

EEG-9100A
EEG-9100J
EEG-9100K
EEG-9100G
EEG-9200A
EEG-9200J
EEG-9200K
EEG-9200G

ELECTROENCEPHALOGRAPH

***Neurofax* μ EEG-9100**

***Neurofax* EEG-9200**

Model: EEG-9100/9200

Manual code no.: 0614-006153D

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GENERAL HANDLING PRECAUTIONS

This device is intended for use only by qualified medical personnel.

Use only Nihon Kohden approved products with this device. Use of non-approved products or in a non-approved manner may affect the performance specifications of the device. This includes, but is not limited to, batteries, recording paper, pens, extension cables, electrode leads, input boxes and AC power.

Please read these precautions thoroughly before attempting to operate the instrument.

1. To safely and effectively use the instrument, its operation must be fully understood.

2. When installing or storing the instrument, take the following precautions:

- (1) Avoid moisture or contact with water, dust, extreme atmospheric pressure, excessive humidity and temperatures, poorly ventilated areas, and saline or sulphuric air.
- (2) Place the instrument on an even, level floor. Avoid vibration and mechanical shock, even during transport.
- (3) Avoid placing in an area where chemicals are stored or where there is danger of gas leakage.
- (4) The power line source to be applied to the instrument must correspond in frequency and voltage to product specifications, and have sufficient current capacity.
- (5) Choose a room where a proper grounding facility is available.

3. Before Operation

- (1) Check that the instrument is in perfect operating order.
- (2) Check that the instrument is grounded properly.
- (3) Check that all cords are connected properly.
- (4) Pay extra attention when the instrument is in combination with other instruments to avoid misdiagnosis or other problems.
- (5) All circuitry used for direct patient connection must be doubly checked.
- (6) Check that battery level is acceptable and battery condition is good when using battery-operated models.

4. During Operation

- (1) Both the instrument and the patient must receive continual, careful attention.
- (2) Turn power off or remove electrodes and/or transducers when necessary to assure the patient's safety.
- (3) Avoid direct contact between the instrument housing and the patient.

5. To Shutdown After Use

- (1) Turn power off with all controls returned to their original positions.
- (2) Remove the cords gently; do not use force to remove them.
- (3) Clean the instrument together with all accessories for their next use.

6. The instrument must receive expert, professional attention for maintenance and repairs. When the instrument is not functioning properly, it should be clearly marked to avoid operation while it is out of order.

7. The instrument must not be altered or modified in any way.

8. Maintenance and Inspection:

- (1) The instrument and parts must undergo regular maintenance inspection at least every 6 months.
- (2) If stored for extended periods without being used, make sure prior to operation that the instrument is in perfect operating condition.

- (3) Technical information such as parts list, descriptions, calibration instructions or other information is available for qualified user technical personnel upon request from your Nihon Kohden distributor.
- 9. When the instrument is used with an electrosurgical instrument, pay careful attention to the application and/or location of electrodes and/or transducers to avoid possible burn to the patient.**
- 10. When the instrument is used with a defibrillator, make sure that the instrument is protected against defibrillator discharge. If not, remove patient cables and/or transducers from the instrument to avoid possible damage.**

WARRANTY POLICY

Nihon Kohden Corporation (NKC) shall warrant its products against all defects in materials and workmanship for one year from the date of delivery. However, consumable materials such as recording paper, ink, stylus and battery are excluded from the warranty.

NKC or its authorized agents will repair or replace any products which prove to be defective during the warranty period, provided these products are used as prescribed by the operating instructions given in the operator's and service manuals.

No other party is authorized to make any warranty or assume liability for NKC's products. NKC will not recognize any other warranty, either implied or in writing. In addition, service, technical modification or any other product change performed by someone other than NKC or its authorized agents without prior consent of NKC may be cause for voiding this warranty.

Defective products or parts must be returned to NKC or its authorized agents, along with an explanation of the failure. Shipping costs must be pre-paid.

This warranty does not apply to products that have been modified, disassembled, reinstalled or repaired without Nihon Kohden approval or which have been subjected to neglect or accident, damage due to accident, fire, lightning, vandalism, water or other casualty, improper installation or application, or on which the original identification marks have been removed.

In the USA and Canada other warranty policies may apply.

CAUTION

United States law restricts this device to sale by or on the order of a physician.

EMC RELATED CAUTION

This equipment and/or system complies with the International Standard IEC60601-1-2 for electromagnetic compatibility for medical electrical equipment and/or system. However, an electromagnetic environment that exceeds the limits or levels stipulated in the IEC60601-1-2, can cause harmful interference to the equipment and/or system or cause the equipment and/or system to fail to perform its intended function or degrade its intended performance. Therefore, during the operation of the equipment and/or system, if there is any undesired deviation from its intended operational performance, you must avoid, identify and resolve the adverse electromagnetic effect before continuing to use the equipment and/or system.

The following describes some common interference sources and remedial actions:

1. Strong electromagnetic interference from a nearby emitter source such as an authorized radio station or cellular phone:

Install the equipment and/or system at another location if it is interfered with by an emitter source such as an authorized radio station. Keep the emitter source such as cellular phone away from the equipment and/or system.

2. Radio-frequency interference from other equipment through the AC power supply of the equipment and/or system:

Identify the cause of this interference and if possible remove this interference source. If this is not possible, use a different power supply.

3. Effect of direct or indirect electrostatic discharge:

Make sure all users and patients in contact with the equipment and/or system are free from direct or indirect electrostatic energy before using it.

4. Electromagnetic interference with any radio wave receiver such as radio or television:

If the equipment and/or system interferes with any radio wave receiver, locate the equipment and/or system as far as possible from the radio wave receiver.

If the above suggested remedial actions do not solve the problem, consult your Nihon Kohden Corporation subsidiary or distributor for additional suggestions.

The CE mark is a protected conformity mark of the European Community. The products herewith comply with the requirements of the Medical Device Directive 93/42/EEC.

The CE mark is only applied to the EEG-9100K/G and EEG-9200K/G Electroencephalograph.

This equipment complies with EUROPEAN STANDARD EN-60601-1-2 (1993) which requires EN-55011, class B.

Conventions Used in this Manual and Instrument

Warnings, Cautions and Notes

Warnings, cautions and notes are used in this manual to alert or signal the reader to specific information.

WARNING

A warning alerts the user to the possible injury or death associated with the use or misuse of the instrument.

CAUTION

A caution alerts the user to possible injury or problems with the instrument associated with its use or misuse such as instrument malfunction, instrument failure, damage to the instrument, or damage to other property.

NOTE

A note provides specific information, in the form of recommendations, prerequisites, alternative methods or supplemental information.

Explanations of the Symbols in this Manual and Instrument

The following symbols found in this manual/instrument bear the respective descriptions as given.

Power supply unit, SC-901A/AK/AG (for EEG-9100A/J/K/G)

Isolation unit, SM-930AA/AJ/AK (for EEG-9200A/J/K/G)

Symbol	Description	Symbol	Description
	Alternative current		Attention, consult operator's manual
	Equipotential ground terminal		Serial number
	Protective ground		Date of manufacture
	The CE Mark is a protected conformity mark of the European Community. The products herewith comply with the requirements of the Medical Device Directive 93/42/EEC.	EMC	The product complies with IEC60601-1-2 (1993) (for sales in Japan only)

PC unit, CC-901AK (for EEG-9100A/J/K/G)

Symbol	Description	Symbol	Description
	Power/suspend indicator		RS-232C connector
	Num Lock indicator		Mouse connector
	Caps Lock indicator		USB connector
	Scroll Lock indicator		PRT connector
	Hard disk access lamp indicator		Unlock icon
	Battery charging indicator		Protective ground
	Power socket		Attention, consult operator's manual

Symbols on the PC unit differ according to model. Refer to the Operator's manual of the PC unit.

For the symbols of the following equipments, refer to each Operator's manual.

- Magneto-optical disk drive
- Printer

PC unit, CC-902AK (for EEG-9200A/J/K/G)

Symbol	Description	Symbol	Description
	Standby (power on/off)		USB connector
	Hard disk access lamp		Video connector
	Headphone connector		Network connector
	Printer port		Audio jack (Microphone)
	Serial port		Audio jack (LINE OUT)
	Mouse connector		Audio jack (LINE IN)
	Keyboard connector		Attention, consult operator's manual
	Protective ground		

Symbols on the PC unit differ according to model. Refer to the Operator's manual of the PC unit.

For the symbols of the following equipments, refer to each Operator's manual.

- Display
- Magneto-optical disk drive
- Printer

Options

Electrode junction box, JE-910A/AG, JE-911A/AG

Symbol	Description	Symbol	Description
	Type BF applied part		Attention, consult operator's manual

Flash lamp assembly, LS-703A/LS-706A

Symbol	Description	Symbol	Description
	Hot surface		Attention, consult operator's manual

Photo control unit, LS-901AJ/AK/AG

Symbol	Description	Symbol	Description
	Attention, consult operator's manual		Serial number
	Alternative current		Date of manufacture
	Equipotential ground terminal		

Photo control unit (inside)

Symbol	Description	Symbol	Description
	High voltage		Ground
	Protective ground		

On screen

Symbol	Description	Symbol	Description
	Display of list box		Warning query that displays a warning or caution for operation.
	Scrolling of data, list and others		Warning message that displays a warning or caution for operation you to do something.
	Check box	 Maximize Restore Minimize	Window maximize/resize minimize button
	Option button		Close button

Precautions for Input Jack Use

NOTE

Do not perform EEG measurement without the Z, C3, C4, A1 and A2 electrodes.

Use of input jack Z

Connect the lead from the electrode (Z electrode) attached on the patient's nasion to the input jack Z on the electrode junction box. The purpose of this input jack is to eliminate AC interference positively.

NOTE

The input jack Z is also used for checking electrode impedance.

Use of input jacks C3 and C4

Connect the leads from the electrodes attached on the positions C3 and C4 to the input jacks C3 and C4 respectively.

NOTE

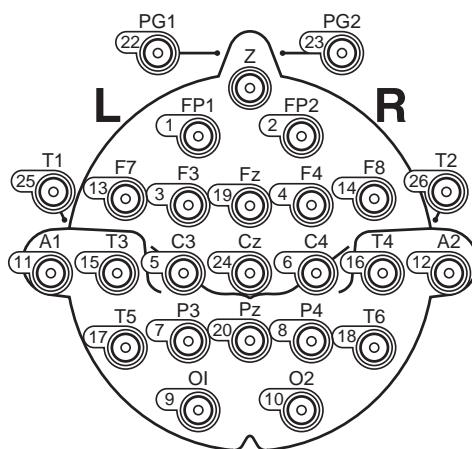
- **The C3 and C4 electrodes are the system reference electrodes for EEG measurement.**
- **The input jacks C3 and C4 must be attached for EEG measurement even when the C3 and C4 are not programmed in any montage.**

Use of input jacks A1 and A2 (or FP1 and FP2), C3 and C4 during skin-electrode impedance check

When checking each electrode impedance, connect the leads from the electrode attached on the positions A1, A2, C3 and C4 to the input jacks A1, A2, C3 and C4 respectively.

NOTE

- **The A1 and A2 (or FP1 and FP2) electrodes are the reference electrodes for skin-electrode impedance check.**
- **The input jacks A1 and A2 (or FP1 and FP2) in addition to the Z, C3 and C4 must be attached for the electrode impedance check.**



Checking original electrode potentials for all active electrodes

Check the original electrode potential for all active electrodes by programming a montage with the system reference (Select the 0 V button for reference electrode on the Montage dialog box). Refer to "Programming Patterns" in Section 4.

The digital EEG displays the EEG waveform in each channel by subtracting two electrode potentials selected to a montage. The subtracted result will be incorrect, if the electrode attachment is not correct, the original electrode potential is flat or unstable, or artifact is superimposed on the original electrode potential. Omit the measurement result if the displayed EEG waveform is incorrect.

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Section 1 General

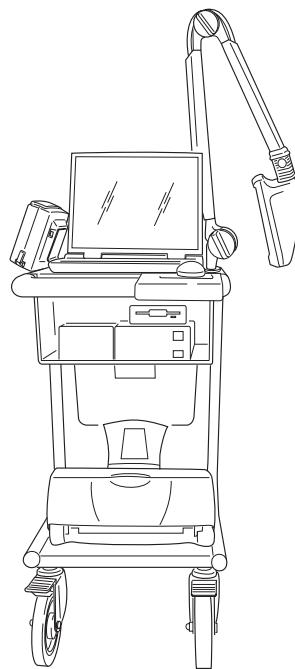
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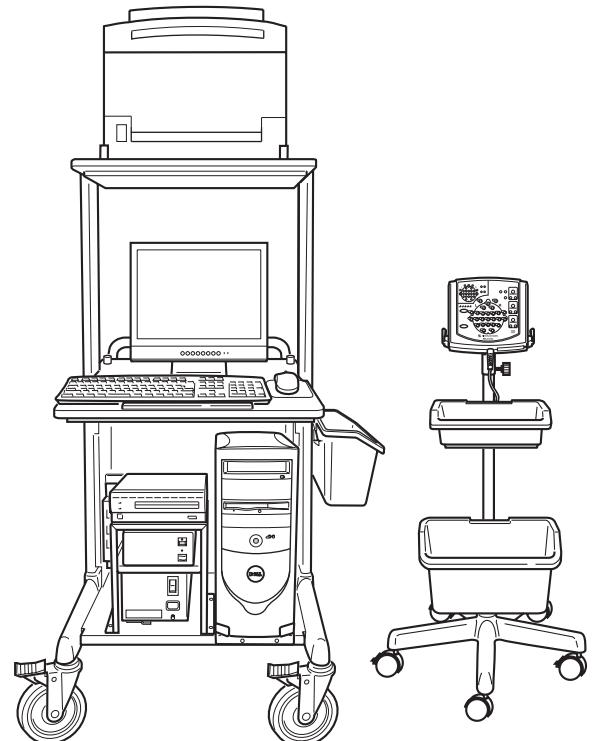
Introduction

The EEG-9100A/J/K/G, EEG-9200A/J/K/G Electroencephalograph is designed for both clinical and research use. This electroencephalograph (referred to as “the instrument” in this operator’s manual) realizes the conventional EEG’s functions in a graphical user interface (GUI) environment (Microsoft Windows 2000). It provides powerful data filing and easy operation. The EEG waveforms and patient information are saved in a large capacity media (hard disk, magneto-optical disk or CD-R/CD-RW disk). This saves a lot of space.

EEG-9100



EEG-9200



NOTE

Use only Nihon Kohden recommended parts and accessories to assure maximum performance from your instrument.

Trademarks

Dell is a registered trademark of Dell Computer Corporation.
 Windows is a registered trademarks of Microsoft Corporation.
 Celeron is a trademark of Intel Corporation.
 Canon is a registered trademark of Canon Corporation.
 Fujitsu is a registered trademark of Fujitsu Limited.
 Pentium is a trademark of Intel Corporation.
 HP is a registered trademark of Hewlette-Packard Company
 SONY is a registered trademark of Sony Corporation.
 EIZO is a registered trademark of EIZO NANAO Corporation.

General Safety Information

WARNING

- Never use this instrument in the presence of any flammable anesthetic gas or high-concentration oxygen atmosphere. Failure to follow this warning may cause explosion or fire.
- Never use this instrument in a high-pressure oxygen medical tank. Failure to follow this warning may cause explosion or fire.

Using with an electrical surgical unit (ESU)

- Never use this instrument near an ESU. The instrument may malfunction due to high-frequency noise from the ESU.
- When using this instrument with an ESU, refer to the instruction manual for the ESU. Before measurement, check that the return plate is correctly attached to the patient and check that the instrument operates correctly when using with the ESU. If the return plate is not attached correctly, it may burn the patient's skin where the electrodes are attached.
- Before using the ESU, remove all needle electrodes and silver ball electrodes from the patient. Failure to follow this warning may cause burn on the patient.

MRI examination

- Do not install this instrument in an MRI examination room. The instrument may not operate properly due to high-frequency magnetic noise from the MRI.
- When performing MRI tests, remove from the patient all the electrodes and transducers which are connected to this instrument. Failure to follow this warning may cause serious electrical burn on the patient due to local heating caused by dielectric electromotive force. For details, refer to the instruction manual for the MRI.

When performing defibrillation

- Before defibrillation, remove from the patient all electrodes and transducers which are connected to connectors that do not have a “” or “” mark. The discharged energy may cause serious electrical burn or shock to the operator.
- Before defibrillation, remove all electrodes and gel from the chest of the patient. If the defibrillator paddle touches electrodes or gel, the discharged energy may burn the patient's skin.
- Before defibrillation, all persons must keep clear of the bed and must not touch the patient or any equipment connected to the patient. Failure to follow this warning may cause serious electrical burn, shock or other injury.

Installation

WARNING

- Do not install the QP-0042/0043 EEG-9000 System program into a personal computer which is not specified by Nihon Kohden and use it for EEG measurement.
 - If the personal computer does not satisfy the performance specifications and safety standards which are required by Nihon Kohden, the patient and operator may get electrical shock.
 - Nihon Kohden does not warrant if hardware and/or software becomes defective after installation.
- Only use the provided power cords. If another power cord is used, it may cause electrical shock to the patient and operator.
- For patient safety, equipotential grounding of all instruments must be performed. Consult a qualified biomedical engineer.
- Use the SC-901A/AK/AG Power Supply Unit (EEG-9100A/J/K/G) or SM-930AA/AJ/AK Isolation Unit (EEG-9200A/J/K/G) to supply AC power to a PC unit, display (EEG-9200A/J/K/G only) and an MO disk drive. When two or more power supply units or isolation units are used, ground the power supply units or isolation units to the same equipotential ground and connect the power supply units or isolation units to the same AC outlet to prevent electrical potential difference between the power supply units or isolation units. Never use a locally available multi-power outlets. Failure to follow this warning may cause electrical shock to the patient and operator.

Display (EEG-9200A/J/K/G only)

- The display must comply with the IEC950 standard and CISPR11 Second Edition 1990-09 Group 1 and Class B standard, or the equivalent.
- Only supply AC power from the SM-930AA/AJ/AK Isolation Unit. Do not connect the display to a wall AC outlet. Failure to follow this warning may cause electrical shock to the patient and operator.

Magneto-optical disk drive

- The MO disk drive must comply with the IEC950 standard and CISPR11 Second Edition 1990-09 Group 1 and Class B standard, or the equivalent.
- Only supply AC power from the SC-901A/AK/AG Power Supply Unit (EEG-9100A/J/K/G) or from the SM-930AA/AJ/AK Isolation Unit (EEG-9200A/J/K/G). Do not connect the MO disk drive to a wall AC outlet. Failure to follow this warning may cause electrical shock to the patient and operator.

Warning - continued**Printer**

- The printer must comply with the IEC950 standard and CISPR11 Second Edition 1990-09 Group 1 and Class B standard, or the equivalent.
- Mount the printer on the KE-910A Cart (EEG-9100A/J/K/G) or KD-024A Cart (EEG-9200A/J/K/G) and supply AC power from the SC-901A/AK/AG Power Supply Unit (EEG-9100A/J/K/G) or SM-800RJ/RK Isolation Unit (EEG-9200A/J/K/G). Do not connect the printer to a wall AC outlet. Failure to follow this warning may cause electrical shock to the patient and operator.
- When the printer is not mounted on the KE-910A Cart or KD-024A Cart, locate the printer outside the patient environment (IEC60601-1-1 2.204*) and supply AC power from a medical isolation transformer. Do not connect the printer to a wall AC outlet. Failure to follow this warning may cause electrical shock to the patient and operator.
- Connect only the specified instruments to the connectors or socket marked with \triangle , by following the specified procedure. Otherwise, electrical leakage current may harm the patient and operator.
- When the instrument is turned on, about 600 V is present at pin 2 of the PHOTIC LAMP connector on the LS-901AJ/AK/AG Photo control unit. To protect against shock, always connect the flash lamp assembly cable to this connector, or attach the PHOTOTIC LAMP connector cap to the PHOTIC LAMP connector even when the photic stimulation is not used.
- When connecting an external instrument to the connectors marked with \triangle , the external instrument and this instrument must be connected according to the IEC-60601-1-1 "Medical electrical equipment - Part 1-1: General requirements for safety - Collateral standard: Safety requirements for medical electrical systems". Failure to follow this warning may cause electrical shock to the patient and operator.

Connecting to a Local Area Network

- When connecting the instrument to a local area network, connect the instrument so that the instrument is electrically separated from the local area network according to the IEC-60601-1-1 "Medical electrical equipment - Part 1-1: General requirements for safety - Collateral standard: Safety requirements for medical electrical systems". Failure to follow this warning may cause electrical shock to the patient and operator.
- Check that there is no damage on the surface of the network cable. If it is damaged, it may cause electrical shock to the patient and operator.

Warning - continued

- Before connecting or disconnecting the DC input cable to the DC input connector on the JE-911A/AG Electrode junction box, make sure that the power of the external instrument is turned off or DC signal is not output from the external instrument. Failure to follow this warning may cause electrical shock to the patient and operator.
-
-

CAUTION

- When connecting the cables, make sure that each instrument is turned off.
- Connect only the CC-901AK PC unit and MO disk drive to the SC-901A/AK/AG power supply unit. If other equipment is connected, the power supply unit may not supply enough AC power and may cause malfunction.
- Connect only the CC-902AK PC unit, display and MO disk drive to the SM-930AA/AJ/AK Isolation Unit. If other equipment is connected, the isolation unit may not supply enough AC power and may cause malfunction.
- Only install the specified software in the instrument. Otherwise the system may malfunction.
- When moving the instrument, select a flat path and move it carefully to prevent the components from falling off or the cart from tipping over.
- If static electricity is applied to the connector for the optional hyperventilation unit, pulse noise may be superimposed on the waveform of the mark channel.
- When using the instrument in a high-frequency electric field, the displayed waveform trace may be thicker.
- Use a printer cable which does not emit an unwanted radio frequency signal (EMC protected).

Caution - continued

Cart

- Use only the KE-910A Cart (EEG-9100A/J/K/G) or KD-024A/025A (EEG-9200A/J/K/G) for this instrument. If any of these carts is not used, secure the components of the instrument so that they do not fall off or tip over.
 - Do not sit or lean on the cart because it may tip over.
 - Set the components of the electroencephalograph on the cart according to the specified procedures. Otherwise, the cart may break or the components may tip over.
 - Align the cable with the cable tie or cable clamp so that the cable is not accidentally pulled or caught. Otherwise, the connector may be damaged or the components connected on the cart may fall off and cause injury.
 - Do not use the SD-901AJ/AK/AG (EEG-9100A/J/K/G), SD-903AJ/AK/AG (EEG-9200A/J/K/G) Multiple Portable Socket Outlet if it is not secured to the cart. Otherwise, it may cause electrical shock to the patient and operator.
 - When moving the cart,
 - make sure that the power of all components are turned off,
 - close the PC unit display (EEG-9100A/J/K/G - CC-901AK),
 - release the caster lock,
 - only grip the handle,
 - select a flat path and move the cart carefully to prevent tipping over, components falling or impact, and
 - take care so that the electrode junction box or flash lamp assembly does not bump into a surrounding instrument.
 - Periodically check that the caster rotates smoothly and that no screw or knob bolt is loose.
-

Operation

WARNING

- When using the instrument for brain death diagnosis, before examination, check and adjust the date and time of the system. The date and time on the screen and on the recording result are part of important information for the medical record.
- Do not connect the Z electrode lead plug to a ground or equipotential ground. Otherwise, leakage current from another instrument cause electrical shock to the patient.
- When the JE-913A/AG mini junction box is not used, make sure that the multiple connector cover is firmly attached to the electrode junction box. Failure to follow this warning may cause electrical shock to the patient and operator.
- All activation testing must be applied under the supervision of the physician in charge. Mouth gags, tongue depressors and gauze sponges must always be prepared for use to prevent the patient from biting his tongue or injuring himself during testing because any pattern of flash stimuli may induce seizure activity.
- Do not perform hyperventilation activation when the patient has serious heart disease, acute cerebrovascular disease or respiratory insufficiency.
- When performing the photic stimulation, If an abnormal waveform appears due to photo-paroxysmal response, stop the photic stimulation immediately to prevent evoking seizure.

When using the NE-224S Sub-dermal Straight Needle Electrode

- Do not use the NE-224S sub-dermal straight needle electrode as a measurement electrode for the EEG or evoked potential measurement for any longer than one hour. When measuring the EEG or evoked potential for over one hour, use the EEG disk electrode.
- Do not check the skin-electrode impedance when using a needle electrode or intracranial electrode. Failure to follow this warning injures the patient because these electrodes will be damaged by electrolyzation inside the body.
- Only connect the respiration pickup which is specified by Nihon Kohden to the RESP F, C, A jack. If an unspecified respiration pickup, sensor or equipment is connected, electrical leakage current may harm the patient and operator.

CAUTION

- During measurement, do not change the date and time. This makes the order of the saved event data and the time of the saved waveforms incorrect.
 - Do not use the photic stimulator continuously over 5 minutes in any mode. When photic stimulation is performed for a long time, the flash lamp assembly gets very hot and causes burn if touched. If the photic stimulator is continuously used for 5 minutes, do not use it for at least 20 minutes to let it cool down.
 - Do not turn the instrument off when the program is running. When turning the instrument off, follow the procedure in “Power Off Procedure” in Section 2.
 - Do not delete any system file in the hard disk. Otherwise the instrument may malfunction.
 - Do not remove the optical disk or magneto-optical disk until the disk drive access lamp is off. Otherwise, the disk or disk drive may be damaged.
 - Periodically back up the EEG data files to prevent loss of data when the hard disk or MO disk is damaged.
-

NOTE

- If any static electricity enters the electrode junction box or serial input terminal, spike noise may be superimposed on the waveform.
- If static electricity is applied to the connector for the optional hyperventilation unit, pulse noise may be superimposed on the waveform of the mark channel.
- When using the instrument in a high-frequency electric field, the displayed waveform trace may be thicker.

Disinfecting or Sterilizing

CAUTION

Turn off the power before cleaning or disinfecting. Otherwise you may get an electrical shock or the instrument may malfunction.

Floppy Disk/CD-ROM Disk Handling and Storing

WARNING

The QP-0042/QP-0043 EEG-9000 System Program is protected by copyright law and international treaties. Unauthorized reproduction or distribution of this software, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under law.

CAUTION

- Keep floppy disks away from strong magnetic objects such as a magnet, TV set or speaker. Otherwise, data in the disk may be lost.
- Do not insert or remove a disk while the lamp on the disk unit is lit.
- During measurement, do not insert or remove a CD-R or CD-RW disk into or from the CD-RW drive. Otherwise, the Acquisition program may malfunction (EEG-9200A/J/K/G).
- Do not touch the disk surface of the recorded side (CD-ROM: opposite side of the label side). If the surface of the disk becomes contaminated with any foreign substances such as fingerprints, reading data may be impossible.
- Keep the disk away from direct sunlight and high temperature. Otherwise, the disk may become deformed.
- Do not handle the disk while smoking or eating.
- Do not get the disk wet.
- Do not put a label on top of another label. Remove the old label before applying a new label.
- Do not write on the label after the label is attached on the disk. Otherwise, the disk may be damaged and reading may be impossible.
- Do not bend the disk, put heavy material on the disk, or give a strong impact to the disk.
- Clean the disk with a disk cleaner. Do not use organic solvents such as acetone.
- This CD-ROM is not an audio CD and cannot be played with an audio CD player.

NOTE

- When using the EEG-9000 application program, close all other programs. Otherwise, the System Program may not function properly.
- Turn off any screen saver before opening the EEG-9000 application program.

Features

Acquiring the EEG waveforms

1. 10-20 type JE-910A/AG, JE-911A/AG Electrode Junction Box

25 electrode jacks in the electrode position layout, 4 multi-purpose input jacks (extra jacks), 3 respiration jacks, 6 bipolar jacks (3 pairs) and 4 DC input connectors (JE-911A/AG only, option) with a remote mark connector.

2. One-touch Selection of Measurement Settings

You can assign different measurement settings to 36 different patterns. A pattern includes the preset montage, amplifier settings and waveform display settings. Waveform display settings are position, display on/off, color, amplitude limit and comment for waveform. Selecting different patterns lets you quickly and easily set up the desired measurement settings.

3. Easy Skin-Electrode Contact Impedance Check

You can check all electrodes for skin-electrode contact impedance by pressing the IMPEDANCE CHECK key on the electrode junction box or clicking the Impedance check button on the screen. The impedance check results are indicated on the electrode position layout on the electrode junction box and screen.

4. Variety of Reference (Monopolar) Derivations

Easy switching from same-side hemispheric earlobe derivation (standard) to single-side hemispheric earlobe ($A1 \rightarrow A2$, $A1 \leftarrow A2$, $A1 \leftrightarrow A2$, $A1 + A2$), vertex (VX), averaged (AV), source derivation (SD) or an original (Org) reference derivation. The original reference (Org) switches all A1 and A2 to the averaged voltage of C3 and C4 (system reference potential).

5. 64 Channel EEG Waveform Display with Various Information

Up to 64 channels of 5, 10, 15, 20, 30, 60 second or 5 minute waveforms can be simultaneously displayed on a high resolution color display. Time marks, time scale, marker channel, montage name, and events can also be displayed on the screen. You can also change the waveform color and amplitude limit for specific channels, or turn the waveform display on/off.

6. Waveform Annotation (Attaching Event Names)

While acquiring the EEG waveforms, you can annotate the EEG waveforms with an event name from the preset event list or with the keyboard. Also when you change the pattern, the pattern name is automatically entered. The event names (annotations) are displayed beside the EEG waveforms and saved with the waveforms as an event.

7. Waveform Amplitude and Time Interval Measurement

The amplitude, frequency and time interval of the EEG waveforms can be automatically measured by vertical and horizontal cursors when the waveforms are frozen.

1. GENERAL

8. ECG Rejection Filter

This filter reduces ECG artifact superimposed on the EEG waveforms. This filter is available during both waveform acquisition and review.

9. Versatile Photic Stimulator

Three preset photic stimulation programs for adults and children for routine and special use. Single, double and random pulse stimulation are also available.

10. Hyperventilation (HV) Timer

The HV timer is available. When the HV timer is started, annotations are automatically marked every 30 seconds on the EEG waveforms.

11. External Signal Input

When the JE-911A/AG electrode junction box is used, up to 4 channel of analog signals can be input and their numeric value can be displayed.

12. Long Term EEG Waveform Monitoring

The long term monitoring function lets you save up to 52 GB (2 GB × 26 stages) of EEG waveforms in different storage media. When the optional QP-224A Serial interface board (analog video link) or QV-110AK Digital Video Unit/QP-110AK Digital Video Software (digital video link) is installed, you can save the patient image during long term EEG waveform monitoring (EEG-9200A/J/K/G only). The optional QP-251AK Spike Detection Software can be used in long term monitoring (online spike detection).

13. Customizing a Window

There are several bars on each window. Each bar contains buttons for changing settings. You can move the bar to any position on the screen by dragging it. When moving the mouse cursor on a button, a pop-up hint appears to show its function.

Reviewing the EEG waveforms

1. File Management

The EEG data files with patient information and volume name of the disk are automatically registered in the database. To review EEG data, you can search for a data file by several methods: patient name, ID number, examination date, or any combination of search items and in a specified range.

2. Calling Up and Displaying Specific Waveforms

You can call up any saved waveform by a variety of methods. For example, if you specify an event name, a waveform which contains that event name is displayed on the screen.

You can display any part of the waveform by clicking on the event jump bar.

3. Re-format and Re-filtering

You can review waveforms and data using different montage settings, amplifier settings (sensitivity, high-cut filter, time constant), and display speeds. (The raw data originally sampled is saved in the referential format.)

4. Variety of Review Modes

- Review the waveforms at the acquisition display speed.
- Review the waveforms forward or backward at high speed.
- Scroll the displayed waveforms forward or backward one second.
- Scroll the displayed waveforms forward or backward one page.
- Move the specified waveform to the center.

5 Event Name (Annotation) Editing

While reviewing waveforms, you can add, delete, and change the event names.

6. Complete, High-quality Documentation with a Printer

You can print the currently displayed waveforms or any part of the EEG waveforms with event log and patient information on a locally purchased printer.

7. EEG Data File Compatibility

EEG data files saved in an EEG-1100, EEG-2110 digital EEG, or digital EEG system (PC with the QP-111AJ/AK, QP-223A/AK acquisition program kit) can be reviewed in this digital EEG.

8. DSA Trendgraph

The instrument analyzes the EEG waveform data to examine the frequency components and displays amplitude for each frequency as a DSA (Density Spectral Array) trendgraph on the review screen and EEG Scope - Comparison mode. The DSA trendgraph let you easily find the EEG waveforms when epileptic seizure occurs or a specific frequency band of the EEG waveform, such as alpha wave, delta wave or spindles in sleep study.

9. Copying Part of Waveforms

You can copy any part of waveforms in the note waveform window and review the waveforms while comparing with the copied waveforms.

File Utility Program

• Combining EEG Data Files

During recording, if an EEG data file for a patient is accidentally saved as separate different files, you can also append one EEG data file to another EEG data file for a patient. When patient images are recorded, patient image files can be appended. For the EEG data files that are measured with the long term EEG monitoring function, you can continuously review these files by using a long term monitoring information file. You do not have to combine these files.

Communication

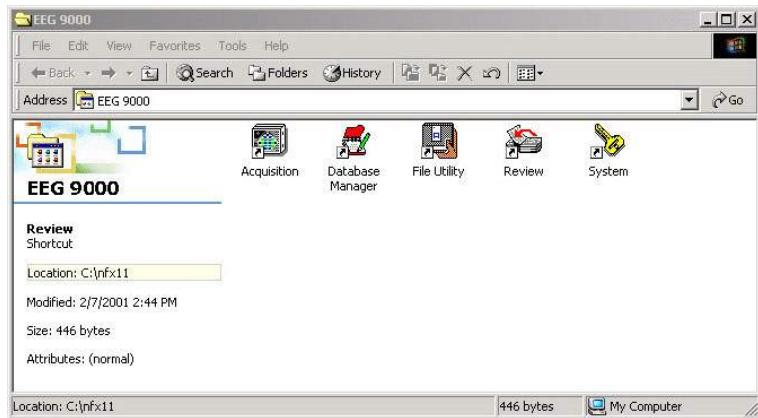
1. Communication with an external instrument (networking) is optionally available.
2. The EEG-9000 software is Windows compatible so you can copy the acquired EEG waveforms and patient information to other Windows applications such as word processors or spreadsheets.

Etc.

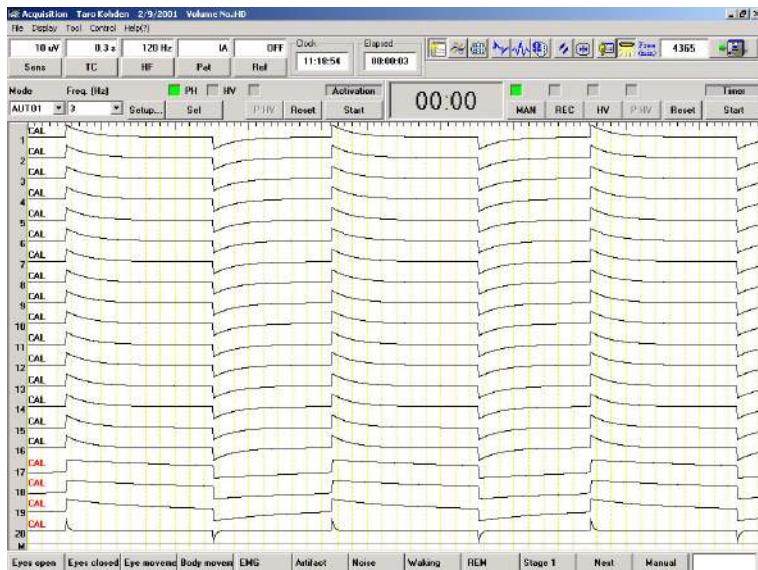
- Sample EEG data files are provided in a CD-ROM with the system program

General Functions and Screens

Menu window (Section 3)



Acquisition screen (Section 5):
EEG measurement

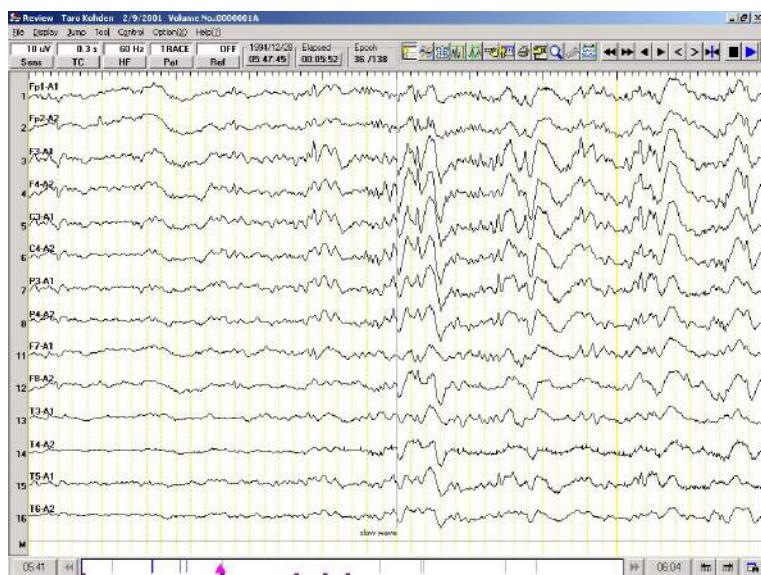


Use this screen to acquire EEG waveforms

- Entering the patient information
- Checking the skin-electrode contact impedance
- Recording the calibration waveforms. The calibration mode and voltage can be selected
- Acquiring the EEG waveforms
- Entering events
- Setting and performing the activation (photic stimulation and hyperventilation)
- Using the timer
- Changing the pattern
- Changing the amplifier settings for all channels
- Changing the amplifier settings for an individual channel
- Changing the waveform display settings
- Changing the FFT analysis settings
- Measuring waveform amplitude and time interval
- Using the AC filter and/or ECG filter
- Selecting and deleting the electrodes for AV derivation
- Temporarily changing the reference electrode
- Saving the acquired EEG waveforms, patient information and events in a file
- Selecting the FFT data analysis for a DSA trendgraph

Review screen (Section 6):

EEG review



Use this screen to review, display and print the saved waveforms

- Selecting the EEG file
- Displaying the waveform from a selected file
- Changing the waveform display settings
- Editing the events
- Changing the calibration voltage
- Entering events
- Changing the pattern
- Changing the amplifier settings for all channels
- Changing the amplifier settings for an individual channel
- Changing the FFT analysis settings
- Measuring waveform amplitude and time interval
- Using the AC filter and/or ECG filter
- Selecting and deleting the electrodes for AV derivation
- Adjusting BN balance for BN derivation Available for the EEG data files that are saved by an EEG-1100, EEG-2110 digital EEG or digital EEG system (PC with the QP-111AJ/AK/QP-223A/AK Acquisition Program Kit).
- Temporarily changing the reference electrode
- Selecting and printing parts of the waveforms
- Selecting and saving parts of the waveform in a file
- Displaying the DSA trendgraph

System Program (Section 4):

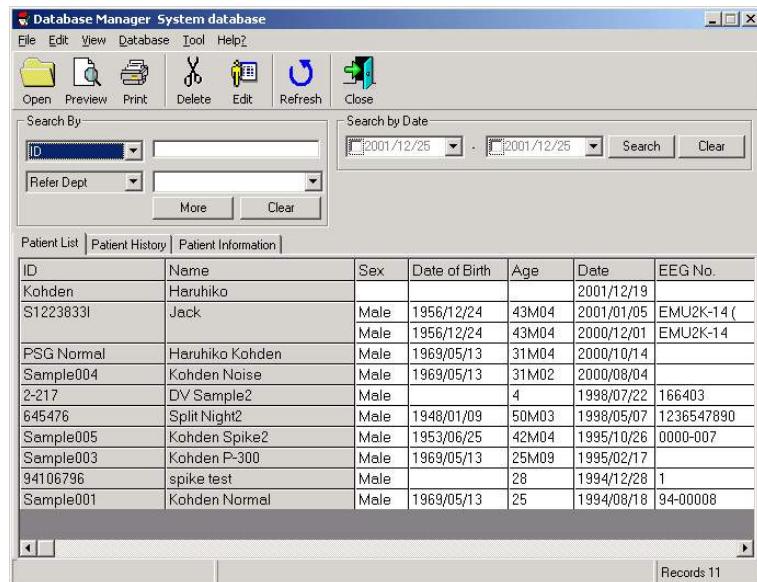


Use the System program to change settings

- Selecting the electrode junction box.
- Programming the pattern
- Programming the automatic photic stimulation mode
- Selecting the automatic EEG waveform recording settings
- Selecting the long term EEG waveform monitoring settings
- Editing the list of preset selectable items for patient information records
- Changing the DC input settings
- Changing all settings to the default settings
- Changing the electrodes to be saved
- Changing the system settings
- Saving the system settings in a file
- Calling up the system settings stored in the file

1. GENERAL

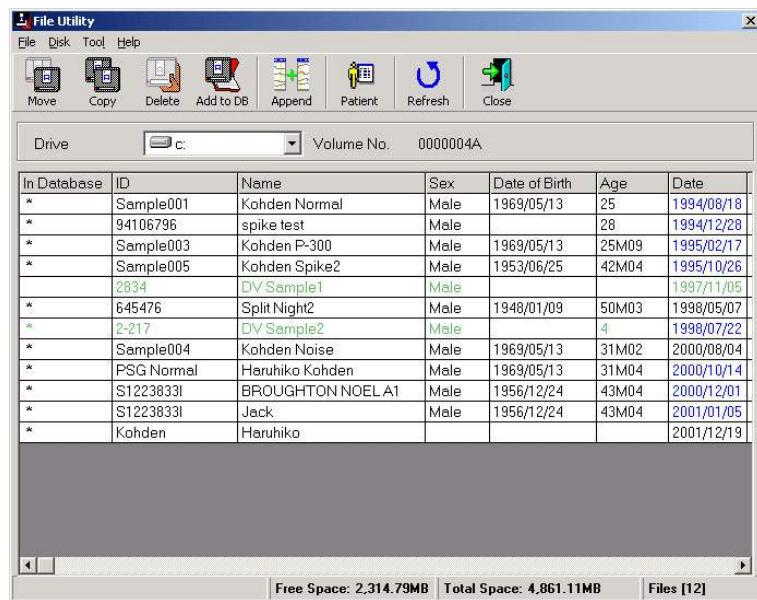
Database Manager: (Section 7)



Use the Database Manager to manage the database for EEG data files

- Saving an entire database or selected records in a file
- Loading a database from a folder or drive to append to the system database or network database
- Appending all or selected records to the system database or network database
- Deleting individual records from a database
- Searching and sorting records
- Printing the records in the database

File Utility (Section 8):



Use the File Utility to manage the saved EEG data files

- Moving EEG data files from one drive to another drive
- Copying EEG data files from one drive to another folder or drive
- Deleting EEG data files from a drive
- Merging the EEG data files
- Adding the EEG data file to the system database or network database
- Formatting a magneto-optical disk
- Assigning a volume number to a magneto-optical disk
- Appending an EEG Data File to Another EEG Data File

Disk Capacity

The following table shows how long an EEG waveform data can be saved in a hard disk, magneto-optical disk or CD-R disk. The file space to save an EEG data file depends on the sampling frequency and the number of electrodes. If either decreases, the file capacity increases. For changing the sampling frequency and the number of electrodes, refer to Section 4 “System Program”. The following table assumes 30 minutes per patient recording for a file.

$$\text{Disk capacity (bytes)} = \text{Recording time (hours)} \times \text{No. of saved electrodes and mark channels} \times \text{Sampling frequency} \times 2 \text{ bytes} \times 60 \text{ s} \times 60 \text{ min}$$

25 electrodes and 2 mark channels for 30 minutes' recording

	Sampling frequency			
	2,000 Hz	1,000 Hz	500 Hz	200 Hz
1 GB	2.6 hours (5.1 files)	5.1 hours (10.3 files)	10.3 hours (20.6 files)	25.7 hours (51.4 files)
18 GB HD (EEG-9200)	46.8 hours (91.8 files)	91.8 hours (185.4 files)	185.4 hours (370.8 files)	462.6 hours (925.2 files)
680 MB CD-R	1.7 hours (3.4 files)	3.4 hours (7.0 files)	7.0 hours (14 files)	17.4 hours (34.9 files)
4.1 GB MO	10.5 hours (21.1 files)	21.1 hours (42.2 files)	42.2 hours (84.4 files)	105.5 hours (210.9 files)

Composition

WARNING

Do not install the EEG-9000 system program into a personal computer which is not specified by Nihon Kohden and use it for EEG measurement.

- If the personal computer does not satisfy the performance specifications and safety standards which are required by Nihon Kohden, the patient and operator may get electrical shock.
- Nihon Kohden does not warrant if hardware and/or software becomes defective after installation.

CAUTION

Only use the specified personal computer. Otherwise the EEG-9000 system program does not operate correctly.

EEG-9100

- PC unit: CC-901AK (Dell Latitude C500, Celeron 700 MHz)
- Power supply unit: SC-901A (100 V, two AC outlets)
SC-901AK/AG (200 V, one AC outlet)
- Multiple portable socket outlet:
SD-901AJ/AK/AG
SD-902AK (two AC outlets, only use with the
SC-901AK/AG power supply unit)
- Electrode junction box: JE-910A/AG (without DC input connector)
JE-911A/AG (with 4 DC input connectors, option)
- Photo control unit: LS-901AJ/AK/AG
- Flash lamp assembly: LS-703A/LS-706A
- Cart: KE-910A
- Printer (locally purchase):
Cannon BJC-80V series compatible recommended
- Medical isolation transformer for the printer:
SC-901A/AK/AG or compatible

- Magneto-optical disk drive (locally purchase):
Fujitsu Dyna MO 1300SF or compatible recommended
- SCSI Card (locally purchase)

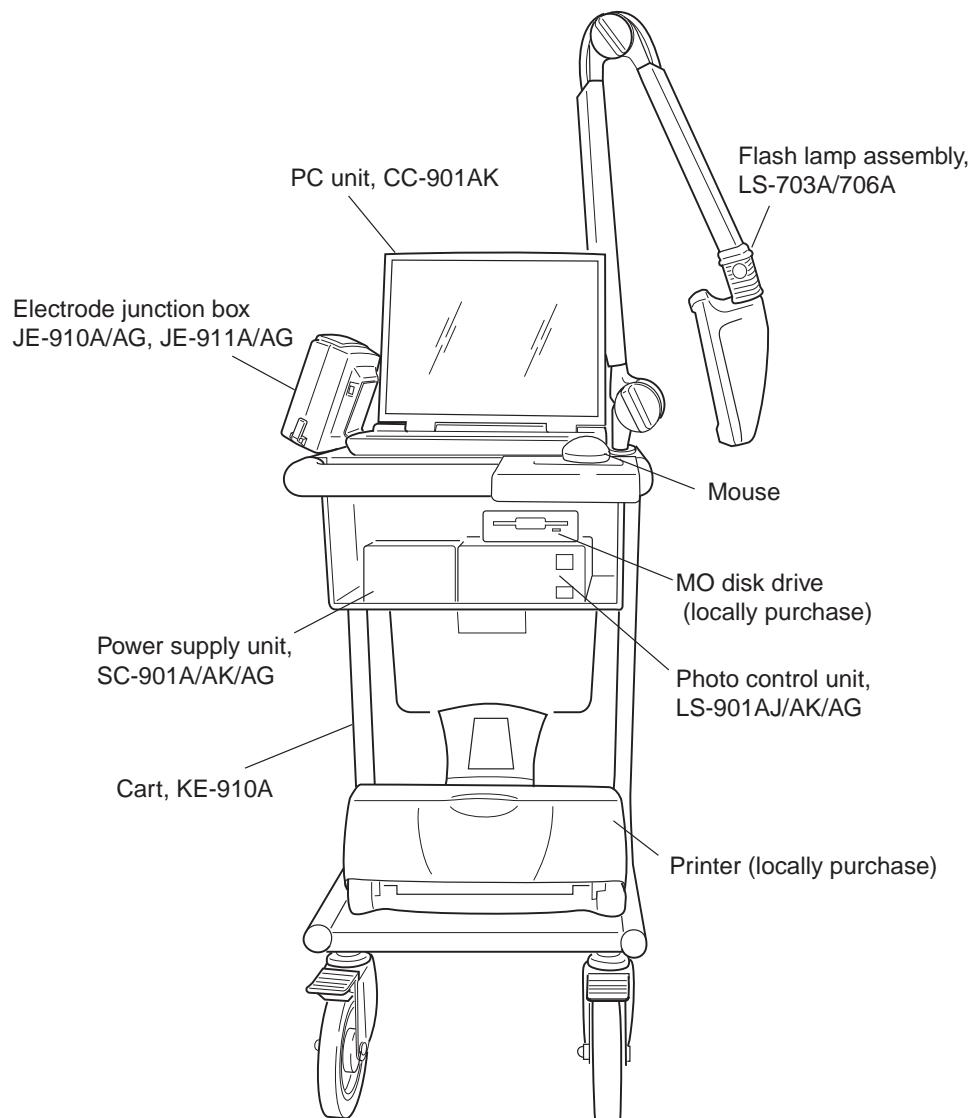
EEG-9200

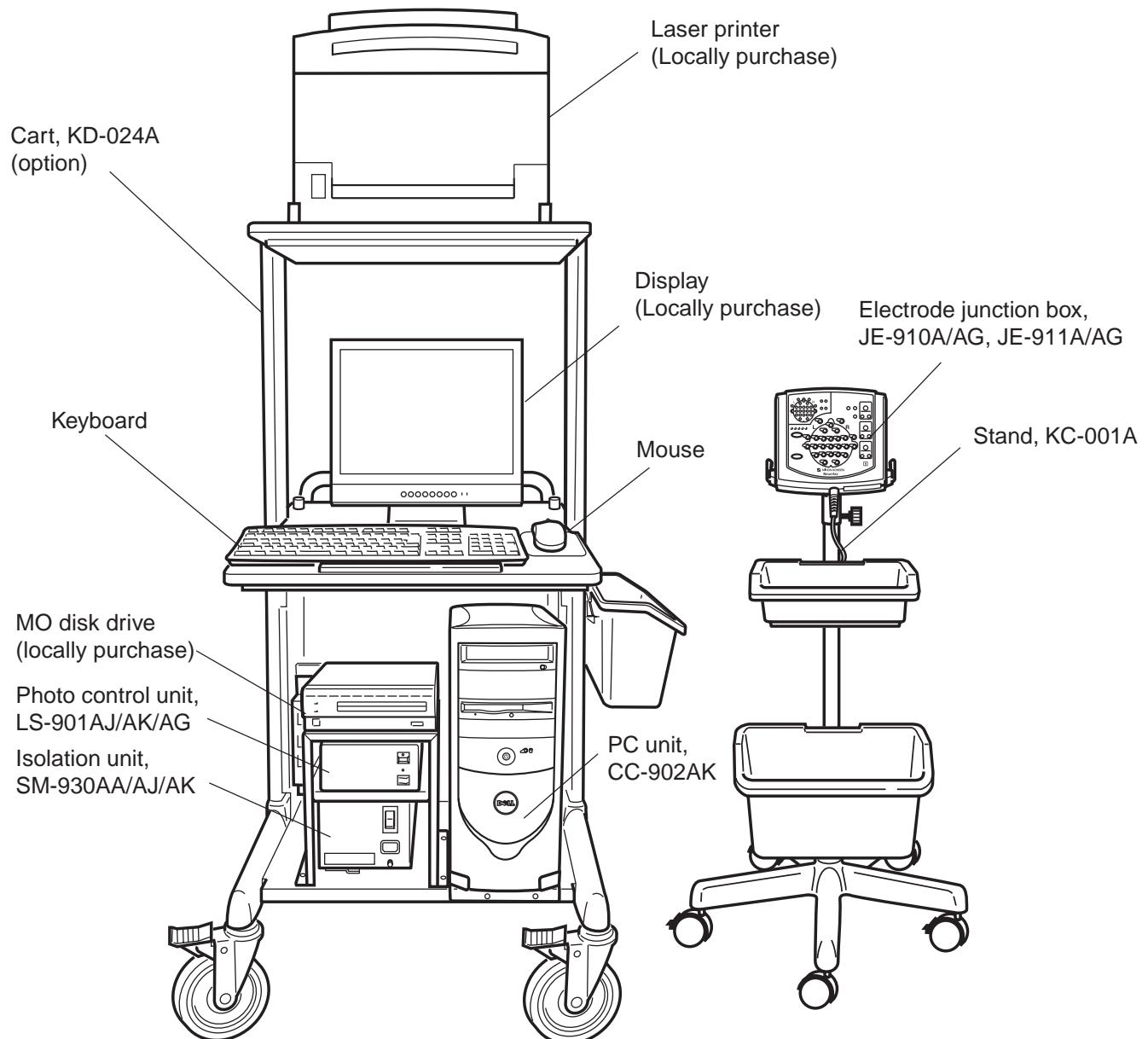
- PC unit: CC-902AK
(Dell Optiplex GX240 SMT, Pentium 4, 1.8 GHz)
- Display EIZO T565T or compatible (17 inch, locally purchase)
- Isolation unit: SM-930AA (117 V, three AC outlets)
SM-930AJ (110 to 127 V, three AC outlets)
SM-930AK (220 to 240 V, three AC outlets)
- Multiple portable socket outlet:
SD-903AJ/AK/AG
- Electrode junction box: JE-910A/AG (without DC input connector)
JE-911A/AG (with 4 DC input connectors, option)
- Photo control unit: LS-901AJ/AK/AG
- Flash lamp assembly: LS-703A/LS-706A
- Cart: KD-024A (with printer table)
KD-025A (without printer table)
- Stand KC-001A
(for electrode junction box or flash lamp assembly)
- Laser printer HP Laserjet 4100 series or compatible
(locally purchase):
- Medical isolation transformer for the printer:
SM-800RJ/RK or compatible
- Magneto-optical disk drive (locally purchase):
SONY model RMO-S551/S
- Magneto optical disk: SONY model, 512 bytes/sector

Panel Descriptions

Component Example

EEG-9100



EEG-9200

1. GENERAL

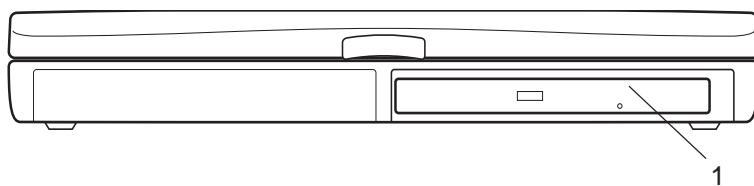
PC Unit, CC-901AK (EEG-9100A/J/K/G)

WARNING

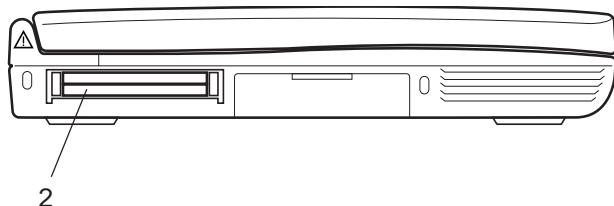
Connect only the specified instruments to the connectors or socket marked with Δ , by following the specified procedure. Otherwise, electrical leakage current may harm the patient and operator.

Symbols on the PC unit differ according to model. Refer to the Operator's manual of the PC unit.

Front panel

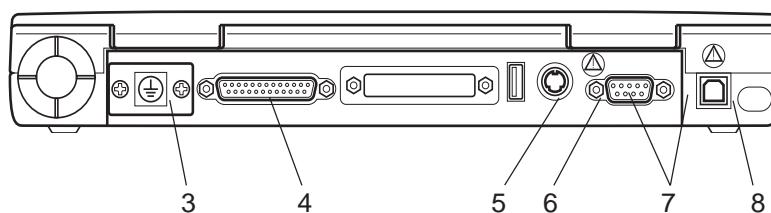


Name	Functions
1. CD-ROM drive	For a CD-ROM.
Left side panel	



Name	Functions
2. PC Card slot	For a SCSI card to connect to a magneto-optical disk drive (locally purchased).

Rear panel

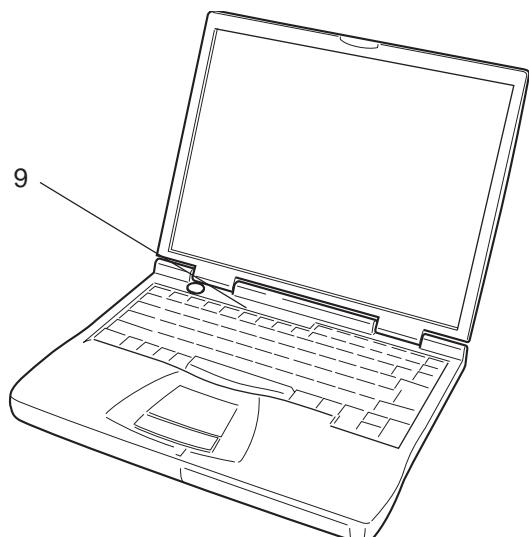


Name	Functions
3. RS-232C connector	Connects to the photo control unit.
4. PRT connector	Connects to the printer (locally purchased)
5. Mouse connector	Connects to the mouse.
6. USB connector	Connects to the electrode junction box.
7. Protective ground terminal	Connects to the power supply unit with the protective ground lead and the electrode junction box with the functional ground lead.
8. Power socket	Connects to the AC adapter to supply DC power to the PC unit.

WARNING

Only supply AC power from an AC outlet on the SC-901A/AK/AG power supply unit to the AC adapter. Do not connect the AC adapter to a wall AC outlet. Failure to follow this warning may cause electrical shock to the patient and operator.

Front view



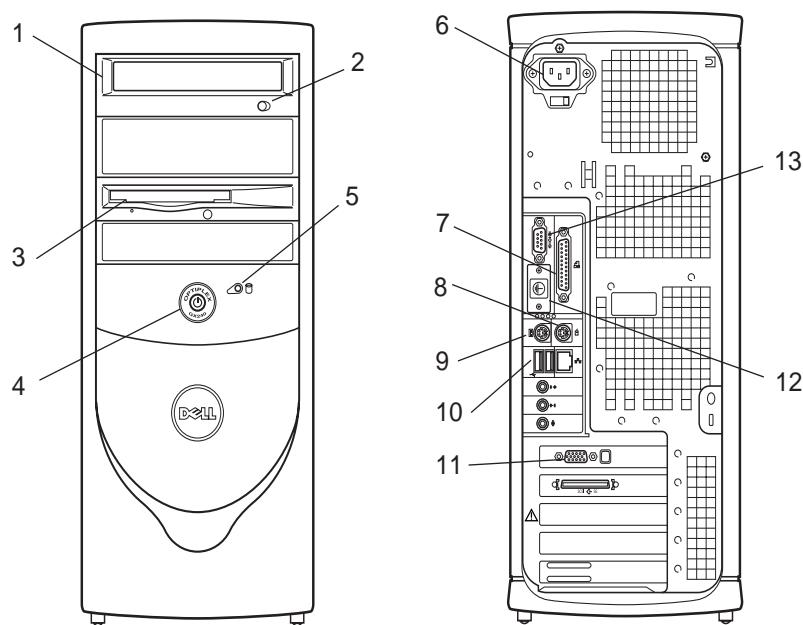
Name	Functions
9. Power button	Turns the PC unit on.

CAUTION

To turn the power off, follow the procedure in "Power Off Procedure" in Section 3. Do not press the power button on the PC unit. If the power button is pressed while a program is running, the program, data file in the hard disk and/or MO disk may be damaged.

1. GENERAL

PC Unit, CC-902AK (EEG-9200A/J/K/G)



Name	Functions
1. CD-RW drive	For a CD-ROM, CD-R and CD-RW.
2. CD-RW eject button	Slides out the CD-RW tray to insert or remove a disk.
3. Floppy disk drive	Saves or retrieves data in/from a floppy disk.
4. PC power switch	Turns the PC unit on/off.

CAUTION

Do not turn the power off while the program is running or hard disk access LED lights. Failure to follow this caution may damage the hard disk.

5. Hard disk access LED	Lights while data is being written to or read from the hard disk.
-------------------------	---

Name	Functions
6. AC socket	Connects to the first 3-prong AC outlet on the isolation unit with the AC power cord to supply AC power to the PC unit.
7. Printer port	Connects to the printer (locally purchased)
8. Mouse connector	Connects to the mouse.
9. Keyboard connector	Connects to the keyboard.
10. USB connector	Connects to the electrode junction box.
11. Video connector	Connects to the display.
12. Protective ground terminal	Connects to the electrode junction box with the functional ground lead.
13. RS-232C connector	Connects to the photo control unit.

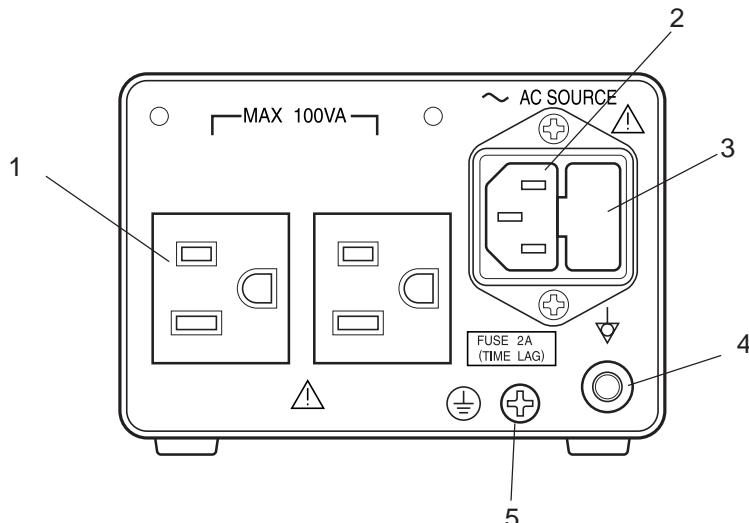
1. GENERAL

SC-901A/AK/AG, Power Supply Unit (for EEG-9100A/J/K/G only)

WARNING

Connect only the specified instruments to the connectors or socket marked with Δ , by following the specified procedure. Otherwise, electrical leakage current may harm the patient and operator.

The shape of the AC outlet differs according to the model.



Example: SC-901A

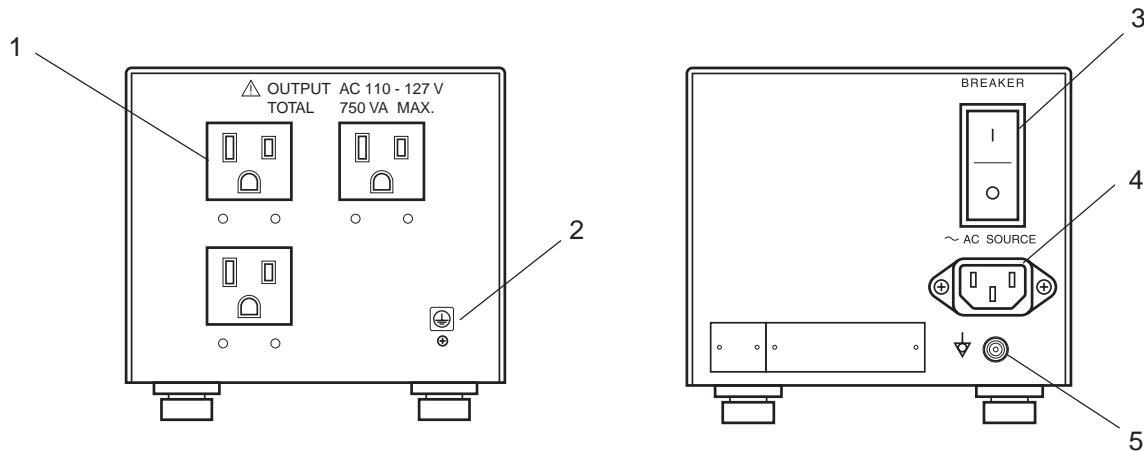
Name	Functions
1. AC outlets	Connects the power cord of the AC adapter for the PC unit, MO disk drive and printer. These outlets are isolated. Maximum power supply: 100 VA.
2. AC SOURCE socket	Connects the power cord to supply AC power to the power supply unit.
3. FUSE holder	Contains the power line protection fuses. To replace the fuse, pry the holder with a flat blade screw driver and remove the fuse.
4. Equipotential ground terminal	Connect this terminal to the equipotential ground terminal on the wall with the ground lead when the equipotential grounding is required to ensure electrical safety.
5. Protective ground terminal	Connect this terminal to the protective ground terminal on the PC unit with the ground lead to ensure electrical safety.

CAUTION

Fuses cut the power off when an abnormality occurs in the instrument. Eliminate the malfunction before replacing the fuse. Use the correct fuse only. The fuse rating is shown on the holder.

SM-930AA/AJ/AK, Isolation Unit (for EEG-9200A/J/K/G only)**WARNING**

Connect only the specified instruments to the connectors or socket marked with \triangle , by following the specified procedure. Otherwise, electrical leakage current may harm the patient and operator.



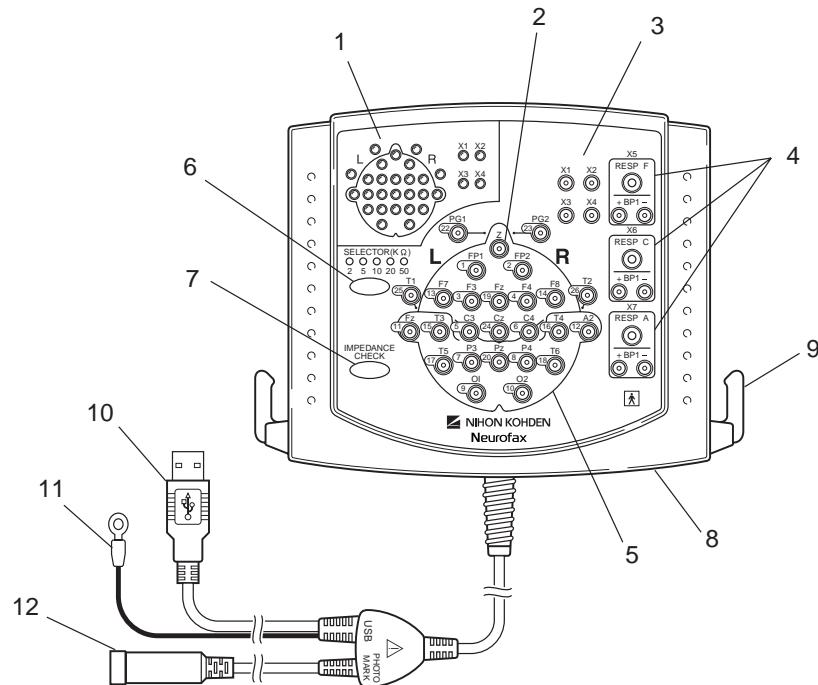
Example: SM-930AJ

Name	Functions
1. OUTPUT (AC outlet)	Connects the AC power cord of the PC unit, display or MO disk drive. These outlets are isolated. Maximum power supply: 750 VA.
2. Protective ground terminal	When using an MO disk drive which AC inlet does not have ground terminal, connect the material part of the MO disk drive to this terminal with the protective ground lead.
3. BREAKER	Turns off when the output current exceeds 10 A.
4. AC SOURCE socket	Connects the power cord to supply AC power to the power supply unit.
5. Equipotential ground terminal.	Connect this terminal to the equipotential ground terminal on the wall with the ground lead when the equipotential grounding is required to ensure electrical safety.

JE-910A/AG, JE-911A/AG (Option) Electrode Junction Box**WARNING**

Connect only the specified instruments to the connectors or socket marked with Δ , by following the specified procedure. Otherwise, electrical leakage current may harm the patient and operator.

Front panel



Name	Function
1. Impedance display LED	After the skin-electrode contact impedance check, a lit LED indicates an electrode impedance higher than the preset value.
2. Z jack	Reduces the artifact when the electrode for Z on the patient is connected to the Z jack. Be sure to attach the Z electrode to the patient during measurement.
3. Extra input jack	Inputs biological signals other than the EEG.
4. RESP F, C, A jack	Connects the thermistor pickup (option) or 3 port respiration pickup system (option) for measuring the respiration waveforms.

NOTE

The BP1 to BP3 (X5 to X7) jacks and the RESP jacks cannot be used simultaneously.

WARNING

Only connect the respiration pickup which is specified by Nihon Kohden to the RESP F, C, A jack. If an unspecified respiration pickup, sensor or equipment is connected, electrical leakage current may harm the patient and operator.

Name	Function
5. Electrode jack	Connects the EEG disk electrode.
6. 2, 5, 10, 20 50 KΩ SELECTOR (Impedance preset key)	Selects a preset impedance (threshold) for evaluation. The LED indicates the selected impedance.
7. IMPEDANCE CHECK key	Measures skin-electrode contact impedance at the electrode junction box. Press for about one second. The check result is displayed on the screen and a lit LED on the electrode junction box indicates an electrode impedance higher than the preset value.
8. Multiple connecter	Connects to the JE-913A mini junction box, BE-911A/BE-912A EEG disk electrode (shielded type). To open the multiple connecter cover, pry the cover off with a flat blade screwdriver.

WARNING

When the JE-913A/AG Mini junction box or BE-911A/BE-912A EEG disk electrode is not used, make sure that the multiple connecter cover is firmly attached to the electrode junction box. Failure to follow this warning may cause electrical shock to the patient and operator.

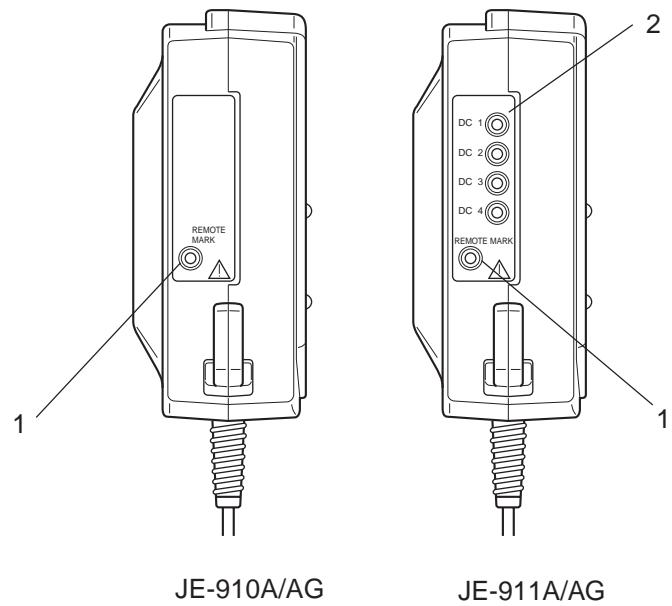
CAUTION

Only connect the JE-913A/AG Mini junction box or BE-911A/BE-912A EEG disk electrode. When another type of mini junction box is connected, the instrument may malfunction.

9. Cord hanger	Use the cord hanger when attaching the EEG disk electrode to the patient.
10. USB cable	Connects to the USB connector on the rear panel of the PC unit.
11. Functional ground lead	Connects to the protective ground terminal on the rear panel of the PC unit.
12. Photo mark cable	Connects to the PHOTO MARK connector on the rear of the photo control unit via the photo mark connection cable.

1. GENERAL

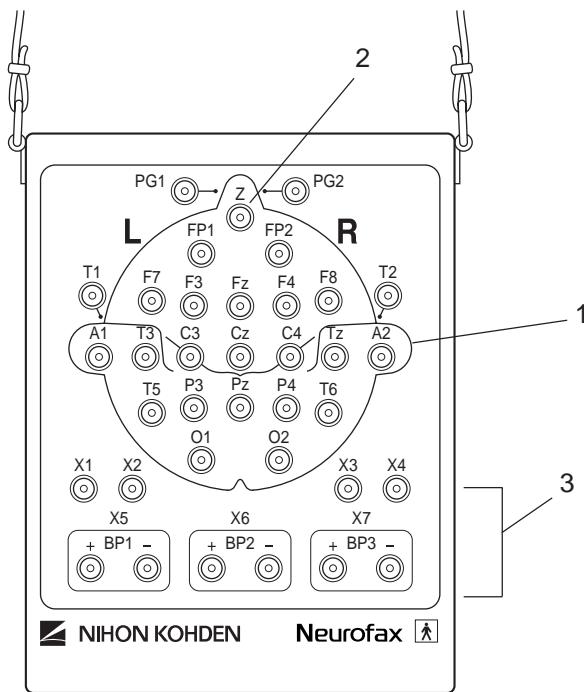
Left side panel



Name	Function
1. REMOTE MARK connector	Connects the marker cord (standard accessory) for recording the marks.
2. DC input connector	Inputs analog signals from an external instrument such as a polygraph system, pulse oximeter, etc. (JE-911A/AG only).

JE-913A/AG Mini Junction Box (Option)**WARNING**

Connect only the specified instruments to the connectors or socket marked with , by following the specified procedure. Otherwise, electrical leakage current may harm the patient and operator.



Name	Function
1. Electrode jack	Connects the EEG disk electrode.
2. Z jack	Reduces the artifact when the electrode for Z on the patient is connected to the Z jack. Be sure to attach the Z electrode to the patient during measurement.
3. Extra input jack	Inputs biological signals other than the EEG.

NOTE

The BP1 to BP3 (X5 to X7) jacks and the RESP jacks cannot be used simultaneously.

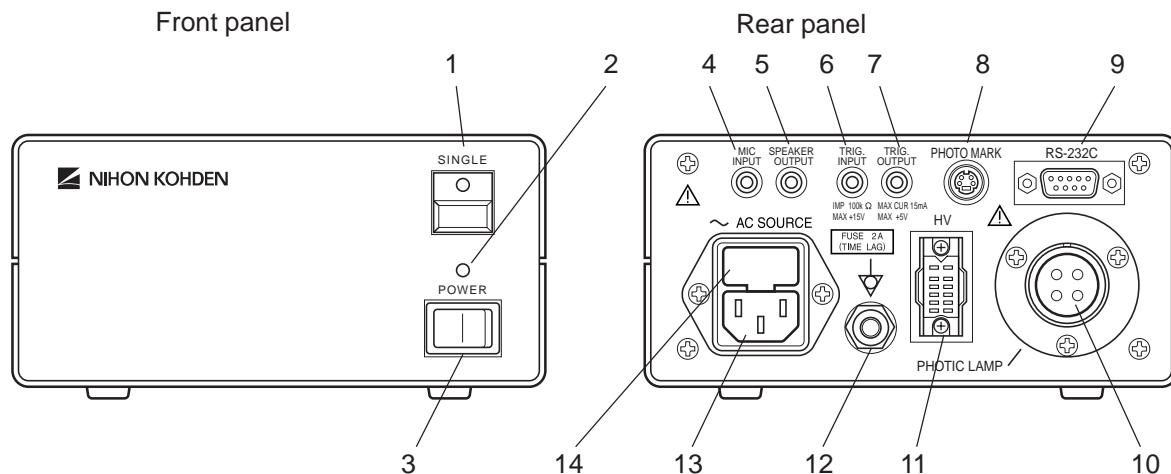
4. Multiple output connector Connects to the JE-910A/AG, JE-911A/AG electrode junction box.

1. GENERAL

LS-901AJ/AK/AG Photo Control Unit (Option)

WARNING

Connect only the specified instruments to the connectors or socket marked with Δ , by following the specified procedure. Otherwise, electrical leakage current may harm the patient and operator.



Name	Function
1. SINGLE button	Performs single photic stimulation. Use for the photo control unit operation check.
2. Power indicator	Lights while the power is on.
3. POWER switch	Turns the power on/off.
4. MIC INPUT connector	Connects to a microphone to tell the patient when to hyperventilate with the optional ZE-510AK Hyperventilation unit.
5. SPEAKER OUTPUT connector	Connects to a speaker to output pacing sounds and tell the patient when to hyperventilate when the optional ZE-510AK Hyperventilation unit is not used.
6. TRIG. INPUT connector	Inputs a trigger signal from an external instrument to activate the photic stimulation.
7. TRIG. OUTPUT connector	Outputs a photic stimulation trigger signal to an external instrument in phase with a flash lamp.
8. PHOTO MARK connector	Connects to the electrode junction box.
9. RS-232C connector	Connects to the PC unit.

Name	Function
10. PHOTIC LAMP connector	Connects to the photic flash lamp assembly.
<hr/>	
WARNING	
<p>When the instrument is turned on, about 600 V is present at pin 2. To protect against shock, always connect the flash lamp assembly cable to this connector, or attach the PHOTIC LAMP connector cap to the PHOTIC LAMP connector even when the photic stimulation is not used.</p>	
<hr/>	
11. HV connector	For the optional ZE-510AK Hyperventilation unit.
12. Equipotential ground terminal.	Connect this terminal to the equipotential ground terminal on the wall with the ground lead when the equipotential grounding is required to ensure electrical safety.
13. AC SOURCE socket	Connects the power cord to supply AC power to the power supply unit.
14. FUSE holder	Contains the power line protection fuses. To replace the fuse, pry loose the holder with a flat blade screw driver and remove the fuse.

CAUTION

Fuses cut the power off when an abnormality occurs in the instrument. Eliminate the malfunction before replacing the fuse. Use the correct fuse only. The fuse rating is shown on the holder.

Windows 2000 Basics

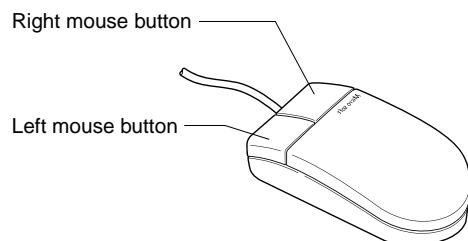
This section briefly explains how to use Windows. For a detailed explanation, refer to the operator's manual or online help for each operating system.

NOTE

Turn off any screen saver and close all application programs before opening the EEG-9000 application program. Otherwise, the EEG-9000 application program may not function properly.

Using the Mouse

With the mouse, you can do all operations to measure, review and print the waveforms.



Mouse pointer

When you move the mouse on the desk, the mouse pointer (arrow-shaped cursor on the screen) follows the movement of the mouse. The mouse pointer indicates which area of the screen will be affected when you press the mouse button.

Mouse button operations

- Click: Quickly press and release the left mouse button. Use this operation to select an item or execute an operation button or function button on the screen.
- Double-click: Click the left mouse button twice in rapid succession. Use this operation to open a program or execute an operation.
- Drag: Press and hold down the left mouse button while you move the mouse. Use this operation to move or resize a window, or select consecutive items in the list (box).
- Point: Move the mouse until the mouse pointer on the screen rests on the desired item.

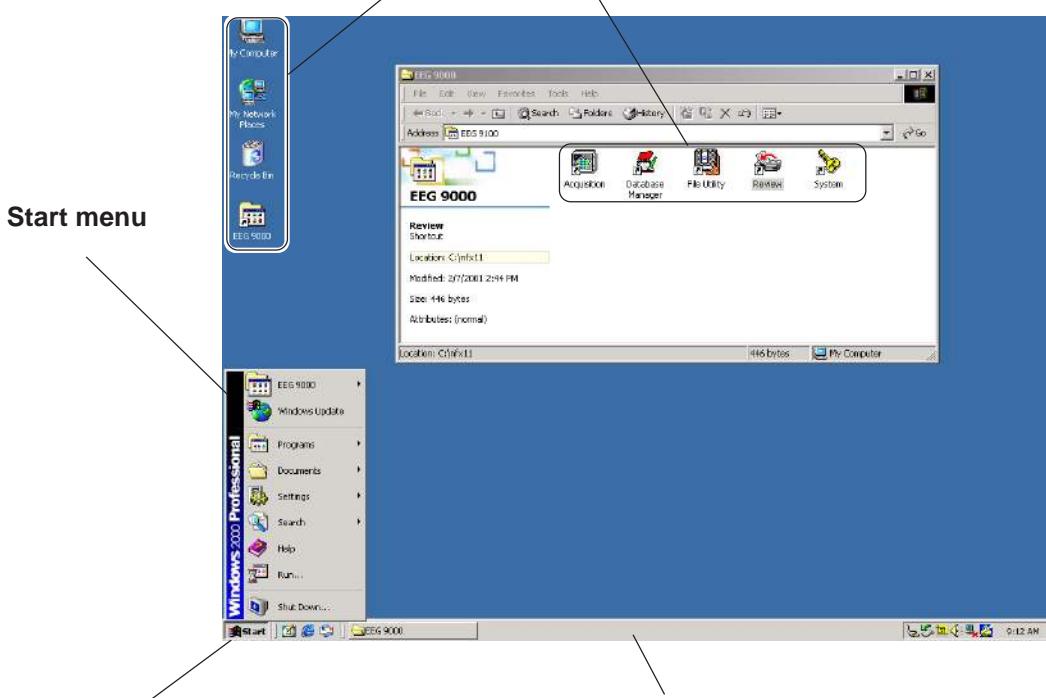
Windows Desktop

On the left side of the desktop there are three or more icons. You will use these icons to find and view the files and folders on your computer.

At the bottom of the desktop is the Taskbar with its Start button and clock. The Taskbar is a switcher. You can easily move between open documents and applications with the Taskbar. If a document or application is on the Taskbar, you need to click it only once to activate it.

Icons:

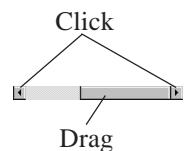
Icons are small pictures that represent applications or documents. To start an application, double click an icon with the mouse.

**Start menu:**

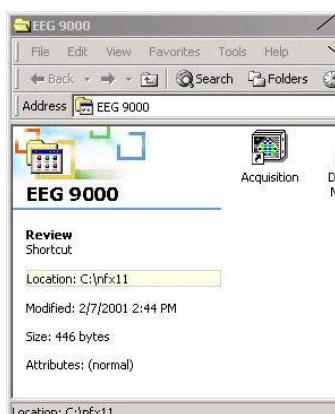
The Start button appears at the left side of the Taskbar. To open the Start menu, click the Start button. The Start menu appears.

Scroll bars:

To view information beyond the borders of the window, use the scroll bar.

**Taskbar:**

All the applications that are running appear as buttons on the Taskbar. To reactivate an application, click its button in the Taskbar. To reduce an application to a button on the Taskbar, click the Minimize button.

Working with a window**Title bar:**

Shows the name of the application or document. If more than two windows are opened, the characters of the title bar for the active window (the one which you are working) are white. The characters of the title bars for the other inactive windows are shaded out.

Menu bar:

Lists the available menus. A menu contains a list of commands or actions you can execute.

**Maximize/Restore button:**

Enlarges the active application window so that it fills the entire desktop. After you enlarge a window, the Maximize button is replaced by the Restore button. By clicking the Restore button, you can return the window to its previous size.

**Minimize button:**

Reduces the window to a button on the Taskbar. By clicking the button on the Taskbar, you can return the window to its previous size.

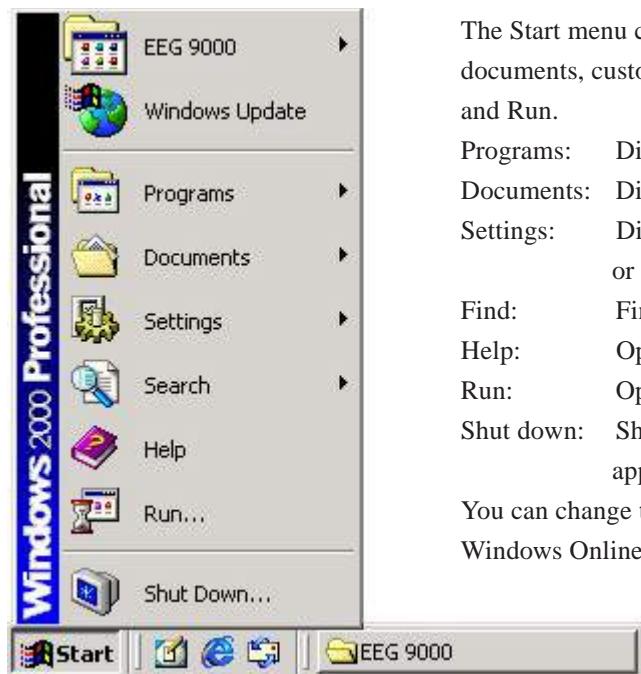
Close button:

Exits the program of the active application window.

Resizing a window:

You can change the size of the window by dragging the corner of the window.

1. GENERAL

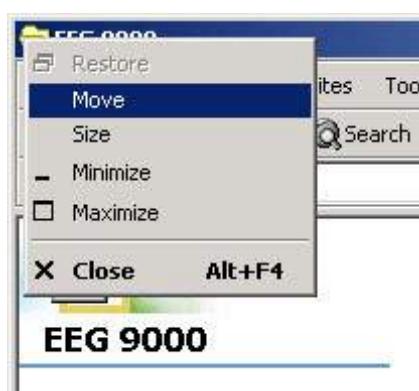


Start Menu

The Start menu contains not only applications but also lists of frequently used documents, customizable settings and frequently used features such as Find, Help and Run.

- Programs: Displays a list of the programs you can start.
Documents: Displays a list of the most recently used documents you can reopen.
Settings: Displays a list of the PC system configuration items (Control Panel or Printers, etc.).
Find: Finds a document or program file by entering information about it.
Help: Opens the Help window for Windows operation.
Run: Opens a program, document or folder by entering the name of it.
Shut down: Shuts down the computer, restarts the computer or closes all applications and logs on with another user ID.

You can change the Start button and the Taskbar display on the screen. Refer to Windows Online Help.



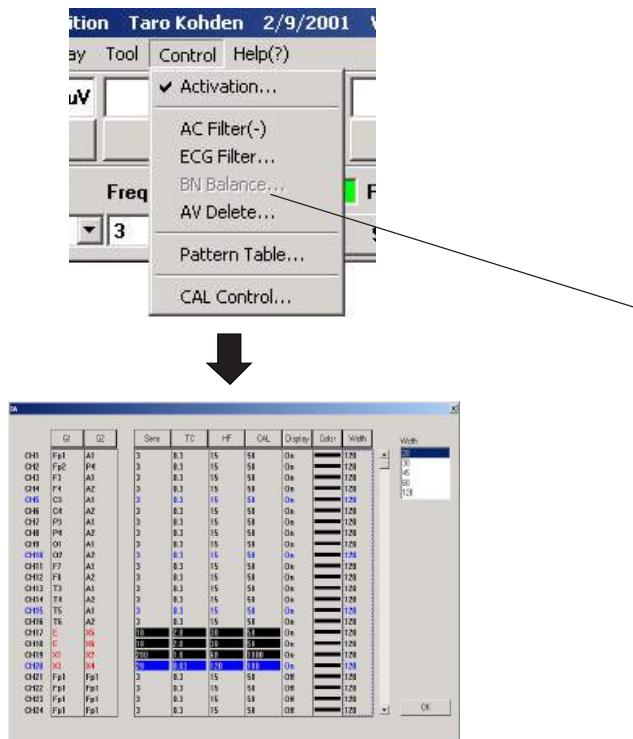
Control Menu Box

To resize, move, maximize, minimize, or close a window, open the Control menu box by clicking it once. If you double-click the Control-menu box, the window closes or the icon is restored to a window. When you open the Control menu, a pull down menu with the following commands appears. (Some applications do not have all these commands.)

Commands in the Control menu

- Restore: Restores the window to its previous size after you have enlarged it or reduced it to an icon.
Move: Moves the window to another position with the keyboard. You can also move the window with the mouse.
Size: Changes the size of the window with the keyboard. You can also change the size of the window with the mouse.
Minimize: Reduces the window to a button on the Taskbar. (Same function as Minimize button.)
Maximize: Enlarges the window to its maximum size. (Same function as Maximize button.)
Close: Closes the window or dialog box. (From an application window, you can use this command to quit the application.)

Using a Menu



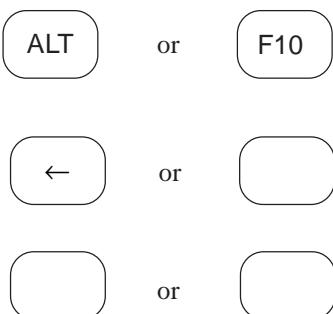
To open a menu

With the mouse:

Move the mouse pointer to the name of the menu on the menu bar, then click it. This opens a pull down menu or a dialog box. From the pull down menu or the dialog box you can execute a command.

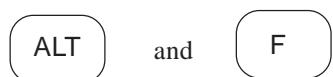
Pull down menu:

Lists commands or actions you can execute with Windows.



With the keyboard:

1. Press the ALT or F10 key to select (highlight) the menu bar.
2. Press the LEFT ARROW or RIGHT ARROW key to select the menu you want.
3. Press the ENTER key or DOWN ARROW key to open the selected menu.



Example to open the File pull down menu

If a name in the menu bar has an underlined letter:

Press the ALT key and an underlined letter key simultaneously to open the pull down menu.

To execute a command in the menu

With the mouse:

From the selected menu, click the command.

With the keyboard:

Type the letter that is underlined in the command name.

Or use the UP ARROW or DOWN ARROW keys until you reach the command that you want to execute, then press the ENTER key.

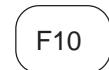
1. GENERAL

To close a menu

With the mouse:

Click the menu name or anywhere outside the menu.

With the keyboard:

 or 

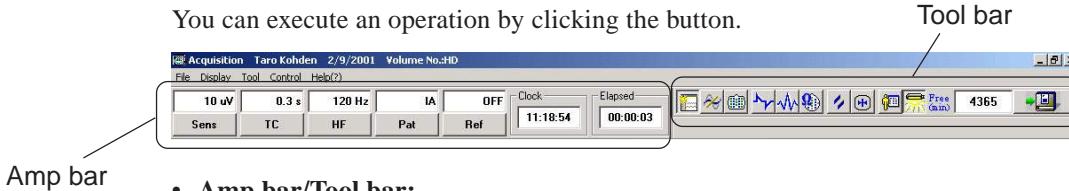
Press ALT or F10 key to cancel the menu and move back to the application workspace.



Or press ESC key to close the menu but remain on the menu bar so that you can select another menu.

Using a Button

You can execute an operation by clicking the button.



- **Amp bar/Tool bar:**

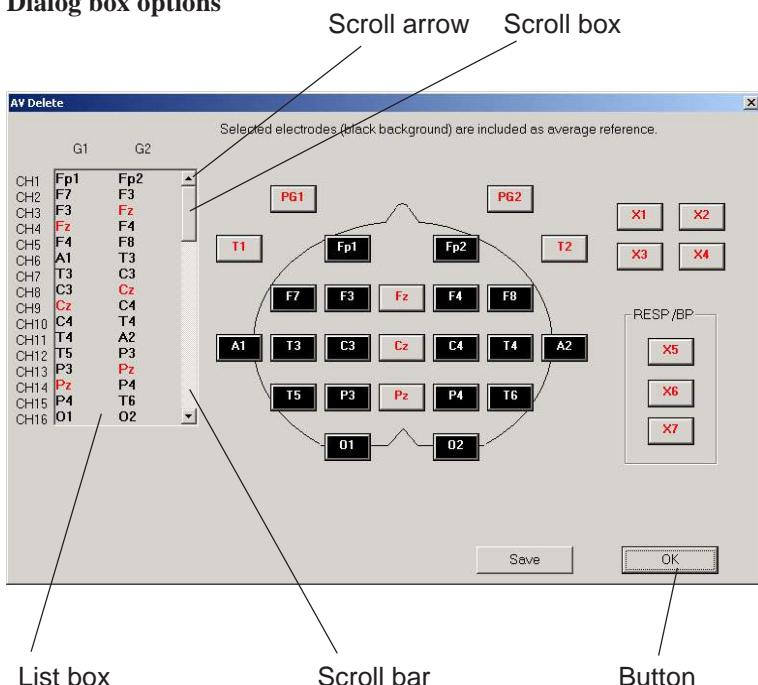
Consists of a row of buttons beneath the Menu bar. By simply clicking a button in the Amp bar or Tool bar, you can instantly execute any of a wide variety of settings or operations.

Using a Dialog Box

A dialog box appears when you select certain menu items. An ellipsis (...) after a menu command indicates that a dialog box will be displayed when you execute that command.

The program displays a dialog box either to request information about an operation that you are now performing or to supply information that you might need.

Dialog box options



- **Scroll arrow, scroll box and scroll bar:**

You can move through text (up or down) to see parts of the file or list.

To scroll	Action
One line up or down	Click the up or down scroll arrow.
One screen	Click the scroll bar above or below the scroll box on the vertical scroll bar.
Continuously	Point to one of the scroll arrows, and hold down the mouse button until the information you want comes into view.
To any position	Drag the scroll box in the scroll bar to the position you want. The section of the list that moves into view according to where you position the scroll box.

- **List boxes:**

A list box displays a list of choices. If there are more choices than can fit in the box, scroll bars are provided so you can quickly move through the list.

- **Button:**

You can start an operation by clicking the button.

To execute a button

With the mouse:

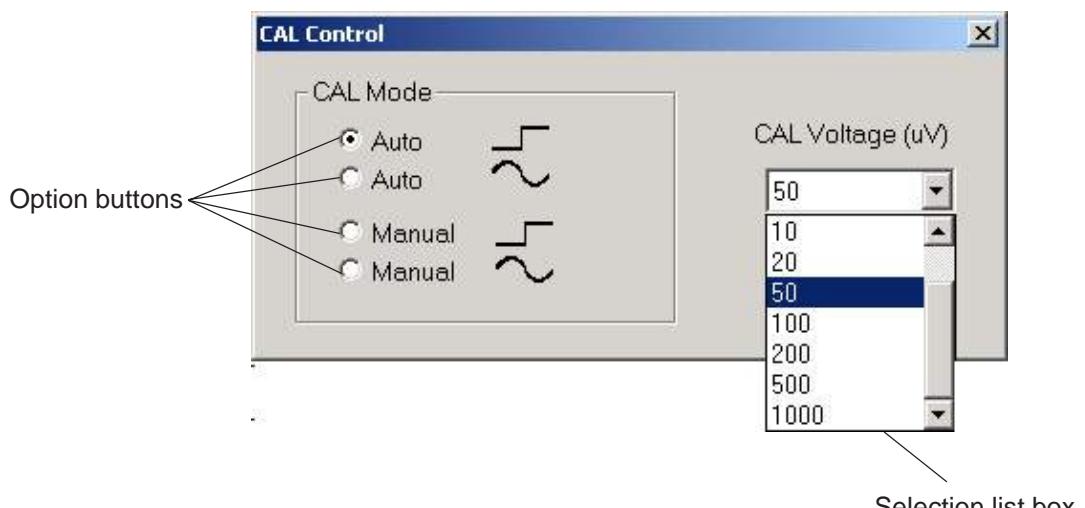
Click the command button.

With the keyboard:

1. Press the TAB key to move to the button you want. A dark border marks the selected button.
2. Press the SPACE BAR or ENTER key.

- **Option buttons:**

Option buttons represent mutually exclusive options. You can select only one option at a time. The selected option button contains a black dot. Unavailable options are dimmed.



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To select an option button

With the mouse:

Click the option button.

With the keyboard:

1. Press the TAB key to move the cursor to the group of options you want.

2. Select the option button you want with the arrow keys.

If the option button has an underlined letter:

Type the underlined letter while pressing and holding down the ALT key.

- **Selection list box:**

The current selection is displayed in the selection list box. When you click the arrow following the list box, a list of available choices appears.

To open a selection list box and select an item

With the mouse:

1. Click the arrow following the list box.

2. Click the up or down scroll arrow. Or drag the scroll box to move the cursor to the item you want.

3. Click the item.

With the keyboard:

NOTE

Be sure the NUM LOCK key is turned off.

1. Press the TAB key to move the cursor to the selection list box.

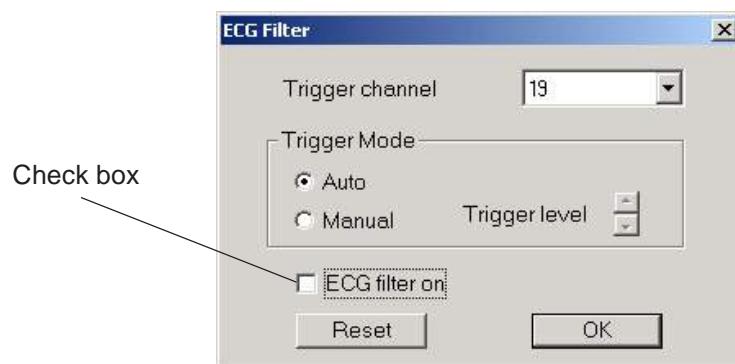
2. Press the ALT key and DOWN ARROW key together to open the box.

3. Press the UP ARROW or DOWN ARROW key to move the selection cursor to the item you want.

4. Press the ALT key and UP ARROW key together or the ALT key and DOWN ARROW key together to select it.

- **Check box:**

A check box next to an option means you can select or clear the option. You can select as many check box options as needed. When a check box is selected, it contains a “✓” mark. Names of unavailable options are dimmed.



To select or clear a check box

With the mouse:

Click a blank check box to select it.

To clear the selected check box, click it.

With the keyboard:

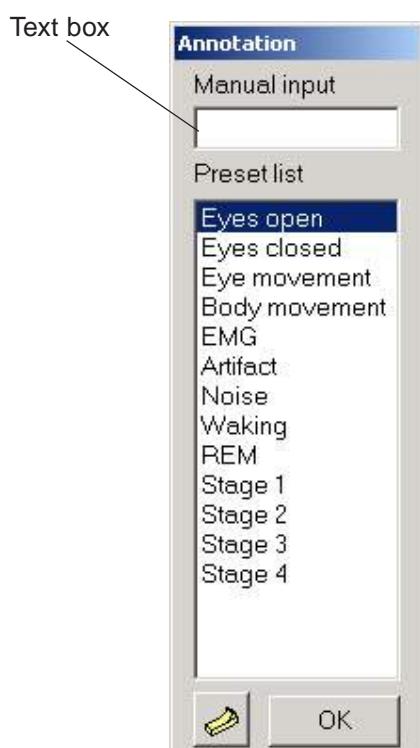
1. Press the TAB key to move the cursor to the check box you want to select or clear.

