integrated solutions for interoperable systems of fingerprint identification

PAPILLON SYSTEMS

PAPILLON
FINGER AND PALM PRINT LIVESCAN DEVICES

PAPILLON LIVE SCANNER
SOFTWARE FOR ELECTRONIC FINGERPRINTING

PAPILLON AO is a well-known Russian company with extensive experience in the provision of robust automated fingerprint identification systems (AFIS) and comprehensive collection of innovative software biometric solutions for law-enforcement agencies, government and business entities throughout Russia and abroad.

PAPILLON designs and implements large-scale interoperable systems of finger and palm print identification meeting diverse identity challenges, including crime investigation, that fully comply with the current world's standards for the interchange, identification and verification of fingerprint information.

PAPILLON has always been an adherent of a comprehensive approach to construction of high-tech integrated software and hardware systems. That is why PAPILLON dactyloscopic technologies have no 'blank' spaces, providing creation and effective interaction of all mission-critical nodes and levels in most complicated systems.

PAPILLON AFIS is a cornerstone of all fingerprint identification solutions, a system featuring the highest search performance on databases of any size, providing the maximum automation of entry, processing, comparison, storage and transfer of fingerprint/palmprint information.

High-quality imaging of finger and palm prints as well as transmission of electronic tenprint cards to AFISs is ensured by PAPILLON's proprietary, patented technology of Live SCANNER.

Our company focuses on the development and production of livescan fingerprint devices. As an instrument of data input and identity verification, a fingerprint scanner is an integral part of any state-of-the-art AFIS system.

Superior quality of fingerprint information acquired through livescan enrollment assures the pin-point accuracy of its automatic recognition and coding, thereby improving major search characteristics of AFIS, such as reliability, accuracy and performance. Electronic fingerprinting accelerates manyfold the process of inputting tenprints into AFIS databases, considerably increases the throughput capacity of the systems and enables real-time identity checks against remote PAPILLON AFIS databases that store millions of tenprint records (FILTER Express ID Check technology by PAPILLON).

PAPILLON livescan devices and systems for electronic fingerprinting (PAPILLON Live SCANNER) have been manufactured since 1992. Widely used by law enforcement agencies in Russia and some other countries, they are invariably highly appreciated by leading experts in the realm of AFIS industry. The Live SCANNER technology is protected by the Russian Federation patent.

The onrush of the biometric market and the increasing need for high-quality, reliable and financially affordable devices for fingerprint enrollment and verification have caused continuously growing interest to PAPILLON products among integrators and coordinators of various biometric projects.

Frequently asked questions about PAPILLON fingerprint scanners and the Live SCANNER system

1 *What type are PAPILLON scanners?*

It's historically established in the evolution of AFIS that optical scanners have gained the prevalence since they are less sensitive to adverse service conditions and have an optimum quality-price ratio in comparison with scanners of other types. The fixed optical system of the scanners developed by PAPILLON is highly durable and tolerant of ambient light, thereby providing the acquisition of high-quality dactyloscopic images virtually in any environmental conditions.

2 *Do PAPILLON scanners meet recognized biometric standards?*

Since 1997, PAPILLON livescan devices have been undergoing certification procedures at the FBI, USA for compliance with requirements set down in EBTS Appendix F (IAFIS Image Quality Specification). As the FBI requirements are duplicated by the international and Russian biometric standards, the FBI certificates guarantee that our scanners fully comply with requirements of the aforesaid standards. In 2011, PAPILLON scanners were certified as meeting the EU standard requirements.

Visit: http://www.fbibiospecs.org/IAFIS/Default.aspx

3 *What type of images can be acquired with PAPILLON scanners?*

The large family of PAPILLON scanners includes models for capturing any and all types of dactyloscopic images: rolled and flat fingerprints taken individually, simultaneous impressions of 4 flat fingers and thumbs and palm prints. The size of the capture platens are sufficient to scan even very large hands.

