

RTK-1010 EVK & RTK-1612 EVK

Simple steps to quickly complete LOCOSYS RTK software settings

(Base Station & Rover)



Version 1.1 2021.4.28

About LOCOSYS

LOCOSYS Technology Inc. established in 2005, a company that provide services the scope of which spans from both hardware and software in Global Navigation Satellite System (GNSS), Wireless Communication, Embedded System to Avionics, Automotive and Consumers electronics. LOCOSYS Technology Came from a well-known research organization of information industry, LOCOSYS sustains a strong R&D in Software, Hardware and system integration. Through its self own (International Automotive Task Force, IATF) IATF16949 : 2016 / ISO 9001 : 2015 certified production lines in Taiwan.

LOCOSYS is a qualified supplier to tier 1 & tier 2 manufacture in Automotive industry (design house, EMS, OEM, ODM) and be the 2017 best partner of 'Automotive Dead Reckoning' in Global automotive industry and provides solutions and services to various market segments. Stay in α-level qualified module designer and supplier in the international market, deal the partnership with more than 20 Well-known distributors overseas, to provide our customers a complete OEM and ODM services.

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Chapter 1. Base Station setting

procedures below. *GPSFox version kindly check with our sales.

Step 1: Choose the software "GPSFox V.099v8_RTKonly" and click it. Then follow up the procedures below. *GPSFox version kindly check with our sales.

Figure 1: COM Port Setting

Step 2: Press 'Connect' button.



Figure 2: Connect button

Step 3: Inputs command 'setbase', press enter.



Figure3 :command

Step 4: Inputs command '\$PAIR436,1', press enter.



Figure4 :command

Step 5: Inputs command '\$PLSC,MCBASE,1', press enter.



Figure5 :command

Note:

GPSFox tool will automatically add the checksum, so there is no need to include the checksum in the command.



	名稱		fé	8改日期	類型		大小
B	🕄 com	2nc	2	021/3/29 上午 10:59	應用程式		8,343 KE
		Figu	ire 6: Softwa	are 'com2nc'			
7: Press	" <mark>Opt</mark> "						
o 7: Press	" <mark>Opt</mark> ". CON	12NC ver. 1.1					
o 7: Press	" <mark>Opt</mark> ". CON 202	12NC ver. 1.1 1/04/09 02:49:33 GPST	ſ	Connect Time	e: 0d 00:	:00:00	
o 7: Press	" <mark>Opt</mark> " CON 202	12NC ver. 1.1 1/04/09 02:49:33 GPS1 Stream	Opt Cmd	Connect Tim	e: Od OO: Bytes	:00:00 Bps	
o 7: Press	" <mark>Opt</mark> " <u> CON</u> <u> 202</u> <u> </u> <u> </u>	12NC ver. 1.1 1/04/09 02:49:33 GPST Stream Input (Serial) 7.	Opt Cmd	Connect Tim	e: Od OO: Bytes O	:00:00 Bps 0	
o 7: Press	" <mark>Opt</mark> ". 	12NC ver. 1.1 1/04/09 02:49:33 GPST Stream Input (Serial) 7. Output (NTRIP Caster)	Opt Cmd	Connect Tim Log	e: 0d 00: Bytes 0 0	:00:00 Bps 0 0	
o 7: Press	"Opt" 	A2NC ver. 1.1 1/04/09 02:49:33 GPST Stream Input (Serial)7.	Opt Cmd	Connect Tim	e: 0d 00: Bytes 0 0	:00:00 Bps 0 0	

Figure 7: com2nc: Serial Options

Step 8: It will	pump up	this window.
-----------------	---------	--------------

CON	A2NC ver. 1.1					Serial Option	ns				>
202	1/04/09 02:55:58 GPS	T	Connect	: Time: Od O	0:00:00	Port	COM1	~	Parity	None	2
	Stream	Opt Cmd	Log	Bytes	Bos	Bitrate (bps)	9600	~	Stop Bits	1 bit	
	Input (Serial 8. 🛞	?				Byte Size	8 bits	4	Flow Control	None	9
	Output (NTRIP Caster)			0	0	Output Re	eceived St	ream to	o TCP Port :		
									ок	Cance	9
					1.5						
	Start			Exit							

Figure 8: com2nc : Serial Options



Step 9: Setting "Com Port" and "Baud rate"

COM4	V	Parity	None	
115200	~	Stop Bits	1 bit	
8 bits	~	Flow Control	None	~
	COM4 115200 8 bits	COM4 ~ 115200 ~ 8 bits ~	COM4 V 115200 V 8 bits V Flow Control	COM4 Parity None 115200 Stop Bits 1 bit 8 bits Flow Control None

Figure 9: com2nc: Serial Options setting

Step 10~11: Click Cmd and input Serial Commands.

