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■E2 emulator Lite Debugging Function

Target MCU			Connection system	Break Function			Trace Function	Memory reference & change while executing program	Performance measurement	Hot plug-in		
Family	Series/Core	Group		Hardware Break	Software Break	Special Break	Internal trace					
RX	RX700	RX71M	JTAG or Single-wire Serial	8 points for an execution address + 4 points for a data access (DMAC or DTC bus is selectable as a bus master) * Sequential breaks are specifiable.	256 points at the max	Forcible break by selecting "Stop" on emulator debugger	Obtains the information of up to 256 branches or the information of up to 256 cycles on data-access operation (DMAC or DTC bus is selectable as a bus master)	Supported	Supported	Supported *3 *4		
	RX600	RX64M	JTAG or Single-wire Serial	8 points for an execution address + 4 points for a data access (DMAC or DTC bus is selectable as a bus master) * Sequential breaks are specifiable.			Obtains the information of up to 256 branches or the information of up to 256 cycles on data-access operation (DMAC or DTC bus is selectable as a bus master)					
		Others than RX64M	JTAG or double-wire Serial *2 (clock and data)	8 points for an execution address + 4 points for a data access * Sequential breaks are specifiable.			Obtains the information of up to 256 branches or the information of up to 256 cycles on data-access operation					
	RX200		Single-wire Serial	4 points for an execution address + 2 points for a data access * Sequential breaks are specifiable.			Obtains the information of up to 64 branches or the information of up to 64 cycles on data-access operation *1			Not supported		
	RX100						Obtains the information of up to 32 branches or the information of up to 32 cycles on data-access operation					

Notes:

^{*1} For RX220 group, the information of 32 branches or the information of 32 cycles on data-access operation is obtained.^{*2} The debugging function and the connection system vary by the MCU you use.^{*3} Hot-plug Adapter for the E1 Emulator (optional) is required.^{*4} Available only when the emulator is connected via JTAG interface.^{*} The information provided only applies to MCUs where we have been able to confirm the specifications of the emulator.This includes MCUs and emulator software that are under development. For more information on support for these items as it becomes available, check our website at: <http://www.renesas.com/e2lite>

■ E1 Debugging Function

Target MCU			Connection system	Break Function			Trace Function	Memory reference & change while executing program	Performance measurement	Hot plug-in					
Family	Series/Core	Group		Hardware Break	Software Break	Special Break	Internal trace								
RH850	RH850/F1x	RH850/F1H RH850/F1M RH850/F1L	LPD4-pin or LPD1-pin	12 points being shared by an execution address and data access	2000 points for ROM area Not settable for RAM area	Forcible break by selecting "Stop" on emulator debugger	Between 2K and 4K of branch information can be acquired when this is the only target or Between 1K and 2K of cycle information on data-access operation can be acquired when this is the only target Trace function isn't supported in some MCU's.	Supported	supported	Supported*5					
	RH850/C1x	RH850/C1H RH850/C1M	LPD4-pin				Not supported								
	RH850/P1x	RH850/P1M					Obtains the information of up to 128 branches (only branch-source info); the obtainable info is limited to 64 branches on some MCUs.								
RL78	RL78/D1x	RL78/D1A	Single-wire Serial	1 point being shared by an execution address and data access	2000 points		Not supported		Not supported; the time b/w Go and Stop is measurable.	Not supported					
	RL78/F1x	RL78/F12		2 points being shared by an execution address and data access			Obtains the information of up to 256 branches (only branch-source info)								
		RL78/G1x		RL78/F13 RL78/F14	2 points for an execution address		Not supported				Not supported				
	RL78/G14 (ROM: 96KByte and more) RL78/G1F			2 points being shared by an execution address and data access	2000 points		Obtains the information of up to 256 branches (only branch-source info)								
				RL78/G12 RL78/G13 RL78/G14 (ROM: 64KByte and less) RL78/G1A RL78/G1C RL78/G1D RL78/G1E RL78/G1G			1 point being shared by an execution address and data access				Not supported				
				RL78/I1A			2 points being shared by an execution address and data access				Obtains the information of up to 256 branches (only branch-source info)				
	RL78/I1x			RL78/I1B RL78/I1D			1 point being shared by an execution address and data access				Not supported				
		RL78/L1x		RL78/L12 RL78/L13			2 points being shared by an execution address and data access				Obtains the information of up to 256 branches (only branch-source info)				
				RL78/L1C											
	RX	RX700		RX71M	JTAG or Single-wire Serial		8 points for an execution address + 4 points for a data access (DMAC or DTC bus is selectable as a bus master) * Sequential breaks are specifiable.				256 points at the max	Obtains the information of up to 256 branches or the information of up to 256 cycles on data-access operation (DMAC or DTC bus is selectable as a bus master)	Supported	Supported	Supported*5*6
		RX600		RX64M	JTAG or Single-wire Serial		8 points for an execution address + 4 points for a data access (DMAC or DTC bus is selectable as a bus master) * Sequential breaks are specifiable.					Obtains the information of up to 256 branches or the information of up to 256 cycles on data-access operation (DMAC or DTC bus is selectable as a bus master)			
Others than RX64M			JTAG or double-wire Serial *4 (clock and data)	8 points for an execution address + 4 points for a data access * Sequential breaks are specifiable.	Obtains the information of up to 256 branches or the information of up to 256 cycles on data-access operation										
RX200		Single-wire Serial	4 points for an execution address + 2 points for a data access * Sequential breaks are specifiable.	Obtains the information of up to 64 branches or the information of up to 64 cycles on data-access operation *3											
RX100				Obtains the information of up to 32 branches or the information of up to 32 cycles on data-access operation											
V850*1*2	V850E1 V850ES V850E2	JTAG, double-wire or 4-wire Serial (data×2, clock and handshake)		2 points being shared by an execution address and data access * Sequential breaks are specifiable.	4 points for ROM area 2000 points for RAM area		Not supported	Not supported; the time b/w Go and Stop is measurable.	Supported*5						
	V850E2M V850E2S	Nexus or Single-wire Serial	[When using JTAG I/F] Before-execution: 4 points After-execution: 8 points Access: 6 points * Sequential breaks are specifiable.	[When using Serial I/F] Before-execution: 4 points After-execution: Not supported Access: 4 points	8 points for ROM area 2000 points for RAM area										

