

Classification	Remote I/O Modules FAQ				No.	2-001-01	
Author	Hans	Version	1.0.0	Date	2014/04/10	Page	1/3

How to solve the offset issue when mapping GPS data on Google Maps?

Applies to:

<i>Platform</i>	<i>Module</i>	
<i>PC, NB, HMI and other control devices.</i>	<i>I-87211W, GPS-721 and GPS-721-MRTU</i>	

ICPDAS Remote I/O modules/Units list:

http://www.icpdas.com/root/product/solutions/remote_io/remote_io_products.html

Problem phenomenon:

1. There is a map offset when using GPS data on Google Maps.
2. How to transform NEMA format to Google Maps format.

The ICP DAS GPS modules like I-87211W, GPS-721 and GPS-721-MRTU use NMEA format, not Google Maps format. And Google Maps doesn't support NMEA format. If a user wants to show position on Google Maps correctly, the GPS data in NMEA format needs be transformed to Google Maps format by the following formula.

For more detailed information, please refer to:

http://en.wikipedia.org/wiki/NMEA_0183

http://en.wikipedia.org/wiki/Decimal_degrees

A DMS value is converted to decimal degrees using the formula:

$$DD = D + \frac{M}{60} + \frac{S}{3600}$$

For instance, the decimal degree representation for

38° 53' 23" N, 77° 00' 32" W ([United States Capitol](#)) is 38.889722°, -77.008889°

In most systems such as [Google Maps](#), the degree symbols are omitted, reducing the representation to

38.889722, -77.008889

Classification	Remote I/O Modules FAQ				No.	2-001-01	
Author	Hans	Version	1.0.0	Date	2014/04/10	Page	2/3

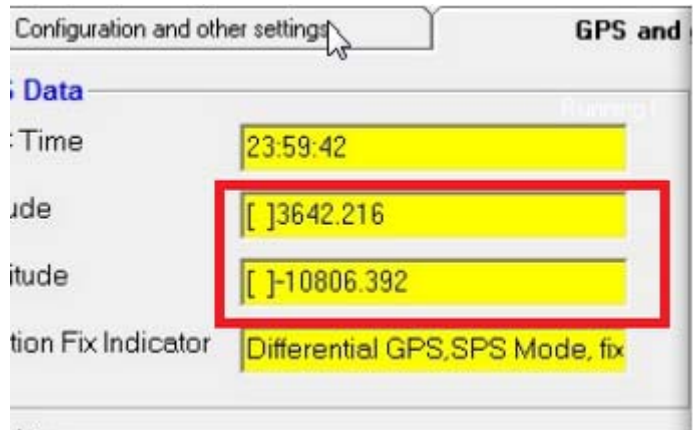
To calculate the D, M and S components, the following formulas can be used:

$$DD = \begin{cases} D & = \text{trunc}(DD) \\ M & = \text{trunc}(|DD| * 60) \text{ mod } 60 \\ S & = (|DD| * 3600) \text{ mod } 60 \end{cases}$$

For example,

The GPS data in NMEA format:

Latitude: 3642.216
Longitude: -10806.392



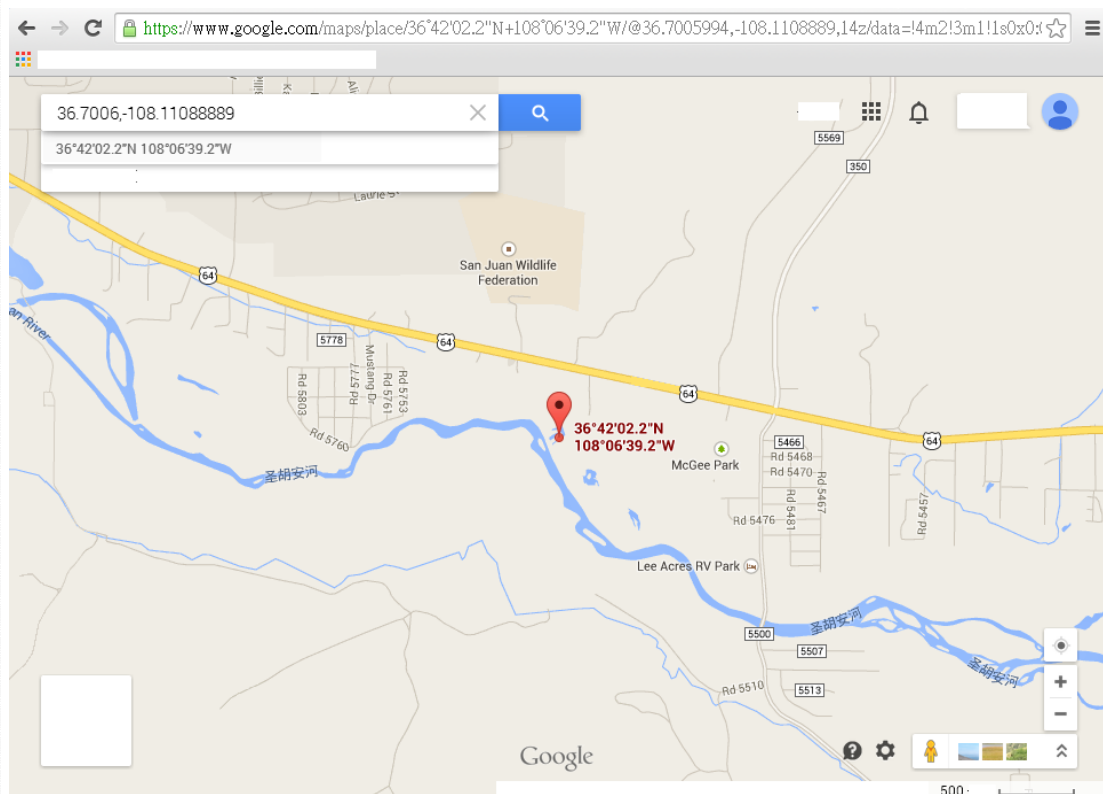
Converting to Google Maps format:

Latitude =

$$36+42/60+21.6/3600=36+0.7+0.006=36.7006$$

$$\text{Longitude} = -(108+6/60+39.2/3600=108+0.1+0.01088889)=-108.11088889$$

The correct position shows as below:



Classification	Remote I/O Modules FAQ				No.	2-001-01	
Author	Hans	Version	1.0.0	Date	2014/04/10	Page	3/3

Revision History

Revision	Date	Description
1.0.0	2014/08/25.	First release