



Digi-Presenter Manual

RESEARCHED AND WRITTEN BY JO-ANNE GREEN

CO-DIRECTOR, NEW RADIO AND PERFORMING ARTS, INC.

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FOREWORD

In January 2004, NYSCA's Presenting Program launched an initiative for New York State Presenters to learn about developments in digital technologies and the performing arts. Over the past two years, a core group of presenters have met in New York City and in Albany to attend performances and events, meet with artists, attend roundtables, visit digi-ready venues, present work, and share project notes. From Binghamton to Brookville, from Game Boy Music to laptop storytelling, from a historic country church to an outdoor park festival, New York State presenters have taken the challenge this season to introduce digi-work to their communities. Much more is in store.

The "Digi-Presenters" requested a guide to which they could refer when considering, negotiating and/or presenting digi-based work. Therefore, the Presenting Program asked Jo-Anne Green, Co-Director of New Radio and the Performing Arts, Inc., to create *The Digi-Presenter Manual*. Ms. Green blogs on [networked performance](#), a rich resource of emerging technologies in the networked arts.

We are pleased to end the year with the publication of *The Digi-Presenter Manual*. Jo-Anne Green has researched and written a comprehensive toolkit for presenters which will help them to master digital terminology, problem solve technical issues and experiment with programming. We thank her for her excellent and thoughtful effort. We hope this manual becomes a useful and handy tool for you and your community, and we welcome your feedback.

Bella Shalom
Director, Presenting Program

Jeanette Vuocolo
Project Organizer

1. Introduction

This glossary is designed for the presenter so that he/she can be fluent in basic terminology of the performing arts in the digital age. It will contain terms referred to in Digi-Presenter Primer, core basics, new and upcoming terminology and references. With this tool, it is hoped that the presenter will be able to negotiate a variety of situations from working with artists and technical staff, to speaking with the board, funders, educators, and audiences.

Major technological additions to live performances in the last decade (at least) are computers, computing, and networks. Synonyms for “computers” and “computing” are “hardware” and “software,” the former being “material” with the latter being “digital code.”

Computers can take the form of desktop, laptop, and/or portable devices worn or carried on performers’ bodies.

Computing refers to the processing of information/software—often developed by the performer/company, other times commercially available—installed on the computer(s).

Networks enable the devices to communicate with one another and can be *distributed* or *autonomous*. “Distributed” networks cover large geographic areas and include the Internet and cellular phone networks. “Autonomous” networks can be set up in small, local areas where only those in close physical proximity can access them.

“Autonomous” networks can also consist of “feedback loops” whereby devices communicate with one another in a circular fashion. An example might be devices worn by dancers that communicate with a laptop computer which, in turn, projects an image/sound into the physical space (onto screens/other objects or via speakers); video cameras or audio recording devices may then capture the images/sounds and feed them back into the software which then responds, and from which the performers take their next cues.

2. Presenters' Responsibilities

COMPUTERS/HARDWARE: Presenters will **sometimes**—though not often—have to provide *some* of the hardware.

COMPUTING/SOFTWARE: Performers or performing arts companies will *almost always* bring their own software to an event.

NETWORKS: Presenters will **always** have to provide **Internet access**, and will **often** have to supply **cables** that connect the performers' devices to their sound and projection systems.

While it is safe to say that **a performance venue *should* be able to provide broadband Internet access and at least one projector**, because performers' computer, computing, and networking needs vary so widely, we have compiled a list of possible questions to prepare the presenter for her initial technical conversation with potential performers. We recommend that you browse the Performance Technology and Core Basics sections before going on to Section 3.

3. What Presenters Need To Know About Their Own Technical Infrastructure

- **Do we own a digital projector?**
 - How many lumens is it?*
 - Is it permanently installed?*
 - Where are the access points and what type of connectors are they?*
 - How far away from the stage or performer's location is it?*
 - Is it installed for rear projection or front projection?*
 - Do you have extra projector lamps on hand?*
- **Do we own a VGA cable?**
 - If yes, how long is it?*
 - Does it have a Mac adaptor?*
 - What type of Mac computer do you have?*
- **Do we own a screen?**
 - If yes, how large is it?*
 - Can the projector fill the full size of the screen?*
 - If not, what is the projection image size?*
 - What is the format? (16:9 widescreen? 4:3 tv format?)*
 - Is it permanently installed?*
 - What material is it made of?*
 - Can it retract?*
 - Is it on a motor?*
 - Is it capable of rear projection?*
 - Does it touch the floor?*
- **Can we make a computer(s) available for the performance?**
 - If yes, what type(s) of computer(s) are they?*
 - What is the processing speed?*
 - What kind of Operating System does it run? (e.g. Pentium Processor; 1.5Ghz, 512MB Ram, Windows XP)*
- **Is the auditorium wired for the Internet?**
 - Do we have broadband access?*
 - If yes, where are the Ethernet ports?*
 - How many are there?*
 - How much bandwidth do we have for streaming?*
 - Do we have wireless broadband access?*
 - If yes, do we need special access?*
- **Do we have our own server?**
 - If yes, what kind?*
 - Does it have a firewall?*
 - If yes, do we need special access?*

- **Lighting?**

What type of lighting is in the space?

Can a performer's body be used as a projection surface?

