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Supporting Research

"AS-BUILT" DESIGN SPECIFICATION FOR SEGMENT MAP (SGMAP) PROGRAM

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Houston, Texas 77058
"AS-BUILT" DESIGN SPECIFICATION
FOR
SEGMENT MAP (SGMAP) PROGRAM
Job Order 71-308
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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
LYNDON B. JOHNSON SPACE CENTER
HOUSTON, TEXAS
June 1981

LEMSCO-15937

2. Government Accession No.

3. Recipient's Catalog No.

4. Title and Subtitle
   "As-Built" Design Specification for Segment Map (SGMAP) Program

5. Report Date June 1981

6. Performing Organization Code SG2

7. Author(s)
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   LEMSCO-15937

9. Performing Organization Name and Address
   Lockheed Engineering and Management Services Company, Inc.,
   Systems and Services Division
   Houston, Texas 77058

10. Work Unit No.

11. Contract or Grant No.
    NAS 9-15800

12. Sponsoring Agency Name and Address
    National Aeronautics and Space Administration
    Lyndon B. Johnson Space Center
    Houston, Texas 77058

13. Type of Report and Period Covered
    "As-Built"


15. Supplementary Notes

16. Abstract
   This document is the "As-Built" Design Specification for Segment Map (SGMAP) Program
   which is part of the CLASYFY package.

   This program is designed to output symbolic maps or numerical dumps from
   Cluster/Classification files or ground truth/processed ground truth files which are
   in 'Universal' format.

17. Key Words (Suggested by Author(s))
   Universal format
   Cluster file
   Classification file
   Ground Truth file
   Map
   Numerical Dump

18. Distribution Statement

19. Security Classif. (of this report) Unclassified

20. Security Classif. (of this page) Unclassified

21. No. of Pages 100

22. Price* Unavailable

*For sale by the National Technical Information Service, Springfield, Virginia 22161
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<td>------</td>
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<td>3-4</td>
</tr>
</tbody>
</table>
SGMAP PROGRAM

1.0 SCOPE

This document contains the description of the SGMAP Program. This program produces as output either a numeric dump or a symbolic map from an input Landsat Segment Cluster/Classification file or a digitized aircraft Ground Truth/Processed Ground Truth file.
2.0 APPLICABLE DOCUMENTS

The following documents form a part of this specification:

AD 63-2457-3308-01 Transferring Badhwar Software.

AD NAS 9-15200 Technical Memorandum Format Specifications for LACIE (Phase III) and Accuracy Assessment Computer Data Products.
3.0 SYSTEM DESCRIPTION

3.1 SYSTEM FLOWCHART

The system flowcharts for processing ground truth and cluster/classification data files are depicted in Figures 3.1.1 and 3.1.2, respectively.
Figure 3.1.1 System Flow for Ground/Processed Ground Truth Input Data File
Figure 3.1.2 System Flow for Cluster/Classification Input Data File
Figure 3.1.3 SGMAP Hierarchy
3.2 HARDWARE DESCRIPTION

The software for the SGMAP Program is operational on the IBM 3031 computer at Purdue.

3.3 SOFTWARE DESCRIPTION

This program produces numeric dumps or symbolic maps of two kinds of files: namely, (1) cluster or classification files and (2) ground truth files.

Cluster or classification files are single channel universal format image files produced by several different clustering and classification programs. They are "pixel level" files; i.e., they consist of 117 lines with 196 pixels per line. (See Section 3.4.1 for a complete file description).

Ground truth files are single channel universal format image files that are similar to the cluster or classification files except that they are at the sub-pixel level, i.e., they have six sub-pixels corresponding to each pixel on a cluster or classification file. They have 351 (3x117) lines with 392 (2x196) sub-pixels per line. (See Section 3.4.1 for a complete file description).

If a cluster or classification file is input, then the output numeric dump or symbolic map is necessarily at the pixel level also. However if the input is a ground truth file, then the output can be either sub-pixel level or pixel level. In the latter case the program combines the six sub-pixels that correspond to each pixel and determines the label for that pixel by majority rule. A numeric dump or symbolic map is then produced of this pixel data.

The valid range of sample values is 1-256.
3.4 FILE DESCRIPTION

3.4.1 INPUT DATA FILE

The two acceptable forms of input data are:

Cluster or Classification Files: These pixel level files are in universal format with one channel per physical record. There are 117 records, each having 360 8-bit bytes.

Ground Truth Files: These sub-pixel level files are in universal format with one channel per physical record. There are 351 records, each having 540 8-bit bytes. The contents of each byte have been biased with -128 and are stored in 8-bit two's-complement notation.
3.4.2 USER DEFINED FILE (SYMBOL FILE NAME) (SYMBOL FILE TYPE) A

For output maps, the symbol file defines a corresponding symbol for each of the 256 crop code values in the universal format input file. The user defines symbols for each crop code or crop code range; i.e., if only one crop code is mapped to a symbol, the beginning and ending of the range are the same. The usual procedure followed is that the user (1) defines all 256 codes to one symbol and (2) redefines any codes which merit unique symbols. The last entry in the file must be 0 0 0.

For output numeric dump the only entry is 0 0 N.

This file provides inputs in the given formats to the SGMAP program.

<table>
<thead>
<tr>
<th>Columns</th>
<th>1-5</th>
<th>6-10</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Format</td>
<td>I5</td>
<td>I5</td>
<td>A1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>start</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>end</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>symbol</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Purpose

- Defines the start and end of a range of sample values assigned to any one symbol (MAP only).
- Signifies the end of SYMBOL input for a MAP.
- Signifies the end of SYMBOL input for a NUMERIC DUMP.

The following is an example of a symbol file for an OUTPUT Numeric Dump.

0 0 N

The following is an example of a symbol file for an OUTPUT Map.

1 256 (blank)
1 1 *
40 40 C
127 127 B
50 50 W
0 0 0
3.4.3 USER DEFINED FILE (FILE NAME) CCA

This file is used to specify a number of parameters mainly related to output description. It is composed of card records which are input to the SGMAP routine.

The first six cards have a keyword beginning in column 1 followed by parameters in columns 11 through 72. Blanks are optional. The following description lists the keywords and describes the corresponding inputs.