Notes:

*1. V850E2/ME3 and V850E/ME2 cannot be used with the E1 emulator. Use the MINICUBE for them.

*2. The number of break points varies by the integrated development environment you use.

*3. For RX220 group, the information of 32 branches or the information of 32 cycles on data-access operation is obtained.

*4. The debugging function and the connection system vary by the MCU you use.

*5. Hot-plug Adapter for the E1 Emulator (optional) is required.

*6. Available only when the emulator is connected via JTAG interface.

* The information provided only applies to MCUs where we have been able to confirm the specifications of the emulator.

This includes MCUs and emulator software that are under development. For more information on support for these items as it becomes available, check our website at: <http://www.renesas.com/e1/devices>

■E1 Debugging Function - Continued-

Target MCU			Connection system	Break Function			Trace Function	Memory reference & change while executing program	Performance measurement	Hot plug-in
Family	Series/Core	Group		Hardware Break	Software Break	Special Break	Internal trace			
78K0R			double-wire Serial (clock and data)	1 point being shared by an execution address and data access	2000 points	Forcible break by selecting "Stop" on emulator debugger	Not supported	Supported	Not supported; the time b/w Go and Stop is measurable.	Not supported
78K0				1 point for a before-execution break (only when software breaks are not used)	2000 points		Not supported			
R8C	R8C/Lx		Single-wire Serial	8 points for an address break + 2 points for a data condition break * Sequential breaks are specifiable.	256 points at the max		Obtains the information of 4 branches (sum of the branch-source and branch-destination PC) or the information of up to 8 cycles of specified data access			
	R8C/5x									
	R8C/3xT-A									
	R8C/3x									

Notes:

*1. V850E2/ME3 and V850E/ME2 cannot be used with the E1 emulator. Use the MINICUBE for them.

*2. The number of break points varies by the integrated development environment you use.

*3. For RX220 group, the information of 32 branches or the information of 32 cycles on data-access operation is obtained.

*4. The debugging function and the connection system vary by the MCU you use.

*5. Hot-plug Adapter for the E1 Emulator (optional) is required.

*6. Available only when the emulator is connected via JTAG interface.

* The information provided only applies to MCUs where we have been able to confirm the specifications of the emulator.

