USB-MCA

APG7300A

Instruction Manual

Version. 1.3.0

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Safety Precautions / Disclaimer

Thank you very much for purchasing the USB-MCA, Model: APG7300A (hereinafter "This device") of TechnoAP Co., Ltd. (hereinafter "We"). Please read this "Safety Precautions / Disclaimer" before using this device, be sure to observe the contents, and use it correctly.

We are not responsible for any damage caused by abnormality of device, detector, connected device, application, damage to failure, other secondary damage, even if accident caused by using this device.

Prohibited matter

- Cannot be used for applications that require special quality and reliability related to human life and accidents.
- Please refrain from using in places with high temperature, high humidity and vibration (excluding countermeasures).
- Do not apply power that exceeds the rating.
- Do not turn on the board product with other metals in contact with the board surface.

Cautions

- If there is smoke or abnormal heat generation, turn off the power immediately.
- It may not work properly in a noisy environment.
- Be careful of static electricity.
- Product specifications and related documents are subject to change without notice.

Warranty conditions

The warranty conditions for "our products" are as follows.

- Warranty period: One year after purchase.
- Warranty details: If the product breaks down during use within the warranty period, it will be repaired or replaced.
- Not covered by warranty: We do not guarantee if the cause of failure falls under any of the following.
    (A) Use other than the original usage of "our products"
    (B) In addition to the above, causes other than "our company" or "our products" (including force majeure such as natural disasters)
    (C) Consumables, etc.

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1. Overview

USB-MCA (USB-multichannel analyzer) made by TechnoAP Co., Ltd. APG7300A and APG7300L (hereinafter referred to as APG7300A (L)) are equipped with a high-speed successive approximation ADC, and operate lightweight with only USB bus power without using an AC adapter It is a compact MCA.

The preamplifier signal from the detector is input to the spectroscope amplifier (linear amplifier), and the output signal amplified and waveform-shaped (shaped) by the analog circuit is input to the USB-MCA. The amplitude (wave height value, peak value) of this signal includes radiation energy information. MCA is a wave height analyzer that detects the signal and digitally converts the maximum crest value to generate a spectrum (histogram).

"Dead time" is an indicator of MCA performance. The dead time is a time period when MCA can not measure peak value. New events can not be measured while events occur irregularly, such as radiation, while events are being detected, peak detection, digitization of wave height values, memory rewriting, resetting of crest value. Normally, the dead time of MCA is said to be 1 μsec with a fast one, but the dead time of our MCA is fixed at 500 nsec.

As a method of peak detection, there is a "first peak detection mode" in addition to a general "absolute mode" in which AD conversion is performed after peak detection. In this mode, AD conversion is started immediately after detecting the pulse peak. Detection conversion processing can be finished within the pulse until 0.25 μs pulse shaping, which is regarded as high speed in the spectroscopic amplifier.

As measurement data, there is a "histogram" data. The histogram is the peak value. Transfer measurement data to PC via USB cable.

Drivers and applications that run on Windows are included as software.

This manual explains the handling of our USB-MCA product.

2. Specifications

Model: APG7300A and APG7300L

(1) Analog input

The number of the channels	1CH
Input range	0 to 10V
Input impedance	1kΩ
Possible input pulse width	Minimum 100 nsec up to Maximum 100 μsec (*the period exceeding the threshold)

(2) ADC

Conversion method	Successive approximation type
Resolution	16bit
Conversion and reset time	500 ns
ADC GAIN	16384, 8192, 4096, 2048, 1024, 512 channels
Threshold	Full scale 0 to 50% set by PC
LLD	Full scale 0 to 100% set by PC
ULD	Full scale 0 to 100% set by PC

(3) Performance

Dead time	Fixed at 500 nsec
Integral nonlinearity	± 0.025% (typ.) or less
Differential nonlinearity	± 1% (typ.) or less

(4) External input

External input	GATE and VETO

(5) Function

Measurement mode	Histogram mode
Communication I/F	USB 2.0 * USB cable length of 2 m or less is recommended. If there is a low power consumption setting in the USB port, please cancel it or use a USB hub with power supply by AC adapter.

(6) Software

USB-MCA software	Windows version, a driver and application

(7) External form

Dimensions : 70mm(W) x 140mm (D) x 20mm (H)

Weight : 180g

(8) Accessories

Instruction manual

CD (a driver and application and instruction manual)

USB cable (a connector the cable of USB (A) male and the USB (Mini-B) male)

3. Appearance

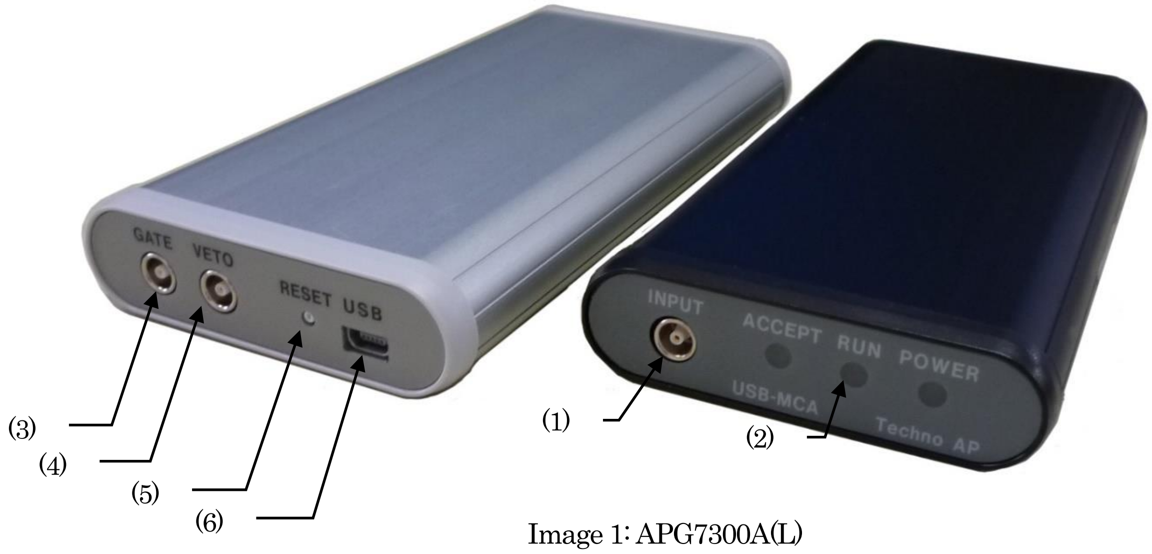


Image 1: APG7300A(L)

[Front]

(1) INPUT	LEMO (EPL.00.250.NTN) connector for amplifier signal input
(2) LED	LED for operation check
POWER	It turn on at the time of connected with PC
RUN	It turn on at the time of a measurement start
ACCEPT	It turn on at the time of the signal detection

[Back]

(3) GATE	LEMO connector for outside GATE signal input. Input the signal of the TTL level. "High" means data acquisition, "Low" means data non-acquisition.
(4) VETO	LEMO connector for outside VETO signal input. Input the signal of the TTL level. "High" means data non-acquisition, "Low" means data acquisition.
(5) RESET	Reset button
(6) USB	USB 2.0 Mini-B receptacle (Female terminal)

※ Introduction of the conversion adapter

The input and output connector of this product is used EPL.00.250.NTN made in LEMO company and the other same size connector. In the case of use BNC connector cable to use this product, it is possible to connect to it by having you use the following conversion adapters.

Manufacturer : HUBER+SUHNER AG
Model : 33_QLA-BNC-01-1/1--_NE
Contents : QLA-01 to BNC
Connector Gender 1 Interface QLA-01
Connector Gender 2 Interface BNC

Image 2 33_QLA-BNC-01/1--_NE

If the adapters interfere with each other, use the LEMO-BNC conversion cable as shown in the photo below.

Image 3 33_QLA-BNC-01/1--_NE

4. Setup

4.1. Connection

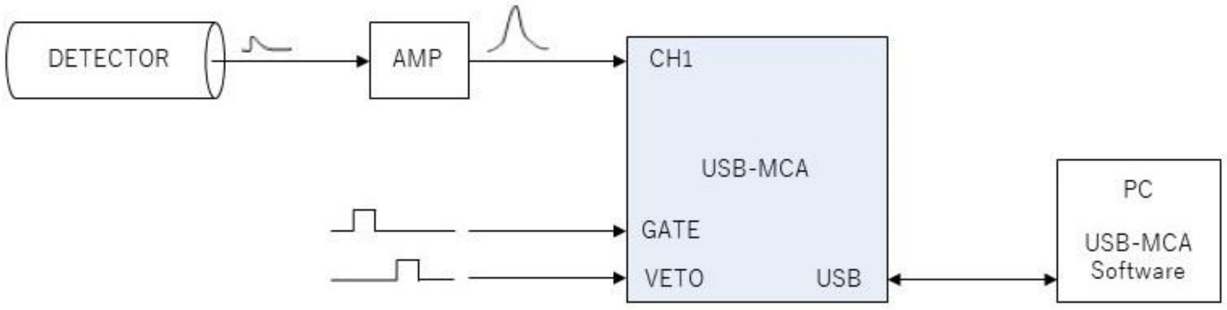


Figure 1: Connection at the time to use of the MCA

(1) Connect USB-MCA and a PC with an USB cable.

NOTE: It is necessary to install the driver software on the PC to be connected for the first time. See below for how to install the driver software.

NOTE: Do not connect the signal cable from the detector when the power of this device is OFF.

(2) Check that the "PWR" LED lights up to indicate that the power is on.

(3) Connect the pre-amp output signal of the detector to a linear amplifier (spectroscopic-amp).

(4) Connect an output signal got the wave pattern of the linear amplifier (spectroscopic-amp) fixed to "INPUT" of USB-MCA.

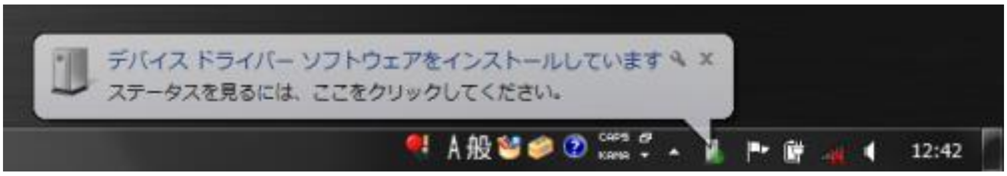
(5) If control by an external signal is required, input the LV-TTL level to the GATE or VETO terminal. When a peak is detected with a cable connected to the GATE terminal, data is acquired when the signal is open or high. Or when detecting a peak with a cable connected to the VETO terminal, data is acquired when the signal is open, or the signal is low.

4.2. Installation of the driver software

The first time you connect this device to the computer, you need to install the driver software from the included CD-ROM.

For Windows 7

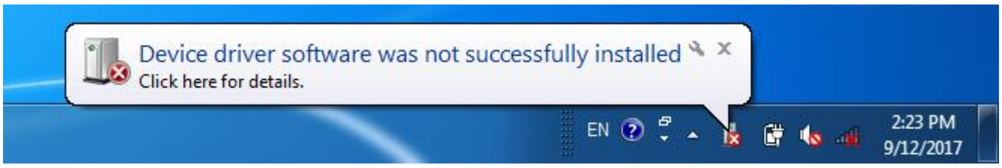
(1) REQUIRED Log in as Administrator or an account of Administrative right.
(2) Connect USB-MCA to a PC with a USB cable.
(3) It is displayed it when "Install device driver software" in the desktop lower right.



デバイス ドライバー ソフトウェアをインストールしています
ステータスを見るには、ここをクリックしてください。

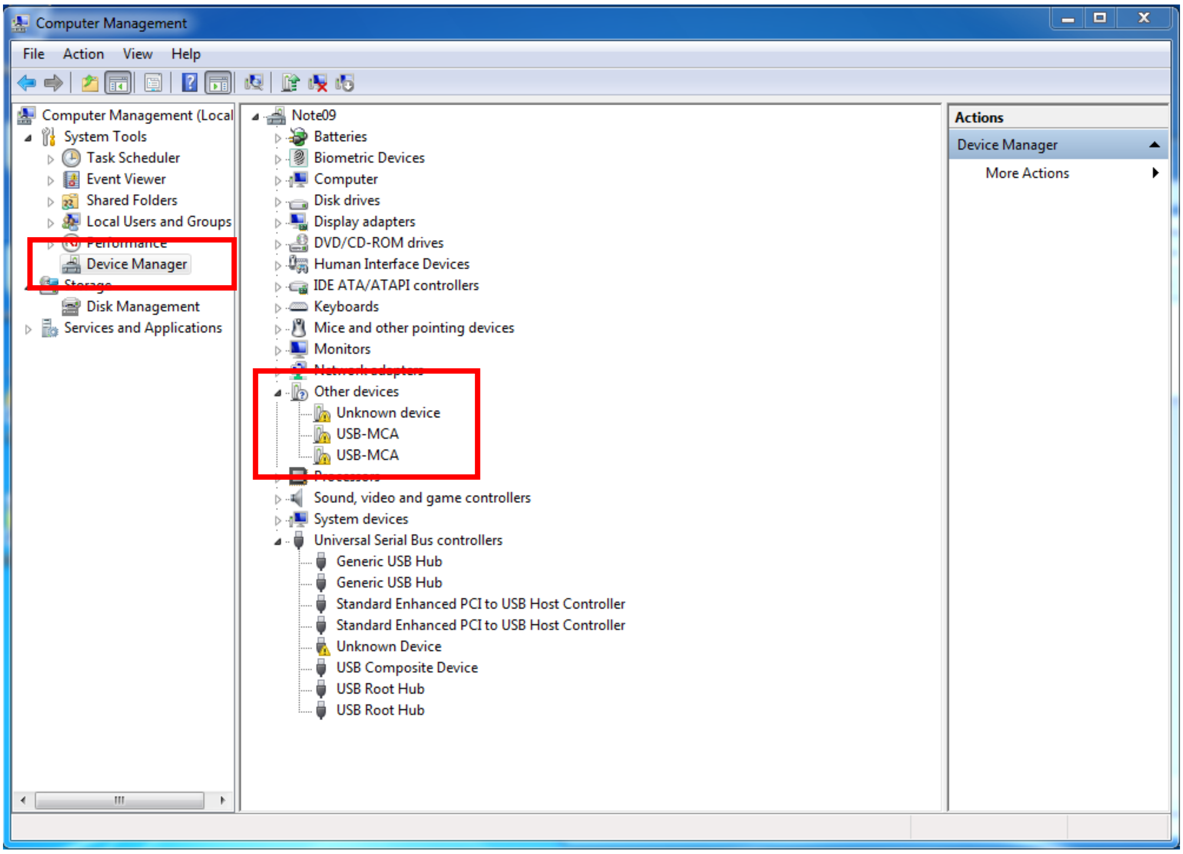
A 般
CAPS
KANA
12:42

After this, if the message "Device driver software was not successfully installed " is displayed, open the device manger, and check the "USB-MCA" icon. Right-click on the icon and click "Update of the driver software".



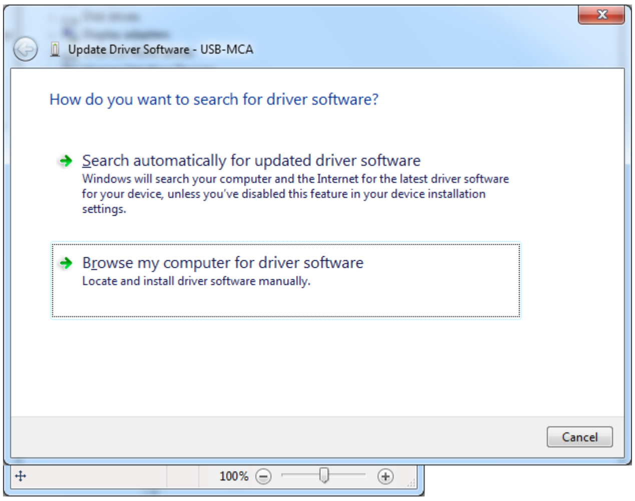
Device driver software was not successfully installed
Click here for details.

EN
2:23 PM
9/12/2017



Computer Management
File
Action
View
Help
Computer Management (Local
System Tools
Task Scheduler
Event Viewer
Shared Folders
Local Users and Groups
Performance
Device Manager
Storage
Disk Management
Services and Applications
Note09
Batteries
Biometric Devices
Computer
Disk drives
Display adapters
DVD/CD-ROM drives
Human Interface Devices
IDE ATA/ATAPI controllers
Keyboards
Mice and other pointing devices
Monitors
Network adapters
Other devices
Unknown device
USB-MCA
USB-MCA
Processors
Sound, video and game controllers
System devices
Universal Serial Bus controllers
Generic USB Hub
Generic USB Hub
Standard Enhanced PCI to USB Host Controller
Standard Enhanced PCI to USB Host Controller
Unknown Device
USB Composite Device
USB Root Hub
USB Root Hub
Actions
Device Manager
More Actions

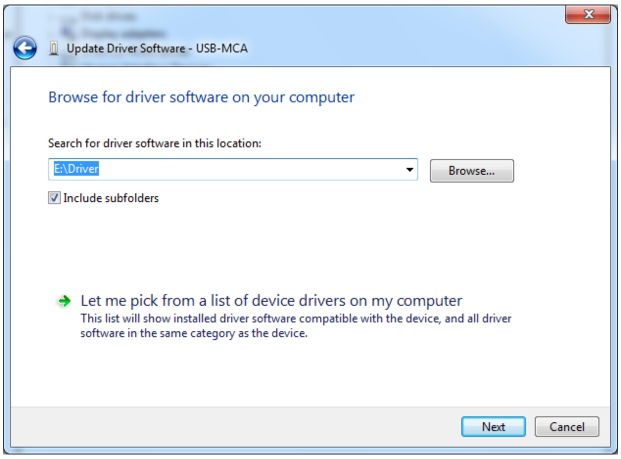
（1） Installation on an interactive basis


Update Driver Software - USB-MCA
Cancel
100%

How do you want to search for driver software?

Search automatically for updated driver software
Windows will search your computer and the Internet for the latest driver software for your device, unless you've disabled this feature in your device installation settings.

Browse my computer for driver software
Locate and install driver software manually.


Update Driver Software - USB-MCA
Browse...
Next
Cancel

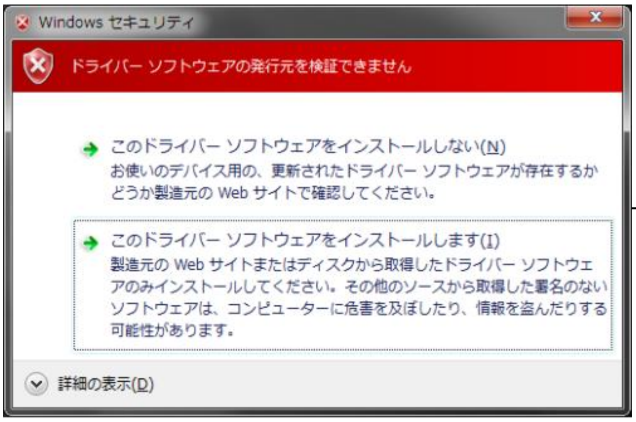
Browse for driver software on your computer

Search for driver software in this location:
E:\Driver

☑ Include subfolders

Let me pick from a list of device drivers on my computer
This list will show installed driver software compatible with the device, and all driver software in the same category as the device.

