

Computers and Color in Philately
Part 8: Signed Copies of Mi47
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Introduction

In this Part, we shall study my signed copies of Germany Mi47 and search the full collection of my copies of this stamp in order to determine other stamps which may be similarly classified. This is a task which most collectors take when looking over a large number of stamps in the hope of finding useful color varieties. The difference here is that we shall be examining the UV images using the tools that we described in Part 7 rather than just relying upon our eyesight and (probably biased) judgment. In addition we will attempt to isolate other stamps which may be of types for which we do not have signed copies and attempt to argue as to their types.

The Signed Copies in the Collection:

Stamp 8: signed a (by dealer)

VIS: rose-red; UV: brilliant carmine (rose) to red

Stamp 59: signed a by Gutw. Zenker

VIS: rose-red; UV: brilliant carmine (rose) to red

Stamp 414: signed b (by dealer)

VIS: bright rose-red; UV: brown

Stamp 574: signed c (by dealer - see the following discussion)

VIS: medium red; UV: ochre

Stamp 1047: signed c (by dealer)

VIS: medium red; UV: ochre

Stamp 1046: double signed ca by Gutw. Zenker

VIS: medium red; UV: dark yellow

Stamp 713: signed d (by dealer)

VIS: bright lilac-red; UV: red (shades)

Stamp 1050: mint signed d by Jaschke

VIS: bright lilac-red; UV: red (shades)

Stamp 1049: mint with tab signed d by Gutw. Zenker

VIS: bright lilac-red; UV: red (shades)

Stamp 1044: signed da (by dealer)

VIS: red-carmine; UV: dark red

Stamp 1045: signed db by Wiegand

VIS: lilac-red (blood red); UV: pale vermillion

Stamp 1021: signed e by Wiegand

VIS: dark rose; UV: bright ochre

In addition to the above signed copies, we will also examine the following in an attempt to show that our classification of them is most likely valid:

Stamp 22: Type aa Unsigned

VIS: magenta; UV: dark carmine

Stamp 60: Type ba Unsigned

VIS: bright rose-red; UV: brownish-red

Stamp 587: Type da Unsigned

VIS: red-carmine; UV: dark red

Stamp 1032: Type ea Unsigned

VIS: dark rose; UV: yellowish-orange

Images and Data for the Signed Copies:

Stamp 8: signed a (by dealer)

VIS: rose-red; UV: brilliant carmine (rose) to red



Stamp 59: signed a by Gutw. Zenker

VIS: rose-red; UV: brilliant carmine (rose) to red



The R-Similarity between these two stamps is 0.9624.

Stamp 414: signed b (by dealer)
VIS: bright rose-red; UV: brown



Stamp 574: signed c (by dealer)
VIS: medium red; UV: ochre



Stamp 1047: signed c (by dealer)
VIS: medium red; UV: ochre



The R-Similarity between these two stamps is 0.8974.
The R-Similarity between stamp 574 and stamp 414 is 0.9617.
This shows a likelihood that Stamp 574 is actually of type b rather than type c.

Stamp 1046: double signed ca by Gutw. Zenker
VIS: medium red; UV: dark yellow



This is an example which shows that the visual scanner color of the UV image cannot be relied upon to determine the color. Using an LED UV flashlight of 365 nm it appears to the eye as an orangey yellow (yellowish orange?).

Visually comparing this scan with the b and c types above, it does appear to be a little yellowish.

The R-Similarity between 1047 and 1046 is 0.9455 which is quite similar but not exactly the same.

Stamp 713: signed d (by dealer)
VIS: bright lilac-red; UV: red (shades)



Stamp 1050: mint signed d by Jaschke
VIS: bright lilac-red; UV: red (shades)



Stamp 1049: mint with tab signed d by Gutw. Zenker
VIS: bright lilac-red; UV: red (shades)



These show three different shades of red as the UV color.
This is valid for a type d.

Stamp 1044: signed da (by dealer)
VIS: red-carmine; UV: dark red



Stamp 1045: signed db by Wiegand
VIS: lilac-red (blood red); UV: pale vermillion



On the next page we compare the Similarities of these 5 stamps.

R-Similarities of the 5 stamps of types d, d, d, da and db

	713 d	1049 d	1050 d	1044 da	1045 db
713 d	1.0000	0.9674	0.9496	0.5485	0.9079
1049 d	0.9674	1.0000	0.9975	0.7216	0.9362
1050 d	0.9496	0.9975	1.0000	0.7594	0.9375
1044 da	0.5485	0.7216	0.7594	1.0000	0.6868
1045 db	0.9079	0.9362	0.9375	0.6868	1.0000

The R-Similarities between the stamps signed as d are all above 0.94.

The R-Similarity between the stamps signed as da and db is small (0.6868).

The R-Similarities between the stamps signed as d and the stamp signed as da are all less than 0.76.

The R-Similarities between the stamps signed as d and the stamp signed as db are all above 0.90 but still less than 0.94.

Let us examine the K-S Similarities.

K-S-Similarities of the 5 stamps of types d, d, d, da and db

	713 d	1049 d	1050 d	1044 da	1045 db
713 d	1.0000	0.8466	0.8125	0.4690	0.9056
1049 d	0.8466	1.0000	0.9659	0.6106	0.9116
1050 d	0.8125	0.9659	1.0000	0.6413	0.8872
1044 da	0.4690	0.6106	0.6413	1.0000	0.5386
1045 db	0.9056	0.9116	0.8872	0.5386	1.0000

The K-S-Similarities here are all smaller than the corresponding R-Similarities.

The R-Similarities appear to do a better job of grouping these types.

Stamp 1021: signed e by Wiegand

VIS: dark rose; UV: bright ochre



Images and Data for the Unsigned Copies:

We shall now investigate the unsigned stamps that I included above. We begin with stamp 60 which we have typed as ba.

Stamp 60: Type ba Unsigned

VIS: bright rose-red; UV: brownish-red



Since it is cancelled and is 1890, it must be of type a, aa, b or ba.
We first rule it out as being of type a.

Comparing it with stamps 8 and 59 which were signed as type a, we obtain:

R-Similarities: 0.8211 and 0.7451

KS-Similarities: 0.7719 and 0.6545

These similarities are low enough so that we can conclude that stamp 60 is not of type a.

Next, let us establish that this stamp is not of type b.

The similarities in the UV domain between stamps 414 and 60 are as follows:

R: 0.9034

K-S: 0.8357

These similarities are low enough for us to declare them as different color types.

We thus rule out the type of stamp 60 being b.

This leaves stamp 60 to either be of type ba or type aa.

Let us address stamp 22.

Stamp 22: Type aa Unsigned

VIS: magenta; UV: dark carmine



This stamp is cancelled as 1890 which according to the Michel catalog only has types a, aa, b or ba. We shall now attempt to eliminate the other possibilities, leaving only type aa.

We will start with eliminating the type as a.

Compare stamp 22 with stamp 8:

The K-S Similarity is only 0.8299.

The R-Similarity is 0.9370.

Compare stamp 22 with stamp 59:

The K-S Similarity is only 0.6822.

The R-Similarity is 0.8492.

These similarities are low enough for us to declare them as different color types.

We thus rule out the type being a. Since the year of its cancellation is 1890, it may still be of type b or ba.

Now we shall contrast it with stamp 414 which has been typed as b by a dealer.

The similarities in the UV domains are as follows:

R: 0.7628

K-S: 0.7761

These similarities are low enough for us to declare them as different color types.

We thus rule out the type being b.

Hence, stamp 22 must be either of type aa or ba.

Now let us compare stamp 60 with stamp 22 (which, at this time we hope to be showing is of type aa).

The similarities in the UV domain are as follows:

R: 0.9512

K-S: 0.9381

These similarities are low enough for us to declare them as different color types.

So, stamp 60 is either of type aa or of type ba.

You are probably looking at the UV images of the two stamps and saying "Any idiot can tell that stamp 60 is brownish-red in the UV domain and so it must be of type ba". Certainly I would agree with that statement but we would still like to present some more positive evidence of that.

What are the actual VIS and UV colors that the software would assign to the two stamps 22 and 60?

Stamp 22:

VIS: RGB = 144, 83, 72
HSL = 0.0251, 0.3326, 0.4245
UV: RGB = 194, 137, 72
HSL = 0.0885, 0.5024, 0.5245

Stamp 60:

VIS: RGB = 138, 74, 68
HSL = 0.0145, 0.3378, 0.4048
UV: RGB = 140, 109, 58
HSL = 0.1036, 0.4127, 0.3892

Thus, in the UV domain, stamp 22 is "redder" than stamp 60. This is confirmed whether we look at the R (red) values or the H (hue) values. Stamp 60 has a little lower saturation than stamp 22. This is consistent with stamp 60 being "brownish"; Brown is a composite color produced by a low saturation in the reddish domain.

Our conclusion is that stamp 22 is of type aa and that stamp 60 is of type ba.

We now address the stamp that we have typed as da.

Stamp 587: Type da Unsigned

VIS: red-carmine; UV: dark red



First let us compare it to the stamps which have been typed as d.

Stamp 713: signed d (by dealer)

VIS: bright lilac-red; UV: red (shades)



Here are the similarities between these two stamps:

R-Similarity: 0.8268

KS-Similarity: 0.6742

These similarities are low and we conclude that they are not the same color.

Now let us first compare the colors of stamps 1049 and 1050.

Stamp 1049: mint with tab signed d by Gutw. Zenker

VIS: bright lilac-red; UV: red (shades)



Stamp 1050: mint signed d by Jaschke
VIS: bright lilac-red; UV: red (shades)



By eye, we would be quick to say that stamps 1049 and 1050 have the same UV shade of red and that the red shade is different from the red shade of stamp 713. We would also be willing to admit that stamp 587 has a much darker shade of red than the others.

The description “red (shades)” does not give us anything concrete to hang our hat on. Where does “red (shades)” become “dark red”? Since stamps 1049 and 1050 are so similar, it would be better for us to just consider them to be one stamp rather than to double the importance of one of them in the discussion. We check the determined UV colors of stamps 1049 and 1050.

Stamp 1049:

VIS: RGB = 155, 78, 71
HSL = 0.0138, 0.3727, 0.4440
UV: RGB = 180, 123, 59
HSL = 0.0871, 0.5020, 4716

Stamp 1050:

VIS: RGB = 154, 70, 64
HSL = 0.0120, 0.4107, 0.4284
UV: RGB = 177, 121, 58
HSL = 0.0874, 0.5020, 0.4638

Thus, the calculations of the colors confirm the intuitive idea that the colors are the same.

Now let's bring in the colors of 587 and 713.

Stamp 587:

VIS: RGB = 131, 69, 62
HSL = 0.0162, 0.3527, 0.3813
UV: RGB = 158, 116, 65
HSL = 0.0917, 0.4127, 0.4402

Stamp 713:

VIS: RGB = 142, 76, 70
HSL = 0.0133, 0.3378, 0.4167
UV: RGB = 182, 118, 56
HSL = 0.0824, 0.5271, 0.4676

A direct comparison of the determined colors of the three (4) stamps shows that stamp 587 has a slightly different (darker) UV color.

Now look at the UV similarities of the colors:

R:	587	713	1049	1050
587	1	0.8268	0.9333	0.9523
713	0.8268	1	0.9674	0.9496
1049	0.9333	0.9674	1	0.9975
1050	0.9523	0.9496	0.9975	1

KS:	587	713	1049	1050
587	1	0.6742	0.8259	0.8580
713	0.6742	1	0.8466	0.8125
1049	0.8259	0.8466	1	0.9659
1050	0.8580	0.8125	0.9659	1

The similarities between 1049 and 1050 are very high and confirm that they are the same color and therefore are of the same type. The similarities between 713 and either of these two are not very high and suggest that it may come from a different ink source.

Stamps 587 and 713 both have cancellation year 1895 and thus must be of type d or da. Their similarities are quite low and thus may be considered to be from different ink sources and so should be of two different color varieties. The luminance of stamp 587 is considerably lower than that of 713. We conclude that stamp 587 is of type da and that stamp 713 is of type d. Recall that stamp 713 has been previously typed as type d by a dealer.

1049 and 1050 are not appreciably close to either of 587 or 713 and so must be of some other type. However, they are both typed as d.

We have one more unsigned stamp to examine:

Stamp 1032: Type ea Unsigned

VIS: dark rose; UV: yellowish-orange



I classified this stamp as ea based on its cancellation year and since it seemed to be yellowish-orange. But, if I stare at it long enough I can convince myself that it is almost any color.

Let us compare it with the signed copy of type e.

Stamp 1021: signed e by Wiegand
VIS: dark rose; UV: bright ochre



Comparing these by their colors we obtain:

Stamp 1032:

VIS: RGB = 144, 77, 71
HSL = 0.0127, 0.3377, 0.4245

UV: RGB = 174, 122, 57
HSL = 0.0926, 0.5024, 0.4559

Stamp 1021:

VIS: RGB = 143, 74, 64
HSL = 0.0208, 0.3768, 0.4089

UV: RGB = 148, 119, 59
HSL = 0.1122, 0.4276, 0.4088

Their UV Similarities Are:

DeltaE76: 0.6922

R: 0.9202

K-S: 0.8336

From the low UV similarities and the difference in the UV colors we can conclude that the two are of different types. We conclude that stamp 1032 is not of type e.

Since stamp 1032 is cancelled with year 1900, it must be of type d, da, db, e or ea. We have eliminated type e and so it must be of type d, da, db or ea.

To eliminate type d, we should check its similarities with the stamps 713, 1049 and 1050.

1032 vs. 713:

DeltaE76: 0.8706

R: 0.9274

K-S: 0.8366

1032 vs. 1049:

DeltaE76: 0.9538

R: 0.9744

K-S: 0.9741

1032 vs. 1050:

DeltaE76: 0.9595

R: 0.9785

K-S: 0.9566

Their similarities are somewhat high but not high enough to eliminate their coming from different ink sources. So we eliminate type d.

Now compare it with stamp 1044 which is signed as type da.

1032 vs. 1044:

DeltaE76: 0.5471

R: 0.7625

K-S: 0.6131

These similarities are very low so it is not of type da.

Now compare it with stamp 1045 which is signed as type db.

1032 vs. 1045:

DeltaE76: 0.8006

R: 0.9850

K-S: 0.9232

The R-similarity is too high to exclude this color.

Let's compare these two stamps side by side.

Stamp 1032: VIS: dark rose; UV: yellowish-orange (unsigned)



Stamp 1045: VIS: lilac-red (blood red); UV: pale vermilion (signed as type db)



By eye, looking at the UV images, stamp 1032 looks a little more reddish and stamp 1045 looks a little more tannish.

Perhaps we would learn something by looking at some of the stamps which are very similar to stamp 1032. Looking at all of the stamps which are close to 1032 but only those from the years 1899-1900, here are the stamps from 1899-1900 which are within 0.9940 R-similarity of 1032.

The Stamps	UV R-similarity to 1032 - are these of type e?				
983	0.9968	1006	0.9958	1007	0.9955
974	0.9944	1013	0.9941	981	0.9940
1022	0.9940				



This one is signed as e:

These stamps do not appear to be "orangy" like stamp 1032 does. Until I learn differently, I will continue to classify stamp 1032 as type ea and it may be the only one of this type in the collection. I am still looking for an objective measure which will allow us to differentiate 1032 from these others. The high similarity between the HS-histograms implies that the peaks are also very close and therefore looking at the determined colors would not show any differences.

To refresh our memory:

Stamp 1032: VIS: dark rose; UV: yellowish-orange (unsigned)



Matching the Signed Types to others in the Collection:

We choose one of each type to perform the matches giving us 11 stamps to match:

- a Stamp 59: signed a by Gutw. Zenker
- aa Stamp 2: Unsigned (R Anti-Clique for 1889, Cutoff 0.8)
- b Stamp 414: signed b (by dealer)
- ba Stamp 587: Unsigned (from R Anti-Clique, Cutoff 0.91)
- c Stamp 1047: signed c (by dealer)
- ca Stamp 1046: double signed ca by Gutw. Zenker
- d Stamp 1050: mint signed d by Jaschke
- da Stamp 1044: signed da (by dealer)
- db Stamp 1045: signed db by Wiegand
- e Stamp 1021: signed e by Wiegand
- ea Stamp 1032: Unsigned (based on year (1900) and UV appearance as yellowish-orange)

What we shall do here is examine all the stamps in the collection to find those that are close (have a high R-Similarity) which are within the years that they are to be expected.

Type a:

Close to Stamp 59: signed a by Gutw. Zenker

VIS: rose-red; UV: brilliant carmine (rose) to red

The only close stamp in the years 1889-1890 is stamp 61 and it is only of similarity 0.9532.

Stamps 59 and 61:



These two stamps are darker than the following stamps and perhaps the owner had thought that stamp 59 was of type aa. This would explain why it had been expertised.

It is clear that stamp 7 must be of type a:



What are the stamps of years 1889-1890 which are close to stamp 7?

50 0.9919 51 0.9776 15 0.9581
12 0.9565

Stamps 7, 50, 51, 15, 12



Stamp 8 which has been signed as type a is of similarity 0.8298 and is quite different.



Conclusion: I will conclude that these 5 stamps 7, 8, 50, 51, 15 and 12 are all of type a. Stamp 8 was signed as type a.

Type aa:

By contrast, here is the stamp 22 which we have argued must be of type aa. Its similarity to stamp 8 (signed a) is only 0.9370.



What are the stamps of years 1889-1890 which are close to this one?
Answer: There are none that are very close.

Stamp 21 is close with a similarity of 0.9874. Its similarity to stamp 8 (signed a) is only 0.9330.



This is deceptively similar to stamp 22.

Stamp 25 is also close with a similarity of 0.9823. Its similarity to stamp 8 (signed a) is only 0.8726.



It is not very close and even visually does not look like the same color.

Conclusion: I will conclude that the stamps 22, 21 and 25 are all of type aa.

Type b:

Type b should only be cancelled in the years 1890-1894.

Stamp 414: signed b (by dealer) (cancel year 1893)

VIS: bright rose-red; UV: brown



What are the stamps of years 1890-1894 which are close to stamp 414?

The permissible indices are 9 thru 575.

414	1.0000	323	0.9986	87	0.9976	527	0.9973
330	0.9969	327	0.9968	365	0.9968	291	0.9967
317	0.9967	408	0.9967	306	0.9965	383	0.9965



Conclusion: I will conclude that the stamps 414, 323, 87, 527, 330, 327, 365, 291, 317, 408, 306 and 383 are all of type b.

Type ba:

Type ba should only be cancelled in the years 1890-1892.

Stamp 60: Type ba Unsigned but typed by us as type ba.

VIS: bright rose-red; UV: brownish-red



What are the stamps of years 1890-1892 which are close to stamp 60?

The permissible indices are 9 thru 270.

60	1.0000	111	0.9967	176	0.9953	212	0.9947
221	0.9945	88	0.9939	158	0.9929	217	0.9891



None of these seem to be likely candidates for others of type ba but we need technical backup. As you recall, our classification of stamp 60 as type ba was quite involved. Thus, it may not be easy for us to provide such backup.

Conclusion: I will conclude that only stamp 60 is of type ba.

Type c:

Type c can be cancelled by any of the years 1893-1894.

Stamp 574: signed c (by dealer)

VIS: medium red; UV: ochre



What are the stamps of years 1893-1894 which are close to stamp 574?

The permissible indices are 271 thru 575.

574	1.0000	551	0.9962	511	0.9948	279	0.9932
290	0.9922						



Perhaps 574 is incorrectly typed as c and is really b? i.e. uv color "brown" not ochre. Data?

As you recall, stamp 1047 was also typed as type c and we were happier with this classification than we were with stamp 574.

Stamp 1047: signed c (by dealer)

VIS: medium red; UV: ochre



What are the stamps of years 1893-1894 which are close to stamp 1047?

The permissible indices are 271 thru 575.

1047	1.0000	328	0.9656	571	0.9619	1048	0.9605
411	0.9550	547	0.9547				



Should we conclude that these stamps are of type c? Let us compare them to stamp 414 which was typed as b. Remember that the type b stamps only go through year 1894 which is of maximum index 575. So, stamp 571 should probably be eliminated from the list except that it may have been a late usage of the stamp.

Comparisons with stamp 414:

1047	0.7691	328	0.8860	571	0.8915	1048	0.9076
411	0.9136	547	0.9150				

None of these are very similar to stamp 414 and so we will conclude they are not of type b.

Conclusion: I will conclude that all of these stamps are of type c.

