

## 3.0 Installation

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**IMPORTANT:** The projector's power plug was designed to be a single phase, 3 wire source. The power plug shipped with the projector may have to be changed to meet electrical codes for local authorities. It is the user's responsibility to contact an **approved electrician** for proper wiring.

**WARNING:** Hughes-JVC will not be responsible for any hazards caused by unlicensed personnel changing the original single phase, 3 wire design.

### 3.1 Before Installation - Location Considerations

Model 340SC is an advanced projector that delivers a premium image—when set up correctly. Improper location and setup will cause problems later during the image adjustment procedures. Carefully observe the requirements in the section to set up the projector for optimum operation.

Prior to installing the projector, consider the following:

- Table or Ceiling mounting
- Projector-to-Screen Alignment
- Screen Size
- Seating Arrangements
- Lens type Selection
- Physical Access
- Heat Dissipation

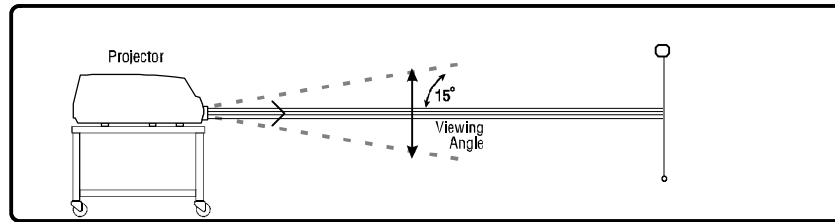
**NOTE:** The projector was designed to be operated rightside up, **not inverted**.

### 3.2 Projector-to-Screen Alignment

Set the projector to the proper distance from the screen as determined by the screen width, and Lens Throw Ratio (see *Lens Section 3.3*). The lens dynamics chart (Table

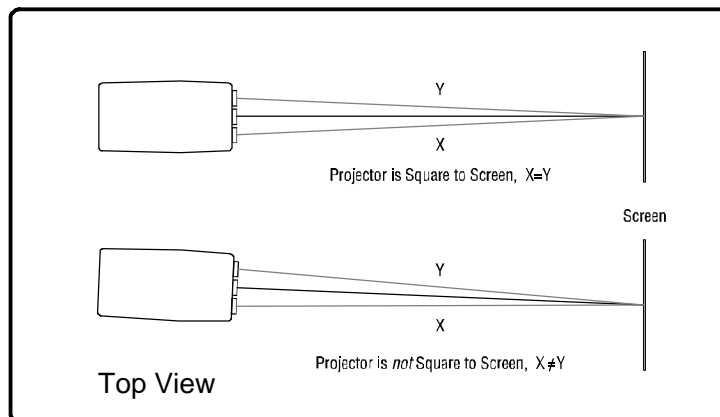
3-1) in Section 3.3 helps determine what lens to use for different throw ranges and screen widths.

Whether using a ceiling or table mount, the maximum *projector-to-screen* vertical tilt angle cannot be exceeded (see Table 3-1). Tilt greater than the maximum causes a severe keystone error that cannot be corrected. The maximum *vertical projector tilt* is 85°. Voids in the prism fluid cause a “dead zone” at  $19^\circ \pm 4^\circ$ . Avoid angles between  $15^\circ$  and  $23^\circ$ .



**Figure 3-1.** Maximum projector-to-screen vertical tilt angle depends on the lens being used (see Table 3-1).

Verify that the projector is centered horizontally on the screen, with the front corners equidistant from the screen (Figure 3-2).



**Figure 3-2.** Projector should be square to screen.

### 3.3 Lens Selection

**Throw Distance and Screen Width.** The Model 340SC Projector currently has ten different lens and converter options. Standard options and common Lens Throw Ratios are listed in Table 3-3. The Lens Throw Ratio numbers indicate the Throw Distance to Screen Width ratios. For example, the **1.5:1** lens indicates a throw distance of 1.5 times the screen width. Figure 3-3 illustrates the screen width and throw distance, and provides a basic formula for calculation based on the projector’s setup.

Tables 3-1 and 3-2 provide information on lens dynamics and lens interchangeability. Figure 3-4 provides a lens chart on screen widths up to 80' and throw distances up to 350' for various lens types plus the .885 special wide angle lens. Table 3-3 provides lens matrices for all various options and part numbers.

Model 340SC has variable throw distances up to 10 times the screen width. For example, Figure 3-4 shows that a 10' wide picture can be projected from 15', 30', 50', or up to 100' depending on the lens option selected. (See Table 3-1, *Lens Dynamics*, below, and Figure 3-4, *Lens Chart*).

