

Xitron Raster Blaster for Fuji Celix Device Driver Manual

*For use in configuring and using the Fuji Celix
Device Driver on the Xitron Raster Blaster*

February 13, 1998

Overview

A Device Driver is the software module that manages the output of data to an imagesetter or printer in the Xitron Raster Blaster. Each Device Driver supports a particular engine class or family. When the Xitron Raster Blaster is started it scans a directory called “devices” for Device Driver files. For each Device Driver it finds, it loads that Device Driver and begins to query the Device Driver for a description of the capabilities of the recorders in the family it supports. This includes media widths, resolutions, density ranges and so on. In this manner the Device Driver tells the Raster Blaster how to configure itself if it wants to output a bitmap to a recorder in its family.

The Device Driver for the Fuji Celix family of recorders communicates with the Celix recorder over a differential SCSI bus. Since differential SCSI is electrically different from typical ‘single-ended’ SCSI buses found in many personal computers, a dedicated differential SCSI interface card is required. Additionally a special type of device driver, known as a Windows NT *SCSI class driver*, is required for the Device Driver to communicate with the Celix recorder through the differential SCSI adapter. This driver, along with the Device Driver are installed automatically.

Device Drivers

Device Drivers for the Xitron Raster Blaster are Win32 dynamic link libraries. Device Drivers act as device drivers for the Raster Blaster and completely control all actions of an output device for the Raster Blaster. This includes checking statuses, device setup, imaging of data and advancing and cutting material. The Device Driver relays back to the Raster Blaster all the physical characteristics of an engine such as supported resolutions and imageable area.

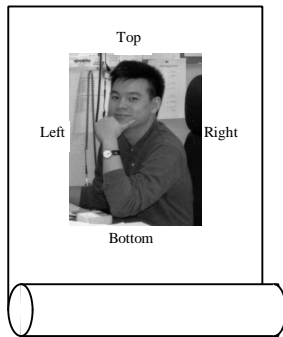
When the Raster Blaster has a page to image on an output device it loads the Device Driver for that device and begins a series of steps to begin output. The Raster Blaster first gives the Device Driver a chance to initialize the engine and check that it is ready. Assuming it is, it begins to read bitmap data off disk (or render the data in “Single/If” mode) into the Printer Buffer, telling the Device Driver where the data is in memory. The Device Driver for the Fuji Celix takes this data and downloads it to the Celix recorder where it is stored on the hard disk. As the output device consumes the data, the Device Driver relays this information to the Raster Blaster, which then refills the memory. This continues until all of the data has been output. Once all the data for the page has been downloaded to the hard drive of the Fuji Celix, the recorder starts to image the page.

Introduction to Drum Output Devices

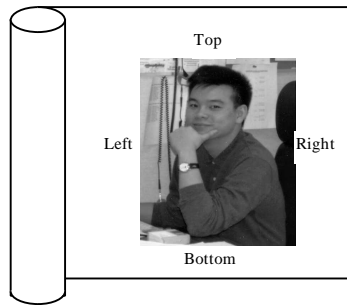
The Fuji Celix recorder is what is termed as a “drum recorder”. The primary difference between capstan and drum recorders is the orientation of the output image on roll type media. An understanding of this is vital to correct image placement on output.

On a capstan-type recorder, the left and right hand side of the image are the same as the left and right hand sides of the media. This would imply that the top and bottom are oriented with the roll, meaning a capstan-type recorder could in effect, image a job that was as wide as the media and any length up to an entire roll of media.

On a drum-type recorder, this is rotated 90 degrees so that the top of the image is on one edge of the media and the bottom of the image is on the other edge. This implies that the left and right sides are with the roll of media. One important difference is that all drum-type recorders have a fixed maximum width, usually called the “drum width” and since top to bottom is across the media, a fixed maximum height. The diagrams below demonstrate the orientation.



Capstan Recorder Image Orientation



Drum Recorder Image Orientation

On a capstan device an image outputs from top to bottom in the direction that the media feeds. On a drum device an image outputs from right to left in the direction the media feeds. This is due to two very important facts which, if remembered, can make it very easy to make heads or tails out of this confusing difference between the recorder types.

