

## User Manual

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# Debug Adapters

Please refer to the following chapters to learn more about iSYSTEM Debug Adapters:

Ordering Code	Description
IC50111-1	<a href="#">20-pin 2.54mm ARM Debug Adapter</a>
IC50111-2	<a href="#">20-pin 2.54mm Cortex Debug Adapter</a>
IC50112	<a href="#">14-pin 2.54mm ARM Debug Adapter</a>
IC50112-ECU14	<a href="#">10-pin 1.27mm ARM ECU14 Debug Adapter</a>
IC50113-AMP	<a href="#">20-pin 1.27mm AMP CoreSight Debug Adapter</a>
IC50115	<a href="#">38-pin Mictor ARM Parallel 16-bit Debug Adapter</a>
IC50115-LV	<a href="#">38-pin Mictor Low Voltage ARM Parallel 16-bit Debug Adapter</a>
IC50116-2	<a href="#">10-pin 1.27mm CoreSight Debug Adapter</a>
IC50116-CUST2	<a href="#">10-pin 1.27mm Custom CoreSight Debug Adapter</a>
IC50118-2	<a href="#">20-pin 1.27mm CoreSight Debug Adapter</a>
IC50118-NETX90	<a href="#">20-pin 1.27mm Cortex SWD + Trace Debug Adapter</a>
IC50118-LV	<a href="#">20-pin 1.27mm Low Voltage CoreSight Debug Adapter</a>
IC50119	<a href="#">20-pin 1.27 x 2.54mm Compact TI-20 Debug Adapter</a>
IC50120	<a href="#">16-pin 1.27mm Custom ARM Debug Adapter</a>
IC50150	<a href="#">14-pin 2.54mm MPC5xxx Debug Adapter</a>
IC50152	<a href="#">38-pin Mictor MPC5xxx Nexus 16-bit Debug Adapter</a>
IC50152-12	<a href="#">38-pin Mictor MPC5xxx Nexus 16-bit Debug Adapter</a>
IC50156	<a href="#">50-pin ERF8 MPC5xxx Nexus 16-bit Debug Adapter</a>
IC50160	<a href="#">16-pin 2.54mm Infineon JTAG Debug Adapter</a>
IC50160-ECU14	<a href="#">10-pin 1.27mm TriCore ECU14 Debug Adapter</a>
IC50160-MEDC17	<a href="#">10-pin 1.27mm TriCore MEDC17 Debug Adapter</a>
IC50162	<a href="#">6-pin 2.54mm Infineon I2C Debug Adapter</a>
IC50163-2	<a href="#">10-pin 1.27mm Infineon DAP2 Wide Debug Adapter</a>
IC50165	<a href="#">6-pin 2.54mm Infineon CoreSight SP49 Debug Adapter</a>
IC50175	<a href="#">14-pin 2.54mm Renesas RL78</a>
IC50176	<a href="#">14-pin 2.54mm Renesas RH850 Debug Adapter</a>
IC50176-EPS	<a href="#">10-pin 1.27mm Renesas RH850 Debug Adapter</a>
IC50177	<a href="#">38-pin Mictor RH850 Nexus 16-bit Debug Adapter</a>



Find more information on [www.isystem.com](http://www.isystem.com) or contact [sales@isystem.com](mailto:sales@isystem.com). To reach for technical support, please visit [www.isystem.com/support](http://www.isystem.com/support).



*This symbol is used within the manual to highlight further safety notices.*

# 20-pin 2.54mm ARM Debug Adapter



Ordering code

IC50111-1

This debug adapter is used to connect the iC5000 and the iC5700 BlueBox to the Cortex-A, the Cortex-R, the ARM7 and the ARM9 based target. It's used to connect to the embedded target featuring a 20-pin 2.54 mm pitch target debug connector with the ARM pinout. The debug adapter connects to the 25 cm 40-pin ribbon cable coming from the BlueBox and to the target debug connector on the other side.

The following pinout is valid on the target side:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
I	Reference Voltage	Vref	1	2	NC	Not Connected	
O	JTAG	nTRST	3	4	GND	Ground	
O	Not Connected / JTAG	NC/TDI	5	6	GND	Ground	
I/O / O	SWD/JTAG	SWDIO/TMS	7	8	GND	Ground	
O	SWD/JTAG	SWDCLK/TCK	9	10	GND	Ground	
I	Return TCK	RTCK	11	12	GND	Ground	
I	SWD/JTAG	SWO/TDO	13	14	GND	Ground	
I/O	Reset	nRESET	15	16	GND	Ground	
O	Debug Request	DBGREQ	17	18	GND	Ground	
I	Debug Acknowledge	DBACK	19	20	GND	Ground	

20-pin ARM pinout

Signal Direction is described from the BlueBox perspective.



When connecting the BlueBox to a target for the first time, double check that the debug adapter pinout matches the Target connector. A mismatch can result in a hardware failure.

The debug adapter features resettable fuses on all pins except for pin 11 and 19. These fuses protect debug signals against over current and cycle back to a conductive state after the excessive current fades away.

The debug adapter connects to the target via a 20-pin 2.54 mm connector, for example Yamaichi FAS-2001-2101-2-0BF. A target should feature a matching part, for example WÜRTH ELEKTRONIK 61202021621.



[How to connect iSYSTEM Hardware \(Video Tutorial\)](#)



[Cross Table Converters/Debug Adapters/Active Probes](#)

# Texas Instruments 14-pin 2.54mm Converter



Ordering code

IAPIN20ARM14TI

Embedded targets based on Texas Instruments (TI) ARM microcontroller can feature Texas Instruments ARM 14-pin target debug connector with the TI the proprietary pinout.

A converter connecting at the end of the 20-pin 2.54mm ARM Debug Adapter is available for Texas Instruments ARM 14-pin pinout. Make sure you don't mix up Texas Instruments pinout with the standard [14-pin 2.54mm ARM Debug Adapter](#) (Ordering code IC50112).

The following pinout is valid on the target side:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
O	JTAG	TMS	1	2	nTRST	JTAG	O
O	JTAG	TDI	3	4	GND	Ground	
I	Reference Voltage	Vref	5	6	NC	Not Connected	
I	JTAG	TDO	7	8	GND	Ground	
I	Return TCK	RTCK	9	10	GND	Ground	
O	JTAG	TCK	11	12	GND	Ground	
I	Debug Acknowledge	DBACK	13	14	nRESET	Reset	I/O

14-pin TI ARM pinout

Signal Direction is described from the BlueBox perspective.



When connecting the BlueBox to a target for the first time, double check that the debug adapter pinout matches the Target connector. A mismatch can result in a hardware failure.

A jumper is present on the converter. If the jumper is populated, the SYSTEM RESET line is connected to pin 14 on the target side. If SYSTEM RESET is not needed, the jumper should be removed.

The converter connects to the target via a 14-pin 2.54 mm connector, for example Yamaichi FAS-1401-2101-2-0BF. A target should feature a matching part, for example WÜRTH ELEKTRONIK 61201421621.



This converter is used only in conjunction with the [20-pin 2.54mm ARM Debug Adapter](#) (Ordering code IC50111-1).



[How to connect iSYSTEM Hardware \(Video Tutorial\)](#)



[Cross Table Converters/Debug Adapters/Active Probes](#)

# 20-pin 2.54mm Cortex Debug Adapter



Ordering code

IC50111-2

This debug adapter is used to connect the iC5000 and the iC5700 BlueBox to the Cortex-M based target. It's used to connect to the embedded target featuring a 20-pin 2.54 mm pitch target debug connector with the Cortex-M pinout. Its operating voltage range is **3.3V - 5.0V**. This particular connector with its pinout is not recommended for new designs and is still available for legacy reasons only.

The debug adapter connects to the 25 cm 40-pin ribbon cable coming from the BlueBox and to the target debug connector on the other side.

Note that the connector has the same physical dimensions as [20-pin 2.54mm ARM Debug Adapter](#) (Ordering code IC50111-1), which is still widely used but the pinouts are completely different. Note that ground signals are on the opposite side, which means using incorrect debug adapter can damage the hardware in worst case.

The following pinout is valid on the target side:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
I	Reference Voltage	Vref	1	2	SWDIO/TMS	SWD/JTAG	I/O
	Ground	GND	3	4	SWCLK/TCK	SWD/JTAG	0
	Ground	GND	5	6	SWO/TDO	SWD/JTAG	I
	Ground	GND	7	8	NC/TDI	Not Connected / JTAG	0
	Ground	GND	9	10	nRESET	Reset	I/O
	Ground	GND	11	12	TRCLK	Trace Clock	I
	Ground	GND	13	14	TRD0	Trace Data	I
	Ground	GND	15	16	TRD1	Trace Data	I
	Ground	GND	17	18	TRD2	Trace Data	I
	Ground	GND	19	20	TRD3	Trace Data	I

### 20-pin Cortex pinout

Blue colored signals are parallel trace signals.

Signal Direction is described from the BlueBox perspective.



*When connecting the BlueBox to a target for the first time, double check that the debug adapter pinout matches the Target connector. A mismatch can result in a hardware failure.*

The debug adapter features resettable fuses on pins 1, 2, 4, 6, 8 and 10. These protect debug signals against overcurrent. These fuses cycle back to a conductive state after the excessive current fades away. The debug adapter connects to the target via a 20-pin 2.54 mm connector, for example Yamaichi FAS-2001-2101-2-0BF. A target should feature a matching part, for example WÜRTH ELEKTRONIK: 612 020 216 21.



[How to connect iSYSTEM Hardware \(Video Tutorial\)](#)

[Cross Table Converters/Debug Adapters/Active Probes](#)

# 14-pin 2.54mm ARM Debug Adapter



Ordering code

IC50112

This debug adapter is used to connect the iC5000 and the iC5700 BlueBox to the Cortex-A, the Cortex-R, the ARM7 and the ARM9 based target. It's used to connect to the embedded target featuring a 14-pin 2.54 mm pitch target debug connector with the ARM pinout.  
The debug adapter connects to the 25 cm 40-pin ribbon cable coming from the BlueBox and to the target debug connector on the other side.

The following pinout is valid on the target side:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
	Not Connected	NC	1	2	GND	Ground	
0	JTAG	nTRST	3	4	GND	Ground	
0	JTAG	TDI	5	6	GND	Ground	
0	JTAG	TMS	7	8	GND	Ground	
0	JTAG	TCK	9	10	GND	Ground	
1	JTAG	TDO	11	12	nRESET	Reset	I/O
1	Reference Voltage	Vref	13	14	GND	Ground	

14-pin ARM pinout

Signal Direction is described from the BlueBox perspective.



*When connecting the BlueBox to a target for the first time, double check that the debug adapter pinout matches the Target connector. A mismatch can result in a hardware failure.*

The debug adapter features resettable fuses on all pins. These fuses protect debug signals against overcurrent and cycle back to a conductive state after the excessive current fades away. The debug adapter connects to the target via a 14-pin 2.54 mm connector, for example Yamaichi FAS-1401-2101-2-0BF. A target should feature a matching part, for example WURTH ELEKTRONIK 61201421621.



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[Cross Table Converters/Debug Adapters/Active Probes](#)

# 10-pin 1.27mm ARM ECU14 Debug Adapter



Ordering code

IC50112-ECU14

The ECU14 connector and the pinout has been defined by Bosch. This debug adapter is used to connect the iC5000 and the iC5700 BlueBox to ARM Cortex based target featuring a 10-pin 1.27mm pitch target debug connector with Bosch ECU14 pinout.

The debug adapter connects to the 25 cm 40-pin ribbon cable coming from the BlueBox and to the target debug connector on the other side.



*This debug adapter supports only the JTAG debug interface.*

The following pinout is valid on the target side:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
	Ground	GND	1	2	TCK	JTAG	0
0	JTAG	nTRST	3	4	TDO	JTAG	I
0	JTAG	TMS	5	6	TDI	JTAG	O
	Not Connected	NC	7	8	Vref	Reference Voltage	I
	Not Connected	NC	9	10	nRESET	Reset	O

10-pin Bosch ECU14 target pinout

Signal Direction is described from the BlueBox perspective.



*When connecting the BlueBox to a target for the first time, double check that the debug adapter pinout matches the Target connector. A mismatch can result in a hardware failure.*

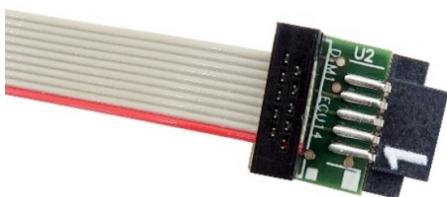
This Debug Adapter features resettable fuses on all connected pins. These protect debug signals against overcurrent and cycle back to a conductive state after the excessive current fades away. Mandatory pins on the microcontroller side are GND, TMS, TDO, TDI, nTRST, TCLK and nRESET.

## Pin 1 position



*The pin next to the alignment pin is pin 10 and not pin 1!*

*Pin is marked with a number 1 directly on the converter target connector.*



The pin 1 position is marked with a small white square on the PCB. Additionally, the pin is marked with a number 1 directly on the debug adapter target connector from revision C1 on.



[How to connect iSYSTEM Hardware \(Video Tutorial\)](#)



[Cross Table Converters/Debug Adapters/Active Probes](#)

# 20-pin 1.27mm AMP CoreSight Debug Adapter



Ordering code

IC50113-AMP

This adapter is used to connect the iC5000 and the iC5700 development system to the Cortex based target. It's used to connect to the embedded target featuring a 20-pin 1.27mm AMPMODU target debug connector with the ARM CoreSight 20 pinout. Its operating voltage range is **3.3V - 5.0V**.

The debug adapter connects to the 25 cm 40-pin ribbon cable coming from the BlueBox and to the target debug connector on the other side.

The following pinout is valid on the target side:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
I	Reference Voltage	Vref	1	2	SWDIO/TMS	SWD/JTAG	I/O
	Ground	GND	3	4	SWCLK/TCK	SWD/JTAG	O
	Ground	GND	5	6	SWO/TDO	SWD/JTAG	I
	Ground	GND	7	8	NC/TDI	Not Connected / JTAG	O
	Ground	GND	9	10	nRESET	Reset	I/O
	Ground	GND	11	12	TRCLK	Trace Clock	I
	Ground	GND	13	14	TRD0	Trace Data	I
	Ground	GND	15	16	TRD1	Trace Data	I
	Ground	GND	17	18	TRD2	Trace Data	I
	Ground	GND	19	20	TRD3	Trace Data	I

ARM CoreSight 20 pinout

Blue colored signals are parallel trace signals.

Signal Direction is described from the BlueBox perspective.



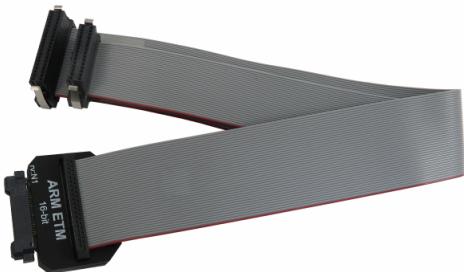
*When connecting the BlueBox to a target for the first time, double check that the debug adapter pinout matches the Target connector. A mismatch can result in a hardware failure.*

The debug adapter features resettable fuses on pins 1, 2, 4, 6, 8 and 10. These protect debug signals against overcurrent and cycle back to a conductive state after the excessive current fades away. Signals on pins 12, 14, 16, 18 and 20 are protected via 100 ohm serial resistors.

