Protek S2405

50MS/s, 5MHz Hand-Held Scope Meter
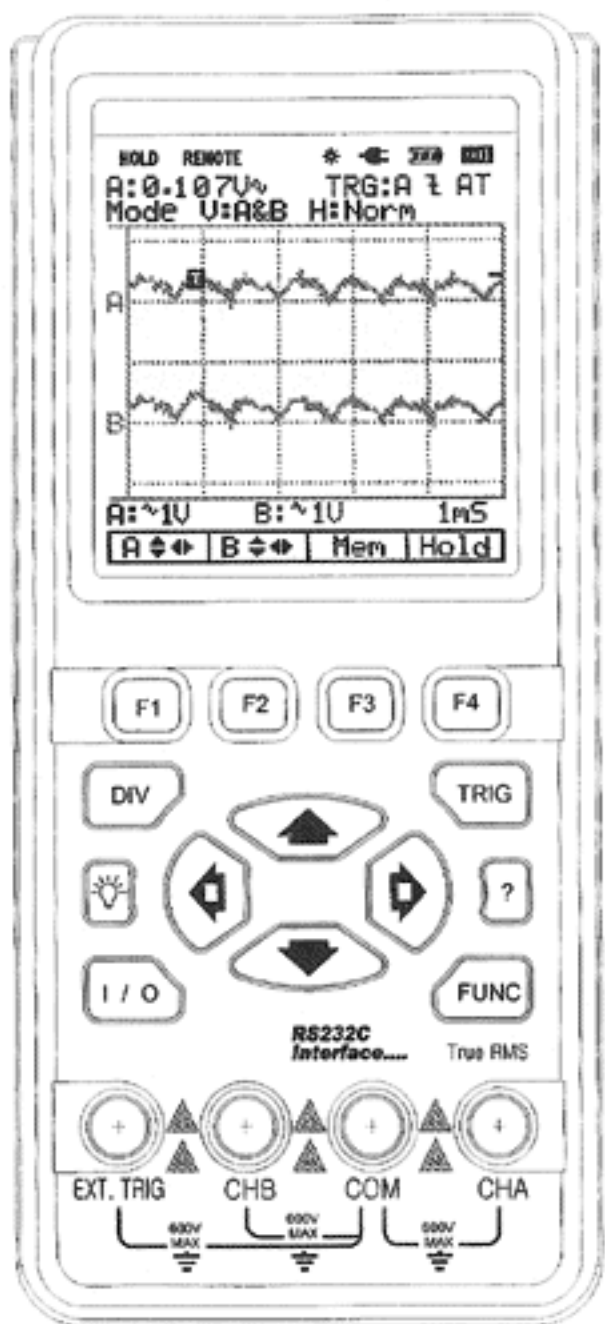
Protek
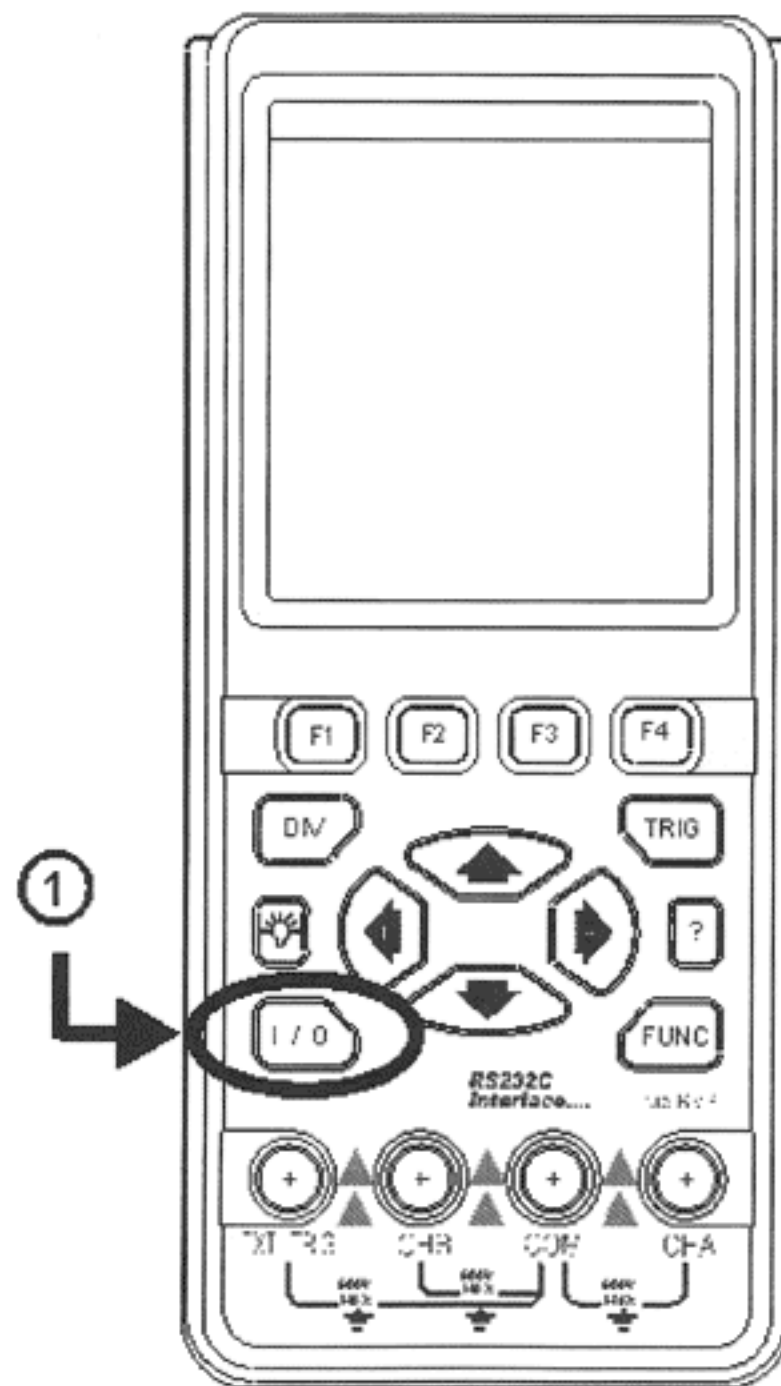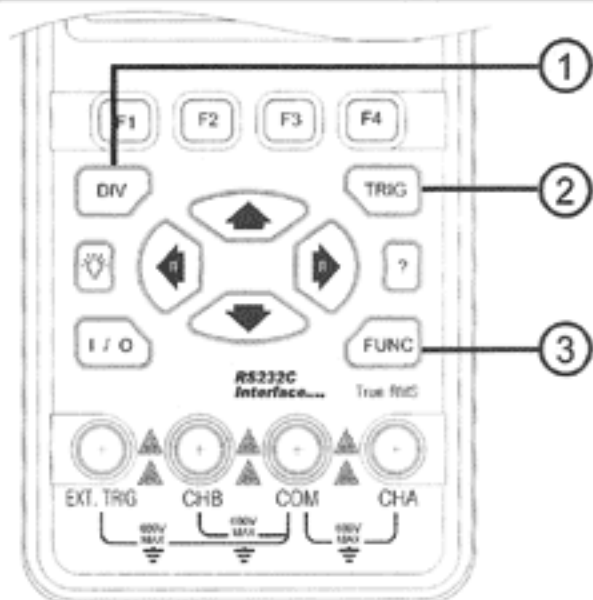
Contents

1. Easy Manual

Front View

1.1. Turning on and off

① Pressing this button for 2 to 3 seconds will turn the unit on.
Pressing this button again for 2 to 3 seconds will turn the power off.

1.2. Division, Trigger and Function key

① **Division key**:
Adjusts vertical division or Horizontal division.

② **Trigger key**:
Adjusts Trigger level.
Selects Single shot mode.
Selects trigger setup.

③ **Function key**:
Selects Scope Setup.
Selects general setup.

1.3. Input Terminals
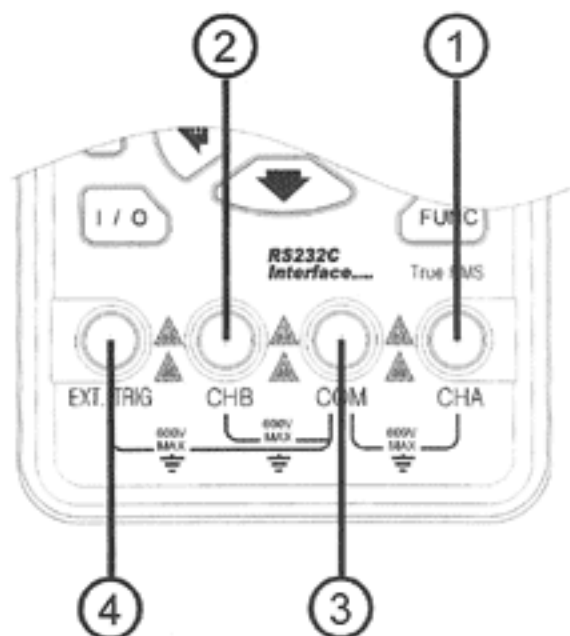
① **Channel A**:
You can always use the red channel A for all single input measurements possible with the meter.

② **Channel B**:
For measurements on two different signals you can use the channel B together with the Channel A.

③ **Common**:
You can use the black common as single ground for low frequency measurements and for ACV, DCV, Ohm, Continuity measurements.

④ **External trigger**:
The EXT.TRIG input accepts external trigger signals.

1.4. Command, Arrow, Backlight and Help key
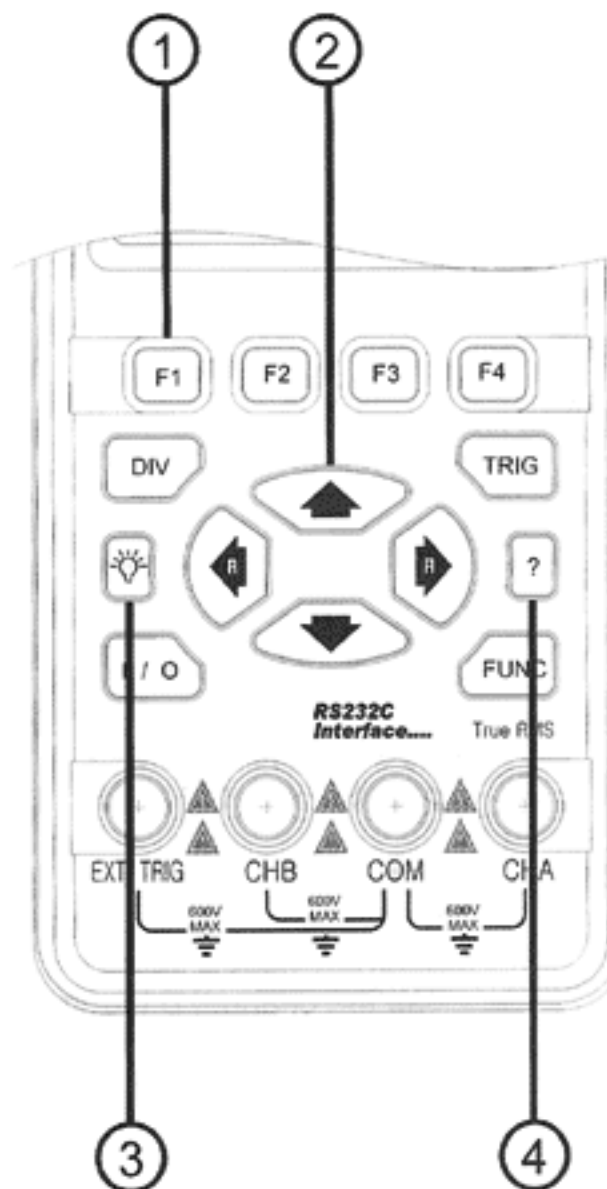
① **Command keys**:
These four keys are command buttons. They are labeled F1-F4. These keys will have various functions.

