MINIWARE

DT71 Mini Digital Tweezers

User Manual V1.3

Thank you for purchasing Mini Digital Tweezers DT71.
Please read this manual before using the device.
This user manual is based on DT71 DFU:V3.55, APP V1.15.

Contents

Safety Statements

Read carefully all the following safety precautions to avoid personal injuries and prevent damage to the device or any products connected to it. Failure to follow these safety instructions could result in personal injuries or risk of fire.

1. Please use only the power supply dedicated for this product or certified by your country/region.
2. Please use DC 5V output power source for charging;
3. Before connecting and disconnecting DT71's tips to device under test, please power off the circuit to be tested, and after connecting DT71's tips correctly, power on and measure the circuit.
4. It is recommended to unplug the controller when DT71 is not in use.
5. To avoid fire or electric shock, please observe all terminal ratings and marking instructions to avoid damage to the device. Before connecting DT71, please read the product manual or product label for information about the rated values;
6. After the power is turned on, do not touch the exposed connectors and components. Do not use it when you suspect that the product is malfunctioning. Please contact after-sales service for testing, maintenance, adjustment or parts replacement;
7. Static electricity can cause damage to DT71, and measuring should be made in anti-static areas if possible. Before connecting DT71 to the device under test, the inner and outer conductors should be grounded briefly to discharge static electricity.
8. Please keep DT71 surface clean and dry; do not operate in humid, inflammable and explosive environment.

Warnings:

Please do not disassemble DT71 controller or test arms. Once disassembled, it cannot be repaired!

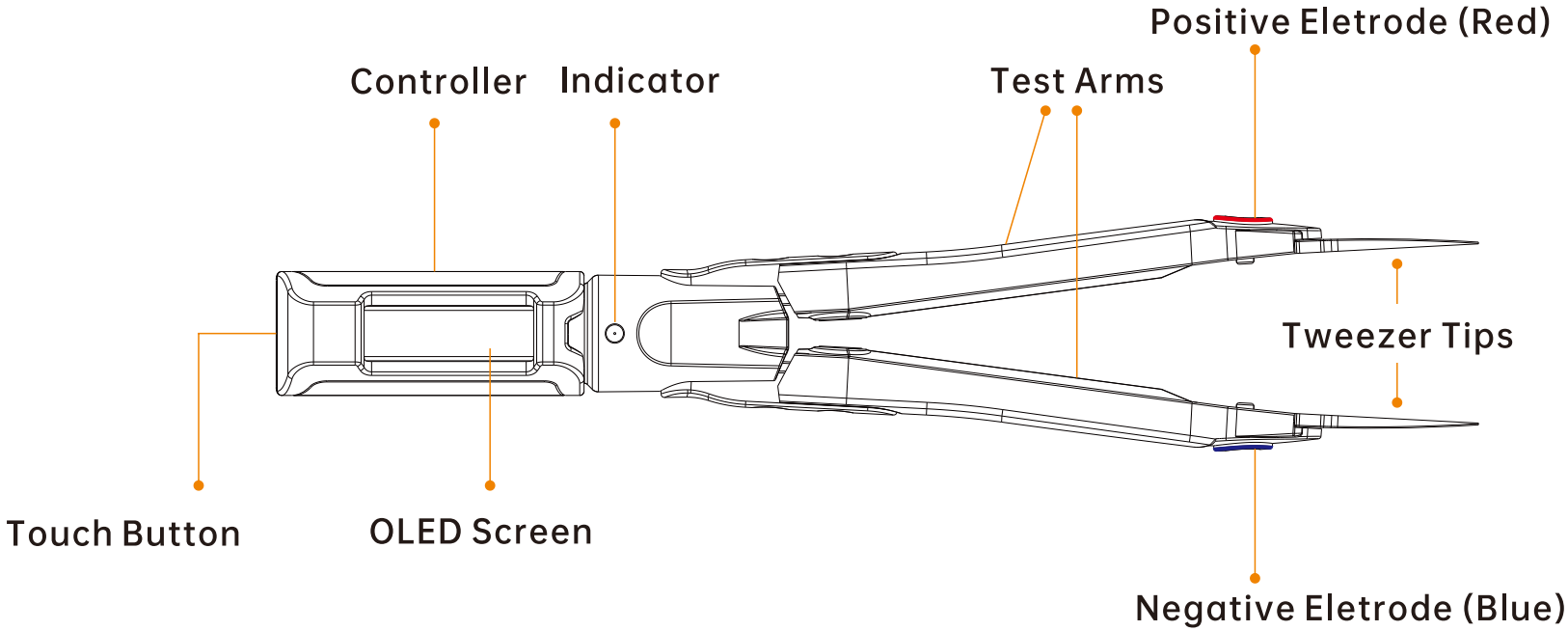
Liability Statement:

Any damage of the product or losses related to the product damage, if it's man-caused, or assumed to be man-caused, the liability will belong to the user. The user is responsible for any damage or loss caused by unauthorized disassembly or modification of the product.

