Tips for successful digitizing

with Golden Software's "Didger5" app, "TabletWorks" driver, & Windows10

by Peter Bird, UCLA, 6 August 2019

Establishing a connection

The wireless puck of the digitizer should be stored with its batteries removed (to prevent corrosion by any leak); insert the batteries now, being careful to align + and – signs.

Power up the digitizer. Set it to single-point mode (not stream mode), per manual.

My digitizer (CalComp Drawing Board VI, 36" x 24") will now show a flashing green light, indicating that the puck is not found. This is because the puck is not yet awake. Click the puck somewhere inside the digitizing area, and the flashing green light should become steady-green. (If not, try new batteries in your digitizing puck. Or, reinsert the same batteries correctly!)

Check that your Windows computer is connected to the digitizer by a long USB cable, plugged in at both ends.

> ***After a recent Windows 10 update (2020.02), the following (indented, small-type) steps are no longer possible, and are probably no longer necessary!***
>
> Your computer should have the free TabletWorks driver (available from Calcomp) installed, and it should be auto-starting each time you reboot your computer. Find the (usually hidden) icon for the TabletWorks user-interface by clicking the "**^**" sign at the lower-right of the Windows desktop to expose the mini-menu of normally-hidden icons. Start its user-interface by double-clicking. The medium-sized window of the TabletWorks Control Panel should now appear.
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> I often have problems at this point: Either the DrawingBoard VI is not recognized, or it is recognized as the wrong model (*e.g.*, 14" x 9"), or it is remembered but frozen. My solution is to use the "Remove tablet" button to eliminate any listed devices, then go to the digitizer and reboot it (with the power switch). You may also have to re-click the digitizing puck. Hopefully this will cause your digitizing table to be recognized and correctly identified. (If not, call tech support for your digitizing tablet; you might need an updated driver program.)
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> Still in the TabletWorks Control Panel application: Bring up the "Test" tab/page. Click "Start". Then go to the digitizing tablet and enter some random points. They should appear (as tiny dots) on the mini-tablet display on your computer. If nothing happens, try this all again. After you succeed, press the "Stop" and then "Clear" and then "OK" buttons.

Next, start the Golden Software "Didger5" application. (Be sure you do not open more than one copy of this program; that ***never*** works!) Click on the "Activate Tablet (F9)" button (or press F9) to turn it yellow (On). Choose the "Help" menu from the top-line menu, and then click on "WinTab info." (If it is grayed-out or won't start, then trying closing and restarting Didger5; otherwise, some previous step(s) in this checklist must be DONE OVER!) Then click the

digitizing puck; the transmitted coordinates should appear in the small information window as TabletX and TabletY, as large integers, which are probably in units of 0.001".
Click "OK" to close this Wintab Info window.

Sometimes this test fails, and nothing happens (even though the Test tab in the TabletWorks mini-app was working). If you encounter this problem, and if you are running Windows on a 64-bit computer, then there is another work-around to try: On your keyboard, press Ctrl + Alt + Delete, then use the mouse to select Task Manager. Choose the Processes tab. Scroll down the list of Background Processes to the end and look for an entry like, "TabletWorks WinTab Server (32-bit)" OR "WinTab Server (32-bit)". Just right-click on this entry, and choose "End Task." (***Sometimes*** this solves the problem; sometimes it doesn't. The reasons are very unclear!)

If you repeatedly FAIL to get this far, try re-booting your computer. Then, there is one more critical thing to check: The Golden Software application "Didger5" is available in both 32-bit and 64-bit versions. A 64-bit Window 10 computer can run *either one*. However, the "bitness" of your TabletWorks (WinTab API) driver and your application MUST MATCH for success! To check which version of Didger5 you are running, use the Help / About Didger command and read the specs. It should match the native "bitness" of your computer hardware. On the driver side, the Release Notes for the TabletWorks driver say that "64-bit WinTab API support" was added with version 11.1.0; one ***presumes*** that this 64-bit version is automatically installed on any 64-bit computer. Still, when I use Windows Task Manager to check what is running, "Tablet Works Control Panel (32 bit)" is seen. I ***think*** that this just refers to the Control Panel mini-app (which is a user-mode add-on that they have not bothered to recompile as 64-bit), and not to the underlying WinTab driver/server. However, the whole subject is ***murky***, and Windows programmers don't seem to understand it either!

