Snapping Guide for the Summit Evolution Stereoplotter with DAT/EM Capture for AutoCAD

DAT/EM Systems International
2014 Merrill Field Drive, Anchorage, Alaska USA
Phone (907) 522-3681
support@datem.com, web: www.datem.com

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## Snapping Guide Introduction

This guide will give you some hints for snapping methods using the DAT/EM Summit Evolution stereoplotter (Summit) and DAT/EM Capture for AutoCAD (Capture). This includes how to set a 2D or 3D snap, settings, and keyins to use for the DAT/EM Keypad and Summit's Button Manager.

Do This Immediately After Installation

All versions of AutoCAD install with some default locks and snaps set on, which you will need to turn off. Some of them are very important, such as grid, axis, or angle locks that will prevent the AutoCAD cursor from moving to or digitizing at the same locations as the Summit cursor.

This may be done after installing AutoCAD, and either before or after configuring AutoCAD to run with DAT/EM Capture. It should be done before digitizing any vectors in AutoCAD using DAT/EM Capture and the Summit digitizer. Check the following:

1. View the icons along the lower right edge of the AutoCAD window and turn off Polar Tracking, Snap mode, and Orthomode. They are off if they do not have a blue highlight.
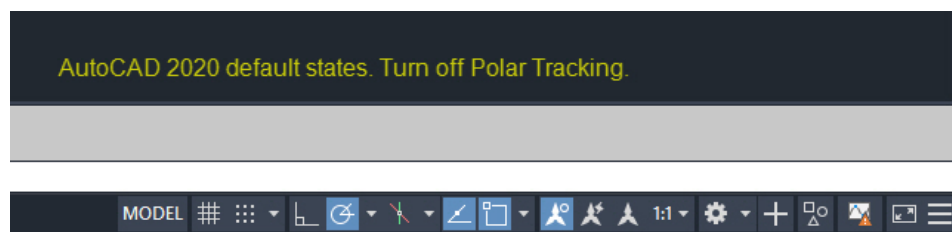
AutoCAD 2020 defaults shown. Turn off Polar Tracking (first blue highlighted icon on the left) If you find them on in your version, also turn off Snap mode and Orthomode.

Other versions may have other locks on. Hover the system mouse over each blue highlighted icon to see what it is. Turn off anything that might interfere with drawing with Summit.

Osnap may be either on or off. Osnap will be used for snapping and will be toggled often.

Use AutoCAD "Help" to look up any settings that are unknown to you. Some of them do not interfere with mapping activities.

It is particularly important to keep **Snap Mode** off, because, unlike polar tracking and orthomode, you may not notice when it's on. The result of snap mode may be to round off coordinates to every 0.25 or 0.1 unit, for example.

To prevent snap mode, orthomode, or polar tracking from being turned back on by a stray mouse click, you could optionally remove their icons from the display. First make sure the modes are turned off (not highlighted in blue). Click the three parallel lines icon on the far lower right corner. Uncheck Snap Mode, Ortho Mode, and Polar Tracking.
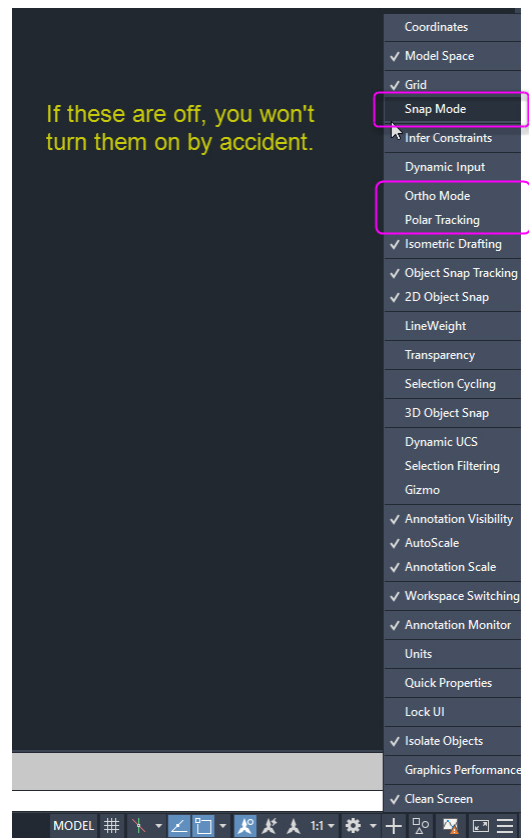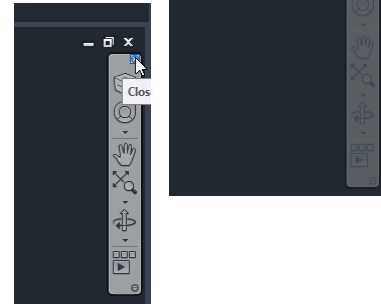
2. This has nothing to do with snapping, but it may bother you, so here's an extra hint. To turn off the WCS compass that appears by default in the upper right corner of the AutoCAD view, key in on the command line:

> Command: **DISPLAYVIEWCUBEIN2D**
> Enter new value for DISPLAYVIEWCUBEIN2D <ON>: **OFF**

Also click the "x" on the remaining toolbar:

AutoCAD OSNAP and 3DOSNAP

While using DAT/EM Capture for AutoCAD, most snapping will be done with AutoCAD's OSNAP, and the choice between 2D and 3D snaps will be done by toggling 3DOSNAP.

You will most likely want to toggle OSNAP and 3DOSNAP snapping modes during drawing, for example:

- From on to off
- From 2D to 3D
- From one mode to another, such as 'nearest', 'midpoint', 'intersection', and 'vertex'

You may notice that the OSNAP or 3DOSNAP command entered directly on the AutoCAD Command line activates a dialog, but a dialog will interfere with any in-process drawing command. Other methods of changing OSNAP settings might be time consuming or might require Summit Lite users to release the mouse in order to click on AutoCAD icons (lower right of AutoCAD). AutoCAD has function keys to set snapping on and off, but AutoCAD must be the Windows focus application in order to use function keys. These methods to make OSNAP settings are too time consuming. It is much faster and more efficient to suppress the dialog and use transparent keyins from the DAT/EM Keypad or Summit's digitizer buttons.

Any AutoCAD command line keyin that affects OSNAP and 3DOSNAP may be activated from the Keypad or a Summit digitizer button. We will give some examples below, but there are too many possible keyins to list here. The best resource for keyin lists is in your AutoCAD version's Help system. The following is a list of environment variables, commands, and suggested topics to research in AutoCAD's Help:

- System variables OSMODE, 3DOSMODE, OSNAPZ, OSOPTIONS
- Commands: OSNAP, 3DOSNAP (and all their sub commands)
- Suggested information: "About using object snaps", "Commands for object snaps", "Commands for object snaps in 3D"

First we'll give some recommended OSNAP advice and examples. You can set Summit's Button Manager "User CAD" buttons or the DAT/EM Keypad to make the OSNAP settings with the most commonly used OSNAP toggles and modes. Use **'-osnap** with the snap type. This uses both the transparent command quote mark (') and the dialog suppression dash mark (-). This way, it can be used during drawing, and it will not interrupt the drawing or display a dialog.

Examples of transparent and suppressed-dialog OSNAP keyins:

> **'-osnap off**
> **'-osnap end**
> **'-osnap nea**
> Etc. see table below.

AutoCAD 2020 "Help" shows the following modes for OSNAP. The CAPITAL letters indicate the shorter version of the keyin. You should find the equivalent of this list for your particular AutoCAD version's Help, in case anything has changed in the different versions:

Object Snap Modes

Specify one or more object snap modes by entering the uppercase characters of the name in the following table. If you enter more than one name, separate the names with commas.

