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# TMS320C6474 Digital Signal Processor (DSP) add-on module (rev. 2.1)

(Data Sheet rev. 2.1 April 2010)

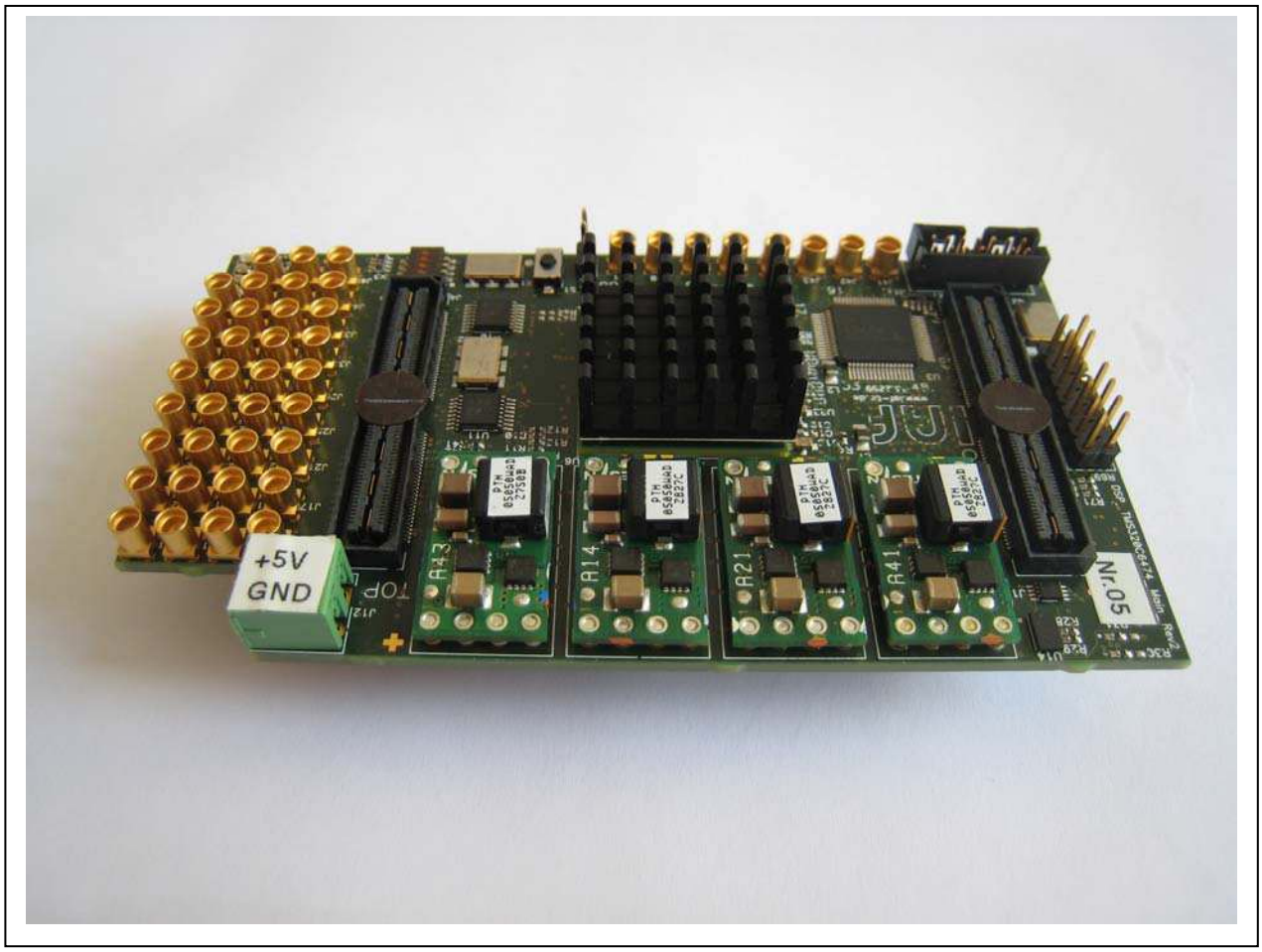


Figure 1: Picture of the TMS320C6474-Main-Board

The DSP-Module, for the FFP-Basic+-Board, consists of two DSP add-on-boards (type Main and type Extension), which are designed for use on a single extension slot of the FFP-Basic+-Board (see Figure 2). The FFP-Basic-Plus-Board, is a Rapid-Prototyping –Board which is built on the Xilinx Virtex V.