② **Four arrow keys**:
These keys serve as the primary means of navigating the instrument's menus and operating displays.

③ **Display back light**:
Press this button to turn on the backlight. To turn the back light off, press this button again.

④ **Help key**:
General information for the test tool is available.

1.5.   Primary Menu Map

| A ⇕ ⬌ | B ⇕ ⬌ | Mem | Hold |

Default Menu

DIV

| A/div | B/div | H/div | Exit |

Division Menu

TRIG

| Tlvl⇕ | Singl | Tmode | Exit |

Trigger Menu

FUNC

| Scope | SetUp | | Exit |

Set Up

SCOPE SETUP

Function Menu

1.6.   Positioning the waveform on the screen
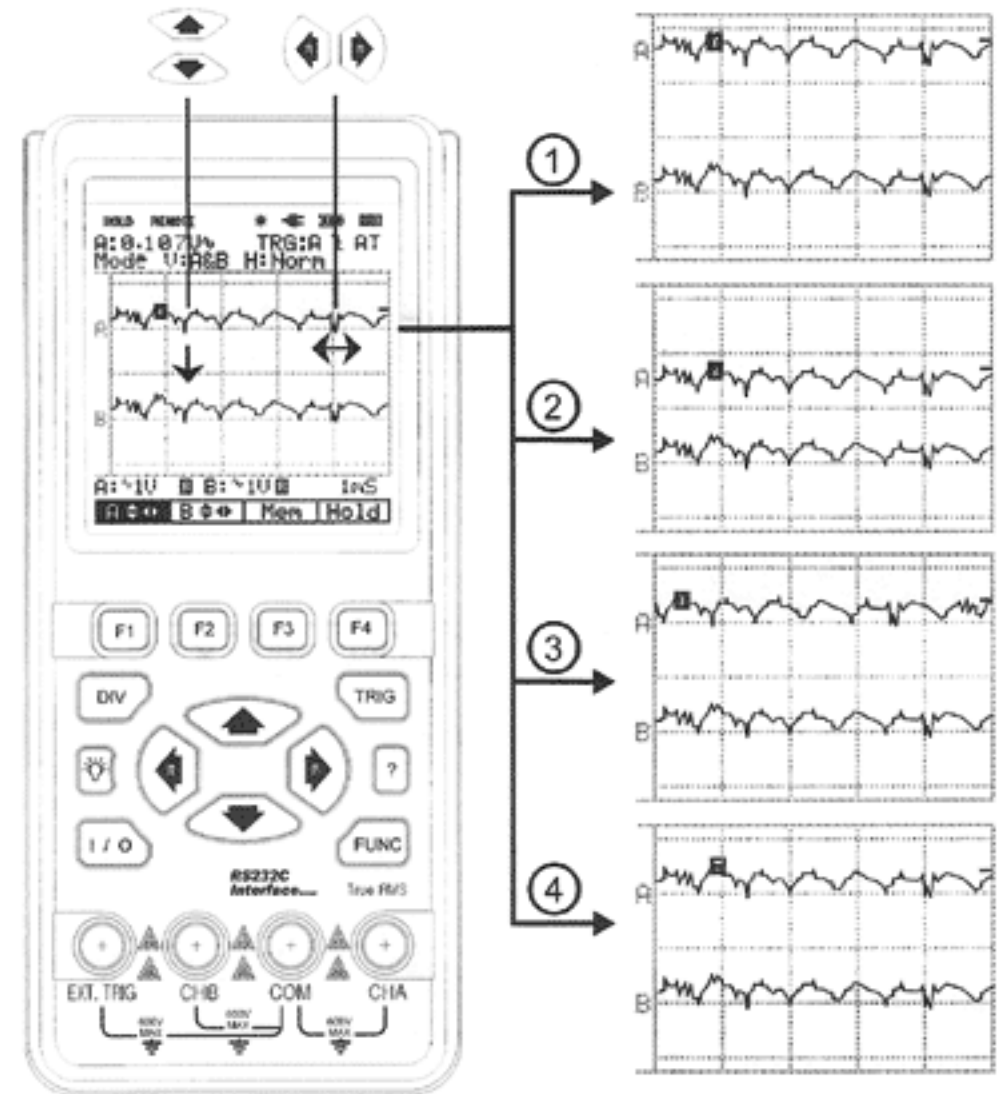
① Pressing ⬆ moves the waveform up.

② Pressing ⬇ moves the waveform down.

③ Pressing ▷ moves the waveform left.

④ Pressing ◁ moves the waveform right.

1.7. Division key map

---
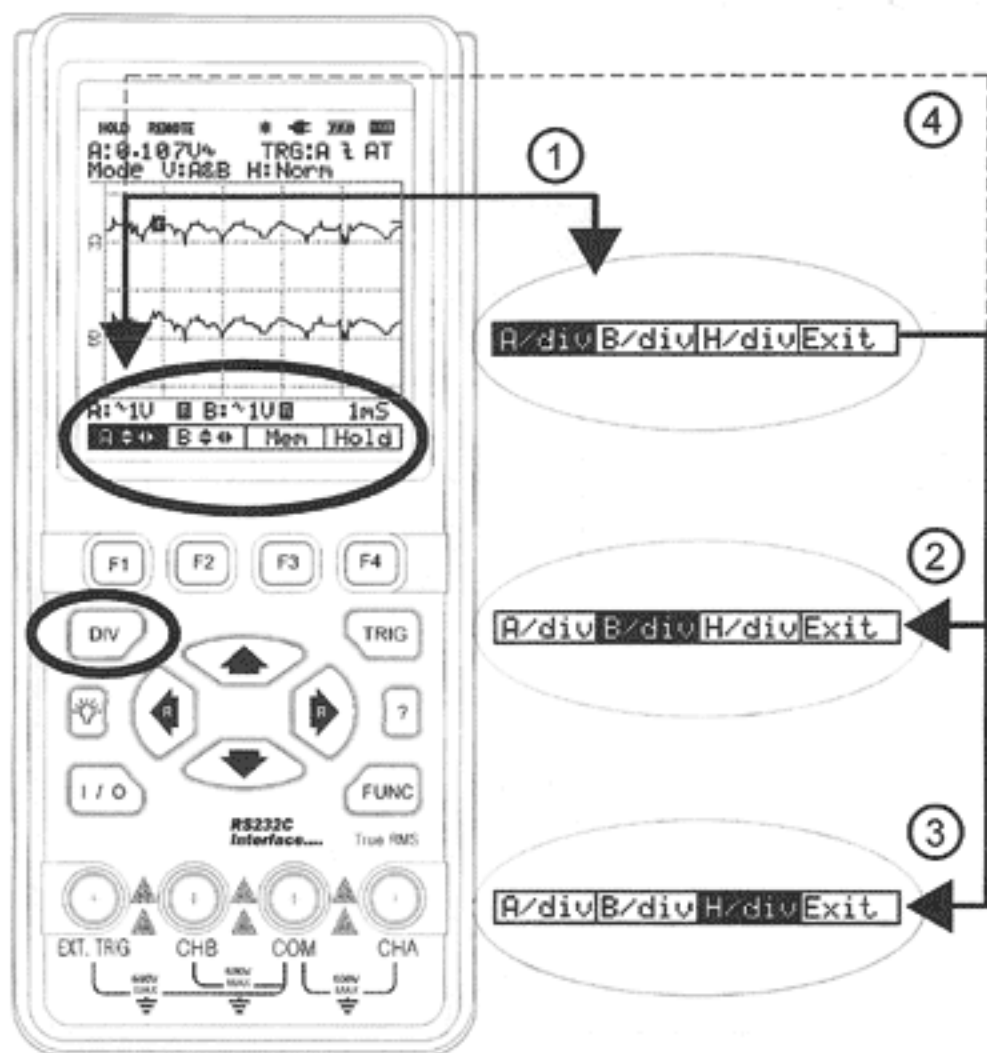
① Pressing `DIV` calls up the default division menu.

② Press `F2` to control the Channel B Vertical Division.

③ Press `F3` to change the Horizontal Division.

④ Press `F4` to exit.

1.8. Changing Vertical (A/div or B/div) division

---
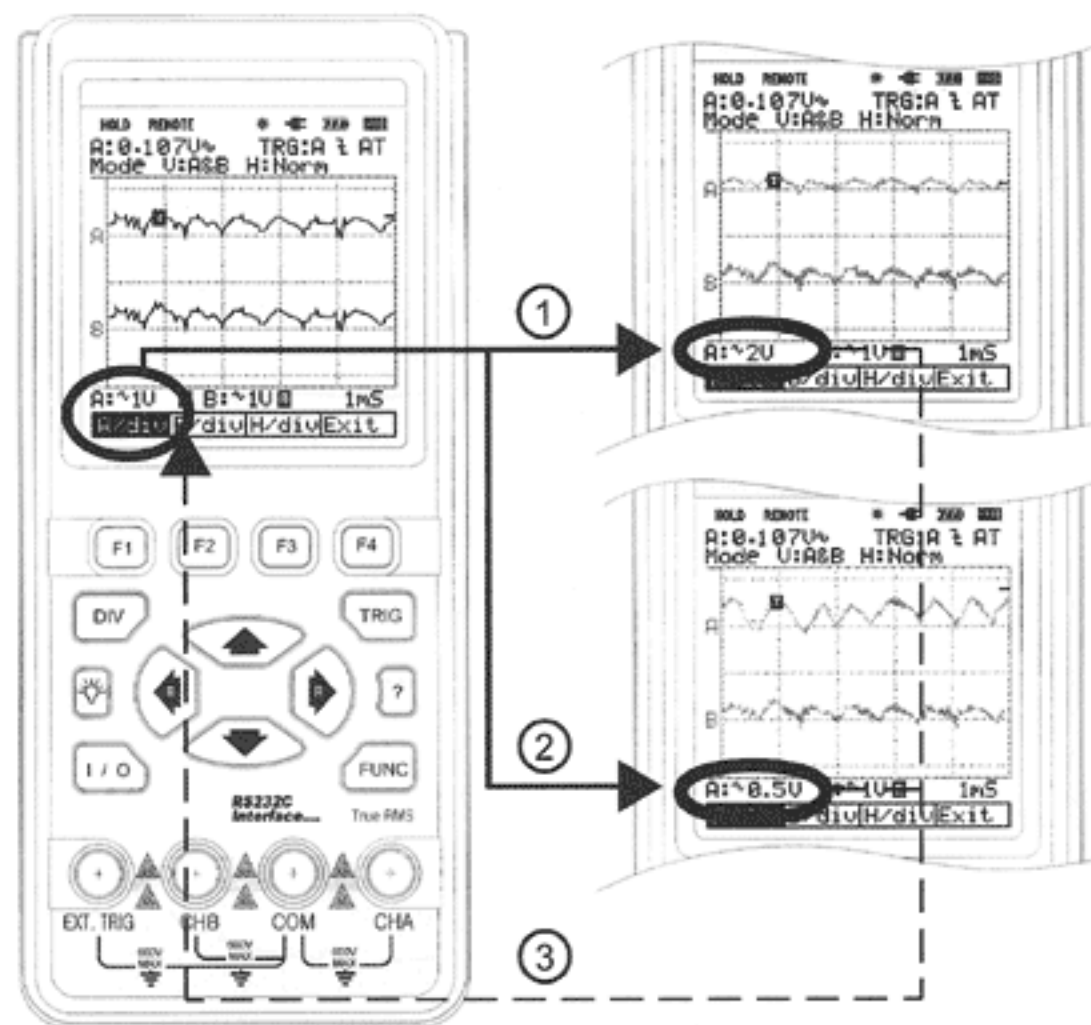
① Pressing ▲ button increases CHA vertical division (A/div).

