

## Overview

The XJAPI gives you low-level access to the JTAG chain via either the XJLink or the PXI hardware, allowing easy integration with a wide range of other systems such as development/evaluation boards, test systems...

**The USB to JTAG hardware and software interface** is composed of a high-speed USB to JTAG hardware module (XJLink) and a simple-to-use DLL Application Program Interface (XJAPI) designed to allow you to access and control the JTAG chain directly.

**The PXI to JTAG hardware and software interface** is composed of a high speed PXI to JTAG hardware module (PXI-01) and the same simple-to-use DLL API (XJAPI).

## XJAPI functions

### Initialising & Terminating

#### XJAPI\_HardwareSetup

Function to set up the hardware and the pin mapping, the desired frequency, and whether power should be applied to the board.

#### XJAPI\_HardwareRelease

The function to release the hardware should be called before exiting.

#### XJAPI\_SetPinMap

Function to set the pin map. Allows you to assign any JTAG function to any of the 16 configurable pins.

### Low Level JTAG Access

#### XJAPI\_SetFrequency

Function to set TCK frequency -between 100kHz and 60MHz.

#### XJAPI\_TmsReset

Function to apply a TMS reset.

#### XJAPI\_GotoState

Function to go to a specific JTAG TAP state.

#### XJAPI\_SetEndState

Function to set the final TAP state that the system goes to after a DR or IR scan operation.

#### XJAPI\_ClockChain

Function to clock the JTAG chain a specific number of times.



USB to JTAG interface

### High Level Scan functions

#### XJAPI\_Scan

Function to execute a JTAG DR/IR scan cycle. By default, it will leave the system in the JTAG\_IDLE state after the scan. To specify a different end state, use XJAPI\_SetEndState.

#### XJAPI\_ScanMultiple

Function to implement multiple scans. This function is used to scan multiple (nScans) chains of mixed type (DR and IR scans) and of mixed length.

### Miscellaneous functions

#### XJAPI\_AutoSkew

Function to automatically compensate for clock skew for the current TCK frequency.

#### XJAPI\_GetLastError

#### XJAPI\_GetVersion

#### XJAPI\_ReadPins

#### XJAPI\_SetPins

#### XJAPI\_SetTrst

#### XJAPI\_Shutdown

#### XJAPI\_Startup

#### XJAPI\_Trst



PXI to JTAG interface

## Key Benefits

- Faster communication / download USB (480 Mbps), JTAG (60 Mbps peak)
- USB to JTAG: Small, lightweight, portable hardware design — ideal for lab and field work
- PXI to JTAG form factor also available: fully software compatible with the USB to JTAG version (3U/32 bit PXI/c PCI bus interface)
- Self-contained licence allowing you to use the XJTAG system on multiple machines
- Can be used with any pinout, ARM, Xilinx, Altera, etc.
- Easily customisable

## Features

- JTAG/IEEE 1149.x compliant
- High speed USB 2.0 interface (480 Mbps), backwards compatible with USB 1.0 & 1.1
- USB bus-powered (no external PSU)
- Can supply power to the target board (3.3V, <100 mA)
- TCK clock frequencies up to 60 MHz
- Adjustable JTAG signal termination
- Automatic signal skew control
- Software configurable pin mapping
- JTAG signals are +5V tolerant
- Spare signals on JTAG connector can be used to control other items e.g. hold a board in reset / turn on a PSU
- Provided with all needed files, libraries and an application example
- Designed to be used in C or C++ applications
- XJDemo board available
- Runs on Windows 7 / XP / Vista

## XJAPI Data types

### JTAG\_STATE

This enumeration defines the possible states for the JTAG TAP controller as defined in the IEEE 1149.1 specification.

### XJAPI\_ERROR

This enumeration contains error codes that can be returned from the various API functions.

### XJAPI\_PIN\_DEF

This structure is used to define an individual pin in a user-defined pinmap.

### XJAPI\_PIN\_DRIVE

Enumeration of the two different pin output impedance values.

### XJAPI\_PIN\_TYPE

Enumeration of the 8 different pin types available when creating a user-defined pinmap.

### XJAPI\_PINMAP

Enumeration of the different standard or user-defined pinmaps. Used as an argument to the `XJAPI_HardwareSetup` and `XJAPI_SetPinMap` functions.

### XJAPI\_SCAN\_TYPE

An enumeration of the different scan types available. Used as an argument to `XJAPI_Scan` and `XJAPI_ScanMultiple` functions.

### XJAPI\_USER\_MAP

A datatype for describing a user-defined pinmap.

## Supplied files

### xjapi.h

Header file describing the XJAPI functions and datatypes.

### jtag.h

Header file with the states defined in IEEE 1149.1 JTAG specification.

### xjapi.dll, hwif.dll, common.dll

The DLLs required to use XJAPI.

### xjapi.lib

The XJAPI import library in COFF format (used by Microsoft Visual Studio).

### xjapi\_omf.lib

The XJAPI import library in OMF format (used by Borland's C/C++ compilers).

### xjapi\_example.c

C code example demonstrating how to use most of XJAPI's functionality (works on XJDemo board for validation).

## Broadcom Videocore® platform

Application example using the USB to JTAG HW & SW interface (courtesy of Broadcom).



Broadcom Corporation - XJTAG - Windows Internet Explorer

http://www.broadcom.com/products/software/mobmm\_xjtag.php

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- WIRELESS LAN

**XJTAG**

**Hardware tools (Tools for JTAG integration with the Debugging environment)**

Every Broadcom Development system comes with a USB XJTAG solution. This advanced and easy to use test and debug suite enables the user to download code from the software toolchain to a VideoCore device.

Debugging on the VideoCore® platform is extremely easy. Each Development Kit includes a USB JTAG device. This links a PC to the JTAG interface on a Development System or on your target circuit board. It is physically small and is simple to install and use, due to the USB plug and play ability.

The device fully integrates with the Development Toolchain, making it very easy to single step, set breakpoints, set watches, and more on a circuit using a VideoCore device. In addition, it can integrate with Xilinx parallel, Altera ByteBlaster®, ARM MultiICE®, or any other pin out currently in use.

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