Hardware Development Manual

Sherlock NEC

Fingerprint Scanner (SAP45)

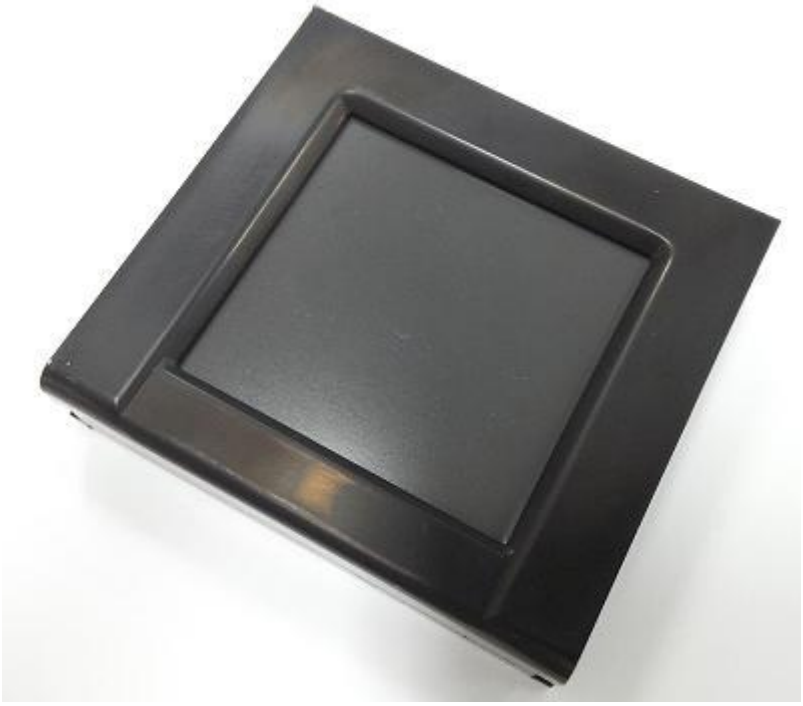
Version 1.0

Revision History

Revision No.	Issue Date	Comments
1.0	2018.1	1.0 Version Preliminary

Contents

1. Introduction



Sherlock utilizes Integrated Biometrics patented LES film with a thin film transistor (TFT) providing the highest forensic-quality roll image in the smallest and lightest form factor available on the market today. Sherlock provides a significant reduction in SWAP (size, weight, & power) when compared to optical scanners.

Sherlock is provided with a full-featured SDK to enable effective integration into applications requiring certified quality images. This product meets the needs for both enrollment and verification applications common in international standards based programs. Sherlock is particularly suited to the many mobile applications where minimal size and weight have significant value. It can also cost-effectively perform all requirements common in Ten Print enrollment applications.

2. Features

- **Lightweight:** designed to have minimal impact on the overall weight or structure of biometric devices
- **Compact:** designed to easily integrate into multiple applications, allowing biometric devices to be smaller and more mobile
- **Durable:** impact-resistant and able to withstand the toughest conditions with minimal maintenance or damage due to scratching or breakdown from contaminants
- **Accurate:** provides accurate high-resolution fingerprint scans in virtually any environment: indirect or direct sunlight, a factory, with dirty or clean fingers
- **Secure:** live finger detection
- **Efficient:** LES fingerprint sensor is not easily confused by foreign matter and contaminants, allowing the sensor surface and the **biometric access control** solution to be essentially maintenance-free. Requires no cleaning for latent prints.

2.1. Hardware Features

- **It can get a fingerprint image with high speed thanks to internal FPGA**
- **The verification of competiablity and interoperability using USB I/F certification**
  - It can get and transfer a fingerprint image most effectively using USB 2.0 interface.
  - It supports USB 2.0 Plug and play.

