

# **OPERATION MANUAL**

## **TH2818**

**Automatic Component Analyzer**

## Manual Printing History

The manual printing data and part number indicate its current edition. The printing date changes when a new edition is printed. The manual part number changes when extensive technical changes are incorporated.

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## Notice

The information contained in this document is subject to change without notice.

## Caution

Do not exceed the operating input voltage, and current level and signal type appropriate for the instrument being used, refer to your instrument's Function Reference.

Electrostatic discharge (ESD) can damage the highly sensitive microcircuits in your instrument. ESD damage is most likely to occur as the test fixtures are being connected or disconnected. Protect them from ESD damage by wearing a grounding strap that provides a high resistance path to ground. Alternatively, ground yourself to discharge any static charge built-up by touching the outer shell of any grounded instrument chassis before touching the test port connectors.

## Safety Summary

When you notice any of the unusual conditions listed below, immediately terminate operation and disconnect the power cable.

Contact your local Tonghui sales representative or authorized service company for repair of the instrument. If you continue to operate without repairing the instrument, there is a potential fire or shock hazard for the operator.

- Instrument operates abnormally.
- Instrument emits abnormal noise, smell, smoke or a spark-like light during operation.
- Instrument generates high temperature or electrical shock during operation.
- Power cable, plug, or receptacle on instrument is damaged.
- Foreign substance or liquid has fallen into the instrument.

## Safety notice supplement

This equipment is MEASUREMENT CATEGORY I (CAT I). Do not use for CAT II, III, or IV.

This equipment is POLLUTION DEGREE 2, INDOOR USE product.

# Contents

Chapter 1 Overview .....	7
1.1 Product Introduction .....	7
1.2 Specifications .....	8
1.2.1 Specification Table .....	8
1.2.2 Load/Store Function .....	10
1.3 Power Requirements and Fuse Selection .....	10
1.4 Operating Environment .....	10
1.5 Dimensions .....	11
1.6 Weight .....	11
1.7 Precautions during use .....	11
1.8 Warranty .....	11
Chapter 2 Panel Description .....	12
2.1 Front Panel .....	12
2.2 Rear Panel .....	13
2.3 Display Area Definition .....	15
2.4 Menu keys and Display Page .....	16
2.5 Summary of Pages .....	16
2.6 Basic Operation .....	23
Chapter 3 Operation .....	24
3.1 Welcome Page .....	24
3.2 LCRZ Menu .....	24
3.2.1 LCR MEAS DISP page .....	24
3.2.1.1 Measurement Function .....	27
3.2.1.2 Measurement Range .....	28
3.2.1.3 Test Frequency .....	28
3.2.1.4 Oscillator Level .....	29
3.2.1.5 DC Bias .....	31
3.2.1.6 Measurement Speed .....	31
3.2.1.7 File Manage .....	31
3.2.1.8 Useful Tools .....	33
3.2.2 BIN No. DISP page .....	34
3.2.2.1 Comparator Function ON/OFF Description .....	35
3.2.2.2 File Manage .....	36
3.2.2.3 Useful Tools .....	36
3.2.3 BIN COUNT DISP page .....	36
3.2.3.1 File Manage .....	38
3.2.3.2 Useful Tools .....	38
3.2.4 LIST SWEEP DISP Page .....	38
3.2.4.1 Sweep Mode .....	40
3.2.4.2 File Manage .....	40
3.2.4.3 Useful Tools .....	40
3.2.5 MEAS SETUP Page .....	40
3.2.5.1 Trigger Mode .....	43
3.2.5.2 Automatic Level Control Function .....	44
3.2.5.3 Bias Current Isolation Function .....	44
3.2.5.4 Averaging Rate .....	45
3.2.5.5 Level Monitor Function .....	45

3.2.5.6	Delay Time .....	46
3.2.5.7	Internal Resistance .....	46
3.2.5.8	Deviation Measurement Functions.....	46
3.2.5.9	File Manage .....	47
3.2.5.10	Useful Tools.....	47
3.2.6	CORRECTION Page.....	48
3.2.6.1	OPEN Correction .....	50
3.2.6.2	SHORT Correction .....	52
3.2.6.3	LOAD Correction.....	53
3.2.6.4	Measurement Function for the LOAD Correction .....	55
3.2.6.5	Cable Length Selection .....	55
3.2.6.6	Multi/Single Correction Mode Selection .....	55
3.2.6.7	File Manage .....	55
3.2.6.8	Useful Tools.....	55
3.2.7	LIMIT TABLE SETUP Page.....	55
3.2.7.1	Swap Parameter .....	58
3.2.7.2	Limit Mode for Comparator .....	58
3.2.7.3	Nominal Value for Tolerance Mode .....	59
3.2.7.4	Comparator Function ON/OFF .....	59
3.2.7.5	Auxiliary Bin ON/OFF .....	59
3.2.7.6	Low/High Limits.....	60
3.2.7.7	File Manage .....	61
3.2.7.8	Useful Tools.....	61
3.2.8	LIST SWEEP SETUP page .....	61
3.2.8.1	Sweep Mode .....	64
3.2.8.2	List Sweep Parameter.....	64
3.2.8.3	Sweep Points and Limit Mode.....	64
3.2.8.4	File Manage .....	65
3.2.8.5	Useful Tools.....	65
3.2.9	FREQ RESP SETUP Page .....	65
3.2.9.1	Frequency Response Function .....	68
3.2.9.2	Start Frequency.....	68
3.2.9.3	End Frequency.....	69
3.2.9.4	Low Limit Value for Primary Parameter .....	69
3.2.9.5	High Limit Value for Primary Parameter .....	69
3.2.9.6	Low Limit Value for Secondary Parameter .....	70
3.2.9.7	High Limit Value for Secondary Parameter .....	70
3.2.9.8	File Manage .....	71
3.2.9.9	Useful Tools.....	71
3.2.10	FREQ RESP MEAS Page.....	71
3.2.10.1	File Manage .....	73
3.2.10.2	Useful Tools.....	73
3.3	TRANS Menu .....	74
3.3.1	TRANS TEST SET Page.....	74
3.3.1.1	Trigger Mode.....	76
3.3.1.2	Test Speed .....	76
3.3.1.3	Test Mode .....	77
3.3.1.4	Test Frequency.....	77
3.3.1.5	Test Level.....	77
3.3.1.6	Turn ON/OFF Function.....	77
3.3.1.7	File Manage .....	77

3.3.1.8	Useful Tools.....	77
3.3.2	TRANS LIMIT SET Page.....	78
3.3.2.1	Limit Mode .....	80
3.3.2.2	Standard Value and Low/High Limits.....	80
3.3.2.3	File Manage .....	81
3.3.2.4	Useful Tools.....	81
3.3.3	TRANS MEAS DISP Page .....	81
3.3.3.1	Trigger Mode.....	83
3.3.3.2	Test Speed .....	83
3.3.3.3	File Manage .....	83
3.3.3.4	Useful Tools.....	83
3.3.4	TRANS JUDGE DISP Page .....	83
3.3.4.1	Trigger Mode.....	85
3.3.4.2	Test Speed .....	85
3.3.4.3	File Manage .....	85
3.3.4.4	Useful Tools.....	85
3.4	SYSTEM Menu .....	85
3.4.1	SYSTEM SETUP Page .....	85
3.4.1.1	LCD Contrast adjustment.....	87
3.4.1.2	BEEPER function ON/OFF .....	87
3.4.1.3	ALARM mode.....	88
3.4.1.4	LANGUAGE selection .....	88
3.4.1.5	PASS WORD function.....	88
3.4.1.6	BUS MODE selection.....	89
3.4.1.7	BUS Address setup .....	89
3.4.1.8	Talk only mode ON/OFF.....	89
3.4.1.9	DC Bias Source mode.....	89
3.4.1.10	File Manage .....	89
3.4.1.11	Useful Tools.....	89
3.4.2	USB DISK MANAGE Page.....	90

# Chapter 1 Overview

Thank you for choosing the product of our company. The contents of the shipment are listed below. If the contents are incomplete, if there is mechanical damage or defect, or if the instrument does not pass the power-on self tests, please notify our company.

**Items packed with TH2818:**

No.	Description	Quantity
1	TH2818 Automatic Component Analyzer	1
2	TH26011A Kelvin test cable	1
3	TH26005B test fixture	1
4	TH26004B test cable	1
5	3-p power cable	1
6	2A fuse	2
7	Operation manual	1
8	Quality and warranty certificate	1
9	Test report	1

**Note:** Read the operation manual clearly before operating the instrument, or operate under the guidance of technician to avoid unnecessary question.

## 1.1 Product Introduction

TH2818 is an automatic component analyzer. TH2818 is specially designed for incoming inspection of components, quality control, and laboratory use. TH2818 is used for evaluating LCR components, materials, and semiconductor devices over a wide range of frequencies (20 Hz to 300 kHz) and test signal levels (5 mV to 2 V<sub>rms</sub>, 50  $\mu$ A to 20 mA<sub>rms</sub>).

TH2818 offers C-D measurements with a basic accuracy of 0.05% (C), 0.0005 (D) at all test frequencies with six digit resolution (the dissipation factor resolution is 0.000001) on every range.

With its built-in comparator, the TH2818 can output comparison/decision results for sorting components into a maximum of ten bins. By using the handler interface option, TH2818 can easily be combined with a component handler, a scanner, and a system controller to fully automate component testing, sorting, and quality control data processing.

TH2818's list sweep function permits entry of up to ten frequencies, test signal levels, or bias level points to be automatically measured.

The GPIB interface is an optional interface on the TH2818 and can be used to build an automatic test system to completely characterize new components and materials, and to fully automatic production line testing.

TH2818 with the DC Bias Option can apply a -100 mA to 100 mA DC current bias to the DUT (Device Under Test). So, current biased impedance measurement of coils or transformers can be performed easy, fast and safe.

TH2818 can also measure the frequency response of a LCR component and transformer parameters such as Leakage Inductance, Turn, Phase and DCR etc.

## 1.2 Specifications

### 1.2.1 Specification Table

**Table 1-1 Measurement parameters**

<b>Parameter</b>	<b>Description</b>
Z :	Absolute value of impedance
Y :	Absolute value of admittance
L:	Inductance
C:	Capacitance
R:	Resistance
G:	Conductance
D:	Dissipation factor
Q:	Quality factor
Rs:	Equivalent series resistance
Rp:	Equivalent parallel resistance
X:	Reactance
B:	Susceptance
$\theta$ :	Phase angle
Lk:	Leakage inductance
TURN	Turns of winding
PH	Positive or negative phase
DCR	DC Resistance



**Table 1-2 Measurement functions**

<b>Functions</b>	<b>Description</b>
Basic accuracy	0.05%
Deviation measurement	$\Delta$ ABS Delta absolute deviation $\Delta\%$ Delta percent deviation
Trigger	Internal Manual External Bus(HP-IB or RS232c)
Equivalent circuit	Series Parallel
Test terminals	Four-Terminal Pair
Measurement speed	Fast: 30 times/sec Medium: 10 times/sec Slow: 2 time/sec
Averaging	1 to 255, programmable
Ranging	Auto Manual (Hold/Up/Down)
Correction	OPEN, SHORT and LOAD selectable
Display	320×240 LCD dot-matrix display
Language	Chinese, English selectable
Resolution	6 digits for primary parameter and secondary parameter
List Sweep	List sweep function permits entry of up to ten frequencies, test signal levels, or bias level points to be automatically measured.
Frequency Response Analysis	Primary and secondary parameter frequency response curves can both be displayed on the LCD over any setup frequency range. The frequency and the measurement result are plotted on a log or linear scale.
Comparator Function	The built-in comparator can sort devices into a maximum of ten bins (BIN 1 to BIN 9 and the OUT OF BINS bin) using a maximum of nine pairs of primary limits and one pair of secondary parameter limits. Also, a device whose primary parameter is within limits, but whose secondary parameter measurement result is not within limits can be sorted into the Auxiliary BIN.
Interface	IEEE488(Optional) HANDLER & SCANNER(Optional) RS232C

**Table 1-3 Test Signal**

Signal Specification	Description
Frequency	20 Hz to 300 kHz
	0.01Hz resolution Frequency accuracy 0.01%
Signal level	5 mV <sub>rms</sub> to 2 V <sub>rms</sub> , 1mV resolution 50 μA <sub>rms</sub> to 20 mA <sub>rms</sub> , 10μA resolution
Output impedance	30Ω (1±5%) 100Ω (1±5%)
Internal DC bias voltage	0 V 1.5 V 2.0 V
External DC bias current	0 to 10A <sub>rms</sub> (Test with TH1773 DC Bias Current Source)
Test signal level monitor	Voltage: 0.01 mV <sub>rms</sub> to 2 V <sub>rms</sub> Current: 0.001 μA <sub>rms</sub> to 20 mA <sub>rms</sub>

**Table 1-4 Display Range**

Parameter	Description
Z , R, X	0.01 mΩ to 99.9999 MΩ
Y , B, G	0.01 nS to 99.9999 S
C	0.00001 pF to 9.99999 F
L	0.01 nH to 99.9999kH
D	0.000001 to 9.99999
Q	0.01 to 99999.9
∅	Degree: -179.999° to 179.999° Radian: -3.14159 to 3.14159
Δ%	-999.999% to 999.999%
Lk, Lx	0.01 nH to 99.9999 kH
Turn	0.001 to 99.9999M
DCR	0.01 mΩ to 99.99 MΩ

### 1.2.2 Load/Store Function

TH2818 uses the internal non-volatile memory or the external USB\_DISK for storing and retrieving a maximum of 20 sets of instrument control settings.

### 1.3 Power Requirements and Fuse Selection

Line Voltage: 198 to 242 Vac

Line Frequency: 47.5 to 52.5 Hz

Power Consumption: 80 VA max.

Fuse: Please use the same-type fuse or contact your nearest Tonghui sales and service office. To verify and replace the fuse, remove the power cable and pull out the fuse holder.

### 1.4 Operating Environment

The instrument must be operated under within the following environment conditions,

and sufficient space must be kept behind the instrument to avoid obstructing the air flow of the cooling fans.

Temperature: 0°C to 40°C

Humidity: ≤95%R.H. at 40°C

### 1.5 Dimensions

430(W) by 186(H) by 490(D) (mm)

### 1.6 Weight

Approximately 15 kg

### 1.7 Precautions during use

- (1) To avoid electric shock hazard, the instrument chassis and cabinet must be connected to a safety earth ground by the supplied power cable with earth blade.
- (2) Do not operate the instrument in the presence of flammable gasses or fumes. Operation of any electrical instrument in such an environment constitutes a definite safety hazard.
- (3) Operating personnel must not remove instrument covers. Component replacement and internal adjustments must be made by qualified maintenance personnel. Do not replace components with the power cable connected. Under certain conditions, dangerous voltages may exist even with the power cable removed. To avoid injuries, always disconnect power and discharge circuits before touching them.
- (4) Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.
- (5) Because of the danger of introducing additional hazards, do not install substitute parts or perform unauthorized modifications to the instrument. Return the instrument to our Sales and Service Office for service and repair to ensure that safety features are maintained.

### 1.8 Warranty

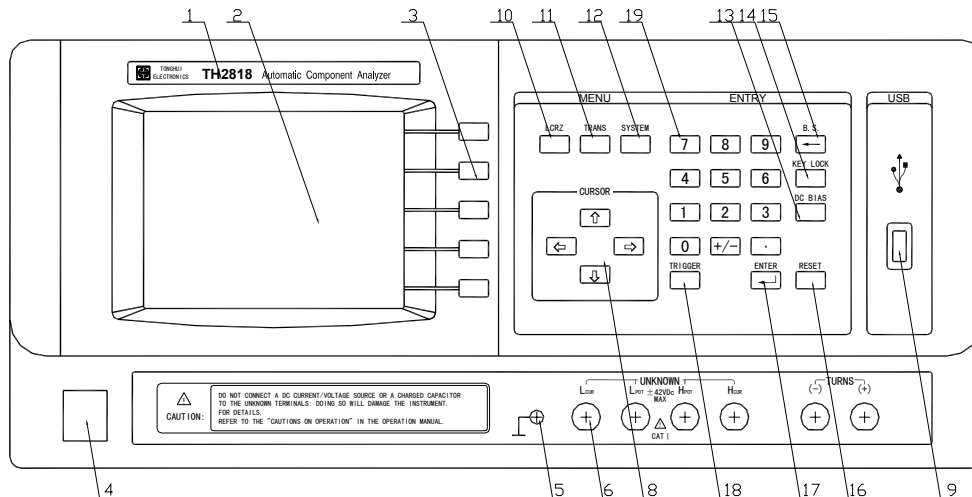
This Tonghui instrument product is warranted against defects in material and workmanship for a period of two years from the date of shipment or purchase. During the warranty period, Tonghui will, at its option, either repair or replace the products which prove to be defective. And warranty card is required when the product needs repairing. And all Tonghui products are warranted for service of lifetime maintenance.

The foregoing warranty shall not apply to defects resulting from improper or inadequate maintenance by Buyer, Buyer-supplied software or interfacing, unauthorized modification or misuse, operation outside of the environmental specifications for the product, or improper site preparation or maintenance.

## Chapter 2 Panel Description

### 2.1 Front Panel

Figure 2-1 shows the brief description of the TH2818's front panel.

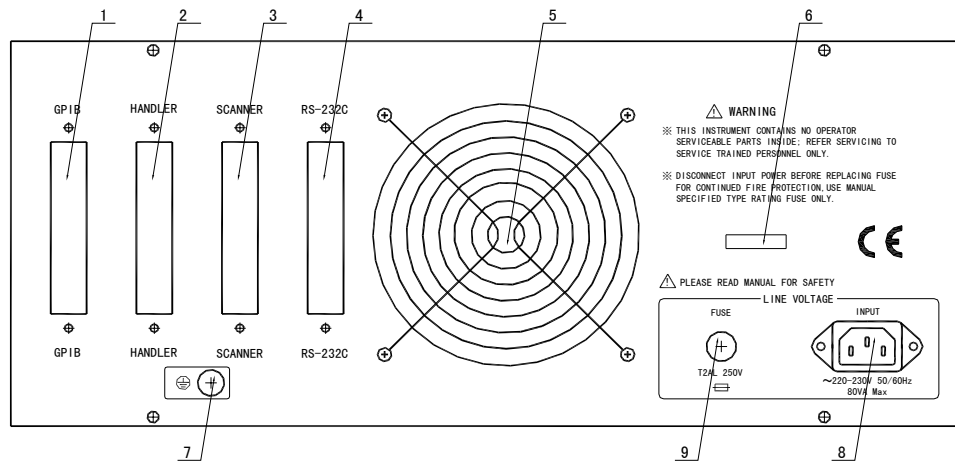


**Figure 2-1 Front Panel**

- 1) **Brand and Name**  
The registered brand of our company and name of the instrument are printed.
- 2) **LCD**  
320\*240 dot-matrix Liquid Crystal Display (LCD) displays measurement results, test conditions, etc.
- 3) **SOFTKEYs**  
Five softkeys are used to select control and parameter functions. Each softkey has a softkey label along its left side.
- 4) **Power on/off**  
Power on/off switch. In the "ON" position all operating voltages are applied to the instrument. In the "OFF" position NO operating voltages are applied to the instrument.
- 5) **FRAME Terminal**  
This is the FRAME Terminal which is tied to the instrument's chassis and which can be used for measurements that require guarding.
- 6) **UNKNOWN Terminals**  
These are the UNKNOWN Terminals used to connect a four-terminal pair test fixture or test leads for measuring the device under test.  
HD: High current drive  
HS: High potential sense  
LS: Low potential sense  
LD: Low current drive
- 8) **CURSOR Keys**  
The CURSOR keys are used to move the field select cursor from field to field on the LCD display page. When the cursor is moved to a field, the field changes to an inverse video image of the original field.

- 9) **USB Interface**  
The USB interface is used to connect with USB disk.
- 10) **LCRZ** menu key  
The pages in menu key **LCRZ** are used for displaying the LCRZ measurement results, and measurement setup. When **LCRZ** is pressed, the LCR MEAS DISP page will be displayed on the LCD screen. The cursor will be positioned at the LCR MEAS DISP field. The power-on default display page is the LCR MEAS DISP page.
- 11) **TRANS** menu key  
The pages in menu key **TRANS** are used for displaying the transformer measurement results and transformer measurement setup. When **TRANS** is pressed, the TRANS TEST SET page will be displayed on the LCD screen.
- 12) **SYSTEM** menu key  
This pages in menu key **SYSTEM** are used for operating conditions other than main measurement control. When **SYSTEM** is pressed, the SYSTEM SETUP page will be displayed.
- 13) **DC BIAS** key  
This is **DC BIAS** key used to enable the DC bias output. The DC BIAS ON/OFF information and indicator are displayed in the system information line. When DC BIAS is set to ON, the DC BIAS ON/OFF indicator is ON, “! Bias turn on” is displayed. When DC BIAS is set to OFF, the DC BIAS ON/OFF indicator is OFF. “! Bias turn off” is displayed. If DC BIAS is set to OFF, even though the DC bias is set to ON according to the BIAS display field, the DC bias isn't output.
- 14) **KEYLOCK** key  
**KEYLOCK** key is used to lock and unlock the keyboard. When the key is pressed, the system information line at the bottom of LCD will display “Keys locked” which means that the keys except **KEYLOCK** on the front panel are locked. And you can press **KEYLOCK** key again to unlock the keys. (The correct pass word must be input, if the keyboard is locked with a pass word.)
- 15) **BACKSPACE** key  
**BACKSPACE** key deletes one last character of the input value.
- 16) **RESET** key  
The key is used to stop the current transformer measurement and cut off the high voltage output in the transformer test system.
- 17) **ENTER** key  
**ENTER** terminates numeric input data and enters the displayed value on the system information (bottom line of the LCD screen).
- 18) **TRIGGER** key  
This is the **TRIGGER** key used to manually trigger the TH2818 when it is set to the Manual Trigger mode.
- 19) **NUMBER** keys  
The **NUMBER** keys are composed of the digits **0** to **9**, a period **.**, a minus sign **-**, keys are used to enter numeric data into the TH2818.

## 2.2 Rear Panel



**Figure 2-2 Rear Panel**

- 1) IEEE488 Interface Connector (Optional)  
This is the IEEE488 interface connector used when operating on the General Purpose Interface Bus.
- 2) HANDLER Interface Connector (Optional)  
This is the HANDLER interface connector used when operation with a component handler to fully automate component testing, sorting, and quality control data processing.
- 3) SCANNER Interface Connector (Not available)  
This is the SCANNER interface connector used to connect with transformer scanner, which is not available for this instrument.
- 4) RS232C Interface Connector  
This is the RS232C interface connector used when operating on the serial interface.
- 5) Window of Cooling Fan  
This window is used to provide a way for the air flow of the cooling fan.
- 6) Name Plate  
Name Plate is used to provide the information of date, model, lot number and manufacturer etc.
- 7) FRAME Terminal  
This is the FRAME Terminal which is tied to the instrument's chassis and which can be used for measurements that require guarding.
- 8) LINE Input Receptacle  
AC power cord receptacle.
- 9) Fuse Holder  
Fuse holder for TH2818 line fuse, 220Vac, 2A.

## 2.3 Display Area Definition

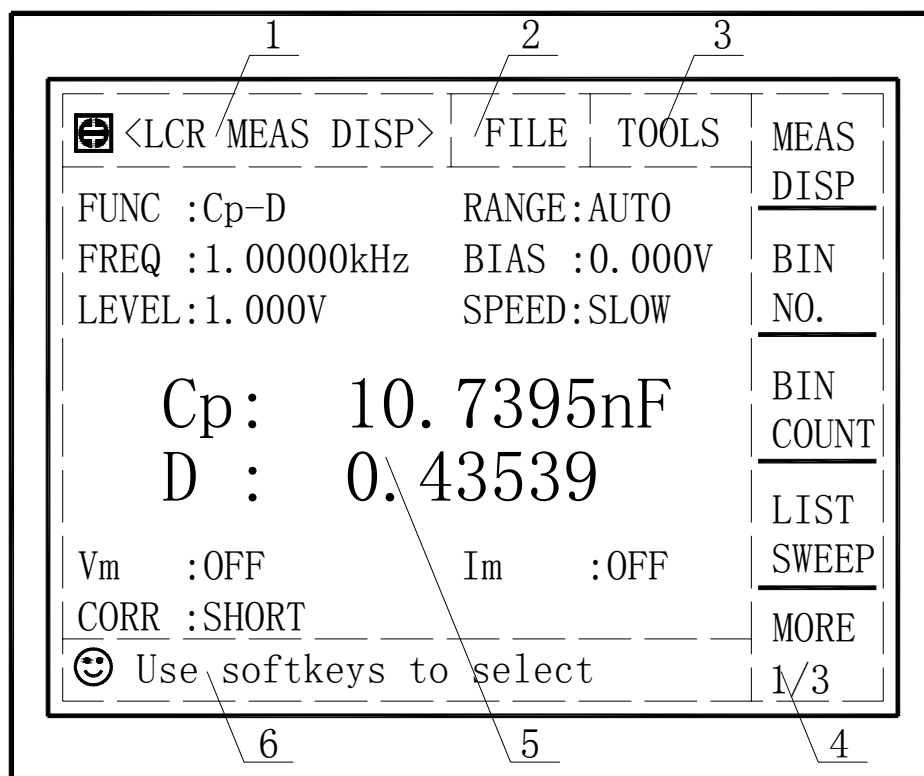


Figure 2-3 Display Area Definition

- ① Display Page Area  
This is the display page area. This area identifies the current display page.
- ② File Field  
When the cursor is set on the FILE field, FILE Manage function is available, Select FILE Manage function, common file functions which are not displayed on the display pages (for example, LOAD/STORE/DEL function) are made available.
- ③ TOOLS Field  
Some special controls which cannot be set on a display page's fields are made available.
- ④ Softkey Area  
The last six character positions of each line are reserved for softkey labels. The softkeys displayed correspond to the field at the cursor's position on the LCD.
- ⑤ Measurement Data/Conditions Area  
This area is where measurement results and measurement conditions are displayed.
- ⑥ Input Line and System Information Line  
This line is where system message, comments, error messages and numeric input data are displayed

## 2.4 Menu keys and Display Page

### 1) LCRZ Menu key

This key has the following pages.

