

Reference Manual

PTG FLASH

Compact Flash Slot Option for *Testor / PTG 5610*

Revision 1.2
July 2008



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Warranty

LYNX Technik AG warrants the firmware option for a period of two (2) years from the date of shipment and that the firmware option substantially conforms to its published specifications. Except for the foregoing, the Firmware option is provided AS IS. This limited warranty extends only to the Customer who is the original licensee. Customer's sole and exclusive remedy and the entire liability of LYNX and its authorized dealers and representatives under this limited warranty will be, at LYNX or its service center's option, repair, upgrade or replacement of the firmware option if reported. In no event does LYNX warrant that the Firmware option is error free or that Customer will be able to operate the firmware option without problems or interruptions.

In order to obtain service under this warranty, customer must notify LYNX Technik of the defect before expiration of the warranty period and make suitable arrangements for the performance of service. Customer shall be responsible for packaging and shipping the defective product to the service center designated by LYNX Technik, with shipping charges prepaid. LYNX Technik shall pay for the return of the product to the customer if the shipment is within the country which the LYNX Technik service center is located. Customer shall be responsible for payment of all shipping charges, duties, taxes and any other charges for products returned to any other locations.

This warranty shall not apply to any defect, failure, or damage caused by improper use or improper or inadequate maintenance and care. LYNX Technik shall not be obligated to furnish service under this warranty a) to repair damage resulting from attempts by personnel other than LYNX Technik representatives to install, repair or service the product; b) to repair damage resulting from improper use or connection to incompatible equipment; c) to repair any damage or malfunction caused by the use of non LYNX Technik supplies; or d) to service a product which has been modified or integrated with other products when the effect of such modification or integration increases the time or difficulty servicing the product.

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Introduction

The PTG FLASH option is a license code which is installed into the PTG 3610 B/D Testor SD/HDSI Test Generator, or the PTG 5610 Test Generator. This license code enables the integrated compact flash slot which is already fitted to these products.

The Compact Flash slot facilitates the loading of external DPX files which can then be recalled and used as still images on the test generator outputs.

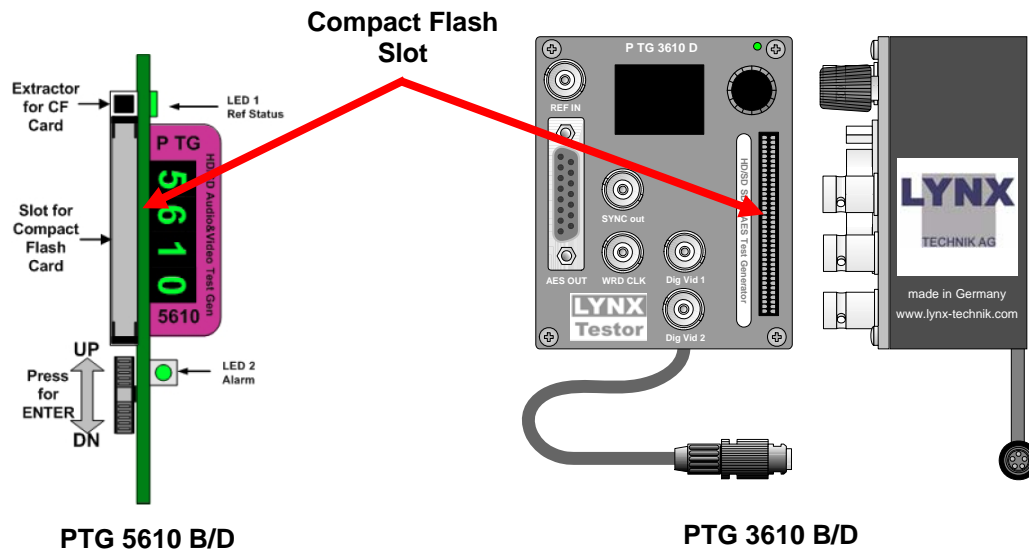
Note. This option is for the license code **ONLY** - which will enable the slot for use. No hardware (Compact Flash Modules) or additional test patterns are provided (a selection of free patterns is available for download from the LYNX website if needed)

Creating Patterns

This manual also contains a brief tutorial with some useful tips on the use of Photoshop for the creation of your own test pattern designs.

File Conversion

The Testor only supports SMPTE DPX graphics files, so some conversion is necessary. This manual contains instructions and examples on how to use third party software to convert files to the SMPTE DPX format.



Pre-requisite for Testor Field Upgrades

If you have purchased a field upgrade and have received a valid license code from LYNX then please consider the following:

The Testor and PTG 5610 Test Generators have the hardware prepared for this option and have the Compact Flash hardware. All PTG 5610 Test Generators will accept the licence code. However, there is a pre-requisite for the Testor base firmware revision to accept the Option license code. This should be release **207** or above.

The version number can be observed on the Testor's integrated display on the home screen (see below)

If running older firmware then when Testor is first switched on the following screen will be shown



After a few seconds the display will then change to the following for a short period of time, and the version number is shown below the PTG 3610



There is also a menu selection called "Version Number", selecting this will display the current firmware revision.

The version number should be **207** or above (first three digits). If not, then the basic firmware requires upgrade in your Testor. LYNX will upgrade this free of charge please contact LYNX for an RMA to return your unit for free upgrade.

Installing the license code

If you purchased the Testor and the PTG FLASH option at the same time then the Testor or PTG 5610 Test Generator has the option pre-installed and you need to do nothing more. If this is a field upgrade then you will require the use of a RCT 3602 USB Service adapter for Testor (or the LYNX central control system) to enter the license code. If you do not have access to a Service Adapter then we will supply the license code in a standard text file (.txt) which can be loaded from Compact Flash.

Note. If using the RFR 3600 or RFR 3610 hard case options for Testor these have an integrated USB port and the license code can be entered this way

Installing license code from Compact Flash

You will receive an e-mail message with your license code text file attached when the option has been purchased. Once received simply follow the steps below to install the license.

1. Create a directory called "Testor" in the root of a Compact Flash card (refer to the section preparing compact flash card for details)
2. Copy the txt file (as received) into the Testor directly using your PC
3. Power up the Testor and insert the compact flash card
4. The CF Card is scanned automatically, and the license code installed.

5. To verify installation select a pattern as usual and you will see there are now two choices "INTERN" and "COMPACT FLASH"

Installing the license code using a PC

If you have the use of a Service Adapter (RCT 3602) or if using the RFR 3600 or RFR 3610 hard case options then the license code can be installed via the Testor GUI.

If using the LYNX central control system then the PTG 5610 uses the same GUI control.

Your license code will be mailed to you via e-mail.

1. Copy the license code from the e-mail into your PC clipboard.
2. On the Test Generator GUI options tab select the "options" tab (see below)

The screenshot shows the 'Options' tab in the Test Generator GUI. At the top, there is a navigation bar with tabs: Main, SDI 1, SDI 2, Pattern Settings, Audio, Options (selected), Params, Backpanel, and Events. Below the navigation bar, the title is 'Activation of optional features for this Device'. A table lists the optional features:

Status	Name	Description
active	P_TG_FLASH	Images from Compact Flash Card

Below the table, there is a text input field labeled 'Enter license code for activation:' and an 'Activate' button. To the right of the table, there is a 'request code' button.

(Note. This example shows the option already installed and active)

3. Paste the license code into the "Enter License Code" field and click the activate button. If the license code is accepted the option will be shown active as shown above.

Note. If Testor was supplied pre-installed in one of the portable hard case options (R FR 3600 or R FR 3610) then these have an integrated USB port and which can be used for this upgrade.

Note. The license code is keyed to the Testor Serial number and will only function for the product it was supplied for.

Note. There are no returns / refunds for the PTG FLASH option; once the license is generated and installed it cannot be revoked.

