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Important Things To Consider Before Choosing A Multi-fingerprint Scanner

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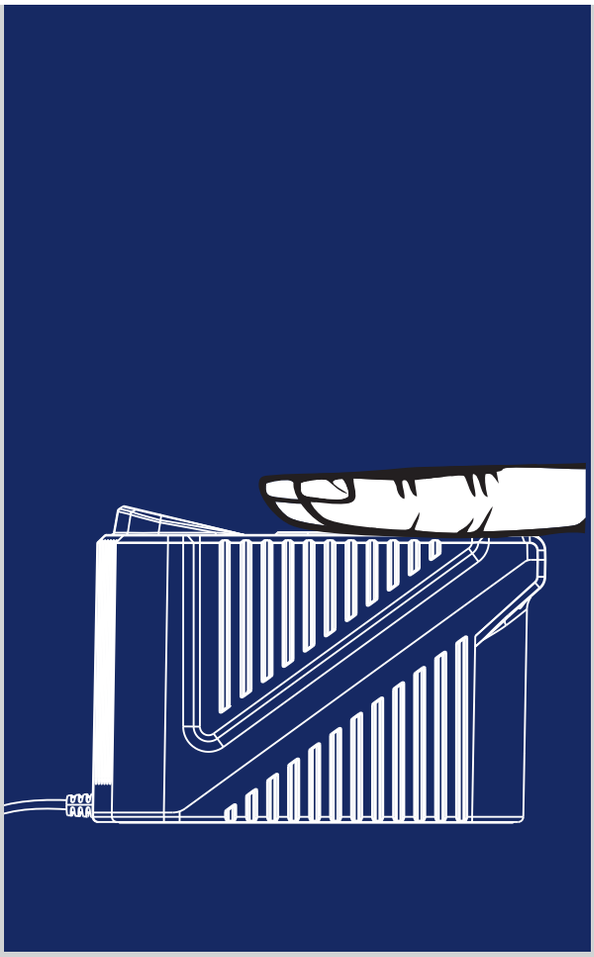


Introduction

Fingerprints are the oldest and most widely used biometric authentication technology in law enforcement. As time passed, fingerprint scanning and identification progressed from a paper-and-ink-based technology to the Automation Fingerprint Identification System (AFIS). The days of manually looking for a latent fingerprint are long gone. With AFIS and tenprint scanners, law enforcement agencies can now find matching fingerprints from the directory in a short time.

Forcing convicts to put all of their fingerprints on paper and then keeping them with their other demographic data in a large data library is an old picture of storing biometric data. The ten-print scanner or slap scanner, or multi-fingerprint scanner, has taken over the process and allows storing the prints digitally. Finding a match for a latent fingerprint is now easier than ever. Agents may submit any of the suspects' latent fingerprints to the AFIS, and the results will be ready in seconds.

What is a multi-fingerprint/ slap/tenprint scanner?

The multi-fingerprint scanner scans and reads a person's ten fingerprints in a 4-4-2 pattern, basically used as an enrollment device. That is, four fingers from each hand are scanned back to back, followed by the two thumbs together, for a total of three fingerprint slaps for a tenprint card of a person.

Among all the types of fingerprint scanners, a tenprint scanner generates the highest quality fingerprint image. Each fingerprint pattern from the slaps will be of sufficient quality to allow for single fingerprint separation and comparison. Simply put, even though a slap contains four fingerprints or two thumbprints, each fingerprint possesses a quality that can recreate each fingerprint separately.

Visually, a tenprint scanner features a big capture area and a rugged design. The rugged body is most required since the scanners have to deploy in diverse environmental conditions, including airports, police stations, jails, and distant remote locations where scanners may encounter moisture, dust, water, shock, etc.

How to choose a multi-fingerprint scanner?

The multi-fingerprint scanner is used as an enrollment device for citizen enrollment, culprit enrollment at jails and police stations, businesses (for employe enrollment), and border security (for immigrant enrollment and livescan). Every multi-fingerprint scanner will almost look the same, but they differ in specifications. The choice should be based on the specification.

