

## Migrating from the ATF2500B to the ATF2500C Family of CPLDs

Atmel announced availability of the long awaited ATF2500C, the highest density CPLD available in a 40-pin or 44-pin packages. The ATF2500C is reprogrammable using Atmel's proven EE-based technology and is pin-compatible with ATF2500B/BQ/BQL/BL which were OTP devices. The ATF2500B/BQ will be replaced by ATF2500C for commercial and industrial grade devices. Samples for these products are available. The ATF2500C is in production.

Datasheet for this device can be viewed online at:  
[http://www.atmel.com/dyn/resources/prod\\_documents/doc0777.pdf](http://www.atmel.com/dyn/resources/prod_documents/doc0777.pdf)

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### Migrating to the ATF2500C Family of CPLDs

### Application Note





## Cross Reference Tables

Table 1 lists devices that are obsoleted and their equivalent replacements.

**Table 1.** Obsoleted Devices and their Equivalent Replacements

| Obsoleted (Atmel P/N) | Replaced with (Atmel P/N) |
|-----------------------|---------------------------|
| ATV2500B-12JC         | ATF2500C-15JC             |
| ATV2500B-12KC         | ATF2500C-15JC             |
| ATV2500B-15JC         | ATF2500C-15JC             |
| ATV2500B-15JI         | ATF2500C-15JI             |
| ATV2500B-15KC         | ATF2500C-15JC             |
| ATV2500B-15KI         | ATF2500C-15JI             |
| ATV2500BQ-20DC        | ATF2500C-20PC             |
| ATV2500BQ-20PC        | ATF2500C-20PC             |
| ATV2500BQ-20KC        | ATF2500C-20JC             |
| ATV2500BQ-20JC        | ATF2500C-20JC             |
| ATV2500BQ-25DC        | ATF2500C-20PC             |
| ATV2500BQ-25PC        | ATF2500C-20PC             |
| ATV2500BQ-25KC        | ATF2500C-20JC             |
| ATV2500BQ-25JC        | ATF2500C-20JC             |
| ATV2500BQ-25DI        | ATF2500C-20PI             |
| ATV2500BQ-25PI        | ATF2500C-20PI             |
| ATV2500BQ-25KI        | ATF2500C-20JI             |
| ATV2500BQ-25JI        | ATF2500C-20JI             |

Note: Atmel will not be offering the K (J-leaded LCC) or the D (Windowed CerDIP) package for ATF2500C (commercial and industrial temperature grade only)

Atmel strongly recommends that customers using the ATV2500BQL or ATV2500BL in commercial and Industrial grade replace them with the ATF2500C if lower Icc (See Power considerations section) is not an important consideration for their application. The ATF2500C is pin compatible with the ATV2500BQL/BL. Table 2 lists devices in equivalent packages.

**Table 2.** Obsoleted Devices and Suggested Replacements

| Obsoleted (Atmel P/N) | Replaced with (Atmel P/N) |
|-----------------------|---------------------------|
| ATV2500BL-20JC        | ATF2500C-20JC             |
| ATV2500BL-20KC        | ATF2500C-20JC             |
| ATV2500BL-20JI        | ATF2500C-20JI             |
| ATV2500BL-20KI        | ATF2500C-20JI             |
| ATV2500BQL-25DC       | ATF2500C-20PC             |
| ATV2500BQL-25JC       | ATF2500C-20JC             |
| ATV2500BQL-25KC       | ATF2500C-20JC             |
| ATV2500BQL-25PC       | ATF2500C-20PC             |

**Table 2.** Obsolete Devices and Suggested Replacements (Continued)

| Obsolete (Atmel P/N) | Replaced with (Atmel P/N) |
|----------------------|---------------------------|
| ATV2500BQL-25DI      | ATF2500C-20PI             |
| ATV2500BQL-25JI      | ATF2500C-20JI             |
| ATV2500BQL-25KI      | ATF2500C-20JI             |
| ATV2500BQL-25PI      | ATF2500C-20PI             |

## Power ( $I_{cc}$ ) Consumption Considerations

In the ATF2500C CPLD family, only one power version is currently being offered, Standard Power. The Low Power version (ATF2500CL) is expected to be offered in the near future. On the other hand, four different power versions were offered in the ATV2500B CPLD family: Standard Power (B), Quarter Power (BQ), Low Power (BL), and Quarter-Low Power (BQL).

