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DIGITAL SIGNAL PROCESSING

MIRAGE-P510D

Dual-channel TMS320 DSP Emulator for PCI-bus Computers

User's Guide

covers:
MP510D rev.1B

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About this Document

This user's guide contains description for *MIRAGE-P510D* universal dual-channel MPSD/JTAG emulator for TI TMS320 DSP for PCI-bus personal computers.

This document does not include detail description neither for TI DSP nor for the corresponding software and applications. Please refer to the following original documentation:

1. ***MIRAGE-P510D and UECMX Universal TMS320 DSP Emulators for ISA-bus PC User's Guide***. MicroLAB Systems, 1999.
2. ***Code Composer C3x/C4x User's Guide***.   Texas Instruments Inc, USA, 1999
3. ***Code Composer Studio C5000 User's Guide***.   Texas Instruments Inc, USA, 2001
4. ***Code Composer Studio C6000 User's Guide***.   Texas Instruments Inc, USA, 2001

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Chapter 1.   Introduction

This chapter contains general description for *MIRAGE-P510D* universal dual-channel MPSD/JTAG emulator for TI TMS320 DSP for PCI-bus personal computers.

1.1   General information

MIRAGE-P510D universal dual-channel MPSD/JTAG emulator (fig.1-1) has been designed for emulation control of TI TMS320 DSP.

Fig.1-1.   MIRAGE-P510D dual-channel emulator with *MP510D/ECM* emulator expansion daughter-card module and MPSD and JTAG pods.

General construction

MIRAGE-P510D emulator installs into PCI-bus slot of host PC and comes either in one- or dual-channel configuration.

Each channel provides universal MPSD/JTAG emulation control for target TI TMS320 DSP. The *MIRAGE-P510D* emulator PCI-us plug-in mainboard itself includes one universal MPSD/JTAG emulation controller and expansion site for optional *MP510D/ECM* emulator expansion daughter-card module (DCM).

External MPSD or JTAG pods are used to connect *MIRAGE-P510D* and *MP510D/ECM* on-board emulation controller to target either MPSD or JTAG DSP on-chip emulation scan-path interface.

Supported DSP

MIRAGE-P510D universal dual-channel MPSD/JTAG emulator supports TI TMS320C30/C31/C32 DSP with on-chip MPSD emulation scan-path interface and TI TMS320VC33, TMS320C5xxx and TMS320C6xxx DSP with on-chip JTAG emulation scan-path interface.

CAUTION

Check with MicroLAB Systems for emulation support of other TI TMS320 DSP and mixed-platforms CPU using *MIRAGE-P510D* PCI-bus plug-in universal dual-channel MPSD/JTAG emulator.

General features

MIRAGE-P510D emulator offers a powerful set of features for development and debugging of TI TMS320 DSP based hardware and software:

- supports both TI MPSD (TMS320C3x) and TI JTAG (TMS320VC33//C5xxx/C6xxx and more coming…) scan-path interfaces
- provides up to two independent emulation channels when *MP510D/ECM* emulator expansion DCM is installed onto *MIRAGE-P510D* PCI-bus plug-in mainboard
- supports multiple devices in a single JTAG path
- includes 32-bit PCI-bus interface
- supported by power TI Code Composer and Code Composer Studio IDE debugging tools
- target TMS320 DSP emulation features:
  - reads/writes to the DSP on-chip registers and I/O ports
  - provides access to the DSP on/off-chip memory, performs program/data upload and download
  - supports software/hardware breakpoints
  - supports program profiling and execution time measurement
  - signal graphics
  - file I/O
  - many more …
- MPSD pod provides optional target TMS320C3x DSP RESET control for reliable emulation
- MPSD pod provides optional LED indicators for target TMS320C3x DSP chip POWER, CLOCK and RESET signals
- JTAG pod provides optional LED indicators for target DSP chip POWER and JTAG *TCK* and *TRST* signals
- MPSD and JTAG pods provide compatibility with all 3v/5v target TMS320 DSP
- MPSD and JTAG pods for *MIRAGE-P510D* emulator are compatible with those for MicroLAB Systems *UECMX*, *MIRAGE-510DX*, *MIRAGE-510D*, *MIRAGE-30D* scan-path emulators and connect to scan-path interface of target TMS320 DSP via interface headers, which are compatible with the corresponding headers for TI XDS510 scan-path emulator
- many more ...

Software development tools

MIRAGE-P510D emulator runs under the industry standard TI Code Composer and Composer Studio IDE debugging tools for Windows 95/98 and Windows NT/2000. All debuggers support debugging of target DSP software both in C and Assembly source codes.

Software development is supported by the corresponding TI Floating-Point or Fixed-Point DSP Optimizing C Compilers and Assembly Language Tools.

