

# **R2CGGTS Documentation**

Version 2.4.1

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## **I. Getting Started**

### **1. Introduction**

R2CGGTTS version 2.4.1 is a MICROSOFT WINDOWS software used to automate the conversion of RINEX daily data files in CGGTTS format files.

This program is designed in FORTRAN and VISUAL BASIC 6 language.

**FORTRAN source code:** It is the conversion code in itself.

It is written and updated by PASCALE DEFRAIGNE, Observatoire Royal de Belgique (ORB).

File used for R2CGGTTS version 2.4.1 is "RINEX\_CGGTTS.f.V41".

This code generates the CGGTTS files in a MULTI-CHANNEL approach from RINEX files at a sampling rate of 30 seconds using broadcast orbits and P3 code.

**VISUAL BASIC 6 source code:**

It is the MICROSOFT WINDOWS environment to permit of a useful graphical user interface and an automatic run of the FORTRAN program (which is compiled with LAHEY/FUJITSU FORTRAN 95).

### **2. Operating System configuration**

This software is written under MICROSOFT WINDOWS XP system.

**Warning:**

R2CGGTTS does not work under MICROSOFT WINDOWS NT4.

R2CGGTTS uses different settings of operating system as reference that must be configure properly:

**Computer time:**

You must set the computer time to UTC (within a few minutes).

Moreover, verify the computer date is correct.

**Windows Regional Options:**

Time format: "HH:mm:ss"

Short Date format: "dd/MM/yyyy"

Number decimal symbol: "." (point)

### **3. Installation**

This version of R2CGGTTS can be installed without uninstall older version.

Get from our FTP server the files: "setup.exe", "setup.lst", and "r2cggts.2.4.1.cab".

You can install the software on any computer that has access to the RINEX files either on a local drive or on a network drive.

Please see description of different steps of installation in Annex I.

## II. Program usage

A new shortcut will be created in your WINDOWS “Program menu”. You can start the program either through it or by double clicking on the “r2cggts.2.4.1.exe” file in path “C:\Program Files\r2cggts 2.4.1\”. To exit the program, click on “Exit” menu of the program.

### 1. Parameter menu

All requested information in this menu are compulsory and must be filled before using other menu (restriction: no blank in field). To do so click in the field you want update, a new window will appear with a short explanation of what should be in the field. Please see an example of updated field in Annex II.

Summary of “CGGTTS header info” field:

Field name	Description	Example
REV DATE	date of the latest update of any of the header info parameters	“2002-05-28”
RCVR	receiver maker, type, serial number and other information relevant	“ASHTECH Z12T LP02944”
CH	receiver number of GPS channel	“12 (GPS)”
LAB	identify the laboratory name	“ORB”
X	enter X coordinate of the antenna phase centre in meters	“4203640.1300”
Y	enter Y coordinate of the antenna phase centre in meters	“162934.3540”
Z	enter Z coordinate of the antenna phase centre in meters	“4778196.4030”
FRAME	enter the frame in which the coordinates are expressed	“ITRF97”
COMMENTS	enter any particular comments about the set up	“no comments”
INT DLY (GPS P1)	enter the system (receiver + antenna) P1 internal delay, ( $X_R + X_S$ ) in ns	“301.3”
INT DLY (GPS P2)	enter the system (receiver + antenna) P2 internal delay, ( $X_R + X_S$ ) in ns	“313.7”
CAB DLY	enter the antenna cable delay, ( $X_C$ ) in ns	“128.33”
REF DLY	enter the delay to Receiver reference, ( $X_P + X_O$ ) in ns	“34.8”
REF	identify the laboratory reference	“UTC(ORB)”

Please see Annex V, “standard hardware setup”, for more delay explanations.

