



# OHDOT\_GeometryPoints

## Description:

The OHDOT\_GeometryPoints application is an OpenRoads Designer CONNECT add-in application to assist the user with common point analysis and reporting tasks.

## Software Requirements:

This application was developed using .NET Framework 4.8 in 64bit Windows 10 and Bentley OpenRoads Designer CONNECT edition, version 10.09.00.91.

## Loading the Application:

The application is in the following folder withing the OHDOT CADD Standards:

..\OHDOT\Standards\Applications\Addins\

The configuration variable ODOT\_ADDINLOC is defined to specify the location of the application.

The application is run within OpenRoads Designer using the following key-in command:

mdl load OHDOT\_GeometryPoints;OHDOT\_GeometryPoints open

The application can also be accessed from the Ohio DOT ribbon menu within OpenRoads Designer (Ohio DOT > Apps > Survey Reports > OHDOT Geometry Points).

The dialog shown below is loaded.

Point Name	Feature	Description	Northing	Easting	Elevation	Elev Source	DGN File	Type	Attribute Pairs	Align-Sta-Off
SV900	RSPK		806780.19	1414340.96	1011.79	3D Point Elev	123456_FB001.dgn	Survey		CLP_1 Sta./Off. info not populated!
SV901	RSPK		805872.347	1414330.207	996.39	3D Point Elev	123456_FB001.dgn	Survey		CLP_1 Sta./Off. info not populated!
SV902	CNPT		804277.405	1414295.962	969.79	3D Point Elev	123456_FB001.dgn	Survey		CLP_1 Sta./Off. info not populated!
SV903	RSPK		803740.593	1415388.752	963.23	3D Point Elev	123456_FB001.dgn	Survey		CLP_1 Sta./Off. info not populated!
SV904	CNPT		807099.764	1414323.813	1003.68	3D Point Elev	123456_FB001.dgn	Survey		CLP_1 Sta./Off. info not populated!
SV905	CNPT		806587.602	1414318.586	1008.67	3D Point Elev	123456_FB001.dgn	Survey		CLP_1 Sta./Off. info not populated!
SV906	CNPT		805862.331	1414310.24	995.1	3D Point Elev	123456_FB001.dgn	Survey		CLP_1 Sta./Off. info not populated!
SV907	CNPT		805079.779	1414327.42	982.06	3D Point Elev	123456_FB001.dgn	Survey		CLP_1 Sta./Off. info not populated!
SV908	CNPT		804452.714	1414363.945	983.54	3D Point Elev	123456_FB001.dgn	Survey		CLP_1 Sta./Off. info not populated!



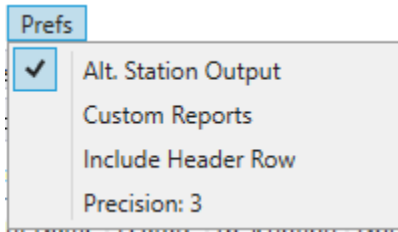
Note the vertical black bar to the left of the alignments list can be used to resize the width of the lists.



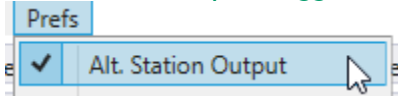
Note that the horizontal black bar above the results section can be used to resize the height of the lists/results section.

When the application is loaded, the active design file and the reference attachments are scanned to generate a list of the Survey Points, Geometry Points, and Alignments contained in the files. The dialog is populated with the list of points and alignments like the example above.

### Prefs Menu Item



### Alt. Station Output Toggle

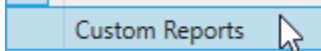


This toggle button is checked on by default. This setting only affects reporting station values of a point when the point is extended (beyond) the limits of the alignment.

When checked on, and the station is before the start of the alignment the returned station value will be the starting station and the tangential distance before the alignment. For example, if a point is 20' before the start of an alignment that has a start station of 2+00. The returned result will be **STA. 2+00 ext. -20'**. If checked off then the value returned will be the hypothetical tangential station value. The above example would be returned as **(extended) STA 1+80**.

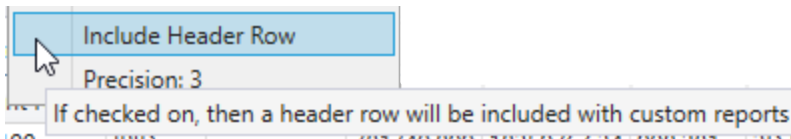
The same logic is used if the point is extended past the end of an alignment.

