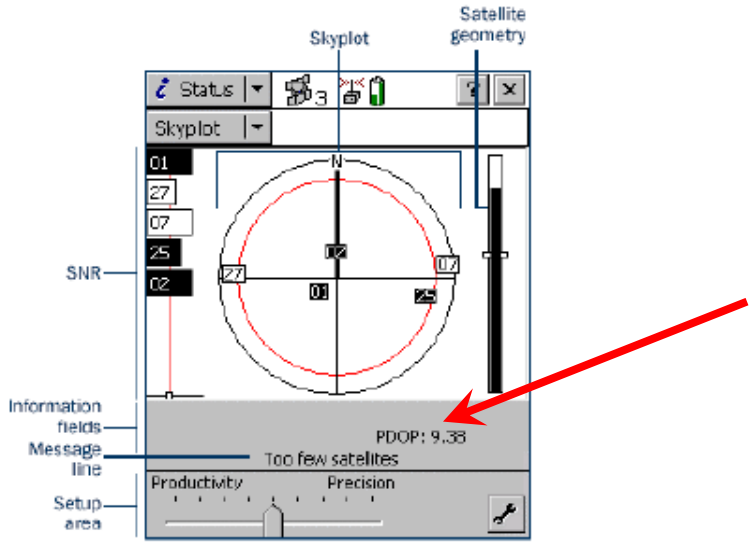
How to Use
Trimble GeoXT with ArcPad 7

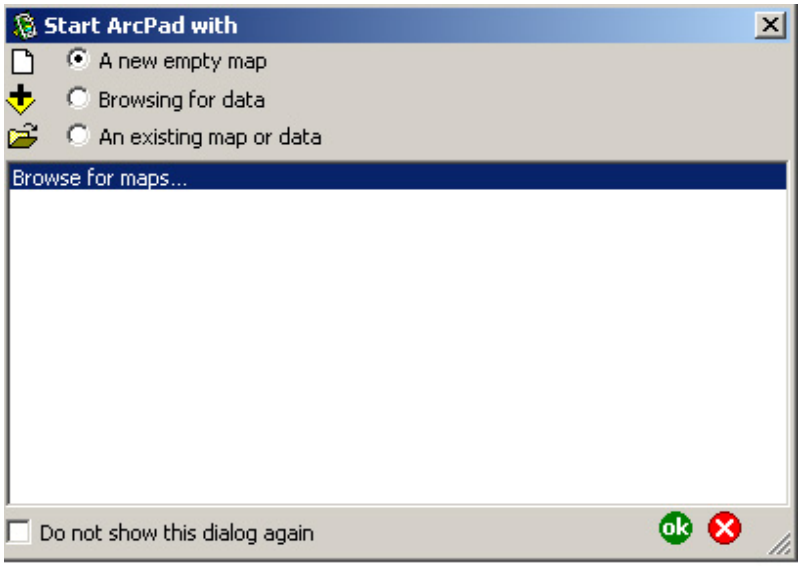
Developed by Scott Ralston
USFWS
May 2006

1. Turning on the GPS controller
    a. You can activate the GPS controller in the Trimble unit without using ArcPad if you want to check GPS reception. However this is not a required step before using ArcPad.
    b. Click on the start menu and choose GPS Controller
    c. A screen similar to this should appear

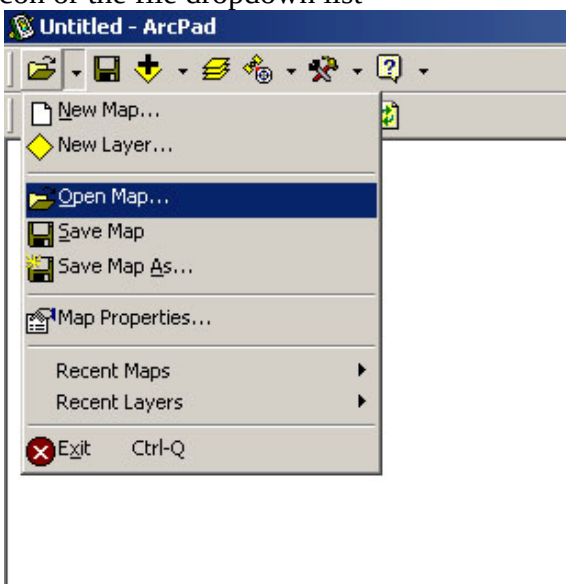


    d. Give the unit a little time to acquire satellites. Facing south will better the chances of acquisition. Also avoid obstructions such as trees or buildings.
    e. The Productivity/Precision bar can be adjusted if necessary. More productivity means less trouble acquiring satellites but the positioning is less precise.
    f. PDOP is the accuracy.

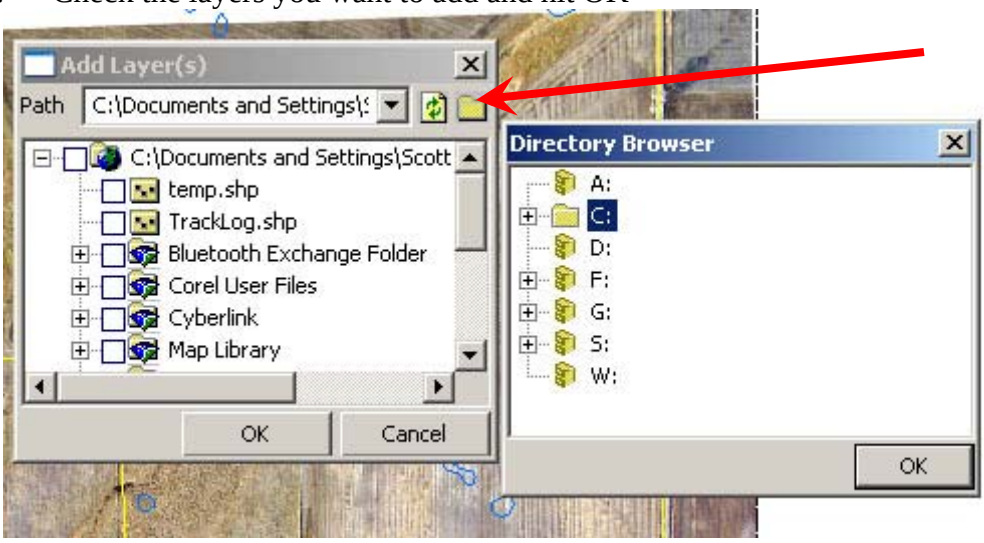
2. Open AcrPad
    a. Use the start screen for choices of opening a new or existing map or use the standard methods below.