Screen width is the maximum picture size that can be focused. The placement of the projector must be a multiple of Screen Width X Lens Throw Ratio, or greater, from the closest point to the screen. A greater distance can be corrected for by reducing the picture size within the ILA<sup>®</sup> image but the picture size *cannot* be increased beyond the ILA<sup>®</sup> image.

**Table 3-1. Lens Dynamics:**

LENS TYPE	THROW	SCREEN WIDTH	LENGTH*	MAX PROJ TO SCREEN VERT TILT
.885:1 <200" Diag.	5.5 ft.-11.8 ft.	6.2 ft.-13.33 ft.	0.5 in.	± 6°
.885:1 >200" Diag.	11.8 ft.-33.6 ft.	13.33 ft.-38 ft.	0.5 in.	± 6°
1.5:1	10.4 ft.-185 ft.	6.9 ft.-123 ft.	2.0 in.	± 15°
3:1	15.7 ft.-241 ft.	5.2 ft.-80.3 ft.	2.2 in.	± 15°
5:1	20.4 ft.-357** ft.	4 ft.-71 ft.	0.5 in.	± 15°
7:1	25.2 ft.-357** ft.	4.0 ft.-51 ft.	5.5 in.	± 15°
10:1	44 ft.-240 ft.	4.4 ft.-24 ft.	6.2 in.	± 15°

\*Length=Maximum distance lens extends beyond front of projector case.

\*\*Lenses have only been tested to 357 ft; actual distance may be longer.

Lens sets selected are dictated by screen size and desired projection distance. Verify that the lenses are mounted in the correct color position. See Table 3-2, *Lens Interchangeability*.

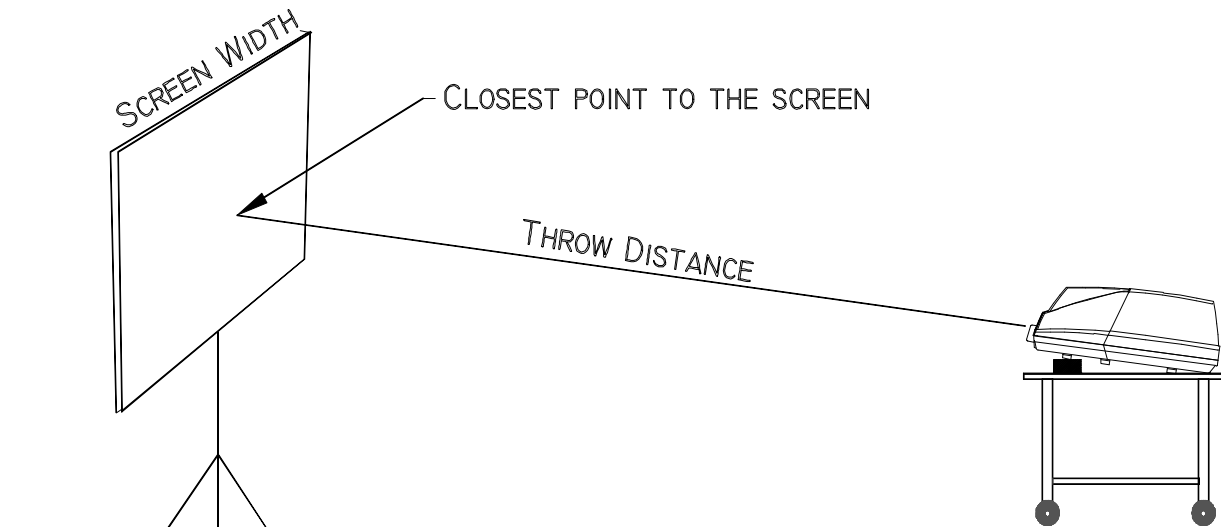
**Table 3-2. Lens Interchangeability:**

<b>LENS THROW RATIO</b>	<b>LENS COLOR</b>	<b>PART NUMBER</b>	<b>LENS POSITION REQUIREMENTS</b>
.885:1 (Special Order)*	R, G, and B have same P/N. Specify color when ordering.	103280 (for 8'-13.33' screen widths 102692 (for 13.33'-38' screen widths)	Specific lens needed for R, G, or B. None interchangeable.
1.5:1	Red Green Blue	102412 102411 102410	Specific lens needed for R, G, or B. None interchangeable.
2.177:1	Red Green Blue	102147 102148 102149	Specific lens needed for R, G, or B. None interchangeable.
3:1	R, G, and B have same P/N. Specify color when ordering.	900609	Specific lens needed for R, G, or B. None interchangeable.
5:1	Red, Green, and Blue	101239	RGB All interchangeable.
7:1	Red, Green, and Blue	101240	RGB All interchangeable.
10:1	R, G, and B have same P/N. Specify color when ordering.	103342	Specific lens needed for R, G, or B. None interchangeable.

