

# SMT8036

## User Manual



Certificate Number FM 55022

## Revision History

<b>Date</b>	<b>Comments</b>	<b>Engineer</b>	<b>Version</b>
10/03/03	First release	PSR	1.0
02/04/03	Compiling instructions added	PSR	1.1
13/06/03	Example code removed as part of package	PSR	1.2
21/12/04	Software requirements added; hyperlinks added/updated	PSR	1.3
14/01/05	Cables part numbers updated	PSR	1.4
25/05/05	SMT365 description corrected to match part number (-4-1)	PSR	1.5
31/05/05	Power Consumption added	PSR	1.6

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## Contacting Sundance.

You can contact Sundance for additional information by sending email to [support@sundance.com](mailto:support@sundance.com).

## Notes.

- SHB stands for **Sundance High-speed Bus**.
- ComPort denotes an 8-bit communication port following the TI C4x standards.
- *SMT8036* is a PCI system to be plugged in a PC. The only software requirement is to have 3L Diamond server installed.

## Precautions

In order to guarantee that Sundance's boards function correctly and to protect the module from damage, the following precautions should be taken:

- They are static sensitive products and should be handled accordingly. Always place the modules in a static protective bag during storage and transition.
- When operated in a closed environment make sure that the heat generated by the system is extracted e.g. a fan extracting heat or blowing cool air.

## Outline description.

The *SMT8036* is a PCI system based on 3 main modules: C64xx-based module (*SMT365-4-1*) combined with a dual high-speed ADC/DAC module (*SMT370*), both plugged on a PCI carrier board (*SMT310Q*).

*SMT365-4-1* characteristics:

- ⇒ TMS320C6416 processor running at 600MHz
- ⇒ Six 20MB/s communication ports (comm.-ports)
- ⇒ 4MB of ZBTRAM (133MHz)
- ⇒ 8MByte Flash ROM for boot code and FPGA programming
- ⇒ Global expansion connector
- ⇒ High bandwidth data I/O via 2 Sundance High-speed Buses (SHB).

*SMT370* characteristics:

- ⇒ Two 14-bit ADCs ([AD6645-105](#)) sampling at up to 105MHz,
- ⇒ Dual 16-bit TxDAC ([AD9777](#)) sampling at up to 400MHz (interpolation),
- ⇒ Two Sundance High-speed Bus (SHB) connectors,
- ⇒ Two 20 MegaByte/s communication ports,
- ⇒ Low-jitter on-board system clock,
- ⇒ Xilinx Virtex-II FPGA,
- ⇒ 50-Ohm terminated analogue inputs and outputs, external triggers and clocks via MMBX (Huber and Suhner) connectors,
- ⇒ User defined pins for external connections,
- ⇒ Compatible with a wide range of Sundance *SHB* modules,
- ⇒ TIM standard compatible,
- ⇒ Default FPGA firmware implementing all the functions described along this documentation.

The *SMT8036* is a demonstration software for the evaluation of the *SMT365-4-1* and *SMT370* modules. It can be used for prototyping 3G (3<sup>rd</sup> generation) systems and high-speed data acquisition system with or without digital processor. This document is an installation guide for the *SMT8036* demonstration system.

