FT001M12C

Freqtime

Time and Frequency Remote Calibration Terminal

FT-001

User's Guide

Ver.2.02

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Freqtime Corporation Ltd.

Time and Frequency Remote Calibration Terminal

FT-001

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1. Before use

⚠WARNING

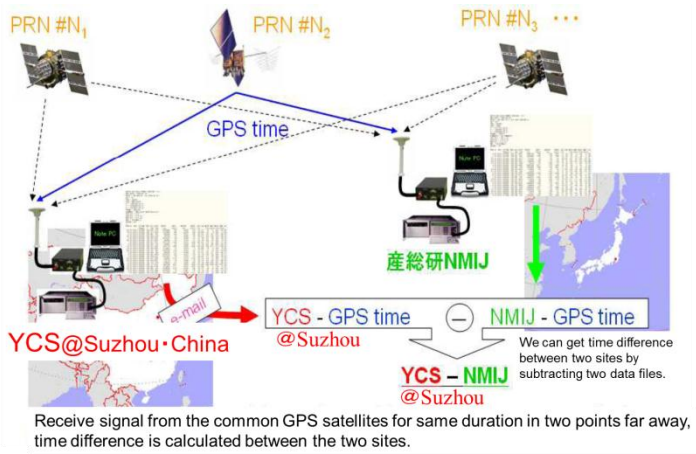
The following precautions are intended to avoid danger of the user's body and life, and damage and deterioration of the product. It may cause a serious accident or malfunction, be sure to follow them.

- Make sure the current and voltage of AC power source apply the rated of product. Use only the supplied AC power cord, or it may cause the risk of electric shock or fire.
- To avoid electrical shock and to protect the product, ground GND terminal of AC power cord.
- Do not input the reference signal which exceeds the specification of the product. It may cause malfunction.
- Do not input other signal or DC voltage to outputs. It may cause malfunction.
- Use the product within the range of operating temperature and humidity, or it may cause the risk of electric shock or fire.
- Do not use the product in a place where inflammable gas, explosive gas, or steam are generated/stored and near them. It may cause the risk of fire.
- Do not use the product in a place where corrosive gas is generated or is filled. It may cause serious damage to the product.
- Do not put any metals, inflammable substances, or water in the vent of the product. It may cause the risk of electric shock, fire, or serious damage to the product.
- When smoke, fire, and odor emits from the product, or any abnormalities are noticed, stop using the product immediately and unplug the power cord. Make sure that there is no risk of fire around the product, and then contact us or the distributor.
- Freqtime Corporation shall not be liable for any other use which is not mentioned herein, and shall not be liable for technical or editorial errors or omissions contained herein.
- The product is intended for use in Japan. When used in a foreign country, be sure to contact the distributor.

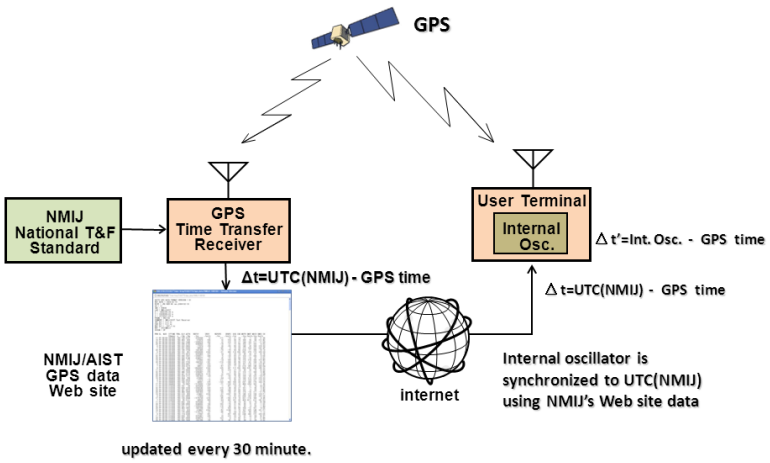
2. Introduction

FT-001S, with GPS common-view method, provides highly stable time and frequency transfer which is synchronized to the National time and frequency standard (UTC(NMIJ)) when connecting to the internet. It is also available for a GPS-disciplined time and frequency oscillator without connecting to the Internet.

The terminal sends data to AIST or authorized companies automatically to have the calibration certificates issued via internet.
If the internet is not available, the terminal accumulates common-view data internally. You send the data (by a FDD or CD, etc.) to AIST or authorized companies keeping your devices working. You do not need to transport your devices for calibration.



Remote calibration: Common-view method



System of remote calibration and synchronization to the National standard

3. Specifications and Recommended operating conditions

Specifications of FT-001S, FT-001S/H

		Specification
GPS receiver unit	Receiving signal	L1(1574.42 MHz), C/A code
	Number of receiving channels	50 channels
	Sensitivity	-160 dBm
Reference signal	Input (for time transfer mode)	1 pps or 10 MHz
	Output (for Internal oscillator mode)	10 MHz/1 port +13 dBm± 1 dBm @ 50 Ω
		1 pps/1 port
Time and frequency Transfer function	Data exchange format	CGGTTS format (1 s and 15 s output interval also available)
	Synchronization function	NMI(J)-DO or GPS-DO
	Data transmission protocol	HTTP protocol
Internal Oscillator	Standard version	TCXO SSB Phase noise < -80 dBc@10 Hz, < -110 dBc@1 kHz Allan deviation < 2×10^{-10}@1 s
	Option #01	OCXO SSB Phase noise <-105 dBc@10 Hz, < -135 dBc@1 kHz Allan deviation < 5×10^{-11}@1 s
	Option #02	Double oven type OCXO SSB Phase noise < -115 dBc@10 Hz, < -135 dBc@1 kHz Allan deviation < 2×10^{-12}@1 s
	Option #03	BVA type OCXO SSB Phase noise < -137 dBc@10 Hz, -145 dBc@1 kHz Allan deviation < 3×10^{-13}@1 - 30 s
	Option #04	Rubidium Oscillator SSB Phase noise < -130 dBc@10 Hz, < -150 dBc@1 kHz Allan deviation < 2×10^{-11}@1 s, 2×10^{-12}@ 100 s
	Option #05	CSAC(Chip Scale Atomic Clock) SSB Phase noise < -78 dBc@10 Hz, < -128 dBc@1 kHz Allan deviation < 1.5×10^{-10}@1 s, 1.5×10^{-11}@ 100 s
Data communication Interface	Standard type	Ethernet (10/100 BASE-T) and USB
	Option #11	Blue tooth (Under development)
	Option #12	Zigbee (Under development)
	Option #13	RS232C
NTP function	Option #31	Precision <1 μs ; Maximum access <50
Distribution amplifier	Option #41	10 MHz 8 ports
	Option #42	10 MHz 4 ports
	Option #43	1 pps 8 ports
	Option #44	1 pps 4 ports
Receiving antenna	Option #51	Small size antenna with 5 m cable
	Option #52	Out side mount type
Time display and time code	Option #61	Yyyymmdd hhmmdd (Under development)
	Option #62	IRIG-B (Under development)
Synchronization to UTC(NMIJ) *2		Uncertainty < 50 ns (Preliminary value)

Frequency transfer *2	< 1×10^{-13} @ 1 day
Dimension	19 inches EIA rack 2U size (88(H) ×430(W)×350(D) mm)
Power supply	100-240 Vac, < 50 W
Operational temperature	0～+50 ℃

Specifications of FT-001A

		Specification
GPS receiver unit	Receiving signal	L1(1574.42 MHz), C/A code
	Number of receiving channels	50 channels
	Sensitivity	-160 dBm
Reference signal	Input (for time transfer mode)	1 pps or 10 MHz
	Output (for Internal oscillator mode)	10 MHz/1 port +13 dBm± 1 dBm @ 50 Ω
		1 pps/1 port
Time and frequency Transfer function	Data exchange format	CGGTTS format (1 s and 15 s output interval also available)
	Synchronization function	NMI(J)-DO or GPS-DO
	Data transmission protocol	HTTP protocol
Internal Oscillator	Standard version	TCXO SSB Phase noise < -80 dBc@10 Hz, < -110 dBc@1 kHz Allan deviation < 2×10^{-10}@1 s
	Option #01	OCXO SSB Phase noise <-105 dBc@10 Hz, < -135 dBc@1 kHz Allan deviation < 5×10^{-11}@1 s
	Option #05	CSAC(Chip Scale Atomic Clock) SSB Phase noise < -78 dBc@10 Hz, < -128 dBc@1 kHz Allan deviation < 1.5×10^{-10}@1 s, 1.5×10^{-11}@ 100 s
Data communication Interface	Standard type	Ethernet (10/100 BASE-T) and USB
	Option #11	
	Option #12	
	Option #13	RS232C
Receiving antenna	Option #51	Small size antenna with 5 m cable
	Option #52	Out side mount type
Synchronization to UTC(NMIJ) *2		Uncertainty < 50 ns (Preliminary value)
Frequency transfer *2		< 1×10^{-13} @ 1 day
Dimension		< 40(H) ×95(W)×140(D) mm）
Power supply		5 Vdc, < 3 W (AC adapter or USB bus power can be used)
Operational temperature and humidity		0～+50 ℃ and 20～70 %

*1: Rated value indicates the value in the recommended operating conditions.

*2: Data transmission depends on the user's network environment, contact us for more information.

*3: The performance of time synchronization and frequency comparison depend on the status of GPS reception.

Specifications subject to change without notice.

Recommended operating conditions

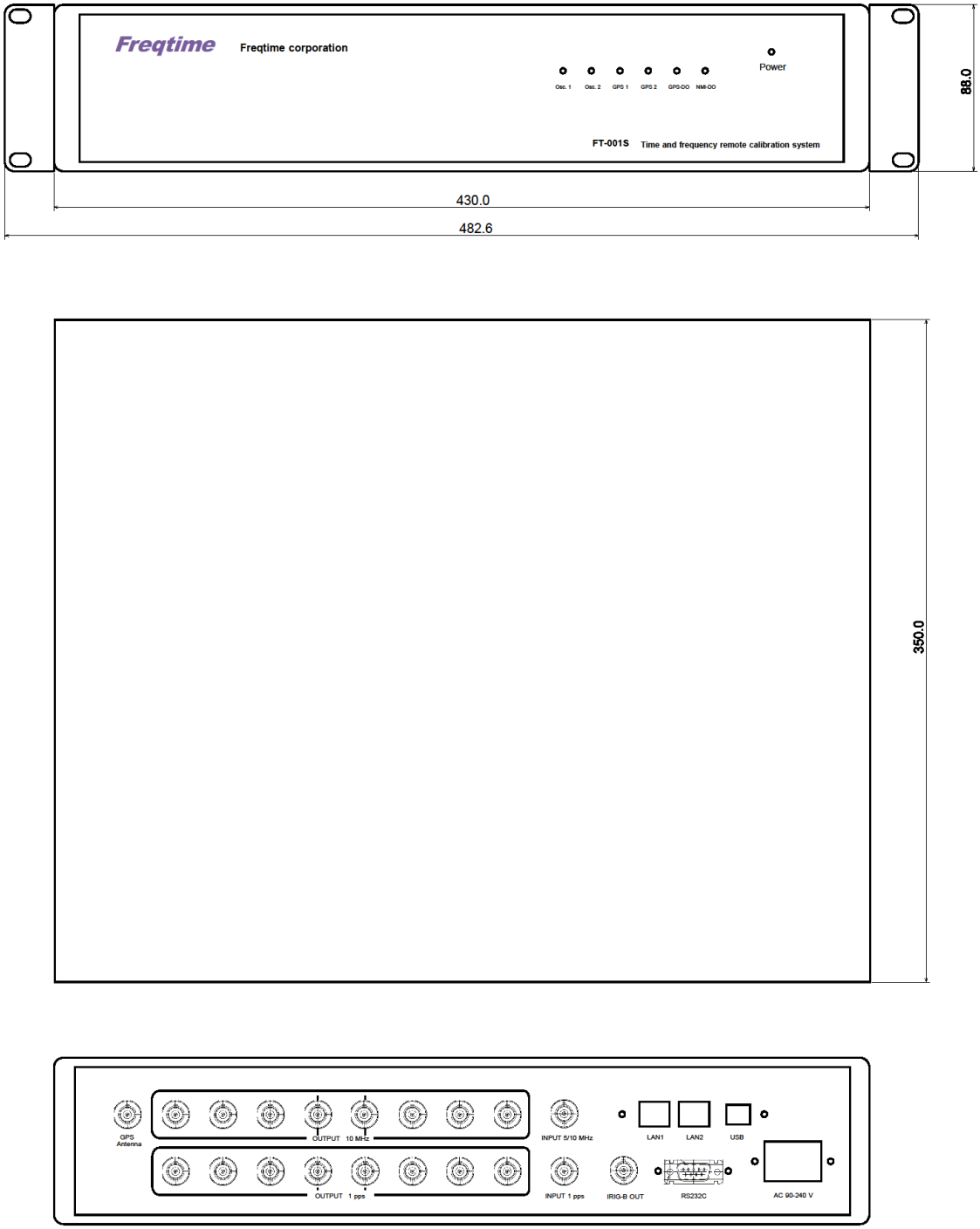
GPS receiving environment	Receiver frequency: 1575.42 MHz ±1.023MHz Antenna LNA gain: More than 25dB Cable loss: Less than 6dB Enable to receive signals from more than 6 GPS satellites at all times
Operating temperatures	15℃ to 35℃ Temperature variation should be within 0.5℃/min

Included Items

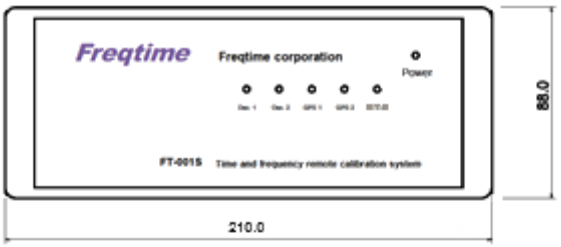
One AC Power Cable	2-pin (FT-001S, FT-001S/H), or 5V 1.2A Switching Power Supply Adapter (FT-001A)
One USB Cable	USB(A)-USB(B) Type
Three Jumper-Pins	2-pin type (Two for spare)
One CD	Includes Control Software (Host_USB_Term_EN_TXT.exe) , Device Driver for Windows 32bit machine (myusb_2011.dll, MYUSB_2011.inf, MYUSB_2011.sys) , Installer program for IP address setting(setup_di_x86x64cd_4.3.0.5.exe) , and User's guide (Japanese).

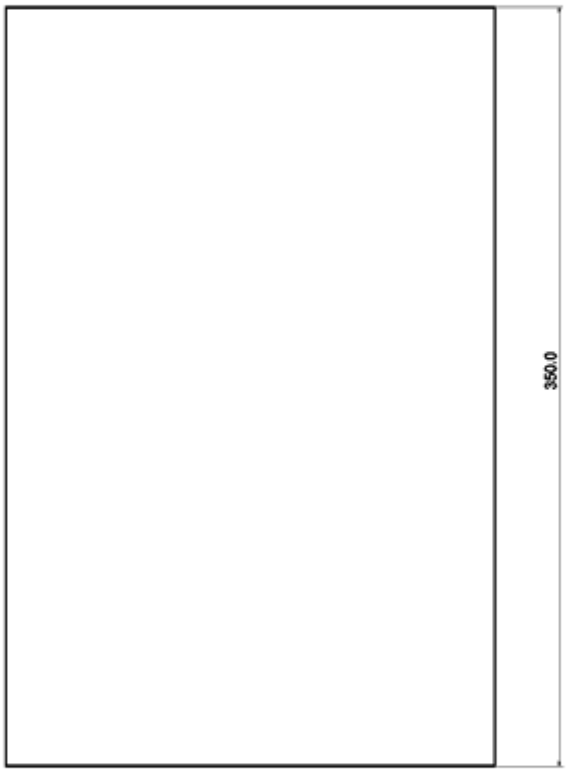
4. Appearance

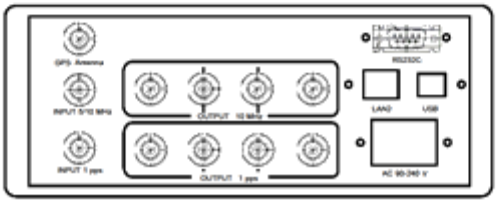
The terminal is designed for sub-rack structure complied with EIA 19-inch rack.



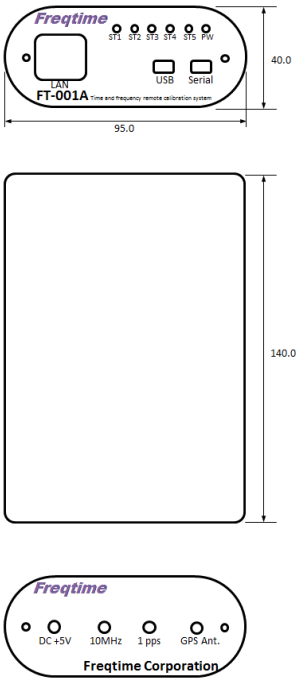
FT-001S Outside drawing







FT-001S/H Half size version Outside drawing



FT-001A Adapter Type Outside drawing

LAN connector pin assignment

1	TX(+) Output
2	TX(-) Output
3	RX(+) Input
4	
5	
6	RX(-) Input
7	
8	

RJ-45 network connector

Serial port connector pin assignment

1	NC	6	NC
2	TXD Output	7	NC
3	RXD Input	8	NC
4	NC	9	NC
5	GND		

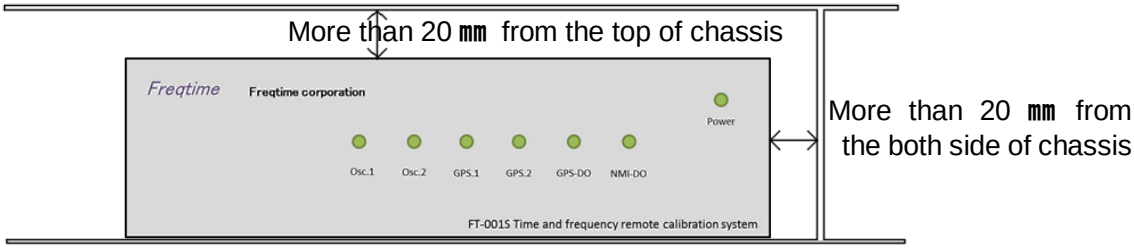
D-Sub 9 pin (female)

*The serial ports of this terminal are not applied to the communication with flow control.

5. Notification for Settings

5.1. Product Mount

This product has a high temperature heated oscillator inside of the chassis. Mount this product with space for exhaust heat both side and top.



5.2. Mount GPS antenna and Connect

GPS antenna is needed to use this terminal. For operating normally, this terminal always should be received at least 4 satellites. It is strongly recommended that antenna should be mounted on the roof in order to receive many satellites, at least 6 to 10 constantly.

Connect the GPS antenna to the TNC-type “Antenna” connector at rear panel of the terminal.

This terminal can supply DC power to LNA of the GPS antenna. When you use extra antenna and supply power by using Bias Tee, “Antenna” input connector of this terminal should be connected to the DC cut port of the Bias Tee.

⚠ Do not input the reference signal which exceeds the specification of the product.

5.3. Network Connection

To use this terminal in NMIJ-DO mode, Internet connection should be needed. Connect “LAN” port of the rear panel to it and establish connection to NMIJ server. For more details, see ”10. Initial Settings by using Controller Program” .

5.4. USB Connection

The setting of this terminal and/or data logging is made via USB port or optional serial port on the rear panel. For more details, see ”9. Installing the USB driver and Controller Program（for Win32bitmachine only）”.

5.5. Power-on

This terminal doesn’t have any power switch to prevent the power-off from miss-operation while it’s working. Connect AC cable to the terminal and it starts to work.

5.6. Initial Setting

Information about running mode of this terminal and how to set are described in chapter 10 ”Initial Settings by using Controller Program” of this document, in detail.

6. Quick start

Things to prepare

PC (32-bit Windows)

USB cable (supplied)

Power cord (FT-001S, FT-001S/H), (supplied)

or 5V 1.2A Switching Power Supply Adapter (FT-001A) (supplied)

Control software “FT-USB_Term”

1. Install control software “FT-USB_Term” in the PC beforehand.

(How to install FT-USB_Term, see “ 9. Configuration with USB port ”.)

2. Plug the power cord into the terminal, and then turn on the power.

3. Connect the PC and the terminal with the USB cable to let the terminal detect the PC.

4. Start up FT-USB_Term.

5. Click Connect button.

At first, initialize the terminal for data acquisition.

6. Set up “Server Settings”.

・To set NMIJ-DO mode, enter the referring URL to the text box of “GET Address” and press the “Set” buton.

・To upload the calibrated data automatically to NMIJ, enter the URL issued from NMI to the text box of “GET Address” and press the “Set” buton.

・To access the Internet via a proxy, enter proxy name, user account, etc… and press “Set” button. After that, press “Enable” button of the text box of “Use Proxy Server”. When you do not use a proxy server, you can leave this field blank.

7. Set up “Discipline Mode Settings”.

・To start in NMI-DO mode, click NMI-DO.
・To start in GPS-DO mode, click GPS-DO.
・If you do not select either, the terminal will select GPS-DO mode automatically.

8. Set up “Position Mode Settings”.

▪When you know the antenna coordinates, enter the values of coordinates at Fix mode, and then click Set.

▪When you do not know the antenna coordinates, select Survey-In mode.

You can set the time for calculating the coordinates and accuracy of the coordinates. When the terminal achieves either of time or accuracy, they will be fixed and the terminal will be set to Fix mode automatically.

However, if the values you set are too small, or the coordinates do not converge during the time for calculating the coordinates, please note that the terminal will accept the optimum coordinates obtained during the searching time, and will start to measure with them.

9. Set up “Data settings”.

▪Input the values of internal delay, cable delay and reference delay.

▪To send the data for calibration to NMI automatically, click Start at Auto Data Sending.

10. Set up “Saving the settings”.

▪To save the settings to the internal SD card of the terminal, click Save Settings. The terminal will start with the previous settings from the next you turn on the power.

The terminal outputs data format complied with CGGTTS Format in every second. Although you can monitor the data immediately, the 1-second data is not saved in the terminal.

If you need to store the 1-second data, check Log at Data logging, and then the data will be saved in PC by the control software. 1-second data will be saved in C: drive as a file named “Receive.txt”.

For more details on how to use the control software, see chapter 10.

7. Operation Modes

The terminal has the following operating modes. Select the mode before operation.

7.1. Time Comparison Mode

Time Comparison Mode is consisted of two modes, internal sync mode and external sync mode. Internal sync mode can be further classified into two modes; NMI-DO mode and GPS-DO mode.

NMI-DO mode

This mode lets the internal oscillator synchronize to NMI standard by downloading CGGTTS data from NMI via the Internet.
For example, if you set to download CGGTTS data from AIST/NMIJ, the terminal executes phase synchronization to UTC(NMIJ). To operate the terminal in this mode, internet connection and various settings are required.

GPS-DO mode

This mode lets the internal oscillator synchronize to GPS system clock. Any particular settings are not required to operate the terminal in this mode. The terminal will be set to this mode from NMI-DO mode automatically when the terminal is not connected to the Internet for a while. To operate the terminal in this mode, connect a GPS antenna, and turn on the power of the terminal.

Time comparison mode by the external oscillator

This mode lets the external oscillator execute time comparison by inputting signals to the terminal. To operate the terminal in this mode, replace the jumper pins on built-in circuit board. For more information, please contact to us (info@freqtime.co.jp).

7.2. Coordinates Mode

The synchronization control of the reference signal using GPS, the coordinates of the receiver antenna will be an important factor.
The terminal has three modes, NAV Mode, FIX Mode, and Survey-in Mode.

① **NAV Mode**

The terminal adopts the coordinates which are calculated with GPS signals. You do not need to measure the position of antenna, or any settings on the software. However, this mode is not suitable for the purpose of time comparison as it will be much uncertainty.

The terminal will be operated in NAV mode when you do not set Coordinates Mode.

② **FIX Mode**

When the position of antenna has already been measured with surveying instruments or DGPS, etc., you can execute time comparison precisely. Enter the each coordinate values (WGS84, ECEF (X, Y, Z)). Within 1 meter of the coordinates is recommended for the time transfer, or your result of time comparison will be degraded.

③ **Survey-In Mode (S-In)**

You can set the time for calculating the coordinates and accuracy of the coordinate values. If the terminal achieves either condition, they will be fixed and the terminal will be set to Fix mode automatically.

However, if the values you set are too small, or the coordinates do not converge during the time for calculating the coordinates, please note that the terminal will accept the optimum coordinates obtained during the searching time, and will start to measure with them.

