Subject: Re: How to read two-bytes variables from a file saved in Mac?
Posted by Craig Markwardt on Mon, 16 Apr 2001 18:58:00 GMT
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"Xiong Hu" <xhu@conrad.ece.uiuc.edu> writes:

> Hi! Does somebody know how to read the two-bytes variables from a file saved
> in Macintosh?
>
> I am trying reading the image data in PC platform. The image data saved in
> IPlab in Mac. And I found out the difference of the way the data be saved in
> between PC and Mac. For example, a two- bytes integer will be saved like:
> 0[low byte]1[high byte] in PC platform. But in Mac, it will be saved like:
> 1[high byte]0[low byte].
>
> So in PC when I try to read a file saved in Mac, I need to read byte by byte
> and do transform in the right way to get the right value of each pixel. But
> I think it is not a good way. I wonder if there are any "keywords" or
> "command" can help me solve this problem directly and efficiently.

You are dealing with an issue called "endianness," which refers to how
a particular CPU stores multi-byte values.

You should investigate the SWAP_* keywords to OPEN, one of them should
be able to help you. If you need to selectively swap data (ie some
values are byte-swapped and others are not), then you can investigate
the BYTEORDER function, which is used after reading the data.

Craig

--
-- --------------
Craig B. Markwardt, Ph.D. EMAIL: craigmnet@cow.physics.wisc.edu
Astrophysics, IDL, Finance, Derivatives | Remove "net" for better response
-- --------------

Subject: Re: How to read two-bytes variables from a file saved in Mac?
Posted by btt on Tue, 24 Apr 2001 13:25:53 GMT
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Hello,

We use IPLAB to collect images, but we are migrating toward IDL for
analysis. I have written three routines (QUERY_IPLAB, READ_IPLAB and
WRITE_IPLAB, see attached) that work using IDL for MAC. I have a vague
memory of these working on UNIX, also. I am quite interested in making
these routines platform independent and would like to know if Craig's

suggestion solved the problem for you.

Ben

Craig Markwardt wrote:
>
> "Xiong Hu" <xhu@conrad.ece.uiuc.edu> writes:
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> Craig
>
> --
> -- --------------
> Craig B. Markwardt, Ph.D. EMAIL: craigmnet@cow.physics.wisc.edu
> Astrophysics, IDL, Finance, Derivatives | Remove "net" for better response
> -- --------------

--
Ben Tupper
Bigelow Laboratory for Ocean Sciences
180 McKown Point Rd.
W. Boothbay Harbor, ME 04575
btupper@bigelow.org
;+
; NAME:
; QUERY_IPLAB
;

```
; PURPOSE:
;   The purpose of this function is to check the format of a IPLAB image file before trying to
;  read it.  The header of the file can optionally be returned.  If the file is a IPLab image format
;   3.1 or greater and in data format then a 1 is returned, otherwise a 0 is returned.
;
; CALLING SEQUENCE:
;  result = QUERY_IPLAB([File])
;
;  ARGUMENTS:
;  File    A scalar string containing the name of the file to query. If not provided, a
;      dialog_pickfile prompt permits the user to select one automatically.
;
; KEYWORDS:
;  HDR   Set this keyword equal to a named variable to return the header structure
;   which contains information about the file.
;  GROUP  Set this keyword equal to the group leader for the widget dialog.  This
;   value is only neccessary if the routine is used in a widget application and the
;   file name is not specified.
;
; EXAMPLE:
;  To interactively locate the file to query and return the file header...
;   GoodFlag = QUERY_IPLAB(HDR = HDR)
;
; COMMENTS:
;  Here's an example of the HDR structure
;  IDL> help, hdr,/str
;** Structure <d183d00>, 13 tags, length=2128, refs=1:
;   VERSION         STRING    '3.1a'
;   IPLABFORMAT     BYTE         0
;   DATATYPE        BYTE         0
;   WIDTH           LONG             640
;   HEIGHT          LONG             480
;   RESERVED1       BYTE         0
;   OVERLAYINFILE   BYTE         0
;   RESERVED2       LONG         16842753
;   NFRAMES         INT              5
;   RESERVED3       BYTE      Array[25]
;   NREGMARKS       BYTE         0
;   RESERVED4       BYTE      Array[24]
;   CLUT            BYTE      Array[2048]
;
; REFERENCE:
;  For more information on the IPLAB format see...
;  'IPLAB Spectrum: Scientific Imaging Software for the Macintosh, User's Guide'
;  Signal Analytics Corporation,  1996.
;
; MODIFICATION HISTORY:
;   Written by Ben Tupper, 27JULY2000
```

```
;   Bigelow Laboratory For Ocean Science
;   tupper@bigelow.org
;
; 2AUG2000 Improved file type checking by examining the Version input by byte elements
;-

FUNCTION  query_iplab, File, HDR = HDR, Group = Group

On_Error, 2

   ;if there is an IO error, make sure to return, 0
On_IOError, Trouble

 ;if the file is undefined, then prompt with a dialog
If N_elements(File) EQ 0 Then Begin
   File = Dialog_PickFile(Group = Group)
   If File[0] EQ ''  Then Return,0
EndIf

   ;open the file
Openr,u,File[0],/get_lun, /Binary

  ;check if this is the proper format
Version  = '    '
Format = 0B

ReadU,U, Version

VersionTest = Byte(Version)
If N_elements(VersionTest) LT 3 Then Begin
  If (FSTAT(U)).Open Then Free_LUN, U
 Return, 0
EndIf

If Float(VersionTest[0]) LT 3 Then Begin
 If (FSTAT(U)).Open Then Free_LUN, U
 Return,0
EndIf


ReadU,U, Format
If Format[0] NE 0B Then Begin
 If (FSTAT(U)).Open Then Free_LUN, U
  Return, 0
EndIf

  ;back up the pointer
Point_LUN,U, 0
```

```
  ;prep the header structure
Hdr = { Version:'    ',$
 IPLabFormat:0B,$
 DataType:0B,$
 Width:1L,$
 Height:1L,$
 Reserved1:0B,$
 OverlayInFile:0B,$
 Reserved2: BytArr(4),$
 nFrames :1,$
 Reserved3: Bytarr(25),$
 nRegMarks:1B,$
 Reserved4: Bytarr(24),$
 CLUT:Bytarr(2048)}

;read the header
ReadU,u,Hdr
FREE_LUN, U

Return, 1

TROUBLE:
 OK = Error_Message(/TraceBack)
If (FSTAT(U)).Open Then Free_LUN, U
 Return, 0


END


;+
; NAME:
;  Read_IPLAB
;
; PURPOSE:
;  This function returns an IPLAB format image. Overlays and
;    registration marks cannot be read.  Overlays are in PICT2
;    vector format.   See Reference  below.
;
; CALLING SEQUENCE:
;  Result = READ_IPLAB(file)
;
; ARGUMENTS:
;  File   Set this argument equal to the full file/path for the
;    IPLAB format image.
;    If not provided, the user is prompted by Dialog_PickFile
;    If the user cancels, then -1 is returned.
```

```
;
; KEYWORDS:
;   HDR  Set this keyword equal to a named variable to return
;      the file header structure which describes the file contents.
;      Below is a sample of a header structure showing the field values.
;      Note that even though there is an OVERLAYINFILE it is not read.