Summary of “Rinex Info” field:

Field name	Description	Example
Observation File Name	enter the 4 characters IGS station code	“BIPC” (i.e. file is BIPC1680.05O)
Observation File Directory	enter the Rinex Observation data complete path name by clicking on “Browse” button	“d:\data\bipmc”
YYDOY subdirectory structure	select it if Rinex Observation data files are inside a YYDOY subdirectory structure where YY is two last digit of the year and DOY is day of year	
Navigation File Name	enter the 4 characters IGS station code	“BRDC” (i.e. file is BRDC1680.05N)
Navigation File Directory	enter the Rinex Navigation data complete path name by clicking on “Browse” button	“d:\data\brdc”
YYDOY subdirectory structure	select it if Rinex Navigation data files are inside a YYDOY subdirectory structure where YY is two last digit of the year and DOY is day of year	

Summary of “Other Info” field:

Field name	Description	Example
Laboratory Code	enter the 2 characters laboratory code (to get from the BIPM)	“BP”
Receiver Code	enter the 2 characters receiver code (your choice but must start with a number)	“01” or “0_” or “4D”
GPS time – UTC	enter the current value of [GPS time - UTC] in seconds	“14”

“Parameter” menu: (“Open” / “Save As”)

You can then either save your parameters as default or save them in a specific file.

You can retrieve a saved configuration file using the menu:

“Parameter” -> “Open” -> “File”

You can retrieve default configuration file using the menu:

“Parameter” -> “Open” -> “Default”

You can save configuration in a specific file using the menu:

“Parameter” -> “Save As” -> “File”

You can save configuration as default (launch by default at start up) using the menu:

“Parameter” -> “Save As” -> “Default”

NB: Informations from “Automatic Conversion” menu (ie FTP information or time of daily process, see below) are also saved with “Parameter” informations.

## 2. Conversion menu

### 2.1 Automatic menu

“Automatic Process” frame: (see Annex III)

Once the parameters are updated and saved, you can start the daily routine.  
Program builds daily CGGTTS format files.

At the date J, it will process data from the date J-2 (files for J-1 are necessary).  
The automation program runs the conversion code once a day at a configurable time (computer time).  
Please make sure the RINEX files are available to the software at that time.

Press the “Run” button to launch “Automatic Process”.  
Press the “Stop” button to stop “Automatic Process”.

At the end of the daily process, the status will be updated with the name of the latest CGGTTS processed file.

Summary of “Automatic Process” field:

Field name	Description	Example
CGGTTS output File Directory	enter the CGGTTS data storage complete path name by clicking on “Browse” button	“c:\data1”
Run once a day at ... UTC	enter time which you want to run conversion, the first field is for hour, and the second field is for minute	“02:05” or “23:45”

“Automatic Data Transfer to FTP server” frame:

It can automatically transfer the CGGTTS files to a FTP server after the daily automatic process.

To activate the automatic FTP transfer, choose “Enable”, before press the “Run” button.  
To deactivate the automatic FTP transfer, choose “Disable”, before press the “Run” button.

In program path “C:\Program Files\r2cggts 2.4.1\” you will also find a log file for the latest FTP transfer.  
(file name: “ftpXXYY.log” where XX is laboratory code and YY is receiver code).

Summary of “Automatic Data Transfer to FTP server” field:

Field name	Description	Example
Server	enter the IP or URL address of FTP server	62.161.69.131 (i.e. BIPM FTP server)
User Name	enter the login of FTP server	“labotai” (i.e. BIPM FTP server)
Password	enter the password of FTP server	“*****” (a)
Remote Path	enter the complete path where data will be transfer in FTP server, if not put “/”	“/” or “/data” (b)

If you want transfer CGGTTS file to BIPM FTP server with this program, please:

(a) contact BIPM to get password.

(b) put in “Remote Path” field: “/data/XXXX/links” where XXXX is the acronym of your laboratory given by BIPM.

## **2.2 Specific menu**

Once the parameters are updated and saved, you can process any old batch of data. (see Annex IV)

Update field of output File Directory by clicking on “Browse” button.

Update field of first day of year (“first DOY” field) and the corresponding year (“year” field).

Update field of last day of year (“last DOY” field) and the corresponding year (“year” field).

If you want all output data in one file, please select “All output data in 1 file”.

Press the “Run” button to launch “Specific Process”.

