



OMEGA® User's Guide

**Shop online at
omega.com®**

**e-mail: info@omega.com
For latest product manuals:
omegamanual.info**



MADE IN TAIWAN



Software for CL427 Documenting Multifunction Calibrator and Arbitrary Function Generator



OMEGAnet® Online Service
omega.com

Internet e-mail
info@omega.com

Servicing North America:

U.S.A.: <u>ISO 9001 Certified</u>	Omega Engineering, Inc., One Omega Drive, P.O. Box 4047 Stamford, CT 06907-0047 Toll-Free: 1-800-826-6342 FAX: (203) 359-7700	TEL: (203) 359-1660 e-mail: info@omega.com
Canada:	976 Bergar Laval (Quebec), H7L 5A1 Canada Toll-Free: 1-800-826-6342 FAX: (514) 856-6886	TEL: (514) 856-6928 e-mail: info@omega.com

For immediate technical or application assistance:

U.S.A. and Canada: Sales Service: 1-800-826-6342 / 1-800-TC-OMEGA®
Customer Service: 1-800-622-2378 / 1-800-622-BEST®
Engineering Service: 1-800-872-9436 / 1-800-USA-WHEN®

Mexico Latin America En Español: 001 (203) 359-7803 FAX: 001 (203) 359-7807
info@omega.com.mx e-mail: espanol@omega.com

Servicing Europe:

Benelux:	Managed by the United Kingdom Office Toll-Free: 0800 099 3344 FAX: +31 20 643 46 43	TEL: +31 20 347 21 21 e-mail: sales@omegeng.nl
Czech Republic:	Frystatska 184 733 01 Karviná, Czech Republic Toll-Free: 0800-1-66342 FAX: +420-59-6311114	TEL: +420-59-6311899 e-mail: info@omegashop.cz
France:	Managed by the United Kingdom Office Toll-Free: 0800 466 342 FAX: +33 (0) 130 57 54 27	TEL: +33 (0) 161 37 29 00 e-mail: sales@omega.fr
Germany/ Austria:	Daimlerstrasse 26 D-75392 Deckenpfronn, Germany Toll-Free: 0800 6397678 FAX: +49 (0) 7056 9398-29	TEL: +49 (0) 7056 9398-0 e-mail: info@omega.de
United Kingdom: <u>ISO 9001 Certified</u>	OMEGA Engineering Ltd. One Omega Drive, River Bend Technology Centre, Northbank Irlam, Manchester M44 5BD United Kingdom Toll-Free: 0800-488-488 FAX: +44 (0) 161 777-6622	TEL: +44 (0) 161 777-6611 e-mail: sales@omega.co.uk

It is the policy of OMEGA Engineering, Inc. to comply with all worldwide safety and EMC/EMI regulations that apply. OMEGA is constantly pursuing certification of its products to the European New Approach Directives. OMEGA will add the CE mark to every appropriate device upon certification.

The information contained in this document is believed to be correct, but OMEGA accepts no liability for any errors it contains, and reserves the right to alter specifications without notice.

WARNING: These products are not designed for use in, and should not be used for, human applications.

Documenting Multifunction Calibrator

and Arbitrary Function Generator

iCal

Software Manual



1. Introduction.....	1-1
1.1 Operation Environment.....	1-1
1.2 Hardware.....	1-1
1.3 Connecting Procedures.....	1-1
2. Software Installation.....	2-1
2.1 Install Application Program.....	2-1
2.2 Install USB Driver.....	2-2
3. Software Operation.....	3-1
Start Executing Program:.....	3-1
3.1 Three Main Functions of iCal.....	3-2
1. Search and communicate with iCal.....	3-2
2. View Files.....	3-2
3. Wave Edit.....	3-2
3.2 Main Screen.....	3-3
1. Communication.....	3-3
2. Tool Bar.....	3-4
Download Records:.....	3-4
Delete Records:.....	3-5
Send Waveform Files.....	3-5
Switch to View (Files) Screen.....	3-6
Switch to (Wave) Edit Screen.....	3-6
3. Screens of Various Functions.....	3-6
4. Remote Control Buttons.....	3-7
5. Function Switching.....	3-11
6. Message.....	3-11
3.3 View Files.....	3-12
1. Tool Bar.....	3-13

Open files	3-13
Save files.....	3-13
Print:.....	3-13
Curve display:.....	3-13
Bar chart.....	3-13
Switch to Main Screen.	3-13
Switch to (Wave) Edit Screen.	3-13
2. Data Full View	3-14
3. Curve Diagram	3-14
4. Record Data Figures	3-14
3.4 Wave Edit	3-15
1. Tool Bar	3-16
Create New Files:	3-16
Save Files:	3-16
Open Old Files:	3-16
Switch to Main Screen.	3-16
Switch to View (Files) Screen.	3-16
2. Edit Tool Bar	3-16
Target	3-17
Zoom in/out display	3-17
Triangular wave	3-18
Triangular wave of a selected range	3-18
Oval Wave	3-19
Oval Wave of a selected range	3-19
Straight Line	3-20
Arbitrary	3-20
Sine Wave	3-20
Square Wave	3-21

