

SYSTEM AND METHOD FOR KEYING VIDEO IMAGES

This invention relates to an image processing system and method. More specifically the invention relates to an image processing system and method in which a foreground image is keyed into a background image.

Keying systems are widely used for picture editing and composition in television and are used to key a foreground image into a background image. For example a keying system may be used for keying letters or other characters forming a caption into a picture to provide information relating to the subject matter of the picture. In such a case video signals

representing the characters, as selected by the operator, are generated by a source such as a character generator, for example the character generator sold by us under the trade mark "CYPHER".

When a character is selected, the generator not only provides the video signals representing the character which may be regarded as foreground signals F, but it

also provides internal control signals K which are used to key the character or foreground video signals over other video signals representing a background matte B. Normally the background matte B is a uniform black. The resulting combined signal is output from

the source for further processing by other television

image processing apparatus. The control signals K are also used within the source to key video signals representing white (value 1) over video signals representing black (value 0) to produce a key signal α which is output from the source for external use together with the combined signal. Thus, the output of the character generator comprises the video signal representation V of the foreground F keyed over the background B together with the external key α . The external key α is used subsequently in external circuitry as will be described in greater detail hereinafter.

At present it is usual to perform the keying of the foreground F over the background matte B within the source character generator using a linear interpolating circuit in which the internal control signals K function as an interpolating co-efficient. The video V which is the result of the interpolation can then be represented by

$$V = F.K + B(1-K) \quad (1)$$

It is also usual for the control signals K to have a maximum value, which may be 1 or less than 1, for pixels lying within the character represented by the video signals F and to have value 0 for pixels within the background matte B, except for a zone round the boundary of the character over which the control

signals K decline gradually from the maximum value, eg 1, to 0 to produce a soft edge between the character F and the background matte B. As is well known, this so-called soft edged keying is employed to reduce aliasing which would otherwise arise between character and background. The maximum value of K will be less than 1 where a foreground image F is to be combined transparently with the background matte B. Thus the coefficient K in the above expression for V may have values in the range:

$$0 \leq K \leq 1$$

and it will be understood that similar soft edging will also appear in the external key signal α .

In the accompanying drawings Figures 1(A) and 1(B) together illustrate a character generator or source of the above described form, conditioned to generate an output video as represented by the above expression for V and also to generate the above mentioned external key α . All the Figures in the drawings are in the form of schematic functional diagrams in which different circuits elements are represented by blocks identified by functional symbols denoting the nature of the respective circuit elements. Specific explanation of individual functional units in the drawings is considered to be unnecessary for an understanding of the invention by those possessed of

the appropriate skills.

Returning to Figure 1(A) it will be appreciated that where $K = 0$ pixels in the video image V will relate solely to the matte background B , where $K = 1$ pixels in the video image V will relate solely to the foreground character F and that for pixels within the soft edges, where K is between 1 and 0, the output video V will include a contribution both from F and from the background B . In the special case where the background matte is black of value 0, then the term $B(1-K)$ will remain 0 regardless of the value of K , but the term $F.K$ will diminish with K at the soft edges, thereby "darkening" the character, in effect increasing the contribution from black. It will also be appreciated from Figure 1(B) that the value of α will track that of K , being non-zero where K is non-zero.

The external key α is used by external circuitry to key the video signal V output from the source into video signals representing a picture which may be regarded as arbitrary external background B_g . In this way a resultant picture R is produced comprising the background picture B_g and the foreground character F . The external keying of the video V into the arbitrary external background B_g has hitherto usually been performed by another linear interpolation process as

illustrated in Figure 1(c) to produce the result:

$$R = \alpha V + Bg(1-\alpha)$$

Bearing in mind that from equation (1) hereinabove

$V = F.K + B(1+K)$ then the above equation for R shows that any contribution of the original background matte B in the signal V is multiplied by α . As mentioned hereinabove pixels within the soft edges are darkened towards black by the keying performed within the character source. In other words pixels in the soft edge output from the character source include an inseparable contribution from the black background of the matte. Therefore, the result signal R from the external interpolator includes the black background contribution in the soft edges thereof in addition to the external background Bg and this black contribution is therefore a spurious signal which may be seen as halos or shadows in the result image R. Whilst these unwanted artefacts are usually faint they are nevertheless visible and can be disturbing.