\***2.177:1** lens special order only. Contact HJT for information on this lens.

Use a **.8** converter to create other lens options to use with the **3:1, 5:1 or 7:1** lens (see Tables 3-3, 3-4).

For help selecting a Lens Throw Ratio vs. screen width and screen throw distance, refer to the Lens Chart, Figure 3-4, and Lens Matrix Table 3-3.



**Figure 3-3.** To find the Lens Throw Ratio, screen width or throw distance, use the following formula:

$$\text{Lens Throw Ratio} = \frac{\text{Throw Distance} \times 1.02}{\text{Screen Width}}$$

When calculating the Lens Throw Ratio, if the result falls between two effective lens throw ratios in Table 3-3, drop down to the *next lower* Lens Throw Ratio to determine the proper lens set. (e.g. If the result shows a lens throw ratio of 6:1, drop down to a 5:1 lens). **Do not** go up to a higher lens throw ratio or the screen width desired may not be possible.

**NOTE:** The throw distance is multiplied by 1.02 to provide an additional 2%. This 2% allows for any measurement inaccuracies and manufacturing tolerances.

Table 3-3. Lens Matrix for Projector Models 340SC.

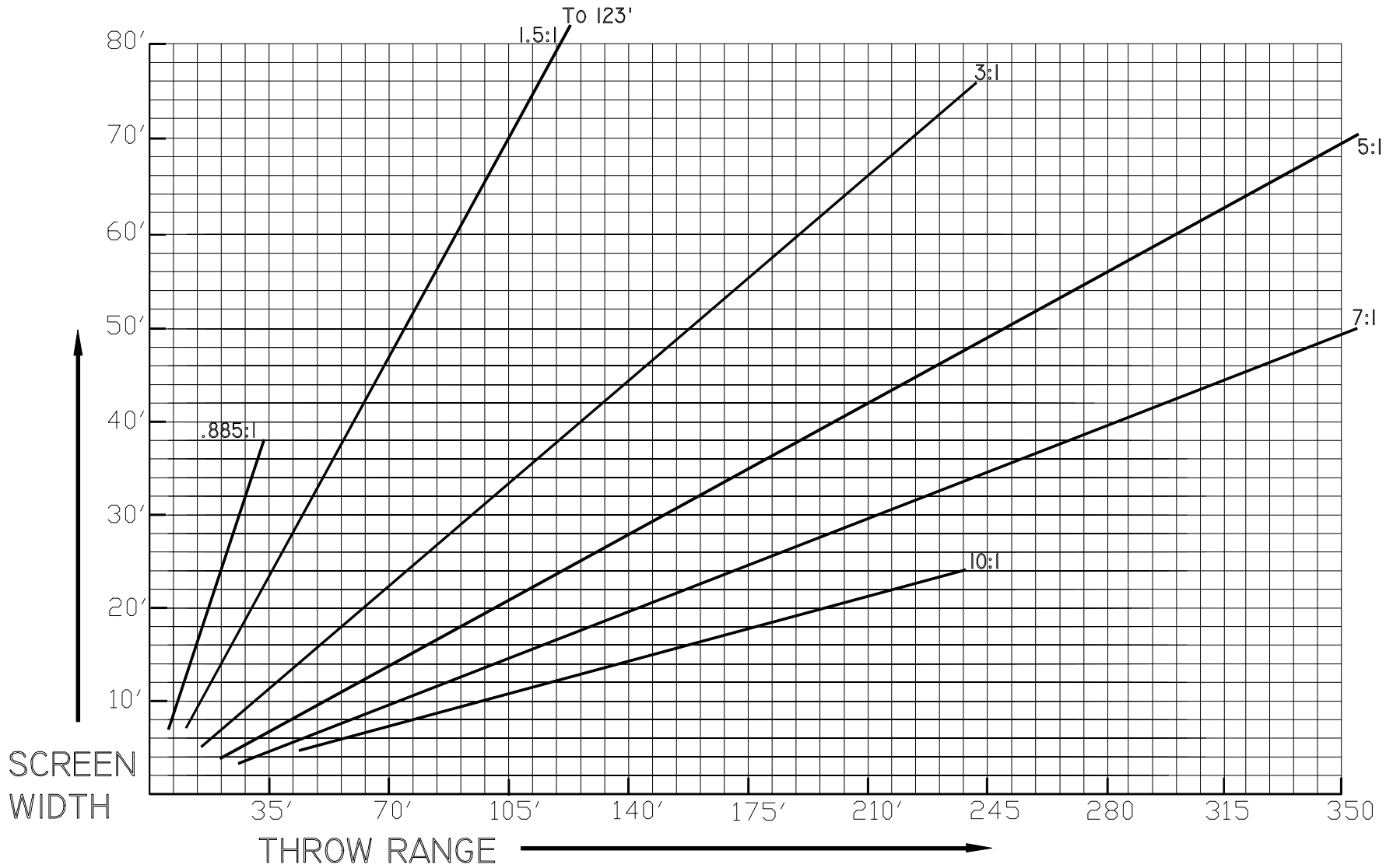
EFFECTIVE LENS THROW RATIO	BASE LENS	CONVERTER	COMMENTS
.885:1	.885:1	None Available	For screen widths 8.0'-13.33' lens set p/n 103280*
	.885:1	None Available	For screen widths 13.33'-38' lens set p/n 102692*
1.5:1	1.5:1	None	Red lens p/n 102412. Green lens p/n 102411 Blue lens p/n 102410.
2.177:1	2.177:1	None	Red lens p/n 102147 Green lens p/n 102148 Blue lens p/n 102149
2.4:1	3:1	.8 Converter p/n 103809. Requires Adapter p/n 102686.	lens set p/n 900609* Bezel** p/n 101594
3:1	3:1	None	lens set p/n 900609* Bezel** p/n 101594.
4:1	5:1	.8 Converter. p/n 102687	lens set p/n 101239.
5:1	5:1	None	lens set p/n 101239.
5.6:1	7:1	.8 Converter. p/n 102687	lens set p/n 101240
7:1	7:1	None	lens set p/n 101240
10:1	10:1	None	lens set p/n 103342.