				Input Seria	I/TCP Commar	ıds	>
				Command	is at startup		
COM2NC ver. 1.1							
2021/04/09 03:06:14	GPST	Connect Time:	0d 00:00:00		le at chutdown		
Stream	Opt Cmd	Log By	tes 11 0	SPLSC,MCBA	SE,0*27		
Input (Serial) 1). (****	Li	1.3	P			
Output (NTRIP Cast	ter)		0 0	l			
			D	Periodic C	Commands : <com< td=""><td>mand> # cycle (</td><td>ms)</td></com<>	mand> # cycle (ms)
► <u>S</u> tart			Exit				
► <u>S</u> tart			EXIL				
				Load	Save	OK I	Cancel

Figure 10: com2nc: Commands setting

Step 12 & 13: Click Opt (Second one) and input Port and either Mountpoint or User ID is ok.

Note: The following demonstration cases.

(1) Please refer to "page 17" of index file, setting "Port" from 1024 to 65535 (ex: 7777).



(2) "Mountpoint" setting Customer company name (ex: LOCOSYS)

2021/04/09 02:49:33	3 GPST	Connec	t Time: 0d 00:00:00	NTRIP Caster Options		0
Stream	Opt Cmd	Log	Byte 3.	NTRIP Caster Address	0	7777
Input (Serial)		🛛	0	Mountpoint User ID		
Output (NIRI2Ca	A			LOCOSYS		
			L.	ŝ	ОК	Cancel
Start			Exit	1		



Step 14: Press 'Start' button

	2021/04/09 02:49:33 GPST			Connect	t Time: Od O	0:00:00
		Stream	Opt Cmd	Log	Bytes	Bps
		Input (Serial)			0	0
		Output (NTRIP Caster)			0	0
						Ē
14.		▶ <u>S</u> tart			Exit	

Figure 12: Start button



2	021/04/09 02:49:33 GPS1	Г	Connect	Time: Od ()0:00:00
	Stream	Opt Cmd	Log	Bytes	Bps
	Input (Serial)		🛛	0	0
5.🚱 🗉	Output (NTRIP Caster)	***		0	0
	(0) COM11 (1) 2 c	lients 8.171		E
	Start	0) 00/111 (1) 20		Evit	

Step 15: It will show RTK "Base station" is working and receiving satellite information

Figure 13: Waiting for client information

In the above 1~15 steps, You have completed the "Base station" setup.

Chapter 2. Rover setting

Step 1: Please choose the software: "**rtknavi**" and double click it. Then follow up the procedures below.

	名稱	修改日期	類型	大小
	GPSFox-V0.99v8_RTK_only	2021/4/7 上午 11:29	應用程式	4,782 KB
	GPSFox-V0.99v8_RTK_only	2021/4/9 上午 11:29	組態設定	1 KB
	kinematicL1L2-2019-0130.conf	2019/1/30 下午 01:26	CONF檔案	7 KB
1.00	😴 rtknavi	2020/10/8 上午 11:50	應用程式	7,516 KB
6	📄 sourcetable.dat	2021/4/7 下午 12:21	DAT 檔案	1 KB

Figure 14: Software: "rtknavi"



Step 2: Please press "I"

RTKNAVI ver 2.4.3 b31 Felix b07	(11<=meas.no.sorting)		0.055	
2000/01/01 00:00:00.0 @ST			2.0	1 0 000+0+0000 0 1
🗉 Lat/Lon/Height 🔹	Rover:Base SNR. (dBHz)			• •
Solution: — — — N: 0° 00' 00.0000" E: 0° 00' 00.0000" He: 0.000 U: 0.000 m N: 0.000 E: 0.000 U: 0.000 m Age: 0.0 s Ramo: 0.0 #Sat: 0				50 40 30 50 50 40
				-30
				-20
< >				
0				G (
► Start	® Mark	() Elot	Ø Options	Egit

Figure 15: rtknavi –press I button.