4 *What software and other supplements are needed for PAPILLON scanners to run?*

PAPILLON scanners are connected to a computer or laptop via a standard USB port. The fingerprinting procedure to create electronic tenprint cards containing required text data and dactyloscopic images, is performed under PAPILLON Live SCANNER software providing ample functional capabilities that let you (if appropriate equipment is installed): • add to electronic tenprint files portraits, photos of distinctive marks such as scars, marks and tattoos, graphic signatures of persons fingerprinted • authenticate tenprints with electronic, digital signature • print paper copies of electronic tenprints.

PAPILLON Live SCANNER software is developed for running Windows and Linux OS.

5 *Is it possible to vary a set of images that appear on electronic tenprints?*

The default nomenclature of images to be included into an electronic tenprint is defined by the scanner model you choose. Optimized for adaptability, the scanning options can be customized as needed. You can specify, by selecting from the list of available types of images, which of them you want to be present on a tenprint you are going to create.

Moreover, you are free to choose the way of obtaining fingerprints: by rolling each finger 'from-nail-to-nail', or by scanning each finger without rolling, or by scanning plain impressions of fingers taken simultaneously as 4+4+2 and then dividing them into separate images.

6 *Does the skin condition (too dry, with a worn-out pattern, moist) affect the image quality?*

PAPILLON scanners have proved that they overcome the aforementioned obstacles to obtaining good results. They generate high-quality images even of difficult-to-capture fingerprints regardless of skin conditions. Such enemies of fingerprint capture as dry skin and worn-out pattern are eliminated through utilization of a special elastic polymeric coating (membrane) that covers the scanning platen. The properties of this replaceable coating provide better contact between the finger and the scanning platen even when the finger skin is dry or when the relief of pattern ridges is too low. Besides, this coating protects the glass surface from dirt, wear and mechanical damages.

As for excess moisture, our scanners incorporate special optical technology that enables the separation of the areas of contact with friction ridges from those filled with moisture.

PAPILLON scanners generate highest-quality images that are not obscured by moisture found on wet and sweaty hands and eliminate any image aberration caused by condensation due to temperature differences.

7 *How is the problem of compensation for smears during rolling solved?*

To compensate for smears that appear when you take rolled fingerprints (the fingers being rolled from side to side), PAPILLON has developed a highly effective program algorithm that 'pastes together' sequentially captured frames having removed inaccuracies caused by slippage during rolling on the scanning prism.

Providing this aforementioned advantage, the Live SCANNER system ensures rolled fingerprint capturing with crisp and sharp result images completely voiding of unreadable areas.

8 *How can electronic tenprints acquired by means of PAPILLON Live SCANNER be used?*

The PAPILLON Live SCANNER software enables creation and functioning of a local database of tenprints providing ample capabilities to search for objects with specific properties, to sort in any order, to print out any information stored in the database. The capability to search by specific text data and just one flat impression of a finger pressed against the scanner platen allows you to determine if the individual's tenprint already exists in the system database and thereby to avoid duplicating tenprints, to reveal facts of re-registration but under different names.

Electronic tenprints can be exported to PAPILLON AFISs where they are automatically inserted into permanent databases without any operators' assistance. To transmit tenprint files to other, dissimilar, AFIS systems, the ANSI/NIST standard is used (Interpol, FBI and Russian MOI implementations). Besides, tenprints can transmitted as TIFF and BMP graphics files.

Images are compressed, without any loss in quality, with WSQ algorithm developed by PAPILLON and certified by the FBI.

Tenprints can be transmitted via any communication channel supporting IP communication. This transmission is initiated and controlled by Pilot, an ad hoc software module included in the Live SCANNER package.

9 *Is any special training needed to operate the PAPILLON Live SCANNER system and livescan devices?*

The operator's work in the Live SCANNER system is automated as much as possible and needs minimal training. Its friendly interface is the best interactive training simulator that makes capturing all prints and text data an intuitive process enabling the user to quickly acquire skills in electronic fingerprinting.

A finger/palm placed on the scanning platen is detected automatically without pressing any button or foot pedal.

True live-display of images guides the operator to ensure quick and easy operation and assist him in handling problems in a 'real time' mode. Once a good quality image has been captured, the system automatically proceeds to the next scanning step.

10 *Does the quality of electronic tenprints depend on the operator's experience and qualification?*

PAPILLON Live SCANNER software is capable of revealing any attempt to submit tenprint files with incomplete data set and those of low quality or containing errors of scanning.