### Custom Reports



This menu item will open the [Custom Reports Dialog](#). Where a user can setup custom reports.

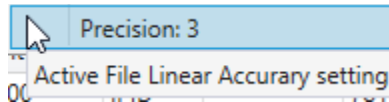
### Include Header Row



This toggle button is checked off by default. This setting is only used when generating custom reports. If checked on then a heading row will be included in the report, if checked off then no header row will be included.

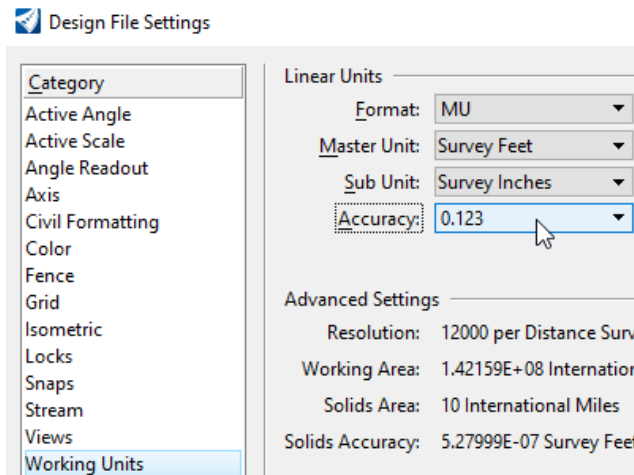


### Precision



This menu item simply informs the user what the active design file's Linear Accuracy is currently set to. This value is used throughout the app to round coordinate values, included when generating reports.

To change this setting open the Design File Settings, and under the working units tab, Linear Units section, change the Accuracy setting to the desired value as shown in the below screen shot.



If the linear accuracy is changed after this app has opened then the dialog must be closed and reopened or select the [Refresh Data Button](#) for this app to use the new linear accuracy setting.

### Refresh Data Button

In the event a point is added to the design, or deleted from the file, or the user changes to a new design file with the application is open, the **Refresh Data** button is used to read the design file and reference attachments to update both the point and alignments lists.

### Window Button

Select this command to window the MicroStation view display on the selected point. Only one point can be selected for this command.

### Inverse

The **Inverse** command is used to report the bearing and horizontal distance between two or more selected points. The points can be geometry points or survey points. The inverse is reported in the order the points are selected and displayed in the output field at the bottom of the dialog.



Point Name	Feature	Description	Northing	Easting	Elevation	Elev Source	
50	IPINS		520001.568	1651627.267	820.145	3D Point Elev	1
51	IPINS		519845.115	1651028.712	821.535	3D Point Elev	1
52	IPINS		519983.893	1650337.463	825.666	3D Point Elev	1
53	IPINS		519987.316	1649668.874	827.992	3D Point Elev	1
54	IPINS		519922.996	1649108.55	846.857	3D Point Elev	1
55	IPINS		519997.941	1648768.339	846.314	3D Point Elev	1
56	IPINS		519921.53	1648076.641	830.214	3D Point Elev	1

Clear

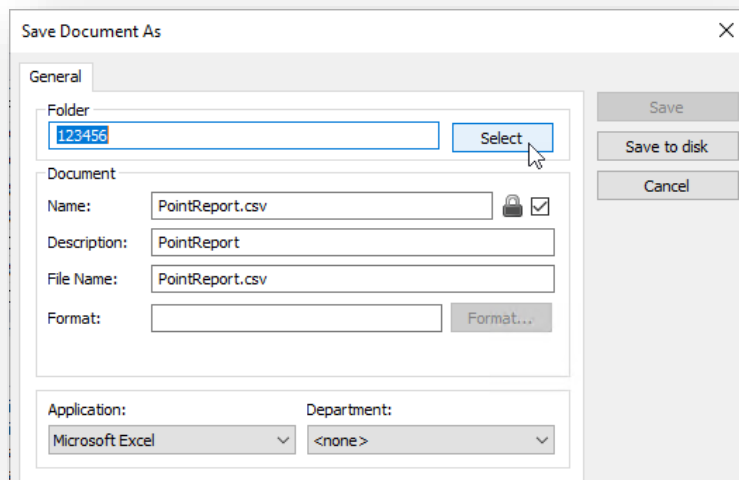
Inverse 51 to 55: Distance = 2,265.533 Direction = N86.132064°W  
Inverse 55 to 53: Distance = 900.598 Direction = S89.324025°E