Similar problems can occur in other systems where two or more keying operations are required over the same area of a picture, for example in systems such as described in our British Patent No. 2,113,950 (equivalent USA patent 4,602,286), or in systems in which different foreground objects can be internally keyed over two copies of the same background picture

and an output produced by internally cross fading between one stamped copy and the other.

The object of the present invention is to reduce the problem of spurious signals such as illustrated above.

5 According to one aspect of the present invention there is provided an image processing system comprising: a first source of image data in which a first keyer is provided for keying first foreground data representing a first foreground image with first background data
10 representing a first background image of a matte of uniform colour in accordance with a first interpolation coefficient to produce first keyed image data representing the first foreground image keyed to the first background image for output as first image
15 data from the first source; an interpolation coefficient generator for generating in dependence on said first interpolation coefficient a generated interpolation coefficient for output from the first source in association with said first image data; a
20 second source of image data for providing second image data representing a second image; a multiplier for weighting the second image data in dependence on said generated interpolation coefficient to produce weighted second image data; and a combiner for
25 combining said first image data with said weighted second image data from said multiplier to produce

combined image data representing the foreground image in combination with the second image.

According to another aspect of the invention there is provided a method of processing image data, the method

5 comprising: keying first foreground data representing

a first foreground image with first background data

representing a first background image of a matte of

uniform colour in accordance with a first inter-

polation coefficient to produce first keyed image data

10 representing the first foreground image keyed to the

first background image for use as first image data;

generating in dependence on said first interpolation

coefficient a generated interpolation coefficient

associated with said first image data; providing

15 second image data representing a second image;

weighting the second image data in dependence on said

generated interpolation coefficient to produce

weighted second image data; and combining said first

image data with said weighted second image data to

20 produce combined image data representing the

foreground image in combination with the second image.

According to another aspect of the invention there is

provided an image processing system comprising: first

interpolation circuit means for keying data comprising

25 a first foreground image over data comprising a

background matte of uniform colour by employing a

first interpolation coefficient; second interpolation circuit means for deriving a second interpolation coefficient from said first interpolation coefficient; a divider for dividing the data output of the first interpolation circuit means by said second interpolation coefficient; and third interpolation circuit means for keying the output data of the divider over data representing a further background image by weighting the output data of the divider and the further background image data by employing said second interpolation coefficient, such that the individual effects of the dividing and the weighting of the data output of the first interpolation circuit means are mutually cancelled, the third interpolation circuit means thereby producing data representing the first foreground image keyed over the further background image.

In a further aspect the invention provides an image processing method comprising: keying data comprising a first foreground image over data comprising a background matte of uniform colour by employing a first interpolation coefficient to produce keyed image data; deriving a second interpolation coefficient from said first interpolation coefficient; dividing the keyed image data by said second interpolation coefficient to produce divided image data; and keying

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the divided image data with data representing a further background image by weighting the divided image data and the further background image data by employing said second interpolation coefficient such that the individual effects of the dividing and the weighting of the keyed image data are mutually cancelled, thereby producing data representing the first foreground image keyed over the further background image.

