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APPENDIX A
COMPARISON OF PCVISION® and PCVISION*plus*®

This appendix discusses the control registers and bits in the PCVISION Frame Grabber, and relates them to the PCVISION*plus*. The PCVISION*plus* Frame Grabber has significantly more features and flexibility over the previous PCVISION Frame Grabber. This also means there are more registers.

Each table in this appendix covers a control register found in the PCVISION Frame Grabber. The bit names (mnemonic) and descriptions are given as they appeared in the PCVISION User's Manual, followed by the register name and bit name for the PCVISION*plus* Frame Grabber.

Base Address +	
0H	Control/Status Low
1H	Control/Status High
2H	Look-Up Table Address
3H	Look-Up Table Data
4H	Mask
5H	Frame Memory Block Select
6H	Reset Vertical Blank Interrupt
7H-1FH	Reserved

Figure A-1. PCVISION Register Map

Base Address +	
0H	Control
1H	LUT Control
2H	LUT Address
3H	LUT Data Port
4H	Gain/Offset
5H	Acquire/Status
6H	Pan
7H	Scroll
8H	Memory Access Control
9H	Host Mask
AH	Video Acquisition Mask
BH	Pixel Buffer
CH-FH	Reserved

Figure A-2. PCVISION*plus* Register Map

Table A–1.Control/Status Low Register

PCVISION MNEMONIC	DESCRIPTION	PCVISION*plus* REGISTER	MNEMONIC
BDSEL	Board Select	Control	BDSEL
LUTMOD0	Look–Up Table Mode	LUT Control	LUTMOD0
LUTMOD1	Look–Up Table Mode	LUT Control	LUTMOD1
CLOCK	Clock Select	Acquire/Status	CLOCK
ACQMODE0	Acquire Mode	Acquire/Status	ACQMD0
ACQMODE1	Acquire Mode	Acquire/Status	ACQMD1
INLUTSEL0	Input LUT Selection	LUT Control	ILUT0
INLUTSEL1	Input LUT Selection	LUT Control	ILUT1

There is a third Input LUT Select bit (ILUT2) on the PCVISION*plus* Frame Grabber. There are eight input LUTs.

Table A–2.Control/Status High register

PCVISION MNEMONIC	DESCRIPTION	PCVISION*plus* REGISTER	MNEMONIC
OES	Odd/Even Status	Acquire/Status	OES
LFS	Last Field Status	Acquire/Status	LFS
VBS	Vertical Blank Status	Acquire/Status	VBS
HBS	Horizontal Blank Status	Acquire/Status	HBS
INTS	Interrupt Status	No equivalent function	
OUTLUTSEL0	Output LUT Select	LUT Control	OLUT0
OUTLUTSEL1	Output LUT Select	LUT Control	OLUT1
NB	Interrupt Enable	No equivalent function	

The Look–Up Table Address register is the same for the two products. The Look–Up Table Data register in the PCVISION and the Look–Up Table Data Port in the PCVISION*plus* are equivalent.

The Mask register in the PCVISION is similar to the Video Acquisition Mask register in the PCVISION*plus*. Both of these registers protect frame memory planes during video scan access, neither protect during a clear operation.

Table A-3. Frame Memory Block Select Register

PCVISION MNEMONIC	DESCRIPTION	PCVISION*plus* REGISTER	MNEMONIC
X	Horizontal Select	Block bits in Control register are	
Y	Vertical Select	similar (see below)	

The Memory Blocks are mapped differently in the two versions of this product. The PCVISION Frame Grabber mapped in four 64K blocks. The PCVISION*plus* Frame Grabber has twice the memory space, and maps in eight blocks, using the two schemes covered in Chapter 4, "Frame Memory Access." The bits that control mapping are Block(2-0), and are located in the Control register.

The PCVISION*plus* has no equivalent for the Reset Vertical Blank Interrupt register. The PCVISION*plus* has does not have interrupt request circuits.

The Pixel Data register is replaced by the Pixel Buffer register, but the operation is not the same. Refer to Chapter 4, "Pixel Buffer."

The following PCVISION*plus* bits and registers have no counterparts in the PCVISION Frame Grabber.