Preparing the Compact Flash Card

Supported Compact Flash Cards

All commercially available compact flash cards are supported. Storage capacity is up to the user determined by the number of patterns you wish to store or transport on the Compact Flash card (for reference, an HD pattern in DPX form can be between 3.5 MB and 9 MB in size depending on the format)

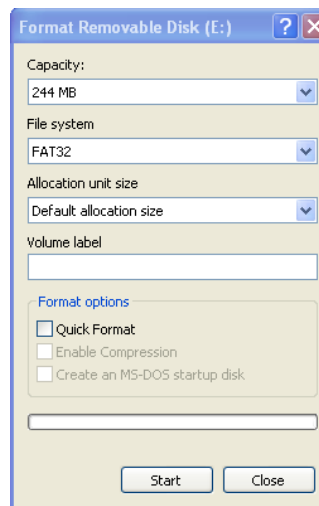
You will require the use of a Windows PC with a Compact Flash reader to format the Compact Flash card and store pattern files.

To format the compact flash card

The Compact flash card needs to be formatted to **FAT 32**, if the CF card is already formatted with **FAT 32** you can skip the formatting step.

1. Insert the compact flash card into the compact flash reader on your PC
2. Navigate the drive letter used for the compact flash using windows explorer
3. Using the mouse Right click over the drive letter and select “ format ”
4. Make the following selections in the dialog (capacity depends on the size of the compact flash card used). Enter a volume name if you would like to and then click start.

NOTE: If the CF card is already formatted with FAT 32 you can skip the formatting step



NOTE. Please take caution when using the "Format" command. Make sure you have selected the Compact Flash card to format; if you select the wrong drive letter (C for example) you will destroy all data on your PC.

The compact flash card should have a folder with some sub directories which need to be created manually. Please refer to the next section for the file structure.

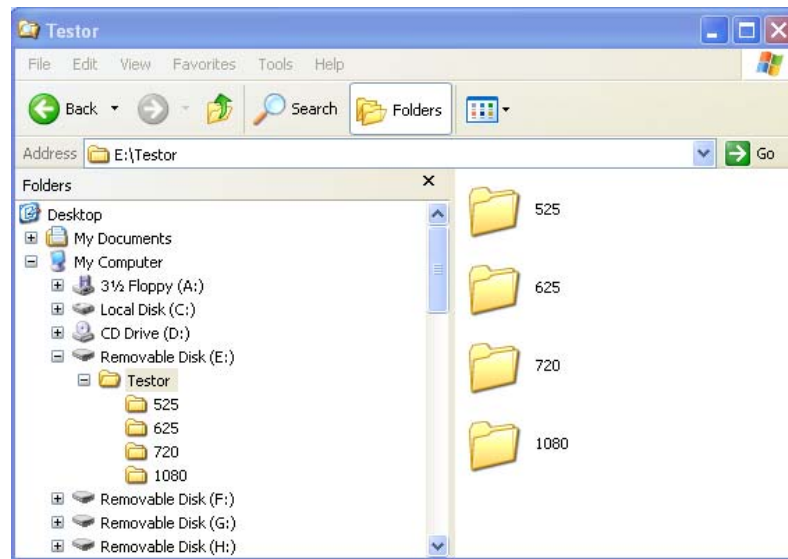
File Structure

The Test Generators require test patterns in 4 specific native formats. The four native formats are shown below:

Native Format (Pixels and Lines)	Used for the following output standards
720 x 480 or 720 x 486 (525 SDTV)	525 / 59.94Hz
720 x 576 (625 SDTV)	625 / 50Hz
1280 x 720 (HDTV)	720P / 50Hz / 60Hz / 59.94Hz / 25Hz / 24Hz 23.98Hz / 24Hz PSF / 23.98Hz PSF / 25Hz PSF / 30Hz / 29.97Hz
1920 x 1080 (HDTV)	1080i / 50Hz / 60Hz / 59.94Hz 1080P / 50Hz / 60Hz / 59.94Hz / 25Hz / 24Hz 23.98Hz / 24Hz PSF / 23.98Hz PSF / 25Hz PSF / 30Hz / 29.97Hz

The patterns should be stored on the compact flash in a folder called “**Testor**” with four sub directories as shown below:

Note. The Testor only scans for files in a folder called “Testor” if you do not create this directly then the card will not function.



Storing Files

The Test Generator will scan the **Testor** directory for any compatible DPX files (in the supported native resolutions) and it will provide access to these via local controls or via the GUI, so files can be placed anywhere in the root of the Testor directory **BUT** this can cause some operational difficulty when reviewing and selecting patterns using the Testor.

The Test Generator needs a separate pattern file in each of the 4 native resolutions to support all output formats for that pattern. Its good practice to save files of the same design, but in the different resolutions using the same filename in the respective sub directory.

For example, if creating a color bar pattern and you would like it to be available in all resolutions you would produce 4 separate DPX files, one for 525 / 625 / 720 and 1080

All these files should have the same filename “colorbar.dpx” and each one placed in its respective sub directory (525/625/720/1080)

This way when using the Test Generators and navigate through the CF Card patterns (in the GUI and via the local display) the pattern “colorbar” will have only a single entry with the formats its available in indicated.

The [not recommended] alternative is to give each file a unique name, e.g “colorbar-525.DPX”, “colorbar-625.DPX” etc (so they can all live in the same directory). The Test Generators will find these files and each file will have a separate listing in the CF Card menu with the filename displayed. While this would work, it will make the operation of Test Generator cumbersome.

About DPX Files

Testor will **only** accept files in the ANSI/SMPTE standard (268M-2003) DPX (Digital Picture Exchange Format).

Note. *DPX is similar to the Kodak Cineon or Kodak DPX format but it is not the same (SMPTE added some specific header information) files must adhere to the SMPTE format. Kodak DPX files or Cineon files will not be recognized by Testor.*

When using Photoshop in 16 bit mode the user has the opportunity to save the file as a Kodak CIN or DPX file (using the “Save As” command) these files **are not** SMPTE compatible and will not be recognized by Testor.

It is necessary to convert graphics files to the DPX format before storing to the CF Card, there are some freely available software tools which can be used for viewing and the conversion of graphics files to the DPX format which will be covered later in this manual.

Loading Files from Compact Flash

Once the DPX files have been stored in the respective folders on the CF Card they can now be loaded and used in the test generator

Compact flash memory is not fast enough to be used directly, so a selected pattern is loaded from compact flash into Testor's high speed ram. This loading process will take a few seconds (depending on the file format).




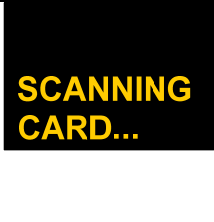


Tip. The Testor display can only display the first 8 characters of the filename on the compact flash card, so it's a good idea to keep the file names this size (max) to allow for easy identification and navigation using the integrated display.

When you have stored all the required DPX image files onto Compact Flash (using your PC) simply remove the card from the PC and plug into Testor (no need to power Testor down)

CF Card Access Using Testor Local Controls

If using the integrated local display and control knob follow the instructions below to use images from the Compact Flash card.