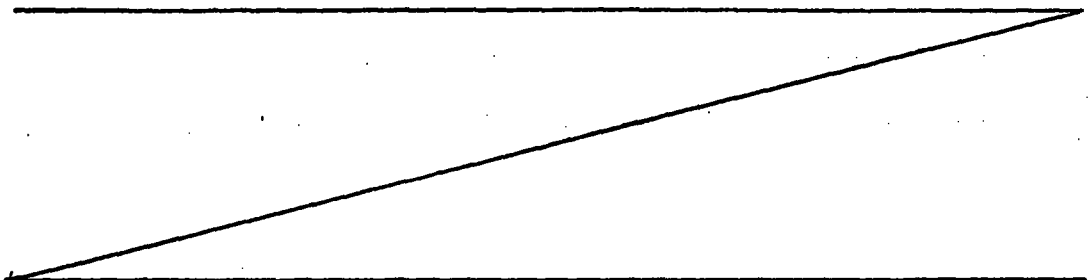
The above and further features of the invention are set forth with particularity in the appended claims and together with advantages thereof will become clearer from consideration of the following detailed description of exemplary embodiments of the invention given with reference to the accompanying drawings.

In the drawings:

Figure 1 illustrates a simple character generator at (a) and (b) and a prior art external keying process at (c) as previously discussed hereinabove.

Figure 2 illustrates a simple external keying system according to the present invention;

Figure 3 illustrates a system including an external keyer for keying overlapped foreground objects onto



the same background;

Figure 4 illustrates a system including an external keyer for keying two different foreground objects over respective copies of the same background and for cross fading between the two; and

Figure 5 illustrates a system in which a foreground image is pre-processed before being delivered externally to a conventional keying circuit.

Further reference will now be made to Figures 2 to 5 of the accompanying drawings, which illustrate several different exemplary embodiments of the invention.

Turning first to Figure 2(A), there is illustrated a system including a simple external or so-called downstream keying circuit according to the invention.

The keying circuit of Figure 2(A) operates on the video V output from the character source of Figure 1(A) under control of the key α output from the source shown in Figure 1(B). There is a second video input in Figure 2(A) namely a picture which can be regarded as an external arbitrary background Bg. It will be noted that in the downstream keying circuit of Figure 2(A) there is no multiplying circuit in the input path for V, as there would be if the keying circuit were a linear interpolating circuit such as used hitherto and illustrated in Figure 1(c) of the accompanying drawings. The Result which is output from the Figure

2(A) downstream keyer is given by the equation:

$$R = V + Bg(1-\alpha)$$

$$\text{but } V = F.K + B(1-K) \quad (1)$$

and if $B = 0$ in equation (1), then substituting for V and α gives

$$R = FK + Bg(1-K).$$

That is to say, the result R output from the external keyer circuit of Figure 2(A) is the foreground F keyed onto the external background Bg with no contribution from the original background B , which is the desired result.

The condition that $B=0$ implies that the "internal" background B in the video represented by the first video V signal is black matte. However, the CCIR specification for broadcast television signals specifies a luminance value 16 for black, and the second video signals representing the "external" arbitrary background might have black equal to sixteen in the scale of luminance signal values. In this event as illustrated in Figure 2(B) of the accompanying drawings the black "offset" value of 16 would, in practice, be subtracted from both video signals V and Bg before applying them to the keying circuit, and would then be re-added to the Result. The circuit of Figure 2(B) can be simplified to the circuit of Figure 2(C).

The invention would usually be applied to colour television signals in digital form comprising different channels for different colour components eg YUV or RGB. In this specification the description is confined to one channel, assumed to be the Y channel of a YUV system. For such a system the Y component to represent black has the value 16 (in the scale 0-255), as already discussed. For U and V components, the CCIR specification prescribes the value 128 (again on the scale 0 to 255) for zero chroma, and appropriate measures for dealing with the offset are required in the U and V channels also. Similar considerations apply to the generation of the external keying signal α from the internal key signals K.

Figures 3(A), 3(B) and 3(C) illustrate a system for keying overlapping foreground objects F1 and F2 onto the same background B, followed by subsequent keying of the output over an external arbitrary background Bg. Figure 3(A) shows the circuit components for keying F1 and F2 and B, Figure 3(B) shows the circuit components for generating the external key α , while Figure 3(C) shows the external keying circuit. The video output from Figure 3(A) is represented by:-

$$V = [F_1 K_1 + B(1-K_1)](1-K_2) + F_2 K_2$$

$$= B(1-K_1)(1-K_2) + F_1 K_1 (1-K_2) + F_2 K_2. \quad (3)$$

The key signal output from Figure 3(B) is represented

by:- $\alpha = K_1 (1-K_2) + K_2$.

