BioBanking Marketing Strategy Attachment A

Technology Description

Chad Watson – Watson MegaTech

President and CEO

# Biobanking Intended Usage

As described in the Marketing Strategy this is a product that is intended for control and execution of personal financial transactions. The device and supporting technologies will reduce and eventually eliminate identity theft.

The application will be a sub-dermal nano-scale microchip, called “The BioBanking Insert” that interacts with active fingerprint reader devices and the user’s fingerprint to ensure two factor authentication. The insert device will store user account information and allow for modification or deletion of accounts very much like the way cell phone providers change the information on a phone when vendors are changed.

Lastly, the BioBanking system will allow payment flexibility. The consumer will be able to pick any account or combination of accounts encoded on their device and allocate portions of the payment among them. Current technologies allow a consumer to use only one account that is associated with a specific card. Since BioBanking is associated with an individual all financial account are fair game to use in purchasing systems. This includes, for example, using two bank accounts from two completely different banks to pay for one item. This is a significant leap forward in transaction flexibility.

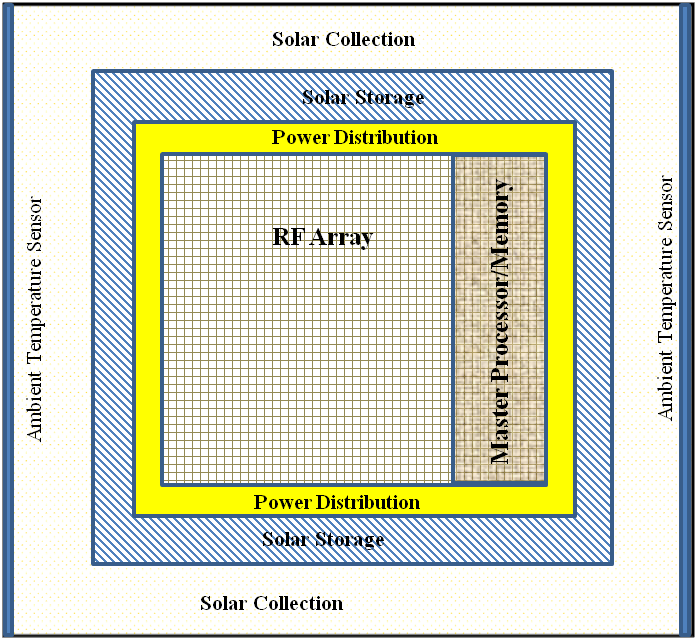
# BioBanking Technology

There are several components that make up the BioBanking system. Some of these are the main technology enhancements and some are supporting technologies. The supporting technologies come in two categories:

* Current existing technology that will be modified to integrate with BioBanking system components
* Current technology that the BioBanking system will overlay (e.g. the financial network)

The entire system is centered on the most advanced nano-scale technology invented to date – The BioBanking Insert. The Insert device is a 50 mm by 50 mm chip that has self-contained power, power distribution, on-board memory and processing, and an active radio frequency (RF) array for active transmit and receive. The active transmit and receive are giant leaps forward in financial transaction security. This takes the convenience of RFID credit and debit cards and adds the security of biometric scanners.

Figure 1 depicts the details of the BioBanking Insert and assists in the description of the salient points of the technologies.



**Figure 1: BioBanking Insert Full Layout**

## Insert Architecture

The Insert architecture is built upon a bio engineered substrate that will not introduce pathogens into the host user. This is not new technology but it is important for the long-term safety of the device. Watson MegaTech worked with substrate developers to apply nano-scale circuit imprints on the device through electron level etching.

The Insert is a set of concentric squares starting at the outside of the device and working inward. The intent was to collect power at the outermost parts of the device and store it close to the distribution so there was minimal power loss in transmission. The power distribution is a square array that surrounds the main parts of the chip that use the power: the RF array and the main processor. This architecture offered the most efficiency in the smallest footprint.

## Insert Power Technology

It was imperative that the Insert not have to be replaced or need regular maintenance. Since it is a sub-dermal device this would pose an undue hardship on our customers. Therefore, the design team opted to use solar power as the power source. Since the device is only sub-dermal there is still significant light intensity to achieve photo-voltaic energy collection. The solar technology in the Insert is very similar to the Eco-Drive technology used in Citizen watches.

