

LAO DATUM SETUPS
For
GARMIN GPS-60
GPS Receivers



GEOMAP LAOS June 2008

This document describes how to set up a Garmin GPS60 receiver to use the 3 map datums most commonly used for printed maps in Laos: Indian 1960, Indian 1975 (UTM projection) & Vientiane 1982 (Gauss-Kruger projection). The more recent Lao 1997 datum is rarely used on printed maps. If you require a setup for this datum, please contact Geomap at the email address shown on the bottom of this page.

INDIAN 1960 and INDIAN 1975 DATUMS (UTM Projection)

The Indian 1960 datum is used on 1:50,000 scale topographic maps and the Indian 1975 datum is used on 1:25,000 scale topographic maps in Laos. Unfortunately, these datums are not included as standard datums in Garmin GPS receivers. However, Garmin does include a datum called "Indian Thailand" This datum is very close to Indian 1960 and Indian 1975. The maximum difference is approximately 15m. This is similar to GPS errors (10m) and insignificant at 50,000 scale (0.3mm) and at 25,000 scale (0.6mm) so the Garmin GPS receiver can be set to the Indian Thailand datum for use with both 1:50,000 and 1:25,000 scale maps in Laos. If more precise results are required (eg, for Differential GPS work), please contact Geomap Laos for further details.

SETUP INSTRUCTIONS

SET UNITS to METRIC.

Press page several times until you see the **Main Menu** page.
Scroll to **SETUP**. Press ENTER.
Scroll to **UNITS**. Press ENTER.
Scroll to **Distance/Speed** box. Press ENTER.
Scroll to **METRIC**. Press ENTER.
You should be back in the **UNITS** page.

SET POSITION FORMAT to UTM UPS (this may already be set)

In the **UNITS** page;
Scroll to **POSITION FORMAT** box. Press ENTER
Scroll to **UTM UPS**. Press ENTER.
You should be in the **UNITS** page.

SET MAP DATUM to INDIAN THAILAND

In the **UNITS** page;
Scroll to **MAP DATUM**. Press ENTER.
Scroll to **Indian Thailand**. Press ENTER.
You should now be in the **UNITS** Page

RETURN TO NAVIGATION PAGES

Press page button repeatedly to go back to navigation pages.

VIENTIANE 1982 DATUM (Gauss-Kruger projection)

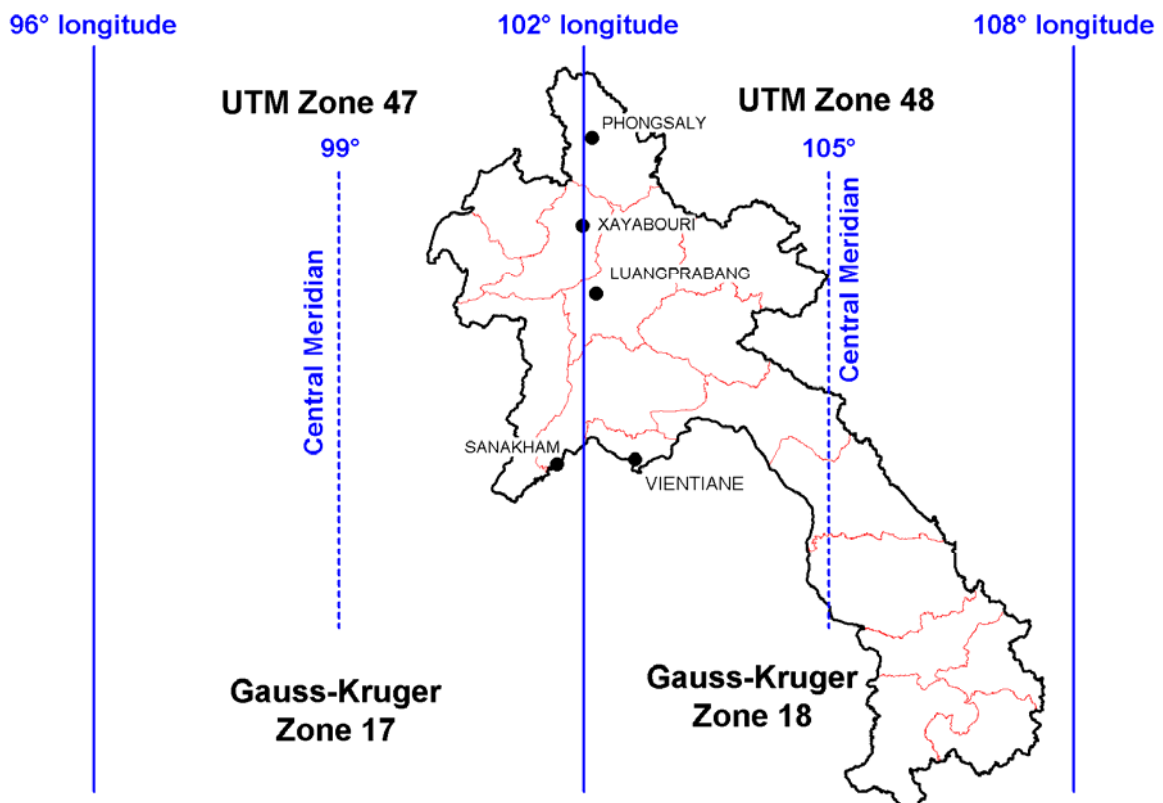
The Vientiane 1982 datum is used with Gauss-Kruger projection on 1:100,000 scale topographic maps in Laos. It is referred to as "Systeme de coordonnees de Vientiane" (Vientiane Coordinate System) with Krassovsky 1940 spheroid and "de Gauss" projection.