(If using the PTG 5610 Test Generator then pattern selection must be made from the GUI)

	<p>Using the local controls navigate to one of the OUPUT PATTERN selections. Click to enter.</p> <p><i>This will be menu entry OUPUT 1 PATTERN or OUTPUT 2 PATTERN (pattern 1 is used for this example)</i></p>
	<p>There are two entries in this layer: INTERN and COMPACT FLASH. Select COMPACT FLASH and click to enter</p> <p><i>INTERN = internal and is how you would access the standard Testor patterns</i></p>
	<p>If the CF card is not installed then you will see the following display. Insert the compact flash card.</p>
	<p>When the card is detected Testor will scan the card, (this can be very quick so you might miss seeing this message). When complete you should see a small "back" in the lower right hand corner, see next step</p> <p>NOTE. Testor may also display the following messages: NO DPX IMAGES = did not detect any compatible files on the CF card. INVALID FILE SYS = Card not formatted to FAT 32</p>
	<p>When you see this display it means the card has been scanned and its ready for use, <u>rotate the control knob</u> to scroll through the available patterns on CF card. <i>(Clicking "back" will take you back to the pattern select root menu).</i></p> <p>NOTE: leave CF the card installed in Testor.</p>
	<p>A pattern name will be displayed and it's possible to scroll through all the patterns on the CF card using the control knob. The filename (first 8 characters) is displayed as the pattern name and above the pattern name the available resolutions the file is available in are indicated. Resolutions not displayed here are not available for the selected pattern.</p> <p>Clicking the control knob will load the pattern from the CF card.</p>

Note. It will take a few seconds for the image to load from the CF card into the Testor RAM. Loading speed depends of the file size. 525 files are fastest and 1080 files the slowest. The file can be observed loading on the Test Generator output from top to bottom.

When scrolling through patterns on the CF card if you reach a pattern which does not support the selected video format then the SDI video output will display something like shown below:

801d
Pattern not found
(standard)

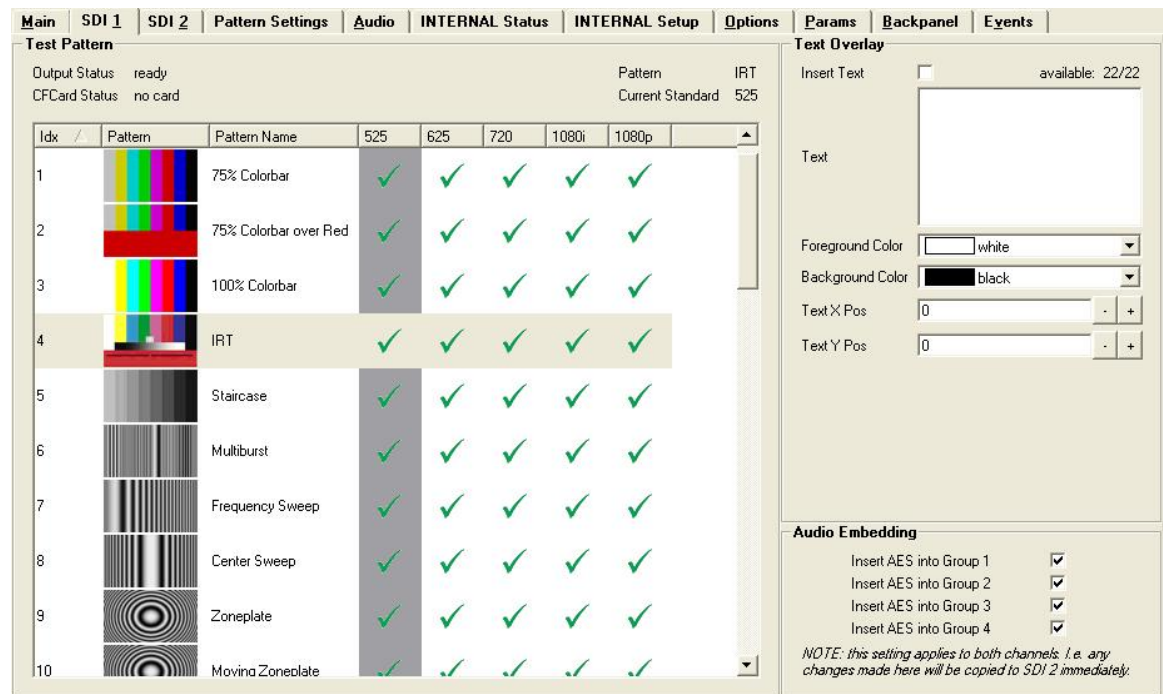
This is indicating the selected pattern on the CF card does not support the selected standard.

CF Card Access Using the LYNX GUI

Patterns from CF Card can also be selected using the LYNX GUI

Click on one of the SDI tabs [SDI 1 or SDI 2]

Without the CF Card installed the display will look normal (As shown below)



Note. the CF Card status is indicating “no card” meaning no CF card has been detected.

Insert the CF card into the Test Generator, the CF Card status will change [briefly] to “scanning”. After a few seconds the pattern list will update to show the available CF card images.

These will always be listed at the top of the table, above the internal pattern listings. Each pattern does not have a thumbnail image and is shown as “COMPACT FLASH IMAGE” see below:

The screenshot shows the PTG FLASH software interface. The 'Test Pattern' table lists various patterns and their availability across different video standards. The 'Text Overlay' panel on the right allows for inserting text and setting its appearance.

Idx	Pattern	Pattern Name	525	625	720	1080i	1080p
CFC 4	FLASH IMAGE	field-test.dpx	✓	✓		✓	✓
CFC 5	COMPACT FLASH IMAGE	GRID DFX	✓	✓	✓	✓	✓
CFC 6	COMPACT FLASH IMAGE	MOIRE1 DFX	✓	✓	✓	✓	✓
CFC 7	COMPACT FLASH IMAGE	MOIRE2 DFX	✓	✓	✓	✓	✓
CFC 8	COMPACT FLASH IMAGE	SAFEACTNDPX	✓	✓	!	!	!
CFC 9	COMPACT FLASH IMAGE	Indian.dpx	✓				
CFC 10	COMPACT FLASH IMAGE	safe-action.dpx	✓	✓	✓	✓	✓
CFC 11	COMPACT FLASH IMAGE	chart-16-9.dpx		✓			
CFC 12	COMPACT FLASH IMAGE	BBC DFX		✓			
CFC 13	COMPACT FLASH IMAGE	black-test.dpx			✓	✓	✓

Text Overlay

Insert Text ☐ available: 22/22

Text

Foreground Color

Background Color

Text X Pos

Text Y Pos

Audio Embedding

Insert AES into Group 1 ☒

Insert AES into Group 2 ☒

Insert AES into Group 3 ☒

Insert AES into Group 4 ☒

NOTE: this setting applies to both channels. I.e. any changes made here will be copied to SDI 2 immediately.

The pattern name is the filename as stored on the CF card, and the respective columns indicate the resolutions the file is available for. Those marked with the small yellow exclamation icon indicates the pattern is not available in this format.

To select a CF pattern simply highlight the pattern in the list and the pattern will load from CF card into Testor.

The SDI video output will show a message similar to the one below for any pattern which is not supporting the selected video standard set on Testor.

801d
Pattern not found
(standard)

Photoshop Tutorial

You can use any graphics program to generate patterns for Testor, when complete store them as standard TIFF file and then convert them to DPX files for use in the Test Generator. As Photoshop is a very popular program we have produced a brief tutorial with some guidelines and tips for creating test patterns for Testor.

This brief tutorial will help in setting up and configuring Photoshop to build your own test patterns. This is a very basic guide and assumes you have a working knowledge of Photoshop. We used Photoshop CS version 8 for this tutorial.

