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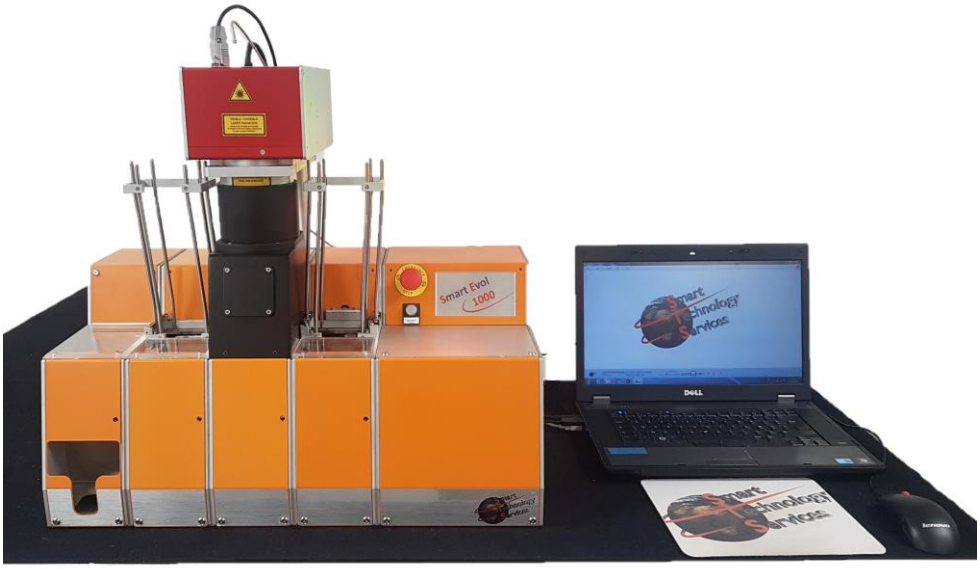
SE1000 card personalization general description

June 2021



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I. Smart Evol 1000 – General overview

Designed to target multiple markets including ID, Financial, transport, GSM, loyalty and others, the Smart Evol 1000 is a mid-range card personalization system bringing:

- Performance and productivity

  Designed to run 24 hours/day, this very robust equipment designed and made in France can reach 1,000 cards/hour, depending on chip encoding time and printing time.

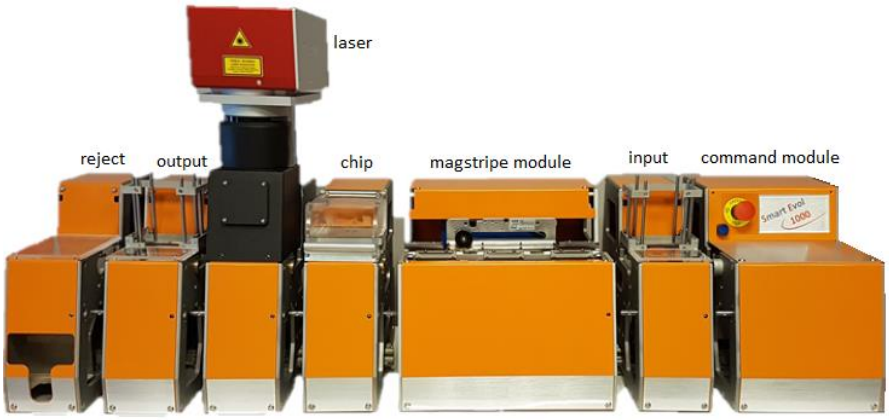
  It also integrates very powerful chip encoders from Smartware – the Ultrasmart Nano - allowing reducing the chip encoding time and therefore allowing keeping a high machine throughput. This allows the equipment supporting a very low cost/card ratio and bringing a fast return on investment.

- Full modularity

  Its unique modular architecture on the market allows to quickly add or remove modules to respond to new project requirements. Adding a module only takes few minutes, thanks to an efficient plug & play concept. An overview of this concept can be seen at https://www.youtube.com/watch?v=X5x9tOnj4Lc&feature=share

  As of May 2020 the following personalization modules are available:

  - Input, output, reject
  - Chip reading/encoding module for contact, contactless and dual interface cards
  - Magnetic stripe encoding module
  - Laser printing module
  - SIM card punching module (for SIM cards)
  - Vision control module
  - Functional and parametric testing for contactless cards or contact cards



The full modularity of the Smart Evol 1000 facilitates on site upgrades to support new requirements. It also facilitates the maintenance.

The Smart Evol 1000 (SE1000) easily stands on a table. The configuration showed here only includes laser printing.

- Able to personalize metal cards

  The input module, as well as all other personalization modules, can personalize metal cards including steel, tungsten, aluminium. The system supports the extra weight of the cards, including at the input and output modules. It can handle very rigid cards. The Smart Evol 1000 laser module provides excellent results when printing on metal cards.

- Fast and easy customization by STS

  The open architecture of the Smart Evol 1000 allows to quickly integrate specific requirements, such as the use of specific lasers, specific couplers, specific cameras for the vision control module. Any request for a customization will be first studied by STS.