② Pressing ▼ button decreases CHA vertical division (A/div).

③ Pressing ◄ or ► key will change Div from MANUAL to AUTO(□).

1.9.   Changing Horizontal division
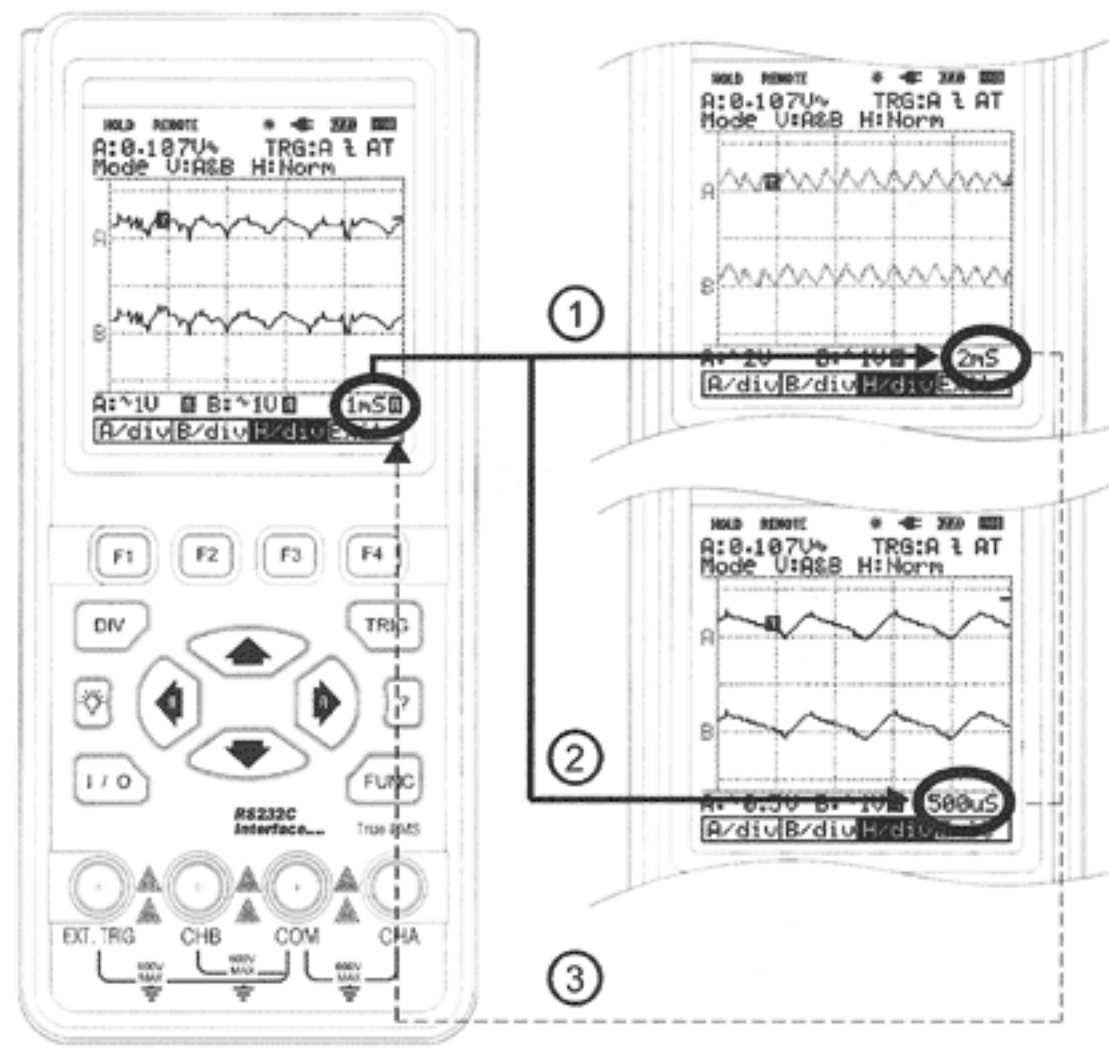
① Pressing ⬆ button increases Horizontal division (H/div).

② Pressing ⬇ button decreases Horizontal division (H/div).

③ Pressing ◀ or ▶ key will change Div from MANUAL to AUTO(▣).

1.10.   Trigger key map
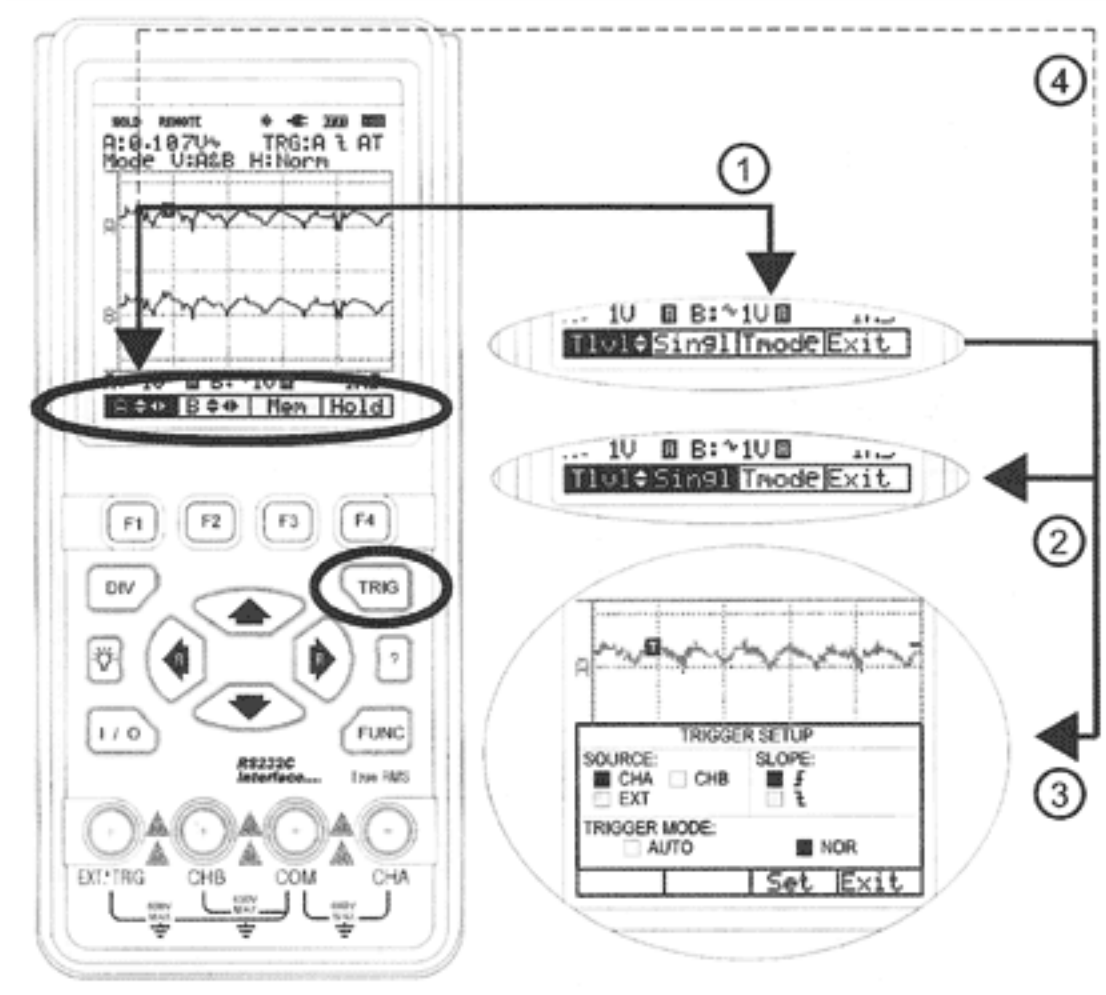
① Press [TRIG] key to display the TRIGGER default menu.

② Press [F2] key for Single shot mode.

③ Press [F3] key for TRIGGER SETUP.

④ Press [F4] to exit.

1.11.　Trigger level control

Trigger point indicator

Trigger level indicator
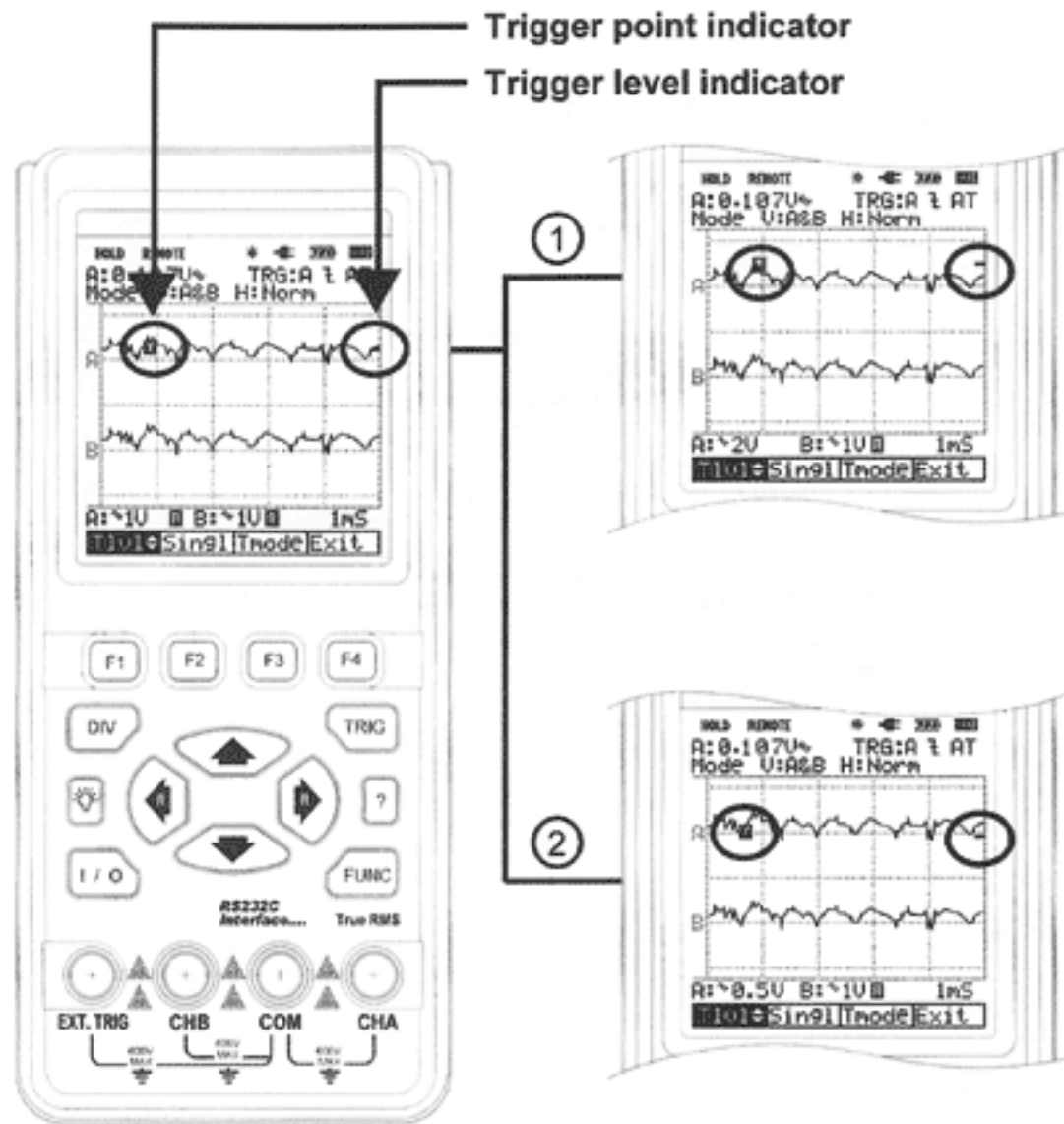
① Pressing ⬆ button increases the Trigger level.