1. Types of multi-fingerprint scanners

The first and foremost step is to select a scanner from the types listed in FBI Appendix F. As per the appendix, fingerprint scanner types vary from FAP 10 to FAP 60, with FAP 10 - 30 mainly for personal fingerprint identification with good image quality to produce one fingerprint. While FAP 40 and above are for enrollment, they are multi-print scanners that can read multiple fingerprints simultaneously.

FAP 40 and 45 can read a maximum of two fingerprints simultaneously, while FAP 50 and 60 are tenprint scanners that can read four fingerprints in one slap and produce a tenprint card in a 4-4-2 pattern. FAP 50 and 60 are specifically used for citizen enrollment, border security, and law enforcement. FAP 40 and 45 find applications in enrolling employees for attendance tracking and security applications.

FAP 50 and 60

FAP 50 and 60 are look-alike tenprint scanners (4-4-2), only differ in capture size. FAP 60 (3.2" x 3") has a larger capture size than FAP 50 (3.2" x 2"). In the early days of ink and paper fingerprint enrolment, people had to roll their fingers to enroll the fingerprint impression. Hence, a shorter length was sufficient to read and acquire the rolled imprint, which is currently replaced by FAP 50 devices. However, for rapid and automated one-to-many (1:N identification) fingerprint searches, a flat fingerprint, which is FAP60, was necessary.

Capture size for FAP 50 level

Capture size for FAP 60 level

Mobile multiprint scanner

2. Mobility

Usual multi-fingerprint scanners have to connect with a desktop, and the desktop must have the image quality assessing software or live scanning software. These scanners won't have any image storing capacity, though they are able to carry out primary image quality checks. Besides, there are integrated mobile multi-fingerprint tablets for mobile fingerprint scanning.

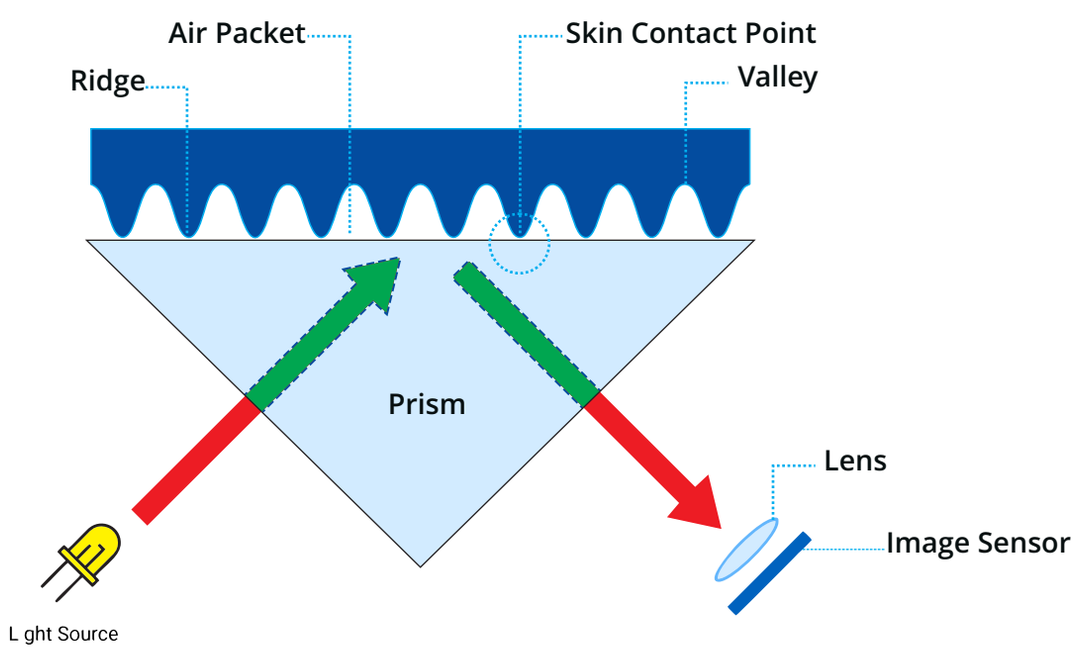
A mobile multi-fingerprint tablet features a tablet screen, a multi-fingerprint scanner (ten prints or two prints), a camera, and all of the additional functions found in a standalone multi-fingerprint scanner and tablet device. In short, the device is mobile and, at the same time, has the ability to run inbuilt image quality assessing software and any other third-party software. It's almost like a pocket multi-fingerprint scanner. It has applications in KYC for SIM cards, banking, domestic LPG, voter registration, health ID, border security, and the defense industry.