Table A–4. PCVISION*plus* Unique Bit Functions

MNEMONIC	DESCRIPTION	REGISTER
ZOOM	Zoom Factor Select	Control
GAINEN	Gain Adjust Enable	Control
OFFEN	Offset Adjust Enable	Control
DIR	Adjust Direction Control	Control
		Gain/Offset Counter
VIDSEL	Video Input Select	Acquire/Status
		Pan
		Scroll
PS(2–0)	Plane Select	Memory Access Control
TMODE	Transfer Mode	Memory Access Control
PBEN	Pixel Buffer Enable	Memory Access Control
		Host Mask

APPENDIX B
GLOSSARY

This glossary provides a reference for Imaging Technology, Inc. software and hardware products. Included are some of the most frequently used terms with brief descriptions of their meanings, as used within the image processing industry and electronics field.

active video window (AVW) – The particular region in frame memory where video data is stored during image acquisition from a video source, or accessed during display on a video monitor.

amplitude – The strength of the signal representing brightness value; in image processing, the analog video signal.

Analog–to–Digital converter (A/D) – A hardware device that changes an analog video signal to a binary quantity; a process known as digitization.

Arithmetic Logic Unit (ALU) – Hardware that performs arithmetic functions such as add or subtract, and logical functions such as AND or OR.

aspect ratio – The ratio of width to height of the display surface; the standard television aspect ratio is 4:3.

asynchronous processing – Processing where each operation starts as a result of a signal generated by the completion of the previous operation or event.

back porch – That part of a composite video display signal between the trailing edges of a horizontal synchronization pulse and the corresponding blanking pulse.

barrel distortion – A distortion that makes a displayed image appear to bulge outwardly on all four sides.

beam – A concentrated, unidirectional flow of electrons or other energy.

beam–current feedback – A system that maintains a constant black level by sampling the electron–beam current during each vertical retrace and adjusting the level of the display–signal amplifier to correct for any error.

blanking – The process of changing the display signal level so that the return trace is not visible on the display screen.

blanking signal – A sequence of recurrent blanking pulses synchronized with the scanning process.

brightness – The value associated with a pixel representing its gray-level value; for example, in a monochrome 8-bit system, black=0 and white=255.

channel – A video path into or out of a video system.

Charge-Coupled Device (CCD) – A self-scanning semiconductor array that uses MOS technology, surface storage, and information transfer by digital shift register techniques.

chrominance – The colormetric difference (dominant wavelength and purity) between any color and a reference "white" of equal luminance. In three-dimensional CIE color space, chrominance is a vector that lies in a plane of constant luminance.

chromaticity – The color quality of light that is defined by its dominant wave length and purity (see chrominance).

composite color signal – A color display signal that includes blanking and synchronizing signals and color-burst.

composite color synchronization – A signal that includes all synchronization signals, and the color-burst reference signal in its proper time relationship.

composite display signal – A blanked display signal combined with all the appropriate synchronizing signals.

console – The terminal used to control image processing operations; a character display with a keyboard (for example, a VT100, IBM-PC display), with additional graphics capability.

contrast – The amount of brightness or the clarity of an image. A high contrast indicates that the image contains largely black and white brightness values; medium contrast indicates that the image contains a wide range of gray level values; a low contrast image contains a small range of gray level values.

contrast enhancement – An operation that changes the contrast attributes of an image to more clearly define a portion of an image (see contrast).

convolution – A mathematical operation calculating the output pixel's value based on the values of the surrounding pixels (neighborhood pixels). Neighbor-

hood pixels are multiplied by the corresponding value defined by a kernel (constants), summed, and scaled. The center pixel is replaced with the resultant value.

