

Lasershow Designer 2000 *Installation Manual*

May 2006

Lasershow Designer 2000 / Showtime 2000, release 4.0



Pangolin Laser Systems

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Due to our policy of continuous product improvement, information in this manual is subject to change without notice.

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Getting Ready

Congratulations on selecting Lasershow Designer 2000! You now own the most powerful and flexible Windows-based software for creating laser light shows.

This manual serves as a brief introduction to LD2000, so you can install it and get started. There is much more information on-line, in the form of Windows help files. Once you have installed LD2000, check these help files.

- ▶ **There are three versions of Lasershow Designer 2000: LD2000 Professional, LD2000 Basic and LD2000 Intro. This manual covers all programs, except where specifically noted. The LD2000 help file has details about the differences between the programs.**

Pangolin provides you with the Lasershow Designer 2000 CD-ROM disc, a QM2000 board, two cable adapters and this manual.

You must provide a laser projector, and a Windows-compatible computer with at least one PCI-bus slot. You will also need to make a cable to go from the QM2000 outputs to your projector inputs. This manual goes into more detail about these requirements.

Projector Requirements

Lasershow Designer 2000 can run most types of scanner-based laser projectors. The **minimum** requirement for graphics is scanners that can display the ILDA test pattern at 12,000 points per second. This includes General Scanning G-120 closed-loop scanners being driven by older boards such as the Laser Media 22SDA scanner amp, and General Scanning G-124 open-loop scanners being driven by

optimized boards such as the Accelerator 124. In addition, there should be some type of blanking device — either scanner blanking or an acousto-optic modulator (AOM), or direct-modulated laser diodes.

The **recommended** system uses high-speed scanners that can display the ILDA test pattern at 30,000 points per second or greater. This includes Cambridge Technology 6800, 6210 or 6215 scanners using Cambridge scanner amps. (For best results, Pangolin strongly recommends the Cambridge model 6215 scanners and Cambridge scanner amps.) If you are using ion lasers, Pangolin recommends you use a polychromatic acousto-optic modulator (PCAOM) for blanking and color control, such as those made by NEOS Technology, or A+A in Europe. If you are using solid-state lasers, these are generally directly modulated by the laser diode driver or laser power supply.

LD2000 is professional-level software that is designed to get the most out of your projector. As explained in the Output Quality section of this manual, if you do not see the results you expect, don't assume there is a problem with the software or hardware. You may need to adjust some of the parameters in the software, such as output speed, line drawing density and color palette.

Hardware Requirements

Computer

The **minimum** computer requirement is any PC (IBM-compatible) with at least one PCI-bus slot, SVGA (800 x 600 video) and which can run 32-bit Microsoft Windows (95, 98, ME, 2000, XP and VISTA).

Since LD2000 comes with its own computer, the QM2000 board, your Lasershow Designer system will run at the same speed no matter how fast or slow your computer runs. You might want to use a slower or older computer when LD2000 is used to merely playback a show.

However, for creating shows we **highly recommend** a fast computer with multimedia, extra memory, and high-resolution XVGA video. This is because Windows itself can be slow; the extra speed will make windows and graphics draw much faster.

At this time, an ideal computer would be a 2.5GHz Pentium IV computer with 512 megabytes of system memory. It should have

MPC Level 2 multimedia, including a DVD-ROM with a sound card to play MP3, WAV and MIDI audio files.

It must have at least one PCI slot available, for the QM2000 card, or a network (Ethernet) adapter when using the QM2000.NET. If you will be running additional QM2000 cards (to drive multiple scanner pairs), you will need one additional PCI slot per additional QM2000 card.

Pointing device

Many functions within LD2000 require a pointing device such as a mouse, to function. This makes complete sense since the LD2000 drawing program requires pointing input to draw with, and the Showtime timeline-based show creation program requires pointing input for drag and drop operations.

Almost any pointing device will do, including a mouse, trackball, light pen and in some cases, a Wintab-compliant tablet can serve as the pointing device.

Video and monitors

LD2000 is designed to fit onto an SVGA (800 x 600), XVGA (1024 x 768), or larger screen. This is because you do not need to have overlapping windows. You can keep two or three LD2000 windows up in separate parts of the screen.

The video system should support SVGA or XVGA resolution with at least 16-bit color (32,000 colors – more colors preferred). The computer monitor should be a 15" monitor at minimum, with 17" or greater recommended. Because you may be looking at the screen for many hours, be sure that the particular monitor you purchase has a good quality image across the entire screen.

Be sure to select your video driver's "Small fonts" option. Using large fonts changes the text spacing in LD2000's windows.

The ultimate in convenience is to use two monitors. This lets you put the LD2000 frame creation program on one monitor, and the Showtime show creation program on the other monitor. You can do this using Windows 98 (or later) with two video boards, or by using a dual-monitor board such as the Appian Jeronimo J2. (The J2 is approximately \$600. For more information, contact: Appian Graphics, Redmond, WA, (206) 885-0107, www.appiantech.com.)

Hard drive usage

LD2000 will place files in two locations: a directory called LD2000 (created when you install the program) and Windows directory. Files put into the Windows directory include shared library files.

More information on file locations is in the LD2000 help file, "LD2000 directories and files" topic area.

The current version of LD2000's standard installation takes up roughly 500 megabytes, plus another 1200 megabytes (1.2GB) when all clip art frames and shows are included. As you use LD2000, you'll need additional space to accommodate your work. Very roughly, you can assume about 2-5 MB for every five minutes of show time. Raster frames use much more memory; a three-minute show can take up 100 MB.

LD2000 uses less hard drive space than many other laser programs, because of its realtime capability. For example, to do a rotation, many other programs pre-calculate and store many slightly different views of an object. LD2000 merely stores a single frame and at run time calculates all the different views. The realtime technique can save up to 30 times the space needed for pre-calculated shows.

Using LD2000 on a notebook

You can use Lasershow Designer 2000 with any Windows notebook that has a docking station that accepts PCI boards. A number of manufacturers, including IBM (now called Lenovo) and Dell, make such units. Even if a laptop manufacturer does not offer a native docking station, you can use a Universal Docking Station, such as those offered by MAGMA (<http://www.magma.com>). LD can also be used on a notebook with Ethernet connection by using the QM2000.NET network adapter (<http://www.qm2000.net>).

As with a desktop or tower computer, the ideal notebook for creating shows is Pentium-based with 512 megabytes of system RAM, a large SVGA or XVGA screen (11.3" or greater, at 1024 x 768 resolution or greater), with a DVD-ROM drive and sound capabilities. More information on notebooks is at Pangolin's website.

Optional hardware

Digitizing tablet: You can draw and edit in LD2000 using a mouse. However, many traditional laser artists prefer a digitizing tablet. This

makes tracing drawings very easy. We recommend tablets made by the company Wacom, such as the Intuos and Art Pad series. You can actually use any digitizing tablet that has a universal "Wintab" driver.

If you already have a digitizing tablet, contact the manufacturer to get updated "Wintab" drivers. Install the drivers and use the tablet's own software to confirm proper operation. Then try the tablet in LD. If it works fine, great. If not, you may want to try different settings or just purchase a Wacom. For more information, see the "Setting up the digitizing pad" topic in the LD2000 help file.

SMPTE/MIDI board: If you must synchronize to SMPTE or MIDI timecode, you can use any standard SMPTE/MIDI board. Pangolin has tested and recommends the following:

- TC2000 SMPTE reader/writer from Pangolin Laser Systems. The TC2000 is a standalone box with sophisticated features. It is popular in planetariums and theme park applications. It is also relatively inexpensive.
- Winman and Portman systems from MIDIMan, (800) 969-6434 or info@midiman.net.
- Certain other USB- or Parallel Port-based external systems from companies like Mark Of The Unicorn (MOTU).

Other hardware: Because LD2000 can autotrace and rasterize bitmaps (pictures), you may want to purchase hardware to get pictures onto your computer. This includes flatbed scanners, digital cameras, or video digitizers such as the Minolta Snappy or one of the many video input boards available.

To trace live video, a genlock such as TelevEyes Pro is used. This is not a digitizer — it does not bring the video into the computer. Instead, it overlays the computer monitor onto a video signal, and sends the result to a TV or video monitor. You see the LD2000 Drawing Window superimposed over the video. For more information, search for the topic "Genlock" in the LD2000 help file.

Software requirements

Operating system

We recommend Windows XP or VISTA. You can use an older version of Windows such as Windows 95, but special drivers are

needed and can be sent to you directly from Pangolin. Note that when using the Windows 95 driver, it is more complex to support multi-scanner systems (multiple QM2000 boards), so you should upgrade.

We do not officially support Windows NT, but if you use NT, please contact Pangolin for special details and drivers.

Optional software

Painting and photo manipulation: Software such as Adobe's Photoshop or JASC's Paint Shop Pro is necessary to clean up any scanned-in artwork. For example, when you scan a picture, there can be thousands of colors in the resulting bitmap. Before you use the AutoTrace feature in LD2000, you may want to reduce the number of colors drastically. Photo manipulation programs allow you to do this. They also have special features such as contrast stretching and enhancement.

Paint programs like Windows Paint (standard with Windows), Corel Draw and others have two purposes. First, you can create logos, drawings etc. using these programs which will then be autotraced or rasterized in LD2000. Second, you can further clean up scanned-in artwork that may need more retouching than can be accomplished by a program such as Paint Shop Pro.

Pangolin highly recommends Paint Shop Pro if you do not already have a photo manipulation program. It is available both as off-the-shelf software, and as shareware. It is simple to use and works well both for cleanup and for retouching.

Visual Basic: Using Visual Basic and LD2000's script commands, you can create your own custom software. It can be as simple as a screen with buttons that, when pressed, play already-created shows. Or it can be as complex as AVI's *Omniscan* 360-degree planetarium projection system. If you enjoy programming, you should consider purchasing Visual Basic. There is more information in the Creating Shows section of this manual, and in the LD2000 Script Commands help file.

Internet: Pangolin's website contains the most up-to-date information. For updates, there are two main ways you'll be notified:

- **Pangolin LaserChat:** This discussion group, which can be found on our web site, keeps you in contact with other Pangolin users. It is available to anyone who has a web access.

- **Update files:** Pangolin puts update files on our Web site every few months. Complete details are in the Getting Updates chapter of this manual.

About the free Pangolin laser shows

Pangolin provides you with nearly 100 free laser shows. Usually, each “show” contains the graphics (or beams) and effects for one song.

How to install shows

You first need to install the main LD2000 software components. These are contained on the Yellow CD. The LD2000 standard installation includes a few Pangolin-supplied shows. Additional frames and shows must be installed separately, by inserting the “Additional Frames and Shows” and “Lightspeed Laser Animation Library” installation CDs.

