ROSEN
AVIATION

Video Distribution Amplifier
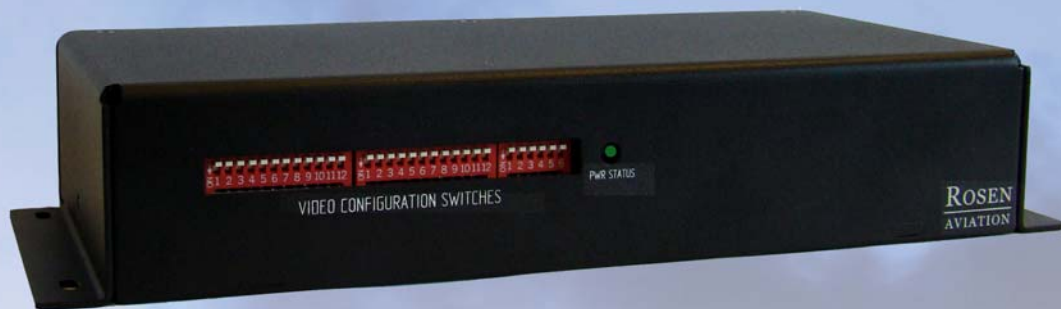
Technical Manual

Model 0700-006

Technical Manual, Video Distribution Amplifier 0700-006

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Contents

1. INTRODUCTION

The Video Distribution Amplifier 0700-006 features four composite and two RGB video inputs, eight composite and three RGB video outputs, and a briefing active discrete input. The briefing active discrete input can override the other inputs when activated. The unit is designed to integrate into any entertainment system that has composite and RGB video capability and controllers that allow you to select different video sources in the aircraft.

This guide describes general configuration information for the Rosen Video Distribution Amplifier (VDA) with any video source equipment to supplement the Outline and Installation Drawing.

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

1.1. Unpacking

The following parts are shipped with the Video Distribution Amplifier:
- Outline and Installation Drawing (P/N **0700-006-CD**)
- Video Distribution Amplifier (P/N **0700-006**)
- Video Distribution Amplifier CD (P/N **101721**)
- Connector Kit, 25W3, female (P/N **0300-036**)
- Connector Kit, 13W6, female (P/N **0300-703 MOD 00**)
- Connector Kit, 8W8, male (P/N **0300-702 MOD 00**)
- Connector Kit, 13W6, male (P/N **0300-701 MOD 00**)
- Connector Kit w/backshell, 21WA4, female (P/N **0300-034**)

➡ NOTICE   The *Outline & Installation* drawings are also available at www.rosenaviation.com.

From the Rosen Aviation home page, select **Support→Drawings and Pinouts**, and look for the product name under the Accessories category.

2. SYSTEM FUNCTIONS

Composite video input	Four composite video sources (A-D) coming into the Video Distribution Amplifier from video equipment with composite video out.
Composite video output	Individual composite video signals going out of the Video Distribution Amplifier into 1-8 personal monitors and/or bulkhead monitors.
RGB video input	Two RGB video sources (A & B) coming into the Video Distribution Amplifier from video equipment with RGB video out.
RGB video output	Individual RGB video outputs going out of the Video Distribution Amplifier into 1-3 personal monitors and/or bulkhead monitors.
Composite source select	A switch that enables you to select between the available composite video inputs (four composite video sources A-D are available).

| RGB source select	A switch that enables you to select between the available RGB video inputs (sources A & B are available).
Auto gain control (AGC)	Takes composite video and adjusts the signal level to match known standards. See Section 4.5.
Briefing active discrete input	Select switch that distributes a designated video input to all outputs. This input can control both composite and RGB video briefings.