Background

The Testor accepts standard SMPTE DPX files loaded via the integrated Compact Flash slot. The 5 step process is:

1. Create pattern design in Photoshop
2. Save as a TIFF file
3. Convert the TIFF file to DPX using a software utility
4. Store DPX file to compact flash card
5. Load file from Compact Flash into Testor

Each native format requires its own pattern, meaning a separate pattern design for each of the 4 supported image resolutions is required (if needed in all resolutions)

HDTV 1920 x 1080 - 16:9 aspect with Square pixels

HDTV 1280 x 720 - 16:9 aspect with Square pixels

SDTV 720 x 486 or 720 x 480 ** - 4:3 aspect with Rectangle pixels (525)

SDTV 720 x 576 – 4:3 aspect with Rectangle pixels (625)

*** **Note.** Depending on the application you may want to create files in either of the two common pixel and line ratios used for 525 patterns. 720 x 486 are the correct number of active pixels and lines for a D1 image, but with the widespread use of image compression and DV the industry has moved to a native format of 720 x 480 (as both are divisible by 16 with an integer result which is the common block size used for MPEG compression). Testor will accept and display 486 or 480 line images (packing the unused lines in 480 mode with black)*

Remember these are the “native” pattern files and will be used for all video formats in this resolution, so a native 1080 pattern can be used for any 1080 format, interlaced or progressive at any supported frame rate.

Photoshop

Fortunately, Photoshop has some nice presets ideal for setting up the canvas for creating a new test patterns.

Click **[File > New]** in Photoshop and you will see the new page dialog. Next click on the **Preset** dropdown menu and you will see a selection of presets for video. The Presets best suited for use with Testor are shown below.

[**NTSC D1 720 x 486 (with Guides)**] for 525 (486 line) test patterns*

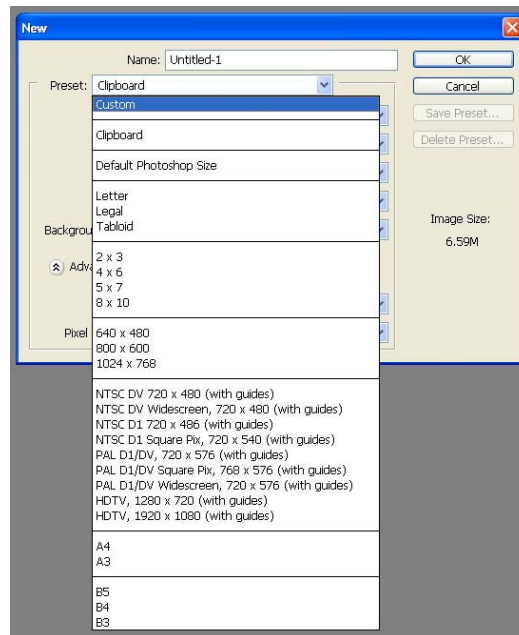
[**NTSC DV 720 x 480 (with guides)**] for 525 (480 line) test patterns*

[**PAL D1/DV 720 x 576 (with Guides)**] for 625 test patterns*

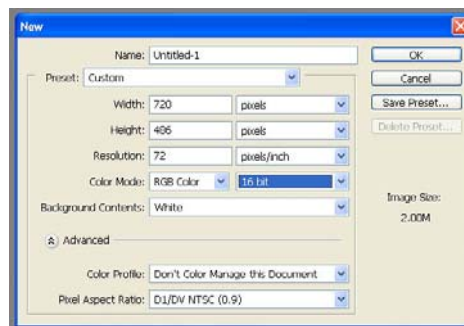
[**HDTV 1280 x 720 (with Guides)**] for 720P test patterns

[**HDTV 1920 x 1080 (with Guides)**] for 1080i and 1080P test patterns

* The SDTV selections provide presets for the rectangular pixels required for these formats



See below the typical settings used for a SDTV 720 x 486 canvas



When opened the canvas includes some preset guides (in blue), which are equivalent to safe action and safe title borders (see below) also the image is scaled (for display only so the image displays in the correct proportions). This is correction for the pixel aspect ratio (basically means if you draw a circle it will look like a circle on the screen but is actually a slight oval because of the rectangle pixels used for SDTV displays).

This correction can be turned on and off using **View > Pixel Aspect Ratio Correction** (obviously this setting does not apply to a HDTV canvas which uses square pixels).

Preset RGB mode and 16 bits per color. Unfortunately there is no 10 bit mode for Photoshop the choices are either 8 or 16 bits. Working in 16 bits gives enough bit depth for the file to be converted to 10 bits using DPX conversion utilities. If you only want to produce an 8 bit pattern then leave the bit depth set to 8 bits.

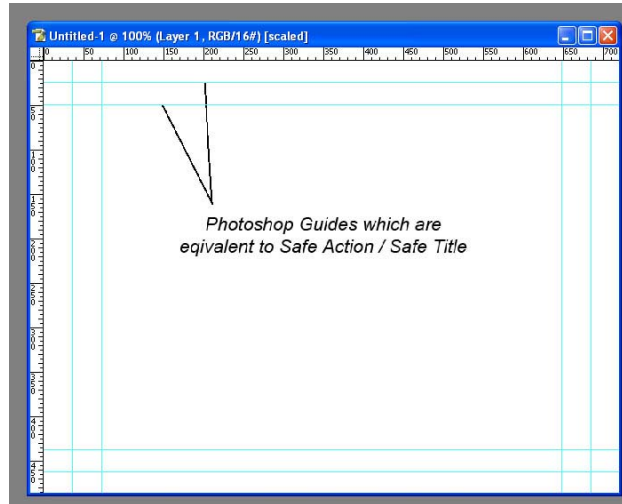
The SDI output from Testor is YUV, and the Testor has an internal matrix to convert the RGB DPX files into the required YUV values for the 4:2:2 video signals. However, in Photoshop we are working in RGB color space when creating the test pattern so it is

theoretically possible to create illegal colors. There are volumes written about color space and color management and this is a very complex issue. Shown below are the Photoshop color profile settings you could use for the standards supported. These are selected from the color profile drop down selection.

For SDTV Patterns use profile “**SMPT-E-C**” = Color Space CCIR601-1
For HDTV Patterns use profile “**sRGB**” = Color Space CCIR 709

Its entirely up to you if you wish to color manage the file using these presets.

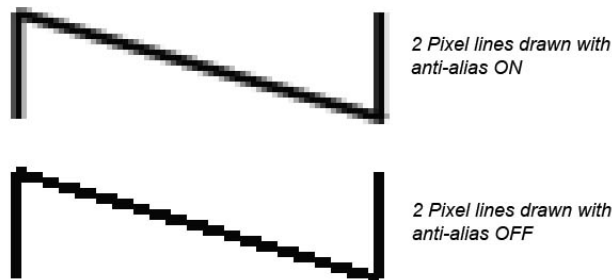
When done making settings click OK to open the canvas, which should look like the example below:



You are now ready to start creating your test pattern!

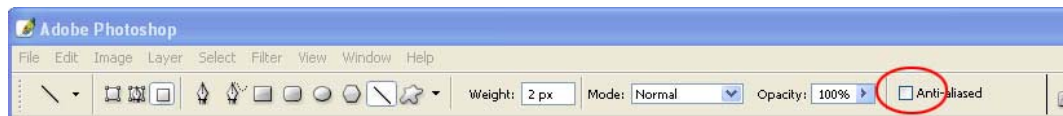
Drawing Tips

Photoshop is designed as a creative painting tool, and some of the drawing tools default to “anti aliased” in operation for better visual results – this will soften the edges of lines and shapes. While perfect for visual representation, it is not ideal for a test pattern and this will artificially soften sharp edges and outlines. See the example below. Note how the lines are made softer.



It is a matter of personal preference and the application (if it is a image file and not a test pattern maybe the anti alias filter will give better visual results) but we have found more accurate test patterns are produced with the anti-alias filters OFF.

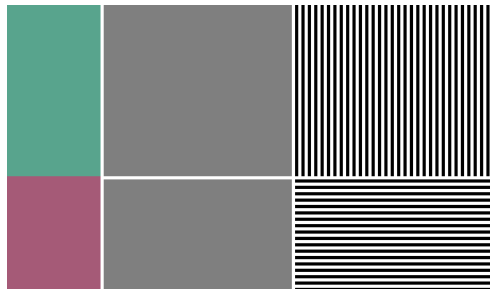
You can turn anti-alias off and on from the drawing tool toolbar at the top of the screen (toolbar below shown for the line tool).



