TC 31-20-2

Special Forces Handbook for the Fingerprint Identification System

September 2008

Headquarters, Department of the Army

Training Circular
No. 31-20-2

Headquarters
Department of the Army
Washington, DC, 30 September 2008

Special Forces Handbook for the Fingerprint Identification System

Contents

Figures

Preface

This training circular (TC) provides a doctrinal framework for Special Forces (SF) personnel involved in fingerprinting operations. It outlines the contribution of SF to the theater biometrics effort. SF personnel recovery (PR) missions seek to achieve specific, well-defined, and often sensitive results of strategic or operational significance.

PURPOSE

Fingerprinting is the most basic and universally recognized means of taking biometric data. This TC describes how to take and read fingerprints and how to then place that information into standard message format for transmission via frequency modulation or satellite communications radio or, if necessary, by telephonic means. This TC forms the basis for providing common SF doctrine. This TC does not describe specific tactics, techniques, and procedures (TTP) or cover the specific role that biometrics plays in SF operations. Specific TTP type of information must be found in other publications or through the appropriate Biometric Fusion Center.

SCOPE

SF routinely employ unconventional tactics and techniques while conducting operations unilaterally and with indigenous assistance. The conduct of SF differs from conventional operations in the degree of political risk, operational techniques, independence from friendly support, and dependence on detailed operational intelligence and indigenous assets.

APPLICABILITY

This publication applies to the Active Army, the Army National Guard (ARNG)/Army National Guard of the United States (ARNGUS), and the United States Army Reserve (USAR) unless otherwise stated.

ADMINISTRATIVE INFORMATION

Unless this publication states otherwise, masculine nouns and pronouns do not refer exclusively to men. The proponent of this manual is the United States Army John F. Kennedy Special Warfare Center and School (USAJFKSWCS). Submit comments and recommended changes to Commander, USAJFKSWCS, ATTN: AOJK-DTD-SF, Fort Bragg, NC 28310-9610.

Chapter 1
Fingerprinting

INTRODUCTION

1-1. Special Forces (SF) Soldiers use various biometric identification systems in SF operations. Biometric applications are fundamental to a wide array of SF operational activities, including, but not limited to, the growing field of SF sensitive site exploitation (SSE) and the range of unit protection activities. SSE applications include the identification of enemy personnel and cell leaders in a counterinsurgency (COIN) environment following tactical operations, particularly during direct action missions. Unit protection applications include maintaining databases on the identities of both United States Government (USG) and local national personnel. A routine example of protection applications for biometric data include the requirement to maintain isolated personnel report (ISOPREP) cards, which are fundamental to personnel recovery (PR) operations for the recovery of isolated, missing, detained, or captured (IMDC) personnel; ISOPREP cards are essential for the authentication of the IMDC individual. Another example of the use of biometric identification in SF operations is for positive identification of local national workers in a combat environment at an SF tactical facility, such as at a firebase. Whether in a garrison or combat environment, the collection, transmission, and storage of biometric data is a critical and common component of SF unit operations.

1-2. The most common and reliable means of identifying a person through biometric means is by the fingerprint identification system (FIS). Since 2001, SF has principally used technological (digital) means to take and transmit fingerprints to an automated fingerprint identification system (AFIS). However, although there are many technological capabilities to accomplish this task at the disposal of U.S. forces, it may not always be feasible to use advanced technological means to take, transmit, and/or store fingerprint data. Therefore, SF Soldiers—particularly the SF intelligence sergeants, military occupational specialty 18F—must be familiar with both the traditional (manual) means of fingerprinting and with the modern (digital) means available to Special Forces operational detachments (SFODs). Therefore, this TC covers both manual fingerprinting systems and some of the current digital systems available to the SFOD.

1-3. Manual FISs are still required in a wide array of SF operations. For example, situations may arise when digital FIS equipment or adequate power supply is inoperable, damaged, or not properly calibrated—simply put, there are times when even the most advanced and useful technology fails. In addition, given that the vast majority of SF operations are conducted "by, with, and through" indigenous forces, SF has a requirement to train, assist, and advise host nation (HN) regular and/or irregular forces who require FISs, but do not have advanced technological means. Likewise, even when digital FISs are available and the HN assets are capable of using them, it may be impractical or unwise to hand over these instruments. An example of this would be in an unconventional warfare environment; it may not be advisable to give digital FIS equipment to an irregular asset. In such a case, it may be necessary for the SF Soldier to read fingerprints from a paper provided by the asset. Some of the factors that must be considered before coming to this conclusion include the following:

- What is the classification restriction of the equipment and its capabilities?
- What are the consequences to the irregular asset and the USG if the asset is caught with this equipment?
- How hard is it to replace this equipment if it is turned over to the asset?
- Is there an available funding authority to procure the necessary equipment for indigenous personnel?
- Can the linkage of this equipment to the United States be avoided if necessary?
- How likely is it that the equipment is available to anyone other than the United States?

- How likely is the discovery of this equipment and its capabilities to cause embarrassment to the United States or its allies?
- How difficult is it to maintain the equipment and is the asset capable of accomplishing that maintenance without assistance?
- Is there another alternative to accomplish the task without losing physical control over the technical equipment?
- With all of these factors taken into consideration, is there a nontechnical means to accomplish the task which will reduce the various risks and is less resource intense?

1-4. In the event the irregular asset provides a set of prints on a plain piece of paper or other suitable surface, the SF Soldier must be able to read, categorize, and format the prints in order to transmit them to the AFIS for positive identification. The information in this TC is designed to enable SF Soldiers to become familiar enough with the FIS to not only use the equipment and techniques, but also to train an irregular asset to provide this service, such as when operating as part of an unconventional assisted recovery team (UART) in a PR scenario. These are critical skills; in the case of a UART, the SF Soldier accomplishing this task will have to be proficient enough in the FIS to successfully complete the authentication of the IMDC individual.

1-5. This TC explains how to take a set of fingerprints, read the fingerprints manually (when necessary), and transmit the results. Transmission includes the proper message format for transmitting FIS data over radio when fully digital file transfer capability is not available.

FINGERPRINTING BASICS

1-6. Manual FISs are the most basic and are still an effective means of identification. For many years fingerprinting was—and even in the United States sometimes still is—performed manually without the aid of current technology. There remain dedicated assets within the USG (the Federal Bureau of Investigation [FBI], for example) that can manually read fingerprints. Although technological mechanisms involving a live scan of a fingerprint to the Biometric Fusion Center (BFC) are routinely capable of receiving and validating the fingerprints in less than 10 minutes, even manual FIS validation can be relatively quick. Under ideal conditions and with a clear set of fingerprints, the manual technique can take as little as 30 minutes when properly done. Even without a live scan device, fingerprints taken by a manual FIS may be transmitted and analyzed using digital devices. Once captured, the fingerprint must be photographed and scanned to send it over the portal or read and converted into a message format for transmittal over a tactical radio or phone. This hybrid manual/digital approach offers added flexibility and a relatively rapid response to the SFOD.

1-7. Traditionally, ink and paper are used to capture fingerprints. This method can be done on living and deceased suspects. When traditional ink and cards are not available, field-expedient methods are applied. Blank paper may be used in the absence of a fingerprint card—lined paper should be avoided. Substitutes for ink can be lipstick, charcoal, camouflage paint, magic marker, and even blood.

1-8. Standard ink and the standard FBI applicant card (covered in Chapter 2) should be used whenever possible. The FBI applicant card can be scanned and photographed as is for transmission to the BFC because the FBI card is a known size and shape. Fingerprint cards from other countries require a scale in the photograph or scan.

1-9. A metric scale should be in the photo or scan. Even if the scale is not metric, it gives the examiner a reference. When there is no metric scale available to use, a common item to size the print must be included, such as a dollar bill scanned with the print, to provide a reference.

1-10. Lifting a fingerprint is easiest when done from a smooth (nonporous) object. Semi-porous and porous objects generally require chemicals; therefore, they must be sent to a lab for proper processing. If the item cannot be removed, a photograph may be the only way to retrieve the fingerprint.

1-11. In the event a traditional latent print cannot be lifted and it is necessary to photograph the print, the following are some of the keys to taking a quality photograph of a fingerprint:

- Latent images need to be 1000 pixels per inch (ppi) and a file type of Joint Photographic Experts Group (JPEG) 2000, Tagged Image File Format (TIFF), or bitmap (BMP). The image should not be saved as a Portable Document Format (PDF) or regular JPEG.
- A scale should always be included in the image—preferably metrics rather than inches. The scale should lay flat on the same plane as the latent print for proper calibration. If the technician reading the print cannot accurately calibrate for size, the AFIS search will be inaccurate.
- When photographing, the camera should be mounted on a tripod and at a 90 degree angle so that the lens is parallel to the latent print being photographed to prevent parallax distortion.
- Since images can only be posted to the portal one at a time, each image should be labeled beginning with a case number and then the image number so that multiple postings can be associated with one case; for example, 07-101-2 = case #07-101, latent image 2.
- One of the most common mistakes when powdering latent prints is to over-powder. Less powder is usually better. A little more powder can be added if the print is too light. Too much powder, however, can fill in the furrows and obscure the fine detail of a fingerprint.
- The technician should not twist the fingerprint brush between his fingers when powdering (like the actors do on television). This method reduces the control over the brushing motion and can damage the print, as well as pull powder between the ridges into the furrows, reducing the quality. It is best to start brushing lightly in an area and when ridge detail begins to appear, try to brush with the ridge flow, not against it.
- Sometimes multiple lifts of the same latent can be taken. This would be done, for example, when it looks like there is too much powder. After one lift, the technician should try to "clean up" the print by lightly brushing with the ridge flow and not adding more powder to the brush—it should still have some powder on it from the previous "dusting," and then take a second lift to see if the quality improves. The technician must be sure to always clearly mark on the lift card if multiple lifts are taken of the same latent so that if someone is identified, it does not look as if they were identified to multiple latents when in fact it is just one. The technician should always ensure a photograph is taken before attempting to "improve" a print in the event the attempt results in irreparable damage to the quality of the print.

LINES

1-12. SF Soldiers must be capable of properly classifying a set of fingerprints. Proper classification includes the correct identification of type lines, core, and delta of each print. Before pattern definition can be understood or impressions classified, it is necessary to understand the meaning of a few technical terms used in the FIS. A bifurcation is the forking or dividing of one line into two or more branches (Figure 1-1); a divergence is the spreading apart of two lines that have been running parallel or nearly parallel (Figure 1-2).

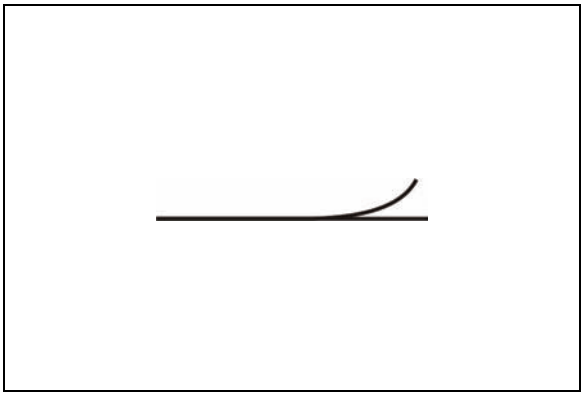

Figure 1-1. Bifurcation

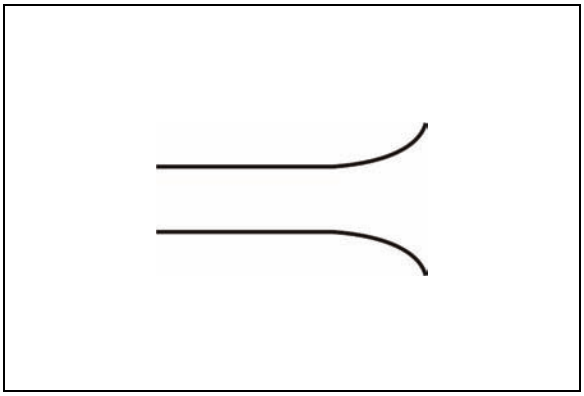

Figure 1-2. Divergence

TYPE LINE

1-13. Type lines are the two innermost ridges that start parallel, diverge, and surround (or tend to surround) the pattern area. They are used to locate the delta. Type lines are not always continuous ridges. In fact, they are more often found to be broken. When there is a definite break in a type line, the ridge immediately outside of it is considered to be its continuation.

1-14. According to the narrow meaning of the words in fingerprint terminology, a single ridge may bifurcate, but it may not diverge. Therefore, with one exception, the two forks of a bifurcation may never constitute type lines. The exception is when the forks run parallel after bifurcating and then diverge. In such a case, the two forks become the two innermost ridge lines required by the definition. In Figure 1-3, the ridges marked T-T are the type lines; the ridges marked A-A are not the type lines because the forks of the bifurcation do not run parallel to each other.

1-15. Angles are never formed by a single ridge but by the abutting of one ridge against another. Therefore, an angular formation cannot be used as a type line. In Figure 1-4, ridges A and B join at an angle, ridge B does not run parallel with ridge D, and ridge A does not diverge. Therefore, ridges C and D are the type lines.

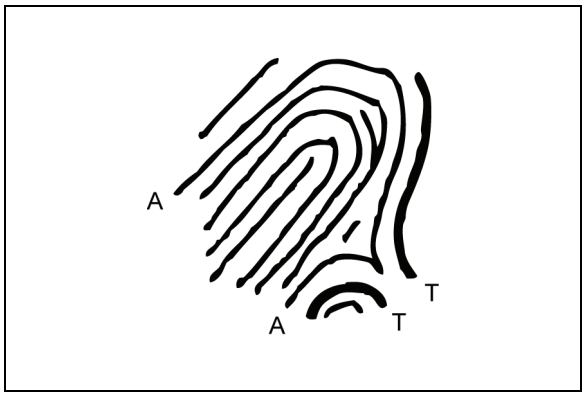

Figure 1-3. Type lines – example 1

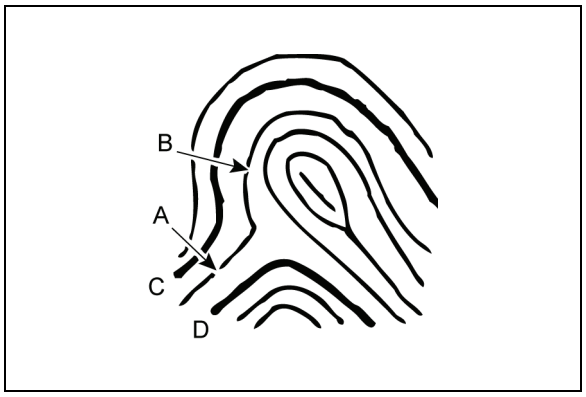

Figure 1-4. Type lines – example 2

1-16. The pattern area is the part of a fingerprint impression within the type lines. This area is the only part of the impression used in SF fingerprint interpretation and classification. It is present in all patterns. In arches and tented arches, it is enough of the print to be able to classify the impression. Arches do not have clearly defined pattern areas. In the pattern areas of loops and whorls, the cores and deltas appear.

CORE

1-17. The core is the innermost recurving ridge line of a fingerprint impression. It will normally be located approximately in the center of the pattern.

DELTA

1-18. The delta is the first print characteristic located in front of and nearest to the divergence of the type lines. This point may be represented by any print characteristic such as a fork, a ridge ending, a ridge segment, or a curving ridge (Figure 1-5, page 1-5).

1-19. In the examples provided in Figure 1-5, C is the core, D is the delta, and T marks the type lines. Soldiers must ensure they are looking at the ridge lines and not the printing surface. Normally, the ridge lines will be darker than the printing surface, as they are in this TC.