All Pangolin-provided shows are located in LD2000\Shows. This is divided into directories such as “Beams” and “Graphics”. Usually, each show then has its own directory, which contains:

- the show instruction file (.SHS format)
- a frame file (.LDS format)
- a text file with information such as the show creator, suggested music including CD catalog number, any restrictions on usage, and legal notices (.TXT format)....
- (optional) media file (MP3, MIDI or WAV music, AVI or MPEG video)

For example, the "Eternity" beamshow files are located in the "LD2000\Shows\Beams\Eternity" directory.

Commercial music

Most of the free shows were programmed for commercial music. Due to copyright restrictions, Pangolin normally does not provide music for these shows.

A complete list of the music can be found in the “Show Listing” section of this manual. As the list changes, an updated online version is at http://www.pangolin.com/LD_music4shows.html.

Free music from Pangolin

For a few free shows, Pangolin has made special arrangements to license songs with “laser music rights” that transfer to you. The songs are included on the installation media as MP3 files (high-quality 192kbps). When you load a show file, the frames and MP3 file will also be automatically loaded. Here are the songs:

LD2000\Shows\Beams

“Again!” © 2000 Peter Heyt, !FX Laserproduction, used by permission.

“Eternity” © 1995 Tom Habes, Soundart Productions, used by permission.

“Farside”, © 2005 Thames Valley University, London, used by permission.

“Mysticon”, © 2005 Thames Valley University, London, used by permission.

“Special!FX”, © 2000 Peter Heyt, !FX Laserproduction, used by permission.

“Spring”, © 1996 John Zelenka, used by permission.

“Voyage”, © 2005 Thames Valley University, London, used by permission.

LD2000\Shows\Graphics

“Grids”, © 2005 Thames Valley University, London, used by permission.

“Revelation” by Andy Hagerman, Singularity Arts. © 2000-2002, Pangolin Laser Systems Inc.

“World in Motion” (WIM). © 1997 Oliver Kobusch, used by permission.

LD2000\Shows\Other\Pangolin 15-sec ID

“Pangolin 15-sec ID” by Andy Hagerman, Singularity Arts. © 2001, Pangolin Laser Systems Inc.

LD2000\Raster\Linea

“Linea” by Tom Habes, Soundart Productions. © 1999, Pangolin Laser Systems Inc.

There are restrictions on a few of the songs. For example, “Again!”, “Eternity” and “Special!FX” have special licensing restrictions in The Netherlands. For all Pangolin-supplied music, additional information on music usage and rights can be found in the “.txt” files, which are located in the same directory as the corresponding show and frame files.

How to run the free shows

To load a show, you need three components: the show file (which has instructions specifying what frames to show at what times), the frame file (which has frames and animations), and music. The music can either be a file (MP3, MIDI, WAV) or an audio CD that is inserted into your computer's CD drive. (The "music" can also be an AVI or MPEG video file; for more information, see the Pangolin.com page http://www.pangolin.com/LD2000/multimedia_in_showtime.htm.)

- **Loading the show file.** From the Timeline Window "File/Open" menu, find the show's directory (look in LD2000\Shows) and load the show file (.SHS).
- **Loading the frame file.** If the directory contains a frame file with the same name, Showtime 2000 will ask if you want to automatically load the frames -- click on "Yes".
If the directory does *not* contain a frame file with the same name, then you will have to manually load the frames; to do this, use the File/Open menu from the Frame List window.
- **Loading the music.** If the directory contains is a music (MP3) or video (AVI) file with the same name, you will also be asked if you want to automatically load the media file -- click on "Yes". The Multimedia Player window will pop up, ready to play the media file.

If your music is on an audio CD, put the audio CD into your CD-ROM drive. Click the CD/multimedia button in Showtime. The Multimedia Player pops up; click on the CD button and wait for the control buttons to appear. Then click the track-forward button to get set up for the appropriate track.



- **Playing the show.** To play the show, press the Play All button (at the top of the Timeline Window).



Note that if you press the Play button on the Multimedia Player, this only plays the media – it does not play the laser show. To play the laser show, you must use one of the Play buttons at the top of the Timeline Window.

Show listing

Below is a convenient listing of the songs and CD's for the shows currently included with LD2000. Because of copyright-related distribution restrictions, Pangolin normally does not provide the music for these songs. You will have to purchase the CDs yourself, or

alternatively acquire these from a music service such as Napster or iTunes. (You may be able to legally compile these songs onto your own CD-R recordable disc, if you own the CD's and the disc is not further duplicated or sold.)

- ▶ **You can easily find the music for the shows on CDs at Amazon.com, by using their "Wish List" feature.**
 1. Go to www.amazon.com
 2. Click on the "Wish List" link in the bottom of the left menu.
 3. Search for "Pangolin" on the top right "Find a wish list" field.
 4. Once you see our Wish List, select the CDs you want. When you check out, be sure to send them to yourself.

- ▶ **Pangolin has compiled a "Play list" on Napster so this provides a convenient and easy way of acquiring most of the music you will need for the shows.**
 1. Download Napster application from www.napster.com
 2. Sign up and run Napster. You have to download the Napster application, the online Napster will not work.
 3. At the top you will find the search feature, select it to search for a member, type "pangolinlaser" and click on search.
 4. Select the songs you wish, drag and drop them on the bottom of the program, where it reads "Burn", and click on "Burn disk" at the bottom right*.

- ▶ **Pangolin has a "play list", or "iMix", on iTunes. Here is how to access the iMix:**
 1. Download and install iTunes from www.itunes.com.
 2. Open iTunes, sign up and log in.
 2. Click on the Music Store and switch your location to United States at the bottom of the Music Store home page.
 3. Click on the iMix link and search for Pangolin or type <http://phobos.apple.com/WebObjects/MZStore.woa/wa/viewIMix?id=174960800> on your web browser.
 4. Download the musics and burn them to a CD*.

***Note that downloaded music from Napster or iTunes will not play on Showtime, they have to be burned on a CD. Once you have created a music CD, this can be turned back into WAV or MP3 files and then these files can be copied into each "Show" folder for convenient show playback.**

For shows that are not on Amazon, Napster, iTunes or that are not listed below, here are two ways to find what CD was used: Look for a ".TXT" file in the show's directory; or, load the show into Showtime

then check the description at the bottom of the Module List Window to see what CD was used.

LD2000\Shows\Graphics directory

1999: Graphics show by Lasertainment. Suggested music: "1999" by Prince (track 1), Warner Bros. 9 23720-2.

40HRWEEK: Graphics show by Laser Force. Suggested music: "40 Hour Week (For A Livin')" (track 1) from Alabama's *40 Hour Week*. RCA Records PCD1-5339.

ALTOGTHR: Graphics show by Laser Mania. Suggested music: "All Together Now" (track 3) from The Beatles' *Yellow Submarine*, Apple CDP 7-46445-2.

ATLANTIS: Graphics show by AquaMax Laser Display. Suggested music: "Rescue in a Wreck" (track 4) from Eric Serra's 1988 soundtrack to the movie *The Big Blue*, Virgin Records America 86078-2.

CELEBRAT: Graphics show by HW Lasertechnik. Suggested music: "Celebration" by Kool & The Gang. This can be found on several of their CDs, including "Greatest Hits & More" (track 14), PolyGram 834914-2.

COSMIC: Graphics show by Audio Visual Imagineering, Inc. Suggested music: "Cosmic Thing" by B-52's. Album Name: Cosmic Thing, Label: Reprise / Wea, Catalog: #25854, ASIN: B000002LGY

CREATION: Graphics show by Lightspeed Design Group. Suggested music: "Creation" (track 1) from James Reynolds' *The Mind's Eye*, Miramar MPCD-2901 or 09006-23008-2.

ELEVATION: Graphics show by LFI International. Suggested music: "Elevation" Performing artist: U2

ENYA: Graphics show by Pangolin. Suggested music: "Storms in Africa" (track 4) from Enya's *Watermark*, Reprise 9-26774-2.

EUROPE: Graphics show by Laser Entertainment SRL. The music for this beam show is a sound track that was custom mixed by Laser Entertainment. Please contact them directly to obtain this music.

FUTURE: Graphics show by Laser Enterprise. Suggested music: "Headed For The Future" (track 1) from Neil Diamond's *Headed For The Future*, Columbia Records #CK 40368.

GRIDS: Graphics show by Faculty of the Arts, Thames Valley University, London. Arts. Pangolin-licensed MP3 music is included with LD2000.

HALOWEEN: Five shows by Laser Fascinations. Suggested music:

Thriller: Track 4 from Michael Jackson's *Thriller*, Epic EK38112, c. 1982.

Crypt Jam: Track 13 from *Original Music From Tales From The Crypt*, Big Screen Records 9 24462-2, c. 1992.

Ghostbusters: Track 1, original soundtrack to *Ghostbusters*, Arista ARCD 8246, c. 1984.

Addams Family: The movie soundtrack; no CD info available.

Monster Mash, Ghostbusters, and Addams Family can be found on the collection *Halloween Hits*, Various Artists, Rhino R2-70535. Monster Mash is on various records including the Rhino collection above. But be sure to get the original version sung by Bobby "Boris" Pickett. Another collection with the song is: *Wacky Weirdos*, K-Tel 3037-2, c. 1997, track 2.

HOLIDAYS: Graphics show by FFT Lasers. The module was not designed for any particular piece of music.

KRYPTONITE: Graphics show by Audio Visual Imagineering, Inc. Suggested music: Track 1: "Kryptonite" from the Album "The Better Life" by the musical band "3 Doors Down". Label: Umvd Labels, Catalog Number: 153920, ASIN: B00004C4QQ.

MISSION: Graphics show by LFI International. Suggested music: "Theme From Mission: Impossible" (track 1) from *Music From And Inspired By The Motion Picture Mission: Impossible*, Mother Records MUMCD9603 or 314-531-682-2.

MONEY: Graphics show by FirstLight Laser Productions. Suggested music: "Money" and "Us And Them" (tracks 5 and 6) from Pink Floyd's *The Dark Side Of The Moon*. There are a number of CD versions of "Dark Side". The music is the same but they differ slightly in where the CD tracks are divided. You may need to adjust the starting time of the Showtime show if the visuals are off a bit.

MONSTER: Graphics show by Laser Mania. Suggested music: "Monster Mash". See "HALLOWEEN" above.

PURPLE: Graphics show by Astronaut Memorial Hall and Observatory, Brevard Community College, Cocoa, Florida. Suggested music: "The (One-eyed, One-horned Flying) Purple People Eater" by Sheb Wooley. This can be found on Sheb Wooley's album *The Purple People Eater* and on various compilation CDs including *Halloween Hits*, Various Artists, Rhino R2-70535.

