How to do auto-time-synchronization and measure the local Longitude and Latitude by using the GPS-721 or I-87211W GPS I/O module in ISaGRAF PAC?

Download FAQ-107 Demo

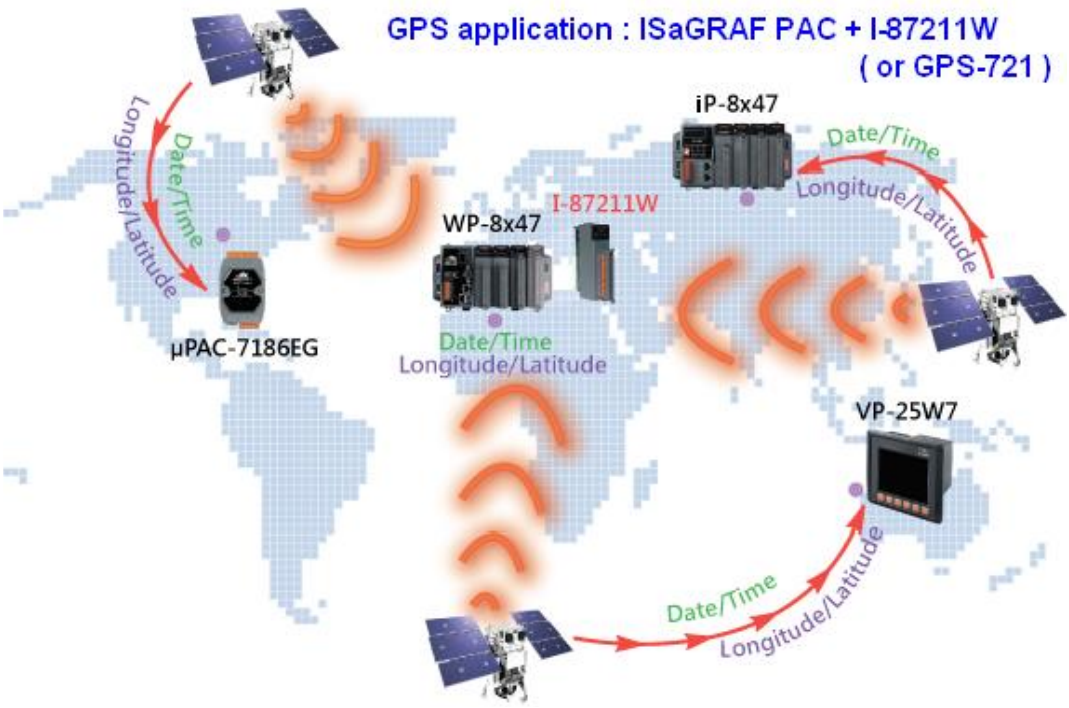
The WP-8xx7, iP-8xx7, uPAC-7186EG and future ViewPAC-25W7 support I-87211W GPS I/O module to do time-synchronization and measure the local Longitude and Latitude since their driver version listed below. There is one another compact RS-485 remote GPS-721 module available, which supports the similar functions than I-87211W does but can only be connected by the PAC via RS-485 connection. (I-87211W can plug in ISaGRAF PAC's slot 0 to 7 or can be connected by PAC via RS-485 connection)

WP-8xx7/ 8xx6:	since ver. 1.07	iP-8xx7:	since ver. 1.03
uPAC-7186EG:	since ver. 1.06	ViewPAC-25W7:	since released.
XP-8xx7-CE6:	since released		

The following driver suppprts "GPS_721".

WP-8xx7/ 8xx6:	since ver. 1.15	iP-8xx7:	since ver. 1.06
uPAC-7186EG:	since ver. 1.09	ViewPAC-25W7:	since ver. 1.06
XP-8xx7-CE6:	since released		

I-87211W 與 GPS-721: http://www.icpdas.com/en/product/I-87211W
http://www.icpdas.com/en/product/GPS-721
New released PAC driver:
http://www.icpdas.com/en/download/show.php?num=368&nation=US&kind1=&model=&kw=ISaGRAF
This document: http://www.icpdas.com/en/faq/index.php?kind=280#751 >FAQ-107



