

Elite External Visual System		3/21/2003
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# 1 Elite External Visual System

## 1.1 OVERVIEW

Up to six visual systems („channels’) can be connected to Elite and display different camera views of the outside world. The cameras can be positioned anywhere relative to the aircraft and rotated in any angle. Moreover the viewing angles (zoom) can be adjusted to fit any rectangular display device.

The physical connection is a network cable. Every visual regularly broadcasts a packet containing connection information to initiate the communication. Any Elite Prop in the network can read this broadcast and ‘capture’ the sending visual system. There is no need to configure IP-addresses in Elite nor in the visual.

Once the channel parameters are set and stored, a connected visual does not require further user interaction. If a configured visual channel is already running when Elite starts, it is automatically connected to the simulation. If the visual is started during a running simulation the connection button on the visual manager page must be pressed to connect and activate the visual. When Elite shuts down the visuals return to a standby mode. A button on the visual manager page can be used to terminate all visual systems including the visual computers.

Access to the visual manager page can be protected with a password. To choose a new password press the ‚Set Password’ button on the visual manager page. Initially no password is set. The password mechanism provides protection from inadvertently configuration changes, but no security. The password is stored without encryption in the file ‚VisualTCPIP.INI’ in the pref-folder and can be changed or deleted there as well.

## 1.2 INSTALLATION

### 1.2.1 Setting up the network

This chapter describes how to install a small network dedicated to the visual systems. If the computers already are in a network, are communicating with each other and the TCP/IP protocol is installed, this chapter can be skipped.

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**Required hardware:**

standard situation:

- Network cards for every visual generator and the elite computer.
- Network Hub
- Network cables to connect every machine to the hub.

direct connection situation (for one channel only):

- one cross-over network cable connecting elite computer and visual generator

**Installation steps:**

- Install the network hardware and physically connect the network.
- Install the needed network hardware drivers.
- Add the TCP/IP protocol, if is not already installed.
- Configure the TCP/IP protocol; specify a unique IP address for each computer in the network.

**To Verify the connection:**

- Enable MS File-Sharing and share a folder on each computer.
- Check that every computer is accessible by every other computer in the network.