Note: The first version of this document described settings for the Pulkovo 1942 datum with the Gauss-Kruger projection for use with 100,000 scale topographic maps. The Pulkovo 1942 datum was used instead of Vientiane 1982 because it is available as a standard setting in MapInfo GIS software. The difference in calculated positions is approximately 60m. This is insignificant on 100,000 scale maps (0.6mm), but greater than GPS error so the Vientiane 1982 datum has been used here to improve accuracy. If the GPS output data is to be used in MapInfo software, a custom datum for Vientiane 1982 must be written into the projection file (email Geomap for details).

The Vientiane 1982 datum is not included as a standard setting in Garmin GPS receivers. So a USER DATUM must be defined.

Gauss-Kruger is a transverse Mercator projection, but it uses a different zone numbering system and scale factor to UTM (Universal Transverse Mercator). Consequently it is also necessary to set up a USER GRID.

Note: there are 2 UTM zones in Laos. Gauss-Kruger projection numbers these 17 and 18. These are equivalent to the UTM zones 47 and 48. The dividing line is 102° longitude. The central meridian for zone 17 is 99°. The central meridian for zone 18 is 105°.



Unfortunately, this also means that the value for the Central Meridian must be changed manually when crossing the 102° zone boundary (See instructions on last page).

Note that full coordinates from the de Gauss projection include the Zone number as the first 2 digits of the easting. Some Garmin receivers do not have enough digits to display these numbers so they have been omitted from this setup. If you use this setup to record coordinates, you must manually add the zone numbers to the front of the eastings if you quote the figures as de Gauss projection or enter the data into GIS software under this projection.

If you are familiar with the operating system of your GPS, you can use the figures below to set up the User Datum and User Grid. If you need more help, there are step by step instructions below the data.

Remember, if you change back to WGS84 Datum or another datum, you need to reset both the **DATUM** and the **LOCATION FORMAT**.

PARAMETERS

MAP DATUM (Vientiane 1982)

Set up the **MAP DATUM** to **USER DATUM** with the following parameters:

dx +42.358

dy -124.688

dz -37.366

da -108

df -0.042776437

The GPS-60 interface does not allow decimal places in the x, y, z shift parameters so the above numbers need to be rounded to the following whole numbers. The resulting differences in position are less than the errors associated with normal GPS operation.

dx +42

dy -125

dz -37

da -108

df -0.042776437

USER GRID (Gauss-Kruger Projection)

Set the **LOCATION FORMAT** to **User UTM** with the following parameters for zone 48 (ie Zone 18 in Pulkovo):

Longitude Origin E105°

False Easting 500000

False Northing 0

Scale Factor 1

For Zone 17, the numbers are the same except that the Longitude Origin is E99°.

SETUP INSTRUCTIONS

SET UNITS to METRIC.

Press page several times until you see the **Main Menu** page.
Scroll to **SETUP**. Press ENTER.
Scroll to **UNITS**. Press ENTER.
Scroll to **Distance/Speed** box. Press ENTER.
Scroll to **METRIC**. Press ENTER.
You should be back in the **UNITS** page.

SET POSITION FORMAT to USER GRID

In the **UNITS** page;
Scroll to **POSITION FORMAT** box. Press ENTER
Scroll to **User UTM Grid**. Press ENTER.
You should be in the **USER GRID** page.

SET LONGITUDE ORIGIN to E 105° (for zone 18)

In the **USER GRID** page;
Scroll to **LONGITUDE ORIGIN**. Press ENTER.
The **E/W** character should be selected.
Scroll to the up arrow key. Press ENTER until the display changes to **E**.
Scroll to the right arrow key. Press ENTER to select the first digit.
Scroll to the **1** key. Press ENTER.
The next digit should now be selected.
Scroll to the **0** key. Press ENTER.
The next digit should now be selected.
Scroll to the **5** key. Press ENTER.
Scroll to the **OK** button. Press ENTER.
You should be back in the **USER GRID** page.
The display should read **LONGITUDE ORIGIN E105°**.

