ProMark 2 Navigation mode

Q. How do I set up the unit to navigate with NAD83 State Plane Coordinates ?
A. The following procedures will enable user's to navigate with NAD83 State Plane coordinates:

Be sure to select the correct map datum and coordinate system (use the User-Defined feature to define State Plane grid zones).

It's advisable to have an adequate reference for the State Plane Coordinate System of 1983. In this example the following reference document was used:

NOAA Manual NOS NGS 5
State Plane Coordinate System of 1983
James E. Stem
National Geodetic Survey
Silver Springs, MD

This document is available on-line from the National Geodetic Survey (NGS):

http://www.ngs.noaa.gov

Once on the NGS Web Site - browse to the following location:

Products & Services

Select, **Publications** <click>

Then select: **Publications Available On Line** <click>

Browse the list of available publications, select & download:

State Plane Coordinate System of 1983 – NOAA Manual NOS NGS 5 <click>

Save to Disk , on your local PC.

Available in pdf format. (January 1989)

See: Appendix A –
Defining Constants for the 1983 State Plane Coordinate System

The default display system for the ProMark 2's Primary position screen is: DEG.MIN.MMM, the default display system for the ProMark 2's Secondary position screen is UTM.

The ProMark 2 unit requires that you enter the User Grid Constants in DECIMAL.DEGREE format, in the Primary Position screen. These constants need to be converted manually before data entry; the ProMark 2 unit cannot convert these constants for you.

To convert values expressed in DEGREES-MINUTES format to DECIMAL.DEGREE format you must divide the minutes by 60.

For example: 38°02' would convert to 38.03333

The degree number remains the same: 38º would be expressed as 38.

However the minutes must be divided by 60 to obtain the decimal value:
02' ÷ 60 = .03333.

NOTE: The following procedure is for the Lambert Projection. For Transverse Mercator skip to page 8

LAMBERT PROJECTION

In the following example, we desire to navigate to the Waypoint - Control Station "MAX1"

NAD83 – Virginia North State Plane Coordinates for "MAX1"

Northing: 2143057.769 m
Easting: 3598646.174 m
Ortho Hgt: 122.933 m

Per the: **State Plane Coordinate System of 1983 – NOAA Manual NOS NGS 5**

Appendix A –
Defining Constants for the 1983 State Plane Coordinate System

For Virginia North – NGS State Zone Code # 4501 (Lambert Conformal Projection)

Defining Constants (Metric):

Standard Parallels:
Bs Southern Standard Parallel 38°02' N
Bn Northern Standard Parallel 39°12' N
Bb Latitude of Grid Origin 37°40' N
Lo Longitude of Grid Origin 78°30' W
Nb False Northing 2000000.0000 m
Eo False Easting 3500000.0000 m

Note that the above values are expressed in DEGREES-MINUTES.

The default display system for the ProMark 2's Primary position screen is: DEG.MIN.MMM, the default display system for the ProMark 2's Secondary position screen is UTM.

The ProMark 2 unit requires that you enter the User Grid Constants in DECIMAL.DEGREE format, in the Primary Position screen. These constants need to be converted manually before data entry; the ProMark 2 unit cannot convert these constants for you.

To convert the VA-North constants into ***DECIMAL.DEGREES*** format:

<u>Standard Parallels:</u>

Bs - Southern Standard Parallel: 38°02' N
Take the 02' ÷ 60 = .03333
Resulting **Bs - Southern Standard Parallel: 38.03333 N**
(For manual entry into the ProMark 2 – Parallel 1).

Bn - Northern Standard Parallel: 39°12' N
Take the 12' ÷60 = .20000
Resulting **Bn - South Standard Parallel: 39.20000 N**
(For manual entry into the ProMark 2 – Parallel 2).

Bb - Latitude of Grid Origin: 37°40' N
Take the 40' ÷60 = .66667
Resulting **Bb - Latitude of Grid Origin: 37.66667 N**
(For manual entry into the ProMark 2)

Lo - Longitude of Origin: 78°30' W
Take the 30' ÷60 = .50000
Resulting **Lo - Longitude of Grid Origin: 78.50000 W**
(For manual entry into the ProMark 2).

