User Manual

QEEG-64FX

Electroencephalogram

LAXTHA
www.laxtha.com

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Thank you very much for purchasing our LAXTHA INC.. products.
LAXTHA INC .. products are designed and manufactured to meet the standards for electromagnetic, electrical and mechanical safety. In order to ensure safety, reproducibility and suitability of the product, please be aware of the following points.

- Installation, training, service, new setup or repair should be performed by a trained specialist at headquarters or head office.
- The electrical installation of the place where the product is placed must meet the requirements of this manual.
- This product should be used according to the intended use.
- Please read this document before using the product.

We are not responsible for problems caused by unauthorized use of the product, including modifications to the product's hardware and software, without the written permission of LAXTHA INC.. To improve the product, some of the contents of this document are examinee to change without notice.

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For faster and more accurate service, make a note of the product serial number (S / N), date of purchase, and source of supply information on the back or bottom of the product. It is recommended that this document be placed as close to the product as possible.

Product Serial number (S / N) : _____

Date and place of purchase : _____

LAXTHA

QEEG-64FX User Manual

64 channel computerized EEG measurement system

Contents

1. Safety Information

1-1. summary

When operating, servicing, and repair this unit, observe the general safety precautions mentioned in this chapter. Failure to follow the mentioned safety instructions or the specific precautions contained in this manual will constitute a breach of safety standards for the design, manufacture and use of this device. LAXTHA INC.. is not responsible for any problems resulting from violations of the user's safety regulations.

It is recommended that you read this manual thoroughly before using this unit to safely and fully.

1-2. Safety symbol

This document and the product uses the following symbols for safe use. Please understand the meaning of the symbol correctly..

symbols	Meaning
	**Manual symbols** If the user needs to refer to this manual, this symbol is displayed at the appropriate location on the product.
	**Equipotential grounding symbol** Indicates the terminals that are connected to the equipment or metal that need to be configured with this unit.
	**BF type mounting part symbol** If there is no direct electrical connection to the heart, this means that the input electrode is suitable for attaching to the body.
Warnings	**Warnings** alert the user or the patient to any action or situation that may cause physical danger.
Caution	**Caution** does not cause physical danger, but it informs you of any action or circumstance that may damage the device, provide incorrect values, or perform unsuitable procedures.
Notice	*Notice* indicates important information. Note the procedures, practices or conditions that need to be highlighted.

1-3. Protection type and degree of protection against lightning

The protection type and degree of protection against lightning of this unit are as follows.

Protective type against lightning : 2nd grade
Degree of protection against lightning : BF

Warnings

This equipment is not suitable for use in conjunction with equipment that may affect electromagnetic waves, such as cardiovascular, mobile phones, and electrosurgical equipment. In addition, do not use this device with persons using a pacemaker . Although it is safe in principle, it has not yet been verified that this device directly affects the three-ply assist device.
This equipment is not suitable for use in conjunction with equipment that may affect the magnetic field, such as MRI.

1-4. Precautions

Computer connection

Because it is a device that is connected to a computer, it is recommended to use a computer with a safety rating higher than BF or use a computer that uses its own power. Alternatively, you can use an isolation transformer to power both the computer and the equipment. If not, the examinee must be at least 1.83 meters (or more) from the touchable metal surface of the computer to avoid contact with the computer. If it is difficult to obtain a safe distance, the examinee should not touch the computer directly in any case.

General precautions

- Do not use in any circumstance where there is a risk of explosion. Where flammable

gases or similar substances are present, it is recommended that storage and use are prohibited.

- After the power is applied, do not touch the inside of the unit. The user must not remove the enclosure from the unit and any replacement or internal adjustment of the part must be performed by qualified service personnel. Do not replace parts if power is connected. Depending on the situation, there may be a dangerous level of voltage even if the power is disconnected. To prevent accidents, always disconnect the power supply and discharge external power before touching the components.
- Do not repair or adjust it alone. Do not attempt internal repairs or adjustments unless you have an agent capable of performing first aid
- Do not change other components or change the unit. Do not change the unit or replace parts that are not allowed, as additional risks may occur. If service and repairs are required to maintain safety, please send your device to LAXTHA INC.. store or headquarters. See Chapter 9 for information on service policies.
- In particular, do not modify or modify performance, structure, rating, appearance, or dimensions. This is not only a safety hazard, it is also a violation of the buyer / user's rights.
- Do not attempt to handle power with wet hands. There is a danger of electric shock.
- Store damaged or defective devices in a safe place to prevent unintentional use.

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Precautions for use

- Please check this document for proper wiring before use
- Do not disassemble the electrode or device. Service and repairs may only be carried out by qualified personnel.
- Various conductors are connected to each other. Be careful of wiring according to each connection method.
- Do not use anything other than electrode wires and electrodes that are equipped for use. This can result in incorrect measurement results.
- Be careful not to contaminate the electrodes and electrode wires. Do not use contaminated electrodes and electrode wires, please purchase a new one. These items can be purchased separately.
- Avoid using the product that appears to be an allergic reaction due to electrode skin contact.
- To prevent this unit from being affected by external vibrations, use the unit on a flat, stable surface.
- Ensure that the examinee does not move during the measurement. Noise can be caused by body movements
- Maintain a stable state of mind and body before measurement for normal measurement results. Beverages, visual stimuli, auditory stimuli, excited psychological states, and exercises that affect the heartbeat can affect measurement results.
- This equipment complies with the common specification for electromagnetic interference. Even so, it may be affected by electromagnetic interference (EMI) by other neighboring equipment. If this happens, please try the following: (1) Increase the distance between the affected devices. (2) Adjust the direction of the equipment connection line. (3) Connect the machine power supply line to a different outlet.
- If the measurement signal appears abnormal, check that the electrodes are properly attached and properly positioned. In particular, the correct attachment of a functional grounding electrode to the human body is critical to obtaining accurate signals. If noise is present in the signal too much, check the electrode attachment. Also consider the suitability of the installation site.
- If an error occurs during operation, turn off the device immediately. After removing all the electrodes attached to the examinee, please contact the distributor or the company that purchased the product.

2. General information

2-1. Product Information

This product can measure up to 64 channels of EEG signals and can measure EOG, ECG and EMG on 3 channels of auxiliary channels. Each signal is displayed on the screen through a computer connected to the unit. The sensitivity can be adjusted according to the signal size, and the signal acquisition speed can be adjusted. If necessary, raw signals can be processed to obtain relevant information.

2-2. Product Features

High-precision multi-channel broadband bioelectric signal measurement system

- Broadband measurement: DC ~ 1000Hz.
- Ultra low noise: ~0.2uVrms @ 250Hz sampling. ~0.5uVrms @ 2000Hz sampling.
- High precision digitizing: 24bit Resolution.
- High sampling frequency: 250Hz/500Hz/1000Hz/2000Hz.
- Channel-to-channel gain uniformity: 0.01% Within.
- Filter selection function: Applicable to HPF, LPF and Notch filters to suit the signal to be measured.
- Low-pass filter: Apply a filter that minimizes signal distortion.
- Auto calibration: Automatic calibration within 2 minutes in user environment. Gain uniformity automatic compensation, internal short offset auto zero adjustment, external short offset voltage auto zero adjustment. Compensation signal offset automatic zeroing.
- EEG measurement channel: 64 channels. Monopolar. Reference electrodes A1, A2, Cz can be selected. (Can be changed according to the number of channels.)
- EEG electrode / cap electrode can be used.
- Number of auxiliary channels: 3 channels. Bipolar. EOG, ECG, EMG can be measured arbitrarily.
- Electrodes - Skin contact information: Device electrode connection LED display of contact information LED of each electrode.
- Electrode - Skin Impedance: All electrodes - skin impedance precision measurement.

Can expand the number of channels

The measuring instrument is designed to be scalable according to the user's application. It can be expanded to 8, 16, 24, 32, 40, 48, 56, 64 channels and can be added as needed.

Low power / Portable / Easy installation / Easy measurement

Since the measuring equipment is connected to the user's computer using only a USB communication cable, installation is very simple and can be used by anyone. By attaching an electrode to the scalp, connecting the instrument to the PC, you can measure EEG. In addition to connecting the electrodes, you do not have to do anything else, so even beginners can easily measure.

Convenient graphical user experience

The interface of the TeleScan program, which collects and analyzes EEG data, is designed to be easily accessible for anyone to easily collect and analyze EEG data.

Various stimulation setting function

You can use the visual and auditory stimulation that you want with the function that can be used when collecting data while stimulating the examinee in EEG data collection. You can set various types of stimulation such as sound, music, text, pictures, video, etc. at the frequency and interval that you want.

Powerful analysis capabilities

The TeleScan program, which works with the device, provides about 50 different methods to meet various EEG needs.

Remote auto update - easy maintenance

- TeleScan software automatic remote update.
- Automatic remote firmware update of the device.

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2-3. Product Components

The overall configuration of the product is shown below. Actual details of each component may differ from the pictures below. After opening the product box, make sure that you have all of the following components.

Turn	Designation	View	Explanation
1	QEEG-64FX		It collects the EEG measured by the electrodes attached to the scalp and sends them to the user's computer. Connect the electrode attached to the scalp to the device. The device connects to the computer using a USB cable and transmits the measured EEG to the computer.
2	TeleScan		TeleScab is a program that can collect and analyze EEG data sent from the QEEG-64FX to the user's computer. User can observe data collection in real time, and can analyze various signals of EEG using about 50 analysis methods.
3	Disc electrode		This electrode is attached to the scalp using paste. 67 channels are provided including 64 channels of EEG electrodes, reference electrode (REF), and ground electrode (GND). * Number of disc electrodes by number of channels - 8channels : 11, 16channels : 19 - 24channels : 27, 32channels : 35 - 40channels : 43, 48channels : 51 - 56channels : 59, 64channels : 67

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4	Paste		It is a conductive medium used together with a disc electrode to reduce the electrode-skin contact resistance of the area to be measured and to help fix the electrode part of the examinee's scalp.
5	Snap electrode		Electrode for EOG 2 channel, ECG 1 channel. A total of 7 are provided, including a grounding electrode (GND). Used with disposable electrodes.
6	Disposable electrode		It is used connecting to snap electrode.
7	USB cable		This is a communication cable that connects the computer to the QEEG-64FX.
8	USB adapter		Adapter for external power supply. More than 40 channels are available.
8	LXCON01		Short device for automatic correction of DC offset.
9	Product manual		Product manual for QEEG-64FX. It largely consists of an overview, equipment description and measurement, TeleScan program description.

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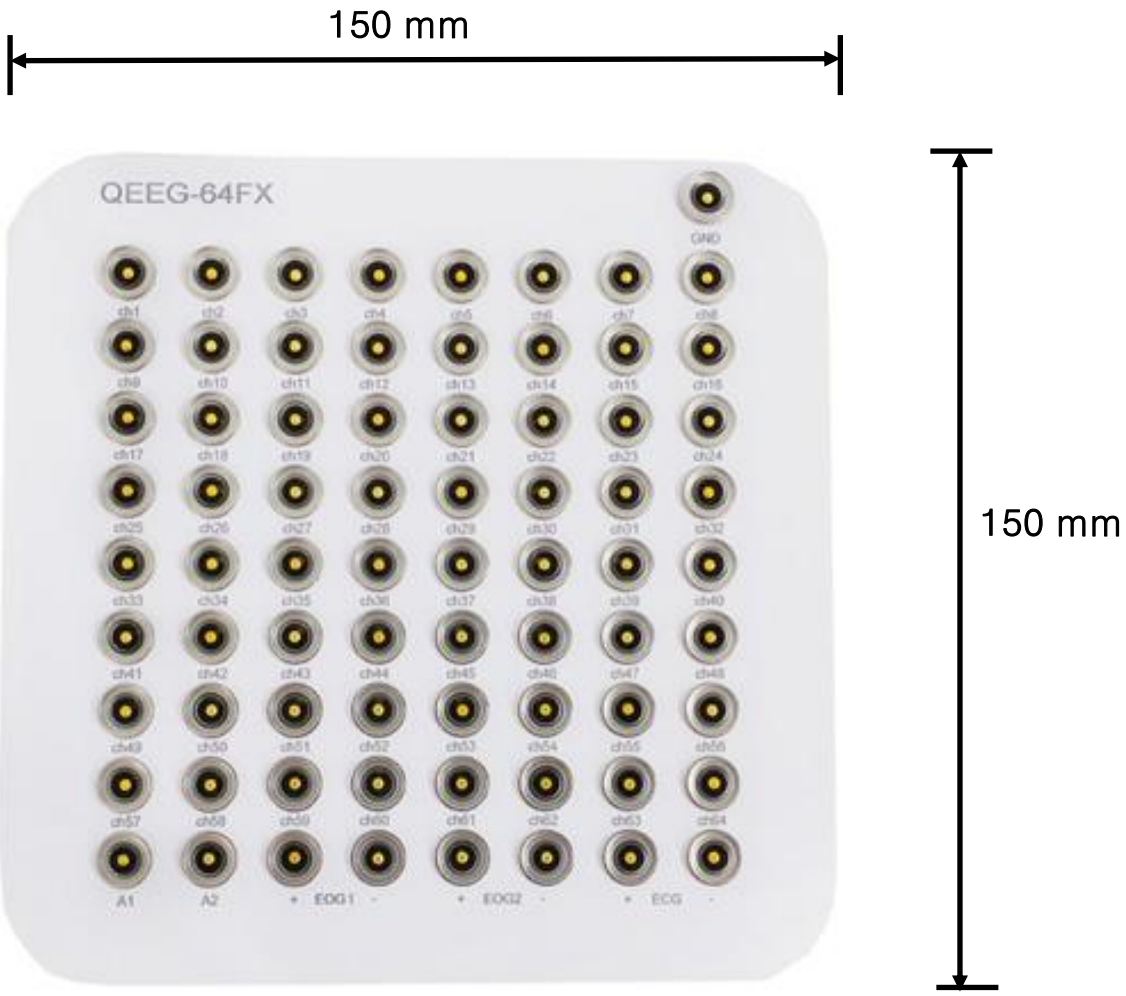
2-4. Appearance and Dimensions

Device front side



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Device side

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Device rear side

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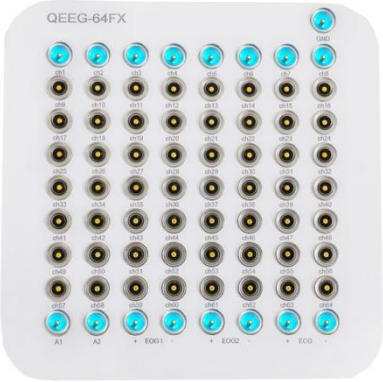
2-5. Channel Count Options

Number of EEG channels	EEG Reference electrode	Conversion frequency	Current Consumption	LED ON State
8channels	A1,A2,(A1+A2)/2	250,500,1K,2K/ch ;user selectable	230mA	
16channels	A1,A2,(A1+A2)/2	250,500,1K,2K/ch ;user selectable	250mA	
24channels	A1,A2,(A1+A2)/2, Cz(CH18)	250,500,1K,2K/ch ;user selectable	275mA	

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32channels	A1,A2,(A1+A2)/2, Cz(CH18)	250,500,1K,2K/ch ;user selectable	300mA	
40channels	A1,A2,(A1+A2)/2, Cz(CH18)	250,500,1K/ch ;user selectable	325mA	
48channels	A1,A2,(A1+A2)/2, Cz(CH18)	250,500,1K/ch ;user selectable	350mA	
56channels	A1,A2,(A1+A2)/2, Cz(CH18)	250,500,1K/ch ;user selectable	375mA	

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64channels	A1,A2,(A1+A2)/2, Cz(CH18)	250,500,1K/ch ;user selectable	400mA	

3. Product installation

3-1. Initial Inspection

Check configuration items

When you receive the product for the first time, check the outside of the package for damage. And make sure that all of the product configuration items are included in the package. If you find a missing item, notify your place of purchase and ask for a refund for the item.

Inspect mechanical defects outside the product

The product was found to be free from any mechanical or electrical defects through inspection prior to shipment. Check for damage that may have occurred during product transportation. Make sure that there are no obvious defects in the appearance of the product. If any defects are found, please contact the place of purchase. The place of purchase will take measures to exchange or repair according to the matter.

Inspect the interior of the product for defects

Ensure that there are no obvious signs of damage inside the product. tilt or swing the product, no sound that roll or shake should be heard product inside. If an unusual situation arises, contact the place of purchase and take the necessary action as well. Please stop the installation product, until the action is completed.

3-2. Hardware Installation

Installation environment

Select measuring room: Good measurement results often depend on the attitude and condition of the examinee. Next, because the physical and electrical environment is important, it is desirable that the measuring room be chosen as a possible location for those conditions. In most cases, there is not much freedom to choose, but user need the best possible compromise.

Physical environment: Ideally, the measuring room should be located in a quiet location in a building distant from the main road. It is advisable to have measurements in a quiet waiting room, a washroom, a comfortable bed or a chairs that you can lie down on. The device should be placed near the examinee and avoid direct eye contact with device. In addition, an environment that is too dry can create static electricity that can cause noiseIn a dry environment, it can cause problems even when walking on waxed floors or synthetic carpets, shaking objects, or even disturbing the air. In this case, the shielded room does not solve this problem either. Sufficient humidity must be maintained to prevent this situation.

Electrical environment: If you select the measuring room well, you do not need a shielding room. Avoid transformers, motors, or large current-carrying AC leads if possible. Radio frequency sources such as high frequency therapy devices and induction coil therapy devices should also be avoided.

A power source

Connect to the computer USB port using the USB cable provided to supply power to the unit.

Warning

Do not handle the USB cable with wet hands. There is a danger of electric shock.

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Device installation procedure

1. Connect device to computer: Place the device in a well-selected location. Place the bottom of the unit on a flat surface so that the unit does not slip well. The bottom of the unit is equipped with anti-slip feet.

Step 1		Connect the USB cable to the device.
Step 2		Connect the USB cable to your computer.

Caution

Connect the polarity of the USB connector to match. If the polarity does not match, do not try to force the connection. Incorrect connection of the USB connector may cause Out of service of device or malfunction.

For accurate and correct operation, connect to computer directly, if possible, without going through a USB hub. Also, please use a dedicated wire that does not exceed 3m in length.

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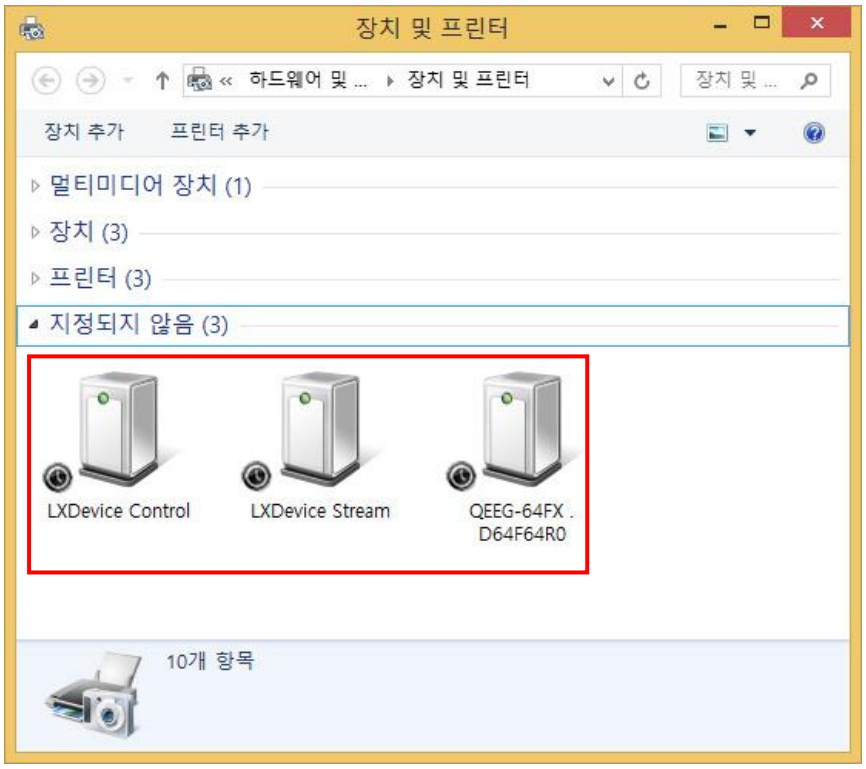
2. Installing Device Drivers: When you connect your device to your computer, the Device Driver Software Installation screen appears in the lower right corner. The time for installing the device driver varies depending on the computer environment and specifications.



Caution

Wait for the three drivers to complete the installation. Once the watch shape prototype is removed, the installation is complete.

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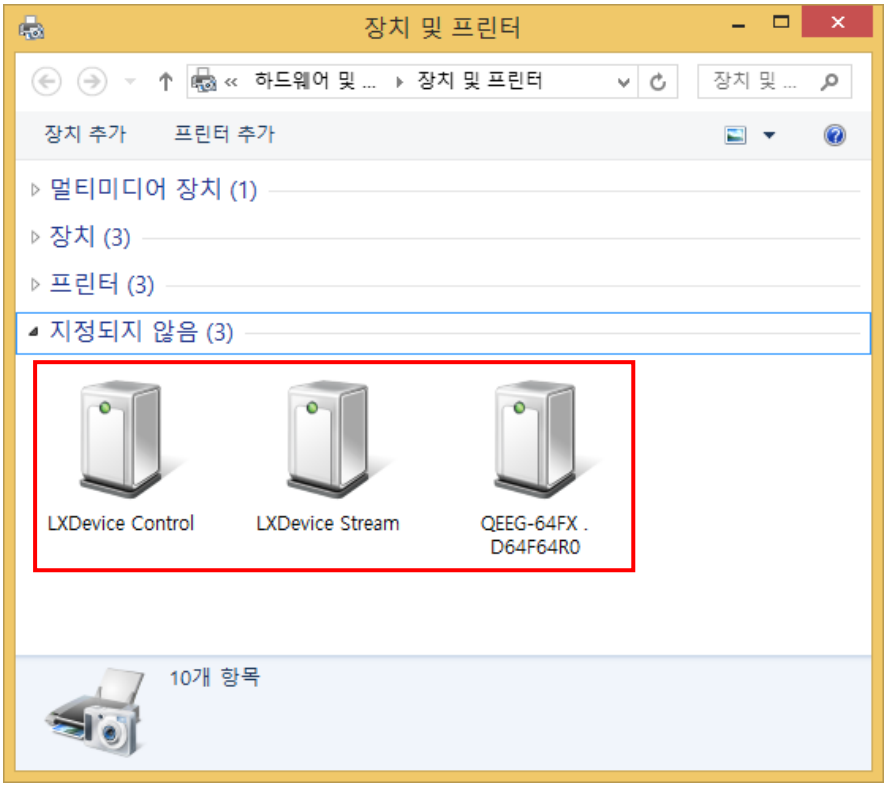
Installed status can be checked in **[Control Panel - Hardware and Sound - Devices and Printers]**.



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3. Automatic installation of QEEG-64FX device drivers : Since QEEG-64FX's Windows device driver has received WHQL certification from MS company, if user connects QEEG-64FX to PC without USB driver installation, driver installation process is automatically started by connecting to MS server .

4. Installing the QEEG-64FX Device Driver Manually : In the following situations, the user must manually install the device driver manually.

