Part C

Microsoft® DirectX™ 3
ffffffŠ”fff

5

Direct3D’□ƒ□ƒ□ƒƒƒƒƒƒ

fff

D3DDivide

```
D3DDivide(a, b)    (float)((double) (a) / (double) (b))
```

- Š,Ž, ,•,

a¤b
Ž,••,•Ž

D3DMultiply

D3DMultiply

```
D3DMultiply(a, b)    ((a) * (b))
```

- 2', ,•,

a¤b
Š, ,,,,'

D3DDivide

D3DRGB

```
D3DRGB(r, g, b) \
    (0xff000000L | ( ((long)((r) * 255)) << 16) | \
    (((long)((g) * 255)) << 8) | (long)((b) * 255))
```

RGB Ø

- RGB •',**D3DCOLOR**',•Š,,

r , g, b
, (red) —(green),,, (blue),—' ,,,,', 0,,1,"^,•" "Œ,,,

D3DRGBA

D3DRGBA

```
D3DRGBA(r, g, b, a) \
    ((((long)((a) * 255)) << 24) | (((long)((r) * 255)) << 16) |
    (((long)((g) * 255)) << 8) | (long)((b) * 255))
```

RGBA Ø

- RGBA •',**D3DCOLOR**',•Š,,

r, *g*, *b*, *a*
, (red) —(green) (blue),,,ƒƒƒƒ(alpha),—‘
D3DRGB

D3DSTATE_OVERRIDE

```
D3DSTATE_OVERRIDE(type) ((DWORD) (type) + D3DSTATE_OVERRIDE_BIAS)
```

ƠƠƠ

- •’,,,

type
ƒ ƒ ƒƒƒ, ‘ ,,ƒƒƒ ƒ,**D3DTRANSFORMSTATETYPE D3DLIGHTSTATETYPE D3DRENDERSTATETYPE**Œ,ƒƒƒ,,,,,,,
STATE_DATA (DirectX SDK ƠƠ Misc/D3dmacs.h) D3DSTATE_OVERRIDE D3DRENDERSTATE_SHADEMODE
ƠƠƠ

```
//  -"ƒ□ƒ,ƒƒƒ

STATE_DATA(D3DSTATE_OVERRIDE(D3DRENDERSTATE_SHADEMODE), TRUE,
lpBuffer);

//  ƒ□ƒƒƒƒ□,,,,,□-"ƒ□ƒ,Ž□,ƒƒƒ‰□,,

STATE_DATA(D3DSTATE_OVERRIDE(D3DRENDERSTATE_SHADEMODE), FALSE,
lpBuffer);
```

ƠƠƠ

D3DVAL

```
D3DVAL(val)     ((float)val)
```

D3DVALUE Ơ

- •ŠŒ,’,•,

val
•Š,,,’
D3DVALP

D3DVALP

```
D3DVALP(val, prec)     ((float)val)
```

- •ŠŒ,’,•,

val
•Š,,,’

prec
–Œ

D3DVAL 16

D3DVAL

RGB_GETBLUE

```
RGB_GETBLUE(rgb)    ((rgb) & 0xff)
```

D3DCOLOR

- •,•,

rgb
•,Ž, , ,D3DCOLOR’

RGB_GETGREEN

```
RGB_GETGREEN(rgb)    (((rgb) >> 8) & 0xff)
```

D3DCOLOR

- — •,•,

rgb
— •,Ž, , ,D3DCOLOR’

RGB_GETRED

```
RGB_GETRED(rgb)    (((rgb) >> 16) & 0xff)
```

D3DCOLOR

- •,•,

rgb
•,Ž, , ,D3DCOLOR’

RGB_MAKE

```
RGB_MAKE(r, g, b)    ((D3DCOLOR) (((r) << 16) | ((g) << 8) | (b)))
```

RGB

- ,’,•,

r, *g*, *b*
,,, , — ,—‘ ’,”^,0,,255

RGB_TORGBA

```
RGB_TORGBA(rgb)     ((D3DCOLOR) ((rgb) | 0xff000000))
```

RGB RGBA

- RGBA ,•,

rgb
RGBA ,•Š,,RGB
RGBA_TORGB

RGBA_GETALPHA

```
RGBA_GETALPHA(rgb)     ((rgb) >> 24)
```

RGBA **D3DCOLOR**

- *ffff* •’,•,

rgb
ffff •,Ž, , ,D3DCOLOR’

RGBA_GETBLUE

```
RGB_GETBLUE(rgb)     ((rgb) & 0xff)
```

RGBA **D3DCOLOR**

- •’,•,

rgb
•,Ž, , ,D3DCOLOR’

RGBA_GETGREEN

```
RGB_GETGREEN(rgb)     (((rgb) >> 8) & 0xff)
```

RGBA **D3DCOLOR**

- — •’,•,

rgb
— •,Ž, , ,D3DCOLOR’

RGBA_GETRED

```
RGB_GETRED(rgb)     (((rgb) >> 16) & 0xff)
```

RGBA **D3DCOLOR**

- •',•,

rgb
•,Ž, , ,D3DCOLOR'

RGBA_MAKE

```
RGBA_MAKE(r, g, b, a)   \
    ((D3DCOLOR) (((a) << 24) | ((r) << 16) | ((g) << 8) | (b)))
```

RGBA **D3DCOLOR**

- ,•,

r, *g*, *b*, *a*
,,,RGBA , — *ffff* •'

RGBA_SETALPHA

```
RGBA_SETALPHA(rgba, x)    (((x) << 24) | ((rgba) & 0x00ffffff))
```

RGBA **D3DCOLOR**

- *ffff* •', ',,,RGBA ,•,

rgba
ffff •', ',,,RGBA

x
',,*ffff* •'

RGBA_TORGB

```
RGBA_TORGB(rgba)    ((D3DCOLOR) ((rgba) & 0xffffff))
```

RGBA **D3DCOLOR** RGB **D3DCOLOR**

- RGB ,•,

rgba
RGB ,•Š,,RGBA
RGB_TORGBA

ƒ□ƒƒƒŠ□

D3DENUMDEVICESCALLBACK

```
typedef HRESULT (FAR PASCAL * LPD3DENUMDEVICESCALLBACK)
    (LPGUID lpGuid, LPSTR lpDeviceDescription,
```

```
LPSTR lpDeviceName, LPD3DDEVICEDESC lpD3DHWDeviceDesc,
LPD3DDEVICEDESC lpD3DHELDeviceDesc, LPVOID lpUserArg);
```

Direct3D

- ffff fff, ^‰,',,,,,•,
  D3DENUMRET_CANCEL
  —‹,'Ž,,
  D3DENUMRET_OK
  —‹,Œ',,

lpGuid
ff ff ff fŽ•Ž(GUID),,ffff

lpDeviceDescription
ffff,'Ž,,ffff

lpDeviceName
ffff–,,ffff

lpD3DHWDeviceDesc
Direct3Dffff f ffff •,**D3DDEVICEDESC** '',,ffff

lpD3DHELDeviceDesc
Direct3Dffff ffff fff •,**D3DDEVICEDESC** '',,ffff

lpUserArg
,,f ffffŠ ,",,,ffff fff'‹f f,,ffff

□□

D3DENUMTEXTUREFORMATSCALLBACK

```
typedef HRESULT (WINAPI* LPD3DENUMTEXTUREFORMATSCALLBACK)
    (LPDDSURFACEDESC lpDdsd, LPVOID lpUserArg);
```

lpDdsd
fffff •,Š,DirectDrawSurfaceffffff,,ffff

lpUserArg
,,f ffffŠ ,",,,ffff fff'‹f f,,ffff

□□

D3DVALIDATECALLBACK

```
typedef HRESULT (WINAPI* LPD3DVALIDATECALLBACK)
    (LPVOID lpUserArg, DWORD dwOffset);
```

IDirect3DExecuteBuffer::Validate □□

□□

lpUserArg
,,f ffffŠ ,“,,,ffff fff’‹f f,,ffff
dwOffset
ffff,ff ,Œ ,,Ž ffff,fffff

ƍ

IDirect3D

IDirect3D ƍDirect3D ƍ**IDirect3D** ƍ*IDirect3D*

IDirect3D ƍƍ

CreateLight
CreateMaterial
CreateViewport

—‹
Š‰

EnumDevices
FindDevice
Initialize

IDirect3D ƍ COM ƍ
IUnknown **IUnknown** ƍ

AddRef
QueryInterface
Release

IDirect3D::CreateLight

```
HRESULT CreateLight(LPDIRECT3DLIGHT* lplpDirect3DLight,
    IUnknown* pUnkOuter);
```

Direct3DLight ƍ**IDirect3DViewport::AddLight**

- Œ,,,D3D_OK Ž”,,, Ž,’,,,,,,•,
  DDERR_INVALIDOBJECT
  DDERR_INVALIDPARAMS

lplpDirect3DLight
Œ,,, IDirect3Dlightfff ffff,,ffff, ’,,,ffff

pUnkOuter
,,fff f,COM ‰‹”, —
ŒŠ ,Ž,,,,,,,,, **IDirect3D::CreateLight**ffff,,,fff f,NULLˆŠ,,,ff ,•,

IDirect3D::CreateMaterial

```
HRESULT CreateMaterial(LPDIRECT3DMATERIAL* lplpDirect3DMaterial,
    IUnknown* pUnkOuter);
```

Direct3DMaterial

- Œ,,, D3D_OK,•, •',ˆ—, *Direct3D ' f f,•'* ,Ž ,,,,

lplpDirect3DMaterial
Œ, ,, Œ,,, IDirect3DMaterial fff ffff,,ffff,ffff

pUnkOuter
,,fff f, COM‘‘, —
Š',,,,,,,,,, **IDirect3D::CreateMaterial**ffff, ,,fff f,NULLˆŠ,,,ff ,•
,

IDirect3D::CreateViewport

```
HRESULT CreateViewport(LPDIRECT3DVIEWPORT* lplpD3DViewport,
    IUnknown* pUnkOuter);
```

Direct3DViewport の**IDirect3DDevice::AddViewport**
Direct3D

- Œ,,,D3D_OK Ž”,,, Ž,',,,,,,•,

  DDERR_INVALIDOBJECT

  DDERR_INVALIDPARAMS

lplpD3DViewport
Œ, ,, Œ,,, IDirect3DViewport fff ffff,,ffff,ffff

pUnkOuter
,,fff f, COM‘‘, —
Š',,,,,,,,,, **IDirect3D::CreateViewport**ffff, ,,fff f,NULLˆŠ,,,ff ,
•,

IDirect3D::EnumDevices

```
HRESULT EnumDevices(LPD3DENUMDEVICESCALLBACK lpEnumDevicesCallback,
    LPVOID lpUserArg);
```

Direct3D

- Œ,,,D3D_OK Ž”,,, Ž,',,,,,,•,

  DDERR_INVALIDOBJECT

  DDERR_INVALIDPARAMS

lpEnumDevicesCallback
Œ ,,,,,,Œ, ,,,—‹ —,**D3DENUMDEVICESCALLBACK**
ƒ ƒƒƒƒŠ ,,ƒƒƒƒ

lpUserArg
ƒ ƒƒƒƒŠ ,“,ƒƒƒƒ ƒƒƒ’‹ƒ ƒ,,ƒƒƒƒ

IDirect3D::FindDevice

```
HRESULT FindDevice(LPD3DFINDDEVICESEARCH lpD3DFDS,
    LPD3DFINDDEVICERESULT lpD3DFDR);
```

ƍƍ

- Œ,,,D3D_OK,•,,, •’,,,,, *Direct3D ’ ƒ ƒ,•’* ,Ž ,,,,

lpD3DFDS
Ž“,,ƒƒƒƒ,Ž,**D3DFINDDEVICESEARCH** ‘‘,ƒƒƒƒ

lpD3DFDR
Œ Ž,ƒƒƒƒ,Ž,**D3DFINDDEVICERESULT** ‘‘,ƒƒƒƒ

IDirect3D::Initialize

```
HRESULT Initialize(REFIID lpREFIID);
```

ƍ COM ƍƍƍ

- Direct3Dƒƒƒƒƒƒ, ,,,,,, Š‰
,,,,, **DDERR_ALREADYINITIALIZED**,•,

lpREFIID
ƒƒƒ ƒƒ ƒƒ ƒŽ•Ž(UUID),,ƒƒƒƒ,•,

IDirect3DDevice

IDirect3DDevice ƍDirect3D ƍƍ**IDirect3DDevice** ƍ*IDirect3DDevice*

IDirect3DDevice ƍƍ

Ž	**CreateExecuteBuffer**
	Execute
•	**EnumTextureFormats**
	GetCaps
	GetDirect3D
	GetPickRecords
	GetStats

”— **CreateMatrix**
DeleteMatrix
GetMatrix
SetMatrix

,,‘ **Initialize**
Pick
SwapTextureHandles

f f **BeginScene**
EndScene

ff f f **AddViewport**
DeleteViewport
NextViewport

IDirect3DDevice ✆ COM
IUnknown **IUnknown** ✆

AddRef
QueryInterface
Release

Direct3DDevice 3D DirectDrawSurface
IDirect3DDevice::QueryInterface

IDirect3DDevice::AddViewport

```
HRESULT AddViewport(LPDIRECT3DVIEWPORT lpDirect3DViewport);
```

✆

- Œ,,,D3D_OK Ž”,,, Ž,’,,,,,,•,
  DDERR_INVALIDOBJECT
  DDERR_INVALIDPARAMS

lpDirect3DViewport
Direct3Ddevice*ffffff*,”’,,,IDirect3DViewport*fff ffff*,,*ffff*

IDirect3DDevice::BeginScene

```
HRESULT BeginScene();
```

- Œ,,,D3D_OK,•,

ƒƒIDirect3DDevice::EndScene

IDirect3DDevice::EndScene

IDirect3DDevice::CreateExecuteBuffer

```
HRESULT CreateExecuteBuffer(LPDIRECT3DEXECUTEBUFFERDESC lpDesc,
    LPDIRECT3DEXECUTEBUFFER* lplpDirect3DExecuteBuffer,
    IUnknown* pUnkOuter);
```

ƒƒ DMA VRAM ƒƒƒƒ

- Œ,,,D3D_OK Ž”,,, Ž,’,,,,,,•,

  DDERR_INVALIDOBJECT

  DDERR_INVALIDPARAMS

lpDesc

,,,Direct3DExecuteBuffer*ffffff*,Ž,**D3DEXECUTEBUFFERDESC** ‘‘ ,,*ffff* ,,*ffff*,*fff*,‘,,*ffffff*, ,,,,,,,, Œ, ,,Ž”,,

lplpDirect3DExecuteBuffer

,,Direct3DExecuteBuffer*ffffff*,,*ffff*,,*ffff*

pUnkOuter

,,*fff f*, COM‘‘, —

Š’,,,,,,,,,, IDirect3DDevice::CreateExecuteBuffer*ffff*, ,,*fff f*,NULL ˆŠ,,*ff* ,•,

D3DEXECUTEBUFFERDESC ƒ DEBCAPS_VIDEO_MEMORY Direct3D

IDirect3DExecuteBuffer::Lock ƒ

ƒ

IDirect3DDevice::CreateMatrix

```
HRESULT CreateMatrix(LPD3DMATRIXHANDLE lpD3DMatHandle);
```

- Œ,,,D3D_OK Ž”,,, Ž,’,•,

  DDERR_ INVALIDPARAMS

lpD3DMatHandle

,,, —,*ffff*• ,,*ffff ffff*,*fff*,‘,,, —, ,,,,,,, ,,Œ, ,,Ž”,,

IDirect3DDevice::DeleteMatrix IDirect3DDevice::SetMatrix

IDirect3DDevice::DeleteMatrix

```
HRESULT DeleteMatrix(D3DMATRIXHANDLE d3dMatHandle);
```

IDirect3DDevice::CreateMatrix

- Œ,,,D3D_OK Ž”,,, Ž,’,•,

  DDERR_ INVALIDPARAMS

d3dMatHandle
,,, —,ffff
IDirect3DDevice::CreateMatrix IDirect3DDevice::SetMatrix

IDirect3DDevice::DeleteViewport

```
HRESULT DeleteViewport(LPDIRECT3DVIEWPORT lpDirect3DViewport);
```

- Œ,,,D3D_OK Ž”,,, Ž,’,,,,,,•,

  DDERR_INVALIDOBJECT
  DDERR_INVALIDPARAMS

lpDirect3DViewport
Direct3DDeviceffffff,, ,—,Direct3DViewportffffff,,ffff

IDirect3DDevice::EndScene

```
HRESULT EndScene();
```

IDirect3DDevice::BeginScene

- Œ,,,D3D_OK,•,

IDirect3DDevice::BeginScene

IDirect3DDevice::EnumTextureFormats

```
HRESULT EnumTextureFormats(
    LPD3DENUMTEXTUREFORMATSCALLBACK lpd3dEnumTextureProc,
    LPVOID lpArg);
```

- Œ,,,D3D_OK Ž”,,, Ž,’,,,,,,•,

  DDERR_INVALIDOBJECT
  DDERR_INVALIDPARAMS

lpd3dEnumTextureProc
—‹ —
,,,Šfffff Œ,Œ, ,,,**D3DENUMTEXTUREFORMATSCALLBACK**f ff ffŠ ,,ffff

lpArg
f ffffŠ ,“,,,ffff fff’‹f f,,ffff

IDirect3DDevice::Execute

```
HRESULT Execute(LPDIRECT3DEXECUTEBUFFER lpDirect3DExecuteBuffer,
    LPDIRECT3DVIEWPORT lpDirect3DViewport, DWORD dwFlags);
```

- Œ,,,D3D_OK Ž”,,, Ž,’,•,
  DDERR_INVALIDOBJECT
  DDERR_INVALIDPARAMS

lpDirect3DExecuteBuffer
Ž ,,,Ž ffff,,ffff
lpDirect3DViewport
•Ž,,,Ž ffff,•Šffffff,‹ ,,Direct3DViewportffffff,,ffff
dwFlags
ffff,ffffff,ffffff,,,,Ž’,,fff ,,fff f, Ž,’,,,,,,,,
D3DEXECUTE_CLIPPED
ff f f,Š,,,ffffff,ffffff,,
D3DEXECUTE_UNCLIPPED
ff f f,’,,,,,ffffff,Š,(ffffff,,,)