**1.2.2 Read Me**

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```

=====
ELITE Visual Engine (v1.4.30) for Windows                      Feb 2003
Read me first!                                               ELITE Simulation Soltions, Switzerland
=====

```

Dear Customer,

Thank you for purchasing this ELITE add-on.

This file describes the installation steps for ELITE Prop/PCATD in combination with the ELITE Visual Engine. Make sure you read this installation file carefully!

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IF YOU WISH TO PRINT THIS DOCUMENT, INSERT THE MAIN DISKETTE INTO YOUR DISKETTE DRIVE AND OPEN THE FILE "README.TXT" WITH A TEXT EDITOR OR WORDPROCESSOR, AS YOU WOULD A STANDARD TEXT FILE, AND USE THE PRINT COMMAND.

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An ELITE external Visual setup involves a computer that runs the ELITE Pilot or ELITE PCATD (the 'ELITE system') and one or more computers running the ELITE Visual Engine (the 'Visual system').

Required media:

- \* CD1: ELITE V7 CD
- \* FD1: ELITE V7 Installation Disk
  
- \* FD2: ELITE External Visual Add-on Installer for Elite Pilot V7
- \* FD3CH1: ELITE Visual Engine Installation Disk Channel 1
  
- \* CD2GVE: Database Add-on CD (e.g. ELITE GenView Europe)
- \* FD4GVE: Database Add-on Disk for the Host System
- \* FD5GVE: Database Add-on Disk for the Visual System  
(one for all channels)

A) Installing software on the ELITE system (HOST system)

A1) Standard Elite Installation

Installing automatically from Windows 95/98/NT:

1. Before installing the Software, connect the Universal Control Interface (UCI), Control Yoke and other purchased Hardware to the appropriate connectors. Insure that the UCI's green light is on and the yellow light "flickers". See also Hardware Installation Manual for connections.
2. Start Windows.
3. Insert the ELITE V7 Installation Diskette (FD1) into your diskette drive (FIRST).
4. Insert ELITE V7 CD (CD1) (SECOND).
5. The program should auto launch to the Main program installation.  
(if the DEMO program launches, then the diskette was not recognized in the floppy drive and you should manually start the SETUP.EXE on the diskette.)
6. Follow the onscreen installation instructions.

A2) Elite External Visual Add-on

1. Insert the External Visual Add-on Installer Disk (FD2).
2. Start SETUP.EXE on the CD.
3. Follow the onscreen installation instructions.

A3) Database Addon

1. Insert the Database Add-on Diskette for Elite (FD4DB) into your diskette drive (FIRST).
2. Insert Database Add-on CD (CD2DB) (SECOND).
