Date: Jun. 8, 2021

RENESAS TECHNICAL UPDATE

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Product Category	MPU/MCU		Document No.	TN-RA*-A0023A/E	Rev.	1.00
Title	RA6T1 Group, Note on the number of ADC channels.		Information Category	Technical Notification		
Applicable Product	RA6T1 Group	Lot No. All	Reference Document	RA6T1 Group User's Manual Hardware Rev.1.00		

The descriptions about the number of ADC channels were changed.

1. Overview

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Table 1.8 **Analog**

Feature	Functional description
12-bit A/D Converter (ADC12)	Up to two successive approximation 12-bit A/D Converters (ADC12) are provided. In unit 0, up to 11 analog input channels are selectable. In unit 1, up to eight analog input channels, the temperature sensor output, and an internal reference voltage are selectable for conversion. The A/D conversion accuracy is selectable from 12-bit, 10-bit, and 8-bit conversion, making it possible to optimize the tradeoff between speed and resolution in generating a digital value. See section 35, 12-Bit A/D Converter (ADC12).

After

Table 1.8 **Analog**

Feature	Functional description
12-bit A/D Converter (ADC12)	Two units of successive approximation 12-bit A/D Converter (ADC12) are provided. Analog input channels are selectable up to 11 in unit 0 and up to 8 in unit 1. Each 2 analog inputs of unit 0 and 1 are assigned to same port (AN005/AN105, AN006/AN106), up to 17 ports are available as analog input. The temperature sensor output and an internal reference voltage are selectable for conversion of each unit 0 and 1. The A/D conversion accuracy is selectable from 12-bit, 10-bit, and 8-bit conversion, making it possible to optimize the tradeoff between speed and resolution in generating a digital value. See section 35, 12-Bit A/D Converter (ADC12).

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Table 1.12 Functional comparison

Function		Part numbers			
		R7FA6T1AD3CFP	R7FA6T1AB3CFP	R7FA6T1AD3CFM	R7FA6T1AB3CFM
Analog	ADC12	19		10	

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Table 1.12 Functional comparison

Function		Part numbers			
		R7FA6T1AD3CFP	R7FA6T1AB3CFP	R7FA6T1AD3CFM	R7FA6T1AB3CFM
Analog	ADC12	Unit0: 11 Unit1: 8 Shared channel pin: 2*		Unit0: 7 Unit1: 3 Shared channel pin: 2*	
	3ch-S/H	Unit0: 1(3ch) Unit1: 1(3ch)		Unit0: 1(3ch)	
	PGA	Unit0: 3 Unit1: 3		Unit0: 3	

Note. Some input channels of the ADC units are sharing same port pin.

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Table 1.13 Pin functions (2 of 3)

Function	Signal	I/O	Description
ADC12	AN000 to AN003, AN005 to AN007, AN016 to AN018, AN020	Input	Input pins for the analog signals to be processed by the ADC12
	AN100 to AN102, AN105 to AN107, AN116, AN117	Input	

After

Table 1.13 Pin functions (2 of 3)

Function	Signal	I/O	Description
ADC12	AN000 to AN003, AN005 to AN007, AN016 to AN018, AN020	Input	Input pins for the analog signals to be processed by the ADC12 AN005 & AN105 and AN006 & AN106 are assigned to same port pin
	AN100 to AN102, AN105 to AN107, AN116, AN117	Input	

2. 12-Bit A/D Converter (ADC12)

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35. 12-Bit A/D Converter (ADC12)

35.1 Overview

The MCU provides two 12-bit successive approximation A/D converter (ADC12) units. In unit 0, up to 11 analog input channels are selectable. In unit 1, up to eight analog input channels, temperature sensor output, and internal reference voltage are selectable for conversion. The A/D conversion accuracy is selectable from 12-, 10-, and 8-bit conversion, making it possible to optimize the trade-off between speed and resolution in generating a digital value.