3. Open an existing map
    a. Click the folder icon or the file dropdown list

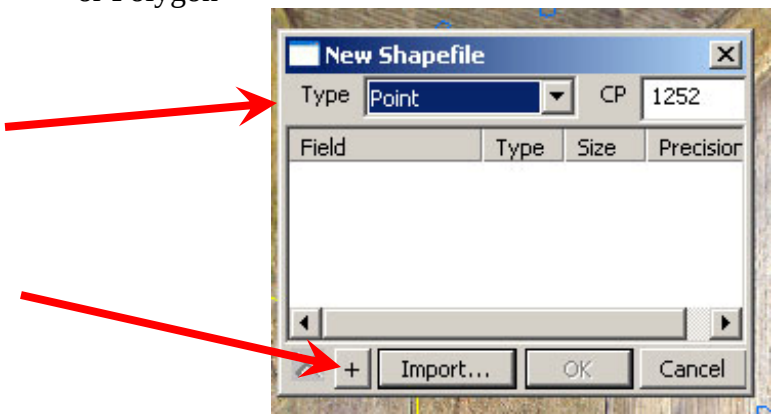


    b. Navigate to the file you want to open and open it. You can also use file explorer on the start menu and find the *.apm file and double tap it to open it in ArcPad.
4. Or start a new map.
    a. A blank map is created when you open the program or by clicking the new map icon in the folder>New drop down menu.
5. Add Data
    a. Add layers to your map by clicking the add data button
        i. Navigate to the location of the data
        ii. If the data does not appear in the layers list you may have to navigate to a different folder by clicking the folder icon to get the full directory.
        iii. Check the layers you want to add and hit OK



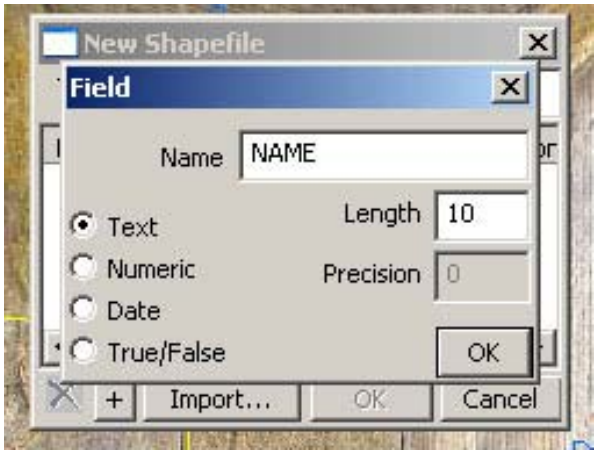
    b. Create a new layer by clicking the new shapefile layer button in the folder>New drop down menu

i. Under type choose what type of layer you are creating (Point, PolyLine or Polygon



ii. Click the + button to add at least one field. A field is a column in the attribute table and is used to add a description for the data points you collect.

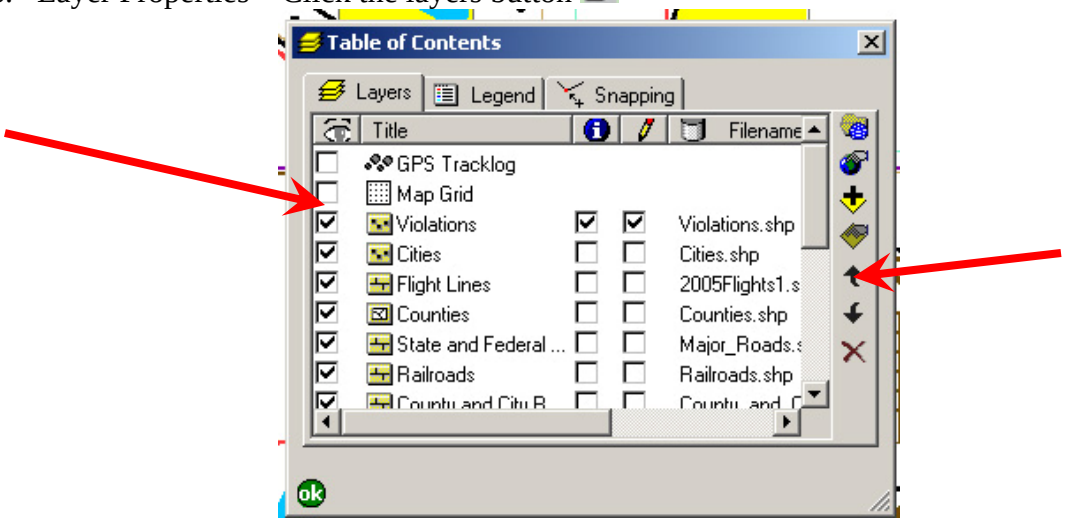
iii. Give the field a name, choose the maximum number of characters you can type (length) and choose data type (text, number etc.) Default values are fine if desired.



iv. Hit OK and OK again

v. Choose where you want to save the data. On the Trimble units store all data on the “Disk” not in the main memory. Also preferably store in the “My Documents” folder on the “Disk”. On the new 2006 version of the Trimble there is no “Disk” option. In this case the My Documents folder is the disk.

6. Layer Properties – Click the layers button

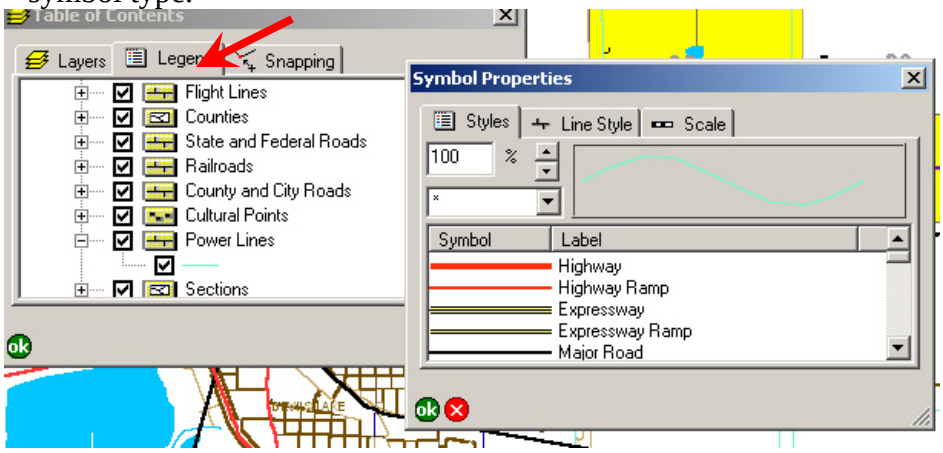


a. Turn visible layers on or off
   i. Check or uncheck the box in the left eye column
b. Change layer order
   i. Change which layer is on top of another by highlighting the layer and click the up or down arrows to change the order
c. Identification
   i. Change which layers will be identified with the identify tool by check the box in the column.