Product Introduction

Mini Digital Tweezers DT71 is a multi-function smart test & analyzing tool with a fully differential input and built-in signal generator. DT71 has a unique ternary structure, which can be split into a controller, test arms andtweezer tips, flexible in replacement and combination. DT71 uses thickened gold-plated tweezer tips, which can be replaced according to the application scenario. It can measure various devices such as resistor, capacitor, inductor, voltage, frequency, diode, etc. , and it has an auto identify mode which can help users quickly verify and sort out components. The built-in micro signal generator of DT71 can output a variety of signals, providing a perfect solution for the debugging and maintenance of complex electronic systems and the classification and detection of discrete chip components.

Appearance



Introduction

Mini Digital Tweezers DT71 is a new concept portable component tester, which can automatically identify the type of electronic components and automatically select the appropriate range for measure; the built-in signal generator can output a variety of required signals for in-circuit debugging and maintenance.

- 6 measurement types: resistance, inductance, capacitance, voltage, frequency, diode
- Controller can be rotated 360°, providing different viewing angles
- Automatic identification of components, Measure primary and secondary parameters (Resistance, indutance, capacitance & diode)
- Smart Recognition, automatically recognize left and right hand mode
- Micro signal generator
- Sleep mode, pick up to wake up

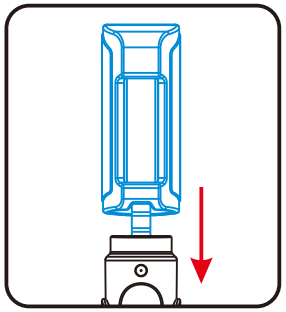
Parameters

Power interface		3.5mm audio
Size	Controller	47mm
	Test arms	106mm
Weight		22g
Working temperature		10~50°C
Working humidity		10~90%RH
Charging time		3 hours
Operation time		10 hours (in continuous use)

Installation And Charging

Installation

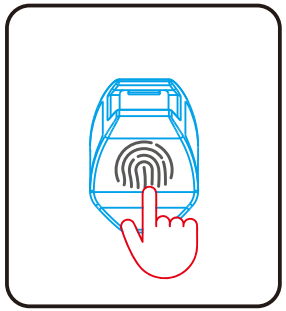
(1) Fully insert the 3.5mm audio plug of DT71 controller into the socket of the test arms. After the correct insertion, the screen will display the bootup icon and firmware version, and then enter user interface;



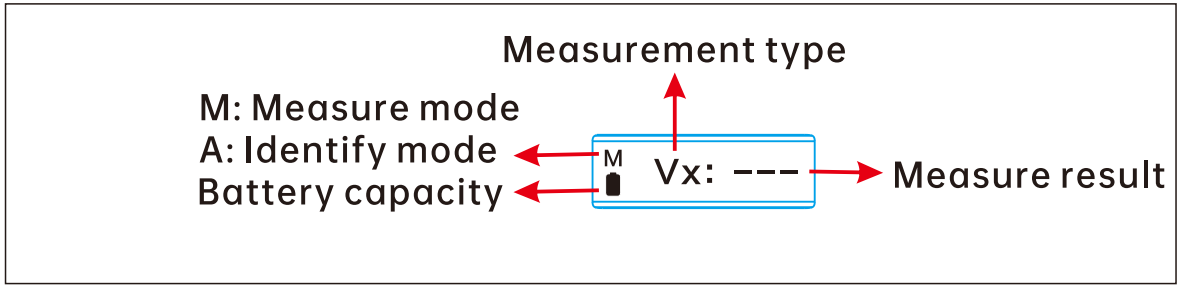
Display

	Bootup icon
DT71 V1.15	Firmware version

(2) Tap the touch button on top of the controller to select measure mode, or long press to switch to auto identify mode for use.



