IAR Embedded Workbench®

JTAGjet™-Trace and JTAGjet™-Trace-CM

User Guide

for Advanced RISC Machines Ltd's

ARM® Cores

IAR SYSTEMS

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Contents

JTAGjet-Trace and JTAGjet-Trace-CM

This guide describes the JTAGjet-Trace and JTAGjet-Trace-CM in-circuit debugging probes. More specifically, this means:

- Introduction
- Working with JTAGjet-Trace
- Technical specifications.

When, in this guide, we refer to JTAGjet-Trace, the text also applies to JTAGjet-Trace-CM, unless otherwise stated.

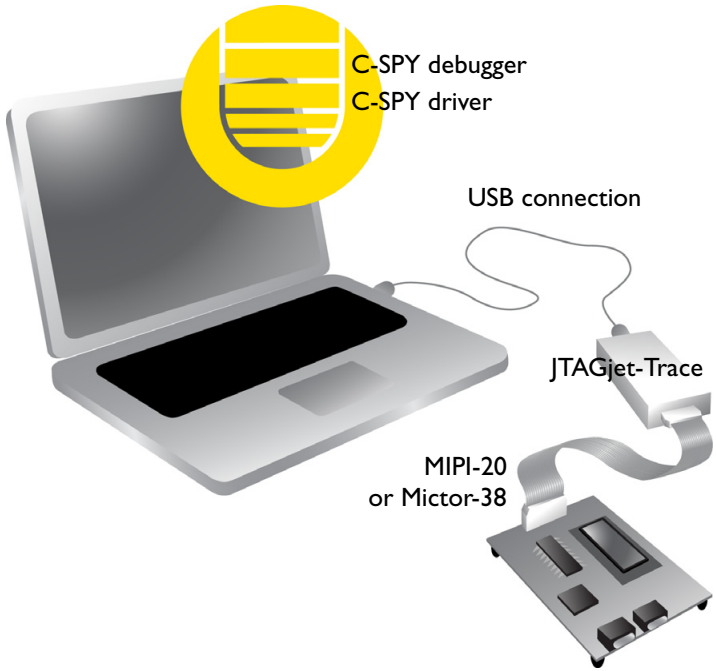
Introduction

This section gives a short overview of the JTAGjet-Trace in-circuit debugging probe. More specifically, this means:

- The JTAGjet-Trace in-circuit debugging probe
- Target connections.

THE JTAGJET-TRACE IN-CIRCUIT DEBUGGING PROBE

JTAGjet-Trace is an in-circuit debugging probe, which connects to the target board via a MIPI-20 or Mictor-38 connection, and to the host PC via the USB port.



The difference between the two debugging probes is that JTAGjet-Trace supports all ARM/Cortex cores and JTAGjet-Trace-CM is limited to support the Cortex-M family only.

TARGET CONNECTIONS

Trace data can be collected from the target board using one of these connectors:

- MIPI-20, a 20-pin high density (0.05 × 0.05 inch spacing) connector
- Mictor-38, a 38-pin ETM high-speed connector (not included with JTAGjet-Trace-CM).

The MIPI-20 connector is the standard connector for Cortex-M devices with ETM trace. The Mictor 38-pin connectors are standard for the ARM7, ARM9, ARM11, and CortexR/A devices, because they feature a wider trace bus (up to 16 bits) and faster ETM clock speeds.

Working with JTAGjet-Trace

This section describes how to work with JTAGjet-Trace.

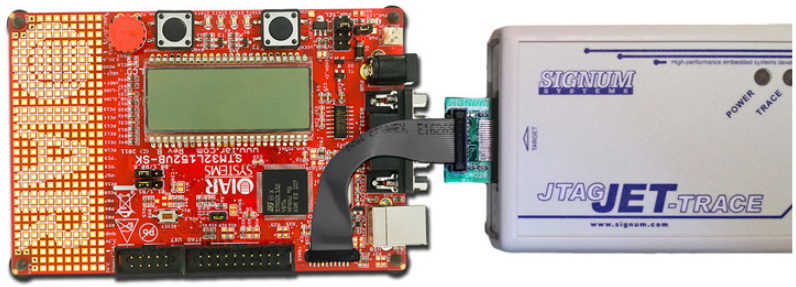
For information about debugging using JTAGjet-Trace, see the *C-SPY® Debugging Guide for ARM*.

CONNECTING JTAGJET-TRACE-CM TO A CORTEX-M BOARD

It is highly recommended to use the shrouded MIPI-20 connectors (like SAMTEC FTSH-110-01-L-DV-K) on your own boards to eliminate bad connections and to make the insertions easier.