1. The Raster Blaster always generates bitmap data such that scanlines are oriented across the image from the left side to the right side. The first scanline is at the top of the image and the last scanline is at the bottom of the image. Another way to think of this is to preview or roam an image. Scanlines run from the left side of the monitor to the right side, the first scanline at the top of the monitor, the next beneath it and so on to the bottom of the screen.
2. A recorder lays down a single scanline every time its laser beam makes a single rotation. The direction that the laser travels is known as its fast scan direction. For a capstan device this is across the media and for a drum device this is around the drum. Or put another way, the capstan device lays down scanlines perpendicular to the direction the media travels and a drum device places them parallel to the media travel.

Using the Device Driver for Fuji Celix

The Device Driver for the Fuji Celix has only a few options that need to be configured. There are two ways to configure these options. The first is through a dialog called the “Configure Celix Device Driver” dialog box. This can be accessed by pressing the “Driver Conf” button in the Device Configuration dialog. You will be presented with the following dialog:

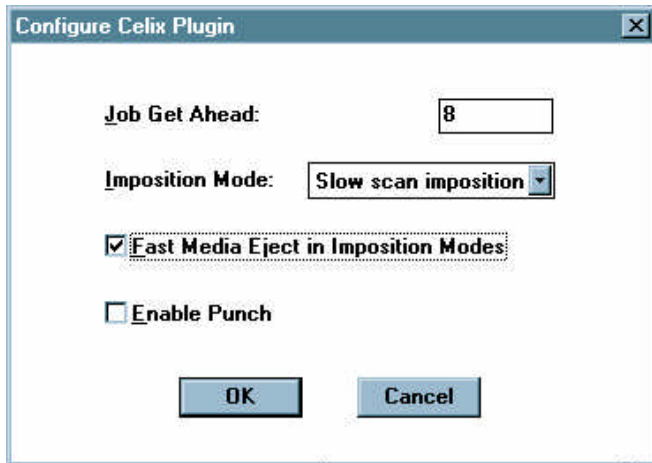


Figure 1. Configure Celix Device Driver dialog box

These parameters are described briefly here:

- **Job Get Ahead:** This describes how many imaged pages the Device Driver allows on the hard drive of the Celix. If a page is ready to be downloaded and there are this many pages waiting to be imaged on the Celix, the Device Driver waits until a page has output before downloading the new page. The default for this value is 5.
- **Imposition Mode:** This tells the Celix Device Driver how to impose pages. There are three modes: Fast scan, slow scan and none. In fast scan imposition mode pages are placed next to each other along a row in the fast scan direction. In slow scan imposition mode pages are stacked up in a column in the slow scan direction. If the selection is none, then pages are output one per piece of film. This feature is described in more detail in a subsequent section.
- **Fast Media Eject in Imposition Modes:** This flag tells the Device Driver to eject the media when it has completely filled a row (fast scan mode) or a column (slow scan mode), as opposed to completely filling the media by starting a second row or column.
- **Enable Punch:** If the recorder has punches this check-box will be enabled. If checked, punches will be enabled on the recorder for this page.

A second set of parameters is configured using “PB2 Diag”. This application is installed with the Raster Blaster and can be found in the Raster Blaster’s start group. By choosing the item :Edit .ini settings” under the “Utils” menu, you will be presented with the following dialog:

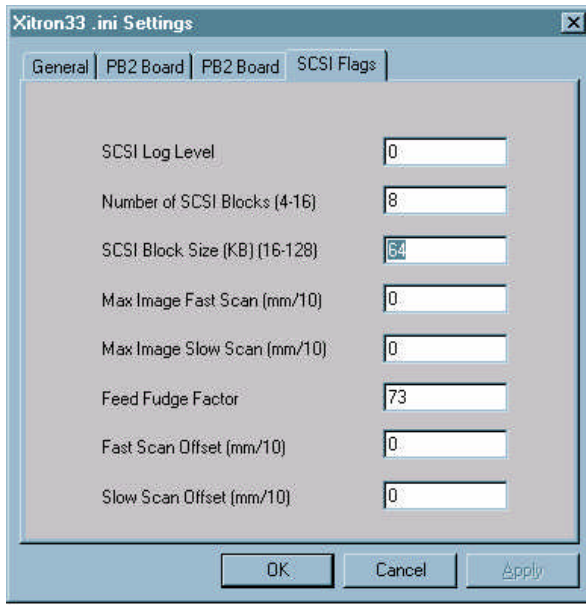


Figure 2. Xitron33.ini Settings dialog box

These parameters are described briefly here:

- **SCSI Log Level:** This is a diagnostic tool and causes results from SCSI transfers to be written to a logfile. This value should remain at 0 during normal production.
- **Number of SCSI Blocks:** This value determines how many blocks of memory the Device Driver uses to transfer image data from the Raster Blaster to the SCSI interface card. Increasing this number can sometimes improve performance. The default for this value is 4 and the range is 4 to 16.
- **SCSI Block Size:** This is the size of each SCSI block in kilobytes. Increasing this value can sometimes improve performance. The default for this value is 32 and the range is 16 to 128.
- **Max Image Size (Slow Scan):** This value can override what the Device Driver uses for the width of the media. If this value is 0, the default, then the Device Driver uses the value that you enter in the cassette manager. This value should remain at 0.
- **Max Image Size (Fast Scan):** This value can override what the Device Driver considers the width or circumference of the drum. If this value is 0, the default, the Device Driver uses the value reported by the recorder itself. This value should remain at 0.
- **Feed Fudge Factor:** This is a value that is added to each sheet of film as it is ejected. The actual value of this number has no meaning; only relative values have significance. If the recorder is not feeding enough media with each page, increase this value. Likewise reduce the number to reduce the extra film fed with each sheet. The default (and recommended setting) for this value is 72.
- **Fast Scan Offset:** This is the distance in the fast scan direction to delay the start of each scanline. This should never be needed and should be kept at 0. The default is 0.
- **Slow Scan Offset:** This is a distance, in tenths of millimeters, to advance down the drum before imaging. If you have a 20" roll of media loaded in the center of a 30" cassette, you would want a 5" delay before imaging. Recalling that there are 25.4 mm per inch or 254 tenths of a mm per inch, you would enter 5 x 254, or 1270 in this case. The default for this value is 0.

Loading Media Values

Although the Fuji Celix recorder can track the quantity of media that it uses, it does not store this value when it is reset. Additionally, there is no method of entering the length of a new roll of media when it is loaded into the recorder. Therefore the tracking capabilities of the Fuji Celix is used in combination with

the Cassette Manager facility in the Xitron Raster Blaster. Initial media lengths are configured in the Cassette Manager. After that, the Fuji Celix reports to the Raster Blaster how much media has been used.

When loading a new cassette on the Fuji Celix follow these steps:

1. Load the media cassette onto the Fuji Celix as described in the documentation for the recorder. You should bring the recorder to the state where it is “AWAITING MEDIA DATA”.
2. From the Xitron Raster Blaster’s Supply menu, turn off the “disable media tracking” option and enter the amount of film in the roll in the “Roll Length” field. Make sure that the “Units” setting is correct for the number you have entered.

The next page that is output, using this output device will cause this information to be downloaded to the Celix. From that point on, the Celix will track the media usage and report it back to the Raster Blaster.

Note: although you can edit the remaining length value in Cassette Manager, the only time that this data is sent to the Fuji Celix is when it is displaying the “AWAITING MEDIA DATA” icon. Any changes you make at any other time will be overridden by values that are returned by the recorder.

Imposition

The Device Driver has the ability to place multiple images on the same sheet of film. Imposition happens automatically once it is enabled. The Device Driver tracks the pages that have been imaged on the recorder and adjusts the placement of subsequent pages as they are output. There are two imposition modes: Fast scan imposition and slow scan imposition. In fast scan mode pages are placed next to each other in a row in the fast scan direction. In slow scan mode they are stacked in a column in the slow scan direction. See Figure 5 for a diagram of how four pages would be placed on a sheet of film in each mode.