D3DEXECUTEDATA D3DINSTRUCTION
IDirect3DExecuteBuffer::Validate

IDirect3DDevice::GetCaps

```
HRESULT GetCaps(LPD3DDEVICEDESC lpD3DHWDevDesc,
    LPD3DDEVICEDESC lpD3DHELDevDesc);
```

Direct3DDevice の

- Œ,,,D3D_OK Ž”,,, Ž,’,,,,,,•,
  DDERR_INVALIDOBJECT
  DDERR_INVALIDPARAMS

lpD3DHWDevDesc
ffff,f ffff •,Š,**D3DDEVICEDESC** ‘‘,,ffff
lpD3DHELDevDesc
—,,,,,,ffffff,ffff fff •,Š,**D3DDEVICEDESC** ‘‘,,ffff
の の の**IDirectDraw2::GetCaps**

IDirect3DDevice::GetDirect3D

```
HRESULT GetDirect3D(LPDIRECT3D* lpD3D);
```

IDirect3D

- Œ,,,D3D_OK,•, ,,‘,,,,ff ,,, •’,,,,, *Direct3D ’ f f,•’* ,Ž ,,,,

lpD3D
ffff,•,fff ffff,,ffff

IDirect3DDevice::GetMatrix

```
HRESULT GetMatrix(D3DMATRIXHANDLE lpD3DMatHandle,
    LPD3DMATRIX lpD3DMatrix);
```

IDirect3DDevice::CreateMatrix

- Œ,,,D3D_OK Ž”,,, Ž,’,•,
  DDERR_ INVALIDPARAMS

lpD3DMatHandle
Ž“,, —• ,,ffff
lpD3DMatrix
ffff,•, —,Š,**D3DMATRIX** ‘‘,,ffff

IDirect3DDevice::CreateMatrix IDirect3DDevice::DeleteMatrix IDirect3DDevice::SetMatrix

IDirect3DDevice::GetPickRecords

```
HRESULT GetPickRecords(LPDWORD lpCount,
    LPD3DPICKRECORD lpD3DPickRec);
```

- Œ,,,D3D_OK,•,

lpCount
Ž“,,**D3DPICKRECORD** ‘‘, ,“,• ,,ffff
lpD3DPickRec
ffff,•,**D3DPICKRECORD** ‘‘,”—,,ffff

IDirect3DDevice::GetStats

```
HRESULT GetStats(LPD3DSTATS lpD3DStats);
```

- Œ,,,D3D_OK Ž”,,, Ž,’,,,,,,•,
  DDERR_INVALIDOBJECT

DDERR_INVALIDPARAMS

lpD3DStats
•,Ž,**D3DSTATS** ‘‘,,ƒƒƒƒ

IDirect3DDevice::Initialize

```
HRESULT Initialize(LPDIRECT3D lpd3d, LPGUID lpGUID,
    LPD3DDEVICEDESC lpd3ddvdesc);
```

- Œ,,,D3D_OK,•, ,,‘,,,,ƒƒ ,,, •’,,,,, *Direct3D’ ƒ ƒ*,•’ ,Ž ,,,,

lpd3d
Š‰,,Direct3D ƒƒƒƒ,,ƒƒƒƒ

lpGUID
ƒƒƒ ƒƒƒƒŽ•Ž,,ƒƒ ƒƒ ƒƒ ƒŽ•Ž(GUID),,ƒƒƒƒ

lpd3ddvdesc
Š‰,,Direct3DDeviceƒƒƒƒƒƒ,Ž,**D3DDEVICEDESC** ‘‘,,ƒƒƒƒ

IDirect3DDevice::NextViewport

```
HRESULT NextViewport(LPDIRECT3DVIEWPORT lpDirect3DViewport,
    LPDIRECT3DVIEWPORT* lplpDirect3DViewport, DWORD dwFlags);
```

- Œ,,,D3D_OK Ž”,,, Ž,’,,,,,,•,

DDERR_INVALIDOBJECT
DDERR_INVALIDPARAMS

lpDirect3DViewport
Direct3DDeviceƒƒƒƒƒƒ,Š˜,,ƒƒ ƒ ƒ,ƒƒƒ,’,ƒƒ ƒ ƒ,,ƒƒƒƒ

lplpDirect3DViewport
Direct3DDeviceƒƒƒƒƒƒ,Š˜,,ƒƒ ƒ ƒ,ƒƒƒ,’,Ž,ƒƒ ƒ ƒ,,ƒƒƒƒ

dwFlags
ƒƒ ƒ ƒ,ƒƒƒ,,Ž“,,ƒƒ ƒ ƒ,Ž’,,ƒƒƒ ƒƒƒƒƒ,D3DNEXT_NEXT

D3DNEXT_HEAD	ƒƒƒ, , –,Ž“
D3DNEXT_NEXT	ƒƒƒ,Ž, –,Ž“
D3DNEXT_TAIL	ƒƒƒ, Œ, –,Ž“

IDirect3DDevice::Pick

```
HRESULT Pick(LPDIRECT3DEXECUTEBUFFER lpDirect3DExecuteBuffer,
    LPDIRECT3DVIEWPORT lpDirect3DViewport, DWORD dwFlags,
    LPD3DRECT lpRect);
```

lpRect の の z

Direct3DExecuteBuffer の

- Œ,,,D3D_OK Ž”,,, Ž,’,,,,,,•,
  D3DERR_EXECUTE_LOCKED
  DDERR_INVALIDOBJECT
  DDERR_INVALIDPARAMS

lpDirect3DExecuteBuffer
Ž“,,,,f f fff,,,Ž ffff,,ffff
lpDirect3DViewport
Direct3DDevicefffffff,”’,,,ff f ffff,’,ff f f,,ffff
dwFlags
,,ffff,,,,Œ ’‹,,,,,fff,,,
lpRect
Ž, ,,,ffff •—^,Ž,**D3DRECT** ‘‘,,ffff
lpRect の **x1** **x2** **y1** **y2**

Direct3DExecuteBuffer の Direct3DDevice

IDirect3DDevice::GetPickRecords

IDirect3DDevice::SetMatrix

```
HRESULT SetMatrix(D3DMATRIXHANDLE d3dMatHandle,
    LPD3DMATRIX lpD3DMatrix);
```

の IDirect3DDevice::CreateMatrix

- Œ,,,D3D_OK Ž”,,, Ž,’,•,
  DDERR_INVALIDPARAMS

d3dMatHandle
’,,, —ffff
lpD3DMatrix
’,,, —,Ž,**D3DMATRIX** ‘‘,,ffff
の IDirect3DDevice::SetMatrix □□□□□ の

IDirect3DDevice::CreateMatrix ***IDirect3DDevice::GetMatrix*** ***IDirect3DDevice::DeleteMatrix***

IDirect3DDevice::SwapTextureHandles

```
HRESULT SwapTextureHandles(LPDIRECT3DTEXTURE lpD3DTex1,
    LPDIRECT3DTEXTURE lpD3DTex2);
```

ღ

- Œ,,,D3D_OK,•,

lpD3DTex1 *lpD3DTex2*
ffff,–,,,, *ŒŠ,,,fffff,ffff,,ffff*
ღღღღ

IDirect3DExecuteBuffer

IDirect3DExecuteBuffer ღDirect3D ღღღღ*IDirect3DDeviceExecuteBuffer*

IDirect3DExecuteBuffer ღღ

f f,Ž	**GetExecuteData**
	SetExecuteData
fff,‰	**Lock**
	Unlock
,,‘	**Initialize**
	Optimize
	Validate

IDirect3DExecuteBuffer ღ COM
IUnknown **IUnknown** ღ

AddRef
QueryInterface
Release

IDirect3DExecuteBuffer::GetExecuteData

```
HRESULT GetExecuteData(LPD3DEXECUTEDATA lpData);
```

Direct3DExecuteBuffer ღღDirect3DExecuteBuffer ღ

- Œ,,,D3D_OK Ž”,,, Ž,’,,,,,,•,
  D3DERR_EXECUTE_LOCKED
  DDERR_INVALIDOBJECT
  DDERR_INVALIDPARAMS

lpData
Direct3DExecuteBuffer*ffffff*,Œ ,Ž *f f*, ‘, ’,,,**D3DEXECUTEDATA** ‘‘,,*ffff*
Direct3DExecuteBuffer ღ

IDirect3DExecuteBuffer::SetExecuteData

IDirect3DExecuteBuffer::Initialize

```
HRESULT Initialize(LPDIRECT3DDEVICE lpDirect3DDevice,
    LPD3DEXECUTEBUFFERDESC lpDesc);
```

COM

- Direct3DExecuteBuffer , Ž, Š‰ ,,,,,**DDERR_ALREADYINITIALIZED**,•,

lpDirect3DDevice
Direct3D ,Ž,,,

lpDesc
,,,Direct3DExecuteBuffer,‹ ,,**D3DEXECUTEBUFFERDESC** ‘‘,, , ,Ž”,,

IDirect3DExecuteBuffer::Lock

```
HRESULT Lock(LPD3DEXECUTEBUFFERDESC lpDesc);
```

- Œ,,,D3D_OK Ž”,,, Ž,’,,,,,,•,

  D3DERR_EXECUTE_LOCKED

  DDERR_INVALIDOBJECT

  DDERR_INVALIDPARAMS

  DDERR_WASSTILLDRAWING

lpDesc
D3DEXECUTEBUFFERDESC ‘‘,, ,•,,,,¤**lpData**,, , ,Ž“,, ,Ž,,, , , **dwCaps**,, ,Ž,,, , , **IDirect3DExecuteBuffer::Lock**,Ž,,Direct3D, , Š,,, ‘‘‘,—‹,,,

Direct3DExecuteBuffer **IDirect3DDevice::Execute**

IDirect3DExecuteBuffer::Unlock

IDirect3DExecuteBuffer::Optimize

```
HRESULT Optimize();
```

IDirect3DExecuteBuffer::SetExecuteData

```
HRESULT SetExecuteData(LPD3DEXECUTEDATA lpData);
```

Direct3DExecuteBuffer の の Direct3DExecuteBuffer の

- Œ,,,D3D_OK Ž”,,, Ž,’,,,,,,•,
  D3DERR_EXECUTE_LOCKED
  DDERR_INVALIDOBJECT
  DDERR_INVALIDPARAMS

lpData
の **D3DEXECUTEDATA** の

Direct3DExecuteBuffer の

IDirect3DExecuteBuffer::GetExecuteData

IDirect3DExecuteBuffer::Unlock

```
HRESULT Unlock();
```

の の の **IDirect3DDevice::Execute**

- Œ,,,D3D_OK Ž”,,, Ž,’,,,,,,•,
  D3DERR_EXECUTE_NOT_LOCKED
  DDERR_INVALIDOBJECT

IDirect3DExecuteBuffer::Lock

IDirect3DExecuteBuffer::Validate

```
HRESULT Validate(LPDWORD lpdwOffset, LPD3DVALIDATECALLBACK lpFunc,
    LPVOID lpUserArg, DWORD dwReserved);
```

IDirect3DLight

IDirect3DLight の の の IDirect3Dlight の *IDirect3DLight*

IDirect3DLight の の

Ž“, ’	**GetLight**
	SetLight
Š‰	**Initialize**

IDirect3DLight の COM の
IUnknown **IUnknown** の

AddRef

QueryInterface

Release

IDirect3DLight::GetLight

```
HRESULT GetLight(LPD3DLIGHT lpLight);
```

Direct3DLight の

- Œ,,,D3D_OK Ž”,,, Ž,’,,,,,,•,
  DDERR_INVALIDOBJECT
  DDERR_INVALIDPARAMS

lpLight
Œ ,ŒŒƒ ƒ, ’,,,**D3DLIGHT** ‘‘,,ƒƒƒƒ

IDirect3DLight::SetLight

IDirect3DLight::Initialize

```
HRESULT Initialize(LPDIRECT3D lpDirect3D);
```

COM ののの

- Direct3DLightƒƒƒƒƒƒ, Ž, Š‰
  ,,,, **DDERR_ALREADYINITIALIZED**,•,

lpDirect3D
Direct3Dƒƒƒƒƒƒ,Ž,Direct3D ‘‘,,ƒƒƒƒ

IDirect3DLight::SetLight

```
HRESULT SetLight(LPD3DLIGHT lpLight);
```

Direct3DLight の

- Œ,,,D3D_OK Ž”,,, Ž,’,,,,,,•,
  DDERR_INVALIDOBJECT
  DDERR_INVALIDPARAMS

lpLight
の **D3DLIGHT** の

IDirect3DLight::GetLight

IDirect3DMaterial

IDirect3DMaterial の IDirect3Dmaterial
IDirect3DMaterial

IDirect3DMaterial の の

,——	**Reserve**
	Unreserve
fffff	**GetMaterial**
	SetMaterial
,,‘	**GetHandle**
	Initialize

IDirect3DMaterial の COM の
IUnknown **IUnknown** の

AddRef
QueryInterface
Release

IDirect3DMaterial::GetHandle

```
HRESULT GetHandle(LPDIRECT3DDEVICE lpDirect3DDevice,
    LPD3DMATERIALHANDLE lpHandle);
```

Direct3DMaterial の の の の Direct3D API の の1

- Œ,,,D3D_OK,•, ,,‘,,,, **DDERR_INVALIDOBJECT**•,

lpDirect3DDevice
Ž—,,,,,fffff,Direct3DDevicefffffff,,ffff
lpHandle
Direct3DMaterialfffffff,‘‰,,fffff,ffff, ’,,,• ,,ffff

IDirect3DMaterial::GetMaterial

```
HRESULT GetMaterial(LPD3DMATERIAL lpMat);
```

Direct3DMaterial の

- Œ,,,D3D_OK Ž”,,, Ž,’,,,,,,•,
  DDERR_INVALIDOBJECT
  DDERR_INVALIDPARAMS

lpMat
Œ ,fffff," , ',,,**D3DMATERIAL** '',,ffff
IDirect3DMaterial::SetMaterial

IDirect3DMaterial::Initialize

```
HRESULT Initialize(LPDIRECT3D lpDirect3D);
```

COM ののの

- Direct3Dmaterialffffff, Ž, Š‰
,,,, **DDERR_ALREADYINITIALIZED**,•,

lpDirect3D
Direct3Dffffff,Ž,Direct3D '',,ffff

IDirect3DMaterial::Reserve

```
HRESULT Reserve();
```

IDirect3DMaterial::SetMaterial

```
HRESULT SetMaterial(LPD3DMATERIAL lpMat);
```

Direct3DMaterial の

- Œ,,,D3D_OK Ž",,, Ž,',,,,,,•,
DDERR_INVALIDOBJECT
DDERR_INVALIDPARAMS

lpMat
fffff" , ',,,**D3DMATERIAL** '',,ffff
IDirect3DMaterial::GetMaterial

IDirect3DMaterial::Unreserve

```
HRESULT Unreserve();
```

IDirect3DTexture

IDirect3DTexture ののののIDirect3Dtexture の*IDirect3DTexture*

IDirect3DTexture のの

ffff	**GetHandle**
Š‰	**Initialize**
f f	**Load** **Unload**
ffff •	**PaletteChanged**

IDirect3DTexture の COM の
IUnknown **IUnknown**

AddRef
QueryInterface
Release

Direct3DTexture
DirectDrawSurface **IDirect3D::QueryInterface**

IDirect3DTexture::GetHandle

```
HRESULT GetHandle(LPDIRECT3DDEVICE lpDirect3DDevice,
    LPD3DTEXTUREHANDLE lpHandle);
```

Direct3DTexture のののの Direct3D API の

- Œ,,D3D_OK Ž”,,, Ž,’,,,,,,•,
  D3DERR_BADOBJECT
  DDERR_INVALIDPARAMS

lpDirect3DDevice
f f,,,,,fffff,Direct3DDeviceffffff,,ffff
lpHandle
Direct3DTextureffffff,‘‰,,fffff,ffff, ’,,,• ,,ffff

IDirect3DTexture::Initialize

```
HRESULT Initialize(LPDIRECT3DDEVICE lpD3DDevice,
    LPDIRECTDRAWSURFACE lpDDSurface);
```

COM ののの

- Direct3DTextureffffff, Ž, Š‰
  ,,,, **DDERR_ALREADYINITIALIZED**,•,

lpDirect3D
Direct3Dffffff,Ž,Direct3D ‘‘,,ffff

lpDDSurface
,,ffffff ,DirectDraw,,ffff

IDirect3DTexture::Load

```
HRESULT Load(LPDIRECT3DTEXTURE lpD3DTexture);
```

DDSCAPS_ALLOCONLOAD

- Œ,,, D3D_OK,•, ,,‘,,,,ff ,,, •’,,,,, *Direct3D ’ f f,•’* ,Ž ,,,,

lpD3DTexture
f f,,,fffff,,ffff
IDirect3DTexture::Unload

IDirect3DTexture::PaletteChanged

```
HRESULT PaletteChanged(DWORD dwStart, DWORD dwCount);
```

Ø

- Œ,,, D3D_OK,•, ,,‘,,,,ff ,,, •’,,,,, *Direct3D ’ f f,•’* ,Ž ,,,,

dwStart
- ,,, “,ffff,ffffff

dwCount
- ,,,ffff,Œ

ØØØØ

IDirect3DTexture::Unload

```
HRESULT Unload();
```

Ø

- Œ,,,D3D_OK,•, ,,‘,,,,ff ,,, •’,,,,, *Direct3D ’ f f,•’* ,Ž ,,,,

IDirect3DTexture::Load

IDirect3DViewport

IDirect3DViewport ØØØØIDirect3DViewport Ø*IDirect3DViewport*

IDirect3DViewport ØØ

”Œ	**GetBackground** **GetBackgroundDepth** **SetBackground** **SetBackgroundDepth**
Š‰	**Initialize**
ŒŒ	**AddLight** **DeleteLight** **LightElements** **NextLight**
fffff,ff f f	**Clear** **GetViewport** **SetViewport**
•Š	**TransformVertices**

IDirect3DViewport Ơ COM Ơ
IUnknown **IUnknown**

AddRef
QueryInterface
Release

IDirect3DViewport::AddLight

```
HRESULT AddLight(LPDIRECT3DLIGHT lpDirect3DLight);
```