2. Press the SPACE BAR to select the box.

Press the SPACE BAR again to clear the selected check box.

If the option name has an underlined letter:

Press and hold down the ALT key while typing the underlined letter to select or clear the check box.



- **Text box:**

You can type information into a text box. When you click a text box, an insertion point (flashing vertical bar) appears. The text you type starts at the insertion point. If the box you want to type already contains text, you can replace it. To delete existing text, press the DEL or BACKSPACE key.

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Instrument Location

The instrument measures very small electrical potential changes (5 to 200 µV). Ideally the instrument should be installed in a shielded room which provides constant environmental conditions. Select the examination locations as follows and also refer to “GENERAL HANDLING PRECAUTIONS”.

WARNING

- Never use this instrument in the presence of any flammable anesthetic gas or high-concentration oxygen atmosphere. Failure to follow this warning may cause explosion or fire.
 - Never use this instrument in a high-pressure oxygen medical tank. Failure to follow this warning may cause explosion or fire.
 - Do not install the instrument in an MRI examination room. The instrument may not operate correctly due to high-frequency magnetic noise from the MRI.
 - When connecting an external instrument to the connectors marked with , the external instrument and this instrument must be connected according to the IEC60601-1-1 “Medical electrical equipment - Part 1-1: General requirements for safety - Collateral standard: Safety requirements for medical electrical systems”. Failure to follow this warning may cause electrical shock to the patient and operator.
 - When connecting the instrument to a local area network, connect the instrument so that the instrument is electrically separated from the local area network according to the IEC60601-1-1 “Medical electrical equipment - Part 1-1: General requirements for safety - Collateral standard: Safety requirements for medical electrical systems”. Failure to follow this warning may cause electrical shock to the patient and operator.
-
-

CAUTION

- Select a room with a 3-prong outlet with a ground third contact.
- Do not install the instrument near equipment with a high power consumption, such as large X-ray equipment.
- Do not install the instrument near a power line, dynamo or motor which has electromagnetic induction.
- Do not install the instrument near an electrosurgical unit or RF therapeutic equipment.
- Select a room with no excessive noise, vibration, sunlight, high humidity or water splashes.
- Make sure that there is no influence from a cellular phone.
- Avoid locations where the instrument may receive strong electromagnetic interference such as radio or TV stations, cellular phones or mobile two-way radios.

Caution - continued

- A sudden loss of power or extreme power surge can damage data and the computer. To assure an uninterrupted power supply, use an uninterruptable power supply (UPS).
- Do not locate the electrode junction box where it could fall on the patient and cause injury.
- When moving the cart,
 - make sure that the power of all components are turned off,
 - close the PC unit display (EEG-9100A/J/K/G - CC-901AK),
 - release the caster lock,
 - only grip the handle,
 - select a flat path and move the cart carefully to prevent tipping over, components falling or impact, and
 - take care so that the electrode junction box or flash lamp assembly does not bump into a surrounding instrument.
- Do not install the instrument where it will be exposed to water or chemical solutions. Avoid direct sprinkling, spray or moist air from the nebulizer or humidifier. These cause malfunction and shorten the life of the instrument.
- Make sure that there is enough space between the instrument and the wall for adequate ventilation. Leave more than 5 cm of space between the wall and vent hole on the rear panel of the instrument. Otherwise the internal temperature of the instrument rises, which leads to inaccurate operation and shortens the instrument life.

For external instrument connection and local area network connection, refer to “General Requirements for Connecting Medical Electrical Systems” in this section.

NOTE

- Install the instrument where the screen can be seen clearly and does not reflect light.
- Do not place blankets or cloth over the instrument.
- Do not install the instrument in dusty area.
- Connect the power cable to an AC outlet which can supply enough AC current to the instrument. The instrument cannot function properly with low current.

Arrange the instrument and other equipment so that the radiation noise caused by other equipment with a CRT display is reduced as much as possible.

Measuring EEG Waveforms in an ICU or Operation Theater

To measure the EEG waveforms, when the patient is connected to transducers or sensors from other medical equipment, a floating type electroencephalograph (type BF or CF) is required and shielded type EEG disk electrodes are recommended to reduce artifact. The EEG-9100/9200 is a BF type electroencephalograph. The optional BE-911A/BE-912A EEG disk electrode is a shielded type.

Confirm the following when measuring EEG waveforms in an ICU or OR:

- The EEG electrode is a shielded type.
- Connect the electrode attached to the nasion (Z electrode) to the Z jack on electrode junction box.

WARNING

Do not connect the Z electrode lead plug to a ground or equipotential ground. Otherwise, leakage current from another instrument cause electrical shock to the patient.

- Ground the instrument to an equipotential ground.

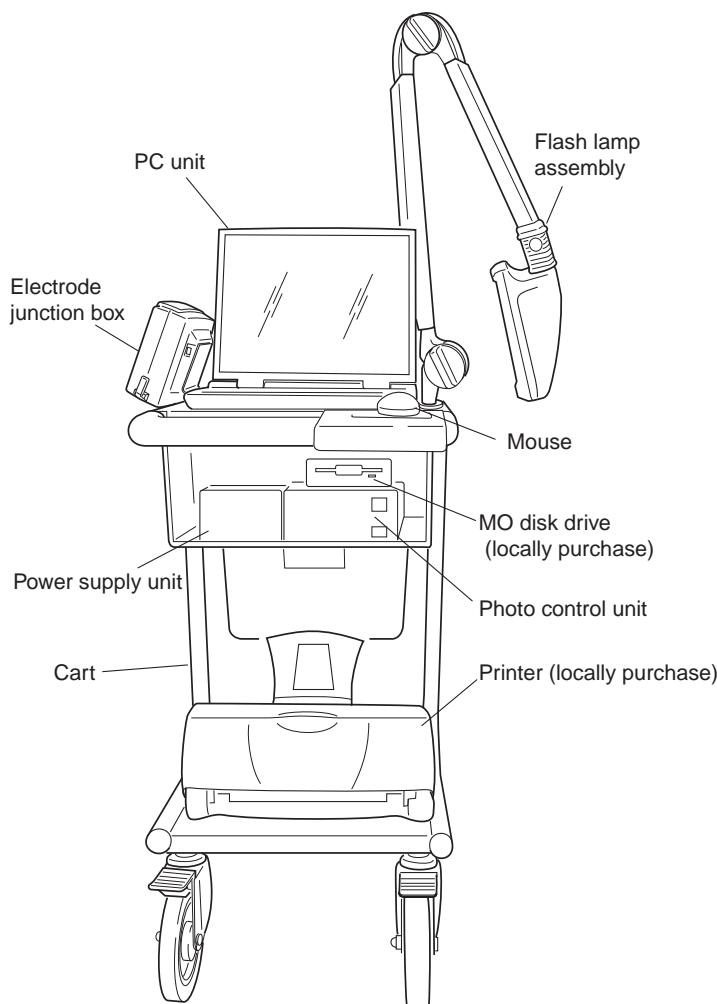
NOTE

When measuring very small electrical potentials, place the instrument more than 50 cm from the patient and electrode junction box so that the radiation noise caused by the instrument is reduced as much as possible.

Setting the Components on the Cart - EEG-9100

CAUTION

- Use only the KE-910A cart for this instrument. If this cart is not used, secure the components of the instrument so that they do not fall off or tip over.
- Do not sit or lean on the cart because it may tip over.
- Set the components of the electroencephalograph on the cart according to the following procedures. Otherwise, the cart may break or the components may tip over.
- Align the cable with the cable tie or cable clamp so that the cable is not accidentally pulled or caught. Otherwise, the connector may be damaged or the components connected on the cart may fall off and cause injury.
- Periodically check that the caster rotates smoothly and that no screw or knob bolt is loose.



Example

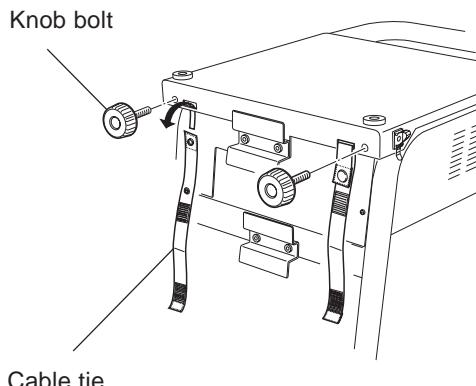
Setting flowchart

Set the components on the cart according to the following steps.

1. Assembling the cart
2. Removing the rear cover
3. Mounting the power supply unit for the printer
4. Mounting the multiple portable socket outlet
5. Mounting the power unit for the PC unit and MO disk drive
6. Mounting the photo control unit
7. Mounting the PC unit
8. Mounting the printer
9. Mounting the MO disk drive
10. Mounting the electrode junction box
11. Mounting the flash lamp assembly

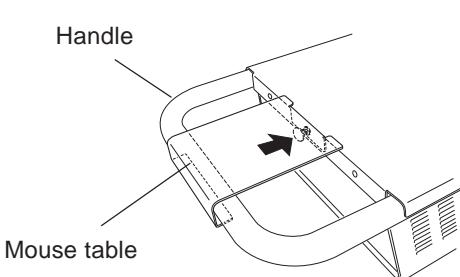
The shape of the connection cable, connector, AC power cord plug holder and AC power cord socket holder differ according to the model.

Assembling the Cart



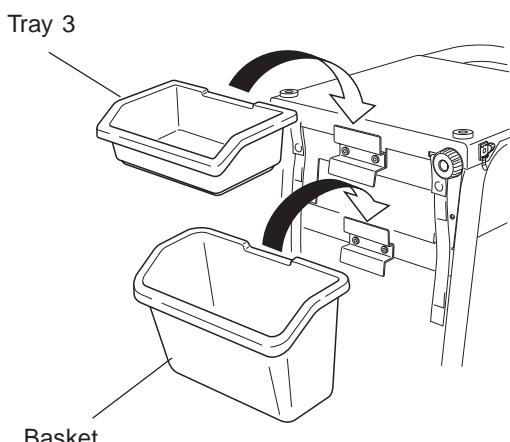
1. Attach the knob bolt and cable tie.

Attach the two knob bolts and two cable ties to the rear of the top plate of the cart. The knob bolts secure the pole of the electrode junction box and flash lamp assembly to the cart.



2. Attach the mouse table.

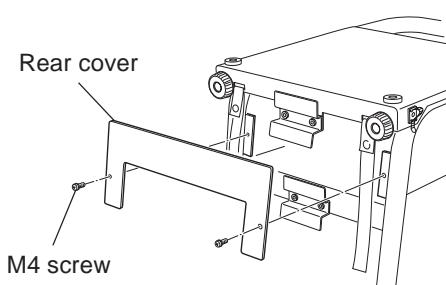
Hook the mouse table on the handle on the cart and push the fastener until it clicks to secure the mouse table. The mouse table can be placed on the left, center or right position. For this mouse table, use the mouse pad provided as a standard accessory.



After setting the components on the cart, hook the tray 3 and basket on the adapter on the rear of the cart. Use the tray 3 and basket to store electrodes and cables, etc.

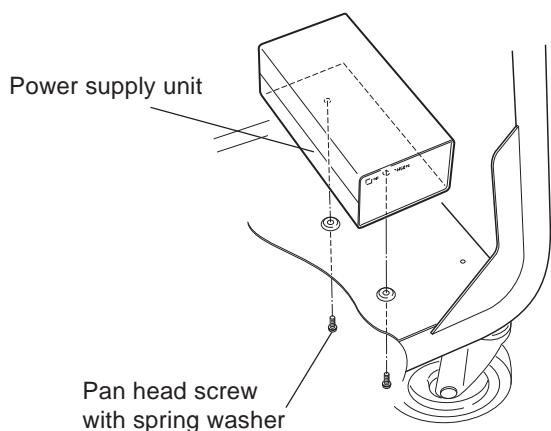
Removing the Rear Cover of the Cart

Remove the two M4 screws and remove the rear cover from the cart.



2. INSTALLATION

Mounting the Power Supply Unit for the Printer



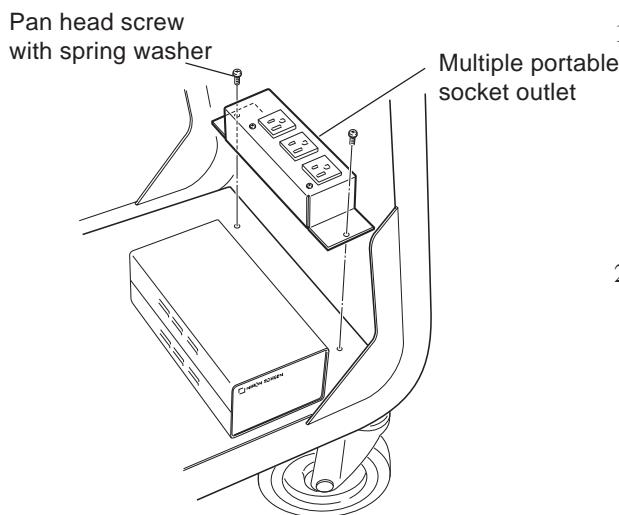
1. Put the power supply unit on the rear side of the bottom plate.

2. Secure the power supply unit with the two pan head screws with spring washers from the bottom of the bottom plate.

Mounting the Multiple Portable Socket Outlet

WARNING

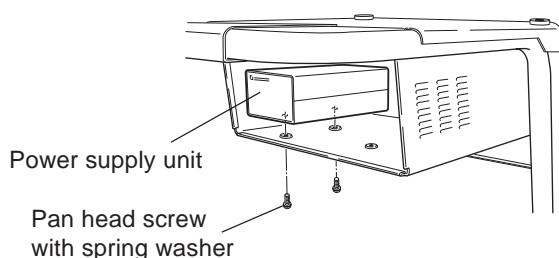
Do not use the multiple portable socket outlet if it is not secured to the cart. Otherwise, it may cause electrical shock to the patient and operator.



1. Put the multiple portable socket outlet on the rear side of the bottom plate behind the power supply unit for the printer.

2. Secure the multiple portable socket outlet with the two pan head screws with the washers from the top of the bottom plate.

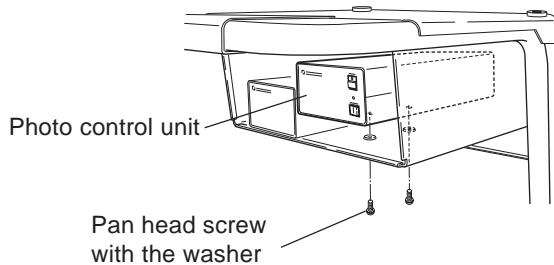
Mounting the Power Supply Unit for the PC Unit and MO Disk Drive



1. Put the power supply unit on the left side of the shelf.

2. Secure the power supply unit with the two pan head screws with spring washers from the bottom of the shelf.

Mounting the Photo Control Unit

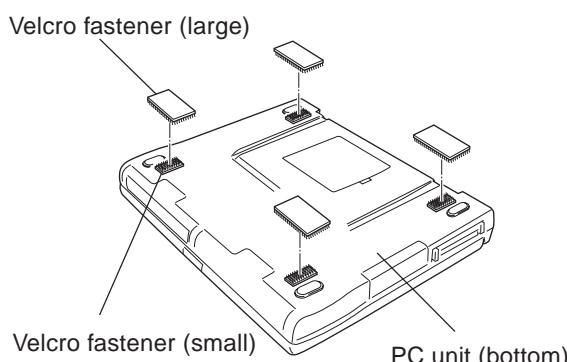


Mounting the PC unit

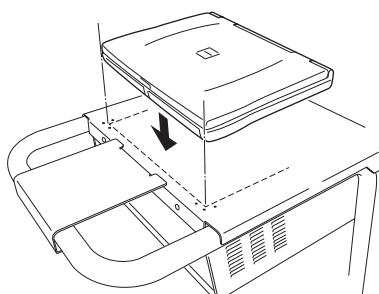
1. Put the photo control unit on the right side of the shelf.
2. Secure the photo control unit with the two pan head screws with spring washers from the bottom of the shelf.

CAUTION

Do not apply a lot of force when attaching the PC unit to the top panel.



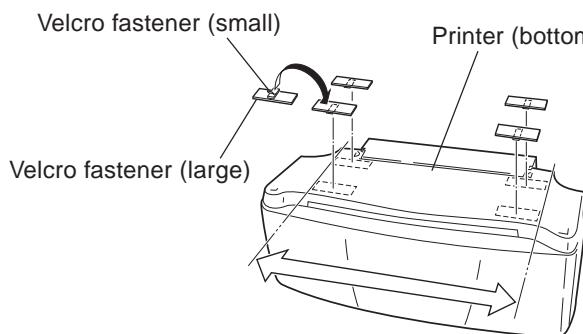
- A pair of velcro fasteners stick to each other with 3 kg force.
1. Clean the top panel with alcohol where the four large velcro fasteners will be attached.
 2. Attach the four large velcro fasteners to each small velcro fastener on the bottom of the PC unit. For the following steps, do not separate the two halves of the velcro fasteners.
When the small velcro fasteners are not attached to the bottom of the PC unit,
 - 1) Attach the four small velcro fasteners to each large fastener,
 - 2) Remove the backing papers from the four small velcro fasteners.
 - 3) Attach the four small velcro fasteners to the bottom of the PC unit.
 3. Remove the backing papers from the four large velcro fasteners.
 4. Set the PC unit on the top plate of the cart so that the PC unit aligns with the holes
 5. Push the PC unit down to securely attach it.
 6. Check that the PC unit is not easily removed from the top plate.



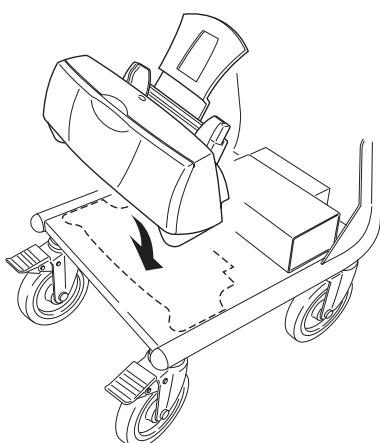
2. INSTALLATION

Mounting the Printer

1. Attach the four small velcro fasteners to each large velcro fastener. For the following steps, do not separate the two halves of the velcro fasteners.
2. Clean the bottom of the printer and bottom plate with alcohol where the velcro fasteners will be attached.
3. Remove the backing papers from the small velcro fasteners.

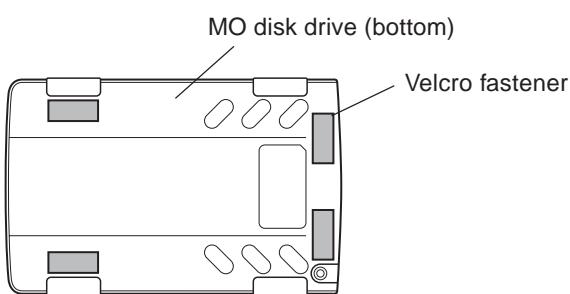
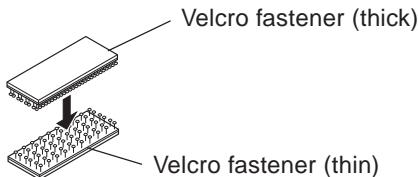


4. Attach the four small velcro fasteners to the bottom of the printer so that the four large velcro fasteners can be attached to the surface of the bottom plate.
5. Put the printer on the front side of the bottom plate and check that the positions of the four large velcro fasteners can be attached to the surface of the bottom plate.
6. Remove the printer from the bottom plate and remove the backing paper from the four large velcro fasteners.
7. Set the printer on the front side of the bottom plate.
8. Push the printer down to securely attach it.

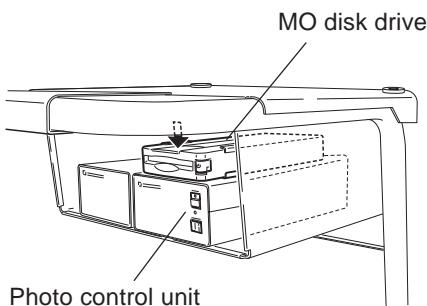


9. Check that the printer is not easily removed from the bottom plate.

Mounting the MO Disk Drive

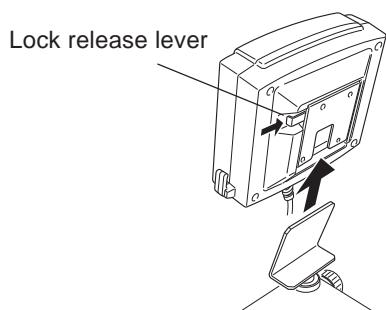
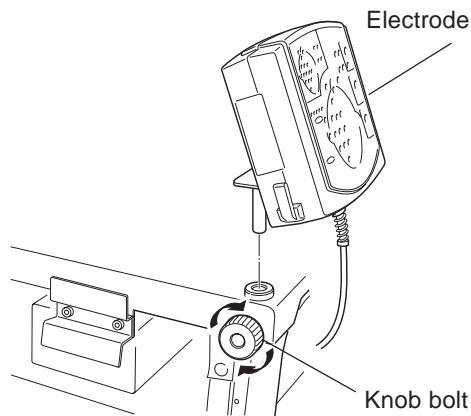


1. Attach the four thin velcro fasteners to each thick velcro fastener. For the following steps, do not separate the two halves of the velcro fasteners.
2. Clean the bottom of the MO disk drive and the top panel of the photo control unit with alcohol where the velcro fasteners will be attached.
3. Remove one backing paper from each pair of velcro fasteners.
4. Attach the four velcro fasteners to the bottom of the MO disk drive.
5. Put the MO disk drive on the top panel of the photo control unit and check that the positions of the four velcro fasteners can be attached to the surface of the top panel of the photo control unit.
6. Remove the MO disk drive from the top panel of the photo control unit and remove the backing paper from the four velcro fasteners.
7. Set the MO disk drive on the top panel of the photo control unit.
8. Push the MO disk drive down to securely attach it.
9. Check that the MO disk drive is not easily removed from the top panel of the photo control unit.



2. INSTALLATION

Mounting the Electrode Junction Box

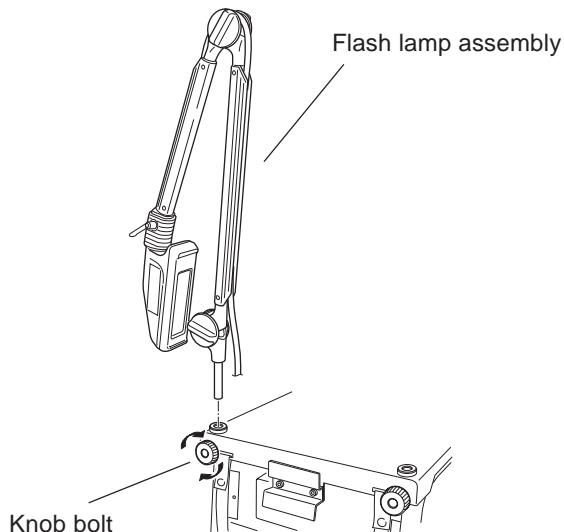


1. Insert the electrode junction box pole into the electrode junction box hole on the top plate.

2. Position the electrode junction box and secure the electrode junction box with the knob bolt.

The electrode junction box can be removed from the electrode junction box holder so you can place the electrode junction box near the patient. To remove the electrode junction box, press the lock release lever and slide the electrode junction box up.

Mounting the Flash Lamp Assembly



1. Insert the flash lamp assembly pole into the flash lamp assembly hole on the top plate.

2. Position the flash lamp assembly and secure the flash lamp assembly with the knob bolt.

Cable Connection - EEG-9100

WARNING

- Before connecting the cables, make sure that the power of all components is turned off.
- When connecting an external instrument to the connectors marked with , the external instrument and this instrument must be connected according to the IEC60601-1-1 “Medical electrical equipment - Part 1-1: General requirements for safety - Collateral standard: Safety requirements for medical electrical systems”. Failure to follow this warning may cause electrical shock to the patient and operator.
- Secure ends of the PC unit, printer and MO disk drive AC power cords at the power supply unit side with fixing brackets.
- Do not use the multiple portable socket outlet if it is not secured to the cart. Otherwise, it may cause electrical shock to the patient and operator.
- If the multiple portable socket outlet is not used, there may be electrical potential difference between the power units. Connect the power units to the same AC outlet. Never use a locally available multi-power outlets. Failure to follow this warning may cause electrical shock to the patient and operator.

Connecting to a Local Area Network

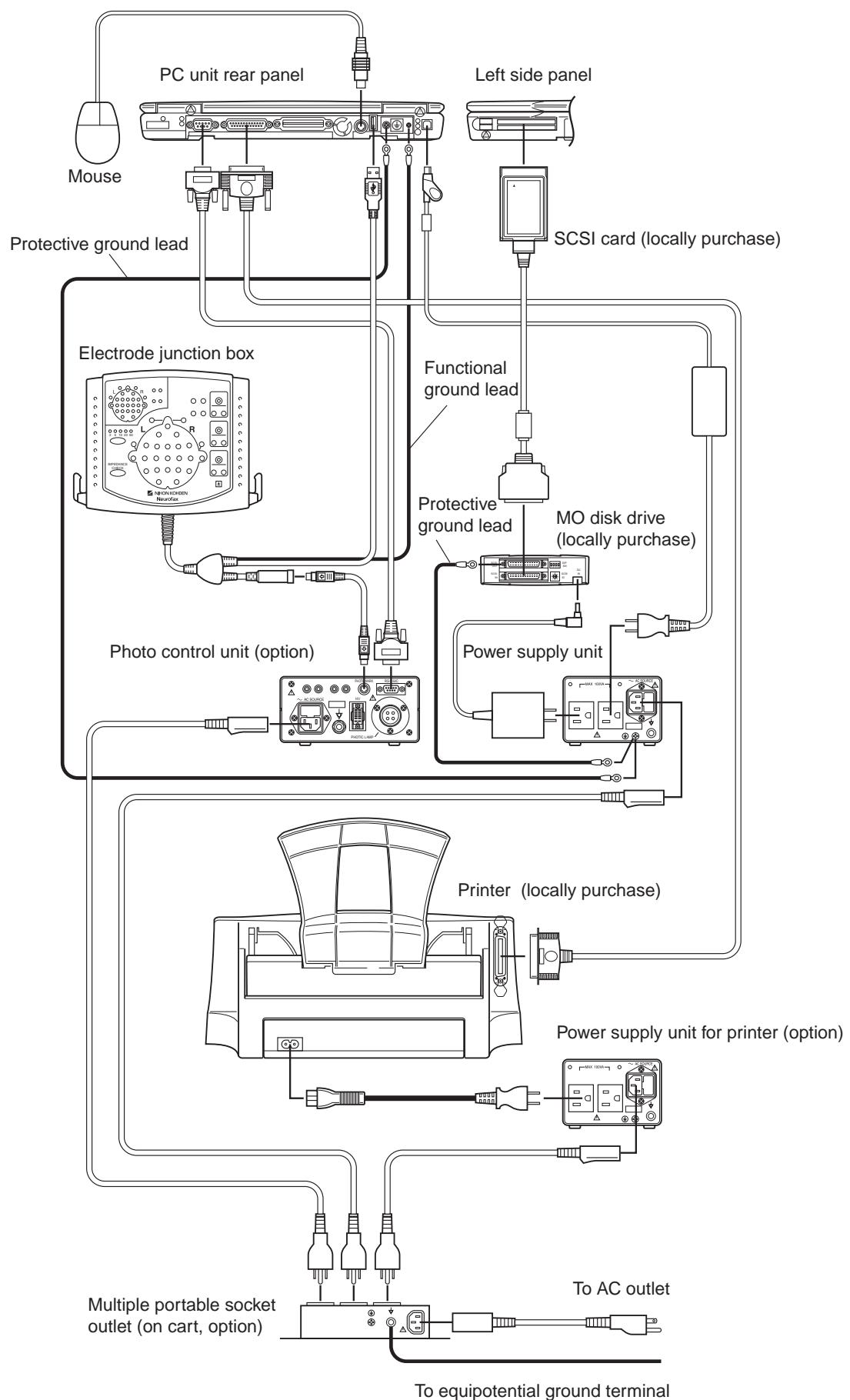
- When connecting the instrument to a local area network, connect the instrument so that the instrument is electrically separated from the local area network according to the IEC60601-1-1 “Medical electrical equipment - Part 1-1: General requirements for safety - Collateral standard: Safety requirements for medical electrical systems”. Failure to follow this warning may cause electrical shock to the patient and operator.
 - Check that there is no damage on the surface of the network cable. If it is damaged, it may cause electrical shock to the patient and operator.
-

- The connector positions and symbols of the PC unit differ according to model. Refer to the Operator's manual of the PC unit.
- When connecting an external equipment to the system, refer to the Operator's manual of each external equipment.
- For external instrument connection and local area network connection, refer to “General Requirements for Connecting Medical Electrical System” in this section.

After connecting the cables, check the cable connection and each instrument operation. Refer to “Power On Procedure” in Section 3 of the this Operator's manual and the Operator's manual for each instrument.

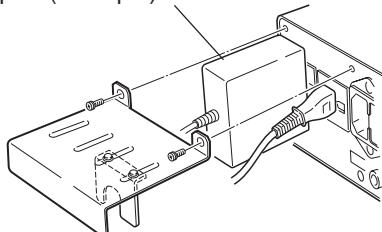
Connection Diagram (example)

The shape of the connection cable, connector, AC power cord plug holder and AC power cord socket holder differ according to the model.



Connecting to the Power Supply Unit

MO disk drive DC power adapter (example)

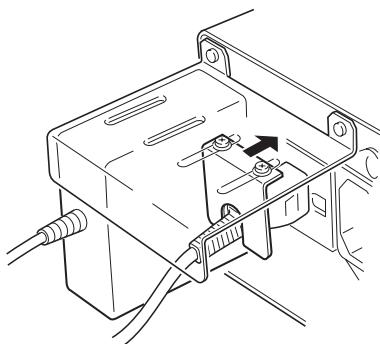


Connecting the Power Cord to the Power Supply Unit

CAUTION

Only supply AC power to the PC unit, printer and MO disk drive from an AC outlet on the SC-901A/AK/AG Power supply unit or a medical-use isolation transformer. Do not connect the PC unit, printer or MO disk drive to a wall AC outlet. Failure to follow this caution may cause electrical shock to the patient and operator.

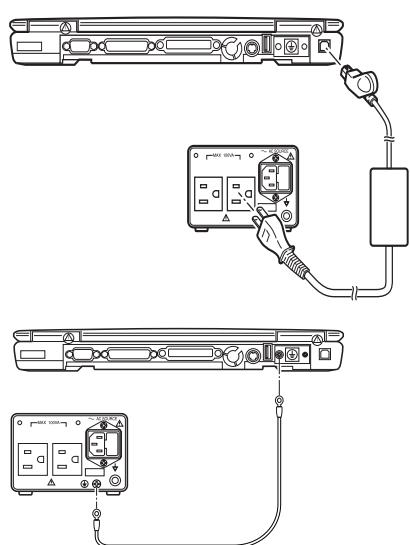
1. Remove the two M3 screws and remove the AC power cord plug holder.
2. Connect the power cords of the PC unit, printer or MO disk drive.
3. Attach the AC power cord plug holder to the power unit and fix the holder with two screws.
4. Secure the AC power cord plug with the fixing plate.



Connecting the PC Unit

CAUTION

Only supply AC power to the PC unit from the power supply unit. Do not connect the PC unit to a wall AC outlet. Failure to follow this caution may cause electrical shock to the patient and operator.

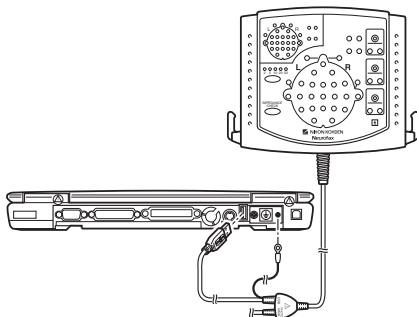


1. Connect the AC adapter cable to the power socket (AC adaptor connector) on the rear of the PC unit.
2. Connect the AC power cable to the AC outlet on the power supply unit. Refer to "Connecting the Power Cord to the Power Supply Unit".
3. Connect the provided ground lead to the protective ground terminal on the rear of the PC unit.
4. Connect the other side of the ground lead to the protective ground terminal on the power supply unit.

Connecting the MO Disk Drive**CAUTION**

- If there is any metal part on the MO disk drive where the operator can touch, connect that metal part to the protective ground terminal on the rear of the power supply unit with a provided protective ground lead. Failure to follow this caution may cause electrical shock to the patient and operator.
- Only supply AC power to the MO disk drive from the power supply unit or a medical-use isolation transformer. Do not connect the MO disk drive to a wall AC outlet. Failure to follow this caution may cause electrical shock to the patient and operator.

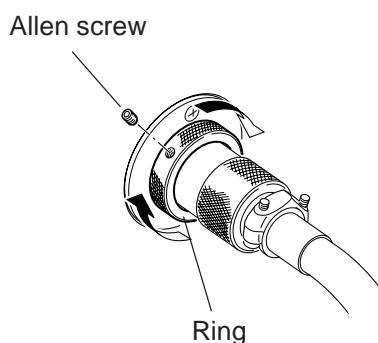
Connect the AC power cord to the AC outlet on the power supply unit. Refer to “Connecting the Power Cord to the Power Supply Unit”.

Connecting the Cables**Connecting the PC Unit and the Electrode Junction Box**

1. Connect the USB cable of the electrode junction box cable to the USB connector on the rear of the PC unit.
2. Connect the functional ground lead of the electrode junction box cable to the protective ground terminal on the rear of the PC unit.

Connecting the Flash Lamp Assembly**CAUTION**

- Before connecting or disconnecting the flash lamp cord, make sure that the power of all components is turned off. After the photo control unit power is turned off, about 600 V is present in the PHOTIC LAMP connector on the photic control unit for several minutes.
- When the instrument is turned on, about 600 V is present at pin 2 of the PHOTIC LAMP connector on the LS-901AJ/AK/AG Photo control unit. To protect against shock, always connect the flash lamp assembly cable to this connector, or attach the PHOTO LAMP connector cap to the PHOTO LAMP connector even when the photic stimulation is not used.



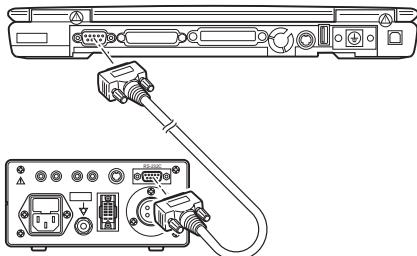
1. Connect the flash lamp assembly cable to the PHOTIC LAMP connector on the rear of the photo control unit and turn the ring clockwise.
2. Secure the ring with the two allen screws.

Connecting the PC Unit and the Photo Control Unit**WARNING**

Before connecting or disconnecting the RS-232C cable, make sure that the power of the PC unit and the photo control unit is turned off.

NOTE

When the photo control unit is not connected, attach the plate (provided with the PC unit) to the RS-232C connector on the rear of the PC unit.



1. Connect the RS-232C cable to the RS-232C connector on the rear of the photo control unit.
2. Connect the other side of the RS-232C cable to the RS-232C connector on the rear of the PC unit.
3. Connect the AC power cord provided with the photo control unit to the AC socket on the rear of the photo control unit.
4. Connect the other side of the AC power cord to the AC outlet on the multiple portable socket outlet and secure both ends of the AC power cord with the fixing brackets.

Connecting the Photo Control Unit and the Electrode Junction Box**CAUTION**

Before connecting or disconnecting the photo mark cord, make sure that the power of the PC unit and the photo control unit is turned off.

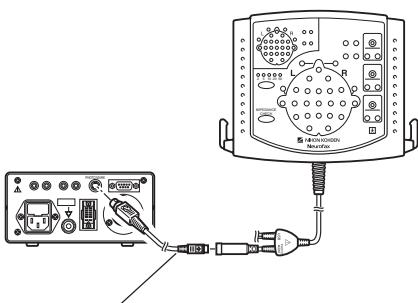


Photo mark Connection cable

Connect the photo mark cord of the electrode junction box to the PHOTO MARK connector on the rear of the photo control unit. The electrode junction box and the photo control unit are connected via the photo mark connection cable.

Connecting the Printer

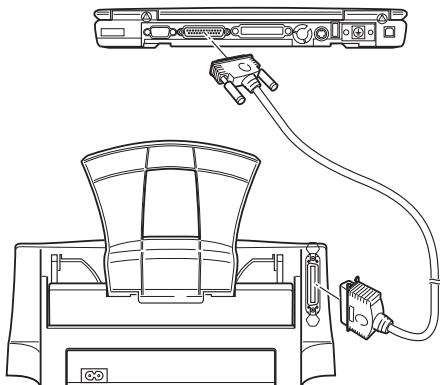
For cable connection and operation, refer to the Operator's manual of the printer.

CAUTION

- Only use a Canon BJC-80V or compatible printer.
- The printer must comply with the IEC60950 standard and CISPR11 Second Edition 1990-09 Group 1 and Class B standard, or the equivalent.
- Mount the printer on the KE-910A cart and supply AC power from a 3-prong AC outlet on the SC-901A/AK/AG power supply unit. Do not connect the printer to a wall AC outlet. Failure to follow this warning may cause electrical shock to the patient and operator.
- When the printer is not mounted on the KE-910A cart, locate the printer outside the patient environment (IEC60601-1-1 2.204*) and supply AC power from a medical isolation transformer. Do not connect the printer to a wall AC outlet. Failure to follow this warning may cause electrical shock to the patient and operator.
- The printer power is supplied from the SC-901A/AJ/AK Power Supply Unit. Use a printer with less than 100 VA power consumption.
- Use a printer cable which does not emit unwanted radio frequency signals (EMC protected).

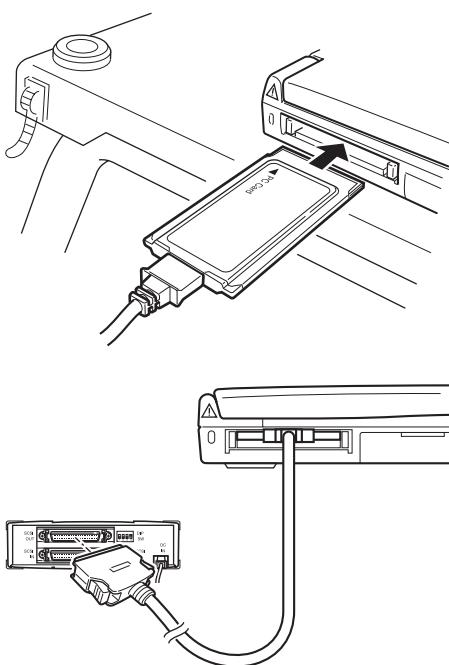
* Patient environment

Any area in which intentional or unintentional contact between PATIENT and parts of SYSTEM or some other persons touching of the SYSTEM can occur.



1. Connect the printer cable provided with the printer to the PRT connector (parallel port) on the rear of the PC unit and secure the printer cable connector with the two jackscrews.
2. Connect the other side of the printer cable to the parallel port on the rear of the printer and secure the printer cable connector with the two stoppers.
3. Connect the AC power cord provided with the printer to the AC socket of the printer.
4. Connect the other side of AC power cord to the AC outlet on the power supply unit. Refer to "Connecting the Power Cord to the Power Supply Unit".

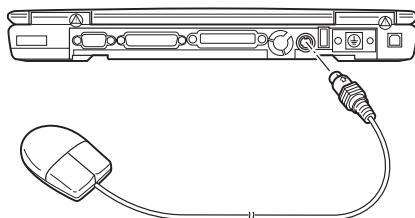
For loading the recording paper, refer to the Operator's manual of the printer.



Connecting the MO Disk Drive

1. Insert the SCSI card into the PC card slot on the left side of the PC unit.
Refer to the Operator's manual of the PC unit.
2. Connect the SCSI cable to the SCSI connector on the SCSI card.
3. Connect the other side of the SCSI cable to the SCSI connector on MO disk drive.
4. Set the following.
SCSI ID: 4
Terminator: On

For details, refer to the Operator's manual of the MO disk drive. When two or more SCSI devices are connected, refer to the operator's manual for each SCSI device for the SCSI ID and terminator setting.



Connecting the Mouse

Connect the mouse cable to the mouse (PS/2) connector (Mini DIN 6 pins) on the rear of the personal computer.

NOTE

- Before connecting the mouse, turn the PC unit power off.
Otherwise, the mouse does not operate.
- When the PC unit power is on, do not touch the connector.
Electrostatic energy may cause PC unit malfunction.

2. INSTALLATION

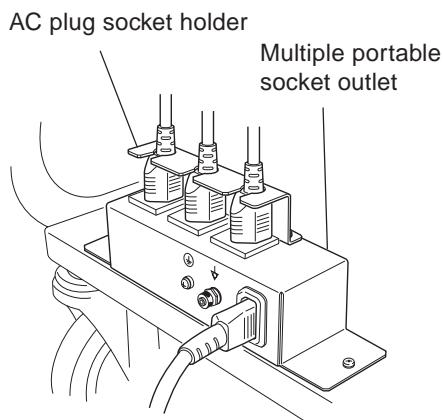
Connecting the AC Power Cords to the Multiple Portable Socket Outlet

WARNING

- Do not use the multiple portable socket outlet if it is not secured to the cart. Otherwise, it may cause electrical shock to the patient and operator.
- If the multiple portable socket outlet is not used, there may be electrical potential difference between the power units. Connect the power units to the same AC outlet. Never use a locally available multi-power outlets. Failure to follow this warning may cause electrical shock to the patient and operator.

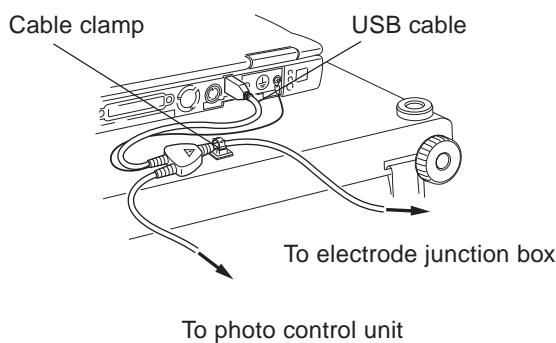
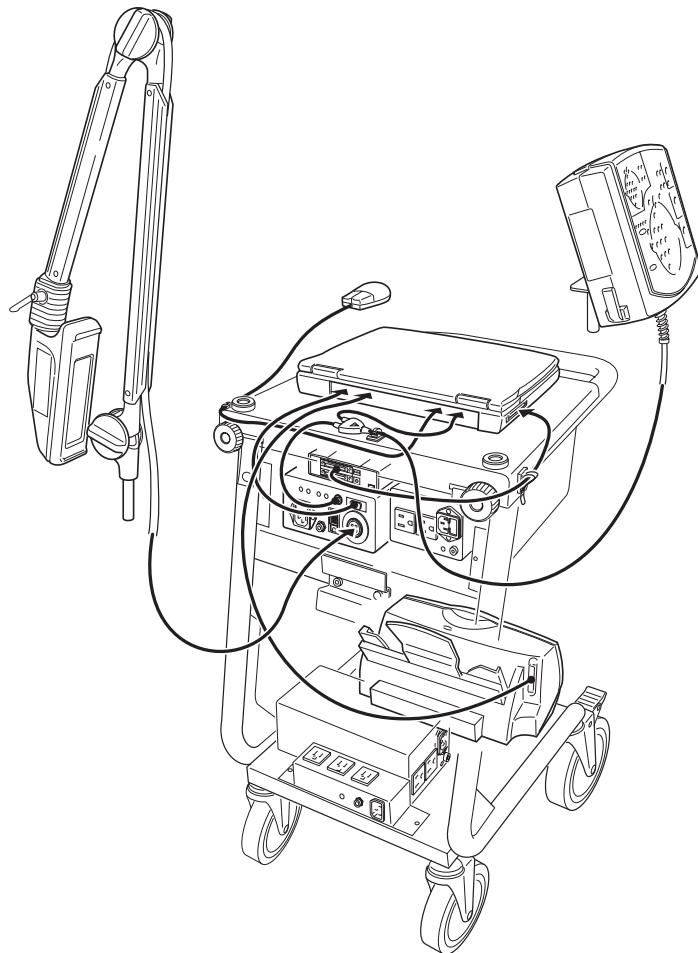
CAUTION

After connecting the AC power cord, secure the AC power cord plug and socket with the AC power cord plug holder and AC power cord socket holder.



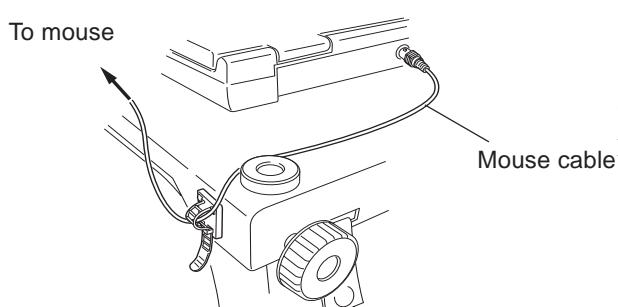
1. Connect the AC power cord for each instrument to the AC outlet on the multiple portable socket outlet. Connect the following AC power cords to the AC outlets on the multiple portable socket outlet. Refer to "Connecting the Cables".
 - Power supply unit for the printer
 - Power supply unit for the PC unit and MO disk drive
 - Photo control unit
2. Attach the AC power cord plug holder to the multiple portable socket outlet and secure the holder with the two M4 screws.

Binding the Cables



USB Cable

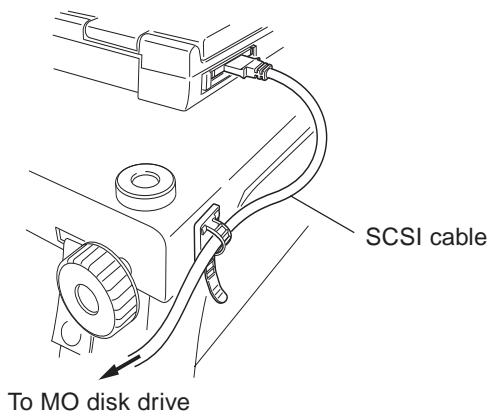
1. Clean the top plate with alcohol where the cable clamp will be attached.
2. Secure the USB cable with the cable clamp. Make sure that there is slack in the cable.



Mouse Cable

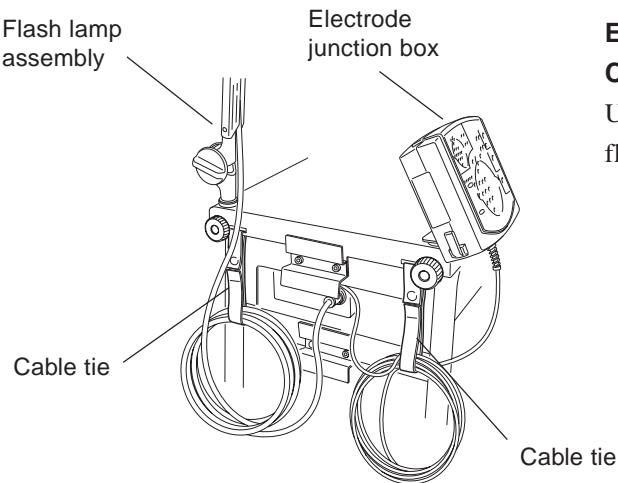
Secure the mouse cable with the cable tie on the right rear of the top plate.

2. INSTALLATION



SCSI Cable

Secure the SCSI cable with the cable tie on the left rear of the top plate.



Electrode Junction Box Cable and Flash Lamp Assembly Cable

Use the cable tie for binding the electrode junction box cable and flash lamp assembly cable.

Setting the Components on the Cart - EEG-9200

Use only the KD-024A or KD-025A cart

KD-024A: With a printer table and isolation transformer holder.

KD-025A: Without a printer table and isolation transformer holder.

For setting the components on the cart, refer to the KD-024A/KD-025A Cart Installation Guide.

CAUTION

When using an unspecified cart, carefully set the components to prevent them from falling off and the instrument from tipping over.

Cable Connection - EEG-9200

WARNING

- Before connecting the cables, make sure that the power of all components is turned off.
- When connecting an external instrument to the connectors marked with \triangle , the external instrument and this instrument must be connected according to the IEC60601-1-1 “Medical electrical equipment - Part 1-1: General requirements for safety - Collateral standard: Safety requirements for medical electrical systems”. Failure to follow this warning may cause electrical shock to the patient and operator.
- Secure ends of the PC unit, printer and MO disk drive AC power cords at the isolation unit side with fixing brackets.
- Do not use the multiple portable socket outlet if it is not secured to the cart. Otherwise, it may cause electrical shock to the patient and operator.
- If the multiple portable socket outlet is not used, there may be electrical potential difference between the power units. Connect the power units to the same AC outlet. Never use a locally available multi-power outlets. Failure to follow this warning may cause electrical shock to the patient and operator.

Connecting to a Local Area Network

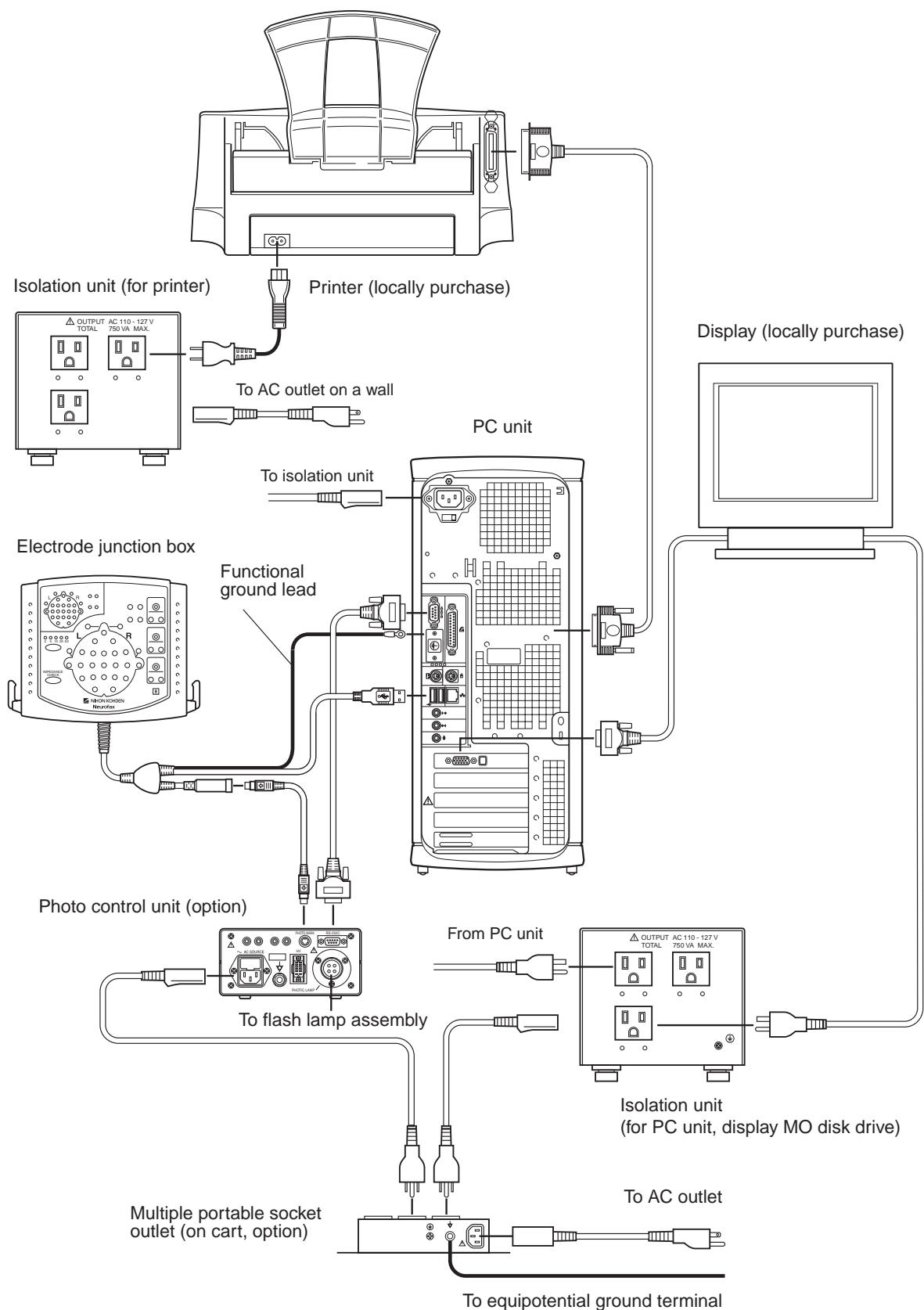
- When connecting the instrument to a local area network, connect the instrument so that the instrument is electrically separated from the local area network according to the IEC60601-1-1 “Medical electrical equipment - Part 1-1: General requirements for safety - Collateral standard: Safety requirements for medical electrical systems”. Failure to follow this warning may cause electrical shock to the patient and operator.
 - Check that there is no damage on the surface of the network cable. If it is damaged, it may cause electrical shock to the patient and operator.
-

- The connector positions and symbols of the PC unit differ according to model. Refer to the Operator's manual of the PC unit.
- When connecting an external equipment to the system, refer to the Operator's manual of each external equipment.
- For external instrument connection and local area network connection, refer to “General Requirements for Connecting Medical Electrical System” in this section.

After connecting the cables, check the cable connection and each instrument operation. Refer to “Power On Procedure” in Section 3 of the this Operator's manual and the Operator's manual for each instrument.

Connection Diagram (example)

The shape of the connection cable, connector, AC power cord plug holder and AC power cord socket holder differ according to the model.



2. INSTALLATION

Connecting the PC Unit to the Isolation Unit

CAUTION

Only supply AC power to the PC unit from the isolation unit. Do not connect the PC unit to a wall AC outlet. Failure to follow this caution may cause electrical shock to the patient and operator.

1. Connect the AC power cord to the AC socket on the rear of the PC unit.
2. Connect the other side of the AC power cable to the AC outlet on the isolation unit.

Connecting the Display

1. Connect the display cable to the VIDEO connector on the rear panel of the PC unit and secure it with the two jack screws.
2. Connect the AC power cord provided with the display to the AC power socket on the rear of the display.
3. Connect the other side of the AC power cord to the AC outlet on the isolation unit and secure both ends of the AC power cord with the fixing brackets.

Connecting the Cables

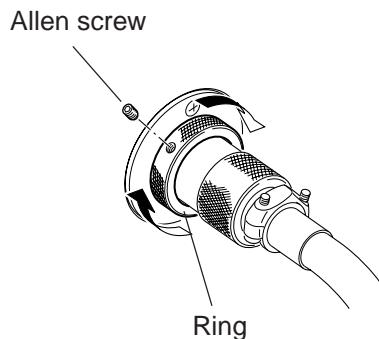
Connecting the PC Unit and the Electrode Junction Box

1. Connect the USB cable of the electrode junction box cable to the  USB connector on the rear of the PC unit.
2. Connect the functional ground lead of the electrode junction box cable to the protective ground terminal on the rear of the PC unit.

Connecting the Flash Lamp Assembly

CAUTION

- Before connecting or disconnecting the flash lamp cord, make sure that the power of all components is turned off. After the photo control unit power is turned off, about 600 V is present in the PHOTIC LAMP connector on the photic control unit for several minutes.
- When the instrument is turned on, about 600 V is present at pin 2 of the PHOTIC LAMP connector on the LS-901AJ/AK/AG Photo control unit. To protect against shock, always connect the flash lamp assembly cable to this connector, or attach the PHOTIC LAMP connector cap to the PHOTIC LAMP connector even when the photic stimulation is not used.



1. Connect the flash lamp assembly cable to the PHOTIC LAMP connector on the rear of the photo control unit and turn the ring clockwise.
2. Secure the ring with the two allen screws.

Connecting the PC unit and the Photo Control Unit

WARNING

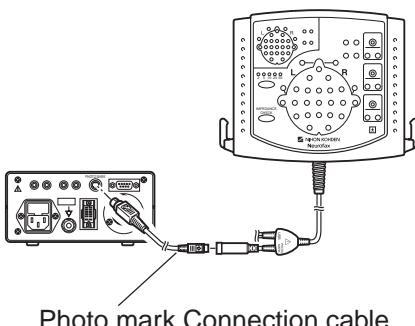
Before connecting or disconnecting the RS-232C cable, make sure that the power of the PC unit and the photo control unit is turned off.

NOTE

When the photo control unit is not connected, attach the plate (provided with the PC unit) to the RS-232C connector on the rear of the PC unit.

1. Connect the RS-232C cable to the RS-232C connector on the rear of the photo control unit.
2. Connect the other side of the RS-232C cable to the RS-232C connector on the rear of the PC unit.
3. Connect the AC power cord provided with the photo control unit to the AC socket on the rear of the photo control unit.
4. Connect the other side of the AC power cord to the AC outlet on the multiple portable socket outlet and secure both ends of the AC power cord with the fixing brackets.

Connecting the Photo Control Unit and the Electrode Junction Box



CAUTION

Before connecting or disconnecting the photo mark cord, make sure that the power of the PC unit and the photo control unit is turned off.

Connect the photo mark cord of the electrode junction box to the PHOTO MARK connector on the rear of the photo control unit. The electrode junction box and the photo control unit are connected via the photo mark connection cable.

Connecting the Printer

For cable connection and operation, refer to the Operator's manual of the printer.

WARNING

- When using the SM-800RJ/RK Isolation Unit, only connect the printer.
 - Do not remove the socket cover from the unused OUTPUT socket. Otherwise electrical leakage current may harm the patient and operator.
-
-

CAUTION

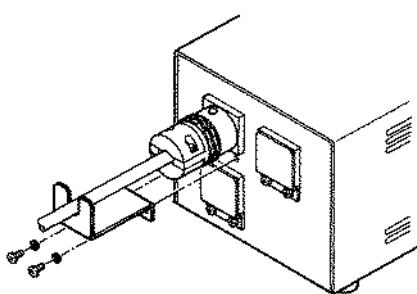
- The printer must comply with the IEC60950 standard and CISPR11 Second Edition 1990-09 Group 1 and Class B standard, or the equivalent.
 - Mount the printer on the KD-024A cart and supply AC power from a 3-prong AC outlet on the SM-800RJ/RK or compatible isolation unit. Do not connect the printer to a wall AC outlet. Failure to follow this warning may cause electrical shock to the patient and operator.
 - When the printer is not mounted on the KD-024A cart, locate the printer outside the patient environment (IEC60601-1-1 2.204*) and supply AC power from a medical isolation transformer. Do not connect the printer to a wall AC outlet. Failure to follow this warning may cause electrical shock to the patient and operator.
 - The printer power is supplied from the SM-800RJ/RK Isolation Unit. Use a printer with less than 750 VA power consumption.
 - Use a printer cable which does not emit unwanted radio frequency signals (EMC protected).
-

* Patient environment

Any area in which intentional or unintentional contact between PATIENT and parts of SYSTEM or some other persons touching of the SYSTEM can occur.

1. Connect the printer cable provided with the printer to the PRT connector (parallel port) on the rear of the PC unit and secure the printer cable connector with the two jackscrews.
2. Connect the other side of the printer cable to the parallel port on the rear of the printer and secure the printer cable connector with the two stoppers.
3. Connect the AC power cord provided with the printer to the AC socket of the printer.
4. Connect the other side of AC power cord to the AC outlet on the isolation unit and secure it with the AC power cord holder.

For loading the recording paper, refer to the Operator's manual of the printer.



Connecting the Mouse

Connect the mouse cable to the mouse (PS/2) connector (Mini DIN 6 pins) on the rear of the PC unit.

NOTE

- Before connecting the mouse, turn the PC unit power off. Otherwise, the mouse does not operate.
- When the PC unit power is on, do not touch the connector. Electrostatic energy may cause PC unit malfunction.

Connecting the AC Power Cords to the Multiple Portable Socket Outlet**WARNING**

- Do not use the multiple portable socket outlet if it is not secured to the cart. Otherwise, it may cause electrical shock to the patient and operator.
 - If the multiple portable socket outlet is not used, there may be electrical potential difference between the power units. Connect the power units to the same AC outlet. Never use a locally available multi-power outlets. Failure to follow this warning may cause electrical shock to the patient and operator.
-
-

CAUTION

After connecting the AC power cord, secure the AC power cord plug and socket with the AC power cord plug holder and AC power cord socket holder.

1. Connect the AC power cord for each instrument to the AC outlet on the multiple portable socket outlet. Connect the following AC power cords to the AC outlets on the multiple portable socket outlet. Refer to “Connecting the Cables”.
 - Isolation unit for the PC unit and display
 - Photo control unit
2. Attach the AC power cord plug holder to the multiple portable socket outlet and secure the holder with the two M4 screws.

Connecting the AC Power Cord and Equipotential Grounding

Connecting the AC Power Cord

WARNING

- Only use the 3-prong power cord with the instrument. Failure to follow this warning may cause electrical shock to the patient and operator.
- If the multiple portable socket outlet is not used, there may be electrical potential difference between the power supply units (EEG-9100A/J/K/F) or isolation units (EEG-9200A/J/K/G). Connect the power supply units or isolation units to the same AC outlet. Never use a locally available multi-power outlets. Failure to follow this warning may cause electrical shock to the patient and operator.

-
1. Connect the connector of the provided 3-prong power cord to the AC SOURCE socket on the multiple portable socket outlet. Plug the cord into an AC outlet.
When a 3-prong power cord is used, the instrument is automatically grounded.
 2. Secure the AC power cord socket with the AC power cord socket holder.

Power line security

If a large power-consuming instrument is used on the same power line, the large power-consuming instrument may be adversely affected. A single line should be secured for the system.

The power cord is only 2 m long; use an AC outlet close to the system.

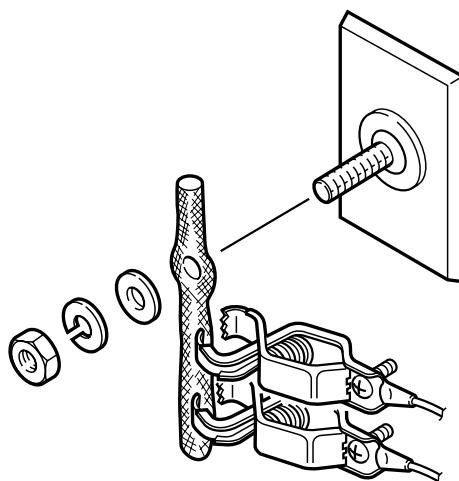
Equipotential Grounding

WARNING

- For patient safety, equipotential grounding of all instruments must be performed. Consult a qualified biomedical engineer.
- Do not connect several ground leads directly to the equipotential terminal because the ground lead may be disconnected from the terminal.

If this instrument is used where equipotential grounding is required, connect the equipotential ground terminal (∇ mark) on the rear panel to the equipotential terminal on the wall with the ground lead.

Use a thick braided wire to securely connect the ground lead to the equipotential terminal.



When more than two electrical instruments are used, there may be electrical potential difference between the instruments. Potential difference between instruments may cause current to flow to the patient connected to the instruments, resulting in electrical shock (micro shock). Never use any medical equipment without proper grounding.

Always perform equipotential grounding when required. It is often required in the OR, ICU, CCU, cardiac catheterization room and cardiovascular x-ray room. In other rooms, equipotential ground is recommended. Consult a qualified biomedical engineer to determine if it is required.

Connecting to a Local Area Network

The acquisition program can use several data storage drives. For example, the instrument can select drive C (hard disk) and drive D (MO disk unit) as data storage drives. To review the EEG data file saved in a drive through a network, the drive C (or drive D) in this instrument needs to be shared as another EEG instrument virtual drive. The EEG waveform which is being saved can be reviewed with the EEG Scope - Remote mode function through the network. For EEG Scope - Remote mode function, refer to the EEG Scope Operator's manual. All the drives in which data will be stored must be shared in the network. CD-ROM drive and floppy disk drives do not need to be shared.

WARNING

When connecting the instrument to a local area network, connect the instrument so that the instrument is electrically separated from the local area network according to the IEC60601-1-1 “Medical electrical equipment - Part 1-1: General requirements for safety - Collateral standard: Safety requirements for medical electrical systems”. Failure to follow this warning may cause electrical shock to the patient and operator.

For external instrument connection and local area network connection, refer to “General Requirements for Connecting Medical Electrical Systems” in this section.

Backing Up and Restoring the Settings in the System Program

CAUTION

When the user name, domain name, and/or work group name is changed in the Windows network setting, the settings in the system program is lost. Before starting the network setting, backup the settings in the system program.

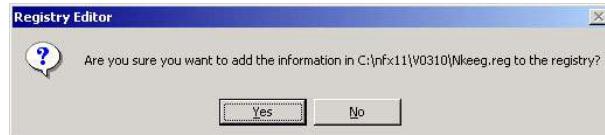
The settings in the System program are saved in the registry. The Acquisition program and Review program use these settings. Windows 2000 has a different registry for each user. To log in as a different user or change the “Domain” and/or “Workgroup” to connect to a local area network, do the following procedure.

1. Back up the settings in the System program. Refer to “Saving the System Program Settings in a File” in the System Program section of the operator’s manual for each instrument.
2. Change the User name, Domain name and/or Workgroup name. Refer to the following sections.

NOTE

If you change or add the user name, add this user name to the Administrator group before changing the network setting. To change the user name, refer to the windows online help.

3. Run the “nkeeg.reg” program.
 - 1) From the start menu, select Run. The Run dialog box opens.
 - 2) Type C:\nfx11\v0403\nkeeg.reg. Where “v0403” is the system program version. Change the version according to your instrument.
 - 3) Click the OK button. The confirmation message dialog box opens.



- 4) Click the Yes button to change the registry setting. The following message box opens.



- 5) Click the OK button
4. Restore the settings to the System Program. Refer to “Calling Up Saved System Program Settings” in the System Program section of the operator’s manual for each instrument.

2. INSTALLATION

Enabling the Network Interface Controller

EEG-9100A/J/K/G:

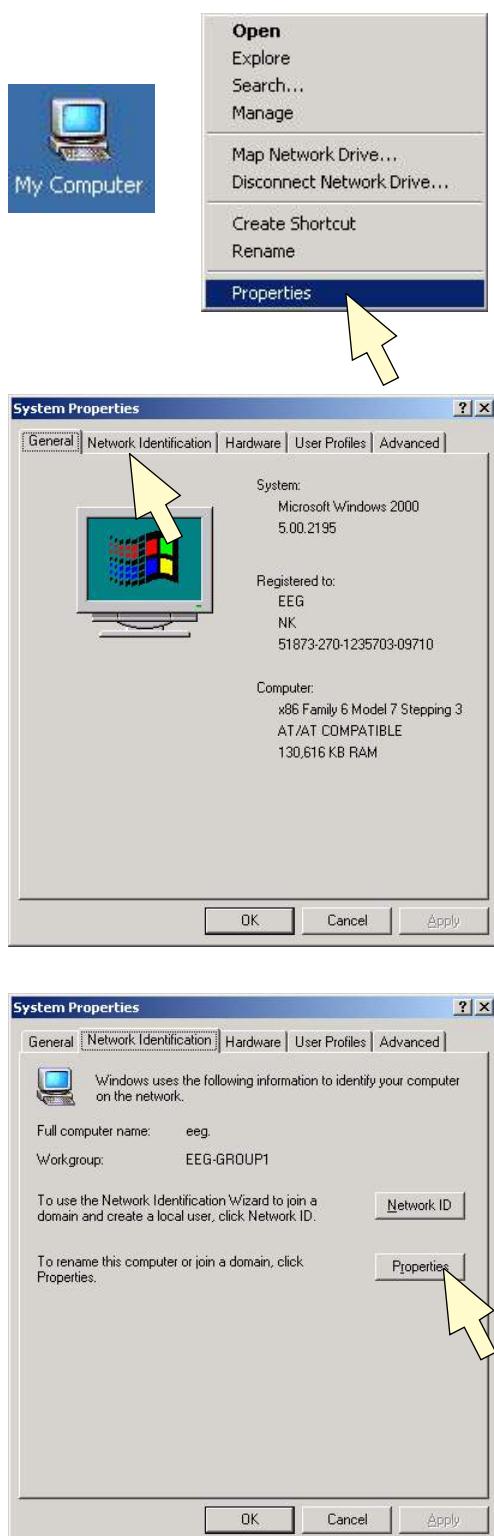
Install a locally purchased network card.

EEG-9200A/J/K/G:

1. Turn the power on. Refer to “Power On Procedure” in Section 3.
2. When the “F2=SETUP” message appears on the right upper corner of the screen, press the F2 key immediately after the power is turned on (while your computer beeps). The BIOS (System) Setup screen appears. If you wait too long the current operating system begins to load into memory. If this happens, let the system complete the load the operation, then shutdown the system and try again.
3. Select “Integrated Device” with the ↑ or ↓ key and press the Enter key.
4. Set “Network Interface Controller” to “ON”.
5. Press the Esc key to close the BIOS Setup screen.
6. Select “Save Changes and Exit” to save the settings and restart the computer.

Setting the Network Identification Settings

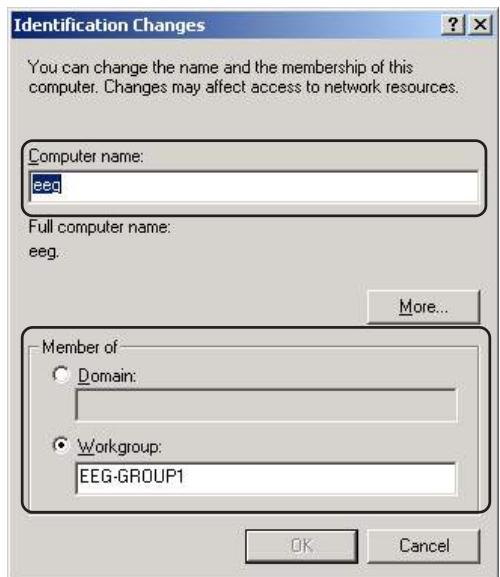
Do the following procedure to identify each instrument in the Windows Network. For the computer name and other identification settings, consult your network administrator.



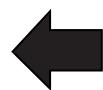
1. Right-click the My computer icon on the desktop. The pop-up menu opens.
2. Select Properties. The System Properties dialog box opens. You can also open the System Properties dialog box by double-clicking the System icon in Control Panel.
3. Click the Network Identification tab. The Network Identification page opens.
4. Click the Properties button. The Identification changes dialog box opens.

2. INSTALLATION

5. Type the computer name and domain or Workgroup name and click the OK button.



Enter the unique computer name in your local area network.



When changing the “Domain” and/or “Workgroup”, refer to the procedure in “Backing Up and Restoring the Settings in the System Program”.

Windows Network Settings

The following network settings are the minimum settings which are necessary to share a drive in the network. Other settings may be required depending on your network configuration.

Opening the Local Area Connection Properties

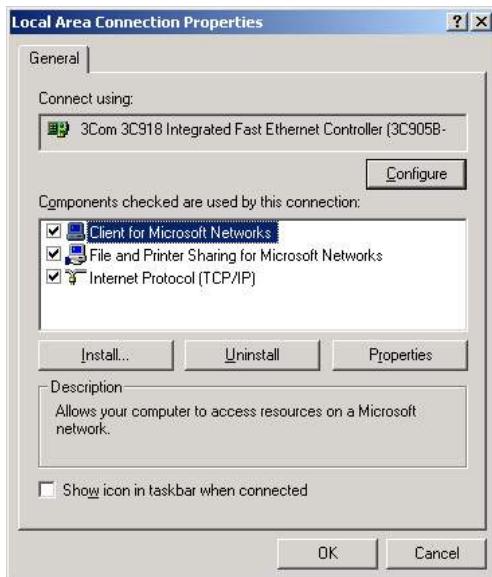
1. When a network interface controller is enabled in the BIOS setting, the Network Neighborhood icon appears on the left side of the Windows 2000 desktop. Right-click the Network Neighborhood icon. The pop-up menu opens.
 2. Select Properties. The Network and Dial-up Connections window opens. You can also open the Network and Dial-up Connection window by double-clicking the Network icon in the Control Panel.
 3. Right-click the Local Area Connection icon. The pop-up menu opens.
-

4. Select Properties. The Local Area Connection Properties opens.

5. Install the following three network components.
 - Client for Microsoft Network
 - File and Printer Sharing for Microsoft Networks:
refer to “Installing the File and Printer Sharing for Microsoft Network”
 - Internet Protocol [TCP/IP]:
refer to “Installing the Internet Protocol (TCP/IP)”.

Note

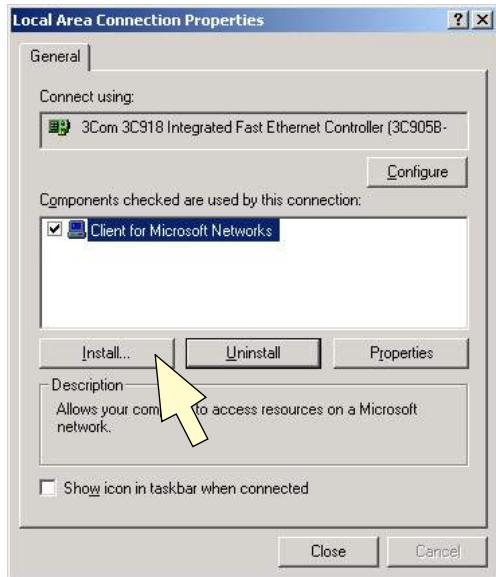
If network components other than the above three network components are installed, remove the other components.



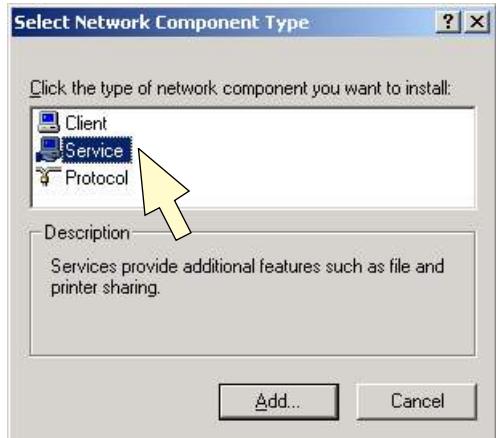
2. INSTALLATION

Installing the File and Printer Sharing for Microsoft Networks

1. In Local Area Connection Properties dialog box, click the Install button. The Select Network Component Type dialog box opens.



2. Select “Service” and click the Add button. The Select Network Service dialog box opens.

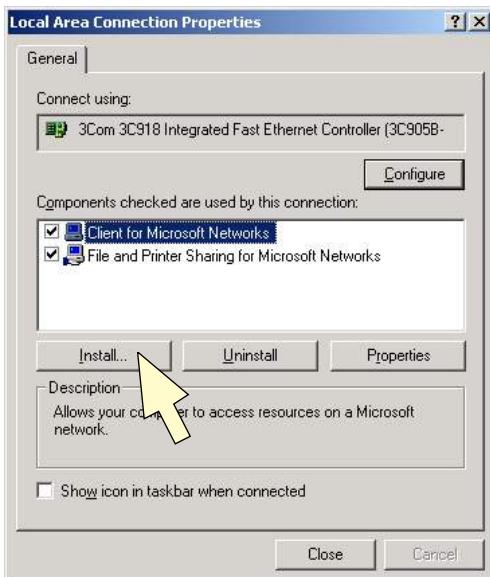


3. Select “File and Printer Sharing for Microsoft Networks” and click the OK button.

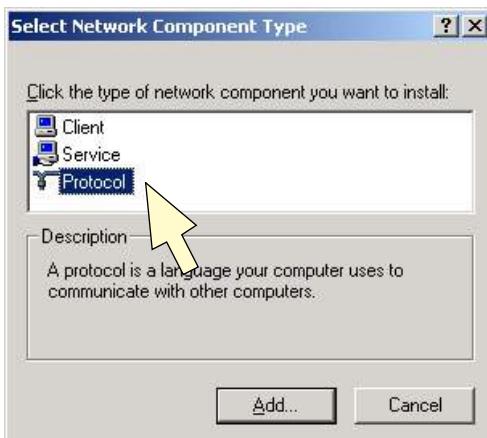


Installing the Internet Protocol (TCP/IP)

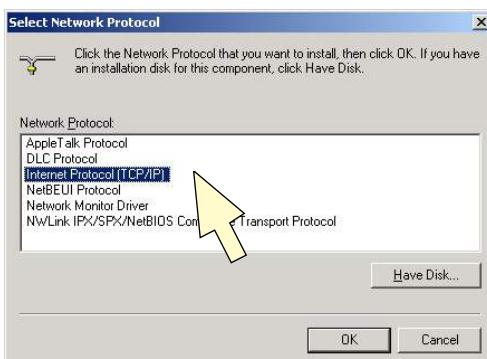
- In the Local Area Connection Properties dialog box, click the Install button. The Select Network Component Type dialog box opens.



- Select "Protocol" and click the Add button. The Select Network Protocol dialog box opens.

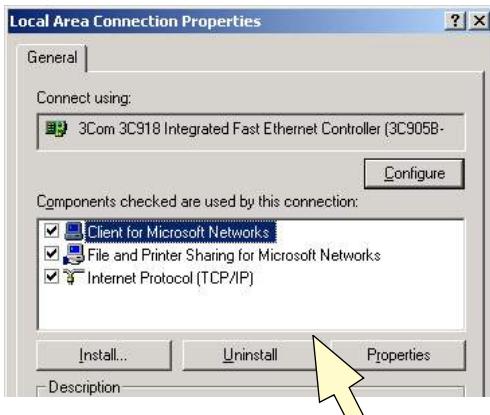


- Select "Internet Protocol [TCP/IP]" and click the OK button.



Uninstalling the Network Component

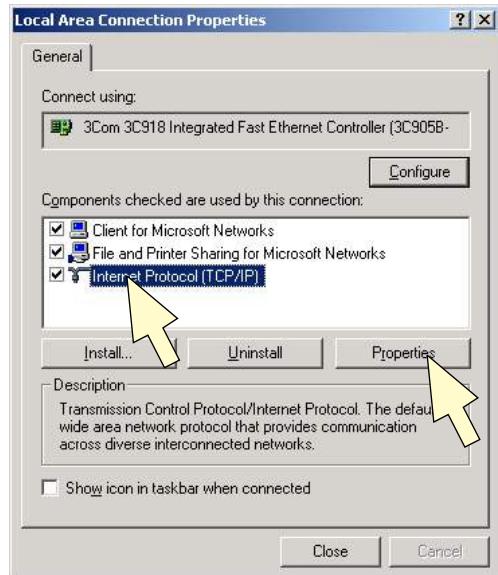
- In the Local Area Connection Properties dialog box, select the network component that you want to uninstall and click the Uninstall button. A confirmation message dialog box opens.
- Follow the message on the confirmation dialog box.



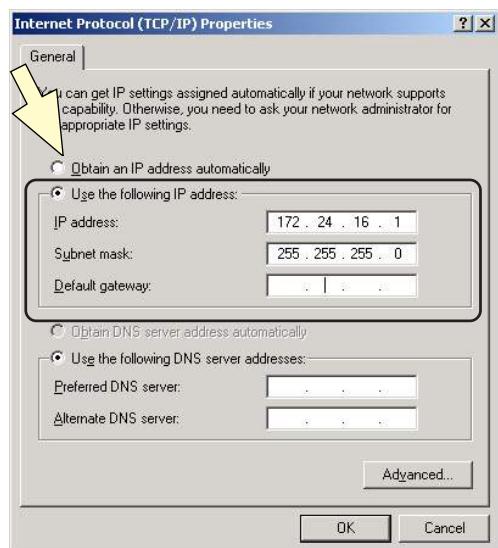
2. INSTALLATION

Setting the Internet Protocol (TCP/IP)

One IP address must correspond to only one instrument. For the IP address and other network settings, consult your network administrator.



1. In the Local Area Connection Properties dialog box, select “Internet Protocol [TCP/IP]” and click the Properties button. The Internet Protocol (TCP/IP) Properties dialog box opens.

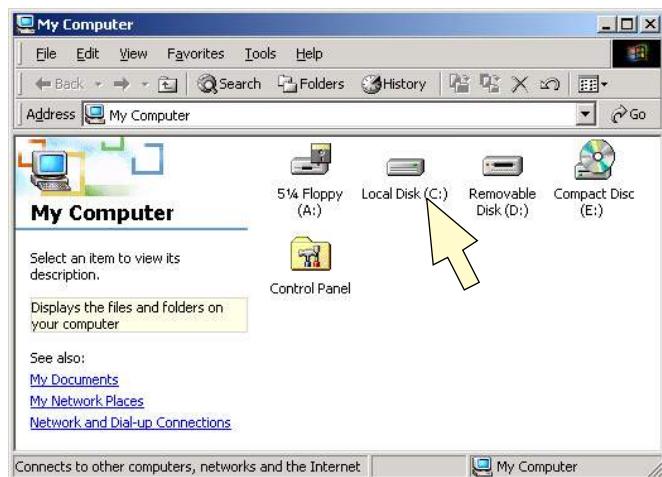


2. Check the “Use the following IP address” option button.

3. Type the IP address and Subnet mask and click the OK button.
If necessary, enter the Default gateway.

4. Restart the computer.

Sharing Drives for Data Storing



1. Double-click the My Computer icon on the desk. The My Computer window opens.

2. Right-click the Local Disk (C:) icon. The pop-up menu opens.

When sharing an MO disk drive, right-click the Removable Disk (D:) icon.

3. Select Sharing. The Sharing page of the Local Disk (C:) Properties dialog box opens.

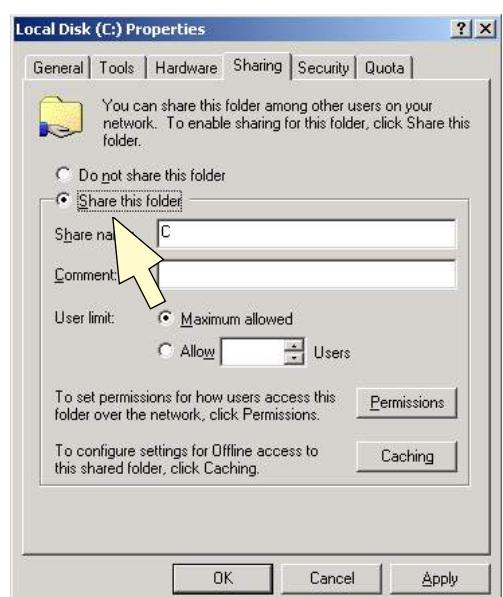


2. INSTALLATION



4. Click the “Do not share this folder” option button and click the Apply button.

Do this operation only when drive C can be selected as a drive to be shared. When sharing the MO disk drive, this operation is not necessary.



5. Click the “Share this folder” option button.
6. Type a comment in the Comment text box if necessary.
7. Click the OK button.
8. Repeat steps 2 to 7 for all data storage drives such as the MO disk drive.

General Requirements for Connecting in Medical Electrical Systems

When more than one electrical instrument is used, there may be electrical potential difference between the instruments. Potential difference between instruments may cause current to flow to the patient connected to the instruments, resulting in electrical shock (micro shock). Therefore, electrical instruments must be appropriately installed as specified in IEC60601-1-1.

The following is an excerpt from IEC60601-1-1 "Medical electrical equipment - Part 1-1: General requirements for safety - Collateral standard: Safety requirements for medical electrical systems". For details, refer to IEC60601-1-1 and consult with a biomedical engineer.

Examples of combinations of MEDICAL ELECTRICAL EQUIPMENT and non-medical electrical equipment

Situation No.	Equipment A	Equipment B	Solution
1	IEC 60601/X		OK
1a	IEC XXXXX		OK, if ENCLOSURE LEAKAGE CURRENT is less than 0.5 mA. If the ENCLOSURE LEAKAGE CURRENT is more than 0.5 mA: Solution Q (separating transformers).
2a	IEC 60601/X	IEC 60601/B	OK
2b	IEC 60601/F	IEC XXXXX	for B any one of P, Q, R
2c	IEC 60601/B	IEC XXXXX	for A solution P•for B any one of P, Q, R
3a	IEC 60601/X	IEC 60601/B	OK
3b	IEC 60601/F	IEC XXXXX	OK
3c	IEC 60601/B	IEC XXXXX	for A solution P
4	see 3a, 3b, 3c		
5a	IEC 60601/X	IEC 60601/B	for A solution P or S (groundloop possible)
5b	IEC 60601/X	IEC XXXXX	for A solution P or S (groundloop possible)
6a	IEC 60601/X	IEC 60601/X	OK (with S)
6b	IEC 60601/X	IEC XXXXX	OK (with S)

IEC 60601/B = IEC 60601-1 EQUIPMENT of TYPE B **with** PATIENT connection

IEC 60601/F = IEC 60601-1 EQUIPMENT of TYPE BF or TYPE CF (or TYPE B **without** PATIENT connection)

IEC 60601/X = IEC 60601-1 EQUIPMENT of TYPE B or TYPE BF or TYPE CF

IEC XXXXX = Equipment complying with e.g. IEC 348, IEC 950 etc.

P: additional protective earth

Q: additional separating transformer

R: floating power supply

S: separation

2. INSTALLATION

Situation No.	PATIENT ENVIRONMENT	Medical-use room	Non-medical use room
1	A PE		
2	A PE	B PE	
3	A PE		B PE
4	A PE		B PE
5	A PE		B (V) PE
6	A PE	> <	B (V) PE

Legend:

(V) = Potential difference between different localities.

>< = SEPARATION DEVICE.

PE = Protective earth.

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Power On Procedure

WARNING

Only use the 3-prong power cord with the instrument. Failure to follow this warning may cause electrical shock to the patient and operator.

CAUTION

- Discharge electrostatic energy before using the instrument.
Electrostatic energy may cause PC unit malfunction.
 - Operate the PC unit with AC power. The battery power is used for a sudden power loss or extreme power surge.
-

NOTE

- To perform the photic stimulation, the optional LS-901AJ/AK/AG Photo control unit is required. Before opening the Acquisition program, check the cable connection between the photo control unit and PC unit and power status of the photo control unit.
- When using the optional ZE-510AK Hyperventilation unit, the optional LS-901AJ/AK/AG Photo control unit is required. Before opening the Acquisition program, check the cable connection between the photo control unit and hyperventilation unit and the power status of the photo control unit.

3. PREPARATION

1. Before turning the power on, check the following items. If there is any damage or the instrument is suspected to be faulty as a result of checking, attach an “Unusable” or “Repair required” label to the instrument and contact your NK distributor or representative.

Check items before turning the power on

Overview:

- Instrument is not dirty, damaged or in contact with liquid.
- No label is peeled or torn.
- Power cord is not damaged.
- No key or switch is broken.
- No electrode is dirty or damaged.
- No electrode lead is frayed or damaged.

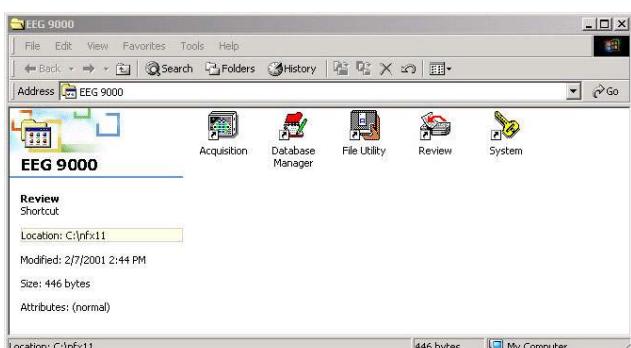
Connection and Setting:

- Power cord and ground lead are properly connected.
- Electrode junction box is properly connected to the PC unit.
- Photo control unit is properly connected to the PC unit.
- Flash lamp is properly connected to the photo control unit.
- Hyperventilation unit is properly connected to the photo control unit.
- Printer is properly connected to the PC unit
- Recording paper is loaded in the printer.
- External equipment is properly connected.
- Optional equipment is properly connected.

Accessories:

- Enough cleaned or sterilized electrodes.
- Enough EEG paste.
- Enough paper for the printer.
- Enough formatted magneto-optical disks. Make sure that MO disks are not write-protected

2. Turn the power on.
 - 1) Turn the power switch of the photo control unit, printer and/or MO disk drive to the ON position and turn on all the connected external instruments.
 - 2) Press the power button on the PC unit. The Windows 2000 opening screen appears and the “EEG 9000” window opens on the desktop.



CAUTION

- **Do not turn the instrument off while programs are running.**
 - **When turning the instrument off, follow the procedure in “Power Off Procedure”.**
-

NOTE

- **Do not use the power management function.**
- **Turn off any screen saver and close all application programs before opening the EEG-9000 application program. Otherwise, the EEG-9100 application program may not function properly.**

3. After turning the power on, check the following items.

Check items after turning the power on

- No fire, smoke or smell.
- No electrical shock when touching the instrument.
- Instrument is not too hot.
- Instrument does not affect surrounding equipment.
- All operation indicators light.
- There is no error message on the screen or malfunction.
- The screen display is correct.
- The clock display is correct.
- The mouse operates properly.
- All keys on the keyboard operate properly.
- All programs operate correctly.
- All settings (such as montage and amplifier settings) are correct.
- All storage devices operate correctly (hard disk drive and magneto-optical disk drive).
- All storage media have enough space to save EEG files (hard disk and magneto-optical disk).
- Magneto-optical disk is not write-protected.
- Printer operates correctly (paper feed, intensity, no jamming).
- Calibration waveform is properly displayed.
- No noise on the calibration waveform.
- Amplitude of the calibration waveform is correct.
- Optional equipment operates correctly.
- External equipment operates correctly.

3. PREPARATION

Opening the EEG-9000 Application Program

The EEG 9000 window opens after turning the power on. The EEG 9100 window contains the following icons.

- Acquisition (EEG measurement program)
- Review (EEG review program)
- System (System setting program)
- File Utility (File management program)
- Database Manager (Database management program)

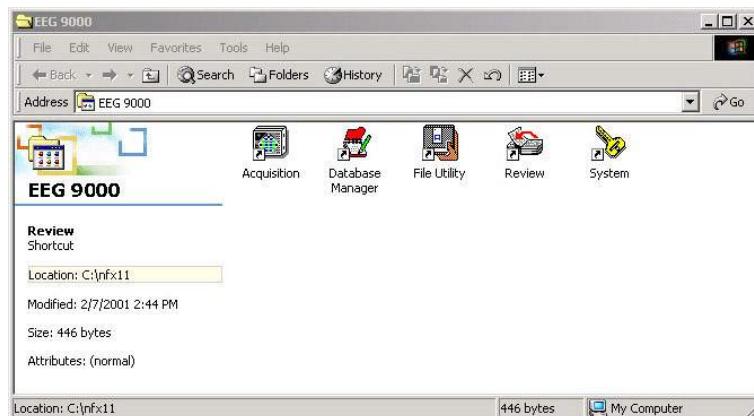
WARNING

When using the instrument for brain death diagnosis, before examination, check and adjust the date and time of the system. The date and time on the screen and on the recording result are part of important information for the medical record.

To set the date and time, refer to the Windows online help.

NOTE

Turn off any screen saver and close all application programs before opening the EEG-9000 application program. Otherwise, the EEG-9000 application program may not function properly.



Double-click an icon to open a program.

If the EEG 9000 window is not opened on the desktop, double-click the “EEG-9000” icon on the desktop.

Closing the EEG-9000 Application Program

There are three ways to close the program.

Using the File menu

1. Click File to open the pull down menu.

2. Click Exit. The program reduces to an icon.

Using the Close button

Click the Close button. The program reduces to an icon.

Using the Control menu icon

Double-click the Control menu icon (in the upper left corner). The program reduces to an icon.

CAUTION

Do not turn off the instrument while the program is running.

If the instrument is turned off while the program is running, the system program and data file saved on the hard disk and/or the magneto-optical disk may be damaged.

If the file is damaged, the saved data will be damaged and the program may not be run.

Power Off Procedure

1. Check the following before turning the power off.

Check items before turning the power off

- All necessary files are saved.
- All programs are closed.
The hard disk access lamp and MO disk access lamp are off.
- Magneto-optical disks are removed from disk drives.

2. Turn the power off.

With a mouse:

1) Exit all programs which are running. Refer to “Closing the Program”.

2) Click the Start button on the taskbar of the screen. The Start menu opens.



3) Click Shut down. The Shut Down Windows appears.



4) Check that “Shut down” is selected in the list box.

5) EEG-9100:

Click the OK button. The PC unit is automatically turned off.

EEG-9200:

Click the OK button. When the “It is now safe to turn off your computer” message appears, press the power switch of the PC unit to turn off the PC unit.

With a keyboard:

- 1) Exit all programs which are running. Refer to “Closing the Program”.
- 2) Press the Ctrl key and ESC key together. The Start menu appears.
- 3) Press the U key. The Shut Down Windows appears.
- 4) Check that “Shut down” is selected in the list box, then press the Enter key. Windows shuts down
- 5) EEG-9100:

Click the OK button. The PC unit is automatically turned off.

EEG-9200:

Click the OK button. When the “It is now safe to turn off your computer” message appears, press the power switch of the PC unit to turn off the PC unit.

3. Turn off the power of all the connected instruments.

4. Check the following items after turning the power off.

Check the following items for the next use

- Power of all external instruments is turned off.
- Instrument is not dirty, damaged or in contact with liquid.
- Power cord is not damaged.
- No key on the keyboard is broken.
- No electrode is dirty or damaged.
- No electrode lead is frayed or damaged.
- Enough electrodes.
- Enough EEG paste.
- Enough paper for printer.
- Enough formatted magneto-optical disk.
- Recording results and magneto-optical disk are properly stored.

Changing the Settings before Measurement

Setting Date and Time

For setting the date and time, refer to Windows online help.

WARNING

When using the instrument for brain death diagnosis, before examination, check and adjust the date and time of the system. The date and time on the screen and on the recording result are part of important information for the medical record.

Changing the Settings in the System Program

To set the date and time, refer to the Windows online help.

- Open the System program to change the followings settings, if necessary.
- EEG pattern setting
 - Automatic photic stimulation setting
 - Contents of the list of the Patient Information and Annotation dialog box
 - Settings in the System Program dialog box
 - Changing the DC input settings
 - Number of electrodes which are saved in a file.

These settings are saved in memory. The Acquisition program and Review program use these settings. These settings can be saved in a file or called up from the file.

Changing the Display Settings

The following display settings can be changed by changing the settings in the E11CFG.ini configuration file.

- Whether or not to display the same patient information of the previous measurement when the Acquisition program opens.
- Whether or not to operate the HV timer together with the ZE-510AK Hyperventilation Unit.
- Whether or not to display the Timer bar when the Activation bar opens.
- Whether or not to display the date and time on the Camera window (EEG-9200 only).
- Whether or not to display the same amplifier settings when you change the pattern.
- Vertical time scale color
- The transparent mode for the Patient Information dialog box
- The transparent mode for the “Not Filing” message on the Acquisition screen.

NOTE

- **When changing the settings in the Configuration file, close all EEG application programs.**
- **Before changing the settings, understand the changed result thoroughly. If the setting is incorrect, the instrument does not operate correctly.**

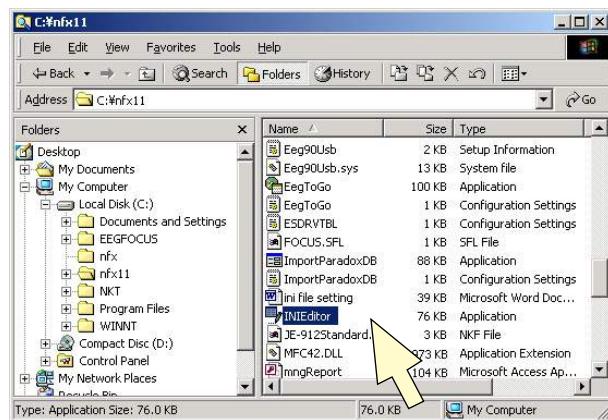
Key Name	Description
Common section	
ConditionFreeMode	Select “ON” to use the same amplifier settings when you change the pattern. (Default setting: OFF)
TimerMarkColor	Select the vertical time scale line color with R, G, and B. 255, 255, 0: yellow (Default setting) 0, 255, 0: green
Acquisition section	
PatientDlgOnNew	Contents of the Patient Information dialog box when the Acquisition program opens. NotClear: Displays the same patient information of the previous measurement. (Default setting) Clear: No patient information is displayed. OFF: Does not display the Patient Information dialog box.
HvTimerLinkMode	When using the ZE-510AK Hyperventilation Unit, the HV timer can operate together with the hyperventilation unit. 0: Does not operate. (Default setting) 1: Operates.
OpenCloseLinkPhotoAndTimer	The Timer bar can be displayed when the Activation bar opens. 0: Not displayed. (Default setting) 1: Displayed.
ShowTimeInCameraWnd (EEG-9200 only)	Select “1” to display the date and time on the Camera window. 0: Not displayed. 1: Displayed. (Default setting)
AlphaBlending section	
AcqPatientDlg	The transparent mode for the Patient Information dialog box on the Acquisition screen. The dialog box is thicker when you select a value closer to “0”. 255: Not transparent. (Default setting)
RevPatientDlg	The transparent mode for the Patient Information dialog box on the Review screen. The dialog box is thicker when you select a value closer to “0”. 255: Not transparent. (Default setting)
StorageDlg	The transparent mode for the “Not Filing” message on the Acquisition screen. The dialog box is thicker when you select a value closer to “0”. (180: Default setting) 255: Not transparent.

3. PREPARATION

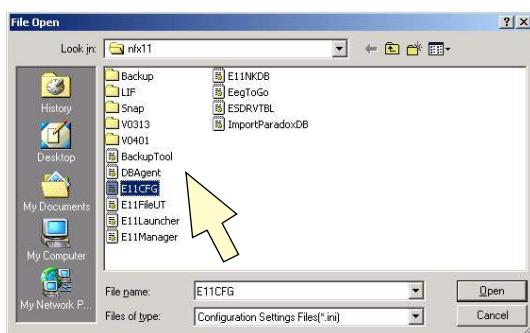
1. Right-click the My Computer icon on the desktop. The pop-up menu opens.