2.1. Block Diagram
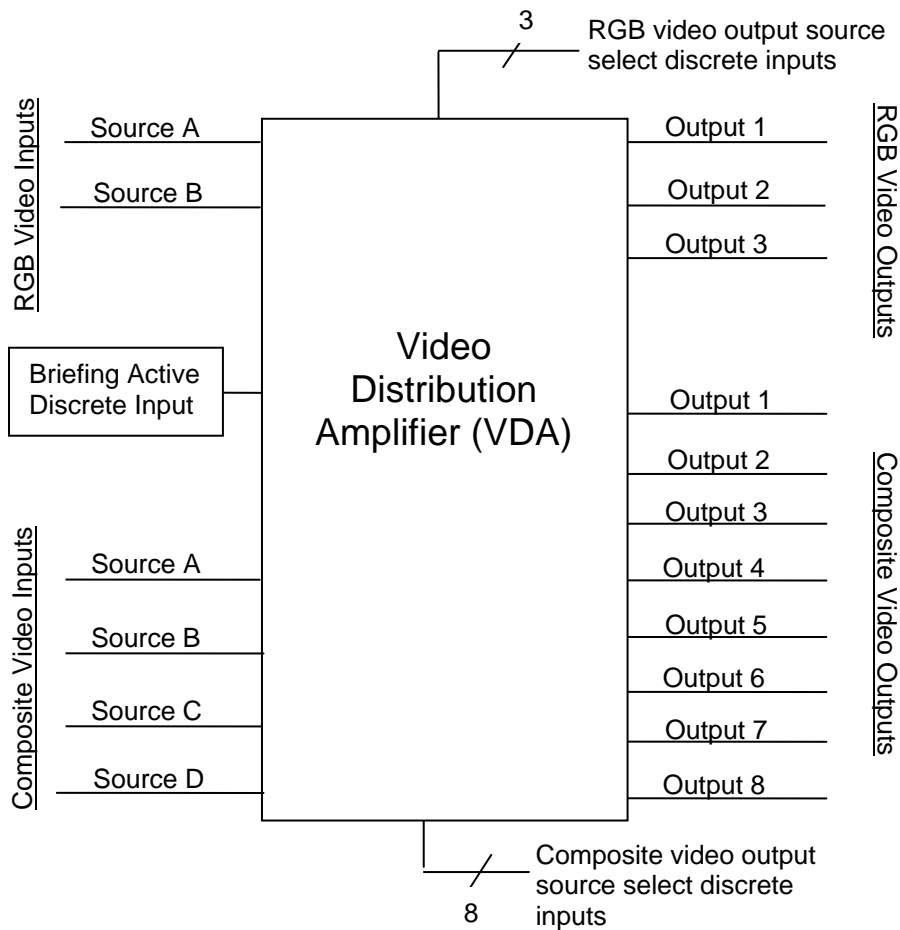
Figure 1 VDA block diagram

2.2. Operating Modes

Each video output may be configured to one of two modes of operation by setting the DIP switches according to the ON indicators on the Video Distribution Amplifier.

Fixed mode	Keeps the video output set to a specific input source—either composite input B, C, or D, or RGB input A or B.
Switched mode	Allows the user to select video input sources with a source select switch. Each output may be configured independently of the other outputs.

3. CONFIGURATION DIP SWITCHES

The configuration DIP switches are divided into three banks—left, middle, and right. Working from left to right, configure the switches to set the video output for all monitors. Composite video output uses paired switches. Figure 3 shows the switches that control each output and the other functions.
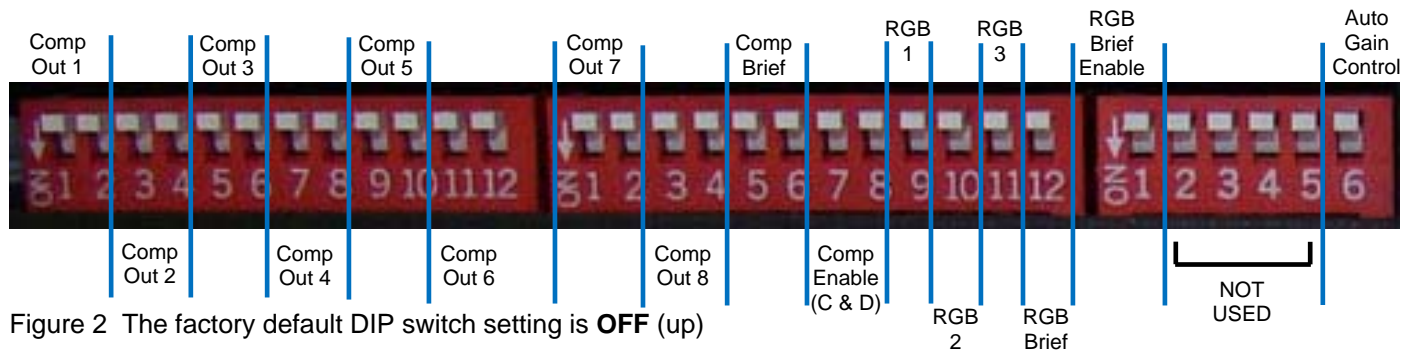
Figure 2   The factory default DIP switch setting is **OFF** (up)

The following tables show the pairs of switch positions for the various video and briefing outputs.

Composite Outputs 1 - 8 (Left bank & Middle SW1-SW4)

SW 1	SW 2	
OFF	OFF	Source A or switched mode
OFF	ON	Source B fixed
ON	OFF	Source C fixed
ON	ON	Source D fixed

Composite Briefing Input Select (Middle SW5, SW6)

SW 1	SW 2	
OFF	OFF	Source A Briefing
OFF	ON	Source B Briefing
ON	OFF	Source C Briefing
ON	ON	Source D Briefing

Composite Enable - C & D (Middle SW7, SW8)

SW 1	SW 2	
OFF	OFF	Source A & B available
N/A*	ON	Source A, B, C, & D available
ON	OFF	Source A, B, & C available

*SW7 can be either OFF or ON

RGB 1, RGB 2, RGB 3 (Middle SW9-SW11)

SW	
OFF	Source A or switched mode
ON	Source B fixed

RGB Briefing Input Select (Middle SW12)

SW	
OFF	Source A Briefing
ON	Source B Briefing

RGB Briefing Enable (Right SW1)

SW	
OFF	Briefing disabled
ON	Briefing enabled

Automatic Gain Control (AGC) (Right SW6)

SW	
OFF	AGC enabled
ON	AGC disabled

4. CONFIGURING A SINGLE VIDEO OUTPUT

Configuring a single video output depends on several variables.