Triangular Wave	3-21
Sawtooth Wave	3-22
Special Wave	3-22
Text	3-23
Copy / Paste	3-23
Mirror Shoots	3-24
3. Wave Edit Area	3-24
4. Move Display Light Bar	3-25
5. Command Area	3-25
6. Message	3-25

1. Introduction

1.1 Operation Environment

- * Application Program should be installed in the operation system of Microsoft Windows 7 / Vista / XP / 2000 (SP3).
- * USB driver program should be installed (Application Program will install it automatically).

1.2 Hardware

- * Personal Computer (PC): we recommend the processor of Pentium 4 Celeron 2.0GHz or above.
- * RAM: we recommend 1GB or above.
- * Screen resolution: requires 1024 x 768 pixels.
DPI must be set up as 96 DPI.
- * Documenting Multifunction Calibrator (“iCal” for short in this manual)
- * USB cable.

1.3 Connecting Procedures

Step 1: Turn on PC and iCal.

Step 2: Connect USB Cable.

Step 3: Start the Application Program of iCal

Step 4: Press Communication button:



2. Software Installation

2.1 Install Application Program

Execute Install.bat (which is in installation disc) to enter the procedures of installing Application Program. Please follow the instructions to install Application Program. During the installation, USB driver program and iCal software will be installed automatically.

Remark:

1. After putting the installation disc into CD-ROM drive, the Application Program will automatically execute the installation.
2. If the installation is not automatically executed, please choose the Install.bat program in the installation disc to perform the installation.
3. After Application Program has been installed, please Restart the system.

2.2 Install USB Driver

During the installation of Application Program, the USB driver program will be installed automatically.

However, if users need to install USB driver program, please choose USB Driver Directory in the installation disc, click CP210x_VCP_Win_XP_S2K3_Vista_7.exe to execute the installation of USB Driver.

Remark:

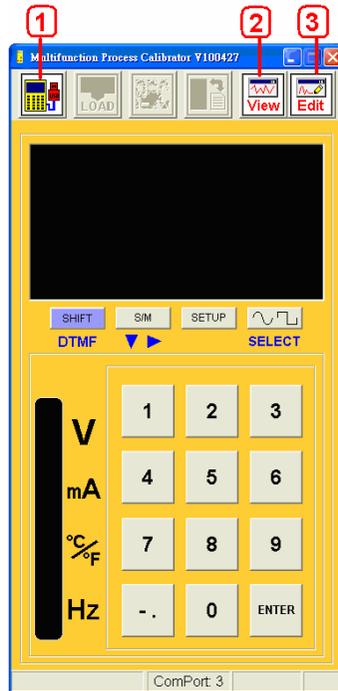
1. If the driver program can't detect the hardware, please remove the hardware and then plug it in properly.

3. Software Operation

Start Executing Program:

In **Start -> All Programs -> iCal**, choose "iCal" or click the shortcut to start executing program.

(Below is the **Initial Screen** of iCal software.)



Three Main Functions of iCal software:

1. Communicate with iCal (hardware): Users can operate the functions of iCal (hardware) via this communication.
2. View Files: providing graphics for recorded files.
3. Wave Edit: Editing user programmable waveforms.

3.1 Three Main Functions of iCal

1. Search and communicate with iCal

After pressing , the software will search for iCal and check if iCal is connecting with PC. When the software can not find iCal, there will be a message -"No ComPort". At this moment, please check if the USB-RS232 cable is plugged in the PC and if the installer program is activated (please check the Device Manager of your system).

When the communication between PC (software) and iCal (hardware) is successful, all the functions of tool bar will be available. But if the communication suddenly stops, some functions of the tool bar will not be available.

2. View Files.



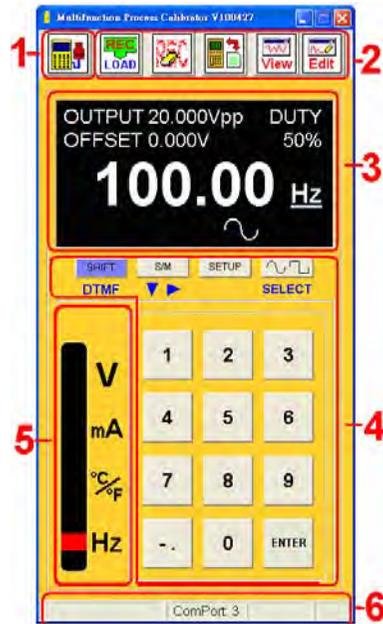
3. Wave Edit.