Type ca:

Type ca can only be cancelled in years 1893-1894.

Stamp 1046: double signed ca by Gutw. Zenker

VIS: medium red; UV: dark yellow



What are the stamps of years 1893-1894 which are close to stamp 1046?

The permissible indices are 271 thru 575. 1046 has no discernible cancellation year.

1046	1.0000	547	0.9975	343	0.9974	572	0.9968
342	0.9953	299	0.9944	328	0.9929	411	0.9918



None of these appear to be dark yellow in the scans. However, by eye under uv light 1046 does appear to be a dark yellow or just (slightly orange) yellow. The others appear to be tan or ochre. It would be useful to have data to back up this statement.

Conclusion: I will conclude that only stamp 1046 is of type ca.

Type d:

Type d can be cancelled by any of the years 1893-1900.
There are three stamps signed as type d.

Stamp 713: signed d (by dealer)

VIS: bright lilac-red; UV: red (shades)



Stamp 1049: mint with tab signed d by Gutw. Zenker

VIS: bright lilac-red; UV: red (shades)



Stamp 1050: mint signed d by Jaschke
 VIS: bright lilac-red; UV: red (shades)



The first thing to note is that the VIS scan of the first stamp shows a color that is significantly darker than the other two.

Cancelled d stamps should only show the years 1893-1900. The index values range from 271 thru 1045. Then there are the stamps with no years and the mint ones from indices 1046-1059 of which there are two examples shown above. We show the stamps beginning with 1895.

Stamps close to stamp 713:

713 1.0000 854 0.9941



Stamps close to stamp 1049:

1049 1.0000 1050 0.9975 640 0.9961 887 0.9961
 851 0.9955 853 0.9939 1012 0.9936 857 0.9933

Stamps close to stamp 1050:

1050 1.0000 1049 0.9975 1012 0.9965 961 0.9962
 640 0.9953 940 0.9951 853 0.9949 887 0.9945

There are some duplications between the last two lists. We combine these into a single list omitting the similarities but in order by decreasing similarity.

1049 1050 1012 961
640 887 851 940
853 857



Type d is cataloged as shades of red. We see that the signed stamps here are examples of two of the shades.

Conclusion: I will conclude that all of these stamps are of type d.

Type da:

Type da can be cancelled by any of the years 1893-1900.

Stamp 1044: signed da (by dealer)

VIS: red-carmine; UV: dark red



As we see, the UV image of 1044 is significantly darker red than any of the above shades of red of type d. So, it is probably correctly identified as being of type d.

There are no other stamps in the collection which are close in R-similarity to this one.

Conclusion: I will conclude that only stamp 1044 is of type da.

Type db:

Type db can be cancelled by the years 1899-1900.

Stamp 1045: signed db by Wiegand

VIS: lilac-red (blood red); UV: pale vermillion



Stamps close to stamp 1045:

1045	1.0000	906	0.9992	675	0.9990	922	0.9990
761	0.9989	616	0.9984	712	0.9984	793	0.9981



Conclusion: I will conclude that all of these stamps are of type db.

Type e:

Type e can be cancelled by any of the years 1899-1900.

Stamps would have indices 963-1045.

Stamp 1021: signed e by Wiegand

VIS: dark rose; UV: bright ochre



Stamps close to stamp 1021:

1021 1.0000

1035 0.9945

1038 0.9928

1026 0.9924



Conclusion: I will conclude that all of these stamps are of type e.

Type ea:

Type ea can be cancelled by any of the years 1899-1900.

Stamps would have indices 963-1045.

Stamp 1032: Type ea Unsigned - We have convinced ourselves (above) that this stamp is of type ea.

VIS: dark rose; UV: yellowish-orange



Stamps close to stamp 1032:

1032	1.0000	1017	0.9983	983	0.9968	1006	0.9958
1007	0.9955	974	0.9944	1013	0.9941	981	0.9940



Conclusion: I will conclude that all of these stamps are of type ea.

Finally, for each of the cancellation years, I will display one stamp of each of the varieties that were valid for that year.

1889: a, aa



1890: a, aa, b, ba



1891 - 1892: b, ba



1893 - 1894: b, c, ca, d, da



1895 - 1898: d, da



1899 - 1900: d, da, db, e, ea