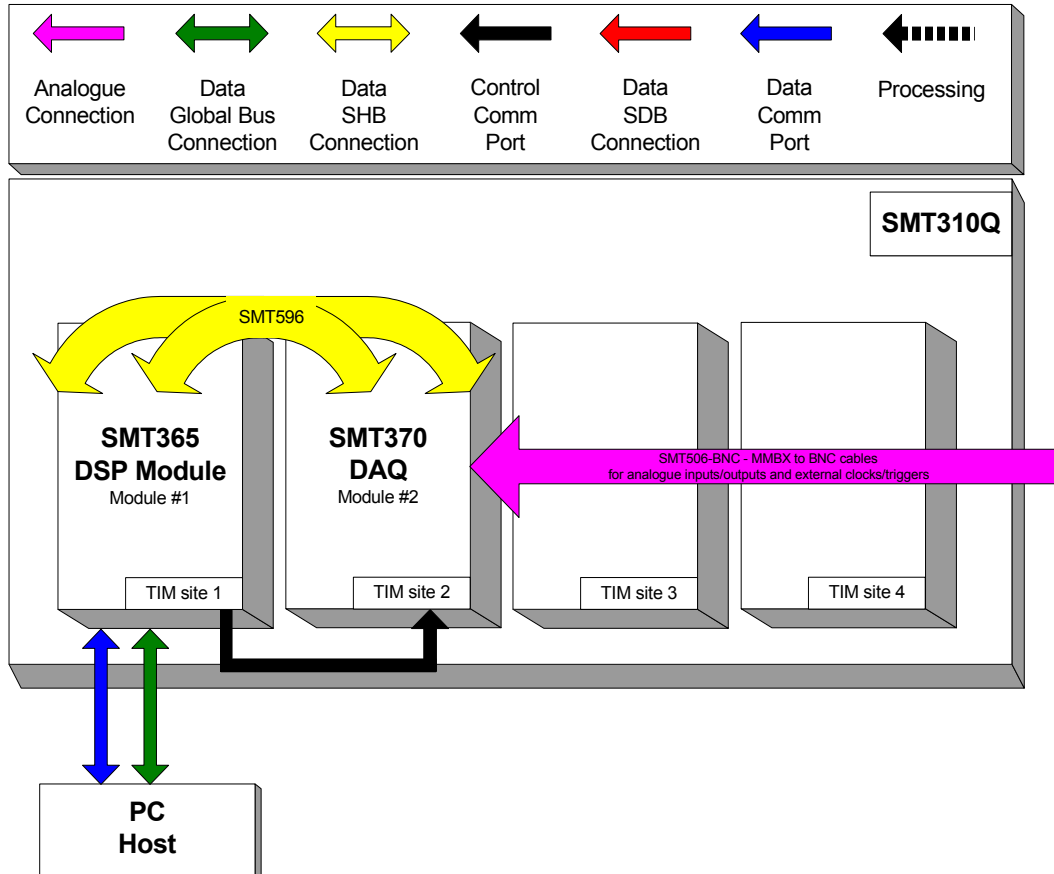
Documentation and source files are installed by the way of the SMT6600 package, which is the Sundance DAQ package. **Source and application files provided are to be run by the way of 3L Diamond Server only.**

The *SMT8036* application gets the DSP on the *SMT365* to configure the DAC of the *SMT370* to generate a continuous sine wave via a first SHB connection. DAC outputs

are loop onto the ADCs inputs. The DSP grabs data from both channels and stores them into a file, which can be read by a Matlab application for data displaying and FFT processing. Sampling clocks (100MHz for the ADCs and 160MHz for the DAC) are generated by on-board clock synthesizers.

## Architecture.

The following diagram shows the architecture of the *SMT8036* system:



## Hardware involved.

The SMT8036 is built around two main modules but also involves an other board and some cables to connect them and allow them to communicate with each other and to access the PC.

① ⇒ 1x **SMT310Q**: PCI carrier

② ⇒ 1x **SMT365-4-1**: C64xx-based module; to be plugged on site 1 of *SMT310Q*.

③ ⇒ 1x **SMT370**: Dual ADC/DAC module; to be plugged on site 2 of *SMT310Q*.

④ ⇒ 1x **FMS cable** (20cm): to connect T1C0 to T2C3 at the back of the *SMT310Q*.

⑤ ⇒ 1x **SHB cable** (standard length): to connect SHBB on the *SMT365* to SHBB on the *SMT370*.

⑥ ⇒ 1x **SMT516** (SHB to SHB PCB): to connect SHBA (*SMT365*) to SHBA (*SMT370*).

⑦ ⇒ 2x **MMBX to MMBX** (SMT509-350) cables to connect J10 to J12 and J9 to J13 on the *SMT370*, or one interconnecting pcb depending on stock.

In some shipments/orders, ⑤ and ⑥ are replaced by the [SMT596](#), which is a dual SHB to SHB mezzanine PCB.

## Hardware installation.

Here are the steps to follow to install the *SMT8036* system.

1 – Place the *SMT365-4-1* on TIM site 1 of the carrier board (*SMT310Q*).

2 – Place the *SMT370* on TIM site 2 of the carrier board (*SMT310Q*).

3 – Make sure that the boards are firmly seated, then provide the 3.3V to the boards by screwing in the bolts and screws through one of the mounting holes on the *SMT365* and *SMT370*.

4 – Connect CommPort 0 of the *SMT365* to CommPort 3 of the *SMT370* (T1C0 to T2C3) via an FMS cable at the back of the *SMT310Q*.