## NEZ Report NEZ Report

This command is used to generate an ASCII text file in CSV format for the **selected points**. The following information is stored in the CSV file:

Point Name, Northing, Easting, Elevation, Feature Name

When the command is selected, the Save Document As dialog is displayed. If the design file is in ProjectWise, the dialog shown below is opened:

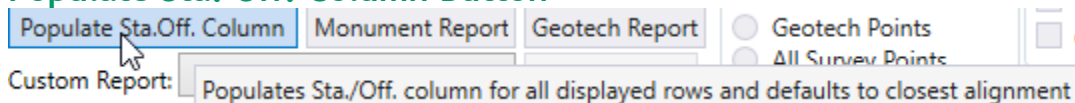


The application defaults to the PID number folder for the WorkSet. Use the **Select** button to browse to the folder where you wish to save the file.

Change the **Name**, **Description**, and **File Name** as desired.

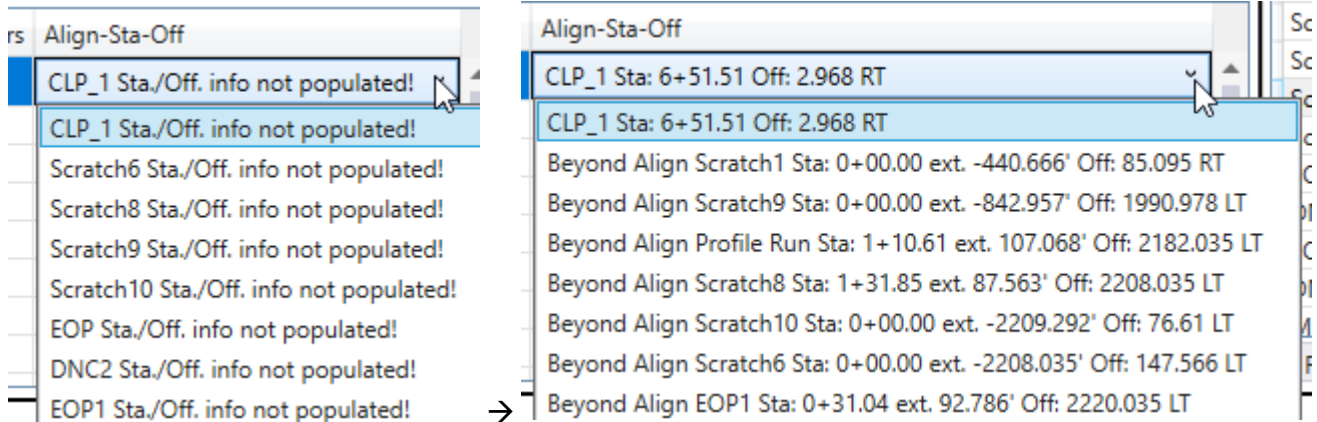
Select **Save to disc** to save the file in the selected location.

## Populate Sta. Off. Column Button





When this button is selected, it will populate the sta/off column in the points listview only for the currently displayed rows. It will default to the closest alignment and sort the dropdown from closed alignment to furthest.



### Monument Report Button

When this button is selected, the selected rows (or all displayed rows if none are selected) will be copied to the clipboard in the following table format

Point Name, Alignment Name, Station, Offset, Offset Side, Northing, Easting, Elevation, Feature Name(Code), blank column (point type), Description.

If can then be easily pasted in the monument report sheet in the survey master excel file.