I-87211W GPS module developed by ICP DAS can search up to 8 satellites to get the global UTC time and local Longitude and Latitude. The WP-8xx7, iP-8xx7, uPAC-7186EG and ViewPAC-25W7 PAC can connect

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one I-87211W to do auto-time-synchronization and measure the local Longitude and Latitude. In theory, one satellite found by I-87211W can get the correct UTC time, while getting correct Longitude and Latitude require at least 3 satellites found. The ISaGRAF PAC can convert the UTC time to the local time. If user enable the auto-time-synchronization function in the ISaGRAF program, the PAC will auto modify its RTC (Real-Time-Clock) to the correct local time when the controller's RTC date and time is different more than 2 seconds than the local time from satellites.

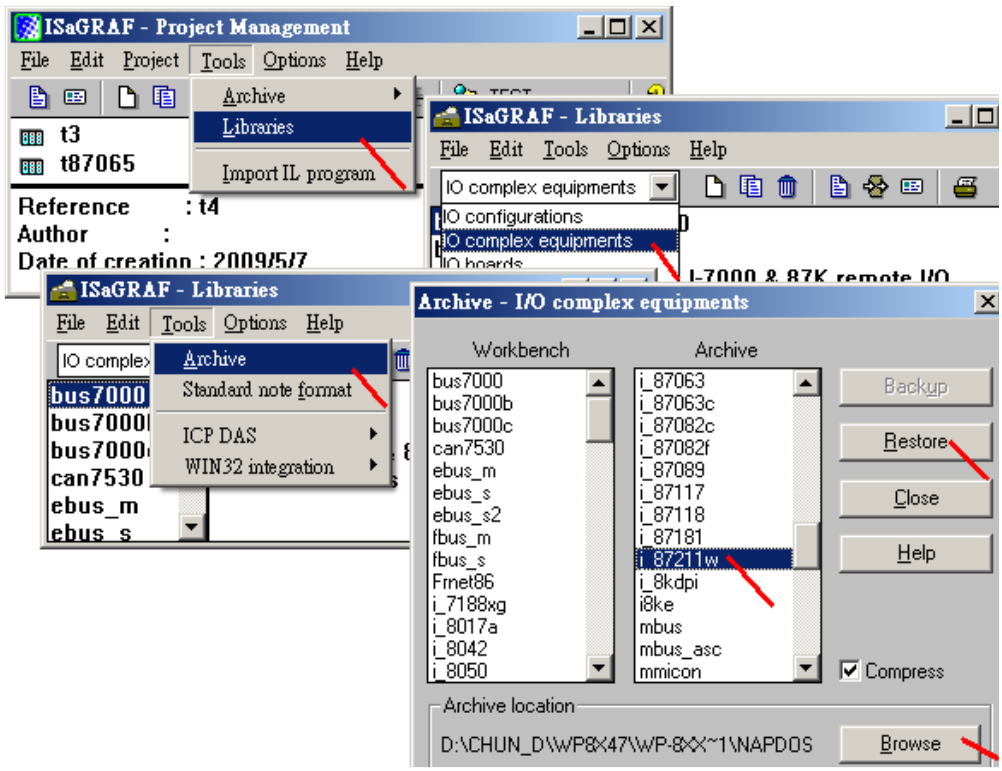
WP-8xx7, iP-8xx7 and ViewPAC-25W7 support one I-87211W plugged in their slot 0 to 7 (The VP-25W7 has only slot 0 to 2).
They also support I-87211W as RS-485 remote I/O module (this RS-485 remote I-87211W need the expansion base:RU-87P1/2/4/8 or I-87K4/5/8/9).There will be one another compact RS-485 remote GPS-721 module available in the future, which supports the similar functions than I-87211W (The GPS-721 doesn't need the expansion base).
(http://www.icpdas.com/en/product/guide+Remote__I_O__Module__and__Unit+PAC__%EF%BC%86amp;__Local__I_O__Modules+I-8K_I-87K__Series__(High__Profile))

Note: One ISaGRAF PAC can connect only one I-87211W or GPS-721.