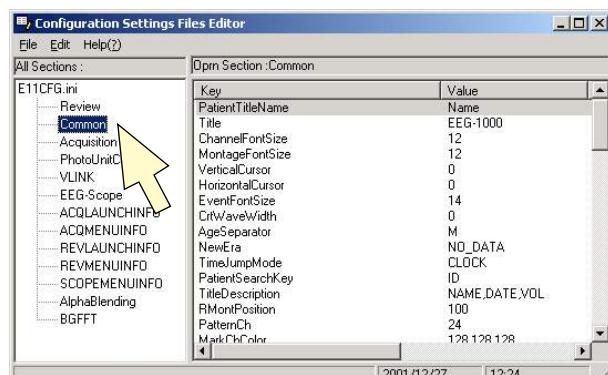
2. Select Explore. The My Computer window opens.



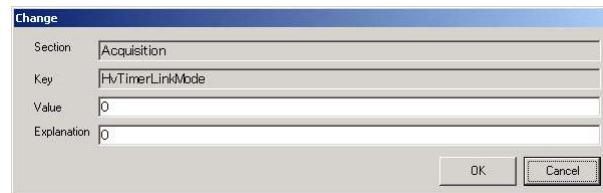
3. Double-click the **C:\nfx11\INIEditor.exe** file. The File Open dialog box opens.



4. Double-click the **E11CFG.ini** file. The Configuration Settings File Editor window opens.



5. Double-click the item that you want to change. The Change dialog box opens.



6. Type the new setting in the Value text box and click the OK button.

To cancel changing click the Cancel button.

Setting the Default Settings of the Search Items

You can select the default settings of the search items, such as a keyword or searching range for the examination date, etc. in the Open dialog box of the Review program and in the Database Manager dialog box of the Database Manager program by changing the settings in the E11Launcher.ini configuration file and E11NKB.ini configuration file..

NOTE

When changing the settings in the Configuration file, close all EEG application programs.

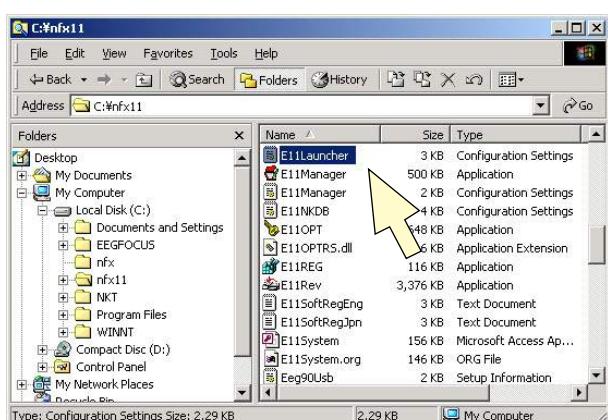
Setting a Keyword Default Setting

1. Right-click the My Computer icon on the desktop. The pop-up menu opens.

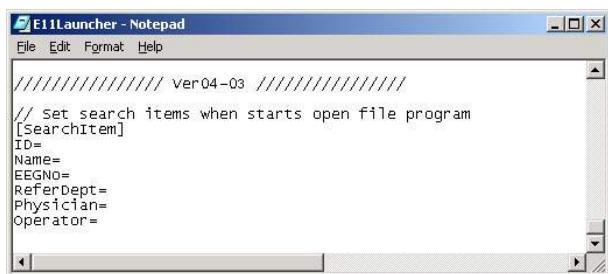


2. Select Explore. The My Computer window opens.

3. Double-click the C:\nfx11\E11Launcher.ini file. The E11Launcher.ini file opens in the Notepad.



4. Type the keyword for the following items in the Ver04-03 - SearchItem section.



/// Ver04-03 ///

// Set search items when starts open file program
[SearchItem]

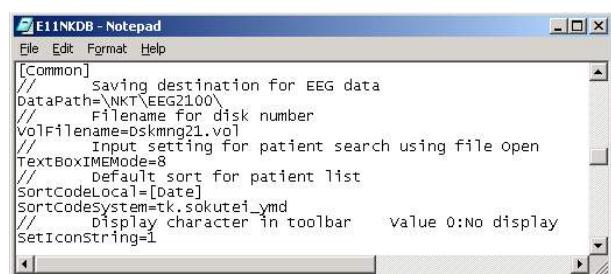
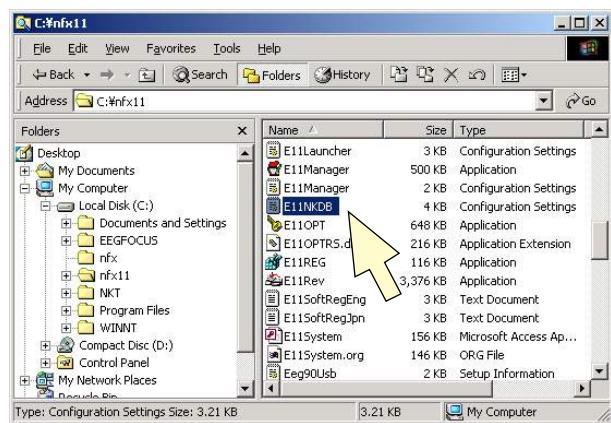
ID=
Name=
EEGNo=
ReferDept=
Physician=
Operator=

5. From the File menu, select Save and close the Notepad. The new settings overwrite the current settings.

3. PREPARATION

Setting the Searching Range for the Examination Date

1. Right-click the My Computer icon on the desktop. The pop-up menu opens.
2. Select Explore. The My Computer window opens.
3. Double-click the C:\nfx11\E11NKDB.ini file. The E11NKDB.ini file opens in the Notepad.



4. Change the settings of the following items in the Common section as follow to set the searching range for the examination date.

[Common]

```
// Duration for date search using File open and Database Manager
FromDate=m,-3
ToDate=m,0
// Set search date condition when starts
DateSearch=True
```

Example: Searching for the examination date from 3 month before to today

From Date=m,-X: Selects the beginning of the search range for the examination date (from X months before)
 To Date=m,Y: Selects the end of the search range for the examination date (To X months after)

For d (day), yyyy (year) can be used instead of m (month)

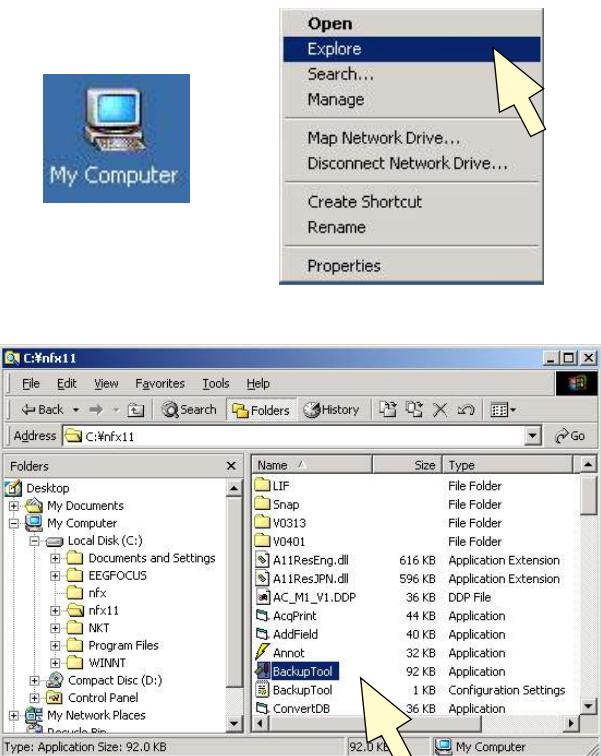
5. From the File menu, select Save and close Notepad. The new settings overwrite the current settings.

Backing Up the System Files

You can back up the system files to prevent sudden loss of the files when the hard disk is damaged.

NOTE

When backing up the files, close all EEG application programs.



1. Right-click the My Computer icon on the desktop. The pop-up menu opens.

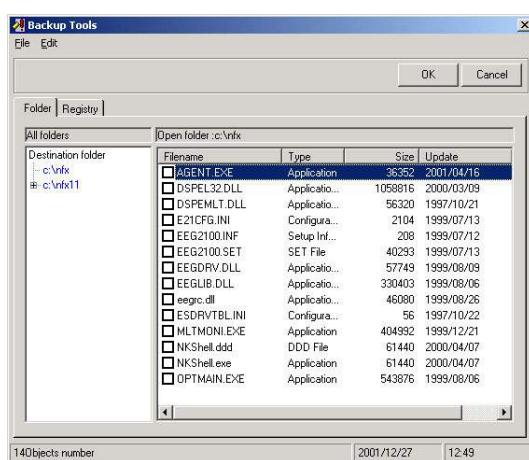
2. Select Explore. The My Computer window opens.

3. Double-click the C:\nfx11\BackupTool.exe file. The Backup Tools dialog box opens.

4. Select the files to back up.

To back up all files:

Select All from the Edit menu.



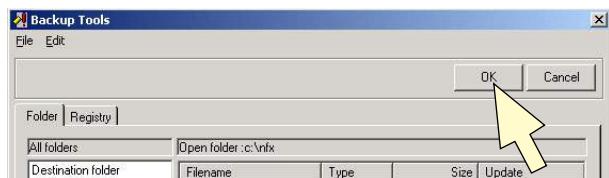
To back up files by specifying the extensions:

- 1) Select file type from the Edit menu. The sub-menu opens.
- 2) Select the extension.



Check marks appear beside the selected files.

3. PREPARATION



5. Click the OK button. The Browse for Folder dialog box opens.

To cancel backup, click the Cancel button.

6. Select the drive or folder and click the OK button.

To cancel backup, click the Cancel button.

7. From the File menu, select Exit to close the Backup Tools dialog box.

Importing System Program Settings and Patient Files from an EEG-2100/2110 Electroencephalograph

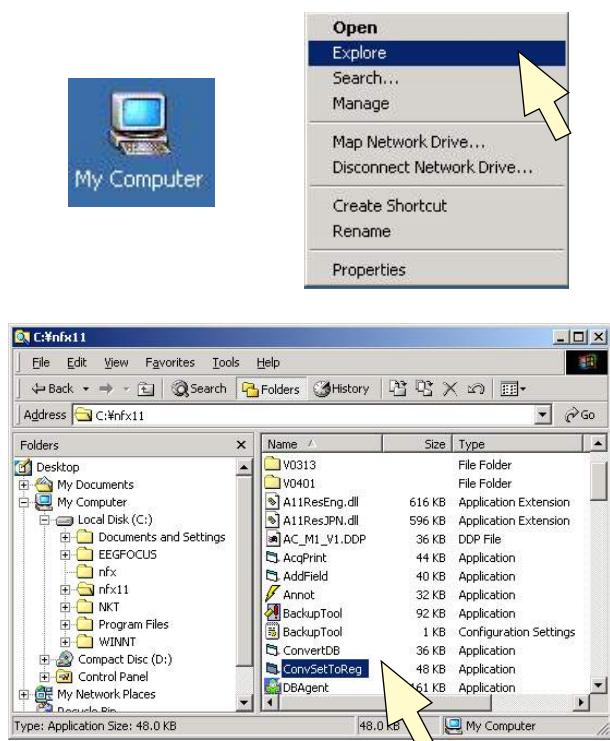
The system program settings and registered patient files in the database of the EEG-2100A/J/K/G, EEG-2110A/J/K/G electroencephalograph can be used in this instrument.

NOTE

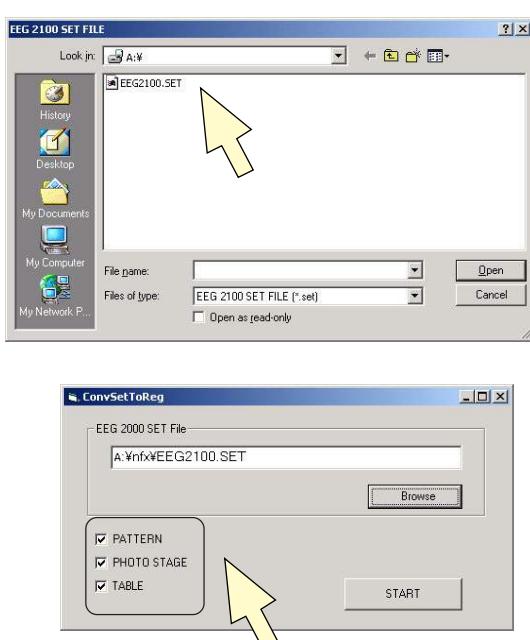
When importing a file, close all EEG application programs.

Importing the System Program Settings

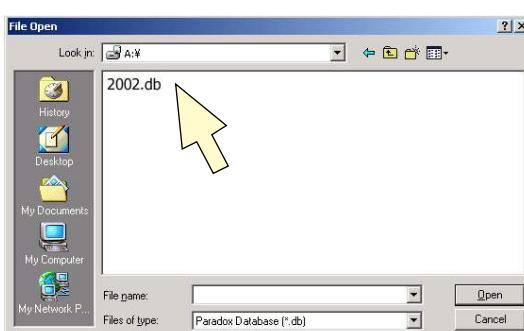
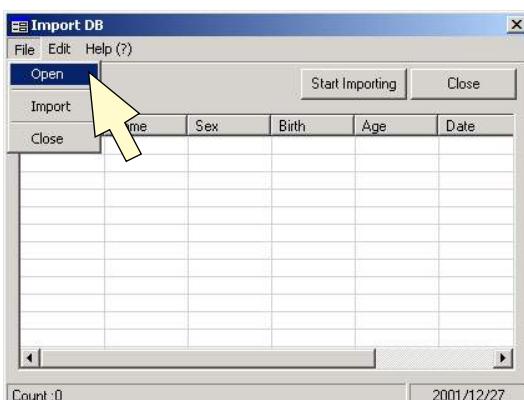
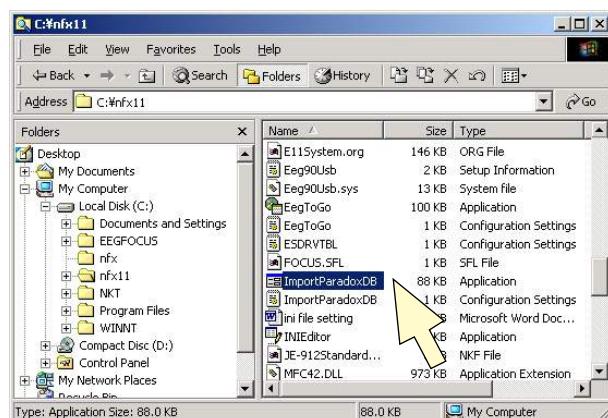
1. In the EEG-2100A/J/K/G, EEG-2110A/J/K/G electroencephalograph, save the system program settings in a floppy disk. Refer to “Saving the System Program Settings in a File” in the System Program section of the EEG-2100 or EEG-2110 Operator’s manual.
2. Insert the floppy disk into the floppy disk of the instrument.
3. Right-click the My Computer icon on the desktop. The pop-up menu opens.
4. Select Explore. The My Computer window opens.
5. Double-click the C:\nfx11\ConvSetToReg.exe file. The ConvSetToReg dialog box opens.



6. Click the Browse button. The EEG 2100 SET FILE dialog box opens.
7. Select the system program setting file (extension: set) in drive A and click the Open button.
8. Select the option from “PATTERN”, “PHOTO STAGE” and “TABLE”.
9. Click the START button.

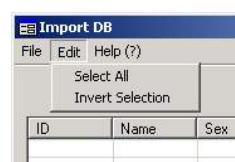


3. PREPARATION



Importing the Registered Patient Files in the Database

1. In the EEG-2100A/J/K/G, EEG-2110A/J/K/G electroencephalograph, save the system program settings in a floppy disk. Refer to "Saving the Current Database on Disk" in the Database Manager Program section of the EEG-2100 or EEG-2110 Operator's manual.
2. Insert the floppy disk into the floppy disk of the instrument.
3. Right-click the My Computer icon on the desktop. The pop-up menu opens.
4. Select Explore. The My Computer window opens.
5. Double-click the C:\nfx11\ImportParadoxDB.exe file. The Import DB dialog box opens.
6. Select Open from the File menu. The FileOpen dialog box opens.
7. Select the database file (extension: db) in drive A and click the Open button. The patient files are displayed in the list.
8. Select the patient file. To select all files, Select Select All from the Edit menu.
9. Click the Start Importing button.
10. Close the Import DB dialog box.



Formatting an Magneto-optical Disk, CD-R Disk and CD-RW Disk

General

When using a magneto-optical disk, CD-R disk or CD-RW disk for the first time, you must format it and assign a volume number.

- To format the MO disk and assign the volume to the MO disk, use the File Utility program.
- To format the CD-R disk and CD-RW disk, use the provided CD recording software. You can assign the volume number with the File Utility program. The CD recording software and CD-RW disk drive is provided as a standard for the EEG-9200A/J/K/G Electroencephalograph.

Disk Capacity

The file capacity of the hard disk and formatted magneto-optical disk depends on the sampling rate and the number of electrodes stored. If either decreases, the file capacity increases.

The following tables assume 30 minutes per patient recording.

25 electrodes and 2 mark channels for 30 minutes' recording

	Sampling frequency			
	2,000 Hz	1,000 Hz	500 Hz	200 Hz
1 GB	2.6 hours (5.1 files)	5.1 hours (10.3 files)	10.3 hours (20.6 files)	25.7 hours (51.4 files)
18 GB HD (EEG-9200)	46.8 hours (91.8 files)	91.8 hours (185.4 files)	185.4 hours (370.8 files)	462.6 hours (925.2 files)
680 MB CD-R	1.7 hours (3.4 files)	3.4 hours (7.0 files)	7.0 hours (14 files)	17.4 hours (34.9 files)
4.1 GB MO	10.5 hours (21.1 files)	21.1 hours (42.2 files)	42.2 hours (84.4 files)	105.5 hours (210.9 files)

Disk capacity

Recording time (hours) = _____

No. of saved electrodes and mark channels × Sampling frequency × 2 bytes × 60 s × 60 min

3. PREPARATION

Formatting a Magneto-optical Disk, CD-R Disk and CD-RW Disk

Formatting a Magneto-optical Disk

After formatting the MO disk, assign the volume number. Refer to “Assigning a Volume Number to a Magento-optical disk, CD-R Disk and CD-RW Disk” in this section.

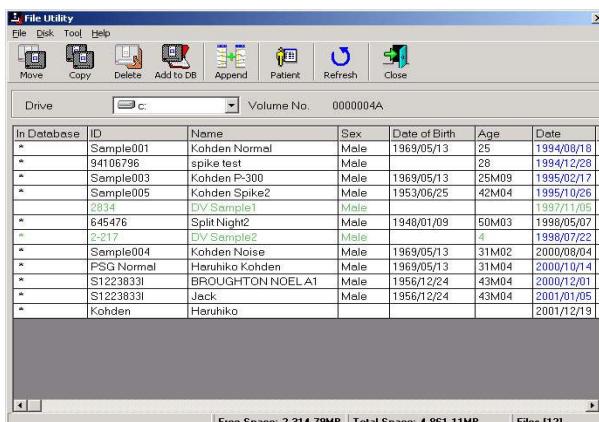
CAUTION

This procedure deletes all data from the disk.

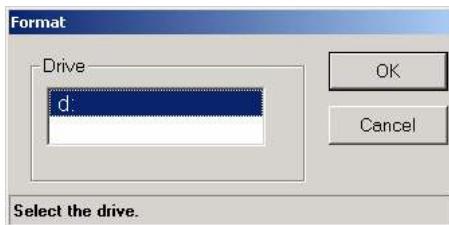
NOTE

- Format a magneto-optical disk only by the Format command of the File Utility program. A magneto-optical disk which is formatted by another formatting function cannot be used. This command is not available for formatting a CD-R disk and CD-RW disk.
- When the MO disk has double sides (5 inch MO disk), format both sides of the magneto-optical disk individually.
- Assign a volume number to each side of the magneto-optical disk.
- After formatting or assigning a volume number to a magneto-optical disk, run Check Disk on the magneto-optical disk to check that the data can be properly saved. Refer to Section “Checking for Disk Damage Using Check Disk”.

1. Double-click the File Utility icon in the EEG 9000 window. The File Utility dialog box opens.

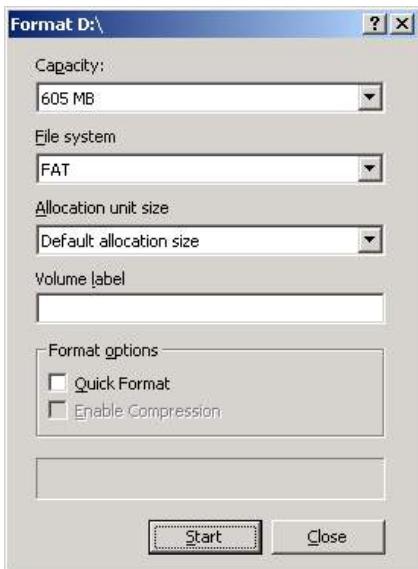


2. From the Disk menu, select Format. The Format (drive selection) dialog box opens.



3. Select the drive where the MO disk is inserted.
4. Click the OK button. The Format dialog box opens.

To cancel formatting, click the Cancel button.



CAUTION

When formatting the MO disk, do not change the Capacity, File system and Other options in the Format dialog box. For File system, only select “FAT”.

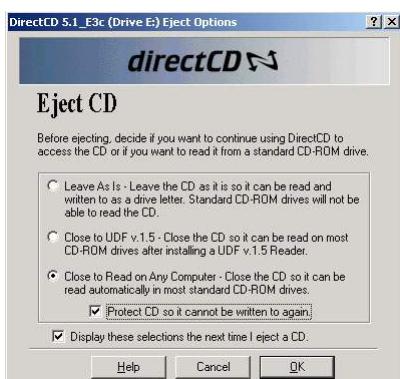
5. Click the Start button. The formatting starts
6. When the formatting is complete, click the Close button.
7. Refer to the next section to assign a volume number to the disk.

Formatting a CD-R and CD-RW Disk

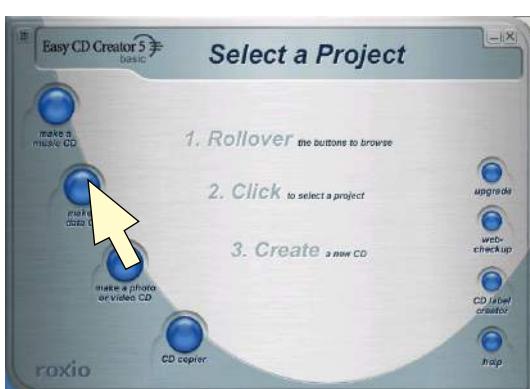
You can back up the saved EEG data file in a CD-R or CD-RW disk. To use the CD-R or CD-RW disk for the first time, format it with the provided Direct CD Software (Easy CD Creator 5® Basic, EEG-9200 only) or compatible CD recording software. After formatting, assign the volume number to the CD-R or CD-RW disk. Refer to “Assigning a Volume Number to a Magneto-optical disk, CD-R Disk and CD-RW Disk” in this section.

NOTE

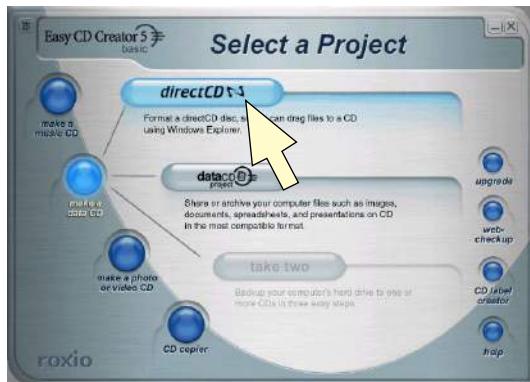
- Before starting format, close all Windows applications
- The Format command (File Utility program → File menu) is not available to format a CD-R disk and CD-RW disk.
- Do not select the storage drive to the CD-RW disk drive (System program → System Settings dialog box - General Page → Data storage area).
- When almost file space is used, close the CD-R disk to read it in most standard CD-ROM drive (Select the “Close to Read on Any Computer ...” option on the directCD Eject Options dialog box).



1. Double-click the Easy CD Creator 5 Basic icon on the desktop. The Easy CD Creator 5 Select a Project dialog box opens.
2. Move the mouse pointer to the make data CD button.



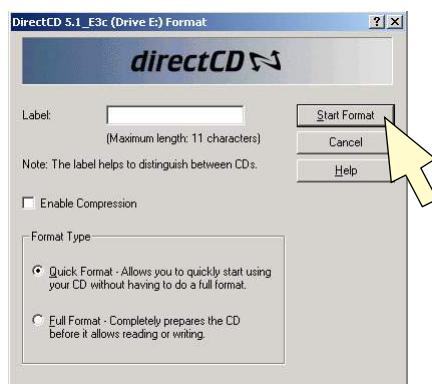
3. PREPARATION



- Click the directCD button. The directCD format utility dialog box opens.

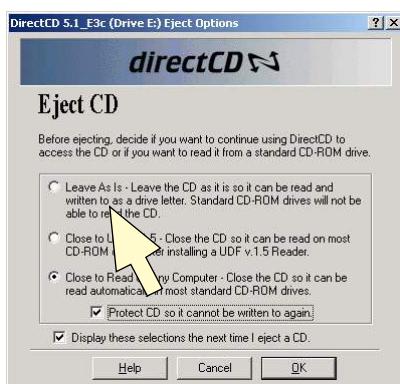


- Click the format button. The directCD - Format dialog box opens.



- Type the CD label and click the Start Format button.

- Follow the instructions in the dialog box.



- When you click the eject button on the directCD format utility dialog box or press the eject button on the CD-RW disk drive to remove the formatted CD-R or CD-RW disk, the Eject Options dialog box opens. Select “Leave As Is - ...” option and click the OK button.

- Leave As Is:

Select when the data will be written to the CD-R disk in the future. The CD-R disk remains as direct-CD format. Most CD-ROM drives cannot read this CD-R disk.

- Close to UDF v.1.5: Not used

- Close to Read on Any Computer:

Select and Check the “Project CD so it cannot be written to again.” check box when the CD-R disk is almost full and you will not need to write more data to this CD-R disk. Any CD-ROM drive can read this CD-R disk.

Assigning a Volume Number to a Magneto-optical Disk, CD-R Disk and CD-RW Disk

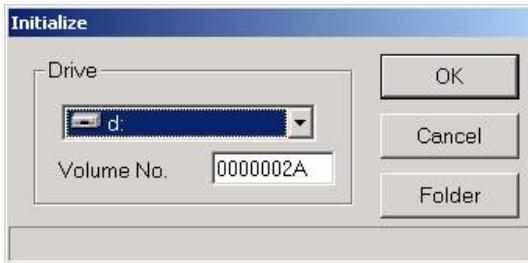
Do the following procedures to assign a volume number to a magneto-optical disk, CD-R disk or CD-RW disk. Each disk has an individual volume number which is used by the Database Manager program to keep track of files. The volume number is automatically incremented.

NOTE

- If a disk with no volume number is used, a volume number is automatically assigned when the Acquisition program opens or EEG waveforms are saved to the disk in the Review program. However, we strongly recommend assigning a volume number immediately after formatting. If you do not assign a volume number, it will be hard to keep track of which files are on which disks.
- When the MO disk has double sides, assign different volume numbers to both sides.

When installing two or more instruments in an area or connecting the instrument to a network with other NK digital EEGs (EEG-1100, EEG-2100/2110, PC with QP-223A/AK or QP-111AJ/AK acquisition program kit), assign a different disk volume number for each instrument and check that each instrument has a different serial number setting. The default disk volume number is “A”. Refer to “General - Writing Down the File and MO Settings Before PC Unit or Hard Disk Replacement” in Section 7 of the EEG-9100/9200 Service manual.

1. Double-click the File Utility icon in the EEG-9000 window. The File Utility dialog box opens.
 2. From the Disk menu, select Initialize. The Initialize dialog box opens.
- 
- Drive


3. Click the Drive box arrow. The list box of the selectable drives is displayed.
 4. Click the drive name that you want to assign a new volume number to. The new volume number is automatically displayed on the dialog box. If the disk already has a number, a message appears. You can change the volume number by typing the volume number in the Volume No. text box.

You can also assign a volume number to any folder. To select the folder, click the Folder button. The system program saves EEG data files in the NKT\EEG2100 folder in the drive selected in the Storage drive option (System program → System Setting dialog box → General page → Data Storage Area) after waveforms acquisition. For a destination folder to back up or copy EEG data files, only use the folders that have a volume number.

3. PREPARATION

5. Write down the new volume number on the label.
6. Click the OK button. The Confirmation dialog box is displayed. The number displayed on the table is assigned to the selected disk.
7. To assign the number, click the OK button.
To cancel, click the Cancel button.

After assigning the volume number, the dialog box closes.

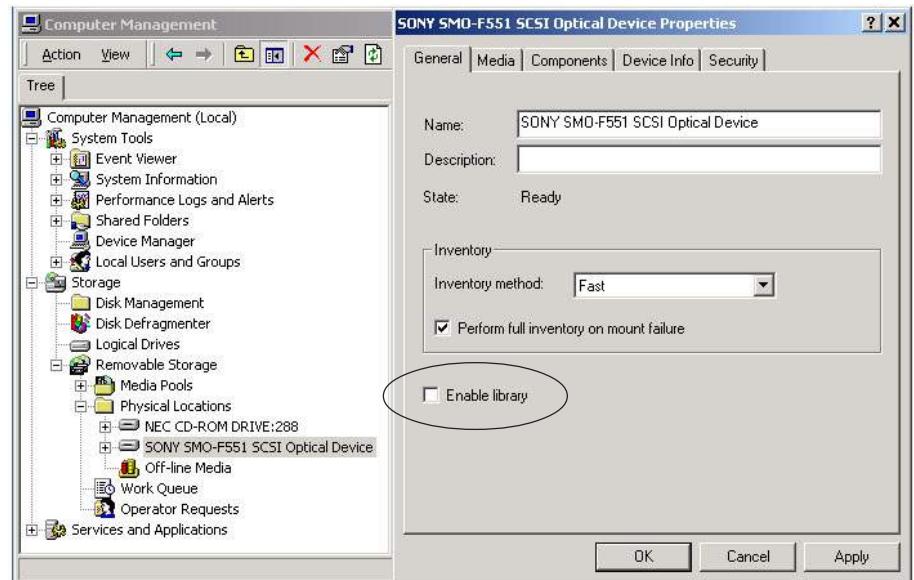
8. Remove the magneto-optical disk and attach the label to it.
9. Close the File Utility program.

Setting the Properties for 5 inch Magneto-optical Disks

NOTE

If a 5-inch MO disk is inserted into an MO disk unit and the power is turned on, you cannot remove the MO disk by pressing the eject switch on the MO disk unit. You can remove the MO disk from the Explore or My computer but the removed MO disk is not recognized by Windows 2000 and EEG-9000 system when the MO disk is inserted. The MO disk is recognized by Windows 2000 and the EEG-9000 system when the MO disk is removed and inserted again or the next time the power is turned on. To prevent this trouble, do the following. This trouble does not occur for a 3.5 inch MO disk.

1. Right-click the My computer icon on the desktop. The pop-up menu opens.
2. Select Manage. The Computer Management window opens.
3. Right-click a 5 inch optical device (Storage → Removable Storage → Physical Locations). The Optical Device Properties opens.



Example: SONY SMO-F551 SCSI MO disk drive

4. Uncheck the Enable library check box on the General tab.
5. Click the Apply button.
6. Close the Computer Management.

Checking for Disk Damage Using Check Disk

Run Check Disk once a month, or whenever your system has a problem, to check, diagnose and repair damage on the hard disk or magneto-optical disk.

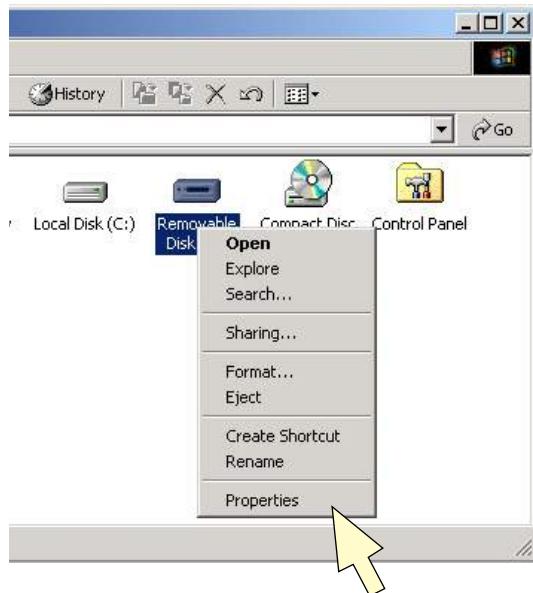
NOTE

- After formatting or assigning a volume number to a magneto-optical disk, run Check Disk on the magneto-optical disk to check that data can be properly saved.
- To check the CD-R/CD-RW disk, use the Scaan Disk function of the Direct CD utilities (EEG-9200 only).

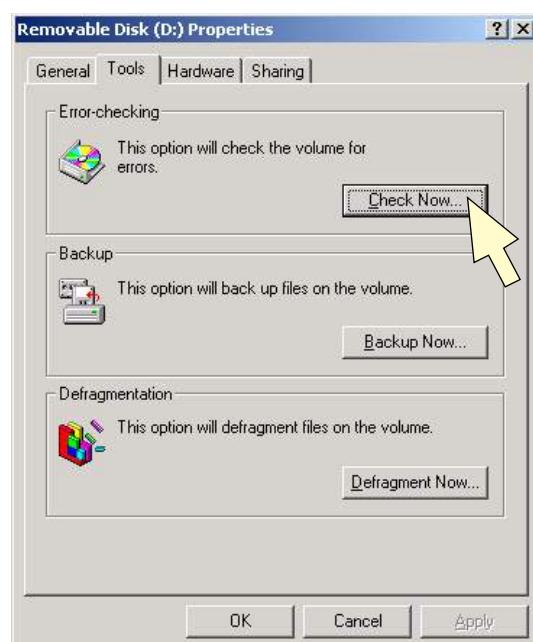


1. Double-click the My Computer icon on the desktop. The My Computer window opens.

2. Right-click the drive icon that you want to check. The pop-up menu opens.



3. Select Properties. The Properties sheet opens.



4. Click the Tools tab. The Tools page opens.

5. Click the Check Now button in the Error-checking area. The Check Disk dialog box opens.



6. Click the Start button.

We recommend that you do not select any options.

To cancel checking, click the Cancel button.



7. During the disk check, if an error is found, a dialog box opens to fix the error. Follow the instructions on the dialog box.



8. When the disk check is complete, the Checking Disk dialog box opens. Check the contents and click the OK button.

Checking for Disk Damage Using Scan Disk (EEG-9200 Only)

Run Scan Disk to check, diagnose and repair damage on the CD-R/CD-RW disk. This function is only available for the EEG-9200A/J/K/G Electroencephalograph.

NOTE

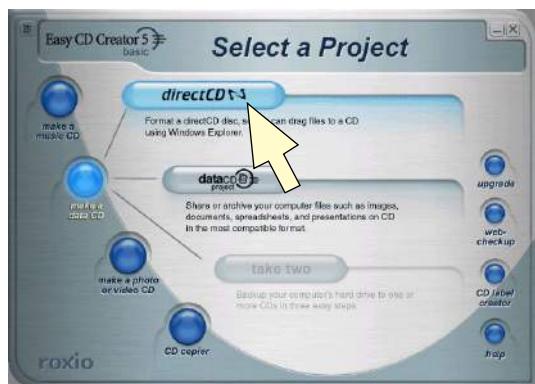
After formatting or assigning a volume number to a CD-R/RW disk, run Scan Disk on the CD-R/CD-RW disk to check that data can be properly saved.

1. Double-click the Easy CD Creator 5 Basic icon on the desktop. The Easy CD Creator 5 Select a Project dialog box opens.

2. Move the mouse pointer to the make data CD button.



3. Click the direct CD button.



4. Click the CD utilities button. The direct CD - Utilities dialog box opens.



3. PREPARATION

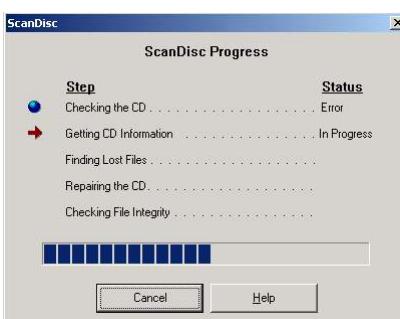


5. Click the ScanDisk button. The ScanDisk dialog box opens.



6. Click the Scan button. We recommend that you do not select any options.

To cancel checking, click the Cancel button.



7. During the disk check, if an error is found, a dialog box opens to fix the error. Follow the instructions on the dialog box.



8. When the scan disk is complete, the Done button is displayed. Check the contents and click the Done button.

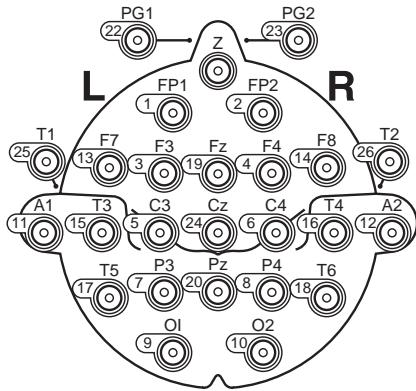
Preparing the Electrodes

Guidelines for Input Jack Use

You must follow these guidelines to obtain correct EEG recordings.

Required Electrodes

Do not perform EEG measurement without the Z, C3, C4, A1 and A2 electrodes.



Input Jack Z

Connect the lead from the electrode (Z electrode) attached on the patient's nasion to input jack Z on the electrode junction box. This input jack is used to eliminate AC interference.

The input jack Z is also used for checking electrode impedance.

Input Jacks C3 and C4

The C3 and C4 electrodes are the system reference electrodes for EEG measurement. Input jacks C3 and C4 must be used for EEG measurement even if C3 and C4 are not programmed in any montage.

Connect the leads from the electrodes on positions C3 and C4 to input jacks C3 and C4, respectively.

Input Jacks A1 and A2 (or FP1 and FP2)

The A1 and A2 (or FP1 and FP2) electrodes are the reference electrodes for skin-electrode impedance check. Input jacks A1 and A2 (or FP1 and FP2) in addition to Z, C3 and C4 must be used for the electrode impedance check.

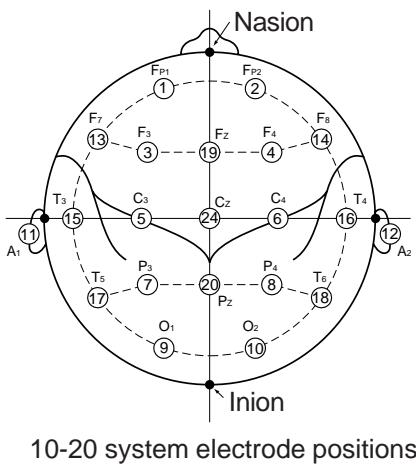
When checking electrode impedance, connect the leads from the electrodes on positions A1 and A2 to input jacks A1 and A2, respectively.

Checking Original Electrode Potentials for All Active Electrodes

Check the original electrode potential for all active electrodes by programming a montage with the system reference (Select the 0 V button for reference electrode on the Montage dialog box). Refer to "Programming Patterns" in Section 4.

The digital EEG displays the EEG waveform in each channel by subtracting two electrode potentials selected to a montage. The subtracted result will be incorrect, if the electrode attachment is not correct, the original electrode potential is flat, or unstable or artifact is superimposed on the original electrode potential. Omit the measurement result if the displayed EEG waveform is incorrect.

Introduction to Electrode Position, Derivation and Montage



Electrode Position

There are various systems of electrode position, such as Illinois, Montreal, Aird, Cohn, etc. Of these, the International 10-20 system, shown below, is currently the most common. Each system has a different number of electrodes and different electrode locations. To compensate for different sized heads, the distances between electrodes are given as ratios.

After determining the electrode position system, measure the head of the patient and calculate the electrode positions according to the distance ratio between each electrode position. The number of electrodes should be reduced for EEG recording on infants and little children.

Derivation

Derivation is the electrode combination for one channel. All derivations have two electrodes: reference and active. In monopolar derivation, one “electrode” can be several physical electrodes connected together. There are 3 kinds of derivations.

Monopolar Derivations (Referential Derivation)

In the monopolar derivation, one electrode is common to all channels and regarded as electrically inactive (“reference electrode”). Each amplifier has two inputs (G1 and G2). The reference electrode is connected to the G2 (+) input of the amplifier and the active electrode is connected to the G1 (-) input.

Monopolar Derivations Using Ear Reference Electrodes:

- Normal Monopolar Derivation
Left ear for left hemispheric derivation and the right ear for right hemispheric derivation.
- A1 + A2
Shorting both ears (in the electrode junction box).
- A1 → A2 or A1 ← A2
Only one ear.
- A1 ↔ A2
Left ear for right hemispheric and right ear for left hemispheric derivation.

Monopolar Derivations Using Other Site Reference Electrodes:

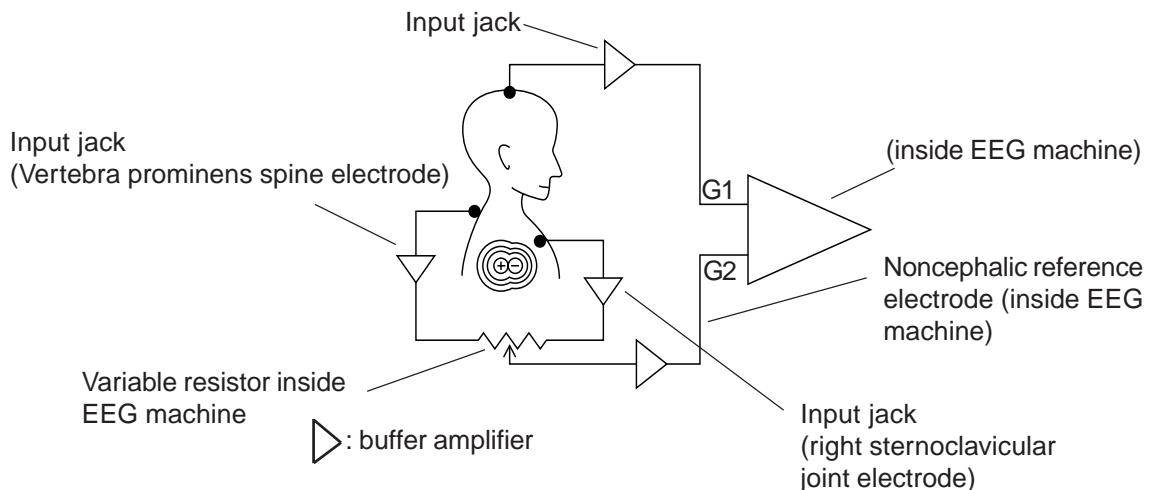
- Vx (Vertex reference derivation)
Mid-line central position Cz as the reference electrode.
- AV (Average reference derivation)
All electrodes for the EEG waveform acquisition are connected by resistors to one averaged point which is the AV reference electrode.

If one or more of the electrodes in the AV electrode contain ECG artifact, or two or more electrodes show simultaneous abnormal potentials, you need to exclude any unstable electrodes.

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BN (Balanced Noncephalic Reference) Derivation

An electrode on the vertebra prominens spine and an electrode near the right sternoclavicular joint are connected by a variable resistor to form a noncephalic reference electrode. The variable resistor lets you balance the ratio of these two electrode signals in order to minimize the ECG. You can use any three input jacks.



BN derivation

This derivation is not available for this instrument when acquiring the EEG waveforms and reviewing the EEG data file which were acquired and saved in this instrument.

Bipolar Derivation

Electrode pairs are connected to the G1 and G2 inputs of channels. The potential difference between two electrodes is recorded on each channel.

T1 and T2 Electrodes

The T1 and T2 electrodes are placed on a line 1/3 of the distance from the external acoustic pore to the lateral orbital margin.

PG1 and PG2 Electrodes

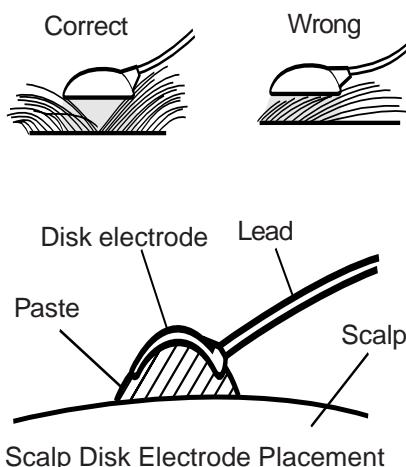
PG1 and PG2 are the pharyngeal electrodes. A silver ball electrode on the tip of a thick copper stick is inserted from the nasal foramen and the silver ball electrode is attached at the rhinopharynx posterior. The EEG of the brainstem, internal temporal lobe and posterial frontal lobe can be recorded.

Montage (Pattern)

Montage is the combination of derivations for all channels. The instrument contains 36 patterns per set file and you can program a different montage and other settings for each pattern.

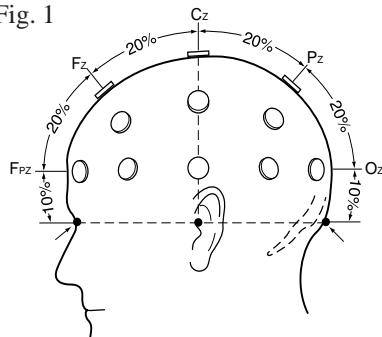
Attaching the Electrodes to the Patient

EEG Scalp Disk Electrodes



- Clean the area where the electrodes are to be mounted with a gauze pad moistened in alcohol or a medical soap solution to remove oil from the skin. Wipe the site with dry gauze.
- Apply a small amount of EEG paste to a 1 cm diameter circle on the cleaned skin. Avoid spreading the paste too thin or creating too large a space.
- Apply a small amount of paste to the disk electrode, and press the electrode down gently on the previously pasted skin spot.
- Cover the electrode with a small gauze pad and press the pad around the electrode. Attach the electrode with surgical tape.

Fig. 1



Electrode Positions

This procedure is for the Ten Twenty System.

- Divide the longitudinal line of the head into halves and attach an electrode at the Cz point (Fig. 1).
- Divide the distance between Cz and the nasion in proportions as shown in Fig. 1 and attach an electrode at Fz and Pz. (Do not attach electrodes at Fpz and Oz.)
- Divide the transverse line of the head into proportions of 10%, 20%, 20%, 20%, 20% and 10% as shown in Fig. 2 and attach electrodes at T3, T4, C3 and C4.
- Divide the peripheral line passing over Fpz, T4, Oz and T3 into proportions as shown in Fig. 3 and attach electrodes at Fp2, F8, T6, O2, Fp1, F7, T5 and O1.

Fig. 2

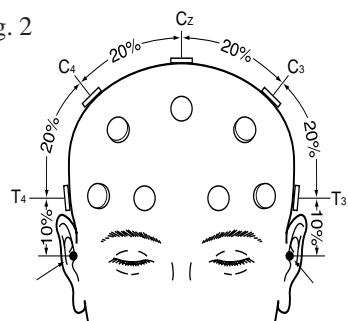
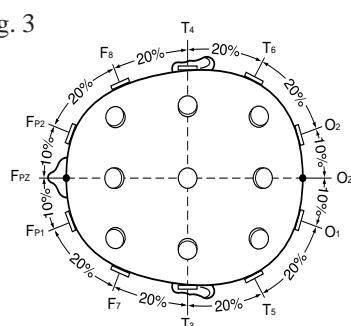
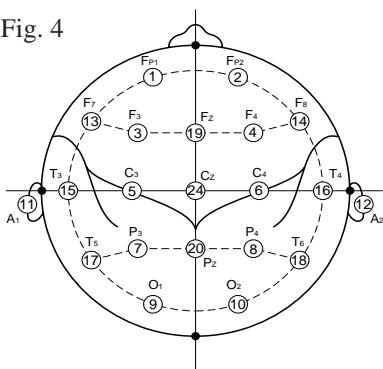


Fig. 3

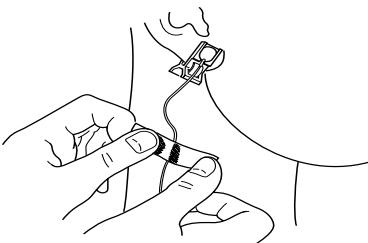
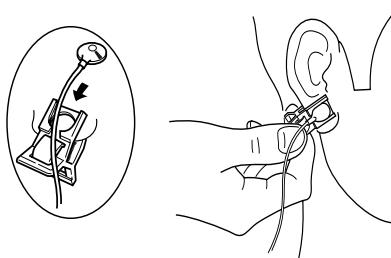


3. PREPARATION

Fig. 4



5. On the line passing over F7, Fz and F8, attach an electrode at the mid-point (F3) between F7 and Fz as shown in Fig. 4. Attach another electrode at the mid-point (F4) between F8 and Fz.
6. On the line passing over T5, Pz and T6, attach an electrode at the mid-point (P3) between T5 and PZ. Attach another electrode at the mid-point (P4) between T6 and PZ.



Earlobe Electrodes

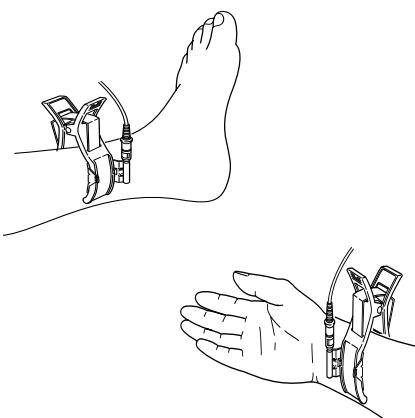
1. Apply a small amount of EEG paste to both earlobes. Gently clip on the earlobe electrodes.
2. Secure the electrode lead to the neck with surgical tape to prevent electrode lead movement.

CAUTION

Do not apply excessive pressure to the electrode because this may cause direct electrode-to-skin contact (not through the paste), and generate unnecessary polarization voltage.

ECG Electrodes

1. Clean the patient's skin with alcohol and apply CardioCream (ECG paste) to the electrode site.
2. Apply CardioCream to the electrode surface of the ECG clip-on limb electrode and clip the limb electrode on the patient's arm or leg as required.



Connecting Electrode Leads to the Electrode Junction Box

WARNING

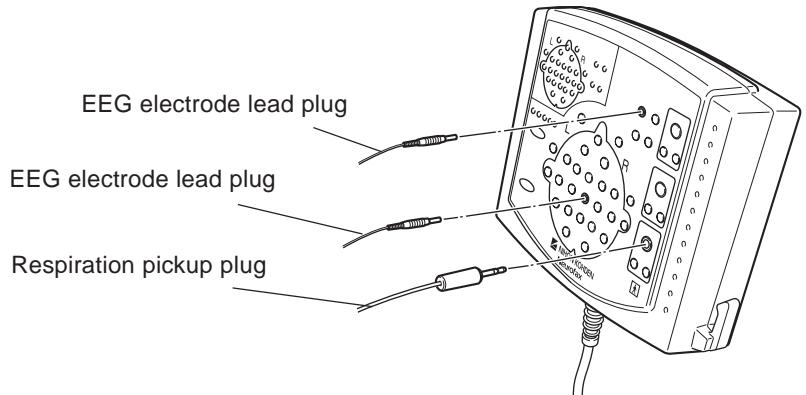
- Do not connect the Z electrode lead plug to a ground or equipotential ground. Otherwise, leakage current from another instrument may harm the patient.
- When the mini junction box is not used, make sure that the multiple connector cover is firmly attached to the electrode junction box. Failure to follow this warning may cause electrical shock to the patient and operator.

CAUTION

Only connect the JE-913A/AG Mini junction box or BE-911A/BE-912A EEG disk electrode. When another type of mini junction box is connected, the measurement result is not correct and the instrument may malfunction.

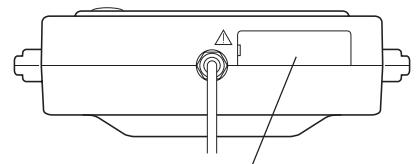
EEG Electrodes

After placing the electrodes on the patient's scalp, connect the electrode lead plugs to the corresponding jacks on the electrode junction box. Make sure that each electrode position corresponds to the correct jack.



Bottom view

To open the multiple connector cover, pry the cover off with a flat blade screwdriver.



Multiple connector cover

3. PREPARATION

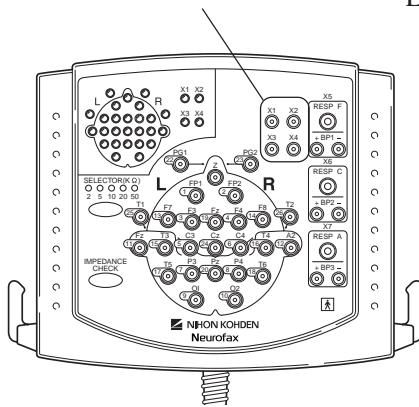
ECG Electrodes

Procedure:

Connect one end of each ECG electrode lead to the ECG clip on the limb. Connect the other ends of the electrode leads to any two jacks (X1 to X4) on the electrode junction box. Refer to the following chart when selecting the ECG lead (Lead I, Lead II or Lead III).

JE-910A/G, JE-911A/AG

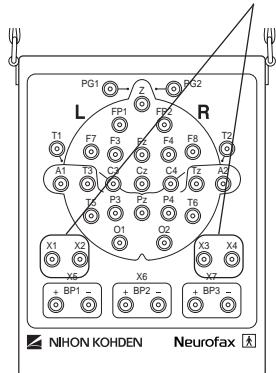
Connect ECG electrode leads



	G1 (-)	G2 (+)
Lead I	Right arm	Left arm
Lead II	Right arm	Left leg
Lead III	Left arm	Left leg

JE-913A/AG

Connect ECG electrode leads



Typical ECG settings:

These settings let you record Lead I on the 19th channel.

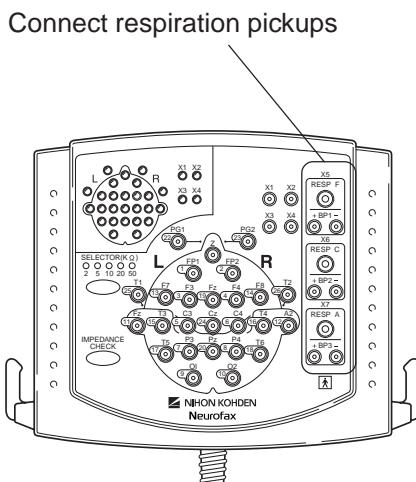
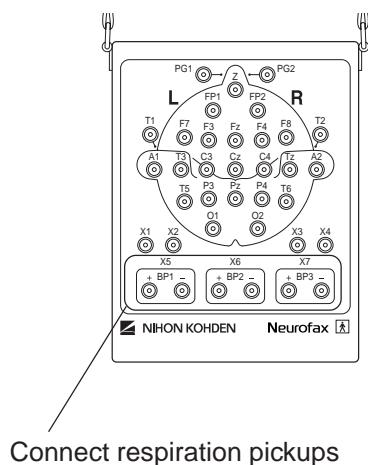
Connect the left and right arms to input jacks X1 and X2, respectively. Program the electrode combination for the 19th channel so that X2 is set to input G1 (-) and X1 is set to input G2 (+). Set the sensitivity to 200 μ V/mm and the time constant to 1.0 s on the display.

Respiration Pickup/Sensor**WARNING**

Only connect the respiration pickup which is specified by Nihon Kohden to the RESP F, C, A jack. If an unspecified respiration pickup, sensor or equipment is connected, electrical leakage current may harm the patient and operator.

NOTE

When the respiration waveform is measured, use any of the X5, X6 and X7 electrodes. Save the respiration electrode. Refer to “Selecting the Electrodes to be Saved with EEG Waveforms” in Section 4.

JE-910A/AG, JE-911A/AG**JE-913A/AG**

You can use the following respiration pickups and sensors to measure the respiration waveform.

- TR-0001/TR-0002 3-port respiration pickup
- TR-751T/TR-752T respiration pickup for chest
- TR-761T/TR-762T respiration pickup for nostril
- Pro-Tech Airflow Sensor®
- Pro-Tech Effort Sensor®

Program the montage for respiration measurement. The E electrode can be used instead of “0V”. When using the E electrode, save the E electrode with the respiration electrode. If the respiration waveform is unstable, use “0V” for G1 electrode. For sleep analysis, select G1 (-) to “0 V” .

In the default setting, channels 17 and 18 of the pattern IA to IVA and channels 13 and 14 of the pattern IB to IIB are programmed for respiration measurement.

Respiration Pickup

Model	Terminal
TR-0001, TR-0002, TR-761T, TR-762T	RESP F (X5)
TR-751T, TR-752T	RESP C (X6) or RESP A (X7)

Connection of the lead tips of the respiration pickup

Jacks/ Montage	G1 (-)	G2 (+)
RESP F (X5)	0V	X5
RESP C (X6)	0V	X6
RESP A (X7)	0V	X7

3. PREPARATION

Respiration Sensor for Sleep Analysis

Model	Terminal
Pro-Tech Airflow Sensor	BP1 (X5)
Pro-Tech Effort Sensor	BP2 (X6) or BP3 (X7)

Connection of the lead tips of the respiration sensor

Jacks/ Montage	G1 (-)	G2 (+)
BP1 (X5)	0V	X5
BP2 (X6)	0V	X6
BP3 (X7)	0V	X7

DC Input Cable (JE-911A/AG only)

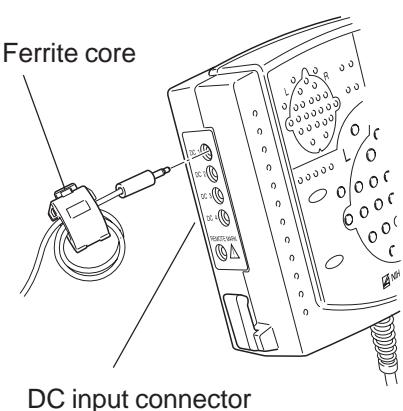
WARNING

Before connecting or disconnecting the DC input cable to the DC input connector on the JE-911A/AG Electrode junction box, make sure that the power of the external instrument is turned off or DC signal is not output from the external instrument. Failure to follow this warning may cause electrical shock to the patient and operator.

NOTE

- When connecting an external instrument to the DC input connector, an unwanted radio frequency signal is generated from this connection. This affects devices such as radio and television receivers operating near the instrument. To reduce the unwanted radio frequency signal, attach the provided ferrite core to the DC input cable.
- **Use a DC input cable that is 3 m or less.**

1. Attach and fix the ferrite core near the connector of the DC input cable that connects to the DC input connector on the left side of the electrode junction box.
2. Wrap the DC input cable around the ferrite core more than 2 turns.
3. Connect the DC input cable to the DC input connector.



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General

This program lets you change the following settings.

- EEG pattern settings
- Automatic photic stimulation settings
- Contents of the table list of the Patient Information and Annotation dialog box
- Settings in the System Setting dialog box
- The electrodes that are used for waveform acquisition and saved in a file with the EEG waveforms.
- Long term EEG waveform monitoring settings
- Automatic EEG waveform recording settings

These settings are saved in memory. The Acquisition program and the Review program use these settings. These settings can be saved in a file or called up from the file.

NOTE

It is not possible to change System Program settings while the Acquisition, Review or any other EEG 9000 application program is open.

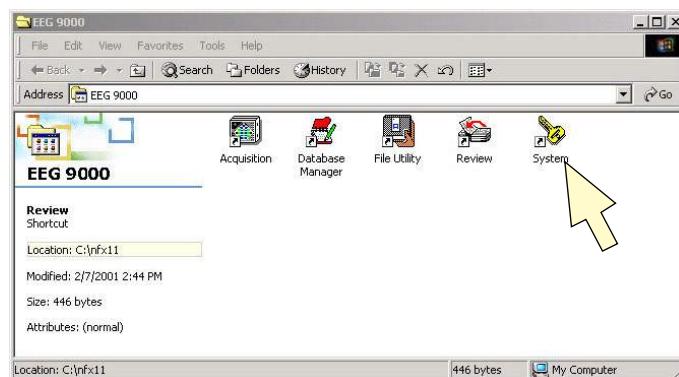
Opening the System Program



From the EEG 9000 window, double-click the System icon. The System Program window opens.

NOTE

Turn off any screen saver and close all application programs before opening the System program. Otherwise, the System program may not function properly.



To close the System program:

1. Click the File. The File pull down menu opens.
2. There are two ways to close the System program. Do any of the following.
 - To close the System program without saving the changed settings, select Close without Saving.
 - To close the System program and save the changed settings, select Close.

The System program returns to the icon.



Explanation of Each Function

Menu Bar

File Menu



Load

Opens the Load dialog box to call up the system settings saved in a file.

Save As

Opens the Save As dialog box to save the system settings in the file.

Initialize

Restores the settings in the System program to the factory default settings.

Close without Saving

Close the System program without saving the changed settings.

Close

Closes the System program and saves the changed settings.

Junction Box Menu



JE-910A/JE-911A (10-20 System)

Select this when the JE-910A/AG or JE-911A/AG Electrode Junction box is used (Default setting).

JE-912A, JE-914A (Sleep)

Select this when the optional JE-912AK Sleep Apnea Unit is used.

The other electrode junction boxes cannot be selected.

EEG-2100 Compatible Mode

Not available for this instrument.

Help Menu

About

Displays information about the program.

Icons**Pattern**

Opens the Pattern table. The instrument contains 36 patterns per set file. The pattern is the combination of the settings: montage setting, amplifier settings (sensitivity, time constant, high-cut filter and calibration voltage), waveform display on/off, waveform color, amplitude limitation of the waveform and comment setting for each channel. You can change the settings for each pattern.

Photic

Opens the Photic Stimulation dialog box. The instrument has three programmable automatic photic stimulation modes (Auto 1, Auto 2 and Auto 3) with up to 30 steps each. You can change the photic stimulation frequencies for each step.

Table

Opens the Table Items dialog box to change or add contents (texts) of the table list on the Patient Information dialog box and Annotation dialog box.

System

Opens the System Settings dialog box to change the several options provided in the instrument.

- General settings for the measurement
- Electrode junction box and display mode
- Default settings for the Acquisition program. The Acquisition program opens with the settings selected in the Standard page on the System Settings dialog box. During waveform acquisition, you can restore the changed settings to the settings in the Standard page by selecting “Standard” from the Tool menu.
- Analog input signals

Electrodes

Opens the Electrodes to be Saved dialog box to select the electrodes that are used for waveform acquisition. The instrument saves the waveforms as an electrode potential for each electrode.

Auto Record

Opens the Auto Record dialog box to select the automatic EEG waveform recording mode and settings. You can select the pattern, recording time, activation settings for each stage.

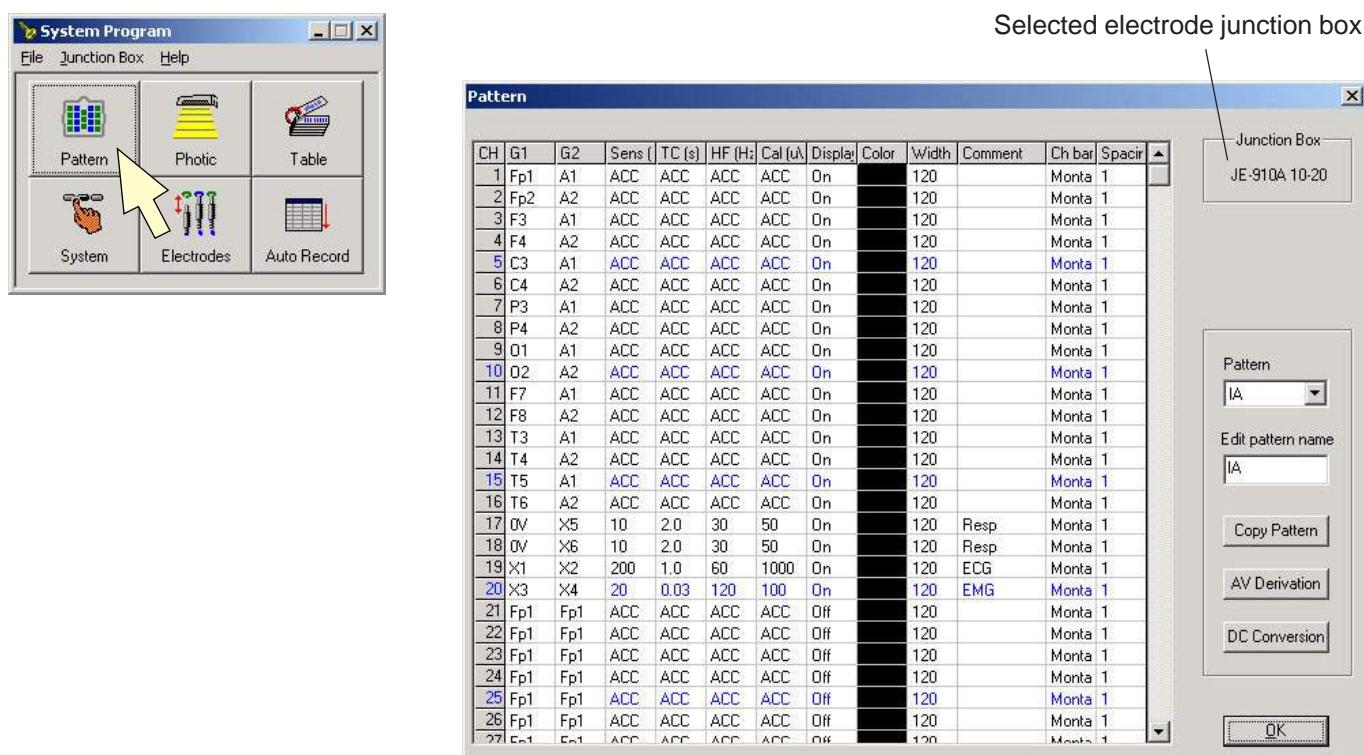
Programming Patterns

General

The instrument contains 36 patterns per set file. The pattern is the combination of the settings: montage setting, amplifier settings (sensitivity, time constant, high-cut filter and calibration voltage), waveform display on/off, waveform color, amplitude limitation of the waveform and comment setting for each channel. You can change the settings for each pattern. During acquisition or review, you can temporarily change pattern settings without losing the original pattern settings.

Opening the Pattern Table

Click the Pattern icon in the System Program window. The Pattern table opens.



Selecting the Pattern

1. Click the Pattern box arrow. The Pattern name list box opens.

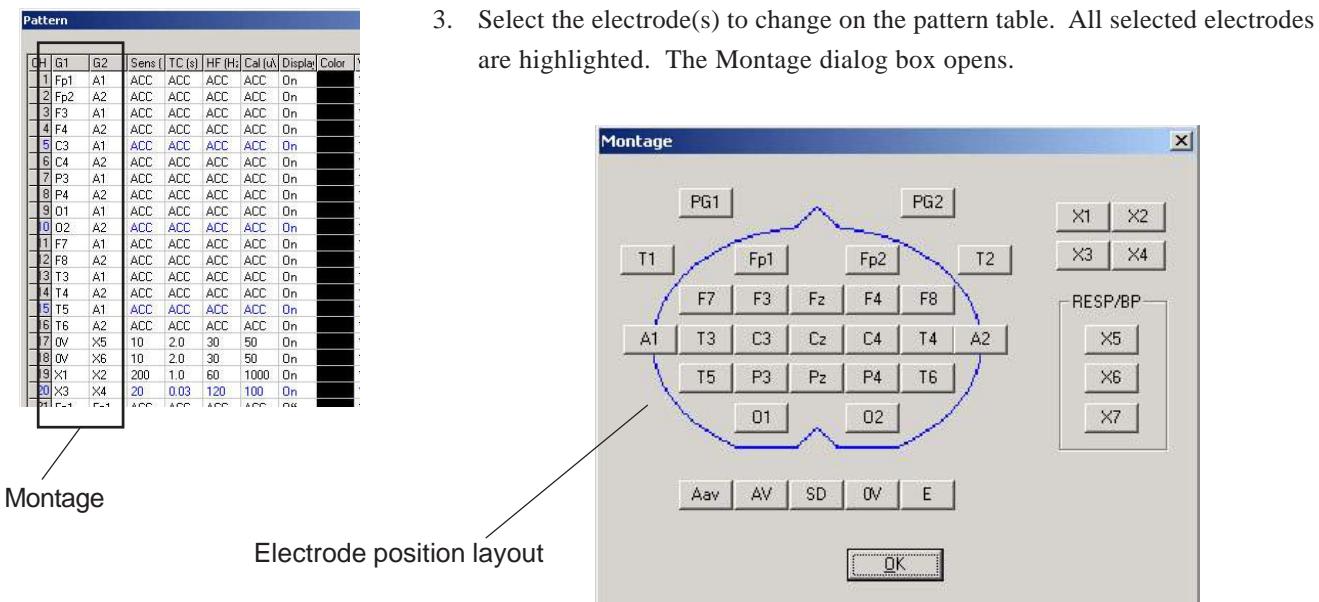
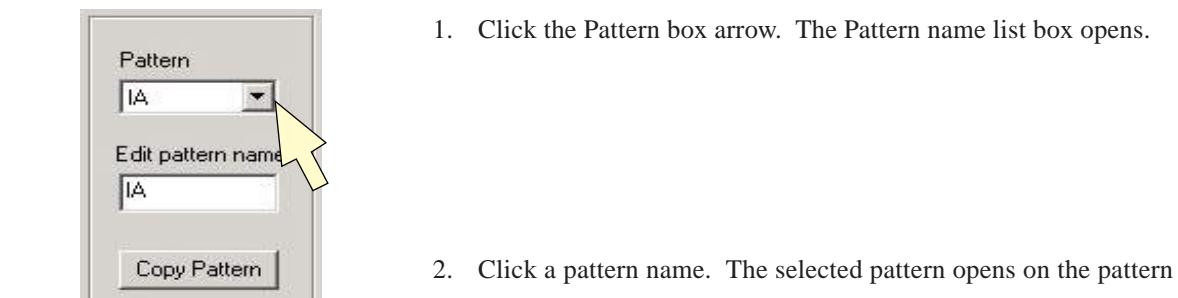
2. Click the pattern name. The selected pattern table opens on the table and the selected pattern name is displayed in the Edit Pattern Name text box.

Changing the Pattern Name

1. Click the Pattern Name text box. The cursor appears in the box.

2. Type in the new name with up to 6 characters. The old pattern name is replaced with the new name.

Changing the Montage



To select one electrode:

Click the electrode name on the table.

To select two or more consecutive channels:

Drag the cursor to select the electrodes.

To select all channel electrodes:

Click the G1 or G2 switch at top of column.

4. Click an electrode in the electrode position layout to select it.

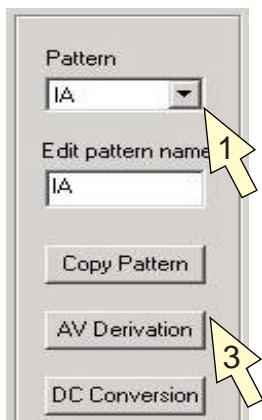
The selected G1 or G2 electrode(s) is replaced with the selected new electrode.
The dotted rectangle moves to the next electrode.

0 V button:

When this is selected to either G1 or G2 electrode, the channel displays the voltage between the system reference (C3/C4) and the selected electrode which is not set to "0 V".

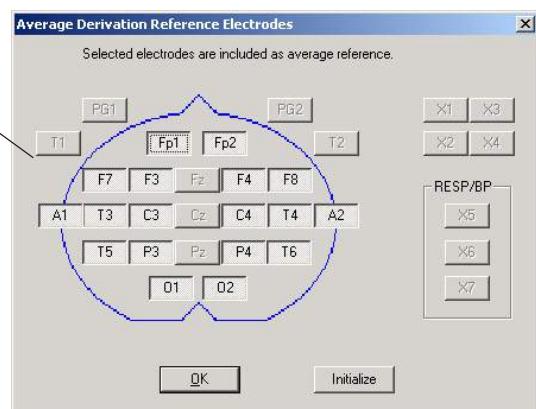
5. Click the OK button to close the dialog box.

Selecting or Deleting Electrodes for AV Derivation



1. Click the Pattern box arrow. The Pattern name list box opens.
2. Click the pattern name. The selected pattern table opens on the pattern table.
3. Click the AV Derivation button. The Average Derivation Reference Electrode dialog box opens.

Electrode position layout



Electrode position layout:

The available electrode name is displayed on the electrode position layout. The clicked (down) electrode is used for reference voltage calculation (AV derivation). To add or delete an electrode on the electrode position layout, click the electrode.

4. Click the electrode for AV derivation.

To delete all the electrodes for AV derivation, click the Initialize button.

5. Click the OK button to close the dialog box.

Changing an Amplifier Setting

NOTE

The selectable high-cut filter frequency settings depend on the sampling frequency shown below.

Sampling frequency (Hz)	Selectable high-cut filter
100	30 Hz or less
200	60 Hz or less
500	120 Hz or less
1,000	300Hz or less

1. Click the Pattern box arrow. The Pattern name list box opens.
 2. Click the pattern name. The selected pattern opens on the pattern table.
 3. Select the Sens, TC, HF or Cal setting to change on the pattern table. The selected setting is highlighted.
- To select one setting:
Click the setting on the table.
- To select two or more consecutive channels:
Drag the cursor to select the settings.
- To select the settings for all channels:
Click the SENS, TC, HF button at the top of the column.
- The selection list box for the setting appears.
4. Click the new setting in the selection list box.
The highlighted settings change to the new settings.
 5. Click the OK button to close the selection list.

CH	G1	G2	Sens	TC (s)	HF (Hz)	Cal (u)	Display
1	Fp1	A1	ACC	ACC	ACC	ACC	On
2	Fp2	A2	ACC	ACC	ACC	ACC	On
3	F3	A1	ACC	ACC	ACC	ACC	On
4	F4	A2	ACC	ACC	ACC	ACC	On
5	C3	A1	ACC	ACC	ACC	ACC	On
6	C4	A2	ACC	ACC	ACC	ACC	On
7	P3	A1	ACC	ACC	ACC	ACC	On
8	P4	A2	ACC	ACC	ACC	ACC	On
9	O1	A1	ACC	ACC	ACC	ACC	On
10	O2	A2	ACC	ACC	ACC	ACC	On
11	F7	A1	ACC	ACC	ACC	ACC	On
12	F8	A2	ACC	ACC	ACC	ACC	On
13	T3	A1	ACC	ACC	ACC	ACC	On
14	T4	A2	ACC	ACC	ACC	ACC	On
15	T5	A1	ACC	ACC	ACC	ACC	On
16	T6	A2	ACC	ACC	ACC	ACC	On
17	0V	X5	10	2.0	30	50	On
18	0V	X6	10	2.0	30	50	On
19	X1	X2	200	1.0	60	1000	On
20	X3	X4	20	0.03	120	100	On
21	Fp1	Fp1	ACC	ACC	ACC	ACC	Off
22	Fp1	Fp1	ACC	ACC	ACC	ACC	Off
23	Fp1	Fp1	ACC	ACC	ACC	ACC	Off
24	Fp1	Fp1	ACC	ACC	ACC	ACC	Off
25	Fp1	Fp1	ACC	ACC	ACC	ACC	Off
26	Fp1	Fp1	ACC	ACC	ACC	ACC	Off
27	E-1	E-1	ACC	ACC	ACC	ACC	Off

Amplifier setting

Displaying/Not Displaying a Waveform

Cal (A)	Display	Color	Width	Comment	Ch bar	Spacer
ACC	On		120		Monta 1	
ACC	On		120		Monta 1	
ACC	On		120		Monta 1	
ACC	On		120		Monta 1	
ACC	On		120		Monta 1	
ACC	On		120		Monta 1	
ACC	On		120		Monta 1	
ACC	On		120		Monta 1	
ACC	On		120		Monta 1	
ACC	On		120		Monta 1	
ACC	On		120		Monta 1	
ACC	On		120		Monta 1	
SO	On		120	Resp	Monta 1	
SO	On		120	Resp	Monta 1	
1000	On		120	ECG	Monta 1	
100	On		120	EMG	Monta 1	
ACC	Off		120		Monta 1	
ACC	Off		120		Monta 1	
ACC	Off		120		Monta 1	

Display



- Click the Pattern box arrow. The Pattern name list box opens.
- Click the pattern name. The selected pattern table opens on the pattern table.
- Select the channel to display or not display the waveform. The selected channel is highlighted.

To select one channel:
Click the setting on the table.

To select two or more consecutive channels:
Drag the cursor to select the settings.

To select all channels:
Click the Display button at the top of the column.
The selection list box for the display on/off appears.
- Click On or Off in the Display box.
- Click the OK button to close the list box.

Changing a Waveform Color

Cal (A)	Display	Color	Width	Comment	Ch bar	Spacer
ACC	On		120		Monta 1	
ACC	On		120		Monta 1	
ACC	On		120		Monta 1	
ACC	On		120		Monta 1	
ACC	On		120		Monta 1	
ACC	On		120		Monta 1	
ACC	On		120		Monta 1	
ACC	On		120		Monta 1	
ACC	On		120		Monta 1	
ACC	On		120		Monta 1	
ACC	On		120		Monta 1	
ACC	On		120		Monta 1	
ACC	On		120		Monta 1	
ACC	On		120		Monta 1	
SO	On		120	Resp	Monta 1	
SO	On		120	Resp	Monta 1	
1000	On		120	ECG	Monta 1	
100	On		120	EMG	Monta 1	
ACC	Off		120		Monta 1	
ACC	Off		120		Monta 1	
ACC	Off		120		Monta 1	

Color



- Click the Pattern box arrow. The Pattern name list box opens.
- Click the pattern name. The selected pattern table opens on the pattern table.
- Select the channel to change the waveform color. The selected channel is highlighted.

To select one channel:
Click the setting on the table.

To select two or more consecutive channels:
Drag the cursor to select the settings.

To select all channels:
Click the Color button at the top of the column.
The selection list box for the color appears.
- Click the new color in the selection list box.
- Click the OK button to close the list box.

4. SYSTEM PROGRAM

Changing the Maximum Amplitude of a Waveform

Cal (u)	Display	Color	Width	Comment	Ch bar	Spacir
ACC	On		120		Monta 1	
ACC	On		120		Monta 1	
ACC	On		120		Monta 1	
ACC	On		120		Monta 1	
ACC	On		120		Monta 1	
ACC	On		120		Monta 1	
ACC	On		120		Monta 1	
ACC	On		120		Monta 1	
ACC	On		120		Monta 1	
ACC	On		120		Monta 1	
ACC	On		120		Monta 1	
ACC	On		120		Monta 1	
ACC	On		120		Monta 1	
ACC	On		120		Monta 1	
50	On		120	Resp	Monta 1	
50	On		120	Resp	Monta 1	
1000	On		120	ECG	Monta 1	
100	On		120	EMG	Monta 1	
ACC	Off		120		Monta 1	
ACC	Off		120		Monta 1	
ACC	Off		120		Monta 1	

Width

You can change the maximum amplitude of a waveform. When the waveform exceeds the limit, it is clipped.

1. Click the Pattern box arrow. The Pattern name list box opens.
2. Click the pattern name. The selected pattern table opens on the pattern table.
3. Select the channel to change the maximum amplitude. The selected channel is highlighted.

To select one channel:

Click the setting on the table.

To select two or more consecutive channels:

Drag the cursor to select the settings.

To select all channels:

Click the Width button at the top of the column.

The selection list box for the maximum amplitude appears.

4. Click the new maximum amplitude in the selection list box.
5. Click the OK button to close the list box.

Annotating a Channel with a Comment

You can annotate a channel with a comment. The selected comment is displayed beside the channel number.

1. Click the Pattern box arrow. The Pattern name list box opens.
2. Click the pattern name. The selected pattern table opens on the pattern table.
3. Select the channel to change the comment. The selected channel is highlighted.

To select one channel:

Click the setting on the table.

To select two or more consecutive channels:

Drag the cursor to select the settings.

To select all channels:

Click the Comment button at the top of the column.

The Wave Comment dialog box opens.

4. Select the comment in the list box, or type the comment in the text box.
5. Click the OK button to close the dialog box.

Changing the Channel Spacing

Cal (A)	Display	Color	Width	Comment	Ch bar	Spacir
ACC On			120		Mont:	1
ACC On			120		Mont:	1
ACC On			120		Mont:	1
ACC On			120		Mont:	1
ACC On			120		Mont:	1
ACC On			120		Mont:	1
ACC On			120		Mont:	1
ACC On			120		Mont:	1
ACC On			120		Mont:	1
ACC On			120		Mont:	1
ACC On			120		Mont:	1
ACC On			120		Mont:	1
ACC On			120		Mont:	1
ACC On			120		Mont:	1
30 On			120	Resp	Mont:	1
30 On			120	Resp	Mont:	1
1000 On			120	ECG	Mont:	1
100 On			120	EMG	Mont:	1
ACC Off			120		Mont:	1
ACC Off			120		Mont:	1
ACC Off			120		Mont:	1

Spacing

You can change the channel spacing. Example: 3 - corresponds to 3 channel space

This setting applies to the waveform display position “Even Layout”.

1. Click the Pattern box arrow. The Pattern name list box opens.
2. Click the pattern name. The selected pattern table opens on the pattern table.
3. Select the channel to change the spacing. The selected channel is highlighted.

To select one channel:

Click the setting on the table.

To select two or more consecutive channels:

Drag the cursor to select the settings.

To select all channels:

Click the Spacing button at the top of the column.

The selection list box for the channel spacing appears.

4. Click the new channel spacing in the selection list box.
5. Click the OK button to close the list box.

Selecting the Item Displayed on the Extended Channel Bar

You can display either the montage or comment on the extended channel bar on the Acquisition screen and Review screen.

1. Click the Pattern box arrow. The Pattern name list box opens.
2. Click the pattern name. The selected pattern table opens on the pattern table.
3. Select the channel to change the item. The selected channel is highlighted.

To select one channel:

Click the setting on the table.

To select two or more consecutive channels:

Drag the cursor to select the settings.

To select all channels:

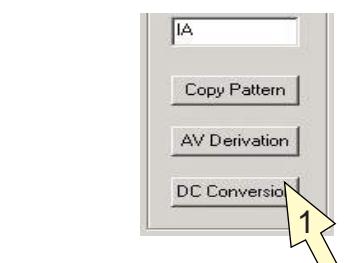
Click the Ch bar button at the top of the column.

The selection dialog box for the extended channel bar appears.

4. Select “Montage” or “Comment” the item in the dialog box.
5. Click the OK button to close the dialog box.

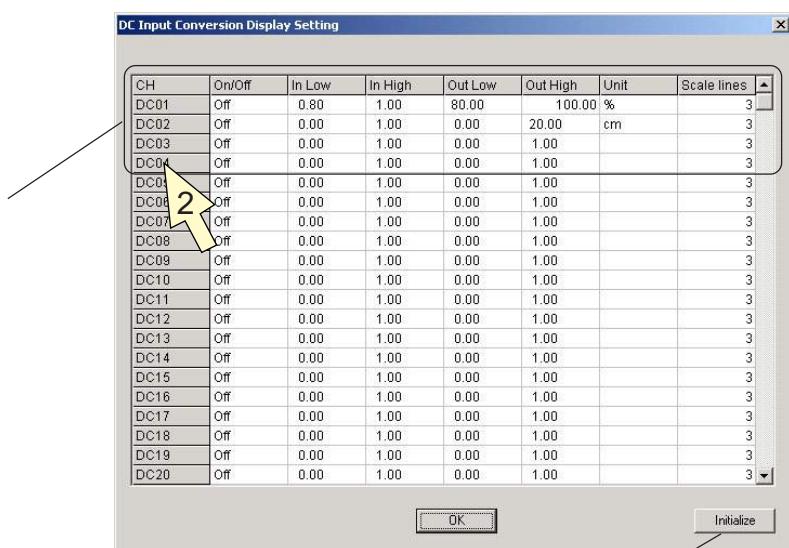
Changing the Conversion Range of the DC Input Signals

When the JE-911A/AG electrode junction box is used, up to 4 channel of DC input signals from an external instrument can be displayed on the screen. You can convert the DC input signal to the numeric value. The converted numeric value is displayed on the extended channel bar.



DC01 to DC04 are available only when the JE-911A/AG electrode junction box is connected.

- Click the DC Conversion button on the pattern table. The DC Input Conversion Display Setting dialog box opens.

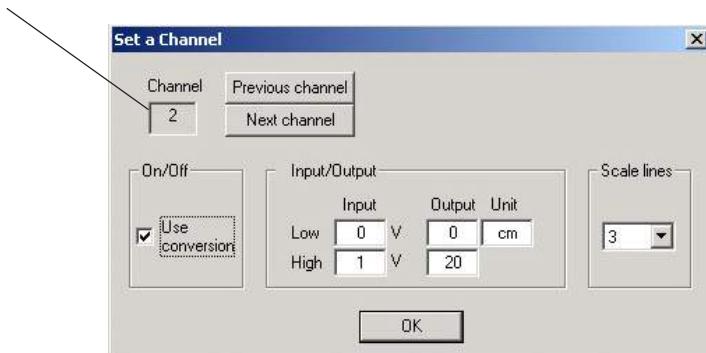


Initialize button:

Change the settings to the factory default settings

- Select the channel that you want to set. The Set a Channel dialog box opens.

Selected channel



- Select the input/output range, unit and number of scales. To change the previous or next channel settings, use the Previous or Next button.

Dialog box options**Previous/Next channel:**

To go to the previous or next channel, use this button.

On/Off:

Check this box to use the settings for the channel. When this box is checked, the conversion values are displayed on the extended channel bar of the Acquisition screen and Review screen.

Input/Output:

Enter the input range (low and high limit) and conversion value of the DC input signal that you want to see. The corresponding scales appear on the Acquisition screen and Review screen when the extended channel bar is displayed.

Unit:

Select the unit for the conversion value.

Scale lines:

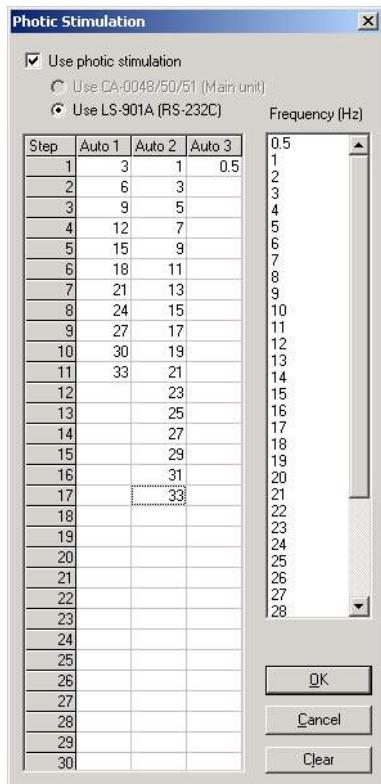
Select the number of scales between the low and high limits.

4. When all settings are complete, click the OK button. The Select a Channel dialog box closes.

5. Click the OK button on the DC Input Conversion Display Setting dialog box.

Programming Automatic Photic Stimulation Modes

The instrument has three programmable automatic photic stimulation modes (Auto 1, Auto 2, and Auto 3) with up to 30 steps each. You can change the photic stimulation frequencies for each step.



1. Click the Photic icon in the System Program window. The Photic Stimulation dialog box opens.
2. Check the Use photic stimulation check box. The Use LS-901A [RS-232C] is automatically selected when the Use photic stimulation check box is checked.
3. Click the frequency of the desired step. A dotted rectangle encloses the selected frequency.
 - To clear all frequency settings after the currently selected step, click the Clear button.
 - To select a new frequency, click the new frequency in the Frequency list box.

The dotted rectangle is replaced with the selected frequency.
4. Repeat step 3 to set the frequency for up to 30 steps.
5. Click the OK button to close the Photic Stimulation dialog box.

To cancel the setting, click the Cancel button.

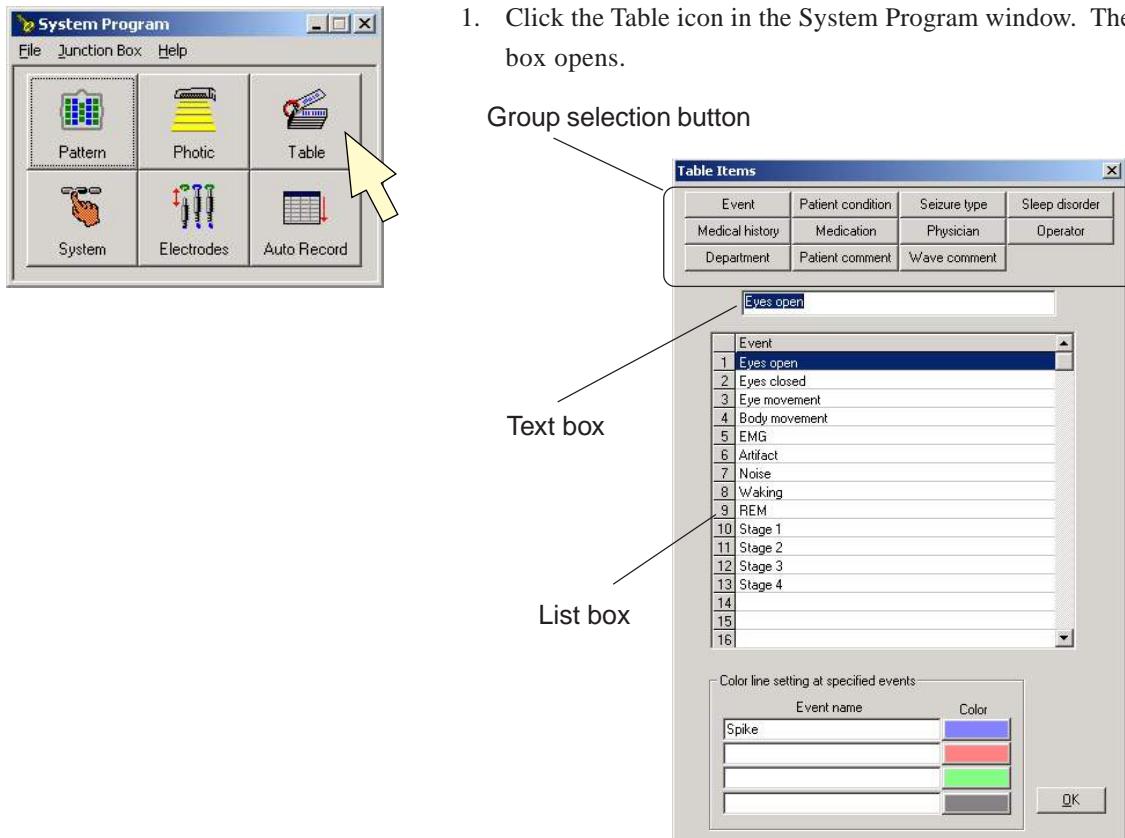
Editing the Waveform Annotations and Patient Information Items

During waveform acquisition or review, you can add annotations to a waveform and enter patient information in the patient table by selecting items from a list. Enter the selectable items for each heading in this procedure. You can display the vertical color line for up to 4 annotations.

Waveform annotation: Event

Patient information: Patient condition, Seizure type, Sleep disorder, Medical history (patient history), Medication, Physician, Operator, Department, Patient comment

Channel annotation: Wave comment



- Click the Table icon in the System Program window. The Table Items dialog box opens.
- Click the group selection button at the top side of the dialog box to open the desired group list.
- Do one of the following.
 - To enter a new item, click the empty column in the list box.
 - To change the item name, click the desired item in the list box.

4. SYSTEM PROGRAM

4. Type the character, word or phrase. Up to 40 characters can be entered per line and up to 40 annotations and items can be entered in the list box.
Enter key: Makes a new line.
Backspace key: Moves the cursor back one space and deletes the character.
Delete key: Deletes the character to the right of the cursor.
5. Type the annotation in Event Name text box on the Color line setting at specified events area and select the color of the vertical line for the annotation. Annotations which include the entered text have the same vertical color line.

To select the color, click the color pallet beside the text box. The selection dialog box opens.
6. Click the OK button to close the Table Items dialog box.

Changing the Settings in the System Setting Dialog Box

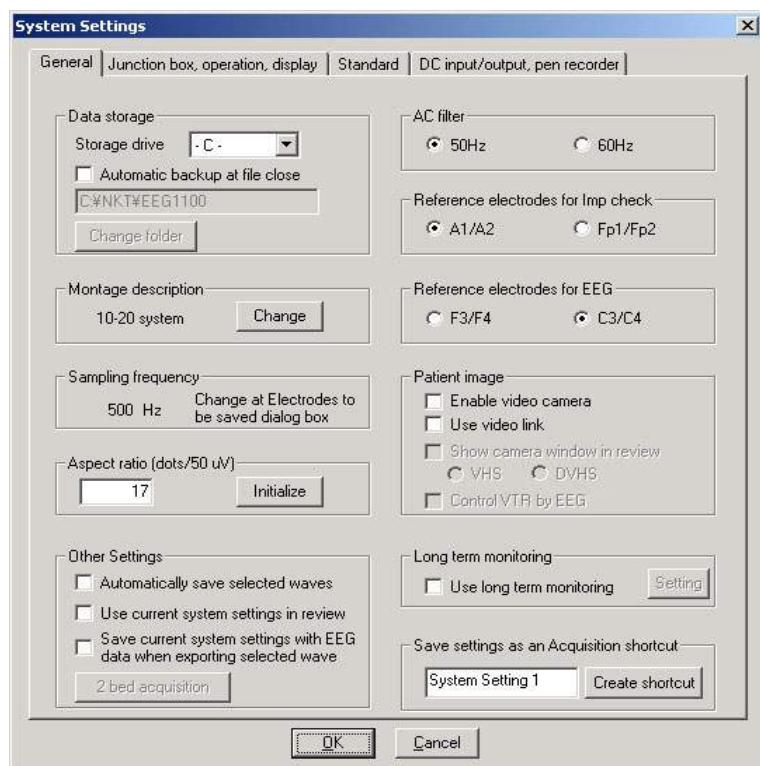
General

The following sections explain the several options in the System Setting dialog box. The System Setting dialog box has four pages to select:

- General settings for the measurement
- Electrode junction box, operation and display
- Default settings for the Acquisition program. The Acquisition program opens with the settings selected in the Standard page on the System Settings dialog box. During waveform acquisition, you can restore the changed settings to the settings in the Standard page by selecting “Standard” from the Tool menu.
- Analog input signals
- Long term EEG waveform monitoring

Opening the System Setting Dialog Box

Click the system icon in the System Program window. The System Settings dialog box opens.

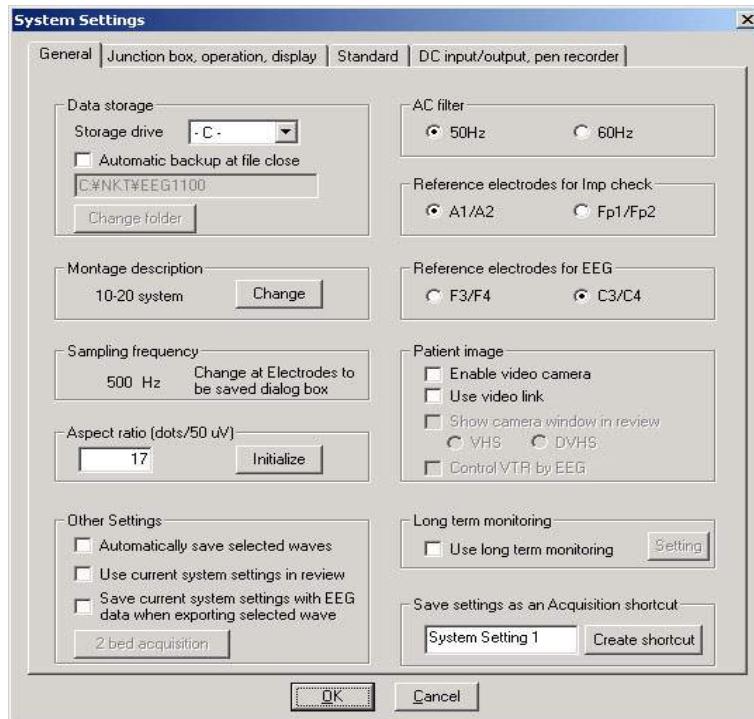


- To open another page, click the tab of the desired page.
- To close the system Setting dialog box, click the OK button.
- To cancel setting, click the Cancel button.

4. SYSTEM PROGRAM

Settings in the General Page

The factory default settings are underlined.



Selecting Storage Drive

Storage Drive:

Select the drive in which to save the acquired waveforms and measurement data.

- [-c-] Built-in hard disk drive (default setting: when an MO disk drive is not installed.)
- [-d-] Magneto-optical disk drive

You can make a copy of the EEG data file when the EEG data file is closed by selecting “Automatic backup at file close”. To change the drive or folder, click the Change folder button.

NOTE

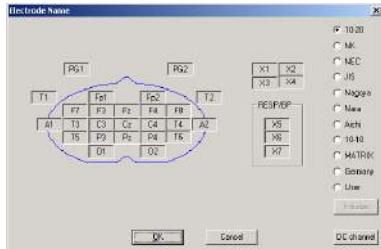
- **Do not select the storage drive to the CD-RW disk drive.**
- **The “Automatic backup at file close” setting is not available when the “Use long term monitoring” check box is checked.**

Changing Montage Description

Montage Description:

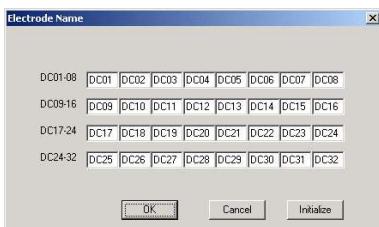
Select the montage description to display the EEG waveforms. You can rename electrodes with up to 4 characters.

Selection list: 10-20, NK (Nihon Kohden), User, etc



To change montage name or rename an electrode:

1. Click the Change button in the Montage description area. The Electrode Name dialog box opens.
2. Select the montage.
 - To define the electrode name, select User. You can define the electrode name with up to 4 characters.
 - To restore the new electrode name to the original 10-20 electrode name, click the Initialize button.