ADC12 features include:

・11 channels (unit 0), 8 channels (unit 1)

After

35. 12-Bit A/D Converter (ADC12)

35.1 Overview

The MCU provides two 12-bit successive approximation A/D converter (ADC12) units. Analog input channels are selectable up to 11 in unit 0 and up to 8 in unit 1. Each 2 analog inputs of unit 0 and 1 are assigned to same port (AN005/AN105, AN006/AN106), up to 17 ports are available as analog input. The temperature sensor output and an internal reference voltage are selectable for conversion of each unit 0 and 1.

The A/D conversion accuracy is selectable from 12-, 10-, and 8-bit conversion, making it possible to optimize the trade-off between speed and resolution in generating a digital value.

ADC12 features include:

・11 channels (unit 0), 8 channels (unit 1), Total usable 17 channels

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Before

Table 35.1 **ADC12 specifications (1 of 3)**

Parameter	Specifications
Number of units	Two units, 0 and 1
Input channels	• Unit 0: Up to 11 channels • Unit 1: Up to 8 channels.

After

Table 35.1 **ADC12 specifications (1 of 3)**

Parameter	Specifications
Number of units	Two units, 0 and 1
Input channels	• Unit 0: Up to 11 channels • Unit 1: Up to 8 channels. (2 channels share same port pin)

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Before

Table 35.2 **ADC12 functions**

Parameter			Unit 0 (ADC120)	Unit 1 (ADC121)
Analog input channel			AN000 to AN003, AN005 to AN007, AN016 to AN018, AN020 Internal reference voltage Temperature sensor output	AN100 to AN102, AN105 to AN107, AN116, AN117 Internal reference voltage Temperature sensor output
Conditions for A/D	Software	Software trigger	Enabled	Enabled

After

Table 35.2 **ADC12 functions**

Parameter			Unit 0 (ADC120)	Unit 1 (ADC121)
Analog input channel *3			AN000 to AN003, AN005 to AN007, AN016 to AN018, AN020 Internal reference voltage Temperature sensor output	AN100 to AN102, AN105 to AN107, AN116, AN117 Internal reference voltage Temperature sensor output
Conditions for A/D	Software	Software trigger	Enabled	Enabled

Note 3. AN005 & AN105 and AN006 & AN106 are assigned to same port pin.

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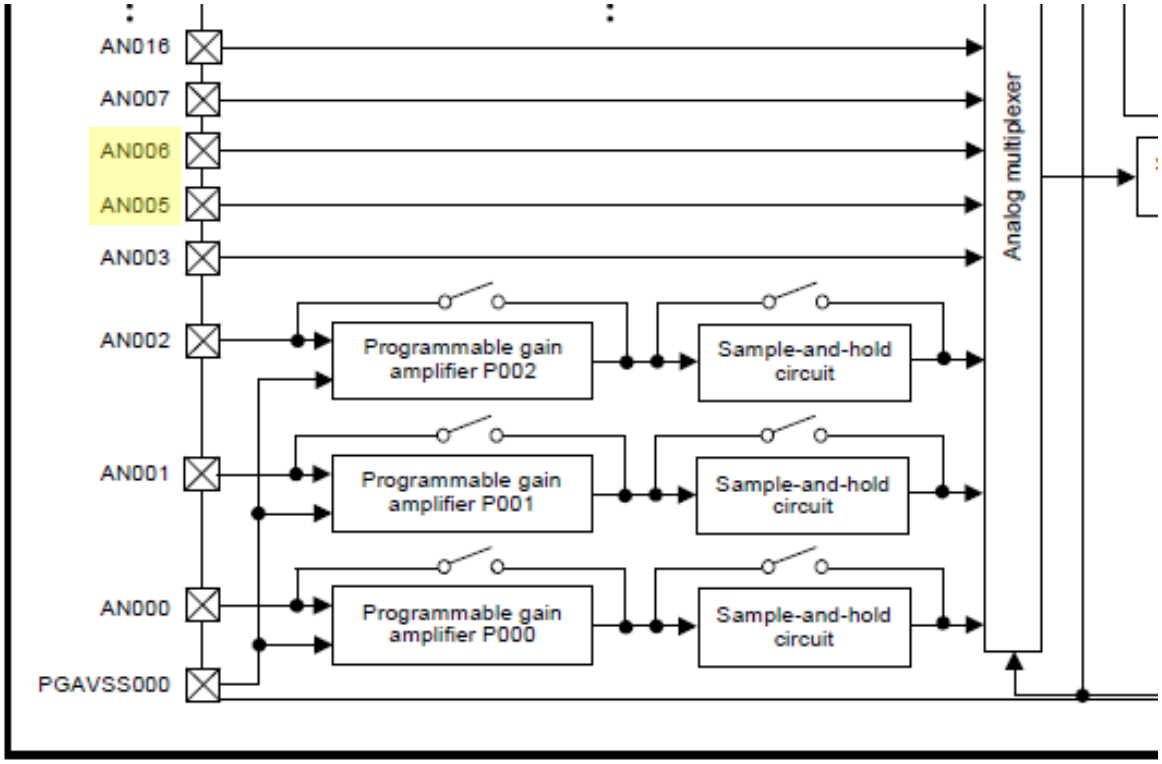