1.2   Host PC requirements

The following are minimum host PC requirements that should be matched for normal operation of *MIRAGE-P510D* emulator and TI Code Composer and Composer Studio IDE tools:

- host PC with Pentium CPU (Pentium III running at 500MHz or higher is recommended) and at-least one 32-bit PCI-bus slot for installation of *MIRAGE-P510D* emulator
- Windows 95/98/NT/2000 installed
- 32Mbyte of RAM (128Mbyte is recommended)
- CD-ROM drive for software installation
- at least 300 MB of free hard disk space
- SVGA or higher adapter (XGA is recommended)

1.3   Technical specifications

The following are technical specifications for *MIRAGE-P510D* emulator for the environment temperature +25°C.

Parameter description	*parameter value*
MIRAGE-P510D host PC interface	33MHz 32-bit PCI-bus
number of on-board MPSD/JTAG emulation control channels	1
number of sites for optional *MP510D/ECM* emulator expansion DCM	1
MIRAGE-P510D emulator power consumption (with two pods and *MP510D/ECM* DCM installed)	+5v@0.85A
dimensions of *MIRAGE-P510D* emulator mainboard	89x57 mm (3.5"x2.25") (half-size PCI-board)
temperature range	0..+50°C
external MPSD and JTAG pods:	
output high level with the load current I_{OH}=-48ma at all outputs	≥2v, TTL 3v compatible
output low level with the load current I_{OH}=48ma at all outputs	≤0.5v

input high level at all inputs	≥2v, TTL 5v compatible
input low level at all inputs	≤0.5v
length of connection cable between pod and *UECMX*	≥1m
length of connection cable for connection to scan-path interface of target DSP	≥0.1m
JTAG and MPSD pod dimensions	89x57x25 mm

Chapter 2.   Construction

This chapter contains information about construction for *MIRAGE-P510D* emulator and for MPSD and JTAG pods.

2.1   *MIRAGE-P510D* emulator and *MP510D/ECM* module

MIRAGE-P510D universal dual-channel MPSD/JTAG emulator for TI TMS320 DSP comprises of the following components:

- *MIRAGE-P510D* emulator PCI-bus plug-in mainboard
- optional *MP510D/ECM* emulator expansion daughter-card module (DCM)
- one or two MPSD or JTAG pods.

MIRAGE-P510D emulator can come in either single channel or dual-channel configuration with either one or two MPSD/JTAG pods correspondingly.

CAUTION

MIRAGE-P510D emulator is PCI-bus plug-in peripheral device and complies with Plug and Play PCI-bus requirements.

There is no configuration jumpers and switches neither on *MIRAGE-P510D* emulator mainboard, nor on the *MP510D/ECM* emulator expansion DCM.

MIRAGE-P510D emulator configuration setting and control are performed via host PC software.

MIRAGE-P510D mainboard

MIRAGE-P510D emulator PCI-bus plug-in mainboard (fig.2-1) has been designed to plug into any 32-bit PCI-bus slot of host PC and includes 32-bit 33MHz host PCI-bus interface, one universal MPSD/JTAG emulation control channel, and on-board expansion site for optional *MP510D/ECM* emulator expansion DCM.
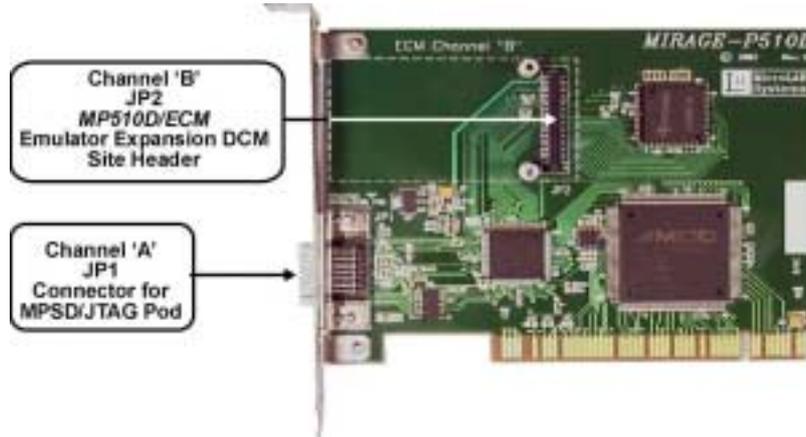
Fig.2-1.   MIRAGE-P510D emulator mainboard.