As shown in Table 4 and the  $I_{cc}$  vs Frequency Curves, the power consumption of the ATF2500C lies in between the ATV2500B and ATV2500BQ. Therefore, existing ATV2500B users can benefit from the reduced power consumption when they migrate to the ATF2500C.

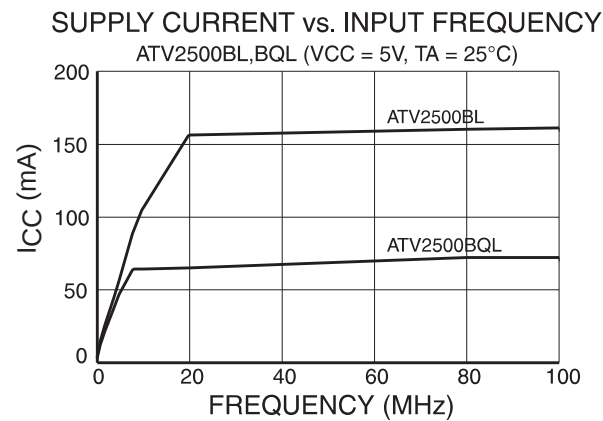
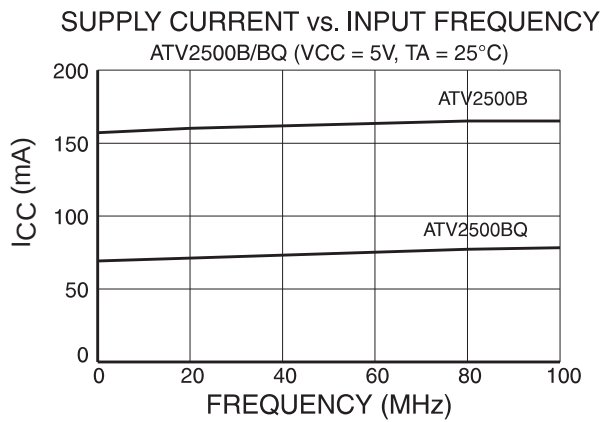
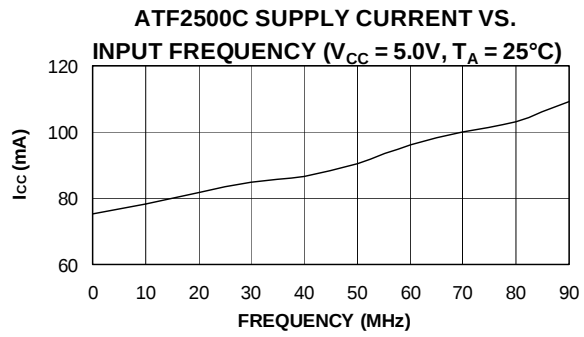
However, when migrating from an ATV2500BQ to the ATF2500C, a designer must take into consideration the slight increase in power consumption of the CPLD. Designers must ensure that the power supply is capable of producing the extra current needed by the ATF2500C. In addition, designers must provide proper thermal management to the ATF2500C if necessary to ensure that the ATF2500C will operate within the allowable temperature ranges.

For applications that are using the Low Power devices (ATV2500BL/BQL), designers must first determine whether the Low Power feature is required or not when considering the migration to the ATF2500C. As shown in the  $I_{cc}$  vs Frequency Curves, the Low Power feature only take effect at operating frequencies below 20 MHz. At frequencies above 20 MHz, the Low Power feature in the CPLD is effectively disabled and the power consumption of the CPLD will be the same as a Standard Power device. Hence, the applications will not benefit from the Low Power feature.

