Subject: repeated use of TVRD() gives different results
Posted by wlandsman on Tue, 11 Oct 2016 18:44:44 GMT
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This is the sort of IDL quirk that I think drove David Fanning into retirement.

The following two lines repeatedly TVRD() the value of a screen pixel

```
IDL> window,0,xsize  = 640,ysize=512     ;Create a window
IDL> for i=0,19 do print,tvrd(635,507,1,1,/true)   ;Read one pixel
```

On my El Capitan Macbook running IDL V8.5.1 in decomposed mode, I get

```
  0   0   0
  0   0   0
  0   0   0
  0   0   0
  0   0   0
  0   0   0
  0   0   0
 112  97  46
  0   0   8
  8   0   0
  0   0  14
  0   0   0
  0   0   0
  0   0   0
  0   0   0
 113 120  46
  46 120 113
 114 112  47
  0   0  14
  0   0  14
```

In other words, repeatedly reading the same pixel does not give the same results. (This does *not* happen on my Linux box but only on the Mac.) Coyote graphics reads a corner pixel to decide whether you are using a "traditional" IDL plot (black background), or modern graphics (white background). But after the first call, this test can randomly fail because the result of TVRD() is unpredictable.

(I am mostly weened off of direct graphics, but still need to maintain legacy code.) --Wayne

Current graphics device: X
Server: X11.0, The X.Org Foundation, Release 11704000
Display Depth, Size: 24 bits, (1440,878)
Visual Class: TrueColor (4)
Bits Per RGB: 8 (8/8/8)
Physical Color Map Entries (Emulated / Actual): 256 / 256

Colormap: Shared, 16777216 colors. Translation table: Bypassed
Graphics pixels: Decomposed, Dither Method: Ordered
Write Mask: 16777215 (decimal) ffffff (hex)
Graphics Function: 3 (copy)
Current Font: <default>, Current TrueType Font: <default>
Default Backing Store: Req from Server.
Window Status: ----------
id typ(x, y, backing store) id typ(x, y, backing store)
0: Win(640, 512, Req from Server)

```
IDL> !VERSION
{
   "ARCH": "x86_64",
   "OS": "darwin",
   "OS_FAMILY": "unix",
   "OS_NAME": "Mac OS X",
   "RELEASE": "8.5.1",
   "BUILD_DATE": "Nov 14 2015",
   "MEMORY_BITS": 64,
   "FILE_OFFSET_BITS": 64
```

Subject: Re: repeated use of TVRD() gives different results
Posted by Burch on Tue, 11 Oct 2016 19:55:28 GMT

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Hmmm, it seems to depend on the type of backing store. On my El Capitan Mac Pro it works fine when set to Pixmap but fails for the others. It will take someone more knowledgeable than me to explain why. Just out of curiosity, is the default backing store different between your Linux and Mac? Or does it work correctly regardless of the backing store setting on the Linux computer?