3.2 Main Screen

There are 6 sections in the Main Screen:

1. Communication
2. Tool bar
3. LCM display
4. Remote control buttons
5. Function switch
6. Message



1. Communication

To get data from iCal (hardware), first users have to make sure the PC (software) has already connected with iCal. There will be a warning message – “Error Code 8021 !!” if the communication stops. At this moment please press this Communication button again. If the reconnecting still doesn’t work, then please restart the software and the iCal.

2. Tool Bar



Download Records:

It can provide a list of records, download records and send them into View (Files) screen. (This function will be enabled only after users switch iCal to SETUP function.) (Under Hz function, please try not to enter SETUP function to prevent from errors.)

When the data recorded in iCal is of the same function, they will be automatically sent into View. But when the data recorded in iCal is of different functions, they will be put in a list in which users can choose the data they want to download. They will not be sent into View, but they can be exported to EXCEL (.csv or .txt).

When SAMPLE is set up as “0”, there will be a sample list in which users can choose the data they want to download.

	FileName	Count	Export
1	10000000	6	Export
2	20000000	7	
3	30000000	6	

When there is a sample list (which means the files saved in iCal are of different functions), please select the files you want to download. Press EXPORT button to export files to EXCEL; or use the SaveAll function to export all files to EXCEL.



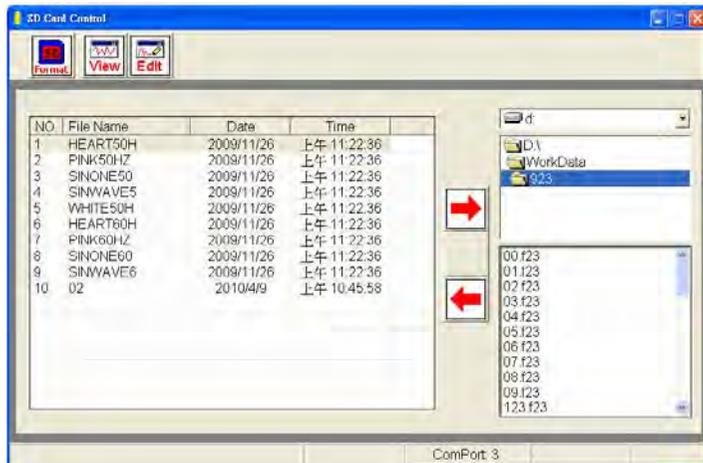
Delete Records:

It can remove all the records which are saved in iCal. (This function will be enabled only after users switch iCal to SETUP function.) (Under Hz function, please try not to enter SETUP function to prevent from errors.)



Send Waveform Files

It can download and upload the user programmable wave files; and format iCal. (This function will be enabled only after users switch iCal to SETUP function.) (Under Hz function, please try not to enter SETUP function to prevent from errors.) (For the file names, please exclude ,.%&^!@#/(.)



Format SD card:

Reformat the SD card inside iCal and retrieve the defaults.



Download:

Download a selected "user programmable wave" file from iCal.



Upload:

Upload a selected "user programmable wave" file to iCal.

(For the file names, please exclude ,.%&^!@#/(.)

User can save 10 user programmable wave files in iCal.

In the SETUP function of iCal, users can set up the programmable wave file they want to export by referring to their file number.



Switch to View (Files) Screen.



Switch to (Wave) Edit Screen.

Under Hz function, please try not to enter SETUP function to prevent from errors.

3. Screens of Various Functions

All the functions have their own screen display with data except the SETUP.



Frequency Output Function Double Tone Multi-Frequency Function



Temperature Output Function Temperature Input Function

(In temperature input function, when "OL" or "----" is displayed which means the current value is open circuit or overload.)



mA Output Function

mA Input Function

(When Mapping is YES, in mA input function and the value is OL, two displayed values will be OL. Here the display is slightly different from the display of iCal.)

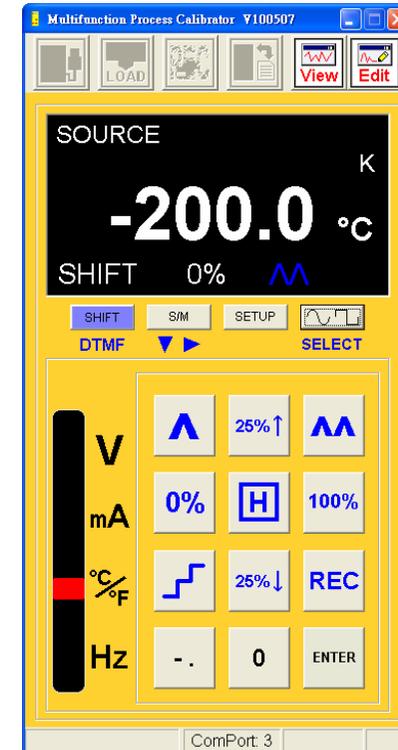


V Output Function

V Input Function

4. Remote Control Buttons

After pressing SHIFT, the original numeric buttons will work as scanning function buttons.