It will be noted that K_1 is the only output from the first of the two multiplying stages in Figure 3(B) because the video signal for black is 0.

5 It will also be noted that the external or downstream keyer circuit of Figure 3(C) is exactly the same as that shown in Figure 2(A) and that similar considerations regarding the offset values of black as discussed hereinabove in relation to Figures 2(B) and
 10 (C). Since the Figure 3(C) downstream keyer is the same as that in Figure 2(A) it follows that the result R of the external keying operation performed in the Figure 3(C) circuit is again represented by the equation:

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$$R = V + Bg(1-\alpha).$$

If $B = 0$ in equation (3) then substituting:

$$\begin{aligned} R &= F_1 K_1 (1-K_2) + F_2 K_2 + Bg (1[K_1(1-K_2)+K_2]) \\ &= F_1 K_1 (1-K_2) + F_2 K_2 + Bg (1-K_1-K_2 + K_1 K_2) \\ &= F_1 K_1 (1-K_2) + F_2 K_2 + Bg (1-K_1)(1-K_2). \end{aligned}$$

20 It should be noted that $Bg (1-K_1) (1-K_2)$ is the same term as was applied to B in equation (3) and is therefore free from contributions from the original background B, as required.

The arrangement illustrated by Figures 3(A), 3(B) and
 25 3(C) can be used in an image composition system such as shown in our British Patent 2,113,950 and USA

The group of figures comprising Figure 4 illustrate an arrangement for keying two different foreground objects F1 and F2 over two respective copies of the same background B in which arrangement the two results are cross faded, as are the two internal keys. Subsequently the cross faded foregrounds F1 and F2 are keyed by a downstream keyer into an external arbitrary background Bg. The initial background B is again assumed to be a black matte and thus to have a value notionally of 0. As an illustration of the use to which the form of the invention may be put, the foreground objects F1 and F2 may be symbols denoting different sports, for example a cricket bat and a tennis racket keyed into the top left hand corner of a black matte. The external background Bg may be a sports commentary of a cricket match and a tennis match, with the commentator switching at will between to two. At any one time the appropriate symbol is keyed into the external background Bg, and when the commentator switches from one match to the other, the two symbols F1 and F2 are cross faded. As represented in Figure 4(A), cross fading of the foregrounds F1 and F2 can be affected under control of the operator by a dissolve signal D, which determines the "profile" of the fade. The Figure 4 arrangement provides an output

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video V, whilst Figure 4(B) shows the circuit arrangement for producing the corresponding external key α derived from the two internal keys K_1 and K_2 . The expressions for the signals V and α are given by the following mathematics:-

$$V = [F_1 K_1 + B(1-K_1)] D + [F_2 K_2 + B(1-K_2)] (1-D) \\ = B[D(K_2-K_1) + (1-K_2)] + F_1 K_1 D + F_2 K_2 (1-D) \quad (5)$$

$$\alpha = K_1 D + K_2 (1-D) \quad (6)$$

Subsequently V and α are applied to an external downstream keying circuit as illustrated in Figure 4(C). Again it should be noted that the circuit of Figure 4(C) is identical to that of Figure 2(A) and similar considerations regarding offset values apply. When V and α are applied to the external keying circuit shown in Figure 4(C) together with the external background Bg, the following mathematics expresses the result R output therefrom.