Mode	Description
ENDpoint	Snaps to the closest endpoint or corner of a geometric object
MIDpoint	Snaps to the midpoint of a geometric object
CENter	Snaps to the center of an arc, circle, ellipse, or elliptical arc
Geometric CEnter	Snaps to the centroid of any closed polylines and splines
NODe	Snaps to a point object, dimension definition point, or dimension text origin
QUAdrant	Snaps to a quadrant point of an arc, circle, ellipse, or elliptical arc
INTersection	Snaps to the intersection of geometric objects
EXTension	Causes a temporary extension line or arc to be displayed when you pass the cursor over the endpoint of objects, so you can specify points on the extension
INSertion	Snaps to the insertion point of objects such as an attribute, a block, or text
PERpendicular	Snaps to a point perpendicular to the selected geometric object
TANgent	Snaps to the tangent of an arc, circle, ellipse, elliptical arc, polyline arc, or spline
NEArest	Snaps to the nearest point on an object such as an arc, circle, ellipse, elliptical arc, line, point, polyline, ray, spline, or xline
APParent intersection	Snaps to the visual intersection of two objects that do not intersect in 3D space but may appear to intersect in the current view
PARallel	Constrains a new line segment, polyline segment, ray or xline to be parallel to an existing linear object that you identify by hovering your cursor
NONe	Turns off object snap modes

For more information on each of these object snap modes, see the Object Snap tab of the Drafting Settings dialog box.

Autodesk's AutoCAD 2020 "Help" for Osnap keyins, which may be set on a digitizer "User CAD" button or the DAT/EM Keypad.

On a Summit Button Manager (Summit > Tools > Button Manager) key, it's possible to either set one setting or string together multiple settings to use in series each time you press the button. Separate each distinct command with the colon **:** character. Each time you press the button, it will issue the next command past the **:**, cycling around to the beginning after issuing the last command.

As an example of separate commands, you could set separate Keypad or Button Manager buttons as to control OSNAP running snapping modes as follows:

**Type**=**User CAD**, **Action**=**'-osnap off{RET}**   (this sets all running snapping modes off/unchecked)

Type=**User CAD**, **Action**=**'-osnap end{RET}**

Type=**User CAD**, **Action**=**'-osnap near{RET}**

Type=**User CAD**, **Action**=**'-osnap int{RET}**

When these are issued separately, they turn off other modes and set only the single listed mode. You may set all of the running modes on at one time by separating multiple modes with a comma. This is explained in AutoCAD Help as well:

**Type**=**User CAD**, **Action**=**'-osnap end,near,int{RET}**
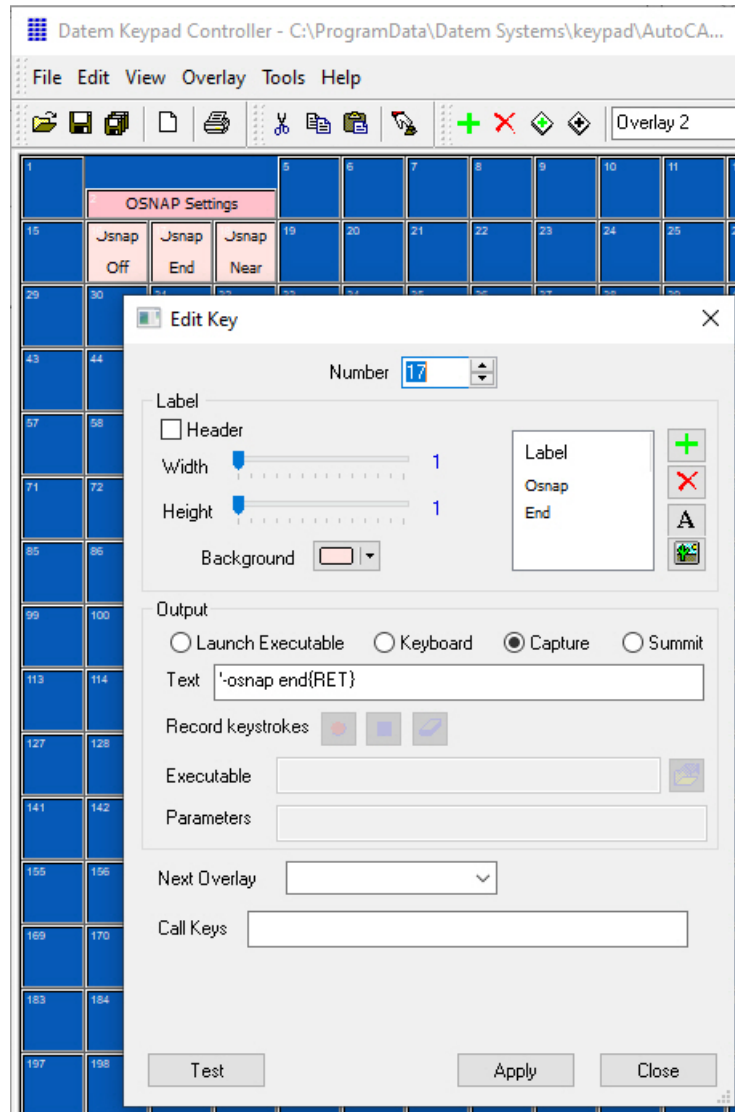
*Example of the DAT/EM Keypad button **Text** that sets OSNAP to endpoint snap mode*
This could also be placed on a Button Manager button

