, or use a bottom-surface mount using the threaded holes as mounting points. Two optional mounting holes are also available on the bottom-rear flange.

Outline and Installation drawings are available to assist in the installation process. Pay close attention to the dimensions when considering installation requirements.

Mount the Dual Blu-ray DVD player with a minimum of four #10-32 screws—two opposing outer holes per side. The following figures show the mounting option dimensions for this unit.

- Side mount—left and right (six screws; three screws per side)
- Bottom-surface mount (minimum of four screws)



Do not exceed the .33" mounting screw depth for mounting orientations or damage to the player will occur!

(Dimensions are in inches)

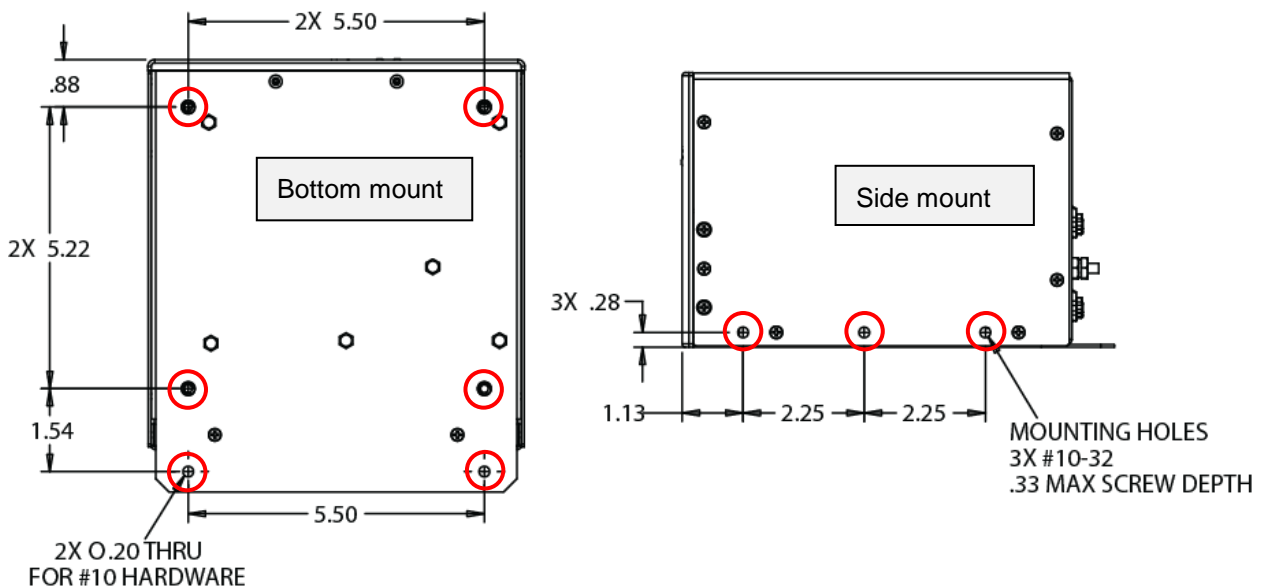


Figure 4 Dimensions for bottom and side mounting



### 3.1. Cooling and Ventilation

Do not block the rear vent holes. Maintain a minimum clearance of ½ inch to the front and rear of the player for ventilation, and provide a minimum of 6.6 square inches of venting if you are mounting the unit in a cabinet.

### 3.2. Electrical Requirements

- Nominal voltage: 28VDC. Unit can operate from a voltage range of 18-32VDC.
- Max Power Consumption: 25.5 W (per disc drive)
- A grounding post connected to chassis ground is accessible for a positive ground connection.



Do not plug or unplug the unit's power connectors while power is applied.

## 4. FRONT PANEL TOUCH CONTROLS

The Dual Blu-ray DVD player has touch-sense buttons on the front panel to control all operating functions.



Figure 5 Dual Blu-ray DVD player's front panel controls













## 4.1. Button Controls

Button presses are acknowledged by changes in light intensity. Two states for the front panel buttons are: active and inactive. These states are distinguished by the intensity of backlight illumination--either at normal or high intensity levels.

The front panel times out to an inactive state after 60 seconds with no activity (indicated by dimming of the lights). The first button press, when in this condition, will reactivate the panel (lights brighten to normal) and not issue a command.

When the front panel is in the active state, all of the buttons are backlit. The panel is in an active state upon power-up and for 60 seconds following any button presses. After 60 seconds, the panel goes into an inactive state and only a limited number of buttons will be backlit. From an inactive state, touch a button once to “wake up” or activate the front panel, and again to perform a function.

Table 1 Dual Blu-ray player's button control functions

Button	Details
<b>Disc Drive Select 1 &amp; 2</b>	Pressing a drive activates the drive selected for control.
<b>Eject</b> 	Press once to eject a disc. Allow the drive time to eject the disc before pressing the Eject button again.
<b>Power</b> 	Turns power to the Dual Blu-ray player on and off. You must press and hold this button for at least four seconds before the unit will power off. Amber color – unit powered off. Green – unit powered on.
	Arrow keys to navigate up, down, left and right in the menus.
<b>Enter</b>	Select menu options.
<b>Menu</b> 	Navigates through the special play features on Blu-ray DVDs. <b>Note:</b> The Menu button functions only with certain Blu-ray discs.
<b>Return/Back</b> 	Returns to the previous menu option.
<b>Previous</b> 	Goes back to the previous chapter on a disc.
<b>Stop</b> 	Press this control to stop the movie. When pressed once, the  button will resume the movie from where it was stopped. (Some discs do not allow the resume feature.)  If the  button is pressed twice, pressing the  button again will start the movie back at the beginning.
<b>Play/Pause/Resume</b> 	Controls the pause, play, or resume disc play.
<b>Next</b> 	Skips to the next chapter on a disc.

## 4.2. USB Service Inputs

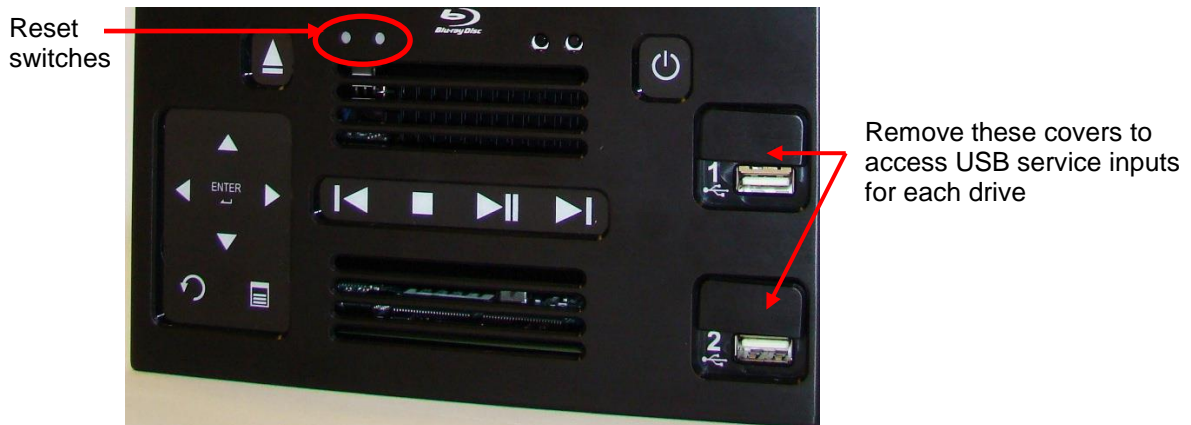


Figure 6 USB service inputs

Use the USB service inputs 1 & 2 to update the firmware on each Dual Blu-ray disc drive. The service inputs are located behind a removable cover just above the USB external media inputs on the front face of the player.

