Dual-Tap AccuPiXEL Series Camera-Control Software

Operation Manual

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Rev. A

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Imaging Products

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Dual-Tap AccuPiXEL Series Camera-Control Software Manual

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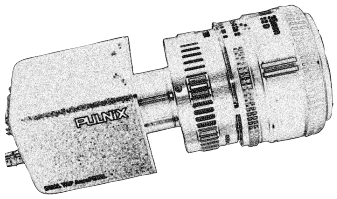


TM-4000 series, TM-2030 series, and
TM-6730 series, including CL versions.

1 Introduction

The dual-tap AccuPiXEL series cameras are high-resolution, progressive scan cameras with JAI PULNiX-proprietary LUT control and other excellent features. The software for these cameras was developed to function as standard software for the entire dual-tap AccuPiXEL series, and can open either the RS-232 serial port (COM) or Camera Link. Camera Link users must physically install the Camera Link frame grabber board into the PC. They must also install the Camera Link API (clserXXX.dll) software. These cameras are specially designed to capture images in progressive scan (non-interlace) format, producing a full frame of electronic shutter images, as well as normal images.

1.1 Software Installation

Following are instructions to install the dual-tap AccuPiXEL series camera-control software on a PC.

1.1.1 Before Installing the Dual-Tap AccuPiXEL Series Camera-Control Software

Before installing the dual-tap AccuPiXEL series camera-control software, please note the following requirements.

- Your computer must be running Microsoft Windows 95, 98, NT 4.0., Windows 2000, or Windows XP.
- The software requires one free communication port that is not in conflict with other peripherals such as the mouse or modem.
- Installation of the software requires 2.0 MB of free space in your PC hard disk.

1.1.2 Installing the Software

To install the dual-tap AccuPiXEL series camera-control software, insert the installation floppy disk into your PC's floppy drive and run "Setup.exe." The installer will direct you to install the application code.

***Note**: You can change the installation directory if you want.*

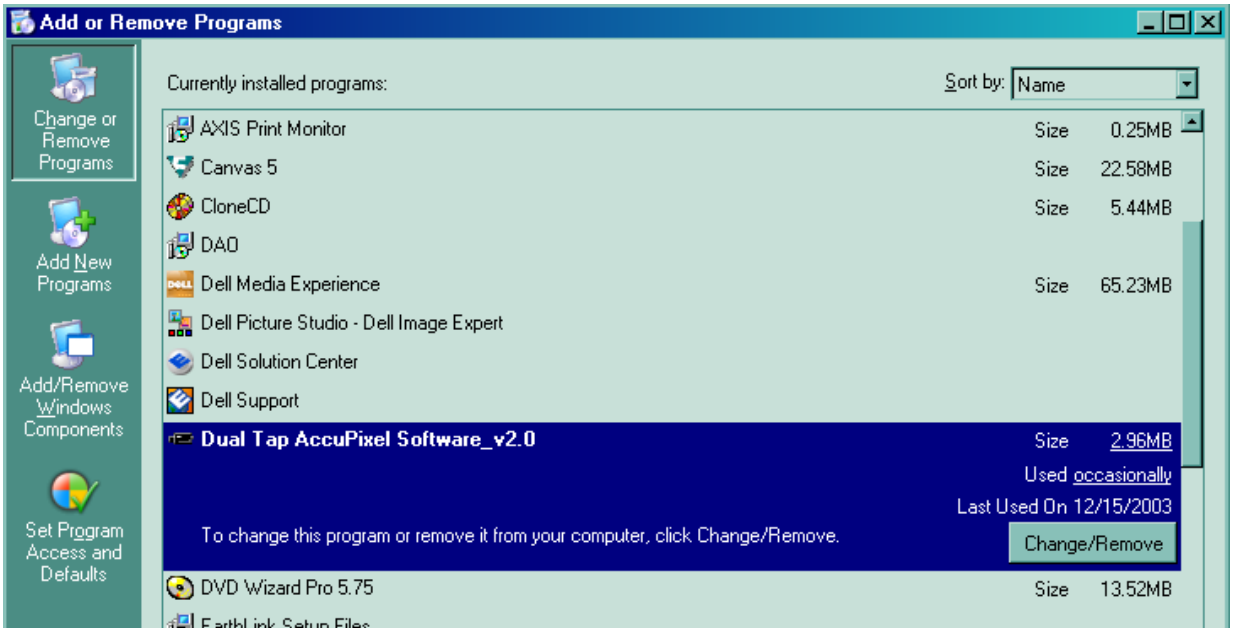
1.1.3 Installing the Camera Link API DLL (clserXXX.dll)

To install the Camera Link control software with frame grabber software, please consult the frame grabber company or JAI PULNiX.