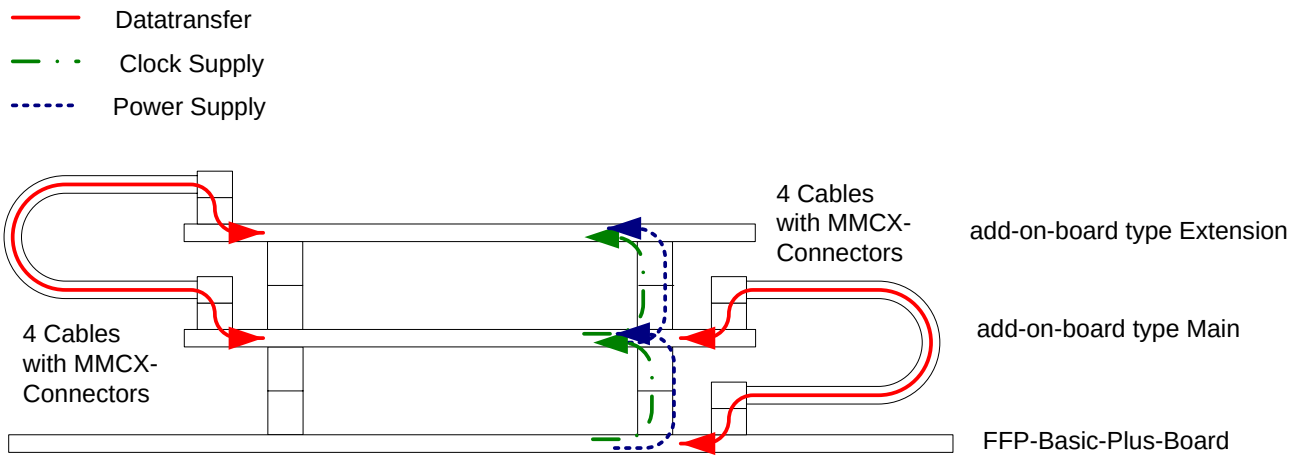


Figure 2: Use of the two DSP-Add-On-Boards on one slot of the FFP-Basic-Board

In combination with an adapter-board the DSP modules are also usable with the FFP-Basic-Board which is built on the Virtex-II-Pro.

It is also possible to use the TMS320C6474 Digital Signal Processor (DSP) add-on module as stand-alone board for communication with other Serial Rapid IO-(SRIO)-Interfaces.

The two boards are a little different.

The Main-Board is the heart of the duo. It contains one DSP TMS320C6474, clock-generation, power supply and conversion.

The Extension-Board can only be used in combination with the Main-Board. There are two TMS320C6474 DSPs integrated. It gets its power and clock from the Main-Board.

The datatransfer between the two boards is realized via MMCX-connector and 4 cables (TXN, TXP, RXN and RXP).

The key features of the two boards are described in the following and shown in Figure 3.