SET SCALE to 1

In the **USER GRID** page;
Scroll down until the **SCALE** box is selected. Press ENTER.
Scroll to the right arrow key. Press ENTER until the second digit is selected.
Scroll to the **1** key. Press ENTER.
The next digit should be selected.
Scroll to the **0** key. Press ENTER.
repeat pressing ENTER until all the remaining digits are set to **0**.
The screen should read **SCALE +01.0000000**.
Scroll to the **OK** key. Press ENTER.
You should be back in the **POSITION FORMAT** page.

SET FALSE EASTING to 500,000

In the **POSITION FORMAT** page;
Scroll until **FALSE EASTING** is selected. Press ENTER.
Scroll to the right arrow key. Press ENTER until the first digit is selected.
Scroll to the **0** key. Press ENTER
The next digit should be selected.
Scroll to the **5** key. Press ENTER.
The next digit should be selected.
scroll to the **0** key. Press ENTER.
repeat pressing ENTER until all the remaining digits are set to **0**.
The display should now read **FALSE EASTING +0500000.0**.
Scroll to the **OK** key. Press ENTER.
You should be back in the **POSITION FORMAT** page.

SET FALSE NORTHING to 0.0

In the **POSITION FORMAT** page;
Scroll until **FALSE NORTHING** is selected. Press ENTER.
Scroll to the right arrow key. Press ENTER until the first digit is selected.
Scroll to the **0** key. Press ENTER.
The next digit should be selected.
Continue pressing ENTER until all the digits are set to **0**.
The display should now read **FALSE NORTHING +0000000.0**.
Scroll to the **OK** key. Press ENTER.

Scroll to the **SAVE** button. Press ENTER.
You should now be in the **UNITS** page.

SET MAP DATUM to USER

In the **UNITS** page;
Scroll to **MAP DATUM**. Press ENTER.
Scroll to **USER**. Press ENTER.
You should now be in the **USER DATUM** Page.

SET DX to 42.

In the **USER DATUM PAGE**;
Scroll to the **DX** box. Press ENTER.
Use the onscreen keyboard to set **DX** to **42**.
Scroll to the **OK** key. Press ENTER.
You should now be in the **USER DATUM** page.
The display should read **DX 42**.

SET DY to -125

In the **USER DATUM PAGE**;
Scroll to **DY** box. Press ENTER.
Use the onscreen keyboard to set **DY** to **-125**.
Scroll to the **OK** key. Press ENTER.
You should now be in the **USER DATUM** page.
The display should read **DY -125**.

SET DZ to -37

In the **USER DATUM PAGE**;
Scroll to **DZ** box. Press ENTER.
Use the onscreen keyboard to set **DZ** to **-37**.
Scroll to the **OK** key. Press ENTER.
You should now be in the **USER DATUM** page.
The display should read **DZ -37**.

SET DA to -108

In the **USER DATUM PAGE**;
Scroll to **DA** box. Press ENTER.
Use the onscreen keyboard to set **DA** to **-108**.
Scroll to the **OK** key. Press ENTER.
You should now be in the **USER DATUM** page.
The display should read **DA -108**.

SET DF to -0.042776437

In the **USER DATUM PAGE**;
Scroll to **DF** box. Press ENTER.
Use the onscreen keyboard to set **DF** to **-0.042776437**.
Scroll to the **OK** key. Press ENTER.
You should now be in the **USER DATUM** page.
The display should read **DF -0.042776437**.

SAVE CHANGES

Scroll to the **SAVE** button. Press ENTER.
You should now be in the **UNITS** page.

RETURN TO NAVIGATION PAGES

Press **PAGE** repeatedly to go back to navigation pages.

CHANGING ZONES

If you are working in an area west of 102° longitude, you will need to change to Zone 17 (central meridian 99°).

CHANGE TO ZONE 17

Press page several times until you see the **MENU** page.
Scroll to **SETUP**. Press ENTER.
Scroll to **UNITS**. Press ENTER.
Scroll to **POSITION FORMAT** box. Press ENTER
Scroll to **User UTM Grid**. Press ENTER.
You should be in the **USER GRID** page.

SET LONGITUDE ORIGIN to E 99° (for zone 17)

Scroll to **LONGITUDE ORIGIN**. Press ENTER.
The **E/W** character should be selected.
Scroll to the right arrow key. Press ENTER to select the first digit.
Scroll to the **0** key. Press ENTER.
The next digit should now be selected.
Scroll to the **9** key. Press ENTER.
The next digit should now be selected.
Scroll to the **9** key. Press ENTER.
Scroll to the **OK** button. Press ENTER.
You should be back in the **USER GRID** page.
The display should read **LONGITUDE ORIGIN E99°**.

RETURN TO NAVIGATION PAGES

Press **PAGE** repeatedly to go back to navigation pages.