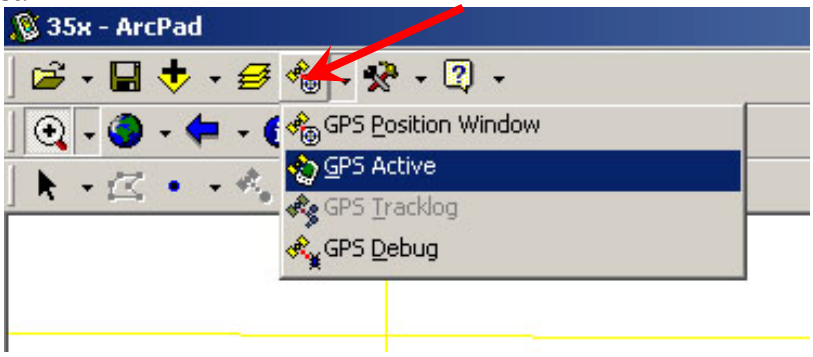
d. Editing
   i. Change which layer you will edit (collect gps points or polygons in) by checking the box in the editor column
e. Layer properties
   i. Change options for labels or symbology by double tapping on the layer you want to change. Choose the appropriate tab for the task you want to modify

f. Legend Properties

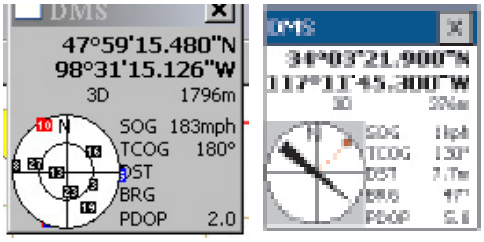
i. Symbology and layer properties can also be changed in the Legend tab. Expand the layer you want to change and click the symbol to edit the symbol type.



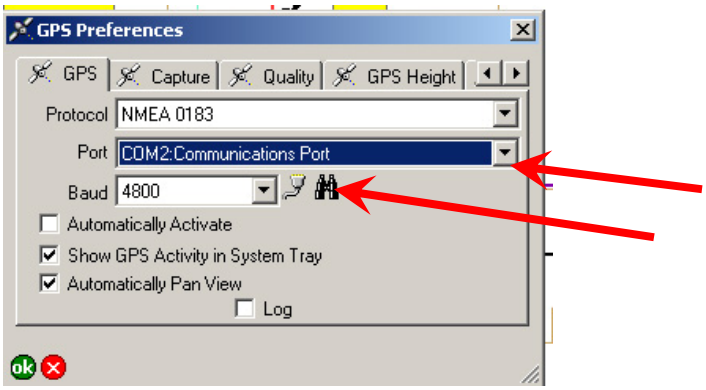
7. Activate the GPS in Arcpad
   a. Hit the GPS button to activate the GPS or choose activate from the GPS drop down list.



   b. GPS window shows speed and PDOP. Taping the window can change the view to a compass. This window can be close if desired.

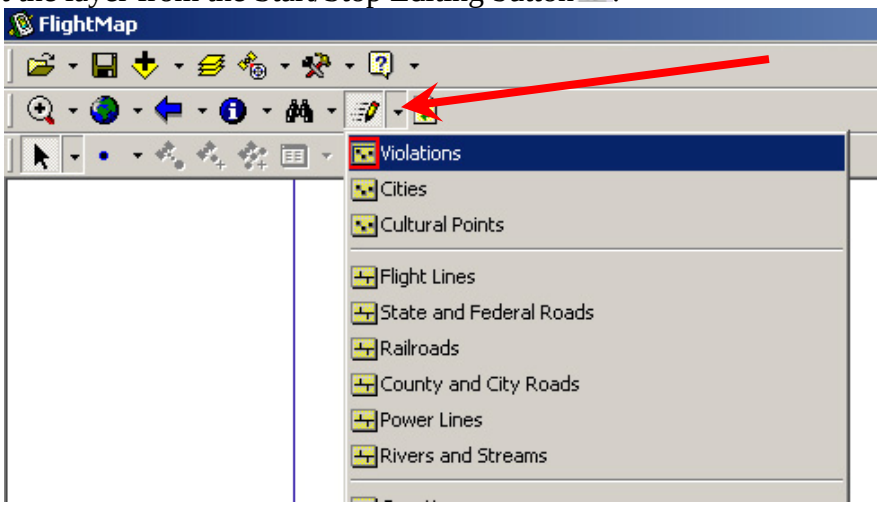


   c. Cross hairs show position
   d. Troubleshooting the GPS
      i. If the GPS controller (Step 1) has acquired a position but ArcPad can not find a position:
         1. Check GPS setting by taping the dropdown list next to the GPS button and select the GPS Preferences button . Make sure for the Trimble unit that the COM port is set to COM2 and Baud is 4800. The protocol should be NMEA
         2. Using the Find button may automatically detect the GPS in some cases.

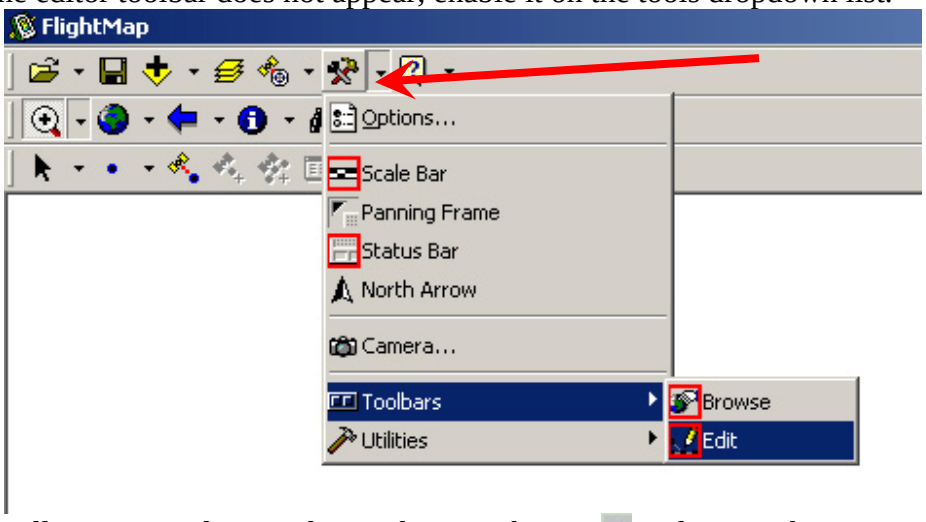


3. If the map was created in ArcGIS and exported but did not have a projection defined before exporting it, the GPS may not work. The best way to solve this in the field is to create a new blank ArcPad Map (Step 4), activate the GPS, then import the data layers you need (Step 5) and save it as a new map.

8. Navigation
   a. Use navigation tools to zoom in , zoom out or pan . These are available in the zoom drop down list
   b. The extent drop down list can also be used for other navigation options including " Center on GPS" which will automatically track and pan the page as you move with the GPS.
   c. Automatic Map Rotation can be turned on under the GPS dropdown menu. This will orient the top of the map/screen to the direction of travel instead of always oriented north. This will improve orientation but may slow the refresh rate of the GPS unit if too many large files are loaded.
9. Editing / Collecting points.
   a. The GPS must be on and position acquired before collecting points
   b. Choose the layer you want to add points or polygons to by checking the edit column in the layers menu next to the appropriate layer (Step 6). Or select the layer from the Start/Stop Editing button .



