

<i>SkyTech S.r.l.</i>	CTR_PROCEDURES Library shared object for CTR-A2100	Doc. : CTR-D2100_DS_0.00
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CTR_PROCEDURES Library shared object for CTR-A2100
SOFTWARE DESCRIPTION

	NAME	CLASSIFICATION	SIGNATURE	DATE
PREPARED	A. Bellesi	SW PEL		23/09/2014
CHECKED	A. Carbone	HW PEL		23/09/2014
CHECKED				
APPROVED				
AUTHORIZED				

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REVISIONS LOG

MOD.	DATE	NAME	CHANGES DESCRIPTION
0	23/09/2014	A. Bellesi	First Issue

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ERROR CODE RETURNED BY DLL FUNCTIONS

#define	Value	Description
CTR_OK	0	No errors
FILE_NOT_FOUND	1	File not found
TIMEOUT_DONE_HIGH	2	The FPGA loading process is failed
LCA_NOT_LOADED	3	The FPGA is not yet been programmed
TIMEOUT_WAITING_ADC_CONVERSION	4	The ADC converter has not ended the conversion
PARAMETER_INCORRECT	5	A parameter passed to a function is invalid
SPC_A600_STATUS_READ_FAIL	6	The read of SPC-A600 board status is failed
COMMUNICATION_SPC_ERROR	7	There is a communication error between BeagleBoneBlack and SPC-A600
USER_ABORT	8	The function is been interrupted by the user
INCOMPLETE_DATA	9	The data stream is not complete
TOO_MANY_PIXELS	11	The pixel number of image is more than expected
LENGTH_TABLES_ERROR	13	The length of a table is wrong
FILE_TABLES_ERROR	14	There is an error in a file table
NO_TABLES_LOADED	15	There are not tables loaded on SPC-A600
SCAN_SEQUENCE_LENGTH_ERROR	39	The length of a scan sequence is wrong
TAB_OF_TAB_LENGTH_ERROR	40	The length of a tab of tab is wrong
EXPOSITION_TERMINATE	42	An exposure has ended
NO_WIPE_TABLE_LOADED	64	The Wipe table is not loaded on SPC-A600
NULL_POINTER_IMAGE	59	The pointer used to save an image is not initialized
ERROR_RELEASE_SEMAPHORE	70	There is an error about the internal DLL mutex semaphore
FILE_OPEN_ERROR	71	Error opening a file
CTR_PRU_DRV_OPEN_FAILED	10000	BeagleBoneBlack initialization driver error
CTR_FAILED_TO_OPEN_DEV_MEM	10001	BeagleBoneBlack initialization memory error
CTR_FAILED_TO_MAP_DEVICE	10002	BeagleBoneBlack initialization map device error
CTR_FAILED_TO_MAP_PRU_MEM	10003	BeagleBoneBlack initialization PRU error
CTR_FAILED_TO_CREATE_MUTEX	10004	BeagleBoneBlack initialization mutex semaphore

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Get_DLL_Model

```
int Get_DLL_Model(char* model);
```

Routine Description

Returns the model version of CTR hardware

Arguments

OUT: *model* is a char pointer that will contain the model version of CTR hardware

Return Value

CTR_OK

Get_DLL_Version

```
int Get_DLL_Version(char* version);
```

Routine Description

Returns the DLL software version

Arguments

OUT: *version* is a char pointer that will contain the DLL software version

Return Value

CTR_OK

Get_FW_Version

```
int Get_FW_Version(char* version);
```

Routine Description

Returns the firmware version loaded on BeagleBoneBlack PRU

Arguments

OUT: *version* is a char pointer that will contain the firmware version

Return Value

CTR_OK if success

Error Code otherwise

Mutex_Clear

```
int Mutex_Clear();
```

Routine Description

Release the DLL internal mutex semaphore

Arguments

NONE

Return Value

CTR_OK if success

ERROR_RELEASE_SEMAPHORE otherwise

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TEST_BBB_Blue_Led

```
int TEST_BBB_Blue_Led(bool OnOff);
```

Routine Description

Tests the correct communication between BeagleBoneBlack and the PRU turning on or off the blue led present on the BeagleBoneBlack

Arguments

IN: *OnOff* is a boolean that if true turn on the led otherwise turn off

Return Value

CTR_OK

CTR_Init

```
int CTR_Init(char* PRU_file);
```

Routine Description

This function initialize the BeagleBoneBlack, all variables and signals to default values and loaded the specified firmware on the PRU. It must be called before any other functions

