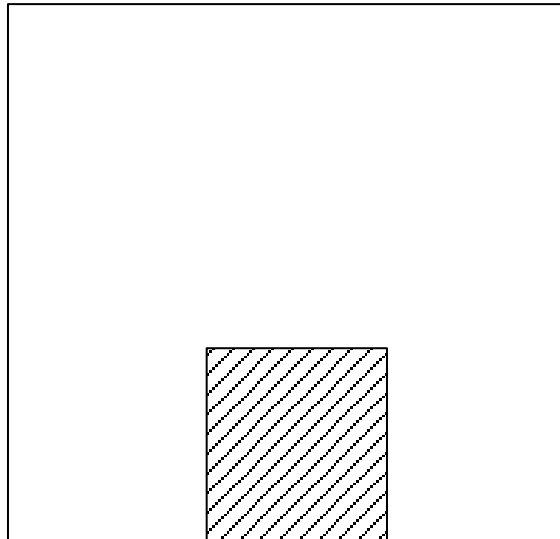


**Novel method of performing rolled finger
acquisition using**

ADAPTIVE ROLL AREA POSITIONING

Usually, acquisition of any rolled fingertip requires higher frame rate than flat acquisition due to moving nature of the scanned object. To achieve higher frame rate, a smaller scan area with normally predefined position is designed. So, as a usual approach, inside the entire scanner window there is a fixed-position roll scan area dedicated to rolled fingerprint. See picture below as an example of roll scan area inside the entire scanner window (MC517 scanner of Green Bit).



It is useful to note that to perform correct full-width rolling, it is necessary to allocate a rolled object near to one border (left or right) of roll area leaving maximum free space for rolling movement in opposite direction to avoid fingerprint cutting by opposite border and then roll object to this direction.

The borders of these roll scan areas can not be marked in a visible manner directly on glass of the scanner window as far as roll areas is a part of the entire scanner window. The only practical way to outline these areas is to use markers outside active scanner window. This could create a certain inconvenience in performing precise initial finger positioning along to the border of roll area obliging to try several “put and check” attempts of initial finger positioning before rolling start.

Moreover, as far as rolled scans are usually used in law-enforcement applications (police stations), where subjects can be non-collaborative or even

resisting to operator (police officer) actions, the necessity for precise initial finger positioning could be a real trouble.

A novel method to improve this situation is proposed. This method is consisting in adaptive roll area positioning depending on actual initial placement of object to be rolled within the entire scanner window.

An acquisition begins from low-resolution preview phase to detect where fingerprint to be rolled is actually placed. Preview area is as wide as the entire scanner window to give a full freedom in horizontal positioning and as high as the entire scanner window to give also full freedom in vertical positioning.

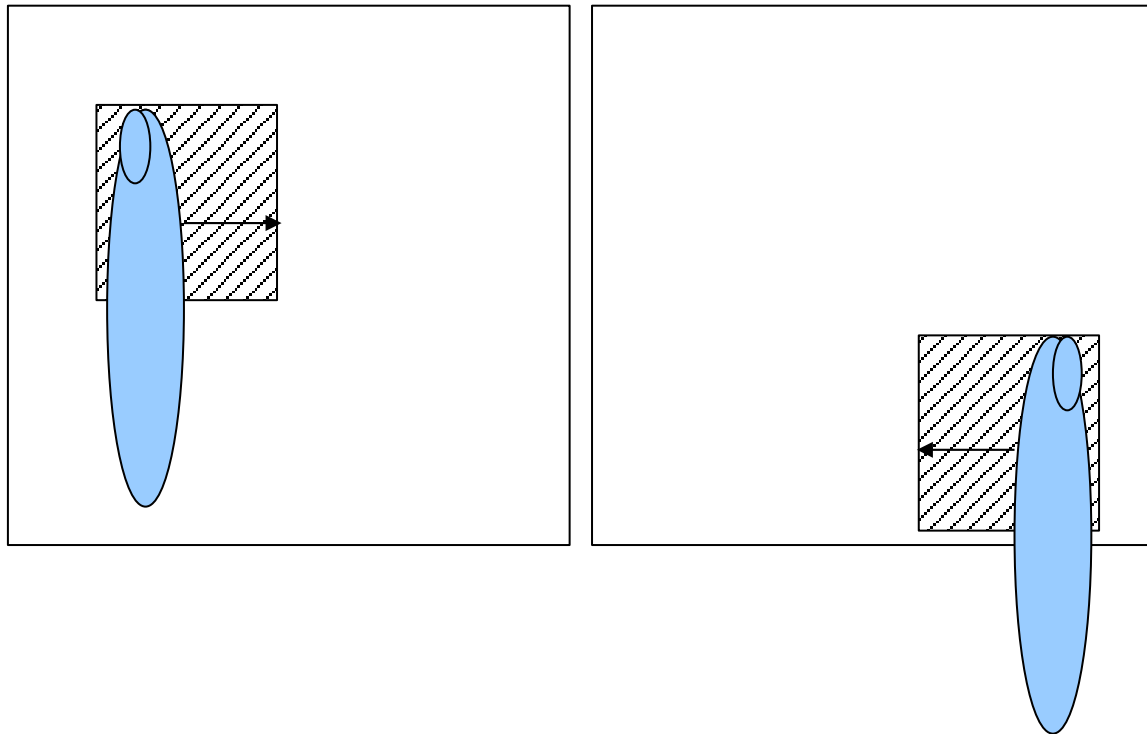
When the fingerprint position is detected, the preview phase ends and the acquisition switches to the corresponding high-resolution higher-frame-rate roll mode moving the roll area position where necessary. Such approach allows for operator to place a finger anywhere (horizontally and vertically) within the entire scanner window and then system automatically adapts roll area position.

For vertical positioning the “finger-top-alignment” method is used - roll area top edge is aligned to the top fingerprint edge leaving also some reserve space.

For horizontal positioning, specific behavior of adaptive roll area positioning algorithm should be synchronized with operator's expected behavior for the used roll preview mode.

For cases where rolling direction is NOT "implied" by preview method itself, system applies "**roll to center**" method as a general rule. It means that if fingerprint to be rolled is allocated on the left half of preview scanning window, it has to be rolled to the right (toward the center of entire scanning window). To allow this, roll area left border will be automatically aligned with the left fingerprint edge in preview image thus leaving maximum possible free space for rolling to the right. And, vice-versa, if fingerprint to be rolled is allocated on the right half of preview scanning window, it has to be rolled to the left (toward the center of entire scanning window). To allow this, roll area right border will be automatically aligned with the right fingerprint edge in preview image thus leaving maximum possible free space for rolling to the left.

As an alternative to “roll to center” method, a constant roll direction can be specified (roll only to the left or only to the right) and system will use the predefined finger edge (right or left, correspondingly) as roll area start and the scan area will be extended to the corresponding opposite direction.



For the case where rolling direction is "implied" by preview method itself, when finger on preview phase is moving half-path to the direction opposite to the next rolling movement direction, there is no necessity to apply “roll to center” rule, because information about rolling movement direction is contained in the preview movement direction itself.