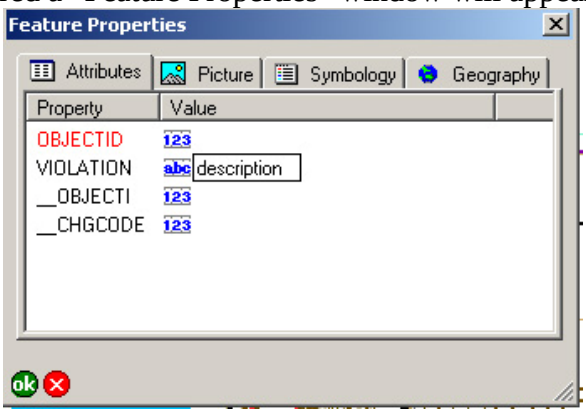
c. If the editor toolbar does not appear, enable it on the tools dropdown list.



d. To collect a manual point choose the point button and tap on the screen where you want to place the point.

e. To collect a GPS point choose the Capture GPS point button

f. Once a point is captured a "Feature Properties" window will appear



   i. Double or triple tap the "abc" to type a field description for the point and hit enter when done typing

   ii. If you don't want a description just hit ok (NOT X to close or the point will not be taken!)

g. If you are editing a polygon layer use the same methods as a point but choose polygon on the editor toolbar and use the Add GPS Vertices button to capture the vertices of the polygon. Use either the single vertex option or the streaming vertex option. Tap the green → Arrow on the bottom of the screen to finish the polygon.

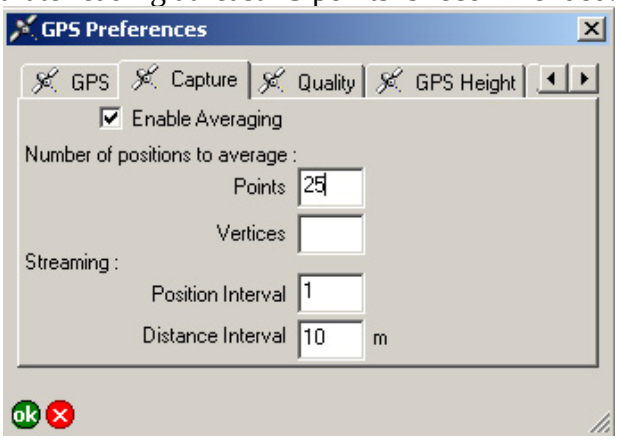
h. Feature field descriptions can be viewed or edited later by selecting the feature with the selection tool and hit the feature properties button

i. Features can be deleted by selecting it with the selection tool and hitting delete on the feature properties drop down list.

j. Uncheck the editing option in the layers menu to stop editing a layer and save the edits. Or tap the Start/Stop Editing Button

k. To improve accuracy of collecting GPS points, enable averaging of points.

i. This will take multiple readings and average them to get a more accurate location.
ii. The GPS must remain stationary while all points are taken
iii. Tap the GPS Preferences button under the GPS dropdown list and select the capture tab.
iv. For an accurate reading at least 25 points is recommended.



v. When capturing averaged points a percent captured number will be visible in the feature properties box. Do not close that box until the percentage reached 100% or the point will not be saved.

10. To save the map tap the save button or choose Save As on the folder drop down menu.
11. Menu Key

ESRI® ArcPad® 7
Quick Reference

GPS POSITION WINDOW

SATELLITE SKYPLOT
Shows the almanac of which satellites should be available.

Black: available and used for calculating the GPS position
Blue: available but not used
Red: unavailable.

Tap the Satellite Skyplot to display the Signal Chart.

GPS POSITION COORDINATES
Tap and hold the coordinate display to change the coordinate system:
Map Projection
DMS (ddd°mm'ss.sss")
DMM (ddd°mm.mmmm')
DD (dd.dddddddddd°)
UTM (Universal Transverse Mercator)
WGS84 DMS (ddd°mm'ss.sss")
WGS84 DMM (ddd°mm.mmmm')
WGS84 DD (dd.dddddddddd°)
MGRS (Military Grid Reference System)

GPS MODE
NOFIX: no position
2D: x,y position
3D: x,y,z position
DGPS 2D/3D: real-time Differential GPS
RTK fix/flt: Real Time Kinematic fixed or float solution
PPS 2D/3D: Precise Positioning Service

ELEVATION
Tap and hold the elevation display to change units:
Altitude (meters or feet)
Depth (meters or feet)

NAVIGATION INFORMATION
SOG: Speed Over Ground
Tap and hold the COG display to change the reference:
TCOG: True North Course Over Ground
MCOG: Magnetic North Course Over Ground
DST: Distance to destination
BRG: Bearing to destination

POSITION MEASURE OF QUALITY
Tap and hold the display to change the measure:
PDOP: Position Dilution of Precision
HDOP: Horizontal Dilution of Precision
VDOP: Vertical Dilution of Precision
TDOP: Time Dilution of Precision

HPE: Estimated Horizontal Position Error
VPE: Estimated Vertical Position Error
EPE: Estimated Position Error
SATS: Satellites used in solution
DAGE: Differential data age
DSID: Differential reference station ID

SIGNAL CHART
Shows a bar chart of the relative signal strength of the satellites in the almanac. A red bar indicates the satellite is unavailable.

Tap the Signal Chart to display the Compass.

COMPASS
Shows the GPS direction with a black arrow and direction to destination in red.

MAIN TOOLBAR

Open Map	Open an ArcPad Map (a file with an .apm extension).
Save Map	Save the current ArcPad map.
Add Layer	Add one or more layers to the current map.
Table of Contents	Open the Table of Contents dialog box.
GPS Position Window	Open or close the GPS Position Window.
Tools	Open the ArcPad Options dialog box.
Quick Reference Help	Open the ArcPad Quick Reference.

OPEN MAP DROPDOWN LIST

New	Display a sub-menu for creating a new map, shapefile, QuickForm, graphics layer, or photo layer.
Open Map	Open an ArcPad Map (a file with an .apm extension).
Save Map	Save the current ArcPad map.
Save Map As	Save the current ArcPad map with a new name and/or in a different folder.
Map Properties	Open the Map Properties dialog box.
Recent Maps	Display the nine most recently opened maps.
Recent Layers	Display the nine most recently added layers.
Exit	Close ArcPad.

NEW SUB-MENU

Map	Close the current map and create a new map.
Shapefile	Create a new shapefile and load it into the current map.
QuickForm	Create a custom form for an existing shapefile.
Graphics Layer	Create a new graphics layer and load it into the current map.
Photo Layer	Create a new photo layer and load it into the current map.

ADD LAYER DROPDOWN LIST

Add Layer	Add one or more layers to the current map.
Add Internet Server	Add an ArcIMS Image service as a layer to the current map.
Geography Network	Go to the www.geographynetwork.com website, using the default internet browser.

