INTERNATIONAL STANDARD ISO/IEC 12087-2:1994

TECHNICAL CORRIGENDUM 1

Published 1997-09-15

Information technology — Computer graphics and image processing — Image Processing and Interchange (IPI) — Functional specification —

Part 2:
Programmer's imaging kernel system application program interface

TECHNICAL CORRIGENDUM 1

Technologies de l'information — Infographie et traitement de l'image — Traitement de l'image et échange (IPI) — Spécification fonctionnelle —

Partie 2: Interface de programme d'application PIKS

RECTIFICATIF TECHNIQUE 1

Technical Corrigendum 1 to International Standard ISO/IEC 12087-2:1994 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 24, *Computer graphics and image processing*.

_____

Page 63

Add the following note below Table 9:

For the Foundation profile, support 2 image resampling is limited to bilinear interpolation.

Page 90

Update the accumulator error codes: add 15; delete 12, 14, 24 and 44.

Page 98

Update the allocate_composite_identifier_array error codes: delete 12 and 14.

ICS 35.140

Ref. No. ISO/IEC 12087-2:1994/Cor.1:1997(E)

© ISO/IEC 1997

Printed in Switzerland

Page 99

Update the allocate_composite_identifier_list error codes: delete 12 and 14.

Page 104

Update the allocate_histogram error codes: delete 12 and 14.

Page 108

Update the allocate_image error codes: add 4, 16, 22, 42, 61 (for profiles < Scientific) and 101.

Page 110

Update the allocate_lut error codes: delete 12 and 14.

Page 112

Update the allocate_matrix error codes: add 101; delete 12, 14, 111 and 112.

Page 113

Replace remark with:

Remarks:

1. The array_size tuple contains parameters of the ND data type

2. The key_pixel tuple contains parameters of the SD data type

3. The scale factor shall be unity for BD, ND, RD and CD data type arrays

4. For SD data type arrays, the scale factor shall be used by implementations as an indirect means of specifying arrays with fractional elements. For example, in an implementation, an image could be convolved with an SD impulse response function array, and then be divided by the scale factor to achieve the equivalent of convolution with a fractional impulse response function array.

Page 114

Update the allocate_neighbourhood_array error codes: add 16, 22 and 42.

Page 116

Update the allocate_pixel_record error codes: add 16, 22 and 42.

Page 118

Update the allocate_roi error codes: add 1, 2, 3, 16, 22 and 42.

Page 120

Update the allocate_static_array error codes: add 16, 22 and 42.

Page 122

Update the allocate_tuple error codes: delete 12 and 14.

Page 124

Update the allocate_value_bounds error codes: add 1, 101 and 102; delete 12 and 14.

Page 128

Update the alpha_blend_constant error codes: add 15 and 18.

Page 130

Update the alpha_blend_variable error codes: add 15, 18, 41, 45 and 47; delete 43.

Page 132

Update the array_to_lut error codes: delete 22, 42 and 121.

Page 134

Update the bind_match_point error codes: add 16, 22 and 42; delete 41.

Page 136

Update the bind_roi error codes: add 16 and 42; delete 41 and 43.

Page 139

Update the bit_shift error codes: add 15 and 18.

Page 144

Update the cartesian_to_polar error codes: add 15 and 45.

Page 160

Update the classifier_bayes error codes: add 15; delete 12, 14, 22, 42 and 48.

Page 164

Update the classifier_nearest_neighbour error codes: add 3 and 15; delete 12, 14, 22 and 42.

Page 165

Update the close_piks error codes: delete 302.

Page 170

Update the colour_conversion_linear error codes: add 15, 16, 18, 25 and 54.

Page 184

Update the colour_conversion_nonlinear error codes: add 15, 18 and 25.

Page 187

Update the colour_conversion_subtractive error codes: add 15, 25 and 104; delete 12 and 14.

3

Page 191

Update the colour_lookup_interpolated error codes: add 15, 16 and 42; delete 25 and 101.

Page 193

In Nomenclature, replace the DST entry with:

DST(x,y,z,t,b)   XxYxZxTxB destination image

Page 194

Update the complement and complement_roi error codes: add 15, 16, 18, 19, 24, 25 and 26; delete 21, 23 and 101.