Direct3DLight Ơ

- Œ,,,D3D_OK Ž”,,, Ž,’,,,,,,•,
  DDERR_INVALIDOBJECT
  DDERR_INVALIDPARAMS

lpDirect3DLight
Direct3DDevice*ffffff*,Š˜,,Direct3DLight*ffffff*,,*ffff*

IDirect3DViewport::Clear

```
HRESULT Clear(DWORD dwCount, LPD3DRECT lpRects, DWORD dwFlags);
```

ƠƠƠ

- Œ,,,D3D_OK Ž”,,, Ž,’,,,,,,•,

  DDERR_INVALIDOBJECT

  DDERR_INVALIDPARAMS

dwCount

lpRects*ƒƒƒ* *ƒ*,Ž’,,,‹Œ,

lpRects

D3DRECT ‘‘,”—,,*ƒƒƒƒ*

dwFlags

‹,‘ ,Ž,*ƒƒƒ* *ƒƒƒƒƒƒ*‘ Z*ƒƒƒƒ*,,,,,—•

D3DCLEAR_TARGET ”Œ*ƒƒƒƒƒ*(’,,,,,,,),*ƒƒƒƒƒƒ*‘

D3DCLEAR_ZBUFFER Z*ƒƒƒƒ*, ,,, ’,,,,,Œ ,”Œ “(’,,,,,,,)

IDirect3DViewport::DeleteLight

```
HRESULT DeleteLight(LPDIRECT3DLIGHT lpDirect3DLight);
```

Direct3DLight∅)

- Œ,,,D3D_OK Ž”,,, Ž,’,,,,,,•,

  DDERR_INVALIDOBJECT

  DDERR_INVALIDPARAMS

lpDirect3DLight

Direct3DDevice*ƒƒƒƒƒƒ*,, ,—, Direct3DLight*ƒƒƒƒƒƒ*,,*ƒƒƒƒ*

IDirect3DViewport::GetBackground

```
HRESULT GetBackground(LPD3DMATERIALHANDLE lphMat, LPBOOL lpValid);
```

- Œ,,,D3D_OK Ž”,,, Ž,’,,,,,,•,

  DDERR_INVALIDOBJECT

  DDERR_INVALIDPARAMS

lphMat

”Œ,,,Ž—,,,,,*ƒƒƒƒƒ*,*ƒƒƒƒ*,,*ƒƒƒƒ*

lpValid

”Œ,*ƒƒ* *ƒ* *ƒ*,Š˜,,,,,,,Ž,,,, ’,,,• ,,*ƒƒƒƒ* ,,*ƒƒƒ* *ƒ*,FALSE,,, *ƒƒ* *ƒ* *ƒ*,Š˜,, ”Œ,,,

IDirect3DViewport::SetBackground

IDirect3DViewport::GetBackgroundDepth

```
HRESULT GetBackgroundDepth(LPDIRECTDRAWSURFACE* lplpDDSurface,
```

```
    LPBOOL lpValid);
```

DirectDraw

- Œ,,,D3D_OK Ž”,,, Ž,’,,,,,,•,
  DDERR_INVALIDOBJECT
  DDERR_INVALIDPARAMS

lplpDDSurface
”Œ “,•,DirectDrawSurface*ffffff*,,*ffff*,,*ffff*

lpValid
ff f f,Š˜•,,,,”Œ “,,,,,FALSE, ’,,,• ,,*ffff*

IDirect3DViewport::SetBackgroundDepth

IDirect3DViewport::GetViewport

```
HRESULT GetViewport(LPD3DVIEWPORT lpData);
```

- Œ,,,D3D_OK Ž”,,, Ž,’,,,,,,•,
  DDERR_INVALIDOBJECT
  DDERR_INVALIDPARAMS

lpData
ff f f,Ž“,,**D3DVIEWPORT** ‘‘,,*ffff*

IDirect3DViewport::SetViewport

IDirect3DViewport::Initialize

```
HRESULT Initialize(LPDIRECT3D lpDirect3D);
```

COM ƠƠƠ

- Direct3DViewport*ffffff*, Ž, Š‰
  ,,,, **DDERR_ALREADYINITIALIZED**,•,

lpDirect3D
Direct3D*ffffff*,Ž,Direct3D ‘‘,,*ffff*

IDirect3DViewport::LightElements

```
HRESULT LightElements(DWORD dwElementCount, LPD3DLIGHTDATA lpData);
```

IDirect3DViewport::NextLight

```
HRESULT NextLight(LPDIRECT3DLIGHT lpDirect3DLight,
    LPDIRECT3DLIGHT* lplpDirect3DLight, DWORD dwFlags);
```

Direct3DLight

- Œ,,,D3D_OK Ž”,,, Ž,’,,,,,,•,

  DDERR_INVALIDOBJECT

  DDERR_INVALIDPARAMS

lpDirect3DLight

Direct3DDevice*ffffff*,Š˜,,ŒŒ*fff*,’,ŒŒ,,*ffff*

lplpDirect3DLight

Direct3DDevice*ffffff*,Š˜,,ŒŒ*fff*,’,,—‹,,,ŒŒ,Š,*ffff*,,*ffff* —‹,,,ŒŒ, *dwFlagsfff f*,Ž’,,,

dwFlags

ŒŒ*fff*,,Ž“,,ŒŒ,Ž’,,*fff ffffff*,,, D3DNEXT_NEXT, ’,,,

D3DNEXT_HEAD	*fff*, , –
D3DNEXT_NEXT	*fff*,Ž, –
D3DNEXT_TAIL	*fff*, Œ, –

IDirect3DViewport::SetBackground

```
HRESULT SetBackground(D3DMATERIALHANDLE hMat);
```

- Œ,,,D3D_OK Ž”,,, Ž,’,,,,,,•,

  DDERR_INVALIDOBJECT

  DDERR_INVALIDPARAMS

hMat

”Œ,,,Ž—,,,*fffff*,*ffff*

IDirect3DViewport::GetBackground

IDirect3DViewport::SetBackgroundDepth

```
HRESULT SetBackgroundDepth(LPDIRECTDRAWSURFACE lpDDSurface);
```

- Œ,,,D3D_OK Ž”,,, Ž,’,,,,,,•,

  DDERR_INVALIDOBJECT

  DDERR_INVALIDPARAMS

lpDDSurface
”Œ “,•,DirectDrawSurface*ffffff,,ffff*

IDirect3DViewport::Clear D3DCLEAR_ZBUFFER
Z 16

IDirect3DViewport::GetBackgroundDepth

IDirect3DViewport::SetViewport

```
HRESULT SetViewport(LPD3DVIEWPORT lpData);
```

- Œ,,,D3D_OK Ž”,,, Ž,’,,,,,•,
  DDERR_INVALIDOBJECT
  DDERR_INVALIDPARAMS

lpData
‹*ff f f*,Ž,**D3DVIEWPORT** ‘‘,,*ffff*
IDirect3DViewport::GetViewport

IDirect3DViewport::TransformVertices

```
HRESULT TransformVertices(DWORD dwVertexCount,
    LPD3DTRANSFORMDATA lpData, DWORD dwFlags, LPDWORD lpOffscreen);
```

- Œ,,,D3D_OK Ž”,,, Ž,’,,,,,•,
  DDERR_INVALIDOBJECT
  DDERR_INVALIDPARAMS

dwVertexCount
*it**fff f*,’,•Š,,’“
lpData
•Š,,,’“,Š,**D3DTRANSFORMDATA** ‘‘,,*ffff*
dwFlags
ˆ‰,*fff*,“,,, ,,,,*fff*,Ž,•,,,,, Œ , –,Ž ,,,,
D3DTRANSFORM_CLIPPED
D3DTRANSFORM_UNCLIPPED

lpOffscreen
•ŠŒ ’“,*fff fŠ*,,, 0ˆŠ,’, ’,,,• ,,*ffff*

it D3DTRANSFORM_CLIPPED の*it*
D3DLVERTEX の*it* *it* 0 の**D3DTRANSFORMDATA** の **drExtent** の 2D

it D3DTRANSFORM_UNCLIPPED

D3DTRANSFORMDATA **drExtent**

D3DTRANSFORMDATA **dwClip**

D3DBRANCH

```
typedef struct _D3DBRANCH {
    DWORD dwMask;
    DWORD dwValue;
    BOOL  bNegate;
    DWORD dwOffset;
} D3DBRANCH, *LPD3DBRANCH;
```

dwMask

dwValue

dwMask

bNegate

TRUE,

dwOffset

0,

D3DCOLORVALUE

```
typedef struct _D3DCOLORVALUE {
    union {
        D3DVALUE r;
        D3DVALUE dvR;
    };
    union {
        D3DVALUE g;
        D3DVALUE dvG;
    };
    union {
        D3DVALUE b;
        D3DVALUE dvB;
    };
    union {
        D3DVALUE a;
        D3DVALUE dvA;
    };
} D3DCOLORVALUE;
```

D3DLIGHT **D3DMATERIAL**

dvR, **dvG**, **dvB**, **dvA**
,—‘,,, — ƒƒƒƒ,Ž’,,**D3DVALUE**Œ,’

D3DDEVICEDESC

```
typedef struct _D3DDeviceDesc {
    DWORD            dwSize;
    DWORD            dwFlags;
    D3DCOLORMODEL    dcmColorModel;
    DWORD            dwDevCaps;
    D3DTRANSFORMCAPS dtcTransformCaps;
    BOOL             bClipping;
    D3DLIGHTINGCAPS  dlcLightingCaps;
    D3DPRIMCAPS      dpcLineCaps;
    D3DPRIMCAPS      dpcTriCaps;
    DWORD            dwDeviceRenderBitDepth;
    DWORD            dwDeviceZBufferBitDepth;
    DWORD            dwMaxBufferSize;
    DWORD            dwMaxVertexCount;
} D3DDEVICEDESC,     *LPD3DDEVICEDESC;
```

の の の**IDirect3DDevice::GetCaps** の の

dwSize
,, ‘‘,ƒƒƒ’^,ƒƒƒ

dwFlags
,, ‘‘,—Œ,ƒ ƒ, ’,,,,,ƒƒƒ,Ž•,,ƒƒƒ

D3DDD_BCLIPPING
bClippingƒƒƒ,—Œ

D3DDD_COLORMODEL
dcmColorModelƒƒƒ,—Œ

D3DDD_DEVCAPS
dwDevCapsƒƒƒ,—Œ

D3DDD_LIGHTINGCAPS
dlcLightingCapsƒƒƒ,—Œ

D3DDD_LINECAPS
dpcLineCapsƒƒƒ,—Œ

D3DDD_MAXBUFFERSIZE
dwMaxBufferSizeƒƒƒ,—Œ

D3DDD_MAXVERTEXCOUNT
dwMaxVertexCountƒƒƒ,—Œ

D3DDD_TRANSFORMCAPS
dtcTransformCapsƒƒƒ,—Œ

D3DDD_TRICAPS
dpcTriCapsƒƒƒ,—Œ

dcmColorModel
ƒƒƒƒ,ƒƒ ƒƒƒ,Ž',,,,**D3DCOLORMODEL**—‹Œƒƒƒ,,,,

dwDevCaps
ƒƒƒƒ,"—,Ž•,,ƒƒƒ

D3DDEVCAPS_EXECUTESYSTEMMEMORY
ƒƒƒƒ ƒƒƒ,Ž ƒƒƒƒ,Ž—‰"

D3DDEVCAPS_EXECUTEVIDEOMEMORY
ƒƒƒ ƒƒƒ,Ž ƒƒƒƒ,Ž—‰"

D3DDEVCAPS_FLOATTLVERTEX
•ŠŒ,'"ƒ ƒ,•" ",Ž"

D3DDEVCAPS_SORTDECREASINGZ
",Œ •Œ,ƒ ƒ,,,ƒ ƒ,•—

D3DDEVCAPS_SORTEXACT
–,ƒ ƒ,,,ƒ ƒ,•—

D3DDEVCAPS_SORTINCREASINGZ
Z'‰•Œ,ƒ ƒ,,,ƒ ƒ,•—

D3DDEVCAPS_TEXTURESYSTEMMEMORY
ƒƒƒƒ ƒƒƒ,,ƒƒƒƒƒ,Ž"‰"

D3DDEVCAPS_TEXTUREVIDEOMEMORY
ƒƒƒƒƒƒƒ,,ƒƒƒƒƒ,Ž"‰"

D3DDEVCAPS_TLVERTEXSYSTEMMEMORY
'",•Š,,,–,,,,,, ƒƒƒƒ ƒƒƒ,ƒƒƒƒ,Ž—‰"

D3DDEVCAPS_TLVERTEXVIDEOMEMORY
'",•Š,,,–,,,,,, ƒƒƒ ƒƒƒ,ƒƒƒƒ,Ž—‰"

dtcTransformCaps
ƒƒƒƒ,•Š"—,Ž',,**D3DTRANSFORMCAPS** '',ƒƒƒ,,,,

bClipping
ƒƒƒƒ,3Dƒƒƒƒƒƒ,Ž ‰",,,, TRUE,,,

dlcLightingCaps
ƒƒƒƒ,ŒŒ"—,Ž',,**D3DLIGHTINGCAPS** '',ƒƒƒ,,,,

dpcLineCaps¤dpcTriCaps
,ŽŠŒ,•‰,,,, ƒƒƒƒ,ƒƒ ƒ •,'‹,,**D3DPRIMCAPS** ''

dwDeviceRenderBitDepth
ƒƒƒƒ,ƒƒƒƒƒƒ¥ƒƒƒ " Ž,DirectDrawƒƒƒ "' DDBD_8 DDBD_16 DBD_24 DDBD_32,",,,^ , ',,,

dwDeviceZBufferBitDepth
ƒƒƒƒ,Zƒƒƒƒ,ƒƒƒ " Ž,DirectDrawƒƒƒ "' DDBD_8 DDBD_16 DDBD_24 DDBD_32,",,,^ , ',,,

dwMaxBufferSize
,,ƒƒƒƒ,Ž ƒƒƒƒ, 'ƒƒƒ ,,ƒƒƒ,0,,,, ƒƒƒƒ ƒƒƒ,,,,,,ƒƒƒ,,Ž—‰",,,

dwMaxVertexCount
,,ƒƒƒƒ, '"

D3DCOLORMODEL D3DFINDDEVICERESULT
D3DLIGHTINGCAPS D3DPRIMCAPS D3DTRANSFORMCAPS

D3DEXECUTEBUFFERDESC

```
typedef struct _D3DExecuteBufferDesc {
    DWORD  dwSize;
    DWORD  dwFlags;
    DWORD  dwCaps;
    DWORD  dwBufferSize;
    LPVOID lpData;
} D3DEXECUTEBUFFERDESC;
typedef D3DEXECUTEBUFFERDESC *LPD3DEXECUTEBUFFERDESC;
```

IDirect3DDevice::CreateExecuteBuffer IDirect3DExecuteBuffer::Lock
の

dwSize
,, ‘‘,fff’^,fff

dwFlags
,, ‘‘,—Œ,f f, ’,,,,,fff,Ž•,,fff

D3DDEB_BUFSIZE	**dwBufferSize**fff,—Œ
D3DDEB_CAPS	**dwCaps**fff,—Œ
D3DDEB_LPDATA	**lpData**fff,—Œ

dwCaps
Ž ffff,fff’,^’

D3DDEBCAPS_MEM
D3DDEBCAPS_SYSTEMMEMORY,
D3DDEBCAPS_VIDEOMEMORY,˜—˜(**OR**)

D3DDEBCAPS_SYSTEMMEMORY
Ž ffff,f f,ffff fff,‘ ,,

D3DDEBCAPS_VIDEOMEMORY
Ž ffff,f f,fffffff,‘ ,,

dwBufferSize
Ž ffff,fff’^,fff

lpData
ffff f f,,ffff

D3DEXECUTEDATA

```
typedef struct _D3DEXECUTEDATA {
    DWORD     dwSize;
    DWORD     dwVertexOffset;
    DWORD     dwVertexCount;
    DWORD     dwInstructionOffset;
    DWORD     dwInstructionLength;
    DWORD     dwHVertexOffset;
```

```
    D3DSTATUS dsStatus;
} D3DEXECUTEDATA, *LPD3DEXECUTEDATA;
```

IDirect3DDevice::Execute ◊◊dwInstructionOffset

dwSize
,, ‘‘,fff’^,fff

dwVertexOffset
’“fff,fffff

dwVertexCount
Ž ,,’“

dwInstructionOffset
Ž ——fff,fffff

dwInstructionLength
Ž ——,’,

dwHVertexOffset
ffff fff,ffffff,•—,,,fff f •f f,—,,,,,,,Ž—,,,“Ž,’“,fffff

dsStatus
•Š —ŒŽ—,,,fff f”^,Š”,,’ ,,’, **D3DSTATUS** ‘‘,,,
D3DSTATUS

D3DFINDDEVICERESULT

```
typedef struct _D3DFINDDEVICERESULT {
    DWORD         dwSize;
    GUID          guid;
    D3DDEVICEDESC ddHwDesc;
    D3DDEVICEDESC ddSwDesc;
} D3DFINDDEVICERESULT, *LPD3DFINDDEVICERESULT;
```

IDirect3D::FindDevice

dwSize
,, ‘‘,fff’^,fff

guid
Œ ,,,ffff,ff ff ff fŽ•Ž(GUID)

ddHwDesc¤ddSwDesc
Œ ,,,f ffff,ffffff,ffff,Ž,**D3DDEVICEDESC** ‘‘
D3DFINDDEVICESEARCH

D3DFINDDEVICESEARCH

```
typedef struct _D3DFINDDEVICESEARCH {
    DWORD         dwSize;
    DWORD         dwFlags;
    BOOL          bHardware;
```

```
    D3DCOLORMODEL dcmColorModel;
    GUID          guid;
    DWORD         dwCaps;
    D3DPRIMCAPS   dpcPrimCaps;
} D3DFINDDEVICESEARCH, *LPD3DFINDDEVICESEARCH;
```

のの IDirect3D::FindDevice

dwSize
,, ‘‘,fff’^,fff

dwFlags
ffff fff,Œ ,,,ffffŒ,’‹,,fff ,,fff,, Ž,’,“,,,^ , ’,,,

D3DFDS_ALPHACMPCAPS
,, ‘‘,**dpcPrimCaps**fff,,,Ž’,,,**D3DPRIMCAPS** ‘‘,**dwAlphaCmpCaps**fff,^’,,

