

## Flash-memory-based secure microcontroller compliant with the Calypso® specification Revision 3 Version 3.2



### Features

- 80 nm Flash memory technology
- Up to 40 Kbytes of user non-volatile memory (NVM)
- Transport application certifications:
  - Calypso Prime
  - Smart Ticketing Alliance according to the CEN/TS 16794 standard

### Platform

- Native operating system
- Single or multiple ticketing application

### Hardware

- ST31 product based on a 32-bit Arm® SecurCore® SC000™ RISC core
- Advanced 80 nm Flash technology
- Best-in-class RF performance
- Up to 40 Kbytes of user NVM
- Full transaction duration, including typical terminal processing compliant with public transportation requirements
- Common Criteria evaluation assurance level EAL5+

### Standard

- Calypso® standard compliant with:
  - Calypso Specification Revision 3 – Portable Object Application Version 3.2
  - Calypso functional specification Revision 2 – Card Application
  - CD97 specifications
  - CD97-BX specifications
  - CD Light specifications

### Applications

- Automatic fare collection
- Public transportation
- Access control
- Ticketing payment
- City services and events
- Leisure parks and stadiums
- Corporate cards and student cards

Product status link

[CD21-Flash-Rev32](#)

## 1 Description

The CD21-Flash-Rev32 device is a cost-effective, dual-interface (contact and contactless) secure microcontroller based on a 32-bit Arm® SecurCore® SC000™ RISC core. It is specifically designed for public transport applications, in that it provides a high level of security, high speed transactions and easy evolution capability for transport and multi-service applications.

The CD21-Flash-Rev32 device is available with 8, 18 or 40 Kbytes of user memory.

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### 1.1 High security features

The security of the CD21-Flash-Rev32 device is managed with various access modes: Pin, Session, Always, and Never.

The cryptographic certificate of the device controls the access to file modifications. The reader (using its built-in SAM) and the card compute this certificate during the transaction, using data encryption standard (DES), DESX (extended DES) or triple DES (TDES) encryption.

The CD21-Flash-Rev32 device implements the Calypso automatic recovery mechanism, which ensures that when data are modified in the card during a secure session, either all the modifications are completed successfully or the data are not modified at all.

The CD21-Flash-Rev32 device provides powerful multi-application synchronization capability: a special mechanism synchronizes modifications between the different applications that the card manages. Each command within the session uses its own secrets, or delegates its security to the session security manager.

### 1.2 Memory organization

The user memory of the CD21-Flash-Rev32 has the following functionality:

- Multi-application card capability
- Data organized in files in accordance with ISO/IEC 7816-4
- E-ticketing compliant with the EN 1545 standard data model
- The file structure may be chosen among many options (for example, two Calypso applications, one multi-purpose application with nine contracts and one e-ticket application)
- Complete CD Light and CD97 (BX) emulation possible
- Diversified keys protect the data (up to 6 keys per directory)

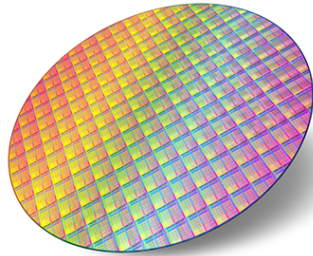
### 1.3 Certifications

The CD21-Flash-Rev32 device is based on a hardware chip that has the Common Criteria EAL5+ certification. The device itself is certified as a Calypso Portable Object (PO) compliant with the Calypso Prime specifications Revision 3 Version 3.2.

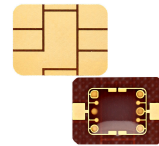
The CD21-Flash-Rev32 device has also obtained the Smart Ticketing Alliance (STA) CEN/TS 16794 certification.

## 1.4 Delivery forms

The CD21-Flash-Rev32 device is delivered as sawn wafers and in D76 or D78 micromodules.



Sawn wafer



D76/D78 micromodules

## Revision history

**Table 1. Document revision history**

Date	Version	Changes
16-Feb-2021	1	Initial release.

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