- To rename the DC channel, click the DC channel button. The DC01 to DC04 can be renamed. This is available only when the JE-911A/AG electrode junction box is used.
3. Click the OK button to close the Electrode Name dialog box.

Selecting EEG Sampling Frequency

Displays the selected sampling frequency in the Systems Settings - Electrode to be Saved page.

Select the number of dots to display the waveforms

Aspect Ratio:

Select the number of dots per 5 mm (1 div) to display the waveforms. This setting is for vertical resolution only (waveform amplitude). The default setting is 17 dots/50 μ v. To restore the setting to the default, click the Initialize button.

Automatically Saving the Waveforms

Automatically save selected waveform:

Check this box to automatically save the selected part of waveforms and patient information when the Review screen is closed.

Selecting AC Line Frequency

AC filter:

Select the AC line frequency. This setting is used by the AC filter to reduce AC interference.

Selection list: 50, 60 Hz.

Using the Current System Settings in the Review Program

Use current system settings in review:

Check this box to use the current system settings in the Review program.

Saving the Current System Settings with a Part of EEG Waveforms

Save current system settings with EEG data when exploring selected wave:
In the Review screen, a part of EEG waveforms and its information can be saved as a new file. Check this box to save the system settings in the file together with a part of EEG waveforms. The EEG waveforms can be reviewed with the saved system settings.

Selecting Reference Electrodes for Skin-Electrode Impedance Check

Reference electrode for Imp check:

Select the reference electrodes for skin-electrode impedance check.

Selection list: A1/A2, FP1/FP2

NOTE

The input jacks A1 and A2 (or FP1 and FP2) must be attached to the patient for the electrode impedance check.

4. SYSTEM PROGRAM

Selecting Reference Electrode for Saved EEG Data

Reference electrodes for EEG:

The reference electrodes (system reference) are set to C3 and C4 for this instrument.

NOTE

The input jacks C3 and C4 must be attached to the patient for EEG measurement even when C3 and C4 are not programmed in any montage.

Displaying the Patient Image

Patient image:

Check the “Use video link” check box to use the QI-224A Serial Interface Board.

You can control the specified video cassette tape recorder with the Video Link dialog box by checking the Control VTR by EEG check box. Refer to the QI-224A Operator’s manual.

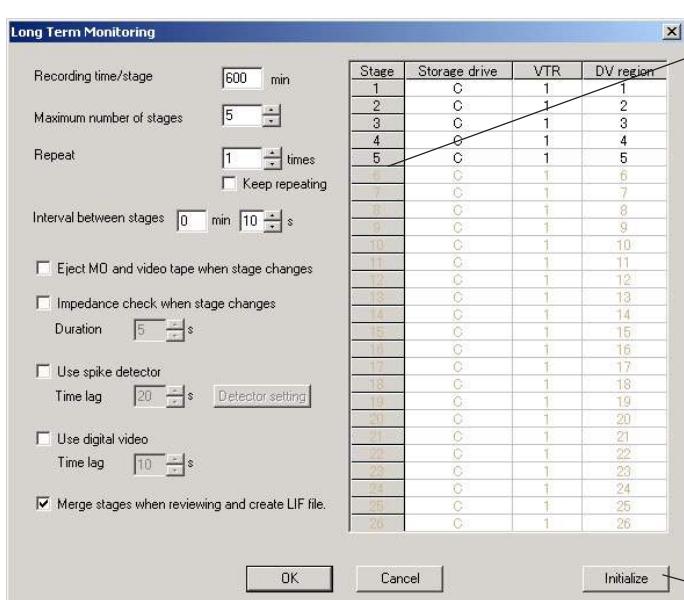
When using the QI-111A Camera Interface Board, check both the “Enable video camera” check box and “Show camera window in review” check box. Refer to the QI-111A Operator’s manual.

These settings are not available for the EEG-9100A/J/K/G Electroencephalograph.

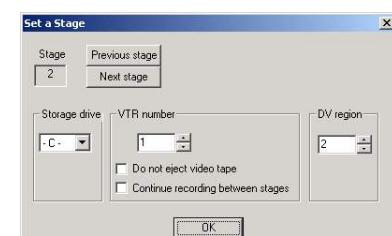
Changing the Settings for Long Term EEG Waveform Monitoring

Long term monitoring:

The long term monitoring function lets you continuously save up to 52 GB (2GB × 26 stages) of EEG waveforms in different storage media. For each stage, a new EEG data file is created and saved in the selected drive as a different EEG data file. When the optional QP-224A Serial Interface Board (analog video link) or QV-110AK Digital Video Unit/QP-110AK Digital Video Software (digital video link) is installed, you can select the storage media for the patient image recording (These options are not available for the EEG-9100A/J/K/G Electroencephalograph). Refer to “Long Term EEG Waveform Monitoring” in Section 5.



To change the setting, click the stage, the Set a Stage dialog box opens. Enter the storage drive for EEG waveforms, VTR number and the region for digital video link for each stage.



Initialize:

Restores the settings to the factory default settings.

Dialog box options:**Stage/Storage drive/VTR/DV region table****Storage drive:**

Enter the storage drive to save the EEG waveforms. Up to 2 GB EEG data file can be created for each stage. The maximum file size differs depending on the combination of the sampling frequency and the number of electrodes to be saved. Properly select the sampling frequency and number of electrodes to be saved. Refer to “Formatting a Magneto-optical Disk - Disk Capacity” in Section 3. If the file size exceeds 2 GB, the long term monitoring cannot be started.

VTR:

VTR is the connected video cassette tape recorder number for analog video link. When one cassette tape recorder is connected, set this to “1”. To use two or more video cassette tape recorders, contact your Nihon Kohden distributor or representative.

DV region:

Enter the region to save the patient image for digital video link. Refer to the QP-110AK Digital Video Software Operator’s manual. When using the QV-110AK Digital Video Unit, this setting is not used.

Recording time/stage:

Select the recording time per stage.

Maximum number of stages:

Select the number of stages.

Repeat:

When repeating the long term EEG monitoring, select the number of repeat times and check the Keep repeating check box.

Interval between stages:

Select the interval between the stages.

Eject MO and video tape when stage changes:

Check this to automatically eject the MO disk when the recording of the stage is complete.

Impedance check when stage changes:

Check this to automatically check the skin-electrode contact impedance at the beginning of the stage. The duration for impedance check can be selected with the Duration list box.

4. SYSTEM PROGRAM

Use spike detector:

The QP-251AK Spike Detection Software can be used in the long term monitoring (online spike detection). The time delay to start online spike detection after the beginning of stage can be selected with the Time lag list box.

NOTE

The time delay must be set to 10 seconds or more. Otherwise, the spike detection software may malfunction.

Detector setting:

Select the electrodes for spike detection.

Use digital video:

When using the QV-110AK Digital Video Unit or QP-110AK Digital Video Software in the long term monitoring. The time delay to start saving the patient image and EEG waveforms for each stage can be selected with the Time lag list box. Enter the region of the video server (patient image recording area) for each stage in the DV region column in the table. Refer to the QV-110AK Digital Video Unit or QP-110AK Digital Video Software Operator's manual.

NOTE

The time delay must be set to 10 seconds or more. Otherwise, the digital video software may malfunction.

Merge stages when reviewing and creating LIF file:

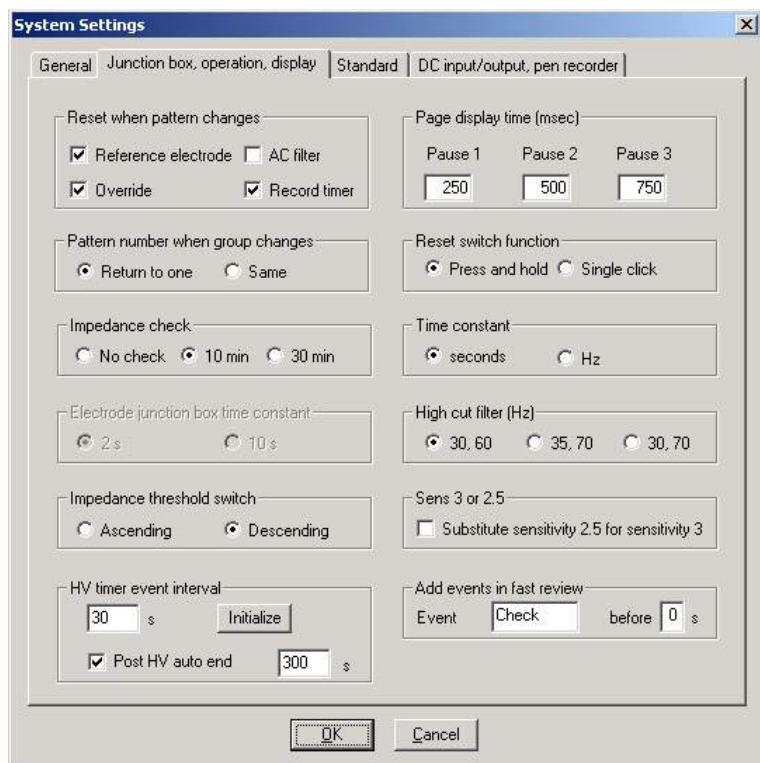
Select to create the long term monitoring information (LIF) file. This file is used to continuously review the long term EEG waveform monitoring data (saved as different EEG data files for each stage) in the review program.

NOTE

If this check box is not checked, the LIF file is not created and you cannot continuously review the long term EEG waveform monitoring data.

Settings in the Junction box, operation, display Page

The factory default settings are underlined.



Resetting the Settings When Pattern Changes

Resets the following items when pattern changes:

	ON	OFF
Reference electrode (default: ON)	Temporary reference electrode settings are lost when you change the pattern.	Temporary reference electrode settings remain when you change the pattern.
AC filter (default: OFF)	The AC filter is turned off when you change pattern.	The AC filter setting remains when you change pattern.
Override (default: ON)	Temporary pattern setting is lost when you change pattern.	Temporary pattern setting remains when you change pattern.
Record timer (default: ON)	The record timer is reset when you change pattern.	The record timer is not reset when you change pattern.

Selecting the Pattern Number When Another Pattern Group is Selected

Pattern number when group changes:

When another pattern group is selected, there are two ways to select the pattern number.

Selection list

Return to one Number 1 of the selected pattern group is selected.

Same The same number as the current pattern number is selected

Selecting the Limitation of the Skin-electrode Impedance Check Time

Impedance check:

Select the limitation of the skin-electrode impedance check time.

Selection list: No check, 10 min, 30 min

4. SYSTEM PROGRAM

Selecting the Electrode Junction Box Time Constant

Electrode junction box time constant:
The time constant is set to 2 s for this instrument.

Selecting the Operation Mode of the Impedance Preset Key

Impedance threshold switch:
Select the operation mode of the Impedance preset key on the electrode junction box.
Selection list: Ascending (2 → 5 → 10 → 20 → 50 kΩ),
Descending (50 → 20 → 10 → 5 → 2 kΩ)

Selecting the Time Interval of the HV Timer and Post HV Timer Event

HV timer event interval:
Select the time interval for the “HVT mm:ss” event of the HV timer and the “POST HVT mm:ss” event of the Post HV timer.
Default setting: 30 s

Post HV auto end:
Selects the post hyperventilation time for the Post HV timer. When the selected time is elapsed, the Post HV timer automatically stops.
Default setting: 300 s

Selecting the Page Display Time

Pause time for reviewing waveforms at high speed:
Selects the pause time when reviewing the EEG waveforms continuously at high speed.
Selection list: 0 to 10,000 ms in 1 ms step.
Default setting: Pause 1 (250 ms), Pause 2 (500 ms), Pause 3 (750 ms)

Selecting the Operation Mode of the Reset Button/Switch

Reset switch function:
Select how the Reset button/switch is operated in the Acquisition.
Selection list:
Press and hold The reset function is On while the mouse button is pressed and held.
Single click: The reset function is on/off by clicking.

Selecting the Time Constant Display Format

Select the time constant display format and unit.
Selection list: seconds (time constant), Hz (low-cut filter)

Selecting the Range of Selectable High Cut Filter Frequencies

High cut filter:
In the Acquisition and Review programs you can change the high-cut filter frequency. The high-cut filter reduces frequency components over the selected frequency. Choose the selectable frequencies.
Selection list: (30, 60), (35, 70), (30, 70)

**Substituting the Sensitivity 2.5
for the Sensitivity 3.**

Sens 3 or 2.5:

Check the “Substitute sensitivity 2.5 for sensitivity 3” check box when substituting the sensitivity 2.5 for the sensitivity 3.

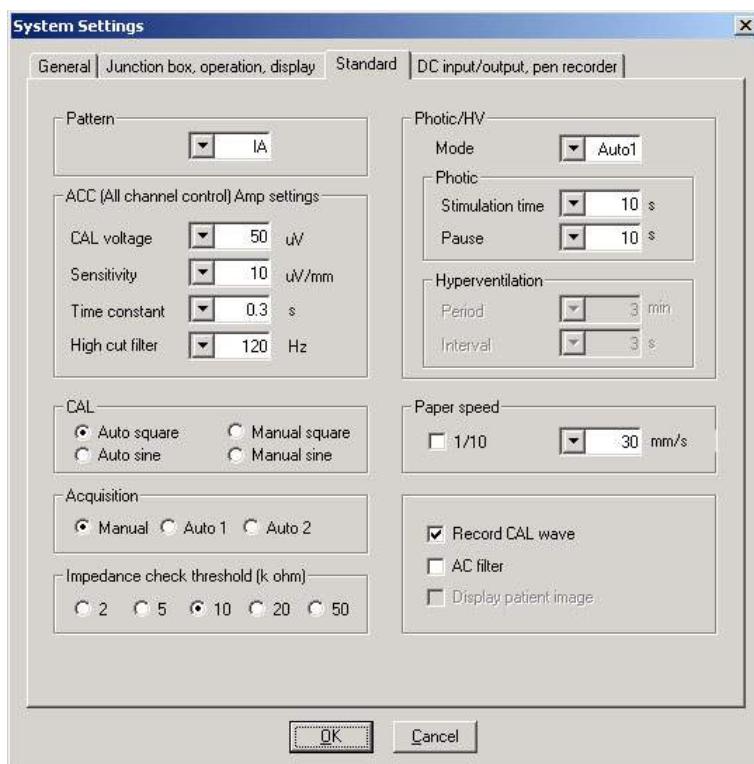
**Entering the Event Name for
High Speed Review**

Add events in fast review:

When reviewing the EEG waveforms backward or forward in high speed on the Review screen, you can add an annotation to a waveform by pressing the “Fn” + “+” key. Enter the event name (annotation) in the Event text box and the time when the event is added to the waveform before pressing the “Fn” + “+” key.

Settings in the Standard Page

The Acquisition program opens with the settings selected in the Standard page on the System Settings dialog box. During waveform acquisition, you can restore the changed settings to the settings in the Standard page by selecting “Standard” from the Tool menu. The factory default settings are underlined.



Selecting the Pattern

Pattern:

Select the pattern when the Acquisition program opens. (default setting: IA)

Selecting the ACC Amplifier Settings

ACC (All channel control) Amp settings:

Select the ACC amplifier settings when the Acquisition program opens.

Default settings:

CAL voltage: 50 μ V, Sensitivity: 10 μ V/mm

Time constant: 0.3 s, High cut filter: 120 Hz

Selecting the Calibration Mode

CAL:

Select the calibration mode when the Acquisition program opens.

Selection list: Auto square, Manual square, Auto sine, Manual sine

Selecting the Automatic EEG Waveform Recording Mode

Acquisition:

Select the default recording mode when the Acquisition program opens.

Selection list: Manual, Auto 1, Auto 2

For the automatic EEG waveform recording, refer to “Programming Automatic Recording Mode” in this section.

Selecting the Impedance Threshold

Impedance check threshold
Select the impedance threshold for skin-electrode impedance check when the Acquisition program opens.
Selection list: 2, 5, 10, 20, 50 kΩ

Selecting the Photic Stimulation and Hyperventilation Settings

Photic/HV:
Select the photic stimulation and hyperventilation mode when the Acquisition program opens.
Selection list:
Mode: Auto 1, Auto 2, Auto 3, Manual, Single, HV
Photic
Stimulation time: 10 s (Type from 1 to 99 s in 1 second steps.)
Pause: 10 s (Type from 0 to 30 s in 1 second steps.)
Hyperventilation
Period: 3 min (Type from 1 to 5 min in 1 min steps.)
Interval 3 s (Type from 1.5 to 5 s)

Selecting Whether or Not to Record the Calibration Waveform

Record CAL wave:
The calibration waveform recording is selected when the Acquisition program opens.

Selecting the AC Filter Setting

AC filter:
The AC filter is turned on when the Acquisition program opens.

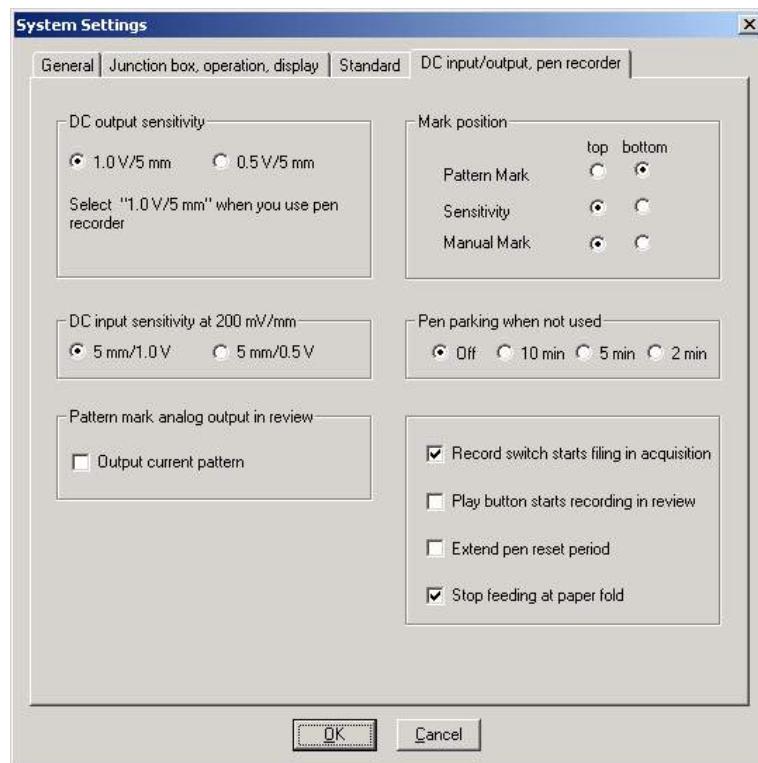
Selecting Whether or Not to Display the Patient Image

Display patient image:
The patient image window is displayed on the screen when the Acquisition program opens. This setting is not available for the EEG-9100A/J/K/G Electroencephalograph.

The Paper speed setting is not available for this instrument.

Settings in the DC input/output, pen recorder Page

To input analog signals from an external instrument, the optional JE-911A/AG electrode junction box is required. The factory default settings are underlined.



Selecting the DC Input Sensitivity

DC input sensitivity at 200 mV/mm

Select the input sensitivity.

Selection list: 5 mm/1.0 V, 5 mm/0.5 V

The following settings are not available for this instrument.

DC output sensitivity (Default setting: 1.0 V/5 mm)

Pattern mark analog output in review (Default setting: not selected)

Mark position

(Default setting - Pattern Mark: bottom, Sensitivity/ Manual Mark: top)

Pen parking when not used (Default setting: Off)

Record switch starts filing in acquisition (Default setting: selected)

Play button before starts recording in review (Default setting: not selected)

Extend pen reset period (Default setting: not selected)

Stop feeding at paper fold (Default setting: selected)

Selecting and Saving the Electrodes for Waveform Acquisition

General

The instrument saves the waveforms as an electrode potential for each electrode. 33 electrodes are default settings. Refer to “Formatting a Magneto-optical Disk” in Section 3 for notes about the number of electrodes to select. The electrode that is not selected here is displayed in red on the pattern table.

CAUTION

The electrodes that are used for waveform acquisition must be selected and saved here. If not, EEG waveforms cannot be reviewed on the Review screen.

NOTE

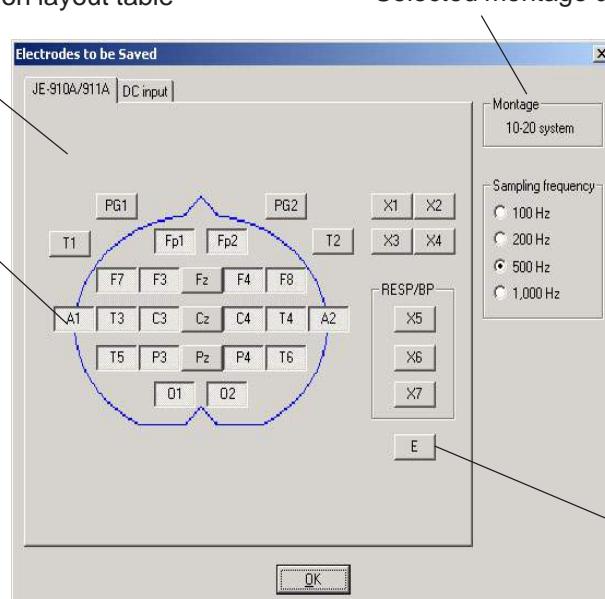
Program the montage for respiration measurement. The E electrode can be used instead of “0V”. When using the E electrode, save the E electrode with the respiration electrode. If the respiration waveform is unstable, use “0V” for G1 electrode.

Selecting and Saving the Electrodes for Waveform Acquisition



Electrode position layout table

Selected



Not selected

2. Click an electrode in the electrode position layout to save it.

3. Select the sampling frequency.

Dialog box optionSampling frequency:

Select the sampling frequency considering the number of electrodes that are used for waveform acquisition, recording time (filing time) and drive capacity. Refer to “Formatting a Magneto-optical Disk” in Section 3.

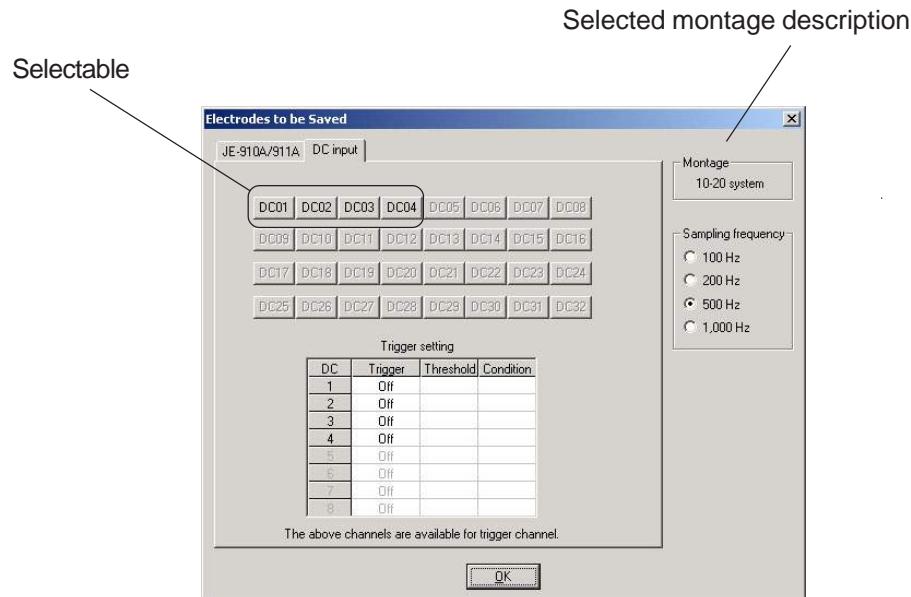
Selection list: 100, 200, **500**, 1,000 Hz

When you change the sampling frequency, the high cut filter frequency is automatically changed to the optimum setting. (Sampling frequency should be at least three times the high-frequency filter setting.) However, changing the high cut filter frequency does not automatically change the sampling frequency setting.

4. Click the OK button to close the Electrodes to be Saved dialog box. The selected settings are saved in memory.

Selecting and Saving the DC Input Channels

1. Click the Electrode icon in the System Program window. The Electrodes to be Saved dialog box selected in the Junction box menu opens.



2. Click the DC input tab to select the DC input channels

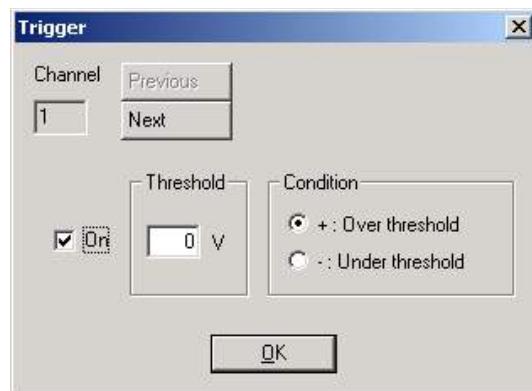
Dialog box optionTrigger setting:

The input signal from channel 1 to 4 can be used for a trigger. To select the channel, open the Trigger selection dialog box by clicking the Trigger column.

3. Select the DC input channels for DC input signals, trigger channel and sampling frequency. DC1 to DC4 can be selected for this instrument. For sampling frequency, refer to “Selecting and Saving the Electrodes for Waveform Acquisition”.

To select the trigger channel:

- 1) Click the Trigger column. The Trigger dialog box opens.



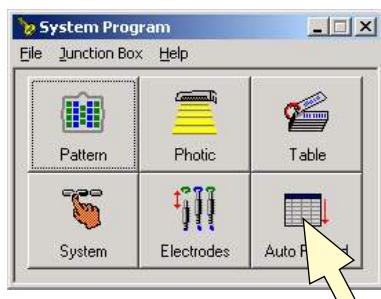
- 2) Select the channel. To select the previous or next channel, click the previous/next button.
 - 3) Click the On check box when the selected DC channel is used for the trigger channel.
 - 4) Type the threshold voltage in the Threshold text box and select the Condition for triggering.
 - 5) Click the OK button to close the Trigger dialog box.
4. Click the OK button to close the Electrode to be Saved dialog box. The selected settings are saved in memory.

The DC input signals can be used for the trigger signals of the QP-211A Analysis software, FOCUS

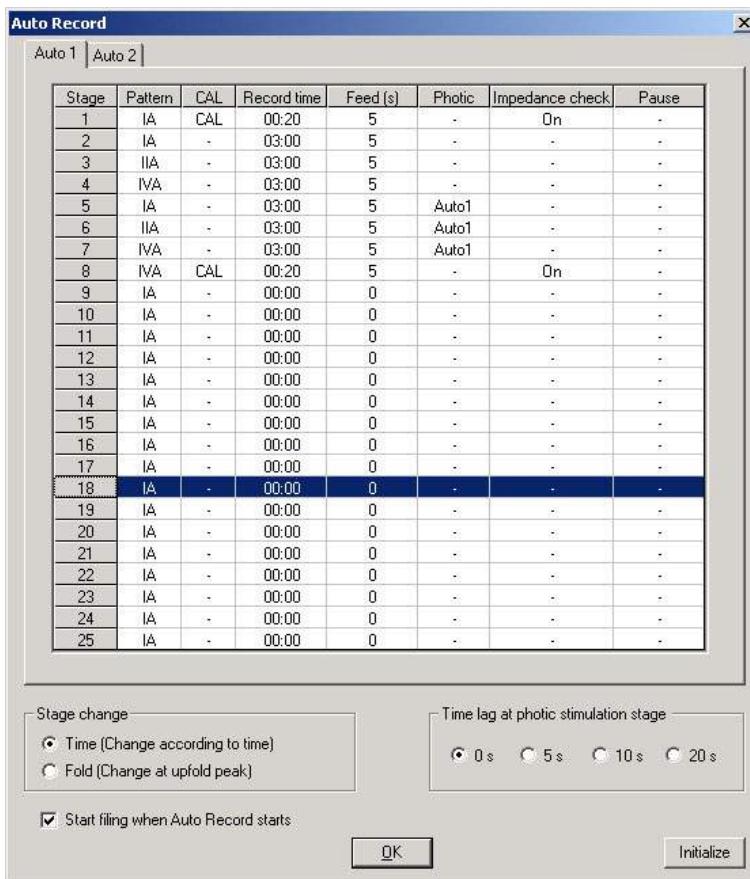
DC input channel	FOCUS trigger channel
DC01	1
DC02	2
DC03	4
DC04	8

Programming Automatic Recording Modes

The instrument has two programmable automatic recording modes (Auto 1 and Auto 2) with up to 25 stages each. You can program the pattern, recording time, photic stimulation mode, etc. for each stage.



1. Click the Auto Record icon in the System Program window. The Auto Record dialog box opens.



Dialog box options:

Stage change:

“Time” is only available for this instrument.

Start filing when Auto Record starts:

Select to start filing when the automatic recording mode is started.

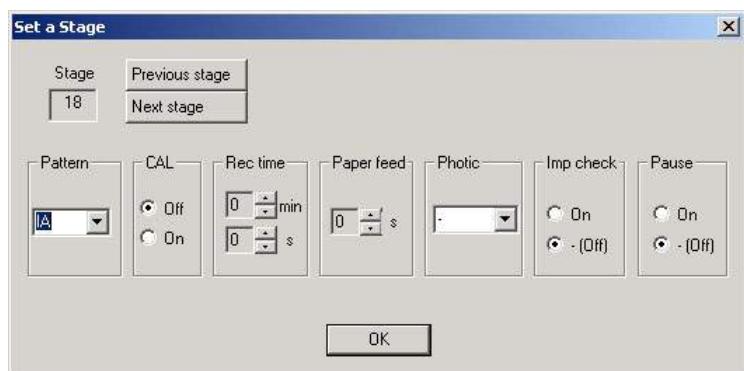
Time lag at photic stimulation stage:

Select the delay time to start automatic photic stimulation.

Initialize:

Restores the settings to the factory default settings.

2. Select the automatic recording mode by clicking the tab.
3. Click any column of the stage that you want to change. The Set a Stage dialog box opens.



4. Select the settings for the automatic recording mode. To change the previous or next stage settings, use the Previous stage or Next stage button.

Dialog box options

Pattern:

Select the pattern.

CAL:

Select “On” to only record the calibration waveforms for the stage.

Rec time:

Select the recording time for the stage.

Paper feed:

Select blank time for before starting waveform acquisition.

Photic:

Select the photic stimulation mode or hyperventilation mode.

Imp check:

Select “On” to perform skin-contact impedance check when the stage is started.

Pause:

Select “On” to temporarily stop automatic recording when the stage is end.

5. Click the OK button. To cancel the setting, click the close button.
6. Repeat steps 3 to 5 to change the settings for another stage.
7. Click the OK button to close the Auto Record dialog box.

Saving the System Program Settings in a File

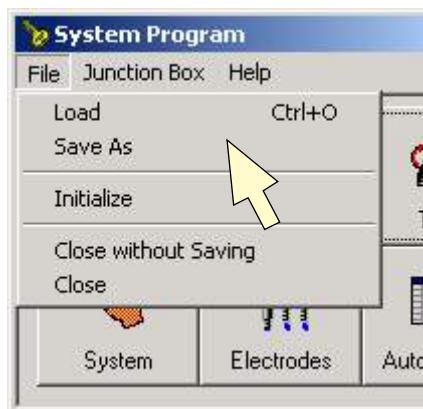
The changed settings in the System program can be saved in a file and called up, if necessary.

All the following settings are saved in a file.

- EEG pattern settings
- Automatic photic stimulation settings
- Contents of the table list of the Patient Information and Annotation dialog box
- Settings in the System Setting dialog box
- The electrodes that are used for waveform acquisition and saved in a file with the EEG waveforms.
- Long term EEG waveform monitoring settings
- Automatic EEG waveform recording settings

1. From the File menu, select Save As. The Save As dialog box opens.

To change the drive or folder, click the Save in box arrow.



2. Type the file name and the extension “reg” in the File name test box.

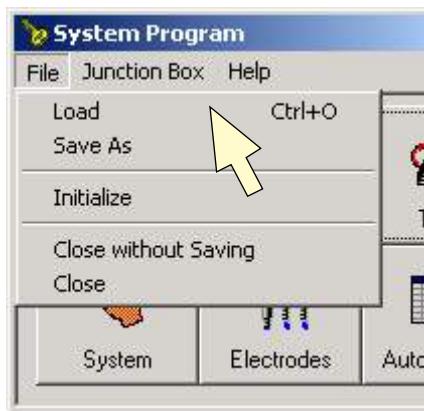
Example: Test.reg

3. Press the Enter key on the keyboard or click the Save button. All the current System program settings are saved in the file.

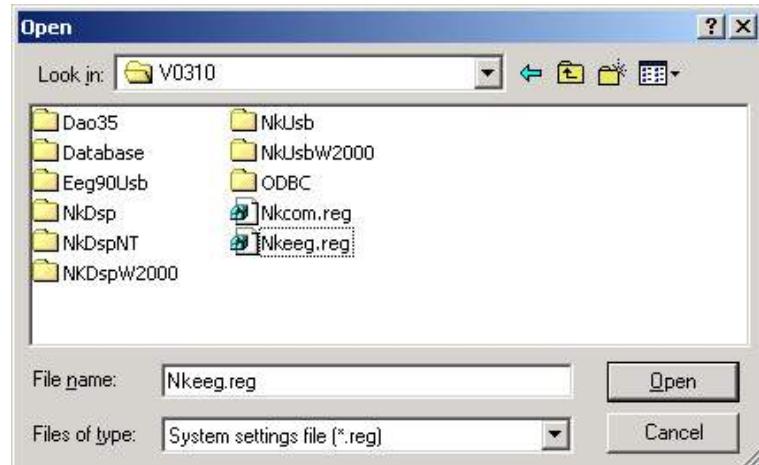
To cancel saving, click the Cancel button.

Calling Up Saved System Program Settings

You can call up System Program Settings which were previously saved in a file.



- From the File menu, select Load. The Open dialog box opens.



To change the drive or folder, click the Look in box arrow.

- Click the file name. The selected file name is displayed in the File name text box.

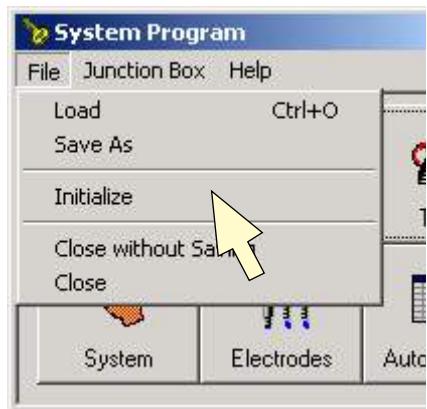
To load the file settings quickly, double-click the file name.

- Click the OK button to load the file.

To cancel, click the Cancel button.

Resetting All System Program Settings to the Factory Default Settings

This resets all settings in the System program to the factory default settings (listed in “List of Factory Default Settings”). All changed settings are lost if you do the following procedure.



1. From the File menu, select Initialize. The confirmation dialog box opens.
2. Click the OK button.

To cancel, click the Cancel button.

List of Factory Default Settings

Patterns

CH	Pattern IA					Pattern IIA				
	Montage		Amplifier Setting			Montage		Amplifier Setting		
	G1 (-) G2 (+)	SENS	TC	HF	CAL	G1 (-) G2 (+)	SENS	TC	HF	CAL
1	FP1 - A1	ACC	ACC	ACC	ACC	FP1 - F7	ACC	ACC	ACC	ACC
2	FP2 - A2	ACC	ACC	ACC	ACC	F7 - T3	ACC	ACC	ACC	ACC
3	F3 - A1	ACC	ACC	ACC	ACC	T3 - T5	ACC	ACC	ACC	ACC
4	F4 - A2	ACC	ACC	ACC	ACC	T5 - O1	ACC	ACC	ACC	ACC
5	C3 - A1	ACC	ACC	ACC	ACC	FP1 - F3	ACC	ACC	ACC	ACC
6	C4 - A2	ACC	ACC	ACC	ACC	F3 - C3	ACC	ACC	ACC	ACC
7	P3 - A1	ACC	ACC	ACC	ACC	C3 - P3	ACC	ACC	ACC	ACC
8	P4 - A2	ACC	ACC	ACC	ACC	P3 - O1	ACC	ACC	ACC	ACC
9	O1 - A1	ACC	ACC	ACC	ACC	FP2 - F4	ACC	ACC	ACC	ACC
10	O2 - A2	ACC	ACC	ACC	ACC	F4 - C4	ACC	ACC	ACC	ACC
11	F7 - A1	ACC	ACC	ACC	ACC	C4 - P4	ACC	ACC	ACC	ACC
12	F8 - A2	ACC	ACC	ACC	ACC	P4 - O2	ACC	ACC	ACC	ACC
13	T3 - A1	ACC	ACC	ACC	ACC	FP2 - F8	ACC	ACC	ACC	ACC
14	T4 - A2	ACC	ACC	ACC	ACC	F8 - T4	ACC	ACC	ACC	ACC
15	T5 - A1	ACC	ACC	ACC	ACC	T4 - T6	ACC	ACC	ACC	ACC
16	T6 - A2	ACC	ACC	ACC	ACC	T6 - O2	ACC	ACC	ACC	ACC
17	0V - X5	10	2.0	30	50	0V - X5	10	2.0	30	50
18	0V - X6	10	2.0	30	50	0V - X6	10	2.0	30	50
19	X1 - X2	200	1.0	60	1000	X1 - X2	200	1.0	60	1000
20	X3 - X4	20	0.03	120	100	X3 - X4	20	0.03	120	100
ch 21 to 64 FP1 - FP1		ACC	ACC	ACC	ACC	ch 21 to 64 FP1 - FP1	ACC	ACC	ACC	ACC
Unit		µV/mm	S	Hz	mV	Unit	µV/mm	S	Hz	mV

0V - X5: Respiration pickup (Flow)

0V - X6: Respiration pickup (Chest)

X1 - X2: ECG

X3 - X4: EMG

The “0V” is for the respiration pickup.

4. SYSTEM PROGRAM

CH	Pattern III A					Pattern IV A				
	Montage	Amplifier Setting				Montage	Amplifier Setting			
		G1 (-) G2 (+)	SENS	TC	HF		G1 (-) G2 (+)	SENS	TC	HF
1	FP1 - F3	ACC	ACC	ACC	ACC	FP1 - FP2	ACC	ACC	ACC	ACC
2	F3 - C3	ACC	ACC	ACC	ACC	F7 - F3	ACC	ACC	ACC	ACC
3	C3 - P3	ACC	ACC	ACC	ACC	F3 - FZ	ACC	ACC	ACC	ACC
4	P3 - O1	ACC	ACC	ACC	ACC	FZ - F4	ACC	ACC	ACC	ACC
5	FP2 - F4	ACC	ACC	ACC	ACC	F4 - F8	ACC	ACC	ACC	ACC
6	F4 - C4	ACC	ACC	ACC	ACC	A1 - T3	ACC	ACC	ACC	ACC
7	C4 - P4	ACC	ACC	ACC	ACC	T3 - C3	ACC	ACC	ACC	ACC
8	P4 - O2	ACC	ACC	ACC	ACC	C3 - CZ	ACC	ACC	ACC	ACC
9	FP1 - F7	ACC	ACC	ACC	ACC	CZ - C4	ACC	ACC	ACC	ACC
10	F7 - T3	ACC	ACC	ACC	ACC	C4 - T4	ACC	ACC	ACC	ACC
11	T3 - T5	ACC	ACC	ACC	ACC	T4 - A2	ACC	ACC	ACC	ACC
12	T5 - O1	ACC	ACC	ACC	ACC	T5 - P3	ACC	ACC	ACC	ACC
13	FP2 - F8	ACC	ACC	ACC	ACC	P3 - PZ	ACC	ACC	ACC	ACC
14	F8 - T4	ACC	ACC	ACC	ACC	PZ - P4	ACC	ACC	ACC	ACC
15	T4 - T6	ACC	ACC	ACC	ACC	P4 - T6	ACC	ACC	ACC	ACC
16	T6 - O2	ACC	ACC	ACC	ACC	O1 - O2	ACC	ACC	ACC	ACC
17	0V - X5	10	2.0	30	50	0V - X5	10	2.0	30	50
18	0V - X6	10	2.0	30	50	0V - X6	10	2.0	30	50
19	X1 - X2	200	1.0	60	1000	X1 - X2	200	1.0	60	1000
20	X3 - X4	20	0.03	120	100	X3 - X4	20	0.03	120	100
ch 21 to 64 FP1 - FP1		ACC	ACC	ACC	ACC	ch 21 to 64 FP1 - FP1	ACC	ACC	ACC	ACC
Unit		µV/mm	S	Hz	mV	Unit	µV/mm	S	Hz	mV

0V - X5: Respiration pickup (Flow)

0V - X6: Respiration pickup (Chest)

X1 - X2: ECG

X3 - X4: EMG

The “0V” is for the respiration pickup.

CH	Pattern I B					Pattern II B				
	Montage		Amplifier Setting			Montage		Amplifier Setting		
	G1 (-) G2 (+)	SENS	TC	HF	CAL	G1 (-) G2 (+)	SENS	TC	HF	CAL
1	FP1 - T3	ACC	ACC	ACC	ACC	FP1 - C3	ACC	ACC	ACC	ACC
2	T3 - O1	ACC	ACC	ACC	ACC	C3 - O1	ACC	ACC	ACC	ACC
3	FP1 - C3	ACC	ACC	ACC	ACC	FP2 - C4	ACC	ACC	ACC	ACC
4	C3 - O1	ACC	ACC	ACC	ACC	C4 - O2	ACC	ACC	ACC	ACC
5	FP2 - C4	ACC	ACC	ACC	ACC	FP1 - T3	ACC	ACC	ACC	ACC
6	C4 - O2	ACC	ACC	ACC	ACC	T3 - O1	ACC	ACC	ACC	ACC
7	FP2 - T4	ACC	ACC	ACC	ACC	FP2 - T4	ACC	ACC	ACC	ACC
8	T4 - O2	ACC	ACC	ACC	ACC	T4 - O2	ACC	ACC	ACC	ACC
9	T3 - C3	ACC	ACC	ACC	ACC	T3 - C3	ACC	ACC	ACC	ACC
10	C3 - CZ	ACC	ACC	ACC	ACC	C3 - CZ	ACC	ACC	ACC	ACC
11	CZ - C4	ACC	ACC	ACC	ACC	CZ - C4	ACC	ACC	ACC	ACC
12	C4 - T4	ACC	ACC	ACC	ACC	C4 - T4	ACC	ACC	ACC	ACC
13	0V - X5	10	2.0	30	50	0V - X5	10	2.0	30	50
14	0V - X6	10	2.0	30	50	0V - X6	10	2.0	30	50
15	X1 - X2	200	1.0	60	1000	X1 - X2	200	1.0	60	1000
16	X3 - X4	20	0.03	120	100	X3 - X4	20	0.03	120	100
ch 17 to 64 FP1 - FP1		ACC	ACC	ACC	ACC	ch 17 to 64 FP1 - FP1	ACC	ACC	ACC	ACC
Unit		µV/mm	S	Hz	mV	Unit	µV/mm	S	Hz	mV

0V - X5: Respiration pickup (Flow)

0V - X6: Respiration pickup (Chest)

X1 - X2: ECG

X3 - X4: EMG

The “OV” is for the respiration pickup.

4. SYSTEM PROGRAM

CH	Pattern VII B					Pattern *				
	Montage	Amplifier Setting				Montage	Amplifier Setting			
		G1 (-) G2 (+)	SENS	TC	HF		G1 (-) G2 (+)	SENS	TC	HF
1	FP1 - AV	ACC	ACC	ACC	ACC	FP1 - FP1	ACC	ACC	ACC	ACC
2	FP2 - AV	ACC	ACC	ACC	ACC	FP1 - FP1	ACC	ACC	ACC	ACC
3	F3 - AV	ACC	ACC	ACC	ACC	FP1 - FP1	ACC	ACC	ACC	ACC
4	F4 - AV	ACC	ACC	ACC	ACC	FP1 - FP1	ACC	ACC	ACC	ACC
5	C3 - AV	ACC	ACC	ACC	ACC	FP1 - FP1	ACC	ACC	ACC	ACC
6	C4 - AV	ACC	ACC	ACC	ACC	FP1 - FP1	ACC	ACC	ACC	ACC
7	P3 - AV	ACC	ACC	ACC	ACC	FP1 - FP1	ACC	ACC	ACC	ACC
8	P4 - AV	ACC	ACC	ACC	ACC	FP1 - FP1	ACC	ACC	ACC	ACC
9	O1 - AV	ACC	ACC	ACC	ACC	FP1 - FP1	ACC	ACC	ACC	ACC
10	O2 - AV	ACC	ACC	ACC	ACC	FP1 - FP1	ACC	ACC	ACC	ACC
11	A1 - AV	ACC	ACC	ACC	ACC	FP1 - FP1	ACC	ACC	ACC	ACC
12	A2 - AV	ACC	ACC	ACC	ACC	FP1 - FP1	ACC	ACC	ACC	ACC
13	F7 - AV	ACC	ACC	ACC	ACC	FP1 - FP1	ACC	ACC	ACC	ACC
14	F8 - AV	ACC	ACC	ACC	ACC	FP1 - FP1	ACC	ACC	ACC	ACC
15	T3 - AV	ACC	ACC	ACC	ACC	FP1 - FP1	ACC	ACC	ACC	ACC
16	T4 - AV	ACC	ACC	ACC	ACC	FP1 - FP1	ACC	ACC	ACC	ACC
17	T5 - AV	ACC	ACC	ACC	ACC	FP1 - FP1	ACC	ACC	ACC	ACC
18	T6 - AV	ACC	ACC	ACC	ACC	FP1 - FP1	ACC	ACC	ACC	ACC
19	FZ - AV	ACC	ACC	ACC	ACC	FP1 - FP1	ACC	ACC	ACC	ACC
20	FC - AV	ACC	ACC	ACC	ACC	FP1 - FP1	ACC	ACC	ACC	ACC
21	PZ - AV	ACC	ACC	ACC	ACC	FP1 - FP1	ACC	ACC	ACC	ACC
ch 22 to 64 FP1 - FP1		ACC	ACC	ACC	ACC	ch 22 to 64 FP1 - FP1	ACC	ACC	ACC	ACC
Unit		µV/mm	S	Hz	mV	Unit	µV/mm	S	Hz	mV

* VA to VIIIA, IIIB to VIB and VIIIB to VIIID

Automatic Photic Stimulation Settings

Step	Frequency		
	AUTO 1	AUTO2	AUTO 3
1	3 Hz	1 Hz	0.5 Hz
2	6	3	-
3	9	5	-
4	12	7	-
5	15	9	-
6	18	11	-
7	21	13	-
8	24	15	-
9	27	17	-
10	30	19	-
11	33	21	-
12	-	23	-
13	-	25	-
14	-	27	-
15	-	29	-
16	-	31	-
17	-	33	-
18	-	-	-
19	-	-	-
20	-	-	-
21	-	-	-
22	-	-	-
23	-	-	-
24	-	-	-
25	-	-	-
26	-	-	-
27	-	-	-
28	-	-	-
29	-	-	-
30	-	-	-

System Setting Dialog Box Options

General page

Setting	Factory default setting
Data Storage	Storage Drive: C * Automatic copy after acquisition: Off C:\NKT\EEG1100
Montage description	10-20
Sampling frequency	500 Hz
Aspect ratio	17
Other Settings	Automatically save selected waves: Off Use current system settings in review: Off Save current system settings with EEG data when exporting selected wave: Off 2 bed acquisition: Off
AC filter	50 Hz
Reference electrode for Imp check	A1/A2
Reference electrode for EEG	C3/C4
Patient Image	Enable video camera: Off Use analog video link: Off Show camera window in review: Off Control VTR by EEG 1000: Off
Long term monitoring	Use long term monitoring: Off
Save settings as an Acquisition shortcut	System Setting 1

Junction box, operation display page

Setting	Factory default setting
Reset when pattern changes	Reference electrode: On AC filter: Off Override: On Record time: On
Pattern number when group changes	Return to one
Impedance check	10 min
Electrode junction box time constant	2 s
Impedance threshold switch	Descending
HV time event interval	30 s
Post HV auto end	On, 300 s
Page display time	Pause 1: 250 msec Pause 2: 500 msec Pause 3: 750 msec
Reset switch function	Press and hold
Time constant	seconds
High cut filter	30, 60 Hz
Sens 3 or 2.5	Off
Add events in fast review	Event: Check before: 0 s

Standard page

Setting	Factory default setting
Pattern	IA
ACC [All channel control] Amp settings	CAL voltage: 50 mV Sensitivity: 10 mV/mm Time constant: 0.3 s High cut filter: 120 Hz
CAL	Auto square
Acquisition	Manual
Impedance check threshold	10 kΩ
Photic/HV	Mode: Auto1 Photic Stimulation time: 10 s Pause: 10 s Hyperventilation Period: 3 min Interval: 3 s
Paper speed	Not available
Record Cal wave	On
AC filter	Off
Display patient image	Not available

DC input/output, pen recorder page

Setting	Factory default setting
DC output sensitivity	Not available
DC input sensitivity at 200 mV/mm	5 mm/1.0 V
Pattern mark analog output in review	Not available
Mark position	Not available
Pen parking when not used	Not available
Record switch starts filing in acquisition	Not available
Play button starts recording in review	Not available
Extend pen reset period	Not available
Stop feeding at paper fold	Not available

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General

The Acquisition program acquires the EEG waveforms and can display up to 64 channels of EEG waveforms. You can save the EEG waveforms with the patient information, annotations, amplifier settings and display settings in a hard disk or MO disk as an EEG data file.

Before or during recording you can temporarily change the measurement settings and enter patient information. Temporary setting changes are lost when you close the Acquisition program. Temporary setting changes are either lost or still apply when you change the pattern - this depends on the Reset when pattern changes setting. Refer to “Resetting the Settings When Pattern Changes” in Section 3. Temporary setting changes are indicated on the pattern table (refer to “Changing the Measurement Settings”).

To permanently change a setting, you must use the System program. Refer to Section 4.

WARNING

When using the instrument for brain death diagnosis, before examination, check and adjust the date and time of the system. The date and time on the screen and on the recording result are part of important information for the medical record.

CAUTION

- During measurement, do not change the date and time. This makes the order of the saved event data and the time of the saved waveforms incorrect.

EEG-9100A/J/K/G

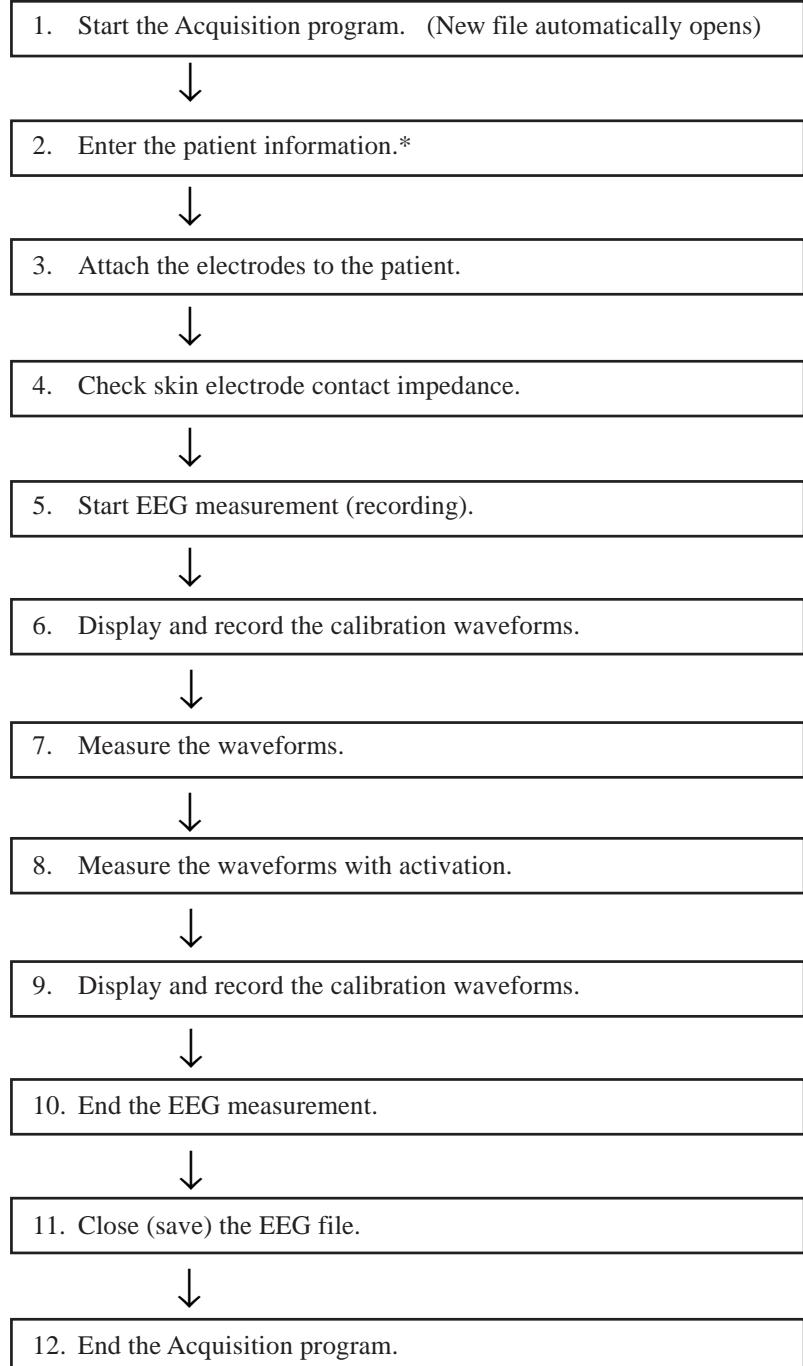
- Operate the PC unit with AC power when using the Acquisition program. The battery power is used for a sudden power loss or extreme power surge.
- During battery power operation, do not move the instrument.
- Do not open the acquisition program if the PC unit battery is not charged enough. If the acquisition program runs while charging the battery, not enough AC power is supplied to the MO disk drive from the power supply unit, and the MO disk drive may malfunction. Check that the PC unit battery is fully charged before opening the acquisition program.

EEG-9200A/J/K/G

During measurement, do not insert or remove a CD-R or CD-RW disk into the CD-RW drive. Otherwise, the Acquisition program may malfunction.

NOTE

- To use the Acquisition program, 100 MB or more hard disk free space is required.
- Turn off any screen saver and close all application programs before opening the Acquisition program. Otherwise, the Acquisition program may not function properly.
- When the USB cable from the electrode junction box is not connected to the PC unit, the Acquisition program cannot open. If the Acquisition program does not open, check the USB cable connection. After connecting the USB cable, restart Windows.
- During operation, do not remove the USB cable from the PC unit.
- To perform the photic stimulation, the optional LS-901AJ/AK/AG Photo control unit is required. Before opening the Acquisition program, check the cable connection between the photo control unit and PC unit and power status of the photo control unit.
- When using the optional ZE-510AK Hyperventilation unit, the optional LS-901AJ/AK/AG Photo control unit is required. Before opening the Acquisition program, check the cable connection between the photo control unit and hyperventilation unit.

Flowchart of Acquiring EEG Waveforms

After measurement, use the Review program to review and print out the EEG waveforms.

* Patient information may be entered before, during or after recording.

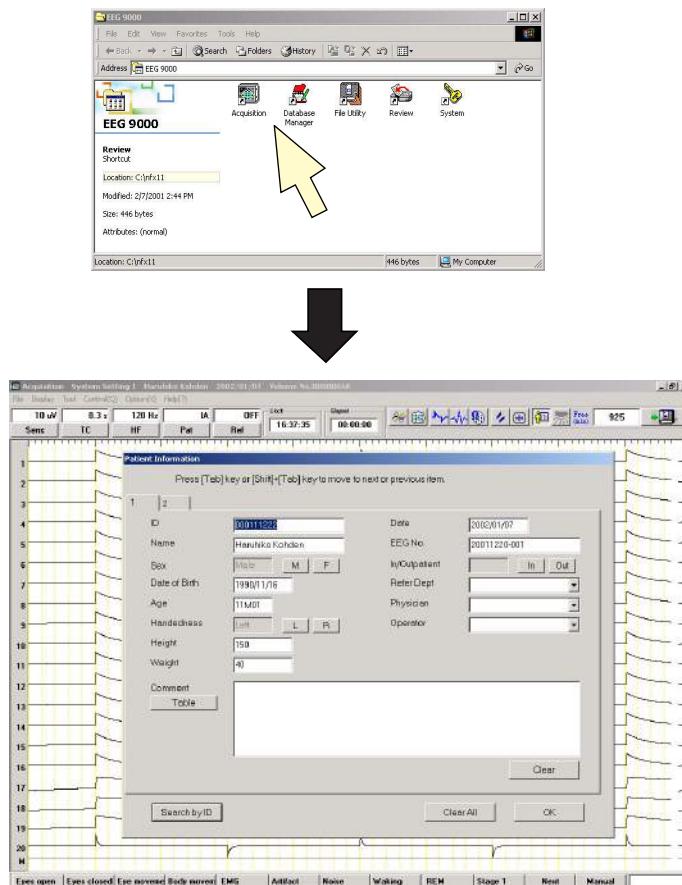
Opening the Acquisition Program

NOTE

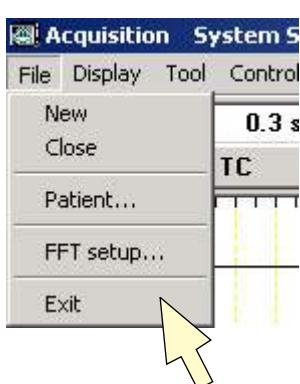
Turn off any screen saver and close all application programs before opening the Acquisition program. Otherwise, the Acquisition program may not function properly.



From the EEG 9000 window, double-click the Acquisition icon. The EEG waveforms are displayed and a new EEG file automatically opens with the Patient Information dialog box.



To close the Acquisition program:

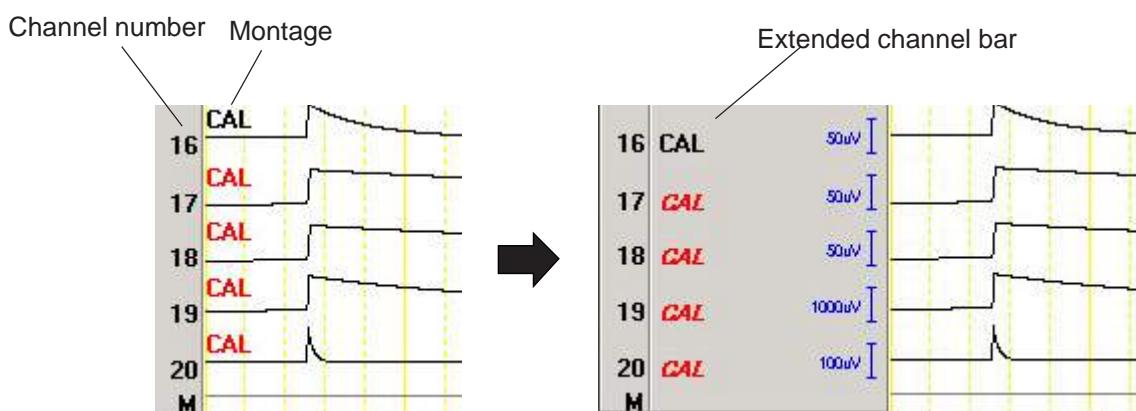
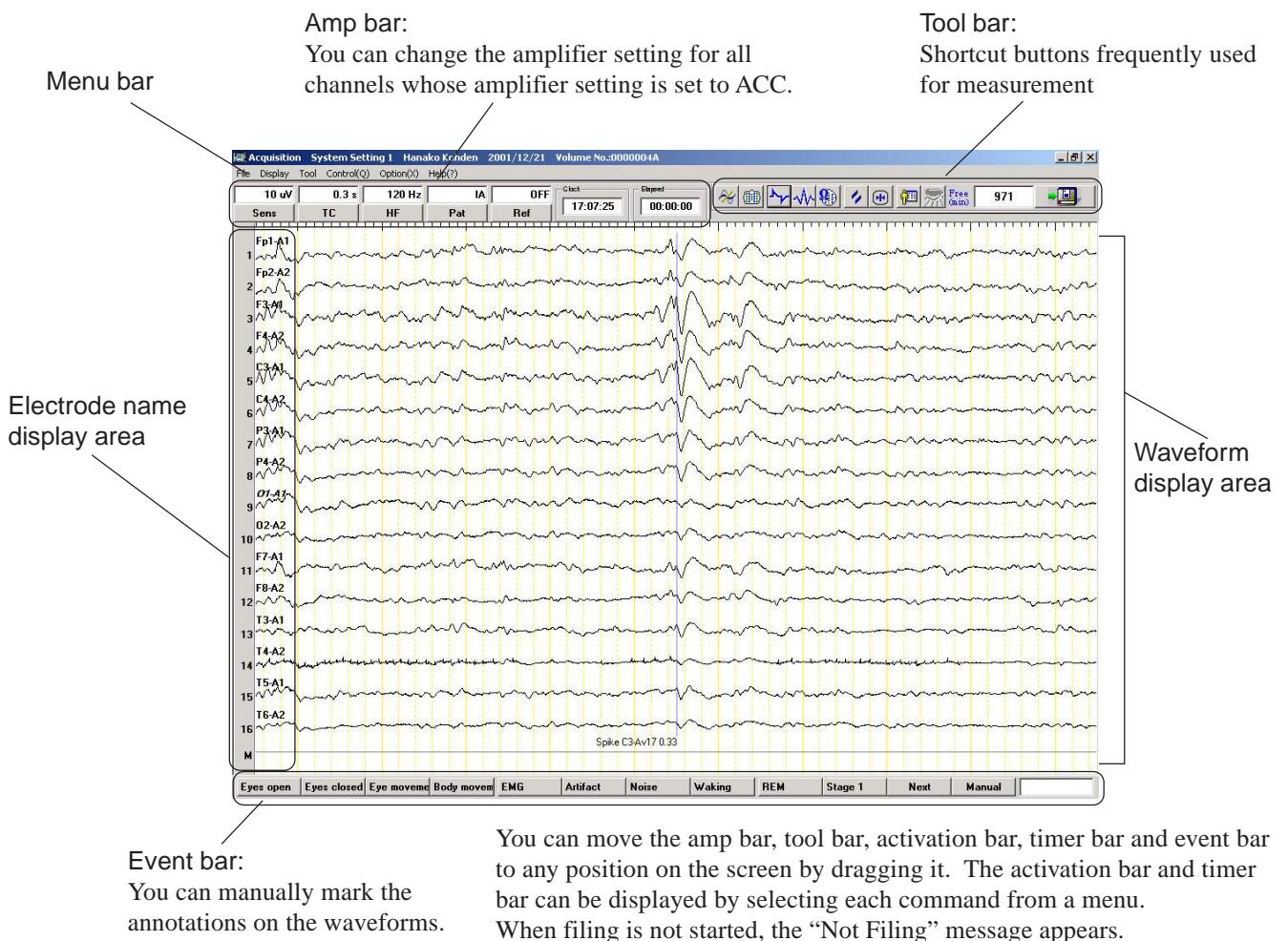


CAUTION

Do not remove the magneto-optical disk until the Acquisition program is completely closed and the disk drive access lamp is off. Otherwise, the disk or disk drive may be damaged.

Select Exit from the File menu. The Acquisition program returns to the icon.

Acquisition Screen



To display the extended channel bar, check the “Display extended channel bar” check box in the Display Control dialog box. The DC conversion value and the scales corresponding to the DC low and high limit are displayed.

- To display the extended channel bar, refer to “Changing the Measurement Settings - Changing the Waveform Display” in this section 4.
- To change the DC conversion settings, refer to the DC input “Programming Patterns - Changing the Conversion Range of the DC Input Signals” in Section 4.

You can display either the montage or comment on the extended channel bar. Refer to “Programming Patterns - Selecting the Item Displayed on the Extended Channel Bar” in Section 4.

Explanation of Each Function

Menu Bar

File Menu



You can manage files. All EEG measurement data is saved in files.

New

Use this command to create a new file. If any other files are open when you select New, a message appears so you can save the files before creating a new file. Refer to “Starting and Ending EEG Measurement - Closing the File without Saving” in this section.

Close

Closes and saves the current file. Refer to “Starting and Ending EEG Measurement - Ending the Measurement and Saving the File” in this section.

Patient

Opens the Patient Information dialog box to enter the patient information. You can also open the Patient Information dialog box by clicking the Display Patient Information button on the tool bar. Refer to “Entering Patient Information and Other Data” in this section.

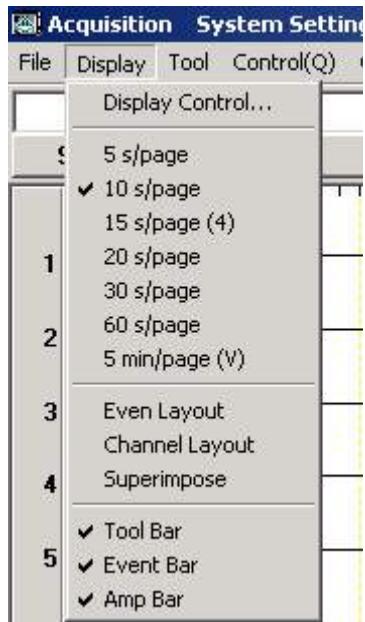
FFT setup

Opens the FFT settings dialog box to select the FFT analysis settings for the EEG frequency analysis.

Exit

Closes the Acquisition program and reduces it to an icon.

Display Menu



You can set the waveform display mode.

Display Control

Opens the Display Control dialog box to select whether or not to display the electrode name (montage) and vertical lines to indicate time scale, etc.

5 s/page

Displays a 5 second page on the screen (corresponds to recording at 60 mm/s).

10 s/page

Displays a 10 second page on the screen (corresponds to recording at 30 mm/s).

15 s/page

Displays a 15 second page on the screen (corresponds to recording at 20 mm/s).

20 s/page

Displays a 20 second page on the screen (corresponds to recording at 15 mm/s).

30 s/page

Displays a 30 second page on the screen (corresponds to recording at 10 mm/s).

60 s/page

Displays a 60 second page on the screen (corresponds to recording at 5 mm/s).

5 min/page

Displays a 5 minute page on the screen (corresponds to recording at 1 mm/s).

Even Layout

Evenly spaces the baseline positions for all channels in channel order. Channels that are temporarily turned off are omitted.

Channel Layout

Evenly spaces the baseline positions for all channels in channel order. Blank spaces are included to indicate undisplayed channels.

Superimpose

Overlays consecutive odd and even number channels.

Tool Bar

Displays the Tool bar.

Event Bar

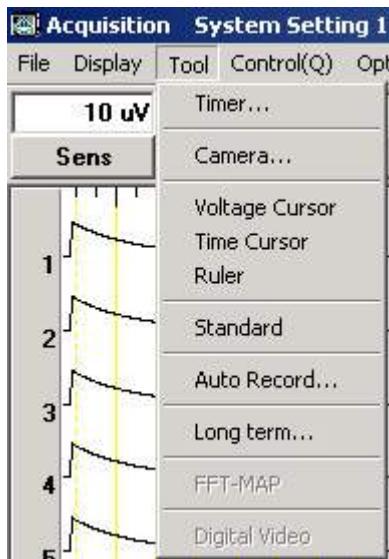
Displays the Event bar.

Amp Bar

Displays the amp bar.

Tool Menu

You can use the following tools for the EEG waveform measurement.



Timer

Opens the Timer bar to display the recording timer, hyperventilation and post hyperventilation timer or stopwatch.

Camera

Displays the patient image on the screen. The optional QI-111A Camera Interface board and a video camera are required. The Enable video camera check box (System program → System Settings → General page) must be selected in the System Setting window of the System program. Refer to “Changing the Settings in the System Settings Dialog Box” in Section 3. This command is not available for the EEG-9100A/J/K/G Electroencephalograph.

Voltage Cursor

Displays the two horizontal cursors to measure the voltage (amplitude) between the two cursors. This function is available only when the screen is frozen by clicking the Freeze button on the tool bar.

Time Cursor

Displays the two vertical cursors to measure the time interval between the two cursors. This function is available only when the screen is frozen by clicking the Freeze button on the tool bar.

Ruler

Displays the ruler to measure amplitude and time interval of the waveform. This function is available only when the screen is frozen by clicking the Freeze button on the tool bar.

Standard

Restores the various settings to the default settings set in the System program.

Auto Record

Opens the Auto Record dialog box for the automatic EEG waveform recording.

Long term

Opens the Long Term bar for the long term EEG waveform monitoring.

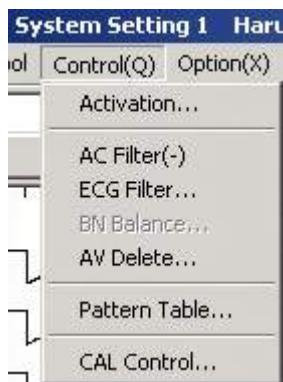
FFT Map

Not available for this instrument.

Digital Video

When the QV-110AK Digital Video Unit is installed, select this command to start patient image recording by clicking the Start/Stop Filing button. This command is not available for the EEG-9100A/J/K/G Electroencephalograph.

Control Menu



Activation

Opens the activation bar to select the photic stimulation mode, and optional pulse, frequency and hyperventilation mode. You can also open the activation bar by clicking the Display Activation Control button on the tool bar.

AC Filter

Turns the AC filter on to reduce the AC interference. You can also turn the AC filter on by clicking the AC Filter On/Off button on the tool bar.

ECG Filter

Opens the ECG Filter dialog box to reduce the ECG waveform superimposed on the EEG waveform. When another pattern is selected, the ECG filter is automatically set to off.

BN Balance

Not available for this instrument.

AV Delete

Opens the AV Delete dialog box to select or delete reference electrodes in the AV derivation.

Pattern Table

Opens the pattern table to check or temporarily change the currently selected montage, amplifier settings (sensitivity, time constant, high-cut filter, calibration voltage), waveform display on/off, waveform color, and amplitude limit for each channel. You can also open the pattern table by clicking the Display Pattern Table button on the tool bar.

CAL Control

Opens the CAL Control dialog box to select the calibration mode and voltage.

Option Menu



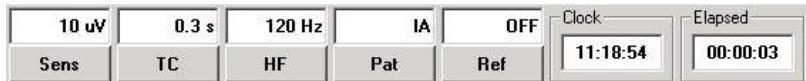
Installed optional programs can be opened from the Option menu. The EEG Scope - comparison mode is provided as a standard. For the EEG Scope - comparison mode, refer to the EEG Scope Operator's manual.

Help Menu

About

Displays the information about program.

Amp Bar



The amplifier settings (sensitivity, time constant and high-cut filter), pattern and reference electrodes can be changed for all channels at a time by clicking the button on the amp bar. You can select whether or not to display the amp bar by clicking the Amp bar button on the tool bar.

Sens

Sens (Sensitivity selection button)

Opens the Sensitivity dialog box to select the sensitivity. This selection applies to all channels whose sensitivity setting is set to ACC.

Sensitivity selection list (μ V/mm):

1, 2, 3, 5, 7, 10, 15, 20, 30, 50, 75, 100, 150, 200

OFF: Only the baseline is displayed.

TC

TC (Time constant selection button)

Opens the Time Constant dialog box to select the time constant (low-cut filter). This selection applies to all channels whose Time Constant setting is set to ACC. You can select the time constant display format (time constant (s) or low-cut filter (Hz)) in the System program.

Time constant selection list (s):

0.001, 0.003, 0.03, 0.1, 0.3, 0.6, 1.0, 2.0

Low-cut filter selection list (Hz):

0.08, 0.16, 0.27, 0.53, 1.6, 5.3, 53, 160

HF

HF (High-cut filter selection button)

Opens the High Cut Filter dialog box to select the high cut filter. This selection applies to all channels whose high-cut filter setting is set to ACC.

High-cut filter selection list (Hz):

15, 35, 60, 70, 120, 300

50RP: Reduces frequency components over 50 Hz (-18 dB/oct) to remove artifacts (EMG). Depending on examination circumstances, use the 50RP filter to remove EMG.

NOTE

The selectable settings (buttons) in the HF dialog box change according to the sampling frequency setting in “Selecting and Saving the Electrodes for Waveform Acquisition” in Section 4.

Pat**Pat (Pattern selection button)**

Opens the Pattern dialog box to select a programmed EEG pattern.

Programmed pattern list:

I to VIII A, B, C, D and Free A, B, C, D (36 patterns per set file).

A pattern includes the montage and amplifier settings (sensitivity, high-cut filter, time constant), calibration voltage, waveform display on/off, waveforms color and amplitude limit.

Ref**Ref (Reference electrode selection button)****NOTE**

When the reference electrode is set to A1 + A2 in waveform acquisition, you cannot change this setting during waveform review.

Opens to select the reference electrode. Only available for monopolar derivation.

Reference electrode selection list:

A1 → A2: Switches all A1 to A2.

A1 ← A2: Switches all A2 to A1.

A1 ↔ A2: Switches A1 and A2.

A1 + A2: Short-circuits A1 and A2 to each other in the electrode junction box.

Vx: Switches all A1 and A2 to CZ.

AV: Switches all A1 and A2 to the reference for AV derivation.

BN: Not available for this instrument.

SD : Switches all A1 and A2 to the reference for Laplacian derivation.

Aav: Switches all A1 and A2 to the averaged reference of A1 and A2.

Org: Switches all A1 and A2 to the averaged voltage of C3 and C4 for the original reference derivation (system reference).

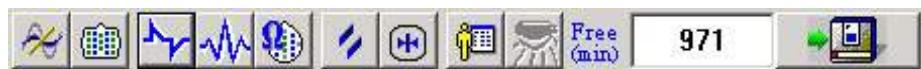
OFF: Cancels the selection of reference electrode and returns to the programmed setting.

**Clock**

Displays the current time.

Elapsed time

Displays the elapsed time from the start of filing.

Tool Bar**AC Filter On/Off button**

Turns the AC filter on to reduce the AC interference. You can also turn the AC filter on by selecting AC Filter from the Control menu.

**Display Pattern Table button**

Opens the pattern table to check or temporarily change the currently selected montage, amplifier settings (sensitivity, time constant, high-cut filter, calibration voltage), waveform display on/off, waveform color, and amplitude limit for each channel. You can also open the pattern table by selecting Pattern Table from the Control menu.

**CAL Signal button**

Displays the calibration waveform.

**EEG Signal button**

Displays the EEG waveforms.

**Impedance Check button**

Opens the Impedance Check dialog box to check the skin-electrode contact impedance. The impedance check starts when this button is pressed and held for about two seconds.

**Reset button**

Returns all waveforms to the baseline position. When this button is clicked the "RESET ON/OFF" annotation is displayed at the bottom of the screen and the annotation is saved in a file as an event.

**Freeze button**

Freezes the waveforms. The EEG waveforms can still be acquired while they are frozen. You can verify the waveforms and measure amplitude or time interval of the waveform.

**Display Patient Information button**

Opens the Patient Information dialog box to enter the patient information. You can also open the Patient Information dialog box by selecting Patient from the File menu.

**Display Activation Control button**

Opens the activation bar to select the photic stimulation mode, and optional pulse, frequency and hyperventilation mode. You can also open the activation bar by selecting Activation from the Control menu.



Units: minutes

Start/Stop Filing button

Starts/Stops saving the EEG data in a file. The remaining available data acquisition time (minute) based on the remaining free disk space is displayed beside this button.

Event Bar



Event name input text box

You can manually add event marks (annotation) on the waveforms.

To add an annotation to a waveform that you want:

- 1) Right-click the waveform. The Annotation dialog box opens.
- 2) Select the annotation in the list or type the annotation.

To add an annotation to the current time on the waveform:

- Click the annotation on the event bar, or press the corresponding function key on the keyboard. To change the annotation display, click the Next button on the event bar. You can add an event mark by typing the annotation in the event name input text box.
- 1) Press the Insert key on the keyboard. The Annotation dialog box opens.
2) Select the annotation in the list or type the annotation.

Refer to “Annotating EEG Waveforms” in this section.

Starting and Ending EEG Measurement

Starting Measurement

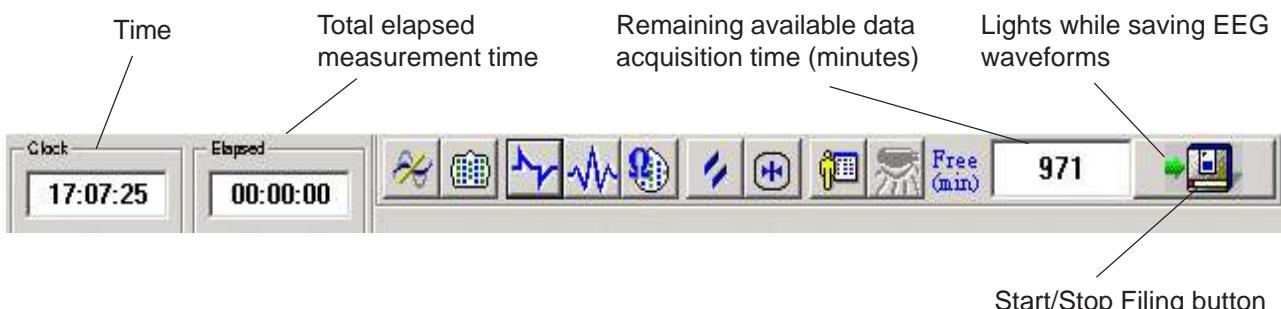
NOTE

- When saving the EEG data file in an MO disk, prepare a formatted MO disk with a volume number. Refer to “Formatting a Magneto-optical Disk” in Section 3.
- Before measurement, check the following.
 - The electrodes that are used for waveform acquisition and sampling frequency are properly selected considering the disk capacity and recording time (Refer to “Selecting and Saving the Electrode for Waveform Acquisition” in Section 4).
 - Storage drive is correctly selected. Refer to “Selecting Storage Drive - Changing the Settings in the System Setting Dialog Box” in Section 4.

Click the  Start/Stop Filing button on the tool bar to start saving EEG waveforms. The Recording LED lights to indicate that EEG waveforms are being saved in the disk.

To stop saving EEG waveforms, click the Start/Stop Filing button again.

The Elapsed box on the amp bar shows the total elapsed measurement time. The box beside the Start/Stop Filing button shows the remaining available data acquisition time based on the remaining free disk space.



“Formatting a Magneto-optical Disk” in Section 3 explains settings which determine the amount of disk space used by recording.

To return all waveforms to the baseline position, click the  Reset button on the tool bar. When this button is clicked the “RESET ON/OFF” annotation is displayed at the bottom of the screen and the annotation is saved in a file as an event.

Ending the Measurement and Saving the File

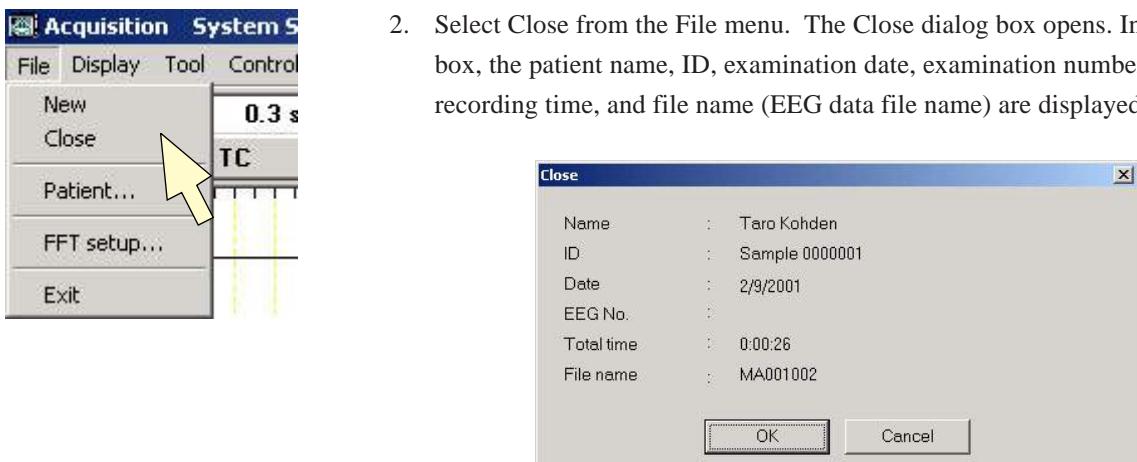
CAUTION

Do not remove the magneto-optical disk until the Acquisition program is completely closed and the disk drive access lamp is off. Otherwise, the disk or disk drive may be damaged.

NOTE

- The patient's ID and name must be entered in order to close the EEG file.
- To save the EEG waveforms, do the following steps. Otherwise, the EEG waveforms are lost.

1. Click the  Start/Stop Filing button on the tool bar.
2. Select Close from the File menu. The Close dialog box opens. In the dialog box, the patient name, ID, examination date, examination number, total recording time, and file name (EEG data file name) are displayed.



3. Click the OK button to close the EEG data file.

To cancel closing, click the Cancel button. The Patient Information dialog box opens. Check the contents of the dialog box and continue the measurement.

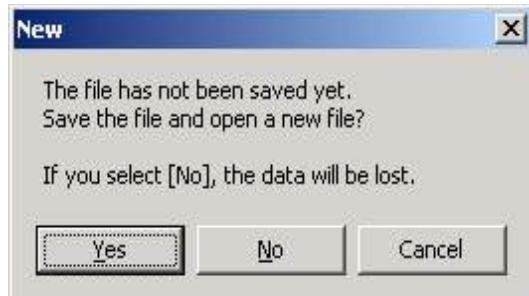
If a file which has the same ID number but different patient name or sex is registered in the database manager, the Information dialog box opens. Select the proper option and click the OK button.



Closing the File Without Saving

1. Click the  Start/Stop Filing button on the tool bar.

2. Select New from the File menu. The New dialog box opens.



3. Do one of the following.

- To close the file without saving, click the No button. A new file automatically opens.
- To close and save the file, click the Yes button. A new file automatically opens.
- To continue measurement, click the Cancel button.

Entering Patient Information and Other Data

General

NOTE

The patient's ID and name must be entered in order to close the EEG file.

You can enter the patient information by either mouse or keyboard.

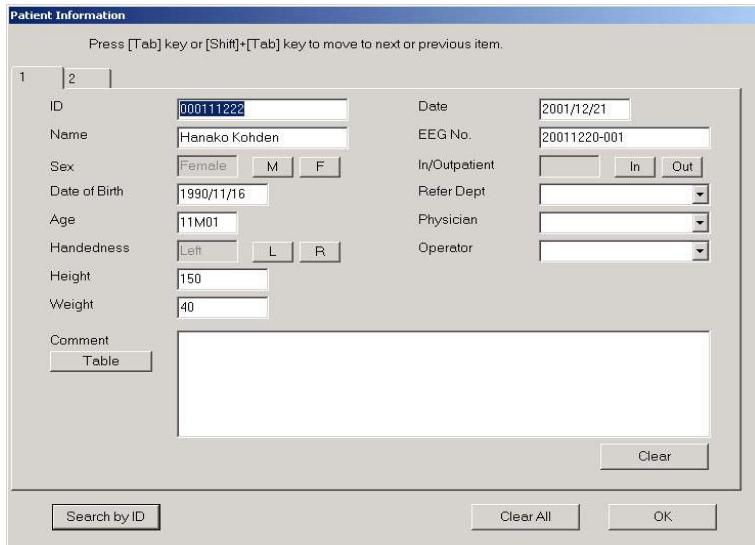
There are two pages in the patient information dialog box. You can enter the basic patient information on page 1 and the patient condition such as seizure type, sleep disorder, medical history, and medication on page 2.

Opening the Patient Information Dialog Box

Click the  Display Patient Information button on the tool bar, or select Patient Information from the File menu. The Patient Information dialog box opens.

To open the page 2, click the 2 tab.

To close the Patient Information dialog box, click the OK button.



Patient Information
Press [Tab] key or [Shift]+[Tab] key to move to next or previous item.

ID	000111222	Date	2001/12/21
Name	Hanako Kohden	EEG No.	20011220-001
Sex	Female	In/Outpatient	In Out
Date of Birth	1990/11/16	Refer Dept	
Age	11M01	Physician	
Handedness	Left	Operator	
Height	150		
Weight	40		
Comment <input type="button" value="Table"/> <input type="button" value="Search by ID"/>			
<input type="button" value="Clear"/> <input type="button" value="Search by ID"/> <input type="button" value="Clear All"/> <input type="button" value="OK"/>			

Patient Information dialog box page 1

Clear All:

Deletes the patient information on pages 1 and 2.

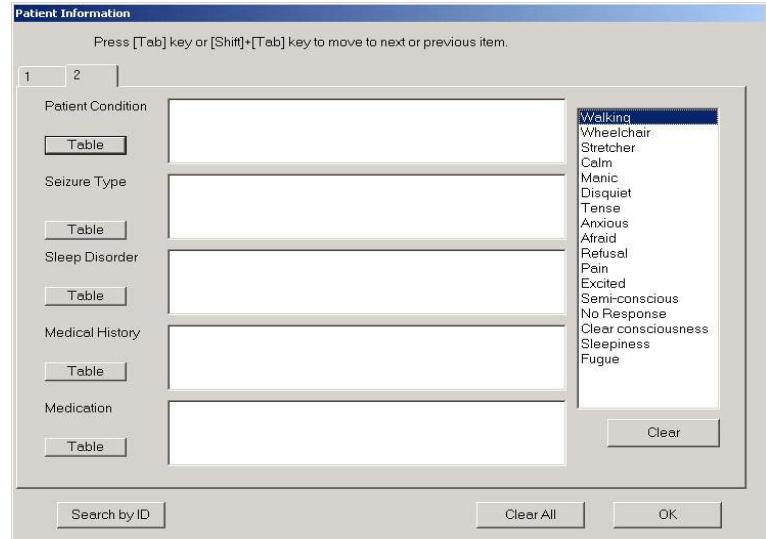
OK:

Closes the Patient Information dialog box.

Search:

Searches for the patient information by ID number.

Patient Information dialog box page 2



Patient Information
Press [Tab] key or [Shift]+[Tab] key to move to next or previous item.

Patient Condition	<input type="button" value="Table"/>	<ul style="list-style-type: none"> Walking Wheelchair Stretcher Calm Manic Disquiet Tense Anxious Afraid Refusal Pain Excited Semi-conscious No Response Clear consciousness Sleepiness Fugue
Seizure Type	<input type="button" value="Table"/>	
Sleep Disorder	<input type="button" value="Table"/>	
Medical History	<input type="button" value="Table"/>	
Medication	<input type="button" value="Table"/>	
<input type="button" value="Clear"/> <input type="button" value="Search by ID"/> <input type="button" value="Clear All"/> <input type="button" value="OK"/>		

5. ACQUISITION PROGRAM

Patient Information Dialog Box Options

The settings in the list box can be changed. Refer to “Editing the Waveform Annotation and Patient Information Items” in Section 4.

Patient Information dialog box page 1

Entry items for Patient Information dialog box:

- ID (up to 30 characters)
- Name (up to 40 characters)
- Sex (M or F)
- Date of Birth (up to 10 characters)
- Age (up to 5 characters)
- Handedness (L or R)
- Height (up to 5 numbers)
- Weight (up to 5 numbers)
- Comment (up to 160 characters)
- Date (Examination date)
(up to 10 characters)
- EEG No. (Examination number)
(up to 30 characters)
- In/Out patient (In or Out)
- Refer. Dept (Referring department)
(up to 20 characters)
- Physician (up to 40 characters)
- Operator (up to 40 characters)

The Date (Examination date) is automatically entered.

Enter the Date of Birth with the same format as the Date.

The age is automatically calculated when the date of birth is entered.

This function does not support ages of 100 or older.

If the age of the patient is 100 or older, edit the age manually.

The format of the Date and Date of Birth can be changed with the Windows Control Panel.

Table:

Calls up a list of preset conditions for “Comment”. When one of these conditions is clicked, it is entered at the cursor position in the Comment window. You can preset conditions for each item. Refer to “Editing the Waveform Annotations and Patient Information Items” in section 4.

Clear:

Deletes the patient information on page 1.

Patient Information dialog box page 2

Entry items for the Patient Information 2 dialog box:

Up to 180 characters can be entered. You can call up the preset condition list by clicking the Table button.

1. Patient Condition
2. Seizure Type
3. Sleep Disorder
4. Medical History
5. Medication

Clear:

Deletes the patient information on page 2.

Entering the Patient Information

NOTE

- **Patient ID and name must be entered, otherwise the EEG file cannot be closed.**
- **The characters “ | ” and “ ‘ ’ ” cannot be entered.**

- To delete the currently displayed or entered patient information:
Click the Clear button on the dialog box.

- To select a description box:
 - 1) Move the mouse pointer to the description box and click it. The input cursor appears.
 - 2) Type the text with the keyboard.

- To move the cursor to the next description box:
Press the TAB key. If there is any word in the box, it is highlighted.

- To move the cursor to a previous description box:
Press the TAB and SHIFT keys together. If there is any word in the box, it is highlighted.

- To insert a character in a description box:
 - 1) Move the mouse pointer to the appropriate position in the box and click it.
The cursor appears at the pointer position.
 - 2) Type a character with the keyboard.

- To change text:
 - 1) Move the mouse pointer to the appropriate word or phrase and double-click it to select the word or phrase. The selected word or phrase is highlighted.
 - 2) Type the text with the keyboard. The new text replaces the highlighted text.

- To enter text in a table or a selection list box:
The following items have a table or selection list box. The settings are preset in the System program.

Table:	Comment, Patient Condition, Seizure Type, Sleep disorder, Medical History, Medication
Selection list box:	Refer. Dept, Physician, and Operator.

 - 1) Move the mouse pointer to the appropriate position in the box and click it.
The input cursor appears.
 - 2) Click the table button (the arrow following the box for “Refer. Dept”, “Physician”, and “Operator”) to open the selection list box.
 - 3) Click the text in the selection list box to enter the text.

- To enter text using a button:
“Sex”, “Handedness” and “In/Outpatient” can be selected by clicking the corresponding button.

Checking the Skin-electrode Impedance

WARNING

Do not check the skin-electrode contact impedance when using a needle electrode or intracranial electrode. Failure to follow this warning injures the patient because these electrodes will be damaged by electrolyzation inside the body.

NOTE

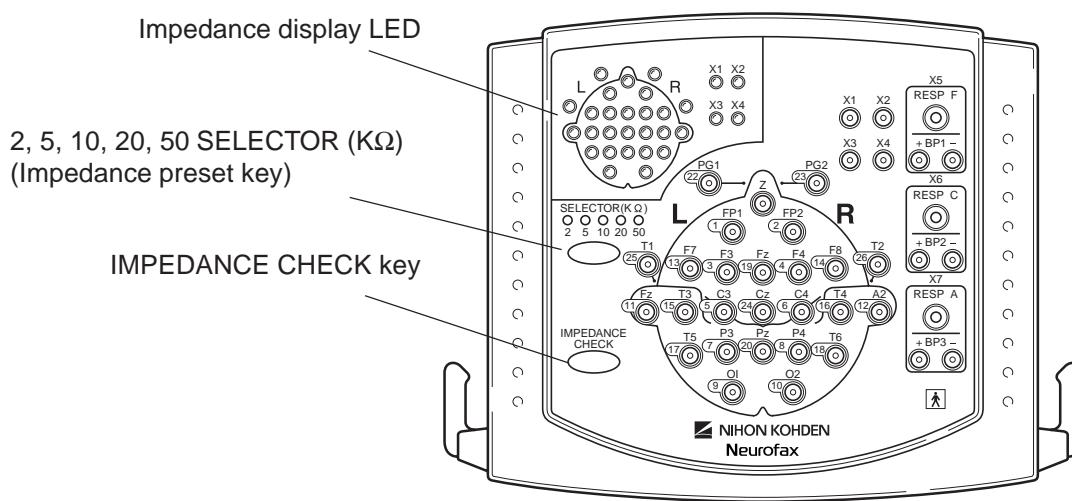
- The impedance can only be checked in the Acquisition program.
- Attach the Z, C3 and C4, A1 and A2 (or Fp1 and Fp2) electrodes to the patient. Otherwise, the impedance check result may be incorrect.

The instrument checks the skin-electrode impedance for the following electrodes.

- When calibration waveforms are displayed, the electrodes that are included in all pattern are checked.
- When the EEG waveforms are displayed, the electrodes that are included in the currently selected pattern are checked.

Setting Impedance Threshold

To select the impedance threshold for the skin-electrode impedance check, press the impedance preset key on the electrode junction box to select 2, 5, 10, 20 or 50 k Ω .



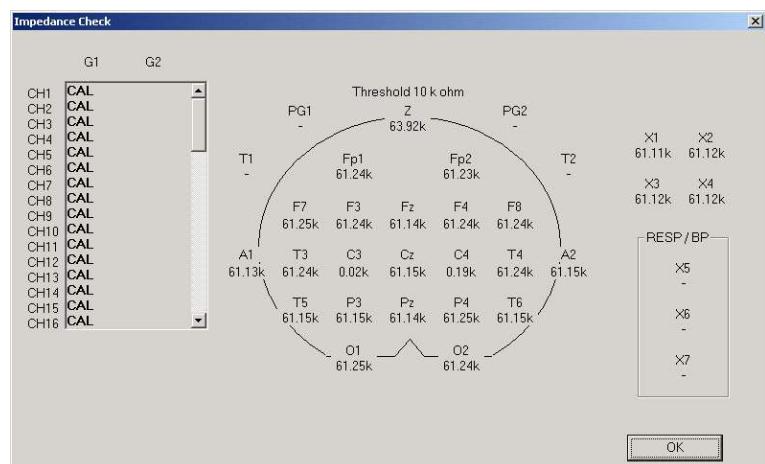
Checking Skin-electrode Impedance

On the electrode junction box:

1. Press and hold the IMPEDANCE CHECK key on the electrode junction box for about two seconds to start skin-electrode contact impedance check. After about one second, the impedance check result is displayed by LEDs on the electrode junction box and on the screen. The LED continuously lights if the corresponding electrode's impedance exceeds the preset value (threshold).
2. Press the IMPEDANCE CHECK key again to complete the impedance check.

On the screen:

1. Move the mouse pointer to the  Impedance Check button on the tool bar.
2. Press and hold the left mouse button for about two seconds to start the skin-electrode impedance check. The Impedance Check dialog box opens on the screen. The currently selected montage is displayed on the dialog box.



The impedance check result is displayed on the screen with measured impedance and color, and on the electrode junction box. If an electrode's impedance exceeds the preset value (threshold) on the electrode junction box, it is highlighted on the Impedance Check dialog box.

3. Click the OK button to close the Impedance Check dialog box.

Displaying the Calibration Waveform

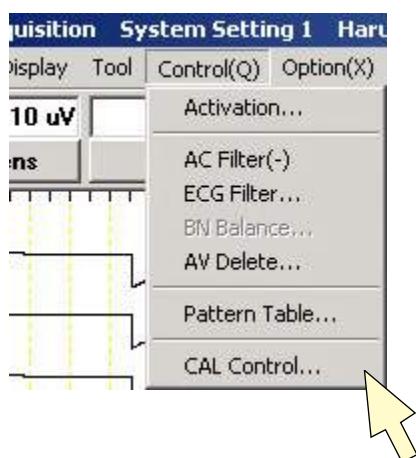
Usually a calibration waveform is recorded before and after EEG waveform measurement.

Displaying and Saving the Calibration Waveform

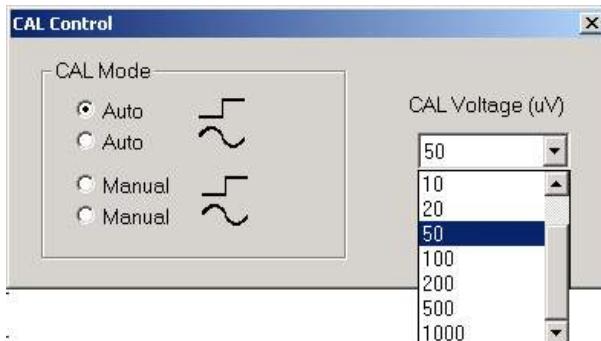
Click the  CAL Signal button on the tool bar. The calibration waveforms are displayed on the screen.

- To stop displaying the calibration waveform, and return to measuring the EEG waveforms, click the  EEG Signal button on the tool bar.
- To save the calibration waveforms, click the  Start/Stop filing button on the tool bar. When the calibration waveforms are displayed, the calibration waveforms are saved in an EEG data file with the EEG waveforms.

Changing the Calibration Waveform



1. Select CAL Control from the Control menu. The CAL Control dialog box opens.



2. Select the new CAL mode.

<CAL Mode>

There are four types of calibration modes.

AUTO  : Every two seconds, an upgoing or downgoing pulse is generated. The polarity of the pulse alternates each time. The calibration wave stops when the EEG button is clicked.

AUTO : Generates a sine wave when the CAL button is clicked. The calibration wave stops when the EEG button is clicked.

MANUAL  : When the CAL button is pressed and held, an upgoing pulse is generated; when the CAL button is released, a downgoing pulse is generated.

MANUAL  : Generates a sine wave while the CAL button is pressed and held.

3. Select the calibration voltage in the CAL Voltage selection list box. All channels whose CAL Voltage settings are set to ACC are changed to the selected calibration voltage.

4. Click the OK button to close the dialog box.

Changing the Pattern

36 patterns (I to VIII A, B, C, D and Free A, B, C, D) are available per set file. A pattern includes the montage and amplifier settings (sensitivity, high-cut filter and time constant), calibration voltage, waveform display on/off, waveform color and amplitude limit. You can change the preset pattern settings with the System program (Refer to “Programming Patterns” in Section 4).

1. Click the  Pat button on the amp bar. The Pattern selection dialog box opens.

Changes the pattern group.



Changes the pattern in the selected group.

You can set the pattern to FREE A to D during the EEG measurement. The setting remains in memory after the power is turned off.

