

## Choosing the Right Portable Data Carrier and Standard Form Factors

Datakey Electronics has over 32 years of experience helping customers find the best technical and most cost-effective portable memory system solutions for their specific applications. This decision usually combines factors on what best fits the application's requirements and what the designer is most comfortable with. Below are some *general guidelines* to review when making this decision – and we are also happy to apply our expertise to help you choose the solution that best meets all of your needs. Please call us today at **1-800-328-8828**.

### Memory Selection

Datakey Electronics offers memory Keys, SlimLine™ Tokens, Extended Tokens, Plug Tokens, and Bar Tokens utilizing **industry standard** technologies and interface protocols. Considerations in selecting the optimal data carrier should include the type of built-in serial interface the microcontroller uses, memory capacity needed, transfer rate (clock speed) required, and (equally important) what the designer prefers. Please note that embedded designs tend to have very small memory requirements in comparison to PC applications.

**Serial EEPROM** – Available with Microwire, I<sup>2</sup>C, and SPI interfaces with memory capacities ranging from 1Kbit to 512Kbit (see [Memory Availability Chart](#)). EEPROMs are ideally suited for access control, low to medium data logging, parameter/configuration uploads, and data storage applications.

**Serial Flash (SPI)** – Available with memory capacities ranging from 1Mbit to 64Mbit (see [Memory Availability Chart](#)), our line of SPI Flash data carriers compliment our EEPROM lines. These devices are page writable and are used most commonly for high-volume data logging and in-field firmware update applications.

**Managed Memory** – The industry's first high-capacity memory Token designed and **optimized specifically for embedded OEM designs**. This device utilizes NAND Flash technology (256MByte – 1GByte) and has both an SPI (for embedded controllers) and USB interface, as well as multiple special OEM and security features.

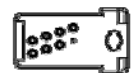
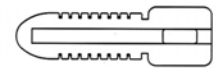
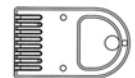
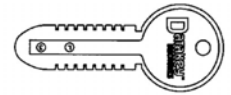
**Secure Memory** – Both our Unique Identifier and CryptoMemory®\* data carrier series (see [Memory Availability Chart](#)) offer increased security features. The Unique Identifier Series offers a guaranteed unique, unchangeable serial number and additional OEM options. CryptoMemory utilizes Atmel's highly secure symmetric dynamic mutual authentication protocol. See [www.cryptomemorykey.com](http://www.cryptomemorykey.com) for more details.

**Parallel EEPROM** – Parallel devices offer a faster transfer rate than Serial devices but require a more complex hardware interface. Please consult the factory for new applications.

*NOTE: See our Memory Availability Chart ([www.datakey.com](http://www.datakey.com)) for a complete listing of available products.*

### Mechanical Requirements

Datakey Electronics offers (6) standard form factors (Key, SlimLine Token, Extended Token, NFX, Plug, and Bar) to meet the mechanical, environmental, and ergonomic requirements of almost any system. Features such as physical size, retention, durability, ESD performance, convenience, mounting options, cycle-life, memory capacity, cost, and other preferences should be reviewed. Most mating Receptacles are available in PCB-mount or Panel-mount versions. Some of the features for the given form factors are compared on the following page.



\*CryptoMemory is a registered trademark of Atmel, Corp.





## Keys

- Familiar form factor (intuitive for users)
- 15,000 cycle rating, 10kV ESD rating
- 200,000 cycle Keyceptacle<sup>®</sup> rating

## Tokens (SlimLine<sup>™</sup>, Extended, NFX)

- Small form factor options
- Receptacle options: smaller, economical, IP-rated
- 10,000 cycle rating, 15kV ESD rating
- 50,000 cycle Receptacle rating

## Plug Systems

- Well suited for extreme environmental needs
- Positive locking Token - vibration “immune”
- 10,000 minimum cycle rating, 12kV ESD rating

## Bar Systems

- Ideal for tactical environments
- Extensive list of MIL-STD ratings
- Smaller form factor with “on-surface” mounting
- 15,000 cycle rating, 15kV ESD rating
- 25,000 cycle Receptacle rating

## Other Considerations

During the initial selection, the designer should also consider what the system might need in the future. The following factors may influence initial device selection:

- ▶ Serial EEPROMS offer the simplest interface and integration
- ▶ SPI Keys/Tokens offer the widest memory capacities, fastest clock rates, and most options for future growth
- ▶ The Extended Token offers the most versatility to add custom electronics and/or custom markings (logos, etc.)

The designer should also consider the possible **growth path requirements** of their project:

- ▶ Will larger memory capacities become a requirement?
- ▶ Will a faster transfer rate become a requirement?
- ▶ Are integrated memory management features important?
- ▶ Would adding features (e.g. firmware update capability) benefit the design?

Many of our customers, who use lower capacity data carriers for access control or data transfers, add a boot loader that allows them to utilize their same Receptacle with higher capacity data carriers to provide firmware update capability. This allows a significant increase in product capability without increasing the final product’s BOM cost.

The designer should also consider the **security requirements** of their project:

Datakey Electronics’ standard form factors are unique and only our products fit in our Receptacles. Our products are also only sold to qualified OEMs – directly from the factory or from an authorized distributor. Both of these factors provide inherent security for the OEM. Additionally, for applications that require it, Datakey Electronics offers **additional electronic security** on some models such as un-changeable serial numbers, OEM registers, on-board encryption, etc.

## Development

- ▶ Datakey Electronics offers support peripherals and development tools for all of our catalog products. These tools are designed to reduce time-to-market, development costs, and technical risks for our customers.
- ▶ Datakey Electronics products utilize industry-standard interface protocols. The designer’s familiarity with the chosen memory technology can also help reduce development investments.
- ▶ Datakey Electronics posts complete interface specifications on our web site.  
**IMPORTANT: We strongly advise our customers to follow our interface specifications, as this is the best way to help protect the longevity of their design.**
- ▶ Datakey Electronics has extensive experience and expertise in systems utilizing our standard and custom solutions and our engineers are readily available to assist you with your implementation.
- ▶ Datakey Electronics also offers toll-free technical assistance, both pre-sale and post-sale.

NOTE: See our Serial Development Kit Info Sheet ([www.datakey.com](http://www.datakey.com)) for further details on our Development Tools.

**www.datakey.com ■ 800-328-8828 ■ 952-746-4066**