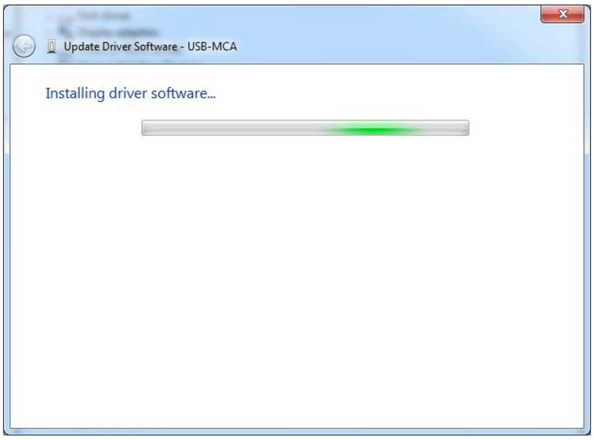
Refer to attached CD "Driver" folder


Windows セキュリティ
詳細の表示(D)

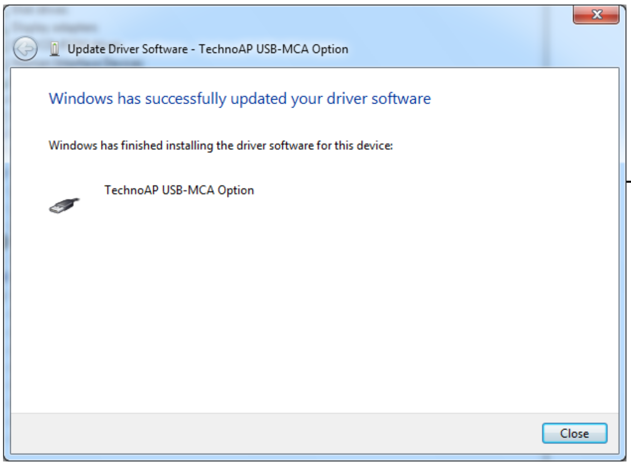
ドライバー ソフトウェアの発行元を検証できません

このドライバー ソフトウェアをインストールしない(N)
お使いのデバイス用の、更新されたドライバー ソフトウェアが存在するかどうか製造元の Web サイトで確認してください。

このドライバー ソフトウェアをインストールします(I)
製造元の Web サイトまたはディスクから取得したドライバー ソフトウェアのみインストールしてください。その他のソースから取得した署名のないソフトウェアは、コンピューターに危害を及ぼしたり、情報を盗んだりする可能性があります。


Update Driver Software - USB-MCA

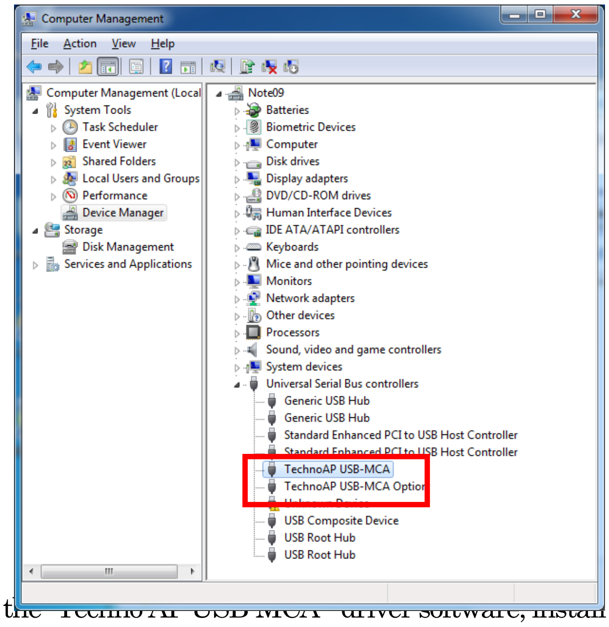
Installing driver software...


Update Driver Software - TechnoAP USB-MCA Option
Close

Windows has successfully updated your driver software

Windows has finished installing the driver software for this device:

TechnoAP USB-MCA Option


Computer Management
File
Action
View
Help
Computer Management (Local
System Tools
Task Scheduler
Event Viewer
Shared Folders
Local Users and Groups
Performance
Device Manager
Storage
Disk Management
Services and Applications
Note09
Batteries
Biometric Devices
Computer
Disk drives
Display adapters
DVD/CD-ROM drives
Human Interface Devices
IDE ATA/ATAPI controllers
Keyboards
Mice and other pointing devices
Monitors
Network adapters
Other devices
Processors
Sound, video and game controllers
System devices
Universal Serial Bus controllers
Generic USB Hub
Generic USB Hub
Standard Enhanced PCI to USB Host Controller
Standard Enhanced PCI to USB Host Controller
TechnoAP USB-MCA
TechnoAP USB-MCA Optior
USB Composite Device
USB Root Hub
USB Root Hub

Next, install "Techno AP USB-MCA Option". After installing the "Techno AP USB-MCA" driver software, install the "Techno AP USB-MCA Option" using the same procedure. In Device Manager, check that the two icons "Techno AP USB-MCA " and "Techno AP USB-MCA Option" are normal. After successfully installing the driver software, install the application. The installation procedure is described in the next chapter.

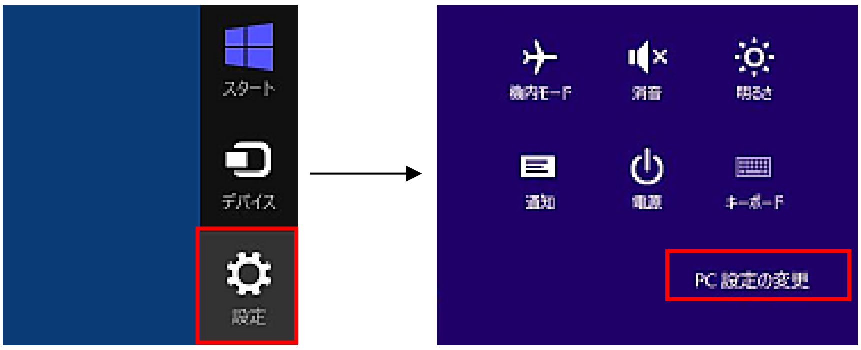
For Windows 8 (64bit)

In Windows8 (64bit), driver software without a digital signature cannot be installed by default to prevent users from accidentally installing driver software. This driver software does not have a digital signature, so you need to "disable driver signature enforcement" by following the steps below before installing.

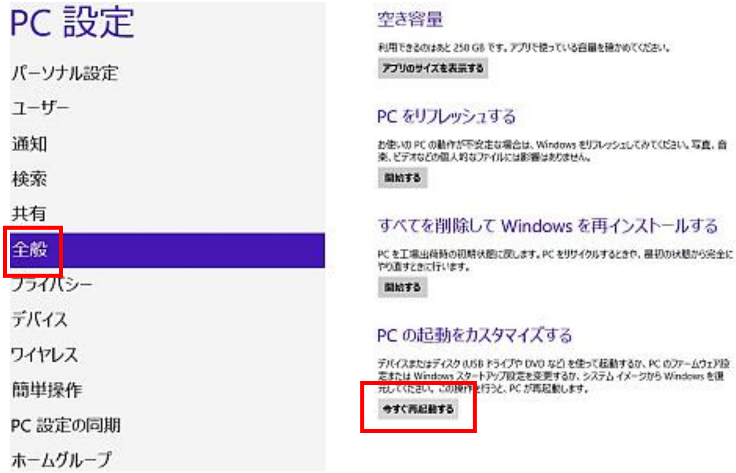
(1) Display a charm with a start screen.

* For mouse operation: Move the mouse to the upper right or lower right corner of the screen.
* For touch operation: Swipe from the right side of the screen toward the center.

(2) Select "Settings" from the charms and select "Change PC settings" from the settings menu.


スタート
デバイス
設定
機内モード
消音
明るさ
通知
電源
キーボード
PC 設定の変更

(3) Select "General" from the "PC Settings" screen, and then select "Customize PC startup"-"Restart now".


PC 設定
パーソナル設定
ユーザー
通知
検索
共有
全般
プライバシー
デバイス
ワイヤレス
簡単操作
PC 設定の同期
ホームグループ
空き容量
アプリのサイズを表示する
PC をリフレッシュする
開始する
すべてを削除して Windows を再インストールする
開始する
PC の起動をカスタマイズする
今すぐ再起動する

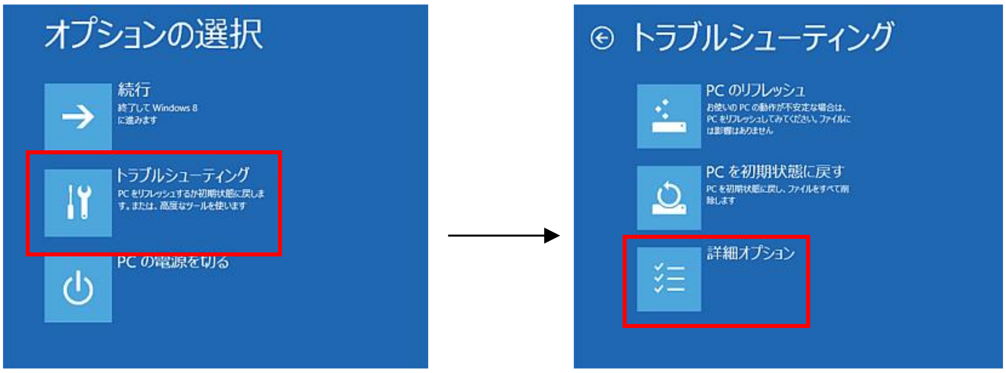
利用できるのはあと 250 GB です。アプリで使っている容量を確かめてください。

お使いの PC の動作が不安定な場合は、Windows をリフレッシュしてみてください。写真、音楽、ビデオなどの個人的なファイルには影響はありません。

PC を工場出荷時の初期状態に戻します。PC をリサイクルするときや、最初の状態から完全にやり直すときに行います。

デバイスまたはディスク (USB ドライブや DVD など) を使って起動するか、PC のファームウェア設定または Windows スタートアップ設定を変更するか、システム イメージから Windows を復元してください。この操作を行うと、PC が再起動します。

(4) Select "Troubleshooting" from the "Choose Options" screen, and select "Advanced Options" from the "Troubleshooting" screen.


オプションの選択
続行
トラブルシューティング
PC の電源を切る
トラブルシューティング
PC のリフレッシュ
PC を初期状態に戻す
詳細オプション

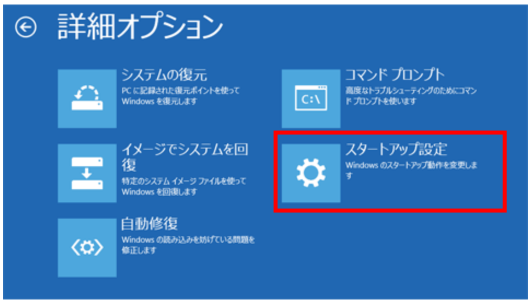
終了して Windows 8 に進みます

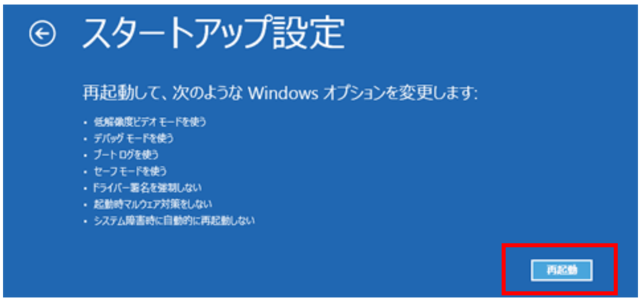
PC をリフレッシュするか初期状態に戻します。または、高度なツールを使います

お使いの PC の動作が不安定な場合は、PC をリフレッシュしてみてください。ファイルには影響はありません

PC を初期状態に戻し、ファイルをすべて削除します

(5) Select "Startup Settings" from the "Advanced Options" screen, and then select "Restart" from the "Startup Settings" screen.


詳細オプション
システムの復元
PC に記録された復元ポイントを使って Windows を復元します
コマンド プロンプト
高度なトラブルシューティングのためにコマンド プロンプトを使います
イメージでシステムを回復
特定のシステム イメージ ファイルを使って Windows を回復します
スタートアップ設定
Windows のスタートアップ動作を変更します
自動修復
Windows の読み込みを妨げている問題を修正します

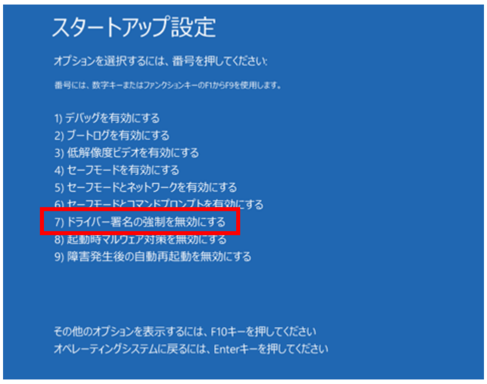

スタートアップ設定

再起動して、次のような Windows オプションを変更します:

- 低解像度ビデオ モードを使う
- デバッグ モードを使う
- ブート ログを使う
- セーフ モードを使う
- ドライバー署名を強制しない
- 起動時マルウェア対策をしない
- システム障害時に自動的に再起動しない

再起動

(6) After restarting, press the "7" key on the "Startup Settings" screen and select "7) Disable driver signature enforcement".



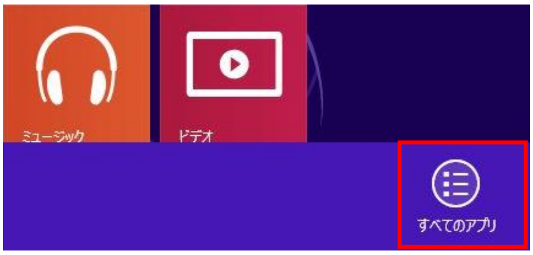
オプションを選択するには、番号を押してください:

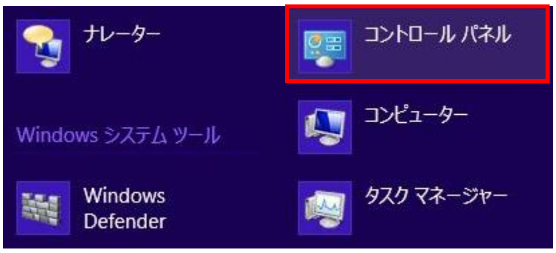
番号には、数字キーまたはファンクションキーのF1からF9を使用します。

1) デバッグを有効にする
2) ブートログを有効にする
3) 低解像度ビデオを有効にする
4) セーフモードを有効にする
5) セーフモードとネットワークを有効にする
6) セーフモードとコマンドプロンプトを有効にする
7) ドライバー署名の強制を無効にする
8) 起動時マルウェア対策を無効にする
9) 障害発生後の自動再起動を無効にする

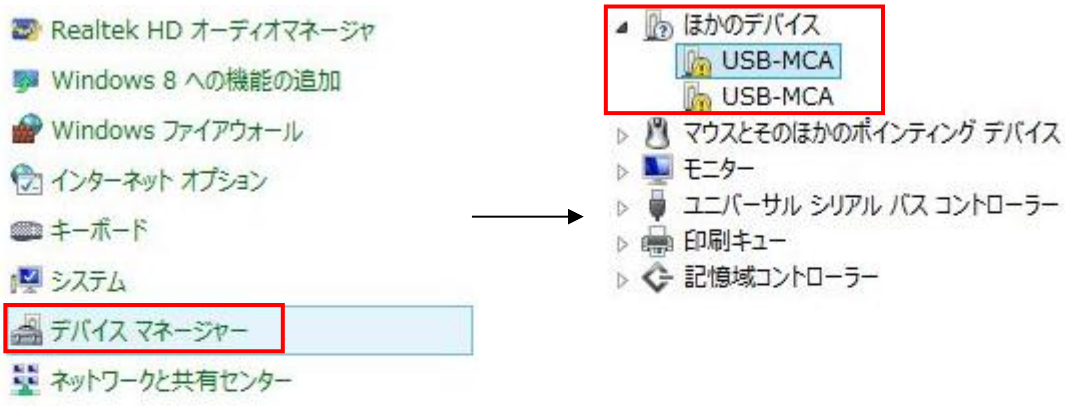
その他のオプションを表示するには、F10キーを押してください
オペレーティングシステムに戻るには、Enterキーを押してください

(7) REQUIRED After rebooting, log in as Administrator or log in with an account with administrator privileges.
(8) Connect USB-MCA to your PC with a USB cable.
(9) Right-click on the Start screen to display the "Apps Bar", select "All Apps", and then select "Control Panel" from the "Apps" view.

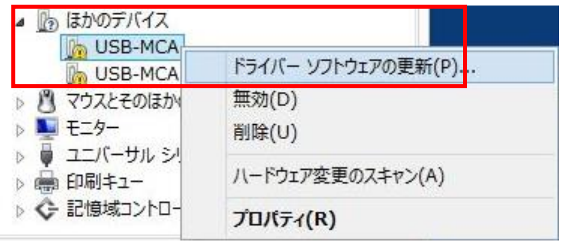

ミュージック
ビデオ
すべてのアプリ

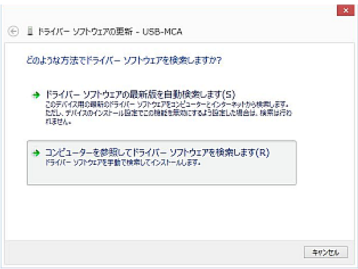

ナレーター
コントロール パネル
Windows システム ツール
コンピューター
Windows Defender
タスク マネージャー

(10) Select "Device Manager" from "Control Panel" to display "Device Manager".


Realtek HD オーディオマネージャ
Windows 8 への機能の追加
Windows ファイアウォール
インターネット オプション
キーボード
システム
デバイス マネージャー
ネットワークと共有センター
ほかのデバイス
USB-MCA
USB-MCA
マウスとそのほかのポインティング デバイス
モニター
ユニバーサル シリアル バス コントローラー
印刷キュー
記憶域コントローラー

(11) Right-click "USB-MCA", select "Update Driver Software (P)", and select "Browse my computer for driver software (R)".


ほかのデバイス
USB-MCA
USB-MCA
マウスとそのほか
モニター
ユニバーサル シ
印刷キュー
記憶域コントロ
ドライバー ソフトウェアの更新(P)...
無効(D)
削除(U)
ハードウェア変更のスキャン(A)
プロパティ(R)

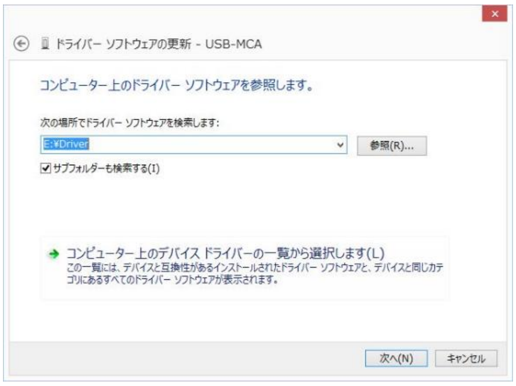

ドライバー ソフトウェアの更新 - USB-MCA
キャンセル

どのような方法でドライバー ソフトウェアを検索しますか?

ドライバー ソフトウェアの最新版を自動検索します(S)
このデバイス用の最新のドライバー ソフトウェアをコンピューターとインターネットから検索します。ただし、デバイスのインストール設定でこの機能を無効にするよう設定した場合は、検索は行われません。

コンピューターを参照してドライバー ソフトウェアを検索します(R)
ドライバー ソフトウェアを手動で検索してインストールします。

(12) When the "Update Driver Software" screen is displayed, select "Browse (R)", and when the "Browse for Folder" screen is displayed, select the drive where the "USB-MCA" driver software is stored. Select OK. When you return to the "Update Driver Software" screen, select "Next (N)".

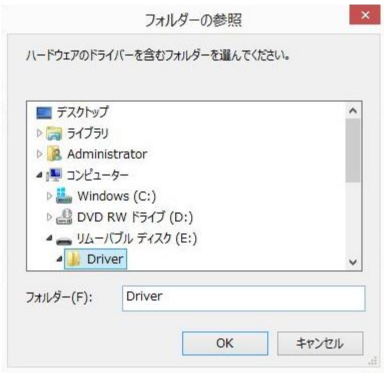

ドライバー ソフトウェアの更新 - USB-MCA
参照(R)...
次へ(N)
キャンセル

コンピューター上のドライバー ソフトウェアを参照します。

次の場所でドライバー ソフトウェアを検索します: E:¥Driver

☑ サブフォルダーも検索する(I)

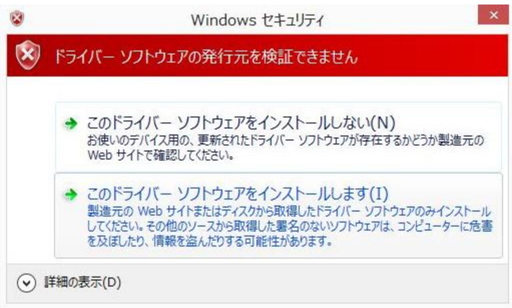
コンピューター上のデバイス ドライバーの一覧から選択します(L)
この一覧には、デバイスと互換性があるインストールされたドライバー ソフトウェアと、デバイスと同じカテゴリにあるすべてのドライバー ソフトウェアが表示されます。


フォルダーの参照
デスクトップ
ライブラリ
Administrator
コンピューター
Windows (C:)
DVD RW ドライブ (D:)
リムーバブル ディスク (E:)
Driver
OK
キャンセル

ハードウェアのドライバーを含むフォルダーを選んでください。

フォルダー(F): Driver

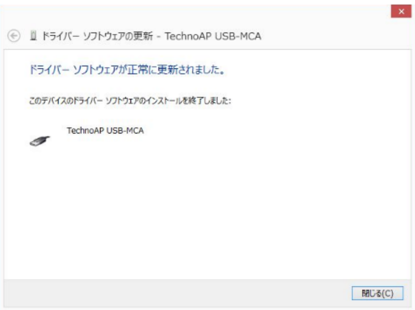
(13) When the "Windows security" screen appears, select "Install this driver software (I)". When the message "Driver software has been updated successfully" is displayed, select "Close (C)".


