RTM-CLK Installation and User Guide

Prepared By: Peter Milne

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Rev	***Date***	***Description***
1	26/3/2011	initial
2	6/7/2011	Added driver knobs

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1 Introduction

1.1 Functionality

RTM_CLK provides 4 channels of clock buffer output in addition to the normal RTM1-DIO32 functionality:

Function	Description
CLK INPUT	EXTERNAL LEMO or INTERNAL
CLK OUTPUT	4 CHANNELS, 20mA drive, 1MHz.
FAST IO	DI6, 6 lines to FPGA, opto coupled.
ETH	Ethernet 100T
CONSOLE	RS232
DIGITAL IO	DIO32, 32 bits registered digital IO.

1.2 References

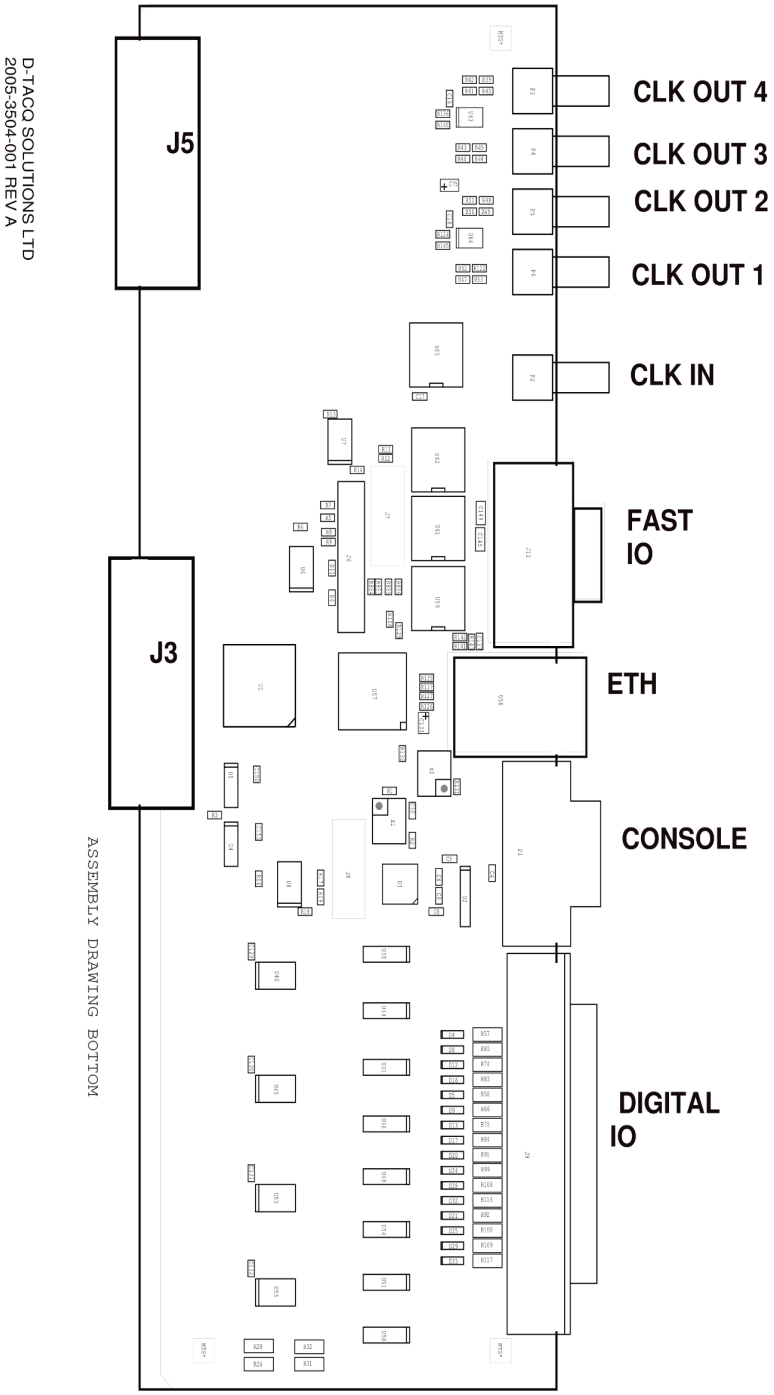
1. ACQ196CPCI Installation Guide

1.3 Notation

- **`command`** : indicates name of a program (command)
- `preformatted text` : literal input or output from terminal session.
- *Defined Term* : some term or acronym specific to this domain (perhaps referenced in the glossary)

2 Mechanical

2.1 Layout



2.2 Front Panel

CLK-IN, CLK-OUT {1 ..4 } are all Single Pin Lemo Connectors:

Currently fitted with LEMO type EPL.00.250.NTN. Various connector can be used LEMO. Please refer to LEMO catalogue or website (www.lemo.com). A readily available type is FFA.00.250.CTAC29Z for use with RG174, RG179 and RG188 co-axial cable

Signal Levels: 0 .. 5V. 1MHz maximum. Maximum current: 25mA.