1.1.4 Uninstalling the Software

To uninstall the dual-tap AccuPiXEL series camera-control software from the control panel, follow the steps below.

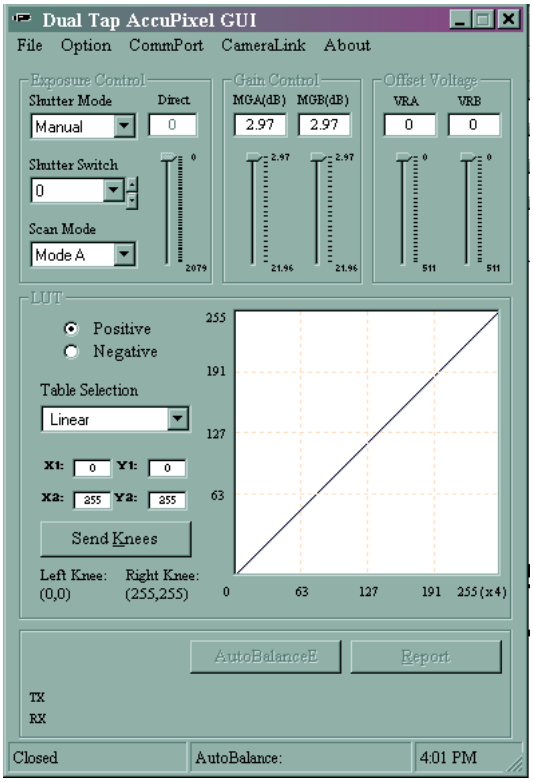
1. Open "Add or Remove Programs" in the control panel.
2. Select "JAI-PULNiX AccuPiXEL Dual-Tap Camera-Control Software" from the lists of the installed software.
3. Click the "Change or Remove" button



2 Graphical User Interface

2.1 GUI Features

The following is a list of camera functions that can be controlled by PC serial commands. The dual-tap AccuPiXEL series Camera Link cameras use differential serial communication through the Camera Link connector on the rear panel of the camera.



- Shutter Mode and Speed
- Scan Mode
- Gain Control
- Offset Voltage
- Report
- Auto balancing enable/disable
- LUT (Look-Up Table) Control

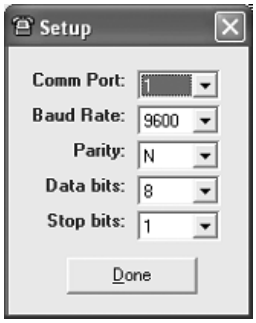
2.2 Open the Link to the Camera

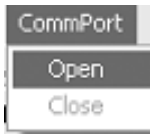
For the RS-232 serial port, refer to “Open/Close RS-232 Port”, below. For Camera Link, refer to “Open/Close Camera Link” below.

2.2.1 Open/Close RS-232 Port

2.2.1 (a) Open

From the main menu, select “CommPort” and click “Open.” Select the port number, and set 9600 bps, no parity, 8 data bits, 1 stop bit, and click “Done.” Check the status bar and make sure the RS-232 port is “opened.”