- Type and number of video inputs
- Use of a source select switch (such as a controller, IR remote, or from the monitor)
- Choice of inputs: composite source A, B, C, or D, and RGB source A or B

4.1. Composite Enable

To enable video source C and/or D, you must set the Composite Enable switches SW7 and SW8 in the middle bank, as shown in Table 1. For a switched mode configuration, leave the Comp Output 1-8 switches OFF.

Table 1 Composite Enable DIP switches in the middle bank

	Mid DIP SW7	Mid DIP SW8	Composite Source	
Composite Enable	OFF	OFF	A & B only	← Composite sources A & B are always enabled
	N/A*	ON	A, B, C, & D	
	ON	OFF	A, B, & C	

*SW7 can be set to either OFF or ON to enable source D.

4.2. Fixed Mode Examples

If you are using only one video input, you do not need a source select switch.

Table 2 shows that configuring DIP switches SW1 and SW2 in the left bank will set the output to receive a desired input source. Repeat the switch settings to display the same video output on the other composite monitors (up to eight).

Leave any switches you do not use in the default OFF position.

Table 2 Fixed mode example: One composite video source and no source select switch

	Left DIP SW1	Left DIP SW2	Composite Source	
Comp Output 1	OFF	OFF	A	Set SW1-SW12 in the left bank of DIP switches for monitors 1-6, and set SW1-SW4 in the middle bank for monitors 7 and 8.
	OFF	ON	B	
	ON	OFF	C*	
	ON	ON	D*	

*To enable sources C or D, you must also set the Composite Enable switches (middle bank SW7 and SW8), as shown in Table 1.

4.2.1. RGB Settings in Fixed Mode

Table 3 shows the configurations for an RGB video output in fixed mode. Typically you use input source B for fixed mode and input source A for switched mode.

Table 3 Fixed mode example: One RGB video source and no source select switch

	Mid DIP SW9	RGB Source
RGB Output 1	OFF	A
	ON	B

To configure RGB outputs 2 and 3, set Mid DIP SW10 and SW11 to the desired source.

4.3. Switched Mode Examples

Source select is an externally wired control that enables you to select different video sources of the same type. The Video Distribution Amplifier switches between composite sources or RGB sources, but it does not switch between the two.

Table 4 shows how to configure a composite output to receive four inputs with a source select switch. For an example with RGB input sources and a source select switch, see Table 5.

Table 4 Switched mode example: Four composite video input sources (A-D) using a source select switch

	Left DIP SW1	Left DIP SW2	Mid DIP SW7	Mid DIP SW8	Composite Source
Comp Output 1	OFF	OFF	N/A*	ON	A, B, C, & D

To use composite select switches, connect the switches to pins 1-8 and corresponding Return pins 10-17 on the P2 connector.

Switched mode will always use the OFF/OFF combination

*SW7 can be set to either OFF or ON to enable source D.

4.3.1. RGB Settings in Switched Mode

If you use two RGB video sources and a source select switch, configure the DIP switches as shown in Table 5.

Table 5 Switched mode example: Two RGB video sources using a source select switch

	Mid DIP SW9	RGB Source
RGB Output 1	OFF	A & B switched

To use RGB select switches, connect the switches to pins 3-5 and corresponding Return pins 14-16 on the P5 connector.

To configure RGB outputs 2 and 3, set middle DIP SW10 and SW11 the same way.

4.4. Briefings

Video briefings can be displayed on composite or RGB video output, and a Briefing Active Discrete Input may be configured during installation that will force all composite and RGB outputs to a specific input. All outputs will return to their previous states after the Briefing Active Discrete Input is released.

Composite briefing cannot be disabled; only RGB briefings can be enabled/disabled.

To configure a composite briefing to an input source, choose a setting in Table 6 that matches the designated source.

Table 6 Composite briefing input select settings

	Mid DIP SW5	Mid DIP SW6	Source
Comp Brief	OFF	OFF	A
	OFF	ON	B
	ON	OFF	C
	ON	ON	D

To use the Briefing Active Discrete Input, connect the briefing switch to Pin 2 on the P5 Connector.

Unless you want the briefing video to be one of the choices viewed with a source select switch, do not include the briefing source in the Composite Enable configuration. Instead, set the Composite Enable to include only the entertainment videos, and configure a Briefing Active Discrete Input, which will override all video outputs and play the briefing source when it is needed.

To enable briefings from an RGB input source, set two switches as shown the tables below.

Table 7A RGB briefing-enabled settings

	Right DIP SW1	Briefing
RGB Brief Enable	OFF	Disabled
	ON	Enabled

Table 7B RGB briefing input select settings

RGB Briefing Input	Mid DIP SW12	Source
	OFF	A
	ON	B

4.5. Automatic Gain Control

All composite inputs have Automatic Gain Control (AGC). Multiple DVD players may need AGC to balance the picture brightness. The AGC will take composite video signals that are not the correct amplitude and adjust them to match a standard 1Vpp video signal. The gain control is enabled when SW6 is OFF (up). To disable the AGC, set SW6 ON (down).