2. Click the new pattern.
3. Click the OK button to close the Pattern selection dialog box.
4. Click the  Start/Stop Filing button on the tool bar to save the EEG waveform in a EEG data file.

To stop saving, click the Start/Stop Filing button again.

Changing the Measurement Settings

NOTE

The selectable settings in the HF dialog box and pattern table change according to the sampling frequency setting in “Selecting and Saving the Electrodes for Waveform Acquisition” in Section 4.

Changing Amplifier Settings for All Selected Channels

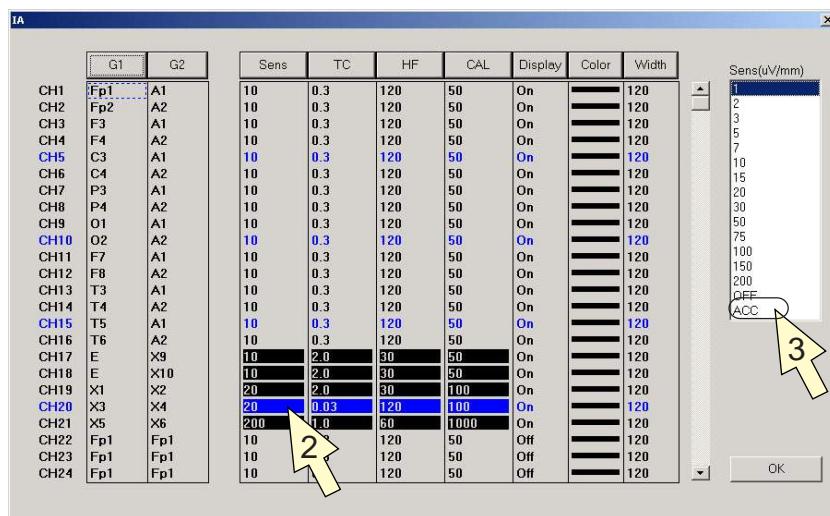
The ACC (All Channel Control) setting lets you change amplifier settings for more than one channel on all patterns at the same time. All channels which have the amplifier settings set to ACC are linked together. When you change the Sens, TC, HF on the amp bar or CAL setting, that setting automatically changes for all ACC channels.

Setting ACC

Use this procedure to set a channel's amplifier setting to ACC.

Changed amplifier settings during waveform acquisition are temporary changes and are lost when you close the Acquisition program. In order to keep changes, use the System program to change the settings.

1. Click the  Display Pattern Table button on the tool bar, or select Pattern Table from the Control menu. The pattern table opens.



2. Select the setting(s) to change. A broken rectangle encloses the selected setting.

To select one setting:

Click the setting on the table.

To select two or more consecutive channels:

Drag the cursor to select the settings.

To select the settings for all channels:

Click the Sens, TC, HF button at the top of column.

The selection list box for the setting appears in the right side of the pattern table.

3. Click ACC.

4. Repeat steps 2 to 3 to change other settings, if necessary.

5. Click the OK button to close pattern table.

Changing the Amplifier Setting

1. Click the Sens, TC or HF button on the amp bar. The Sensitivity, Time Constant or High Cut Filter dialog box opens.

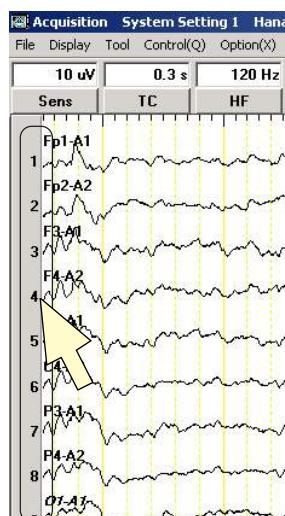


Example: Sensitivity dialog box

2. Click the new setting. All channels whose settings are set to ACC are changed to the selected sensitivity. The selected setting is indicated on the box above the button.
3. Click the OK button to close the dialog box.

5. ACQUISITION PROGRAM

Changing Amplifier Settings for Individual Channels



You can change amplifier settings for individual channels. Even if the setting is ACC (see “Changing Amplifier Settings for All Selected Channels”), you can still change settings for individual channels using this procedure.

Changing Amplifier Settings for One Channel

This setting change is lost when another pattern is selected or when you close the Acquisition program.

1. Click the channel number on the left side of the waveform. The channel number of the selected channel is highlighted.
2. Click the Sens, TC or HF button on the amp bar. The Sensitivity, Time Constant or High Cut Filter dialog box opens.



3. Click the new settings
4. Click the OK button to close the dialog box.

Changing Amplifier Settings for Two or More Channels

This setting change, except for a free pattern, is lost when another pattern is selected or when you close the Acquisition program.

1. Click the Display Pattern Table button on the tool bar, or select Pattern Table from the Control menu. The pattern table opens.

	G1	G2	Sens	TC	HF	CAL	Display	Color	Width
CH1	Fp1	A1	10	0.3	120	50	On	■■■■■	120
CH2	Fp2	A2	10	0.3	120	50	On	■■■■■	120
CH3	F3	A1	10	0.3	120	50	On	■■■■■	120
CH4	F4	A2	10	0.3	120	50	On	■■■■■	120
CH5	C3	A1	10	0.3	120	50	On	■■■■■	120
CH6	C4	A2	10	0.3	120	50	On	■■■■■	120
CH7	P3	A1	10	0.3	120	50	On	■■■■■	120
CH8	P4	A2	10	0.3	120	50	On	■■■■■	120
CH9	O1	A1	10	0.3	120	50	On	■■■■■	120
CH10	O2	A2	10	0.3	120	50	On	■■■■■	120
CH11	F7	A1	10	0.3	120	50	On	■■■■■	120
CH12	F8	A2	10	0.3	120	50	On	■■■■■	120
CH13	T3	A1	10	0.3	120	50	On	■■■■■	120
CH14	T4	A2	10	0.3	120	50	On	■■■■■	120
CH15	T5	A1	10	0.3	120	50	On	■■■■■	120
CH16	T6	A2	10	0.3	120	50	On	■■■■■	120
CH17	E	X9	10	2.0	30	50	On	■■■■■	120
CH18	E	X10	10	2.0	30	50	On	■■■■■	120
CH19	X1	X2	20	2.0	30	100	On	■■■■■	120
CH20	X3	X4	20	0.03	120	100	On	■■■■■	120
CH21	X5	X6	200	1.0	60	1000	On	■■■■■	120
CH22	Fp1	Fp1	10	0.3	120	50	Off	■■■■■	120
CH23	Fp1	Fp1	10	0.3	120	50	Off	■■■■■	120
CH24	Fp1	Fp1	10	0.3	120	50	Off	■■■■■	120

2. Select the setting(s) to change on the pattern table. The selected setting is enclosed by a dotted rectangle.

To select one setting:

Click the setting on the table.

To select two or more consecutive channels:

Drag the cursor to select the settings.

To select the settings for all channels:

Click the Sens, TC, HF button at the top of column.

The selection list box for the setting appears in the right side of the pattern table.

3. Click the new setting in the selection list box.
The settings enclosed by the dotted rectangles changes to the new settings. An “*” mark is displayed before all changed settings which are temporary changes.
4. Click the OK button to close the pattern table.

Changed Settings and ACC Marks

Changed settings and ACC are indicated on the pattern table as follows:

Mark	Meaning
\$	Temporarily changed reference electrode
*	Any other temporarily changed settings.
Highlighted	Sensitivity, TC, HF or CAL setting which is not set to ACC.
Not highlighted	Sensitivity, TC, HF or CAL setting which is set to ACC.

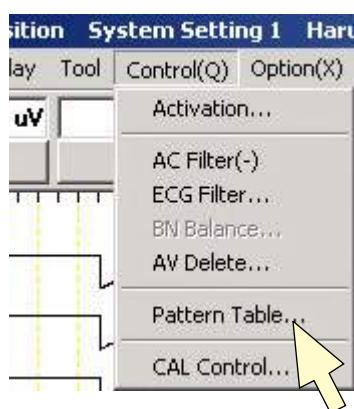
When you change Sens, TC, HF or CAL on the amp bar, all ACC settings are changed. If you select and change any individual setting in the pattern table, only that setting is changed. If an ACC setting is set to an individual value, it can be changed individually.

Changing the Montage

You can change the montage by changing electrodes. An “*” mark appears to the right of all changed electrodes as temporary changes. This setting change, except for a free pattern, is lost when another pattern is selected or when you close the Acquisition program.

NOTE

Electrodes that are not saved with EEG waveforms are displayed in red on the Pattern table and Electrode position layout table. You cannot review the EEG waveforms in a montage which includes unsaved electrodes. To save an electrode, refer to “Selecting and the Electrodes to be Saved with EEG Waveforms” in Section 4.



1. Click the Display Pattern Table button on the tool bar, or select Pattern Table from the Control menu. The pattern table opens.

	G1	G2	Sens	TC	HF	CAL	Display	Color	Width
CH1	Fp1	A1	10	0.3	120	50	On	Black	120
CH2	Fp2	A2	10	0.3	120	50	On	Black	120
CH3	F3	A1	10	0.3	120	50	On	Black	120
CH4	F4	A2	10	0.3	120	50	On	Black	120
CH5	C3	A1	10	0.3	120	50	On	Red	120
CH6	C4	A2	10	0.3	120	50	On	Black	120
CH7	P3	A1	10	0.3	120	50	On	Black	120
CH8	P4	A2	10	0.3	120	50	On	Black	120
CH9	O1	A1	10	0.3	120	50	On	Black	120
CH10	O2	A2	10	0.3	120	50	On	Red	120
CH11	F7	A1	10	0.3	120	50	On	Black	120
CH12	F8	A2	10	0.3	120	50	On	Black	120
CH13	T3	A1	10	0.3	120	50	On	Black	120
CH14	T4	A2	10	0.3	120	50	On	Black	120
CH15	T5	A1	10	0.3	120	50	On	Red	120
CH16	T6	A2	10	0.3	120	50	On	Black	120
CH17	E	X9	10	2.0	30	50	On	Black	120
CH18	E	X10	10	2.0	30	50	On	Black	120
CH19	X1	X2	20	2.0	30	100	On	Black	120
CH20	X3	X4	20	0.03	120	100	On	Red	120
CH21	X5	X6	200	1.0	60	1000	On	Black	120
CH22	Fp1	Fp1	10	0.3	120	50	Off	Black	120
CH23	Fp1	Fp1	10	0.3	120	50	Off	Black	120
CH24	Fp1	Fp1	10	0.3	120	50	Off	Black	120

2. Select the electrode(s) to change on the pattern table. All selected electrodes are enclosed by dotted rectangles. The Electrode position layout table opens.

To select one electrode:

Click the electrode name on the table.

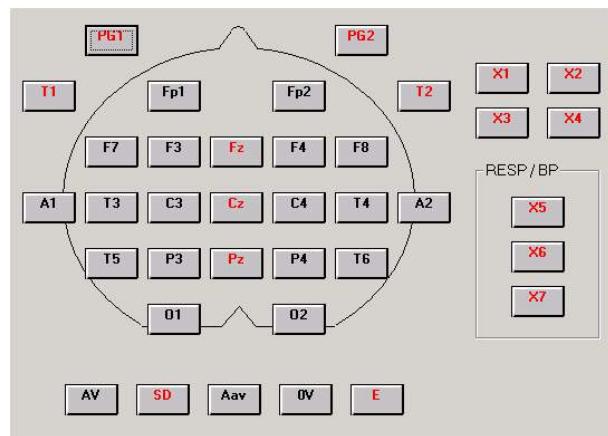
To select two or more consecutive channels:

Drag the cursor to select the electrodes.

To select all channel electrodes:

Click the G1 or G2 button at top of column.

Electrode position layout table



Reference electrode:

- AV: The reference for AV derivation.
- SD : The reference for Laplacian derivation.
- Aav: The averaged reference of A1 and A2.

0 V button:

When this is selected to either G1 or G2 electrode, the channel displays the potential between the system reference (C3/C4) and selected electrode which is not set to “0 V”.

3. Click an electrode in the Electrode position layout table to select it. The selected G1 or G2 electrode(s) enclosed by the broken rectangle is replaced with the selected new electrode. The dotted rectangle moves to the next electrode.
4. Click the OK button to close the pattern table.

Changing the Reference Electrode

NOTE

When the reference electrode is set to A1 + A2 in acquisition, you cannot change this setting during review.

When the EEG waveforms are displayed with monopolar montages using A1 and A2 electrodes, you can change the reference electrode. Changed electrodes are displayed with a “\$” mark.

1. Click the **Ref** button on the amp bar. The Reference electrode selection dialog box opens.

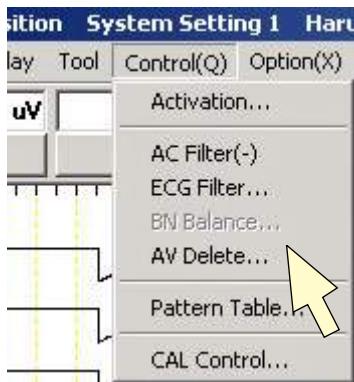


Reference electrode selection list:

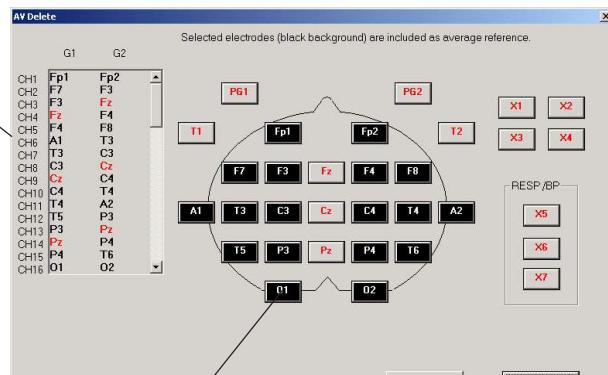
A1 → A2:	Switches all A1 to A2.
A1 ← A2:	Switches all A2 to A1.
A1 ↔ A2:	Switches A1 and A2.
A1 + A2:	Short-circuits A1 and A2 to each other in the electrode junction box.
Vx:	Switches all A1 and A2 to CZ.
AV:	Switches all A1 and A2 to the reference for AV derivation.
BN:	Not available for this instrument.
SD :	Switches all A1 and A2 to the reference for Laplacian derivation.
Aav:	Switches all A1 and A2 to the averaged reference of A1 and A2.
Org:	Switches all A1 and A2 to the averaged voltage of C3 and C4 for the original reference derivation (system reference).
OFF:	Cancels the selection of reference electrode and returns to the programmed setting.

2. Click a reference electrode to change the reference electrode. The A1 and A2 electrodes on the pattern table and the waveform is replaced with the selected reference electrode name.
3. Click the OK button to close the Reference electrode selection dialog box.

Selecting or Deleting Electrodes for AV Derivation



Pattern table



Electrode position layout

Pattern table:

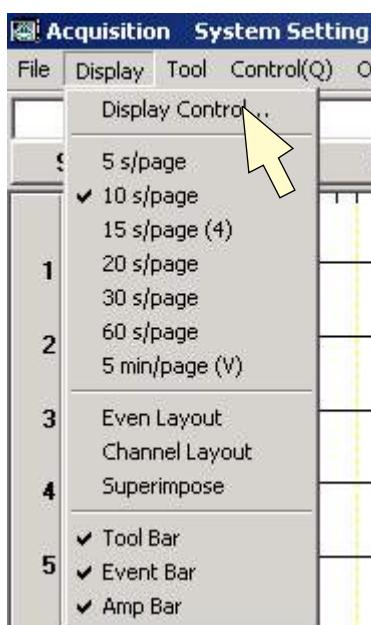
Displays the montage for the current pattern. All channels can be displayed by using the scroll bar.

Electrode position layout:

The reference electrode names are displayed on the Electrode position layout. The electrodes used for reference voltage calculation are highlighted. To add or delete an electrode on the electrode position layout, click the electrode.

2. Click an electrode to highlight or unhighlight it. Highlighting indicates that the electrode is selected for AV derivation. “*” appears beside changed electrodes (“*” means temporary changes).
3. Click the Save button to save the changed settings. The settings are saved in each pattern.
4. Click the OK button to close the AV Delete dialog box.

Changing the Waveform Display Settings



About the Display Control Dialog Box

You can select the waveform display settings in the Display Control dialog box. To open this dialog box, select Display Control from the Display menu.



Displaying the Derivation (Montage) and/or Comment Beside Each Channel

You can display or not display the derivation beside each channel. To display the derivation and/or comment beside each channel, click the Display Montage and/or Comment check box in the Montage and Comment area. You can select the derivation and comment display position by clicking the Left Side or Right Side option button.

Displaying the Time Scale

To display the time scale in the Time Mark area, select the 1 s or 200 ms option on the Time Scale area.

OFF: A vertical line is not displayed.

1 s: Displays a vertical line every one second.

200 ms: Displays a vertical line every 200 milliseconds.

Displaying the Extended Channel Bar

You can display the montage and calibration voltage on the extended channel bar. To display the extended channel bar, check the Extended channel bar check box.

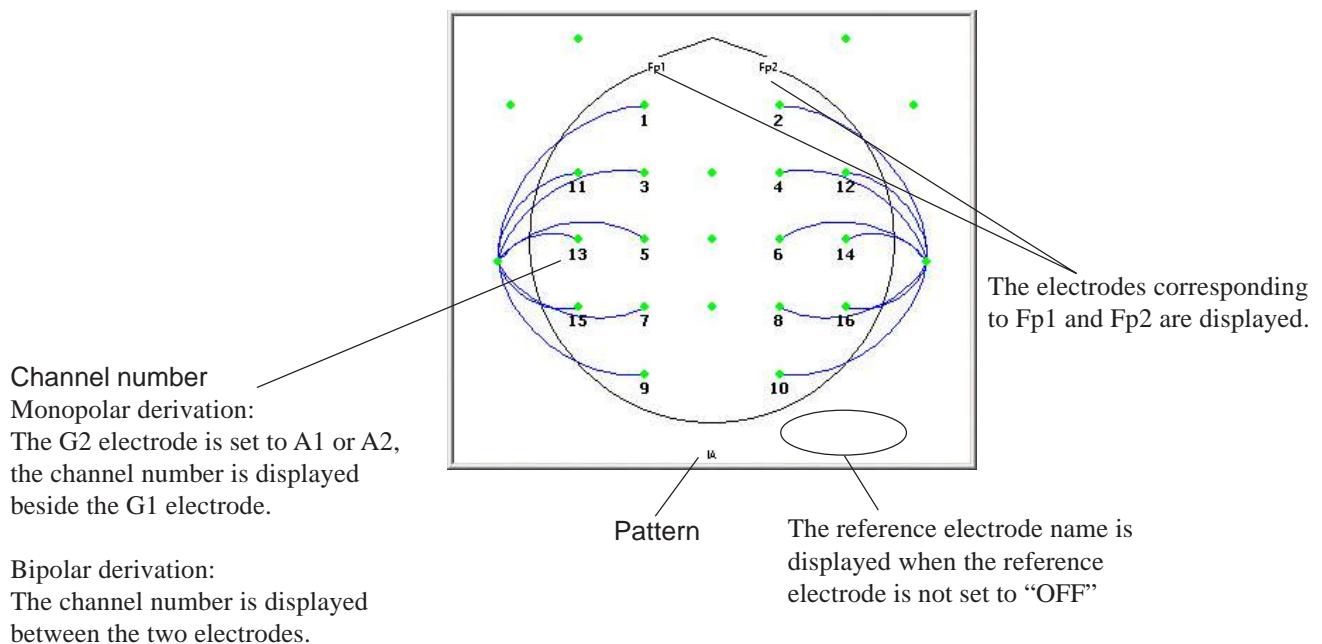
Displaying the Vertical Lines for the Events

You can display the vertical light gray lines for annotations. To display the vertical lines, check the Display event color line check box. For the specified event, you can assign a color vertical line. Refer “Editing the Waveform Annotations and Patient Information Items” in Section 4.

Displaying the Montage Map Window

The montage map window displays the montage on the electrode position layout. To display the montage window, check the Display montage map check box.

About the montage map window



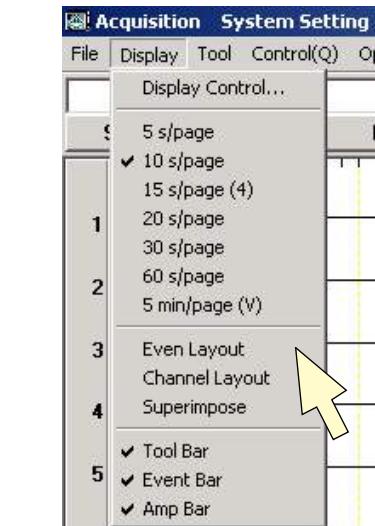
- The electrodes that are selected to be saved in the System program are displayed with a green circle “●”. Refer to “Selecting and Saving the electrodes for Waveform Acquisition” in Section 4.
- The electrode that are not selected to be saved in the system program is displayed with a red circle “○”.
- The electrode combination is displayed with an electrode combination line. The blue electrode combination line shows both the G1 and G2 electrodes are selected to be saved in the System program. The dotted red electrode combination line shows either electrode or both either electrodes are not selected to be saved in the System program.
- To move the montage map window, drag it.
To change the size of the window, drag the corner of the window.

NOTE

The electrode combination line can be displayed when:

- The JE-910A/AG or JE-911A/AG electrode junction box is used.
- The G1 or G2 electrode is set to Fp1, Fp2, F3, F4, C3, C4, P3, P4, O1, O2, F7, F8, T3, T4, T5, T6, A1, A2, Fz, Cz, Pz, T1, T2, PG1 or PG2
- The reference electrode is set to A1 → A2, A1 ← A2 or A1 ↔ A2.

5. ACQUISITION PROGRAM



Changing Waveform Display Positions

To change the position of all channels:

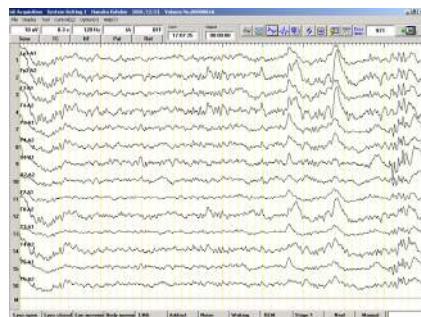
There are three waveform display position setting modes.

Even Layout: Evenly spaces the baseline positions for all channels in channel order. Channels that are temporarily turned off are omitted.

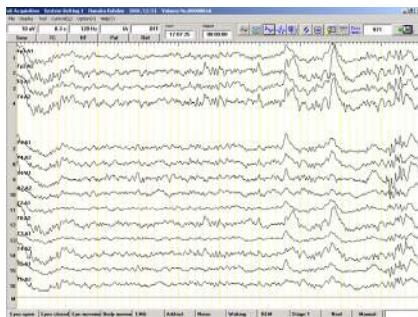
Channel Layout: Evenly spaces the baseline positions for all channels in channel order. Blank spaces are left for undisplayed channels.

Superimpose: Overlaps consecutive odd and even channels. Channels are omitted if their time constant is not set to ACC.

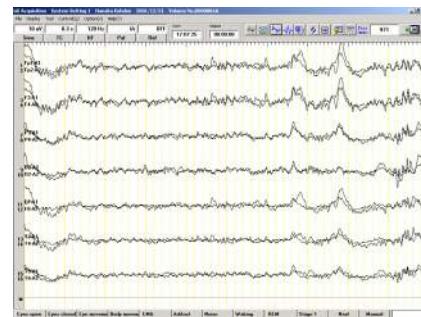
From the Display menu, select the appropriate layout command to select the waveform display position.



Even layout



Channel layout

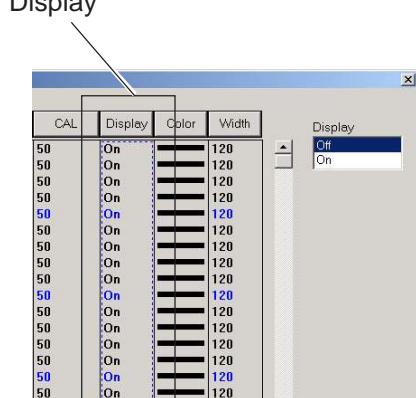


Superimpose

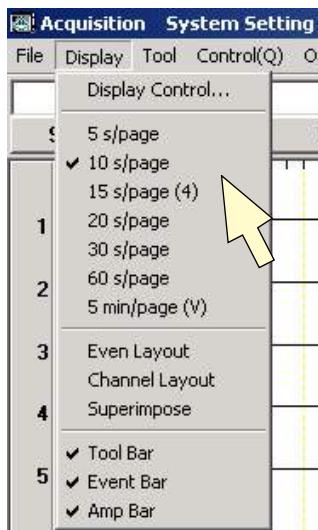
To change the position of a specific channel:

1. Click the channel number on the left side of the screen to select the channel.
The selected channel number is highlighted.
 2. Move the mouse pointer to the selected channel number.
 3. Press and hold down the left mouse button, then move the mouse pointer to the appropriate position.
 4. Release the mouse button to fix the waveform position.
 5. Click the waveform window to release the channel selection.

Displaying/Not Displaying a Waveform



1. Click the  Display Pattern Table button on the tool bar, or select Pattern Table from the Control menu. The pattern table opens.
 2. Click the Display column of the channel to open the selection list box on the pattern table. The selected column is enclosed by a dotted rectangle.
 3. Click ON or OFF in the selection list box.
 4. Click the OK button to close the table.

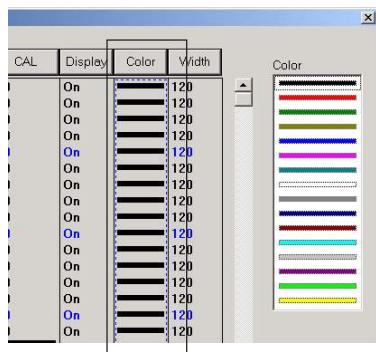


Changing the Waveform Display Speed

From the Display menu, select the speed.

- 5 s/page: Displays a 5 second page on the screen (corresponds to recording at 60 mm/s).
- 10 s/page: Displays a 10 second page on the screen (corresponds to recording at 30 mm/s).
- 15 s/page: Displays a 10 second page on the screen (corresponds to recording at 20 mm/s).
- 20 s/page: Displays a 20 second page on the screen (corresponds to recording at 15 mm/s).
- 30 s/page: Displays a 30 second page on the screen (corresponds to recording at 10 mm/s).
- 60 s/page: Displays a 10 second page on the screen (corresponds to recording at 5 mm/s).
- 5 min/page: Displays a 5 minute page on the screen (corresponds to recording at 1 mm/s).

Changing a Waveform Color

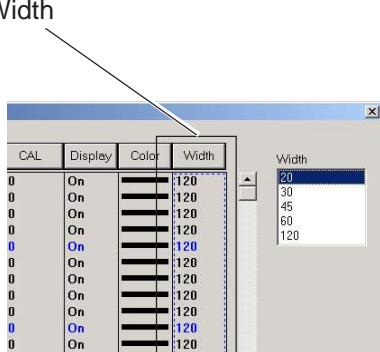


Color

1. Click the Display Pattern Table button on the tool bar, or select Pattern Table from the Control menu. The pattern table opens.
2. Click the Color column of the channel to open the selection list box on the pattern table. The selected column is enclosed by a dotted rectangle.
3. Click the new color in the selection list box.
4. Click the OK button to close the table.

Changing the Maximum Amplitude of a Waveform

You can change the maximum amplitude of a waveform. When the waveform exceeds the limit, it is clipped.



Width

1. Click the Display Pattern Table button on the tool bar, or select Pattern Table from the Control menu. The pattern table opens.
2. Click the Width column of the channel to open the selection list box on the pattern table. The selected column is enclosed by a dotted rectangle.
3. Click the new maximum amplitude in the selection list box.
4. Click the OK button to close the table.

5. ACQUISITION PROGRAM

Returning All Waveforms to the Baseline

Click the  Reset button on the tool bar to return all waveforms to the baseline position. When this button is clicked the “RESET ON/OFF” annotation is displayed at the bottom of the screen and the annotation is saved in a file as an event.

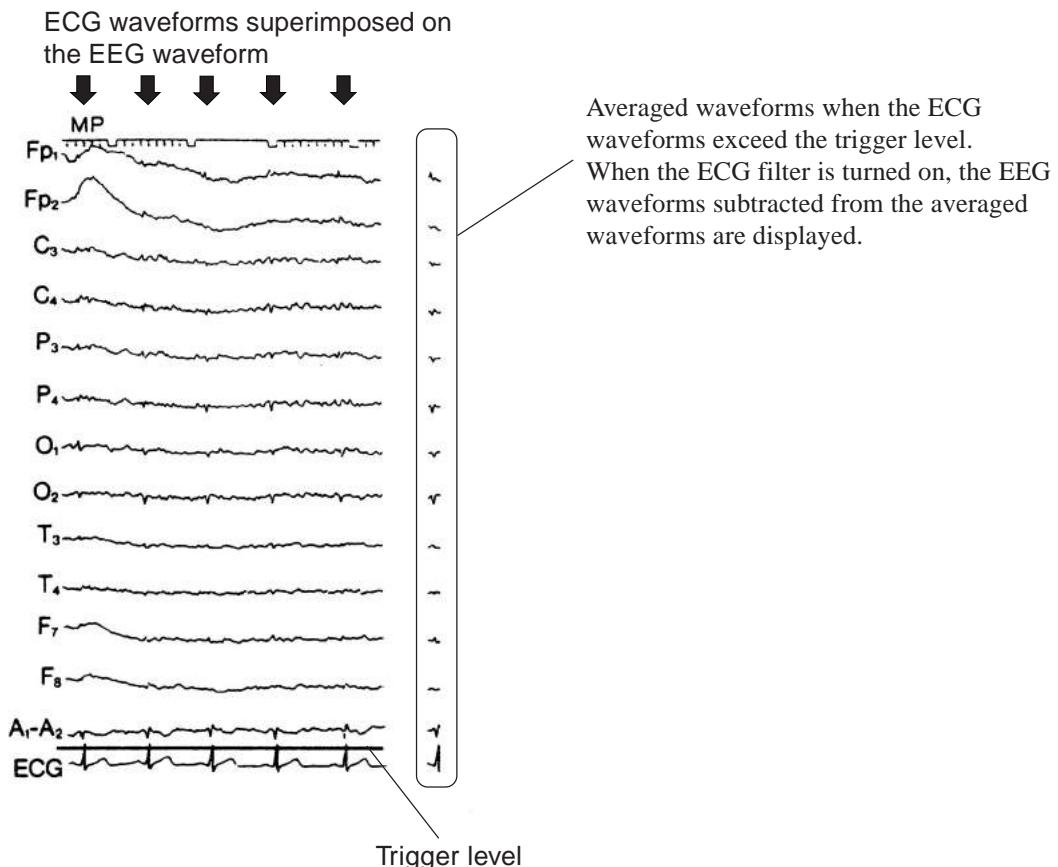
Using the AC Filter

To turn on the AC filter, click the  AC Filter On/Off button on the tool bar, or select AC Filter from the Control menu.

Using the ECG Filter

When ECG waveforms are superimposed on the EEG waveforms, use the ECG filter to reduce the ECG waveform on each EEG channel. This filter works in the following way to subtract the ECG components from the EEG waveforms.

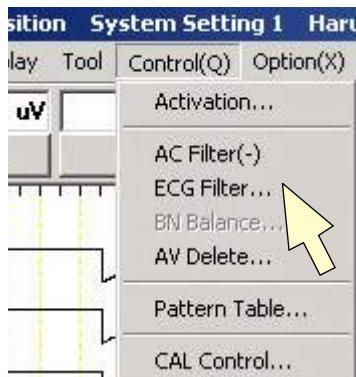
- 1) The time point when the ECG waveforms exceed the trigger level of the trigger channel is used as averaging trigger.
- 2) The part of the EEG waveforms synchronized with the trigger is averaged in each channel.
- 3) The averaged waveform is subtracted from the next trigger point of the ECG waveform in the averaging period in each channel.



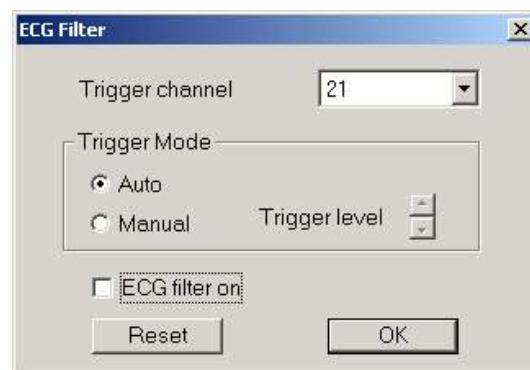
Caution when using the ECG filter

The ECG filter detects the ECG waveforms superimposed on the EEG waveforms by triggering the QRS wave of the ECG waveforms and averaging. When the ECG filter is turned on, if a large artifact with continuously varying, such as body movement, EMG or respiration waveform which amplitude varies continuously, is superimposed on the EEG waveforms, the ECG waveform (averaging result) cannot be correctly measured. This may distort the EEG waveforms or the EEG waveforms may not be displayed continuously. When the EEG waveforms are not displayed continuously, click the Reset button on the ECG filter dialog box to reset the ECG filter.

Be careful using the ECG filter when there is a large artifact. The ECG filter is useful to reduce the ECG waveforms superimposed on the EEG waveforms when the EEG waveforms are stable and there is no large artifact.

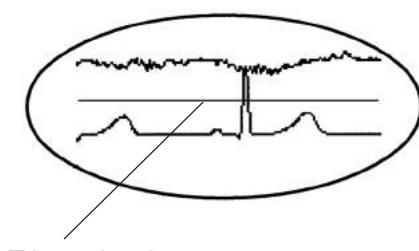


1. Select ECG Filter from the Control menu. The ECG Filter dialog box opens.



NOTE

Requires application of dedicated ECG electrodes on patient and ECG channel displayed in the montage.

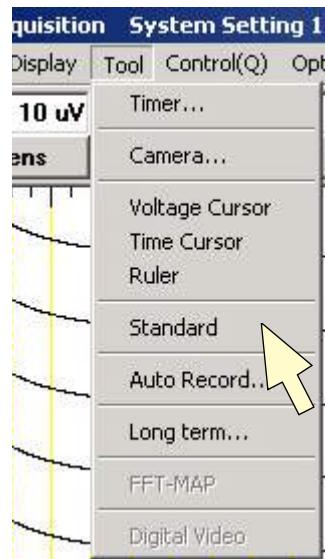


Trigger level cursor

2. Click the Trigger Channel box arrow to select the ECG trigger channel.
3. Click to select the trigger mode.
 AUTO: The trigger level is set automatically. The trigger level cursor is not displayed on the screen.
 MANUAL: You can set the trigger level manually with the trigger level cursor displayed over the trigger channel on the screen. Move the cursor with the Trigger Level ↑ or ↓ arrow so that the cursor position is at half of the peak amplitude of the QRS wave.
4. Click the ECG filter On check box to turn the ECG filter on.
 To turn off the ECG filter, click it again.

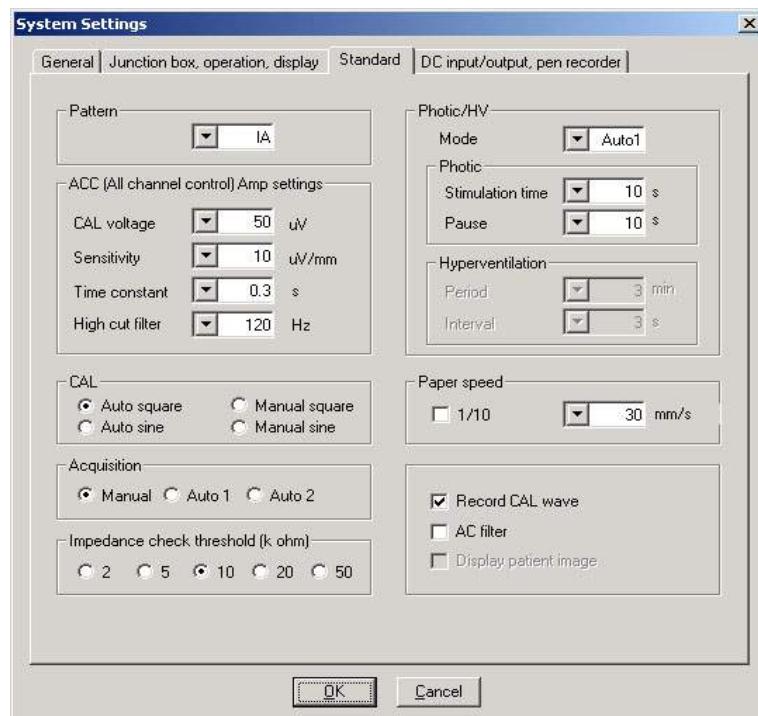
When you close the Acquisition program or change the pattern, the ECG filter is automatically set to Off.

Changing the Various Settings to the Default Settings



You can change the following settings to the default settings set in the System Program. Refer to “Settings in the Standard Page - Changing the Settings in the System Setting Dialog Box” in Section 4.

To change the settings to the default settings, select Standard from the Tool menu.



Annotating EEG Waveforms

General

While acquiring the EEG waveforms, event marks (annotations) can be added on the waveforms. The following annotations are automatically added on the waveforms and registered in the event log. You can also manually add annotations on the waveforms. Up to 5,000 annotations can be saved in the event log.

Annotation	Meaning
REC START	EEG waveform acquisition started
PAT....EEG	Patterns changed
PAT....CAL	Calibration waveform applied
PHOTO....Hz	Photic stimulation started (When the stimulation frequency is changed according to the preset program, this event mark is also saved in the event log.)
HV START	Hyperventilation started
HV END	Hyperventilation finished
HV mm:ss	Elapsed time after start of hyperventilation (every 30 seconds)
POST HV mm:ss	Elapsed time after start of post hyperventilation (every 30 seconds)
HVT mm:ss	Elapsed time after HV timer started (default setting: every 30 seconds)
POST HVT m:ss	Elapsed time after Post HV timer started (default setting: every 30 seconds)
HVT START	HV timer started
HVT END	HV timer stopped
IMP CHECK ON	Impedance check started
IMP CHECK OFF	Impedance check finished
MARK ON	Mark switch pressed
MARK OFF	Mark switch released
RESET ON	Reset function on
RESET OFF	Reset function off
A1 + A2 ON	A1 + A2 reference electrode selected
A1 + A2 OFF	A1 + A2 reference electrode released

The time interval of the “HVT mm:ss” event and “Post HVT mm:ss” event can be changed. Refer to “Changing the Settings in the System Settings Dialog Box - Junction Box, Operation, Display Page” in Section 4.

5. ACQUISITION PROGRAM

Manually Annotating the Waveforms

Adding a Registered Annotation



When the Acquisition program is opened, 10 annotations appear on the event bar at the bottom of the screen. These annotations correspond to the function keys on the keyboard. To display different annotations, click the NEXT button on the event bar or press the F11 key on the keyboard.

To add an annotation on the waveforms, click the annotation on the event bar or press the function key on the keyboard. The annotation is added to the latest point on the waveform.

Entering an Annotation with the Keyboard

The annotation is added to the latest point on the waveform.

1. Click the Event name input text box on the event bar or press the F12 key.
2. Type the annotation with up to 40 characters.
3. Press the Enter key on the keyboard. The annotation is marked on the waveforms.

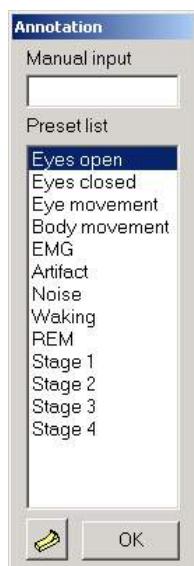
Using the Annotation Dialog Box

To add an annotation to any specified time on the waveform:

1. Right-click the waveform that you want to add an annotation mark. The Annotation dialog box opens.
2. Click the annotation on the list box or type the annotation in the Manual Input text box with up to 40 characters. The annotation is added to the waveform at the point where you right-clicked. When a new waveform overwrites the point where you right-clicked, the time of the point is saved in memory and the annotation is added to the point.
3. Click the OK button to close the Annotation dialog box.

To add an annotation to the current time on the waveform:

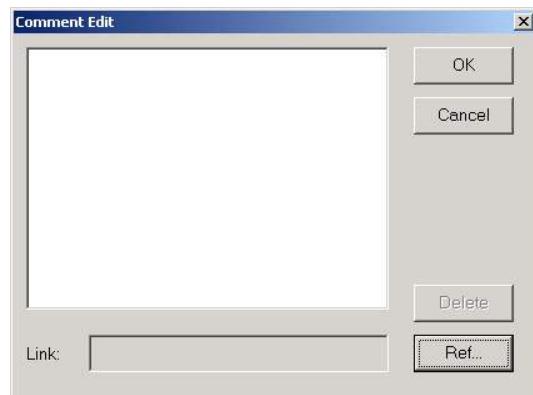
1. Press the Insert key. The Annotation dialog box opens.
2. Click the annotation on the list box or type the annotation in the Manual Input text box with up to 40 characters. The annotation is added to the waveform at the point where you press the Insert key.
3. Click the OK button to close the Annotation dialog box.



Adding a Screen Comment

You can add a text and attach a picture file to a waveform as a screen comment. The attached file is saved together with the EEG data file.

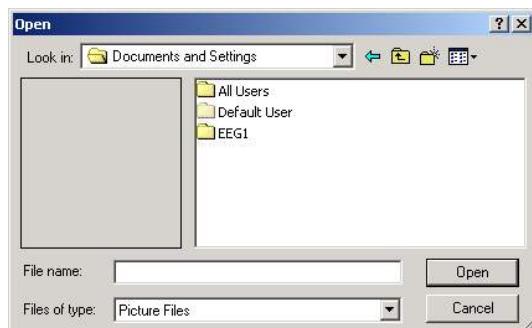
1. Right-click the waveform that you want to add an annotation mark. The Annotation dialog box opens.
2. Click the  Screen Comment button on the Annotation dialog box. The Comment Edit dialog box opens.



3. Type a comment with up to 384 characters.

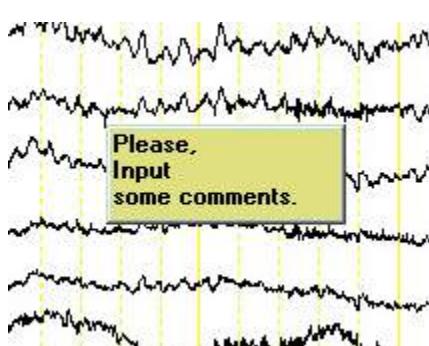
To attach a picture file as a screen comment.

- 1) Click the Ref button on the Comment Edit dialog box. The Open dialog box opens.



- 2) Select the file.
- 3) Click the Open button. The Open dialog box closes.
- 4) Click the OK button. The screen comment is added to the waveform at the point where you right-clicked as a P-COMMENT. When a new waveform overwrites the point where you right-clicked, the time of the point is saved in memory and the comment is added to the point.

To cancel adding the comment, click the Cancel button.



Screen comment on the Review screen. The attached picture is shown as an icon.

The screen comment can be displayed on the Review screen. To edit the screen comment. Refer to “Editing the Annotation Added to the Waveforms”

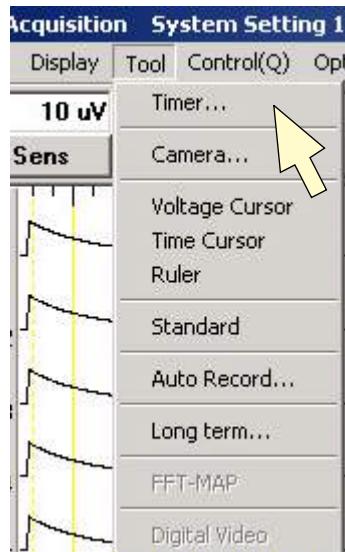
Using the Timers

About the Timer Bar

The Timer bar provides a Manual, Record, HV and Post HV timer. An LED indicates the selected timer. The time for the selected timer is displayed in the time indicator. The timer can count up to 99 minutes 59 seconds.



- MAN:** The timer can be manually started and stopped by clicking the Start/Stop button on the Timer bar.
- REC:** The time indicator displays the total saving time of the selected pattern.
- HV:** The time indicator displays the elapsed hyperventilation time. Timing is started with the Start button. When this button is clicked, an “HVT START” annotation is automatically marked on the EEG waveforms.
- P HV:** The time indicator displays the elapsed post hyperventilation time. Timing is started with the P HV button. When this button is clicked, a “HVT END” annotation is automatically marked on the EEG waveforms.
- Start/Stop:** Starts and stops the Timer. After the timer is started, the name on this button changes from Start to Stop.
- Reset:** Resets the Timer.



To open the Timer bar, select Timer from the Tool menu.

Manual Timer

1. Select Timer from the Tool menu. The Timer dialog bar opens.
2. Click the MAN button. The MAN LED lights.
3. Click the Start/Stop button to start the timer.

To reset counting, click the Reset button.

4. Click the Start/Stop button to stop the timer.

Record (Recording) Timer

1. Select Timer from the Tool menu. The Timer bar opens.
2. Click the REC button. The REC LED lights.
3. Click the Start/Stop button in the box. The “REC START” message appears in the dialog box. When the EEG waveform saving starts, the timer starts counting.
4. Click the  Start/Stop Filing button on the tool bar to start saving the EEG waveform. The timer starts counting.
To reset counting, click the Reset button. When the pattern is changed, the timer is reset.
5. Click the Start/Stop button to stop counting. You can restart counting by clicking this button again.

HV and Post HV Timer

1. Select Timer from the Tool menu. The Timer bar opens.
2. Click the HV button to select hyperventilation timer. The HV LED lights.
3. Click the Start/Stop button to start counting elapsed hyperventilation time. An “HVT START” annotation is marked on the EEG waveforms at the start of counting and the “HVT mm:ss” event indicating the elapsed time is marked on the waveform every 30 seconds after that.
To reset counting, click the Reset button. The timer is reset to “00:00”.
Click the Start/Stop button to stop counting temporarily. You can restart the counting by clicking this button again.
4. Click the P HV button to start counting elapsed post hyperventilation time. An “HVT END” annotation is marked on the EEG waveforms at the start of counting and the “Post HVT mm:ss” event v indicating the elapsed time is marked on the waveform every 30 seconds after that.

To reset counting, click the Reset button. The timer is reset to “00:00” and stops counting.

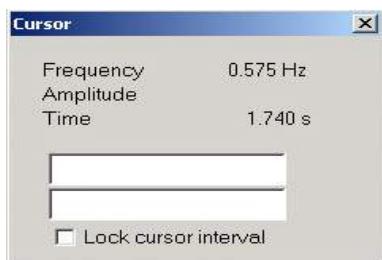
The time interval of the “HV mm:ss” event and the “Post HV mm:ss” event can be changed. Refer to “Changing the Settings in the System Settings Dialog Box - Junction Box, Operation, Display Page” in section 4.

Measuring Amplitude and Time with the Cursors and Ruler

You can measure the voltage (amplitude) or time interval of the waveform by displaying the two vertical cursors, horizontal cursors or ruler on the screen when the waveforms are frozen. The voltage and time cursors can be displayed at the same time.

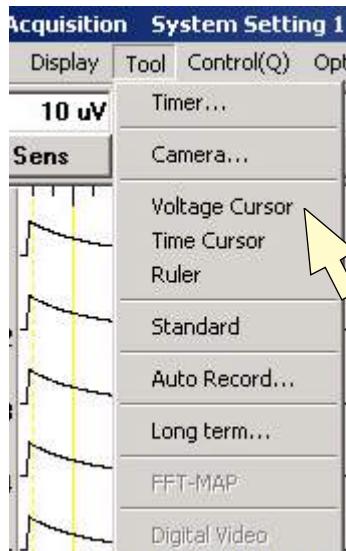
About the Cursor Dialog Box

The Cursor dialog box is displayed together with the voltage and/or time cursors to indicate the amplitude and time interval between the two cursors.

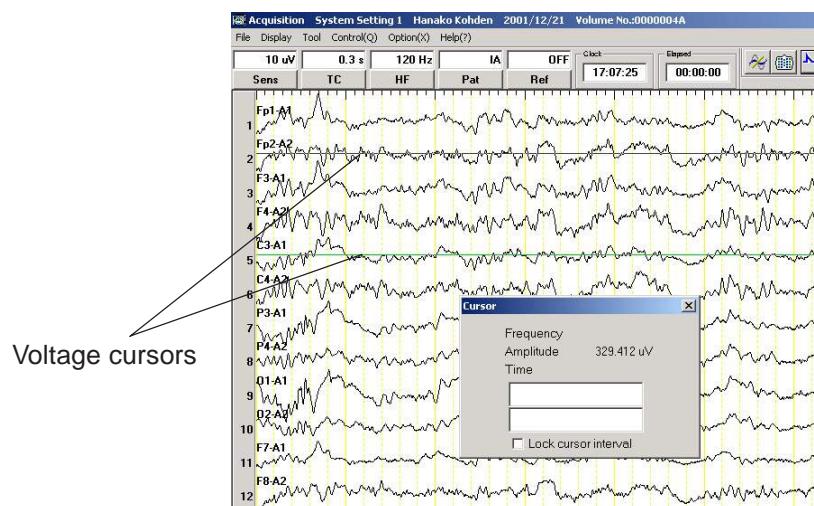


- | | |
|-----------------------|---|
| Frequency: | Displays the frequency calculated from the time interval. |
| Amplitude: | Displays the amplitude between the two voltage cursors. |
| Time: | Displays the time interval between the two time cursors. |
| Lock cursor interval: | When checked, the intervals between the two cursors are fixed. When the voltage cursors and time cursors are displayed, the rectangle enclosed by 4 cursors and the rectangle can be moved with the mouse |

Using the Voltage Cursor



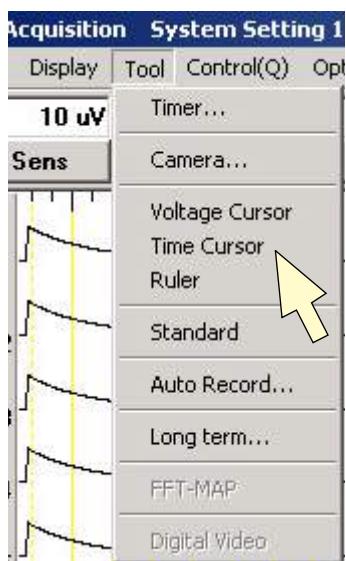
1. Click the Freeze button on the tool bar to freeze the EEG waveforms.
2. Select Voltage Cursor from the Tool menu. The two horizontal (voltage) cursors appear on the screen.



3. Click the right mouse button to select the cursor. The selected cursor changes color.
4. Click the appropriate position to move the cursor to, or drag the cursor to the appropriate position. The voltage between the two cursors is displayed on the Cursor dialog box.

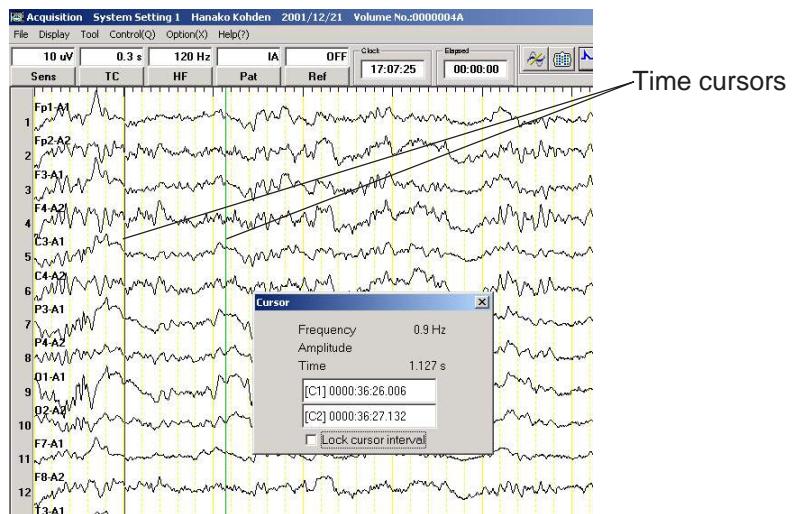
To measure the voltage of a channel, click the channel No. on the left side of the screen.

Using the Time Cursor



1. Click the Freeze button on the tool bar to freeze the EEG waveforms.

2. Select Time Cursor from the Tool menu. The two vertical (time) cursors appear on the screen.

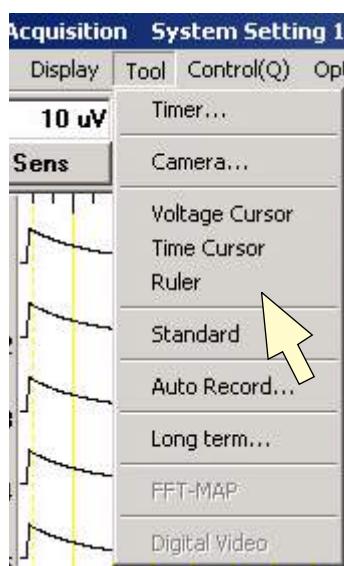


3. Click the right mouse button to select the cursor. The selected cursor changes color.
4. Click the appropriate position to move the cursor to, or drag the cursor to the appropriate position.

The time interval and frequency between the two cursors are displayed on the Cursor dialog box.

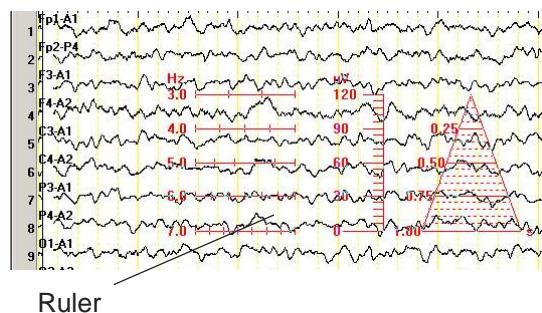
5. ACQUISITION PROGRAM

Using the Ruler



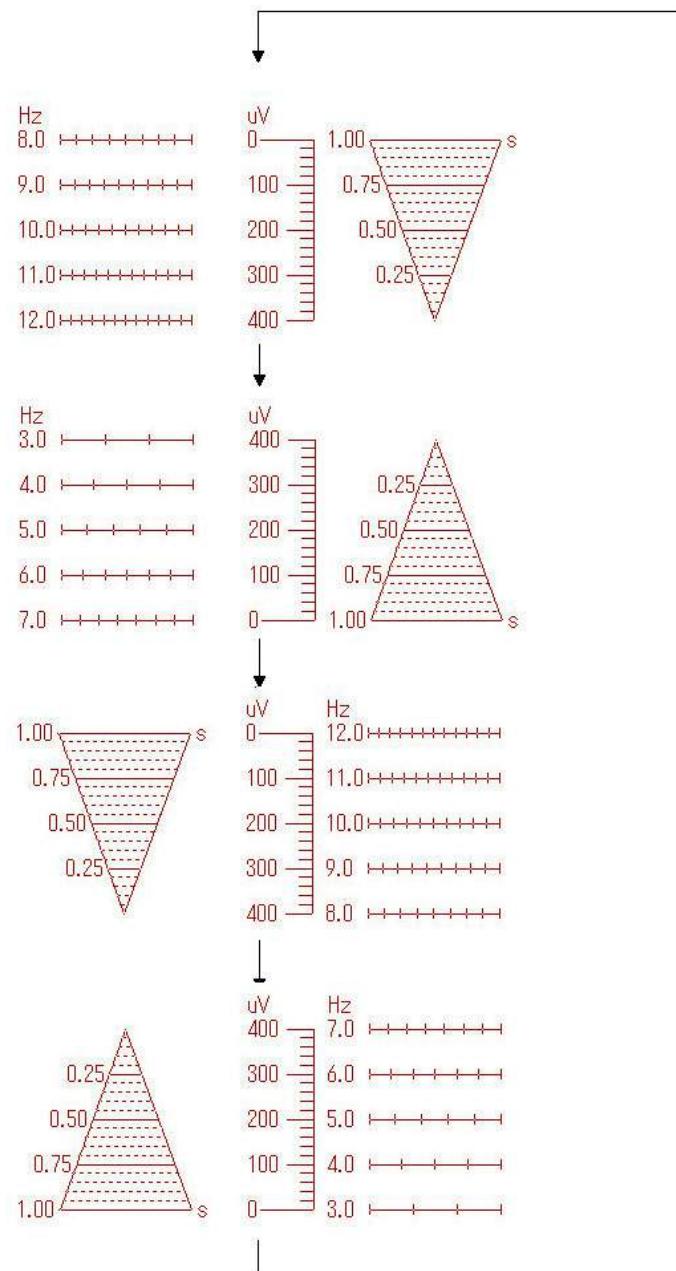
1. Click the Freeze button on the tool bar to freeze the EEG waveform.

2. Select Ruler from the Tool menu. The ruler appears on the screen.



3. Click the appropriate position to measure the amplitude or time of the waveform. Or, drag the ruler to the position.

To change the scale of the ruler, click the right mouse button.



Photic Stimulation and Hyperventilation

WARNING

- All activation testing must be applied under the supervision of the physician in charge. Mouth gags, tongue depressors and gauze sponges must always be prepared for use to prevent the patient from biting his tongue or injuring himself during testing because any pattern of flash stimulation may induce seizure activity.
- When performing the photic stimulation, If an abnormal waveform appears due to photo-paroxysmal response, stop the photic stimulation immediately to prevent the patient from evoking seizure
- When the instrument is turned on, about 600 V is present at pin 2 of the PHOTIC LAMP connector on the LS-901AJ/AK/AG Photo Control Unit. To protect against shock, always connect the flash lamp assembly cable to this connector even when the photic stimulation is not used.
- Do not perform hyperventilation activation when the patient has serious heart disease, acute cerebrovascular disease or respiratory insufficiency.

CAUTION

- Do not use the photic stimulator continuously over 5 minutes in any mode. When photic stimulation is performed for a long time, the flash lamp assembly gets very hot and causes burn if touched. If the photic stimulator is continuously used for 5 minutes, do not use it for at least 20 minutes to let it cool down.
- Firmly fix the flash lamp assembly to prevent the flash lamp accidentally touching the patient during examination. The flash lamp very hot and causes burn if touched.

The flash lamp is put 20 to 30 cm from the patient's eyes.

NOTE

- To perform the photic stimulation, the optional LS-901AJ/AK/AG Photo Control Unit is required.
- To control the optional ZE-510AK Hyperventilation Unit, the optional LS-901AJ/AK/AG Photo Control Unit is required.

About Activation Bar

The instrument provides three photic stimulation modes: auto, manual, single, and a hyperventilation mode. You can start activation and change the stimulation settings by opening the Activation bar.

NOTE

- To perform the photic stimulation, the optional LS-901AJ/AK/AG Photo Control Unit is required.
- Before starting the photic stimulation, check the cable connection between the photo control unit and PC unit. When the photo control unit is not connected to the PC unit or the power of the photo control unit is turned off, the Activation bar cannot be opened (The Display Activation Control button on the tool bar is dimmed). When the Display Activation Control button is dimmed, check the cable connection and the power status of the photo control unit. After connecting the cable and/or turning on the power of the photo control unit, restart the Acquisition program.



Mode: Select the photic stimulation mode.

Selection list:

AUTO1, AUTO2, AUTO3:

Performs the programmed automatic photic stimulation. Up to 30 steps can be set for each automatic photic stimulation mode

MANUAL

Performs manual photic stimulation.

SINGLE:

Performs manual single photic stimulation.

Frequency: Select the photic stimulation frequency.

Sel: Select the photic stimulation or hyperventilation mode. The LED indicates the selected activation mode.

Setup: Opens the Photo/HV Setup dialog box to select the photic stimulation pulse mode, stimulation time, pause time, delay time or interval time for photic stimulation or hyperventilation.

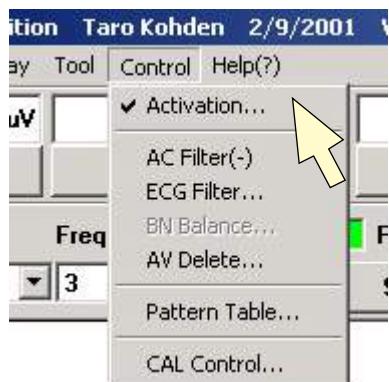
P HV: Stops the hyperventilation pacing and starts the Post HV timer.

Reset: Cancels the current photic stimulation or hyperventilation activation.

Start: Starts the selected activation.

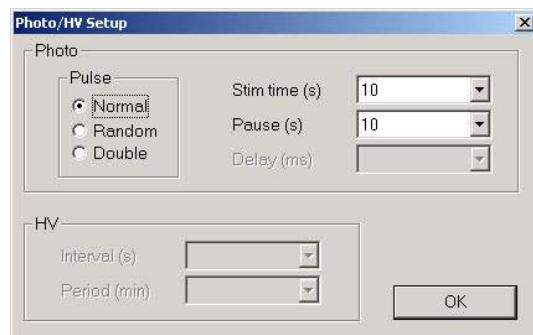
- To temporarily stop activation, click this button.
- To restart activation, click this button again.

Close: Closes the Activation dialog box.



To open the Activation dialog bar, click the Display Activation Control button on the tool bar, or select Activation from the Control menu.

Photo/HV Setup dialog box



Photo

Pulse:

Selects the photic stimulation pulse mode for each photic stimulation mode. The default setting is Normal.

Normal: Sequentially generates regular single pulses at the preset frequency.

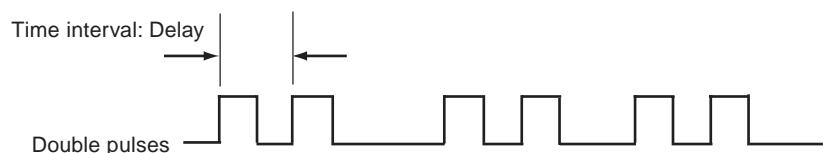
Random: Generates single pulses at a random frequency which is within $\pm 50\%$ of the preset frequency.

Double: Generates regular double pulses at the preset frequency. You can change the time interval between the two pulses.

Stim Time (s): Sets the stimulation time duration from 1 to 99 s in 1 s steps (available in both automatic and manual photic stimulation).

Pause (s): Sets the stimulation pause time from 0 to 30 s in 1 s steps (available only in automatic photic stimulation).

Delay (ms): Sets the time interval between double pulses from 10 to 990 s in 10 ms steps (available only in double photic stimulation).



HV

Interval (s): Sets the duration of one hyperventilation.

Period (min): Sets the total period of all hyperventilations.

OK:

Closes the Photo/HV Setup dialog box.

Photic Stimulation

Photic stimulation is performed from low frequency to about 30 Hz at 2 Hz or 3 Hz intervals. There are two ways to perform the photic stimulation:

- With a rest time between stimulation periods
- Continuous stimulation by changing frequency

The instrument provides the automatic and manual modes. In automatic mode, the frequency and duration of each step is preset and stimulation is completely automatic. To program the stimulation frequency for each step, use the System program (See “Programming Automatic Photic Stimulation Modes” in Section 4). In manual mode, you must change the frequency and start and stop each step manually.

NOTE

- **To perform the photic stimulation, the optional LS-901AJ/AK/AG Photo Control Unit is required.**
- **Before starting the photic stimulation, check the cable connection between the photo control unit and PC unit and power status of the photo control unit. When the photo control unit is not connected to the PC unit or the power of the photo control unit is turned off, the Activation bar cannot be opened (The Display Activation Control button on the tool bar is dimmed). When the Display Activation Control button is dimmed, check the cable connection and the power status of the photo control unit. After connecting the cable and/or turning on the power of the photo control unit, restart the Acquisition program.**

Automatic Photic Stimulation

1. Click the  Display Activation Control button on the tool bar, or select Activation from the Control menu. The Activation bar opens.

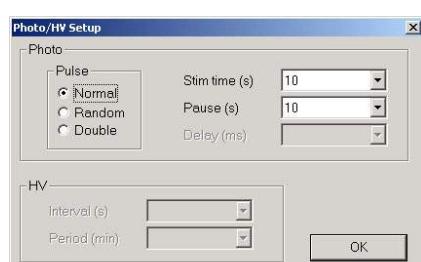


2. Click the Sel button to select the photic stimulation mode. The PS LED lights.
3. Select “AUTO1”, “AUTO2” or “AUTO3” from the Mode list box.
4. Select the stimulation time (Stim Time), pause time (Pause) and/or photic stimulation pulse mode (Pulse).

- 1) Click the Setup button on the Activation bar. The Photo/HV Setup dialog box opens.

To change the stimulation time:

Click the Stim Time list box arrow, then click the appropriate stimulation time.



To change the pause time:

Click the Pause Time list box arrow, then click the appropriate pause time. To change the photic stimulation pulse mode, click the appropriate button in the PHOTO Pulse area. When DOUBLE is selected, select the delay time with the Delay list box.

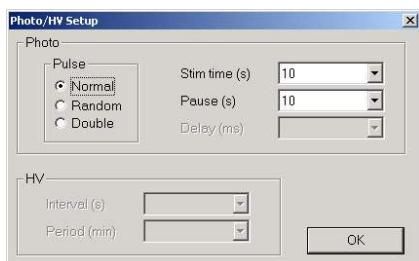
- 2) Click the OK button to close the Photo/HV Setup dialog box.
5. Click the Start button on the Activation bar to start photic stimulation. The stimulation automatically stops when the preset steps are complete.
 - To temporarily stop the stimulation, click the Start/Stop button.
 - To restart the stimulation, click the Start/Stop again. The automatic stimulation is restarted from the current step.
 - To cancel the stimulation, click the Reset button.

Manual Photic Stimulation

1. Click the  Display Activation Control button on the tool bar, or select Activation from the Control menu. The Activation bar opens.



2. Click the Sel button to select the photic stimulation mode. The PS LED lights.
3. Select “MANUAL” from the Mode list box.
4. Select the stimulation frequency from the Frequency list box.
5. Select the stimulation time (Stim Time) and photic stimulation pulse mode (Pulse).
 - 1) Click the Setup button. The Photo/HV Setup dialog box opens.

To change the stimulation time:

Click the Stim Time list box arrow, then click the appropriate stimulation time.

To change the photic stimulation pulse mode:

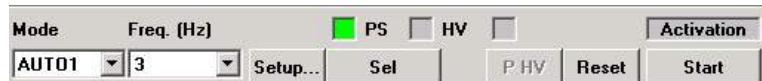
Click the appropriate button in the PHOTO Pulse area. When DOUBLE is selected, select the delay time with the Delay list box.

- 2) Click the OK button to close the PHOTO/HV Setup dialog box.
6. Click the Start button on the Activation bar to start the manual photic stimulation. The Start button changes to the Stop button.
To stop the stimulation, click the Stop button.

Single Photic Stimulation

Every time the Start button is pressed or a trigger pulse is input from an external instrument, a single photic stimulation is generated.

1. Click the  Display Activation Control button on the tool bar, or select Activation from the Control menu. The Activation bar opens.



2. Click the Sel button to select the photic stimulation mode. The PS LED lights.
3. Select "SINGLE" from the Mode list box.
4. Click the Start button on the Activation bar to generate a single photic stimulation.

Hyperventilation

The Acquisition program can control the optional ZE-510AK Hyperventilation unit. For cable connection and operation, refer to the Operator's manual of the hyperventilation unit. This section explains hyperventilation procedures when using the hyperventilation unit. If the hyperventilation unit is not used, use the HV timer to tell the patient when to hyperventilate.

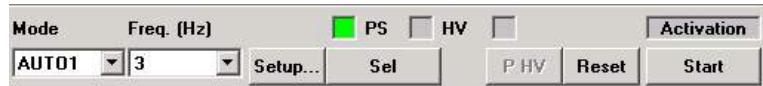
The following annotations are automatically marked on the EEG waveforms.

HV START	Hyperventilation started.
HV mm:ss	Every 30 seconds during hyperventilation
HV END	Hyperventilation stopped.
PostHV mm:ss	Every 30 seconds during post hyperventilation

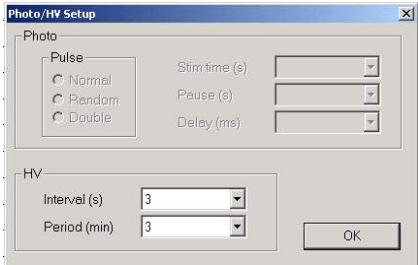
NOTE

- To control the optional ZE-510AK Hyperventilation Unit, the optional LS-901AJ/AK/AG Photo Control Unit is required.
- Before starting the hyperventilation, check the cable connection between the photo control unit and PC unit, the cable connection between the photo control unit and hyperventilation unit, and the power status of the photo control unit and hyperventilation unit. When any cable is not connected or any unit is turned off, hyperventilation with the hyperventilation unit cannot be performed. When the Display Activation Control button on the tool bar is dimmed, check the cable connection between the photo control unit and PC unit, and the power status of the photo control unit. After connecting the cable and/or turning on the power of the photo control unit, restart the Acquisition program. When the hyperventilation tone does not sound, check the cable connection between the photo control unit and hyperventilation unit, and the power status of the hyperventilation unit.

1. Click the  Display Activation Control button on the tool bar, or select Activation from the Control menu. The Activation dialog box opens.



2. Click the Sel button to select the hyperventilation mode. The HV LED lights.
3. Select the duration of one hyperventilation (Interval) and the total period of all hyperventilations (Period).
 - 1) Click the Setup button. The Photo/HV Setup dialog box opens.
 - 2) Select the duration of one hyperventilation with the Interval list box.
 - 3) Select the total period of all hyperventilations with the Period list box.
 - 4) Click the OK button to close the Photo/HV Setup dialog box.
4. Click the Start button on the Activation dialog box to start the hyperventilation pacing. The HV timer automatically starts counting. The "HV mm:ss." annotation is recorded every 30 seconds.



When the hyperventilation tone sounds, the HV mark is automatically recorded on the mark channel.

- To temporarily stop hyperventilation, click the Stop button.
- To restart hyperventilation, click this button again.
- To cancel the current hyperventilation, click the Reset key.
- To stop hyperventilation and start Post HV mode, click the P HV button. The PostHV timer automatically starts counting.

When the preset total period is complete, hyperventilation pacing automatically stops, the PostHV timer automatically starts counting and the PostHV LED lights. The "PostHV mm:ss." annotation is recorded every 30 seconds.

- To reset the Post HV timer, click the Reset button.

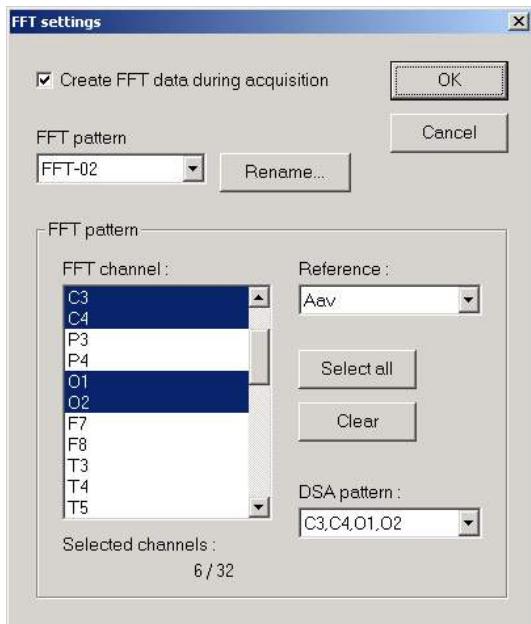
Creating the FFT Data for DSA Trendgraph



The instrument analyzes the EEG waveform data to examine the frequency components and displays amplitude for each frequency as a DSA (Density Spectral Array) trendgraph on the review screen and EEG Scope - Comparison mode. During waveform acquisition, the instrument can create the FFT data to display the DSA trendgraph.

1. From the File menu, select FFT setup. The FFT settings dialog box opens.
2. Select the following options to create the FFT data.

FFT settings dialog box options



Create FFT data during acquisition:

Check this box to create the FFT data during waveform acquisition.

FFT pattern:

The settings in the FFT pattern area can be saved with a pattern name. To change the pattern name, click the Rename button.

FFT channel:

Select the electrode for the FFT calculation.

To select all electrodes, click the Select all button.

To cancel electrode selection, click the Clear button.

NOTE

When all electrodes are selected, the recording time is about 20% shorter. Depending on the number of selected electrodes, CPU performance is reduced and the display drawing becomes unsMOOTH.

Reference:

Select the reference electrode for the FFT calculation.

DSA pattern:

In the Review screen, to select the DSA trendgraph display settings. Refer to “Displaying a DSA Trendgraph - Changing the DSA Trendgraph Display Settings” in Section 6.

3. Click the OK button.

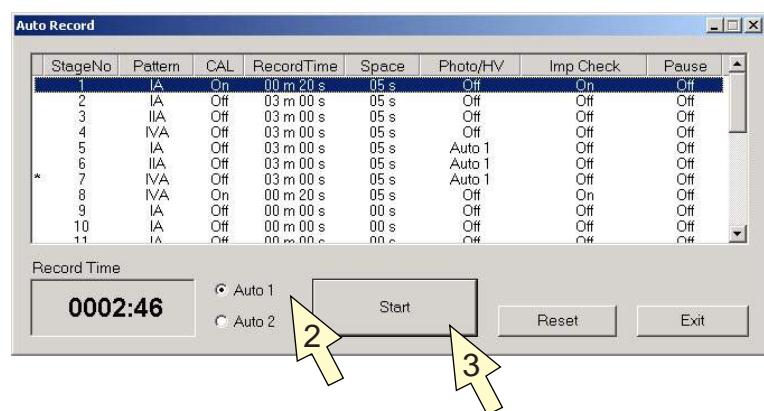
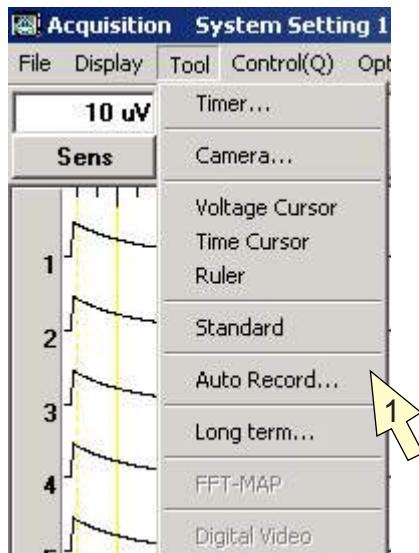
To cancel settings, click the Cancel button.

Automatic EEG Waveform Recording

In the automatic EEG waveform recording mode, the skin-electrode contact impedance check, calibration waveform recording, pattern changing and activation are automatically performed according to the automatic recording settings. To program the automatic recording settings, refer to “Programming Automatic Recording Modes” in Section 4.

NOTE

Make sure that the “Start filing when Auto Record starts” check box on the Auto Record dialog box - System program is checked.
Otherwise, the filing does not start when the Start button on the Auto Record dialog box is clicked.



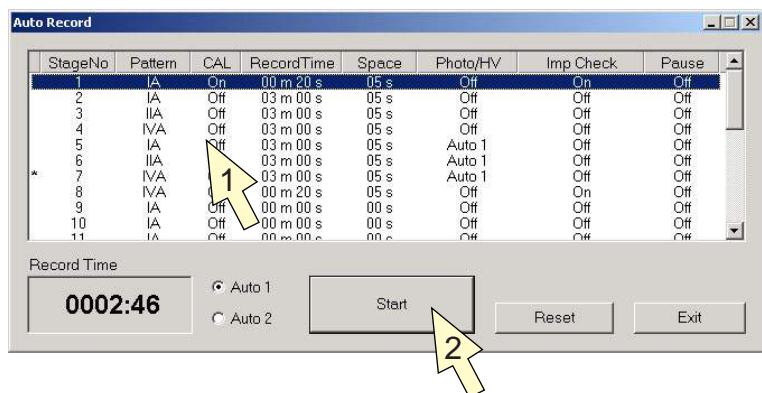
- From the Tool menu, select Auto Record. The Auto Record dialog box opens.

- Check the Auto 1 or Auto 2 option button to select the automatic recording mode.
- Click the Start button to start waveform acquisition. The filing automatically starts at the same time. When the final stage waveform acquisition is complete, the automatic recording automatically stops.
 - To temporarily stop waveform acquisition, click the Start/Stop filing button on the tool bar.
 - To resume waveform acquisition, click the Start/Stop filing button again.
 - To stop automatic recording, click the Exit button.
 - To start automatic recording from the stage 1 during recording, click the Reset button.

5. ACQUISITION PROGRAM

- To start automatic recording mode from the stage that you want:

1) Click the stage in the list box.



2) Click the Start button.

- To change the stage during recording:

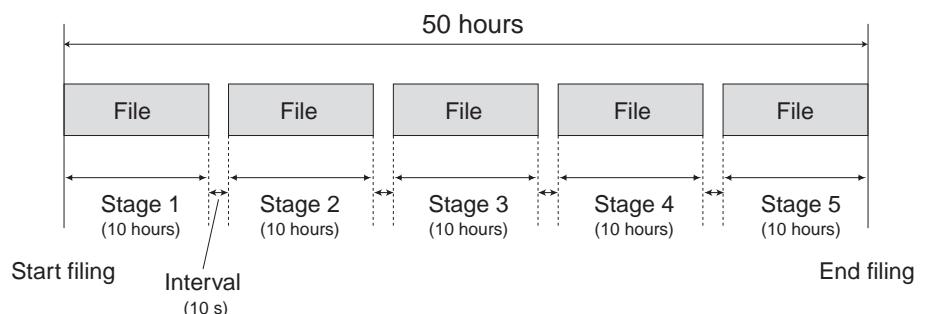
Double-click the stage in the list box. The waveform acquisition continues from the selected stage.

Long Term EEG Waveform Monitoring

The long term monitoring function lets you save up to 52 GB (2 GB × 26 stages) of EEG waveforms in different storage media. For each stage, a new EEG data file is created and saved in the selected drive as a different EEG data file. Up to 2 GB EEG data file can be saved for each stage. When the optional QP-224A Serial Interface Board (analog video link) or QV-110AK Digital Video Unit/QP-110AK Digital Video Software (digital video link) is installed, you can save the patient image during long term EEG waveform monitoring (These options are not available for the EEG-9100A/J/K/G Electroencephalograph). The QP-251AK Spike Detection Software (version 20000714NK or later) can be used in the long term monitoring (online spike detection).

Setting Example

For setting, refer to “Changing the Settings for Long Term EEG Waveform Monitoring” in Section 4. In the following example, up to 50 hours EEG waveforms are saved in a different EEG data file for each stage.



Total recording time: 50 hours

Number of stages: 5

Interval between stages: 10 s

NOTE

If the file size exceeds 2 GB, the long term monitoring cannot be started. File size differs depending on the combination of the sampling frequency and electrodes to be saved. Refer to “Formatting a Magneto-optical Disk - Disk Capacity” in Section 3.

5. ACQUISITION PROGRAM

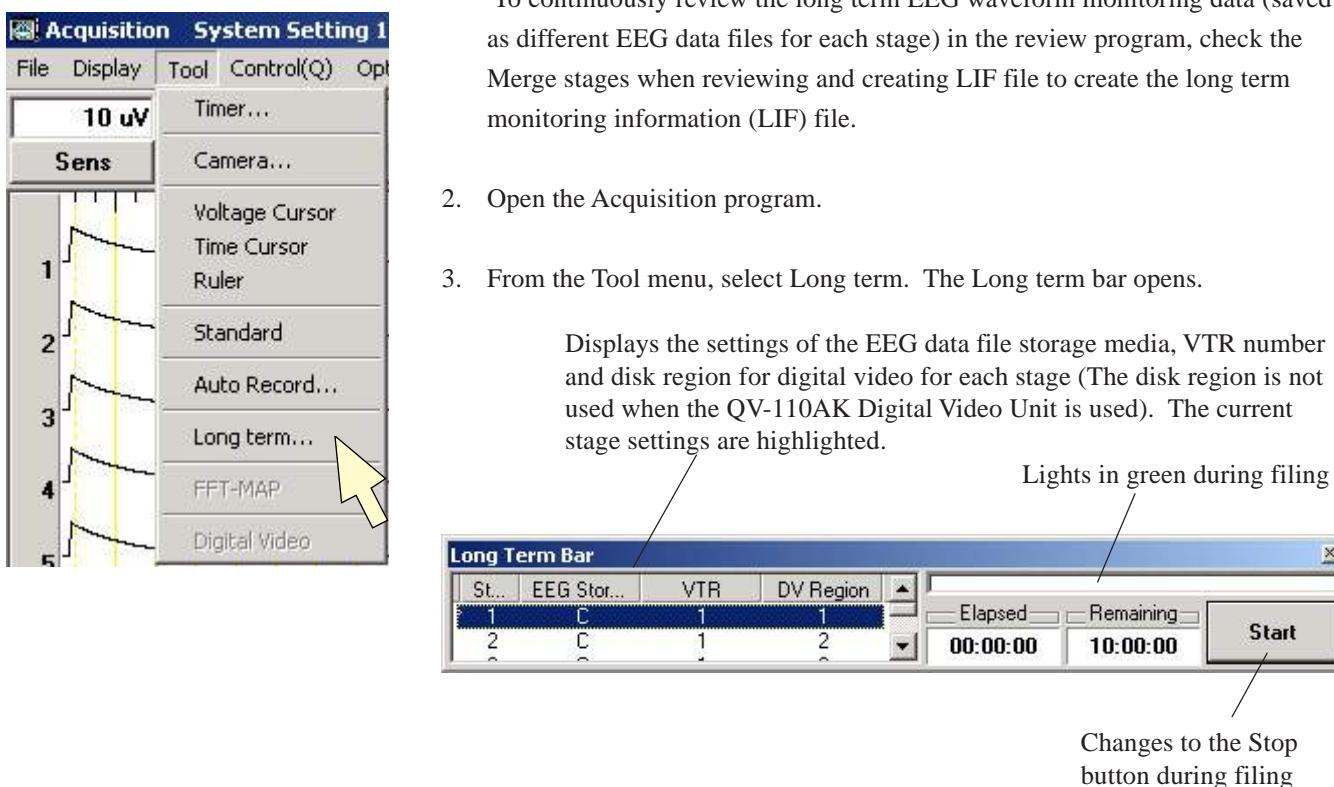
Procedure

- Check and change the long term monitoring settings (System program → System icon → System Settings dialog box - General page → Long term monitoring).

To continuously review the long term EEG waveform monitoring data (saved as different EEG data files for each stage) in the review program, check the Merge stages when reviewing and creating LIF file to create the long term monitoring information (LIF) file.

- Open the Acquisition program.
- From the Tool menu, select Long term. The Long term bar opens.

Displays the settings of the EEG data file storage media, VTR number and disk region for digital video for each stage (The disk region is not used when the QV-110AK Digital Video Unit is used). The current stage settings are highlighted.



NOTE

During long term EEG waveform monitoring, other functions are not available.

- Select the starting stage to start long term EEG waveform monitoring.
- Click the Start button. A new EEG data file is created in the selected storage media. The stage is automatically changed at the preset recording time.

To stop the long term monitoring, click the Stop button.

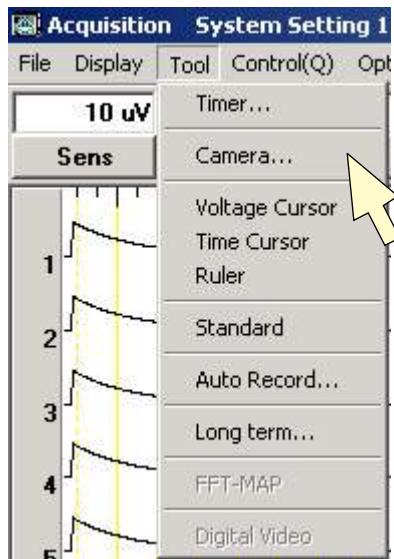
- When the filing of all the stages is complete, the Acquisition dialog box opens. Check the filing result and click the OK button.

NOTE

We recommend that you close the Acquisition program and shut down the computer because the system may be unstable after long time filing.

- From the File menu, select Exit to close the Acquisition program.
- From the Start menu, select Shut Down. If necessary, restart the computer.

Displaying the Patient Image



You can display the patient image on the screen. The optional QI-111A Video Camera Interface board and a video camera are required (The camera interface board is not available for the EEG-9100A/J/K/G Electroencephalograph). The Enable video camera option must be selected in the System Setting window of the System program. Refer to "Changing the Settings in the System Settings Dialog Box" in Section 4.

To display the patient image, select Camera from the Tool menu.

Keyboard Operation

You can operate the instrument with the following keys in the Acquisition screen. You can change the key function by changing the “[Common] - AccSelectType” setting in the E11CFG.INI file in C:\nfx11 directory. Refer to “PC Unit Setting” in Section 2 of the Service manual.

NOTE

Keyboard operation is only available when the Acquisition program window is active.

AccSelectType = 0 (default setting)

	Operation	Key (Label)
a)	Changes to the pattern in the current group.	1: Pattern I (Pat I), 2: Pattern II (Pat II), 3: Pattern III (Pat III), 4: Pattern IV (Pat IV)
b)	Changes to the free pattern in the current group.	5 (Free)
c)	Changes the pattern group. Pattern I is automatically selected. Each operation changes the selection as follows: A → B → C → D → A	6 (Group)
d)	Opens the Sensitivity dialog box.	Q (SENS)
e)	Opens the TC dialog box.	W (TC)
f)	Opens the HF dialog box.	E (HF)
g)	Opens the Pattern dialog box.	R (Pat)
h)	Opens the Reference dialog box.	T (Ref)

AccSelectType = 1

	Operation	Key (Label)
a)	Changes to the pattern in the same group.	1: Pattern I (Pat I), 2: Pattern II (Pat II), 3: Pattern III (Pat III), 4: Pattern IV (Pat IV)
b)	Changes to the free pattern in the same group.	5 (Free)
c)	Changes the pattern group. Pattern I is automatically selected. Each operation changes the selection as follows: A → B → C → D → A	6 (Group)
d)	Highlights the setting in the Sens text box on the Amp bar.	Q (SENS)
e)	Highlights the setting in the TC text box on the Amp bar.	W (TC)
f)	Highlights the setting in the HF text box on the Amp bar.	E (HF)
g)	Highlights the setting in the Pat text box on the Amp bar.	R (Pat)
h)	Highlights the setting in the Ref text box on the Amp bar.	T (Ref)

When the setting is highlighted, use the ↑ or ↓ key and Enter key to change the setting.

Both AccSelectType = 0 and 1

	Operation	Key (Label)
i)	Turns the AC filter on/off.	Y (AC-F), or Alt + - key
j)	Displays the calibration waveforms.	A (CAL), or Alt + C
k)	Displays the EEG waveforms.	S (EEG), or Alt + G
l)	Performs the skin-electrode contact impedance check.	D (IMP), or Alt + M
m)	Returns all waveforms to the baseline position.	F (RESET), or Alt + S
n)	Opens the Patient Information dialog box.	Z (Patient), or Alt + A
o)	Opens the Activation bar and highlights the Start button. When the Activation bar is open, highlights the Start button. You can start the photic stimulation by pressing the Enter key.	X (Photo)
p)	Opens the Timer bar and highlights the Start button. When the Timer bar is open, highlights the Start button. You can start counting by pressing the Enter key.	C (Timer)
q)	Starts or stops filing.	Alt + [Space] (Record)
r)	Closes and saves the current file.	Ctrl + [Space] (Close)
s)	Opens the Auto Record dialog box.	V (AutoRecord)

When the Activation bar or Timer bar is open, use the Tab key to select another setting and use the ↑ or ↓ key and Enter key to change the setting.

5. ACQUISITION PROGRAM

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Section 6 Review Program

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General

To review the EEG waveforms saved in the file, use the Review program. This program lets you do the following:

- Sort and search for EEG data files
- Review the waveforms at normal or high speed
- Change the measurement settings (Reformat and Refiltering)
- Edit the patient information and annotations
- Select parts of waveforms to print or save in a file

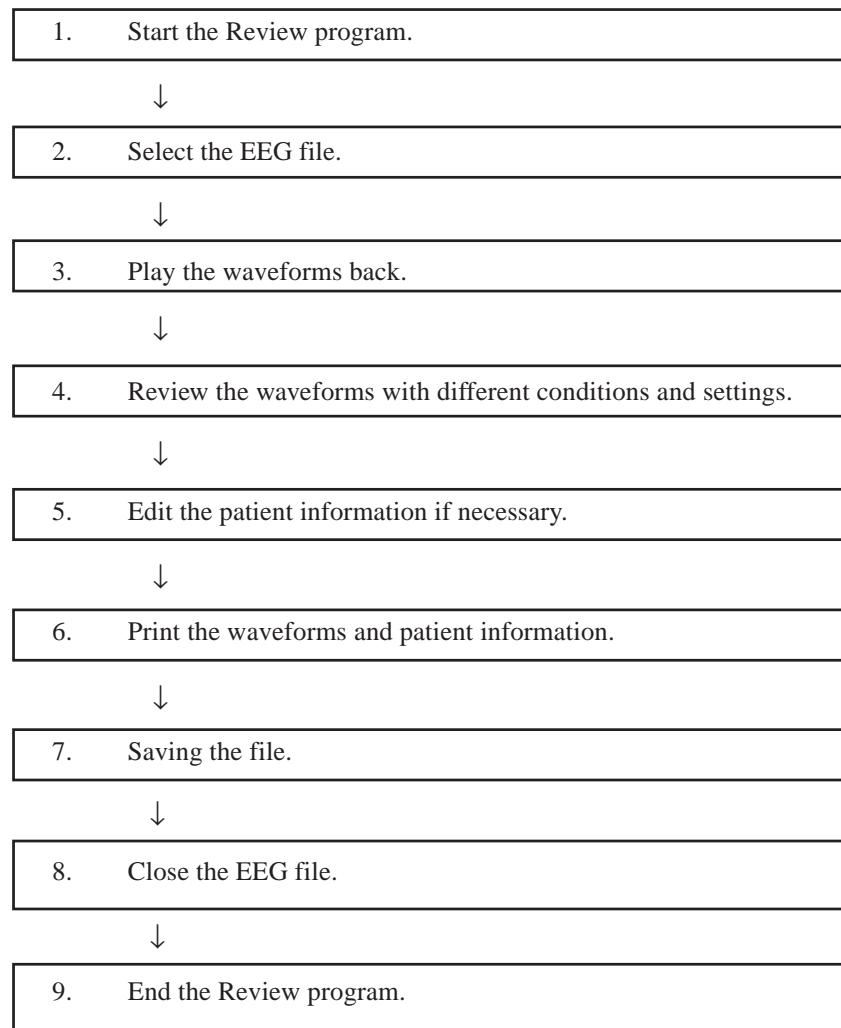
When reviewing the EEG data files saved by an EEG-2110, EEG-1100 Series electroencephalograph, digital EEG system (PC with the QP-111AJ/AK, QP-223A/AK acquisition program kit), the EEG data file opens on the Review screen with the settings in which the file was acquired. Refer to the Operator's manual for each instrument.

NOTE

When reviewing an EEG data file saved by another electroencephalograph or digital EEG system, the file is not registered in the system database. To register the file in the system database, use the Register command in the File Utility program.

6. REVIEW PROGRAM

Flowchart of Reviewing EEG Waveforms



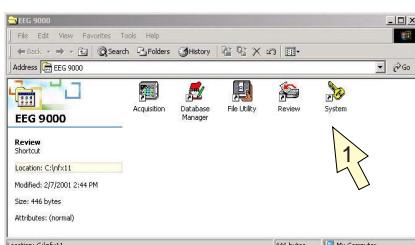
Opening the Review Program

CAUTION

Do not remove the magneto-optical disk, CD-R disk or CD-RW disk until the disk drive access lamp is off. Otherwise, the disk or disk drive may be damaged.

NOTE

- To use the Review program, 100 MB or more hard disk free space is required.
- Turn off any screen saver and close all application programs before opening the Review program. Otherwise, the Review program may not function properly.
- It is not possible to open the Review program while the Acquisition, System program or any other EEG-9000 application program is open.

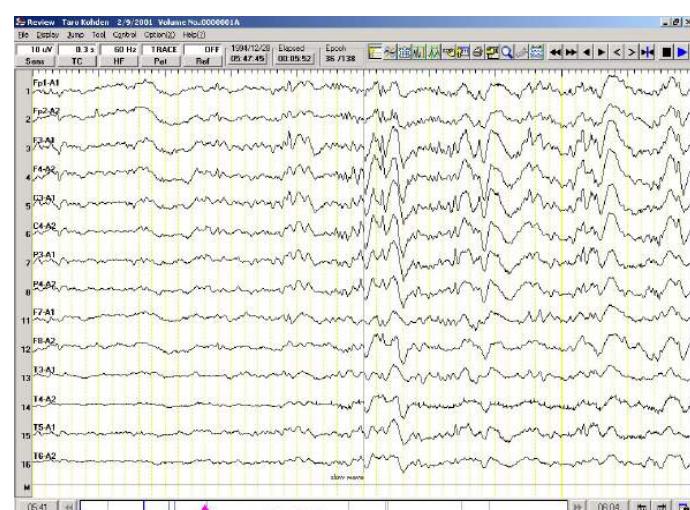
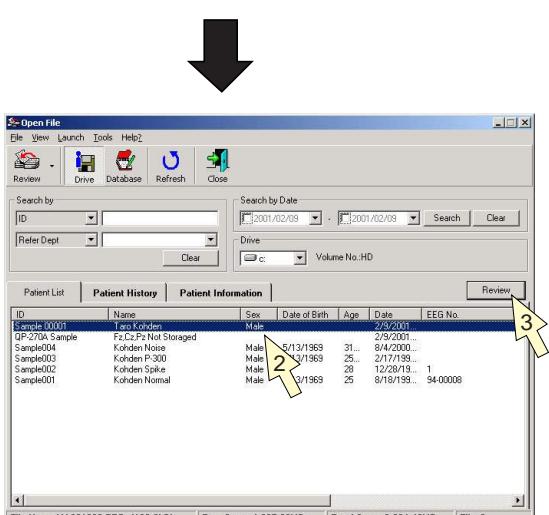


1. From the EEG 9000 window, double-click the Review icon. The Open File window opens.

To find files, you can use the search function. Refer to “Opening the EEG Data File” in this section.

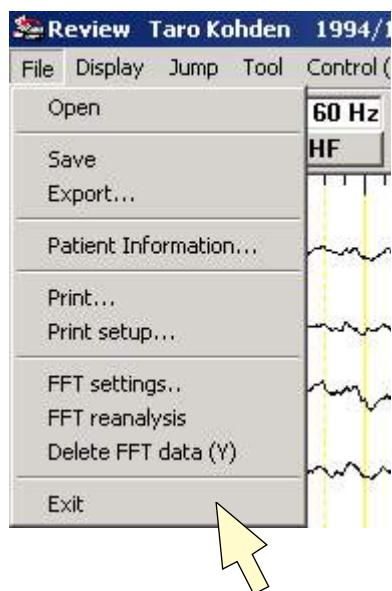
2. In the list, select the EEG data file you want to review.

3. Click the **Review** button. The selected EEG data file opens on the Review screen.



6. REVIEW PROGRAM

To close the Review program:



CAUTION

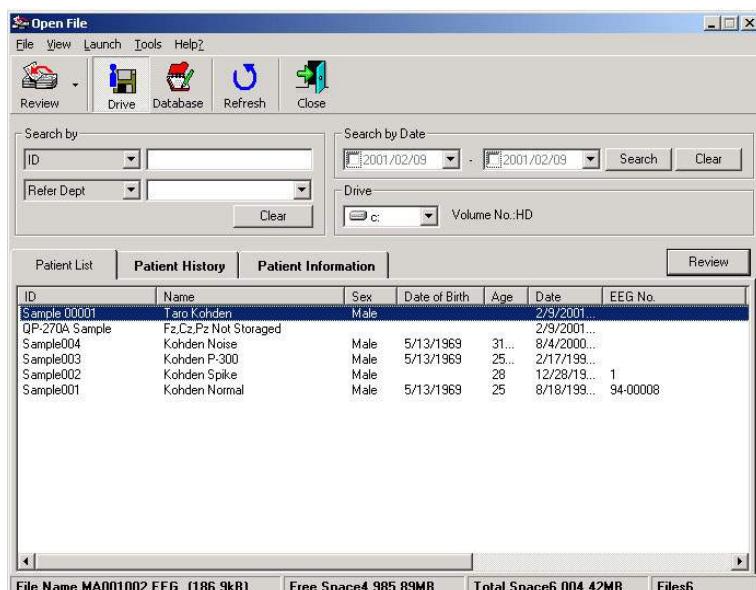
Do not remove the magneto-optical disk, CD-R disk or CD-RW disk until the disk drive access lamp is off. Otherwise, the disk or disk drive may be damaged.

1. Select Exit from the File menu to close the Review program. The Open File windows opens.
2. Click the Close button on the Open File dialog box, or select Exit from the File menu.

Opening the EEG Data File

Opening the EEG Data File in a Drive

- From the EEG 9000 window, double-click the Review button. The Open File window opens.



- If the EEG data file that you want to review is saved in an MO disk, insert the disk into the MO disk drive. Select the drive from the Drive list box by clicking the Drive box list arrow. The patient information for each EEG data file in the selected drive are displayed in the patient file list.



NOTE

When the EEG data file is saved in a CD-R disk, copy it to a hard disk and change the file attribution to “Archive”. If not, you cannot change the patient information as a new file.