On-board universal MPSD/JTAG emulation controller of *MIRAGE-P510D* emulator mainboard provides emulation control of target TMS320 DSP (fig.2-2) with either MPSD (TMS320C3x) or JTAG (TMS320VC33, TMS320C5xxx, TMS320C6xxx, etc) DSP on-chip scan-path emulation interface via external MPSD or JTAG pod correspondingly (see corresponding section below in this chapter for detail information about JTAG and MPSD pods), which connects to *MIRAGE-P510D* emulator on-board JP1 connector (refer to fig.1-1 and fig.2-2). This comes as standard single-channel configuration of *MIRAGE-P510D* emulator.
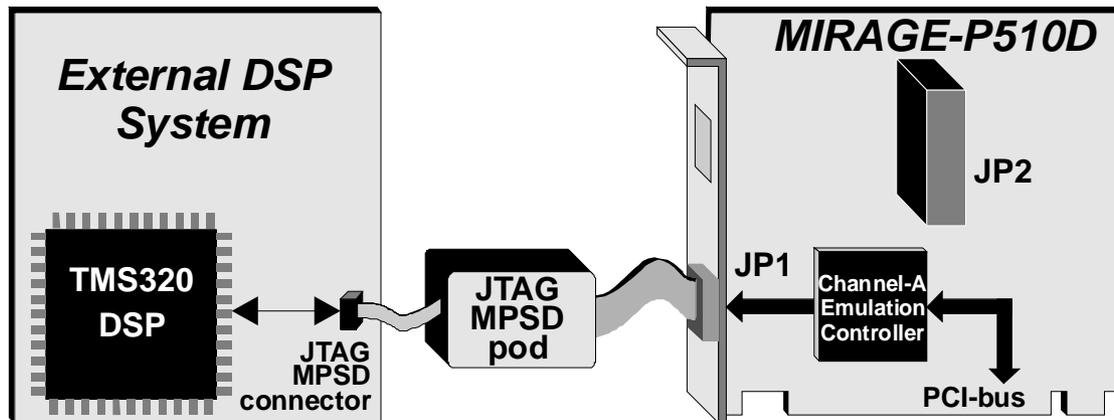
Fig.2-2.   Emulation control of target TMS320 DSP via on-board emulation controller of *MIRAGE-P510D* emulator mainboard.

Optional *MP510D/ECM* emulator expansion DCM with second MPSD or JTAG pod are used in case dual-channel configuration of *MIRAGE-P510D* emulator is required. *MP510D/ECM* emulator expansion DCM plugs into on-board JP2 expansion site of *MIRAGE-P510D* emulator mainboard and second MPSD or JTAG pod is connected directly to *MP510D/ECM* emulator expansion DCM.

MP510D/ECM emulator expansion DCM

MP510D/ECM emulator expansion DCM (fig.2-3) must be used for dual-channel expansion of *MP510D/ECM* emulator mainboard.
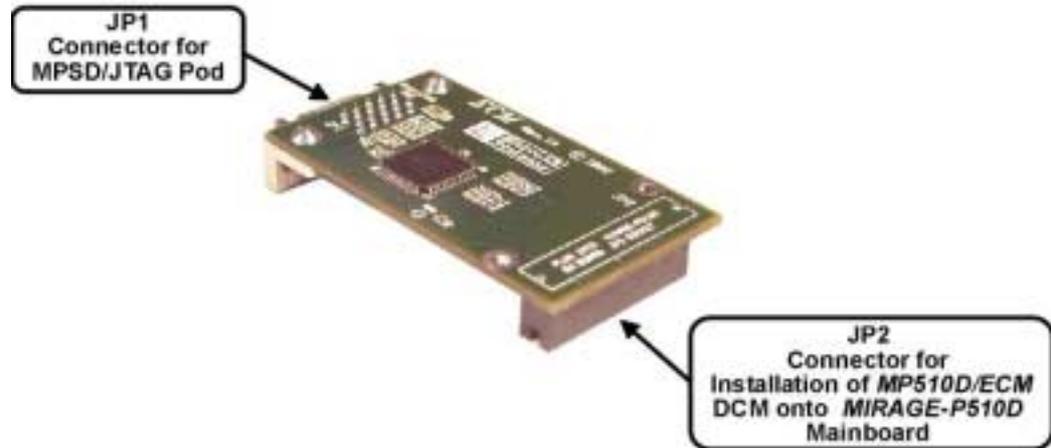
Fig.2-3. *MP510D/ECM* optional emulator expansion DCM for *MIRAGE-P510D* emulator.