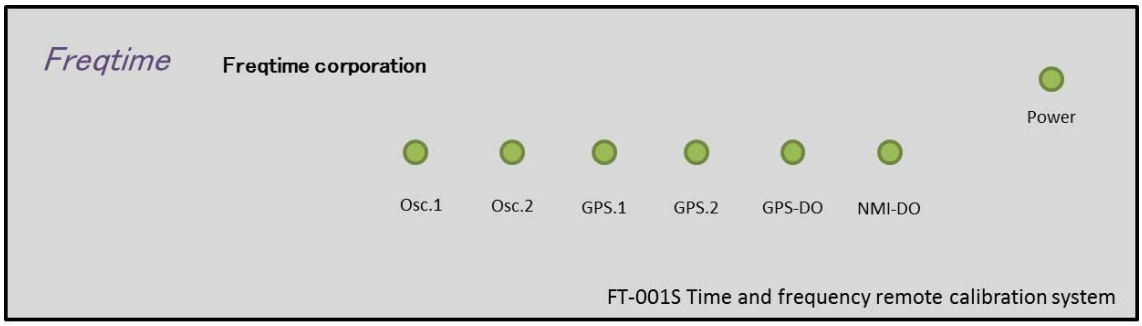
If you do not know the position of antenna precisely, enter the coordinate values measured in this mode.

Caution for Coordinates mode

This terminal operates under the NAV Mode, but the time transfer result has no meaning in that mode, because the coordinates are not fixed in CGGTTS format. Usually, for the time transfer, the Survey-in mode is recommended to be used.

8. Front panel LED

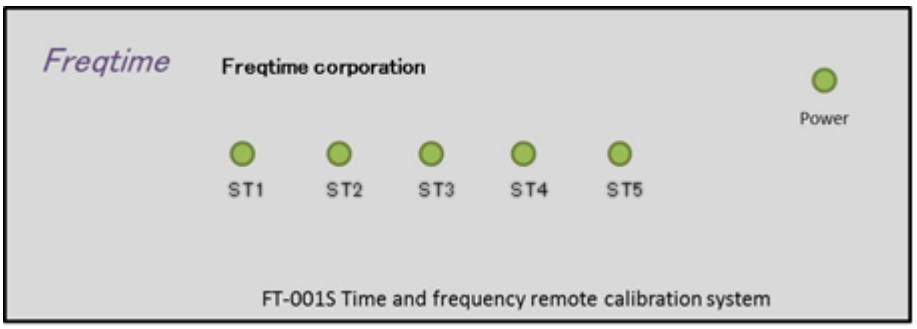
Front panel（FT-001S）



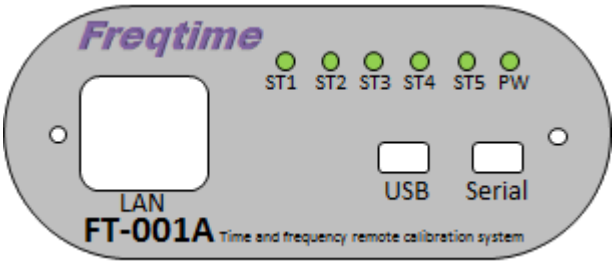
Meaning of LED status（FT-001S）

LED	Definition
Power	Turns on when the power is on.
NMI-DO	NMI sync. Mode status Turns on when the terminal is; ・set to NMI-DO mode ・receiving GPS signal ・downloading the CGGTTS data from the internet
GPS-DO	GPS sync. Mode status Turns on when the terminal is set to GPS-DO mode.
GPS.2	GPS receiver status 2 Turns on when the terminal finishes calculating the position of antenna.
GPS.1	GPS receiver status 1 Turns on when the terminal receives signals from adequate number of GPS for time comparison.
OSC.2	External oscillator input status Turns on when the terminal detects external input signal.
OSC.1	Sync. status Turns on when the terminal executes the synchronization normally.

Front panle（FT-001S/H）



Front panle（FT-001A）



Meaning of LED status（FT-001S/H, FT-001A）

LED	Definition
Power	Turns on when the power is on.
ST1	External oscillator input status Turns on when the terminal detects external input signal.
ST2	GPS receiver status 1 Turns on when the terminal is ready for time comparison.
ST3	GPS receiver status 2 Turns on when the terminal finishes calculating the position of antenna.
ST4	GPS sync. Mode status Turns on when the terminal is set to GPS-DO mode.
ST5	NMI sync. Mode status Turns on when the terminal is; ・set to NMI-DO mode ・receiving GPS signal downloading the CGGTTS data from the internet

9. Configuration with USB port

You can operate the terminal, confirm the status of configuration, and retrieve log information by connecting a PC installed the control software to a USB port on the rear of the terminal.

9.1 Installing the USB driver and FT-USB_Term sortware

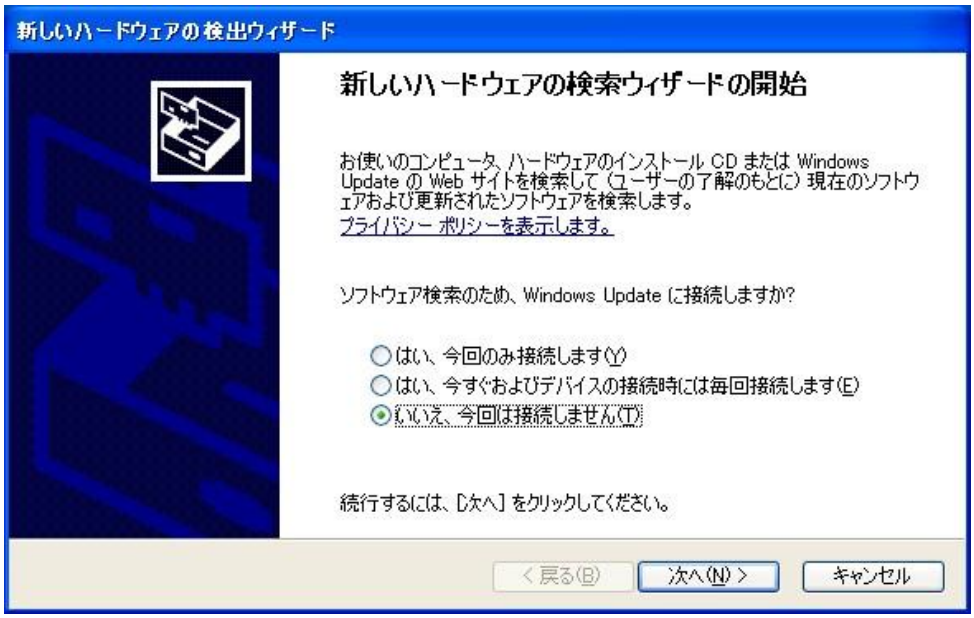
9.1.1 System requirement

A 32-bit PC/AT compatible with the following OS should be required to operate the control software. (As of April 2012)

OS	Windows XP (32bit)	Windows Vista (32bit)	Windows 7 (32bit)
CPU	PentiumⅢ1GHz or more	Core Duo 1.6 GHz or more	Core Duo 1.6 GHz or more
Memory	More than 256 MB	More than 1.0 GB	More than 1.0 GB
HDD	More than 100 MB free space on a single boot configuration	More than 500 MB free space on a single boot configuration	More than 500 MB free space on a single boot configuration
Display	XGA(1024×768) or more		

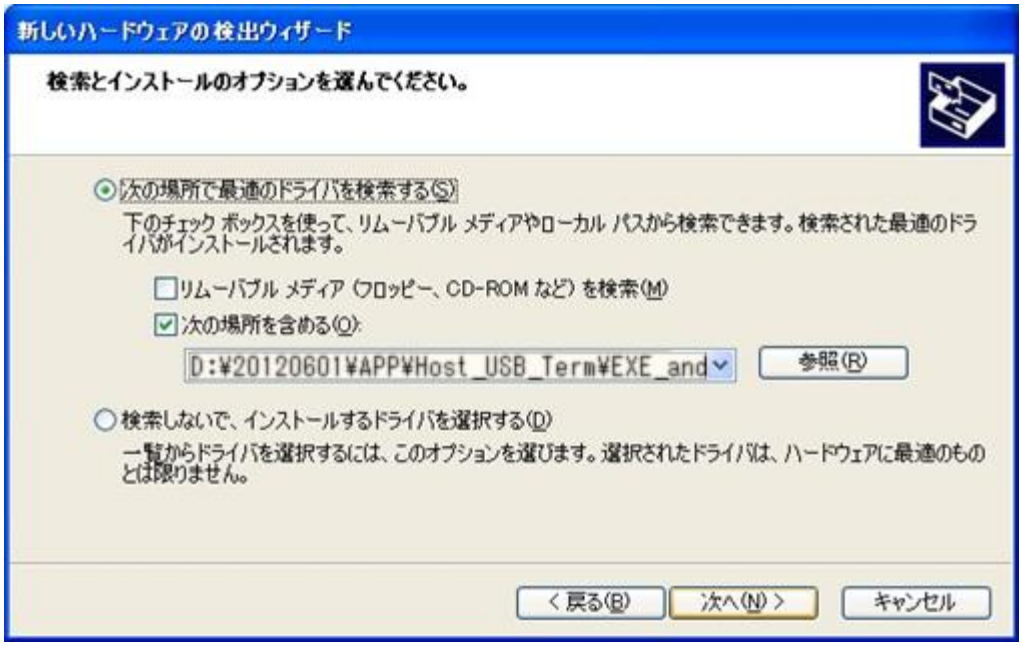
9.1.2. Installing the USB driver

Connect the supplied USB cable to the terminal and the PC. The screen for installing the USB driver appears.



Select ”No, not this time” here, and then click **Next**.

Select [install from a list or specific location [Advance], and then click **Next**.

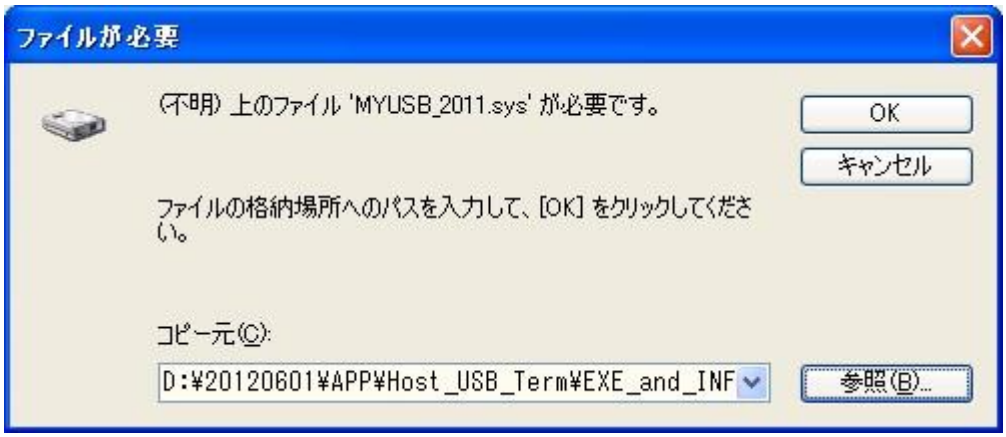


Click [include this location in the seach], and then select the path where the USB driver file is by clicking Browse. The USB driver file is stored in the directory of [root directory(8digits)] - [APP] - [EXE_and_INF] - [HOST] in the included CD

Ex. D:/20120601/APP/EXE_and_INF/Host

When you complete the search, click Next to see the list of drivers.

Click **Next**.



The screen for selecting a necessary file appears. Click **Browse** to select the same path, and then click **OK**.

Click **Finish** to complete the installation.

Now you are ready to operate the terminal via USB.

9.1.3 Starting up the control software "Host_USB_Term_EN_TXT.exe"

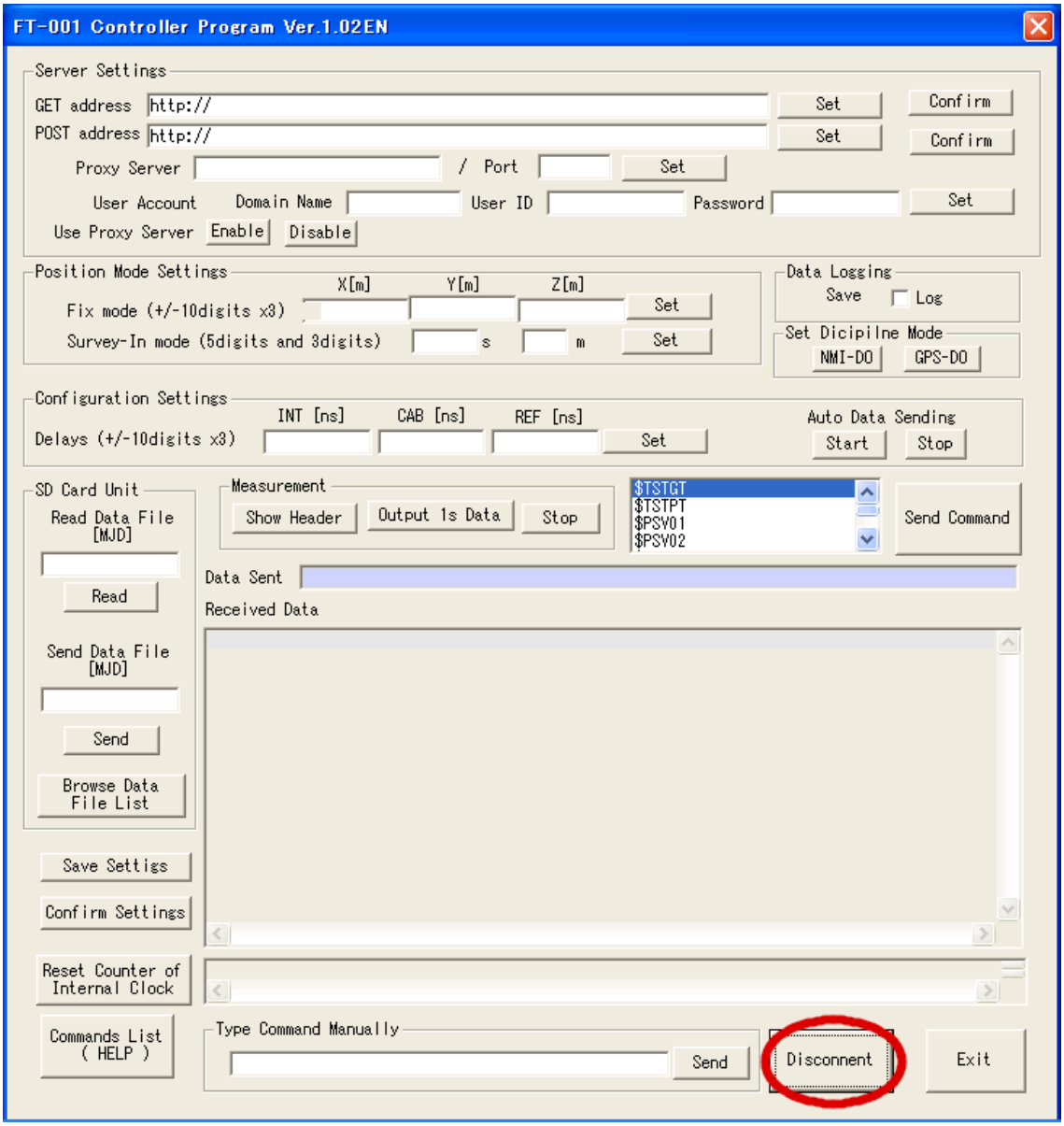
The control software is stored in the directory of [root directory (8digits)] - [APP] - [Host_USB_Term] - [EXE_and_INF] in the included CD

Ex. D:/20120601/APP/Host_USB_Term/EXE_and_INF/Host_USB_Term_EN_TXT.exe

This control software does not need to be installed to your system, because it can work single software unit. Copy it to your specified directory for your convenience.
The software will easily star up by double clicking.

10. Initialization of the terminal with FT-USB_Term

Start up FT-USB_Term. When you click **Connect**, the button changes to **Disconnect**, and then the connection between the terminal and FT-USB_Term is set up.



10.0.1 Factory settings

Each setting at the time of shipment is as follows.

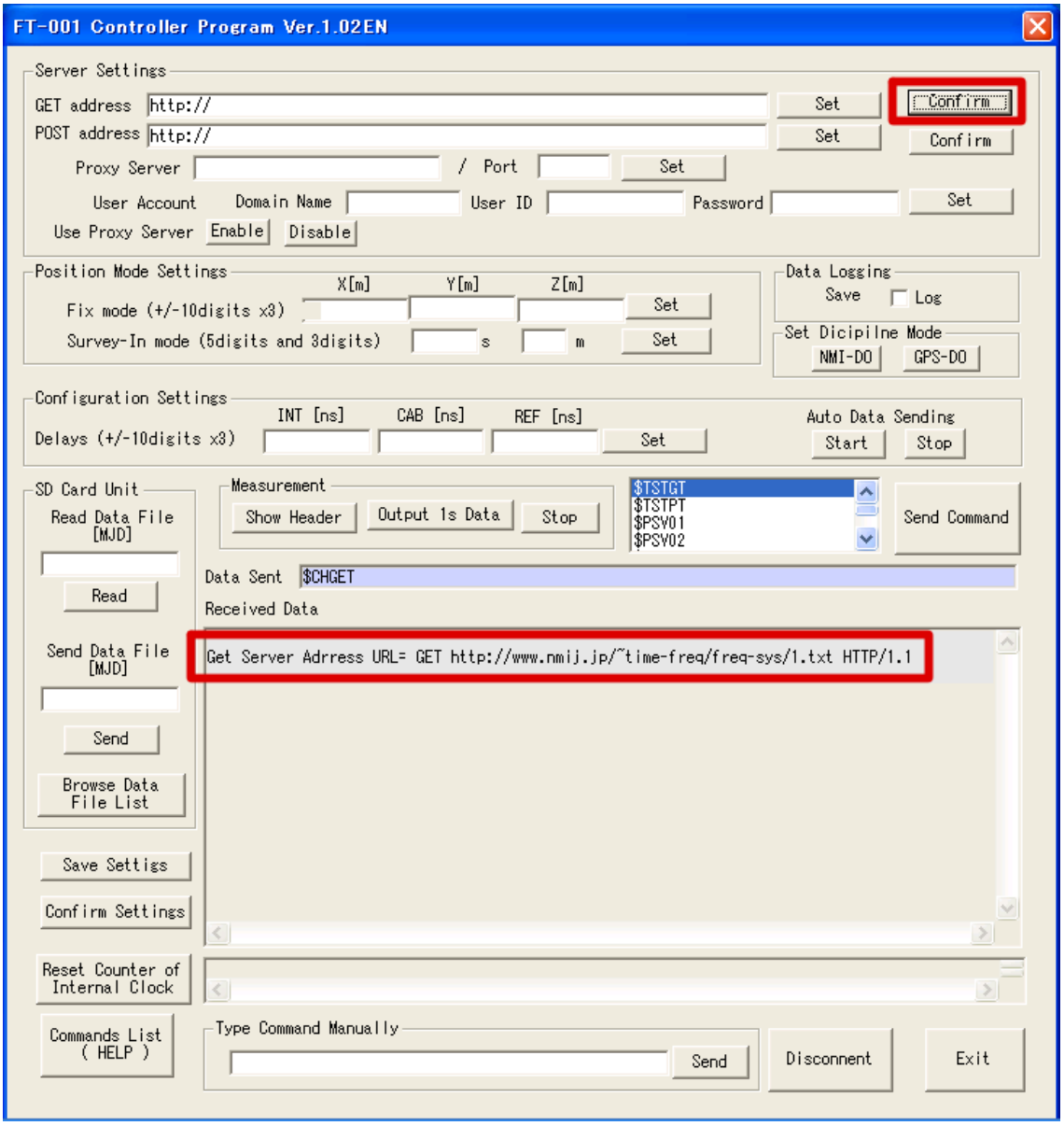
Item	Factory setting
The referring URL for time comparison	http://www.nmij.jp/~time-freq/freq-sys/1.txt
The uploading URL of the calibrated data	http://www.freqtime.co.jp/reg.cgi
Proxy server	Proxyserver
Proxy user	ABCDRFG
ECEF coordinates	X=0.0 m,Y=0.0 m,Z=0.0 m
Position mode	Survey-in mode
Survey-in searching time	600 s
Survey-in standard deviation	10 m
IntDelay	0.0 ns
CabDelay	0.0 ns
RefDelay	0.0 ns
Threshold mask of multi-pass	1000 ns
Sync mode	GPS-DO mode
Threshold mask of Elevation	10 degree
Proxy mode	OFF

10.1 Server Data Settings

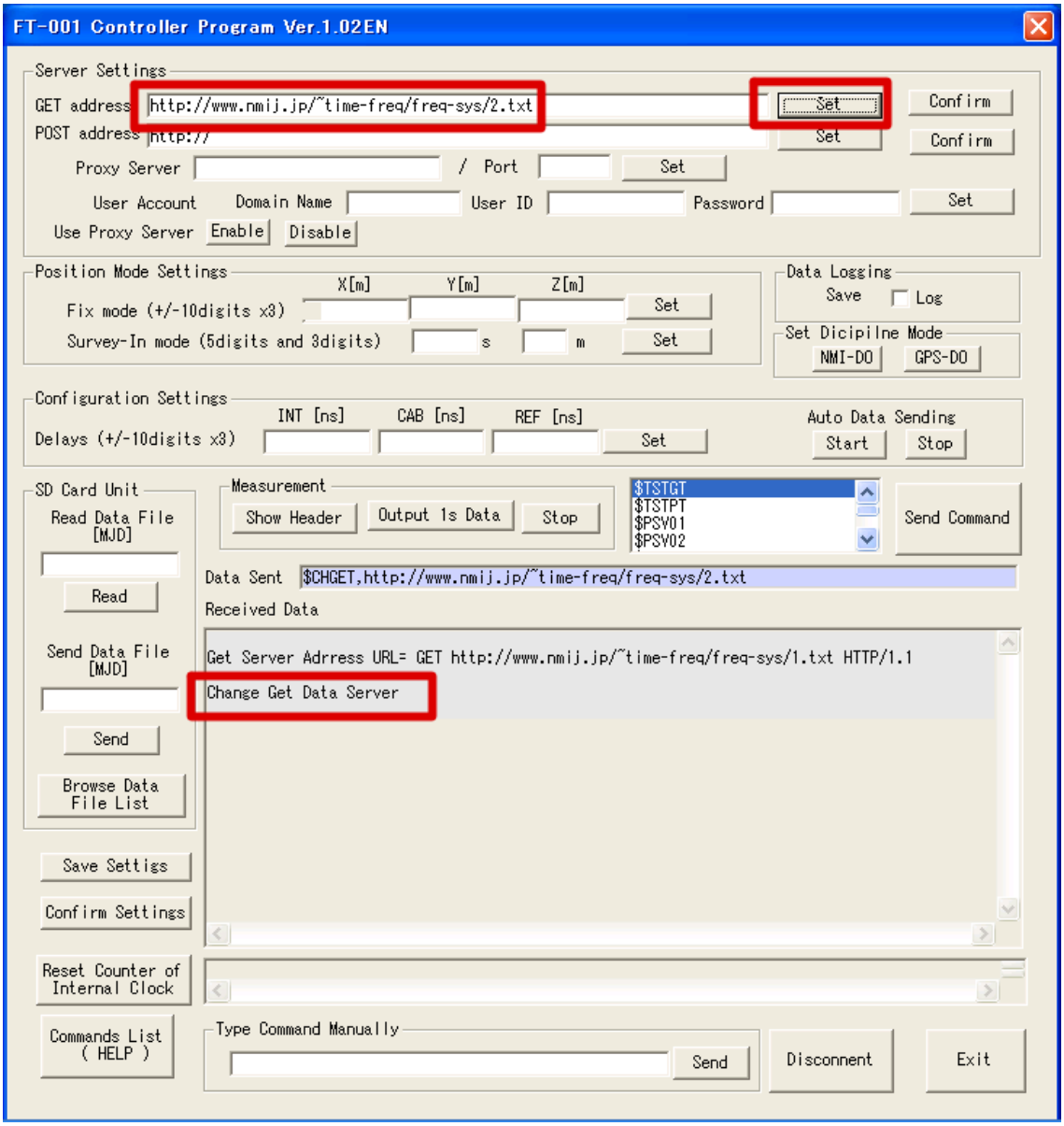
10.1.1 How to change URL for referring data of time comparison

You change URL which refers data for time comparison when you operate the terminal in NMI-DO Mode.
*This is not necessary when you operate the terminal in GPS-DO Mode.

Click **Confirm** on the right of GET address field while the connection has been set up, and then you can confirm the referring URL that is currently configured.