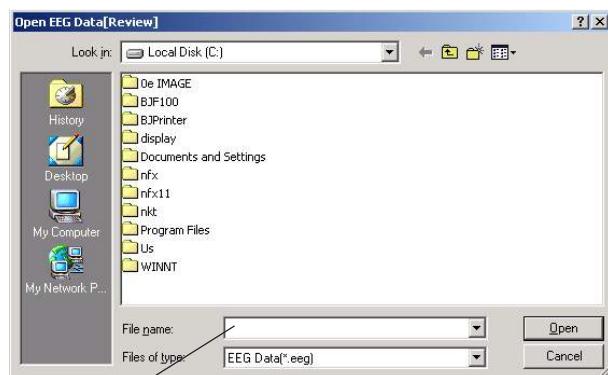
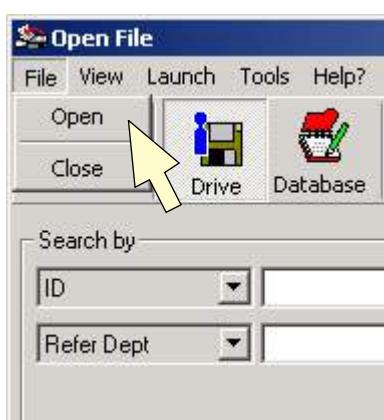
To display all EEG data files registered in the database, click the Database button.

- Click the file that you want to review. The selected file is highlighted.
- Click the **Review** button or double click the selected file. The selected EEG data file opens on the Review screen with the settings in which the file was acquired.

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Selecting the EEG Data File in a Folder

1. Select Open from the File menu. The Open EEG Data dialog box opens.



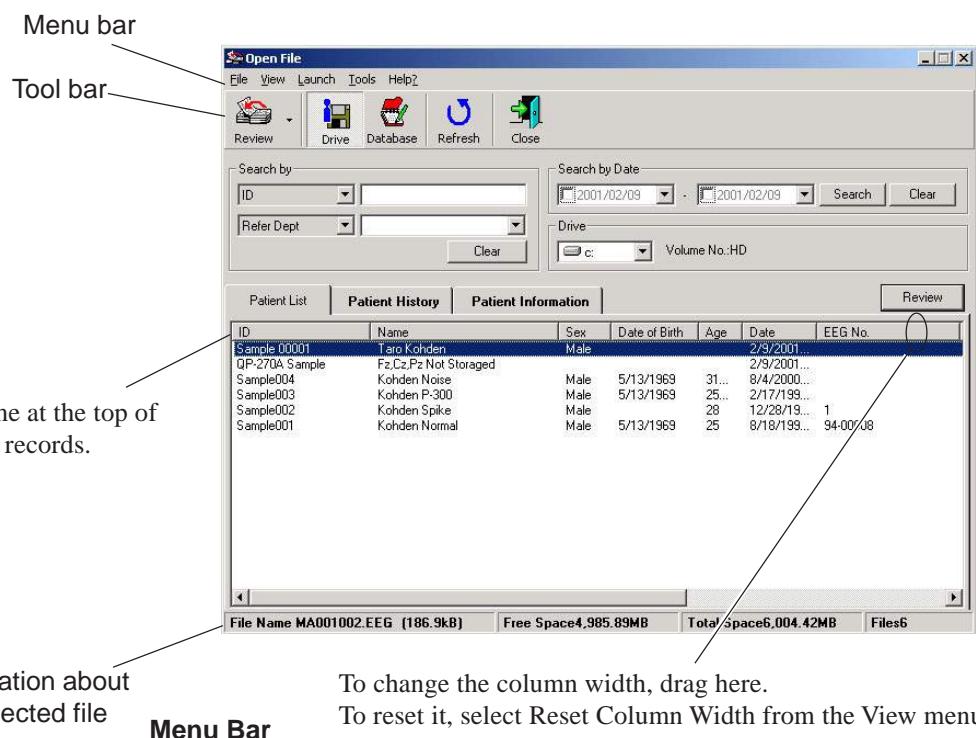
Select a file with an “.eeg” extension.

2. Use the Look in text box (arrow) to select the drive and folder where the file that you want to review is saved.
3. Select a file with an “.eeg” extension.
4. Click the OK button. The selected EEG data file opens on the Review screen.

To cancel it, click the Cancel button.

About the Open File Dialog Box

You can search for an EEG data file to review. Before opening the file, you can review the patient information and patient history.



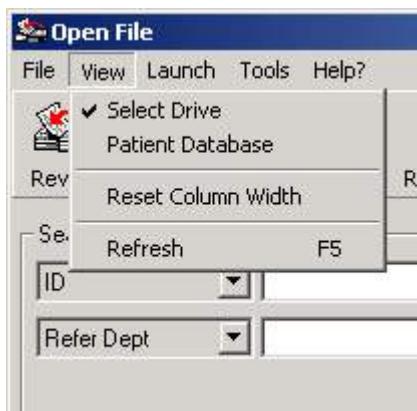
File Menu

Open:

Opens the Open EEG Data dialog box to select an EEG data file in a folder.

Close:

Closes the File Open dialog box.



View menu

Select Drive:

Displays all patient information in the EEG data files saved in the currently selected drive. You can also display all patient information by clicking the Selected Drive button.

Patient Database:

Displays all patient information in the EEG data files registered in the system database. You can also display all patient information by clicking the Database button.

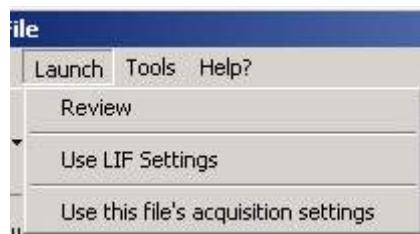
Reset Column Width:

Resets the column width to the factory default setting.

Refresh:

Use this command to refresh the patient file list when another drive is selected or another MO disk is inserted.

6. REVIEW PROGRAM



Launch menu

Review:

Opens the selected EEG data file on the Review screen.

Use LIF Settings:

When the EEG waveforms are measured with the long term EEG monitoring function, The EEG waveforms for each stage are saved as a different EEG data file. To continuously review the EEG waveforms, select the corresponding EEG data files and check this command

Use this file's acquisition settings:

In the review screen, the EEG waveforms are displayed with the pattern settings when they were acquired. When reviewing the EEG waveforms in another instrument, the pattern settings of the other instrument is applied. This is because each instrument may have different pattern settings. To use the pattern settings of the instrument which the waveforms were acquired, check this command.

NOTE

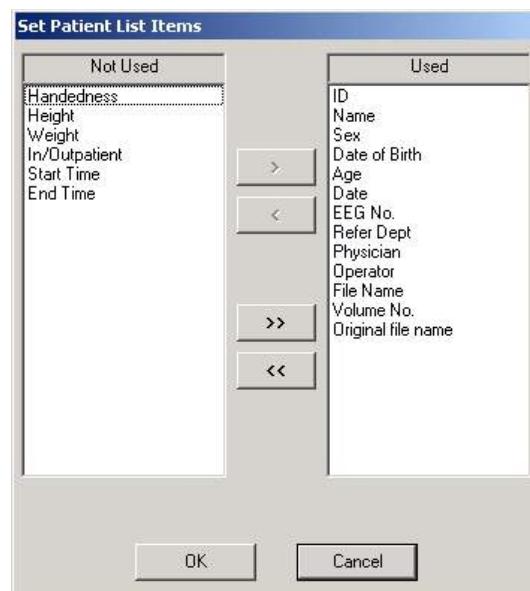
This function is only available when “Use current system settings in review” is set to “On” (System Settings dialog box → General page → Other Settings area) when the waveforms were acquired.



Tools menu

Set Patient List Items:

Opens the Set Patient List Items dialog box to select the items displayed in the patient list. Use the “>”, “>>”, “<” and “<<“ buttons to add or remove the items.



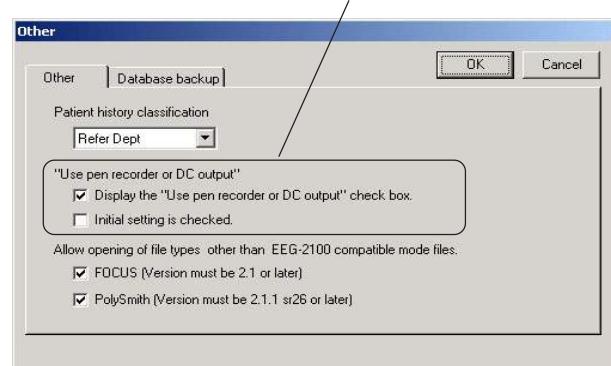
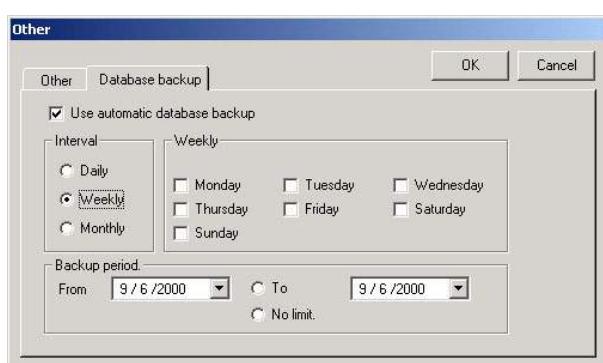
Option:

Opens the Other dialog box to select the database backup schedule and select the item (Refer Dept, Physician or Operator) to group the patient information in the patient history. To automatically back up the database, check the “Use automatic database backup” check box on the database page. The database is backed up as the E11system_backup.mdb file in C:\nfx11\backup folder.

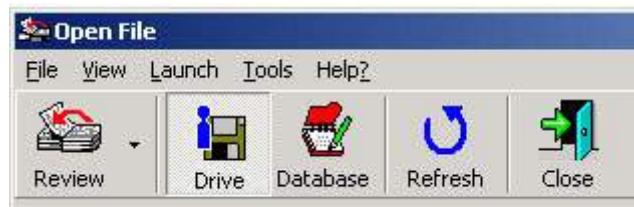
Change File Attributes:

Remove the read-only attribute of the selected file.

Not available for this instrument.

**Help menu**About:

Displays the information about the program.

Tool BarReview button:

Opens the selected EEG data file on the Review screen.

Selected Drive button:

Displays all patient information in the EEG data files saved in the currently selected drive. You can also display all patient information by selecting Selected Drive from the View menu.

Database button:

Displays all patient information in the EEG data files registered in the system database. You can also display all patient information by selecting Patient Database from the View menu.

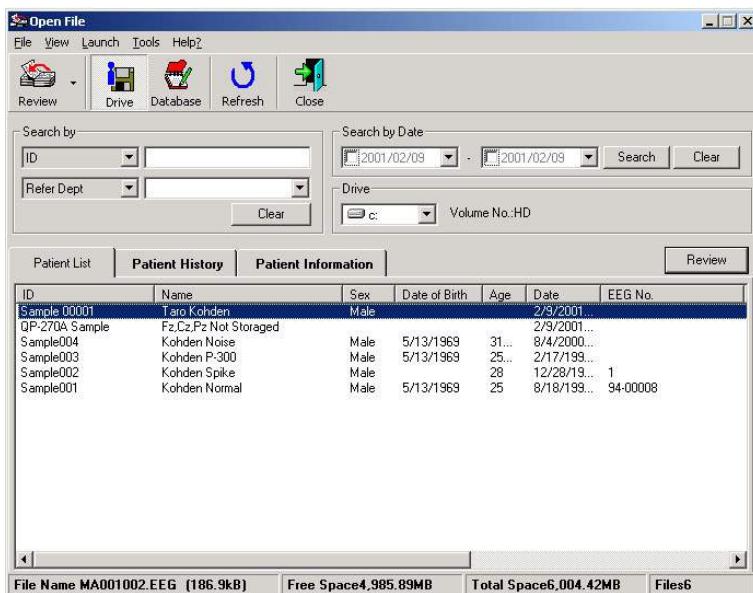
Refresh button:

Use this button to refresh the patient file list when another drive is selected or another MO disk is inserted.

Close button:

Closes the File Open dialog box. You can also close the File Open dialog box by selecting Close from the File menu.

6. REVIEW PROGRAM



Search By:

Searches for the EEG data file by ID, Name, EEG No., Refer Dept (Department), Physician and/or Operator. To search for the EEG data file, type the keyword.

Search by Date:

Searches for the EEG data file by Date (examination date). To search for the EEG data file, open the calendar by clicking the box arrow.

Drive:

Select the drive where the EEG data files are saved.

Patient List page:

Displays the patient information for each EEG data file in the selected drive or system database.

Patient History page:

Each set of patient information is grouped into a folder by Refer Dept, Physician or Operator. To change the item to group the patient information, use the Other dialog box - Other page (Tools menu → Option).

Patient Information page:

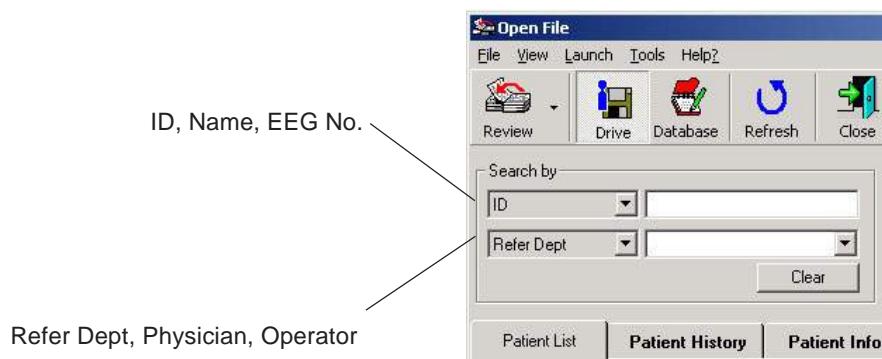
Displays the patient information of the selected EEG data file.

Searching for a File

You can search for a file by a keyword and/or date. If one or more keywords/dates are entered, the program searches for all files which satisfy all of the entered keywords/dates. Searching starts when the keyword is entered.

Searching for a File by a Keyword

1. Select one or two items in the Search By box arrows.



2. Type the keyword. Searching automatically starts.

For Refer Dept, Physician and Operator, you can use the box arrow to enter the keyword.

Use of “*”:

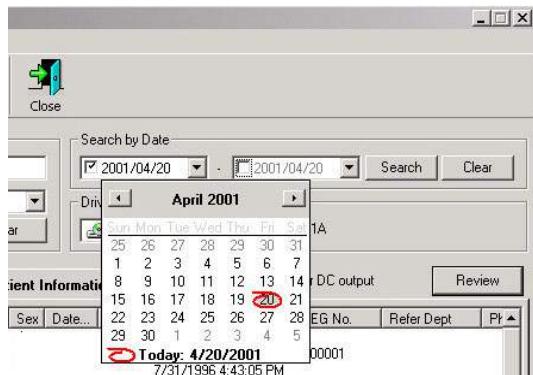
- *123: Searches for characters which end with “123”.
- *123*: Searches for characters which include “123”.
- 12*3: Searches for characters which start with “12” and end with “3”.

- To clear the entered keywords, click the Clear button.
- To refresh the patient file list in the selected drive, click the Refresh button.

6. REVIEW PROGRAM

Searching for a File by the Examination Date

1. Click the Search by date box arrow. The calendar appears.



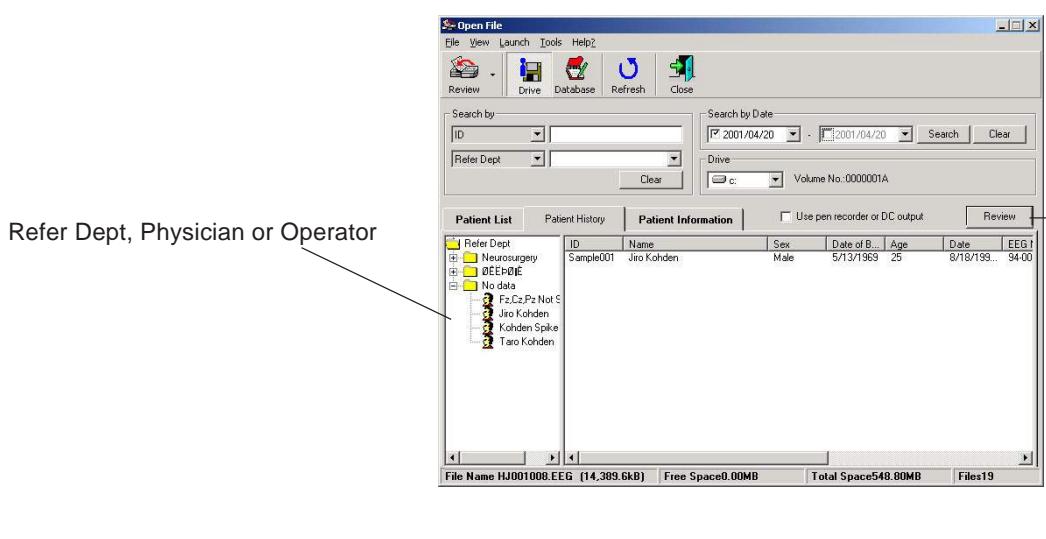
2. Click the examination date.

- To search for files between two dates, select the beginning date with the left box and the ending date with the right box.
 - To select the year, click the year on the top of the calendar (The up/down arrow appears).
 - To select the month, click the left/right arrow or month on the top of the calendar
3. Click the Search button.
- To clear the entered date, click the Clear button.
 - To refresh the patient file list, click the Refresh button.

Reviewing the Patient History

Each set of patient information is grouped into a folder by Refer Dept, Physician or Operator. To change the item to group the patient information, use the Other dialog box - Other page (Tools menu → Option).

To open the Patient History page, click the Patient History tab.



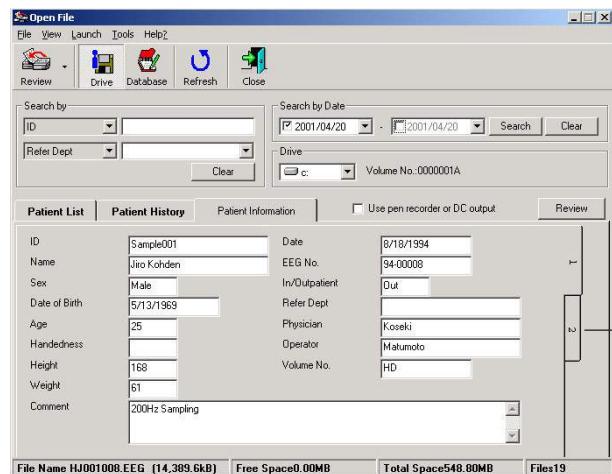
Click the Review button to open the selected file on the Review screen.

Reviewing the Patient Information

To open the Patient Information Page, click the Patient Information tab.

NOTE

The contents of the Patient Information page cannot be changed in the Open File dialog box.

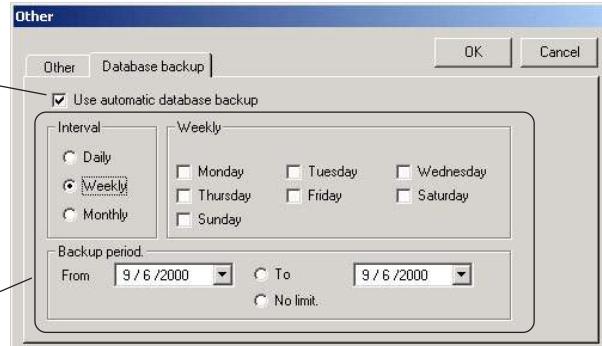


[Click here to see more information.](#)

Backing Up the Database

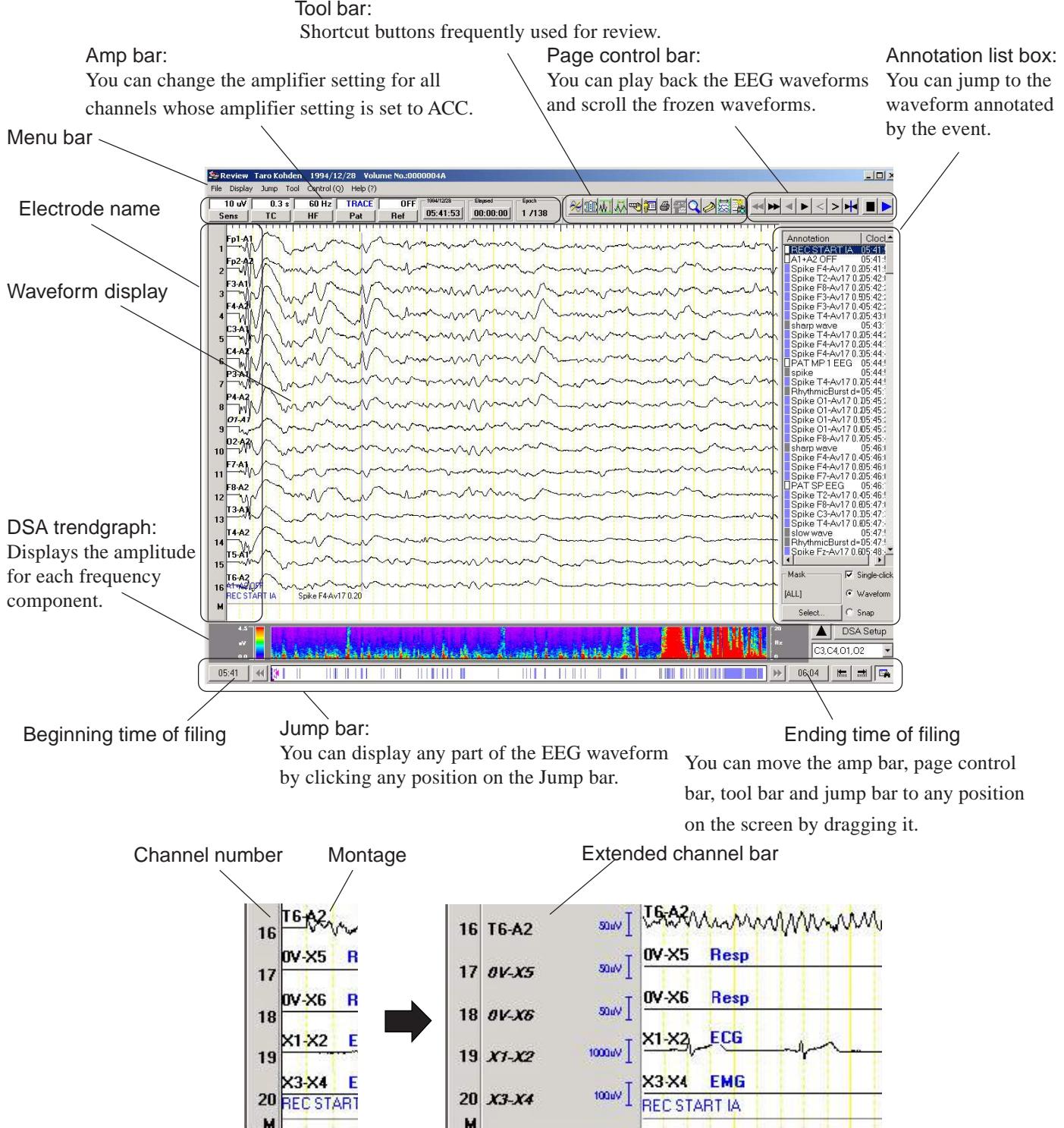
The EEG data file is managed by the Database manager program. The patient information, disk No are saved in system the database. Refer to Section 7 "Database Manager Program". The database can be automatically backed up as the E11system_backup.mdb file in C:\nfx11\backup folder. To back up the database, use the Other dialog box (Tools menu → Option).

To automatically back up the database, check the "Use automatic database backup" check box.



Select the backup schedule.

Review Screen



To display the extended channel bar, check the “Display extended channel bar” check box in the Display Control dialog box. The DC conversion value and the scales corresponding to the DC low and high limit are displayed.

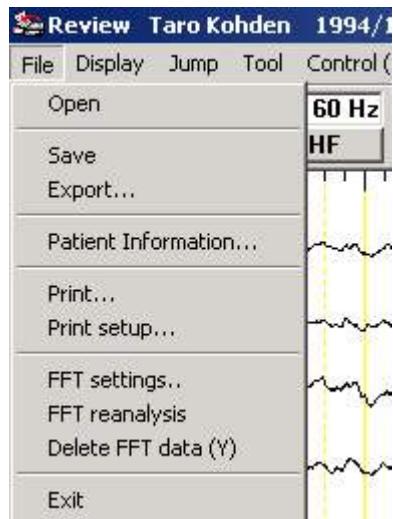
- To display the extended channel bar, check the “Display extended channel bar” check box in the Display Control dialog box.
- To display the extended channel bar, refer to “Changing the Measurement Settings - Changing the Waveform Display” in this section 4.

You can display either the montage or comment on the extended channel bar. Refer to “Programming Patterns - Selecting the Item Displayed on the Extended Channel Bar” in Section 4.

Explanation of Each Function

Menu Bar

File Menu



You can save the changed data to the currently selected file and print it on the paper.

Open

Opens the Open File window to select a patient file.

Save

Saves the changed data to the currently selected file.

Export

Opens the Export dialog box to save all or part of waveforms in a new file.

Patient Information

Opens the Patient Information dialog box to review and change the patient information. You can open the Patient Information dialog box by clicking the



Display Patient Information button on the tool bar.

Print

Opens the Print dialog box to print the waveform.

Printer setup

Opens the Print setup dialog box to select the printer settings. Refer to your printer's instruction manual.

FFT setup

Opens the FFT settings dialog box to select the FFT analysis settings for the EEG frequency analysis.

FFT reanalysis

Analyzes the EEG data according to the settings in the FFT setting dialog box.

Delete FFT data

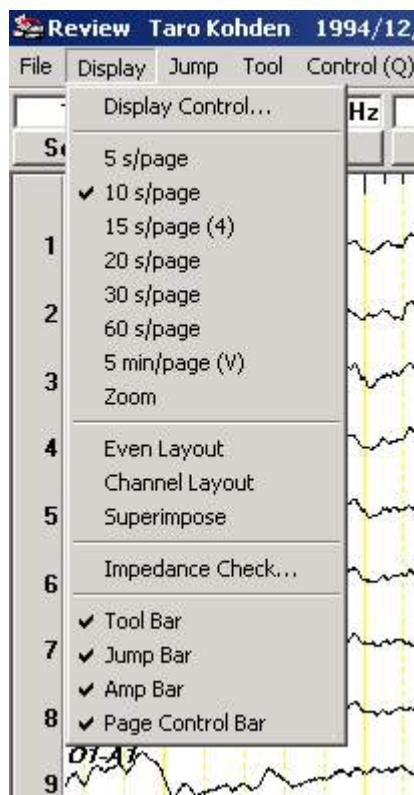
Deletes the FFT data saved with the EEG waveform data.

Exit

Closes the Review program.

Display Menu

You can set the waveform display mode.



Display Control

Opens the Display Control dialog box to select the display mode, and whether or not to display the electrode name (montage) and vertical lines to indicate time scale.

5 s/page

Displays a 5 second page on the screen (corresponds to recording at 60 mm/s).

10 s/page

Displays a 10 second page on the screen (corresponds to recording at 30 mm/s).

15 s/page

Displays a 15 second page on the screen (corresponds to recording at 20 mm/s).

20 s/page

Displays a 20 second page on the screen (corresponds to recording at 15 mm/s).

30 s/page

Displays a 30 second page on the screen (corresponds to recording at 10 mm/s).

60 s/page

Displays a 60 second page on the screen (corresponds to recording at 5 mm/s).

5 min/page

Displays a 5 minute page on the screen (corresponds to recording at 1 mm/s).

Zoom

Displays the magnifying glass to zoom in the waveforms. You can also displaying the magnifying glass by clicking the Zoom button on the tool bar.

Even Layout

Evenly space the baseline positions for all channels on the screen in channel order. Channels that are temporarily turned off are omitted.

Channel Layout

Evenly spaces the baseline positions for all channels in channel order. Blank spaces are included to indicate undisplayed channels.

Superimpose

Overlaps consecutive odd and even number channels.

Impedance Check

Displays the most recent impedance check result before the currently displayed waveforms.

Tool Bar

Displays the Tool bar.

Jump Bar

Displays the Jump bar.

Amp Bar

Displays the amp bar.

Page Control Bar

Displays the Page control bar.

Jump Menu

Clock time / Elapsed time display area

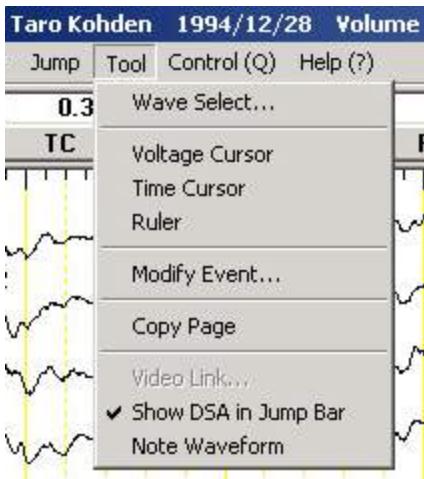
Event

Opens the annotation list box to display the EEG waveform by specifying the event (annotation on the waveform). You can also open the Event Jump dialog box by clicking the Select Event button on the jump bar.

Time

Opens the Time Jump dialog box to display the EEG waveform by specifying the time. You can also open the Time Jump dialog box by clicking the button on the clock time display area or elapsed time display area.

Tool Menu



Wave Select

Opens the Wave Select dialog box to select part of the waveform.

Voltage Cursor

Displays the two horizontal cursors to measure the voltage (amplitude) between the two cursors. You can also display the voltage cursors by clicking the Display Voltage Cursor button on the tool bar. This function is available only when the screen is frozen.

Time Cursor

Displays the two vertical cursors to measure the time interval between the two cursors. You can also display the time cursors by clicking the Display Time Cursor button on the tool bar. This function is available only when the screen is frozen.

Ruler

Displays the ruler to measure amplitude and time interval of the waveform.

You can also display the ruler by clicking the Display Ruler button on the tool bar. This function is available only when the screen is frozen.

Modify Event

Opens the Modify Event dialog box to change, add or delete the event name (annotation) that is manually marked on the waveform.

Copy Page

Copies the currently displayed waveforms to the clipboard. You can copy the clipboard data to another Windows application, such as a word processor. Refer to the Windows online help.

Video Link

Opens the Video Link dialog box and the patient image window (analog video link), or Digital Video Player. (digital video link) when the QI-224A Serial Interface Board or QV-110AK Digital Video Unit/QP-110AK Digital Video Software is installed.

You can also open the Video link dialog box and the patient image window, or Digital Video Player by clicking the Video Link button on the tool bar. This function is available only when the screen is frozen. This function is not available for the EEG-9100A/J/K/G Electroencephalograph

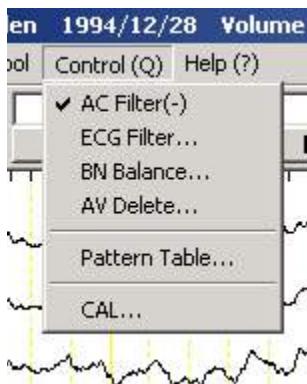
Show DSA in Jump Bar

Displays the DSA trendgraph. The DSA trendgraph displays the amplitude for each frequency component.

Note Waveform

Displays the note waveform window. You can copy the waveforms in the note waveform window to compare the waveforms. You can also display the note waveform window by clicking the  Display Note Waveform button on the tool bar.

Control Menu



AC Filter

Turns the AC filter on to reduce the AC interference. You can also turn the AC filter on by clicking the  AC Filter On/Off button on the tool bar.

ECG Filter

Opens the ECG Filter dialog box to reduce the ECG waveform superimposed on the EEG waveform.

BN Balance

Opens the BN Balance dialog box to adjust the voltage balance between the BN reference electrodes when the balanced noncephalic derivation is selected. This derivation is not available for this instrument when reviewing the EEG data file which were acquired and saved in the EEG-9100/EEG-9200 instrument.

AV Delete

Opens the AV Delete dialog box to select or delete reference electrodes in the AV derivation.

Pattern Table

Opens the pattern table to check or temporarily change the currently selected montage, amplifier settings (sensitivity, time constant, high-cut filter, calibration voltage), waveform display on/off, waveform color, and amplitude limit for each channel. You can also open the pattern table by clicking the  Display Pattern Table button on the tool bar.

CAL Control

Opens the CAL Control dialog box to select the calibration voltage.

Help Menu

About

Displays information about the program.

Amp Bar

The amplifier settings (sensitivity, time constant and high-cut filter), pattern and reference electrodes can be changed for all channels at the same time by clicking the button on the amp bar. You can select whether or not to display the amp bar by clicking the Amp bar button on the tool bar. (The settings with “*” mark are not available for this instrument when reviewing the EEG data file which were acquired and saved in the EEG-9100/9200 Electroencephalograph.)

Sens**Sens (Sensitivity selection button)**

Opens the Sensitivity dialog box to select the sensitivity. This selection applies to all channels whose sensitivity setting is set to ACC.

Sensitivity selection list (μ V/mm):

1, 2, 3, 5, 7, 10, 15, 20, 30, 50, 75, 100, 150, 200

OFF: Only the baseline is displayed.

TC**TC (Time constant selection button)**

Opens the Time Constant dialog box to select the time constant (low-cut filter). This selection applies to all channels whose time constant setting is set to ACC. You can select the time constant display format (time constant (s) or low-cut filter (Hz)) in the System program.

Time constant selection list (second):

0.001, 0.003, 0.03, 0.1, 0.3, 0.6, 1.0, 2.0, 5.0*, 10.0*

Low-cut filter selection list (Hz):

0.016*, 0.032*, 0.08, 0.16, 0.27, 0.53, 1.6, 5.3, 53, 160

HF**HF (High-cut filter selection button)**

Opens the High Cut Filter dialog box to select the high cut filter. This selection applies to all channels whose high-cut filter setting is set to ACC.

High-cut filter selection list (Hz):

15, 30, 35, 60, 70, 120, 300, 600*, 1,200*, 3,000*

50RP: Reduces frequency components over 50 Hz (-18 dB/oct) to remove artifacts (EMG). Depending on examination circumstances, use the 50RP filter to remove EMG.

NOTE

The selectable settings (buttons) in the HF dialog box change according to the sampling frequency setting.

Pat**Pat (Pattern selection button)**

Opens the Pattern dialog box to select a programmed EEG pattern.

Programmed pattern list:

I to VIII A, B, C, D and Free A, B, C, D (36 patterns per set file), Trace as Acquired.

A pattern includes the montage and amplifier settings (sensitivity, high-cut filter, time constant), calibration voltage, waveform display on/off, waveforms color and amplitude limit.

Trace as Acquired: Displays the waveforms with the pattern setting in which the waveforms were acquired.

Ref**Ref (Reference electrode selection button)****NOTE**

When the reference electrode is set to A1 + A2 in acquisition, you cannot change this setting during review.

Opens to select the reference electrode. Only available for monopolar derivation.

Reference electrode selection list:

A1 → A2: Switches all A1 to A2.

A1 ← A2: Switches all A2 to A1.

A1 ↔ A2: Switches A1 and A2.

Vx: Switches all A1 and A2 to CZ.

AV: Switches all A1 and A2 to the reference for AV derivation.

BN*: Switches all A1 and A2 to the reference for BN derivation.

SD : Switches all A1 and A2 to the reference for Laplacian derivation.

Aav: Switches all A1 and A2 to the averaged reference of A1 and A2.

Org: Switches all A1 and A2 to the averaged voltage of C3 and C4 for the original reference derivation (system reference).

OFF: Cancels the selection of reference electrode and returns to the programmed setting.

Clock

Displays the date and time of the left side of the waveform.

Elapsed time

Displays the elapsed time from the start of filing.

Epoch

Displays the epoch number of the currently displayed EEG waveforms. One epoch corresponds to 10 seconds of data.

Tool Bar**AC Filter On/Off button**

Turns the AC filter on to reduce the AC interference. You can also turn the AC filter on by selecting AC Filter from the Control menu.

**Display Pattern Table button**

Opens the pattern table to check or temporarily change the currently selected montage, amplifier settings (sensitivity, time constant, high-cut filter, calibration voltage), waveform display on/off, waveform color, and amplitude limit for each channel. You can also open the pattern table by selecting Pattern Table from the Control menu.

**Display Voltage Cursor button**

Displays the two horizontal cursors to measure the voltage (amplitude) between the two cursors. This function is available only when the screen is frozen.

**Display Time Cursor button**

Displays the two vertical cursors to measure the time interval between the two cursors. This function is available only when the screen is frozen.

**Display Ruler button**

Displays the ruler to measure amplitude and time interval of the waveform. This function is available only when the screen is frozen.

**Display Patient Information button**

Opens the Patient Information dialog box to enter the patient information. You can also open the Patient Information dialog box by selecting Patient Information from the File menu.

**Print Current Page button**

Prints the currently displayed screen on the printer on a one page.

**Video Link button**

Opens the Video Link dialog box and the patient image window (analog video link), or Digital Video Player. (digital video link) when the QI-224A Serial Interface Board or QV-110AK Digital Video Unit/QP-110AK Digital Video Software is installed. This function is not available for the EEG-9100A/J/K/G Electroencephalograph

**Zoom button**

Displays the magnifying glass to zoom in the waveforms.

**Screen Comment button**

Opens the Comment Edit dialog box to add a screen comment. The entered comment can be displayed on the screen.

**Select Displayed Page and Advance button**

Selects all waveforms on the current page and its information in the Wave Select dialog box, then displays the next page. The selected waveforms can be printed or exported.

**Display Note Waveform button**

Displays the Note waveform window. You can copy the waveforms in the Note waveform window to compare the waveforms.

Page Control Bar

You can review the EEG waveforms by clicking the desired button on the page control bar. “()” shows the keyboard shortcut.

**NOTE**

When reviewing the waveform forward or backward at high speed by using the Rewind or Fast Forward button, if you want to scroll the waveform by using the 1 Page Back, 1 Page Forward, 1 s Back or 1 s Forward button, first click the Stop button to freeze the waveform then click the desired button.

**Rewind button**

Reviews the waveform backward at high speed. (7)

**Fast Forward button**

Reviews the waveform forward at high speed. (9)

**1 Page Back button**

Scrolls one page of the displayed waveform backward. (4)

**1 Page Forward button**

Scrolls one page of the displayed waveform forward. (6)

**1 s Back button**

Scrolls the displayed waveform backward one second. (1)

**1 s Forward button**

Scrolls the displayed waveform forward one second. (3)

**Centering button**

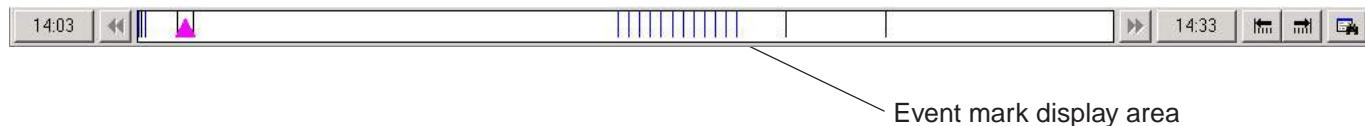
When this button is clicked, the mouse pointer changes to “”. You can move the selected waveform to the center by clicking the waveform with this pointer.

**Stop button**

Stops reviewing the waveform and freezes the waveform. (0)

**Play button**

Reviews the waveform continuously. (.)

Jump Bar**Time (Beginning/Ending Time of File)**

Displays the beginning/ending time of the file. You can also display the beginning or ending of the EEG waveform by clicking the button.

**Previous/Next Section button**

Scrolls the event mark display area backward/forward one hour. This button is only available when the range of the event mark display area is set to “HOUR”.

**Previous Event button**

Displays the EEG waveform marked by the previous event mark.

**Next Event button**

Displays the EEG waveform marked by the next event mark.

**Select Event button**

Opens the annotation list box to display the EEG waveform by specifying the event name (annotation on the waveform). You can also open the annotation list box by selecting Event from the Jump menu.

Reviewing the EEG Waveforms

When the EEG data file opens on the Review screen, the first page of the waveforms appears. You can review the EEG waveforms by clicking the desired button on the page control bar.

NOTE

When reviewing the waveform forward or backward at high speed by using the Rewind or Fast Forward button, if you want to scroll the waveform by using the 1 Page Back, 1 Page Forward, 1 s Back or 1 s Forward button, at first click the Stop button to freeze the waveform, then click the desired button.

Rewind/Forward button:

Reviews the waveform backward/forward at high speed.

1 s Back/Forward button:

Scrolls the displayed waveform backward/forward one second.

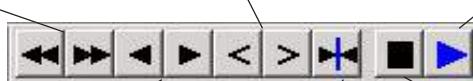
Play button:

Reviews the waveform continuously.

1 Page Back/Forward button:
Scrolls one page of the displayed waveform backward/forward.

Centering button

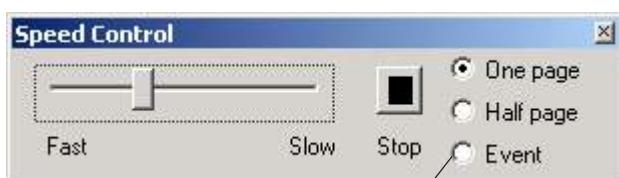
Stop button
Stops reviewing the waveform and freezes the waveform.



When reviewing the EEG waveforms backward or forward at high speed, the Speed Control dialog box opens. You can select the scroll speed and scroll mode with the dialog box.

A pause time and display mode can be changed in the Display control dialog box (Display menu → Display Control). After each page sweeps, the waveform is frozen on the screen for the specified pause time. You can also add an annotation to the waveform while reviewing the waveform backward or forward at high speed .

- To display the EEG waveform by specifying the event name (annotation) added to the waveform, use the annotation list box or jump bar at the bottom of the screen. Refer to “Searching for Waveforms”.
- To display the EEG waveforms by specifying the time, use the Time Jump dialog box. Refer to “Searching by Time”.
- To move the waveform to the center, use the centering button. When this button is clicked, the mouse pointer changes to “”. You can move the selected waveform to the center by clicking the waveform with this pointer.
- To add an annotation to a waveform when reviewing the EEG waveforms backward or forward at high speed, press the “+” key on the number keys. The event name and the time when the annotation is added before pressing the “+” on the number keys are selected in the “Add events in fast review” area in the System Setting dialog box- Junction box, operation, display page.



Jumps to the next or previous event at high speed

Searching for Waveforms

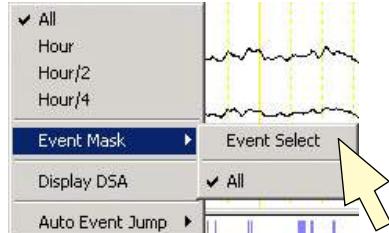
You can quickly display the waveform by specifying the event name or time. This is only available when the waveforms are frozen.

Searching by the Event Name



The annotation list box can be opened from the Event Jump bar.

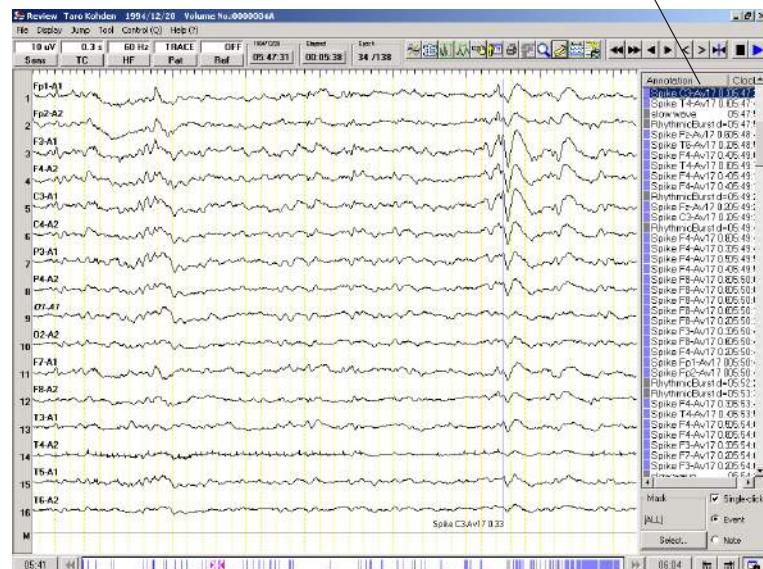
- 1) Right-click the event mark display area on the Event Jump bar. The pop-up menu opens.
- 2) Select Event Select from the Event Mark menu. The annotation list box opens.



1. Click the Stop button to freeze the EEG waveform.

2. Click the Select Event button on the Jump bar, or select Event from the Jump menu. The annotation list box opens.

Click the item name at the top of the column to sort events.



Annotation list box options

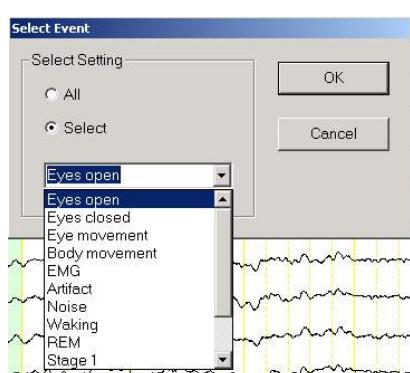
Single-click: Single-click to jump to the waveform annotated by the event.
Event/Note wave:

Event: Displays the annotations in the list box.

Note wave: Display the note waveform window and the list of the copied part of waveforms in the list box. Refer to “Copying Parts of waveforms” in this section.

Mask area

Select: Opens the Event Select dialog box to select the event names . The selected event names are displayed in the annotation list and the event marks are displayed in the Event Jump bar.



When the Select option is selected, you can also type an event name with up to 40 characters. All events that include the entered characters are displayed on the annotation list. You can type two or more event names. To enter two or more event names, separate the event names with “,”.

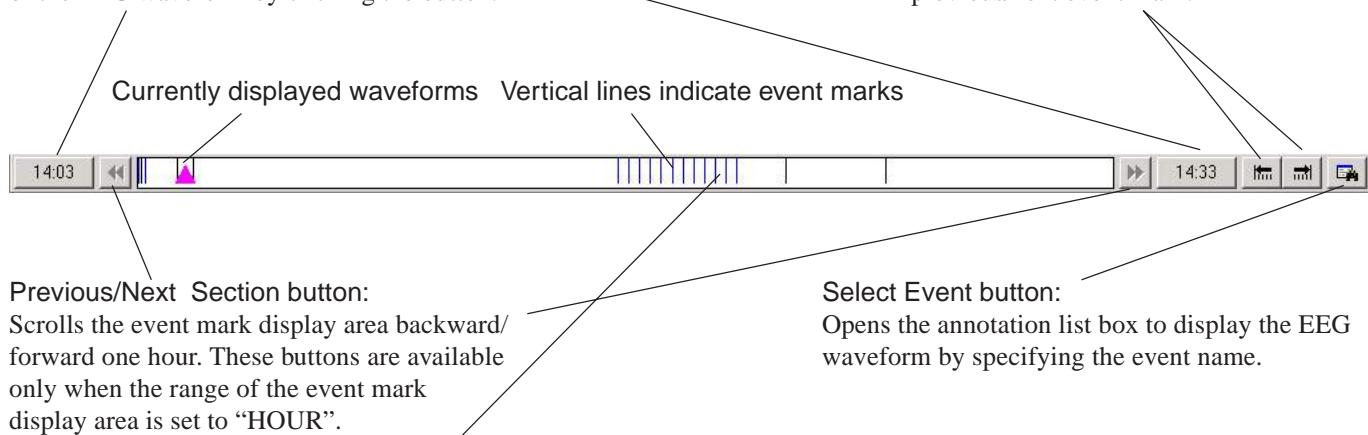
3. Double-click the event name you want to jump to in the annotation list. The specified waveform is displayed on the screen.
4. Click the Select Event button again. The annotation list box closes.

Searching by the Event Jump Bar

You can display any part of the EEG waveform by clicking any place on the Event jump bar at the bottom of the screen.

Beginning/ending time of filing:

Displays the beginning/ending time of filing.
You can also display the beginning or ending of the EEG waveform by clicking the button.



Event mark display area:

- To display any part of the EEG waveform, click any position on the Jump bar.
- To display the EEG waveform marked by the event mark, click the vertical line.
- To display the clock time information, move the mouse pointer on the desired position and leave it for about 1 second.
- To display the name of the event mark, move the mouse pointer onto the vertical line and leave it for more than 1 second.
- To open the annotation list box:
 - 1) Right-click the event mark display area on the Event Jump bar. The pop-up menu opens.
 - 2) Select Event Select from Event Mask menu. The annotation list box opens.

During measurement, when the date changes, a green vertical line appears.

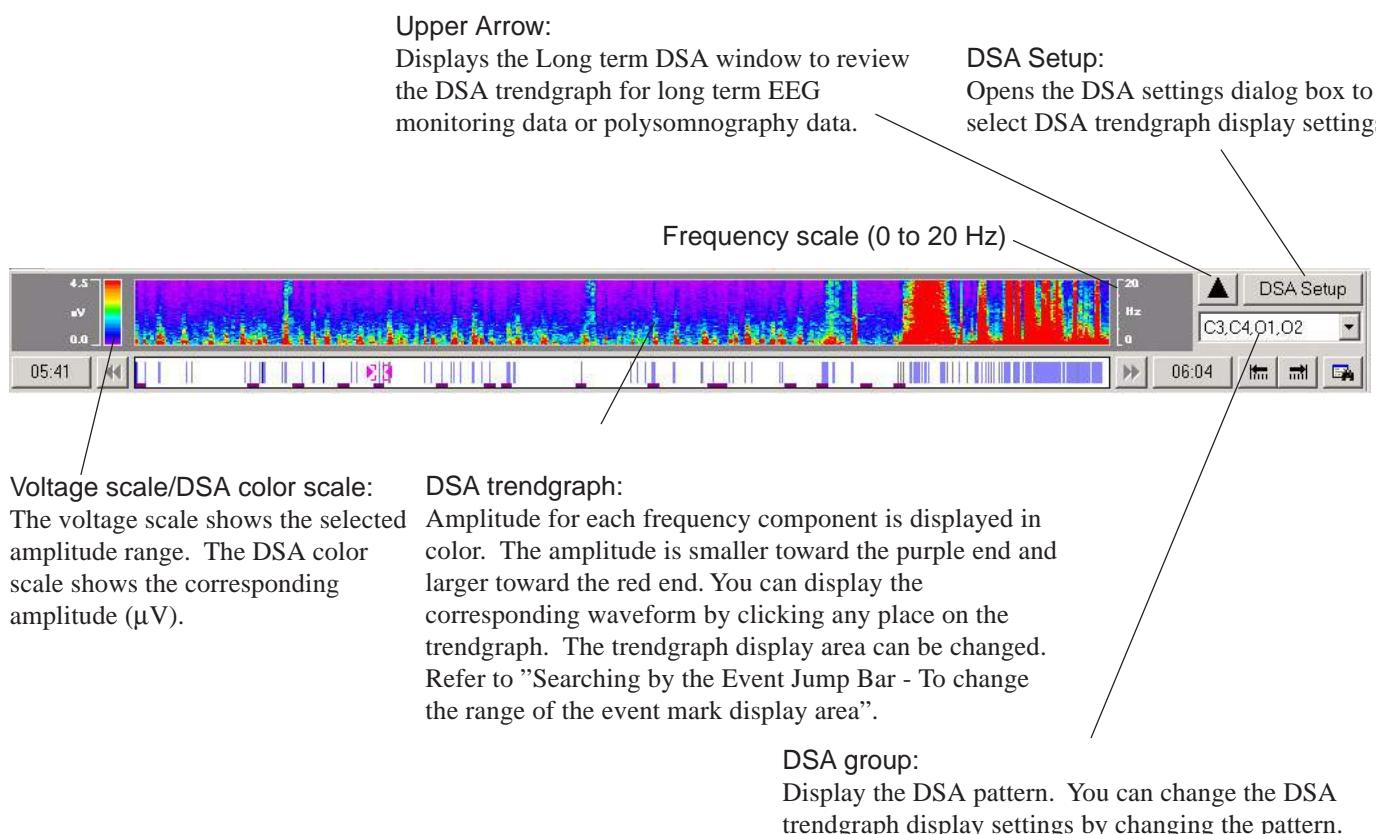
System events which can be deleted are displayed in black and manual events which cannot be deleted are displayed in blue.

Screen Comment:

The screen comment can be displayed when the Display screen comment check box on the Display Control dialog box is checked. The attached picture can be displayed by clicking the picture icon on the screen comment.

Searching by the DSA Jump Bar

You can display any part of the EEG waveform by clicking any place on the DSA jump bar at the bottom of the screen. The DSA trendgraph displays amplitude for each frequency component every 2.5 seconds.



Changing the Range of the Event Mark Display Area and DSA Trend Graph Display Area



1. Right-click the display area. The pop-up menu opens.
2. Select the range from the menu.

Selection list:

- | | |
|--------|--|
| All | Displays the beginning to end of the file. |
| Hour | Displays an hour of the file. |
| Hour/2 | Displays a half hour of the file. |
| Hour/4 | Displays a quarter hour of the file. |

You can scroll the event mark display area backward or forward by clicking the Previous or Next Section button when "Hour", "Hour/2" or "Hour/4" is selected.

Continuously Reviewing the EEG Waveforms Annotated by an Event Mark

1. Right-click the display area. The pop-up menu opens.
2. Select \leftarrow or \rightarrow from the Auto Event Jump sub-menu.

Selection list:

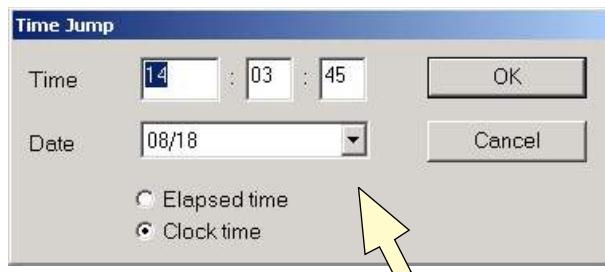
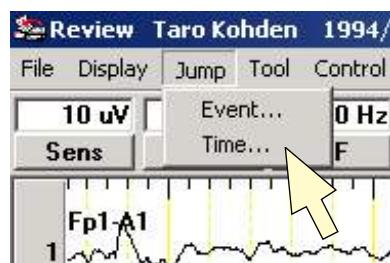
- | | |
|---------------|--|
| \leftarrow | Reviews the waveforms backward continuously. |
| \rightarrow | Reviews the waveforms forward continuously. |

6. REVIEW PROGRAM

Searching by Time

1. Click the  Stop button to freeze the EEG waveform.

2. Select Time from the Jump menu, or click the button in the clock display area or Elapsed time display area. The Event Jump dialog box opens.



3. Select the Elapsed time or Clock time option. The selectable date is displayed in the Date list box when "Clock Time" is selected.

4. Type the time in the following format.

Elapsed time: "hhhh:mm:ss"

Clock time: "hh:mm:ss"

5. Click the OK button

To cancel, click the Cancel button.

Changing the Pattern

A pattern includes the montage and amplifier settings (sensitivity, high-cut filter and time constant), calibration voltage, waveform display on/off, waveform color and amplitude limit. When the EEG data file opens, waveforms are displayed with the pattern settings in which they were acquired. You can change the pattern to any of 36 programmed patterns (I to VIII A, B, C, D and Free A, B, C, D).

When an EEG data file opens, “Trace as Acquired” is automatically selected.

1. Click the **Pat** button on the amp bar. The Pattern selection dialog box opens.

Changes the pattern group.



Changes the pattern in the selected group.

Displays the waveforms with the pattern setting in which they were acquired. When this setting is selected, “TRACE” is displayed on the Pat button in blue and each amplifier setting above the button in the amp bar is also displayed in blue.



2. Click the new pattern.

3. Click the OK button to close the Pattern selection dialog box.

When individually changing the montage, reference electrode, the setting value above all buttons in the amp bar is displayed in black. In this case, “Trace” mode is off and the waveforms are displayed with the currently selected pattern and amplifier settings.

When changing the amplifier setting (sensitivity, time constant or high-cut filter), the setting value above the Sens, TC or HF button in the amp bar is displayed in black. In this case, the waveforms are displayed with the currently selected amplifier setting. But the trace mode for the montage and reference electrode remain.

Changing the Measurement Settings

You can change the amplifier settings for all channels or individual channels.

NOTE

The selectable settings in the HF dialog box and pattern table change according to the sampling frequency setting in “Selecting and Saving the electrodes for Waveform Acquisition” in Section 4.

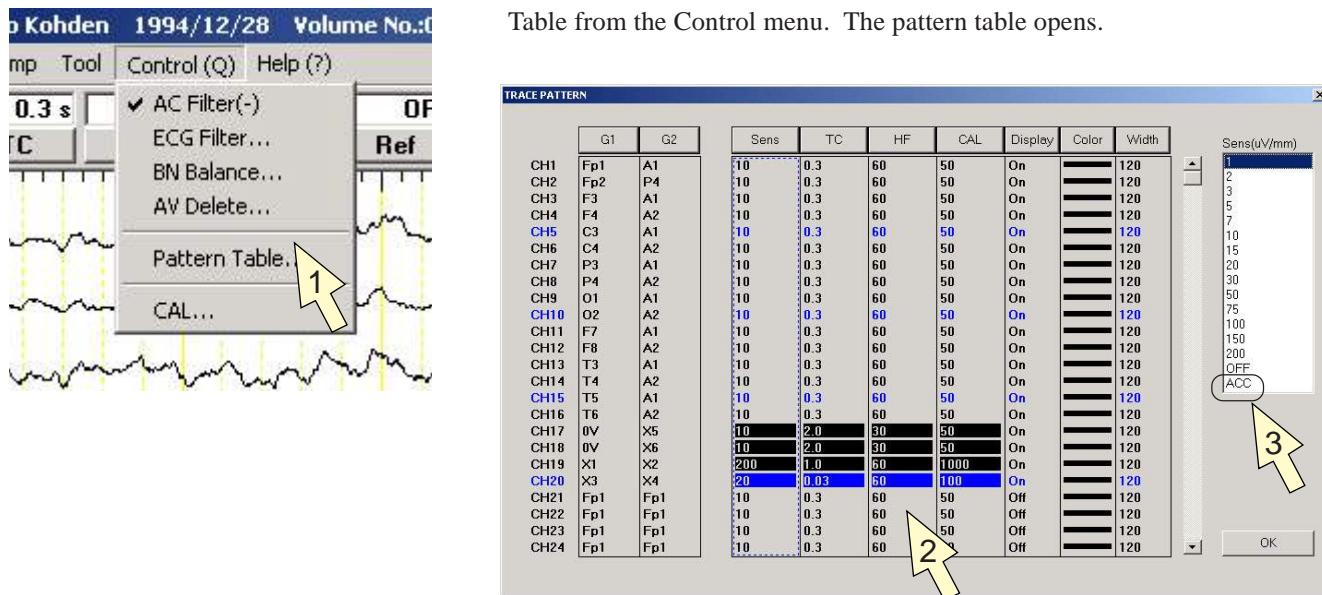
Changing Amplifier Settings for All Selected Channels

The ACC (All Channel Control) setting lets you change amplifier settings for more than one channel on all patterns at the same time. All channels which have the amplifier settings set to ACC are linked together. When you change the Sens, TC or HF on the amp bar or the CAL setting, that setting automatically changes for all ACC channels.

Setting ACC

Changed amplifier settings during waveform review are temporary changes and are lost when you close the Review program. To keep the changes, change the settings in the System program.

1. Click the  Display Pattern Table button on the tool bar, or select Pattern Table from the Control menu. The pattern table opens.



2. Select the setting(s) to change. A broken rectangle encloses the selected settings.

To select one setting:

Click the setting on the table.

To select two or more consecutive channels:

Drag the cursor to select the settings.

To select the settings for all channels:

Click the Sens, TC, HF button at the top of the column.

The selection list box for the setting appears in the right side of the pattern table.

3. Click ACC.

4. Repeat steps 2 to 3 to change other settings, if necessary.

5. Click the OK button to close the pattern table.

Changing the Amplifier Setting

1. Click the Sens, TC or HF button on the amp bar. The Sensitivity, Time Constant or High Cut Filter dialog box opens.



Example: Sensitivity dialog box

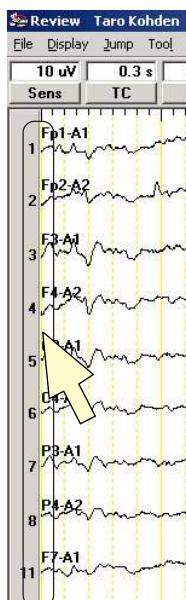
2. Click the new setting. All channels whose settings are set to ACC are changed to the selected sensitivity. The selected setting is indicated on the box above the button in black.
3. Click the OK button to close the dialog box.

Changing Amplifier Settings for Individual Channels

You can change amplifier settings for individual channels. Even if the setting is ACC (see “Changing Amplifier Settings for All Selected Channels”), you can still change settings for individual channels using this procedure.

Changing Amplifier Settings for One Channel

This setting change is lost when another pattern is selected or when you close the Review program.



Example: Sensitivity dialog box

1. Click the channel number on the left side of the waveform. The channel number of the selected channel is highlighted.
2. Click the Sens, TC, or HF button on the amp bar. The Sensitivity, Time Constant or High Cut Filter dialog box opens.

Changing Amplifier Settings for Two or More Channels

This setting change, except for a free pattern, is lost when another pattern is selected or when you close the Review program.

1. Click the Display Pattern Table button on the tool bar, or select Pattern Table from the Control menu. The pattern table opens.

TRACE PATTERN		Sens(uV/mm)							
G1	G2	Sens	TC	HF	CAL	Display	Color	Width	Sens(uV/mm)
CH1	Fp1	A1	10	0.3	60	50	On	120	1
CH2	Fp2	P4	10	0.3	60	50	On	120	2
CH3	F3	A1	10	0.3	60	50	On	120	3
CH4	F4	A2	10	0.3	60	50	On	120	5
CH5	C3	A1	10	0.3	60	50	On	120	7
CH6	C4	A2	10	0.3	60	50	On	120	10
CH7	P3	A1	10	0.3	60	50	On	120	15
CH8	P4	A2	10	0.3	60	50	On	120	20
CH9	O1	A1	10	0.3	60	50	On	120	30
CH10	O2	A2	10	0.3	60	50	On	120	50
CH11	F7	A1	10	0.3	60	50	On	120	75
CH12	F8	A2	10	0.3	60	50	On	120	100
CH13	T3	A1	10	0.3	60	50	On	120	150
CH14	T4	A2	10	0.3	60	50	On	120	200
CH15	T5	A1	10	0.3	60	50	On	120	OFF
CH16	T6	A2	10	0.3	60	50	On	120	ACC
CH17	0V	X5	10	2.0	30	50	On	120	
CH18	0V	X6	10	2.0	30	50	On	120	
CH19	X1	X2	200	1.0	60	1000	On	120	
CH20	X3	X4	20	0.07	60	100	On	120	
CH21	Fp1	Fp1	10	0.3	60	50	Off	120	
CH22	Fp1	Fp1	10	0.3	60	50	Off	120	
CH23	Fp1	Fp1	10	0.3	60	50	Off	120	
CH24	Fp1	Fp1	10	0.3	60	50	Off	120	

2. Select the setting(s) to change on the pattern table. The selected settings are enclosed by a dotted rectangle.

To select one setting:

Click the setting on the table.

To select two or more consecutive channels:

Drag the cursor to select the settings.

To select the settings for all channels:

Click the Sens, TC, HF button at the top of the column.

The selection list box for the setting appears in the right side of the pattern table.

3. Click the new setting in the selection list box.
The settings enclosed by the dotted rectangles changes to the new setting. An “*” mark is displayed before all changed settings which are temporary changes.
4. Click the OK button to close the pattern table.

Changed Settings and ACC Marks

Changed settings and ACC are indicated on the pattern table as follows.

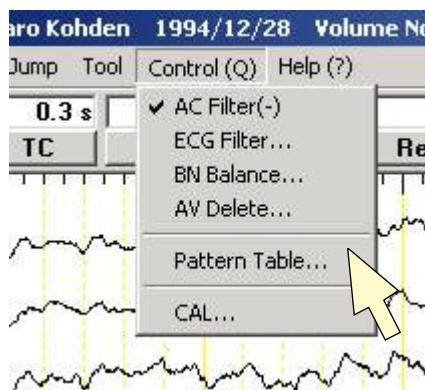
Mark	Meaning
\$	Temporarily changed reference electrode
*	Any other temporarily changed settings.
Highlighted	Sensitivity, TC, HF or CAL setting which is not set to ACC.
Not highlighted	Sensitivity, TC, HF or CAL setting which is set to ACC.

When you change Sens, TC, HF or CAL on the amp bar, all ACC settings are changed. If you select and change any individual setting in the pattern table, only that setting is changed. If an ACC setting is selected individually, it is changed individually.

Changing the Montage

You can change the montage by changing electrodes. An “*” mark appears to the right of all changed electrodes as temporary changes. This setting change, except for a free pattern, is lost when another pattern is selected or when you close the Review program.

Electrodes that are not saved with EEG waveforms are displayed in red on the Pattern table and Electrode position layout table. You cannot review the EEG waveforms in a montage which includes unsaved electrodes. To save an electrode, refer to “Selecting and the Electrodes to be Saved with EEG Waveforms” in Section 4.



1. Click the Display Pattern Table button on the tool bar, or select Pattern Table from the Control menu. The pattern table opens.

	G1	G2	Sens	TC	HF	CAL	Display	Color	Width
CH1	Fp1	A1	10	0.3	60	50	On		120
CH2	Fp2	P4	10	0.3	60	50	On		120
CH3	F3	A1	10	0.3	60	50	On		120
CH4	F4	A2	10	0.3	60	50	On		120
CH5	C3	A1	10	0.3	60	50	On		120
CH6	C4	A2	10	0.3	60	50	On		120
CH7	P3	A1	10	0.3	60	50	On		120
CH8	P4	A2	10	0.3	60	50	On		120
CH9	O1	A1	10	0.3	60	50	On		120
CH10	O2	A2	10	0.3	60	50	On		120
CH11	F7	A1	10	0.3	60	50	On		120
CH12	F8	A2	10	0.3	60	50	On		120
CH13	T3	A1	10	0.3	60	50	On		120
CH14	T4	A2	10	0.3	60	50	On		120
CH15	T5	A1	10	0.3	60	50	On		120
CH16	T6	A2	10	0.3	60	50	On		120
CH17	0V	X5	10	2.0	30	50	On		120
CH18	0V	X6	10	2.0	30	50	On		120
CH19	X1	X2	200	1.0	60	1000	On		120
CH20	X3	X4	20	0.03	60	100	On		120
CH21	Fp1	Fp1	10	0.3	60	50	Off		120
CH22	Fp1	Fp1	10	0.3	60	50	Off		120
CH23	Fp1	Fp1	10	0.3	60	50	Off		120
CH24	Fp1	Fp1	10	0.3	60	50	Off		120

2. Select the electrode(s) to change on the pattern table. All selected electrodes are enclosed by dotted rectangles.

To select one electrode:

Click the electrode name on the table.

To select two or more consecutive channels:

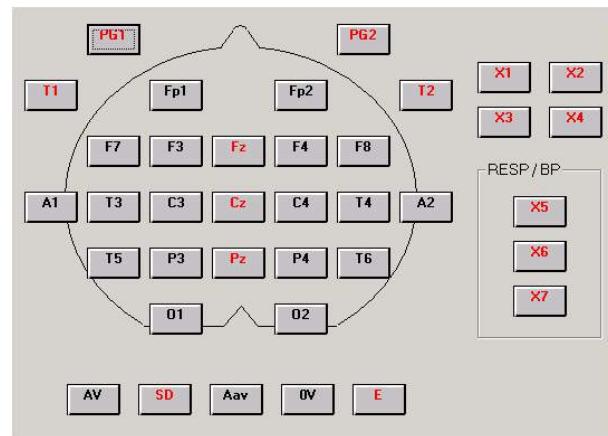
Drag the cursor to select the electrodes.

To select all channel electrodes:

Click the G1 or G2 button at top of the column.

The Electrode position layout table opens.

Electrode position layout table



Reference electrode:

- AV: Switches all A1 and A2 to the reference for AV derivation.
- SD : Switches all A1 and A2 to the reference for Laplacian derivation.
- Aav: Switches all A1 and A2 to the averaged reference of C3 and C4.
- OV: Switches all A1 and A2 to the averaged voltage of C3 and C4 for the original reference derivation (system reference).

0 V button:

When this is selected to either G1 or G2 electrode, the channel displays the potential between the reference electrodes (C3/C4) and whichever G1 or G2 electrode is not set to “0 V”.

3. Click an electrode in the Electrode position layout table to select it. The selected G1 or G2 electrode(s) enclosed by the broken rectangle are replaced with the selected new electrode. The dotted rectangle moves to the next electrode.
4. Click the OK button to close the pattern table.

Changing the Reference Electrode

NOTE

When the reference electrode is set to A1 + A2 in acquisition, you cannot change this setting during review.

When the EEG waveforms are displayed with monopolar montages using A1 and A2 electrodes, you can change the reference electrode. Changed electrodes are displayed with a “\$” mark.

1. Click the **Ref** Ref button on the amp bar. The Reference electrode selection dialog box opens.



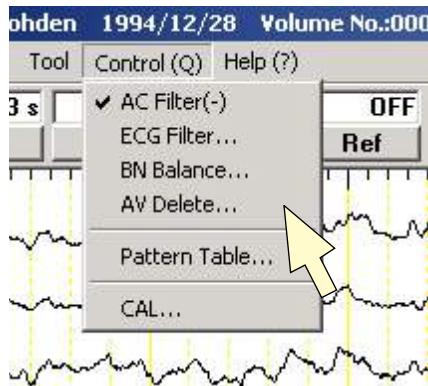
Reference electrode selection list:

- A1 → A2: Switches all A1 to A2.
- A1 ← A2: Switches all A2 to A1.
- A1 ↔ A2: Switches A1 and A2.
- Vx: Switches all A1 and A2 to CZ.
- AV: Switches all A1 and A2 to the reference for AV derivation.
- BN*: Switches all A1 and A2 to the reference for BN derivation.
- SD : Switches all A1 and A2 to the reference for Laplacian derivation.
- Aav: Switches all A1 and A2 to the averaged reference of A1 and A2.
- Org: Switches all A1 and A2 to the averaged voltage of C3 and C4 for the original reference derivation (system reference).
- OFF: Cancels the selection of reference electrode and returns to the programmed setting.

*: Available when an EEG data file from an electroencephalograph other than EEG-9100/EEG-9200 is opened.

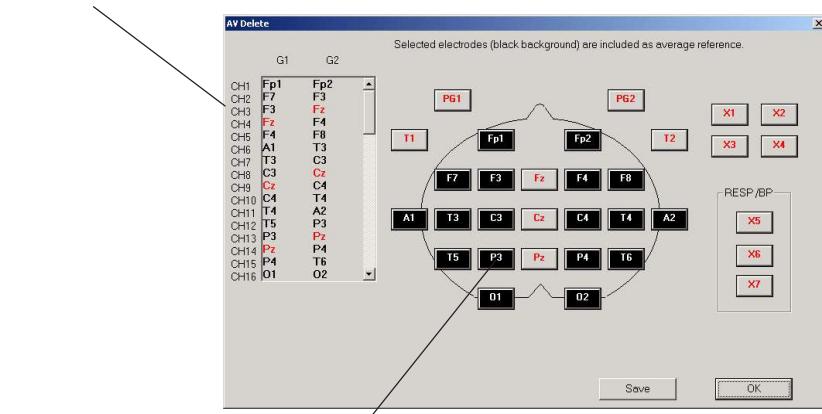
2. Click an electrode to change the reference electrode. The corresponding electrode name on the pattern table and the waveform is replaced with the selected electrode name.
3. Click the OK button to close the Reference electrode selection dialog box.

Selecting or Deleting Electrodes for AV Derivation



1. Select AV Delete from the control menu. The AV Delete dialog box opens and the Electrode position layout table and the currently selected montage appears on the dialog box.

Pattern table



Electrode position layout

Pattern table:

Displays the montage for the current pattern. All channels can be displayed by using the scroll bar.

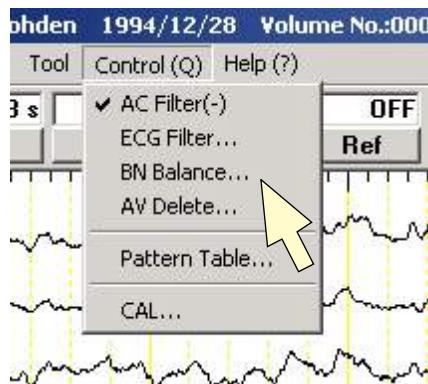
Electrode position layout:

The reference electrode names are displayed on the Electrode position layout. The electrodes used for reference voltage calculation are highlighted. To add or delete an electrode on the electrode position layout, click the electrode.

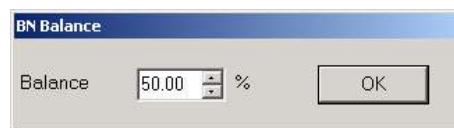
2. Click an electrode to highlight or unhighlight it. Highlighting indicates that the electrode is selected for AV derivation. “*” appears beside changed electrodes.
3. Click the Save button to save the changed settings. The settings are saved in each pattern.
4. Click the OK button to close the AV Delete dialog box.

Adjusting BN Balance for BN Derivation

To adjust the voltage balance between the BN1 and BN2 reference electrodes when the balanced noncephalic derivation is selected, use the BN balance dialog box. This operation is available when an EEG data file from an electroencephalograph other than EEG-9100/9200 is opened.



1. Select BN Balance from the Control menu. The BN Balance dialog box opens. When the reference electrode is changed to BN, the BN Balance dialog box automatically opens.



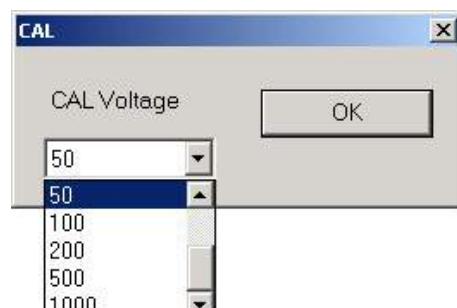
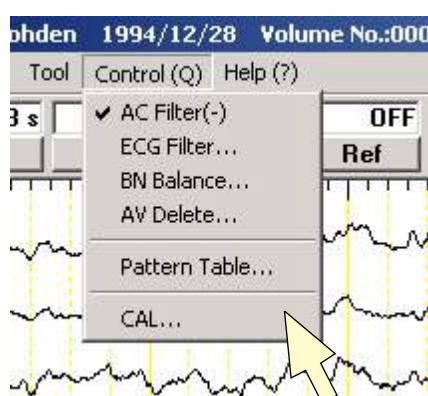
Balance:

The voltage balance between the BN1 electrode and the BN2 electrode. The displayed value is the ratio of the BN1 electrode.

2. Click the ↑ or ↓ arrow to minimize the ECG waveform overlapped on the EEG waveform. You can type the ratio with the keyboard.
3. Click the OK button to close the BN Balance dialog box.

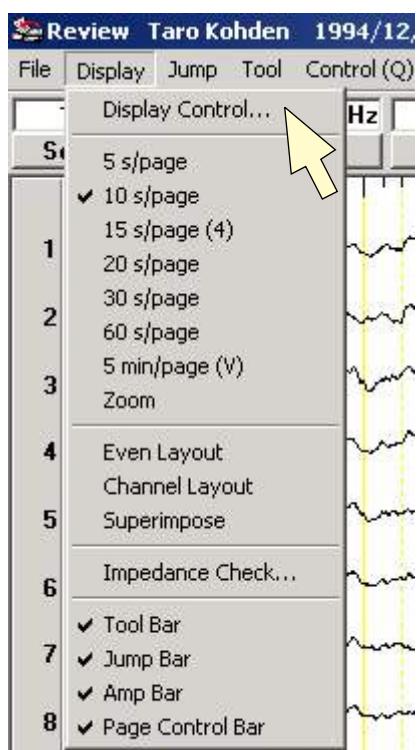
Changing the Calibration Voltage

1. From the Control menu, select CAL. The CAL dialog box opens.



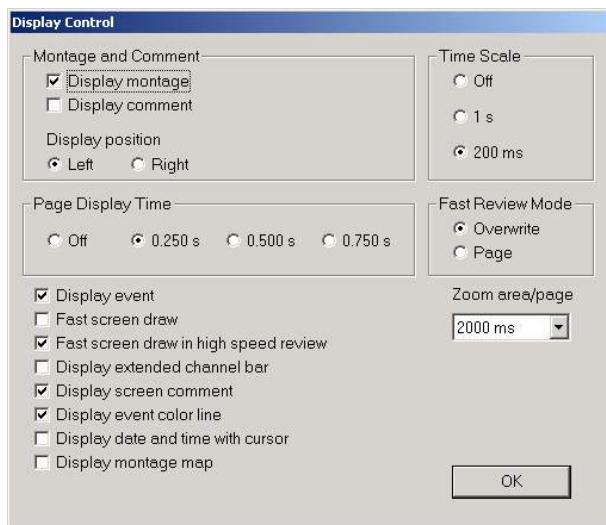
2. Select the desired calibration voltage from the list box. All channels whose calibration settings are set to ACC are changed to the selected voltage.
3. Click the OK button to close the CAL dialog box.

Changing the Waveform Display Settings



About the Display Control Dialog Box

You can select the waveform display settings in the Display Control dialog box. To open this dialog box, select Display Control from the Display menu.



Displaying the Derivation (Montage) and/or Comment beside Each Channel

You can display or not display the derivation beside each channel. To display the derivation and/or comment beside each channel, click the Display Montage and/or Comment check box in the Montage and Comment area. You can select the derivation and comment display position by clicking the Left Side or Right Side option button.

Displaying the Time Scale

To display the time scale in the Time Mark area, select the 1 s or 200 ms option on the Time Scale area.

OFF: A vertical line is not displayed.

1 s: Displays a vertical line every one second.

200 ms: Displays a vertical line every 200 milliseconds.

Changing the Pause Time

When reviewing the EEG waveforms continuously in high speed, you can select a pause time and display mode to easily observe the waveform. After each page sweeps, the waveform is frozen on the screen for the specified pause time.

To select the pause time, click the OFF, 0.250 s, 0.500 s or 0.750 s option in the Page Display Time Area.

Changing the Display Mode

When reviewing the EEG waveforms continuously in high speed, you can select either of two display modes to easily observe the waveform. To select the display mode, click the Overwrite or Page option in the Fast Review Mode area.

Overwrite: The waveforms are fixed on the screen and the new waveforms continuously overwrite the previous waveforms.

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Page: The waveforms are fixed on the screen and the display is updated one page at a time.

Displaying the Event

To display the events on the screen, check the Display event check box.

Drawing a High Speed Sampled Waveforms Quicker

When the EEG waveforms are acquired in at a high sampling frequency, the review program can draw the waveforms on the screen quicker when the Fast screen draw and/or Fast screen draw in high speed review check box is checked.

Displaying the Extended Channel Bar

You can display the montage and calibration voltage on the extended channel bar. To display the extended channel bar, check the Display extended channel bar check box.

Displaying the Screen Comment

You can display the screen comment by checking the Display screen comment check box. To add a comment, open the Comment Edit dialog box by clicking the Screen Comment button on the tool bar when the waveforms are frozen.

Displaying the Vertical Lines for the Selected Events

You can display the vertical light gray lines for annotations. To display the vertical lines, check the Display event color line check box. For the specified event, you can assign a color vertical line. Refer “Editing the Waveform Annotations and Patient Information Items” in Section 4.

Selecting the Zoom in Area

Select the duration to zoom in. You can zoom in a part of the waveforms by clicking the magnifying glass.

Selection list: 100, 200, 500, 1000, 2000 ms

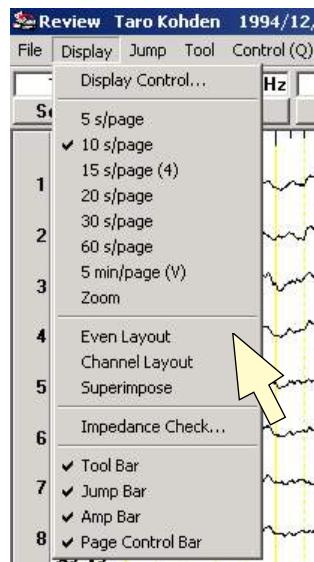
Displaying the Measurement Date and Time When Using the Time Cursor

The Cursor dialog box can display measurement date and time for the time cursors. To display the measurement date and time, check the Display date and time with cursor check box.

For the montage window, refer to “Changing the Measurement Settings - Changing the Waveform Display - Displaying the Montage Map Window” in Section 5.

Displaying the Montage Map Window

The montage map window displays the montage on the electrode position layout. To display the montage window, check the Display montage map check box.



Changing Waveform Display Positions

To change the position of all channels:

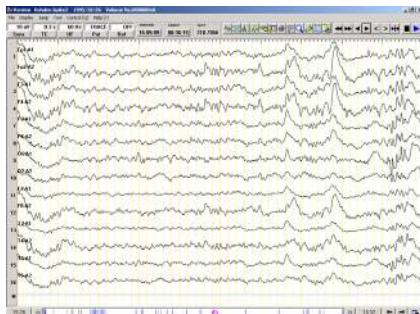
There are three waveform display position setting modes.

Even Layout: Evenly spaces the baseline positions for all channels in channel order. Channels that are temporarily turned off are omitted.

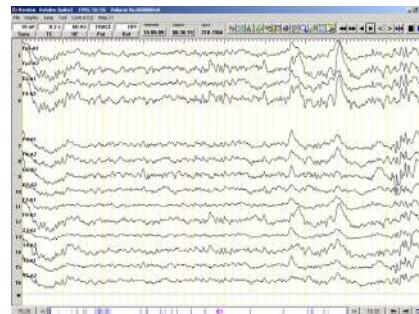
Ch. Layout: Evenly spaces the baseline positions for all channels in channel order. Blank spaces are left for undisplayed channels.

Superimpose: Overlaps consecutive odd and even channels. Channels are omitted if their time constant is not set to ACC.

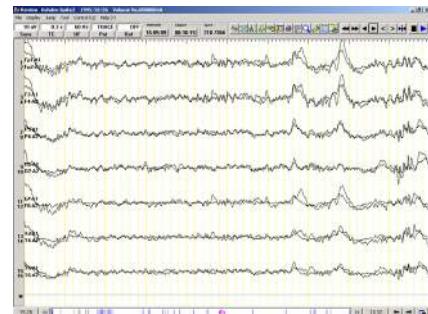
From the Display menu, select the appropriate layout command to select the waveform display position.



Even layout



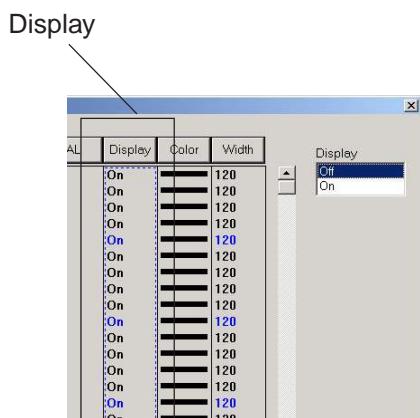
Channel layout



Superimpose

To change the position of a specific channel:

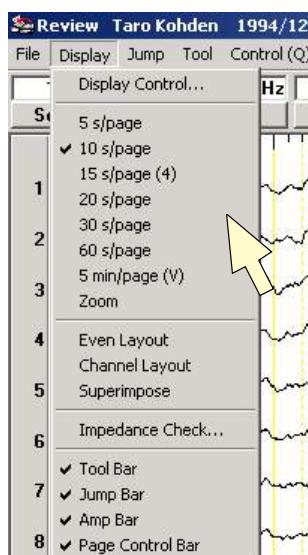
1. Click the channel number on the left side of the screen to select the channel.
The selected channel number is highlighted.
2. Move the mouse pointer to the selected channel number.
3. Press and hold down the left mouse button, then move the mouse pointer to the appropriate position.
4. Release the mouse button to fix the waveform position.
5. Click the waveform window to release the channel selection.



Displaying/Not Displaying a Waveform

1. Click the Display Pattern Table button on the tool bar, or select Pattern Table from the Control menu. The pattern table opens.
2. Click ON or OFF in the Display box.
3. Click ON or OFF in the selection list box.
4. Click the OK button to close the table.

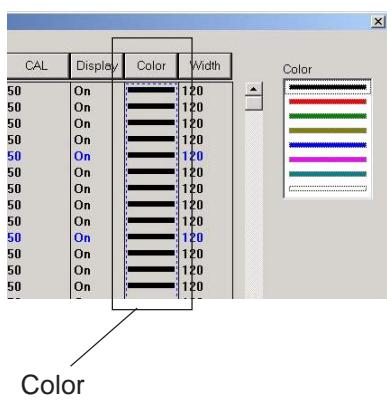
6. REVIEW PROGRAM



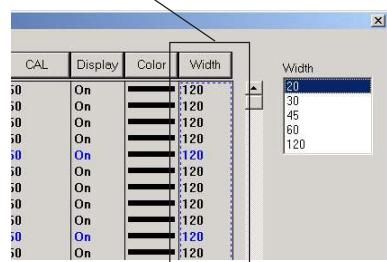
Changing the Waveform Display Speed

From the Display menu, select the speed.

- 5 s/page: Displays a 5 second page on the screen (corresponds to recording at 60 mm/s).
- 10 s/page: Displays a 10 second page on the screen (corresponds to recording at 30 mm/s).
- 15 s/page: Displays a 15 second page on the screen (corresponds to recording at 20 mm/s).
- 20 s/page: Displays a 20 second page on the screen (corresponds to recording at 15 mm/s).
- 30 s/page: Displays a 30 second page on the screen (corresponds to recording at 10 mm/s).
- 60 s/page: Displays a 60 second page on the screen (corresponds to recording at 5 mm/s).
- 5 min/page: Displays a 5 minute page on the screen (corresponds to recording at 1 mm/s).



Width



Changing a Waveform Color

1. Click the Display Pattern Table button on the tool bar, or select Pattern Table from the Control menu. The pattern table opens.
2. Click the Color column of the channel to open the selection list box on the pattern table. The selected column is enclosed by a dotted rectangle.
3. Click the new color in the selection list box.
4. Click the OK button to close the table.

Changing the Maximum Amplitude of a Waveform

You can change the maximum amplitude of a waveform. When the waveform exceeds the limit, it is clipped.

1. Click the Display Pattern Table button on the tool bar, or select Pattern Table from the Control menu. The pattern table opens.
2. Click the Width column of the channel to open the selection list box on the pattern table. The selected column is enclosed by a dotted rectangle.
3. Click the new maximum amplitude in the selection list box.
4. Click the OK button to close the table.

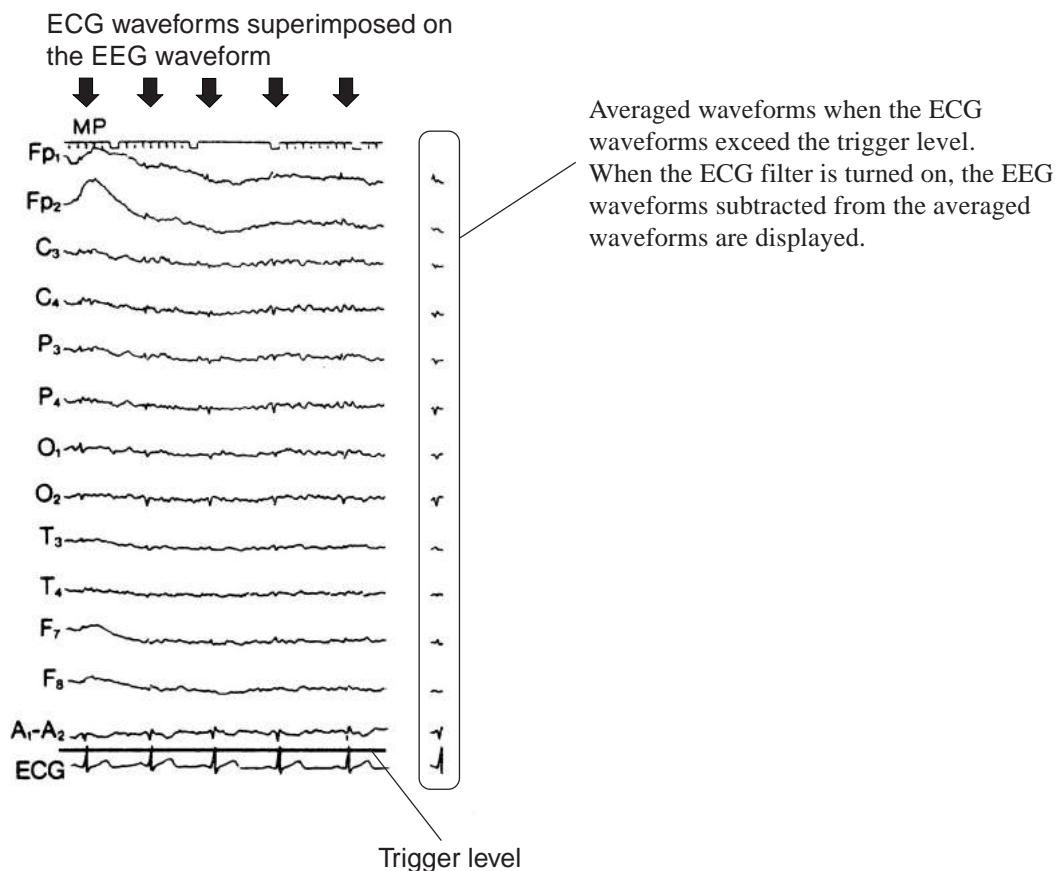
Using the AC filter

To turn on the  AC filter, click the AC Filter On/Off button on the tool bar, or select AC Filter from the Control menu.

Using the ECG Filter

When ECG waveforms are superimposed on the EEG waveforms, use the ECG filter to reduce the ECG waveform on each EEG channel. This filter works in the following way to subtract the ECG components from the EEG waveforms.

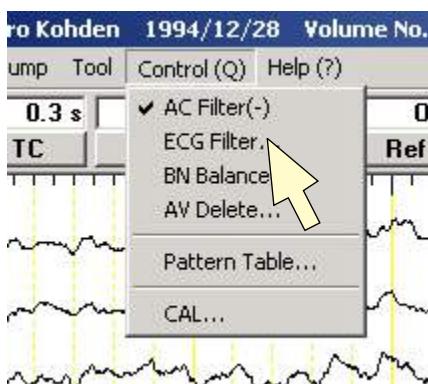
- 1) The time point when the ECG waveforms exceed the trigger level of the trigger channel is used as an averaging trigger.
- 2) The part of the EEG waveforms synchronized with the trigger is averaged in each channel.
- 3) The averaged waveform is subtracted from the next trigger point of the ECG waveform in the averaging period in each channel.



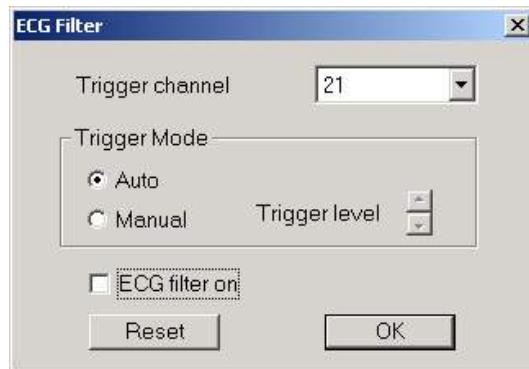
Caution when using the ECG filter

The ECG filter detects the ECG waveforms superimposed on the EEG waveforms by triggering the QRS wave of the ECG waveforms and averaging. When the ECG filter is turned on, if a large artifact with continuously varying, such as body movement, EMG or respiration waveform which amplitude varies continuously, is superimposed on the EEG waveforms, the ECG waveform (averaging result) cannot be correctly measured. This may distort the EEG waveforms or the EEG waveforms may not be displayed continuously. When the EEG waveforms are not displayed continuously, click the Reset button on the ECG filter dialog box to reset the ECG filter.

Be careful using the ECG filter when there is a large artifact. The ECG filter is useful to reduce the ECG waveforms superimposed on the EEG waveforms when the EEG waveforms are stable and there is no large artifact.

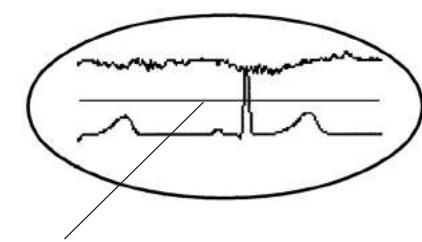


1. Select ECG Filter from the Control menu. The ECG Filter dialog box opens.



NOTE

Requires application of dedicated ECG electrodes on patient and ECG channel displayed in the montage.



Trigger level cursor

2. Click the Trigger Channel box arrow to select the ECG trigger channel.

3. Click to select the trigger mode.

AUTO: The trigger level is set automatically. The trigger level cursor is not displayed on the screen.

MANUAL: You can set the trigger level manually with the trigger level cursor displayed over the trigger channel on the screen. Move the cursor with the Trigger Level ↑ or ↓ arrow so that the cursor position is at half of the peak amplitude of the QRS wave.

4. Click the ECG filter On check box to turn the ECG filter on.

To turn off the ECG filter, click it again.

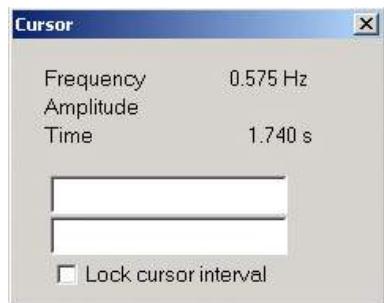
When you close the Acquisition program or change the pattern, the ECG filter is automatically set to Off.

Measuring Amplitude and Time with the Cursors and Ruler

You can measure the voltage (amplitude) or time interval of the waveform by displaying the two vertical cursors, horizontal cursors or ruler on the screen when the waveforms are frozen. The voltage and time cursors can be displayed at the same time.

About the Cursor Dialog Box

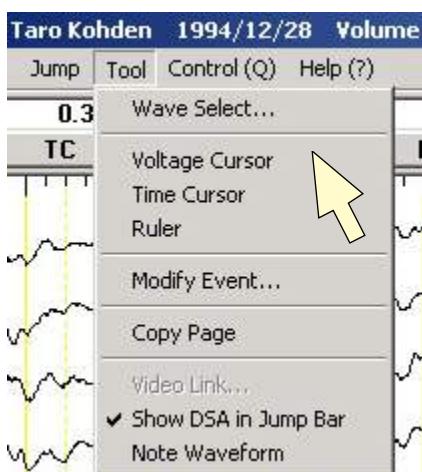
The Cursor dialog box is displayed together with the voltage and/or time cursors to indicate the amplitude and time interval between the two cursors.



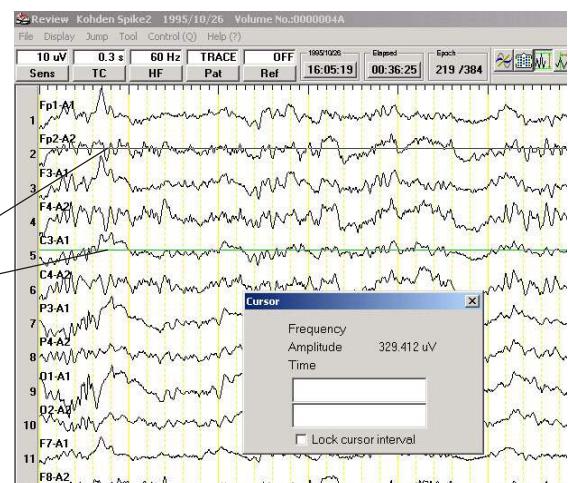
- | | |
|-----------------------|---|
| Frequency: | Displays the frequency calculated from the time interval. |
| Amplitude: | Displays the amplitude between the two voltage cursors. |
| Time: | Displays the time interval between the two time cursors. |
| C1 box/C2 box: | Displays the elapsed time or measurement date and time of each time cursor. The default setting is the elapsed time. To display the measurement date and time, check the Display date and time with cursor check box in the Display Control dialog box. |
| C1 box: | For the left time cursor |
| C2 box: | For the right time cursor |
| Lock cursor interval: | When checked, the intervals between the two cursors are fixed. When the voltage cursors and time cursors are displayed, the rectangle enclosed by 4 cursors and the rectangle can be moved with the mouse |

Using the Voltage Cursor

1. Click the Stop button on the tool bar to freeze the EEG waveforms.
2. Click the Display Voltage Cursor button on the tool bar, or select Voltage Cursor from the Tool menu. The two horizontal (voltage) cursors appear on the screen.



Voltage cursors



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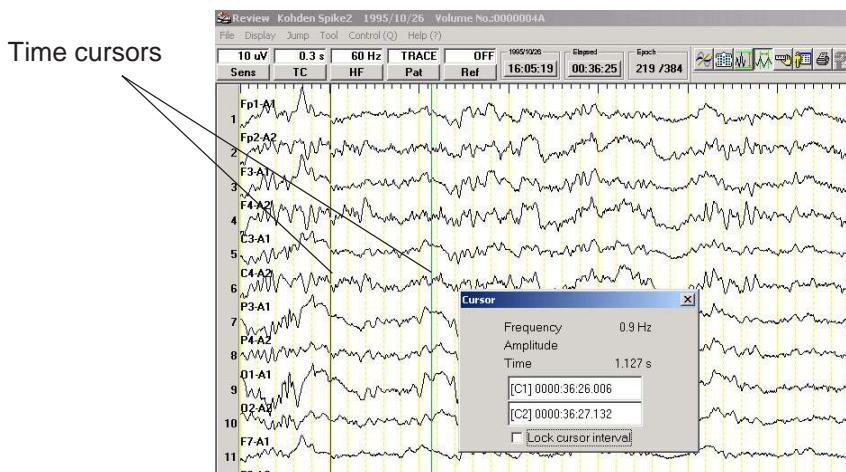
3. Click the right mouse button to select the cursor. The selected cursor changes color.
4. Click the appropriate position to move the cursor to, or drag the cursor to the appropriate position.

The voltage between the two cursors is displayed on the Cursor dialog box.

To measure the voltage of a channel, click the channel No. on the left side of the screen.

Using the Time Cursor

1. Click the  Stop button on the tool bar to freeze the EEG waveforms.
2. Click the  Display Time Cursor button on the tool bar, or select Time Cursor from the Tool menu. The two vertical (time) cursors appear on the screen.
3. Click the right mouse button to select the cursor. The selected cursor changes color.

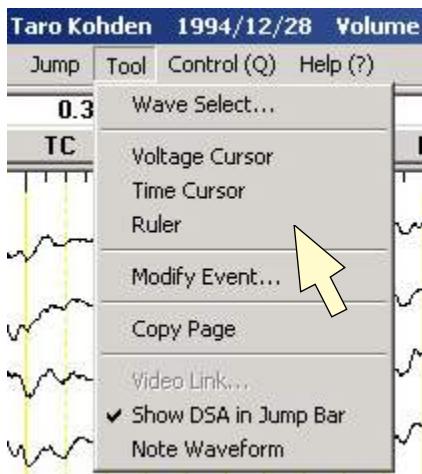


4. Click the appropriate position to move the cursor to, or drag the cursor to the appropriate position.

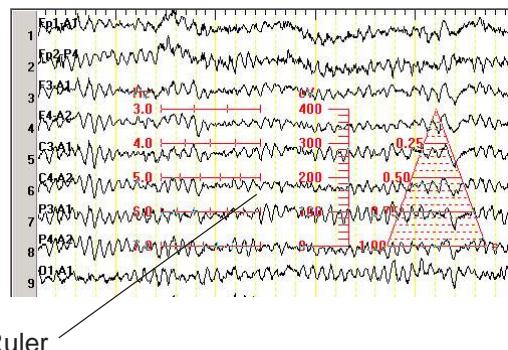
The time interval and frequency between the two cursors are displayed on the Cursor dialog box.

Using the Ruler

1. Click the Stop button on the tool bar to freeze the EEG waveform.

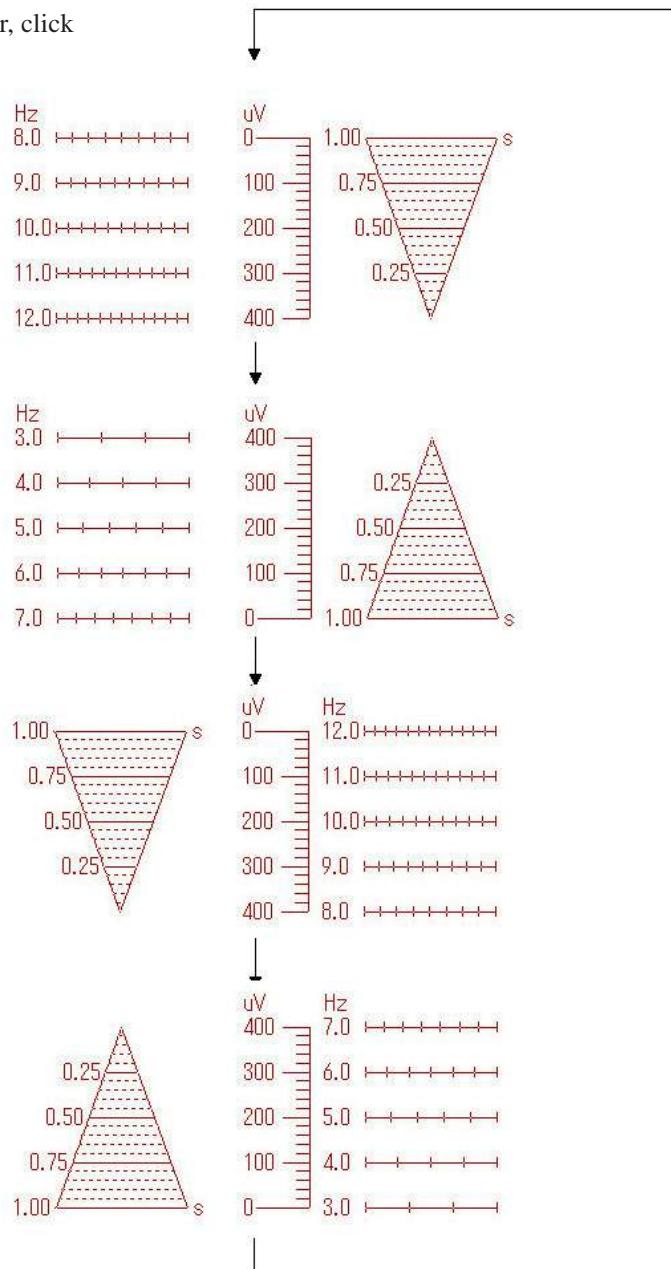


2. Click the Display Ruler button on the tool bar or, select Ruler from the Tool menu. The ruler appears on the screen.



3. Click the appropriate position to measure the amplitude or time of the waveform. Or, drag the ruler to the position.

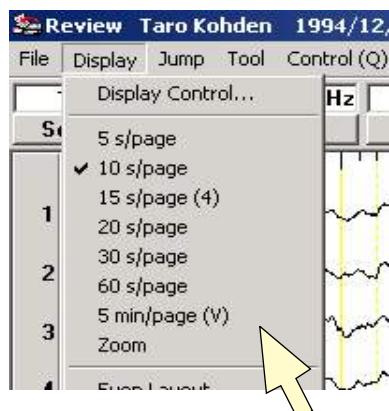
To change the scale of the ruler, click the right mouse button.



6. REVIEW PROGRAM

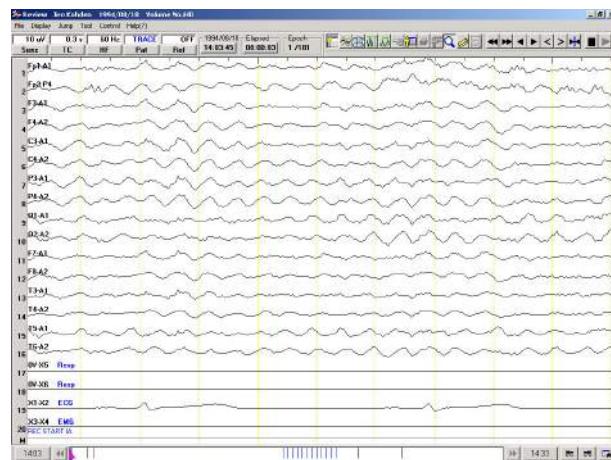
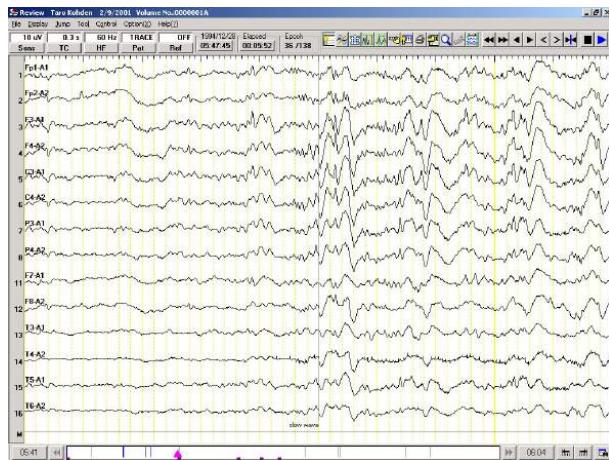
Zooming In the Waveform

You can zoom in a part of the waveforms.



1. Click the Zoom button on the tool bar or select Zoom from the Display menu. The mouse pointer changes to the magnifying glass.

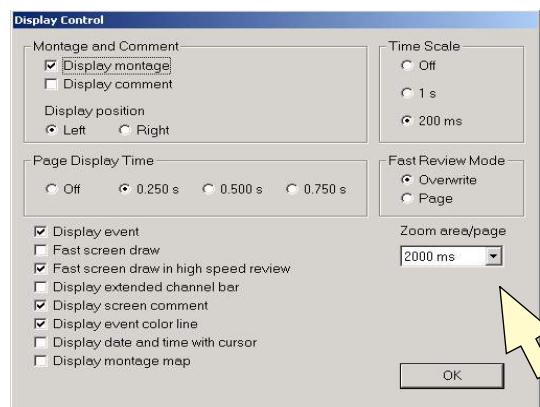
2. Click anywhere on the screen you want to zoom in with the magnifying glass. The waveforms in the selected duration in the Zoom in area/page option of the Display Control dialog box are enlarged and displayed in one page.



To return to the original size, click anywhere on the screen or unselect Zoom in the Display menu.

To change the duration,

- 1) From the Display menu, select Display Control. The Display Control dialog box opens.



- 2) Select the duration in the "Zoom area/page" list box.

Selection list: 100, 200, 500, 1000, 2000 ms

Entering Patient Information and Other Data

General

NOTE

The patient's ID and name must be entered in order to close the EEG file.

You can change the patient information by either mouse or keyboard.

There are two pages in the patient information dialog box. You can enter the basic patient information on page 1 and the patient condition such as seizure type, sleep disorder, medical history, and medication on page 2.

Opening the Patient Information Dialog Box

Click the  Display Patient Information button on the tool bar, or select Patient Information from the File menu. The Patient Information dialog box opens.

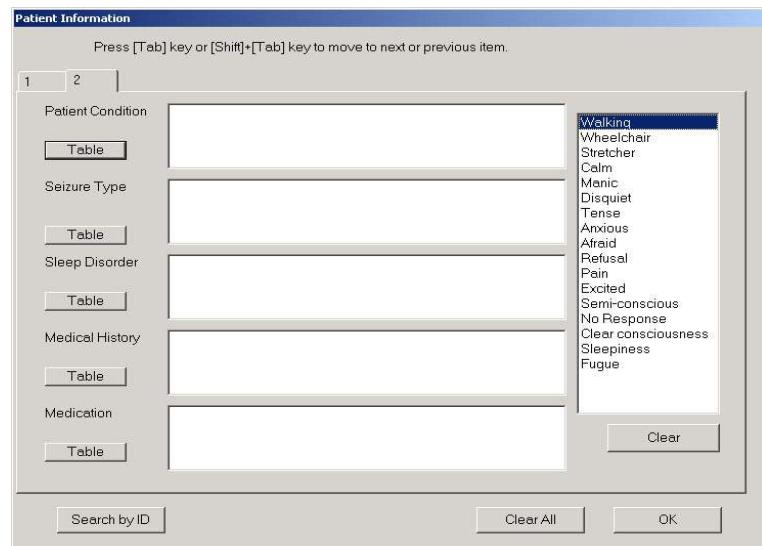
To open the page 2, click the 2 tab.

To close the Patient Information dialog box, click the OK button.



Patient Information dialog box page 1

Patient Information dialog box page 2



Patient Information Dialog Box Options

The settings in the list box can be changed. Refer to “Editing the Waveform Annotation and Patient Information Items” in Section 4.

Patient Information dialog box page 1

Entry items for Patient Information dialog box:

- ID (up to 30 characters)
- Name (up to 40 characters)
- Sex (M or F)
- Date of Birth (up to 10 characters)
- Age (up to 5 characters)
- Handedness (L or R)
- Height (up to 5 numbers)
- Weight (up to 5 numbers)
- Comment (up to 160 characters)
- Date (Examination date)
(up to 10 characters)
- EEG No. (Examination number)
(up to 30 characters)
- In/Out patient (In or Out)
- Refer. Dept (Referring department)
(up to 20 characters)
- Physician (up to 40 characters)
- Operator (up to 40 characters)

The Date (Examination date) is automatically entered.

Enter the Date of Birth with the same format as the Date.

The age is automatically calculated when the date of birth is entered.

This function does not support ages of 100 or older.

If the age of the patient is 100 or older, edit the age manually.

The format of the Date and Date of Birth can be changed with the Windows Control Panel.

Table:

Calls up a list of preset conditions for “Comment”. When one of these conditions is clicked, it is entered at the cursor position in the Comment window. You can preset conditions for each item. Refer to “Editing the Waveform Annotations and Patient Information Items” in section 4.

Patient Information dialog box page 2

Entry items for the Patient Information 2 dialog box:

Up to 180 characters can be entered. You can call up the preset condition list by clicking the Table button.

1. Patient Condition
2. Seizure Type
3. Sleep Disorder
4. Medical History
5. Medication

Entering the Patient Information

NOTE

- **Patient ID and name must be entered, otherwise the EEG file cannot be closed.**
- **The characters “ | ” and “ ‘ ’ ” cannot be entered.**

- To select a description box:
 - 1) Move the mouse pointer to the description box and click it. The input cursor appears.
 - 2) Type the text with the keyboard.

- To move the cursor to the next description box:

Press the TAB key. If there is any word in the box, it is highlighted.

- To move the cursor to a previous description box:

Press the TAB and SHIFT keys together. If there is any word in the box, it is highlighted.

- To insert a character in a description box:
 - 1) Move the mouse pointer to the appropriate position in the box and click it. The cursor appears at the pointer position.
 - 2) Type a character with the keyboard.

- To change text:
 - 1) Move the mouse pointer to the appropriate word or phrase and double-click it to select the word or phrase. The selected word or phrase is highlighted.
 - 2) Type the text with the keyboard. The new text replaces the highlighted text.

- To enter text in a table or a selection list box:

The following items have a table or selection list box. The settings are preset in the System program.

Table: Comment, Patient Condition, Seizure Type, Sleep disorder, Medical History, Medication

Selection list box: Refer. Dept, Physician, and Operator.

 - 1) Move the mouse pointer to the appropriate position in the box and click it. The input cursor appears.
 - 2) Click the table button (the arrow following the box for “Refer. Dept”, “Physician”, and “Operator”) to open the selection list box.
 - 3) Click the text to enter the description box.

• To enter text using a button:

“Sex”, “Handedness” and “In/Outpatient” can be selected by clicking the corresponding button.

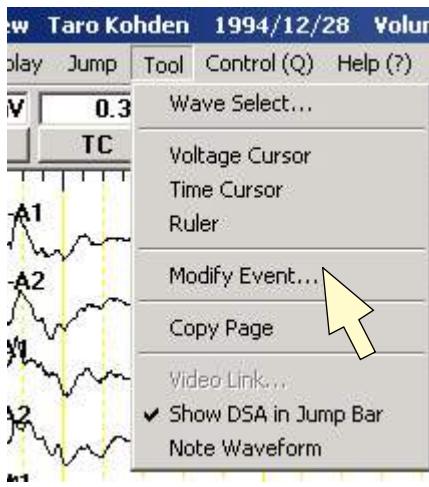
Editing the Annotation Added to the Waveforms

You can change and delete the event marks (annotations) added to the waveforms during acquisition, or add a new annotation to the waveform.

Deleting an Annotation

NOTE

An annotation marked with type “S” cannot be deleted.



- From the Tool menu, select Modify Event. The Modify Event dialog box opens.

Annotation	Type	Elapsed	Clock	Epoch	
PRO START IA	M	0000:00:00	14:03:48	1	
Artifact	M	0000:01:12	14:04:54	8	
EMG	M	0000:01:41	14:05:23	11	
Noise	S	0000:14:49	14:18:31	89	
PHOTO 3Hz	S	0000:15:09	14:18:51	91	
PHOTO 6Hz	S	0000:15:29	14:19:11	93	
PHOTO 9Hz	S	0000:15:49	14:19:31	95	
PHOTO 12Hz	S	0000:16:09	14:19:51	97	
PHOTO 15Hz	S	0000:16:29	14:20:11	99	
PHOTO 18Hz	S	0000:16:49	14:20:31	101	
PHOTO 21Hz	S	0000:16:59	14:20:51	103	
PHOTO 24Hz	S	0000:17:29	14:21:11	105	
PHOTO 27Hz	S	0000:17:49	14:21:31	107	
PHOTO 30Hz	S	0000:18:09	14:21:51	109	
PHOTO 33Hz	S	0000:18:29	14:22:11	111	
PHOTO 50Hz	S	0000:20:00	14:23:42	121	
HV	M	0000:23:06	14:26:48	139	
End of HV	M				

- Select the event in the Annotation list box. The selected annotation is highlighted.

To select one event:

Click the event.

To select consecutive events:

- Click the first event.
- Press and hold the Shift key while you click the last event.
Or, drag the cursors to select the event.

To select two or more events out of sequence:

Press and hold the Ctrl key while you click each event.

- Click the Delete button. The confirmation dialog box opens.

- Click the OK button.

To cancel deleting, click the Cancel button.

The event can be deleted in the annotation list box by pressing the Delete key on the keyboard.

On screen**NOTE****Blue annotations cannot be deleted.**

1. Click the  Stop button on the page control bar to freeze the EEG waveforms.
2. Double-click the annotation. The confirmation dialog box opens.
3. Click the OK button.

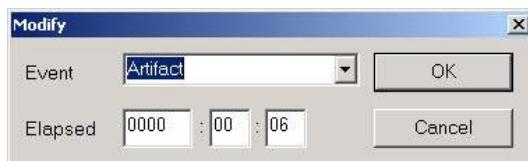
To cancel deleting, click the Cancel button.

Changing an Annotation**NOTE****An annotation marked with “S” cannot be changed.**

1. From the Tool menu, select Modify Event. The Modify Event dialog box opens.

Modify Event				
Annotation	Type	Elapsed	Clock	Epoch
REC START IA	S	0000:00:00	14:03:42	1
Artifact	M	0000:00:06	14:03:48	1
EMG	M	0000:01:12	14:04:54	8
Noise	M	0000:01:41	14:05:23	11
PHOTO 3Hz	S	0000:14:49	14:18:31	89
PHOTO 6Hz	S	0000:15:09	14:18:51	91
PHOTO 9Hz	S	0000:15:29	14:19:11	93
PHOTO 12Hz	S	0000:15:49	14:19:31	95
PHOTO 15Hz	S	0000:16:09	14:19:51	97
PHOTO 18Hz	S	0000:16:29	14:20:11	99
PHOTO 21Hz	S	0000:16:49	14:20:31	101
PHOTO 24Hz	S	0000:17:09	14:20:51	103
PHOTO 27Hz	S	0000:17:29	14:21:11	105
PHOTO 30Hz	S	0000:17:49	14:21:31	107
PHOTO 33Hz	S	0000:18:09	14:21:51	109
PHOTO 50Hz	S	0000:18:29	14:22:11	111
HV	M	0000:20:00	14:23:42	121
End of HV	M	0000:23:06	14:26:48	139

2. Click the annotation in the Annotation list box. The selected annotation is highlighted.
3. Click the Modify button. The Modify dialog box opens and the selected annotation is displayed in the Event text box.



4. Keyboard:

Type the annotation with up to 40 characters.

Mouse:

- 1) Click the Event list box arrow. The Event name list box opens.
- 2) Click the annotation.

6. REVIEW PROGRAM

The annotation displayed in the Event text box is replaced with the selected annotation. The measurement time of the previous annotation is displayed in the description box.

To change the time, use the keyboard.

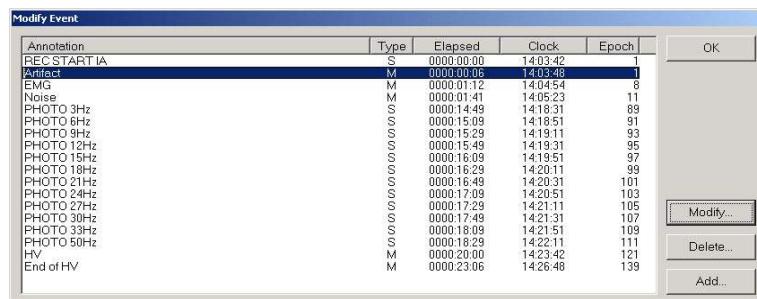
5. Click the OK button.

To cancel the change, click the Cancel button.

Adding an Annotation

Adding an Annotation by Specifying the Time

1. From the Tool menu, select Modify Event. The Modify Event dialog box opens.



2. Click the Add button. The Add dialog box opens.



3. Keyboard:

Type the annotation with up to 40 characters.

Mouse:

- 1) Click the Event list box arrow. The Event name list box opens.
- 2) Click the annotation.

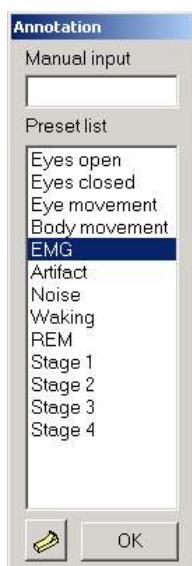
4. Type the measurement time with the “hhhh:mm:ss” format.

5. Click the OK button.

To cancel the change, click the Cancel button.

On screen**NOTE**

Close the measuring cursors (voltage cursor, time cursor and ruler), if used. If not, the Annotation dialog box cannot be opened.



1. Click the Stop button to freeze the EEG waveforms.
2. Right-click the waveform where you want to add an annotation.
3. Click the right mouse button. The Annotation dialog box opens.
4. Click the annotation on the list box or type the annotation in the manual Input text box with up to 40 characters. The annotation is marked on the waveform.
5. Click the OK button to close the Annotation dialog box.

Adding an Annotation in High Speed Review

You can add an annotation to a waveform when reviewing the EEG waveforms backward or forward at high speed. To add an annotation to a waveform, press the “+” key in the number keys. A beep sounds. The event name and the time when the event is added before pressing the “+” key in the number keys are selected in the “Add events in fast review” area in the System Setting dialog box- Junction box, operation, display page.

Moving an Annotation

Within the currently displayed EEG waveforms, you can move annotations displayed in black to another position.

NOTE

Blue annotations cannot be moved.

1. Click the Stop button to freeze the EEG waveforms.
2. Move the mouse pointer to the annotation.
3. Drag the annotation to the position where you want to move.

The confirmation dialog box appears.

4. Click the OK button. The annotation moves.

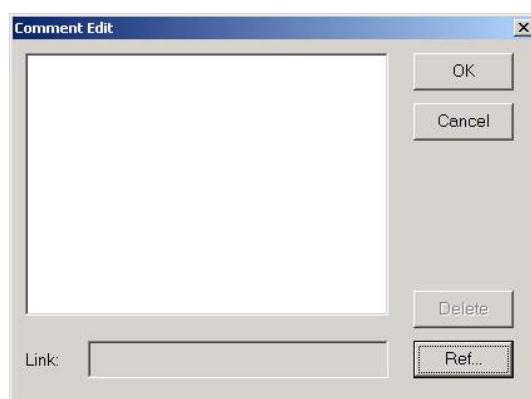
To cancel moving, click the Cancel button.

Adding a Screen Comment

When the waveforms are frozen, you can add a text and attach a picture file to a waveform as a screen comment. The attached file is saved together with the EEG data file.

The screen comment can be displayed when the Display screen comment check box on the Display Control dialog box is checked. The attached picture can be displayed by clicking the picture icon on the screen comment. The screen comment can be moved anywhere on the page

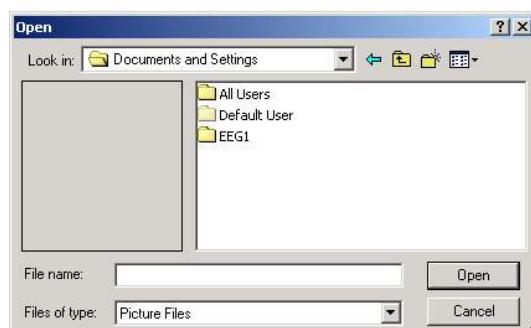
1. Click the  Stop button to freeze the EEG waveforms.
2. Click the  Screen Comment button on the tool bar. The Comment Edit dialog box opens.



3. Type a comment with up to 384 characters.

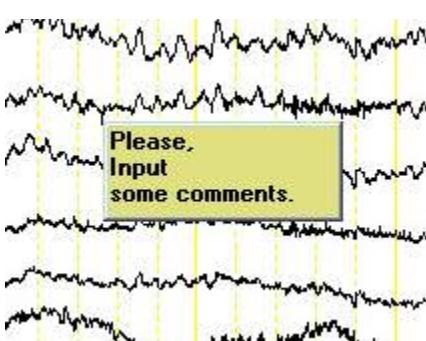
To attach a picture as a screen comment.

- 1) Click the Ref button on the Comment Edit dialog box. The Open dialog box opens.



- 2) Select the file.
- 3) Click the Open button. The Open dialog box closes.
4. Click the OK button. The comment is saved as a P-COMMENT and displayed on the screen.

To cancel adding the comment, click the Cancel button.



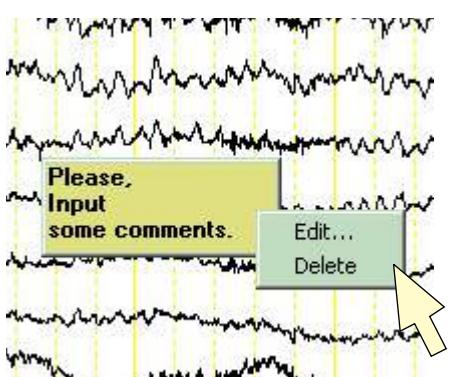
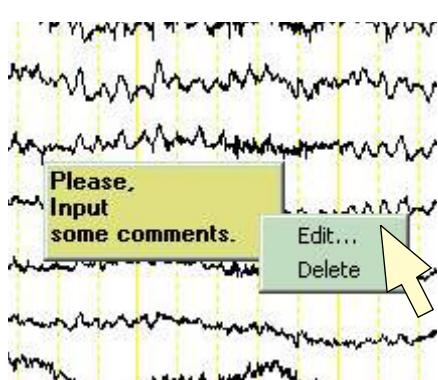
Editing the Screen Comment:

1. Right-click the comment. The screen comment menu opens.
2. Select Edit. The Comment Edit dialog box opens. The comment is displayed on the text box and the attached picture file name is displayed on the Link text box.
3. Change or add the comment in the text box.
To delete the comment or picture:
 - 1) Select the comment or picture
 - 2) Click the Delete button
4. Click the OK button. The changed or added comment is displayed on the screen.

To cancel editing, click the Cancel button.

Deleting the Screen Comment

1. Right-click the comment. The screen comment menu opens.
2. Select Delete. The screen comment is deleted.



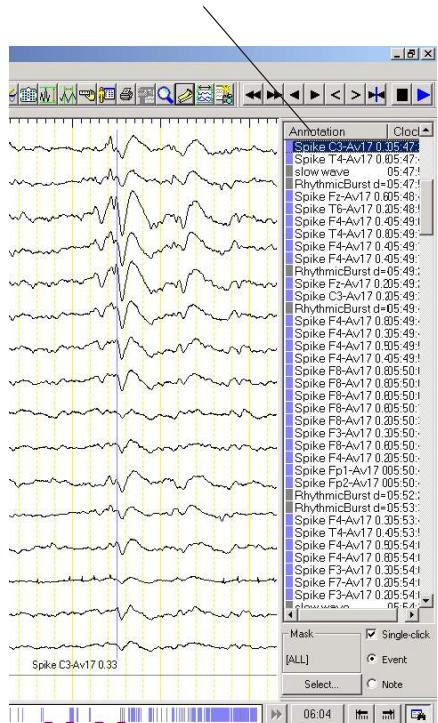
6. REVIEW PROGRAM

Selecting the Events

You can select events in the annotation list box and Event Jump bar. The selected event names are displayed in the annotation list and the event marks are displayed in the Event Jump bar.

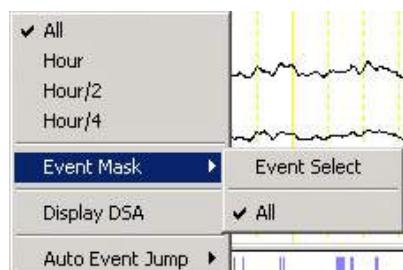


Click the item name at the top of the column to sort events.



The annotation list box can be opened from the Event Jump bar.

- 1) Right-click the event mark display area on the Event Jump bar. The pop-up menu opens.
- 2) Select Event Select from the Event Mask menu. The annotation list box opens



1. Click the Stop button to freeze the EEG waveform.

2. Click the Select Event button on the Jump bar, or select Event from the Jump menu. The annotation list box opens.

Annotation list box options

Single-click: Single-click to jump to the waveform annotated by the event.
Event/Note wave:

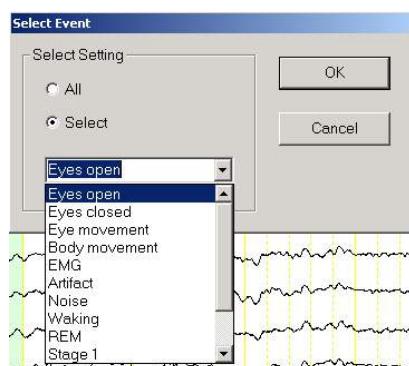
Event: Displays the annotations in the list box.

Note wave: Display the note waveform window and the list of the copied part of waveforms in the list box. Refer to “Copying Parts of waveforms” in this section.

Mask area

Select button: Opens the Event Select dialog box to select the event names .

The selected event names are displayed in the annotation list and the event marks are displayed in the Event Jump bar.



All:

Displays all event names on the annotation list.

Select:

Displays the selected event names on the annotation bar.

When the Select option is selected, you can also type an event name with up to 40 characters. All events that include the entered characters are displayed on the annotation list. You can type two or more event names. To enter two or more event names, separate the event names with “,”.

3. Double-click the event name you want to jump to in the annotation list. The specified waveform is displayed on the screen.

The latest 6 events selected in the annotation list that you jumped to are saved in memory.

To display and select the saved events:

- 1) Right-click the event mark display area on the Event Jump bar. The pop-up menu opens.
- 2) Select the Event Mask. The saved event are displayed in the pop-up menu.

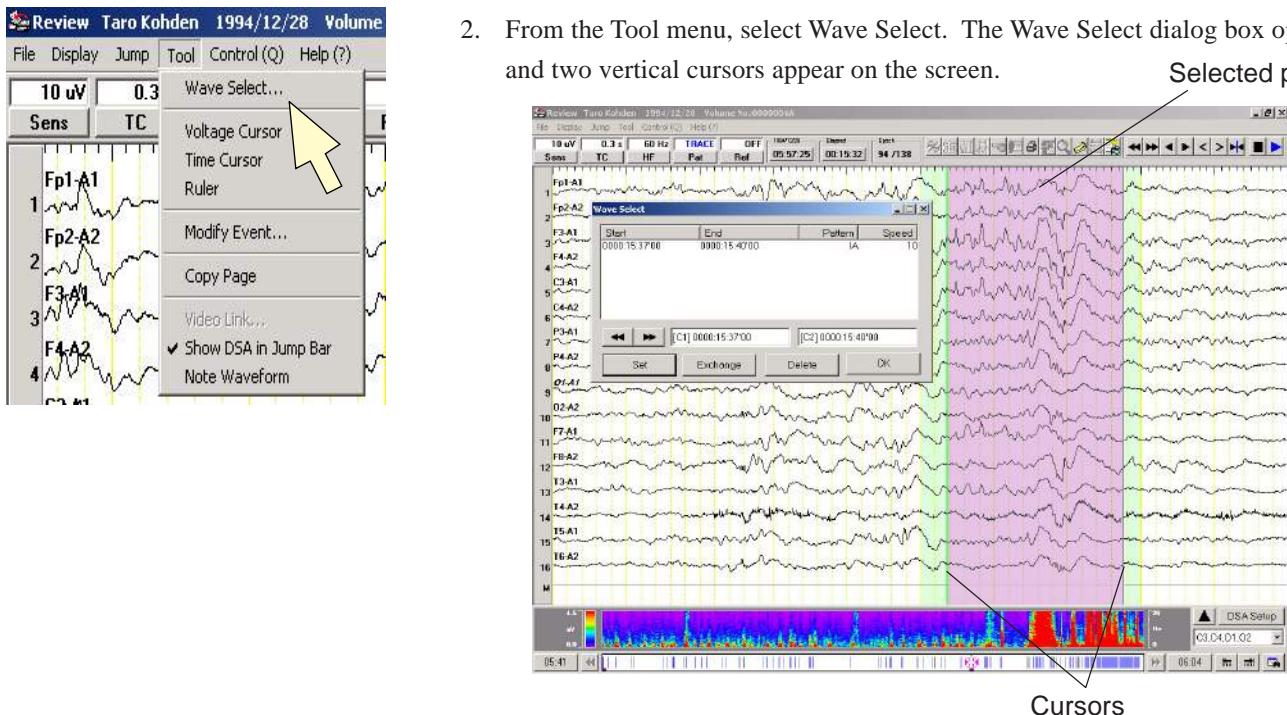
Selecting Parts of the Waveforms

You can select part of the waveforms and its information in the Wave Select dialog box. Selected waveform parts can be printed or exported. Up to 100 parts of the waveforms in one second steps can be selected.

NOTE

- When saving several parts of waveforms, the selected parts must not overlap each other.
- When saving a file as an ASCII file, select parts of waveforms that are less than 5 minutes. 500 Hz sampling time, 20 channels, 5 minutes of waveforms uses 25 MB file space. If the file is 25 MB or more, another application may be unable to open the file.

1. Click the  Stop button to freeze the waveform.
2. From the Tool menu, select Wave Select. The Wave Select dialog box opens and two vertical cursors appear on the screen.



3. Move the cursors to select part of the waveforms by clicking the left mouse button.

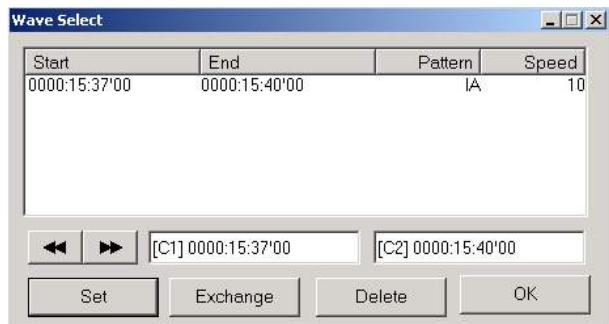
To change a cursor, click the right mouse button.

4. Click the Set button in the Wave Select dialog box. The waveforms between the two cursors, its beginning and ending time, pattern number, and display speed are saved and displayed in the list.

Later, you can display the selected waveform parts by double-clicking the data in the list. You can print or export the selected waveform parts.

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Wave Select dialog box options



Rewind button/Forward button:

Reviews the selected waveform data in the list backward or forward at high speed.

Set:

Saves the selected part of waveforms between two cursors.

Exchange:

Exchanges the waveform data in the list for the part of waveforms between the two cursors.

Delete:

Deletes the selected waveform data in the list.

5. Click the OK button. The Wave Select dialog box closes and the cursors disappear.

Selecting All Waveforms on a Page

To select all waveforms on a page, click the Select Displayed Page and Advance button on the tool bar. When waveforms are selected, the next page appears.

Displaying a DSA Trendgraph

The instrument analyzes the EEG waveform data to examine the frequency components and displays amplitude for each frequency as a DSA (Density Spectral Array) trendgraph on the review screen and EEG Scope - Comparison mode. The DSA trendgraph let you easily find the EEG waveforms when ictus epileptic seizure occurs or a specific frequency band of the EEG waveform, such as alpha wave, delta wave or stage of spindle in sleep study. During waveform acquisition, the instrument can create the FFT data to display the DSA trendgraph. Refer to “Creating the FFT Data for DSA Trendgraph” in Section 5. If the FFT data is not created, create it. Refer to “Creating the FFT Data for DSA Trendgraph” in this section.

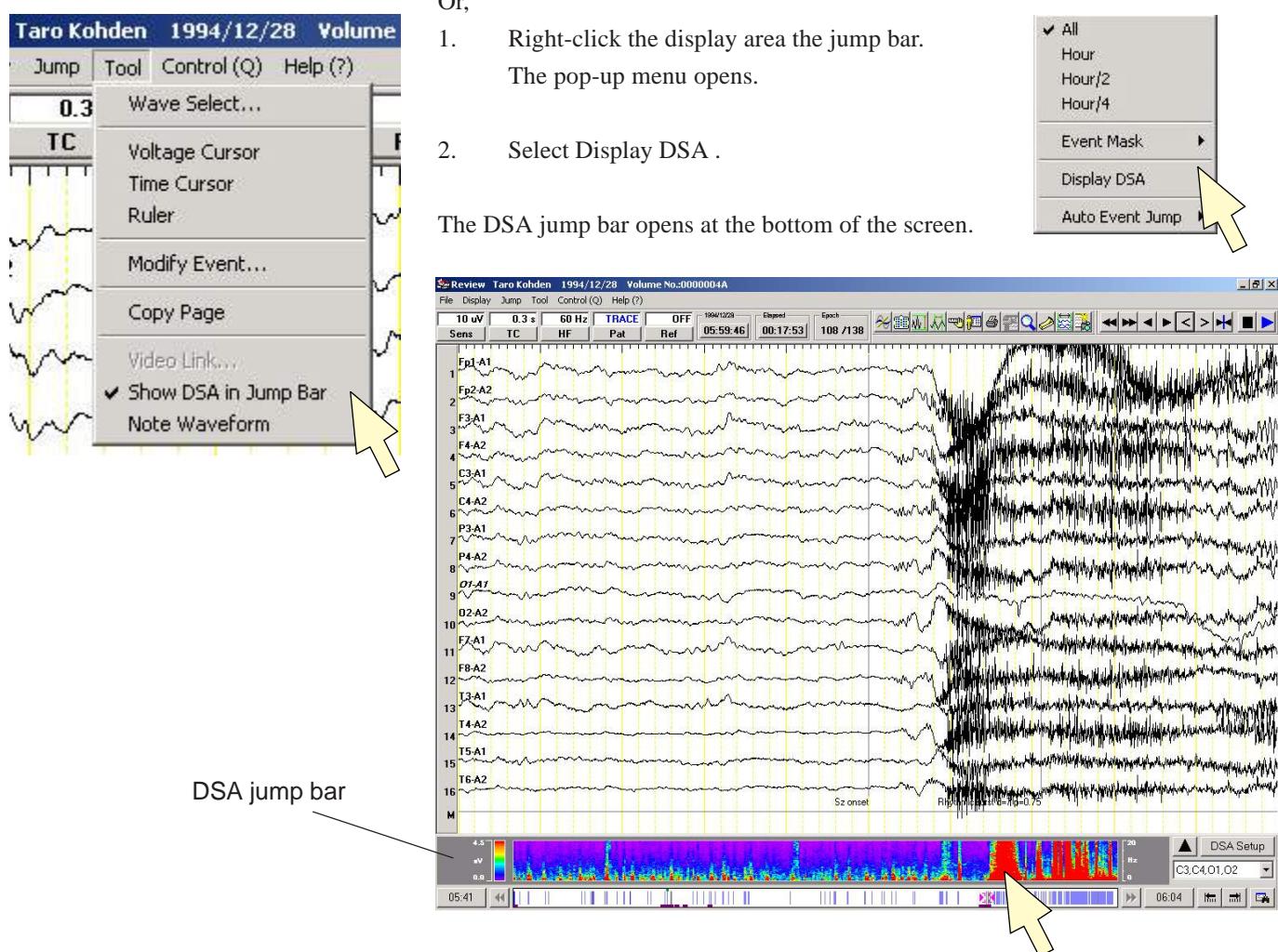
Displaying a DSA Trendgraph

From the Tool menu, select show DSA in Jump Bar.

Or,

1. Right-click the display area the jump bar.
The pop-up menu opens.
2. Select Display DSA .

The DSA jump bar opens at the bottom of the screen.



Around here, the DSA trendgraph is almost red. This shows that amplitude and frequency components of the EEG waveforms suddenly change. You can jump to the EEG waveforms by clicking here.

6. REVIEW PROGRAM

About the DSA Jump Bar

You can display any part of the EEG waveform by clicking any place on the DSA trendgraph. The DSA trendgraph displays amplitude for each frequency component every 2.5 seconds.

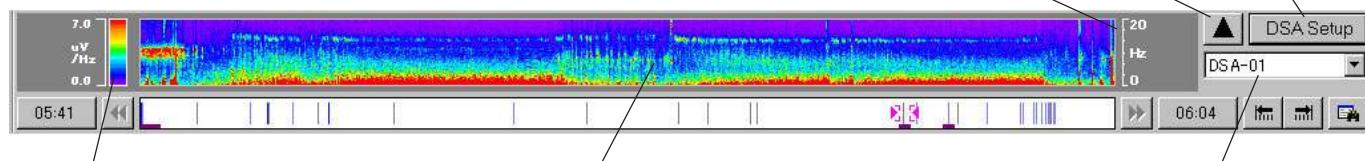
Upper Arrow:

Displays the Long term DSA window to review the DSA trendgraph for long term EEG monitoring data or polysomnography data.

DSA Setup:

Opens the DSA settings dialog box to select DSA trendgraph display settings.

Frequency scale (0 to 20 Hz)



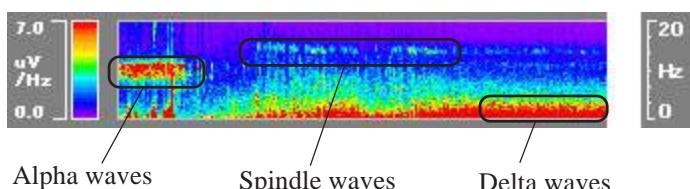
Voltage scale/DSA color scale:

The voltage scale shows the selected amplitude range. The DSA color scale shows the corresponding amplitude (μ V).

DSA trendgraph:

Amplitude for each frequency component is displayed in color. The amplitude is smaller toward the purple end and larger toward to red end. You can display the corresponding waveform by clicking any place on the trendgraph. The trendgraph display area can be changed. Refer to "Searching by the Event Jump Bar - To change the range of the event mark display area".

Example:



DSA group:

Display the DSA pattern. You can change the DSA trendgraph display settings by changing the pattern.

Changing the Range of the DSA Trend Graph Display Area

1. Right-click the display area. The pop-up menu opens.

2. Select the range from the menu.

Selection list:

All Displays the beginning to end of the file.

Hour Displays an hour of the file.

Hour/2 Displays a half hour of the file.

Hour/4 Displays a quarter hour of the file.



You can scroll the event mark display area backward or forward by clicking the Previous or Next Section button when "Hour", "Hour/2" or "Hour/4" is selected.

Creating the FFT Data for DSA Trendgraph



- From the File menu, select FFT setup. The FFT settings dialog box opens.
- Select the following options to create the FFT data.

FFT settings dialog box options

FFT pattern:

The settings in the FFT pattern area can be saved with a pattern name. To change the pattern name, click the Rename button.

FFT channel:

Select the electrode for the FFT calculation.

To select all electrodes, click the Select all button.

To cancel electrode selection, click the Clear button.

Reference:

Select the reference electrode for the FFT calculation.

DSA pattern:

Select the default DSA pattern when the DSA trendgraph is displayed in the Review screen. Refer to “Changing the DSA Trendgraph Display Settings”.

- Click the OK button.

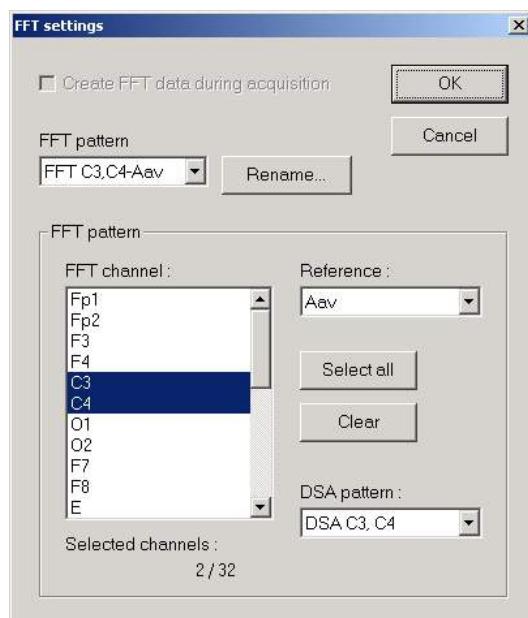
To cancel settings, click the Cancel button.

- From the File menu, select FFT reanalysis. The confirmation dialog box opens.

To create or overwrite the FFT analysis data, click the OK button.

To cancel creating or overwriting, click the Cancel button.

- When the FFT data is created, the message dialog box opens. Click the OK button. The DSA jump bar automatically opens.



Displaying the DSA Trendgraph in Detail

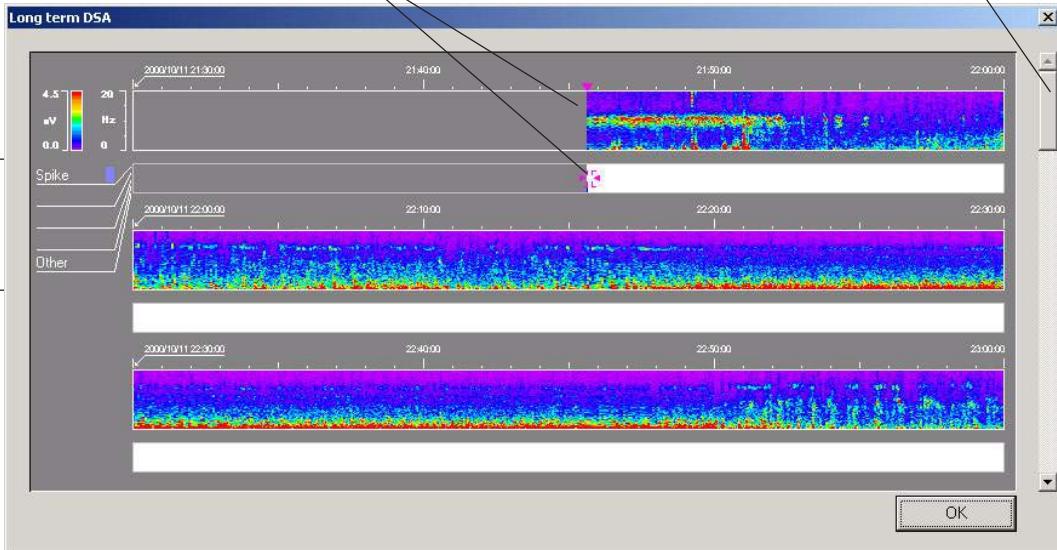
The DSA trendgraph can be displayed in detail by opening the Long Term DSA window. To open the window, click the  upper arrow on the DSA jump bar.

This box is useful to review the EEG waveforms measured for long time in sleep study.

DSA trendgraph/Event jump bar:

You can display any part of the EEG waveform by clicking any place on the DSA trendgraph or jump bar.

Use the scroll bar to view the information beyond the borders of the window.



Events

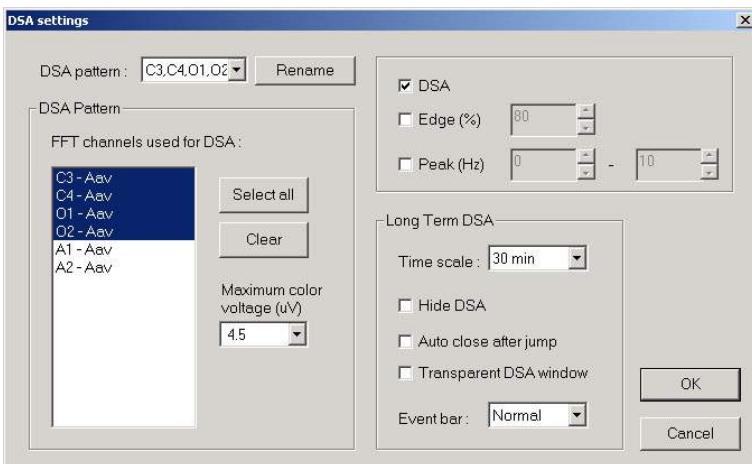
Event marks for up to 5 events can be displayed with a vertical color line in the Event jump bar. The selected event names are displayed Refer to “Changing the DSA Trendgraph Display Settings”.

OK:
Closes the Long Term DSA window.

Changing the DSA Trendgraph Display Settings

To change the DSA trendgraph display settings, use the DSA settings dialog box.

1. Click the upper arrow on the DSA jump bar. The DSA settings dialog box opens.
2. Change the settings.



DSA settings dialog box options

DSA pattern:

The settings in the DSA Pattern area can be saved with a DSA pattern name. To change the pattern name, click the Rename button. Up to 40 characters can be used.

DSA Pattern area

FFT channels used for DSA:

You can select the derivations to display the DSA trendgraph.

- To select all derivations, click the Select all button.
- To select two or more consecutive derivations, drag the cursor to select the derivations.
- To select the derivations, click the derivations while pressing the Ctrl key.

Maximum color voltage (μ V):

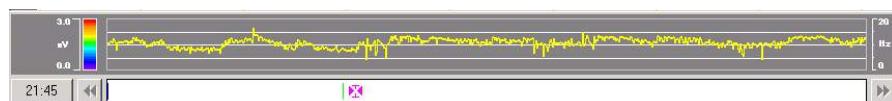
Selects the maximum voltage for the trendgraph

DSA:

Selects whether or not to display the DSA data in the DSA trendgraph.

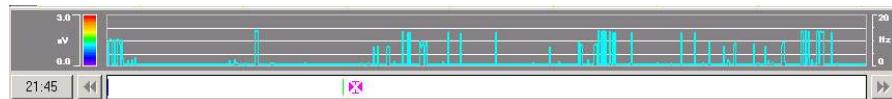
Edge:

Displays the edge frequency for each analysis period. You can set E% from 0 to 100% in the text box.



Peak:

Displays the peak frequency for each analysis period. You can set the range of the peak frequency between 0 to 20 Hz in the text box.



Either "Edge" or Peak is selectable.

6. REVIEW PROGRAM

Long Term DSA area

Time scale:

Selects the time range for each row of the DSA trendgraph

Hide DSA

Does not display the DSA trendgraph on the Long Term DSA window.

Auto close after jump:

Closes the Long Term DSA window when you jump to any part of waveform

Transparent DSA window:

Displays the transparent Long Term DSA window.

Event bar:

OFF: Closes the Event jump bar.

Normal: Displays all event marks for all events.

Detailed: Displays the event marks for the event that is selected in the Table Items dialog box in the System program. Refer to “Editing the Waveform Annotations and Patient Information Items”.

3. Click the OK button.

To cancel settings, click the Cancel button.

Copying Parts of Waveforms

You can copy any part of the waveforms in the note waveform window. Up to 1000 parts of the waveforms can be copied. You can review the waveforms while comparing with the copied waveforms. The copied waveforms can be registered in the instrument as sample data. Up to 100 sample data can be registered. You can also review waveforms while comparing with sample data.

NOTE

- When several review windows are opened, the note waveform window is only available for the currently selected review window.
- After 1000 waveform parts are copied in the note waveform window, new waveforms overwrites the oldest waveforms.
- After 100 sample data are registered in the instrument, new sample data overwrites the oldest sample data.

Displaying the Note Waveform Window

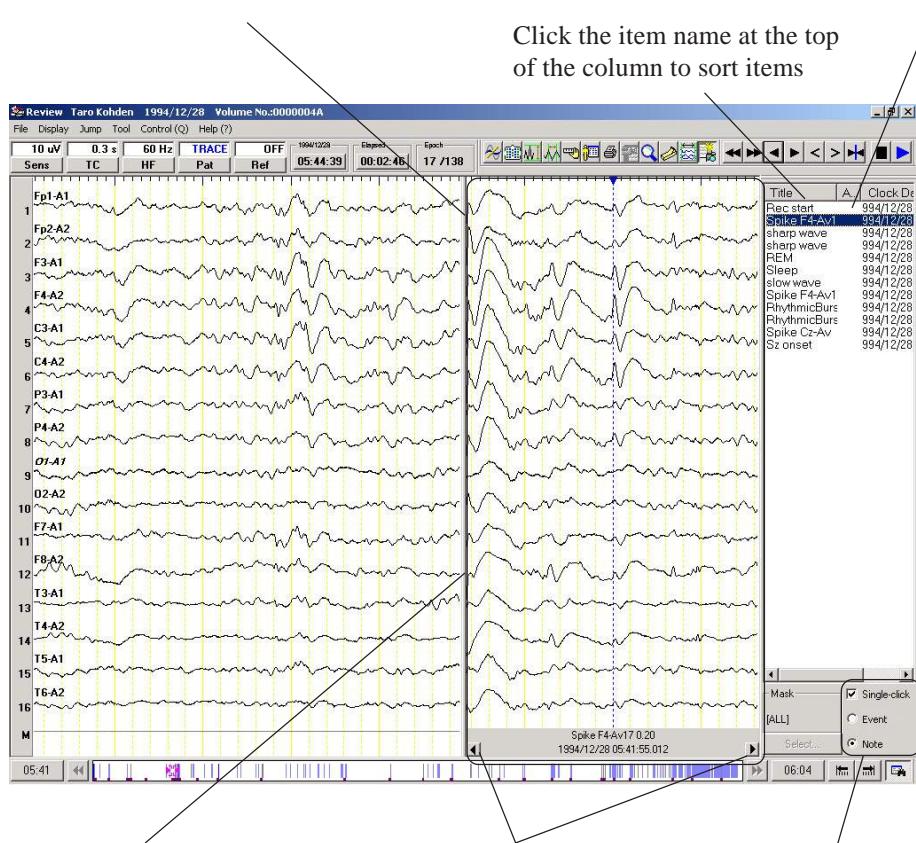
1. Click the  Stop button to freeze the EEG waveforms.
2. Click the  Display Note Waveform button on the tool bar, or select Note Waveform from the Tool menu. The note waveform window opens.
 - The list of the copied part of waveforms can be displayed in the annotation list box. To display the note waveform list, click the  Select Event button on the Jump bar, or select Event from the Jump menu.
 - To close the note waveform window, click the  Display Note Waveform button.

6. REVIEW PROGRAM

Note waveform window

Displays the copied part of waveforms.

The waveforms are displayed with the current waveform display settings. The dotted line shows the center of the copied part of waveforms.



To change the window size, drag the corner of the window.

Moves 1/10 backward or forward.

The time point (measurement date and time) of the dotted line is displayed at the bottom of the window. When no part of waveform is copied in the note waveform window, the "Drag and drop a note waveform" message appears at the bottom of the note waveform window.

Note waveform list:

Information about the copied part of waveforms are listed. Sample data is indicated by an "S" mark.

Copying Part of Waveforms

A 20-second part of the waveforms can be copied in the note waveform window by the following ways.

- 10 seconds before and after the time point where you click.
- 10 seconds before and after the time point at the center of the review window.
- 10 seconds before and after the time point where you select with the time cursor.

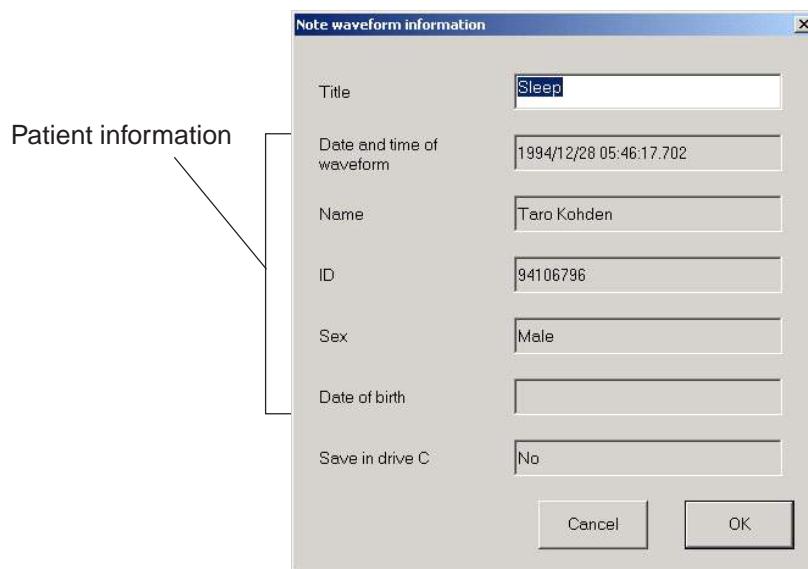
Copying Part of the Waveforms with a Mouse

The waveforms for 10 seconds before and after the time point where you click can be copied.

NOTE

When a cursor is displayed on the screen, the waveforms cannot be copied with the mouse operation. Do the procedure in “Copying the Part of the Waveforms at the Center of the Review Window”.

1. Click the  Stop button to freeze the EEG waveforms.
2. Click the  Display Note Waveform button on the tool bar, or select Note Waveform from the Tool menu. The note waveform window opens.
3. Display the waveforms that you want to copy.
4. Click the center of the area you want to copy.
5. Drag it to the note waveforms window. The note waveform information dialog box opens.



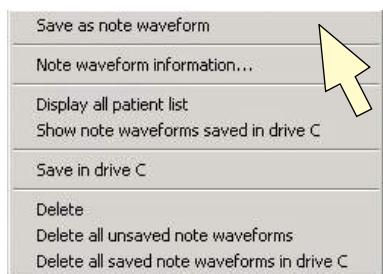
6. Type the title of the part of the waveforms in the Title text box with up to 40 characters.
7. Click the OK button. The information of the copied waveforms is displayed in the note waveform list.

To cancel copying the waveforms, click the cancel button.

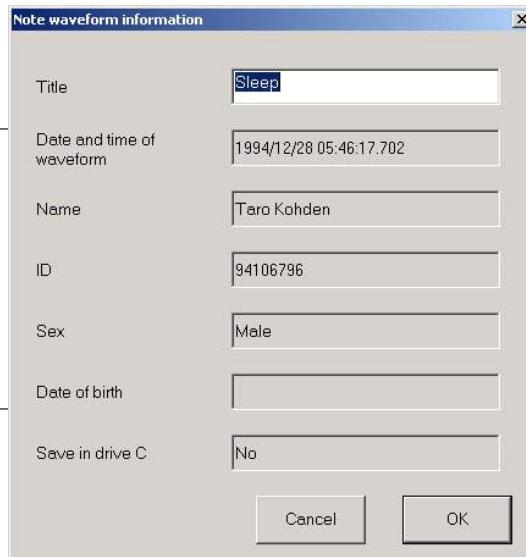
Copying Part of the Waveforms at the Center of the Review Window

The waveforms for a 10 seconds before and after the time point at the center of the review window can be copied.

1. Click the  Stop button to freeze the EEG waveforms.
2. Click the  Display Note Waveform button on the tool bar, or select Note Waveform from the Tool menu. The note waveform window opens.
3. Display the waveforms that you want to copy.
4. Right-click anywhere on the note waveform window. The pop-up menu opens.
5. Select “Save as note waveform”. The note waveform information dialog box opens.



Patient information



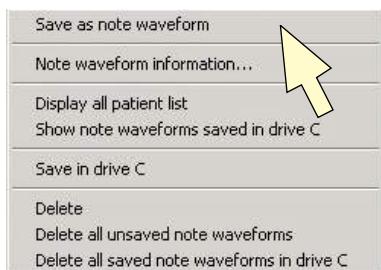
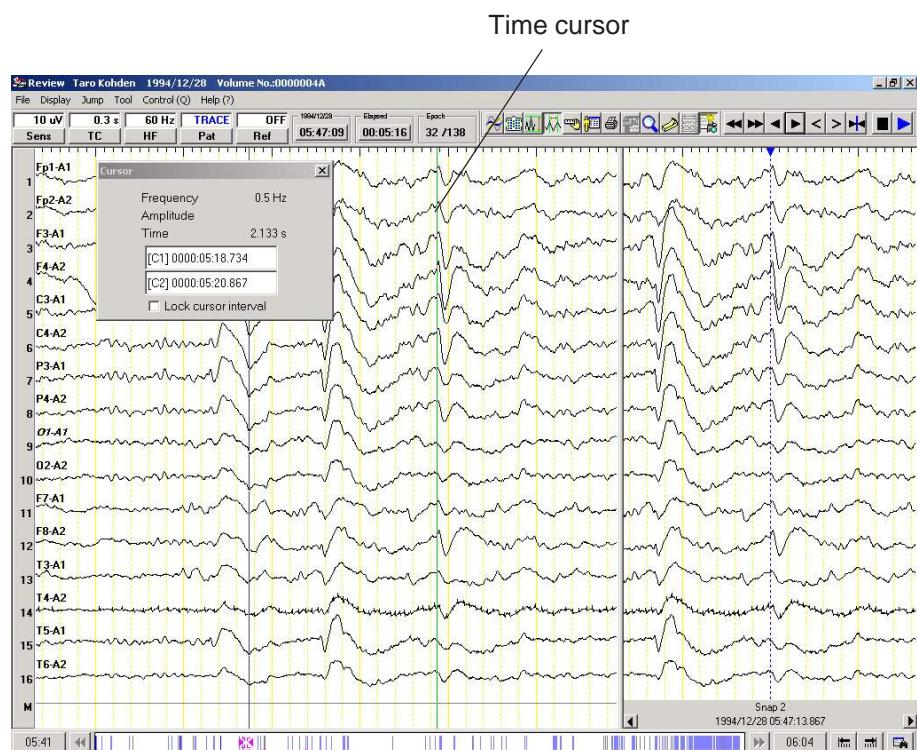
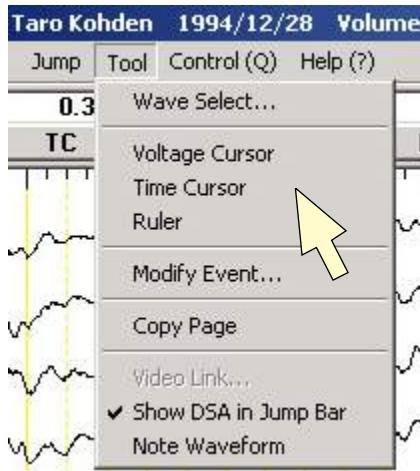
6. Type the title of the part of the waveforms in the Title text box with up to 40 characters.
7. Click the OK button. The information of the copied waveforms is displayed in the note waveform list.

To cancel copying the waveforms, click the cancel button.

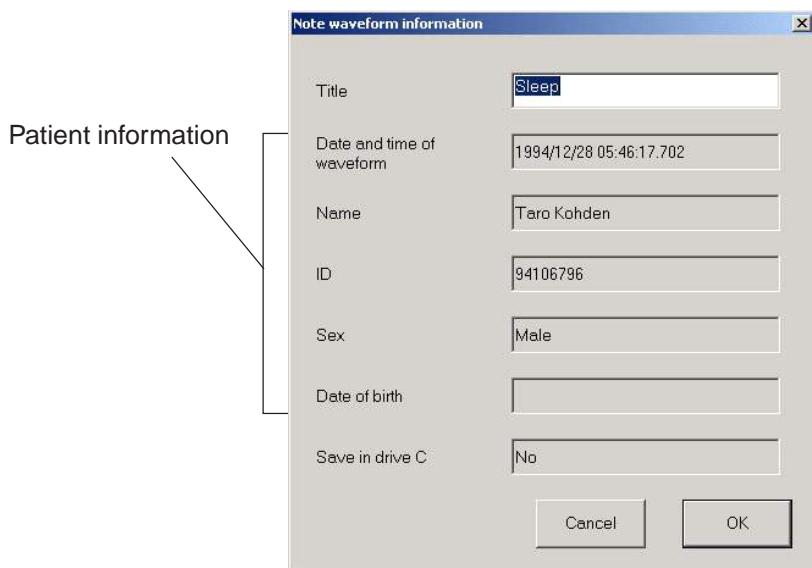
Copying Part of the Waveforms Using the Time Cursor

The waveforms for 10 seconds before and after the time point where you select with the time cursor can be copied.

1. Click the Stop button to freeze the EEG waveforms.
2. Display the waveforms that you want to copy.
3. Click the Display Time Cursor button on the tool bar, or select Time Cursor from the Tool menu. The two vertical (time) cursors appear on the screen.
4. Click the center of the waveforms that you wan to copy.
5. Click the Display Note Waveform button on the tool bar, or select Note Waveform from the Tool menu. The note waveform window opens.



6. Right-click anywhere on the note waveform window. The pop-up menu opens.
7. Select “Save as note waveform”. The note waveform information dialog box opens.



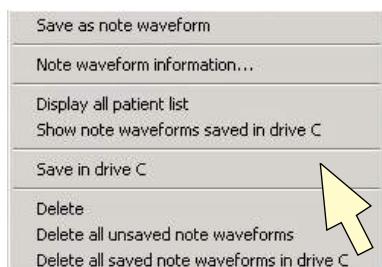
6. Type the title of the part of the waveforms in the Title text box with up to 40 characters.
7. Click the OK button. The information of the copied waveforms is displayed in the note waveform list.

To cancel copying the waveforms, click the cancel button.

Registering the Copied Waveforms as a Sample Data

You can register the copied waveforms in the instrument as a sample data. Up to 100 sample data can be registered.

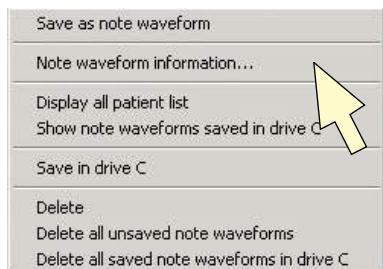
1. From the note waveform list, select the part of waveforms.
2. Right-click anywhere on the note waveform window. The pop-up menu opens.
3. Select “Save in drive C”. The attribute of the registered waveforms changes to “S” in the note list and the “Save in drive C” in the note waveform information dialog box changes from “No” to “Yes”.



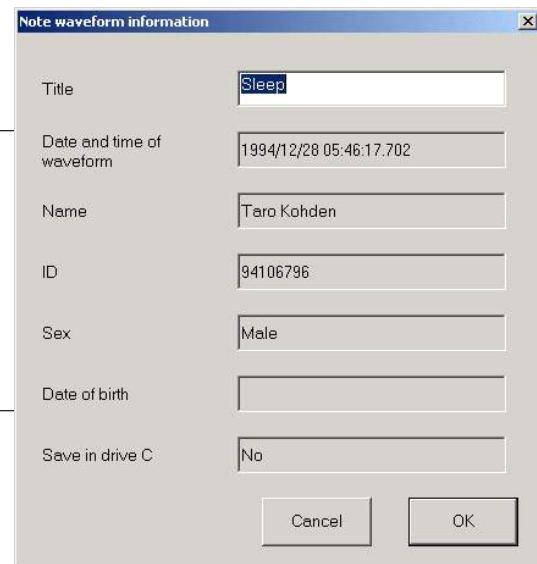
Changing the Title of the Copied Waveforms

The title of the copied waveforms can be changed.

1. Right-click anywhere on the note waveform window. The pop-up menu opens.
2. Select “Note waveform information”. The Note waveform information dialog box opens.



Patient information



3. Type the new title in the Title text box with up to 40 characters. To change the patient information, use the patient information dialog box.
4. Click the OK button.

To cancel changing, click the Cancel button.

Displaying the Copied Waveforms

Copied waveforms can be displayed by selecting the copied waveforms in the annotation list box. You can display the copied waveforms for all patients registered in the instrument.

Displaying the Copied Waveforms for the Current Patient



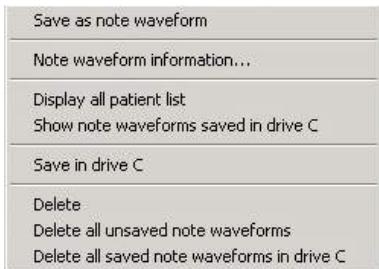
1. Click the Stop button to freeze the EEG waveform.
2. Click the Select Event button on the Jump bar, or select Event from the Jump menu. The annotation list box opens.
3. Select the Note wave option. The list of the copied waveforms for the current patient is displayed.
4. Select the waveforms that you want to display.

6. REVIEW PROGRAM

Displaying the Copied Waveforms for All Patients (Sample Data)

The sample data (copied waveforms that are registered in the instrument) can be displayed.

1. Right-click anywhere on the note waveform window. The pop-up menu opens.



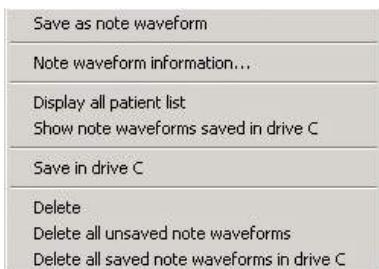
2. To display the list of sample data, select “Show note waveforms saved in drive C”.

To display the list of copied waveforms for all patients, select “Display all patient list”.

3. Select the waveforms that you want to display

Deleting Copied Waveforms

To delete the copied waveforms, use any of following commands from the pop-up forms in the note waveform list



Delete all unsaved note waveforms:

Deletes the copied waveforms that are not registered in the instrument.

Delete all saved note waveforms:

Deletes the copied waveforms that are registered in the instrument.

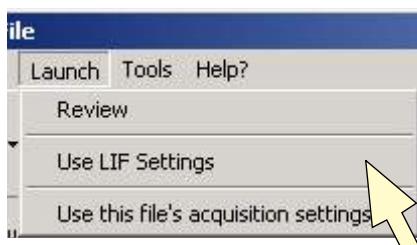
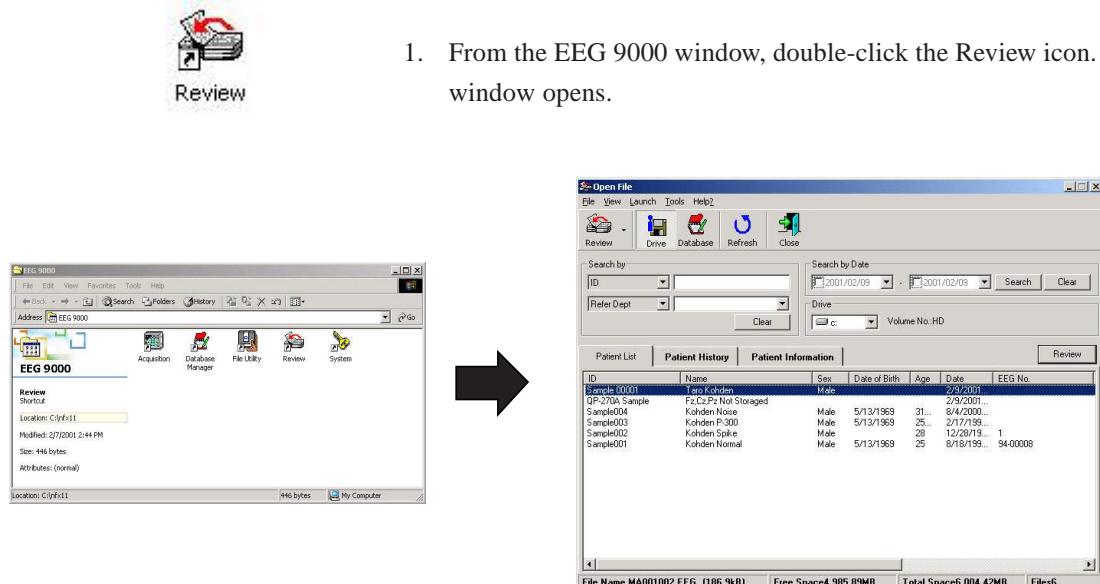
To print the copied waveform, display them on the note waveform window and select Current Page option in the Print Range area of the Print dialog box.

Printing the Copied Waveform

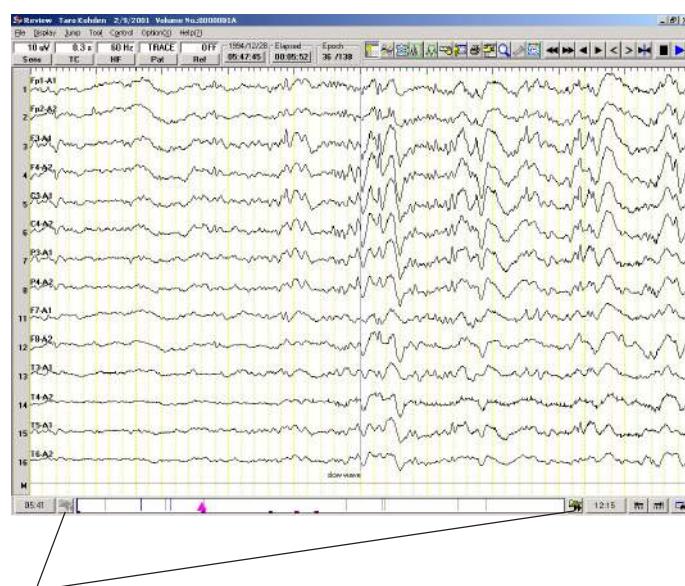
For the Print dialog box, refer to “Printing” in this section.

Reviewing the Long Term EEG Waveforms

When the EEG waveforms are measured with the long term EEG monitoring function, the EEG waveforms for each stage are saved as a different EEG data file. You can continuously review these EEG data files for a patient.



1. From the EEG 9000 window, double-click the Review icon. The Open File window opens.
2. From the Launch menu, Select Use LIF Settings.
3. In the list, select any EEG data file that is measured with the long term EEG monitoring function.
To find files, you can use the search function. Refer to “Opening the EEG Data File” in this section.
4. Click the **Review** button. The selected EEG data file opens on the Review screen.

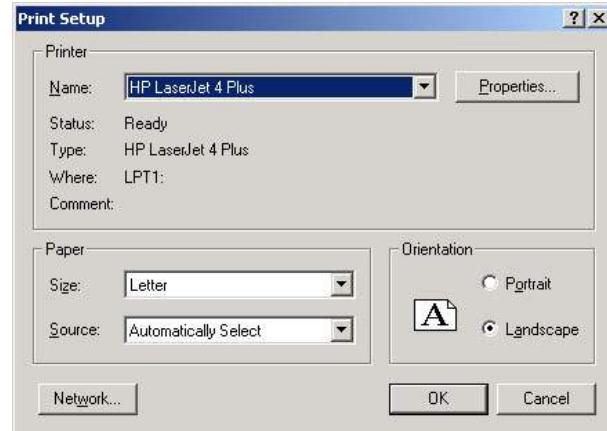
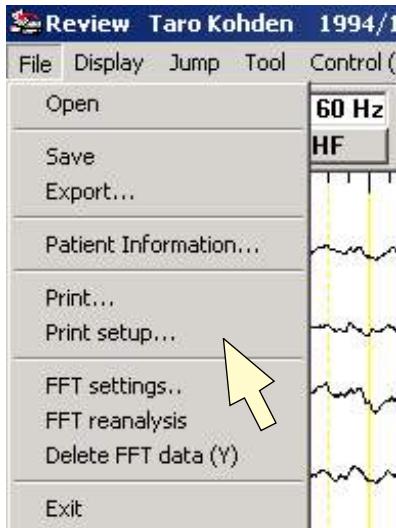


Previous/Next stage button:
Displays an EEG data file in the previous or next stage

Printing

Before printing, you can select the data, format, printer setting, and some options. Refer to Print dialog box, Image Option dialog box, and Printer Setup dialog box.

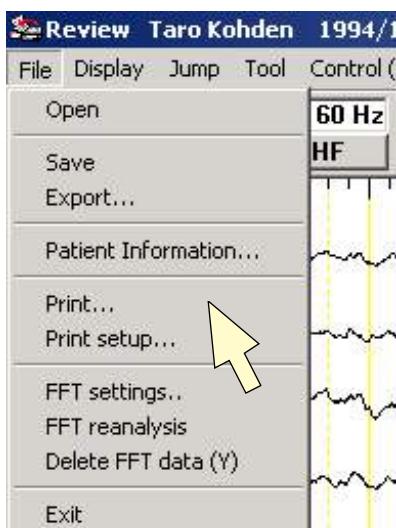
Setting Up the Printer



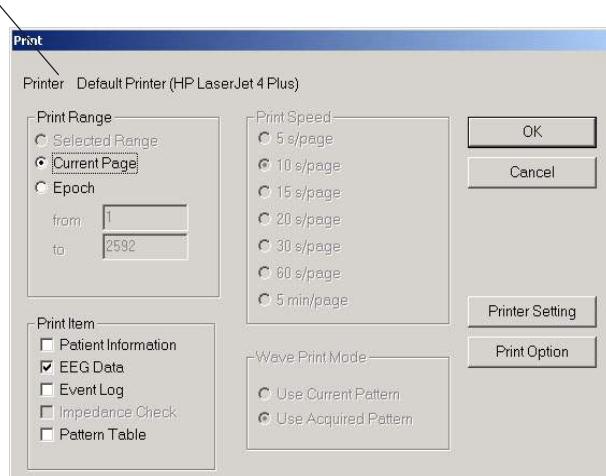
Print Setup dialog box example

1. From the File menu, select Printer setup. The Print Setup dialog box opens.
2. Select the print options.
3. Click the OK button to close the Print Setup dialog box.

Printing Waveforms and Patient Information



Selected printer



About the Print dialog box options**Print Range:**

Select the part of the EEG waveform data on the screen to print.

Selected Range: Prints the currently selected part of the EEG waveform data.

Current Page: Prints the page currently displayed on the screen.

Epoch: Prints the selected epochs. One epoch corresponds to 10 seconds of data.

from: Type the beginning epoch.

to: Type the ending epoch.

Print Item:

Select the data to print.

(Patient Information, EEG Data, Event Log, Impedance Check and/or Pattern)

Print Speed:

Select the printing speed of the EEG waveform data per page. This mode is in effect when the Print Range is set to Epoch.

5 s/page: Prints 5 second EEG waveform per page.

10 s/page: Prints 10 second EEG waveform per page.

15 s/page: Prints 15 second EEG waveform per page.

20 s/page: Prints 20 second EEG waveform data per page.

30 s/page: Prints 30 second EEG waveform data per page.

60 s/page: Prints 60 second EEG waveform data per page.

5 min/page: Prints 5 minute EEG waveform data per page.

Wave Print Mode:

Select the pattern to print the EEG waveforms. This option is available when the Print Range is set to Epoch.

Use Current Pattern: Prints the EEG waveforms in the currently selected pattern.

Use Acquired Pattern: Prints the EEG waveforms in the pattern in which they were acquired.

Printer Setting:

Select the printer, orientation, and paper type, etc. by opening the Printer Setup dialog box. Refer to your printer's instruction manual.

Print Option:

Select what to print.

2. Select the waveforms to print.

- To print the selected part of the EEG waveforms, click the Selected Range option. To select a part of waveforms, refer to "Selecting and deleting Parts of the Waveforms".
- To print the currently displayed EEG waveforms, click the Current Page option.

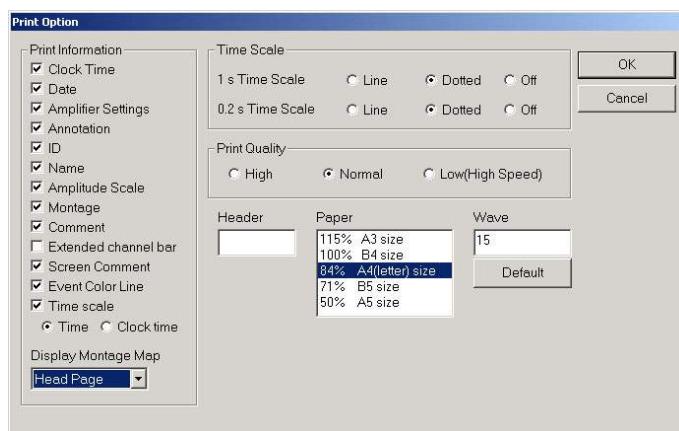
6. REVIEW PROGRAM

- To print the EEG waveforms by specifying the epoch:
 - 1) Click the Epoch option in the Print Range area.
 - 2) Type the beginning epoch in the from box and the ending epoch in the to box.
- 3. Click the desired printing item in the Print Item group.
- 4. Click the desired options in the Print Speed and/or Wave Print Mode area when Epoch option in Print Range is selected.
- 5. Click the OK button to start printing

To cancel printing, click the Cancel button.

Selecting the Information for Waveform Printing

1. Click the Print Option button on the Print dialog box. The Print Option dialog box opens.



About the Print Option dialog box

Print Information:

Select the information to be printed with the EEG waveform data.

Clock Time: Time of the waveform acquisition

Date: Date of the waveform acquisition

Amplifier Settings: Amplifier settings (Sens, TC and HF) set to ACC.

Annotation:

ID: Patient's ID

Name: Patient's name

Amplitude Scale: Amplitude scale and reduced scale

Montage:

Comment: Comment beside each channel

Extended channel bar:

Screen comment: Screen comment for each page

Event color line: Vertical color line for the specified event

Time scale:

Display Montage Map:

Time Scale:

Select the time scale interval printing.

1 s Time Scale: Prints a solid, dotted line every second or off.

0.2 s Time Scale: Prints a solid, dotted line every 200 ms or off.

Header:

The words entered in the text box are printed on every page.

Paper:

Select the paper size.

Selection list 115% A3 size, 100% B4 size (equal to the screen size), 84%

A4 letter, 71% B5 size, 50% A5 size

When using A3 paper, select “100% B4 size”.

Wave:

Type the thickness of the trace. The default setting is 15.

2. Select the Time Scale and Print Information options. Type the page header, if necessary.
3. Click the OK button to close the dialog box.

Saving the EEG Waveforms

There are two ways to save files.

- Saves the changed data in the currently selected file (overwrite)
- Saves all or part of the file in a new file (export)

Saving the Changed Data in the Currently Selected File

This procedure overwrites the original data with the changed data.

NOTE

The patient's ID and name must be entered in order to save the changed data.

1. From the File menu, select Save. The confirmation message appears.



2. Click the Yes button.

To cancel saving, click the Cancel button.

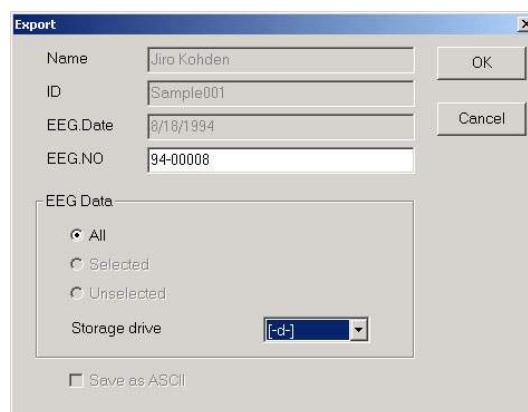
Saving All or Part of the File as a New File

This procedure creates a new file and saves the selected data in it.

NOTE

- When saving several parts of waveforms, the selected parts must not overlap each other.
- When saving a file as an ASCII file, select parts of waveforms that are less than 5 minutes. 500 Hz sampling time, 20 channels, 5 minutes of waveforms uses 25 MB file space. If the file is 25 MB or more, another application may be unable to open the file.

1. Select part of the file. Refer to “Selecting Parts of the Waveform” in this section.
2. From the file menu, select Export. The Export dialog box opens.



Export dialog box options

Name, ID, EEG.Date, EEG. No:

Name, ID, Date and EEG No. of the file are displayed.

EEG Data:

Select the EEG data that you want to save.

- | | |
|-------------|---|
| All: | Saves the currently selected EEG file as a new file. |
| Selected: | Saves the currently selected part of the EEG waveforms as a new file. |
| Unselected: | Saves the unselected part of the EEG waveforms as a new file. |

Storage Drive:

Select the drive in which to save the waveforms and measurement data.

Save as ASCII:

Saves the selected EEG file as an ASCII file.

3. Select options. Name, ID and EEG.Date cannot be changed.
4. Click the OK button to start saving.

To cancel saving, click the Cancel button.

ASCII File Format and File**Name****ASCII File Format**

First line

Time Points: Number of data for each channel

Channels: Number of channels

Begin Sweep [ms]: Delay time from 0 point, (always 0)

Sampling Interval [ms]: Sampling interval

Bins/ μ V: Value corresponds to 1 μ V (always 1)

Second line (Montage)

When “org” or “0V” is set to the G2 electrode, only the electrode name is saved.

Example

Montage: Fp1-A1, Fp2-A2, F3-A1, F4-A2
C3-A1, C4-A2, P3-A1, P4-A2

Electrode name: Fp1, Fp2, F3, F4, C3, C4, P3, P4

After third line

Amplitude for all channels in every time point (μ V)**ASCII File Name**

A file is named based on the EEG data file name with extension “.m**”. When selecting parts of waveforms and saving them as ASCII files, a different ASCII file is created for each part. The extension changes according to the number of files that are created at the same time.

File name example: MA001001 or MC001001 (Default setting)

1st digit: Type of the EEG instrument (Fixed tag)

2nd digit: Language data (Country, A: English, C: Chinese)

3rd to 5th digits: Instrument serial number

6th to 9th digits: Total number of created EEG data files (File Number)

For details about the EEG data file name, refer to “Writing Down the File and MO Data Before PC Unit or Hard Disk Replacement” in Section 7 of the Service manual.

When 5 ASCII files are created from the EEG data file “MA001001”, the following files are created.

1st part: MA001001.m00

2nd part: MA001001.m01

3rd part: MA001001.m02

4th part: MA001001.m03

5th part: MA001001.m04

Before saving the file, you can change the file name.

Section 7 Database Manager Program

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General

This program manages EEG-9100/9200 database files. You can save the patient information as a database file. Each file contains patient name, exam date, exam number, Refer dept. (Referring department), disk volume No. and other patient information.

When the Acquisition program is closed, the data listed above are automatically saved in the database file.

The Database Manager program has the following functions.

- Searching and sorting patient information
- Saving an entire database or selected records in a file
- Loading a database from a folder or drive to append to the system database or network database
- Appending all or selected records to the system database or network database
- Deleting individual records from a database
- Printing the patient information
- Editing the patient information

When the file is saved in the disk, it is saved with a “.mdb” or “.MDB” extension. If the extension is not specified, “.mdb” is automatically assigned.

To use the database to view patient information files, call up the desired information from the database to the patient file list, using the “Selecting Records in the Database” procedure.

When saving or deleting the record, it is convenient to select a patient information in advance by using this function.

Only the database in the hard disk of the instrument (System database) is active. To do anything with individual files, the database must be loaded into the hard disk (drive C).

To append files to a database, refer to “Appending Records to the System Database or Network Database”.

CAUTION

Backup the database every week to prevent loss of data. If the hard disk drive is damaged you may lose important patient database data.

Refer to “Saving the Current Database in Another Folder or Drive” in this section.

NOTE

You can review the EEG data file which was acquired and saved in an EEG-2110, EEG-1100, EEG-9100/9200 Electroencephalograph or digital EEG system (PC with the QP-223A/AK or QP-111AJ/AK Acquisition Program Kit). However the file information is not added to the system database in this instrument. To add the file information to the system database, refer to “Adding Files to the System Database” in Section 8.

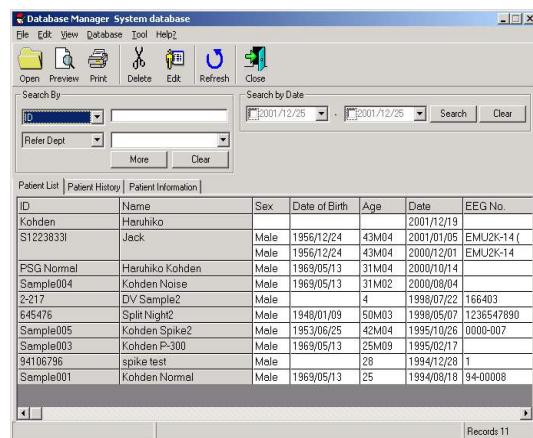
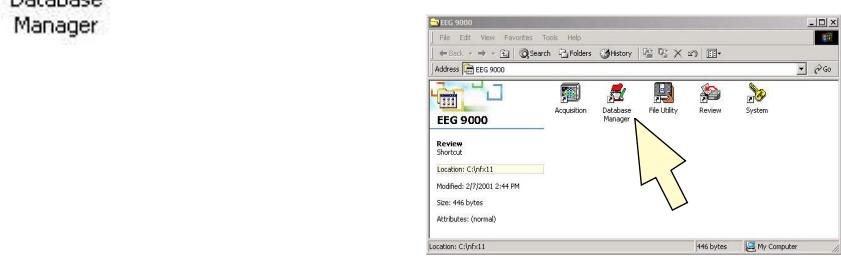
Opening the Database Manager Program

NOTE

Turn off any screen saver and close all application program before opening the Database manager program. Otherwise, the Database manager program may not function properly.



From the EEG 9000 window, double-click the Database Manager button. The Database manager dialog box opens.



CAUTION

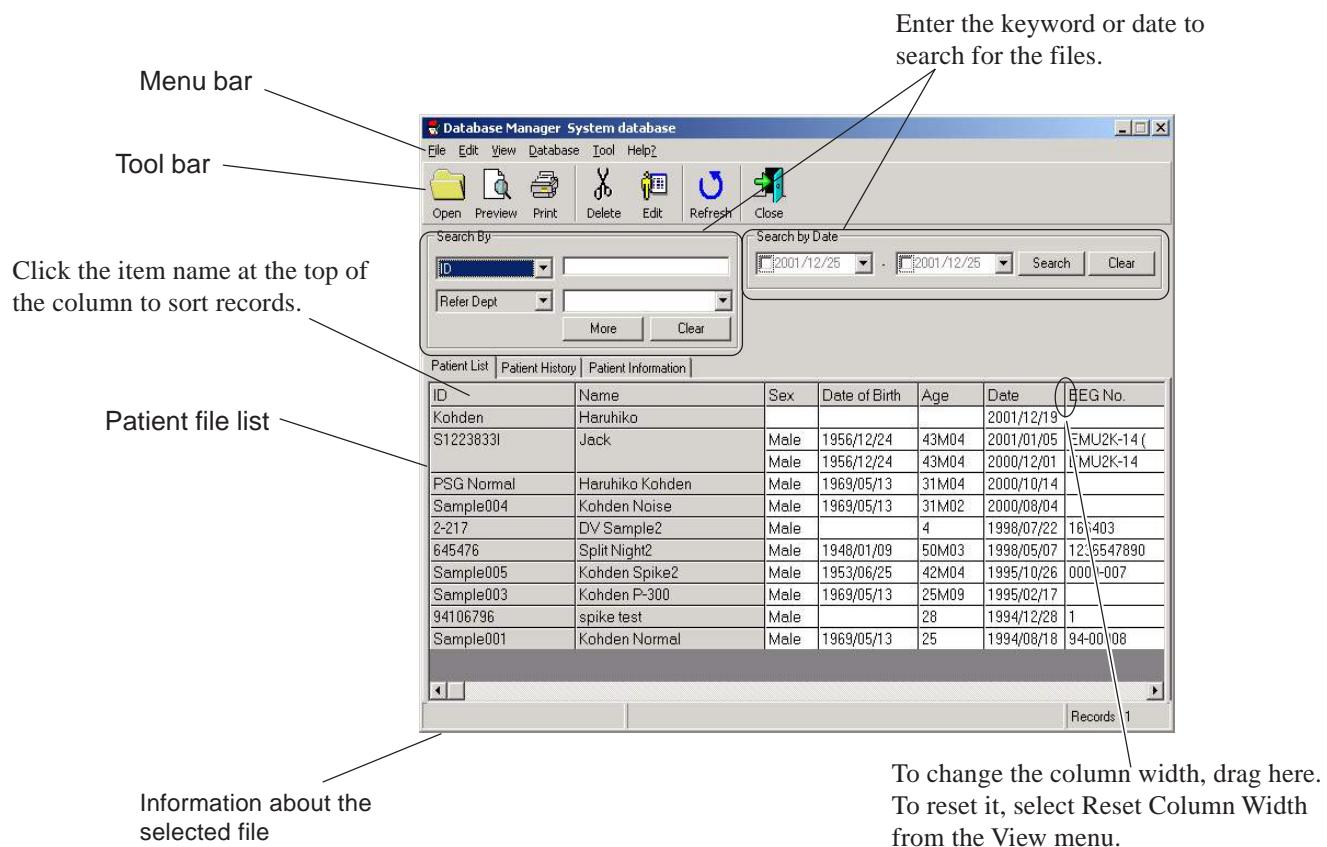
Do not remove the magneto-optical disk, CD-R disk or CD-RW disk until the disk drive access lamp is off. Otherwise, the disk or disk drive may be damaged.



To close the Database manager program, click the Close button or select Close from the File menu.

Explanation of Each Function

About the Database Manager Dialog Box



Menu Bar

File Menu

You can manage the database.



Load

Opens the Load dialog box to load a database in another drive or folder as a user database. You can also open the Load dialog box by clicking the Open button on the tool bar. The patient information in the user database are displayed in the patient list. You can review, change, add or delete the patient information in the user database. This operation does not append the user database to the system database or network database. To append the records, refer to “Appending Records to the System Database or Network Database”. CSV format files cannot be opened with the Load dialog box.

Save

Opens the Save As dialog box to save the selected files as a database in another disk or drive. You can save the records as either EEG-1100 database format (the standard format for the EEG-9100/9200 Electroencephalograph) or text (CSV) format.

Append

Appends the selected records in the user database to the system database or the network database.

Print Preview

Displays the list of patient information on the Print Preview window before printing. You can also display the list of patient information by clicking the Preview button on the tool bar.

Print

Prints the list of patient information. You can also print the list of patient information by clicking the Print button on the tool bar.

Close

Closes the Database manager program. You can also close the Database manager program by clicking the Close button on the tool bar.

Edit Menu



Delete

Deletes the record from the database. You can also delete the database by clicking the Delete button.

Edit Patient Information

Displays the Patient Information to edit the patient information in the database. You can also display the Patient Information page by clicking the Edit button. Changing the patient information in the database does not change the patient information in the EEG data file.

Select All

Selects all records displayed in the patient file list.

Invert Selection

Changes the selected records to unselected and the unselected records to selected.

View Menu



View All Information

Use to display all records in the currently selected database in the patient file list after searching for files.

View by ID

When records have the same ID and Name, this merges the duplicate ID and Name cells for easier viewing.

Reset Column Width

Resets the column width to the default setting.

Refresh

Refreshes the patient file list. You can also refresh the file list by clicking the Refresh button on the tool menu.

7. DATABASE MANAGER PROGRAM

Database Menu



User Database

Displays the patient information in a database which is selected (loaded) in the Load dialog box.

System Database

Displays the EEG data files in the system database saved in the instrument in the patient file list.

Network Database

Displays the EEG data files in a database saved in a network in the patient file list.

Tool Menu



List Set

Opens the Table Items dialog box to edit the entry items (Refer Dept, Physician, Operator) for the patient information page of the Database manager dialog box. Changing the entry item in the database does not change the entry item in the EEG data file.

Help Menu

About

Displays information about the program.

Tool Bar**Open button**

Opens the Load dialog box to load a database in another drive or folder as a user database. You can also open the Load dialog box by selecting Load from the File menu. The patient information in the user database are displayed in the patient list. You can review, change, add or delete the patient information in the user database. This operation does not append the user database to the system database or network database. To append the records, refer to “Appending Records to the System Database or Network Database”.

**Preview button**

Displays the list of patient information on the Print Preview window before printing. You can also display the list of patient information by selecting Print Preview from the File menu.

**Print button**

Prints the list of patient information. You can also print the list of patient information by selecting Print from the File menu.

**Delete button**

Deletes the record from the database. You can also delete the record by selecting Delete from the Edit menu.

**Edit button**

Displays the Patient Information to edit the patient information. You can also edit the selected patient information by selecting Edit Patient Information from the Edit menu. Changing the patient information in the database does not change the patient information in the EEG data file.

**Refresh button**

Refresh the patient file list. You can also refresh the file list by selecting Refresh button from the View menu.

**Close button**

Closes the Database manager program. You can also close the Database manager program by selecting Close from the File menu.

Selecting Records in the Database

Before saving, deleting or appending EEG data files to a database, select the record in the patient file list. You can easily find files by sorting or searching for the files.

To select one record:

Click the record.

To select consecutive records:

- 1) Click the first record.
 - 2) Press and hold the Shift key while you click the last record.
- Or, drag the cursors to select the record.

To select two or more records of sequence:

Press and hold the Ctrl key while you click each record.

The selected records are highlighted.

Sorting Files

To sort the files, click the item name at the top of the column. By clicking the column the files are displayed in ascending or descending order.

Click the item name at the top of the column to sort records.

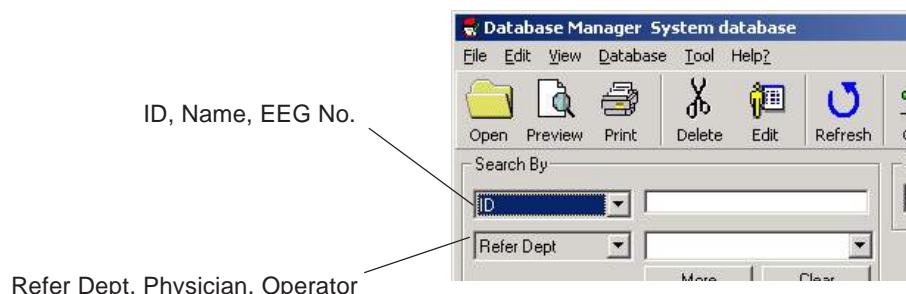
ID	Name	Sex	Date of Birth	Age	Date	EEG No.
Kohden	Haruhiko				2001/12/19	
S1223833I	Jack	Male	1956/12/24	43M04	2001/01/05	EMU2K-14 (
		Male	1956/12/24	43M04	2000/12/01	EMU2K-14
PSG Normal	Haruhiko Kohden	Male	1969/05/13	31M04	2000/10/14	
Sample004	Kohden Noise	Male	1969/05/13	31M02	2000/06/04	
2-217	DV Sample2	Male		4	1998/07/22	166403
645476	Split Night2	Male	1948/01/09	50M03	1998/05/07	1236547890
Sample005	Kohden Spike2	Male	1953/06/25	42M04	1995/10/26	0000-007
Sample003	Kohden P-300	Male	1969/05/13	25M09	1995/02/17	
94106796	spike test	Male		28	1994/12/28	1
Sample001	Kohden Normal	Male	1969/05/13	25	1994/08/18	94-00008

Searching for a File

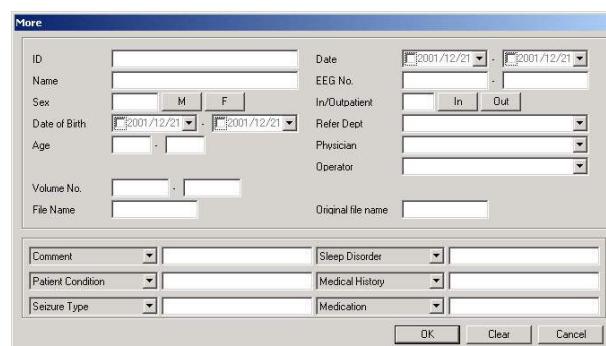
You can search for a file by a keyword and/or date. If one or more keywords/dates are entered, the program searches for all files which satisfy all of the entered keywords/dates. Searching starts when the keyword is entered.

Searching for a File by a Keyword

1. Select one or two items in the Search By box arrows.



You can select other keywords by opening the More dialog box. To open the dialog box, click the More button.



