To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

Renesas Electronics website: http://www.renesas.com

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Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (http://www.renesas.com)
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Thank you for your consistent patronage of Renesas semiconductor products.

We would like to inform you of the usage notes when performing A/D conversion of three units simultaneously in system clock mode of H8SX/1645 Group.

The A/D conversion accuracy may not be assured when performing A/D conversion on three units simultaneously in system clock mode using an A/D converter of H8SX/1645 Group.

Please perform detailed evaluation when using A/D converter on three units simultaneously.

1. Usage Notes

1.1 Clock Mode Setting Conditions

   System clock mode
   • Pφ = 1/2
   • ADCSR_EXCKS = 1 (Enable the sampling state value of ADSSTR)
   • ADMOSEL_ICKSEL = 1 (Select system clock mode)
   • ADSSTR = H'19 (Set sampling state count to 25)

1.2 A/D Conversion Starting Conditions

(1) Usage notes when A/D conversion accuracy of the unit whose A/D conversion starts third is not assured

• The accuracy of A/D conversion of unit Z may not be assured if the A/D conversion of the third unit Z starts at a timing of T_{X,Y,Z} = 2 to 7 states (relative to Pφ) after the A/D conversion of units X and Y starts simultaneously as shown in figure 1.

• The accuracy of A/D conversion of unit Z may not be assured if the A/D conversion of unit Y starts at a timing of T_{X,Y} = 1 state (relative to Pφ) after the A/D conversion of the first unit X starts, and the A/D conversion of the third unit Z starts at a timing of T_{X,Z} = 2 to 8 states (relative to Pφ) after the A/D conversion of unit Y starts as shown in figure 2.
Figure 1  When A/D Conversion Accuracy of Unit Z whose A/D Conversion Starts Third is not Assured: Case 1

Figure 2  When A/D Conversion Accuracy of Unit Z whose A/D Conversion Starts Third is not Assured: Case 2

[Note]  X, Y, and Z of units X, Y, and Z can be any value from 0 to 2.

* The accuracy of A/D conversion of unit Z may not be assured if the A/D conversion of the third unit Z starts at a timing of $T_{XYZ} = 2$ to 7 states (relative to $P_\phi$) after the A/D conversion of units X and Y starts simultaneously.

[Legend]  $T_{XYZ}$: Difference between A/D conversion start times of units X and Y and unit Z.
(2) Usage notes when A/D conversion accuracy of the unit whose A/D conversion is started first is not assured

- The accuracy of A/D conversion of unit X may not be assured if the A/D conversion of units Y and Z starts simultaneously at a timing of $T_{YZ,X} = -23$ to -19 states (relative to $P\phi$) after the A/D conversion of the first unit X starts as shown in figure 3.

- The accuracy of A/D conversion of unit X may not be assured if the A/D conversion of unit Y starts at a timing of $T_{Y,X} = -24$ to -19 states (relative to $P\phi$), and the A/D conversion of unit Z starts at a timing of $T_{Y,Z} = 1$ state (relative to $P\phi$) after the A/D conversion of the first unit X starts as shown in figure 4.

![Diagram](image)

**Figure 3** When A/D Conversion Accuracy of Unit X whose A/D Conversion Starts First is not Assured: Case 1
(3) Usage notes when A/D conversion accuracy of the unit whose A/D conversion is started second is not assured

- The accuracy of A/D conversion of unit Y may not be assured if the A/D conversion of unit Y starts second at a timing of $T_{X,Y} = 2$ to 7 states (relative to $P_\phi$) and the A/D conversion of unit Z starts at a timing of $T_{X,Z} = 24$ states (relative to $P_\phi$) after the A/D conversion of unit X starts as shown in figure 5.

- The accuracy of A/D conversion of unit Y may not be assured if the A/D conversion of unit Y starts second at a timing of $T_{X,Y} = 2$ to 6 states (relative to $P_\phi$) and the A/D conversion of unit Z starts at a timing of $T_{X,Z} = 25$ states (relative to $P_\phi$) after the A/D conversion of unit X starts as shown in figure 6.

- The accuracy of A/D conversion of unit Y may not be assured if the A/D conversion of unit Y starts second at a timing of $T_{X,Y} = 2$ to 7 states (relative to $P_\phi$) and the A/D conversion of unit Z starts at a timing of $T_{X,Z} = 26$ states (relative to $P_\phi$) after the A/D conversion of unit X starts as shown in figure 7.
Figure 5  When A/D Conversion Accuracy of Unit Y whose A/D Conversion Starts Second is not Assured: Case 1

Figure 6  When A/D Conversion Accuracy of Unit Y whose A/D Conversion Starts Second is not Assured: Case 2
**Figure 7**  When A/D Conversion Accuracy of Unit Y whose A/D Conversion Starts Second is not Assured: Case 3