

## FxIntegrator

OEM Module  
Fingerprint recognition



### Applications

- Access control
- Time & attendance
- Door locks
- Armored doors
- Alarm systems
- Gate openers
- Safe boxes
- Racks
- ATM, Kiosks, POS
- Industrial machines
- Vehicle engine start
- Satellite alarm



FxIntegrator is a professional module for fingerprint recognition, designed to be integrated within third party systems.

Its high quality fingerprint sensor (top of the market area and resolution) produces high definition images thus maximizing recognition accuracy. The internal powerful microprocessor allows the user identity to be verified in less than 1 second without any additional external hardware.

The integration of FxIntegrator into a third party electronic device is very easy thanks to the ICP (Integrator Control Protocol) serial protocol. Moreover, thanks to the ISP (Integrator Simplified Protocol) buttons and leds interface, the module can be integrated into third party systems without the use of external electronics.

## Technical specifications

### Fingerprint Sensor

- Optical, high resolution (500 dpi)
- Wide acquisition area (13.2x25 mm<sup>2</sup>)
- ISO model

### Microprocessor and memory

- RISC 32-bit, 200 MHz, core ARM9
- 16 MB RAM

### Storage

- Basic - 4 MB Flash (about 1500 users)
- Max 32 MB Flash (about 10000 users)

### Input / Output

- RS 232 TTL (commands)
- 4 digital Inputs (high impedance)
- 4 digital Outputs (open collector)

### Power supply and size

- 5 V DC ( $\pm 0,2V$ ), 350 mA (max)
- Size (mm): 88 x 58.5 x 55

### Accessories

- Relay board Fx2Relay/Fx4Relay
- Sun Technology

# FxIntegrator

## OEM Module Fingerprint recognition

### Fingerprint Sensor

The high resolution of the internal sensor (500 dpi; as FBI specifications) and its very large sensing area significantly improves fingerprint recognition accuracy: the resolution and area of the FxIntegrator module are the highest among the existing fingerprint modules. Thanks to these features, false rejections due to incorrect finger placement are drastically reduced.

### Microprocessor and memory

The core of FxIntegrator is a board equipped with a powerful microprocessor (RISC 32-bit, 200 MHz, ARM9) and 16 MB of RAM. This allows very large images (560×296 pixels) to be processed on-line, without jeopardizing recognition accuracy.

### Accuracy and efficiency

FxIntegrator can operate both in Verification mode (1:1 match – PIN based), and Identification mode (1:N search on the database of enrolled users) with a very low error rate. A single user verification takes about 0.8 seconds.

### Template Storage

The FxIntegrator (basic model) stores up to 1500 fingerprints (up to 10000 in the model with max flash memory). Fingerprints are not stored as images but as templates (compact numerical features extracted from them). From a fingerprint template it is not possible to reconstruct the original fingerprint image.

### Integrator Command Protocol (ICP)

FxIntegrator can be driven by third party devices through the serial protocol ICP (Integrator Control Protocol). ICP enables the interfacing of the FxIntegrator with simple 8-bit microcontrollers. FxIntegrator operates as a biometric co-processor and supports the storage of fingerprint templates: the external host (master) sends all requests (enrolment, verification, and identification) to the FxIntegrator (slave), and waits for a response. Through ICP it is also possible to export/import/delete fingerprint templates and adjust several system parameters.

### Integrator Simplified Protocol (ISP)

FxIntegrator can be also interfaced through ISP (Integrator Simplified Protocol). ISP does not require any external host; therefore, integrating the module with other devices through ISP does not require the development of additional electronics. In fact, FxIntegrator is controlled through 3 buttons and few leds: one button for user enrollment; another for identification over the database of enrolled users, and another for canceling the ongoing operation. Once a user has been authenticated a programmable digital output is sent out by FxIntegrator on a specific line.

### Integration and Development (SDK)

FxIntegrator SDK includes:

- 1)one FxIntegrator module;
- 2)one external mini-board (with a cable for connection to FxIntegrator) with: 5 Volt power adjuster, RS 232 port for the connection to a PC (ICP), 4 buttons and 4 leds connected to FxIntegrator inputs and outputs respectively (ISP);
- 3)one RS 232 cable for connection with PC;
- 4)one external power supply;
- 5)software to control the FxIntegrator from a PC running Windows (source code available in C language);
- 6)examples of integration with microcontrollers (electrical schema and source codes).

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