\*When ordering a single .885:1 lens or 3:1 lens, always specify the color the lens is used with.

\*\*The 3:1 lens has a smaller diameter and requires a bezel that fits over the end of the lens to help keep random light from exiting the projector and disturbing the screen.

**NOTE:** The 2.177:1 lens is a special order item. Allow additional time when ordering this lens.

To use the Figure 3-4 graph below, locate the throw distance (lens to closest point on the screen) and screen width. Move to the closest lens line **to the left** of that point to find the best lens for that application.



**Figure 3-4. Lens Chart. Distances are to the closest point of the screen.**

## 3.4 System Connections

### Power Connections

Model 340SC operates from a 208-240V, 20A single-phase, 50-60 Hz AC power source and draws 12-14.5 amps at 200-240 volts.

**NOTE:** Before connecting more than one projector to the same power source, consider the current draw from each projector as mentioned in the above paragraph.

### Terminal or Tethered Remote

Connect the Tethered Technician Remote or a VT100 Control Terminal to the RS-232 control jack (marked TERMINAL IN) on the projector back panel. The projector can also be controlled with the IR (InfraRed) Technician Remote.

### InfraRed Repeater

The InfraRed repeater is used with rear projection setups and when the IR remote is 50' from the projector. With rear projection, the InfraRed windows are hidden by the screen from the remote control. The InfraRed repeater is plugged into the Model 340 (at the telephone-style connector on the rear panel), and placed in front of the screen.

### InfraRed (IR) Windows

The projector has two IR windows, one in front, and one in back. These windows receive projector control signals from the IR remotes.

## 3.5 Signal Sources

The projector accommodates a wide range of formats. The optional Decoder Board provides the necessary processing for Composite video, S-Video, PAL, and SECAM. For any given installation, it is critical that the projector be compatible with all anticipated sources. The key parameters for projector compatibility are: the signal standard; horizontal and vertical scan rates; blanking times; and video bandwidth.

### Composite Signals

Composite signals can be received with the optional Decoder Board. A composite signal carries vertical and horizontal sync information as well as luminance (brightness), chroma (color), and video information. Several standards exist for composite video such as: NTSC for U.S. consumer television; PAL and SECAM-international standards; and RS-170-closed circuit monochrome. These standards differ in relation to parameters such as signal timing and the encoding scheme for the "video information."