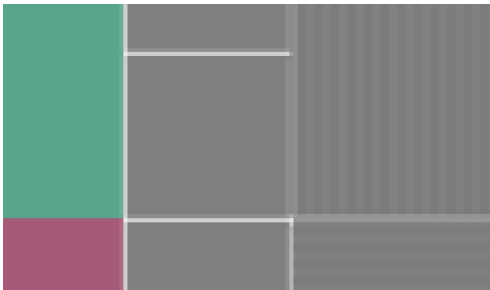
Scaling

Better results can also be obtained if you avoid the “transform” functions and scaling functions in Photoshop, these also will degrade image quality (does not matter if you are reducing or increasing scale or changing aspect ratio, of it’s a big or small change - a significant quality hit is still there).

Each test pattern should be produced on its own canvas in the native resolution for best results. It’s tempting to take a 1920 x 1080 pattern and simply scale down to 1280 x 720 but this will result in a considerable loss in quality. The example below shows a small zoomed in portion of a native 1920 x 1080 pattern which was then down scaled to 1280 x 720 in Photoshop.



Section from the original native 1920 x 1080 pattern



Result from Photoshop downscaling to 1280 x 720 resolution.

You can see the filtering process has completely destroyed the 1 pixel wide frequency test chips on the right, also note the softening of the edges around the white lines on the grey background. This will happen anytime you touch any object or layer with any Photoshop scaling filter regardless of the scaling factor (there are several selections for the scaling filter, all leave behind artifacts)

Color

Although the patterns are YUV output from Testor we work in a RGB space in Photoshop. This means there is the possibility to create illegal colors which at this time

we have no means to prevent or monitor. (Aside from using the color profile presets mentioned earlier)

When presetting a color or greyscale level for use in a test pattern its often necessary to specify a precise value. For this the value can be calculated quite easily and entered directly as a numerical value using the standard Photoshop color pick dialog.

Note. Although working in 16 bit color for some reason Photoshop has not implemented a 16 bit color picker, you are still required to enter a value equivalent to the 8 bit range, where 0 = black and 255 digital = peak white, Also Photoshop only works in 15 bit not 16 bit. From what we have determined this means the 15 bit range (0 - 32,768) is broken up into larger chunks which span the 0 – 255 color picker range but the underlying code values are 15 bit. The 15 bit limitation is of no great concern as we will be converting these files to 10 bits per color when we generate the DPX version.



Note: Photoshop defaults to the color swatches so you will need to select the color tab

Basically the scaling range is black level = 0 and White = 255 for each color

So for example if you needed 75% saturated red, the three numerical settings would be:

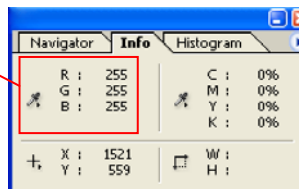
R= 192, G= 0, B= 0

(Red calculated as being 75% of the 256 peak range = 192)

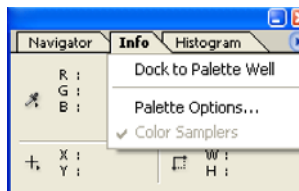
Note. If you need to see the actual underlying 15 bit numeric values you can set Photoshop to display the 16 bit (15 bit) values for the selected color.

On the navigation dialog click on the “info” tab (see below) this will display the RGB values.

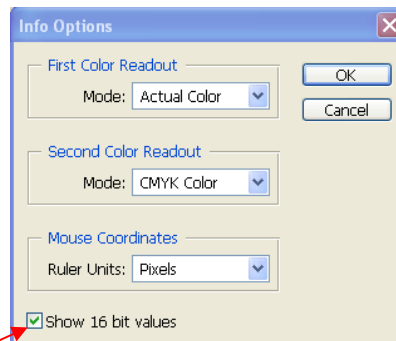
8 bit values



Even when working in 16 bit mode they are still displayed as 8 bit values by default. To switch to display 16 bit values click on the small arrow in the top right hand corner.



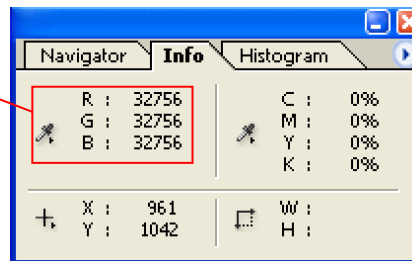
Select **Palette Options** to open the dialog below:



Check the box **Show 16 bit values** and select OK

Now the Info tab will show the 16 (15 bit) values, see below:

15 bit values



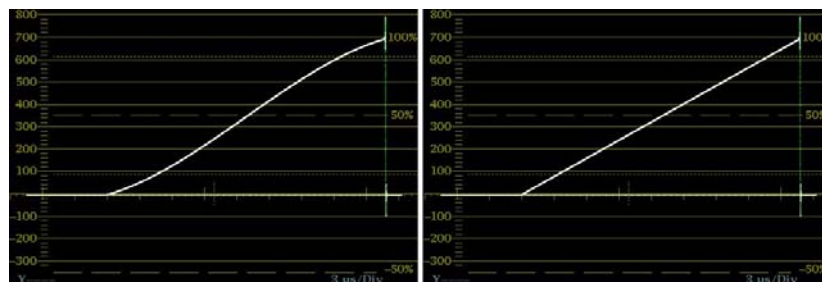
Note the RGB values are now showing larger numbers, what's is shown is peak white which in 8 bit is 255, and is shown as 32,756 by Photoshop (*which shows its only working in 15 bits as 16 bits should be 65,512*)

While it's possible to show a 15 bit value for a color selected, there is no way to numerically enter a precise value in this mode, the color picker remains in 8 bit.

Generating Ramps

If the test pattern needs a ramp (or sawtooth) element this can be created using the **Gradient Fill** function in Photoshop. However, for some reason Photoshop does not generate completely linear ramps but applies a very slight "S Curve" function. We have no idea why Photoshop works this way but it's something you should be aware of.

Example below is taken from a Waveform Monitor after a ramp was created in Photoshop; next to it is what the ramp should look like.



Ramp as generated by Photoshop

Standard Linear Ramp

Grids and Guides

It is recommended you preset a suitable drawing grid and place guides on the Photoshop document where needed - and then “snap” to the grid and /or guides. This will assist greatly when setting up more precise geometric pattern layouts. Guides and grids are standard Photoshop drawing tools and can be setup under **edit>preferences>guides**, then select **grids and slices**. The drawing snap presets can be set under **view>snap** (You can also turn drawing guides and drawing grids on and off as needed under the **view** menu)

Saving Photoshop files

Normally you will have used some layers to construct your pattern so its always recommended to store a master copy as a standard **photoshop.psd** file in case you need to go back and make changes.

For use in the Test Generators we need to save the file as a 16 bit TIF file which we can then convert to DPX later. Save a copy of the image as a TIF file using the **“format”** option in the **save** dialog.

Converting TIF files to DPX format

The TIFF files created in Photoshop need to be converted to SMTE DPX files, this we do using a freeware utility called **XnView**, and a freeware utility called **GraphicsMagick**.

About XNView

This is a free ware utility which can be freely downloaded and used to view and convert a wide variety of different graphics file formats. However, there are some limitations to this utility when converting files to the DPX format. While support is provided for 10 bit conversions when converting a 16 bit file to 10 bit DPX files unpredictable results have been observed. From what we have found this utility is only suitable for taking an 8 bit per color TIF file and converting to 10 bit DPX, this will yield a compatible 10 bit file for use in the test generators but its only 8 bit quantization with 2 bits “stuffed” to make it a 10 bit file. Converting a 16 bit file has resulted in drastic color value shifting.