The debug adapter connects to the target via a 20-pin AMP connector, for example TE connectivity, part number 1-111196-8. A target should feature a matching part, for example TE connectivity part number 5-104549-2 in SMT technology.



# 38-pin Mictor ARM Parallel 16-bit Debug Adapter



Ordering code

IC50115

This debug adapter is used to connect the iC5000 and the iC5700 BlueBox to the Cortex-A, the Cortex-R, the ARM7 and the ARM9 based target. It's used to connect to the embedded target featuring a 38-pin Mictor target debug connector with the ARM ETMv1 or the ARM ETMv3 pinout. Its operating voltage range is **3.3V - 5.0V**. Use [38-pin Mictor Low Voltage ARM Parallel 16-bit Debug Adapter](#) (Ordering code IC50115-LV) for voltages below this range.

The same debug adapter covers the ARM ETMv1 and the ARM ETMv3 pinout.



*When connecting the BlueBox to a target for the first time, double check that the debug adapter pinout matches the Target connector. A mismatch can result in a hardware failure.*

The debug adapter features resettable fuses on pins 9, 11, 12, 15, 17, 19 and 21. These protect debug signals against overcurrent and cycle back to a conductive state after the excessive current fades away. Signals on pins 6, 16, 18, 20 and 22-38 are protected via 47 ohm serial resistors.

The debug adapter connects to the target via a 38-pin Mictor connector, for example Tyco Electronics 5767055-1. A target should feature a matching part, for example Tyco Electronics 5767081-1 in SMT technology.



*Only 8- and 16-bit parallel trace width is supported.*



[How to connect iSYSTEM Hardware \(Video Tutorial\)](#)



[Cross Table Converters/Debug Adapters/Active Probes](#)

The following pinout is valid on the target side for the ARM **ETMv1**:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
	Not Connected	NC	1	2	NC	Not Connected	
	Not Connected	NC	3	4	NC	Not Connected	
	Not Connected	NC	5	6	TRACECLK	Trace Clock	I
	Not Connected	NC	7	8	NC	Not Connected	
O	Reset	nRESET	9	10	NC	Not Connected	
I	JTAG	TDO	11	12	Vref	Reference Voltage	I
	Not Connected	NC	13	14	NC	Not Connected	
O	JTAG	TCK	15	16	TRACEPKT[7]	Trace Data	I
O	JTAG	TMS	17	18	TRACEPKT[6]	Trace Data	I
O	JTAG	TDI	19	20	TRACEPKT[5]	Trace Data	I
O	JTAG	nTRST	21	22	TRACEPKT[4]	Trace Data	I
I	Trace Data	TRACEPKT[15]	23	24	TRACEPKT[3]	Trace Data	I
I	Trace Data	TRACEPKT[14]	25	26	TRACEPKT[2]	Trace Data	I
I	Trace Data	TRACEPKT[13]	27	28	TRACEPKT[1]	Trace Data	I
I	Trace Data	TRACEPKT[12]	29	30	TRACEPKT[0]	Trace Data	I
I	Trace Data	TRACEPKT[11]	31	32	TRACESYNC	Trace Data	I
I	Trace Data	TRACEPKT[10]	33	34	PIPESTAT[2]	Trace Data	I
I	Trace Data	TRACEPKT[9]	35	36	PIPESTAT[1]	Trace Data	I
I	Trace Data	TRACEPKT[8]	37	38	PIPESTAT[0]	Trace Data	I

ETMv1 target pinout

The following pinout is valid on the target side for the ARM **ETMv3**:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
	Not Connected	NC	1	2	NC	Not Connected	
	Not Connected	NC	3	4	NC	Not Connected	
	Ground	GND	5	6	TRACECLK	Trace Clock	I
	Not Connected	NC	7	8	NC	Not Connected	
O	Reset	nRESET	9	10	NC	Not Connected	
I	JTAG	TDO	11	12	Vref	Reference Voltage	I
	Not Connected	NC	13	14	NC	Not Connected	
O	JTAG	TCK	15	16	TRACEDATA7	Trace Data	I
O	JTAG	TMS	17	18	TRACEDATA6	Trace Data	I
O	JTAG	TDI	19	20	TRACEDATA5	Trace Data	I
O	JTAG	nTRST	21	22	TRACEDATA4	Trace Data	I
I	Trace Data	TRACEDATA15	23	24	TRACEDATA3	Trace Data	I
I	Trace Data	TRACEDATA14	25	26	TRACEDATA2	Trace Data	I
I	Trace Data	TRACEDATA13	27	28	TRACEDATA1	Trace Data	I
I	Trace Data	TRACEDATA12	29	30	GND	Ground	I
I	Trace Data	TRACEDATA11	31	32	GND	Ground	I
I	Trace Data	TRACEDATA10	33	34	Vref	Reference Voltage	I
I	Trace Data	TRACEDATA9	35	36	TRACECTL	Trace Data	I
I	Trace Data	TRACEDATA8	37	38	TRACEDATA0	Trace Data	I

### ETMv3 target pinout

Blue colored signals are trace signals.

Signal Direction is described from the BlueBox perspective.



Ordering code

IAMIC38MIPI60TMS570

Embedded targets based on Texas Instruments (TI) TMS570 microcontroller can feature Texas Instruments 60-pin MIPI target debug connector with the TI proprietary pinout.

A converter connecting at the end of the Mictor 38-pin ARM Parallel 16-bit Debug Adapter is available for Texas Instruments 60-pin MIPI pinout and must be ordered separately.



*The iC5000 and the iC5700 can trace up to 16 trace data lines. For this reason the target microcontroller has to be configured for 16-bit trace port operation even if the target features 60-pin MIPI connector with 32 data trace lines connected.*



*Signal naming in iSYSTEM documentation uses target signal names and not the ones from the MIPI standard. Refer to 'MIPI Alliance Recommendation for Debug and Trace Connectors' and 'ARM Target Interface Connections' documentation for more information about signal names and their functions.*

The converter connects to the target via a 60-pin MIPI connector, for example Samtec QTH-030-01-L-D-A. A target should feature a matching part, for example Samtec QSH-030-01-L-D-A.



*This converter is used only in conjunction with the [38-pin Mictor ARM Parallel 16-bit Debug Adapter](#) (Ordering code IC50115).*

The following pinout is valid on the target side:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
I	Reference Voltage	Vref	1	2	TMS	JTAG	O
O	JTAG	TCK	3	4	TDO	JTAG	I
O	JTAG	TDI	5	6	nRESET	Reset	O
O	Return TCK	RTCK	7	8	nTRST	JTAG Pull down	O
O	JTAG Pull up	nTRST	9	10	NC	Not Connected	
	Not Connected	NC	11	12	NC	Not Connected	
I	Trace Clock	TRACECLK	13	14	NC	Not Connected	
	Not Connected	NC	15	16	GND	Ground	
I	Trace Data	TRACECTL	17	18	NC	Not Connected	
I	Trace Data	TRACEDATA0	19	20	NC	Not Connected	
I	Trace Data	TRACEDATA1	21	22	NC	Not Connected	
I	Trace Data	TRACEDATA2	23	24	NC	Not Connected	
I	Trace Data	TRACEDATA3	25	26	NC	Not Connected	
I	Trace Data	TRACEDATA4	27	28	NC	Not Connected	
I	Trace Data	TRACEDATA5	29	30	NC	Not Connected	
I	Trace Data	TRACEDATA6	31	32	NC	Not Connected	
I	Trace Data	TRACEDATA7	33	34	NC	Not Connected	
I	Trace Data	TRACEDATA8	35	36	NC	Not Connected	
I	Trace Data	TRACEDATA9	37	38	NC	Not Connected	
I	Trace Data	TRACEDATA10	39	40	NC	Not Connected	
I	Trace Data	TRACEDATA11	41	42	NC	Not Connected	
I	Trace Data	TRACEDATA12	43	44	NC	Not Connected	
I	Trace Data	TRACEDATA13	45	46	NC	Not Connected	
I	Trace Data	TRACEDATA14	47	48	NC	Not Connected	
I	Trace Data	TRACEDATA15	49	50	NC	Not Connected	
	Not Connected	NC	51	52	NC	Not Connected	
	Not Connected	NC	53	54	NC	Not Connected	
	Not Connected	NC	55	56	NC	Not Connected	
	Ground	GND	57	58	GND	Ground	
	Not Connected	NC	59	60	NC	Not Connected	

60-pin MIPI pinout

Blue colored signals are trace signals.

Signal Direction is described from the BlueBox perspective.

# 38-pin Mictor Low Voltage ARM Parallel 16-bit Debug Adapter



Ordering code

IC50115-LV

This debug adapter is used to connect the iC5000 and the iC5700 BlueBox to the Cortex-A, the Cortex-R, the ARM7 and the ARM9 based target featuring debug interface operating at voltages **below 3.3V**. Its operating voltage range is **1.65V - 3.6V**. It is used to connect to the embedded target featuring a 38-pin Mictor target debug connector with the ARM ETMv1 or the ARM ETMv3 pinout.

The same debug adapter covers the ARM ETMv1 and the ARM ETMv3 pinout.



*When connecting the BlueBox to a target for the first time, double check that the debug adapter pinout matches the Target connector. A mismatch can result in a hardware failure.*

The debug adapter features resettable fuses on pins 9, 11, 12, 15, 17, 19 and 21. These protect debug signals against overcurrent and cycle back to a conductive state after the excessive current fades away. Signals on pins 6, 16, 18, 20 and 22-38 are protected via 47 ohm serial resistors.

The debug adapter connects to the target via a 38-pin Mictor connector, for example Tyco Electronics 5767055-1. A target should feature a matching part, for example Tyco Electronics 5767081-1 in SMT technology.

The following pinout is valid on the target side for the ARM **ETMv1**:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
	Not Connected	NC	1	2	NC	Not Connected	
	Not Connected	NC	3	4	NC	Not Connected	
	Not Connected	NC	5	6	TRACECLK	Trace Clock	I
	Not Connected	NC	7	8	NC	Not Connected	
O	Reset	nRESET	9	10	NC	Not Connected	
I	JTAG	TDO	11	12	Vref	Reference Voltage	I
	Not Connected	NC	13	14	NC	Not Connected	
O	JTAG	TCK	15	16	TRACEPKT[7]	Trace Data	I
O	JTAG	TMS	17	18	TRACEPKT[6]	Trace Data	I
O	JTAG	TDI	19	20	TRACEPKT[5]	Trace Data	I
O	JTAG	nTRST	21	22	TRACEPKT[4]	Trace Data	I
I	Trace Data	TRACEPKT[15]	23	24	TRACEPKT[3]	Trace Data	I
I	Trace Data	TRACEPKT[14]	25	26	TRACEPKT[2]	Trace Data	I
I	Trace Data	TRACEPKT[13]	27	28	TRACEPKT[1]	Trace Data	I
I	Trace Data	TRACEPKT[12]	29	30	TRACEPKT[0]	Trace Data	I
I	Trace Data	TRACEPKT[11]	31	32	TRACESYNC	Trace Data	I
I	Trace Data	TRACEPKT[10]	33	34	PIPESTAT[2]	Trace Data	I
I	Trace Data	TRACEPKT[9]	35	36	PIPESTAT[1]	Trace Data	I
I	Trace Data	TRACEPKT[8]	37	38	PIPESTAT[0]	Trace Data	I

ETMv1 target pinout

The following pinout is valid on the target side for the ARM **ETMv3**:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
	Not Connected	NC	1	2	NC	Not Connected	
	Not Connected	NC	3	4	NC	Not Connected	
	Ground	GND	5	6	TRACECLK	Trace Clock	I
	Not Connected	NC	7	8	NC	Not Connected	
O	Reset	nRESET	9	10	NC	Not Connected	
I	JTAG	TDO	11	12	Vref	Reference Voltage	I
	Not Connected	NC	13	14	NC	Not Connected	
O	JTAG	TCK	15	16	TRACEDATA7	Trace Data	I
O	JTAG	TMS	17	18	TRACEDATA6	Trace Data	I
O	JTAG	TDI	19	20	TRACEDATA5	Trace Data	I
O	JTAG	nTRST	21	22	TRACEDATA4	Trace Data	I
I	Trace Data	TRACEDATA15	23	24	TRACEDATA3	Trace Data	I
I	Trace Data	TRACEDATA14	25	26	TRACEDATA2	Trace Data	I
I	Trace Data	TRACEDATA13	27	28	TRACEDATA1	Trace Data	I
I	Trace Data	TRACEDATA12	29	30	GND	Ground	I
I	Trace Data	TRACEDATA11	31	32	GND	Ground	I
I	Trace Data	TRACEDATA10	33	34	Vref	Reference Voltage	I
I	Trace Data	TRACEDATA9	35	36	TRACECTL	Trace Data	I
I	Trace Data	TRACEDATA8	37	38	TRACEDATA0	Trace Data	I

### ETMv3 target pinout

Blue colored signals are trace signals.

Signal Direction is described from the BlueBox perspective.



[How to connect iSYSTEM Hardware \(Video Tutorial\)](#)



[Cross Table Converters/Debug Adapters/Active Probes](#)

# 10-pin 1.27mm CoreSight Debug Adapter



Ordering code

IC50116-2

This debug adapter is used to connect the iC5000 and the iC5700 BlueBox to the Cortex based target. It's used to connect to the embedded target featuring a 10-pin 1.27mm target debug connector with the ARM CoreSight 10 pinout. Current version was renamed from Cortex Debug Adapter.

The following pinout is valid on the target side:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
I	Reference Voltage	Vref	1	2	SWDIO/TMS	JTAG	I/O
	Ground	GND	3	4	SWCLK/TCK	JTAG	0
	Ground	GND	5	6	SWO/TDO	JTAG	I
	Not Connected	KEY	7	8	NC/TDI	Not Connected /JTAG	0
	Ground	GND	9	10	nRESET	Reset	I/O

10-pin ARM CoreSight pinout

Signal Direction is described from the BlueBox perspective.

The debug adapter features resettable fuses on pins 1, 2, 4, 6, 8 and 10. These fuses protect debug signals against overcurrent and cycle back to a conductive state after the excessive current fades away.

## 10-pin 1.27mm connectors



The debug adapter connects to the target through **one** of the two 10-pin 1.27mm connectors. Note that only one is to be connected to the target!

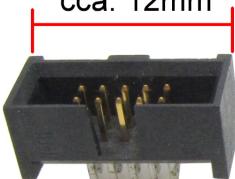
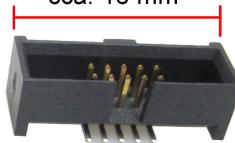
### Strain relief

The robust connector (Samtec FFSD-05-01-N-SR) is located at the end of the cable and is the recommended connection connector. It's a bit wider and therefore the target must have a matching part populated. Matching part on the target side is e.g. Samtec ESHF-105-01-L-D (full frame connector) or Samtec FTS defense grade connector without the frame at the side).

### Standard type

The second connector (Samtec FFSD-05-01-N) is 1cm away from the first one toward the BlueBox (Samtec FFSD-05-01-N). It's much less robust and is prone to fail if the cable is not handled cautiously or just connected/disconnected too many times. This connector should be used when the target doesn't provide the matching target connector for the Strain relief type connector. Matching part on the target is Samtec SHF-105-01-L-D or Samtec FTS defense grade connector without the frame at the side).

For the target side connector it's most convenient to use the FTS defense grade connector since it matches the connector with and without the Strain relief option.