3. The program should auto launch to the Main program installation.

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(if the DEMO program launches, then the diskette was not recognized in the floppy drive and you should manually start the SETUP.EXE on the diskette.)

4. Follow the onscreen installation instructions.

B) Installing Software on multiple Visual systems (VISUAL system)

B1) ELITE Visual Engine

1. Insert the ELITE Visual Engine Installation Diskette (FD3CH1) Channel 1 into your diskette drive on the Visual System 1.
2. Start SETUP.EXE on the diskette.
3. Follow the onscreen installation instructions.
4. If you have only one channel skip the rest of this section.  
For each additional channel X repeat steps 5 through 7.
5. Insert the ELITE Visual Engine Installation Diskette (FD3CHX) Channel X into your diskette drive on the Visual System X.
6. Start SETUP.EXE on the diskette.
7. Follow the onscreen installation instructions.

B2) Database Add-on

1. For every visual system repeat steps 2 through 5 with the same Installation diskette.
2. Insert the Database Add-on Diskette Visual (FD5DB) into your diskette drive (FIRST).
3. Insert Database Add-on CD (CD2DB) (SECOND).
4. The program should auto launch to the Main program installation.  
(if the DEMO program launches, then the diskette was not recognized in the diskette drive and you should manually start the SETUP.EXE on the diskette.)
5. Follow the onscreen installation instructions.

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For more information call: ELITE SIMULATION SOLUTIONS AG, Switzerland  
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## 1.3 CONFIGURATION

### 1.3.1 First time startup

When the visual system is started for the first time, each channel must be manually connected and configured. The connected channels are stored at system shutdown and will be reconnected automatically at the next start.

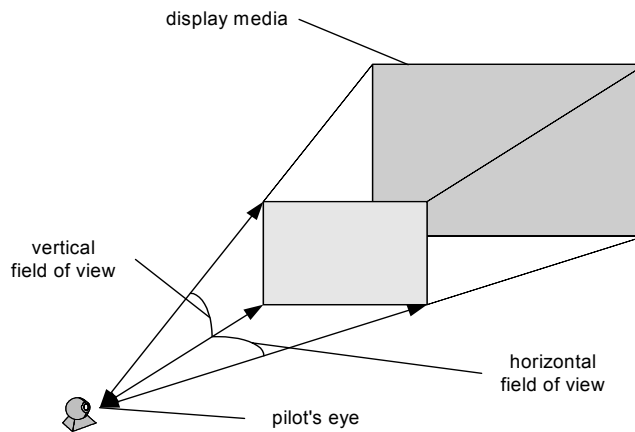
This is the activation procedure:

- Start all visual generators
- Start Elite.
- Go to the visual manager page (Ctrl-Y)
- For every available visual system in the network this page should contain a window displaying properties of that visual.
- Click the ‚CONNECTION‘ button in each window to connect and activate the visual.
- Adjust the viewing cone properties of each channel, see chapter 1.3.1 for details.
- Elite stores the communication settings in a configuration file („(elite)/pref/VisualTCPIP.ini“) when it terminates.

