



## TECHNICAL TIPS

**PRODUCT:** BioLock and BioLock+ Standalone

**Subject:** Large User Populations

**Date:** 7<sup>th</sup> October 2007

**Revision:** 2

BioLocks are used in a wide variety of installations ranging from single-user secure cabinets, through residential applications with around a dozen enrolled users, small commercial access control systems with perhaps 80 users on several BioLocks, up to larger corporate networks of many dozens of BioLocks and hundreds of enrolled users.

Given that BioLocks operate in 1:Many mode (with a presented finger checked against all the known finger templates previously enrolled), as user populations increase the “matching” task gets somewhat more difficult, and some precautions become necessary.

BioLock+ Standalone operating in its standalone mode has a coded limit at present of up to 100 fingers enrolled. BioLock+ Standalone can also have a card-plus-finger population of up to 1,000 or more fingers/users (as well as the 100 finger-only users) depending on the firmware version purchased.

BRS' BioScan units (both Security and Time & Attendance) have a limit of 1,000 templates (with greater capacity available on request).

Beyond those limits, BioLock+ can be used with larger user populations in its network mode (with the PC software included), as can the network-only BioLock.

The remainder of this note deals with BioLocks operating in network mode (i.e. running from a PC server using the BioLock software supplied on the CD-ROM shipped with the BioLock kits).

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There are two main issues with large user populations on BioLocks: speed and matching errors.

### ***Speed***

As user finger templates are added to the database, the verification matching naturally takes longer (matching is very CPU-intensive). If measures are not planned or taken to manage this speed, users can become frustrated with the time required to open the door.

The first step is to ensure that the memory (RAM) is large enough. For small populations (up to around 40 finger templates), the memory that runs your operating system comfortably is adequate. For populations of up to around 80 finger templates, 1 GB is adequate. For populations of up to 500, 2GB is preferred.

The second step is to ensure that the PC has sufficient CPU speed. Whilst things such as memory bus clock speeds and bandwidth can affect performance, broadly the rated CPU clock speed is the main determinant of matching speed. On commonly-available PCs, a CPU with a 2.8 GHz clock speed should give adequate performance for populations of up to around 120 finger templates.

For larger populations, multi-core CPUs (such as the Intel Core Duo or AMD Athlon X2) are recommended, in conjunction with BioLock software versions 57 or greater (which implement support for multi-cores/multi-threading). A 2.4 GHz dual-core CPU should give good performance for up to around 250 finger templates, a quad-core CPU should give good performance for up to around 450 templates.

### ***Matching errors***

Any finger presented to a BioLock is verified (matched) against all the enrolled finger templates in the database. As the database gets larger, the chance of the presented finger wrongly matching against a different (but similar) stored finger likewise grows. Some sensible precautions need to be taken.

Firstly, make sure that unwanted finger templates are deleted. Often (especially in a commercial environment) temporary contractors, visitors or other people are given access then later are no longer required but the templates are left in the database. This is a potential security problem, so periodically cleaning up the database by deleting no-longer-wanted users/templates is good housekeeping.

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Secondly, enrolment technique is critical, especially in large user populations. Common problems include enrolling the tips of fingers rather than the flats (the finger-ridge patterns on the *tips* of most fingers are very similar, so can give great potential for poor matches).

Read the Technical Tip on enrolment, and make a significant effort to achieve high enrolment quality/scores. The users will subsequently appreciate the convenience of less rejects, and the BioLock system will be more secure. For large populations (more than 80 finger templates), also raise the threshold at which you accept an enrolment quality score to be greater than 55 for the great majority of users. Do not, except in very rare circumstances, allow quality scores of less than 50 without having first tried all fingers/thumbs.

Thirdly, increase the security levels for all enrolled templates. There is a small increase in rejections, but the greatly reduced risk of false matches is much more significant.

#### **FURTHER INFORMATION:**

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*Bio Recognition Systems Pty Ltd is a 100% Australian owned and operated hardware and software developer and manufacturer. Located in Lane Cove, Sydney, Bio Recognition Systems Pty Ltd began by offering its customers software and hardware solutions in 1999. Its leading edge BioMetric technology harnesses the power of the newest technology in fingerprint recognition.*

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