'IDL_GR_X_RETAIN' set to 0 (None):

```
IDL> window,0,xsize  = 640,ysize=512
IDL> for i=0,19 do print,tvrd(635,507,1,1,/true)
  0   0   0
  0   0  32
 110 117  97
 110 117  97
 110 117  97
  0   0   2
  0   0   0
  0   0  32
  0   0   0
  0   0   0
  0   0   0
 120 113  81
  0   0   0
  0  48  58
```

```
   0   0   0
   0   0  32
   0   0   0
   0   0   0
   0   0  32
   0   0   0
IDL> help, /device
Available Graphics Devices: CGM HP LJ NULL PCL PRINTER PS REGIS TEK X Z
Current graphics device: X
    Server: X11.0, The X.Org Foundation, Release 11604000
    Display Depth, Size: 24 bits, (1920,1080)
    Visual Class: TrueColor (4)
    Bits Per RGB: 8 (8/8/8)
    Physical Color Map Entries (Emulated / Actual): 256 / 256
    Colormap: Shared, 16777216 colors.  Translation table: Bypassed
    Graphics pixels: Decomposed, Dither Method: Ordered
    Write Mask: 16777215 (decimal) ffffff (hex)
    Graphics Function: 3 (copy)
    Current Font: <default>, Current TrueType Font: <default>
    Default Backing Store: None.
    Window Status: ----------------------
    id  typ(    x,  y,   backing store)    id  typ(   x,   y,   backing store)
     0: Win( 640, 512,            None)


'IDL_GR_X_RETAIN' set to 1 (Server, System):
IDL> window,0,xsize  = 640,ysize=512
IDL> for i=0,19 do print,tvrd(635,507,1,1,/true)
   0   0   0
   0   0   0
   0   0   0
   0   0   0
   0   0   0
   0   0   0
   0   0   0
   0   0   0
   0   0   0
 110 117  97
   0   0   0
   0   0   0
   0   0  32
   0   0   0
 110 117  97
   0   0   0
   0   0   0
   0   0  32
   0   0  32
   0   0  32
```

```
IDL> help, /device
Available Graphics Devices: CGM HP LJ NULL PCL PRINTER PS REGIS TEK X Z
Current graphics device: X
   Server: X11.0, The X.Org Foundation, Release 11604000
   Display Depth, Size: 24 bits, (1920,1080)
   Visual Class: TrueColor (4)
   Bits Per RGB: 8 (8/8/8)
   Physical Color Map Entries (Emulated / Actual): 256 / 256
   Colormap: Shared, 16777216 colors.  Translation table: Bypassed
   Graphics pixels: Decomposed, Dither Method: Ordered
   Write Mask: 16777215 (decimal) ffffff (hex)
   Graphics Function: 3 (copy)
   Current Font: <default>, Current TrueType Font: <default>
   Default Backing Store: Req from Server.
   Window Status: ----------------------
   id  typ(   x,  y,   backing store)   id  typ(   x,   y,   backing store)
    0: Win( 640, 512, Req from Server)


'IDL_GR_X_RETAIN' set to 2 (Pixmap):
IDL> window,0,xsize  = 640,ysize=512
IDL> for i=0,19 do print,tvrd(635,507,1,1,/true)
  0   0   0
  0   0   0
  0   0   0
  0   0   0
  0   0   0
  0   0   0
  0   0   0
  0   0   0
  0   0   0
  0   0   0
  0   0   0
  0   0   0
  0   0   0
  0   0   0
  0   0   0
  0   0   0
  0   0   0
  0   0   0
  0   0   0
  0   0   0
IDL> help, /device
Available Graphics Devices: CGM HP LJ NULL PCL PRINTER PS REGIS TEK X Z
Current graphics device: X
   Server: X11.0, The X.Org Foundation, Release 11604000
   Display Depth, Size: 24 bits, (1920,1080)
   Visual Class: TrueColor (4)
```

```
   Bits Per RGB: 8 (8/8/8)
   Physical Color Map Entries (Emulated / Actual): 256 / 256
   Colormap: Shared, 16777216 colors.  Translation table: Bypassed
   Graphics pixels: Decomposed, Dither Method: Ordered
   Write Mask: 16777215 (decimal) ffffff (hex)
   Graphics Function: 3 (copy)
   Current Font: <default>, Current TrueType Font: <default>
   Default Backing Store: Pixmap.
   Window Status: ----------
   id  typ(   x,  y,   backing store)   id  typ(   x,   y,   backing store)
    0: Win( 640, 512,          Pixmap)
IDL> !version
{
   "ARCH": "x86_64",
   "OS": "darwin",
   "OS_FAMILY": "unix",
   "OS_NAME": "Mac OS X",
   "RELEASE": "8.5",
   "BUILD_DATE": "Jul  7 2015",
   "MEMORY_BITS": 64,
   "FILE_OFFSET_BITS": 64
}

-Jeff
```