**Block Diagramm:**

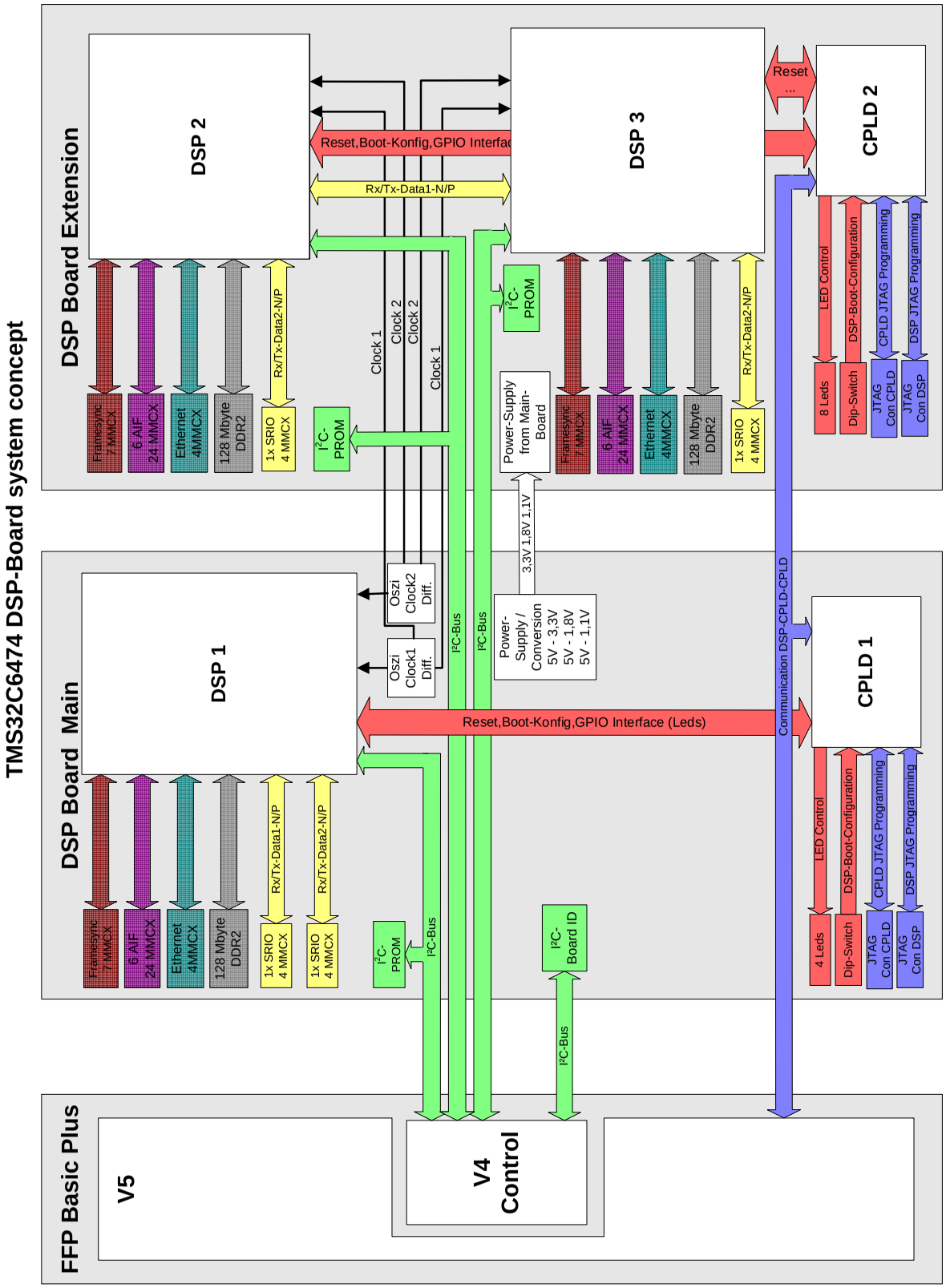


Figure 3: Block Diagram of DSP add-on-Board

**The Main-Board has the following key features:**

- 1 Texas Instruments DSP TMS320C6474
- JTAG-Connector for using with an external emulator
- 3 NMI (1 for each core of the DSP) controlled via FFP-Basic+-Board
- 1MBit I²C EPROM for DSP programmn code, programmable via FFP-Basic+-Board or via DSP
- Xilinx CPLD (Reset-, JTAG, DIP- and LED-Control) with separate JTAG-Connector
- 2 SRIO-Interfaces (2 lanes), each on four MMCX-connectors for communication with FFP-Basic+-Board, Extention-Board or other SRIO-Interfaces
- Antenna Interface (AIF) 6 configurable links (Full Duplex) on MMCX-connectors
- Frame Synchronization Interface on MMCX-connectors
- 128 Mbytes of DDR2 memory
- 1000 Mbps Ethernet MAC (EMAC) on MMCX-connectors
- 4 Dip-Switches with programmable functionality (standard: Dips for DSP-Boot-Configuration)
- 4 On-Board-LEDs controlled via DSP GPIO-Interface (standard) or controlled via CPLD
- Connector with 8 DSP GPIO-Pins for connection of external LEDs or Dip-Switches
- Board-Detection and Board-Identification from FFP-Basic+-Board via I²C
- On-Board clock-generation
- Single-Power-Supply (+5V) via FFP-Basic-Plus-Board or via external power connector (standard), On-Board-Power-Conversion

**The Extension-Board has the following key features:**

- 2 Texas Instruments TMS320C6474 DSPs
- JTAG-Connector for using with an external emulator
- 6 NMI (1 for each core of the two DSPs) controlled via FFP-Basic+-Board
- 2 MBit I²C EPROM for DSP programm code, one for each DSP, programmable via FFP-Basic+-Board or via DSP
- Xilinx CPLD (Reset-, JTAG, DIP- and LED-Control) with separate JTAG-Connector
- SRIO-Interface 1 (1 lane for each DSP), for communication between the two DSPs on the Extension-Board
- SRIO-Interface 2 (1 lane for each DSP), on four MMCX-connectors for communication with Main-Board, FFP-Basic+-Board or other SRIO-Interfaces
- Antenna Interface (AIF) 6 configurable links (Full Duplex) on MMCX-connectors
- Frame Synchronization Interface on MMCX-connectors
- 128 Mbytes of DDR2 memory for each processor
- 1000 Mbps Ethernet MAC (EMAC) on MMCX-connectors
- 4 Dip-Switches with programmable functionality (standard: Dips for DSP-Configuration)
- 8 LEDs controlled via GPIO-Interface of the DSP (standard) or controlable via CPLD
- Clock- and powersupply via Main-Board

**Board -Dimensions:**

Figure 4 shows the board dimensions of the TMS320C6474-DSP add-on-boards.