**Table 3.**  $I_{cc}$ , Standby - Power Supply Current, Standby (mA), (Com/Ind)  
Condition:  $V_{cc} = \text{Max}$ ,  $V_{in} = \text{Gnd}$  or  $V_{cc}$  (freq = 0 MHz), Outputs Open

| ATF2500C |         | ATV2500B |         | ATV2500BQ |       | ATV2500BL |      | ATV2500BQL |     |
|----------|---------|----------|---------|-----------|-------|-----------|------|------------|-----|
| Typ      | Max     | Typ      | Max     | Typ       | Max   | Typ       | Max  | Typ        | Max |
| 80/80    | 110/130 | 110/110  | 190/210 | 30/30     | 70/85 | 2/2       | 5/10 | 2/2        | 4/5 |

## I<sub>CC</sub> vs Frequency Curves



## Programming (How do I program the ATF2500C?)

Cross-programming is the fastest way to port an ATF2500H/L design or an ATF2500B/BQ/BQL/BL design to the ATF2500C. Third Party Programmer support for ATF2500C (including cross-programming capability) is available from major vendors like Data I/O, B.P. Microsystems and Hilo.

Most Third party Programmers such as Data I/O [Unisite/3900 Models] have a Device listing specifically for Atmel-XPGM (cross-programming). In simplistic terms, cross-programming implies that existing Jedec (Fuse) maps can be programmed into the ATF2500C without the need for recompiling designs specifically for the ATF2500C. Table 4 lists examples of device menu types that are listed for the top tier third party programmers qualified by Atmel.

For example:

Use device "ATF2500C-PLCC as ATF2500B-PLCC" to cross-program an ATF2500B Jedec pattern into an ATF2500C."

**Table 4.** Cross-programming Device Type Examples

| Programmers     | Software Versions Qualified | Cross-programming Device Type Examples  |
|-----------------|-----------------------------|-----------------------------------------|
| Bp Microsystems | V3.65 (Dos)                 | Atmel ATF2500C-PLCC as ATF2500-PLCC     |
| Data I/O        | V6.8 (EXT)                  | 2500C-PLCC as 2500B-PLCC <sup>(1)</sup> |
| Needhams        | V1.3 (Windows®)             | ATF2500C (V2500B)                       |
| Hilo Systems    | V3.23A (Windows®)           | ATF2500C/CL (V2500B)                    |

Note: 1. Under the Atmel-XPGM manufacturer list.

The Atmel EPLD Applications group maintains a list of major third party programmers in a document (program.pdf) that includes information on the earliest Software Revision qualified to support programming for PLDs.

## Design Compilers

Customers that need to re-compile their designs to target the ATF2500C must use Atmel-WinCUPL. The datasheet provides information on design tools supported by Atmel. For customers that have DOS-ABEL or ATMEL-SYNARIO (with ABEL 6.x), they can continue to target designs to an ATF2500B device and then use cross-programming to program the ATF2500C device.

**New features added in the ATF2500C:** User electronic signature (UES) row and Pin Keeper fuse. Hence, the default Jedec fuse map for the ATF2500C is now larger than that of an ATF2500B device. The ATF2500C retains the Superset features introduced in the ATF2500B family of CPLDs (see "History of the ATF2500H/L and the ATF2500B/BQ/BQL/BL" on page 6).



## **History of the ATV2500H/L and the ATV2500B/BQ/BQL/BL**

The ATV2500H/L was the first CPLD introduced by Atmel in early 1990. It was a one-time programmable (OTP) device unless the package was windowed ceramic. A windowed ceramic package allowed the device to be erased using Ultra-violet (UV) light. The ATV2500H version was the standard power device. The L extension to the ATV2500 implied that it was a low power device. Both ATV2500H and ATV2500L were obsoleted in 1999.

In the mid-nineties, the architecture was slightly modified to add a few customer friendly features and the ATV2500B/BQ/BL/BQL family was introduced.

The ATV2500B, ATV2500BQ, ATV2500BQL and the ATV2500BL have Superset features as compared to the ATV2500H/L and accordingly a different Jedec Fuse file. The extensions Q imply quarter power and L implies low power.

**Superset features introduced in the ATV2500B family:** D/T type Flip Flops, Clock option for Pin or Product term, Faster (offered in faster speed grades)

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