- Very easy maintenance

  The full modularity of the equipment facilitates the maintenance of the equipment as any module that needs an intervention can be easily shipped to STS and replaced by another one, without having to ship the whole system.

II. Modules description

▪ *Command module*

PC controller Operating system	Windows 10
Basic software *(General description in chapter 5 below)*	SmartGear EvolMotion EvolTools
Dimensions LxWxH	200 x 340 x 280 mm
Weight	10 Kg
Power supply	200 to 240V, 50 or 60 Hz
Operating environment	10 to 25°C

▪ *Input module*

Hopper capacity	250 cards
Card feeding	Automatic, with empty hopper detection
Card types supported	ISO/IEC 7810 ID-1 Size; 30 mil (+/- 10%)
Card material supported	PVC, composite, polycarbonate, Metal, ABS, PET and PETG
Dimensions LxWxH	100 x 340 x 280 mm
Weight	6 Kg

▪ Magnetic stripe encoding module

The magnetic stripe encoding / reading module is equipped with a HiCo / LoCo ISO 1, 2, and 3 magnetic stripe head, able to read and write the magstripe. It can be positioned before the chip personalization module, or at the end of the machine for quality control purposes

Dimensions LxWxH	300 x 340 x 280 mm
Weight	17 Kg

▪ Chip personalization module

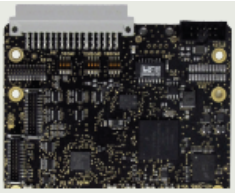
Contact cards supported	All cards complying with ISO 7816 protocols (T=0, T=1), and memory cards, with 1, 2 or 4 chips
- Cards with 1 chip	
- Cards with 2 chips	
- Cards with 4 chips	
Contactless cards	All cards supporting the ISO 14443 A/B, ISO 15693, Mifare, Mifare+, FeliCa protocols
Dual interface cards	All cards supporting above protocols
Couplers	Smartware Ultrasmart couplers (1 per chip encoding head)
Dimensions LxWxH	100 x 340 x 280 mm
Weight	6 Kg

Smartware coupler

The Smartware Ultrasmart coupler is a very powerful chip encoder able to run embedded applications, and integrating the latest technologies allowing to encode a chip at its maximum speed. The coupler also integrates various features eliminating the risk of rejecting cards due to ESD – Electrostatic Discharges.

The coupler is an association of a Ultrasmart Core V5 (the main board) and either contact interfaces, contactless interfaces, or both.

Ultrasmart-CORE V5 - CPU Board (main board)

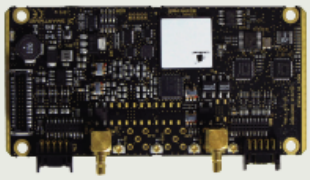


- 32bit 240 MHz processor
- 256MB SDRAM for applications and data
- 8MB Flash memory for OS and resident applications
- Ethernet 100 Mbps (UDP & TCP/IP)
- RS-232
- Support up to 4 production-dedicated daughter boards

Ultrasmart-ICC2 – 2 contact interfaces

- FPGA-based contact interfaces
- ISO 7816 (T=0 and T=1)
- SWP/SHDLC up to 1.6 Mbit
- Memory chips (SLExxxx, ATxx)
- Open/Short test on all contacts
- Adjustable parameters (Vcc, Frequency, ETU, S2 threshold, Timings)
- Integrated Electrostatic discharge suppressors

Ultrasmart-PICC2 - 2 contactless interfaces + 2 simplified contact interfaces



Contactless interfaces

- FPGA-based contactless interfaces
- ISO 14443 A/B up to 848 kbps
- ISO 15693, Mifare™, Mifare+™, FeliCa™
- Programmable RF field amplitude, RF demultiplexer

Contact interfaces

- ISO 7816 (T=0 and T=1), Memory chips (SLExxxx, ATxx)

- ***Vision registration / Vision inspection module***

The module includes a Keyence vision sensor and lighting system, series IV model HG500MA. Further information on the sensor can be found at https://www.keyence.fr/products/vision/vision-sensor/iv/index.jsp

The module can be used for vision registration purpose when it is installed before the laser module, in a view to check the exact position of the area where to print for each card.

The module can be also installed after the laser module, for vision inspection purposes.

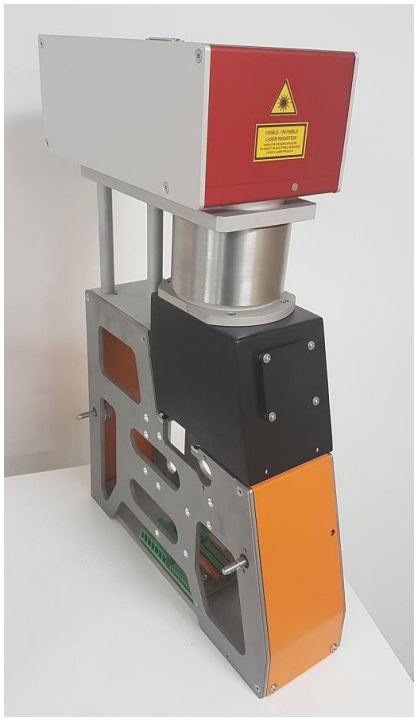
The Keyence vision sensor that can manage OCR/OCV for readability of text, numbers, logos verification, bar code verification (1D, 2D like QR code), magnetic stripe detection, chip detection, etc.