3. Type of sensor

Fingerprint sensors are classified into four kinds based on their operating principles: optical, capacitive, ultrasonic, and LES (Light Emitting Sensor).

Optical scanner

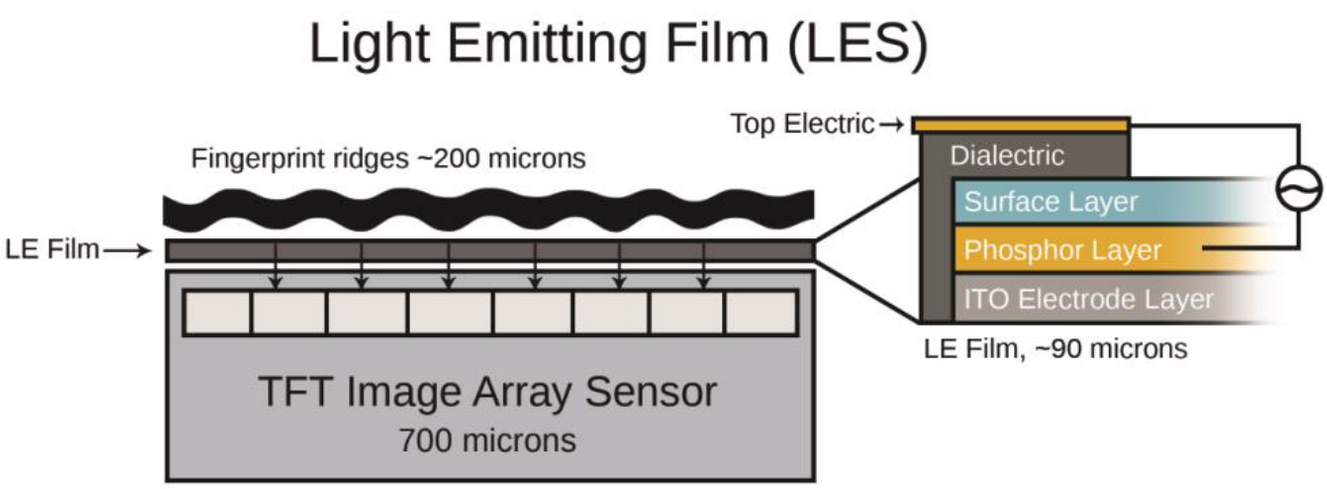
Optical scanners are the most common and oldest type of fingerprint sensor. As the name suggests, it captures the optical image of the fingerprint using CCD or CMOS image sensors. An array of these sensors illuminates the finger and captures a high-quality picture of the reflected image. The ridges and valleys of a fingerprint will be clearly depicted in the 2D image. The most advanced optical fingerprint scanners can recognize ridges, and valleys in minute detail, even on greasy or wet fingers and in direct sunlight.



Light Emitting Sensor (LES) technology

LES is the first non-optical sensor to be certified by the FBI Appendix F. The LES film in the capture region includes luminescent phosphor particles that only light up when they come into touch with a human finger. This light is captured by a TFT camera, which produces a high-resolution fingerprint image.