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■ E20 Debugging Function

Target MCU			Connection system	Break Function			Trace Function		Memory reference & change while executing program	Performance measurement	Real-time RAM monitor	CO coverage	Hot plug-in						
Family	Series/Core	Group		Hardware Break		Software Break	Special Break	Internal trace						External Trace					
RH850	RH850/F1x	RH850/F1H RH850/F1M RH850/F1L	LPD4-pin or LPD1-pin	12 points being shared by an execution address and data access		2000 points for ROM area Not settable for RAM area		Between 2K and 4K of branch info can be acquired when this is the only target or Between 1K and 2K of cycle info on data-access operation can be acquired when this is the only target Trace function isn't supported in some MCU's.	Not supported		Supported		Supported						
	RH850/C1x	RH850/C1H RH850/C1M	LPD4-pin																
	RH850/P1x	RH850/P1M																	
RL78	RL78/D1x	RL78/D1A	Single-wire Serial	1 point being shared by an execution address and data access		2000 points		Not supported		Not supported; the time b/w Go and Stop is measurable.	Not supported	Not supported	Not supported						
	RL78/F1x	RL78/F12		2 points being shared by an execution address and data access				Obtains the information of up to 128 branches (only branch-source info); the obtainable info is limited to 64 branches on some MCUs.					Supported						
		RL78/F13 RL78/F14																	
	RL78/G1x	RL78/G10		2 points for an execution address		Not supported		Not supported					Not supported						
		RL78/G14 (ROM: 96KByte and more) RL78/G1F		2 points being shared by an execution address and data access		Obtains the information of up to 256 branches (only branch-source info)													
		RL78/G12 RL78/G13 RL78/G14 (ROM: 64KByte and less) RL78/G1A RL78/G1C RL78/G1D RL78/G1E RL78/G1G		1 point being shared by an execution address and data access		Not supported													
		RL78/I1A		2 points being shared by an execution address and data access		Obtains the information of up to 256 branches (only branch-source info)													
		RL78/I1B RL78/I1D		1 point being shared by an execution address and data access		Not supported													
	RL78/L1x	RL78/L12 RL78/L13		2 points being shared by an execution address and data access		Obtains the information of up to 256 branches (only branch-source info)													
		RL78/L1C																	
	RX	RX700		RX71M	JTAG only or Single-wire Serial	8 points for an execution address + 4 points for a data access (DMAC or DTC bus is selectable as a bus master) * Sequential breaks are specifiable.		256 points at the max					Forcible break by selecting "Stop" on emulator debugger	Obtains the information of up to 256 branches or the information of up to 256 cycles on data-access operation (DMAC or DTC bus is selectable as a bus master)	-	Supported	Not supported	Not supported	
					JTAG + External Trace	8 points for an execution address + 4 points for a data access (DMAC or DTC bus is selectable as a bus master) * Sequential breaks are specifiable.								Obtains the information of up to 256 branches or the information of up to 256 cycles on data-access operation (DMAC or DTC bus is selectable as a bus master)	Obtains the information of approx. 2M branches or the information of approx. 2M cycles on data access operation (DMAC or DTC bus is selectable as a bus master)		Supported	(Data- and Last-access attributes [Read/Write/Non-accessed])	
RX600		RX64M	JTAG only or Single-wire Serial	8 points for an execution address + 4 points for a data access (DMAC or DTC bus is selectable as a bus master) * Sequential breaks are specifiable.		Obtains the information of up to 256 branches or the information of up to 256 cycles on data-access operation (DMAC or DTC bus is selectable as a bus master)	-		Not supported	Not supported									
			JTAG + External Trace	8 points for an execution address + 4 points for a data access (DMAC or DTC bus is selectable as a bus master) * Sequential breaks are specifiable.	Obtains the information of up to 256 branches or the information of up to 256 cycles on data-access operation (DMAC or DTC bus is selectable as a bus master)	Obtains the information of approx. 2M branches or the information of approx. 2M cycles on data access operation (DMAC or DTC bus is selectable as a bus master)	Supported		(Data- and Last-access attributes [Read/Write/Non-accessed])										
		Others than RX64M	JTAG only or double-wire Serial *4 (clock and data)	8 points for an execution address + 4 points for a data access * Sequential breaks are specifiable.		Obtains the information of up to 256 branches or the information of up to 256 cycles on data-access operation	-		Not supported	Not supported									
			JTAG or double-wire Serial *4 (clock and data)	8 points for an execution address + 4 points for a data access * Sequential breaks are specifiable.		Obtains the information of up to 256 branches or the information of up to 256 cycles on data-access operation	Obtains the information of approx. 2M branches or the information of approx. 2M cycles on data access operation		Supported	(Data- and Last-access attributes [Read/Write/Non-accessed])									
RX200		RX100	Single-wire Serial	4 points for an execution address + 2 points for a data access * Sequential breaks are specifiable.		Obtains the information of up to 64 branches or the information of up to 64 cycles on data-access operation *3	Not supported		Not supported	Not supported	Not supported								
						Obtains the information of up to 32 branches or the information of up to 32 cycles on data-access operation													