Figure 35.1 **ADC12 unit 0 block diagram**

After

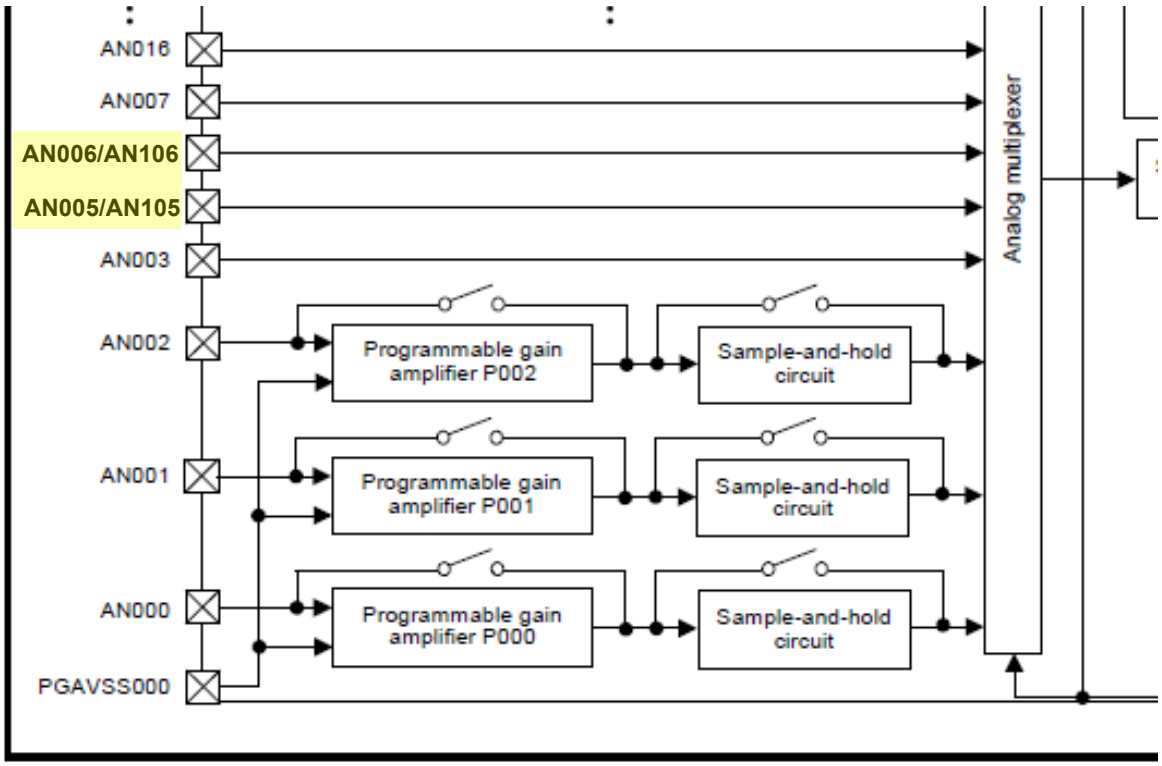

Figure 35.1 **ADC12 unit 