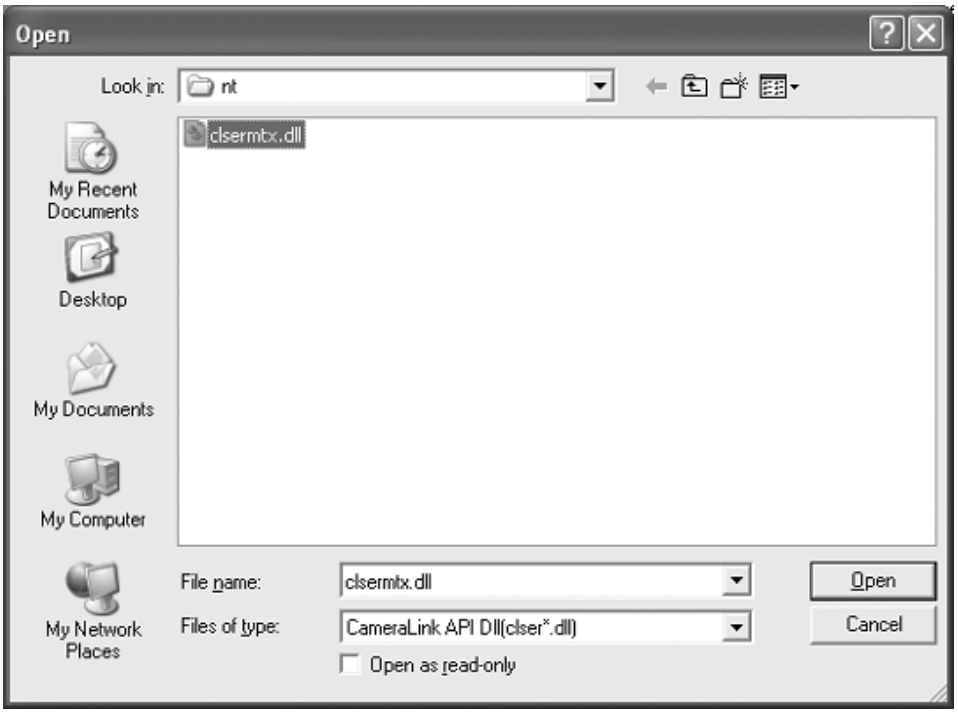
2.2.1 (b) Close

From the main menu, select “CommPort” and click “Close.” Check the status bar and make sure that the RS-232 port is “closed.”

2.2.2 Open/Close Camera Link

2.2.2 (a) Open

From the main menu, select “Camera Link” and click “Open.” Choose the appropriate Camera Link API dll (typically named “clserXXX.dll”) which is provided by the frame grabber manufacturer. If the board is not installed or the wrong API dll is selected, an error message appears. If this happens, please contact JAI PULNiX for further assistance. Check the status bar to make sure the Camera Link status is “opened.”



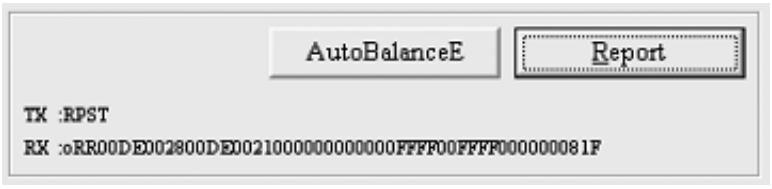
2.2.2 (b) Close

From the main menu, select “Camera Link” and click “Close.” Check the status bar to make sure the Camera Link status is “closed.”

2.3 Operating The Control Software

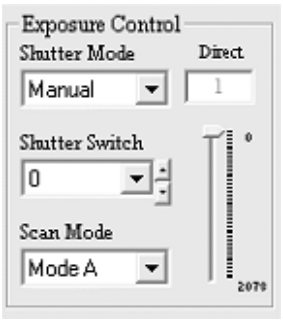
2.3.1 Check Current Camera Setting

Click the “Report” button to get the current camera setting from the camera. For detailed information about the current camera setting, please see Table 2 on page 11.



2.3.2 Exposure Control

In Exposure Control, you can specify the shutter mode and scan mode.

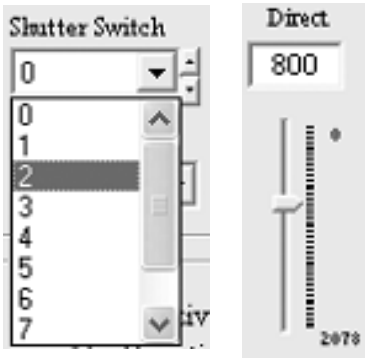


2.3.2 (a) Shutter Mode

In this list box you can select Manual or Async or Direct shutter.

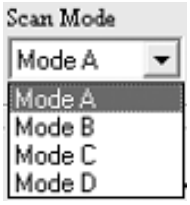
2.3.2 (b) Shutter Time

The Shutter Time list box allows you to select the specific shutter speed for manual shutter and Async shutter. Manual shutter shutter speed 0 is no shutter mode; Async shutter shutter speed 0 is Async No Shutter mode; Async shutter shutter speed 1~8 is Async normal shutter mode; Async shutter shutter speed 9 is Async no delay shutter mode (pulse width control). For detailed information, please see the appropriate camera manual. Scroll Bar Direct Shutter allows you to select shutter speed for direct shutter count by the video line.