② Pressing ⬇ button decreases the Trigger level.

1.12.　Function key map
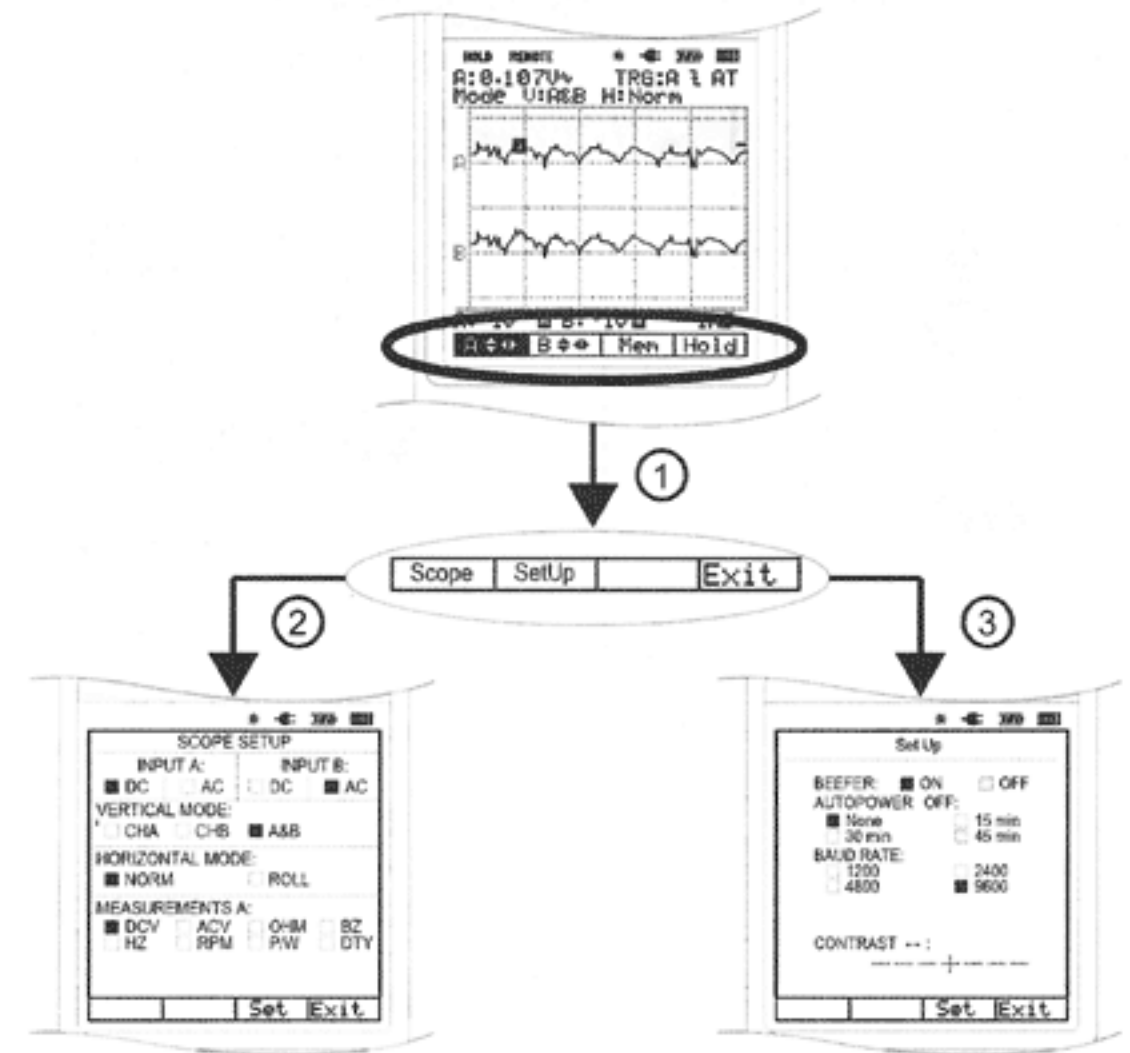
① Press [FUNC] key to display the FUNCtion default menu.

② Press [F1] key for SCOPE SETUP.

③ Press [F2] key for General SETUP.

④ Press [F4] to exit.

2. Introduction

2.1. Main Features

This Programmable Universal Scope Meter offers enhanced features that similar type test instruments on the market today don't have. All the functions are designed to be very convenient to use. You can quickly get used to working with this METER and the great many functions integrated inside. This instrument features:

No	Features
1	**RS-232C** interface for transferring measurement data and waveform.
2	**Dual Channel** and Auto Calibration.
3	**Automatic setting** for horizontal and vertical division.
4	DC to **5MHz**(2405), **1MHz**(2401) oscilloscope band width
5	Built-in auto ranging **True-RMS** digital MultiMeter
6	Auto ranging
7	Data hold and run mode.
8	Back light display and Low battery indication.
9	Display Type: Super-Twist 132 x 128 pixels.
10	Designed to comply with safety standard for UL3111, CSA C22.2 No.1010-1

2.2. Unpacking the Test Tool Kit

The following items are included in your test tool kit.

Note
When new, the rechargeable Ni-MH battery pack is not fully charged.

■ STANDARD

#	Description <Cont.>
1	Scope Meter <1>
2	Ni-MH Battery Pack (installed) <1>
3	AC Power & Rechargeable Adaptor <1>
4	Test Leads; Red <1>, Black <1>, White <1> and Blue <1>
5	Alligator Clips; Red <1>, Black <1>, White <1> and Blue <1>
6	Users Manual (this book) <1>

■ OPTION

#	Description
1	Carrying case <1>
2	Holster <1>
3	RS-232 Cable <1>
4	Scope Meter Software for Windows <1>

Note:
The accessories may be changed to improve the product quality without notifying the customers.

2.3. Specification

2.3.1. General Specifications

1) Operational Temperature:
   0°C to +50°C (+32°F to +122°F) at a relative humidity 75% or less

2) Storage Temperature:
   -20°C to +60°C with a relative humidity of 75% less

3) Temperature Coefficient:
   0.1 x (Specified Accuracy) per °C for temperature <18°C to >28°C

4) Max. Voltage between any Input and Ground: DC or AC 600Vrms

5) Basic DC Accuracy: 0.3%

6) Band width: 5MHz(2405), 1MHz(2401)

7) Meter AC Band width: 20kHz

8) Power Supply: Ni-MH Battery 4.8V (1.2V x 4 cell)

9) Battery Life Time:
   4 Hours without Backlight on,
   3 Hours with Backlight on.

10) Battery Change Time: About 3 Hours

11) Battery Change:
    Class-2 transformer,
    Input: 120V AC 60Hz or 240V AC 60Hz
    Output: 9V DC 1A

12) Display Type: Super-Twist 132 x 128 pixels

13) Equipment Dimensions:
    90 mm (width) x   195 mm (depth) x   40 mm (height)

14) Equipment Weight: About 460g

2.3.2. Technical Specification

1) Oscilloscope Function

(1) Horizontal

Sample Rate	25 MS/s (Dual CH mode) 50 MS/s (Single CH mode)
Record Length	512 single shot mode 256 in all modes
Sample / Division	25
Modes	Single shot, Roll, Normal
Accuracy	0.01%
Sweep Rate	1uS to 5S in 1, 2, 5 sequence

(2) Vertical

Bandwidth		1MHz
Resolution		8 Bit
Channels		Dual
Coupling		AC, DC
Input impedance		1 MΩ
Accuracy		3%
Max. Input Volts		DC or AC 600Vrms
Volt / Division	2401	0.5 V to 500V in 1, 2, 5 sequence
	2405	50 mV to 500V in 1, 2, 5 sequence

(3) Triggering

Type	CHA, CHB, External
Coupling	AC, DC
Slope	Rising (↑) or Falling (↓) edge
Internal Trigger Sensitivity	2 / 20 Division

(4) Waveform Memory

Waveform Memory	16 Shots

2) Digital MultiMeter Function

DC V

Range	Resolution	Accuracy	Impedance
5V	0.001V	±(0.3%+3)	1 MΩ
50V	0.01V	±(0.3%+3)	1 MΩ
500V	0.1V	±(0.5%+5)	1 MΩ
1000V	1V	±(0.5%+5)	1 MΩ

AC V

Range	Resolution	Accuracy			Impedance
		50~450Hz	0.45k~5kHz	5k~20kHz	
3V	0.001V	±(0.75%+5)	±(2%+5)	±(2.5%+5)	1 MΩ
30V	0.01V	±(0.75%+5)	±(2%+5)	±(2.5%+5)	1 MΩ
300V	0.1V	±(0.75%+5)	±(2%+5)	±(2.5%+5)	1 MΩ
750V	1V	±(0.75%+5)	±(2%+5)	N/A	1 MΩ

OHM

Range	Resolution	Accuracy	Over Load Protection
5 kΩ	0.001 kΩ	±(0.5%+5)	600V DC or AC rms
50 kΩ	0.01 kΩ	±(0.5%+5)	600V DC or AC rms
500 kΩ	0.1 kΩ	±(0.5%+5)	600V DC or AC rms
5 MΩ	0.001 MΩ	±(0.75%+10)	600V DC or AC rms

Continuity Buzzer

Test Voltage	Threshold	Over Load Protection
1.7V	100 digits	600V DC or AC rms

Frequency

Range	Resolution	Accuracy	Overload Protection
100 Hz	0.01 Hz	±(0.05%+5)	600V DC or AC rms
1 kHz	0.0001 kHz	±(0.05%+5)	600V DC or AC rms
10 kHz	0.001kHz	±(0.05%+5)	600V DC or AC rms
100 kHz	0.01kHz	±(0.05%+5)	600V DC or AC rms
1 MHz	0.0001MHz	±(0.05%+5)	600V DC or AC rms
10 MHz (2405)	0.001MHz	±(0.05%+5)	600V DC or AC rms

The guaranteed range is below 5 MHz.