Firmware instructs the drive how to operate per the disc's format. Much like a computer, Dual Blu-ray DVD players occasionally need an update to support the latest disc features.

Rosen provides firmware updates to help guarantee high-quality performance of your Dual Blu-ray DVD player. There are several ways to view the firmware installed on the unit:

- Issue an About command from the RS-232 or RS-485
- Using the Universal Remote Control, press Info
- Using the unit's front panel press the following key sequence:  
▲, ▼, ►, ◀, ▲, ▼, ►, ◀, ◀, ◀, ◀

When necessary, firmware updates and update instructions are available on the Rosen Aviation web site at [www.rosenaviation.com](http://www.rosenaviation.com).

### 4.2.1. Reset

There is a reset button for each drive located on the front panel, as shown in [Figure 6](#).

### 4.2.2. Ethernet

An Ethernet connector on the rear panel provides BD-Live functionality and requires an airborne Internet communication system.

## 5. INPUTS AND OUTPUTS

Inputs that control the Dual Blu-ray DVD player can come from the unit's front panel, a Universal IR Remote, or via a cabin management system using RS-232 or RS-485.

### 5.1. Control Inputs / Outputs

- RS-485 (see Section [5.4.2](#), [RS-485](#), on page [15](#))
- RS-232 (see Section [5.4.3](#), [RS-232](#), on page [16](#))
- IR Remote Input (see Section [5.4.1](#), [IR Control](#), on page [14](#))
- Cabin Brief / Pause Input

Some models have a Cabin Brief / Pause option, which can be controlled by a switch or by the cabin entertainment system. The Dual Blu-ray DVD player stays in pause while the cabin briefing pause input is held low.

- Status Output

Status output is normally open. The status output connects to ground when the player is in error mode, such as over-temperature.

### 5.2. Audio/Video Outputs

The following outputs listed are per each drive on the unit.

- Two scrambled 3G HD-SDI outputs  
To display the SDI video from the Dual Blu-ray player requires a Rosen monitor or Audio Video Distribution System capable of processing the signal.
- Two CVBS (Composite) Out  
1V Vpp, into 75 ohms. NTSC or PAL.
- One Component (YPbPr) Out  
Y: 1 Vpp into 75 ohms, YPbPr: 0.7 Vpp into 75 ohms.
- DVI/HDMI Out  
TMDS with HDCP, Digital video, and up to 7.1 digital audio.
- Stereo analog Audio Out (fixed volume)  
2V RMS, adjustable volume. (Fixed volume adjustment may cause brief video glitch while command is set.)
- 7.1 Analog Audio Out (volume controlled)  
2V RMS, user adjustable volume. Audio delay is adjustable for lip-sync.
- SPDIF Digital Audio Out  
Coaxial

- Other Audio Options
  - For a 2.1 or 2-channel audio system, use left- and right-front speakers, and a bass subwoofer.
  - For a 5.1 or 5-channel audio system, use left- and right-front speakers, center speaker, left- and right-surround speakers, and a bass subwoofer variation.

### 5.3. Video Output

Video output on the Dual Blu-ray depends on the disc type and the video connections. Both digital (DVI/HDMI) and Component video outputs are affected.

#### Analog Sunset\*

As a part of Rosen’s ongoing efforts to comply with all laws, regulations, and license agreements, Rosen’s Blu-Ray players will no longer support Analog outputs, which include Composite and Component outputs, while playing Blu-Ray movies. The Composite and Component outputs will function, however, while playing a standard DVD.

**➡ NOTICE** SDI will not output if HDMI is plugged in.

The following tables list the formats output by the different video combinations.

Table 2 Blu-ray discs output these formats with 3G HD-SDI video connected

Display Resolution Setting	3G HD-SDI	Component	Composite
480i/576i	480i/576i	Not Supported*	Not Supported*
720p	720p60/50	Not Supported*	Not Supported*
1080i	1080i30/25	Not Supported*	Not Supported*
1080p	1080p60/50	Not Supported*	Not Supported*
1080p film	1080p24/25	Not Supported*	Not Supported*
HDMI Auto	1080i30/25	Not Supported*	Not Supported*

Table3 Blu-ray discs output these formats with DVI/HDMI video connected

Display Resolution Setting	HDMI	Component	Composite
480i/576i	480i/576i	Not Supported*	Not Supported*
720p	720p60/50	Not Supported*	Not Supported*
1080i	1080i30/25	Not Supported*	Not Supported*
1080p	1080p60/50	Not Supported*	Not Supported*
1080p film	1080p24/25	Not Supported*	Not Supported*
HDMI Auto	Auto	Not Supported*	Not Supported*

Table 4 Standard DVDs output these formats with 3G HD-SDI video connected

Display Resolution Setting	3G HD-SDI	Component	Composite
480i/576i	480i/576i	480i/576i	480i/576i
720p	720p60/50	480i/576i	480i/576i
1080i	1080i30/25	480i/576i	480i/576i
1080p	1080p60/50	480i/576i	480i/576i
1080p film	1080p24/25	480i/576i	480i/576i
HDMI Auto	1080i30/25	480i/576i	480i/576i

Table 5 Standard DVDs output these formats with DVI/HDMI video connected

Display Resolution Setting	HDMI	Component	Composite
480i/576i	480i/576i	480i/576i	480i/576i
720p	720p60/50	480i/576i	480i/576i
1080i	1080i30/25	480i/576i	480i/576i
1080p	1080p60/50	480i/576i	480i/576i
1080p film	1080p24/25	480i/576i	480i/576i
HDMI Auto	1080i30/25	480i/576i	480i/576i

## 5.4. Dual Blu-ray DVD Control Setup

Individual control for up to eight Rosen Dual Blu-ray DVD players is possible. Control options include IR, RS-485, and RS-232.

### 5.4.1. IR Control

The Dual Blu-ray DVD player can be controlled with Rosen Aviation’s pre-programmed, universal remote control. If you have questions, please contact Technical Support for details.

Rosen Dual Blu-ray DVD players have eight optional network addresses (1-8). For aftermarket customers, the default address for player drive #1 is 1; the default address for player drive #2 is 2.

For OEM application 0602-205, the address selection is set per the discrete ID controls.

Complete the following to change the default network address.

1. Supply power to the Rosen Dual Blu-ray DVD player and ensure that there is no disc inserted.
2. The sequences shown below define how to establish the eight possible network addresses. Press front panel buttons to complete the sequences.  
**Note:** Perform this sequence only when there is no disc in the player!