Can all "errant light" be focused away from the projection screen?

4. What Presenters Need To Ask Performers

- What kind of computer(s) will you be bringing?
- Where in the space will your computer(s) need to be?
- Will we need to provide a “total blackout” for your performance?
- Will you need to connect to our amplification system?
Do you have your own cable?
How long is it?
What kind of sound output does your equipment have? (e.g. 2xRCA Jacks or XLR)
- Will you need to connect to our projector or will you be bringing your own?
Do you have an adaptor (usually only necessary if the computer is a Mac)?
Do you have a VGA cable?
How long is it?
How many hours will you be running our projector
Do you have spare lamps for your own projector?
- How large a screen do you need?
- Do you need to connect to the Internet?
How long a cable do you need?
How fast a connection will you need?
How much bandwidth will you consume?
Do you have access to a streaming server?

In some cases, artists/performers will have a general list of equipment needs on their web sites or available by other means. For instance, Barbara Lattanzi provides the following information with regard to her performance “Do Video Objects Have Tails?” on <http://www.wildernesspuppets.net/yarns/indexframeset.html>:

Equipment supplied by Barbara Lattanzi:

- Dell PC laptop computer
- Samson Audio Mixer

Equipment supplied by Host:

1. multimedia projector and screen
2. cable (for connection between projector display and computer)
3. audio amplification system
4. audio speakers

After finding out where your projector, speakers, and amplification systems are located, questions for Barbara might be:

1. Where will you be setting up your computer? How large a screen will you need?
2. How long a VGA cable will you need?
3. Do you have a cable to connect your computer to our amplification system? If so, how long is it? If not, what kind of cable do you need?
4. How many speakers will you need? Where will you need them to be set up?
5. Does the sound system need to be stereo? Can it be mono? Do you have surround sound?

Also see *Troika Ranch's* technology requirements for **16[R]evolutions** here:
<http://www.troikaranch.org/16revs/staging.html>

5. Performance Terminology

COMPUTERS/HARDWARE: Today, the world of personal computers is basically divided between [Apple Macintoshes](#) and PCs. The principal characteristics of personal computers are that they are single-user [systems](#) and are based on microprocessors.

Mac/Macintosh: Made by Apple—which introduced one of the first and most popular personal computers, the Apple II, in 1977—this computer has its own operating system and GUI (graphical user interface). More http://www.webopedia.com/TERM/M/Macintosh_computer.html

PC: In 1981, [IBM](#) entered the fray with its first personal computer, known as the [IBM PC](#). The [IBM PC](#) quickly became the personal computer of choice, and most other personal computer manufacturers fell by the wayside. Other companies adjusted to IBM's dominance by building IBM [clones](#), computers that were internally almost the same as the IBM PC, but that cost less. Because IBM clones used the same microprocessors as IBM PCs, they were capable of running the same [software](#). Many PCs use Microsoft Windows operating systems. More http://www.webopedia.com/TERM/P/personal_computer.html

COMPUTING/SOFTWARE: Sets of instructions or data that tell a computer what to do. Software is often divided into two categories: *application software*, which includes programs that perform specific tasks (e.g., word processors, spreadsheets, and databases); and *system software*, which includes the [operating system](#) (e.g., Windows, MacOSX, Unix) and all utilities that enable the computer to function.

Operating System: Every general-purpose [computer](#) must have an [operating system](#) to run other programs. [Operating systems](#) perform basic tasks, such as recognizing [input](#) from the [keyboard](#), sending [output](#) to the [display screen](#), keeping track of [files](#) and [directories](#) on the [disk](#), and controlling [peripheral devices](#) such as [disk drives](#) and [printers](#).

For large systems, the operating system has even greater responsibilities and powers. It is like a traffic cop -- it makes sure that different programs and [users](#) running at the same time do not interfere with each other. The operating system is also responsible for [security](#), ensuring that unauthorized users do not [access](#) the system. More http://www.webopedia.com/TERM/O/operating_system.html

UNIX: A computer [operating system](#) developed in the early 1970s. Unix (pronounced "YOU-nicks") is widely used in high-end workstations and servers. Many variants of Unix have been developed, including Sun Solaris, Free BSD, [Linux](#), and [MacOSX](#). More <http://www.webopedia.com/TERM/U/UNIX.html>

Cables:

VGA Cable: A cable that connects a laptop to a data/video projector.

Audio Cables: vary depending on computer type and audio system type.

Ethernet Cables: connect computers to routers or modems for Internet access.

Projectors:

Digital/Data/Video Projector: An **LCD** (Liquid Crystal Display) or **DLP** (Digital Light Processing) projector, for displaying video or computer data. Also referred to as a *multimedia* projector. *There are multiple brands and degrees of technical sophistication; the higher their lumens (see Core Basics, page 17) and resolution output, the more expensive they tend to be.*

Innovative Projection Systems:

The Media Beam: a special projection system that accommodates almost any type digital input including digital video (pre-recorded or live,) and Flash animation, as well as JPG, GIF, or BMP graphics. The Media Beam's control system also allows users to correct an image's perspective, size / scale, rotation (X-Y,) and skew, allowing theatrical projection to take place anywhere on stage, onto a variety of surfaces. The Media Beam allows projected imagery to move along with stage action. More <http://www.digitalperformance.org/mediabeam.htm>

Screens:

CRT (Cathode-Ray Tube): the technology used in most televisions and computer display screens. A CRT works by moving an electron beam back and forth across the back of the screen. Each time the beam makes a pass across the screen, it lights up phosphor dots on the inside of the glass tube, thereby illuminating the active portions of the screen. By drawing many such lines from the top to the bottom of the screen, it creates an entire screenful of images.