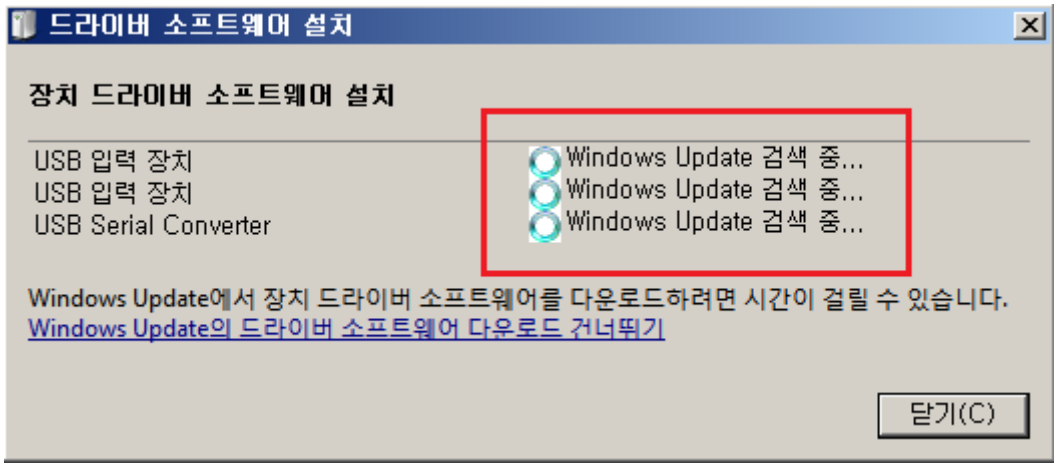
[If you need to manually install the QEEG-64FX device driver]

1) PC is not connected to the Internet.

2) There is a problem with the automatic installation process depending on the user's PC environment and the Internet environment.

An example of a problem situation.

- The drive installation process (screen below) is automatically completed within one minute after the QEEG-64FX is connected to the PC, but the driver installation does not take more than five minutes to complete. If this situation is occur, Device Drivers should be manually installed.



[How to Install QEEG-64FX Device Drivers Manually]

- The following procedure can be performed only once on a PC, using the device.

Step1. State of QEEG-64Fx's USB not connect to PC.

Step2. Disable automatic installation function of device driver on PC.

Step3. QEEG-64FX Device driver install manually.

Step4. After Step3), When QEEG-64FX is connected to PC via USB, normal recognition of QEEG-64FX is handled on PC.

Step5. Return the settings that were disabled in Step2) to the original state.

- To restore User PC environment to its original state.

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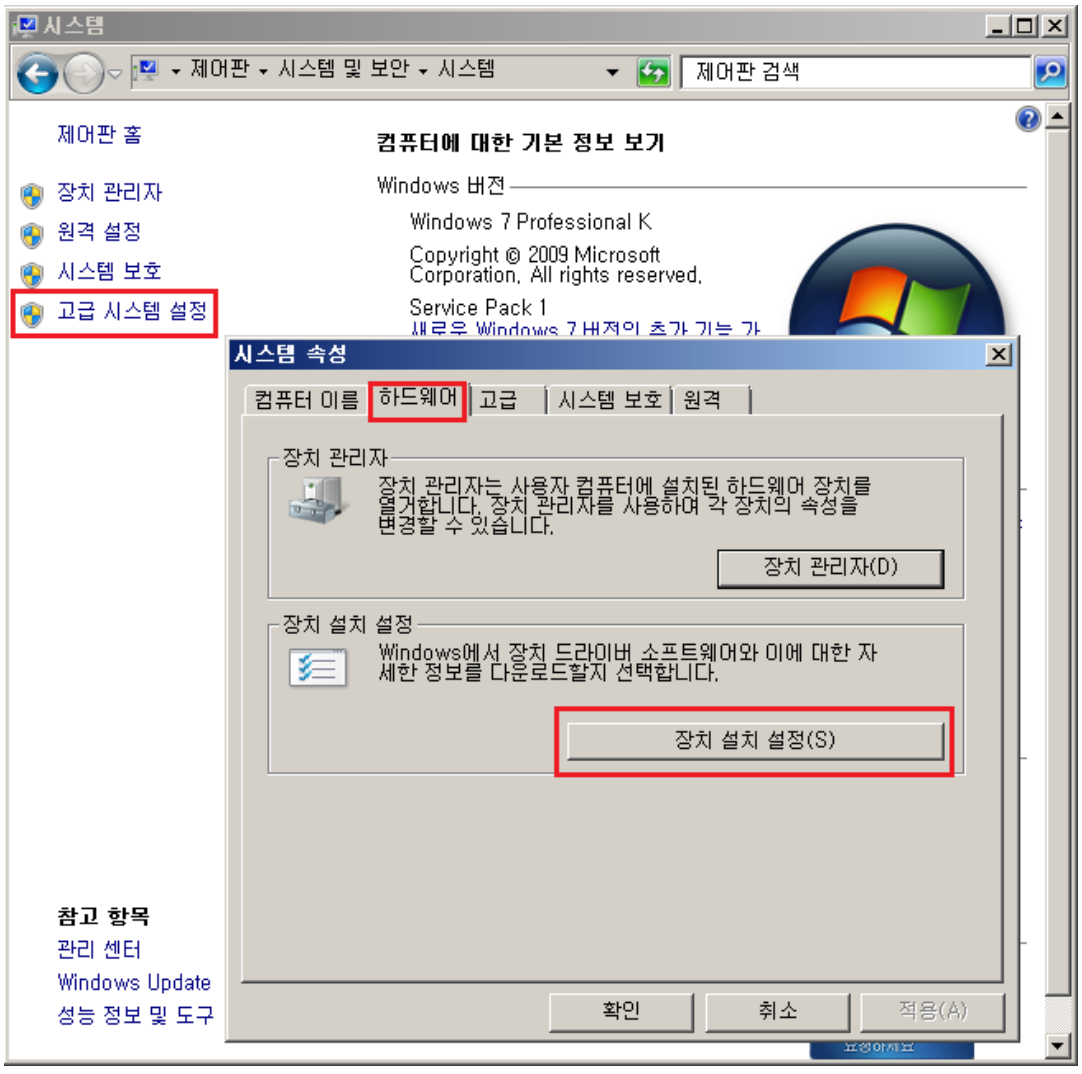
[Detail of Step2 and Step3]

Detail of Step2 . Disable automatic installation function of device driver on PC.

[How to disable automatic installation function of device drivers in Windows 7.]

[Start - Right click on the computer - Properties], the system window will pop up as shown below.
Click System Settings on the left side of the system window to open the System Properties window.



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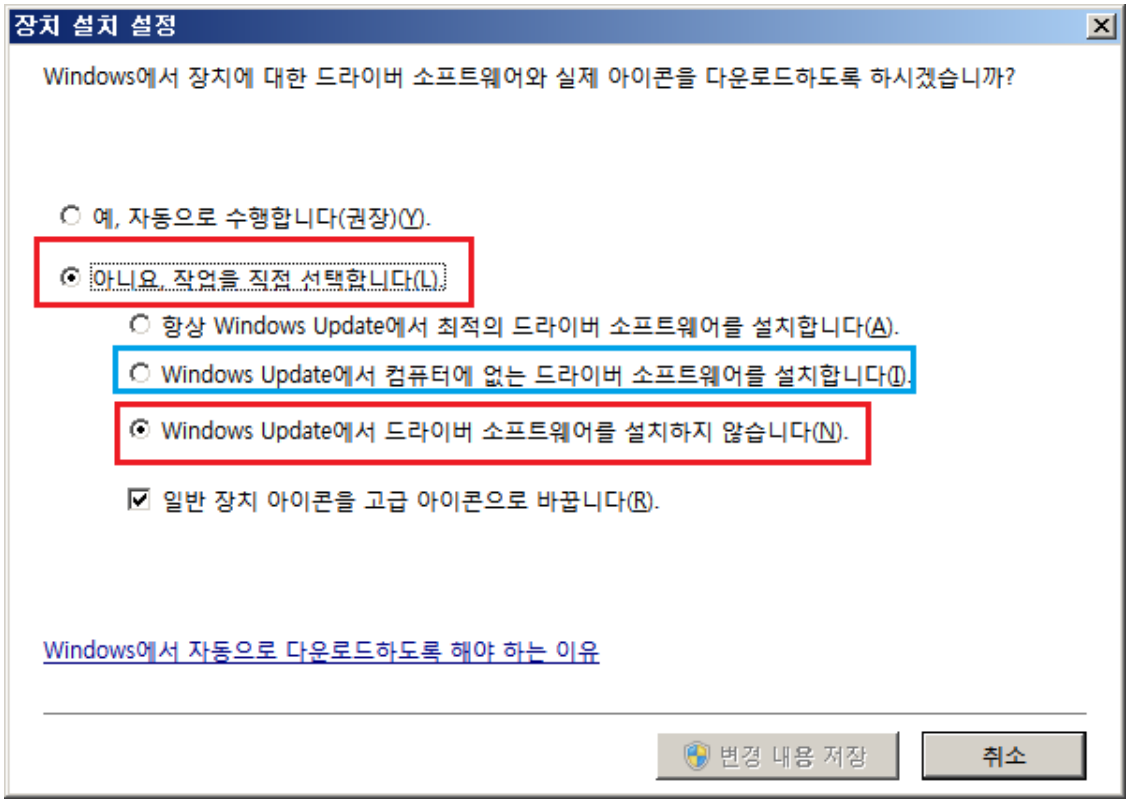
If you click the [Hardware - Button "Device Installation Settings]" tab in the System Properties window, the device installation settings will appear as shown in the figure below.

Select the option "No, I will choose the task myself" and select the red box with the detailed options "Do not install the driver software on Windows Update."



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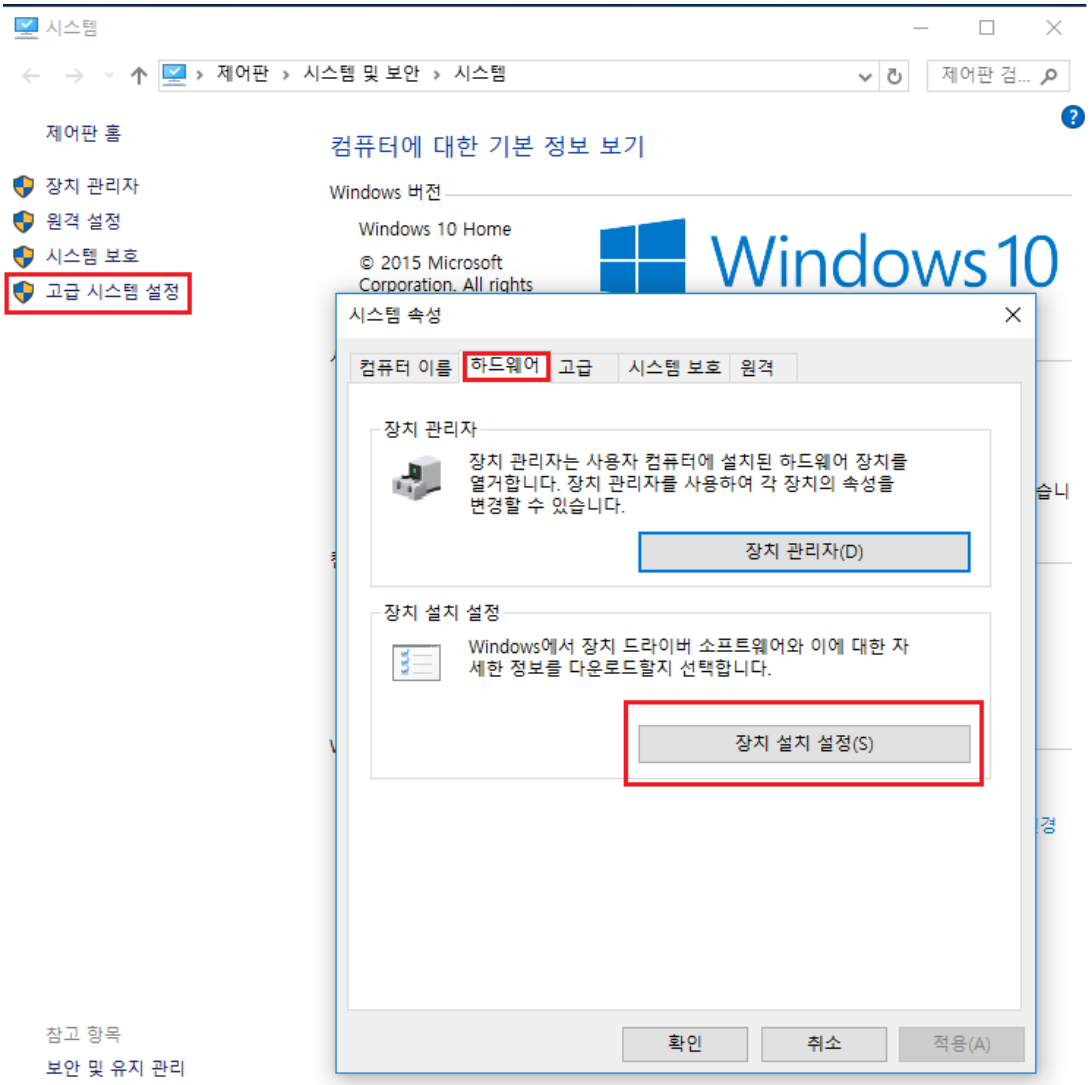
[How to disable the automatic installation fucntion of device drivers in Windows 8 / 8.1 / 10.]

Click the [Start - Right click on the computer - Properties], the system window will pop up as shown below. Click on "Advanced System Settings" on the left side of the system window and the "System Properties" window will appear.



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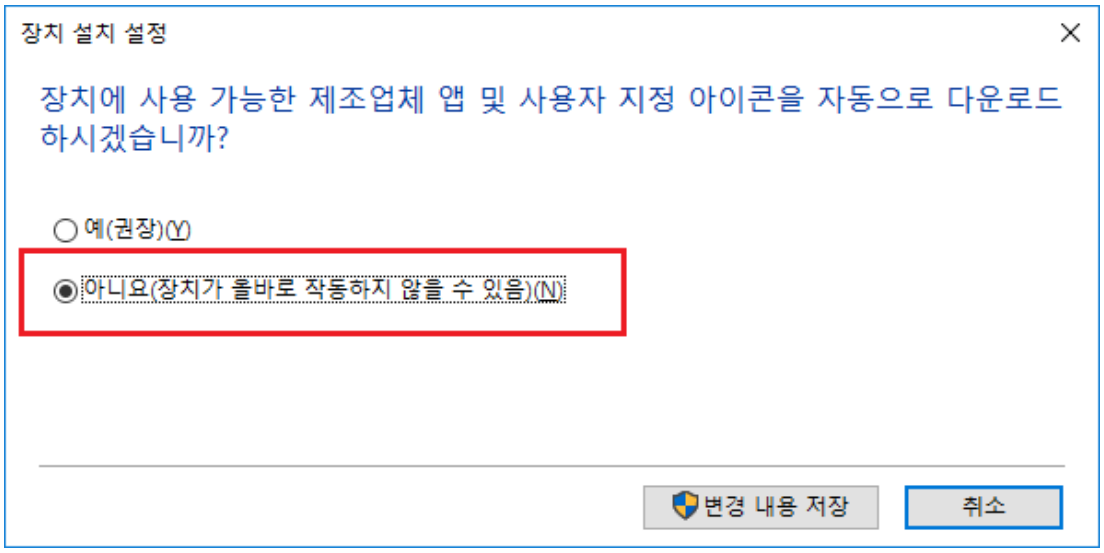
Select "No" in the "Device Installation Settings" (shown below) by clicking the button device installation setting in the above picture, and save the changes.



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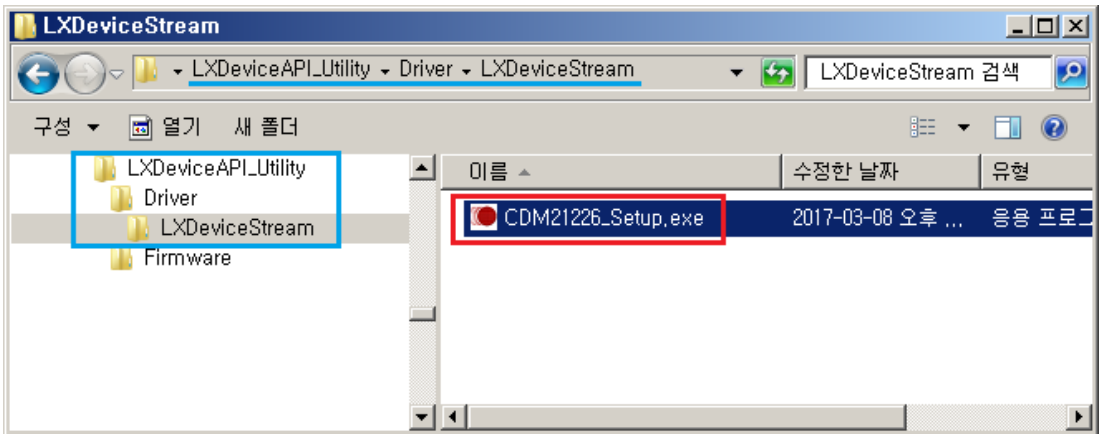
Detail of Step3 . How to install the device driver manually.

Device Driver Installer program : CDMxxxxx_Setup.exe(xxxxx is the version number and the number may vary from installation to installation.)

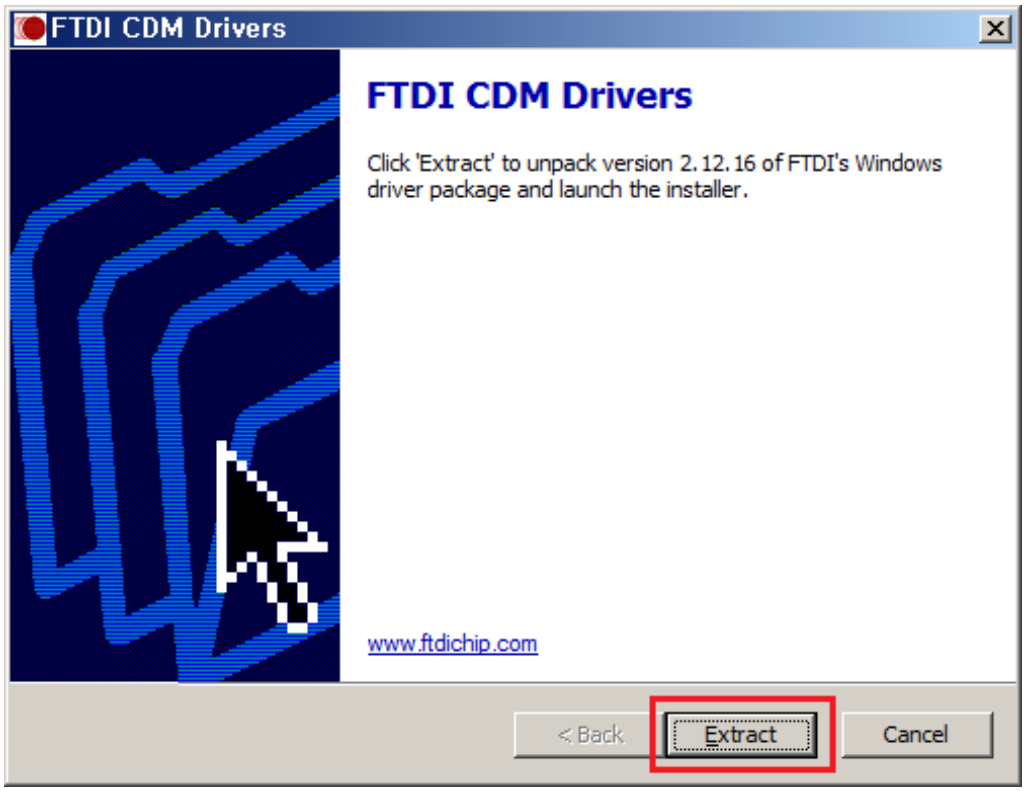
Device driver installer program path : TeleScan installer path -> folder LXDeviceAPI_Utility -> Driver -> LXDeviceStream

(As shown in the figure below, the path that is visible in Windows Explorer)



Double click "CDMxxxxx_Setup.exe" to execute.

Click "Extract" Button on the first screen.



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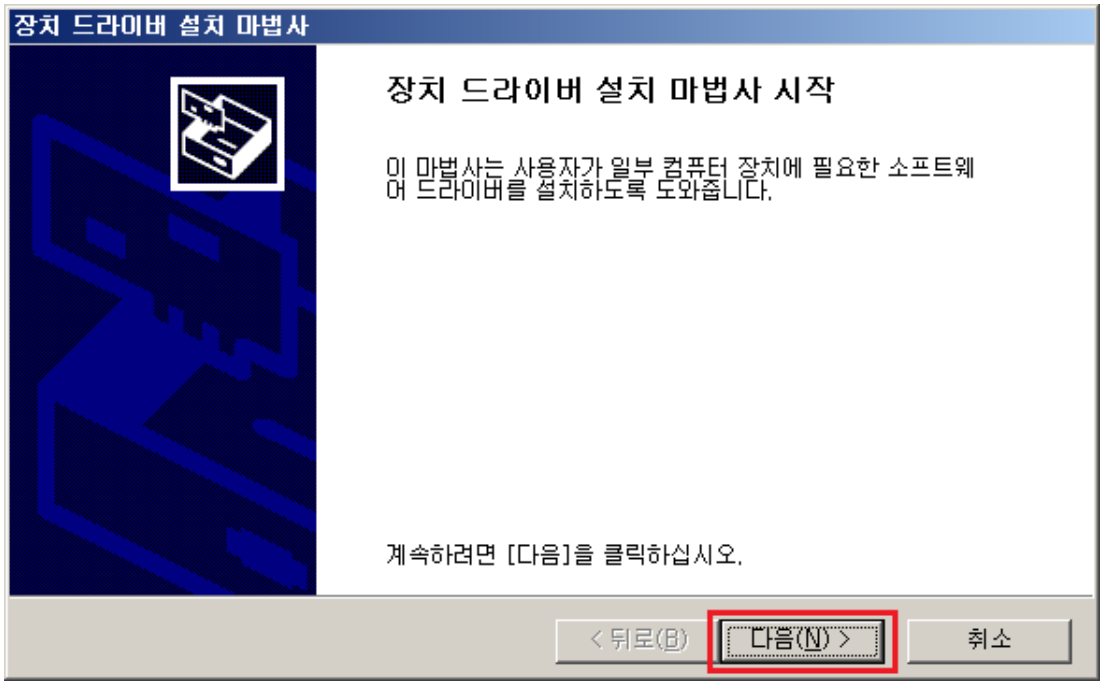
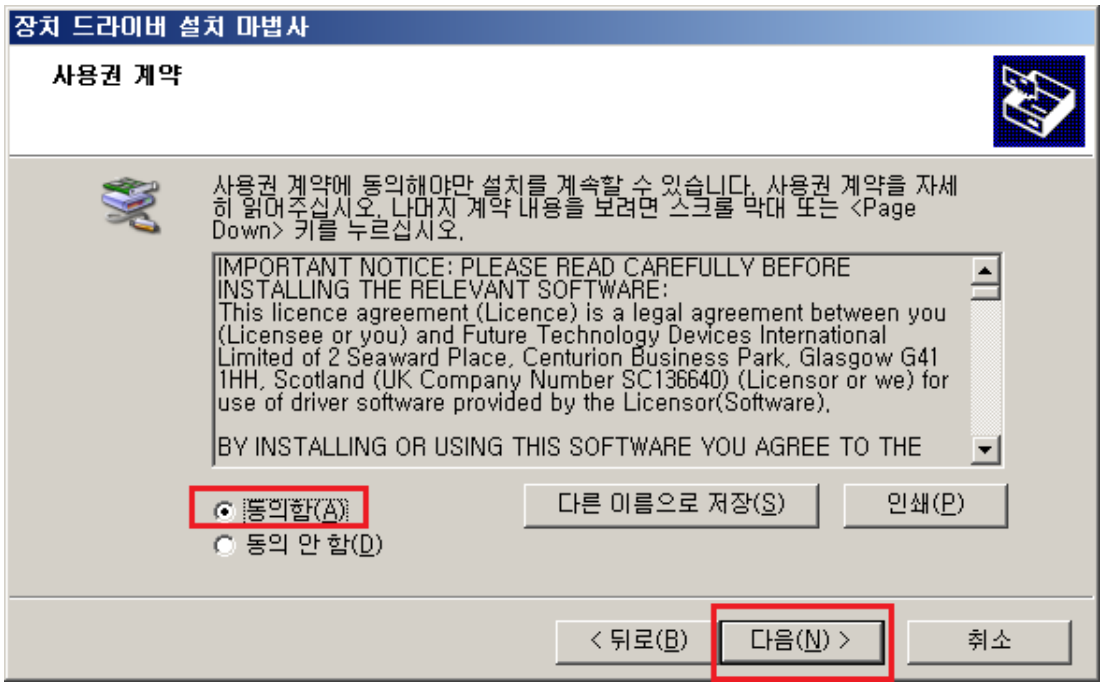
Click the Next button.