Table 6 Key sequences for setting RS-485 network addresses

RS-485 Address	Corresponding Remote Control Source	Required Key Sequence
20	Dual Blu-ray 1	Λ, V, <, >, Λ, V, <, >, <, <, <
21	Dual Blu-ray 2	Λ, V, <, >, Λ, V, <, >, <, <, ►
22	Dual Blu-ray 3	Λ, V, <, >, Λ, V, <, >, <, <, ■
23	Dual Blu-ray 4	Λ, V, <, >, Λ, V, <, >, <, <, Menu
24	Dual Blu-ray 5	Λ, V, <, >, Λ, V, <, >, <, <,  ◀
25	Dual Blu-ray 6	Λ, V, <, >, Λ, V, <, >, <, <, Λ
26	Dual Blu-ray 7	Λ, V, <, >, Λ, V, <, >, <, <, V
27	Dual Blu-ray 8	Λ, V, <, >, Λ, V, <, >, <, <, ►

**Note:** The power status LED blinks at the end of the sequence to verify the setting. For example, if you enter the network address 22 sequence, the power status LED will blink at completion of sequence to verify the setting.

**⇒ NOTICE**

If you choose to restore defaults, the network address will automatically reset to 20. Restore defaults must be done with no disc in the player.

5.4.2. RS-485

Rosen’s Dual Blu-ray DVD player can be controlled with RS-485. For a copy of the *RS485 Network Message Definitions* document (P/N **9002933**), please contact Rosen Aviation Technical Support at 541.342.3802.

**⇒ NOTICE**

The Dual Blu-ray DVD player is set to address 20 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.

**RS485 Network Address Selection:**

For the purposes of controlling multiple Dual Blu-ray units from a single cabin management system or button panel, each device must be assigned a unique address on the RS-485 network. See the network address table shown above.

### 5.4.3. RS-232

Rosen's Dual Blu-ray DVD players can also be controlled with RS-232. For a copy of the, *RS-232 External Controller Message Formats (P/N 9002934)*, please contact Rosen Aviation Technical Support at 541.342.3802.

### 5.4.4. Communication Protocol

- 9600 baud
- 8 data bits
- 1 stop bit
- no parity

### 5.4.5. Restore Defaults

Full Factory Reset sets every setting back as it shipped from the factory. There are four ways to perform a Full Factory Reset to restore the defaults:

1. Using the following front panel key sequence:  
▲, ▼, ◀, ▶, ▲, ▼, ◀, ▶, ▼, ▼, ▼
2. With an IR remote through the OSD Main Menu, select **Settings→System→Restore Factory Defaults**.
3. RS-485 Full Factory Reset command using serial messaging.
4. RS-232 Full Factory Reset command using serial messaging.



## 5.5. Changing DVD and Blu-ray Regions

The default DVD region code is set to Region 1, and the Blu-ray region is set to A. Although the player allows unlimited Blu-ray region changes, there are only four alternate DVD region changes available. Whichever DVD region you select on the fourth change, you can only play discs from the last region set. You cannot change DVD regions again.

If you insert a DVD from an invalid region into the drive, you will see the following screen.



Figure 7 Invalid DVD region notification

1. To change the drive's region code, press **ENTER** for Ok and follow the on-screen instructions; otherwise, press any key to close the screen and select a different DVD.
2. Press **ENTER** when you see the next About screen, as shown below.



Figure 8 Instructions to change a DVD region

3. Re-insert the DVD to play and press **ENTER** for Ok.

The unit allows an unlimited number of Blu-ray region changes (A, B, or C) without affecting the DVD region or remaining number of region changes on the player. To change the Blu-ray region, use a universal remote control or an RS-232 or RS-485 controller. After you change Blu-ray regions with the remote, a notice screen, similar to the one below, will display.

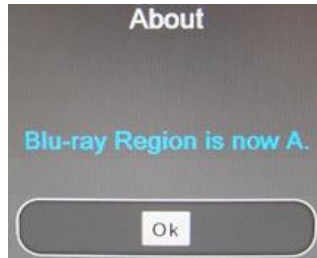


Figure 9 Message after changing a Blu-ray region

## 6. INITIAL POWER UP

Make sure that power is turned off and connect the following harnesses to the Blu-ray DVD player connectors:

1. Ensure a secure ground connection on the Blu-ray DVD player's #10-32 grounding stud.
2. Connect 28VDC power to P2/P6.
3. Connect the video to P3/P7 and/or to P4/P8.
4. Adjust the fixed-level audio.
5. Apply power and wait for the LED lights to become active and the OSD main menu to display on a cabin monitor.



---

Do not plug or unplug the video connector while power is applied.  
When cycling power, leave unit off for 20 seconds before restoring power.

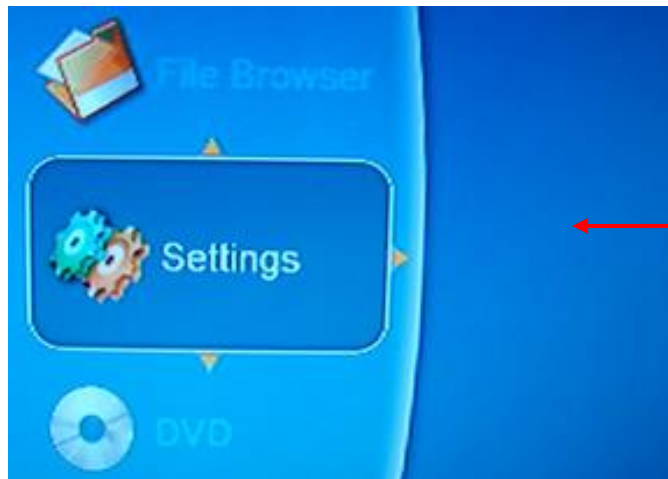
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## 7. OSD MAIN MENU

The Dual Blu-ray's OSD automatically comes on at power up if there is no disc in the drive. Use the ▲, ▼, ◀, ▶, ENTER, and return/back buttons from either the front panel, internal IR, external IR, RS-232, or RS-485. The menus require a line of sight to a display in order to view the OSD options.

The menu structure is arranged like a wheel with submenus arranged in the outer rings. The main menu of the Blu-ray OSD contains the system's Settings Menu, as shown below.

For the Media Share Dual Blu-ray DVD players, when either an external or an internal drive is connected to the unit, the File Browser is part of the menu OSD.



The OSD Main Menu will also open if you press the ■ (Stop) button while a movie is playing

Figure 10 OSD Main Menu screen

Press the ▲ button to navigate through the options clockwise, and press ▼ to rotate counter-clockwise. Press the ▶◀ buttons to navigate between the submenus, and press ENTER to choose a selection.

The Settings menu selection may be displayed or hidden by default, depending on the model number. To show or hide the Settings menu option, enter the following key sequence from the Main Menu using the front panel and pausing between each key press to allow each key to light:

▲, ▼, ◀, ▶, ▲, ▼, ◀, ▶, ◀, ▶, ◀. Repeat to toggle Settings off or on.

## 7.1. Settings Menu

When you press ENTER to select Settings, the following Settings menu options are displayed in the next ring with the System option active.