MP510D/ECM emulator expansion DCM plugs into on-board JP2 expansion site of *MIRAGE-P510D* emulator mainboard. On-board universal MPSD/JTAG emulation controller of *MP510D/ECM* emulator expansion DCM provides emulation control of target TMS320 DSP (fig.2-4) with either MPSD or JTAG DSP on-chip scan-path emulation interface via external MPSD or JTAG pod correspondingly (see corresponding section below in this chapter for detail information about JTAG and MPSD pods), which connects to *MP510D/ECM* on-board JP1 connector (refer to fig.1-1 and fig.2-4). This comes as standard single-channel configuration of *MIRAGE-P510D* emulator.
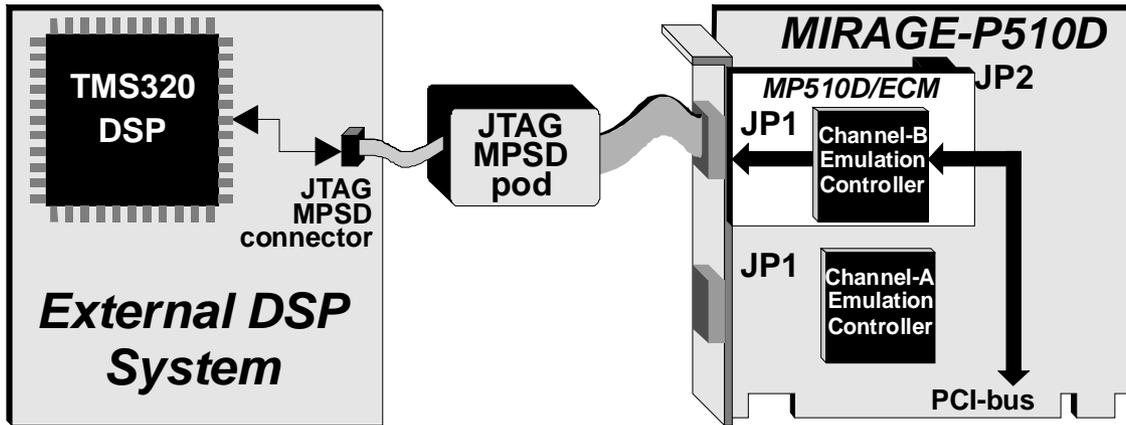
Fig.2-4. Emulation control of target TMS320 DSP via on-board emulation controller of *MP510D/ECM* emulator expansion DCM.

MPSD and JTAG pods

MPSD and JTAG pods, which are used for connection of on-board emulation controllers of *MIRAGE-P510D* emulator mainboard and *MP510D/ECM* emulator expansion DCM to external TI TMS320 DSP.

MPSD and JTAG pods used with *MIRAGE-P510D* emulator mainboard and *MP510D/ECM* emulator expansion DCM are the same pods, which have been used with *MIRAGE-510DX*, *MIRAGE-510D* and *MIRAGE-30D* dual-channel emulators for ISA-bus and *UECMX*, *UECM-30*, and *UECM* universal emulator DCM for *TORNADO* DSP systems from MicroLAB Systems. Both MPSD and JTAG pods provide compatibility with all 3v/5v target TMS320 DSP.

MPSD pod is used for emulation of external TMS320C3x (TMS320C30/C31/C32) DSP only. MPSD pod is connected to target TMS320C3x DSP via user supplied 12-pin male header that is compatible with that for TI XSD510 emulator.

JTAG pod is used for emulation of external TMS320C2xx/VC33/C4x/C5x/C54x/C6x/C8x DSP. JTAG pod is connected to target TMS320 DSP via user supplied 14-pin male header that is compatible with that for TI XSD510 emulator.

2.2   MPSD pod

MPSD pod (fig.2-5) is designed for connection between on-board emulation controller of *MIRAGE-P510D* emulator mainboard and *MP510D/ECM* emulator expansion DCM and scan-path interface of external target TMS320C3x (TMS320C30/C31/C32) DSP only.

Fig.2-5. MPSD pod.

CAUTION

No other TMS320 DSP except for TMS320C3x (TMS320C30/C31/C32) DSP allow connection of MPSD pod to DSP on-chip MPSD scan-path emulation interface.

Connection of MPSD pod to on-board emulation controllers of *MIRAGE-P510D* emulator mainboard and *MP510D/ECM emulator expansion DCM*

MPSD pod connects to on-board emulation controllers of *MIRAGE-P510D* emulator mainboard and *MP510D/ECM* emulator expansion DCM via the 20-pin connector at the end of the pod's shielded cable via the mounting bracket of *MIRAGE-P510D* mainboard. It plugs into JP1 on-board connector of *MIRAGE-P510D* emulator mainboard (fig.2-2) or into JP1 on-board connector of *MP510D/ECM* emulator expansion DCM (fig.2-4).

Connection of MPSD pod to scan-path interface of target TMS320C3x DSP

MPSD pod connects to scan-path emulation interface of target TMS320C3x DSP via 12-pin dual-row male header, which should be provided on the target TMS320C3x DSP based equipment and should be compatible with that for connection of TI XDS510 scan-path emulator. Scan-path signals specifications are identical to those for TI XDS510 scan-path emulator. MPSD pod provides compatibility with all 3v/5v target TMS320C3x DSP.