- LCR MEAS DISP
- BIN No. DISP
- BIN COUNT DISP
- LIST SWEEP DISP

- MEAS SETUP
- CORRECTION
- LIMIT TABLE SETUP
- LIST SETUP

- FREQ RESP SETUP
- FREQ RESP MEAS

The first group of four display pages is used for displaying the measurement results, and displaying the sorting results.

The second group of four display pages is used for setting the measurement conditions (including the correction function), or setting the bin sorting limits.

The last group of two display pages is used for frequency response setup and frequency response measurement.

### 2) TRANS Menu key

This menu key has the following pages.

- TRANS TEST SET
- TRANS LIMIT SET
- TRANS MEAS DISP
- TRANS JUDGE DISP

These pages are used for setting the transformer measurement conditions and displaying the transformer measurement results.

### 3) SYSTEM Menu key

This menu has the following page

- SYSTEM SETUP
- USB DISK MANAGE

These page are used for operating conditions other than main measurement control.

## 2.5 Summary of Pages

Figure 2-4 shows all display pages. Each summary of each page is shown below.

### MEAS DISP (under LCRZ Menu)

This display page provides the measurement result information, and control settings are entered from this page. TH2818 measures the device under test from this page, and displays the measurement results in large characters. This page is the default page when the instrument is turned on.

### BIN NO. DISP (under LCRZ Menu)

This display page provides the bin sorting result information, the measurement results, and comparator function ON/OFF settings. TH2818 measures the device under test from this page. The bin number is displayed in large characters, and the



measurement results are displayed in small characters.

**BIN COUNT DISP** (under LCRZ Menu)

This display page provides the limit table's conditions, and the comparator's bin counter results. TH2818 can measure the device under test from this page, but the measurement results will not be displayed.

**LIST SWEEP DISP** (under LCRZ Menu)

This display page provides the list sweep measurement results, and the sweep mode STEP/SEQ selection. TH2818 measures the device under test according to the list sweep conditions in the LIST SWEEP SETUP page. An arrow (▶) indicates the current measuring point in the list sweep points. The list sweep point cannot be set from this page. You must use the LIST SWEEP SETUP page to set the list sweep points.

**MEAS SETUP** (under LCRZ Menu)

This display page provides all of the measurement control settings. TH2818 cannot perform a measurement from this page, and the measurement result can not be displayed on this page.

**CORRECTION** (under LCRZ Menu)

This display page provides the correction function. The correction function must be used to measure the device under test accurately. TH2818 cannot measure the device under test from this page, and the measurement results will not be displayed.

**LIMIT TABLE SETUP** (under LCRZ Menu)

This display page provides the limit table settings for bin sorting. TH2818 cannot perform a measurement from this page, and the comparison results can not be displayed. When you want to see the comparison results, either the BIN No. DISP page or the BIN COUNT DISP page must be used. This function page is used to setup the BIN COUNT, BIN COM, BIN LIMIT, NORM etc.

**LIST SWEEP SETUP** (under LCRZ Menu)

This display page provides the control settings for the List Sweep measurement function. TH2818 cannot measure the device under test from this page, and the list sweep measurement results can not be displayed from this page. When you measure the device under test using the control settings on the LIST SWEEP SETUP page, the LIST SWEEP DISP page must be used.

**FREQ RESP. SETUP** (under LCRZ Menu)

This display page provides the control settings for the frequency response measurement function. TH2818 cannot perform a measurement from this page and the frequency response curves can not be displayed. When you want to see the curves using the control settings on the FREQ RESP. SETUP page, the FREQ RESP. MEAS page must be used.

**FREQ RESP. MEAS** (under LCRZ Menu)

This display page provides the frequency response measurement results. TH2818 measures the device under test according to the frequency response conditions in the FREQ RESP. SETUP page. The frequency range and resolution cannot be set from this page. You must use the FREQ RESP. SETUP page to set the frequency

range and resolution.

**TRANS TEST SET** (under TRANS Menu)

This display page provides all of the transformer measurement control settings. TH2818 can not perform a transformer measurement from this page, and the measurement result can not be displayed on this page. When you measure the transformer under test using the control settings on this page, use the TRANS MEAS DISP page.

**TRANS LIMIT SET** (under TRANS Menu)

This display page provides the limit table settings for transformer judgment. TH2818 can not perform a measurement from this page, and the judgment results can not be displayed. When you want to see the judgment results, use the TRANS JUDGE DISP page.

**TRANS MEAS DISP** (under TRANS Menu)

This display page provides the transformer measurement result information, and TRIG, SPEED control settings can also be set from this page. TH2818 measures the transformer under test and displays the measurement results.

**TRANS JUDGE DISP** (under TRANS Menu)

This display page provides the judgment result information, and TRIG, SPEED control settings can also be set from this page. TH2818 measures the transformer under test and displays the judgment result information.

**SYSTEM SETUP**

This display page provides the control settings of LCD CONST, BEEPER, ALARM, LANGUAGE, PASS WORD, BUS, BUS ADDR, and TALK ONLY.

**USB MANAGE**

This display page provides the ways to save and load control setting files from the external USB disk.

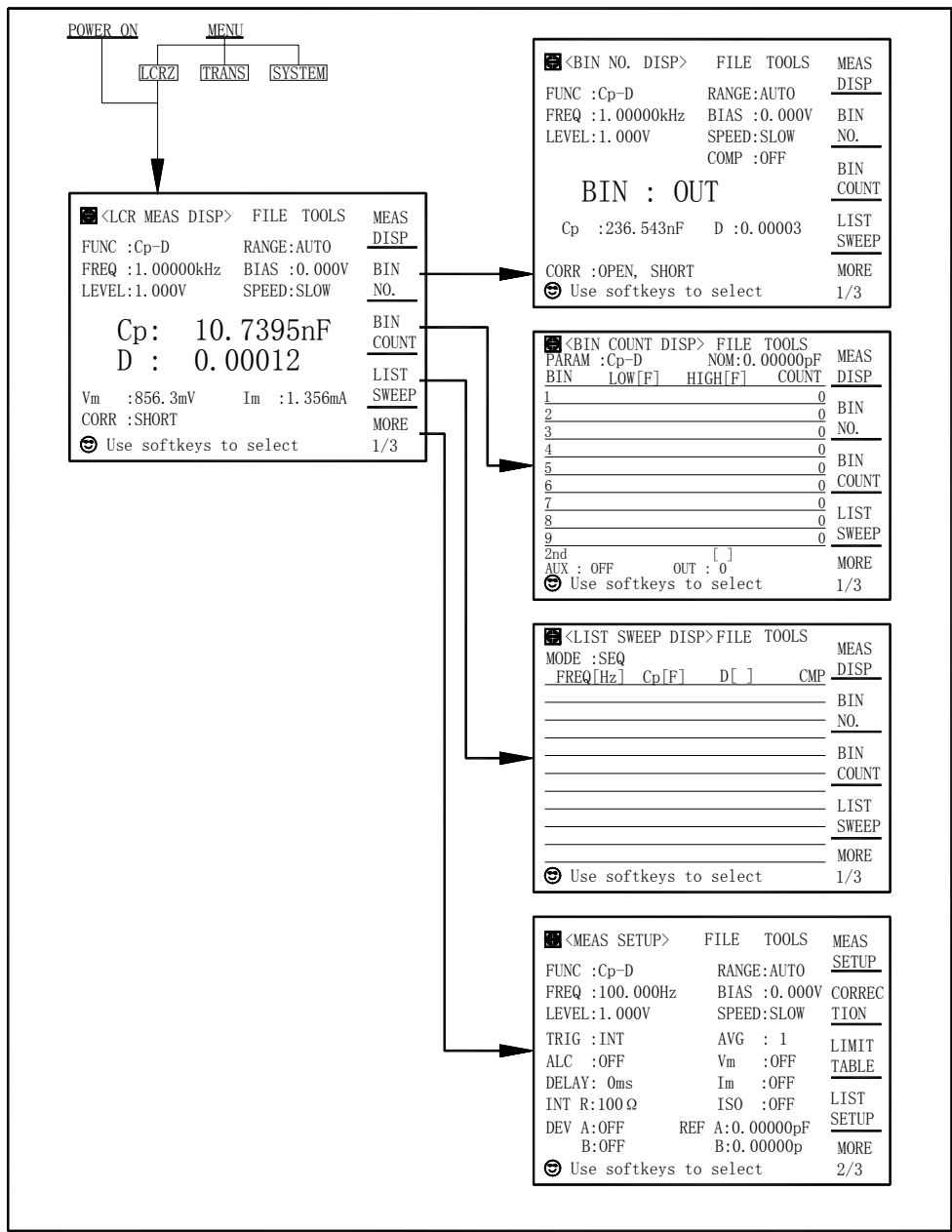


Figure 2-4 Display Pages (1/5)

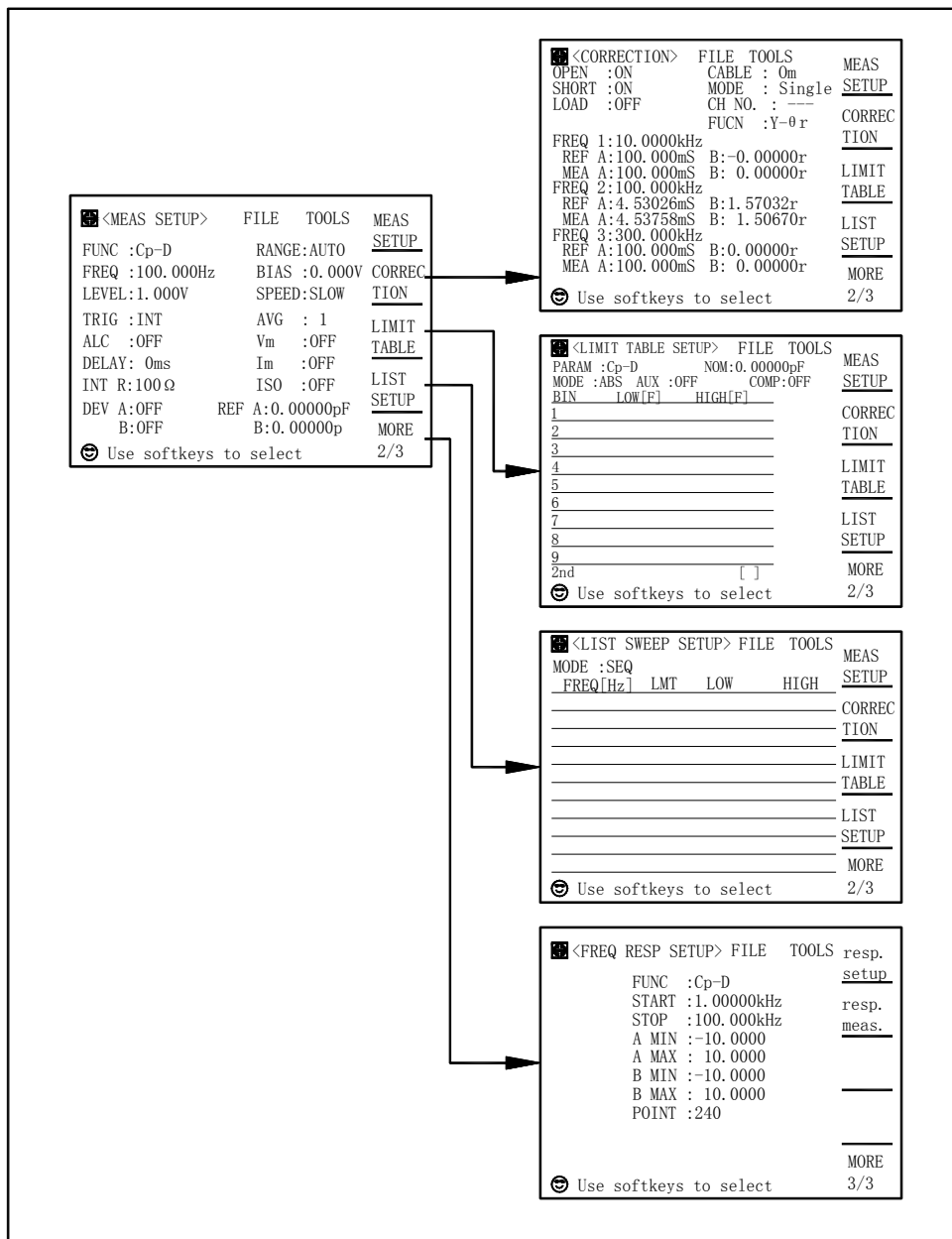


Figure 2-4 Display Pages (2/5)

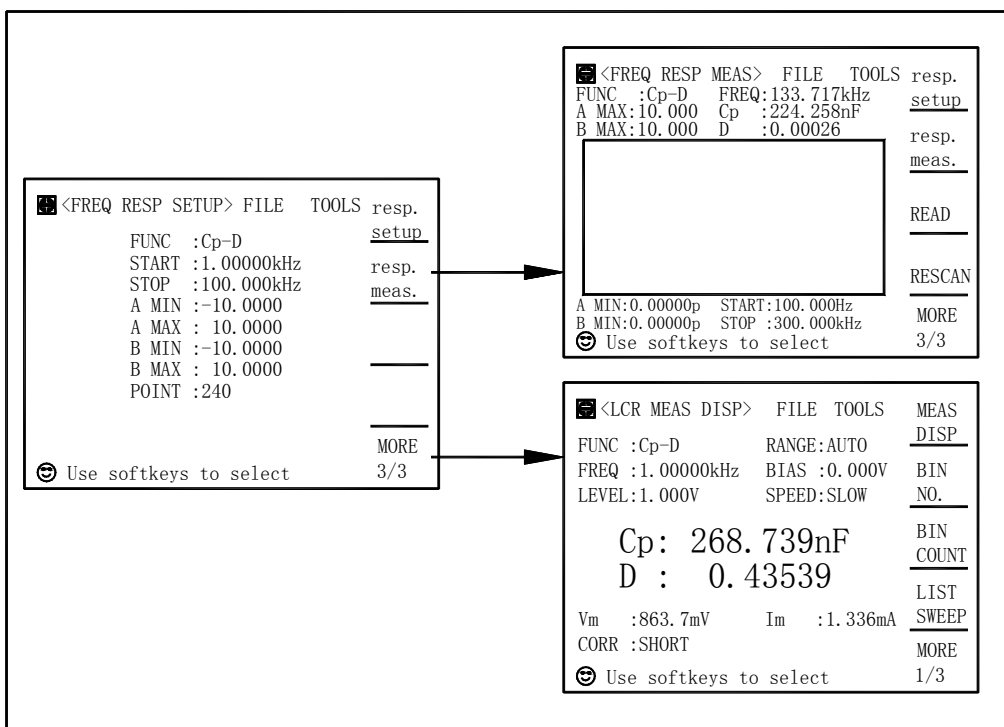


Figure 2-4 Display Pages (3/5)

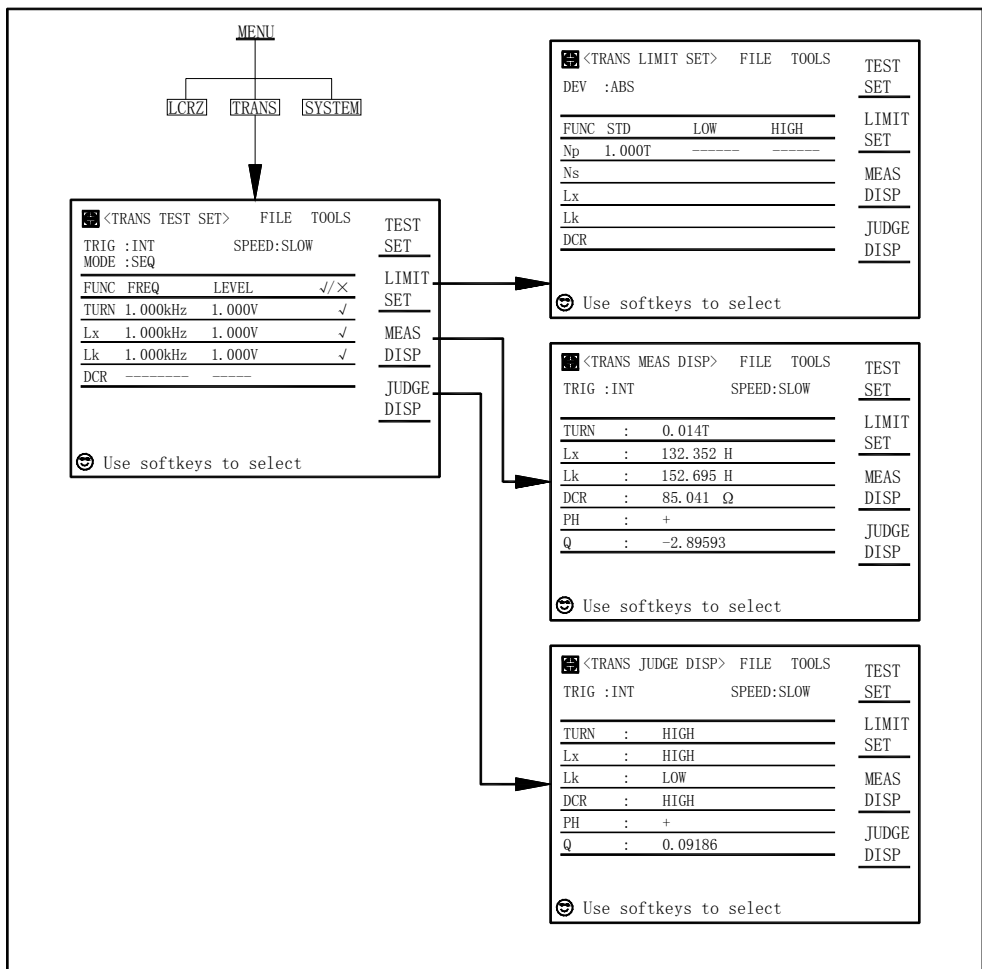


Figure 2-4 Display Pages (4/5)

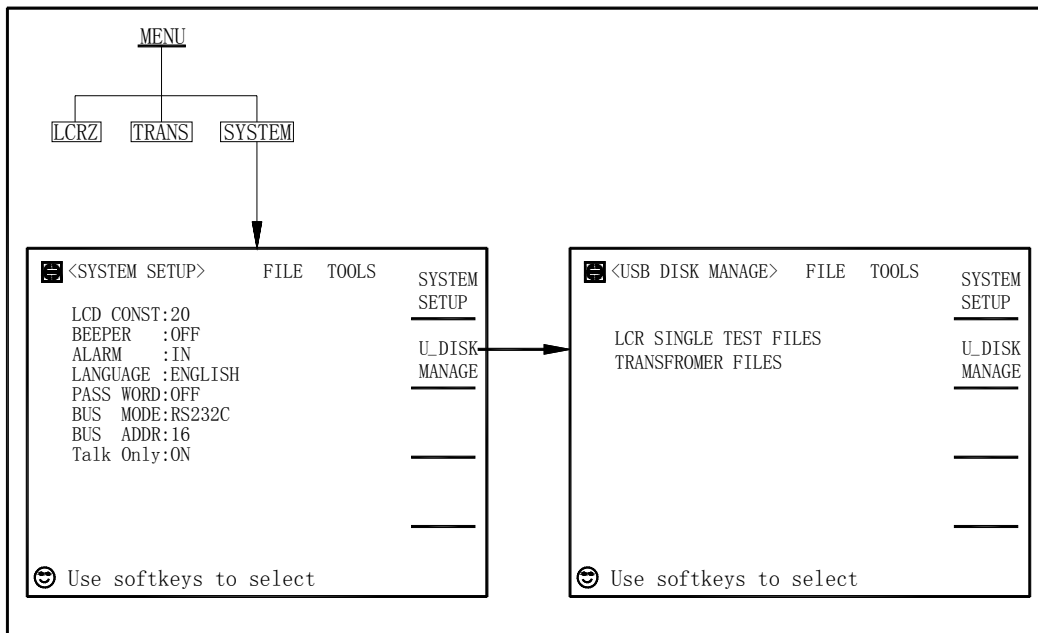


Figure 2-4 Display Pages (5/5)

## 2.6 Basic Operation

TH2818 basic operation is described in the following paragraphs.

- 1) Display the desired display page using both the MENU keys and the softkeys.  
(Refer to Figure 2-4)
- 2) Move the cursor to the desired field using the CURSOR keys. When the cursor is moved to a field, the field changes to an inverse video image of the original field, and the field is the area to which you can set the cursor.
- 3) The softkeys corresponding to the field will be displayed. Select and press a softkey. The numeric entry keys and **ENTER** are used to enter numeric data. When one of the numeric entry keys is pressed, the softkeys will change to the available unit softkeys. You can use these unit softkeys instead of **ENTER**. When **ENTER** is used, the numeric data is entered with Hz, V, or A as the default unit depending on the cursor field selected, e.g., test frequency's unit will be Hz, etc.

## Chapter 3 Operation

### 3.1 Welcome Page

Press the power switch to turn on TH2818, the welcome page will display as shown in Figure 3-1. The name of the instrument with its version will also be displayed. If password function is ON, you must input the correct password to start the instrument.



Figure 3-1 Welcome Page

**Note:** The default password for TH2818 is “2818”. The password can be set to ON or OFF and can be modified by the user on the SYSTEM SETUP page.

### 3.2 LCRZ Menu

#### 3.2.1 LCR MEAS DISP page

When you press **LCRZ**, the LCR MEAS DISP page will be displayed. On this page, the measurement results are displayed in large characters, and the following measurement controls can be set from this page.

- Measurement Function (FUNC)
- Measurement Range (RANGE)
- Test Frequency (FREQ)
- Oscillator Level (LEVEL)
- DC Bias (BIAS)
- Measurement Speed (SPEED)
- File Manage (FILE)
- Useful Tools (TOOLS)



There are nine fields on this page: LCR MEAS DISPLAY, FUNC, RANGE, FREQ, LEVEL, BIAS, SPEED, FILE and TOOLS. Each control function is described in the following paragraphs.

This page also provides the following information in measurement data and condition area on the displayed page. These conditions can be set from the MEAS SETUP page or CORRECTION page.



- Oscillator Level Voltage/Current Monitor value ( $V_m$ ,  $I_m$ )
- OPEN, SHORT, LOAD on/off setting conditions (CORR)

The available fields and the softkeys which correspond to the fields on this page are shown in Figure 3-2 and Figure 3-3 respectively.

 <LCR MEAS DISP>		<input type="button" value="FILE"/>	<input type="button" value="TOOLS"/>	<input type="button" value="MEAS"/>
FUNC : <input type="text" value="Cp-D"/>		RANGE : <input type="text" value="AUTO"/>		<input type="button" value="DISP"/>
FREQ : <input type="text" value="1.00000kHz"/>		BIAS : <input type="text" value="0.000V"/>		<input type="button" value="BIN"/>
LEVEL : <input type="text" value="1.000V"/>		SPEED : <input type="text" value="SLOW"/>		<input type="button" value="NO."/>
Cp : 256.765nF				<input type="button" value="BIN"/>
D : 0.00003				<input type="button" value="COUNT"/>
Vm : <input type="text" value="876.4mV"/>		Im : <input type="text" value="1.365mA"/>		<input type="button" value="LIST"/>
CORR : <input type="text" value="SHORT"/>				<input type="button" value="SWEEP"/>
 Use softkeys to select				<input type="button" value="MORE"/>
				<input type="button" value="1/3"/>

<input type="text"/>	: Field
<input type="text"/>	: Monitor

Figure 3-2 Available Fields on the LCR MEAS DISP Page

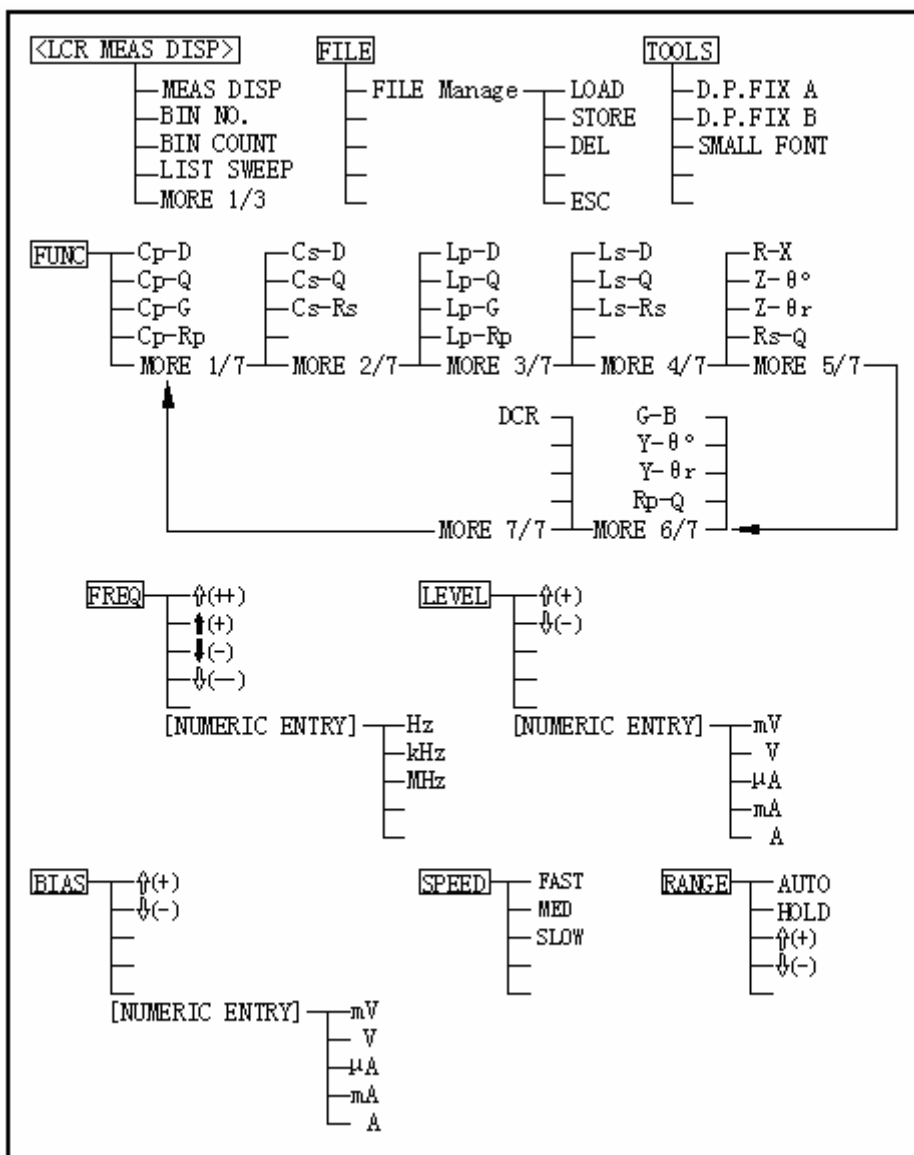


Figure 3-3 Available Softkeys on the LCR MEAS DISP Page

### 3.2.1.1 Measurement Function

TH2818 measures two components of the complex impedance (parameters) at the same time in a measurement cycle. The measurement parameters are listed as follows.