Windows セキュリティ
詳細の表示(D)

ドライバー ソフトウェアの発行元を検証できません

このドライバー ソフトウェアをインストールしない(N)
お使いのデバイス用の、更新されたドライバー ソフトウェアが存在するかどうか製造元の Web サイトで確認してください。

このドライバー ソフトウェアをインストールします(I)
製造元の Web サイトまたはディスクから取得したドライバー ソフトウェアのみインストールしてください。その他のソースから取得した署名のないソフトウェアは、コンピューターに危害を及ぼしたり、情報を盗んだりする可能性があります。

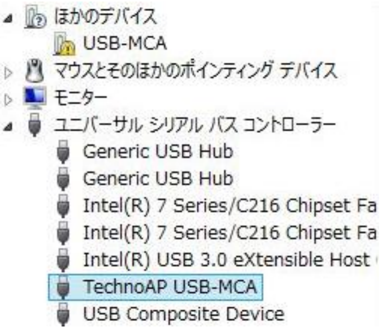

ドライバー ソフトウェアの更新 - TechnoAP USB-MCA
閉じる(C)

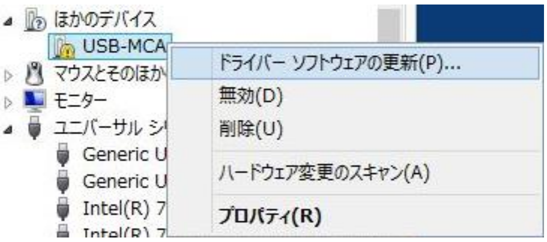
ドライバー ソフトウェアが正常に更新されました。

このデバイスのドライバー ソフトウェアのインストールを終了しました:

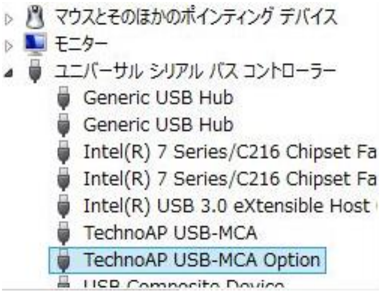
TechnoAP USB-MCA

(14) When "TechnoAP USB-MCA" is displayed on the "Device Manager" screen, right-click the remaining "USB-MCA" and repeat from (11) to update the remaining driver software.


ほかのデバイス
USB-MCA
マウスとそのほかのポインティング デバイス
モニター
ユニバーサル シリアル バス コントローラー
Generic USB Hub
Generic USB Hub
Intel(R) 7 Series/C216 Chipset Fa
Intel(R) 7 Series/C216 Chipset Fa
Intel(R) USB 3.0 eXtensible Host
TechnoAP USB-MCA
USB Composite Device


ほかのデバイス
USB-MCA
マウスとそのほか
モニター
ユニバーサル シ
Generic U
Generic U
Intel(R) 7
ドライバー ソフトウェアの更新(P)...
無効(D)
削除(U)
ハードウェア変更のスキャン(A)
プロパティ(R)

(15) The "TechnoAP USB-MCA Option" is displayed on the "Device Manager" screen, and the driver software installation is complete.

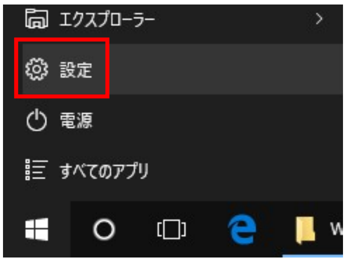

マウスとそのほかのポインティング デバイス
モニター
ユニバーサル シリアル バス コントローラー
Generic USB Hub
Generic USB Hub
Intel(R) 7 Series/C216 Chipset Fa
Intel(R) 7 Series/C216 Chipset Fa
Intel(R) USB 3.0 eXtensible Host
TechnoAP USB-MCA
TechnoAP USB-MCA Option

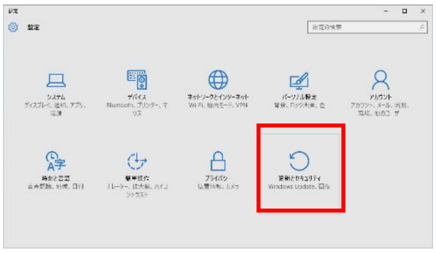
For Windows10 (64bit)

In Windows 10 (64-bit), driver software without digital signature cannot be installed by default to prevent the user from installing driver software by mistake. Since this driver software does not have a digital signature, it is necessary to "disable force driver signature enforcement" before installing it according to the following procedure.

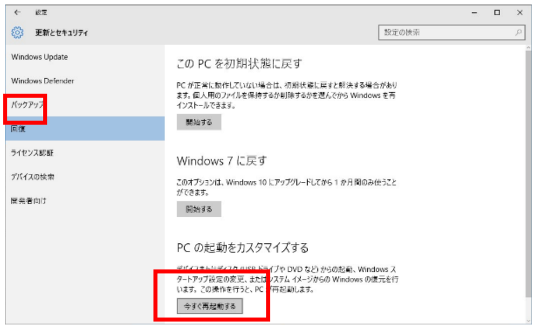
(1) Click the "Windows" mark ⊞ at the bottom left of the screen to display the "Start Menu".

(2) Select "Settings" from the start menu and select "Change & Security" from the settings menu.


エクスプローラー
設定
電源
すべてのアプリ


設定
設定
設定の検索
システム
ディスプレイ、通知、アプリ、電源
デバイス
Bluetooth、プリンター、マウス
ネットワークとインターネット
Wi-Fi、機内モード、VPN
パーソナル設定
背景、ロック画面、色
アカウント
時刻と言語
簡単操作
プライバシー
位置情報、カメラ
更新とセキュリティ
Windows Update、回復

(3) Select "Recovery" from the "Change and Security" screen and select "Customize PC startup" - "Restart now".


設定
更新とセキュリティ
設定の検索
Windows Update
Windows Defender
バックアップ
回復
ライセンス認証
デバイスの検索
開発者向け

この PC を初期状態に戻す

PC が正常に動作していない場合は、初期状態に戻すと解決する場合があります。個人用のファイルを保持するか削除するかを選んでから Windows を再インストールできます。

開始する

Windows 7 に戻す

このオプションは、Windows 10 にアップグレードしてから 1 か月間のみ使うことができます。

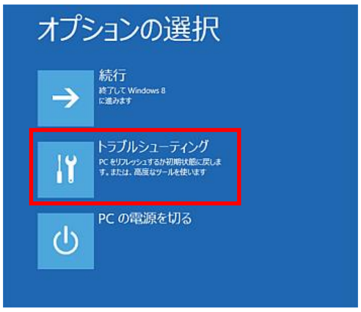
開始する

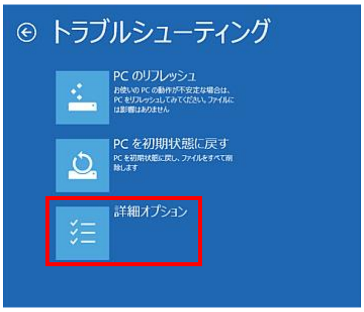
PC の起動をカスタマイズする

デバイスまたはディスク (USB ドライブや DVD など) からの起動、Windows スタートアップ設定の変更、またはシステム イメージからの Windows の復元を行います。この操作を行うと、PC が再起動します。

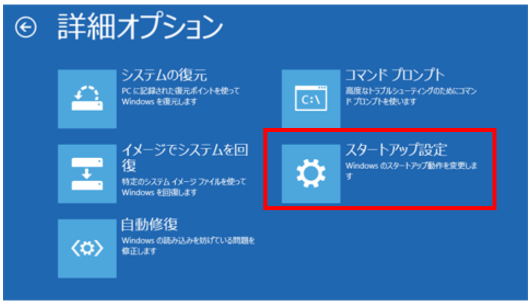
今すぐ再起動する

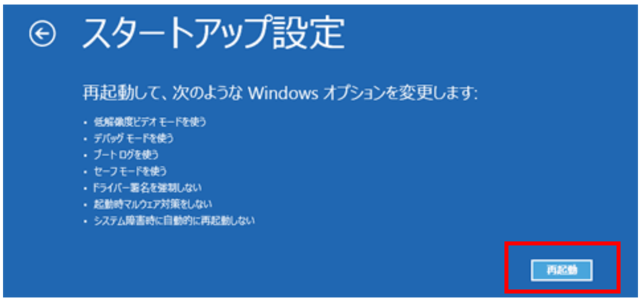
(4) Select "Troubleshooting" from the "Select Options" screen and select "Advanced Options" from the "Troubleshooting" screen.


オプションの選択
続行
終了して Windows 8 に進みます
トラブルシューティング
PC をリフレッシュするか初期状態に戻します。または、高度なツールを使います
PC の電源を切る


トラブルシューティング
PC のリフレッシュ
お使いの PC の動作が不安定な場合は、PC をリフレッシュしてみてください。ファイルには影響はありません
PC を初期状態に戻す
PC を初期状態に戻し、ファイルをすべて削除します
詳細オプション

(5) Select "Startup Settings" from the "Advanced Options" screen, and select "Restart" on the "Startup Settings" screen.


詳細オプション
システムの復元
PC に記録された復元ポイントを使って Windows を復元します
コマンド プロンプト
高度なトラブルシューティングのためにコマンド プロンプトを使います
イメージでシステムを回復
特定のシステム イメージ ファイルを使って Windows を回復します
スタートアップ設定
Windows のスタートアップ動作を変更します
自動修復
Windows の読み込みを妨げている問題を修正します

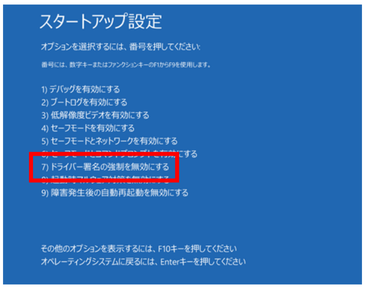

スタートアップ設定

再起動して、次のような Windows オプションを変更します:

- 低解像度ビデオ モードを使う
- デバッグ モードを使う
- ブート ログを使う
- セーフ モードを使う
- ドライバー署名を強制しない
- 起動時マルウェア対策をしない
- システム障害時に自動的に再起動しない

再起動

(6) On the "Startup Settings" screen after rebooting, press the "7" key and select "7) Disable Force Driver Signing".



スタートアップ設定

オプションを選択するには、番号を押してください:

番号には、数字キーまたはファンクションキーのF1からF9を使用します。

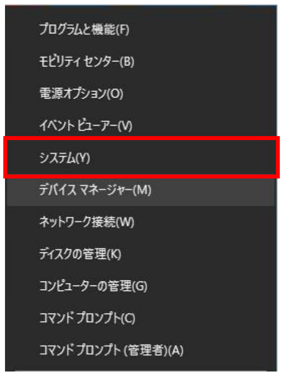
1) デバッグを有効にする
2) ブートログを有効にする
3) 低解像度ビデオを有効にする
4) セーフモードを有効にする
5) セーフモードとネットワークを有効にする
6) セーフモードとコマンドプロンプトを有効にする
7) ドライバー署名の強制を無効にする
8) 起動時マルウェア対策を無効にする
9) 障害発生後の自動再起動を無効にする

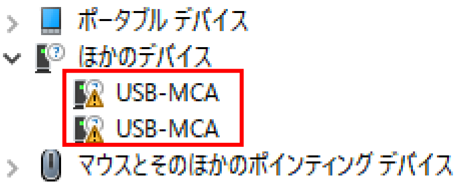
その他のオプションを表示するには、F10キーを押してください
オペレーティングシステムに戻るには、Enterキーを押してください

(7) REQUIRED After rebooting, log in as an administrator or log in with an account with administrator privileges.

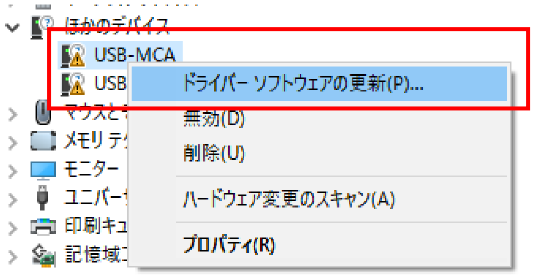
(8) Connect the USB-MCA to the PC with a USB cable.

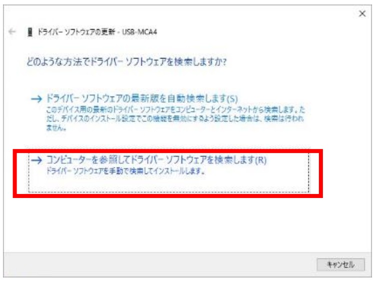
(9) Right-click the "Windows" mark ⊞ on the lower left of the screen to display "Menu", and select "Device Manager".


プログラムと機能(F)
モビリティ センター(B)
電源オプション(O)
イベント ビューアー(V)
システム(Y)
デバイス マネージャー(M)
ネットワーク接続(W)
ディスクの管理(K)
コンピューターの管理(G)
コマンド プロンプト(C)
コマンド プロンプト (管理者)(A)


ポータブル デバイス
ほかのデバイス
USB-MCA
USB-MCA
マウスとそのほかのポインティング デバイス

(10) Right-click "USB-MCA", select "Update Driver Software (P)" , and select "Browse my computer for driver software (R)".


ほかのデバイス
USB-MCA
USB
ドライバー ソフトウェアの更新(P)...
無効(D)
削除(U)
ハードウェア変更のスキャン(A)
プロパティ(R)
メモリ テ
モニター
ユニバー
印刷キュ
記憶域



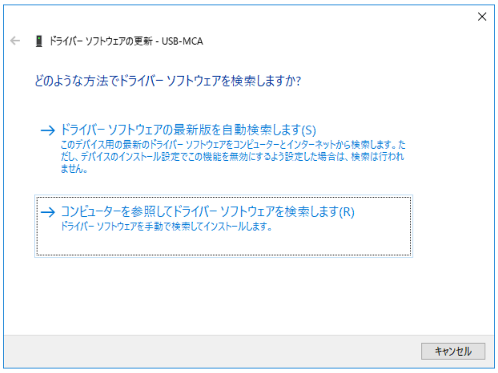
ドライバー ソフトウェアの更新 - USB-MCA4

どのような方法でドライバー ソフトウェアを検索しますか?

→ ドライバー ソフトウェアの最新版を自動検索します(S)
このデバイス用の最新のドライバー ソフトウェアをコンピューターとインターネットから検索します。ただし、デバイスのインストール設定でこの機能を無効にするよう設定した場合は、検索は行われません。

→ コンピューターを参照してドライバー ソフトウェアを検索します(R)
ドライバー ソフトウェアを手動で検索してインストールします。

(11) When the "Update Driver Software" screen is displayed, select "Reference (R)", and when "Browse Folder" screen is displayed, select the drive where the driver software of "USB-MCA " is stored. Select when you return to the "Update Driver Software" screen, select "Next (N)".

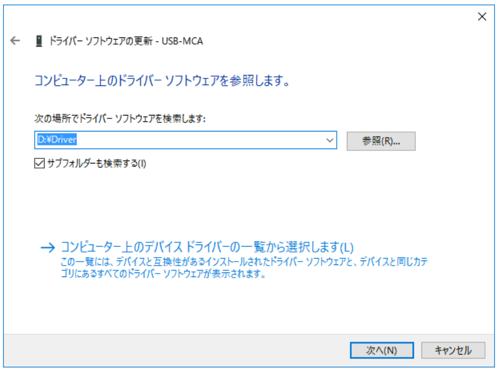


ドライバー ソフトウェアの更新 - USB-MCA

どのような方法でドライバー ソフトウェアを検索しますか?

→ ドライバー ソフトウェアの最新版を自動検索します(S)
このデバイス用の最新のドライバー ソフトウェアをコンピューターとインターネットから検索します。ただし、デバイスのインストール設定でこの機能を無効にするよう設定した場合は、検索は行われません。

→ コンピューターを参照してドライバー ソフトウェアを検索します(R)
ドライバー ソフトウェアを手動で検索してインストールします。



ドライバー ソフトウェアの更新 - USB-MCA

コンピューター上のドライバー ソフトウェアを参照します。

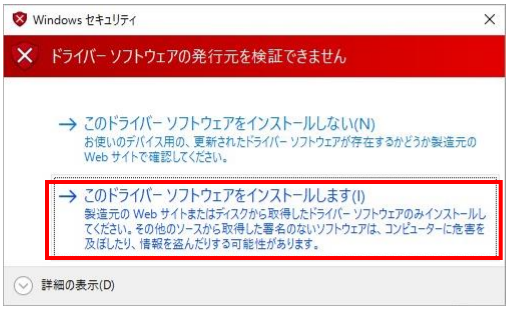
次の場所でドライバー ソフトウェアを検索します:
D:¥Driver

☑ サブフォルダーも検索する(I)

→ コンピューター上のデバイス ドライバーの一覧から選択します(L)
この一覧には、デバイスと互換性があるインストールされたドライバー ソフトウェアと、デバイスと同じカテゴリにあるすべてのドライバー ソフトウェアが表示されます。

参照(R)...
次へ(N)
キャンセル

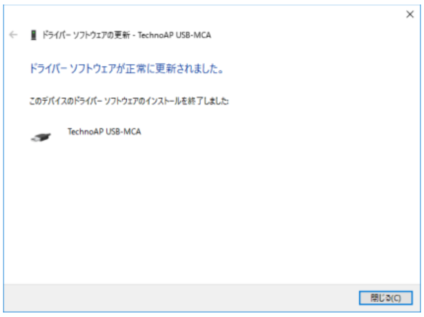
(12) When the "Windows Security" screen is displayed, select "Install this driver software (I)". When "Driver software has been updated successfully" is displayed, select "Close (C)".


Windows セキュリティ
詳細の表示(D)

ドライバー ソフトウェアの発行元を検証できません

→ このドライバー ソフトウェアをインストールしない(N)
お使いのデバイス用の、更新されたドライバー ソフトウェアが存在するかどうか製造元の Web サイトで確認してください。

→ このドライバー ソフトウェアをインストールします(I)
製造元の Web サイトまたはディスクから取得したドライバー ソフトウェアのみインストールしてください。その他のソースから取得した署名のないソフトウェアは、コンピューターに危害を及ぼしたり、情報を盗んだりする可能性があります。

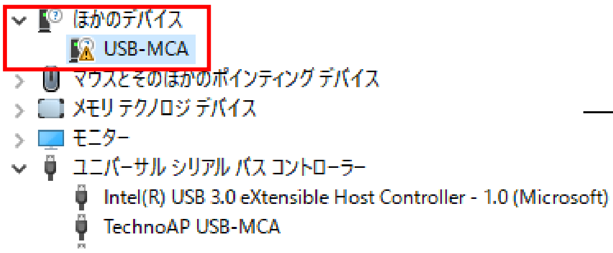

ドライバー ソフトウェアの更新 - TechnoAP USB-MCA
閉じる(C)

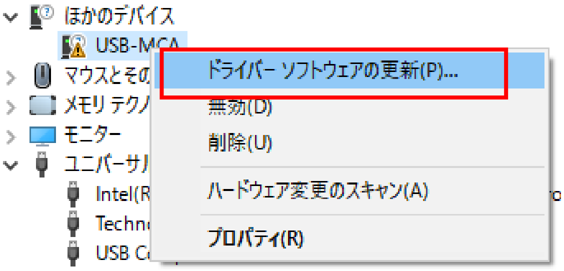
ドライバー ソフトウェアが正常に更新されました。

このデバイスのドライバー ソフトウェアのインストールを終了しました:

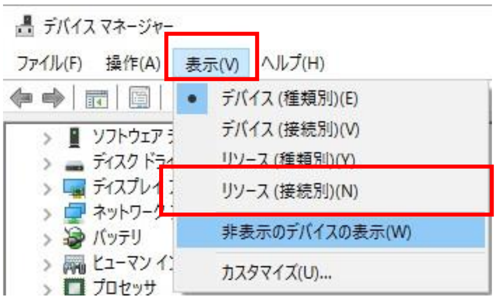
TechnoAP USB-MCA

(13) When "TechnoAP USB - MCA" is displayed on the "Device Manager" screen, right-click the remaining "USB-MCA", repeat from (11), and update the remaining driver software.

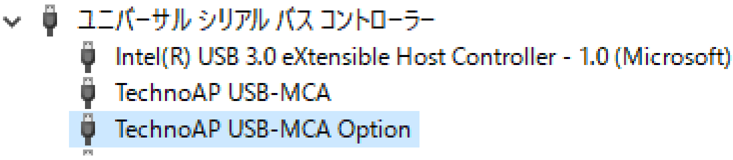

ほかのデバイス
USB-MCA
マウスとそのほかのポインティング デバイス
メモリ テクノロジ デバイス
モニター
ユニバーサル シリアル バス コントローラー
Intel(R) USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)
TechnoAP USB-MCA


ほかのデバイス
USB-MCA
マウスとその
メモリ テクノ
モニター
ユニバーサ
Intel(R
Techn
USB C
ドライバー ソフトウェアの更新(P)...
無効(D)
削除(U)
ハードウェア変更のスキャン(A)
プロパティ(R)

(14) If "TechnoAP USB-MCA" is not displayed on the "Device manager" screen, select "Show hidden devices" from "Display" in the device menu.


デバイス マネージャー
ファイル(F)
操作(A)
表示(V)
ヘルプ(H)
ソフトウェア
ディスク ドラ
ディスプレイ
ネットワーク
バッテリ
ヒューマン イ
プロセッサ
デバイス (種類別)(E)
デバイス (接続別)(V)
リソース (種類別)(Y)
リソース (接続別)(N)
非表示のデバイスの表示(W)
カスタマイズ(U)...

(15) The "TechnoAP USB-MCA Option" is displayed on the "Device Manager" screen, and installation of the driver software is completed.