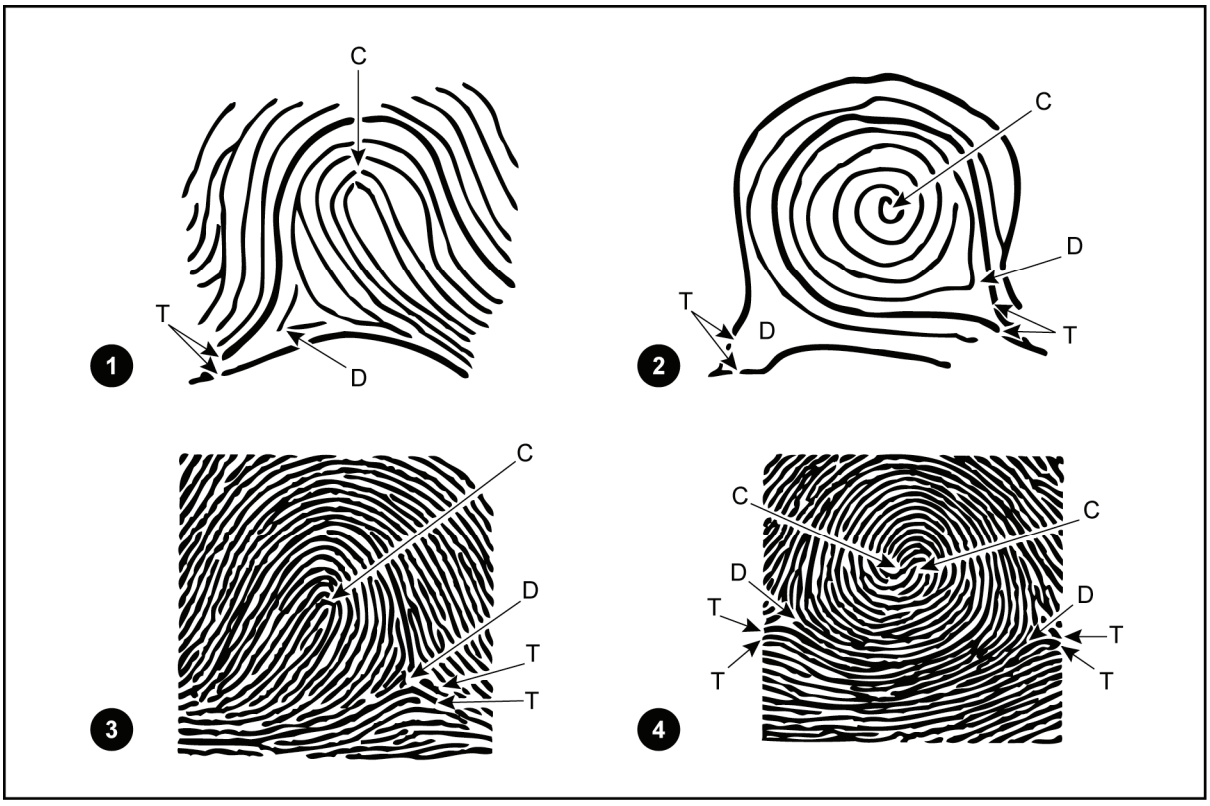

Figure 1-5. Core, delta, and type lines

PATTERNS

1-20. In the FIS, there are three main fingerprint patterns: arches, loops, and whorls. Arches are further divided into arches and tented arches. Loops are further subdivided into finger loops and thumb loops.

ARCH

1-21. In an arch, the ridges enter one side of the impression and tend to flow out the other side with a gentle rise in the middle. There may be various ridge formations in the pattern. Arches do not have a core. All ridges flow (or tend to flow) with a slight rise in the center from one side of the pattern to the other without any ridges recurving to the side they entered. An arch is an easily identifiable print providing the individual reading the print does not get confused between ridges that have bifurcations and an innermost recurving ridge. The best way to determine the difference is by looking closely at the place where the ridge starts what appears to be a recurve. When the ridges have sharp angles, they are either bifurcations or two ridges running into each other; they are not a recurving ridge line. Figure 1-6, page 1-6, shows examples of arch patterns.

1-22. In the tented arch, most of the ridges enter from one side of the impression and flow (or tend to flow) out the other side, as in the arch. The key difference, however, is that the ridge or ridges at the center of the impression have a definite upthrust, which can be compared to the center pole of a tent and from which this pattern derives its name. There are no recurving ridges in a tented arch. Figure 1-7, page 1-6, shows examples of tented arches.

Note: Arches and tented arches constitute about 5 percent of fingerprint patterns.

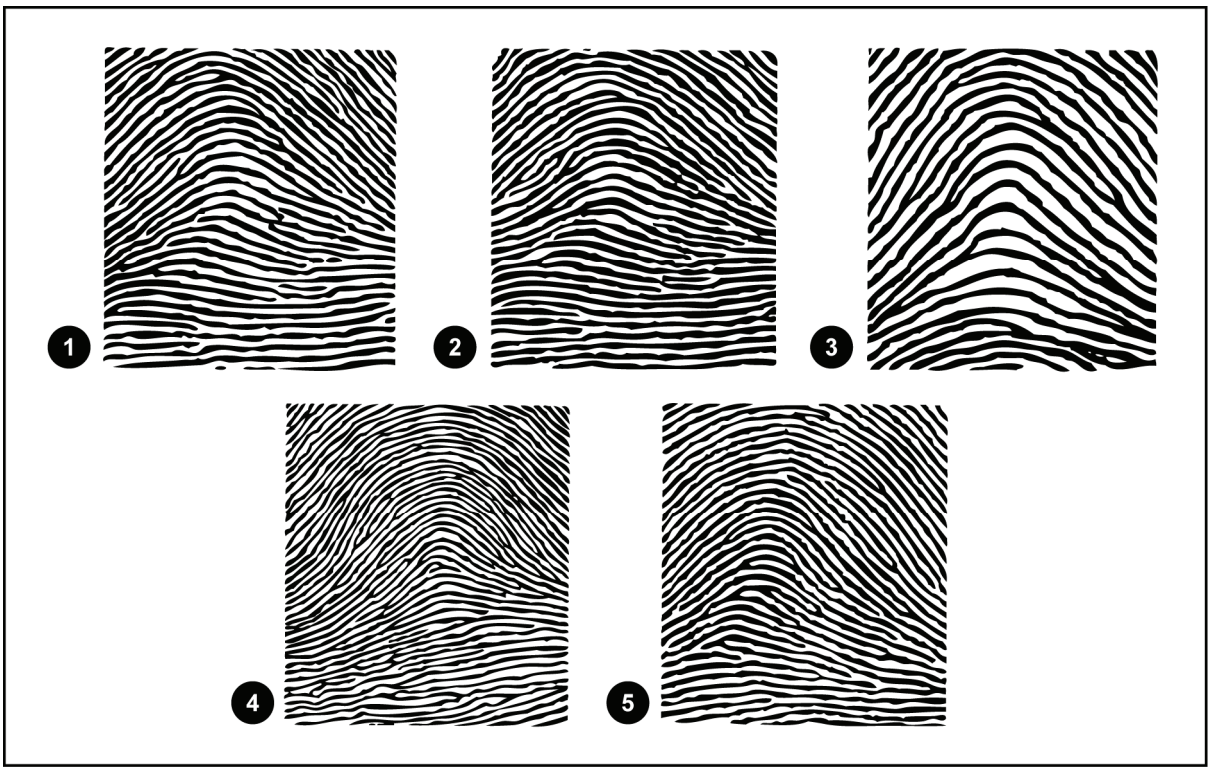

Figure 1-6. Arch

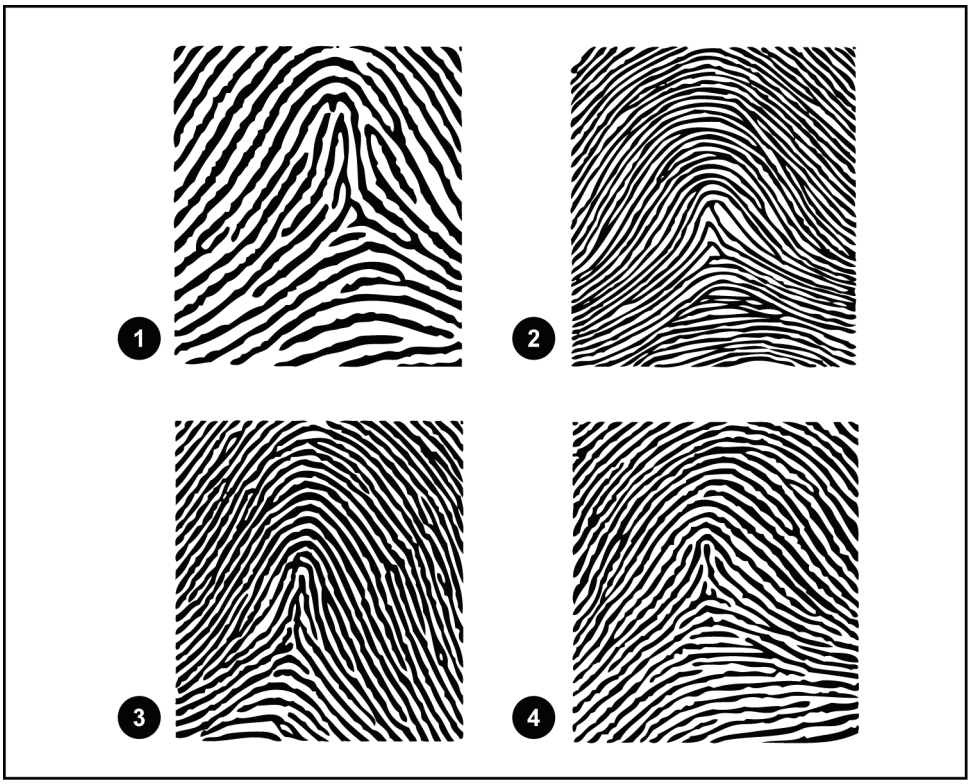

Figure 1-7. Tented arch

LOOP

1-23. A loop is the type of pattern found on fingerprint impressions in which one or more of the ridges enter the impression from either side, flow toward the center of the impression, recurve upon themselves, and tend to exit on the same side of the impression from which they entered. Loops are the most common type of fingerprint patterns, accounting for approximately 65 percent. Loops are divided into two categories: finger loops and thumb loops. The type of loop is not determined by the digit where it appears. Rather, the rule for determining whether a loop print is a finger loop or thumb loop is determined by the direction of the open ends of the loop in direct relationship to the finger or thumb on which the print appears. With a finger loop, the ridges enter the print from the side of impression toward the little finger, form a loop, and depart the impression from the same side. With a thumb loop, the ridges enter the print from the side of the impression toward the thumb, form a loop, and depart the impression on the same side. Loops have only one core and one delta. Figure 1-8 shows examples of loops.

Note: If patterns 1 and 3 in Figure 1-8 were on the left hand, they would be finger loops; if they were on the right hand, they would be thumb loops. The reverse is true of patterns in patterns 2 and 4 in Figure 1-8.

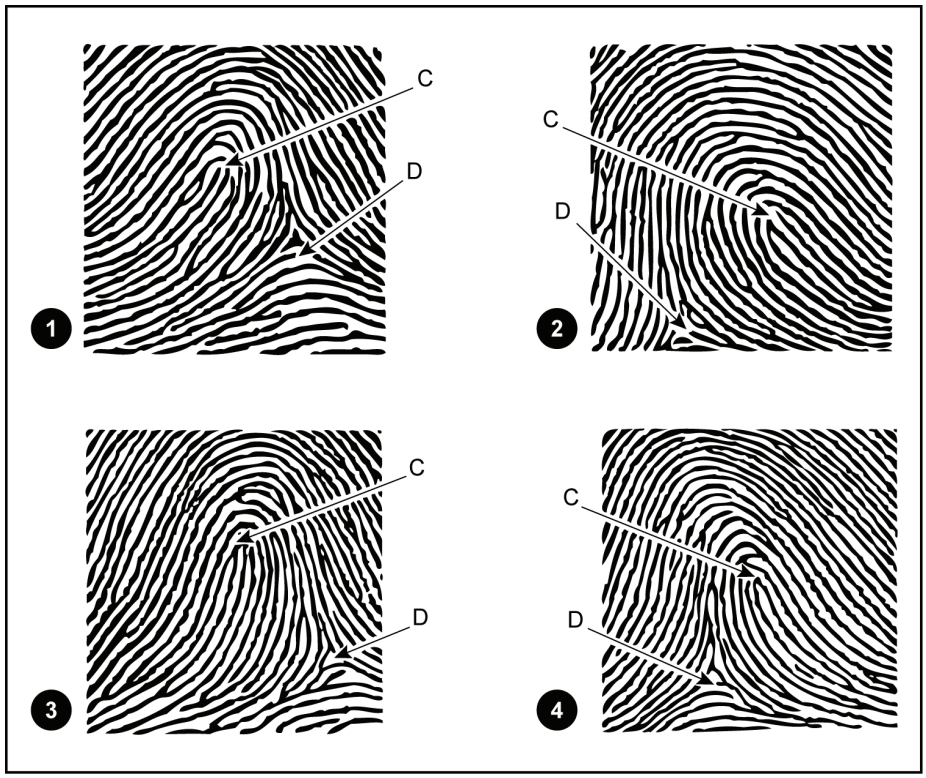

Figure 1-8. Loops

WHORL

1-24. A whorl, for the purposes of this TC, is any print that is not an arch, tented arch, finger loop, or thumb loop. Whorls are fairly common—approximately 30 percent of fingerprint patterns are whorls. Whorls always have two or more deltas and may have more than one core. In some prints, the delta may be located on the extreme edge of the impression and is not revealed unless the finger is fully rolled from nail edge to nail edge. In cases where this procedure is not done, an incorrect interpretation of the print may be made. Figure 1-9, page 1-8, shows typical whorl patterns.

Note: All impressions in Figure 1-9 have two deltas. Patterns 1 and 2 have only one core, whereas patterns 3 and 4 have two cores.

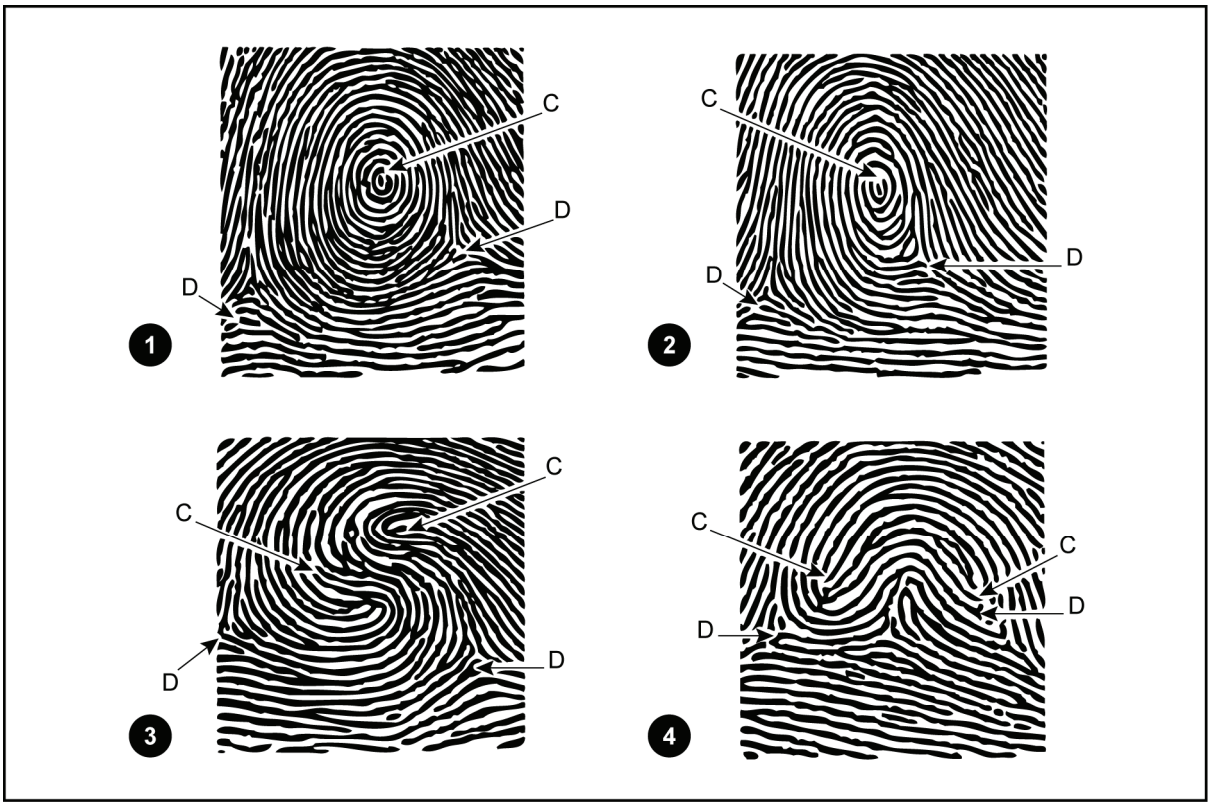

Figure 1-9. Whorls

1-25. No matter how definite fingerprint rules and pattern definitions are made, there will always be some patterns causing doubt as to their classification. The primary reason for this doubt is that no two fingerprints will ever appear that are exactly alike. Other reasons are differences in the degree of judgment and interpretation of the individual analyzing the fingerprints. The correct interpretation of patterns that are questionable because of their resemblance to more than one pattern type is determined by the analyst's proficiency in determining focal points, cores, and deltas. The more skilled the analyst is in reading the prints, the fewer questionable patterns are encountered. For positive identification, there is no allowable error for the type of print. The print may be questionable and stated as such in the FIS message. In questionable prints, the procedures described below help to identify the individual.

RIDGE COUNT

1-26. A fingerprint ridge count is the number of ridges that occur between the core and the delta. To obtain the ridge count, a line is drawn from the point of nearest tangency on the core through the delta. The Soldier may use a ready-made line scribed on a piece of glass or any transparent material. This line may be shifted around until proper alignment has been achieved. Figure 1-10, page 1-9, shows the placement of the reference line on some typical patterns. There are four rules to be followed in the ridge count:

- A ridge count must be reported on all fingers.
- A ridge count is conducted only on loops and whorls.
- Every line that crosses or touches the reference line is counted.
- The count starts on the core, which receives the number one and ends at the delta, which receives the last number.

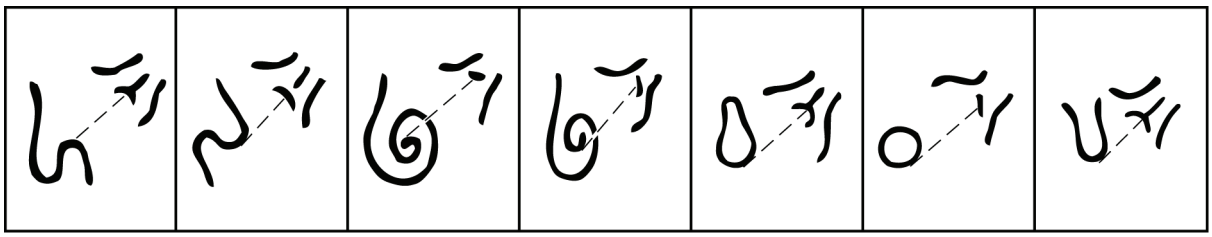

Figure 1-10. Placement of the reference line

1-27. Inasmuch as arches and tented arches have no core, a ridge count cannot be done on them because there is no way to orient the reference line. When these patterns occur, they are assigned a ridge count of zero. Missing fingers are also assigned a ridge count of zero. When a scar or mutilation between the core and the delta makes a ridge count impossible, a ridge count of zero is assigned to the finger.

1-28. With the reference line properly oriented on the print, the ridge count is made by counting all of the ridge lines that cross or touch the reference line, starting with the core as the first ridge counted and ending with the delta as the last ridge counted. Figure 1-11 below and Figure 1-12, page 1-10, illustrate this technique on a loop and whorl, respectively.

1-29. In Figure 1-11, lines 8 and 9 and 14 and 15 received a double count because the reference line crosses at the point where a ridge bifurcates. In keeping with the third rule described in paragraph 1-18, each of the lines formed by the bifurcation receives a count since they touch the reference line. Lines 5, 6, 10, and 11 of Figure 1-11 and ridge lines 8 and 9 of Figure 1-12 are formed by a ridge line bifurcating on one side of the reference line and reclosing on the other side of the reference line. However, at the point where they encounter the reference line there are two distinct ridges, and each receives a count.

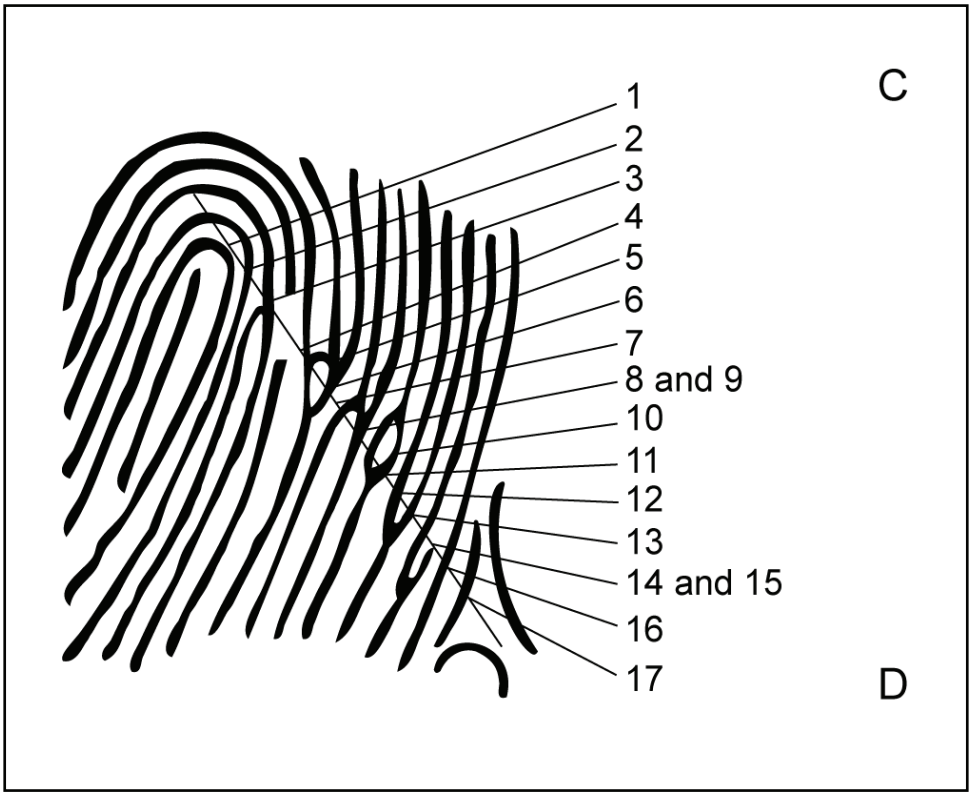

Figure 1-11. Ridge count (loop)

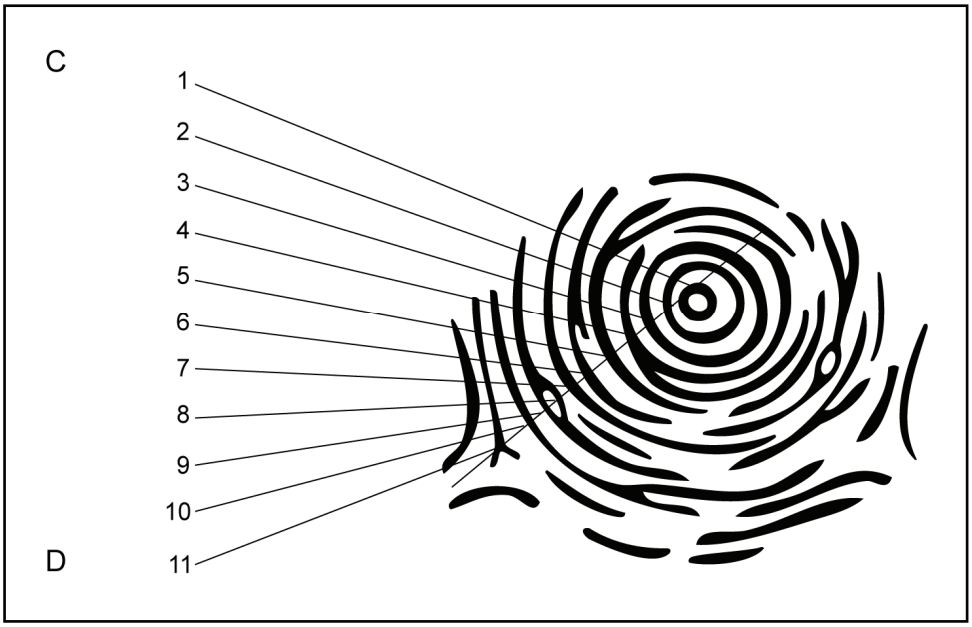

Figure 1-12. Ridge count (whorl)

1-30. Because whorl patterns have more than one delta, the FIS dictates which delta is to be used. The leftmost delta and the core nearest it will be used unless a crease or mutilation on that side would prevent an accurate count. In such instances, the count is made between the rightmost delta and the core nearest to it (this fact must be reported in the message transmitting the data). Figure 1-13 shows the placement of the reference line on typical patterns.

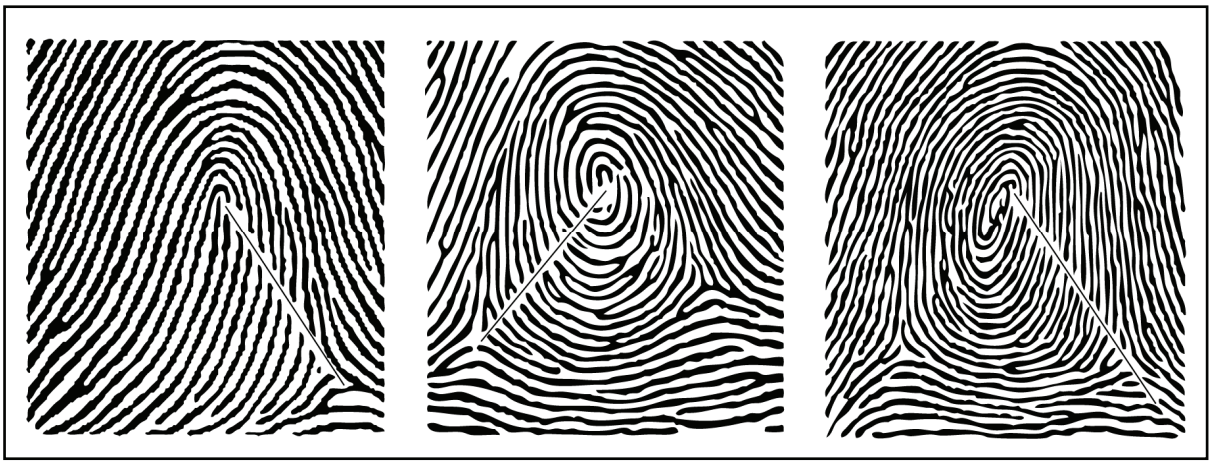

Figure 1-13. Loop pattern, (normal), whorl pattern (normal), and whorl pattern (mutilated)

1-31. Normally, the lowest ridge count would be two—one for the core and one for the delta. However, rare patterns may be encountered where the core and the delta are the same (Figure 1-14, page 1-11). In such instances, the ridge count is one.

1-32. A small, two-power magnifier is necessary for ease and accuracy of print interpretation (although, in emergencies, it is possible to read a perfectly clear print without magnification). The magnifier should be mounted on some type of stand that allows the analyst to have both hands free to make a ridge count. Field experience has shown that two individuals counting the ridges on the same print may make an error of two counts; therefore, an error of plus or minus two is allowable in the ridge count comparison.

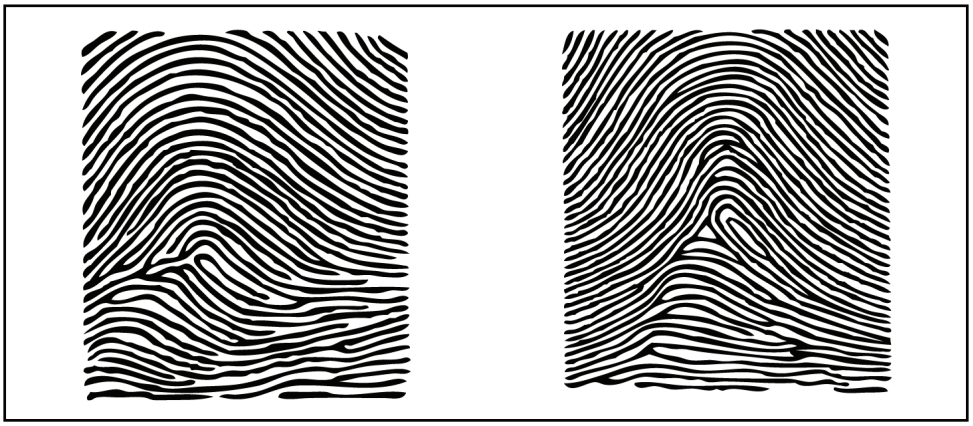

Figure 1-14. Example of rare pattern where core and delta are the same

1-33. In the following practical exercise, Figure 1-15, pages 1-11 and 1-12, represents the 10 fingerprint impressions of an individual. The analyst classifies the pattern and conducts a ridge count on these impressions. The analyst must remember that there is no allowable error in pattern classification, but an error of plus or minus two counts is allowable in the ridge count.

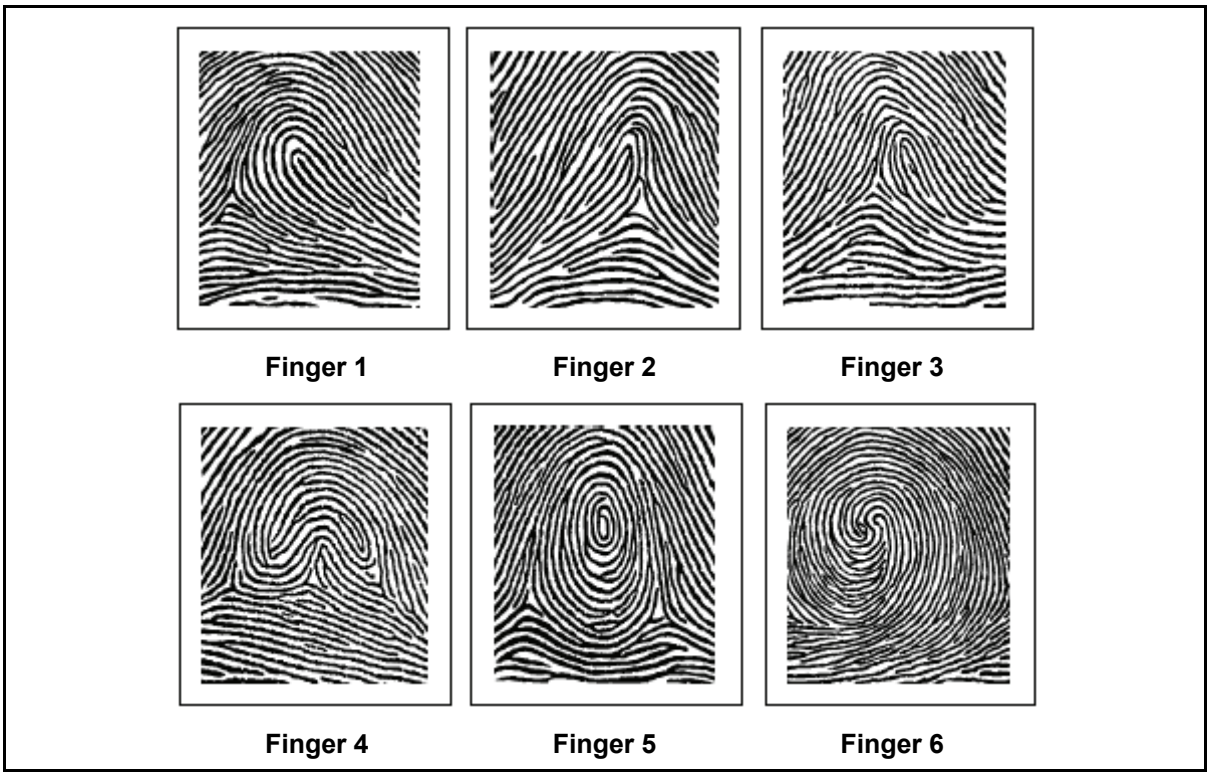

Figure 1-15. Fingerprint impressions

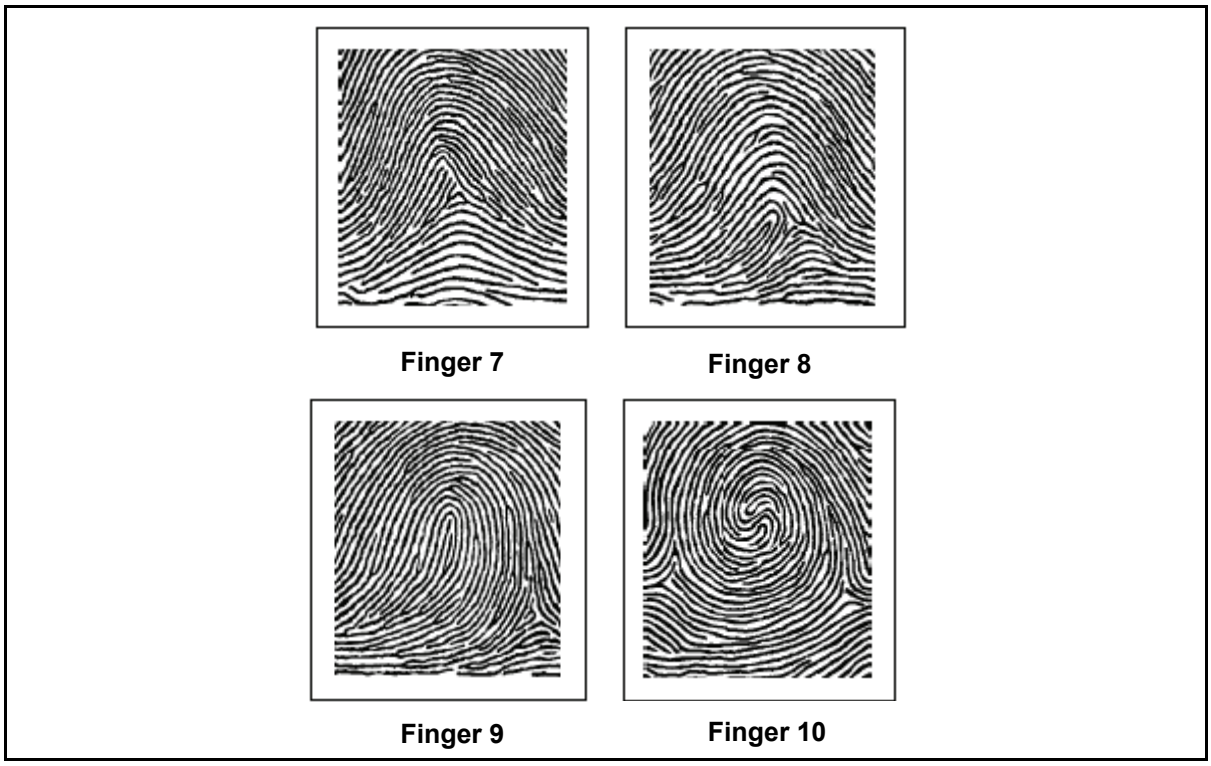

Figure 1-15. Fingerprint impressions (continued)

FAULT COUNT

1-34. Faults are peculiar formations occurring on ridges within the pattern area. They tend to interrupt the continuity of impressions and are the distinguishing features of fingerprints. Faults appear in five forms, as depicted in Figure 1-16. The five forms are—

- Islands (ridges that bifurcate and then reclose, forming an island).
- Forks (single ridges that split [bifurcate] into two ridges).
- Segments (short fragments of ridges standing alone).
- Ends (ridges that end abruptly).
- Breaks (separation or interruption of a ridge on the same plane).

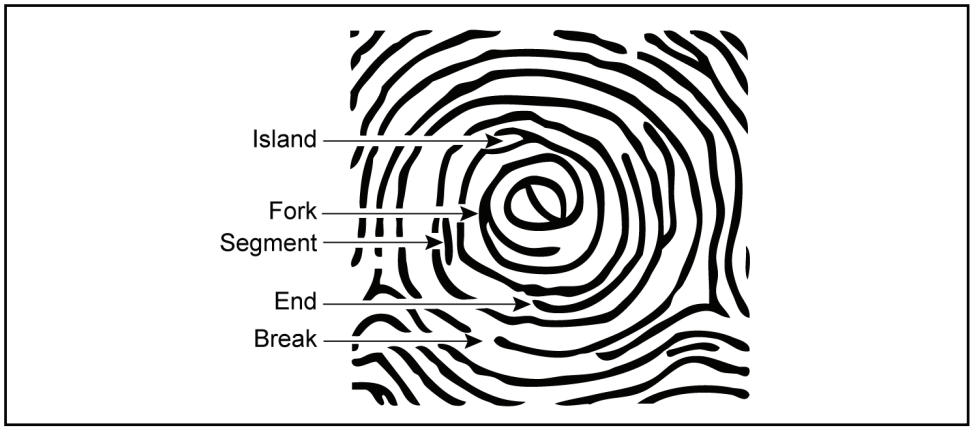

Figure 1-16. Types of faults

1-35. Faults appear frequently and haphazardly throughout the pattern areas of fingerprints. Their use as authenticating data for the FIS requires an accurate method for recording the description of the faults and their location in the pattern area. A template is used in the fault count to provide a means of orienting the critical faults. The template is a transparent medium upon which reference lines are inscribed. The reference lines are three parallel lines drawn 2 millimeters (mm) apart and closed at one end by a line drawn perpendicular to the parallel lines (Figure 1-17). The overall length of the parallel lines only needs to be as long as is required to reach from the core of an impression to its delta.

Figure 1-17. Template

1-36. The proper position of the template on loop and whorl patterns is with the center line tangent to the core and through the delta in the same manner that the reference line is placed for the ridge count. The perpendicular line of the template is placed so that it intersects the core at the point of tangency of the center line (Figure 1-18).

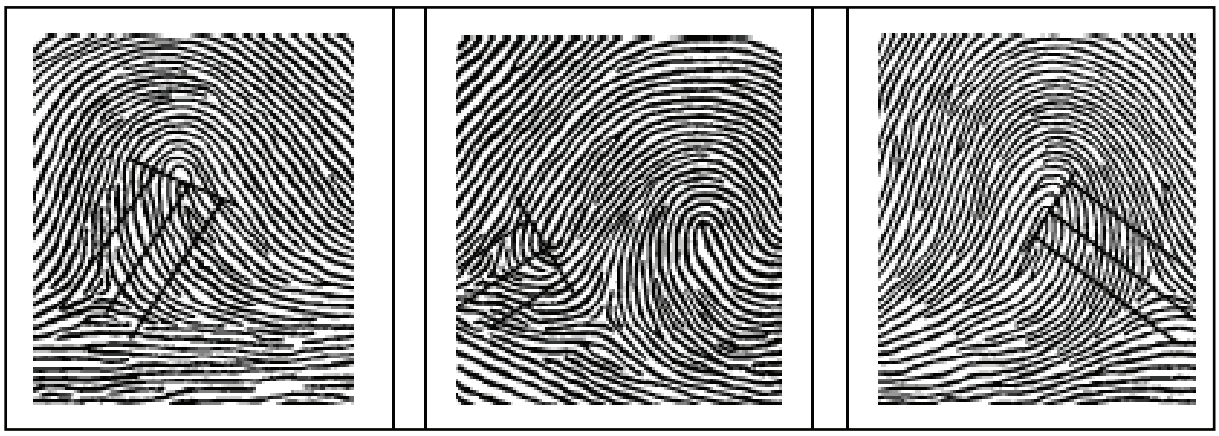

Figure 1-18. Template positioning on loop, whorl, and loop

1-37. With the template correctly positioned, the only faults to be considered for the fault count are those which appear within the 4-mm area bounded by the right and left parallel lines, below the cross line intersecting the core, and above the delta. The Soldier does not count the faults that occur—

- Outside the limits.
- On the core.
- On the delta.

Note: When a fault is partly inside and partly outside the limits of the template, its description will be limited to only that part of the fault which is inside the limits of the template.

1-38. The numbering of faults is governed by the ridge count. Faults appearing on ridges that cross or touch the center line of the template receive the same number as the ridge on which they occur. When more

than one fault appears on the same ridge line, every fault on that ridge receives the same number. Faults appearing on ridge lines that do not cross or touch the center line of the template receive the number of the ridge immediately above them.

1-39. The two columns created by the three parallel lines of the template provide a means of locating the faults as well as adding direction to their other characteristics. Looking at the template with the core oriented away from the viewer, the columns are described as the left-hand column and the right-hand column. The fault descriptions are composed of the following two or three letters:

- The first letter identifies the type of fault.
- The second letter states the location of the fault (in the left column, in the right column, or on the center line).
- The third letter (when there is a third letter) gives the direction in which a fork opens, the direction in which an end points, or in which column the greater parts of a segment, island, or break appear when they are on the center line but slightly off center.

1-40. When more than one fault appears on a ridge line or has the same number, those faults appearing in the left-hand column of the template are reported first, those in the right-hand column second, and those that touch the center line last. Each ridge line will be completely fault-counted before moving on to the next ridge line.

1-41. When two or more faults have the same number and location, the direction or movement of the fault is used to determine the sequence of reporting. In these circumstances, faults pointing to the left are reported first, those pointing to the right are reported second, and those with no direction are reported last.

1-42. To clarify these reporting procedures, all faults—regardless of type—with the same number are reported in the following sequence:

- Those in the left column pointing left (LL).
- Those in the left column pointing right (LR).
- Those in the left column with no direction (segments, breaks, and islands) (L).
- Those in the right column pointing left (RL).
- Those in the right column pointing right (RR).
- Those in the right column with no direction (R).
- Those on the center line pointing left (forks or ends) or with the major portion of the fault in the left-hand column (segments, breaks, and islands) (CL).
- Those on the center line pointing right or with the major portion of the fault in the right-hand column (CR).
- Those directly on the center line with no direction or with no part of the fault offset by a majority to either side of the center line (C).

1-43. The core and the delta never have a reportable fault. No fault will ever have the same number as the delta. A fault may have the number one if it appears between the core and ridge line number two.

1-44. Figure 1-19, page 1-15, is a line drawing of the critical part of a pattern area on which a correctly placed template has been superimposed. The drawing illustrates many of the variations of faults that may appear in fingerprint impressions and the method used for numbering and describing the faults. The abbreviations used for the fault descriptions are explained in the legend to the left of the illustration. All of the faults illustrated in Figure 1-19 are described in Figure 1-20, pages 1-15 through 1-17.

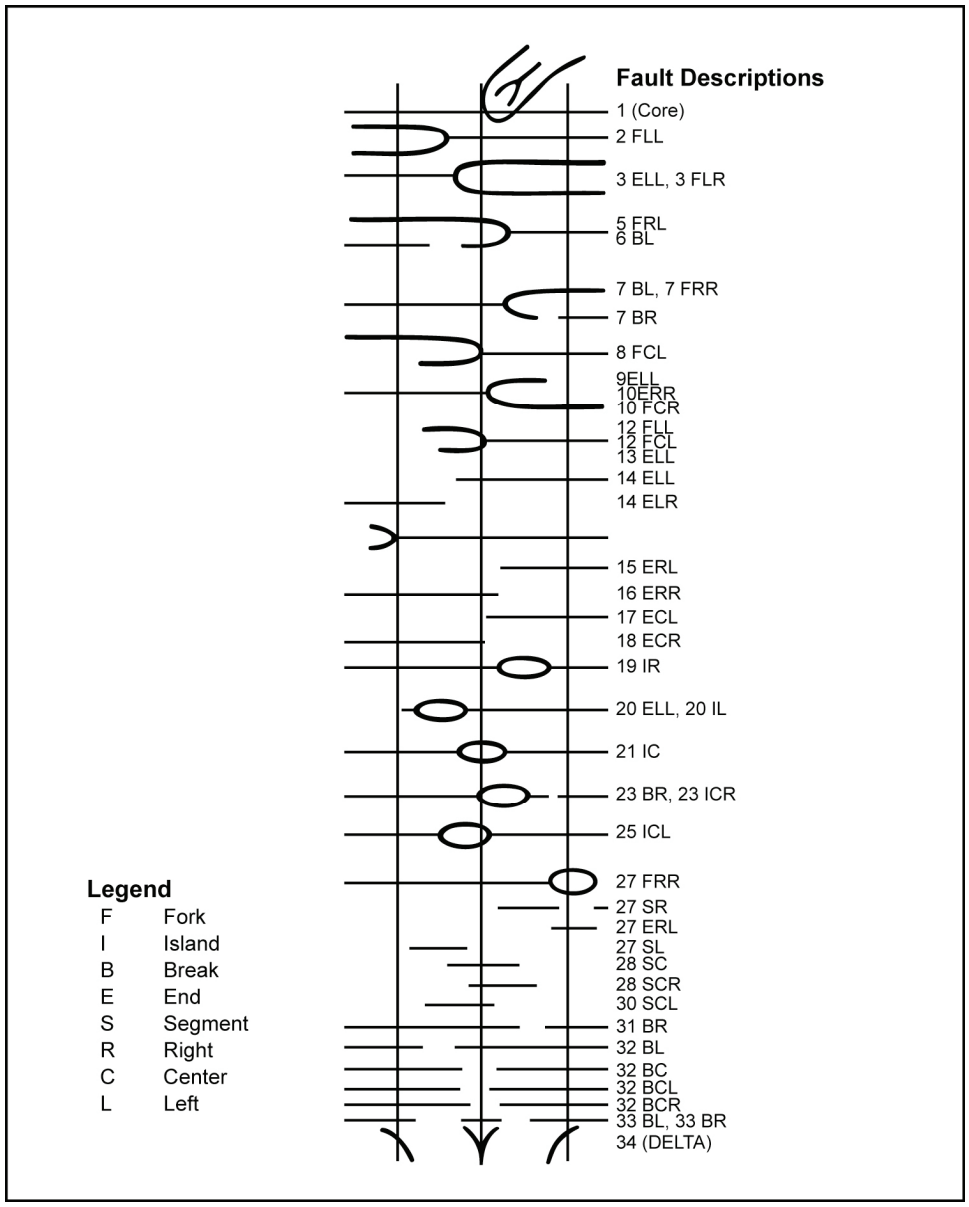

Figure 1-19. Sample fault count

2FLL *(Fork Left-Left)*	Indicates a fork on the second ridge line, in the left column of the template, opening to the left.
3ELL *(End Left-Left)*	Indicates an end on the third ridge line, in the left column of the template, pointing to the left. Because this fault appears on a ridge line that does not cross or touch the center line, it receives the number of the ridge line immediately above it.
3FLR *(Fork Left-Right)*	Indicates a fork on the third ridge line, in the right column, opening to the right. Note that double line faults, such as forks and islands, are given the number of the first of its ridges that cross or touch the center line.
Ridge line 4 contains no faults and is not reported.	
5FRL *(Fork Right-Left)*	Indicates a fork on the fifth ridge line, in the right column, opening to the left.
6BL *(Break Left)*	Indicates a break on the sixth ridge line in the left column. A break does not have direction unless it is located on the center line. Although this ridge is part of the fork on ridge line five, it also touches the center line and therefore is reported separately.

Figure 1-20. Detailed fault count description

7BL *(Break Left)*	Indicates a break on the seventh ridge line entirely in the left column.
7FRR *(Fork Right-Right)*	Indicates a fork in the right column opening to the right.
7BR *(Break Right)*	Indicates a break in the right column. It receives a count of 7 because the ridge line it appears on does not cross or touch the centerline, and it therefore receives the number of the line above.
8FCL *(Fork Center-Left)*	Like all double faults, it receives the number of the first line that crosses or touches the center line.
9ELL *(End Left-Left)*	Indicates an end in the left column pointing to the left. This fault appears on the lower tine of the fork and so that count is advanced by one.
1OERR *(End Right-Right)*	Indicates an end in the right column pointing to the right. It appears on the upper tine of the fork.
1OFCR *(Fork Center-Right)*	Indicates a fork originating directly on the center line opening to the right. This fault is similar to 8FCL but opens in the opposite direction.
Ridge line 11 is the bottom tine of the fork and has no faults; therefore it is not included in the fault count.	
12ELL *(End Left-Left)*	Indicates an end on the upper tine of the fork in the left column pointing to the left.
12FCL *(Fork Center-Left)*	Indicates a fork originating on the center line opening to the left. It is the same as fault 8FCL (paragraph 9i).
13ELL *(End Left-Left)*	Indicates an end in the left column pointing to the left. It is the same as 12ELL (paragraph 9m) except it is on the bottom tine of the fork.
14ELL *(End Left-Left)*	Indicates an end in the left column pointing to the left.
14ELR *(End Left-Right)*	Indicates an end in the left column pointing to the right. The ridge line does not cross or touch the center line, and therefore it receives the number of the line above.
The fork appearing on ridge line 15 is outside of the limits of the template; therefore it is not included in the fault count.	
15ERL *(End Right-Left)*	Indicates an end in the right column pointing to the left. The ridge line does not cross or touch the center line and therefore receives the number of the line above.
16ERR *(End Right-Right)*	Indicates an end in the right column pointing to the right.
17ECL *(End Center-Left)*	Indicates an end directly on the center line pointing to the left.
18ECR *(End Center-Right)*	Indicates an end directly on the center line pointing to the right.
19IR *(Island Right)*	Indicates an island completely within the limits of the right column. Notice that no direction is reported for this fault since it does not touch the center line.
20ELL *(End Left-Left)*	Indicates an end in the left column pointing to the left. It is the continuation of the ridge that forms the island.
20IL *(Island Left)*	Indicates an island completely within the left column. It has no direction since it does not touch the reference line.
21IC *(Island Center)*	Indicates an island directly centered on the reference line. Like all double line faults, it receives the count of the first line that crosses or touches the center line.
Ridge line 22 is the bottom line of the island and has no faults; therefore it is not included in the fault count.	
23BR *(Break Right)*	Indicates a break in the right column. The fault does not have a direction since it is not on the reference line. The line the fault appears on does not cross or touch the center line so it receives the count of the ridge line above. This fault could have been described as ERL and ELL, but this description would have entailed additional letters and longer transmission time.
23ICR *(Island Center-Right)*	Indicates an island on the center line with the majority of the fault in the right column. Like all double line faults, it receives the count of the first line to touch the center line.
Ridge line 24 (the bottom line of the fault) has no faults and therefore is not included in the fault count.	
25ICL *(Island Center-Left)*	Is the same as 23ICR except the majority of the fault is in the left column.

Figure 1-20. Detailed fault count description (continued)

27FRR *(Fork Right-Right)*	Indicates a fork in the right column opening to the right. Although the complete fault is an island, the part within the right limit of the template becomes a fork.
27SR *(Segment Right)*	Indicates a segment in the right column. Since it is not on the center line, it has no direction and receives the count of the ridge line above it that touches the reference line.
27ERL *(End Right-Left)*	Indicates an end in the right column pointing to the left. Although this complete fault is a segment, the right limit of the template cuts through it and the part within the limit of the template is an end. It has no count of its own and therefore will receive the count of the last ridge line above it that crosses or touches the reference line.
27SL *(Segment Left)*	Indicates a segment in the left column. Since it does not cross or touch the reference line, it has no direction, and it receives the number of the line above. This fault could be described as ELL and ELR, but this description would have entailed additional letters and longer transmission time.
28SC *(Segment Center)*	Indicates a segment directly on the center line. It has no direction since it does not have a majority in either column of the template.
28SCR *(Segment Center-Right)*	Indicates a segment on the center line with the majority of the fault in the right column.
30SCL *(Segment Center-Left)*	Indicates a segment on the center line with a majority of the fault in the left column.
31BR *(Break Right)*	Indicates a break entirely in the right column. It does not have any direction since it does not touch the center line.
32BL *(Break Left)*	Indicates a break entirely in the left column. It does not have any direction since it does not touch the center line.
32BC *(Break Center)*	Indicates a break that exactly straddles the center line.
32BCL *(Break Center-Left)*	Indicates a break straddling the center line with the majority of the fault in the left column.
32BCR *(Break Center-Right)*	Indicates a break straddling the center line with the majority of the fault in the right column.
Because none of these breaks are on ridge lines that cross or touch the center line, they all receive the count of the ridge line above them that does touch the reference line.	
33BL *(Break Left)*	Indicates a break entirely in the left column.
33BR *(Break Right)*	Indicates a break entirely in the right column.
Neither of these faults has a direction because they are not on the reference line. These two faults could be described in other ways, but this method uses the fewest letters and would result in the shortest transmission time.	
34 (DELTA)	The fault count ends at the beginning of the delta. The delta is discussed in other paragraphs.

Figure 1-20. Detailed fault count description (continued)

1-45. There will be rare cases when a fault count is required on an individual whose 10 fingers do not contain 2 readable loops or whorls. In such instances, it will be necessary to use arches for the fault count. Because an arch does not have a core, the lockpoint method is used to provide a means of orienting the template (Figure 1-21, page 1-18). A step-by-step procedure for employing the lockpoint method for fault count on arches is as follows:

- Place the template over the print so that the center line runs approximately through the center of the impression from the tip to the line of cleavage.
- Scan the print and select an easily identifiable fault near the bottom of the print above the line of cleavage and as close to the center line as possible.
- Scan the print again and select an easily identifiable fault near the top of the impression as near the center line as possible.
- Readjust the template so that the center line passes through or touches the selected faults. This procedure locks the template into position so that faults can be described. In the lockpoint method, the center line of the template touches ends, crosses the bifurcation of forks, and passes through the center of segments, breaks, and islands.

- Identify the bottom lockpoint by counting the ridges that cross or touch the center line starting at the line of cleavage and proceeding upward through the impression. Give the fault that ridge number and identify it both as it appears within the template and as a lockpoint. For example, in Figure 1-21, 5ECLLP is an end center-left, on the fifth ridge line up from the line of cleavage, and is the lockpoint.
- Continue a normal fault count, counting upwards to the top lockpoint, which is the last fault described. The rules of fault count for loops and whorls apply, with the exception that the count is upwards in the lockpoint method.
- Identify the top lockpoint in the same manner as the bottom lockpoint. In Figure 1-21, 33ICLP is an island center on the 33rd ridge up from the line of cleavage and the lockpoint.

Note: All double-line faults receive the count of their lower ridge. This method is in keeping with the rule that all double-line faults receive the count of the first line that touches the reference line. The faults appearing on ridge lines that do not cross or touch the center line still receive the count of the line above. In the lockpoint method, this count will always be the larger number, whereas in the fault count of loops and whorls, this count will be the lower number.

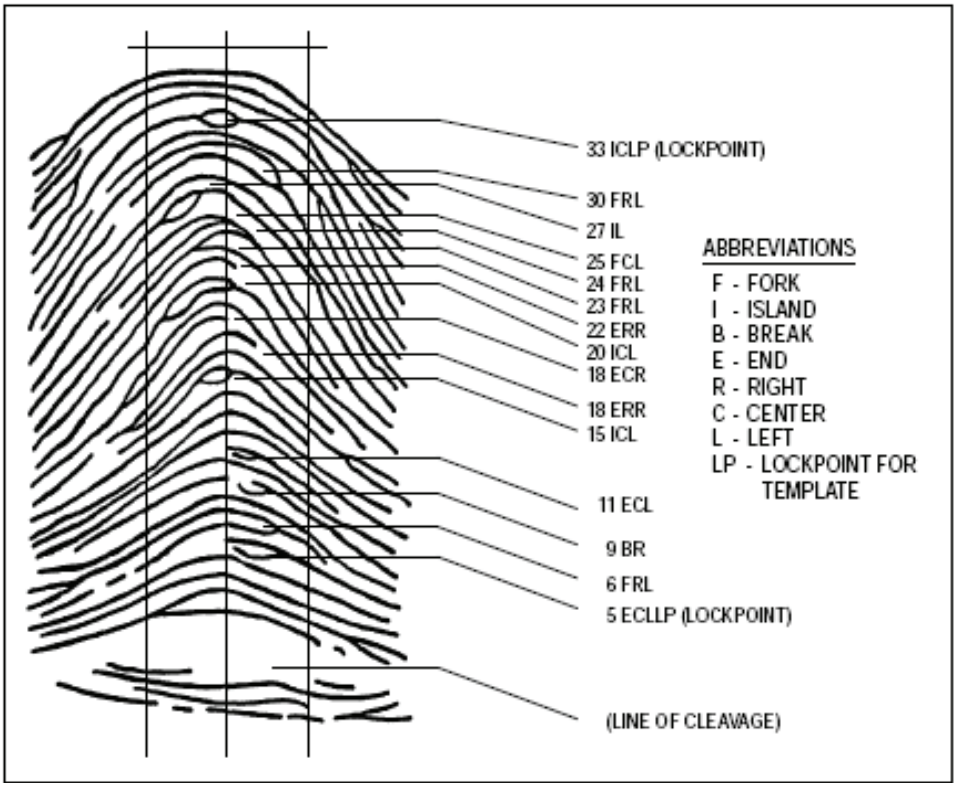

Figure 1-21. Lockpoint

Chapter 2

Taking a Set of Fingerprints

OVERVIEW

2-1. A set of fingerprints should cover the area from nail bed to nail bed and from the tip of the finger to below the first joint. Prints must be clear enough to be classified and numbered. The equipment needed for taking fingerprint impressions is simple and inexpensive. It consists of a marking substance (ink or dye) and a smooth surface. Standard items of equipment may not be available, and SF Soldiers may have to improvise from locally available material.

NECESSARY MATERIALS

2-2. The substance used to obtain fingerprint impressions must spread evenly on the fingers and allow for the transfer to the interpreting surface. The standard item is printer's ink, which is a heavy, black paste. Other substances, when applied with care, will also produce acceptable impressions. These substances include the following:

- *Cheap lipstick*. Cheaper lipstick works better because the oils in cheaper brands mix better with the natural oils of the fingers.
- *Stamp pad inks with stamp pads*. These inks can be used; however, stamp pad ink is very light or thin and takes a long time to dry. If possible, a pad with a silk cloth should be used. The silk cloth is not as likely to cause clotting as cotton cloth, thus allowing a more even flow of ink.
- *Soot*. By holding a piece of glass at an angle over an open flame, a thin film of soot forms on the glass. The finger may then be rolled in the soot and then on paper. This procedure will produce a usable impression.
- *Charred wood*. Charred wood may be pulverized and thinned with a liquid to make a usable ink. To obtain the best results, the liquid that is added should have a slightly oily base.
- *Berry juice*. The juice of most berries can be used; however, the impressions obtained are normally light.
- *Shoe polish*. Polish that has a lanolin base—not a wax base—should be used. Any substance with a wax base tends to clot, causing smudged or smeared impressions.

2-3. A smooth surface should be used to get the fingerprint impression. The surface may be of any material suitable to accept the inked impression. Suitable surfaces include the following:

- *Index cards (3 by 5 inches or 5 by 8 inches)*. Because of their heavy weight, both sides can be used. These cards may also be used for a permanent fingerprint file.
- *Magazines*. A magazine, especially one with a slick surface, has an excellent surface for temporary prints. Although not all of the magazine can be used, several pages will normally have large borders that can be used to take a few individual prints.
- *Newspaper*. The paper used for newspapers holds ink; therefore, it is not the best type of surface to use. By soaking in water, newspapers can be bleached out and then dried in the sun. This procedure will produce a large amount of usable paper.
- *Glass*. Flat pieces of glass or plastic may be used; however, their hard surfaces make them difficult to work with. Care must be taken to avoid smearing the impressions.
- *Wood*. A flat piece of wood sanded or painted smooth makes an excellent surface. It has the added advantage of being reusable simply by being cleaned, sanded, or repainted.

2-4. Figure 2-1 is an example of a typical commercially available fingerprint identification kit. The minimum contents of this kit should include the following:

- Carrying case.
- Index cards (5 by 8 inches).
- Fingerprint ink.
- Roller (used with fingerprint ink).
- Inking plate (used with fingerprint ink).
- Card holder.
- Magnifier.
- Reading glass (used as magnifier).
- Template.
- Curved spatula (used for deformed fingers).

Figure 2-1. Typical commercially available fingerprint identification kit

2-5. There is a wide variety of equipment available for taking fingerprints. Figure 2-2, page 2-3, is an example of a commercially available compact fingerprint identification station. Figure 2-3, page 2-3, is an example of a commercially available inkless fingerprint kit. Figure 2-4, pages 2-3 and 2-4, shows examples of field-expedient inking materials, to include shoe polish, camouflage stick, lipstick, stamp pad, and camouflage compact. Figure 2-5, page 2-4, is an example of a field-expedient fingerprint card with handwritten information blocks. Figure 2-6, page 2-5, shows commercially available magnifiers. Figure 2-7, page 2-6, shows examples of biometric AFIS equipment available through the BFC representative or the operational group headquarters (HQ).

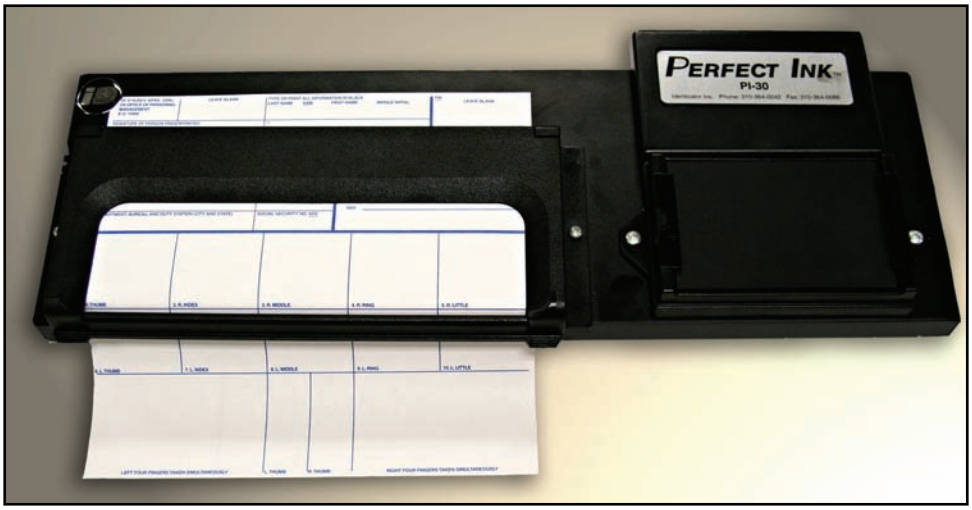

Figure 2-2. Commercially available compact fingerprint identification station

Figure 2-3. Commercially available inkless fingerprint kit

Figure 2-4. Examples of field-expedient inking material

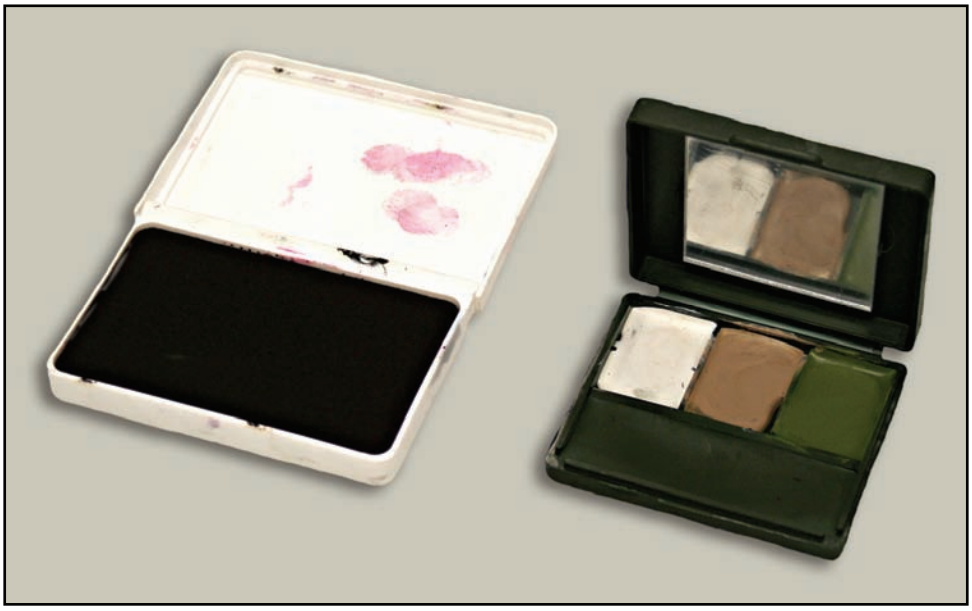

Figure 2-4. Examples of field-expedient inking material (continued)

