SpecBoardInterface Tango Cpp Class

Contents :

SpecBoardInterface Class Identification :

Contact	: at esrf.fr - broquet
Class Family	: Acquisition
Platform	: Unix Like
Bus	: PCI Express
Manufacturer	: none
Manufacturer ref. :	

SpecBoardInterface Class Inheritance :

- Tango::DeviceImpl
  - SpecBoardInterface

SpecBoardInterface Class Description :

The Simple PCIe FMC carrier (SPEC) board is a FPGA based board with SFP connector and PCIe interface (throw the Gennum GN4124 chip bridge). It is under CERN Open Hardware License (CERN OHL v1.2).
The SPEC board can hold one FMC card for ADC, DAC, DIO... It can also be used as a standard node for the White Rabbit system.
Check the web page http://www.ohwr.org/projects/spec/wiki for full documentation and sources.

This class is a simple basic interface for the SPEC board. It allows to:
* load the FPGA bitstream
* read/write registers of the user and gn4124 cores.

You will need the libspec library to build and run this class:
* git clone git@ohwr.org:fmc-projects/spec/spec-sw.git
* cd spec-sw/tools
* make
* libspec.a and libspec.so are available

SpecBoardInterface Properties :

There is no class properties

There is no device properties

SpecBoardInterface Class Commands				
Name	Input type	Output type	Level	Description
State	DEV_VOID	DEV_STATE	OPERATOR	This command gets the device state (stored in its device_state data member) and returns it to the caller.
Status	DEV_VOID	CONST_DEV_STRING	OPERATOR	This command gets the device status (stored in its device_status data member) and returns it to the caller.
ReadRegister	DEV_VOID	DEV_VOID	OPERATOR	Read a register of the barArea (whishbone or gn4124) at the address readAddress (barArea base_address + offset). Registers are 32 bits wide.
ReadRegisterBlock	DEV_VOID	DEV_VOID	OPERATOR	Read a block of registers in the barArea (whishbone or gn4124). The block starts at the address readAddress (barArea base_address + offset) and reads next registers until sizeReadBlock is reached. Registers are 32 bits wide.
WriteRegister	DEV_VOID	DEV_VOID	OPERATOR	Write writeValue in a register of the barArea (whishbone or gn4124) at the address writeAddress (barArea base_address + offset). Registers are 32 bits wide.
LoadBitstream	DEV_VOID	DEV_VOID	OPERATOR	Load the bitstream bitfile in the FPGA. The bitfile must be the full path (/full/path/bitstream.bit) of the bitstream. The barArea attribute is ignored because this command obviously uses the BAR4 area dedicated to the GN4124 for programming the FPGA.

Command State :

This command gets the device state (stored in its device_state data member) and returns it to the caller.

State Definition		
Input Argument	Tango::DEV_VOID	none
Output Argument	Tango::DEV_STATE	Device state
DisplayLevel	OPERATOR	..
Inherited	true	..
Abstract	true	..
Polling Period	Not polled	..
Command allowed for	All states	..

Command Status :

This command gets the device status (stored in its device_status data member) and returns it to the caller.

Status Definition		
Input Argument	Tango::DEV_VOID	none
Output Argument	Tango::CONST_DEV_STRING	Device status
DisplayLevel	OPERATOR	..
Inherited	true	..
Abstract	true	..
Polling Period	Not polled	..
Command allowed for	All states	..

Command ReadRegister :

Read a register of the barArea (whishbone or gn4124) at the address readAddress (barArea base_address + offset). Registers are 32 bits wide.

ReadRegister Definition		
Input Argument	Tango::DEV_VOID	
Output Argument	Tango::DEV_VOID	
DisplayLevel	OPERATOR	..
Inherited	false	..
Abstract	false	..
Polling Period	Not polled	..
Command allowed for	All states	..

Command ReadRegisterBlock :

Read a block of registers in the barArea (whishbone or gn4124).
The block starts at the address readAddress (barArea base_address + offset) and reads next registers until sizeReadBlock is reached.
Registers are 32 bits wide.