As an example of multiple commands on the same Button Manager button (but not the Keypad), you could place all of the commands separated by a colon **:** character on one **Type=User CAD** button:

Type=User CAD, **Action**='-osnap end{RET}**:**'-osnap near{RET}**:**'-osnap int{RET}

Each time you press this button, it scrolls to the next command after the **:** character. For example, to change from *Osnap End* to *Intersection* in this example, you would press the button two times.
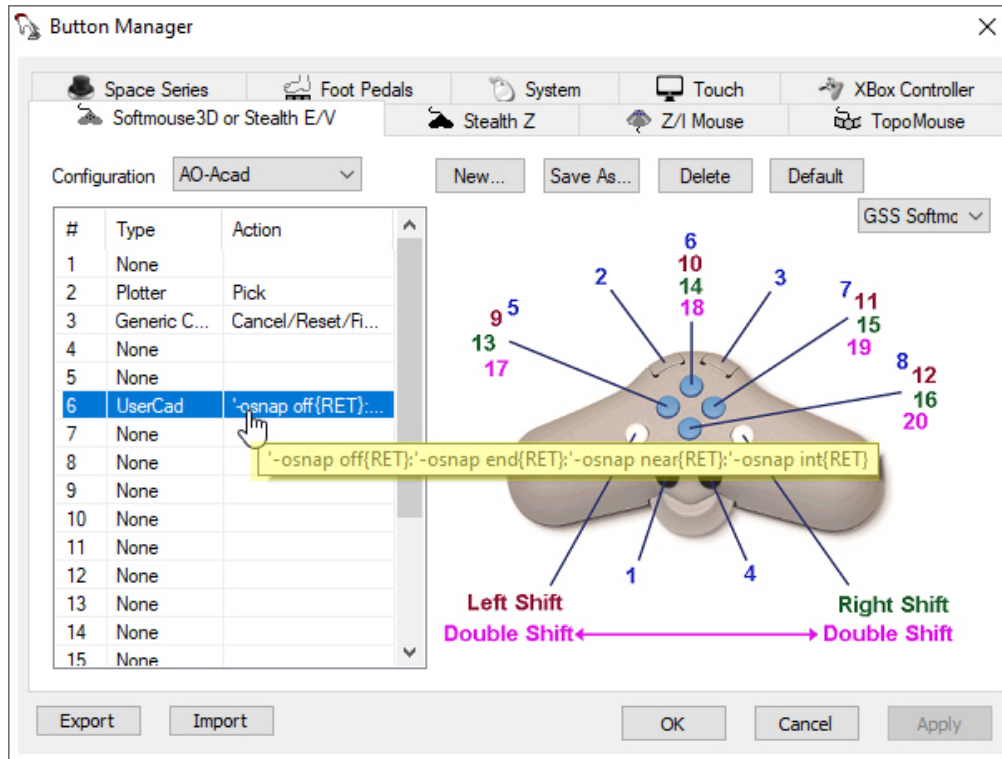
Example of three OSNAP settings on one Button Manager button
(the : character method only works in Button Manager, not on the DAT/EM Keypad)

You may submit 3DOSNAP commands in a similar manner on the DAT/EM Keypad and Button Manager buttons. Find 3DOSNAP keyins in AutoCAD Help.

