Logger Tools for Acoustic data logger

Ver.4.40

Software Manual to set up A-tag

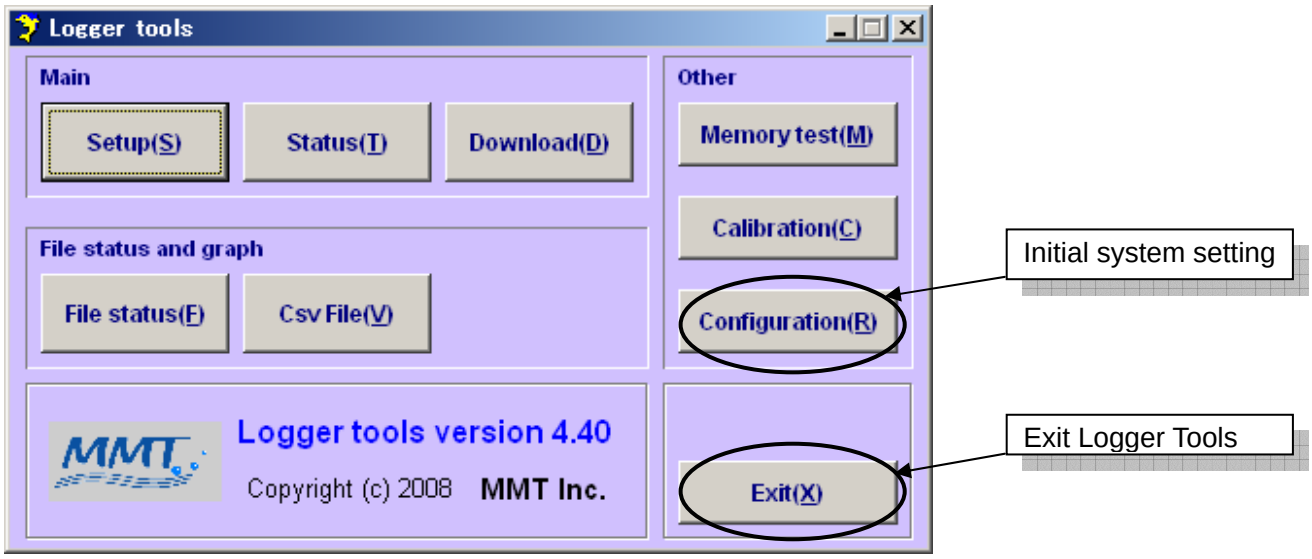
MMT Co. Ltd.

1. Start and quit Logger Tools

➢ Start

Start -> Program -> Logger Toold V4.40 -> Logger Tools
Or click short cut on your desktop

Following “Main dialog box” will show up
If you use Logger Tools at the first time, click ***Configuration*** and go to next page of this manual.

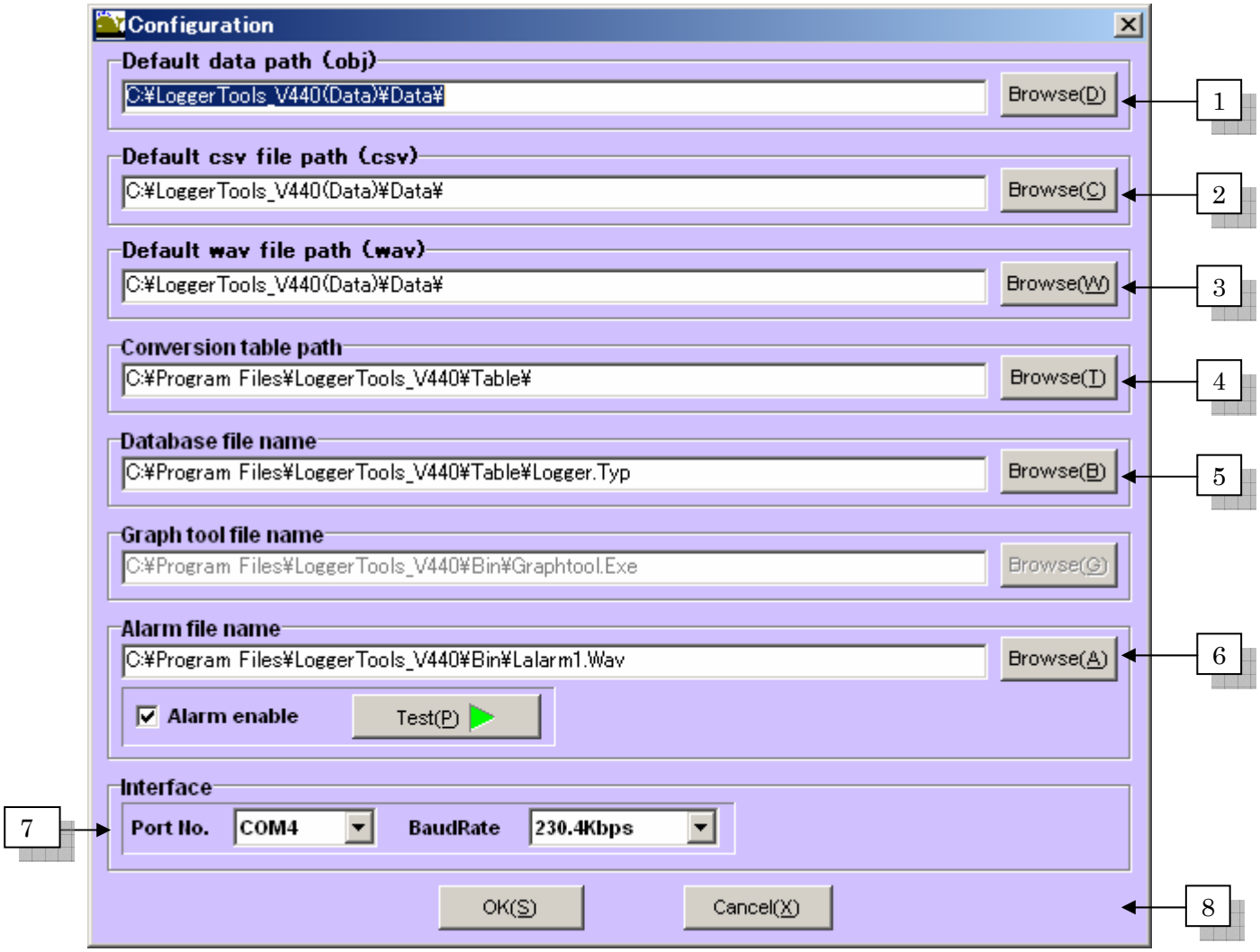


➢ Exit

click ***Exit*** to quit Logger Tools

2. Configuration

Configuration dialog box is for the initial parameter setting for the system operation, such as data path and communication port number. Click ***Browse*** to select path or file. You can not type directly in the box.