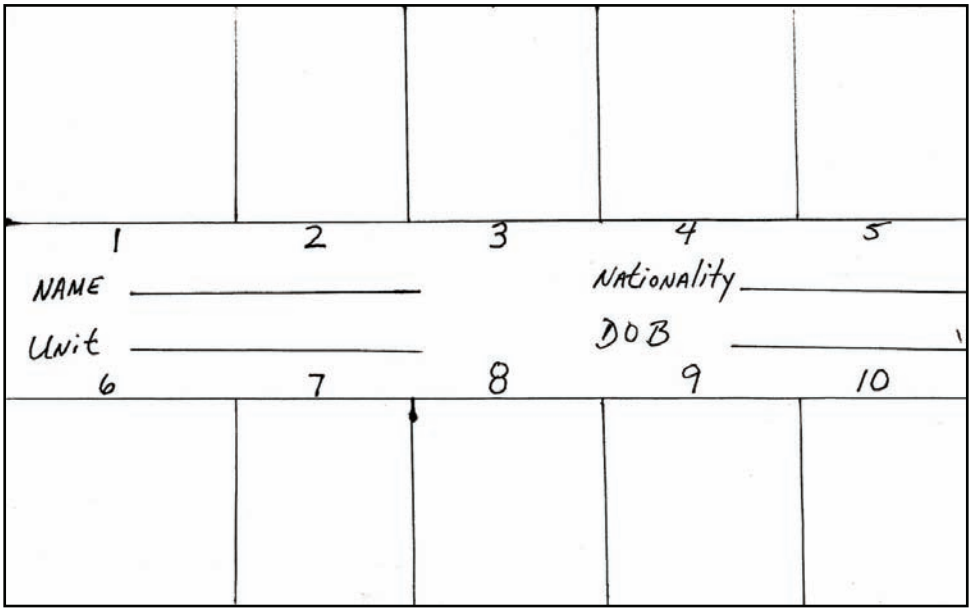

Figure 2-5. Example of field-expedient fingerprint card

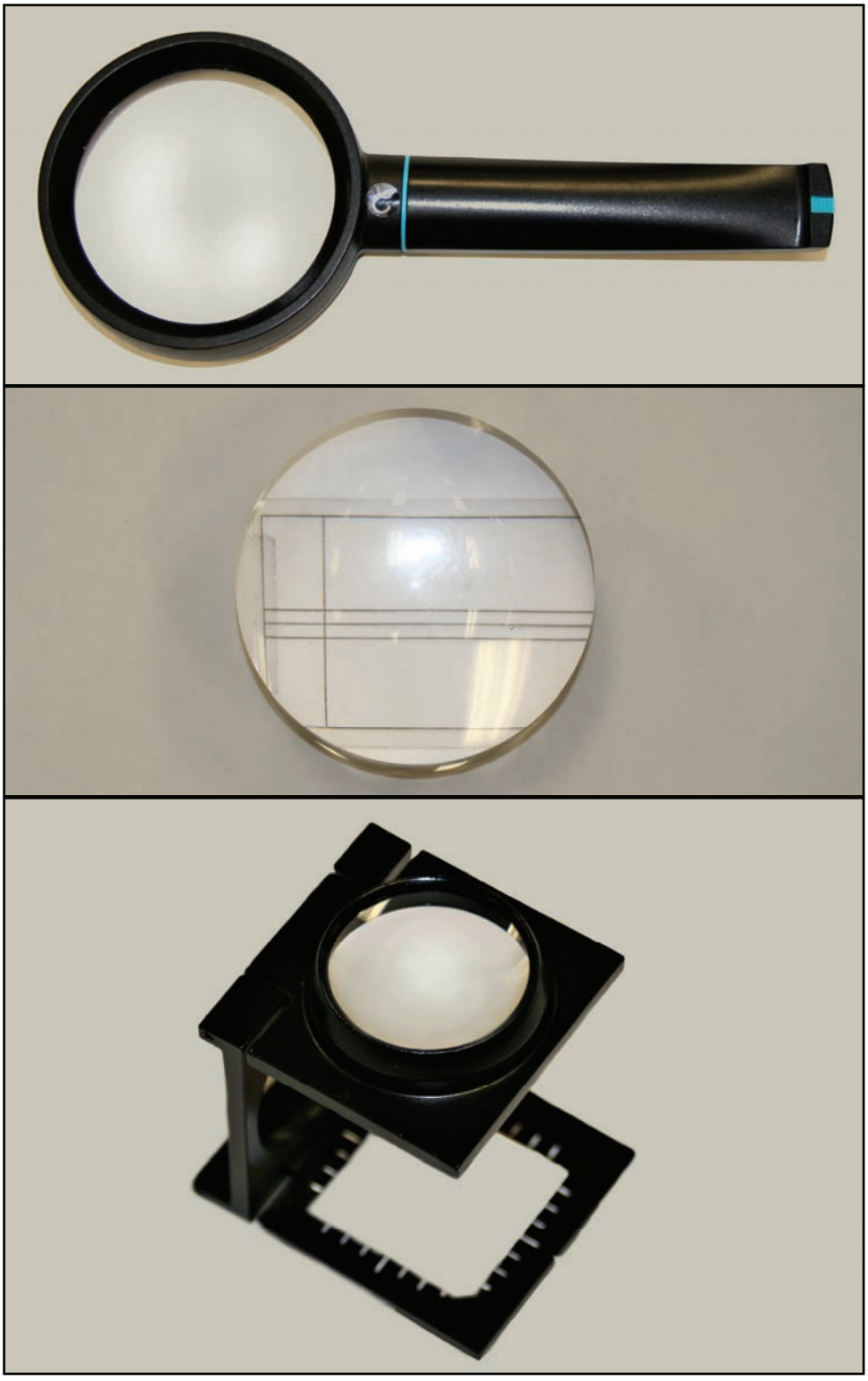

Figure 2-6. Examples of commercially available magnifiers

Figure 2-7. Examples of biometric equipment

TECHNIQUES

2-6. To get the best possible results, the Soldier should apply a number of techniques. These techniques include the following:

- Ensure that all the necessary equipment is available, clean, and in working order.
- Select a location that provides a degree of privacy and a sufficient source of light.
- Organize the printing area, arrange the working surface, and ink the printing plate.

2-7. The working surface should be arranged so that the subject being fingerprinted stands in front of and at forearm's length from the surface. The height of the working surface should be even with the subject's elbow when his arm is hanging naturally to his side (when the arm is bent to a right angle, the forearm will be even with the surface). The card and inking plate should be mounted at the edge of the surface so that

the subject's fingers will not interfere with the manipulation of the other fingers during the printing process.

2-8. To ink the printing plate properly, the Soldier should place two or three small daubs (about the size of a match head) of printer's ink on the plate and thoroughly roll until a thin, even film covers the entire surface. The inked plate should be checked to ensure the film is neither too heavy (smudged prints) nor too light (undefined prints).

2-9. Prior to inking the fingertips, the Soldier should ensure that the subject's fingers are clean. Lint, dust, dirt, or gummed ink in the pattern area can cause imperfect impressions, void identifying characteristics, or print false markings. Alcohol, gasoline, or soap and water are suitable for cleaning. If the skin is rough or callused and difficult to print, the hands should be washed and, if necessary, soaked in warm water. Soaking softens the skin and brings out the ridges. After soaking, the hands should be dried thoroughly—moisture on the hands will blur the prints.

2-10. For proper and accurate analysis, the Soldier must ensure that all critical areas of the fingerprints are imprinted. The fingers must be inked properly and rolled (rather than pressed) to obtain the impressions. In taking rolled impressions, the bulb of the finger is placed at right angles to the surface and then turned or rolled until the bulb faces in the opposite direction. To obtain uniform impressions, the Soldier may take advantage of the natural finger movement—the fingers are turned away from the awkward to the easy position. Such movement relieves strain and leaves the fingers relaxed so that they may be lifted easily from the surface without slipping. Slipping causes the prints to smudge and blur.

2-11. If an individual holds his arms in front of him with the backs of his hands touching each other, his hands feel strained and awkward. If he turns his hands over so they are palm to palm, they are in a comfortable position. When taking fingerprints, the Soldier should roll the fingers by starting in the awkward position (Figure 2-8) and ending with them in the comfortable position (that is, rolled away from the center of the subject's body).

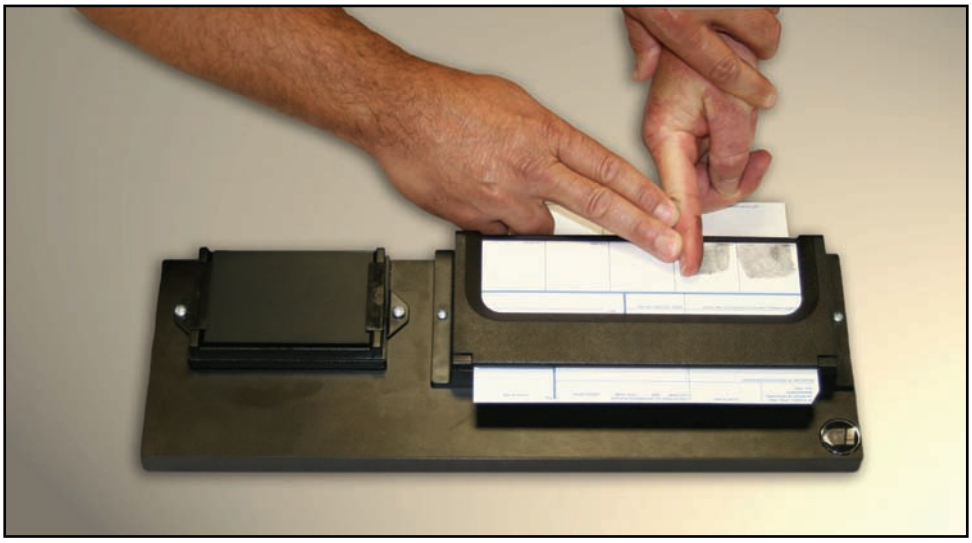

Figure 2-8. Completing the roll of the finger from "awkward-to-comfortable" position

2-12. If an individual holds both hands in front of him with palms up and thumbs extended, the inside edges of the thumbs will be down and the person will feel strain. If he holds both hands in front of him with the palms down, the outside edges of the thumbs will be down and he will be comfortable. Therefore, in rolling the thumbs, the Soldier should roll the thumb toward the center of the subject's body (Figure 2-9, page 2-8).

2-13. When taking fingerprints, each finger must be inked evenly from the tip to below the first joint and from nail edge to nail edge. Each finger should be inked and printed separately, not all at once. In inking and taking rolled impressions, the amount of pressure used is important; proper pressure can best be

determined through experience and observation. It is quite important, however, that the subject relaxes, refrain from helping, and not exert any pressure that will prevent the Soldier from gauging the amount of pressure needed. One way to get the subject to relax his hand is to have him look at the opposite wall instead of his hands. It also helps if the Soldier can stand between the subject and the working surface.

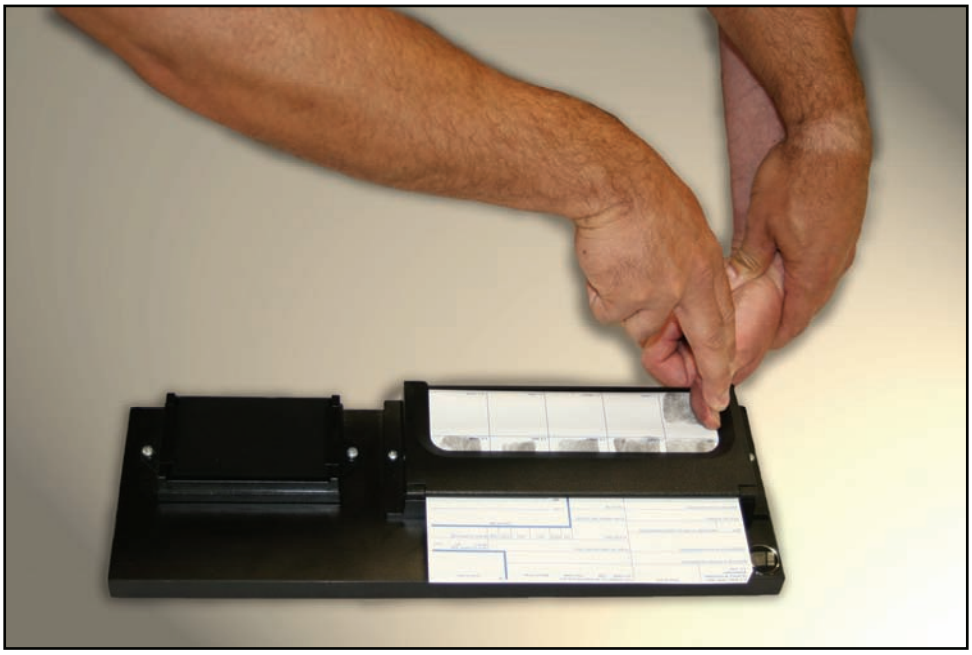

Figure 2-9. Completing the roll of the right thumb

2-14. Figure 2-10 shows fingerprints taken with biometric AFIS equipment. Figure 2-11, page 2-9, shows the thumbprint being taken using this equipment. When using biometric equipment, it is not necessary to roll the finger to obtain a print (Figure 2-12, page 2-9).

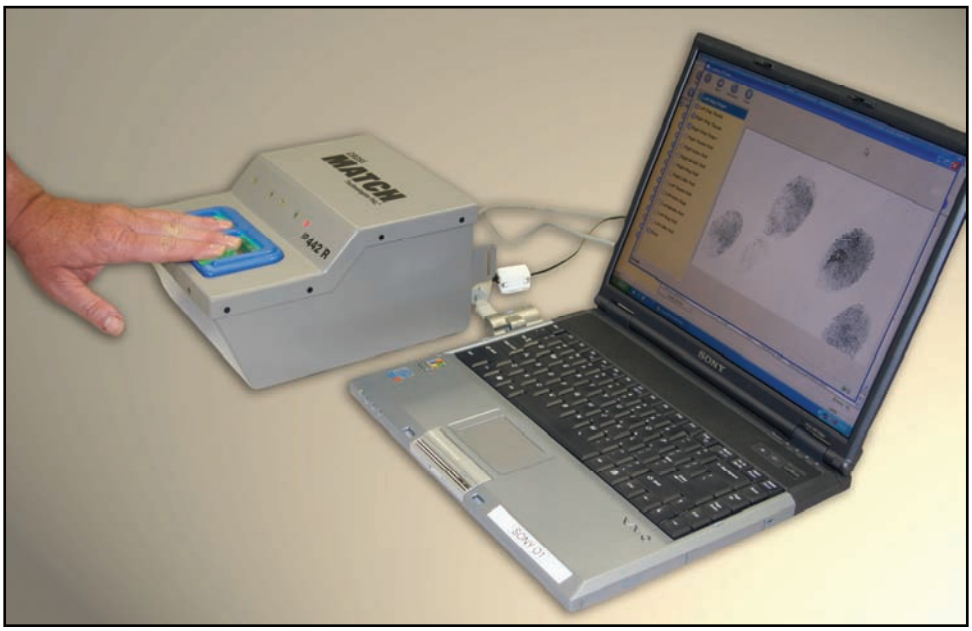

Figure 2-10. Fingerprints taken with biometric equipment

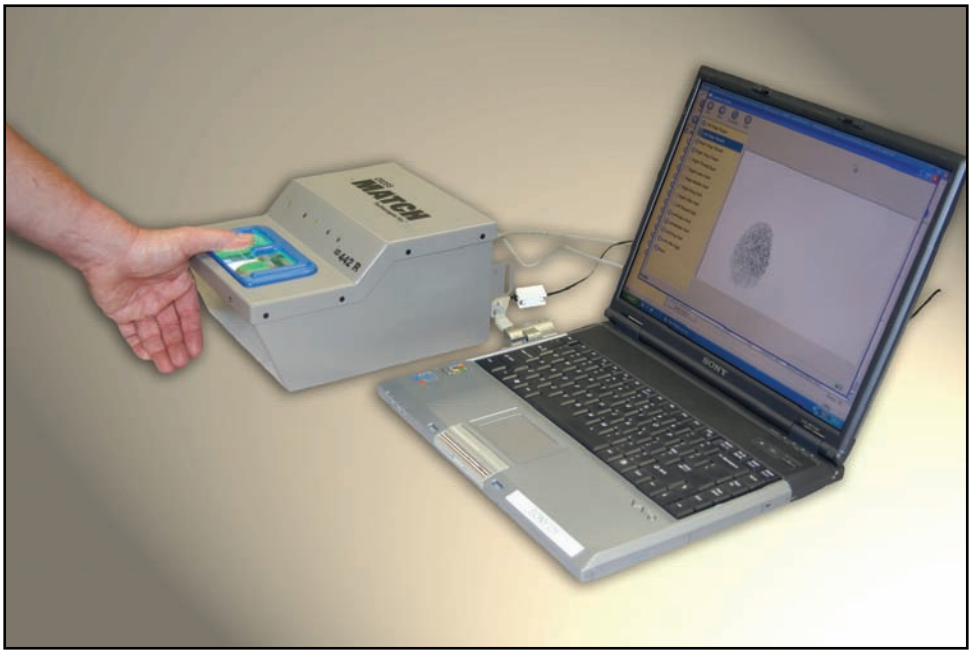

Figure 2-11. Thumbprint taken with biometric equipment

Figure 2-12. Fingerprint taken with biometric equipment

2-15. The procedure for inking the fingers is the same as that described for taking the prints. A finger should not be rolled back and forth on the inking plate to get enough ink. If insufficient ink is transferred the first time, the finger should be re-inked on another portion of the inking plate. A finger should never be inked at a place on the inking plate where a finger was previously inked. This practice will result in uneven inking, causing missed or voided characteristics.