From equation (6)

$$(1 - \alpha) = 1 - (K_1 D + K_2 (1 - D)) \\ = 1 - K_1 D - K_2 + K_2 D \\ = D(K_2 - K_1) + (1-K_2) \quad (7)$$

If B is 0 in equation (5) then

$$V = F_1 K_1 D + F_2 K_2 (1-D)$$

Now $R = V + BG (1 - \alpha)$, and so substituting both for V (with $B = 0$) and for $(1-\alpha)$ gives:

$$\text{Result} = Bg[D(K_2-K_1) + (1-K_2)] + F_1 K_1 D + F_2 K_2 (1-D)$$

This is the same term for Bg as was applied to B in equation (5) and is therefore the required result. That is to say, in the result R the original internal background B is replaced with the external background Bg with no residual contribution from the original background.

In each of Figures 2, 3 and 4 various video signals V, which have previously been created by keying one or more foreground signals F onto a background matte signal B, are supplied to a downstream keyer together with an external keying signal α derived from the internal keying signals K used to produce the video signal. The derived external keying signal α is used to weight an arbitrary background signal Bg in the downstream keyer and the weighted background signal is then combined with the video signal V, unweighted, to produce the desired result.

An alternative arrangement allows a conventional keyer similar to that shown in Figure 1(C) of the accompanying drawings to be used. The keyer shown in Figure 1(C) is a widely available apparatus and by using such a keyer the costs of the system can be kept to a reasonable level. The alternative arrangement is shown in Figure 5 of the accompanying drawings and comprises a conventional source, such as a CYPHER character generator which provides a video signal V

and a keying signal α similar to those signals already discussed hereinabove in relation to Figures 3 and 4 of the drawings, and a conventional keyer. The video signal comprises a foreground F keyed onto a black matte background B by a key K. The output video V and the internally derived external key α are output to a look up table LUT which divides V by α . In setting up the look up table consideration must be given to the black offset in the foreground data F and the key data (see Figures 2B and 2C). The output from the look up table is delivered together with the external key α and an arbitrary background Bg to the conventional keyer which keys the α -divided video V onto the background using the key α . It will be noted that net effect of the look up table is to precondition the foreground signal F such that it is supplied unchanged to the conventional keyer. Once inside the keyer the foreground signal is multiplied by the external key α and added to the background weighted by $(1-\alpha)$ to produce the result $R=V+Bg(1-\alpha)$ as before. Thus, the look up table performs the inverse operation to that performed by the multipliers within the source. Thus, the look up table, which may be a stand-alone unit but preferably is built into the source, serves to pre-compensate the background video V so that it is not processed for a second time by the same key data in

the conventional keyer thereby ensuring that the background matte B is replaced completely by the external background Bg in the conventional keyer without the introduction of unwanted artefacts.

5 In each of the above described embodiments the video signal is created by keying one or two foreground signals over a black matte background using a respective internal key for the or each foreground signal. An external key signal is derived from the
10 internal keys and is subsequently used to combine the video signal with an external background signal of arbitrary content. The embodiments are not limited to the use of a video signal created from only one or two foreground signals and can be applied equally to a
15 video signal formed from multiple foreground images so long as the keying signal for each foreground signal is available for use in deriving the external keying signal.

Having thus described the present invention by
20 reference to preferred embodiments it is to be well understood that the embodiments in question are exemplary only and that modifications and variations such as will occur to those possessed of appropriate knowledge and skills may be made without departure
25 from the scope of the invention as set forth in the appended claims and equivalents thereof.



CLAIMS:

1. An image processing system comprising:

a first source of image data in which a first keyer is provided for keying first foreground data representing a first foreground image with first background data representing a first background image of a matte of uniform colour in accordance with a first interpolation coefficient to produce first keyed image data representing the first foreground image keyed to the first background image for output as first image data from the first source;

an interpolation coefficient generator for generating in dependence on said first interpolation coefficient a generated interpolation coefficient for output from the first source in association with said first image data;

a second source of image data for providing second image data representing a second image;

a multiplier for weighting the second image data in dependence on said generated interpolation coefficient to produce weighted second image data; and

a combiner for combining said first image data with said weighted second image data from said multiplier to produce combined image data representing the foreground image in combination with the second image.



2. An image processing system as claimed in claim 1, wherein said interpolation coefficient generator is provided in said first source.