Select "I Agree" and click the "Next" button.



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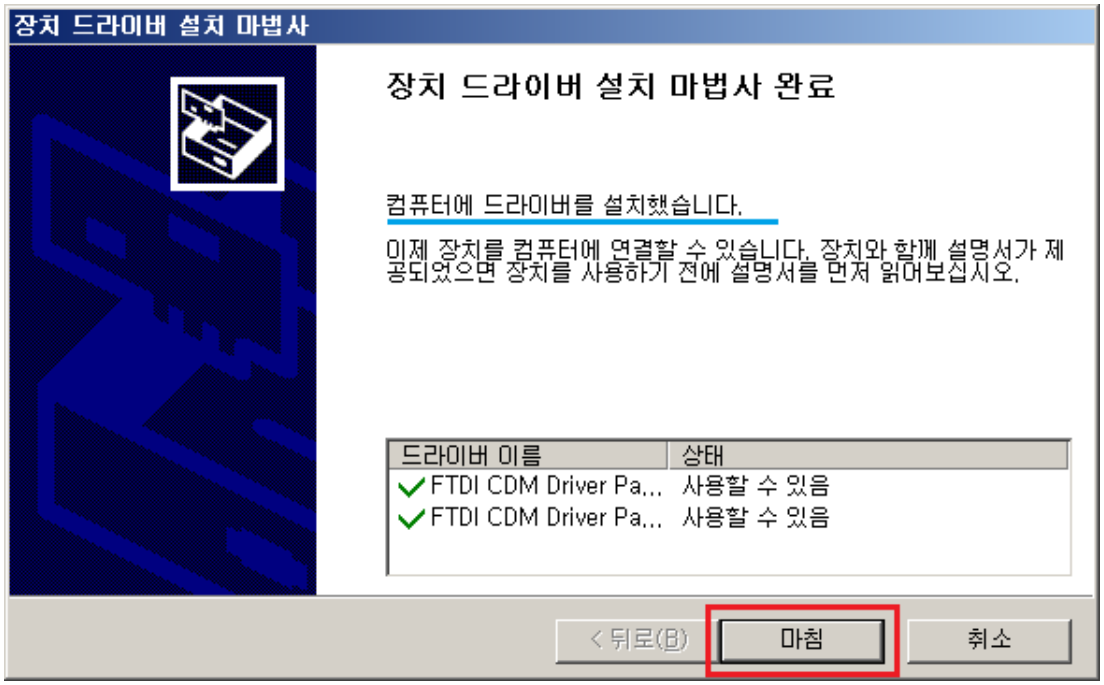
Click the "Finish" button.



Step3. When finished, connect QEEG-64FX to PC and QEEG-64FX will be recognized automatically from PC.

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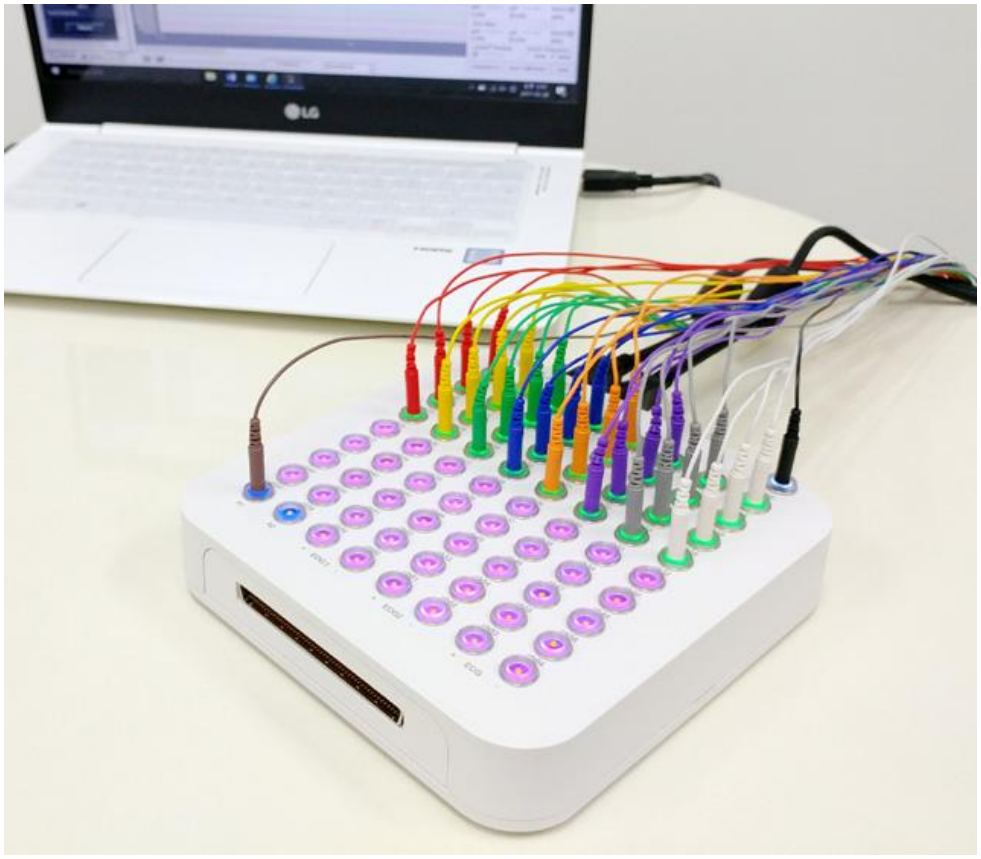
5. Connect electrode wires to device: Connect the electrode wires to the required channels.



Warning

Use the supplied electrode wire.

Keep the electrode contact surface clean. Poor electrode surfaces can cause damage to skin contact. In particular, be cautious about infections and allergic reactions.

Notice

Keep Electrode wire connected to the unit as connected as possible. Frequent detachment can result in poor contact of the connector, making it difficult to obtain a clean signal. Keep Electrode wire clean before and after use.

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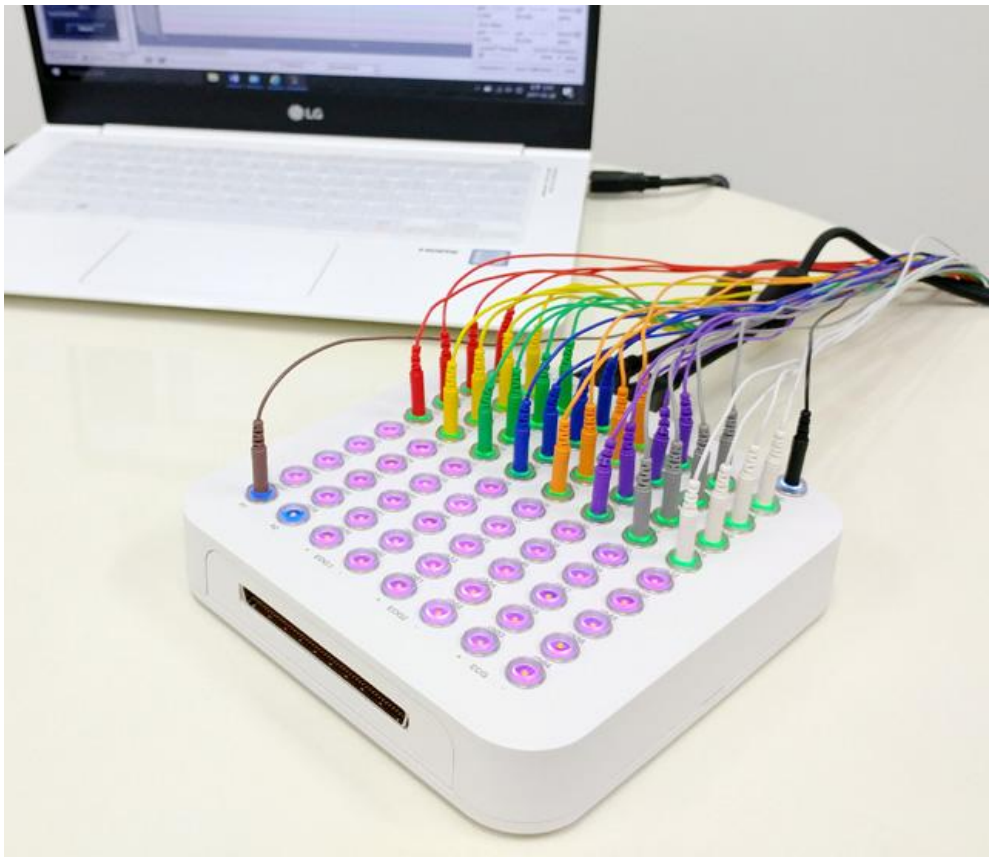
6. Attaching electrodes: Attach the electrode to the human body.

When the electrode is attached to the human body, the measuring electrode turns green and the reference electrode turns blue.



7. Program driven: After attaching the electrodes, measure the EEG using TeleScan on the user's computer.

This is the final step in the product installation to ensure that the device is working properly. Click the program icon to start the program. Click on the "Acquisition" menu on the first screen and select "QEEG-64FX" by clicking "Device Selection" of "Option" on the next screen. After confirming that the USB cable is connected to the actual device, initialize the device by clicking the "Power" button in the program on the selected device screen. If the device is normal and the USB cable is properly connected, there will be no error in the process. In the error-free state, you can see that the "Waveform Measurement" button is active, and click the button to display the waveform on the screen. Now, you can attach electrodes to the real human body and perform full-scale product utilization to measure and analyze vital signals.

Caution

Do not disconnect the USB cable while the program is running. This may cause program execution and machine operation errors. To complete the program execution, click the "Stop" button and then click the "Power" button to disconnect the unit.

Notice

Refer to the separate "Software User's Guide" for instructions on using the correct program. This manual refers only to software installation and simple usage. Descriptions of the various methods and tools for ease of use are not covered in this manual.

3-3. Software Installation

Computer Requirements

Hardware Specifications: More than CPU=2 GHz, More than RAM=2 GB

Operating software and other related software specifications: OS = Win7, Win8.1, Win 10

Installation Procedure

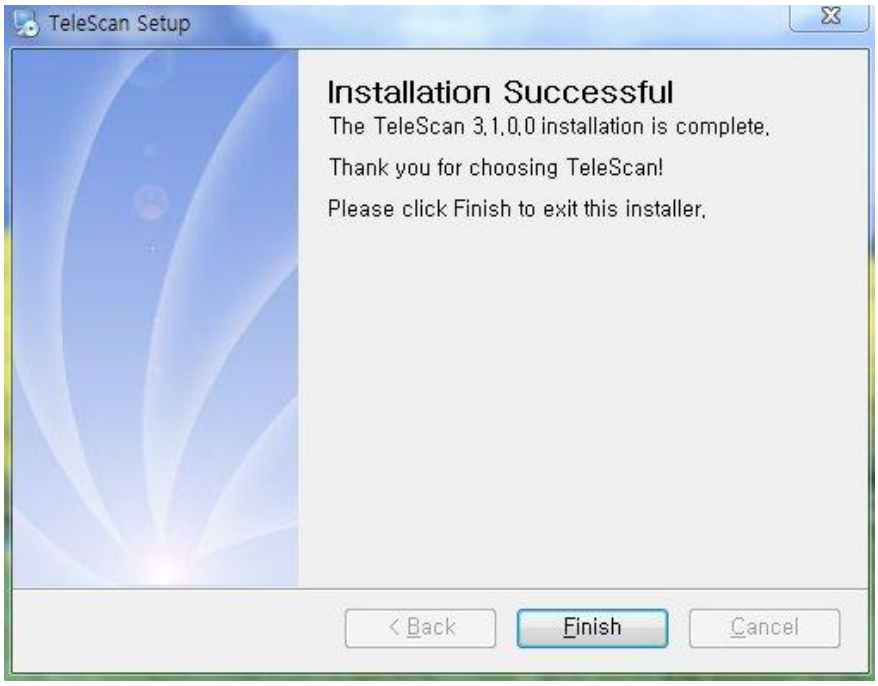
When you insert the program installation CD into the CD-ROM, the installation starts automatically and the following picture appears on the screen.

If you want to install on your computer, click the Next> button.

QEEG-64FX User Manual

Select the folder where you want to install TeleScan. If you want to install in a folder other than the currently selected folder, you can click the Change ... button to set the location. When you specify a folder and click the Next> button, TeleScan folder is created and executable files are copied.

When the installation is complete, the following screen will appear to inform you that the installation is complete. Clicking the Finish button will complete the installation and you will see the new TeleScan shortcut on your desktop. Double click the TeleScan icon to launch the program.



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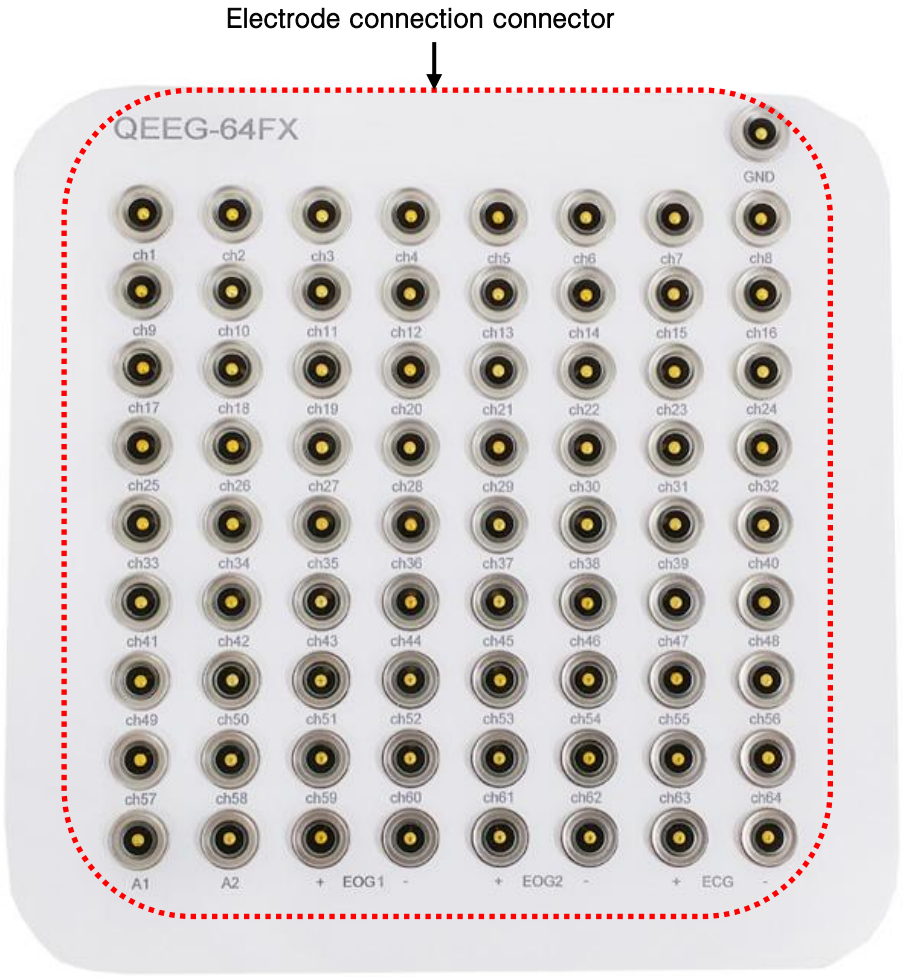
4. How to use

4-1. External name

Hardware name



1. **Electrode connection connector**: It is a connector to connect disk electrode and snap electrode.

Caution

Do not apply excessive force when connecting the electrode wires. Frequent removal of the electrode leads to loosening of the connection area, which may lead to poor connection, so keep the connected electrode wire as is.

QEEG-64FX User Manual

2. USB cable connection connector: It is a connection connector for connecting the USB port of the computer for communication between the computer and the device.

Caution

When connecting the connectors on both ends of the USB cable to the computer and the device, pay attention to the polarity of the connector. If the polarity is not correct, the connector will not be connected properly. In this case, do not try to force the connection. Excessive connections can cause permanent damage to your computer and device. It may also cause malfunction.
For accurate and correct operation, connect to your computer directly, if possible, without going through a USB hub. Also, please use a dedicated wire that does not exceed 3m in length.

3. USB adapter connection connector: It is a USB adapter connection connector.
When measuring more than 40 channels, connect external power adapter.

Caution

After connecting the EXT.POWER cable, connect the USB DATA cable. If the order is reversed, the product may malfunction.

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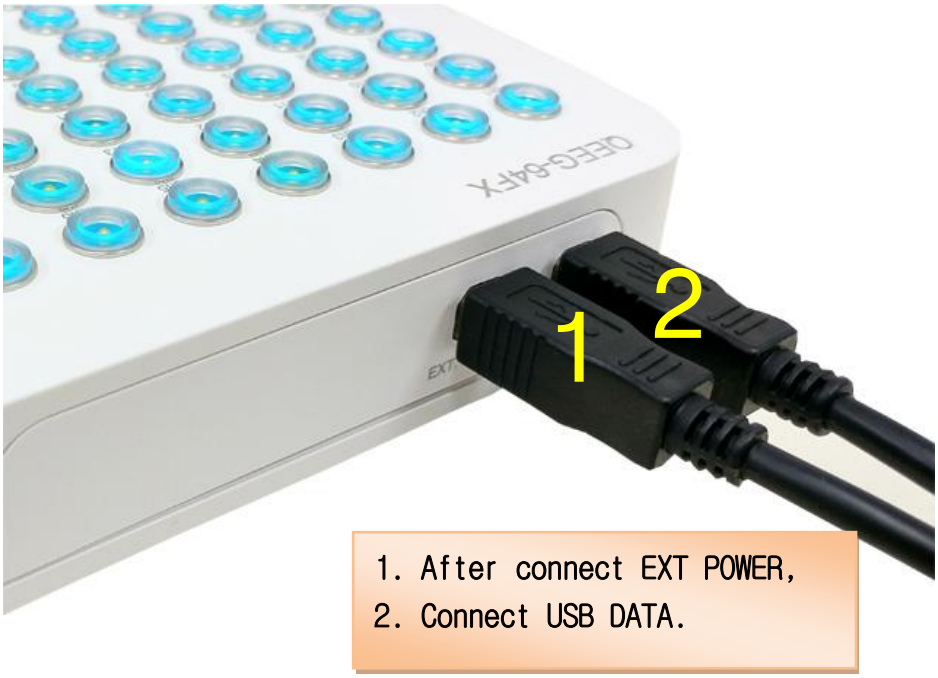
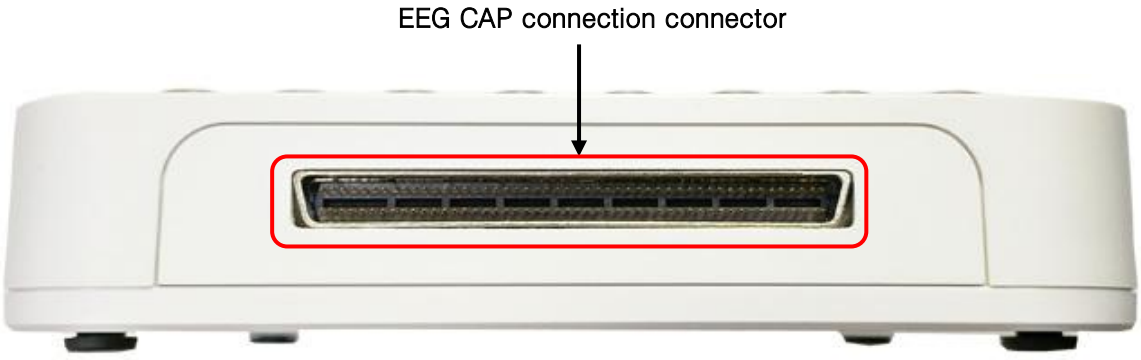


4 EEG CAP connection connector: Connection connector to connect EEG CAP. Compatible gender is a separate purchase item. If you wish to purchase, please contact the place of purchase.