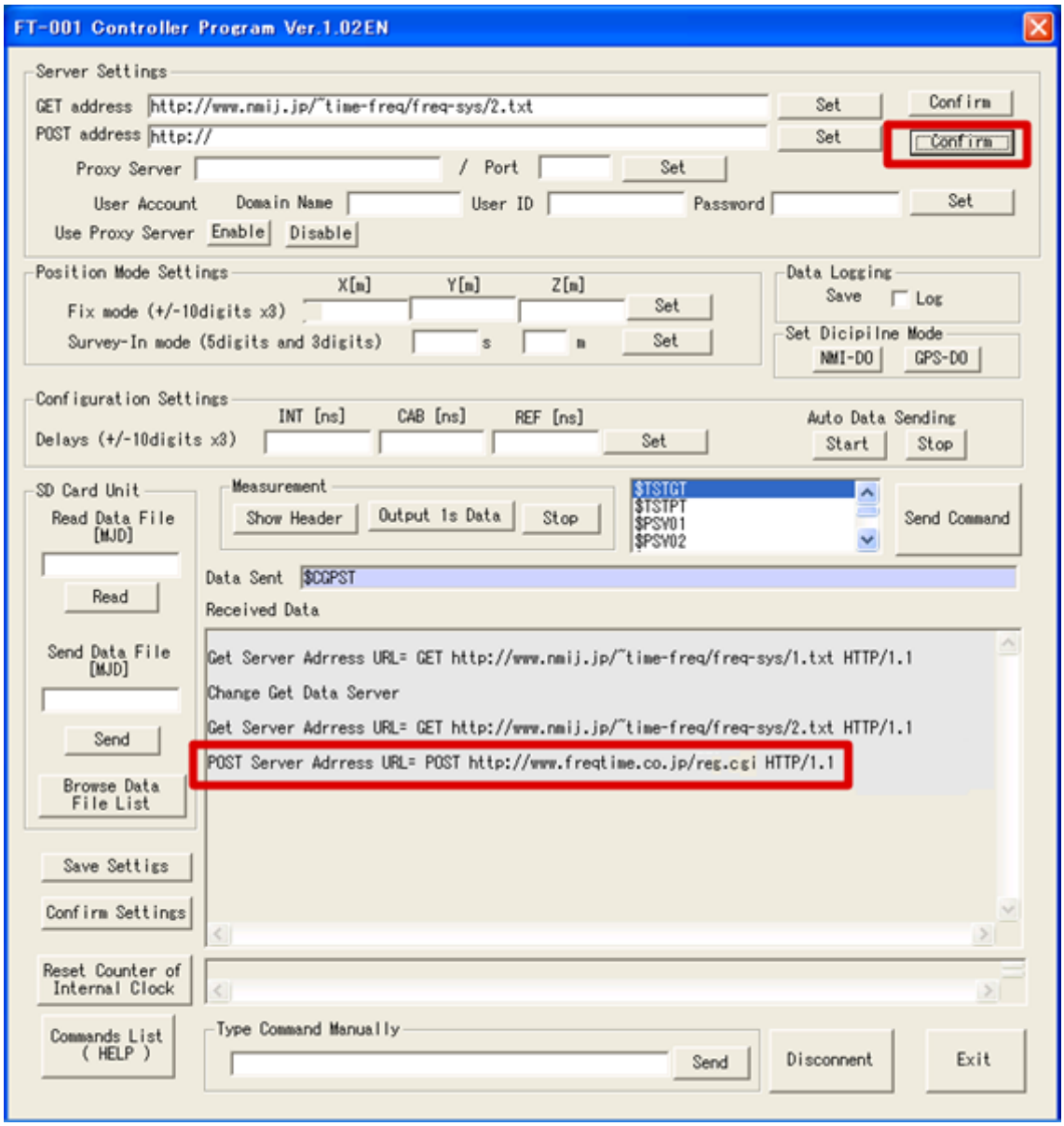
To change the referring URL, enter another URL to GET address field, and then click **Set**. The terminal will return the message of 'Change Get Data Server'.



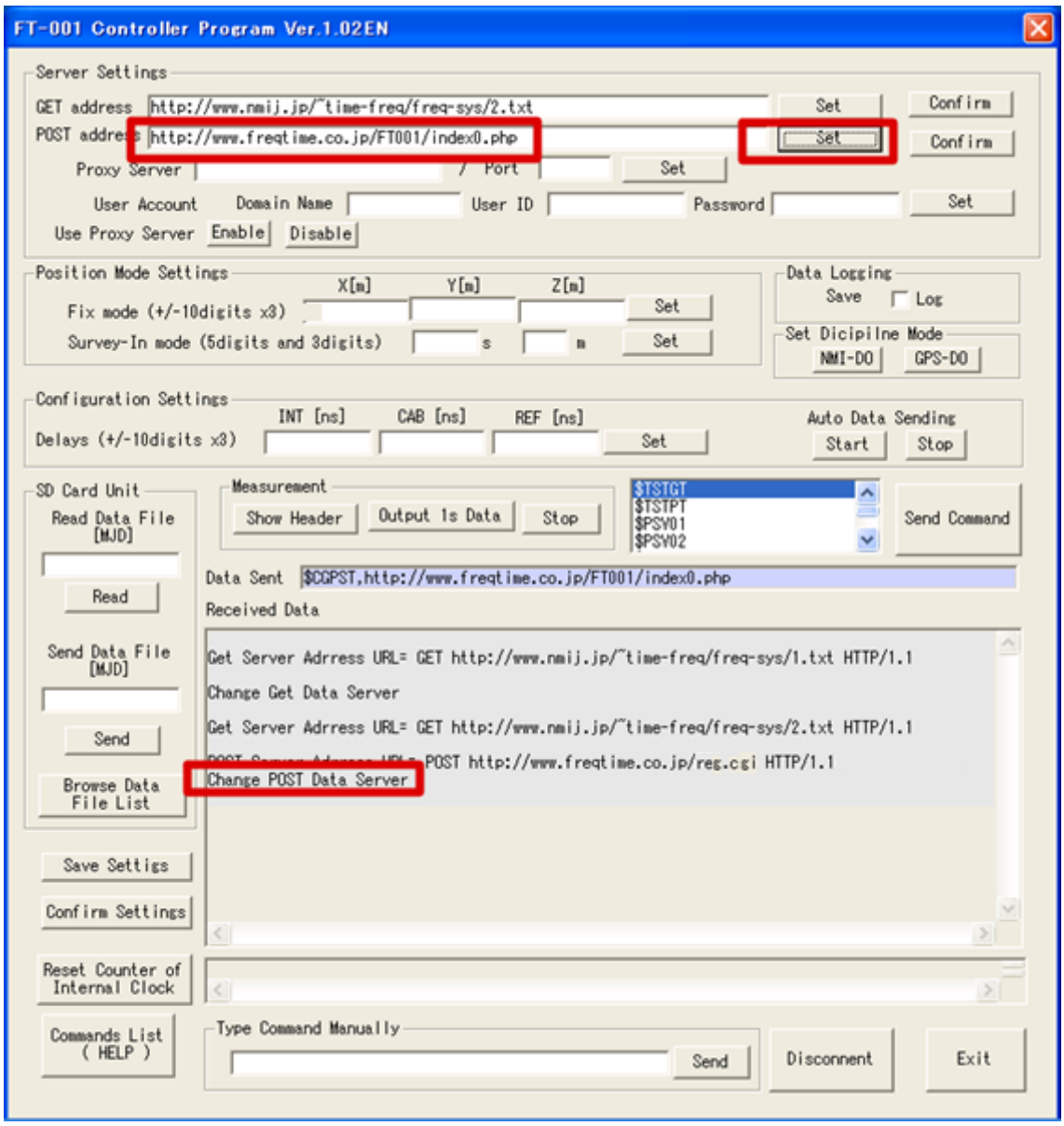
10.1.2 How to change URL for uploading the calibrated data

You change URL which uploads the calibrated data when you ask an accredited calibration laboratory to issue the calibration certificate.
*This is not necessary when the calibration certificate is not required.

Click **Confirm** on the right of POST address field while the connection is set up, and then you can confirm the uploading URL that is currently configured.



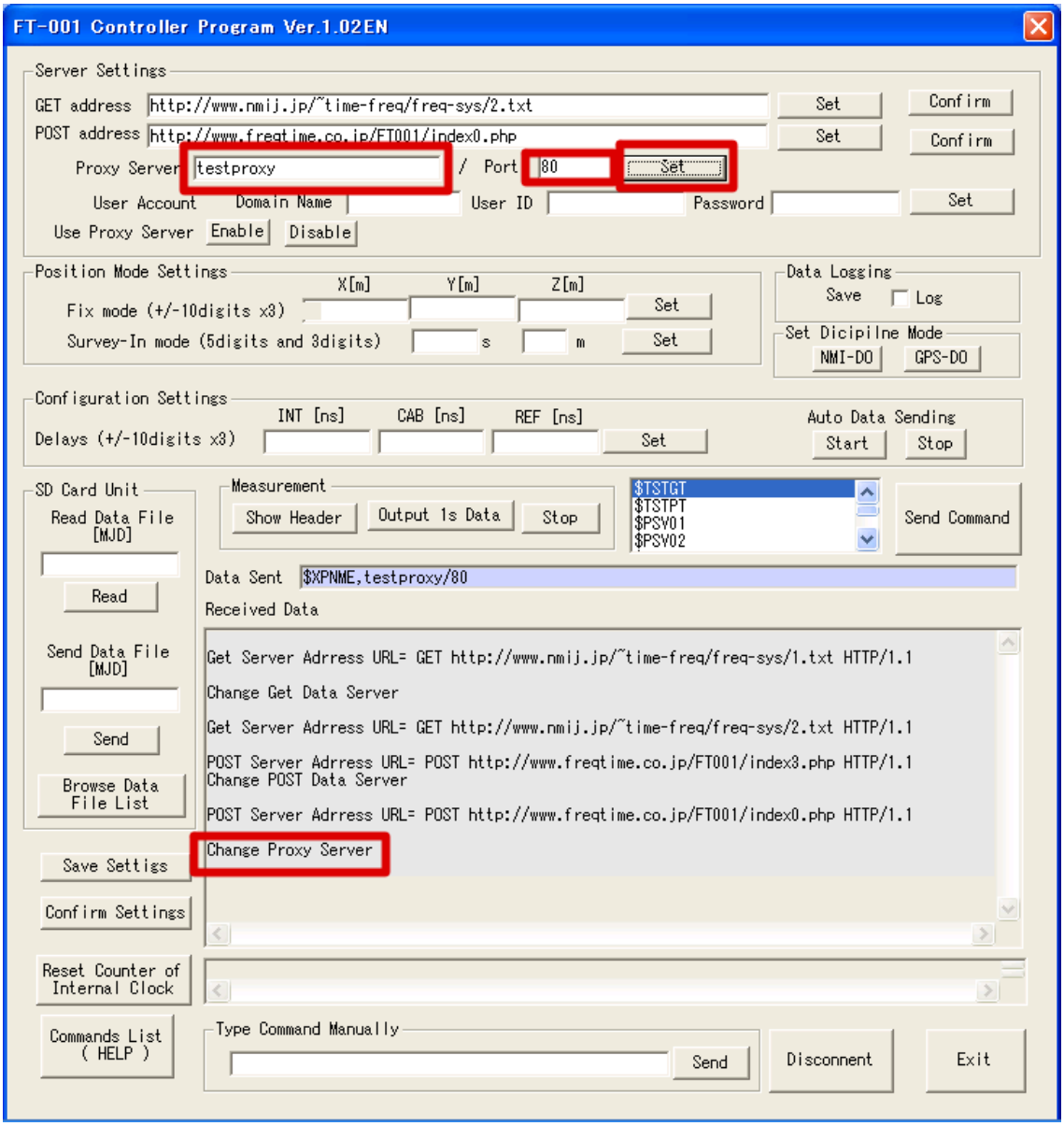
To change the uploading URL, enter another URL to POST address field, and then click **Set**. The terminal will return the message of 'Change POST Data Server'.



10.1.3. How to change the connecting proxy and port

*This is not necessary when you do not connect to the network via a proxy.

Enter the proxy name on Proxy Server field and the port number on Port field, and then click **Set**. The terminal will return the message of 'Change Proxy Server'.

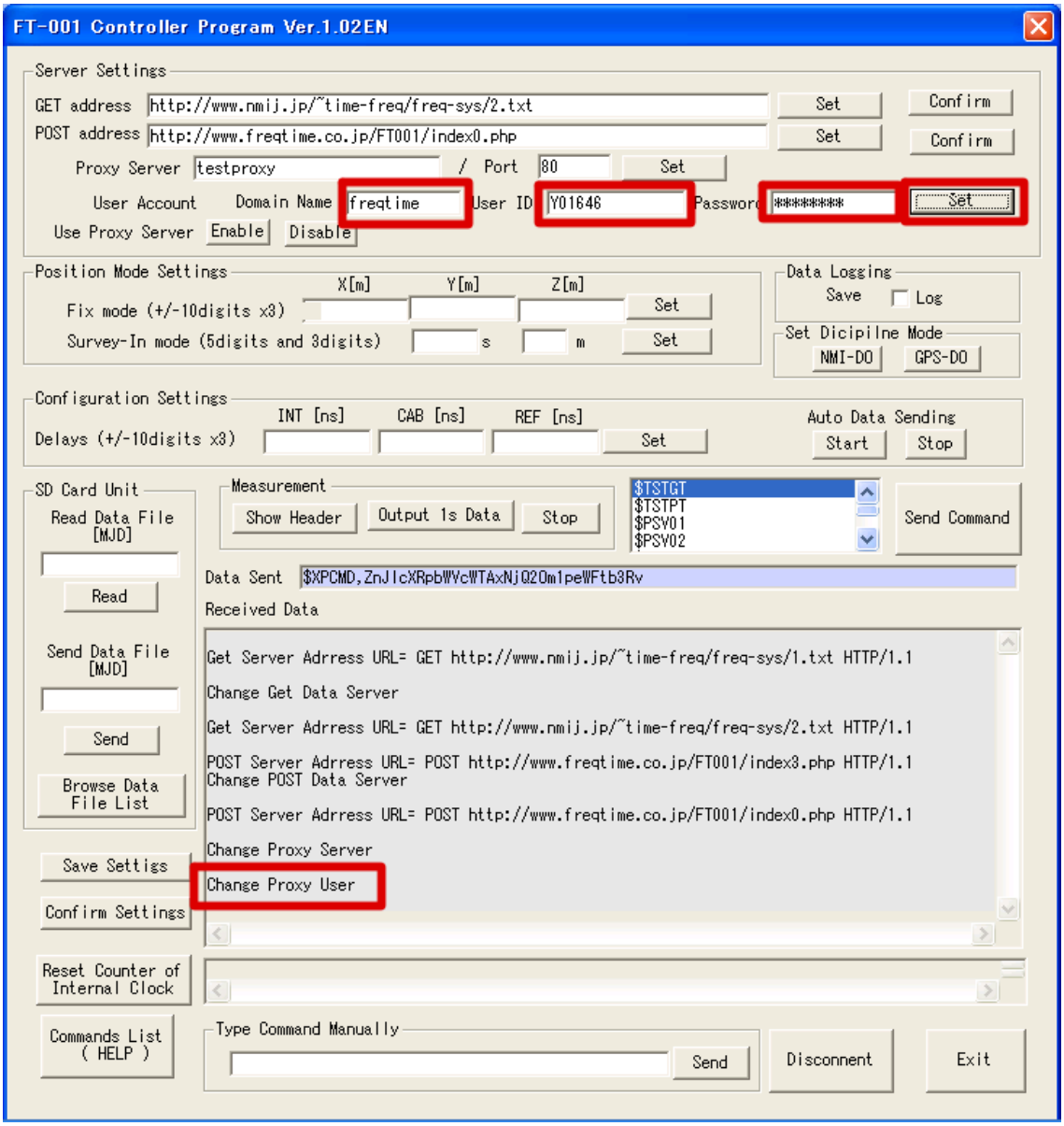


10.1.4. How to change proxy user

* This is not necessary when you do not connect to the network via a proxy.

This terminal is compatible with Basic Authentication to the proxy server.
When you need Basic Authentication, set up a user account. You can enter each field of ‘Domain name’, ‘User ID’, and ‘Password’. If a domain name is not necessary, you can leave this field blank.

Enter the appropriate user account, and then click **Set**. The terminal will return the message of ‘Change Proxy User’.

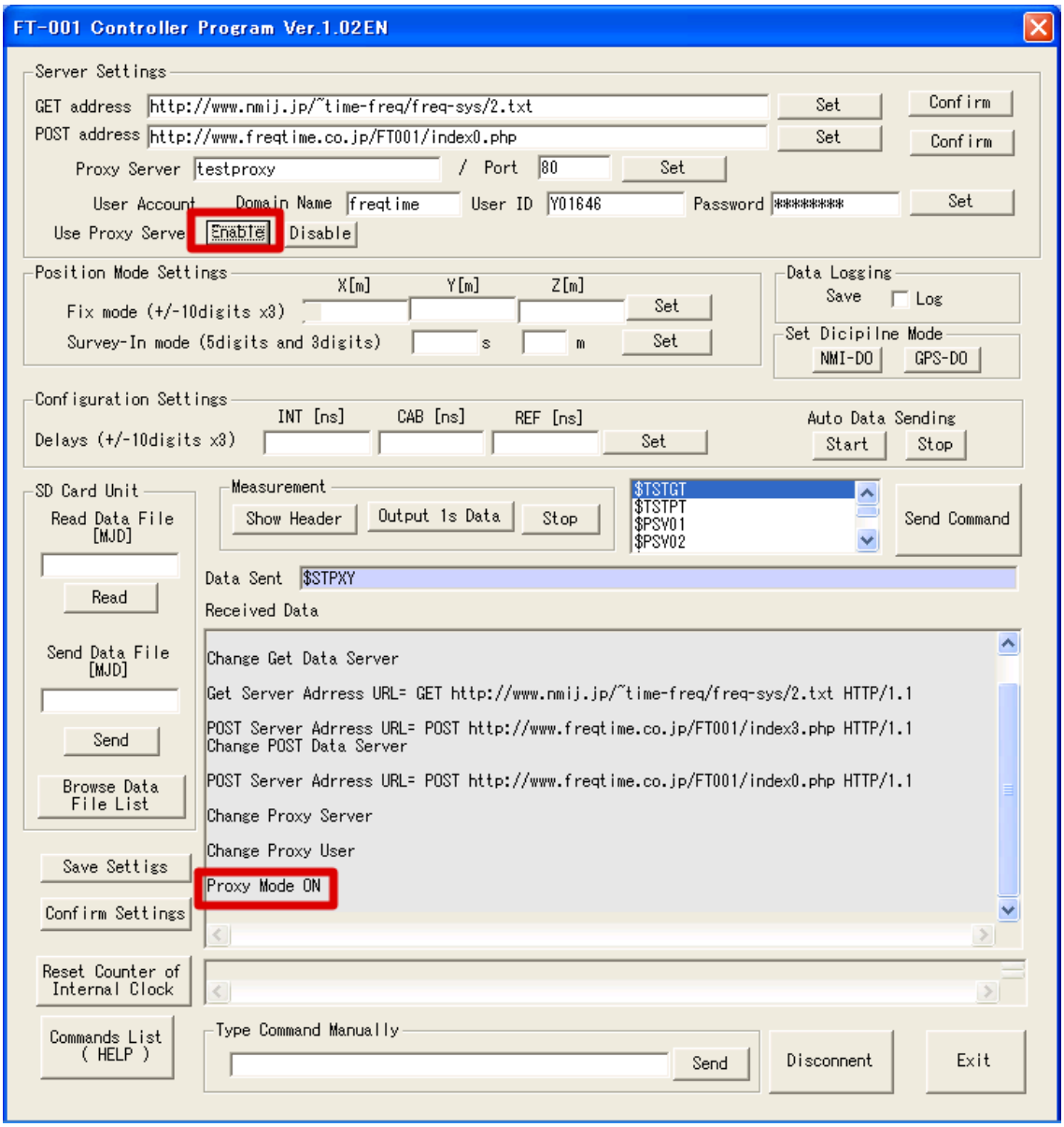


10.1.5. How to use a proxy server

* This is not necessary when you do not connect to the network via a proxy.

*** Unless you click Enable, the terminal does not connect to a proxy server.**

You can select to use a proxy or not.
Click **Enable** at Use Proxy Server.
The terminal will return the message of 'Proxy Mode On' and connect to a proxy server.
To stop connecting to a proxy server, click **Disable**.



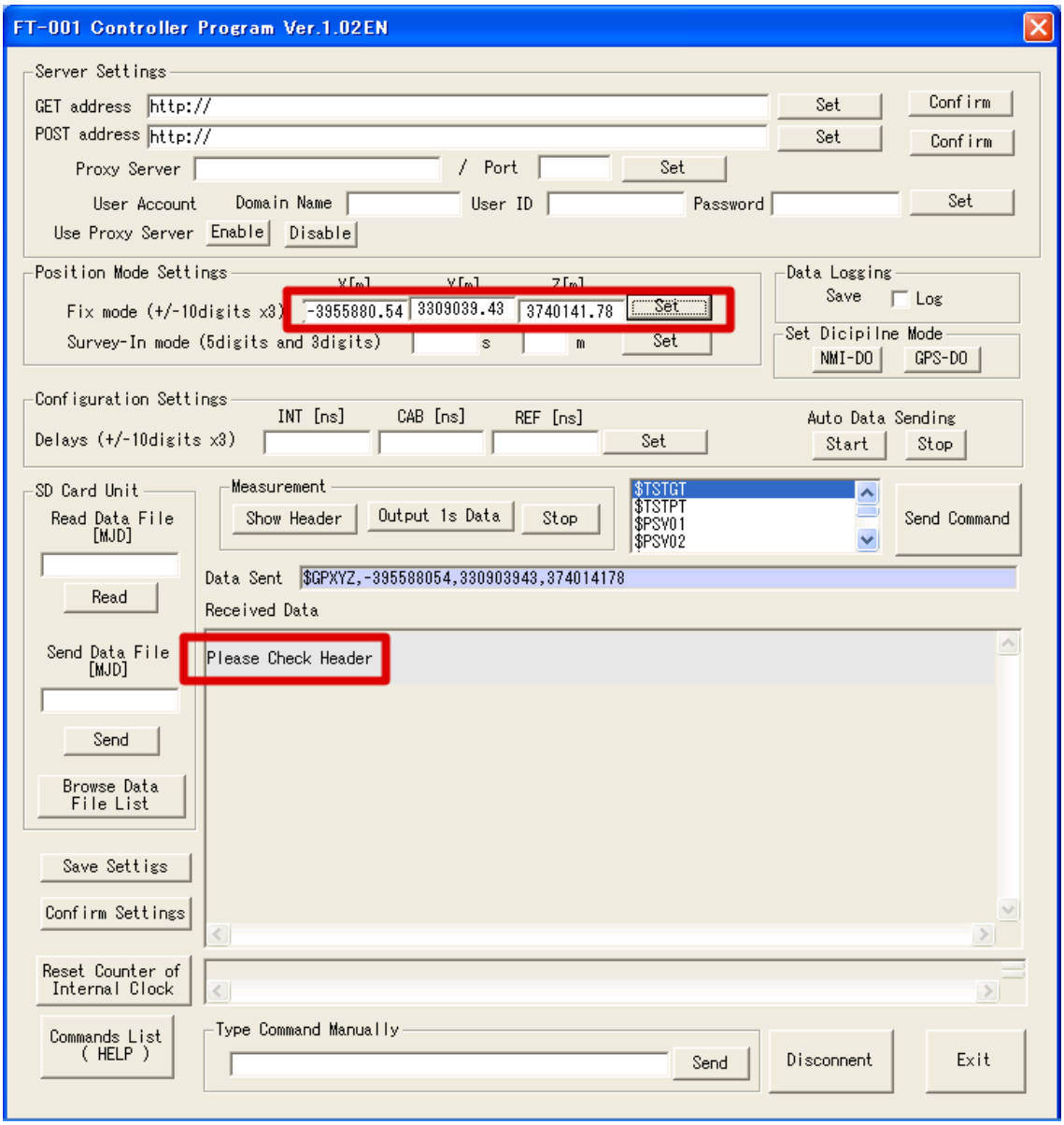
10.2 Position Mode Settings

10.2.1. Fix mode

You enter the values of fixed coordinates to operate the terminal in Fix mode.
Enter the values of coordinates which is complied with ECEF Coordinate System on each XYZ field at Fix mode.

For example: “-3955880.54” “3309039.43” “3740141.78” [m]

Click **Set**. The terminal will return the message of ‘Please Check Header’.