5 – Connect SHBA on the *SMT365* to SHBA on the *SMT370* via the *SMT516*.

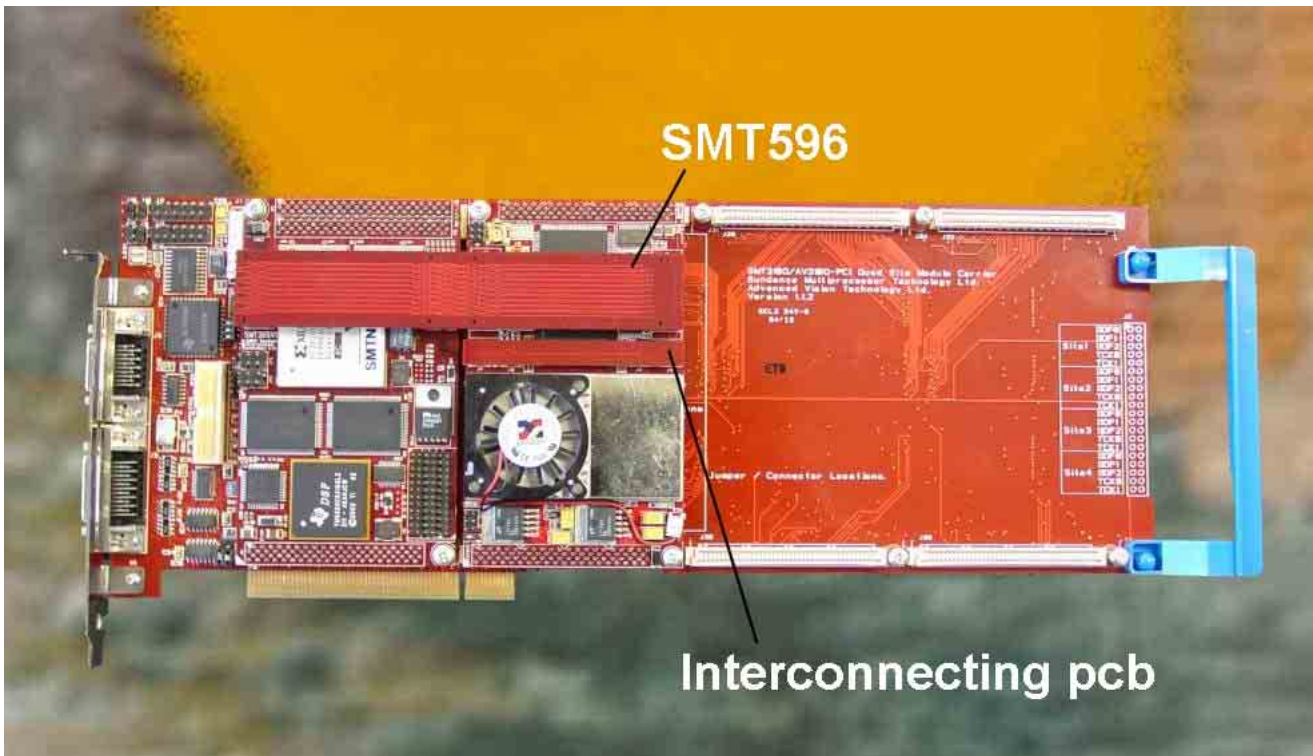
6 – Connect SHBB on the *SMT365* to SHBB on the *SMT370* via a standard SHB cable.

7 – Connect J10 to J12 and JJ9 to J13 on the *SMT370*.

