
AVR527: Migrating from ATmega164P/324P/644P to ATmega164PA/324PA/644PA



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Microcontrollers

1 Introduction

In order to optimize the manufacturing process and to further reduce current consumption, an optimized version of ATmega164P/324P/644P has been introduced.

The ATmega164PA/324PA/644PA is a functionally identical, drop-in replacement for the ATmega164P/324P/644P. All devices are subject to the same qualification process and same set of production tests, but as the manufacturing process is not the same some electrical characteristics differ.

ATmega164P/324P/644P and ATmega164PA/324PA/644PA have separate datasheets. This application note outlines the differences between the two devices and the datasheets. There is also a detailed change log to assist the user at the end of the ATmega164PA/324PA/644PA datasheet. Remember to always use the latest revision of the device datasheet.

Minor differences in typical characteristics are not discussed in this document as long as the low and high limits remain the same. For detailed information about the typical characteristics, see sections "Electrical Characteristics" and "Typical Characteristics" of the device datasheets.

Note: This application note serves as a guide to ease migration. For complete device details, always refer to the most recent version of the ATmega164PA/324PA/644PA datasheet.

Application Note

Rev. 8190C-AVR-08/09





2 Changes in Characteristics

This section outlines major differences in characteristics that may have an effect on the application in which the device is used. For detailed information, refer to the most recent version of the device datasheets.

2.1 Current Consumption

Active and Idle mode current consumption of the device has been reduced significantly. The tables below present typical current consumption figures at room temperature. All values are taken from device datasheets, unless otherwise noted.

Table 2-1. Typical Current Consumption of Device at Room Temperature

Mode	Condition	ATmega164P	ATmega164PA	Change
Active	V _{CC} =2V, f=1 MHz	0.4 mA	0.3 mA	- 25%
	V _{CC} =3V, f=4 MHz	2.1 mA	1.4 mA	- 33%
	V _{CC} =5V, f=8 MHz	7.4 mA	4.8 mA	- 35%
Idle	V _{CC} =2V, f=1 MHz	0.1 mA	0.07 mA	- 30%
	V _{CC} =3V, f=4 MHz	0.5 mA	0.25 mA	- 50%
	V _{CC} =5V, f=8 MHz	1.9 mA	1 mA	- 47%

Table 2-2. Typical Current Consumption of Device at Room Temperature

Mode	Condition	ATmega324P	ATmega324PA	Change
Active	V _{CC} =2V, f=1 MHz	0.42 mA	0.3 mA	- 29%
	V _{CC} =3V, f=4 MHz	2.4 mA	1.5 mA	- 38%
	V _{CC} =5V, f=8 MHz	8.0 mA	5.2 mA	- 35%
Idle	V _{CC} =2V, f=1 MHz	0.13 mA	0.06 mA	- 54%
	V _{CC} =3V, f=4 MHz	0.6 mA	0.35 mA	- 42%
	V _{CC} =5V, f=8 MHz	2.3 mA	1.3 mA	- 43%

Table 2-3. Typical Current Consumption of Device at Room Temperature

Mode	Condition	ATmega644P	ATmega644PA	Change
Active	V _{CC} =2V, f=1 MHz	0.41 mA	0.38 mA	- 7%
	V _{CC} =3V, f=4 MHz	2 mA	1.8 mA	-10%
	V _{CC} =5V, f=8 MHz	7.5 mA	5.6 mA	-25%
Idle	V _{CC} =2V, f=1 MHz	0.1 mA	0.06 mA	-40%
	V _{CC} =3V, f=4 MHz	0.5 mA	0.2 mA	-60%
	V _{CC} =5V, f=8 MHz	1.6 mA	1.1 mA	-31%

3 Signature Bytes

The table below summarizes the difference between the signature bytes of ATmega324P and ATmega324PA. Note, that no change for ATmega164P/644P and ATmega164PA/644PA.

Table 3-1. Device and JTAG ID

Part	Signature Bytes Address			JTAG	
	0x000	0x001	0x002	Part Number	Manufacture ID
ATmega324P	0x1E	0x95	0x08	9508	0x1F
ATmega324PA	0x1E	0x95	0x11	9511	0x1F

4 Datasheet Changes

For a summary of changes, see the datasheet revision history at the end of the ATmega164PA/324PA/644PA datasheet.



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