## Annex I

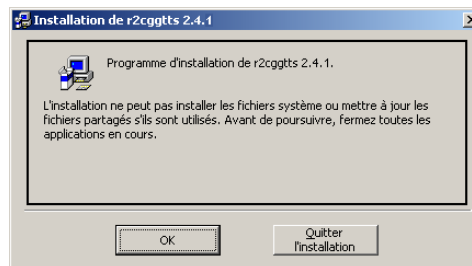
### Installation steps

Unfortunately setup installation is in French but it is a standard MICROSOFT WINDOWS setup.

Run “setup.exe”:

- Step 1:

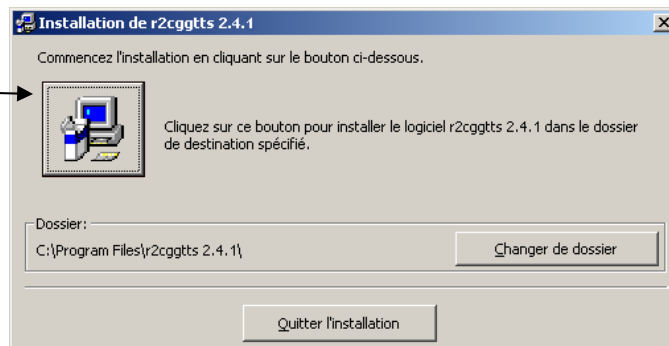
click on “OK”.



- Step 2:

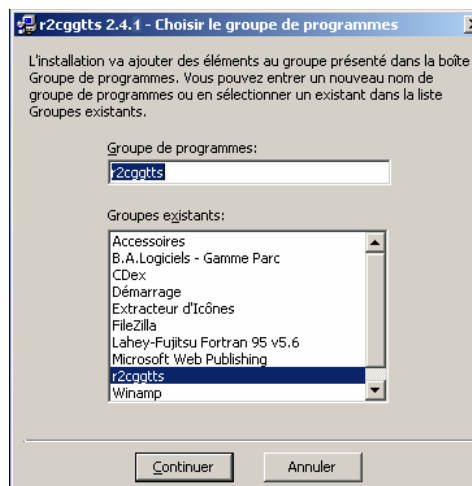
click here :

**Warning,**  
Do not change default path,  
“C:\Program Files\r2cggts 2.4.1\”.



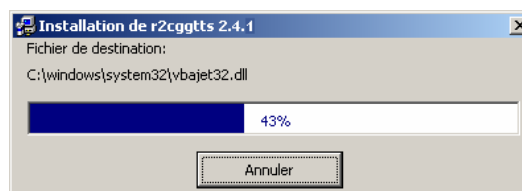
- Step 3:

click on “continuer”.



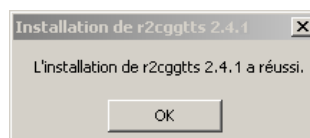
- Step 4:

Wait...



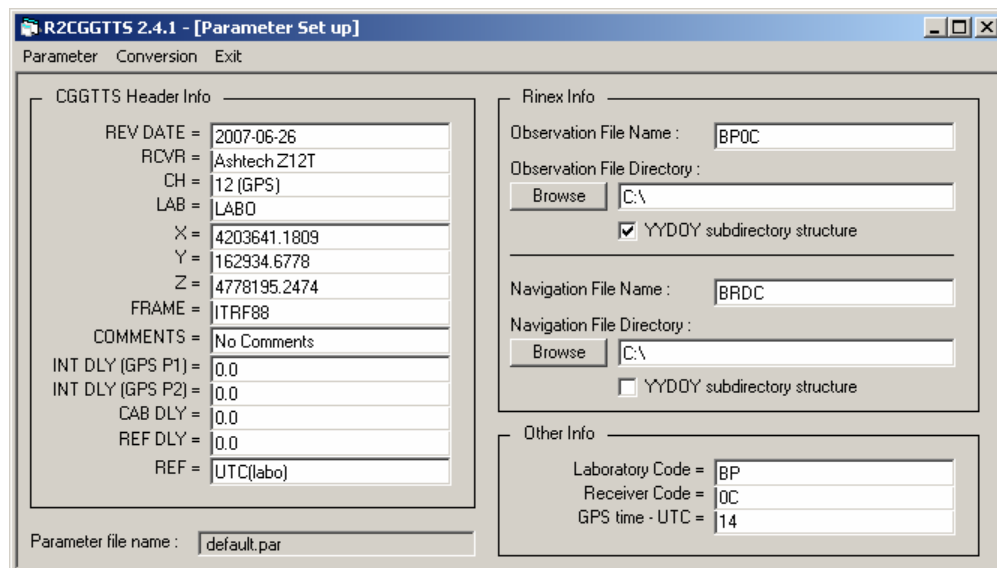
- Step 5:

click on “OK”, it is finish.