The Settings Menu contains the following selections:



Figure 11 Settings Menu option

### Settings Menu

- System
- Network
- Info
- Display
- Audio
- Speaker
- Language

### 7.1.1. System Submenu

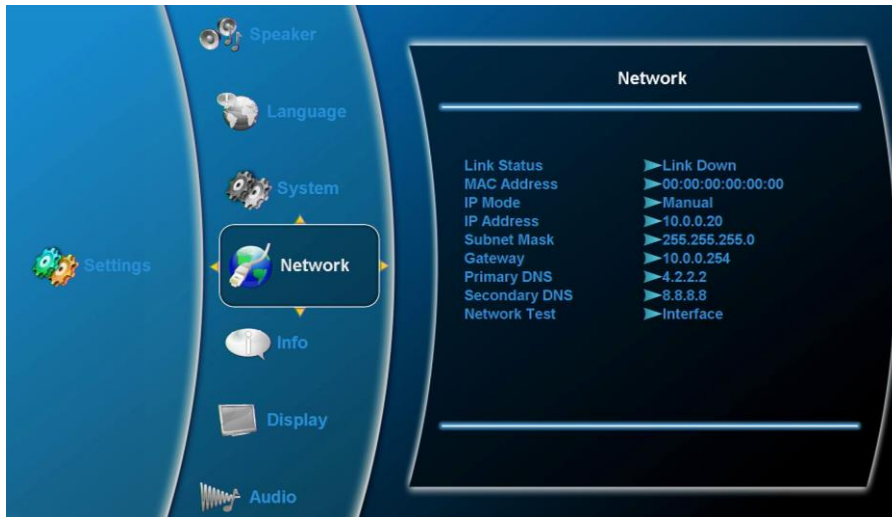
When the System option is selected, a pop-up menu contains the following options:

Option	How it Works
<b>Optical Disc Auto Play</b>	On/Off settings for disc play. When On, the unit automatically plays an optical disc when it is inserted. When Off, the user must select Play to start playing a movie after inserting a disc.
<b>Network Access</b>	Determines the network access through the Ethernet port. Settings: Limit Access, Always Allow Access, or Prohibit Access. <b>Note:</b> When <b>Prohibit Access</b> is active, BD-Live content will not be accessible when playing Blu-ray discs.
<b>BD-Live Storage</b>	Displays the available free space for BD-Live storage. The maximum value for BD-Live Storage is 400.3 MB.
<b>Erase BD Live Storage</b>	Erases disc storage on the Dual Blu-ray player. Choose Ok or Cancel at the prompt. <ul style="list-style-type: none"> <li>● <b>Ok:</b> Erases the BD-Live Storage and closes the pop-up window.</li> <li>● <b>Cancel:</b> Closes the pop-up window without erasing the disc storage.</li> </ul>

<b>CEC Support</b>	Consumer Electronics Control (CEC) supports status messages for the device. This feature is currently not implemented.
<b>Restore Factory Defaults</b>	Restores the unit to the factory default settings. Choose Ok or Cancel at the prompt. <ul style="list-style-type: none"> <li>● <b>Ok:</b> Restores the factory defaults and closes the pop-up window.</li> <li>● <b>Cancel:</b> Closes the pop-up window without resetting the factory defaults.</li> </ul> <b>Note:</b> Factory defaults are different to each model and depend on whether the unit is connected to an HDMI monitor.
<b>Activate Device (or De-activate Device if device is activated)</b>	This feature is reserved for future use.

7.1.2. Network Submenu

When you select the Network, the Dual Blu-ray player initiates a network test and displays the test results in a summary window. All fields are read-only unless you change the IP Mode options. Select **Settings**→**Network** and then press **ENTER** to open the window, as shown below.



- Network Test Summary**
- Link Status
  - MAC Address
  - IP Mode submenu
  - IP Address
  - Subnet Mask
  - Gateway
  - Primary DNS
  - Secondary DNS
  - Network Test

Figure 12 Network submenu showing the test summary

7.1.2.1. IP Mode Submenu

IP Mode enables you to set values manually for the Network options. Use the arrow buttons and the Enter command to select the following IP Mode options:

Option	How it Works
Off	Disables Ethernet communications.
Manual	Enables you to set values manually for the IP Address, Subnet Mask, Gateway, Primary DNS, and Secondary DNS fields.
Dynamic	Uses DHCP to acquire an IP Address, Subnet Mask, Gateway, Primary DNS, and Secondary DNS fields.

7.1.3. Info Submenu

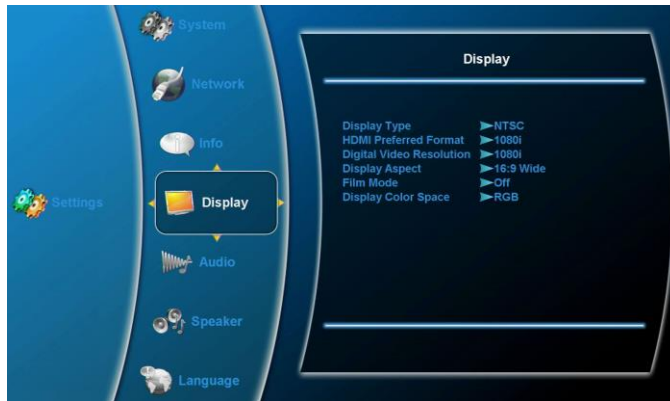
The Info option displays a read-only window that shows the operating information about the Dual Blu-ray DVD player. Select **Settings**→**Info** and then press **ENTER** to open the window, as shown below.



Figure 13 Info submenu

### 7.1.4. Display Submenu

Use the Display submenu options to set the attributes for the video output. Select **Settings→Display** and then press **ENTER** to open the window, as shown below.



#### Display Submenu

- Display Type
- HDMI Preferred Format
- Digital Video Resolution
- Display Aspect
- Film Mode
- Display Color Space

Figure 14 Display submenu with video attributes

#### 7.1.4.1. Display Type

Use the Display Type options to set the format of the video output. Select **Settings→Display→Display Type**, and use the arrow buttons and then press **ENTER** to select either option.

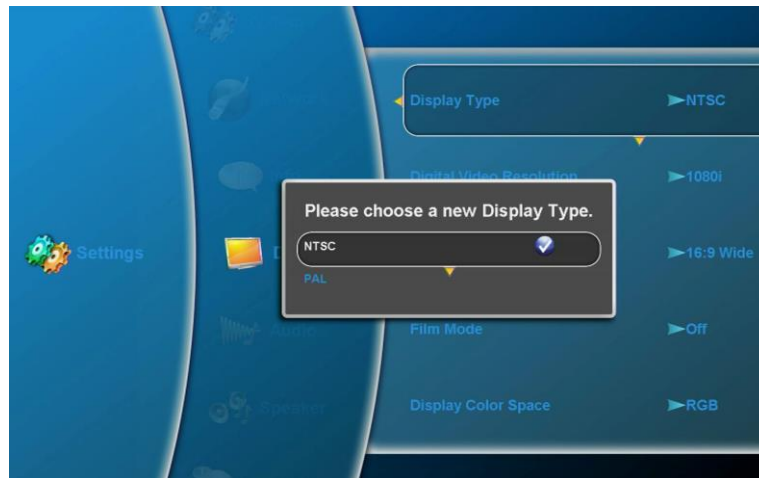


Figure 15 Display Type option for setting video format

Press **Enter** to open the Display Type pop-up menu with the following options:

Option	How it Works
<b>NTSC</b>	Sets the composite video output be NTSC format.
<b>PAL</b>	Sets the composite video output to PAL format when the Digital Video Resolution is set to a value other than Auto. This setting will revert to NTSC if the HDMI preferred format is set to Auto.

**Note:** Display Type will default to NTSC format if the Digital Video Resolution (see Section [7.1.4.3](#)) is set to Auto.