Solution:	verifiaat SNR (dBHz) 3. F	Input Streams Input Stream (1) Rover (2) Base Station (3) Correction Transt MEA GPGG	Type Serial Serial A to Base Station	Opt III	Cmd Format – RTCM 2 – RTCM 2 – RTCM 2	Cipt Cipt Ser ministration Ser ministrat	
Solution: N: 0° 00' 00.0000" E: 0° 00' 00.0000" He: 0.000 m	3.₹	Input Streams Input Stream (1) Rover (2) Base Station (3) Correction Transmit IMEA GFGG	Type Senal Senal Senal A to Base Station	Opt	Cmd Format = RTCM 2 = RTCM 2 = RTCM 2	Cipt Cipt Sel mining Sel mining	
N: 0° 00' 00.0000" E: 0° 00' 00.0000" He: 0.000 m		(3) Correction	Seriel	-	- RTCM 2		
N: 0.000 E: 0.000 U: 0.000 m Age: 0.0 s Rate: 0.0 #Sat: 0		Reset Crid Input File Paths	0.00000000	.0000	00000 0.000 Max Scattere 10	40. 40. 40. 40. 40. 40. 40. 40.	
< >		Time x1 -	0 6-bit		OK Can	cel	

Step 3: After you press 'I', it will jump out this and select option (2) only.

Figure 16: rtknavi – select option

	Input Streams Input Stream	Туре		Opt	Cmd		Format		× Opt
1	(1) Rover	Serial		444		RTCM	12		(***)
3.05	(2) Base Station	NTRIP Client	~			RTCM	13	~	
4	(3) Correction	Serial	- 65	447	+++	RTCM	12	.4	
	Transmit NMEA GPGG	A to Base Station							
	OFF	∽ 0.000000000	0	.0000	00000	0	0.000		1440

Figure 17: rtknavi – Choose NTRIP Client in Type and choose RTCM3 in Format.

Note:

- (1) After selecting option.
- (2) Choose "NTRIP Client" in Type and choose "RTCM3" in Format.
- (3) And then choose Opt in Step 4.



Step 4~5:

(1) Click "Opt"

(2) Please input data in "NTRIP Caster Host" IP address (ex: 192.168.98.152)

(3) "Port" (ex: 7777) and "Mountpoint" (ex: LOCOSYS).

Input Stream	Туре	Opt C	md Forma	at Opt	NTRIP Client Option	5	Port
(1) Rover	Serial	e land a	RTCM 2	5. 35	192.168.98.152	~	7777
(2) Base Station				5	Mountpoint U	ser-ID	Password
(3) Correction	Serial		RTCM 2		LOCOSYS		
Transmit NMEA GPGGA	to Base Station	1	W		String		
OFF	✓ 0.000000000	0.00000	0000 0000)			
Reset Cmd			Max Baseline	e 10 km	Ntrip	OK	Cancel
Input File Paths							
				_2220			

Time V1 V4			W.	Connel			

Figure 18: rtknavi – input data in NTRIP Caster Host, Port and Mountpoint.



Step 6: Press 'L' button.

RTKNAVI ver 2.4.3 b31 Felix b07 (11<=meas. no sorting)			24.121.02
2000/01/01 00:00:00.0 GPST				1 000+0+ <mark>6</mark> . 🐼 L
🖙 Lat/Lon/Height 🔹	Rover:Base SNR (dBHz)			
Solution: N: 0° 00' 00.0000" E: 0° 00' 00.0000" E: 0° 00' 00.0000" He: 0.000 m				
Age: 0.0 s Ratio: 0.0 #5at: 0				50
t F				
s c >				20
a				E2 7
▶ <u>S</u> tart	⊛ Mark	🕑 Blot	Options	Egit

Figure 19: rtknavi – 'L' button.

Step 7: Select option (7) and choose TCP Server in Type and click Opt ...

	Log Streams			×	TCP Server Opt	tions		
	Log Stream	Туре	Opt		Server Address		P	ort
	(6) Rover	Serial		Output Event			~	
F	(7) Base Station	TCP Server	~		Mountpoint	User-ID	P	assword
0	(8) Correction	Serial	~			~		
	Log File Paths			1000	String			
							ОК	Cancel
	Time-Tag Swap Int	V VH 2	OK	Cancel	-			

Figure 20: rtknavi - Selecting option (7) and choose **TCP Server** in Type and click Opt.



Step 8: Input 16800 into Port. Since this is corresponding to GPSFox.



Log Stream	Type Serial	Opt	utput Event		Server Address	dons 8	. F	Port 16800	
🗹 (7) Base Station	TCP Server				Mountpoint	User-ID	0	Password	
(8) Correction Log File Paths	Serial				String	~			
							OK	Cano	el
				**					
Time-Tag Swap Int	v <u>v</u> H ?	ОК	Cancel						

Figure 21: rtknavi - Input 16800 into Port

Step 9: After finished setting for 'I'and 'L'. Please press "Start".