### 1.3.2 Configuring the Views

The visual can be understood as a camera that records a certain portion of the simulation scenery. The camera can be rotated and positioned relative to the aircraft position and attitude. The position is described as an offset from the pilot’s eyes: the distance in meters along the longitudinal, lateral and vertical axis of the aircraft. After changing the position of the camera, the rotation can be set as an additional heading, pitch or bank angle to the aircraft angles.

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**Figure 1**

The 'zoom' of the camera can be adjusted – it's called the field of view. The horizontal field of view is the angle spanned from the left side to the right side of the picture; the vertical field of view is the angle spanned from the bottom to the top of the picture (see Figure 1). To find the correct angle one should measure the angle from the pilot's eye to both edges of the display screen, i.e. the projection screen or monitor.

**Caution:** make sure the ratio between the horizontal and the vertical view angle is the same as the display screen ratio (typically 4:3), otherwise the displayed image will be distorted.

### 1.3.3 Sample Setups

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#### 1.3.3.1 Three projectors (LCD)

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Projector model: **InFocus LP 435Z**

Display resolution: 1024x768 pixels

Brightness: 1000 lumen

Contrast Ratio: 400:1

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Size of the displayed image of each channel: 1.56 m x 1,17 m

Frame size: 0 cm

Distance from the projection surface to the pilot's eye: 1.9 m

Vertical viewing angle: 33,7 deg.

Horizontal viewing angle: 45 deg.

Position offsets: all three cameras have zero offset

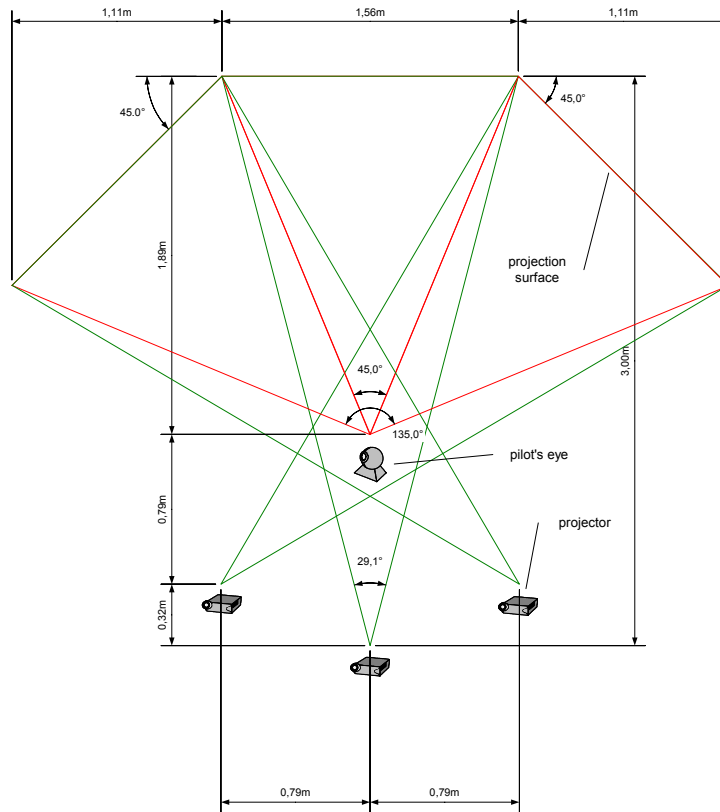
Rotation offset (hdg/pitch/bank):

Left camera (-45 / 0 / 0)

Center camera (0/0/0)

Right camera (45/0/0)

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### 1.3.3.2 Five CRT monitors

Monitor model: **Black Trinitron 19"**

Display resolution: 1024x768 pixels

Size of the displayed image of each channel: 0.38m

Frame size: 4 cm

Distance from the display surface to the pilot's eye: 0.7 m

Vertical viewing angle: 22.5 deg.

Horizontal viewing angle: 30 deg.

Position offset: all five cameras have zero offset

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Rotation offset (hdg/pitch/bank):

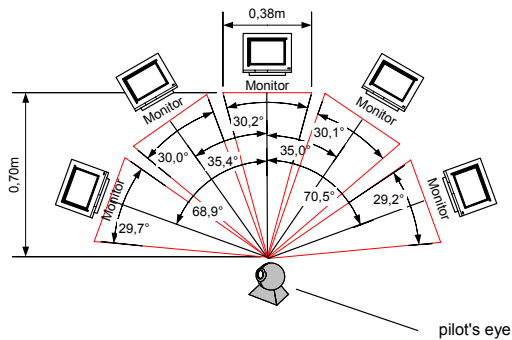
Far left camera (-46/0/0)

Center left camera (-23/0/0)

Center camera (0/0/0)

Center right camera (35/0/0)

Far right camera (70/0/0)



### 1.3.3.3 Three plasma screens

Model: Sony 42"