ADVOSNAPS (DAT/EM Advanced Object Snap Settings)

ADVOSNAPS (DAT/EM Advanced Object Snap Settings) is a DAT/EM Capture command to let you choose layers that AutoCAD OSNAP will either recognize or filter for snapping. When ADVOSNAPS is activated, if a layer is not checked, then OSNAP will not snap to it.
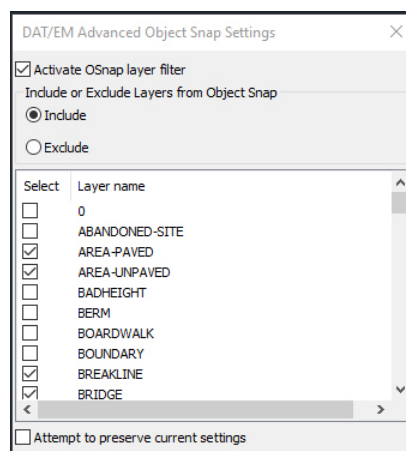
ADVOSNAPS shown checked on and several layers unchecked/checked

Snap Overrides Such as NEA and INT

If OSNAP and 3DOSNAP are off, you may still accomplish a snap with AutoCAD snap keyins, such as NEA (one-time near snap) and INT (one-time intersection snap).

Drive the Stereoplotter to Potential Snaps with DATEMSNAP

DAT/EM provides a command called DATEMSNAP that works during drawing with the DAT/EM AUTOARC3D and AutoCAD 3DPOLY commands. It moves the stereoplotter cursor to selected snap coordinates.

To use DATEMSNAP, perform the following steps:

1. In an active drawing, turn on DATEMSNAP from a keyin or a DAT/EM Keypad key:
    ```
    Command: Datemsnap
    DATEMSNAP On/Off: On
    Datemsnap is now ON.
    ```

    Note: To set DATEMSNAP on and off from DAT/EM Keypad keys, use the following strings:
    Datemsnap{RET}on{RET}
    Datemsnap{RET}off{RET}

2. Start either **3DPOLY** or **AUTOARC3D** and begin drawing. During drawing, if you pick any type of snap, the stereoplotter will move to the snapped location.

Post-Processing 2D and 3D Snaps with MapEditor

The MapEditor can be used as a post-processing step to create 2D and 3D snaps. It offers options to add nodes (vertices) or breakline objects at intersections.

The MapEditor can be run on a quick one-time-only, this-drawing-only basis, or it can run a parameter file of preset tasks. If you often use the same drawing file template, so that you always have the same set of layer names, it will be worth the time to create a parameter file and ensure the desired snaps. You will save a lot of time at the drawing stage if you can skip the commonly done object snaps and have MapEditor do them later.

Even if you carefully ensure snaps during digitizing, MapEditor can still check them later. It could catch that one out of a thousand that was missed or 2D snapped when it should have been 3D snapped. It can also quickly "visit" the edited locations to let you visually check the MapEditor edits. It could also simply visit the proposed edit locations and let you decide what to do there.

