

# **What's New in DEF C/C++ Programming Interface**

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# Contents

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<u>About This Manual</u> .....	3
<u>How This Document Is Organized</u> .....	3
<u>Related Documents</u> .....	3

## 1

<u>New Features</u> .....	5
<u>Reader Class Routines</u> .....	6
<u>DEF Reader Callback Routines</u> .....	6

## 2

<u>Changed Features</u> .....	7
<u>Reader Class Routines</u> .....	7
<u>defiBlockage</u> .....	7
<u>defiComponent</u> .....	7
<u>defiFill</u> .....	8
<u>defiNet</u> .....	9
<u>defiPath</u> .....	10
<u>defiPinPort</u> .....	11
<u>defiPin</u> .....	12
<u>defiTrack</u> .....	13
<u>defiVia</u> .....	14

## What's New in DEF 5.8 C/C++ Programming Interface

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# About This Manual

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This document provides information on new and changed features for version 5.8 of the C and C++ application programming interface (API) used to read and write Cadence® Design Exchange Format (DEF) files.

## How This Document Is Organized

This *What's New* document is organized into the following chapters:

- **New Features**

This chapter describes features that were added since version 5.7 of the DEF API. New features are those that introduce new functionality into the DEF API. Any enhancements made to existing statements to support a new feature are also described in this chapter.

- **Changed Features**

This chapter discusses features that were changed since version 5.7 of the DEF API. Changed features include such things as changes in default behavior, changes in whether keywords and statements are required, and any other changes that do not reflect new functionality.

## Related Documents

The following documents provide detailed information about LEF and DEF, and the LEF and DEF application programming interfaces.

- [DEF C/C++ Programming Interface \(Open Licensing Program\)](#)
- [LEF C/C++ Programming Interface \(Open Licensing Program\)](#)
- [LEF/DEF Language Reference](#)
- [What's New in LEF C/C++ Programming Interface](#)
- [What's New in LEF/DEF](#)

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# **What's New in DEF 5.8 C/C++ Programming Interface**

## About This Manual

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## New Features

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This chapter describes the new features that were added in this release of the DEF application programming interface.

- [Reader Class Routines](#) on page 6
- [DEF Reader Callback Routines](#) on page 6

## Reader Class Routines

The following reader class routines were added in this release:

- defiComponentMaskShiftLayer

For more information, see “DEF Reader Classes” in the *DEF C/C++ Programming Interface (Open Licensing Program)*.

## DEF Reader Callback Routines

The following reader callback routines were added in this release:

- defrComponentMaskShiftLayerCbkType

For more information, see “DEF Reader Callback Routines” in the *DEF C/C++ Programming Interface (Open Licensing Program)*.



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## Changed Features

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This chapter describes the features that were changed in this release of the DEF application programming interface.

- [Reader Class Routines](#) on page 7

### Reader Class Routines

The following syntax was added to the listed reader class routines.

#### defiBlockage

```
void setMask(int maskColor);  
int hasMask() const;  
int mask() const;
```

##### Description:

`setMask(int maskColor)`

Adds the color mask number to the blockage. The default value is 0.

`hasMask()`

Checks if the blockage is colored.

`mask()`

Returns the color mask number of the blockage.

For more information, see “[defiBlockage](#)” in the *DEF C/C++ Programming Interface Open Licensing Program*).

#### defiComponent

```
void setMaskShift(int color);  
int maskShiftSize();  
int maskShift(int index) const;
```

## What's New in DEF 5.8 C/C++ Programming Interface

### Changed Features

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#### Description:

`setMaskShift(int color)`

Sets the layer mask shift information.

`maskShiftSize()`

Returns the number of shifted layer masks.

`maskShift(int index)`

Returns the layer masks by index. `maskShift(0)` will return the right-most digit.

For more information, see [“defiComponent”](#) in the *DEF C/C++ Programming Interface Open Licensing Program*).

#### defiFill

```
void setMask(int colorMask);
int layerMask() const
int viaTopMask() const;
int viaCutMask() const;
int viaBottomMask() const;
```

#### Description:

`setMask(int colorMask)`

Specifies the mask number information to the layer. The default value is 0.

`layerMask()`

Returns the layer mask information.

`viaTopMask()`

Returns the top mask number of the via.

`viaCutMask()`

Returns cut mask number of the via.

`viaBottomMask()`

Returns bottom mask number of the via.

For more information, see [“defiFill”](#) in the *DEF C/C++ Programming Interface Open Licensing Program*).

## What's New in DEF 5.8 C/C++ Programming Interface

### Changed Features

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#### defiNet

```
void addPolygon(const char* layerName,
    defiGeometries* geom,
    int *needCbk,
    int colorMask,
    ...);

void addRect(const char* layerName,
    defiGeometries* geom,
    int *needCbk,
    int colorMask,
    ...);

void addPts(const char* viaName,
    defiGeometries* geom,
    int *needCbk,
    int colorMask,
    ...);

int polyMask(int index) const;
int rectMask(int index) const;
int topMaskNum(int index) const;
int cutMaskNum(int index) const;
int bottomMask(int index) const;
```

#### Description:

```
addPolygon(const char* layerName,
defiGeometries* geom,
int *needCbk,
int colorMask
```

Specifies color mask information for a polygon. The default value is 0.

```
addRect(const char* layerName,
defiGeometries* geom,
int *needCbk,
int colorMask,
```

Specifies color mask information for a rectangle. The default value is 0.

```
addPts(const char* viaName,
defiGeometries* geom,
int *needCbk,
int colorMask,
```

## What's New in DEF 5.8 C/C++ Programming Interface

### Changed Features

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	Specifies color mask information for points. The default value is 0.
<code>polyMask(int index)</code>	Returns the color mask information of a polygon by index.
<code>rectMask(int index)</code>	Returns the color mask information of a rectangle by index.
<code>topMaskNum(int index)</code>	Returns the top mask number of the via.
<code>cutMaskNum(int index)</code>	Returns the cut mask number of the via.
<code>bottomMask(int index)</code>	Returns the bottom mask number of the via.