➢ Parameters

1. ***Default data path***
   Select the folder path of the data file that you are going to download.
   Default path is automatically created in the folder you installed the Logger Tools.
2. ***Default csv file path***
   Select the folder path of the csv file(comma separated value file) that you are going to convert from downloaded binary file.
   Default path is automatically created in the folder you installed the Logger Tools.
3. ***Default wav file path***

Select the folder path of the wav file(Windows standard audio file) that you can convert from downloaded binary file.

Default path is automatically created in the folder you installed the Logger Tools.

4. ***Conversion table path***

   Use default path for this. The path of the system table file will be automatically assigned.

5. ***Database file name***

   Use default path for this. The path of the system database file will be automatically assigned.

6. ***Alarm file name***

   Use default path for this. The path of the alarm sound file will be automatically assigned.

   If you want to use another sound, you can select your preferred sound file in your PC.

   To stop alarm sound, remove check mark at the left of **Alarm enable**

7. ***Interface***

   Select COM Port number of serial interface (RS-232). If you are using USB-serial converter, the larger COM Port number will be ok. To check the COM Port number of your PC, go to CONTROL PANEL of the Windows and open the system configuration. You will see COM Port icon.

   Select BaudRate (communication speed kilo bit per second) among 230.4Kbps ort 115.2Kbps

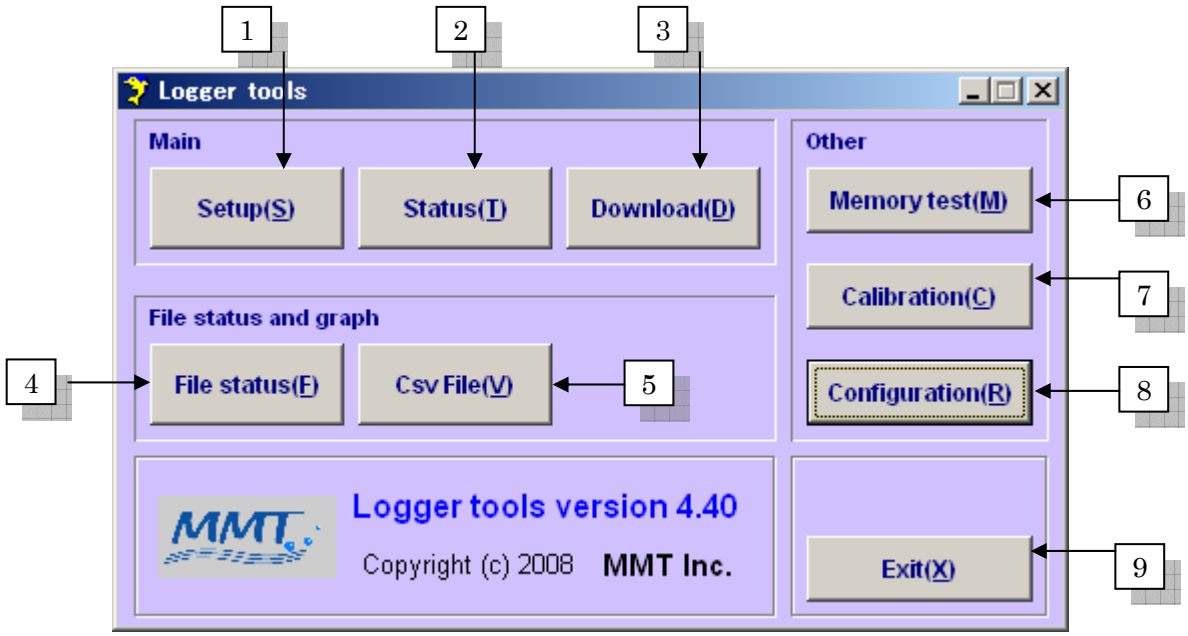
8. ***OK (S) / Cancel (X)***

   To save the parameters, click ***OK***

   To cancel and back to Main dialog box, click ***Cancel***

3. Main dialog box

Main dialog box is for the command menu for each function. This dialog box is the portal of Logger Tools.