Please make sure the “i_87211w” c-function block and I/O complex-equipment are well installed in your PC/ ISaGRAF before programming I-87211W. Please visit the following web site to download them. They are inside the zip file. (File name is “i_87211w.fia” and “i_87211w.xia” and “gps_721.fia”)
http://www.icpdas.com/en/faq/index.php?kind=280#751 >FAQ-107

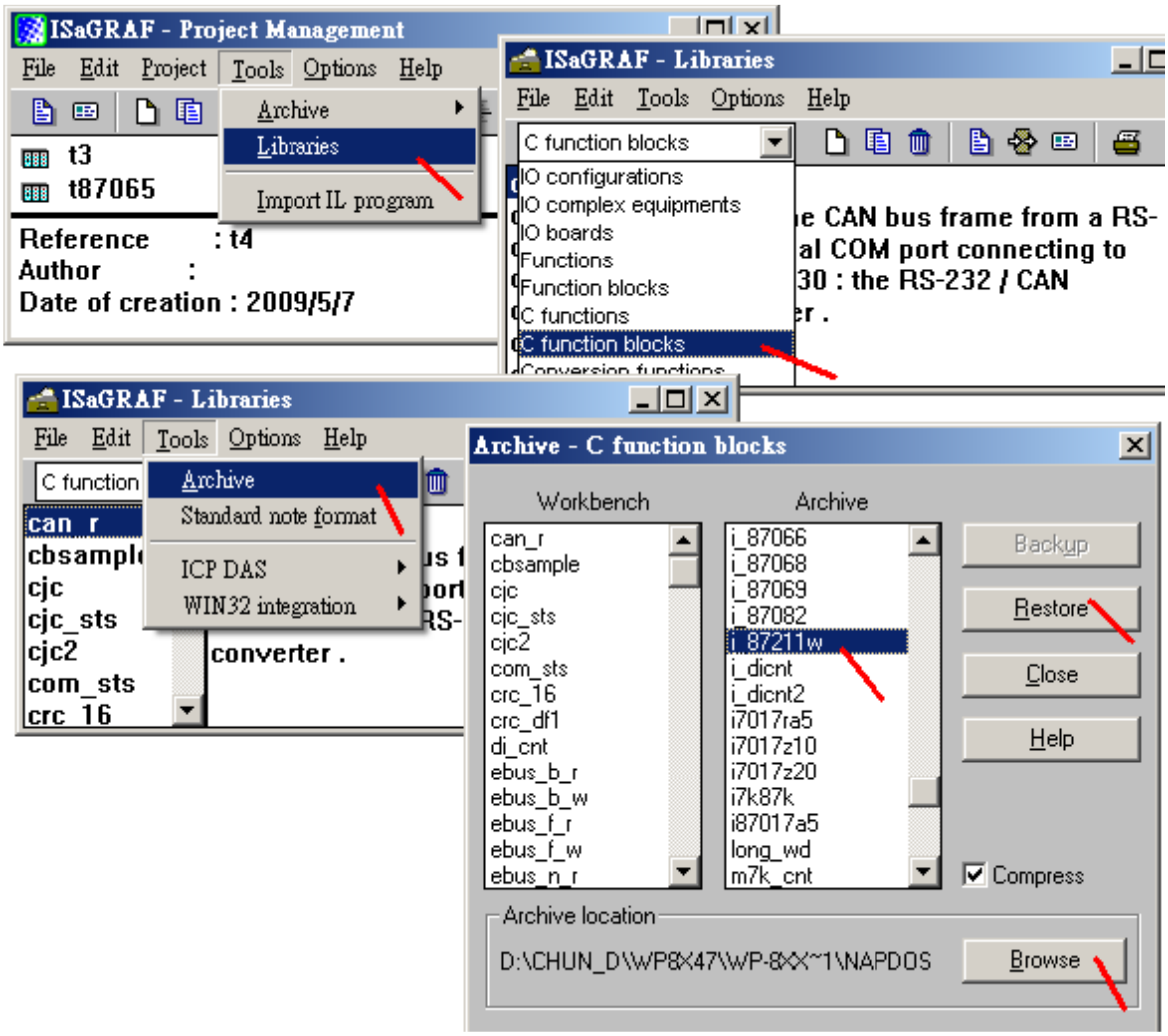
Then follow below steps to restore them to your PC/ ISaGRAF.