#### Primary Parameters

- $|Z|$  (absolute value of impedance)
- $|Y|$  (absolute value of admittance)
- L (inductance)
- C (capacitance)
- R (resistance)
- G (conductance)

#### Secondary Parameters

- D (dissipation factor)
- Q (quality factor)
- $R_s$  (ESR (equivalent series resistance))
- $R_p$  (equivalent parallel resistance)
- X (reactance)
- B (susceptance)
- $\Theta$  (phase angle)

The primary parameter measurement result is located on the upper line as two large character lines on this page, and the secondary parameter measurement result is located on the lower line as two large character lines on this page.

### Front Panel Operation for Setting the Measurement Function

Perform the following steps to set the measurement function.

- 1) Use the CURSOR arrow keys to move the cursor to the FUNC field. The following softkeys will be displayed.
  - Cp-D
  - Cp-Q
  - Cp-G
  - Cp-Rp
  - MORE 1/7
- 2) Select and press a softkey to set the measurement function. If the softkey you want is not displayed, press MORE 1/7 to display the following set of softkeys.
  - Cs-D
  - Cs-Q
  - Cs-Rs
  - MORE 2/7
- 3) Select and press a softkey to set the measurement function. If the softkey you want is not displayed, press MORE 2/7 to display the following set of softkeys.
  - Lp-D
  - Lp-Q
  - Lp-G
  - Lp-Rp
  - MORE 3/7
- 4) Select and press a softkey to set the measurement function. If the softkey you want is not displayed, press MORE 3/7 to display the following set of softkeys.
  - Ls-D
  - Ls-Q
  - Ls-Rs
  - MORE 4/7



- 5) Select and press a softkey to set the measurement function. If the softkey you want is not displayed, press **MORE 4/7** to display the following set of softkeys.
  - R-X
  - Z- $\theta^\circ$
  - Z- $\theta$  r
  - Rs-Q
  - MORE 5/7
- 6) Select and press a softkey to set the measurement function. If the softkey you want is not displayed, press **MORE 5/7** to display the following set of softkeys.
  - G-B
  - Y- $\theta^\circ$
  - Y- $\theta$  r
  - Rp-Q
  - MORE 6/7
- 7) Select and press a softkey to set the measurement function. If the softkey you want is not displayed, press **MORE 6/7** to display the following set of softkeys.
  - DCR
  - MORE 7/7
- 8) Select and press a softkey to set the measurement function. When **MORE 7/7** is pressed, the softkeys shown in step 1 will be displayed. Retry steps 1 through 8 if you missed the function you were looking for.

### 3.2.1.2 Measurement Range

Th2818 has nine measurement ranges: 10  $\Omega$ , 30  $\Omega$ , 100  $\Omega$ , 300 $\Omega$ , 1 k $\Omega$ , 3 k $\Omega$ , 10 k $\Omega$ , 30 k $\Omega$ , and 100 k $\Omega$ . When DCR measurement is selected, TH2818 has ten measurement ranges: 0.3  $\Omega$ , 3  $\Omega$ , 30  $\Omega$ , 100  $\Omega$ , 300  $\Omega$ , 1 k $\Omega$ , 3 k $\Omega$ , 10 k $\Omega$ , 30 k $\Omega$ , and 100 k $\Omega$ . The measurement range is selected according to the DUT's impedance even if measurement parameter is capacitance or inductance.

#### Front Panel Operation for Setting the Measurement Range

Perform the following procedure to set the measurement range.

- 1) Move the cursor to the RANGE Field using the CURSOR keys. The following softkeys will be displayed.
  - **AUTO** This softkey is used to set the measurement range to AUTO.
  - **HOLD** This softkey is used to change the measurement range from the AUTO mode to the HOLD mode. When the measurement range is set to the HOLD mode, the impedance range is fixed at the current range setting, and the impedance range is displayed in the RANGE field.
  -  This softkey is used to increase the measurement range in the HOLD (fixed range) mode.
  -  This softkey is used to decrease the measurement range in the HOLD (fixed range) mode.
- 2) Use the softkeys to set the measurement range.

### 3.2.1.3 Test Frequency


TH2818 operates from 20 Hz to 300 kHz with 0.01 Hz resolution. When DCR measurement is selected for TH2818, "----" is displayed in the frequency field.

#### Front Panel Operation for Setting the Test Frequency

There are two ways to set the test frequency. One is to use the softkeys, and the

other is to use the numeric entry keys. Perform the following steps to set the test frequency.

1) Move the CURSOR to the FREQ field. The following softkeys will be displayed.

■  (++)

This softkey is the coarse frequency increment softkey used to increment the test frequency to the next sequentially higher tenfold value after 20 Hz. The frequency points set using this softkey are as follows.


20 Hz 100 Hz 1 kHz 10 kHz 100 kHz 300 kHz

■  (+)


This softkey is the fine frequency increment softkey used to increment the current test frequency to the next sequentially higher frequency point. There are 10 frequency points between successive decade values. The sequential frequency points which can be set using this softkey are as follows.

20 Hz	100 Hz	1 kHz	10 kHz	100 kHz
25 Hz	120 Hz	1.2 kHz	12 kHz	120 kHz
30 Hz	150 Hz	1.5 kHz	15 kHz	150 kHz
40 Hz	200 Hz	2 kHz	20 kHz	200 kHz
50 Hz	250 Hz	2.5 kHz	25 kHz	250 kHz
60 Hz	300 Hz	3 kHz	30 kHz	300 kHz
80 Hz	400 Hz	4 kHz	40 kHz	
	500 Hz	5 kHz	50 kHz	
	600 Hz	6 kHz	60 kHz	
	800 Hz	8 kHz	80 kHz	

■  (-)

This softkey is the fine frequency decrement softkey used to decrease the test frequency to the next sequentially lower frequency point. There are ten frequency points between successive decade values. The frequency points set using this softkey are the same values as set using  (+).

■  (--)

This softkey is the coarse frequency decrement softkey which is used to decrement the test frequency to the next sequentially lower tenth value. The frequency points set using this softkey are the same as the frequency points set using  (++) .

2) Select and set the test frequency using either the softkeys or the numeric entry keys. When the test frequency is entered using the numeric entry keys, the softkey labels are changed to the available units (Hz, kHz, and MHz), and so you can use these softkeys instead of **ENTER** to enter the units and enter the data. When **ENTER** is used, the numeric data is entered with Hz as the default unit.

#### 3.2.1.4 Oscillator Level

TH2818's oscillator level can be set as the effective value (RMS value) of a sine wave of the test frequency from the TH2818's internal oscillator. You can set either the oscillator voltage level or the oscillator current level. The output impedance is 100  $\Omega$  and 30  $\Omega$  selectable. When DCR measurement is selected for TH2818, "----" is displayed in the LEVEL field.

**Note:** The set value of the oscillator current level is the value set when the measurement contacts (UNKNOWN Terminals) are shorted together. The set value of the oscillator voltage level is the value set when the measurement contacts (UNKNOWN Terminals) are opened.

The oscillator voltage level can be set from 0  $V_{rms}$  to 2  $V_{rms}$  with a resolution as listed in Table 3-1, or the oscillator current level can be set from 0  $A_{rms}$  to 20  $mA_{rms}$  with a resolution as listed in Table 3-1.

**Table 3-1 Oscillator Level and Resolution**



Mode	Oscillator Level	Resolution
Voltage	0 $V_{rms}$	1 $mV_{rms}$
	5 $mV_{rms}$ to 200 $mV_{rms}$ 210 $mV_{rms}$ to 2 $V_{rms}$	10 $mV_{rms}$
Level	0 $A_{rms}$	10 $\mu A_{rms}$
	50 $\mu A_{rms}$ to 2 $mA_{rms}$ 2.1 $mA_{rms}$ to 20 $mA_{rms}$	100 $\mu A_{rms}$

TH2818 can measure a device using a constant voltage or current level by using the automatic level control function. (The automatic level control function (ALC field) can be set to ON from the MEAS SETUP page.) When a constant voltage or current level measurement is performed, the asterisk mark (\*) is located at the end of the oscillator level value. For more information about the automatic level control function, refer to MEAS SETUP page.

**Front Panel Operation for Setting the Oscillator Level**

There are two ways to set the oscillator level. One is to use the softkeys, and the other is to use the use the numeric entry keys.

Perform the following steps to set the oscillator level.

- 1) Move the cursor to the LEVEL field. The following softkeys will be displayed.
  -  Press this softkey to increases the oscillator's output level.
  -  Press this softkey to decreases the oscillator's output level.
  
- 2) Select and set the oscillator level using either the softkeys or the numeric entry keys. When the oscillator level is entered using the numeric entry keys, the softkey labels are changed to the available units labels (mV, V,  $\mu A$ , mA, and A), and you can use these softkeys to enter the units and enter the data instead of **ENTER**. When **ENTER** is used, the numeric data is entered with V or A as the default unit.

**Note:** When you want to change the oscillator level from voltage to current or from current to voltage, the numeric entry keys and units' softkeys must be used.



### 3.2.1.5 DC Bias

TH2818 has internal dc bias voltage selections of 0 V, 1.5 V, and 2.0 V. When DCR measurement is selected for TH2818, “----” is displayed in the BIAS field.

#### Front Panel Operation for Setting the DC Bias

There are two ways to set the DC bias, one is to use the softkeys, and the other is to use the numeric entry keys.

Perform the following steps to set the DC bias.

- 1) Move the cursor to the BIAS field. The following softkeys will be displayed.
  -  ↑ (+)  
Press this softkey to increase the DC bias level.
  -  ↓ (-)  
Press this softkey to decrease the DC bias level.
- 2) Set the dc bias to your desired bias using either the softkeys or the numeric entry keys. When the dc bias is entered using the numeric entry keys, the softkey labels are changed to the available units (mV, V,  $\mu$ A, mA, and A), and so you can use these softkeys instead of **ENTER**. When **ENTER** is used, the numeric data is entered with V or A as the default unit.

---

**Note:** When you want to change the DC bias from voltage to current or from current to voltage, you must use the numeric entry keys and the units' softkeys.

---

- 3) Set **DC BIAS** on the front panel to ON to output the dc bias. When DC Bias is set to ON, the DC Bias indicator will be displayed in the system information line.

### 3.2.1.6 Measurement Speed

TH2818's measurement Speed is determined by the following conditions.

- Integration Time (A/D conversion)
- Averaging Rate (number of measurement averaged)
- Delay Time (time delay between the trigger and the start of the measurement)
- Measurement result's display time.

Generally, a slow measurement speed will result in more stable and accurate measurement results. SLOW, MED, or FAST measurement speed can be selected.

#### Front Panel Operation for Setting the Measurement Speed

Perform the following steps to set the measurement speed.

- 1) Move the cursor to the SPEED field. The following softkeys will be displayed.
  - **FAST**
  - **MED**
  - **SLOW**
- 2) Use the preceding softkeys to select and set the measurement speed.

### 3.2.1.7 File Manage

TH2818 uses the internal EEPROM for storing and retrieving a maximum of 20 sets of instrument control settings. The following data will be stored in non-volatile memory as one file.

- Control settings on the MEAS SETUP page.
  - Measurement Function
  - Test Frequency

- Measurement Range
  - Oscillator Level
  - DC Bias
  - Measurement Speed
  - Averaging Rate
  - Delay Time
  - Trigger Mode
  - ALC on/off
  - Internal Resistance
  - V Monitor on/off
  - I Monitor on/off
  - Deviation Measurement A/B
  - Deviation Measurement A/B Reference Value
  - Bias Current Isolation on/off
- Control settings on the LIMIT TABLE SETUP page.
    - Measurement Parameter
    - Nominal Value
    - Limit Mode for the Primary Parameter
    - Auxiliary Bin on/off
    - Comparator Function on/off
    - Low/High Limits for Each Bin
- Control setting on the BIN COUNT DISP page
    - Bin Count on/off
- Control settings on the LIST SWEEP SETUP page
    - Sweep Mode
    - All Sweep Points
    - All Low/High Limits including the limit mode (A or B)
- Display page format
- Control settings on the TRANS TEST SETUP page
    - Trigger Mode
    - Measurement Speed
    - Transformer Test Mode
    - Test Frequency and Level for TURN, Lx, Lk and DCR.
- Control settings on the TRANS LIMIT SETUP page
    - Deviation Mode
    - STD and High Low Limits for Np, Ns, Lx, Lk and DCR
- Control settings on the FREQ RESP SETUP page
    - Measurement Function
    - Start Frequency
    - Stop Frequency
    - A/B Max and Min Scale
    - POINT



### Front Panel Operation for File Manage

Perform the following steps to store the control settings to the internal non-volatile memory.

- 1) Select and set all control settings on the MEAS DISPLAY page.
- 2) Move the cursor to the FILE field, the following softkey will be displayed.
  - FILE Manage
- 3) Press FILE Manage, The following softkeys will be displayed with the file list.
  - LOAD
  - STORE
  - DEL
  - ESC
- 4) Select a file No. from 1 to 20 using the cursor keys.
- 5) Press STORE. The following softkeys will be displayed.
  - YES
  - NO
- 6) Press NO to return to Step 3.
- 7) Press YES, the message "FILE name:" will be displayed on the system message line.
- 8) Enter a record number using the numeric entry keys and **ENTER** to store the current control settings.

Perform the following steps to load the control settings from the internal non-volatile memory.

- 1) Move the cursor to the FILE field, the following softkey will be displayed.
  - FILE Manage
- 2) Press FILE Manage, The following softkeys will be displayed with the file list.
  - LOAD
  - STORE
  - DEL
  - ESC
- 3) Select a stored file from No.1 to 20, and Press LOAD. The following softkeys will be displayed.
  - YES
  - NO
- 4) Press NO to return to Step 2.
- 5) Press YES to load the file.

### 3.2.1.8 Useful Tools

TH2818 displays the measurement data using a six digit floating point display format. The fixed decimal point function is used to display the measurement data using a fixed point display format. This function can also be used to change the number of digits displayed. The display character of measurement display digits can be changed between big front and small front.

### Front Panel Operation for Useful Tools

Perform the following steps to set fixed decimal point and set measurement display digits front.

- 1) Move the cursor to the TOOLS field. The following softkeys will be displayed.
  - D.P. FIX A
  - D.P. FIX B
  - SMALL FRONT

- 2) Press **D.P. FIX A** to fix the decimal point for the main parameter's data. The ▲ mark will be displayed at the decimal fixed point. Each time **D.P. FIX A** is pressed, the last digit is dropped, the value is rounded off.
- 3) Press **D.P. FIX B** to fix the decimal point for the sub parameter's data. The ▲ mark will be displayed at the decimal fixed point. Each time **D.P.FIX B** is pressed, the value is rounded off giving one less digit.
- 4) Press **SMALL FRONT** to change the measurement display digits from big front to small front. The softkey **SMALL FRONT** will change to **BIG FRONT**.
- 5) Press **BIG FRONT** to change the measurement display digits from small front to big front. The softkey **BIG FRONT** will change to **SMALL FRONT**.

**Note:** In the following cases the fixed decimal point function is automatically disabled.

- The measurement function is changed.
- When the deviation measurement (which is set on the MEAS SETUP page) is performed, the deviation measurement function ( $\Delta$ ABS,  $\Delta$ %, OFF) is changed.

### 3.2.2 BIN No. DISP page


When you press **LCRZ**, and **BIN No.**, the BIN No. DISP page will be displayed. The bin sorting results are displayed in large characters and the measurement results are displayed in normal characters on the BIN No. DISP page, and the following measurement controls can be set from the BIN No. DISP page. (The field in parenthesis is used when this control is set.)

- Comparator Function ON/OFF (COMP)
- File Manage (FILE)
- Usefull Tools (TOOLS)

There are four fields on this page: <BIN No. DISP>, COMP, FILE and TOOLS fields. Each control is described in the following paragraphs. This page also provides the following information in the monitor areas (each monitor area looks like a field, but is not). These conditions can be set from the MEAS SETUP page, and most conditions can be set from the MEAS DISP page.

- Measurement Function (FUNC)
- Measurement Range (RANGE)
- Test Frequency (FREQ)
- Oscillator Level (LEVEL)
- DC Bias (BIAS)
- Measurement Speed (SPEED)
- OPEN, SHORT, LOAD on/off setting conditions (CORR)

The available fields and the softkeys which correspond to each field on this page are shown in Figure 3-4 and Figure 3-5.

 <BIN NO. DISP>	<input type="text" value="FILE"/>	<input type="text" value="TOOLS"/>	<u>MEAS DISP</u>
FUNC : <input type="text" value="Cp-D"/>	RANGE : <input type="text" value="AUTO"/>		<u>BIN NO.</u>
FREQ : <input type="text" value="1.00000kHz"/>	BIAS : <input type="text" value="0.000V"/>		<u>BIN COUNT</u>
LEVEL : <input type="text" value="1.000V"/>	SPEED : <input type="text" value="SLOW"/>		<u>LIST SWEEP</u>
	COMP : <input type="text" value="OFF"/>		<u>MORE</u>
<b>BIN : OUT</b>			1/3
Cp : <input type="text" value="368.542nF"/>	D : <input type="text" value="0.00003"/>		
CORR : <input type="text" value="OPEN, SHORT"/>			
☺ Use softkeys to select			

	: Field
	: Monitor

Figure 3-4 Available Fields on the BIN No. DISPLAY Page

<input type="text" value="&lt;BIN NO. DISP&gt;"/>	<input type="text" value="FILE"/>	<input type="text" value="TOOLS"/>	<input type="text" value="COMPA"/>
— MEAS DISP	— FILE Manage	— LOAD	— ON
— BIN NO.	—	— STORE	— OFF
— BIN COUNT	—	— DEL	—
— LIST SWEEP	—	— ESC	—
— MORE 1/3	—	—	—

Figure 3-5 Available Softkeys on the BIN No. DISPLAY Page

### 3.2.2.1 Comparator Function ON/OFF Description

TH2818's built-in comparator can sort devices into a maximum of ten bins (BIN 1 to

BIN 9 and the OUT OF BINS bin) using a maximum of nine pairs of primary limits and one pair of secondary parameter limits. Also, a device whose primary parameter is within limits, but whose secondary parameter measurement result is not within limits can be sorted into an AUXiliary BIN. The comparator function is especially useful when using TH2818 with a component handler (handler interface option is installed). These limit settings for bin sorting are only set on the LIMIT TABLE SETUP page. So this COMP field allows you to only set the comparator function to ON or OFF.

#### **Front Panel Operation for Setting the Comparator Function to ON or OFF**

Perform the following steps to set the comparator function to ON or OFF.

- 1) Move the cursor to the COMP field. The following softkeys will be displayed.
  - ON
  - OFF
- 2) Use the softkeys to set the comparator function to ON or OFF.

#### **3.2.2.2 File Manage**

Refer to 3.2.1.7 File Manage.

#### **3.2.2.3 Useful Tools**

The Bin No. DISP page provides no tools operation.

#### **3.2.3 BIN COUNT DISP page**

When you press **LCRZ** and **BIN COUNT**, the BIN COUNT DISP page will be displayed. On the BIN COUNT DISP page, the comparator's count results are displayed, and the following measurement controls can be set.

- File Manage (FILE)
- Useful Tools (TOOLS)

So there are three fields on this page: <BIN COUNT DISP>, FILE and TOOLS fields. This page also provides the following information in monitor areas (the monitor areas look like fields, but they are not). These conditions can be set from the LIMIT TABLE SETUP page.

- Nominal Value
- Measurement Function
- Bin Sorting Low/High Limits

The available fields and the softkeys which corresponded to each field on this page are shown in Figure 3-6 and Figure 3-7.

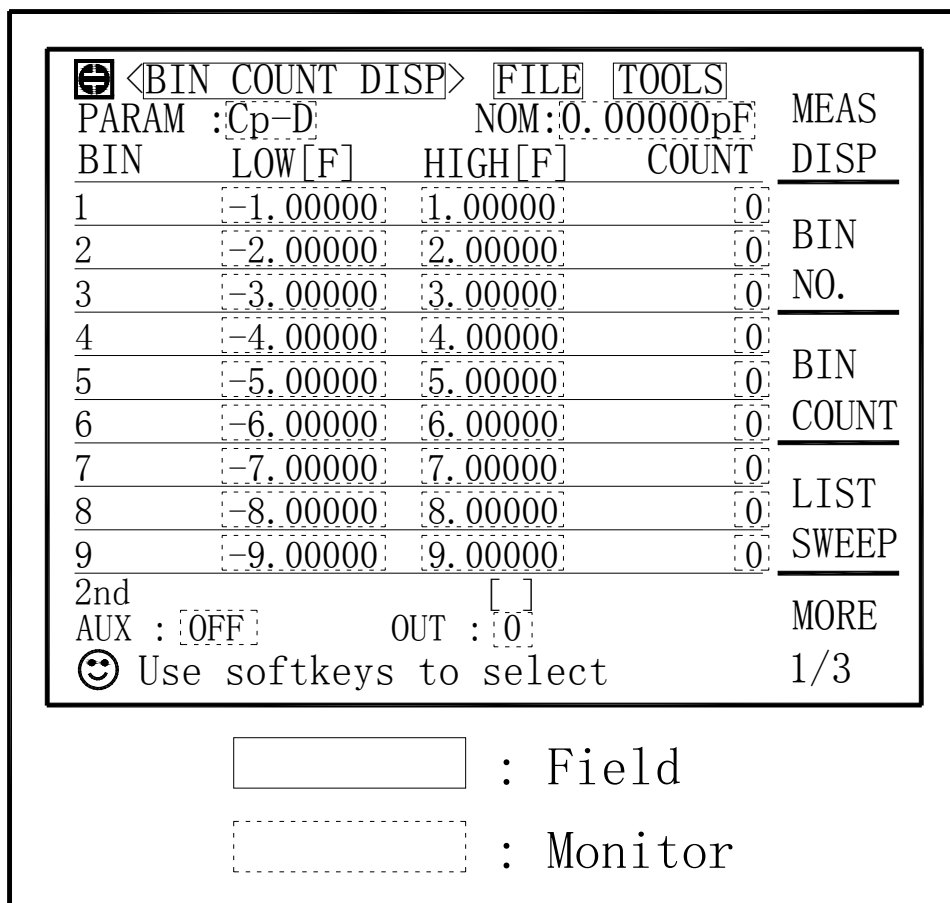


Figure 3-6 Available Fields on the BIN COUNT DISPLAY Page

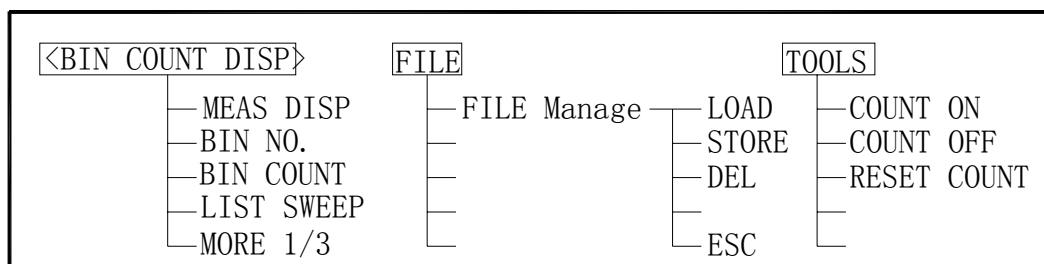


Figure 3-7 Available Softkeys on the BIN COUNT DISPLAY Page

### 3.2.3.1 File Manage

Refer to 3.2.1.7 File Manage.