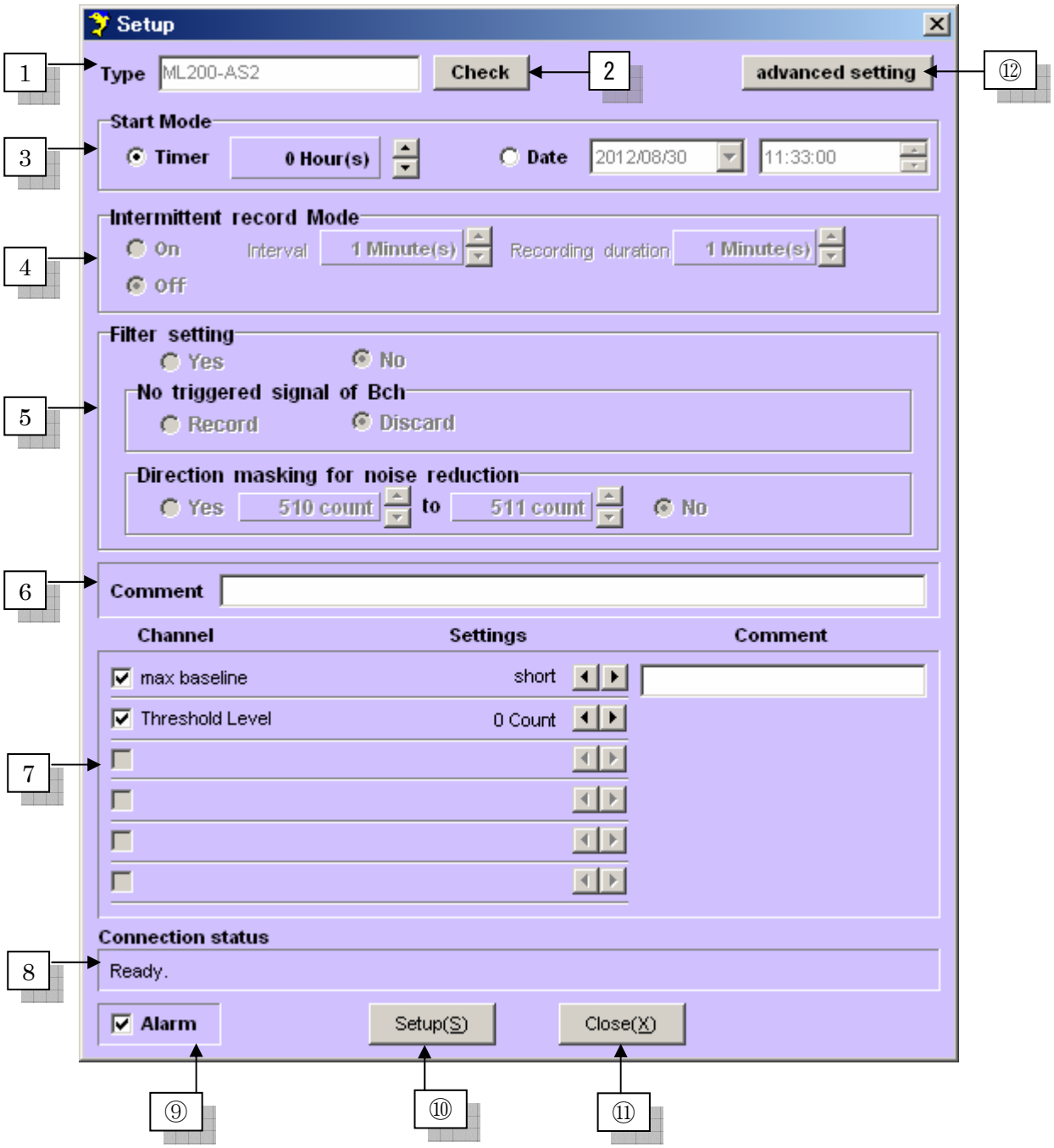
1. ***Setup***
   Setup the parameters for recording
2. ***Status***
   Show the parameters of setup when A-tag is connected to your PC.
3. ***Download***
   Download binary data from the Acoustic Data Logger (A-tag) and save in your harddisk.
4. ***File status***
   Show the setup parameters of selected file
5. ***Csv File***
   Convert the downloaded binary file to a csv file(comma separated value file)
6. ***Memory test***
   Text the built in flash memory of A-tag
7. ***Calibration***
   Show the measured parameters (2ch sound pressure and time difference) in real time.
8. ***Configuration***
   Initial parameter setting for the system operation. See previous page.
9. ***Exit***
   Quit Logger Tools

4. Setup

Make sure the hardware electronic connection in advance to setup parameters for recording.

➢ Electronic connection

- Open A-tag to screw out the water proof case (opporsite side of the hydrophone)
- Plug out the battery case.
- Connect Serial Port of your PC to the interface box
- Connect AC adaptor to the interface box. The red LED of the interface box should be is lit.
- Connect the interface cable to the interface box
- Connect the interface cable to A-tag. See details for the hardware manual.
- Click ***Setup*** then the following dialog box will show up



1. ***Type***
   Type of the connected data logger
2. ***Check***
   To check the connection and get the type of the data logger automatically.
3. ***Start Mode***
   Setup the timer start mode.
   To start recording immediately, check **Timer** and select 0 Hours using up and down switch
   To start recording several hours after the connection of battery box, check **Timer** and select any hours.
   To start recording at specific time, check **Date** and type or select date and time.
   Note that the present time of the data logger is transferred from your PC.

4. ***Intermittent record Mode***
   Setup intermittent recording
   To disable intermittent recording function, check
   To use intermittent recording function check **On**
      Select interval without recording
      Select duration of recording
      Note that the sum of the interval and the recording duration is the period of operation.
   Note this function can be used only after clicking "12 Advanced setting". Normally you do not need to use this because inappropriate setting causes no data acquisition.

5. ***Filter setting***
   This function eliminates data to reduce possible noise source. However do not use this before getting accustomed because inappropriate setting causes no data acquisition.

   No (default))

   Yes
      To include sound triggered only 1st hydrophone, check **Record**. Note that data without time difference is recorded.
      To exclude sound triggered only 1st hydrophone, check **Discard**. Note that data without time difference is NOT recorded.
      To include sound from all direction, check **No**.
      To exclude sound from specific range of direction, check **Yes** and select maximum and minimum count of time difference. Default setting is 510-511, which means sounds come from most of the directions are recorded.
   Note this function can be used only after clicking "12 Advanced setting".

The maximum count value of the time difference between two hydrophone is depends on the distance of the hydrophone and the max baseline parameter you are going to select. A-tag start counting the time difference when the 1st hydrophone is triggered by the pulse sound over the detection threshold level, which will be selected later of this section. For example if you selected max baseline as **Short**, the count raises every 271-ns until the 2nd hydrophone will be triggered. The maximum count is given as follows.

(distance between two hydrophone in meter) / (sound speed m/s x 0.000271 s)

If you select max baseline as Middle and Long, count rises every 542-ns or 1084-ns, respectively. The maxi mum count can be expressed as follows;

D/(c t), where D: baseline length, c: sound speed, t: time resolution of counting time difference.

Do not worry about the trigger happened first at the 2nd hydrophone. A-tag recognize this triggering and wait for the trigger at the 1st hydrophone. In this case, the count value is negative.

We recommend simple calibration in a kitchen. Start your A-tag and put it in a bucket filled with water. Then pour the tap water to make a lot of bubbles in the bucket. A-tag record randomly produced ultrasonic pulses from bubbles around all directions. Most of the downloaded data of the time difference appears between the maximum and minimum values. The minimum value of the time difference is the negative of the maximum value.