IO Complex-equipment - “I-87211w.xia”



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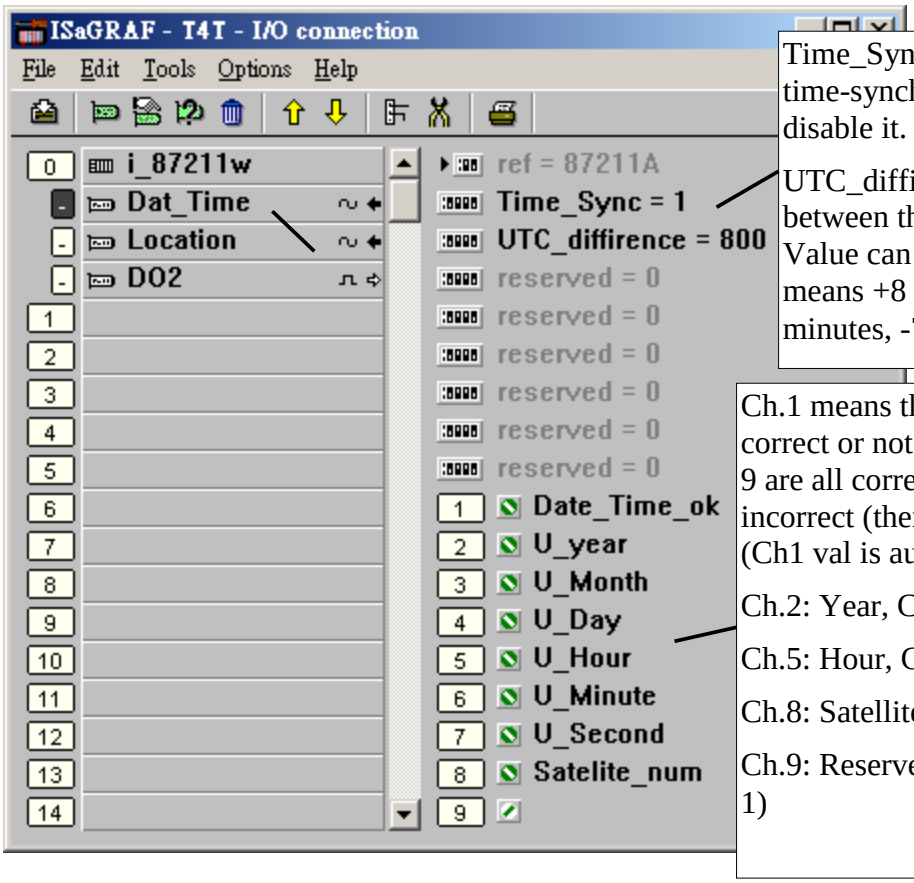
C-function block - “i_87211w.fia” (and “GPS_721.fia”)



Please connect the IO complex-equipment “i_87211w” in the ISaGRAF IO connection window as below if using I-87211W in WP-8xx7/ iP-8xx7’s slot 0 ~ 7 or in VP-25W7’s slot 0 ~ 2.

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All channels in the “Dat_Time” and “Location” are Integer input type, while are Boolean output type in the “DO2”.



Time_Sync: value 1 means enable the auto-time-synchronization function. Value 0 disable it.

UTC_diffirence: The time difference between the UTC Time and local time. Value can be -1200 to +1200, for ex., 800 means +8 hour, +230 means +2 hour and 30 minutes, -700 means -7 hour.