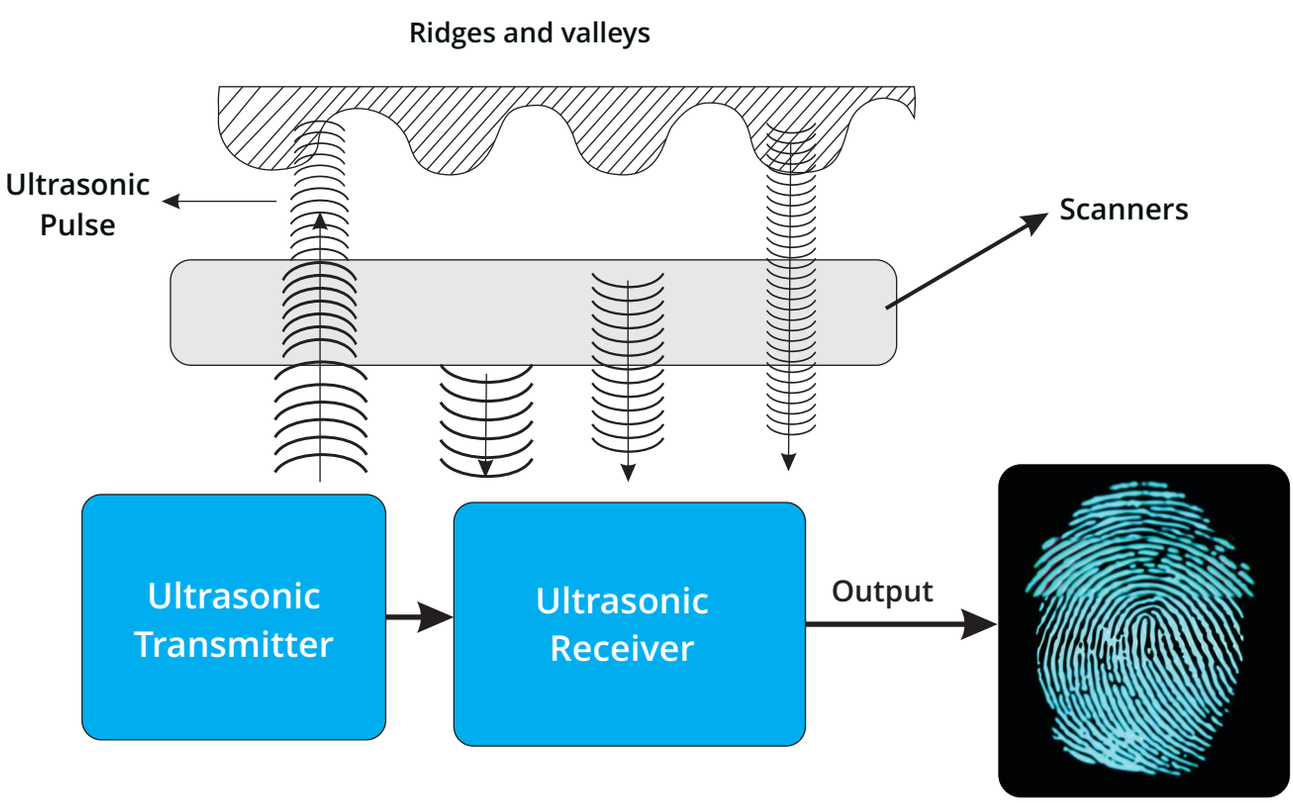
LES is unique for its compactness and lightweight, making it ideal for integrated mobile or pocket tenprint scanners. The LES is also resistant to bright sunlight, dust, oil, and grease.



Ultrasonic scanners

Recently, QUALCOMM developed in-display dual fingerprint scanners for smartphones and tablets. Ultrasonic multi-fingerprint scanners could become available in smartphones, standalone and integrated devices in the coming years. As of now, only dual print scanners introduced but we can expect 4 fingerprint readers as standalone and integrated devices soon.

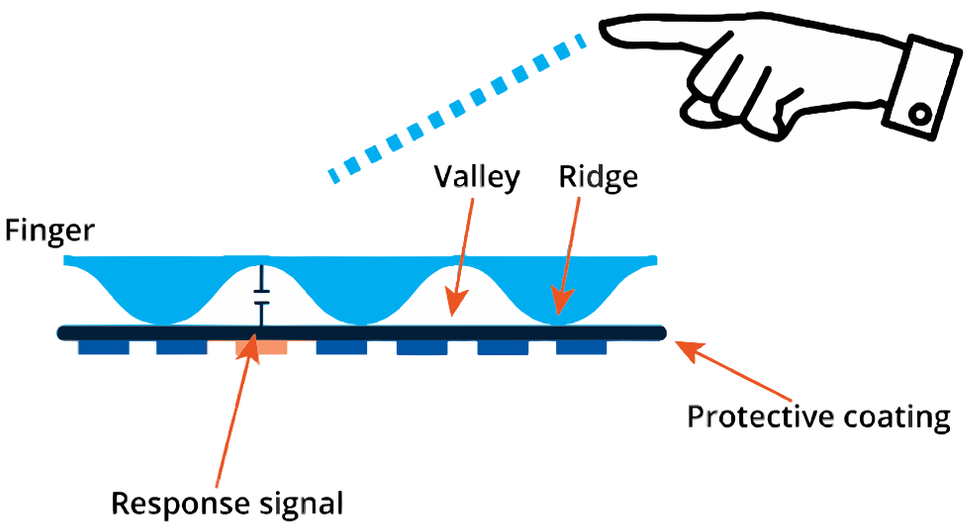
Ultrasonic sensors are utilized to create 3D fingerprints and on-screen fingerprint readings. It operates in the same way as sonar technology does. It transmits a sound wave to the screen and absorbs the sound reflected from the fingerprint. The sensor will construct a 3D map of the fingerprint using the pulses reflected from different spots on the finger. Ultrasonic is ideal for in-display fingerprint scanning and 3D print generation.