Arguments

IN: *PRU_file* is a char pointer that specified the firmware file name to be loaded on the PRU

Return Value

CTR_OK if success

Error Code otherwise

CTR_DeInit

```
int CTR_DeInit();
```

Routine Description

This function reset the system and turn off the PRU. It must be called after any other functions

Arguments

NONE

Return Value

CTR_OK

Read_ICF_File

```
int Read_ICF_File(char* ICF_File);
```

Routine Description

Load a ICF (Interface Configuration file) but no performs any hardware action

Arguments

IN: *ICF_file* is a char pointer that specified the ICF file to be loaded

Return Value

CTR_OK if success

Error Code otherwise

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Init_All

```
int Init_All(char* icf_file, char* msg);
```

Routine Description

Load a ICF (Interface Configuration file) and performs all hardware action to initialize the system. After the call of this function, the controller is ready to operate

Arguments

IN: *ICF_file* is a char pointer that specified the ICF file to be loaded

OUT: *msg* is a char pointer that will contain the message status of initialization

Return Value

CTR_OK if success

Error Code otherwise

CTR_Code_Error

```
void CTR_Code_Error(unsigned short Error_code, char* Str_Error_Code);
```

Routine Description

Return a string that explains the error type

Arguments

IN: *Error_code* is an error code value

OUT: *Str_Error_Code* is a char pointer that contains the error string description

Return Value

NONE

SPC_A600_Load_FPGA

```
int SPC_A600_Load_FPGA(char* fpga_file);
```

Routine Description

Initialize the SPC-A600 FPGA

Arguments

IN: *fpga_file* is a char pointer that specified the fpga file to be loaded on the SPC-A600 FPGA

Return Value

CTR_OK if success

Error Code otherwise

SPC_A600_Led_Green

```
int SPC_A600_Led_Green(bool On_Off);
```

Routine Description

Turns on or off the green led present on the SPC-A600

Arguments

IN: *OnOff* is a boolean that if true turn on the led otherwise turn off

Return Value

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CTR_OK

SPC_A600_Load_Clock_Calibration_Table

SPC_A600_Load_Clock_Calibration_Table(char* Path_File_Name_Calibration_Tables);

Routine Description

Read and applies the values for the clock calibration from a specific file

Arguments

IN: *Path_File_Name_Calibration_Tables* is a char pointer that specified the file that contains the value for the clock calibration

Return Value

CTR_OK if success

Error Code otherwise

SPC_A600_Set_Clock

int SPC_A600_Set_Clock(unsigned int Clock_Type, unsigned int Clock_Number, double Clock_Value);

Routine Description

Set the value of a SPC-A600 clock

Arguments

IN: *Clock_Type* is '0' for the low clocks and '1' for the high clocks

IN: *Clock_Number* specified which clock will be set

IN: *Clock_Value* is the value in volt for the clock

Return Value

CTR_OK if success

Error Code otherwise

SPC_A600_Init

int SPC_A600_Init();

Routine Description

Initializes the SPC-A600 hardware

Arguments

NONE

Return Value

CTR_OK if success

Error Code otherwise

SPC_A600_Clock_Output_Enable

int SPC_A600_Clock_Output_Enable(bool On_Off);

Routine Description

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Enables on disables the SPC-A600 clock outputs

Arguments

IN: *OnOff* is a boolean that if true enables the SPC-A600 clock outputs otherwise disables

Return Value

CTR_OK if success

Error Code otherwise

SPC_A600_Board_Identifier_Read

```
int SPC_A600_Board_Identifier_Read(unsigned short *SPC_Identifier);
```

Routine Description

Read the specific board identification number of the CCD controller

Arguments

OUT: *SPC_Identifier* is a USHORT pointer that will contains the CCD controller board identification number

Return Value

CTR_OK if success

Error Code otherwise

SPC_A600_Status_Read

```
int SPC_A600_Status_Read(unsigned short *SPC_status);
```

Routine Description

Read the SPC-A600 status register value

Arguments

OUT: *SPC_status* is a USHORT pointer that will contains the value of the SPC-A600 status register. The status register bits are the following:

```
#define N_SHUTDOWN      0x0002
#define ADC_READY       0x0004
#define ERR_TEMP_CCD    0x0008
#define ERR_TEMP_CTR    0x0010
#define ERR_PWR         0x0020
#define ERR_HEART_BEAT  0x0040
```

