XA-XTAG4 DATASHEET

XM-014675-DS

2022-10-05

IN THIS DOCUMENT

INTRODUCTION

The XA-XTAG4 debug adapter allows load, run and debug of firmware on XMOS processors. Connection to the host, running the XMOS XTC development tools, is via USB, connection to the target is via the xSYS2 interface.

The xcore-200 and xcore.ai target devices are supported.

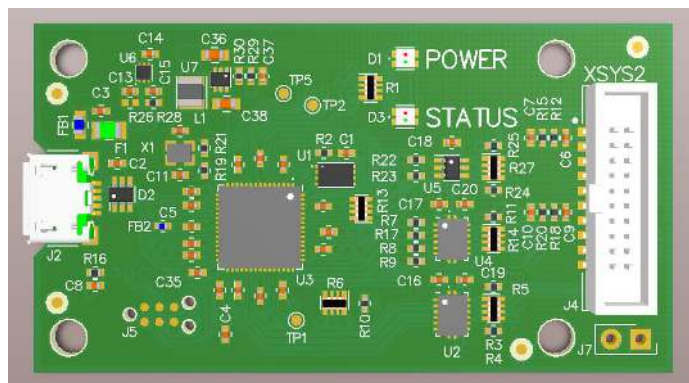The diagram below shows the layout of the components on the card.

Fig. 1: XA-XTAG4 board

To debug a board with the XA-XTAG4 you must use XTC Tools 15.1 or later, available from the XMOS website: https://www.xmos.ai/software-tools/

The target board should have an XMOS xSYS2 connector fitted. Details of the this connector can be found in the XU316 datasheets.
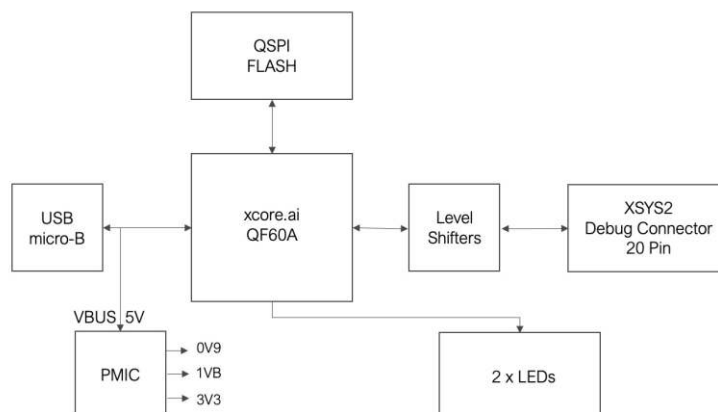
XTAG BLOCK DIAGRAM

Fig. 2: Block diagram of XTAG4 board

XU316-1024-QF60A DEVICE

The XA-XTAG4 is based on the XU316-1024-QF60A device comprising two xCORE tiles comprising a multicore microcontroller with tightly integrated general purpose I/O pins and 1024 KBytes of on-chip RAM. The firmware configures the device as a high speed USB device with data connections to the target through JTAG and the XSCOPE XMOS Link.

STATUS INDICATORS

Two LEDs on the XTAG are driven by the debugger POWER and STATUS with their function shown below:

POWER indicator:

INDICATION	MEANING
Green	xtag is powered up and firmware is running
Off	xtag is unpowered or downloading xtag firmware

STATUS indicator:

INDICATION	MEANING
Green	Connected and xcores are running
Amber	Connected and xcores are in their debug mode
Off	No current xgdb/xrun connection to target

XSYS2 CONNECTOR (J4)

The XA-XTAG4 includes an xSYS2 20-way IDC header, which can be used to connect it to an XMOS development board for debugging programs on the hardware.

The signals interfacing to the target are split into two groups, JTAG and LINK. Each group can have different signalling levels as defined by the voltage on the VREF_JTAG and VREF_LINK pins which are sourced from the target board. xcore-200 devices should use 3.3V for both groups. xcore.ai devices should use 1.8V for the JTAG group and 1.8V or 3.3V for the LINK group dependent on the target hardware.

PIN NO.	SIGNAL NAME	DIRECTION	ASSOCIATED VREF	DESCRIPTION

1	VREF_JTAG	Target to xtag	-	Voltage reference for JTAG, Reset and GPIO. This is the interfacing voltage level used for the JTAG interface. Must be provided by the target board. 0.8V to 3.6V.
2	TMS	xtag to Target	VREF_JTAG	JTAG Test Mode Select signal to the target.
4	TCK	xtag to Target	VREF_JTAG	JTAG Test Clock signal to the target.
6	TDO	Target to xtag	VREF_JTAG	JTAG Test Data Output from the target.
8	TDI	xtag to Target	VREF_JTAG	JTAG Test Data Input signal to the target.
10	RST_N	Output	VREF_JTAG	Reset signal to the target. Active Low. Open-Drain. This is also sampled by the xtag to sense if the target is in reset.
11	VREF_LINK	Target to xtag	-	Voltage reference for the XMOS Link (used for xScope). Must be provided by the target board. 0.8V to 3.6V.
12	XL_DN1	xtag to Target	VREF_LINK	Downstream (from xtag) XMOS link wire 1.
14	XL_DN0	xtag to Target	VREF_LINK	Downstream (from xtag) XMOS link wire 0.
16	XL_UP0	Target to xtag	VREF_LINK	Upstream (to xtag) XMOS link wire 0.
18	XL_UP1	Target to xtag	VREF_LINK	Upstream (to xtag) XMOS link wire 1.
20	GPO	Output	VREF_JTAG	Multipurpose GPIO. Open-Drain.
3,5,7,9,13,1 5,17,19	GND	`GND	Signal/Power Ground.

The interface can also be used with a smaller 10 pin connector which only connects pins 1-10. This does not connect the XMOS link so does not have xScope functionality. See the XU316 datasheet for futher information.

XSYS2 CABLE

A ribbon cable is required for connection to the target board. The connector on the XTAG4 accepts a 20 way, 0.05"/1.27mm pitch connector An appropriate length is 150mm.

Fig. 3 – Debug adapter cable

A suitable cable assembly can be obtained from DigiKey:

 https://www.digikey.com/product-detail/en/harwin-inc/M50-9101042/952-2662-ND/3922577

FURTHER INFORMATION

	LINK
XU316 (xcore.ai)	https://www.xmos.ai/xcore-ai/
XTC Tools User Guide	https://www.xmos.ai/file/tools-user-guide
XTC Programming Tools	https://www.xmos.ai/software-tools

REVISION HISTORY

DOCUMENT VERSION	RELEASE DATE	CHANGE DESCRIPTION
XM-014675-DS-1	2022-07-13	First Release

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