In the imposition modes, media is ejected automatically in one of two ways. The first method is called “Fast Eject” and is enabled in the Device Driver’s configuration dialog as described above. If this is enabled, media is ejected if the Device Driver finds that a column or row is full and it is time to start a second. If the “Fast Eject” is not enabled, the media is ejected if a page is ready to be downloaded and the Device Driver discovers that it will not fit on the sheet.

Imposition is enabled in the configure Celix Device Driver dialog using the list box labeled “Imposition Mode”. The area of film on which to impose pages is automatic. The Device Driver uses the value you have entered in the “Cassette Manager” for the media width for the height (slow scan direction) of the film area. The circumference of the drum as reported by the Fuji Celix itself is used for the width (fast scan direction).

The values for the width and height may be overridden manually by using PB2 Diag. To set a custom film width, set the value of “Max Image Slow Scan” to the desired value. Note that the measurements are in tenths of millimeters, which are the native units for the Fuji Celix. Hence, if you wanted the width to be 20”, or 508 mm, you would enter 5080. Likewise the value for width around the drum (fast scan) can be manually set using the entry “Max Image Fast Scan”. Again these units are in tenths of millimeters.

Here is a brief description of how the Device Driver handles jobs as they are output and makes the decision about ejecting pages with and without imposition enabled:

1. If imposition is disabled:
 - If there are exposed images on the drum, they are ejected.
 - The page being downloaded is always ejected.
2. If imposition is enabled:
 - If the page is the first page and there are exposed images on the drum, they are ejected.
 - If a new row or column is required and “Fast Eject” is enabled, the film is ejected.
 - If the page does not fit on the remaining area of the film, the film is ejected.
 - The image to be imposed is downloaded and its position is recorded.

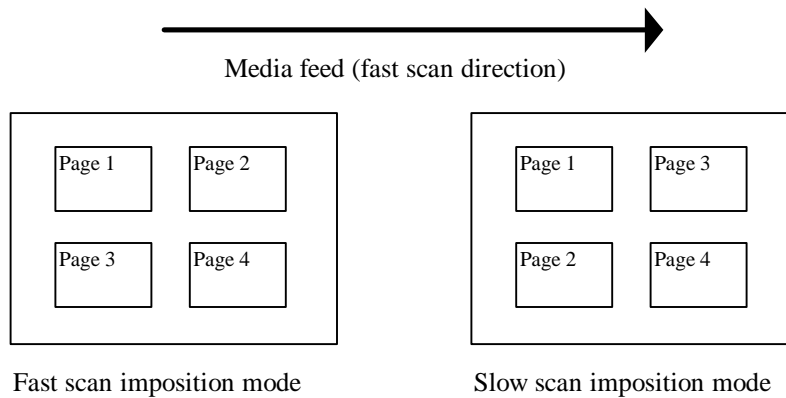


Figure 3. Page layout order in the two imposition modes

Device Driver Messages

From the time a Device Driver is loaded for the purpose of setting up and outputting to one of its devices, it begins to send messages to the Raster Blaster's System Monitor window. These messages are typically informational but can also convey warnings and report errors from an engine. The quantity of these messages can be controlled by a setting called the “debug level”. This can range from 0 (almost no messages) to 4 (very high message traffic).

Examples of informational messages are:

- PostScript job name.
- Commands being sent to configure the engine.
- Output start and stop time.

Examples of warning messages are:

- A job being clipped to fit a recorder.
- Data being left at the end of the job.
- Certain settings in the .ini file overriding defaults.

When a Device Driver encounters an error on an output device, it will print an appropriate error message. The short form of this message will appear in the Throughput Controller. The long form will appear in the Raster Blaster System Monitor window. Refer to figure 1 on the last page of this document for a sample of the Raster Blaster running. If the error encountered is one that can be easily remedied, i.e. an engine panel is open, then the Device Driver will continue to periodically test the engine until the error has been cleared. During this time the user may disable output by checking the "Disable output" check box in the Output Monitor and drag the page to either the Active or Held queues. If the error is serious, the Device Driver will request that the Raster Blaster disable output and the page will be placed back in the Active Queue automatically.