### Geotech Report Geotech Report

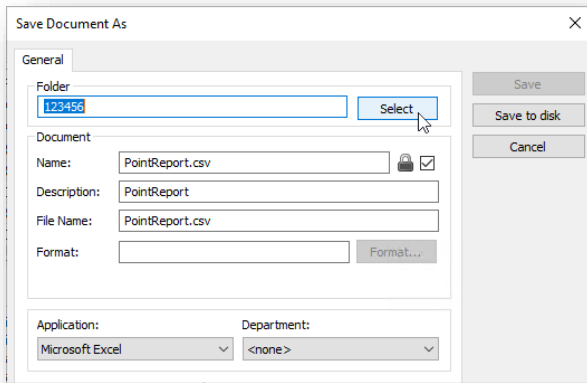
This command is used to generate an ASCII text file in CSV format for the **selected points**. You must select one alignment and at least one point for this report to be created. The following information is stored in the CSV file:

Point Name, Station, Offset, Direction, Elevation, Northing, Easting, Latitude, Longitude, Description, Feature Code, Chain, GCSName

Note that if the point does not have a description then the name is also used as the description.

The GCSName is the name of the geographic coordinate system set on the model the point resides in. if this is blank and the Latitude, Longitude columns are blank then a GCS is not defined on that model.

When the command is selected, the Save Document As dialog is displayed. If the design file is in ProjectWise, the dialog shown below is opened:

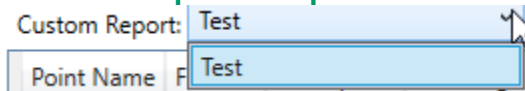


The application defaults to the PID number folder for the WorkSet. Use the **Select** button to browse to the folder where you wish to save the file.

Change the **Name**, **Description**, and **File Name** as desired.

Select **Save to disc** to save the file in the selected location.

### Custom Report DropDown



This dropdown is populated with all Custom Reports saved by the user.

### Custom Report Button

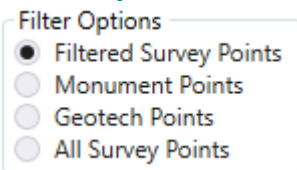
This button is only enabled if a custom report is selected in the custom report dropdown.

When this button is selected, the selected rows (or all displayed rows if none are selected) will be copied to the clipboard in the specified format at the selected Custom Report.

If the [Include Header Row](#) menu item is checked on this a header row will be included in the report.

If can then be easily pasted in an excel file or other document.

### Filter Options



#### Filtered Survey Points

By default, the application only lists the survey points that are defined as control or monument points. A CSV file is used to define the list of Feature Definitions that are considered control or monument points. The configuration variable **ODOT\_ADDINLOC** is used to define the location of the CSV file. The CSV file must be named **SurveyControlPointFeatureList.csv**.

#### Monument Points

Selecting this option will only list monument points. A CSV file is used to define the list of Feature Definitions that are considered monument points. The configuration variable **ODOT\_ADDINLOC** is used to define the location of the CSV file. The CSV file must be named **MonumentPointFeatureList.csv**.



### Geometry Points

Selecting this option will only list points with a code of SOIL, SOILINST, SOILTARG, WELLM or feature definition of GT\_P\_Soil Boring Instrumented, GT\_P\_Soil Boring Project, GT\_P\_Soil Boring Target, GT\_X\_Soil Boring Historic.

### Show All Survey Points

Selecting this option will update the list to include all the survey points regardless of the feature definition.

### Elevation Source

Elevation Source		
<input checked="" type="checkbox"/> Use	3D Point Elev	if its >0
<input checked="" type="checkbox"/> else use	Ruled Geomtry Elev	if its >0
<input type="checkbox"/> else use	Active Surface Elev	if its >0

This section provides the logic for which source should be used as the points elevation. There are three elevation sources listed/explained below. This section will determine which elevation source should be used from the top to the bottom. If a row is not checked on, then it is grayed out and not considered. If the elevation source has a value that is not zero then it is set as the elevation for the point, if not then it checks the next line. If all sources have an elevation of zero (or no rows are checked on) then the points elevation source is set to none and the elevation is set to zero.

The Elevation source for each row can be changed via the drop down to change the order/priority that the elevation sources are checked against.

### 3D Point Elev

This would be the z value of a point in a 3D. typically survey points.

### Rules Geometry Elev

Geometry Points	
X	1648948.969'
Y	519888.806'
Elevation	828.023'
Rotation	N90.000000"E
Rotation Reference	None
Absolute Angle	True

This would be the elevation rule that gets assigned to a point placed with geometry tools. Typically, this is a 2D point in a 2D design model so there is no 3D Point Elevation.

### Active Surface Elev

This is the elevation of a point if it was draped to the active surface. If there is no active surface then this value is 0.