Page 196

Update the complex_composition error codes: add 15, 18 and 25; delete 21 and 23.

Page 198

Update the complex_conjugate error codes: add 15, 18, 25 and 45; delete 21 and 23.

Page 200

Update the complex_decomposition error codes: add 15, 18 and 25; delete 21 and 23.

Page 202

Update the complex_magnitude error codes: add 15, 18 and 25; delete 21 and 23.

Page 204

Update the composite_identifier_array_equal error codes: add 22 and 28; delete 21 and 27.

Page 206

Update the composite_identifier_array_get error codes: add 16.

Page 214

Update the composite_identifier_list_get error codes: add 16.

Page 218

Update the composite_identifier_list_remove error codes: add 16.

Page 220

Update the composite_identifier_record_equal error codes: add 28; delete 27.

Page 222

Update the composite_identifier_record_get error codes: add 16.

Page 226

Update the constant_predicate error codes: add 15 and 101.

Page 228

Update the convert_array_to_image error codes: add 16, 32 and 53; delete 42 and 43.

Page 229

In Objects, add BD to the SRC and DST data types as follows:

SRC data type:	BD, ND, SD, RD, CD
DST data type:	BD, ND, SD, RD, CD

Page 230

Replace remark 5 with:

    5. Conversions from the CD to the BD, ND, SD and RD data types are not allowed.

Update the convert_image_datatype error codes: add 15 and 18; delete 41 and 43.

Page 232

Update the convert_image_to_array error codes: add 15, 31 and 40; delete 41 and 45.

Page 234

Update the convert_image_to_roi error codes: add 15 and 31; delete 44.

Page 236

Update the convert_roi_to_image error codes: add 16 and 32; delete 42.

Page 242

Update the convolve_2d error codes: add 15, 16, 22, 25, 42 and 43; delete 52.

Page 246

Update the convolve_5d error codes: add 15, 16, 18, 42 and 43; delete 52.

Page 247

Add the following remark.

    3. For colour images, the band offset is zero and the band sizes are equal.

Page 249

Update the copy_window and copy_window_roi error codes: add 15, 16, 22, 26, 46 and 101; delete 41.

Page 251

In Parameters, move the data value parameters to the end of the parameter list.

Page 252

Update the create_tuple error codes: add 24, 44 and 101; delete 22 and 42.

Page 255

Update the cross_correlation error codes: add 15 and 47; delete 12, 14, 24 and 44.

Page 257

Update the deallocate_data_object error codes: add 11 and 13.

Page 259

Replace remark with:

Remarks:

1. The parameter tuples contain parameters of the ND data type.
2. The sub-image does not inherit the ROI of the source image.
3. An ROI can be bound to a sub-image.

Page 260

In the definition, replace the DST equation with:

$$DST\left(x - x_0, y - y_0, z - z_0, t - t_0, b - b_0\right) = SRC(x,y,z,t,b)$$

Update the define_sub_image error codes: add 12, 14, 15, 16, 17, 22, 23, 42 and 45; delete 1 and 3.

Page 262

Update the difference_measures error codes: add 3, 15 and 43; delete 2.

Page 265

Update the diffuse error codes: add 15, 16, 18, 22, 42 and 43; delete 1.

Page 269

Update the dither error codes: add 15, 16, 18, 22, 42 and 43; delete 1.

Page 272

Update the draw_pixels and draw_pixels_roi error codes: add 23; delete 11, 12, 13 and 14.

Page 275

Update the dyadic_arithmetic error codes: add 15, 18, 23 and 43.

Page 279

Update the dyadic_complex error codes: add 15, 18, 23 and 45.

Page 284

Update the dyadic_logical error codes: add 15, 18, 23 and 43.

Page 288

Update the dyadic_predicate error codes: add 15, 18 and 23.

Page 292

Update the edge_detection_orthogonal_gradient error codes: add 15, 16 and 18; delete 28.

Page 296

Update the edge_detection_second_derivative error codes: add 15, 16, 18 and 101.

Page 300

Update the edge_detection_template_gradient error codes: add 15, 16 and 18.