Notes:

*1. V850E2/ME3 and V850E/ME2 cannot be used with the E1 emulator. Use the MINICUBE for them.

*2. The number of break points varies by the integrated development environment you use.

*3. For RX220 group, the information of 32 branches or the information of 32 cycles on data-access operation is obtained.

*4. The debugging function and connection system vary by the MCU you use.

* The information provided only applies to MCUs where we have been able to confirm the specifications of the emulator.

This includes MCUs and emulator software that are under development. For more information on support for these items as it becomes available, check our website at: <http://www.renesas.com/e20/devices>

■ E20 Debugging Function - Continued -

Target MCU			Connection system	Break Function			Trace Function		Memory reference & change while executing program	Performance measurement	Real-time RAM monitor	CO coverage	Hot plug-in	
Family	Series/Core	Group		Hardware Break		Software Break	Special Break	Internal trace						External Trace
V850 *1 *2	V850E1 V850ES V850E2		JTAG, double-wire or 4-wire Serial (data×2, clock and handshake)	2 points being shared by an execution address and data access * Sequential breaks are specifiable.		4 points for ROM area 2000 points for RAM area	Forcible break by selecting "Stop" on emulator debugger	Not supported	Not supported	Supported	Not supported; the time b/w Go and Stop is measurable.	Not supported	Not supported	Not supported
	V850E2M V850E2S		Nexus or Single-wire Serial	[When using JTAG I/F] Before-execution: 4 points After-execution: 8 points Access: 6 points * Sequential breaks are specifiable.	[When using Serial I/F] Before-execution: 4 points After-execution: Not supported Access: 4 points 8 points for ROM area 2000 points for RAM area	Supported								
	78K0R			1 point being shared by an execution address and data access		2000 points								Not supported
78K0			1 point for a before-execution break (only when software breaks are not used) + 1 point for an access break											
R8C	R8C/Lx		Single-wire Serial	8 points for an address break + 2 points for a data condition break * Sequential breaks are specifiable.		256 points at the max		Obtains the information of 4 branches (sum of the branch-source and branch-destination PC) or the information of up to 8 cycles of specified data access						
	R8C/5x													
	R8C/3xT-A													
	R8C/3x													

Notes:

*1. V850E2/ME3 and V850E/ME2 cannot be used with the E1 emulator. Use the MINICUBE for them.

*2. The number of break points varies by the integrated development environment you use.

*3. For RX220 group, the information of 32 branches or the information of 32 cycles on data-access operation is obtained.

*4. The debugging function and connection system vary by the MCU you use.

*5. Available only when the emulator is connected via JTAG interface.

* The information provided only applies to MCUs where we have been able to confirm the specifications of the emulator.

This includes MCUs and emulator software that are under development. For more information on support for these items as it becomes available, check our website at: <http://www.renesas.com/e20/devices>

■ MINICUBE2 Debugging Function

Target MCU			Break Function			RAM Monitor	DMM (Rewriting memories during RUN)	Time Measurement (from the start of execution to break)
Family	Series/ Core	Group	Hardware Break	Software Break	Forcible break			
V850	V850E1 V850ES V850E2		2 points *1 (Shared by an execution and access)	ROM area: 4 points RAM area: 2000 points	Supported *2	Supported	Supported	Measurement resolution: 100 μs Max. measurement time: Approx. 100 hours
	V850E2M V850E2S		Before-execution break : 4 points Access break : 4 points * Sequential breaks are specifiable.	ROM area: 8 points RAM area: 2000 points	Supported			
78K0R			1 point (Shared by an execution and access)	2000 points	Supported	Pseudo-Real RAM Monitor (RRM) : Supported	Supported	Measurement resolution: 100 μs Max. measurement time: Approx. 100 hours
78K0			Before-execution break : 1 point (Not supported when software breaks are used) Access break : 1 point	2000 points	Supported	Pseudo-Real RAM Monitor (RRM) : Supported	Supported	Measurement resolution: 100 μs Max. measurement time: Approx. 100 hours
78K0S			Not supported	2000 points	Supported (Not supported while interrupts are inhibited)	Not supported	Not supported	Measurement resolution: 100 μs Max. measurement time: Approx. 100 hours