RTRNAVI ver.2.4.3 b31 Felix b07	(11 < -mest, no sorting)		
2000/01/01 00:00:00.0 GPST			0 00000+0+0000 1
is Lat/Lan/Height •	Ravershee SFR (All-12)		
Solution: — — — N: 0° 00' 00.0000" E: 0° 00' 00.0000" He: 0.000 m Ni 6000 E: 0 000 U: 0 000 m Age: 00 + Batter 00 #Set 0			
C			
u			
Pr		222333	

Figure 22: rtknavi – "Start" button.



Step 10: View "Green light" show up near the 'I' button. It means Rover station received RTCM data from "Base station".



Figure 23: rtknavi – Rover station received RTCM data from Base station.



Step 11: Minimize RTKNAVI window and click **GPSFox-V0.99v8_RTK only** *GPSFox version kindly check with our sales.

	名稱	修改日期	類型	大小
11. 35	GPSFox-V0.99v8_RTK_only	2021/4/7 上午 11:29	應用程式	4,782 KB
	kinematicL1L2-2019-0130.conf	2019/1/30 下午 01:26	CONF 檔案	7 KB
	😸 rtknavi	2020/10/8 上午 11:50	應用程式	7,516 KB
	📄 sourcetable.dat	2021/4/7 下午 12:21	DAT 檔案	1 KB

Figure 24: Click GPSFox-V0.99v8_RTK only

Step 12~13: Click Ntrip_TCPIP and it will show RTK(fix)



12.00	D' Nirio 1	гсрір	Latitude :	N325706102251
	1	rip connected	Longitude :	
	12	351, 15856	Altitude :	8134 720 ml
	Log R	CM INTERNAL PROPERTY	Allitade (MSL):	11.9.400 m
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	13. 🕵	Fix Mode :	BURG (PLK)
			Speed (SOG):	0.9 Mp/IL

Figure 25: Click Ntrip_TCPIP and RTK Fix



Step 14: Both side show "Green light" which means "Rover " is online and connect with "Base

station".





Figure 26: Rover is online

In the above 1~14 steps, You have completed the "Rover" setup.



Chapter 3. Supplement (Basic commands & Troubleshooting)

1. Following screen shot is showing Base station connecting with Rover station and the Rover station (ex: IP is 192.168.98.171)

COM2NC ver. 1.1				
2021/04/09 02:49:33 GPST	ř.	Connec	t Time: 0d 0	00:00:00
Stream	Opt Cmd	Log	Bytes	Bps
Input (Serial)		🛛	0	0
Output (NTRIP Caster)			0	0
(0)) COM11 (1) 192	2.168.98.171		1
▶ <u>S</u> tart			Exit	

2. Following screenshot shows the RTK base station is working and two of the clients are connecting.

COM2NC ver. 1.1				
2021/04/09 02:49:33 GP	ST	Connec	t Time: 0d 0	0:00:00
Stream	Opt Cmd	Log	Bytes	Bps
Input (Serial)			0	0
Output (NTRIP Caster)			0	0
	(0) COM11 (1)	2 dients 8,171		13
► <u>S</u> tart			Exit	



3. Following proprietary command are the most commonly used to support initial base station mode at COM2NC program

• Set the base location (reference position)

Synopsis:

\$PLSC,SETBASEXYZ,<X>,<Y>,<Z>*CK<CR><LF>

Response:

\$PLSR,BASEXYZ,<X>,<Y>,<Z>*CK<CR><LF>

Parameter	Format	Description
Х	DDDDDDD.DDD	WGS-84 ECEF X-axis coordinate (in meters)
Y	DDDDDDD.DDD	WGS-84 ECEF Y-axis coordinate (in meters)
Ζ	DDDDDDD.DDD	WGS-84 ECEF Z-axis coordinate (in meters)

Examples:

\$PLSC,SETBASEXYZ,-3028442.081,4923062.884,2687870.875*03<CR><LF>

System response:

\$PLSR,BASEXYZ,-3028442.081,4923062.884,2687870.875*50<CR><LF>

• Query current base location (ECEF coordinate)

Synopsis:

\$PLSC,GETBASEXYZ,<X>,<Y>,<Z>*CK<CR><LF>

Response:

\$PLSR,BASEXYZ,<X>,<Y>,<Z>*CK<CR><LF>

Examples:

\$PLSC,GETBASEXYZ*38<CR><LF>

System response:

\$PLSR,BASEXYZ,0.000,0.000,0.000*7D<CR><LF>

(0: Base station coordinate not set yet)

System response:

\$PLSR,BASEXYZ,-3028442.081,4923062.884,2687870.875*50<CR><LF>

(Current base station's ECEF coordinate setup as X=-3028442.081 meters, Y=4923062.884 meters, Z=2687870.875 meters)