## Annex II

### Parameter set up menu



R2CGGTS 2.4.1 - [Parameter Set up]

Parameter Conversion Exit

CGGTS Header Info

REV DATE = 2007-06-26  
RCVR = Ashtech Z12T  
CH = 12 (GPS)  
LAB = LABO  
X = 4203641.1809  
Y = 162934.6778  
Z = 4778195.2474  
FRAME = ITRF88  
COMMENTS = No Comments  
INT DLY (GPS P1) = 0.0  
INT DLY (GPS P2) = 0.0  
CAB DLY = 0.0  
REF DLY = 0.0  
REF = UTC(labo)

Rinex Info

Observation File Name : BP0C  
Observation File Directory :  
Browse C:\  
☒ YYDDYY subdirectory structure

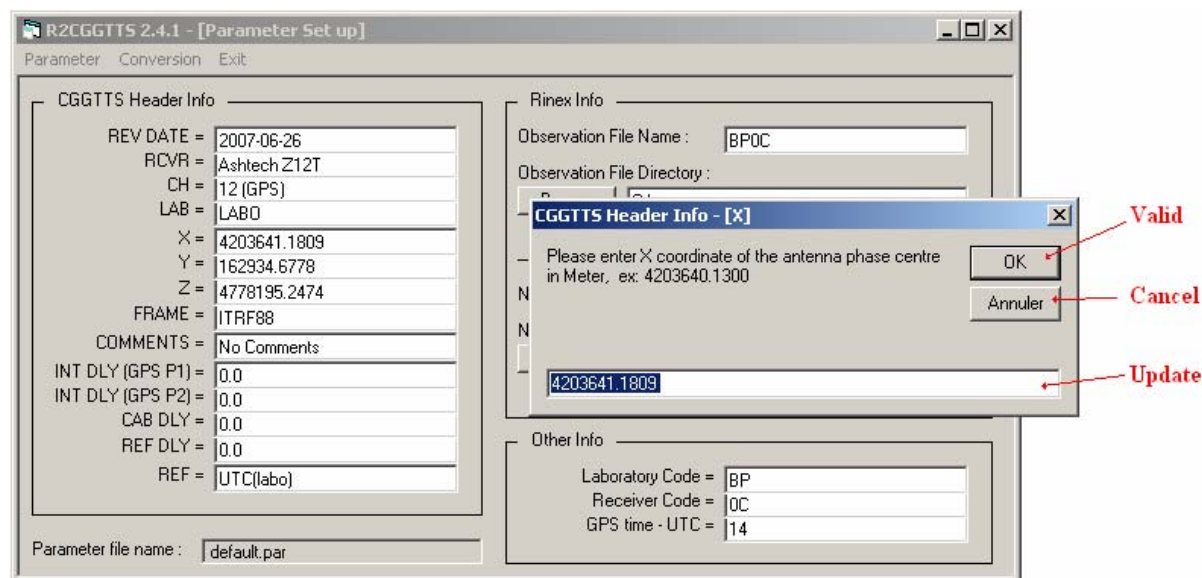
Navigation File Name : BRDC  
Navigation File Directory :  
Browse C:\  
☐ YYDDYY subdirectory structure

Other Info

Laboratory Code = BP  
Receiver Code = OC  
GPS time - UTC = 14

Parameter file name : default.par

### Example of updated field



R2CGGTS 2.4.1 - [Parameter Set up]