DC restoration – The re–establishment of the DC and low–frequency components of a display signal suppressed by AC coupling. The amount of restoration is usually established by sampling the display signal at a time when its level represents a known luminance value.

device driver – The device–dependent part of a host computer software package. The device driver generates a device–dependent output and handles all device–dependent interactions with the host computer software and hardware.

decibel (dB) – The ratio of two signals. The dB value is 20 x log 10 of a voltage or current ratio or 10 x log 10 of a power ratio.

digital image – An image composed of discrete pixels of digital brightness values.

digitize – The process of converting an analog signal's amplitude to a digital (binary) value.

display – The device in which an image is converted from electrical to optical signals, for example, a television monitor.

dynamic range – The variation or spread of the vertical lines in a histogram that indicates the degree of contrast. If the vertical lines within the histogram are close together, the image has low dynamic range; if the vertical lines are spread far apart, the image has high dynamic range.

field – In an interlaced scanning system, the set of even and odd lines into which a frame is divided.

filter – In image processing, an operation that changes the spatial and intensity characteristics of an image.

flicker – A perceived rapid periodic change. Flicker disappears when the frequency of the stimulus change exceeds a rate called the critical flicker frequency.

flyback – The shorter of the two time intervals that comprise a sawtooth wave. In raster scanning, this is the retrace interval.

frame – The total number of lines of scan that represent an image on a display device. In two–field, interlaced, raster scanning, a frame is the time interval between the vertical retrace at the start of the first field and the end of the second field.

frame buffer – A high-speed memory designed to store one or more images and allow simultaneous video display, pipeline processing, and CPU access; also known as a frame store.

frame frequency – The number of frames displayed per second; the United States standard (RS-170) is 30 frames/second for video (24 for film), the European standard (CCIR) is 24 frames/second.

frequency analysis – Determining the number of frequency components along a selected line or within a specified area of interest.

front porch – That part of a composite video display signal between the leading edges of a horizontal blanking pulse and the corresponding synchronization pulse.

gain – (1) A ratio, a number without units. (2) An increase in voltage or power, usually expressed in decibels (dB).

gray-scale – Variations in the luminance value of "white" light, from black to white. Shades of gray are defined as gray-scale gradations that differ by the square root of 2. In an 8-bit monochrome system, these values can range from 0 and 255 (0=black and 255=white).

high pass filter – During the spatial filtering process, selectively passing through only high-frequency components, while removing all other components from the image. A high pass filter tends to sharpen the specified area of interest. The process of filtering is based on either a convolution or a selection of appropriate information.

histogram – A graphic representation of the gray-scale values contained in an image, that effectively measures the color/gray values in an image. The horizontal axis represents the gray levels and the vertical axis displays the number of pixels within each gray level. The histogram displays the actual contrast of the image, enabling the user to decide the appropriate operation to perform for contrast enhancement.

histogram equalization – This process changes the dynamic range of an image expanding the image to contain the entire range of gray-scale or color indices.

histogram slide – The process of adding or subtracting, increasing or decreasing the values contained in an image by a single specified value, sliding the histogram gray scale up or down. This process maintains the dynamic range but changes the brightness values.

horizontal resolution – In a raster–scan graphics systems, the number of discernible signal transitions along a raster line, or the number of display–memory addresses representing pixels along the horizontal axis of the display. In video systems, the number of vertical test–pattern lines that can be reproduced by a camera and monitor.

image processing – The analysis and alteration of an image with the purposes of enhancement or feature recognition.

intensity – The strength of light at a particular point in an image. Pixels in a visible spectrum image represent intensity values that are perceived as brightness by the eye.

interlace – The means by which an image is scanned, where the odd and even fields are displayed alternately. Interlace is used to reduce flicker in an image.

jitter – Instability of a signal in amplitude and/or phase.

Look–Up Table (LUT) – Hardware that provides values for transforming pixels. Input pixel values act as the address to the memory. The output value is generated by the data at the addressed location.

low–pass filter – During a filtering process, selectively passing low–frequency components, while removing high–frequency components from the image. A low–pass filter tends to blur an image.

luminance – A single value that defines the amount of lightness or white component in an image.

monitor – Display device used for images (for example, an RS–170 monitor).

monochrome – Any combination of colors of the same hue, but of different saturations and luminances. Generally, a monochrome image is known as black and white (B/W).

National Television System Committee (NTSC) – Used to identify the color–encoding method adopted by the committee in 1953. The NTSC standard was the first monochrome–compatible, simultaneous color system used for public broadcasting.

orthicon – A camera tube in which a low–velocity electron beam scans a photo–active mosaic that has an electronic storage capability.

Phase Alternation Line (PAL) – A color–encoding system in which one of the subcarrier phases derived from the color burst is inverted in phase from one line

to the next in order to minimize errors in hue which might occur during color transmission.