#### 7.1.4.2. HDMI Preferred Format

The HDMI Preferred Format is a read-only field that displays the resolution of the monitor connected via the DVI/HDMI connector. Select **Settings→Display Type→HDMI Preferred Format**, and then press **Enter** to view the field.

#### 7.1.4.3. Digital Video Resolution

The Digital Video Resolution option enables you to select display video resolutions as outlined below. A pop-up menu displays available options.

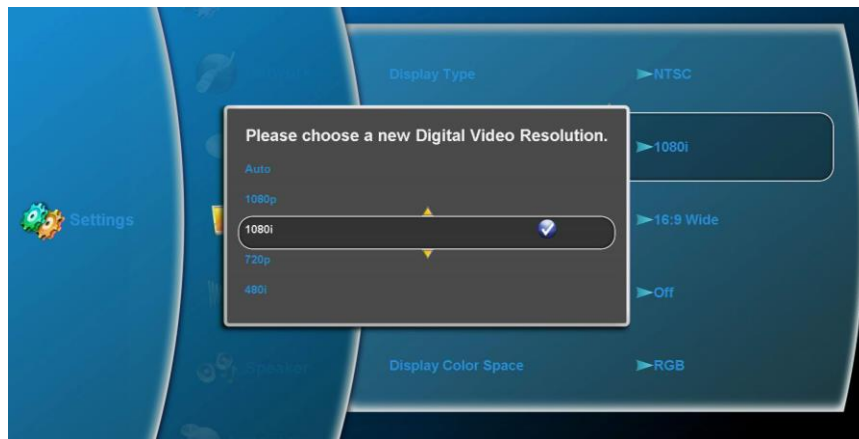


Figure 16 Digital Video Resolution options

Use arrow buttons and the Enter command to select the desired Digital Video Resolution.

If the Dual Blu-ray DVD player is connected to an HDMI monitor, the OSD will retain the **Auto** setting under Digital Video Resolution. If HDMI is not connected, the option will revert to 1080i.

For related information about [Audio/Video Outputs](#), see Section [5.2](#) on page [12](#).



7.1.4.4. Display Aspect

This option is restricted to the capability of the disc being played. Use Display Aspect to adjust the picture expansion to match the encoding of the source image most closely. Select **Settings**→**Display**→**Display Aspect** and then press **ENTER** to open the submenu, as shown below.

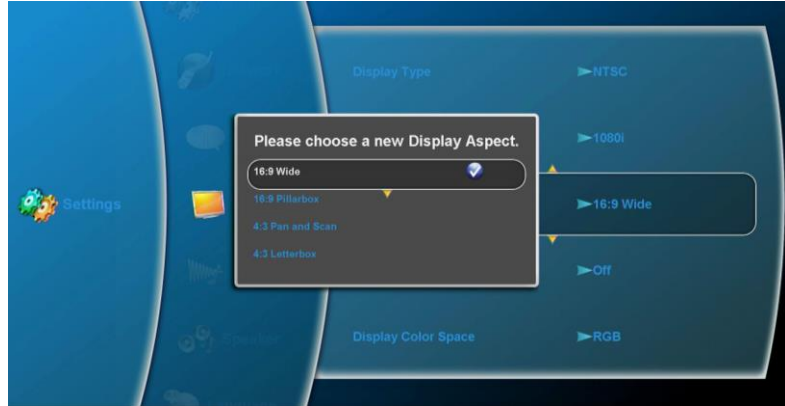


Figure 17 Display Aspect ratio options

Use the arrow buttons and then press **ENTER** to choose an aspect ratio of the digital video output.

Option	How it Works
<b>16:9 Wide</b>	For widescreen displays. Stretches 4:3 images horizontally to eliminate black bars on the left and right.
<b>16:9 Pillarbox</b>	For widescreen displays, but attempts to correctly display the 4:3 image ratio.
<b>4:3 Pan and Scan</b>	For non-widescreen displays, but attempts to eliminate black bars on 16:9 images by cropping left and right portions of the image. Some black bars will still be present on 2.35:1 images. Use this aspect ratio with 480i/576i or 480p/576p video.
<b>4:3 Letterbox</b>	For non-widescreen displays. Shows 16:9 images with black bars on top and bottom. Use this aspect ratio with 480i/576i or 480p/576p video.

7.1.4.5. Film Mode

Film Mode sets the frames-per-second rate for video output. Select **Settings→Display→Film Mode** and then press **ENTER** to open the window, as shown below.



Figure 18 Film Mode options

Option	How it Works
On	Outputs video at 24 frames per second.
Off	Outputs video at 60 frames per second.

**Note:** Not all discs are capable of allowing this feature.

7.1.4.6. Display Color Space

Use Display Color Space to select the color space of the DVI/HDMI digital output signal. Select **Settings→Display→Display Color Space** and then press **ENTER** to open a menu with the following options, as shown below.

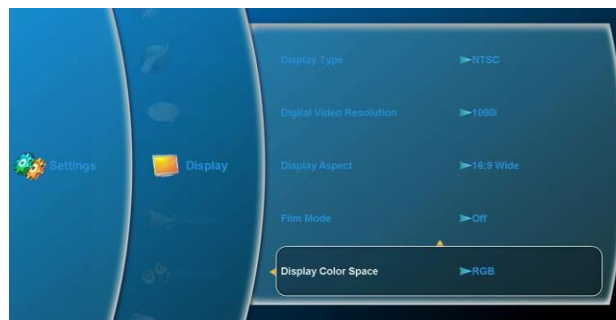


Figure 19 Display Color Space options

Use the arrow buttons and then press **ENTER** to select the different Display Color Space options from individual pop-up windows.

**Note:** Many displays do not recognize the xvYCC and YCC settings, and display purple.

Option	How it Works
<b>RGB</b>	Changes the color space of the DVI/HDMI digital output to RGB.
<b>YCC</b>	Changes the color space of the DVI/HDMI digital output to YCC.
<b>xvYCC</b>	Changes the color space of the DVI/HDMI digital output to xvYCC.

Be sure to connect the Dual Blu-ray DVD player to an HDMI source before setting the Display Color Space; otherwise, the option will revert to RGB when exiting the Color Space option.

### 7.1.5. Audio

Use the Audio submenu options to select the format of the digital audio output signals. Select **Settings**→**Audio** and then press **ENTER** to open a menu with the following options, (see table on the following page).



Figure 20 Audio options for digital output

Use the arrow buttons and the Enter command to select the different Audio options from individual pop-up windows.