The system checks the sequence and accuracy of finger impressions. Automatic slap-to-roll comparisons ensure that each finger is in its correct location and belongs to the same individual – correct rolling, sequence checking, no swapped hands, no duplicate fingers.

The system automatically gauges the size and performs a quality check on each print to ensure that essential features are captured before submission. Using color-coded indication and displaying text messages, the system warns the operator of problems and their possible causes, giving an opportunity to scan fingers as many times as needed to achieve the required quality.

Thus, the lack of experience may manifest itself only through a longer time the operator spends creating a tenprint, but in no way affects its quality.

11 *What are the LCD displays built in some scanner models used for?*

All the relevant information, that appear on the main computer display during the process of fingerprinting, is duplicated on an LCD panel some of our scanners are equipped with. This technical solution:

- makes the scanning process easier (the operator does not use the computer screen while scanning, thereby focusing his attention on the process itself)
- enables the arrangement of an isolated place for taking fingerprints (the scanner can be installed at a 5 meter distance away from the base computer)

To enter relevant text data and to take facial photos, the operator uses the base computer screen and the keyboard. The process of fingerprinting can be managed from the scanner console and display. If the place for fingerprinting is arranged like this, a person being fingerprinted does not approach to the operator's workplace and cannot see the station display.

12 *Can PAPILLON livescan devices be used in systems of other vendors?*

PAPILLON fingerprint scanners can be easily integrated into any existing or new biometric applications, where the acquisition of highest quality fingerprints is needed. This integration is enabled by a full-featured SDK (Software Development Kit) provided for all scanners manufactured by PAPILLON.

Having obtained access to any and all scanners' capabilities, skilful system integrators can rapidly develop their own applications which will incorporate PAPILLON scanners.

PAPILLON Livescan Devices

Image Resolution . . . . . **500 ppi**
Dynamic Range . . . . . **8 bpp**
Signal/Noise Ratio . . . . . **≥ 40 db**
Interface . . . . . **USB 2.0** (480 Mbit/sec)






Model	DS-45	DS-45M	DS-30N	DS-30NM	DS-22N	DS-21C
System Requirement	1 GB RAM (minimum), 2 GB RAM (recommended)			512 MB RAM (minimum), 1 GB RAM (recommended)		
Image Capturing	Flat fingerprints (4+4+2), rolled fingerprints, single flat fingerprints, full palmprints and writer's palms		Flat fingerprints (4+4+2), rolled fingerprints, single flat fingerprints		Rolled fingerprints, single flat fingerprints	Single flat fingerprints
Active Platen Area	132 x 130 mm		86 x 78 mm		42 x 40 mm	20 x 20 mm
Output Image Size (W x H): – Rolled or flat fingerprint	42 x 41 mm		45 x 40 mm		42 x 40 mm	20 x 20 mm
– 4 flat fingers	132 x 130 mm		86 x 78 mm		–	–
– Palmprint	132 x 130 mm		–		–	–
Scan Time	< 5 seconds (3 seconds for flat impressions)		< 4 seconds (2.5 seconds for flat impressions)		< 4 seconds (2.5 seconds for flat impressions)	< 2.5 seconds
Compliance	Compliant with FBI's IAFIS Image Quality Specifications, App. F		Compliant with FBI's IAFIS Image Quality Specifications, App. F		Compliant with FBI's IAFIS Image Quality Specifications, App. F, not subject to certifying because of the scanning platen size.	
	Certified in February 2010	Certified in July 2010	Certified in March 2011		Compliant with FBI's IAFIS IQS EBTS App. F Mobile ID FAP 45, certified in 2015	Compliant with FBI's INGIS IQS EBTS App F. Mobile ID FAP 10, certified in 2016
Power Supply	12 V (~220 V, 50 Hz power adapter)		5 V (USB)	12 V (~220 V, 50 Hz power adapter)	5 V (USB)	
Power Consumption, Maximum	8 Watt	12 Watt	2.5 Watt	5 Watt	2.5 Watt	2 Watt
Overall Dimensions (W x D x H)	243 x 423 x 127 mm	243 x 425 x 135 mm	142 x 160 x 160 mm	137 x 307 x 107 mm	88 x 192 x 60 mm	53 x 110 x 31 mm
Weight	10.5 kg	11 kg	2.4 kg	4 kg	0.95 kg	0.17 kg
Product Features	Metal/shockproof plastic housing, self-contained control board	Metal/shockproof plastic housing, self-contained control board, color LCD display (480 x 272 pixels)	Shockproof plastic housing, self-contained control board	Metal housing, self-contained control board, color LCD display (480 x 272 pixels)	Shockproof plastic housing, miniaturized size	Shockproof plastic housing, minimal weight and dimensions
Optimal Use	• PAPILLON Live SCANNER system for creating tenprint cards with palmprints • Enrollment station for access control and biometric documents application		• PAPILLON Live SCANNER system for creating tenprint cards • Enrollment station for access control and biometric documents application		• Express ID checks against AFIS databases • Enrollment (DS-22N), verification and identification station for access control and biometric documents application	