2.3.2 (c) Scan Mode

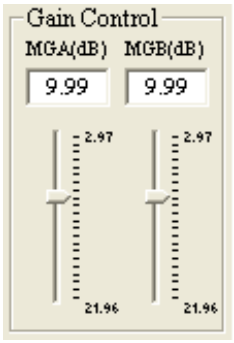
The dual-tap AccuPiXEL series cameras have four selectable scan modes. The Scan Mode list box allows you to select scan mode.



2.3.3 Gain Control

2.3.3 (a) Gain

The Gain Control box allows you to change the Gain value from 2.97dB to 21.96dB. To change the value, move the slider or enter the value directly into the text box.

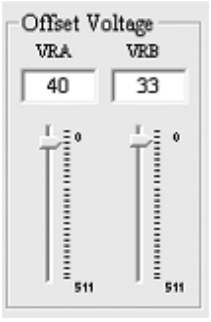


2.3.3 (b) Gain Auto Balancing Control

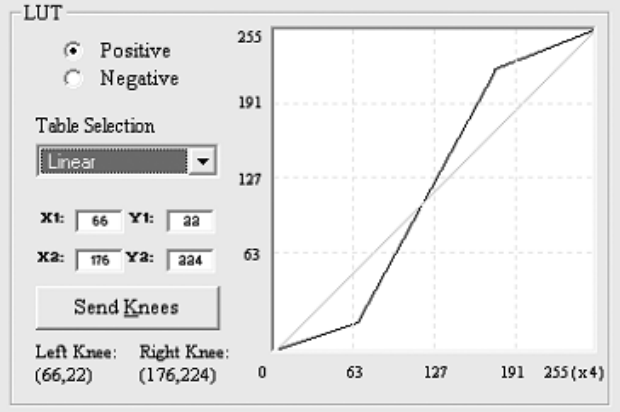
Click the "Autobalance E" button to enable Gain Auto balancing. Once it is finished, the software will disable Gain Auto balancing automatically.

2.3.4 Offset Voltage

The Channel A offset voltage is master, the channel B is slave. The offset voltage box allows you to change Channel A offset voltage. To change the value, move the slider or enter the value directly into the box. The camera itself automatically adjusts Channel B offset voltage, every other frame.



2.3.5 LUT (Look-Up Table)

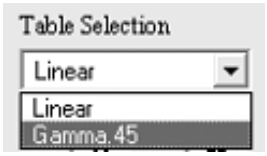


The Knee Control box allows you to set your own knee value to each LUT. For more detail regarding knee control, please refer to the appropriate hardware operation manual or data sheet.

2.3.5 (a) Positive or Negative LUT Selection

The LUT control panel allows you to select the positive or negative LUT.

2.3.5 (b) LUT (Look-Up Table) Selection



The LUT Selection box allows you to choose between linear or gamma 0.45 output.

2.3.5 (c) Knee Control

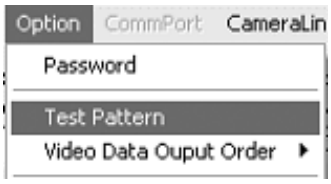
The Knee Control graphical control allows you to change two knee point values visually by clicking and dragging the "knee line." You may enter X_1, Y_1, X_2, Y_2 values directly to adjust the knee curve. When you have chosen the value you want and are ready to set this value to the camera, click the "Send Knees" button.

2.3.6 Main Menu: "Option"

2.3.6 (a) Password

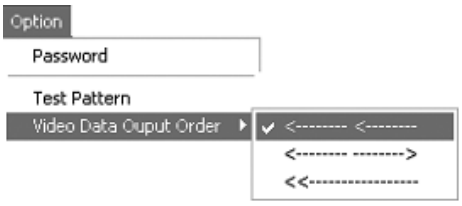
Please contact JAI PULNiX for password access. The password allows access to the EEPROM to rewrite factory default settings.

2.3.6 (b) Test Pattern



From the main menu, select "Option" and click 'Test pattern" to enable or disable test pattern.

2.3.6 (c) Pixel Output Order



From the main menu, select “option” and “Video data output order” and click “<--- <---” or “<--- --->” or “<<----”

“<--- <---” = First video data are pixel no. 1 and no. 1025.
“<--- --->” = First video data are pixel no. 1 and no. 2848.
“<<------” = First video data are pixel no. 1 and no. 2.