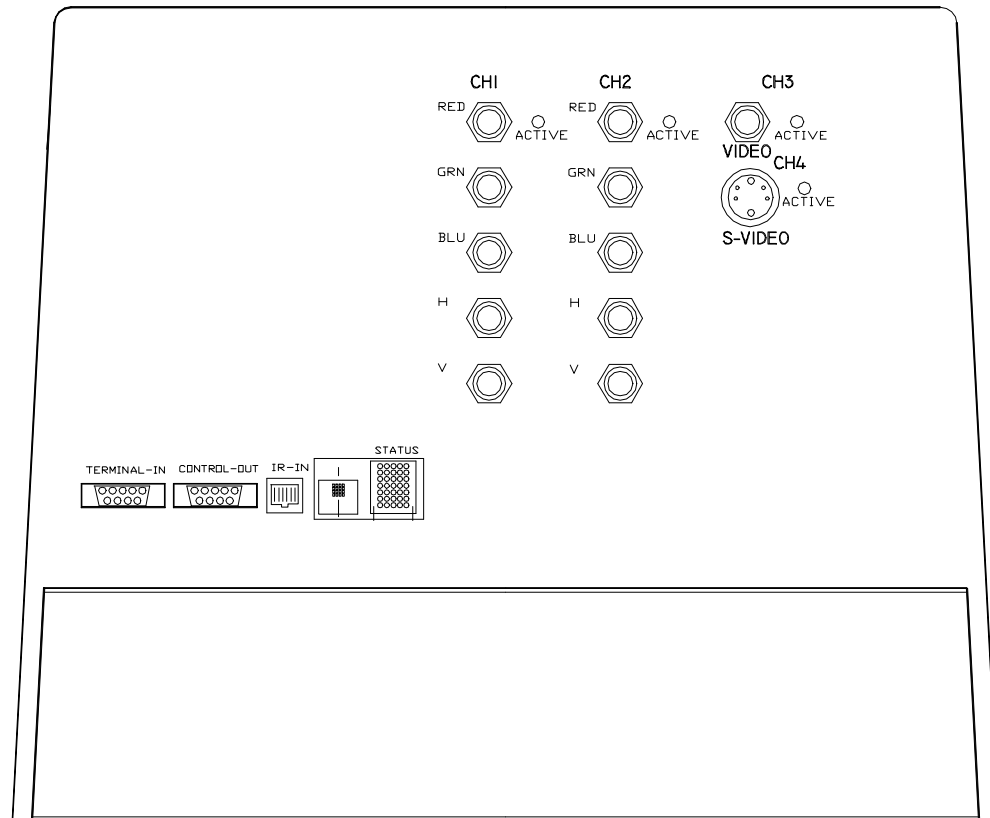
### Red, Green and Blue Analog Signals

Input for the most general computer graphics projector is separate red, green and blue (RGB) analog signals. The sync signals for RGB analog sources can be separate horizontal and vertical, included with the green analog signal (sync on green), or composite (horizontal and vertical combined) which requires the optional Decoder Board.

### Signal Inputs

Signal source inputs are connected directly to the projector via appropriate connecting cables.

The signal input jacks are located on the rear panel of the projector as illustrated in Figure 3-5.



**Figure 3-5.** Model 340SC rear panel connections (shown with the optional CH 3 and CH 4 inputs used with the optional Decoder Board).

Model 340SC has the following input jacks:

- 2 RGB inputs, compatible with any of the following sync combinations
- R, G, B, H, V; R, G, B, H/V; and R, Gs, B (sync on green)
- One Composite Video and 1 S-Video Composite (Optional)

Connect source signal to the rear panel. LEDs on the rear panel light up when a particular input is selected.

### 3.6 Connections Checklist

- Connect the power cord to a 208-240 VAC, 50/60 Hz, 20 amp source, single phase power source.

**Caution!** Do not apply power to projector if cable appears damaged. Replace damaged cable before restoring power.

- Connect the Tethered Tech Remote VT-100 or PC to the RS-232 Control jack (marked TERMINAL IN) on the projector rear panel.
- Connect the signal inputs to the jacks at the projector's rear panel corresponding to the signals. (*Figure 3-5*)
- If using an Extron switcher, connect it to output marked CONTROL OUT (*Figure 3-5*).
- If using an IR Repeater, connect it to the telephone-style connector next to the CONTROL OUT jack. Use the IR Repeater for distances 50' from the projector to the IR remote (note that IR distances are for **LINE OF SIGHT** only).