	Target connector		
	Robust and less prone to fail	✗	✓
 cca. 12mm	With frame without strain relief (SHF-1xx-01-L-D)	✓	✗
	Without frame (FTSH-1xx-01-L-DV)	✓	✓
 cca. 16 mm	With frame with strain relief (ESHF-1xx-01-L-D)	✓	✓

If the 10-pin 1.27 mm pitch ribbon cable gets damaged, it can be ordered as a spare part under the ordering codes:

- IA10PIN10PIN127
- IA10PIN10PIN127-CUST - Custom cable length must be specified at the order.



Note that the optional length should be reasonable (e.g. 10 cm) since the quality of electrical signals degrades with prolonging the cable.



iSYSTEM gives no assurance for BlueBox operation with this cable. The cable is meant to be used only for boundary cases where the BlueBox can't be connected to the target hardware through the standard debug adapter, e.g., due to the physical obstacles of the target system. In such cases, operating the BlueBox at lower debug frequency scan speeds and not using the trace functionality at all, might be still an acceptable compromise. It's up to the user to thoroughly test and qualify the BlueBox operation using a custom-length ribbon cable and to determine working winIDEA settings for the

system.

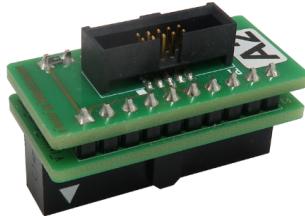


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[Cross Table Converters/Debug Adapters/Active Probes](#)

# 10-pin 1.27mm CoreSight to 20-pin 2.54mm ARM Converter



Ordering code

IA10PINCS20PINARM-1

This converter is required only when the Active Probe is to be connected to the embedded target providing the 20-pin 2.54 mm ARM target debug connector exposing only the debug interface without the ARM HSSTP trace interface. No trace interface (e.g. SWO, parallel) is supported with this converter. The converter is delivered along the Active Probe. Refer to ARM HSSTP II Active Probe User Manual for more information.

The following pinout is valid on the target side:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
I	Reference Voltage	Vref	1	2	NC	Not Connected	
O	JTAG	nTRST*	3	4	GND	Ground	
O	JTAG	TDI	5	6	GND	Ground	
I/O	JTAG/SWD	TMS/SWDIO	7	8	GND	Ground	
O	JTAG/SWD	CLK/SWCLK	9	10	GND	Ground	
	Not Connected	NC	11	12	GND	Ground	
I	JTAG/SWD	TDO	13	14	GND	Ground	
I/O	Reset	nRESET	15	16	GND	Ground	
	Not Connected	NC	17	18	GND	Ground	
	Not Connected	NC	19	20	GND	Ground	

20-pin CoreSight pinout

\* nTRST is permanently pulled up

Signal Direction is described from the BlueBox perspective.

# 10-pin 1.27mm Custom CoreSight Debug Adapter



Ordering code

IC50116-CUST2

This debug adapter is used to connect the iC5000 and the iC5700 BlueBox to the Cortex based target. It's used to connect to the embedded target featuring a 20-pin 1.27mm target debug connector with the **custom** CoreSight 10 pinout. Optionally, connecting the RTCK or the JTAG TRST to pin 7 (KEY pin otherwise) via a jumper makes this debug adapter distinct from the [10-pin 1.27mm CoreSight Debug Adapter](#) (Ordering code IC50116-2).

The following pinout is valid on the target side:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
I	Reference Voltage	Vref	1	2	SWDIO / TMS	JTAG	I/O
	Ground	GND	3	4	SWCLK / TCK	JTAG	0
	Ground	GND	5	6	SWO / TDO	JTAG	I
	Not Connected / Return TCK / JTAG	KEY / RTCK / nTRST	7	8	NC / TDI	Not Connected / JTAG	0
	Ground	GND	9	10	nRESET	Reset	I/O

ARM Coresight 10 Custom pinout

Signal Direction is described from the BlueBox perspective.



When connecting the BlueBox to a target for the first time, double check that the debug adapter pinout matches the Target connector. A mismatch can result in a hardware failure.

## Jumper J1

Jumper position 1-2: pin 7 = JTAG-TRST

Jumper position 3-2: pin 7 = RTCK

Jumper position floating: pin 7 = KEY (default)

The debug adapter features resettable fuses on pins 1, 2, 4, 6, 8 and 10. These fuses protect debug signals against overcurrent and cycle back to a conductive state after the excessive current fades away. The debug adapter connects to the target via a 10-pin 1.27mm connector, for example SAMTEC FFSD-05-01-N. A target should feature a matching part, for example SAMTEC: SHF-105-01-L-D-TH.

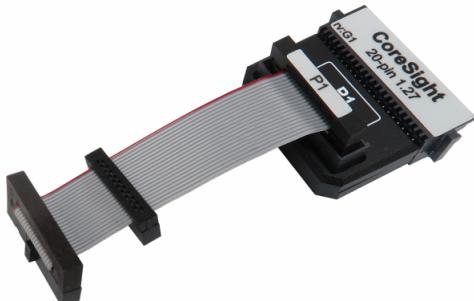


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[Cross Table Converters/Debug Adapters/Active Probes](#)

# 20-pin 1.27mm CoreSight Debug Adapter



Ordering code

IC50118-2

This adapter is used to connect the iC5000 and the iC5700 development system to the Cortex based target. It's used to connect to the embedded target featuring a 20-pin 1.27mm target debug connector with the ARM CoreSight 20 pinout. Its operating voltage range is 3.3V - 5.0V. Use [20-pin 1.27mm Low Voltage CoreSight Debug Adapter](#) for voltages below this range. Current version was renamed from Cortex Debug Adapter.

The debug adapter connects to the 25 cm 40-pin ribbon cable coming from the BlueBox and to the target debug connector on the other side.

The following pinout is valid on the target side:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
I	Reference Voltage	Vref	1	2	SWDIO/TMS	JTAG	I/O / O
	Ground	GND	3	4	SWCLK/TCK	JTAG	0
	Ground	GND	5	6	SWO/TDO	JTAG	I
	Not Connected	KEY	7	8	NC/TDI	Not Connected / JTAG	0
	Ground	GND	9	10	nRESET	Reset	I/O
	Reference Voltage / Ground	NC_CAPGND	11	12	TRCLK	Trace Clock	I
	Reference Voltage / Ground	NC_CAPGND	13	14	TRD0	Trace Data	I
	Ground	GND	15	16	TRD1	Trace Data	I
	Ground	GND	17	18	TRD2	Trace Data	I
	Ground	GND	19	20	TRD3	Trace Data	I

20-pin ARM CoreSight pinout

Blue colored signals are parallel trace signals.

Signal Direction is described from the BlueBox perspective.



When connecting the BlueBox to a target for the first time, double check that the debug adapter pinout matches the Target connector. A mismatch can result in a hardware failure.

The debug adapter features resettable fuses on pins 1, 2, 4, 6, 8 and 10. These protect debug signals against overcurrent and cycle back to a conductive state after the excessive current fades away. Signals on pins 12, 14, 16, 18 and 20 are protected via 100 ohm serial resistors.

## 20-pin 1.27mm connectors



The debug adapter connects to the target through **one** of the two 20-pin 1.27mm connectors. Note that only one is to be connected to the target!

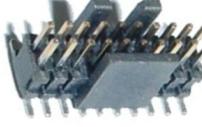
### Strain relief

The robust connector (Samtec FFSD-05-01-N-SR) is located at the end of the cable and is the recommended connection connector. It's a bit wider and therefore the target must have a matching part populated. Matching part on the target side is e.g. Samtec ESHF-105-01-L-D (full frame connector) or Samtec FTSH-105-01-F-DV-K (connector without the frame at the side).

### Standard type

The second connector (Samtec FFSD-05-01-N) is 1cm away from the first one toward the BlueBox (Samtec FFSD-05-01-N). It's much less robust and is prone to fail if the cable is not handled cautiously or just connected/disconnected too many times. This connector should be used when the target doesn't provide the matching target connector for the Strain relief type connector. Matching part on the target is Samtec SHF-105-01-L-D or Samtec FTSH-105-01-F-DV-K (connector without the frame at the side).

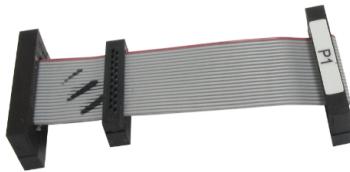
For the target side connector it's most convenient to use the FTSH-105-01-F-DV-K connector since it matches the connector with and without the Strain relief option.

Target connector		✓	
	Robust and less prone to fail	✗	✓
 cca. 19mm	With frame without strain relief (SHF-1xx-01-L-D)	✓	✗
	Without frame (FTSH-1xx-01-L-DV)	✓	✓
 cca. 23mm	With frame with strain relief (ESHF-1xx-01-L-D)	✓	✓

If the 20-pin 1.27 mm pitch ribbon cable gets damaged, it can be ordered as a spare part under

ordering codes:

- IA20PIN20PIN127
- IA20PIN20PIN127-CUST - Custom cable length must be specified at the order.



*Note that the optional length should be reasonable (e.g. 10 cm) since the quality of electrical signals degrades with prolonging the cable.*



*iSYSTEM gives no assurance for BlueBox operation with this cable. The cable is meant to be used only for boundary cases where the BlueBox can't be connected to the target hardware through the standard debug adapter, e.g., due to the physical obstacles of the target system. In such cases, operating the BlueBox at lower debug frequency scan speeds and not using the trace functionality at all, might be still an acceptable compromise. It's up to the user to thoroughly test and qualify the BlueBox operation using a custom-length ribbon cable and to determine working winIDEA settings for the system.*

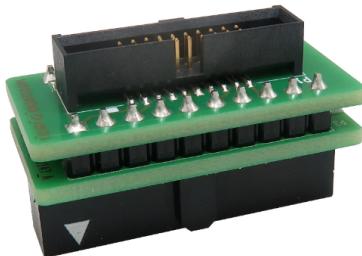


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[Cross Table Converters/Debug Adapters/Active Probes](#)

## 20-pin CoreSight to ARM20 Converter



Ordering code

IA20PINCS20PINARM

This converter is used to connect to embedded targets featuring a [20-pin 1.27mm CoreSight Debug Adapter](#) (Ordering code IC50118-2) or [20-pin 1.27mm Low Voltage CoreSight Debug Adapter](#) (Ordering code IC50118-LV) and converter 40-pin Samtec ERF8 to 10-pin 1.27mm CoreSight&40-pin Samtec ERF8 HSSTP which enables merged Debug and Trace. Refer to ARM HSSTP II Active Probe User Manual for more information.

The following pinout is valid on the target side:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
I	Reference Voltage	Vref	1	2	Vref	Reference Voltage (optional)	I
O	JTAG	nTRST	3	4	GND	Ground	
O	JTAG	TDI	5	6	GND	Ground	
I/O	JTAG/SWD	TMS/SWDIO	7	8	GND	Ground	
O	JTAG/SWD	CLK/SWCLK	9	10	GND	Ground	
	Not Connected	NC	11	12	GND	Ground	
I	JTAG/SWD	TDO/SWO	13	14	GND	Ground	
I/O	Reset	nSRST	15	16	GND	Ground	
	Not Connected	NC	17	18	GND	Ground	
	Not Connected	NC	19	20	GND	Ground	

CoreSight 20 pinout

Signal Direction is described from the BlueBox perspective.



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[Cross Table Converters/Debug Adapters/Active Probes](#)

# 20-pin 1.27mm Cortex SWD + Trace Debug Adapter



Ordering code

IC50118-NETX90

This debug adapter has been introduced to connect the iC5000 and the iC5700 development system to the Hilscher NXHX 90-JTAG Board based on Hilscher NETX90 microcontroller. It's used to connect to the embedded target featuring a 20-pin 1.27mm target debug connector with the ARM Cortex SWD + Trace 20 pinout. Its operating voltage range is **3.3V - 5.0V**. The debug adapter connects to the 25 cm 40-pin ribbon cable coming from the BlueBox and to the target debug connector on the other side.

Specific to the aforementioned Hilscher Board is that only the SWD debug interface can be used. The Board has trace clock (output from the CPU) signal for some reason additionally routed to the JTAG TDI pin on the target debug connector. To prevent signal collision, the TDI is not connected on the debug adapter side and consequentially only the SWD debug interface is supported.

The following pinout is valid on the target side:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
I	Reference Voltage	Vref	1	2	SWDIO	SWD IO	I/O
	Ground	GND	3	4	SWCLK	SWD Clock	0
	Ground	GND	5	6	SWO	SWD	I
	Not Connected	KEY	7	8	NC	Not Connected	
	Ground	GND	9	10	nRESET	Reset	I/O
	Reference Voltage/Ground	NC_CAPGND	11	12	TRCLK	Trace Clock	I
	Reference Voltage/Ground	NC_CAPGND	13	14	TRD0	Trace Data	I
	Ground	GND	15	16	TRD1	Trace Data	I
	Ground	GND	17	18	TRD2	Trace Data	I
	Ground	GND	19	20	TRD3	Trace Data	I

ARM Cortex SWD + Trace 20 pinout

Blue colored signals are parallel trace signals.

Signal Direction is described from the BlueBox perspective.



*When connecting the BlueBox to a target for the first time, double check that the debug adapter pinout matches the Target connector. A mismatch can result in a hardware failure.*

## 20-pin 1.27mm connectors



The debug adapter connects to the target through **one** of the two 20-pin 1.27mm connectors. Note that only one is to be connected to the target!

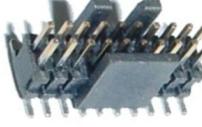
### Strain relief

The robust connector (Samtec FFSD-05-01-N-SR) is located at the end of the cable and is the recommended connection connector. It's a bit wider and therefore the target must have a matching part populated. Matching part on the target side is e.g. Samtec ESHF-105-01-L-D (full frame connector) or Samtec FTSH-105-01-F-DV-K (connector without the frame at the side).

### Standard type

The second connector (Samtec FFSD-05-01-N) is 1cm away from the first one toward the BlueBox (Samtec FFSD-05-01-N). It's much less robust and is prone to fail if the cable is not handled cautiously or just connected/disconnected too many times. This connector should be used when the target doesn't provide the matching target connector for the Strain relief type connector. Matching part on the target is Samtec SHF-105-01-L-D or Samtec FTSH-105-01-F-DV-K (connector without the frame at the side).

For the target side connector it's most convenient to use the FTSH-105-01-F-DV-K connector since it matches the connector with and without the Strain relief option.

Target connector		✓	
	Robust and less prone to fail	✗	✓
	With frame without strain relief (SHF-1xx-01-L-D)	✓	✗
	Without frame (FTSH-1xx-01-L-DV)	✓	✓
	With frame with strain relief (ESHF-1xx-01-L-D)	✓	✓

If the 20-pin 1.27 mm pitch ribbon cable gets damaged, it can be ordered as a spare part under ordering codes:

- IA20PIN20PIN127
- IA20PIN20PIN127-CUST - Custom cable length must be specified at the order.