### Sta-Off

The **Sta-Off** report is used to compute the station and offset value for selected from the selected alignment like the example below.

Station and offset values for points outside the limits of the alignment are reported along an extension of the alignment. Station output format is dependent on if [Alt. Station Output Toggle](#) is checked on or off.



OHDOT Point Tools

Help

Refresh Data Window Inverse NEZ Report Geotech Report

Filter Options:
 

- Filtered Survey Points
- Geotech Points
- All Survey Points

Elevation Source:
 

- Use 3D Point Elev if its >0
- else use Ruled Geometr Elev if its >0
- else use Active Surface Elev if its >0

Point Name	Feature	Description	Northing	Easting	Elevation	Elev Source	DGN File
B-001-1-21	GT_P_Soil Boring Project		519983.543	1646155.29	830.395	Ruled Geometry Elev	102375_BI001.dgn
B-008-2-21	GT_P_Soil Boring Project		519834.786	1649392.574	826.655	Ruled Geometry Elev	102375_BI001.dgn
B-018-1-21	GT_P_Soil Boring Project		518258.427	1648850.007	833.261	Ruled Geometry Elev	102375_BI001.dgn
B-018-2-21	GT_P_Soil Boring Project		518705.4	1648845.939	832.171	Ruled Geometry Elev	102375_BI001.dgn
B-021-1-21	GT_P_Soil Boring Project		518612.867	1648983.489	832.697	Ruled Geometry Elev	102375_BI001.dgn
B-021-2-21	GT_P_Soil Boring Project		518913.77	1648995.503	831.729	Ruled Geometry Elev	102375_BI001.dgn
B-026-1-21	GT_P_Soil Boring Project		520964.776	1648887.383	826.574	Ruled Geometry Elev	102375_BI001.dgn
B-031-0-21	GT_P_Soil Boring Project		519206.823	1649071.732	828.339	Ruled Geometry Elev	102375_BI001.dgn
B-032-0-21	GT_P_Soil Boring Project		519322.885	1649084.268	826.924	Ruled Geometry Elev	102375_BI001.dgn

Sta-Off

Exclude null Aligns

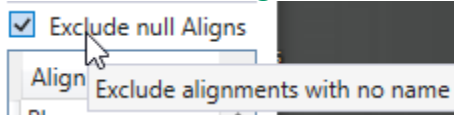
Alignment Name

- Plan-
- CLP\_RAMP D
- CLP\_RAMP AA
- CLP\_RAMP BB
- CLP\_RAMP CC
- CLP\_RAMP DD
- CLX\_IR75**
- CLX\_TECHNOLOG
- CLX\_SPEEDWAY
- CLX\_VENTURA
- CLX\_MAIN

Clear

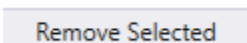
Point B-018-2-21 Station 1023+53.11, Offset -75.932, Alignment CLX\_IR75  
Point B-021-1-21 Station 1022+62.99, Offset 63.207, Alignment CLX\_IR75

## Exclude null Aligns



This check box will filter out all alignments that do not have a name. It is on by default.

## Remove Selected Button



this button is only enabled if at least one alignment is selected. When selected will remove the selected alignments from the Alignment list as well as from the options in the Align-Sta-Off column.

## Clear

Select the **Clear** command to clear the output window content.

## Cut and Paste Operations

Standard windows cut and paste operations (ctrl-c, ctrl-v) can be used to copy data from the application window into other applications.





## Custom Report Dialog



This dialog is used to set up custom reports.

### New Report Button

When this button is selected a new report will be added to the Reports ListView with a default name of new report.

### Delete Report Button

This button is only enabled if a Report is selected in the Reports ListView. When selected will remove the selected report from the Reports ListView.

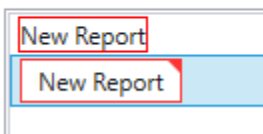
### Save Reports Button

This button will not be enabled if there are multiple reports in the Reports ListView with the same name. When selected, the current settings of this dialog are saved for the user. This is per user per machine. You must hit this button to save any changes made, if you close the dialog without hitting this button, any changes will be lost.