### 3.2.3.2 Useful Tools

TH2818 has bin counting capability. When many devices are being sorted into bins using the comparator function, the number of devices sorted into each bin is counted. The maximum count is 999999, the overflow message "----" will be displayed when this value is exceeded. The bin counter will still be operating, so you can only get the count data via GPIB.

Perform the following steps to set the counter function to ON or OFF from the BIN COUNT DISP page.

- 1) Move the cursor to TOOLS field on the BIN COUNT DISP page. The following softkeys will be displayed.
  - COUNT ON
  - COUNT OFF
  - RESET COUNT
- 2) Press COUNT ON to set the counter function to ON. An arrow ► will be displayed at the left of COUNT.
- 3) Press COUNT OFF when you want to set the counter function to OFF. The arrow ► will disappear.
- 4) Press RESET COUNT when all counts are reset to zero. The message "Resetting count. Sure? " will be displayed on the system message line, and YES and NO softkeys will be displayed. Press YES.

### 3.2.4 LIST SWEEP DISP Page

TH2818's LIST SWEEP function permits entry of up to ten frequencies, signal levels, or DC bias levels, and the measurement limits on the LIST SWEEP SETUP page. These points are automatically swept and the measurement results are compared to the limits set. When you press **LCRZ** and **LIST SWEEP**, the LIST SWEEP DISP page will be displayed. On the LIST SWEEP DISP page, the sweep points are swept and the measurement results are compared to the limits. During a sweep, an arrow ► will appear on the left side of the current measuring list sweep point. The following measurement controls can be set from this page. (Each field in parenthesis is used when that control is set.)

- Sweep Mode of the List sweep Measurement (MODE)
- File Manage (FILE)
- Useful Tools (TOOLS)

So there are four fields on this page: <LIST SWEEP DISP>, MODE, FILE and TOOLS fields. The list sweep point can not be set from this page, but can only be set from the LIST SWEEP SETUP page.

The available fields and the softkeys which corresponded to each field on this page are shown in Figure 3-8 and Figure 3-9.

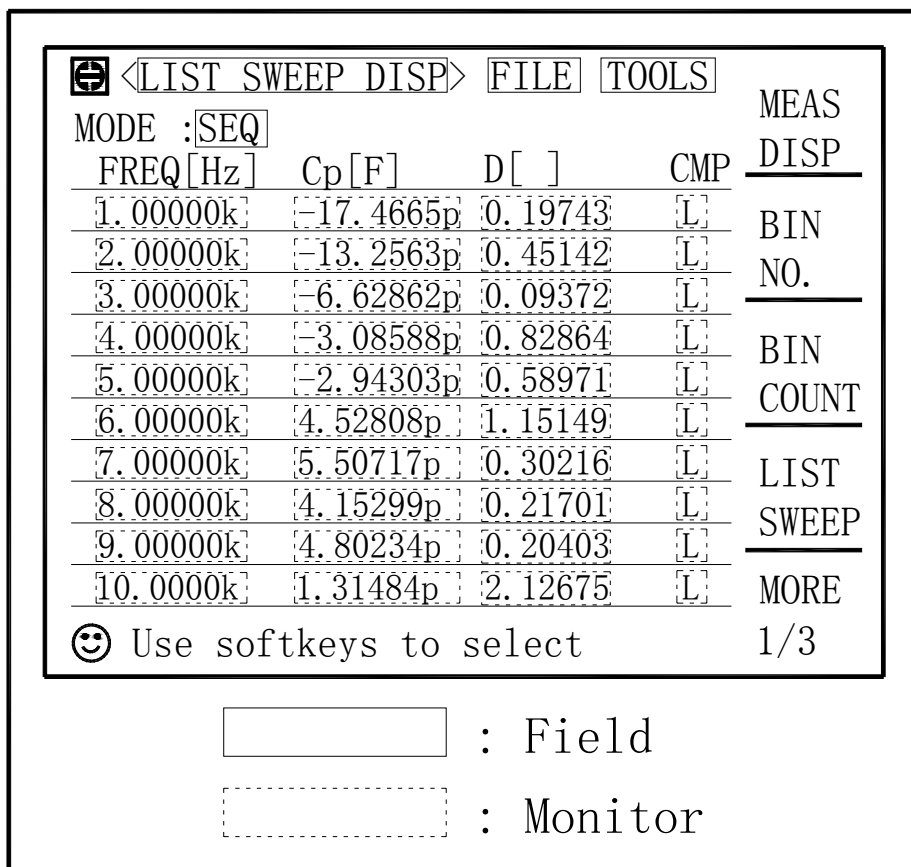


Figure 3-8 Available Fields on the LIST SWEEP DISP Page

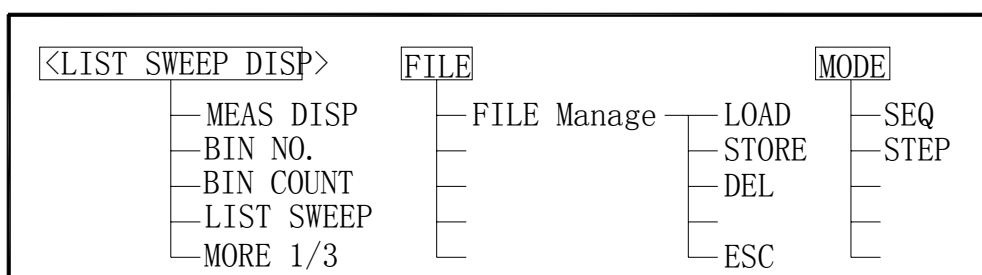


Figure 3-9 Available Softkeys on the LIST SWEEP DISP Page

### 3.2.4.1 Sweep Mode

TH2818 List Sweep Measurement function permits up to 10 test frequencies, oscillator levels, or DC bias points to be automatically measured. There are two measurement modes for list sweep measurements: sequential (SEQ) mode and step (STEP) mode. In the case of SEQ mode, when TH2818 is triggered once, all sweep points are automatically swept. In the case of the STEP mode, each time the TH2818 is triggered the sweep point is swept by one step.

### Front Panel Operation for Setting the Sweep Mode of the List Sweep Measurement

Perform the following steps to set the list sweep measurement mode to the SEQ or STEP modes.

- 1) Move the cursor to the MODE field. The following softkeys will be displayed.
  - SEQ
  - STEP
- 2) Use the softkeys to select and set the list sweep measurement mode (SEQ or STEP mode).

### 3.2.4.2 File Manage

Refer to 3.2.1.7 File Manage

### 3.2.4.3 Useful Tools

There are no tools on this LIST SWEEP DISP page.

### 3.2.5 MEAS SETUP Page

When you press **LCRZ** and **MORE 1/3**, the MEAS SETUP page will be displayed. On this MEAS SETUP page, all of the following measurement control functions can be set. (Each field in parenthesis is used when each control is set.)



- Measurement Function (FUNC)
- Measurement Range (RANGE)
- Test Frequency (FREQ)
- Oscillator Level (LEVEL)
- DC Bias (BIAS)
- Measurement Speed (SPEED)
- Trigger Mode (TRIG)
- Automatic Level Control (ALC)
- Bias Current Isolation Mode ON/OFF (ISO)
- Averaging Rate (AVG)
- Voltage Level Monitor ON/OFF ( $V_m$ )
- Current Level Monitor ON/OFF ( $I_m$ )
- Delay Time (DELAY)
- Internal Resistance (INT R)
- File Manage (FILE)
- Useful Tools (TOOLS)
- Deviation Measurement A Mode (DEV A)
- Deviation Measurement B Mode ((DEV) B)
- Reference Value for the Deviation Measurement A (REF A)
- Reference Value for the Deviation Measurement B ((REF) B)

Some fields on the MEAS SETUP page are the same as the fields on the MEAS DISP page as follows. So, these fields are not described in this Chapter, and the other functions on the MEAS SETUP page are described in the following paragraphs.



- Measurement Function (FUNC)
- Measurement Range (RANGE)
- Test Frequency (FREQ)
- Oscillator Level (LEVEL)
- DC Bias (BIAS)
- Measurement Speed (SPEED)

The available fields and the softkeys which corresponded to each field on this page are shown in Figure 3 -10 and Figure 3-11.

 <MEAS SETUP>		FILE	TOOLS	MEAS SETUP
FUNC :	Cp-D	RANGE :	AUTO	CORREC
FREQ :	100.000Hz	BIAS :	0.000V	TION
LEVEL :	1.000V	SPEED :	SLOW	LIMIT
TRIG :	INT	AVG :	1	TABLE
ALC :	OFF	Vm :	OFF	LIST
DELAY :	0ms	Im :	OFF	SETUP
INT R :	100 Ω	ISO :	OFF	MORE
DEV A :	OFF	REF A :	0.00000pF	
B :	OFF	B :	0.00000p	
 Use softkeys to select				2/3

	:	Field
	:	Monitor

Figure 3-10 Available Fields on the MEAS SETUP Page

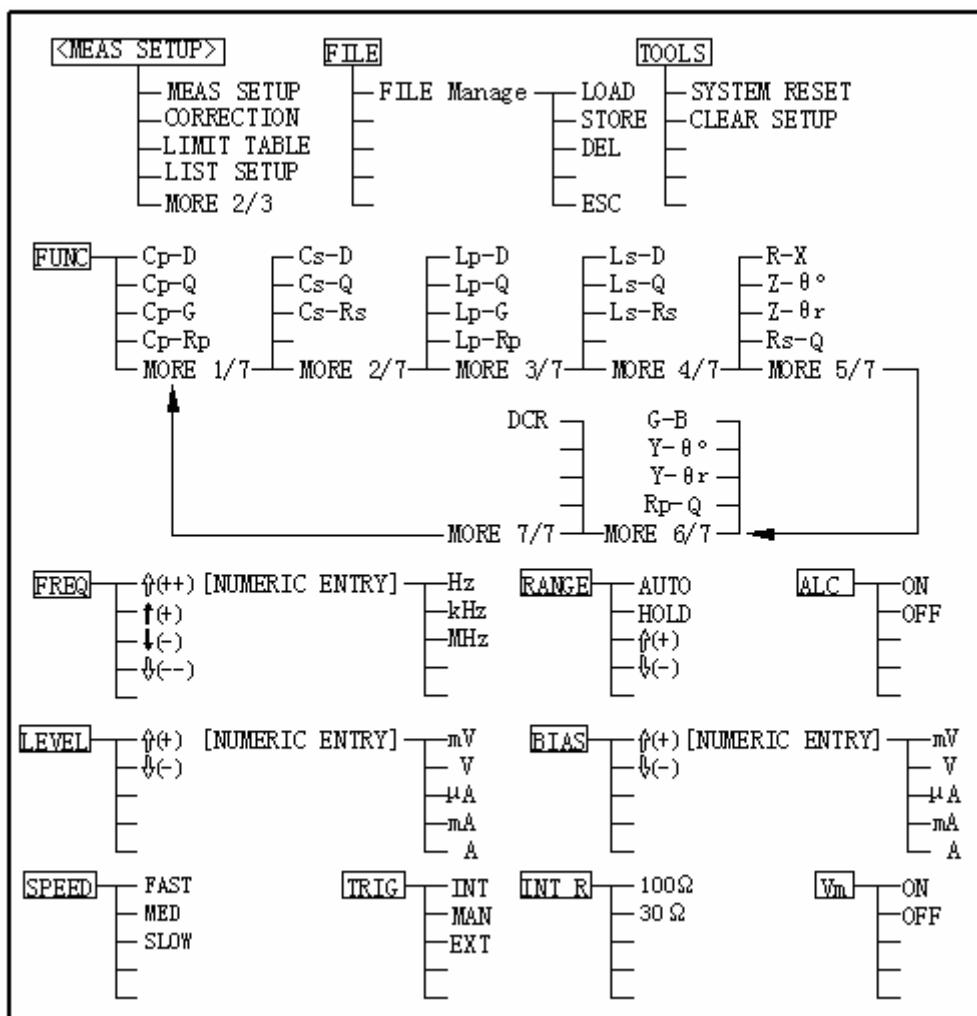


Figure 3-11 Available Softkeys on the MEAS SETUP Page (1/2)

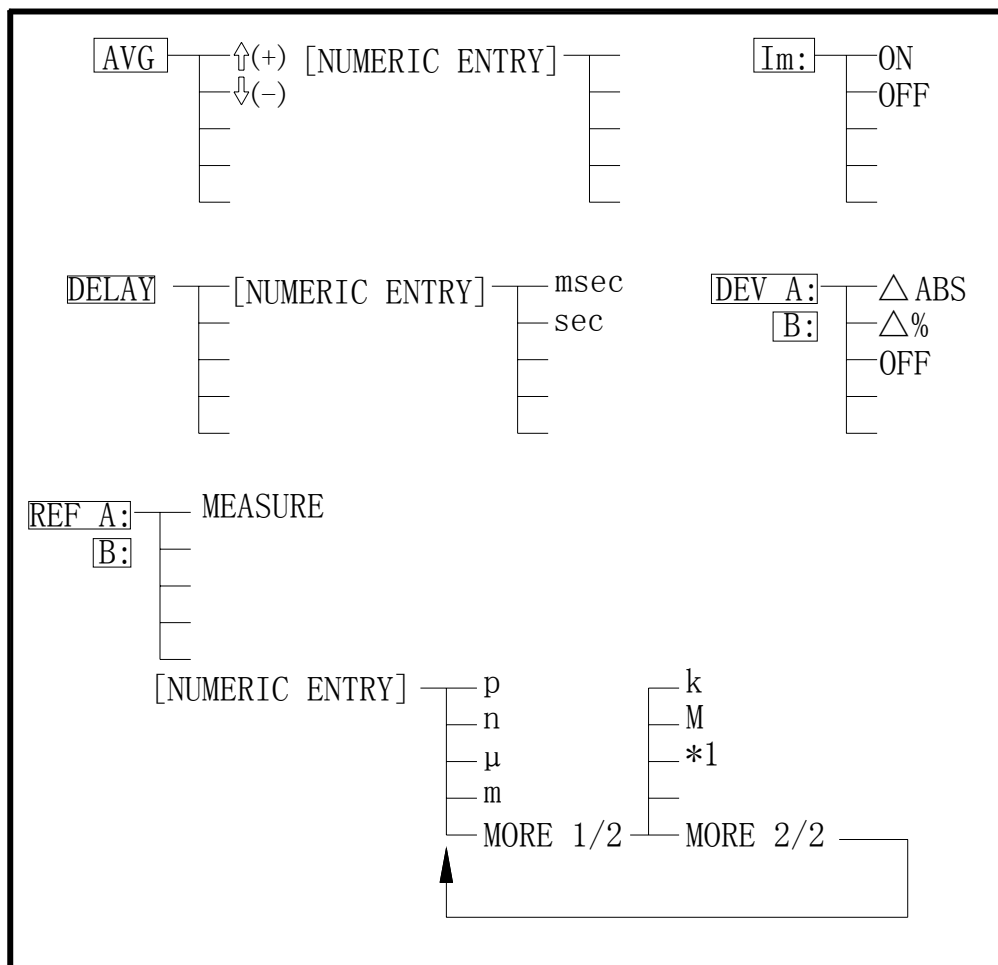


Figure 3-11 Available Softkeys on the MEAS SETUP Page (2/2)

### 3.2.5.1 Trigger Mode

TH2818 has four trigger modes: INTernal, EXTernal, MANual, and BUS.

When the trigger mode is set to INT trigger mode, TH2818 continuously repeats measurements.

When the trigger mode is set to MAN trigger mode, TH2818 performs a single measurement every time **TRIGGER** on the front panel is pressed.

When the trigger mode is set to EXT trigger mode, TH2818 performs a single measurement every time a positive going TTL pulse is applied to the Handler Interface connector on the rear panel.

When the trigger mode is set to BUS trigger mode, TH2818 performs a single measurement every time the TRIGGER command is sent to TH2818 via GPIB. Then the BUS trigger mode cannot be set on the front panel.

**Note:** TH2818 ignores triggers that are applied while a measurement is in progress. Trigger TH2818 after the measurement is completed. Select the EXT trigger mode when TH2818 is triggered via an optional interface.

### Front Panel Operation for Setting the Trigger Mode

Perform the following steps to set the trigger mode except for in the BUS TRIG mode. To set the trigger mode in the BUS TRIG mode, the **TRIGger:SOURce BUS** command should be sent via GPIB.

- 1) Move the cursor to the TRIG field. The following softkeys will be displayed.
  - INT
  - MAN
  - EXT

- 2) Set the trigger mode using the softkeys.

### 3.2.5.2 Automatic Level Control Function

The automatic level control (alc) function regulates the actual test level (voltage across the DUT, or current through the DUT) to your desired level. So by using this function, the test signal voltage or current level at the DUT can be held constant.

When the automatic level control function is used, the oscillator level settings are limited as follows.

Voltage Level: 10 mV<sub>rms</sub> to 1 V<sub>rms</sub>  
 Current Level: 100 μA<sub>rms</sub> to 10 mA<sub>rms</sub>

**Note:** When the ALC function is active, if the oscillator level setting exceeds the above limits, the ALC function is automatically set to OFF and the setting value is entered as a normal oscillator level.

### Front Panel Operation for Setting the Automatic Level Control Function

Perform the following steps to set the automatic level control function to ON or OFF.

- 1) Move the cursor to the ALC field. The following softkeys will be displayed.
  - ON
  - OFF
- 2) Press **ON** to set the automatic level control function to ON. Press **OFF** to set the automatic level control function OFF.

### 3.2.5.3 Bias Current Isolation Function

This bias current isolation function prevents the DC current from affecting the measurement input circuit. The ISO field allows you to set the bias current isolation function to ON or OFF. When the bias current isolation function is set to ON, the bias current through the device can be up to 100 mA. When the bias current isolation function is set to OFF, the current through the device can be set to the values listed in Table. When the current through a device exceeds the values listed in Table, normal measurement can't be performed.

**Table 3-2 Maximum DC Bias Current**

Measurement Range	10Ω	30Ω	100 Ω	300 Ω	1 kΩ	3 kΩ	10 kΩ	30 kΩ	100 kΩ
Max. current	2 mA	2 mA	2 mA	2 mA	1 mA	300μA	100μA	30μA	10μA

---

**Note:** The bias current isolation function influences the measurement accuracy. So when measuring a high impedance device at low frequency with low bias current, the bias current isolation function should be set to OFF.

---

### Front Panel Operation for Setting the Bias Current Isolation Function

Perform the following steps to set the bias current isolation function to ON or OFF when high power mode is set to ON.

- 1) Move the cursor to the ISO field. The following softkeys will be displayed.
  - ON
  - OFF
- 2) Press ON to set the bias current isolation function to ON. Press OFF to set the bias current isolation function to OFF.

### 3.2.5.4 Averaging Rate

TH2818's averaging rate function arithmetically averages the results of two or more A/D conversions. The number of conversions averaged can be set from 1 to 256, in steps of 1.

### Front Panel Operation for Setting the Averaging Rate

Perform the following steps to set the averaging rate.

- 1) Move the cursor to the AVG field. The following softkeys will be displayed.
  - ↑ (+)  
This softkey is used to increment the averaging rate.
  - ↓ (-)  
This softkey is used to decrement the averaging rate.
- 2) Use the softkeys to set the averaging rate, or enter the averaging rate using the numeric entry keys, and **ENTER**.

### 3.2.5.5 Level Monitor Function

The level monitor function allows you to monitor the actual voltage level across the device under test or the actual current level through the device under test. The voltage monitor value is only displayed on the MEAS DISP page at Vm monitor area. The current monitor value is only displayed on the MEAS DISPLAY page at Im monitor area.

---

**Note:** The correction function interacts with the level monitor function. So the monitor value may be changed by the correction data change or the OPEN/SHORT/LOAD correction ON/OFF condition change.

---

### Front Panel Operation for Setting the Level Monitor Function

Perform the following steps to set the level monitor function to ON or OFF.

- 1) Move the cursor to the Vm field. The following softkeys will be displayed.
  - ON
  - OFF
- 2) Press ON to set the voltage level monitor function to ON. Press OFF to set the voltage level monitor function to off.
- 3) Move the cursor to the Im field. The following softkeys will be displayed.
  - ON

- OFF
- 4) Press ON to set the current level monitor function to ON. Press OFF to set the current level monitor function to OFF.

### 3.2.5.6 Delay Time

TH2818's delay time function allows you to set a trigger delay so TH2818 will delay the start of the measurement after it is triggered. (When the list sweep measurement is performed, TH2818 will delay the start of the measurement at each sweep point using the trigger delay time.) The trigger delay time can be set from 0 s to 60 s in 1 ms steps. This function is useful if a component handler triggers the TH2818 before stable contact is made with the device under test (dut).

#### Front Panel Operation for Setting the Delay Time

Perform the following steps to set the delay time.

- 1) Move the cursor to the DELAY field.
- 2) Enter the delay time using the numeric entry keys. When one of the numeric entry keys is pressed, the following unit softkeys will be displayed, these can be used instead of ENTER.
  - msec
  - sec

### 3.2.5.7 Internal Resistance

TH2818 has two kinds of internal resistances (or output impedances) for choice 100  $\Omega$  and 30  $\Omega$ . It is useful to make it compatible with other instrument when an inductor is measured.

#### Front Panel Operation for Setting the Internal Resistance

Perform the following steps to set the delay time.

- 1) Move the cursor to the INT R field. The following softkeys will be displayed.
  - 100  $\Omega$
  - 30  $\Omega$
- 2) Press 100  $\Omega$  to select the 100  $\Omega$  output impedance and press 30  $\Omega$  to select the 30  $\Omega$  output impedance.

### 3.2.5.8 Deviation Measurement Functions

The deviation measurement function allows you to display the deviation value instead of the actual measurement value. The deviation value is the value calculated by taking the difference between the actual measurement value and a previously stored reference value. This function is useful when the change of a component's value versus changes in temperature, frequency, bias, etc. are being observed. Deviation measurements can be made for either or both primary parameter and/or secondary parameter measurements. There are two types of deviation measurements.

- $\Delta$ ABS (Delta ABSolute) deviation measurement

The difference between the measured value of the DUT and a previously stored reference value are displayed. The formula used to calculate the deviation is as follows.

$$\Delta\text{ABS} = X - Y$$

Where, X: The measured value of the DUT

Y: The stored reference value

- $\Delta\%$  (Delta percent) deviation measurement

The difference between the measured value of the DUT and a previously stored reference value are displayed as a percentage of the reference value. The formula

used to calculate the percent deviation is as follows.

$$\Delta\% = (X - Y) / Y \times 100 [\%]$$

Where, X: The measured value of the DUT

Y: The stored reference value

### Front Panel Operation for the Deviation Measurement Function

Perform the following steps to execute the deviation measurement function.

- 1) Move the cursor to the REF A field to enter the reference value for the primary parameter. The following softkey will be displayed.
  - MEA-SURE

When the device which has a reference value is connected, pressing this MEA-SURE, TH2818 measures the device, and the measurement results are entered as a reference value for REF A and REF B values.
- 2) Enter the reference value for the primary parameter using MEA-SURE or the numeric entry keys.
- 3) Move the cursor to the (REF) B field to enter the reference value for the secondary parameter. The following softkey will be displayed.
  - MEA-SURE

When the device is to be used as the reference value is connected, MEA-SURE is pressed, TH2818 measures the device, and the measurement results are entered as a reference value for REF A and REF B values.
- 4) Enter the reference value for the secondary parameter using MEA-SURE or the numeric entry keys. If the reference values for A and B are entered using MEA-SURE in step 2, skip this step.
- 5) Move the cursor to the DEV A field. The following softkeys will be displayed.
  - ΔABS
  - Δ%
  - OFF
- 6) Select and press a softkey to select the deviation mode for the primary parameter.
- 7) Move the cursor to the (DEV) B field. The following softkeys will be displayed.
  - ΔABS
  - Δ%
  - OFF
- 8) Select and press a softkey to select the deviation mode for the secondary parameter.

### 3.2.5.9 File Manage

Refer to 3.2.1.7 File Manage

### 3.2.5.10 Useful Tools

The SYSTEM RESET function allows you to reset TH2818, the CLEAR SETUP function allows you to set all of the operation on the MEAS SETUP page to the power on default settings.

### Front Panel Operation for the SYSTEM RESET and CLEAR SETUP Function

Perform the following steps to reset the system or load the default settings on the MEAS SETUP PAGE.

- 1) Move the cursor to the TOOLS field. The following softkeys will be displayed.
  - SYSTEM RESET
  - CLEAR SETUP
- 2) Press SYSTEM RESET to reset TH2818 and press CLEAR SETUP to set all of the

control settings on the MEAS SETUP page to the power-on default settings.

### 3.2.6 CORRECTION Page

When you press **[CRZ]**, **MORE 1/3** and **CORRECTION**, the **CORRECTION** page will be displayed. On the **CORRECTION** page, the **OPEN**, **SHORT**, **LOAD** correction for correcting the stray admittance, the residual impedance, and the other errors can be performed. The correction function has two kinds of correction methods. In one method the open and short correction can be performed at all of the frequency points using the interpolation method, and in the other method the open, short, and load correction can be performed at the frequency points you specify.

The following operations can be performed from this page. The field is in parenthesis.