Return Value

CTR_OK if success

Error Code otherwise

SPC_A600_Get_Clock_Telemetry

```
int SPC_A600_Get_Clock_Telemetry(pTELEM_SPC_A600_DATA pTelem_Data);
```

Routine Description

Returns the SPC-A600 clock telemetry

Arguments

OUT: *pTelem_Data* is a pointer to the following structure that contains the telemetry values:

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```

typedef struct _TELEM_SPC_A600_DATA {
    double Clock_High[MAX_STRUCT_CLK_SPC_A600]; filled by this function
    double Clock_Low[MAX_STRUCT_CLK_SPC_A600]; filled by this function
    double Temp[MAX_STRUCT_TEMP_SPC_A600];
    double Volt[MAX_STRUCT_VOLT_TLM_SPC_A600];
    unsigned int n_Data_Acq;
} TELEM_SPC_A600_DATA, *pTELEM_SPC_A600_DATA;

```

Return Value
CTR_OK if success
Error Code otherwise

SPC_A600_Get_Voltage_Telemetry

```
int SPC_A600_Get_Voltage_Telemetry(pTELEM_SPC_A600_DATA pTelem_Data);
```

Routine Description

Returns the SPC-A600 clock voltage telemetry

Arguments

OUT: pTelem_Data is a pointer to the following structure that contains the telemetry values:

```

typedef struct _TELEM_SPC_A600_DATA {
    double Clock_High[MAX_STRUCT_CLK_SPC_A600];
    double Clock_Low[MAX_STRUCT_CLK_SPC_A600];
    double Temp[MAX_STRUCT_TEMP_SPC_A600];
    double Volt[MAX_STRUCT_VOLT_TLM_SPC_A600]; filled by this function
    unsigned int n_Data_Acq;
} TELEM_SPC_A600_DATA, *pTELEM_SPC_A600_DATA;

```

Return Value
CTR_OK if success
Error Code otherwise

SPC_A600_Get_Temperature_Telemetry

```
int SPC_A600_Get_Temperature_Telemetry(int TempIndex, double *pTemperature);
```

Routine Description

Returns the SPC-A600 temperature telemetry

Arguments

IN: *TempIndex* is '1' for the CCD temperature, '2' for the controller temperature

OUT: *pTemperature* is a pointer that will contain the value of the specified temperature

Return Value

CTR_OK if success
Error Code otherwise

SPC_A600_Shutter_Drive

```
int SPC_A600_Shutter_Drive(int open_close);
```

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Routine Description

Open or close the shutter

Arguments

IN: *open_close* is '1' to open the shutter, '0' to close the shutter

Return Value

CTR_OK

SPC_A600_Load_Tables

```
int SPC_A600_Load_Tables(char *Path_File_Name_Tables, char* List_File_Name_Tables);
```

Routine Description

Load the file 'Name of tables' in the SPC-A600 RAM

Arguments

IN: *Path_File_Name_Tables* is a char pointer that specified the system path where are located the 'Name of tables' files

IN: *List_File_Name_Tables* is a char pointer that specified the file with the list of table names

Return Value

CTR_OK if success

Error Code otherwise

SPC_A600_Load_Wipe_Sequence

```
int SPC_A600_Load_Wipe_Sequence(char *Path_File_Name_Tables, char* Wipe_Seq_File_Name);
```

Routine Description

Load a Wipe table in the SPC-A600 RAM

Arguments

IN: *Path_File_Name_Tables* is a char pointer that specified the system path where are located the Wipe table files

IN: *Wipe_Seq_File_Name* is a char pointer that specified the wipe table file

Return Value

CTR_OK if success

Error Code otherwise

SPC_A600_Load_Scan_Sequence

```
int SPC_A600_Load_Scan_Sequence(char *Path_File_Name_Tables, char* Scan_Seq_File_Name);
```

Routine Description

Load a Scan Sequence table in the SPC-A600 RAM

Arguments

IN: *Path_File_Name_Tables* is a char pointer that specified the system path where are located the Scan Sequence table files

IN: *Scan_Seq_File_Name* is a char pointer that specified the scan sequence table file

Return Value

CTR_OK if success

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Error Code otherwise

SPC_A600_Expo_Time_Read

```
int SPC_A600_Expo_Time_Read(unsigned int *expo_time);
```

Routine Description

Returns the value of the expo time register

Arguments

OUT: *expo_time* is a pointer that will contain the value of the expo time register

Return Value

CTR_OK if success

Error Code otherwise

SPC_A600_Safety_Enable

```
int SPC_A600_Safety_Enable(bool On_Off);
```

Routine Description

Enables or disables the system Safety feature

Arguments

IN: *On_Off* is a boolean that if true enables the Safety feature else disables the Safety feature

Return Value

CTR_OK

SPC_A600_Safety_HB

```
int SPC_A600_Safety_HB();
```

Routine Description

Clear the safety watch dog

Arguments

NONE

Return Value

CTR_OK

SPC_A600_Safety_Clear

```
int SPC_A600_Safety_Clear();
```

Routine Description

Clear the safety error register

Arguments

NONE

Return Value

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CDS_A600_Init

```
int CDS_A600_Init();
```

Routine Description

Initializes the CDS-A600 hardware

Arguments

NONE

Return Value

CTR_OK if success

Error Code otherwise

CDS_A600_Led_Red

```
int CDS_A600_Led_Red(unsigned int Board_Num, bool On_Off );
```

Routine Description

Turns on or off the red led present on the CDS-A600

Arguments

IN: *Board_Num* specifies which CDS board in a multi CDS environment. In case of one CDS this value must be '1'

IN: *OnOff* is a boolean that if true turn on the led otherwise turn off

Return Value

CTR_OK

CDS_A600_Bias_Output_Enable

```
int CDS_A600_Bias_Output_Enable(bool On_Off);
```

Routine Description

Enables on disables the CDS-A600 bias outputs

Arguments

IN: *OnOff* is a boolean that if true enables the CDS-A600 clock outputs otherwise disables

Return Value

CTR_OK if success

Error Code otherwise

CDS_A600_Bias

```
int CDS_A600_Bias(unsigned int Board_Num, unsigned int Bias_Number, double Bias_Value);
```

Routine Description

Set the value of a CDS-A600 bias

Arguments

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IN: *Board_Num* specifies which CDS board in a multi CDS environment. In case of one CDS this value must be '1'

IN: *Bias_Number* specified which bias will be set

IN: *Bias_Value* is the value in volt for the bias

Return Value

CTR_OK if success

Error Code otherwise

CDS_A600_Offset_Input

```
int CDS_A600_Offset_Input(unsigned int Board_Num, unsigned int Offset_Number, double Offset_Value);
```

Routine Description

Set the value of a CDS-A600 Input Offset

Arguments

IN: *Board_Num* specifies which CDS board in a multi CDS environment. In case of one CDS this value must be '1'

IN: *Offset_Number* specified which Input Offset will be set

IN: *Offset_Value* is the value in volt for the Input Offset

Return Value

CTR_OK if success

Error Code otherwise

CDS_A600_Offset_Output

```
int CDS_A600_Offset_Output(unsigned int Board_Num, unsigned int Offset_Number, double Offset_Value);
```

Routine Description

Set the value of a CDS-A600 Output Offset

Arguments

IN: *Board_Num* specifies which CDS board in a multi CDS environment. In case of one CDS this value must be '1'

IN: *Offset_Number* specified which Output Offset will be set

IN: *Offset_Value* is the value in volt for the Output Offset

Return Value

CTR_OK if success

Error Code otherwise

CDS_A600_Get_Telemetry

```
int CDS_A600_Get_Telemetry(unsigned int Board_Num, pTELEM_CDS_A600_DATA pTelem_Data);
```

Routine Description

Returns the CDS-A600 telemetry

Arguments

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IN: *Board_Num* specifies which CDS board in a multi CDS environment. In case of one CDS this value must be '1'

OUT: *pTelem_Data* is a pointer to the following structure that contains the telemetry values:

```
typedef struct _TELEM_CDS_A600_DATA {
    unsigned int                n_Valid_Board;
    unsigned int                n_Data_Acq;
    unsigned int                n_Channel;
    unsigned int                n_Sample;
    TELEM_CDS_A600_BOARD        Board[MAX_ACQ_BOARD];
    double                      Standard_Dev[3];
    double                      Mean_Value[3];
} TELEM_CDS_A600_DATA, *pTELEM_CDS_A600_DATA;
```

where:

```
typedef struct _TELEM_CDS_A600_BOARD {
    double Bias[MAX_BIAS_CDS_A600];
} TELEM_CDS_A600_BOARD, *pTELEM_CDS_A600_BOARD;
```

Return Value

CTR_OK if success
Error Code otherwise

CDS_A600_Shutter_Drive

