Project	CERN-TMS
Date	2013-02-01
Reference	Cern-tms/TmsControlGui
Version	2.0.0
Author	Martin Thomas

Table of Contents

1. Introduction

This document covers the operation of the TmsControlGUI test application. The program is intended to allow a user to connect to and control a TmsServer. It make extensive uses of the libTmsApi. The program is intended for test and diagnostics, users should be familiar with the TMS system.

2. Using the Program

The application binary is by default located in the directory */usr/tms/bin.* To start the program assuming that PATH environment variable includes this bin directory run the following command:-

tmsServerGui [-r <ring>] [hostName]

On startup the application automatically attempts to connect to a **tmsServer** running on the host specified or on the local host if not. The ring number is specified with the -r options, the default is ring 1. Connection to another server can be made by entering the remote host name in the dialog posted from the from the **File->New Connection** menu item.

The actions that a user can perform are accessed via the tab buttons at the bottom of the application window.

2.1. Configure System

The screen allows a user to change the virtual -> physical mappings of the Pupe interfaces for the ring in question. To change simply enter the new values and then click the **Reconfigure** button. To add a new virtual channel click the **Add Channel** button. The **Delete Channel** button will delete the last channel. Any modification made but not committed with **Reconfigure** will be lost on exit of this screen.

2.2. Control/Data View

This screen allows a user to request data from the server. The data obtained is presented in graphical form.

Parameter/Control		*Description*
Auto Cycle Num	checkbox	If enabled, the current cycle number is automatically requested from the server and the Cycle Number when data is requested is set to the current cycle number. The current cycle number is displayed to the bottom right of the window.
Cycle Number	textedit	The cycle number for which data is requested. If the **Auto Cycle Num** checkbox is enabled this data field is disabled. Once data is captured this field displays the cycle number pertaining to the captured data.
Channel	spinbox	The virtual channel number from which to acquire data.
Cycle Period	combobox	The cycle period for which data is to be viewed.
Start Time	textedit	The start time in ms from the start of the specified cycle period.
Orbit Number	textedit	Orbit number to select after the start time.
Num Values	textedit	The number of data values to be requested.
Bunch Number	combobox	Particle bunch number . 0 means all bunches.
Function	combobox	Algorithm to be applied to the data.
Argument	textedit	Argument passed to the data processing function. At present none of the functions use this data.

- **Refresh Data Button:** This button will request the data from the server.
- **Save To File Button:** The currently captured data is saved into an ASCII file.

2.3. Server Selftest

Clicking the **Run Server Self Test** button causes the server to perform it's selftest. In the event of errors the errors are listed. This tests the whole system, not just the individual ring.

2.4. Pupe Diagnostics

Low level diagnostics for a Pupe channel. Data is captured to the specification entered following a click of the **Refresh Data** button. The **Save To File** button saves the currently displayed data into an ASCII file.

Parameter/Control		*Description*
Channel		Channel from which to acquire the data
Source	spinbox	Selects 64 bits of the possible 256 bits of diagnostics. The names of the the data fields within the 64 bits are displayed in the graphs when

		refreshed.
Clock	combobox	Diagnostics clock source.
StartTime	textedit - number	The time in ms from CYCLE_START before trigger is activated.
Post trigger delay	textedit - number	Delay in clock cycle periods after the trigger before data is captured.
Trigger src Data	checkbox	If checked the trigger is no longer the timing signals but the lower 32bits of data. The actual data signals used depends upon the source selected.
Trigger And	checkbox	The trigger function is an AND rather than the default OR function.
Trigger Store	checkbox	Stores the trigger in the lower 8 bits. If active on refresh the trigger signals are plotted.
Trigger Mask	checkboxes	Trigger Mask. This is a mask of the eight timing signals.
Save format kst		Saved ASCII data file are prepended with column labels.

2.5. Pupe Simulation

Enables the loading of test data into FPGA memory.

Pupe Pickup Test Data		
Parameter/Control		***Description***
Channel Number	spinbox	Channel into which simulation data is to be programmed.
Test Data file	textedit	Binary file to be loaded.
Select	pushbutton	Invokes the file selector dialog.
Load Test Data	button	Load the specified data file into a PUPE boards SDRAM and sets up a PUPE channel to source this data rather than the ADC data.
Clear Test data	button	Clear the test data
Internal Timing Controls		
Use internal Adc Clock Ref	checkbox	Use the internal ADC clock reference rather than locking to the external 10MHz source.
Disable BLR	checkbox	Disables the BLR algorithm
Use internal Timings for specified signal.	checkboxes	Use internal software timings for the selected signals.
Apply	button	Apply Internal timing options

Cycle Type		
Cycle Type	combobox	The name of the cycle type that will be loaded when the apply button is pressed.
Apply		Apply the selected cycle type.
Server Control		
Initialise TMS	button	Initialise the TMS server. This re-loads the FPGA firmware and re-initialises the system to defaults.

2.6. Cycle Params

This windows allows the user to load and edit the Cycle Parameters for each possible Cycle Type.