ReadRegisterBlock Definition		
Input Argument	Tango::DEV_VOID	
Output Argument	Tango::DEV_VOID	
DisplayLevel	OPERATOR	..
Inherited	false	..
Abstract	false	..
Polling Period	Not polled	..
Command allowed for	All states	..

Command WriteRegister :

Write writeValue in a register of the barArea (whisbone or gn4124) at the address writeAddress (barArea base_address + offset).
Registers are 32 bits wide.

WriteRegister Definition		
Input Argument	Tango::DEV_VOID	
Output Argument	Tango::DEV_VOID	

DisplayLevel	OPERATOR	..
Inherited	false	..
Abstract	false	..
Polling Period	Not polled	..
Command allowed for	All states	..

Command LoadBitstream :

Load the bitstream bitfile in the FPGA.
The bitfile must be the full path (/full/path/bitstream.bit) of the bitstream.
The barArea attribute is ignored because this command obviously uses the BAR4 area dedicated to the GN4124 for programming the FPGA.

LoadBitstream Definition		
Input Argument	Tango::DEV_VOID	
Output Argument	Tango::DEV_VOID	
DisplayLevel	OPERATOR	..
Inherited	false	..
Abstract	false	..
Polling Period	Not polled	..
Command allowed for	All states	..

SpecBoardInterface Class Attributes							
Name	**Inherited**	**Abstract**	**Attr. type**	**R/W type**	**Data type**	**Level**	**Description**
barArea	false	false	Scalar	READ_WRITE	Tango::DEV_SHORT	OPERATOR	This is the PCIe BAR area on which you want read/write registers. BAR0 :FPGA Whishbone bus registers. Access internal FPGA embedded system.

							BAR4 :GN4124 control registers. Access system control as boot mode or loading FPGA bitstream.
bitfile	false	false	Scalar	READ_WRITE	Tango::DEV_STRING	OPERATOR	Path of the bitstream to load in the FPGA.
readAddress	false	false	Scalar	READ_WRITE	Tango::DEV_ULONG	OPERATOR	Address of the register to read
writeAddress	false	false	Scalar	READ_WRITE	Tango::DEV_ULONG	OPERATOR	Address of the register to write
readValue	false	false	Scalar	READ	Tango::DEV_ULONG	OPERATOR	Value read at readAddress
writeValue	false	false	Scalar	WRITE	Tango::DEV_ULONG	OPERATOR	Value to write at writeAddress
sizeReadBlock	false	false	Scalar	READ_WRITE	Tango::DEV_ULONG	OPERATOR	Size of the register block to read (number of registers to read).
readRegisterBlock	false	false	Spectrum	READ	Tango::DEV_ULONG	OPERATOR	This spectrum contains the values of a block of registers. The block starts at address readAddress and reads next registers until sizeReadBlock is reached.

There is no dynamic attribute defined.

Attribute barArea :

This is the PCIe BAR area on which you want read/write registers.
BAR0 :FPGA Whishbone bus registers. Access internal FPGA embedded system.
BAR4 :GN4124 control registers. Access system control as boot mode or loading FPGA bitstream.

Attribute Definition			Attribute Properties			Attribute Event Criteria	
Attribute Type	Scalar		label	BAR area		Periodic	Not set
R/W Type	READ_WRITE		unit			Relative Change	Not set
Data Type	Tango::DEV_SHORT		standard unit			Absolute Change	Not set
Display Level	OPERATOR		display unit				
Inherited	false		format	%1d		Archive Periodic	Not set
Abstract	false		max_value	4		Archive Relative Change	Not set
Polling Period	Not polled		min_value	0		Archive Absolute Change	Not set
Memorized	Not set		max_alarm				
			min_alarm			Push Change event by user code	false
Read allowed for	All states		max_warning			Push Archive event by user code	false
Write allowed for	All states		min_warning				
			delta_time			Push DataReady event by user code	false
			delta_val				

Attribute bitfile :

Path of the bitstream to load in the FPGA.