Nb - False Northing: 2000000.0000 m

(for meters) Resulting **Nb - False Northing: 2000000.0000 m**

(for SI feet) Take 2000000.0000 ÷ 0.3048
Resulting **Nb - False Northing: 6561680.0 SI feet**

(for US feet) Take 2000000.0000 ÷ 0.30480061
Resulting **Nb - False Northing: 6561667.0 US feet**

(For manual entry into the ProMark2)

Eo - False Easting: 3500000.0000 m

(for meters) Resulting **Eo - False Easting: 3500000.0000 m**

(for US feet) Take 3500000.0000 ÷ 0.3048 (for SI feet)
Resulting **Eo - False Easting: 11482940.0 SI feet**

(for US feet) Take 3500000.0000 ÷ 0.30480061
Resulting **Eo - False Easting: 11482917.0 US feet**

(For manual entry into the ProMark 2)

Summary of the NAD83 Virginia – North Zone constants expressed in ***DECIMAL.DEGREE*** format:

Standard Parallels:
Bs Southern Standard Parallel 38.03333 N
Bn Northern Standard Parallel 39.20000 N
Bb Latitude of Grid Origin 37.66667 N
Lo Longitude of Grid Origin 78.50000 W
Nb False Northing 2000000.0000 m or **6561679.8 SI feet** or **6561666.7 US feet**
Eo False Easting 3500000.0000 m or **11482939.6 SI feet** or **11482916.7 US feet**

Scale Factor: 1.00000000

Now that you have converted the published NAD83 Virginia – North Zone constants into Decimal.Degree format, you are now ready to manually enter these parameters into the ProMark 2 unit.

On the ProMark 2 GPS Receiver:

Turn on the Unit, wait for the Ashtech ProMark 2 logo screen to display…

MODE
Survey
Navigate – select **Navigate** from the **Mode** screen.

WARNING!
All Data is provided for reference only.
You assume full responsibility and risk when using this device.

PRESS ENTER TO AGREE
TIPS
Press right or left arrow from position screen for secondary coord system
OK

Press [**MENU**] button…

Menu

Browse down the menu to **Setup** <enter>

Setup Menu

Browse down the menu to **Coord System** <enter>

Coord System

Primary – select **Primary** from the **Coord System** screen.
Secondary

***Note:* In order to Navigate using NAD83 State Plane Coordinates – it is essential to select "Primary" in the Coord System screen. You will then enter your WAYPOINTS in NAD83 State Plane Coordinates in the USER Data Base.**

Coord System (cont'd)

Primary <enter>

Coord System
Browse down the menu to **User Grid** <enter>

User Grid
Projection
Browse down the menu to **Lambert con** <enter>

User Grid
Lambert con
2 Standard Par – select **2 Standard Par** <enter>
1 Standard Par

User Grid Enter NAD83 Virginia – North State Plane Zone Constants Expressed in Decimal.Degree format.

Latitude of origin
[37.66667N] <enter>

Longitude of origin
[078.50000W] <enter>

Latitude of standard
Parallel 1 **[38.03333N]** <enter>

Parallel 2 **[39.20000N]** <enter>

[NEXT] - Icon <enter>

User Grid (cont'd)

Scale Factor
[1.00000000] <enter>

Unit to meters conv

(for meters) **[1.00000000]** <enter>

(for SI feet) **[0.30480000]** <enter>

(for US feet) **[0.30480061]** <enter>

False east at origin

(for meters) **[03500000.0]** <enter>

(for SI feet) **[11482940.0]** <enter>

(for US feet) **[11482917.0]** <enter>

False north at origin

(for meters) **[02000000.0]** <enter>

(for SI feet) **[06561680.0]** <enter>

(for US feet) **[06561667.0]** <enter>

< Back (Icon) **Done** (Icon)

Select – **Done** (Icon)…

You have now completed the Creation of a **User-Defined Grid Coordinate System;** specifically for NAD83 Virginia – North Zone.

You can now enter Waypoints in the NAD83 Virginia – North Zone State Plane coordinates, entered in Easting, Northing and Elevation format.

Remember, in order to Navigate in the User Grid system – NAD83 Virginia – North, your Waypoints must be expressed in the Primary System.