Beware of static electricity. Handle any exposed system elements in a static-free environment.

1. Make sure the JTAGjet-Trace-CM debugging probe and the target board are turned off and that the USB cable is disconnected.
2. Connect the ADA-ETM-MIPI20 adapter to the Mictor-38 connector on the front panel of the debugging probe, and then connect the MIPI-20 flat cable between the adapter and the 20-pin TRACE connector on the target board.



Some Cortex-M target boards might have 20-pin TRACE connectors in which pin 7 is not removed. On such boards, it is necessary to remove pin 7, because the trace cable is keyed and cannot be inserted if pin 7 is there.

3. Connect the MIPI-20 cable to the MIPI-20 connector on the target board. Make sure that the location and orientation of the connectors are correct.
4. Make sure to always connect the power supply to the debugging probe before connecting the USB cable. The debugging probe has no power switch and will power up as soon as the AC adapter is plugged in. When the power is applied, the POWER LED on the debugging probe is lit.

5 Connect the debugging probe to a PC using the supplied USB cable. The probe will be recognized by the USB driver automatically.

6 Power up the target board. For reliable operation, the target board should be powered after the debugging probe has been powered up.

Technical specifications

This section provides technical specifications for the JTAGjet-Trace in-circuit debugging probe. More specifically, this means:

- Model specifications
- ETM connector for ARM and Cortex
- The ADA-ETM-MIPI20 adapter.

MODEL SPECIFICATIONS

These are the specifications of the JTAGjet-Trace debugging probe:

Parameter	JTAGjet-Trace-CM	JTAGjet-Trace
Emulated cores	Cortex-M series	ARM7, ARM9, ARM11, Cortex-M, Cortex-R, Cortex-A
Compatible voltage range	1.8 V-3.3 V	1.8 V-3.3 V
JTAG clock range	1 kHz-30 MHz	1 kHz-30MHz
Max JTAG clock rise/fall time	5 ns/5 ns (with 5 pF load)	5 ns/5 ns (with 5 pF load)
TDO, SWO, RTCK, TMS, SWD rise/fall times	5 ns/5 ns (with 5 pF load)	5 ns/5 ns (with 5 pF load)
Emulation type	via ETM port	via ETM port
Cable type	MIPI-20	ETM-38 and MIPI-20
Communication interface	USB 2.0	USB 2.0
Max. CPU speed	Unlimited	Unlimited
Max. trace clock speed	200 MHz (dual-edge capture)	200 MHz (dual-edge capture)
Max. trace clock rise/fall time	1.5 ns/1.5 ns	1.5 ns/1.5 ns
Max. trace data rise/fall time	1.5 ns/1.5 ns	1.5 ns/1.5 ns
ETM memory size (model dependant)	1 M frames (4.5 MB) or 4 M frames (18 MB)	1 M frames (4.5 MB) or 4 M frames (18 MB)
Frame size	36 bits	36 bits

Table 1: JTAGjet-Trace specifications

Parameter	JTAGjet-Trace-CM	JTAGjet-Trace
Timestamp	56 bits, CPU cycle-accurate	56 bits, CPU cycle-accurate
Size (W L H)	2.5 × 5.5 × 1.0 inches	2.5 × 5.5 × 1.0 inches
Power supply adapter	100-240 VAC input 5 VDC at 1 A output	100-240 VAC input 5 VDC at 1 A output
Storage temperature	0 to 40 degrees C	0 to 40 degrees C
Operating temperature	10 to 35 degrees C	10 to 35 degrees C
Operating humidity	0 to 90%	0 to 90%

Table 1: JTAGjet-Trace specifications

ETM CONNECTOR FOR ARM AND CORTEX

The JTAGjet-Trace series debugging probes come with an Embedded Trace Macrocell (ETM) 38-pin Mictor connector on the front panel. This connector accepts either the 38-pin high-speed Mictor cable supplied with JTAGjet-Trace or the small Mictor to MIPI-20 adapter supplied with JTAGjet-Trace-CM.