<table>
<thead>
<tr>
<th>KEYWORD</th>
<th>ACCEPTABLE INPUTS</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYPE</td>
<td>GROUND TRUTH</td>
<td>This card defines the type of run. In the case where the output symbolic map is a classification or cluster map, the entry on this card is &quot;Class/Cluster&quot;. In the case where the output symbolic map is a ground truth map there are two possible entries; namely,(1) &quot;Ground Truth&quot; if pixel level output is desired and (2) &quot;Sub-Pixel&quot; if sub-pixel output is desired.</td>
</tr>
<tr>
<td></td>
<td>SUB-PIXEL</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CLASS/CLUSTER</td>
<td></td>
</tr>
<tr>
<td>OUTPUT</td>
<td>MAP</td>
<td>This card specifies whether the output will be a numeric dump or a symbolic map. The corresponding entries are &quot;Numeric&quot; and &quot;Map&quot;.</td>
</tr>
<tr>
<td></td>
<td>NUMERIC</td>
<td></td>
</tr>
<tr>
<td>RECSKP</td>
<td>Positive number</td>
<td>This card specifies a number of records to skip following the header record. Normally no skipping is required. However, some input files do require it. If missing, the default is 0.</td>
</tr>
<tr>
<td>DATE</td>
<td>Free form</td>
<td>This card gives the date (in free-form) for report identification.</td>
</tr>
<tr>
<td></td>
<td>Segment number</td>
<td>This card specifies the segment number for report identification.</td>
</tr>
<tr>
<td></td>
<td>Analyst's name</td>
<td>This card specifies the analyst's name for report identification.</td>
</tr>
<tr>
<td>*END</td>
<td>Ignored</td>
<td>This card identifies the end of the user defined cards.</td>
</tr>
</tbody>
</table>

Optional Input
Next there are one or more cards which specify the part of the image which is to be dumped or mapped. Each card specifies the PIXEL (never sub-pixel) coordinates of the upper left corner of the area to be dumped or mapped. The output always begins at this corner and produces a display that is 117 lines by 196 samples. If pixel level output has been specified, these lines and samples are pixels; if sub-pixel output has been specified, they are sub-pixels. When pixel level output is desired, the vertex 1,1 will cause all of the image to be output. However, when sub-pixel output is desired, six vertices are required to output the entire image. Of course, fewer vertices can be used if only part of the image is desired. The vertices (line, sample) are entered one to a card and may begin in any column 1 through 72. Leading, trailing and embedded blanks on these cards are ignored. The range of values permitted is 1 through 79 for lines and 1 through 99 for samples. A maximum of six vertex cards may be used.

A $END card is placed after the last vertex card.

All cards following the $END card are considered comments and are printed.

The following is an example of an user's CC file where the input data is in SUB-PIXEL structure. Maps giving complete coverage of all lines and samples are desired.

```
AI MARY ANN TOMPKINS
DATE DECEMBER 25, 1980
SEGMENT 1981
TYPE SUB-PIXEL
OUTPUT MAP
*END
1,1
40,1
79,1
1,99
40,99
79,99
$END
```
3.5 SOFTWARE DESCRIPTION

3.5.1 SGMAP PROGRAM

Purpose

SGMAP produces either a numeric dump or a symbolic map from an input Landsat Segment Cluster/Classification file or a digitized aircraft Ground Truth/Processed Ground Truth file.

Linkages

SGMAP calls CRD2IN, CPTIME, GTMAP, KUSKLA, and SPMAP.

Interface

Calling sequence:

N/A (A description for SGMAP EXEC which can be use to load and execute SGMAP is found in Section 4.0).

Calling sequence parameters:

<table>
<thead>
<tr>
<th>Argument</th>
<th>Input/Output</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

Function value:

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

Labeled COMMON parameters:

Full description of labeled COMMON blocks are contained in Appendix A.

<table>
<thead>
<tr>
<th>Label</th>
<th>Variable</th>
<th>Element Position</th>
<th>Input/Output</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAP</td>
<td>IXLBUF(3060)</td>
<td>1</td>
<td>0</td>
<td>Pixel/subpixel input buffer.</td>
</tr>
<tr>
<td></td>
<td>IXLINE(98)</td>
<td>2</td>
<td>0</td>
<td>Output transformed data line.</td>
</tr>
<tr>
<td></td>
<td>IXLTRN(256)</td>
<td>3</td>
<td>0</td>
<td>Transformations for a sample value.</td>
</tr>
</tbody>
</table>
Blank COMMON parameters:

Full description of blank COMMON is contained in Appendix A.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Element Position</th>
<th>Input/Output</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Inputs

<table>
<thead>
<tr>
<th>Unit</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>seq. data</td>
<td>Universal formatted ground truth, classification, or cluster file (See section 3.4.1).</td>
</tr>
<tr>
<td>13</td>
<td>seq. data</td>
<td>Symbolic mapping information (See section 3.4.2).</td>
</tr>
</tbody>
</table>

Outputs

<table>
<thead>
<tr>
<th>Unit</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Report</td>
<td>Printout of the user defined control cards.</td>
</tr>
<tr>
<td>14</td>
<td>Report</td>
<td>Symbolic map or numeric dump of input data.</td>
</tr>
</tbody>
</table>

Storage requirement

Not applicable.

Description

SGMAP, according to user specification and type of input data file, produces symbolic maps or dumps in pixel or subpixel form (See Appendix C).

Flowchart

Not applicable.

Listing

See Appendix B for program listing.
3.5.2 SOFTWARE COMPONENT NO. 1 (CRD2IN)

Purpose
Subroutine CRD2IN reads, decodes, and writes to a printer file the user supplied card control file.

Linkages
CRD2IN is called by SGMAP.
CRD2IN calls INTPAR and NUMB.

Interface
Calling sequence:
CALL CRD2IN (MTYPE, KOUT, NRECSK, LFTCRS, IERR).

Calling sequence parameters:

<table>
<thead>
<tr>
<th>Argument</th>
<th>Input/Output</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTYPE</td>
<td>0</td>
<td>Identifies the type of conversion of input structure to output structure.</td>
</tr>
<tr>
<td>KOUT</td>
<td>0</td>
<td>Identifies the format of output.</td>
</tr>
<tr>
<td>NRECSK</td>
<td>0</td>
<td>Number of records to skip.</td>
</tr>
<tr>
<td>LFTCRS(6)</td>
<td>0</td>
<td>Identifies the upper left corner of output.</td>
</tr>
<tr>
<td>IERR</td>
<td>0</td>
<td>Input error indicator flag.</td>
</tr>
</tbody>
</table>

Function value:
N/A.

Labeled COMMON parameters:
Full description of labeled COMMON blocks are contained in Appendix A.
None.

Blank COMMON parameters:
Full description of blank COMMON is contained in Appendix A.
None.
Inputs

<table>
<thead>
<tr>
<th>Unit</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>seq. data</td>
<td>Control card file (See Section 3.4.3).</td>
</tr>
</tbody>
</table>

Outputs

<table>
<thead>
<tr>
<th>Unit</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Printer</td>
<td>File contains copy of report summary of user defined cards.</td>
</tr>
<tr>
<td>30</td>
<td></td>
<td>Used as a reread file.</td>
</tr>
</tbody>
</table>

Storage requirement

Not applicable.

Description

CRD2IN reads the key word (first four bytes) on the Control Card and then outputs the card. If the key word is not recognized, an error message is printed and execution continues. If the key word is recognized, the appropriate action regarding the card's parameter is taken. The routine determines if all required cards are present and if the parameters are acceptable. If either test fails, an error flag is set.