2.3.7 EEPROM

Dual-tap AccuPiXEL cameras have seven pages restore the cameras’ settings. Page 0 is the factory default page and cannot be edited without a password. Page 1 is power up default. This page will allow you to save default setting to load at power up.

2.3.7 (a) Load Page

From the main menu, select “file” and “load page” and click the page number and load camera setting from EEPROM.

2.3.7 (b) Save Page

From the main menu, select “File,” “Save Page,” and click the page number to save the current camera setting to EEPROM.

Note: Page 0 is the factory default page and is protected by password.

2.3.7 (c) Read Page

From the main menu, select “File” “Read Page,” and click the page number to read the EEPROM. When you read the page from EEPROM, the current camera setting will not be changed.

2.3.8 Main Menu “About”

2.3.8 (a) Camera Model

From the main menu, select “About” and click “Camera Model” to check the camera information.

2.3.8 (b) CPU Firmware Version

From the main menu, select “About” and click “CPU Firmware Version” to check the CPU firmware information.

2.3.8 (c) About Control Software

From the main menu, select “About” and click “About Control Software” to check the software information.

2.3.9 Exit

From the main menu, select “File,” and click “Exit” to exit the software.

3 Dual-Tap AccuPiXEL Series Camera Serial Commands

The dual-tap AccuPiXEL series cameras can be controlled by serial command either via RS-232 or Camera Link. The Start character is always ":" and the End character is always <CR> (return). For example, to set Asynchronous Pulse Width Mode, send the command :SA9<CR> to the camera. The following table contains serial commands that can be used to control the camera.

TABLE 1. Dual-Tap AccuPiXEL Camera Preliminary Command List

Command	Parameters	End of Command	Ack Response	Description
Camera Control				
:MGA=	DDD	<cr>	:o<cr>	Set CDS gain for ch A (DDD = 042 - 1E8)
:MGB=	DDD	<cr>	:o<cr>	Set CDS gain for ch B (DDD = 042 - 1E8)
:MGA?		<cr>	:oGA[DDD]<cr>	Enquire CDS gain for ch A
:MGB?		<cr>	:oGB[DDD]<cr>	Enquire CDS gain for ch B
:VRA=	DDD	<cr>	:o<cr>	Set offset voltage for ch A (DDD = 000 - 1FF)
:VRB=	DDD	<cr>	:o<cr>	Set offset voltage for ch B (DDD = 000 - 1FF)
:VRA?		<cr>	:oVA[DDD]<cr>	Enquire offset voltage for ch A
:VRB?		<cr>	:oVB[DDD]<cr>	Enquire offset voltage for ch B
Test Pattern, Auto Calibration and Auto Channel Balance				
:EABL		<cr>	:o<cr>	Enable Auto Gain Channel Balance
:DABL		<cr>	:o<cr>	Disable Auto Gain Channel Balance
:ABL?		<cr>	:oAB[N]<cr>	Check if auto gain balance is enabled (N=1 Enable, N=0 Disable)
:EACL		<cr>	:o<cr>	Enable Auto Calibration
:DACL		<cr>	:o<cr>	Disable Auto Calibration
:ACL?		<cr>	:oAC[N]<cr>	Check if auto calibration is enable (N=1 Enable, N=0 Disable)
:TPTN	N	<cr>	:o<cr>	Enable/Disable Test Pattern (N=1 Enable, N=0 Disable)
Shutter Control				
:MSH=	S	<cr>	:o<cr>	Set Manual Shutter (S= 0 - 9)
:DSH=	DDD	<cr>	:o<cr>	Set Direct Shutter (DDD=000 - 81F)
:ASH=	S	<cr>	:o<cr>	Set Async Shutter (S= 0 - 9)
:SHR?		<cr>	:o[shtr]<cr>	Enquire current shutter mode and number
Lookup Table				
:LINR		<cr>	:o<cr>	Set linear table
:GM45		<cr>	:o<cr>	Set gamma (.45) table
:KNEE=	X1Y1X2Y2	<cr>	:o<cr>	Set knees (X1,Y1,X2,Y2 = 00 - FF)

TABLE 1. Dual-Tap AccuPiXEL Camera Preliminary Command List (Continued)