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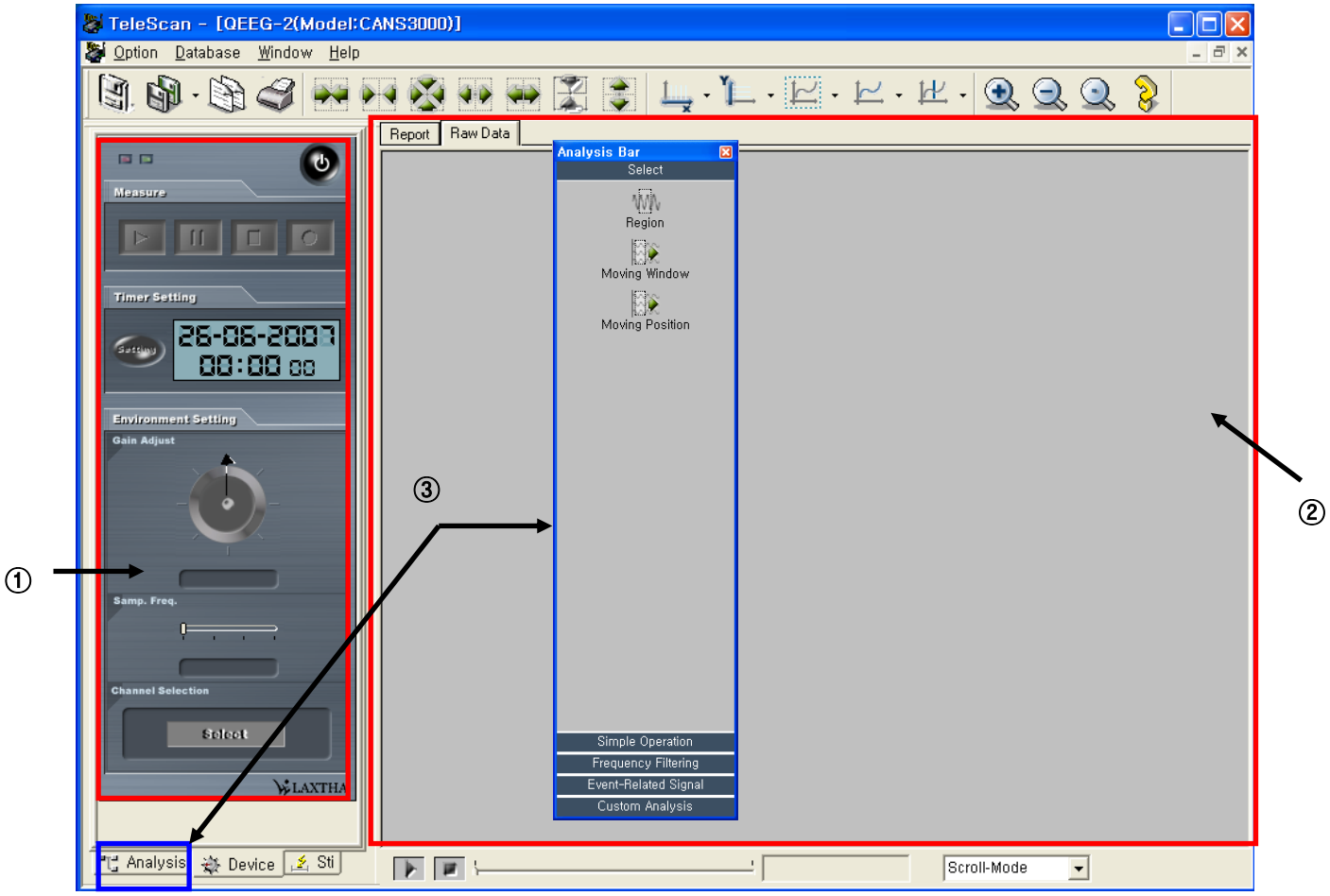
Software name



① **Data collection unit**: It is the part that provides the device control and measurement functions necessary for data collection.

② **Data display editor**: This function provides the ability to observe or edit the measured data waveform or analyzed result graph screen in various forms.

③ **Data Analysis Department**: It provides various time series signal processing functions to analyze the measured data.

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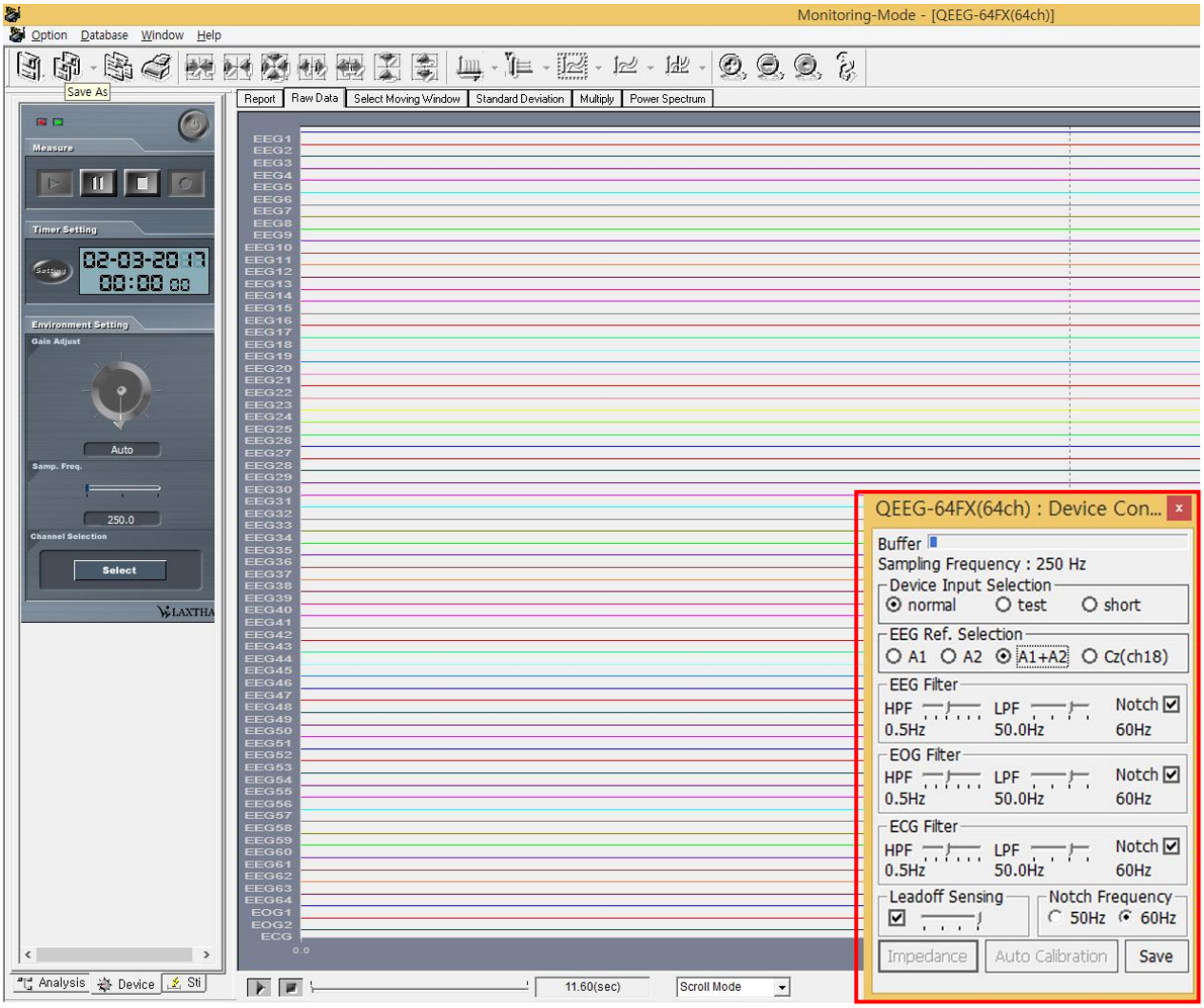
1. QEEG-64FX device open in software

When the device is open in the software, the QEEG-64FX Device Control window opens on the right and bottom of the screen.



[QEEG-64FX Device Control]

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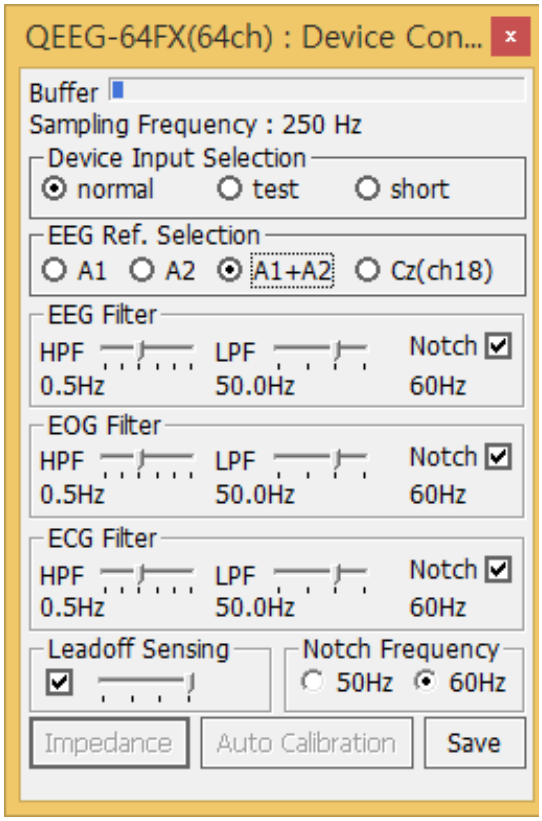

1) Buffer: Remaining data remaining in PC memory that stores data received from the device.

2) Sampling Frequency: The sampling frequency of the current instrument

Device Input Selection: Input selection of device.

- normal: Biological potential measurement through electrodes.
- test: Generation of device internal square wave.
- Short: Instrument amplifier input short.

3) EEG Ref. Selection: Electroencephalogram reference electrode selection

4) EEG/EOG/ECG Filter: Filter selection for each source.

Notch Frequency: select 50Hz/60Hz.

5) Leadoff Sensing: Turn on / off the electrode contact sensing function of the device, adjust the lead off LED brightness of the device.

6) Impedance: View impedance window measurement between electrode and skin.

7) Auto Calibration: Open the auto calibration window on your device.

8) Save: Saved to the user setting device of the instrument control panel.

- Device Input Selection status is not saved and it is always normal when the power is turned on.

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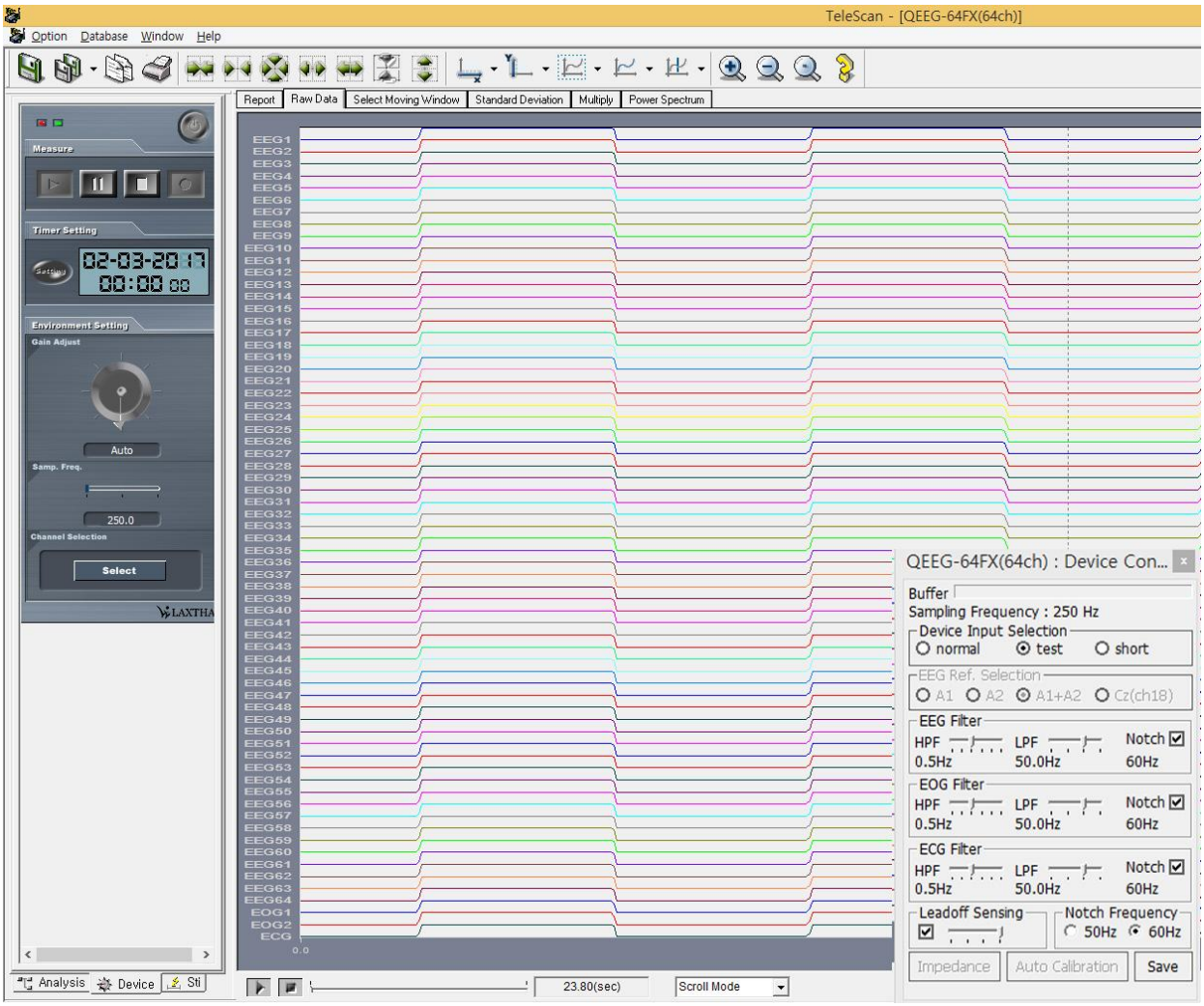
2. Test of QEEG-64FX Device Control Panel

If you select test as Device Input Selection on the instrument control panel, square wave (Vpp = 3,750uV, 1.95Hz) is input as the amplifier input of the instrument and square wave is also measured on the software measurement screen.



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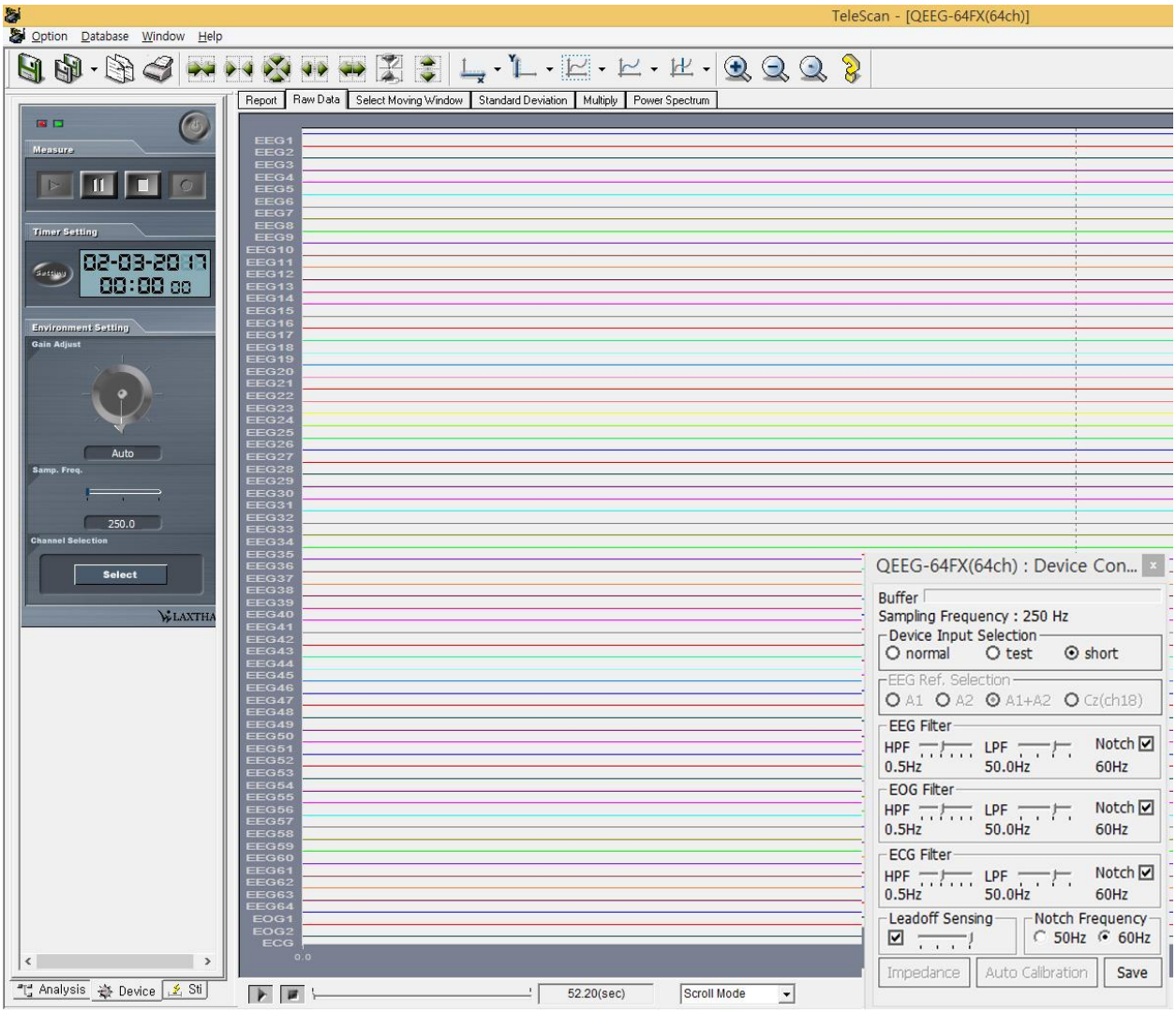
3. Short of QEEG-64FX Device Control Panel

If you select short for Device Input Selection on the instrument control panel, all amplifier inputs of the instrument will be shorted and the output signal of the amplifier due to input short will also be measured on the software measurement screen.



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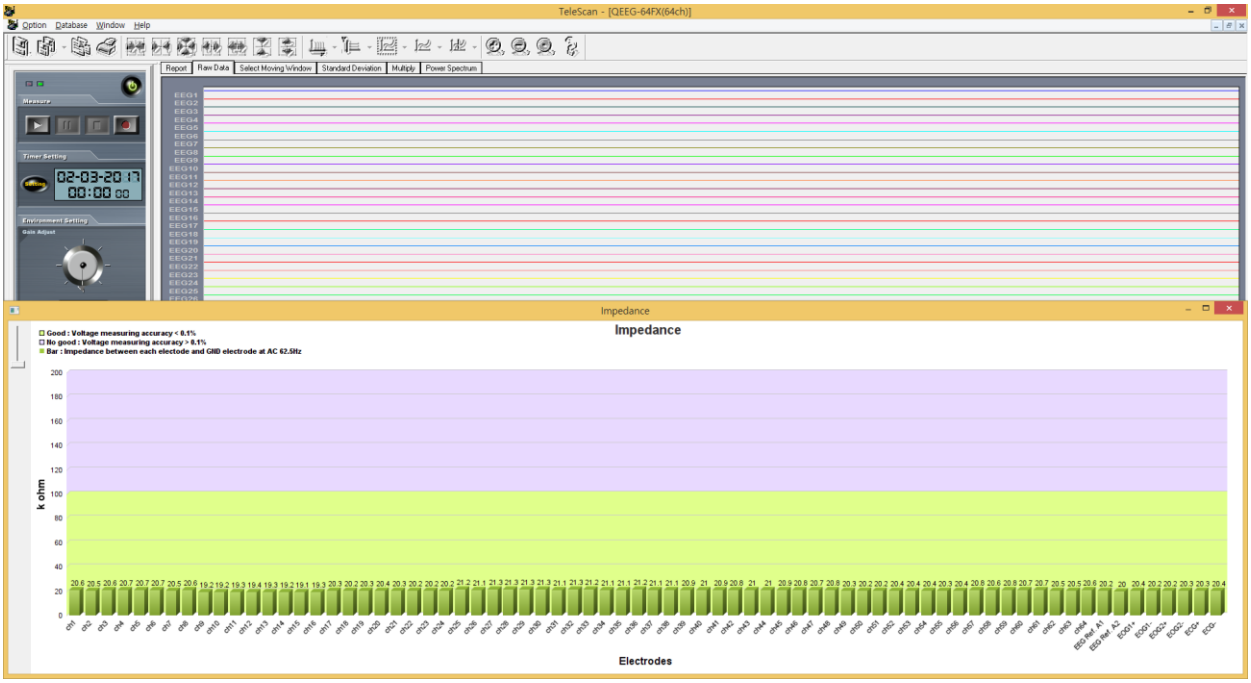
4. Impedance of QEEG-64FX Device Control Panel

Click the "Impedance" button on the instrument control panel and the Impedance window (shown below)is displayed at the bottom of the software.



Impedance Window Indications

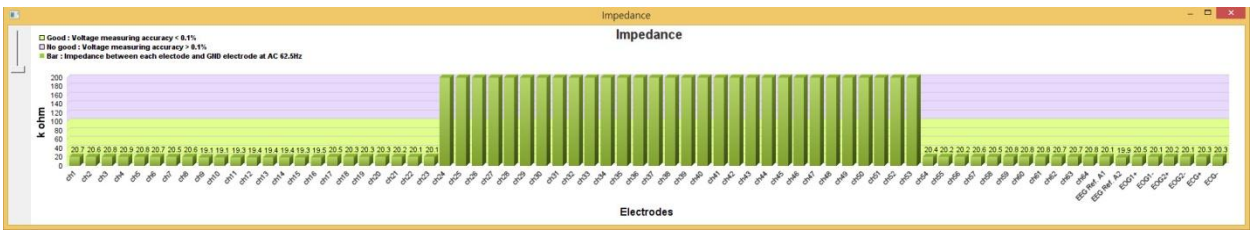
1) Bar: Impedance between each electrode connected to human body and GND electrode is expressed as height. (Unit: k Ω)

2) Background color - green: Voltage accuracy during bioelectrical potential measurement is less than 0.1%.

3) Background color - purple: This means that the voltage accuracy is not guaranteed by 0.1% when measuring the bioelectrical potential.

4) The QEEG-64FX must have an impedance of less than 100k Ω for precise measurement of the vital potential voltage.

Impedance measurement example.



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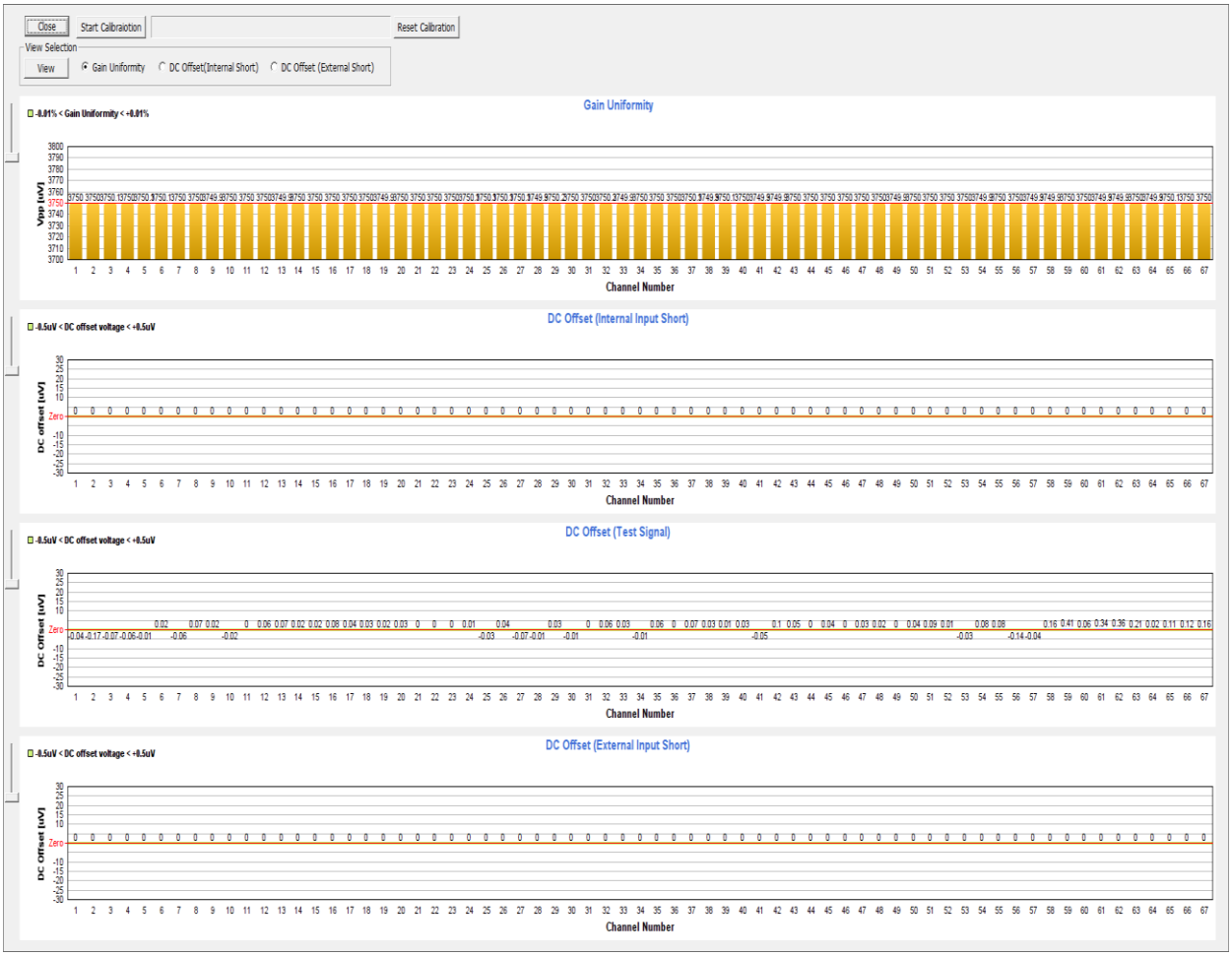
5. Auto Calibration of QEEG-64FX Device Control

Click the button "Auto Calibration" in the instrument control window to display the full-screen accuracy. Three items: Gain Uniformity (Gain Uniformity of Amplifier), DC Offset (Internal Input Short) - Amplifier offset in internal input short), DC Offset (Test Signal) - Offset of device internal square wave, DC Offset (External Input Short) - Shows the offset of the external input short circuit for all channels.