D3DFDS_COLORMODEL
,, ‘‘,**dcmColorModel**fff,Ž’,,,ff ¥fff,^’,,

D3DFDS_DSTBLENDCAPS
,, ‘‘,**dpcPrimCaps**fff,,,Ž’,,,**D3DPRIMCAPS** ‘‘,**dwDestBlendCaps**fff,^’,,

D3DFDS_GUID
,, ‘‘,**guid**fff,Ž’,,,ff ff ff fŽ•Ž(GUID),^’,,

D3DFDS_HARDWARE
,, ‘‘,**bHardware**fff,—,,,,,,f ffff,ffffff,Ž““—,^’,,

D3DFDS_LINES
D3DDEVICEDESC ‘‘,**dpcLineCaps**fff,Ž’,,, **D3DPRIMCAPS** ‘‘,^’ ,,

D3DFDS_MISCCAPS
,, ‘‘,**dpcPrimCaps**fff,,,Ž’,,,**D3DPRIMCAPS** ‘‘,**dwMiscCaps**fff,^’ ,,

D3DFDS_RASTERCAPS
,, ‘‘,**dpcPrimCaps**fff,,,Ž’,,,**D3DPRIMCAPS** ‘‘,**dwRasterCaps**fff ,^’,,

D3DFDS_SHADECAPS
,, ‘‘,**dpcPrimCaps**
fff,,,Ž’,,,**D3DPRIMCAPS** ‘‘,**dwShadeCaps**fff,^’,,

D3DFDS_SRCBLENDCAPS
,, ‘‘,**dpcPrimCaps**fff,,,Ž’,,,**D3DPRIMCAPS** ‘‘,**dwSrcBlendCaps**fff,^’,,

D3DFDS_TEXTUREBLENDCAPS
,, ‘‘,**dpcPrimCaps**fff,,,Ž’,,,**D3DPRIMCAPS** ‘‘, **dwTextureBlendCaps**fff,^’,,

D3DFDS_TEXTURECAPS
,, ‘‘,**dpcPrimCaps**
fff,,,Ž’,,, **D3DPRIMCAPS** ‘‘,**dwTextureCaps**fff,^’,,

D3DFDS_TEXTUREFILTERCAPS

,, ‘‘,**dpcPrimCaps**fff,,,Ž’,,,**dwTextureCaps** ‘‘, **dwTextureFilterCaps** fff,^’,,

D3DFDS_TRIANGLES

D3DDEVICEDESC ‘‘, **dwTextureFilterCaps**fff,Ž’,,, **D3DPRIMCAPS** ‘‘,^’,,

D3DFDS_ZCMPCAPS

,, ‘‘,**dpcPrimCaps**fff,,,Ž’,,,**D3DPRIMCAPS** ‘‘,**dwZCmpCaps**fff ,^’,,

bHardware

Ž“,,ffff, f ffff,ffffff,,,,,,,,Ž’,,fff ,,fff,TRUE,,,, f ffff,fff, Ž“,, ,,, f ffff fffff fff, , ,,fff,Ž— ,,ffff fff, **dwFlags**fff,D3DFDS_HARDWAREfff, ’,,,,

dcmColorModel

fff,RGBff ¥fff,Ž“,,ffff,Ž’,,**D3DCOLORMODEL**—‹Œfff,,,,

guid

Œ ,,ffff,ff ff ff fŽ•Ž(GUID)

dwCaps

”—,fff

dpcPrimCaps

,,,,,ffffffŒ,,,,ffff,”—,Ž,**D3DPRIMCAPS** ‘‘,Ž’,,

D3DFINDDEVICERESULT

D3DHVERTEX

```
typedef struct _D3DHVERTEX {
    DWORD        dwFlags;
    union {
        D3DVALUE hx;
        D3DVALUE dvHX;
    };
    union {
        D3DVALUE hy;
        D3DVALUE dvHY;
    };
    union {
        D3DVALUE hz;
        D3DVALUE dvHZ;
    };
} D3DHVERTEX, *LPD3DHVERTEX;
```

の D3DTRANSFORMDATA の

dwFlags

“Ž’“,ffffff ‘,’‹,,fff ,,fff, **D3DTRANSFORMDATA** ‘‘,**dwClip**fff, fff,,,,^ ’,,,

dvHX dvHY dvHZ

“Ž •,,•Š,Ž’,,**D3DVALUE**Œ,’ ,,,, •, ’“,Ž,

D3DINSTRUCTION

```
typedef struct _D3DINSTRUCTION {
    BYTE bOpcode;
    BYTE bSize;
    WORD wCount;
} D3DINSTRUCTION, *LPD3DINSTRUCTION;
```

の¥ののの

bOpcode
D3DOPCODE —‹Œ,ƒƒƒ,,,Ž',,,ƒƒƒƒƒƒ——

bSize
——ƒ ƒƒƒƒƒ,ƒƒƒ ,,ƒƒƒ, Ž,Ž,——,",,,,Ž,,,

wCount
',,——ƒ ƒ ,,ƒƒƒ, ŽŠŒ,ƒƒƒƒ,,,,,,ŽŠŒ,,,, Ž,——,,,,,Ž,Ž,,,

D3DLIGHT

```
typedef struct _D3DLIGHT {
    DWORD          dwSize;
    D3DLIGHTTYPE   dltType;
    D3DCOLORVALUE  dcvColor;
    D3DVECTOR      dvPosition;
    D3DVECTOR      dvDirection;
    D3DVALUE       dvRange;
    D3DVALUE       dvFalloff;
    D3DVALUE       dvAttenuation0;
    D3DVALUE       dvAttenuation1;
    D3DVALUE       dvAttenuation2;
    D3DVALUE       dvTheta;
    D3DVALUE       dvPhi;
} D3DLIGHT, *LPD3DLIGHT;
```

IDirect3DLight::SetLight IDirect3DLight::GetLight のの

dwSize
,, ‘',ƒƒƒ'^,ƒƒƒ

dltType
ŒŒ,Œ ,,', **D3DLIGHTTYPE**—‹Œ,ƒƒƒ,,,,,,,

dcvColor
ŒŒ, ,,ƒƒƒ, **D3DCOLORVALUE** ‘',,,

dvPosition¤**dvDirection**
ƒ ƒƒ‹Š,,ŒŒ,^',"^

dvRange
ŒŒ,—Œ"^

dvFalloff
‰(**dvTheta**ƒƒƒ,Ž',,,Š"),"‰,Š˜(**dvPhi**ƒƒƒ,Ž',,,Š")
,Š,‹",Œ ,, "‰",",‹", Ž,•'Ž,Ž,,,

$$Light \times \cos^{falloff}\left(\frac{\pi}{2}\left(\frac{2rho - dvTheta}{dvPhi - dvTheta}\right)\right)$$

,,•'Ž,, rho, ŽŽ,fffffff'“,,Š“,•,

dvAttenuation0
^',‹“ ŒŒ,**dvRange**fff,,,—,,,,'Ž“,Š,Œ ,,,ŒŒfff,Ž',,

dvAttenuation1
fff,Œ ,,‹“ ‹“, **dvRange**fff,,,—,,,,'Ž“,Š,'Š, ,,',50f fff,,,

dvAttenuation2
2ŽŒ —, ,,Œ ,,‹“

dvTheta
fffffff,“Š(ffff) ,,,,fffffff,‰ Œ,,,

dvPhi
fffffff,ŠŠ(ffff) ,,‰ Œ,Š‘,“, fffffff, ,,,,,

Ø 3 ØØØ d ØØ

$$attenuation = attenuation_0 + attenuation_1 \times d + attenuation_2 \times d^2$$

Ø

D3DLIGHTTYPE

D3DLIGHTDATA

```
typedef struct _D3DLIGHTDATA {
    DWORD                dwSize;
    LPD3DLIGHTINGELEMENT lpIn;
    DWORD                dwInSize;
    LPD3DTLVERTEX        lpOut;
    DWORD                dwOutSize;
} D3DLIGHTDATA, *LPD3DLIGHTDATA;
```

IDirect3DViewport::LightElements Ø

dwSize
,, ‘‘,fff'^,fff

lpIn
“—'“,– ffff,Ž',,**D3DLIGHTINGELEMENT** ‘‘,,ffff

dwInSize
Ž,“——‘,,^“— ,,, ffff fff,—‘,fffff —, —Šf f,Š”,,,,,'‹,,,

lpOut
— ,Ž',,**D3DTLVERTEX** ‘‘,,ffff

dwOutSize
Ž, — ,,,^“— ,,, ffff fff, ,fffff —, —Šf f,Š”,,,,,'‹,,,

D3DLIGHTINGCAPS

```
typedef struct _D3DLIGHTINGCAPS {
    DWORD dwSize;
    DWORD dwCaps;
    DWORD dwLightingModel;
    DWORD dwNumLights;
} D3DLIGHTINGCAPS, *LPD3DLIGHTINGCAPS;
```

のの D3DDEVICEDESC の

dwSize
,, ‘‘,fff’^,fff

dwCaps
ŒŒfff f,”—,Ž,fff Ž,fff,’‹,,,,,

D3DLIGHTCAPS_DIRECTIONAL
’ŽŒ,ff f,,

D3DLIGHTCAPS_GLSPOT
Open-GLffff,fffffff,ff f,,

D3DLIGHTCAPS_PARALLELPOINT
• Œ,ff f,,

D3DLIGHTCAPS_POINT
“ŒŒ,ff f,,

D3DLIGHTCAPS_SPOT
fffffff,ff f,,

dwLightingModel
ŒŒfff, RGB,ffff,,,,,’‹,,fff Ž,fff,’‹,,,

D3DLIGHTINGMODEL_MONO ffffŒŒfff

D3DLIGHTINGMODEL_RGB RGBŒŒfff

dwNumLights
Ž—,,,ŒŒ

D3DLIGHTINGELEMENT

```
typedef struct _D3DLIGHTINGELEMENT {
    D3DVECTOR dvPosition;
    D3DVECTOR dvNormal;
} D3DLIGHTINGELEMENT, *LPD3DLIGHTINGELEMENT;
```

のの D3DLIGHTDATA の

dvPosition
fff‹Š,, –^’,Ž’,,’ ,,’, **D3DVECTOR** ‘‘,,,

dvNormal
– ffff,Ž’,,’ ,,’, **D3DVECTOR** ‘‘,,,

D3DLIGHTDATA IDirect3DViewport::LightElements

D3DLINE

```
typedef struct _D3DLINE {
    union {
        WORD v1;
        WORD wV1;
    };
    union {
        WORD v2;
        WORD wV2;
    };
} D3DLINE, *LPD3DLINE;
```

D3DOPCODE の D3DOP_LINE のの

wV1¤wV2
’“,ffffff

1

D3DLINEPATTERN

```
typedef struct _D3DLINEPATTERN {
    WORD wRepeatFactor;
    WORD wLinePattern;
} D3DLINEPATTERN;
```

の D3DRENDERSTATETYPE の D3DRENDERSTATE_LINEPATTERN

wRepeatFactor
ff fŠŽ, ”,,, ŠŽ‘,Ž—,,,**wLinePattern**fff,Ž’,,,ff f,fff

wLinePattern
fff¥ff f,Ž’,,fff ,,,, ’1100110011001100, fff¥fff, ,,

D3DLVERTEX

```
typedef struct _D3DLVERTEX {
    union {
        D3DVALUE x;
        D3DVALUE dvX;
    };
    union {
        D3DVALUE y;
        D3DVALUE dvY;
    };
    union {
        D3DVALUE z;
        D3DVALUE dvZ;
    };
    DWORD        dwReserved;
    union {
        D3DCOLOR color;
```

```
        D3DCOLOR dcColor;
    };
    union {
        D3DCOLOR specular;
        D3DCOLOR dcSpecular;
    };
    union {
        D3DVALUE tu;
        D3DVALUE dvTU;
    };
    union {
        D3DVALUE tv;
        D3DVALUE dvTV;
    };
} D3DLVERTEX, *LPD3DLVERTEX;
```

(ტ)ტტტ

dvX, **dvY**, **dvZ**
’“,“Ž •,Ž’,,**D3DVALUE**Œ,’

dwReserved
—— , 0,,,,,,,,

dcColor¤dcSpecular
’“, ,“‰,Ž’,,**D3DCOLOR**Œ,’

dvTU¤dvTV
’“,*fffff* •,Ž’,,**D3DVALUE**Œ,’

D3DMATERIAL

```
typedef struct _D3DMATERIAL {
    DWORD             dwSize;
    union {
        D3DCOLORVALUE diffuse;
        D3DCOLORVALUE dcvDiffuse;
    };
    union {
        D3DCOLORVALUE ambient;
        D3DCOLORVALUE dcvAmbient;
    };
    union {
        D3DCOLORVALUE specular;
        D3DCOLORVALUE dcvSpecular;
    };
    union {
        D3DCOLORVALUE emissive;
        D3DCOLORVALUE dcvEmissive;
    };
    union {
        D3DVALUE      power;
        D3DVALUE      dvPower;
    };
    D3DTEXTUREHANDLE  hTexture;
    DWORD             dwRampSize;
```

```
} D3DMATERIAL, *LPD3DMATERIAL;
```

IDirect3DMaterial::GetMaterial IDirect3DMaterial::SetMaterial のの

dwSize
,, ‘‘,fff’^,fff

dcvDiffuse dcvAmbient dcvSpecular dcvEmissive
,,,, fffff,ŠŽ •^ “‰ •Ž ,Ž’,,’ ,,,,’, **D3DCOLORVALUE** ‘‘, ,,

dvPower
“‰,fffff,‹,,Ž’,,**D3DVALUE**Œ,’

hTexture
fffff¥fff,ffff

dwRampSize
,Œ Ž,‘,, ’ ,(ŒŽ)ffff,, ”Œ,Ž’,,,fffff,,,, ,,’,1^‰ ,,,,,,,,, ,,‘,,, ”Œ,•Ž,,,, ,,“,, ”Œ,Ž’,,,fffff,**dwRampSize**fff,1^ ,fff ff,Œ ,,,,,,,,•,,

のの

IDirect3DMaterial::GetMaterial IDirect3DMaterial::SetMaterial

D3DMATRIX

```
typedef struct _D3DMATRIX {
    D3DVALUE _11, _12, _13, _14;
    D3DVALUE _21, _22, _23, _24;
    D3DVALUE _31, _32, _33, _34;
    D3DVALUE _41, _42, _43, _44;
} D3DMATRIX, *LPD3DMATRIX;
```

IDirect3DDevice::GetMatrix IDirect3DDevice::SetMatrix

Direct3D の_44 のの-1

IDirect3DDevice::GetMatrix IDirect3DDevice::SetMatrix

D3DMATRIXLOAD

```
typedef struct _D3DMATRIXLOAD {
    D3DMATRIXHANDLE hDestMatrix;
    D3DMATRIXHANDLE hSrcMatrix;
} D3DMATRIXLOAD, *LPD3DMATRIXLOAD;
```

D3DOPCODE の D3DOP_MATRIXLOAD のの¥

hDestMatrix ¤ hSrcMatrix
‘‘ ,‘‘Œ, —,ffff

D3DOPCODE

D3DMATRIXMULTIPLY

```
typedef struct _D3DMATRIXMULTIPLY {
    D3DMATRIXHANDLE hDestMatrix;
    D3DMATRIXHANDLE hSrcMatrix1;
    D3DMATRIXHANDLE hSrcMatrix2;
} D3DMATRIXMULTIPLY, *LPD3DMATRIXMULTIPLY;
```

D3DOPCODE の D3DOP_MATRIXMULTIPLY のの¥

hDestMatrix
ŒŽŒ‰,Š”,, —,ƒƒƒƒ

hSrcMatrix1 ¤ hSrcMatrix2
1”–,2”–,ŒŽ‘ , —,ƒƒƒƒ

D3DOPCODE

D3DPICKRECORD

```
typedef struct _D3DPICKRECORD {
    BYTE     bOpcode;
    BYTE     bPad;
    DWORD    dwOffset;
    D3DVALUE dvZ;
} D3DPICKRECORD, *LPD3DPICKRECORD;
```

IDirect3DDevice::GetPickRecords のの

bOpcode
‘‘ƒƒƒƒƒƒ,ƒƒƒ ƒ

bPad
Padƒƒƒ

dwOffset
Œ ,,,‘‘ƒƒƒƒƒƒ,Ž ƒƒƒƒ, “,,,ƒƒƒƒƒ

dvZ
‘‘ƒƒƒƒƒƒ, “

の x y **IDirect3DDevice::Pick**

IDirect3DDevice::GetPickRecords IDirect3DDevice::Pick

D3DPOINT

```
typedef struct _D3DPOINT {
    WORD wCount;
    WORD wFirst;
} D3DPOINT, *LPD3DPOINT;
```

D3DOPCODE の D3DOP_POINT の¥

wCount
’“,

wFirst
,’“,ffffff

D3DOPCODE

D3DPRIMCAPS

```
typedef struct _D3DPrimCaps {
    DWORD dwSize;
    DWORD dwMiscCaps;
    DWORD dwRasterCaps;
    DWORD dwZCmpCaps;
    DWORD dwSrcBlendCaps;
    DWORD dwDestBlendCaps;
    DWORD dwAlphaCmpCaps;
    DWORD dwShadeCaps;
    DWORD dwTextureCaps;
    DWORD dwTextureFilterCaps;
    DWORD dwTextureBlendCaps;
    DWORD dwTextureAddressCaps;
    DWORD dwStippleWidth;
    DWORD dwStippleHeight;
} D3DPRIMCAPS, *LPD3DPRIMCAPS;
```

ののののの**D3DDEVICEDESC** ののの

dwSize
,, ‘‘,fff’^,fff

dwMiscCaps
,,ffffff,‘“,”— ,,fff,, Ž,’,,,^ , ’,,,

D3DPMISCCAPS_CONFORMANT
ffff, OpenGL• , ,,,,

D3DPMISCCAPS_CULLCCW
ffff, D3DRENDERSTATE_CULLMODE ‘,‘‘,, ‰ ,,ff f,,(ŽŠŒ,ffffff, ,,) **D3DCULL** —‹Œ,**D3DCULL_CCW**fff,‘‰,,