GPS POSITION WINDOW DROPDOWN LIST

GPS Position Window	Open or close the GPS Position Window.
GPS Active	Activate or deactivate the GPS.
GPS Tracklog	Start or stop storing GPS points in the tracklog shapefile.
Rangefinder Active	Activate or deactivate the Rangefinder.
GPS Preferences	Open the GPS Preferences dialog box.
Rangefinder Preferences	Open the Rangefinder Preferences dialog box.
GPS/Rangefinder Debug	Open or close the GPS and Rangefinder Debug window.
Automatic Map Rotation	Automatically rotates the map to "course up" when the GPS is active.
Clear Rotation	Clears the map rotation so that the map is "north up".

TOOLS DROPDOWN LIST

Options	Open the ArcPad Options dialog box.
Scale Bar	Display or hide the scale bar.
Panning Frame	Display or hide the map panning frame.
Status Bar	Display or hide the status bar.
North Arrow	Display or hide the north arrow in the map view.
Camera	Open the camera tool.
Toolbars	Display a sub-menu containing all the toolbars in ArcPad.
Utilities	Display a sub-menu containing utility tools.

UTILITIES DROPDOWN LIST

Pack Shapefile	Pack a shapefile by removing records flagged for deletion.
Reproject Shapefile	Reproject a shapefile to another projection and/or datum.
Export Projection Information	Export ArcPad's projection information into CSV and text files.
Run Script	Open the Script dialog box.

HELP DROPDOWN LIST

Quick Reference Help	Open the ArcPad Quick Reference.
User Guide	Open the User ArcPad guide (PC only).
Reference Guide	Open the ArcPad Reference Guide (PC only).
ESRI Support Center	Go to the support.esri.com website, using the default internet browser.
About ArcPad	Open the About ArcPad dialog box.
About Extension	Display a sub-menu listing all loaded ArcPad extensions.

BROWSE TOOLBAR

Zoom In	Zoom in on map using the pen.
Zoom to Full Extent	Zoom to the full extent of the map.
Go Back to Previous Extent	Zoom back to the previous extent you were using.
Identify	Activate the Identify tool.
Find	Open the Find tool.
Start/Stop Editing	Display a sub-menu containing all the editable layers in the ArcPad map. Tapping a layer toggles its editing state.
Refresh	Redraw the map.

ZOOM IN DROPDOWN LIST

Zoom In	Zoom in on map using the pen.
Zoom Out	Zoom out on map using the pen.
Pan	Pan the map using the pen.
Rotate Map	Set the map rotation angle.

ZOOM FULL EXTENT DROPDOWN LIST

Fixed Zoom In	Zoom in on the center of the map by 25%.
Fixed Zoom Out	Zoom out on the center of the map by 25%.
Zoom To Selected	Zoom to the extent of the selected feature.
Center on GPS	Center the map on the current GPS position.
Zoom to Full Extent	Zoom to the full extent of the map.
Zoom to Layer	Zoom to the extent of a particular layer in the map.

GO BACK TO PREVIOUS EXTENT DROPDOWN LIST

Go Back to Previous Extent	Zoom back to the previous extent you were using.
Go to Next Extent	Zoom forward to the next extent in the extent history.
Create Bookmark	Create a spatial bookmark
Zoom to Bookmark	Zoom to an existing spatial bookmark.

IDENTIFY DROPDOWN LIST

Identify	Activate the Identify tool.
Measure	Measure distances in the map view in "point mode".
Radial Measure	Measure radial distances in the map view using the pen.
Freehand Measure	Measure distances in the map view in "freehand mode".
Hyperlink	Activate the Hyperlink tool.
Go To	Activate the Go To tool.
Advanced Select	Activate the Advanced Select tool.

FIND DROPDOWN LIST

Find Features	Open the Find tool.
Clear Selected Feature	Unselect the selected feature.

START/STOP EDITING DROPDOWN LIST

Point Features Target Layers	Display the editable point feature layers.
Line Features Target Layers	Display the editable line feature layers.
Polygon Features Target Layers	Display the editable polygon feature layers.
Multi-Features Target Layers	Display the editable layers which support multiple feature types.

EDIT TOOLBAR

Select	Activate the Select tool.
Point	Activate the point feature type for data capture.
Capture Point using GPS	Capture a point feature in the editable point layer using the current GPS position.
Add GPS Vertex	Capture a single vertex in the current polyline or polygon feature using the current GPS position.
Add GPS Vertices Continuously	Continuously capture vertices in the current polyline or polygon feature using the current GPS position.
Feature Properties	Open the Feature Properties dialog box (or custom edit form) for the selected feature.
Offset Point	Activate offsets for point data capture.

SELECT DROPDOWN LIST

Select	Activate the Select tool.

Select and Vertex Editing	Activate the Select and Vertex Editing tool.
Select at GPS Position	Select the feature at the current GPS position.
Center on Selected Feature	Center the map on the selected feature without changing the current map scale.
Zoom to Selected Feature	Zoom to the selected feature.
Go To Selected Feature	Set the selected feature to be the current destination for navigation.
Clear Selected Feature	Unselect the selected feature.

POINT DROPDOWN LIST

Point	Activate the point feature type for data capture.
Line	Capture a straight line feature using the pen.
Polyline	Activate the polyline feature type for data capture and start a new line feature.
Freehand Line	Capture a freehand line feature using the pen.
Rectangle	Capture a rectangle polygon feature using the pen.
Polygon	Activate the polygon feature type for data capture and start a new polygon feature.
Ellipse	Capture an ellipse polygon feature using the pen.
Circle	Capture a circle polygon feature using the pen.
Freehand Polygon	Capture a freehand polygon feature using the pen.
Text Point	Capture a text feature relative to a point, using the pen.
Text Line	Capture a text feature relative to a line, using the pen.
Text Polygon	Capture a text feature relative to a polygon, using the pen.
Text Rectangle	Capture a text feature relative to a rectangle, using the pen.
Text Ellipse	Capture a text feature relative to an ellipse, using the pen.

FEATURE PROPERTIES DROPDOWN LIST

Feature Properties	Open the Feature Properties dialog box (or custom edit form) for the selected feature.
Insert Vertices	Insert new vertices to the selected polyline or polygon.
Append Vertices	Add new vertices to the end, or tail, of the selected polyline.
Move Feature	Move the selected feature.
Rotate Feature	Rotate the selected polyline or polygon feature.
Scale Feature	Change the size of the selected polyline or polygon feature, relative to the original size.
Resize Feature	Change the size of the selected polyline or polygon feature.
Delete Feature	Delete the selected feature.

OFFSET POLYLINE/POLYGON DROPDOWN LIST

Offset Point	Activate offsets for point data capture.
Offset Polyline/Polygon	Activate left or right offsets for polyline or polygon data capture.
Linear Traverse	Activate the linear traverse mode for capturing a new polyline or polygon feature.
Radial Traverse	Activate the radial traverse mode for capturing a new polyline or polygon feature.
Set Reference Point A	Set a reference point, A, for capturing a single point offset.
Set Reference Point B	Set a second reference point, B, for capturing a two point offset.
Segment Polyline	Activate adding new polylines which start at the end of the selected polyline.
Repeat Attributes	Activate copying of attributes from the previous feature into the new feature.