When the initial screen is displayed, only the Gain Uniformity and DC Offset (Test Signal) are displayed in real time. Select the data type to be viewed in the View Selection, and click the View button, change to the corresponding information view.

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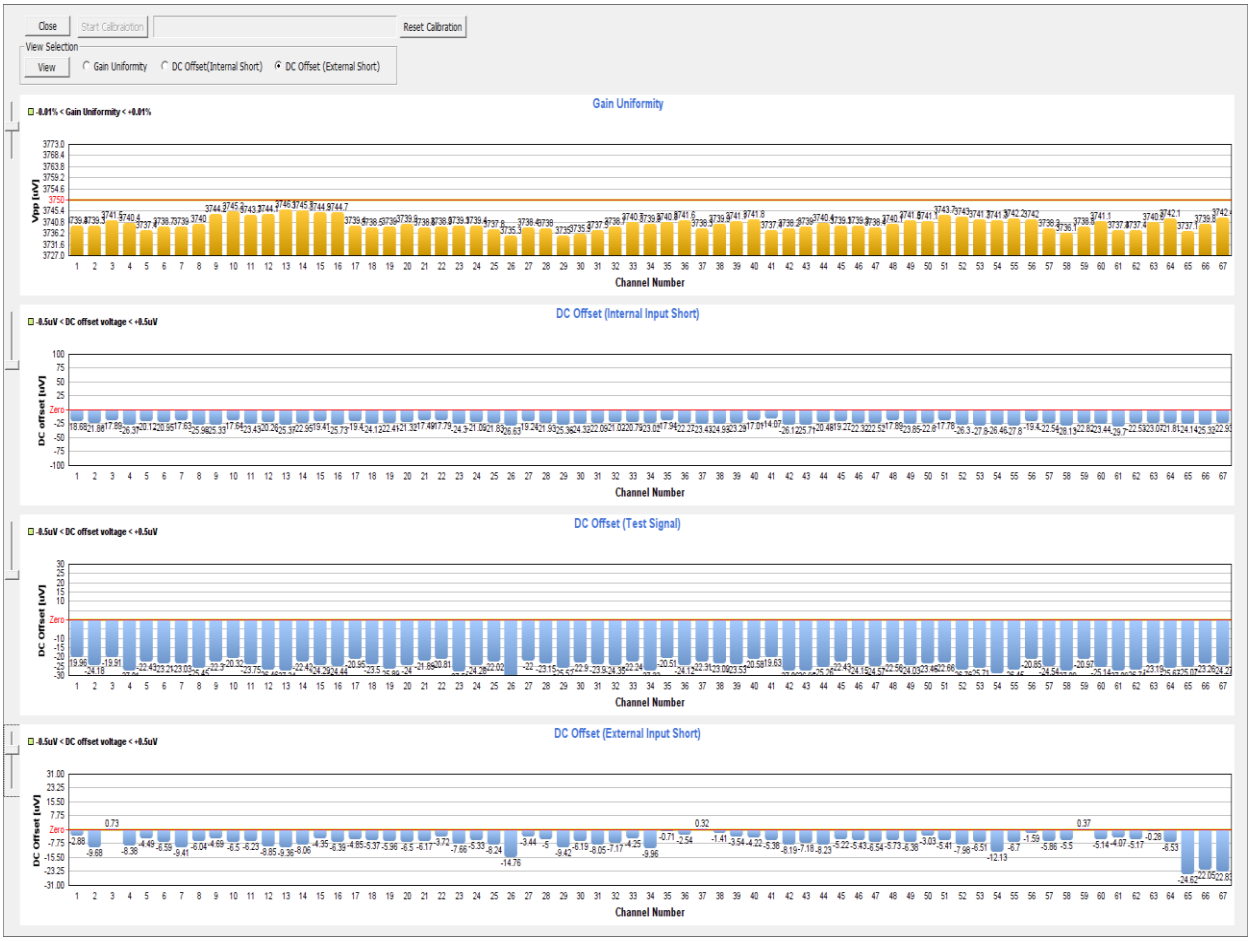
If the calibration status is not good, the gain of each channel is not uniform, the offset voltage is large, and the characteristics of each channel are different as shown in the following example screen.



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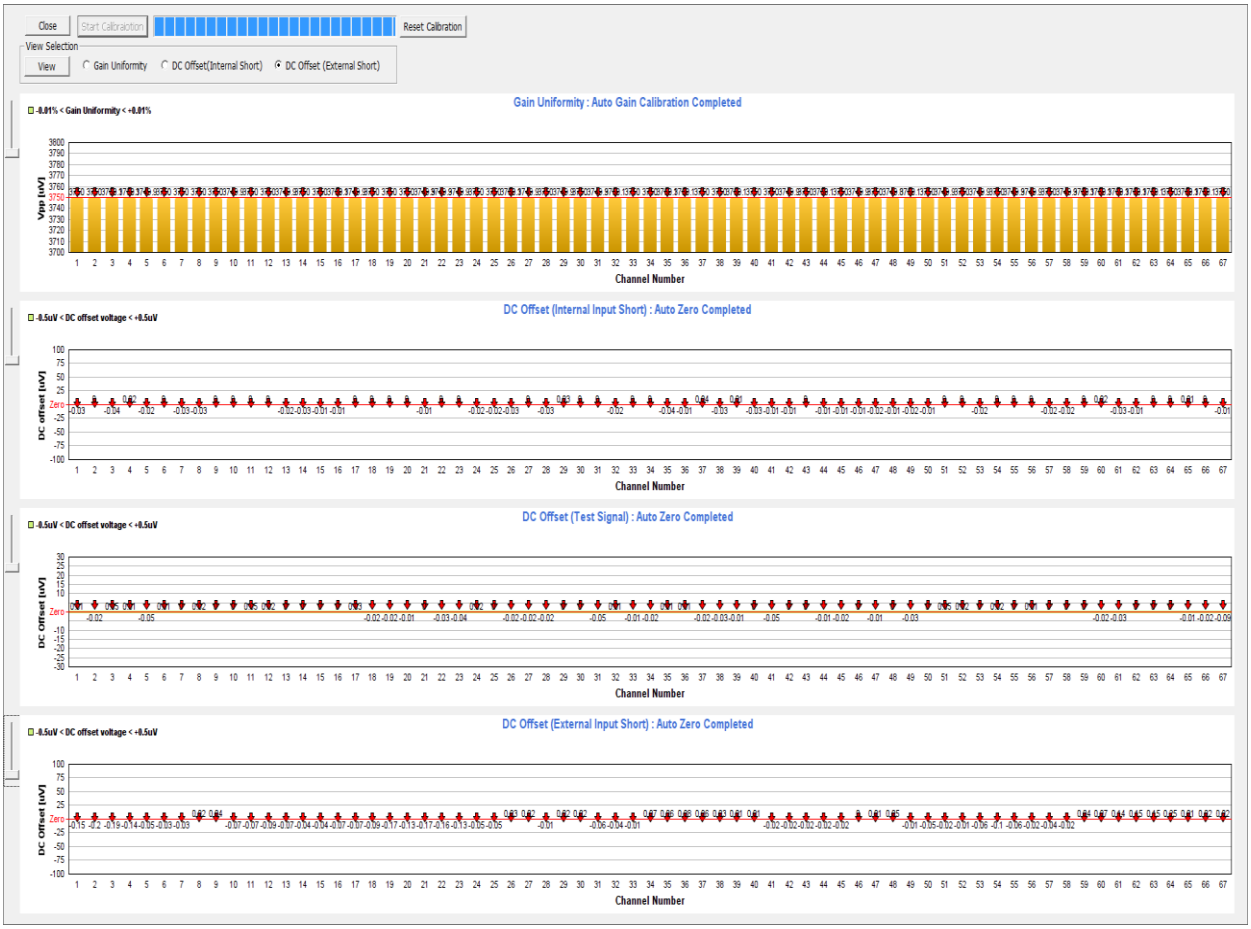
6. Button Start Calibration.

If you click "Start Calibration" button at the top of the screen, the calibration process will start from channel 1 of Gain Uniformity and the process will be completed to channel 35 of the final DC Offset (External Input Short).

If LXCON01, which is a separate device that short-circuits all external input channels of the device, is connected to the input connector of the device, automatic compensation is performed until the final DC Offset (External Short). If LXCON01 is not connected to the device input connector, It goes to DC Offset (Test Signal) and completes the entire calibration process.



[Calibration processing completed status. (Total travel time within 2 minutes)]

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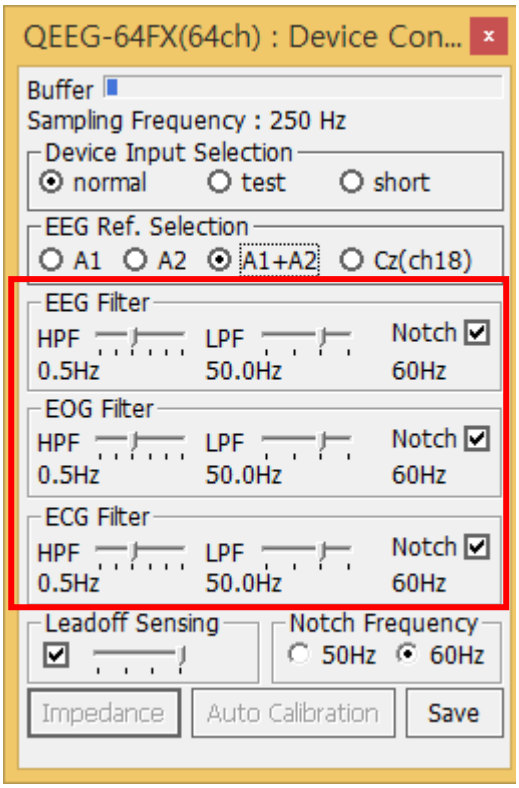
7. Select QEEG-64FX Device Control Filter



It can be individually applied to each signal group and can be selected according to the frequency of the measurement target.

High Pass Filter

0Hz,0.1Hz, 0.5Hz, 2.5Hz, 12.5Hz, 25Hz.

- 0Hz is a mode that does not apply HPF and includes DC component.

HPF Detailed characteristics for each frequency: See Appendix A.

Low Pass Filter

Sampling frequency	LPF frequency
250Hz	12.5Hz, 25Hz, 50Hz, off
500Hz	25Hz, 50Hz,100Hz, off
1000Hz	50Hz, 100Hz, 200Hz, off
2000Hz	100Hz, 200Hz, 400Hz, off

- (off) LPF Not applicable.

LPF Detailed characteristics for each frequency: See Appendix B.

Typical filter selection by measurement target.

- The table below is a typical example and can be changed according to the purpose of experiment.

Measurement target	HPF	LPF
EEG Spontaneous Potential	0.5Hz, 2.5Hz	More than 50Hz.
EOG	0.1Hz	12.5Hz
ECG Simple monitoring	2.5Hz	25Hz
ECG Waveform Details	0.1Hz, 0.5Hz	More than 100Hz.
EMG	12.5Hz, 25Hz	More than 400Hz.

QEEG-64FX's EOG and ECG channels are bipolar input channels and can be used for EMG and EEG measurements.

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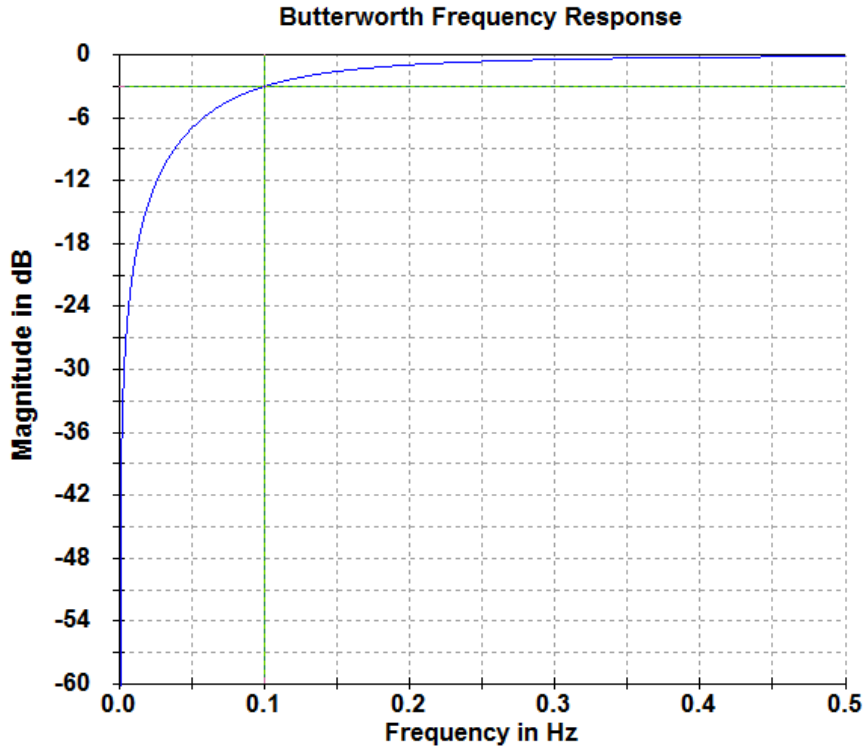
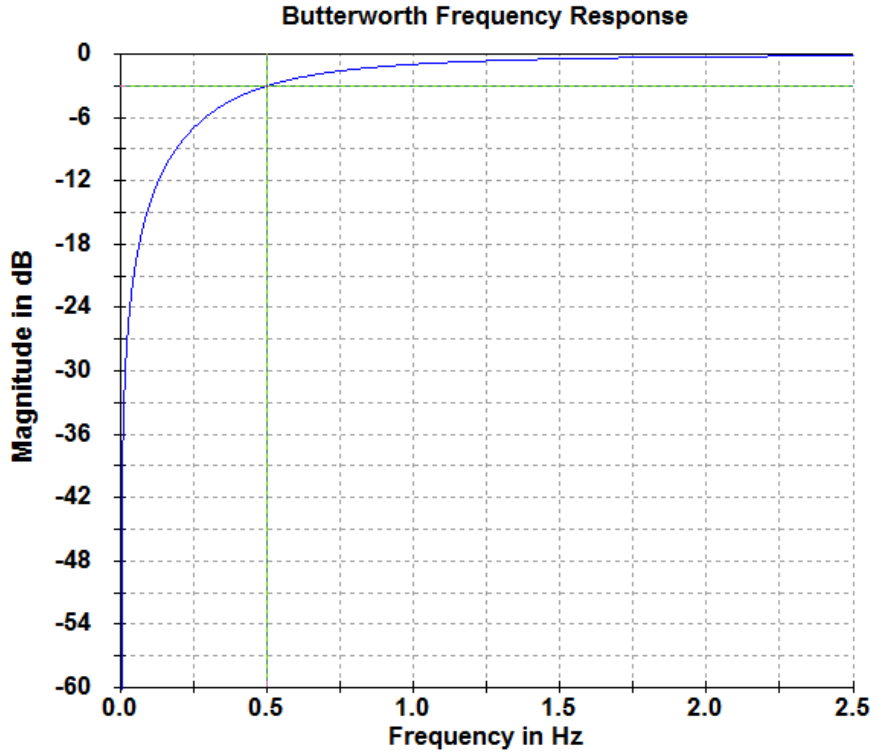
Appendix A. High Pass Filter Characteristics.

[0.1 Hz]



[0.5 Hz]



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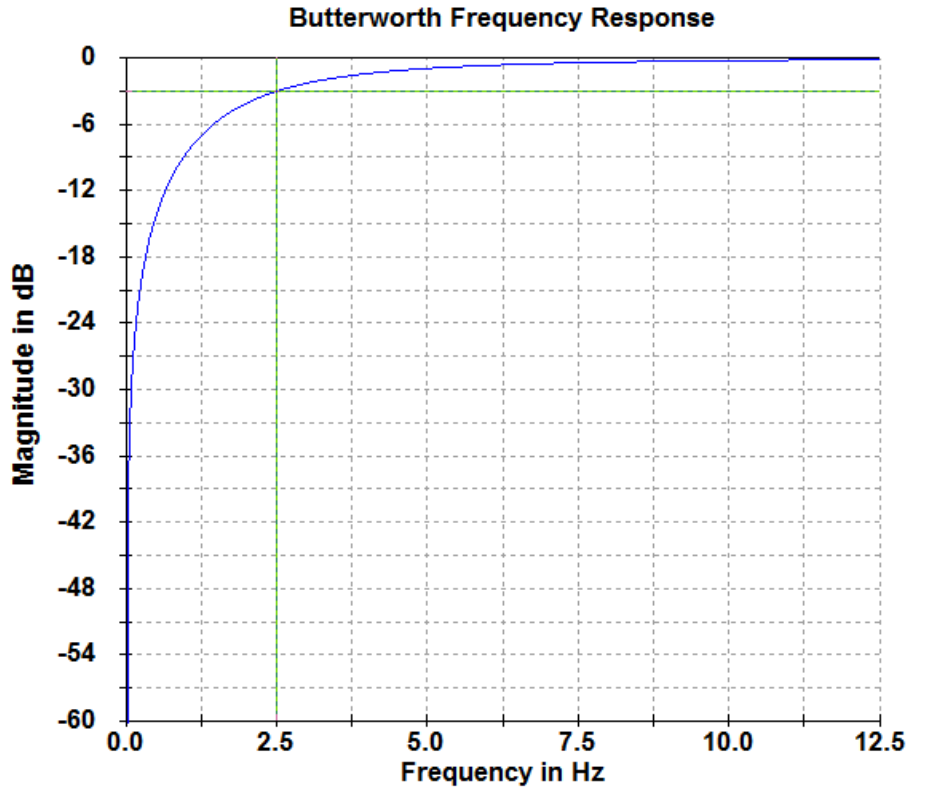
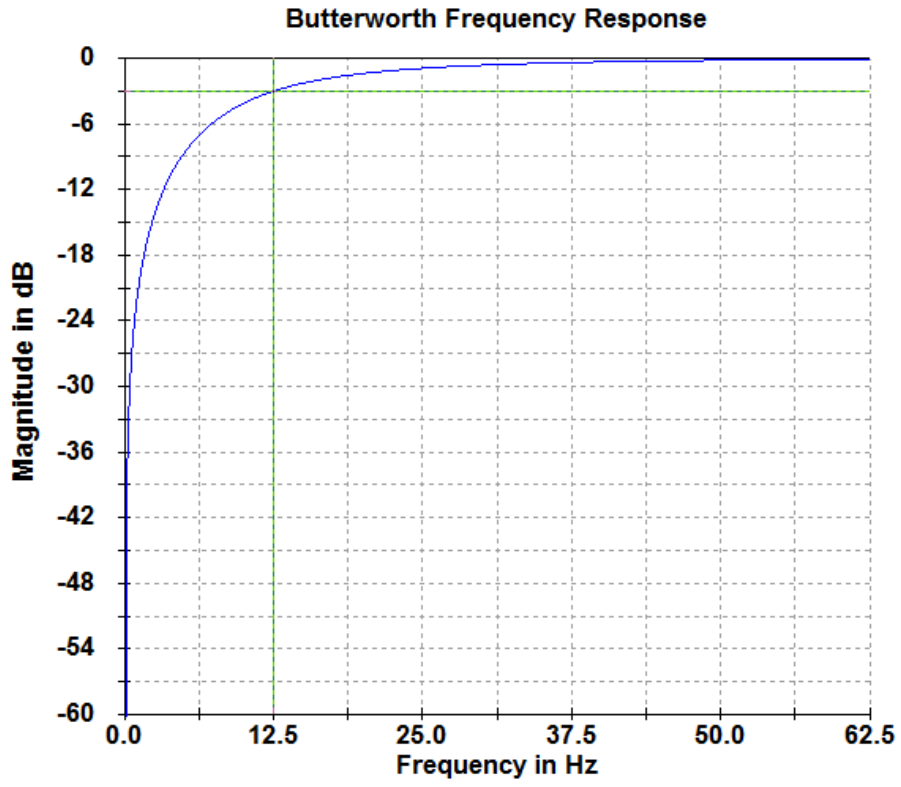
[2.5 Hz]



[12.5 Hz]



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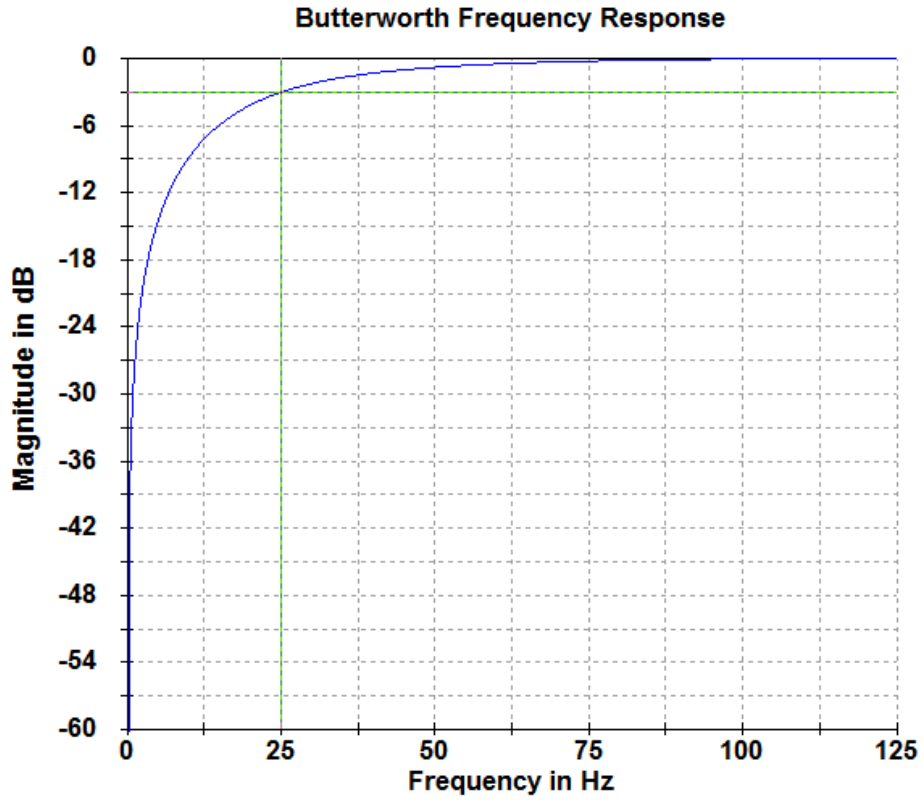
[25 Hz]