Display



Button and menu

DT71 has no physical buttons, only a hidden touch button on the top of the controller. Users can switch functions and modes by tapping the touch button.

Operating		Function
	Long press	Switch submenu of measure/automatic identification/signal generator/calibration mode
	Single tap	Switch menu options

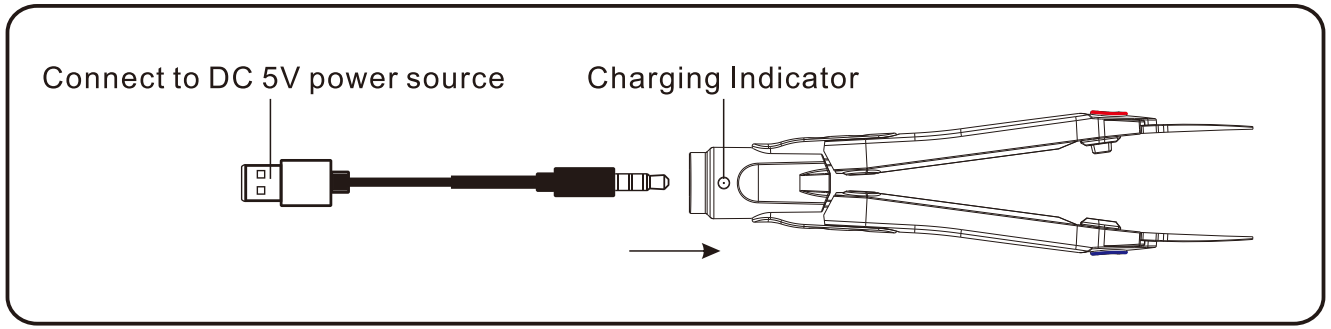
Menu:

Submenu	Menu Definition	Options	Options Definition	Measuring Range
Measure	Measure mode (default)	Rx:---	Resistance	0.1Ω~2MΩ
		Dx:---	Diode	0.1V~3V
		Cx:---	Capacitance	1pF~400uF
		Lx:---	Inductance	1uH~4.7mH
		Fx:---	Frequency	10Hz~20MHz
		Vx:---	Voltage	1mV~40V

Submenu	Menu Definition	Options	Options Definition	Measuring Range
Identify	Automatic identification mode (Long press to switch menu)		Screen will display "A" on upper left corner; Can automatically measure resistance/ inductance/capacitance /diode	
Signal Gen	Signal generator mode (Long press to switch menu)	SINE 10KHz	Output sine wave, default 10KHz	For frequency modification options, see configuration file description on P15
		NOISE 100KHz	Output noise wave, default 100KHz	
		USER 10KHz	Output user-defined wave, default 10KHz	
		PULSE 100KHz	Output pulse wave, default 100KHz	
Calibration	Calibration mode (Long press to switch menu)	Calibration #0 Close Tips Pls!	Close (short-circuit) tweezer tips	Please refer to P14
		Calibration #1 Open Tips Pls!	Open (open-circuit) the tweezer tips	

How to charge

Fully insert the 3.5mm male plug of DT71's dedicated cable into test arms, and connect a DC5V power source for charging. The charging indicator will be on (red) when charging, and off when fully charged.



Warnings:
DO NOT charge DT71 controller.

Automatic sleep and wake up

DT71 has an automatic sleep function, when DT71 remains inactive for 60 seconds (factory setting), it will automatically enter sleep mode; When you need to use it again, pick up DT71 to wake it up to enter user interface.

Measure

Preparation before measuring

Before measuring, please connect DT71 controller to test arms, or wake up DT71 from sleep mode. When the screen displays, select the correct measure mode to start measuring.

Measure parameters and accuracy:

Measure Type	Range	Resolution	Accuracy
Voltage	1mV~100mV	1mV	2%+5
	0.1V~40V	0.1V	1%+3
Diode	0.1V~3V	0.1V	1%+3
Frequency	10.0Hz~99.9Hz	0.1Hz	0.1%+3
	100Hz~999Hz	1Hz	
	1.00KHz~9.99KHz	0.01KHz	0.1%+3
	10.0KHz~99.9KHz	0.1KHz	
	100KHz~999KHz	1KHz	
	1.00MHz~9.99MHz	0.01MHz	
	10.0MHz~20MHz	0.1MHz	