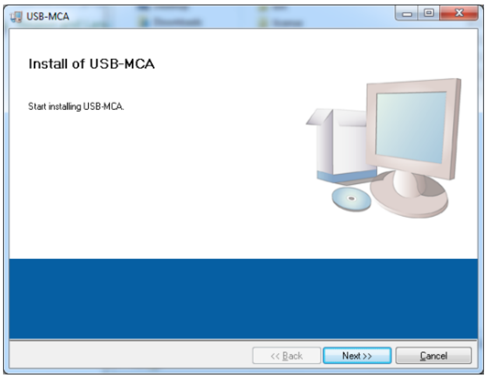

ユニバーサル シリアル バス コントローラー
Intel(R) USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)
TechnoAP USB-MCA
TechnoAP USB-MCA Option

4.3. Installation of the applications software

After the driver software has been successfully installed as described in the previous chapter, you need to install the USB-MCA application (the executable file) and the LabVIEW runtime engine, which is the development environment. The installer on the included CD contains the USB-MCA application and the LabVIEW runtime engine, which can be installed at the same time. The installation procedure is as follows..

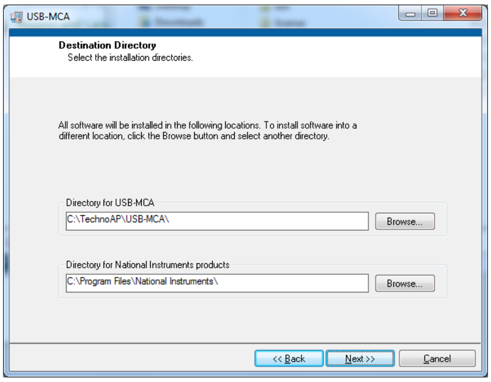
For Windows 7 * Same for Windows 8

(1) REQUIRED Log in as Administrator or an account of Administrative right.
(2) Execute "setup.exe" in the "Application" folder in the attached CD. Proceed with the installation interactively



Install of USB-MCA

Start installing USB-MCA.

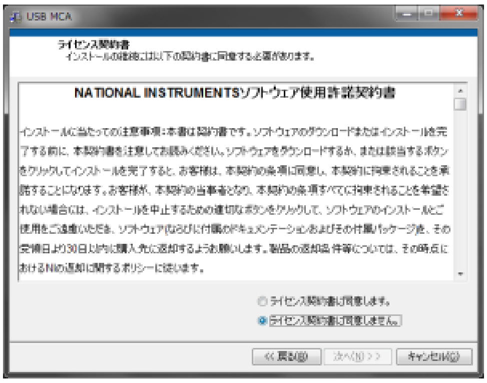


Destination Directory
Select the installation directories.

All software will be installed in the following locations. To install software into a different location, click the Browse button and select another directory.

Directory for USB-MCA: C:\TechnoAP\USB-MCA\

Directory for National Instruments products: C:\Program Files\National Instruments\

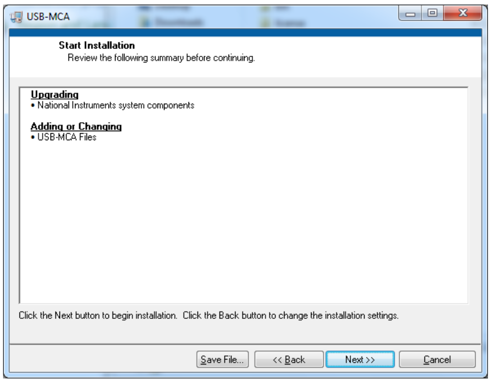


ライセンス契約書
インストールの継続には以下の契約書に同意する必要があります。

NATIONAL INSTRUMENTSソフトウェア使用許諾契約書

インストールに当たっての注意事項：本書は契約書です。ソフトウェアのダウンロードまたはインストールを完了する前に、本契約書を注意してお読みください。ソフトウェアをダウンロードするか、または該当するボタンをクリックしてインストールを完了すると、お客様は、本契約の条項に同意し、本契約に拘束されることを承諾することになります。お客様が、本契約の当事者となり、本契約の条項すべてに拘束されることを希望されない場合には、インストールを中止するための適切なボタンをクリックして、ソフトウェアのインストールとご使用をご遠慮いただき、ソフトウェア（ならびに付属のドキュメンテーションおよびその付属パッケージ）を、その受領日より30日以内に購入先に返却するようお願いします。製品の返却条件等については、その時点におけるNIの返却に関するポリシーに従います。

○ ライセンス契約書に同意します。
● ライセンス契約書に同意しません。

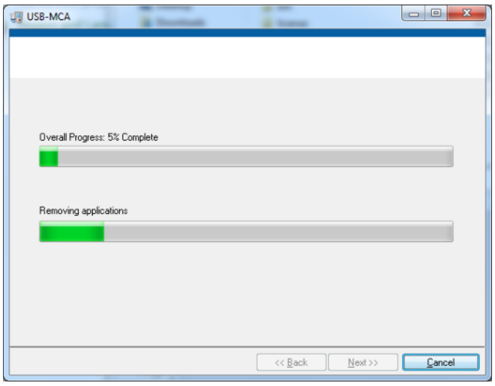


Start Installation
Review the following summary before continuing.

Upgrading
- National Instruments system components

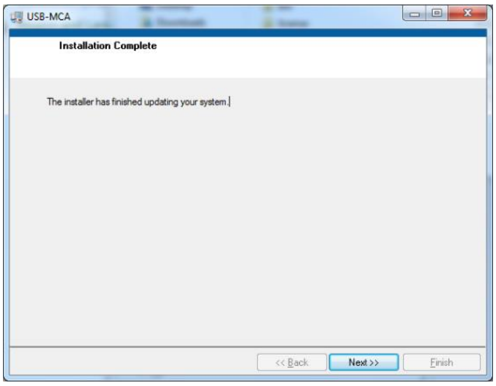
Adding or Changing
- USB-MCA Files

Click the Next button to begin installation. Click the Back button to change the installation settings.



Overall Progress: 5% Complete

Removing applications



Installation Complete

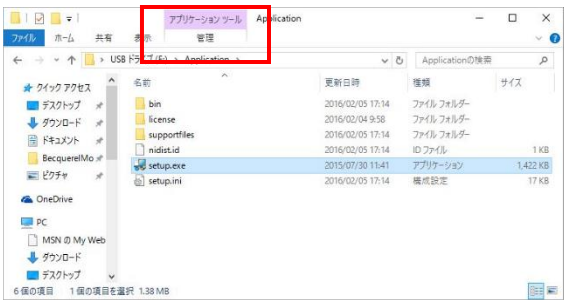
The installer has finished updating your system.

(3) Execute "Start button" - "TechnoAP" - "USB-MCA".
(4) The application "USB-MCA" will start.

If the "connection error" dialog is displayed immediately after startup, check whether the device is properly connected to the PC and whether the device is recognized by the device manager.

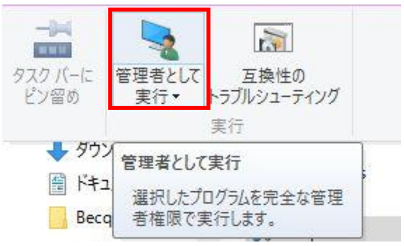
For Windows 10 　* Same for Windows 11

(1) Select "Setup.exe" in the "Application" folder in the supplied CD. Select "Manage" in the application tool of the menu and select "Run as administrator".


アプリケーション ツール
Application
ファイル
ホーム
共有
表示
管理
USB ドライブ (F:) > Application >
Applicationの検索
クイック アクセス
デスクトップ
ダウンロード
ドキュメント
BecquerelMo
ピクチャ
OneDrive
PC
MSN の My Web
ダウンロード
デスクトップ
名前
更新日時
種類
サイズ

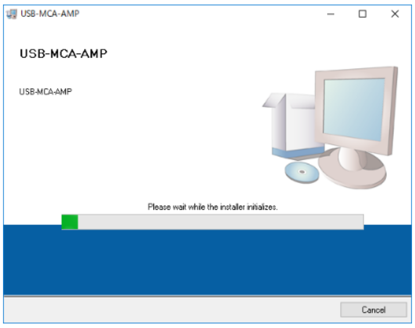
名前	更新日時	種類	サイズ
bin	2016/02/05 17:14	ファイル フォルダー	
license	2016/02/04 9:58	ファイル フォルダー	
supportfiles	2016/02/05 17:14	ファイル フォルダー	
nidist.id	2016/02/05 17:14	ID ファイル	1 KB
setup.exe	2015/07/30 11:41	アプリケーション	1,422 KB
setup.ini	2016/02/05 17:14	構成設定	17 KB

6 個の項目　1 個の項目を選択 1.38 MB

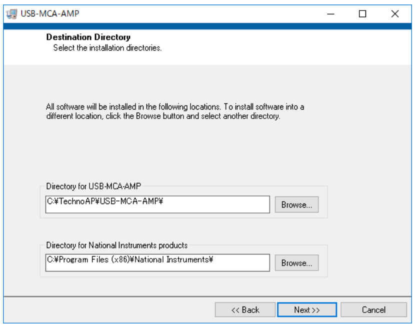

タスク バーに
ピン留め
管理者として
実行
互換性の
トラブルシューティング
実行
ダウン
ドキュ
Becq
管理者として実行

選択したプログラムを完全な管理者権限で実行します。

(2) Run "Setup.exe" in the "Application" folder in the supplied CD. Proceed with the installation interactively.


USB-MCA-AMP
USB-MCA-AMP
USB-MCA-AMP
Cancel

Please wait while the installer initializes.

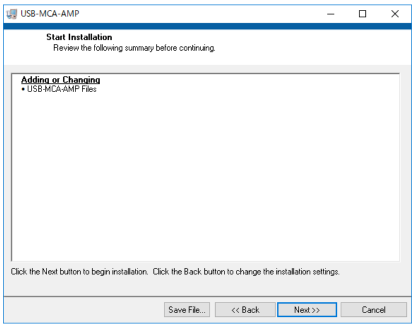

USB-MCA-AMP
Browse...
Browse...
<< Back
Next >>
Cancel

Destination Directory
Select the installation directories.

All software will be installed in the following locations. To install software into a different location, click the Browse button and select another directory.

Directory for USB-MCA-AMP
C:¥TechnoAP¥USB-MCA-AMP¥

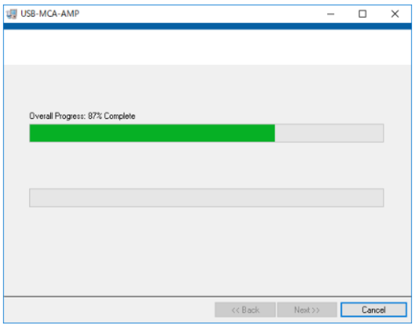
Directory for National Instruments products
C:¥Program Files (x86)¥National Instruments¥


USB-MCA-AMP
Save File...
<< Back
Next >>
Cancel

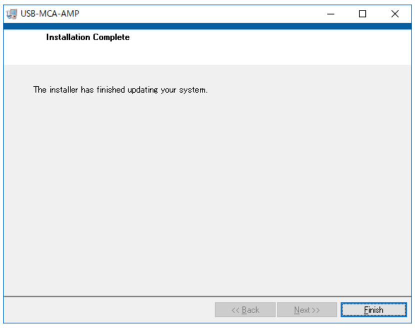
Start Installation
Review the following summary before continuing.

Adding or Changing
- USB-MCA-AMP Files

Click the Next button to begin installation. Click the Back button to change the installation settings.


USB-MCA-AMP
<< Back
Next >>
Cancel

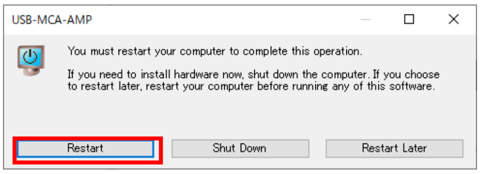
Overall Progress: 87% Complete


USB-MCA-AMP
<< Back
Next >>
Finish

Installation Complete

The installer has finished updating your system.

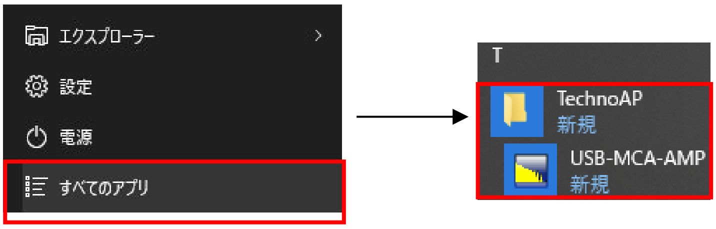
(3) Display the computer restart, click the "Restart" button to restart.


USB-MCA-AMP
Restart
Shut Down
Restart Later

You must restart your computer to complete this operation.

If you need to install hardware now, shut down the computer. If you choose to restart later, restart your computer before running any of this software.

(4) Right-click the "Windows" mark at the bottom left of the screen to display "Menu" and execute "All apps"-"TechnoAP"-"USB-MCA ".

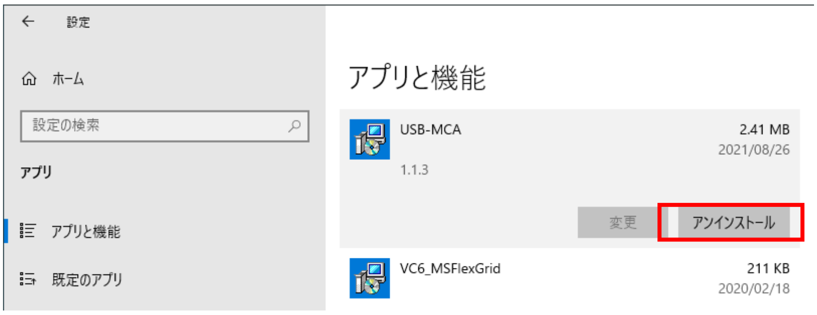

エクスプローラー
設定
電源
すべてのアプリ
T
TechnoAP
新規
USB-MCA-AMP
新規

(5) The application "USB-MCA" starts up.

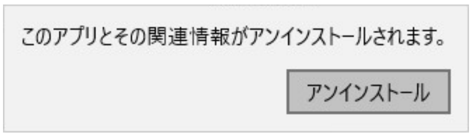
If a "connection error" dialog is displayed immediately after startup, check if the device is correctly connected to the PC or if the device manager recognizes the device.

*** Uninstall**

To uninstall, select "USB-MCA" from "Settings"-"System"-"Apps and Features" and select "Uninstall".


設定
ホーム
設定の検索
アプリ
アプリと機能
既定のアプリ
アプリと機能
USB-MCA
2.41 MB
2021/08/26
1.1.3
変更
アンインストール
VC6_MSFlexGrid
211 KB
2020/02/18

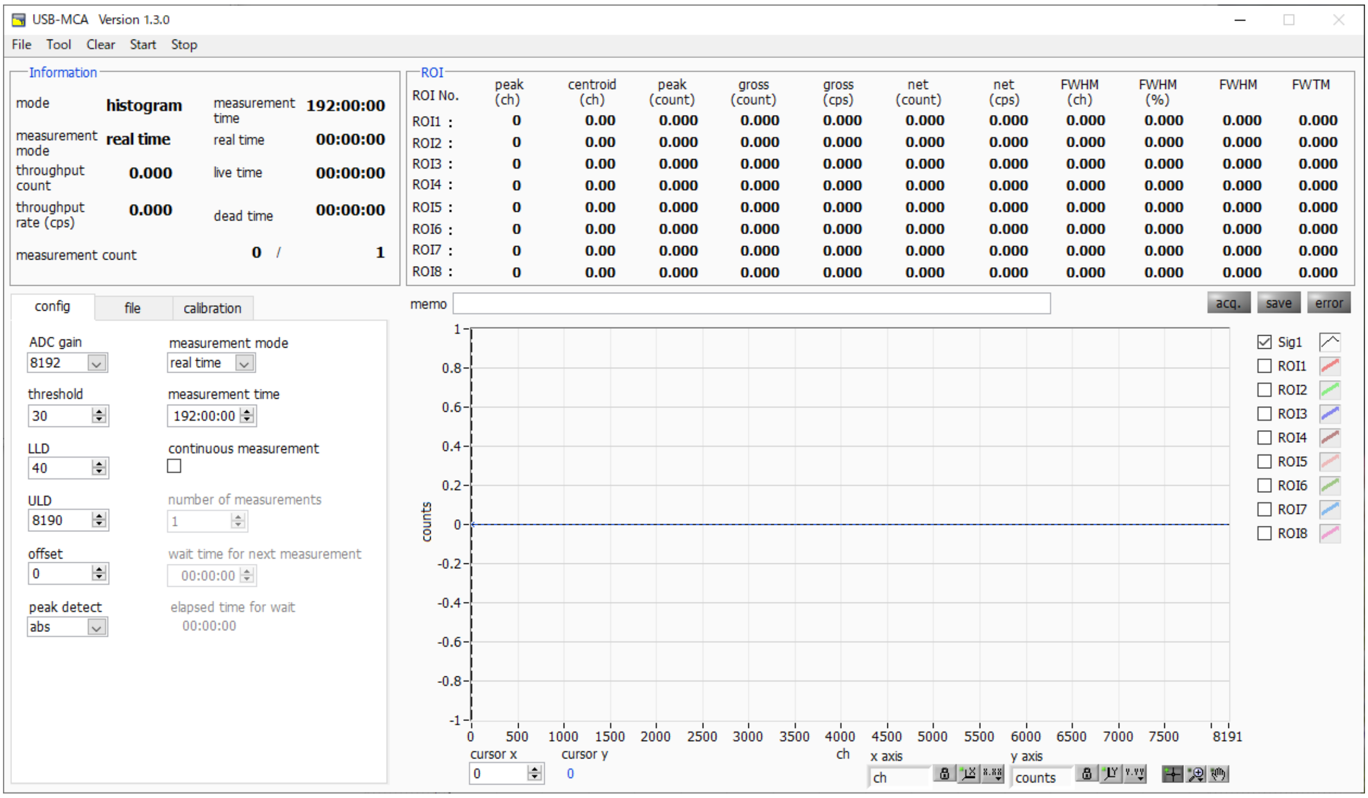
"Uninstall this application and its related information will be stalled easily" is displayed. Select "Uninstall".


このアプリとその関連情報がアンインストールされます。

5. Application screen

5.1. Startup screen

Execute in order of start button, “TechnoAP”, “USB-MCA”. Alternatively, if you execute the shortcut icon "USB-MCA" on the desktop, the following startup screen will be displayed.



mode **histogram**
measurement time **192:00:00**
measurement mode **real time**
real time **00:00:00**
throughput count **0.000**
live time **00:00:00**
throughput rate (cps) **0.000**
dead time **00:00:00**
measurement count **0** / **1**

ROI No.	peak (ch)	centroid (ch)	peak (count)	gross (count)	gross (cps)	net (count)	net (cps)	FWHM (ch)	FWHM (%)	FWHM	FWTM
ROI1 :	0	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ROI2 :	0	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ROI3 :	0	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ROI4 :	0	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ROI5 :	0	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ROI6 :	0	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ROI7 :	0	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ROI8 :	0	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

ADC gain 8192
threshold 30
LLD 40
ULD 8190
offset 0
peak detect abs
measurement mode real time
measurement time 192:00:00
continuous measurement ☐
number of measurements 1
wait time for next measurement 00:00:00
elapsed time for wait 00:00:00

☑ Sig1
☐ ROI1
☐ ROI2
☐ ROI3
☐ ROI4
☐ ROI5
☐ ROI6
☐ ROI7
☐ ROI8

cursor x 0
cursor y 0
x axis ch
y axis counts

Figure 2: Startup screen of USB-MCA

* Menu section

File - open config	Reading the configuration file
File - open histogram	Reading the histogram data file
File -save config	Save current setting to file
File - "save histogram	Save current histogram to file
File - save image	Save this screen with PNG form image
File - quit	Quit
Tool - gauss fit analysis	Open gauss fit screen. Performs Gaussian fitting on the specified peak and performs half-value width analysis, etc.
Tool - peak search analysis	Open peak search screen. Perform peak detection on histogram data and perform half-value width analysis, etc.
Clear	Initialize histogram data in this device
Start	After sending all settings to this device, send measurement start to this device
Stop	Send measurement stop to this device

* Tab section

config	Measurement settings
file	File settings
calibration	Settings such as ROI (Region Of Interest) for energy calibration

* Information section

mode	Mode. Indicate "histogram"
measurement mode	Measurement mode. Display "Real time" or "Live time"
throughput count	Total count. The number of the handled events
throughput rate(cps)	Count rate. The number of the handled events for one second
measurement time	Setting measurement time
real time	Real time (real measurement time)
live time	Live thyme (effective measurement time). real time - dead time
dead time	Dead time (invalidity measurement time). real time - live time This is the dead time from when the input signal exceeds "threshold" (described later) to when a peak is detected, and its peak value is determined.