Also, when checking DPX file properties with **XNView** the result is always showing a 24 bit file (8 bits per color) even if the file is 30 bit (10 bits per color).

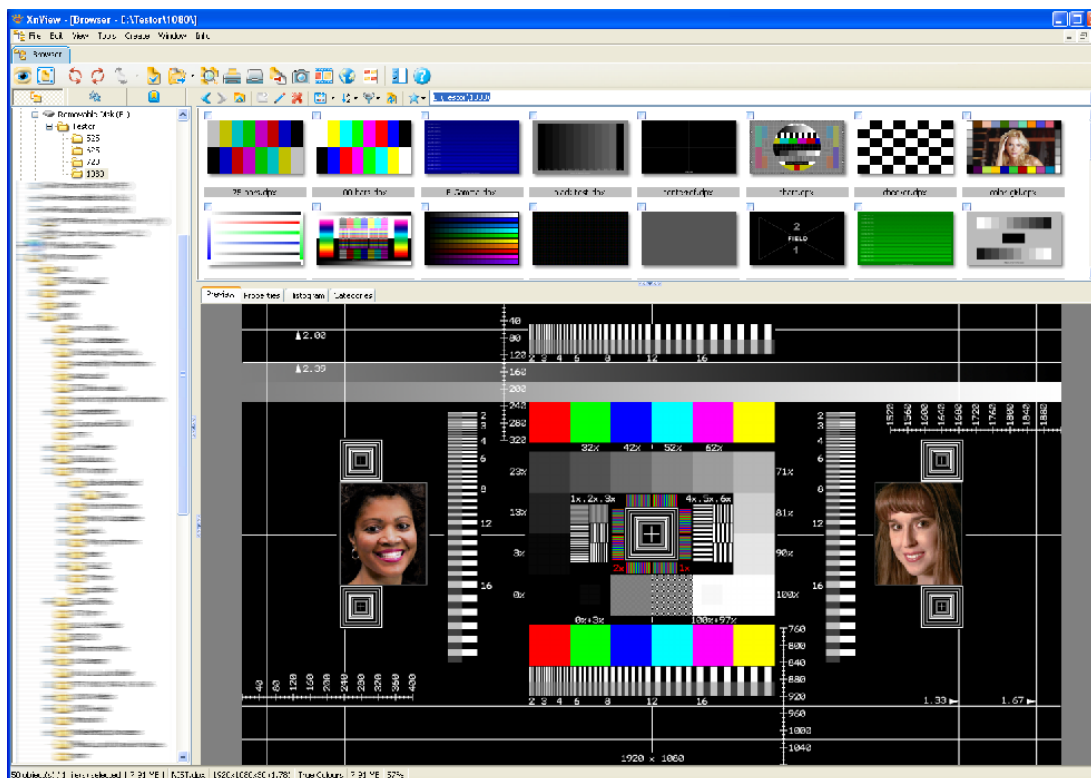
Because of these inconsistencies and problems we recommend **XNView** is only used as a tool to view DPX files and not used for any conversion. We recommend the use of **GraphicsMagick** for the DPX conversion process.

XNView can be downloaded from www.xnview.com

XNView is provided as Freeware for private non-commercial, educational use and non-profit organizations.

Using XNView to View Files

XNView provides a simple and intuitive user interface, which should be self explanatory in operation to anyone familiar with Windows. XNView will show DPX files as viewable high resolution images, see below:



About GraphicsMagick

GraphicsMagick is a collection of tools and libraries which support reading, writing, and manipulating a graphics image in over 88 formats including major formats such as DPX, GIF, JPEG, JPEG-2000, PNG, PDF, SVG, and TIFF.

While a very versatile and useful set of tools, for the purpose of our application we are focusing on the use of GraphicsMagick to perform a simple conversion of a 16 bit source file into a 10 bit DPX file.

GraphicsMagick is free to use, and is distributed under an X11-style license ("MIT License"), which is approved by the open source initiative. For more information on GraphicsMagick please visit www.graphicsmagick.org

License Information: www.graphicsmagick.org/www/Copyright.html

Download and Install the GraphicsMagick Utility

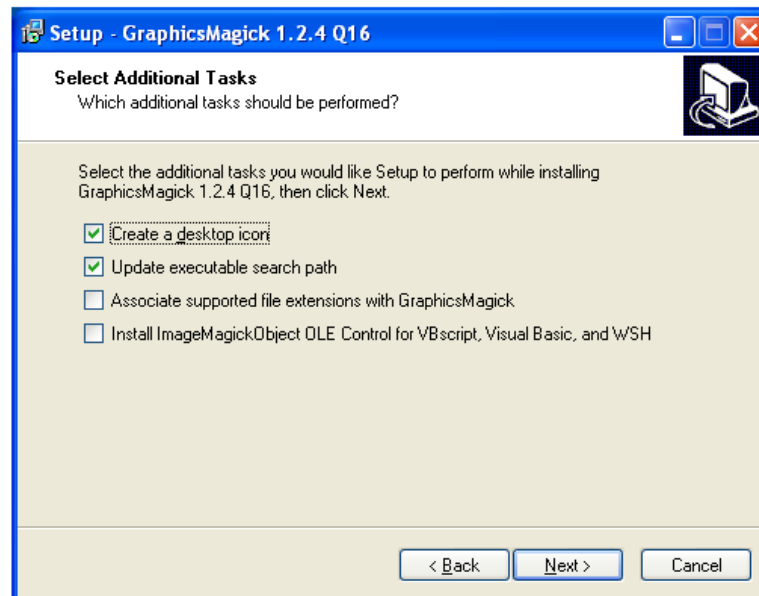
Note. GraphicsMagick is a command line utility and this application note assumes the user has a basic understanding of the Windows operating system and also using DOS commands.

Download the latest version (quantum depth=16) of GraphicsMagick, which *(at time of writing this document)* is version 1.2.4 – Q16. Save the program to disk when prompted to do so.

Link below is to the current windows installer:

<http://ftp.graphicsmagick.org/pub/GraphicsMagick/windows/GraphicsMagick-1.2.4-Q16-windows-static.exe>

b) Click on the downloaded “exe” file to install the utility. When the following dialog is shown during installation please make sure the two check boxes marked are selected. *(if not then the “gm” command as used in DOS will not be associated with the GraphicsMagick executable)*



c) Continue through the installation process until completion.

Using GraphicsMagick to Convert Files

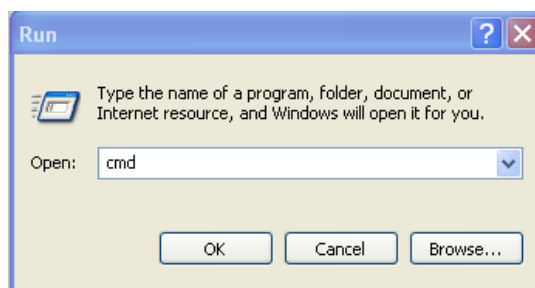
To create a 10 bit DPX file the source file has to be more than 10 bits, (which is typically 16 bits). Converting an 8 bit file will not result in a correct conversion. For the purpose of the following example we are using a 16 bit TIF file to make the conversion. While it's certainly possible to use another source file format supported by GraphicsMagick, care should be taken to not use a compressed format, as artifacts could result; therefore the use of a TIF source file is recommended. (Which is a uncompressed format)

Checklist for source file creation using your graphics program:

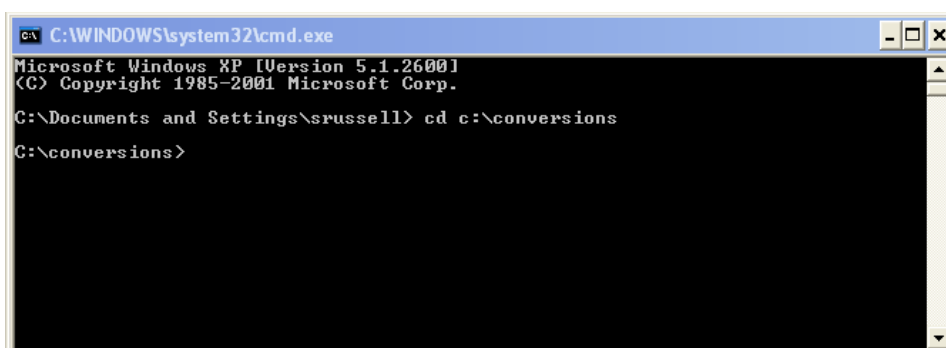
1. Files should be 16 bits per color, RGB (for grayscale images please use RGB mode also)
2. Store file as TIF file format
3. File stored in the correct resolution
 - 1920 x 1080 (for 1080i and 1080P patterns)
 - 1280 x 720 (for 720P patterns)
 - 720 x 486 (for 525 patterns)
 - 720 x 576 (for 625 patterns)

Note. The DPI (or dots per inch) setting is not important, as this related to printed documents and is typically 72 DPI.

- a) Make a note of the path to the source file (where it's stored on disk) you will need this for the conversion process.
- b) Open a command window on your PC, this can be done by selecting Start>Run and typing **cmd** in the dialog box and clicking "OK". See below:



- c) Using standard DOS commands, navigate the DOS prompt to the source file directory (use the path noted down in step a.). In our example the source file is located in a directory called c:\ conversions.



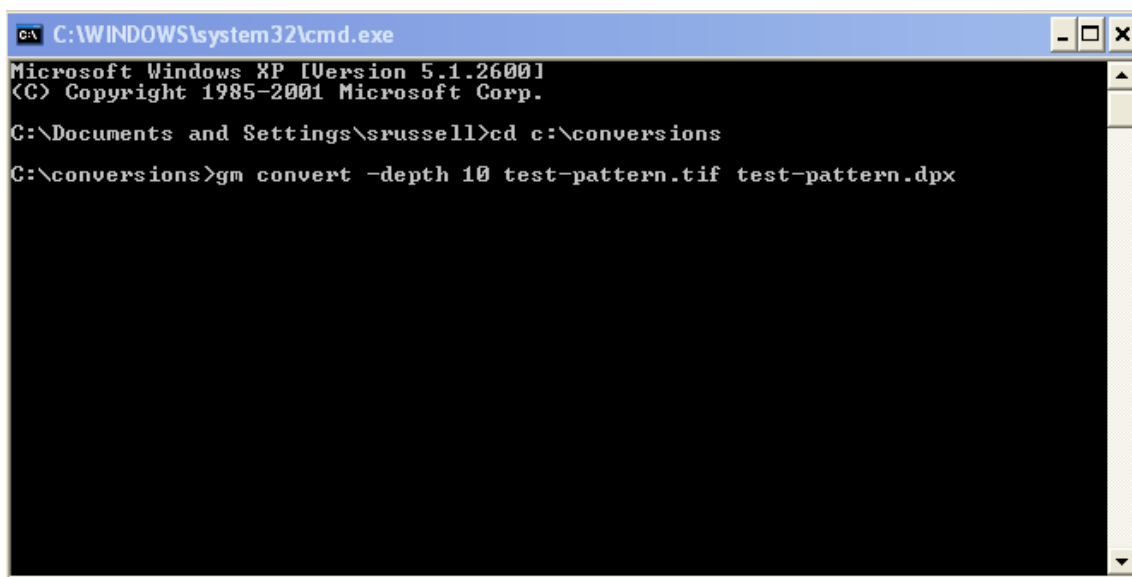
- d) For this example the source file is called test-pattern.tif and it is stored in the c:/conversions directory. At the command (DOS) prompt type in the following command line to convert the file (observe spaces)

gm convert -depth 10 <source file.tif> <outputfile.dpx>

So, assuming we want to store the converted file as "test-pattern.dpx" the command line would be:

gm convert -depth 10 test-pattern.tif test-pattern.dpx

and again as seen in the command window below: (note the spaces)

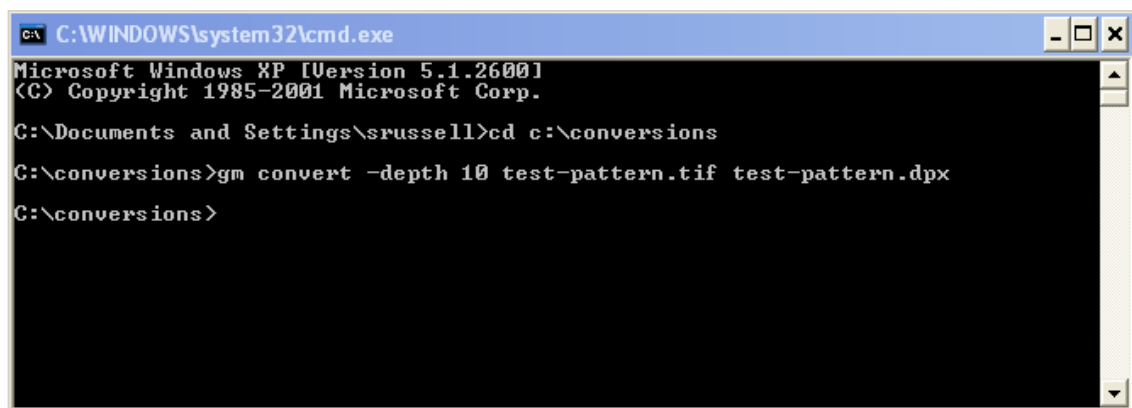


```
C:\WINDOWS\system32\cmd.exe
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\sRussell>cd c:\conversions

C:\conversions>gm convert -depth 10 test-pattern.tif test-pattern.dpx
```

- e) Press the return key to start the conversion. If successful you will be quickly returned back to the command prompt in the source file directory. See below. *(If you made a mistake typing or the conversion is not successful then there will be an error message)*
The converted file resides in the same directory as the source file.



```
C:\WINDOWS\system32\cmd.exe
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\sRussell>cd c:\conversions

C:\conversions>gm convert -depth 10 test-pattern.tif test-pattern.dpx

C:\conversions>
```

For the more advanced users, you can expand upon this command line to include a path to an alternate directory for the converted files, and you can change the filename of the converted files during the conversion process.

Description of the commands used in this example:

gm	Name of the applications (GraphicsMagick)
convert	Utility within GraphicsMagick to convert images or sequences of images
depth	Utility within GraphicsMagick to specify the number of bits of color required in the conversion (in our case 10 bits)

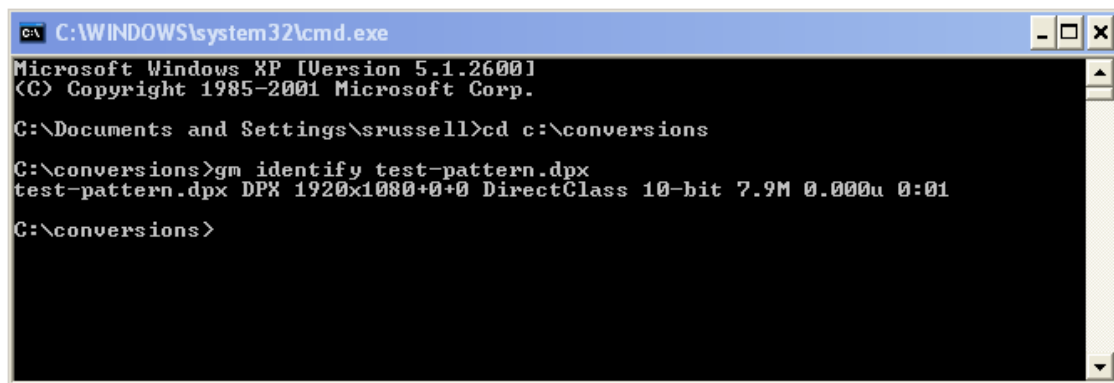
When the conversion process is complete you can check the characteristics of the converted file by using the following command

gm identify <filename.dpx>

In our example this would be

gm identify test-pattern.dpx

See below:



```
C:\WINDOWS\system32\cmd.exe
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\sRussell>cd c:\conversions

C:\conversions>gm identify test-pattern.dpx
test-pattern.dpx DPX 1920x1080+0+0 DirectClass 10-bit 7.9M 0.000u 0:01

C:\conversions>
```

As you can see from the return result above the test-pattern.dpx file shows it is a DPX file and has a size of 1920x1080 with a color bit depth of 10 bits and is 7.9 MB in size.