High Gain Screen: A screen that uses one of many methods to collect light and reflect it back to the audience, which dramatically increase the brightness of the image over a white wall or semi-matte screen. Technologies used include curved screens, special metal foil screens (some polarized), and certain glass bead screens. Prices and performance vary tremendously.

LCD (Liquid Crystal Display): A type of display used especially in small portable electronic devices (digital watches & clocks, cell phones, PDAs, etc.) as well as laptop computers and some flat-panel monitors and TVs.

DPI (Dots Per Inch): A *resolution* (often used interchangeably with "resolution") measure for printers, computer monitors, projectors and screens. The higher the resolution (i.e. number of dots/pixels per inch), the more crisp the image quality.

Flat Panel Display: A display that uses LCD technology, which allows both the screen to be flat and the body of the monitor to remain very slim, due to the absence of the CRT tube in most monitors.

HDTV: High-definition television. A format for TV broadcasts that allows for a higher-quality picture.

PLASMA Display: A **plasma display** is an emissive flat panel display where light is created by phosphors excited by a plasma discharge between **two** flat panels of glass. Plasma displays are bright (1000 lx or higher for the module), have a wide color gamut, and can be produced in fairly large sizes, up to 200 cm (80 inches) diagonally. They have a very high "dark-room" contrast, creating the "perfect black", desirable for watching movies. The display panel is only 6 cm (2 1/2 inches) thick, while the total thickness, including electronics, is less than 10 cm (4 inches). Plasma displays use as much power per square meter as a CRT or a AMLCD television; in 2004 the cost has come down to US\$1900 or less for the popular 42-inch diagonal size, making it very attractive for home-theatre use.

However, since the power consumption is proportional to the square of the diagonal size, the larger screen sizes can use considerable power—"as much as 700 watts of power, enough to make some critics worry about the environmental consequences if the displays are widely adopted." The lifetime of the latest generation of PDPs is estimated at 60,000 hours to half life when displaying video. Half life is the point where the picture has degraded to half of its original brightness and intensity, which is considered the end of the functional life of the display. *Wikipedia:* http://en.wikipedia.org/wiki/Plasma_screen

New Screen Materials/Alternatives:

Stewart Filmscreen Corporation:

http://www.stewartfilm.com/screen_materials/index.jsp?proj_loc=Front

Goo Systems (<http://www.goosystems.com/index.php>): Screen Goo products are specially formulated, color corrected, *screen coatings in liquid form*. Front projection Screen Goo can be applied to any smooth paintable surface. They are designed to achieve the highest performance levels possible for a given display situation. Reviewed here http://www.projectorcentral.com/goo_systems_projector_screens.htm

NETWORKS: A set of conjoined computers that can share storage devices, peripherals, and applications. Networks may be connected directly by cable connection, or indirectly by telephone lines or satellites, and can be part of a small-office system or global web of numerous other networks.

Distributed Performance:

Bandwidth: The capacity of a network or data connection to transmit data. **BPS** (Bits Per Second) is the measure of data transmission for a modem or network. As the name implies, bits per second is the number of bits that pass a certain point in one second.

All computers connect to the Internet via a **Server**. A **Server** is a computer that delivers information and software to other computers linked by a network. Many Servers are “hosted” (for a monthly fee) by commercial companies in their own physical storage facilities. The “hosting” company bases their rates to the client on how much bandwidth the client uses monthly. Typically, audio and video files streamed on the Internet will use large amounts of bandwidth; the larger the number of “users”/audience simultaneously logged on to a site, the more bandwidth the site will consume. *Thus, when estimating the costs of a live, streamed Internet performance, projecting the amount of bandwidth consumption is essential when determining the total cost of the event.*

The number of BPS influences the speed at which the actions of the performers are transmitted via the Internet to the receiving performers or audience. In a live situation, a slow transmission rate will result in delays, glitches, or artifacts in the sound and image streams.

Broadband: Broadband refers to the ability of the user to view content across the Internet that includes large files, such as video, audio and 3D. Broadband refers to an increased ability to do so. The term narrowband can refer to the inability to do so.

A users’ broadband capability is typically governed by the connection between the ISP (Internet Service Provider, for example, Verizon, or Comcast) and the user.

All broadband services require specialized hardware, for example **modems**. A Modem is an electronic device that converts computer signals into analog signals in order to transmit data over a telephone line (i.e. telephone lines are not inherently compatible with computers, so the modem was designed to format computer information for telephone technology). Examples of Broadband services/hardware are:

Cable Modem: A cable modem is used for connecting to the Internet using the cable TV infrastructure. It offers high speed Internet access.

DSL (Digital Subscriber Line) Modem: A network that runs over traditional phone lines but provides much faster service than dial-up or its predecessor, ISDN.