0 block diagram**

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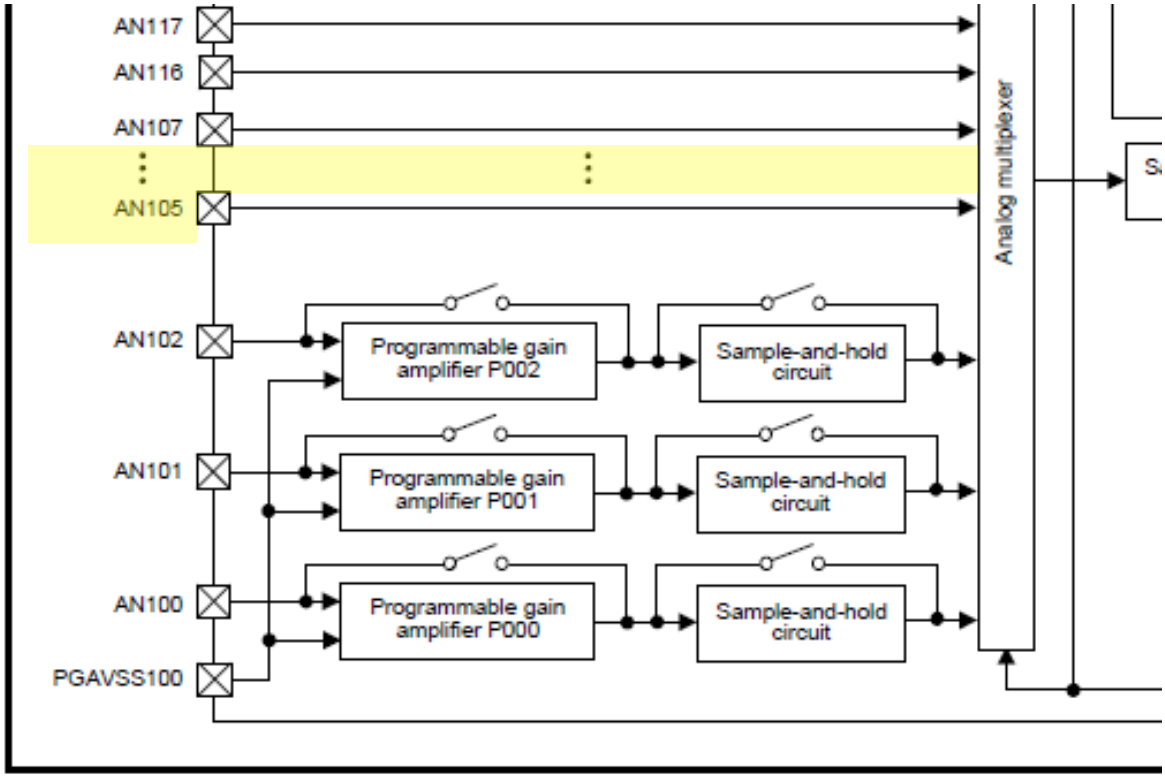