* ROI section

peak(ch)	Channel with maximum count
centroid(ch)	Center value (ch) calculated from the sum of all counts
peak(count)	Maximum count
gross(count)	Sum of counts between ROIs
gross(cps)	Sum of counts between ROIs per second
net(count)	Sum of counts minus background between ROIs
net(cps)	Sum of counts minus background between ROIs for 1 second
FWHM(ch)	Half width (ch)
FWHM(%)	Half width / Peak value * 100
FWHM	Half width
FWTM	1/10 the width of the peak

* acq. LED	Blinks during measurement
* save LED	Lights up while saving data
* error LED	Lights up when an error occurs

5.2. Quit screen

To exit the application, click "File" and then "quit" on the menu bar. After execution, the following confirmation screen for ending is displayed.

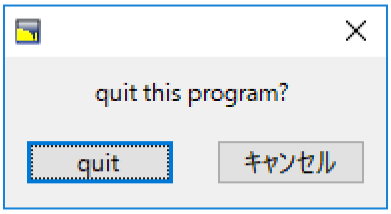
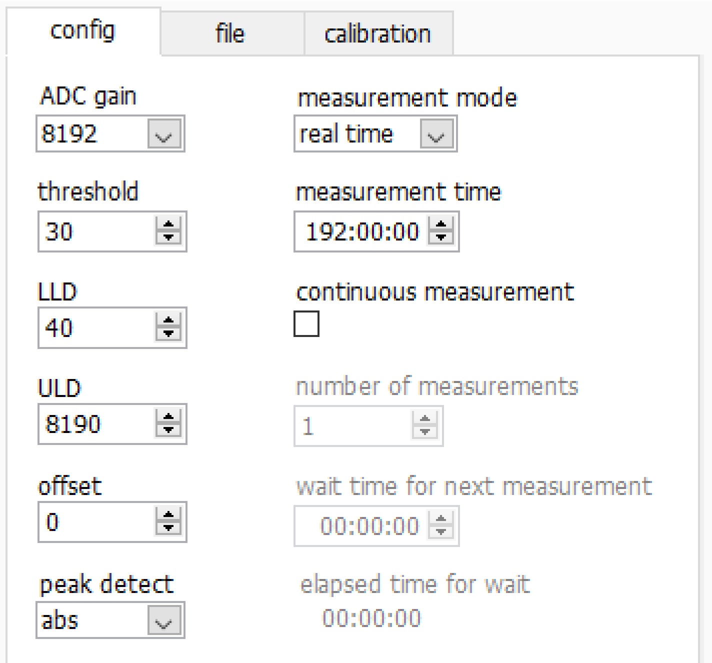

quit this program?

Figure 3 Quit confirmation window

Click the "quit" button to finish. After execution, the application screen disappears and ends.

5.3. config tab



ADC gain: 8192
threshold: 30
LLD: 40
ULD: 8190
offset: 0
peak detect: abs
measurement mode: real time
measurement time: 192:00:00
continuous measurement: ☐
number of measurements: 1
wait time for next measurement: 00:00:00
elapsed time for wait: 00:00:00

Figure 4 config tab

* ADC gain

Gain of ADC. Select from 16384, 8192, 4096, 2048, 1024, and 512 channels (ch). The input voltage range of the amplifier output signal of each channel is 0 to 10V. Divide this range by the above channel. For high energy resolution detectors such as Ge semiconductor detectors, you can obtain data with fine resolution by selecting 16384. However, when the count is small, it takes time to acquire the peak. Since energy resolution is somewhat inferior such as NaI (Tl) scintillation detector, if it can not be divided finely, set 4096 channels and so on.
Select from 16384, 8192, 4096, 2048, 1024, and 512 channels (ch).

※ Attention ※

The upper limit is as follows without being able to use all domains of the number of the channels.

ADC gain	16384	8192	4096	2048	1024	512
The channel upper limit	16127	8063	4031	2015	1008	504

* threshold

Sets the threshold (threshold) of the waveform acquisition start timing. The unit is digit. The setting range is 0 to 16383. Set to the value less than LLD. Waveform shaping Triggers for peak detection and AD conversion from the timing when the input signal exceeds the threshold setting value. If this setting is set too high, we can not acquire peak value of low energy. Conversely, if the setting is too small, noise will be picked up. For example, when "ADC gain" is "16384", set "threshold" and "LLD" at around 100 in the beginning. While looking at the histogram "input rate / throughput rate", gradually lower it, it discriminates the boundary with the noise where the value increases, and sets the threshold value slightly above it.

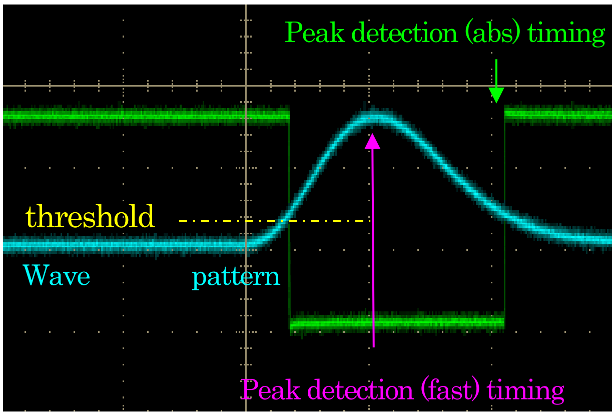


Figure 5　threshold and peak detection (abs / fast) timing

* Set LLD	energy LLD (Lower Level Discriminator). The unit is ch. We do not count ch below this threshold. Set it to a value greater than or equal to threshold and less than ULD.
* Set ULD	energy ULD (Upper Level Discriminator). The unit is ch. We do not count ch above this threshold. Set it to a value larger than LLD.

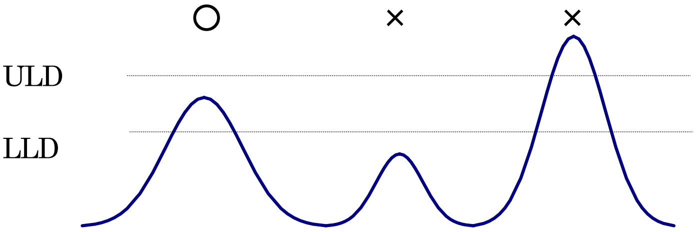
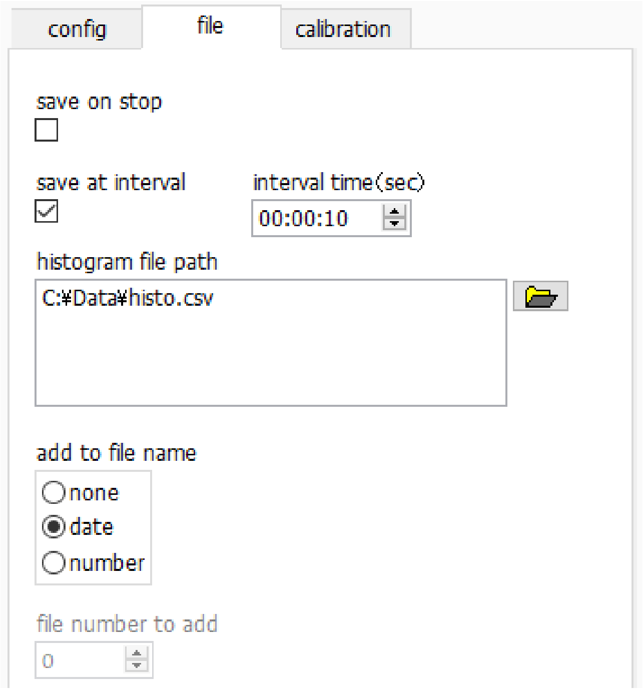


Figure 6　LLD and ULD

* offset		Set the offset of the positive direction. The unit is Ch.
* peak detect		Select "abs" or "fast" for a detection method of the peaks (high peak value)
	abs	Absolute mode. Start AD conversion when it arrives at the peak after surpassing threshold and it damps less than threshold. Acquirable high peak value more certainty.
	fast	Fast mode. It always seeks a high peak value and start AD conversion just after it arrives at the peak value. It is for high count measurement.
* mode		The mode is only "Histogram". Stores away a high peak value from the linear amplifier signal in up to 16,384 ch and makes histogram.
* measurement mode		Select "Real time" or "Live time" as a measurement mode.
	real time	It measure the time data which you set beforehand.
	live time	It measure it until the time that it set beforehand in effective measurement time (difference of real time and the dead time)
* measurement time		Measurement time setting. The set range is from 0 for 192 hours (8 days).
* continuous measurement		Possibility of continuous measurement execution. When ON, repeat measurement for the number of "number of measurements".
* number of measurements		Number of measurements during continuous measurement execution. 1 to 1,000,000.
* wait time for next measurement		Standby time before measurement starts at continuous measurement. 0 to 1 hour.
* elapsed time for wait		Waiting elapsed time.

5.4. file tab



save on stop ☐

save at interval ☑

interval time(sec): 00:00:10

histogram file path: C:¥Data¥histo.csv

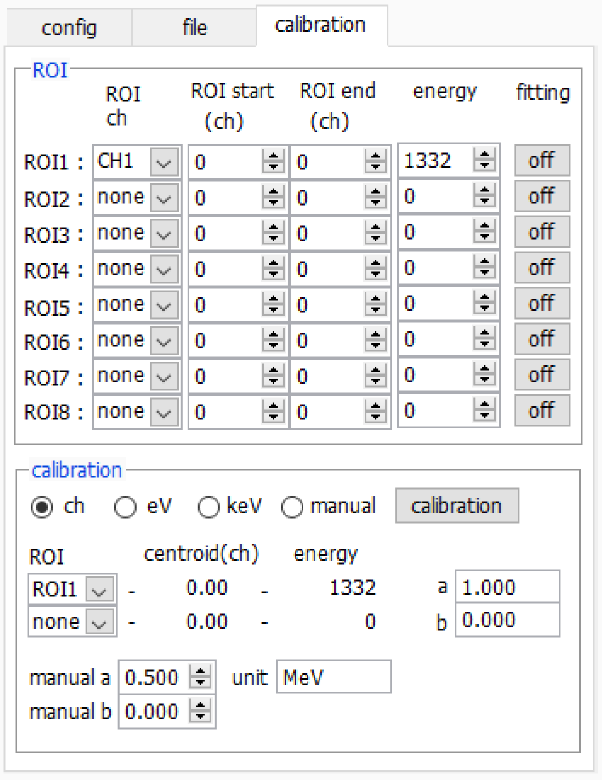
add to file name:
○none
●date
○number

file number to add: 0

Figure 7　file tab

* save on stop	When measurement is completed, histogram data is saved in a file. The file is saved in the same format as described above.
* save at interval	Sets whether to save histogram data to file at preset time intervals.
* interval time(sec)	Sets the time interval of consecutive saving of histogram data. The unit is seconds. The setting range is from 5 seconds to 3600 seconds.
* histogram file path	Sets the absolute path of the histogram data file. No extension is allowed. Depending on the setting of "add to file name", it will be in the following format based on this file name. As an example, check "save at interval", set 10 in "interval time(sec)", set "C: ¥Data ¥ histo.csv" in "histogram file path" , select "date" in "add to file name", then start measurement at 2023/09/01 12:00:00, At first , after 10 seconds , data storage starts with the file name "C:¥Data¥histo_20230901_120010.csv". then after next 10 seconds, save as "C:¥Data¥histo_20230901_120020.csv" file.
* add to file name	Selection of additional entry of histogram data file name.
none	No additional notes. ※Caution※ If you perform continuous measurement or regular saving, it will be overwritten.
date	Added measurement end date and time.
number	Added sequence number starts with file "file number to add"
* file number to add	Initial measurement number for appendix. The 6-digit number of 0 is appended to the file name. When it exceeds the maximum value 999999, it returns to 0. If there is a file with the same name, it will be overwritten.

5.5. calibration tab



ROI

	ROI ch	ROI start (ch)	ROI end (ch)	energy	fitting
ROI1 :	CH1	0	0	1332	off
ROI2 :	none	0	0	0	off
ROI3 :	none	0	0	0	off
ROI4 :	none	0	0	0	off
ROI5 :	none	0	0	0	off
ROI6 :	none	0	0	0	off
ROI7 :	none	0	0	0	off
ROI8 :	none	0	0	0	off

calibration

● ch ○ eV ○ keV ○ manual

ROI		centroid(ch)		energy		
ROI1	-	0.00	-	1332	a	1.000
none	-	0.00	-	0	b	0.000

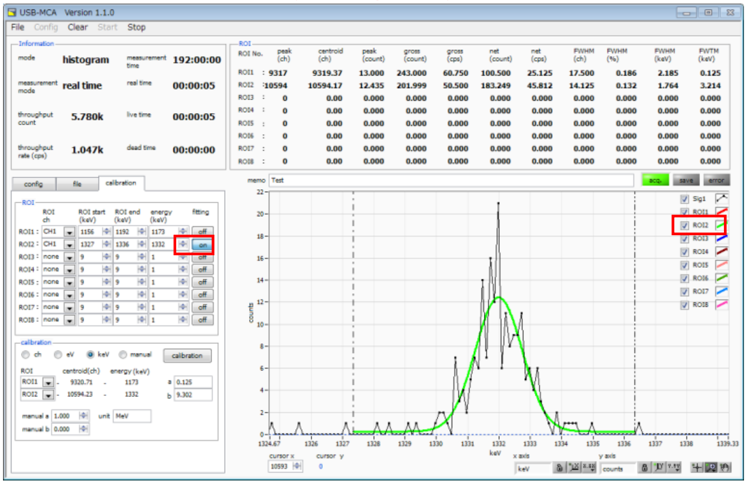
manual a 0.500
manual b 0.000
unit MeV

Figure 8 calibration tab

Set ROI (region of residence) and the energy calibration. It calculates the number of the counts or the half bandwidth of the peak by setting ROI at the spectrum peak.

"ROI" part

ROI CH	Choose the CH number that ROI intends for. It is stable in up to 8 ROI for 1 CH signal.
ROI start	Set a start position of ROI. The unit depends on the situation of the energy calibration.
ROI end	Set an end position of ROI. The unit depends on the situation of the energy calibration.
Energy	Define the energy level of the peak position (ch). In the case of 60Co, you set it 1173 or 1332. When you choose "ch" in next "calibration" part, it detects a peak between ROI and calculate keV/ch from the peak position (ch) and energy level that you set and do a summary for a calculation result of the half bandwidth.
Fitting	Set whether it applies gauss fitting for a spectrum between ROI. Even a state with a few counts can calculate half bandwidth when you make "ON" such as the chart below. ※ Caution ※ The CPU load may be higher by PC. In that case, please use "OFF".



Information

mode histogram
measurement time 192:00:00
measurement mode real time
real time 00:00:05
throughput count 5.780k
live time 00:00:05
throughput rate (cps) 1.047k
dead time 00:00:00

ROI

ROI No.	peak (ch)	centroid (ch)	peak (count)	gross (count)	gross (cps)	net (count)	net (cps)	FWHM (ch)	FWHM (%)	FWHM (keV)	FWTM (keV)
ROI1 :	9317	9319.37	13.000	243.000	60.750	100.500	25.125	17.500	0.186	2.185	0.125
ROI2 :	10594	10594.17	12.435	201.999	50.500	183.249	45.812	14.125	0.132	1.764	3.214
ROI3 :	0	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ROI4 :	0	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ROI5 :	0	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ROI6 :	0	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ROI7 :	0	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ROI8 :	0	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

memo Test

ROI

	ROI ch	ROI start (keV)	ROI end (keV)	energy (keV)	fitting
ROI1 :	CH1	1156	1192	1173	off
ROI2 :	CH1	1327	1336	1332	on
ROI3 :	none	9	9	1	off
ROI4 :	none	9	9	1	off
ROI5 :	none	9	9	1	off
ROI6 :	none	9	9	1	off
ROI7 :	none	9	9	1	off
ROI8 :	none	9	9	1	off

calibration

○ ch ○ eV ● keV ○ manual

ROI		centroid(ch)		energy (keV)		
ROI1	-	9320.71	-	1173	a	0.125
ROI2	-	10594.23	-	1332	b	9.302

manual a 1.000
manual b 0.000
unit MeV

cursor x 10593
cursor y 0
x axis keV
y axis counts

"calibration" part

Types of calibration: Choose the unit of the X-axis among following three.

ch — ch (channel) unit indication
The unit of "FWHM" of "FWTM" of ROI is optional.

eV — eV unit indication. Calculate degree of leaning a and graft b of linear function y=ax+b so that ch is eV with two kinds of peaks (center level) in one spectrum and two points of calibration of the energy level and set it in the X-axis. The unit of "FWHM" of "FWTM" of ROI is "eV".

keV — keV unit indication. Calculate degree of leaning a and graft b of linear function y=ax+b so that ch is eV with two kinds of peaks (center level) in one spectrum and two points of calibration of the energy level and set it in the X-axis. The unit of "FWHM" of "FWTM" of ROI is "keV".
(Example) When there is 1173.24keV of 60Co in 5717.9ch, and there is 1332.5keV of 60Co in 6498.7ch, it calculates automatically “a” is 0.20397 and “b” is 6.958297 by two-point calibration.

Manual Set degree of leaning a and graft b and a unit label of linear function y=ax+b optionally in "manual a" and "manual b" by "unit" and, it used for energy calibration.

ROI — Choose ROI targeted for the energy calibration. In "centroid" and "energy of the right neighbor," a central value of choose ROI and energy set level are indicated. For example, it performed one-point calibration by peak center level of ROI1 and "energy" which you set beforehand when you choose "ROI1" and "none", and in case of two points of calibration by peak center level of ROI1 and ROI2 and "energy" which you set beforehand, when you choose "ROI1" and "ROI2".

Manual “a” and “b” — The degree of leaning in linear function y=ax+b to make the cross axle of the graph indicate a, the graft with b as a calculation result of the energy calibration.

Calibration button — Execute energy calibration depending on a type of calibration. Degree of leaning (a) and the graft (b) of the graph are calculated after execution. It is a linear function to be applied to the cross axle (y= ax+b), and t is displayed by "a" and "b" of the bottom. Please refer to "9.5. Calculation method of two-point calibration" later.

For example, choose "keV" in a calibration part and click "calibration" button. the cross-axle unit of graph, a set point of ROI, the unit of the calculation result of ROI become "keV" like the chart below.

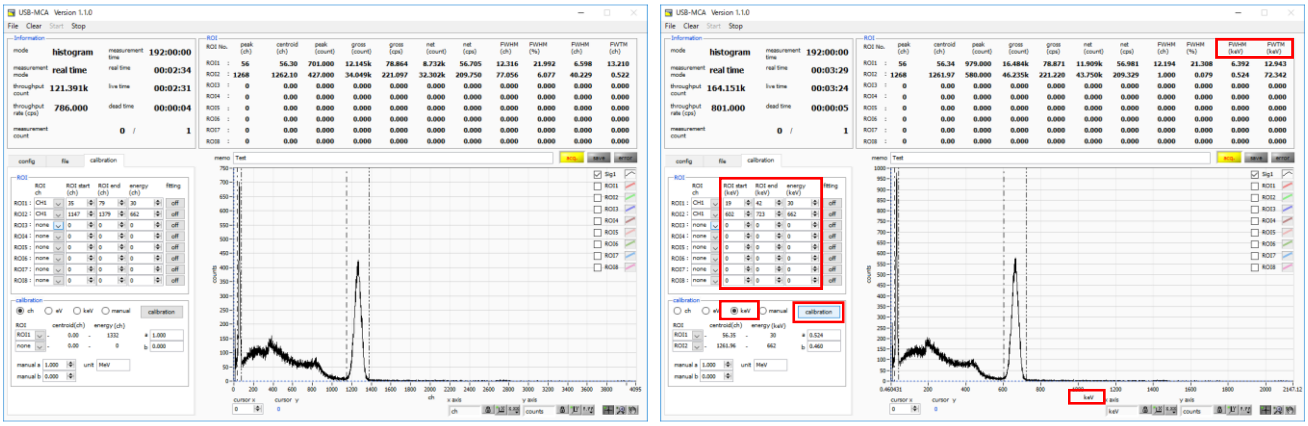
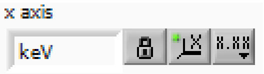


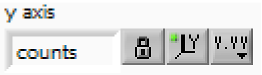
Figure 9 When "keV" is selected in the calibration section

(Left figure: before energy calibration execution, right figure: after energy calibration execution)

5.6. Graph

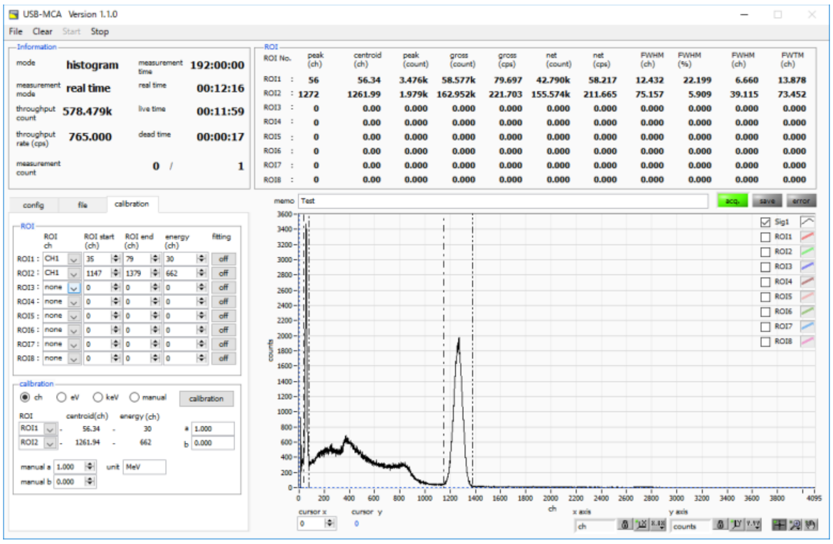
graph	Indicate the spectrum which gauss fitted by data between spectrum of CH1 and each ROI.
cursor x	Set the position of the dotted line cursor in the graph. The count value on the spectrum at the set position is displayed in “cursor y”.
X-axis range	Click the right button on the X-axis and check "an automatic scale", it becomes the automatic scale. Not an automatic scale, the minimum and the maximum of the X-axis become fixed when you exclude a check. When you change the minimum or the maximum, you put the pointer of the mouse on the numerical value to change and it click or double-clicking.
Y-axis range	Click the right button on the Y-axis and check "an automatic scale", it becomes the automatic scale. Not an automatic scale, the minimum and the maximum of the Y-axis become fixed when you exclude a check. When you change the minimum or the maximum, you put the pointer of the mouse on the numerical value to change and it click or double-clicking.




y axis
counts

In the X-axis, set the automatic scale and precision, mapping (linear / logarithm).