Option	How it Works
<b>PCM Down sampling</b>	Opens a pop-up submenu to select a PCM sampling rate: <ul style="list-style-type: none"> <li>● 48 KHz</li> <li>● 96 KHz</li> <li>● Off. Off allows various sampling rates, depending on the disc.</li> </ul>
<b>Digital Output</b>	<p><b>PCM Stereo:</b> Sends a 2-channel audio signal via the unit's stereo audio outputs.</p> <p><b>PCM 5.1:</b> Sends a PCM audio signal of up to 5.1 channels via the DVI/HDMI and SPDIF output.</p> <p><b>PCM 7.1:</b> Sends a PCM audio signal of up to 7.1 channels via the DVI/HDMI and SPDIF output.</p> <p><b>Bitstream HD:</b> Outputs DTS-MA bitstreams via the DVI/HDMI and SPDIF output. If the Blu-ray player is not connected to an HDMI monitor when you select this option, it will revert to the PCM Stereo option upon closing the Audio submenu.</p> <p><b>Bitstream Legacy:</b> Sends DTS or Dolby Digital bitstream via the DVI/HDMI and SPDIF output. If the Blu-ray player is not connected to an HDMI monitor when you select this option, it will revert to the PCM Stereo option upon closing the Audio submenu.</p> <p><b>Bitstream Mixed:</b> Sends a DTS audio stream over DVI/HDMI and SPDIF outputs. If the Blu-ray player is not connected to an HDMI monitor when you select this option, it will revert to the PCM Stereo option upon closing the Audio submenu.</p>
<b>Dynamic Range</b>	Opens a pop-up submenu to select the Dynamic Range setting: <ul style="list-style-type: none"> <li>● On: causes player to apply appropriate compression to make low-level content more intelligible and prevent dramatic passages from getting too loud.</li> <li>● Off: plays back the content with the standard dynamic range.</li> </ul>

Be sure to connect the Dual Blu-ray DVD player to an HDMI monitor before setting any of the Bitstream options; otherwise, the option will revert to the PCM Stereo option.



Using Bitstream Mixed overrides all other speaker settings.

7.1.6. Speaker (7.1 Multi-channel analog audio only)

Use the Speaker options to connect and configure cabin speakers to the Dual Blu-ray DVD player. Select **Settings**→**Speaker** and then press **ENTER** to open a menu with the following options, as shown below.



Figure 21 Speaker options for analog audio

Use the arrow buttons and the Enter command to select the different Speaker options from individual pop-up windows.

Option	How it Works
<b>Front L</b>	Select the size of the front speakers: <b>Large</b> or <b>Small</b> . When either front speaker is set, the OSD will automatically set the other front speaker to the same value. <ul style="list-style-type: none"> <li>● Off: Turns off the left front speaker.</li> </ul>
<b>Center</b>	Enable and select the size of the center speaker: <b>Large</b> or <b>Small</b> . Large is only available when Front L and Front R set to Large. <ul style="list-style-type: none"> <li>● Off: Turns off the center speaker.</li> </ul>
<b>Front R</b>	Select the size of the front speakers: <b>Large</b> or <b>Small</b> . When either front speaker is set, the OSD will automatically set the other front speaker to the same value. <ul style="list-style-type: none"> <li>● Off: Turns off the right front speaker.</li> </ul>
<b>Surround L</b>	Enable and select the size of the surround sound speakers: <b>Large</b> or <b>Small</b> . Large is only available when Front L and Front R are set to Large. When either surround speaker is set, the OSD will automatically set the other surround speaker to the same value. <ul style="list-style-type: none"> <li>● Off: Turns off the left surround speaker.</li> </ul>

<b>Rear L</b>	Select the size of the rear speakers: <b>Large</b> or <b>Small</b> . When either rear speaker is set, the OSD will automatically set the other rear speaker to the same value. <ul style="list-style-type: none"> <li>● Off: Turns off the left rear speaker.</li> </ul>
<b>Rear R</b>	Select the size of the rear speakers: <b>Large</b> or <b>Small</b> . When either rear speaker is set, the OSD will automatically set the other rear speaker to the same value. <ul style="list-style-type: none"> <li>● Off: Turns off the right rear speaker.</li> </ul>
<b>Surround R</b>	Enable and select the size of the surround sound speakers: <b>Large</b> or <b>Small</b> . Large is only available when Front L and Front R are set to Large. When either surround speaker is set, the OSD will automatically set the other surround speaker to the same value. <ul style="list-style-type: none"> <li>● Off: Turns off the right surround speaker.</li> </ul>
<b>Subwoofer</b>	Sets the bass crossover frequency for the subwoofer's output. <ul style="list-style-type: none"> <li>● Off: Disables the subwoofer output.</li> <li>● 80 Hz:</li> <li>● 100 Hz</li> <li>● 120 Hz</li> </ul>
<b>Test</b>	<ul style="list-style-type: none"> <li>● Initiates the speaker testing. Once you select the test desired, the unit will send a tone signal to a single speaker, then switch to the next speaker, and so on, until all speakers have been tested.</li> </ul>

7.1.7. Language

Use the Language options to select the preferred audio language to play and other related features, if supported by the disc. Select **Settings**→**Language** and then press **ENTER** to open a menu with the following options, as shown below.



Figure 22 Language options

Use the arrow buttons and the Enter command to select the different Language options from individual pop-up windows.

Option	How it Works
<b>OSD</b>	Displays the Dual-Blu-ray player's OSD text in the selected language.
<b>Menu</b>	Displays Menu text in the selected language, if the optical media played supports the selected language. <b>Note:</b> Depending on the disc, the menu text may have to be set via the BR/DVD menus.
<b>Audio</b>	Plays the Audio in the selected language, if the optical media played supports the selected language. <b>Note:</b> Depending on the disc, the audio may have to be set via the BR/DVD menu.
<b>Subtitle</b>	Displays subtitles in the selected language, if the optical media played supports the selected language. Select a language or choose <b>None</b> to turn off subtitles.

This setting's usability is disc-dependent and sometimes will not automatically function according to setup. In such cases, enter the disc's setting menu to choose the option.

- Auto/None
- English
- French
- Spanish
- Italian
- German
- Portuguese
- Chinese
- Japanese

## 8. MEDIA SHARE

These units use the File Browser option on the main menu to access stored data on the internal media share drives or from a USB thumb stick, and perform simple file management tasks. You can download media from USB thumb stick drives or copy from optical disks.

Supported media files include: WMV9, WMA, MP3, JPG and PNG.

Formatting of the thumb drive must be FAT32 or NTFS.

**Note:** When using NTFS-formatted USB thumb drives, files cannot be copied to the USB thumb drive, but only copied off of the USB thumb drive.

### 8.1. File Browser

The main menu of the Blu-ray OSD contains the system's **Settings** Menu, as shown below, and when either an external or an internal drive is connected to the unit, the **File Browser** is part of the menu OSD. To show or hide the Settings menu, enter the following key sequence from the Main Menu using the front panel and pausing between each key press to allow each key to light: **▲, ▼, ◀, ▶, ▲, ▼, ◀, ▶, ◀, ▶, ◀**. Repeat to toggle Settings off or on.

When you insert an external USB drive into either Dual Blu-ray USB internal storage port, the OSD displays an icon in the upper-right corner of the monitor to show a successful connection.

The successful connection and File Browser submenu displayed is only relevant for the drive in which the thumb drive is inserted.



The media icon displays after you connect an external drive

Figure 23 Screen icon showing the external drive connected

Press the **▶** button to expand the File Browser submenu and access the internal and external drives, as shown below.



Metadata about the selected file

Figure 24 Contents of the File Browser for an external drive

**Note:** With the larger font, the File Browser can only display two lines of text for file and folder names; longer file names will be truncated.



When an optical disc with media files is inserted into a Blu-ray DVD drive, the contents display in the File Browser. Select the Internal Drive and the OSD will display files and folders stored on the internal drive.

When a USB drive is inserted into the unit, select the External Drive and the OSD will display the contents of that drive.

Press the arrow buttons and then press Enter to select a video or music file. A submenu will display any metadata information associated with that file.

Selecting the right arrow when the media file is highlighted will bring up the action menu.