Parameter Conversion Exit

CGGTS Header Info

REV DATE = 2007-06-26  
RCVR = Ashtech Z12T  
CH = 12 (GPS)  
LAB = LABO  
X = 4203641.1809  
Y = 162934.6778  
Z = 4778195.2474  
FRAME = ITRF88  
COMMENTS = No Comments  
INT DLY (GPS P1) = 0.0  
INT DLY (GPS P2) = 0.0  
CAB DLY = 0.0  
REF DLY = 0.0  
REF = UTC(labo)

Rinex Info

Observation File Name : BP0C  
Observation File Directory :  
Browse C:\  
☒ YYDDYY subdirectory structure

Navigation File Name : BRDC  
Navigation File Directory :  
Browse C:\  
☐ YYDDYY subdirectory structure

Other Info

Laboratory Code = BP  
Receiver Code = OC  
GPS time - UTC = 14

Parameter file name : default.par

CGGTS Header Info - [X]

Please enter X coordinate of the antenna phase centre in Meter, ex: 4203640.1300

OK  
Annuler

4203641.1809

Valid  
Cancel  
Update



### Annex III

#### Automatic conversion menu

R2CGGTS 2.4.1 - [Automatic Conversion]

Parameter Conversion Exit

Automatic Data Transfer to FTP server

Disable

Server : 62.161.69.131

User Name : labotai

Password : xxxxxxx

Remote Path : /data

Status :

Automatic Process

CGGTS Output File Directory :

Browse C:\

Run once a day at 02 : 00 UTC

Run Stop

Status :

### Annex IV

#### Specific conversion menu

R2CGGTS 2.4.1 - [Specific Conversion]

Parameter Conversion Exit

Info

After updating all info in parameter set up menu, you can converse a specific period of consecutive rinex data here.

Minimum 2 consecutive days of rinex data are necessary.

The last DOY is not processed if rinex data of [last DOY + 1] don't exist.

Specific Process

CGGTS Output File Directory :

Browse C:\

first DOY : year :

last DOY : year :

Run ☐ All output data in 1 file

Status :

## Annex V

### Standard hardware set up

#### Delays Definitions:

$X_P$  = Delay of the 1PPS-in to the laboratory reference

$X_O$  = Delay of the “internal reference” to the 1PPS-in

$X_R$  = receiver internal delay, measured from the “internal reference”

$X_C$  = antenna cable delay

$X_S$  = antenna delay

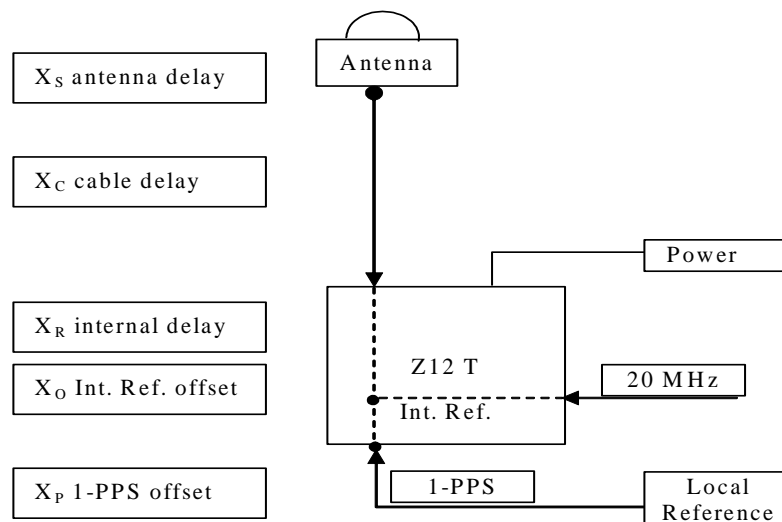


Figure: Definition of the different delays used in a typical set up.

The precise definition the “internal reference”, to which the GPS measurements are referred, is given in (Petit et al., Progresses in the calibration of geodetic like GPS receivers for accurate time comparisons, *Proc. 15<sup>th</sup> EFTF*, 2001, 164-166.).

The values of  $X_P$ ,  $X_O$ ,  $X_C$  are to be measured at each new set up. The values of  $X_R$  and  $X_S$  are the calibration results.