Page 302

Update the equal_predicate error codes: add 15 and 101.

Pages 305 and 306

Remove the overbars on H in the dilation equations.

Page 307

Update the erosion_dilation_boolean and erosion_dilation_boolean_roi error codes: add 15, 16, 18, 19 and 101; delete 41 and 43; reorder 3 and 2.

Page 313

Update the erosion_dilation_grey error codes: add 15, 16, 18, 43, 48 and 101.

Page 316

Update the error_function_scaling error codes: add 15, 18 and 45.

Page 321

Update the error_test error codes: delete 62 and 302.

Page 324

Update the export_histogram error codes: add 16; delete 24, 42 and 44.

Page 325

In Parameters, replace *data_type* with:

data_type	destination data type option	SP	in
	BI planar		
	BI pixel interleaved		
	NI Planar		
	NI pixel interleaved		
	SI planar		
	SI pixel interleaved		
	TI planar		
	TI pixel interleaved		
	RF planar		
	RF pixel interleaved		
	CF		

Page 326

Add remark 5 as follows:

5. The external data type option specifies whether colour images are stored in planar or pixel interleaved format.

Add the following after the current DST definition:

Image data exported from PIKS to an application is transferred as a one-dimensional array. This data is presented in planar or pixel interleaved form according to the following ordering.

Planar representation:	Pixel interleaved representation:
data(0,0,0,0,0),	data(0,0,0,0,0),
data(1,0,0,0,0),	data(1,0,0,0,0),
...,	...,
data(X,0,0,0,0),	data(B,0,0,0,0),
...,	...,
data(0,1,0,0,0),	data(0,1,0,0,0),
...,	...,
data(X,Y,0,0,0),	data(B,X,0,0,0),
...,	...,
data(0,0,1,0,0),	data(0,0,1,0,0),
...,	...,
data(X,Y,Z,0,0),	data(B,X,Y,0,0),
...,	...,
data(0,0,0,1,0),	data(0,0,0,1,0),
...,	...,
data(X,Y,Z,T,0),	data(B,X,Y,Z,0),
...,	...,
data(0,0,0,0,1),	data(0,0,0,0,1),
...,	...,
data(X,Y,Z,T,B)	data(B,X,Y,Z,T)

Page 327

Update the export_image error codes: add 15; delete 23, 41 and 43.

Page 330

Update the export_lut error codes: add 16; delete 24, 42 and 44.

Page 332

Update the export_matrix error codes: add 16; delete 24, 42 and 44.

Page 334

Update the export_neighbourhood_array error codes: add 1, 16 and 101; delete 24, 42 and 44.

Page 336

Update the export_roi_array error codes: add 16; delete 24, 42 and 44.

Page 338

Update the export_static_array error codes: add 16; delete 24, 42 and 44.

Page 340

Update the export_tuple error codes: add 16; delete 24, 42 and 44.

Page 342

Update the export_value_bounds error codes: add 16; delete 24, 42 and 44.

Page 344

Update the extract_pixel_plane and extract_pixel_plane_roi error codes: add 12, 14, 15, 16, 18, 19 and 24; delete 11, 13, 23 and 41.

Page 347

Update the extrema error codes: add 15; delete 1, 12, 14, 24, 30, 44 and 50.

Page 350

Update the false_colour error codes: add 15, 16, 18 and 52.

Page 354

Update the fill_region error codes: add 15, 18, 45 and 101.

Page 357

Update the filter_butterworth error codes: add 16.

Page 360

Update the filter_gaussian error codes: add 16.

Page 363

Update the filter_inverse error codes: add 16.

Page 367

Update the filter_matched error codes: add 16 and 19; reorder 48 and 74.

Page 371

Update the filter_wiener error codes: add 16 and 19.

Page 376

Update the filter_zonal error codes: add 16, 22 and 42.

Page 379

Update the filtering_homomorphic error codes: add 15, 16, 18, 43 and 45; delete 44.

Page 383

Update the filtering_linear error codes: add 15, 16, 18 and 45.

Page 388

Update the filtering_median error codes: add 15, 16 and 18.