T1: A dedicated digital communications connection supporting data rates of 1.544Mbits per second. A T1 line actually consists of 24 individual channels, each of which supports 64Kbits per second. Each channel can carry voice or data traffic. *This is the fastest transmission route except for Internet 2.*

Internet 2: Internet 2 is a nationwide project to develop advanced network applications to facilitate the research and education missions of universities. There are over 180 leading universities, in partnership with industry and government that develop and

deploy the advanced network applications and technologies that comprise Internet 2. Internet 2 is many times larger and faster than the Internet we commonly use. This makes it optimal for live, streamed performance, as its high transmission speeds cut the delay and can make “lag” unperceivable. For more information, [see the Internet 2 Web site](#).

Wireless Modem: A service that allows a computer to access the Internet without a cable.

Ethernet: Ethernet is a network standard of communication using either coaxial or twisted pair cable. The most widely used for LAN (Local Area Network) communication, Ethernet typically runs at 10 megabytes per second, though newer systems use 100 Mbps, for every gigabit of transfer.

Firewall: In its most basic terms, a firewall is a system designed to control access between two networks. There are many different kinds of firewalls—packet filters, application gateways, or proxy servers. These firewalls can be software programs or dedicated hardware devices that were designed solely as firewalls. *Simply put, Firewalls protect computers from ‘harmful’ data coming into computers via the Internet, but in doing so; they can impede efforts to send information out. Therefore, it is important for performers to know whether the host’s server is protected by a Firewall because this could impact their ability to send and receive data.*

FTP (File Transfer Protocol): A standard [protocol](#) for transferring files between computers over a network (used, for example, when uploading data to a Server). *Performers may need to access a presenter’s Server. This would mean that the presenter needs to have their own system administrator set up a folder, login, and password for the performers beforehand.*

Streaming Media: Streaming Media is [media](#) that is consumed (read, heard, viewed) *while* it is being delivered. Streaming is more a *property* of the delivery system than the media itself. The distinction is usually applied to media that is distributed over computer networks; most other delivery systems are either inherently streaming (radio, television) or inherently non-streaming (books, video cassettes, audio CDs). The word "stream" is also used as a verb, meaning to deliver streaming media.

Streaming Media is a technique for transferring data such that it can be processed as a steady and continuous stream. Streaming technologies are becoming increasingly important with the growth of the [Internet](#) because most users do not have fast enough access to download large [multimedia](#) files quickly. With streaming, the [client browser](#) or [plug-in](#) can start displaying the data before the entire file has been transmitted.

For streaming to work, the client side receiving the data must be able to collect the data and send it as a steady stream to the application that is processing the data and converting it to sound or pictures. This means that if the streaming client receives the data more quickly than required, it needs to save the excess data in a [buffer](#). If the data doesn't come quickly

enough, however, the presentation of the data will not be smooth. There are a number of competing streaming technologies emerging. For audio data on the Internet, the de facto standards are Progressive Network's RealAudio and Apple Computer's QuickTime.

Telematic Performance is one in which the interaction is either between people geographically separated or between a person and a machine geographically separated.

Autonomous Networked Performance:

Wi-Fi (Wireless Fidelity): Used generically to refer to any kind of wireless computer network.

Bluetooth: A protocol for short-range wireless communication between multiple kinds of devices, like PDAs, computers, and cell phones that provides transfer speeds of up to 2Mbps. *To access a wireless network, a computer must have a Bluetooth or equivalent device installed on it (analogous to a modem).*

GIS (Geographic Information System): Specialized database for storing and manipulating geographic information.

GPS (Global Positioning System): Comprised of 24 satellites, the system is used to identify locations around the earth and can find a signal's location within a few meters. Many cell phones and other PDAs are now equipped with GPS.

LAN (Local Area Network): Two or more computers, usually within a single room or building that are connected so they can interact with each other.

PCS (Personal Communications Services): are similar to cellular telephones. Sometimes referred to as digital cellular, PCS enables users to enjoy greater mobility, offering fewer blind spots and transmission errors than cellular technology, which emphasizes coverage on highways and major roadways.

PDA (Personal Digital Assistant): Generic term for handheld devices such as Palm Pilots that are commonly used to store address and calendar information. Newer models may include networking features as well as cell phones and cameras. Many such devices are now equipped with locative media such as GPS.

Example: **iPAQ:** The iPAQ is a Pocket PC and personal digital assistant first introduced by Compaq in November 1999. The device is the main competition to the Palm Pilot, but provides more multimedia capabilities and the familiar Microsoft Windows interface. Higher end units were very modular, having "sleeve" accessories which would slide around the unit and add functionality like a card reader, wireless networking, GPS, and even wikipedia.org.

6. Core Basics

Asynchronous: Any transmission technique that does not require a common clock between two communicating devices, but instead derives timing signals from special bits or characters imbedded in the data stream itself.

Back Room Projector: A projector with a "long-throw" lens designed to be used from the far back of the room, often in a projection booth, balcony, or back of an auditorium. Many typical projectors have third party lenses available for "long-throw" applications.

Backlit Projector: Refers to a remote control, or on projector control panel, that has buttons and controls that are illuminated. This is a major asset when using the projector in a darkened or semi-darkened room. Many projectors have backlit remote controls, while the number of projectors with backlit control panels is growing.

