

## New C-Master Coordinate Capabilities

This version of C-Master includes the capability to handle coordinates in differing datums. C-Master is NOT a GIS program; that said, coordinates are handled in as rigorous a method as practical to insure you get the right results that you can trust. This document describes the functionality that is being added, and limitations that you should know about to effectively use the software.

### Background

C-Master has always handled NAD27 datum for UTM, Lat/Lon and State Plane coordinates. The coordinate software was obtained from the USGS (public domain) and used with very little modification. While sufficient for many day-to-day operations, the capability to additionally accept as input NAD83 data, and output as NAD27, NAD83, or WGS84 was asked for.

To get this capability, two additional software packages were integrated into C-Master. First, the public domain software from the National Geodetic Survey provided the conversion from State Plane to Lat/Lon coordinates as well as to/from UTM for NAD27 and NAD83 datums. The second package has global capability (Proj.4), and converts between WGS84 and NAD27/NAD83 data seamlessly.

### Implementation

Testing the software and making sure the configuration of the components was corrected demanded a “run-time check” be implemented. So, when you start C-Master, the coordinate conversion capability is checked against a set of global benchmarks to ensure that all conversions will take place without error.

There are three datums supported. For USA users, only the first two are of interest<sup>1</sup>. Numerically, they are identified as NAD27 (== 0), NAD83 (==1) and WGS84 (==2).

All of your existing data is assumed to be in the NAD27. All of the existing coordinates (UTM) stored in the Master Catalog are assumed to be NAD27 as well.

C-Master now allows you to set the default datum for initial input and a variety of outputs.

For coordinate input, the default datum is assumed to be NAD27. When entering a coordinate, however, you can over-ride this and specify that NAD83 is to be used. If your coordinate is in NAD83 State Plane coordinates, you can enter either the 4-digit zone number or the NAD83 4-character sequence to pick the State Plane Zone Name.

There are multiple data outputs from C-Master, and, in broad-brush categories, you can set the default datum for display of coordinates

The data in the Master Catalog can be stored there as NAD27, NAD83, or WGS84. This same setting is applied to Catalog printed listing.

If you create a CATSEARCH file (from the Catalog Display option), you can select the specific datum to use for this file alone.

For KML files, the output datum is always set to WGS84 to define the coordinate used to locate a push-pin on Google Earth map. In the associated data for that push-pin, the Lat/Lon and/or UTM is displayed in WGS84, and State Plane in the original entry datum.

Log strip displayed coordinates present different problems. If you have set the LOGPLOT datum to NAD83, the coordinate is converted only for UTM or Lat/Lon coordinates. State Plane coordinates cannot be automatically converted between datums.

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<sup>1</sup> Coordinates outside of the Continental US are assumed to be WGS84 if the requested datum is NAD83. NAD27 coordinates outside the USA are assumed to be Clark 1866 spheroid projection.

For CIMPORT\_CSV and CEXPORT\_CSV files, you can specify the datum to be used of UTM and Lat/Lon coordinates. Changing the datum for State Plane Coordinates is not permitted. There is not fool-proof way to do this.

## Configuration File Commands

The following configuration file commands will allow you to set the datum for various C-Master inputs and outputs.

DATUM {NAD27|NAD83|WGS84} {CATALOG|CATSEARCH|LOGPLOT|KML}

Examples:

<b>DATUM NAD83 INPUT</b>	<i>sets the default input datum to NAD83</i>
<b>DATUM WGS84 CATALOG</b>	<i>sets the datum for Master Catalog display</i>
<b>DATUM NAD27 LOGPLOT</b>	<i>sets the datum for log strip UTM and Lat/Lon to NAD27</i>
<b>DATUM NAD83 KML</b>	<i>sets the datum for display of UTM and Lat/Lon coordinates inside a Google Earth "push-pin" to NAD83</i>
<b>DATUM NAD83 ALL</b>	<i>sets the default datum for all inputs and outputs to NAD83</i>

The datum can be changed dynamically in the Configuration Display. The change you make is only for the current run of the program (i.e. you can change it, but it will not apply to a subsequent LOGPLOT run). It is there to allow you to display coordinate data in a different datum than you normally would (PDF or KML).

## C-Master Coordinate Datum Defaults

If you do not put specific DATUM commands in your configuration file, here are the defaults:

- Coordinate Input: NAD27
- Catalog Storage: NAD27
- CATSEARCH file: NAD27
- LOGPLOT (log strips): NAD27
- KML (Google Earth): NAD27 (affects the display only)

## Additional CONFIG Commands

There are some additional CONFIG file commands to allow some specific tailoring. These commands affect the ability to use C-Master for international coordinates and are datum specific. If you have work in areas not in the Continental USA, I can give you more information and let you evaluate the capabilities for yourself.