Eliminating the Impact of Moisture

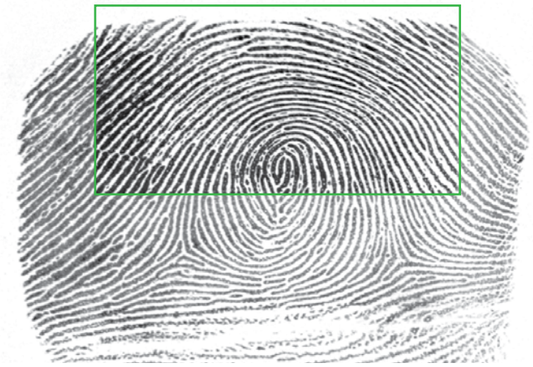
Image of a dry finger

Image of a sweaty finger captured by a conventional scanner

Image of a sweaty finger captured by a PAPILLON scanner

Compensating for Smears During Rolling

Smeared image



Smeared areas compensated in PAPILLON Live SCANNER

PAPILLON LIVE SCANNER SYSTEM FOR ELECTRONIC FINGERPRINTING

- Fingerprint enrollment that includes production of complete electronic “10-print-forms”
- Creation and use of a local database
- Export of tenprints to PAPILLON or dissimilar AFIS databases

System Components:

- PAPILLON Live Scanner software • PC/Notebook
- Scanner PAPILLON DS-45/45M or DS-30N/30NM
- Digital camera • Camera tripod • Printer • UPS
- Modem and/or EDGE/GPRS/GSM modem
- Digital signature (optional) • Electronic signature tablet (optional)

PAPILLON Live Scanner screen. Taking rolls.

Creation of Electronic Tenprints:

Choice of forms for text data entry
Choice of tenprint forms
Biographic data entry using predefined lists of values

Optoelectronic fingerprinting: • Flats (4 fingers of each hand + thumbs) • Rolled or flat single fingerprints • Palm prints (DS-45/45M)

Entry of photographs (digital, TV and WEB cameras, flatbed scanner, JPEG, BMP, TIFF, PNG files): • Full face (frontal) • Profile • Identifying marks (SMT) • Documents

WSQ image compression (Max. 1:15)

Automatic Export of Tenprints to AFIS

PAPILLON format

ANSI/NIST format (RUS-I, Interpol, FBI)

Data transmission (TCP/IP): • Dial-up and dedicated connections • Cellular link (GPRS/GSM, CDMA) • LAN

Local Database Support

Search for a tenprint by a single fingerprint

Search for a tenprint by specific text data

Retrieval and view of tenprints (ANSI/NIST format)

Printing of tenprints, reports and other information stored in database (600 dpi, 1200 dpi)

Recording of tenprint files onto any portable mediums (PAPILLON and ANSI/NIST formats)

Desktop workstation for electronic fingerprinting with PAPILLON DS-45 palmprint scanner

Taking flat impressions of 4 fingers with PAPILLON DS-30N

IMPORTANT!