Measure Type	Range	Resolution	Accuracy
Resistance	0.1Ω~99.9Ω	0.1Ω	1%+5
	100Ω~999Ω	1Ω	
	1.00KΩ~9.99KΩ	0.01KΩ	1%+2
	10.0KΩ~99.9KΩ	0.1KΩ	
	100KΩ~999KΩ	1KΩ	
	1.00MΩ~2.00MΩ	0.01MΩ	
Capacitance	1pF~99.9pF	0.1pF	5%+5
	100pF~999pF	1pF	
	1.00nF~9.99nF	0.01nF	5%+5
	10.0nF~99.9nF	0.1nF	
	100nF~999nF	1nF	
	1.00uF~9.99uF	0.01uF	
	10.0uF~99.9uF	0.1uF	
	100uF~400uF	1uF	
Inductance	1uH~99.9uH	0.1uH	5%+5
	100uH~999uH	1uH	
	1.00mH~4.7mH	0.01mH	5%+5

Note:
1. The above test data are laboratory test data, and the test environment condition is room temperature 25℃;
2. The inductance test results are tested under 2Vrms and 10KHz test conditions, and are for reference only;

3. Actual parameter value calculation method:

Error =± (reading * accuracy of the corresponding range %+ minimum resolution * accuracy value)
Actual parameter value = reading ± error

For example, when DT71 measures a resistance and gets a reading of 100Ω, this reading belongs to the range of 100Ω~999Ω and its corresponding minimum resolution is 1Ω, and the accuracy is 1%+5.

Error =± (1%*100Ω+1Ω×5) =±6Ω,
The actual parameter value is 100Ω±6Ω, which is 94Ω to 106Ω.

4. DT71 is a component test analyzer, not an accurate measurement instrument, and the test data results are for reference only.

Note: Maximum absolute input voltage: -5V ~ 50V; Input resistance: 1MΩ.

Manual Measure Mode

●Resistance

1) Tap DT71's touch button to switch to resistance measure mode;
2) Clamp tweezer tips in the two poles of resistance;
3) The screen will display the resistance value.

●Inductance

1) Tap DT71's touch button to switch to inductance measure mode;
2) Clamp tweezer tips in the two poles of inductance;
3) The screen will display the inductance value.

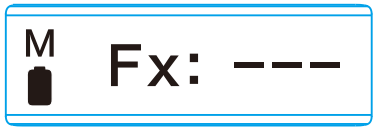
●Diode

1) Tap DT71's touch button to switch to diode measure mode;
2) Clamp tweezer tips in the two poles of diode.
   The positive electrode (red) of the tweezer tips to the positive of the diode, and the negative electrode (blue) of the tweezer tips to the negative of the diode; there will be no value if connected in reverse
3) The screen will show the diode forward voltage drop.

●Capacitance

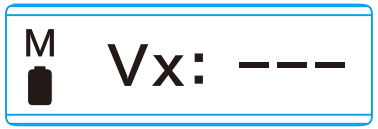
1) Tap DT71's touch button to switch to capacitance measure mode;
2) Clamp tweezer tips in the two poles of capacitance;
3) The screen will display the capacitance value.

●Frequency



1) Tap DT71's touch button to switch to frequency measure mode;
2) The positive electrode (red) of the tweezer tips connects to the signal positive, and the negative electrode (blue) to the signal ground;
3) The screen will display the frequency value.

●Voltage



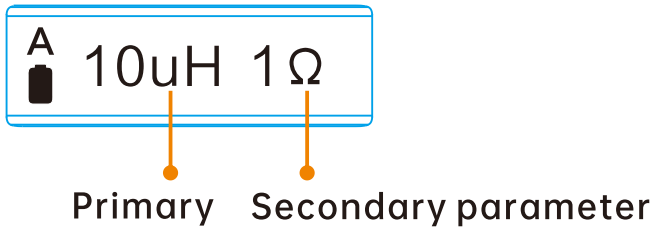
1) Tap DT71's touch button to switch to voltage measure mode;
2) The positive electrode (red) of the tweezer tips connects to the high potential, and the negative electrode (blue) to the low potential;
3) The screen will display the voltage value.

⚠ The screen will display "Negativ" if the positive and negative tips of the DT71 are reversed. Please adjust and measure again.

⚠ When the measured object is powered on, DO NOT insert or remove DT71 controller.

Notice: Due to the design of circuit, when testing on-board or in-circuit SMDs, the measuring results may exceed the measuring accuracy of DT71.