It can also be used for read/look-up capabilities.
An optional small monitor displaying information read for each card can also be installed on the machine.

The vision sensor

The monitor (option)

▪ *Laser module*



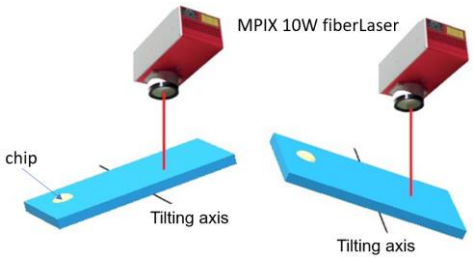
Module Functionality	Engraves text, photos, barcodes and other images on the card surface using laser technology.
Engraving Capabilities	Can print on both side cards, using a card flipper station. Supports tactile effect, micro-printing, ghost photos
CLI/MLI	Available as an option
Dimensions LxWxH	100 x 340 x 280 mm
Weight	11,3 Kg (with a MPIX laser MP-10)
MPIX laser	
Laser type	Diode pumped YVO 2 Watts, or 3 Watts, or Fiber 10 or 20 Watts
Resolution	More than 400 dpi
Laser light source expected life	Around 10 years, in normal conditions of use
Card material supported	Polycarbonate, composite, ABS, PVC cards with a laser receptive overlay. Metal cards also supported

- The MPIX MP-2, MPIX MP-3 and MP-10 can be used for several applications including financial and ID, with the capability to print images and photos.
- The MPIX MP-20 targets more applications requiring black/white printing, like text, bar codes, QR codes.

MPIX 3W laser

MPIX 10W or 20W laser

CLI/MLI is available as an option, using the MPIX 10 Watts fiber laser. The tilting movement is available only along one axis, as illustrated here. The MPIX laser integrates a laser head able to automatically adjust the focus of the laser beam depending on the exact position of the card, thus allowing always printing with the best quality.



Other laser brands (Rofin, Foba ..) and technologies (CO_2, UV, …) can also be studied.

▪ Resonance Frequency measurement & test for contactless cards

The module is based on Smartware CLT solution for parametric testing, and supports the following features:

- Resonance Frequency measurement
- Q (Quality) Factor measurement
- ATS & Reading distance
- Contactless chip encoding
- Complies with QCM requirements from Master Card
- Easy settings, production views and individual card testing thanks to User-Friendly sceens

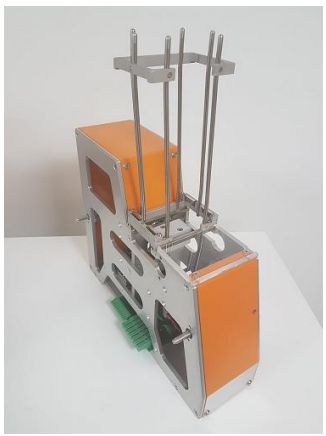
Smartware CLT kit

A similar module for contact cards is also available, allowing functional and parametric testing.

▪ Output module / Reject module

Reject module

Card box capacity	50 cards
Dimensions (LxWxH)	100 x 340 x 280 mm
Weight	4 Kg



Output module

Card hopper capacity	250 cards
Dimensions (LxWxH)	100 x 340 x 280 mm
Weight	6 Kg

III. General software architecture

Smart Evol 1000 basic software

The command module is delivered with the following 3 basic software:

- SmartGear™, from Smartware. This software is designed to drive various high-volume industrial personalization equipments like the MPR5800, as well as desktop machines like the Smart Evol 1000. SmartGear™ is able to manage different jobs facilitating the production of different kind of batches thanks to indicators like number card to produce, card remaining, etc.
  Start, stop, pause, abort, empty machine is a short list of production commands available under the production view of SmartGear™. This view displays also instant and average throughput, bad card counters and last error code for each station.
- EvolMotion; allowing monitoring all the mechanisms of the machine.
- EvolTools; allowing to define the production set ups (data set up, machine set up, card set ups, audit set up), to manage them, and to manage data (data input control, data storage (database), data deletion). It helps optimizing the production through batch remakes and auto remakes.

Application software

For any project, an application software needs to be implemented to monitor chip encoding depending on the chip personalization requirements. Such application software can be developed and implemented on the Smart Evol 1000 using the Smart Evol SDK and related training, using C language.

Generation of laser layouts

The laser module is always delivered with a software allowing to easily create the layouts to print on each card. When using the MPIX laser, this software is called SCAPS.

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