RPM

Range	Resolution	Accuracy
240 - 60,000	1 RPM	±(0.05%+5)

Pulse Width

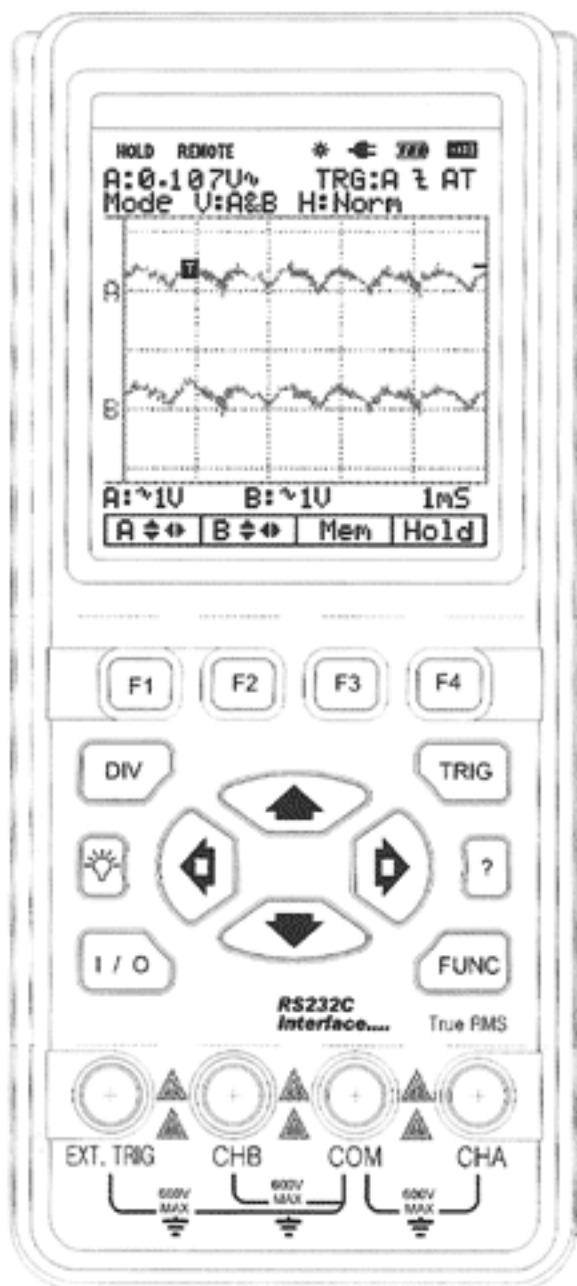| Range |
|---|
| 2uS-500mS (Pulse Width > 2uS) |

% Duty

Range
25% - 75%

3. Product Description

In this chapter, the LCD, front panel buttons, controls and terminal are described.

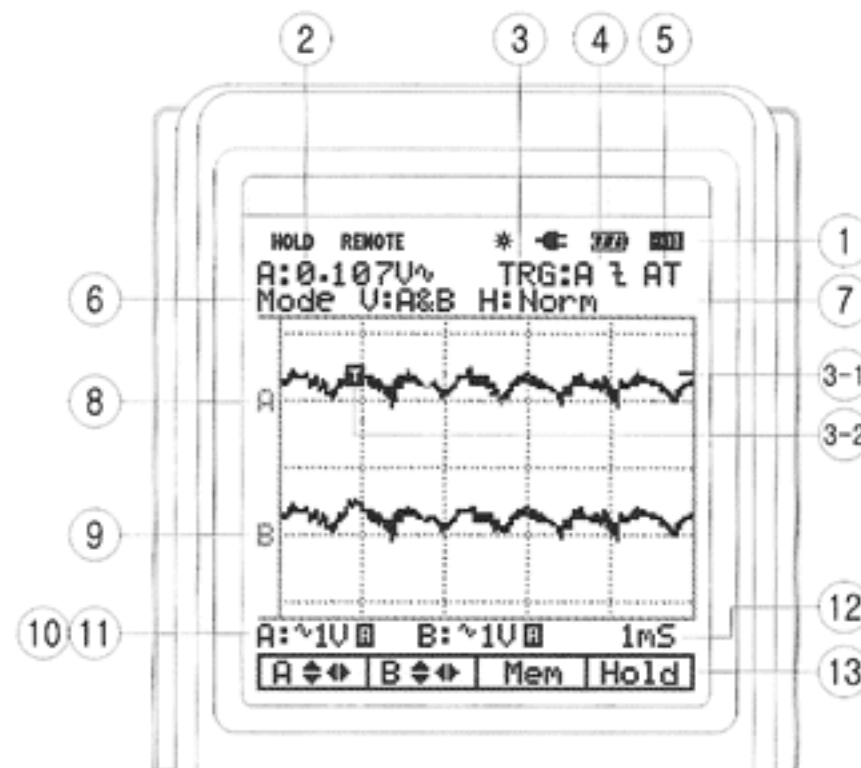

LCD Area

Keys Area

Terminal Area

[Front View]

3.1. LCD Area

The screen is divided into five areas: Indicator area, Reading area, Waveform area, Setting area and Menu area. Refer to Figure below.

LCD Area

[LCD Display]

1) Indicator
- HOLD: Freezes display in the LCD
- REMOTE: RS232 Output indicator
- BACK LIGHT(☀): Back light indicator
- BUZZER(▥): Buzzer indicator
- Charging LINE(⚡): Charging Battery indicator
- BATTERY(▥): Low battery indicator

2) Primary Numerical Field (DMM Function)
Displays the numerical readings. Because only input A is on, you will see the input A readings only.

3) Trigger selection
   - Channel A, B and External

   3-1) Trigger level indicator
   3-2) Trigger Cursor

4) Trigger Slope
   - Rising or Falling edge

5) Trigger mode: Normal or AUTO

6) Channel mode status
   Vertical mode:
   - CHA
   - CHB
   - A&B

   Horizontal mode:
   - Normal
   - Roll

7) Memory Address
   - 0 to 15

8) Live Scope Display (Channel A)
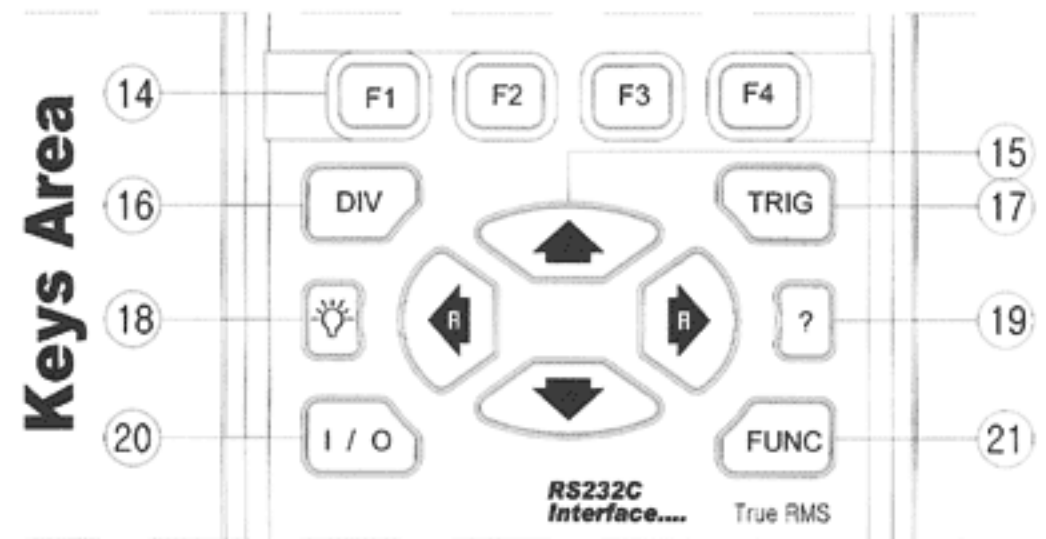   Displays real time waveforms and freezes held captures.

9) Channel B

10) Channel A Vertical Division

11) Channel B Vertical Division

12) Horizontal Division (Time base)
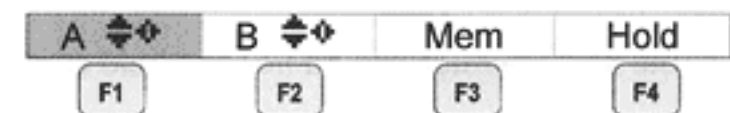
13) Command Menu Field

3.2. Keys Area

[Keys Area]

14) F1 F2 F3 F4   Command Menu keys

All Keys are command buttons. They are labeled F1~F4. These keys will have various functions.

① Default (Command Menu)

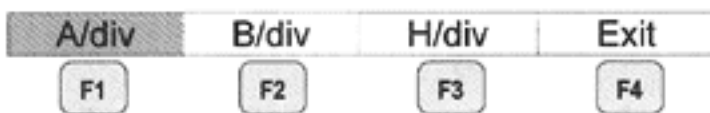| A ⇕⇔	B ⇕⇔	Mem	Hold
F1	F2	F3	F4

15) Arrow keys

Use the black arrow keys to highlight the item.

①		The cursor to be changed is moved to up with this button. Pushing the button will increase the value or position.
②		The cursor to be changed is moved to down with this button. Pushing the button will decrease the value or position.
③		The cursor to be changed is moved to left with this button. Pressing this button changes Vertical division or horizontal division from MANUAL to AUTO.
④		The cursor to be changed is moved to right with this button. Pressing this button changes Vertical division or horizontal division from MANUAL to AUTO.

16) DIV   Division key
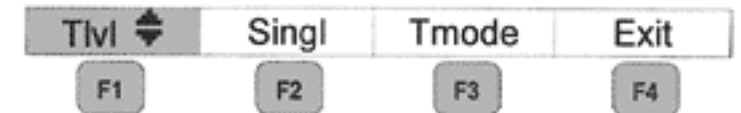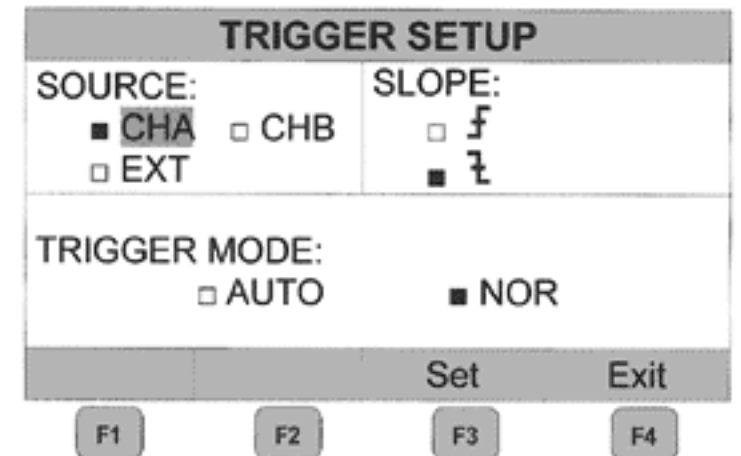
Set Channel A, B and Horizontal Division

① DIV

A/div	B/div	H/div	Exit
F1	F2	F3	F4

17) TRIG   Trigger key

Set Trigger level, Single mode and Setup

① TRIG

Tlvl ⇕	Singl	Tmode	Exit
F1	F2	F3	F4

② F3

TRIGGER SETUP

SOURCE:	SLOPE:
■ CHA □ CHB	□ ∫
□ EXT	■ ∫

TRIGGER MODE:
□ AUTO   ■ NOR

		Set	Exit
F1	F2	F3	F4

18) Back light key

Activates Back Light for the LCD
Toggles backlight ON and OFF.