- OPEN Correction (OPEN)
- SHORT Correction (SHORT)
- LOAD Correction (LOAD)
- Cable Length Selection (CABLE)
- Multi/Single Correction Mode Selection (MODE)
- Measurement Function for LOAD Correction (FUNC)
- Frequency 1, 2, 3 for OPEN, SHORT, LOAD Correction (FREQ1, FREQ2, and FREQ3)
- Reference Values (A, B) at each three frequencies for LOAD Correction (REF A, B)
- File Manage (FILE)
- Useful Tools (TOOLS)

There are eighteen available fields on this page: <CORRECTION>, FILE, TOOLS, OPEN, SHORT, LOAD, CABLE, MODE, FUNC, FREQ1, REF A, B, FREQ2, REF A, B, FREQ3, REF A, and B.

This page also provides the following monitor information (the monitor area looks like a field, but it is not).

- Actual Measurement Values for LOAD Correction
- Channel Number on the MULTI Correction Mode

The actual measurement values for LOAD Correction can be measured from the FREQ1, FREQ2, or FREQ3 fields on this page, and the channel number can be set using the scanner interface connector or GPIB.

The available fields and the softkeys which are corresponded with each field on this page are shown in Figure 3-12 and Figure 3-13.




	<CORRECTION>	FILE	TOOLS	
OPEN	:ON	CABLE	: 0m	MEAS
SHORT	:ON	MODE	: Single	<u>SETUP</u>
LOAD	:OFF	CH NO.	: [ ]	CORREC
		FUCN	: Y-θ r	<u>TION</u>
FREQ 1:	10.0000kHz			LIMIT
REF A:	100.000mS	B:	-0.00000r	<u>TABLE</u>
MEA A:	100.000mS	B:	0.00000r	LIST
FREQ 2:	100.000kHz			<u>SETUP</u>
REF A:	4.53026mS	B:	1.57032r	MORE
MEA A:	4.53758mS	B:	1.50670r	2/3
FREQ 3:	300.000kHz			
REF A:	100.000mS	B:	0.00000r	
MEA A:	100.000mS	B:	0.00000r	
☺ Use softkeys to select				
[ ]		: Field		
[ ]		: Monitor		

Figure 3-12 Available Fields on the CORRECTION Page

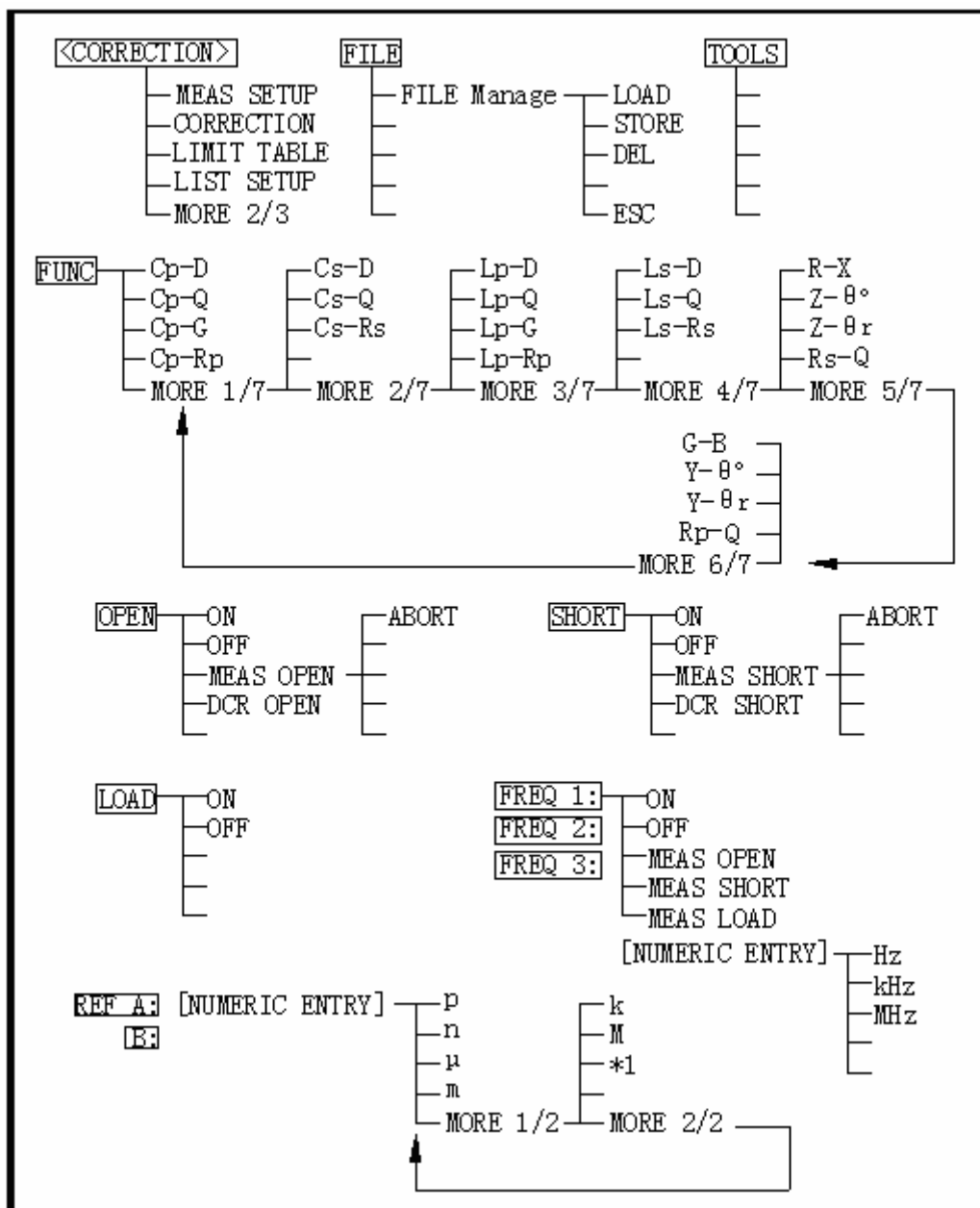
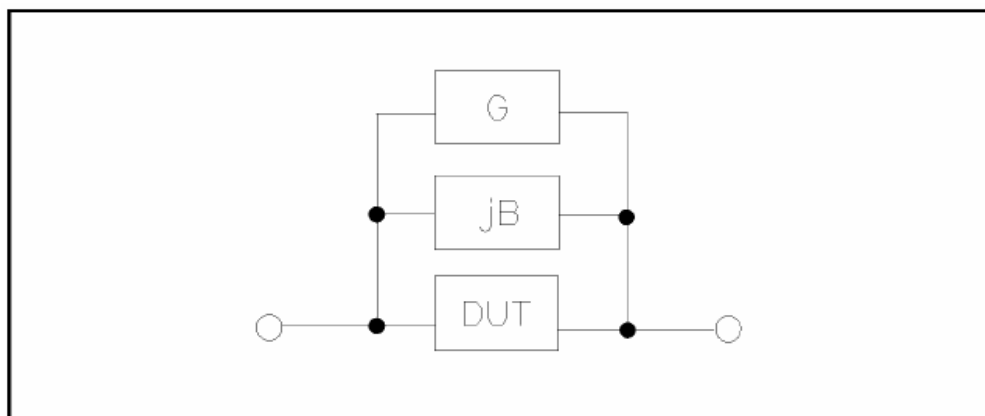


Figure 3-13 Available Softkeys on the CORRECTION Page

**3.2.6.1 OPEN Correction**

TH2818's OPEN correction capability cancels errors due to the stray admittance (G, B) in parallel with the device under test (Refer to Figure 3-14).



**Figure 3-14 Stray Admittance**

TH2818 uses two kinds of OPEN correction data as follows.

- The OPEN correction data is taken at all 48 preset frequency points, independent of the test frequency you set. Except for those 43 frequency points, the OPEN correction data for each measurement point over the specified range is calculated using the interpolation method. The following is a list of the 43 preset frequency points. To take the OPEN correction data at the preset frequencies, **MEAS OPEN** displayed when the cursor is moved to the OPEN field, is used.

20 Hz	100 Hz	1 kHz	10 kHz	100 kHz
25 Hz	120 Hz	1.2 kHz	12 kHz	120 kHz
30 Hz	150 Hz	1.5 kHz	15 kHz	150 kHz
40 Hz	200 Hz	2 kHz	20 kHz	200 kHz
50 Hz	250 Hz	2.5 kHz	25 kHz	250 kHz
60 Hz	300 Hz	3 kHz	30 kHz	300 kHz
80 Hz	400 Hz	4 kHz	40 kHz	
	500 Hz	5 kHz	50 kHz	
	600 Hz	6 kHz	60 kHz	
	800 Hz	8 kHz	80 kHz	

- The OPEN correction data which is taken at the frequency points you specify allows you to set up to three frequency points in the **FREQ1**, **FREQ2**, and **FREQ3** fields. To take the OPEN correction data at the frequency points you specify, **MEAS OPEN** displayed when the cursor is moved to the **FREQ1**, **FREQ2**, or **FREQ3** field, is used.

### Front Panel Operation for the Open Correction

There are two procedures: OPEN correction using the interpolation method, and OPEN correction at the frequency points you specify.

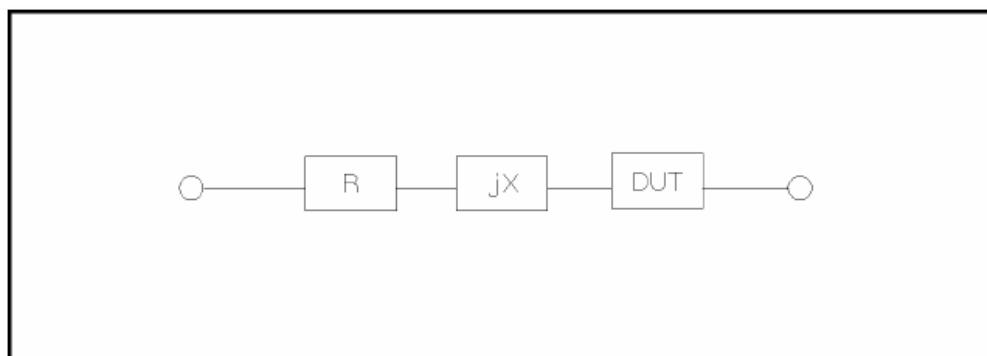
Perform the following steps to execute the OPEN correction at all frequency points using the interpolation method. When you want to execute the OPEN correction at a single frequency point, refer to "LOAD Correction".

- 1) Move the cursor to the OPEN field. The following softkeys will be displayed.
  - ON
  - OFF

- MEAS OPEN
  - DCR OPEN
- 2) Connect your test fixture to the UNKNOWN Terminals without connecting the device under test.
  - 3) Press MEAS OPEN. TH2818 will measure the OPEN admittance (capacitance, and inductance) at the preset frequency points. The time required to measure the open correction data is approximately 75 s. During the OPEN correction measurement, the following softkey is available.
    - ABORT
 This softkey is used to stop an OPEN correction data measurement. The previous OPEN correction data will still be stored.
  - 4) Press DCR OPEN. TH2818 will measure the OPEN resistance under DCR function.
  - 5) Press ON to enable DCR open correction calculation and perform the OPEN correction calculations on subsequent measurements using the OPEN interpolation correction data when the FREQ1, FREQ2, and FREQ3 fields are set to OFF. When the FREQ1, FREQ2, and FREQ3 fields are set to ON, and the test frequency is equal to FREQ1/2/3, the OPEN correction data at FREQ1/2/3 is used.
  - 6) Press OFF not to perform the OPEN correction calculations on subsequent measurements.

### 3.2.6.2 SHORT Correction

TH2818's SHORT correction capability corrects for the residual impedance (R, X) in series with the device under test (Refer to Figure 3-15).



**Figure 3-15 Residual Impedance**

TH2818 uses the following two kinds of SHORT correction data.

- The SHORT correction data is taken at all 43 preset frequency points independent of the test frequency you set, and the SHORT correction data for each measurement point other than those present frequency points are calculated using the interpolation method. All preset frequency points (43 frequency points) are as same as the preset frequencies for the OPEN correction using the interpolation method. To take the SHORT correction data at the preset frequency points, MEAS SHORT, which is displayed when the cursor is moved to the SHORT field, is used.
- The SHORT correction data which is taken at the frequency points you specify. You can set up to three frequency points in the FREQ1, FREQ2, and FREQ3 fields.

To take the SHORT correction data at the frequency points you specify, **MEAS SHORT**, which is displayed when the cursor is moved to the **FREQ1**, **FREQ2**, or **FREQ3** field, is used.

### Front Panel Operation for the Short Correction

There are two procedures: SHORT correction at all frequency points, and SHORT correction at user specified frequency points.

Perform the following steps to execute the SHORT correction for all frequency points. When you want to execute the short correction at the user specified frequency points, refer to "LOAD Correction".

- 1) Move the cursor to the SHORT field. The following softkeys will be displayed.
  - **ON**
  - **OFF**
  - **MEAS SHORT**
  - **DCR SHORT**
- 2) Connect the test fixture to the UNKNOWN Terminals, and short the measurement contacts together.
- 3) Press **MEAS SHORT**. TH2818 will measure the short impedance (inductance and resistance) at the preset frequency points. The time required to measure the short correction data is approximately 75 s. During the SHORT correction measure cycle, the following softkey is available.
  - **ABORT**This softkey is used to stop the short correction data measurement. The previous SHORT correction data is still stored.
- 4) Press **DCR SHORT**. TH2818 will measure the SHORT resistance under DCR function.
- 5) Press **ON** to enable DCR short correction calculation and perform the SHORT correction calculations on subsequent measurements when the **FREQ1**, **FREQ2**, and **FREQ3** fields are set to **OFF**. When the **FREQ1**, **FREQ2**, and **FREQ3** fields are set to **ON**, and the test frequency is equal to **FREQ1/2/3**, the SHORT correction data at **FREQ1/2/3** is used.
- 6) Press **OFF** to halt SHORT correction calculations on subsequent measurements.

### 3.2.6.3 LOAD Correction

TH2818's LOAD correction capability corrects for the other errors by using the transmission coefficient derived from the relationship between a standard's (pre-measured) reference value to the actual measurement value at the frequency points you specify (up to three frequency points). So, OPEN/ SHORT/LOAD corrections can be performed at the frequency points you specify. The three frequency points can be set in the **FREQ1**, **FREQ2**, and **FREQ3** fields. The standard's reference values are set in the **REF A**, and **B** fields. Before entering the standard's reference values, the measurement function for the standard must be set in the **FUNC** field. The standard's value can be measured using **MEAS LOAD**, which is displayed when the cursor is moved to the **FREQ1**, **FREQ2**, or **FREQ3** fields.

### Front Panel Operation for the OPEN/SHORT/LOAD Correction

Perform the following steps to perform the OPEN/ SHORT/LOAD correction at the frequency points you want to specify.

- 1) Move the cursor to the **FREQ1**, **FREQ2**, or **FREQ3** field to specify the frequency for the OPEN/SHORT/LOAD correction. The following softkeys will be displayed.
  - **ON**

This softkey is used to make the OPEN/SHORT/LOAD correction data at the FREQ1, FREQ2, or FREQ3 frequency point valid.

■ OFF

This softkey is used to make the OPEN/SHORT/LOAD correction data at the FREQ1, FREQ2, or FREQ3 frequency point invalid.

■ MEAS OPEN

This softkey is used to perform an OPEN correction measurement at the FREQ1, FREQ2, or FREQ3 frequency points.

■ MEAS SHORT

This softkey is used to perform a SHORT correction measurement at the FREQ1, FREQ2, or FREQ3 frequency points.

■ MEAS LOAD

This softkey is used to perform a LOAD correction measurement at the FREQ1, FREQ2, or FREQ3 frequency points.

- 2) Press ON to show the previous frequency for the OPEN/SHORT/LOAD correction.
- 3) Enter the frequency using the numeric entry keys. When pressing one of the numeric entry keys, the softkey labels are changed to the available units (Hz, kHz, and MHz), so you can use these softkeys to enter the unit and terminate the entry without hitting **ENTER**. (When **ENTER** is used, the numeric data is entered with Hz.)
- 4) Connect the test fixture to the UNKNOWN Terminals.
- 5) Leave the connection contacts open.
- 6) Press **MEAS OPEN**. TH2818 performs an OPEN correction measurement at the frequency points you specified. After which, the OPEN correction measurement data are displayed on the system message line.
- 7) Move the cursor to the OPEN field.
- 8) Press **ON** to perform the OPEN correction calculations for subsequent measurements at the specified frequency points.
- 9) Move the cursor to the FREQ1, FREQ2, or FREQ3 field at which you specified the frequency.
- 10) Short the connection contacts together.
- 11) Press **MEAS SHORT**. TH2818 will perform a SHORT correction measurement, and display the SHORT correction data on the system message line.
- 12) Move the cursor to the SHORT field.
- 13) Press **ON** to perform the SHORT correction calculations for subsequent measurements at the specified frequency points.
- 14) Prepare the standard for measurement.
- 15) Move the cursor to the FUNC field.
- 16) Set the measurement function for your standard.
- 17) Move the cursor to the REF A field of your specified frequency.
- 18) Enter the pre-measured value of your standard's primary parameter using the numeric entry keys and the unit softkeys.
- 19) Move the cursor to the B field on the right side of your set REF A field.
- 20) Enter your standard's pre-measured secondary parameter value using the numeric entry keys and the unit softkeys.
- 21) Move the cursor to the FREQ1, FREQ2 or FREQ3 field at which you specified the frequency.
- 22) Connect the standard to the measurement contacts.
- 23) Press **MEAS LOAD**. TH2818 will perform a LOAD correction measurement, and display the LOAD correction data on the system message line.
- 24) Move the cursor to the LOAD field.

25) Press **ON** to enable the LOAD correction calculations for subsequent measurements at the specified frequency points.

#### **3.2.6.4 Measurement Function for the LOAD Correction**

When the LOAD correction is performed, the reference (pre-measured) value of the standard must be entered. The reference value should be the premeasured value of the specified measurement functions.

The LOAD correction corrects the errors using the transmission coefficient derived from the relationship between the standard's reference value and the actual raw measurement value. The specified function is used only for calculating the transmission coefficient.

#### **Front Panel Operation for Setting the Standard's Measurement**

Refer to 3.2.1.1 Measurement Function

#### **3.2.6.5 Cable Length Selection**

Only 0m can be selected now.

#### **3.2.6.6 Multi/Single Correction Mode Selection**

Refer to Scanner Interface option Manual.

#### **3.2.6.7 File Manage**

Refer to 3.2.1.7 File Manage.

#### **3.2.6.8 Useful Tools**

No tool is provided on CORRECTION PAGE

#### **3.2.7 LIMIT TABLE SETUP Page**

When you press **LCRZ**, **MORE 1/3** and **LIMIT TABLE**, the LIMIT TABLE SETUP page will be displayed. The LIMIT TABLE SETUP page allows you to set TH2818's comparator. TH2818's built-in comparator can sort devices into a maximum of ten bins (BIN 1 to BIN 9 and one OUT OF BINS) using a maximum of nine pairs of primary limits and one pair of secondary parameter limits. Also, devices whose primary parameter is within limits, but whose secondary parameter measurement result not within limits, can be sorted into an AUXiliary BIN. The comparator function is especially useful when using TH2818 with a component handler (handler interface option is installed). These limit settings for bin sorting are only set on this LIMIT TABLE SETUP page.

- Measurement Parameter (PARAM)
- Comparator Function's Limit Mode (MODE)
- Nominal Value for tolerance mode (NOM)
- Auxiliary bin ON/OFF (AUX)
- Comparator Function ON/OFF (COMP)
- Low Limit Value of each bin (LOW)
- High Limit Value of each bin (HIGH)

The available fields and the softkeys which correspond to the fields on this page are shown in Figure 3-16 and Figure 3-17.

<LIMIT TABLE SETUP>			FILE	TOOLS	
PARAM :	Cp-D	NOM:	0.00000pF		MEAS SETUP
MODE :	ABS	AUX :	OFF	COMP:	OFF
BIN	LOW[F]	HIGH[F]			
1	-1.00000	1.00000			CORREC TION
2	-2.00000	2.00000			
3	-3.00000	3.00000			LIMIT TABLE
4	-4.00000	4.00000			
5	-5.00000	5.00000			LIST SETUP
6	-6.00000	6.00000			
7	-7.00000	7.00000			MORE
8	-8.00000	8.00000			2/3
9	-9.00000	9.00000			
2nd	0.00000	0.10000	[ ]		
Use softkeys to select					
<input type="text"/> : Field					

Figure 3-16 Available Fields on the LIMIT TABLE SETUP Page



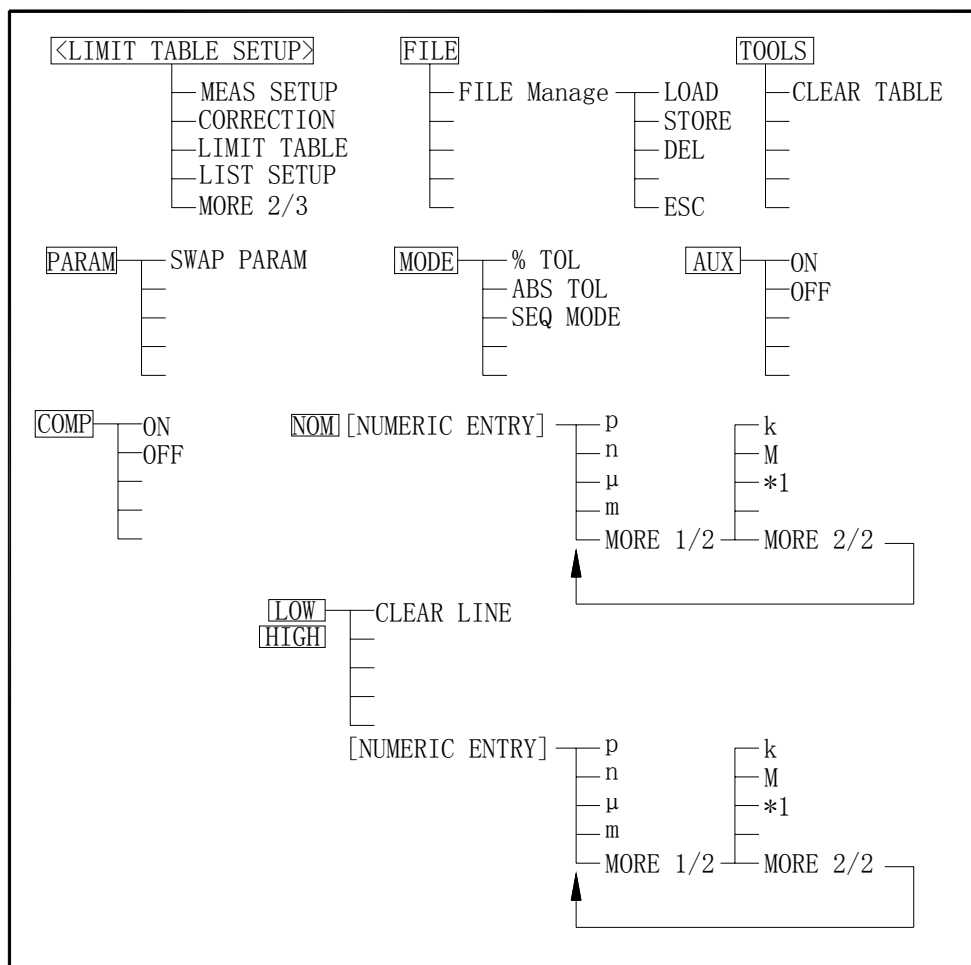


Figure 3-17 Available Softkeys on the LIMIT TABLE SETUP Page

### 3.2.7.1 Swap Parameter

The swap parameter function is used to swap the primary parameter for the secondary parameter in the PARAM field. For example, when the measurement function is Cp-D, the swap parameter function sets the measurement function to D-Cp. Then the comparison limits for D are a maximum of nine pairs of comparison limits, and the comparison limits for Cp are now one pair.

#### Front Panel Operation for Swapping the Primary Parameter for the Secondary Parameter

Perform the following steps to swap the primary parameter for the secondary parameter.

- 1) Move the cursor to the PARAM field. The following softkey will be displayed.
  - SWAP PARAM
- 2) Press SWAP PARAM to swap the primary parameter for the secondary parameter.
- 3) Press SWAP PARAM again to return the measurement function to the previous combination.

### 3.2.7.2 Limit Mode for Comparator

There are two methods for specifying primary parameter limits, as follows. (Refer to Figure 3-18)

#### ■ Tolerance Mode

The tolerance mode specifies comparison limits by the deviation from the specified nominal value. (The nominal value is specified at NOM field.) There are two methods used to specify the tolerance mode limits, the ratio in percent and by parameter value.

#### ■ Sequential Mode

The sequential mode specifies comparison limits as the absolute measurement value. The limits must be set in order from the smallest value to the largest value.