Flowchart

Not applicable.

Listing

See Appendix B for routine listing.
3.5.3 SOFTWARE COMPONENT NO. 2 (NUMB)

Purpose
NUMB decodes character information into numerical information.

Linkages
NUMB is called by CRD2IN.

Interface
Calling sequence:
CALL NUMB (KCHAR, NUMBER, ICOL).

Calling sequence parameters:

<table>
<thead>
<tr>
<th>Argument</th>
<th>Input/Output</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>KCHAR(80)</td>
<td>I</td>
<td>Card image.</td>
</tr>
<tr>
<td>NUMBER</td>
<td>O</td>
<td>Decoded number.</td>
</tr>
<tr>
<td>ICOL</td>
<td>I</td>
<td>Column to start decode procedure</td>
</tr>
</tbody>
</table>

Function value:

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

Labeled COMMON parameters:
Full description of labeled COMMON blocks are contained in Appendix A.

<table>
<thead>
<tr>
<th>Label</th>
<th>Variable</th>
<th>Element Position</th>
<th>Input/Output</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Blank COMMON parameters:
Full description of blank COMMON is contained in Appendix A.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Element Position</th>
<th>Input/Output</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Inputs
None.

Outputs
None.

Storage requirement
Not applicable.

Description
Decodes a number on a user supplied control card starting with the first non-blank character in the control card parameter field (ICOL) and ending with the first non-blank, non-numeric character.

Flowchart
Not applicable.

Listing
See Appendix B for routine listing.
3.5.4 SOFTWARE COMPONENT NO. 3 (INTPAR)

Purpose
Read and decode user defined control cards consisting of a pair of numbers.

Linkages
INTPAR is called by CRD2IN.

Interface
Calling sequence:

CALL INTPAR (LFTCRS, IERR).

Calling sequence parameters:

<table>
<thead>
<tr>
<th>Argument</th>
<th>Input/Output</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LFTCRS(6)</td>
<td>0</td>
<td>Identifies upper left corner of output.</td>
</tr>
<tr>
<td>IERR</td>
<td>0</td>
<td>Identifies input error</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IERR = 0 OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IERR = 1 Error</td>
</tr>
</tbody>
</table>

Function value:
N/A

Labeled COMMON parameters:
Full description of labeled COMMON blocks are contained in Appendix A.
None.

Blank COMMON parameters:
Full description of blank COMMON is contained in Appendix A.
None.

Inputs

<table>
<thead>
<tr>
<th>Unit</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>Seq. data</td>
<td>Control c-rd file (See Section 3.4.3).</td>
</tr>
</tbody>
</table>
### Outputs

<table>
<thead>
<tr>
<th>Unit</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Printer</td>
<td>File contains copy of report summary of user defined control cards.</td>
</tr>
<tr>
<td>30</td>
<td></td>
<td>Used as a reread file.</td>
</tr>
</tbody>
</table>

#### Storage requirement

Not applicable.

#### Description

INTPAR reads and decodes number pairs, input one to a card, separated by a comma.

#### Flowchart

Not applicable.

#### Listing

See Appendix B for routine listing.
3.5.5 SOFTWARE COMPONENT NO. 4 (SPMAP)

Purpose

SPMAP reads input data in pixel structure and transforms the data into output form.

Linkages

SPMAP is called by SGMAP.

Interface

Calling sequence:

CALL SPMAP (PIXPRO, MOFFS, LINE, LNS).

Calling sequence parameters:

<table>
<thead>
<tr>
<th>Argument</th>
<th>Input/Output</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PIXPRO</td>
<td>0</td>
<td>Current number of pixels processed.</td>
</tr>
<tr>
<td>MOFFS</td>
<td>I</td>
<td>Output pixel offset.</td>
</tr>
<tr>
<td>LINE</td>
<td>I</td>
<td>Starting line of pass.</td>
</tr>
<tr>
<td>LNS</td>
<td>I</td>
<td>Current line.</td>
</tr>
</tbody>
</table>

Function value:

N/A.

Labeled COMMON parameters:

Full description of labeled COMMON blocks are contained in Appendix A.

<table>
<thead>
<tr>
<th>Label</th>
<th>Variable</th>
<th>Element Position</th>
<th>Input/Output</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>/MAP/</td>
<td>IXLBUF(3060)</td>
<td>1</td>
<td>0</td>
<td>Subpixel input buffer.</td>
</tr>
<tr>
<td></td>
<td>IXLTRN(256)</td>
<td>3</td>
<td>1</td>
<td>Transformations for a sample value.</td>
</tr>
<tr>
<td></td>
<td>IXLTRN(98)</td>
<td>2</td>
<td>0</td>
<td>Transformed data line.</td>
</tr>
</tbody>
</table>
Blank COMMON parameters:

Full description of blank COMMON is contained in Appendix A.

None.

Inputs

<table>
<thead>
<tr>
<th>Unit</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Seq. data</td>
<td>Universal formatted ground truth file (See Section 3.4.1).</td>
</tr>
</tbody>
</table>

Outputs

None.

Storage requirement

Not applicable.

Description

SPMAP reads one line of data into an internal buffer beginning with the first requested line. Each pixel is assigned an output symbol by using the pixel value to index into the pixel transformation buffer which contains a user defined symbol. This symbol is then stored into an output buffer for eventual output.

Flowchart

Not applicable.

Listing

See Appendix B for routine listing.
3.5.6 SOFTWARE COMPONENT NO. 5 (KUSKLA)

Purpose
KUSKLA reads input data in pixel structure and transforms the data into output form.

Linkages
KUSKLA is called by SGMAP.

Interface
Calling sequence:
CALL KUSKLA (MOFFS).

Calling sequence parameters:

<table>
<thead>
<tr>
<th>Argument</th>
<th>Input/Output</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOFFS</td>
<td>I</td>
<td>Output pixel offset.</td>
</tr>
</tbody>
</table>

Function value:
N/A.

Labeled COMMON parameters:
Full description of labeled COMMON blocks are contained in Appendix A.

<table>
<thead>
<tr>
<th>Label</th>
<th>Variable</th>
<th>Element Position</th>
<th>Input/Output</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>/MAP/</td>
<td>IXLBUF(3060)</td>
<td>1</td>
<td>0</td>
<td>Pixel input buffer.</td>
</tr>
<tr>
<td></td>
<td>IXLINE(98)</td>
<td>2</td>
<td>0</td>
<td>Transformed data line.</td>
</tr>
<tr>
<td></td>
<td>IXLTRN(256)</td>
<td>3</td>
<td>I</td>
<td>Transformations for a sample value.</td>
</tr>
</tbody>
</table>

Blank COMMON parameters:
Full description of blank COMMON is contained in Appendix A.
None.
**Inputs**

<table>
<thead>
<tr>
<th>Unit</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Seq. data</td>
<td>Universal formatted classification or cluster file (See Section 3.4.1).</td>
</tr>
</tbody>
</table>

**Outputs**

None.