(The screen of SHIFT scanning)

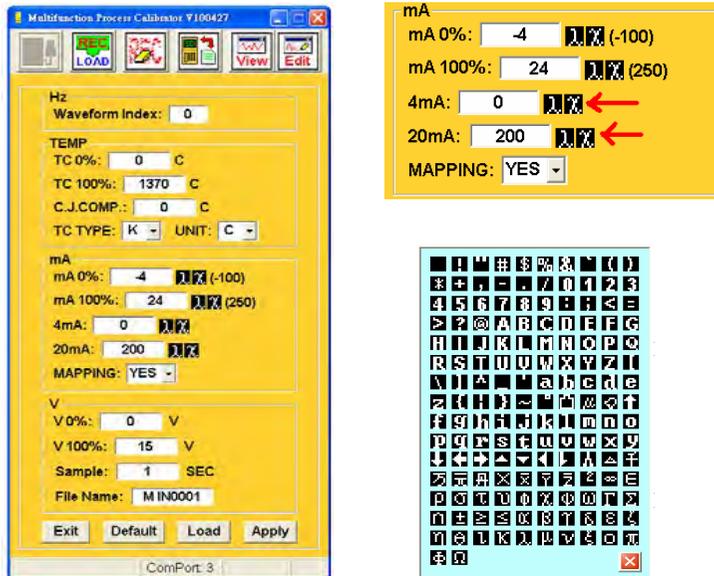
These functions are the same as the button functions of iCal (refer to hardware manual). Here we only introduce SETUP and S/M buttons. When entering SETUP, the software will enter the (parameter) setup screen. When pressing S/M and entering MEASURE, the data recording function of software is enabled.

SETUP of iCal

Here the setup is the same as the (parameter) setup of iCal.

All the parameters (of 4 functions) can be set up here and completed by one setup.

(Under Hz function, please try not to enter SETUP function to prevent from errors.)



Apply: apply the current parameters to iCal.

Load: read the parameter values of iCal.

Default: retrieve the defaults (users have to press Apply).

Exit: leave the parameter setup for the previous function.

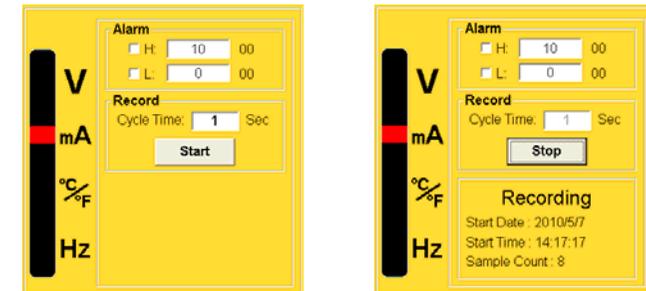
And iCal will exit the parameter setup screen as well.

Programmable Unit: (As the buttons pointed by the arrows on

the top right picture) click the left button of mouse to open the quick list for choosing special characters.

The details of parameters please refer to the operation (hardware) manual.

Use S/M to enter MEASURE, the record function of software is enabled.



When the function is switched to INPUT mode (like above picture), iCal provides the following functions:

Alarm: users can set up the high/low thresholds. After ticking a H/L alarm, when value is over the thresholds, PC will give a beep sound.

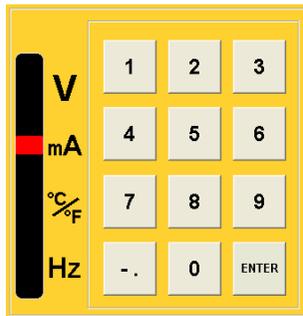
Record: After pressing Start button, the current data will be recorded according to Cycle Time and the data will be displayed. Pressing Stop button to stop data recording and the data will be sent into View screen.

Note: During data recording, the function switching will stop the recording!

5. Function Switching

Each function has its own function display. When switching a function, a symbol representing the current function will be displayed (V mA °C/°F Hz)

(The symbol in below picture shows the function is mA.)