CLK-IN is opto-isolated.

CLK-OUT are NOT isolated, they are intended to drive other isolated inputs

eg ACQ196CPCI/ACQ132CPCI front panel CLK input.

2.3 RTM1-DIO32 Functionality

Please refer to [1], the ACQ196CPCI Installation Guide.

2.4 Simplified Schematic of RTM-CLK

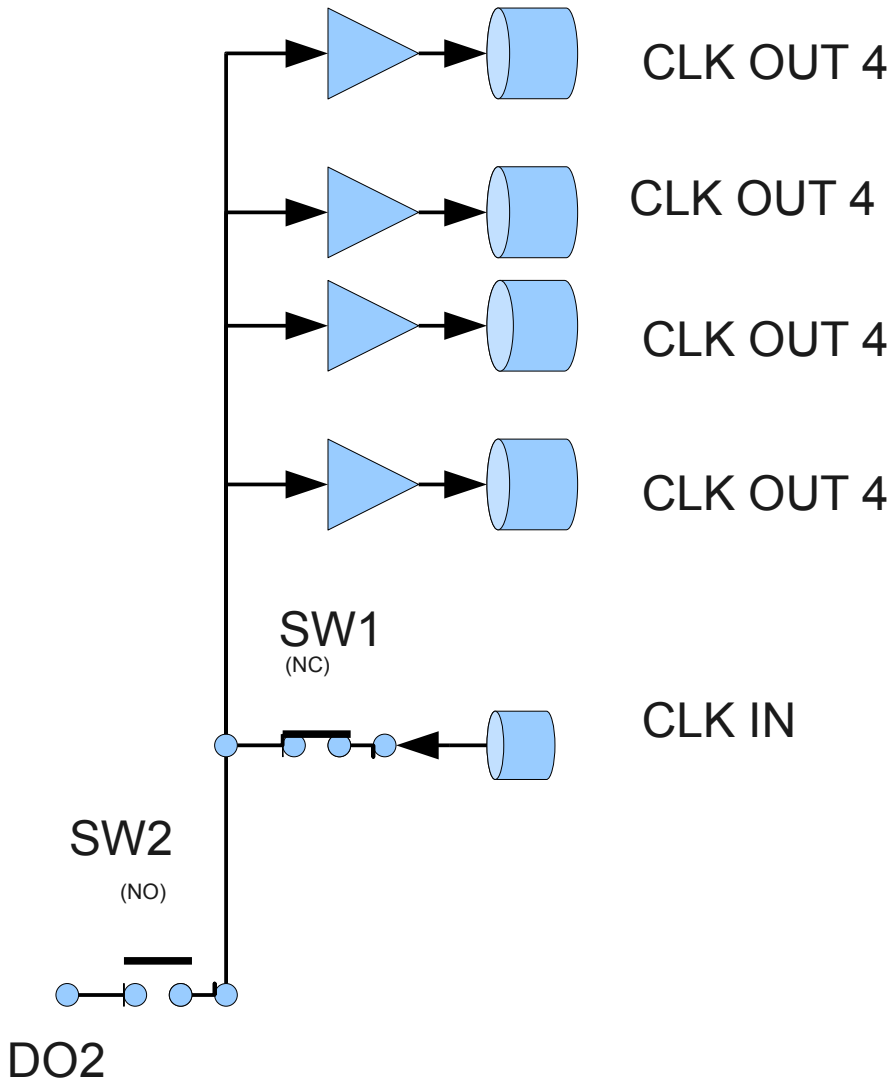
CLK-IN is an opto-isolated input

CLK-OUT{1,2,3,4} are fast op-amp driven outputs, suitable for driving multiple opto-isolators.

CLK-OUT is sourced by default from CLK-IN, but, under software control, the sources for CLK-OUT can be individually set.

The recommended use is to drive all the clock lines from the Internal Clock on the ACQ1xx card in the front slot.