SKIP to page 13

TRANSVERSE MERCATOR

In the following example, we desire to navigate to the Waypoint - Control Station "W 328" PID – KE1114

NAD83 – Missouri West State Plane Coordinates for "W 328"

Northing: 325,702.474
Easting: 857,632.940
Ortho Hgt: 278.67

Per the: **State Plane Coordinate System of 1983 – NOAA Manual NOS NGS 5**

Appendix A –
Defining Constants for the 1983 State Plane Coordinate System

For Missouri West – NGS State Zone Code # 2403 (Transverse Mercator Projection)

Defining Constants (Metric):

Central Meridian and Scale Factor:
Central Meridian 94°30'
Scale Factor 1:17,000

Grid Origin:
Longitude 94°30'
Latitude 36°10'
Easting 850,000
Northing 0

Note that the above values are expressed in DEGREES-MINUTES.

The default display system for the ProMark 2's Primary position screen is: DEG.MIN.MMM, the default display system for the ProMark 2's Secondary position screen is UTM.

The ProMark 2 unit requires that you enter the User Grid Constants in DECIMAL.DEGREE format, in the Primary Position screen. These constants need to be converted manually before data entry; the ProMark 2 unit cannot convert these constants for you.

To convert the MO-West constants into ***DECIMAL.DEGREES*** format:

Central Meridian:

Latitude of Grid Origin: 36°10' N
Take the 10' ÷60 = .16667
Resulting **Latitude of Grid Origin: 36.16667 N**
(For manual entry into the ProMark 2)

Longitude of Origin: 94°30' W
Take the 30' ÷60 = .50000
Resulting **Longitude of Grid Origin: 94.50000 W**
(For manual entry into the ProMark 2).

Grid Origin Easting 850,000 m

(for meters) Resulting **False East: 850000 m**

(for SI feet) Take 850000.0000 ÷ 0.3048
Resulting **False East: 2788714.0 SI feet**

(for US feet) Take 850000.0000 ÷ 0.30480061
Resulting **False East: 2788708.0 US feet**

(For manual entry into the ProMark2)

False North: 0 m

(for meters) resulting **False North: 0 m**

(for SI feet) Take 0 ÷ 0.3048
Resulting **False North: 0 SI feet**

(for US feet) Take 0 ÷ 0.30480061
Resulting **False North: 0 US feet**

(For manual entry into the ProMark 2)

Summary of the NAD83 Missouri – West Zone constants expressed in ***DECIMAL.DEGREE*** format:

Central Meridian:
Latitude of Grid Origin 36.16667 N
Longitude of Grid Origin 94.50000 W
False Easting 850000.0000 m or **2788714.0 SI feet** or **2788708.0 US feet**
False Northing 0 m or **0 SI feet** or **0 US feet**

Scale Factor: 1-(1÷17,000) = **0.99994118**

Now that you have converted the published NAD83 Missouri – West Zone constants into Decimal.Degree format and computed the scale factor, you are now ready to manually enter these parameters into the ProMark 2 unit.

On the ProMark 2 GPS Receiver:

Turn on the Unit, wait for the Ashtech ProMark 2 logo screen to display…

MODE
Survey
Navigate – select **Navigate** from the **Mode** screen.

WARNING!
All Data is provided for reference only.
You assume full responsibility and risk when using this device.

PRESS ENTER TO AGREE
TIPS
Press right or left arrow from position screen for secondary coord system
OK

Press [**MENU**] button…

Menu

Browse down the menu to **Setup** <enter>

Setup Menu

Browse down the menu to **Coord System** <enter>

Coord System

Primary – select **Primary** from the **Coord System** screen.
Secondary

***Note:* In order to Navigate using NAD83 State Plane Coordinates – it is essential to select "Primary" in the Coord System screen. You will then enter your WAYPOINTS in NAD83 State Plane Coordinates in the USER Data Base.**

Coord System (cont'd)

Primary <enter>

Coord System
Browse down the menu to **User Grid** <enter>

User Grid
Projection
Browse down the menu to **Trans Merc** <enter>

[NEXT] - Icon <enter>

User Grid Enter NAD83 Missouri – West State Plane Zone Constants Expressed in Decimal.Degree format.