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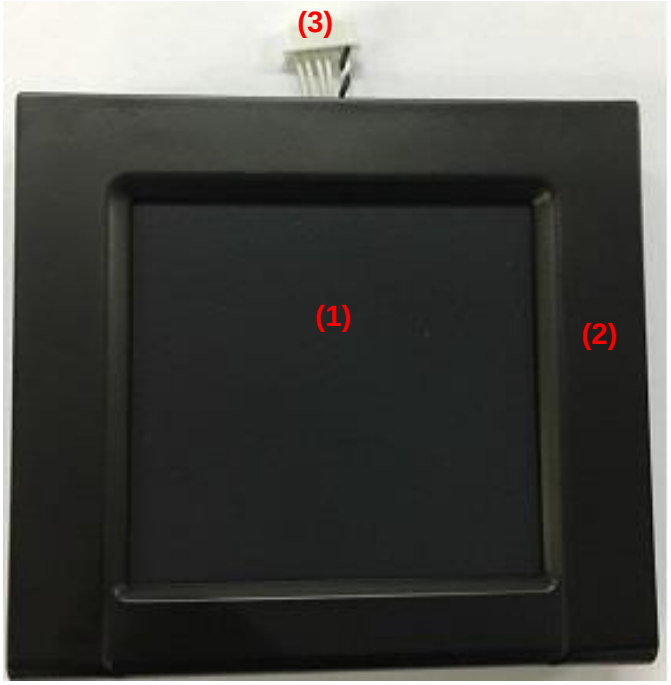
2.2. Software Features

- **It can capture single flat fingerprint, single rolled fingerprint, and two flat fingerprints.**
- **High security level**
  - It can distinguish between real and fake fingerprint.
  - U.S patented Contact Light Emitting Sensor
- **High image quality**
  - We get the FBI Appendix F Mobile ID IQS SAP45 certification.
- **Automatic fingerprint capturing**
- **Provide SDK**
  - We provide a SDK for developing Windows & Linux program (Visual Basic, Visual C++, .Net).

3. Applications

- Immigration system
- Electronic ID
- Electronic passport

4. Exterior



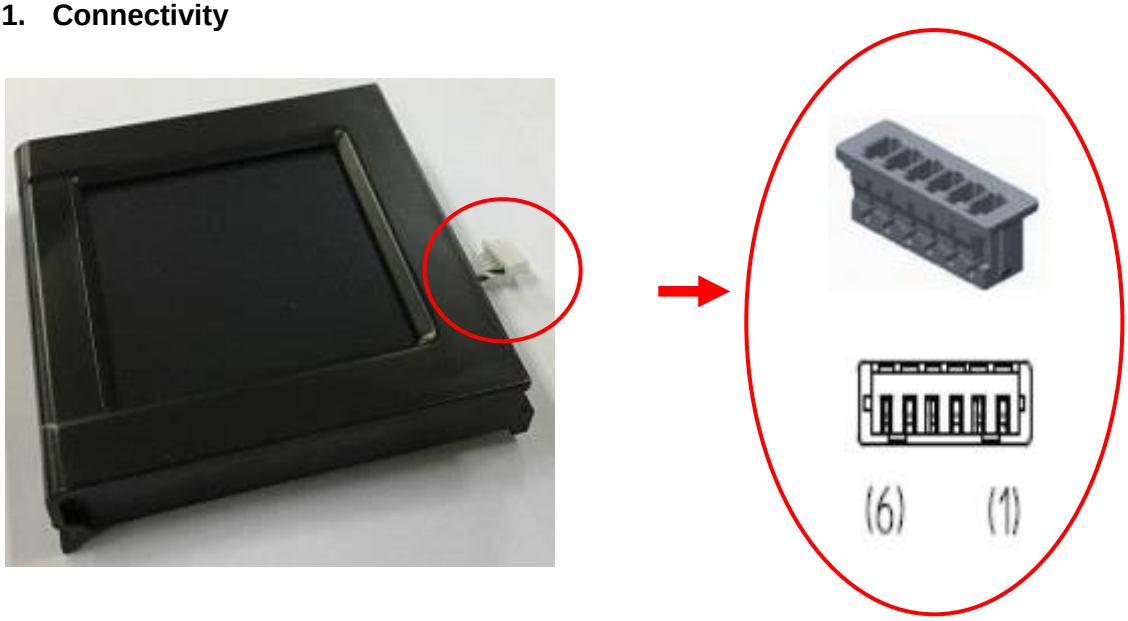
(1) LE Sensor : **L**ight **E**mitting **Sensor**