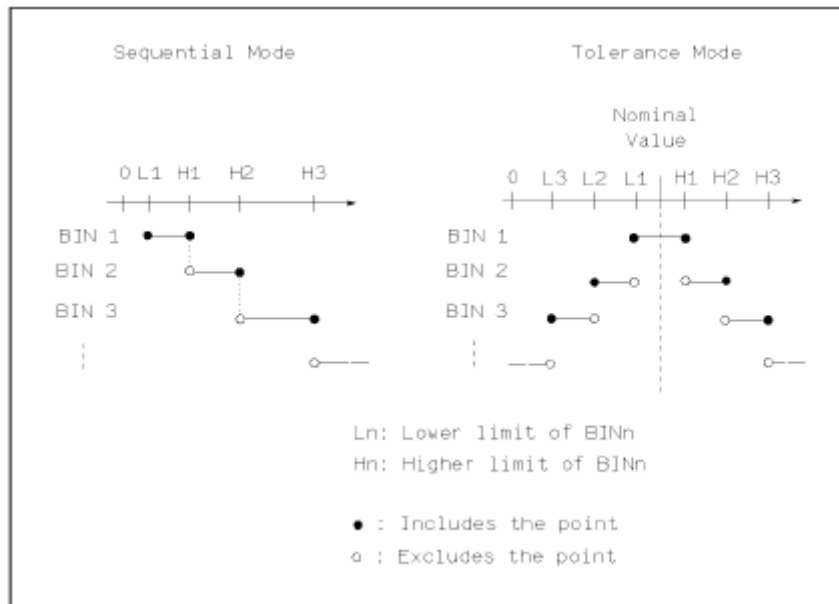


Figure 3-18 Tolerance Mode and Sequential Mode

**Note:** The limit values for tolerance mode sorting must be placed in the order of the narrower limits to the wider limits. If BIN 1 has the widest limits, all of the DUTs will be sorted into BIN 1.

In tolerance mode sorting, the lower limit doesn't have to be less than the nominal value, and the upper limit doesn't have to be greater than the nominal value. There can be openings and there can be duplications.

### Front Panel Operation for Setting the Limit Mode for the Comparator

Perform the following steps to set the limit mode for the comparator.

- 1) Move the cursor to the MODE field. Then the following softkeys will be displayed.
  - % TOL  
This softkey is used to set the limit mode to the tolerance mode (the ratio in percent).
  - ABS TOL  
This softkey is used to set the limit mode to the tolerance mode (parameter value).
  - SEQ  
This softkey is used to set the limit mode to the sequential mode.
- 2) Select and set the limit mode using the softkeys.

#### 3.2.7.3 Nominal Value for Tolerance Mode

When the tolerance mode is used as a limit mode for the primary parameter, the nominal value must be set. The nominal value can be set within the range of the display range. Refer to Table 1-4 Display Range

When the limit mode for the primary parameter is the sequential mode, the nominal value can be set, but this has no meaning in the sequential mode.

### Front Panel Operation for Setting the Nominal Value

Perform the following steps to set the nominal value.

- 1) Move the cursor to the NOM field.
- 2) Enter the nominal value using the numeric entry keys. When the numeric data is entered, the suffix softkeys (p, n,  $\mu$ , m, k, M \*1) can be used instead of **ENTER**. When **ENTER** is pressed, the numeric data is entered with the same unit selected last time. When \*1 is pressed, the numeric data is entered with the F, H and  $\Omega$  as the default unit.

#### 3.2.7.4 Comparator Function ON/OFF

TH2818's built-in comparator can sort devices into a maximum of ten bins (BIN 1 to BIN 9 and the OUT OF BINS bin) using a maximum of nine pairs of primary limits and one pair of secondary parameter limits. Also, a device whose primary parameter is within limits, but whose secondary parameter measurement result is not within limits can be sorted into the AUXiliary BIN. The comparator function is especially useful when using TH2818 with a component handler (handler interface option is installed).

### Front Panel Operation for Setting the Comparator Function to ON or OFF

Perform the following steps to set the comparator function to ON or OFF.

- 1) Move the cursor to the COMP field. The following softkeys will be displayed.
  - ON
  - OFF
- 2) Use the softkeys to set the comparator function to ON or OFF.

#### 3.2.7.5 Auxiliary Bin ON/OFF

When the secondary parameters affect the sorting results, the limits for the

secondary parameter can be set in 2nd LOW/HIGH fields.

So there are three patterns for the sorting area of the secondary parameter.

- When the secondary parameter limits are not specified on the LIMIT TABLE SETUP page.  
Devices will be sorted according to primary parameter comparison results.
- When the secondary parameter limits are set and AUX BIN are set to OFF.  
Only devices within secondary limits are sorted by the primary parameter result. Devices not within the secondary parameter limits are sorted OUT OF BINS even if the device's primary parameter is within limits.
- When the secondary parameter limits are set and AUX BIN are set to ON.  
Devices whose primary parameter is not within limits are sorted OUT OF BINS. Devices whose primary parameter is within limits, but whose secondary parameter is out of limits are sorted into the AUX BIN.

**Note:** When only the lower limit of the secondary parameter is set and the AUX BIN are set to ON, the devices whose primary parameter is within limits, but whose secondary parameter is equal to or below the lower limit are sorted into the AUX BIN. Also when only the higher limit of the secondary parameter is set and the AUX BIN are set to ON, the devices whose primary parameter is within limits, but whose secondary parameter is equal or above the higher limit are sorted into the AUX BIN.

#### Front Panel Operation for Setting the AUX BIN to ON or OFF

Perform the following steps to set the AUX BIN to ON or OFF.

- 1) Move the cursor to the AUX field. The following softkeys will be displayed.
  - ON
  - OFF
- 2) Select and press a softkey to set AUX BIN to ON or OFF.

#### 3.2.7.6 Low/High Limits

TH2818's built-in comparator can sort devices into a maximum of ten bins (BIN 1 to BIN 9, and OUT OF BINS) using a maximum of nine pairs of primary parameter limits and one pair of secondary parameter limits. These primary parameter low/high limits can be set in the BIN 1 to BIN 9 LOW/HIGH fields, and the secondary parameter low/high limits can be set in the 2nd LOW/HIGH fields.

#### Front Panel Operation for Setting the Low/High Limits

Perform the following steps to set the bin sorting limits.

- 1) Set the measurement function for the comparator function, the nominal value, and the limit mode for the primary parameter.
- 2) Move the cursor to the TOOLS field, and perform the clear table function.
- 3) Move the cursor to the BIN 1 LOW field. When you use the tolerance mode, perform steps 4 through 7. When you use the sequential mode, perform steps 8 through 12.
- 4) Enter the limit value of the BIN 1 at BIN 1 LOW field using the numeric entry keys. When one of the numeric entry keys is pressed, the suffix softkeys (p, n,  $\mu$ , m, k, M \*1) can be used instead of **ENTER**. When **ENTER** is pressed, the numeric data is entered with the same unit selected last time. When \*1 is pressed, the numeric data is entered with the F, H and  $\Omega$  as the default unit. When the limit value of BIN 1 is entered in the BIN 1 LOW field, the BIN 1 low limit becomes  $-$  (absolute input value), and the BIN 1 high limit becomes  $+$  (absolute input value).

- 5) The cursor will be automatically moved to the BIN 2 LOW field. Repeat step 4 until the limits of the BIN 9 is entered. After that, the cursor will be moved to the 2nd LOW field.
- 6) Enter the low limit value of the secondary parameter. After that, the cursor will be automatically moved to the 2nd HIGH field.
- 7) Enter the high limit value of the secondary parameter.
- 8) Enter the low limit of the BIN 1 using the numeric entry keys. When the one of the numeric entry keys is pressed, the suffix softkeys (p, n,  $\mu$ , m, k, M \*1) can be used instead of **ENTER**. When **ENTER** is pressed, the numeric data is entered with the same unit selected last time. When \*1 is pressed, the numeric data is entered with the F, H and  $\Omega$  as the default unit.
- 9) The cursor will be automatically moved to the BIN 1 HIGH field after entering the low limit of the BIN 1. Enter the high limit of the BIN 1.
- 10) The cursor will be automatically moved to the BIN 2 HIGH field. Because the BIN 2 low limit value is as same as the BIN 1 high limit value. Enter the high limit of the BIN 2.
- 11) Repeat step 5 until the BIN 9 limits are entered. After entering the BIN 9 high limit, the cursor will be automatically moved to the 2nd LOW field. Enter the low limit value of the secondary parameter.
- 12) The cursor will be automatically moved to the 2nd HIGH field. Enter the high limit value of the secondary parameter.

### 3.2.7.7 File Manage

Refer to 3.2.1.7 File Manage

### 3.2.7.8 Useful Tools

Clear Table Function allows you to clear all of the limit values. So, when you change the limit mode, this function must be used.

Perform the following steps to clear all of bin sorting limits on the LIMIT TABLE SETUP page.

- 1) Move the cursor to the TOOLS field.
- 2) Press **CLEAR TABLE** to clear all of the bin sorting limits.

### 3.2.8 LIST SWEEP SETUP page

When you press **LCRZ**, **MORE 1/3** and **LIST SETUP**, the LIST SWEEP SETUP page will be displayed. TH2818 has a list sweep measurement function which permits up to ten test frequencies, oscillator levels, or DC bias points to be automatically measured. On the LIST SWEEP SETUP page, the following control settings of the list sweep measurement can be set. (Each field in parenthesis is used when that control is set.)

- Sweep Mode (MODE)
- Sweep Parameter Selection (FREQ [Hz], LEVEL [V], LEVEL [A], BIAS [V], or BIAS [A])
- Sweep Point Settings (sweep point)
- Limit Parameter Selection (LMT)
- Low/High Limit Values (LOW, HIGH)

There are following fields on this page: <LIST SWEEP SETUP>, MODE, FREQ [Hz] (LEVEL [V], LEVEL [A], BIAS [V], or BIAS [A]), LMT, LOW/HIGH, FILE, TOOLS and sweep points.

These functions are described in the following paragraphs.

The available fields and softkeys which corresponded to the fields on this page are

shown in Figure 3-19 and Figure 3-20.

☐ <LIST SWEEP SETUP> FILE TOOLS				MEAS
MODE :SEQ				SETUP
FREQ [Hz]	LMT	LOW	HIGH	CORREC
1. 00000K	A	1. 10000	1. 20000	TION
2. 00000K	A	1. 10000	1. 20000	LIMIT
3. 00000K	A	1. 10000	1. 20000	TABLE
4. 00000K	A	1. 10000	1. 20000	LIST
5. 00000K	A	1. 10000	1. 20000	SETUP
6. 00000K	A	1. 10000	1. 20000	MORE
7. 00000K	A	1. 10000	1. 20000	2/3
8. 00000K	A	1. 10000	1. 20000	
9. 00000K	A	1. 10000	1. 20000	
10. 0000K	A	1. 10000	1. 20000	
☺ Use softkeys to select				
☐ : Field				

Figure 3-19 Available Fields on the LIST SWEEP SETUP Page

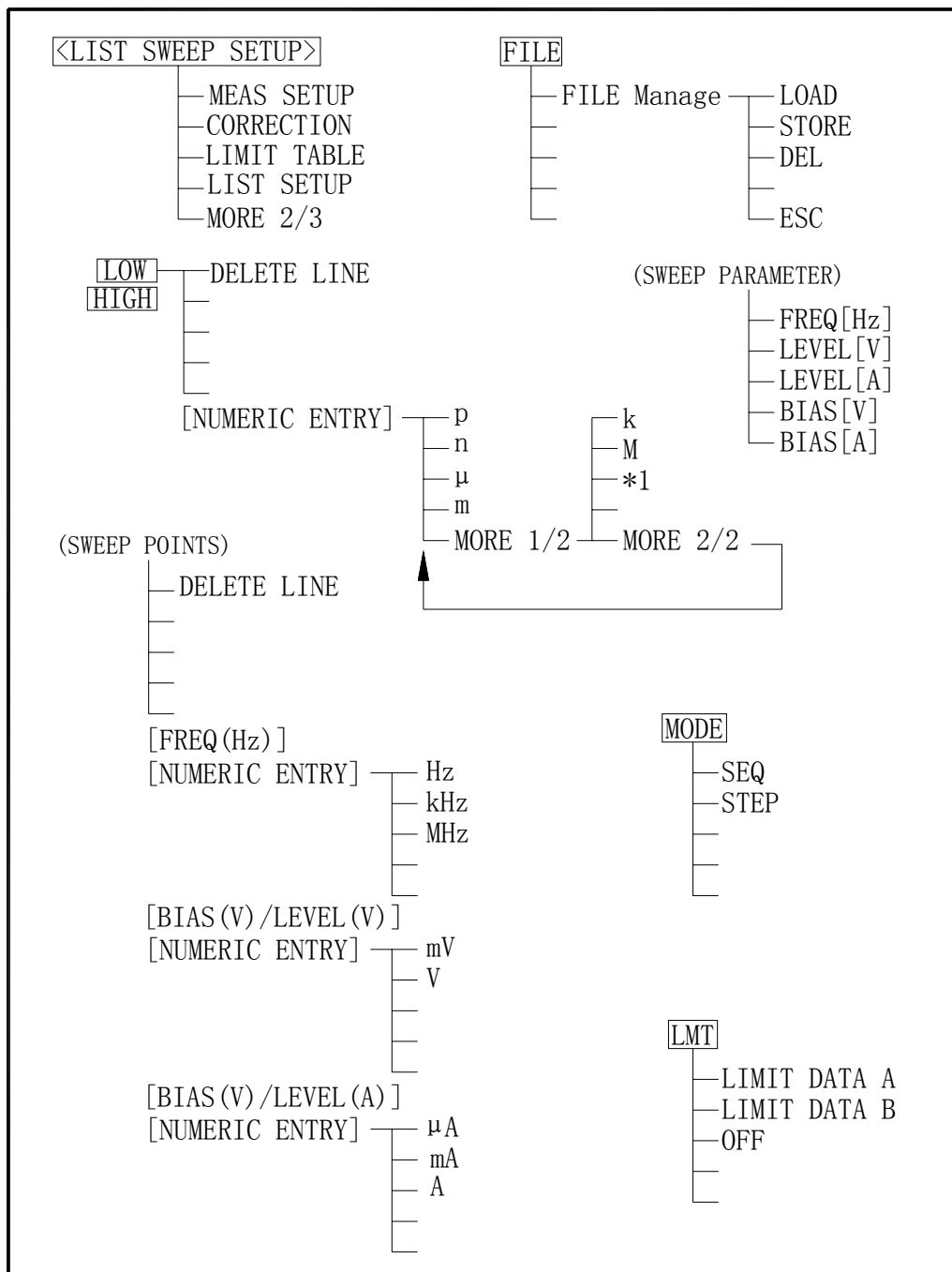


Figure 3-20 Available Softkeys on the LIST SWEEP SETUP Page

### 3.2.8.1 Sweep Mode

Th2818 has a List Sweep measurement function which permits up to 10 test frequencies, oscillator levels, or DC bias points to be automatically measured. There are two sweep modes for the list sweep measurements: sequential (SEQ) mode and step (STEP) mode. In the case of the sequential mode, when TH2818 is triggered once, the device is automatically measured at all sweep points. In the case of the step mode, the sweep point is incremented each time TH2818 is triggered.

#### Front Panel Operation for Setting the List Sweep Measurement Mode

Perform the following steps to set the list sweep measurement mode to the sequential mode, or to the step mode.

- 1) Move the cursor to the MODE field. The following softkeys will be displayed.
  - SEQ
  - STEP
- 2) Select and press a softkey to set the list sweep measurement mode.

### 3.2.8.2 List Sweep Parameter

The sweep point parameter for the list sweep measurement can be set to the test frequency, oscillator level, and DC bias. This field allows you to set the parameter of the list sweep measurement.

#### Front Panel Operation for Setting the List Sweep Parameter

Perform the following steps to set the list sweep parameter.

- 1) Move the cursor to the FREQ [Hz] (LEVEL [V], LEVEL [A], BIAS [V], or BIAS [A]) field. The following softkeys will be displayed.
  - FREQ [Hz]
  - LEVEL [V]
  - LEVEL [A]
  - BIAS [V]
  - BIAS [A]
- 2) Select and press a softkey to set the list sweep measurement sweep parameter.

### 3.2.8.3 Sweep Points and Limit Mode

The list sweep function permits entry of up to 10 points and measurement limits.

#### Front Panel Operation for Setting the Sweep Points

Perform the following steps to set the sweep points and measurement limits.

- 1) Move the cursor to the sweep parameter field and set the sweep parameter.
- 2) Move the cursor to the sweep point field.
- 3) Enter the sweep point using the numeric entry keys. When the one of the numeric entry keys is pressed, the unit softkeys (p, n,  $\mu$ , m, k, M \*1) can be used instead of **ENTER**. When **ENTER** is pressed, the numeric data is entered with the same unit selected last time. When \*1 is pressed, the numeric data is entered with the F, H and  $\Omega$  as the default unit.
- 4) The cursor will move automatically to the LMT field after you enter a sweep point. The following softkeys will be displayed.
  - LIMIT DATA A
 

This softkey is used to set the limit parameter to the primary parameter of the measurement function. When this softkey is pressed, the cursor will automatically move to the LOW field.
  - LIMIT DATA B



This softkey is used to set the limit parameter to the secondary parameter of the measurement function. When this softkey is pressed, the cursor will move automatically to the LOW field.

■ OFF

This softkey is used to set the list sweep measurement's limit function to OFF for the sweep point. When this softkey is pressed, the cursor will move automatically to the next sweep point field.

- 5) Press the softkey to set the limit parameter.
- 6) The cursor will move automatically to the LOW field. (If you pressed OFF in the previous step, the cursor will move automatically to the next sweep point field.) Enter the low limit value.
- 7) The cursor will move automatically to the HIGH field. Enter the high limit value using the numeric entry keys. After entering the high limit value, the cursor will move automatically to the next sweep point field. Repeat steps 3 through 7.

#### 3.2.8.4 File Manage

Refer to 3.2.1.7 File Manage.

#### 3.2.8.5 Useful Tools

No tool is provided on LIST SWEEP SETUP

#### 3.2.9 FREQ RESP SETUP Page

When you press **LCRZ**, **MORE 1/3**, **MORE 2/3** and **RESP SETUP**, the FREQ RESP SETUP page will be displayed. TH2818 has a frequency response analysis function which permits up to 960 test frequencies. These frequency points are automatically measured and the measurement results are displayed with frequency response curves. On the FREQ RESP SETUP page, the following control settings of the frequency response analysis can be set. (Each field in parenthesis is used when that control is set.)

- Frequency Response Function (FUNC)
- Start Frequency (START)
- End Frequency (STOP)
- Low Limit Value for Primary Parameter (A MIN)
- High Limit Value for Primary Parameter (A MAX)
- Low Limit Value for Secondary Parameter (B MIN)
- High Limit Value for Secondary Parameter (B MAX)
- File Manage (FILE)

There are following fields on this page: <FREQ RESP SETUP>, FUNC, START, STOP, A MIN, A MAX, B MIN, B MAX, FILE and TOOLS fields.

These functions are described in the following paragraphs.

The available fields and softkeys which corresponded to the fields on this page are shown in Figure 3-21 and Figure 3-22.

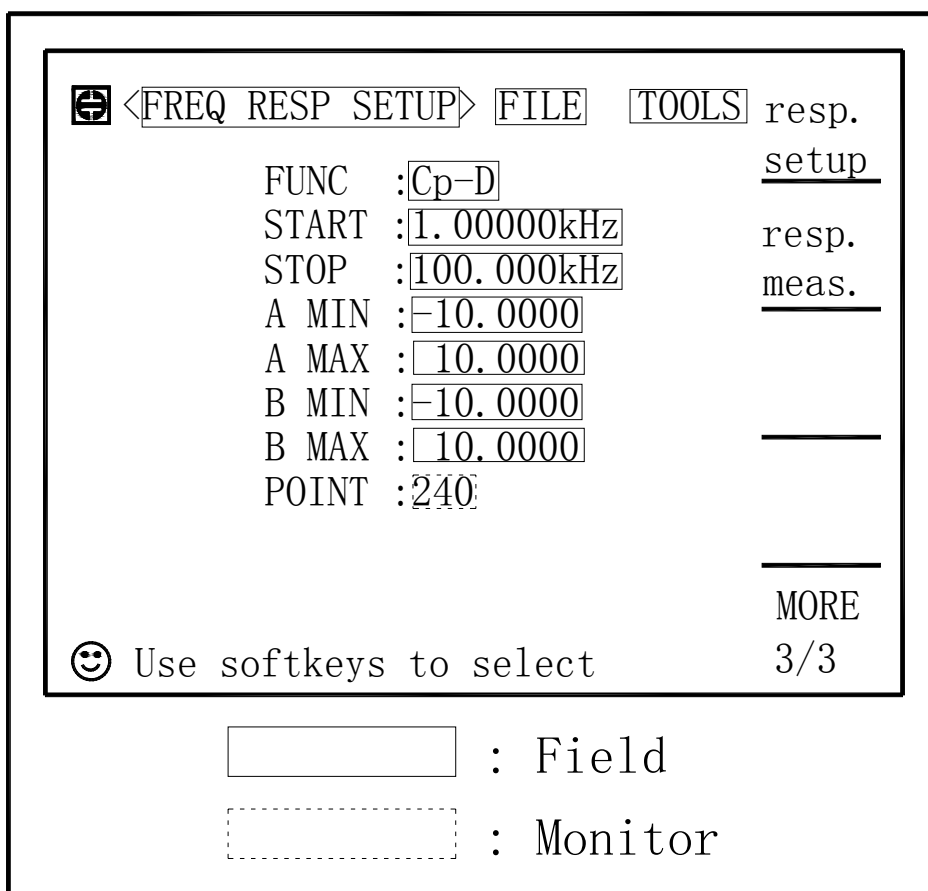


Figure 3-21 Available Fields on the FREQ RESP SETUP Page

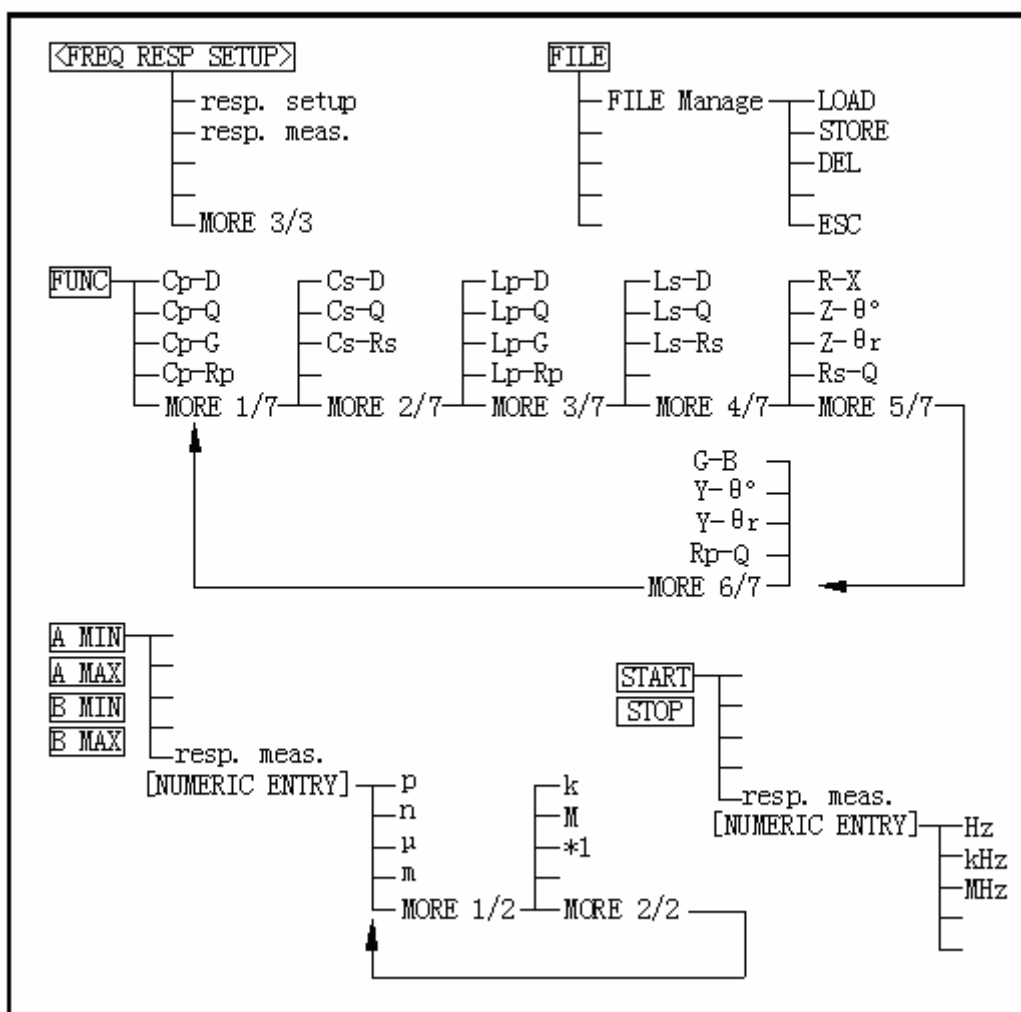


Figure 3-22 Available Softkeys on the FREQ RESP SETUP Page

### 3.2.9.1 Frequency Response Function

#### Front Panel Operation for Setting the Frequency Response Function

Perform the following steps to set the frequency response function.

- 1) Use the CURSOR arrow keys to move the cursor to the FUNC field. The following softkeys will be displayed.
  - Cp-D
  - Cp-Q
  - Cp-G
  - Cp-Rp
  - MORE 1/6
- 2) Select and press a softkey to set the frequency response function. If the softkey you want is not displayed, press MORE 1/6 to display the following set of softkeys.
  - Cs-D
  - Cs-Q
  - Cs-Rs
  - MORE 2/6
- 3) Select and press a softkey to set the frequency response function. If the softkey you want is not displayed, press MORE 2/6 to display the following set of softkeys.
  - Lp-D
  - Lp-Q
  - Lp-G
  - Lp-Rp
  - MORE 3/6
- 4) Select and press a softkey to set the frequency response function. If the softkey you want is not displayed, press MORE 3/6 to display the following set of softkeys.
  - Ls-D
  - Ls-Q
  - Ls-Rs
  - MORE 4/6
- 5) Select and press a softkey to set the frequency response function. If the softkey you want is not displayed, press MORE 4/6 to display the following set of softkeys.
  - R-X
  - Z- $\theta^\circ$
  - Z- $\theta$  r
  - Rs-Q
  - MORE 5/6
- 6) Select and press a softkey to set the frequency response function. If the softkey you want is not displayed, press MORE 5/6 to display the following set of softkeys.
  - G-B
  - Y- $\theta^\circ$
  - Y- $\theta$  r
  - Rp-Q
  - MORE 6/6
- 7) Select and press a softkey to set the frequency response function. When MORE 6/6 is pressed, the softkeys shown in step 1 will be displayed. Retry steps 1 through 7 if you missed the function you were looking for.