Notes:

*1. The following MCUs have not been supported yet: V850ES/KE2, V850ES/KF2, V850ES/KG2, μPD70F3733, and V850ES/IE2.

*2. A forcible break is not possible in the following states.

- Interrupts are inhibited (DI).
- Interrupts from the serial interface used for communications between MINICUBE2 and the target device are masked.
- The device is on standby and triggering of release from standby by makeable interrupts is disabled.
- The main clock is stopped while the UART is being used as the communications interface between MINICUBE2 and the target device.

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This includes MCUs and emulator software that are under development. For more information on support for these items as it becomes available, check our website at:
<http://www.renesas.com/cubesuite+>> "Functions Supported by CubeSuite+"(PDF)

■E10A-USB (HS0005KCU01H/HS0005KCU02H) Debugging Function

Target MCU			Break Function		Performance Measurement Function	Invalid External extension Mode of Embedded ROM	Trace Function								
Family	Series/ Core	Group	Hardware Break	Software Break			Internal Trace	AUD Trace							
SuperH	SH-4A (Except for Multi-core MCUs)		Address/Data/R/W/Execution-count condition break : 2 points + Address/R/W condition break : 4 points + Data/R/W condition break : 2 points + System bus condition break : 2 points * Sequential breaks are specifiable.		255 points	Supported	No Mode	8 branches ◎	Up to 64K events *1 (Up to 32K of branch information can be acquired when branch trace is the only target) ◎						
	SH-4	SH7760 SH7751R	Address/Data/R/W : 2 points + Address/R/W condition break : 4 points * Sequential breaks are specifiable.			Supported	No Mode	8 branches	Up to 64K events *1 (Up to 32K of branch information can be acquired when branch trace is the only target) ◎						
		SH7750R					No Mode		-						
	SH-3	SH7721 SH7720 SH7712 SH7710 SH7705	Address/Data/R/W/Execution-count condition break : 1 point + Address/R/W condition break : 1 point * Sequential breaks are specifiable.			Supported	No Mode	8 branches	Up to 64K branches *1 (Only branch-destination information) ◎						
		SH7727 SH7709S SH7706					No Mode		Up to 26214 branches *1						
	SH-2A (Except for Multi-core MCUs)	SH7206		Address break : 8 points + Address/Data/R/W/Execution-count condition break : 1 point + Address/Data/R/W condition break : 1 point * Sequential breaks are specifiable.		Supported	No Mode	1000 cycles Select the target info from: Address/Data/Status/ Time stamp bus.	Up to 64K events *1 (Up to 32K of branch information can be acquired when branch trace is the only target) ◎						
		SH72AY SH72AW SH72A0 SH72A2					Supported								
		SH7211 SH7216 (SH7216, SH7214) SH7231 SH7237 SH7239 SH7243 SH7285 SH7286								No Mode	256 cycles Select the target info from: Address/Data/Status/ Time stamp bus.				
		SH7670 SH726A SH726B SH7269 SH7268 SH7267 SH7266 SH7264 SH7262 SH7203 SH7263								No Mode					
		SH7201 SH7261								No Mode					
		SH7256R SH7254R								Supported	-				
		SH7253								No Mode					
		SH-2	SH7619 SH7618				Address/Data/R/W/Execution-count condition break : 1 point + Address/R/W condition break : 1 point * Sequential breaks are specifiable.			-	No Mode	4 branches	-		
			SH7145F SH7144F SH7047F				Address break : 4 points * Sequential breaks are specifiable.				-	-	Up to 64K events *2 (Up to 32K of branch information can be acquired when branch trace is the only target)		
			R5F71494A R5F71464A R5F70865A R5F70855A R5F70854A R5F70845A R5F70844A R5F70835A R5F70834A				Address break : 2 points + Address/Data/R/W/Execution-count condition break : 1 point + Address/Data/R/W condition break : 1 point * Sequential breaks are specifiable.			Supported	Supported	4 branches	-		
			SH7137							-	Supported				
			SH7136 SH7125 SH7124							-	No Mode				
	R5E71494R R5E71491R R5E71464R R5E70865R R5E70855R R5E70845R R5E70835R		Address break : 8 points + Address/Data/R/W/Execution-count condition break : 1 point + Address/Data/R/W condition break : 1 point * Sequential breaks are specifiable.			Supported	Supported	1000 cycles Select the target info from: Address/Data/Status/ Time stamp bus.	Up to 64K events *1 (Up to 32K of branch information can be acquired when branch trace is the only target) ◎						
	H8SX		H8SX/1700	H8SX/1720S H8SX/1720		Address break : 3 points + Address/Data/Satisfaction-count condition break : 1 point * Sequential breaks are specifiable.		Supported	- *3	8 branches	-				
			H8SX/1600					-							
		H8SX/1500													
	H8S	H8S/2400	H8S/2472 H8S/2463 H8S/2462	Address break : 6 points + Address/Data condition break : 2 points		-	-	4 branch sources	-						
			H8S/2456R H8S/2456 H8S/2454 H8S/2426R H8S/2426 H8S/2424				Supported	4 branch sources or Bus trace : 1024 cycles							
			H8S/2427R H8S/2427 H8S/2425					8 branch sources							
			H8S/2378 H8S/2378R H8S/2368				Address/Data condition break : 2 points			-	-	4 branch sources or Bus trace : 512 cycles			
			H8S/2319 *4 H8S/2339 *5 H8S/2329 *6							Supported	4 branch sources				
			H8S/2218							-	-	4 branch sources			
		H8S/2200	H8S/2215 *7 H8S/2212	Address/Data condition break : 2 points		-	-	4 branch sources	-						

Notes:

- *1. Not usable with HS0005KCU01H.
- *2. Not usable with HS0005KCU01H. While using RAM monitor function with HS0005KCU02H, no trace information can be acquired.
- *3. Supported only by H8SX/1651.
- *4. Only H8S/2319EF is supported.
- *5. Only H8S/2339EF is supported.
- *6. Only H8S/2329EF is supported.
- *7. Only H8S/2215R and H8S/2215T are supported.

◎ Acquirable trace information:

Branch, Memory access within the specified range, and Software trace (Trace(x): variable x).

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■E10A-USB (HS0005KCU01H/HS0005KCU02H) Debugging Function - Continued-

Target MCU			Break Function		Performance Measurement Function	Invalid External extension Mode of Embedded ROM	Trace Function	
Family	Series/ Core	Group	Hardware Break	Software Break			Internal Trace	AUD Trace
H8S	H8S/2100	H8S/2168 H8S/2153 H8S/2164 H8S/2117 H8S/2117R H8S/2125 H8S/2116 H8S/2113 H8S/2112 H8S/2112R	Address break : 6 points + Address/Data condition break : 2 points	255 points	Not supported	No Mode	4 branch sources	Not supported
		H8S/2189R H8S/2114R	Address break : 6 points + Address/Data condition break : 2 points				4 branch sources or Bus trace : 512 cycles	

Notes:

*1. Not usable with HS0005KCU01H.

*2. Not usable with HS0005KCU01H. While using RAM monitor function with HS0005KCU02H, no trace information can be acquired.

*3. Supported only by H8SX/1651.

*4. Only H8S/2319EF is supported.

*5. Only H8S/2339EF is supported.

*6. Only H8S/2329EF is supported.

*7. Only H8S/2215R and H8S/2215T are supported.