RHAPSODY IN BALLOON: Graphics show by Stuart Technologies Unlimited. Suggested music: track# 3 on "Fantasia 2000: An Original Walt Disney Records Soundtrack" - "Rhapsody in Blue" (edited to fit the module style).

SABREDANCE: Graphics show by LFI International. Suggested music: "Saber Dance", by Khachaturian. Album Name: Symphonic Spectacular, Label: Telarc, Catalog: 80170, ASIN: B000003CUY.

SENTMENT: Graphics show by LFI International. Suggested music: "Sentimental Journey" by Juan Garcia Equivel. This can be found on at least two CDs. One is track 10 of *Cabaret Mañana*, RCA 66657-2. The other is track 20 of *Infinity of Sound Volumes 1 and 2*, Bar/None Records AHAON-092 or maybe DRC1-1825 (the label is unclear).

REVELATION: 3D Studio MAX/Lasershow Converter MAX show and music by Singularity Arts. Pangolin-licensed MP3 music is included with LD2000.

STRIP: Graphics show showcasing VST video-tracing by MediaLas.

Suggested music: "Twilight Zone" (track 12) from Golden Earring's 1989 greatest hits album *The Continuing Story of Radar Love*, Uni/MCA B00000206P.

TAKEBACK: Abstract show from LPD Laser. Suggested music: "Take It Back" from Pink Floyd's *The Division Bell*.

THE_BEST: Graphics show by Pannon Laser. Suggested music: "The Best" (track 1) from Tina Turner's *Simply The Best*, Capitol Records CDP 7 97152 2. This a greatest-hits collection so the song will also be on the original album where it first appeared.

THIS_KISS: Graphics show by LFI International. Suggested music: "This Kiss" by Faith Hill, Album Name: Faith, Label: Warner Brothers / WEA, Catalog: 46790, ASIN: B0000062V7.

TIMESHOW: Graphics show by Laser Enterprise. Suggested music: "Time" (track 3) from Pink Floyd's *The Dark Side Of The Moon*. See note above for MONEY.

TUESDAYS: Graphics show by Aura Technologies. Suggested music: "Let Them Try" (track 11) from Eric Serra's *The Big Blue: Original Motion Picture Soundtrack*, Virgin Records America 86078 2.

WIM: Graphics show by Trick Design. Pangolin-licensed MP3 music is included with LD2000.

LD2000\Shows\Beams directory

12_YEARS_LATER: Beam show by HW Lasertechnik. The show is produced for a specific music file which is available upon request from HW Lasertechnik.

AGAIN: Beam show by !FX Laser Productions. Beam show by !FX Laser Productions. Pangolin-licensed MP3 music is included with LD2000. See the file "Again.txt" for important restrictions on use of this song in The Netherlands.

CLOCKWRK: Beam show by Anthropomorphic Productions. Suggested music: "Title Music from A Clockwork Orange" (track 1) from the soundtrack to *A Clockwork Orange*, Warner Bros. CD2573-2.

CONTRA: Beam show by New Wave Productions. Suggested music: "Contradanza", (track 2) from Vanessa-Mae's *The Violin Player*, Angel 7243 5 550892 8 (or just 5 55089 2). Look for it in the classical section of music stores.

DOV'E L'AMORE: Beam show by Laserlight Showdesign. Suggested music: "Dov'e l'Amore" by CHER. Look for this CD single in the pop section of music stores

DUELFATE: Beam show by Laser Presentation. Suggested music: "Duel of the Fates" from John Williams' original motion picture soundtrack *Star Wars Episode 1*, Sony Classical SK 61816.

EVERYBODY: Beam show by Faculty of the Arts, Thames Valley University, London. Suggested music: 'The Prodigy' and the track 'Everybody in the Place' is from their 'Experience' Album (01/12/1991)

Catalogue No: XLCDM110 ASIN No: B000026XST

ETERNITY: Beam show by !FX Laser Productions. Pangolin-licensed MP3 music is included with LD2000. See the file "Eternity.txt" for important restrictions on use of this song in The Netherlands.

F_F_OVER: Beam show by !FX Laser Productions. Suggested music: "Far From Over" (track 7) from the *Staying Alive* soundtrack, Polydor 813 269-2.

FARISIDE: Beam show by Faculty of the Arts, Thames Valley University, London. Pangolin-licensed MP3 music is included with LD2000.

GRADIENT_MOBY: Beam show by LM Productions. Suggested music: "Porcelain", track 3 of the "PLAY" album (V2/Bmg, June 1999) by Moby.

GRAVITY: Beam show by Laserpresentation. Suggested music: Track No. 3 – "Gravity of Love" by Enigma, Album: Love Sensuality Devotion - The greatest hits.

HERO: Beam show by Laserpresentation. Suggested music: "Holding out for a hero" by Bonnie Tyler, CD Name: Super Hits: Bonnie Tyler (or just Bonnie Tyler), Track 12, Label: Sony, Catalog: #65917, ASIN: B00000IQMA

I_SEE_RIGHT_TROUGH_YOU: Beam show by Laserpresentation. Suggested music: "I See Right Through To You" by DJ Encore, CD Single, Label: Mca, ASIN: B00005OR9G.

LA_LUNA: Beam show by DTL Lasertechnology. Suggested music: "HIJO DE LA LUNA" from Sara Brightman, by Eastwest Records GmbH (A Warner Music Group Company) (no. 8573-82883-2)

LIVE_SHOW: Beam show by Lasercorp Showlasers. This show is programmed to utilize all of the features of the Lasershow Performer console from Pangolin. It will work with any music.

LOST_IN_SPACE: Beam show by Faculty of the Arts, Thames Valley University, London. Suggested music: 'Will and Penny's Theme' is from their 'Lost in Space' Album by Stealth Sonic/Sony (1998) Catalogue No: SSX9CDX ASIN No: B00000B9GH

LSDIBEAM: Beam show by Lighting Systems Design Inc. Not designed for a specific piece of music; try with any fast beat song (disco, techno, etc.)

MELODY: Beam show by DTL Lasertechnology. Suggested music: "Bass, Beats & Melody" by Brooklyn Bounce / Proximus - Mauro Picotto

MISSIONB: Beam show by !FX Laser Productions. Suggested music: same as "Mission" graphics show.

MYSTICON: Beam show by Faculty of the Arts, Thames Valley University, London. Pangolin-licensed MP3 music is included with LD2000.

PARADISE: Beam show by DTL Lasertechnology. Suggested music: The music used for Paradise is a custom mix between the two pieces of

music: Ralph Fridge-Paradise 1 Maxi Single CD | VIRGIN/EMI Electrola GmbH and Cafe del Mar " by Energy 52 (second part of Paradise show)

REFLECT: Beam show by Holger Walter, HW Lasertechnik, Germany. Suggested music: "Reflections of Earth" (Track 1) from the 1999 album "Walt Disney Presents Millennium Celebration" (Walt Disney Records 60659-7).

SILENCE: Beam show by Laserpresentation. Suggested music: Track No. 1 on bonus-CD "Silence (Airscape remix)" by DELERIUM, Title of CD: Karma (double CD)

SPECL_FX: Beam show by !FX Laser Productions. Pangolin-licensed MP3 music is included with LD2000. See the file "Specl_FX.txt" for important restrictions on use of this song in The Netherlands.

SPRING: Beam show by John Zelenka. Pangolin-licensed MIDI music is included with LD2000.

STARWARS: Beam show by Rob DiAddezio. Suggested music: "Main Title" (track 2) from John Williams' *The Star Wars Trilogy*, Varujan Kojian conducting the Utah Symphony Orchestra, Varese Sarabande VCD 47201

TURNBEAT: Beam show by Laser Mania. Suggested music: "Turn the Beat Around" (track 7) from Gloria Estefan's *Hold Me, Thrill Me, Kiss Me*, Epic EK 66205.

VOYAGE: Beam show by Faculty of the Arts, Thames Valley University. Pangolin-licensed MP3 music is included with LD2000.

LD2000\Shows\Raster directory

LINEA: Raster (TV-like) show by Laser Show Design. Music by Tom Habes is included on the LD2000 CD-ROM.

LD2000\Shows\Other directory

PANGOLIN 15-SEC ID: A 15-second identification spot (like "Intel Inside") that you can use in your own shows. 3D Studio MAX/Lasershow Converter MAX show and music by Singularity Arts. Pangolin-licensed MP3 music is included with LD2000.

HOLIDAYS: A brief graphics show by Tom Grimes of FFT Lasers. This does not require any specific piece of music.

Music rights notice

Laser artists have designed their modules with a specific song in mind. However, the songs above are only suggestions. You are free to readjust each module in Showtime so it can work with other songs of your own choosing. If you use the artist-suggested songs, then be aware of the complex issue of music rights. Pangolin cannot give you specific advice. But here are some general tips:

- You are probably OK if you buy the CD containing the suggested song, and play it along with the module in the privacy of your home or laser studio.
- Once you begin to play the song in public, or for commercial purposes, then you should be obtaining music rights. These include both performance rights and synchronization rights (so you can display images that are designed to go with the music).
- For most shows, Pangolin provides only laser frames, a show control file, and the name of the artist's suggested song. Pangolin is not performing the music, nor are we presenting synchronized images and music. Therefore, you are fully responsible should any music rights issues arise.
- For some shows, Pangolin has obtained laser-related rights which transfer to most clients. The music is included on the LD2000 installation media, as MP3 files. For all Pangolin-supplied songs, additional information on music usage and rights can be found in the ".txt" files, which are located in the same directory as the corresponding show and frame files.
- You can purchase royalty-free music from many sources. It is relatively simple in Showtime to readjust the show timing to work with a similar piece of music. Thus, if you have any questions or concerns, use royalty-free music instead of the artist's suggested songs.

Installing the Hardware and Software

It is very easy to install the QM2000 hardware board and the Lasershow Designer 2000 software. Here is a brief summary:

- ▶ **Turn off the computer, open it up, and put in the QM2000 board. With the computer still open, turn it on. Windows should notice the new hardware, and ask for drivers. Insert the CD-ROM into your drive. After the hardware is installed, you can install the LD2000 software. After installing, start LD2000 to be sure it runs properly. Once you are satisfied, turn the computer off and put the case back on.**

The information in this chapter goes into more detail about the installation procedure.

QM2000 Hardware Installation

The QM2000 board works only in a PC (IBM-type) computer. The board fits into a standard PCI-bus slot. The QM2000 will not fit in ISA, MicroChannel, VESA or AGP slots.

There are no jumpers on the QM2000. All adjustments are done through software. There is one “user-serviceable part”; this is the memory board (more on this later).