For those of you who want more detailed information on the conversion process, you can use “verbose” mode and compare the source file and converted file. See below.

Command **gm -verbose <filename>**

(see next page for example)

```

C:\WINDOWS\system32\cmd.exe
C:\conversions>gm identify -verbose test-pattern.tif
Image: test-pattern.tif
Format: TIFF (Tagged Image File Format)
Geometry: 1920x1080
Class: DirectClass
Type: grayscale
Depth: 16 bits-per-pixel component
Channel Depths:
  Gray: 16 bits
Channel Statistics:
  Gray:
    Minimum: 0.00 (0.0000)
    Maximum: 65535.00 (1.0000)
    Mean: 33191.72 (0.5065)
    Standard Deviation: 18991.55 (0.2898)
Resolution: 72x72 pixels/inch
Filesize: 11.9M
Interlace: None
Orientation: Unknown
Background Color: grey100
Border Color: #DFDFDFDFDFDF
Matte Color: grey74
Dispose: Undefined
Iterations: 0
Compression: None
Timestamp: 2008:07:02 12:27:44
Software: Adobe Photoshop CS Windows
Signature: 5f6759c218a872f155a67d059f5dcad33557a3dbb454a6de9d4c4f474dccc9fe
Profile-iptc: 3610 bytes
  unknown:
    Custom Field 2:
      0x00000000: ff65ff5e 571fffff 38ff6cff ff031aff ff42ff40  y>>eú^W-ç l8 f1l'
      0x00000014: 031affff 42ff4047 0b2b2b00  τ--ñºB
Profile-XMP: 6432 bytes
Tainted: False
User Time: 0.047u
Elapsed Time: 0:01
Pixels Per Second: 42.1M

C:\conversions>gm identify -verbose test-pattern.dpx
Image: test-pattern.dpx
Format: DPX (SMPTE 268M-2003 (DPX 2.0))
Geometry: 1920x1080
Class: DirectClass
Type: grayscale
Depth: 10 bits-per-pixel component
Channel Depths:
  Gray: 10 bits
Channel Statistics:
  Gray:
    Minimum: 0.00 (0.0000)
    Maximum: 65472.00 (0.9990)
    Mean: 33160.03 (0.5060)
    Standard Deviation: 18989.94 (0.2898)
Filesize: 7.9M
Interlace: None
Orientation: TopLeft
Background Color: grey100
Border Color: #DFDFDFDFDFDF
Matte Color: grey74
Dispose: Undefined
Iterations: 0
Compression:
Software: GraphicsMagick 1.2.4 2008-06-29 Q16 http://www.GraphicsMagick.org/
Document: test-pattern.dpx
DPX:file.version: 02.0
DPX:file.filename: test-pattern.dpx
DPX:file.creation.datetime: 2008:07:03:15:58:13Paci
DPX:file.creator: GraphicsMagick 1.2.4 2008-06-29 Q16 http://www.GraphicsMagick.org/
DPX:image.orientation: 0
DPX:source.filename: test-pattern.tif
Signature: dc96ab33e01b69602fe81c69295ffec43f0f52b977ff4c23c06a2492189ba35e3
Tainted: False
User Time: 0.047u
Elapsed Time: 0:01
Pixels Per Second: 42.1M

C:\conversions>cd c:\conversions

```

Free Pattern Downloads

We have provided an area on our website where additional patterns can be freely downloaded for use with the CF Card and the Test Generators

We have provided some patterns for download (for which we have had requests) and the download area is open for anyone to upload their own pattern designs to share with the growing LYNX Test Pattern Generator community.

Visit www.lynx-technik.com Select the "Support" drop down menu and then open "Testor Test Pattern Downloads"



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Home >> Support >> Testor Pattern Downloads

Welcome to the Testor pattern download area!

Here you will find a selection of test patterns in various formats for use with Testor and the new PTG FLASH option - which allows you to load external image files into Testor.

All patterns on this site can be freely downloaded and we encourage you to upload your own designs to share with others. Please use the **upload my pattern design** link found below. (all submissions have to be approved before they will be posted to the site)

Test patterns need to be in the industry standard SMPTE DPX format. Patterns can be created using any graphic program (e.g. Photoshop) and converted to DPX. We have prepared a brief tutorial for using Photoshop to create test patterns along with some instructions on converting graphic files to the required DPX format. This tutorial can be downloaded from the **other downloads** section.

You will require the **PTG FLASH** option to load patterns into Testor, please contact your local sales representative if you would like to order this option.

Testor requires patterns in 4 native resolutions to support all output formats and standards, (525 / 625 / 720P and 1080) the pattern categories can be seen below. Click on a category to view the available pattern downloads.

The **Just for Fun** category is to place slightly off topic image files, we have started this with a couple of nostalgic test patterns seen in the past, please feel free to add to this if you have any more patterns like this.

In a Hurry? - You can download all the patterns on the site in a single zip archive, extract this to the root of your Compact Flash card and you have all the patterns on the site pre arranged into the required folder structure. This file is located in the **Bulk Download** category.

- For more information on Testor [click here](#)
- For more information on the PTG Flash option for Testor [click here](#)

Note: If you are a current Testor customer and are interested in The PTG FLASH option this requires Testor Firmware revision 205 or above for activation. LYNX will upgrade your Testor with the latest firmware for free, please contact LYNX (or your local sales representative) for an RMA to return your unit for this free upgrade. (The free firmware upgrade adds the required licence support for the option - the PTG FLASH option still needs to be purchased)

Upload My Pattern Design

▶ 1080 (HDTV) Test Patterns (20 downloads)	▶ 525 (SDTV) Test Patterns (12 downloads)
▶ 625 (SDTV) Test Patterns (13 downloads)	▶ 720 (HDTV) Test Patterns (12 downloads)
▶ Bulk Download (1 downloads)	▶ Just for fun (2 downloads)
▶ Other Downloads (0 downloads)	

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Further References:

LYNX Technik Testor and PTG 5610 B/D Reference Manuals

SMPTE Standard (268M-2003)

Service

Technical Support

If you are experiencing problems, or have questions please contact your local distributor for further assistance.

Technical support is also available from our website.

More detailed product information and product updates may be available on our web site:

www.lynx-technik.com

Contact Information

Please contact your local distributor; this is your local and fastest method for obtaining support and sales information.

LYNX Technik can be contacted directly using the information below.

Address LYNX Technik AG
Brunnenweg 3
D-64331 Weiterstadt
Germany.

Website www.lynx-technik.com

E-Mail info@lynx-technik.com

LYNX Technik manufactures a complete range of high quality modular products for broadcast and Professional markets, please contact your local representative or visit our web site for more product information.