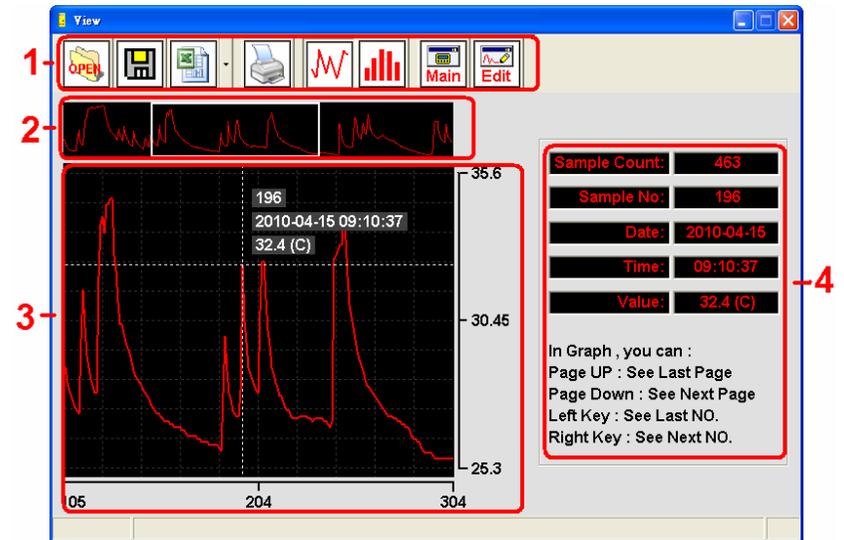
Here the button function of all the functions under OUTPUT (SOURCE) mode are the same as the ones of iCal's numeric buttons.

6. Message



The relating messages (about system operation) are displayed here.

3.3 View Files



There are 4 sections in View Files screen:

1. Tool bar.
2. Data full view.
3. Curve diagram.
4. Record data figures.

1. Tool Bar



Open files.



Save files.



Print:

Print out all the data in the current View (files) screen.



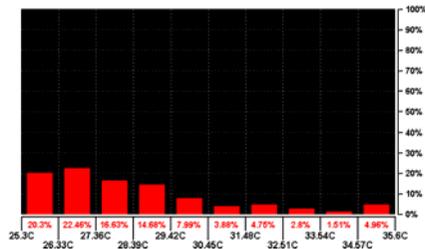
Curve display:

Display a diagram of curves.



Bar chart

All the record data (total: 100%) in the function displayed proportionally in bars.

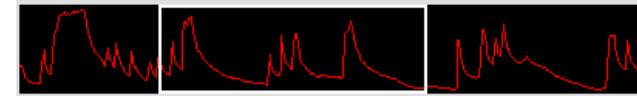


Switch to Main Screen.



Switch to (Wave) Edit Screen.

2. Data Full View



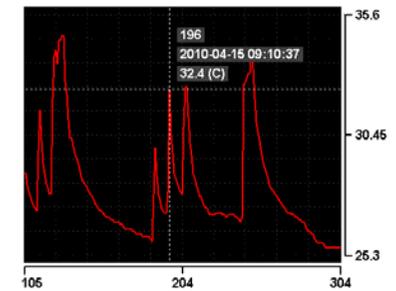
A full view of all the record data showed in curves.

The section of white frame represents the display function of the Curve Data. Inside the frame, press the left button of mouse to move the display function.

3. Curve Diagram

It displays 200 records.

Use the mouse to move the display data, or apply the left and right direction buttons to move the cursor to display data.



Users can use PageUp or PageDown buttons to view the last or next 200 records.

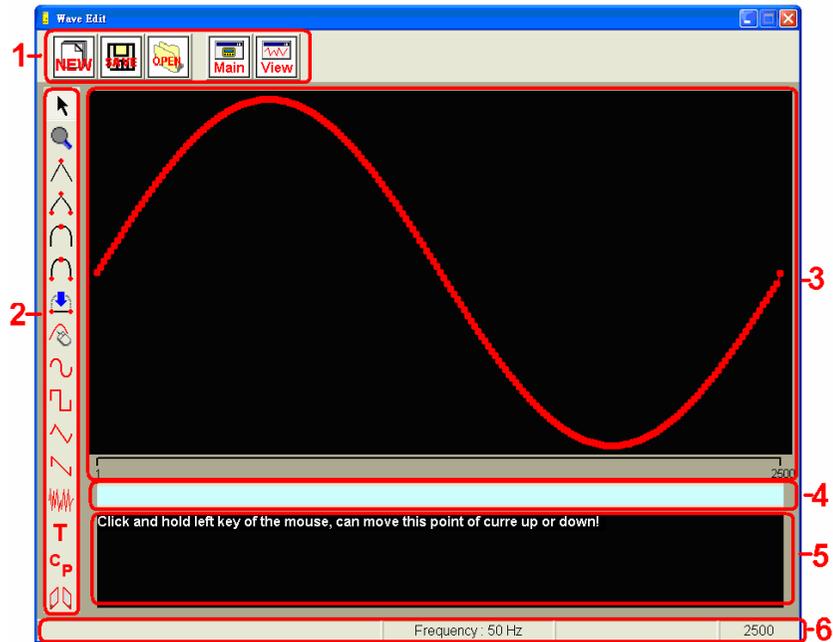
4. Record Data Figures

This section shows the figures of the cursor point in curve diagram.