**Storage requirement**

Not applicable.

**Description**

KUSKLA reads one line of data into an internal buffer, transforms each pixel into an output symbol, and stores the pixel into an output buffer for eventual output.

**Flowchart**

Not applicable.

**Listing**

See Appendix B for routine listing.
3.5.7 SOFTWARE COMPONENT NO. 6 (GTMAP)

Purpose

GTMAP reads input data in subpixel structure and converts the data to a pixel value.

Linkages

GTMAP is called by SGMAP.
GTMAP calls CROPP.

Interface

Calling sequence:

CALL GTMAP (PIXPRO, MCFFS).

Calling sequence parameters:

<table>
<thead>
<tr>
<th>Argument</th>
<th>Input/ Output</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PIXPRO</td>
<td>0</td>
<td>Current number of pixels processed.</td>
</tr>
<tr>
<td>MOFFS</td>
<td>I</td>
<td>Output pixel offset.</td>
</tr>
</tbody>
</table>

Function value:

None.

Labeled COMMON parameters:

Full description of labeled COMMON blocks are contained in Appendix A.

<table>
<thead>
<tr>
<th>Label</th>
<th>Variable</th>
<th>Element Position</th>
<th>Input/ Output</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>/MAP/</td>
<td>IXLBUF(3060)</td>
<td>1</td>
<td>0</td>
<td>Subpixel input buffer.</td>
</tr>
<tr>
<td></td>
<td>IXLWLINE(98)</td>
<td>2</td>
<td>0</td>
<td>Output transformed data line.</td>
</tr>
<tr>
<td></td>
<td>IXLTRN(256)</td>
<td>3</td>
<td>I</td>
<td>Transformations for a sample value.</td>
</tr>
<tr>
<td>/NSBIKL/</td>
<td>NSUBPX(6)</td>
<td>1</td>
<td>3-22</td>
<td>Subpixel that map to a pixel.</td>
</tr>
</tbody>
</table>
Blank COMMON parameters:

Full description of blank COMMON is contained in Appendix A.
N/A.

Inputs

<table>
<thead>
<tr>
<th>Unit</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Seq. data</td>
<td>Universal formatted ground truth file.</td>
</tr>
</tbody>
</table>

Outputs

None.

Storage requirement

Not applicable.

Description

GTMAP reads three lines of subpixel structure data into an internal buffer. The sub-pixels are divided into sub-pixel sets (2 sub-pixel across x 3 lines down) and CROPP is called to rule on a pixel value for the set. Each pixel is assigned an output symbol by using the pixel value to index into the pixel transformation buffer which contains a user defined symbol. This symbol is then stored into an output buffer for eventual output.

Flowchart

Not applicable.

Listing

See Appendix B for routine listing.
3.5.8 SOFTWARE COMPONENT NO. 7 (CROPP)

Purpose
CROPP accepts six subpixels as input and outputs a pixel value representative of the subpixels.

Linkages
CROPP is called by GRMAP.

Interface
Calling sequence:
CALL CROPP (KROP, IXLCNT).

Calling sequence parameters:

<table>
<thead>
<tr>
<th>Argument</th>
<th>Input/Output</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>KROP</td>
<td>0</td>
<td>Majority crop code.</td>
</tr>
<tr>
<td>IXLCNT</td>
<td>0</td>
<td>Count of number subpixels that match the majority code.</td>
</tr>
</tbody>
</table>

Function value:
N/A.

Labeled COMMON parameters:
Full description of labeled COMMON blocks are contained in Appendix A.

<table>
<thead>
<tr>
<th>Label</th>
<th>Variable</th>
<th>Element Position</th>
<th>Input/Output</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>/NSBIXL/</td>
<td>NSUBPX(6)</td>
<td>1</td>
<td>I</td>
<td>Subpixels that map to a pixel.</td>
</tr>
</tbody>
</table>

Blank COMMON parameters:
Full description of blank COMMON is contained in Appendix A.

None.
Inputs
None.

Outputs
None.

Storage requirement
Not applicable.

Description
The first sub-pixel value upon entry is considered to be the majority pixel (KROP) value. The NSUBPX array is traversed and the number of codes equal to KROP counted. This procedure continues until a count of each unique code is made. If at anytime a count becomes greater than the count of KROP this code becomes KROP's value.

Flowchart
Not applicable.

Listing
See Appendix B for routine listing.
4.0 OPERATION

4.1 OPERATING INSTRUCTIONS

SGMAP is operational on the IBM 3031 computer at LARS, West Lafayette, Indiana.

This program requires the use of a D disk which is assigned as a temporary disk. This disk will be assigned by the SGMAP EXEC; and the user, therefore, should not assign a disk to his machine using a MODE D.

Prior to invoking the SGMAP EXEC, the user must establish on his A disk a SYMBOL file as described in section 3.4.3 and a USER CONTROL file as described in section 3.4.4.

4.2 COMMANDS DESCRIPTION

To execute SGMAP, the user enters the following series of commands which invoke the JOB CONTROL SOFTWARE.

START

SGMAP......

END

The following sections describe each of these commands in detail. Input fields are separated by blanks. If more than one word is required to describe an input field, the description is enclosed in pointed brackets <>. If an input is optional the field is enclosed in square brackets []. Do not include these explanatory characters <> [] when actually submitting input to the computer. To enter a command, the user types one input per defined input field and separates each field with a blank.
4.2.1 START

The START command spools the user's console file. The use of this command alone with the END command will provide a listing of all information appearing on the user's console file. (If running an interactive job, this is the terminal; if running a batch job, this is a system defined device). The START command is invoked by the user typing the following:

START

4.2.2 SGMAP

The SGMAP command executes the program. The SGMAP has the following as forms and is invoked by typing one of the following, according to the users requirement.

\[
\text{SGMAP } <\text{SYMBOL FILE}> <\text{SYMBOL FILE}> <\text{CC FILE}> \text{ TAPE# FILE# [TAPE DENSITY]} \\
< \text{NAME} > < \text{TYPE} > < \text{NAME} >
\]

If the file is on disk -

\[
\text{SGMAP } <\text{SYMBOL FILE}> <\text{SYMBOL FILE}> <\text{CC FILE}> <\text{FILENAME}> <\text{FILETYPE} > <\text{FILEMODE}>
< \text{NAME} > < \text{TYPE} > < \text{NAME} >
\]

The output from the SGMAP program is spooled to the HOUSTON line printer. The output consists of a MAP and the USER IDENTIFICATION file.

4.2.3 END

This command closes the user's console file and causes a copy to be sent to the printer. This command has no effect if the START command was not previously issued. The END command is invoked by the user typing the following:

END
4.3 OPERATING EXAMPLE

For our example we will assume the following:

The user's symbol file is established as required on his A disk under the file description:

880 79082 A

The user's information file is established as required on his A disk under the filename of his choice and the required filetype (CC). (For our example we will use SYM880 CC A for our complete file description.)