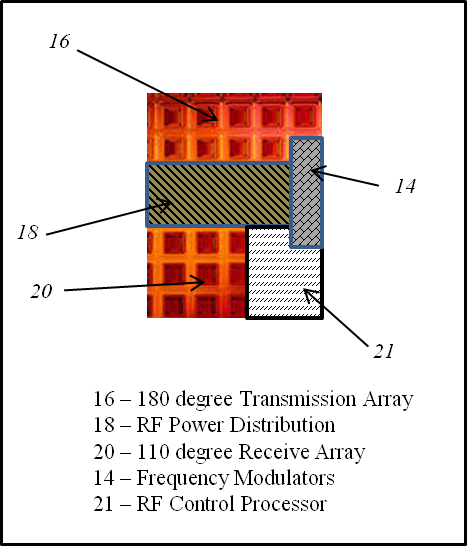
Shown in Figure 1, the solar energy is stored directly adjacent to the solar collectors and the power distribution in tiny solar collection capacitors. The power is transformed to 12 Volts Direct Current (DC) power for the on-board equipment requiring power.

The power distribution grid is the next concentric square in the device and is immediately adjacent to the RF Array and Processor/Memory Array. This proximity prevents line loss and ensures the most power is delivered to the heart of the device with the most efficiency.

This power architecture offers the most efficiency with zero long-term maintenance. For an implanted device this is the best architecture that is available.

## Insert RF Array

The heart of the Insert and the most important part is the active transmit and receive RF Array. Figure 2 depicts the features of this part of the device.



**Figure 2: BioBanking Insert Active RF Array Architecture**

* The most advanced technology and the heart of the Insert are the Transmit and Receive RF Arrays. These are the smallest phased-array guided RF antennae in the world. The transmission array covers 180 degrees with small side lobes so the readers can pick up the signal with almost any finger presentation angle. This will alleviate much frustration experienced by previous implementation of simple passive fingerprint scanners.
* The RF Receive Array is where information is received for encoding in the device. This allows addition, deletion, and modification of account information.
* The RF Array has local power distribution that is strictly dedicated to the RF Array. This adds efficiency as the array does not have to share power with other devices.
* The control and emission of the RF Array is governed by the RF Control Processor and the Frequency Modulators. The RF Control processor is responsible for beam steering and signal processing of the returned signals. The frequency controls are to keep the two arrays from interfering and to control the timing and execution of the RF pulses.

## Insert Master Processor/Memory Module

Any device of this complexity needs on-board processing. Since the Insert also stores account information for retransmit, there must be addressable on-board storage that is read and write memory. Figure 1 shows this module directly adjacent to the RF Array and the power distribution. This placement was for efficiency of signal travel and signal loss prevention. Both the processor and memory module are electron etched integrated circuits offering 1 GHz clock speed and 20 Gigabytes of Memory. The memory module applies RAID-type striping across three memory components for redundancy.

# BioBanking Enabling Technology

The Insert alone would not work without many enabling devices. Additionally, there must be a gradual sun setting of current technology as BioBanking matures and become the accepted personal transaction method. So BioBanking will be enabled by some current technologies some of which will need modification while others will simply need upgrade but would be cost prohibitive to replace.

## Current Financial Technologies Requiring Modification

Currently almost all financial transactions are completed using magnetic tape reader machines. The market for RFID tagged cards is growing rapidly but has not yet overtaken the magnetic card paradigm due to some recurring security concerns. However, there are many places where the RFID reader and the Magnetic strip readers are adjacent or are integrated. This is the vision for the BioBanking active RF interrogators.

Figure 3 shows a prototype BioBanking Reader. The device has the fingerprint reader and a key pad that enables the customer to select the account or set of accounts with which they wish to pay.



**Figure 3: BioBanking Active Interrogator**

The Active Interrogator will initially be placed alongside current transaction devices. Within one year, all Active Interrogators will also have magnetic reader devices integrated and will replace current technology devices.

The second major current technology that will be modified for BioBanking use is an encoder device. The Insert requires active RF signal to encode accounts. The Encoder will be a modification of the devices that encode RFID tags in consumer goods. The modification will be to adapt to financial industry network protocols and use fingerprint authentication for identity purposes. These will be deployed at all financial institutions that employ BioBanking.