Page 391

Update the filtering_pseudomedian error codes: add 15, 16, 18 and 43.

Page 396

Update the filtering_rank_order error codes: add 15, 16 and 18.

Page 399

Update the flip_spin_transpose and flip_spin_transpose_roi error codes: add 12, 14, 15, 16, 18, 19, 22, 24 and 26; delete 41 and 45.

Page 403

Update the gamma_correction error codes: add 15, 18 and 104; delete 103.

Page 406

Update the get_colour_pixel error codes: add 15; delete 62.

Page 408

Update the get_pixel and get_pixel_roi error codes: add 12, 14, 15 and 16; delete 11, 13 and 41.

Page 409

In Parameters, replace the jo and ko entries with:

jo	first index offset	SP	in
ko	second index offset	SP	in

Replace remark with:

Remarks:

1. The data type of each array data value shall be of the same class as the source image.

2. If the array spatially extends over the J-K plane of the source image, the returned pixel values in the non-coincident region are set to zero for arithmetic data type images, and are set to FALSE for Boolean data type images.

Page 410

Update the get_pixel_array and get_pixel_array_roi error codes: add 15 and 16; delete 11, 12, 13, 14, 24, 41, 44, 62 and 112.

Page 412

Update the get_pixel_record and get_pixel_record_roi error codes: add 15 and 16; delete 11, 12, 13, 14, 24, 41, 44 and 62.

Page 416

Update the histogram_modification error codes: add 15 and 18.

Page 419

Update the histogram_scaling error codes: add 15 and 18.

Page 423

Update the histogram_shape_ld error codes: add 16; delete 24 and 44.

Page 428

Update the histogram_shape_2d error codes: add 16; delete 24 and 44.

Page 431

Update the histogram_ld error codes: add 15; delete 44.

Page 435

Update the histogram_2d error codes: add 15; delete 44.

Page 443

Update the hit_or_miss error and hit_or_miss_roi codes: add 12. 14, 15, 16, 18 and 19; delete 11, 13, 25, 41 and 43.

Page 448

Update the hough_transform error codes: add 15.

Page 451

Update the image_bar_chart error codes: add 16.

Page 454

Update the image_constant error codes: add 16, 22, 23 and 42.

Page 456

Update the image_gaussian error codes: add 16, 22, 42 and 101.

Page 459

Update the image_grey_scale error codes: add 16, 22 and 42.

Page 462

Update the image_random_number error codes: add 16, 22, 23 and 42.

Page 464

Update the import_histogram error codes: add 16; delete 22, 42 and 44.

Page 465

In Parameters, replace the src_data_ type with:

src_data_type	source data type option	SP	in
	BI planar		
	BI pixel interleaved		
	NI planar		
	NI pixel interleaved		
	SI planar		
	SI pixel interleaved		
	TI planar		
	TI pixel interleaved		
	RF planar		
	RF pixel interleaved		
	CF		

Page 466

Add remark 5 as follows:

5. The external data type option specifies whether colour images are stored in planar or pixel interleaved format.

Add the following after the current DST definition:

Image data exported from PIKS to an application is transferred as a one-dimensional array. This data is presented in planar or pixel interleaved form according to the following ordering.

Planar representation:	Pixel interleaved representation:
data(0,0,0,0,0),	data(0,0,0,0,0),
data(1,0,0,0,0),	data(1,0,0,0,0),
...,	...,
data(X,0,0,0,0),	data(B,0,0,0,0),
...,	...,
data(0,1,0,0,0),	data(0,1,0,0,0),
...,	...,
data(X,Y,0,0,0),	data(B,X,0,0,0),
...,	...,
data(0,0,1,0,0),	data(0,0,1,0,0),
...,	...,
data(X,Y,Z,0,0),	data(B,X,Y,0,0),
...,	...,
data(0,0,0,1,0),	data(0,0,0,1,0),
...,	...,
data(X,Y,Z,T,0),	data(B,X,Y,Z,0),
...,	...,
data(0,0,0,0,1),	data(0,0,0,0,1),
...,	...,
data(X,Y,Z,T,B)	data(B,X,Y,Z,T)

Page 467

Update the import_image error codes: add 15; delete 41, 43 and 61.