(2) Sherlock NEC Case

(3) Sherlock NEC USB Cable

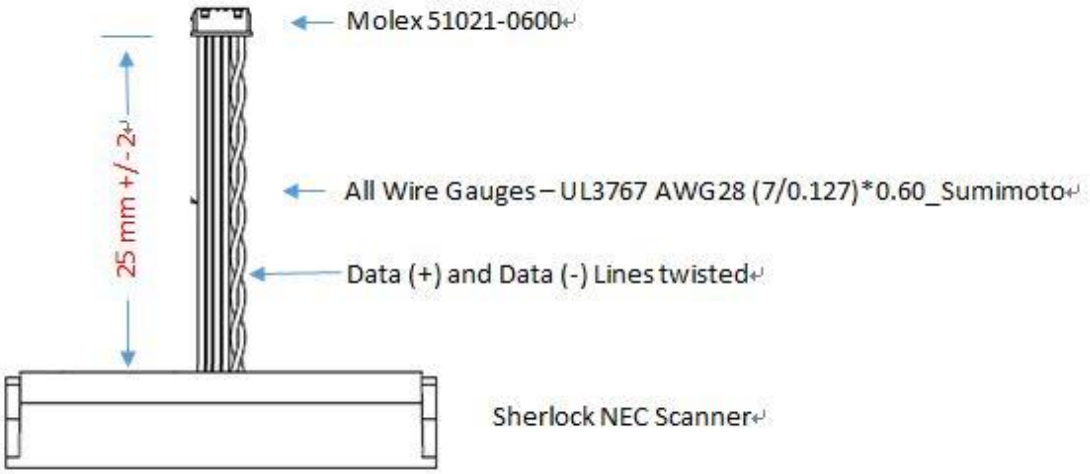
5. Hardware Overview

5.1. Connectivity



- USB connector Pin Description

Pin No.	Type	Description
1	USB	Data (-)
2	USB	Data (+)
3	G	Ground
4	V_BUS	+5 VDC
5	G	Shield (Ground)
6	I/O	Wake Up



Wire specification: Sumimoto Eletronics Type UL3767 AWG28 (7/0.127)*0.60

UL スタイル No. UL STYLE No.	定格 RATING 温度 TEMP. (℃)	定格 RATING 電圧 VOLT. (VAC)	導体 CONDUCTOR サイズ SIZE (AWG)	導体 CONDUCTOR 構成 No./mm	導体 CONDUCTOR 外径 NOM.DIA. (mm)	絶縁体 INSULATION 厚さ NOM. THICK. (mm)	絶縁体 INSULATION 外径 NOM.DIA. (mm)	最大導体抵抗 MAX. CONDUCTOR RESISTANCE (20℃) (Ω/km)	最小絶縁抵抗 MIN. INSULATION RESISTANCE (20℃) (MΩ-km)	絶縁耐圧 DIELECTRIC STRENGTH VAC(1min)
3767	105	30	32	7/0.08	0.24	0.10	0.44	594	10	500
			30	7/0.10	0.30	0.10	0.50	355		
			28	7/0.127	0.38	0.11	0.60	224		
			28	19/0.08	0.40	0.10	0.60	223		

APPLICATION

It is used in electrical and electronic equipment specified in the UL standard. Especially Internal wiring(narrow space)of electronic equipment; mobile equipment and electronic equipment.

DESCRIPTION

- Rating ····· Rating voltage 30 V, rating temperature 105℃.
- Insulation ····· Insulation material is our original flame retardant polyolefin. This material doesn't use any halogen or halogen compounds, red phosphorus, any lead or lead compounds or any antimony or antimony compounds at all.
- Flamability ····· These wires pass the vertical flame test bassed on UL VW-1.
- Outer diameter ··· Small finished diameter is advantageous in relation to space factor.
- Connector ···AWG28 is suitable for 1.0mm,0.8mm pitch crimp type connector.

5.2. Connection Specification

The communications cable will be connected to the Sherlock NEC PCB at connection J1. J1 male connector is BM06B-SURS-TF and female connector is SUHR-06V-S. This is shown in the image below

Connection to J1

Final Assembly

6. USB Specification

6.1. Supported OS Driver

Section	Spec.	Remarks
Windows	XP	
	VISTA	
	7 & 8	
Android	Android 4.0 higher	
Linux	Kernel 2.6	

6.2. Recommended specification for PC

Section	Spec.	Remarks
CPU	Pentium4 - 2.0GHz or higher	
Memory	512 RAM or higher	
USB	USB 2.0	

6.3. Minimum specification for PC

Section	Spec.	Remarks
CPU	Pentium4 - 1.0GHz or higher	
Memory	256RAM or higher	
USB	USB 1.0	