Table 8 Automatic Gain Control for composite video

AGC Right DIP SW6	
OFF	AGC enabled
ON	AGC disabled

4.6. Configuring a Video Distribution Amplifier

We recommend using the following approach for a successful configuration:

- Turn power **ON** and verify that the power status LED on the VDA is green.
- Configure the DIP switches in a left-to-right order.
- Leave any switches turned **OFF** that you do not use.
- Cycle the 28V power after setting the configuration switches to ensure that all switches remain on the last switched settings.

4.6.1. Installation Example

You can mix the video control and configure each output differently, as shown in Figure 3.

Composite outputs 1-2 are set to switched mode and they have a choice of video inputs A-C. Outputs 3-5 are set to input source C, they do not have a source select switch. Outputs 6-8 are set to input source B, they do not have a source select switch. A composite briefing is set to input source D and there is a Briefing Active Discrete Input.
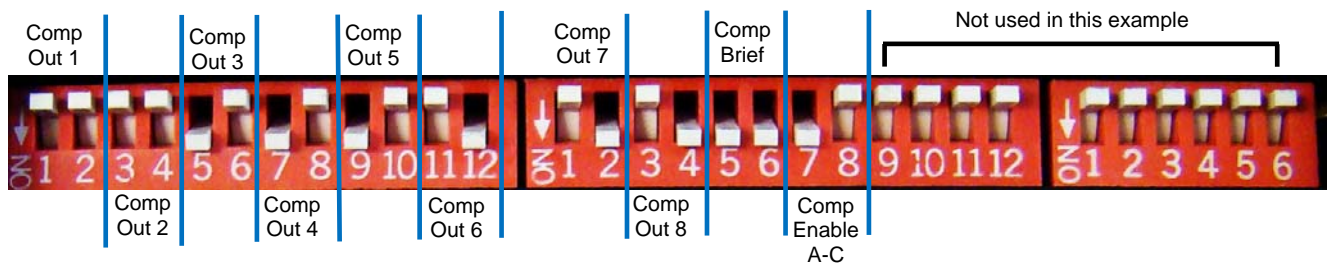

Figure 3 Mixed video control configuration

Table 9 Modes and sources for mixed video example

Output	Mode	Sources Used
Comp Out 1	Switched	A
Comp Out 2	Switched	A
Comp Out 3	Fixed	C
Comp Out 4	Fixed	C
Comp Out 5	Fixed	C
Comp Out 6	Fixed	B
Comp Out 7	Fixed	B
Comp Out 8	Fixed	B
Comp Briefing	N/A	D

Outputs **3-5** are set to input **Source C**. Outputs **6-8** are set to input **Source B**.

Outputs 3-8 do not have source select switches.

Only outputs **1-2**, which are set to **switched mode** (OFF/OFF), can use a source select switch.

Composite Enable is set to **ON/OFF** to select between the three video sources, reserving **Source D** for the briefing.

For more configuration examples, see the Appendix on page 14.

5. MOUNTING

Mount the Video Distribution Amplifier in any orientation using <u>all</u> four mounting slots in the flange brackets on the exterior housing. Refer to Note 3 on the *Outline and Installation Drawing* (P/N **0700-006-CD**).
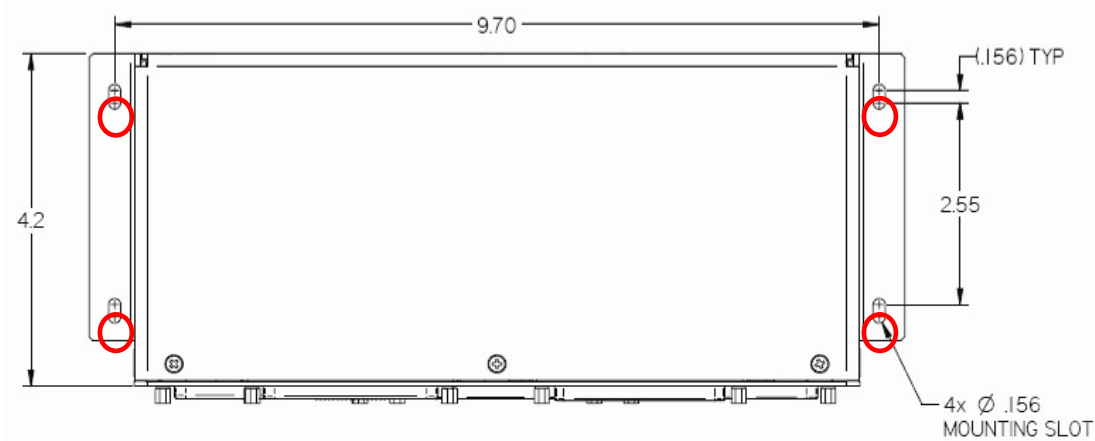
6. TECHNICAL REFERENCES AND SUPPORT

⇒ NOTICE   The *Outline & Installation* drawing is also available at www.rosenaviation.com.