Subject: Re: repeated use of TVRD() gives different results
Posted by wlandsman on Wed, 12 Oct 2016 03:29:20 GMT
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Nice catch! Yes, TVRD() works consistently on both my Mac and my Linux box when I have set pixmap backing store (either IDL_GR_X_RETAIN = 2 or device,retain = 2). And TVRD() does not work consistently when RETAIN = 0 or RETAIN = 1. Thanks, --Wayne

On Tuesday, October 11, 2016 at 3:55:52 PM UTC-4, Jeff B wrote:
> Hmmm, it seems to depend on the type of backing store. On my El Capitan Mac Pro it works fine when set to Pixmap but fails for the others. It will take someone more knowledgeable than me to explain why. Just out of curiosity, is the default backing store different between your Linux and Mac? Or does it work correctly regardless of the backing store setting on the Linux computer?

Subject: Re: repeated use of TVRD() gives different results
Posted by Bill Nel on Wed, 12 Oct 2016 13:41:41 GMT
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There's a note in the documentation under TVRD about "unexpected results" unless IDL is

providing the backing store (which I hadn't seen before). Ages ago, I found that TVRD() didn't work properly when the graphics window extended off the edge of the screen. (I solved it by copying the window's contents to a pixmap and calling TVRD on the pixmap.) The note explains why.

--Wayne

Subject: Re: repeated use of TVRD() gives different results
Posted by wlandsman on Thu, 13 Oct 2016 03:11:06 GMT
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Thanks. Interestingly, I don't find any other problems with using IDL_GR_X_RETAIN = 1 (the default value) on my MacBook. The backing store seems to work fine, and you only run into trouble when using TVRD().

It turns out that this has been a cause of a lot of mysterious color problems I've had when using Coyote graphics. The safe fix is to always set RETAIN=2 but I've also sent a pull request to https://github.com/idl-coyote/coyote to update CGCOLOR so that it never uses TVRD() on X windows when IDL_GR_X_RETAIN is less than 2. I've also put an updated CGCOLOR on http://idlastro.gsfc.nasa.gov/ftp/pro/coyote/cgcolor.pro

--Wayne

On Wednesday, October 12, 2016 at 9:42:06 AM UTC-4, ri...@crd.ge.com wrote:
> There's a note in the documentation under TVRD about "unexpected results" unless IDL is providing the backing store (which I hadn't seen before). Ages ago, I found that TVRD() didn't work properly when the graphics window extended off the edge of the screen. (I solved it by copying the window's contents to a pixmap and calling TVRD on the pixmap.) The note explains why.
>
> --Wayne

Subject: Re: repeated use of TVRD() gives different results
Posted by rawahranger on Sat, 15 Oct 2016 18:36:17 GMT
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Wayne Landsman writes:

> This is the sort of IDL quirk that I think drove David Fanning into retirement.

Indeed! :-)

I see Matt Savoie took care of this in the repository while I was off hiking, so I think you are good.

Thanks, Matt!

David

Subject: Re: repeated use of TVRD() gives different results
Posted by penteado on Fri, 28 Oct 2016 19:03:02 GMT
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On Wednesday, October 12, 2016 at 6:42:06 AM UTC-7, ri...@crd.ge.com wrote:
> There's a note in the documentation under TVRD about "unexpected results" unless IDL is providing the backing store (which I hadn't seen before). Ages ago, I found that TVRD() didn't work properly when the graphics window extended off the edge of the screen. (I solved it by copying the window's contents to a pixmap and calling TVRD on the pixmap.) The note explains why.
>

A long time ago, I used to have problems with tvrd() when the backing store was set to 1, for some versions of the X server under Linux. It would copy whatever was shown in that area of the screen, meaning if there was another window over the window I was reading from, that window's contents would show up in the result of tvrd(). I have not seen the problem in many years, but I rarely use direct graphics, and I generally stopped using tvrd() from a real window (as opposed to a pixmap), except when doing it interactively (so I would then see the result right away and notice any problems).