2-16. A slightly different procedure is used when applying lipstick to the fingers to take a set of impressions. The lipstick should be applied directly to the fingers. To coat the fingers uniformly, lipstick should be applied in one sweeping motion beginning below the first joint and ending at the tip of the

finger. Since more than one motion is normally needed to cover a fingerprint, a slight overlap should be allowed in each subsequent application. Soldiers should avoid using back-and-forth motions, as this type of motion will fill in the furrows between the ridges, causing smudged and blurred impressions.

STANDARD NUMBERING OF THE FINGERS

2-17. The standard method of numbering the fingers in the FIS permits the data to be transmitted in a message without numbering the data for each finger. This procedure only requires that the data be transmitted in proper order—the data for the first finger appearing first in the message, followed by the data for the second finger, and so on. This procedure also ensures that individuals at various locations will derive the same information from received messages dealing with fingerprint identification.

2-18. The FIS is devised for 10 fingers. In the FIS, the fingers are always numbered, palms down, starting with the little finger of the left hand as finger number 1 and proceeding across the back of the hands. Each finger is numbered in order until the little finger of the right hand is numbered (Figure 2-13). Therefore, in the standard method of numbering, the fingers of the left hand will always be numbered 1 through 5 and the fingers of the right hand will always be numbered 6 through 10.

2-19. When a finger or fingers are missing, the numbers stay as if all fingers were present. For example, if the ring finger of the left hand is missing, the little finger on the left hand is still number 1, the missing finger is number 2, the middle finger on the left hand is still number 3, and so forth (Figure 2-14, page 2-11). The same would be true if the left hand were missing. The missing fingers of the left hand would still be numbers 1 through 5, and right hand fingers would still be numbers 6 through 10 beginning with the thumb and ending with the little finger. The missing fingers would be reported in the fingerprint message.

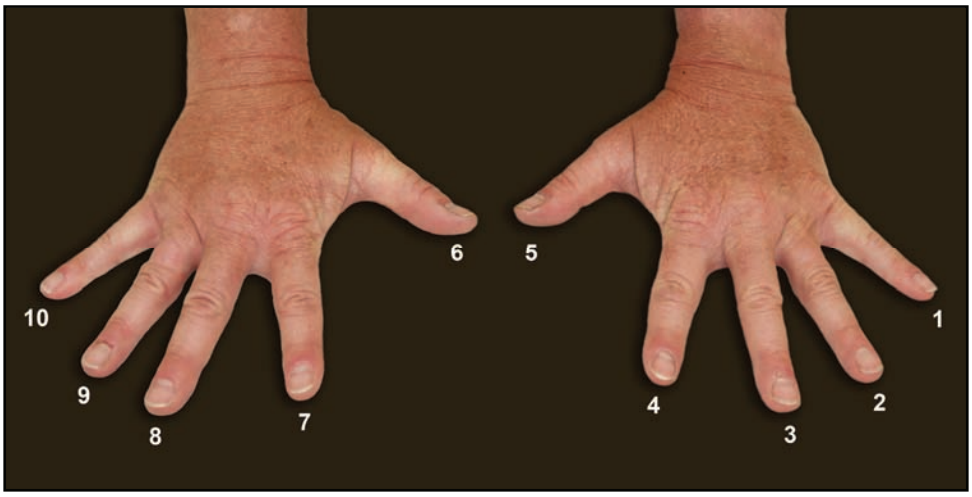

Figure 2-13. Standard numbering of the fingers

2-20. An individual with 11 or more fingers presents a special situation. The first consideration for any additional finger is that it must have an identifiable fingerprint. It will then be given the number in the sequence where it appears, using the rule counting from left to right, palms down (Figure 2-15, page 2-11). If the additional finger does not have an identifiable fingerprint, it is not included in the finger count. All additional fingers, regardless of the presence of an identifiable fingerprint, should be reported in the FIS message.

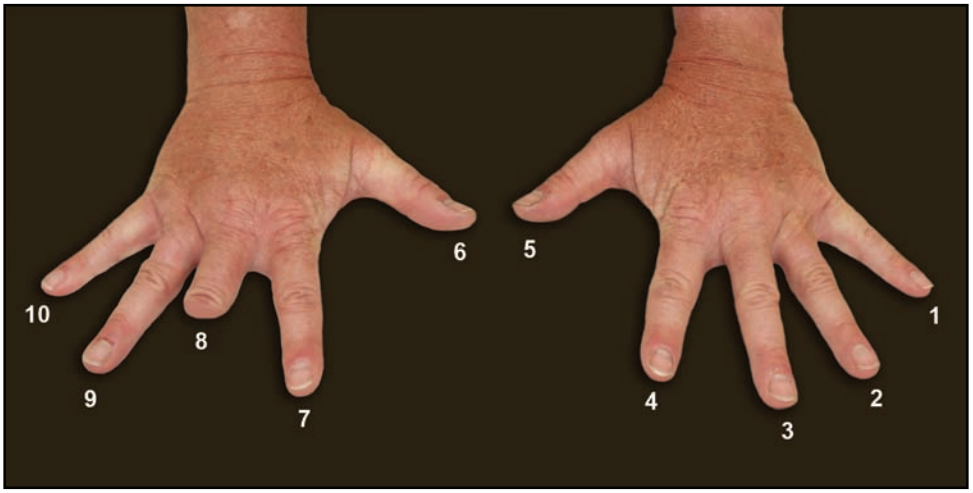

Figure 2-14. Finger numbering when finger is missing

2-21. Cuts, scratches, blisters, and wounds fall in the category of temporary disabilities. Given time, these problems will cure themselves. If the time is not readily available, the Soldier must be patient and use extreme care to obtain the best possible impression in spite of the disabilities.

2-22. Some of the physical disabilities encountered in taking fingerprint impressions are permanent. The system provides for some of these permanent disabilities, such as missing or extra fingers. Other permanent disabilities, such as deformed or mutilated fingers, may require the use of special equipment (such as the curved spatula) or techniques. In addition, Soldiers must use extra care to obtain the best possible impressions.

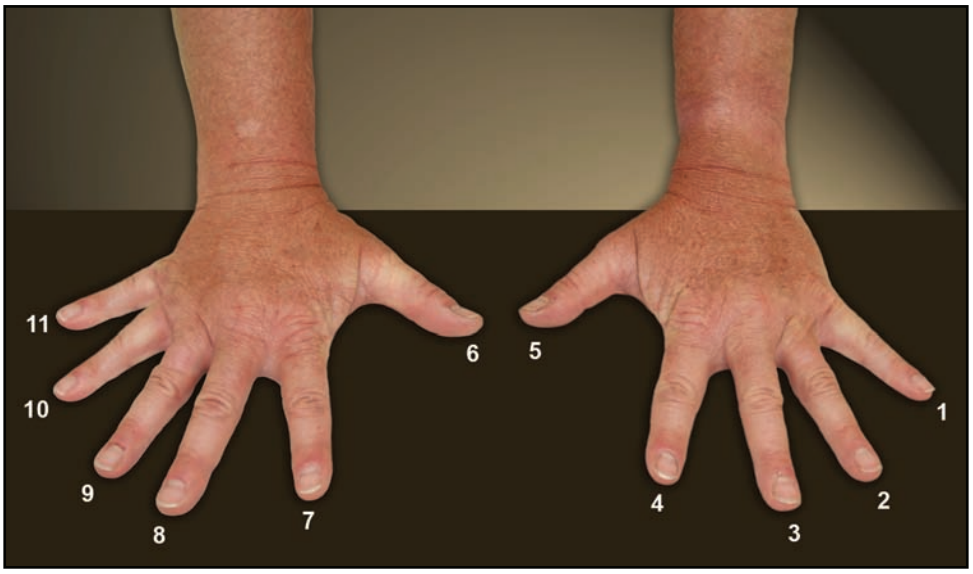

Figure 2-15. Finger numbering when an extra digit is present

2-23. The final category—general—deals primarily with errors made in the interpretation of the impressions and the transmission of fingerprint data. Misinterpretation of impressions, misuse of the brevity code, incomplete data, or transmission of data in the wrong sequence are examples of these errors. Attention to detail will eliminate most of these problems. Figure 2-16, pages 2-12 and 2-13, shows a sample of Standard Form (SF) 87A (Fingerprint Chart), also known as a FIS record card.

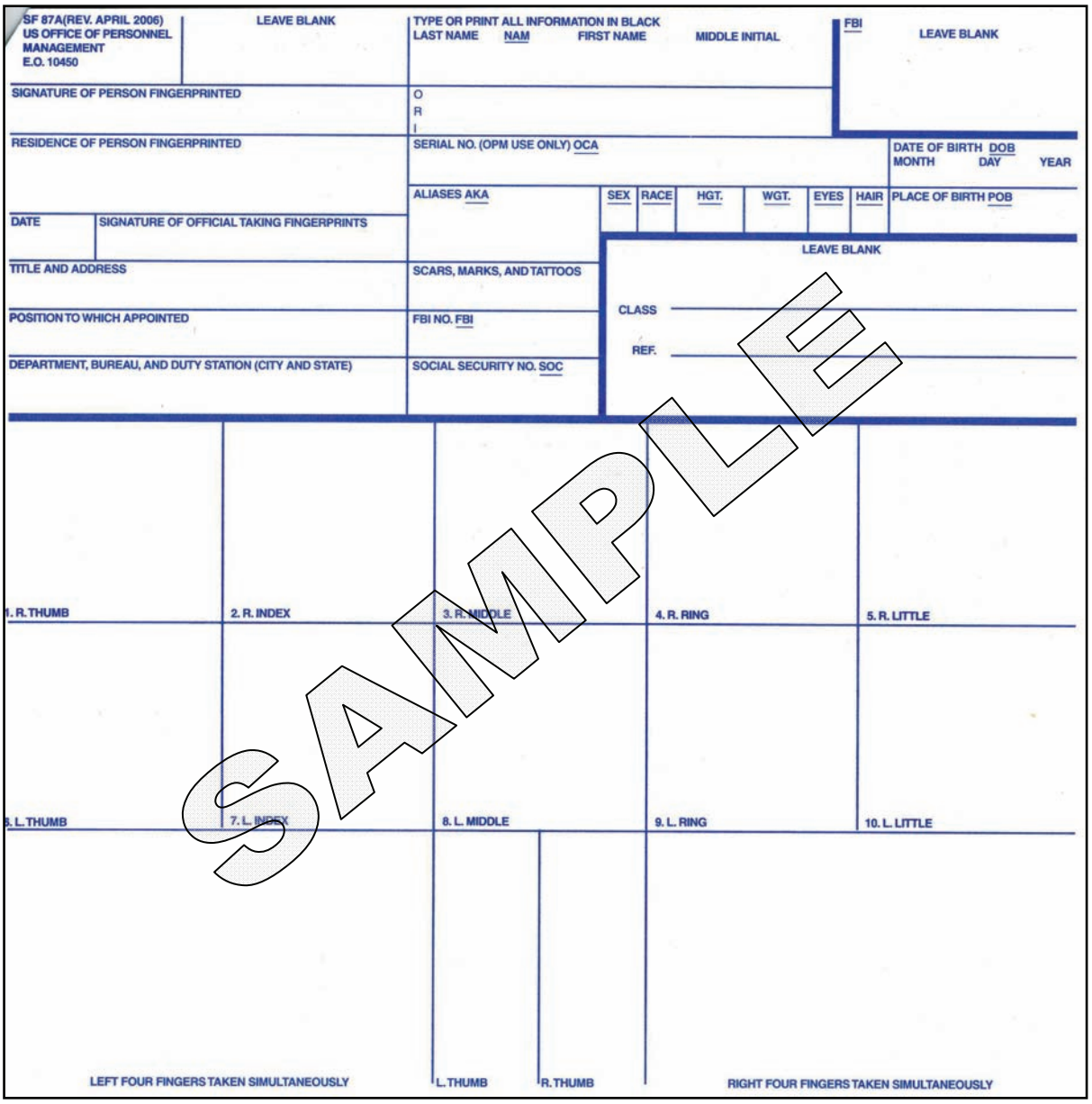

Figure 2-16. Sample of SF 87A (Fingerprint Chart)

INSTRUCTIONS FOR OBTAINING CLASSIFIABLE FINGERPRINTS ON STANDARD FORM 87A, FINGERPRINT CHART

1. USE PRINTER'S INK.
2. DISTRIBUTE INK EVENLY ON INKING SLAB.
3. WASH AND DRY FINGERS THOROUGHLY.
4. ROLL FINGERS FROM NAIL TO NAIL AND AVOID ALLOWING FINGERS TO SLIP.
5. BE SURE IMPRESSIONS ARE RECORDED IN CORRECT ORDER.
6. IF AN AMPUTATION OR DEFORMITY MAKES IT IMPOSSIBLE TO PRINT A FINGER, MAKE A NOTATION TO THAT EFFECT IN THE INDIVIDUAL FINGER BLOCK.
7. IF SOME PHYSICAL CONDITION MAKES IT IMPOSSIBLE TO OBTAIN PERFECT IMPRESSIONS, SUBMIT THE BEST THAT CAN BE OBTAINED WITH A MEMO STAPLED TO THE CARD EXPLAINING THE CIRCUMSTANCES.
8. EXAMINE THE COMPLETED PRINTS TO SEE IF THEY CAN BE CLASSIFIED, BEARING IN MIND THE FOLLOWING; MOST FINGERPRINTS FALL INTO THE PATTERNS SHOWN BELOW:

(OTHER PATTERNS OCCUR INFREQUENTLY AND ARE NOT SHOWN HERE)

(A) A DELTA (Δ) IS THE POINT AT WHICH THE LINES FORMING THE LOOP OR WHORL PATTERN SPREAD AND BEGIN GOING IN DIFFERENT DIRECTIONS. ALL LOOP PRINTS HAVE ONE DELTA. WHORL PRINTS HAVE TWO.

(B) LOOP PRINTS CANNOT BE CLASSIFIED UNLESS THE CENTER OF THE LOOP AND DELTA, AND THE LINES BETWEEN THEM, ARE CLEAR.

(C) WHORL PRINTS CANNOT BE CLASSIFIED UNLESS THE TWO DELTAS, AND THE LINES CONNECTING THE DELTAS, ARE CLEAR.

(D) ARCH FINGERPRINTS CAN BE CLASSIFIED IF A SUFFICIENTLY CLEAR IMPRESSION IS OBTAINED TO PERMIT IDENTIFICATION OF THE PATTERN AS BEING AN ARCH.

9. IF, UPON EXAMINATION, IT APPEARS THAT ANY OF THE IMPRESSIONS CANNOT BE CLASSIFIED, NEW PRINTS SHOULD BE MADE. IF NOT MORE THAN THREE IMPRESSIONS ARE UNCLASSIFIABLE, NEW PRINTS OF THESE FINGERS MAY BE TAKEN AND PASTED OVER THE DEFECTIVE ONES. IF MORE THAN THREE ARE UNCLASSIFIABLE MAKE A NEW CHART.

1. LOOP
CENTER OF LOOP
DELTA
THE LINES BETWEEN CENTER OF LOOP AND DELTA MUST SHOW

2. WHORL
DELTA
THESE LINES RUNNING BETWEEN DELTAS MUST BE CLEAR

3. ARCH
ARCHES HAVE NO DELTAS

PRIVACY STATEMENT

Solicitation of this information is authorized by sections 1304 (Loyalty Investigations) and 3301 (Civil Service) of title 5, U.S. Code; Executive Order 10450 (Security Requirements for Government Employment); or Public Law 82-298 (Authority for Conducting Certain Personnel Investigations). This information will be used to search the Federal Bureau of Investigation's fingerprint files in determining your fitness for Federal employment or a security clearance. It may also be used for searches of other law enforcement agencies maintaining fingerprint files for the same purpose.
Your Social Security Number (SSN) is being requested under the authority of Executive Order 9397 (November 22, 1943). This Order requires agencies to use the SSN for the sake of economy and orderly administration in the maintenance of personnel records. Furnishing any of the requested information is voluntary. However, failure to furnish this information may result in your not being considered for employment or for a clearance. A false answer to any question on this form is punishable by law (title 18, U.S. Code, Section 1001).

