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USB_Control_SDK manual

Laser promotion division
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Preparation : Install

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Please install the LabVIEW Runtime to execute [Installer¥install.exe] or [Installer_for_64bit_SDK] in the DVD attached. Detailed instructions can be found in the operation manual of the LCOS-SLM control software (SLMControl3.exe). If customer has already installed it, this step is not necessary.

Note: License agreement for the related DLLs are conform to the “SLMControl3.exe”

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DLL

About supported DLL

DLL	Overview
hpkSLMdaLV.dll	A wrapping DLL for simple communication. This DLL accesses the controller via hpkSLMda.dll
hpkSLMda.dll	For low-level communication to the controller board. Place “hpkSLMda.dll” in the same directory as hpkSLMdaLV.dll.

There are 4 types of “hpkSLMdaLV.dll”

32bit stdcall ・・・for Win32API (for VBA and so on)
32bit cdecl ・・・Windows10-64bit, for LabVIEW-32bit
64bit stdcall ・・・for Win64API
64bit cdecl ・・・for 64bit app

DLL functions overview

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No.	Function Name	Processing
1	Open_Dev	Establish communication with all LCOS-SLM controller connected to the USB. Get the device ID (bID) for communication.
2	Close_Dev	Disconnects communication with the target device. When exiting the software, disconnect all communication of all controllers.
3	Check_HeadSerial	LCOS-SLM head serial can be read from microSD card.
4	Write_FMemBMP	Writes data to any slot number in the frame memory by specifying the BMP file path. BMP files should be SXGA (1272x1024) in size.
5	Write_FMemArray	Writes data to any slot number in the frame memory in array data format. For array data, use SXGA size as 1D array data. (1272x1024=1302528)
6	Change_DispSlot	Change the slot number of the frame memory for the LCOS-SLM head display.
7	Check_Temp	Read out the temperature of the LCOS-SLM head and the controller board.
8	Check_FMem_Slot	Reads the image array data stored in the specified slot number of the frame memory.
9	Check_Disp_IMG	Read out the image array data displaying in the LCOS-SLM head.
10	Mode_Select	Change the mode.(DVI mode, USB/Trigger mode) The mode change is applied after the LCOS-SLM controller is rebooted.
11	Mode_Check	Check the mode.(DVI mode, USB/Trigger mode)
12	Check_LED	Check the lighting status of the LED
13	Check_IO	Read out the IO pin-header(No.3-16) voltage, high or low.
14	Reboot	The controller board can be restarted.

DLL functions overview

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No.	Function Name	Processing
15	Write_SDBMP	Writes data to any slot number in the microSD card on the board by specifying the BMP file path.BMP files should be SXGA (1272x1024) in size.
16	Write_SDArray	Writes data to any slot number in the microSD card on the board in array data format. For array data, use SXGA size as 1D array data. (1272x1024=1302528)
17	Check_SD_Slot	Reads the image array data stored in the specified slot number of the microSD card on the controller board.
18	Upload_SDtoFMem	Load the image data in the microSD card to the frame memory.

Note:
Basically, please set All “0” data to the microSD card slot No.0 when DVI mode is applied.
The DVI signal is combined with the data in the frame memory slot No.0, which is automatically loaded from microSD card slot No.0 at boot up.

DLL function details

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＜Open_Dev＞

Calling	int32_t Open_Dev(uint8_t bIDList[], int32_t bIDSize)	
Parameters	bIDList[]	List of bIDs assigned to the connected device.
	bIDSize	Size of bID list Please input number of USB-connected LCOS-SLM driver circuit.
Return value	Number of connected device	

＜Close_Dev＞

Calling	int32_t Close_Dev(uint8_t bIDList[], int32_t bIDSize)	
Parameters	bIDList[]	List of bIDs of devices to be disconnected.
	bIDSize	Size of bID list
Return value	1 :Function succeeds 0 :Function fails	

＜Check_HeadSerial＞

Calling	int32_t Check_HeadSerial(uint8_t bID, char HeadSerial[], int32_t CharSize)	
Parameters	bID	Device bID to be communicated with
	HeadSerial[]	LCOS-SLM head serial string
	CharSize	Specifies the number of characters in the serial number. 11 should be specified.
Return value	1 :Function succeeds 0 :Function fails	

DLL function details

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＜Write_FMemBMPPath＞

Calling	int32_t Write_FMemBMPPath(uint8_t bID, char Path[], uint32_t SlotNo)	
Parameters	bID	Device bID to be communicated with
	Path[]	BMP file path string
	SlotNo	Slot of frame memory. An integer value between 0 and 818. Writes two-dimensional array data of BMP to the specified slot number.
Return value	1 :Function succeeds 0 :Function fails	

DLL function details

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＜Write_FMemArray＞

Calling	**int32_t Write_FMemArray(uint8_t bID, uint8_t ArrayIn[], int32_t ArraySize, uint32_t XPixel, uint32_t YPixel, uint32_t SlotNo)**	
Parameters	bID	Device bID to be communicated with
	ArrayIn[]	Array data pointer. A one-dimensional flattened array of two-dimensional array data to be written.
	ArraySize	Array data size. 1272x1024=1302528
	XPixel	Number of X pixels of 2D array data to be written. SXGA column size :1272
	YPixel	Number of Y pixels of 2D array data to be written. SXGA column size :1024
	SlotNo	Slot of frame memory. An integer value between 0 and 818. Writes two-dimensional array data of BMP to the specified slot number.
Return value	1 :Function succeeds 0 :Function fails	

DLL function details

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＜Change_DispSlot＞

Calling	int32_t Change_DispSlot(uint8_t bID, uint32_t SlotNo)	
Parameters	bID	Device bID to be communicated with
	SlotNo	Slot of frame memory. An integer value between 0 and 818. Writes two-dimensional array data of BMP to the specified slot number.
Return value	1 :Function succeeds 0 :Function fails	

＜Check_Temp＞

Calling	int32_t Check_Temp(uint8_t bID, double *HeadTemp, double *CBTemp)	
Parameters	bID	Device bID to be communicated with
	*HeadTemp	Pointer to LCOS-SLM head temperature
	*CBTemp	Pointer to LCOS-SLM controller board temperature
Return value	1 :Function succeeds 0 :Function fails	

DLL function details

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＜Check_FMem_Slot＞

Calling	**int32_t Check_FMem_Slot(uint8_t bID, uint32_t ArraySize, uint32_t XPixel, uint32_t YPixel, uint32_t SlotNo, uint8_t ReadArray[])**	
Parameters	bID	Device bID to be communicated with
	ArraySize	Array data size. 1272x1024=1302528
	XPixel	Number of X pixels of 2D array data to be read. SXGA column size :1272
	YPixel	Number of Y pixels of 2D array data to be read. SXGA column size :1024
	SlotNo	Slot of frame memory. An integer value between 0 and 818. Read out the image array data stored in the input slot number.
	ReadArray[]	Array data pointer. Read out one-dimensional flattened array of two-dimensional array data.
Return value	1 :Function succeeds 0 :Function fails	

DLL function details

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＜Check_Disp_IMG＞

Calling	**int32_t Check_Disp_IMG(uint8_t bID, uint32_t ArraySize, uint32_t XPixel, uint32_t YPixel, uint8_t ReadArray[])**	
Parameters	bID	Device bID to be communicated with
	ArraySize	Array data size. 1272x1024=1302528
	XPixel	Number of X pixels of 2D array data to be read. SXGA column size :1272
	YPixel	Number of Y pixels of 2D array data to be read. SXGA column size :1024
	ReadArray[]	Array data pointer. Read out one-dimensional flattened array of two-dimensional array data.
Return value	1 :Function succeeds 0 :Function fails	

DLL function details

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＜Mode_Select＞

Calling	int32_t Mode_Select(uint8_t bID, uint8_t Mode)	
Parameters	bID	Device bID to be communicated with
	Mode	Specifies the mode. 0 : DVI mode 1 : USB/Trigger mode The mode change is applied after the LCOS-SLM controller is rebooted.
Return value	1 :Function succeeds 0 :Function fails	

＜Mode_Check＞

Calling	int32_t Mode_Check(uint8_t bID, uint32_t *Mode)	
Parameters	bID	Device bID to be communicated with
	*Mode	Pointer to the mode. 0 : DVI mode 1 : USB/Trigger mode
Return value	1 :Function succeeds 0 :Function fails	

DLL function details

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＜Check_LED＞

Calling	int32_t Check_LED(uint8_t bID, uint32_t *LED_Status)	
Parameters	bID	Device bID to be communicated with
	*LED_Status	Pointer to the lighting status of the LED(No.10-19) By converting to binary number, the lighting state of the LED can be determined (off: 0, lighting: 1). In the case of USB/Trigger mode, LED10 will light and return 1.
Return value	1 :Function succeeds 0 :Function fails	

＜Check_IO＞

Calling	int32_t Check_IO(uint8_t bID, uint32_t *IO_Status)	
Parameters	bID	Device bID to be communicated with
	*IO_Status	Pointer to the IO bin header(No.3-16) voltage status. By converting to binary number, the high/low state of the IO pin can be determined (low: 0, high: 1). IO pin No.4 changes high/low depending on the read timing because the pin indicates the frame signal of LCOS-SLM.
Return value	1 :Function succeeds 0 :Function fails	

DLL function details

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＜Reboot＞

Calling	void Reboot(uint8_t bID)	
Parameters	bID	Device bID to be communicated with
	-	Reboot the target device. Since USB communication will be interrupted, after using this function, it is necessary to wait for a while, and after USB is recognized again, start processing from Open_Dev again.
Return value	-	

＜Write_SDBMP＞

Calling	int32_t Write_SDBMPPath(uint8_t bID, char Path[], uint32_t SDSlotNo)	
Parameters	bID	Device bID to be communicated with
	Path[]	BMP file path string
	SDSlotNo	Slot of the image data in the microSD card. An integer value between 0 and 5658. Writes two-dimensional array data of BMP to the specified slot number.
Return value	1 :Function succeeds 0 :Function fails	

Note:

Basically, please set All “0” data to the microSD card slot No.0 when DVI mode is applied.
The DVI signal is combined with the data in the frame memory slot No.0, which is automatically loaded from microSD card slot No.0 at boot up.

DLL function details

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＜Write_SDArray＞

Calling	**int32_t Write_SDArray(uint8_t bID, uint8_t ArrayIn[], int32_t ArraySize, uint32_t XPixel, uint32_t YPixel, uint32_t SDSlotNo)**	
Parameters	bID	Device bID to be communicated with
	ArrayIn[]	Array data pointer. A one-dimensional flattened array of two-dimensional array data to be written.
	ArraySize	Array data size. 1272x1024=1302528
	XPixel	Number of X pixels of 2D array data to be written. SXGA column size :1272
	YPixel	Number of Y pixels of 2D array data to be written. SXGA column size :1024
	SDSlotNo	Slot of the image data in the microSD card. An integer value between 0 and 5658. Writes two-dimensional array data of BMP to the specified slot number.
Return value	1 :Function succeeds 0 :Function fails	

Note:
Basically, please set All “0” data to the microSD card slot No.0 when DVI mode is applied.
The DVI signal is combined with the data in the frame memory slot No.0, which is automatically loaded from microSD card slot No.0 at boot up.

DLL function details

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＜Check_SD_Slot＞

Calling	**int32_t Check_SD_Slot(uint8_t bID, uint32_t ArraySize, uint32_t XPixel, uint32_t YPixel, uint32_t SDSlotNo, uint8_t ReadArray[])**	
Parameters	bID	Device bID to be communicated with
	ArraySize	Array data size. 1272x1024=1302528
	XPixel	Number of X pixels of 2D array data to be read. SXGA column size :1272
	YPixel	Number of Y pixels of 2D array data to be read. SXGA column size :1024
	SDSlotNo	Slot of the image data in the microSD card. An integer value between 0 and 5658. Read out the image array data stored in the input slot number.
	ReadArray[]	Array data pointer. Read out one-dimensional flattened array of two-dimensional array data.
Return value	1 :Function succeeds 0 :Function fails	

DLL function details

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＜Upload_SDtoFMem＞

Calling	**int32_t Upload_from_SD_to_FMem(uint8_t bID, uint32_t SDSlotNo, uint32_t FMemSlotNo)**	
Parameters	bID	Device bID to be communicated with
	SDSlotNo	Slot of the image data in the microSD card to be uploaded to the frame memory. An integer value between 0 and 5658.
	FMemSlotNo	Slot of frame memory to be uploaded. An integer value between 0 and 818.
Return value	1 :Function succeeds 0 :Function fails	

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