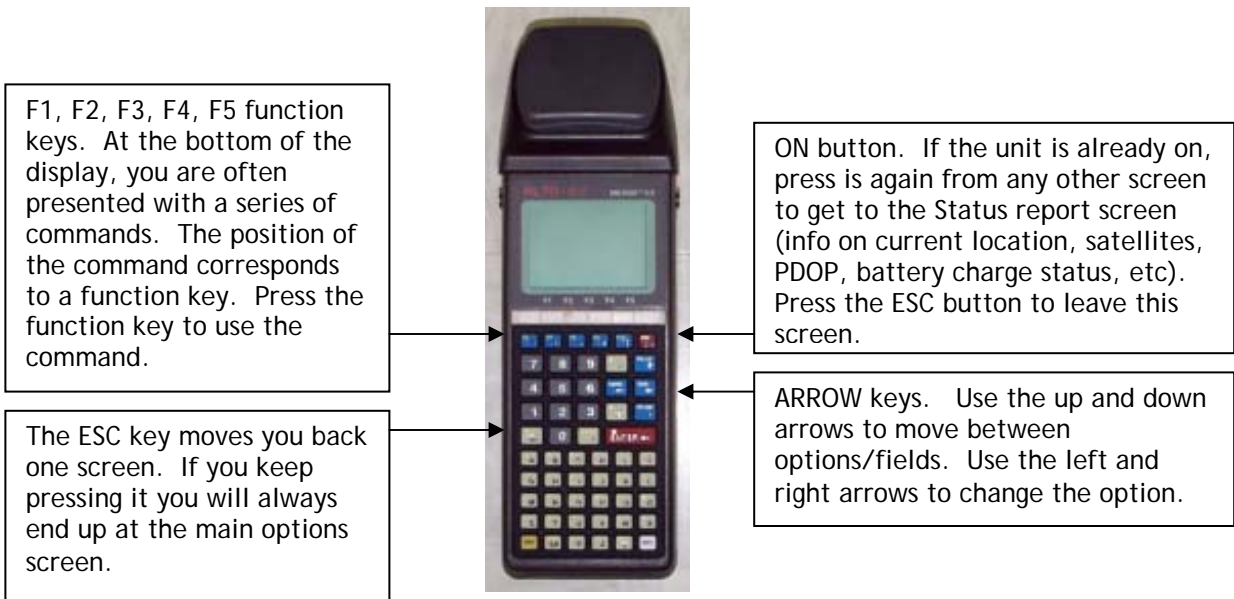# Alto-G12 GPS
Operating Instructions

Introduction

The units we have purchased are manufactured by Corvallis Microtechnology, Inc., a subsidiary of Hewlett-Packard. The unit model is the "Alto-G12". If the units are used with the backpack, we can collect real-time differential data (no post processing). If the units are used without the backpack, the data can be differentially post-processed later for sub-meter accuracy (using the base station data at http://www.uwsp.edu/cnr/acl), or can be used as is with an accuracy of about 5m.

F1, F2, F3, F4, F5 function keys. At the bottom of the display, you are often presented with a series of commands. The position of the command corresponds to a function key. Press the function key to use the command.

ON button. If the unit is already on, press is again from any other screen to get to the Status report screen (info on current location, satellites, PDOP, battery charge status, etc). Press the ESC button to leave this screen.

The ESC key moves you back one screen. If you keep pressing it you will always end up at the main options screen.

ARROW keys. Use the up and down arrows to move between options/fields. Use the left and right arrows to change the option.

Explanation of the Status codes in the upper right corner

It is important to observe the status messages in the upper right of the screen.

WAIT   The unit is busy and will not respond immediately to your commands.
ACQ   The receiver is acquiring signals from one or more satellites.
TRK   The receiver is tracking at least one satellite.

For the following 4 digit codes, the fourth number (#) always represents the current PDOP. A PDOP of 4.4 will appear as the number 5 (it rounds up).
N2D#   The receiver is collecting data from $\geq$ 3 satellites, and can provide a 2D coordinate.
N3D#   The receiver is collecting data from $\geq$ 4 satellites, and can provide a 3D coordinate.
F2D#   The receiver is logging feature data to a file in 2D mode.
F3D#   The receiver is logging feature data to a file in 3D mode.

The D will become a C when the receiver is detecting the RTCM beacon signal that it uses for real-time differential. If the code does not say N3C# or F3C#, then you are not collecting sub-meter data. Also, if the PDOP is greater than 6, the receiver will not log sub-meter data.