*Note that the optional length should be reasonable (e.g. 10 cm) since the quality of electrical signals degrades with prolonging the cable.*



*iSYSTEM gives no assurance for BlueBox operation with this cable. The cable is meant to be used only for boundary cases where the BlueBox can't be connected to the target hardware through the standard debug adapter, e.g., due to the physical obstacles of the target system. In such cases, operating the BlueBox at lower debug frequency scan speeds and not using the trace functionality at all, might be still an acceptable compromise. It's up to the user to thoroughly test and qualify the BlueBox operation using a custom-length ribbon cable and to determine working winIDEA settings for the system.*



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[Cross Table Converters/Debug Adapters/Active Probes](#)

# 20-pin 1.27mm Low Voltage CoreSight Debug Adapter



Ordering code

IC50118-LV

This adapter is used to connect the iC5000 and the iC5700 development system to the Cortex based target featuring debug interface operating at voltages **below 3.3V**. Its operating voltage range is **1.65V - 3.6V**. It's used to connect to the embedded target featuring a 20-pin 1.27mm target debug connector with the ARM CoreSight 20 pinout.

The debug adapter connects to the 25 cm 40-pin ribbon cable coming from the BlueBox and to the target debug connector on the other side.

Some embedded targets acquire additional converters which enable merged Debug and Trace via ARM HSSTP Active Probe II. Refer to [20-pin 1.27mm CoreSight Debug Adapter](#) or ARM HSSTP II Active Probe User Manual for more information.

The following pinout is valid on the target side:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
I	Reference Voltage	Vref	1	2	SWDIO/TMS	JTAG	I/O / O
	Ground	GND	3	4	SWCLK/TCK	JTAG	0
	Ground	GND	5	6	SWO/TDO	JTAG	I
	Not Connected	KEY	7	8	NC/TDI	Not Connected / JTAG	0
	Ground	GND	9	10	nRESET	Reset	I/O
	Reference Voltage / Ground	NC_CAPGND	11	12	TRCLK	Trace Clock	I
	Reference Voltage / Ground	NC_CAPGND	13	14	TRD0	Trace Data	I
	Ground	GND	15	16	TRD1	Trace Data	I
	Ground	GND	17	18	TRD2	Trace Data	I
	Ground	GND	19	20	TRD3	Trace Data	I

20-pin ARM CoreSight pinout

Blue colored signals are parallel trace signals.

Signal Direction is described from the BlueBox perspective.



When connecting the BlueBox to a target for the first time, double check that the debug adapter pinout matches the Target connector. A mismatch can result in a hardware failure.

## 20-pin 1.27mm connectors



The debug adapter connects to the target through **one** of the two 20-pin 1.27mm connectors. Note that only one is to be connected to the target!

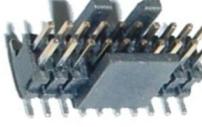
### Strain relief

The robust connector (Samtec FFSD-05-01-N-SR) is located at the end of the cable and is the recommended connection connector. It's a bit wider and therefore the target must have a matching part populated. Matching part on the target side is e.g. Samtec ESHF-105-01-L-D (full frame connector) or Samtec FTSH-105-01-F-DV-K (connector without the frame at the side).

### Standard type

The second connector (Samtec FFSD-05-01-N) is 1cm away from the first one toward the BlueBox (Samtec FFSD-05-01-N). It's much less robust and is prone to fail if the cable is not handled cautiously or just connected/disconnected too many times. This connector should be used when the target doesn't provide the matching target connector for the Strain relief type connector. Matching part on the target is Samtec SHF-105-01-L-D or Samtec FTSH-105-01-F-DV-K (connector without the frame at the side).

For the target side connector it's most convenient to use the FTSH-105-01-F-DV-K connector since it matches the connector with and without the Strain relief option.

Target connector		✓	
	Robust and less prone to fail	✗	✓
	With frame without strain relief (SHF-1xx-01-L-D)	✓	✗
	Without frame (FTSH-1xx-01-L-DV)	✓	✓
	With frame with strain relief (ESHF-1xx-01-L-D)	✓	✓

If the 20-pin 1.27 mm pitch ribbon cable gets damaged, it can be ordered as a spare part under ordering codes:

- IA20PIN20PIN127
- IA20PIN20PIN127-CUST - Custom cable length must be specified at the order.



*Note that the optional length should be reasonable (e.g. 10 cm) since the quality of electrical signals degrades with prolonging the cable.*



*iSYSTEM gives no assurance for BlueBox operation with this cable. The cable is meant to be used only for boundary cases where the BlueBox can't be connected to the target hardware through the standard debug adapter, e.g., due to the physical obstacles of the target system. In such cases, operating the BlueBox at lower debug frequency scan speeds and not using the trace functionality at all, might be still an acceptable compromise. It's up to the user to thoroughly test and qualify the BlueBox operation using a custom-length ribbon cable and to determine working winIDEA settings for the system.*

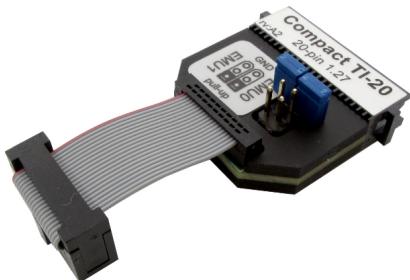


[How to connect iSYSTEM Hardware \(Video Tutorial\)](#)



[Cross Table Converters/Debug Adapters/Active Probes](#)

# 20-pin 1.27 x 2.54mm Compact TI-20 Debug Adapter



Ordering code

IC50119

This debug adapter is used to connect the iC5000 and the iC5700 BlueBox to the Cortex-M based target. It's used to connect to the embedded target featuring a 20-pin 1.27 x 2.54 mm target debug connector with the Compact TI-20 pinout.

The debug adapter connects to the 25 cm 40-pin ribbon cable coming from the BlueBox and to the target debug connector on the other side.

The following pinout is valid on the target side:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
O	JTAG	TMS	1	2	nTRST	JTAG	O
O	JTAG	TDI	3	4	GND	Ground	
I	Reference Voltage	Vref	5	6	KEY	Not connected	
I	JTAG	TDO	7	8	GND	Ground	
I	Return TCK	RTCK	9	10	GND	Ground	
O	JTAG	TCK	11	12	GND	Ground	
I	Emulation pins	EMU0	13	14	EMU1	Emulation pins	I
I/O	Reset	nRESET	15	16	GND	Ground	
I	Emulation pins	EMU2	17	18	EMU3	Emulation pins	I
I	Emulation pins	EMU4	19	20	GND	Ground	

20-pin Compact TI-20 pinout

Signal Direction is described from the BlueBox perspective.



When connecting the BlueBox to a target for the first time, double check that the debug adapter pinout matches the Target connector. A mismatch can result in a hardware failure.

20-pin 1.27 x 2.54mm Compact TI-20 Debug Adapter features resettable fuses on all pins except for pin 9, 13, 14, 17-19. These fuses protect debug signals against overcurrent and cycle back to a conductive state after the excessive current fades away. Signals on pins 13, 14, 17-19 are protected via 100 ohm serial resistors.

## Jumpers J1 and J2

Jumpers J1 and J2 selects whether the EMU0 (J1) or the EMU1 (J2) is tied to pull-up (position 1-2) or directly to the GND (position 2-3).

The EMU signals' functions may vary from board to board. See target board manual and schematics for more information on how to set the jumpers.

The debug adapter connects to the target via a 20-pin 1.27 x 2.54 mm connector, for example Sullins Connector Solutions: SFH41-PPP-B-D10-ID-BK. A target should feature a matching part, for example Samtec FTR-110-51-G-D-P.

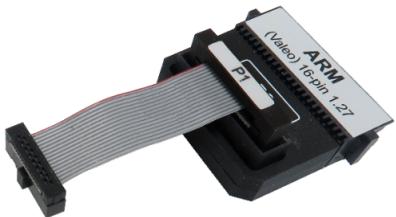


[How to connect iSYSTEM Hardware \(Video Tutorial\)](#)



[Cross Table Converters/Debug Adapters/Active Probes](#)

# 16-pin 1.27mm Custom ARM Debug Adapter



Ordering code

IC50120

This debug adapter is used to connect the iC5000 and the iC5700 BlueBox to the Cortex-M based target. It's used to connect to the embedded target featuring a 16-pin 1.27 mm pitch target debug connector with the **custom** ARM pinout.

The debug adapter connects to the 25 cm 40-pin ribbon cable coming from the BlueBox and to the target debug connector on the other side.

The following pinout is valid on the target side:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
I	JTAG	TCK	1	2	GND	Ground	
O	JTAG	TMS	3	4	GND	Ground	
I	JTAG	TDO	5	6	GND	Ground	
O	JTAG	TDI	7	8	GND	Ground	
O	Reset	TRST	9	10	GND	Ground	
I	Reference Voltage	Vref	11	12	GND	Ground	
O	Power Reset	nRESET	13	14	GND	Ground	
	Not Connected	NC	15	16	GND	Ground	

16-pin custom ARM pinout

Signal Direction is described from the BlueBox perspective.



When connecting the BlueBox to a target for the first time, double check that the debug adapter pinout matches the Target connector. A mismatch can result in a hardware failure.

The debug adapter features resettable fuses on pins 1, 3, 5, 7, 9, 11 and 13. These protect debug signals against overcurrent. These fuses cycle back to a conductive state after the excessive current fades away. The adapter connects to the target via a 16-pin 1.27mm connector, for example Samtec FFSD-08-01-N. A target should feature a matching part, for example Samtec FTSH-108-01-F-DV-K.



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[Cross Table Converters/Debug Adapters/Active Probes](#)

# 14-pin 2.54mm MPC5xxx Debug Adapter



Ordering code

IC50150

This debug adapter is used to connect the iC5000 and the iC5700 BlueBox to the MPC5xxx/SPC5 based target. It's used to connect to the embedded target featuring a 14-pin 2.54mm pitch target debug connector with the MPC5xxx/SPC5 pinout.

The debug adapter connects to the 25 cm 40-pin ribbon cable coming from the BlueBox and to the target debug connector on the other side.

The following pinout is valid on the target side:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
0	JTAG	TDI	1	2	GND	Ground	
I	JTAG	TDO	3	4	GND	Ground	
0	JTAG	TCK	5	6	GND	Ground	
0	Nexus Event Input	nEVTI(EVTIO)	7	8	PORST	Power On Reset	I/O
I/O	Reset	nRESET	9	10	TMS	JTAG	0
I	Reference Voltage	Vref	11	12	GND	Ground	
	Not Connected	NC	13	14	JCOMP	JTAG TRST (optional)	0

14-pin MPC5xxx & SPC5 target pinout

Signal Direction is described from the BlueBox perspective.



When connecting the BlueBox to a target for the first time, double check that the debug adapter pinout matches the Target connector. A mismatch can result in a hardware failure.

14-pin 2.54mm MPC5xxx Debug Adapter features resettable fuses on all connected pins. These protect debug signals against overcurrent and cycle back to a conductive state after the excessive current fades away.

Mandatory pins on the microcontroller side are the GND, Vref, nRESET, TMS, TDI, TDO and TCK.



Pin 8 (Power on reset) is supported with the debug adapter C1 or newer.

The JCOMP is an optional pin. Some microcontrollers don't have this pin. Internally, this is actually the JTAG TRST, which resets the JTAG TAP state machine. Because the JTAG TAP state machine can be reset also by the TMS and the TCK, this pin is optional also for the debugger. If the microcontroller has the JCOMP pin but it is not connected to the target debug connector, it must be set to the non-active state in the target via a pull-up resistor. If not, then the JTAG TAP state machine remains in reset and debugging is not possible.

## Jumper J1 (TCK)

If the TCK (debug JTAG clock) signal path from the target debug connector to the target microcontroller is not designed as a single point to point connection, user may experience signal integrity problems. For example, the TCK signal degrades electrically if it's is routed to multiple points, e.g. to the target microcontroller and also to some other IC(s), or expansion connector(s) or even to another PCB. In such cases, signal integrity gets improved by adding a buffer on the TCK driver side (J1: position 2-3).

Normally jumper J1 should be kept in default 1-2 position. When experiencing problems with the initial debug connection or just unstable operation of the debugger, position 2-3 should be tested.



*Jumper J1 was introduced with the debug adapter revision D1. Earlier versions don't provide this jumper.*

## Jumper J2

The jumper J2 has been put on the debug adapter for making provision for future extensions. The EVTI signal (pin 7) is connected to this jumper. Keep the jumper in "not bridged" position (default) since it has no functionality for the time being.



*Jumper J2 has been introduced with the debug adapter revision C1. Earlier versions don't provide this jumper.*

The debug adapter connects to the target via a 14-pin 2.54 mm connector, for example Yamaichi FAS-1401-2101-2-0BF. A target should feature a matching part, for example WÜRTH ELEKTRONIK: 612 014 216 21.

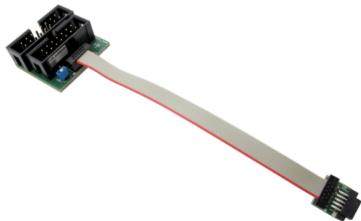


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[Cross Table Converters/Debug Adapters/Active Probes](#)

# ECU14 JTAG 10-pin 1.27mm Converter



Ordering code

IAMPC-TC2ECU14

The ECU14 connector and the pinout has been defined by Bosch. A converter connecting at the end of the [14-pin 2.54mm MPC5xxx Debug Adapter](#) (IC50150) is available for the MPC5xxx/SPC5 embedded target featuring the ECU14 10-pin 1.27mm connector and must be ordered separately.



*This converter supports only the JTAG debug interface.*

Note that this converter can be used either for MPC5xxx/SPC5 architecture or Infineon TriCore architecture since both can feature ECU14 target connection connector. For this reason the converter provides two "input" connectors. Use 14-pin 2.54 mm connector when used for the MPC5xxx/SPC5 architecture.

If the converter would be used for Infineon TriCore architecture, 16-pin 2.54 mm connector would be used. Don't use this "input" in conjunction with the MPC5xxx/SPC5 architecture.

The following pinout is valid on the target side:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
	Ground	GND	1	2	TCLK	JTAG	0
0	JTAG TRST (optional)	nJCOMP	3	4	TDO	JTAG	1
0	JTAG	TMS	5	6	TDI	JTAG	0
I/O	User specific	USERIO	7	8	Vref	Reference Voltage	1
	Not Connected	NC	9	10	nRESET	Reset	0

*10-pin Bosch ECU14 target pinout*

Signal Direction is described from the BlueBox perspective.



*When connecting the BlueBox to a target for the first time, double check that the debug adapter pinout matches the Target connector. A mismatch can result in a hardware failure.*

## Jumper J2

The jumper J2 is optional and by default not bridged. It connects 10k pull-down resistor to the USERIO pin when bridged. The jumper has been introduced for a custom target, where the target watchdog gets disabled during the debugging, when low level at the USERIO signal (pin 7) is detected.

The converter connects to the target via a 10-pin 1.27mm connector, Samtec SFM-105-01-S-D). A target should feature a matching part, for example Samtec TFM-105-01-L-D.



*This converter is used only in conjunction with the [14-pin 2.54mm MPC5xxx Debug Adapter](#) (Ordering code IC50150) or alternatively with the [16-pin 2.54mm Infineon JTAG Debug Adapter](#) (Ordering code IC50160) when used for TriCore architecture.*



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[Cross Table Converters/Debug Adapters/Active Probes](#)

# MPC 14-pin JTAG to MPC Samtec 34-pin Converter



Ordering code

IAMPCPIN14SAM34

This converter connects between the [14-pin 2.54mm MPC5xxx Debug Adapter](#) (IC50150) and the MPC5xxx/SPC5 embedded target featuring a 34-pin Samtec ERF8 connector exposing Aurora trace interface. Only debugging (no trace) is possible through this converter.

The converter must be ordered separately.