Calibrate the Digitizer

Now you need to "teach" the Didger5 application how to convert integer digitizer-hardware coordinates that are coming in through the USB port, such as (***x, y***) = (0:35999, 0:23999), to real-world dimensions in meters. This process has several steps:

Mark two perpendicular ***x*** and ***y*** axes on the map you are digitizing. (If it is borrowed, then mark these axes on PostIt notes that are temporarily stuck onto the map.) Usually your ***x*** axis should point Eastward and your ***y*** axis should point Northward (at least, at the map-point where they intersect; this may not be true everywhere).

On the map, mark the intersection of your ***x*** and ***y*** axes as having Cartesian coordinates of (0, 0) meters. Then, mark two new points at the extreme limits of your ***x*** and ***y*** axes. Measure their distances from your origin in meters of "lab distance" (e.g., 0.50 m and 0.30 m, respectively), and then multiply by the map scale (*e.g.*, 1:750,000) to obtain real-world distances. (In this

example, they would be 375000 m and 225000 m, respectively.) Label the right-hand point as (375000, 0) m, and the upper-left point as (0, 225000) m {or whatever #s apply in your case}.

Now, inside Didger5, find the "Calibrate Digitizer" button (or use the Draw / Tablet / Tablet Calibration… command from the menus). Agree to the "Cartesian Coordinate System" default by clicking Next. Now, go to the digitizing tablet and digitize your (0, 0) origin with a single click. Its (integer) digitizer-hardware coordinates should appear on Didger5 under TabletX and TabletY. Type your desired real-world coordinates (*x*, *y*; usually in meters) under WorldX and WorldY. *(Click on the number already in the box, then type in your own number.* ***I strongly suggest typing in decimal numbers, as using integers seems to trigger a bug in Didger5****!)* Press the "Add Point" button (twice?). Do this for all 3 calibration points. [CAUTION: Do not leave any incomplete line(s) hanging around in this table. If you have accidentally started a fourth line, then click on it and then use the Delete Point button to get rid of it.] Click "Next" twice.

I advise UN-checking the box labelled "Auto Snap Nodes", unless you <u>want</u> future digitized polylines to topologically link to nearby existing polylines. (I don't.) Click "Next".

The next menu allows you to set the limits for the digitizing area. I find the default settings (±5% margin beyond the calibration points you just entered) are usually fine. If not, enlarge the range by entering different numbers. I recommend that you LEAVE the "Based on calibration" box checked; otherwise, you may get into a confusing situation using two different systems of coordinates! AND, <u>ALWAYS CHECK</u> the box labelled, "Set Proportional XY Scaling" which is always appropriate for maps (but not for graphs where *x* and *y* have different units). Click "Finish".

<u>Digitizing your first polyline:</u>

In Didger5, the "Activate Digitizer (F9)" button should be yellow, to show, "ON". Otherwise, click it.

Click the Didger5 button "Draw Polyline (Ctrl+L)". ***Note that you may have to click it more than once!*** You will know the software is ready for digitizing when the Property Manager window at the lower-left contains the words "Digitize Data Attributes" at the top.

In the Property Manager window, expand "Increment Settings" (if not already expanded).

Check the box "Enter Data After Digitizing" BUT UN-CHECK "Create Several". *[CAUTION: After making this change, I typically find that the <u>first</u> polyline I try to create is <u>un</u>successful, because Didger5 now thinks that I am digitizing with the computer-mouse! So, I usually just complete a bogus polyline with the mouse (ending with a double-mouse-click), and then immediately select and delete it. Subsequent polylines should work better!]*

As always, click on the Didger5 button "Draw Polyline (Ctrl+L)". Go to the digitizing pad and click sequential points along desired line on your map. You should see them echoed on your computer screen (but perhaps distorted; more on that later).