5 3. An image processing system as claimed in claim 1 or 2, wherein the interpolation coefficient generator is adapted to generate said generated interpolation coefficient by applying said first interpolation coefficient to data representing image white and data representing image black.

10 4. An image processing system as claimed in claim 1 or 2 or 3, wherein said first background image is a black matte.

15 5. An image processing system as claimed in any preceding claim, further comprising offset means for applying an offset value to the second image data so that image black is represented by a value corresponding to zero in said second image data.

20 6. An image processing system as claimed in claim 5, wherein said offset means is adapted to apply the offset value to the first image data output from said first source so that image black is represented by a value corresponding to zero in said first image data, and is



further adapted to remove the offset value from said combined image data from said combiner.

7. An image processing system as claimed in claim 3, wherein said first source is provided with a second
5 keyer for keying second foreground data representing a second foreground image with said first keyed image data in accordance with a second interpolation coefficient to produce image data representing the first foreground
10 image and the second foreground image keyed to the first background image for output as said first image data, and said interpolation coefficient generator is adapted to generate said generated interpolation coefficient in dependence on said first interpolation coefficient and said second interpolation coefficient.

15 8. An image processing system as claimed in claim 7, wherein the interpolation coefficient generator is adapted to generate said generated interpolation coefficient by applying said first interpolation coefficient to data representing image white and data
20 representing image black in order to produce intermediate data and thereafter by applying said second interpolation coefficient to said data representing image white and said intermediate data.



9. An image processing system as claimed in claim 1 or 2, wherein said first source is provided with:

a second keyer for keying second foreground data representing a second foreground image with second background data representing a second background image of a matte of uniform colour in accordance with a second interpolation coefficient to produce second keyed image data representing the second foreground image keyed to the second background image;

10 a user variable source of dissolve data; and

a cross fader connected to receive said first keyed image data from said first keyer and said second keyed image data from said second keyer for combining said first keyed image data and said second keyed image data in dependence on said dissolve data to produce for output image data representing a cross fade between the first keyed image and the second keyed image.

10. An image processing system as claimed in claim 9, wherein the control data generator in said first source is adapted to generate said control data by:

applying said first interpolation coefficient to data representing image white and data representing image black in order to produce first intermediate data;

applying said second interpolation coefficient to said data representing image white and image black to



produce second intermediate data; and

combining said first and said second intermediate data in dependence on said dissolve data.

11. An image processing system as claimed in claim 1,
5 comprising a conventional keyer comprising a first multiplier, a second multiplier and a summing circuit for summing together signals from the first and second multipliers; and a divider for dividing said first image data from said first source in dependence on said
10 generated interpolation coefficient, and wherein said first multiplier is connected to receive divided data from said divider such that the individual effects of the first multiplier and the divider on the first image data are mutually cancelled, said second multiplier is
15 connected to serve as said multiplier for weighting the second image data in dependence on said generated interpolation coefficient, and said summing circuit is thereby operable as said combiner.

12. An image processing system as claimed in claim 11,
20 wherein said divider comprises a look up table.

13. A method of processing image data, the method comprising:

keying first foreground data representing a first



foreground image with first background data representing a first background image of a matte of uniform colour in accordance with a first interpolation coefficient to produce first keyed image data representing the first foreground image keyed to the first background image for use as first image data;

generating in dependence on said first interpolation coefficient a generated interpolation coefficient associated with said first image data;

providing second image data representing a second image;

weighting the second image data in dependence on said generated interpolation coefficient to produce weighted second image data; and

combining said first image data with said weighted second image data to produce combined image data representing the foreground image in combination with the second image.

14. The method as claimed in claim 13, wherein the interpolation coefficient is generated by applying said first interpolation coefficient to data representing image white and data representing image black.

15. The method as claimed in claim 13 or 14, wherein said first background image is a black matte.



16. The method as claimed in claim 13 or 14, further comprising applying an offset value to the second image data so that image black is represented by a value corresponding to zero in said second image data.