The figures of date and time are available only for the files saved via software.

Sample Count:	463
Sample No:	196
Date:	2010-04-15
Time:	09:10:37
Value:	32.4 (C)

3.4 Wave Edit



Edit a user programmable wave file (0.3Hz ~ 20kHz).

The total edit points is a cycle of set frequency

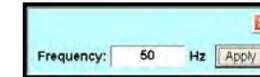
There are 6 sections in "Wave Edit" Screen:

1. Tool bar.
2. Edit tool bar.
3. Wave edit area.
4. Move display light bar.
5. Command area.
6. Message.

1. Tool Bar



Create New Files:



When pressing "NEW", users will be requested input a frequency value.



Save Files:

When pressing "SAVE", the waveform files of iCal will be saved. Please exclude ,.\$%&^!@#/() for the file names.



Open Old Files:

When pressing "OPEN", a waveform file (of iCal) will be opened.



Switch to Main Screen.



Switch to View (Files) Screen.

2. Edit Tool Bar

The tools of "Edit tool bar" will be also applied in the "Command area" and "Wave edit area" so here the explanation can be referred to for these 3 sections.

 **Target**

On the specified point (green point) of wave edit area, press the left button of mouse and then this point will be adjusted according to the moving (up and down) of mouse.

When using other tools, press Esc will return to the first step.

When pressing Esc on the first step will return to this tool.

 **Zoom in/out display**

In the wave edit area,

Click the left button of mouse: zoom in (roller forward)

Click the right button of mouse: zoom out (roller backward)

For the mouse with left/right buttons and a roller, the ZOOM function can be used without opening the zoom display. But during the period of using some tools, the ZOOM function may not be applied. And when using ZOOM function, the “move display light bar” will be zoomed at the same time!

Zoom in to the extreme, the wave edit area will display 50 points only. Zoom out to the extreme, the wave edit area will display complete points.

Please note the max. edit points of wave edit area is 200.

The “Message” section will show the points should be displayed in the current wave edit area. When it shows the points are over 200, the program will calculate proportionally and then display the points should be displayed.

For minor adjustments, please zoom in to the extreme.

Zooming out to the extreme is for adjusting a large area.

 **Triangular wave**

On the edit point, press the left button of mouse and move it forward and backward and then draw a 2-side-symmetry triangular wave (the green point is the middle point).

In the Command Area, user can input alternate multiple 1~4.

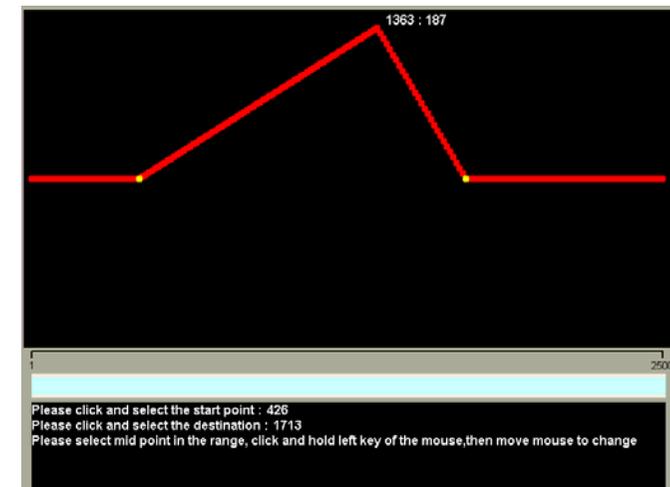
 **Triangular wave of a selected range**

Draw a triangular wave in a certain range.

The steps in the Command Area:

1. Select “start” point of the range.
2. Select “end” point of the range.
3. Choose a certain point within the range as the middle point.

Press the left button of the mouse to move this point. And other points within the range will change positions accordingly.



 **Oval Wave**

On the edit point, press the left button of mouse and move it forward and backward and then draw a 2-side-symmetry oval wave (the green point is the middle point).

In the Command Area, user can input alternate multiple 1~3.

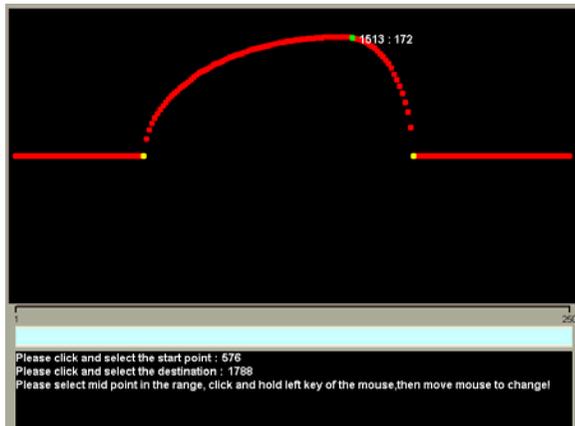
 **Oval Wave of a selected range**

Draw an oval wave in a certain range.