To STOP entering this polyline, return to the computer and press the "Enter" key. This often causes the mini-window with (blank) line attributes to pop up. If it doesn't, another way to end the line (which is less safe) is to double-click the left button on your computer mouse (NOT the left button on your digitizing puck). The danger with this second method is that the mouse might slip slightly, entering a final point which is not wanted, or not accurate.

Fill in the name, serial #, and/or other identifiers of this polyline in the boxes provided, and then click on the "OK" button. You should see that your new polyline is now a graphical object in the Data Manager window. You can select it there, or directly on the computer-image of the map. Once selected, it can be Deleted, or Exported, or combined with other lines, or have its data edited….

It is possible that Didger5 will now be displaying a DISTORTED IMAGE of your polyline(?). If so, use the Create Graticule or Grid button to add a "grid" of lines with constant *x* and constant *y*, in a new graphical layer called "Grid". This should fix the problem. (You can then delete this new Grid layer in the Layer Manager window, or just hide it.)

Exporting your polyline(s):

Be sure that any/all polylines you want to export are selected. (Typically, you do NOT want the Grid lines to be selected.)

From the upper-left main menu of Didger5, choose File / Export… .

From the drop-down Save As Type menu, select "SHP ESRI Shapefile (*.shp)".

Type a file-name for this export (*e.g.*, "*yourName*", or whatever you want).

Click "OK".

Four (4) new files should appear on your Desktop (or, in some other designated working folder?): *yourName*.shp, *yourName*.dbf, *yourName*.shx, & *yourName*.cpg. The first two of these (.SHP & .DBF) should be saved together (always in the same folder). The other two (.SHX & .CPG) are mainly for use in ESRI program products. I usually delete them.

Postprocessing:

Put the exported file-pair (*yourName*.shp & *yourName*.dbf) back on your Desktop (or wherever your active working folder is) and run my utility program **SHP_toFrom_xyDIG** . This program will quickly and easily convert this pair of files into the single file *yourName_xy*.dig, in my .DIG format.

My .DIG format is documented here: http://peterbird.name/guide/dig_format.htm

Any .DIG file can be inspected and edited in any simple ASCII text editor. (I like EditPad Pro; alternatively, the less-powerful NotePad is supplied free with Windows.)

If you had to use multiple data windows (each being only 32 characters wide) to label your polyline(s) inside Didger5, you can simply combine these short labels into one longer label by deleting any unwanted line-breaks in your ASCII text editor. (Just remember that any header lines have to be left-justified, and start in column 1.)

Another issue to check for: Didger5 sometimes breaks long polylines into pieces, with no warning(!), during the Export process. You should suspect this if my program **SHP_toFrom_xyDIG** reports more lines that you were expecting! You can fix the problem in your ASCII-editing program, by simply deleting the extra *** and Fnnnn lines that separate the pieces.

Unless you are modeling the Earth in a flat-Earth approximation (*e.g.*, with flat-Earth finite-element programs that use Cartesian (***x***, ***y***) coordinates), you will probably want to convert *yourName*_xy.dig to (*longitude, latitude*) coordinates, and call it something different, such as *yourName*.dig. To do this, run my utility program **Projector**. It will allow you to select the map-projection (of the map you originally digitized), and specify the geographic (*longitude, latitude*) coordinates of the (***x***, ***y***) Cartesian origin that you used for digitizing, and specify the radius of the planet (*e.g.*, 6371000 meters for Earth), *etc.*

Now, you can inspect your results in my other programs. **OrbWin** can display any (*longitude, latitude*)-type .DIG file as a Basemap, on a virtual globe that you can rotate and zoom. Also, my mapping programs (**FiniteMap**, **NeoKineMap**, or **RetroMap**) can all create publication-ready map illustrations in Adobe Illustrator (.AI) file format. From Adobe Illustrator, you can further convert these maps to other formats such as .EPS, .PDF, .JPG, and .GIF. Note that these latter 3 mapping programs will allow you to display your polylines in map projections that are *different* from the original published-map-projection that you described to my program **Projector**.