Blog (weB LOG): A blog is basically a journal that is available on the Web. The activity of updating a blog is "blogging" and someone who keeps a blog is a "blogger." Blogs are typically updated daily using software that allows people with little or no technical background to update and maintain the blog. Postings on a blog are almost always arranged in chronological order, with the most recent additions featured most prominently.

Browser (or Web browser): An application (such as Mozilla Firefox or Microsoft Internet Explorer) that locates and displays a Web page, allowing the user to jump from place to place by selecting highlighted text or graphics.

CODEC (Code/Decode, Compression/Decompression): Originally a device used in the telecommunications industry for converting voice signals from analog to digital for use in digital transmission schemes (over fiber-optics, GSM mobile, etc.), and re-converting them back to analog. The term is now used to include the conversion of analog video and audio signals into a digital form and the subsequent compression of these signals to *conserve bandwidth*. Most codecs used for video and audio signals use a proprietary conversion algorithm scheme.

Compression Artifacts: Compacting of a digital signal, particularly when a high compression ratio is used, may result in small errors when the signal is decompressed. These unwanted defects are known as artifacts. Artifacts may resemble noise or edge busyness or may cause parts of the picture, particularly fast moving portions, to be displayed with the movement distorted or missing.

CPU (Central Processing Unit): Think of the CPU, or microprocessor, as the brain of a computer system. The CPU is a chip that deciphers and initiates your commands.

Digital: Using a limited, predetermined numbering system to measure or represent the flow of data. Modern computers are digital because they use the fixed binary digits 0 and 1 to represent all data.

Download: To transfer a file from a remote computer — through a network connection or modem — to the hard drive of the user's computer.

DVD (Digital Video Disc): A special type of disc with greater data storage capacity and access rate. Commonly used as a medium for movies and other video data, but can hold any kind of data.

DV Tape (Digital Video Tape): Tape used to store digital video; instead of actually storing images and sound, it stores the movie as a file, like on a computer.

Expansion Card: A special-purpose circuit board that can be inserted into your computer to give it additional capabilities. For example, a network interface card.

Firewire: The trademarked Apple name for an interface used to connect devices with computers, in compliance with the IEEE 1394. Available in both 400Mbps (IEEE 1394a) and 800 Mbps (IEEE 1394b) speed (usually called Firewire and Firewire 800, respectively). A single port on a computer can be used to connect up to 63 devices by plugging them into each other.

Gigabit (Gbps): In data communications, a gigabit is one billion bits, or 1,000,000,000 bits. It's commonly used for measuring the amount of data that is *transferred in a second between two telecommunication points*. For example, Gigabit Ethernet is a high-speed form of Ethernet (a local area network technology) that can provide data transfer rates of about 1 gigabit per second.

Gigabyte (GB): Amount of computer storage equivalent to approximately 1 billion bytes or 1,000 megabytes. This measurement is often used when measuring the capacity of hard drives or other storage devices.

GIF (Graphics Interchange Format): One of the two most commonly used formats for Web graphics. More suited for illustrations and graphic art than photographs. See also JPEG.

Gigahertz (GHz): Measurement of a computer's speed equal to approximately 1 billion cycles per second.

GUI (Graphical User Interface). The most commonly used computer interface, exemplified by Microsoft Windows and MacOS. Typical elements of a GUI are a mouse interface and a file system organized to look like a set of folders.

Halogen Lamps: Used in most low and medium priced projectors, these lamps last about 40 hours, with consistent output throughout their life. Although halogens look very white compared to a normal incandescent lamp, they are not as white as metal halide units. Cost of operation: Under \$0.50 per hour. Most projectors using halogen lamps carry a spare lamp inside.

Hard Drive: The main device a computer uses to permanently store and retrieve information. These drives are typically sealed boxes found inside the computer. Also called a "hard disk."

Hertz (Hz): Hertz refers to the number of electrical vibrations or cycles per second. One Hertz is equal to one cycle per second.

Interface: The point of meeting between a computer and an external entity, whether an operator, a peripheral device or a communications medium. An interface may be physical, involving a connector, or logical, involving software.

IP (Internet Protocol) Address: The address of a computer on a TCP/IP (Transmission Control Protocol/Internet Protocol) network. IP addresses are written as four groups of up to three digits (e.g., 169.237.104.18).

Kilobits (Kbps): one thousand bits per second. A measure of data transmission speed.

Kilobyte (KB): An amount of storage equivalent to 1,024 bytes, or about 1,000 characters of information.

LASER (Light Amplification by Stimulated Emission of Radiation): A very pure and intense beam of light formed within a crystal, or the device that creates the light.

Linux: Linux is an open-source operating system derived from the Unix operating system. It is often used to run servers.

Long Throw Lens: A lens designed for projection from the back of a room, or rather the back of a long room. Long throw lenses would be used a projection booth in the back of a theater, etc. A typical long throw lens might have to be 50 to 100 FT back to project a 10FT diagonal image (also known as "throw ratio).

Lumens [also ANSI Lumens or Lux]: ANSI lumens is a measurement of the overall brightness of a projector. Because the center of a projected image is brighter than the corners, ANSI lumens is a the most accurate representation of the image brightness. ANSI lumens are calculated by dividing a square meter image into 9 equal rectangles, measuring the lux (or brightness) reading at the center of each rectangle, and averaging these nine points.

Megabits (Mbps): one million bits per second. *A measure of data transmission speed.*

Megabyte (MB): A measurement of computer storage that equals 1,048,576 bytes (1,024 Kilobytes). Bytes are typically represented in computer terminology by an upper case "B." Colloquially referred to as a "meg."

Megahertz (MHz): one million cycles per second. A measure of the speed of a microprocessor (sometimes referred to as the computer's "clock speed").

Metal Halide Lamp: The type of lamp used in many medium and high end portable projectors. These lamps typically have a "half-life" of 1000-2000 hours. That is they slowly lose intensity (brightness) as they are used, and at the "half-life" point, they are half as bright as when new. These lamps output a very "hot" temperature light, similar to mercury vapor lamps used in street lights. Their whites are "extremely" white (with slight bluish cast.) and make Halogen lamp's whites look very yellowish by comparison.

MIDI (Musical Instrument Digital Interface): A digital communications language that allows multiple electronic instruments, controllers, computers and other related devices to communicate within a connected network. MIDI is an asynchronous, serial interface, which is transmitted at the rate of 31.25 KBaud or 31,250 bits per second.

Modem (MOdulator-DEModulator): A device used to transform digital data sent by a computer to analog format suitable for transmission over a telephone line. It also transforms analog signals back to the digital form. A modem is required for the dial up connection to the Internet.

Motion Capture: A technique of digitally recording the movements of real things—usually humans—it was originally developed as an analysis tool in biomechanics research, but has grown increasingly important as a source of motion data for computer animation. In this application, it has been widely used for both cinema and video games.

MPEG (Motion Picture Experts Group): Refers to a multimedia graphics, movie, and sound format; higher numbers indicate standards that were developed later. For example, MPEG-3 (MP3) provides near-CD quality sound with relatively small file sizes.

Multimedia: The combination of audio, video, animation, text, and graphics.

Open Source: Computer programs or operating systems for which the source code is publicly available are referred to as open-source software. Inherent in the open source philosophy is the freedom of a distributed community of programmers to modify and improve the code. The most widely known example of open-source software is the Linux operating system.

OS (Operating System): The software on your computer that controls the basic operation of the machine. The operating system performs such tasks as recognizing keyboard input, sending output to the monitor, keeping track of files and directories on the disk, and controlling other connected devices such as disk drives and printers.

OS X: The Macintosh operating system introduced in 2002, OS X was significantly different from the previous operating system (OS 9). OS 9 applications can only run under a special mode of OS X. Several updated versions of OS X are available, usually referred to as decimals of 10 (10.1, 10.35).

PCS (Personal Communications Services): are similar to cellular telephones. Sometimes referred to as digital cellular, PCS enables users to enjoy greater mobility, offering fewer blind spots and transmission errors than cellular technology, which emphasizes coverage on highways and major roadways.

Platform: A combination of hardware and system software forming the basis for a computer system. Examples include Macintosh, PC, NT, and UNIX. The term "cross-platform" refers to programs and formats that can be used on more than one platform.

POP (Post Office Protocol): POP is a way of retrieving email from an email server (called a POP server).

PPP (Point-to-Point Protocol): A method of connecting a computer to the Internet that connects to a server that is connected to the Internet rather than linking directly to other computers.

Protocol: A set of formal rules and procedures which your computer must support in order to communicate with other computers on a network or through the Internet.

QuickTime: A video and animation system developed by Apple Computer. QuickTime is built into the Macintosh operating system and is used by most Mac applications that include video or animation. PCs can also run files in QuickTime format, but they require a special QuickTime driver. QuickTime supports most encoding formats, including Cinepak, JPEG, and MPEG. QuickTime is competing with a number of other standards, including AVI and ActiveMovie.

RAM (Random Access Memory): RAM is commonly considered synonymous with main memory (i.e., the memory available to programs in use on a computer). Physically, RAM consists of memory chips or chip modules (e.g., SIMMs or DIMMs) which attach to the computer's logic board, the main circuit board inside the computer. Memory modules can continue to be added as long as open slots are available on the logic board.

Real-Time: Any production act that is done in a linear form from start to finish. This would include short segments as well as longer segments. If frames of a media program are created or processed in the frame rate that is the designed final frame rate, that act is considered to be real-time.

Rear Screen Projection: Using an opaque screen, the projector is placed behind the screen, invisible to the audience. It projects onto the screen and the audience sees it on the other side. Good rear projection screens actually produce brighter images than some standard screens. So as not to waste space behind the screen, ideally a projector with a short throw lens is used. Since the projector can be placed even with the middle of the screen, without blocking anyone's view, keystoneing is not a problem. Some mid-room projectors like the Epson have available 3rd party short throw lenses. Since the image is projected through the screen, the image must be reversed.

Resolution: The measure of the ability of a television system to reproduce detail. Related directly to system **bandwidth**. The number of bits determines the resolution of the digital signal. Eight bits is the minimum acceptable for broadcast television. Start of active video in component digital systems. The timing reference that indicates that the active picture area of a video line is beginning.

Router: A dedicated computer (or other device) that sends packets from one place to another, paying attention to the current state of the network. Small businesses will often connect multiple PCs via a router to the Internet; this enables multiple machines to run on a single ISP account.