The steps in the Command Area:

1. Select "start" point of the range.
 2. Select "end" point of the range.
 3. Choose a certain point within the range as the middle point.
- Press the left button of the mouse to move this middle point.

When the middle point is not exactly located at the center point, the wave created will be an arc which is not of the same circle.

**Straight Line**

Make a straight line connecting 2 points.

The steps in the Command Area:

1. Select "start" point.
2. Select "end" point.

 **Arbitrary**

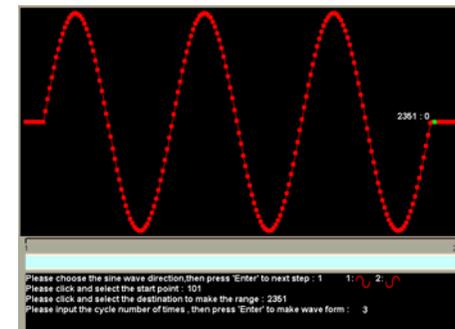
Hold ctrl button and the left button of mouse to move in the wave edit area, the edit points will be changed according to the mouse moving.

 **Sine Wave**

Generating some sine waves in a certain range.

The steps in the Command Area:

1. Choose the sine wave direction.
2. Select "start" point of the range.
3. Select "end" point of the range.
4. Input the cycle number of times, then press "Enter" to make wave form.



Square Wave

Generating some square waves in a certain range.

The steps in the Command Area:

1. Choose the square wave direction.
2. Select "start" point of the range.
3. Select "end" point of the range.
4. Input the cycle number of times, then press "Enter" to make wave form.

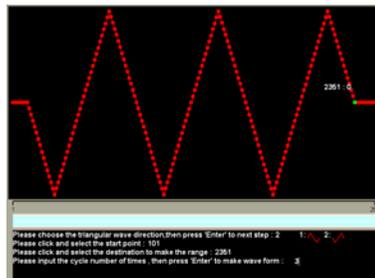


Triangular Wave

Generating some triangular waves in a certain range.

The steps in the Command Area:

1. Choose the triangular wave direction.
2. Select "start" point of the range.
3. Select "end" point of the range.
4. Input the cycle number of times, then press "Enter" to make wave form.

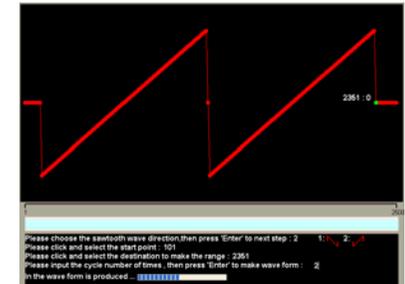


Sawtooth Wave

Generating some truncated sine waves in a certain range.

The steps in the Command Area:

1. Choose the sawtooth wave direction.
2. Select "start" point of the range.
3. Select "end" point of the range.
4. Input the quantity of sawtooth waves, then press "Enter" to make wave form.



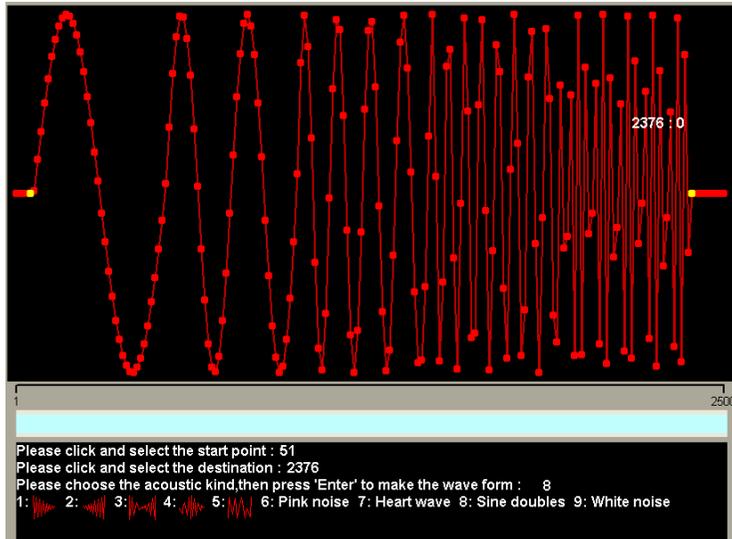
Special Wave

There are 9 special waves for users to choose:

- 1: 2: 3: 4: 5:
 6: Pink noise 7: Heart wave 8: Sine doubles 9: White noise

The steps of the Command Area:

1. Select the "start" point.
2. Select the "end" point.
3. Select the type of the wave, then press "Enter" to make the wave form.



(The above wave is "sine doubles")

T Text

Users can edit text for max. 110 characters.