The user has a 1600 BPI tape# 2645 which contains the file (17) he wishes to map.

<table>
<thead>
<tr>
<th>COMMAND</th>
<th>EXPLANATION OR ACTION TAKEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>START</td>
<td>Spools the console file.</td>
</tr>
</tbody>
</table>
| SGMAP 880 79082 SYM880 2645 17 | Executes the SGMAP PROGRAM  
The user's tape is 1600 BPI; therefore, the user inputs tape#, file#, exercising the option of using the defined default of 1600 BPI. |
| END              | Closes the user's console file and spools the file to the HOUSTON printer. |
APPENDIX A
COMMON BLOCKS
COMMON BLOCKS

COMMON/MAP/IXLBUF(3060), IXLINE(98), IXLTRN(256)
  IXLBUF          PIXEL/SUB-PIXEL INPUT BUFFER
  IXLINE        OUTPUT TRANSFORMED DATA
  IXLTRN    TRANSFORMATIONS FOR SAMPLE VALUE

COMMON/NSBIXL/NSUBPX(6)
  NSUBPX 6 GROUND TRUTH SUB-PIXELS THAT ARE ASSOCIATED WITH
           A CORRESPONDING LACIE PIXEL
<table>
<thead>
<tr>
<th>INTEGER MYTYPE</th>
<th>TYPE OF OUTPUT REQUESTED</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTEGER KOUT</td>
<td>KIND OF OUTPUT</td>
</tr>
<tr>
<td>INTEGER WRETS</td>
<td>NUMBER OF WRETS TO SKIP IN FILE</td>
</tr>
<tr>
<td>INTEGER LFTCHS(A,P)</td>
<td>UPPPER LEFT CORNER(S) OF OUTPUT</td>
</tr>
<tr>
<td>INTEGER ERR</td>
<td>ERROR FLAG</td>
</tr>
<tr>
<td></td>
<td>0 - NO ERROR(S)</td>
</tr>
<tr>
<td></td>
<td>1 - ERROR(S)</td>
</tr>
</tbody>
</table>

**HISTORY**

MARY TOMPINS LEMSCO 10/10/80 ORIGINAL CODE

**PURPOSE**

HEAD AND ANALYZE CARDS DESCRIBING THE FOLLOWING:

- **FILE** - DOCUMENTATION LIST OF INPUT FILES
- **TYPE** - INPUT: FIRST NON-BLANK CHARACTER AFTER COLUMN 10
- **ACCEPTABLE INPUTS**
  - 0 - GROUND TRUTH
  - S - SUBJECT
  - C - CLUSTER
- **OUTPUT** - INPUT: KIND OF OUTPUT
- **ACCEPTABLE INPUTS**
  - M - MAP
  - N - NUMERICAL DUMP
- **RECSKP** - INPUT: NUMBER OF RECORDS TO SKIP WITHIN FILE
- **DATE** - DOCUMENTATION: CURRENT DATE
- **SEGMENT** - DOCUMENTATION: SEGMENT NUMBER
- **AI** - DOCUMENTATION: ANALYST'S NAME
- **END** - SPECIFY THE END OF USER DEFINED RECORDS.

**EXTERNAL REFERENCES**

NUMB DECODE A NUMBER
INPAR DECODE INTEGER PAIR(S)

**EXCEPTION**

1. IF ANY OF THE FOLLOWING CARDS ARE MISSING OR DATA IS UNACCEPTABLE ISSUE A DIAGNOSTIC MESSAGE AND SET ERR = 1.

**LOCAL DECLARATIONS**

<table>
<thead>
<tr>
<th>INTEGER KARD</th>
<th>CARD READ WORD AT A TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTEGER KCHAR</td>
<td>CARD HEAD CHARACTER AT A TIME</td>
</tr>
<tr>
<td>INTEGER KOUT</td>
<td>COUNT OF NUMBERS RETURNED FROM FUNCTION NUMA</td>
</tr>
<tr>
<td>INTEGER NUMBER</td>
<td>DECODED NUMBER</td>
</tr>
<tr>
<td>INTEGER INFC</td>
<td>ALLOWABLE CARD TYPES</td>
</tr>
<tr>
<td>INTEGER KANDY</td>
<td>CARD TYPE</td>
</tr>
</tbody>
</table>
### FORTRAN CROSS REFERENCE LISTING

<table>
<thead>
<tr>
<th>Label</th>
<th>Defined References</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0040</td>
</tr>
<tr>
<td>B</td>
<td>0012</td>
</tr>
<tr>
<td>C</td>
<td>0014</td>
</tr>
<tr>
<td>D</td>
<td>0004</td>
</tr>
<tr>
<td>E</td>
<td>0026</td>
</tr>
<tr>
<td>F</td>
<td>0006</td>
</tr>
<tr>
<td>G</td>
<td>0024</td>
</tr>
<tr>
<td>H</td>
<td>0016</td>
</tr>
<tr>
<td>I</td>
<td>0042</td>
</tr>
</tbody>
</table>

### NAME TAG TYPE ADD. NAME TAG TYPE ADD. NAME TAG TYPE ADD. Name TAG TYPE ADD. Name TAG TYPE ADD.

<table>
<thead>
<tr>
<th>KHA</th>
<th>0018</th>
</tr>
</thead>
<tbody>
<tr>
<td>KOUT</td>
<td>0012</td>
</tr>
<tr>
<td>CME</td>
<td>0014</td>
</tr>
<tr>
<td>PFS</td>
<td>00010</td>
</tr>
</tbody>
</table>

### SOURCE STATEMENT LABELS

<table>
<thead>
<tr>
<th>Label</th>
<th>ISN</th>
<th>ADDR</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>17</td>
<td>0018</td>
</tr>
<tr>
<td>40</td>
<td>17</td>
<td>00058</td>
</tr>
<tr>
<td>60</td>
<td>17</td>
<td>00066</td>
</tr>
</tbody>
</table>

### COMPILER GENERATED LABELS

<table>
<thead>
<tr>
<th>Label</th>
<th>ISN</th>
<th>ADDR</th>
</tr>
</thead>
<tbody>
<tr>
<td>10004</td>
<td>2</td>
<td>00010</td>
</tr>
<tr>
<td>10008</td>
<td>2</td>
<td>00006</td>
</tr>
<tr>
<td>10010</td>
<td>2</td>
<td>00008</td>
</tr>
<tr>
<td>10011</td>
<td>2</td>
<td>00009</td>
</tr>
<tr>
<td>10012</td>
<td>2</td>
<td>0000A</td>
</tr>
<tr>
<td>10013</td>
<td>2</td>
<td>00014</td>
</tr>
<tr>
<td>10014</td>
<td>2</td>
<td>00016</td>
</tr>
<tr>
<td>10015</td>
<td>2</td>
<td>00018</td>
</tr>
<tr>
<td>10016</td>
<td>2</td>
<td>0001A</td>
</tr>
<tr>
<td>10017</td>
<td>2</td>
<td>0001C</td>
</tr>
<tr>
<td>10018</td>
<td>2</td>
<td>0001E</td>
</tr>
</tbody>
</table>