D3DPMISCCAPS_CULLCW
ffff, D3DRENDERSTATE_CULLMODE ‘,‘‘,,‰‰ ,,ŽŠŒ,ff f,,(ŽŠŒ,ffffff, ,,) **D3DCULL** —‹Œ,**D3DCULL_CCW**fff,‘‰,,

D3DPMISCCAPS_CULLNONE
ffff, ‘‘,,,,ŽŠŒ,Ž ,,,, **D3DCULL**—‹Œ,**D3DCULL_NONE**fff,‘‰ ,,

D3DPMISCCAPS_LINEPATTERNREP
ffff, **D3DLINEPATTERN** ‘‘,**wRepeatFactor**fff,1^ ,’,Ž— ,,,(’ •‰,ffffff, ,,)

D3DPMISCCAPS_MASKPLANES

ƒƒƒƒ, ,ƒƒƒƒƒƒ,Ž ,,,

D3DPMISCCAPS_MASKZ

ƒƒƒƒ, ƒƒƒƒ —,Zƒƒƒƒ, ,‰”,,,,•‰”,,,,,,

dwRasterCaps

ƒƒƒ•‰,”— • ,,ƒƒƒ,, Ž,’,,,,^ ’,,,

D3DPRASTERCAPS_DITHER

ƒƒƒƒ, , Œ—,—,,,,,,ƒƒƒ•Ž,,,

D3DPRASTERCAPS_FOGTABLE

ƒƒƒƒ, ƒƒƒƒ, ,,Ž,ƒƒƒ’,•Š,,Ž“ƒ ƒƒ, ,, ƒƒƒ’,Ž ,,

D3DPRASTERCAPS_FOGVERTEX

ƒƒƒƒ, – —,Š’ **3DTLVERTEX** ‘‘,**specular**ƒƒƒ,—
,,,,**D3DCOLOR**’,ƒƒƒƒ •’,’,ŒŽ,, ,,, ƒƒƒ,Š’ ƒƒƒ’, ,Š,,

D3DPRASTERCAPS_PAT

ƒƒƒƒ, ƒƒ ƒ•‰, —,,, (D3DRENDERSTATE_LINEPATTERN,
D3DRENDERSTATE_STIPPLEPATTERNƒƒƒƒƒƒ ‘,,,,,, •,“,,,,)ƒƒƒƒ
ƒƒ—, ‰,,,

D3DPRASTERCAPS_ROP2

ƒƒƒƒ, R2_COPYPENˆŠ,ƒƒƒ —,ƒƒ ƒ,,,

D3DPRASTERCAPS_STIPPLE

ƒƒƒƒ, ”“–,ƒƒƒƒ ƒ,,ƒƒƒƒ,“•,,,

D3DPRASTERCAPS_SUBPIXEL

ƒƒƒƒ, ^”‹, Œ,ƒƒƒƒ •,,, Z ƒƒƒƒ,ƒ ƒ,ƒƒƒƒƒ”’, —
,, ,,, Z,ƒƒ ƒ ,”,,,, ,,(,ƒƒƒ,ƒƒƒƒ,ƒƒƒƒ’,) ,,,, —Œ,,,–
Œ,,,,,,,,(ƒƒƒƒ, ƒƒƒƒƒ”’,Ž ,,, ,,,,,,,,) ,,ƒƒƒ, ƒƒƒƒƒ,Ž,Œ’,,,,,,,,
Direct3Dƒƒƒƒƒƒ,’‹,,,

D3DPRASTERCAPS_SUBPIXELX

ƒƒƒƒ, XŽ,‰
,,ƒƒƒƒƒ”’,,, Œ,YŽ,‘ , , ,,,,,,, ƒƒƒƒƒ”’,,,,, , *D3DPRASTERCAPS_SUBPIXEL*,Ž ,,,,

D3DPRASTERCAPS_XOR

ƒƒƒƒ,”‘“˜—˜ —(XOR)
,ƒƒ ƒ,, ,,ƒƒƒ, ’,,, D3DPRIM_RASTER_ROP2, ’,,,,, , ”‘“˜—
˜ —,ƒƒ ƒ,,,,,,,,,,,

D3DPRASTERCAPS_ZTEST

ƒƒƒƒ,Zƒƒƒ —
,Ž ,,, ,,, Œ‰“,ƒƒƒƒƒƒ,ƒƒƒƒƒƒ, ƒƒƒƒƒƒ,,,,,,,Zƒƒƒƒ,,•Ž,,

dwZCmpCaps

ƒƒƒƒ,Ž ‰”,Š ,”Š,,Zƒƒƒƒ ,,ƒƒƒ, Ž,’,,,,^ ’,,,

D3DPCMPCAPS_ALWAYS

,,,Zƒƒƒ,’,

D3DPCMPCAPS_EQUAL

‹,Z,Œ ,Z,“,, Zƒƒƒ,’,

D3DPCMPCAPS_GREATER

‹,Z,Œ ,Z,,‘,, Zƒƒƒ,’,

D3DPCMPCAPS_GREATEREQUAL

‹,Z,Œ ,Z,,‘,,,“,, Zƒƒƒ,’,

D3DPCMPCAPS_LESS

‹,Z,Œ ,Z,, ,, Zƒƒƒ,’,

D3DPCMPCAPS_LESSEQUAL

‹,Z,Œ ,Z,, ,,,“,, Zƒƒƒ,’,

D3DPCMPCAPS_NEVER

,,,Zƒƒƒ,Ž”,,

D3DPCMPCAPS_NOTEQUAL

‹,Z,Œ ,Z,“,,,, Zƒƒƒ,’,

dwSrcBlendCaps

ƒ ƒ • ,,ƒƒƒ, Ž,’,,,,ˆ ’,,,(RGBA’,ƒ ƒ,ƒƒƒƒƒ ƒƒƒ, ,,,,s,d,•,)

D3DPBLENDCAPS_BOTHINVSRCALPHA

ƒ ƒ —‘(1-As, 1-As, 1-As, 1-As),ƒƒƒƒƒ ƒƒƒ —‘(As, As, As, As) ƒƒƒƒƒ ƒƒƒ ,‘‘, –Œ,,,

D3DPBLENDCAPS_BOTHSRCALPHA

ƒ ƒ —‘(As, As, As, As),ƒƒƒƒƒ ƒƒƒ —‘(1-As, 1-As, 1-As, 1-As) ƒƒƒƒƒ ƒƒƒ ,‘‘, –Œ,,,

D3DPBLENDCAPS_DESTALPHA

—‘(Ad, Ad, Ad, Ad)

D3DPBLENDCAPS_DESTCOLOR

—‘(Rd, Gd, Bd, Ad)

D3DPBLENDCAPS_INVDESTALPHA

—‘(1-Ad, 1-Ad, 1-Ad, 1-Ad)

D3DPBLENDCAPS_INVDESTCOLOR

—‘(1-Rd, 1-Gd, 1-Bd, 1-Ad)

D3DPBLENDCAPS_INVSRCALPHA

—‘(1-As, 1-As, 1-As, 1-As)

D3DPBLENDCAPS_INVSRCCOLOR

—‘(1-Rd, 1-Gd, 1-Bd, 1-Ad)

D3DPBLENDCAPS_ONE

—‘(1, 1, 1, 1)

D3DPBLENDCAPS_SRCALPHA

—‘(As, As, As, As)

D3DPBLENDCAPS_SRCALPHASAT

—‘(f, f, f, 1) f = min(As, 1-Ad)

D3DPBLENDCAPS_SRCCOLOR

—‘(Rs, Gs, Bs, As)

D3DPBLENDCAPS_ZERO

—‘(0, 0, 0, 0)

dwDestBlendCaps

fffff fff • ,,*fff*, **dwSrcBlendCaps***fff*,’‹,,,”— •,“,,,,

dwAlphaCmpCaps

ffff,Ž ‰”,Š ,”Š,,*ffff fff* ,,*fff*, **dwZCmpCaps***fff*,’‹,,,”— •,“,,,,

dwShadeCaps

ffff,Ž ,,*ff ffff* — ˆ”“, *ffff*,—,,,,*ffff*(**D3DOP_TRIANGLE**,,,,) ,Ž ,,, , D3DSHADE_FLAT*f f*(**D3DSHADEMODE**—‹Œ,Ž’,,,,,,) ,*ff f*,, ,,*fff*, *ff ff ffff*,*fff ff ffff*,*ff f*,,*ffff*, ,,*ff f f*,,,,,*ff f*,,,*ffff* ,Ž’,, *ffff*—‘,— ,,,,*f f*,*ff f*,,,, ,,*f f*, ,,, ,*ffff*’,•,255,,, ,, ’, *ffff*, ‘’(*ffff* , ‹),,,

ŽŠŒ, *fffff*“‰ *fff ffff* •,,,,,, *ffff ffff*,*ffff fff*,’’,,”— *fff*,,,

,,*fff*, *ff ffff f f ff fff* ,,, ,“•,,, ,*ffff* •, ,,, , *ffff* ,Ž ,,,,

,,*fff*, Ž,’,,,ˆ ’,,,

D3DPSHADECAPS_ALPHAFLATBLEND

D3DPSHADECAPS_ALPHAFLATSTIPPLED

ffff, “‰“,,,,, ,“•,,,•–(**D3DSHADEMODE** —‹Œ,D3DSHADE_FLAT) ,*ffff* •,*ff f*,,, ,,,,*f f*, ,,,,—‘,,,,*ffff* •, —‘, ,’“, ,1••,,,—,,,,

D3DPSHADECAPS_ALPHAGOURAUDBLEND

D3DPSHADECAPS_ALPHAGOURAUDSTIPPLED

ffff, “‰“,,,,, ,“•,,,*ff* (**D3DSHADEMODE** —‹Œ,D3DSHADE_GOURAUD) ,*ffff* •,*ff f*,,, ,,,,*f f*,, *ffff* •,’“,,,,,, ‘, •,,,, , ,,,

D3DPSHADECAPS_ALPHAPHONGBLEND

D3DPSHADECAPS_ALPHAPHONGSTIPPLED

ffff, “‰“,,,,, ,“•,,,*fff*(**D3DSHADEMODE** —‹Œ,D3DSHADE_PHONG),*ffff* •,*ff f*,,, ,,,,*f f*, ’“*fff f*, — , •,“‰,,ŒŒŒ‰,*ffff*’ˆ, •‰,,,

D3DPSHADECAPS_COLORFLATMONO

D3DPSHADECAPS_COLORFLATRGB

ffff, **D3DCOLOR_MONO**,**D3DCOLOR_RGB***ff f f*,•– *ff ffff*, •,,*ff f*,,, ,,,,*f f*,, ,,,,—‘, •, —‘, ,’“, ,,,— ,,,, *ffff*ŒŒ*f f*, , •,,, ,Š,,,, RGBŒŒ*f f*,, — •, ,Š,,,,

D3DPSHADECAPS_COLORGOURAUDMONO

D3DPSHADECAPS_COLORGOURAUDRGB

ffff, **D3DCOLOR_MONO**,**D3DCOLOR_RGB***ff f f*,*ff ff f fff*, •,,*ff f*,,, ,,,,*f f*, ,,,,—‘,,,,*ffff* •,’“,,,,,, ‘, •,,,,•–

,“,, , ,,, ffffŒŒf f, , •,,, ,Š,,,, RGBŒŒf f,, — •, ,Š,,,,

D3DPSHADECAPS_COLORPHONGMONO

D3DPSHADECAPS_COLORPHONGRGB

ffff, **D3DCOLOR_MONO**,**D3DCOLOR_RGB**ff f f,fff ff f fff, •,,ff f,,, ,,,,f f, ’“fff f,ffff’^, •‰,,, ŒŒŒ‰ , RGBf f, — , •,“‰,,, fff ff ffff,Œ ff f,,,,,,

D3DPSHADECAPS_FOGFLAT

D3DPSHADECAPS_FOGGOURAUD

D3DPSHADECAPS_FOGPHONG

ffff, •– ff ffff f,fff,ff f,,, fff ff ffff, Œ ff f,,,,,,

D3DPSHADECAPS_SPECULARFLATMONO

D3DPSHADECAPS_SPECULARFLATRGB

ffff, **D3DCOLOR_MONO**,**D3DCOLOR_RGB**ff f f,•– ff ffff,fffff“‰,ff f,,,

D3DPSHADECAPS_SPECULARGOURAUDMONO

D3DPSHADECAPS_SPECULARGOURAUDRGB

ffff, **D3DCOLOR_MONO**,**D3DCOLOR_RGB**ff f f,ff ff f fff,fffff“‰,ff f,,,

D3DPSHADECAPS_SPECULARPHONGMONO

D3DPSHADECAPS_SPECULARPHONGRGB

ffff, **D3DCOLOR_MONO**,**D3DCOLOR_RGB**ff f f,fff ff f fff,fffff“‰,ff f,,,

dwTextureCaps

fffff fffff • ,,fff, Ž,’,,,,^ ’,,,

D3DPTEXTURECAPS_ALPHA

D3DTEX_DECAL,D3DTEX_MODULATEfffffffff f f,RGBAfff ff,ff f,, ,,‹”, ’,,,,,, RGBfffff,,, ,,,,f f,ff f,,, ,,fff, ’ ,–Ž,,, ffff,Ž— ‰”,D3DTEX_DECAL_MASK D3DTEX_DECAL_ALPHA D3DTEX_MODULATE_ALPHAfffff f,ff f,,,

D3DPTEXTURECAPS_BORDER

‹Š ,‰,,fffff,,,fffff,ff f,,

D3DPTEXTURECAPS_PERSPECTIVE

“Ž“‰,ff f,,,

D3DPTEXTURECAPS_POW2

,,fff, ’,,, ffffff,,,fffff, 2 ,Ž’,,,•, ,,Ž,,,,,,,,,(ffffff fff ff, •,2 ŽŒ,,,,,,,,,)

D3DPTEXTURECAPS_SQUAREONLY

fffff, ,,,‹Œ,,,,,,,,,

D3DPTEXTURECAPS_TRANSPARENCY

“‰fffff,ff f,,,(Œ ,“‰ ,,,,,,,fffff,,•‰,,,)

dwTextureFilterCaps

fffff,fffff • ,,*fff*, Ž,',,,,^ ',,,

D3DPTFILTERCAPS_LINEAR

ffff,Ž,Š,*ffff*,2 2—^, ,•,,,,•‹' ,,, Š', ,—•,Ž— ,,, Š', ,*ff f*,,,,,,,, —•,*ff f*,,,,,,,,,,,

D3DPTFILTERCAPS_LINEARMIPLINEAR

D3DPRIM_TEX_MIP_LINEAR,"—,, ,,,,‹Ž*ffffff*, ,Š,,

D3DPTFILTERCAPS_LINEARMIPNEAREST

D3DPRIM_TEX_MIP_NEAREST,"—,, ,,,,‹Ž*ffffff*, ,Š,,

D3DPTFILTERCAPS_MIPLINEAR

D3DPRIM_TEX_LINEAR,"—,, ''*ffff*,'‰,,*ffffff*,Ž—,,

D3DPTFILTERCAPS_MIPNEAREST

D3DPRIM_TEX_NEAREST,"—,, ''*ffff*,'‰,,*ffffff*,Ž—,,

D3DPTFILTERCAPS_NEAREST

ffff',‹Ž •,*ffff*,Ž—,,, ,,, Š', ,—•,Ž—,,, Š', ,*ff f*,,,,,,,, —•,*ff f*,,,,,,,,,,,

dwTextureBlendCaps

fffff • *fffff f f*,Ž',,,,**D3DTEXTUREBLEND**—‹Œ, ‰ ,, ,,*fff*, Ž,',,,,^ ',,,

D3DPTBLENDCAPS_COPY

fffff f f,*ff* (**D3DTEXTUREBLEND** —‹Œ,,**D3DTBLEND_COPY**),*ff f*,,

D3DPTBLENDCAPS_DECAL

ff f¥*fffff f f*(**D3DTEXTUREBLEND** —‹Œ,,**D3DTBLEND_DECAL**),*ff f*,,

D3DPTBLENDCAPS_DECALALPHA

ff f¥*ffff*¥*fffff f f*(**D3DTEXTUREBLEND** —‹Œ,,**D3DTBLEND_DECALALPHA**),*ff f*,,

D3DPTBLENDCAPS_DECALMASK

ff f¥*fff*¥*fffff f f*(**D3DTEXTUREBLEND** —‹Œ,,**D3DTBLEND_DECALMASK**),*ff f*,,

D3DPTBLENDCAPS_MODULATE

•'*fffff f f*(**D3DTEXTUREBLEND** —‹Œ,,**D3DTBLEND_MODULATE**),*ff f*,,

D3DPTBLENDCAPS_MODULATEALPHA

•'*ffff*¥*fffff f f*(**D3DTEXTUREBLEND** —‹Œ,,**D3DTBLEND_MODULATEALPHA**),*ff f*,,

D3DPTBLENDCAPS_MODULATEMASK

•'*fff*¥*fffff f f*(**D3DTEXTUREBLEND** —‹Œ,,**D3DTBLEND_MODULATEMASK**),*ff f*,,

dwTextureAddressCaps

fffff,ffff • ,,*fff*, Ž,',,,,^ ',,,

D3DPTADDRESSCAPS_CLAMP

ffff, fffff,Œ',‰",,,

D3DPTADDRESSCAPS_MIRROR

ffff, fffff,"",‰",,,

D3DPTADDRESSCAPS_WRAP

ffff, fffff,',•,,‰",,,

dwStippleWidth ¤ dwStippleHeight

ff f,,,"•, '•, ,(32 32^)

D3DPROCESSVERTICES

```
typedef struct _D3DPROCESSVERTICES {
    DWORD dwFlags;
    WORD  wStart;
    WORD  wDest;
    DWORD dwCount;
    DWORD dwReserved;
} D3DPROCESSVERTICES, *LPD3DPROCESSVERTICES;
```