### 3.2.9.2 Start Frequency

Perform the following steps to set the Start Frequency.

- 1) Use the CURSOR arrow keys to move the cursor to the START field. Enter the start frequency using the numeric keys, the following softkeys will be displayed.

- Hz
  - kHz
  - MHz
- 2) Use these softkeys to enter the units and enter the data instead of **ENTER**. When **ENTER** is used the numeric data is entered with Hz as the default unit.

### 3.2.9.3 End Frequency

Perform the following steps to set the End Frequency.

- 1) Use the CURSOR arrow keys to move the cursor to the STOP field. Enter the stop frequency using the numeric keys, the following softkeys will be displayed.
- Hz
  - kHz
  - MHz
- 2) Use these softkeys to enter the units and enter the data instead of **ENTER**. When **ENTER** is used the numeric data is entered with Hz as the default unit.

### 3.2.9.4 Low Limit Value for Primary Parameter

Perform the following steps to set the Low Limit Value for Primary Parameter.

- 1) Use the CURSOR arrow keys to move the cursor to the A MIN field. Enter the Low Limit Value using the numeric keys, the following softkeys will be displayed.
- p
  - n
  - $\mu$
  - m
  - More 1/2
- 2) Use these softkeys to enter the units and terminate the entry without **ENTER**. When **ENTER** is pressed, the numeric data is entered with the same unit selected last time. If the softkeys you want are not displayed, press **More 1/2** to display the following softkeys.
- k
  - M
  - \*1
  - More 2/2
- 3) Use these softkeys to enter the units and terminate the entry without **ENTER**. When **ENTER** is pressed, the numeric data is entered with the same unit selected last time. When **\*1** is pressed, the numeric data is entered with the F, H and  $\Omega$  as the default unit.

### 3.2.9.5 High Limit Value for Primary Parameter

Perform the following steps to set the High Limit Value for Primary Parameter.

- 1) Use the CURSOR arrow keys to move the cursor to the A MAX field. Enter the High Limit Value using the numeric keys, the following softkeys will be displayed.
- p
  - n
  - $\mu$
  - m
  - More 1/2
- 2) Use these softkeys to enter the units and terminate the entry without **ENTER**. When **ENTER** is pressed, the numeric data is entered with the same unit selected last time. If the softkeys you want are not displayed, press **More 1/2** to display the

following softkeys.

- k
  - M
  - \*1
  - More 2/2
- 3) Use these softkeys to enter the units and terminate the entry without **ENTER**. When **ENTER** is pressed, the numeric data is entered with the same unit selected last time. When \*1 is pressed, the numeric data is entered with the F, H and  $\Omega$  as the default unit.

### 3.2.9.6 Low Limit Value for Secondary Parameter

Perform the following steps to set the Low Limit Value for Secondary Parameter.

- 1) Use the CURSOR arrow keys to move the cursor to the B MIN field. Enter the Low Limit Value using the numeric keys, the following softkeys will be displayed.
- p
  - n
  - $\mu$
  - m
  - More 1/2
- 2) Use these softkeys to enter the units and terminate the entry without **ENTER**. When **ENTER** is pressed, the numeric data is entered with the same unit selected last time. If the softkeys you want are not displayed, press **More 1/2** to display the following softkeys.
- k
  - M
  - \*1
  - More 2/2
- 3) Use these softkeys to enter the units and terminate the entry without **ENTER**. When **ENTER** is pressed, the numeric data is entered with the same unit selected last time. When \*1 is pressed, the numeric data is entered with the F, H and  $\Omega$  as the default unit.

### 3.2.9.7 High Limit Value for Secondary Parameter

Perform the following steps to set the High Limit Value for Secondary Parameter.

- 1) Use the CURSOR arrow keys to move the cursor to the B MAX field. Enter the High Limit Value using the numeric keys, the following softkeys will be displayed.
- p
  - n
  - $\mu$
  - m
  - More 1/2
- 2) Use these softkeys to enter the units and terminate the entry without **ENTER**. When **ENTER** is pressed, the numeric data is entered with the same unit selected last time. If the softkeys you want are not displayed, press **More 1/2** to display the following softkeys.
- k
  - M
  - \*1
  - More 2/2
- 3) Use these softkeys to enter the units and terminate the entry without **ENTER**. When

**ENTER** is pressed, the numeric data is entered with the same unit selected last time. When **\*1** is pressed, the numeric data is entered with the F, H and  $\Omega$  as the default unit.

### 3.2.9.8 File Manage

Refer to 3.2.1.7 File Manage.

### 3.2.9.9 Useful Tools

No tool is provided on FERQ RESP SETUP Page

### 3.2.10 FREQ RESP MEAS Page

When you press **LCRZ**, **MORE 1/3**, **MORE 2/3** and **RESP MEAS**, the FREQ RESP MEAS page will be displayed. TH2818 has a frequency response analysis function which permits up to 960 test frequency points. These frequency points are automatically measured and the measurement results are displayed with frequency response curves. On the FREQ RESP MEAS page, the following control settings of the frequency response analysis can be set. (Each field in parenthesis is used when that control is set.)

- File Manage (FILE)
- Useful Tools (TOOLS)

There are following fields on this page: <FREQ RESP MEAS>, FILE and TOOLS fields.

These functions are described in the following paragraphs.

The available fields and softkeys which corresponded to the fields on this page are shown in Figure 3-23 and Figure 3-24.

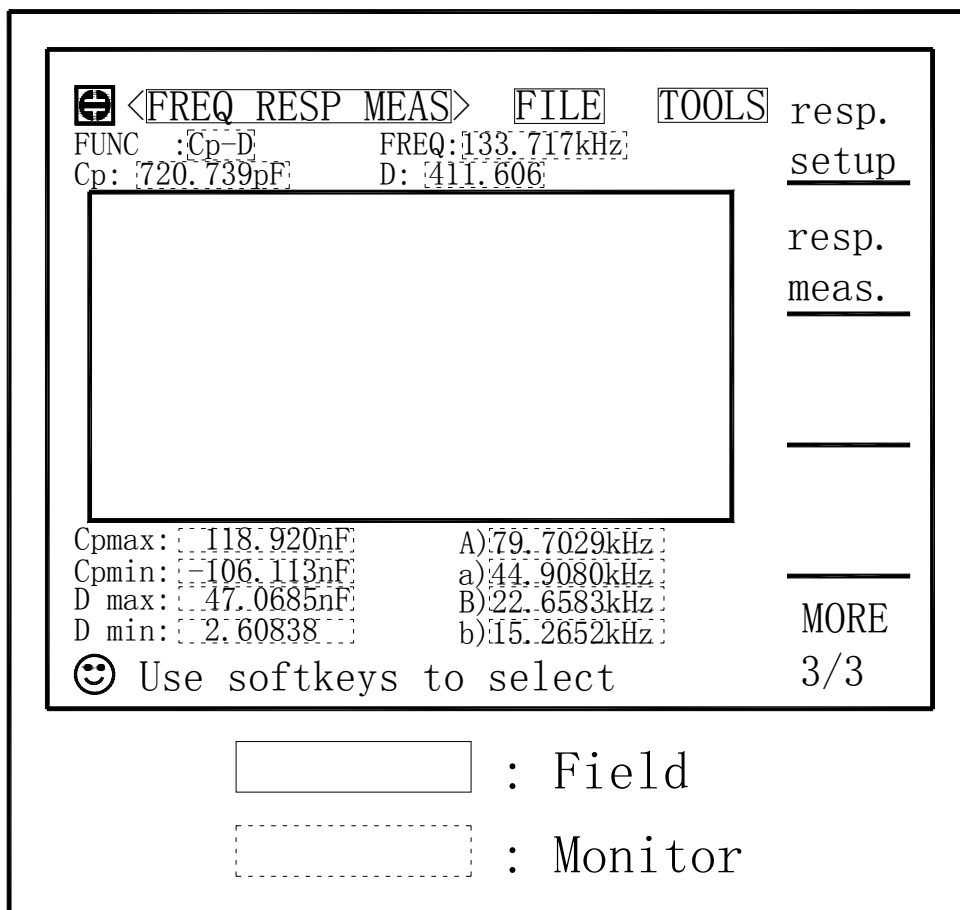
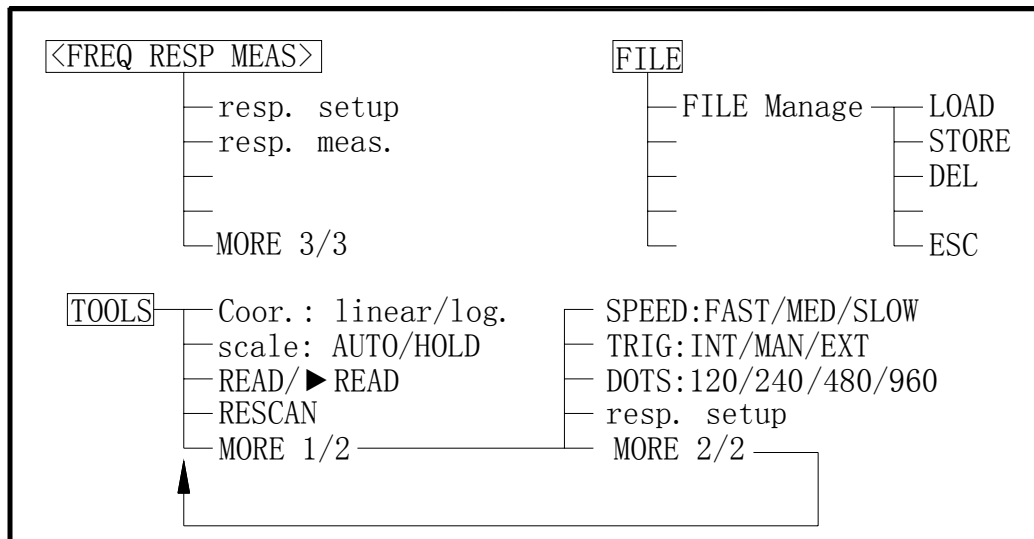


Figure 3-23 Available Fields on the FREQ RESP MEAS Page





**Figure 3-24 Available Softkeys on the FREQ RESP MEAS Page**

### 3.2.10.1 File Manage

Refer to 3.2.1.7 File Manage.

### 3.2.10.2 Useful Tools

Perform the following steps to set the control functions on the FREQ RESP MEAS page.

- 1) Move the cursor to the TOOLS field. The following softkeys will be displayed.
  - Coord.
  - Scale
  - READ
  - RESCAN
  - MORE 1/2
- 2) Press Coord: to set the coordinates to log mode or to linear mode.
- 3) Press Scale to set the scale to hold mode or to auto mode.
- 4) Press READ, a ▶ marker will be displayed at the left of READ. The instrument halts the current scan, and you can use the cursor arrow keys to read the measurement results. UP/DOWN key provides a skip of 8 frequency points; LEFT/RIGHT key provides a skip of 1 frequency point. Press READ again, the ▶ marker disappears, and the frequency response scan goes on.
- 5) Press the RESCAN to stop the current scan, and start a new scan.
- 6) If the softkeys you want are not displayed, press MORE 1/2 to display the following softkeys.
  - SPEED
  - TRIG
  - DOTS
  - RESP SETUP
  - MORE 2/2
- 7) Press SPEED to set the scanning speed to FAST, MED and SLOW.
- 8) Press TRIG to set the trigger mode to INT, MAN and EXT.
- 9) Press DOTS to set the frequency points scanned to 120, 240, 480 and 960 dots.

- 10) Press **RESP SETUP** to display the **FREQ RESP SETUP** page.
- 11) Press **MORE 2/2** to display the softkeys in step1 again.

### 3.3 TRANS Menu

TRANS Menu key provides the following four pages.

- TRANS TEST SET
- TRANS LIMIT SET
- TRANS MEAS DISP
- TRANS JUDGE DISP

The functions on each page are described in the following paragraphs.

#### 3.3.1 TRANS TEST SET Page

When you press **TRANS**, the TRANS TEST SET Page will be displayed. On this TRANS TEST SET page, the following control functions can be set from this page. (The field in parenthesis is used to set the control function.)

- Trigger Mode (TRIG)
- Test Speed (SPEED)
- Test Mode (MODE)
- Test Frequency of Turn (FERQ \_ TURN)
- Test Frequency of Lx (FREQ \_ Lx)
- Test Frequency of Lk (FREQ \_ Lk)
- Test Level of Turn (LEVEL \_ TURN)
- Test Level of Lx (LEVEL \_ Lx)
- Test Level of Lk (LEVEL \_ Lk)
- Turn ON/OFF Function ( $\sqrt{X}$  \_ TURN)
- Lx ON/OFF Function ( $\sqrt{X}$  \_ Lx)
- Lk ON/OFF Function ( $\sqrt{X}$  \_ Lk)
- DCR ON/OFF Function ( $\sqrt{X}$  \_ DCR)
- File Manage (FILE)
- Useful Tools (TOOLS)

SO there are fifteen fields on this page. Each field is described in the following paragraphs.

The available fields and the softkeys which correspond to each field on this page are shown in Figure 3-25 and Figure 3-26.



 <TRANS TEST SET>		FILE	TOOLS	TEST SET
TRIG :	INT	SPEED :	SLOW	
MODE :	SEQ			
FUNC	FREQ	LEVEL	√/×	LIMIT SET
TURN	1.000kHz	1.000V	<input checked="" type="checkbox"/>	
Lx	1.000kHz	1.000V	<input checked="" type="checkbox"/>	MEAS DISP
Lk	1.000kHz	1.000V	<input checked="" type="checkbox"/>	
DCR	-----	-----	<input checked="" type="checkbox"/>	JUDGE DISP
 Use softkeys to select				
<input type="text"/> : Field				

Figure 3-25 Available Fields on the TRANS TEST SET Page

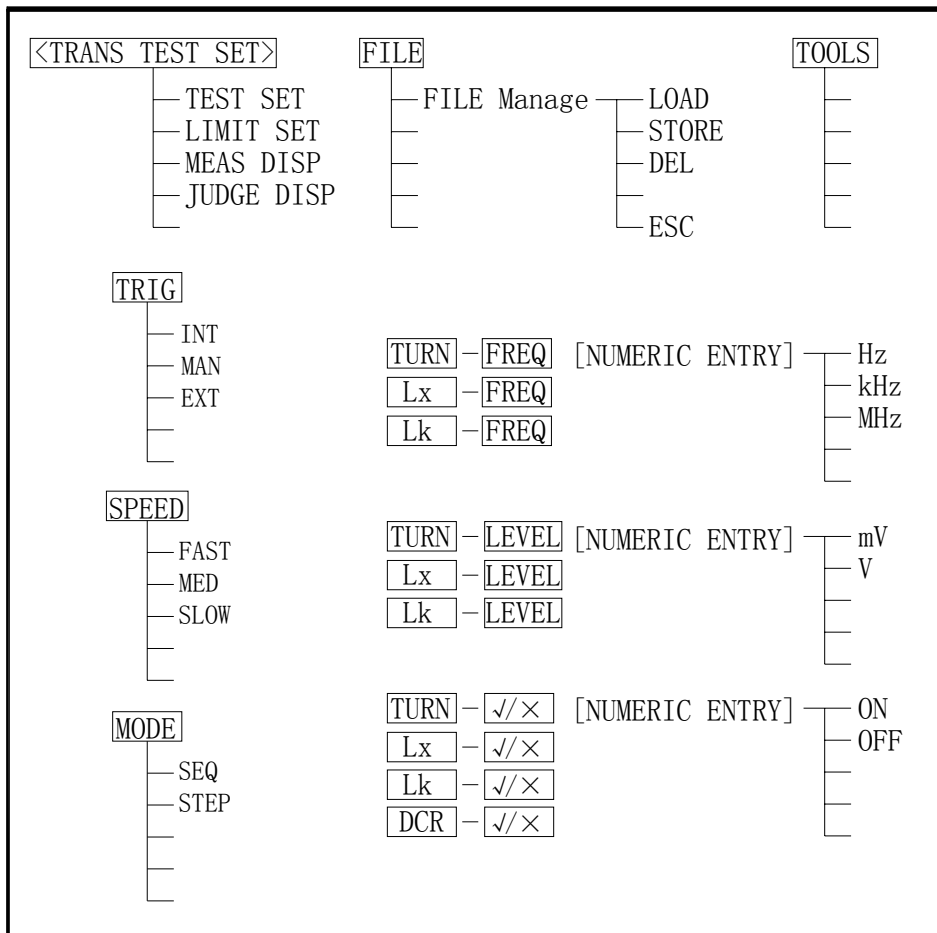


Figure 3-26 Available Softkeys on the TRANS TEST SET Page

### 3.3.1.1 Trigger Mode

Perform the following steps to set the trigger mode on the TRANS TEST SET page.

- 1) Move the cursor to the TRIG field. The following softkeys will be displayed.

- INT
- MAN
- EXT

- 2) Set the trigger mode using the softkeys.

### 3.3.1.2 Test Speed

Perform the following steps to set the transformer test speed on the TRANS TEST SET page.

- 1) Move the cursor to the SPEED field. The following softkeys will be displayed.

- FAST
- MED
- SLOW

- 2) Use the preceding softkeys to select and set the test speed.

### 3.3.1.3 Test Mode

Perform the following steps to set the transformer test Mode on the TRANS TEST SET page.

- 1) Move the cursor to the MODE field. The following softkeys will be displayed.
  - SEQ
  - STEP
- 2) Use the preceding softkeys to select and set the test mode.

### 3.3.1.4 Test Frequency

Perform the following steps to set the transformer test Frequency on the TRANS TEST SET page.

- 1) Move the cursor to the FERQ \_ TURN field. Enter the frequency with the numeric keys; the following softkeys will be displayed.
  - Hz
  - kHz
  - MHz
- 2) Use these softkeys to enter the units and terminate the entry without **ENTER**. When **ENTER** is pressed, the numeric data is entered with Hz as the default unit.
- 3) Move the cursor to the FREQ \_ Lx and FREQ \_ Lk. Repeat step 1 to 2 to set the test frequency for Lx and Lk.

### 3.3.1.5 Test Level

Perform the following steps to set the transformer test Level on the TRANS TEST SET page.

- 1) Move the cursor to the LEVEL \_ TURN field. Enter the level with the numeric keys; the following softkeys will be displayed.
  - mV
  - V
- 2) Use these softkeys to enter the units and terminate the entry without **ENTER**. When **ENTER** is pressed, the numeric data is entered with V as the default unit.
- 3) Move the cursor to the LEVEL \_ Lx and LEVEL \_ Lk. Repeat step 1 to 2 to set the test level for Lx and Lk.

### 3.3.1.6 Turn ON/OFF Function

Perform the following steps to set the transformer test ON/OFF function on the TRANS TEST SET page.

- 1) Move the cursor to the  $\sqrt{X}$  \_ TURN field. The following softkeys will be displayed.
  - ON
  - OFF
- 2) Use these softkeys to set the Turn Test function to ON or to OFF.
- 3) Move the cursor to the  $\sqrt{X}$  \_ Lx,  $\sqrt{X}$  \_ Lk and  $\sqrt{X}$  \_ DCR fields, repeat step 1 to 2 to set the ON/OFF function for Lx, Lk and DCR test.

### 3.3.1.7 File Manage

Refer to 3.2.1.7 File Manage.

### 3.3.1.8 Useful Tools

No Tool function is provided on the TRANS TEST SET page.

### 3.3.2 TRANS LIMIT SET Page

When you press **TRANS**, and **LIMIT SET** the TRANS LIMIT SET Page will be displayed. On this TRANS LIMIT SET page, the following control functions and high/low limits can be set from this page. (The field in parenthesis is used to set the control function.)

- Limit Mode (MODE)
- Standard Value for Np (STD\_Np)
- Standard Value for Ns (STD\_Ns)
- Standard Value for Lx (STD\_Lx)
- Standard Value for Lk (STD\_Lk)
- Standard Value for DCR (STD\_DCR)
- Low Limit Value for Ns (LOW\_Ns)
- Low Limit Value for Lx (LOW\_Lx)
- Low Limit Value for Lk (LOW\_Lk)
- Low Limit Value for DCR (LOW\_DCR)
- High Limit Value for Ns (HIGH\_Ns)
- High Limit Value for Lx (HIGH\_Lx)
- High Limit Value for Lk (HIGH\_Lk)
- High Limit Value for DCR (HIGH\_DCR)
- File Manage (FILE)
- Useful Tools (TOOLS)

SO there are seventeen fields on this page. Each field is described in the following paragraphs.

The available fields and the softkeys which correspond to each field on this page are shown in Figure 3-27 and Figure 3-28.





 <TRANS LIMIT SET>  				TEST SET
DEV :ABS				
<hr/>				LIMIT SET
FUNC	STD	LOW	HIGH	
Np	10.00T	8.000T	12.00T	
Ns	10.00T	8.000T	12.00T	MEAS DISP
Lx	11.00μH	7.000μH	11.00μH	
Lk	12.00μH	8.000μH	14.00μH	JUDGE DISP
DCR	22.00mΩ	20.00mΩ	24.00mΩ	
 Use softkeys to select				
<input type="text"/> : Field				

Figure 3-27 Available Fields on the TRANS LIMIT SET Page

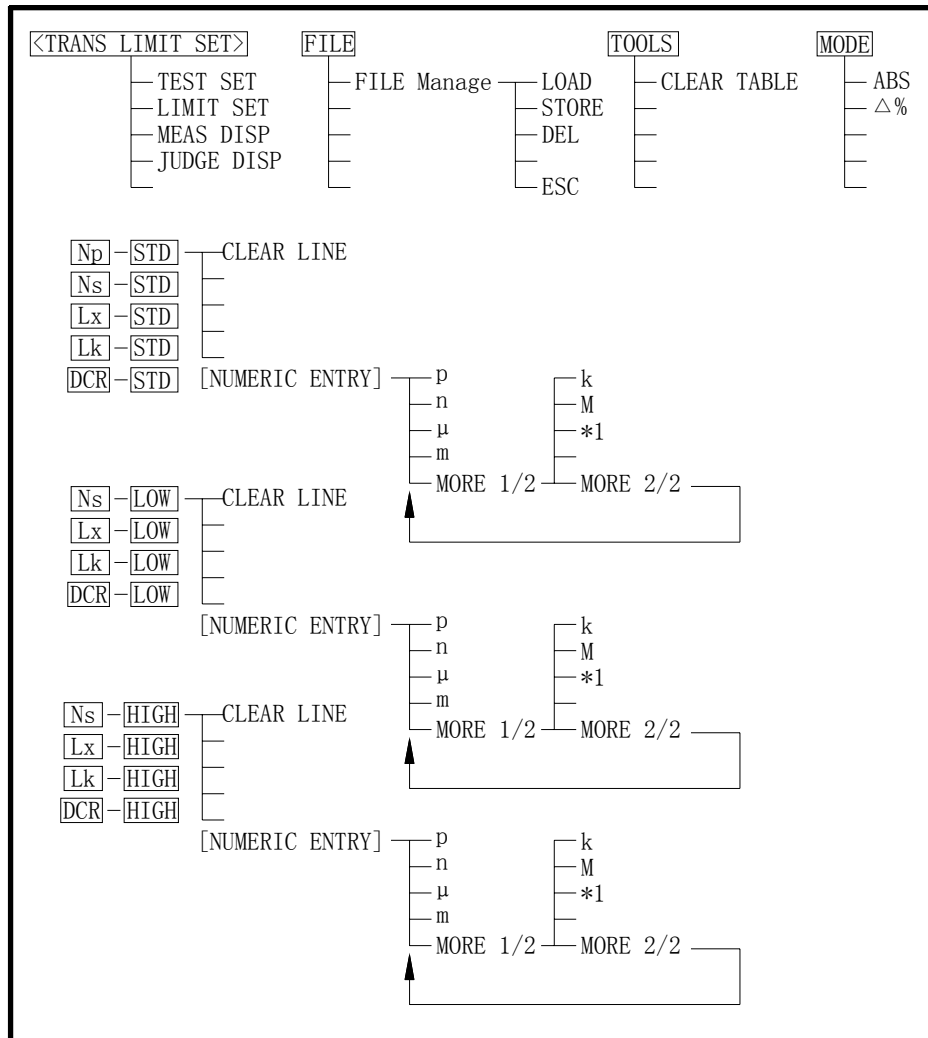


Figure 3-28 Available Softkeys on the TRANS LIMIT SET Page

**3.3.2.1 Limit Mode**

Perform the following steps to set the Limit mode on the TRANS LIMIT SET page.

- 1) Move the cursor to the MODE field. The following softkeys will be displayed.
  - ABS
  - Δ%
- 2) Set the Limit Mode using the softkeys.

**3.3.2.2 Standard Value and Low/High Limits**

Perform the following steps to set the Standard Values and Low/High Limits.