7. Specification

7.1. Hardware Specification

Section		Spec.	Remarks
IBNS110	Interface	USB 2.0 High speed Plug & Play	
	Sensor Type	LE Polymer Film	
	Camera	TFT	
	Frames	>10 FPS across 1.5” x 1.6” platen	
	Resolution	500DPI ± 1%	
	Capture area	40mm(W) x 38mm(H), 1.6”(W) x 1.5”(H)	
	Image Size	800(W) x 750(H) pixels	
	Power	USB Level 4.40V ~ 5.25V	
	Static Discharge	IEC61000-4-2 Air Discharge : ±8kV Contact Discharge : ±4kV	
	Sunlight	Has no effect on fingerprint image	
Mechanical	Scanner Package	61.6mm x 65.4mm x 14.3mm (±1mm)	
	Color	Black – Conductive Plastic	
	Product Weight	<55 grams	

7.2. Software Specification

Section	Spec.	Remarks
FBI Certifications	Appendix F Mobile ID IQS SAP45	
API Interface	Capture Two finger	
	Capture roll image	
	BIOAPI 2.0	
Supported Operating System	Windows, Linux, Android	

7.3. Environmental

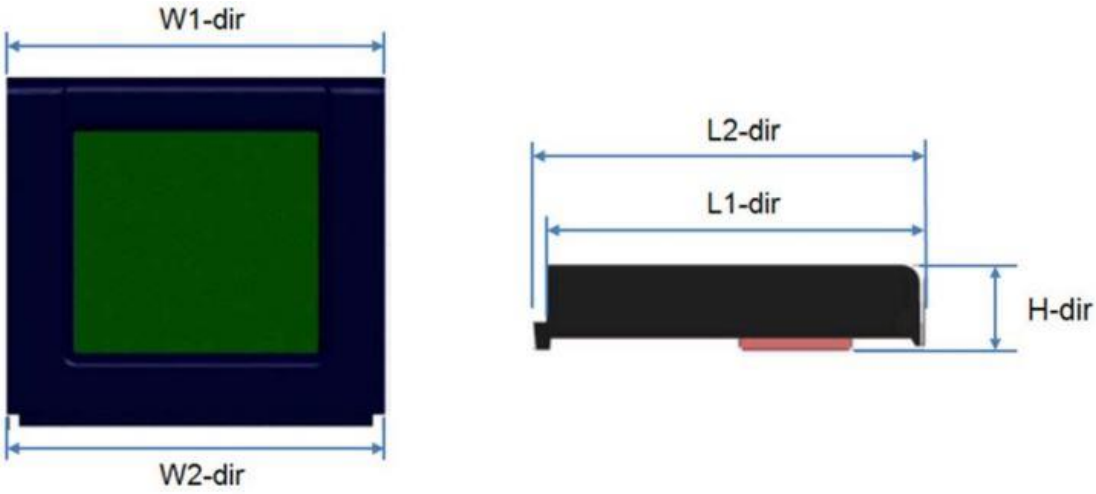
Section	Spec.	Remarks
Operating Temperature	-10℃ ~ 55℃	
Humidity	20 ~ 95 %RH < 40℃, Non-condensing	
Hazardous Material	RoHS 2002/95/EC Compliant	
Storage Temperature	-30℃ ~ 80℃	

7.4. Electrical DC Characteristics (VDD = 5Vdc, Top = 25℃)

Section		Min.	Typ.	Max.	Unit
Power Supply Voltage (VBUS)		4.5		5.5	V
Full Scanning		-	-	300	mA
Scanner in Sleep Mode		-	-	2	mA
USB only (Driver connection)				70	mA
Wake-Up Line	On/Off V_{IH} (LVTTL)	2		3.6	V
	On/Off V_{IL} (LVTTL)		0.8		V
Grounding		Bezel <5Ω to USB cable shield			
D+ and D-		USB			

8. Mechanical Specification

Item	Specifications
Scanner package	65.2 +0.1mm / -0.3mm (W) x 59.5±0.2mm (L1) x 61.7±0.2mm (L2) x 14.2mm (H) + 0.1mm / -0.3mm
Color	Black – Conductive Plastic
Total weight	<55 grams



* 3D Model is available upon request (*.step)

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