

EMUL-ARM™

ARM Connections

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About This Guide

The EMUL-ARM is a PC-based hardware debugger for the ARM™ Core (currently ARM7 and ARM9 cores). Seehau is the name of the user interface of EMUL-ARM – Seehau and EMUL-ARM is often used interchangeably.

This guide helps you understand how to design the target debugger connection.

Additional Information

ARM has documentation available for download at <http://www.arm.com/arm/documentation>. Following are relevant for Target Connections.

- The 20-pin connector – “Multi-ICE User Guide” (ARM DUI0048E).
- 38-pin ETM Trace Mictor connector – “Embedded Trace Macrocell Specification” (ARM IHI 0014H).

1 INTRODUCTION

ARM has specified three different debug connectors –all of which are supported by EMUL-ARM:

- 14-pin JTAG (old standard replaced by the 20-pin connector)
- 20-pin JTAG
- 38-pin Mictor connector JTAG / ETM trace.

The 14-pin and the 20-pin date from different eras, where the 20-pin connector is the currently recommended. The 38-pin high-density Mictor Connector should only be used for ETM trace.

2 CONNECTIONS

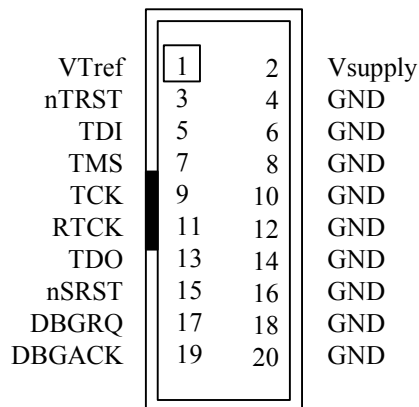
20-Pin JTAG Connection

The 20-pin connector is the currently recommended from ARM – it is specified in the Multi-ICE User Guide on page F2 (ARM DUI0048E). Connector type: 20-way IDC male header, 0.1” pitch.

Example part number: AMP PART 103308-5

Many target boards have a square pod on pin 1, as indicated in the picture. EMUL-ARM has a red lead on the JTAG cable to indicate pin 1.

Voltage levels: 3.0 – 5.5 V (Please note that the voltage on VTref will be fed back to the target.)



Signal	Description	Required
VTref	Reference voltage – used to condition voltage level of Vsupply.	Yes
Vsupply	Supply voltage – used to power parts of the USB/JTAG interface. The current drawn should be less than 100 μA. Vsupply drives the signal from the buffer on the pod through the target connector to the target board.	Yes
nTRST	JTAG TAP Reset	No
TDI	JTAG Test Data Input line	Yes
TMS	JTAG Test Data Output line	Yes
TCK	JTAG Test Clock, controls communication independently from the system clock.	Yes
TDO	JTAG Test Data Output line	Yes
RTCK	Returned Test Clock – used for adaptive clocking (supported on CTM and USB2/JTAG. Note that not all ARM based MCUs implement this signal.	No
nSRST	Target System Reset	No
DBGREQ	Debug request.	No
DBGACK	Debug acknowledge	No

14-Pin JTAG Connection

The 14-pin connector is the previously recommended from ARM (long time ago). Connector type: 20-way IDC male header, 0.1" pitch

Many target boards have a square pod on pin 1, as indicated in the picture. EMUL-ARM has a red lead on the JTAG cable to indicate pin 1.

Voltage levels: 3.0 – 5.5 V.

Vcc	1	2	GND
nTRST	3	4	GND
TDI	5	6	GND
TMS	7	8	GND
TCK	9	10	GND
TDO	11	12	nSRST
Vcc	13	14	GND

Signal	Description	Required
Vcc (1)	Supply voltage.	No
Vcc (13)	Supply voltage – used to power parts of the USB/JTAG interface. The current drawn should be less than 100 μ A. Vcc drives the signal from the buffer on the pod through the target connector to the target board.	Yes
nTRST	JTAG TAP Reset	No
TDI	JTAG Test Data Input line	Yes
TMS	JTAG Test Data Output line	Yes
TCK	JTAG Test Clock, controls communication independently from the system clock.	Yes
TDO	JTAG Test Data Output line	Yes
RTCK	Returned Test Clock – used for adaptive clocking (supported on CTM and USB2/JTAG. Note that not all ARM based MCUs implement this signal.	No
nSRST	Target System Reset	No

14-Pin Texas Instruments JTAG Connection

In addition to the connections specified by ARM, Texas Instruments has also specified a connector. Nohau does not directly support this connector, however it should be possible to make an adapter.

Texas Instruments connector pin layout:

TMS	1	2	nTRST
TDI	3	4	GND
Vcc	5	6	N.C.
TDO	7	8	GND
RTCK	9	10	GND
TCK	11	12	GND
EMU0	13	14	EMU1

For EMU0 and EMU1, please consult your board / MCU documentation.

ETM Trace - 38-Pin Mictor JTAG

The 38-pin Mictor connector is the currently recommended from ARM for ETM trace – it is specified in the Embedded Trace Macrocell Specification in section 7.2 (ARM IHI 0014H).

Example part number: AMP PART 2-767004-2

Pin	Signal	Pin	Signal
38	PIPESTAT[0]	37	TRACEPKT[8]
36	PIPESTAT[1]	35	TRACEPKT[9]
34	PIPESTAT[2]	33	TRACEPKT[10]
32	TRACESYNC	31	TRACEPKT[11]
30	TRACEPKT[0]	29	TRACEPKT[12]
28	TRACEPKT[1]	27	TRACEPKT[13]
26	TRACEPKT[2]	25	TRACEPKT[14]
24	TRACEPKT[3]	23	TRACEPKT[15]
22	TRACEPKT[4]	21	nTRST
20	TRACEPKT[5]	19	TDI
18	TRACEPKT[6]	17	TMS
16	TRACEPKT[7]	15	TCK
14	Vtarget	13	RTCK
12	Vtref	11	TDO
10	EXTTRIG	9	nSRST
8	DBGACK	7	DBGCRQ
6	TRACECLK	5	Ground
4	no-connect	3	no-connect
2	no-connect	1	no-connect

NEXUS Trace - 38-Pin Mictor JTAG