RSS (Rich Site Summary) or RDF (Rich Document Format): An electronic document users post to another Web site that allows the original publisher to continue updating it remotely.

Sampling: The process during which analog audio is converted into digital information. The sampling rate of an audio stream specifies the interval at which all samples are captured.

SCSI (Small Computer System Interface, pronounced "scuzzy"): An interface standard for connecting peripheral devices to computers. Hardware components for implementing a SCSI interface include connector ports on computers and cables for connecting peripheral devices to the computer. SCSI is being supplanted by the newer USB standard.

Sensor: A device that responds to a stimulus, such as heat, light, or pressure, and generates a signal that can be measured or interpreted.

Server: The control computer on a local-area network (LAN). The server controls software, access to printers, and other parts or functions of the network. The server is usually connected to workstations that share the main system's resources.

Short Throw Lens: A lens designed to project the largest possible image from short distance. Most front room projectors use short throw lens. They are often required for rear projection, where the depth behind the screen is limited. A typical short throw lens might produce a diagonal image size of 10 FT, from a distance of 7 to 10 FT (also known as "throw ratio").

SMPTE (Society of Motion Picture and Television Engineers): SMPTE adopted a standard time code in order to synchronize video and audio. SMPTE information is in the form of Hours, Minutes, Seconds, and Frames. There are two types of SMPTE time code, Longitudinal Time Code which can be recorded on audio tape or one of the audio tracks of a video tape and vertical interval time code which is recorded within the video signal on video tape.

SVGA: SVGA is used to define a specific display resolution. Resolution is defined by the number of individual dots that a display uses to create an image. These dots are called

pixels. An SVGA display has 800 horizontal pixels and 600 vertical pixels giving a total display resolution of 480,000 individual pixels that are used to compose the image delivered by a projector.

Synchronous: Data communications in which transmissions are sent at a fixed rate, with the sending and receiving devices synchronized.

TCP (Transmission Control Protocol): Together with Internet Protocol (IP), TCP is one of the core protocols underlying the Internet. The two protocols are usually referred to as a group, by the term "TCP/IP." TCP enables two computers to establish a connection and exchange information. It guarantees delivery of data and also guarantees that information packets will be delivered in the same order in which they were sent.

USB (Universal Serial Bus): An interface standard for connecting peripheral devices to computers. Hardware components for implementing a USB interface include connector ports on computers and cables for connecting peripheral devices to the computer. There are two USB standards; USB 1.1 (commonly referred to as just USB) supports data transfer rates of 12 Mbps, while USB 2.0 supports up to 480 Mbps. USB 2.0 is fully compatible with USB 1.1. A single USB port can be used to connect up to 127 peripheral devices plugged into each other.

VGA: VGA is used to define a specific display resolution. Resolution is defined by the number of individual dots that a display uses to create an image. These dots are called pixels. A VGA display has 640 horizontal pixels and 480 vertical pixels giving a total display resolution of 307,200 individual pixels that are used to compose the image delivered by a projector.

Videoconference: A discussion made possible by electronic communications between two or more people in different locations. Participants view each other on screens; real-time sound and video is transmitted between locations via the network. See ACCESS Grid: <http://www.accessgrid.org/>

VRML (Virtual Reality Markup Language): Allows display of 3-dimensional imagery on the Web.

7. References, Articles And Web Sites

References:

1. Capturing Unstable Media: Glossary: <http://www.v2.nl/projects/capturing/glossary.html>
2. Glossary of technical terms, acronyms and abbreviations in the telecommunications sector: <http://www.art-telecom.fr/glossaire/glossary.htm>
3. Information and Educational Technology: <http://iet.ucdavis.edu/glossary.cfm>
4. <http://iparenting.com/technology/glossary.htm>
5. Electronic Music: <http://www.electronicmusic.com/datafiles/glossary/athrug.html#a>
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7. LCD & DLP Projectors Glossary: <http://www.projectorcentral.com/glossary.cfm>
8. Sound Glossary: <http://harada-sound.com/sound/handbook/defa-d.html>
9. Wikipedia: http://en.wikipedia.org/wiki/Main_Page
10. Tufts Educational Media Center: <http://www.tufts.edu/orgs/edmedia/gloss.shtml>
11. Learn that: <http://www.learnthat.com/define/>
12. search Google by typing “define:” plus the term.

Articles:

Motion^e Performance Melds Art, Technology:

<http://www.asu.edu/feature/includes/spring05/readmore/motion-e.html>

Toward a Digital Stage Architecture: A Long-Term Research Agenda in Digitally Enabled Theatre [PDF File]: <http://www.gertstein.org/cgi-bin/article.pl?ID=715>

Organizations:

Gertrude Stein Repertory Theatre

<http://www.gertstein.org/firsthome.html>

The Gertrude Stein Repertory Theatre (GSRT) was founded in 1990 to promote and support innovation in the performing arts. To achieve its mission, GSRT is pioneering the application of new technologies to the process of creating live theater. To advance its creative work GSRT has conducted a wide range of research and workshop activities that are facilitated and enhanced by advanced Internet, film, and theatre technologies. Activities are designed to enable traditional artists from a variety of media, including theater artists around the globe, to interact on cross-cultural, inter-media projects. By increasing broad appreciation for the depth and breadth of world theater, and sponsoring research into the development of new tools and processes, GSRT aims to assist the development of new artists and audiences for America's theater. GSRT is also applying the potential of digital technologies to theatrical education for students of all ages and the preservation and dissemination of new and innovative work.