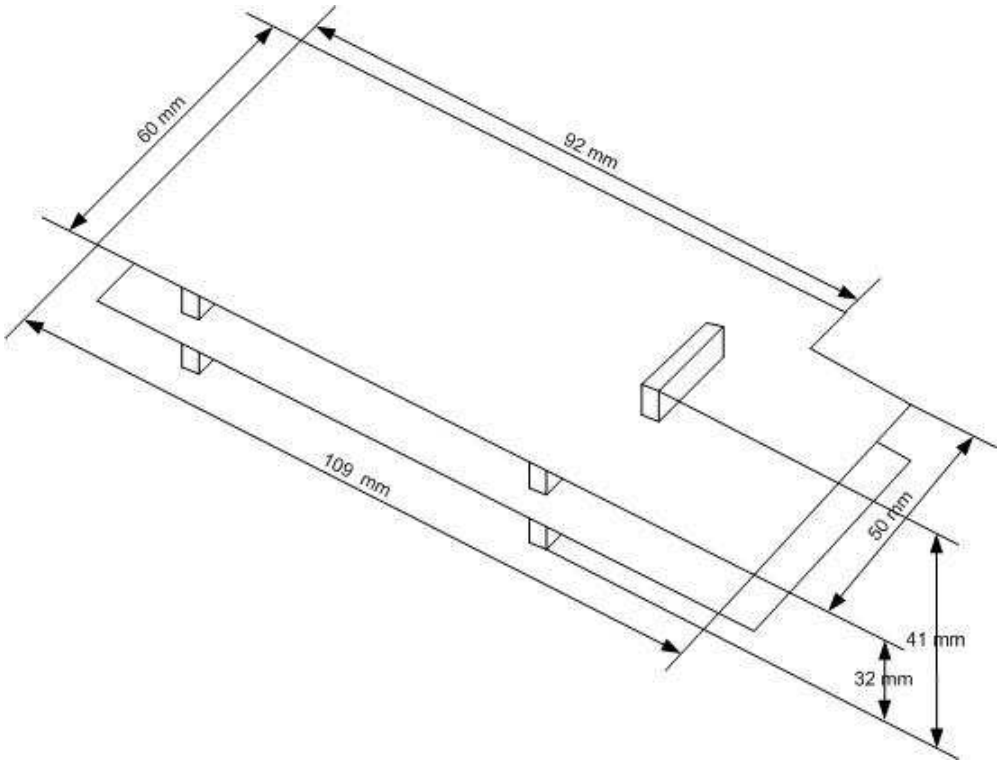


Figure 4: DSP add-on-boards (type Main and Extension) – board dimensions

**Programming and debugging**

For DSP-programming and –debugging the connector J5 can be used. It is a standard 14 pin TI JTAG connector. Figure 5 shows the connector pinout.

| | | | |
|---|---|---|---|
| TMS | 1 | 2 | TRST- |
| TDI | 3 | 4 | GND |
| +3,3V | 5 | 6 | no pin (key) |
| TDO | 7 | 8 | GND |
| TCK-RET | 9 | 10 | GND |
| TCK | 11 | 12 | GND |
| EMU0 | 13 | 14 | EMU1 |

Figure 5: J5, 14 Pin JTAG connector

If only the main board is used the DSP 1 is in the scan chain for the JTAG interface. The onboard CPLD detects if a second board is connected too. In this case only the JTAG connector on the extention-board can be used and all three DSP are in the scan chain for the JTAG interface.

## Integrated Devices

***TMS320C6474*** DSP from Texas Instruments

***XC2C256 CoolRunner-II*** CPLD from Xilinx

***AT24C1024B*** I²C-Prom from Atmel

***MT47H64M16*** DDR2 SDRAM 8 Meg x 16 x 8 banks from Micron

## Combination possible with the following IAF-Prototyping-Boards

***Rapid Prototyping Board Virtex-5*** FFP Basic+

More information:

http://www.iaf-bs.de/products/ffp-basic_plus.en.html

***Rapid Prototyping Board Virtex-II-Pro*** FFP Basic

More information:

http://www.iaf-bs.de/products/ffp-basic.en.html