To install the QM2000 master board, turn off power to your computer. Open the case and plug the board into any available PCI-bus slot. Be sure to securely tighten the screw on the L-shaped bracket.

(If you have additional QM2000 slave boards, do not install them yet. Get LD2000 operating with the master board first. Later, open up the QM2000 Board help file for instructions on installing and using multiple boards.)

If you are using a projector with an ILDA-standard DB-25 input, simply connect a commonly available DB-25 parallel extension cable between the QM2000 and the projector. Be sure the cable connects all 25 lines together.

If you are using a projector with a Pangolin-style DB-25 input (designed for our older QM32 board), you may obtain an adapter cable from Pangolin. The cost is currently \$25, plus shipping.

- ▶ **The QM2000 to QM32 adapter cable only works with the QM2000. It is NOT a general-purpose ILDA-to-Pangolin adapter. For example, you cannot reverse the cable to connect from an older QM32 board to an ILDA projector.**

If you are using any other type of projector (i.e., not ILDA and not Pangolin compatible), you will need to make your own adapter to go from the QM2000 to your projector's input. Pinouts are in Appendix A of this manual.

The projector does not have to be on for the next step, installing the LD2000 software. Therefore, you can continue installing even if you haven't yet connected to your projector. Keep the computer case open through the software installation, since it may be necessary to change jumpers on the QM2000 board.

LD2000 Software Installation

Be sure the QM2000 board is installed in a PCI-bus slot. Turn on your computer and boot up into Microsoft Windows.

Put the LD2000 CD-ROM in your CD-ROM drive.

Select **Start/ Run** from the Taskbar. In the "Command Line:" box, type the CD-ROM's drive letter, a colon (:), a forward slash (\), and "setup". For example, if the CD-ROM is drive "D:", type:

D:\SETUP

A dialog box will confirm that you want to install; click "OK". You will next be asked for an installation directory. The default directory is

C:\LD2000

This indicates the installation program will create a directory called "LD2000" which is in the root of the C drive. This should be fine. We do not recommend that you change the name of the directory, or that you put LD2000 inside another directory. (You can put it on another drive if your C drive is full.)

Click on "OK" and the installation process begins.

When you return to Windows, you should see the new Lasershow Designer 2000 program group.

Starting LD2000

Select **Start/ Programs/ Lasershow Designer 2000**. You see a list of programs in the Lasershow Designer 2000 group:

- **Lasershow Designer 2000**. This starts the frame creation and editing program. (It is a bit confusing that the entire system is called Lasershow Designer 2000, as well as one of the two main programs. Fortunately, it is usually clear from the context whether the entire LD2000 system or just the single LD2000 program is being referred to.)
- **Showtime 2000**. This is the show creation program.
- **Autoplay 2000**. This utility program was designed for demonstrations, trade shows, and other situations where you might want to continuously run a laser show, or instantly choose a laser show to run. It also contains an easy-to-use text scrolling application.
- **LivePRO**. This is an advanced live controller designed for performing shows at Discos, Nightclubs, and other music-oriented venues. Note that LivePRO is free with the PRO version of LD2000 but there is an additional cost for BASIC and INTRO users. If you do not have the PRO version of LD2000, LivePRO will operate in a demo capacity so you can explore the features.

- **Lasershow Video (VST2002).** “Video system tracing” program. Project live laser outlines or raster images, direct from video input. Also, capture frames for later use in laser shows.
- **Asteroids.** A remake of the classic vector game. Allows you to play Asteroids on a preview window, or on the laser.
- **Help files.** This brings up help files covering LD2000, Showtime, LivePRO, Asteroids, the QM2000 board, laser fundamentals, and the ILDA Laser Glossary. Appendix B in this manual has more information on the help files.
- **Edit LD2000.ini.** This starts Windows Notepad, so you can edit LD2000's initialization file.
- **Update LD2000 from Internet.** First, get connected to the Internet. Then, when you select this item, you will go to Pangolin's LD2000 update page, where you can automatically get an update if one is available.
- **Uninstall.** Removes LD2000 from your system. Note that if you have added any frames or files to the LD2000 directory, the directory and those frames or files will not be removed.

You are now ready to begin Lasershow Designer 2000. Start the program choosing "Lasershow Designer 2000" from the Start menu in Windows. You will see a title window open. The window will go away and be replaced by two other windows, the Control Window and the Drawing Window. Depending on your LD2000.INI settings, you may also see a "Tip of the Day" window. LD2000 takes a few seconds to load the operating system and a new session into the QM2000 board. When loading is complete, LD2000 is ready to begin.

If you have not received any error messages or dialog boxes, then everything is working fine. You can exit Windows, turn off the computer, and close up the computer case.

Installation Troubleshooting

Most LD2000 installations go smoothly. However, if something should go wrong, check this section for tips on solving the problem.

LD2000.DLL communications window

The LD2000 program communicates through a Windows Dynamic Link Library to the QM2000 computer board. You can "eavesdrop" on this communication by selecting "Open LD-to-DLL Communications window" from the "Help" menu in LD2000.

Looking at the values sent to the QM2000, and the messages returned (if any) may help track down problems. Also, it gives you an idea of what script commands are used to perform certain operations. This will be helpful should you write your own Visual Basic scripts.

No QM2000 board

If the QM2000 computer is loose or missing, three things happen. First, you'll hear Windows' default beep each time LD2000 tries to talk to Windows. Second, in the LD2000.DLL communications window, you'll see:

LDLIB: FIFO ERROR ****

after each LD2000-sent command. Third, during LD2000's startup a message box appears. It reports that the QM2000 is not installed.

To fix this, be sure the QM2000 is securely plugged into its slot.

- ▶ **You cannot run LD2000 or Showtime2000 without a QM2000.**

LD2000/Win paths do not agree

A message box comes up saying "The LD2000 path listed in your LD2000.INI file is not the same as the apparent path to your LD2000 files according to Windows." It then shows the path in the LD2000.INI file, and what Windows thinks the path should be. You may want to write these down so you can edit the LD2000.INI file.

If you see this message box, do not continue loading. Select "No", to exit the program. (If you do continue, nothing bad will happen but LD2000 might not be able to find some files.)

Go into the **Start/ Programs/ Lasershow Designer 2000** group and select **Edit LD2000.ini**. This starts Windows Notepad, so you can edit the initialization file. Look for the section beginning with "[File paths]". Change the file paths to accurately reflect where these files are stored, and then save the file using **File/ Save**. Start LD2000 again. The message box should not reappear.

If the message does appear again, or if the paths were already correct in LD2000.INI, you may have a special situation. One example would be if there were two copies of LD2000: one on your C drive and one on another drive. LD2000 looks first for "C:\LD2000"; if that is not found, it looks next where Windows thinks LD2000 was started from (the application path).

Or, the application path may be incorrect:

- To fix this, navigate through **Start/ Programs/ Lasershow Designer 2000** to the desired program. Select it using a right-click. This pops up a floating menu. Select **Properties**. The program's Properties sheet will open; select **Shortcut** from the tabbed dialog. Be sure the Start In and Target boxes indicate the correct location.

Cable or projector problems

If you have a persistent problem that you think is hardware related, first check the cabling. Remove the cable adapter from the QM2000, so that nothing is plugged into it. Run LD2000 and see if the problem disappears. If so, something is wrong either with the cable adapter or with your particular projector setup.

The cable adapter is relatively simple, so the cause is likely to be in your projector wiring. Something as simple as a ground loop can sometimes cause problems. Try plugging your equipment into different circuits, to see if breaking the ground loop solves the problem.

Caution: Beware of static and voltages

The QM2000 board, like any piece of computer equipment, is susceptible to static and improper voltage sources. For example, one customer had the ground line on a power strip fail; this put high voltage into the computer and thus into his QM board. Another client had a QM board, scanner amplifiers and other equipment damaged by a lightning strike near the show site. This could have been avoided by unplugging the equipment as the storm neared.

- ▶ **Exercise reasonable caution when handing and connecting the QM2000 board. Pangolin cannot be responsible for problems caused by static or improper voltage sources.**

If damage occurs we will try to repair it, but you will be responsible for any shipping and repair costs.

Setting Up Your Projector

Lasershow Designer 2000 was designed to work on just about any laser projector. There are a number of adjustments you should make so LD2000 gives the best possible results. The general procedure is as follows:

- Load the test frames
- Adjust the size, offset, colors and speed for your projector
- Change LD2000's automatic drawing parameters and save these changes

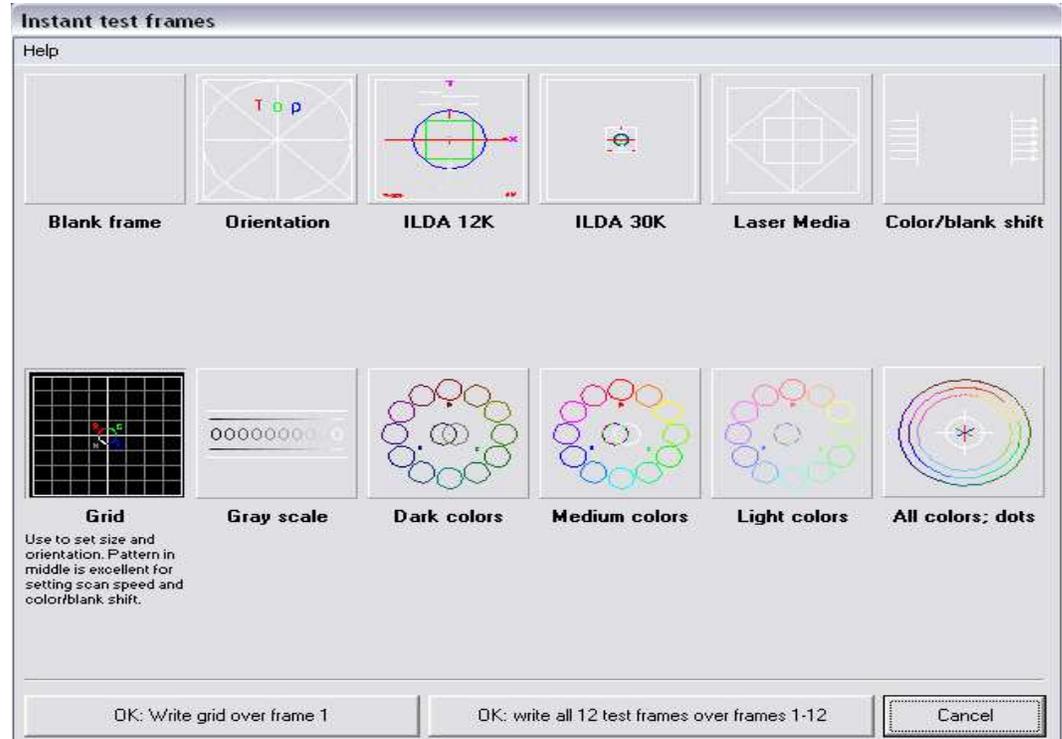
These steps are detailed in the following sections.