Fig. 2-6 shows pinout of the MPSD 12-pin male header for target TMS320C3x DSP based equipment for connection to MPSD pod.

```
                                              ┌──────────────────────┐
 Header dimensions:                   EMU1    │ •  1      2 • │  GND
                                              │              │
 pin-to-pin spacing:     0.1" x 0.1"  EMU0    │ •  3      4 • │  GND
 pin width:              0.025" x 0.025"      │              │
 pin length:             0.235"       EMU2    │ •  5      6 • │  GND
                                              │              │
                                      PD(+5V) │ •  7    ▓▓▓▓  │  No pin (key)
                                              │              │
                                      EMU3    │ •  9     10 • │  GND
                                              │              │
                                       H3     │ • 11     12 • │  GND
                                              └──────────────────────┘
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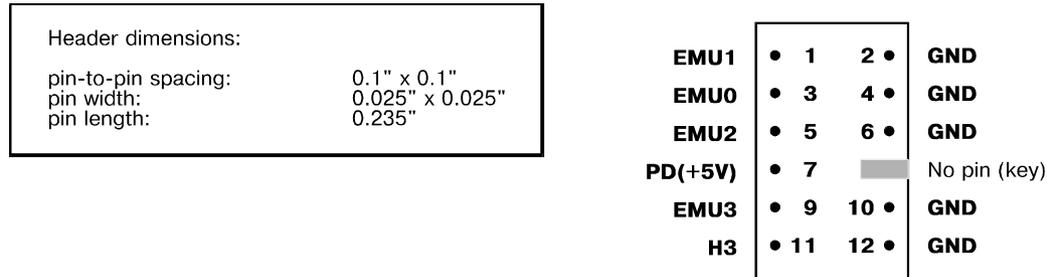
Fig.2-6.   Pinout of male header for attachment of MPSD pod to scan-path emulation interface of target TMS320C3x DSP (top view).

For more information about MPSD scan-path emulation interface signals of TMS320C3x DSP refer to original technical documentation from TI.

RESET signal control for target TMS320C3x DSP

MPSD pod provides optional facility for remote control of RESET signal for target TMS320C3x DSP chip. This has approved to increase reliability of scan-path emulation control of target TMS320C3x DSP chip.

CAUTION

MPSD pod supports generation of RESET signal for
target TMS320C3x DSP only.

MPSD pod provides 2-pin female connector (see fig.2-6) that includes two reset signals of opposite polarities (*RESET* and $\overline{RESET}$), which might be connected to the target TMS320C3x DSP hardware in order to provide control of target TMS320C3x DSP reset signal.

CAUTION

MPSD pod generates target TMS320C3x DSP reset signal of opposite polarities (*RESET*
and $\overline{RESET}$).

Actual selection of target DSP RESET signal polarity should be done by user in accordance
with schematics of target hardware.

RESET and $\overline{RESET}$ outputs of MPSD pod provide the load current 48 ma for both high and low output 3v/5v TTL compatible signal levels.

Indication of target TMS320C3x DSP status

For user convenience, MPSD pod provides LED indicators for the following signals:

- *'ACTIVE'* LED indicates activity of MPSD pod and is always on in case MPSD pod is connected to *MIRAGE-P510D* emulator mainboard or *MP510D/ECM* emulator expansion DCM.
- *'T-POWER'* LED indicates validity of target TMS320C3x power supply. In case the '*T-POWER'* LED has continuous green lighting, then the power is applied to target DSP. In case this LED blinks, then no power is applied to target DSP.
- *'T-CLOCK'* LED indicates validity of target H3 output clock. When H3 target clock is absent or not connected to MPSD pod interface header, then no scan-path emulation control of target TMS320C3x DSP chip is available.
- *'T-RESET'* LED indicates activity of optional target RESET signal generated by emulation controller of *MIRAGE-P510D* emulator mainboard or *MP510D/ECM* emulator expansion DCM.

2.3   JTAG pod

JTAG pod (fig.2-5) is designed for connection between on-board emulation controller of *MIRAGE-P510D* emulator mainboard and *MP510D/ECM* emulator expansion DCM and scan-path interface of external target TMS320 DSP with JTAG scan-path emulation interface (TMS320C2xx/VC33/C4x/C5x/C54x/C6x/C8x).

Fig.2-7. JTAG pod.

CAUTION

No other TMS320 DSP except for TMS320 DSP with on-chip JTAG scan-path emulation interface allow connection of JTAG pod to DSP on-chip JTAG scan-path emulation interface.

Connection of JTAG pod to on-board emulation controllers of MIRAGE-P510D emulator mainboard and MP510D/ECM emulator expansion DCM