The following pinout is valid on the target side:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
	Not Connected	NC	1	2	Vref	Reference Voltage	I
	Not Connected	NC	3	4	TCK	JTAG	O
	Ground	GND	5	6	TMS	JTAG	O
	Not Connected	NC	7	8	TDI	JTAG	O
	Not Connected	NC	9	10	TDO	JTAG	I
	Ground	GND	11	12	nJCOMP	JTAG TRST (optional)	O
	Not Connected	NC	13	14	NC	Not Connected	
	Not Connected	NC	15	16	<a href="#">~EVTIO</a>	Nexus Event Input	O (not used)
	Ground	GND	17	18	Not Connected	NC	
	Not Connected	NC	19	20	nPORST	Power On Reset	O
	Not Connected	NC	21	22	nRESET	Reset	IO
	Ground	GND	23	24	GND	Ground	
	Not Connected	NC	25	26	Not Connected	NC	O
	Not Connected	NC	27	28	Not Connected	NC	O
	Ground	GND	29	30	GND	Ground	
	Not Connected	NC	31	32	NC	Not Connected	
	Not Connected	NC	33	34	NC	Not Connected	

34-pin MPC Samtec pinout

Blue colored signals are parallel trace signals.

Signal Direction is described from the BlueBox perspective.



When connecting the BlueBox to a target for the first time, double check that the debug adapter pinout matches the Target connector. A mismatch can result in a hardware failure.

# 38-pin Mictor MPC5xxx Nexus 16-bit Debug Adapter



Ordering code	IC50152
	IC50152-12

This debug adapter is used to connect the iC5000 and the iC5700 BlueBox to NXP MPC5xxx / ST SPC5 based target. It's used to connect to the embedded target featuring a 38-pin Mictor target debug connector with the MPC5xxx Nexus pinout.

The debug adapter connects to the BlueBox through the two ribbon cables and to the target debug connector on the other side.

The debug adapter features a standard ribbon cable length, which is cca. 24 cm. A debug adapter with shorter cable length, 12 cm, (Ordering code IC50152-12) is used for situations when standard length doesn't work e.g. due to a badly designed target board layout where reliable Nexus trace capture with the standard 24 cm ribbon cable cannot be achieved.

## Jumper J2 (EVTIN)

Under some circumstances it can happen that the debugger cannot find any absolute program counter message in the analyzed Nexus trace stream. Consequently, the program trace reconstruction fails and errors or nothing gets displayed in the trace window. To avoid such situations, the BlueBox can feed periodic signal to the EVTIN CPU pin connecting to the on-chip Nexus trace engine, which then periodically generates and broadcasts program counter synchronization messages.

In order to use this feature, the jumper J2 must be bridged and the *Force periodic Nexus SYNC* option in the *Hardware / CPU Options / Nexus* tab must be checked in winIDEA. Refer to winIDEA Help for more details on the [\*Force periodic Nexus SYNC\*](#) option use.

Note that the EVTI (Nexus Event In) CPU pin may be shared with other CPU functionalities. For instance, on the MPC5516 the same pin can operate as the GPIO, the EBI read/write or the EVTI. Whenever the CPU pin is configured and used for the EVTI alternate operation, the J2 must not be populated in order to prevent electrical conflicts.



Typically, there is no need to use the **Force periodic Nexus SYNC** functionality unless a specific application code is traced, which does not generate messages containing absolute program counter information. As long as the user has no problems with the trace use, it is recommended to keep the jumper J2 disconnected.



Jumper J2 was introduced with the debug adapter revision N1. Earlier versions don't provide this jumper.

The following pinout is valid on the target side:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
I	Message Data Outputs	MDO12	1	2	MDO13	Message Data Outputs	I
I	Message Data Outputs	MDO14	3	4	MDO15	Message Data Outputs	I
I	Message Data Outputs	MDO9	5	6	NC	Not Connected	
	Not Connected	NC	7	8	MDO8	Message Data Outputs	I
I/O	Reset	nRESET	9	10	EVTIN	Nexus Event Input	O
I	JTAG	TDO	11	12	Vref	Reference Voltage	I
I	Message Data Outputs	MDO10	13	14	NC	Not Connected	I
O	JTAG	TCK	15	16	MDO7	Message Data Outputs	I
O	JTAG	TMS	17	18	MDO6	Message Data Outputs	I
O	JTAG	TDI	19	20	MDO5	Message Data Outputs	I
O	JTAG TRST (optional)	nJCOMP	21	22	MDO4	Message Data Outputs	I
I	Message Data Outputs	MDO11	23	24	MDO3	Message Data Outputs	I
	Not Connected	NC	25	26	MDO2	Message Data Outputs	I
	Not Connected	NC	27	28	MDO1	Message Data Outputs	I
	Not Connected	NC	29	30	MDO0	Message Data Outputs	I
	Not Connected	NC	31	32	EVTO	Nexus Event Output	I
	Not Connected	NC	33	34	MCKO	Message Data Clock	I
	Not Connected	NC	35	36	MSE01	Message Data Clock	I
	Not Connected	NC	37	38	MSE00	Message Data Clock	I

MPC5xxx and SPC56 16-bit Nexus target pinout

Blue colored signals are trace signals.

Signal Direction is described from the BlueBox perspective.

Debug adapter features resettable fuses on pins 9, 10, 11, 12, 15, 17, 19 and 21. These protect debug signals against overcurrent and cycle back to a conductive state after the excessive current fades away. Signals on pins 1, 2, 3, 4, 5, 8, 13, 14, 16, 18, 20, 22, 23, 24, 26, 28, 30, 32, 34, 36 and 38 are protected via 47 ohm serial resistors.

The debug adapter connects to the target via a 38-pin Mictor connector, Tyco Electronics 5767055-1. A target should feature a matching part, for example Tyco Electronics 5767081-1 in the SMT technology.



[How to connect iSYSTEM Hardware \(Video Tutorial\)](#)



[Cross Table Converters/Debug Adapters/Active Probes](#)

# 50-pin ERF8 MPC5xxx Nexus Converter



Ordering code

IAMIC38SAM50MPC

Some targets based on NXP MPC5xxx / ST SPC5 family can feature a 50-pin Samtec ERF8 connector for the Nexus debug interface instead of the popular 38-pin Mictor connector. In this case use and connect the converter to the target first and then connect the [38-pin Mictor MPC5xxx Nexus 16-bit Debug Adapter](#) to the converter.



*It has been noticed that the 50-pin Samtec ERF8 target connector may not always provide good mechanical stability in a vertical direction which can in worst case yield an unreliable debug connection. Special care must be taken when connecting this debug adapter to the target to prevent potential connection problems.*



*When connecting the BlueBox to a target for the first time, double check that the debug adapter pinout matches the Target connector. A mismatch can result in a hardware failure.*

The converter connects to the target via a 50-pin Samtec ERM8 connector, Samtec ERM8-025-01-L-D-EM2-TR. A target should feature a matching part, for example Samtec ERF8-025-05.0-L-DV.



[How to connect iSYSTEM Hardware \(Video Tutorial\)](#)



[Cross Table Converters/Debug Adapters/Active Probes](#)

The following pinout is valid on the target side:

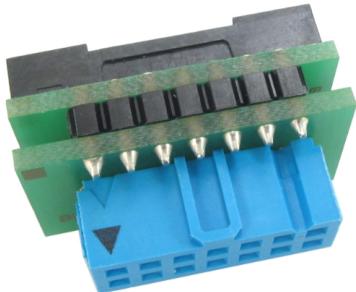
Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
I	Message Data Clock	MSE00	1	2	Vref	Reference Voltage	I
I	Message Data Clock	MSE01	3	4	TCK	JTAG	O
	Ground	GND	5	6	TMS	JTAG	O
I	Message Data Outputs	MD00	7	8	TDI	JTAG	O
I	Message Data Outputs	MD01	9	10	TDO	JTAG	I
	Ground	GND	11	12	nJCOMP	JTAG TRST (optional)	O
I	Message Data Outputs	MD02	13	14	NC	Not Connected	
I	Message Data Outputs	MD03	15	16	EVTI	Nexus Event Input	O
	Ground	GND	17	18	EVTO	Nexus Event Output	I
I	Message Data Clock	MCK0	19	20	nRESET	Reset	O
I	Message Data Outputs	MD04	21	22	NC	Not Connected	O
	Ground	GND	23	24	GND	Ground	
I	Message Data Outputs	MD05	25	26	NC	Not Connected	
I	Message Data Outputs	MD06	27	28	NC	Not Connected	
	Ground	GND	29	30	GND	Ground	
I	Message Data Outputs	MD07	31	32	NC	Not Connected	
I	Message Data Outputs	MD08	33	34	NC	Not Connected	
	Ground	GND	35	36	GND	Ground	
I	Message Data Outputs	MD09	37	38	NC	Not Connected	
I	Message Data Outputs	MD010	39	40	NC	Not Connected	
	Ground	GND	41	42	GND	Ground	
I	Message Data Outputs	MD011	43	44	MD013	Message Data Outputs	I
I	Message Data Outputs	MD012	45	46	MD014	Message Data Outputs	I
	Ground	GND	47	48	GND	Ground	
I	Message Data Outputs	MD015	49	50	NC	Not Connected	

50-pin Samtec ERF8 MPC5xxx Nexus target pinout

Blue colored signals are trace signals.

Signal Direction is described from the BlueBox perspective.

# 14-pin 2.54 mm MPC5xxx Converter



Ordering code

IAMIC38MPCPIN14

MPC5xxx / SPC5 embedded target can also feature only 14-pin 2.54 mm target debug connector exposing debug interface only without the Nexus (trace) interface. iSYSTEM BlueBox can connect to such target through the [38-pin Mictor MPC5xxx Nexus 16-bit Debug Adapter](#) in conjunction with this converter. Connect converter to the target first and then connect the 38-pin Mictor MPC5xxx Nexus 16-bit Debug Adapter to the converter.

The following pinout is valid on the target side:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
0	JTAG	TDI	1	2	GND	Ground	
I	JTAG	TDO	3	4	GND	Ground	
0	JTAG	TCK	5	6	GND	Ground	
	Not Connected	NC	7	8	NC	Not Connected	
I/O	Reset	nRESET	9	10	TMS	JTAG	0
I	Reference Voltage	Vref	11	12	GND	Ground	
	Not Connected	NC	13	14	JCOMP	JTAG TRST (optional)	0

14-pin MPC5xxx / SPC5 target pinout

Signal Direction is described from the BlueBox perspective.



*When connecting the BlueBox to a target for the first time, double check that the debug adapter pinout matches the Target connector. A mismatch can result in a hardware failure.*



[How to connect iSYSTEM Hardware \(Video Tutorial\)](#)



[Cross Table Converters/Debug Adapters/Active Probes](#)

# 50-pin ERF8 MPC5xxx Nexus 16-bit Debug Adapter



Ordering code

IC50156

This debug adapter is used to connect the iC5000 and the iC5700 BlueBox to NXP MPC5xxx or ST SPC56 based target featuring a 50-pin Samtec ERF8 target debug connector with the MPC5xxx Nexus pinout.

The debug adapter connects to the BlueBox through the two ribbon cables and to the target debug connector on the other side.

## Jumper J2 (EVTIN)

Under some circumstances it can happen that the debugger cannot find any absolute program counter message in the analyzed Nexus trace stream. Consequently, the program trace reconstruction fails and errors or nothing gets displayed in the trace window. To avoid such situations, the BlueBox can feed periodic signal to the EVTIN CPU pin connecting to the on-chip Nexus trace engine, which then periodically generates and broadcasts program counter synchronization messages.

In order to use this feature, the jumper J2 must be bridged and the *Force periodic Nexus SYNC* option in the *Hardware / CPU Options / Nexus* tab must be checked in winIDEA. Refer to winIDEA Help for more details on the [\*Force periodic Nexus SYNC\*](#) option use.

Note that the EVTI (Nexus Event In) CPU pin may be shared with other CPU functionalities. For instance, on the MPC5516 the same pin can operate as the GPIO, the EBI read/write or the EVTI. Whenever the CPU pin is configured and used for the EVTI alternate operation, the J2 must not be populated in order to prevent electrical conflicts.



*Typically, there is no need to use the **Force periodic Nexus SYNC** functionality unless a specific application code is traced, which does not generate messages containing absolute program counter information. As long as the user has no problems with the trace use, it is recommended to keep the jumper J2 disconnected.*



*When connecting the BlueBox to a target for the first time, double check that the debug adapter pinout matches the Target connector. A mismatch can result in a hardware failure.*

The following pinout is valid on the target side:

Signal direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal direction
I	Message Data Clock	MSE00	1	2	Vref	Reference Voltage	
I	Message Data Clock	MSE01	3	4	TCK	JTAG	O
	Ground	GND	5	6	TMS	JTAG	O
I	Message Data Outputs	MD00	7	8	TDI	JTAG	O
I	Message Data Outputs	MD01	9	10	TDO	JTAG	I
	Ground	GND	11	12	nTRST	JTAG	O
I	Message Data Outputs	MD02	13	14	NC	Not Connected	
I	Message Data Outputs	MD03	15	16	EVTI	Nexus Event Input	O
	Ground	GND	17	18	EVTO	Nexus Event Output	I
I	Message Data Clock	MCKO	19	20	nRESET	Reset	O
I	Message Data Outputs	MD04	21	22	NC	Not Connected	O
	Ground	GND	23	24	GND	Ground	
I	Message Data Outputs	MD05	25	26	NC	Not Connected	
I	Message Data Outputs	MD06	27	28	NC	Not Connected	
	Ground	GND	29	30	GND	Ground	
I	Message Data Outputs	MD07	31	32	NC	Not Connected	
I	Message Data Outputs	MD08	33	34	NC	Not Connected	
	Ground	GND	35	36	GND	Ground	
I	Message Data Outputs	MD09	37	38	NC	Not Connected	
I	Message Data Outputs	MD010	39	40	NC	Not Connected	
	Ground	GND	41	42	GND	Ground	
I	Message Data Outputs	MD011	43	44	MD013	Message Data Outputs	I
I	Message Data Outputs	MD012	45	46	MD014	Message Data Outputs	I
	Ground	GND	47	48	GND	Ground	
I	Message Data Outputs	MD015	49	50	NC	Not Connected	

50-pin Samtec ERF8 MPC5xxx Nexus target pinout

Blue colored signals are trace signals.

Signal Direction is described from the BlueBox perspective.

50-pin ERF8 MPC5xxx Nexus 16-bit Debug Adapter features resettable fuses on pins 2, 4, 6, 8, 10, 12, 16 and 20. These protect debug signals against overcurrent and cycle back to a conductive state after the excessive current fades away. All other signals are protected via the 47 ohm serial resistor.

The debug adapter connects to the target via a 50-pin Samtec connector, Samtec ERM8-025-01-L-D-EM2. A target should feature a matching part, for example Samtec ERF8-025-05.0-L-DV in the SMT technology.



[How to connect iSYSTEM Hardware \(Video Tutorial\)](#)



[Cross Table Converters/Debug Adapters/Active Probes](#)

# 16-pin 2.54mm Infineon JTAG Debug Adapter



Ordering code

IC50160

This debug adapter is used to connect the iC5000 and the iC5700 BlueBox to Infineon TriCore and XC2000/XC166 based target featuring a 16-pin 2.54mm pitch target debug connector with Infineon JTAG pinout.