Because there are many different types of laser projectors, we cannot give specific instructions about which knobs to turn or which controls to use. *Please be cautious when working with LD2000 for the first time.* Not all systems are immediately set up for the fast and accurate frames that LD2000 outputs. For example, most scanner and amp systems can handle points that instantly jump across the scanned area. However, a few systems may blow fuses or damage scanners, since they are too tightly tuned.

- ▶ **If you are using an unknown or non-standard set of scanners and amps, you may wish to contact the manufacturer first or to take extra care. If you hear the scanners making abnormally loud noises, or see instability in the image, immediately shut down the scanner amp and check for potential problems.**

Loading the Test Frames

Start the LD2000 program. Note that the program starts by displaying frame 1. Select **View/ Instant test frames...** from the Control Window menu.



Select the Grid test frame and click on the "OK: Write grid over frame 1" button. You will return to frame 1; it now will have the grid frame in it.

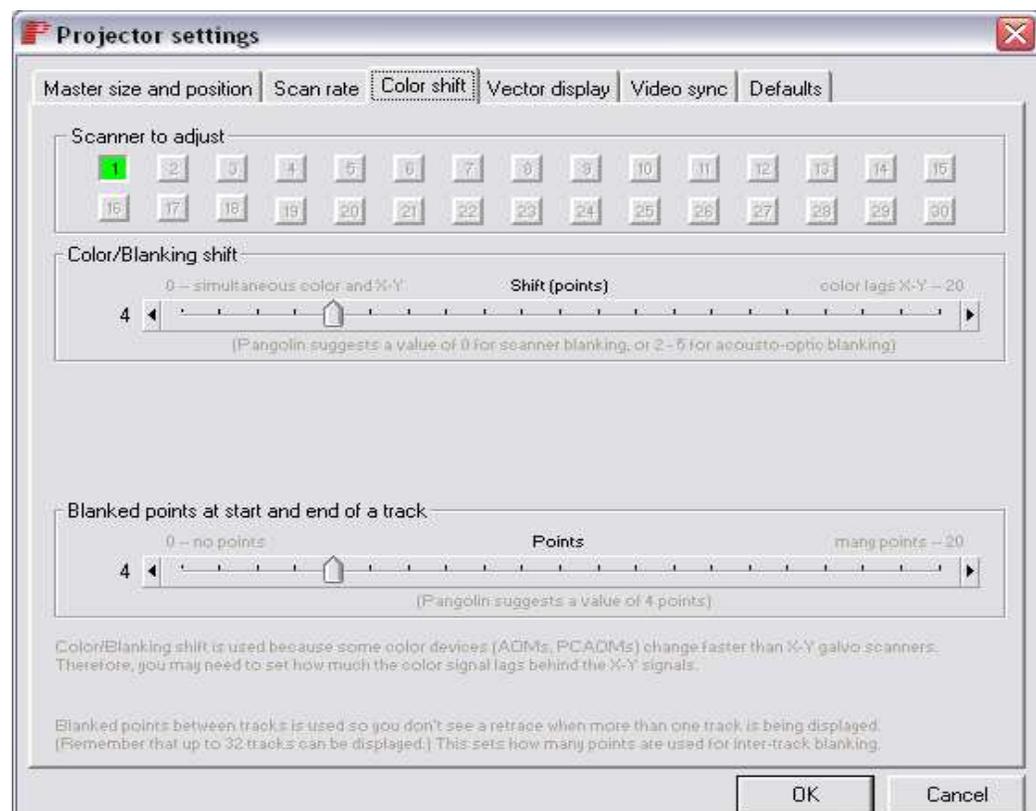
Projector Scan Speed and Tuning

Use the grid to adjust the size and offset of your scanner amp. If you have a hardware geometric corrector, or similar device, adjust the GC to eliminate keystone, non-linearity, shear and other distortions. With a GC, you can get a perfect field even if you are far off axis. Note that LD2000 does include a software geometric corrector. This can be found as part of the Projection Zones dialog box.

Blanking shift (timing) adjustment

Call up the Instant Test Frames dialog again, and select the "Color/blank shift" frame. This shows horizontal lines jumping across a large gap. While the horizontal lines may have different lengths, you're interested in the average position of the projected lines. If the lines appear too far to the left or right (i.e., not centered relative to the gap), then the blanking timing needs to be adjusted.

(The reason for this is that most projectors use blanking devices such as PCAOMs, or direct-modulated laser diodes, that work faster than scanners. Therefore, the blanking signal needs to be delayed relative to the scanner signal. Shifting blanking ensures that both signals are synchronized on the projected image.)



To set the blanking shift, select **Settings/ Projector settings** from the Control Window menu. This brings up the Projector Settings dialog box. Select the "Color/Beam Brush shift" tab. Change the Color/Blanking shift slider. As you move the slider back and forth, you will see the projected lines — actually, the blanking part of the lines — shifting back and forth.

Get the lines to look balanced on either side of the gap. When you have finished adjusting the blanking shift, select the "Defaults" tab and click on the "Save settings" button to save your preferred color settings. Finally, click on "OK" to exit the dialog box.

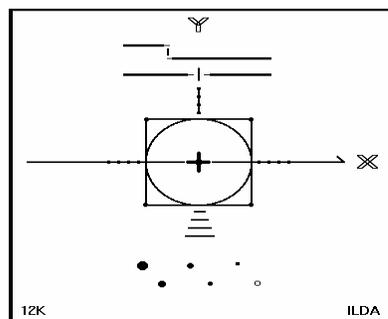
You may need to re-adjust the blanking shift later, after changing the scan speed. This is because large changes in scanner speed change the relative blanking timing.

- ▶ **Since changing the scan rate can require a change in blanking shift, you may need to go back and forth in the Projector settings dialog, between the "Scan rate" tab and the "Color shift" tab. This is because scanners and color devices have different speed characteristics.**

Checking your scanner speed

Next check your scanner's output speed. From the "Instant Test Frames" dialog, select the ILDA 12K test frame.

First you need to size the test pattern. Select **Settings/ Projector settings**, then the "Size and position" tab. Adjust the size so your scanners are scanning approximately 40° peak-to-peak if you have a slower 12K system, and approximately 10° if you have a faster 30K system. (These angles are for tuning only — you can scan other frames at wider angles.)



To find out at what speed your scanners are tuned, select the "Scan rate" tab. Use the "Point oriented frames" slider to change the point rate. Move it up or down until the circle fits inside the square. In other words, the circle will be just touching the midpoint of the square's sides (as shown in the diagram).

This test lets you compare your scanner amp speed to the industry standard. ILDA recommends that you tune so the circle is in the square when the output is either 12,000 or 30,000 points per second.

If your speed is lower than 12,000 points per second, you should probably tune up your scanner amps before doing any serious graphics work. If you are higher than this, then you are fine for now.

- ▶ **For more detailed information on tuning and scan rates, see the Laser Graphics Fundamentals help file. You can find this in the LD2000 program under the Help/ Help files menu.**

Setting a scan rate

You can pick a default scanning rate now, if you like. This rate should be set to match most of the frames you already have.

Note that for almost all Pangolin-supplied frames and shows, the scan rate should be set to 30,000 pts/sec for best results.

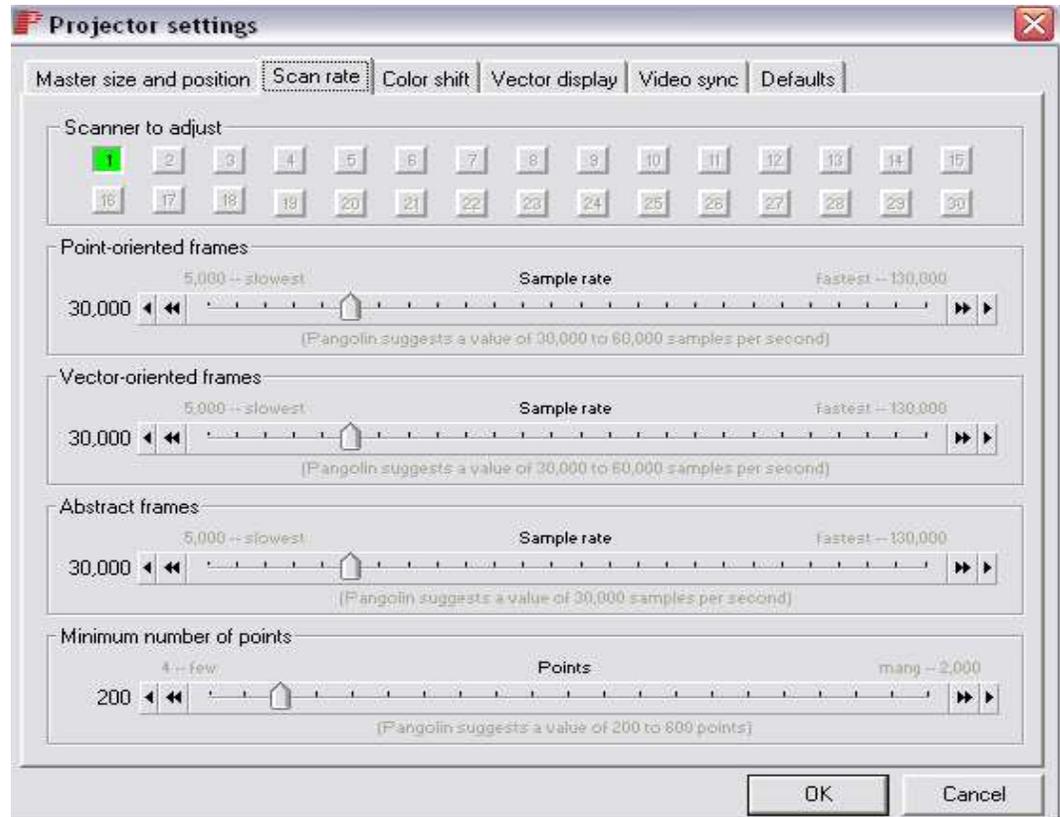
It should be noted that some companies routinely scan at or above the ILDA test pattern speed. This is fine, as long as you are aware that different frames may require different speeds.

Fortunately, LD2000 has two scan speeds: 1) an overall scan rate for all frames, and 2) a scan rate for each frame. This lets you offset individual frames so they go slower or faster than the overall scan rate. With this scheme, you only need to make one adjustment (overall scan rate) to use other scanners with different tunings.