Automatic Identification Mode



1) Long press DT71's touch button to switch to automatic identification mode (Identify); DT71 can automatically identify inductor,capacitor, resistor, diode;
2) The screen will display the primary parameters and secondary parameters of the measured object.

Signal Output

Signal output types:

Type	SINE	NOISE	USER	PULSE
	Sine Wave	Noise Wave	User-defined Wave	Pulse Wave
Frequency	For frequency modification options, see configuration file description on P15			

Signal Generator

SINE 10KHz

1) Long press DT71's touch button to switch to signal generator mode (Signal Gen);
2) Tap the touch button to switch sine wave/noise wave/user-defined wave/pulse wave.

User-Defined Wave

USER 100KHz

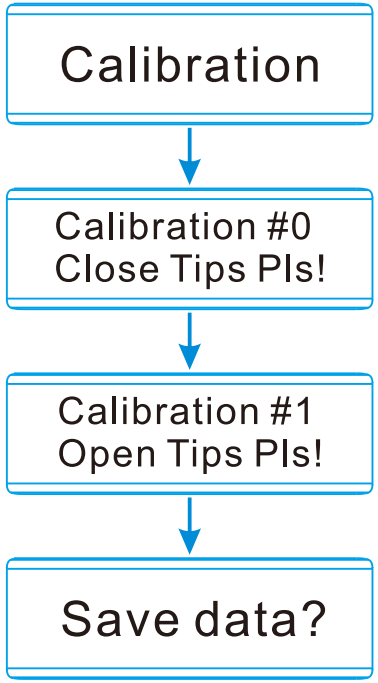
1) Tap DT71's touch button to switch to "USER" signal output;
2) The output waveform can be defined in the DFU configuration file, please refer to P16。

Calibration

Zero Calibration

1. Long press DT71's touch button to switch to calibration mode (Calibration);
2. When screen prompts an instruction to close tips, keep the tweezer tips closed and short circuit until the screen prompts the next step;
3. When screen changes instrution to open tips, open the tweezer tips and keep it open until the screen prompts the next step;
4. After the open calibration is successful, the screen will prompt whether to save the calibration data, tap the touch button to confirm and save.

* If you mistakenly enter calibration mode, long press the touch button to exit.



Accurate Calibration

For accurate calibration, please visit www.miniware.com.cn to download the DT71 calibration file, and operate according to the instructions. If Users need to obtain data accurate calibration, please inquire from your local bureau measurements or relevant agencies.

Config File

Insert DT71 controller into the Data Cable's 3.5mm female socket (no need to connect test arms) , connect the Data Cable to your PC via USB Type-C cable; a 8-character string removable hard disk will appear on your PC. Open the CAL.INI configuration file in the removable disk and set the parameters.

Parameter Setting

Parameter	Definition	Setting Range
SLEEP_TIME=60	Sleep time	30~999 (Second)
DISPLAY_DIRECTION=4	Left/Right hand mode	0: Right hand mode, 3: Left hand mode 4: Automatic recognition
OLED_BRIGHTNESS=2	Display brightness	0~10
TSC_SEN=1	Touch button sensitivity	0:Not sensitive, 1:Normal, 2:Sensitive
SINE_FREQ_OPT=0	Sine wave signal frequency parameters	0:10KHz, 1:5KHz, 2:2KHz, 3:1KHz, 4:500Hz, 5:200Hz
NOISE_FREQ_OPT=0	Noise signal frequency parameter	Currently the noise signal only supports 100KHz
USER_FREQ_OPT=0	User-defined signal frequency parameters	0:10KHz, 1:5KHz, 2:2KHz, 3:1KHz, 4:500Hz, 5:200Hz
PULSE_FREQ_OPT=0	Pulse signal frequency selection parameter	0:100KHz, 1:50KHz, 2:20KHz, 3:10KHz, 4:5KHz, 5:2KHz, 6:1KHz, 7:500Hz, 8:200Hz

Restore Factory Setting

Open the CAL.INI config file in the removable hard disk, delete all data, enter "load default" and save it to restore the factory settings.