- To start searching, click the OK button.
- To clear the entered keyword, click the Clear button.
- To close the dialog box, click the Cancel button

Use of “*”:

- *123: Searches for characters which end with “123”.
- *123*: Searches for characters which include “123”.
- 12*3: Searches for characters which start with “12” and end with “3”.

2. Type the keyword for ID, Name and/or EEG No. Searching automatically starts.

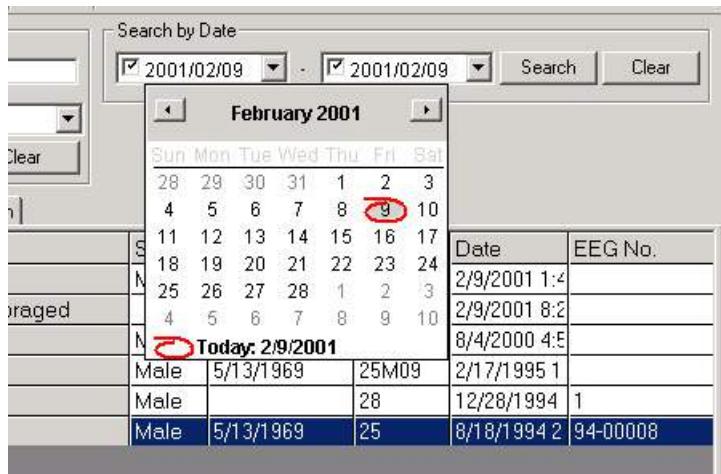
For Refer Dept, Physician and Operator, you can use the box arrow to enter the keyword.



- To refresh the patient file list, click the Refresh button on the tool bar.
- To display all files in the selected database, select View All Information from the View menu.

Searching for a File by the Examination Date

1. Click the Search by date box arrow. The calender appears.



2. Click the examination date.

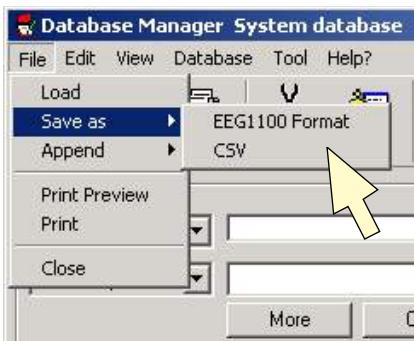
- To search for the files between two dates, select the beginning date with the left box and the ending date with the right box.
- To select the year, click the year on the top of the calender (The up/down arrow appears).
- To select the month, click the left/right arrow or month on the top of the calender

3. Click the Search button.

- To clear the entered date, click the Clear button.
- To refresh the patient file list, click the Refresh button on the tool bar.
- To display all files in the selected database, select View All Information from the View menu.

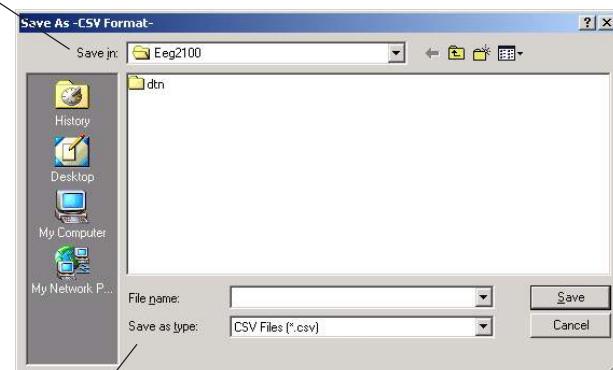
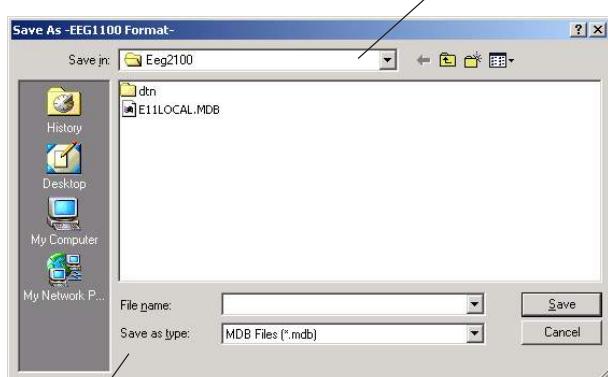
Saving the Current Database in Another Folder or Drive

You can save the records in another folder or drive in either EEG-1100 format (the standard format for the EEG-9100/9200 Electroencephalograph) or CSV format (text separated with commas). This is useful to back up the current database or to create a new database from part of an existing database. When saving the database in a CD-R/CD-RW disk, first save the database in the hard disk, then copy the database to the CD-R/CD-RW disk.



1. Select the records in the patient file list box. To easily find the records, use the sort or search function. Refer to “Sorting Files” and “Searching for a File”.
2. Do one of the following
 - To save the records as the EEG-1100 format, select Save as → EEG1100 Format from the File menu to open the Save As - EEG1100 Format- dialog box.
 - To save the records as the CSV format, select Save as → CSV from the File menu to open the Save As - CSV Format- dialog box.

A: Floppy disk
 C: Hard disk
 D: MO disk



Save AS - EEG1100 Format - dialog box

Save AS - CSV Format - dialog box

mdb or MDB

csv or CSV

3. Select the folder or drive from the Save in list box by clicking the Save in list box arrow. If the database files that you want to save are saved in an MO disk, insert the disk into the MO disk drive.
4. Type a file name in the File name text box.

7. DATABASE MANAGER PROGRAM

5. Click the Save button. The Confirmation - Save As dialog box opens.



Confirmation - Save As dialog box example: EEG1100 format

6. Select the option.

All: Saves all records in the system database.

Listed: Saves the records that are currently listed in the patient file list.

Selected: Saves only the records that are selected (highlighted) in the patient file list.

7. Click the OK button. The selected files are saved in the selected database file.

To cancel saving, click the Cancel button.

Displaying the Patient Information in Another Database

You can display the patient information saved in another database to review, change, add or delete the patient information. In this procedure, you cannot append records to the system database or to another database in the EEG-9100/9200, EEG-1100 Electroencephalograph or digital EEG system (PC with the QP-111AJ/AK Acquisition Program Kit).

To append records to another database, refer to “Appending Records to the System Database or Network Database”.

When a database was saved with an EEG-1100 digital EEG with system software version 03-01 or earlier, the database cannot be read. Convert the database with the conversion utility. Refer to “Converting the Database”



1. Click the Open button on the tool bar, or select Load from the File menu. The Load dialog box opens.



2. Select the folder or drive from the Look in list box by clicking the Look in list box arrow. The database files in the selected folder or drive are displayed in the file list. If the database file that you want to review is saved in a CD-R/RW disk or MO disk, insert the disk into the CD-R/RW or MO disk drive.
3. Click the file name. The selected file name is displayed in the File name text box.
4. Click the OK button or double-click the file name. The files in the selected database are displayed in the patient file list.
 - To cancel loading, click the Cancel button.
 - To change, add or delete the patient information, refer to “Editing the Patient Information”.

Converting the Database File

NOTE

A converted database file cannot be read by an the EEG-1100 Electroencephalograph with software version 03-01 or earlier because the conversion adds a new field “Original file name”.

1. Click the Start button on the taskbar. The start menu opens.



2. Select Run. The Run dialog box opens.
3. Type the following line in the Open text box.

C:\nfx11\convertdb



4. Click the OK button. The Open dialog box opens.



5. Select the database file.
6. Click the OK button.

Appending Records to the System Database or Network Database

You can append the records saved in another folder or drive to the system database or database in the EEG-9100/9200, EEG-1100 Electroencephalograph or digital EEG system (PC with the QP-111AJ/AK Acquisition Program Kit) on a network.

1. Display the files in another data base in the patient file list. Refer to “Displaying the Patient Information in Another Database”.

2. Select the records. Refer to “Selecting Records in the Database”. The selected records are highlighted.

3. Do one of the following.

- To append the records to the system database, select Append → System database from the File menu.
- To append the records to the database in the EEG-1100 instrument on a network, select Append → Network database from the File menu.

The Save As dialog box opens.



4. Select an option.

All: Appends all records in the patient file list.

Listed: Appends the records that are currently listed in the patient file list.

Selected: Appends only the records that are selected (highlighted) in the patient file list.

5. Click the OK button.

To cancel saving, click the Cancel button.

Deleting Records from the Database

You can delete records from the database.

1. Display the files in the patient file list.
2. Select the records. Refer to “Selecting Records in the Database”. The selected records are highlighted.
3. Click the Delete button on the tool bar or select Delete from the Edit menu. The Message dialog box opens. The file information of the selected record is displayed in the dialog box.



4. Click any of the following button.

- All Overwrite: Deletes all selected records from the database.
- Yes: Deletes the currently selected record. Deletion is performed one by one.
- No: Does not delete the currently selected record. The file information of the next record is displayed in the dialog box.
- Cancel: Cancel deletion.

Editing the Patient Information

You can change, add or delete patient information in the database. This does not change the patient information in the EEG data file.

1. Display the files in the patient file list.
2. Select the records. Refer to “Selecting Records in the Database”. The selected records are highlighted.
3. Click the Edit button on the tool bar, click the Patient Information tab or select Edit Patient Information from the Edit menu. The confirmation message dialog box opens.
4. Click the Yes button. The Patient Information page 1 is displayed.



[Click here to see page 2.](#)



5. Edit the patient information.
To change or add the entry items for Refer Dept, Physician and Operator, use the Table Items dialog box. To open the Table Items dialog box, select List Set from the Tool menu.
6. Click the Patient List tab. The confirmation dialog box opens.
7. Click the Yes button.

To cancel your changes, click the No button.

Printing the Patient Information in the Database

You can preview the list of patient information in the database.

Previewing the List of Patient Information

1. Display the files in the patient file list.
2. Select the records. Refer to “Selecting Records in the Database”. The selected records are highlighted.
3. Click the Preview button on the tool bar or select Print Preview from the File menu. The Print Preview dialog box opens.



4. Select the option.

All: Previews all records from the database.

Listed: Previews the records that are currently listed in the patient file list from the database.

Selected: Previews only the records that are selected (highlighted) in the patient file list from the database.

To close the Print Preview dialog box, click the Cancel button.

5. Click the OK button. The Preview window opens.

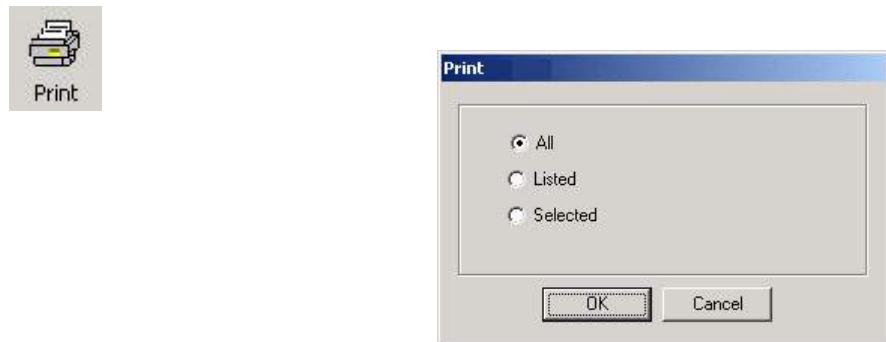
Database Manager -Preview-										
<u>Database Manager System database</u>										
ID	Name	Sex	Birth	Age	Date	In/Out	Refer Dept.	Physician	Operator	Volume No.
Sample00001	Taro Kohden	Male			2/9/2001 1:41:					HD
QP-270A Samp	Px.Cx.Px Not Storage				2/9/2001 8:27:					HD
Sample004	Kohden Noise	Male	5/13/1969	31M02	8/4/2000 4:38:	In	0EDP 0% E			HD
Sample003	Kohden D-300	Male	5/13/1969	25M09	2/17/1995 11:3	In	Neurosurgery			HD
Sample002	Kohden Spike	Male		28	12/28/1994 5:4	Out		Dr.Okada	Dr.Okada	HD
Sample001	Otro Kohden	Male	5/13/1969	25	8/18/1994 2:03	Out		Dr.Koseki	Matsumoto	HD

6. Click the Close button to close the Preview window.

Printing the List of Patient Information

You can preview the list of patient information in the database.

1. Display the files in the patient file list.
2. Select the records. Refer to “Selecting Records in the Database”. The selected records are highlighted.
3. Click the Print button on the tool bar or select Print from the File menu. The Print dialog box opens.



4. Select a option.

All: Prints all records from the database.

Listed: Prints the records that are currently listed in the patient file list from the database.

Selected: Prints only the records that are selected (highlighted) in the patient file list from the database.

To cancel printing, click the Cancel button.

5. Click the OK button. The Print dialog box opens.
6. Select the options and click the Print button.

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Section 8 File Utility Program

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General

The File Utility Program lets you move or copy EEG data files from one drive to another drive, delete EEG data files from a drive, or register file information to a database.

- When using a magneto-optical disk for the first time, you must format it and assign a volume number. You can do this with the File Utility program. Refer to “Formatting a Magnet-optical Disk, CD-R Disk and CD-RW Disk” in Section 3.
- When using a CD-R disk or CD-RW disk for the first time, you must format it with the provided CD-R/CD-RW writing software. You can assign the volume number with the File Utility program. This operation is only available for the EEG-9200A/J/K/G Electroencephalograph. Refer to “Formatting a Magneto-optical Disk, CD-R Disk and CD-RW Disk” in Section 3.

NOTE

- **When saving EEG data files in a CD-R or CD-RW disk, select a writing speed compatible with the CD-R or CD-RW disk.**
- **After the EEG data file is saved in the CD-R or CD-RW disk, check that the saved EEG data file can be reviewed before removing the original EEG data file from the hard disk.**
- **Make a backup CD-R or CD-RW disk of any CD-R or CD-RW disk which contains important EEG data files.**
- **EEG data files which are copied with Windows Explorer are not added to the system database.**

The following operations can be performed in this program.

- Moving EEG data files to another drive
- Copying EEG data files to another folder or drive
The EEG data files can be added to the system database.
- Deleting EEG data files from a drive
- Adding EEG data files to the system database or network database
- Formatting a magneto-optical disk
- Assigning a volume number to a magneto-optical disk
- Copying LIF (long term EEG monitoring information file) files to another folder or drive
- Combining an EEG data file to another EEG data file

Initial Setting

Each drive is initially set as follows.

Drive A: 3.5 inch floppy disk drive

Drive C: Built-in hard disk drive

Drive D: Magneto-optical disk drive (Option)

Drive E: CD-ROM drive (EEG-9100)/CD-RW drive (EEG-9200)

The drive letter changes according to the installed storage device.

Opening the File Utility Program

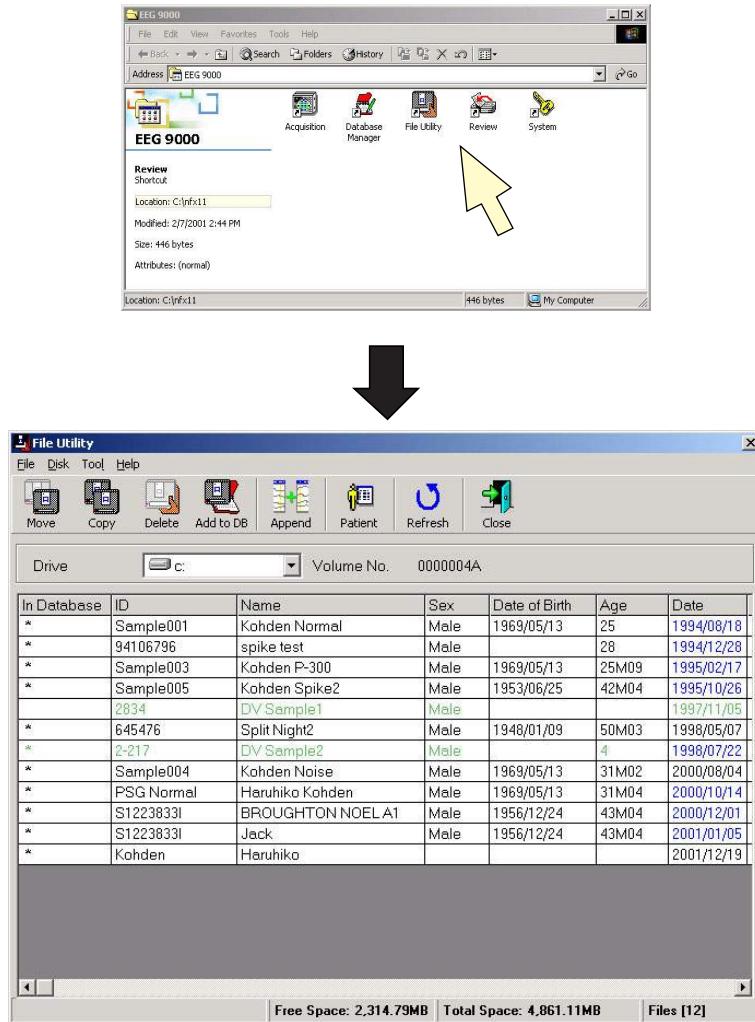
NOTE

Turn off any screen saver and close all application programs before opening the File Utility program. Otherwise, the File Utility program may not function properly.



File Utility

From the EEG 9000 window, double-click the File Utility icon. The File Utility dialog box opens.



CAUTION

Do not remove the magneto-optical disk, CD-R disk, CD-RW disk until the disk drive access lamp is off. Otherwise, the disk or disk drive may be damaged.

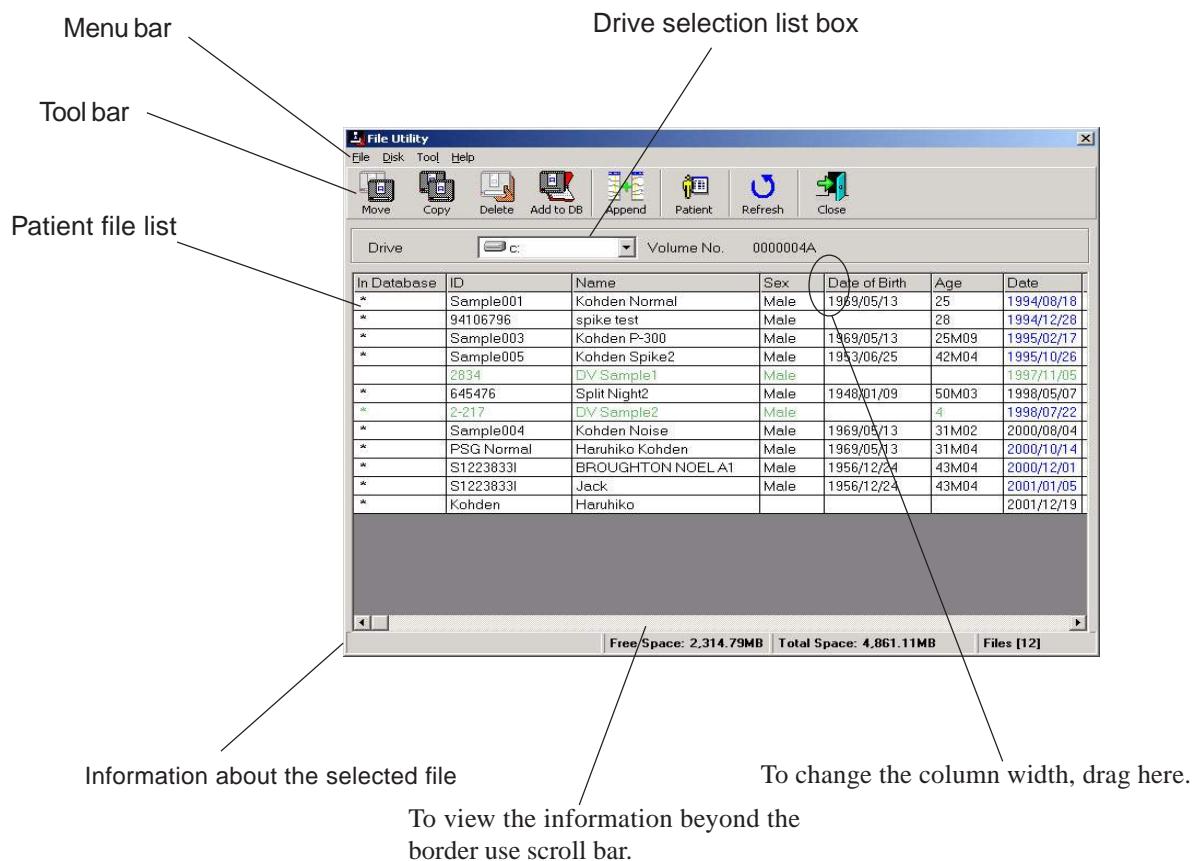


Close

To close the File Utility program, click the Close button or select Close from the File menu.

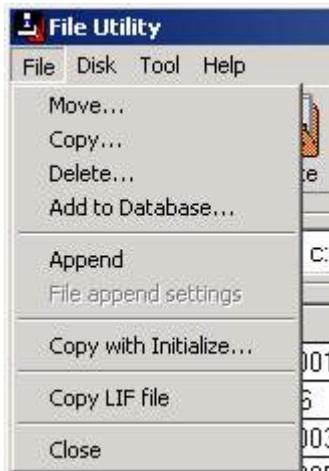
Explanation of Each Function

About the File Utility Dialog Box



Menu Bar

File Menu



Move

Opens the Move dialog box to move EEG data files from a disk to another folder or drive. You can also move the EEG data files by clicking the Move button on the tool bar.

Copy

Opens the Copy dialog box to copy EEG data files from a disk to another folder or drive. You can also copy the EEG data files by clicking the Copy button on the tool bar.

Delete

Deletes EEG data files from a folder or drive. You can also delete EEG data files by clicking the Delete button on the tool bar.

Add to Database

Adds EEG data files to the system database or network database. You can also add EEG data files by clicking the Add to Database button on the tool bar.

Append

Opens the file append area on the File Utility dialog box to add two EEG data files for a patient. You can also open the file append area by clicking the Append button on the tool bar.

File append settings

Opens the File append settings dialog box to select the settings to append the files when the Append command is selected.

Copy with Initialize

Opens the Copy with Initialize dialog box to assign a disk volume number to a disk or folder and copy the EEG data file to the disk or folder.

Copy LIF file

When copying the long term EEG waveform data (saved as different EEG data files for each stage) to another folder or drive, use this command to copy the LIF file (long term monitoring information file) to same drive or folder.

Close

Closes the File Utility program. You can also close the File Utility program by clicking the Close button on the tool bar.

Disk Menu



Format

Formats the magneto-optical disk. Refer to “Formatting a Magneto-optical Disk” in Section 3.

NOTE

- Format a magneto-optical disk only by this format command. This command is not available to format a CD-R disk and CD-RW disk.
- When the MO disk has double sides (5 inch MO disk), format both sides of the disk individually. Assign a disk volume number after formatting.

Initialize

You can assign a disk volume number to each side of the disk in order to manage the disks in the EEG-9000 program. The volume number is used by the EEG-9000 program.

NOTE

Assign the disk volume number for each side, then write down the disk volume number on the label sheet and stick it on each side.

Tool Menu



Patient Info

Opens the Patient Information dialog box. You can also open the Patient Information dialog box by clicking the Patient button on the tool bar.

Refresh

Refresh the patient file list. You can also refresh the file list by clicking the Refresh button on the tool bar.

Help Menu

About

Displays information about the program.

Tool Bar**Move button**

Open the Move dialog box to move EEG data files from one disk to another folder or drive. You can also move the EEG data files by selecting Move from the File menu.

**Copy button**

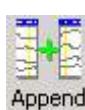
Opens the Copy dialog box to copy EEG data files from one disk to another folder or drive. You can also copy the EEG data files by selecting Copy from the File menu.

**Delete button**

Deletes EEG data files from a folder or drive. You can also delete the EEG data files by selecting Delete from the File menu.

**Add to Database button**

Adds the EEG data file to the system database or network database. You can also add the EEG data files by selecting Add to Database from the File menu.

**Append button**

Opens the file append area on the File Utility dialog box to add two EEG data files for a patient. You can also open the file append area by selecting Append from the File menu.

**Patient button**

Opens the Patient Information dialog box. You can also open the Patient Information dialog box by selecting Patient Info from the Tool menu.

**Refresh button**

Refreshes the patient file list. You can also refresh the patient file list by selecting Refresh from the Tool menu.

**Close button**

Closes the File Utility program. You can also close the File Utility program by selecting Close from the File menu.

Selecting Files in the Patient File List

Before moving, copying, deleting or adding EEG data files to a database, select the EEG data files in the patient file list. You can easily find files by sorting them.

To select one file:

Click the record.

To select consecutive files:

1) Click the first file.

2) Press and hold the Shift key while you click the last file.

Or, drag the cursors to select the file.

To select two or more non-consecutive file:

Press and hold the Ctrl key while you click each file.

The selected files are highlighted.

Sorting Files

To sort the files, click the item name at the top of the column. By clicking the column, the files are displayed in ascending or descending order.

Click the item name at the top of the column to sort records.



In Database	ID	Name	Sex	Date of Birth	Age	Date
*	Sample001	Kohden Normal	Male	1969/05/13	25	1994/08/18
*	94106796	spike test	Male		28	1994/12/28
*	Sample003	Kohden P-300	Male	1969/05/13	25M09	1995/02/17
*	Sample005	Kohden Spike2	Male	1953/06/25	42M04	1995/10/26
2834	DV_Sample1	Male				1997/11/05
*	645476	Split Night2	Male	1948/01/09	50M03	1998/05/07
=	2-217	DV_Sample2	Male		4	1998/07/22
*	Sample004	Kohden Noise	Male	1969/05/13	31M02	2000/08/04
*	PSG Normal	Haruhiko Kohden	Male	1969/05/13	31M04	2000/10/14
*	S1223833I	BROUGHTON NOEL A1	Male	1956/12/24	43M04	2000/12/01
*	S1223833I	Jack	Male	1956/12/24	43M04	2001/01/05
*	Kohden	Haruhiko				2001/12/19

Free Space: 2,314.79MB | Total Space: 4,861.11MB | Files [12]

Moving Files

CAUTION

It is safer to copy rather than move EEG data files. If there is an error during moving, the EEG data file is lost with no backup.

NOTE

Before using a new magneto-optical disk, CD-R disk or CD-RW disk, format it and assign a volume number. Refer to “Formatting a Magneto-optical Disk, CD-R Disk and CD-RW Disk” in Section 3.



1. Click the Drive list box arrow to select the EEG data files that you want to move. The patient information for each EEG data file is displayed in the patient file list.

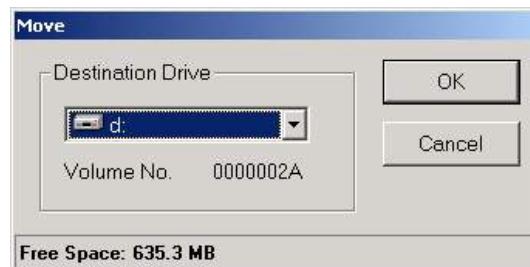
Patient file list

In Database	ID	Name	Sex	Date of Birth	Age	Date
~	Sample001	Kohden Normal	Male	1969/05/13	25	1994/08/18
*	94106796	spike test	Male		28	1994/12/28
*	Sample003	Kohden P-300	Male	1969/05/13	25M09	1995/02/17
*	Sample005	Kohden Spike2	Male	1953/06/25	42M04	1995/10/26
~	2834	DV Sample1	Male			1997/11/05
*	645476	Split Night2	Male	1948/01/09	50M03	1998/05/07
*	2-217	DV Sample2	Male		4	1998/07/22
*	Sample004	Kohden Noise	Male	1969/05/13	31M02	2000/08/04

2. In the patient file list, select the files that you want to move. Refer to “Selecting Files in the Patient File List”
3. Click the Move button on the tool bar or select Move from the File menu. The Move dialog box opens.

NOTE

When moving long term EEG waveform monitoring data (saved as different EEG data files for each stage), copy the LIF file to the same drive where the long term EEG waveform data is moved to. Otherwise, you cannot review the long term EEG waveform data continuously. Refer to “Copying Files - Copying the LIF File”.



4. Click the Drive list box arrow to select the drive that you want to move to.
- To cancel moving the files, click the Cancel button.
5. Click the OK button. The confirmation dialog box opens.
6. Click the OK button.

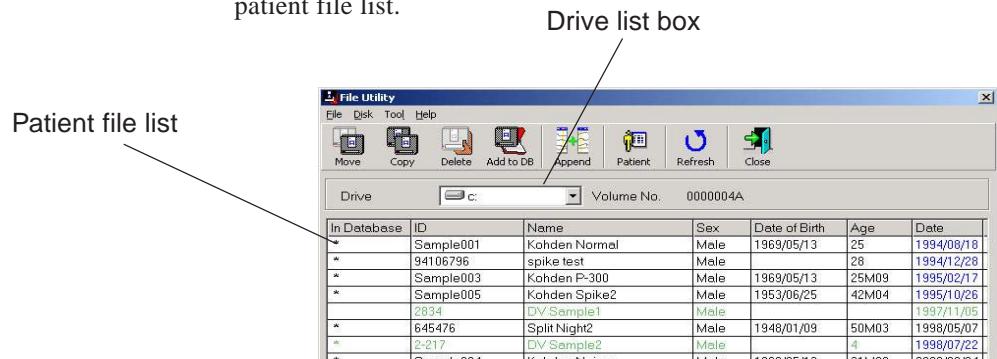
To cancel moving the files, click the Cancel button.

Copying Files

NOTE

Before using a new magneto-optical disk, CD-R disk or CD-RW disk, format it and assign a volume number. Refer to “Formatting a Magneto-optical Disk, CD-R Disk and CD-RW Disk” in Section 3.

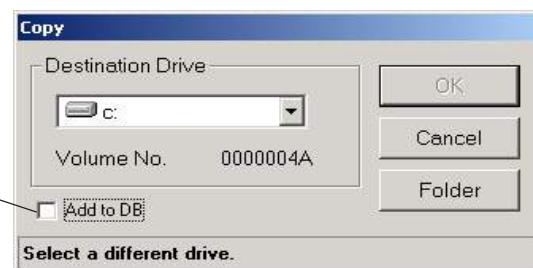
1. Click the Drive list box arrow to select the EEG data files that you want to copy. The patient information for each EEG data file is displayed in the patient file list.



2. In the patient file list, select the files that you want to copy. Refer to “Selecting Files in the Patient File List”.



3. Click the Copy button on the tool bar or select Copy from the File menu. The Copy dialog box opens.



Add to DB:

Select this box to add an EEG data file when copying it from another disk or folder.

4. Select the folder or drive that you want to copy to.

- To select the drive, click the Drive list box arrow.

When you select the drive to copy the EEG data file to, the files are copied to the subdirectory \NKT\EEG2100 in the selected drive.

- To cancel copying the files, click the Cancel button.

8. FILE UTILITY PROGRAM



- To select the folder:
 - 1) Click the Folder button. The Browse For Folder dialog box opens.
 - 2) Select the drive and folder that you want to copy to.
 - 3) Click the Save button.

To cancel copying the files, click the Cancel button.

5. Click the Save button. The confirmation dialog box opens.
6. Click the Yes button.

To cancel copying the files, click the No button.

Copying the LIF File

NOTE

- When copying the EEG data files that are measured with the long term EEG monitoring function (saved as different EEG data files for each stage), copy the LIF (long term monitoring information) file to the same folder or drive where the long term EEG waveform data is copied to. Otherwise, you cannot review the long term EEG waveform data continuously.
- The LIF file can only be copied from the instrument which acquired the long term EEG waveform monitoring data.

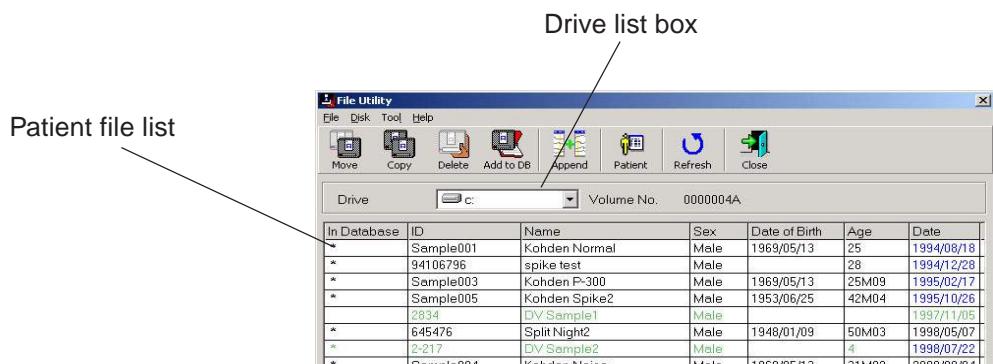
1. Click the Drive list box arrow to select the drive that you copied the long term EEG waveform data from. The patient list of the selected drive is displayed.
2. In the patient file list, select the EEG data file that is a part of the long term EEG waveform monitoring data. The selected file is highlighted.
3. Select Copy LIF file from the File menu.

Deleting Files

CAUTION

Files that are deleted in this procedure cannot be restored. Deleted files are not moved to the Windows Recycle Bin.

1. Click the Drive list box arrow to select the EEG data files that you want to delete. The patient information for each EEG data file is displayed in the patient file list.



2. In the patient file list, select the files that you want to delete. Refer to “Selecting Files in the Patient File List”
3. Click the Delete button on the tool bar or select Delete from the File menu. The confirmation dialog box opens.
4. Click the Yes button.



To cancel deleting the files, click the No button.

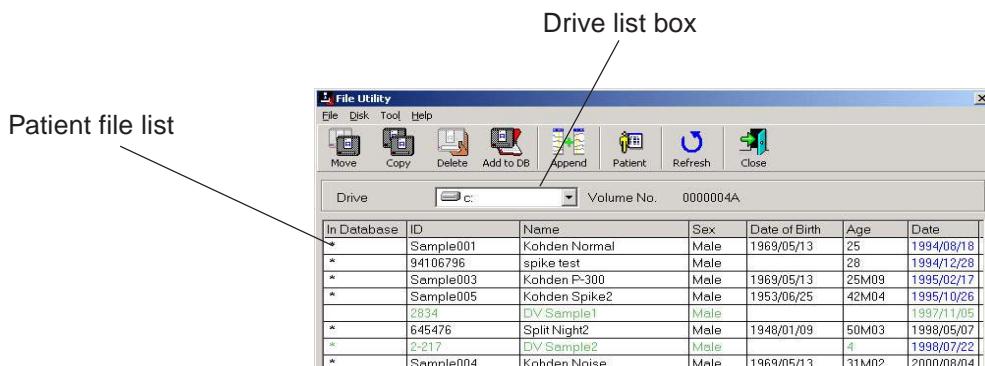
NOTE

This operation is available for the CD-R disk formatted with the Direct CD Software or compatible. When a file is deleted with this operation, the file is not visible and you can use the same file name but the file remains in the CD-R disk.

Adding Files to the System Database

The EEG data files saved in an EEG-1100, EEG-2110, EEG-9100/9200 Electroencephalograph and digital EEG system (PC with the QP-223A/AK or QP-111AJ/AK Acquisition Program Kit) can be added to the system database (in this instrument).

1. Click the Drive list box arrow to select the EEG data files that you want to add. The patient information for each EEG data file is displayed in the patient file list.



2. In the patient file list, select the files that you want to add. Refer to “Selecting Files in the Patient File List”
3. Click the Add to DB button on the tool bar or select Add to Database from the File menu.



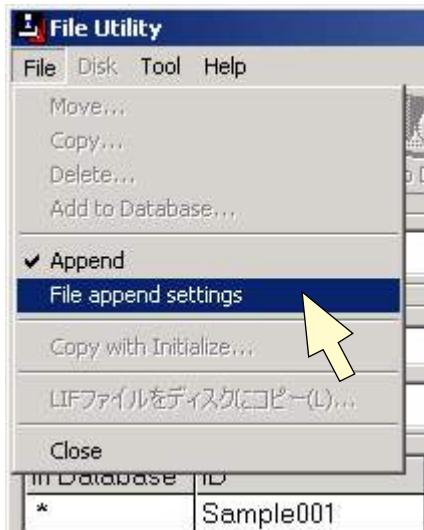
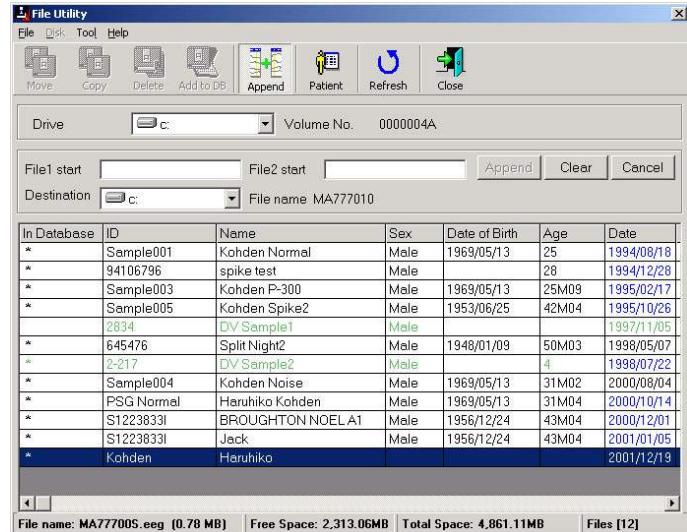
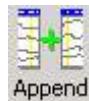
Combining EEG Data Files

During recording, if an EEG data file for a patient is accidentally saved as separate different files, you can append one EEG data file to another EEG data file for a patient.

NOTE

- Up to one file can be appended to another file for each operation.
- If total file space exceeds 2 GB, this operation cannot be performed.

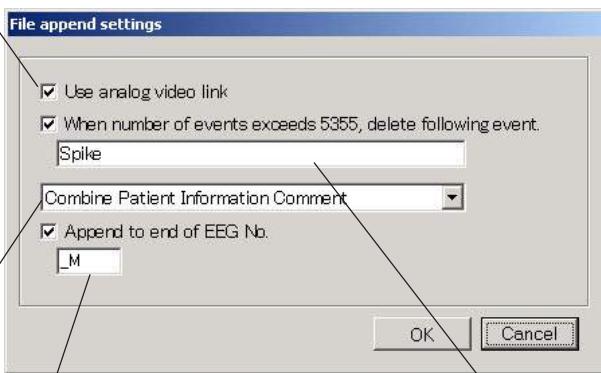
1. Click the Append button on the tool bar, or select Append from the File menu.
The file append area opens on the File Utility dialog box.



Before appending the files, you can select the following options with the File append setting dialog box. To open the File append setting dialog box, select File appending setting from the File menu.

Dialog box options

Select to use the combined file with an analog video link.



Select and type the letters to add an EEG number.

Select and type the event to delete when the number of events exceeds 5355.

Select the option for the comment in the Patient Information dialog box.

Combine Patient Information Comment:

The comments of the first file and second file are combined.

Use newer file: The comment of the second file is used

Use older file: The comment of the first file is used.

2. Click the Drive list box arrow to select the EEG data files to append.
3. In the patient file list, select the first file. The beginning of the first file is displayed in the File 1 start box.
4. Select the file to append to the first file. The beginning of the second file is displayed in the File 2 start box.

To cancel file selection, click the Clear button.

5. Click the Destination list box arrow to select the destination drive.
6. Click the Append button on the file append area.

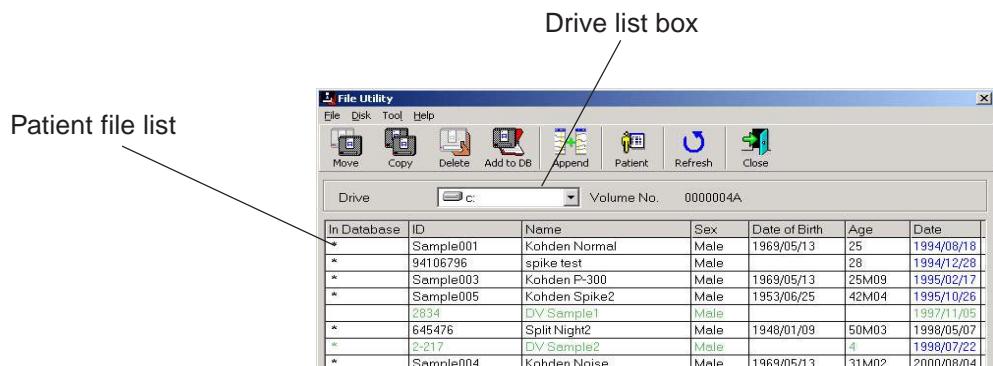
To cancel appending, click the Cancel button. The file append area closes.

7. Click the Refresh button on the tool bar to refresh the patient list. "MERGED" is displayed in the Original file column of the merged file.

Reviewing the Patient Information

You can review the patient information in the patient file list. In this procedure you cannot change, add or delete the patient information.

1. Click the Drive list box arrow to select the EEG data file that you want to check. The patient information for each EEG data file is displayed in the patient file list.

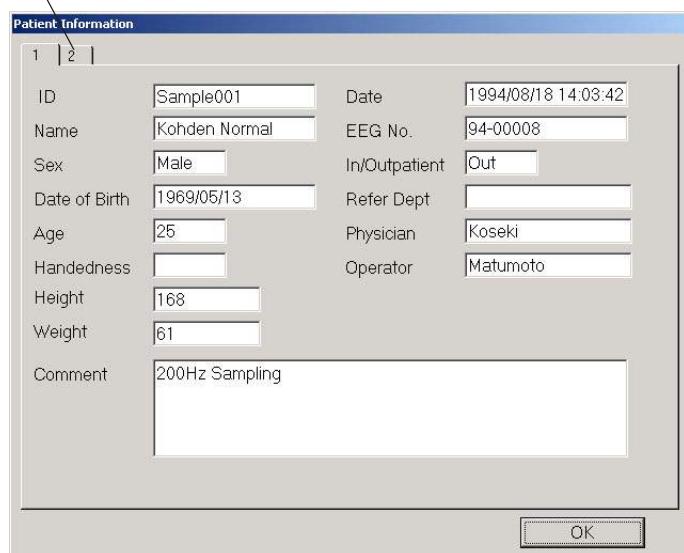


2. In the patient file list, select the file that you want to review the patient information. Refer to "Selecting Files in the Patient File List"



3. Click the Patient button on the tool bar or select Patient Info from the Tool menu. The Patient information dialog box opens.

Click here to see page 2.



To close the Patient Information dialog box, click the OK button.

Refreshing the File List



You can refresh the patient file list by clicking the Refresh button on the tool bar or selecting Refresh from the Tool menu. Use this function when replacing the MO disk.

Formatting a Magneto-optical Disk and Assigning a Volume Number

When using a magneto-optical disk for the first time, you must format it and assign a volume number. You can do this with the File Utility program. Refer to “Formatting a Magneto-optical Disk, CD-R Disk and CD-RW Disk” in Section 3.

CAUTION

When formatting the MO disk, do not change the Capacity, Format type and Other options in the Format dialog box.

Formatting a CD-R Disk and CD-RW Disk, and Assigning a Volume Number (EEG-9200 Only)

When using a CD-R disk or CD-RW disk for the first time, you must format it with the provided CD-R/CD-RW writing software. You can assign the volume number with the File Utility program. The CD-RW disk drive is provided as a standard for the EEG-9200A/J/K/G Electroencephalograph. Refer to “Formatting a Magneto-optical Disk, CD-R Disk and CD-RW Disk” in Section 3.

Section 9 Troubleshooting

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When trouble occurs, take quick action referring to the table below. If there is any damage or the instrument is suspected to be faulty, turn the power off, attach a “Unusable” or “Repair request” label to the instrument and contact your Nihon Kohden distributor or representative.

CAUTION

To turn the power off, follow the procedure in “Closing the EEG-9000 Program” in Section 3. Do not press the power button on the PC unit. If the power button is pressed while a program is running, the program, data file in the hard disk and/or MO disk may be damaged.

Instrument

Problem	Possible Cause	Action
When the power is turned on, the instrument does not operate.	The AC power adaptor is not connected to the power supply unit (EEG-9100).	Connect the AC power adaptor to the power supply unit firmly.
	The AC power cord is not connected to the isolation unit or AC outlet on the wall correctly (EEG-9200).	Connect the AC power cord correctly.
	The PC unit is not turned on.	Press the PC power switch to turn the PC unit on.
When the power is turned on, nothing is displayed on the screen	The power of the display is not turned on.	Press the power switch of the display to turn the display on.
	The brightness or contrast of the display is not appropriate.	Adjust the brightness or contrast. Refer to the Operator's manual of the display.
	The display cable is not connected to the PC unit correctly.	Connect the display cable to the video connector on the PC unit correctly.
	The input line (BNC/D-Sub) is not correct.	Select the correct input line. Refer to the Operator's manual of the display.
	Dell Optiplex GX240 SMT: The display cable from the CRT display is not connected to the video connector on the QI-111A Camera Interface Board or display cable of the A/V input cable from the Camera Interface Board is not connected to the 15 pin video connector on the PC unit.	Connect the display cable from the CRT display and the display cable of the A/V cable correctly.
When the power is turned on, Windows does not start.	A floppy disk is inserted into the floppy disk drive.	Remove the floppy disk.
The mouse or keyboard does not function.	The mouse is not connected to the PC unit.	Turn the power off, then connect the mouse cable to mouse connector on the PC unit correctly.
	The mouse is connected to the keyboard connector (ECG-9200).	
	The keyboard is not connected to the PC unit (EEG-9200).	Turn the power off, then connect the keyboard cable to keyboard connector on the PC unit correctly.
	The keyboard is connected to the mouse connector (EEG-9200).	
	The displayed window is inactive. The title bar of the window is dimmed.	Click the title bar of the window so that the window is active.
The Acquisition program does not open.	When the "The disk full. Close the current file to exit the acquisition program. Insert a new disk." message appears, the power of the photo control unit is turned off.	Use the Task Manager to close the program, then shut down Windows. Refer to "Closing the Program and Shutting Down Windows".
	Program malfunction.	
The Acquisition program does not open.	The USB cable from the electrode junction box is not connected to the PC unit.	Turn the power off, then connect the USB cable to the PC unit correctly.

Problem	Possible Cause	Action
The flash lamp does not flash.	The AC power cord is not connected to the photo control unit correctly.	Connect the AC power cord correctly.
	The flash lamp assembly cable is not connected to the photo control unit correctly.	Turn the power off and wait for several minutes, then connect the flash lamp assembly cable to the PHOTIC LAMP connector on the photo control unit correctly.
	The RS-232C cable is not connected to the photo control unit and PC unit correctly.	Turn the power off, then connect the RS-232C cable to the photo control unit and PC unit correctly.
	The power of the photo control unit is turned on after the Acquisition program opens.	1) Close the Acquisition program. 2) Turn on the photo control unit power. 3) Open the Acquisition program.
	The “Use photic stimulation” check box on the Photic Stimulation dialog box (System program) is not checked.	Check the “Use photic stimulation” check box.
	The photic stimulation mode is set to “Single”.	Select the correct photic stimulation mode.
	The flash lamp is faulty.	Replace the flash lamp.
The photic stimulation mark or HV mark does not appear.	The photo mark connection cable is not connected to the electrode junction box and the photo control unit correctly.	Turn the power off, then connect the photo mark connection cable to the electrode junction box and the photo control unit correctly.
The manual mark (MARK ON, MARK OFF) does not appear.	The mark cord is not connected to the electrode junction box.	Connect the mark cord to the electrode junction box correctly.
The EEG-9000 application program does not operate correctly.	A screen saver program is active.	Close the screen saver program.
	Another Windows application program is active.	Close all Windows application programs. Or, delete the application program if it conflicts with the EEG-9000 application program.
	The USB cable from the electrode junction box is not connected to the PC unit.	Turn the power off, then connect the USB cable to the PC unit correctly.

9. TROUBLESHOOTING

Problem	Possible Cause	Action
During waveform acquisition, the following message appears. “The disk is full. Close the current file to exit the acquisition program. Insert a new disk.”	The disk which saves the EEG data file is full.	<p>Do not turn the power off any components until the procedure to save the file is finished.</p> <p>Click the OK button on the message dialog box, then end the measurement and save the file. Refer to “Saving and Ending EEG Measurement - Ending the Measurement and Saving the File” in Section 5.</p> <p>After saving the file, prepare the new MO disk, or delete unnecessary files in the hard disk.</p>
The layout of the window is changed.	The size of the window is changed. When the size of the window is changed, the position of buttons changes.	Change the size of the window properly.
The date and time is not correct.	The date and time setting is not correct.	Set the correct date and time. Refer to the Windows online help.
	The backup battery of the PC unit is discharged.	Contact your NK distributor or representative

Closing the Program and Shutting Down Windows

1. Open the Windows Task Manager.

When the mouse does not operate:

- 1) Press the Ctrl + Alt + Del key. The Windows Security dialog box opens.
- 2) Select Task Manager to open the Windows Task Manager dialog box.

When the keyboard does not operate:

- 1) Right-click the task bar. The pop-up menu opens.
- 2) Select Task Manager to open the Windows Task Manager dialog box.

2. Select the program to close.

3. Select the End Task button.

4. Shut down Windows.

- 1) Select Shut Down from the Start menu. Or, press the Ctrl + Esc key, then press the U key. The Shut Down Windows dialog box opens.
- 2) Select “Shut Down” in the “What do you want the computer to do ?” list box.
- 3) EEG-9100:
Click the OK button. The PC unit is automatically turned off.

EEG-9200:

Click the OK button. When the “It is now safe to turn off your computer” message appears, press the power switch of the PC unit to turn off the PC unit.

Acquiring the EEG Waveforms

Problem	Possible Cause	Action
Noise or artifact is superimposed on the waveforms.	The electrode lead is faulty.	Check the continuity of the electrode lead with a multimeter. If it is faulty, replace it with a new one.
	One or more of the leads from the Z, C3 and C4 input jacks are not attached to the patient.	Attach these leads to the patient because the Z electrode and C3 and C4 electrodes are necessary for EEG measurement.
	The bed is not grounded.	When the bed is metallic, ground it.
	The instrument is not grounded.	When the AC outlet on the wall does not have a ground terminal, ground the instrument with the provided ground lead.
	The provided AC power cord is not used.	Only use the provided AC power cord to correctly ground the instrument.
	Several medical electronic instruments are used together.	Perform equipotential grounding.
	There is an AC outlet or table tap near the patient or bed.	Arrange the measurement environment so that there is no influence from an AC power line.
	The display or printer is placed near the patient or electrode junction box.	Arrange the measurement environment so that unwanted radio frequency does not affect the measurement.
	A desk lamp or fluorescent light is turned on.	Turn the desk lamp or fluorescent light off.
	The patient touched some metal part.	Prevent the patient from touching metal parts.
The waveform is not stable.	The patient is using an electric blanket.	Use another warming method or place the shield cover around the blanket.
	There is a cellular phone near the patient.	Turn the cellular phone off.
The waveform becomes sometime flat.	One or more of the leads from the Z, C3 and C4 input jacks are not attached to the patient.	Attach these leads to the patient because the Z electrode and C3 and C4 electrodes are necessary for EEG measurement.
	New and old electrodes or different types of electrodes are used together.	Do not use new and old electrodes or different types of electrodes together. This may cause high polarization voltage.
The skin-electrode contact impedance check cannot be performed.	The skin-electrode contact impedance of the C3 or C4 is high.	Clean the electrode attachment to reduce the impedance, and reattach the electrode.
Z, A1 and A2 (or Fp1 and Fp2), C3 and C4	One or more of the following electrodes used for the impedance check are not attached to the patient.	Attach these electrodes for the impedance check.

9. TROUBLESHOOTING

Problem	Possible Cause	Action
The waveform is not displayed.	The color of the waveform and background is the same.	Use a different color for waveform and background.
	The Display setting in the Pattern table is set to “Off”.	Set the Display setting to “On” for necessary channels.
The waveforms do not sweep smoothly.	Many channels are displayed.	The PC unit cannot process all running programs. Reduce the channels to display or set the FFT analysis function to off.
	The FFT analysis function is set to on.	
AC filter does not function.	The AC filter setting is not correct.	Select the correct AC filter setting (50 or 60 Hz) in the System program.
	Noise is not caused by AC line influence.	Use the proper filter according to artifact.
Noise when AV derivation	The unused electrode for AV derivation is selected in the AV Delete dialog box.	Delete unnecessary electrodes for AV derivation in the AV Delete dialog box.
The electrode name on the screen is indicated in red.	The electrode that is used for measurement is not selected for the storage electrode.	Select the electrode for the storage electrode in the Electrode to be Saved dialog box of the System program.
	The electrode is selected for the AV derivation but not selected for the storage electrode.	Select all electrodes which are selected for the AV derivation for the storage electrode.
The amplifier setting does not change with the Amp bar	The amplifier setting is not set to “ACC”.	Set the amplifier setting to “ACC” with the pattern table in the System program. You can temporarily change the amplifier setting in the Acquisition program and Review program.

MO Disk Drive

The following table explains the general troubleshooting in combination with the instrument. For details, refer to the MO disk drive Operator's manual.

Problem	Possible Cause	Action
Cannot assign the volume number to the MO disk.	The MO disk is not a type specified by Nihon Kohden.	Use only the specified MO disk type.
	The SCSI device ID number of the MO disk drive is not set to "4".	Set the SCSI device ID number to "4" and turn the instrument on again.
	The MO disk is write-protected.	Release the write-protect and try again.
	The MO disk is not formatted.	Format the MO disk and try again.
	The MO disk drive is not turned on,	Turn the MO disk drive on.
Cannot read/write a file from/to the MO disk.	The MO disk is not specified by Nihon Kohden.	Use only the specified MO disk.
	The MO disk is inserted into the MO disk drive for long time.	Clean the MO disk. Refer to the Operator's manual of the MO disk drive.
	The MO disk drive is dirty.	
	The MO disk drive is hot.	For adequate ventilation locate the MO disk drive so that the cooling vent is not covered with anything.
	The SCSI device ID number of the MO disk drive is not set to "4".	Set the SCSI device ID number to "4" and turn the instrument on again.
	The MO disk drive is not recognized by the instrument because the MO disk drive is not turned on or it was turned on after the instrument was turned on.	Check that the MO disk drive is recognized as a Removable Drive in the My Computer. If not, turn the power switch of the MO disk drive on and turn the instrument on again.
	The same SCSI device ID number is used for two or more SCSI devices.	Set a different SCSI device ID number for each SCSI device. Refer to the Operator's manual of each device.
	The terminator is not connected to the end of the SCSI device.	Connect the terminator to the end of the SCSI device. Refer to the Operator's manual of the SCSI device.
	The MO disk is write-protected.	Release the write-protect and try again.
	The MO disk is not formatted.	Format the MO disk and assign the volume number.
	The MO disk drive is not selected as the storage drive.	Select MO disk drive to the storage drive in the System Setting dialog box of the System program.
	The SCSI cable is not connected to the PC unit or MO disk drive.	Connect the SCSI cable correctly then turn the power on again.
	The SCSI card is not inserted into the PC card slot firmly.	Insert the SCSI card into the PC card slot firmly.
	The MO disk is faulty.	Use the Check Disk function to recover the MO disk.
The MO disk cannot be removed by pressing the eject switch on the MO disk drive.	The Enable library check box (Computer Management window → Optional Device Properties → General page) is checked.	Uncheck the Enable library check box. Refer to "Setting the Properties for 5 inch Magneto-optical Disk" in Section 3.

CD-RW Disk Drive (EEG-9200 Only)

The following table explains the general troubleshooting. For details, refer to PC unit Operator's manual and CD-R/CD-RW recorder software online help..

Problem	Possible Cause	Action
Cannot assign a volume number to the CD-R/CD-RW disk.	The CD-R/CD-RW disk is not formatted as a Direct CD.	Format the CD-R/CD-RW disk with the Direct CD format utility and try again. Refer to "Formatting an Magneto-optical Disk, CD-R Disk and CD-RW Disk" in Section 3.
Cannot read/write a file from/to the CD-R/CD-RW disk.	The CD-R/CD-RW disk is not formatted.	Format the CD-R/CD-RW disk with the Direct CD format utility and assign the volume number.
	The volume number is not assigned to the CD-R/CD-RW disk.	Assign the volume number to the CD-R/CD-RW disk.
	The CD-R/CD-RW disk is faulty.	Use the Scan Disk function of the Direct CD utility to recover the CD-R/CD-RW disk.
	The CD-RW drive is not recognized by the Windows 2000 operating system.	Clean the CD-R/CD-RW disk. Refer to the Operator's manual of the PC unit.
		Check that the CD-RW drive is recognized as a Compact Disk in the My Computer window. If not, the PC unit is faulty. Replace the PC unit.

Printer

The following table explains general troubleshooting used with the instrument. For details, refer to the printer Operator's manual.

Problem	Possible Cause	Action
The printer does not operate.	The printer power cord is not connected to the power supply unit.	Connect the AC power cord correctly
	The printer cable is not connected to the PC unit or printer.	Connect the printer cable correctly.
The printer does not print correctly.	The printer driver is not installed or an incorrect printer driver is installed.	Install the correct printer driver.
	An error message appears on the printer.	Refer to the Operator's manual of the printer.
	The size of the recording paper does not match the size of the printing data.	Match the size of the recording paper and printing data.

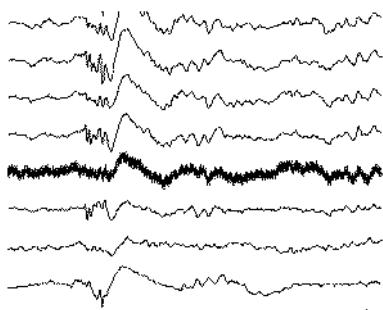
Acquiring Clear EEG Waveforms

Instrument Location

Avoid locations where the instrument may receive strong electromagnetic interference such as radio or TV stations, cellular phones or mobile two-way radios. Electromagnetic interference causes the screen image to bounce, wavy oscillations, or the trace to become thick. Also, locate the instrument as far away as possible from devices which emit high radio frequencies.

Refer to “EMC RELATED CAUTIONS” and “Instrument Location” in Section 2.

AC Interference



Constant amplitude and interval

AC Interference Superimposed on All Channels

If AC interference is superimposed over all channels on the recording, check for ground connection and other possible external causes around the patient. If it is difficult to eliminate the AC interference, press the AC Filter On/Off button on the tool bar. This function reduces a 50 or 60 Hz AC interference to 1/25 or better of the original amplitude.

AC Interference Superimposed on Specific Channels

Check for poor electrode placement or poor electrode tip connection to the jacks on the electrode junction box.

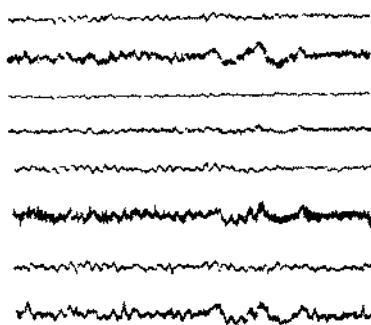
Press the IMPEDANCE CHECK key on the electrode junction box or the Impedance Check button on the tool bar on the screen to perform the skin-electrode contact impedance check to detect a faulty electrode.

Causes of AC interference

- Dirty or corroded lead wire tips or electrodes
- Loose electrode connection
- Patient or technician touching an electrode during recording
- Patient touching any metal part of a bed or examination table
- Broken lead wire or power cord
- Electrical devices in the immediate area, lighting, concealed wiring in walls or floors
- Improper equipotential grounding

9. TROUBLESHOOTING

Occasional Noise



Amplitude and interval vary.

Occasional noise may be caused by the patient's movement or by EMG artifacts due to the patient's nervous condition. Instruct the patient to relax.

Causes of EMG

- Patient is uncomfortable, tense, nervous or apprehensive
- Patient is cold and shivering
- Patient has a neuro or muscular disorder (e.g. Parkinson's Disease)
- Examination chair or bed is too narrow or short to support limbs comfortably

If EMG artifact cannot be removed depending on the examination circumstances, use the 50RP high-cut filter.

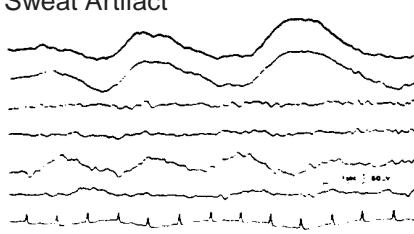
Unstable Waveform Fluctuation

Waveform fluctuation may be caused by the patient's perspiration or respiration, unstable electrode mounting, or electrode lead wire movement.

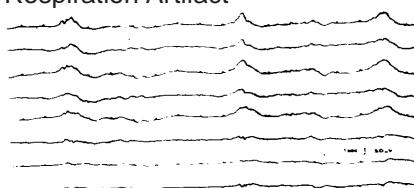
Causes:

- Patient is sweating. Examination room is too warm.
- Dirty or corroded electrodes
- New and old electrode or different types of electrodes are used together.
- Insufficient or dried out EEG paste
- The skin-electrode impedance of the C3 or C4 is high.
- Rising and falling of chest during normal or apprehensive respiration

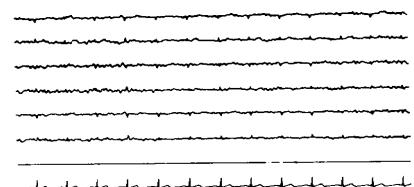
Sweat Artifact



Respiration Artifact



ECG Artifact



Synchronized with ECG

Noise appears synchronized with ECG. Change the patient position or change the reference electrode to A1 + A2 when monopolar derivation is used. If noise is not reduced, use the ECG filter.

Flash Lamp Artifact

An electrode or paste is exposed to the photic stimulation light. Cover the electrode with a black tape to avoid the flash lamp light.

Section 10 Maintenance

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System Components	10.2
Cleaning, Disinfecting and Sterilizing	10.2
Cleaning	10.2
Disinfecting and Sterilizing	10.2
Cart	10.3
Cleaning	10.3
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Cleaning	10.3
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Periodic Replacement Schedule	10.7
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Check Items After Use

After use, check the following items for the next use.

Overview:

- All external instruments power are turned off.
- Instrument is not dirty, damaged or in contact with liquid.
- Power cord is not damaged.
- No peeling or tears on the keyboard.
- No key on the keyboard is broken.
- No electrode is dirty or damaged.
- No electrode is frayed or damaged.

Accessories:

- Enough electrodes.
- Enough EEG paste.
- Enough paper for printer.
- Enough formatted magneto-optical disks.

Storage:

- Electrode leads are washed.
- The power is turned off.
- No chemical or water is near the instrument
- Acceptable storage temperature and humidity
- Recording results and magneto-optical disk are properly stored.

Cleaning, Disinfecting and Sterilizing

System Components

Cleaning

CAUTION

- Turn off the system power before doing maintenance. Otherwise you may receive an electrical shock or the system may function improperly.
 - Do not use volatile liquids such as thinner or benzine, because these will cause the materials to melt or crack.
 - The system components are not waterproof. Do not let any water get inside them.
 - After cleaning, make sure that the system components are completely dried.
 - To prevent water from entering the system component, use a slightly moist, well-wrung cloth with neutral detergent or tap water for cleaning the panel.
-

After use, clean the surface of the system components with a soft cloth moistened with neutral detergent diluted with water, and wipe with a dry cloth.

To remove any attached paste, immediately wipe the paste off the component with a wet cloth before the paste dries.

For the MO disk drive and printer, refer to the Operator's manual for each instrument.

Disinfecting and Sterilizing

CAUTION

- Do not sterilize the system components.
 - Do not disinfect and sterilize the PC unit.
 - Follow the instructions of the disinfectant's manual.
 - Wipe the system components and completely dry them after disinfecting them with spray.
 - Never use ultraviolet sterilization because this may cause the materials to deform, crack or discolor.
-

To disinfect the exterior surface of the system components, wipe them with a non-abrasive cloth moistened with any of the disinfectants listed below. Use the recommended concentration.

<u>Disinfectant</u>	<u>Concentration (%)</u>
Chlorohexidine gluconate solution	0.5
Benzethonium chloride solution	0.2
Glutaraldehyde solution	2.0
Benzalkonium chloride	0.2
Hydrochloric alkyl diaminoethylglycine	0.5

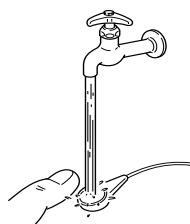
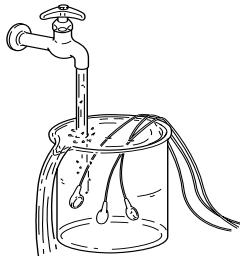
Cart**Cleaning****CAUTION**

Do not use volatile liquids such as thinner or benzine, because these will cause the materials to melt or crack.

Periodically clean the surface of the component with a soft cloth moistened with warm water, and wipe with a dry cloth.

Electrodes and Leads**Cleaning****CAUTION**

Do not wipe an electrode lead or cord with alcohol. If the electrode is wiped with alcohol, the lead or cord vinyl cover will harden.



1. Remove the disk electrode from the site holding the electrode part. To prevent the internal wire from breaking, do not pull or bend it.
2. Soak the electrodes in running water for a while, and clean them gently with the running water.

NOTE

If any paste remains on the electrode, it will harden and be difficult to remove.

3. Wipe them with a wet cloth which has been cleaned with invert soap and water.
4. Wipe the electrode lead or cord with water or lukewarm water.

NOTE

If there is a possibility of discontinuity in an electrode lead, check the lead continuity with a multimeter. Replace the electrode with a new one if discontinuity is found.

Disinfection / Sterilization

CAUTION

- **Never autoclave the electrode leads and connection cables.**
 - **The sterilizer temperature must not exceed 70°C (158°F). The electrode(s) may deform or melt above this temperature.**
-

Use ethylene oxide gas according to the sterilization equipment if sterilization is necessary. The sterilizing conditions depend on the contamination. Refer to the manual of the sterilizing equipment. The following is an example.

Gas:	Ethylen oxide: 30%, carbon dioxide: 70%
EO concentration:	710 mg/L
Temperature:	45°C (113°F)
Relative humidity:	50%
Pressure:	96 kPa (0.5 kg/cm ²)
Period:	5 to 10 hours
120 minutes:	30%

To remove the remaining gas from the electrode and lead after sterilization, first decrease the internal pressure of the sterilization equipment to -96 kPa with a vacuum pump, then add carbon dioxide or antiseptic gas in the equipment. Repeat this procedure (aeration) at least 5 times.

Checking the Electrode Lead

When any of the following trouble occurs during measurement, check the electrode lead wire with a multimeter.

- An artifact is superimposed on the waveform of a specified channel during recording.
- An artifact (AC interference) is superimposed on the waveforms of all channels during recording.
(Z, C3, C4, A1 or A2 electrode may be broken or not properly attached.)
- The skin-electrode impedance is not decreased even after reattaching the electrode.

NOTE

A broken lead wire cannot be repaired. Discard it.

CAUTION

Before disposing of the lead wire, check with your local solid waste officials for recycling options or proper disposal.

Regular Check

Check the following items regularly to keep your instrument in optimal condition.

- Instrument is not dirty, damaged or rusty.
- No label is torn.
- No key on the keyboard is broken.
- Power cord is not damaged.
- Ground lead is properly connected.
- No electrode lead is frayed or damaged.
- Calibration waveform is properly recorded.
- Electrode junction box input jacks are connected properly.
- The sensitivities and time constant are correct.
- Screen brightness can be adjusted.
- Screen display is correct.
- Clock is correct.
- System settings are correct and saved correctly.
- Flash lamp assembly is properly connected and operates correctly.
- Hyperventilation unit operates properly.
- Printer operates properly.
- Mouse operates properly.
- All storage devices operate properly (hard disk drive and magneto-optical disk drive). Use “Check Disk” to check the hard disk and magneto-optical disk. Refer to “Checking for Disk Damage Using Check Disk” in Section 3.
- No current leakage.
- The components are correctly mounted on the cart.
- No loosen screw on the cart.

Periodic Replacement Schedule

To maintain the performance of the instrument, the following parts must be periodically replaced by qualified service personnel.

Built-in lithium Battery (PC unit) After 3 years

This battery backs up the system clock. When the battery power is low, the time is not accurately displayed. Refer to the PC unit operator's manual.

Rechargeable Battery (CC-901AK PC unit for EEG-9100A/J/K/G)

After 2000 times recharging

Refer to the PC unit operator's manual.

CAUTION

Before disposing of the battery, check with your local solid waste officials for recycling options or proper disposal.

Repair Parts Availability Policy

Nihon Kohden Corporation (NKC) shall stock repair parts (parts necessary to maintain the performance of the instrument) for a period of 6 years after NKC announces discontinuation of the instrument. In that period NKC or its authorized agents will repair the instrument. This period may be shorter than 6 years if the board or part necessary for the faulty section is not available. For discontinuation announcements, contact your Nihon Kohden representative.

10. MAINTENANCE

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Section 11 Reference

Specifications	11.1
Standard Accessories	11.5
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Input/Output Connector/Jack Pin Assignment	11.11
JE-910A/AG, JE-911A/AG Electrode Junction Box	11.11
LS-901AJ/AK/AG, Photo Control Unit	11.13
JE-913A/AG Mini Junction Box	11.16

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Specifications

Data Acquisition

Number of input jacks	
EEG inputs on electrode position layout:	25
Extra inputs:	4 (X1 to X4)
Reference input for feedback:	1 (Z)
Respiration inputs:	3 {RESP F (flow), RESP C (chest), RESP A (abdomen)}
Bipolar inputs	6 (3 pairs)
DC input:	4 (JE-911A/AG only)
Input impedance	100 MΩ
Input leakage current	less than 5 nA
Internal noise level	Less than 1.5 μVp-p (0.53 to 60 Hz)
CMRR	105 dB or greater (at 60 Hz)
Gain	×469.73
Low-cut filter	0.08 Hz (time constant: 2 s)
High-cut filter	300 Hz (-18 dB/oct)
Offset tolerance	±750 mV
A/D conversion	16 bits (97 nV/LSB)
Sampling and hold	All electrodes at the same time
Sampling frequency	1,000 Hz

Data Processing

Sensitivity	
EEG INPUT:	OFF, 1, 2, 3 (2.5), 5, 7, 10, 15, 20, 30, 50, 75, 100, 150, 200 μV/mm
DC INPUT:	OFF, 10, 15, 20, 30, 50, 70, 100, 150, 200 mV/mm
Time constant (Low-cut filter)	0.001, 0.003, 0.03, 0.1, 0.3, 0.6, 1.0, 2.0 s 0.08, 0.16, 0.27, 0.53, 1.6, 5.3, 53, 159 Hz (-6 dB/oct)
High-cut filter	15, 30, 35, 60, 70, 120 (-12 dB/oct), 50 (RAPID), 300 Hz (-18 dB/oct)
AC filter	50 or 60 Hz, (rejection ratio: 1/25 or more)
Calibration waveform	
Waveform shape:	0.25 Hz step wave or 10 Hz sine wave
Voltage:	2, 5, 10, 20, 50, 100, 200, 500, 1,000 μV (×1000 for DC input signal)
ECG elimination filter	Available in acquisition and review programs
Impedance check	
Indication on the screen:	All electrodes are displayed on the screen in electrode position layout. Impedance for each electrode is displayed and electrodes with impedance higher than the preset impedance threshold are highlighted.
Indication on LED:	LEDs on the electrode junction box with impedance higher than the preset impedance threshold light.
Impedance threshold:	2, 5, 10, 20 and 50 kΩ
Pattern	36 sets of programmable montages combined with programmable individual amplifier settings
Reference electrode selector	A1 → A2, A1 ← A2, A1 ↔ A2, A1 + A2, VX, AV (with unsuitable electrode deletion function), Aav, Org, SD and OFF.
Marking signal	Photic stimulation mark, Hyperventilation mark

11. REFERENCE

Display

Display resolution	1024 dots × 768 lines (EEG-9100)
Number of display channels	Up to 1600 dots × 1200 lines (EEG-9200)
Display modes	Up to 64 and one mark channel
Waveform display color	Overwrite and page-by-page
Waveform display on/off	16 colors
Waveform position adjustment	Provided
Waveform freeze	Provided
Patient image display	Provided
Waveform sweep speed	Available when the optional QP-111A Camera Interface Board and/or QV-110AK Digital Video Unit, and video camera are used (EEG-9200 Only).
Timing mark	5, 10, 15, 20, 30, 60s or 5 min /page
Time scale	0.1, 1 s
Event mark	off, 0.2, 1 s
EEG scale	Displays at the bottom of the screen
	Provided

Acquisition Program

Timer function	Manual timer, recording timer, HV timer
Data storage device	Hard disk drive (standard), magneto-optical disk drive (option)
Sampling frequency	100, 200, 500, 1000 Hz

Photic Stimulator

Maximum flash energy	0.64 J or more
Stimulation modes	3 automatic (30 steps, programmable), manual, and single
Mode of operation	Continuous operation with intermittent loading
Duty cycle	Max. 5 minutes continuous operation in 30 minutes
Automatic stimulation	
Stimulus rate	0.5, 1 to 33 (1 Hz steps), 50 and 60 Hz
Stimulation period	1 to 99 seconds in 1 second steps
Pause period	1 to 30 seconds in 1 second steps
Manual stimulation	Manually set frequency and stimulation period
Photic frequency	0.5 Hz, 1 to 33 Hz in 1 Hz steps, 50 and 60 Hz
Stimulation time	1 to 99 s in 1 second steps and continuous stimulation (FREE: Max. 5 min)
Pulse mode	Normal, random, and double
Random stimulation	1 to 33 Hz in 1 Hz steps within ±50%
Single stimulation	Manual key operation single stimulation or automatic single stimulation by external trigger signal.
Trigger input	TRIG. INPUT connector (1 to 5 V)
Trigger output	TRIG. OUTPUT connector (3 V or more)

Hyperventilation

Hyperventilation interval	1.5, 2, 2.5, 3, 4 or 5 s
Stimulation time	1, 2, 3, 4 or 5 min

Review Program

Changeable items	Montage, sensitivity, high-cut filter, time constant, reference electrode, and display speed
Jump functions	Specified event, page by page, and specified time
Display modes	Continuous, high speed, high speed with pause, manually page-by-page, manually second-by-second and manually waveform centering
Display information	Event, channel number, montage and comment

Safety

Safety standard	IEC 60601-1 (1988) IEC 60601-1 Amendment 1 (1991) IEC 60601-1 Amendment 2 (1995) IEC 60601-2-26 (1994) EN 60601-1-1 (1992-06) with AM1 (1995 - 10)
Type of protection against electric shock	Class I
Degree of protection against electric shock	
Electrode jacks, respiration jacks:	Type BF applied part
Degree of protection against harmful ingress of water	Not protected (IPX0)
Degree of safety of application in flammable gas	Not suitable for use in the presence of a flammable anaesthetic mixture with air or oxygen or nitrous oxide
Mode of operation	Continuous

Electromagnetic Compatibility

IEC60601-1-2 (1993)
CISPR11(1990) GROUP 1 CLASS B

Dimensions and Weight

<u>EEG-9100A/J/K/G</u>	319.5 (W) × 253.6 (D) × 36.8 (H) mm, 2.2 kg
The dimensions and weight differ according to model. Refer to the Operator's manual of the PC unit.	

SC-901A/AK/AG Power supply unit	110 (W) × 200 (D) × 75 (H) mm, 3.0 kg
---------------------------------	---------------------------------------

KE-910A Cart (option)	420 (W) × 746 (D) × 800 (H) mm, 18.5 kg
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<u>EEG-9200A/J/K/G</u>	181 (W) × 447 (D) × 425 (H) mm, 12.7 kg
The dimensions and weight differ according to model. Refer to the Operator's manual of the PC unit.	

Isolation unit	SM-930AA/AJ: 150 (W) × 250 (D) × 140 (H) mm, 7.5 kg SM-930AK: 180 (W) × 320 (D) × 140 (H) mm, 12.5 kg
----------------	--

Cart (option)	KD-024A: 620 (W) × 850 (D) × 1300 (H) mm, 45.5 kg KD-025A: 620 (W) × 850 (D) × 830 (H) mm, 36.0 kg
---------------	---

11. REFERENCE

LS-901AJ/AK/AG Photo control unit

155 (W) × 300 (D) × 75 (H) mm, 3.9 kg

Multiple portable socket outlet

SD-901AJ 240 (W) × 60 (D) × 95 (H) mm, 0.6 kg

SD-901AK/AG 240 (W) × 63 (D) × 81 (H) mm, 0.75 kg

SD-903AJ 240 (W) × 60 (D) × 117 (H) mm, 0.6 kg

SD-903AK/AG 240 (W) × 63 (D) × 81 (H) mm, 0.75 kg

JE-910A/911A Electrode junction box

185 (W) × 72 (D) × 167 (H) mm, 1.0 kg (not including cables)

JE-913A/AG Mini junction box

85 (W) × 26.5 (D) × 113 (H) mm, 0.3 kg (not including cables)

Power Requirements

EEG-9100A/J/K/G

Line voltage SC-901A: AC 100 to 127 V

SC-901AK/AG: AC 220 to 240 V

Line frequency 50/60 Hz

Power consumption 420 VA

EEG-9200A/J/K/G

Line voltage SM-930AA: AC 117 V

SM-930AJ: AC 100 to 127 V

SM-930AK: AC 220 to 240 V

Line frequency 50/60 Hz

Power consumption 750 VA (for PC unit, display and MO disk drive)

1 kVA (PC unit, display, MO disk drive and photo control unit)

Operation Conditions

Temperature 10 to 35° C (50 to 95° F)

Humidity 30 to 80 % (no condensing)

Atmospheric pressure 70 kPa to 106 kPa

Transport and Storage Conditions

Temperature -20 to 65° C (-4 to 149° F)

Humidity EEG-9100A/J/K/G: 10 to 95 % (non-condensing)

EEG-9200A/J/K/G: 20 to 80 % (non-condensing)

Atmospheric pressure 70 kPa to 106 kPa

Standard Accessories

NOTE

When ordering the following accessories/consumables, specify the Supply Code No. When the Supply Code No. is not provided with the accessory, specify the Code No.

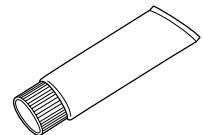
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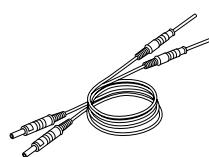
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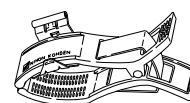
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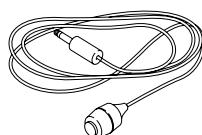
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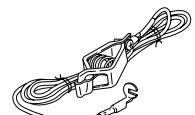
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10



11



12



11. REFERENCE

For EEG-9100A/J/K

No.	Description	Q'ty	Code No.	Supply Code No.
1	Collodion EEG disk electrode, NE-133A (24 pcs/set)	1 set	2154-000575E	H526
2	EEG ear clip electrode NE-311A (2 pcs/set)	1 set	2144-12527J	H540A
3	EEG paste, Elefix (180 g)	1	276096C	H510
4	ECG electrode lead, BC-112B (2 pcs/set)	1 set	6144-004111H	K512A
5	ECG clip-on electrode	2	2143-002068A	H068
6	ECG paste, CardioCream	1	078399A	F010
7	Marker cord	1	277825B	-
8	Power cord	1	--	-
9	Ground lead	1	098029	L910
10	QP-0042 System program	1	--	-
11	Mouse pad	1	6123-012597	-
-	Protective ground lead			
	for connecting the PC unit and power supply unit	1	516399	--
	for connecting the MO disk drive and power supply unit	1	613133	
12	Fuse (Time-lag) for the SC-901A/AK power supply unit 2A/250V (Line voltage: 110 or 127 V AC) 1.25A/250V (Line voltage: 220, 230 or 240 V AC)	1 set	104522 590959	--

For EEG-9100G

No.	Description	Q.ty	Code No.	Supply Code No.
-	Head saline pad elecrode kit, DIN, BE-413AG including EEG ear clip electrode NE-311A	1 set	-	-
3	EEG paste, Elefix (180 g)	1	276096C	H510
4	ECG electrode lead, BC-112B (2 pcs/set)	1 set	6144-004111H	K512A
5	ECG clip-on electrode	2	2143-002068A	H068
6	ECG paste, CardioCream	1	078399A	F010
7	Marker cord	1	277825B	-
8	Power cord	1	--	-
9	Ground lead	1	098029	L910
10	QP-0043 System program	1	--	-
11	Mouse pad	1	6123-012597	-
-	Protective ground lead			
	for connecting the PC unit and power supply unit	1	516399	--
	for connecting the MO disk drive and power supply unit	1	613133	
12	Fuse (Time-lag) for the SC-901AG power supply unit 1.25A/250V (Line voltage: 220, 230 or 240 V AC)	1 set	590959	--

For EEG-9200A/J/K

No.	Description	Q'ty	Code No.	Supply Code No.
1	Collodion EEG disk electrode, NE-133A (24 pcs/set)	1 set	2154-000575E	H526
2	EEG ear clip electrode NE-311A (2 pcs/set)	1 set	2144-12527J	H540A
3	EEG paste, Elefix (180 g)	1	276096C	H510
4	ECG electrode lead, BC-112B (2 pcs/set)	1 set	6144-004111H	K512A
5	ECG clip-on electrode	2	2143-002068A	H068
6	ECG paste, CardioCream	1	078399A	F010
7	Marker cord	1	277825B	-
8	Power cord	1	--	-
9	Ground lead	1	098029	L910
10	QP-0042 System program	1	--	-
11	Mouse pad	1	6123-012597	-
-	Protective ground lead for connecting the MO disk drive and power supply unit	1	516399	-
-	EEG Anywhere Program	1	639373	-
-	EEG Anywhere Program operator's manual	1	0614-007054	-

For EEG-9200G

No.	Description	Q.ty	Code No.	Supply Code No.
-	Head saline pad electrode kit, DIN, BE-413AG including EEG ear clip electrode NE-311A	1 set	-	-
3	EEG paste, Elefix (180 g)	1	276096C	H510
4	ECG electrode lead, BC-112B (2 pcs/set)	1 set	6144-004111H	K512A
5	ECG clip-on electrode	2	2143-002068A	H068
6	ECG paste, CardioCream	1	078399A	F010
7	Marker cord	1	277825B	-
8	Power cord	1	--	-
9	Ground lead	1	098029	L910
10	QP-0043 System program	1	--	-
11	Mouse pad	1	6123-012597	-
-	Protective ground lead for connecting the MO disk drive and power supply unit	1	516399	-
-	EEG Anywhere Program	1	639373	-
-	EEG Anywhere Program operator's manual	1	0614-007054	-

The following model or Code No. is for the provided standard accessory only.

Please specify the Supply Code No. when ordering.

Model or Code No. Supply Code No.

EEG paste	F510	Z-401CE Elefix 400 g, 3 pcs/set
NE-134A	H526	Collodion EEG disk electrode 12 pcs/set

Fuses (time-lag) for the optional LS-901AJ/AK/AG Photo control unit

<u>Model</u>	<u>Description</u>	<u>Code No.</u>
LS-901AJ:	Time-lag, 2A/250V, 110 or 127 V AC	104522
LS-901AK/AG:	Time-lag, 1.25A/250V, 220, 230 or 240 V AC	590959

Optional Accessories

*Not available for EEG-9100A/J/K/G

- Electrode junction box/Mini junction box
Electrode Junction Box, JE-911A /AG
10-20 type , 25 electrode jacks in the electrode position layout, 4 multi-purpose input jacks (extra jacks), 3 respiration jacks, 6 bipolar jacks (3 pairs) and 4 DC input connectors with a remote mark connector.
- Mini junction box, JE-913A/AG
25 electrode jacks in the electrode position layout, 4 multi-purpose input jacks (extra jacks) and 6 bipolar jacks (3 pairs)
- Sleep apnea unit, JE-912AK*
For polysomnogram measurement

SpO₂ measurement:
TL-101T Finger Probe
TL-201T Finger Probe
TL-251T SpO₂ Probe
TL-252T SpO₂ Probe
TL-253T SpO₂ Probe
TL-120T Multi-site probe
TL-121T Foot Probe
TL-051S/052S SpO₂ Probe
TL-061S/062S SpO₂ Probe
JL-951T3 SpO₂ Adaptor
- Photo control unit, LS-901AJ/AK/AG
For photic stimulation and hyperventilation
Mode
AUTO1, AUTO2, AUTO3:
Performs the programmed automatic photic stimulation. Up to 30 steps can be set for each automatic photic stimulation mode
MANUAL Performs manual photic stimulation.
SINGLE: Performs manual single photic stimulation.
HV: Outputs beep sound to tell the patient when to hyperventilate.
- Flash lamp assembly, LS-703A, LS-706A
- Hyperventilation unit ZE-510AK
- Power supply unit (for EEG-9100A/J/K/G)
SC-901A: 100 to 127 V AC, 2 AC outlets
SC-901AK /AG : 220 to 240 V, one AC outlet

- Isolation unit (for EEG-9200A/J/K/G)
SM-930AA: 117 VAC, 3 AC outlets
SM-930AJ: 100 to 127 V AC, 3 AC outlets
SM-930AK : 220 to 240 V, 3 AC outlets
- Multiple portable socket outlet
SD-901AJ/AK/AG: 3 AC outlets for power supply unit and photo control unit for EEG-9100A/J/K/G
SD-903AJ/AK/AG: 3 AC outlets for isolation unit and photo control unit for EEG-9200A/J/K/G
- Cart
KE-910A (for EEG-9100A/J/K/G)
KD-024A (for EEG-9200A/J/K/G, with printer table)
KD-025A (for EEG-9200A/J/K/G, without printer table)
- Carrying case (for EEG-9100A/J/K/G)
YE-910A: For PC unit, power supply unit, electrode junction box and accessories
YE-911A: For photo control unit and flash lamp assembly
- Chest/abdomen respiration pickup for adult, TR-751T
Chest/abdomen respiration pickup for child, TR-752T
- Air flow respiration pickup for adult, L-type, TR-761T
Air flow respiration pickup for child, clip, TR-762T
- Air flow 3-port respiration pickup for adult, TR-0001
Air flow 3-port respiration pickup for child, TR-0002
- EEG disk electrode (shielded type, 24 electrode leads), BE-911A
- EEG disk electrode (shielded type, 12 electrode leads), BE-912A
- Spike detector software, QP-251AK
- Polysmith software, QP-260AK
- Analysis software (Focus), QP-211A
- Analysis software (MULTIVIEW), QP-214A
- EEG mapping program, QP-220AK
- Review program, QP-112AK
- Spike and seizure detector software, QP-120AK/121AK
- Digital video system, QP-110AK

11. REFERENCE

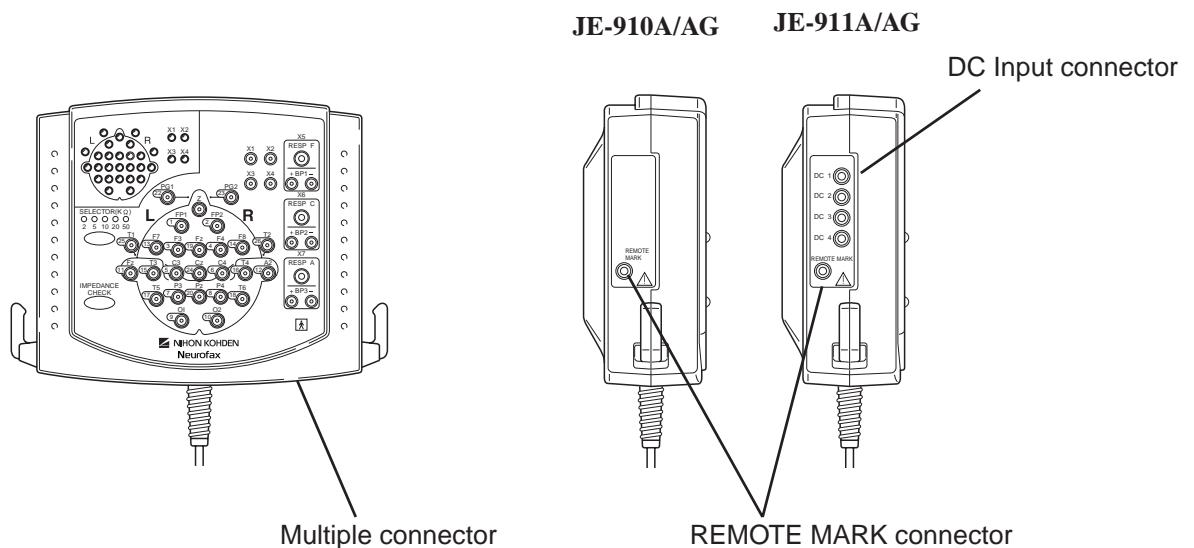
- Digital video unit, QV-110AK*
- Camera Interface Board, QI-111A*
- Serial Interface board, QI-224A*

Input/Output Connector/Jack Pin Assignment

CAUTION

Connect only the recommended equipment to the instrument input/output connectors or jacks. Otherwise, there is a risk of electrical shock to the patient and operator.

JE-910A/AG, JE-911A/AG Electrode Junction Box



Multiple Connector

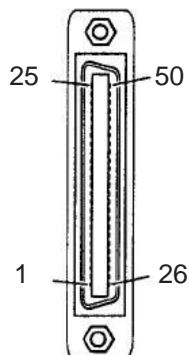
For mini junction box

WARNING

When the JE-913A Mini junction box or BE-911A/BE-912A EEG disk electrode is not used, make sure that the multiple connector cover is firmly attached to the electrode junction box. Failure to follow this warning may cause electrical shock to the patient and operator.

CAUTION

Only connect the JE-913A Mini junction box or BE-911A/BE-912A EEG disk electrode to the multiple connector. When another type of mini junction box is connected, the instrument may malfunction.

Multiple Connector

Pin No.	Signal	Pin No.	Signal
1	FP1	26	T2
2	FP2	27	Not used
3	F3	28	Not used
4	F4	29	Not used
5	C3	30	X1
6	C4	31	X2
7	P3	32	X3
8	P4	33	X4
9	O1	34	Not used
10	O2	35	Not used
11	A1	36	Not used
12	A2	37	BP1 +
13	F7	38	BP1 -
14	F8	39	BP2 +
15	T3	40	BP2 -
16	T4	41	BP3 +
17	T5	42	BP3 -
18	T6	43	Z
19	FZ	44	AG
20	PZ	45	AG
21	Not used	46	AG
22	PG1	47	Not used
23	PG2	48	Not used
24	CZ	49	Not used
25	T1	50	Not used

Junction box side: PCR-E50LMD-SLB1

(Code No.: 513713)

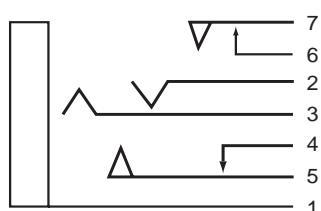
Cable side: Connector - PCR-E50FA

Housing- PCS-XEM50GLIU2N

DC Input ConnectorJE-911A only, Max. ± 3 V, input impedance: $1.5 \text{ M}\Omega$ 

Pin No.	Signal
1	Not used
2	DC INPUT
3	DGND

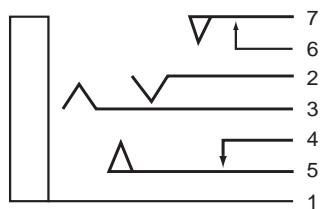
Junction box side: HJS1462-01-010 (Code No.: 608389)

Cable side: KP-2S (Code No.: 608406),
2.5 mm φ miniature jack**REMOTE MARK Connector**

Pin No.	Signal
1	Not used
2	MARK INPUT
3	DGND
4	Not used
5	Not used
6	Not used
7	Not used

Junction box side: HSJ2000-01-010 (Code No.: 501503)

Cable side: 3.5 φ miniature jack (Code No: 606907)

LS-901AJ/AK/AG, Photo Control UnitPin 2

Trigger input:

Max. +5 V, input impedance: $100 \text{ k}\Omega$

Trigger output:

Max +5 V, output current: 1.5 mA

TRIG. INPUT/TRIG. OUTPUT Connector

TRIG. INPUT connector

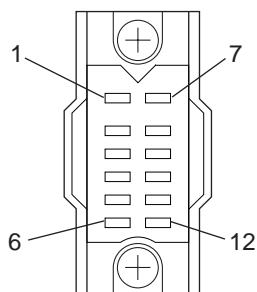
Pin No.	Signal
1	DGND
2	EXT TRIG IN
3	Not used
4	Not used
5	Not used
6	DGND
7	Not used

TRIG. OUTPUT connector

Pin No.	Signal
1	DGND
2	EXT TRIG OUT
3	Not used
4	Not used
5	Not used
6	Not used
7	Not used

Unit side: HSJ2000-01-010 (Code No.: 501503)

Cable side: 3.5 φ miniature jack (Code No: 606907)

HV Connector

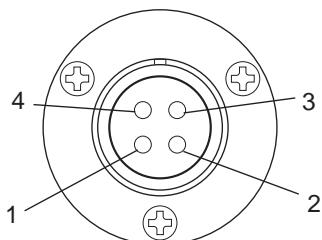
Pin No.	Signal	Pin No.	Signal
1	Not used	7	VOICE
2	-12 VA	8	+12 VA
3	Not used	9	DGND
4	HVDTC	10	+12 VA
5	HVTRG	11	AGND
6	Not used	12	SG

Unit side: SW-1612A-ST (Code No.: 271582)

Cable side: P-1620BA-C (Code No.: 269513)

PHOTIC LAMP Connector**WARNING**

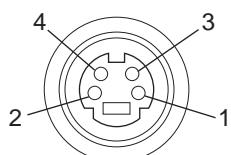
- Before connecting or disconnecting the flash lamp cord, turn the power off. After the power is turned off, about 600 V is present in the PHOTIC LAMP connector for several minutes.
- When the instrument is turned on, about 600 V is present at pin 2 of the PHOTIC LAMP connector on the LS-901AJ/AK/AG Photo control unit. To protect against shock, always connect the flash lamp assembly cable to this connector, or attach the PHOTIC LAMP connector cap to the PHOTIC LAMP connector even when the photic stimulation is not used.



Pin No.	Signal
1	CG
2	High Voltage, 600 V
3	PG
4	Lamp Trigger

Unit side: NCS-254-RF (Code No.: 269121)

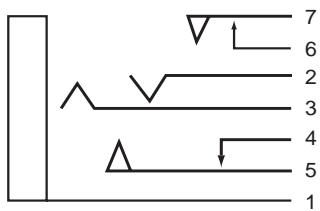
Cable side: NCS-254-PM (Code No.: 268782)

PHOTO MARK Connector

Pin No.	Signal
1	PS/HV MRK
2	DGND
3	Not used
4	Not used

Unit side: TCS7548-01-201 (Code No.: 504946)

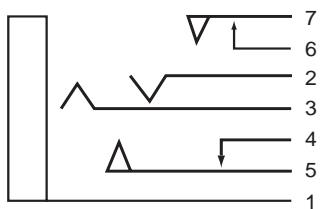
Cable side: TCP8340

MIC INPUT Connector

Unit side: HSJ2000-01-010 (Code No.: 501503)

Cable side: 3.5 φ miniature jack (Code No: 606907)

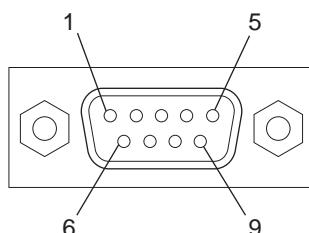
Pin No.	Signal
1	AGND
2	MIC IN
3	Not used
4	Not used
5	Not used
6	AGND
7	Not used

SPEAKER OUTPUT Connector

Unit side: HSJ2000-01-010 (Code No.: 501503)

Cable side: 3.5 φ miniature jack (Code No: 606907)

Pin No.	Signal
1	AGND
2	SPEAKER OUT
3	Not used
4	Not used
5	Not used
6	AGND
7	Not used

RS-232C Connector

Unit side: DELC-J9PAF-10L9

(Code No.: 516987)

Cable side: Connector - DE-9SF-N

(Code No.: 383425)

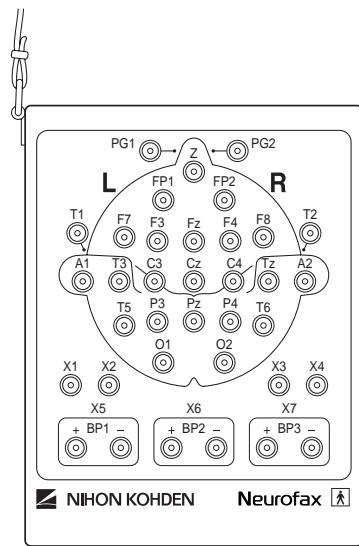
Housing - DE-C4-J6

Pin No.	Signal
1	Not used
2	RXDO'
3	TXDO'
4	Not used
5	DGND
6	Not used
7	RTS
8	Not used
9	Not used

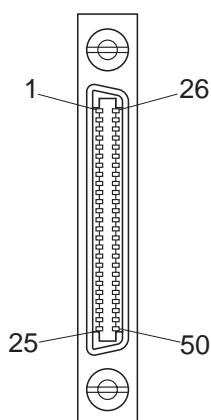
11. REFERENCE

JE-913A/AG Mini Junction Box

Multiple output connector



Multiple output connector



Pin No.	Signal	Pin No.	Signal
1	FP1	26	T2
2	FP2	27	Not used
3	F3	28	Not used
4	F4	29	Not used
5	C3	30	X1
6	C4	31	X2
7	P3	32	X3
8	P4	33	X4
9	O1	34	Not used
10	O2	35	Not used
11	A1	36	Not used
12	A2	37	BP1 +
13	F7	38	BP1 -
14	F8	39	BP2 +
15	T3	40	BP2 -
16	T4	41	BP3 +
17	T5	42	BP3 -
18	T6	43	Z
19	FZ	44	AG
20	PZ	45	AG
21	Not used	46	AG
22	PG1	47	Not used
23	PG2	48	Not used
24	CZ	49	Not used
25	T1	50	Not used

Unit side: HDR-E50LFDT1-SLK

(Code No.: 521464)