This is especially important for Showtime, as it can change the overall scan rate without affecting the show timing. Shows can be projected using any scanner tuning.

Here is how to find the best overall scan rate for you — at least, for traditional frames.

Go back to the Instant Test Frames dialog, and load the Grid test pattern.



Select the **Settings/ Projector settings**, "Scan rate" tab once again. Adjust the "Point oriented frames" slider to the fastest settings before the corners round or pull apart objectionably. Round this speed to the nearest multiple of 1,000 — for example, 30,000 or 31,000 points per second. Select the "Defaults" tab and click on the "Save settings" button to save your scan rate. Finally, click on "OK" to exit the dialog box.

Later, be sure to read the ILDA test pattern information in the Laser Graphics Fundamentals help file. You can then decide if you want to tune your scanner amps further so they more closely resemble the ILDA standard and so you get higher performance.

Other tuning tests

There are a number of other test pattern frames. Theoretically, scanners can be perfectly tuned using only frame 3, the quadrature square wave. This highlights any overshoot or undershoot. (For this reason, a quadrature square wave is superimposed on frames 5 and 8. This lets you tune scanner amps by looking at two or more aspects of a single frame.)

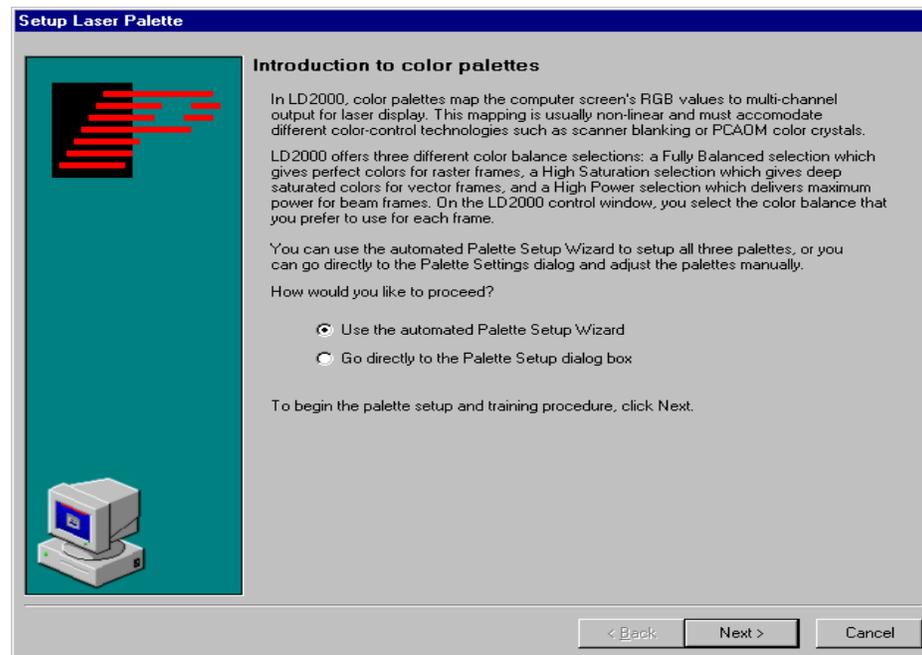
However, Pangolin believes that the best tuning job is done not by looking at only one pattern, but by checking different patterns to

observe different characteristics. Each pattern emphasizes a different characteristic.

Projector Color Adjustments

Next, you'll set up the color and blanking outputs (sometimes called the laser palette). These adjustments take only a few minutes to accomplish, and once you have done them, they are set for as long as you use that projector. The settings can be saved so they can be quickly recalled if you change projectors.

LD2000 offers a new Palette Setup Wizard which helps you to quickly setup the color outputs for any laser projector, regardless of the number of colors or connection scheme. To activate the Palette Setup Wizard, select **Settings/ Palette** from the Control Window menu. This brings up the Setup Laser Palette dialog box. Once this is displayed, press Next to begin setting up the colors for your projector.



The Palette Setup Wizard works by displaying lines and circles, and having you make simple slider adjustments to indicate visual similarity between projected lines. Once this is done, the wizard will automatically save the palette file created for use each time LD2000 or Showtime is used.

- ▶ **Much more information, including information on manually setting up the palette can be found in the LD2000 for Windows help file. To open this file, click on its icon in the Pangolin**

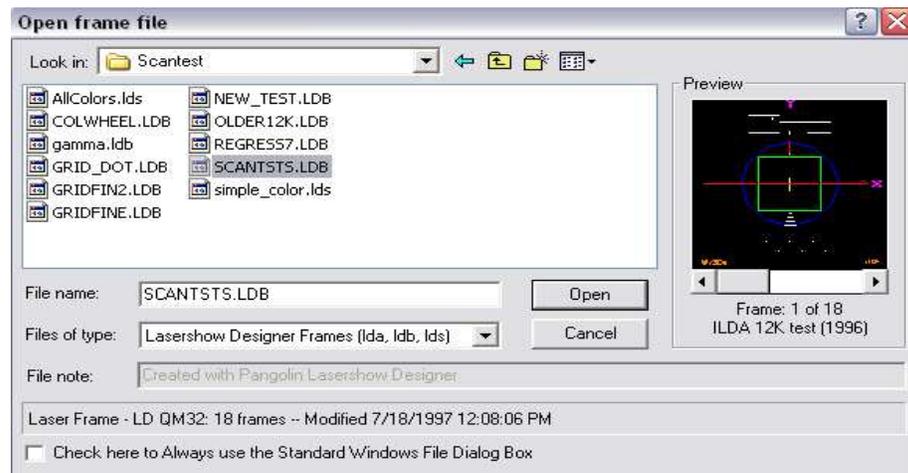
window. The contents page appears; click on the "Important LD2000 concepts" topic area. Select the "Color usage in Lasershow Designer" topic.

Automatic Drawing Parameters

When you draw with LD2000, it automatically adds points for you. This lets you concentrate more on drawing and less on the mechanics of scanning. Since each projector is different, and each person has their own preferences, you need to set these up initially.

AutoBlank settings

Blanked points are automatically put at the beginning and end of each line segment. The number of blanked points depends on your blanking device's speed. To set this, first be sure you are on frame 1. Next, load in the file "LD2000\ Frames\ Scantest\ Scantsts.ldb".



This loads 18 test pattern frames. Select frame 14. This shows horizontal lines spanning a large gap. The numbers at right show how many blanked points were added before and after the gap.

There are two things to check. One we have already looked at: the blanking shift. This controls whether the horizontal lines are more or less centered around the vertical lines. If they are not, select the **Settings/ Projector settings** dialog, "Color/Beam Brush shift" tab. Adjust the blanking shift slider (the longer one on the left) to get the best centering. Exit the dialog box when you have finished.

Next, decide which lowest-numbered line is fully blanked. For example, on Pangolin's projector, at our standard speed of 18,000 points per second, the line with four blanked points is the lowest fully blanked line (the one with three blanked points extends into the gap).

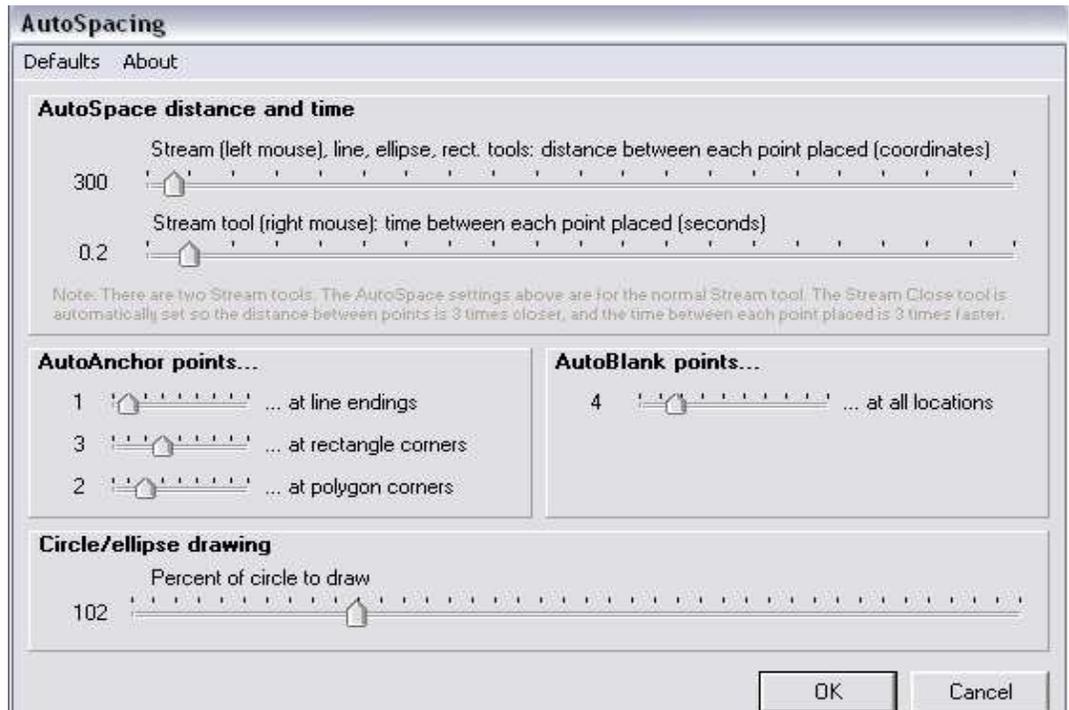
This will be your AutoBlank setting. To set it, select **Settings/ AutoSpacing** from the Control Window menu. Change the AutoBlank slider to the value you decided on. Select **Defaults/ Save** from the dialog's menu, to save AutoSpacing and AutoBlank settings.

AutoAnchor settings

Follow a similar procedure to find the best AutoAnchor settings. In LD2000, anchor points are two or more points placed at a corner. They help the scanners slow down, so corners appear sharper. LD2000 places these automatically at line endings, rectangle corners, and polygon corners.

Select frame 16; it shows AutoAnchor squares. Each square has a different number of points on the corners. Decide on the lowest-numbered square that has sharp corners. On Pangolin's projector, four anchor points give reasonably sharp corners.

Once again select **Settings/ AutoSpacing** from the Control Window menu. This time, change the three AutoAnchor settings. Usually, you set the middle (rectangle corners) and bottom (polygon corners) sliders to the value you decided on; the top slider (line endings) is one less than this value. However, the actual values are completely up to you. As before, use the **Defaults/ Save** menu to save these values. They'll be automatically set each time you load Lasershow Designer.



Other automatic settings

The AutoSpacing dialog contains a few other settings, in addition to AutoAnchor and AutoBlank. For more information, see the LD2000 for Windows help file; search for the "AutoSpacing" topic.