From the Rosen Aviation home page, select **Products→Accessories**, and look for the product name under the Accessories category.

6.1. Definitions

AGC	Automatic Gain Control
DIP	Dual in-line package
RGB	Red, Green, Blue – abbreviation commonly used for analog computer graphics video in which the 3 primary colors are transmitted on separate wires
SS	Source select switch
SW	Switch – used to reference specific DIP switch numbers
VDA	Video Distribution Amplifier
Vpp	Volts peak-to-peak

6.2. DO-160E Qualifications

Table 10 DO-160E test criteria to which we test the Video Distribution Amplifier

Description	DO-160E Section	DO-160E Category
Temperature and Altitude	4.0	A1
Temperature Variation	5.0	C
Humidity	6.0	A
Operational Shocks & Crash Safety	7.0	B
Vibration	8.0	S, Curve B
Explosive Atmosphere	9.0	N/A
Waterproofness	10.0	N/A
Fluids Susceptibility	11.0	N/A
Sand and Dust	12.0	N/A
Fungus Resistance	13.0	N/A
Salt Spray	14.0	N/A
Magnetic Effect	15.0	Z
Power Input	16.0	Z,B
Voltage Spike	17.0	A
Audio Frequency Conducted Susceptibility – Power Inputs	18.0	Z
Induced Signal Susceptibility	19.0	AC
Radio Frequency Susceptibility (Radiated and Conducted)	20.0	T
Emission of Radio Frequency Energy	21.0	B
Lightning Induced Transient Susceptibility	22.0	N/A
Lightning Direct Effects	23.0	N/A
Icing	24.0	N/A
Electrostatic Discharge (ESD)	25.0	A
Fire, Flammability	26.0	N/A

6.3. Specifications

Table 11 Video Distribution Amplifier specifications

Weight	1.5 lbs [.6804 kg]
Dimensions	9.7" (W) x 1.9" (H) x 4.4" (D) [246.38 mm (W) x 111.76 mm (H) x 48.26 mm (D)]
Power Requirements	28V DC
Operating Temperature	0ºC - 50ºC
Warranty	2-year

6.4. Troubleshooting

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

Table 12 Troubleshooting tips and solutions

Problem	Possible Solutions
Power LED does not illuminate (GREEN)	● Verify that pinout to power input connection is correct.
No video	● Wait at least five seconds after turning on the Video Distribution Amplifier power. ● Verify that the pinout for video is correct. ● Verify video signal on connector pins. ● Verify that video source is in play mode. ● Check for damaged connector pins. ● Check DIP switch configuration.
Amplifier does not cycle through sources	● Check the DIP switch settings and adjust. ● Check for damaged connector pins. ● Verify source select switch operation and pinout.
Differences in picture brightness	● Enable the AGC.

If you need assistance with an installation, please contact Rosen Aviation at 541.342.3802 or 888.668.4955.
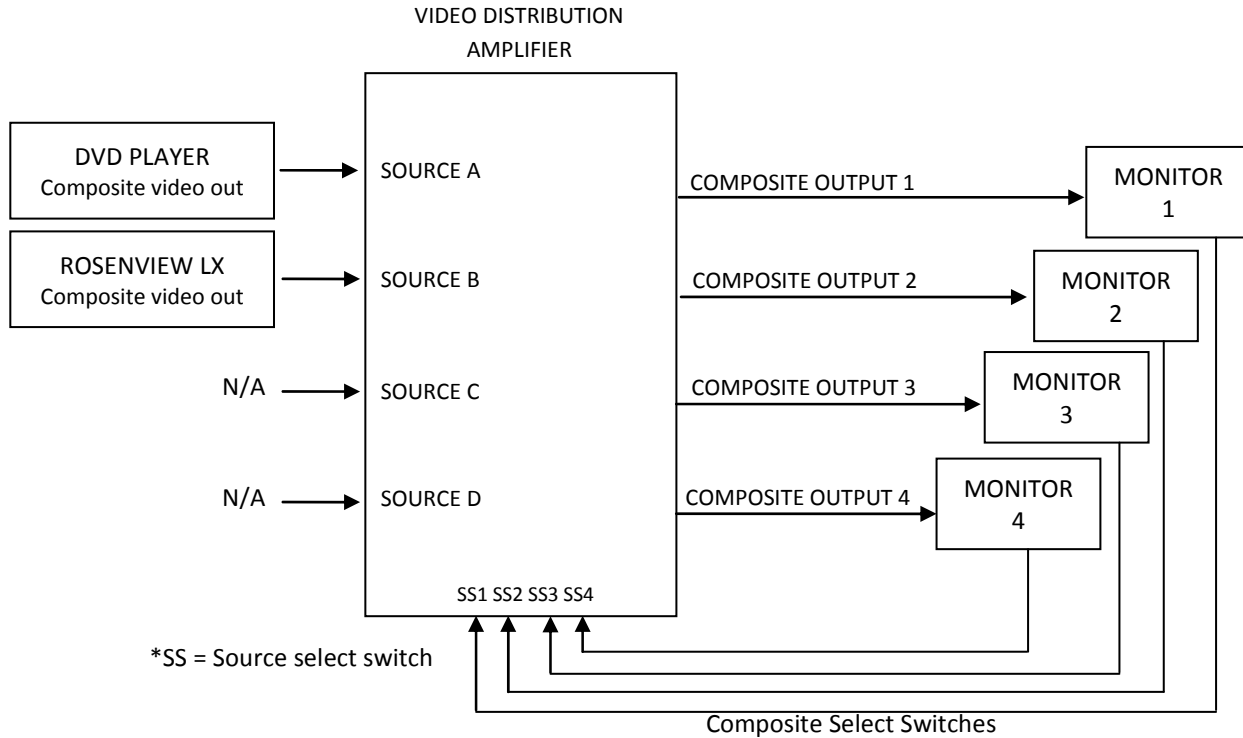
7. REVISION HISTORY