### 8.1.1. Action Menu

When you select a .WMV video file or an .MP3 / .WMA music file, and press ►, the Action submenu opens with the following options, as shown below.



Figure 25 Action menu options

Press the arrow buttons to select an option and then **Enter** to activate it.

Option	How it Works
<b>Play</b>	Starts the playback and displays the playback status window.
<b>Copy or Copy Folder</b>	Adds the copied file or folder to the copy queue and highlights the filename/folder in the File Browser.
<b>Delete or Delete Folder</b>	Deletes a file or folder from internal or external storage after the following prompt: Are you sure you want to delete the media item? Yes / No <b>Yes:</b> Deletes the item. <b>No:</b> Cancels the action and closes the pop-up window.
<b>Cancel</b>	Cancels any actions and closes the pop-up window.
<b>Paste</b>	Places the copied file or folder in the copy queue into the current directory.

### 8.1.2. Playing All Files on a Drive

The Play Files option plays all files in the top-level folder that is active.

1. Press the **Disc 1 or 2** icons to activate the drive where the files are stored.
2. Press the arrow keys to select the **File Browser** and then the folder that you want to start playing.
3. Press the arrow keys to select **Play Files**. A pop-up window will display the following options:
  - Play All Music
  - Play All Videos
  - Play All Pictures
  - Cancel
4. Select an option and then press **ENTER**.

When you choose a Play All option, the unit will create a playlist of all files in the current folder and similar files in any subfolder and begin playing the first file in the playlist.

## 8.2. About Page

To view operating information about the Dual Blu-ray DVD player, issue an About command from the RS-232 or RS-485, or open the Universal Remote's home page, select the desired drive and press the **INFO** key. The About screen will display, as shown below.



Figure 26 About shows the operating information for a specific drive

The About page contains the following fields:

- Rosen I/O Firmware Part Number and Revision
- Video Board Firmware Part Number and Version
- Audio (either Multi or Stereo)
- Volume Level (either Master or Stereo)

- Player Location Top/Bottom drive
- RS485 Address & Control designation (485 follows the player location)
- Media Option (specifies whether or not the unit is a media share unit)
- Temperature (displays current temperature readout (Fahrenheit) on the appropriate player's register)
- Loader Region (L = Current region setting for selected loader)
- DVD Region (D = Region setting of the player)
- Blu-ray Region (B = Region setting of the player)

## 9. TECHNICAL REFERENCES AND SUPPORT



Check the [Rosen Aviation](http://www.rosenaviation.com) website to ensure that you are working with the most current revision of technical documentation.

Table 7 Technical references

Product	Part Number	Location
Universal Remote Control	Contact Rosen Sales for part number availability	
<i>RS-485 Network Message Definitions</i>	<b>9002933</b>	Contact Rosen Technical Support
<i>RS-232 External Controller Message Formats</i>	<b>9002934</b>	Contact Rosen Technical Support
Outline & Installation Drawings	<b>0602-20x</b>	<a href="http://www.rosenaviation.com">www.rosenaviation.com</a>

### 9.1. Troubleshooting

If the Dual Blu-ray DVD player does not function properly, refer to the following troubleshooting table for symptoms and possible solutions before contacting Rosen Technical Support.

**Note:** 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.

Table 8 Troubleshooting tips

Problem	Possible Solutions
USB drive not recognized	Verify USB drive is formatted for either FAT32 or NTFS.
Unable to control via RS-485	Verify RS-485 address of the Dual Blu-ray player has been set correctly per section <a href="#">5.4</a> .
No SDI Video output	Verify nothing connected to the DVI/HDMI connector on the back of the Dual Blu-ray unit.
No metadata displayed for MP3/WMA files	Not all MP3/WMA files are encoded with metadata. Verify the file in question does have encoded metadata.
Analog audio too low	Adjust the volume level with an Rosen universal remote control.

Problem	Possible Solutions
Disc not recognized	Press the drive eject button manually. Access to the drive eject button can be accessed with a small diameter wire (paper clip) using the hole just below each drive slot.

9.1.1. Manually Ejecting Disc Drive

If a disk is not recognized by the player and will not eject, small holes in the bezel give access to the disc drive eject buttons, see Figure 27. To eject an unrecognized disc use a small diameter wire (paper clip) to press the eject button on the drive that will not eject. This must be done right after the Dual Blu-ray DVD player is powered on. The drive eject button will not work once the player has fully started up.

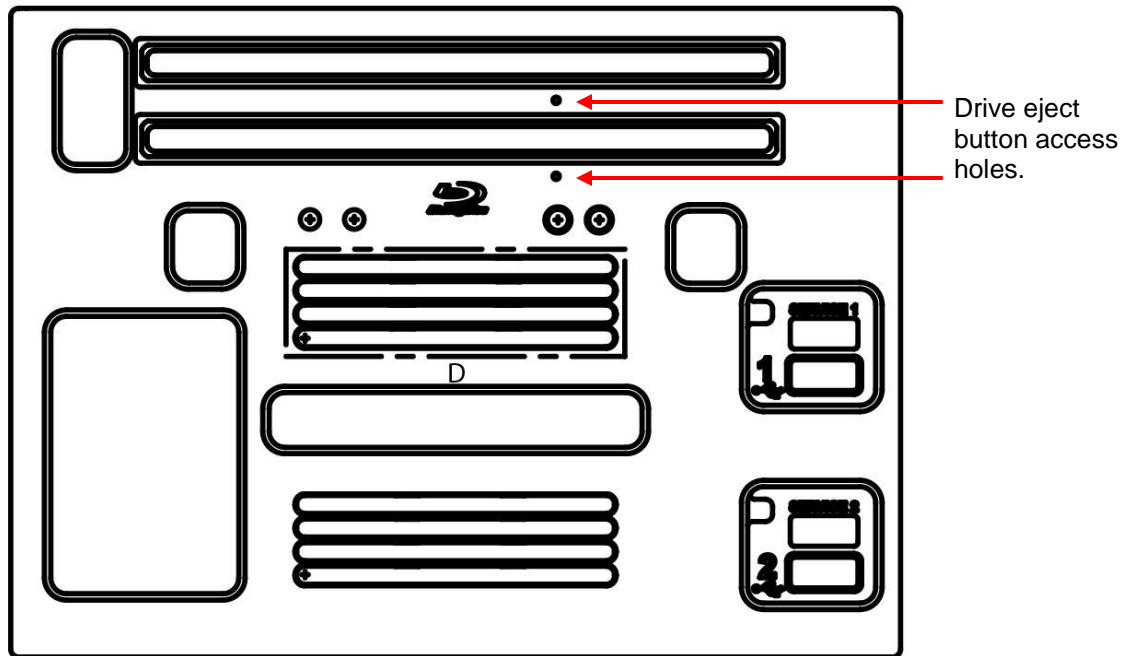


Figure 27 Drive eject button access hole location

### 9.2. RTCA DO-160F Qualifications

The table below summarizes the DO-160 test results for qualification of the Dual Blu-ray DVD players. Omitted categories are not applicable to this product or its expected installation.