For more information, see "[defiNet](#)" in the *DEF C/C++ Programming Interface Open Licensing Program*).

### defiPath

```
void addMask(int colorMask);
void addViaMask(int colorMask);
int getMask();
int getViaTopMask();
int getViaCutMask();
int getViaBottomMask();
int getRectMask();
```

#### Description:

<code>addMask(int colorMask)</code>	Specifies the color mask information for a path.
<code>addViaMask(int colorMask)</code>	Specifies the color mask information for a via.
<code>getMask()</code>	Returns the color mask information of a path.
<code>getViaTopMask()</code>	Returns the top mask number of a via.
<code>getViaCutMask()</code>	Returns the cut mask number of a via.
<code>getViaBottomMask()</code>	Returns the bottom mask number of a via.
<code>getRectMask()</code>	Returns the color mask information of a rectangle.

## What's New in DEF 5.8 C/C++ Programming Interface

### Changed Features

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Additionally, a new enum was added to `defiPath`. The syntax is as follows:

```
enum defiPath_e {  
    ...  
    DEFIPATH_RECT,  
    DEFIPATH_VIRTUALPOINT,  
    DEFIPATH_MASK,  
    DEFIPATH_VIAMASK
```

The returned value depends on the input data that is read in.

For more information, see [“defiPath”](#) in the *DEF C/C++ Programming Interface Open Licensing Program*).

### defiPinPort

```
void addLayerMask(int mask);  
void addPolyMask(int mask);  
void addVia(const char*via,  
            int viaX,  
            int viaY,  
            int mask);  
int layerMask(int index) const;  
int polygonMask(int index) const;  
int viaTopMask(int index) const;  
int viaCutMask(int index) const;  
int viaBottomMask(int index) const;};
```

#### Description:

`addLayerMask(int mask)`

Specifies the color mask for a layer on the pin port.

`addPolyMask(int mask)`

Specifies the color mask for a polygon on the pin port.

```
addVia(const char*via,  
        int viaX,  
        int viaY,  
        int mask);
```

Specifies the color mask for a via on the pin port.

`layerMask(int index)`

Returns the layer mask number.

`PolygonMask(int index)`

## What's New in DEF 5.8 C/C++ Programming Interface

### Changed Features

---

Returns the polygon mask number.

```
viaTopMask(int index)
```

Returns top mask number of a via by index.

```
viaCutMask(int index)
```

Returns cut mask number of a via by index.

```
viaBottomMask(int index)
```

Returns bottom mask number of a via by index.

### defiPin

```
void addLayerMask(int mask);
void addPolyMask(int mask);
void addVia(const char*via,
            int viaX,
            int viaY,
            int mask);
void addPortLayerMask(int mask);
void addPortPolyMask(int mask);
int layerMask(int index) const;
int polygonMask(int index) const;
int viaTopMask(int index) const;
int viaCutMask(int index) const;
int viaBottomMask(int index) const;
```

### Description:

```
addLayerMask(int mask)
```

Specifies the color mask for a layer on the pin.

```
addPolyMask(int mask)
```

Specifies the color mask for a polygon on the pin.

```
addVia(const char*via,
int viaX,
int viaY,
int mask);
```

Specifies the color mask for a via on the pin.

```
addPortLayerMask(int mask)
```

Specifies the layer color mask number on the port.

## What's New in DEF 5.8 C/C++ Programming Interface

### Changed Features

---

`addPortPolyMask(int mask)`

Specifies the polygon color mask number on the port.

`layerMask(int index)`

Returns the layer mask number on a pin.

`polygonMask(int index)`

Returns polygon mask number on a pin.

`viaTopMask(int index)`

Returns the top mask number of a via by index.

`viaCutMask(int index)`

Returns cut mask number of a via by index.

`viaBottomMask(int index)`

Returns bottom mask number of a via by index.

For more information, see [“defiPin”](#) in the *DEF C/C++ Programming Interface Open Licensing Program*).

## defiTrack

```
void addMask(int colorMask,
             int sameMask);
int firstTrackMask() const;
int sameMask() const;
```

### Description:

`addMask(int colorMask)`  
`int sameMask);`

Specifies the mask number on the first routing track. If `sameMask` is true, all the routing tracks have the same mask number as the first mask.

`int firstTrackMask()`

Returns the color mask information of the first routing track.

`sameMask()`

Indicates whether same mask is defined or not.

## What's New in DEF 5.8 C/C++ Programming Interface

### Changed Features

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For more information, see "[defiTrack](#)" in the *DEF C/C++ Programming Interface Open Licensing Program*).

### defiVia

```
void addLayer(const char* layer,
              int xl, int yl,
              int xh, int yh,
              int colorMask);
void addPolygon(const char* layer,
                defiVar geometries *geom,
                int colorMask);
int rectMask(int index) const;
int polyMask(int index) const;
```

### Description:

```
addLayer(const char* layer,
          int xl, int yl,
          int xh, int yh,
          int colorMask);
```

Specifies color mask information of a rectangle. The default value is 0.

```
addPolygon(const char* layer,
            defiVar geometries *geom,
            int colorMask)
```

Specifies color mask information of a polygon. The default value is 0.

`rectMask(int index)` Returns color mask for the defined rectangle.

`polyMask(int index)` Returns color mask for the defined polygon.

For more information, see "[defiVia](#)" in the *DEF C/C++ Programming Interface Open Licensing Program*).