Programmable Array Logic (PAL) – Similar to a PROM in that it has a single array of fusible links. It differs from a PROM in that it is user-programmable AND array driving a fixed OR array. PAL (Programmable Array Logic) is a registered trademark of Monolithic Memories, Inc.

pixel – The smallest unit of storage in a digital image or raster line that can be discretely controlled by the acquisition, storage, and display system. A pixel is addressed by its horizontal and vertical coordinates that determine its location in storage.

real-time – An operation that can be completed in one frame time is said to be performed in real-time. For standard television (RS-170) equipment a frame time is 1/30 of a second (see frame frequency).

resolution – The number of bits of accuracy or number of gray levels that can be represented in a pixel; for example, 8 bits = 256 levels, 6 bits = 64 levels.

saturation – In a full-color system, the purity of the color or how strong or weak the color appears.

spatial enhancement – These operations use a convolution process similar to the filtering process, and are used to enhance the edges of a specified area of interest.

spatial filtering – The process of selecting and removing certain frequency components from a digital image, via high- and low-pass filters.

spatial resolution – The number of pixels into which an image is divided: the precision or accuracy horizontally and vertically. For example, a spatial resolution of 512 x 480 means that the image has 480 lines, with 512 pixels each.

spin – A phenomenon that occurs in image processing operations when a pixel is delayed in time as it is processed through a pipeline, resulting in that pixel being written back at a memory location offset from its origin. Spin occurs in both the horizontal and vertical directions.

sync signal – A signal that synchronizes the scanning operation of a raster-scan monitor; this might also include a phase reference for an encoded-color monitor.

synchronous processing – When two or more operations are performed simultaneously.

vertical resolution – In raster display systems, the number of lines displayed by a monitor. In video systems, the number of horizontal test–pattern lines that can be reproduced by a camera and monitor (typically equal to 70% of the displayed raster lines).

video screen coordinates – A coordinate system differing from standard graphics coordinates in that their origin is in the upper–left corner of the screen: Y values increase vertically downward, and X values increase horizontally toward the right.

zoom – To enlarge or reduce the size of a displayed image on a pixel–by–pixel basis.

APPENDIX C
CUSTOMER RESPONSE FORM

If technical assistance is required, please contact the Imaging Technology Customer Response Center at (617) 275–2700 or (800) 532–3500. The Customer Response Center provides operational assistance without charge during the term of the warranty. Applications support and product training can also be arranged at current rates.

RETURN PROCEDURE

Imaging Technology products are covered by a Return–to–Factory warranty for defective equipment. If your equipment malfunctions and must be returned to the factory for service, follow these procedures:

Before you return equipment, you must contact Customer Response Center. Fill out the Customer Response Form (CRF) on the next page, and have it available when you call.

If it is determined that the equipment must be returned to the factory for any reason, you will be given an RMA (Return Material Authorization) number by the Customer Response Center. Items must not be returned to Imaging Technology Incorporated without an RMA number.

Include a copy of the completed CRF with the material to be returned. Please note any diagnostic tests that failed. Be sure to write your RMA number in the space provided.

Pack the equipment carefully. Use the original shipping carton for this purpose. Damage caused during shipment is your responsibility if the equipment is not adequately packed.

Ship the defective equipment freight prepaid. Write clearly on the outside of the package near the address label the RMA number provided by the Customer Response Center.

After the equipment has been repaired and tested, it will be returned freight prepaid.

Customer Response Form (CRF)

RMA NUMBER_____

Name_____

Company_____ Date_____

Street_____ Telephone_____

City_____ Contact_____

State_____ Zip Code_____

Country_____

ITI Product Type_____ Serial #_____

Camera_____ Monitor_____

Host Computer (Please be specific)_____

Model #_____ Host memory size_____

Other Expansion Boards Present in Host Computer:
(please include Manufacturer, Size, Address)

_____

_____

_____

Description of Symptoms:
(Please be specific. Use additional sheets if necessary.)_____

_____

_____

_____

Diagnostic Failures_____

Are board(s) factory configured?_____Yes_____No

If no, please list jumpers that are changed_____

Please attach other useful comments on additional sheets.

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