In the Y-axis, set the automatic scale and precision, mapping (linear / logarithm).


USB-MCA Version 1.1.0
File
Clear
Start
Stop
Information
ROI
config
file
calibration
memo
acq.
save
error
Sig1
ROI1
ROI2
ROI3
ROI4
ROI5
ROI6
ROI7
ROI8
counts
ch
cursor x
cursor y
x axis
y axis

mode	histogram	measurement time	192:00:00
measurement mode	real time	real time	00:12:16
throughput count	578.479k	live time	00:11:59
throughput rate (cps)	765.000	dead time	00:00:17
measurement count		0 /	1

ROI No.	peak (ch)	centroid (ch)	peak (count)	gross (count)	gross (cps)	net (count)	net (cps)	FWHM (ch)	FWHM (%)	FWHM (ch)	FWTM (ch)
ROI1 :	56	56.34	3.476k	58.577k	79.697	42.790k	58.217	12.432	22.199	6.660	13.878
ROI2 :	1272	1261.99	1.979k	162.952k	221.703	155.574k	211.665	75.157	5.909	39.115	73.452
ROI3 :	0	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ROI4 :	0	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ROI5 :	0	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ROI6 :	0	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ROI7 :	0	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ROI8 :	0	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

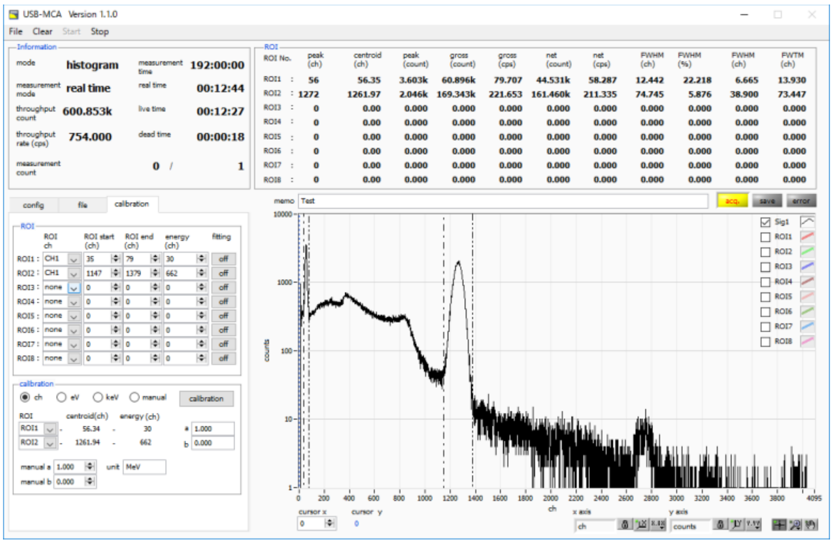
memo: Test

	ROI ch	ROI start (ch)	ROI end (ch)	energy (ch)	fitting
ROI1 :	CH1	35	79	30	off
ROI2 :	CH1	1147	1379	662	off
ROI3 :	none	0	0	0	off
ROI4 :	none	0	0	0	off
ROI5 :	none	0	0	0	off
ROI6 :	none	0	0	0	off
ROI7 :	none	0	0	0	off
ROI8 :	none	0	0	0	off

calibration: ● ch ○ eV ○ keV ○ manual

ROI	centroid(ch)	energy (ch)
ROI1	56.34	30
ROI2	1261.94	662

a 1.000
b 0.000
manual a 1.000
manual b 0.000
unit MeV
cursor x 0
cursor y 0


USB-MCA Version 1.1.0
File
Clear
Start
Stop
Information
ROI
config
file
calibration
memo
acq.
save
error
Sig1
ROI1
ROI2
ROI3
ROI4
ROI5
ROI6
ROI7
ROI8
counts
ch
cursor x
cursor y
x axis
y axis

mode	histogram	measurement time	192:00:00
measurement mode	real time	real time	00:12:44
throughput count	600.853k	live time	00:12:27
throughput rate (cps)	754.000	dead time	00:00:18
measurement count		0 /	1

ROI No.	peak (ch)	centroid (ch)	peak (count)	gross (count)	gross (cps)	net (count)	net (cps)	FWHM (ch)	FWHM (%)	FWHM (ch)	FWTM (ch)
ROI1 :	56	56.35	3.603k	60.896k	79.707	44.531k	58.287	12.442	22.218	6.665	13.930
ROI2 :	1272	1261.97	2.046k	169.343k	221.653	161.460k	211.335	74.745	5.876	38.900	73.447
ROI3 :	0	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ROI4 :	0	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ROI5 :	0	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ROI6 :	0	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ROI7 :	0	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ROI8 :	0	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

memo: Test

	ROI ch	ROI start (ch)	ROI end (ch)	energy (ch)	fitting
ROI1 :	CH1	35	79	30	off
ROI2 :	CH1	1147	1379	662	off
ROI3 :	none	0	0	0	off
ROI4 :	none	0	0	0	off
ROI5 :	none	0	0	0	off
ROI6 :	none	0	0	0	off
ROI7 :	none	0	0	0	off
ROI8 :	none	0	0	0	off

calibration: ● ch ○ eV ○ keV ○ manual

ROI	centroid(ch)	energy (ch)
ROI1	56.34	30
ROI2	1261.94	662

a 1.000
b 0.000
manual a 1.000
manual b 0.000
unit MeV
cursor x 0
cursor y 0

Figure 10 Select "linear" (upper) and "logarithm" (lower) in Y axis "mapping mode"

Cursor movement tool. The cursor can be moved on the graph when setting the ROI.

Zoom You can select and execute the following six zoom in and zoom out by clicking.

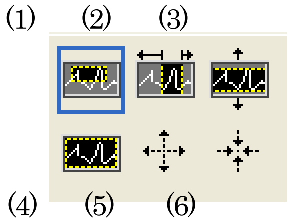


Figure 11 Graph zooming in and zoom out tool

(1) Rectangle Zoom Use this option to click on a point on the display as the corner of the zoom area and drag the tool until the rectangle occupies the zoom area.

(2) X - Zoom Zooms in the area of the graph along the X axis.

(3) Y - Zoom Zoom in on the graph area along the Y axis.

(4) Fit zoom Auto scales all X and Y scales on the graph.

(5) Zoom out centering on points. Click the center point to zoom out.

(6) Zoom in around the points. Click the center point to zoom in.

Pan tool. You can grab a plot and move on the graph.

6. Measurement

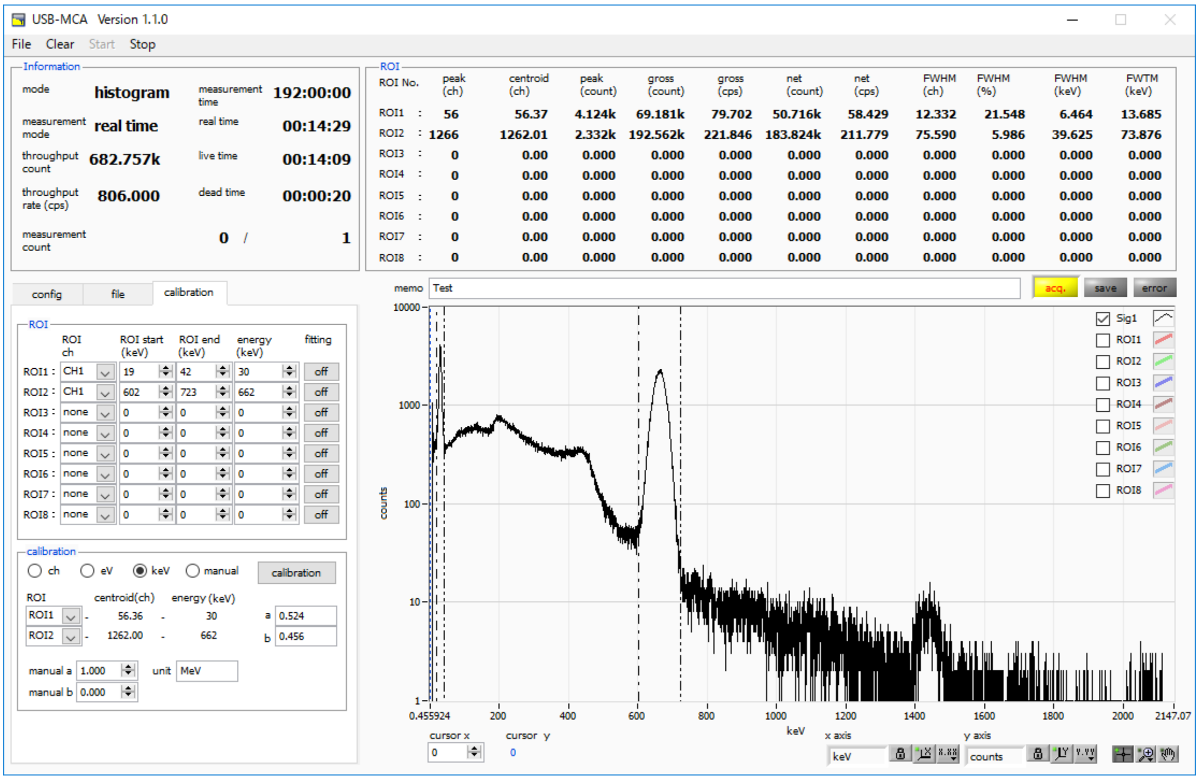
6.1. Start Measurement

(1) Click the menu "Clear". The histogram data in the device is initialized. If you want to continue the previously measured histogram or measurement results, start the next measurement without clicking "Clear".

(2) Click "Start" on the menu bar to start measurement after all settings have been sent to this device.

(3) After starting measurement, transition to the following state.

- "Acq" LED flashes.
- The measurement status is displayed in the "Information" section.
- Real time acquired from this device is displayed in "real time".
- The "live time" of each channel will display the live time acquired from this device.
- The dead time obtained from this device is displayed in "dead time" of each channel.
- Each "ROI No." in "ROI", "calibration" central value in tub ROI range, gloss count (range summation) and rate (net counts minus background from the sum in the range) Net Count And the calculation result such as rate, half width, 1/10 width etc. are displayed.
- A histogram is displayed on the graph.



Information

mode	histogram	measurement time	192:00:00
measurement mode	real time	real time	00:14:29
throughput count	682.757k	live time	00:14:09
throughput rate (cps)	806.000	dead time	00:00:20
measurement count		0 /	1

ROI

ROI No.	peak (ch)	centroid (ch)	peak (count)	gross (count)	gross (cps)	net (count)	net (cps)	FWHM (ch)	FWHM (%)	FWHM (keV)	FWTM (keV)
ROI1 :	56	56.37	4.124k	69.181k	79.702	50.716k	58.429	12.332	21.548	6.464	13.685
ROI2 :	1266	1262.01	2.332k	192.562k	221.846	183.824k	211.779	75.590	5.986	39.625	73.876
ROI3 :	0	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ROI4 :	0	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ROI5 :	0	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ROI6 :	0	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ROI7 :	0	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ROI8 :	0	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

memo Test

ROI

	ROI ch	ROI start (keV)	ROI end (keV)	energy (keV)	fitting
ROI1 :	CH1	19	42	30	off
ROI2 :	CH1	602	723	662	off
ROI3 :	none	0	0	0	off
ROI4 :	none	0	0	0	off
ROI5 :	none	0	0	0	off
ROI6 :	none	0	0	0	off
ROI7 :	none	0	0	0	off
ROI8 :	none	0	0	0	off

calibration

○ ch ○ eV ● keV ○ manual

ROI	centroid(ch)	energy (keV)		
ROI1	56.36	30	a	0.524
ROI2	1262.00	662	b	0.456

manual a 1.000

manual b 0.000

unit MeV

cursor x 0

cursor y 0

Figure 12 Measurement screen

6.2. Stop Measurement

- When "measurement mode" is "real time", measurement will end when "real time" reaches "measurement time".
- When "measurement mode" is "live time", measurement will end when "live time" reaches "measurement time".
- To stop during measurement, click the menu "Stop". Stop measurement after execution.

7. File

7.1. Histogram data file

(1) File format

Text format separated by comma (csv)

(2) File name

Create arbitrarily

(3) Configuration

[Header] header section

Measurement mode	Measurement mode. Real time or Live time
Measurement time	Measurement time. Unit is seconds
Real time	real time
Live time	live time
Dead time	Dead time
Start Time	Measurement start time
End Time	Measurement end time
ADC gain	ADC gain
threshold	threshold
LLD	energy LLD
ULD	Energy ULD
offset	offset
CursorX	position (ch), count

[Calculation] Calculation section, NOTE: The following is saved for each ROI

ROI No.	Input channel number targeted by ROI.
ROI start(any)	ROI start position (keV etc.)
ROI end(any)	ROI end position (keV etc.)
energy(any)	peak energy value (keV etc.)
fitting	whether execute fitting or not(.0: Non execution, 1: Execute)
peak(ch)	peak position between ROIs (ch)
centroid(ch)	Center position between ROIs (ch)
peak(count)	Maximum peak count between ROIs
gross(count)	Sum of counts between ROIs
gross(cps)	gross (count) per second
net(count	Sum of counts minus background between ROIs
net(cps)	net (count) per second
FWHM(ch)	Half-width between ROIs (ch)
FWHM(%)	Half-width between ROIs (%)
FWHM(any)	Half-width between ROIs (keV etc.)
FWTM(any)	1/10 width between ROIs (keV etc.)

[Status] Status section

throughput count	Total umber of events processed
throughput rate	Number of events processed per second

[Data] Data section

X-axis data (channel or eV, keV, arbitrary), histogram data. Up to 16384 points.

8. Function

8.1. Data acquisition by the GATE signal timing

When you want to acquire event data at that time from an external condition when an event occurs, input a LV-TTL level signal to the LEMO connector "GATE" on the front panel. When it is high, it measures. When it is low, it does not measure.

Set the external GATE input signal to slow with the DAC monitor and input it in such a range (see the figure below) that the slow output signal from the OUTPUT terminal is sufficiently covered. The guideline for the pulse width of the external GATE input signal is × 8 for shaping time.
Adjust so slow pole zero does not overshoot or undershoot. Keep the external GATE input signal high until the slow output input signal goes from the baseline to the point where it exceeds the threshold level Vth.

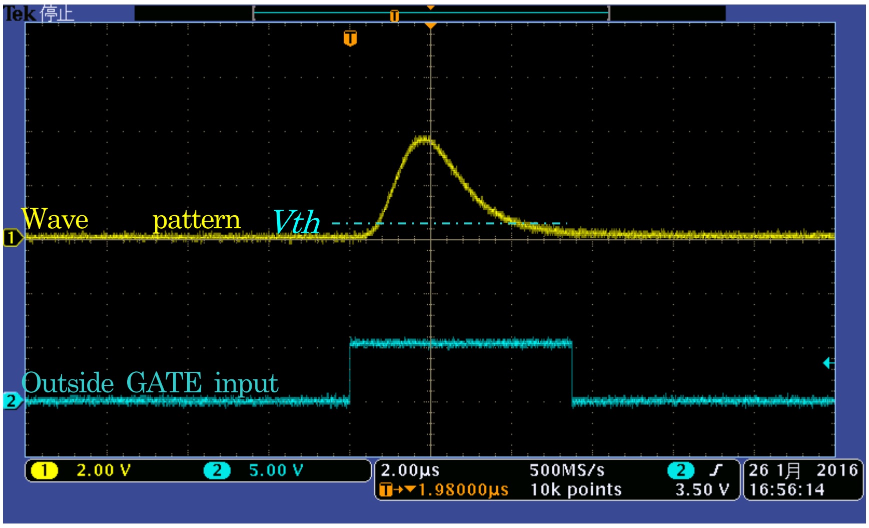


Figure 13 External GATE input signal timing

NOTE: As for the external GATE input signal, at LV-TTL level, 0.8 V or less is judged as LOW level and 2.0 V or more is judged as High level. The maximum input voltage is 5V.

8.2. Data discard by the VETO signal timing

When you want to acquire event data at that time from an external condition when an event occurs, input a LV-TTL level signal to the LEMO connector "VETO" on the front panel. Contrary to the "GATE" function, it measures when it is low and does not measure when it is low. The timing is the same as GATE described above.

8.3. Calculation method of FWHM (half bandwidth)

The FWHM (Full Width at Half Maximum) in the "status" tab is calculated as follows..

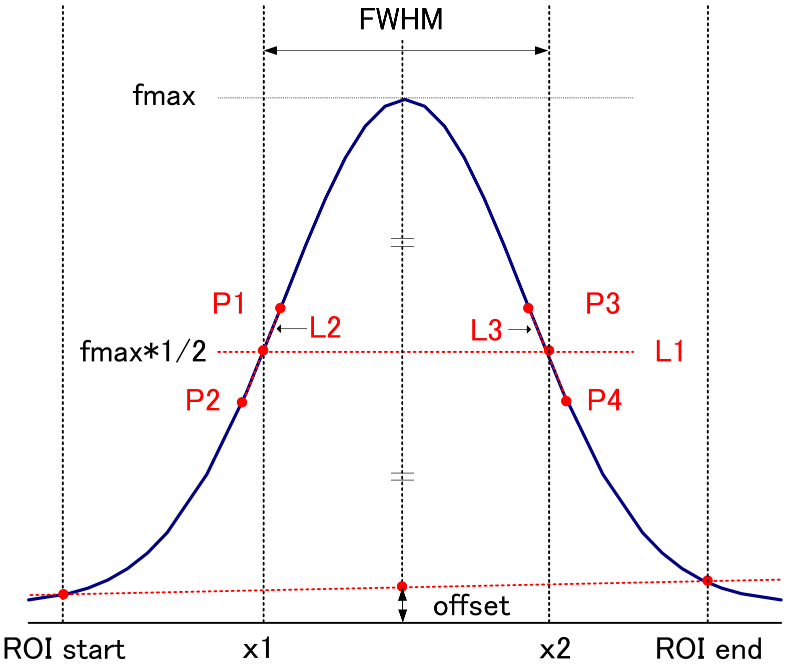


Figure 14　Calculation of FWHM

(1) The maximum value fmax between ROI Start and ROI end in the histogram is detected.
(2) Connect the intersection point of histogram and ROI start with the intersection point of histogram and ROI end. The background offset (offset) is calculated by finding the intersection of the straight line and the line drawn vertically from the peak value fmax to the x axis.
(3) Calculate 1/2 of fmax minus offset and draw a straight line L1 parallel to the X axis.
(4) In order to find two points where the histogram and L1 intersect, the crossing points P1 and P2 and P3 and P4 are detected.
(5) Draw a straight line L2 connecting P1 and P2 and a straight line L3 connecting P3 and P4.
(6) Find the X coordinate x1 of the intersection of L1 and L2, and the X coordinate x2 of the intersection of L1 and L3.
(7) The difference between x2 and x1 is FWHM.

8.4. Calculation of gross count and net count

The "gross" and "net" counts in the "ROI" part are calculated by the Covell method.