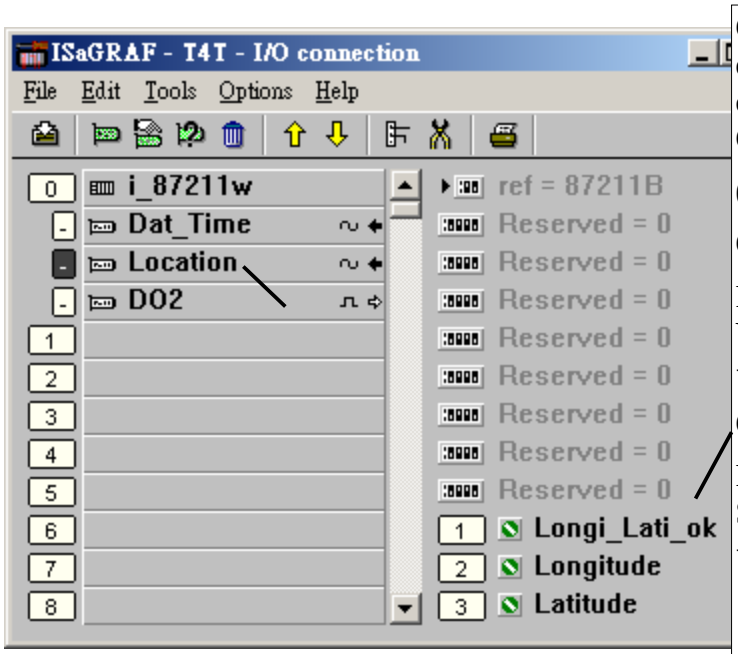
Ch.1 means the Date/ Time from satellite is correct or not. Value 1 means correct (Ch.2 to 9 are all correct). However value 0 means incorrect (then Ch.2 to 9 data can not be used). (Ch1 val is auto-modified by the satellite state)

Ch.2: Year, Ch.3: Month, Ch.4: Day

Ch.5: Hour, Ch.6: Minute, Ch.7: Second

Ch.8: Satellite amount found, can be 0 to 8

Ch.9: Reserved (GPS working state, normal is 1)



Ch.1 means the Longitude and Latitude correct or not. Value 1 means correct (Ch.2 and 3 are correct). However value 0 means incorrect (then Ch.2 and 3 data can not be used)

(Ch1 val is auto-modified by the satellite state)

Ch.2: Longitude, unit is 0.00001 degree.

Positive val means East, negative means West. Value can be -17999999 (-179.99999 degree) to +18000000 (+180.00000 degree)

Ch.2: Latitude, unit is 0.00001 degree.

Positive val means North, negative means South. Value can be -9000000 (-90.00000) to +9000000 (+90.00000 degree)

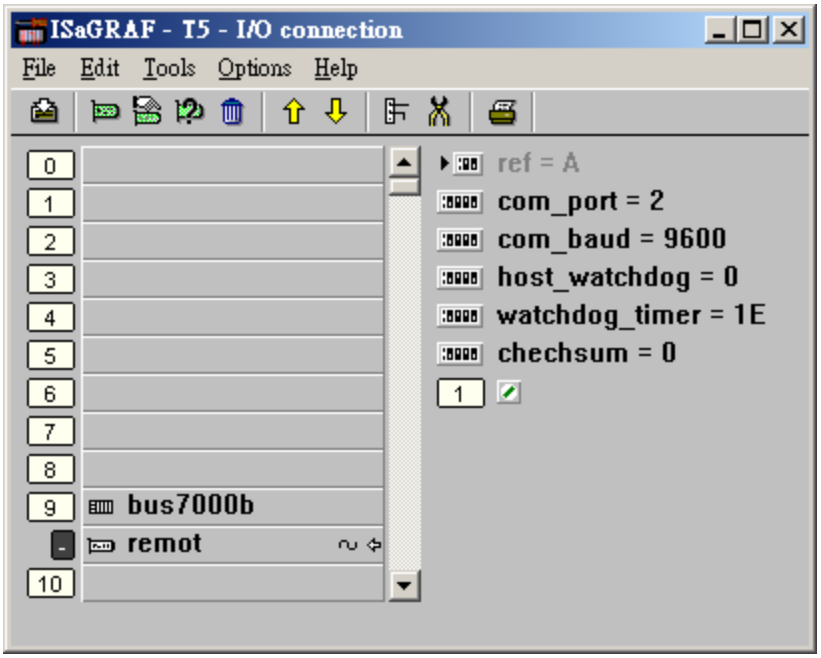
The “DO2” is two Boolean output channels in I-87211W modules.

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If I-87211W (or using GPS-721) is connected by the WP-8xx7, iP-8xx7, uPAC-7186EG or VP-25W7 PAC via RS-485, please run DCON utility (at least version 5.0.5, can be download at below web site, http://www.icpdas.com/en/product/guide+Software+Utility_Driver+DCON__Utility__Pro to do initial setting for I-87211W. Setting well its Addr and BaudRate and Checksum (Disable/ Enable, default is Disable).
Then connect the IO complex-equipment “bus7000b” in the ISaGRAF IO connection window.