You can draw objects such as driveways, fences, and vegetation lines running into building roof polygons without worrying about precise 2D snaps at the time of drawing. You can also draw driveway lines that fall a little short or overlap the road a little, then enter and exit the building (garage). Later, MapEditor Clip can remove the objects from inside the buildings, performing a 2D snap, and MapEditor Touch can extend or trim the driveways to the road with a 3D snap. It can also add a node (vertex) at the intersection on the road line and optionally create a "Visit" file for you to visually verify each edit:
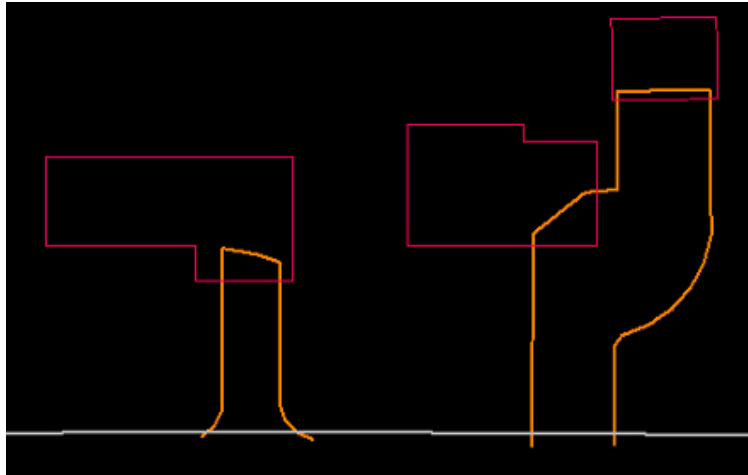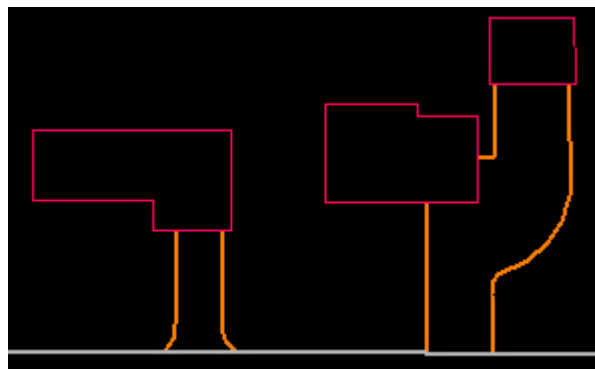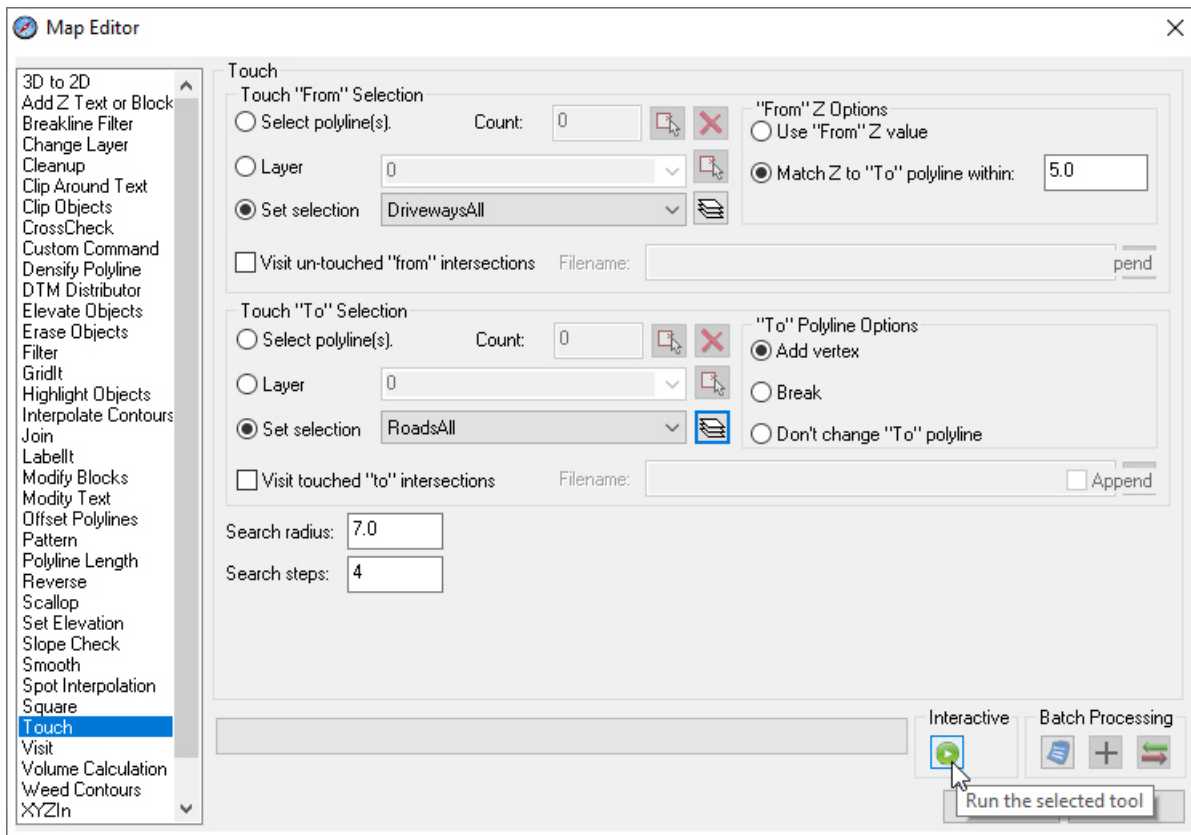
*Example of driveway lines drawn overlapping the road and building objects*
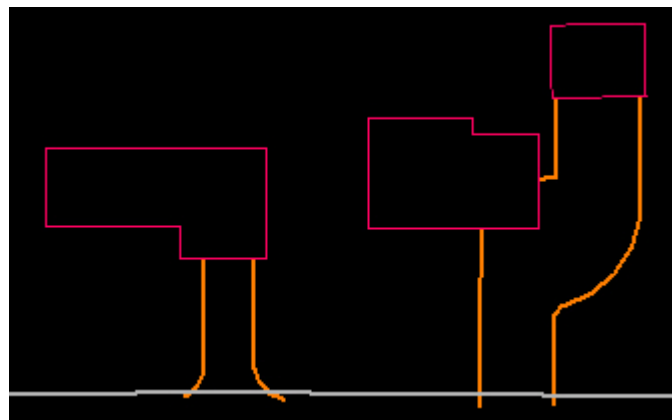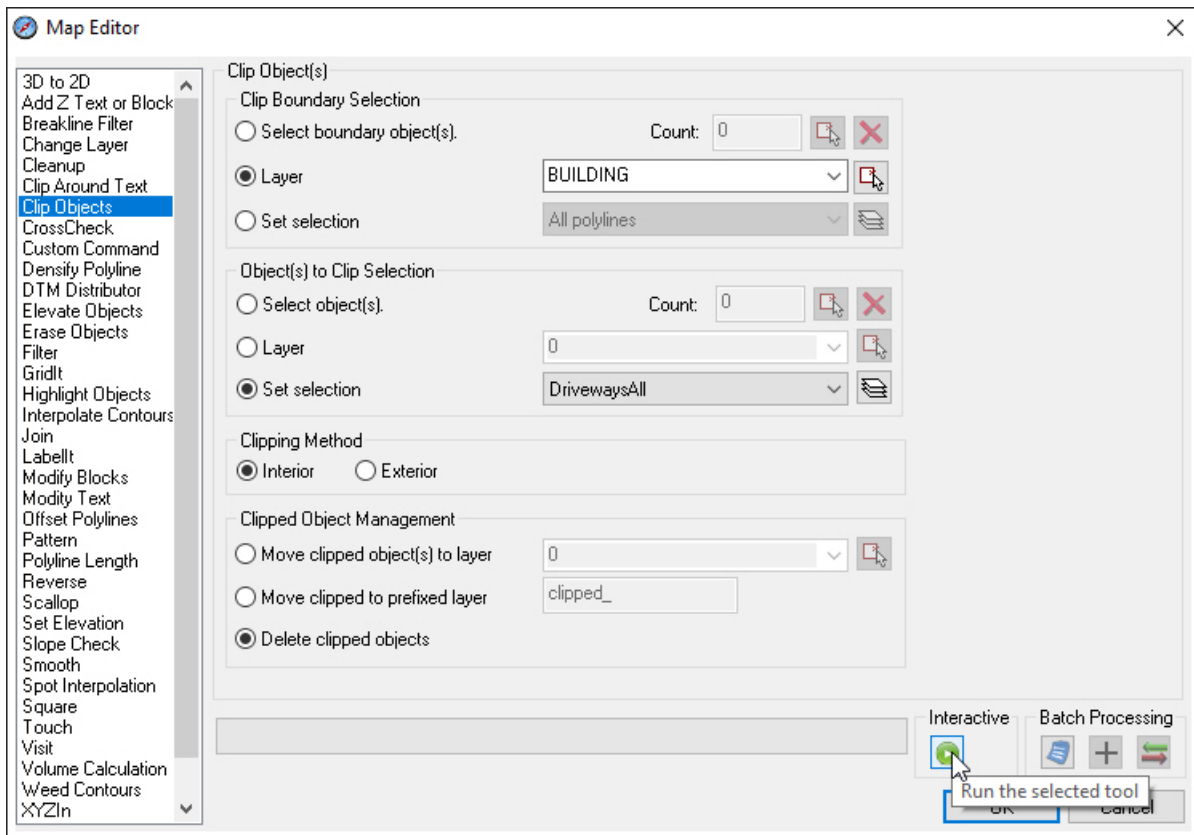
Example of MapEditor Clip Objects set to clip the driveways out of the buildings, resulting in 2D snaps

