



AVR528: Migrating from ATmega48P/88P/168P to ATmega48PA/88PA/168PA

8-bit **AVR**[®]
Microcontrollers

1 Introduction

In order to optimize the manufacturing process and to further reduce current consumption, an optimized version of ATmega48P/88P/168P has been introduced.

The ATmega48PA/88PA/168PA is a functionally identical, drop-in replacement for the ATmega48P/88P/168P. 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.

This application note outlines the differences between ATmega48P/88P/168P and ATmega48PA/88PA/168PA. There is also a detailed change log to assist the user at the end of the ATmega48PA/88PA/168PA 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 ATmega48PA/88PA/168PA datasheet.

Application Note

Rev. 8196E-AVR-09/09





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	ATmega48P	ATmega48PA	Change
Active	V _{CC} =2V, f=1 MHz	0.3 mA	0.2 mA	-33 %
	V _{CC} =3V, f=4 MHz	1.9 mA	1.2 mA	-37 %
	V _{CC} =5V, f=8 MHz	6.8 mA	4.0 mA	-41 %
Idle	V _{CC} =2V, f=1 MHz	0.06 mA	0.03 mA	-50 %
	V _{CC} =3V, f=4 MHz	0.4 mA	0.21 mA	-48 %
	V _{CC} =5V, f=8 MHz	1.6 mA	0.9 mA	-44 %

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

Mode	Condition	ATmega88P	ATmega88PA	Change
Active	V _{CC} =2V, f=1 MHz	0.3 mA	0.2 mA	-33 %
	V _{CC} =3V, f=4 MHz	1.7 mA	1.2 mA	-30 %
	V _{CC} =5V, f=8 MHz	6.3 mA	4.1 mA	-35 %
Idle	V _{CC} =2V, f=1 MHz	0.05 mA	0.03 mA	-40 %
	V _{CC} =3V, f=4 MHz	0.3 mA	0.18 mA	-40 %
	V _{CC} =5V, f=8 MHz	1.4 mA	0.8 mA	-43 %

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

Mode	Condition	ATmega168P	ATmega168PA	Change
Active	V _{CC} =2V, f=1 MHz	0.3mA	0.2mA	-33%
	V _{CC} =3V, f=4 MHz	1.8mA	1.2mA	-33%
	V _{CC} =5V, f=8 MHz	6.7mA	4.2mA	-37%
Idle	V _{CC} =2V, f=1 MHz	0.06mA	0.03mA	-50%
	V _{CC} =3V, f=4 MHz	0.4mA	0.2mA	-50%
	V _{CC} =5V, f=8 MHz	1.7mA	0.9mA	-47%

3 Datasheet Changes

For a summary of changes, see the datasheet revision history at the end of the ATmega48PA/88PA/168PA datasheet.



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