D3DOPCODE D3DOP_PROCESSVERTICES

dwFlags

ffff,,,'", —•–,Ž',,Ž,fff, ,,,^ ',,

D3DPROCESSVERTICES_COPY

'" •, ffff, ——,,, Ž ffff,','" •, ——,,,, ffff,'", —,,•— ,,,,, ,,Œ‰ —'",‰',,,

D3DPROCESSVERTICES_NOCOLOR

'", •,,,,,

D3DPROCESSVERTICES_OPMASK

D3DPROCESSVERTICES_NOCOLOR,

D3DPROCESSVERTICES_UPDATEEXTENTS,Ž ,**dwFlags**fff,',f ff,ffffff,Ž',,

D3DPROCESSVERTICES_TRANSFORM

'",•Š,,,

D3DPROCESSVERTICES_TRANSFORMLIGHT

'",•Š,, –Œ‰,—,,,,

D3DPROCESSVERTICES_UPDATEEXTENTS

,,,•ŠŒ,'","^ ,, •,**D3DSTATUS** '',**drExtent**fff,•,

wStart

f f, ,'",ffffff

wDest

f ff¥ffff, ,'",ffffff

dwCount

—,,,'"

dwReserved
—— , 0,,,,,,,,,
D3DOPCODE

D3DRECT

```
typedef struct _D3DRECT {
    union {
        LONG x1;
        LONG lX1;
    };
    union {
        LONG y1;
        LONG lY1;
    };
    union {
        LONG x2;
        LONG lX2;
    };
    union {
        LONG y2;
        LONG lY2;
    };
} D3DRECT, *LPD3DRECT;
```

lX1 ¤lY1
‹Œ, ‹, •
lX2 ¤lY2
‹Œ,‰‰‹, •
D3DRMUPDATECALLBACK IDirect3DDevice::Pick IDirect3DViewport::Clear

D3DSPAN

```
typedef struct _D3DSPAN {
    WORD wCount;
    WORD wFirst;
} D3DSPAN, *LPD3DSPAN;
```

D3DOPCODE ∩ D3DOP_SPAN ∩ y y

wCount
fff,
wFirst
,'“,*ffffff*
D3DOPCODE

D3DSTATE

```
typedef struct _D3DSTATE {
    union {
        D3DTRANSFORMSTATETYPE dtstTransformStateType;
        D3DLIGHTSTATETYPE     dlstLightStateType;
        D3DRENDERSTATETYPE    drstRenderStateType;
    };
    union {
        DWORD                 dwArg[1];
        D3DVALUE              dvArg[1];
    };
} D3DSTATE, *LPD3DSTATE;
```

D3DOPCODE ᑎᑎ D3DOP_STATETRANSFORM D3DOP_STATELIGHT D3DOP_STATERENDER ᑎᑎᑎᑎ2 ᑎᑎᑎᑎ

dtstTransformStateType dlstLightStateType drstRenderStateType
ffffff ‘,Ž’,,,**D3DTRANSFORMSTATETYPE D3DLIGHTSTATETYPE D3DRENDERSTATETYPE**—‹Œ,fff,,,,

dvArg
,, ‘‘, ,fff,Ž’,,,Œ,’

D3DLIGHTSTATETYPE D3DOPCODE D3DRENDERSTATETYPE D3DTRANSFORMSTATETYPE D3DVALUE

D3DSTATS

```
typedef struct _D3DSTATS {
    DWORD dwSize;
    DWORD dwTrianglesDrawn;
    DWORD dwLinesDrawn;
    DWORD dwPointsDrawn;
    DWORD dwSpansDrawn;
    DWORD dwVerticesProcessed;
} D3DSTATS, *LPD3DSTATS;
```

IDirect3DDevice::GetStats

dwSize
,, ‘‘,fff’^,fff

dwTrianglesDrawn, **dwLinesDrawn**, **dwPointsDrawn**, **dwSpansDrawn**
ffff, ^Œ•‰,,,ŽŠŒ “ fff,

dwVerticesProcessed
ffff, ^Œ —,,,’“,

IDirect3DDevice::GetStats

D3DSTATUS

```
typedef struct _D3DSTATUS {
    DWORD   dwFlags;
    DWORD   dwStatus;
```

```
    D3DRECT drExtent;
} D3DSTATUS, *LPD3DSTATUS;
```

の の の D3DEXECUTEDATA の D3DOPCODE の の D3DOP_SETSTATUS

dwFlags

ƒƒ ƒƒ ”^ ,,,,,—•,,,,,,Ž’,,Ž,ƒƒƒ,,,,, ’,,

D3DSETSTATUS_STATUS

ƒƒ ƒƒ, ’

D3DSETSTATUS_EXTENTS

drExtentƒƒƒ,Ž’,,,”^, ’

D3DSETSTATUS_ALL

ƒƒ ƒƒ,”^,—•, ’

dwStatus

ƒƒƒƒƒ¥ƒƒƒ ,,ƒƒƒ, Ž,ƒƒƒ,,,,^ , ’,,

‘, ,,,^”ƒƒƒ

D3DSTATUS_CLIPINTERSECTION

,,,,CLIPINTERSECTIONƒƒƒ,‘, ,,

D3DSTATUS_CLIPUNIONALL

,,,,CLIPUNIONƒƒƒ,‘, ,,

D3DSTATUS_DEFAULT

D3DSTATUS_CLIPINTERSECTION,

D3DSTATUS_ZNOTVISIBLEƒƒƒ,‘, ,, ,,’, ƒƒƒƒƒ,,,

D3DSTATUS_ZNOTVISIBLE

ƒƒƒƒŒ ƒƒƒ

D3DSTATUS_CLIPINTERSECTIONBACK

‰ Œ,Œ•ƒƒƒƒ–,’“,ƒƒƒƒƒƒ ƒƒƒ,˜— ,,,

D3DSTATUS_CLIPINTERSECTIONBOTTOM

‰ Œ,‰,’“,ƒƒƒƒƒƒ ƒƒƒ,˜— ,,,

D3DSTATUS_CLIPINTERSECTIONFRONT

‰ Œ,‘•ƒƒƒƒ–,’“,ƒƒƒƒƒƒ ƒƒƒ,˜— ,,,

D3DSTATUS_CLIPINTERSECTIONGEN0 D3DSTATUS_CLIPINTERSECTIONGEN5

ƒƒƒƒ ƒƒƒ’‹,ƒƒƒƒ–,˜— ,,,

D3DSTATUS_CLIPINTERSECTIONLEFT

‰ Œ, ‘,’“,ƒƒƒƒƒƒ ƒƒƒ,˜— ,,,

D3DSTATUS_CLIPINTERSECTIONRIGHT

‰ Œ,‰‘,’“,ƒƒƒƒƒƒ ƒƒƒ,˜— ,,,

D3DSTATUS_CLIPINTERSECTIONTOP

‰ Œ, ,’“,ƒƒƒƒƒƒ ƒƒƒ,˜— ,,,

ffffŒ fff

D3DSTATUS_CLIPUNIONBACK

D3DCLIP_BACK,“,

D3DSTATUS_CLIPUNIONBOTTOM

D3DCLIP_BOTTOM,“,

D3DSTATUS_CLIPUNIONFRONT

D3DCLIP_FRONT,“,

D3DSTATUS_CLIPUNIONGEN0 D3DSTATUS_CLIPUNIONGEN5

D3DCLIP_GEN0 D3DCLIP_GEN5,“,

D3DSTATUS_CLIPUNIONLEFT

D3DCLIP_LEFT,“,

D3DSTATUS_CLIPUNIONRIGHT

D3DCLIP_RIGHT,“,

D3DSTATUS_CLIPUNIONTOP

D3DCLIP_TOP,“,

Š–*ffffff*¥*fff*

D3DCLIP_BACK

‰ Œ,”–,,,*ffffff*,,,

D3DCLIP_BOTTOM

‰ Œ,’–,,,*ffffff*,,,

D3DCLIP_FRONT

‰ Œ,‘–,,,*ffffff*,,,

D3DCLIP_LEFT

‰ Œ, ‘–,,,*ffffff*,,,

D3DCLIP_RIGHT

‰ Œ,‰‘–,,,*ffffff*,,,

D3DCLIP_TOP

‰ Œ, ’–,,,*ffffff*,,,

D3DCLIP_GEN0 D3DCLIP_GEN5

ffff fff’‹,*ffff*–

drExtent

,,,,’“,,,“,Š,‹Œ,’‹,,**D3DRECT** ‘‘ ,,,, **D3DPROCESSVERTICES** ‘‘,’, ’,,,D3DPROCESSVERTICES_UPDATEEXTENTS*fff*,Ž“,,**D3DOP_PROCESSVERTICES***fff f*, —,Š,—^,’‹,,

ƠƠD3DOP_SETSTATUS

D3DEXECUTEDATA D3DOPCODE D3DRECT

D3DTEXTURELOAD

```
typedef struct _D3DTEXTURELOAD {
```

```
    D3DTEXTUREHANDLE hDestTexture;
    D3DTEXTUREHANDLE hSrcTexture;
} D3DTEXTURELOAD, *LPD3DTEXTURELOAD;
```

D3DOPCODE のの D3DOP_TEXTURELOAD の

hDestTexture
　‘‘ fffff,ffff

hSrcTexture
　‘‘Œfffff,ffff

hDestTexture　hSrcTexture

D3DTLVERTEX

```
typedef struct _D3DTLVERTEX {
    union {
        D3DVALUE sx;
        D3DVALUE dvSX;
    };
    union {
        D3DVALUE sy;
        D3DVALUE dvSY;
    };
    union {
        D3DVALUE sz;
        D3DVALUE dvSZ;
    };
    union {
        D3DVALUE rhw;
        D3DVALUE dvRHW;
    };
    union {
        D3DCOLOR color;
        D3DCOLOR dcColor;
    };
    union {
        D3DCOLOR specular;
        D3DCOLOR dcSpecular;
    };
    union {
        D3DVALUE tu;
        D3DVALUE dvTU;
    };
    union {
        D3DVALUE tv;
        D3DVALUE dvTV;
    };
} D3DTLVERTEX, *LPD3DTLVERTEX;
```

D3DLIGHTDATA のの(の)

dvSX, **dvSY**, **dvSZ**
　fff　f　•,’“,Ž’,,**D3DVALUE**Œ,’

dvRHW
D3DVALUEŒ,' ,,', ,,ZŽ,‰,,Œ",,ffffff,,‹—,Š,,',,,

dcColor ¤ dcSpecular
'", ,"‰,Ž',,**D3DCOLOR**Œ,'

dvTU ¤ dvTV
'",,fffffŽ',,**D3DVALUE**Œ,'

D3DLIGHTDATA

D3DTRANSFORMCAPS

```
typedef struct _D3DTransformCaps {
    DWORD dwSize;
    DWORD dwCaps;
} D3DTRANSFORMCAPS, *LPD3DTRANSFORMCAPS;
```

ののD3DDEVICEDESC の

dwSize
,, "',fff'^,fff

dwCaps
•Š',ffff,ffffff,,,,,,,Ž',,fff ,,fff, 0,,Ž,fff, ',,,

D3DTRANSFORMCAPS_CLIP ffff,•Š',ffffff,,

D3DTRANSFORMDATA

```
typedef struct _D3DTRANSFORMDATA {
    DWORD        dwSize;
    LPVOID       lpIn;
    DWORD        dwInSize;
    LPVOID       lpOut;
    DWORD        dwOutSize;
    LPD3DHVERTEX lpHOut;
    DWORD        dwClip;
    DWORD        dwClipIntersection;
    DWORD        dwClipUnion;
    D3DRECT      drExtent;
} D3DTRANSFORMDATA, *LPD3DTRANSFORMDATA;
```

IDirect3DViewport::TransformVertices の

dwSize
,, "',fff'^,fff

lpIn
•Š,,,'",,ffff ,,, **D3DLVERTEX** "',,,

dwInSize
•Š,,,'",ŠŠ

lpOut
•Š,,,'",,ffff

dwOutSize

—’“,ŠŠ

lpHOut

‹Ž•Š,,,’“,Š,’,,ƒƒƒƒ ,,’, **D3DHVERTEX** ‘‘,,,

dwClip

’“,,,,,,ƒƒƒƒƒƒ,,,,,Ž’,,ƒƒƒ ,,ƒƒƒ,, Ž,’,,,,^ ’,,

D3DCLIP_BACK

‰ Œ,”–,,,ƒƒƒƒƒƒ,,,

D3DCLIP_BOTTOM

‰ Œ,’–,,,ƒƒƒƒƒƒ,,,

D3DCLIP_FRONT

‰ Œ,‘–,,,ƒƒƒƒƒƒ,,,

D3DCLIP_GEN0 through **D3DCLIP_GEN5**

ƒƒƒƒ ƒƒƒ’‹,ƒƒƒƒ−

D3DCLIP_LEFT

‰ Œ, ‘–,,,ƒƒƒƒƒƒ,,,

D3DCLIP_RIGHT

‰ Œ,‰‘–,,,ƒƒƒƒƒƒ,,,

D3DCLIP_TOP

‰ Œ, ’–,,,ƒƒƒƒƒƒ,,,

dwClipIntersection

ƒƒƒƒƒƒ ƒƒƒ,Œ ,Ž,ƒƒƒ ,,ƒƒƒ,, Ž,’,,,,^ ’,,

D3DSTATUS_CLIPINTERSECTIONBACK

‰ Œ,Œ•ƒƒƒƒ–,’“,ƒƒƒƒƒƒ ƒƒƒ,˜— ,,,

D3DSTATUS_CLIPINTERSECTIONBOTTOM

‰ Œ,‰,’“,ƒƒƒƒƒƒ ƒƒƒ,˜— ,,,

D3DSTATUS_CLIPINTERSECTIONFRONT

‰ Œ,‘•ƒƒƒƒ–,’“,ƒƒƒƒƒƒ ƒƒƒ,˜— ,,,

D3DSTATUS_CLIPINTERSECTIONGEN0 D3DSTATUS_CLIPINTERSECTIONGEN5

ƒƒƒƒ ƒƒƒ’‹,ƒƒƒƒ–,˜— ,,,

D3DSTATUS_CLIPINTERSECTIONLEFT

‰ Œ, ‘,’“,ƒƒƒƒƒƒ ƒƒƒ,˜— ,,,

D3DSTATUS_CLIPINTERSECTIONRIGHT

‰ Œ,‰‘,’“,ƒƒƒƒƒƒ ƒƒƒ,˜— ,,,

D3DSTATUS_CLIPINTERSECTIONTOP

‰ Œ, ,’“,ƒƒƒƒƒƒ ƒƒƒ,˜— ,,,

dwClipUnion

ƒƒƒƒƒƒ ƒƒƒ,Œ ,Ž,ƒƒƒ ,,ƒƒƒ,, Ž,’,,,,^ ’,,

D3DSTATUS_CLIPUNIONBACK

D3DCLIP_BACK,“,

D3DSTATUS_CLIPUNIONBOTTOM

D3DCLIP_BOTTOM,“,

D3DSTATUS_CLIPUNIONFRONT

D3DCLIP_FRONT,“,

D3DSTATUS_CLIPUNIONGEN0 D3DSTATUS_CLIPUNIONGEN5

D3DCLIP_GEN0 D3DCLIP_GEN5,“,

D3DSTATUS_CLIPUNIONLEFT

D3DCLIP_LEFT,“,

D3DSTATUS_CLIPUNIONRIGHT

D3DCLIP_RIGHT,“,

D3DSTATUS_CLIPUNIONTOP

D3DCLIP_TOP,“,

drExtent

•ŠŒ,’“,”^,Œ’,,’ ,, ‘‘, *fffff*•ŠŒ,*fff f*”^,•Š*fff f*,,,*fff*,,, *ffffff*,,,, , ,,”^,Ž ‘‘“•,’“,,,Š, ,,’,**D3DRECT** ‘‘,,,

の[x y z]の**dwInSize** の

16

のの

IDirect3DViewport::TransformVertices

D3DTRIANGLE

```
typedef struct _D3DTRIANGLE {
    union {
        WORD v1;
        WORD wV1;
    };
    union {
        WORD v2;
        WORD wV2;
    };
    union {
        WORD v3;
        WORD wV3;
    };
    WORD     wFlags;
} D3DTRIANGLE, *LPD3DTRIANGLE;
```

のの

D3DOPCODE の D3DOP_TRIANGLE

wV1 wV2 wV3

ŽŠŒ,Ž’,,’“

wFlags

Ž—‰”,ŽŠŒ,ƒƒƒ,’‹,,ƒƒƒ(,, •, ƒƒƒƒƒ ƒ ƒ ƒ,,,— Œ) ,,ƒƒƒ,, Ž,’,,,,^ ’,,

ƒƒƒ¥ƒƒƒ

D3DTRIFLAG_EDGEENABLE1

ƒƒƒ**v1–v2**,’‹,,

D3DTRIFLAG_EDGEENABLE2

ƒƒƒ**v2–v3**,’‹,,

D3DTRIFLAG_EDGEENABLE3

ƒƒƒ**v3–v1**,’‹,,

D3DTRIFLAG_EDGEENABLETRIANGLE

,,,,ƒƒƒ,’‹,,

“Š , Œƒƒƒ

D3DTRIFLAG_EVEN

Œ ,ŽŠŒ,**v1–v2**ƒƒƒ, ’‘,ŽŠŒ,**v3–v1**ƒƒƒ, ,,,,, **v1**,’‘,**v1**, **v2**,’‘,**v3**,,,

D3DTRIFLAG_ODD

Œ ,ŽŠŒ,**v1–v2**ƒƒƒ, ’‘,ŽŠŒ,**v2–v3**ƒƒƒ, ,,,,, **v1**,’‘,**v3**, **v2**,’‘,**v2**,,,

D3DTRIFLAG_START

“Š , Œ,ŠŽ,, ,,,’“,ƒ ƒ,,

D3DTRIFLAG_STARTFLAT(len)

,,ŽŠŒ, ,”,,,,, ,,Œ,ŽŠŒ,Ž’,,, , ,”, ,,’,, 0,,‘,,30,, ,,

ՈՈՈՈՈ **v1 v2 v3** ՈՈՈՈ

The D3DTRIFLAG_ODD D3DTRIFLAG_EVEN ՈՈՈՈ 5 ՈՈՈ

D3DTRIFLAG_START

D3DTRIFLAG_ODD

D3DTRIFLAG_EVEN

D3DTRIFLAG_ODD

D3DTRIFLAG_EVEN

Ո 5 ՈՈ

D3DTRIFLAG_START

D3DTRIFLAG_EVEN

D3DTRIFLAG_EVEN

D3DTRIFLAG_EVEN

D3DTRIFLAG_EVEN

5 の の の

D3DTRIFLAG_STARTFLAT(4)
D3DTRIFLAG_EVEN
D3DTRIFLAG_EVEN
D3DTRIFLAG_EVEN
D3DTRIFLAG_EVEN

の

D3DVECTOR

```
typedef struct _D3DVECTOR {
    union {
        D3DVALUE x;
        D3DVALUE dvX;
    };
    union {
        D3DVALUE y;
        D3DVALUE dvY;
    };
    union {
        D3DVALUE z;
        D3DVALUE dvZ;
    };
} D3DVECTOR, *LPD3DVECTOR;
```