Capacitive sensor:

Capacitive multi-fingerprint sensor is under development phase; we may see these sensors in integrated devices soon. Capacitive sensors are thinner and lighter than optical sensors. Apart from that, it can produce precise fingerprint pattern, has good image quality, is less resistant to hacking, and is relatively inexpensive.

Capacitive sensors use an array of hundreds of small capacitors. These capacitors read the capacitance between ridges and valleys. The capacitance will be greater for ridges as the distance to the ridges is less, and the capacitance will be low as the distance to the valley is high. As a result of the variation in capacitance, the capacitive sensor generates a digital image of the fingerprint.



4. Durability and ruggedness

Multi-fingerprint scanners are not just for indoor usage; they have applicability in varying environmental conditions. The durability and ruggedness of the device must be evaluated according to the nature of the deployment. Higher IP ratings and durability are required if the devices are to be used for citizen enrolment and immigration registration in rural and remote locations. Furthermore, the picture capturing surface must be scratch-resistant and durable.

5. Connectivity

Adequate connectivity like USB is necessary for scanners to connect with systems. In the case of mobile scanners, as per the requirements, tablets must have WIFI, NFC, Bluetooth, 3G, 4G, 5G connectivity. Whatever, the connectivity has to be secured and certified.

6. Working conditions

The multi-fingerprint scanner of choice must be flexible to its application's working conditions. Humidity, temperature, and moisture are all important operating conditions to consider. In a humid environment, vapor condensation on the optical sensor screen may prevent the fingerprint from being read. In this case, IP protection is required, and some companies utilize fans to minimize condensation.

People doing fingerprint enrolment and verification come from different physical or working conditions. Their hands could be wet from sweating (due to the high ambient temperature), oily, greasy, etc. Sticky particles on the hands may produce scratches on the screen, lowering image quality. A scratchless capture area is always recommended for multi-fingerprint scanners, and it must withstand the environmental conditions mentioned above.

7. Choose based on the application

Airports, border security, enrollment, verification, security access control, and other applications employ multi-fingerprint scanners. A tenprint scanner FAP 50 or 60 is recommended for citizen enrolment. They are also essential in applications that need tenprint livescans, such as border security and airport security.

Two print scanners (FAP 40/45) are mostly used in personal identification and security access control applications in which FAP 45 allows livescan and rolled scanning. While FAP 40 facilitates flat scanning, basically used for personal identification and verification.

8. Versatility

Many companies offer embedded software for desktops with their multi-fingerprint scanners; the scanner will only work with this software. This is unacceptable in the case of security applications and citizen enrollment; they must be universally inter-portable.

Third-party software dependency poses a security risk to law enforcement and other government agencies. And so, multi fingerprint scanners should have universal portability as per the standards.

Conclusion

Choosing a multi-fingerprint scanner is as easy as it gets. When it comes to specs, one must select between FAP 40 and FAP 60 devices. Their specifications are mentioned above in this article. Their applications, where each kind is appropriate, are also outlined. As the security threats and throughput in each system are increasing, the need for multi-fingerprint scanners will also increase. Aside from public enrollment and security, the scanners will find use in the commercial and financial sectors. As a result, there will be additional advancements in device size, design, durability, connection, and capabilities.

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