*This debug adapter supports only the JTAG debug interface. It doesn't support the DAP debug interface.*

The debug adapter connects to the 25 cm 40-pin ribbon cable coming from the BlueBox and to the target debug connector on the other side.

The following pinout is valid on the target side:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
0	JTAG	TMS	1	2	Vref	Reference voltage	1
1	JTAG	TDO	3	4	GND	Ground	
0	(optional)	CPUCLK	5	6	GND	Ground	
0	JTAG	TDI	7	8	nRESET	Power On Reset	0
0	JTAG	TRST	9	10	BRK_OUT	Break Output	1
0	JTAG	TCLK	11	12	GND	Ground	
0	Break Input	BRK_IN	13	14	OCDS_E	(optional)	0
	Not Connected	NC	15	16	NC	Not Connected	

16-pin Infineon JTAG target pinout

Signal Direction is described from the BlueBox perspective.



*When connecting the BlueBox to a target for the first time, double check that the debug adapter pinout matches the Target connector. A mismatch can result in a hardware failure.*

This debug adapter features resettable fuses on all connected pins which protect debug signals against overcurrent and cycle back to a conductive state after the excessive current fades away.

Mandatory pins on the microcontroller side are TMS, TDO, TDI, TRST, TCLK and RESET. BRK\_IN and BRK\_OUT signals can be used optionally.

The debug adapter connects to the target via a 16-pin 2.54 mm connector, Yamaichi FAS-1601-2101-2-OBF. A target should feature a matching part, for example WÜRTH ELEKTRONIK 61201621621.

As an alternative to this debug adapter, which communicates with the target TriCore device over the JTAG debug interface, iSYSTEM recommends the [10-pin 1.27mm Infineon DAP2\\_Wide](#)

[Debug Adapter](#) 10-pin (Ordering code IC50163-2) in conjunction with the [16-pin 2.54 mm Infineon JTAG Converter](#) as a preferable solution. In this case iSYSTEM BlueBox communicates with the target TriCore device via the DAP debug interface while physically connecting to the 16-pin target JTAG debug connector. The DAP debug interface is faster comparing to the JTAG debug interface in all aspects and as such provides a smoother winIDEA experience while debugging and testing.



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# AUTO20 20-pin 1.27mm Converter



Ordering code

IAJTAG16AUTO20-AURIX

A converter connecting at the end of the [16-pin 2.54mm Infineon JTAG Debug Adapter](#) (Ordering code IC50160) is available for TriCore embedded target featuring the AUTO20, a 20-pin Automotive target debug connector and must be **ordered separately**.

The following pinout is valid on the target side:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
I	Reference voltage	Vref	1	2	TMS	JTAG	O
	Ground	GND	3	4	TCLK	JTAG	O
	Ground	GND	5	6	TDO	JTAG	I
	Ground	GND	7	8	TDI	JTAG	O
	Ground	GND	9	10	nRESET	Power On Reset	O
	Ground	GND	11	12	NC	Not Connected	
	Ground	GND	13	14	OCDS_E	(optional)	O
	Ground	GND	15	16	TRST	JTAG	O
	Ground	GND	17	18	BRK_IN	Break Input	O
	Ground	GND	19	20	BRK_OUT	Break Output	I

20-pin AUTO20 pinout

Signal Direction is described from the BlueBox perspective.



This converter can only be used in conjunction with the [16-pin 2.54mm Infineon JTAG Debug Adapter](#) (Ordering code IC50160). This debug adapter supports only the JTAG debug interface.

## 20-pin 1.27mm connectors



The debug adapter connects to the target through **one** of the two 20-pin 1.27mm connectors. Note that only one is to be connected to the target!

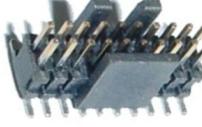
### Strain relief

The robust connector (Samtec FFSD-05-01-N-SR) is located at the end of the cable and is the recommended connection connector. It's a bit wider and therefore the target must have a matching part populated. Matching part on the target side is e.g. Samtec ESHF-105-01-L-D (full frame connector) or Samtec FTSH-105-01-F-DV-K (connector without the frame at the side).

### Standard type

The second connector (Samtec FFSD-05-01-N) is 1cm away from the first one toward the BlueBox (Samtec FFSD-05-01-N). It's much less robust and is prone to fail if the cable is not handled cautiously or just connected/disconnected too many times. This connector should be used when the target doesn't provide the matching target connector for the Strain relief type connector. Matching part on the target is Samtec SHF-105-01-L-D or Samtec FTSH-105-01-F-DV-K (connector without the frame at the side).

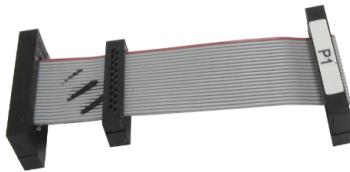
For the target side connector it's most convenient to use the FTSH-105-01-F-DV-K connector since it matches the connector with and without the Strain relief option.

Target connector		✓	
	Robust and less prone to fail	✗	✓
 cca. 19mm	With frame without strain relief (SHF-1xx-01-L-D)	✓	✗
	Without frame (FTSH-1xx-01-L-DV)	✓	✓
 cca. 23mm	With frame with strain relief (ESHF-1xx-01-L-D)	✓	✓

If the 20-pin 1.27 mm pitch ribbon cable gets damaged, it can be ordered as a spare part under

ordering codes:

- IA20PIN20PIN127
- IA20PIN20PIN127-CUST - Custom cable length must be specified at the order.



*Note that the optional length should be reasonable (e.g. 10 cm) since the quality of electrical signals degrades with prolonging the cable.*



*iSYSTEM gives no assurance for BlueBox operation with this cable. The cable is meant to be used only for boundary cases where the BlueBox can't be connected to the target hardware through the standard debug adapter, e.g., due to the physical obstacles of the target system. In such cases, operating the BlueBox at lower debug frequency scan speeds and not using the trace functionality at all, might be still an acceptable compromise. It's up to the user to thoroughly test and qualify the BlueBox operation using a custom-length ribbon cable and to determine working winIDEA settings for the system.*

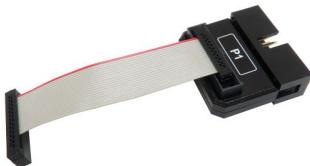


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# AUTO26 26-pin 1.27mm Converter



Ordering code

IAJTAG16AUTO26-AURIX

A converter connecting at the end of the [16-pin 2.54mm Infineon JTAG Debug Adapter](#) (Ordering code IC50160) is available for TriCore embedded target featuring the AUTO26, a 26-pin Automotive target debug connector and must be **ordered separately**.

The following pinout is valid on the target side:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
I	Reference voltage	Vref	1	2	TMS	JTAG	O
	Ground	GND	3	4	TCLK	JTAG	O
	Ground	GND	5	6	TDO	JTAG	I
	Ground	GND	7	8	TDI	JTAG	O
	Ground	GND	9	10	nRESET	Power On Reset	O
	Ground	GND	11	12	NC	Not Connected	
	Ground	GND	13	14	OCDS_E	(optional)	O
	Ground	GND	15	16	TRST	JTAG	O
	Ground	GND	17	18	BRK_IN	Break Input	O
	Ground	GND	19	20	BRK_OUT	Break Output	I
	Not Connected	NC	21	22	NC	Not Connected	
	Not Connected	NC	23	24	NC	Not Connected	
	Not Connected	NC	25	26	NC	Not Connected	

26-pin AUTO26 pinout

Signal Direction is described from the BlueBox perspective.



This converter can only be used in conjunction with the [16-pin 2.54mm Infineon JTAG Debug Adapter](#) (Ordering code IC50160). This debug adapter supports only the JTAG debug interface.

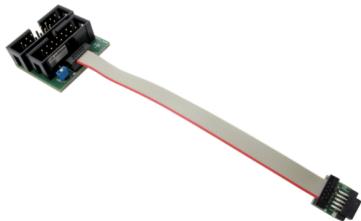


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# ECU14 JTAG 10-pin 1.27mm Converter



Ordering code

IAMPC-TC2ECU14

The ECU14 connector and the pinout has been defined by Bosch. A converter connecting at the end of the [14-pin 2.54mm MPC5xxx Debug Adapter](#) (IC50150) is available for the MPC5xxx/SPC5 embedded target featuring the ECU14 10-pin 1.27mm connector and must be ordered separately.



*This converter supports only the JTAG debug interface.*

Note that this converter can be used either for MPC5xxx/SPC5 architecture or Infineon TriCore architecture since both can feature ECU14 target connection connector. For this reason the converter provides two “input” connectors. Use 14-pin 2.54 mm connector when used for the MPC5xxx/SPC5 architecture.

If the converter would be used for Infineon TriCore architecture, 16-pin 2.54 mm connector would be used. Don’t use this “input” in conjunction with the MPC5xxx/SPC5 architecture.

The following pinout is valid on the target side:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
	Ground	GND	1	2	TCLK	JTAG	0
0	JTAG TRST (optional)	nJCOMP	3	4	TDO	JTAG	1
0	JTAG	TMS	5	6	TDI	JTAG	0
I/O	User specific	USERIO	7	8	Vref	Reference Voltage	1
	Not Connected	NC	9	10	nRESET	Reset	0

*10-pin Bosch ECU14 target pinout*

Signal Direction is described from the BlueBox perspective.



*When connecting the BlueBox to a target for the first time, double check that the debug adapter pinout matches the Target connector. A mismatch can result in a hardware failure.*

## Jumper J2

The jumper J2 is optional and by default not bridged. It connects 10k pull-down resistor to the USERIO pin when bridged. The jumper has been introduced for a custom target, where the target watchdog gets disabled during the debugging, when low level at the USERIO signal (pin 7) is detected.

The converter connects to the target via a 10-pin 1.27mm connector, Samtec SFM-105-01-S-D). A target should feature a matching part, for example Samtec TFM-105-01-L-D.



*This converter is used only in conjunction with the [14-pin 2.54mm MPC5xxx Debug Adapter](#) (Ordering code IC50150) or alternatively with the [16-pin 2.54mm Infineon JTAG Debug Adapter](#) (Ordering code IC50160) when used for TriCore architecture.*



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# 10-pin 1.27mm TriCore ECU14 Debug Adapter



Ordering code

IC50160-ECU14

The ECU14 connector and the pinout has been defined by Bosch and it is used to connect the iC5000 and the iC5700 BlueBox to Infineon TriCore and XC2000/XC166 based target featuring a 10-pin 1.27mm pitch target debug connector with Bosch ECU14 pinout.



*This debug adapter supports only the JTAG debug interface. It doesn't support the DAP debug interface.*

The debug adapter connects to the 25 cm 40-pin ribbon cable coming from the BlueBox and to the target debug connector on the other side.

The following pinout is valid on the target side:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
	Ground	GND	1	2	TCLK	JTAG	0
0	JTAG	nTRST	3	4	TDO	JTAG	I
0	JTAG	TMS	5	6	TDI	JTAG	0
I/O	User specific	USERIO	7	8	Vref	Reference Voltage	I
	Not Connected	NC	9	10	nRESET	Power On Reset	0

10-pin Bosch ECU14 target pinout

Signal Direction is described from the BlueBox perspective.



*When connecting the BlueBox to a target for the first time, double check that the debug adapter pinout matches the Target connector. A mismatch can result in a hardware failure.*

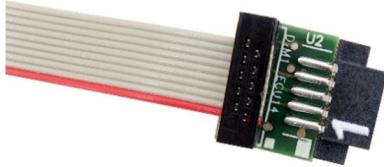
This debug adapter features resettable fuses on all connected pins. These protect debug signals against overcurrent and cycle back to a conductive state after the excessive current fades away. Mandatory pins on the microcontroller side are GND, TMS, TDO, TDI, ~TRST, TCLK and ~RESET. The USERIO signal is used optionally.

## Pin 1 position



The pin next to the alignment pin is pin 10 and not pin 1!

Pin is marked with a number 1 directly on the converter target connector.



The pin 1 position is marked with a small white square on the PCB. Additionally, the pin is marked with a number 1 directly on the debug adapter target connector from revision C1 on.

## Jumper J1

The jumper J1 has been put on the debug adapter only for making provision for future extensions of the "ECU14" target connection.

The USERIO signal (target debug connector pin 7) is connected to the BlueBox output (J1 in the position 1-2) or to the BlueBox input (J1 in the position 2-3). Currently the signal has no functionality and consequentially the J1 doesn't bridge any of the two positions.

## Jumper J2

The jumper J2 is optional and by default not bridged. It connects 10k pull-down resistor to the USERIO pin when bridged.

The jumper has been introduced for a custom target, where the target watchdog gets disabled during the debugging, when low level at the USERIO signal (pin 7) is detected.

The debug adapter connects to the target via a 10-pin 1.27mm connector, Samtec SFM-105-01-S-D. A target should feature a matching part, for example Samtec TFM-105-01-L-D.

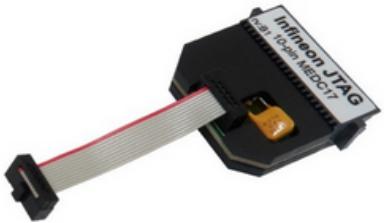


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# 10-pin 1.27mm TriCore MEDC17 Debug Adapter



Ordering code

IC50160-MEDC17

This connector has been defined by Bosch and it is used to connect the iC5000 and the iC5700 BlueBox to Infineon TriCore and XC2000/XC166 based target (via the JTAG debug interface) featuring a 10-pin 1.27mm pitch target debug connector with Bosch MEDC17 pinout.

The debug adapter connects to the 25 cm 40-pin ribbon cable coming from the BlueBox and to the target debug connector on the other side.



*This debug adapter supports only the JTAG debug interface. It doesn't support the DAP debug interface.*

The following pinout is valid on the target side:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
0	Break Input	nBRK_IN	1	2	nTRST	JTAG	0
	Ground	GND	3	4	TCLK	JTAG	0
0	JTAG	TMS	5	6	nBRK_OUT	Break Output	I
0	Power On Reset	nRESET	7	8	TDI	JTAG	0
I	Reference Voltage	Vref	9	10	TDO	JTAG	I

10-pin Bosch MEDC17 target pinout

Signal Direction is described from the BlueBox perspective.



*When connecting the BlueBox to a target for the first time, double check that the debug adapter pinout matches the Target connector. A mismatch can result in a hardware failure.*

This Debug Adapter features resettable fuses on all connected pins. These protect debug signals against overcurrent and cycle back to a conductive state after the excessive current fades away.

Mandatory pins on the microcontroller side are GND, TMS, TDO, TDI, nTRST, TCLK and nRESET. nBRK\_IN and nBRK\_OUT signals can be used optionally.

The debug adapter connects to the target via a 10-pin 1.27mm connector, Samtec FFSD-05-01-N. A target should feature a matching part, for example Samtec SHF-105-01-L-D-TH.



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# 6-pin 2.54mm Infineon I2C Debug Adapter



Ordering code

IC50162

This debug adapter is used to connect the iC5000 and the iC5700 BlueBox to Infineon SP37/SP40 based target featuring a 6-pin 2.54mm pitch target debug connector with Infineon I2C pinout.

The debug adapter connects to the 25 cm 40-pin ribbon cable coming from the BlueBox and to the target debug connector on the other side.

The following pinout is valid on the target side:

Pin	Signal	Signal Description	Signal Direction
1	Vref	Reference Voltage	
2	PP0	SCL (I2C clock line)	I/O
3	PP1	SDA (I2C data line)	I/O
4	GND	Ground	
5	PP2	(optional)	I/O
6	PP3	(optional)	I/O

6-pin 2.54mm Infineon I2C pinout

Signal Direction is described from the BlueBox perspective.