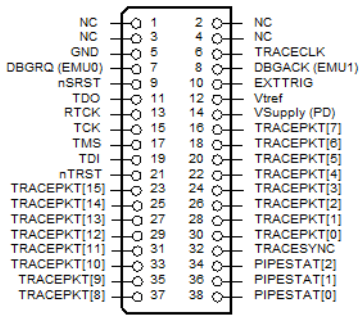
These are the pin definitions of the front panel ETM connector:

ARM signal	OMAP signal	ETMV3 signal	Pin		ETMV3 signal	OMAP signal	ARM signal
No connect	No connect	No connect	1	2	No connect	No connect	No connect
No connect	No connect	No connect	3	4	No connect	No connect	No connect
GND	GND	GND	5	6	TRACECLK	TRACECLK	TRACECLK
DBGRQ	EMU0	DBGRQ	7	8	DBGACK	EMU1	DBGACK
nSRST	CPU_RESET	nSRST	9	10	EXTTRIG	EXTTRIG	EXTTRIG
TDO	TDO	TDO	11	12	VTREF	VTREF (ETM)	VTREF
RTCK	TCK_RET	RTCK	13	14	vSupply	PD (JTAG)	VTREF
TCK	TCK	TCK	15	16	TRACEDATA[7]	TRACEPKT[7]	TRACEPKT[7]
TMS	TMS	TMS	17	18	TRACEDATA[6]	TRACEPKT[6]	TRACEPKT[6]
TDI	TDI	TDI	19	20	TRACEDATA[5]	TRACEPKT[5]	TRACEPKT[5]
nTRST	TRST'	nTRST	21	22	TRACEDATA[4]	TRACEPKT[4]	TRACEPKT[4]
TRACEPKT[15]	TRACEPKT[15]	TRACEDATA[15]	23	24	TRACEDATA[3]	TRACEPKT[3]	TRACEPKT[3]
TRACEPKT[14]	TRACEPKT[14]	TRACEDATA[14]	25	26	TRACEDATA[2]	TRACEPKT[2]	TRACEPKT[2]
TRACEPKT[13]	TRACEPKT[13]	TRACEDATA[13]	27	28	TRACEDATA[1]	TRACEPKT[1]	TRACEPKT[1]
TRACEPKT[12]	TRACEPKT[12]	TRACEDATA[12]	29	30	GND	TRACEPKT[0]	TRACEPKT[0]

ARM signal	OMAP signal	ETMV3 signal	Pin		ETMV3 signal	OMAP signal	ARM signal
TRACEPKT[11]	TRACEPKT[11]	TRACEDATA[11]	31	32	GND	TRACEPKT[4]	TRACEPKT[4]
TRACEPKT[10]	TRACEPKT[10]	TRACEDATA[10]	33	34	VTREF (high)	PIPESTAT[2]	PIPESTAT[2]
TRACEPKT[9]	TRACEPKT[9]	TRACEDATA[9]	35	36	TRACECTL	PIPESTAT[1]	PIPESTAT[1]
TRACEPKT[8]	TRACEPKT[8]	TRACEDATA[8]	37	38	TRACEDATA[0]	PIPESTAT[0]	PIPESTAT[0]

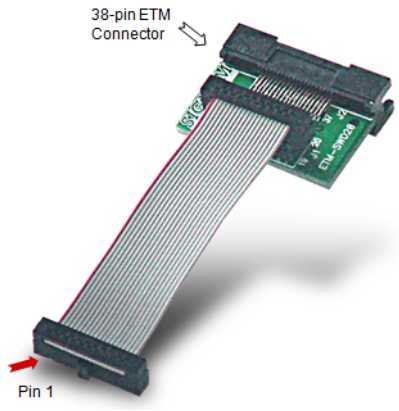
Pinout of the Mictor 38-pin connector

This is the pinout of the Mictor 38-pin connector when used with ARM targets:

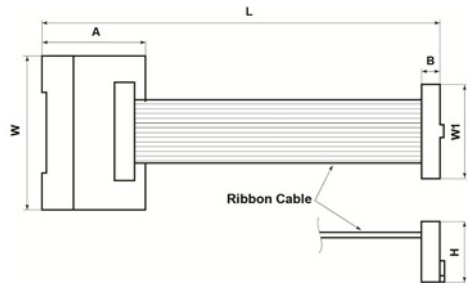


THE ADA-ETM-MIPI20 ADAPTER

This passive Mictor-38 to MIPI-20 adapter for Cortex-M provides an interface between the JTAGjet-Trace debugging probe and the 20-pin connector on Cortex-M target boards. The adapter's ETM connector plugs onto the JTAGjet-Trace front panel.



This is a top-view drawing of the ADA-ETM-MIPI20 connector:



These are the dimensions of the ADA-ETM-MIPI20 connector:

A	19.12 mm (0.75 in)
B	3.11 mm (0.122 in)
H	5.1 mm (0.2 in)
W1	16.9 mm (0.67 in)

W 25.7 mm (1.01 in)

L 65.5 mm (2.58 in)

Pinout of the MIPI-20 connector

The MIPI-20 connector accepts a 20-pin flat cable which plugs into the target board. This is the pinout of the MIPI-20 connector: