

APPENDIX A. RTE-V850/SA1-IE INTERNAL COMMANDS

This document describes the internal commands of the RTE-V850/SA1-IE. These commands can be used as through commands in each debug monitor. Refer to the manual for the respective debug monitors for how to use the commands.

(Example) PARTNER/Win

>& << Selects the through command mode.
>#ENV << Internal command
>& << Exits the through command mode.

Commands

Access break point setting	: ABP, ABP1, ABP2, ABP3, and ABP4 commands.....	A3
Access trace trigger setting #1	: ATP, ATP1, and ATP2 commands.....	A4
Access trace trigger setting #2	: ATP3 command	A5
Environment setting	: env command	A7
Help	: help command	A9
Initialization	: init command	A10
Memory mapping specification	: map command.....	A11
Cache area cancellation	: nc command	A12
Cache area specification	: ncd command	A13
Reset command	: reset command	A14
Real-time RAM monitor base	: rrm command.....	A15
Real-time RAM monitor read	: rrm command	A16
SFR	: sfr command.....	A17
Symbol file read	: symfile and sym commands.....	A18
Execution time display	: time command	A19
Execution trigger point setting	: TP, TP1, and TP2 commands	A20
Trace start and setting	: TRON command	A21
Trace termination	: TROFF command	A22
Trace result display	: TRACE command	A23
Version information display	: ver command	A25

Caution Do not use these commands when equivalent functions are supported by the debugger. If you issue a command when the debugger in use has an equivalent function, contention will occur between them, and either the command or the equivalent function is likely to malfunction.

Command syntax

The internal commands of the RTE-V850/SA1-IE are explained using the following notation.

Command name parameter

* A parameter enclosed in [and] is omissible. The horizontal line (|) separates optional parameters.

The command name is an alphabetic character string. The command name string is separated from the first parameter by a space or tab character. A parameter is specified using an alphabetic character string or hexadecimal number. Parameters are separated by a space or tab character. (No operator can be used for hexadecimal numbers.)

ABP, ABP1, ABP2, ABP3, and ABP4 commands**[Format]**

```

abp [ADDR [DATA [MASK]]] [read|write|access] [byte|hword|word|nosize] [/del]
abp1 [ADDR [DATA [MASK]]] [read|write|access] [byte|hword|word|nosize] [/del]
abp2 [ADDR [DATA [MASK]]] [read|write|access] [byte|hword|word|nosize] [/del]
abp3 [ADDR [DATA [MASK]]] [read|write|access] [byte|hword|word|nosize] [/del]
abp4 [ADDR [DATA [MASK]]] [read|write|access] [byte|hword|word|nosize] [/del]

```

[Parameters]

ADDR : An address value is specified in hexadecimal.

DATA : Data to be accessed is specified in hexadecimal.

MASK : A data mask is specified in hexadecimal.

read|write|access A type of status is specified.

read : Data read

write : Data write

access : Data access

byte|hword|word|nosize The size of data to be accessed is specified.

byte : Byte access

hword : Halfword access

word : Word access

nosize : No access size

/del : Any previous setting by the command is canceled.

[Function]

The ABP, ABP1, ABP2, ABP3, and ABP4 commands set or cancel an access break point. There are four access break points. The abp command specifies an unused break point automatically.

- The abp1, abp2, abp3, and abp4 commands are used to specify a break point explicitly.
- The data mask is used to specify invalid bits in the data.
- If a mask bit is 1, the corresponding data bit will not be compared. If the mask bits are ffffffff, for example, the accessed data will be utterly ignored.

[Example]

```
abp 1020 0 ffffffff access hword
```

A break occurs if a halfword at address 1020H is accessed (regardless of the bit configuration of the data).

```
abp 1020 100 0 write word
```

A break occurs if the word 100H is written to address 1020H.

```
abp2 /del
```

The abp2 command is canceled.

ATP, ATP1, and ATP2 commands**[Format]**

```
atp [ADDR [DATA [MASK]]] [read|write|access] [byte|hword|word|nosize] [/del]
atp1 [ADDR [DATA [MASK]]] [read|write|access] [byte|hword|word|nosize] [/del]
atp2 [ADDR [DATA [MASK]]] [read|write|access] [byte|hword|word|nosize] [/del]
```

[Parameters]

ADDR : An address value is specified in hexadecimal.

DATA : Data to be accessed is specified in hexadecimal.

MASK : A data mask is specified in hexadecimal.

read|write|access A type of status is specified.

read : Data read

write : Data write

access: Data access

byte|hword|word|nosize The size of data to be accessed is specified.

byte : Byte access

hword : Halfword access

word : Word access

nosize : No access size

/del : Any previous setting by the command is canceled.

[Function]

The ATP, ATP1, and ATP2 commands set or cancel an access trigger point. There are two access trigger points. The atp command specifies an unused trigger point automatically.

- The atp1 and atp2 commands are used to specify a trigger point explicitly.
- The data mask is used to specify invalid bits in the data.
- If a mask bit is 1, the corresponding data bit will not be compared.

Example) If the mask bits are ffffffff, the accessed data will be utterly ignored.

When any of these commands is issued, the trace buffer will be cleared, and tracing will newly begin.

[Example]

```
atp 1020 0 ffffffff access hword
```

Triggering occurs if a halfword at address 1020H is accessed (regardless of the bit configuration of the data).

```
atp 1020 100 0 write word
```

Triggering occurs if the word 100H is written to address 1020H.

```
atp2 /del
```

The atp2 command is canceled.

ATP3 command**[Format]**

atp3 [in|out] [ADDR [HADDR [DATA [MASK]]]] [read|write|access] [byte|hword|word|nosize] [/del]
 atp3 [<|>|<>|<=|>|=|eq] [ADDR [DATA [MASK]]] [read|write|access] [byte|hword|word|nosize] [/del]
 atp3 noaddr [DATA [MASK]] [read|write|access] [byte|hword|word|nosize] [/del]

[Parameters]

in|out An address range is specified.
 in : Addresses in a specified range are assumed to be valid.
 ADDR <= trigger address <= HADDR
 out : Addresses out of a specified range are assumed to be valid.
 Trigger address < ADDR, HADDR < trigger address
 ADDR : A lower address value is specified in hexadecimal.
 HADDR : An upper address value is specified in hexadecimal.

<|>|<>|<=|>|=|eq An address condition is specified.
 < : Addresses lower than the specified address are made valid.
 Trigger address < ADDR
 > : Addresses higher than the specified address are made valid.
 Trigger address > ADDR
 <> : Any address not equal to the specified address is made valid.
 Trigger address <> ADDR
 <= : Addresses lower than or equal to the specified address are made valid.
 Trigger address <= ADDR
 >= : Addresses higher than or equal to the specified address are made valid.
 Trigger address >= ADDR
 eq : Any address equal to the specified address is made valid.
 Trigger address = ADDR

noaddr Address conditions are ignored.

DATA : Data to be accessed is specified in hexadecimal.
 MASK : A data mask is specified in hexadecimal.
 read|write|access A type of status is specified.
 read : Data read
 write : Data write
 access: Data access

byte|hword|word|nosize The size of data to be accessed is specified.

byte : Byte access
hword : Halfword access
word : Word access
nosize : No access size

/del : Any previous setting by the command is canceled.

[Function]

The ATP3 command sets or cancels a range-of-address access break point. If in or out is specified as a address range condition, two address values, upper and lower, can be specified. In any other address range specification, only one address value can be specified.

When the command is issued, the trace buffer will be cleared, and tracing will newly begin.

- The data mask is used to specify invalid bits in the data.
- If a mask bit is 1, the corresponding data bit will not be compared. If the mask bits are ffffffff, for example, the accessed data will be utterly ignored.

[Example]

atp3 in 1020 1300 0 ffffffff access hword

Triggering occurs if a halfword at an address between 1020H and 1300H is accessed (regardless of the bit configuration of the data).

atp3 <= 1020 100 0 write word

Triggering occurs if the word 100H is written to address 1020H or lower.

env command**[Format]**

```
env rom[32|64|128|256] ram[1|2|3|4|6|8|10|12|16|20|24|28] [[!]  
reset][[!]  
wait][[!]  
nmi][[!]  
hldrq]  
[w0|w16|w32|w64|w128|w256]
```

[Parameters]

rom[36|64|128|256]

The size of internal ROM is specified. The sizes that can be specified include 32K, 64K, 128K, and 256K. ROM256 should be specified for the RTE-V850/SA1-IE.

ram[1|2|3|4|6|8|10|12|16|20|24|28]

The size of internal RAM is specified. The sizes that can be specified include 1K, 2K, 3K, 4K, 6K, 8K, 10K, 12K, 16K, 20K, 24K, and 28K. RAM8 should be specified for the RTE-V850/SA1-IE.

[[!]
reset]

Whether to mask the RESET pin is specified. Special character ! specifies not to mask the pin.

[[!]
wait]

Whether to mask the WAIT pin is specified. Special character ! specifies not to mask the pin.

[[!]
nmi]

Whether to mask the NMI pin is specified. Special character ! specifies not to mask the pin.

[[!]
hldrq]

Whether to mask the HLDRQ pin is specified. Special character ! specifies not to mask the pin.

[[!]
stop]

For the RTE-V850/SA1-IE, keep this parameter at the initial value (to mask).

[w0|w16|w32|w64|w128|w256]

A wait timeout value is specified.

- w0 specifies to wait permanently.
- The other values specify that a timeout is to occur after 16 to 256 clock cycles.

[Function]

The env command is used to specify various environmental values for the emulation CPU of the RTE-V850/SA1-IE. A parameter may be omitted if it is unnecessary.

- Parameters may be written in any order.
- If parameters that are mutually exclusive are coded, the last to appear is effective.
- After the init command is issued, the initial values are as follows:

The initial values for the V850/SA1 are as follows:

Built-in ROM capacity : 256 K

Built-in RAM capacity : 8 K

Pin masks : Pins (other than the stop pin) are not masked.

Wait time : 256 clock pulses

[Example]

```
env !nmi
```

The NMI pin is not masked.

```
env rom128 w16
```

The capacity of built-in ROM is set to 128 Kbytes. The wait time is specified to be 16 clock pulses.

help command

[Format]

help [command]

[Parameters]

command: The name of the command you want to be helped with. When the command name is omitted, the command list is displayed.

[Function]

The help command displays the help message for each specified command.

[Example]

help map

The information about the map command is displayed.

init command

[Format]

init

[Parameters]

None

[Function]

The init command initializes the RTE-V850/SA1-IE. The mapping information and environmental values are initialized.

The rejection area of the memory cache is not initialized.

map command**[Format]**

map [ADDR LENGTH] [guard|ram|rom|target]

[Parameters]

ADDR : The address of a location where mapping is to begin

LENGTH : The number of bytes to be mapped

[guard|ram|rom|target]: The mapping attributes are specified.

guard : Specifies a guarded area. An attempt to access the guarded area results in an error being detected.

ram : Specifies that the emulation memory be treated as RAM.

rom : Specifies that the emulation memory be treated as ROM.

target : Specifies that the memory of the target system be used.

[Function]

The map command carries out memory mapping. The 1-Mbyte emulation memory can be assigned in address spaces above and below 1M.

- The size of memory assignment can be specified in 64-Kbyte units.

[Example]

map 100000 80000 ram

512 Kbytes starting at 100000h are assigned as emulation RAM.

map 0 100000 guard

1 Mbyte starting at address 0h is assigned as a guard area.

nc command**[Format]**

nc [[ADDR [LENGTH]]

[Parameters]

[ADDR] : The start address of a memory cache rejection area is specified.

[LENGTH]: The number of bytes in the memory cache rejection area is specified. The default value is 32 bytes. The minimum value that can be specified is 32 bytes.

[Function]

The RTE-V850/SA1-IE has an 8-block x 32-byte memory read cache to speed memory reference. When memory reference is repeated at the same address, an actual read operation may not be carried out. This cache operation conflicts with the actual operation of an I/O unit if it is mapped in memory. In such a case, the nc command can be used to specify a memory cache rejection area. Up to 8 blocks can be specified as a memory cache rejection area. The minimum acceptable block size is 32 bytes. An address space above 0fff000 is always a memory cache rejection area. So, it is unnecessary to specify this portion as a no-memory cache area.

[Example]

```
nc 10000 1000
```

A 1000-byte area starting at address 10000 is specified as a memory cache rejection area.

```
>nc 10000 1000
```

No Memory Cache Area

No.	Address	Length
1	010000	001000
2	fff000	001000

ncd command**[Format]**

ncd block-number

[Parameters]

block-number: The block number for a memory cache rejection area to be deleted is specified.

[Function]

The ncd command deletes a memory cache rejection area. The memory cache rejection area to be deleted is specified using a block number.

[Example]

ncd 2

Block 2 is deleted from a memory cache rejection area.

>nc

No Memory Cache Area

No.	Address	Length
-----	---------	--------

1	020000	000100
---	--------	--------

2	010000	001000
---	--------	--------

3	fff000	001000
---	--------	--------

>ncd 2

No Memory Cache Area

No.	Address	Length
-----	---------	--------

1	020000	000100
---	--------	--------

2	fff000	001000
---	--------	--------

reset command

[Format]

reset

[Parameters]

None

[Function]

The reset command resets the emulation CPU of the RTE-V850/SA1-IE.

rrmb command**[Format]**

rrmb ADDR

[Parameters]

ADDR: The base address for the real-time RAM monitor is specified.

[Function]

The rrmb command specifies the base address for the real-time RAM monitor. A 1-Kbyte area starting at the address specified here can be referenced using rrm command, even when the CPU is running.

[Example]

rrmb 10000

A 1-Kbyte area starting at address 10000 is specified as the real-time RAM monitor area.

rrm command**[Format]**

rrm [ADDR[LENGTH]]

[Parameters]

ADDR : The memory reference start address in the real-time RAM monitor is specified.

LENGTH : The number of bytes (up to 256 bytes) to be read is specified.

[Function]

The rrm command accesses a location in the real-time RAM monitor memory area. The length can be up to 256 bytes.

[Example]

rrm 10000 30

30H bytes are read from the real-time RAM monitor, starting at address 10000.

sfr command**[Format]**

sfr [reg] [VAL]

[Parameters]

VAL : An SFR register value is specified in hexadecimal.

reg : An SFR register name is specified. The names that can be used for registers are listed below.

Read/write registers

P0 P1 P2 P3 P4 P5 P6 P9 P10 P11 P12
 PM0 PM1 PM2 PM3 PM4 PM5 PM6 PM9 PM10 PM11 PM12
 MM PMC12 DWC BCC SYC MAM PSC PCC SYS PU0 PU1
 PU2 PU3 PU10 PU11 PF1 PF2 PF10
 EGP0 EGN0 WDTIC PIC0 PIC1 PIC2 PIC3 PIC4 PIC5 PIC6
 WTIC TMIC00 TMIC01 TMIC10 TMIC11 TMIC2 TMIC3 TMIC4 TMIC5
 CSIC0 SERIC0 CSIC1 STIC0 CSIC2 SERIC1 SRIC1 STIC1 ADIC
 DMAIC0 DMAIC1 DMAIC2 WTIC DIOA0 DRA0 DBC0 DCHC0 DIOA1 DRA1 DBC1
 DCHC1 DIOA2 DRA2 DBC2 DCHC2 CR00 CR01 PRM0 TMC0 CRC0
 TOC0 CR10 CR11 PRM1 TMC1 CRC1 TOC1 CR20 TCL2 TMC2 CR23 CR30
 TCL3 TMC3 CR40 TCL4 TMC4 CR45 CR50 TCL5 TMC5
 SIO0 CSIM0 CSIS0 SIO1 CSIM1 CSIS1 SIO2 CSIM2 CSIS2 ASIM0
 BRGC0 BRGMC0 ASIM1 BRGC1 BRGMC1 IICC0 IICCL0 SVA0
 IIC0 WTM OSTs WDCS WDTM RTBL RTBH RTPM RTPC ADM ADS

Write-only registers

PRCMD TXS0 TXS1

Read-only registers

P7 P8 ISPR TM0 TM1 TM2 TM23 TM3 TM4 TM45 TM5
 ASIS0 RXB0 ASIS1 RXB1 IICS0 ADCR ADCRH

[Function]

The sfr command sets and displays a value in an SFR register.

[Example]

sfr TM4

A value in the TM4 register is displayed.

sfr MM 07

The value 07H is set in the MM register.

symfile and sym commands**[Format]**

symfile FILENAME : Reads symbols from an elf file (.elf) of GHS.
sym [NAME] : Displays 30 symbols.

[Parameters]

symfile : File name
sym : The first character string in symbols.

[Function]

The symfile command reads symbols from the elf file specified as FILENAME. This command targets only global symbols. The sym command displays up to 30 symbols.

[Example]

```
symfile c:\test\dry\dry.elf
           The elf file (dry.elf) is read from the directory c:\test\dry.
sym m
           Up to 30 symbols starting with character m are displayed.
```

time command**[Format]**

time [sysclk]

[Parameters]

sysclk: The system clock of the CPU is specified in MHz. Up to two decimal places are valid.
The default is 33.33 MHz.

[Function]

The time command displays the result of execution time measurement. Each time the CPU starts running, the execution time measurement timer is initialized and started to count. It continues to count, as long as the CPU is running. The timer counts two clock cycles of the CPU as one.

[Remark]

The measurement value contains the overhead time (several clock cycles) needed in starting and breaking measurement.

[Example]

time 17

Execution time measured at a system clock of 17 MHz is displayed.

TP, TP1, and TP2 commands**[Format]**

tp [ADDR] [/del]
tp1 [ADDR] [/del]
tp2 [ADDR] [/del]

[Parameters]

ADDR : An address value is specified in hexadecimal.
/del : Any previous setting by the command is canceled.