*When connecting the BlueBox to a target for the first time, double check that the debug adapter pinout matches the Target connector. A mismatch can result in a hardware failure.*

6-pin 2.54mm Infineon I2C Debug Adapter features resettable fuses on pins 1, 2, 3, 4, 5 and 6. These fuses protect debug signals against overcurrent and cycle back to a conductive state after the excessive current fades away.

## Emulation Notes

The MCU can run in normal, debug or programming mode. Mode is always selected after power-on and cannot be changed later. Because of this the Vref (pin 1 on the debug connector) is a power supply output from **the emulator and the target power supply (battery) must be removed while debugging**. Before the debug download takes place, power off/on sequence is generated by the emulator and programming mode selected. During the debug download, first user flash is erased, then the application code programmed into the flash and at the end the complete flash is read back. This last step is required since the code memory can be no longer read once the MCU is in the debug mode. Beside of the user flash, the SP41 has also the Firmware ROM which cannot be read by the debugger.

After the debug download, the MCU is reset again since it was in the programming mode during the debug download. This means a power off/on sequence is initiated again and the debug mode selected. This same sequence is also applied when debug reset command is executed from winIDEA. During the debugging (the MCU in the debug mode) two hardware execution breakpoints are available. No software breakpoints in flash are available since the user flash cannot be modified in the debug mode. Real time access is not available.

On-chip debug logic does not implement a stop command. Therefore the MCU cannot be stopped by the debugger while the application is running. The MCU will stop only if hardware execution breakpoint is hit.

Note: The 4-pin "connector" located on the side of the debug adapter is meant for future extensions of debug functionalities. Currently it provides no functionality.

The debug adapter connects to the target via a 6-pin 2.54 mm connector, LUMBERG: 2,5 MBX 06. A target should feature a matching part, e.g., WÜRTH ELEKTRONIK: 613 006 111 21.



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# 10-pin 1.27mm Infineon DAP2 Wide Debug Adapter



Ordering code

IC50163-2

This debug adapter is used to connect the iC5000 and the iC5700 BlueBox to Infineon TriCore and XC2000/XC166 based target featuring a 10-pin 1.27mm pitch target debug connector with Infineon DAP pinout.

The debug adapter connects to the BlueBox through the two ribbon cables and to the target debug connector on the other side.

The following pinout is valid on the target side:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
I	Reference Voltage	Vref	1	2	DAP1	DAP Data pin	I/O
	Ground	GND	3	4	DAP0	DAP clock	0
	Ground	GND	5	6	DAP2	Optional 2d DAP Data pin	I/O
	Not Connected	NC	7	8	DAPEN	DAP Enable	0
	Ground	GND	9	10	nRESET	Reset	I/O

*10-pin Infineon DAP pinout*

Signal Direction is described from the BlueBox perspective.



*When connecting the BlueBox to a target for the first time, double check that the debug adapter pinout matches the Target connector. A mismatch can result in a hardware failure.*

## Jumper J1

Position 1-2 (default) – Normal debug operation is configured. The debugger drives the MCU reset line low during the initial debug connection and then takes control over the microcontroller.

Position 2-3 – Hot Attach operation is configured. All debug signals from the BlueBox are disconnected and the target starts running as soon as the power is applied to the target. When the Hot Attach command is issued from winIDEA, the debugger connects to the MCU and control over the MCU is taken without resetting the MCU. Refer to the [winIDEA Help](#) for more details on the Hot Attach configuration and use.

## 10-pin 1.27mm connectors



The debug adapter connects to the target through **one** of the two 10-pin 1.27mm connectors. Note that only one is to be connected to the target!

### Strain relief

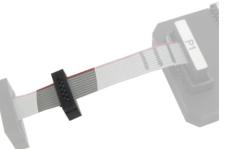
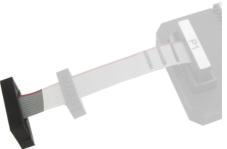
The robust connector (Samtec FFSD-05-01-N-SR) is located at the end of the cable and is the recommended connection connector. It's a bit wider and therefore the target must have a matching part populated. Matching part on the target side is e.g. Samtec ESHF-105-01-L-D (full frame connector) or Samtec FTSH-105-01-F-DV-K (connector without the frame at the side).

### Standard type

The second connector (Samtec FFSD-05-01-N) is 1cm away from the first one toward the BlueBox (Samtec FFSD-05-01-N). It's much less robust and is prone to fail if the cable is not handled cautiously or just connected/disconnected too many times. This connector should be used when the target doesn't provide the matching target connector for the Strain relief type connector. Matching part on the target is Samtec SHF-105-01-L-D or Samtec FTSH-105-01-F-DV-K (connector without the frame at the side).

For the target side connector it's most convenient to use the FTSH-105-01-F-DV-K connector since it matches the connector with and without the Strain relief option.

	<b>Target connector</b>		
	Robust and less prone to fail	✗	✓
 cca. 12mm	With frame without strain relief (SHF-1xx-01-L-D)	✓	✗

	<b>Target connector</b>		
	Without frame (FTSH-1xx-01-L-DV)	✓	✓
 cca. 16 mm	With frame with strain relief (ESHF-1xx-01-L-D)	✓	✓

If the 10-pin 1.27 mm pitch ribbon cable gets damaged, it can be ordered as a spare part under the ordering codes:

- IA10PIN10PIN127
- IA10PIN10PIN127-CUST - Custom cable length must be specified at the order.



Note that the optional length should be reasonable (e.g. 10 cm) since the quality of electrical signals degrades with prolonging the cable.



iSYSTEM gives no assurance for BlueBox operation with this cable. The cable is meant to be used only for boundary cases where the BlueBox can't be connected to the target hardware through the standard debug adapter, e.g., due to the physical obstacles of the target system. In such cases, operating the BlueBox at lower debug frequency scan speeds and not using the trace functionality at all, might be still an acceptable compromise. It's up to the user to thoroughly test and qualify the BlueBox operation using a custom-length ribbon cable and to determine working winIDEA settings for the system.



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# 16-pin 2.54 mm Infineon JTAG Converter



Ordering code

IA10PINDAP16PINJTAG

When TriCore based target features only a 16-pin JTAG debug connector (no 10-pin DAP debug connector) and you have BlueBox with the [10-pin 1.27mm Infineon DAP2 Wide Debug Adapter](#) (Ordering code IC50163-2), iSYSTEM provides a converter converting 16-pin target JTAG debug connector to 10-pin DAP debug connector. DAP debug interface features better performance over the JTAG debug interface. Since the DAP debug interface shares signals with the JTAG debug interface signals, this solution might be even better than the [16-pin 2.54mm Infineon JTAG Debug Adapter](#) (Ordering code IC50160).

The following pinout is available on the target side:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
I/O	JTAG TMS / DAP Data pin	TMS/DAP1	1	2	Vref	Reference voltage	I
I/O	JTAG TDO / Optional 2nd DAP Data pin	TDO/DAP2	3	4	GND	Ground	
	Not Connected	NC	5	6	GND	Ground	
	Not Connected	NC	7	8	nRESET	Power On Reset	0
0	JTAG nTRST / DAP enable (optional)	nTRST*	9	10	NC	Not Connected	I
0	JTAG TCK / DAP clock	TCK/DAP0	11	12	GND	Ground	
	Not Connected	NC	13	14	NC	Not Connected	
	Not Connected	NC	15	16	NC	Not Connected	

Required DAP debug interface signals (**bold**) exposed on the 16-pin JTAG debug connector

Signal Direction is described from the BlueBox perspective.

\* nTRST must be connected since the DAP debug interface selection is configured through this signal when nRESET is released.

Connect the converter to the target JTAG debug connector first and then the BlueBox to the converter via the [10-pin 1.27mm Infineon DAP2 Wide Debug Adapter](#) (ordering code IC50163-2). BlueBox must be configured for DAP debug interface operation in this setup!



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# ECU14 DAP 10-pin 1.27mm Converter



Ordering code

IADAP10ECU14

The ECU14 connector and the pinout has been defined by Bosch.

The ECU14 DAP 10-pin converter is connecting at the end of the [10-pin 1.27mm Infineon DAP2 Wide D. Adapter](#) (Ordering code IC50163-2) or Infineon DAP/DAPE Active Probe (Ordering code IC57163) acting as a pinout converter is available for TriCore embedded targets featuring the ECU14 10-pin 1.27mm target debug connector. It must be ordered separately.

**A1** - The following pinout is valid on the target side:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
I/O	Ground	GND	1	2	DAP0	DAP clock	0
	Not Connected	NC	3	4	DAP2	Optional 2nd Data pin	I/O
	DAP Data pin	DAP1	5	6	DAPEN	Optional 3rd Data pin	I/O
	Not Connected	NC	7	8	Vref	Reference voltage	I
	Not Connected	NC	9	10	nRESET	Reset	0

Revision A1: 10-pin ECU14 target pinout

**A2** - The following pinout is valid on the target side:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
I/O	Ground	GND	1	2	DAP0	DAP clock	0
	Optional 3rd Data pin	nTRST/DAPE N	3	4	DAP2	Optional 2nd Data pin	I/O
	DAP Data pin	DAP1	5	6	DAPEN	Optional 3rd Data pin	I/O
I/O	Not Connected	NC	7	8	Vref	Reference voltage	I
	Not Connected	NC	9	10	nRESET	Reset	0

Revision A2: 10-pin ECU14 target pinout

Signal Direction is described from the BlueBox perspective.



The pin next to the alignment pin is pin 10 and not pin 1!  
Pin is marked with a number 1 directly on the converter target connector.



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# MEDC17 DAP 10-pin 1.27mm Converter



Ordering code

IADAP10MEDC17

The MEDC17 converter and the pinout has been defined by Bosch.

Converter is connected at the end of the [10-pin 1.27mm Infineon DAP2 Wide D. Adapter](#) (Ordering code IC50163-2) or Infineon DAP/DAPE Active Probe (Ordering code IC57163) acting as a pinout converter and is available for TriCore embedded targets featuring the MEDC17 10-pin 1.27mm target debug connector. The adapter must be ordered separately.

The following pinout is valid on the target side:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
			1	2			
	Ground	GND	3	4	DAP0	DAP clock	0
I/O	DAP Data pin	DAP1	5	6			
I/O	Power on Reset	nRESET	7	8	nTRST/DAPEN	Optional 3rd Data pin	I/O
I/O	Reference Voltage	Vref	9	10	DAP2	Optional 2nd Data pin	I/O

10-pin MEDC17 target pinout

Signal Direction is described from the BlueBox perspective.



*The pin next to the alignment pin is pin 10 and not pin 1!*

*Pin is marked with a number 1 directly on the converter target connector.*



The converter connects to the target via a 10-pin 1.27mm connector, Samtec SFM-105-02-L-D-A. A target should feature a matching part, for example Samtec TFM-105-02-L-D.



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## AUTO20 20-pin 1.27mm Converter



Ordering code

IADAP10AUTO20-AURIX

A converter connecting at the end of the [10-pin 1.27mm Infineon DAP2 Wide D. Adapter](#) or Infineon DAP/DAPE Active Probe acting as a pinout converter is available for TriCore embedded targets featuring the AUTO20 20-pin 1.27mm target debug connector. It must be ordered separately under the IADAP10AUTO20-AURIX ordering code. This device converts from DAP to Auto-20 and support **DAP mode only** with TRST input of MCU help with a pull-up to Vref to ensure this.

### Jumper

20-pin AUTO20 target debug connector optionally provides a watchdog disable (WDTDIS) signal on pin 14. A target can implement watchdog disable function through this pin for more predictable debugging of the target application. Sometimes it's even impossible to debug the target application without disabling the embedded target watchdog logic.

When the BlueBox debugger connects to the CPU through the 20-pin AUTO target debug connector, it optionally forces low or high (depending on the J1 setting) level to the WDTDIS signal, which then yields disabling watchdog logic in the embedded target (when supported by the target).

A jumper is present on the adapter which connects high level (Vref voltage) or low level (GND). Jumper position 1 is marked with a white line.

Jumper position 2 (Default): Not connected

Jumper position 1-2: VREF – WDTDIS

Jumper position 2-3: WDTDIS – GND

The following pinout is valid on the adapter side:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
I	Reference Voltage	Vref	1	2	DAP1	DAP Data pin	I/O
	Ground	GND	3	4	DAP0	DAP clock	0
	Ground	GND	5	6	DAP2	Optional 2nd Data pin	I/O
	Not Connected	NC	7	8	DAPEN	Optional 3rd Data pin	0
	Ground	GND	9	10	nRESET	Reset	0

10-pin DAP pinout

The following pinout is valid on the target side:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
I	Reference Voltage	Vref	1	2	DAP1	DAP Data pin	I/O
	Ground	GND	3	4	DAP0	DAP clock	0
	Ground	GND	5	6	DAP2	Optional 2nd Data pin	I/O
	Not Connected	NC	7	8	DAPEN	Optional 3rd Data pin	0
	Not Connected	NC	9	10	nRESET	Reset	0
	Ground	GND	11	12	NC	Not Connected	
	Ground	GND	13	14	WDTDIS	Watchdog disable	0
	Ground	GND	15	16	nTRST*	JTAG	0
	Ground	GND	17	18	NC	Not Connected	
	Not Connected	NC	19	20	NC	Not Connected	

20-pin AUTO20 pinout

\* Not driven, pull-up 1k to Vref.

Signal Direction is described from the BlueBox perspective.



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# DAP male to USB-C Converter



Ordering code

IADAP10-HSTCU

This converter is used to connect via [10-pin 1.27mm Infineon DAP2 Wide Debug Adapter](#) (Ordering code: IC50163-2) or Infineon DAP/DAPE Active Probe (Ordering code: IC57163) to the USB-C target debug connector. The converter must be ordered separately.



*When attaching this converter to the Active Probe, make sure its **marking A** and **marking B** is aligned and matches with the markings on the Active Probe connector.*

The following pinout is valid on the converter side:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
I	Reference Voltage	Vref	1	2	DAP1	DAP Data pin	I/O
	Ground	GND	3	4	DAP0	DAP clock	0
	Ground	GND	5	6	DAP2	Optional 2nd DAP Data pin	I/O
	Not Connected	NC	7	8	DAP3	Optional 3rd DAP Data pin	I/O
	Ground	GND	9	10	nRESET	Reset	I/O

*10-pin Infineon DAP pinout*

The following pinout is valid on the target side:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
	Ground	GND	A1	B12	NC	Not Connected	
	Not Connected	NC	A2	B11	NC	Not Connected	
	Not Connected	NC	A3	B10	NC	Not Connected	
	Not Connected	NC	A4	B9	NC	Not Connected	
IO	Target Reset Pin	nRESET	A5	B8	DAP1	DAP Data	I
IO	Optional 2nd DAP data	DAP2	A6	B7	nTRST*	JTAG	
IO	Optional 3rd DAP data	DAP3	A7	B6	NC	Not Connected	
O	DAP Clock	DAP0	A8	B5	Vref	Reference Voltage	I
	Not Connected	NC	A9	B4	NC	Not Connected	
	Not Connected	NC	A10	B3	NC	Not Connected	
	Not Connected	NC	A11	B2	NC	Not Connected	
	Ground	GND	A12	B1	GND	Ground	

USB-C pinout

Signal Direction is described from the BlueBox perspective.