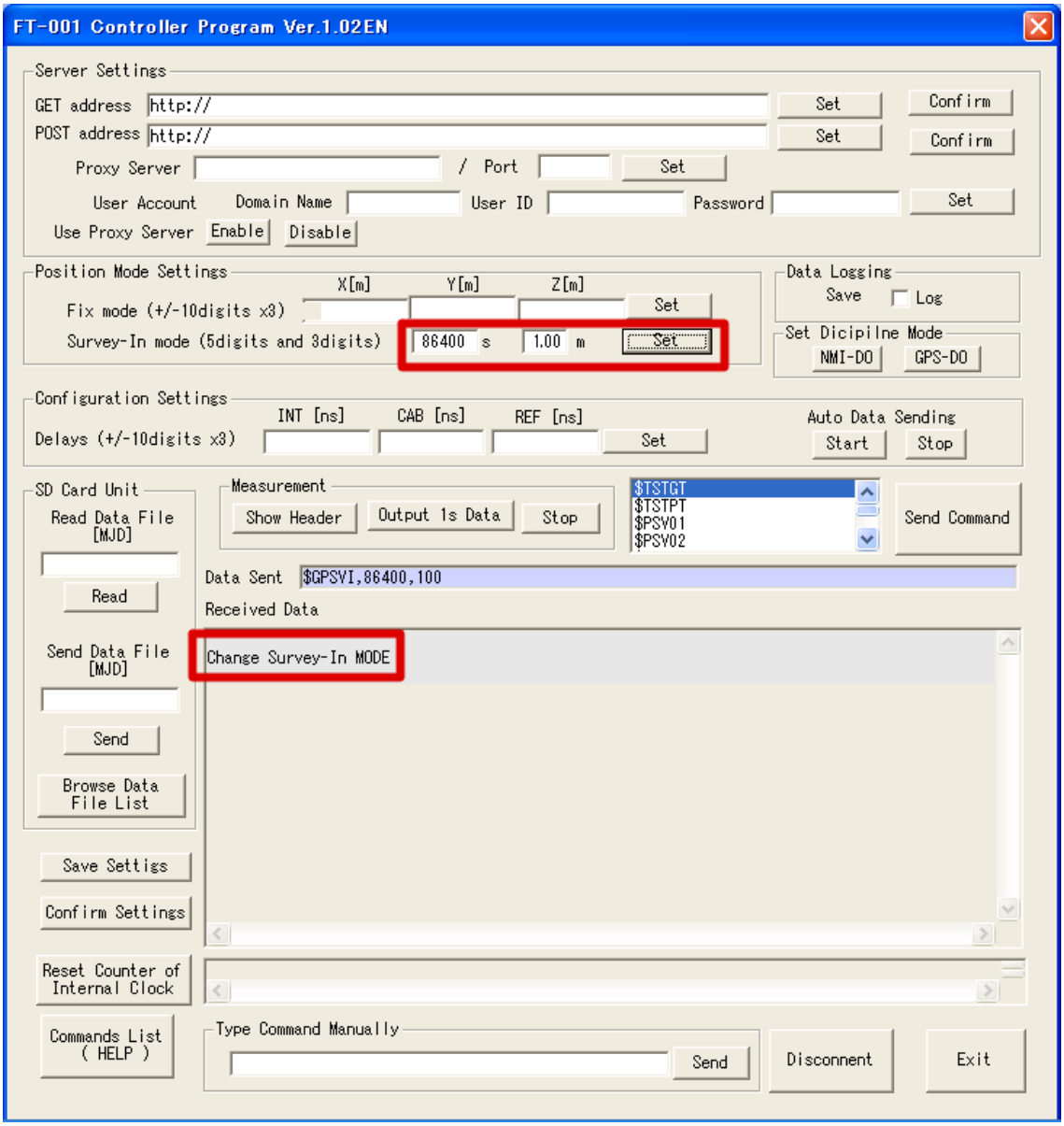
10.2.2. Survey-In mode

The terminal starts to search the coordinates during the time you set. When the coordinate values fall within the range of standard deviation, they will be fixed and the terminal will change to Fix mode automatically. This mode is recommended when the antenna coordinates are unknown as you install a new GPS antenna.

Enter the searching time [s] and the standard deviation [m] on each field at Survey-In mode.

For example: “86400” [s] “5” [m]

Click **Set**. The terminal will return the message of ‘Change Survey-In MODE’.



10.3. Data Logging

You can save the log output from the terminal. Check **Log** at Save.
“Receive.txt” will be created in C: drive in the PC, and the log will be written to it.
When you stop data logging, uncheck **Log**.

*When you see the “Receive.txt” file, please uncheck **Log** first and open it.

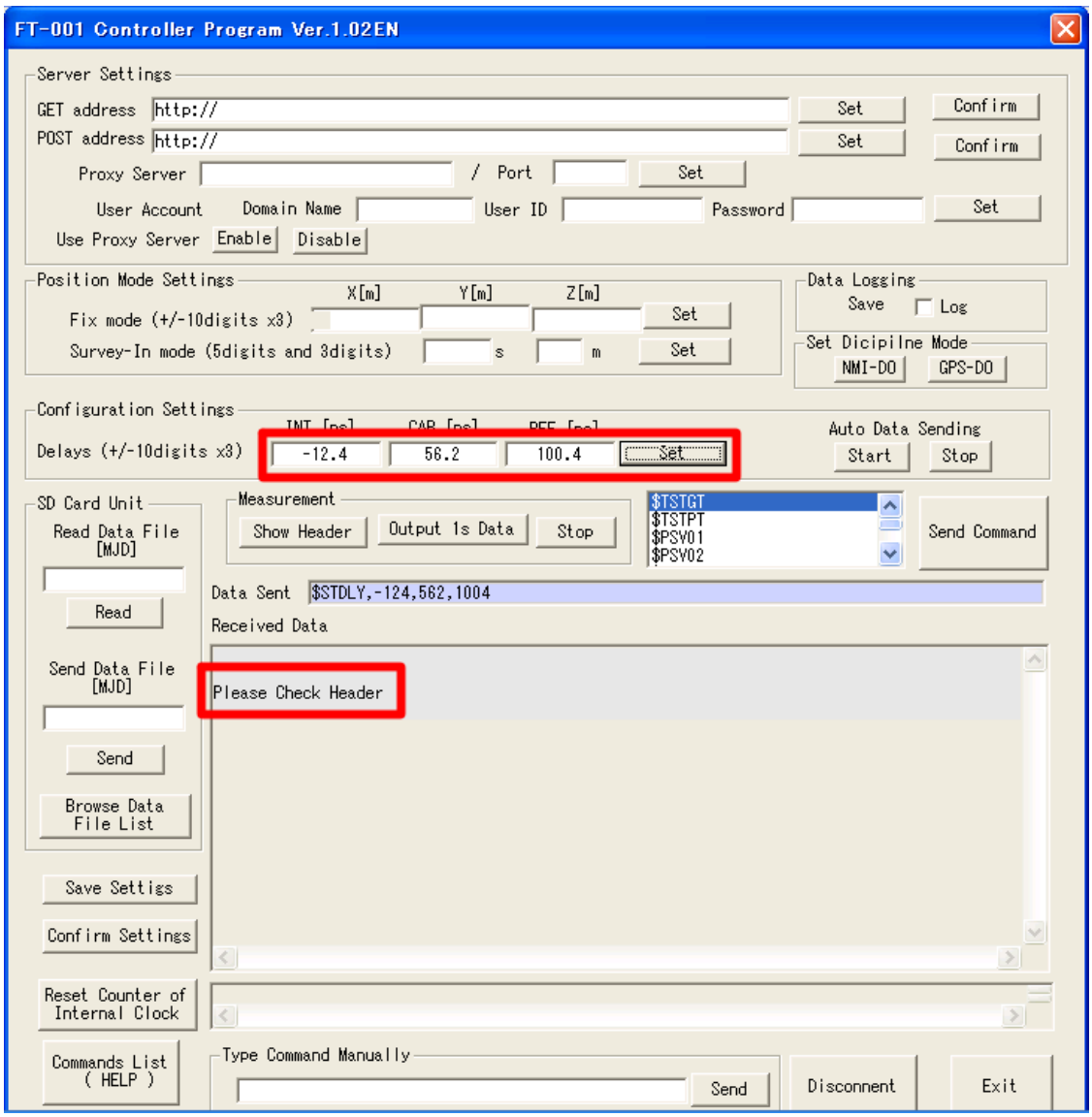
10.4. Configuration Settings

* This is not necessary when you control the internal oscillator.

Enter the values of INT, CAB, and REF [ns] on each field at Configuration Settings.

For example: “-12.4” [ns] “56.2” [ns] “100.4” [ns]

Click **Set**. The terminal will return the message of ‘Please Check Header’.



10.5. Discipline Mode Settings

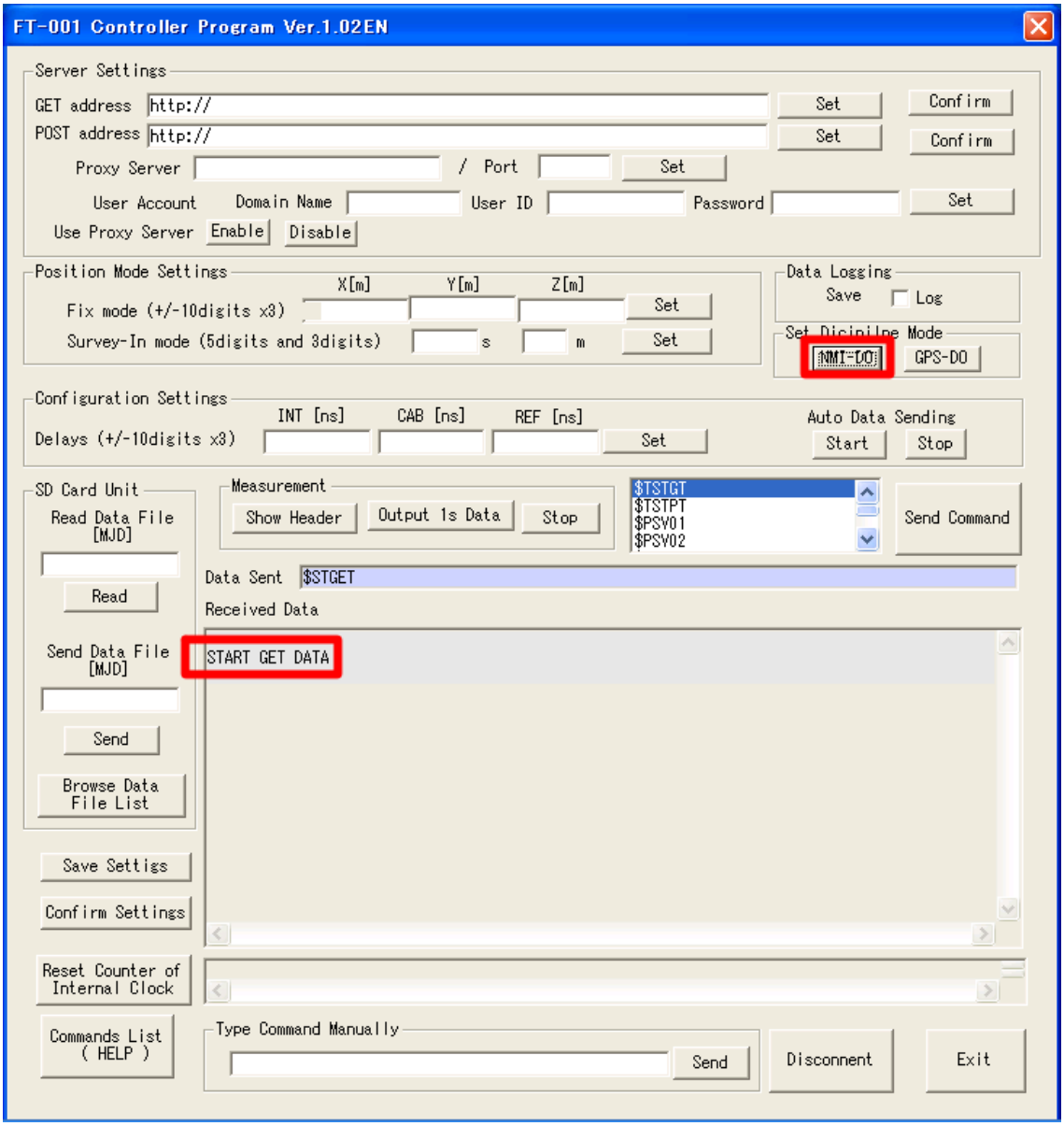
10.5.1. Selecting Sync mode (NMI-DO/ GPS-DO)

* This is not necessary when you operate the terminal in GPS-DO mode.

NMI-DO mode

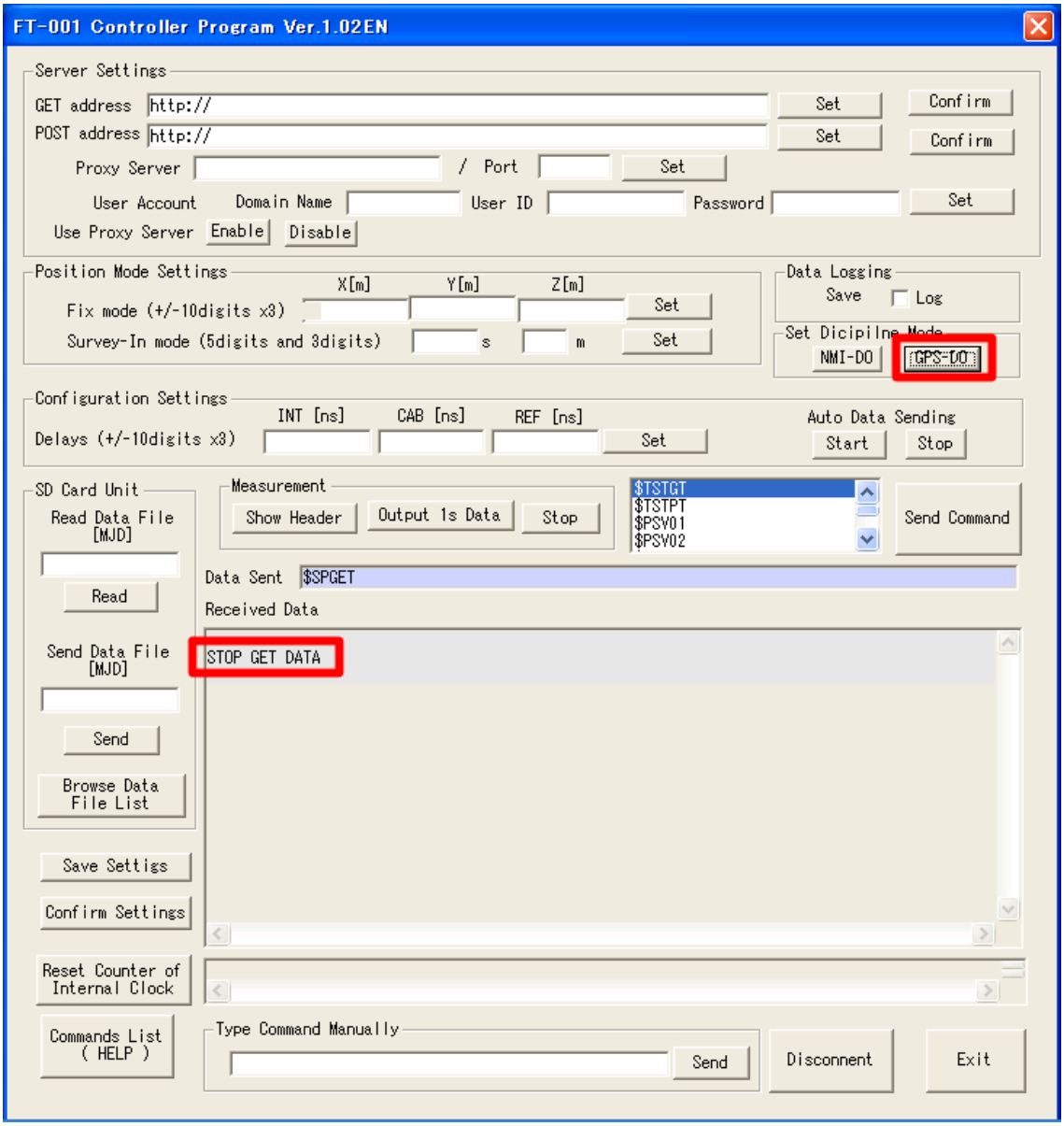
Click **NMI-DO** at Set Disipline Mode.

The terminal will return the message of ‘START GET DATA’.
Now the terminal starts to retrieve data according to CGGTTS format and you operate the terminal in NMI-DO mode.



GPS-DO mode

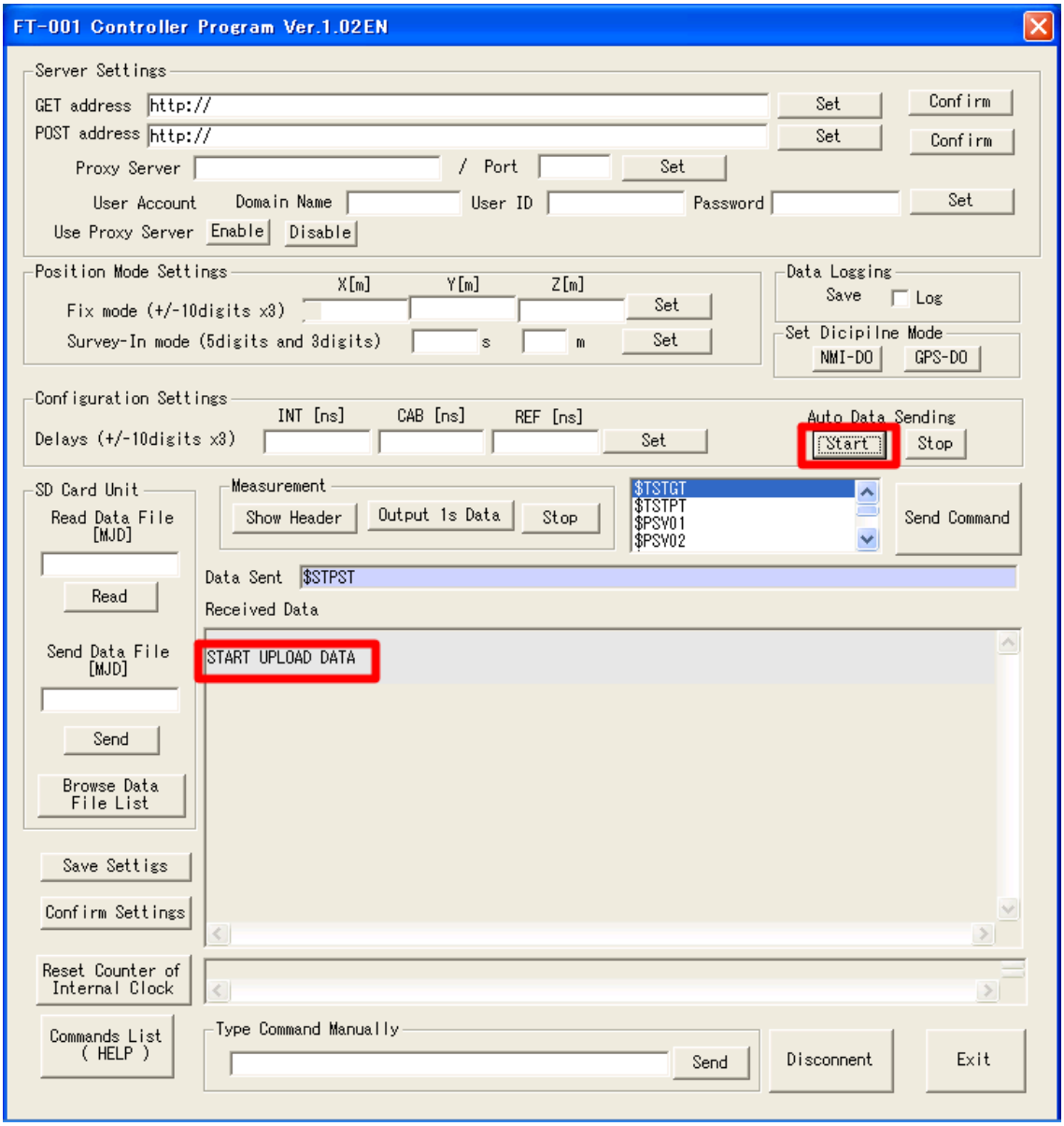
Click **GPS-DO** at Set Disipline Mode.
The terminal will return the message of ‘STOP GET DATA’.
Now the terminal stops retrieving data, and you operate the terminal in GPS-DO mode.



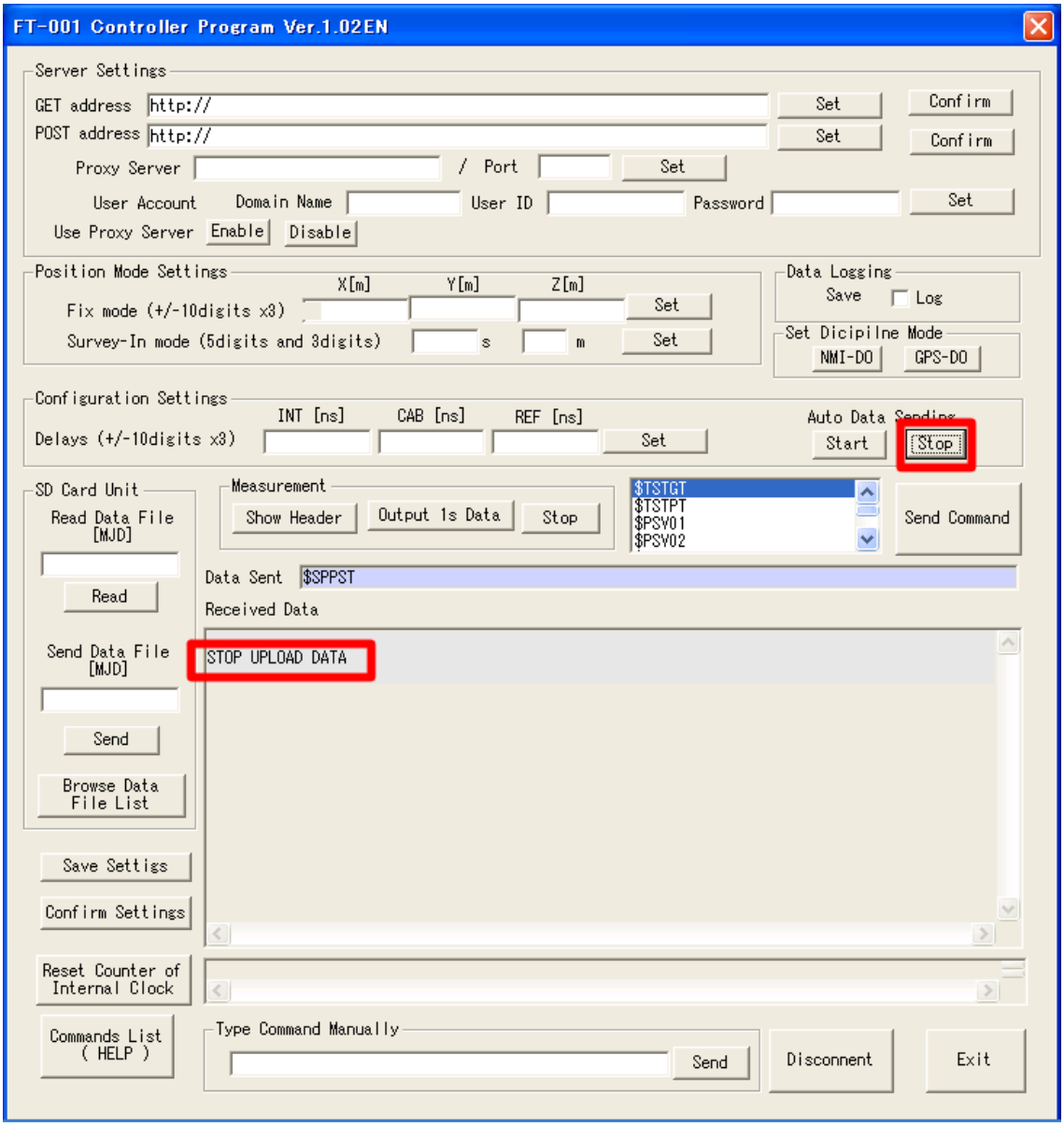
10.6. Auto Data Sending

* This is not necessary when you do not ask for the calibration certificate.

You can select to start or stop sending data for calibration.
Click **Start** at Auto Data Sending to send data for calibration.
The terminal will return the message of 'START UPLOAD DATA'.
Now the terminal uploads data periodically.



Click **Stop** at Auto Data Sending when you stop sending data for calibration.
The terminal will return the message of ‘STOP UPLOAD DATA’.
Now the terminal stop uploading data.

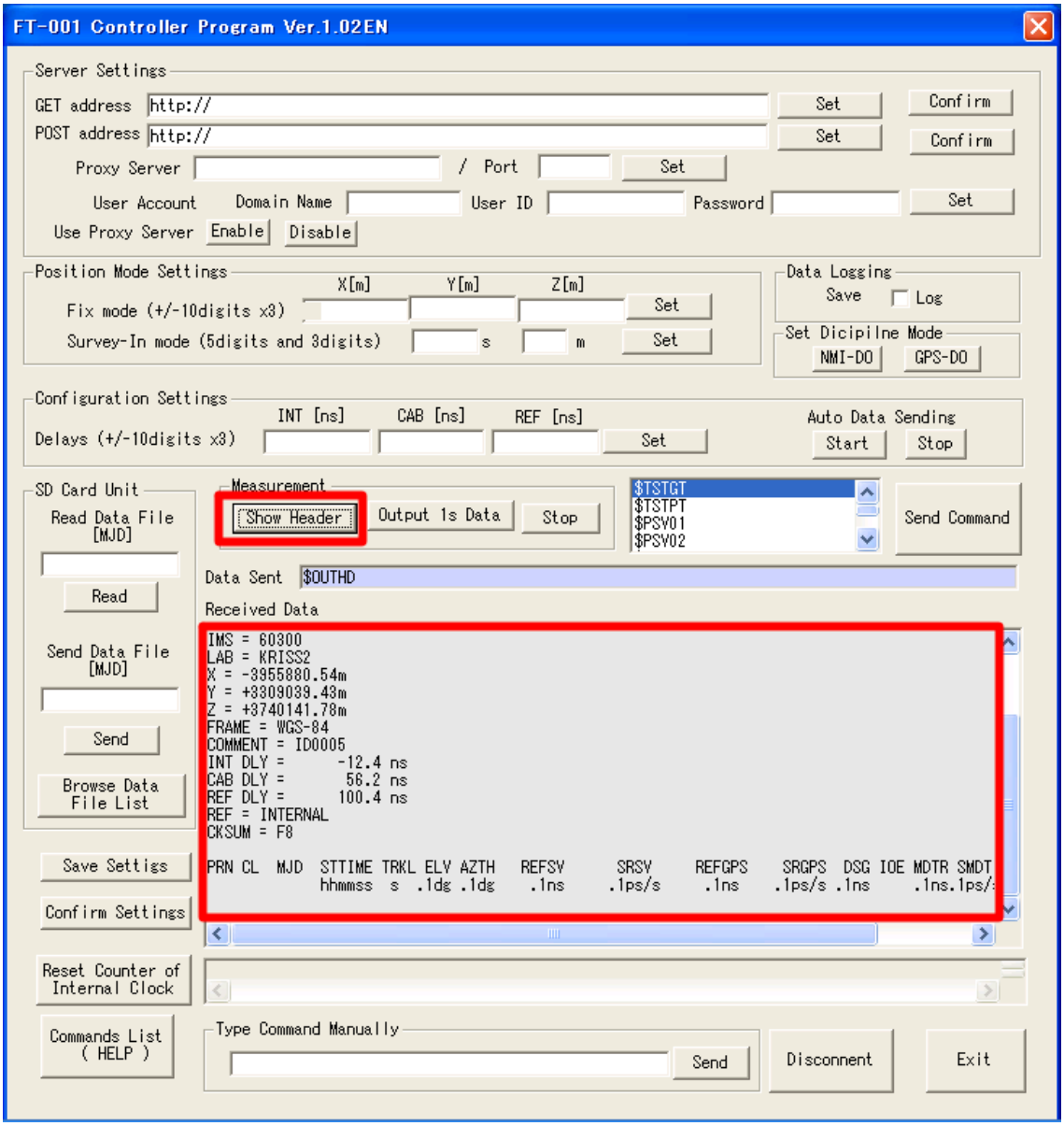


10.7. Measurement

You can monitor the header of CGGTTS format and the result of time comparison in every second complied with the format.

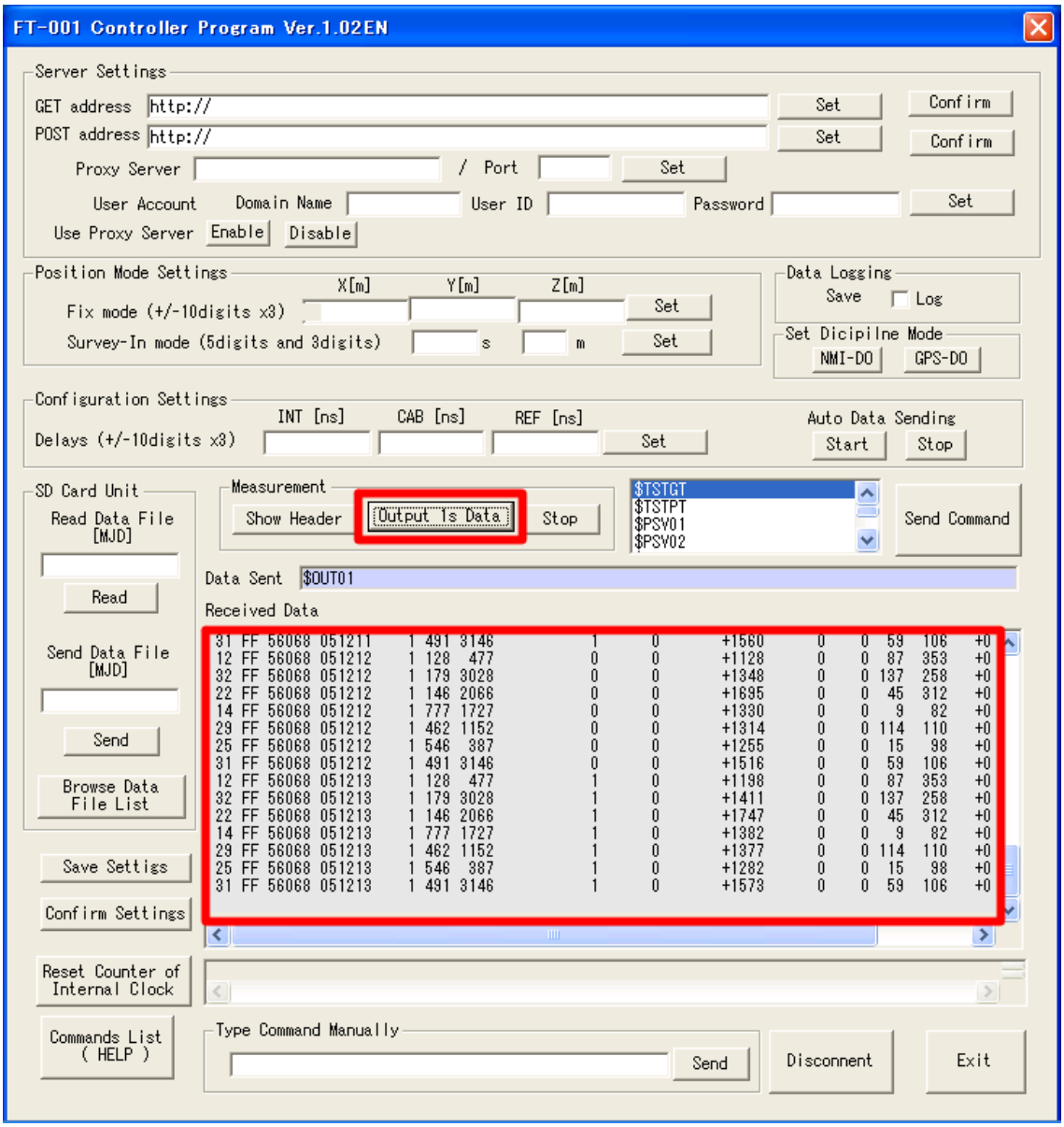
10.7.1. Checking CGGTTS Header

Click **Show Header** at Measurement to check the header.
The terminal will return the information of current header.



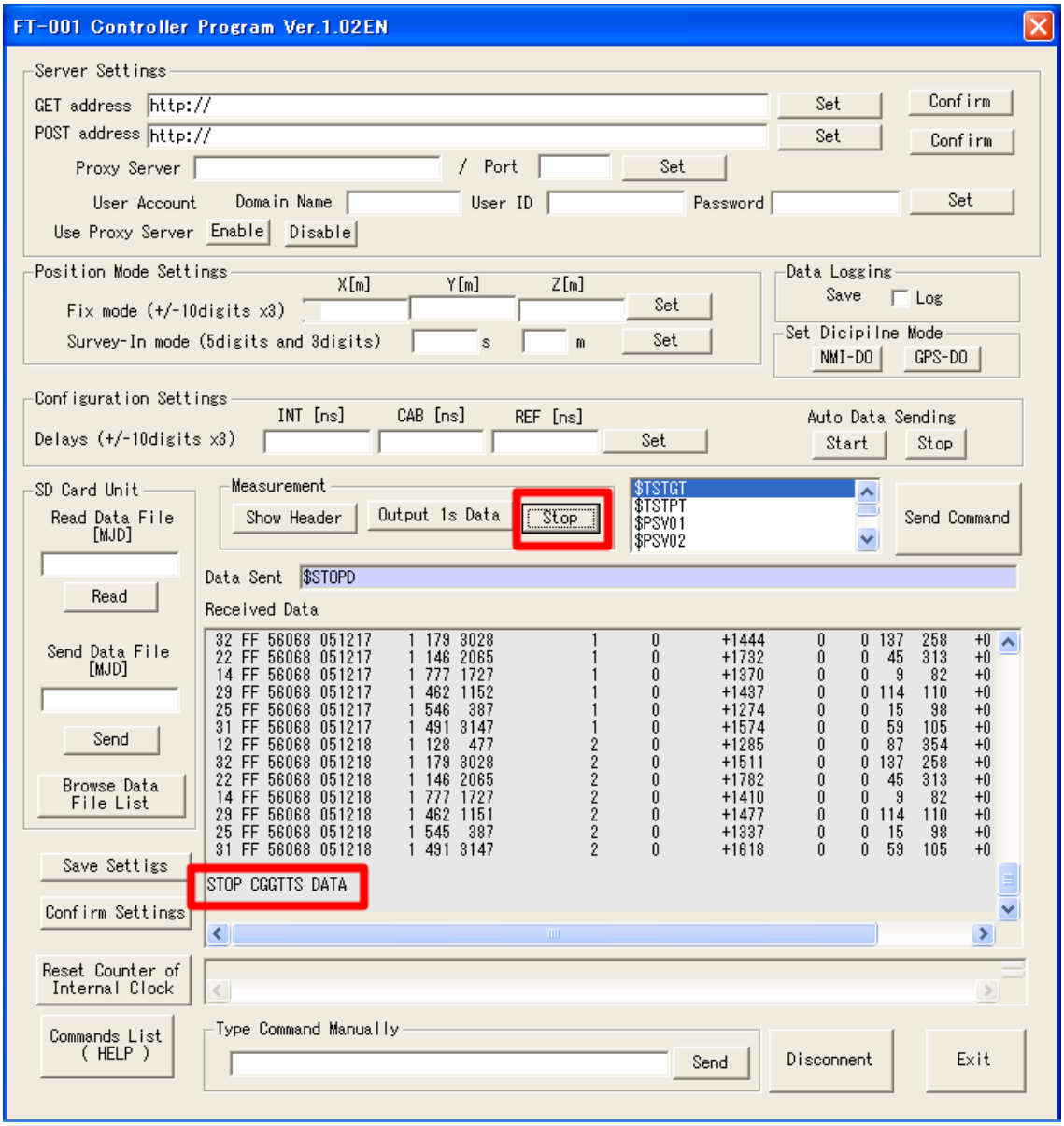
10.7.2. 1-second Data output

Click **Output 1s Data** at Measurement to start outputting 1-second data.
The terminal will return the result of time comparison in every second.



10.7.3. Stopping 1-second data output

Click **Stop** at Measurement to stop outputting 1-second data.
The terminal will return the message of ‘STOP CGGTTS DATA’.

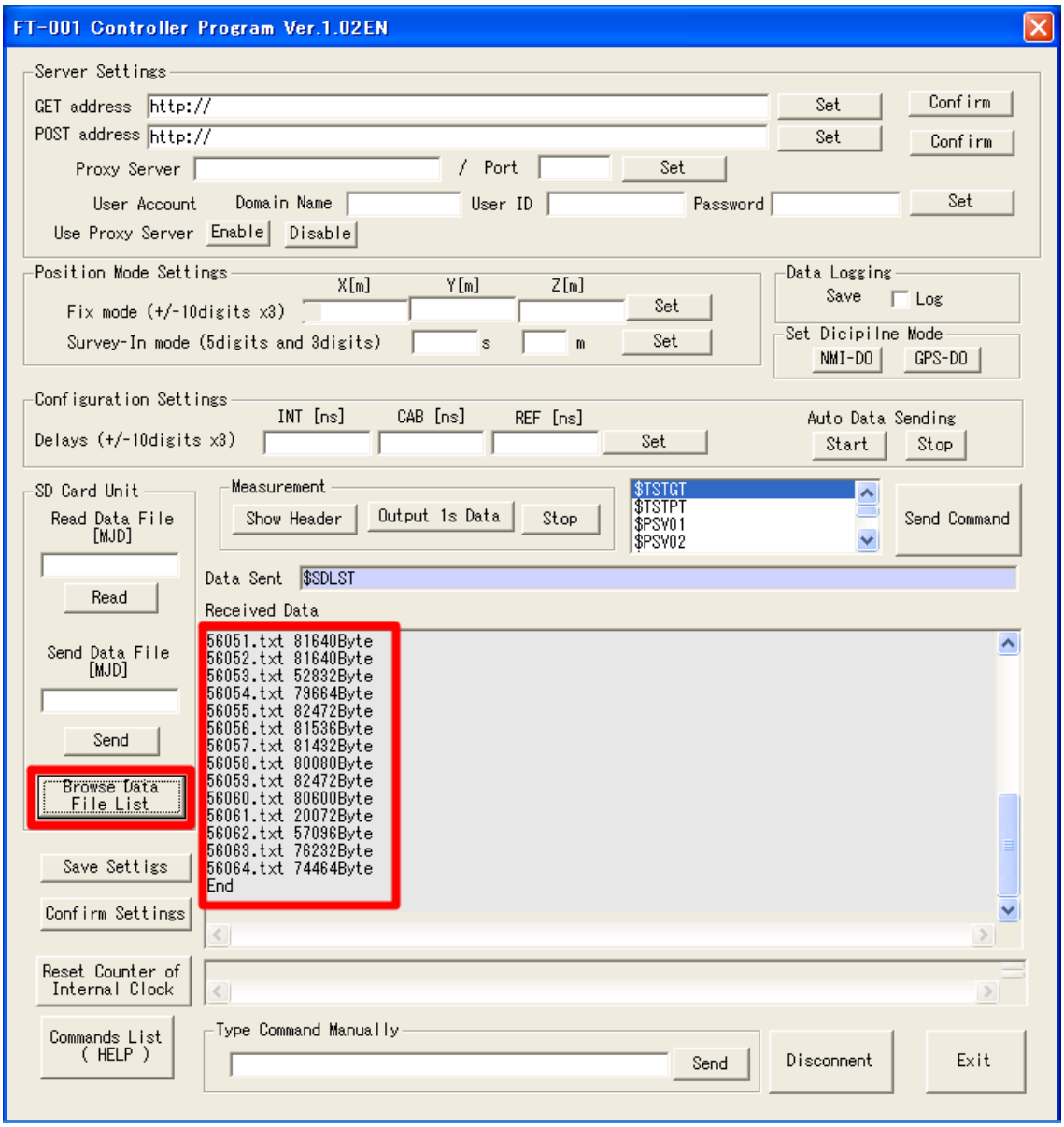


10.8. SD Card Unit

The terminal accumulates the result of time comparison in the internal SD card.
You can load the data from it or send the data of specific date to the server by accessing to it.

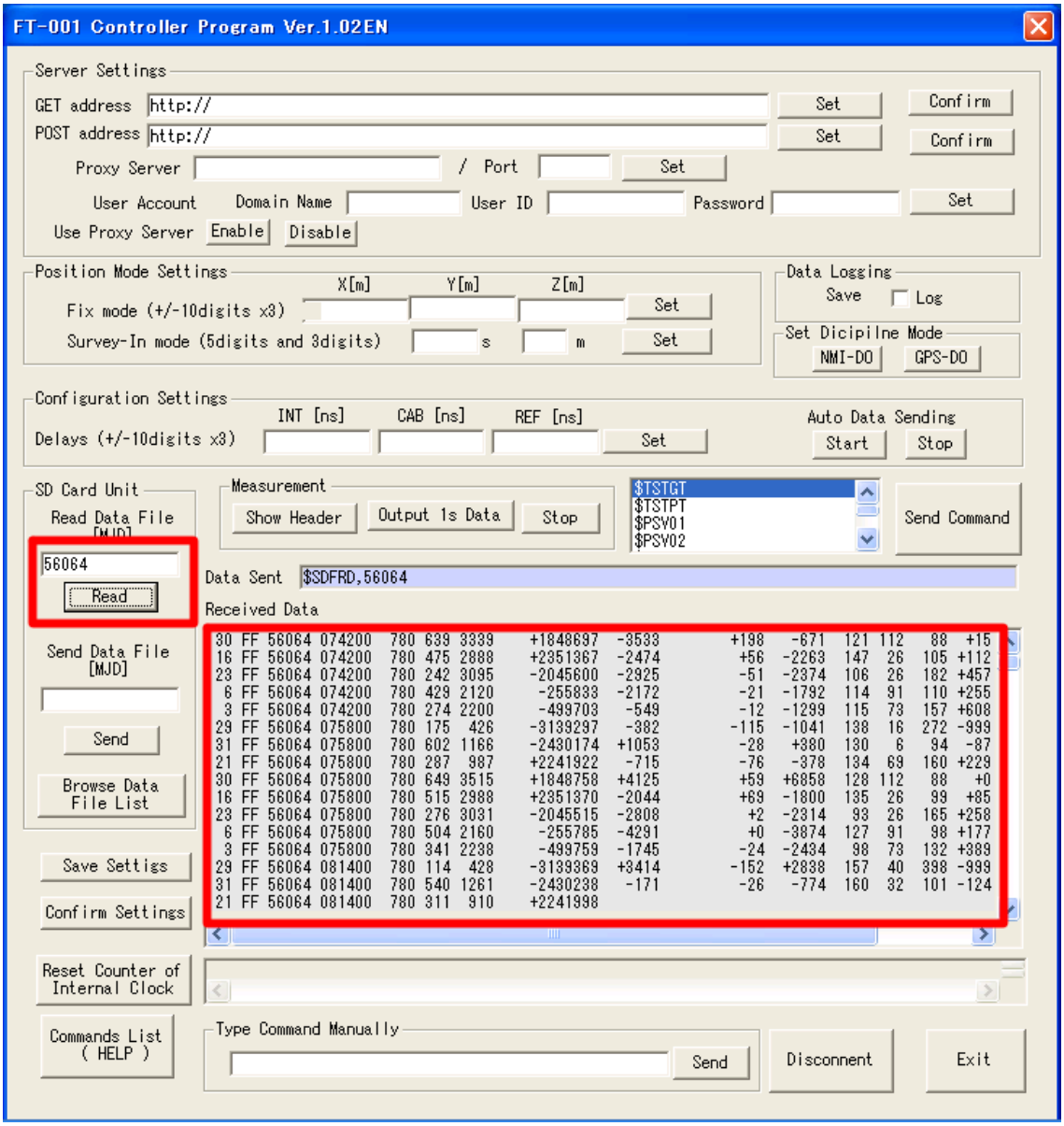
10.8.1. Displaying the file list

The terminal displays the list of files that is currently stored.
Click **Browse Data File List** at SD Card Unit.
The unit will display the list of files in the form of FileName (‘MJD’.txt) and Size (Byte).



10.8.2. Loading file of the specified date

The terminal displays CGGTTS data of the date you specify in MJD (Modified Julian Date).
Enter the date in MJD to read out the data on the field of Read Data File [MJD] at SD Card Unit, and then click **Read**.
The terminal will display the accumulated messages.

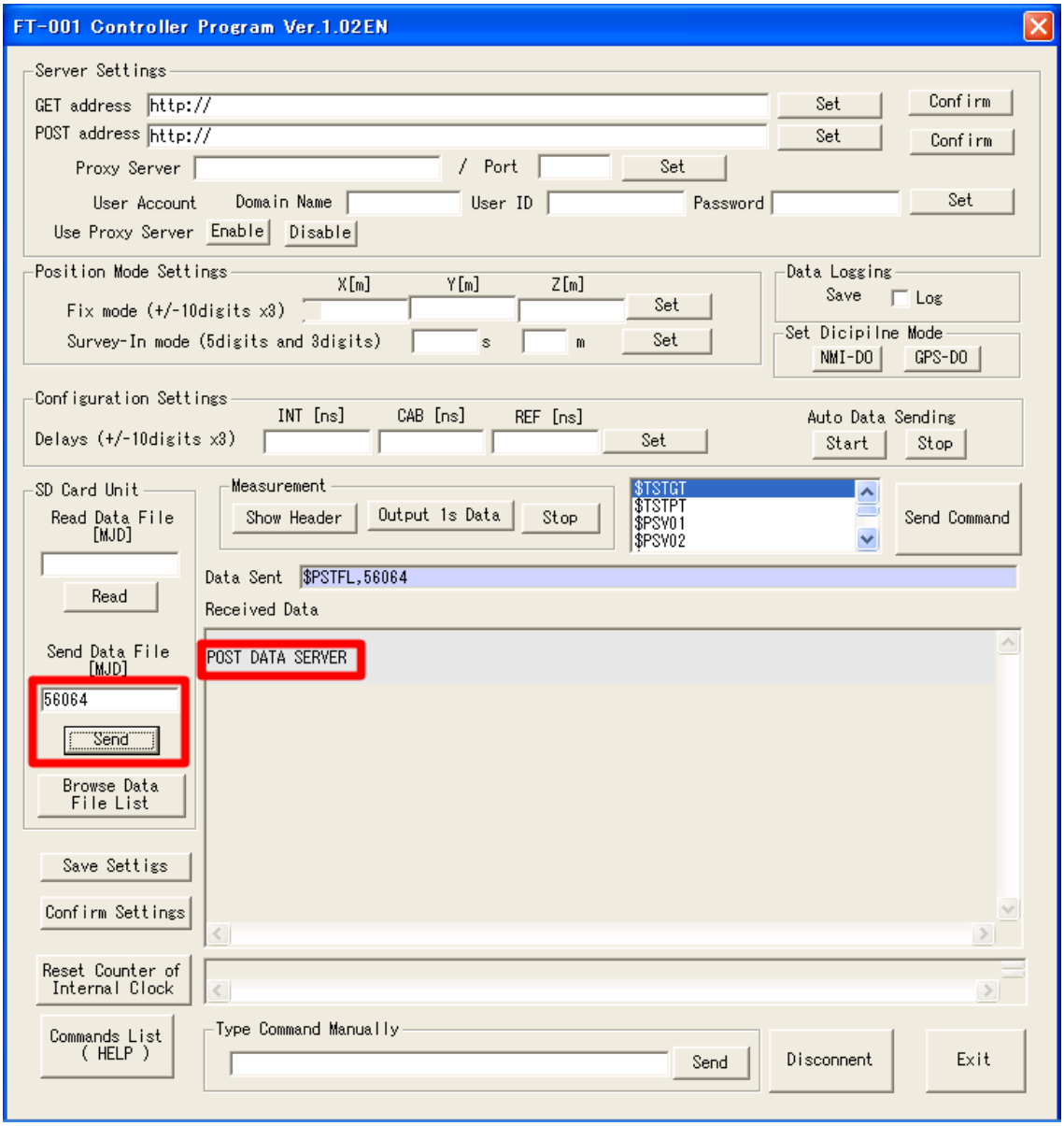


*The first half of the data will not be displayed when it is a large amount of data. See 9.3 “Data Logging” to save the data beforehand.

10.8.3. Sending file on the specified day

The terminal sends data to the server to have the calibration certificates issued on the day you specify in MJD.

Enter the date in MJD to send the data on the field of Send Data File [MJD] at SD Card Unit, and then click **Send**. The unit will return the message of ‘POST DATA SERVER’.

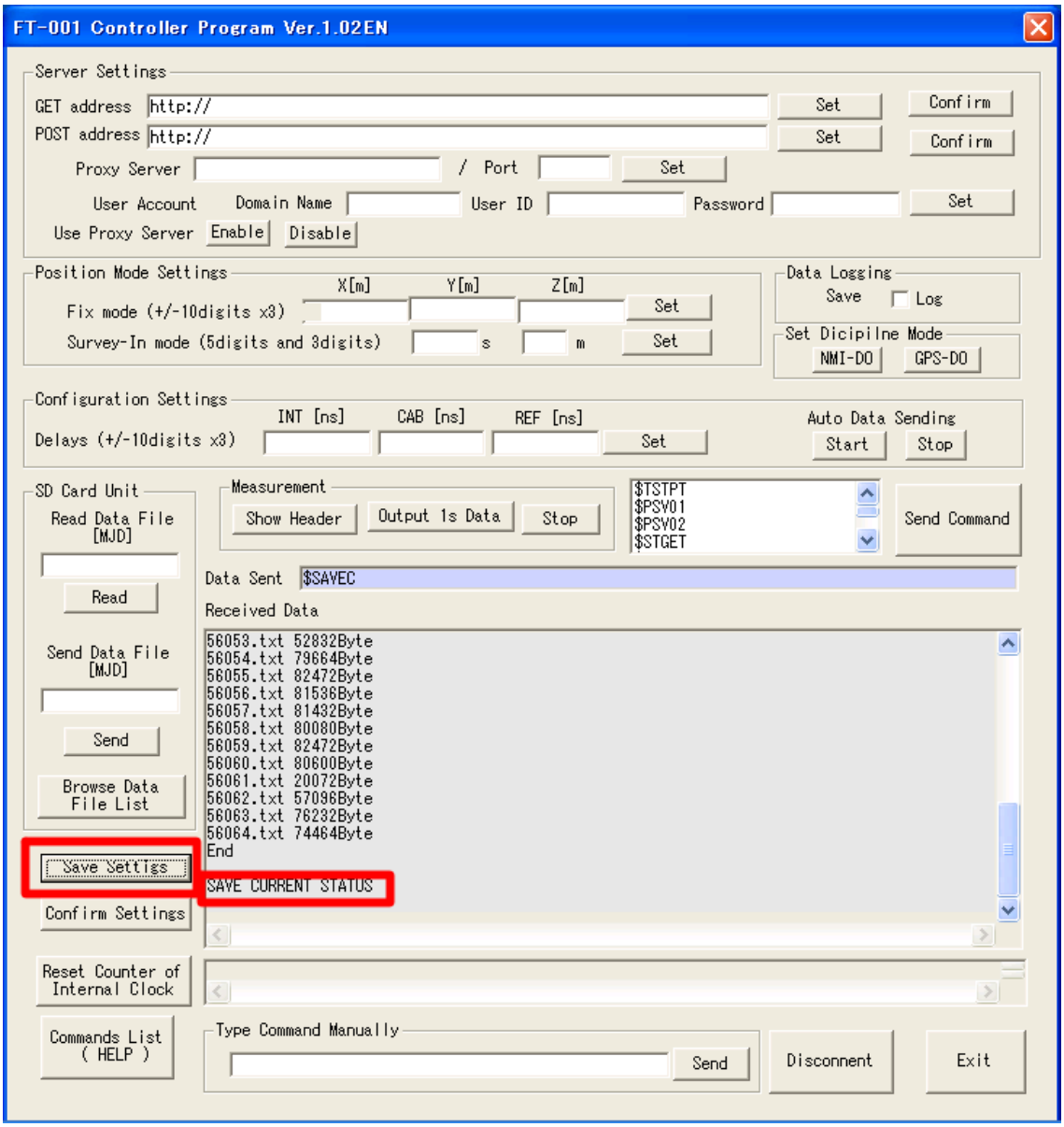


10.8.4. Initializing the internal clock

When synchronization errors as multi-pass occur, you restart the internal clock.
Click **Reset Counter of Internal Clock**.

10.9. Saving the settings

You can save the settings you have set.
Click **Save Settings**.
The terminal will return the message of ‘SAVE CURRENT STATUS’.
The terminal starts with the saved settings from the next you turn on the power.


FT-001 Controller Program Ver.1.02EN
Server Settings
GET address
http://
Set
Confirm
POST address
http://
Set
Confirm
Proxy Server
/ Port
Set
User Account
Domain Name
User ID
Password
Set
Use Proxy Server
Enable
Disable
Position Mode Settings
X[m]
Y[m]
Z[m]
Fix mode (+/-10digits x3)
Set
Survey-In mode (5digits and 3digits)
s
m
Set
Data Logging
Save
Log
Set Dicipilne Mode
NMI-DO
GPS-DO
Configuration Settings
INT [ns]
CAB [ns]
REF [ns]
Delays (+/-10digits x3)
Set
Auto Data Sending
Start
Stop
SD Card Unit
Read Data File [MJD]
Read
Send Data File [MJD]
Send
Browse Data File List
Measurement
Show Header
Output 1s Data
Stop
$TSTPT
$PSV01
$PSV02
$STGET
Send Command
Data Sent
$SAVEC
Received Data
56053.txt 52832Byte
56054.txt 79664Byte
56055.txt 82472Byte
56056.txt 81536Byte
56057.txt 81432Byte
56058.txt 80080Byte
56059.txt 82472Byte
56060.txt 80600Byte
56061.txt 20072Byte
56062.txt 57096Byte
56063.txt 76232Byte
56064.txt 74464Byte
End
SAVE CURRENT STATUS
Save Settigs
Confirm Settings
Reset Counter of Internal Clock
Commands List (HELP)
Type Command Manually
Send
Disconnent
Exit

10.10. Setting IP address

The terminal is set to obtain IP address automatically via DHCP by default.
To change IP address, the followings are required;

- PC for setting
  (Win32 OS which is installed “DeviceInstaller” software manufactured by Lantronix)
- DHCP
- Network hub

*To install DeviceInstaller, see Appendix A-4.

There are two situations when IP address should be changed. One is to change to fix a new IP address “from the mode of default settings or of automatically assigned IP address”. Another is to do “from the mode of already fixed your IP address”.

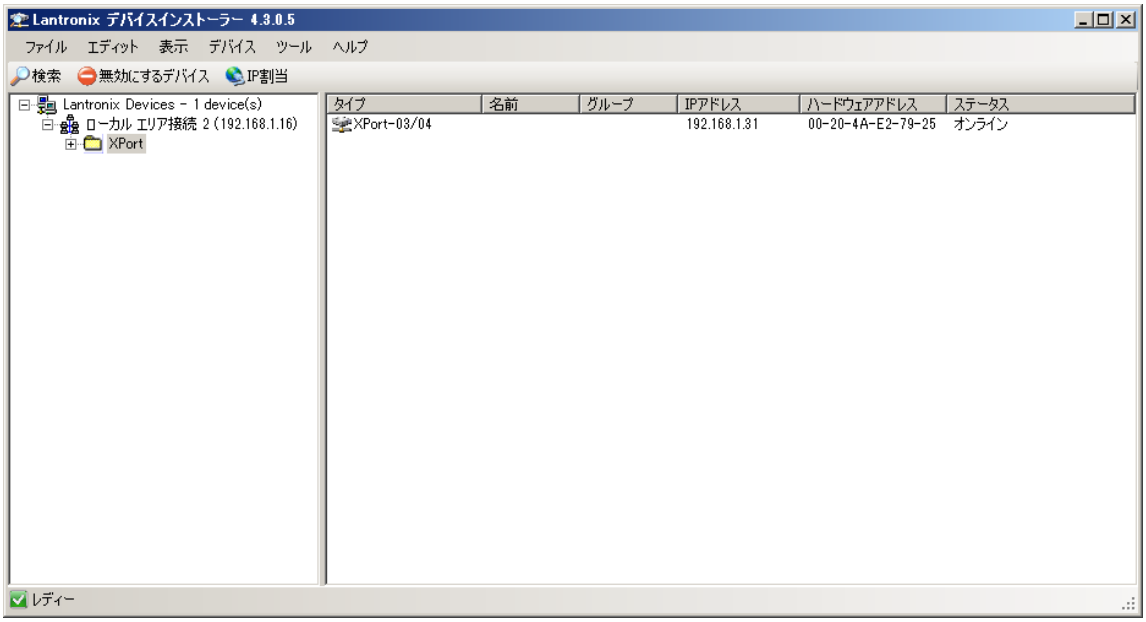
1. How to fix your IP address from the mode of default settings or of automatically assigned IP address

The terminal is set to obtain IP address automatically via DHCP by default. You can change the configuration to static IP address as follows.

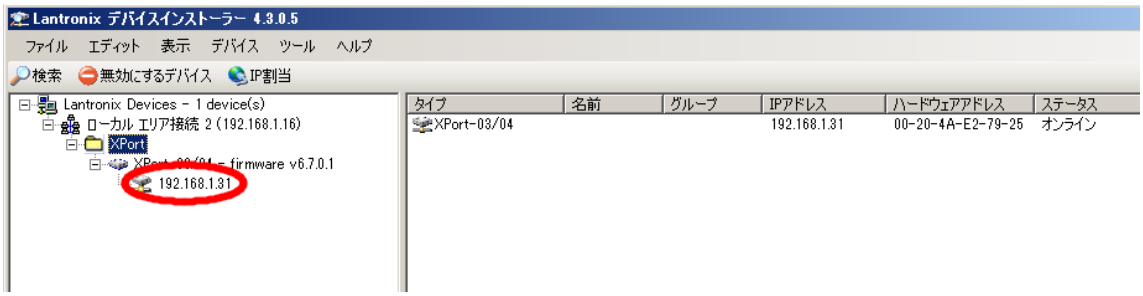
Connect the hub to DHCP, and then connect the terminal already powered up to the hub. DHCP will assign IP address to the terminal.
Then connect the PC for setting to the same DHCP to obtain the same IP address as the terminal.

Next, click Start of Windows on the PC for setting and select “All Programs” →“Lantronix”→”DeviceInstaller4.3”→”DeviceInstaller” to start the program.

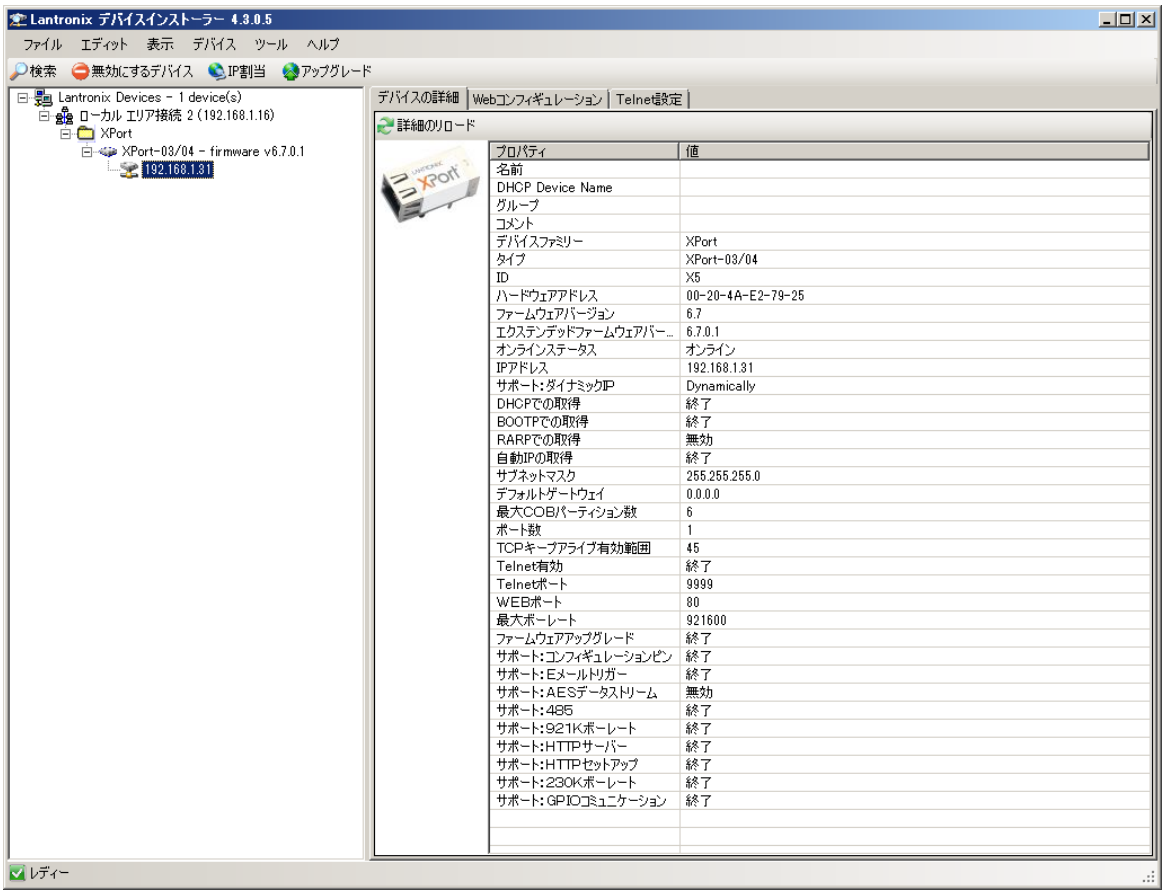
You can find the device named “Xport”.



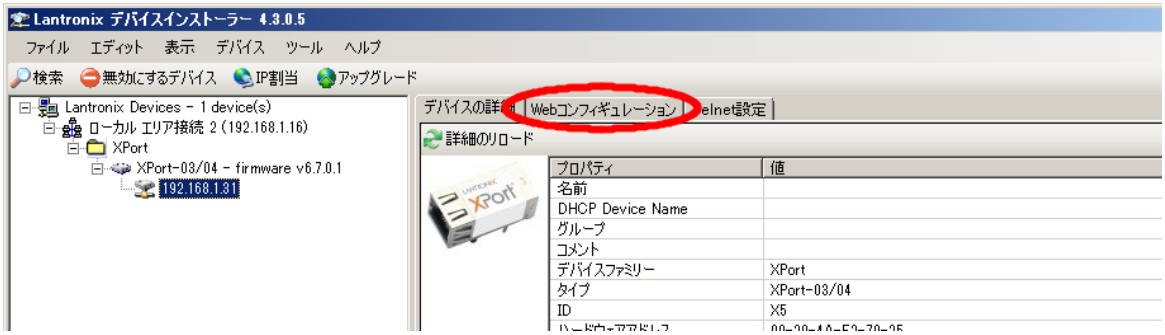
Click **Xport** to select IP address.



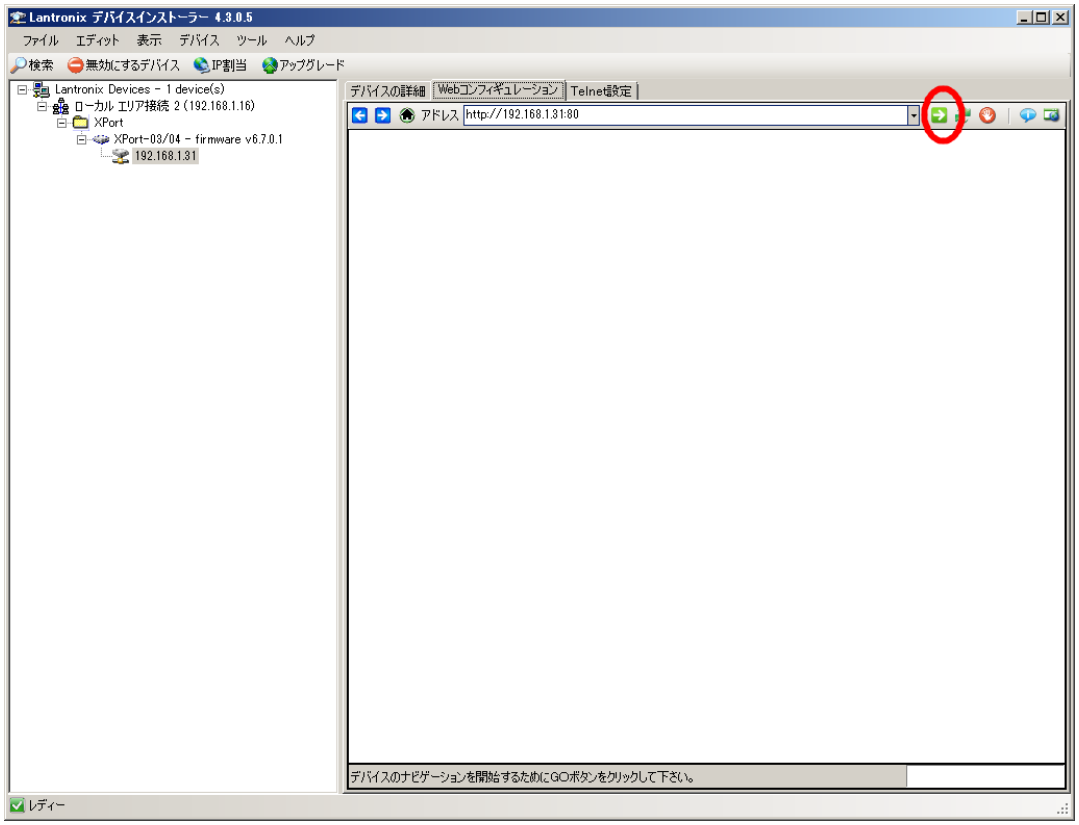
You can see the list of current settings on the right side of the screen of DeviceInstaller.



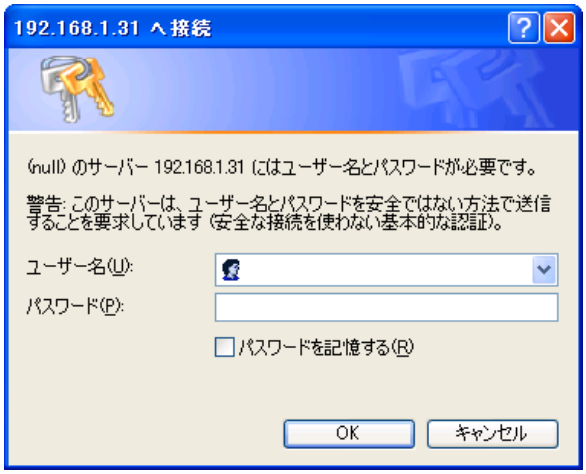
Click “Web configuration” tab.

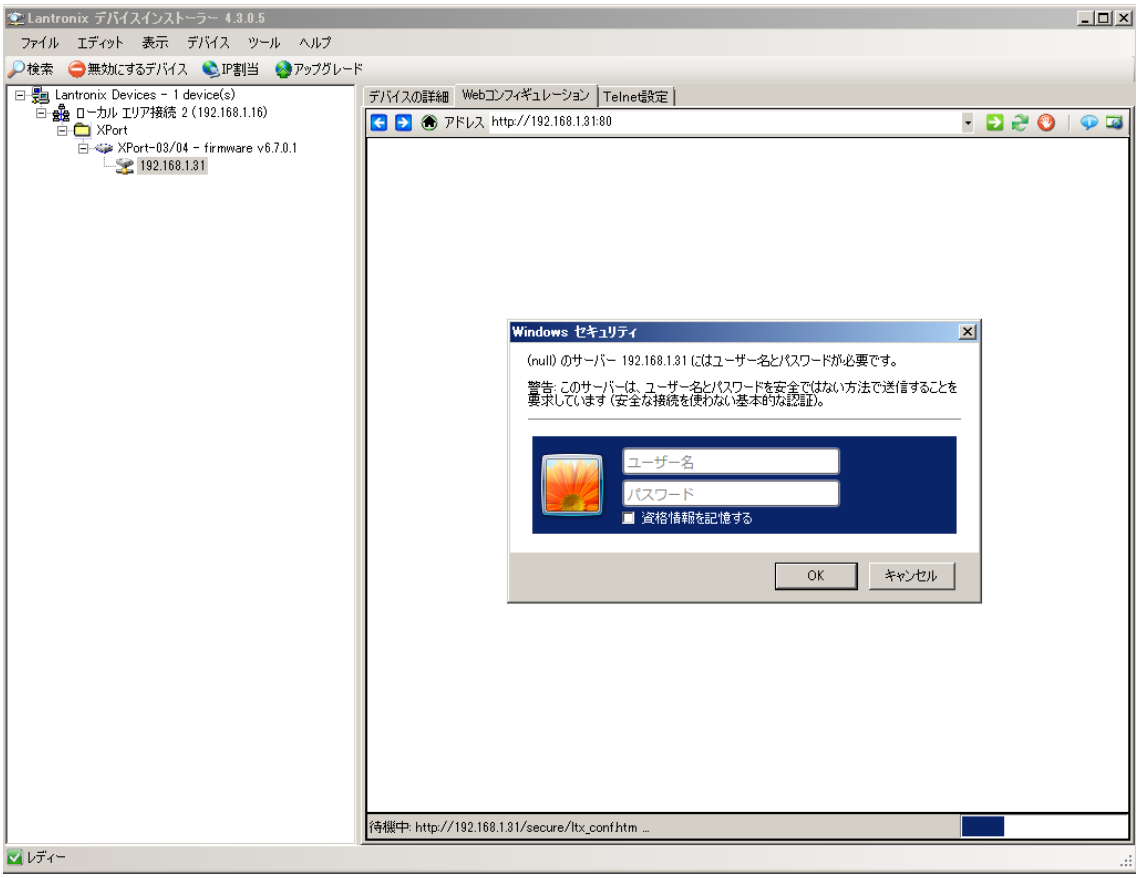


The following screen will appear.



On this screen, click the arrow on the right of the address bar.
A dialog box asking for user name and password will appear.

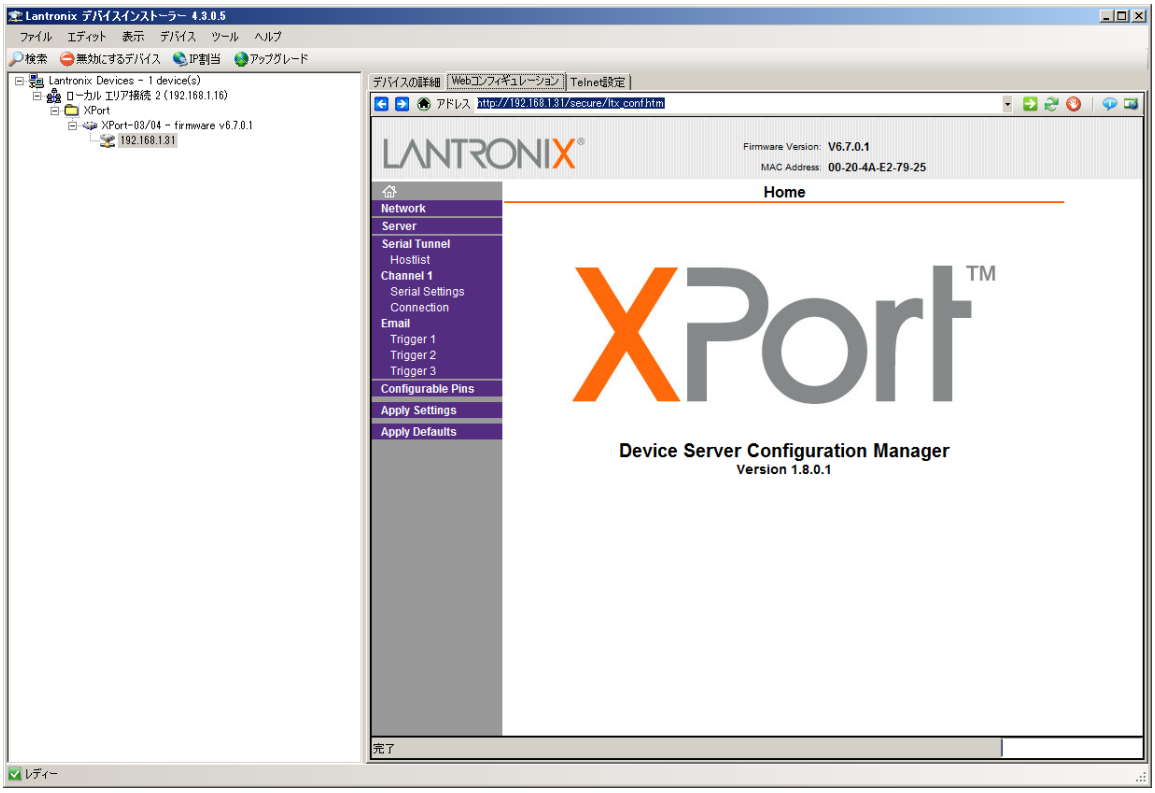




This is an example of a dialog box in Windows7.

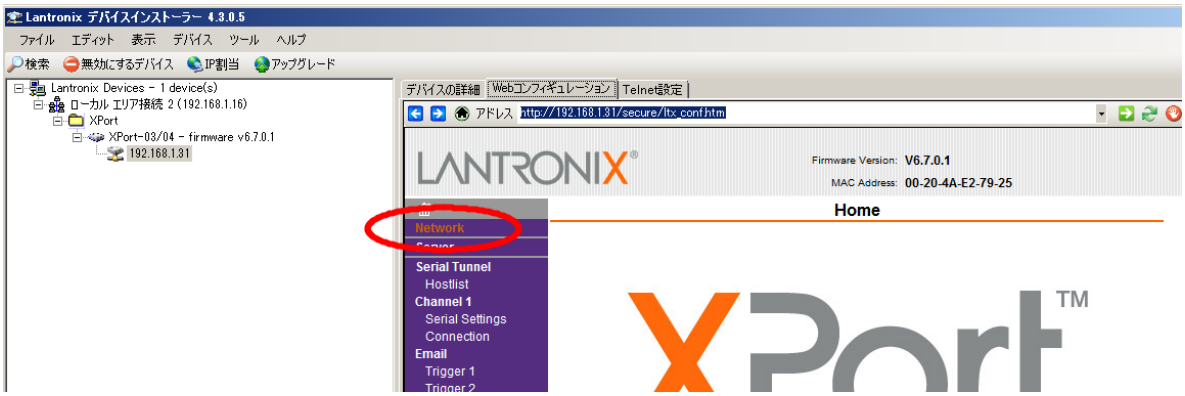
Click **OK** with both of user name and password blank.

The following screen will appear, and then you can go on to LAN adapter setting.

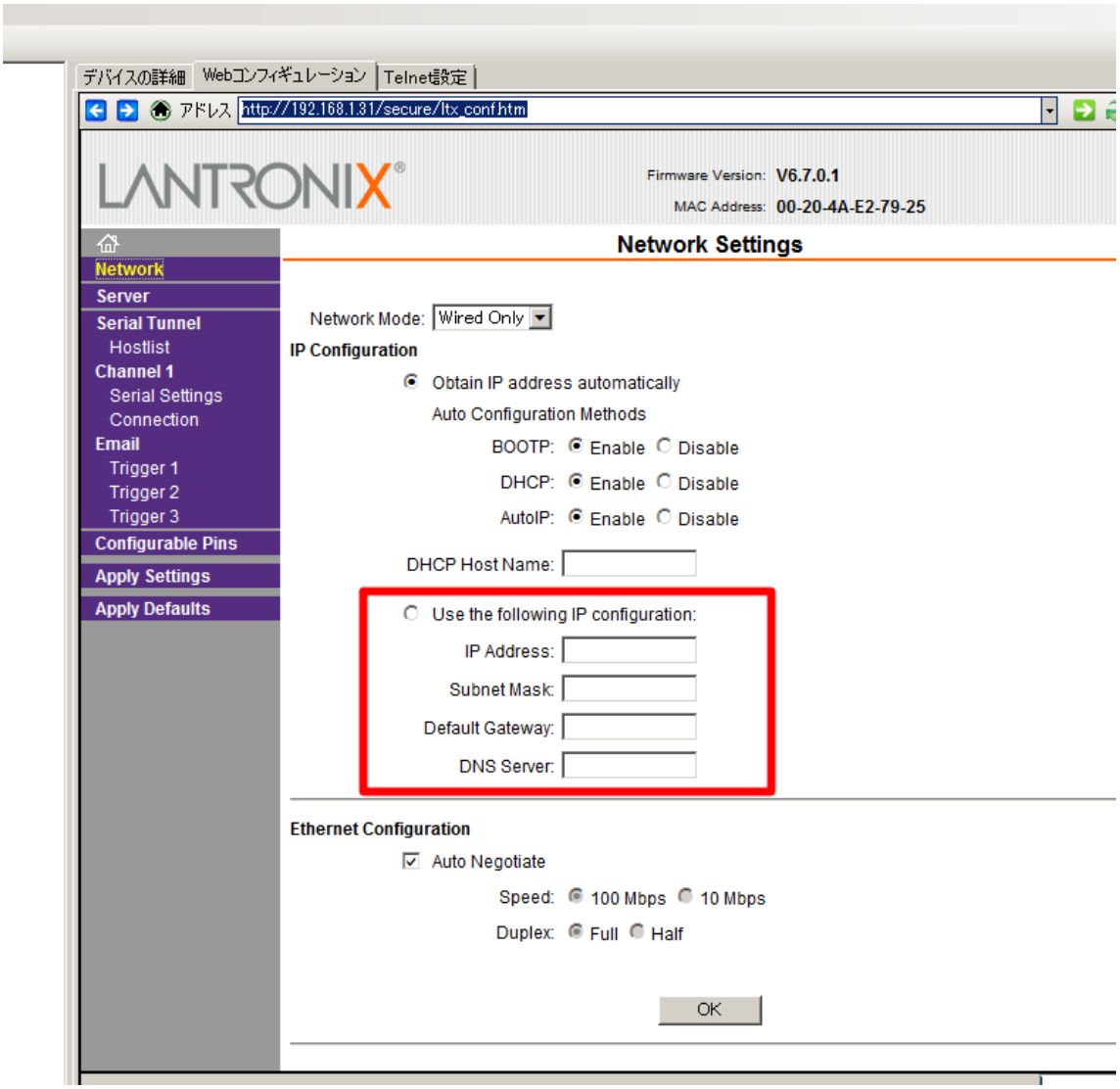


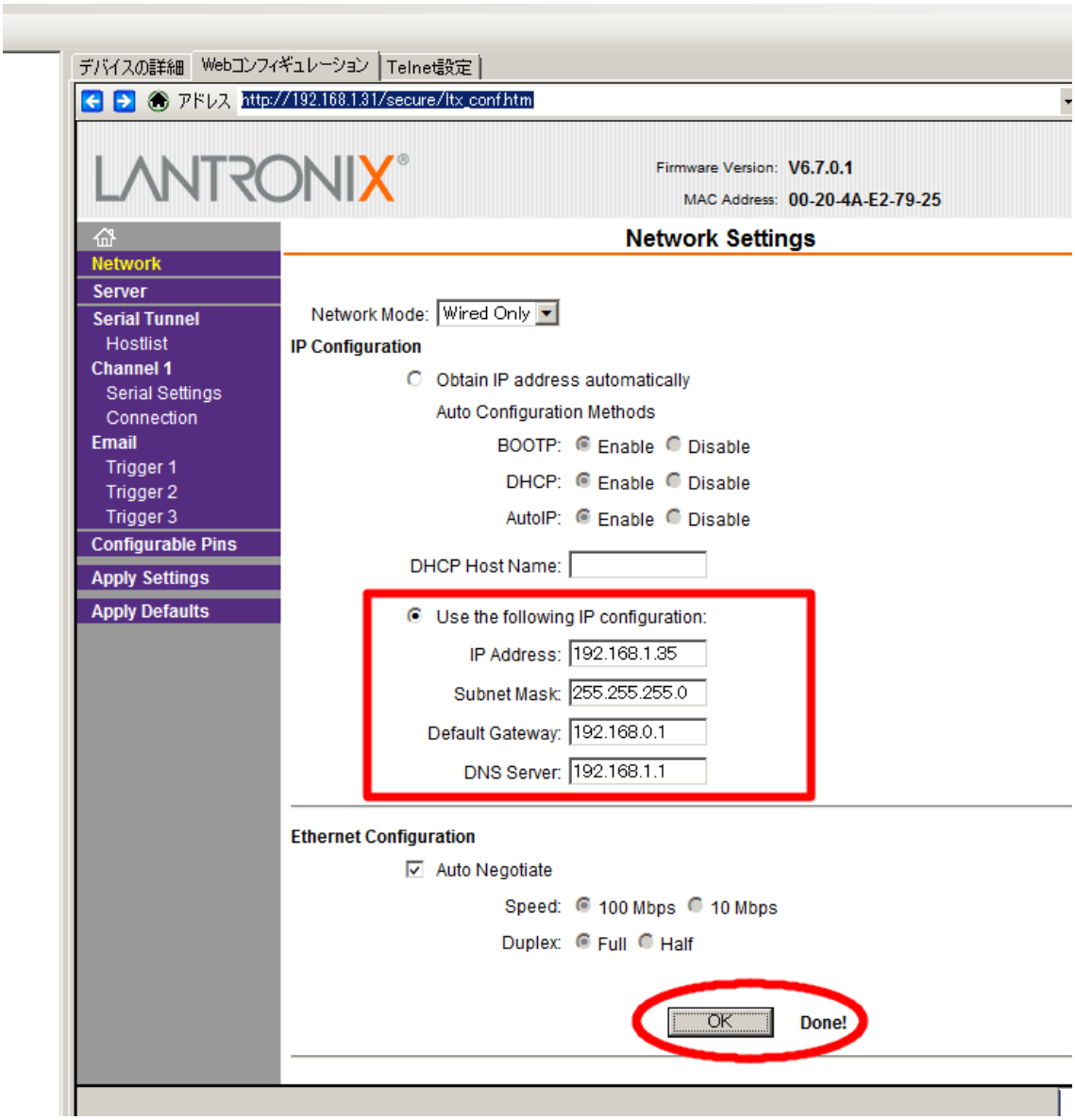
Screen to set LAN adapter

Select "Network" from the menu on the left side of DeviceInstaller.



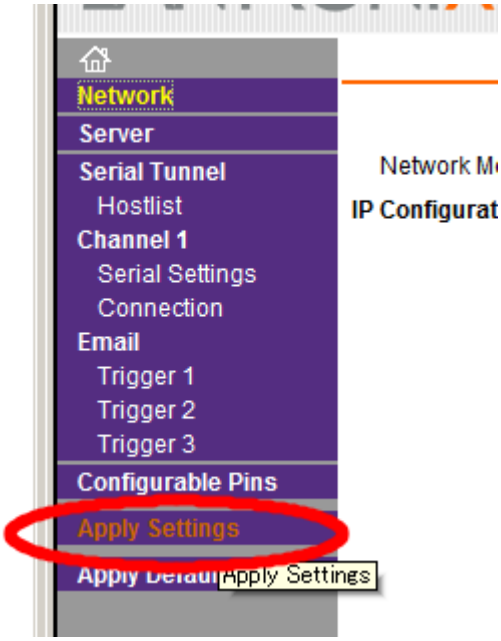
Select “Use the following IP configuration” at IP configuration and fill out the forms.



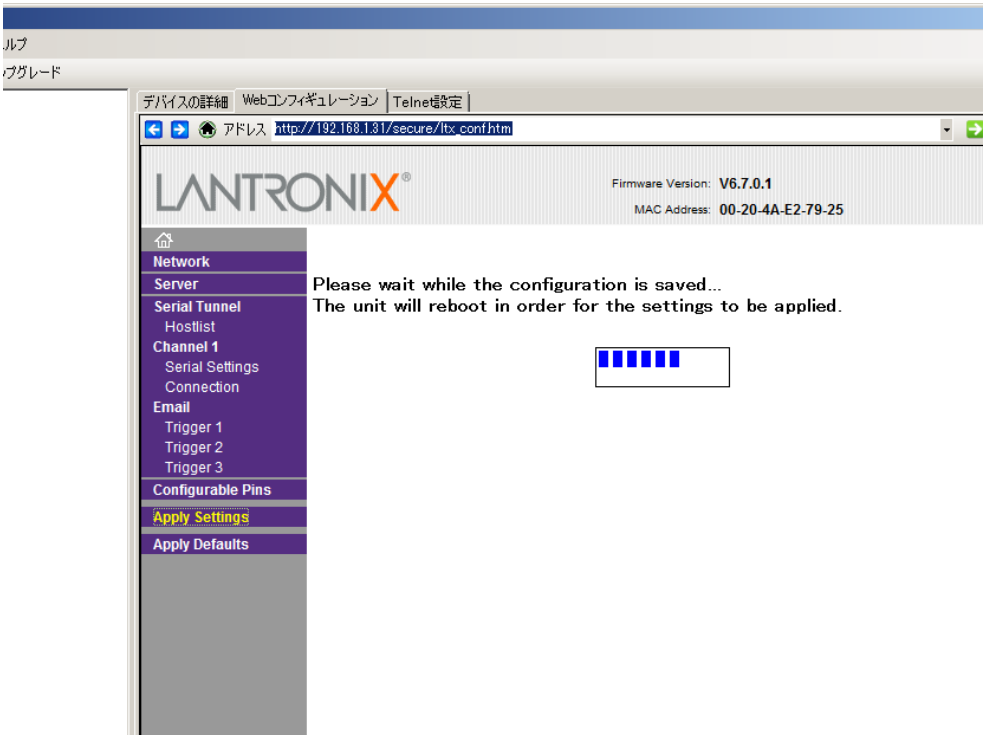


After you enter, make sure to click OK to confirm the settings. When the settings are confirmed, “Done!” will appear.

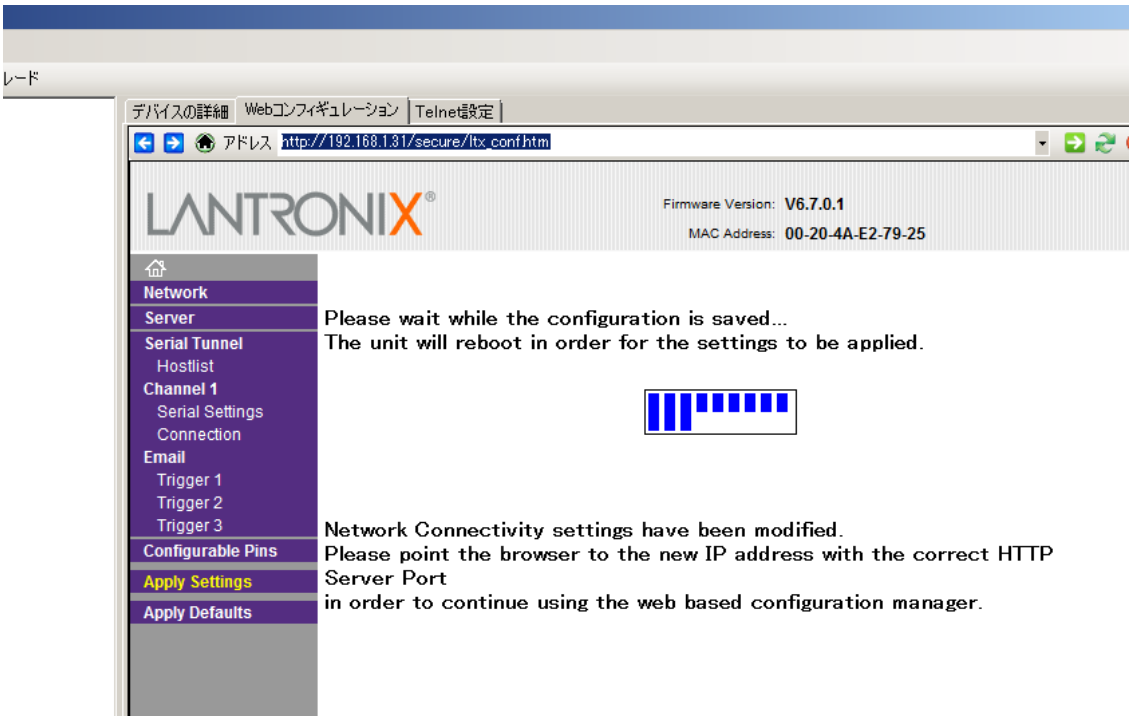
To reflect the settings, select “Apply Settings” from the menu on the left side of DeviceInstaller.



Then, LAN adapter will reboot.



The following screen appears when the program finished restarting LAN adapter and the settings should be reflected. You can exit DeviceInstaller program.



Now, you succeeded to be fixed your IP address.

2. How to fix your IP address from the mode of already fixed your IP address

When the terminal is provided a static IP address, you can change the settings of LAN adapter by connecting the PC installed DeviceInstaller to the same network as the terminal, and then run DeviceInstaller.

You need to assign a static IP address to the PC, and then connect to network.

Next, click Start of Windows on the PC for setting and select “All Programs” →“Lantronix”→”DeviceInstaller4.3”→”DeviceInstaller” to start the program.

You can find the device named “Xport”. See previous section of “How to fix your IP address from the mode of default settings or of automatically assigned IP address” and follow the steps to change IP address.

Appendix

A-1 Introduction of CGGTTS Format

A-2 CGGTTS Header

A-3 CGGTTS Data part

A-4 Schedule of CGGTTS Format

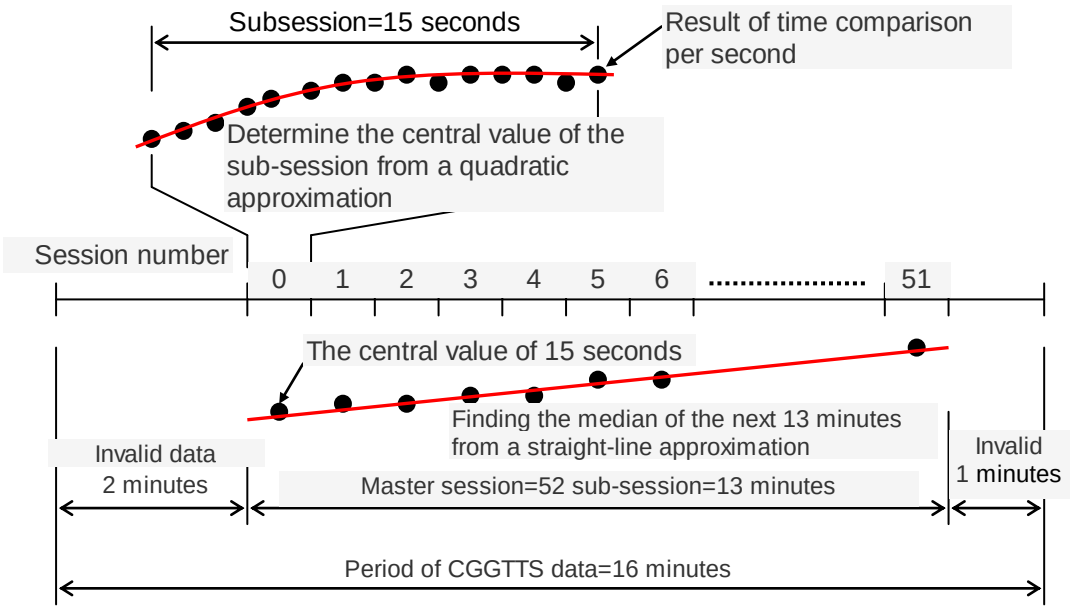
A-5 Install Lantronix software “DeviceInstaller”

A-1 Introduction of CGGTTS Format

This terminal is adopted CGGTTS format (Common GPS/GLONASS Time Transfer Standard format), which is the international standard format of time comparison by GPS satellites. Not only the synchronization control of internal clock, but also calibration are executed with CGGTTS format. Time comparison data can be confirmed by CGGTTS format.

CGGTTS format repeats 15-seconds data acquisition 52 times, and the total of 13 minutes consists of one session and it becomes a unit of time comparison.
Period of the session is 16 minutes.

Definition of time comparison by CGGTTS format



CGGTTS format creates a file of all satellites a day, and the file is composed of header part and data part.

A-2 CGGTTS Header part

CGGTTS header is normally inserted at the beginning of the data.
However, when there is a change to any of the following parameters contained in the header, the header will be inserted again in the part of time.

CGGTTS Format Definition of header parameters

Label	Definition
CGGTTS…=	The version of the CGGTTS format
REV DATE =	The revision of the CGGTTS header format
RCVR =	The status of the receiver (manufacturer, device name, and version)
CH =	Number of received channels
IMS =	The status of the receiver
LAB =	Data station User ID is displayed when you ask the calibration. It will be blank when you do not enter user ID.
X =	Coordinates of the receiver. X, Y and Z show the coordinates used for the time transfer. The coordinates show the determined values in the case of positioning mode, and the entered values by the user in the case of the fixed position mode.測
Y =	
Z =	
FRAME =	Indicates the Geodetic Reference Frame used. Usually the WGS-84 is used.
COMMENT =	Comment of the coordinates Navigation: Survey-In mode Fixed: Fix mode
INT DLY =	Internal delay
CAB DLY =	Cable delay
REF DLY =	Reference delay
REF =	Reference of time
CK SUM =	Check sum of header

A-3 CGGTTS Data part

CGGTTS section data is in the form of fixed-length string with 103 characters as a single line for 1 session /1 satellite.
A space is inserted between each parameter.

The list of parameter for CGGTTS data format

Label	Definition
PRN	the satellite vehicle PRN number
CL	the hexadecimal number that corresponds to the Common View class of the track
MJD	the five digit Modified Julian Date of the start of the track
STTIME	hour, minute, and second (in UTC) of the start of the track
TRKL	the track length in seconds (a full track is 780 seconds)
EVL	the elevation of the satellite at the midpoint of the track
AZTH	the azimuth of the satellite at the midpoint of the track
REFSV	the time difference (measured in .1 nanosecond) between the laboratory reference clock and satellite time, referred to the midpoint of the pass via a linear fit
SRSV	the slope determined via the linear fit to produce REFSV (measured in .1 picosecond per second)
REFGPS	the time difference (measured in .1 nanosecond) between the laboratory reference clock and GPS system time, referred to the midpoint of the pass via a linear fit
SRGPS	the slope determined via the linear fit to produce REFGPS (measured in .1 picosecond per second)
DSG	the root mean square of the residuals of the linear fit used to produce REFGPS
IOE	the index of ephemeris, a three digit decimal code indicating the ephemeris used for computations
MDTR	the modeled tropospheric delay (measured in .1 nanosecond) referred to the midpoint of the pass via a linear fit
SMDT	the slope determined via the linear fit to produce MDTR (measured in .1 picosecond per second)
MDIO	the modeled ionospheric delay (measured in .1 nanosecond) referred to the midpoint of the pass via a linear fit
SMDI	the slope determined via the linear fit to produce MDIO (measured in .1 picosecond per second)
CK	the data line check sum in hexadecimal format, computed as the sum of the ASCII values of the preceding 115 columns, modulo 256

When the value of each parameter exceeds the digits specified in CGGTTS format, the maximum/minimum value within the range of specification will be displayed.

Example: SRSV > 9999.9[ps/s] → 99999
SMDI < -99.9 [ps/s] → -999

A-4 Schedule of CGGTTS Format

The following table shows CGGTTS schedule.

Example of schedule (Variable schedule of 359 days period)

Year/Month /Day	MJD	Session 1		Session 2		Session 89		Session 90		Session 91	
		Start	End	Start	End	Start	End	Start	End	Start	End
:	:	:	:	:	:	:	:	:	:	:	:
2006/08/01	53948	00:10	00:19	00:22	00:35	23:34	23:47	23:50	00:03		
2006/08/02	53949	00:06	00:15	00:18	00:31	23:30	23:43	23:46	23:59		
2006/08/03	53950	00:02	00:11	00:14	00:27	23:26	23:39	23:42	23:55		
2006/08/04	53951	23:58	00:07	00:10	00:23	23:22	23:35	23:38	23:51	23:54	00:03
2006/08/05	53952	00:06	00:19	00:22	00:35	23:34	23:47	23:50	23:59		
2006/08/06	53953	00:02	00:15	00:18	00:31	23:30	23:43	23:46	23:55		
2006/08/07	53954	23:58	00:11	00:14	00:27	23:26	23:39	23:42	23:51	23:54	00:07
2006/08/08	53955	00:10	00:23	00:26	00:39	23:38	23:47	23:50	00:03		
2006/08/09	53956	00:06	00:19	00:22	00:35	23:34	23:43	23:46	23:59		
2006/08/10	53957	00:02	00:15	00:18	00:31	23:30	23:39	23:42	23:55		
2006/08/11	53958	23:58	00:11	00:14	00:27	23:26	23:35	23:38	23:51	23:54	00:07
:	:	:	:	:	:	:	:	:	:	:	:
2007/07/22	54303	00:10	00:23	00:26	00:35	23:34	23:47	23:50	00:03		
2007/07/23	54304	00:06	00:19	00:22	00:31	23:30	23:43	23:46	23:59		
2007/07/24	54305	00:02	00:15	00:18	00:27	23:26	23:39	23:42	23:55		
2007/07/25	54306	23:58	00:11	00:14	00:23	23:22	23:35	23:38	23:51	23:54	00:07
2007/07/26	54307	00:10	00:19	00:22	00:35	23:34	23:47	23:50	00:03		
2007/07/27	54308	00:06	00:15	00:18	00:31	23:30	23:43	23:46	23:59		
2007/07/28	54309	00:02	00:11	00:14	00:27	23:26	23:39	23:42	23:55		
2007/07/29	54310	23:58	00:07	00:10	00:23	23:22	23:35	23:38	23:51	23:54	00:03
2007/07/30	54311	00:06	00:19	00:22	00:35	23:34	23:47	23:50	23:59		
2007/07/31	54312	00:02	00:15	00:18	00:31	23:30	23:43	23:46	23:55		
2007/08/01	54313	23:58	00:11	00:14	00:27	23:26	23:39	23:42	23:51	23:54	00:07
:	:	:	:	:	:	:	:	:	:	:	:

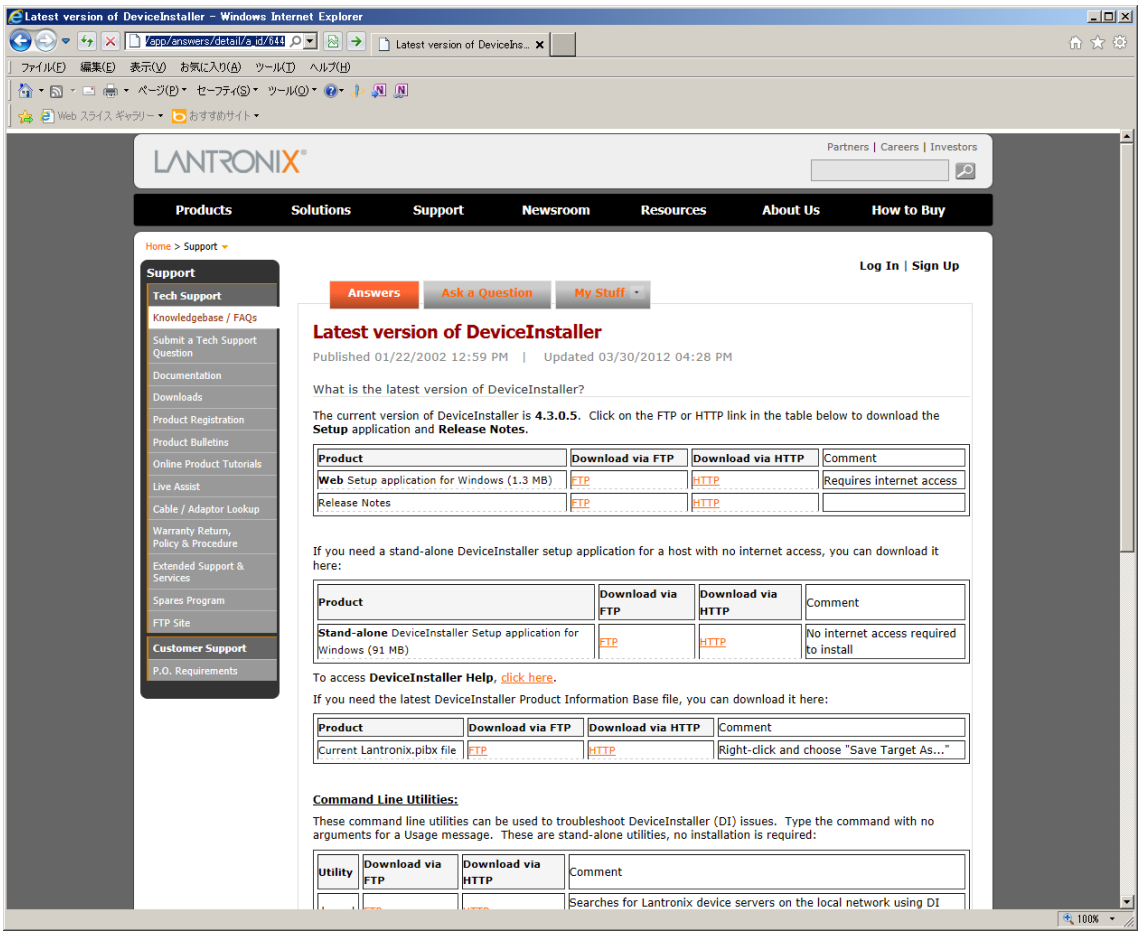
*Between the yellow cells of above is 9 minutes (540 seconds) short schedule.