Display resolution: 1024x768 pixels

Size of the displayed image of each channel: 9.2m x 5.1m

Frame size: 4 cm

Distance from the display surface to the pilot's eye: 1.25 m

Vertical viewing angle: 22,4 deg.

Horizontal viewing angle: 40 deg.

Position offset: all three cameras have zero offset

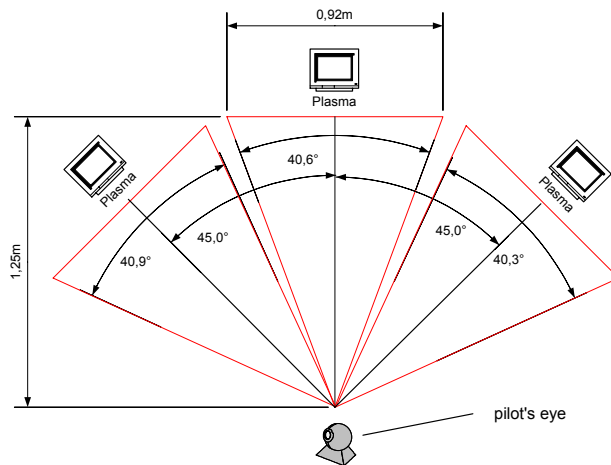
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Rotation offset (hdg/pitch/bank):

Left camera (-45 / 0 / 0)

Center camera (0/0/0)

Right camera (45/0/0)



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## 1.4 USER INTERFACE

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### 1.4.1 Standard startup and shutdown

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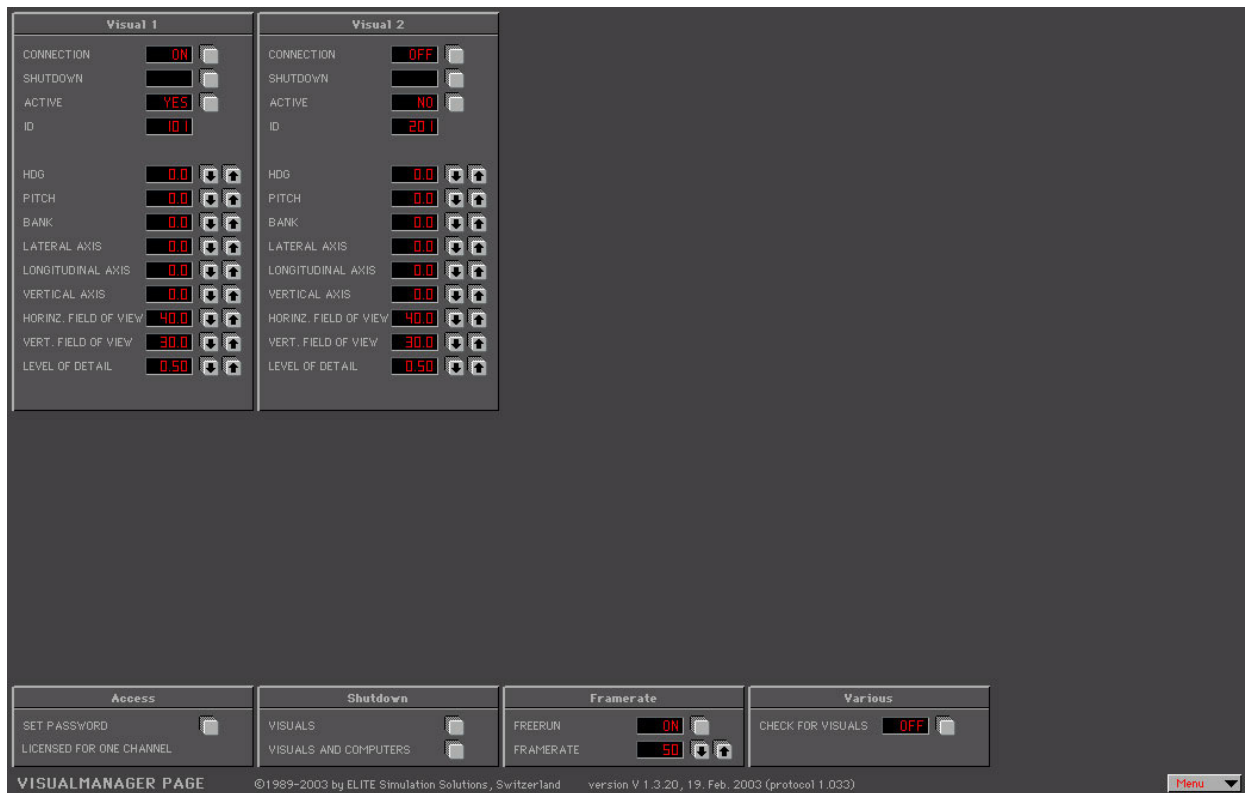
The visual system is reconnected automatically after the initial configuration is completed. It is necessary to start the visual computers before starting elite, therefore the standard startup sequence is this:

- Start all visual generators
- Start Elite.

To terminate the visual systems including the visual computers press the button "VISUALS AND COMPUTERS" in the panel "SHUTDOWN" on the visual manager page.

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## 1.4.2 Manager Page



The Visual Manager Page contains a panel for each channel (up to 6) and four additional panels for some overall settings.

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### 1.4.3 Channel Panel

On the visual manager page the parameters for each connected visual system can be adjusted.

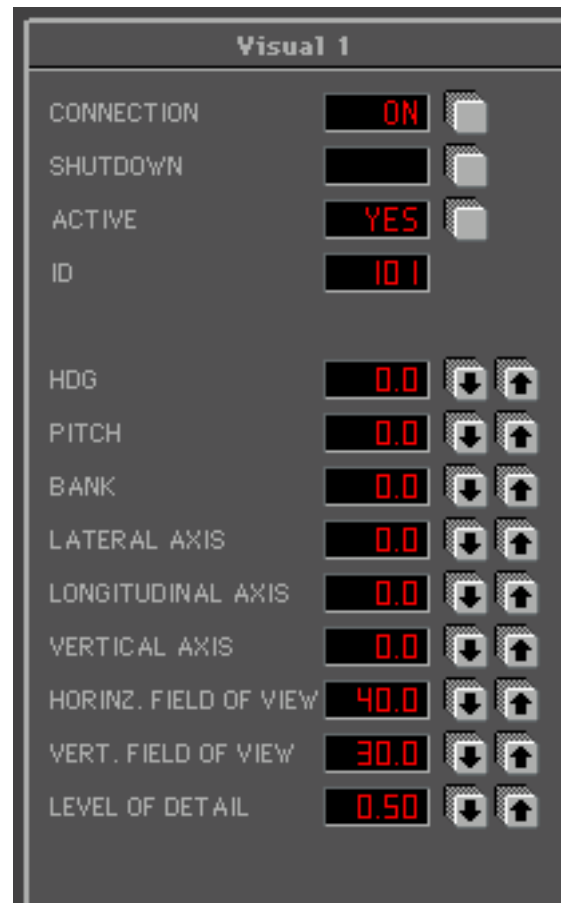
**CONNECTION:** (Toggle) Initializes or terminates the communication with the visual. Only connected visuals are stored in the configuration file.

**SHUTDOWN:** Press this button to quit the visual application.

**ACTIVE:** (Toggle) The datastream to the visual can be interrupted by deactivating the visual.

**ID:** The identification number of the visual.

**HDG, PITCH, BANK:** camera attitude offset relative to the aircraft attitude (in degrees).



**LATERAL AXIS:** camera position offset in meters from the aircraft center along the lateral axis. The positive lateral axis is on the left wing of the aircraft.

**LONGITUDINAL AXIS:** camera position offset in meters from the aircraft center along the longitudinal axis. The positive longitudinal axis is forward on the fuselage of the aircraft.

**VERTICAL AXIS:** camera position offset in meters from the aircraft center. The positive vertical axis is straight up.

**HORIZONTAL FIELD OF VIEW:** The left-to-right opening angle covered by the camera view in degrees.

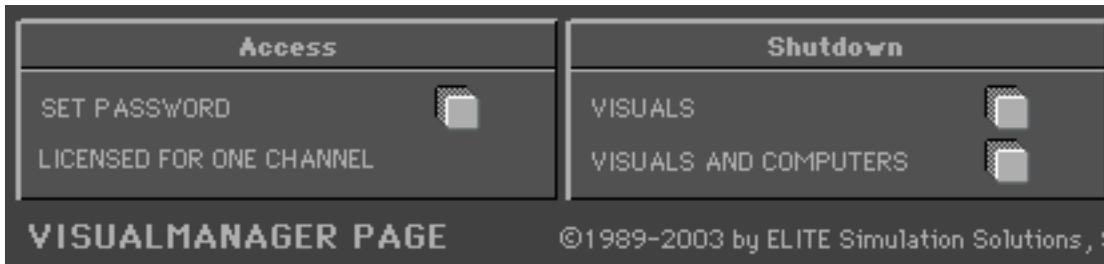