の Direct3D Direct3DRM の

dvX dvY dvZ
ƒƒƒƒ,Ž',,**D3DVALUE**Œ,'

D3DLIGHT D3DLIGHTINGELEMENT D3DRMBOX D3DRMQUATERNION D3DRMVERTEX

D3DVERTEX

```
typedef struct _D3DVERTEX {
    union {
        D3DVALUE x;
        D3DVALUE dvX;
    };
    union {
        D3DVALUE y;
        D3DVALUE dvY;
    };
    union {
        D3DVALUE z;
        D3DVALUE dvZ;
    };
    union {
```

```
        D3DVALUE nx;
        D3DVALUE dvNX;
    };
    union {
        D3DVALUE ny;
        D3DVALUE dvNY;
    };
    union {
        D3DVALUE nz;
        D3DVALUE dvNZ;
    };
    union {
        D3DVALUE tu;
        D3DVALUE dvTU;
    };
    union {
        D3DVALUE tv;
        D3DVALUE dvTV;
    };
} D3DVERTEX, *LPD3DVERTEX;
```

(◌)

D3DOPCODE ◌◌ D3DOP_TRIANGLE

dvX dvY dvZ
‹Ž, •,’“,Ž’,,**D3DVALUE**Œ,’

dvNX dvNY dvNZ
‹ •,’“,Ž’,,**D3DVALUE** Œ,’

dvTU ¤ dvTV
’“,*fffff*,Ž’,,**D3DVALUE**Œ,’

D3DVALUE

D3DVIEWPORT

```
typedef struct _D3DVIEWPORT {
    DWORD    dwSize;
    DWORD    dwX;
    DWORD    dwY;
    DWORD    dwWidth;
    DWORD    dwHeight;
    D3DVALUE dvScaleX;
    D3DVALUE dvScaleY;
    D3DVALUE dvMaxX;
    D3DVALUE dvMaxY;
    D3DVALUE dvMinZ;
    D3DVALUE dvMaxZ;
} D3DVIEWPORT, *LPD3DVIEWPORT;
```

3D 2D 3D
IDirect3DViewport::GetViewport **IDirect3DViewport::SetViewport**

dwSize
,, ‘‘,fff’^,fff

dwX ¤ dwY
ff f f, ‹, •

dwWidth ¤ dwHeight
ff f f,”—

dvScaleX ¤ dvScaleY
fff f,‹Ž,ff f”,Ž’,,**D3DVALUE**Œ,’

dvMaxX dvMaxY dvMinZ dvMaxZ
x y z,‹Ž •, ‘’, ’,Ž’,,**D3DVALUE**Œ,’

D3DVALUE IDirect3DViewport::GetViewport IDirect3DViewport::SetViewport

—‹Œ

D3DBLEND

```
typedef enum _D3DBLEND {
    D3DBLEND_ZERO            = 1,
    D3DBLEND_ONE             = 2,
    D3DBLEND_SRCCOLOR        = 3,
    D3DBLEND_INVSRCCOLOR     = 4,
    D3DBLEND_SRCALPHA        = 5,
    D3DBLEND_INVSRCALPHA     = 6,
    D3DBLEND_DESTALPHA       = 7,
    D3DBLEND_INVDESTALPHA    = 8,
    D3DBLEND_DESTCOLOR       = 9,
    D3DBLEND_INVDESTCOLOR    = 10,
    D3DBLEND_SRCALPHASAT     = 11,
    D3DBLEND_BOTHSRCALPHA    = 12,
    D3DBLEND_BOTHINVSRCALPHA = 13,
} D3DBLEND;
```

D3DRENDERSTATETYPE の の **D3DRENDERSTATE_DESTBLEND** の の の の RGBA s¤d

D3DBLEND_ZERO
—‘, (0, 0, 0, 0)

D3DBLEND_ONE
—‘, (1, 1, 1, 1)

D3DBLEND_SRCCOLOR
—‘, (Rs, Gs, Bs, As)

D3DBLEND_INVSRCCOLOR
—‘, (As, As, As, As, 1-As)

D3DBLEND_SRCALPHA
—‘, (As, As, As, As)

D3DBLEND_INVSRCALPHA
—‘, (1-As, 1-As, 1-As)

D3DBLEND_DESTALPHA
—‘, (Ad, Ad, Ad, Ad)

D3DBLEND_INVDESTALPHA
—‘, (1-Ad, 1-Ad, 1-Ad, 1-Ad)

D3DBLEND_DESTCOLOR
—‘, (Rd, Gd, Bd, Ad)

D3DBLEND_INVDESTCOLOR
—‘, (1-Rd, 1-Gd, 1-Bd, 1-Ad)

D3DBLEND_SRCALPHASAT
—‘, (f, f, f, 1) f = min(As, 1-Ad)

D3DBLEND_BOTHSRCALPHA
f f —‘, (As, As, As, As) *fffff fff* —‘, (1-As, 1-As, 1-As, 1-As) *fffff fff* , –Œ,,,

D3DBLEND_BOTHINVSRCALPHA
f f —‘, (1-As, 1-As, 1-As, 1-As) *fffff fff* —‘, (As, As, As, As) *fffff fff* , –Œ,,,

D3DCMPFUNC

```
typedef enum _D3DCMPFUNC {
    D3DCMP_NEVER        = 1,
    D3DCMP_LESS         = 2,
    D3DCMP_EQUAL        = 3,
    D3DCMP_LESSEQUAL    = 4,
    D3DCMP_GREATER      = 5,
    D3DCMP_NOTEQUAL     = 6,
    D3DCMP_GREATEREQUAL = 7,
    D3DCMP_ALWAYS       = 8,
} D3DCMPFUNC;
```

D3DRENDERSTATETYPE ○○ D3DRENDERSTATE_ZFUNC
D3DRENDERSTATE_ALPHAFUNC ○

D3DCMP_NEVER
,,,*fff*,Ž”,,

D3DCMP_LESS
,,*ffff*’, Œ ,*ffff*’,, ,,,,,‰,,

D3DCMP_EQUAL
,,*ffff*’, Œ ,*ffff*’,“,,,,,‰,,

D3DCMP_LESSEQUAL
,,ffff', Œ ,ffff'^‰,,,,‰,,

D3DCMP_GREATER
,,ffff', Œ ,ffff',,',,,,,‰,,

D3DCMP_NOTEQUAL
,,ffff', Œ ,ffff',",,,,,,,‰,,

D3DCMP_GREATEREQUAL
,,ffff', Œ ,ffff'^ ,,,,‰,,

D3DCMP_ALWAYS
,,,fff,Ž ,,

D3DCOLORMODEL

```
typedef enum _D3DCOLORMODEL {
    D3DCOLOR_MONO = 1,
    D3DCOLOR_RGB  = 2,
} D3DCOLORMODEL;
```

の

D3DCOLOR_MONO
fffffff(,,, ffffff),Ž—,, ,,fff, '" , ,', '",‹",',‹,,,,,Ž—,,,

D3DCOLOR_RGB
Š',RGBfff,Ž—,,

D3DDEVICEDESC D3DFINDDEVICESEARCH D3DLIGHTSTATETYPE IDirect3DRMDevice::GetColorModel

D3DCULL

```
typedef enum _D3DCULL {
    D3DCULL_NONE = 1,
    D3DCULL_CW   = 2,
    D3DCULL_CCW  = 3,
} D3DCULL;
```

の

D3DCULL_NONE
,",,,,,

D3DCULL_CW
‰‰,, ,",

D3DCULL_CCW
‰,, ,",

D3DPRIMCAPS D3DRENDERSTATETYPE

D3DFILLMODE

```
typedef enum _D3DFILLMODE {
    D3DFILL_POINT     = 1,
```

```
    D3DFILL_WIREFRAME = 2,
    D3DFILL_SOLID     = 3
} D3DFILLMODE;
```

の D3DRENDERSTATETYPE のの D3DRENDERSTATE_FILLMODE の

D3DFILL_POINT
“,“,,,,

D3DFILL_WIREFRAME
fff ff f,“,,,,

D3DFILL_SOLID
–,“,,,,

D3DFOGMODE

```
typedef enum _D3DFOGMODE {
    D3DFOG_NONE   = 0,
    D3DFOG_EXP    = 1,
    D3DFOG_EXP2   = 2,
    D3DFOG_LINEAR = 3
} D3DFOGMODE;
```

D3DRENDERSTATETYPE のの D3DRENDERSTATE_FOGTABLEMODE の

D3DFOG_NONE
fffŒ‰,,,

D3DFOG_EXP
Ž,•’Ž,‘ , fffŒ‰,‘,

$$f = e^{-(density \times z)}$$

D3DFOG_EXP2
Ž,•’Ž,‘ 2 , fffŒ‰,‘,

$$f = e^{-(density \times z)^2}$$

D3DFOG_LINEAR
Ž,•’Ž,Ž“, “,Š, Œ, fffŒ‰,‘,

$$f = \frac{end - z}{end - start}$$

,,, Œ ff f,,,,,—^,fff f f,,,

D3DLIGHTSTATETYPE

```
typedef enum _D3DLIGHTSTATETYPE {
    D3DLIGHTSTATE_MATERIAL   = 1,
    D3DLIGHTSTATE_AMBIENT    = 2,
    D3DLIGHTSTATE_COLORMODEL = 3,
    D3DLIGHTSTATE_FOGMODE    = 4,
    D3DLIGHTSTATE_FOGSTART   = 5,
    D3DLIGHTSTATE_FOGEND     = 6,
    D3DLIGHTSTATE_FOGDENSITY = 7,
} D3DLIGHTSTATETYPE;
```

D3DOP_STATELIGHT の D3DSTATE の

D3DLIGHTSTATE_MATERIAL
Œ, ,fff‰,Š,',“ ,,Ž ,,,,Ž—,, –,“,,,,fffff,'‹,, fffff',NULL,,,

D3DLIGHTSTATE_AMBIENT
,Œ ,ŒŒ,“ ,, ',, ffff fff,,,',Ž',,,,, fff f,,,ŒŒ,Ž',,, fffff',0 ,,,

D3DLIGHTSTATE_COLORMODEL
D3DCOLORMODEL—‹Œ,fff,,,, fffff',D3DCOLOR_RGB,,,

D3DLIGHTSTATE_FOGMODE
D3DFOGMODE—‹Œ,fff,,,, fffff',D3DFOG_NONE,,,

D3DLIGHTSTATE_FOGSTART
fff,ŠŽ','‹,, fffff',1.0,,,

D3DLIGHTSTATE_FOGEND
fff, —','‹,, fffff',100.0,,,

D3DLIGHTSTATE_FOGDENSITY
fff, ',, “,'‹,, fffff',1.0,,,

D3DOPCODE* ¤ *D3DSTATE

D3DLIGHTTYPE

```
typedef enum _D3DLIGHTTYPE {
    D3DLIGHT_POINT         = 1,
    D3DLIGHT_SPOT          = 2,
    D3DLIGHT_DIRECTIONAL   = 3,
    D3DLIGHT_PARALLELPOINT = 4,
    D3DLIGHT_GLSPOT        = 5,
} D3DLIGHTTYPE;
```

の D3DLIGHT の

D3DLIGHT_POINT
ŒŒ,“,,,

D3DLIGHT_SPOT
ŒŒ,fffffff,,,

D3DLIGHT_DIRECTIONAL
ŒŒ,' Œ,,,

D3DLIGHT_PARALLELPOINT
ŒŒ,• ,“,,,

D3DLIGHT_GLSPOT
ŒŒ,GLŒ,*fffffff*,,,

IDirect3DRMLight* ¤ *IDirect3DRMLightArray Interfaces

D3DOPCODE

```
typedef enum _D3DOPCODE {
    D3DOP_POINT           = 1,
    D3DOP_LINE            = 2,
    D3DOP_TRIANGLE        = 3,
    D3DOP_MATRIXLOAD      = 4,
    D3DOP_MATRIXMULTIPLY  = 5,
    D3DOP_STATETRANSFORM  = 6,
    D3DOP_STATELIGHT      = 7,
    D3DOP_STATERENDER     = 8,
    D3DOP_PROCESSVERTICES = 9,
    D3DOP_TEXTURELOAD     = 10,
    D3DOP_EXIT            = 11,
    D3DOP_BRANCHFORWARD   = 12,
    D3DOP_SPAN            = 13,
    D3DOP_SETSTATUS       = 14,
} D3DOPCODE;
```

Ø

D3DOP_POINT
ffff ,“,‘, *fffff f f*, **D3DPOINT** ‘‘,Ž’,,,

D3DOP_LINE
ffff , ,‘, *fffff f f*, **D3DLINE** ‘‘,Ž’,,,

D3DOP_TRIANGLE
ffff ,ŽŠŒ,‘, *fffff f f*,**D3DTRIANGLE** ‘‘,Ž’,,,

D3DOP_MATRIXLOAD
ffffff ffff,f f“‘,,*fff* ,,, *fffff f f*,**D3DMATRIXLOAD** ‘‘,Ž’,,
,

D3DOP_MATRIXMULTIPLY
ffffff ffff,f f“‘,,*fff* ,,, *fffff f f*,**D3DMATRIXMULTIPLY** ‘
‘,Ž’,,,

D3DOP_STATETRANSFORM
•Š*fff f*—
,*ffffff ffff*, “• ‘• ,’, ’,, *fffff f f*, • ,,,*f ff*, ,,’,,, *f ff*,
“• ‘• ,Ž, ,,• ’,, ,,’, ’,,, ,,,,• ,,,,, , ***D3DSTATE*** ‘‘,***D3DTR
ANSFORMSTATETYPE***—‹Œ,Ž ,,,,

D3DOP_STATELIGHT
ŒŒ*fff f*—
,*ffffff ffff*,“• ‘• ,’, ’,, *fffff f f*, • ,,,*f ff*, ,,’,,, *f ff*, “
• ‘• ,Ž, ,,• ’,, ,,’, ’,,, ,,,,• ,,,,, , ***D3DSTATE*** ‘‘,***D3DLIGH
TSTATETYPE***—‹Œ,Ž ,,,,

D3DOP_STATERENDER
ƒƒƒƒƒƒƒƒƒ ƒ—
,ƒƒƒƒƒƒ ƒƒƒƒ,“• ‘• ,’, ’,, ƒƒƒƒƒ ƒ ƒ, • ,,,ƒ ƒƒ, ,,’,,, ƒ ƒƒ, “ • ‘• ,Ž, ,,• ’,, ,,’, ’,,, ,,,,• ,,,,, , ***D3DSTATE*** ‘‘,***D3DRENDERSTATETYPE***—‹Œ,Ž ,,,,

D3DOP_PROCESSVERTICES
’“,ŒŒ,•Š, ’,, ƒƒƒƒƒ ƒ ƒ, **D3DPROCESSVERTICES** ‘‘,Ž’,,,

D3DOP_TEXTURELOAD
ƒƒƒƒƒƒ ƒƒƒƒ,ƒ ƒ,“‘,,ƒƒƒ ,,, ƒƒƒƒƒ ƒ ƒ, **D3DTEXTURELOAD** ‘‘, Ž’,,,

D3DOP_EXIT
“’,,ƒƒƒ, —,“’,,Ž,Ž,

D3DOP_BRANCHFORWARD
Ž ƒƒƒƒ,•Š,‰”,,, , ***D3DBRANCH*** ‘‘,Ž ,,,,

D3DOP_SPAN
“,Y’,“,ƒƒƒ,,ƒƒƒ,’, , ***D3DSPAN*** ‘‘,Ž ,,,,

D3DOP_SETSTATUS
Ž ƒƒƒƒ, ‘,ƒƒƒƒ,, , ***D3DSTATUS*** ‘‘,Ž ,,,,

Ơ( ) /ƠƠƠƠƠ

D3DINSTRUCTION

D3DRENDERSTATETYPE

```
typedef enum _D3DRENDERSTATETYPE {
    D3DRENDERSTATE_TEXTUREHANDLE      = 1,
    D3DRENDERSTATE_ANTIALIAS          = 2,
    D3DRENDERSTATE_TEXTUREADDRESS     = 3,
    D3DRENDERSTATE_TEXTUREPERSPECTIVE = 4,
    D3DRENDERSTATE_WRAPU              = 5,
    D3DRENDERSTATE_WRAPV              = 6,
    D3DRENDERSTATE_ZENABLE            = 7,
    D3DRENDERSTATE_FILLMODE           = 8,
    D3DRENDERSTATE_SHADEMODE          = 9,
    D3DRENDERSTATE_LINEPATTERN        = 10,
    D3DRENDERSTATE_MONOENABLE         = 11,
    D3DRENDERSTATE_ROP2               = 12,
    D3DRENDERSTATE_PLANEMASK          = 13,
    D3DRENDERSTATE_ZWRITEENABLE       = 14,
    D3DRENDERSTATE_ALPHATESTENABLE    = 15,
    D3DRENDERSTATE_LASTPIXEL          = 16,
    D3DRENDERSTATE_TEXTUREMAG         = 17,
    D3DRENDERSTATE_TEXTUREMIN         = 18,
    D3DRENDERSTATE_SRCBLEND           = 19,
    D3DRENDERSTATE_DESTBLEND          = 20,
    D3DRENDERSTATE_TEXTUREMAPBLEND    = 21,
    D3DRENDERSTATE_CULLMODE           = 22,
    D3DRENDERSTATE_ZFUNC              = 23,
    D3DRENDERSTATE_ALPHAREF           = 24,
    D3DRENDERSTATE_ALPHAFUNC          = 25,
```

```
    D3DRENDERSTATE_DITHERENABLE       = 26,
    D3DRENDERSTATE_BLENDENABLE        = 27,
    D3DRENDERSTATE_FOGENABLE          = 28,
    D3DRENDERSTATE_SPECULARENABLE     = 29,
    D3DRENDERSTATE_ZVISIBLE           = 30,
    D3DRENDERSTATE_SUBPIXEL           = 31,
    D3DRENDERSTATE_SUBPIXELX          = 32,
    D3DRENDERSTATE_STIPPLEDALPHA      = 33,
    D3DRENDERSTATE_FOGCOLOR           = 34,
    D3DRENDERSTATE_FOGTABLEMODE       = 35,
    D3DRENDERSTATE_FOGTABLESTART      = 36,
    D3DRENDERSTATE_FOGTABLEEND        = 37,
    D3DRENDERSTATE_FOGTABLEDENSITY    = 38,
    D3DRENDERSTATE_STIPPLEENABLE      = 39,
    D3DRENDERSTATE_STIPPLEPATTERN00   = 64,
       // ‟•ƒƒ□ƒ,01,,30,□—
    D3DRENDERSTATE_STIPPLEPATTERN31   = 95,
} D3DRENDERSTATETYPE;
```