JTAG pod connects to on-board emulation controllers of *MIRAGE-P510D* emulator mainboard and *MP510D/ECM* emulator expansion DCM via the 20-pin connector at the end of the pod's shielded cable via the mounting bracket of *MIRAGE-P510D* mainboard. It plugs into JP1 on-board connector of *MIRAGE-P510D*

emulator mainboard (fig.2-2) or into JP1 on-board connector of *MP510D/ECM* emulator expansion DCM (fig.2-4).

Connection of JTAG pod to scan-path interface of target TMS320 DSP

JTAG pod connects to scan-path emulation interface of target TMS320 DSP via 14-pin dual-row male header, which should be provided on the target TMS320 DSP based equipment and should be compatible with that for connection of TI XDS510 scan-path emulator. Scan-path signals specifications are identical to those for TI XDS510 scan-path emulator. JTAG pod provides compatibility with all 3v/5v target TMS320 DSP.

Fig. 2-8 specifies pinout of the JTAG 14-pin male header for target TMS320 DSP based equipment for connection to JTAG pod.

Header Dimensions:		
pin-to-pin spacing:	0.1" x 0.1"	
pin width:	0.025" x 0.025"	
pin length:	0.235"	

Signal	Pin	Pin	Signal
TMS	• 1	2 •	T̅R̅S̅T̅
TDI	• 3	4 •	GND
PD (+5V)	• 5		No pin (key)
TDO	• 7	8 •	GND
TCK_RET	• 9	10 •	GND
TCK	• 11	12 •	GND
EMU0	• 13	14 •	EMU1
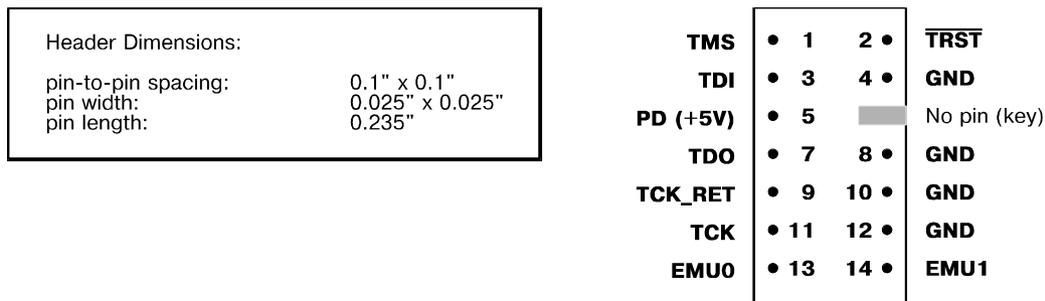
Fig.2-8. Pinout of male header for connection of JTAG pod to scan-path emulation interface of target TMS320 DSP (top view).

For more information about JTAG scan-path emulation interface signals of TMS320 DSP refer to original technical documentation from TI.

Setting terminators for TDO and TCK_RET JTAG signals

JTAG pod provides optional facility for setting 220/270 Ohm parallel resistor terminators for *TDO* and *TCK_RET* JTAG scan-path signals. This delivers noise reduction and increase reliability of JTAG operation, however this requires high-current output drivers in the target hardware, and might be not applicable for all designs. To get more information about signal terminators for *TDO* and *TCK_RET* JTAG signals refer to section *"XDS510 Emulator Design Considerations"* of the corresponding TI TMS320 User's Guide.

In order to set terminators for *TDO* and *TCK_RET* JTAG signals you have to use buttons #3 and #4 of DIP-switch, which is located at the bottom of JTAG pod.

Table 2-2. Setting resistor terminators for *TDO* and *TCK_RET* JTAG signals in JTAG pod.

DIP-switch of JTAG pod	state of the button	description
button #4	OFF	resistor terminator 220/270 Ohm for signal *TDO* is off
	ON	resistor terminator 220/270 Ohm for signal *TDO* is on
button #3	OFF	resistor terminator 220/270 Ohm for signal *TCK_RET* is off
	ON	resistor terminator 220/270 Ohm for signal *TCK_RET* is on

Notes: The highlighted configurations correspond to default factory settings.

Setting active edge of TCK_RET clock signal for clocking TMS and TDI JTAG signals

JTAG pod provides optional facility for setting active edge of *TCK_RET* clock signal that is used for clocking *TMS* and *TDI* JTAG scan-path signals. This facility allows to increase clocking frequency of JTAG path and increase its performance. Default clocking edge is the rising edge of *TCK_RET* clock. To get more information about clocking of *TMS* and *TDI* JTAG signals refer to section *"XDS510 Emulator Design Considerations"* from the corresponding TI TMS320 User's Guide.

In order to set active edge of *TCK_RET* clock signal for clocking *TMS* and *TDI* JTAG signals you have to use buttons #1 and #2 of DIP-switch, which is located at the bottom of JTAG pod.

Table 2-3. Setting active edge of *TCK_RET* clock for clocking *TMS* and *TDI* JTAG signals in JTAG pod.

Button #1 of DIP-switch in JTAG pod	button #2 of DIP-switch in JTAG pod	description
OFF	OFF	Reserved (do not use)
OFF	ON	Rising edge of *TCK_RET* is used to clock *TMS* and *TDI* signals. This configuration should be set when *UECMX* is configured for TI XDS510 emulation compatibility mode.