6. ***Comment***

write any comments or just leave as blank

7. ***Channel, Settings***

Measure the distance D between two hydrophone.
Select **max baseline**
Short when D< 207 mm = time resolution (271-ns) x 9 bits (511) x sound speed (1500 m/s)
Medium when 208 < D < 415 mm
Long when 416 < D < 830 mm

Range	max baseline	max distance	time resolution	width of time bin
+/- 511 (10 bits)	Short	207 mm	271-ns	0.5-ms
+/- 511 (10 bits)	Medium	415 mm	542-ns	1.0-ms
+/- 511 (10 bits)	Long	830 mm	1084-ns	2.0-ms

Note that the maximum distance between two hydrophone is 830 mm. If you separate two hydrophone longer than 830 mm, time difference of sound from end fire direction may not be recorded

Important note that the sampling frequency is also depends on the max baseline. A-tag need to wait a pulse go through from the 1st hydrophone to the 2nd hydrophone before to start next measurement for +/-138-us, which is time resolution (271-ns) x 9 bits (511). Sound may reach the 2nd hydrophone first. Therefore A-tag need to wait at least 276-us =2 x 138-us for **Short**. Actually, A-tag waits for 0.5 ms for **Short** baseline setting to allow identical pulse sound completely pass through two hydrophone including margin. It wait 1 ms for **Medium** and 2 ms for **Large**. The second trigger could happen at the next time bin when the 1st trigger happened near the end of 0.5 ms time bin. A-tag waits for the second trigger up to 9 bits (511 count) and measure the time difference correctly. However, another trigger by the second pulse happened in the next time bin before the second trigger of the first pulse happened, A-tag start the new measurement of the time difference. Therefore, A-tag does not record sonar sounds with very short

inter click interval < 0.5 ms, such as buzz correctly. A-tag still record the intensity even in this case, but the inter click interval and the time difference may not be correct.

Type or select detection threshold level at **Threshold Level**

To convert Threshold level from the count to Pa, use conversion constant for each A-tag
It is approximately 0.1 for example. Additional period (a couple of months) will be needed before delivery to provide the calibration constant. Consult MMT.

Threshold level in count	Threshold level in Pa	Threshold in dB
30	3.0	129.5
40	4.0	132.0
100	10.0	140.0
300	30.0	149.5

8. **Connection status**
Show the status of connection.

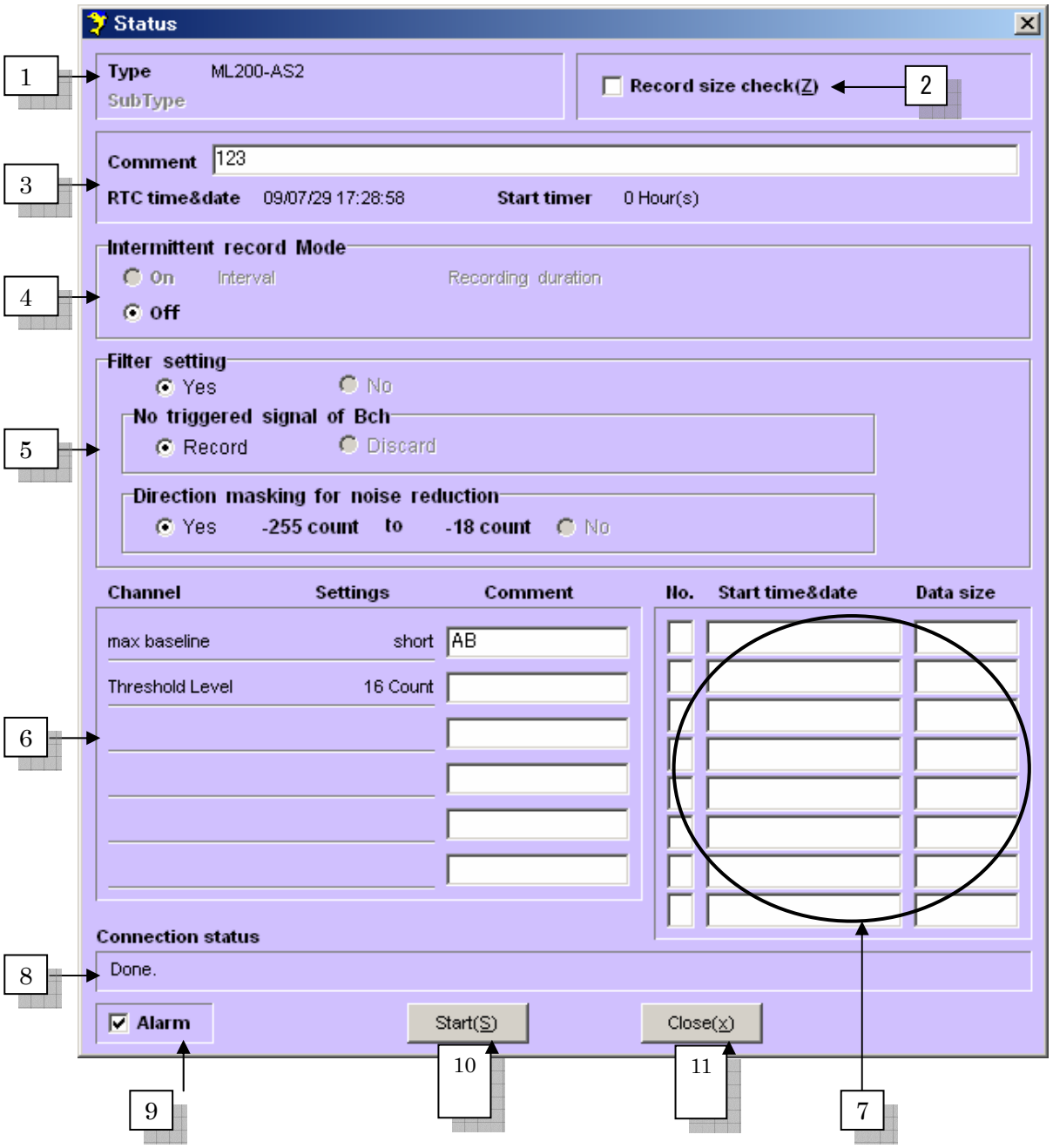
9. ***Alarm***
Check to make sound when set up has been done

10.***Setup***
Start setup
Parameter sets are recorded in your PC and same parameters will appear when you setup net time.

11.***Close***
Close this window. This button is shown as ***Cancel*** when you are setting parameters.

5. Status

Show the parameters of setup when A-tag is connected to your PC.



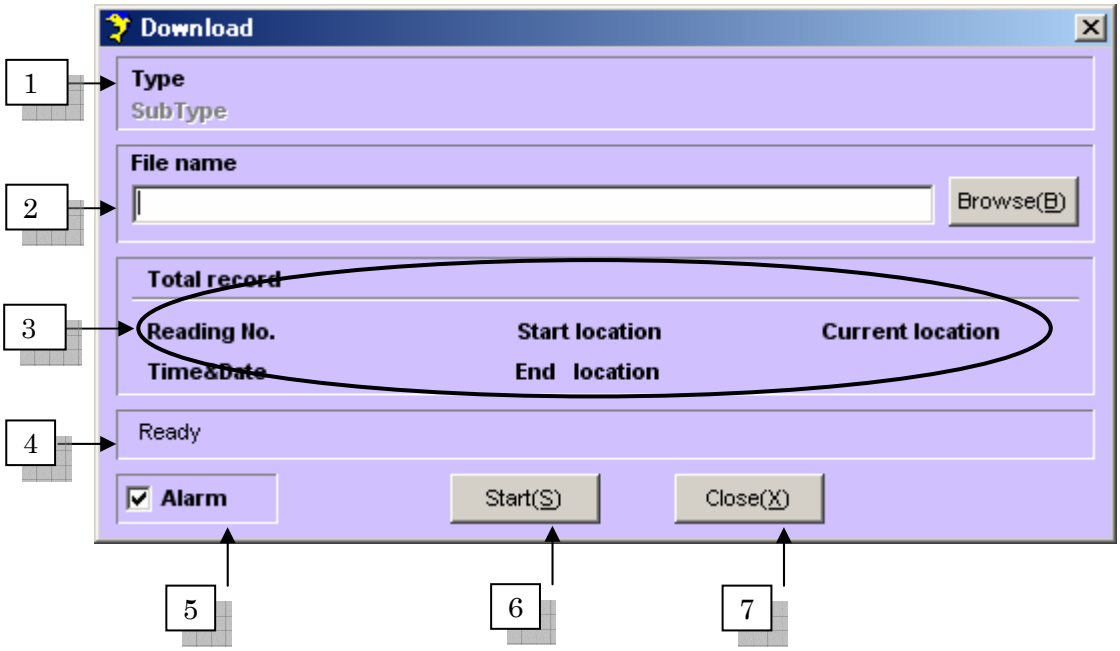
1.***Type***
indicate logger type
2. ***Record size check***
click to check the recorded file size in A-tag
3. ***Comment, RTC time&date, Start Timer***
- **Comment** indicates the comment typed during setup
- **RTC time&date** indicates the time of the clock of A-tag
- **Start Timer** indicates the start mode of the setup

4. ***Intermittent record Mode***
indicates the intermittent mode
5. ***Filter setting***
indicate filter setting
6. ***Channel, Settings， Comment***
indicate max baseline, threshold level, comments
7. ***No., Start time & date, Data size***
indicate the status of the recorded data
- ***No.*** indicates the serial number of file (max. 8).
  A file was created from the start and the end of recording
- ***Start time & date*** indicates the time and date when the recording started
- ***Data size*** indicate data size of each file in bite

8. ***Connection status***
show the status of connection
9. ***Alarm***
Check to make sound when reading has been done
10. ***Start***
click to start to read parameters above
11. ***Close***
close this window

6. Download

Download the data from A-tag and save in a harddisk of your PC. The downloaded file will be converted for csv file (comma separated value file) for further analysis.



1. ***Type***
   indicate logger type
2. ***File name***
   type file name you wish to download. The default data folder is the folder you set up in Configuration window. If you want to change the folder, click Browse button and select the appropriate folder. The extension of the name should be .obj. This extension will be added automatically.
3. ***Total record, Reading No., Time&Date, Start location, End location, Current location***
   - ***Total record***
     Indicate the total number of files recorded
   - ***Reading No.***
     Indicate the serial number of file, which the Logger Tools is downloading.
   - ***Time&Date***
     The start time of the recording of the downloaded file
   - ***Start location***
     The memory address of the start point of the downloaded file.
   - ***End location***
     The memory address of the end point of the downloaded file.
   - ***Current location***
     The memory address of the current reading point of the downloaded file..
4. ***Message***
   Indicate the status of the downloading
5. ***Alarm***
   Click to alarm at the end of downloading. Otherwise, remove check mark.
6. ***Start***

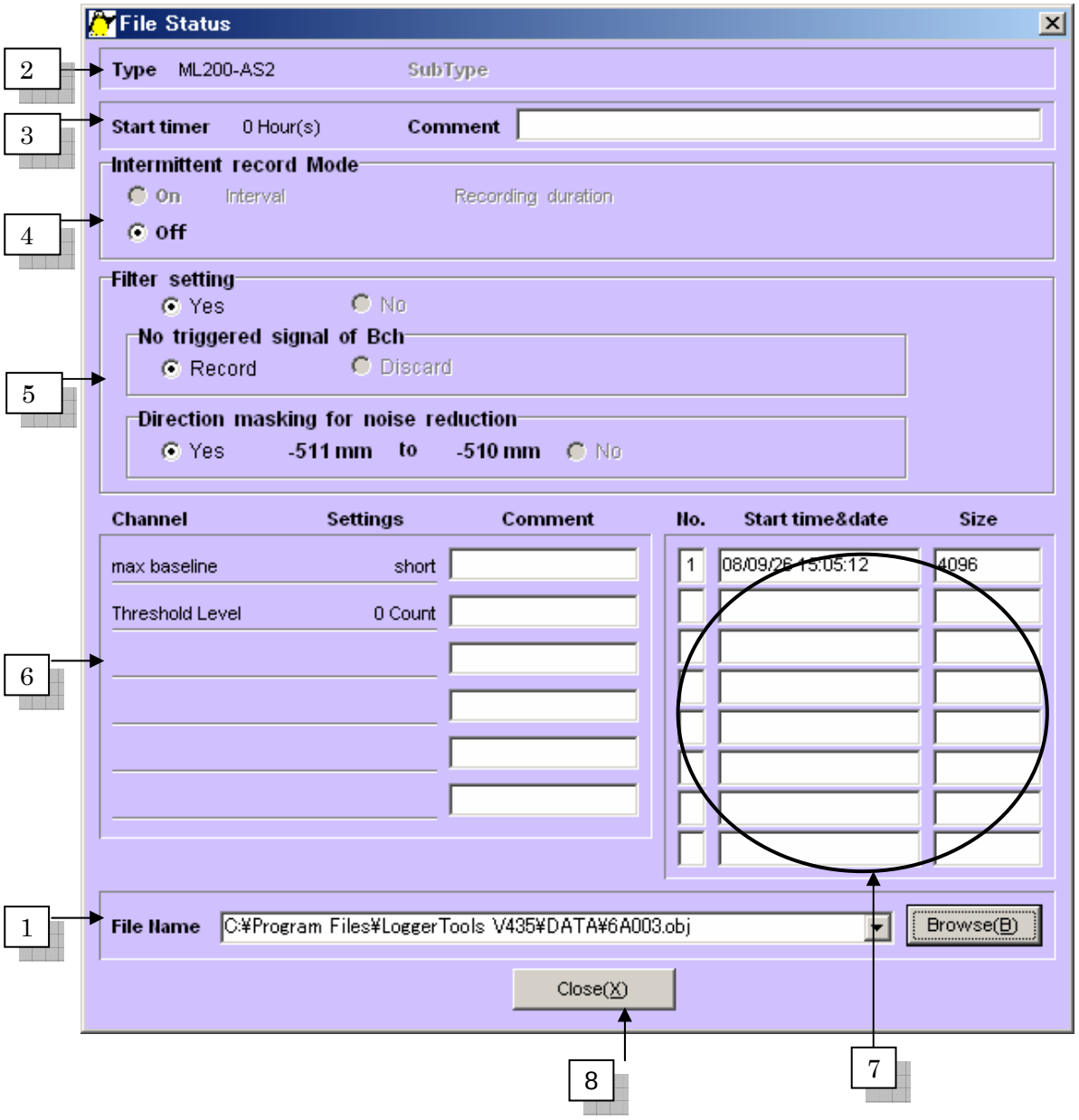
Click to start the downloading.

If any error of communication between the interface box and A-tag happens when you click Start, following message will show up. In this case, plug out the power line from the interface box and plug in again. Note that you can leave A-tag connected to the interface box during plug in and out. When you plug in, LED on A-tag blinks. If the error happened during downloading, do same procedure and click start. Then Logger Tools start to read the file after the terminated point.

7. ***Close***
   Close Download window.
   During downloading this button is shown as ***Cancel***. To quit downloading on the way, click ***Cancel***.

7. File status

File status window shows the setup parameters of the downloaded file.



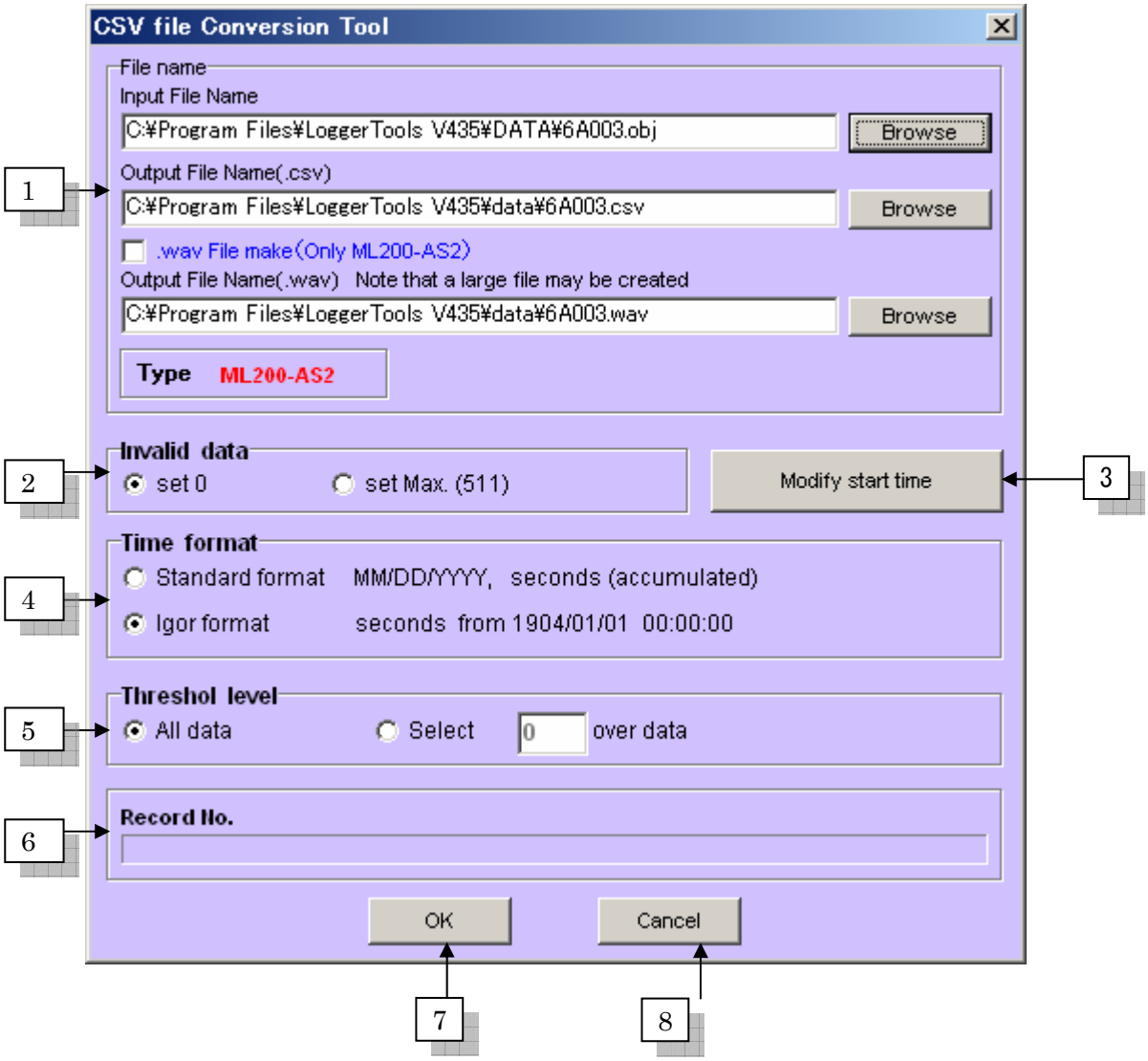
1. ***File name***
   Click **Browse** button and select file you wish to see the parameters
2.***Type***
   indicate logger type
3.***Start Mode, Comment***
   - **Start timer**
     Indicate the start mode (Timer or date)
   - **Comment**
     Indicate the commnet
4. ***Intermittent record Mode***
   indicates the intermittent mode
5. ***Filter setting***
   indicate filter setting
6. ***Channel, Settings，Comment***
   Indicate max baseline, threshold level, comments

7 ***No., Start time & date, Data size***
   indicate the status of the recorded data
   - ***No.*** indicates the serial number of file (max. 8).
     A file was created from the start and the end of recording
   - ***Start time & date*** indicates the time and date when the recording started
   - ***Data size*** indicate data size of each file in bite

   8. ***Close***
   close this window

8. Csv File

convert downloaded binary file to comma separated value file, which can be read by Excel of Igor.



1. ***File name***
   - Click **Browse** to select the file you wish to convert.
   - Selected file name is shown in **Input File Name**
   - Output file name is shown in **Output File Name(.csv)**
     The extension of the file (csv) is automatically added.
     You can select appropriate folder to save the converted file to click Browse.
   - **.wav File make(Only ML200-AS2)**
     Click to create stereo wav file (Windows sound file). Note that the created file is very large if your recorded hours. In this case it may take time to convert and occupy large space in your harddisk. The amplitude of the created sound is faint due to 10 bits system. Please amplify 30 dB (or 30 times) to listen loud sound. The wave file name and its path is indicated in **Output File Name(.wav).**

The extension (wav) is automatically added

   - **Type**
     Indicate logger type.

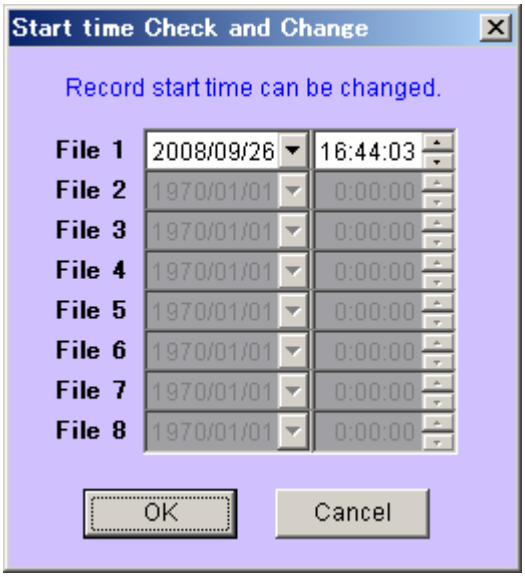
2. ***Invalid data***

Select dummy value of the invalid data of the time difference when trigger happened only one hydrophone. In this case, the time difference could not be measured and categorized invalid.

   - check **set 0** to set dummy data as 0
   - check **set Max.(511)** to set dummy data as 511 (maximum value of +9 bits).

3. ***Modify start time***

Click to set other start time of the recording. You can select start time of each recorded file in the dialog box below..



   - click **OK** to set new start time and close this dialog box.
   - click **Cancel** to quit.

4. ***Time format***

Select time format of the converted file.

   - check **Standard format** to select MM/DD/YYYY type

・check **Igor format** to select serial time in second started at 00:00, January 1st 1904.

5. ***Threshold level***
   ・Check **All data** to convert all of the recorded data
   ・Check **Select** to convert data with the intensity at the first hydrophone larger than the value (right)
6. ***Record No.***
   Indicate the serial number of file, which is converted and the status of the conversion.
7. ***OK***
   Click to start conversion
8. ***Close***
   Click to close this window.

File format of CSV converter

Standard format

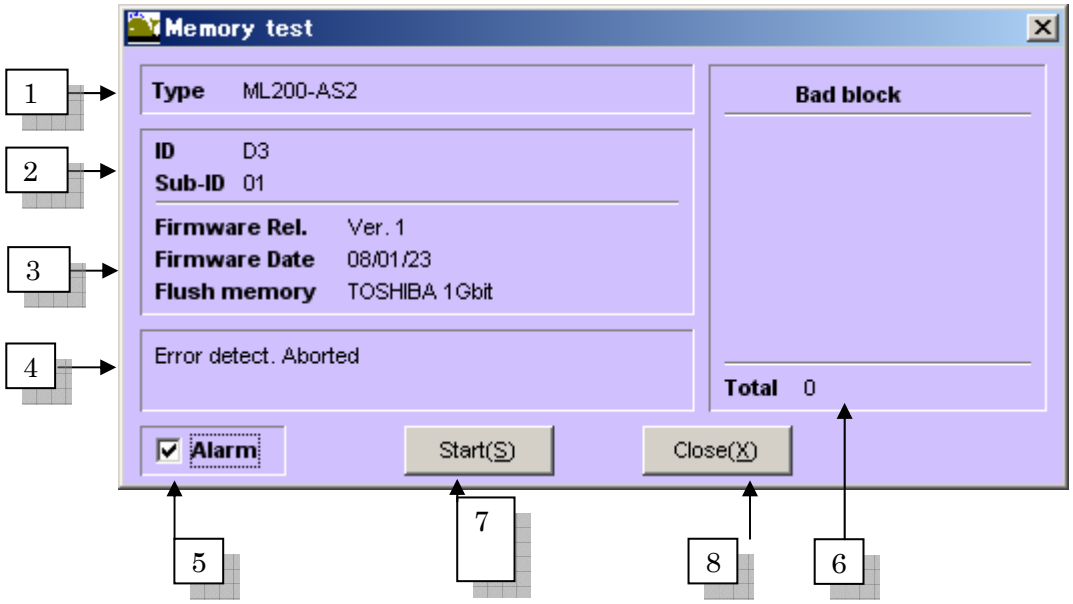
MM/DD/YYYY	Seconds in a day	Sound pressure at Ach	Sound pressure at Bch	Time arrival difference
09/26/2008	60243.003	23	72	43
09/26/2008	60243.004	31	67	43
09/26/2008	60243.005	27	62	43
09/26/2008	60243.006	26	65	43
09/26/2008	60243.007	18	60	42
09/26/2008	60243.008	27	53	43
09/26/2008	60243.009	24	58	43
09/26/2008	60243.01	27	66	43

Igor format

YY/MM/DD &Time in Igor format	Sound pressure at Ach	Sound pressure at Bch	Time arrival difference
3305292243	23	72	43
3305292243	31	67	43
3305292243	27	62	43
3305292243	26	65	43
3305292243	18	60	42
3305292243	27	53	43
3305292243	24	58	43
3305292243	27	66	43

9. Memory test

You do not need to do memory test. This function tests the flash memory of A-tag and create the bad block list. This test was conducted before delivery of A-tag. MMT has the bad block list of each A-tag., in case of repair. If you try to test, the following message will show up.

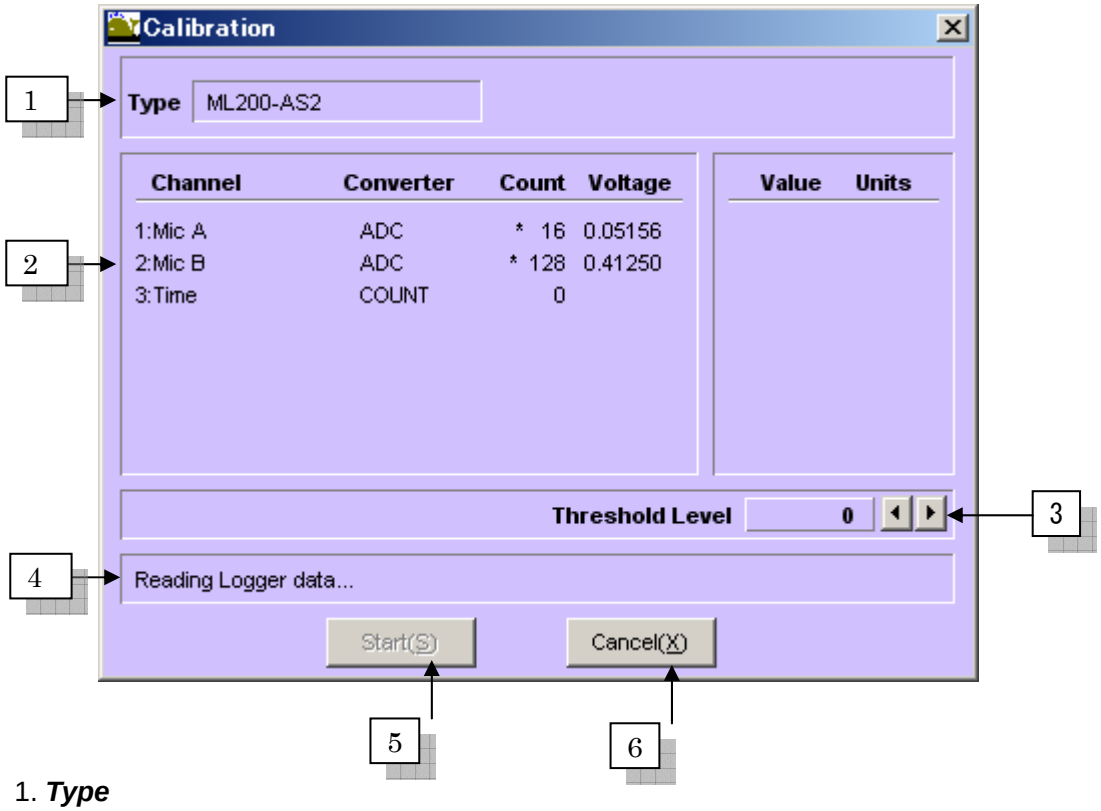


1. ***Type***
   Indicate logger type
2. ***ID, Sub-ID***
   Indicate ID of the logger
3. ***Firmware Rel, Firmware Date, Flush memory***
   - indicate the firmware version at ***Firmware Rel***
   - Indicate the data of the firmware released at ***Firmware Date***
   - Indicate the products and the size of the flash memory at ***Flush memory***
4. ***Message***
   Show the status of the memory test

5. ***Alarm***
   Check to Alarm at the end of the test. Remove check to disable
6. ***Bad block***
   Indicate the number of the bad blocks.
7. ***Start***
   Click to start memory test
8. ***Close***
   Click to close this window.

10. Calibration

Show measured parameters in real-time. Note that calibration does not affect stored data. It will not end until you click ***Cancel (X)*** button.



1. ***Type***
   Type of the data logger
2. ***Channel,Converter,Count,Voltage***
   - **Channel**
     Channel name
     (Mic A: primarily hydrophone, Mic B: secondary Hydrophone, Time: time difference)
   - **Converter**
     ADC: analogue digital converter, COUNT: time difference counter
   - **Count**
     measured values of each channel
   - **Voltage**
     output voltage of ADC
3. ***Threshold Level***
   Setting of the detection threshold level. Note that this only change the threshold level during calibration. You should set appropriate threshold level at Setup window.
4. ***Message***
   status of the calibration
5. ***Start***
   Start calibration
6. ***Close***

close calibration
This button is shown as ***Cancel*** when calibration is going.