Output Quality

A few LD2000 customers initially thought that LD2000 "did not look as good" as their previous systems. In all cases, it was because they did not take a few moments to set up LD2000 for their particular projector. Once they made those adjustments, they found that LD2000 looked as good or better than their previous system, and was easier to use.

- ▶ **Remember that, for any single frame shown at a specific speed, there is no difference between laser computer graphics systems.**

For example, if you output the ILDA test pattern at 30,000 points per second on Lasershow Designer, it will look the same as if it was output on any other system. (There may be minor differences in voltage levels, but these are easily adjusted with scanner amp trim pots or similar level controls.)

Similarly, a few customers have not had "proper" colors. They might draw with a red color, and see red on the computer screen, but get blue or green from the laser. This means that the palette has not been set up properly.

One way to check colors is to click on the **Settings/Instant test frames** menu. Click on the color test frames. The colors shown on the computer monitor should be close to the laser-projected colors. If the colors do not match, you need to set up the Palette as described in the LD2000 help file.

Creating Shows

The Lasershow Designer 2000 frame creation program is for drawing, editing and animating your frames. For creating shows, you have three main choices: recording, Showtime and scripting.

Recording

This is done using an ADAT, digital videotape, digital hard disk, or similar system. In all cases, the recording device must be able to record and playback the laser signals, which often have a large direct current (DC) component. For example, ADAT machines must be custom modified. Pangolin sells a booklet that describes ADAT modification and recording techniques.

In many ways, it is easiest to record pieces of your show "live". You can use the Lasershow Designer 2000 program to create animations and effects. When you see something you like, put it onto tape while listening to the pre-recorded audio tracks. You don't have to worry about re-creating the effect (it is permanently on tape). Plus, it will inherently always sync with the music.

However, unless you have two machines for dubbing, this may make it difficult to change existing shows — for example, to add a new client's logo.

Showtime 2000

This revolutionary program creates shows merely by dropping frames and effects onto a timeline.

The core Showtime 2000 code is extremely advanced. It has many features that make it ideal for professional work. For example, shows are not refresh-based but are time-based. This means that you can add

or delete frames, add more laser tracks, even change the scan rate and the show will always hit every time cue.

Showtime can handle both corporate-type shows, where you press "Play" to playback a previously-created show, and live shows. In the case of live shows, you must first set up the various frames and effects. These are then assigned to cue buttons in the Live! program, which is part of Showtime. (Press the "Play Live!" button to access Live!) At performance time, you then press the cue buttons to create the show.

For more information on Showtime, see the Showtime 2000 Help file.

Scripting with Visual Basic

No single program can meet every single client's need. At some point you may need to do something we've never thought of. For this, you can use a programming language such as Visual Basic (VB), Visual C++, or Delphi. Visual Basic is the easiest.

From your programming language, you can write sophisticated show scripts. For example, the script might get the current computer time, then start a Showtime show on schedule. You can also write custom control scripts. These can be simple or complex. For example, Audio Visual Imagineering uses VB to control the laser and show in their *Omniscan* projector, which can scan 360° across an entire planetarium dome.

You can either learn to program yourself, or you can hire a programmer. If you have some programming experience, or if you're good with the logical, methodical nature of dealing with computers, you'll probably enjoy Visual Basic programming. There is a learning curve to VB, since it is a different way of programming. (Fortunately, many good books are available, since VB is quite popular.)

Once you get over this curve, you'll find VB to be very clever, very powerful, and very much fun. For example, you can draw one rectangle, type two lines of code, and have a working slider that lets you display any LD2000 frame.

To begin programming, contact Pangolin to acquire the Lasershow Designer Software Development Kit (SDK). You can also feel free to e-mail to sdk@pangolin.com if you have specific questions while programming.

Learning More

This manual only covers installation. Most documentation is in the form of Windows on-line help files. See Appendix B of this manual for more information on these files.

- ▶ **LD2000 is a professional-level program. You can't expect to learn all about it in a few hours. In fact, training with Pangolin usually takes about two days: LD2000 on the first day, and Showtime on the second. You should check with your dealer to find out about their training options.**

If you do have questions, please call your dealer first. If they can't answer your questions, then either they or you can call Pangolin. We're always glad to help, since we want to you get the most from your Lasershow Designer 2000 system.

Chapter 4

Getting Updates

Lasershow Designer 2000 is continually improved. If you are using LD2000 professionally, we want to be sure you have the latest features. That's why you don't ever have to pay for updated software, shows or clip-art frames. Updates are free with your Lasershow Designer system!

To get the updates themselves, there are three methods:

- Download them from the Pangolin website.
- Order the most recent CD/DVD installation set from Pangolin, and re-install LD2000 so you have the latest programs, frames and shows.
- Obtain updates from your dealer.

Updating via the Web

Go to the Pangolin website, www.pangolin.com. From the home page, look for the Updates link.

Each time a new update is released, a link will be put on the Pangolin home page, with a "New!" indication. Or you can bookmark the LD2000 Updates page and check occasionally to see what files are available.

No password is needed. You can download the update files to any computer. However, they will only run on a computer that has a working Lasershow Designer 2000 system.

Updating by ordering the latest CD/DVD-ROM

You can order the latest Lasershow Designer CD/DVD installation set directly from Pangolin. When you receive it, the installer can automatically backup your existing LD2000 files, then install the new programs, frames and shows from the installation media. For CD/DVD orders, we currently charge \$75 plus shipping.

For more information, go to the “Pangolin price list” page at our website, to find the current price. Then go to the “Ordering information” page, to order the CD/DVD installation set.

Updating from your dealer or other users

Your dealer may be able to supply you with the latest version. Or, you can get updates from another LD2000 user in your area or on your particular online service. There are only two restrictions on third parties sending LD2000 files:

- The recipient must be a registered LD2000 user.
- The files must be sent privately. They cannot be put on a Web, FTP or other site where non-users could possibly access them.

Appendix A

QM2000 Pinouts

[The following information is based on the QM2000 help file. You may wish to also check the help file in case any information has changed since this manual was printed.]

ILDA DB-25F connector

Physical

The "D"-shaped DB-25 connector is very common. For example, the parallel port on most computers uses a DB-25F female connector. You can purchase DB-25 connectors, cables and switch boxes at most computer and electronics stores. This wide availability is one reason that ILDA chose the DB-25 for its ILDA Standard Projector connector.

Pangolin also supplies an adapter cable for older Pangolin-compatible projectors. When you use this adapter, the QM2000 can be directly plugged into projectors compatible with Pangolin's Lasershow Designer QM32 board (a full-length ISA board, sold from 1993 through 2000).

- ▶ **CAUTION: The QM2000-to-Pangolin adapter cable is NOT a general-purpose ILDA-to-Pangolin adapter.** This cable only works on the QM2000. The QM2000 actually senses the cable's internal connections, and automatically adjusts its voltage. **Do NOT use this cable with any equipment other than the QM2000.**

Electrical

The QM2000 generates ILDA-compliant differential voltages. For more information on the voltage levels or other aspects of each signal, see the LDQM2000 help file.

ILDA DB-25F pinouts

Signal name	Pin	Notes
X+	1	-5V to +5V
Y+	2	-5V to +5V
Intensity/Blanking +	3	0V to +2.5V
Interlock A	4	Connected to pin 17 inside the QM2000
Red+	5	0V to +5V
Green+	6	0V to +5V
Blue+	7	0V to +5V
Deep blue +	8	0V to +5V
Yellow +	9	0V to +5V
Cyan +	10	0V to +5V
Z+	11	Depth Z (this is not intensity), -5V to +5V
Not connected	12	
Shutter	13	0V to +5V
X-	14	-5V to +5V
Y-	15	-5V to +5V
Intensity/Blanking -	16	0V
Interlock B	17	Connected to pin 4 inside the QM2000
Red-	18	0V
Green-	19	0V
Blue-	20	0V
Deep blue -	21	0V
Yellow -	22	0V
Cyan -	23	0V
Z-	24	-5V to +5V
Ground	25	Cable shield

Where to connect X and Y

There are two types of scanner amps. For this discussion we'll talk about the X signal; the Y signal works the same but of course uses different pins:

- **Single-ended amps** have two input lines per signal, such as "Ground" and "X". Examples include Catweazle and Laser Media. With these amps, connect the QM2000's Ground (pin 25) and the X+ (pin 1) lines. Do not connect the X- (pin 14) line.

- **Differential amps** have three input lines per signal, such as "X-", "Ground" and "X+". Examples include Cambridge, GS MiniSax and TurboTrack. With these amps, simply connect the appropriate lines on the QM2000: X- (pin 14), Ground (pin 25) and X+ (pin 1).

Where to connect intensity and color

Just as with scanner amps, intensity/color drivers can be divided into two types. However, note that the way you connect the QM2000 to single-ended scanner amps is different than the way you connect to single-ended drivers. In the former case, you'll use Ground and normal (+); in the latter case, you'll use inverted (-) and normal (+).

For this discussion we'll talk about the "Red" line, but the other signals work the same way of course.

- **Single-ended drivers** have two input lines per signal, such as "Ground" and "Red". Examples include A.A, MVM and NEOS (4-channel driver) as well as typical laser diode drivers. With these drivers, connect both the QM2000's Red- (pin 18) and the QM2000's Ground (pin 25) to the driver's "Ground", and the Red+ (pin 5) to the driver's "Red".
- **Differential drivers** have three input lines per signal, such as "Red-", "Ground" and "Red+". Examples include NEOS 6- and 8-channel drivers. With these amps, simply connect the appropriate lines on the QM2000: Red- (pin 18), Ground (pin 25) and Red + (pin 5).

Where to connect ground

The ground line (pin 25) should be connected to the ground on your projector. This may be accessed through the projector's connector, or you may have to physically ground to the projector's case, or the third (grounding) pin on the projector's electrical cable.

Ideally, the cable going from the QM2000 to the projector will have its shield (wire mesh or foil wrap around the cable) connected to the ground line (pin 25). But you should still be OK even if you are using prebuilt cables such as standard parallel extension cables, and you don't know whether the shield is connected to the ground.

Note on interlock lines 4, 17

The purpose of the two Interlock lines is so that a projector can tell when it is properly connected to an ILDA-compatible signal source.

The projector will put a current or signal into pin 4. The same current or signal should be present back at the projector when reading pin 17. (This is because pins 4 and 17 are connected together on the QM2000 board.)

If no current or signal is seen on pin 17, it means the DB-25 connector is not plugged into the projector.

Color Signals

The QM2000 DB-25F connector is designed to be ILDA compatible. ILDA has developed a specific nomenclature for colors and specific color wiring recommendations.