19) ? Help key

Aids the technician in correct operation and efficient use of the meter.

20) I / O Power switch

Turns the instrument ON or OFF.

21) **FUNC** Function Key
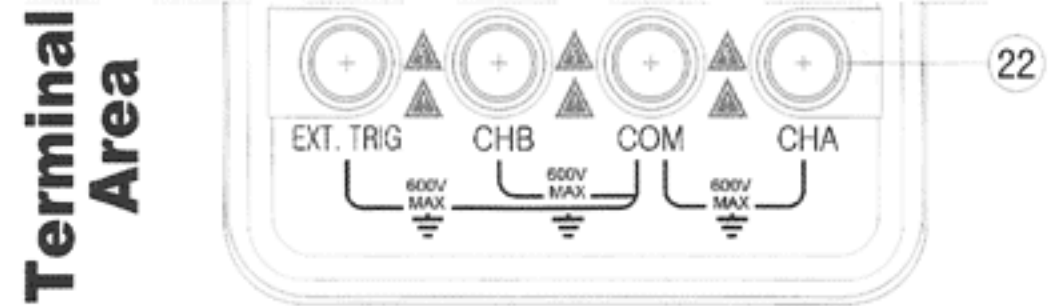
Set Scope, Auto Scope and Setup of the METER

① **FUNC**

Scope	AScop	SetUp	Exit
F1	F2	F3	F4

▪ **Scope Setup**
① **FUNC→F1 (Scope)**

SCOPE SETUP			
INPUT A:		**INPUT B:**	
▪ DC	☐ AC	▪ DC	☐ AC
VERTICAL MODE:			
☐ CHA	☐ CHB	☐ A&B	
HORIZONTAL MODE:			
▪ NORM	☐ ROLL		
MEASUREMENTS A:			
▪ DCV	☐ ACV	☐ OHM	☐ BZ
☐ HZ	☐ RPM	☐ P/W	☐ DTY
		Set	Exit

F1	F2	F3	F4

3.3. Terminal Area

Terminal Area

[Terminal Area]

22) Terminals description
Look at the bottom of the METER. The METER provides **4** input jacks.

① CHA: Channel A
You can always use the red channel A for all single input measurements possible with the Meter.

② COM: Common
You can use the black COMMON as single ground for DCV, ACV, Ohm, Continuity, frequency and RPM measurements.

③ CHB: Channel B
For measurements on two different signals you can use the channel B together with the red channel A.

④ EXT. TRIG
External trigger.

4. Using the METER

4.1. Safely Using the Test Tool

4.1.1. Attention
Carefully read the following safety information before using the test tool.

4.1.2. Safety Precautions
Specific warning and caution statements, where they apply, will be found throughout the manual.

A Caution identifies conditions and actions that may damage the test tool. A Warning identifies conditions and actions that pose hazard(s) to the user.

Symbols used on the test tool and in this manual are explained in the next table.

⚠ **Warning**

To avoid electrical shock, use only specific power supply, Model (Power Adapter used as a Battery Charger).

⚠	See explanation in manual
⚡	Dangerous Voltage
▣	Double Insulation (Protection Class)
⏚	Earth (Ground)
⎓	Either AC or DC
===	DC – Direct Current
∿	AC – Alternating Current
▭	Fuse

4.1.3. Powering the METER

Follow the procedure to power the Meter from a standard ac outlet.

①		Power Adaptor is inserted in to AC outlet.
②		Power Adaptor➔ the Meter.
③	I / O	Turn the Meter on by pressing this button for about 3 seconds.

The meter powers up in its last setup configurations.

4.1.4. Changing Backlight
After power-up, the screen has a high bright display.
To save battery power, the screen has an economic brightness display when operated on the battery pack (no power adapter connected).

To change the brightness of the display, do the following:

①	☀	Brighten the backlight.
②	☀	Dim the backlight again.
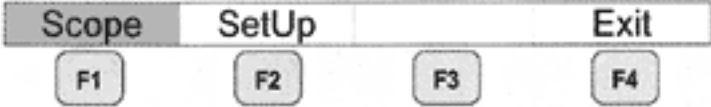
The high brightness increases when you connect the power adapter.

Note
Using dimmed display lengthens maximum battery power operation time by about one hour.
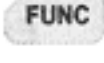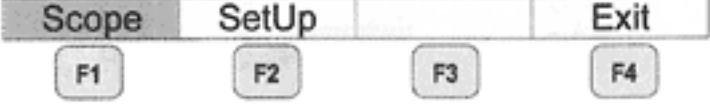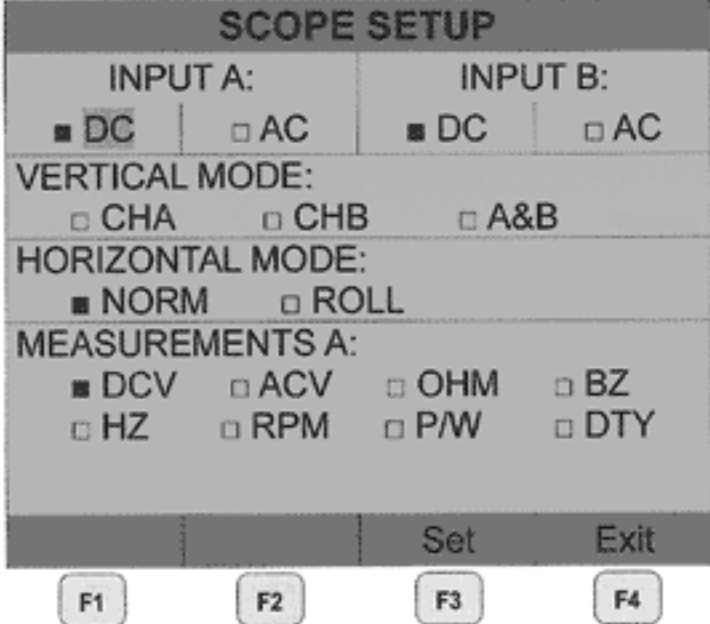
4.1.5. Making Selections in a Menu

Subsequently follow steps ① to ⑤ to open a menu and to choose an item.

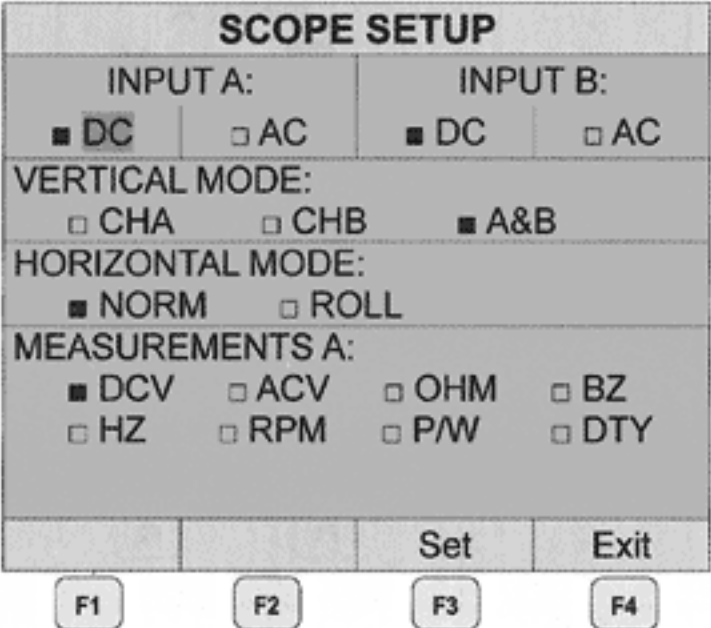|		
①	FUNC	Open the FUNCTION menu. Scope (F1)　SetUp (F2)　　　Exit (F4)
②	F1	Open the **Scope Setup** menu. **SCOPE SETUP** INPUT A:　　■ DC　□ AC INPUT B:　　■ DC　□ AC VERTICAL MODE:　□ CHA　□ CHB　■ A&B HORIZONTAL MODE:　■ NORM　□ ROLL MEASUREMENTS A: ■ DCV　□ ACV　□ OHM　□ BZ □ HZ　□ RPM　□ P/W　□ DTY Set (F3)　Exit (F4)
③	(arrow keys)	Use the arrow keys to highlight the item.
④	F3	Select the proper item.
⑤	F4	Exit.

Key: FUNC → F1 → (arrow keys) → F3 → F4

4-3

---

1) To choose a Frequency measurement for CHA, do the following:

①		Plug the black test lead into the COM input jack.
②		Plug the red test lead into the CHA input jack.
③	FUNC	Open the FUNCTION menu. Scope (F1)　SetUp (F2)　　　Exit (F4)
④	F1	Open the Scope Setup menu. **SCOPE SETUP** INPUT A:　　■ DC　□ AC INPUT B:　　■ DC　□ AC VERTICAL MODE:　□ CHA　□ CHB　□ A&B HORIZONTAL MODE:　■ NORM　□ ROLL MEASUREMENTS A: ■ DCV　□ ACV　□ OHM　□ BZ □ HZ　□ RPM　□ P/W　□ DTY Set (F3)　Exit (F4)
⑤	(arrow keys)	Highlight Hz (□ Hz)
⑥	F3	Select Hz (■ Hz)
⑦	F4	Exit.

Observe that Hz is now the main reading.

Key: FUNC → F1 → (arrow keys) → F3 → F4

4-4

4.1.6. Freezing the screen

You can freeze the screen (all readings and waveforms) at any time.

Default (Command Menu) Display:

A ⇕◊	B ⇕◊	Mem	Hold
F1	F2	F3	F4
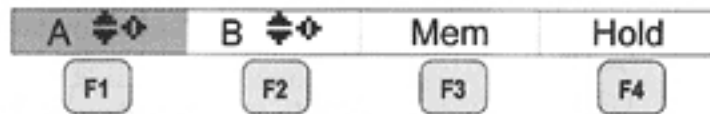
① F4 — Freeze the screen. Highlighted Hold appears at the bottom of the Command Menu area.