### FORMAT STATEMENT LABELS

<table>
<thead>
<tr>
<th>Label</th>
<th>ISN</th>
<th>ADDR</th>
</tr>
</thead>
<tbody>
<tr>
<td>900</td>
<td>12</td>
<td>0002A</td>
</tr>
<tr>
<td>1000</td>
<td>19</td>
<td>0000F</td>
</tr>
<tr>
<td>1004</td>
<td>19</td>
<td>0000D</td>
</tr>
<tr>
<td>1007</td>
<td>19</td>
<td>0000C</td>
</tr>
</tbody>
</table>

### OPTIONS

- OPTIONS IN FFECT*NAME(MAIN) OPTIMIZE(1) LINECOUNT(10) SIZE(MAX) AUTOTDL(NONE)
- OPTIONS IN .FFCT*SOURCE ERDICT NOLIST NODECK OBJECT MAP NFORMAT NOSTMT XREF ALC NOANSF NOTERM IHM FLAG(I)
- STATISTICS SOURCE STATEMENTS = 75, PROGRAM SIZE = 1980, SUBPROGRAM NAME = CRD2IN
- STATISTICS NO DIAGNOSTICS GENERATED

### END OF COMPILATION
*LEVEL 2.3.0 (JUNE 78)  05/300 FORTRAN I EXTENDED  DATE 01.140/12.32.42  PAGE 1

REQUESTED OPTIONS: NOKTEN

OPTIONS IN EFFECT: NAME (MAIN)  OPTIM (L1)  LINECOUNT (NO)  SIZE (MAX)  AUTOWR (NONE)
SOURCE EXC00C HOIST DOLLAR OBJECT MAP RTFORMAT NOOSSNT AME ALC NSANFS NOTHEM IGM FLAGE

ISN 0002

SUBROUTINE CHKCPKIOU,ILNCLNT

INTEGRK KOMP  CHOP CODE = MAJORITY KOLE ON FIRST IN
INTEGRK IALNCT  COUNT OF CODE USED AS CHOP CODE

HISTORY

CARL AKLENS  LEC
MANY TOMPINS  LEMSCO  11/21/60  ORIGINEAL CODE (PDP)
REDU (IBM)

PURPOSE

THIS ROUTINE IS CALLED TO MAKE THE MAJORITY KOLE DECISION
FOR THE 6 SUB-PINES.

EXTERNAL REFERENCES

NONE.

EXCEPTIONS

NONE.

LOCAL DECLARATIONS

INTEGRK KOUNT  COUNT OF CURRENT TYPE CHOP CODE

PROCEDURE

ISN 0003  C  COMMON/NSH!XL/NSHBP/ (6)
ISN 0004  C  IXCLNT = 0
ISN 0005  C  DO 20 I=1,6
ISN 0006  C  KOUT = 0
ISN 0007  C  IF(NSHBP(I).EQ.NSHEP(J))KOUNT = KOUNT + 1
ISN 0008  C  10 CONTINUE
ISN 0009  C  IF(KOUNT.EQ.IXCLNT) GO TO 20
ISN 0010  C  IXCLNT = KOUNT
ISN 0011  C  IF(NSHBP(I).EQ.NSHEP(I))IXCLNT = IXCLNT + 1
ISN 0012  C  20 CONTINUE
ISN 0013  C  IXCLNT = IXCLNT + 1
ISN 0014  C  IF((IXCLNT.EQ.IXCLNT))RETURR
ISN 0015  C  20 CONTINUE
ISN 0016  C  RETURN
ISN 0017  C  END

SYMBOL INTERNAL STATEMENT NUMBERS

# 0005  0008  0012
# 0007  0008  0017
# 0002  0003  0014
# 0006  0007  0013
# 0006  0008  0011  0015
# 0014  0008  0011  0015

****FORTRAN CROSS REFERENCE LISTING****

LABEL DEFINED REFERENCES
<table>
<thead>
<tr>
<th>ISN 0002</th>
<th>SUBROUTINE GETMAP (PIXEL4, MOSES)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>REAL PIAX4, PIXEL PROCEESSED</td>
</tr>
<tr>
<td></td>
<td>INTEGER MOSES, OUTPUT OFFSET</td>
</tr>
</tbody>
</table>