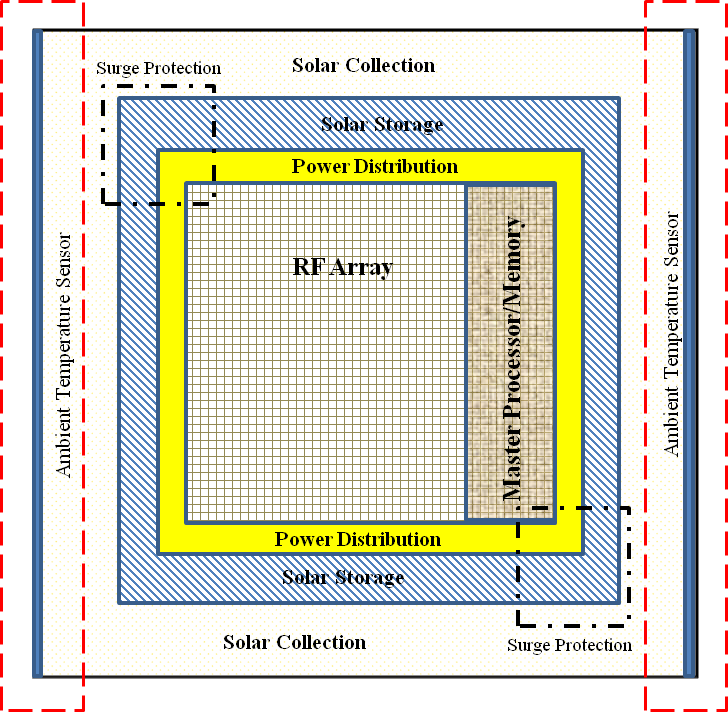
## Current Financial Technologies That Will Remain

There is simply no way to replace the current financial network with something new. Therefore, the BioBanking system will use this current financial network as its transport mechanism. Since the vision is to integrate magnetic card readers into Active Interrogators, this should be a simple overlay to the current financial network.

The only major changes to the network will come in need for additional speed and protocol changes. Currently the protocols are to read the transaction information and do a singular authentication based on account information. With the added payment flexibility, the protocol must now account for interrogation and authentication of several accounts with a summary transaction approval. This will require more speed in the network to ensure this process does not bog down transaction times and frustrate customers.

# BioBanking Technology Safeguards

BioBanking deals mostly with digital security but it is evident that physical security of the devise is also paramount for customer satisfaction. The Insert has three major safety features that safeguard the technology as well as the use of the device. Refer to Figure 4 for details of these features. Figure 4 has highlighted areas showing locations of the salient physical security features.



**Figure 4: BioBanking Technology Safeguards**

* The first major protection is from physical device injury. The consideration was if a customer cut their finger and the resultant injury to the device and the repercussions to the customer. To combat this concern, the entire Insert is coated in an acrylic epoxy. This limits physical damage to the device in a personal injury situation. The epoxy also has the added benefit of RF signal amplification so it actually enhances performance of the Insert while protecting it.
* The second major technology safeguard was to protect the device from electric power surge. This could come from static electricity or from a small shock event where the user crossed paths with an electrical current. This could be detrimental to the unit and cause it to need replacement which would be an inconvenience to customers as well as a potential safety issue. Therefore, the Insert has self-grounding electromagnetic absorbers. These are shown in the black dotted box in Figure 4 labeled surge protection. These devices protect for both static and kinetic electrical shock. The ingenious design also allows the Insert to store the absorbed energy in the storage array for future use. This provides both protection and performance enhancement.
* The last major concern was for the safety of the individual. There is an element of the population that would likely sever fingers to gain access to personal account information. To combat this, the BioBanking Insert must be regulated at +/- 2 degrees Fahrenheit from the nominal body temperature of the user. This varies from human to human and is an added security marker. The device has a factory default to 98.6 degrees, but adjusts to the nominal body temperature of the user over the first three months. If the ambient temperature falls outside this range the Insert shuts down. This is accomplished by using temperature sensors embedded in the Insert. These are shown in Figure 4 within the red dotted lines at the extreme edges of the device.

These safety enhancements allow convenience and protection for BioBanking customers. They also are used to enhance the performance of the device so these are winning additions to the technology and everyone benefits.

# Conclusion

BioBanking represents significant technology innovation and improved customer benefit. The system offer security that will virtually eradicate identity theft. The system offers greatly enhanced payment flexibility for customers. Lastly the system implements several technology firsts and is patented under US Patent 9,998,473.