Load Cycle Parameters		
Load From TMS	listbox	This lists the cycle types known by the TMS server. To edit a cycle firstly select from the list and then click on the Load From TMS button.
Load From TMS	pushbutton	Read the currently selected TMS cycle type for editing.
Load from File	textedit	Cycle File name that will be loaded when load from file button is clicked.
Select	pushbutton	Invokes file selector dialog.
Load from File	pushbutton	Loads the specified Cycle Parameter file for editing and/or upload.
Base Parameters		
Cycle Type	textedit	Name for the Cycle type.
name	textedit	A name for this set of parameters.
ring	spinbox	The ring number. 0 for all rings.
channel	spinbox	The channel number. 0 for all channels.
Info	textedit	A single line description for the cycle.
Pll Initial Frequency	textedit	The initial base frequency for the phase lock loop. This value should be around 2^32 * FREF / 125.0e6.
Pll Initial Frequency Delay	textedit	This is the delay, in milliseconds, after the CYCLE_START event that the pllInitialFrequency value is loaded into the PLL. The delay is there to allow the FREF timing input to have stabilised before the PLL attempts a lock.
Pll Fref Gain	textedit	This is the gain value applied to the incoming FREF signal before using as a reference for the PLL. FREF is a binary timing signal. The FREF signal used for the PLL will have the values +pllFrefGain and -pllFrefGain. A typical value for this would be around 4096 to match the

		incoming values of Sigma.
Pll Gain	textedit	This parameter provides a control of the gain of the PLL feedback path. Its value defines the number of right shifts that are applied to the binary error value. The PLL filters have a gain of about 128, so a value of 7 here will be equivalent of a loop feedback gain of 1. Note that the PLL feedback gain is also dependant on the level of Sigma and pllFrefGain.
pllDdsMinimum	textedit	This defines the minimum frequency that the PLL's frequency register will go down to. If this value and pllDdsMaximum are set to 0 there are no bounds to the PLL frequency.
pllDdsMaximum	textedit	This defines the maximum frequency that the PLL's frequency register will go up to. If this value and pllDdsMinimum are set to 0 there are no bounds to the PLL frequency.
State Delay	textedit	This defines the delay in FREF periods when a delay state is entered.
Positions		
Phase Table	table	This is an array of phase shift values for each of the PU channels. The phase shift effectively applied to the incoming FREF global timing signal so that the locally generated FREF signal and other PLL signals can be phase aligned to the channels PS ring position. Its value can be plus or minus and is in 1/512 of a rotation or 0.703125 degrees. It is possible to edit individual entries or use the offset entry box.
Offset	spinbox	Value that will be applied to every channel when the **Add offset to all Channels** button is clicked. This is a signed value.
Add Offset to all Channels	pushbutton	Add/Subtracts the value in the offset box to all channels.
Load Defaults	pushbutton	This loads the default phase shift values for the PS TMS system
State Setup		
Enable Modification	checkbox	Modification of the state tables can only be made if this check box is enabled.
State Selector	combobox	Selects the state to be displayed or edited. The variables for the selected state are displayed in the editing boxes.
Period	combobox	Selects the Cycle period this state belongs to
Add next state	pushbutton	Adds a new state at the end of the states for a new harmonic change.
Delete last state	pushbutton	Deletes the last state.

Lo1 Harmonic	textedit	The harmonic number of the LO1 phase table oscillator.
Lo1 Phase	textedit	The LO1 phase with respect to the phase table contents. By default the LO1 phase is offset by 90 degrees to compensate for the PLL algorithm. This is a floating point value in the range -1.0 to 1.0. (1.0 == 1 FREF period). Positive values indicate a delay in the signal.
F1RefSigma	checkbox	Filter1's reference frequency is either FREF or Sigma
F1LoMsb	checkbox	Filter 1's local oscillator is phase tables Lo1 or the phase tables MSB
Lo2 Harmonic	textedit	The harmonic number of the LO2 phase table oscillator.
Lo2 Phase	textedit	The LO2 phase with respect to the phase table contents. By default the LO2 phase is offset by 90 degrees to compensate for the PLL algorithm. This is a floating point value in the range -1.0 to 1.0. (1.0 == 1 FREF period). Positive values indicate a delay in the signal.
F2RefSigma	checkbox	Filter2's reference frequency is either FREF or Sigma
F2LoMsb	checkbox	Filter 2's local oscillator is phase tables Lo2 or the phase tables MSB
State Bit6	checkbox	The setting of state bit 6. Special purpose use
State Bit7	checkbox	The setting of state bit 7. Special purpose use
Pll use F2	checkbox	The PLL uses filter 1 or filter 2 as its feedback path.
Acquire Data	checkbox	Acquire data during this state.
Bunch Mask	textedit (Hex)	The bitmask for which bunches to capture.
Mean1 Mask	textedit (Hex)	Which bunches to pass to the mean1 filter.
Mean2 Mask	textedit (Hex)	Which bunches to pass to the mean2 filter.
Gate Width	textedit	The GATE pulse width relative to one LO period. It can have a value between 0.0 and 1.0.
Gate Phase	textedit	The GATE pulse phase with respect to a LO period. This is a floating point value in the range -1.0 to 1.0. (1.0 == 1 LO period). Positive values indicate a delay in the signal.
Blr Width	textedit	The BLR pulse width relative to one LO period. It can have a value between 0.0 and 1.0.
Blr Phase	textedit	The BLR pulse phase with respect to a LO period. This is a floating point value in the range -1.0 to 1.0. (1.0 == 1 LO period). Positive values indicate a delay in the signal.
NextStates	fields	Settings for the next state fields

2.7. Status

Updates the screen with the server status once every second or when the Refresh Button is clicked. This is

the overall system status not just the ring.

2.8. Statistics

Updates the screen with the server statistics once every second or when the Refresh Button is clicked. This is the overall system statistics not just the ring.