NCIC Fingerprint Classification

The NCIC method of fingerprint classification is utilized in many ways by the criminal justice system to better establish the identity of an individual.

When a wanted person's fingerprint classification is available, the NCIC FPC should always be included in the wanted person's record for entry into the TIME System Warrant/Wanted Persons File.

While not a positive identifier, the NCIC fingerprint classification can be of assistance in eliminating a person as a suspected wanted person, or a suspect in a criminal investigation. It is also included on the Crime Information Bureau Identification Transcript as an additional identifier. The use of the NCIC FPC in communications is less subject to error in transmission than the Henry Classification and is convertible to the Henry Classification for searching fingerprint files.

A typical NCIC classification might appear as such: **FPC/ 19 PI PO PM 07 16 PO 18 PI CI**

The NCIC FPC formula is printed in a straight line of 20 alphabetic and numeric characters, beginning with the right thumb as number 1, and continuing through number 10 with the left thumb being number 6. Two characters are to be used for each finger as shown in the following table:

Pattern Type	Pattern Subgroup	NCIC (FPC) Code
Arch	Plain Arch	AA
	Tented Arch	TT
Loop	Radial Loop (≥ 51)	Determine actual ridge count and add fifty (50). (2 numeric characters.)
	Ulnar Loop (≥ 01)	Actual ridge count. If ridge count is less that 10, precede the count with a zero (0). (2 numeric characters)
Whorls:		
Plain Whorl: Enter "P" followed by tracing of whorl.	Inner Tracing	PI
	Meeting Tracing	PM
	Outer Tracing	PO
Central Pocket Loop: Enter "C" followed by tracing of whorl.	Inner Tracing	CI
	Meeting Tracing	CM
	Outer Tracing	CO
Double Loop: Enter "d" or "D" followed by tracing of whorl.	Inner Tracing	dI or DI
	Meeting Tracing	dM or DM
	Outer Tracing	dO or DO
Accidental: Enter "X" followed by tracing of whorl.	Inner Tracing	XI
	Meeting Tracing	XM
	Outer Tracing	XO
Other		
Missing or Amputated Finger		XX
Completely Scarred or Mutilated Pattern		SR

Delta and Core

A <u>delta</u>, by the technical definition is a place where two lines run side-by-side and then diverge to form a triangle.

In **Image 1** at right you can see where the <u>three sides of the delta form three sides of a triangle</u>.

Deltas help to determine the fingerprint pattern.

A <u>core</u> is a "dead end" formed by a ridge that loops back on itself.


Image #1

Fingerprint Patterns - Arches

Arches come in two types, *plain* or *tented*. Arches by definition have **no** delta's. If the pattern has one delta then it is a <u>loop</u> and if it has more than one delta it is a <u>whorl</u>.

You will notice in the image at right *(plain arch)* that there is no delta and no significant core. Because there is no delta this pattern, by default, has to be an arch. If you study the image and look at the overall pattern you notice that the pattern area tends to just flow through the print with no significant changes. This makes it a **plain arch** pattern.
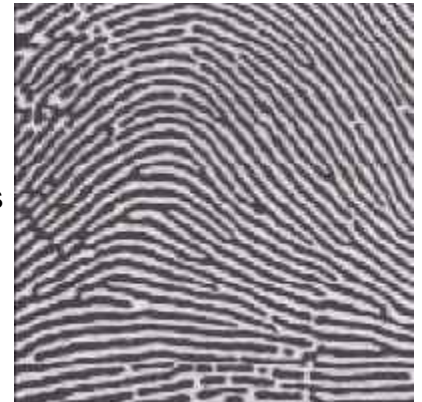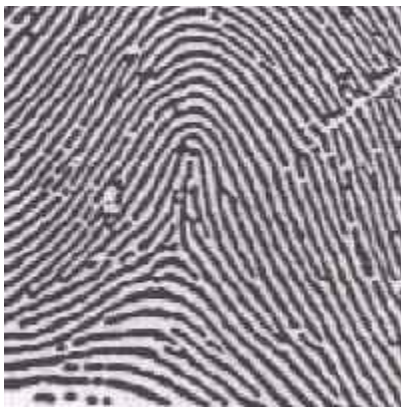
Plain Arch

If you compare the plain arch and tented arch diagrams, you can see that while the plain arch tends to flow rather easily through the pattern with no significant changes, the tented arch does make a significant change and does not have the same "easy" flow that the plain arch does. The technical definition is that a tented arch has a "significant up-thrust" where a plain arch does not.

<u>The NCIC code (FPC) for a plain arch is "AA" while the tented arch is "TT."</u>

Tented Arch

If you study this image long enough you might say "wait there appears to be a delta in there and it can't be an arch with a delta!!". Well you are partially correct in that yes, you could see a delta in this print (three sides of the triangle) but here is why it is not a *valid* delta: To be a valid delta there has to be a *significant re-curving line* which passes in front of the delta, and in this case there is not.

In a little simpler terms here is why this can't be a loop, which it would be if it had a valid delta. If you considered the "almost delta" which appears in the near center left side of the pattern, and you attempted to get a ridge count then the ridge count between the delta and core would be "0". You cannot have a loop with a "0" ridge count. If you call something a loop and then when you try to get a ridge count you come up with "0" then it is not a loop but rather a tented arch, more than likely.

The image at right is a questionable pattern. Is it a tented arch or is it a small count loop? Probably depends on what person is conducting the examination and what their respective opinions happen to be. The point is this, anytime you see a tented arch classification or a very small loop (1, 2 or 3 count) on an NCIC Classification you should realize that these are easily mistaken for one another.

Tented Arch/ Loop?

Fingerprint Patterns – Loops

Loops are the most common pattern type found. To be a loop the pattern must have **one** *(and only one)* delta and a core.
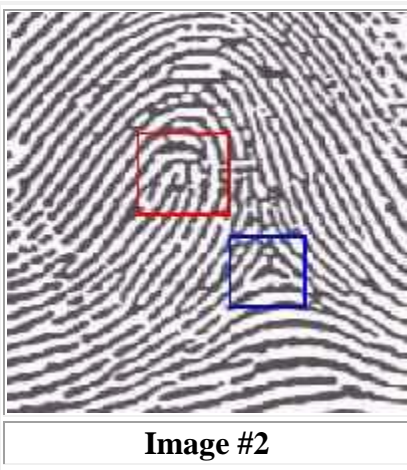
Image #2

In **Image #2** we see a loop pattern. You will notice that it has one delta *(shown in the lower right box)* and a core *(shown in the upper left box)*. By definition the existence of a core and **one** delta makes this pattern a loop.

The distinction between *Ulnar* and *Radial* loops depends on which hand the loop is found on. In the image at left the core pattern area tends to come in from the left and go back out the left. If this were a print from your right hand, it would be a radial loop. If it is from your left hand it is an ulnar loop.

Obviously to make the distinction between these two types of loops you have to know on which hand they appear because if a loop pattern is an *Ulnar* loop on the right hand, then by default it will be a *Radial* loop if found on the left hand.

Radial loops are not very common. Most of the time if you find a radial loop on a person it will usually be on the index fingers (the #2 and #7) fingers. If you see several radial loops together on a 10 print card then you should check the simultaneous prints at the bottom of the page and make sure the card is not out of sequence or doesn't have the hands transposed (the right fingers printed in the left blocks and the left fingers printed in the right blocks).

Fingerprint Patterns – Loops

Loops are classified not only by the fact that they have **one delta** and **one core** but also by something called a *ridge count*. The ridge count is the number of lines intersected if you were to draw a line from the delta to the core plus or minus 1. Always add plus or minus 1 to the ridge count if you were to be searching for this print card based on classification or in the event you were comparing it to an NCIC Classification.

Loops are noted as numerical numbers on an NCIC classification. The *ridge count* is obtained by making an imaginary line between the delta and the core and then counting the number of ridges that intersect the line. In **Image #3** at the right, there is a line drawn between the delta and core. If you count the intersecting lines between these two points you should come up with 11 *(plus or minus 1)*. To distinguish between radial and ulnar loops, you add 50 to the radial count. The print to the right would be an 11 if it is from a left hand and a 61 if it is from a right hand.
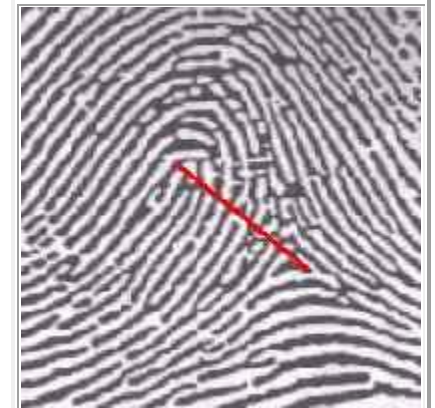
Image #3

Fingerprint Patterns - Whorl Patterns

Any fingerprint pattern which contains 2 or more deltas will be a whorl pattern. In the scheme of classification you can make the assumption that if a pattern contains no deltas then it is an arch, if it contains one (and only one) delta it will be a loop and if it contains 2 or more it will always be a whorl. If a pattern does contain more than 2 deltas it will always be an accidental whorl.

| Plain | Central Pocket | Double Loop | Accidental |
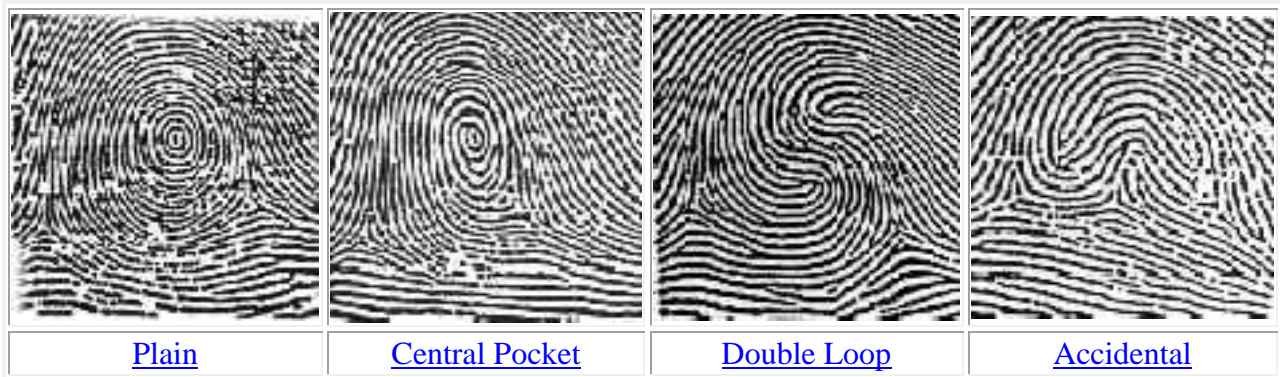
In the NCIC (FPC) classification, a plain whorl is denoted by "P," a central pocket by a "C," a double loop by a "d" and an accidental by "X." The second alphabetical letter in the code represents the whorl tracing (next).
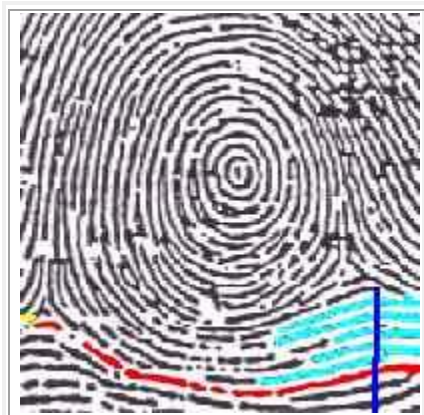
Fingerprint Patterns - Whorl Tracings

Image #4

There are two components of a whorl classification. The first is the whorl pattern such a *plain, double, central pocket, accidental* and the second is the *tracing*. The tracing is relatively simple.

Image #4 at left is a *plain whorl* pattern. To determine the tracing we must identify the left delta on the left side of the image.

Follow the ridge line from the bottom of the left delta across to a point just **below** the right delta. Draw a vertical line from that point to the right delta (it has been done for you).

Count the number of intervening lines that are intersected by the imaginary line (the vertical line). You should count 6 intervening lines.

There are three types of tracings, **outer**, **meet** and **inner**. Outer means that there are 3 or more intersecting lines and they are *outside* of the pattern area. In this case we had 6 lines and they are *outside* the pattern area therefore this tracing is an *outer tracing*. If the number of intersecting lines in **Image #4** had been three or less, then this would have been a *meet tracing*.
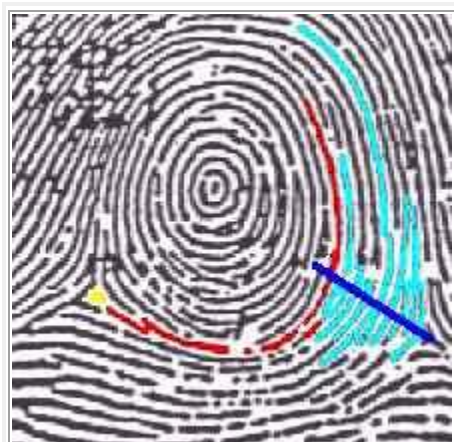

Image #5

Now let's take a look at **Image #5** at left. In this image we again take the left-most delta and begin following a line until it intersects an imaginary line (the diagonal line drawn in) with the right delta. Count the intersecting lines. There are 8 intersecting lines. Remember the only thing we are looking for is 3 or more lines. In this case there is more than three and this time the intersecting point is *inside* the pattern area. This makes this an *inner tracing*. Again if the imaginary intersecting line is within 3 intervening lines of the right delta when counting across an imaginary line, then it would be a *meet tracing*. More than 3 to the inside of the pattern area make it an *inner tracing* and more than 3 outside the pattern area make it an *outer tracing*.

In the NCIC (FPC) classification, whorl tracings are represented alphabetically by I, O and M (inner, outer and meet). A *plain whorl* with an *inner tracing* would be represented by "PI."

Fingerprint Patterns - Plain Whorls

Image #6

Image #7

As with any whorl there must be *more than* 1 valid delta or else it is a loop. Look at **Image #6** and you should be able to identify the two deltas. They are in the square boxes.

The technical definition of a plain whorl is *a pattern which consists of one or more ridges which make or tend to make a complete circuit, with two delta's, between which an imaginary line is drawn and at least one re-curving ridge within the inner pattern area is cut or touched.*

Notice the inner area of the pattern—the area that tends to form a circle? This is what you would call the inner pattern area and it is what makes a whorl look like a whorl. If you draw an imaginary line between the deltas (**Image #7**), you can see that the line intersects the same lines or ridges that tend to form the circle.

The NCIC classification for a plain whorl is "P." The tracing for image 7 is an outer tracing (5 intersecting ridges). The final classification for #7 is "PO."

Fingerprint Patterns - Double Loop Whorls

Technical Definition: A double loop whorl consists of two separate and distinct loop formations with two separate and distinct shoulders and two deltas.
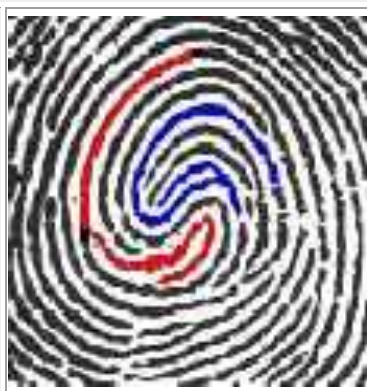

Image #8

Image #9

If you look at **Images #8** and **Image #9** you can clearly see that there appears to be two separate "loops" inside of this whorl. In most cases this means that the pattern will most likely be a *double loop whorl* but not always.

The problems lies in the "separate and distinct" shoulder requirement sometimes. If you look at **Image #9** you can clearly see that there are *separate and distinct* shoulders. The shoulders of each "core" must comprise **separate** lines.

A double loop whorl in NCIC Classification is denoted as a "d" or "D"with the second number, which is either "I", "O" or "M" coming from the whorl tracing.   In the case shown above with the caption "Image #8" this is a *Double Loop Whorl with an Inner Tracing* and would be denoted in NCIC code as "dI" or "DI."

Image #10

Image #9 has been edited such that both apparent shoulders (cores) now use the same line (Image #10). Because they both now use the same line to form the shoulders of each core this is no longer a valid double loop whorl. If the shoulder is formed by **the same,** re-curving line then it is not valid. Both loops must have a valid core.

Fingerprint Patterns - Central Pocket Whorls

Technical Definition: A *central pocket* whorl consists of at least one re-curving ridge, or an obstruction at right angles to the line of flow, with two deltas, between which when an imaginary line is drawn, no re-curving ridge within the pattern area is cut or touched.

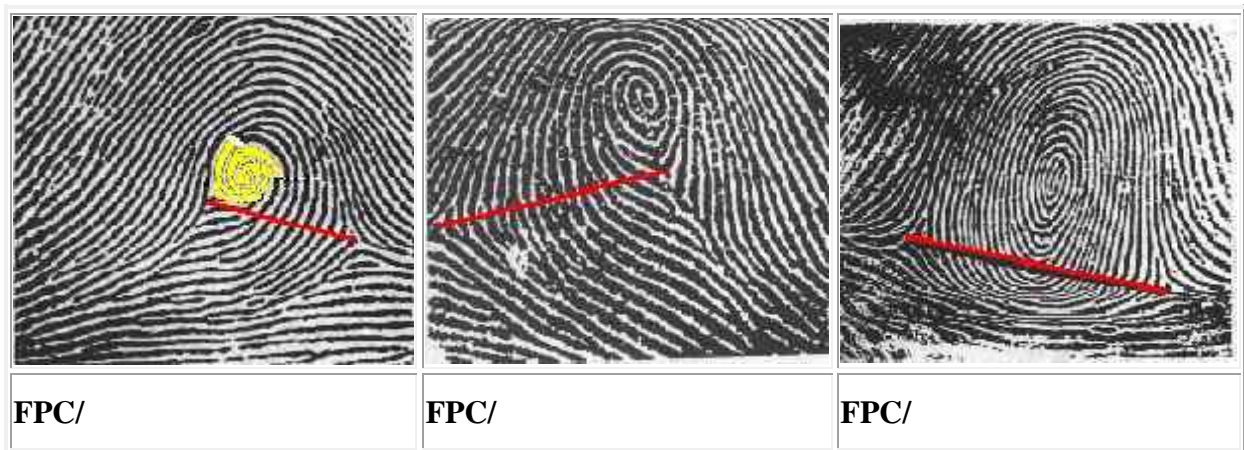| Image #11 | Image #12 | Image #13 |
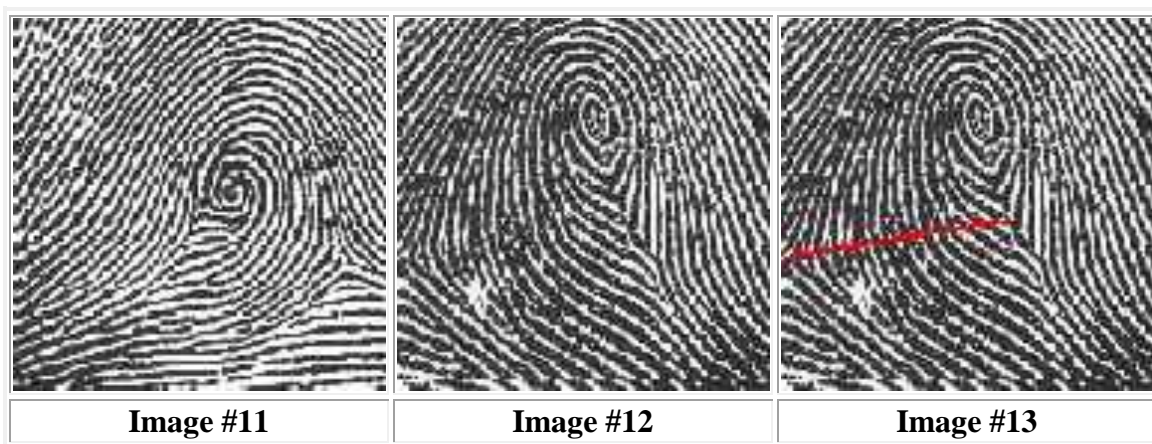
If you look at the pattern area of the three images above, you will notice that the actual lines that make a "circle" are very close to the center of the pattern and there are not very many of them, in fact only about two or three on **Image #11** and about the same on **Image #12**.

To make the determination of the type of pattern we must draw an imaginary line between the two deltas that appear on the print. In **Image #13** a line was drawn between the two deltas. The ridges that form the inner pattern are not intersected by this line. This makes it a *central pocket* whorl. If the ridges of the inner pattern were crossed then this would be a plain whorl.

Central Pocket	Plain Whorl	Double Loop
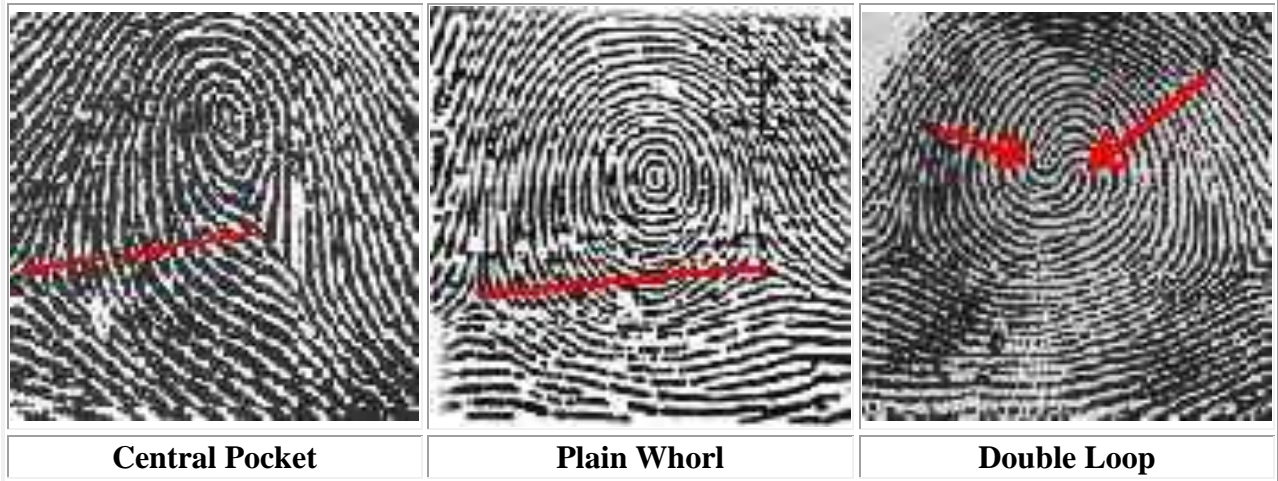
Let's looks at some comparisons between a central pocket whorl and the other types: When compared side-by-side the differences become a little more obvious. If you look at the **Central Pocket Loop** you can see that the imaginary line does not cut across any ridges that form the inner pattern area. But if you look at the **Plain Whorl** you can see that the imaginary line does cut across the inner pattern area (or the ridges which form or tend to form a circle). The pattern in the **Double Loop** might at first glance be taken for a plain whorl because *if* you were to draw the imaginary line it would cut the pattern area, but you will notice there are two core area's in this pattern, which are shown by the red pointers. Because of the two cores this pattern is a *double loop whorl*.

A central pocket whorl in NCIC Classification is denoted as a "C" with the second number, which is either "I", "O" or "M" coming from the whorl tracing. In the case shown above with the caption "Central Pocket" this is a *Central Pocket Whorl with an Outer Tracing* and would be denoted in NCIC code as "CO".

FPC/	FPC/	FPC/

Can you give the NCIC classification for the above images?

Full credit to: http://www.brazoria-county.com/sheriff/id/fingerprints/id~ncic.htm