;
;  VERSION         STRING    '3.1a'
; IPLABFORMAT     BYTE         0
; DATATYPE        BYTE         0
; WIDTH           LONG             640
; HEIGHT          LONG             480
; RESERVED1       BYTE         0
; OVERLAYINFILE   BYTE         1
; RESERVED2       LONG         16842753
; NFRAMES         INT              5
; RESERVED3       BYTE      Array[25]
; NREGMARKS       BYTE         0
; RESERVED4       BYTE      Array[24]
; CLUT            BYTE      Array[2048]
;
; ALPHA  Set this keyword to return a 32 bit image with the
; first image plane [0] equal to the alpha channel.
;
; REFERENCE:
;   IPLAB Spectrum,  Scientific Imaging Software for the MacIntosh.
;   Signal Analytics Corporation, 1996, User's Guide, v 3.1 , rev. 5.8.
;
; REQUIREMENTS:
;  QUERY_IPLAB is called.
;
; MODIFICATION HISTORY:
;  Written by Ben Tuppper, Fall, 1999
;   Bigelow Lab for Ocean Sciences
;   tupper@seadas.bigelow.org
;   pemaquidriver@tidewater.net
;
;  Added Documentation and cleaned up.  29JUNE2000 BT
;  Changed BytesPerPixel to 1L for a Integer Image
;  Added call to QUERY_IPLAB. 27JULY2000 BT
;-

Function Read_IPLab, File , $
 Alpha = Alpha, Hdr = Hdr, Group = group

 ;make sure that the type conforms to IPLAB image data, get the header
Flag = QUERY_IPLAB(File, HDR = HDR, Group = Group)
```

```
If Flag LT 1 Then Return, -1

    ;prep the image aray
Case Hdr.DataType of
 0:  Begin
      BytesPerPixel = 1L ;byte
      Type = 1
  END

 1:  BEGIN
  BytesPerPixel = 1L ;int
  Type = 2
  END

 2:  BEGIN
  BytesPerPixel = 4L ;long
  Type = 3
  END

 3: BEGIN
  BytesPerPixel = 4L ;Float
  Type = 4
  END

 4: BEGIN
  BytesPerPixel = 2L ;16 bit
  Type = 1
  END

 5: BEGIN
  BytesPerPixel = 4L ;24 bit
  Type = 1
  END

 6: BEGIN
  BytesPerPixel = 2L ; 16 bit unsigned
  Type = 1
  END

EndCase

Image= Make_Array( Hdr.Width* Hdr.Height*BytesPerPixel*Hdr.nFrames,Type = Type)

   ;open the file
OpenR,U,File,/get_lun, /Binary

 ;advance the file pointer past the header info
Point_LUN, U, 2120
```

```
   ;read the image
ReadU,u, Image

   ; clean the image formatting
If Hdr.nFrames EQ 1 Then Begin

 Case 1 of
  BytesPerPixel EQ 1 : Image = Reform(Image,Hdr.Width,Hdr.Height)
  BytesPerPixel GT 1 : Image = Reform(Image, BytesPerPixel,Hdr.Width,Hdr.Height)
 EndCase

EndIf Else Image = Reform(Image,  Hdr.Width, Hdr.Height,Hdr.nFrames)

   ;check for alpha
If Not(KeyWord_Set(Alpha)) Then $
  If BytesPerPixel GT 1 Then Image = Image[1:3,*,*]

Free_LUN,u

Return, Image
End

;+
; NAME:
; WRITE_IPLAB
;
; PURPOSE:
; This procedure saves an image and header in the IPLAB image format.
; See reference for details.
;
; CALLING SEQUENCE:
; WRITE_IPLAB, Image, Hdr, File
;
; CATEGORY:
; IPLAB
;
; ARGUMENTS:
; IMAGE  The image data.
; HDR The header structure associated with the image.  (See reference and READ_IPLAB and
;  QUERY_IPLAB routines.)
; FILE  The fully qualified filename for the image.  If the file already exists, the original
;  is overwritten without warning.
;
; KEYWORDS:
; None
;
; MODIFICATION HISTORY:
```

```
; Written by Ben Tupper, Summer 2000.
; Bigelow Laboratory for Ocean Science
; btupper@bigelow.org
;-


PRO WRITE_IPLAB, Image, HDR, File

On_Error, 2

On_IOerror, trouble

If N_elements(File) EQ 0 Then Begin
 Message, 'File name must be present'
 Return
EndIf

If N_elements(HDR) EQ 0 OR Size(HDR, /TName) NE 'STRUCT' Then Begin
 Message, 'HDR must be a structure.'
 Return
EndIf

If N_elements(Image) EQ 0 Then Begin
 Message, 'Image must be present'
 Return
EndIf

OpenW, U, File, /Binary, /NoAutoMode , /Get_LUN

WRITEU, U, HDR.Version  ;version
WRITEU, U, HDR.IPLABFORMAT      ;File Format  0 for Data
WRITEU, U, HDR.DataType  ;dat type
WRITEU, U, HDR.WIDTH
WRITEU, U, HDR.HEIGHT
WRITEU, U, HDR.Reserved1   ;reserved
WRITEU, U, HDR.OVERLAYINFILE
WRITEU, U, HDR.Reserved2    ;reserved
WRITEU, U, HDR.NFRAMES
WRITEU, U, HDR.Reserved3    ;reserved
WRITEU, U, HDR.NRegMarks
WRITEU, U, HDR.RESERVED4
WRITEU, U, HDR.CLUT

WRITEU, U, IMAGE

TROUBLE:

FREE_LUN, U
```

END

File Attachments

1) query_iplab.pro, downloaded 79 times
2) read_iplab.pro, downloaded 85 times
3) write_iplab.pro, downloaded 110 times