Page 470

Update the import_lut error codes: delete 22 and 42.

Page 472

Update the import_matrix error codes: delete 22 and 42.

Page 474

Update the import_neighbourhood_array error codes: add 16.

Page 476

Update the import_roi_array error codes: add 16.

Page 478

Update the import_static_array error codes: add 16.

Page 479

Delete remark 2.

Page 480

Update the import_tuple error codes: delete 22, 42 and 44.

Page 482

Update the import_value_bounds error codes: add 102; delete 22 and 42.

Page 485

Update the impulse_boxcar error codes: add 16, 22 and 42.

Page 489

Update the impulse_derivative_of_gaussian error codes: add 16, 22 and 42.

Page 493

Update the impulse_difference_of_gaussians error codes: add 16, 22 and 42.

Page 497

Update the impulse_elliptical error codes: add 16, 22 and 42.

Page 500

Update the impulse_gaussian error codes: add 16, 22 and 42.

Page 502

Update the impulse_laplacian_of_gaussian error codes: add 16, 22 and 42.

Page 505

Update the impulse_pyramid error codes: add 16, 22 and 42.

Page 508

Update the impulse_rectangular error codes: add 16, 22 and 42; delete 111 and 112.

Page 511

Update the impulse_sinc error codes: add 16, 22 and 42.

Page 514

Update the input_object error codes: add 11; delete 1, 14, 42, 44 and 62.

Page 528

Add the following remark.

4. If a non-image data object parameter has not been set prior to an inquiry, an indication of this state is returned to the application.

Page 529

In the Lookup table, replace "table size" with "table entries".

Page 530

In ROI elliptical, replace:

    ellipse dimension   EP

with:

    index manipulate 5-tuple   ID
    ellipse dimension code   EP
        2D
        3D
        4D
        5D

In ROI polygon, insert the following between the array entries and polarity code lines:

    index manipulate 5-tuple   ID

In ROI rectangular, insert the following between the end position 5-tuple and rectangle dimension code lines:

    index manipulate 5-tuple   ID

Page 546

Update the insert_pixel_plane and insert_pixel_plane_roi error codes: add 15, 16, 18, 23 and 45; delete 21, 41 and 43.

Page 549

Update the label_objects error codes: add 16 and 18.

Page 553

Update the laws_texture_features error codes: add 15, 16 and 18.

Page 556

Update the level_slice error codes: add 15 and 18.

Page 561

Update the line_profile error codes: add 15, 16, 22, 42 and 62; delete 24 and 44.

Page 565

Update the lookup error codes: add 15, 16, 18, 21, 23, 52 and 53; delete 42 and 43.

Page 569

Update the lookup_interpolated error codes: add 15, 16, 18, 21, 23, 52; delete 42 and 43.

Page 573

Update the luminance_generation error codes: add 15, 18 and 43.

Page 576

Update the markov_spectrum error codes: add 16, 22 and 42.

Page 578

Update the moments error codes: add 15.

Page 581

Update the monadic_arithmetic error codes: add 15, 18 and 43.

Page 585

Update the monadic_complex error codes: add 15, 18 and 45.

Page 590

Update the monadic-logical and monadic_logical_roi error codes: add 12, 14, 15, 16, 18, 19, 26, 42, 43 44 and 46; delete 11, 13, 25, 41 and 45.

Page 592

Add the following remarks:

    4. The pixel stacker neighbourhood lies totally within the J-K pixel plane.

    5. The first and last rows and columns of the destination image are set to FALSE.

Page 593

In the Morphic processor conceptual model, replace "Bit 1" with "MSB" and replace "Bit 9" with "LSB".

Update the morphic_processor and morphic_processor_roi error codes: add 15, 16, 18,19, 23, 24 and 26; delete 11, 13, 25, 41 and 43.

Page 600

Update the morphology and morphology_roi error codes: add 12, 14, 15, 16, 18, 19, 24 and 26; delete 11,13, 25, 41 and 43.

Page 609

Update the neighbour_count error codes: add 15,16 and 18.

Page 613

Update the noise_combination error codes: add 15 and 18.