Latitude of origin
[36.16667N] <enter>

Longitude of origin
[094.50000W] <enter>

[NEXT] - Icon <enter>

User Grid (cont'd)

Scale Factor
[0.99994118] <enter>

Unit to meters conv

(for meters) **[1.00000000]** <enter>

(for SI feet) **[0.30480000]** <enter>

(for US feet) **[0.30480061]** <enter>

False east at origin

(for meters) **[00850000.0]** <enter>

(for SI feet) **[02788714.0]** <enter>

(for US feet) **[02788708.0]** <enter>

False north at origin

(for meters) **[00000000.0]** <enter>

(for SI feet) **[00000000.0]** <enter>

(for US feet) **[00000000.0]** <enter>

< Back (Icon) **Done** (Icon)

Select – **Done** (Icon)…

You have now completed the Creation of a **User-Defined Grid Coordinate System;** specifically for NAD83 Missouri – West Zone.

You can now enter Waypoints in the NAD83 Missouri – West Zone State Plane coordinates, entered in Easting, Northing and Elevation format.

Remember, in order to Navigate in the User Grid system – NAD83 Missouri – West, your Waypoints must be expressed in the Primary System.

Next, select the correct **Map Datum…**

On the ProMark 2 GPS Receiver:

Turn on the Unit, wait for the Ashtech ProMark 2 logo screen to display…

MODE
Survey
Navigate – select **Navigate** from the **Mode** screen.

WARNING!
All Data is provided for reference only.
You assume full responsibility and risk when using this device.

PRESS ENTER TO AGREE

TIPS
Press right or left arrow from position screen for secondary coord system
OK

Press **[MENU]** button…

Menu

Browse down the Menu to **Map Datum** <enter>

Coord System
Primary – select **Primary** from the **Coord System** <enter>
Secondary

Map Datum

Browse down the Menu to the **NAD83** selection <enter>

Returns user to Navigation screens…

Creating New Waypoints Manually

Allows the creation of a new waypoint with coordinates other than your present position. The coordinates for the new position need to be entered manually.

Examples are for the Lambert Projection NAD83 Virginia – North Meters.

From Any Screen: **[MARK/GOTO]** button , hold down for 2-3 seconds…

Mark

ICON	Name	
⊕	**WPT001**	highlight the Name Field - <enter>
		Allows entry of ASCII / Numeric Name, using keypad Enter **"MAX1"** Highlight **OK** when finished **–** then <enter>…

Mark
Location

Highlight the Location Field - <enter>
Allows entry of the Way-Points Position, in this example NAD83, Virginia – North, Meters.

NOTE: The ProMark 2 requires entry of the coordinates in **Easting, Northing** format.

Easting 03598646.174 (m)
Northing 02143057.769 (m)

(NAD83 – Virginia, North Coordinates for "MAX1").

<enter> to save entered position.

Mark
Elevation

Highlight the Elevation Field - <enter>
Allows entry of the Waypoints elevation, in this example Orthometric – Meters.

123 m

<enter> to save entered elevation.

Mark
Message

Create Message ? <enter> to save entered message.

Allows entry of Message associated to entered Icon, Location, and Elevation,
Using keypad. Highlight **OK** when finished.

Highlight – **[Save]** <enter> to save the Waypoint's properties.

Returns Use to Navigation Screen…

Waypoints / Database

Accessing Waypoints in the Database – All stored waypoints, whether user-input or preloaded, can be found in the Waypoint Database. You will need to access waypoints in the database whenever you are editing waypoints, activating a GOTO point, route or multi-leg route.

From Any Screen…

Press the **[MARK/GOTO]** button…

Goto
User <enter>

User
Browse the list of available Waypoints – select the Waypoint you desire to Navigate to.

In this example: **MAX1** <enter>

Note: The ProMark 2 unit must have a current GPS Position in order for any of the Navigation functions to work.

You should be Outside, where the ProMark 2 unit has "line of site" to the GPS Satellites.

For Additional Technical Reference, Please see the following Magellan Manuals:

MAP 330 – User Manual Magellan Part Number: 630778 C
ProMark 2 – User's Guide Magellan Part Number: 630860-01, Revision A