- 1) Set the Limit Mode; follow the steps described in 3.3.2.1 Limit Mode.
- 2) Move the cursor to the TOOLS field, and perform the clear table function.
- 3) Move the cursor to the STD\_Np field. Enter the standard value of Np using the numeric entry keys. When one of the numeric entry keys in pressed, the suffix



- softkeys (p, n,  $\mu$ , m, k, M \*1) can be used instead of **ENTER**. When **ENTER** is pressed, the numeric data is entered with the same unit used last time. When \*1 is pressed, the numeric data is entered with the T (turn), H and  $\Omega$  as the default unit.
- 4) **CLEAR LINE** softkey is displayed in the softkey label area when a standard value is entered or selected. You can this softkey to delete the current line.
  - 5) Move the cursor to other fields for standard value input.
  - 6) Repeat step 3 to step 5 to enter the rest standard values for Ns, Lx, Lk and DCR.
  - 7) Move to cursor to the LOW\_Ns field; enter the limit value of Ns using the numeric entry keys. When one of the numeric entry keys is pressed, the suffix softkeys (p, n,  $\mu$ , m, k, M \*1) can be used instead of **ENTER**. When **ENTER** is pressed, the numeric data is entered with the same unit selected last time. When \*1 is pressed, the numeric data is entered with the T (turn), H and  $\Omega$  as the default unit.
  - 8) **CLEAR LINE** softkey is displayed in the softkey label area when a limit value is entered or selected. You can this softkey to delete the current line.
  - 9) Move the cursor to other fields for limit value input.
  - 10) Repeat step 7 to step 9 to enter the rest LOW/HIGH limit values for Ns, Lx, Lk and DCR.

### 3.3.2.3 File Manage

Refer to 3.2.1.7 File Manage.

### 3.3.2.4 Useful Tools

Perform the following steps to clear the TRANS LIMIT SET table.

- 1) Move the cursor to the TOOLS field on the TRANS LIMIT SET page. The following softkey is displayed.
  - **CLEAR TABLE**
- 2) Press the **CLEAR TABLE**, the whole TRAMS LIMIT SET table is cleared.

### 3.3.3 TRANS MEAS DISP Page

When you press **TRANS**, and **MEAS DISP** the TRANS MEAS DISP Page will be displayed. On this TRANS MEAS DISP page, the measurement results are displayed, and the following control functions can be set from this page. (The field in parenthesis is used to set the control function.)

- Trigger Mode (TRIG)
- Test Speed (SPEED)
- File Manage (FILE)
- Useful Tools (TOOLS)

SO there are five fields on this page: TRANS MEAS DISP, TRIG, SPEED, FILE and TOOLS fields. Each field is described in the following paragraphs.

The available fields and the softkeys which correspond to each field on this page are shown in Figure 3-29 and Figure 3-30.

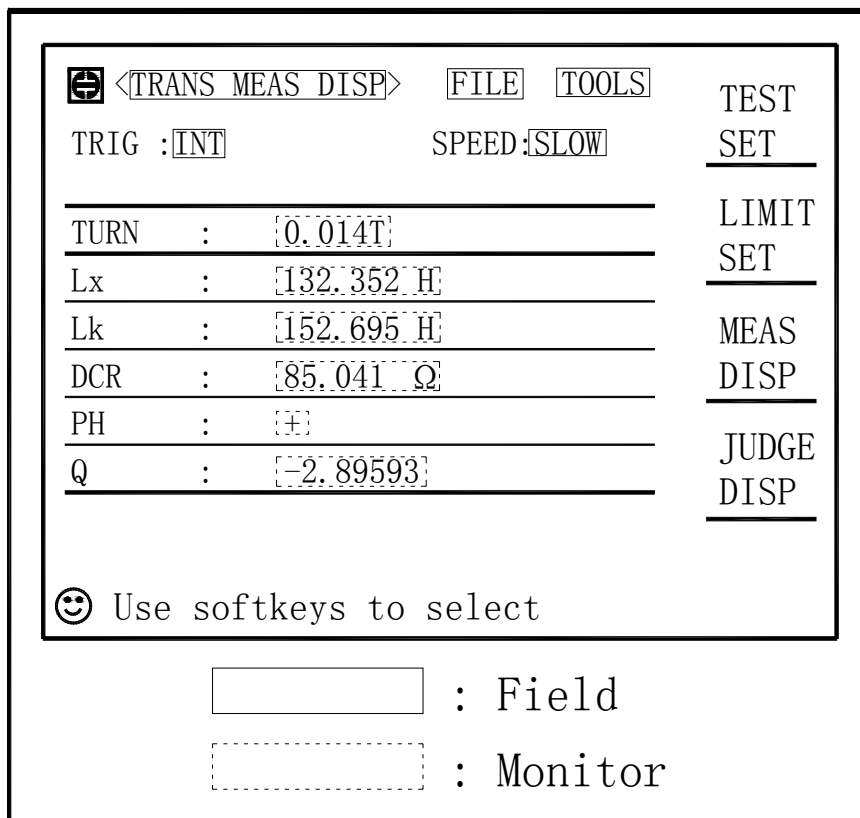


Figure 3-29 Available Fields on the TRANS MEAS DISP Page

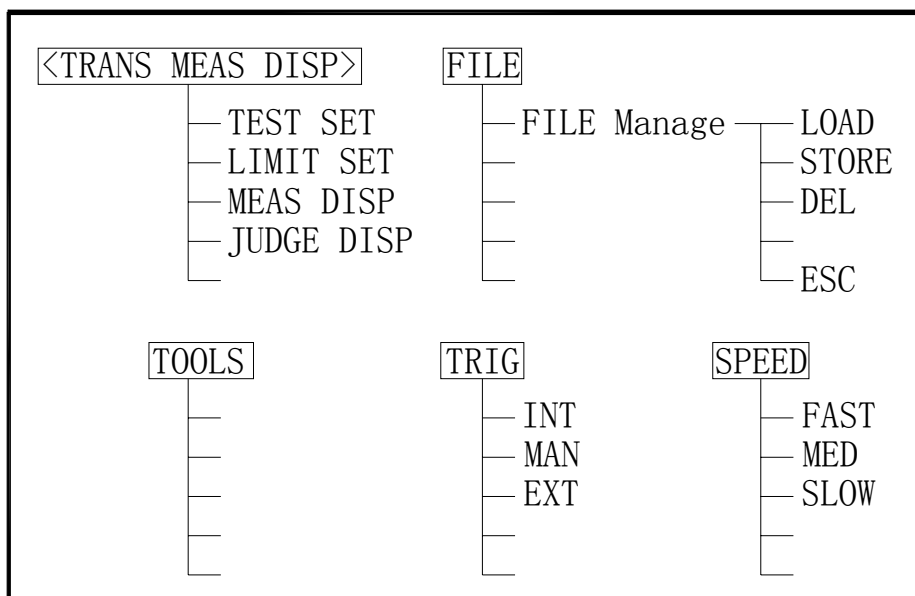


Figure 3-30 Available Softkeys on the TRANS MEAS DISP Page

### 3.3.3.1 Trigger Mode

Perform the following steps to set the trigger mode on the TRANS MEAS DISP page.

- 1) Move the cursor to the TRIG field. The following softkeys will be displayed.
  - INT
  - MAN
  - EXT
- 2) Set the trigger mode using the softkeys.

### 3.3.3.2 Test Speed

Perform the following steps to set the transformer test speed on the TRANS MEAS DISP page.

- 1) Move the cursor to the SPEED field. The following softkeys will be displayed.
  - FAST
  - MED
  - SLOW
- 2) Use the preceding softkeys to select and set the test speed.

### 3.3.3.3 File Manage

Refer to 3.2.1.7 File Manage.

### 3.3.3.4 Useful Tools

This page provides no tools.

## 3.3.4 TRANS JUDGE DISP Page

When you press **TRANS**, and **JUDGE DISP** the TRANS JUDGE DISP Page will be displayed. On this TRANS JUDGE DISP page, the judgment results are displayed, and the following control functions can be set from this page. (The field in parenthesis is used to set the control function.)

- Trigger Mode (TRIG)
- Test Speed (SPEED)
- File Manage (FILE)
- Useful Tools (TOOLS)

SO there are five fields on this page: TRANS JUDGE DISP, TRIG, SPEED, FILE and TOOLS fields. Each field is described in the following paragraphs.

The available fields and the softkeys which correspond to each field on this page are shown in Figure 3-31 and Figure 3-32.

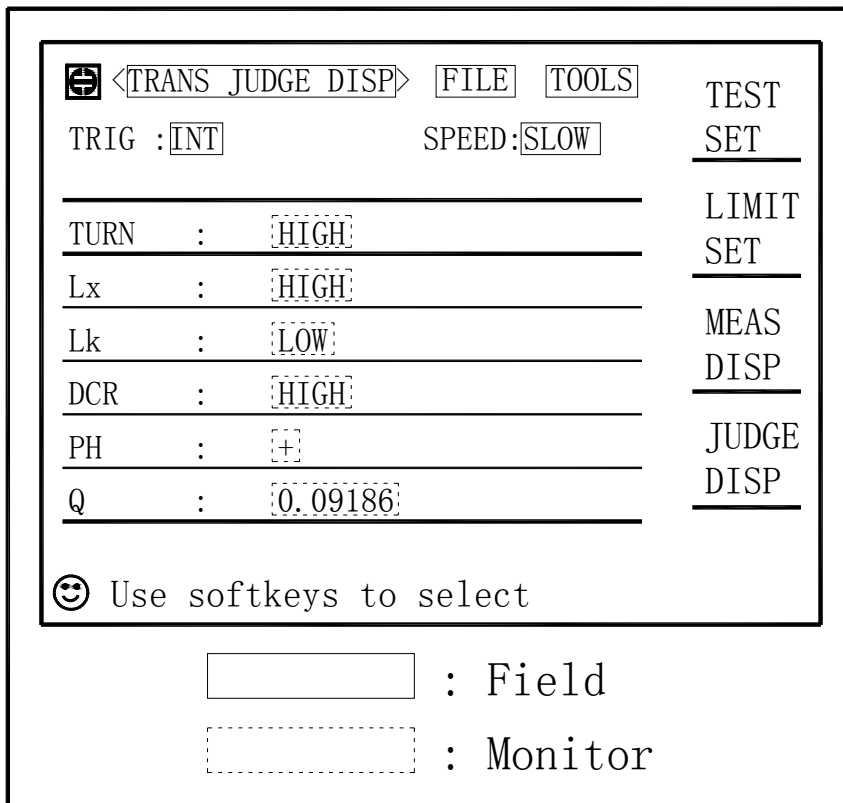


Figure 3-31 Available Fields on the TRANS JUDGE DISP Page

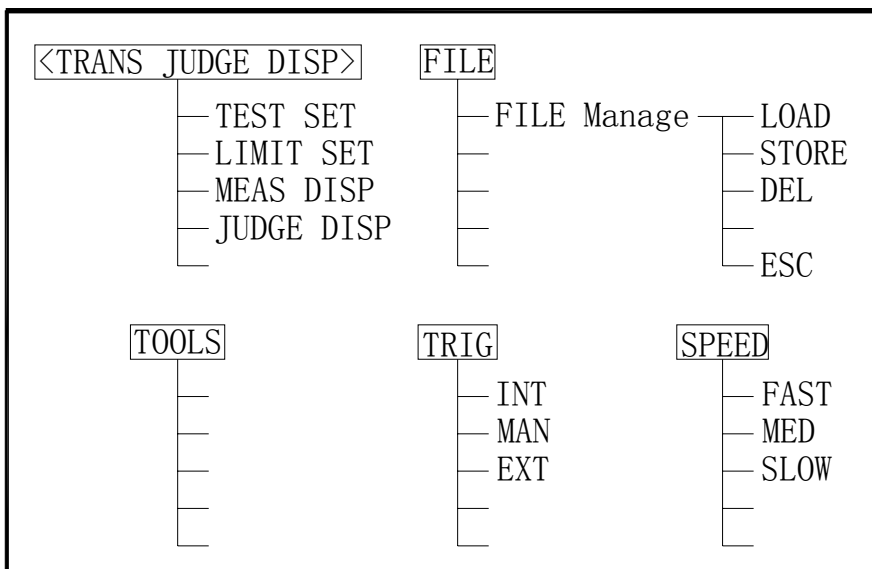


Figure 3-32 Available Softkeys on the TRANS JUDGE DISP Page

### 3.3.4.1 Trigger Mode

Perform the following steps to set the trigger mode on the TRANS JUDGE DISP page.

- 1) Move the cursor to the TRIG field. The following softkeys will be displayed.
  - INT
  - MAN
  - EXT
- 2) Set the trigger mode using the softkeys.

### 3.3.4.2 Test Speed

Perform the following steps to set the transformer test speed on the TRANS JUDGE DISP page.

- 3) Move the cursor to the SPEED field. The following softkeys will be displayed.
  - FAST
  - MED
  - SLOW
- 4) Use the preceding softkeys to select and set the test speed.

### 3.3.4.3 File Manage

Refer to 3.2.1.7 File Manage.

### 3.3.4.4 Useful Tools

This page provides no tools.

## 3.4 SYSTEM Menu

System Menu key provides the following two pages.

- SYSTEM SETUP
- USB DISK MANAGE

The functions on each page are described in the following paragraphs.

### 3.4.1 SYSTEM SETUP Page

When you press **SYSTEM**, the SYSTEM SETUP Page will be displayed. On this SYSTEM SETUP page, the following control functions can be set from this page. (The field in parenthesis is used to set the control function.)

- LCD Contrast adjustment (LCD CONST)
- BEEPER function ON/OFF (BEEPER)
- ALARM mode (ALARM)
- LANGUAGE selection (LANGUAGE)
- PASS WORD function (PASS WORD)
- BUS MODE selection (BUS MODE)
- BUS Address setup (BUS ADDR)
- Talk only mode ON/OFF (TALK ONLY)
- DC Bias Source mode (BiasSourc)

So there are twelve fields on this page: SYSTEM SETUP, FILE, TOOLS, LCD CONST, BEEPER, ALARM, LANGUAGE, PASS WORD, BUS MODE, BUS ADDR, TALK ONLY and Bias sourc fields. Each field is described in the following paragraphs.

The available fields and the softkeys which correspond to each field on this page are shown in Figure 3-33 and Figure 3-34.

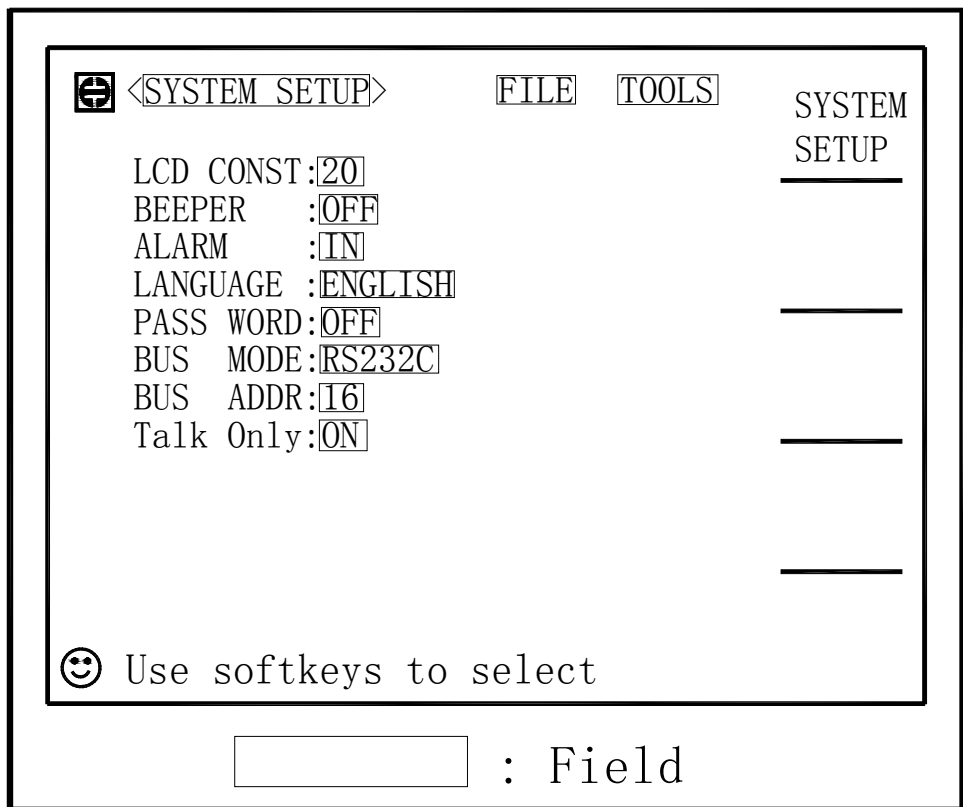


Figure 3-33 Available Fields on the SYSTEM SETUP Page

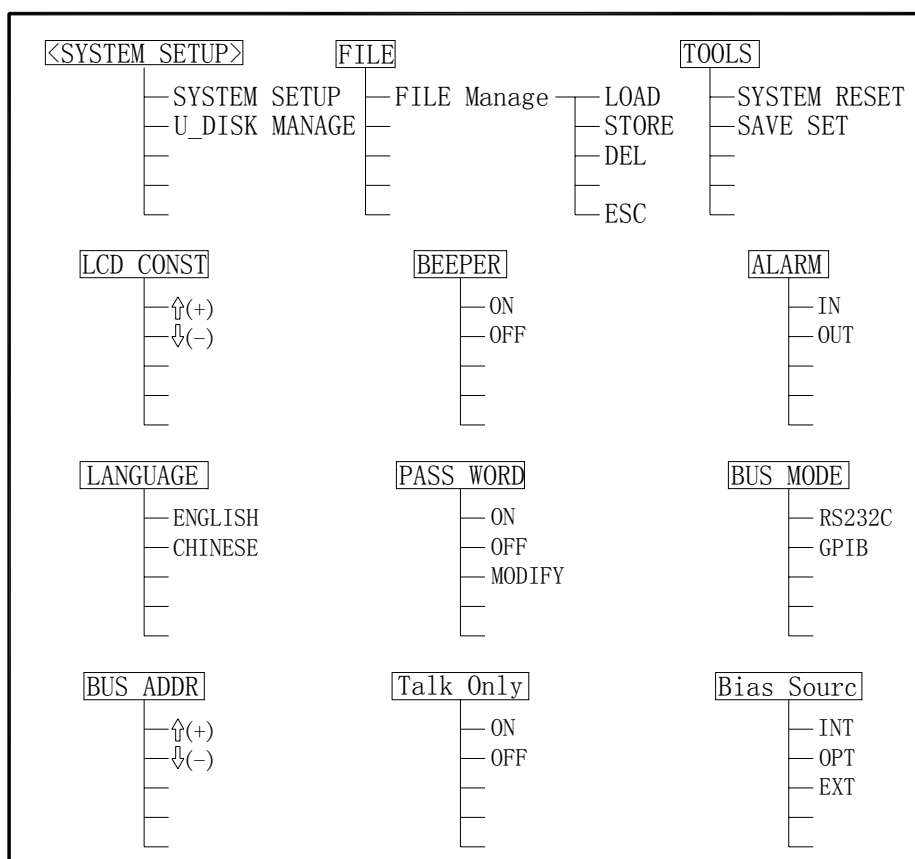


Figure 3-34 Available Softkeys on the SYSTEM SETUP Page

### 3.4.1.1 LCD Contrast adjustment

Perform the following steps to adjust the LCD's CONTRAST.

- 1) Move the cursor to the LCD CONST field on the SYSTEM SETUP page. The following softkeys will be displayed in the softkey label area.

- ↑(+)
- ↓(-)

- 2) Use the softkeys to adjust the LCD's contrast from 1 to 31 until you get the suitable contrast effect.

### 3.4.1.2 BEEPER function ON/OFF

TH2818 has a beeper which it beeps if any of the following conditions occur.

- An error has occurred.
- Warning message is displayed.
- Correction data measurement at 43 preset frequencies is completed.
- Comparison judgment Result is consistent with the ALARM mode.
- Key lock ON/OFF is switched.
- DC BIAS ON/OFF is switched.

### How to Set the Beeper to ON or OFF

Perform the following steps to set the beeper function to ON or OFF.

- 1) Move the cursor to the BEEPER field on the SYSTEM SETUP page. The following softkeys will be displayed in the softkey label area.
  - ON
  - OFF
- 2) Use the softkeys to set the beeper function to the ON or OFF.

#### 3.4.1.3 ALARM mode

Perform the following steps to set the ALARM mode.

- 1) Move the cursor to the ALARM field on the SYSTEM SETUP page. The following softkeys will be displayed in the softkey label area.
  - IN
  - OUT
- 2) Press IN to make the instrument beep when comparison result is IN or PASS.
- 3) Press OUT to make the instrument beep when comparison result is HIGH/LOW or FAIL.

#### 3.4.1.4 LANGUAGE selection

Perform the following steps to select display language.

- 1) Move the cursor to the LANGUAGE field on the SYSTEM SETUP page. The following softkeys will be displayed in the softkey label area.
  - English
  - 中文 (Chinese)
- 2) Use the softkeys to set the display language.

#### 3.4.1.5 PASS WORD function

TH2818 needs a pass word in the following conditions.

- Turn on the instrument on Welcome page ( if pass word ON)
- To cancel the key lock function ( if pass word ON)
- Set the pass word function to OFF
- Modify the pass word.

---

**Note:** The default pass word for TH2818 is “2818”.

---

Perform the following steps to select display language.

- 1) Move the cursor to the PASS WORD field on the SYSTEM SETUP page. The following softkeys will be displayed in the softkey label area.
  - ON
  - OFF
  - MODIFY
- 2) Press ON to set the pass word to ON.
- 3) Press OFF, “Input password:” will be displayed in the system information line. Input the correct password, the password function is set to OFF.
- 4) Press MODIFY, “Input password:” will be displayed in the system information line.
- 5) Input the correct password, “New password:” will be displayed in the system information line.
- 6) Input the new password, “Confirm new password:” will be displayed in the system information line.
- 7) Input the new password again, “Password modify ok” will be displayed in the system information line.



- 8) If the new password is wrongly entered, "Password modify fail" will be displayed.

#### 3.4.1.6 BUS MODE selection

TH2818 provides two types of bus mode, RS232C and GPIB.

Perform the following steps to set the bus mode.

- 1) Move the cursor to the BUS MODE field on the SYSTEM SETUP page. The following softkeys will be displayed in the softkey label area.
  - RS232C
  - GPIB
- 2) Use the softkeys to set the bus mode.

#### 3.4.1.7 BUS Address setup

TH2818 provides the bus address range from 1 to 31.

Perform the following steps to set the bus address.

- 1) Move the cursor to the BUS ADDR field on the SYSTEM SETUP page. The following softkeys will be displayed in the softkey label area.
  - ↑(+)
  - ↓(-)
- 2) Use the softkeys to set the bus address.

#### 3.4.1.8 Talk only mode ON/OFF

Perform the following steps to set TH2818 to the Talk Only mode (ON). To set TH2818 to the addressable mode, perform the following steps to set the Talk Only mode to OFF.

- 1) Move the cursor to the TALK ONLY field on the SYSTEM SETUP page. The following softkeys will be displayed in the softkey label area.
  - ON
  - OFF
- 2) Use the softkeys to set the Talk Only mode to ON (Talk only), or to OFF (addressable).

#### 3.4.1.9 DC Bias Source mode

TH2818 provides three types of DC Bias Source mode INT (internal), OPT (option) and EXT (external).

Perform the following steps to set the DC Bias Source mode.

- 1) Move the cursor to the BiasSourc field on the SYSTEM SETUP page. The following softkeys will be displayed in the softkey label area.
  - INT
  - OPT
  - EXT
- 2) Use the softkeys to set the DC Bias Source mode.

#### 3.4.1.10 File Manage

Refer to 3.2.1.7 File Manage.

#### 3.4.1.11 Useful Tools

##### Front Panel Operation for Useful Tools

Perform the following steps to reset TH2818 and save the system setup.

- 1) Move the cursor to the TOOLS field on the SYSTEM SETUP page. The following softkeys will be displayed.
  - SYSTEM RESET

- **SAVE SET**
- 2) Press **SYSTEM RESET** to reset TH2818.
  - 3) Press **SAVE SET** to save the system setup page.

### 3.4.2 USB DISK MANAGE Page

When you press **SYSTEM** and **U\_DISK MANAGE**, the USB DISK MANAGE Page will be displayed, and **LCR SINGLE TEST FILES** field control function can be set from this page.

Perform the following steps to manage the **LCR SINGLE TEST FILES**.

- 1) Move the cursor to the **LCR SINGLE TEST FILES** field on the USB DISK MANAGE page. The following softkeys will be displayed in the softkey label area.
  - **READ U\_DISK**
  - **WRITE U\_DISK**
- 2) Press **READ U\_DISK**, "Input file No, in Instrument:" will be displayed in the system information line.
- 3) Input the start file No. in TH2818's file list with the numeric keys and **ENTER**, "Input file No. in UsbDisk:" will be displayed in the system information line.
- 4) Input the start file No. in the USB disk file list with the numeric keys and **ENTER**, "Input file number for access:" will be displayed in the system information line.
- 5) Inputs the file number for access with numeric keys and **ENTER**. "Access successful!" will be displayed.
- 6) Press **WRITE U\_DISK**, "Input file No, in Instrument:" will be displayed in the system information line.
- 7) Input the start file No. in TH2818's file list with the numeric keys and **ENTER**, "Input file No. in UsbDisk:" will be displayed in the system information line.
- 8) Input the start file No. in the USB disk file list with the numeric keys and **ENTER**, "Input file number for access:" will be displayed in the system information line.
- 9) Inputs the file number for access with numeric keys and **ENTER**. "Access successful!" will be displayed.