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http://www.renesas.com/e10a_usb/devices

■E10A-USB (HS0005KCU01H/HS0005KCU02H + Debug MCU Board) Debugging Function

Target MCU			Break Function		Performance Measurement Function	Invalid External extension Mode of Embedded ROM	Trace Function	
Family	Series/ Core	Group	Hardware Break	Software Break			Internal Trace	AUD Trace
SuperH	SH-4A	SH7456 SH7455 SH7451 SH7450	Address/Data/R/W/Execution-count condition break : 2 points + Address/R/W condition break : 4 points + Data/R/W condition break : 2 points + System bus condition break : 2 points * Sequential breaks are specifiable.	255 points	Supported	No Mode	8 branches ◎	Up to 64K events *1 (Up to 32K of branch information can be acquired when branch trace is the only target) ◎
	SH-2	SH7125 SH7124	Address break : 8 points + Address/Data/R/W/Execution-count condition break : 1 point + Address/Data/R/W condition break : 1 point * Available to specify the sequential break		Supported	No Mode	1000 cycles Select the target one from Address/Data/Status/Time stamp bus.	Up to 64K events *1 (Up to 32K of branch information can be acquired when branch trace is the only target.) ◎
H8S	H8S/2400	H8S/2456R H8S/2456 H8S/2454 H8S/2426R H8S/2426 H8S/2424	Address break : 6 points + Address/Data condition break : 2 points		Not supported	Supported	4 branch sources or Bus trace : 1024 cycles	Not supported

Note:

*1. Not usable with HS0005KCU01H.

◎ Acquirable trace information: Branch, Memory access within the specified range, and Software trace (Trace(x): variable x).

■E10A-USB (HS0005KCU14H) Debugging Function

Target MCU			Break Function		Performance Measurement Function	Invalid External extension Mode of Embedded ROM	Trace Function	
Family	Series/ Core	Group	Hardware Break	Software Break			Internal Trace	AUD Trace
SuperH	SH-4A (Multi-core MCU)	SH7786	10 points (Using UBC module)	255 points (for each core in MCU)	Supported	No Mode	60 sets of branch sources and destinations	Up to 128K events (Up to 64K of branch information can be acquired when branch trace is the only target) ◎
	SH-2A (Multi-core MCU)	SH7205 SH7265					1024 cycles (When acquiring trace info by core in MCU, 512 cycles respectively.)	

◎ Acquirable trace acquisition information: Branch, Memory access, and General register. (Conditions are setttable by each CPU.)

■ E8a Debugging Function

Target MCU			Break Function			Trace Function	
Family	Series/ Core	Group	Hardware Break	Software Break	Special Break	Internal Trace	
R8C	R8C/Lx		Address break : 8 points + Data condition break : 2 points * Sequential breaks are specifiable.	255 points	Forcible break by selecting "Stop" on emulator debugger	4 branches (sum of branch source PC and destination PC) Up to 8 cycles of specified data access	
	R8C/Mx		Address break : 4 points + Data condition break : 1 point			3 branches (sum of branch source PC and destination PC) or 6 branches (branch source PC) or Up to 8 cycles of specified data access	
	R8C/3x	Other than R8C/3xD	Address break : 8 points + Data condition break : 2 points * Sequential breaks are specifiable.			4 branches (sum of branch source PC and destination PC) or Up to 8 cycles of specified data access	
		R8C/3xD	Address break : 4 points or Address break : 2 points + Data condition break : 1 point			The latest 4 branches (branch source PC)	
	R8C/2x						
	R8C/1x	Other than R8C/10-13					
		R8C/10-13					
M16C	R32C/100		Address break : 8 points			-	
	M32C/80						
	M16C/60	M16C/62P M16C/6Nx M16C/6S	Address break : 8 points + Data condition break : 2 points * Sequential breaks are specifiable.				32 branches of order execution history (sum of branch source PC and destination PC) or Up to 64 cycles of specified data access
		M16C/63 M16C/64A M16C/64C M16C/65 M16C/65C M16C/6C					16 branches of order execution history (sum of branch source PC and destination PC) or Up to 32 cycles of specified data access
		M16C/6S1 M16C/6B					32 branches of order execution history (sum of branch source PC and destination PC) or Up to 64 cycles of specified data access
		M16C/50					-
	M16C/Tiny		Address break : 6 points				
	H8S	H8S/Tiny					Address break : 8 points + Address/Data condition break : 2 points
H8	H8/300H Tiny		Address/Data condition break : 1 point			The latest 4 branch sources	
	H8/300H Super Low Power		Address break : 1 point + Address/Data condition break : 1 point				
	H8/300L Super Low Power		Address/Data condition break : 1 point				
740			Address break : 2 points			-	

* The information provided only applies to MCUs where we have been able to confirm the specifications of the emulator.
This includes MCUs and emulator software that are under development. For more information on support for these items as it becomes available, check our website at:
<http://www.renesas.com/e8a/devices>