Spotlight on the Media Beam: Furthering the artist's vision with innovation in projection technology: <http://www.digitalperformance.org/mediabeam.htm>

The New Dramaturgy: Theater for the 21st Century Global Performance at the Gertrude Stein Repertory Theatre--The Gertrude Stein Repertory Theatre (GSRT) is pioneering the use of advanced technologies to develop a new theater for the 21st century. Our productions and arts education programs emphasize international collaborations and the merger of performance vocabularies from a variety of media. Our work in these areas has led to new opportunities for expanding the function of theater dramaturgy, as stage artists search for and develop new models for performance using interactive study guides on global performance techniques like Chinese Opera and Indian Dance, and multi-lingual databases for the performing arts. Our productions merge camera and film editing techniques with live theatrical lighting and mobile projections to create characters, sets, and scripts. GSRT's creative teams consist of unorthodox combinations of stage directors, video editors, stage actors, art directors, directors of photography, animators, costume designers, and computer programmers. And GSRT's distance learning courses emphasize interactive textbooks, global teams of educators, and one-on-one interaction with world class artists and masters of the performing arts through video conferencing links.

John Mitchell and ADaPT

<http://www.ephemeral-efforts.com/>

<http://www.dvpg.net/adapt.html>

John D. Mitchell is a multi-disciplinary composer, educator and researcher committed to using technology for expanding sensory and creative experiences in the arts and education. He has worked with artists from around the world to design and realize projects ranging from multimedia dance archives to interactive multi-site distributed performances.

ADaPT, initiated in December 1999, was the brain child of Mitchell while working under the auspices of the Institute for Studies in the Arts at Arizona State University. ADaPT originally included researchers and information technology specialists from five institutions: Arizona State University, The Ohio State University, The University of California, Irvine, The University of Utah, and The University of Wisconsin, Madison. Over the years ADaPT has expanded to include partners in other countries on four continents.

In 1987, Mitchell and choreographer Gary Lund created Movement Initiated Sound Events (MISE), one of the earliest dance works to use a personal computer and optical sensors for creating a completely interactive, performer driven sound score. Over the next three-years Mitchell and Lund produced several dance-driven, interactive multimedia works for the stage, often collaborating with visual artists and live musicians.

Upon joining Arizona State University in 1990 Mitchell became a founding member of the Institute for Studies in the Arts. At the Institute, Mitchell was instrumental in pioneering the development of the Intelligent Stage

(<http://dance.asu.edu/istage/index.html>) – both as a concept and a facility – where he continued to work for the next ten years as a composer, director and interactive media designer. Mitchell has collaborated with numerous artists to create performance works that have been staged throughout United States and abroad. Mitchell currently directs the graduate emphasis in Dance and Technology and teaches interdisciplinary media and telematics courses in the Department of Dance at Arizona State University (<http://dance.asu.edu/sdat05/leaders.html>). See Using Human Movement to Control Activities in Theatrical Environments (<http://www.particles.de/paradocs/bbb/lablan/www/uhm/uhm2.html>) by Robb E. Lovell and John D. Mitchell.

MARCEL

<http://www.mmmarcel.org/>

MARCEL is a permanent broadband interactive network and web site dedicated to experimentation and research across the fields of art, science, education, technology and industry. The network is made up of research centers, media labs, museums, arts organizations and arts practitioners who facilitate research, projects and collaborations which make use of high bandwidth networks - looking towards a future where fully interactive, virtual online experiences are as commonplace and user-friendly as today's relatively static internet.

New Radio and Performing Arts, Inc.

<http://new-radio.org>

New Radio and Performing Arts, Inc. (NRPA) was founded in 1981 to foster the development of new and experimental work for radio and sound arts. From 1987 to 1998, the organization commissioned and/or distributed over 300 original works for public radio and introduced American radio art to European audiences. It was considered the single most influential source of radio art in America. New American Radio is partially archived at <http://someswhere.org>

In 1996, NRPA extended its mandate to net art and launched its pioneering Turbulence web site. Turbulence commissions artists exploring the Internet, and who both use existing applications and technologies and develop new ones to create innovative work. Turbulence has commissioned over **100 works** and hosted more than twenty multilocation streaming performance events (<http://turbulence.org/multilocation/index.html>).

On July 14, 2004, NRPA, along with Michelle Riel, Assistant Professor of New Media & Department Chair, Teledramatic Arts & Technology at California State University Monterey Bay launched the **networked_performance_blog** to explore the shifting paradigms in performative cultural practice. Our goal was to take the pulse of current network-enabled performance practice, to obtain a wide range of perspectives on current issues and interests—which we felt were under-examined—and uncover common threads.

With more than 1,800 entries and 1,600 visitors per day, the `networked_performance` blog reveals an explosion of creative experimental pursuits, as artists investigate the possibilities opened by the migration of computing out of the desktop PC and into the physical world, and by the continuing advances in internet technologies, wireless telecommunications, sensor technologies and Geographic Information Systems (GIS).

See the **networked_performance blog**, <http://turbulence.org/blog> for many more examples of current performance practices.