**VERTICAL FIELD OF VIEW:** The bottom-to-top opening angle covered by the camera view in degrees.

**LEVEL OF DETAIL:** Allows adjustment to the level of detail of the visual (range 0-1). At a high level (1) the size of the drawn scene and the image quality is greater but the framerate is lower.

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#### 1.4.4 Additional panels

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##### Panel Password

###### SET PASSWORD

Access to the visual manager page can be protected by a password. The password can be set or changed by pressing the 'SET PASSWORD' button. If a password is set, the user is prompted for the password before every access to the page. Initially no password is set.

##### Panel Shutdown

When Elite terminates, the visual returns to standby mode. The shutdown panel holds buttons to terminate the visual systems.

Button 'VISUALS': Terminates all connected visual channels - only the application is closed, the operating system keeps running.

Button 'VISUALS AND COMPUTERS': Terminates all connected visual channels -closes the application and shuts the computer down, ELITE it closed as well.

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## Panel Framerate

### FRAMERATE

This is the rate at which position updates are sent to the image generators.

### FREERUN

If *FREERUN* is set to ON, the image generator draws as many frames as possible.

If *FREERUN* is set to OFF, each frame is triggered by a position update. If the generator can render the current scene at 60 Hz and *FRAMERATE* is set to 50, the resulting actual frame rate is 50 Hz. If the image generator can render the current scene at 30 Hz and *FRAMERATE* is still set to 50 Hz, the actual frame rate will drop to 25 Hz

## Panel Various

### CHECK FOR VISUALS

The "*CHECK FOR VISUALS*" button displays the status and allows manually activating and deactivating the mechanism described below. Once the system is configured and running, the status should be OFF.

If an image generator is available - connected to the LAN, but not attached to a visual manager - it regularly broadcasts its connection information on the LAN. By default, the visual manager regularly checks for available image generators and displays them on the visual manager page. When the first image generator has been connected, the visual manager stops checking for additional image generators and the status display goes to "OFF".

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