**HISTORY**

**CAVL A. LEFEBRE**

**NASH TOMKINS** [MSOCO 11/21/74] 

**ORIGINAL CODE (PDP)**

**REDO (IBM)**

**PURPOSE**

This routine processes pixel maps from universal tapes in 

**SIM-PIXEL (5X5 SIM-PIXELS X 30) LINES**. The crop 

**CODE** has output lines 12 M the top and bottom in value 

**on symbolic according to USP** specified options.

**EXTERNAL REFERENCES**

**CROPP** 

Evaluates sim-PIXEL crop codes for pixel code

**EXCEPTIONS**

**NONE**

**LOCAL DECLARATIONS**

**INTEGER LINDEX** 

Pointer to line end in buffer

**INTEGER IINDEX, PIXEL # ADJUSTMENT FACTOR (ADVANCE FOR** 

**EACH PIXEL OF PIXELS)**

**INTEGER IXLIN, PIXEL COUNT OF PIXEL**

**INTEGER IXT3** 

**INTEGER** 

**INTEGER** 

**INTEGER KAPL** 

**INTEGER NPIX** 

**INTEGER KAPSL** 

**SUBROUTINE (6)** 

**SIM-PIXELS TO OFFSET PIXEL**

**PROCEDURE**

**LOGICAL IXLHIF**

**COMMON/MAP(IXLHIF, 30), IXLINE,(98), XLINTN(256)**

**COMMON**

**COMMON**

**COMMON**

**READ 3 LINES INTO BUFFER**

**DO 20 L = 1, 1620, 540**

**LINDEX = L * 530**

**READ**

**DO 100 FORMAT(1X)**

**CONTINUE**

**IF IXLHIF = -470 + MOSES**

**LOOP FOR EACH PIXEL IN LINE**

**KAPSL** = 1

**PAGE 1**

**ORIGINAL PAGE IS OF POOR QUALITY**
OF POOR QUALITY
```fortran
*LEVEL 7.3A (JUNE 78) 05/36B FORTHAN M EXTENDED DATE 81.1399/13.25.09 PAGE 1

REQUESTED OPTIONS: NOTHER

OPTIONS IN EFFECT: NAME (MAIN) OPTIMIZE(1) LINECOUNTING MAX AUTODNL (NONE)
SOURCE ECNTRIC POLIST NOUNCK OBJECT MAP NOSTMT XREF ALC NOANSF NOTERM IBMFLAG(1)

ISN 0002

SUBROUTINE INPAR(LFTCRS,ERROR)

INTEGER LFTCRS(10,1CO)
INTEGER ERROR

LEFT CORNER(S) OF OUTPUT ERROR FLAG
0 - NO ERROR(S)
1 - ERROR(S)

HISTORY

MARY TOMPKINS LEMSCU 10/27/80 ORIGINAL CODE

PURPOSE

READ AND INTERPRET CARDS CONSISTING OF A PAIR OF NUMBERS SEPARATED
BY COMMAS.

EXTERNAL REFERENCES

NONE.

EXCEPTIONS

IF A NON-NUMERIC CHARACTER OTHER THAN A BLANK WHICH IS
IGNORED OR A COMMA WHICH IS USED AS A SEPARATOR IS
FOUND A MESSAGE IS ISSUED AND ERROR = 1.

LOCAL DECLARATIONS

INTEGER KARO CARD READ WORD AT A TIME
INTEGER KIRAO CARD READ CHARACTER AT A TIME
INTEGER TYPE TYPE OF OUTPUT REQUESTED
INTEGER KOUT KIND OF OUTPUT
INTEGER KUNIT POWER OF 10 UNIT
INTEGER KNUMER DIGIT VALUE OF CHARACTER
INTEGER INTIJ CHARACTER DIGITS

ISN 0003

DATA (blank/1/\,komma/*,*/(0)/SEND) /

ISN 0004

D) IS = 1 &
DO IF =0 &
CONTINUE 10 CONTINUE

ISN 0005

ZERO FILL LEFT CORNER ARRAY

ISN 0006

IF LFTCRS(1,J) = 0

READ CARD AND PLACE CARD IN READ BUFFER

ISN 0011

IF 30000ewart = 1
IF (9000000) (KARO(1),I = 1,20)

ISN 0017

1000 FORMAT(284)

ISN 0015

IF 10 (30,1000) (KARO(1),I = 1,20)
READ 30

ISN 0016

IF CARD IS NOT SEND ASSUME IT CONTAINS A PAIR OF NUMBERS

---
```
### FORTRAN CROSS REFERENCE LISTING

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<thead>
<tr>
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<th>TYPE</th>
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<td>IERH</td>
<td>SF</td>
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### SOURCE STATEMENT LABELS

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<td>009030B</td>
</tr>
<tr>
<td>10003</td>
<td>12</td>
<td>009030C</td>
</tr>
<tr>
<td>10004</td>
<td>21</td>
<td>009030D</td>
</tr>
<tr>
<td>10005</td>
<td>20</td>
<td>009030E</td>
</tr>
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<tr>
<td>1002</td>
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**OPTIONS IN EFFECT**
- FKEEP=NAME=MAIN
- OPTIMIZE=1
- LINECOUNT=0
- SIZE=MAX
- AUTOLOAD=NONE

**OPTIONS IN EFFECT**
- SOURCE=EHDCIC
- NOLIST
- NODECK
- NOOBJECT
- MAP
- NOFORMAT
- NOSYMNTXKHEF
- NOASCII
- NOTERM
- IBM

**STATISTICS**
- SOURCE STATEMENTS = 46
- PROGRAM SIZE = 131H
- SUPROGRAM NAME = INTPAR

---

*END OF COMILATION***
SUBROUTINE KUSKLAP(MOFFS)

INTEGER MOFFS
OUTPUT OFFSET

HISTORY

CARL KLERS LFC
MARY TOMPKINS LEMCO
11/21/80

ORIGINAL CODE (PDP)
REDO (IBM)

PURPOSE

REFERENCES

EXTERNAL REFERENCES

NONE.

EXCEPTIONS

NONE.

LOCAL DECLARATIONS

INTEGER KALRTY
INTEGER XLINE, PIXEL NUMBER

PROCEDURE

LOGICAL IXLHUF
COMMON/IAX,hbuf(3060),IAXLINE(98),IAXTRN(256)

READ ONE LINE OF SEGMENT

READ(1,1001)(IXLHUF(I), I=1,1360)

GET PIXEL TRANSFORMATION FOR OUTPUT

DO 100 KALRTY = 72 + MOFFS

100 CONTINUE

RETURN

END

**** FORTRAN CROSS REFERENCE LISTING (****

SYMBOL INTERNAL STATEMENT NUMBERS

MOFFS 0005 0005 0005 0000 0009 0010 0011
IXLHUF 0003 0004 0005 0010 0011
IXLINE 0004 0010 0011
IXLNUM 0009 0010 0011
IAXTRN 0004 0010
LEVEL 2.3 (JUNE 78)  
KUSKALA 05/360 FOWTHAN H EXTENDED  
DATE 11.139/13.25.73  
PAGE 2

**FORTRAN CROSS REFERENCE LISTING**

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<td>F</td>
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<tr>
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<td>C</td>
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<td>IXLNUM</td>
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<td>C</td>
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<td>000004</td>
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</tr>
</tbody>
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**COMMON INFORMATION**

NAME OF COMMON BLOCK | SIZE OF BLOCK | 00117C HEXADECIMAL BYTES
VAR NAME | TYPE | REL. ADDR | VAR. NAME | TYPE | REL. ADDR | VAR. NAME | TYPE | REL. ADDR | VAR. NAME | TYPE | REL. ADDR |
|------|-----|-----------|------|-----|-----------|------|-----|-----------|------|-----|-----------|
| IFLG | L*1 | 000000 | IXLNUM | L*4 | 000000 |}

**SOURCE STATEMENT LABELS**

<table>
<thead>
<tr>
<th>LABEL</th>
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**COMPILER GENERATED LABELS**

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**FORMAT STATEMENT LABELS**

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**LEVEL - FORTRAN H EXTENDED ERROR MESSAGES**

1FF5261 4(W) ISN 0011 THE EXPRESSION USES A LOGICAL VARIABLE WITH A RELATIONAL OPERATOR.

**OPTIONS IN EFFECT**

- NAME (MAIN) OPTIMIZE (1) LINECOUNT (NO) SIZE (MAX) AUTODRL (NONE)
- OPTIONS IN EFFECT: SOURCE ERGIC NOLIST NODECK OBJECT MAP NOFORMAT NOGOSTMT XREF ALC NOANSF NOTEHM IBM FLG (1)
- STATISTICS SOURCE STATEMENTS = 14; PROGRAM SIZE = 390; SUBPROGRAM NAME = KUSKLA
- STATISTICS 1 DIAGNOSTICS GENERATED; HIGHEST SEVERITY CODE IS 4

**END OF COMPIILATION**

292K BYTES OF CORE NOT USED
FUNCTION NUM(N,HB,NC,HICL)

INTEGRKHB CARD READ CHARACTER AT A TIME
INTEGRKHB CARD IN CARD TO START DECODE
HISTORY
MARY Tomkins LFMSCO 08/21/70 ORIGINAL CONF
PURPOSE
DECODA NUMBER STARTING WITH ICOL AND TERMINATING WITH THE
FIRST NON-NULL NON-NUMERIC CHARACTER.
EXTERNAL REFERENCES
NONE.
EXCEPTIONS
1. IF NO VALID NUMBER IS FOUND NUM = 0.
LOCAL DECLARATIONS
INTEGRKIN1(IN1) NUMERIC CHARACTERS
INTEGRKFIN1 UNIT OF 10 UNIT
INTEGRKNDIGIT NEW DIGIT

PERCENUSE

ISN 0003
ISN 0004
UNIT = 1
ISN 0005
ISS 0006
LOOP UNTIL CHARACTER IS NON-NUMERIC IGNORING BLANKS.