Example of MapEditor Touch settings to extend/trim the driveways to the road, resulting in 3D snaps and a node added to the road line at each driveway intersection.

As another example, you could ensure that breakline-level polylines always intersect with each other and have a node at their intersection. For this, use MapEditor's CrossCheck command set to average the elevations (result is a 3D snap) at intersections, add a node on both "from" and "to" objects, and optionally visit the edited intersections when finished.
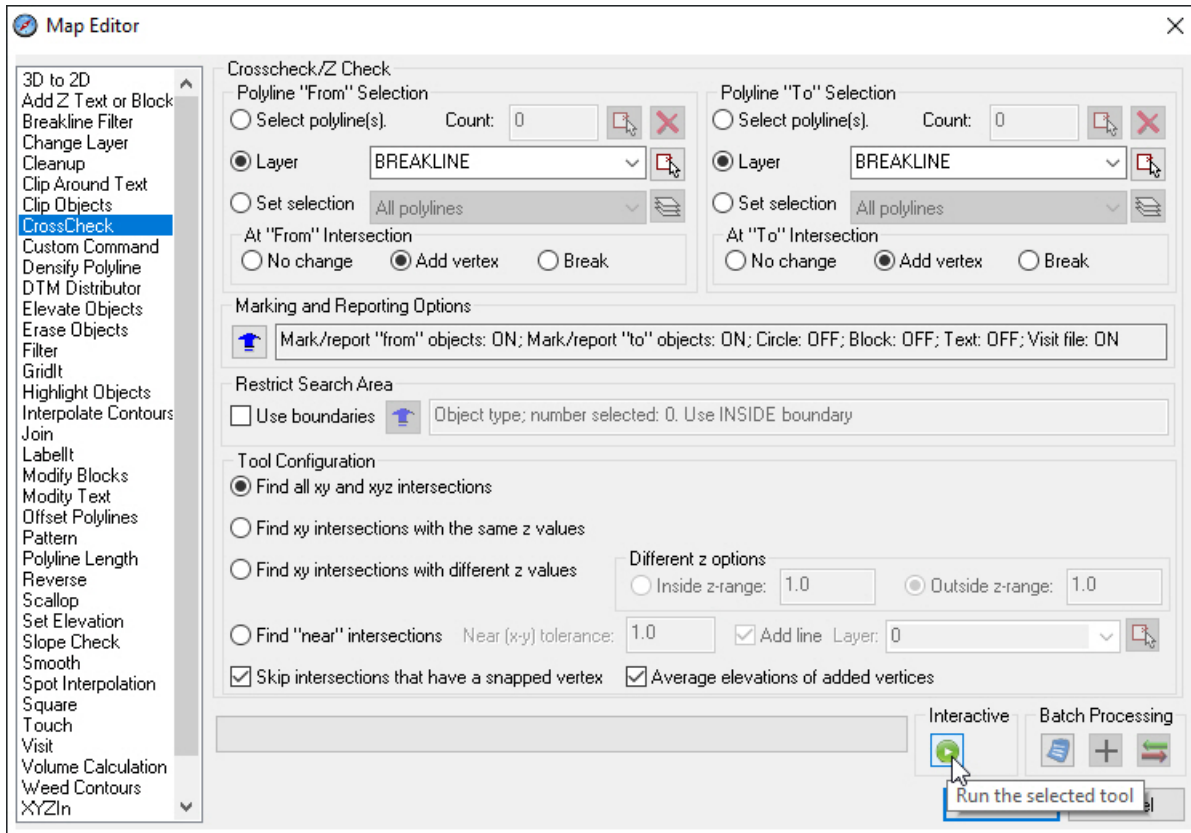
CrossCheck is set here to find intersections, ensure a 3D snap, and add nodes at the intersection. At the end of processing, CrossCheck can launch Visit to show the intersections that either were edited or qualify for editing.