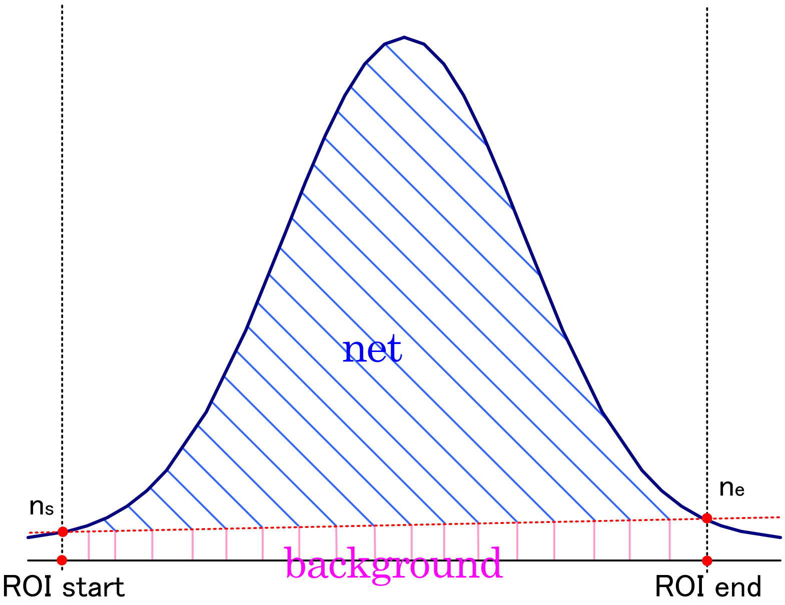


Figure 15 Gross and net calculation

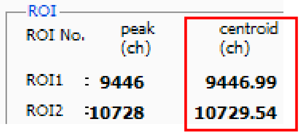
(1) The " gross" count is the sum of counts between ROI start and ROI end.

(2) The "net" count is the net count of the peak minus the background count from the "gross" count (blue shaded area above).

(3) Background (background) count connects ROI start and spectrum intersection ns with ROI end and spectrum intersection ne by a straight line. This is the area of the rectangle surrounding the four points of ROI start, ns, ne and ROI end (pink line in the above figure).

8.5. Calculation method of two-point calibration

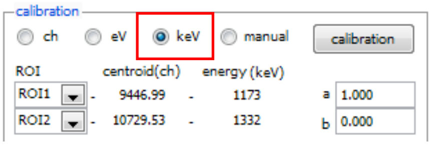
Perform a two-point calibration using the centroid of the two energy peaks and the peak energy value to make the unit scale of the X axis of the graph an energy (e.g., keV). One-point calibration is also possible.



ROI

ROI No.	peak (ch)	centroid (ch)
ROI1 :	9446	9446.99
ROI2 :	10728	10729.54

Set "ROI start (keV)" and "ROI end (keV)" in the upper "ROI" in the "calibration " tab, referring to the "centroid (ch)" value of ROI1 / ROI2 displayed in "ROI "at the top of the graph. Or set the range of ROI1 and ROI2 by cursor movement of the graph.

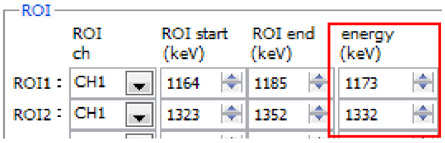


calibration

○ ch ○ eV ● keV ○ manual

ROI		centroid(ch)		energy (keV)		
ROI1	-	9446.99	-	1173	a	1.000
ROI2	-	10729.53	-	1332	b	0.000

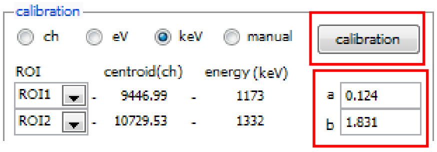
Select the radio button "keV" in "calibration" at the bottom of the "calibration" tab. Select "ROI1" and "ROI2" as the ROI in "calibration" at the bottom of the "calibration" tab.



ROI

	ROI ch	ROI start (keV)	ROI end (keV)	energy (keV)
ROI1 :	CH1	1164	1185	1173
ROI2 :	CH1	1323	1352	1332

Set the peak energy of each of ROI1 / ROI2 to "keV" for how many keV it corresponds.



calibration

○ ch ○ eV ● keV ○ manual

ROI		centroid(ch)		energy (keV)		
ROI1	-	9446.99	-	1173	a	0.124
ROI2	-	10729.53	-	1332	b	1.831

When you click the "calibration" button, the slope a and intercept b of the linear equation y = ax + b, which are calculated by the following equation, are automatically reflected in the lower positions of "a" and "b".

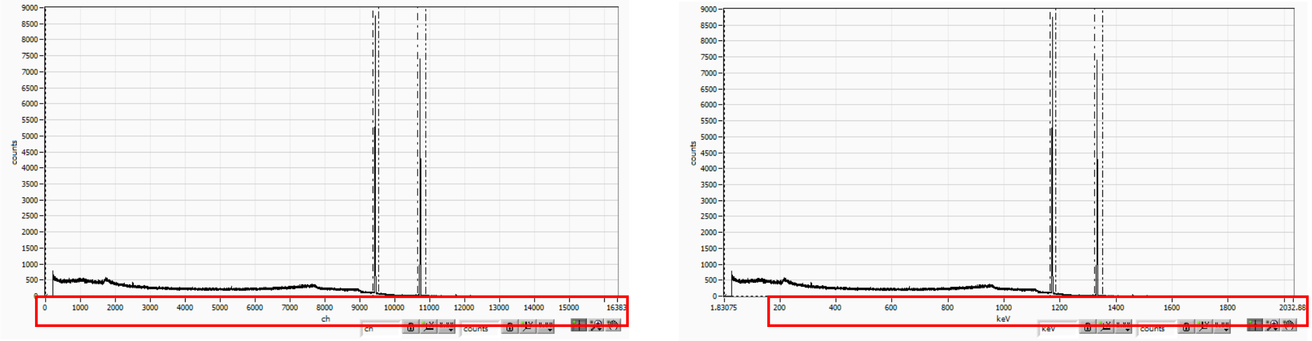


Figure 16 Before Energy Calibration (Left) After Energy Calibration (Right)

a = (peak 1 - peak 2) / (centroid 1 - centroid 2)

b = y - ax

For example, using Co-60, with 1473 keV centroid 9446.99 ch. And 1332 keV centric 10729.53 ch,

a = (1332 - 1173) / (10729.53 - 9446.99) = 0.124

b = 1332 - 0.124 * 10729.53 = 1.831

As described above, "a" is automatically reflected as "0.124" and "b" is automatically reflected as "1.831", and the unit scale of the X axis is created by the linear expression 0.124 * ch + 1.831.

9. Gauss-fit

This software has a peak analysis function by Gauss fitting. By opening the dedicated screen, you can calculate the half-value width, etc. by dividing the peaks with a small number of counts and the peaks that overlap with each other during measurement or for the histogram data in the data file.

9.1. Startup screen

Select Tool from the menu bar and execute gauss fit analysis. After execution, the startup screen shown below will be displayed.

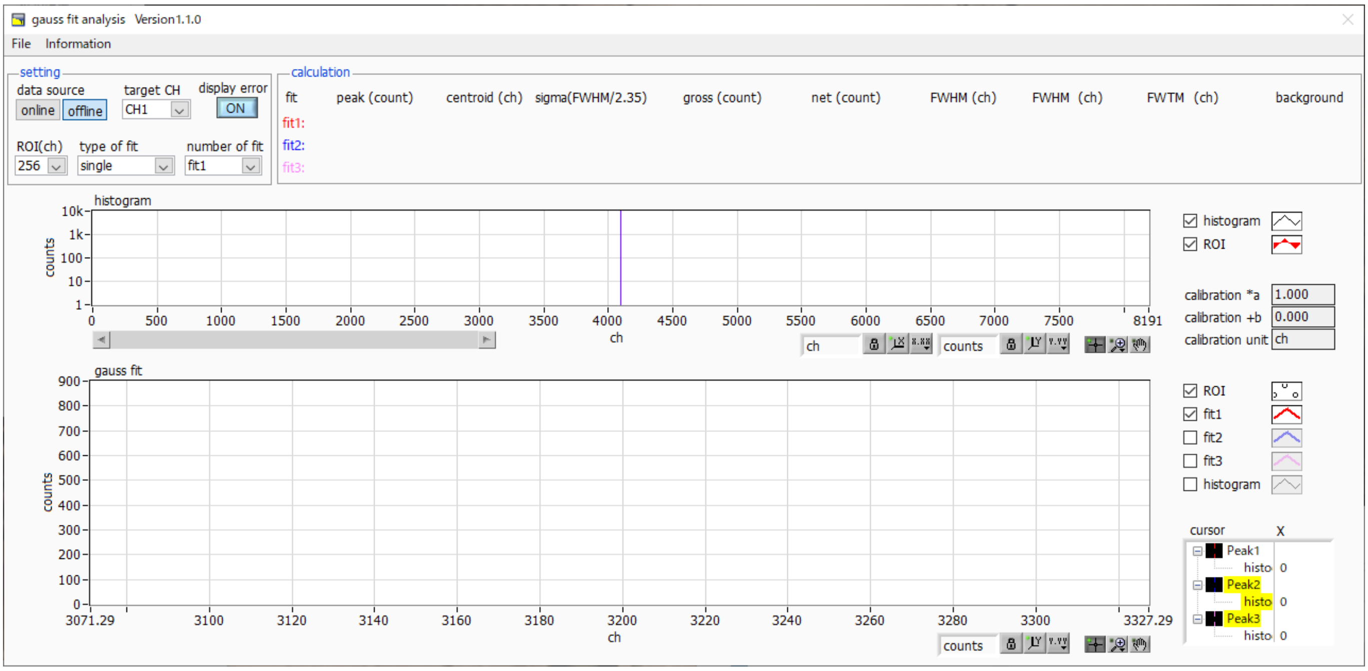
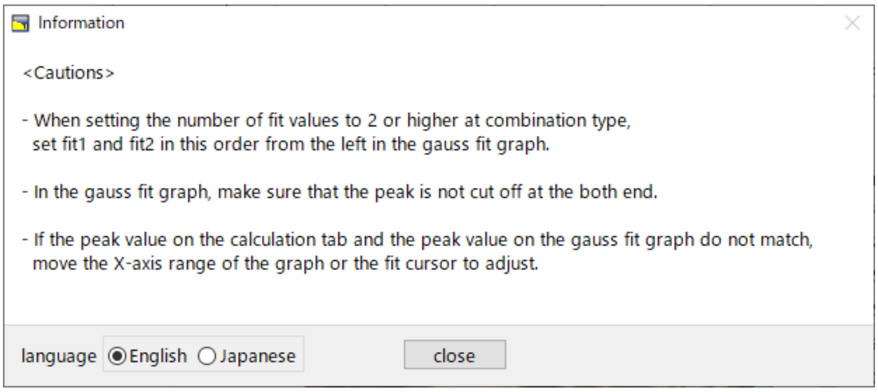

gauss fit analysis Version1.1.0
File
Information
setting
data source
online
offline
target CH
CH1
display error
ON
ROI(ch)
256
type of fit
single
number of fit
fit1
calculation
fit
peak (count)
centroid (ch)
sigma(FWHM/2.35)
gross (count)
net (count)
FWHM (ch)
FWHM (ch)
FWTM (ch)
background
fit1:
fit2:
fit3:
histogram
counts
10k
1k
100
10
1
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
7000
7500
8191
ch
ch
counts
☑ histogram
☑ ROI
calibration *a
1.000
calibration +b
0.000
calibration unit
ch
gauss fit
900
800
700
600
500
400
300
200
100
0
3071.29
3100
3120
3140
3160
3180
3200
3220
3240
3260
3280
3300
3327.29
ch
counts
☑ ROI
☑ fit1
☐ fit2
☐ fit3
☐ histogram
cursor
X
Peak1
histo
0
Peak2
histo
0
Peak3
histo
0

Figure 17 Gauss fit startup screen

* Menu section

File - open gauss fit file	Read Gauss fit file
File - open histogram file	Read histogram data file
File - save gauss fit file	Save Gaussian fit data to a file
File - save image	Save screen in png format
File - close	Exit screen
Information	Display the information screen. Display precautions when using this screen on the dialog screen


Information

<Cautions>

- When setting the number of fit values to 2 or higher at combination type, set fit1 and fit2 in this order from the left in the gauss fit graph.

- In the gauss fit graph, make sure that the peak is not cut off at the both end.

- If the peak value on the calculation tab and the peak value on the gauss fit graph do not match, move the X-axis range of the graph or the fit cursor to adjust.

language ● English ○ Japanese

Figure 18 Information screen

* Setting section

data source	Select the data to be analyzed
online	Targets the data being measured on the main screen
offline	Targets the data in the pre-read histogram data file or Gauss fit data file
target CH	Analysis target CH setting
display error	Select the error to be displayed
ROI (ch)	It is the number of data points to be analyzed to be displayed in the graph of gauss fit. Choose from 256 or 512 channels
type of fit	Select the type of Gaussian fit either single or combination. Single is normally sufficient. Select combination in case two or three peaks come too close to fit.
number of fit	Setting the number of Gaussian fits. Gaussian fit analysis can be performed on up to 3 peaks for a single histogram

* Calculation section

peak (count)	Maximum count
centroid (ch)	Median value (ch) calculated from the sum of all counts
sigma(FWHM/2.35)	Standard deviation
gross (count)	Sum of counts
net (count)	Sum of counts minus background
FWHM (ch)	Half width
FWHM	Half width * The unit is the energy calibration state on the main screen.
FWTM	1/10 width of the peak * The unit is the energy calibration state on the main screen.
background	background value
calibration *a	The energy calibration factor *a on the main screen is displayed
calibration +b	The energy calibration factor +b on the main screen is displayed.
calibration unit	The unit on the main screen is displayed
histogram graph	The histogram plot in the histogram graphs the histogram data for Gaussian fit. The ROI plot is the part displayed in the gauss fit graph and is displayed in red. You can change the display position while keeping the number of display points constant by moving the horizontal slide bar at the bottom left of the graph to the left or right. If each check box is checked, the plot is displayed, and if it is not checked, the plot is hidden.
gauss fit graph	From the histogram data displayed in the histogram graph, the channel set by ROI (ch) is extracted from the start position of the X axis of the gauss fit graph and displayed. The fit1 to fit3 plots are Gaussian-fitted data for the peaks set by each cursor. Histogram plots are concatenated data of Gaussian fit results. You can change the display position while keeping the number of display points constant by dragging the graph area after select the pan button ✋ at the bottom right of the graph to the left or right. The X of the cursor at the bottom right of the graph is the position of the cursor to be aligned with the Gaussian fit target peak, and you can also move the cursor by directly inputting X. If each check box is checked, the plot is displayed, and if it is not checked, the plot is hidden.

9.2. On-line

For the histogram acquired during measurement, perform Gaussian fit analysis for the specified peak according to the following procedure.

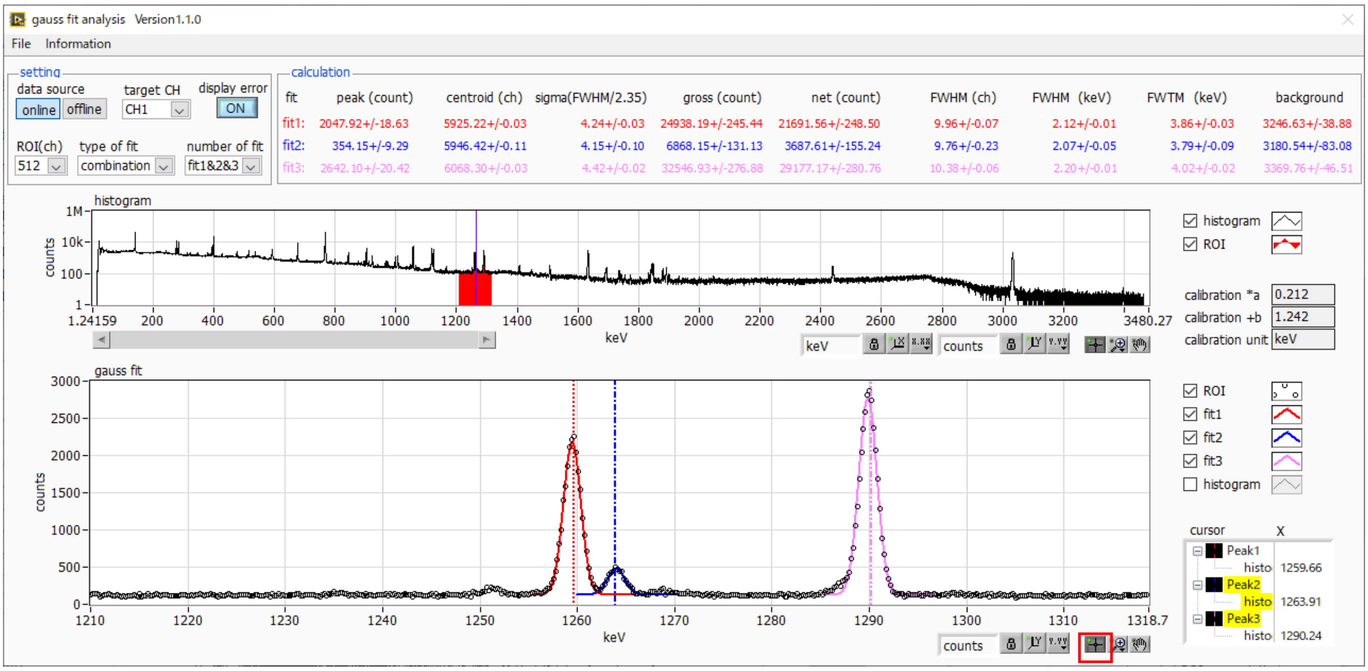
1. Select data source, “online”.

2. Start measurement in histogram mode. The histogram during measurement is displayed in the histogram graph.

3. In the gauss fit graph, the histogram of the part of interest in the histogram graph is displayed. To set the horizontal axis range of this graph, enter the minimum value of the horizontal axis of the gauss fit graph directly or move the vertical cursor in the histogram graph to the target range. After that, the histogram graph will have the range selected in the gauss fit graph red.

4. Set up to three vertical cursors at the approximate peak part of the analysis target. To set the cursor, drag the red, blue, and pink vertical cursor lines while the button in the red frame in the figure below is pressed, and drop them on the peak part. Alternatively, you can move the cursor and set it by entering a numerical value in the X value of the cursor at the bottom right of the screen.

5. Calculation results such as half-value width based on each Gaussian fit data are displayed in the calculation section


gauss fit analysis Version1.1.0
File
Information
histogram
1M
10k
100
1
counts
1.24159
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200
3480.27
keV
keV
counts
gauss fit
3000
2500
2000
1500
1000
500
0
counts
1210
1220
1230
1240
1250
1260
1270
1280
1290
1300
1310
1318.7
keV
counts

setting

data source: [✓ online] offline

target CH: CH1

display error: ON

ROI(ch): 512

type of fit: combination

number of fit: fit1&2&3

calculation

fit	peak (count)	centroid (ch)	sigma(FWHM/2.35)	gross (count)	net (count)	FWHM (ch)	FWHM (keV)	FWTM (keV)	background
fit1:	2047.92+/-18.63	5925.22+/-0.03	4.24+/-0.03	24938.19+/-245.44	21691.56+/-248.50	9.96+/-0.07	2.12+/-0.01	3.86+/-0.03	3246.63+/-38.88
fit2:	354.15+/-9.29	5946.42+/-0.11	4.15+/-0.10	6868.15+/-131.13	3687.61+/-155.24	9.76+/-0.23	2.07+/-0.05	3.79+/-0.09	3180.54+/-83.08
fit3:	2642.10+/-20.42	6068.30+/-0.03	4.42+/-0.02	32546.93+/-276.88	29177.17+/-280.76	10.38+/-0.06	2.20+/-0.01	4.02+/-0.02	3369.76+/-46.51

☑ histogram
☑ ROI

calibration *a: 0.212
calibration +b: 1.242
calibration unit: keV

☑ ROI
☑ fit1
☑ fit2
☑ fit3
☐ histogram

cursor	X
Peak1	
histo	1259.66
Peak2	
histo	1263.91
Peak3	
histo	1290.24

Figure 19 Gauss fit screen, **ONLINE**

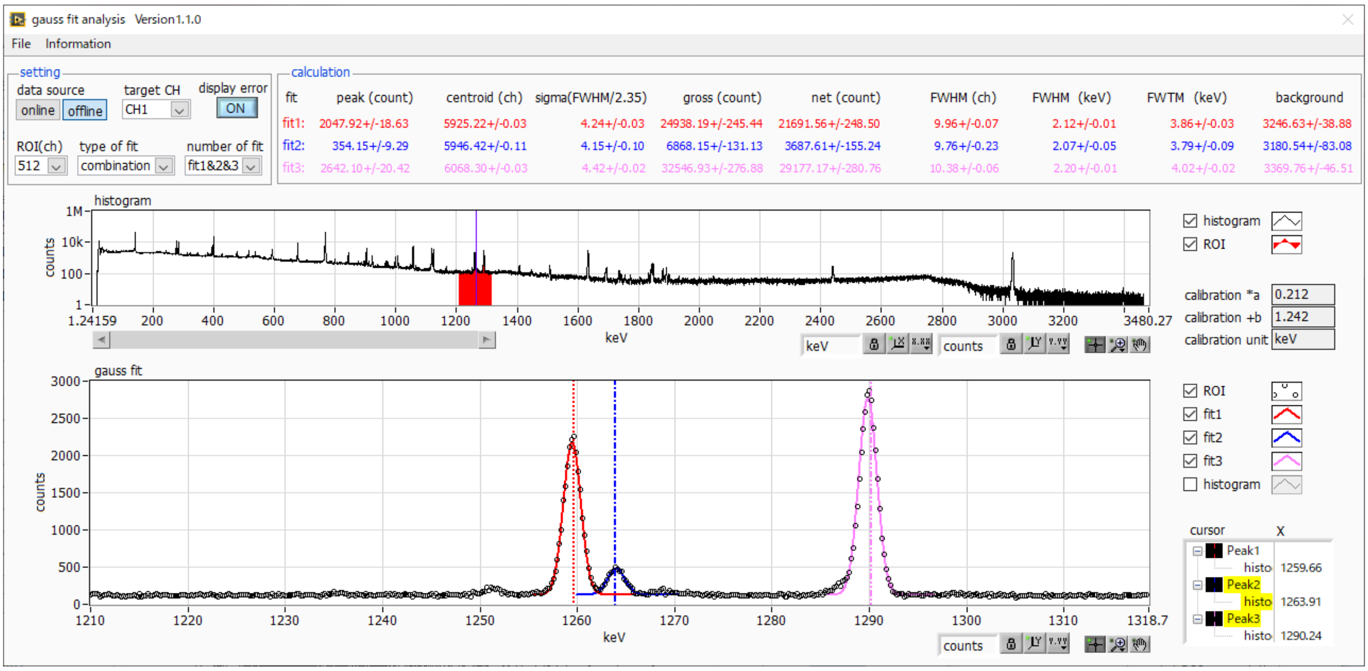
9.3. Off-line

For the histogram obtained by reading the histogram data file or the Gauss fit data file, perform Gauss fit analysis for the specified peak by the following procedure.