ISN 0007
ISS 0008
ISS 0010
ISS 0012
ISS 0013
ISS 0014
ISS 0016
ISS 0017
ISS 0018
ISS 0019
ISS 0020
ISS 0021
ISS 0022
00 200 I = ICON '72
00 200 .IF (KCHAR[I],E),.THANK, GO TO 200
00 200 .IF (KCHAR[I],LT,INT11),GO TO 400
00 200 .IF (KCHAR[I],LT,INT11),INT11,GO TO 400
00 200 NO 10 G =1,10
00 200 NO 10 G =1,10
00 200 NJMIN = INT11
00 200 INT11,GO TO 60
00 200 CONTINUE
00 200 NUMBER = NUMMER*UNIT + DIGIT
00 200 UNIT = 10
00 200 NUMBER = NUMBER
00 200 CONTINUE
00 200 CONTINUE
00 200 RETURN
END

SYMBOL INTERNAL STATEMENT NUMBER
I 0007 0008 0010 0012 0016
J 0017 0018 0019 0020 0021
ISN 0002

SUBROUTINE SNAP(PIXMAP,NORE,MAXLINES)

INTEGER PIXMAP,PIXELS,PROCESSOR
INTEGER NOORE,OUTPUT,OFSSET
INTEGER ILINES,STARTING_LINE
INTEGER EARLY

HISTORY

CALG SKL
Mury TonKINS LEFACCO 11/21/80
ORIGINAL CODE (POP)
REDO (IBM)

PURPOSE

THIS ROUTINE PROCESSES SUB-PIXEL MAPS FROM UNIVERAL TAPES
TO SUB-PIXEL FORMS (123456, SUB-PIXEL,S-12) LINES, THE CROP
MAY HAVEBeen H1AD IF -176 AND ALL OTHER NUMERICS IN VALUE
OR SYMBOLIC, ACCORDING TO USER SPECIFIED OPTIONS.

EXTERNAL REFERENCES

NONE.

EXCEPTIONS

NONE.

LOCAL DECLARATIONS

INTEGER ILIN
LINE REFERNS TO (123456) LINES
INTEGER ILAYT CALIBRATION INFORMATION + OFFSET
INTEGER ILMN CURRENT PIXEL NUMBER
INTEGER KHGD CROP CODE
INTEGER KPDV CURRENT ON LAST VALID CROP CODE

PROCEDURE

ISN 0003

LOGICAL-ILHUF,
COMMON/IXILHUF(3060),ILHUF(3060),ILTRN(256)

STARTING LINE IS NOT 1 SO FIND IT
IFILINS.NF1,I2INLINE,EO,1) GO TO 100
IILN = ILINE - 1
IBM 11 I = 1 ILIN
IFILINS(11)EO,1) GO TO 100
100 FORMAT(13180A1)

ISN 0011
CONTINUE

ISN 0012

POSITIONED AT REQUESTED LINE
100 READ(1,1000)(ILHUF(I),I = 1,3540)

SET PIXEL TRANSFORMATION FOR OUTPUT (TAPE WAS WRITTEN FOR POP
WHICH USES THE EIGHTH BIT AS A SIGN BIT REQUIRING AN ADJUSTMENT
FILE: SNGAP DATE 4 1974/75 PRIOR UNIVERSITY

CONTROL OFF

SNGAP FILE

HISTORY

MARY TOMPKINS TXHCO 11/24/74 ORIGINAL CODE

METHOD

THIS FEE IS USED TO EXECUTE THE SNGAP PROGRAM. THE ACCEPTABLE
ARGUMENTS TO THE EXECUTA:

ARGUMENT  DATA ON DISK  DATA ON TAPE
1. SYMBOL FILE NAME  SYMBOL FILE NAME
2. SYMBOL FILE TYPE  SYMBOL FILE TYPE
3. CC FILE NAME  CC FILE NAME
4. INITIAL DATA FILENAME  TAPE NUMBER
5. DATA FILE TYPE  FILE # ON TAPE
6. DATA FILE NAME  TAPE DECK (OPTIONAL)

BOTH CC FILE AND SYMBOL FILE ARE REQUIRED TO BE ON THE USERS A DISK.

EXCEPTIONS

ERROR MESSAGES FOLLOWED BY PROGRAM TERMINATION ARE FOR
THE FOLLOWING REASONS:
1. NO TEMP OR DISK AVAILABLE.
2. INCORRECT FILENAME OR TYPE.
3. INCORRECT TAPE NAME.
4. INSUFFICIENT TAPE MOUNT.
5. UNEXPECTED INPUT.

PROCEDURE

TAG OFF PRINTED LISTS
SNGAP PARSE FOR STRING ORNAMENT TO BSEC
GLOBAL TXHCO TXHCO TXHCO TXHCO
CP QUERY VIRTUAL 192
LIF ARETC?O NE 0 GET DISK TEMP 2H CLEAR
CP QUERY VIRTUAL 192
LIF ARETC?O NE 0 ATYPE NO TEMP DISK AVAILABLE.
LIF ARETC?O NE 0 EXIT 1
ASPACE 0
LTYPE SYMBOL FILE: 01 02 03
LTYPE CC FILE: 04 05 06
LTYPE INPUT DATA: 07 08 09 10
EXIT = 1500

CHECK FOR ACCEPTABLE PARAMETER COUNT.
LIF @INDEX 0 1500 -TAPE
LIF @INDEX 0 1500 -CONT
LTYPE TOO MANY - TOO FEW INPUTS
EXIT 2

-CONT LIF @A FO 1000 XGOTO -TAPE
LIF @A FO 1500 XGOTO -CONT
LTYPE EXIT 2
LIF LTEST FO CHKX AUTO -DISC
LTYPE @A NOT THE INPUT EXPECTED,
EXIT 3

DATA IS ON TAPE - TEST LIF TAPE 'NAME' IS NUMERIC
- TAPE ATEST = ATYPE @A
LIF LTEST FO NUM @AONP 2
LTYPE ILLEGAL TAPE MOUNT @A

PAGE 001
APPENDIX D
SAMPLE OUTPUT
ORIGINAL PAGE IS OF POOR QUALITY