If the customer only knows the exact of WGS-84 LLA not WGS-84 ECEF coordinate, you can use <u>https://tool-online.com/en/coordinate-converter.php</u> website which supports online coordinate converter from LLA to ECEF

	Conline coordinate converter Long = ' Lat = ' h = 0.000 m
	WORLD V WGS 84 (GPS) V WORLD V XYZ (GEOCENTRIC) V
New 1: Geocentric car Following a request from - Long, Lat, h -> X, Y, Z: S - X, Y, Z -> Long, Lat, h: S	testan coordinates (X, Y, Z) a visitor, I added the option to convert to and from Geocentric cartesian coordinates (X, Y, Z). Here's how Select WGS84 left and right: WGS84_XYZ (geocentric) under 'International' menu;

We take an example. The absolute LLA of the LOCOSYS RTK's roof antenna is 25.06186550 N, 121.64574778 E, and 136.969 height (WGS-84) to converter get ECEF coordinate as following

Long = +121.64574778			X =	-3033218.180	m
Lat = +25.06186550	50		¥ =	4921616.337	m
h = 136.969	9	>	Z =	2685341.889	m
WORLD ~			WORLD	5	
WGS 84 (GPS) 👻 📑			XYZ (GE	OCENTRIC)	~

To get ECEF coordinate as following

X=-3033218.180 meters

Y=4921616.337 meters

Z=2685341.889 meters

To set the base location as **\$PLSC,SETBASEXYZ,-3033218.180,4921616.337,2685341.889*0C**



• Set up the module as a reference station or as a rover

Synopsis:

\$PLSC,MCBASE,<MODE>*CK<CR><LF>

Response:

\$PLSR,MCBASE,<MODE>*CK<CR><LF>

Parameter	Format	Description		
MODE		0: Set up the board as a rover (default)		
	Decimal	1: Set up the board as a reference station		
		(Output RTCM3.3 1005, 1074, 1084, 1094, 1124		
		messages)		

Examples:

\$PLSC,MCBASE,1*26<CR><LF>

Set the base location (reference position)

\$PLSC,MCBASE,0*27<CR><LF>

Disable base station mode

• PAIR_RTCM_SET_OUTPUT_EPHEMERIS

[Packet Type]

436

[Command]

PAIR_RTCM_SET_OUTPUT_EPHEMERIS

[Description]

This command is to set enable/disable RTCM output with satellite ephemeris.

[Data Field]

\$PAIR436,<ENABLE>*CS<CR><LF>

ENABLE:

0: Disable

1: Enable

[Return]

1. PAIR_ACK for send result.

[Example]

- 1 Send:
- 2 PAIR436,1*26'r'n ==> set RTCM3.x output with satellite ephemeris
- 3 Response:



4 $PAIR001,436,0*3A\r ==>$ Success

Regarding how to calculate the checksum value for the command? Take 8 bits EX-OR of all characters between '\$' to '*' in the sentence (not including '\$' to '*').

Customer also can use <u>https://nmeachecksum.eqth.net/</u> website which supports the NMEA Checksum Calculator to get the values of checksum.



The following screenshot shows our typing input has added with Checksum.



To configure COM2NC output (Ntrip Caster) options

	COM2NC ver. 1.1					
1	2021/04/08 10:29:27 GPST			Connect Time: 0d 00:00:00		
	Stream	Opt Cmd	L <mark>o</mark> g	Bytes	Bps	
	Input (Serial)			0	0	
	Output (NTRIP Ca	ster) 🛄		0	0	
1						
	► <u>S</u> tart			E <u>x</u> it		
COM2NC ver. 1.1			NTRIP Ca	ster Options		
2021/04/08 10:31:51 0	PST Co	nnect Time: 0d 00:00	:00	ster Address		Port
Stream	Opt Cmd Log	Bytes	Bps Mountpoin	t User ID		Password
Input (Serial)		0	0 LOCOSYS	~		
Output (NTRIP Caste	r)	0	0		ок	Cancel
D. Charle		5 .44				

a. Customer needs fill to put following account information to let the Clients for connection using Ntrip Caster address: It shows the reverse type for using a fixed network IP

b. Port: filled in 7777 or It can set using Dynamic Ports (1024 to 65535). Ntrip client AP should set the same as port for getting the connection.

c. Mountpoint: filled in LOCOSYS or customer can type he wants to. Ntrip client AP should select the same as Mountpoint name for getting the connection.

d. User ID: It can be ignored for every client can logging in.

e. Password: It can be ignored for every client can logging in.

f. After finished Output options, you can click Start button to start the RTK Ntrip server & caster service

End of above