1

<u>Before you leave</u>

1. Check the status of the Alto batteries:
   ‣ Turn the Alto ON.
   ‣ Press the ON button a second time (may take a moment).
   ‣ The % charge status of the two batteries is displayed on the screen.
   ‣ As long as the two percentages add up to more than 40%, you will be fine. If you are going out for a full day the two percentages should add up to at least 100%.

2. If you are collecting real-time differential data, make sure you have the backpack. It is highly advisable to take the unit out to the sundial and make sure you are able to acquire the real-time sub-meter corrections (see below for detailed instructions).

<u>How to check the battery power in the Alto-G12</u>

1. Press the ON button. Wait for a few seconds while it initializes.
2. Press the ON button again. If nothing seems to happen, wait a few more seconds.

The battery status is listed as:
BATT PACK 1(%): 54
BATT PACK 2(5): 58
(100 % = a full charge).

3. Press the ESC key to go back to the main menu.
4. Press F1 to turn the Alto off.

<u>How to check the battery in the backpack</u>

You can't. If the battery is low, you will not get sub-meter locations because the receiver in the backpack will not work. The symptom of a low backpack battery is that the units will not detect any satellites, and the status indicator (in the top-right of the screen) will just say ACQ.

The battery should be fully charged before you check it out. If you are just using one or two units, I recommend checking out a spare backpack battery too (we have 10 spare).

If the battery is connected, it is being drained. BE CERTAIN THAT THE BATTERY IS DISCONNECTED WHILE YOU ARE NOT USING IT.

<u>Check the Setup parameters on the Alto-G12</u>

1. Press the ON button. Wait for a few seconds while it initializes.
2. At the Main Menu, use the ↑/↓ keys to select "Setup" and press ENTER.
3. Use the ↑/↓ keys to select "Datum/Coord. System." Press ENTER.
4. Check the DATUM is WGS84, and the COORD is your preferred coordinate system: either LLA (Lat/Long), SPC[1] (State Plane Coordinates) or UTM (Universal Transverse Mercator). If you don't know what you need, use LLA.
5. Press F4 (SAVE).
6. Advanced users may also want to check the setup options under "Receiver". Of particular importance is the PDOP setting, which represents the maximum allowable PDOP. Ideally this should be set to 6, but if you are having trouble acquiring points, you can try setting it to 7. Never set it higher than 8!
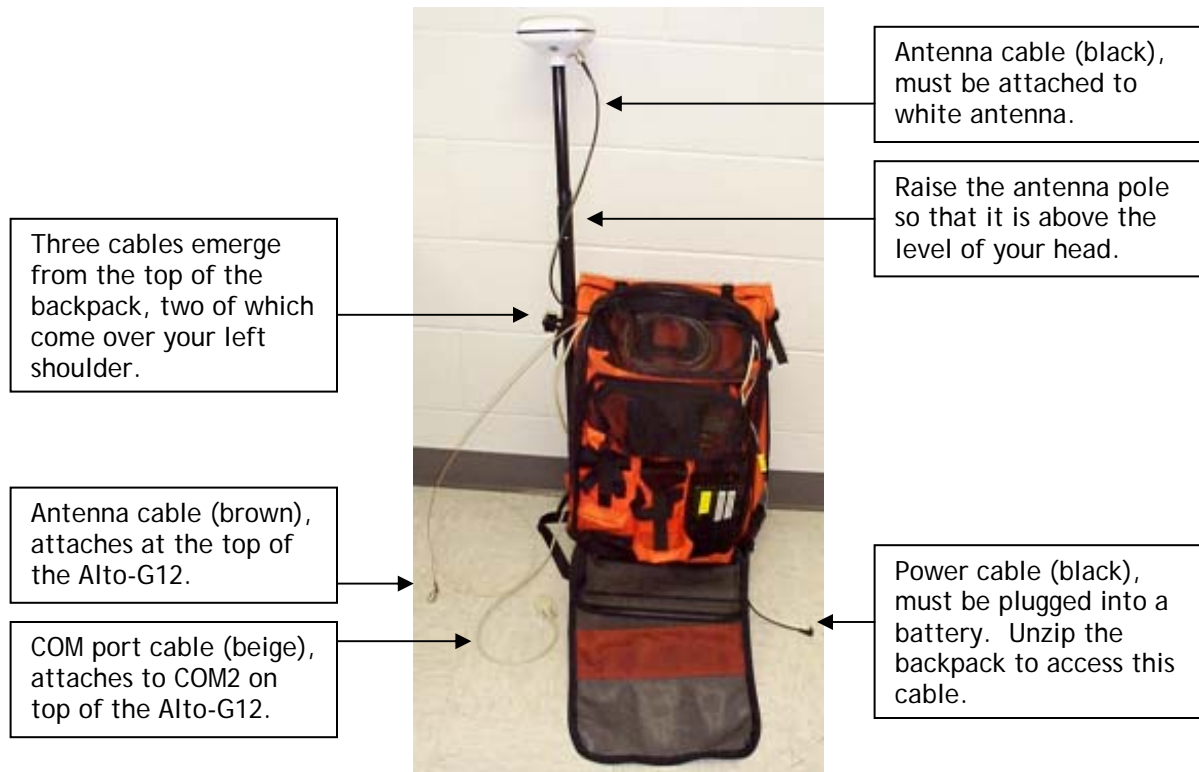
[NOTE: see pages 29-28 of the instruction manual for detailed setup instructions.]