### Reports ListView

#### Custom Reports

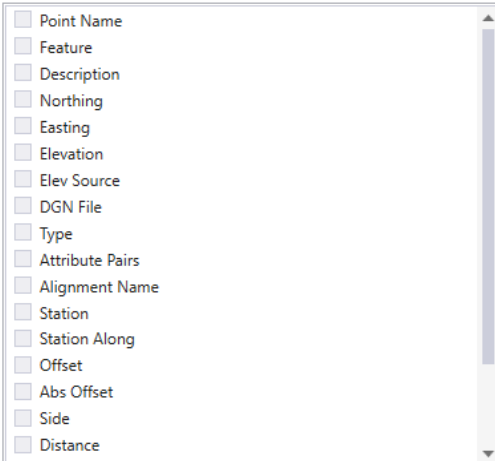
This listview will list all the custom reports for the user. The selected report will be editable to change the name. Note that a report name must be unique.





## Report Columns ListView

Drag and Drop to Reorder!



This List view will be populated with the available report columns when a Report from the Report ListView is selected.

Check on the column options desired for the currently selected report.

Drag and drop items to set the order of the checked on items.

## Add Blank Column

Add Blank Column

This button will add a blank column to the Report Columns ListView. There is no limit for the number of blank columns that can be added.

## Updates

### Version 1.0.0.0

Original Release

### Version 1.0.1.0

- Added Filter Options section with three options (Filtered Survey Points, Geotech Points, All Survey Points) this replaces the Show All Survey Points Checkbox.
- Added Geotech Report Button
- Added Elevation Source section with options/logic for what source to get the points elevation should be used (3D Point Elevation, Rules Geometry Elevation, or Active Surface elevation)
- The Elevation column in the Points List now will show the elevation from the elevation source.
- An Elevation Source Column was added to the Points List to show where the which source was used for the elevation.
- Added filter checkbox to exclude alignments without a name from the alignments list.
- Added vertical splitter between the Points Lists and the Alignments List for dynamic resizing.
- Made the horizontal splitter between the Results section and the Points/Alignments List a black line and thicker.

### Version 1.0.1.1

- Updated Geotech Report Button to include Latitude, Longitude and the name of the coordinate system used to convert northing/easting to Latitude, Longitude. If Lat./Long. Columns are blank then a GCS is not set in the model/file that point resides in.



#### Version 1.0.1.2

- Fixed bug introduced with ORD 10.12 what was displaying incorrect northing, easting, and elevation values for geometry points.
- Fixed bug that was display the same points and/or alignments multiple times in dialog.

#### Version 1.0.1.3

- Added Attribute Pairs Column to point list.
- Added Remove Selected button to remove selected alignments from the list.
- Added Monument Report Button
- Added Monument Points Filter option
- Added Sta. Off. Column to point list to define the alignment to calculate station offset values.
- Added Populate Sta. Off. Column button
- Added Prefs menu item
- Added Alt. Station output option
  - Updated Sta-Off button to use the Alt. Station output option to know what format to return the sta. value in.
- Added Custom Report preference
- Added dialog to create and save custom reports.
- Added Custom Report button
- Added Populate Sta. Off. Column button

#### Version 1.0.1.4

- Added Include Header Row Menu Item
- Added Precision Menu Item
- Fixed reports outputting the incorrect Northing, Easting, and elevation values (it was incorrectly leaving the units of resolution on the values)
- Added all elevation options (3d, Ruled, and Draped) to the custom report available columns
- Fixed all report outputs to output the current elevation source, some reports were always outputting the 3d elevation source.
- Updated to handle 2023 version number change.

#### Version 1.0.1.5

- Removed Google Analytics from app
- Fixed problem with app not calculating the draped active surface elevation of a point if the point was in a reference.
- Fixed problem with survey points coordinates being returned in coordinate system of the model the point resides in and not the active model coordinates. This problem only happened if the reference model was in a different GCS then the active. This was never a problem with the geometry points. App now returns all coordinates using the active model's GCS.
- Added Lat., Long., dgn file name, and model name options to the available custom report columns.
- Added the ability to add blank columns to custom reports.



## Contacts

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For any questions, suggestions, or problems with this application please contact the ODOT Office of CADD and Mapping Services by use of the following form on the ODOT website:

[https://odot.formstack.com/forms/cadd\\_servicerequest](https://odot.formstack.com/forms/cadd_servicerequest)

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