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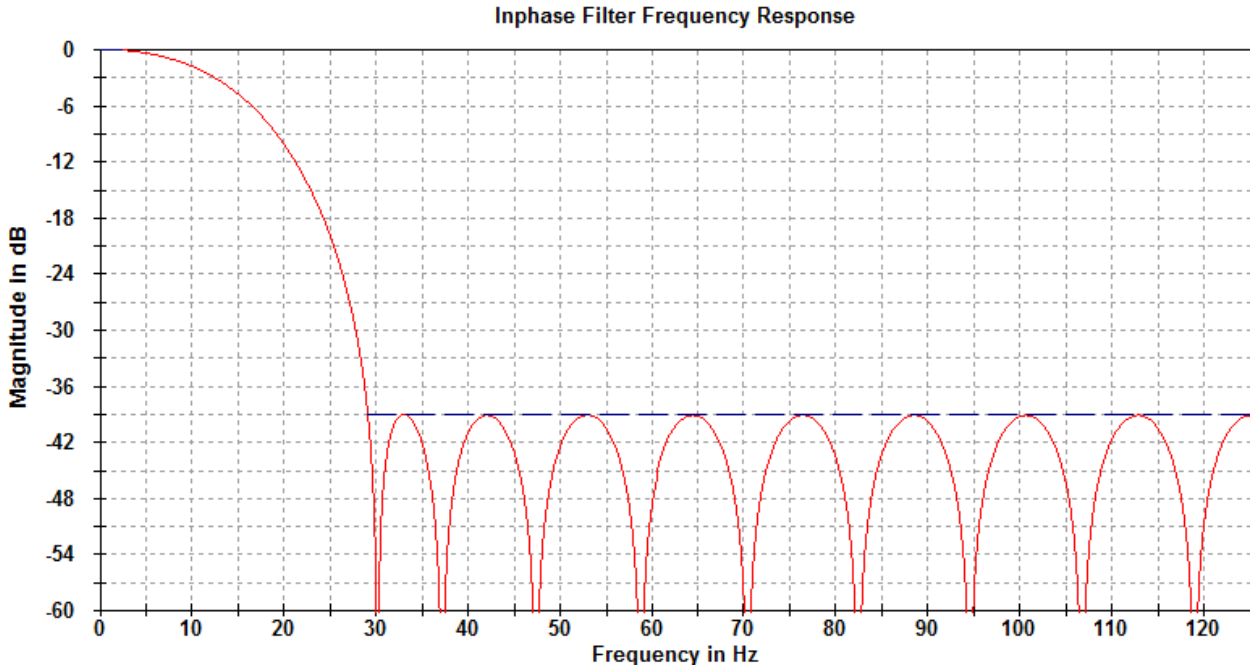
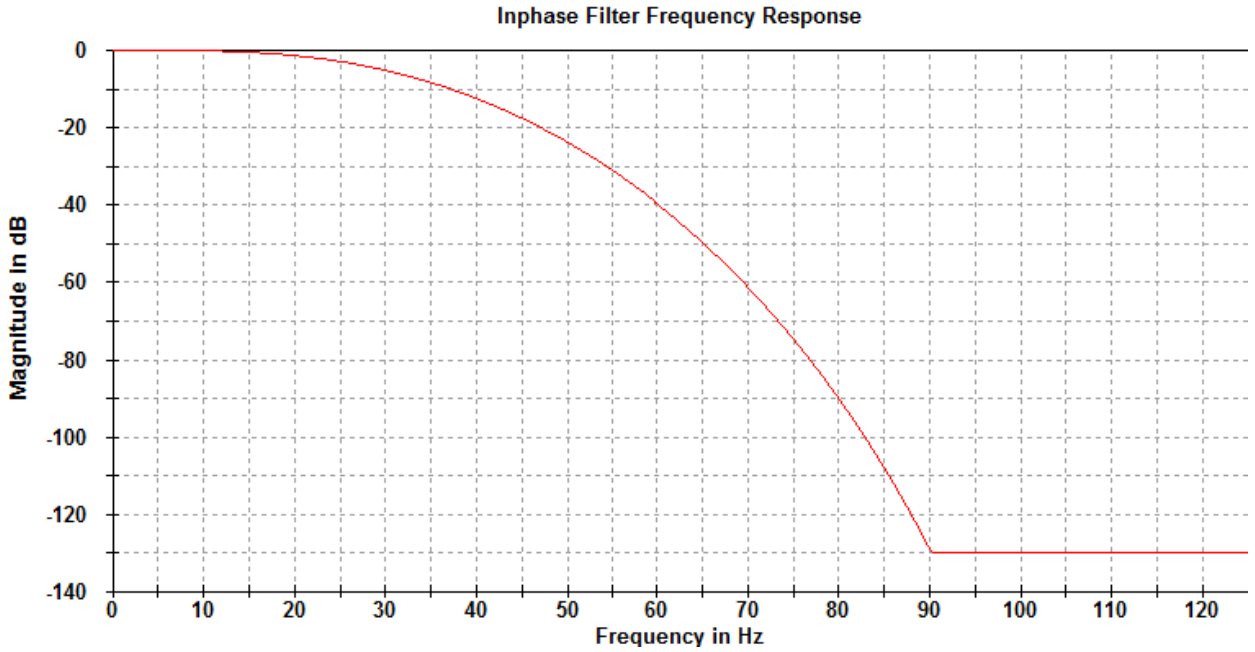
☐ Appendix B. Low Pass Filter Characteristics.

[LPF 12.5 Hz, Sampling frequency 250 Hz]



[LPF 25 Hz, Sampling frequency 250 Hz]



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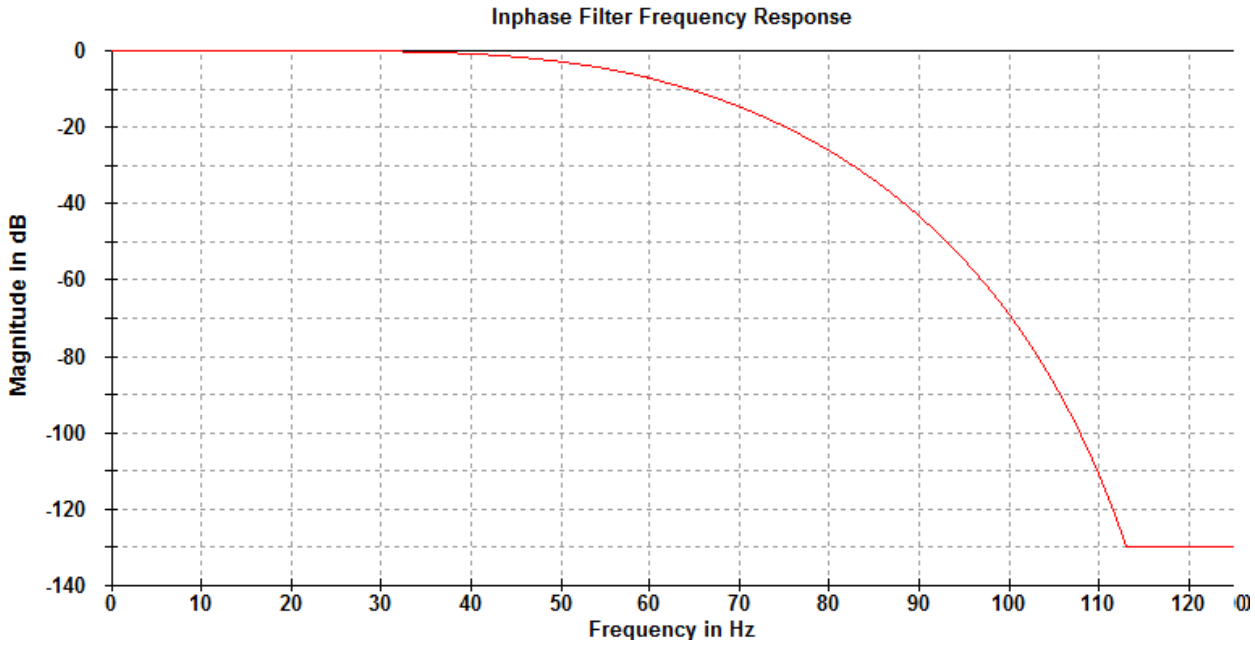
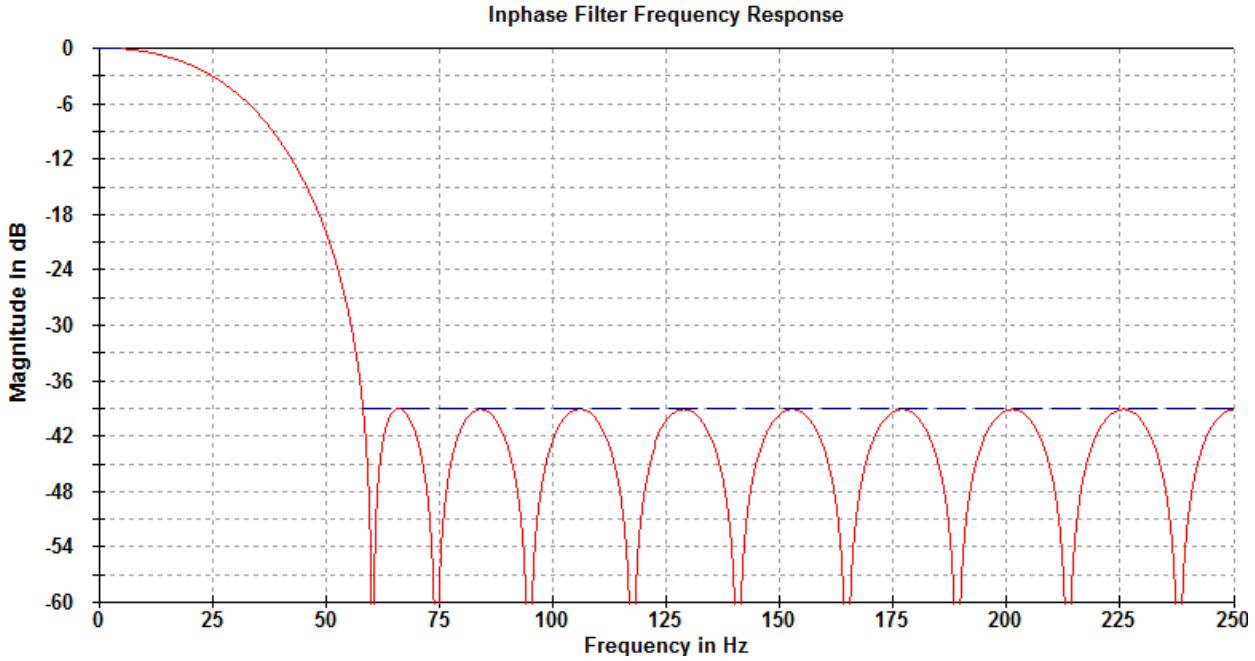
[LPF 50 Hz, Sampling frequency 250 Hz]



[LPF 25 Hz, Sampling frequency 500 Hz]



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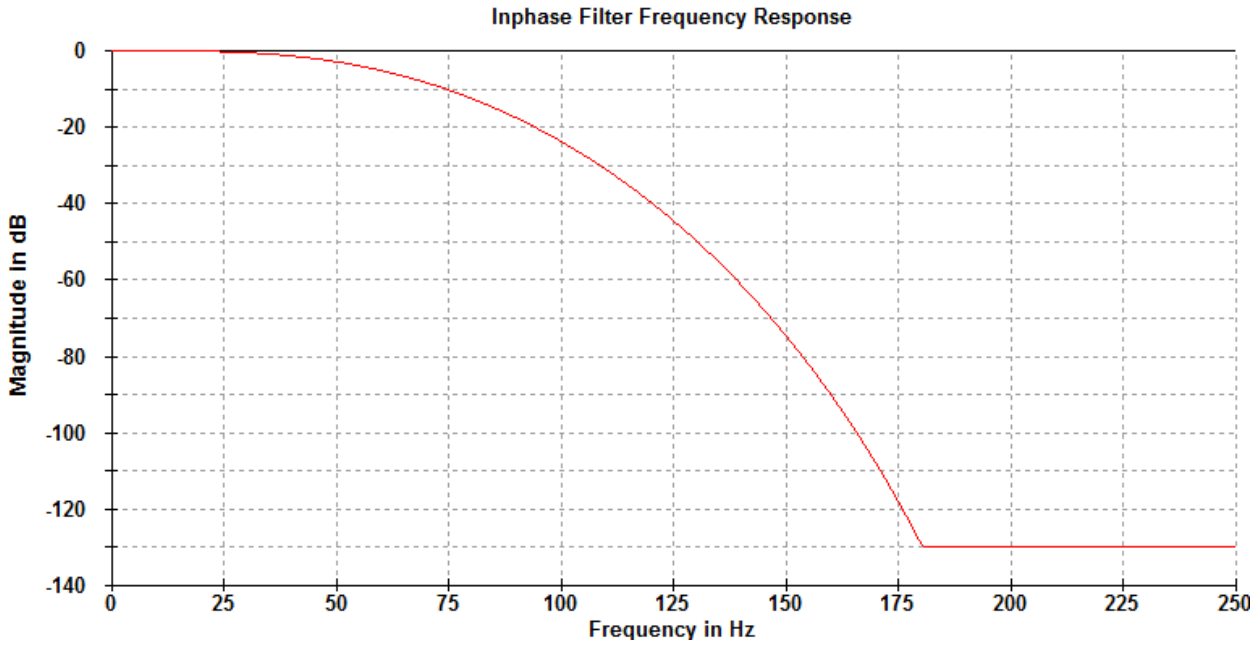
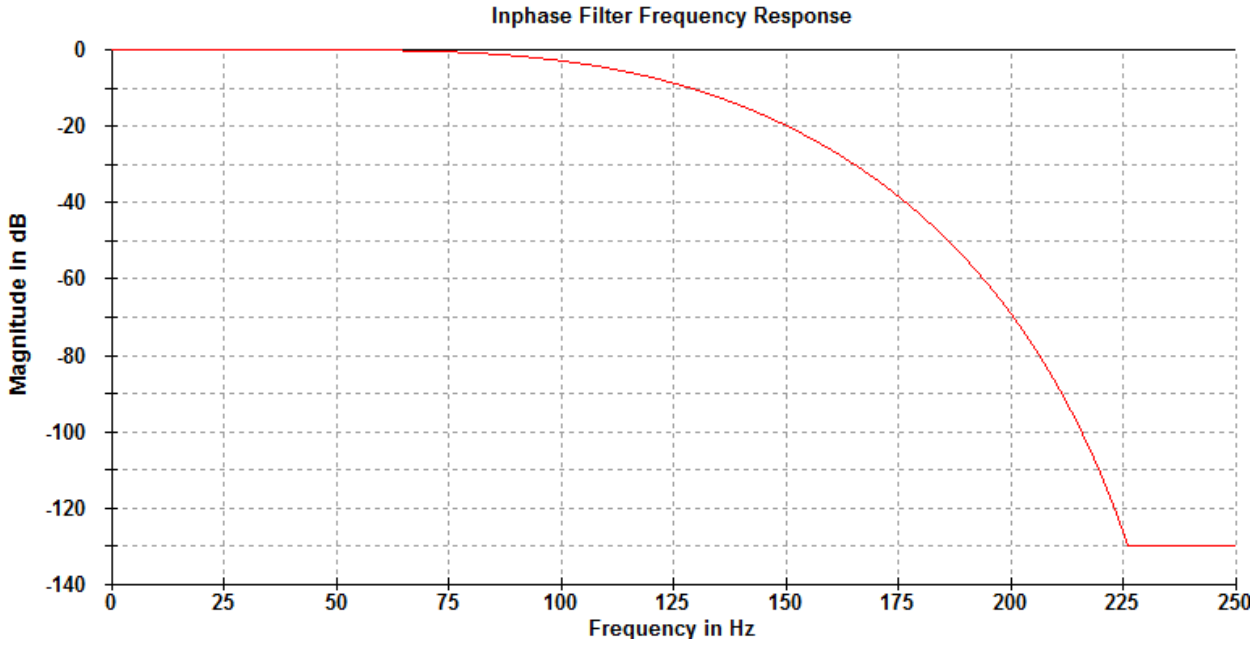
[LPF 50 Hz, Sampling frequency 500 Hz]



[LPF 100 Hz, Sampling frequency 500 Hz]



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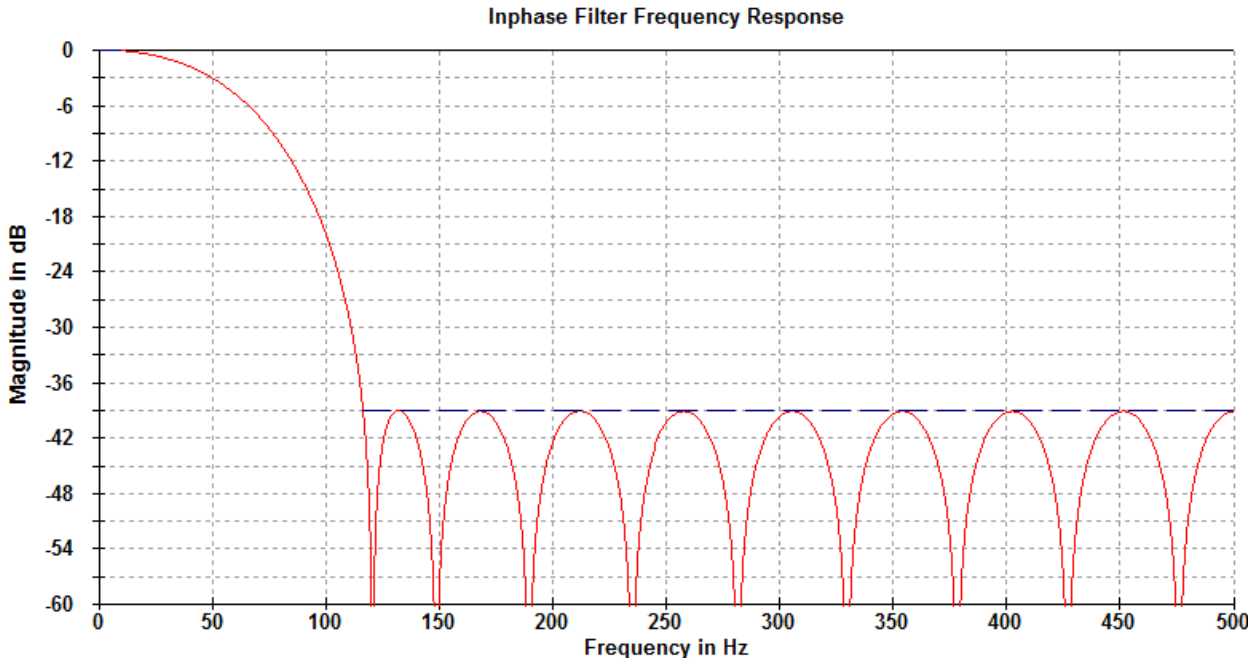
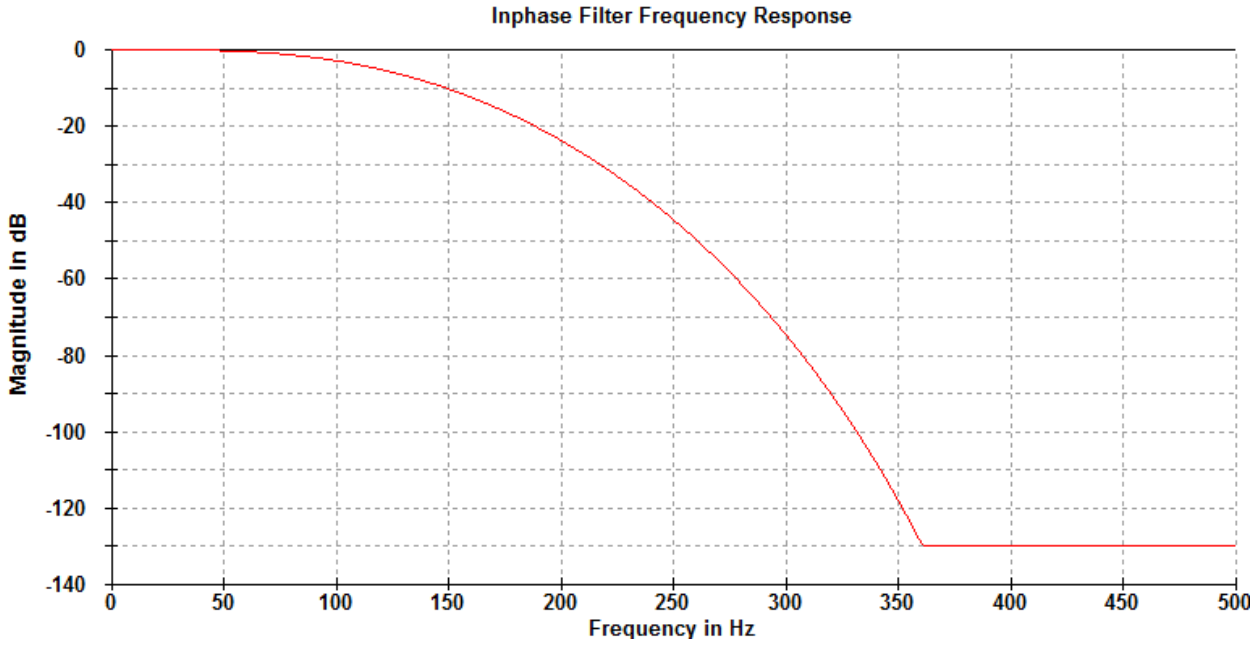
[LPF 50 Hz, Sampling frequency 1,000 Hz]



[LPF 100 Hz, Sampling frequency 1,000 Hz]