Figure 35.2 ADC12 unit 1 block diagram

After

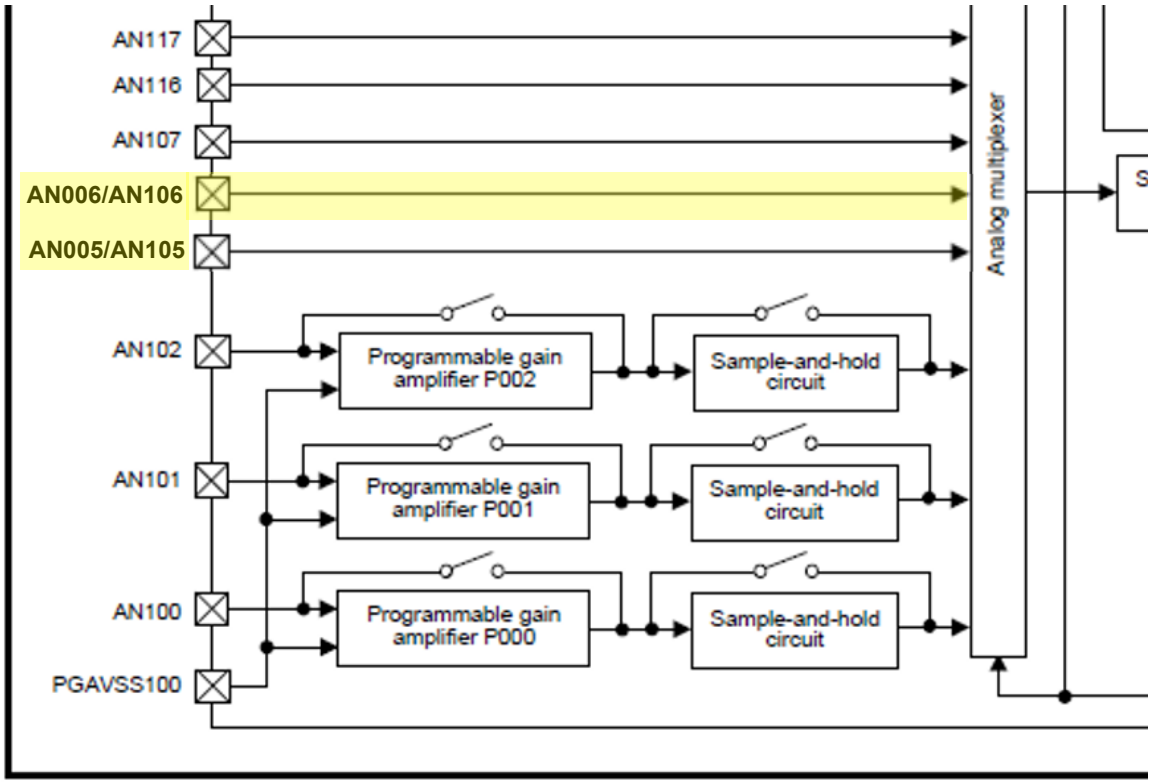

Figure 35.2 ADC12 unit 1 block diagram

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Table 35.3 **ADC12 I/O pins**

Unit	Pin name	I/O	Function
Unit 0	AVCC0	Input	Analog block power supply pin
	AVSS0	Input	Analog block power supply ground pin
	VREFH0	Input	Reference power supply pin
	VREFL0	Input	Reference power supply ground pin
	AN000 to AN003, AN005 to AN007, AN016 to AN018, AN020	Input	Analog input pins 0 to 3, 5 to 7, 16 to 18, and 20
	ADTRG0	Input	External trigger input pin for starting A/D conversion, active low
	PGAVSS000	Input	Differential input pin
Unit 1	AVCC0	Input	Analog block power supply pin
	AVSS0	Input	Analog block power supply ground pin
	VREFH	Input	Reference power supply pin for ADC12 unit 1 and DAC
	VRELF	Input	Reference power supply ground pin for ADC12 unit 1 and DAC
	AN100 to AN102, AN105 to AN107, AN116, AN117	Input	Analog input pins 0 to 2, 5 to 7, 16, and 17
	ADTRG1	Input	External trigger input pin for starting A/D conversion, active low
	PGAVSS100	Input	Differential input pin

After

Table 35.3 **ADC12 I/O pins**

Unit	Pin name	I/O	Function
Unit 0	AVCC0	Input	Analog block power supply pin
	AVSS0	Input	Analog block power supply ground pin
	VREFH0	Input	Reference power supply pin
	VREFL0	Input	Reference power supply ground pin
	AN000 to AN003, AN005 to AN007,*1 AN016 to AN018, AN020	Input	Analog input pins 0 to 3, 5 to 7, 16 to 18, and 20
	ADTRG0	Input	External trigger input pin for starting A/D conversion, active low
	PGAVSS000	Input	Differential input pin
Unit 1	AVCC0	Input	Analog block power supply pin
	AVSS0	Input	Analog block power supply ground pin
	VREFH	Input	Reference power supply pin for ADC12 unit 1 and DAC
	VRELF	Input	Reference power supply ground pin for ADC12 unit 1 and DAC
	AN100 to AN102, AN105 to AN107,*1 AN116, AN117	Input	Analog input pins 0 to 2, 5 to 7, 16, and 17
	ADTRG1	Input	External trigger input pin for starting A/D conversion, active low
	PGAVSS100	Input	Differential input pin

Note 1. AN005 & AN105 and AN006 & AN106 are assigned to same port pin.