Command	Parameters	End of Command	Ack Response	Description
:SLUT	N	<cr>	:o<cr>	Set Positive Knee or Negative Knee (0=Positive, 1=Negative)
:LUT?		<cr>	:o[lut]<cr>	Enquire current LUT setting
Memory Pages				
:WRPG	N	<cr>	:o<cr>	Write Page N (N = 0 - 6; Page 0 is factory setting)
:LDPG	N	<cr>	:o<cr>	Load Page N (N = 0 - 6)
:RDPG	N	<cr>	:o[settings]<cr>	Read (Report) Page N (N = 0 - 6)
:RPST		<cr>	:o[settings]<cr>	Report Current Overall Settings
Scan Mode				
:SMD	M	<cr>	:o<cr>	Set Mode (M = A,B,C,D)
:SMD?		<cr>	:oMD[mode]<cr>	Enquire current scan mode
Miscellaneous				
:CAM?		<cr>	:o[CamMode]<cr>	Enquire Camera Model
:VER?		<cr>	:o[version]<cr>	Enquire current version of firmware

Note: If a command is not accepted for any reason, the camera will return a Nack response ":e"<cr>
*" *" means that the command is a system command. It is valid when having an appropriate password provided.*

Note: 1-byte data is represented in 2 ASCII characters, e.g. 0x3A is "3A" or 0x3341.

<CR> = 0x0D *Command or response terminator*
<NAK> = "e" *Command not accepted*

RS Command : RPST<CR>
TS Return : O RR + "24 bytes" + <CR>

TABLE 2. 18 Bytes Status Report

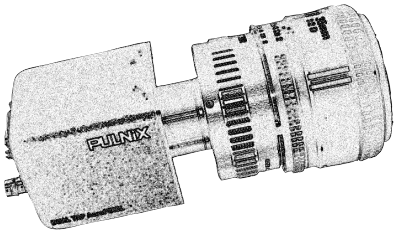
Byte 1, 2	MGA		Channel A Gain Control
			(H'042 - H'1E8)
Byte 3, 4	VRA		Channel A Offset Voltage
			(H'000 - H'1FF)
Byte 5, 6	MGB		Channel B Gain Control
			(H'042 - H'1E8)
Byte 7, 8	VRB		Channel B Offset Voltage
			(H'000 - H'1FF)

TABLE 2. 18 Bytes Status Report (Continued)

Byte 9	Function Flag 0		
	Bit 7		
	Bit 6		
	Bit 5		
	Bit 4		
	Bit 3	ScanMode3	“0000”=Scan Mode A
	Bit 2	ScanMode2	“0001”=Scan Mode B
	Bit 1	ScanMode1	“0010”=Scan Mode C
	Bit 0	ScanMode0	“0011”=Scan Mode D
Byte 10	Function Flag 1		
	Bit 7	ShutterMode2	“000”=Manual Shutter “001”=Async Shutter “010”=Direct Shutter
	Bit 6	ShutterMode1	
	Bit 5	ShutterMode0	
	Bit 4		
	Bit 3	ShutterSpeed3	“0000” - “1001” Shutter Speed 0 - 9
	Bit 2	ShutterSpeed2	
	Bit 1	ShutterSpeed1	
	Bit 0	ShutterSpeed0	
Byte 11	Function Flag 2		
	Bit 7	LUTSIGN	0=Positive LUT; 1=Negative LUT
	Bit 6		
	Bit 5		
	Bit 4		
	Bit 3		
	Bit 2	LUTTABLE2	“000”=Linear LUT “001”=Gamma.45 LUT “010”=Two Knee Table
	Bit 1	LUTTABLE1	
	Bit 0	LUTTABLE0	
Byte 12	Function Flag 3		
	Bit 7	TESTPATTERN	0=Disable TP; 1=Enable TP
	Bit 6	PASSWORD	0=Disable PW; 1=Enable PW
	Bit 5		
	Bit 4		
	Bit 3		
	Bit 2		
	Bit 1		
	Bit 0	AUTOBALANCING	0=Disable AB; 1=Enable AB
Byte 13	X1		(X1, Y1) Coordinate for Knee 1 (X1, Y1 = H’00 - H’FF)
Byte 14	Y1		
Byte 15	X2		(X2, Y2) Coordinate for Knee 1 (X2, Y2 = H’00 - H’FF)
Byte 16	Y2		

TABLE 2. 18 Bytes Status Report (Continued)

Byte 17	Reserved		
Byte 18	Reserved		
Byte 19	Reserved		
Byte 20	Reserved		
Byte 21, 22	Direct Shutter		H’000 - H’819
Byte 23, 24	Reserved		



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