| Revision	Date	Revision Description	EC #
A	10/14/08	Initial release	08300

8. APPENDIX

8.1. Configuration Examples

The following diagrams illustrate different ways to configure the unit's connections to integrate video control into an in-flight entertainment system.

Example 1 – The aircraft has four monitors. Each monitor has a composite video signal and a source select switch. There are two composite video sources in the system. Each monitor can play either source. No video briefing is provided.
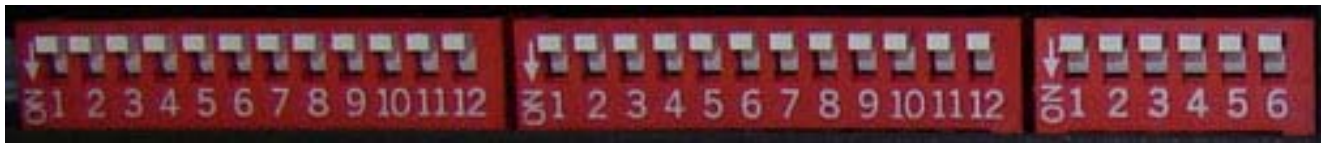
Configure the DIP switches on the Video Distribution Amp as shown above. Leave all other unused switches in the OFF position.

All switches are off because the monitors are in switched mode for sources A & B, and there are no briefings or RGB sources. The AGC is on.