[Function]

The TP, TP1, and TP2 commands set and cancel execution trigger points. There are two execution trigger points. The tp command specifies an unused trigger point automatically.

- The tp1 and tp2 commands are used to specify a trigger point explicitly.
When any of these commands is issued, the trace buffer will be cleared, and tracing will newly begins.

[Example]

tp 1020

Triggering occurs when an instruction at address 1020H is executed.

TRON command**[Format]**

tron [DELAY] [add|cycle]

tron [x1|x2|x4|x8|x16|x32|x64|x128|x256|x512|x1k|x4k|x16k|x64k|x256k]

[Parameters]

DELAY=0..07fff Delay counter

The number of instruction cycles (delay counter) during which tracing should continue since the occurrence of triggering is specified in hexadecimal. The trace buffer can hold data for up to 32K cycles.

x1..x1m Trace timer tag counter frequency division ratio

The frequency division ratio for the time tag counter clock is specified. The setting x16 means that the timer unit is multiplied by 16.

add The addition mode is specified.

In this mode, a value from the previous cycle is accumulated.

cycle The cycle mode is specified.

The trace timer tag counter value is displayed for an individual cycle.

[Function]

The TRON command clears the trace buffer and begins recording trace data.

[Caution]

1. Even when the addition mode is specified for the timer counter, the time tag will be cleared at restart if a break occurs.

[Example]

tron 100 x16 cycle

Tracing is terminated after data for 100h (256) cycles has been recorded since the occurrence of triggering. The timer unit is multiplied by 16. Execution results are written to the trace buffer in every cycle.

TROFF command

[Format]

troff

[Parameters]

None

[Function]

The TROFF command forcibly terminates tracing.

TRACE command

[Format]

trace [POS] [asm]

[Parameters]

POS= ±0..07fff Read start position (with the trigger point or end point as 0)
 The number of cycles counted from the beginning of the trace buffer is specified in hexadecimal.

asm Display type (assembler)...displayed in a disassembly form

[Function]

The TRACE command displays the contents of the trace buffer.

- Tracing is terminated when this command is issued.
- To restart tracing, it is necessary to issue the tron command.

[Display] Assembly mode

Frame	neis	Time	Ext	Address	Code	Operand
_start:						
-0003	--i-	0003	0000	00000800	401e0000	movehi 0000h, zero, sp
-0002	--i-	0003	0000	00000804	231efcef	movea -1004h, sp, sp
-0001	--i-	0001	0000	00000808	40360000	movehi 0000h, zero, r6
+0000	--i-	0001	0000	0000080c	26365c11	movea +115ch, r6, r6
+0001	--i-	0001	0000	00000810	6600 jmp	[r6]
main:						
+0002	--i-	0003	0000	0000115c	5c1a add	-04h, sp
+0003	--i-	0001	0000	0000115e	63ff0100	st.w lp, +00h [sp]
				00000246	Write	00000246h-> [00ffeff8h]
main+0006h:						
+0004	--i-	0001	0000	00001162	bfff64f8jarl	RegChklnit (000009c6h)
RegChklnit:						
+0005	--i-	0003	0000	000009c6	501a add	+10h, sp
+0006	--i-	0001	0000	000009c8	63ff0d00	st.w lp, +0ch [sp]
				00001166	Write	00001166h-> [00ffeff4h]
+0007	--i-	0001	0000	000009cc	63b70900	st.w r22, +08h [sp]
				00000000	Write	00000000h-> [00ffeff0h]
+0008	--i-	0001	0000	000009d0	63af0500	st.w r21, +04h [sp]
				00000908	Write	00000908h-> [00ffefech]

Frame : A trigger position is specified in hexadecimal with the first trigger cycle as 0.



- neis : The PSW flag is displayed.
n : NMI flag
e : External interrupt flag
i : Exception flag
s : Saturation flag
- Time : The trace timer tag counter is displayed in hexadecimal.
- Ext : External data is displayed in bit units (in sequence of EXT0, 1, 2, 3 from the right).
- Address : An instruction execution address is displayed in hexadecimal.
- Code : For execution tracing, an instruction code is displayed in hexadecimal. For data tracing, data is displayed in hexadecimal.
- Operand : An instruction is displayed in a disassembly form.
Data is displayed in the following format:
Read [address] <- data
Write data -> [address]
The number of digits in the data means the data size.

<<Caution>>

The first two frames of the time display contain error. If add (addition mode) is specified in the tron command, the first frame is not subjected to addition.

ver command

[Format]

ver

[Parameters]

None

[Function]

The ver command indicates the version of the RTE-V850/SA1-IE.