Manual: Building and running a Simulink model in the external mode with eclib

(in Ubuntu Linux)

http://cstwiki.wtb.tue.nl/index.php?title=E-box

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Open or create a Simulink model. The library can be found by typing eclib in the Matlab console. The supported modules while writing this document are:

EL3102	2 channel analog input 10V10V differential, 16 bit
EL5101	1 channel incremental encoder interface TTL
EL2008	8 channel digital output 24V
EL2004	4 channel digital output 24V
EL4132	2 channel analog output -10 tot 10V 16-bit
EL4038	8 channel analog output -10 tot 10V 12-bit
EL1018	8 channel analog input terminal 24V
EL1008	8 channel digital input terminal 24V
EL1014	4 channel digital input terminal 24V



EL1018

Check or change te configuration- parameters:

5	Configuration Parameters: ECATtest/Configuration
Select: -Data Import/Export -Optimization Diagnostics -Diagnostics -Diagnostics -Diagnostics -Diagnostics -Diagnostics -Diagnostics -Diagnostics -Diagnostics -Diagnostics -Diagnostics -Diagnostics -Diagnostics -Connectivity -Conpatibility -Model Referencing -Hardware Implemen -Model Referencing D-Real-Time Workshop -Comments -Symbols -Custom Code -Debug -Interface	Configuration Parameters: ECAItest/Configuration Simulation time Start time: 0.0 Solver options Type: Fixed-step Y Solver: discrete (no continuous states) Y Periodic sample time constraint: Unconstrained Y Fixed-step size (fundamental sample time): 0.01 Tasking mode for periodic sample times: Auto Higher priority value indicates higher task priority Automatically handle data transfers between tasks
	OK Gancel Help Apply

-Fixed step.

-Sample Time e..g. 0.01 sec (100Hz). -Minimum Sample Time is 0.1 sec.

-Maximum Sample Time depends on computation-time and computer . -Discrete (no continuous states).

N	Configuration Parameters: ECATtest/Configuration	ĸ
Select:	Target selection	4
Select: -Solver -Data Import/Export -Optimization Diagnostics -Sample Time -Data Validity -Type Conversion -Connectivity -Compatibility -Model Beference	System target file: ectarget.tlc Browsv Language: C Y Description: Ethercattarget Real-Time Target for PREEMPT-RT/Linux Documentation Generate HTML report Launch report automatically Build process	
-Hardware ImplemeModel Referencing -Real-Time Workshop -Comments -Symbols -Custom Code -Debug -Interface	TLC options: Makefile configuration Generate makefile Make command: make_rtw OPTS='-DNETIF_ID=1' Template makefile: ec_unix.tmf Generate code only	-
		/

-Select: ectarget.tlc.

-Make command: make_rtw OPTS='DNETIF_ID=<X>' .

<X> is the ethernetport. eth0 is ethernetport 0 and eth1 is ethernetport 1.

It is possible to check the available network interfaces by typing:

sudo ifconfig

The "ifconfig" command allows the operating system to setup network interfaces and allow the user to view information about the configured network interfaces.

	Configuration Parameters: ruudmodel1/Configuration	×
Select: -Solver -Data Import/Export -Optimization -Diagnostics -Sample Time -Data Validity -Type Conversion -Connectivity -Compatibility -Madel Referencing -Real-Time Workshop -Comments -Symbols -Custom Code -Debug -Debug	Software environment Target floating-point math environment: ANSI-C Utility function generation Verification MAT-file variable name modifier: rt_ Data exchange Interface: External mode Host/T arget interface Transport layer: tcpip MEX-file name: ext_comm MEX-file arguments: Memory management Static memory allocation	
KI	QK Cancel Help	Apply

-External mode.

-Transport layer tcpip. Mex file: ext_com

All S-function blocks have 1 parameter which must be set They are called the **link_id**. The **link_id** is a counter, starting at 0 for each different type of module or device in the EtherCAT stack. Click on the s-function blocks and check the **link id's** starts from zero.

😣 Sink Block	Parameters: EL4132
– EL4132 (mask) —	A
- Parameters	
Link id (>0)	
0	
	OK Cancel Help Apply

Press "CTRL+B" or type rtwbuild('Modelnaam') to build the code. Go to the directory where the model is saved. Run the executable in the external mode by typing:

sudo ./modelname --w

in a terminal.



Return to your Simulink model. Connect To Target:



Wait a couple of seconds till the text is not longer grayed out and Start Real-Time Code



Respons:

800	roo	t@ruud	l-laptop:	/home/e	box/sv	n/tr	unk/sr	c/E-box						
File Edit	View	Termin	nal Help											
ECtarget Net inte ec_start ec_start ec_start ec_count adc:	v1.3 rface repor repor ports	SOEM, = eth1 rts: op rts: ma rts: 6 s repor	M.J.G. v L. Dening Et aster soc slaves f rts: port	.d. Mole herCAT c ket bind bund and types a	engraft communi l on et l confi are	& l cati h1 s gure	IME Te ion. succee ed.	chnolog: ded.	ies, 20	909				
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Sourcecode: Eclib by M.J.G. van de Molengraft. Ectarget by M.J.G. van de Molengraft & IME Technologies. Soem by Arthur Ketels.