A-5 Install Lantronix software “DeviceInstaller”

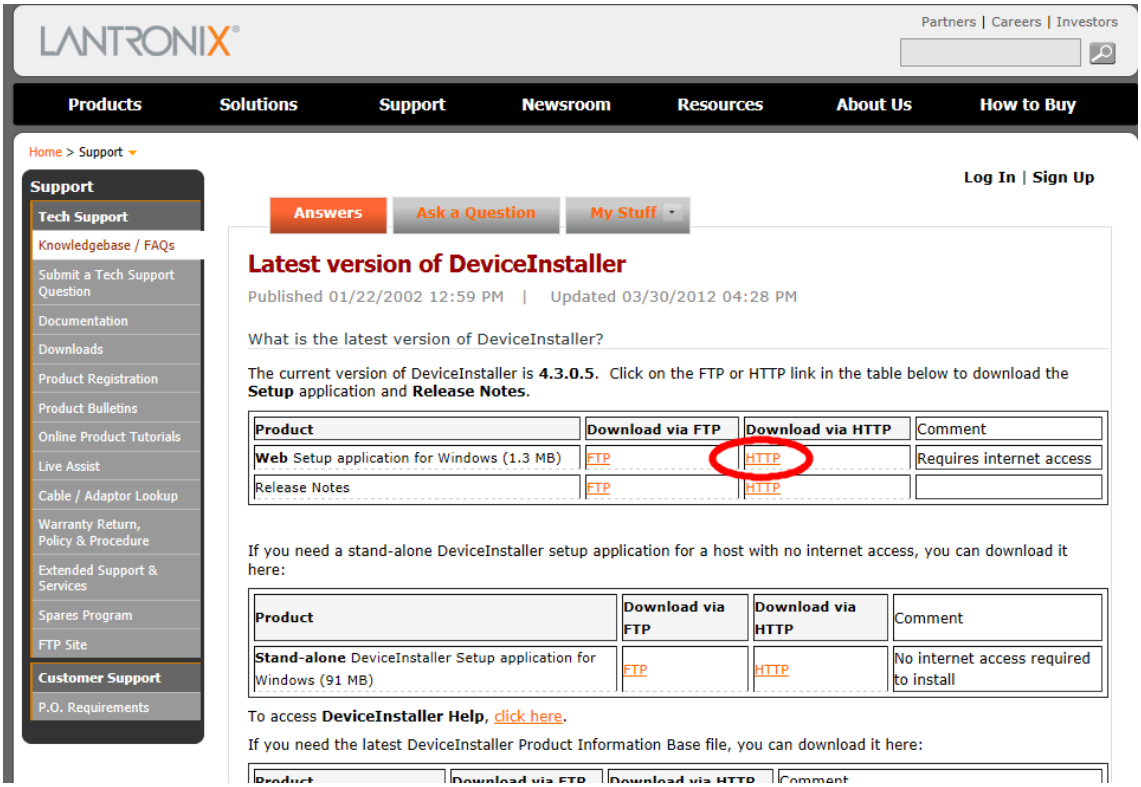
The following steps show how to install Lantronix’s DeviceInstaller to a PC for setting IP address of the terminal.

Download DeviceInstaller from the following website, and then install it.

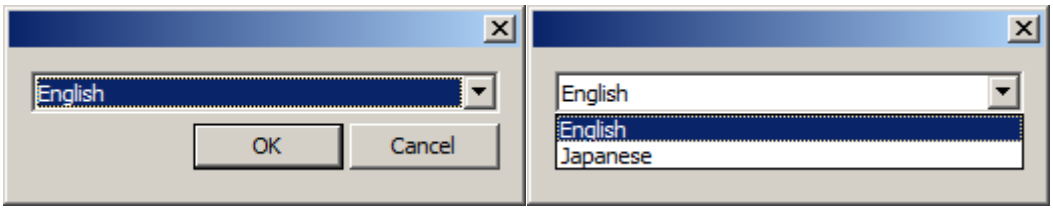
http://ltxfaq.custhelp.com/app/answers/detail/a_id/644



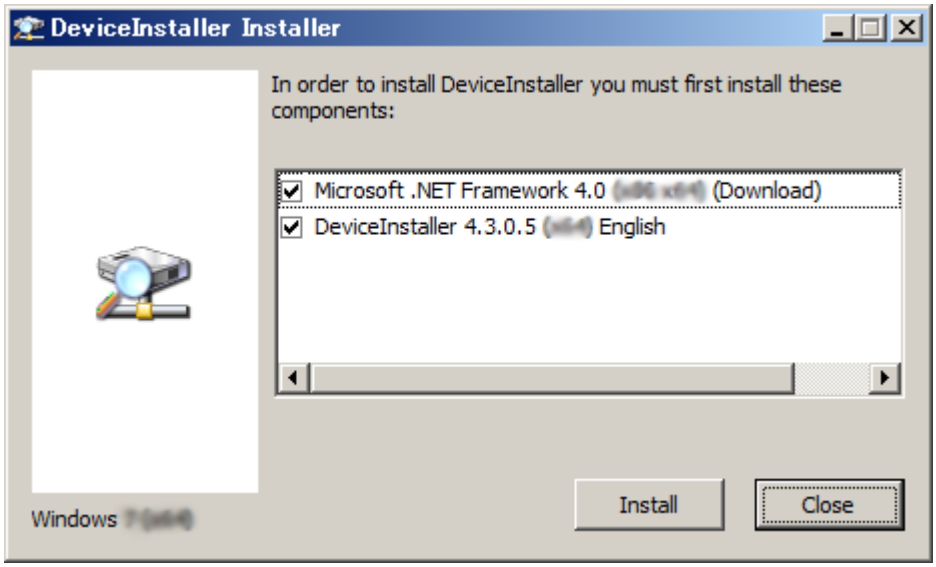
Select “WEB Setup application for Windows(1.3MB)” here, and then start installation.



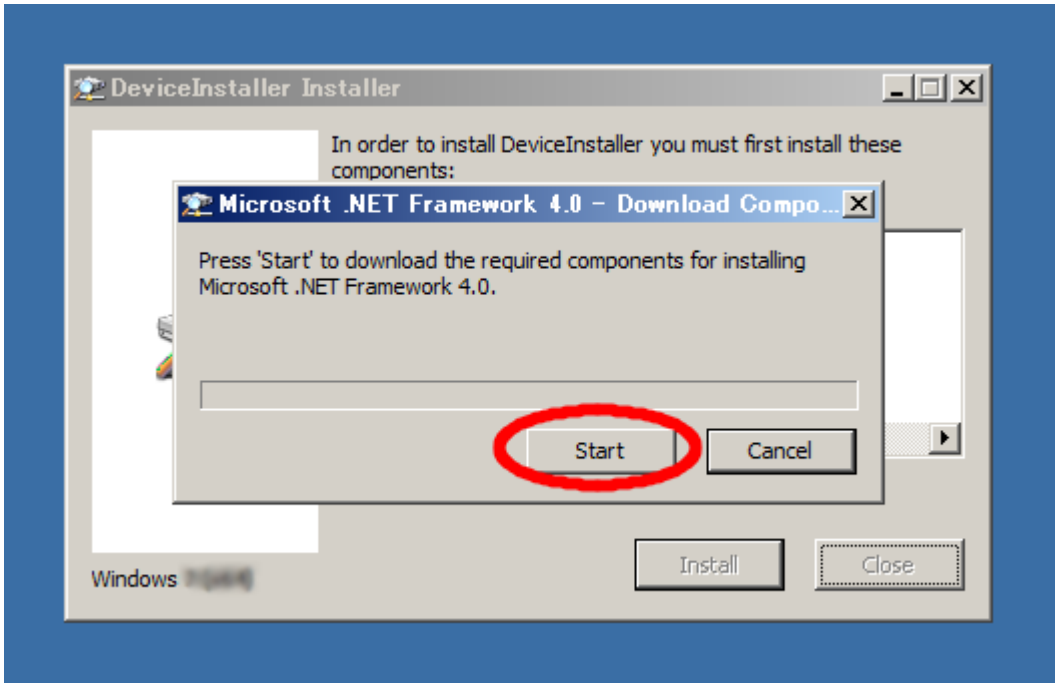
You can select language from English and Japanese during installation.



The following screen will appear.

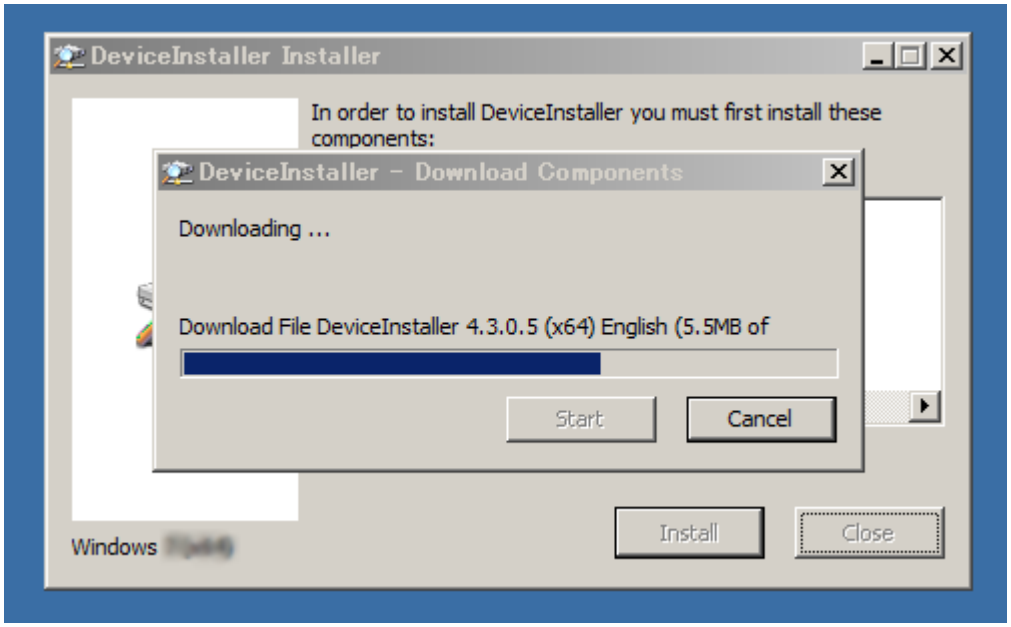


Install '.NET framework' of Microsoft and DeviceInstaller. When '.NET framework' has already been installed, you will install only DeviceInstaller.

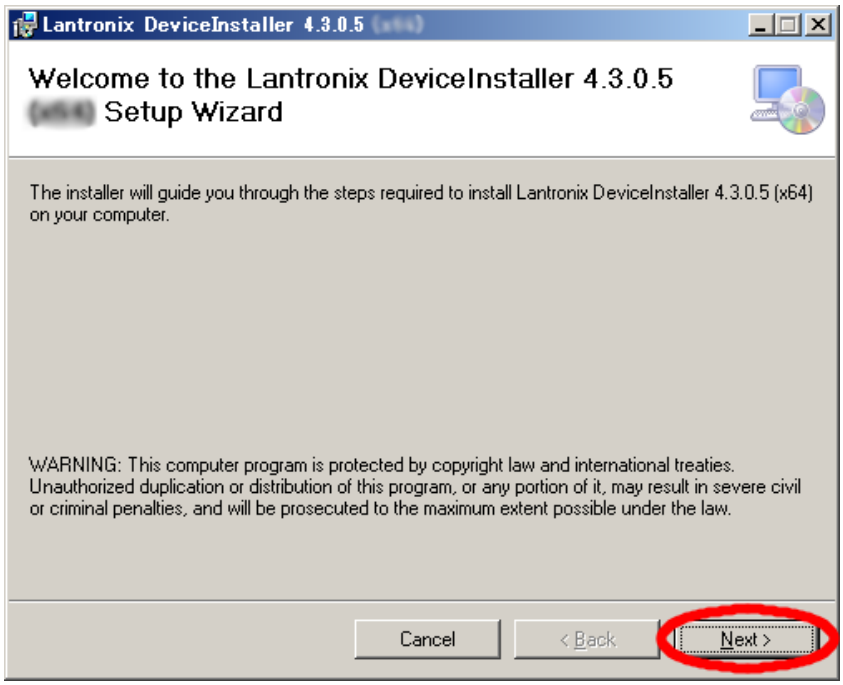


Make sure you click Start to start installing .NET framework.

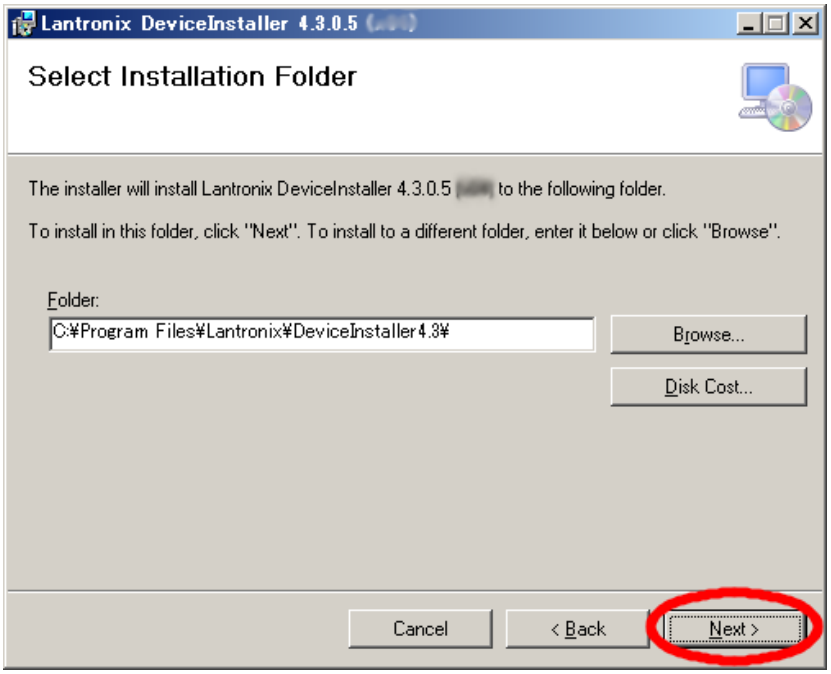
Click **Finish** when you have installed .NET framework, it will start to download DeviceInstaller.



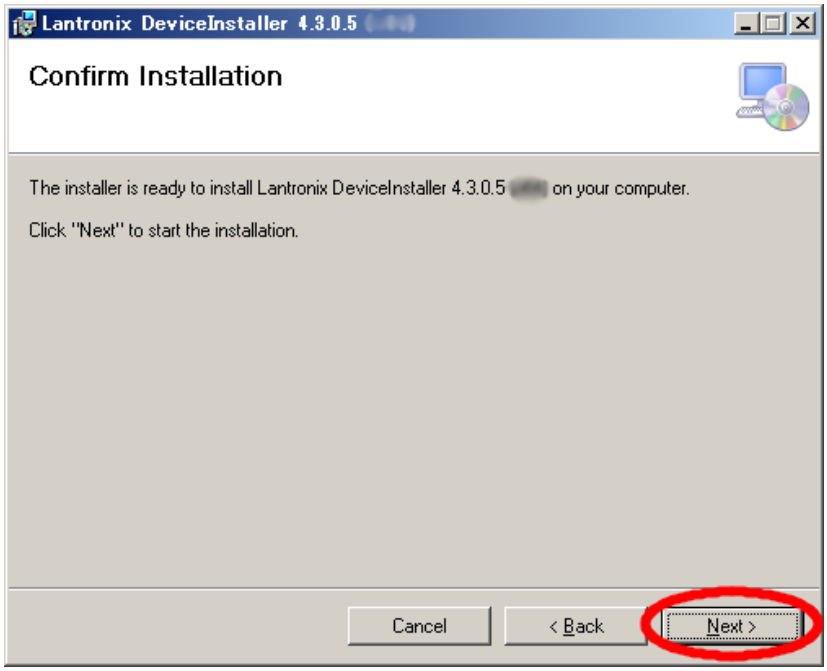
When the download is complete, the setup wizard will start.



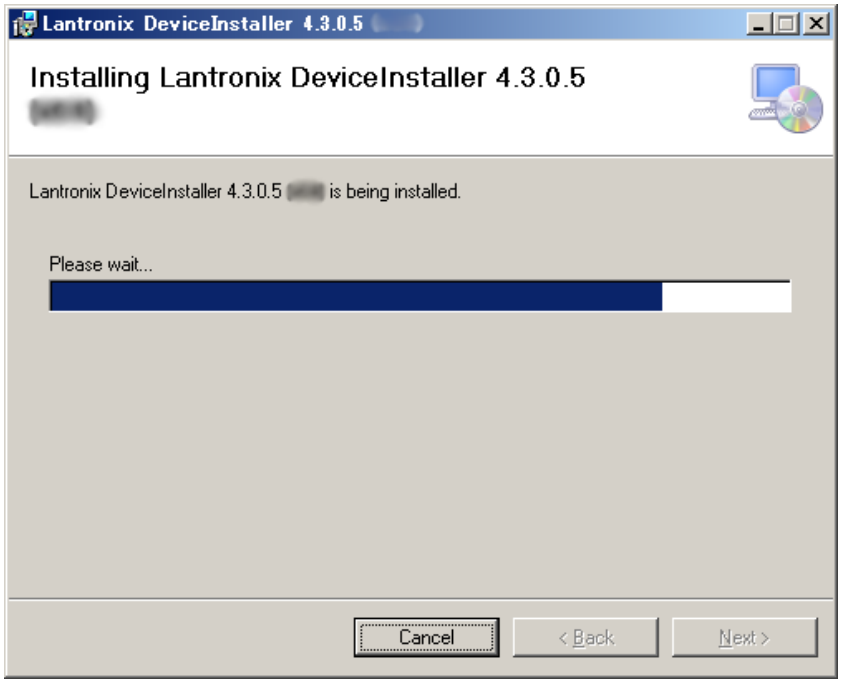
Click **Next** to continue.



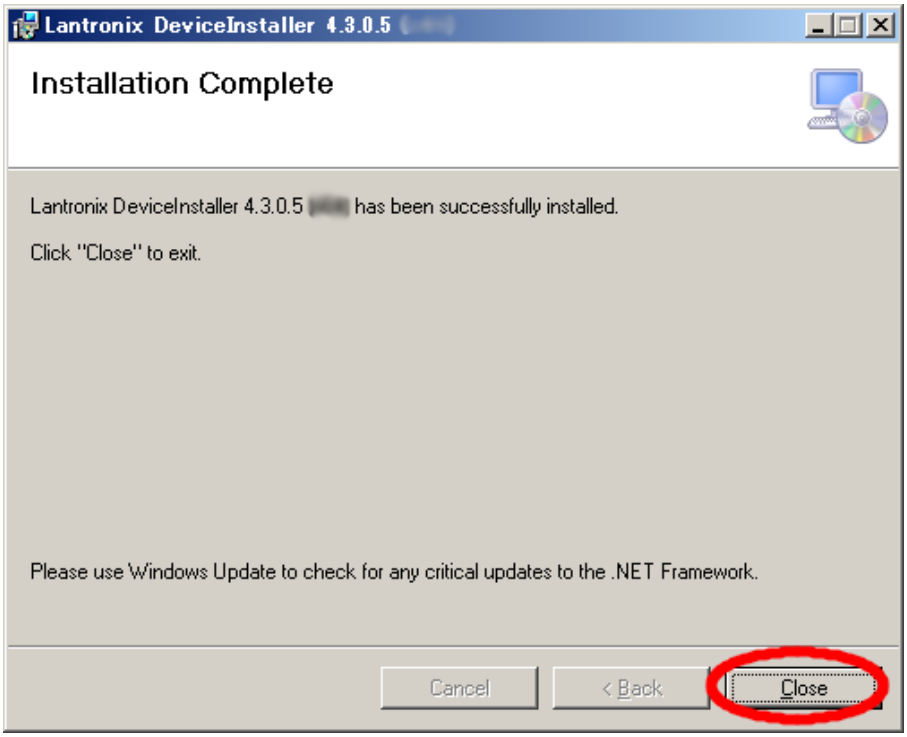
Click **Next** to continue when you do not need to change the destination.



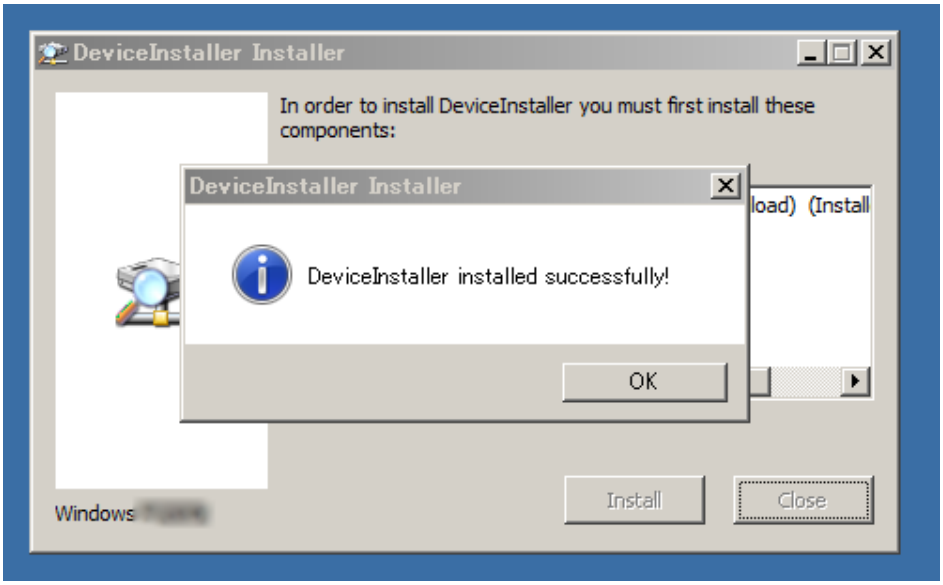
Click **Next** here to start installing.



While Installing DeviceInstaller , the screen above appears.



Click Close when finished installation, the screen below will appear.



Now you have finished installing DeviceInstaller.
To operate this software, see 10.10 Setting IP address.

＜Revision History＞

Rev. Date	Version	Change	Author
2012.6.5.		First English Version Released.	Y.Fujii
6.13.	2.0	Version number is added	Y.Fujii
8.3.	2.01	Change the reference output level written in “3. Specifications and recommended operating condition” section from 13dBm±2dBm to 7dBm±2dBm, and Add comment to “10.3 Data Logging” section.	Y.Fujii
8.29	2.02	Add A (Adapter) type products and delete the character “S” in the title. Changed default post address of section 10.0.1, and modified the specification.	Y.Fujii