COMMAND BAR

Lock	Disables the ArcPad application from pen or mouse input.
Save Geometry Changes	Save geometry changes to an existing feature.
Proceed to Attribute Capture	End the geometry capture of a new feature and proceed to capturing the feature's attributes.
Undo	Undo the last edit made to a feature.
Pen Toggle	Enable or disable use of the pen for capturing new features.
Cancel	Cancel edits to an existing feature's geometry, or cancel capture of a new feature.

Copyright © 1995 - 2005 ESRI. All Rights Reserved. ESRI, the ESRI globe logo, www.geographynetwork.com, ArcPad, ArcIMS, www.esri.com, and the ArcGIS logo are trademarks, or service marks of ESRI in the United States, the European Community, or certain other jurisdictions.

ArcPad Resources

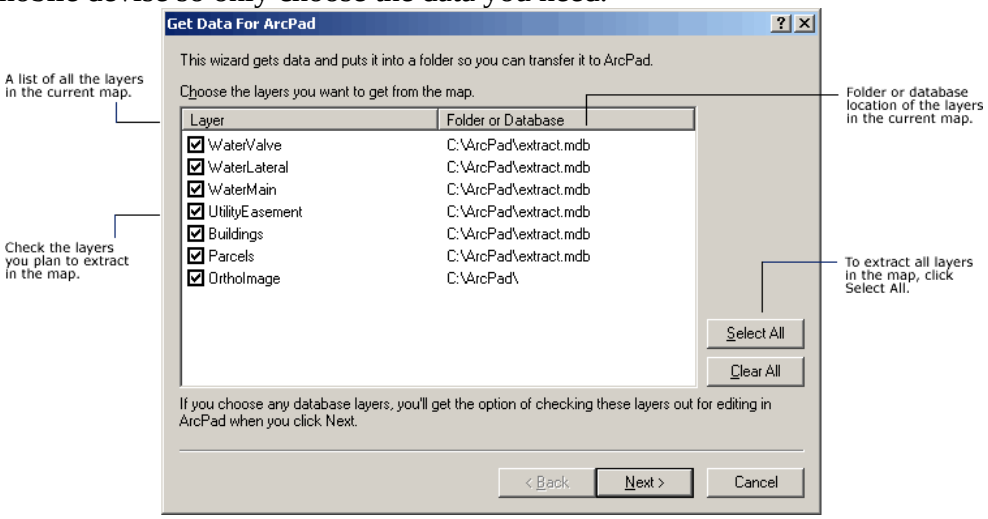
Visit **www.esri.com/arcpad** for:

- The latest information on ArcPad.
- Updates and downloads.
- Technical Support Knowledge Base.
- ArcPad Discussion Forum.

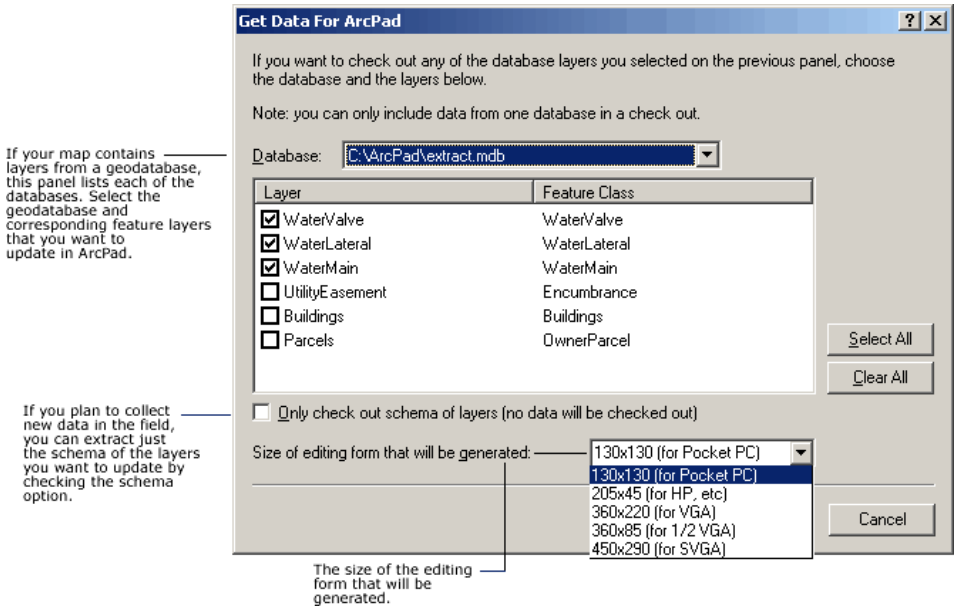
Exporting ArcGIS Maps to ArcPad on a PDA or Trimble

1. You need:
    a. A PDA or Trimble with ArcPad 6 or 7
    b. Cradle connecting the PDA or Trimble to you PC
    c. Microsoft Active Sync software
2. Turn on your PDA or GPS and place it in the cradle
3. Your PC should detect the unit and open Microsoft Active Sync. If not you will have to manually open the program.
4. Open ArcMap
    a. Create a new map or open an existing map with the data you want to export to ArcPad.
        i. The map <u>MUST HAVE A COORDINATE SYSTEM DEFINED</u> or it may cause problems in ArcPad.
    b. Enable the ArcPad Toolbar available in the View > Toolbars Menu

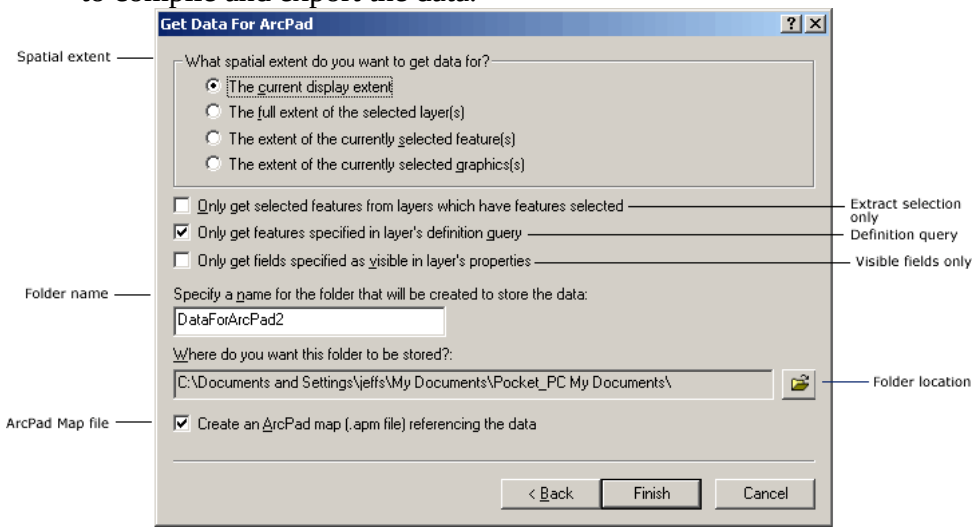
    c. Click the Get data for ArcPad button
    d. Check the boxes next to the layers you wan to include in your map. Notice too many image files will make very large file sizes and may not work well on the mobile devise so only choose the data you need.



    e. If you map contains geodatabase layers you will have an option of which parts of the database you want to export. If you are only dealing with shapefiles you do not need to worry about this.