“All-in-one” software allowing acquisition of amplest information on persons enrolled: demographic and descriptive data, finger and palm print images, photos

“Bulk” data entry mode: to speed up the process of enrolling a large number of people

Auto detection start: without pressing any button or foot pedal – the moment a finger/palm is placed on the scanning platen

Real-time image preview on screen: visual control during all steps of operation (on the station screen and scanner monitor)

Automatic slap-to-roll comparisons: check upon the sequence and accuracy of the rolled impressions and warning of any error

Automatic real-time quality assurance checks: color-coded indication and text messages about the quality of each scanned image

Automatic move forward to scanning the next image: if the quality of previous image is good

Autonomous control over the scanning process: using controls located on the device console

4+4+2 mode: creation of full-information tenprint cards by extracting individual fingerprint images from flat impressions taken as 4+4+2

Elimination of impurities found on the image background: highest-quality images that are not obscured by oil or dirt residue remaining on the scanning prism

Digital camera and special software settings for capture and input facial images (frontal face image compliant with the standard ISO/IEC 19794-5:2005/GOST R ISO/IEC 19794-5-2006

SPECIAL SOLUTIONS FOR ID CAPTURE

PAPILLON MDS 45 Livescan Station

designed for intensive use at law enforcement agencies, as a point of capture for all data collected during suspect booking. This standalone station is equipped with PAPILLON DS-45.

PRODUCT HIGHLIGHTS:

- Self-contained rugged cabinet, incorporating all necessary equipment
- Maximum performance in harsh, high traffic environments
- Effective protection of the equipment against unauthorized access, damage and destruction
- Ergonomic design providing working areas sufficient for operation with documents and accessories such as a tablet for electronic signatures

OPTIONAL FEATURES:

- Real-time automatic express ID check by a single flat fingerprint against PAPILLON AFIS databases (PAPILLON FILTER package)
- Acquisition of fingerprint data from paper tenprint cards and lifted latent print record cards to search them against AFIS databases (flatbed scanner and remote input package)

More than 1,500 PAPILLON MDS stations are currently in operation throughout the Russian Federation.

PAPILLON MKDS xx Mobile Station

designed for in-the-field enrollment and identity checks. It’s a part of PAPILLON’s extensive portfolio of integrated communication and information solutions that address mission-critical public safety and security requirements. Can be equipped with DS-30N fingerprint scanner or DS-45 integrated finger and palm print scanner.

PRODUCT HUGHLIGHTS:

- Use of a portable computer (notebook)
- Shockproof cases incorporating all of the components and relevant mounting accessories for easy transport to the remotest locations
- Use of cellular links for data transmission
- Autonomy due to rechargeable batteries
- Can use car adapter for power supply

All components are packed neatly into two rather small shockproof, rugged cases. To create electronic tenprints, you need the case where a notebook, a fingerprint scanner and a camera are enclosed. The other case contains a printer and relevant consumables needed for printing.

OPTIONAL FEATURES:

- Real-time automatic express ID check by a single flat fingerprint against PAPILLON AFIS databases (PAPILLON FILTER package)

The mobile stations have been successfully used during counter-terrorism operations on the territory of Chechnya. Currently, they are actively used by Border Police of the Russian Federation.

PAPILLON Scanners Worldwide

Country	Capital	PAPILLON Scanners
Russia	Moscow	8 675
Abkhazia	Sukhumi	40
Azerbaijan	Baku	152
Albania	Tirana	48
Bangladesh	Dakka	79
Belarus	Minsk	14
Bosnia & Herzegovina	Saraevo	5
Vietnam	Hanoi	2
Georgia	Tbilisi	25
Zambia	Lusaka	6
India	Deli	1 845
Kazakhstan	Astana	86
Cuba	Havana	1
Latvia	Riga	174
Mongolia	Ulan Bator	51
Nigeria	Abudja	40
Poland	Warsaw	383
Serbia	Belgrad	59
Tajikistan	Dushanbe	12
Turkmenistan	Ashkhabad	33
Turkey	Ankara	5 617
Ukraine	Kiev	14
Uzbekistan	Tashkent	4
South Korea	Seoul	284
Other countries		818
Total:		**18 527**, of them:
PAPILLON MDS Livescan Stations		1 557
Mobile Enrolment/Booking Stations		885

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