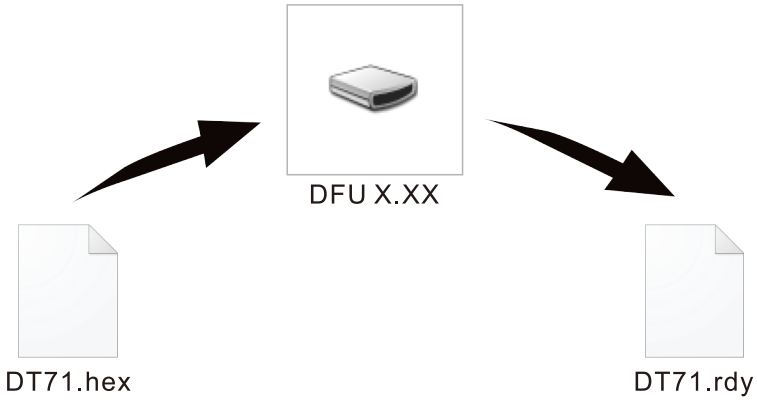
User-Defined Wave Setting

USER_WAVEFORM = {
0x7FF, 0x87F, 0x8FF, 0x97E, 0x9FC, 0xA77, 0xAF0, 0xB66, 0xBD9, 0xC48,
0xCB2, 0xD18, 0xD78, 0xDD3, 0xE29, 0xE77, 0xEC0, 0xF01, 0xF3C, 0xF6F,
0xF9A, 0xFBE, 0xFDA, 0xFEE, 0xFFA, 0xFFE, 0xFFA, 0xFEE, 0xFDA, 0xFBE,
0xF9A, 0xF6F, 0xF3C, 0xF01, 0xEC0, 0xE77, 0xE29, 0xDD3, 0xD78, 0xD18,
0xCB2, 0xC48, 0xBD9, 0xB66, 0xAF0, 0xA77, 0x9FC, 0x97E, 0x8FF, 0x87F,
0x7FE, 0x77E, 0x6FE, 0x67F, 0x601, 0x586, 0x50D, 0x496, 0x424, 0x3B5,
0x34B, 0x2E5, 0x285, 0x22A, 0x1D4, 0x186, 0x13D, 0x0FC, 0x0C1, 0x08E,
0x063, 0x03F, 0x023, 0x00F, 0x003, 0x000, 0x003, 0x00F, 0x023, 0x03F,
0x063, 0x08E, 0x0C1, 0x0FC, 0x13D, 0x186, 0x1D5, 0x22A, 0x285, 0x2E5,
0x34B, 0x3B5, 0x424, 0x497, 0x50D, 0x586, 0x601, 0x67F, 0x6FE, 0x77E,
0x000, 0x000, 0x000, 0x000, 0x000, 0x000, 0x000, 0x000, 0x000, 0x000,
0x000, 0x000, 0x000, 0x000, 0x000, 0x000, 0x000, 0x000, 0x000, 0x000,
0x000, 0x000, 0x000, 0x000, 0x000, 0x000, 0x000, 0x000, }

Note:
1) Take the above example as reference, use hexadecimal number 0x000~0xFFF to represent 0~3V signal waveform;
2) The output waveform only loads the first 100 points of valid data; editing the highlighted data above will not take effects.

Firmware Upgrade

1) Visit www.miniware.com.cn to download the appropriate DT71 firmware to your PC.
2) Insert DT71 controller into the Data Cable's 3.5mm female socket (no need to connect test arms), connect the Data Cable to your PC; a 8-character string removable hard disk will appear on your PC, and the controller screen will show "DFU 3.55", entering DFU mode.
3) Copy the .hex firmware to the root directory of that disk. After the extension of the firmware changes from ".hex" to ".rdy", re-connect DT71 controller and test arms to restart DT71, thus the firmware is upgraded.



Standard Service

One year of free warranty will be provided for DT71 controller and test arms, if the damage is not caused by false manipulation by the user. Please contact your seller for warranty details. Tweezer tips are consumables, once it's used, no replacement will be provided.

Legal Statements

Disposal

This product contains batteries and/or recyclable electronic parts.
Please do not dispose of the product together with household garbage.
Please handle it according to your local laws and regulations.

Statement of fulfilling FCC standard

This device fulfills part 15 of the FCC regulations. Device must fulfill below 2 conditions:
(1) Device must not generate interference;
(2) Device must be able to resist any interferences on it, including interferences that could cause dangerous manipulation.

Statement of fulfilling CE standard

This product with CE logo on it fulfills related Euro Union laws and regulations.

Statement of fulfilling UKCA standard

UKCA (United Kingdom Conformity Assessed) mark is a certification mark for UK conformity. This device complies with the standard testing and certification under British regulations required for electrical and electronic products to enter the British market.