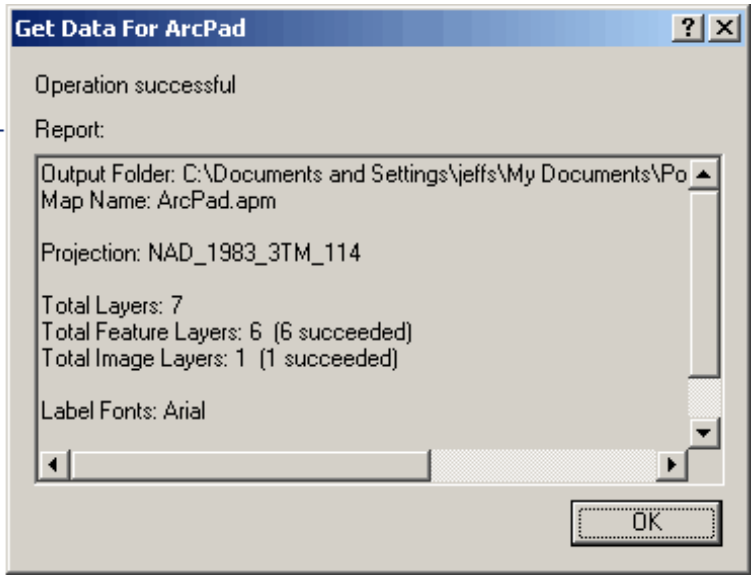


f. Next define your output options.
   i. For extent you may want to use the current display extent. This means only the data you see on your screen now in ArcMap will be exported to ArcPad. Everything else will be clipped off in the output file. This can be a good way to reduce the file size you are exporting. PDA,s and Trimble units have limited memory space.
   ii. For most uses you can leave default settings for the feature and field options
   iii. All the map data will be exported to a folder. You must specify a folder name and location. Make the folder name intuitive to the project such as "LakeAlice". To keep tract of data sent to each GPS unit in the DL WMD office set the folder location to G:/GPS/*GPS Unit Name*/
   iv. Check the box for Create ArcPad map or only the data will be exported and you will have to create a map yourself in ArcPad.
   v. Click Finish and wait. If there are large files it may take a minute or more to compile and export the data.

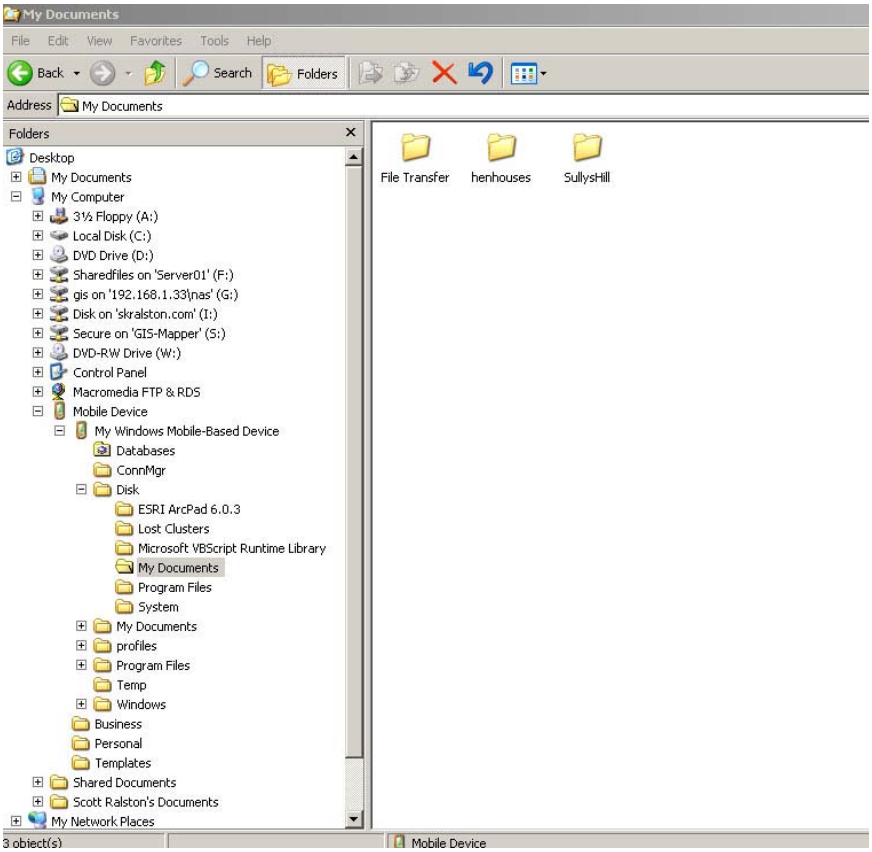


g. Check the summary dialog box to make sure everything exported successfully.
    i. If more than one layer has the same file name there may be a conflict and those layers will not export. You must rename one of the conflicting files and re-export it.

Summary that details a report of the extraction you completed.



5. ArcPad 7 users may be automatically directed to transfer data to the mobile device. If so follow directions onscreen and see step 6c below for location to store the data when prompted. If you are not automatically prompted follow the steps below.
6. Open Windows Explorer to transfer the data to the Mobile Device.
    a. Navigate to the location you saved the ArcPad folder (G:/GPS/*GPS Unit Name*/*ProjectName*/)
    b. Right click on the folder and choose copy
    c. Within "My Computer" navigate to the Mobile Device (GPS Unit or PDA) and find the location you want to store the data and hit paste.
        i. On the Trimble units you want to store the files on the "Disk/My Documents". Notice there is more than one My Documents folder so choose the one on the Disk.
        ii. On a PDA such as the Garmin Ique you want to store the data on the SD card

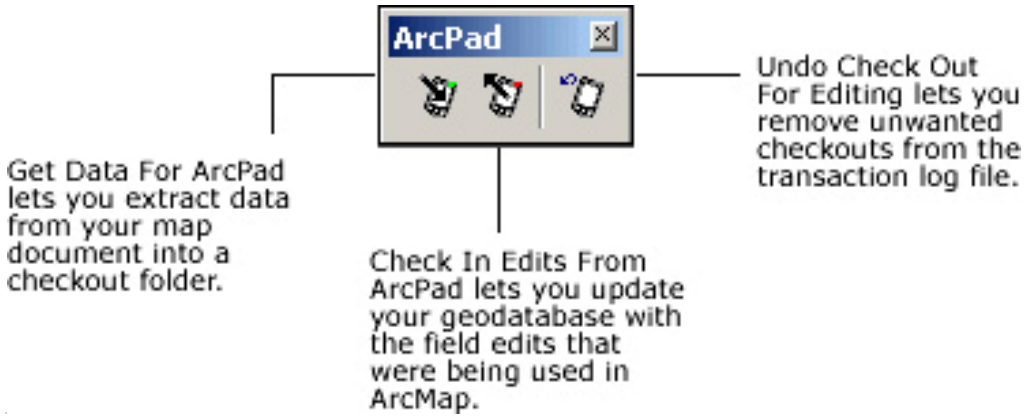


d. Once you paste Microsoft Active Sync will take over and send the data to the mobile device. This may take time.

