Protection of Embedded Software

More and more industrial equipment contains embedded software or contains a complete PC dedicated to a specific task. A recent study by the German Engineering Federation (VDMA) showed that 56 percent of German manufacturers had been affected by illegal reverse engineering of their equipment. In addition to proprietary software, industrial computing systems can contain data such as logs, service records, and documentation that has competitive value. Such intellectual capital must be protected from theft and competition from gray-market products.

Starting in 2008, WIBU-SYSTEMS undertook a project to migrate the proven CodeMeter technology from the desktop to embedded applications. Customer surveys and market research in 2008 and 2009 showed three critical requirements:

- Support for operating systems like Windows Embedded, Windows CE, VxWorks, and real-time Linux variants
- Ability to be easily retrofitted to existing applications
- Maximum reliability via tough requirements for durability, control, temperature range, fixed BOM (bill of material) of the protection hardware and no uncontrolled firmware changes

It took a year and a half to develop, but WIBU-SYSTEMS is proud to announce the availability of three new CodeMeter variants aimed at the embedded space: CmCard/CF, CmCard/SD, and CmCard/µSD. CodeMeter functionality and flash memory are provided in industry-standard Compact Flash (CF), SD-Card, and Micro-SD form factors. WIBU-SYSTEMS developed the cards with Swissbit AG and Hyperstone. The CmCards are the world's first and only memory cards using the CodeMeter protection system. Along with the new cards is a revision to the CodeMeter Runtime to support the new targeted operating systems.

CmCard/µSD in an industry PC board, e.g., Kontron nanoETXexpress-SP with HMI Baseboard. In this case, the entire application software is protected and saved on the µSD-Card, and the board can be installed in various devices.

CmCard/CF in an industry PC, e.g., Beckhoff CX1010. In this case, Windows XP Embedded or Windows CE together with the protected application software can be directly saved to the CF-Card. The file formats of different operating systems are supported.

CmCard/CF, /SD, and /µSD Profiles:

The CodeMeter CF-, SD- and Micro-SD-Card combine flash mass memory with CodeMeter in a card meeting industrial needs with the following basic data:

- Extended temperature range: -25 ° Celsius (-13 ° Fahrenheit) to +85 ° Celsius (+185° Fahrenheit)
- Increased Electro-Static Discharge (ESD) resistance
- Galvanic hard gold coating improves resistance to corrosive gases and provides high contact durability
- Fixed bill of material (BOM) of the manufactured hardware, controlled firmware, Made in-Germany
- CodeMeter 100% compatible to the CmStick
- Improved read-write speed and reliability due to SLC Flash and 32-bit RISC Controller for ECC error correction, wear leveling, and bad-block handling
- S.M.A.R.T. lifetime monitoring for flash memory
- Support of FAT32, NTFS, and EXT3 file systems

WIBU SYSTEMS

CmCard/CF /SD /µSD

Description

The CmCard/CF /SD /µSD is the heart of the CodeMeter Digital Rights Management system as a memory card. It contains a SmartCard chip including a secure memory of about 384 kbyte available for storing thousands of licenses plus additional SLC Nand flash memory which can be used as a removable or local drive. The basic idea of the revolutionary CodeMeter concept is that licenses can be stored for many products even from many different vendors at the same time.

License Options are: Text (description of an entry), Unit Counter (number of runs or actually run time of a license), Activation Time (the license is valid from), Expiration Time (the license is valid until), Usage Period (starts at first time), Feature Map (up to 32 modules or versions), License Quantity (concurrent use / floating network licenses), Protected Data / Extended Protected Data (128x256 bytes read-only data), Hidden Data (128x256 bytes only readable with password; usable as secret/private key), Secret Data (128x256 bytes non-readable, only usable as secret/private key), User Data (unsecured 256 bytes), Customer Owned License Information (256 bytes).

Algorithms: 128 bit AES, SHA-256, 1024 bit RSA, 224 bit ECC.

The used SmartCard chip contains a random number generator according to FIPS140-1 and fulfills EAL 4+ (Common Criteria).

P/N 1041-02-103: CmCard/µSD 512 MB

CmCard/µSD Technical Specifications

- **Interface:** Micro SD(HC) Card, SDA 2.0
- **Data retention:** >10 years @ 2 million program / erase cycles typical
- **Power supply:** 2.7 - 3.6 V bus-powered, typ. 25 mA
- **Temperature:** -25... +85 degree C, non-condensing
- **Case/Dimensions:** 11 mm x 15 mm x 0,7 mm
- **Weight:** 0,5 g
- **Performance:** Read seq. up to 24 MB/s,
  Write seq. up to 23 MB/s

P/N 1040-02-104: CmCard/SD 1GB
P/N 1040-02-105: CmCard/SD 2GB
P/N 1040-02-106: CmCard/SD 4GB

CmCard/SD Technical Specifications

- **Interface:** SD(HC) Card, SDA 2.0
- **Data retention:** >10 years @ 2 million program / erase cycles typical
- **Power supply:** 2.7 - 3.6 V bus-powered, typ. 25 mA
- **Temperature:** -25... +85 degree C, non-condensing
- **Case/Dimensions:** 32 mm x 24 mm x 2.1 mm
- **Weight:** 2 g
- **Performance:** Read seq. up to 24 MB/s,
  Write seq. up to 23 MB/s

P/N 1042-02-105: CmCard/CF 2GB
P/N 1042-02-106: CmCard/CF 4GB
P/N 1042-02-107: CmCard/CF 8GB
P/N 1042-02-108: CmCard/CF 16GB

CmCard/CF Technical Specifications

- **Interface:** CompactFlash Type 1
- **Data retention:** >10 years @ 2 million program / erase cycles typical
- **Power supply:** 5V/ 3,3V bus-powered, < 110 mA /85 mA
- **Temperature:** -25 ... +85 degree C, non-condensing
- **Case/Dimensions:** 36,4 mm x 42,8 mm x 3,3 mm
- **Weight:** 11.4 g
- **Compliance:** CFA 3.0, CFA 4.1
- **Data Transfer Mode:** PIO6, UDMA4, MDMA4
- **Performance:** Read seq. 14-39 MB/s,
  Write seq. 10-30 MB/s

RoHS compliant
WEEE-Reg-No:
DE 90465365

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