Table 9 DO-160 Level F test criteria

Description	Section	Category	Comments
<b>Temperature and Altitude</b>	<b>4</b>		
Ground Survival/Short-Time Operating Low Temp	4.5.1	A1	
Operating Low Temperature	4.5.2	A1	
Ground Survival/Short-Time Operating High Temp	4.5.3	A1	
Operating High Temperature	4.5.4	A1	
Altitude	4.6.1	A1	
Decompression	4.6.2	A1	
Overpressure	4.6.3	A1	
<b>Temperature Variation</b>	<b>5</b>		
Temperature Variation	5.3.1	C	
<b>Humidity</b>	<b>6</b>		
Humidity	6.3.1	A	
<b>Operational Shocks &amp; Crash Safety</b>	<b>7</b>		
Operational Shocks	7.2.1	B	
Crash Safety (Impulse)	7.3.2	B	
Crash Safety (Sustained)	7.3.3	B	
<b>Vibration</b>	<b>8</b>		
Random Vibration – Fixed Wing Aircraft	8.5.2	S (Curve B)	
<b>Magnetic Effect</b>	<b>15</b>		
Magnetic Effect	15.3	Z	
<b>Power Input</b>	<b>16</b>		
<b>Normal Operating Conditions (DC)</b>	<b>16.6.1</b>		
Average Value Voltage (DC)	16.6.1.1	Z	
Ripple Voltage (DC)	16.6.1.2	Z	
Momentary Power Interruptions (DC)	16.6.1.3	Z (B)	
Normal Surge Voltage (DC)	16.6.1.4	Z	
Engine Starting Under Voltage Operation (DC)	16.6.1.5	Z	

Description	Section	Category	Comments
<b>Abnormal Operating Conditions</b>	<b>16.6.2</b>		
Voltage Steady State (DC)	16.6.2.1	Z	
Momentary Under Voltage (DC)	16.6.2.3	Z	
Abnormal Surge Voltage (DC)	16.6.2.4	Z	
<b>Voltage Spike</b>	<b>17</b>		
Voltage Spike	17.4	A	
<b>Audio Frequency Conducted Susceptibility</b>	<b>18</b>		
AF Conducted Susceptibility- Power Inputs	18.3.1	Z	
<b>Induced Signal Susceptibility</b>	<b>19</b>		
Magnetic Fields Induced Into Equipment	19.3.1	AC	
Magnetic Fields Induced Into Interconnecting Cables	19.3.2	AC	
Electric Fields Induced Into Interconnecting Cables	19.3.3	AC	
Spikes Induced Into Interconnecting Cables	19.3.4	AC	
<b>Radio Frequency Susceptibility</b>	<b>20</b>		
Conducted Susceptibility (CS) – 10 KHz to 400 MHz	20.4	T	
Radiated Susceptibility (RS) – 100 MHz to 18 GHz	20.5	T	
<b>Emission of Radio Frequency Energy</b>	<b>21</b>		
Conducted RF Emission	21.4	M	
Radiated RF Emission	21.5	M	
<b>Electrostatic Discharge (ESD)</b>	<b>25</b>		
Electrostatic Discharge (ESD)	25.5	A	
<b>Flammability</b>	<b>26</b>	N/A	Flammability testing in accordance with 14 CFR 25.853 Appendix F

### 9.3. Specifications

The specifications in the following tables apply to each drive for both models of Dual Blu-ray players.

Table 10 Model 0602-200 (no media share) specifications

Nominal Voltage/Current Draw	28VDC/0.8A
Inrush Current	44A
Op Voltage Range	18-32VDC
Maximum Current Draw	1.28A
Power Consumption	23W
Weight	5.12 lbs [1.42 kgs.] $\pm$ 5%
Operating Temperature	0°C – 45°C

Table 11 Model 0602-205 and 0602-201 (with media share) specifications

Nominal Voltage/Current Draw	28VDC/0.9 A
Inrush Current	44A
Op Voltage Range	18-32VDC
Maximum Current Draw	1.36A
Power Consumption	25W
Weight	5.45 lbs [2.47 kgs.] $\pm$ 5%
Operating Temperature	0°C – 45°C

## 10. DEFINITIONS

- 3G HD-SDI** High-definition SDI with 3 gigabit/s data rate transfer
- CFR** Code of Federal Regulations
- CVBS** Composite Video Baseband Signal
- DC** Direct Current
- DNS** Domain Name System
- DTS-MA** Digital Theater System High Definition Master Audio
- DVI** Digital Visual Interface
- HD** High Definition
- HDCP** High-Bandwidth Digital Content Protection
- HDMI** High Definition Multimedia Interface
- HD-SDI** High Definition Serial Digital Interface
- IP** Internet Protocol

<b>IR</b>	Infrared
<b>LCD</b>	Liquid crystal display
<b>LED</b>	Light emitting diode
<b>LPCM</b>	Linear Pulse Code Modulation
<b>MP3</b>	MPEG layer 3, which is a compressed audio format
<b>MPEG</b>	Moving Picture Experts Group; video file format for MPG files
<b>NTFS</b>	New Technology File System; a format used for large files
<b>NTSC</b>	National Television Standards Committee. A video standard used in the United States, Canada, Japan, Mexico, the Philippines, South Korea, Taiwan, and some other countries.
<b>OSD</b>	On Screen Display – the actual user/technician menu, and any informational readouts displayed on the image.
<b>PAL</b>	Phase Alternating Line. A video standard used in Europe, China, Malaysia, Australia, New Zealand, the Middle East, parts of Africa, and other parts of the world.
<b>PCM</b>	Pulse Code Modulation
<b>P/N</b>	Part Number
<b>RGB</b>	Red, green, blue; an abbreviation commonly used for analog computer graphics video that transmits the three primary colors on separate wires
<b>RMS</b>	Root Mean Squared
<b>RS-232</b>	Standard for serial binary data interchange
<b>RS-485</b>	Standard for allowing multiple devices to share a common set of serial data communication lines.
<b>SDI</b>	Serial Digital Interface
<b>SPDIF</b>	Sony/Philips Digital InterFace (Serial digital audio)
<b>TMD5</b>	Transition-minimized differential signaling
<b>USB</b>	Universal Serial Bus
<b>VDC</b>	Volts Direct Current
<b>Vpp</b>	Volts peak-to-peak; the maximum range of a sine wave. Sometimes expressed as $V_{p-p}$ .



- W** Watts
- WMA** Windows Media Audio, an audio data compression technology developed by Microsoft
- xvYCC** Extended-gamut YCC
- YCC** Abbreviation of YCbCr, which is a way of encoding RGB information, where Y is the Luma component, and Cb and Cr are color difference components.
- YPbPr** Analog video signal carried by component video cable in consumer electronics. Y carries luma (brightness) information. Pb carries the difference between blue and luma (B - Y). Pr carries the difference between red and luma (R - Y).

## 11. REVISION HISTORY



Revision E is limited to draft or prototype documents. Revisions I, O, Q, S, X and Z are not to be used.

Revision	Date	Revision Description	EC
A	09/23/11	Initial release	11589
B	12/06/12	Removed inactive P/N references; added new font change, show/hide feature for the Settings menu, changing region codes, playing all files function; restructured the outline	12-0670
C	09/19/13	Update RS-485 key sequence for addresses 25 and 26	13-0352
D	05/28/15	Update troubleshooting section, added section 9.1.1 to include manual disc ejection	15-0186
F	12/22/15	Update manual to include addition of media share to 0602-200	15-0332
G	2/23/16	Added Analog sunset	16-0036