A ⇕◊	B ⇕◊	Mem	Hold
F1	F2	F3	F4

② F4 — Resume your measurement

A ⇕◊	B ⇕◊	Mem	Hold
F1	F2	F3	F4
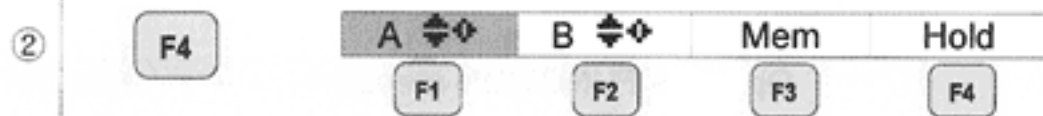
4.1.7. Changing the Graphic Representation

1) Changing the vertical division

① DIV — Open the Command Menu.

A/div	B/div	H/div	Exit
F1	F2	F3	F4

② F1 or F2 — Change the vertical division. (CH A or CH B)

③ ▲ — Increase the vertical division. Div is changed to manual mode.

④ ▼ — Decrease the vertical division. Div is changed to manual mode.
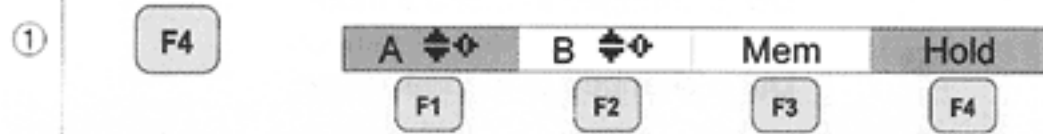
⑤ ◄ or ► — Change Div from Manual mode to AUTO mode.

2) Changing the Time Base

① DIV — Open the Command Menu.

A/div	B/div	H/div	Exit
F1	F2	F3	F4

② F3 — Change the Horizontal division.

A/div	B/div	H/div	Exit
F1	F2	F3	F4

③ ▲ — Increase the number of periods. Div is changed to manual mode.

④ ▼ — Decrease the number of periods. Div is changed to manual mode.

⑤ ◄ or ► — Change Div from Manual mode to AUTO mode.

4.1.8. Acquiring the Waveform

① FUNC — Open the FUNCTION menu.

Scope	SetUp		Exit
F1	F2	F3	F4

② F1 — Open the Scope Setup menu.

SCOPE SETUP			
INPUT A:		INPUT B:	
■ DC □ AC	■ ON □ OFF	■ DC □ AC	■ ON □ OFF
MEASUREMENTS A:			
■ DCV □ ACV □ OHM	□ BZ □ Hz	□ RPM □ P/W	□ DTY □ DWL
SCOPE MODE:			
■ NORMAL	□ ROLL MODE		
		Set	Exit
F1	F2	F3	F4
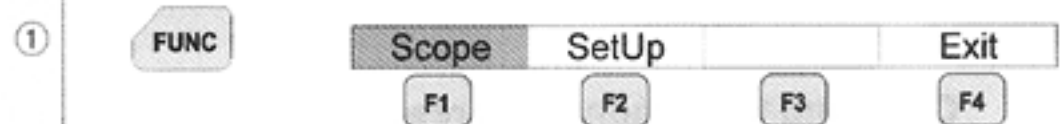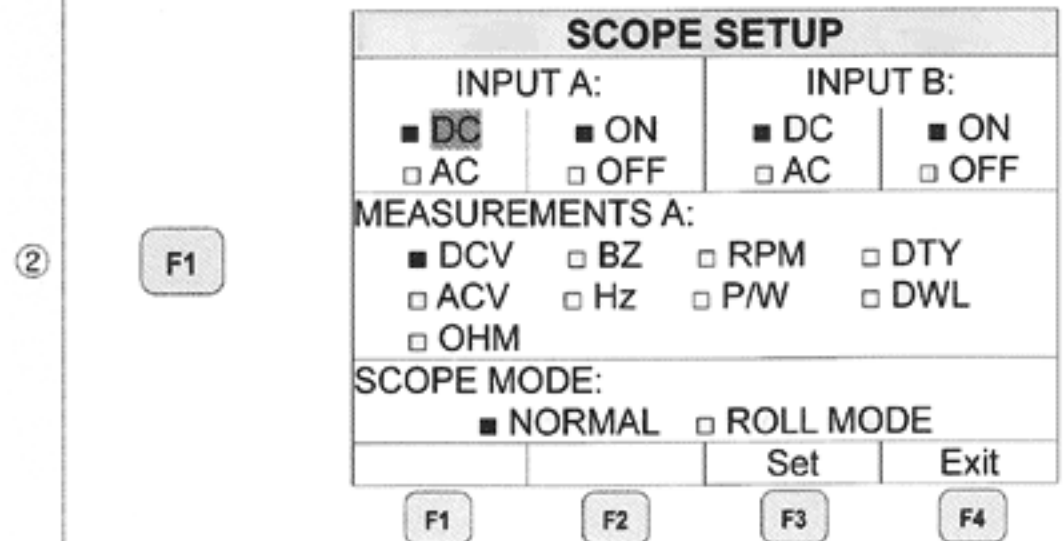
Recording Slow Signals over a Long Period of Time

③	(arrows)	Highlight ROLL MODE.
④	F3	Set ROLL MODE.
⑤	F4	Exit.

The roll mode function supplies a visual log of waveform activity and is especially useful when you measure lower frequency waveforms.

Note
ROLL MODE operates when the horizontal division is between 1s and 5s

Key: FUNC → F1 → (arrows) → F3 → F4

Selecting AC-Coupling for INPUT A

③	(arrows)	Highlight AC for INPUT A.
④	F3	Accept AC-coupling for INPUT A.
⑤	F4	Exit.

Use AC-coupling when you wish to observe a small AC signal that rides on a DC signal.

Key: FUNC → F1 → (arrows) → F3 → F4

5.   Triggering on a Waveform

Triggering tells the METER when to begin displaying the waveform. You can select which input signal should be used, on which edge this should occur and you can define the condition for a new update of the waveform.

The right-top line of the LCD identifies the trigger parameters being used. Trigger icons on the screen indicate the trigger level and slope.
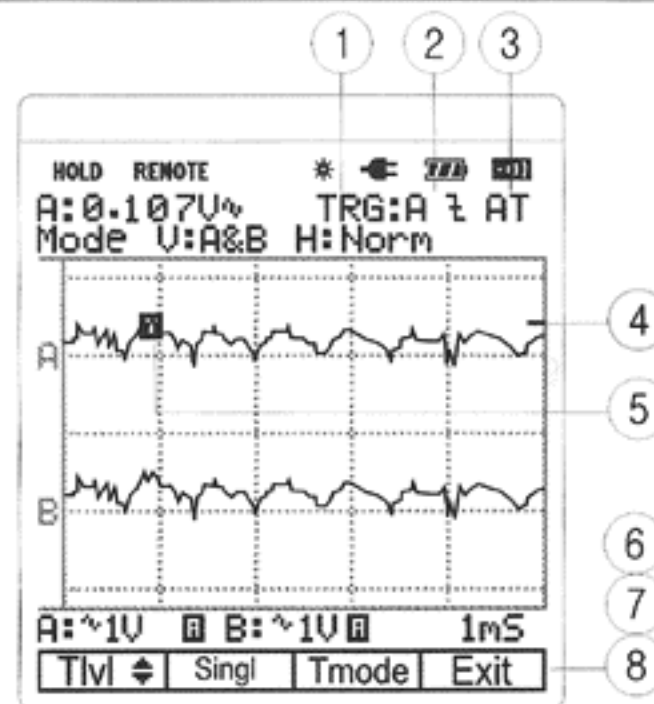
Screen with all Trigger Information

(1) Trigger Channel: Channel A or B
(2) Slope: rising or falling
(3) Trigger mode: Trigger setting mode (Auto or Normal)
(4) Trigger Level indicator
(5) Trigger Cursor
(6) Command Menu: Trigger level
(7) Command Menu: Single shot
(8) Command Menu: Trigger mode (Setup)

5.1. Setting Trigger level (on NORmal trigger mode)

①	TRIG	Open the Trigger menu
		Tlvl ↕ Singl Tmode Exit
		F1 F2 F3 F4

| ③ | ▲ ▼ | Adjust the Trigger Level continuously. Observe the trigger icon on the second time division line indicates the trigger level. |

| ⑤ | F4 | Exit. |

Key: TRIG → ◄▲►▼ → F4

5.2. Making a single acquisition

To catch single events, you can perform a single shot. (One time screen update.) To set up the test tool for a single shot on the input A waveform, do following:

* Connect the probe to the signal to be measured.

①	TRIG	Open the default Trigger menu
		Tlvl ↕ Singl Tmode Exit
		F1 F2 F3 F4

②	F2	Highlight Singl (SINGLE SHOT)
		Tlvl ↕ Singl Tmode Exit
		F1 F2 F3 F4
		Test tool performs a single shot. (One time screen update)

③	F2	Return to normal Trigger mode.
		Tlvl ↕ Singl Tmode Exit
		F1 F2 F3 F4

Key: TRIG → F2 → F2

5.3. Setting Trigger mode (Tmode)

①	TRIG	Open the Trigger menu
		Tlvl ↕ Singl Tmode Exit
		F1 F2 F3 F4

| ② | F3 | Open the Trigger Setup |

TRIGGER SETUP

SOURCE:
■ CHA   □ CHB
□ EXT

SLOPE:
□ ʃ
■ ᶚ

TRIGGER MODE:
□ AUTO   ■ NOR

| | | Set | Exit |
| F1 | F2 | F3 | F4 |

| ③ | ◄▲►▼ | Highlight the ITEM you want. |

| ④ | F3 | Set the ITEM. |

| ⑤ | F4 | Exit. |

Key: TRIG → F3 → ◄▲►▼ → F3 → F4

5.4. Setting AUTO Trigger Level

For quick operation, use the AUTO trigger mode to trigger on nearly all signals automatically. To optimize trigger slope manually, do the following:

①	**TRIG**	Open the Trigger menu

Tlvl ⬍	Singl	Tmode	Exit
F1	F2	F3	F4

②	**F3**	Open the Trigger Setup

TRIGGER SETUP

SOURCE:	SLOPE:
■ CHA □ CHB	□ ƒ
□ EXT	■ Ʇ

TRIGGER MODE:	
□ AUTO	■ NOR

		Set	Exit
F1	F2	F3	F4

③	(arrows)	Highlight AUTO.
④	**F3**	Set AUTO.
⑤	**F4**	Exit.

Key: TRIG → F3 → (arrows) → F3 → F4

5.5. Setting Normal Trigger mode

	(arrows)	Highlight NOR.
④	**F3**	Set NOR.
⑤	**F4**	Exit.

	(up/down arrows)	Adjust the Trigger Level continuously. Observe the trigger icon on the second time division line indicates the trigger level.

Key: TRIG → F3 → (arrows) → F3 → F4

5.6. Setting Trigger Slope

③	(arrows)	Highlight ƒ or Ʇ.
④	**F3**	Set ƒ or Ʇ.
⑤	**F4**	Exit.

	ƒ or Ʇ.	Trigger on either positive Slope or negative Slope of the chosen waveform.