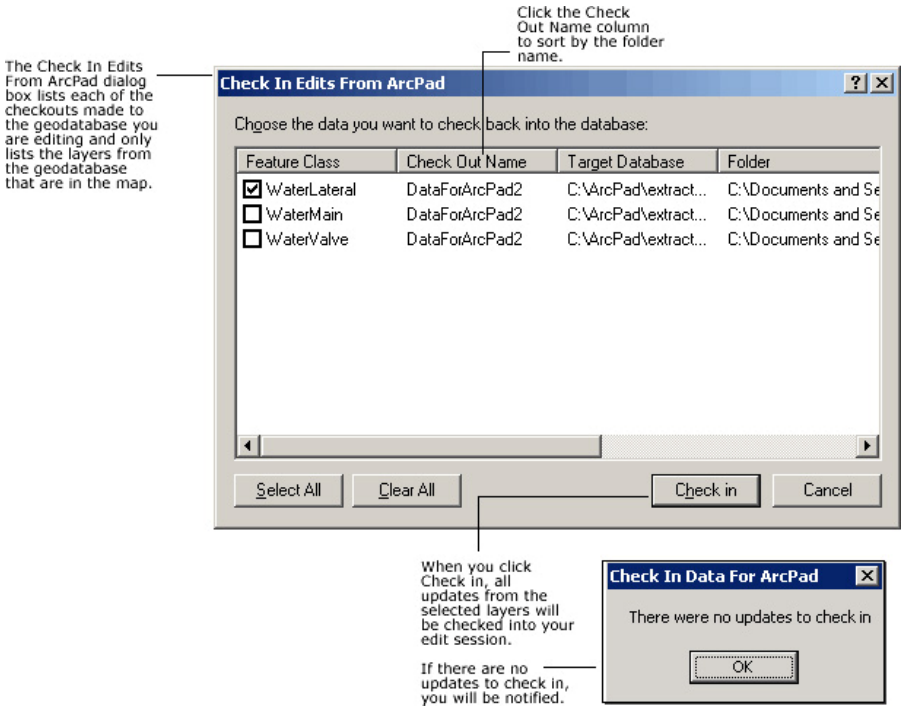
7. You may now use the open the map you created in ArcPad on your mobile GPS unit and collect data as needed.
8. It is HIGHLY recommended you open the map on the unit and check to see if all the data you need is there BEFORE leaving the office.

Importing Data from ArcPad on a PDA or Trimble to ArcGIS

1. Check the Mobile GPS Unit
    a. Save any, edits or changes you made to the map. Close ArcPad by choosing exit on the file menu. Do not just hit the X button as this only minimizes the program.
    b. Keep the power on and place the unit in the cradle connected to your PC
    c. Microsoft Active Sync should find the device and connect to it.
2. Open Windows Explorer
    a. Navigate to the mobile device and the folder containing the data you collected (location as described in part 6c of the Lesson 8 on Exporting to ArcPad)
    b. Select the whole folder or just the individual files you modified and choose copy.
    c. Navigate to the original location on the computer where the files were stored such as G:/GPS/*GPS Unit Name*/*ProjectName*/ and choose paste, overwriting the old files.
3. Open ArcMap
    a. If the ArcPad map was not created and exported from ArcMap then save the desired layer to any location you wish and develop a new map as needed. If the data was exported to ArcPad as described above in the Export lesson, you must follow one of the following methods to import your data.
    b. Open the original map you created before exporting.
    c. If the data you exported came from an existing file, use the ArcPad toolbar "Check In" option.
    d. To use this option you must be editing the original layer that the data came from.



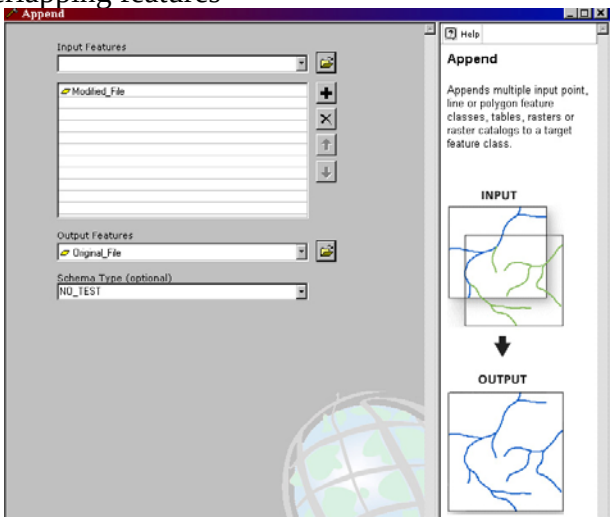
        i. Follow on-screen directions



e. If the file was not checked out from an existing file or the check in option does not work you have a few options.
   i. If the file from ArcPad contains <u>ALL</u> original features from the original data layer as well as those you collected with the gps then delete the old shapefile and copy and paste the updated file in the desired storage location. Notice, If only part of the shapefile visible in the maps extent was exported, not all original features may be part of the exported file and you should use one of the following options.
   ii. If the exported file contains features you collected from the GPS and <u>SOME</u> original features but does <u>NOT</u> contain <u>ALL</u> features from the original file you must copy new features to the existing shapefile.
      1. With the original file open in ArcMap, use the Add Data button to add the modified shapefile from G:/GPS/*GPS Unit Name*/*ProjectName*/*filename*.shp or wherever you downloaded to from your GPS or PDA.
      2. Start editing the GPS version of the shapefile (highlight it in the table of contents and hit the x-tools edit button), select all the new or changed features , hit copy from the Edit menu. Switch to editing the original shapefile and choose paste from the Edit menu.
   iii. If the GPS file contains <u>ONLY</u> new features and does not have any features from the original shapefile you can append the files together.
      1. With the original file open in ArcMap, use the Add Data button to add the modified shapefile from G:/GPS/*GPS Unit Name*/*ProjectName*/*filename*.shp or wherever you downloaded to from your GPS or PDA.Open the ArcToolbox and use

Data Management>General>Append Tool to merge the new files into the old file.

2. This does work with files that contain some or all of the original files as well but it will produce two copies of overlapping features



4. When finished with the file on the GPS and done merging the data back to its original location, delete the files off the GPS unit and from the G:/GPS/*GPS Unit Name*/*ProjectName*/ using windows explorer to avoid storage size limitations or file clutter for the next user.