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[1] If you select SPC, you must also define the STATE.

USING THE ALTO-G12

To hook up the real-time differential receiver

There are 4 cables you need to hook up. (Please try not to let the cables touch the ground as you are hooking them up.)

Antenna cable (black), must be attached to white antenna.

Raise the antenna pole so that it is above the level of your head.

Three cables emerge from the top of the backpack, two of which come over your left shoulder.

Antenna cable (brown), attaches at the top of the Alto-G12.

COM port cable (beige), attaches to COM2 on top of the Alto-G12.

Power cable (black), must be plugged into a battery. Unzip the backpack to access this cable.

For real-time, sub-meter locations, attach the COM port cable to COM2, and the antenna cable to the connector as shown.

To use the Alto-G12 without the real-time differential, use the built-in antenna as shown.

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<u>To see the coordinates of your current location, without saving them</u>

When the unit is ON, press the ON button again to get to the STATUS screen. Your coordinates are displayed.

<u>Collecting data and saving to a file</u>

Data is collected and organized into "jobs" and "features". A job file can contain many features. The job file might represent an entire working day of collecting points, and the features might be locations of trees (points), sidewalks (lines), parking lots (areas).

1. From the Main Menu, select "Collect Data" and press Enter.
2. On the JOB DATA screen you can take the defaults[2]. Press F1 (GO).
3. A default file name will be displayed. Accept it by pressing ENTER or give it your own name and press ENTER.
4. On the FEATURE INFO screen, you must enter a feature name (e.g. TREES, TRAILS, Etc.) and define the following:

‣ Feature type: Point, Line or Area.
‣ Feature ID: This is OPTIONAL it will sequence automatically (e.g. TREES001, TREES002...).
‣ Logging mode: Static (for Points) or Dynamic (for Lines and Areas)
‣ Intvl/session: In dynamic mode, this represents the interval between successive points collected. In static mode, the represents the length of time to collect data for.

5. Press F5 (CONFIRM)
6. On the FEATURING screen you may manually enter as many ATTRIBUTES and corresponding VALUES for your features as you wish (A reasonable ATTRIBUTE for TREES may be SPECIES with a VALUE of OAK for instance).
7. On the FEATURING screen, press F4 (STORE) to begin collecting data.

• For **Points** the screen will automatically return to the FEATURING screen after the point has been collected and stored. Move to your next point, change any attribute values if needed and press F4 (STORE) to begin collecting the next point and so on.

• For **Lines** and **Areas**, once you press F4 (STORE) to begin collecting data, start moving to collect your feature, when you have reached the end, press F5 (END) to stop collecting the feature, press F5 (YES) again, to verify you want to stop. You will automatically return to the FEATURING screen where you can begin collecting the next feature.

8. To change the Feature Type (e.g. to change from collecting points to lines), from the FEATURING screen, press F2 (NEW FT) which returns you to the FEATURE INFO screen. Redefine your info as in #4 above and proceed.
9. To finish, press ESC repeatedly to return to the Main Menu then turn the unit off.

At any time during this process you can press the ON button to see the Status screen. Press the ESC key to get back to the screen you were on.

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[2] If you wish to add to an existing Job file, use the ↑/↓ keys to get to the Job File option, and the ←/→ keys to select the job file. Then press F1 (GO).

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<u>Downloading the data to a PC</u>

You will need to find a computer with the "PC-GPS 3.7" software on it (which may also be labeled "Alto-G12 GPS" depending on who installed the software). All the lab computers in the ACL and at Treehaven should have it.

You will also need a black, coiled cable with a COM port connection at both ends. Connect one end to COM port 1 (sometimes COM port A) on the computer. Connect the other end to COM port 1 at the top of the unit.

Receiving files from the CMT Alto-G12 GPS data collector in "Automatic" mode

Use this procedure to transfer Job files (*.FTR, *.RAW, *.DEF), Feature List files (*.FBR), Route files (.PAT), Waypoint files (.WPT), Base files (*.DIF), Almanac files (ALM.*) or User-defined Coordinate System files (USER_COR.SYS and USER_DAT.SYS) from a CMT GPS data collector in "Automatic" mode.
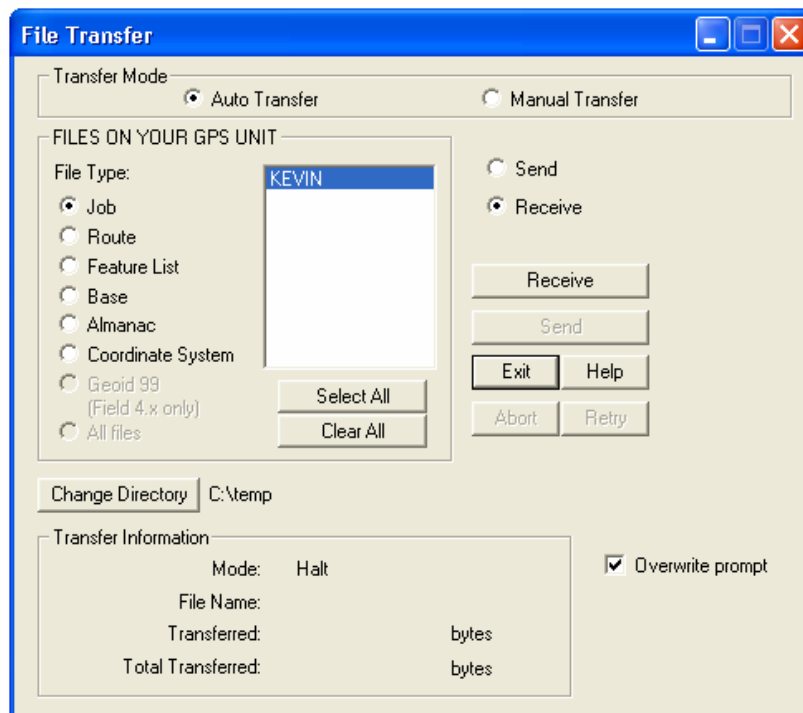
Please Note: PC-Mapper does not make use of Waypoint Files.

On the CMT GPS data collector:

1. Connect your data transfer cable from **COM1** on the data collector to a serial port on your PC.
2. From the Main Menu, highlight **Transfer Data** and press the **Enter** key.

In PC-GPS:

1. From the **GPS** menu, click **Transfer**.

2. (Optional) Click the **Change Directory** button to choose a different directory for the incoming files.

3. (If necessary) Click the type of file you wish to transfer in the **File Type**: list. All files on your CMT GPS data collector of the selected type will be displayed.
4. Click the files you wish to receive or click the **Select All** button to receive all files listed.
5. Click the **Receive** button. You will see activity on both the computer screen and the GPS screen.
6. When file transfer is complete, click the **OK** button **OR** if you are transferring Job files, you will be given the option to open the files, go directly to differential correction or transfer additional files.

On the CMT GPS data collector:

Press **F5** (QUIT) to return to the Main Menu if it does not return automatically.

[Troubleshooting: If you see a "percent done" screen on the GPS unit, but nothing seems to happen, you probably have either i) connected the cable to the wrong COM ports. Press the ESC key to quit the file transfer, then connect to a different port and try again.]

The unit automatically transfers the almanac at the end of every transfer session. You may be asked whether you want to overwrite ALM.ASH. It is always acceptable to overwrite it.

Converting your data to ArcView shapefiles

1. In the PC-GPS 3.7 software, go to File, Open, and select the job file (*.ftr) that you just transferred. If you have multiple features contained in a single job file (as will usually be the case) the software will load them as separate themes.

2. Select your coordinate system. The bottom right of the screen will show you what the current coordinate system is (i.e. the coordinate system the data was collected in). Most Wisconsin data is in the WTM83/91 coordinate system, so if you want your GPS locations to 'line up' with other data in ArcView, you must change the coordinate system: Go to Map > Coordinate System, select User Defined, and choose WTM83/91.[3] Make sure that the ZONE = Wisconsin and that UNIT = Meters. If it does not, change it then press OK.

3. From the drop down menu on the main screen of the PC-GPS software (see right), select Shape File. Then press the Export button:

4. Use the check mark boxes ☒ on the next screen to identify which themes you wish to export and press OK. It will export the shape file to the same folder that contains the job file.