1. Select data source, “offline”.

2. Click open gauss fit file or open histogram file from file in the menu. A file selection dialog is displayed. Select the data file to be read and open it. The histogram in the data file is displayed in the histogram graph

The rest of the procedure is the same as the on-line mode.


gauss fit analysis Version1.1.0
File
Information
setting
online
histogram
1M
10k
100
1
counts
1.24159
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200
3480.27
keV
counts
gauss fit
3000
2500
2000
1500
1000
500
0
1210
1220
1230
1240
1250
1260
1270
1280
1290
1300
1310
1318.7
☑ histogram
☑ ROI
☑ ROI
☑ fit1
☑ fit2
☑ fit3
☐ histogram
cursor
X

data source: offline

target CH: CH1

display error: ON

ROI(ch): 512

type of fit: combination

number of fit: fit1&2&3

calculation

fit	peak (count)	centroid (ch)	sigma(FWHM/2.35)	gross (count)	net (count)	FWHM (ch)	FWHM (keV)	FWTM (keV)	background
fit1:	2047.92+/-18.63	5925.22+/-0.03	4.24+/-0.03	24938.19+/-245.44	21691.56+/-248.50	9.96+/-0.07	2.12+/-0.01	3.86+/-0.03	3246.63+/-38.88
fit2:	354.15+/-9.29	5946.42+/-0.11	4.15+/-0.10	6868.15+/-131.13	3687.61+/-155.24	9.76+/-0.23	2.07+/-0.05	3.79+/-0.09	3180.54+/-83.08
fit3:	2642.10+/-20.42	6068.30+/-0.03	4.42+/-0.02	32546.93+/-276.88	29177.17+/-280.76	10.38+/-0.06	2.20+/-0.01	4.02+/-0.02	3369.76+/-46.51

calibration *a: 0.212

calibration +b: 1.242

calibration unit: keV

cursor	X
Peak1 histo	1259.66
Peak2 histo	1263.91
Peak3 histo	1290.24

Figure 20　Gauss fit screen, **OFFLINE**

9.4. Notes

Please note the following points to operate normally on the Gauss fit screen.

- When selecting combination as type of fit and setting the number of fit to two or more, set fit1 and fit2 in this order from the left in the gauss fit graph. If fit1 is not working properly, the following fit2 and fit3 will also be hidden.

- The peak to be fitted should be displayed without being cut off at both ends of the gauss fit graph.

- If the peak value on the calculation tab and the peak value on the gauss fit graph do not match, move the horizontal axis range of the graph or the fit cursor.

9.5. End

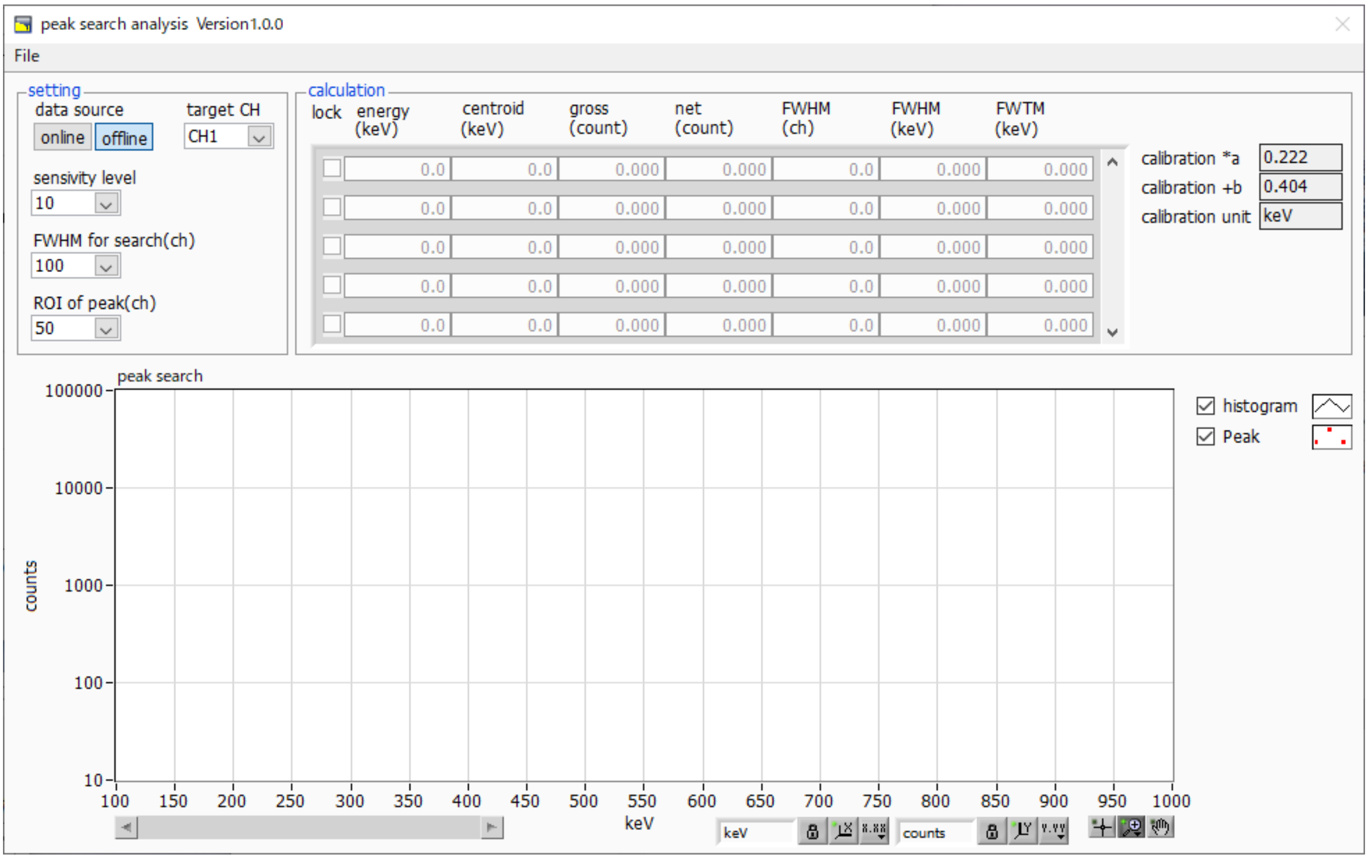
To close this screen, click close from File on the menu bar.

10. Peak search

This software has a function to automatically detect peaks and perform peak analysis. You can open the dedicated screen and automatically detect the peak and calculate the half width etc. for the histogram data of the data file during measurement.

10.1. Startup screen

Execute peak search analysis from Tool on the menu bar. After execution, the startup screen shown below will be displayed.


peak search analysis Version1.0.0
File
setting
calculation
peak search
counts
100000
10000
1000
100
10
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
850
900
950
1000
keV
keV
counts
☑ histogram
☑ Peak

data source: online [✓ offline]
target CH: CH1
sensivity level: 10
FWHM for search(ch): 100
ROI of peak(ch): 50

lock	energy (keV)	centroid (keV)	gross (count)	net (count)	FWHM (ch)	FWHM (keV)	FWTM (keV)
☐	0.0	0.0	0.000	0.000	0.0	0.000	0.000
☐	0.0	0.0	0.000	0.000	0.0	0.000	0.000
☐	0.0	0.0	0.000	0.000	0.0	0.000	0.000
☐	0.0	0.0	0.000	0.000	0.0	0.000	0.000
☐	0.0	0.0	0.000	0.000	0.0	0.000	0.000

calibration *a: 0.222
calibration +b: 0.404
calibration unit: keV

Figure 21 Peak search startup screen

*Menu section

File - open peak search file	Read peak search file
File - open histogram file	Read histogram data file
File - save peak search file	Save peak search to a file
File - save image	Save screen in png format
File - close	Exit screen

*Setting section

data source	Select the data to be analyzed
online	Targets the data being measured on the main screen
offline	Targets the data in the pre-read histogram data file or Gauss fit data file
target CH	Analysis target CH setting
sensitivity level	Selection of peak detection threshold. If the value is small, even a slight peak will be detected.
FWHM for search (ch)	Approximate half-value width required for peak search. The unit is channel. Set the approximate half width from the actual peak by channel (point)
ROI of peak (ch)	Setting the number of ROI plots (CH) for the peak

* Calculation section

lock	If you want to display it at the top of the list, turn on the check. If it is OFF, the display position may move up or down each time a peak is detected.
centroid (ch)	Median value (ch) calculated from the sum of all counts
gross (count)	Sum of counts
net (count)	Sum of counts minus background
FWHM (ch)	Half width
FWHM	Half width * The unit is the energy calibration state on the main screen.
FWTM	1/10 width of peak * The unit is the energy calibration state on the main screen.
calibration *a	The energy calibration factor *a on the main screen is displayed.
calibration +b	The energy calibration factor +b on the main screen is displayed
calibration unit	The unit on the main screen is displayed.
peak search graph	The histogram plot in the peak search graph displays the histogram data of the peak search target as a graph. The Peak plot is the part where the peak is detected and is displayed in red with a Gaussian fit. You can change the display position while keeping the number of display points constant by moving the horizontal slide bar at the bottom left of the graph to the left or right. If each check box is checked, the plot is displayed, and if it is not checked, the plot is hidden.

10.2. On-line

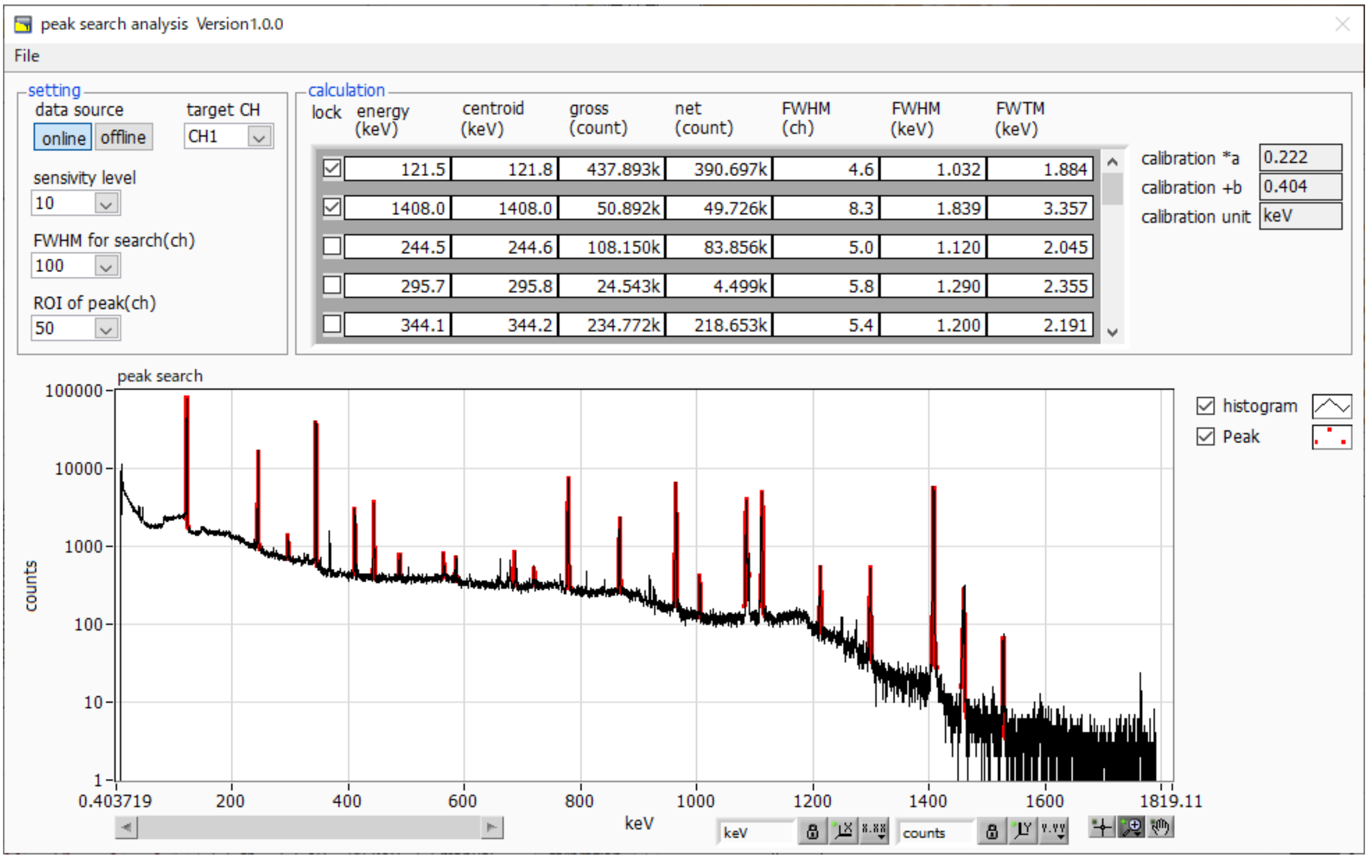
Perform peak search analysis using the following procedure for the histogram acquired during measurement.

1. Select data source online

2. Start measurement in histogram mode. The histogram being measured is displayed in the peak search graph.

3. In the peak search graph, the peak part where the peak is detected is gauss-fitted and a red histogram is displayed.

4. In the calculation section, the calculation results such as the half-value width are displayed for each peak detected. If the peak is detected or not detected, the calculation result display may move up and down, making it difficult to see. In this case, if you turn on the lock check, it will always be displayed at the top.



peak search analysis Version1.0.0

setting

data source: online

target CH: CH1

sensivity level: 10

FWHM for search(ch): 100

ROI of peak(ch): 50

calculation

lock	energy (keV)	centroid (keV)	gross (count)	net (count)	FWHM (ch)	FWHM (keV)	FWTM (keV)
☑	121.5	121.8	437.893k	390.697k	4.6	1.032	1.884
☑	1408.0	1408.0	50.892k	49.726k	8.3	1.839	3.357
☐	244.5	244.6	108.150k	83.856k	5.0	1.120	2.045
☐	295.7	295.8	24.543k	4.499k	5.8	1.290	2.355
☐	344.1	344.2	234.772k	218.653k	5.4	1.200	2.191

calibration *a: 0.222

calibration +b: 0.404

calibration unit: keV

☑ histogram

☑ Peak

Figure 22 Peak search screen, **ONLINE**

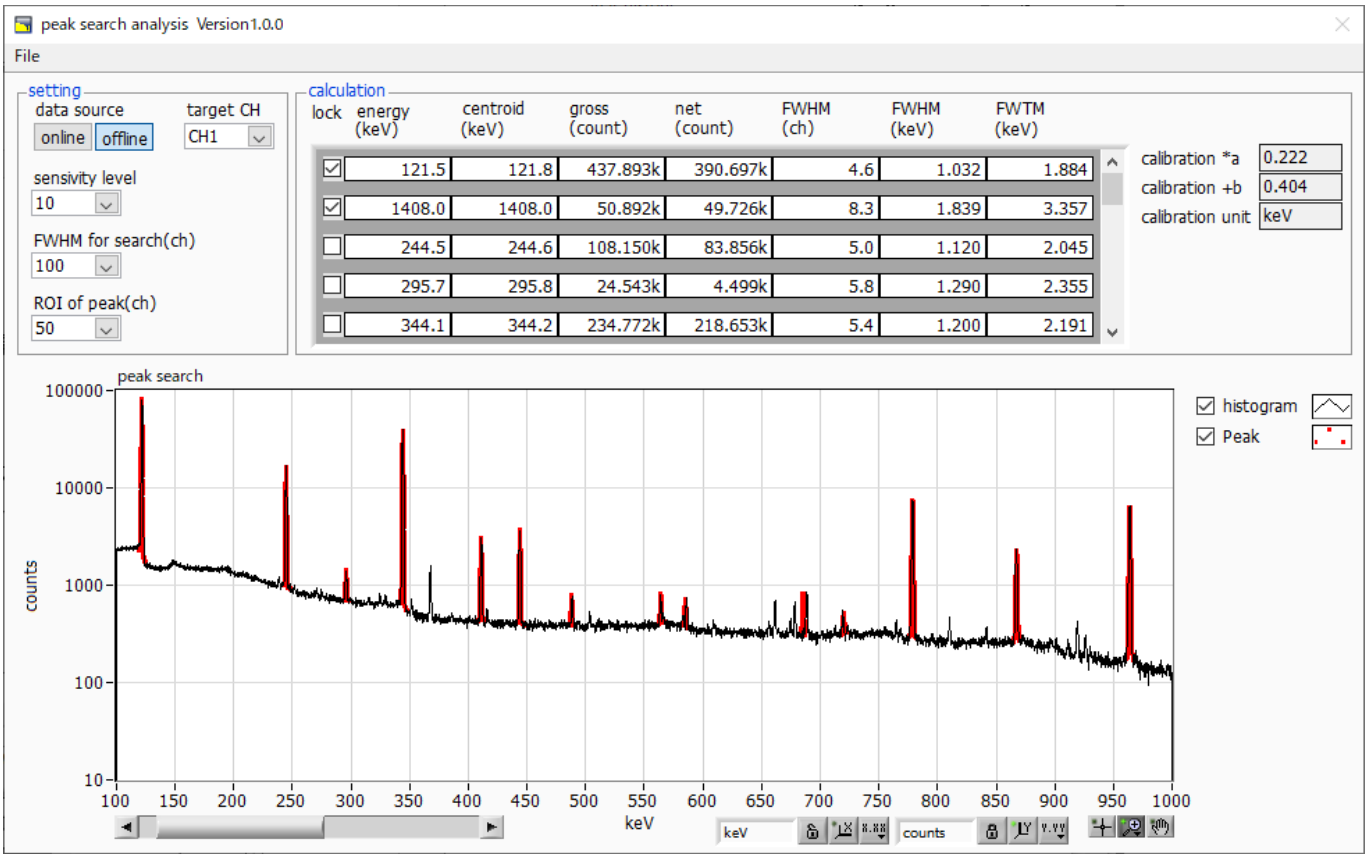
10.3. Off-line

Perform peak search analysis according to the following procedure for the histogram obtained by reading the histogram data file or peak search data file.

1. Select data source as offline

2. Click open peak search file or open histogram file from file on the menu bar. A file selection dialog is displayed. Select the data file to be read and open it. The histogram in the data file is displayed in the peak search graph

The rest of the procedure is the same as the on-line mode.


peak search analysis Version1.0.0
File
setting
calculation
peak search
counts
keV
histogram
Peak
100000
10000
1000
100
10
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
850
900
950
1000
keV
counts

data source: online [✓ offline]

target CH: CH1

sensivity level: 10

FWHM for search(ch): 100

ROI of peak(ch): 50

lock	energy (keV)	centroid (keV)	gross (count)	net (count)	FWHM (ch)	FWHM (keV)	FWTM (keV)
☑	121.5	121.8	437.893k	390.697k	4.6	1.032	1.884
☑	1408.0	1408.0	50.892k	49.726k	8.3	1.839	3.357
☐	244.5	244.6	108.150k	83.856k	5.0	1.120	2.045
☐	295.7	295.8	24.543k	4.499k	5.8	1.290	2.355
☐	344.1	344.2	234.772k	218.653k	5.4	1.200	2.191

calibration *a: 0.222

calibration +b: 0.404

calibration unit: keV

☑ histogram

☑ Peak

Figure 23 Peak search screen, **ONLINE**

10.4. Notes

Please note the following points to operate normally on the peak search screen.

- The degree of peak search changes by adjusting the sensitivity level, FWHM for search (ch.), and ROI of peak (ch.). Adjust each setting to the optimum while observing the shape of the red peak detection part.

10.5. End

To close this screen, click close from File on the menu bar.

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