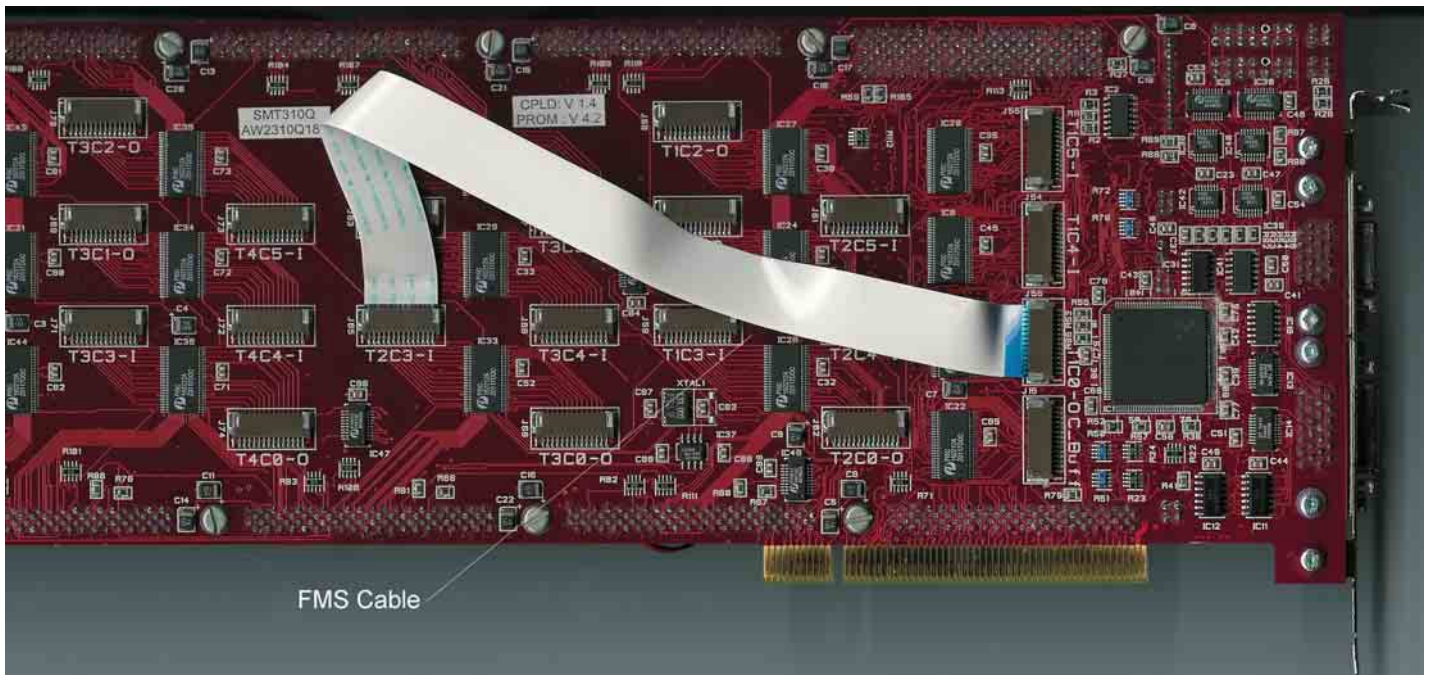
8 – Place the carrier board in the host system.

In some shipments/orders 5 and 6 would consist in fitting the *SMT596*.

The following picture shows how connections are made at the top of the system:



The following picture shows the CommPort connection at the back of the SMT310Q. Note that the FMS are 'twisted', i.e. one end should be blue and the other should show silver pins.





## Power Consumption.

Here are the details of the power consumption of the entire system (PC+SMT310Q+SMT365+SMT370) when no applications is running:

- 3.3-Volt rail: 15.87 Watts (4.81 Amps),
- 5-Volt rail: 13.35 Watts (2.67 Amps),
- 12-Volt rail: 6.36 Watts (0.53 Amp).

It gives a total power consumption of 18 Watts excluding the PC.

The following measurements are when the Pegasus application provided is running:

- 3.3-Volt rail: 15.87 (4.81 Amps),
- 5-Volt rail: 30.15 Watts (6.03 Amps),
- 12-Volt rail: 6.48 Watts (0.54 Amp)

It gives a total power consumption of 34.5 Watts excluding the PC.

Please note that the power consumption of the PC used for that purpose is 17.6 Watts.

## Software applications.

### ***3L application.***

In a sub-folder labelled 3L, you will find a C (*Test.c*), a configuration (*Test.cfg*), a make (*nmake*) and an application (.app) files, in order to execute directly and/or modify and recompile the code. ***Please note that the code provided targets 3L Diamond.***

In a DOS prompt window, simply type *nmake* to generate the 3L application file, which can be loaded into the *SMT365* by using the 3L Server (3L Diamond needs to be installed first).

This application allows the user to execute simple commands such as configuring the DAC, the clock synthesizers, capturing data, etc.

### ***Pegasus application.***

The *SMT8036* is also provided with a Pegasus application (*Pegasus* folder), which shows the user the dynamic performance of the system.