(Please refer to the Chapter 6 of the ISaGRAF User's manual for using RS-485 remote I/O modules)

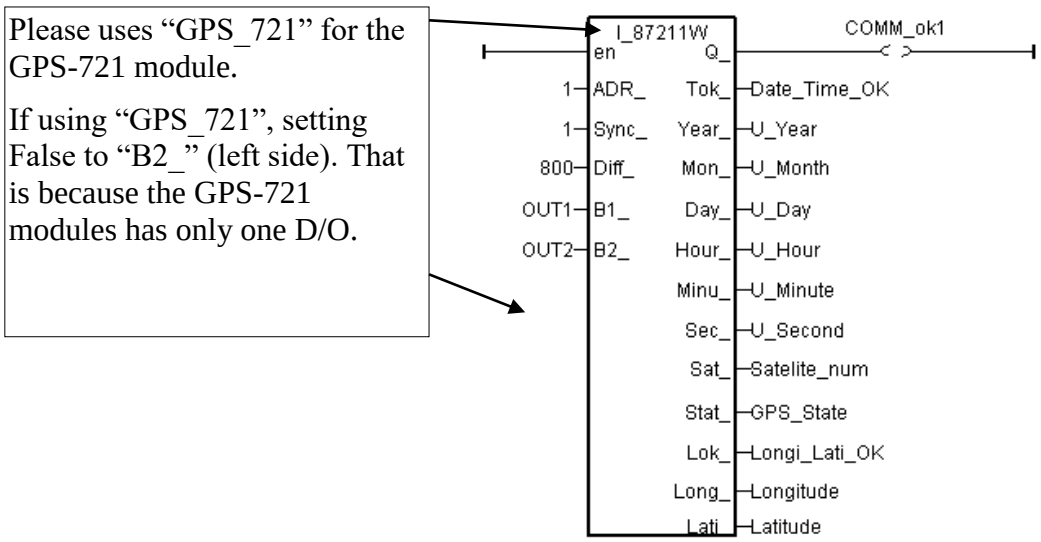
The following figure is using PAC’s COM2, Baud Rate as 9600 bps, No checksum to connect remote I/O modules.



Then write a similar Ladder program as the next page to control the remote I-87211W (or GPS-721).

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Writing one Ladder prgram as below to control remote I-87211W:



Parameters on left:

ADR_: Remote IO module’s Addr. 1 ~ 255. (must be constant value)
Sync_ : 1 means enable the auto-time-synchronization function, 0: disable it (must be constant value)
Diff_ :The time difference between the UTC Time and local time. Value can be -1200 to +1200, for ex., 800 means +8 hour, +230 means +2 hour and 30 minutes, -700 means -7 hour. (must be constant value)
B1_ : Digital output Ch.1 (Internal Boolean)
B2_ : Digital output Ch.2 (Internal Boolean), Setting False if using “GPS_721”

Parameters on right: (Q_ is internal Boolean, others are all internal Integer)

Q_: The communication state between the PAC and I-87211W, True: Ok, False: broken
Tok_: means the Date/ Time from satellite is correct or not. Value 1 means correct (then Year_, Mon_, Day_, Hour_, Minu_, Sec_, Sat_, Stat_ are all correct). However value 0 means incorrect (then all the above data can not be used). (Tok_ valus is auto-modified by the satellite state)
Year_: year, Mon_: month, Day_: day, Hour_: hour, Minu_: minute, Sec_: second
Sat_: Satellite amount found, can be 0 to 8
Stat_: Reserved (GPS working state, normal is 1)
Lok_: means the Longitude and Latitude correct or not. Value 1 means correct (then Long_ and Lati_ are correct). However value 0 means incorrect (then Long_ and Lati_ data can not be used) (Lok value is auto-modified by the satellite state)
Long_: Longitude, unit is 0.00001 degree. Positive val means East, negative means West. Value can be -17999999 (-179.99999 degree) to +18000000 (+180.00000 degree)
Lati_: Latitude, unit is 0.00001 degree. Positive val means North, negative means South. Value can be -9000000 (-90.00000) to +9000000 (+90.00000 degree)

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