VIDEO DISTRIBUTION AMPLIFIER

BRIEFING ACTIVE DISCRETE INPUT

DVD PLAYER
Composite video out → SOURCE A

ROSENVIEW LX
Composite video out → SOURCE B

DVD PLAYER
Movie or Video Briefing out → SOURCE C

N/A → SOURCE D

SS1 SS2 SS3 SS4

*SS = Source select switch

COMPOSITE OUTPUT 1 → MONITOR 1
COMPOSITE OUTPUT 2 → MONITOR 2
COMPOSITE OUTPUT 3 → MONITOR 3
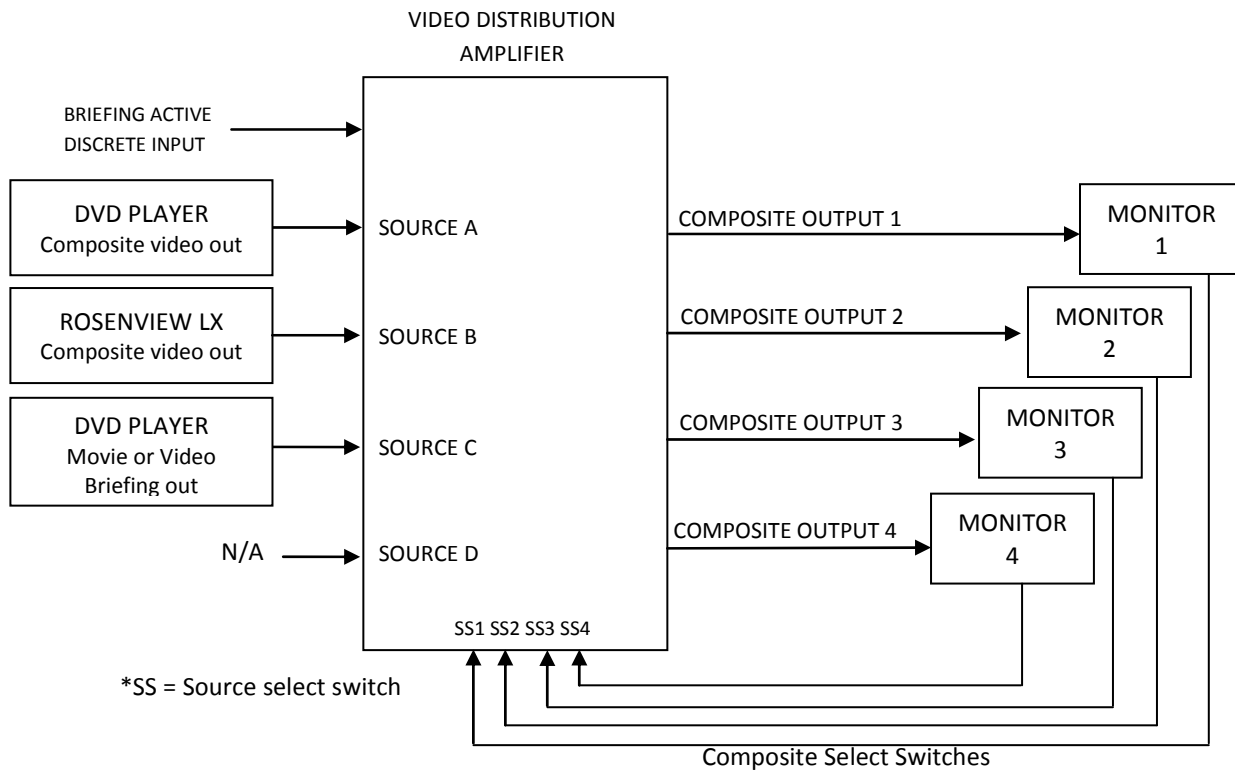COMPOSITE OUTPUT 4 → MONITOR 4
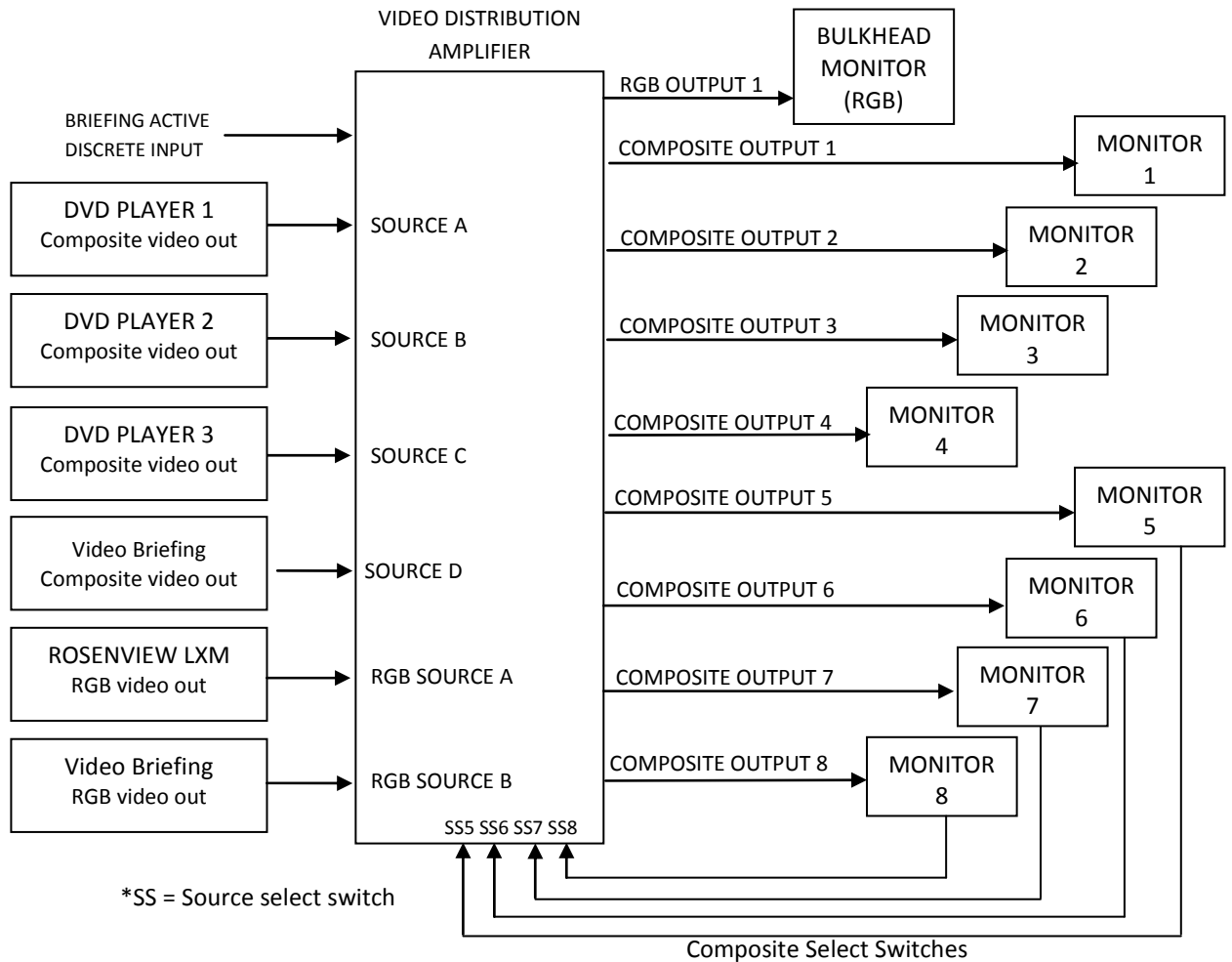
Composite Select Switches