D3DOP_STATERENDER ののD3DSTATE ののののの 2 の

D3DRENDERSTATE_TEXTUREHANDLE
fffff,ffff ffffff,NULL,,,

D3DRENDERSTATE_ANTIALIAS
fffffffff—‘,’ *fffff*,FALSE,,,

D3DRENDERSTATE_TEXTUREADDRESS
D3DTEXTUREADDRESS
—‹Œ,*fff*,,,, *fffff*,D3DTADDRESS_WRAP,,,

D3DRENDERSTATE_TEXTUREPERSPECTIVE
TRUE,,, “Ž *fffff*,FALSE,,,

D3DRENDERSTATE_WRAPU
TRUE,,, u•Œ,’,•,, *fffff*,FALSE,,,

D3DRENDERSTATE_WRAPV
TRUE,,, v•Œ,’,•,, *fffff*,FALSE,,,

D3DRENDERSTATE_ZENABLE
TRUE,,, Z*ffff*,”Š*fff*,‰”,,, *fffff*,FALSE,,,

D3DRENDERSTATE_FILLMODE
D3DFILLMODE—‹Œ,*fff*,,,, *fffff*,D3DFILL_SOLID,,,

D3DRENDERSTATE_SHADEMODE
D3DSHADEMODE—‹Œ,*fff*,,,, *fffff*,D3DSHADE_GOURAUD,,,

D3DRENDERSTATE_LINEPATTERN
D3DLINEPATTERN ‘‘,,, *fffff*,**wRepeatPattern**—,0, **wLinePattern**—,0,,,

D3DRENDERSTATE_MONOENABLE
TRUE,,, *ffff ffffff*,‰”,,, *fffff*,FALSE,,, *ffff*,RGB*ffffff*,*ff f*,,,,,,, TRUE,,, *ffff fff*, *ffff*,RGB*ffffff*,*ff f*,,,,,,**D3DDEVICE DESC** ‘‘,**dcmColorModel***fff*,Ž—,,’,,,,,,,,

D3DRENDERSTATE_ROP2
TRUE,,,ffff ffffff,‰”,,, fffff’,FALSE,,, ffff,RGBffffff,ff f, ,,,,,, TRUE,,, ffff fff, ffff,RGBffffff,ff f,,,,,,**D3DDEVICEDESC** ‘‘,**dcmColorModel**fff,Ž—,,’,,,,,,,,

—,,,,ffff,•Žf fff,ffff, , ,•–,Ž’,, 16 ROP2fffffff — ,,,, fffff’, R2_COPYPEN,,, ffff fff, ff f,,,’‰fff — ,Œ’,,**D3DPRIMCAPS** ‘‘,**dwRasterCaps**fff,**D3DPRASTERCAPS_ROP2**fff,Ž—,,,

D3DRENDERSTATE_PLANEMASK
ULONGŒ,•—ff ffff fffff’, 0,,,

D3DRENDERSTATE_ZWRITEENABLE
TRUE,,, Z , ,,‰”,,, fffff’, TRUE,,, ,,fff, ffff fff,ffff, ,,Z’,Zffff, ,,,,–,Ž,‹‰,,

D3DRENDERSTATE_ALPHATESTENABLE
ffff fff,‰”,,,,TRUE fffff’, FALSE,,, ,,fff, ffff fff,ffff’,Š ,,,ffff,Ž,Ž,,Ž,Ž,‹”,’Ž,‹‰,, **D3DRENDERSTATE_LASTPIXEL**

TRUE,,, , Œ,ffff,•‰,,,,Ž,, fffff’, TRUE,,,

D3DRENDERSTATE_TEXTUREMAG
D3DTEXTUREFILTER
—‹Œ,fff,,,, fffff’, D3DFILTER_NEAREST,,,

D3DRENDERSTATE_TEXTUREMIN
D3DTEXTUREFILTER
—‹Œ,fff,,,, fffff’, D3DFILTER_NEAREST,,,

D3DRENDERSTATE_SRCBLEND
D3DBLEND—‹Œ,fff,,,, fffff’,D3DBLEND_ONE,,,

D3DRENDERSTATE_DESTBLEND
D3DBLEND—‹Œ,fff,,,, fffff’,D3DBLEND_ZERO,,,

D3DRENDERSTATE_TEXTUREMAPBLEND
D3DTEXTUREBLEND
—‹Œ,fff,,,, fffff’,D3DTBLEND_MODULATE,,,

D3DRENDERSTATE_CULLMODE
D3DCULL
—‹Œ,fff,,,, fffff’,D3DCULL_CCW,,, ffffff,ffffff, Œ’, ,”, , Ž, ,”,f f,• ,ff f,,,

D3DRENDERSTATE_ZFUNC
D3DCMPFUNC
—‹Œ,fff,,,, fffff’,D3DCMP_LESSEQUAL,,, ,,fff, ffff fff,fff,, ,‹—,Š ,,,ffff,Ž,Ž,,Ž,Ž,‹”,‹‰,,

D3DRENDERSTATE_ALPHAREF
ffff fff,‰”,,, fff,,,ffff,‘,,Ž ffff’,Ž’,,’ ,,’,Œ,**D3DFIXED**,,, fff ff’,0,,,

D3DRENDERSTATE_ALPHAFUNC
D3DCMPFUNC
—‹Œ,fff,,,, fffff’, D3DCMP_ALWAYS,,, ,,fff, ffff fff,ffff’, Š ,,,ffff,Ž,Ž,,Ž,Ž,‹”,‹‰,,

D3DRENDERSTATE_DITHERENABLE
TRUE,,,ffffff,‰”,,, fffff’,FALSE,,,

D3DRENDERSTATE_BLENDENABLE
TRUE,,,ffff, ,‰”,,, fffff’,FALSE,,,

D3DRENDERSTATE_FOGENABLE
TRUE,,,fff,‰”,,, fffff’,FALSE,,,

D3DRENDERSTATE_SPECULARENABLE
TRUE,,,“‰,‰”,,, fffff’,TRUE,,,

D3DRENDERSTATE_ZVISIBLE
TRUE,,,ZŒ ,‰”,,, fffff’,FALSE,,, ZŒ ,, •‰
,,ffff,Œ,,,,,Zffff,‘,,fff,,, ,,,,ffff,ff f,fff f‹Š,•,,,ffff,, ,”,‹,,,,,,

D3DRENDERSTATE_SUBPIXEL
TRUE,,,ffffff,’ ,‰”,,, fffff’,FALSE,,,

D3DRENDERSTATE_SUBPIXELX
TRUE,,,X,,,’ ,‰”,,, fffff’,FALSE,,,

D3DRENDERSTATE_STIPPLEDALPHA
TRUE,,,“•,,,ffff,‰”,,, fffff’,FALSE,,,

D3DRENDERSTATE_FOGCOLOR
D3DCOLORŒ,’ fffff’,0,,,

D3DRENDERSTATE_FOGTABLEMODE
D3DFOGMODE—‹Œ,fff,,,, fffff’,D3DFOG_NONE,,,

D3DRENDERSTATE_FOGTABLESTART
fff f ff,ŠŽ ,,, Œfff f f,,,ŠŽ,,,fffŒ‰,^’,,,

D3DRENDERSTATE_FOGTABLEEND
fff f ff, — ,,, Œfff f f, ‘–“,“’,,fffŒ‰,^’,,,

D3DRENDERSTATE_FOGTABLEDENSITY
Œfff f f, ‘fff–“, ’,, ,,’,”^, 0,,1,,,

D3DRENDERSTATE_STIPPLEENABLE
ffff ffff,,“•,‰”,,, “•,,,ffff,‰”,,, Œ ,“•ff f,–Œ,,,,,,,,,

D3DRENDERSTATE_STIPPLEPATTERN00
D3DRENDERSTATE_STIPPLEPATTERN31
“•ff f ,,,,,ffffff ‘, “•ff f,•— ,“‰,,,

D3DOPCODE D3DSTATE

D3DSHADEMODE

```
typedef enum _D3DSHADEMODE {
    D3DSHADE_FLAT    = 1,
    D3DSHADE_GOURAUD = 2,
    D3DSHADE_PHONG   = 3,
} D3DSHADEMODE;
```

D3DRENDERSTATETYPE ↔ D3DRENDERSTATE_SHADEMODE

D3DSHADE_FLAT
•–ƒƒ ƒƒƒƒ ƒ ƒ ŽŠŒ, ,'“, , •–, ,Œ',,,,,Ž—,,,

D3DSHADE_GOURAUD
ƒƒ ƒƒ ƒƒƒƒ ƒ ƒ •–, , ŽŠŒ,,,,'“Š, , ,,, Œ,,,Œ',,,

D3DSHADE_PHONG
ƒƒƒ ƒƒ ƒƒƒƒ ƒ ƒ ,,ƒ ƒ, Œ ƒƒ ƒ,,,,,,

D3DRENDERSTATETYPE

D3DTEXTUREADDRESS

```
typedef enum _D3DTEXTUREADDRESS {
    D3DTADDRESS_WRAP   = 1,
    D3DTADDRESS_MIRROR = 2,
    D3DTADDRESS_CLAMP  = 3,
} D3DTEXTUREADDRESS;
```

D3DRENDERSTATETYPE ↔
D3DRENDERSTATE_TEXTUREADDRESS ↔

D3DTADDRESS_WRAP
D3DRENDERSTATETYPE—‹Œ,

D3DRENDERSTATE_WRAPU,**D3DRENDERSTATE_WRAPV**ƒƒƒƒƒƒ ‘,Ž—,,, ,,, ƒƒƒƒƒ, ',,,

D3DTADDRESS_MIRROR
ƒƒƒƒƒ ƒƒƒƒƒ,ƒƒƒƒ,“,, (D3DRENDERSTATE_WRAPU,,D3DRENDERSTATE_WRAPV,,,,,,)
,,, ,,,, ƒƒƒƒƒƒ,,,ƒƒƒƒƒ, , ,,,,ƒƒƒƒƒ, 0,1,Š,u', ‹ƒƒƒƒ,,, 1,2, Š,, ƒƒƒƒ("“),,, ,,2,3,Š,, , ‹,–,

D3DTADDRESS_CLAMP
ƒƒƒƒƒ •,1.0,,'‘,,,, 1.0, ',,, 0.0,, ,,,, 0.0, ',,,

D3DRENDERSTATE_WRAPU D3DRENDERSTATE_WRAPV
IDirect3Dtexture

D3DRENDERSTATETYPE

D3DTEXTUREBLEND

```
typedef enum _D3DTEXTUREBLEND {
    D3DTBLEND_DECAL         = 1,
    D3DTBLEND_MODULATE      = 2,
    D3DTBLEND_DECALALPHA    = 3,
    D3DTBLEND_MODULATEALPHA = 4,
    D3DTBLEND_DECALMASK     = 5,
    D3DTBLEND_MODULATEMASK  = 6,
    D3DTBLEND_COPY          = 7,
} D3DTEXTUREBLEND;
```

↔D3DRENDERSTATETYPE ↔
D3DRENDERSTATE_TEXTUREMAPBLEND

D3DTBLEND_DECAL
ff f fffff f f,ff f,,, ,,f f,, fffff,RGB,ffff', fffff,Ž—
,,,,,, ,'Š,,

D3DTBLEND_MODULATE
•' fffff f f,ff f,,, ,,f f,, fffff,RGB', fffff,Ž—
,,,,,,RGB',Œ,•, fffff,ffff', fffff,Ž—,,,,,, ,ffff','Š,,

D3DTBLEND_DECALALPHA
ff f ffff fffff f f,ff f,,, ,,f f,, fffff,RGB,ffff', Ž,•'Ž,
fffff,Ž—,,,,,, , ,,,

$$C = (1 - A_t)\, C_o + A_t C_t$$

,,•'Ž, C, A,ffff t,fffff o,Œ,ffffff(‘,),•,
D3DTBLEND_DECALALPHAf f, fffff,ffff', fffff,Ž—
,,,,,, ,ffff','Š,,

D3DTBLEND_MODULATEALPHA
•'ffff,fffff f f,ff f,,, ,,f f, fffff,RGB', RGB',‘,, fffff,ff
ff','‘,,

D3DTBLEND_DECALMASK
ff f fff,fffff f f,ff f,,,

D3DTBLEND_MODULATEMASK
•'fff,fffff f f,ff f,,,

D3DTBLEND_COPY
•Žfffff f f,ff f,,,

Ơ0 1 ƠƠƠƠƠƠ(1)
(1 1 1)ƠƠ

D3DTEXTUREFILTER

```
typedef enum _D3DTEXTUREFILTER {
    D3DFILTER_NEAREST          = 1,
    D3DFILTER_LINEAR           = 2,
    D3DFILTER_MIPNEAREST       = 3,
    D3DFILTER_MIPLINEAR        = 4,
    D3DFILTER_LINEARMIPNEAREST = 5,
    D3DFILTER_LINEARMIPLINEAR  = 6,
} D3DTEXTUREFILTER;
```

D3DRENDERSTATETYPE Ơ D3DRENDERSTATE_TEXTUREMAG

D3DFILTER_NEAREST
—‹,,,ffff', ,‹, •,ffff,Ž—,,, ,,, Š‘, ,—•,—
,,,, Š‘, ,ff f,,,,,,,, —•,ff f,,,,,,,,,,,

D3DFILTER_LINEAR
2 2,—^, ,,•‹ ffffŠ‹,—‹,,,ffff,Ž—,,, ,,,Š‘, ,—•,—
,,,, Š‘, ,ff f,,,,,,,, —•,ff f,,,,,,,,,,,

D3DFILTER_MIPNEAREST
D3DFILTER_NEAREST,“—,, ‘‘ƒƒƒƒŒ—,ƒƒƒƒƒƒ,Ž—,,

D3DFILTER_MIPLINEAR
D3DFILTER_LINEAR,“—,, ‘‘ƒƒƒƒŒ—,ƒƒƒƒƒƒ,Ž—,,

D3DFILTER_LINEARMIPNEAREST
D3DFILTER_MIPNEAREST,“—,, ,,,,‹Žƒƒƒƒƒƒ, ,‘,,

D3DFILTER_LINEARMIPLINEAR
D3DFILTER_MIPLINEAR,“—,, ,,,,‹Žƒƒƒƒƒƒ, ,‘,,

D3DTRANSFORMSTATETYPE

```
typedef enum _D3DTRANSFORMSTATETYPE {
    D3DTRANSFORMSTATE_WORLD      = 1,
    D3DTRANSFORMSTATE_VIEW       = 2,
    D3DTRANSFORMSTATE_PROJECTION = 3,
} D3DTRANSFORMSTATETYPE;
```

D3DOPCODE の D3DOP_STATETRANSFORM の D3DSTATE の

D3DTRANSFORMSTATE_WORLD
D3DTRANSFORMSTATE_VIEW
D3DTRANSFORMSTATE_PROJECTION
•Š,,ƒ ƒƒ ƒƒ “‰,”—,’‹,, ƒƒƒƒ’, NULL,,,(“^,”—)
D3DOPCODE D3DRENDERSTATETYPE

,,‘,Œ

D3DCOLOR

```
typedef DWORD D3DCOLOR, D3DCOLOR, *LPD3DCOLOR;
```

の Direct3D の
D3DRGB D3DRGBA

D3DVALUE

```
typedef float D3DVALUE, *LPD3DVALUE;
```

の Direct3D の

•’

の Direct3D ののの

D3D_OK

D3DERR_BADMAJORVERSION

D3DERR_BADMINORVERSION

D3DERR_EXECUTE_CLIPPED_FAILED

D3DERR_EXECUTE_CREATE_FAILED

D3DERR_EXECUTE_DESTROY_FAILED

D3DERR_EXECUTE_FAILED

D3DERR_EXECUTE_LOCK_FAILED

D3DERR_EXECUTE_LOCKED

D3DERR_EXECUTE_NOT_LOCKED

D3DERR_EXECUTE_UNLOCK_FAILED

D3DERR_LIGHT_SET_FAILED

D3DERR_MATERIAL_CREATE_FAILED

D3DERR_MATERIAL_DESTROY_FAILED

D3DERR_MATERIAL_GETDATA_FAILED

D3DERR_MATERIAL_SETDATA_FAILED

D3DERR_MATRIX_CREATE_FAILED

D3DERR_MATRIX_DESTROY_FAILED

D3DERR_MATRIX_GETDATA_FAILED

D3DERR_MATRIX_SETDATA_FAILED

D3DERR_SCENE_BEGIN_FAILED

D3DERR_SCENE_END_FAILED

D3DERR_SCENE_IN_SCENE

D3DERR_SCENE_NOT_IN_SCENE

D3DERR_SETVIEWPORTDATA_FAILED

D3DERR_TEXTURE_CREATE_FAILED

D3DERR_TEXTURE_DESTROY_FAILED

D3DERR_TEXTURE_GETSURF_FAILED

D3DERR_TEXTURE_LOAD_FAILED

D3DERR_TEXTURE_LOCK_FAILED

D3DERR_TEXTURE_LOCKED

D3DERR_TEXTURE_NO_SUPPORT

D3DERR_TEXTURE_NOT_LOCKED

D3DERR_TEXTURE_SWAP_FAILED

D3DERR_TEXTURE_UNLOCK_FAILED