

# Finger Printing & Biometrics

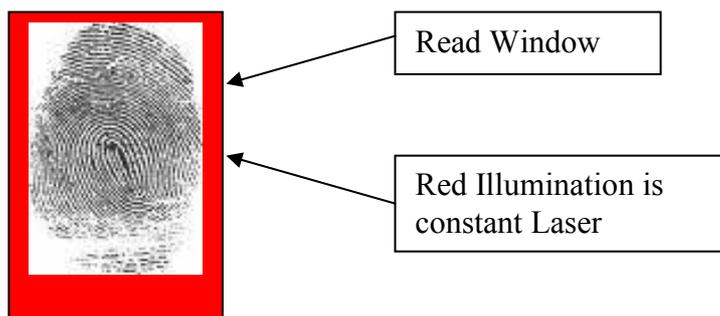
This document is intended to explain the application of biometrics for access control and time and attendance as developed by Wiztec.

The advent of Biometrics offered a unique and virtually fool proof method of confirming a persons identity when either logging onto a system or gaining access to a building. However initially it was taking in the region of 2 minutes to confirm or deny whether the finger print was recognised or not. This was due to the fact that the biometric technology initially was in fact taking an image of your finger print and storing this image and then on the next read was making an "image comparison". This proved to be too slow for any real use of this technology to be accepted. In 1999 when we first looked at Biometrics it took up to 4 minutes to confirm a read and this was with a unit with only 10 staff recorded in it.

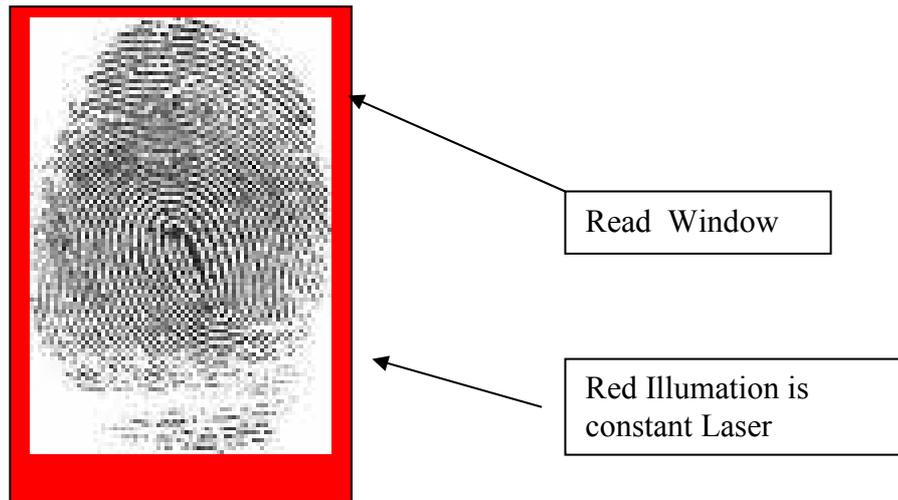
Where finger printing imaging is in use today as in entry to the US for example the above method is still applied. However the computer doing an analysis of the finger prints is rather too large to be used as an access or time unit. Even with todays largest IBM Mainframes running at 9000 MIPS the validation of an imaged finger print still produces a processor load.

Then in 2003 a simple advancement by chip manufacturers allowed a whole new view of biometrics to make their use a feasible reality. Instead of reading an image of the finger print the new hardware would read only the ups and downs of the finger print and do this at intervals along the finger print. It was up to the individual companies designing the readers to decide the frequency and amount recorded. Obviously the more of a finger print recorded then the better the accuracy and the less equally was true.

Here's simply how we now record a finger print:



This is a finger print as recorded as an image and if you look at the detail you can get an idea of how complex it would be to confirm or match this.



The following is how we convert the Finger print to useable information giving us high accuracy without the overhead of comparison.

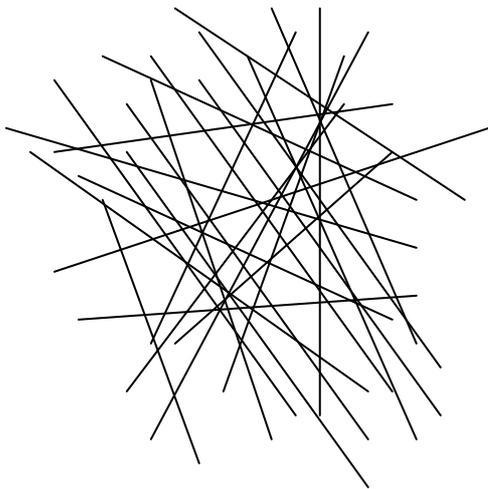


The manufacturer and designers decide (in this case Wiztec) how many cross points they want to read and they can record up to 512. The 512 is a hardware design limitation. Once decide upon when the finger is placed on the reader the laser reads both horizontally and vertically to read and calculate the junction points and then repeats the procedure for a pre determined time period until it either confirms , denies or cannot read the finger print.

Each point where crossed is given a mathematical value based on its distance from a pre determined center point and recorded as follows :

1<sup>st</sup> point 0A, from 1<sup>st</sup> to 2<sup>nd</sup> time taken to reach = A3 from second to 3<sup>rd</sup> = D1 and so on so we end up with something like the following :

0AA3D14BC8688239079845a2bbf7f3f2f9b4bffba9a8a8a8 and if we tried to translate this back into a finger print with the best intentions we would get something like this :



The reason a finger print cannot be recreated from this method is simply that we don't record a finger print to redraw. We have points of vertical and horizontal value and what's put into this value also depends on whether the point recorded is a crest of the finger print or a valley.

If we took a cross section of a finger print we would see something like this :



You can see the crests and valleys and in the event for example that a person cuts their finger it then becomes dependant on the design engineers to decide the accuracy required from the read. It is the norm that in finger print biometrics that a number of different fingers be recorded to avoid the above situation. The only draw back or advantage (depending whether you are buying or selling) with the above system is that it is vendor unique and you cannot mix different readers in the way for example that you can use different bank cards as there is no standard for this reading process.

Where palm readers are used the process is pretty much the same except we would normally read more areas of the hand and take a greater sample. However the principal is the same.