ON	OFF	Falling edge of *TCK_RET* is used to clock *TMS* and *TDI* signals.
ON	ON	Reserved (do not use)

Notes: The highlighted configuration corresponds to the factory settings.

Indication of target DSP status

For user convenience, JTAG pod includes LED indicators for the following signals:

- *'ACTIVE'* LED indicates activity of MPSD pod and is always on in case JTAG pod is connected to *MIRAGE-P510D* emulator mainboard or *MP510D/ECM* emulator expansion DCM.
- *'T-POWER'* LED indicates validity of target DSP power supply. In case '*T-POWER'* LED has continuous green lighting, then the power is applied to target DSP. In case this LED blinks, then no power is applied to target DSP.
- *'TCK_RET'* LED indicates validity of JTAG path clock. When JTAG return path clock is absent or not returned back to JTAG pod interface header, then no scan-path emulation control of target DSP is available.
- *'TRST'* LED indicates activity of JTAG path RESET signal generated by emulation controller of *MIRAGE-P510D* emulator mainboard or *MP510D/ECM* emulator expansion DCM.

Chapter 3.   Installation

This chapter contains instructions for installation of *MIRAGE-P510D* emulator and how to connect *MIRAGE-P510D* emulator and *MP510D/ECM* emulator expansion DCM to target TMS320 DSP.

3.1   Installation of *MP510D/ECM* emulator expansion DCM onto *MIRAGE-P510D* mainboard

MP510D/ECM emulator expansion DCM must be installed onto *MIRAGE-P510D* emulator mainboard in case dual-channel configuration of *MIRAGE-P510D* emulator is required.

MP510D/ECM emulator expansion DCM installs into on-board JP2 expansion connector site of *MIRAGE-P510D* emulator mainboard (refer to fig.2-1). Figure 3-1 demonstrates installation of *MP510D/ECM* emulator expansion DCM must be installed onto *MIRAGE-P510D* emulator mainboard.

The following are general guides for installation of *MP510D/ECM* emulator expansion DCM must be installed onto *MIRAGE-P510D* emulator mainboard:

- slant *MP510D/ECM* emulator expansion DCM
- insert *MP510D/ECM* emulator expansion DCM on-board connector JP1 for connection to external pod into the corresponding hole at *MIRAGE-P510D* mounting bracket
- plug in *MP510D/ECM* emulator expansion DCM male header into the JP2 expansion female connector site on *MIRAGE-P510D* mainboard
- screw-in the *MP510D/ECM* emulator expansion DCM to the *MIRAGE-P510D* mainboard using two supplied screws.
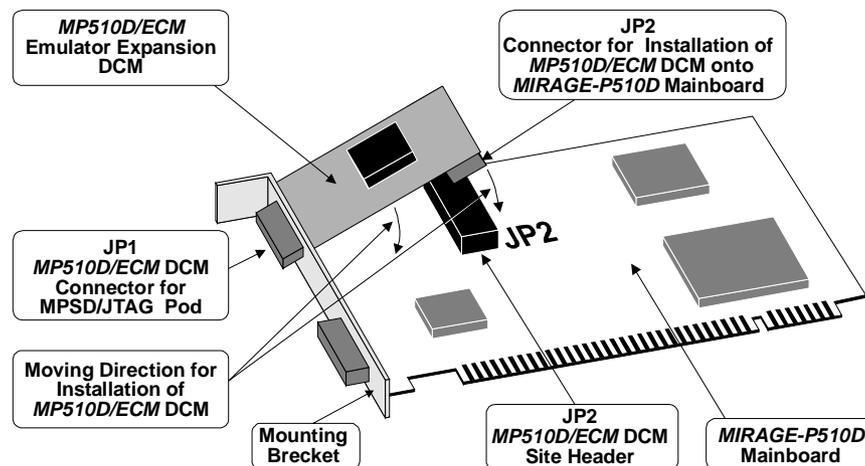

Fig.3-1. Installation of *MP510D/ECM* emulator expansion DCM onto *MIRAGE-P510D* mainboard.

3.2   Connection of MPSD/JTAG pod to *MIRAGE-P510D* emulator and *MP510D/ECM* emulator expansion mainboard

The following are general guides for connection of MPSD or JTAG pod to JP1 on-board connector of *MIRAGE-P510D* emulator mainboard or JP1 on-board connector of *MP510D/ECM* emulator expansion DCM:

- switch off power of host PC where *MIRAGE-P510D* emulator mainboard is installed
- install *MIRAGE-P510D* emulator mainboard into PCI-bus slot of host PC and screw-in the mounting bracket of *MIRAGE-P510D* emulator mainboard to the rear panel of host PC
- insert the 20-pin on-cable connector of MPSD or JTAG pod into the corresponding pod plug-in connector of either *MIRAGE-P510D* emulator mainboard or *MP510D/ECM* emulator expansion DCM and ensure that it has been fixed by hearing the typical sound click
- switch on power of host PC
- Connect MPSD or JTAG pod to scan-path interface of target TMS320 DSP.

Chapter 4.   Utility Software

This chapter contains information about utility software for *MIRAGE-P510D* emulator and how to configure TI Code Composer Studio debug tools in order to run with *MIRAGE-P510D* emulator hardware.

4.1   Utility software

MIRAGE-P510D emulator has been designed to run under TI Code Composer and Code Composer Studio debug tools, so its control is performed completely automatically via the corresponding software drivers for TI Code Composer and Code Composer Studio.