This can be a bit confusing, especially when the same wavelength (such as the argon 488 cyan line) is called "blue" in a three-channel system and "cyan" in a six-channel system. ILDA did this so that as you increase color channels you can start breaking out or highlighting especially important colors such as deep blue and cyan, which in a simple 3-channel projector might all be merged into a single "blue" designation.

Fortunately, all you have to do is determine how many color channels you have, and then find the corresponding section below.

Single-ended vs. differential

If your color device has two wires per color channel, such as "Ground" and "Red", then use the column labeled "Single-ended". This shows what pins to use on the QM2000's ILDA DB-25F connector. If your color device has three wires per color channel, such as "Red-", "Ground" and "Red+" use the column labeled "Differential", to find out what pins to use.

Single color with TTL blanking

The blanking device can either turn on (let light through) or off (block light). Examples might be scanner blanking, or a digital AOM driver.

Pin name	Wavelength range	Single-ended	Differential
Intensity	All (single-color)	3(+), 16(-)	3(+), 25(Gnd), 16(-)

Single color with intensity only

The intensity device can dim or brighten the beam, giving shades of a single color. An example might be using an AOM or PCAOM with a single-color laser.

Pin name	Wavelength range	Single-ended	Differential
Intensity	All (single-color)	3(+), 16(-)	3(+), 25(Gnd), 16(-)

3-channel: RGB color

This is one of the most commonly used setups. Note that the common argon "cyan" wavelength at 488 nm is controlled by the Blue channel (pins 7 and 20), not by the Cyan channel (pins 10 and 23). This is because for a three-channel projector, the 488 line looks blue enough for "everyday" use.

Pin name	Wavelength range	Single-ended	Differential
Red	610 nm to 690 nm	5(+), 18(-)	5(+), 25(Gnd), 18(-)
Green	510 nm to 550 nm	6(+), 19(-)	6(+), 25(Gnd), 19(-)
Blue	450 nm to 490 nm	7(+), 20(-)	7(+), 25(Gnd), 20(-)

4-channel: RGB plus deep blue

Once you move beyond three channels, the best way to get a wider spectrum of color is to separate out the deep blue (sometimes called "violet") line and control it separately.

Pin name	Wavelength range	Single-ended	Differential
Red	610 nm to 690 nm	5(+), 18(-)	5(+), 25(Gnd), 18(-)
Green	510 nm to 550 nm	6(+), 19(-)	6(+), 25(Gnd), 19(-)
Blue	470 nm to 490 nm	7(+), 20(-)	7(+), 25(Gnd), 20(-)
Deep blue	450 nm to 470 nm	8(+), 21(-)	8(+), 25(Gnd), 21(-)

5-channel: RGB, deep blue plus yellow

Frankly, yellow is not as usable a color as you might expect. If you have a laser with a separate yellow line, you can certainly try using it instead of a mix of red plus green. But in Pangolin's experience, it is

often simpler to leave yellow out and simply "waste" it. See what you think!

Pin name	Wavelength range	Single-ended	Differential
Red	610 nm to 690 nm	5(+), 18(-)	5(+), 25(Gnd), 18(-)
Green	510 nm to 550 nm	6(+), 19(-)	6(+), 25(Gnd), 19(-)
Blue	470 nm to 490 nm	7(+), 20(-)	7(+), 25(Gnd), 20(-)
Deep blue	450 nm to 470 nm	8(+), 21(-)	8(+), 25(Gnd), 21(-)
Yellow	550 nm to 570 nm	9(+), 22(-)	9(+), 25(Gnd), 22(-)

6-channel: RGB, deep blue, yellow and cyan

This is the most common setup for Pangolin users going direct to PCAOM color devices. It separates out the bluish-green 488 nm "cyan" line of the argon laser, to help give even better blues and violets.

If you have more than six channels on your PCAOM driver, then connect two sets of related colors together. See the Help file topic *PCAOMS and color control* for more information.

Pin name	Wavelength range	Single-ended	Differential
Red	610 nm to 690 nm	5(+), 18(-)	5(+), 25(Gnd), 18(-)
Green	510 nm to 550 nm	6(+), 19(-)	6(+), 25(Gnd), 19(-)
Blue	470 nm to 480 nm	7(+), 20(-)	7(+), 25(Gnd), 20(-)
Deep blue	450 nm to 470 nm	8(+), 21(-)	8(+), 25(Gnd), 21(-)
Yellow	550 nm to 570 nm	9(+), 22(-)	9(+), 25(Gnd), 22(-)
Cyan	480 nm to 490 nm	10(+), 23(-)	10(+), 25(Gnd), 23(-)

DMX DB-9F or DB-15F connector

First-generation QM2000 boards shipped with a DB-9F connector for DMX connections. Newer-style QM2000 boards shipped with a DB-15F connector for the same purpose.

Whether your QM2000 board has a DB-9F or DB-15F connector, this connector is there for two purposes. It provides DMX connection (input or output) on three of the connector's pins. It also can provide other functions, using the other pins. Since almost all clients will be using this connector only for DMX, it is commonly known as the "DMX connector"

Physical

Pangolin supplies a DMX adapter cable. One end plugs into the QM2000's DB-9F or DB-15F connector. (This is the same connector that is commonly found on computers, so it should be easy to find in computer and electrical supply stores.) The other end is a DMX-standard 5-pin DIN (female) connector.

Electrical

Use this adapter cable if you are connecting to equipment controlled by the DMX-512 standard, such as laser "beam tables", lights, fog machines, etc. or to a lighting desk.

The DMX port on the QM2000 is bi-directional. This can serve as either a DMX input or a DMX output, but not both at the same time. The current version of the QM2000 software supports DMX both input and output. This is selected in the DMX Settings dialog box in either LD2000 or Showtime.

Other functions

QM2000 boards also have the capability to input a video sync pulse. Video sync is intended for advanced applications. For more information about video sync, please see the Video Sync Input Signal section of the QM2000 help file.

DB-9F/DB-15F connector pinouts for DMX and video sync

Signal name	Pin	Notes
Drive true	1	Data + for DMX
Drive complement	2	Data - for DMX
Video sync pulse in	5	Signal for video sync
Signal common	6	Common for DMX
Digital ground	15*	Ground for video sync

* on QM2000 boards with a DB-9F connector, pin 9 is used for Digital Ground

DMX 5-pin XLR connector pinouts

Signal name	Pin	Notes
Signal common	1	Shield
Drive complement	2	Data -
Drive true	3	Data +
Not connected	4	
Not connected	5	

Appendix B

Help Files

If you need more information, you can usually find it in the help files that come with Lasershow Designer 2000. The help files are actually easier to use than printed documentation because they have extensive hypertext links. This allows you to choose your own path through the topics.

You can get to the help files in two ways:

- From the Start menu, choose **Start/ Programs/ Lasershow Designer 2000/ Help** to see a list of help files.
- From within "Help" menu item of each program.

Registration Form

Many of our customers purchase through dealers, so we don't always know who you are. To help us give you the best service and support, please fill in the form, then mail or fax it to the address on the back cover of this manual.

(Note that you can also register on line at our website at <http://www.pangolin.com/registration.htm>.)

Contact name (primary LD2000 user)		
Company name		
Street address		
City	State or province	Zip or postal code
Country	Telephone country code (non-US)	Telephone area code or city code
Work/daytime phone number	Fax number	Other phone (mobile, nighttime, etc.)
Preferred e-mail address		
Website (if you have one)		
QM2000 board serial number	Computer type, speed (e.g., Dell Pentium III)	Windows version (e.g., 98, ME, 2000, XP)
Computer peripherals used with LD2000 (e.g., digitizing pad, genlock, time code)		

EC Declaration of Conformity

Manufacturer: Pangolin Laser Systems, Inc.

Address: 9501 Satellite Boulevard, Suite 109, Orlando, FL 32837, USA

Product Description: PC Peripheral Board QM2000

The above mentioned product is in accordance with the following European Standards:

Numbers: EN55022: 1998 + A1: 2000 + A2: 2003, Class A
EN 61000-3-2: 2000
EN 61000-3-3: 1995 + A1: 2001
EN55024: 1998 + A1: 2001 + A2: 2003
EN 61000-4-2: 1995 + A1: 1998 + A2: 2001
EN 61000-4-3: 2002 + A1: 2002
EN 61000-4-4: 1995 + A1: 2001 + A2: 2002
EN 61000-4-5: 1995 + A1: 2001
EN 61000-4-6: 1996 + A1: 2001
EN 61000-4-8: 1993 + A1: 2001
EN 61000-4-11: 1994 + A1: 2001

following the provision of Directive

93/68/EEC
73/23/EEC
89/336/EEC

Council Directive 93/68/EEC on CE Marking

Council Directive 73/23/EEC on Low Voltage Directive

Council Directive 89/336/EEC on Electromagnetic Directive including amendments

Placement of CE-mark: Lower right corner of Peripheral Board

Issuer: Pangolin Laser Systems, Inc.

Place / Date: Orlando, June 21, 2005

Signature:



William R. Benner, Jr.
President

RoHS Certificate of Compliance

Restriction of the use of certain Hazardous Substances

EC directive 2002/95/EC (**the RoHS Directive**) restricts the use of the hazardous substances listed below in electrical and electronic equipment. Based on information provided by our suppliers, Pangolin designates the products listed below as **RoHS compliant** for orders placed on or after the date of this certificate.

RoHS compliant means that:

- Our Products conform to the RoHS Standards.
- Our suppliers have confirmed the compliance status of the relevant components to us.
- We have implemented processes to confirm and document this.
- We perform material content testing where appropriate.
- We have introduced RoHS labeling for all compliant products to help identify and segregate compliant stock through our distribution network and our customers' stock management and purchasing systems.

Confirmation of compliance status by our suppliers is either because the products do not contain any of the restricted substances referred to in Article 4(1) of the RoHS Directive at concentrations in excess of those permitted under the RoHS Directive, or because removal of the restricted substances is not technically possible and their existence in the products at levels in excess of these concentrations is allowed as one of the particular applications listed in the Annex to the RoHS Directive.

For these purposes, the maximum concentration values of the restricted substances by weight in homogenous materials are:

Lead	0.1%
Mercury	0.1%
Hexavalent Chromium	0.1%
Polybrominated Biphenyls	0.1%
Polybrominated Diphenyl Ethers	0.1%
Cadmium	0.01%

Pangolin has taken reasonable steps to confirm suppliers' statements regarding the absence of the restricted substances and maintains a full audit trail of relevant documentation to support this.

Description	QM2000 LASER CONTROLLER	RoHS Compliant: Yes
Manufacturer/Brand Name	PANGOLIN	
Manufacturer Part No.	QM2000	
Date	June 30, 2006	



William R. Benner, Jr.
President