PUBLIC BURDEN STATEMENT

We estimate the Public Burden for this collection of information is approximately five minutes per response. This includes time for reviewing the instructions, completing the form, and the actual fingerprinting. Send comments regarding our estimate or any other aspect of this form, including suggestions for reducing completion time, to the Office of Personnel Management, OPM Forms Officer, Paperwork Reduction Act (3206-0150), Washington, DC 20415-7900. The OMB Number 3206-0150 is currently valid. OPM may not collect this information and you are not required to respond unless this number is displayed.

SF 87A (REV. APRIL 2006)
NSN-7540-01-269-3384
FEBRUARY 2002 EDITION USABLE
ALL OTHER PREVIOUS EDITIONS UNUSABLE

FORM APPROVED
☆ OMB NO. 3206-0150

87-206

THIS SPACE FOR FBI USE

SAMPLE

Figure 2-16. Sample of SF 87A (Fingerprint Chart) (continued)

CONVERTING FINGERPRINT DATA FOR RADIO TRANSMISSION BY USING THE BREVITY CODE

2-25. The identification of an individual is either confirmed or refuted by the comparison of a set of impressions (fingerprints). Because the means of communication between elements may be by radio, Soldiers must be familiar with converting fingerprint information into a format for radio transmission and message formats.

2-26. To convert the data interpreted from a fingerprint impression into a form adaptable to radio transmission, a brevity code is used. As the name implies, this code is used only for brevity and in no way provides security for transmitted data. Security is provided by encrypting the brevity coded messages. This brevity code will be used only for the fingerprint data and will not be used for the personal data that form a

part of the messages. When converting fingerprint data to the brevity code, they must be transmitted in the following order:

- Pattern.
- Ridge count.
- Additional data.

2-27. The first part of the brevity code is the numerical code (Figure 2-17) used for ridge counts and the numbers assigned in fault count identification. All numbers reported in the messages have two digits. Therefore, single digit numbers will have a zero placed in front of them before encoding. For example, using the data in Figure 2-17, a ridge count of 9 would be 09 and encoded JI. Because arches, tented arches, missing fingers, and mutilated fingers (on which no ridge count is possible) are assigned a ridge count of zero, their ridge count would be encoded as JJ.

1	2	3	4	5	6	7	8	9	0
A	B	C	D	E	F	G	H	I	J

Figure 2-17. Numerical brevity code

2-28. The second part of the brevity code is the pattern classification code (Figure 2-18). In this code, the major pattern classifications—arches, loops, and whorls—and the subdivisions of arches and loops fall in alphabetical order. All of the codes are composed of repeated double letters.

Arch	Tented Arch	Finger Loop	Thumb Loop	Whorl
KK	LL	MM	NN	OO

Figure 2-18. Pattern classification brevity code

2-29. The identification of an individual is either confirmed or refuted by the comparison of a set of impressions (fingerprints). Because the means of communication between elements may be by radio, Soldiers must be familiar with converting fingerprint information into a format for radio transmission and message formats.

2-30. To convert the data interpreted from a fingerprint impression into a form adaptable to radio transmission, a brevity code is used. As the name implies, this code is used only for brevity and in no way provides security for transmitted data. Security is provided by encrypting the brevity coded messages. This brevity code will be used only for the fingerprint data and will not be used for the personal data that form a part of the messages. When converting fingerprint data to the brevity code, they must be transmitted in the following order:

2-31. In the third part of the brevity code—the fault count (Figure 2-19, page 2-15)—double letters are used. The first letter of the code indicates the type of fault and the second letter completes the description (location and direction, if applicable). The fault description code letters follow an alphabetical sequence in keeping with the reporting order of faults.

2-32. The final part of the brevity code is the miscellaneous code (Figure 2-20, page 2-15). This part of the code is used for the oddities that occur in fingerprint impressions and allows the analyst to further clarify questionable data.

2-33. Any time a finger is missing, it is encoded with the double letter PP. Because all missing fingers have a ridge count of zero assigned, they will have a complete code of PPJJ. If a complete hand is missing, every finger on that hand is so reported.

Fork	*End*	*Island*	*Segment*	*Break*
Left Left	Left Left	Left	Left	Left
RR	SR	TR	UR	VR
Left Right	Left Right	Left	Right	Right
RS	SS	TS	US	VS
Right Left	Right Left	Center Left	Center Left	Center Left
RT	ST	TT	UT	VT
Right Right	Right Right	Center Right	Center Right	Center Right
RU	SU	TU	UU	VU
Center Left	Center Left	Center	Center	Center VV
RV	SV	TV	UV	VV
Center Right	Center Right			
RW	SW			

Figure 2-19. Fault count brevity code

Data	*Code*
Missing Finger	PP
Mutilated Finger	QQ
Question	YY
Right Delta	WS
Lockpoint	WT
Separator	ZZ
Begin/End Fingerprint Data	ZZZZ

Figure 2-20. Miscellaneous brevity code

2-34. The double letter QQ indicates a mutilated finger. It must be used when the mutilation affects the pattern classification and/or ridge count and may be used as a further means of identification even though the pattern classification and/or ridge count is not affected. When the mutilation makes an accurate pattern classification impossible, the code QQJJ is entered for the finger. If the mutilation makes an accurate ridge count impossible, but does not affect the pattern classification, the code will follow immediately after the JJ indicating a ridge count of zero.

2-35. If the mutilation causes some confusion in respect to the pattern classification but does not completely make classification impossible, the code is placed between the two classifications. For example, an impression believed to be a thumb loop with a ridge count of 04 which—because of a mutilation—could be a tented arch would be encoded NNQQLLJD.

2-36. If the mutilation appears on a whorl pattern, but it only causes a difference in using the right delta instead of the left delta, it would be encoded OOAFWSQQ (a whorl, a ridge count of 16, using the right delta because of a mutilation). When a mutilation does not affect either the pattern classification or ridge count, it may be indicated at the end of the encoded impression as a means of further identification.

2-37. The double letter code YY allows the analyst to question any of the information he is not positive about in his interpretation. If, during pattern classification, the analyst believes an impression is a finger

loop with a ridge count of two, but he is not quite sure that it is not a tented arch, he would encode this pattern MMJBLLJJ.

2-38. Although it is not advisable, an analyst can question the ridge count in the same manner as he questions a pattern classification. Therefore, a thumb loop with a ridge count of 14 or 15 would be encoded NNADYYAE. Normally, ridge counts are not questioned because of the allowable error of plus or minus two counts. The question code can be used in a multitude of other ways, as long as both analysts understand how it is being used and derive the same information from it.

2-39. The code WS indicates the use of the right delta in obtaining the ridge count on a whorl type pattern. This indicator follows the ridge count at all times and may be used in conjunction with other codes. The code WT identifies the lockpoints used to orient the template when making a fault count on either an arch or tented arch pattern.

2-40. The repeated letter code ZZ is used in the additional data message to separate the fault count and repeated fault count on the same finger. It is not used to separate the data on the two fingers being fault counted.

2-41. The four-letter repeated code ZZZZ is used to indicate the beginning and end of the fingerprint data contained in the messages. The indicator at the beginning of the fingerprint data also will separate the fingerprint data from the personal data of the individual. The ZZZZ at the end of the fingerprint data will normally indicate the end of the message.

2-42. The brevity code is used to standardize the order in which information is transmitted and can be used any time face-to-face communication is not possible. The brevity codes can be used when communicating by written text, telephone, radio (frequency modulation, amplitude modulation, or very high frequency), satellite communications, or any other form of communications. When transmitting messages that deal with the FIS, from lower (tactical element) to higher HQ element requesting assistance in positive identification of an individual, the message format is codeword PASTE. This message format is found in the command and control section of the Standard Audiovisual Services Supplement (SAV SER SUP), entitled "E&R Fingerprint Fault Count Data Report." These messages follow a prescribed format and sequence for ease of use and clarity. This report indicates to the higher HQ that the subordinate unit has someone in its AO that it wishes to identify. The format is shown in Figure 2-21, pages 2-16 and 2-17.

2-43. The higher HQ replies to the request for fingerprint data using the PRINT message format also found in the command and control section of the SAV SER SUP, entitled "E&R Authentication Data Report." The higher HQ will convert the plain text pattern and ridge count of all fingers using the brevity code. The subordinate unit uses the brevity code to decode the received fingerprint data into lain text equivalents. The format for this message is depicted in Figure 2-22, page 2-17. In unconventional assisted recovery and nonconventional assisted recovery operations, the lower tactical element can send the higher HQ or receiving station the information from the PRINT and PASTE report formats in an effort to verify the identification of an individual through the AFIS assets.

Proword/Codeword PRINT.

This element identifies the type of message and will be found in the current SAV SER SUP.

1. First name, middle name, family name, date of birth (DOB) (repeat [RPT] the first name, middle name, family name, and DOB), nationality, and branch of service.

The subject's name is transmitted in the following order: first name, middle name, and last name. If the subject has only a single letter (initial) in any element of his name, it will be repeated three times. If the individual is a first, second, third, junior, or senior, this fact will be spelled out in the sequence used by the individual (for example, Samuel M. Jones III would be SAMUEL MMM JONES THIRD).

The date is presented as day, month, and year. The individual's year of birth is spelled out in two digits. If the individual's day of birth has only a single digit, a zero is placed in front of it. The month of birth may be abbreviated using the standard three-letter abbreviations (for example, a DOB of 5 February 1935 would be reported as ZERO FIVE FEB THREE FIVE).

Figure 2-21. Brevity code format PRINT

RPT.
Full Name. *Exactly as the first time.*
DOB. *Exactly as the first time.*
Nationality. *The individual's nationality is either spelled out or abbreviated, using standard abbreviations. If the standard abbreviation consists of initials, they will be repeated three times (for example, a U.S. citizen would be reported as UUU SSS).*
Service. *If the individual is in the armed forces, branch of service will be entered. If initials are used to indicate the branch of service, they will be repeated three times. If the individual's nationality is different from the country of his branch of service, the branch of service will be preceded by the country designation (for example, a German national serving in the USAF would be reported as GERMAN [nationality] UUU SSS AAA FFF [country and branch of service]). For a civilian, this element will be deleted.*
2. Evasion and Recovery Fingerprint Codes.
3. Authenticator question: answer; RPT answer. (This information would only be provided from higher to lower because it would be extracted from the Personnel Recovery Mission Software/ Isolated Personnel Report form.)
4. Height in inches or centimeters, color of eyes, color of hair.
5. Authenticator number; RPT authenticator number.
6. Additional information (to include disposition instructions). *Any additional information that would aid the higher HQ in the identification procedures may be included in this part of the message. Any circumstance involving extra fingers must be included in this part of the message. If identification is confirmed, the higher HQ may instruct the UART to move the individual to an extraction/ recovery location for pickup.*

Figure 2-21. Brevity code format PRINT (continued)

Proword/Codeword PASTE. *This element identifies the type of message and will be found in the current SAV SER SUP.*
1. Full Name. *The subject's name is transmitted in the following order: first name, middle name, and last name. If the subject has only a single letter (initial) in any element of his name, it will be repeated three times. If the individual is a first, second, third, junior, or senior, this fact will be spelled out in the sequence used by the individual (for example, Samuel M. Jones III would be SAMUEL MMM JONES THIRD).*
2. Number of the fingers from which the data is gathered. (Normally, only two fingers are used for brevity purposes.)
3. Converted Fault Count Data on the First Finger.
4. Converted Fault Count Data on the Second Finger.
5. Additional Information.

Figure 2-22. Brevity code format PASTE

2-44. After having compared the data received from higher HQ with the fingerprint impressions taken from the individual, a determination of the individual's identity must be made and transmitted to the higher HQ. If the individual has been positively identified, or it has been positively established that he is an impostor, the FIS has accomplished its task and messages on this subject will cease. If there is still some doubt as to the bona fides of the individual, this last message acts as a request for additional fingerprint data. The higher HQ will reply by sending the fault count on two random fingerprint impressions. The two

clearest and most readable impressions will be selected. Usually, it will be possible to select loops and whorls for the fault count; however, if arches are used, the lockpoint method will be followed. The subordinate unit may request the impressions it wants fault counted; otherwise, the higher HQ will make the selection.

2-45. Having compared the fault count of the two fingers with the impressions on hand, the subordinate unit should be able to make a determination whether or not the individual is bona fide. They must notify their higher HQ of this determination, as discussed earlier. If there is still doubt of the bona fides of the individual, additional fingerprint data (the fault count on two more fingers) may be requested and received. This routine may be followed until the fault count on all fingers has been received. At this time, the FIS has been expended; if there is still doubt of the bona fides of the individual, another means of authenticating his identity will have to be used.

2-46. Figures 2-23 and 2-24 depict filled-in PRINT and PASTE messages.

Message # _ _ _ PRINT
AAA Jessie Dale Smith XX Two Six Jun Seven Zero RPT Jessie Dale Smith XX Two Six Jun Seven Zero XX Uniform Sierra XX USAF XXX
BBB MM XX MM XX PP XX NN XX MM XX OO XX MM XX KK XX MM XX LL
CCC SPOUSES MIDDLE NAME XX FAY XXX FAY
CCC FAVORITE STATE XX TEXAS XXX TEXAS
CCC JESSIES NICKNAME XX COWBOY XXX COWBOY
CCC FATHERS OCCUPATION XX DENTIST XXX DENTIST
DDD SEVEN FOUR INCHES XX BROWN XXX BROWN
EEE SEVEN ONE SIX ONE XXX SEVEN ONE SIX ONE
FFF MOVE TO RECOVERY SITE AND EXTRACT BY AIR ASSET 12 JUL 0230 HOURS ZZZ

Figure 2-23. PRINT message

Message # _ _ _ PASTE				
AAA	John RRR Doe Junior			
BBB	one	two	three	four
CCC	KK JJ	MMAE	NNJI	KK JJ YY
DDD	*additional information would be entered here*			

Figure 2-24. PASTE message

Glossary

ACRONYMS AND ABBREVIATIONS

AFIS	automated fingerprint identification system
BFC	Biometric Fusion Center
bmp	bitmap
DOB	date of birth
E&R	evasion and recovery
FBI	Federal Bureau of Investigation
FIS	fingerprint identification system
HQ	headquarters
IMDC	isolated, missing, detained, or captured
ISOPREP	isolated personnel report
JPEG	Joint Photographic Experts Group
mm	millimeter
PDF	Portable Document Format
ppi	pixels per inch
PR	personnel recovery
RPT	repeat
SAV SER SUP	Standard Audiovisual Services Supplement
SF	Special Forces
SSE	sensitive site exploitation
TC	training circular
TIFF	Tagged Image File Format
TTP	tactics, techniques, and procedures
UART	unconventional assisted recovery team
U.S.	United States
USAJFKSWCS	United States Army John F. Kennedy Special Warfare Center and School
USG	United States Government

This page intentionally left blank.

References

SOURCES USED:

ARMY PUBLICATIONS

FM 1-02, *Operational Terms and Graphics*, 21 September 2004

FM 3-05.70, *Survival*, 17 May 2002

FM 3-50.1, *Army Personnel Recovery*, 10 August 2005

GTA 21-03-009, *Code of Conduct*, 1 June 2008

GTA 31-02-002, *Air Tasking Order and Special Instructions*, 1 August 2004

ST 3-90.15, *Tactics, Techniques, and Procedures for Tactical Operations Involving Sensitive Sites*, 16 December 2002

JOINT PUBLICATIONS

JP 1-02, *Department of Defense Dictionary of Military and Associated Terms,* 12 April 2001

JP 3-50, *Personnel Recovery,* 5 January 2007

OTHER

SF 87A (Fingerprint Chart)

This page intentionally left blank.

Index

This page intentionally left blank.

By Order of the Secretary of the Army:

GEORGE W. CASEY, JR.
General, United States Army
Chief of Staff

Official:

JOYCE E. MORROW
Administrative Assistant to the
Secretary of the Army
0835803

DISTRIBUTION:

Active Army, Army National Guard, and U.S. Army Reserve: Not to be distributed; electronic media only.