



**10-Print Capture
Scanner & Software Requirements
Version 0.9 DRAFT**

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Discussion of Requirements - Agenda

- **Purpose of this discussion is to highlight requirements for which you submitted questions or comments.**
- **We have organized your questions and comments into requirements categories.**

General Goals

- **Meet the current space requirements (6"x6"x6")** constraints of the deployment facilities.
- **Be mobile** so as to support multiple operational scenarios.
- **Perform all the ten print capture** processing steps including individual finger segmentation and image quality checks **within 5 seconds per slap**, from the time the subject places his/her fingers on the Scanner, to the moment the capture Software has segmented, analyzed image quality, and delivered status to the operator.
- **Be powered without an additional 120v power plug** in order to meet power capacity and power cabling constraints of the current facilities.
- **Comply with the current biometric industry standards**
- **Meet or exceed fingerprint quality requirements** contained in the latest version (7.1) of the Federal Bureau of Investigation's (FBI's) Electronic Fingerprint Transmission Specification, Appendix F



2.1 General Requirements

1. The Scanner and Software shall **capture the ten fingers using 2 four finger slaps and one 2 thumbs slap.**
2. The Scanner and Software shall support slap capture of **both identification slaps and individual finger flats.**
3. The Scanner and Software shall output fingerprint images **in accordance with format standards** identified in section 2.6, below.
4. The Scanner and Software should support **rolled fingerprint capture.**
5. The Scanner and Software shall be able to **auto sense or auto capture finger** when a finger is placed on it.
6. The Scanner and Software should have an **anti-spoofing capability** (e.g. live finger detection).
7. The Scanner shall be factory **calibrated** and shall provide automatic recalibration.
8. The Scanner should be **mobile** enough to be used by subjects who cannot reach the countertop.
9. The Scanner shall have the capability to be firmly **mounted on the counter-top.**
10. The Scanner shall operate in the following **environment**
 - Temperature Range 35°F to 120°F (2°C to 49°C)
 - Humidity Range 10-90% non-condensing; splash resistant
 - Direct sunlight and/or in variable outdoor conditions.



2.2 Scanner Form Factor Requirements

1. The Scanner shall be no larger than the following dimensions:
Length 6", Width 6", and Height 6".
2. The Scanner shall capture a slap size image of no less than **3.2 inches wide by 3 inches tall.**
3. The weight of the Scanner shall **not exceed 5 pounds.**
4. The Scanner shall have a **mean time between failure** of at least **5 years** of 7x24 operational use.
5. The Scanner shall have sealed, rugged container with **high tolerance for shock and vibration**
6. Other proper **human factor design** should be considered, for example, but not limited to
 - **tilting capture area** angle to increase pressure on the platen to achieve better print quality,
 - be designed to support both handheld and counter mounted use.
7. The Scanner should provide visible indication of power and status (e.g. off-line; ready, processing).



Scanner Interface and Drivers

1. The Scanner shall interface with Microsoft **Windows 2000 and Windows XP** environments.
2. The **power** for the Scanner shall be drawn from the desktop computer to which it is connected and **not require an additional 120v plug.**
3. The Scanner interface to desktop computers shall be supported through a **single, 6' cable** to provide both data transmission and power supply.
4. The Scanner shall be provided with **device drivers.**
5. The Scanner drivers shall run in **Microsoft Windows 2000 and Windows XP environments, in both 32 and 64** bit operating modes.
6. The Scanner shall support **upgrading and managing of the software/firmware** in the unit from the connected PC.
7. The Scanner shall be **UL certified.**



Scanner Fingerprint Image Quality

1. The Scanner image quality shall be certified to be in **compliance with or exceed the FBI's EFTS Appendix F Image Quality** Specifications (IQS) for Identification Flats.
2. A means should be provided to verify that the Scanner **continues to meet** EFTS Appendix F image quality requirements at operator selected intervals throughout the useful life of the Scanner.
3. The Scanner shall **eliminate the Halo Effect**: the effect of condensation from placing warm, moist fingers on the platen.
4. The Scanner should have the ability to capture print images when the fingers are **dry or wet**.
5. The Scanner shall be able to captures high quality fingerprint images **regardless of skin color or age** of the subject.
6. The Scanner and Software shall provide means to distinguish and **eliminate ghost** (residual latent fingerprint) **images**.



Software Requirements

1. The Software shall be in the form of a Software Development Kit (**SDK**) for easy integration with both **client** (PC with Scanner attached) **and server** (an application server without the Scanner attached) applications.
2. The Software, operating with the Scanner, shall deliver segmented, quality assessed and sequenced images to the client component in **no greater than 5 seconds** per step, from the moment the subject first touches the scanner platen, through capture of one of the three slap images.
3. The Software shall be provided with **sample source code and documentation** necessary to support development of client and server applications.
4. The Software shall run in **Microsoft Windows 2000, Windows 2003 Server and Windows XP environments**, in both 32 and 64 bit operating modes, as well as all major **Unix and Linux** variants.
5. The Software shall support **any approved Scanner**.
6. The Software shall assess **overall slap quality**, including correct number of fingers captured, size and grayscale intensity of the fingers, fingers not truncated at edges, etc., in support of **auto-capture**.
7. The Software shall **segment** any single **four-finger slap** image into discrete, single-finger images.
8. The Software shall **segment** any single **two-thumb slap** image into discrete, single-thumb images.



Software Requirements, Continued

9. The Software shall **assess the fingerprint quality** of all individual fingerprint images
10. The Software shall **construct single two-thumb images** from discrete single thumb images.
11. The Software shall **distinguish between left and right hands** for any four-finger slaps.
12. The Software shall be able to distinguish **image sequence** (finger number) of the captured fingers.
13. The Software shall provide handling for hands that are not easily segmented such as **amputations and deformities**.
14. The Software shall conduct quality checks that assess image quality and **provide the user with instant feedback**.
15. The Software should provide the capability to **interrupt** auto sense or auto capture.
16. The Software shall **track source and version** of image quality modules in segmentation and sequence determination.
17. The Software shall support **java and C++** applications on the client, and **J2EE, C++, and .Net** applications on the server.
18. The Software shall provide a NIST and FBI-certified **WSQ** compression at selectable compression ratios (e.g. 10:1, 15:1)



Compliance to Standards

1. ANSI INCITS 358-2002, **BioAPI** Specification, <http://www.bioapi.org/> - (note: it is anticipated that the interface between Scanner and Software may use a subset of the BioAPI specification. Both the Scanner and Software therefore should support BioAPI.)
2. CJIS-RS-0010 (V7.1), Electronic Fingerprint Transmission Standard (EFTS) (address **EFTS** support with compression) , http://www.fbi.gov/hq/cjisd/iafis/efts_70.pdf
3. ANSI/NIST ITL 1-2000, **Data Format for the Interchange of Fingerprint, Facial, & Scar Mark & Tattoo (SMT)** Information, <http://www.itl.nist.gov/>
4. IAFIS-IC-0010(V3), IAFIS Wavelet Scalar Quantization (**WSQ**) Grayscale Fingerprint Image Compression Specification, dated December 19, 1997.
5. ISO/IEC 15444 – Information technology – **JPEG** 2000 Image Coding System, <http://www.incits.org/>
6. **Fingerprint Image Quality**, NISTIR 7151, August 2004
<http://www.itl.nist.gov/iaui/894.03/pact/pact.html>

NOTE: The Software shall return image with **ANSI/NIST ITL1-2000/EFTS** format. It shall further allow selection of the compression to be applied (i.e., WSQ, JPEG2000, or none).