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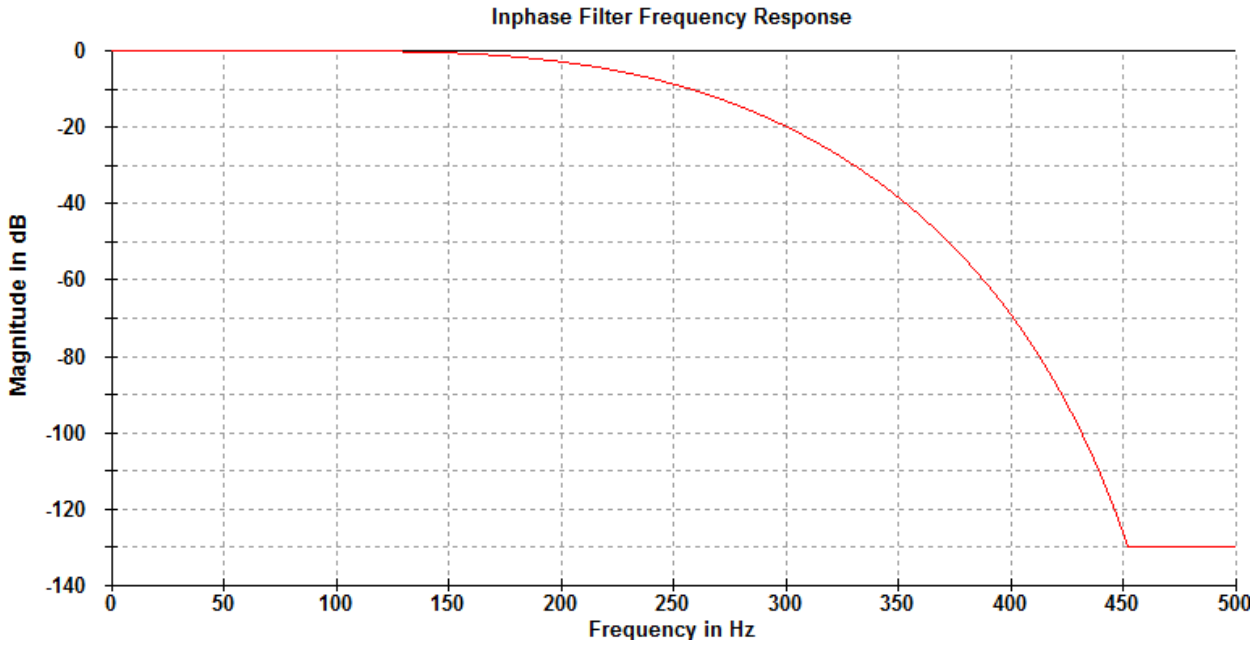
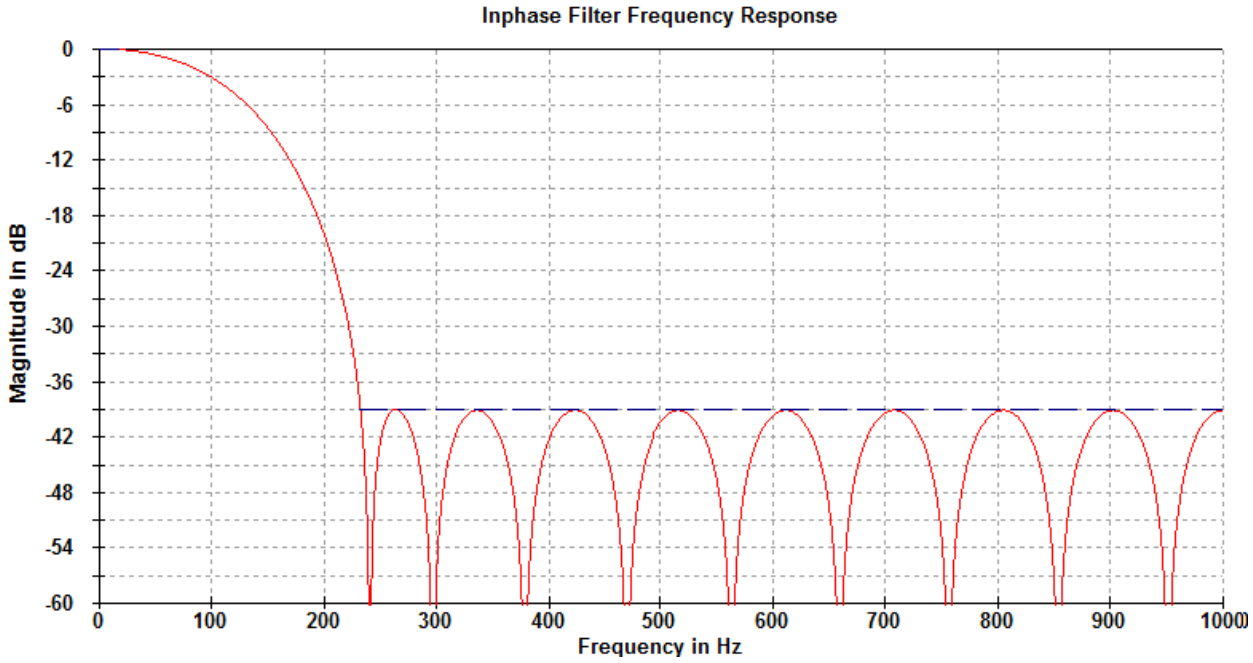
[LPF 200 Hz, Sampling frequency 1,000 Hz]



[LPF 100 Hz, Sampling frequency 2,000 Hz]



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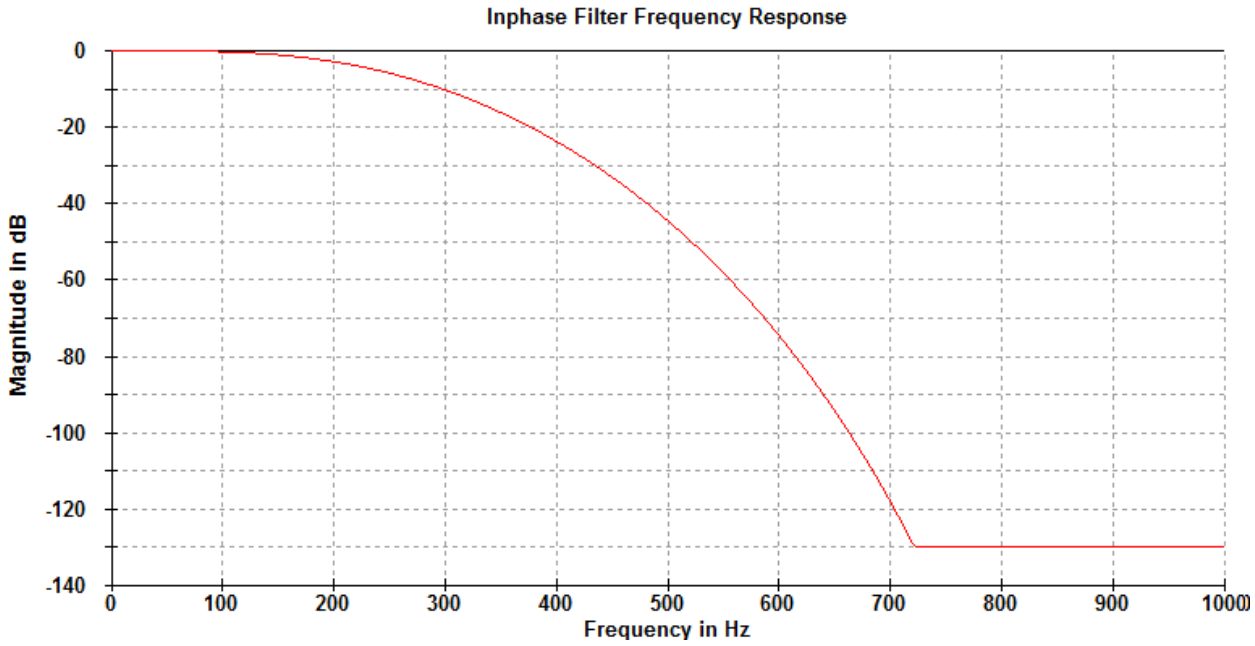
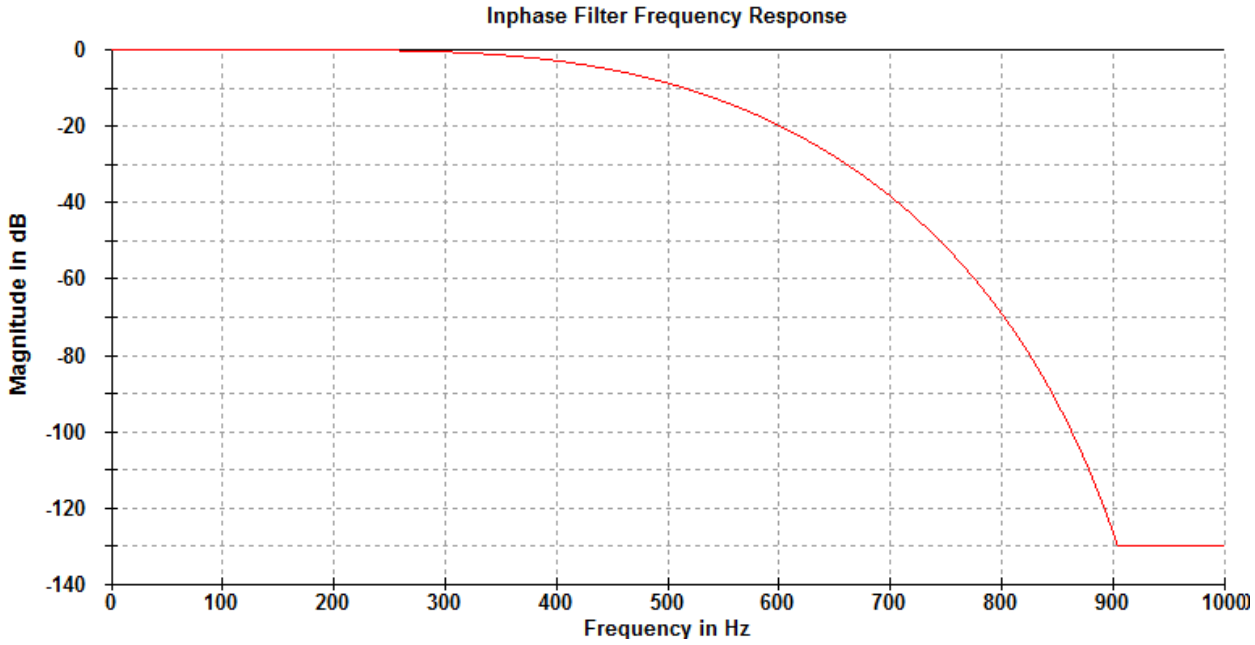
[LPF 200 Hz, Sampling frequency 2,000 Hz]



[LPF 400 Hz, Sampling frequency 2,000 Hz]



Notice

Refer to the separate "Software User's Guide" for the Details of the software.

4-2. Work

Prepare device

If user have completed the installation in the manner described in Chapter 3, "Installing the Product," users are now ready to use the device. Power on the device and run the program (TeleScan®) so that the waveform is displayed normally. Make sure that the noise signal due to this shake appears on the screen when you shake the electrode wire that is not connected to the electrode. If user determine that these conditions are normal, user may proceed with the measurement. For reliable measurements, the instrument requires a commissioning time of at least 10 minutes. The "power" of the program (TeleScan®) can be repeated on / off as required. Keep the power of the equipment on as long as possible.

Notice

If possible, leave it in its original installed location. Changing the installation location frequently makes it difficult to maintain a constant using environment. Changes in the environment can lead to unintentional noise sources into the measurement signal.

Attaching electrodes

Select the appropriate electrode attachment area according to the purpose of measurement. Electrode attaching can be used disposable as needed, or electrode paste can be used by sticking to disk type electrode. Keep the skin that contacts the electrode as clean as possible. It is advisable to maintain a clean skin condition for good contact. The quality of the measurement signal varies depending on the state of electrode contact. When disposable electrodes are used, ensure that the area where the electrodes are attached is wide, and then attach them to the skin of the human body first. When using an electrode paste, apply an electrode paste (paste) first to the dish electrode and then to a relatively narrow attachment area. Since the electrode is attached only by the viscosity of the electrode paste, the contact surface can be easily isolated. To prevent this, please cover with the clean gauze surrounding the electrode. Ensure that the electrode wires are securely fixed, especially to prevent shaking. Please be careful not to give psychological or physical pain to the examinee during electrode attachment process. In some cases, these effects may render the measurement objective meaningless. Take care not to move

the examinee during the measurement. The movement of the examinee leads to a serious signal failure which can make the measurement meaningless.

Warning

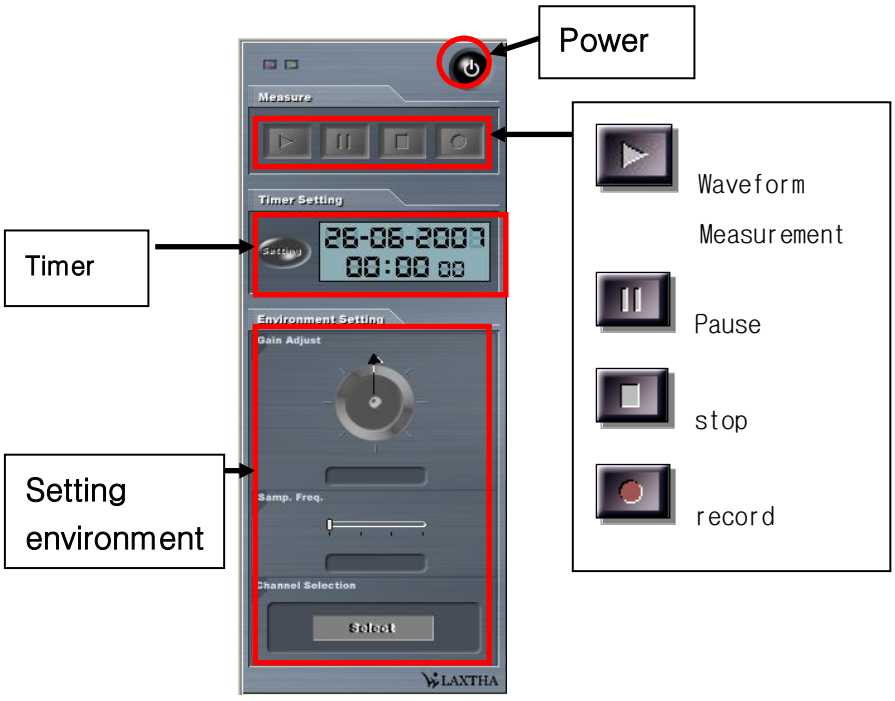
If you suspect that the electrode or paste is causing an allergic reaction to the skin, immediately remove the electrode or paste from the skin and clean it thoroughly. Do not take measurements on examinees with allergic reactions.

Check Waveform

If all electrodes are attached to the measurement site and the electrode line connected to the electrode is connected to the connection box, the program (TeleScan®) is driven to obtain the corresponding signal. First, click the "Waveform Measurement" button to see if the signal is being measured correctly. If the signal displayed on the screen is normal, adjust the signal sensitivity, sampling frequency, etc. to optimize the program for measurement (TeleScan®).

Notice

Once created (TeleScan®), the optimal state can be created by saving the "environment file", so that the same file can be called up even if you use it next time. For instructions on how to create and use the "environment file", refer to the software user manual.



4-3. Waveform Measurement and Analysis

Waveform Measurement

After confirming that the normal waveform is displayed, check the condition of the examinee. If necessary, run relevant protocols such as the presentation of the stimulus to check that the waveform is not faulty. The state of the examinee is stable, and the environments related to the measurement protocol are in a state where they can save the displayed waveform.

Save Waveform

Waveforms measured on the program (TeleScan®) can be saved by clicking the "Record" button. With the "Waveform Measurement" button, the signal displayed on the screen disappears at the same time as clicking the "Stop" button. However, the signal displayed after clicking the "Record" button can be saved without disappearing with the "Stop" button. There are two ways to save a waveform. One is to store the signal obtained after setting the waveform measurement time in advance, and the other is to save the waveform by terminating when necessary.

The former case, follow these steps.

(1). In the "Timer Setting" window, click the "Setting" button and enter the hour, minute and second, then click the "Set" button to set the required time.

(2). Click the "Record" button to start measuring the waveform.

(3). After the set time (the time remaining in the program status display window is displayed), the program automatically terminates and a window asking where to save the waveform appears. Save the waveform by specifying the appropriate folder and entering a filename.

In the latter case, follow these steps.

(1). Click the "Record" button to display the waveform on the screen.

(2). Click the "Stop" button when you have secured the desired signal length.

(3). Save the measured waveform by specifying the appropriate folder in the window to save the file and entering the file name.

Notice

To save the waveform and exit the program, click the "Power" button on the program to cancel the activation and exit the program. For more details, please refer to the software manual.

Signal analysis

Open the saved data file by double-clicking the data file in Windows Explorer or using the "Open File" menu of TeleScan program. Then click the icon of the various mathematical time series signal processing icons in the "Analysis Tool Bar" that you want to apply, and the corresponding processing result will appear on the screen.

Notice

For more details, please refer to the software manual.

5. Maintenance

5-1. Hardware Maintenance

Device and connection box

After operation, it is necessary to check periodically (yearly) for safe and reliable use of the device. If necessary, please get proofreading service.
Before use, check the connection status and the identification status of the main display, and be careful not to apply any mechanical shock during use. In particular, do not place any objects on top of the unit. After use, turn off the power and keep it away from places with high humidity or direct sunlight. When transporting is necessary, pay particular attention to external impact.

Electrode line

The electrode line of both connectors must be well managed to avoid deformation. For the safety of use, the connector to be connected to the device should be careful that this material is not caught in the inside of the female type where the metal surface is surrounded by the insulator. If the contact of the connector is poor, the quality of the measurement signal can not be relied upon. Dispose of the defective electrode wire and keep a new one. The other connector attached to the electrode must be handled differently depending on its shape. In the snap type, the connection condition of the connector connected to the disposable electrode should be kept good. If the connector is loose, discard the electrode and keep a new one. Disk type requires special management. After use, clean the attached electrode pool (paste) and keep it clean. If possible, soak in salt water for approximately 10 minutes at a concentration of approximately 1% before use.
Be careful not to contaminate the conductors of the electrode wires with other substances. Do not store or use wires with excessive bending. In addition, it is necessary to control the lead wire from exposure to direct sunlight. Electrode wire are a primary factor in good signal measurement. Electrode line management is more important than ever to ensure consistently reliable signal quality.

Paste

Please check the expiration date indicated on the container and use within the time limit. Please keep in accordance with the storage instructions marked on the container as it is opened for use. Paste is a substance that comes into direct contact with the skin of the human body, so special care must be taken. Discard old ones after opening and keep new ones.

Disposable electrode

Check the expiration date written on the outer wrapper containing the individual electrodes. Manage the electrode according to the storage instructions on the packaging. Please expire as soon as it is released for use. Always keep the opened electrode wrapper sealed. Dispose of the used electrode only once. Disposable electrodes have a relatively low risk of infection due to poor contact or electrode surface contamination.

5-2.Responding to changes in software usage environment

Change computer

If you need to change the computer on which the software is installed, the specification of the new computer is ensure that the computer meets the specifications listed in "3-3.Installing the Software". Install the software on the new computer according to the procedure.

Operating system changes

If you use a new operating system on your computer and use the supplied software (TeleScan®), make sure that the operating system (OS) meets the recommended specifications. In particular, be aware that the supplied software (TeleScan®) may not work properly for higher versions of the operating system.

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Caution

If you try to run the software (TeleScan®) using the upper version of the recommended OS, it may not operate normally. Please note that the operation of this software is not verified for the new version OS.

6. Product Specifications

Amplifier	
Number of Channels	Mono-polar, 64ch (Max) - EEG Bipolar, 3ch - EOG, ECG, EMG, user defined
Option for Maximum EEG channel	8ch, 16ch, 24ch, 32ch, 40ch, 48ch, 56ch, 64ch
Reference Selections	More than EEG 24 ch : - A1, A2, (A1+A2)/2, Cz(CH18) Lower than EEG 16 ch : - A1, A2, (A1+A2)/2
Input Range	± 0.36 V for all channels
Input Impedance	> 300 Mohm
Internal Noise	< 0.2 uVrms
CMRR	> 100 dB
Input Error	< ±1%
Input Coupling	DC (@ High Pass Filter Off)
Gain Calibration	Yes
DC Offset Calibration	Yes

Electrode impedance	
Leadoff Check	Real-time monitoring Lead ON - Active : Green LED ON - Reference : Blue LED ON Lead OFF - Active : Purple LED ON - Reference : Purple LED ON(selected), LED OFF(non-selected)
Leadoff Detection type	DC
Impedance Meas. Type	AC (62.5Hz)
Impedance Meas. Range	0 ~ 200 kohm

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Impedance Error	±10%

Filter	
High Pass Filter, -3dB	Off, 0.1Hz, 0.5Hz, 2.5Hz, 12.5Hz, 25Hz, for all sampling frequency, User selectable
Low Pass Filter, -3dB	25Hz, 50Hz, off (@ 250Hz sampling freq.) 50Hz, 100Hz, off (@ 500Hz sampling freq.) 100Hz, 200Hz, off (@ 1kHz sampling freq.) 200Hz, 400Hz, off (@ 2kHz sampling freq.)
Notch Filter, fc	50/60 Hz(on/off user selectable)
Attenuation	> 50dB

Analog to digital conversion	
resolution	24 bits
sampling frequency	250, 500, 1k,2k sps/ch ; user selectable
sampling frequency error	± 50 ppm

interface	
Communication method	USB 2.0

I / O connector	
Electrode input connector	100-pin. I/O connector
Computer interface connector	USB-B type

Hardware properties	
Size	150(W) X 150(H) X 32(D) , mm
Weight	700 g

Electrical characteristic

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Supply Power	+5 VDC (from USB Power)
Consumption current	Lower than 8ch: 230 mA Lower than 16ch: 250 mA Lower than 24ch: 275 mA Lower than 32ch: 300 mA Lower than 40ch: 325 mA Lower than 48ch: 350 mA Lower than 56ch: 375 mA Lower than 64ch: 400 mA

Operating environment	
Temperature	10 ~ 40 ℃
Humidity	30 ~ 80 %

Transportation and storage environment	
Temperature	-20 ~ 60 ℃
Humidity	20 ~ 90 %

7. product composition

7-1. product composition

Products are largely composed of hardware and software. The hardware is powered by USB power and transfers measurement data to the computer via USB communication. The software is installed and operated on the computer. Displays, analyzes and saves measurement data provided by the device. also control device can behavior.
The hardware requires additional electrodes and electrodes. Electrodes are sensors attached to the body to detect EEG signals. An electrode line is a wire that guides the signal measured through the electrode to the hardware.

Software (TeleScan)

It is installed in the computer and communicates with the device via USB to control the device, display the measurement data, analyze and store it. Please refer to Chapter 3 and 4 for software installation and use.

Hardware(Device, QEEG-64FX)

Connect the device to the computer with the software installed via USB. After you first connect the device to the USB port on your computer, the computer will recognize the device. At the same time, the device is initialized. When the device is initialized, the LEDs on each electrode light up in blue. In this state, the device can receive user input via software.
The device and the computer are connected by a USB cable, and the device and the examinee are connected to the electrode wire through the electrodes. Once these connections are complete, you can measure your brain waves with the installed software.

Electrode wire

The electrode wire is a wire that connects the device to the human body. Electrical connection between the device and the human body is essential for EEG signal measurement. Most of the signal failures are caused by bad electrode lines.