- For External Clock Buffer:
  - Default SW1 is closed, SW2 is open.
  - CLK IN is buffered to all CLK OUT
- For Internal Clock Buffer:
  - Software opens SW1, closes SW2
  - Internal clock is routed on DO2 to all CLK OUT.

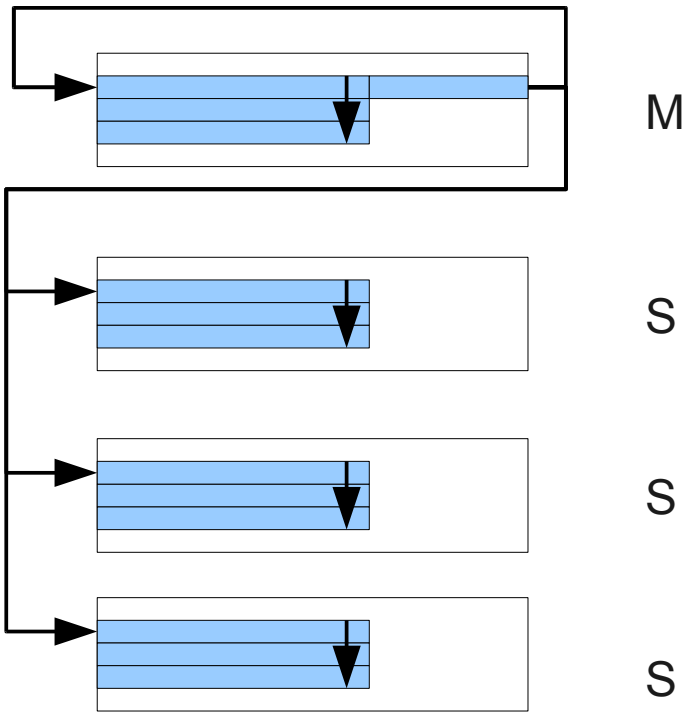


Other combinations are possible under software controll, see [3.4]

2.5 Schematic System

Example System:
4 CPCI crates, each with 3 ACQ132CPCI

In the Master crate M, a CLK Master card supplies CLK via RTM-CLK



In Slave Crates S, CLK is input on the front panel LEMO to a local Master card which distributes to 2 slave cards using PXI.

The RTM-CLK to LEMO CLK cable IS required in the Master crate to ensure identical phase delays.

3 Operating Modes

3.1 External Clock Buffer

This is the default setting, no software is required.

Simply connect the external clock to the CLK IN LEMO, connect a cable from each CLK OUT to the LEMO CLK in connector on the front panel of the master card in each CPCI crate.

NB: if additional expansion beyond 4 crates is required, each CLK OUT can drive 2 front panel LEMO CLK loads.

3.2 Internal Clock Buffer

Configuration made by software:

Example: 1MHz clocking:

```
/sbin/insmod /usr/local/lib/modules/acq100_rtmclk.ko
set.acq132.role MASTER 1000
```

Now connect CLK-OUT1 to MASTER on first slave crate, CLK-OUT2 to MASTER on second slave crate, etc.

If the firmware release does not include the module acq100_rtmclk.ko, then a firmware update will be required. Please update firmware from the latest image at www.d-tacq.com.

3.3 Front side card uses RIO routing

To access clock inputs and outputs on RTM-CLK, the front-side card should set the appropriate SRC/DST routing end point for the appropriate signal lines to RIO.

Commands like the following do this automatically:

```
set.acq132.role MASTER command
```

3.4 Non-Default routings

Finer controls are available from the driver.

Example:

```
set.sys /dev/rtmclk/LEMO_IN DI2
```

Knob	**Values**	**Comment**
LEMO_IN	DI0, DI1 DI2, NC[0]	Routes LEMO IN
LEMO_OUT_1	LIN[1], DO0, DO1, DO2	Routes LEMO OUT_1
LEMO_OUT_2	LIN[1], DO0, DO1, DO3[2]	Routes LEMO OUT_2
LEMO_OUT_3	LIN[1], DO0, DO1, DO4[3]	Routes LEMO OUT_3
LEMO_OUT_4	LIN[1], DO0, DO1, DO5[4]	Routes LEMO OUT_4
	[0] NC : No connect	
	[1] LIN : LEMO IN	
	[2] DO3 : Suggested TRG output	
	[3], [4] DO4, DO5 : Suggested GPG Outputs	