5. You can now close the PC-GPS software, open ArcView and load the themes you just exported.

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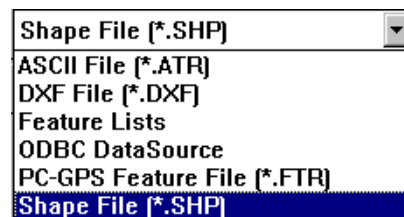
[3] If WTM83 is not listed on your computer, you will need to define it yourself. Click on Edit Coordinate System. Coordinate System Name: WTM83. Zone Name: WI. Projection: Transverse Mercator. Datum: WGS84. The parameters are:

|	
Central meridian:	$090^{0}00'00.0000"$W
False northing:	-4480000
False easting:	520000
Lat of false origin:	$00^{0}00'00.0000"$N
Scale factor:	0.9996

6

Advanced Techniques

Creating Data Dictionaries

Data dictionaries allow you to attach attribute data to GPS points, lines, or areas. The dictionaries must be designed and created using the PC-GPS software, and then uploaded to the units. Dictionaries increase the efficiency of data collection and reduce the risk of associating a location with the wrong attribute data.

A. Create a feature list.

Start the PC-GPS 3.62d software. Go to the GPS menu, then Feature List. A window will appear that allows you to either i) open an existing feature list (*.fbr) or ii) create a new feature list (type in a filename to create and press OK).

Attribute data are modeled using Features, Attributes and Values. The Feature is the general descriptive term: e.g. Tree. A tree is characterized by various Attributes: Species, DBH, Height, etc. Each attribute has a specific value. If you know the range of possible values, you can create a list that users can easily select the correct choice from. If the range of possible values is too large to accommodate, or you are measuring precise numbers, you just leave the Values field blank and the user can type in the value manually at the time of collection.
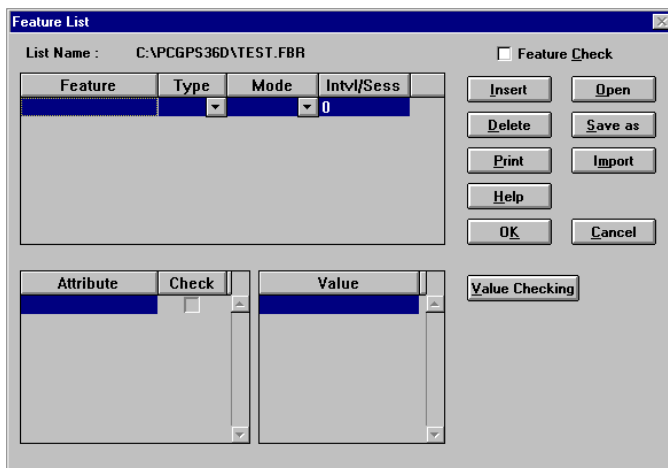
Click on a blue box and start typing to fill in a field. Remember to keep your words short (e.g. 20 letters max).

Use the Insert button to add more lines (you must fill in the first line before it will allow you to insert more).

See pages 66-69 in the "PC-GPS Reference Guide" for detailed instructions.

Press OK when you are finished.

B. Uploading the data dictionary to the Alto-G12

Connect the Alto-G12 to the PC using the black-coiled cable as described above (you may wish to refer to the section "Setting Up the COM Port"). Turn the unit ON, then F4 (XFER), F4 (RECV). A status screen will appear that says WAITING.

In the PC-GPS software on your PC, select GPS, Transfer, Send. Change the file type to Feature List (*.fbr). Select the file you wish to transfer, and press OK. If successful, you will see activity on both screens. If it seems to do nothing, then you likely have a connection problem (see the section "To download the data you have collected" for tips on troubleshooting).

[Note: use the ESC key to force the unit to exit out of transfer mode if you have a connection problem.]

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C. <u>Collecting data using a Feature List</u>

1. From the Main Menu select Collect Data and press enter.
2. On the Job Data screen, use the ↑/↓ keys to select Feature List, and use the ←/→ keys to change the selected feature list to the one you transferred. Press F1 (GO).
3. Accept the default File Name (press Enter).
4. Use the ↑/↓ keys to select the feature type from the list. Press Enter.
5. Fill in the Value field for each of the attributes in the list. If you are presented with a list of options, use the ↑/↓ keys to select the correct option and press Enter. If there is no list, use the keypad to type in the attribute value and press Enter.
6. When you have completed all the attributes, you will be able to press F4 (STORE) to continue (it will start collecting the GPS data).

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