CP Copy / Paste

Copy a selected range and then post it.

The steps in the Command Area:

1. Select "start" point of the range.
2. Select "end" point of the range.
3. Select "Copy" in the copy quick list.

When the selected range is copied, users can paste it on any point in the wave edit area by clicking the right button of mouse and opening Paste quick list. If users do not copy a range first, then there won't be a Paste quick list.

Mirror Shoots

This function is to mirror a selected range.

The steps of the Command Area:

1. select "start" point
2. select "end" point
3. select the type of mirror shoots, then press "Enter".

 left-right change over

 top-bottom change over

 On the next edit point (outside the range), post the left-right change over. The original range is unchanged.

 On the next edit point (outside the range), post the top-bottom change over. The original range is unchanged.

3. Wave Edit Area

This section provides waveform display and edit points.

The total edit points (of the wave edit area) is a cycle of set frequency.

In the screen the max. waveform edit points is 200.

When the displayed waveform is over 200 points, the program will calculate proportionally and display the points should be displayed.

For example: The current screen displays a waveform of 800 points but actually there is only 200 edit points. So the program will calculate proportionally and display the points should be displayed.

4. Move Display Light Bar

The function of this section is to move the display. The size of the light bar is changed in accordance with the displayed waveform points. When the displayed waveform points are the complete waveform points, the light bar is the longest and can not be moved.

5. Command Area

This section displays all the necessary steps and instructions for wave edit.

6. Message

In this section, users can see the operation status and the wave points of the current screen.

WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **13 months** from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal **one (1) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

OMEGA is pleased to offer suggestions on the use of its various products. However, OMEGA neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by OMEGA, either verbal or written. OMEGA warrants only that the parts manufactured by the company will be as specified and free of defects. OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. LIMITATION OF LIABILITY: The remedies of purchaser set forth herein are exclusive, and the total liability of OMEGA with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall OMEGA be liable for consequential, incidental or special damages.

CONDITIONS: Equipment sold by OMEGA is not intended to be used, nor shall it be used: (1) as a "Basic Component" under 10 CFR 21 (NRC), used in or with any nuclear installation or activity; or (2) in medical applications or used on humans. Should any Product(s) be used in or with any nuclear installation or activity, medical application, used on humans, or misused in any way, OMEGA assumes no responsibility as set forth in our basic WARRANTY/DISCLAIMER language, and, additionally, purchaser will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the Product(s) in such a manner.

RETURN REQUESTS/INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

OMEGA is a registered trademark of OMEGA ENGINEERING, INC.

© Copyright 2012 OMEGA ENGINEERING, INC. All rights reserved. This document may not be copied, photocopied, reproduced, translated, or reduced to any electronic medium or machine-readable form, in whole or in part, without the prior written consent of OMEGA ENGINEERING, INC.

Where Do I Find Everything I Need for Process Measurement and Control? OMEGA...Of Course!

Shop online at omega.comSM

TEMPERATURE

- ☑ Thermocouple, RTD & Thermistor Probes, Connectors, Panels & Assemblies
- ☑ Wire: Thermocouple, RTD & Thermistor
- ☑ Calibrators & Ice Point References
- ☑ Recorders, Controllers & Process Monitors
- ☑ Infrared Pyrometers

PRESSURE, STRAIN AND FORCE

- ☑ Transducers & Strain Gages
- ☑ Load Cells & Pressure Gages
- ☑ Displacement Transducers
- ☑ Instrumentation & Accessories

FLOW/LEVEL

- ☑ Rotameters, Gas Mass Flowmeters & Flow Computers
- ☑ Air Velocity Indicators
- ☑ Turbine/Paddlewheel Systems
- ☑ Totalizers & Batch Controllers

pH/CONDUCTIVITY

- ☑ pH Electrodes, Testers & Accessories
- ☑ Benchtop/Laboratory Meters
- ☑ Controllers, Calibrators, Simulators & Pumps
- ☑ Industrial pH & Conductivity Equipment

DATA ACQUISITION

- ☑ Data Acquisition & Engineering Software
- ☑ Communications-Based Acquisition Systems
- ☑ Plug-in Cards for Apple, IBM & Compatibles
- ☑ Data Logging Systems
- ☑ Recorders, Printers & Plotters

HEATERS

- ☑ Heating Cable
- ☑ Cartridge & Strip Heaters
- ☑ Immersion & Band Heaters
- ☑ Flexible Heaters
- ☑ Laboratory Heaters

ENVIRONMENTAL MONITORING AND CONTROL

- ☑ Metering & Control Instrumentation
- ☑ Refractometers
- ☑ Pumps & Tubing
- ☑ Air, Soil & Water Monitors
- ☑ Industrial Water & Wastewater Treatment
- ☑ pH, Conductivity & Dissolved Oxygen Instruments