Attribute Definition			Attribute Properties			Attribute Event Criteria	
Attribute Type	Scalar		label	Bitstream Path		Periodic	Not set
R/W Type	READ_WRITE		unit			Relative Change	Not set
Data Type	Tango::DEV_STRING		standard unit			Absolute Change	Not set
Display Level	OPERATOR		display unit				
Inherited	false		format			Archive Periodic	Not set
Abstract	false		max_value			Archive Relative Change	Not set
Polling Period	Not polled		min_value				
			max_alarm				

Memorized	Not set
Read allowed for	All states
Write allowed for	All states

min_alarm	
max_warning	
min_warning	
delta_time	
delta_val	

Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	false

Attribute readAddress :

Address of the register to read

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ_WRITE
Data Type	Tango::DEV_ULONG
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All states
Write allowed for	All states

Attribute Properties	
label	Read Address
unit	
standard unit	
display unit	
format	%5d
max_value	
min_value	
max_alarm	
min_alarm	
max_warning	
min_warning	
delta_time	
delta_val	

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	false

Attribute writeAddress :

Address of the register to write

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ_WRITE
Data Type	Tango::DEV_ULONG
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All states
Write allowed for	All states

Attribute Properties	
label	Write Address
unit	
standard unit	
display unit	
format	%5d
max_value	
min_value	
max_alarm	
min_alarm	
max_warning	
min_warning	
delta_time	
delta_val	

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	false

Attribute readValue :

Value read at readAddress

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ
Data Type	Tango::DEV_ULONG
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled

Attribute Properties	
label	Read Value
unit	
standard unit	
display unit	
format	
max_value	
min_value	

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not

~~Memorized~~	~~Not set~~
Read allowed for	All states

max_alarm	
min_alarm	
max_warning	
min_warning	
delta_time	
delta_val	

	set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	false

Attribute writeValue :

Value to write at writeAddress

Attribute Definition	
Attribute Type	Scalar
R/W Type	WRITE
Data Type	Tango::DEV_ULONG
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Write allowed for	All states

Attribute Properties	
label	Write Value
unit	
standard unit	
display unit	
format	
max_value	
min_value	
max_alarm	
min_alarm	
max_warning	
min_warning	
delta_time	
delta_val	

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	false

Attribute sizeReadBlock :

Size of the register block to read (number of registers to read).

Attribute Definition	
Attribute Type	Scalar
R/W Type	READ_WRITE
Data Type	Tango::DEV_ULONG
Display Level	OPERATOR
Inherited	false
Abstract	false
Polling Period	Not polled
Memorized	Not set
Read allowed for	All states
Write allowed for	All states

Attribute Properties	
label	Size of Register Block
unit	
standard unit	
display unit	
format	
max_value	
min_value	
max_alarm	
min_alarm	
max_warning	
min_warning	
delta_time	
delta_val	

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set
Archive Periodic	Not set
Archive Relative Change	Not set
Archive Absolute Change	Not set
Push Change event by user code	false
Push Archive event by user code	false
Push DataReady event by user code	false

Attribute readRegisterBlock :

This spectrum contains the values of a block of registers.
The block starts at address readAddress and reads next registers until sizeReadBlock is reached.

Attribute Definition	
Attribute Type	Spectrum (65536)
R/W Type	READ
Data Type	Tango::DEV_ULONG
Display Level	OPERATOR

Attribute Properties	
label	Register Block
unit	
standard unit	
display unit	

Attribute Event Criteria	
Periodic	Not set
Relative Change	Not set
Absolute Change	Not set

~~Inherited~~ Abstract	~~false~~ false		format		Archive Periodic	Not set
Polling Period	Not polled		max_value		Archive Relative Change	Not set
Memorized	Not set		min_value		Archive Absolute Change	Not set
			max_alarm			
Read allowed for	All states		min_alarm		Push Change event by user code	false
			max_warning			
			min_warning		Push Archive event by user code	false
			delta_time			
			delta_val		Push DataReady event by user code	false

SpecBoardInterface Class States	
Name	**Description**
ON	The SPEC board is accessed. Commands are able to be executed.
FAULT	The SPEC board can not be accessed. Not found.
ALARM	The SPEC is accessed. But some commands failed.