Key: TRIG → F3 → (arrows) → F3 → F4

6.   Storing and Recalling Screens
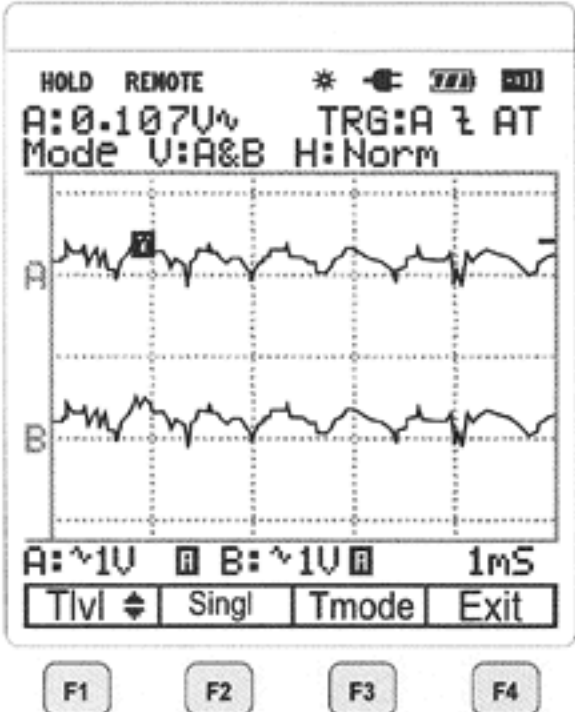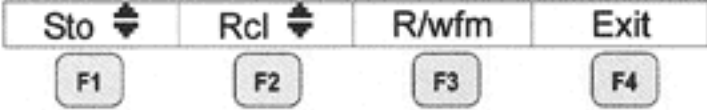
You can store setups and waveforms to memory and recall them again from memory. Sixteen (0-15) setup and waveform memories are available.
Store waveforms when you want to use the present waveform images for future reference.
Store setups when you need the present operating configuration for your future measurements.
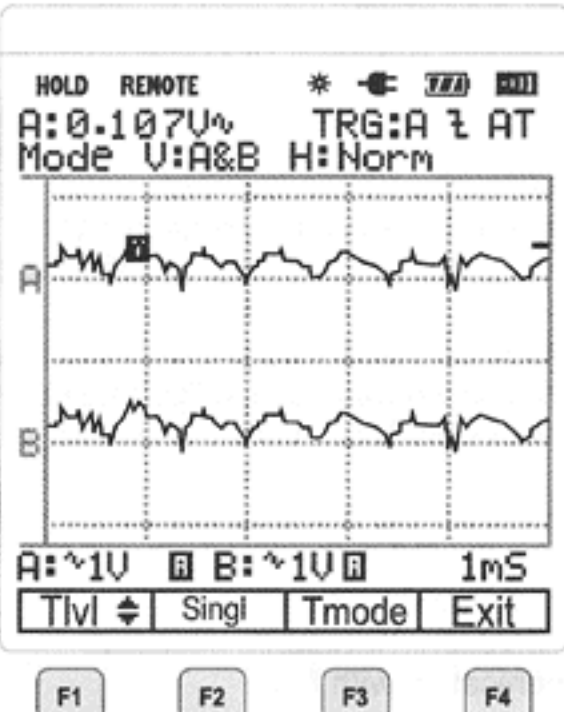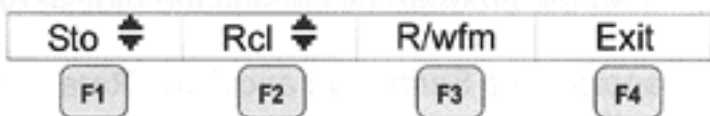
6.1.   Storing Screen

To store a screen, do the following:

①	Default	
②	F3	Open the memory (Mem) menu Memory field (M;0) appears at the top-right corner of the display area.
③	▲ ▼	Select the memory address you want to store in.
④	F1	Store the actual screen

6.2. Recalling Screen

To recall a screen, do the following:

①	Default	
②	F3	Open the memory menu | Sto ⬍	Rcl ⬍	R/wfm	Exit
F1	F2	F3	F4	 Memory field (M;0) appears at the top-right corner of the display area.
③	⬆ ⬇	Select the memory address you want to recall from.
④	F2	View the saved screen.

The image is presented as a picture that can no longer be changed.

7. Using RS232 Software

1) Hardware and Software requirement:
   (1) IBM PC/XT/AT or Compatible Computer.
   (2) Microsoft Windows VER 3.1 or Windows 95, 98.
   (3) Serial Port for Connection with Instrument.

2) Installation of supplied software
   (1) Insert the supplied diskette into the Drive A. (or B).
   (2) Click the mouse on "**MY COMPUTER**" or "**FILE MANAGER**" ICON, then Floppy Drive A icon
   (3) When the file names are displayed click on SETUP.EXE.
   (4) Monitor program is installed and create a new directory named "**Model No.**" automatically in Hard Disk.

3) Connection of PC and Instrument:
   Connect the RS-232 cable to the built-in RS-232 connector in the Instrument and to the PC serial port.

4) Communication with PC
   This section will help the user load the Meter software correctly.
   (1) Connect the RS232c cable between PC and equipment.
   . Start the program by clicking the mouse on the icon.
   (3) Click on the Setup button to open the setup dialog. Then select appropriate Serial Port and Baud Rate and click on the OK button.
   (4) Click on the S TIME button and type in the appropriate sampling time.
   (5) Turn off the equipment.
   (6) Turn on the equipment.
   (7) Click the "**START**" button with mouse to start the program.
   Start: Starts the program.
   Stop: Stops the program.

8.   Maintaining the test tool

About this Chapter
This chapter covers basic maintenance procedures that can be performed by the user.

Cleaning the Test Tool
Clean the test tool with a damp cloth and a mild soap to avoid abrasion of text on the test tool. Do not use abrasives, solvents, or alcohol.

Storing the Test Tool
If you are storing the test tool for an extended period of time, charge the NI-MH battery pack before storing. It is not necessary to remove the battery pack.

Replacing and Disposing of the NI-MH Battery Pack

Warning
To avoid electrical shock, remove the test leads and probes before replacing the battery pack.

Note
This instrument contains NI-MH battery pack. Do not dispose of this battery pack with other solid waste. Used batteries should be disposed of by a qualified recycler or hazardous materials handler. Contact your authorized Service Center for recycling information.

To replace the battery pack, do the following:
1. Disconnect the test leads and probes both at the source and at the meter.
2. Loosen the screw with a screwdriver.
3. Lift the rear cover away from the test tool.
4. Take the battery pack out of the battery compartment.
5. Remove the battery plug from the connector.
6. Install a new battery pack.
7. Reinstall the rear cover and secure the screw.

Replacing the Battery
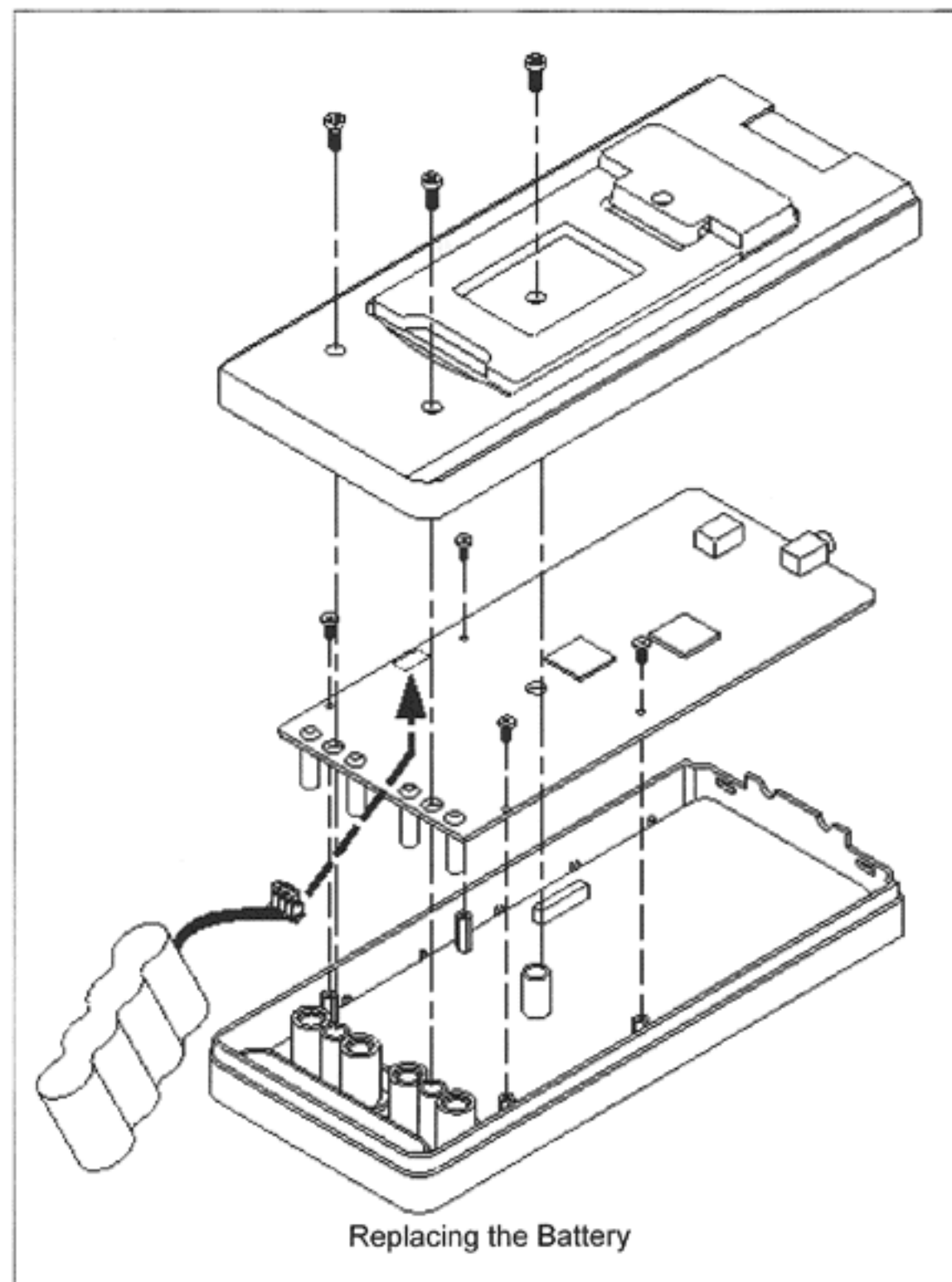
9.   Appendices

9.1.   Troubleshooting guide

If you experience trouble with your instrument, try these corrective actions before concluding that the instrument needs repair.

1. Make sure you are using fresh NI-MH battery pack or fully charged rechargeable battery pack. If you are using the AC/DC power adapter, make sure the adapter is plugged into an appropriate live power source.

2. If the buttons do not respond to your control or the contrast is set such that the display is unreadable, remove the power source while the instrument is on. Wait 15 minutes and then restore power and try operations.

3. If you still experience difficulty, check your connections and reread the usage instructions.

4. If meter is frozen while you control the trigger level:

   If you set the trigger level to normal (NOR) mode, trigger level must be the same level of waveform. Meter does not trigger if trigger level set above or below waveform.

   If you set the trigger level to Auto (AT) mode, you do not need to control the trigger level.

   In rare cases, your instrument may require servicing. There are no user-serviceable parts inside the instrument. For service, return the instrument to your customer service center.