\* Permanently pulled-up.



*When connecting the BlueBox to a target for the first time, double check that the debug adapter pinout matches the Target connector. A mismatch can result in a hardware failure.*



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# 10-pin DAP2 to 22-pin ERF8 DAP2 Converter



Ordering code IA10PINDAP22PINSAM

A converter connecting at the end of the 10-pin 1.27 mm DAP debug cable is available for Infineon 22-pin ERF8 Aurix pinout. This converter must be ordered separately.

The following pinout is valid on the target side:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
	Not Connected	NC	1	2	Vref	Reference Voltage	I
	Not Connected	NC	3	4	DAP0	DAP Clock	0
	Ground	GND	5	6	DAP1	DAP Data pin	I/O
	Not Connected	NC	7	8	NC	Not Connected	
	Not Connected	NC	9	10	DAP2	Optional 2nd Data pin	I/O
	Ground	GND	11	12	nTRST	JTAG	0
	Not Connected	NC	13	14	NC	Not Connected	
	Not Connected	NC	15	16	NC	Not Connected	
	Ground	GND	17	18	NC	Not Connected	
	Not Connected	NC	19	20	NC	Not Connected	
	Not Connected	NC	21	22	RESET	Reset	I/O

22-pin ERF8 AURIX target pinout

Signal Direction is described from the BlueBox perspective.



When connecting the BlueBox to a target for the first time, double check that the debug adapter pinout matches the Target connector. A mismatch can result in a hardware failure.

This debug adapter features resettable fuses on pins 2, 4, 5, 6, 10, 11, 12, 17 and 22. These fuses protect debug signals against overcurrent and cycle back to a conductive state after the excessive current fades away.

The debug adapter connects to the target via a 22-pin ERF8 connector, Samtec ASP-137971-02. The target must have populated a matching part, for example Samtec ASP-137969-01, Samtec Series ERF8, Rugged High Speed Socket.



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# 6-pin 2.54mm Infineon CoreSight SP49 Debug Adapter



Ordering code

IC50165

This debug adapter is used to connect the iC5000 and the iC5700 BlueBox to Infineon SP49 based target featuring a 6-pin 2.54mm pitch target debug connector with Infineon SWD pinout.

The debug adapter connects to the 25 cm 40-pin ribbon cable coming from the BlueBox and to the target debug connector on the other side.

The following pinout is valid on the target side:

Pin	Signal	Signal Description	Signal Direction
1	Vref	Reference Voltage	I
2	PP0	SCL (I2C clock line)	I/O
3	PP1	SDA (I2C data line)	I/O
4	GND	Ground	-
5	PP2	SWCLK (optional)	I/O
6	PP3	SWDIO (optional)	I/O

6-pin 2.54mm Infineon SWD pinout

Signal Direction is described from the BlueBox perspective.



*When connecting the BlueBox to a target for the first time, double check that the debug adapter pinout matches the Target connector. A mismatch can result in a hardware failure.*

6-pin 2.54mm Infineon Debug Adapter features resettable fuses on pins 1, 2, 3, 4, 5 and 6. These fuses protect debug signals against overcurrent and cycle back to a conductive state after the excessive current fades away.

## Emulation Notes

The MCU can run in normal or debug mode. Mode is always selected after power-on and cannot be changed later. Because of this the Vref (pin 1) is a power supply output from the emulator and the target power supply (battery) must be removed while debugging. Before the debug download takes place, power off/on sequence is generated by the emulator and programming mode selected. During the debug download, flash is erased and then the application code programmed into the flash. Verification is done on-the-fly by flash controller but can also be performed by the debugger at the end of programming by reading back the flash contents.

SP49 has also the Firmware ROM which cannot be read by the debugger.

If sector lock bytes are used, a Mass Erase and then power off/on cycle needs to be performed before new application can be downloaded.

After the download, it is recommended to reset the MCU (winIDEA can be configured to perform this automatically) so that new flash configuration and sector lock bytes can take effect. This means a power off/on sequence is initiated. Power off/on sequence is also applied when debug reset command is executed. During the debugging (the MCU in the debug mode) two hardware execution breakpoints are available. One hardware breakpoint is reserved for the debugger (stepping, run until etc.). Software breakpoints in flash and modifying flash via Memory window is not available. Real time access is available.

Note: The 4-pin "connector" located on the side of the debug adapter is meant for future extensions of debug functionalities. Currently it provides no functionality.

The debug adapter connects to the target via a 6-pin 2.54 mm connector, LUMBERG: 2,5 MBX 06. A target should feature a matching part, for example WÜRTH ELEKTRONIK: 613 006 111 21.



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# 14-pin 2.54mm Renesas RL78 Debug Adapter



Ordering code

IC50175

This debug adapter is used to connect the iC5000 and the iC5700 BlueBox to Renesas RL78 based target featuring 14-pin 2.54mm pitch target debug connector with the RL78 pinout.

The debug adapter connects to the 25cm 40-pin ribbon cable coming from the BlueBox and to the target debug connector on the other side. Refer to the BlueBox User Manual for more details on connecting the debug adapter.

The following pinout is valid on the target side:

Signal direction	Signal	Pin	Pin	Signal	Signal direction
I/O	NC	1	2	GND	
	NC	3	4	NC	
	TOOL0	5	6	RESET_IN	I
	NC	7	8	VDD	
	EVDD	9	10	RESET_OUT	O
	NC	11	12	GND	
	RESET_OUT	13	14	GND	

14-pin RL78 target pinout

Signal Direction is described from the BlueBox perspective.

If the 'Supply 5V to the target' option is checked in the 'Hardware/Emulation Options/CPU Setup/Advanced' tab, the debugger supplies 5V at the 'VDD' pin (pin 8) on the target debug connector, which can be used to power the target. Maximum target current consumption should not exceed 50mA.

Some RL78 devices may have two power supply pins (EVDD and VDD). Both must be connected to the target debug connector, when the power is provided by the BlueBox.

The EVDD voltage from the pin 9 is used as a target reference voltage when 'Vref' option under the 'Debug I/O levels' setting is checked in the 'Hardware/Emulation Options/Hardware' tab.

If 'RESET IN' (target reset detection) from the microcontroller is not connected to the target debug connector pin 6, 10k ohm pull-up must be connected to this pin or the debugger may exhibit unpredictable behavior.

The debug adapter connects to the target via a 14-pin 2.54 mm connector, for example Yamaichi FAS-1401-2101-2-OBF. A target should feature a matching part, for example WÜRTH ELEKTRONIK 61201421621.



When connecting the BlueBox to a target for the first time, double check that the debug adapter pinout matches the Target connector. A mismatch can result in a hardware failure.

# 14-pin 2.54mm Renesas RH850 Debug Adapter



Ordering code

IC50176

This debug adapter is used to connect the iC5000 and the iC5700 BlueBox to Renesas RH850 based target featuring a 14-pin 2.54 mm pitch target debug connector with the RH850 pinout. The debug adapter connects to the 25 cm 40-pin ribbon cable coming from the BlueBox and to the target debug connector on the other side.

The following pinout is valid on the target side:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
0	Debug Clock	LPDCLK/TCK	1	2	GND	Ground	
0	JTAG	nTRST	3	4	FLMD0	Flash Mode	0
I	Trace / Debug Signal	LPDO/TDO	5	6	NC	Not Connected	
0	Debug Signal	LPDI/TDI	7	8	Vref	Reference Voltage	I
0	JTAG	TMS	9	10	NC	Not Connected	
I	Trace Clock / Debug Clock / Synchronization	LPDCLK0/RDY	11	12	GND	Ground	
I/O	Reset	nRESET	13	14	GND	Ground	

14-pin RH850 target pinout

Signal Direction is described from the BlueBox perspective.



When connecting the BlueBox to a target for the first time, double check that the debug adapter pinout matches the Target connector. A mismatch can result in a hardware failure.

14-pin 2.54mm RH850 Debug Adapter features resettable fuses on all pins except for pin 11. These fuses protect debug signals against overcurrent and cycle back to a conductive state after the excessive current fades away.

A signal on pin 11 is protected via 22 ohm serial resistor.

The debug adapter connects to the target via a 14-pin 2.54 mm connector, Yamaichi FAS-1401-2101-2-OBF. A target should feature a matching part, for example WÜRTH ELEKTRONIK 61201421621.



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# 10-pin 1.27mm Renesas RH850 Debug Adapter



Ordering code

IC50176-EPS

This debug adapter is used to connect the iC5000 and the iC5700 BlueBox to Renesas RH850 based target featuring a 10-pin 1.27 mm pitch target debug connector with the RH850 proprietary (EPS) pinout.

The debug adapter connects to the 25 cm 40-pin ribbon cable coming from the BlueBox and to the target debug connector on the other side.

The following pinout is valid on the target side:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
I	Trace Clock / Debug Clock / Synchronization	LPDCLKO/RDY	1	2	nRESET	Reset	I/O
O	Debug Clock	LPDCLK/TCK	3	4	LPDI/TDI	Debug Signal	O
O	JTAG	TMS	5	6	nTRST	JTAG	O
I	Trace / Debug Signal	LPDO/TDO	7	8	FLMD0	Flash Mode	O
		Vref	9	10	GND	Ground	

10-pin RH850 proprietary (EPS) target pinout

Signal Direction is described from the BlueBox perspective.



*When connecting the BlueBox to a target for the first time, double check that the debug adapter pinout matches the Target connector. A mismatch can result in a hardware failure.*

10-pin 1.27mm RH850 Debug Adapter features resettable fuses on all pins except for pin 1 and pin 10. These fuses protect debug signals against overcurrent and cycle back to a conductive state after the excessive current fades away. A signal on pin 1 is protected via 22 ohm serial resistor.



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## 10-pin 1.27mm connectors



The debug adapter connects to the target through **one** of the two 10-pin 1.27mm connectors. Note that only one is to be connected to the target!

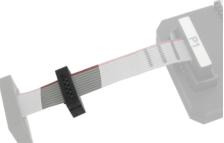
### Strain relief

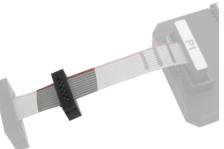
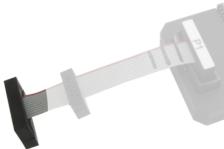
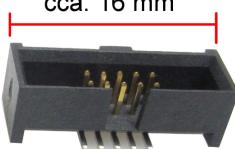
The robust connector (Samtec FFSD-05-01-N-SR) is located at the end of the cable and is the recommended connection connector. It's a bit wider and therefore the target must have a matching part populated. Matching part on the target side is e.g. Samtec ESHF-105-01-L-D (full frame connector) or Samtec FTSH-105-01-F-DV-K (connector without the frame at the side).

### Standard type

The second connector (Samtec FFSD-05-01-N) is 1cm away from the first one toward the BlueBox (Samtec FFSD-05-01-N). It's much less robust and is prone to fail if the cable is not handled cautiously or just connected/disconnected too many times. This connector should be used when the target doesn't provide the matching target connector for the Strain relief type connector. Matching part on the target is Samtec SHF-105-01-L-D or Samtec FTSH-105-01-F-DV-K (connector without the frame at the side).

For the target side connector it's most convenient to use the FTSH-105-01-F-DV-K connector since it matches the connector with and without the Strain relief option.

	Target connector		
	Robust and less prone to fail	✗	✓
 cca. 12mm	With frame without strain relief (SHF-1xx-01-L-D)	✓	✗
	Without frame (FTSH-1xx-01-L-DV)	✓	✓

	<b>Target connector</b>		
 cca. 16 mm	With frame with strain relief (ESHF-1xx-01-L-D)	✓	✓



*Note that the optional length should be reasonable (e.g. 10 cm) since the quality of electrical signals degrades with prolonging the cable.*



*iSYSTEM gives no assurance for BlueBox operation with this cable. The cable is meant to be used only for boundary cases where the BlueBox can't be connected to the target hardware through the standard debug adapter, e.g., due to the physical obstacles of the target system. In such cases, operating the BlueBox at lower debug frequency scan speeds and not using the trace functionality at all, might be still an acceptable compromise. It's up to the user to thoroughly test and qualify the BlueBox operation using a custom-length ribbon cable and to determine working winIDEA settings for the system.*

# 38-pin Mictor RH850 Nexus 16-bit Debug Adapter



Ordering code

IC50177

This debug and trace adapter is used to connect the iC5000 and the iC5700 BlueBox to Renesas RH850 based target featuring a 38-pin Mictor target connector with the RH850/F1H and RH850/F1KM-S4 Nexus pinout.

The debug adapter connects to the BlueBox through the two ribbon cables and to the target debug connector on the other side.



*When connecting the BlueBox to a target for the first time, double check that the debug adapter pinout matches the Target connector. A mismatch can result in a hardware failure.*

## Jumper J1

The jumper J1 on the debug adapter is used to isolate (jumper removed) the target microcontroller EVTI input pin from the debugger, which can optionally control it.

Mictor 38-pin Renesas RH850 Nexus 16-bit Debug Adapter features resettable fuses on pins 9, 11, 12, 15, 17, 19, 21, 37. Fuse on pin 33 is not assembled. The fuses protect debug signals against overcurrent and cycle back to a conductive state after the excessive current fades away. All other signals are protected via 47 ohm serial resistor.

The debug adapter connects to the target via a 38-pin Mictor adapter, Tyco Electronics 5767055-1. A target should feature a matching part, for example Tyco Electronics 5767081-1 in SMT technology.



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[Cross Table Converters/Debug Adapters/Active Probes](#)

The following pinout is valid on the target side:

Signal Direction	Signal Description	Signal	Pin	Pin	Signal	Signal Description	Signal Direction
I	Message Data Outputs	MDO12	1	2	MDO13	Message Data Outputs	I
I	Message Data Outputs	MDO14	3	4	MDO15	Message Data Outputs	I
I	Message Data Outputs	MDO9	5	6	NC	Not Connected	
	Not Connected	NC	7	8	MDO8	Message Data Outputs	I
O	Reset	nRESET	9	10	EVTI	Nexus Event Input	O
I	Trace / Debug Signal	LPDO/TDO	11	12	Vref	Reference Voltage	I
I	Message Data Outputs	MDO10	13	14	LPDCLKO/R DY	Trace Clock / Debug Clock / Synchronization	I
O	Debug Clock	LPDCLK/TC K	15	16	MDO7	Message Data Outputs	I
O	JTAG	TMS	17	18	MDO6	Message Data Outputs	I
O	Debug Signal	LPDI/TDI	19	20	MDO5	Message Data Outputs	I
O	JTAG	nTRST	21	22	MDO4	Message Data Outputs	I
I	Message Data Outputs	MDO11	23	24	MDO3	Message Data Outputs	I
	Not Connected	NC	25	26	MDO2	Message Data Outputs	I
	Not Connected	NC	27	28	MDO1	Message Data Outputs	I
	Not Connected	NC	29	30	MDO0	Message Data Outputs	I
	Not Connected	NC	31	32	EVTO	Nexus Event Output	I
	Not Connected	NC	33	34	MCK0	Message Data Clock	I
	Not Connected	NC	35	36	MSE01	Message Data Clock	I
O	Flash Mode	FLMD0	37	38	MSE00	Message Data Clock	I

RH850/F1H/F1KM 16-bit Nexus target pinout

Blue colored signals are trace signals.

Signal Direction is described from the BlueBox perspective.

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