```
int CDS_A600_Shutter_Drive(double Sht_Time, unsigned int Enable_Sht);
```

Routine Description

Starts an exposition cycle

Arguments

IN: *Sht_Time* specifies the exposition time of the shutter

IN: *Enable_Sht* specifies if the shutter is enable (1) or disable (0)

Return Value

CTR_OK if success
Error Code otherwise

CDS_A600_Execute_Wipe_Table

```
int CDS_A600_Execute_Wipe_Table(unsigned int* more, unsigned int* less);
```

Routine Description

Starts an CCD wipe cycle

Arguments

OUT: *more* specifies the number of pixels in addition received compared to those expected

OUT: *less* specifies the number of pixels received in less than expected

Return Value

CTR_OK if success
Error Code otherwise

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CDS_A600_Readout_Table

```
int CDS_A600_Execute_Readout_Table(unsigned short row, unsigned short col, unsigned short num_ch,
                                   unsigned int* buffer, unsigned int* more, unsigned int* less);
```

Routine Description

Starts an CCD readout cycle

Arguments

IN: *row* specifies the CCD row number

IN: *col* specifies the CCD column number

IN: *num_ch* specifies the CCD total channel number

OUT: *buffer* specifies the memory buffer where the image will be stored

OUT: *more* specifies the number of pixels in addition received compared to those expected

OUT: *left* specifies the number of pixels received in less than expected

Return Value

CTR_OK if success

Error Code otherwise

CDS_A600_Readout_Table_To_File

```
int CDS_A600_Execute_Readout_Table_To_File(unsigned short row, unsigned short col, unsigned short num_ch,
                                             unsigned int* buffer, unsigned int* more, unsigned int* less,
                                             char* ch1, char* ch2, char* ch3, char* ch4);
```

Routine Description

Starts an CCD readout cycle and save the image in four file, each file for a channel.

Arguments

IN: *row* specifies the CCD row number

IN: *col* specifies the CCD column number

IN: *num_ch* specifies the CCD total channel number

OUT: *buffer* specifies the memory buffer where the image will be stored

OUT: *more* specifies the number of pixels in addition received compared to those expected

OUT: *left* specifies the number of pixels received in less than expected

OUT: *ch1, ch2, ch3, ch4* specifies the file name, each for a channel where the pixels will be saved

Return Value

CTR_OK if success

Error Code otherwise

CDS_A600_Exposition_Readout_Abort

```
int CDS_A600_Exposition_Readout_Abort();
```

Routine Description

Abort an exposition cycle in progress

Arguments

NONE

Return Value

CTR_OK

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ICF FILE Example

CONFIG/LBC_Tech/SPC_A600_Clock.ini	# File SPC Clock
CONFIG/LBC_Tech/SPC_A600_Clock_Calibration.ini	# File SPC Clock Calibration
CONFIG/LBC_Tech/CDS_A600_Bias.ini	# File CDS Bias
CONFIG/LBC_Tech/CDS_A600_Offset.ini	# File CDS Offset
CONFIG/LBC_Tech/Name_of_Tables.txt	# Name_of_Tables file
CONFIG/LBC_Tech/tab_of_tab.dat	# Default Readout Table file
CONFIG/LBC_Tech/wipe_tab.dat	# Default Wipe Table file
2304	# CCD Rows Number
256	# CCD Columns Number
4	# CCD Channels Number

SPC CLOCK FILE Example

Clock 1 1= 3.00
 Clock 1 2= 3.00
 Clock 1 3= 3.00
 Clock 1 4= 3.00
 Clock 1 5= 0.00
 Clock 1 6= 0.00
 Clock 1 7= 3.00
 Clock 1 8= 3.00
 Clock 1 9= 3.00
 Clock 1 10= 3.00
 Clock 1 11= 1.00
 Clock 1 12= 0.00
 Clock 0 1= -9.00
 Clock 0 2= -9.00
 Clock 0 3= -9.00
 Clock 0 4= -9.00
 Clock 0 5= 0.00
 Clock 0 6= 0.00
 Clock 0 7= -9.00
 Clock 0 8= -9.00
 Clock 0 9= -9.00
 Clock 0 10= -9.00
 Clock 0 11= -7.00
 Clock 0 12= 0.00

SPC CLOCK CALIBRATION FILE Example

//Calibration	Gain	Offset
Clock 1 1 = 1.0	0.2	
Clock 1 2 = 1.0	0.2	
Clock 1 3 = 1.0	0.2	
Clock 1 4 = 1.0	0.2	
Clock 1 5 = 1.0	0.2	

<i>SkyTech S.r.l.</i>	CTR_PROCEDURES	Doc. : CTR-D2100_DS_0.00
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Clock 1 6 = 1.0 0.2
 Clock 1 7 = 1.0 1.5
 Clock 1 8 = 1.0 1.5
 Clock 1 9 = 1.0 1.5
 Clock 1 10 = 1.0 1.5
 Clock 1 11 = 1.0 1.5
 Clock 1 12 = 1.0 1.5
 Clock 0 1 = 1.0 0.0
 Clock 0 2 = 1.0 0.0
 Clock 0 3 = 1.0 0.0
 Clock 0 4 = 1.0 0.0
 Clock 0 5 = 1.0 0.0
 Clock 0 6 = 1.0 0.0
 Clock 0 7 = 1.0 -0.8
 Clock 0 8 = 1.0 -0.8
 Clock 0 9 = 1.0 -0.8
 Clock 0 10 = 1.0 -0.8
 Clock 0 11 = 1.0 -0.8
 Clock 0 12 = 1.0 -0.8

CDS BIAS FILE Example

Board 1 Bias 1= -6.0
 Board 1 Bias 2= -5.0
 Board 1 Bias 3= -6.0
 Board 1 Bias 4= -5.0
 Board 1 Bias 5= 0.0
 Board 1 Bias 6= 0.0
 Board 1 Bias 7= 0.0
 Board 1 Bias 8= 0.0
 Board 1 Bias 9= 15.0
 Board 1 Bias 10= 9.0
 Board 1 Bias 11= 9.0
 Board 1 Bias 12= 0.0
 Board 1 Bias 13= 21.0
 Board 1 Bias 14= 21.0
 Board 1 Bias 15= 15.0
 Board 1 Bias 16= 0.0

CDS BIAS FILE Example

Board 1 Offset I 1= 2
 Board 1 Offset I 2= 2
 Board 1 Offset I 3= 2
 Board 1 Offset I 4= 2
 Board 1 Offset O 1= 2.4
 Board 1 Offset O 2= 2.4
 Board 1 Offset O 3= 2.4

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Board 1 Offset O 4= 2.4

NAME OF TABLE FILE Example

CONFIG/LBC_Tech/vert.wfN
 CONFIG/LBC_Tech/horiz.wfN
 CONFIG/LBC_Tech/vdump.wfN
 CONFIG/LBC_Tech/hdump.wfN

READOUT TABLE FILE Example

920100 // TAB [0x1|2|0100] (Command | Num_Tab | Repeat_Tab) (Vertical Dump Phase)
 131000 // TAB [0x1|3|1000] (Command | Num_Tab | Repeat_Tab) (Horizontal Dump Phase)
 200100 // repeat 256 times the row reading
 900001 // 1 row/s uploads
 110900 // read 2304 pixels
 300000 // REPEAT [0x300000] (Command)
 000000 // END [0x000000] (Command)

WIPE TABLE FILE Example

920200 // TAB [0x9|2|0200] (Command | Num_Tab | Repeat_Tab) (Slow Vertical Dump Phase)
 131200 // TAB [0x1|3|1200] (Command | Num_Tab | Repeat_Tab) (Horizontal Dump Phase)

PHASE FILE Example

// File Name: I:\CTR\CTR-A2100\vdump.wfN
 // Table Name: FY
 // Date: Wednesday, 02 April 2014
 // Comments: CCD VERTICAL PHASE
 // States change Number: 6
 // Table lenght: 501
 // Phase 1: PP0(stc)
 // Phase 2: PP2(clamp)
 // Phase 3: Clk11(R)
 // Phase 4: Clk12
 // Phase 5: Clk1(I1)
 // Phase 6: Clk2(I2)
 // Phase 7: Clk3(I3)
 // Phase 8: Clk4(DG)
 // Phase 9: Clk5(Link)
 // Phase 10: Clk6(Link_Dis)
 // Phase 11: Clk7(R1)
 // Phase 12: Clk8(R2)
 // Phase 13: Clk9(R3)
 // Phase 14: Clk10(SW)

<i>SkyTech S.r.l.</i>	CTR_PROCEDURES Library shared object for CTR-A2100	Doc. : CTR-D2100_DS_0.00
<i>Electronics Technologies</i>		Mod. : 0
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// Phase 15: NO HW
// Phase 16: NO HW
// Tick time: 20.00 ns
// Zoom: 4.00
FFFFF1 3744
FFFFAF 3808
FFFFB1 3776
FFFFB0 3792
FFFFA6 3728
FFFFB0 3760
FFFFB4 3744