5 17. The method as claimed in claim 16, wherein the offset value is applied to the first image data so that image black is represented by a value corresponding to zero in said first image data, and the offset value is subsequently removed from said combined image data.

10 18. The method as claimed in claim 14, further comprising:

keying second foreground data representing a second foreground image with said first keyed image data in accordance with a second interpolation coefficient to
15 produce image data representing the first foreground image and the second foreground image keyed to the first background image for use as said first image data; and

generating said generated interpolation coefficient in dependence on said first interpolation coefficient
20 and said second interpolation coefficient.

19. The method as claimed in claim 18, further comprising generating said generated interpolation coefficient by applying said first interpolation



coefficient to data representing image white and data representing image black in order to produce intermediate data and thereafter by applying said second interpolation coefficient to said data representing image white and said intermediate data.

20. The method as claimed in claim 13, further comprising:

keying second foreground data representing a second foreground image with second background data representing a second background image of a matte of uniform colour in accordance with a second interpolation coefficient to produce second keyed image data representing the second foreground image keyed to the second background image;

generating variable dissolve data; and

combining said first keyed image data and said second keyed image data in dependence on said dissolve data to produce combined image data for use as said first image data representing a cross fade between the first keyed image and the second keyed image.

21. The method as claimed in claim 20, wherein the control data is generated by:

applying said first interpolation coefficient to data representing image white and data representing



image black in order to produce first intermediate data;
applying said second interpolation coefficient said
data representing image white and image black to produce
second intermediate data; and

5 combining said first and said second intermediate
data in dependence on said dissolve data.

22. An image processing system comprising:

first interpolation circuit means for keying data
comprising a first foreground image over data comprising
10 a background matte of uniform colour by employing a
first interpolation coefficient;

second interpolation circuit means for deriving a
second interpolation coefficient from said first
interpolation coefficient;

15 a divider for dividing the data output of the first
interpolation circuit means by said second interpolation
coefficient; and

third interpolation circuit means for keying the
output data of the divider over data representing a
20 further background image by weighting the output data of
the divider and the further background image data by
employing said second interpolation coefficient, such
that the individual effects of the dividing and the
weighting of the data output of the first interpolation
25 circuit means are mutually cancelled, the third



interpolation circuit means thereby producing data representing the first foreground image keyed over the further background image.

23. An image processing system as claimed in claim 22,
5 wherein said first foreground, said background and said further background image data comprises digital data.

24. An image processing system as claimed in claim 22 or 23, wherein said divider comprises a look-up table.

25. An image processing system as claimed in claim 22,
10 23 or 24, wherein said background matte is black and said second interpolation coefficient is derived from said first interpolation coefficient by applying said first interpolation coefficient to data representing image white and data representing image black.

15 26. An image processing system as claimed in any of claims 22 to 25, wherein said first, second and third interpolation circuit means are linear interpolation circuit means.

27. An image processing method comprising:
20 keying data comprising a first foreground image over data comprising a background matte of uniform



colour by employing a first interpolation coefficient to produce keyed image data;

deriving a second interpolation coefficient from said first interpolation coefficient;

5 dividing the keyed image data by said second interpolation coefficient to produce divided image data; and

keying the divided image data with data representing a further background image by weighting the
10 divided image data and the further background image data by employing said second interpolation coefficient such that the individual effects of the dividing and the weighting of the keyed image data are mutually cancelled, thereby producing data representing the first
15 foreground image keyed over the further background image.

28. An image processing method as claimed in claim 27, wherein said first foreground, said background and said further background image data comprise digital data.

20 29. An image processing method as claimed in claim 27 or 28, wherein the background matte is black and said second interpolation coefficient is derived from said first interpolation coefficient by applying said first interpolation coefficient to data representing image



white and data representing image black.

30. An image processing method as claimed in claim 27 or 28 or 29, wherein said first and second interpolation coefficients are employed in linear interpolations.