```
                          CAUTION

  MIRAGE-P510D emulator is PCI-bus plug-in peripheral device and complies with Plug and
                      Play PCI-bus requirements.

           There is no user configurable parameters and control settings
                          for MIRAGE-P510D emulator.
```

The only utility software provided for *MIRAGE-P510D* emulator is the *MP510D_LIST.EXE MIRAGE-P510D* emulator list utility, which must be used to view a list and configuration of installed *MIRAGE-P510D* emulators and to obtain logical ID for each of available emulation control channels. Emulation channel ID is required in order to configure TI Code Composer configuration tools to run with this emulation channel.

Installation of utility software

In order to install utility software for *MIRAGE-P510D* emulator, follow instructions provided in the utility software installation directory on MicroLAB Systems CD. Utility software for *MIRAGE-P510D* emulator runs under Windows 9x, Windows NT and Windows 2000.

Running utility software

MP510D_LIST.EXE MIRAGE-P510D emulator list utility has been designed to be invoked from command line prompt window of Windows:

MP510D_LIST

Provided display output contains list for all detected *MIRAGE-P510D* emulator and available emulator channels. Emulator channel ID, external pod configuration, power loss detector and is provided for each available emulator channel, as well as the PCI-bus number and PCI-bus slot numbers are provided for each detected *MIRAGE-P510D* emulator.

Emulator channel ID

Utility software and TI Code Composer Studio debug tools are using logical emulator channel ID in order to address particular *MIRAGE-P510D* emulator channel from all detected in host PC.

The following are general rules for how emulator channel ID is being processed by utility software and TI Code Composer debug tools:

- Emulation channel ID are numbered starting from the '0' value.
- Two succeeding emulator channel ID are reserved for each *MIRAGE-P510D* emulator. The even value is used for identifying on-board emulation channel of *MIRAGE-P510D* emulator mainboard. The odd value is reserved for identifying on-board emulation channel of *MP510D/ECM* emulator expansion DCM, which comes valid only in case *MP510D/ECM* emulator expansion DCM is installed.
- Emulation channel ID equal to the '0' value is assigned to on-board emulation channel of *MIRAGE-P510D* emulator mainboard, which is installed into the PCI-bus slot with the lowest number. Note, that PCI-bus slots are typically numbered from left to right if looking from the front panel of opened host PC compartment.

4.2   Configuring TI Code Composer debug tools for running with *MIRAGE-P510D* emulator

MIRAGE-P510D emulator has been designed to run under TI Code Composer and Code Composer Studio debug tools using compatible driver provided by MicroLAB Systems.

CAUTION

MIRAGE-P510D emulator driver for TI C5xxx/C6xxx Code Composer Studio debug tools runs with Code Composer Studio version 2.0 and later.

Installation of MIRAGE-P510D driver for TI Code Composer and Composer Studio debug tools

In order to install *MIRAGE-P510D* compatible driver for TI Code Composer and Composer Studio debug tools, follow instructions provided in the Code Composer driver installation directory on MicroLAB Systems CD. *MIRAGE-P510D* compatible driver for TI Code Composer and Composer Studio debug tools runs under Windows 9x, Windows NT and Windows 2000.

Configuring TI Code Composer and Code Composer Studio debug tools to run with MIRAGE-P510D hardware

TI Code Composer and Code Composer Studio debug tools are using the corresponding Code Composer configuration tool (*CC_SETUP.EXE* utility) in order to select the emulator, which will be used to run Code Composer or Code Composer Studio debug tools.

The following are general rules for how to configure Code Composer and Code Composer Studio debug tools to run with *MIRAGE-P510D* hardware via Code Composer configuration tool (*CC_SETUP.EXE*):

- Run *MP510D_LIST.EXE MIRAGE-P510D* emulator list utility (refer to section 4.1) and obtain emulation channel ID for particular emulator channel, which will be used to run Code Composer and Code Composer Studio IDE.
- Run *CC_SETUP.EXE* Code Composer configuration tool and follow instructions provided with the installed *MIRAGE-P510D* compatible driver in the Code Composer driver installation directory on MicroLAB Systems CD.