Example 2 – The aircraft has four monitors. Each monitor has a composite signal and a source select switch. There are three composite video sources in the system, including a DVD player that plays either a movie or the Composite Video Briefing. Each monitor will play all sources. A Briefing Active Discrete Input is also connected.
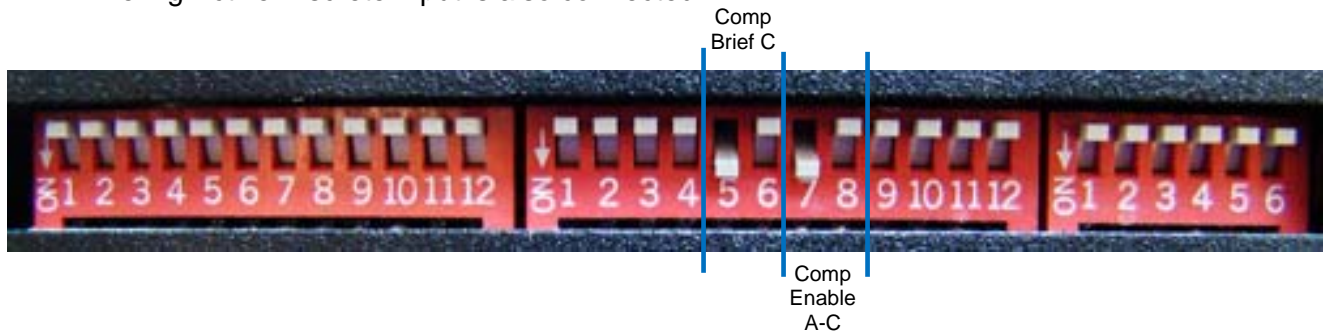
Comp Brief C

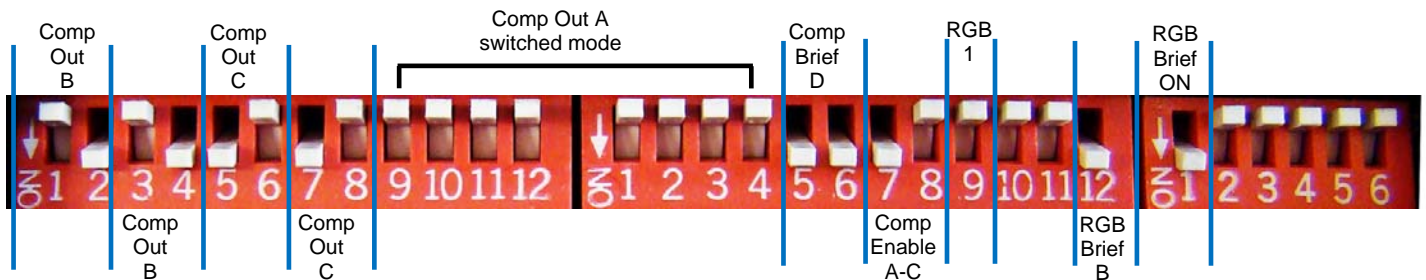Comp Enable A-C

Configure the DIP switches on the Video Distribution Amp as shown above. Leave all other unused switches in the OFF position.

In this configuration, the monitors are in switched mode for sources A & B, the briefing is set for source C, and there are no RGB sources. The AGC is on. The Composite Enable includes the composite briefing because source C can play a movie or a briefing DVD.

VIDEO DISTRIBUTION AMPLIFIER

BRIEFING ACTIVE DISCRETE INPUT

DVD PLAYER 1
Composite video out → SOURCE A

DVD PLAYER 2
Composite video out → SOURCE B

DVD PLAYER 3
Composite video out → SOURCE C

Video Briefing
Composite video out → SOURCE D

ROSENVIEW LXM
RGB video out → RGB SOURCE A

Video Briefing
RGB video out → RGB SOURCE B

SS5 SS6 SS7 SS8

*SS = Source select switch

RGB OUTPUT 1 → BULKHEAD MONITOR (RGB)

COMPOSITE OUTPUT 1 → MONITOR 1
COMPOSITE OUTPUT 2 → MONITOR 2
COMPOSITE OUTPUT 3 → MONITOR 3
COMPOSITE OUTPUT 4 → MONITOR 4
COMPOSITE OUTPUT 5 → MONITOR 5
COMPOSITE OUTPUT 6 → MONITOR 6
COMPOSITE OUTPUT 7 → MONITOR 7
COMPOSITE OUTPUT 8 → MONITOR 8

Composite Select Switches

Example 3 – The aircraft has nine monitors. There are four composite video sources and two RGB sources in the system. Monitors 1 and 2 have access to DVD player 2 only. Monitors 3 and 4 have access to DVD player 3 only. Monitors 5-8 have access to DVD players 1, 2, & 3 and have a source select switch. The RGB video and RGB briefing are displayed on the bulkhead monitor. The AGC is on.

Configure the DIP switches on the Video Distribution Amp as shown above. Leave all other unused switches in the OFF position.