Page 617

Update the open_close and open_close_roi error codes: add 15, 16, 18 and 19; delete 25, 41, 45 and 101.

Page 620

Update the open_piks error codes: add 62.

Page 622

Update the outlier_removal error codes: add 15, 16 and 18.

Page 624

Update the output_object error codes: add 11, 13, 15, 16 and 62; delete 25, 26 and 46.

Page 628

Update the paint_pixels error codes: add 15, 16 and 18.

Page 632

Update the perimeter_code_generator error codes: add 15; delete 12, 14, 24 and 44.

Page 636

Update the polar_to_cartesian error codes: add 15 and 45.

Page 638

Update the power_law_scaling error codes: add 15.

Page 640

Update the pseudocolour error codes: add 15, 16, 18 and 52; delete 28 and 172.

Page 644

Update the put_pixel and put_pixel_roi error codes: add 12 and 14; delete 11, 13 and 43.

Page 645

In Parameters, replace the jo and ko entries with:

jo	first index offset	SP	in
ko	second index offset	SP	in

Add the following remark section:

Remark:

If the array spatially extends over the J-K plane of the source image, the pixel values of the non-coincident region are not recorded in the source image.

Page 646

Update the put_pixel_array and put_pixel_array_roi error codes: delete 11, 12, 13, 14, 22, 42 and 43.

Page 647

Replace the Name section with:

put_pixel_record   put_pixel_record_roi

Page 648

Update the put_pixel_record and put_pixel_record_roi error codes: delete 11, 12, 13, 14, 22, 42 and 43.

Page 652

Update the rescale and rescale_roi error codes: add 15, 16, 22, 24 and 42; delete 1, 11 and 13.

Page 655

Update the resize and resize_roi error codes: add 15, 16, 22, 24 and 42; delete 11 and 13.

Page 661

Update the roi_coordinate error codes: add 2 and 16; delete 44.

Page 664

Add the following remark.

　　6. The *index_manipulate* tuple contains parameters of the CS data type.

Page 666

Update the roi_elliptical error codes: add 16, 22 and 42; delete 44.

Page 667

Replace remark 4 with:

　　4.　The *roi_size* tuple contains parameters of the ND data type.

Page 668

Add the following remark.

　　6. The *index_manipulate* tuple contains parameters of the CS data type.

Update the roi_polygon error codes: add 2 and 16; delete 44.

Page 670

In Nomenclature, make the following substitutions:

From:	To:
je > js	je $\geq$ js
ke > ks	ke $\geq$ ks
le > ls	le $\geq$ ls
me > ms	me $\geq$ ms
ne > ns	ne $\geq$ ns

Replace remark 3 as follows:

　　3. The *roi_size, start_position* and *end_position* tuples contain parameters of the ND data type.

18

Add the following remark.

5. The *index_manipulate* tuple contains parameters of the CS data type.

Page 672

Update the roi_rectangular error codes: add 16, 22 and 42; delete 44.

Page 674

In remark 2, add the following to the beginning of the sentence: "In the 2D case, 'rotation...'".

Page 675

In the definition:, switch signs before all SIN functions, i.e. -SIN instead of SIN and SIN instead of -SIN.

Page 676

Update the rotate and rotate_roi error codes: add 12, 14, 15 and 16; delete 25, 41 and 45.

Page 678

Update the rubber_band_scaling error codes: add 15 and 43.

Page 682

Update the sequence_average error codes: add 1 and 3; delete 21.

Page 685

Update the sequence_karhunen_loeve error codes: add 15, 16 and 18.

Page 690

Update the sequence_running_measures error codes: add 12, 15, 16 and 23; delete 21, 25 and 173.

Page 697

In the definition, replace the first sentence with:

This mechanism performs the following functions only for attributes that are NULL:

Update the set_image_attributes error codes: add 4, 5, 12, 14, 16, 22, 42 and 101.

Page 701

Update the set_index_assignment error codes: delete 12, 14, 24 and 44.

Page 708

Update the shape_metrics error codes: add 15; delete 12, 14, 24 and 44.

Page 712

Update the spatial_moments_invariant error codes: add 15; delete 12 14 24 and 44.