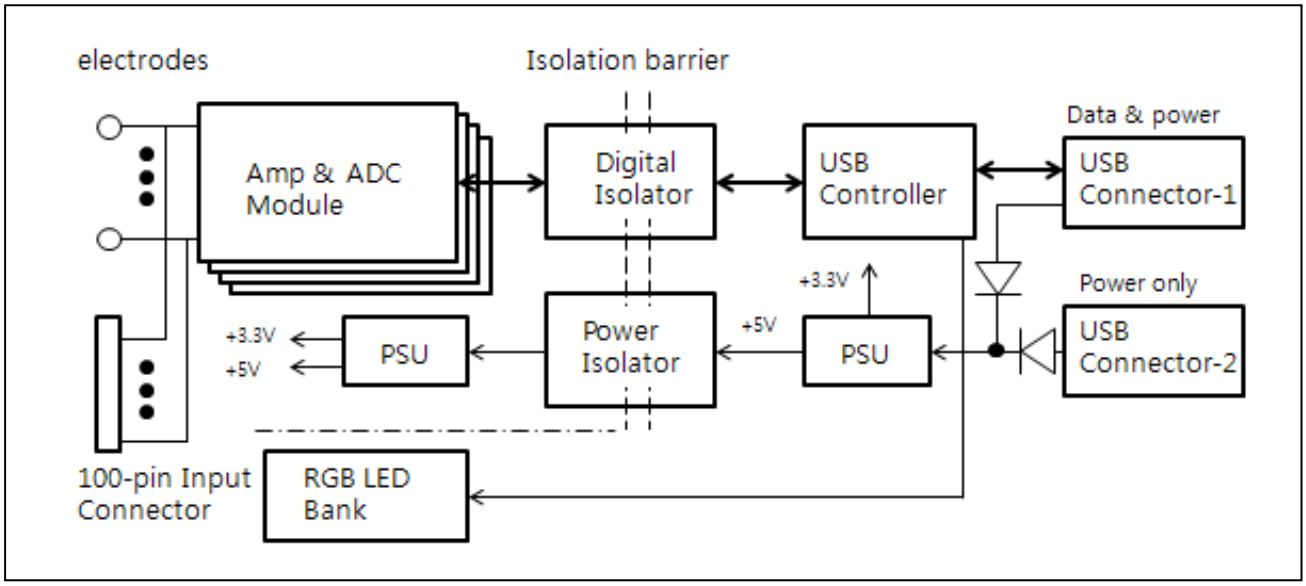
Electrode

It is a component that detects the electric signal generated in the living body. The measuring electrode and the reference electrode should be made of the same material.

7-2. Operation Diagram and operation principle

Diagram

The overall diagram of the hardware is shown below.



operation principle

EEG signals are input through the individual electrode connection connector or 100-pin connector provided in the device. The device amplifies the potential difference between the reference electrode and the measuring electrode, and digitally converts the analog signal for each channel.

The digitally converted signal is provided to the USB controller via a digital signal isolator. In order to protect against electric shock of the examinee, it is accomplished by insulated DC-DC converter at the same time as the signal insulation and the power insulation. Isolation power is generated with 3.3VDC for digital signal power and + 5VDC for analog signal power.

The isolated DC-DC converter accepts + 5VDC of constant voltage as USB power. USB power is supplied through two USB connectors. USB current through the two USB connectors is synthesized as a diode and input to the power supply (PSU). If you run out of power, use both connectors.

The digital signal input to the USB controller is converted to a signal for USB communication and transmitted to the computer through the USB connector. The digital signal includes the EEG data of each channel, the electrode contact state of each channel, and the contact impedance. Through the control signals provided by the

computer operation program (Telescan), the USB controller controls ON / OFF of the RGB LED according to the contact state of the individual electrodes. The user can check the electrode contact status in real time by LED color of each electrode according to RGB LED Bank.

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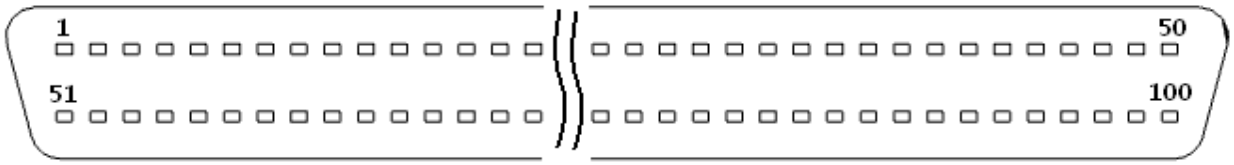
7-3. I / O connector assignment

Electrode Connector



The pin assignment of the 100-pin connector is shown in the table below.

Signal number	100-pin connector Pin number	100-pin connector Pin number	Signal number
reserved	51	1	ECGP
reserved	52	2	ECGN
reserved	53	3	EOG1P
reserved	54	4	EOG1N
reserved	55	5	EOG2P
reserved	56	6	EOG2N
reserved	57	7	reserved
reserved	58	8	reserved
CH64	59	9	CH62
A2	60	10	CH2
CH34	61	11	CH4
CH36	62	12	CH6
CH38	63	13	CH8
CH40	64	14	CH10
CH22	65	15	CH42
CH24	66	16	CH44
CH26	67	17	CH46
CH48	68	18	CH12
CH50	69	19	CH14
CH28	70	20	CH16
CH30	71	21	CH52
CH32	72	22	CH54
CH58	73	23	CH56

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CH60	74	24	CH18
Body-Driver	75	25	CH20
CH61	76	26	CH19
CH59	77	27	CH17
CH57	78	28	CH55
CH31	79	29	CH53
CH29	80	30	CH51
CH27	81	31	CH15
CH49	82	32	CH13
CH47	83	33	CH11
CH25	84	34	CH45
CH23	85	35	CH43
CH21	86	36	CH41
CH39	87	37	CH9
CH37	88	38	CH7
CH35	89	39	CH5
CH33	90	40	CH3
A1	91	41	CH1
reserved	92	42	CH63
GNDA(Analog power)	93	43	GNDA(Analog power)
reserved	94	44	+5VA(Analog power)
GNDD(Digital power)	95	45	GPIO7
GNDA(Analog power)	96	46	GPIO6
SDA	97	47	GPIO5
SCL	98	48	GPIO4
GPIO0	99	49	GPIO3
GPIO1	100	50	GPIO2

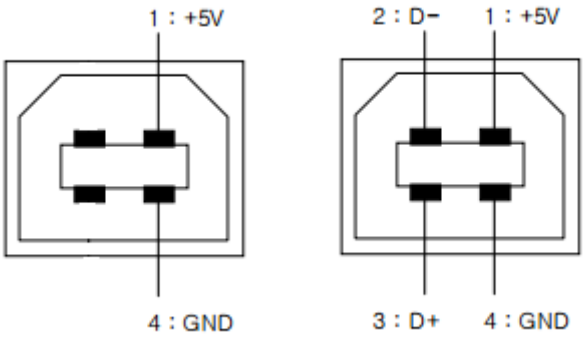
[Pin assignment information for 100-pin input connector]

The input connector can be used for a variety of purposes, but is mainly used for connecting the EEG cap. It is also used for device calibration using the supplied input shorting adapter (LXCON01).

EEG cap adapter and montage

Can connect an EEG adapter to the 100-pin input connector. The EEG cap and its adapter depend on the number of channels in device. Refer to the appropriate manual for adapter and EEG cap for each channel.

USB-B type connector



[USB-2; Power only] [USB-1; Power & Data]

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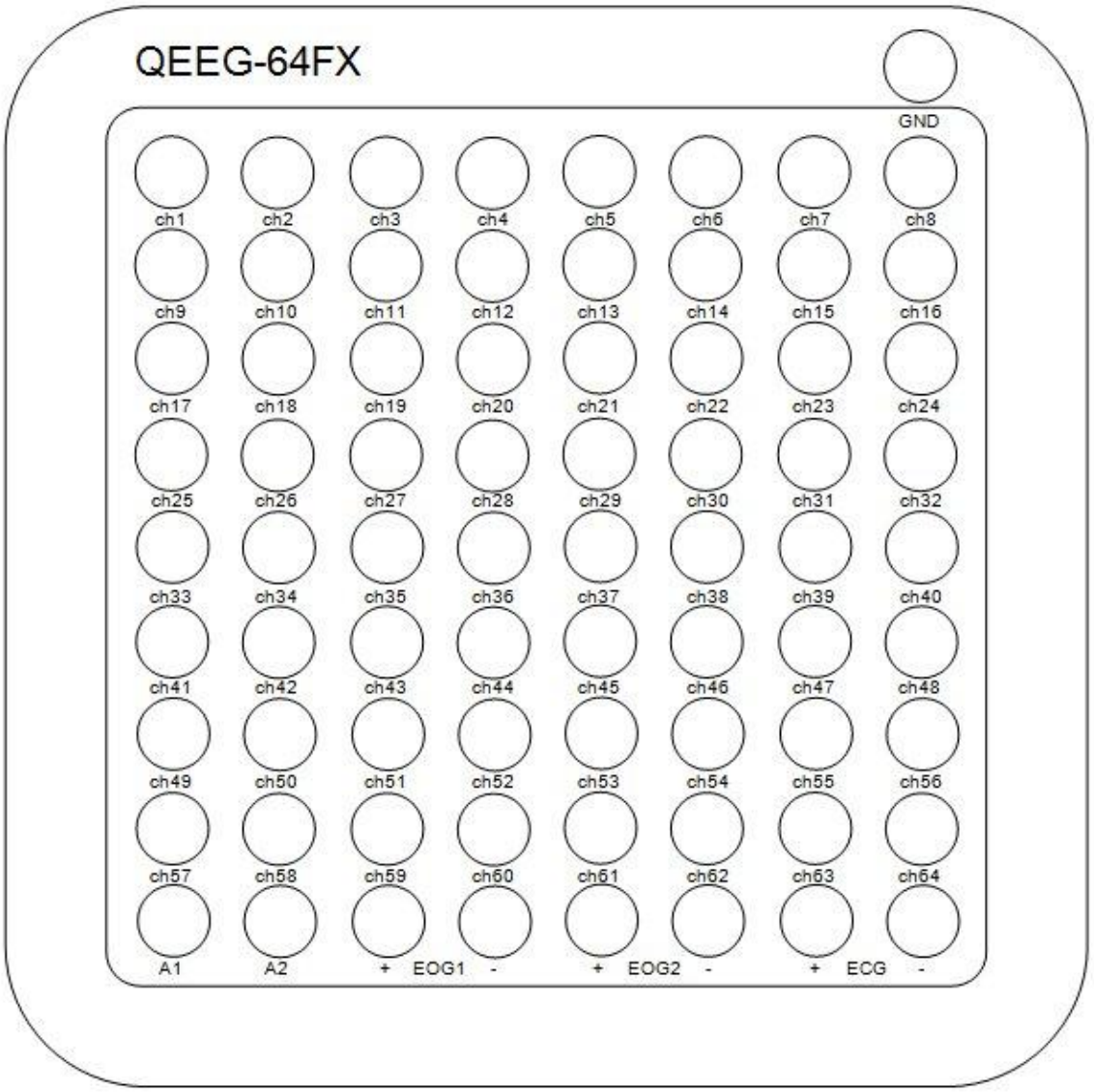
Electrode connector

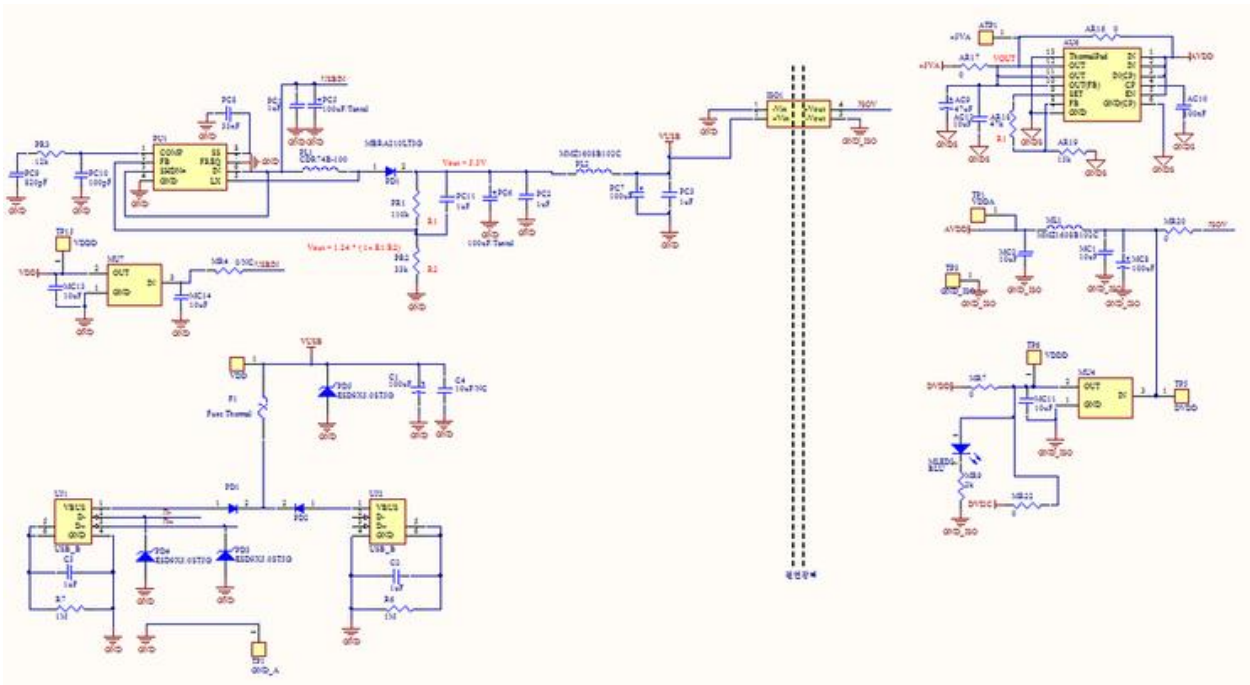


7-4. Electrical rating

The device uses USB power + 5VDC. The USB power voltage must conform to the USB standard (4.75 to 5.25V). For more than 40 channels, it is recommended to use an additional USB connector for power supply. Refer to 6. Specifications for the current consumed by the device.

Power supply Schematic

The power supply schematic of the device is shown below. Power is supplied via two USB connectors. Each USB power source is current synthesized to a Schottky diode and supplied to the device via a resettable fuse (F1) with a common power supply. The maximum allowable current of Fuse (F1) is 500mA. The + 5.5V is generated from the USB power supply by a step-up converter and supplied to the isolated DC-DC converter. In addition, + 3.3VD voltage is generated directly from the USB power source, and it is utilized as digital circuit driving power of the device. On the other hand, from the output of the isolated DC-DC converter, generate the power of the insulation part, + 3.3VDD and + 5VA. In isolation, + 3.3VDD is used as the power for digital circuits and + 5VA is used as analog power.



8. Repairs

Approach to problem solving

Except in the case of equipment failure, the most common problem is that the connection "leads". USB cable connection, and electrode wire connection. If checks for these connections consists accurate and correct most of the problems will be solved. In addition, rational, step-by-step thinking will simplify the problem and provide a solution easily. For example, consider the problem that power noise is mixed extensively in a signal on a particular channel. When you trace the signal path, you can think of three major suspects. It is doubtful whether the electrode that provides the signal, the electrode wire connected to the electrode, and the instrument inside the instrument related to the channel. At this time, we will check the easiest thing to do in each step. If an electrode attached to the electrode line or in good condition and their connections in good condition finally leads to the signal wiring in the other channel other than the channel, and to identify what is causing the problems Does the problem still occurs. Once you know the cause of the problem, find a solution to resolve it. If it is from an electrode, you may be able to resolve it by attaching a new electrode correctly. Similarly, if the electrode wire is a problem, it can be replaced by a new electrode wire. However, if you are experiencing problems with your device's channel, please do not try to solve this problem yourself, but contact your dealer for service. This set of procedures is an appropriate approach to problem solving. To simplify the problem, remove all other elements except those related.

The most difficult problem with using the device is when the abnormal phenomenon occurs intermittently. The first task of healing this phenomenon is to reproduce the phenomenon. As soon as we detect such a phenomenon, we carefully look at the device and its surroundings, especially the changes in the environment that use large currents.

Electrode, electrode wire

(1). As a certain channel signal is initially clean, noise flows in more frequently and eventually only power noise appears.

The measurement electrode contact condition of the channel is not good or the electrolyte of the electrode is insufficient. If a disposable electrode is used,

reattach the new electrode correctly. If using an paste, fill the paste further and make sure that the electrode is properly attached.

(2). The entire channel signal is clean at first, and as the time passes, the noise is frequently introduced and eventually the power noise appears.

The reference electrode and / or the ground electrode are not in good contact or the electrolyte of the electrode is insufficient. Keep the electrolyte and adhesion of these electrodes well.

(3). There is a tendency to repeat the appearance of power noise at a certain moment when a certain channel signal appears clear.

This may be caused by poor connection of the electrode wire of the channel. The resistance of the electrode wire should be 3Ω or less. Try replacing the measuring electrode wire of that channel with another good electrode wire. At this time, pay attention to the contact state of the connector connected to the connection box. If the same behavior still occurs, the connector box connector may not be properly attached to the board. If the electrode wire connector is frequently disconnected from the connection box, or if force is exerted on it, the board and connector pins may be detached. If this is the case, contact your place of purchase.

(4). There is a tendency to repeat the appearance of power noise at any moment while the signal is clear throughout the entire channel.

This may be caused by poor connection of the reference electrode wire and / or the ground electrode wire. This is the same as (3). However, it is different that the electrode wire is the reference or / and the ground electrode wire. In some cases, this may be due to external factors not related to the device. Try again over time or try different measurement locations. If such a problem still occurs, the cause of the former is certainly valid. However, if the problem is solved in this case, it is due to the latter cause and there is no problem with the instrument, the electrode, and the electrode wire. If it is due to an external factor, it usually returns to normal once the factor has disappeared. However, it is often necessary to move the measuring room to another location when this happens. Refer to the "3-2.Hardware Installation" section for the proper installation location.

(5). Over the entire channel, the signal contains a lot of power noise, and over time, it appears as "---" above or below the screen.

The grounding electrode is not connected. Check that the grounding electrode is properly attached to the human body and that the electrode wire is connected correctly.

Device

(6). LED does not light up.

Make sure that the USB cable is properly connected to the device. Also check that the polarity of the connected connector is correct. If all of these are normal but the LED does not light up, contact your dealer for service.

(7). The electrode connector is loosened and the electrode wire is not securely connected.

It means that the connector for the electrode line is not firmly fixed to the connection box body and is not connected to the board. In this case, please contact the place of purchase and ask for service.

(8). When the power button is clicked on the software (TeleScan®), the message "OS is not recognized normally" is displayed.

Make sure that the USB cable is properly connected between the device and the computer. Also, make sure that power is applied to the device. At the same time, make sure that "device selection" is set correctly in the software. If all of these are normal and you see this message, try shutting down the software and device and try again. Nevertheless, if the problem persists, contact your dealer for service.

(9). When you click the Power button on the software (TeleScan®) and click the "Waveform Measurement" button activated, the waveform is not displayed on the screen.

Quit the equipment and program and try again. If the same phenomenon repeats continuously, contact your dealer for service.

Software(TeleScan®)

(10). The stimulus window does not appear.

The power of the stimulus control window is turned off. Click the power switch on the stimulus control window to turn it on.

(11). After complete measurement, the Save Data dialog box does not close when you click the Close button.

If the data file name contains special characters such as *. Please remove the special characters and try again.

(12). The data file saved after measurement does not open normally.

If the data is measured for a long time, the user has forcibly terminated the program before the completion message "Save completed when saving the file". Please be sure to wait for the message 'Save completed' when saving the measurement data.

(13). The software is not installed.

First of all, make sure that the computer specification meets the requirements. If it is correct, there may be a case where the provided software installation CD is partially damaged. Please download it from the company homepage and download it.

9. Warranty & Service

9-1. Warranty Guide

Warranty

The warranty of the product is only granted to the first customer who purchased this product. This is a unique right for this product granted to the original purchaser who can not transfer. This product is finally approved and shipped by strict quality control of Laxtha Inc. Features of the product, such as functionality and stability, are only guaranteed if:

(1). If the seal attached to the product packaging is not broken

(2). If there is no evidence of misrepresentation or attempted modification or alteration without approval of the Laxtha Inc.

(3). Replaced only with parts approved by Laxtha Inc.

(4). If the product is used only for its intended purpose

(5). Not resold or used as part of another product without approval of Laxtha Inc.

Warranty period

The warranty period for the product is three years after the customer has delivered the product. It is not the starting point for a new product warranty to receive services related to a product, whether it is a free service due to a defect in the product during the warranty period or a fee-based service caused by other factors.

Damage due to transportation

This product has been approved by our strict quality control and testing and finally shipped. However, if the product is delivered by consignment, it may be damaged due to careless handling during transportation. The product carrier is responsible for these damages. Please inform your dealer immediately about the damage of such product after delivery of the product. You can also request repair or replacement of the product. Such services are expressly evidence of damages for the carrier. Please keep all packaging materials that you have delivered.

Software Use Rights and Warranties

The software included with this product is licensed for use with the hardware. The quality assurance of this software used with the hardware is the same as that given throughout the product. However, since the software itself is provided free of charge, it is not guaranteed by Laxtha Inc. to use it independently without hardware, and Laxtha Inc. shall not be held responsible for any problems caused by it.

Measures to be taken during the warranty period

During the warranty period, we will take action free of charge for faults occurring under normal operating conditions. Actions include replacing components, individual modules, and even product units except consumables, and repairing the unit. Free of charge includes the cost of shipping the product and the cost of the action. However, in the following cases, even if it is within that period, you will be charged for the service, including shipping.

- In case of malfunction caused by carelessness
- In the event of a faulty repair that has not been approved by Laxtha Inc.
- In the event of a failure resulting from the use of the product for any other purpose, in an improper place,
- In case of malfunction caused by natural disasters such as fire, earthquake, flood
- In case of failure due to flooding

If you need product service, contact the place of purchase listed in the first page or contact us. For more systematic and reliable service, contact your place of purchase.

9-2. Service policy

The warranty period for this product is three years after the customer has delivered the product. During this period, the product will be repaired and replaced free of charge in case of failure, even if the product was operated under normal use within the scope of this manual. However, refunds are not included. Please refer to Section 9-1 for free service conditions and contents.

Customer service

Requests for product-related data such as quotes, orders, catalogs, etc. for products and other components, please contact our general sales agency. Here's information about your global sales agency:

- Mutual : Neuromedi Inc.
- Tel. : 042-342-8617
- Fax : 042-349-8617
- Home Page : www.neuromedi.com
- e-mail : sales@neuromedi.com

Product Utilization Support Service

Provides technical support for product utilization. If you need information on using the product, please visit our website or contact our technical support staff.

Technical Support Services

Support for product troubleshooting, instrument calibration, repair or replacement. If you need help, please let us know the model and serial number (S / N) of the product. It is recommended that these services be firstly requested from the place of purchase to receive systematic and stable support.

Contact

manufacturer

Mutual : Laxtha Inc.
Manufacturing license number : No. 1431
Tel. : 042-931-4590
Fax : 042-331-4590
Home Page : www.laxtha.com
e-mail : sales@laxtha.com

A representative seller

Mutual : Neuromedi Inc.
Tel. : 042-342-8617
Fax : 042-349-8617
Home Page : www.neuromedi.com
e-mail : sales@neuromedi.com

QEEG-64FX User Manual

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