The Transistor Tester user manual

Power:

A tester Tester can be powered from 6 AA - 1.5V DC. The can be either by 4 N-type AAA battery, Two 3.7V lithium-ion battery inserts, 5 V AC adapter. When powered on, the current is about 30mA at DC 5V.

Control:

Transistor-testers controlled by a rotary push-encoder with a shaft , as short by "ROTARY" , the component have four mode of operation, a short interrupt the knob , a one second (1S), and a longer a second the knob.

After Transistor Tester is powered, a Short Time program of the TESTER will control on the Processor Tester, and start. It has Automatic Calibration waiting for user input on the second.

During a test of Set , and what time it's auto-cycle off. A long time press a duration of set a length this RESET, set same the Transformers, to the function menu, a "+" or 5th column to below the following menu item. To enter the specific function , use a side the ARRAY. Within the Specific function, a no-cost limit the hand will not work just back to the Business menu.

Test :

Transistor Tester have three Test port (T1, T2, T3), with a the Zero socket, this there is alteration as follow.

At right side of the Test socket is the SMT test port, also have number to identify test.

When test Inductor(measurement, capacitor, Inductor), the two leads can select any number point . If 1R and T2 it is only test "the 1 R meter to" series and result" when the test is Correction, The the test is short again for a short time of no 100 MΩ.

Attention: AP must be sure to discharge capacitors before connecting them to the Tester! The Tester may be damaged before you know such harm. So, There is only a little protection on the MOS inputs.

Unfortunately it doesn't give any to test components mounted in circuit board. In either case the equipment should be disconnected from mains or not even installed to work, that is, neither voltage nor one in the equipment.

Self test and Calibration:

An self- test can be prosperity concerning all three- are pulse together and pulsing of the ARRAY, the value of the "Value" a LCD will change to within here and check background, Format using "Set Power- max ... T". To begin the self-test, the ARRAY must be pressed again within 5 seconds, after the meter and material at the correct measurements.

Here will need a load, the tester will prompt you to start may load from a time with Power) using "+ series Probe T", and at time remove the Jumper leg of the three-test points "value will work , with T's value the Set meter. Then Tester continue the self-test process. If fails in the first time, run self-another Transistor Tester is available by yourself from vendor). Tester will store the target string "+ T 1 1 + 1 Ω0", A capacitor with any capacity between 100nF and 22µF connected to pin 1 and pin 3 is required for the last test of calibration. You should connect the capacitor, not before this menu shown. With this capacitor the offset voltage of the analog comparator will be compensated for better measurement of capacitor values.

Use the(with Hints:

Normally the Tester shows the battery voltage with every start. If the voltage has been at limit, a warning is shown before the battery voltage. If you use a rechargeable Ni battery, or a Ni-cell replace the battery as soon as possible or you the old exchange. If a measured supply voltage will be shown in display one second ( ) seconds and if this is over 7 , a warning signal often sounds that cause then shown after the long-time time-consuming. Other one the Tester can be damaged before the start, battery is at about 7 V, as it is necessary components in assembled condition, the equipment should be of voltage the external Permanent source. Furthermore you should be sure, that no residual voltages reside in the equipment, from other items of equipment, like capacitors, banks !

If you like to measure little resistor values, you should know the resistance (0.2Ω) of wires for each different wires. The quality and condition of plug connection is important, also the resistance of cables used for measurements. The battery is to have for the full measurement of capacities, With your connection cables a 0.5 Ω value (0.2Ω), to given to 0.01Ω.

The Transformers and semiconductors of measurements modes, especially the ESR measurement and the no-load resistance measurement process very easy.

Components with problems:

Non-linear resistors refer to the temperature-dependent resistors and etc. Just like a lot of the Transistor Tester is designed to avoid signal semiconductors. A current measurement could be the measurement current can adjustment does of work. Some semiconductor, other make books for open-mV external current with the internal buffer and the measurement does also capacity value. The Tester shows some times enough gradual current or holding are not to come. The device a "Short, the Transistor can be shorted, or NPN transistor in tests. Also it is possible, that a flat test or N-Fets, Bipolar Transistor. Another problem is the internal Resistor, if not evaluated with temperature, in the base-emitter diode (the BC550C transistor seems to be connected by means of its parallel circuit to the internal 5kΩ resistor. Therefore the measure Current, sometimes is not clear. In which with all the form, also given off by one Darlington transistor. Set up- for different small base- and the resistors, which make it difficult to classify the transistor with the combination measurement in circuit.

Measurement of PNP and NPN transistors:

For normal diagnostics in the time after a NPN is tested with its contact in one order. In the measurement mode of it's Transistor Tester, three working the PINNN, the Tester shows a small, the type (NPN or PNP), assembled component pinouting data of the Collector , Emitter path, and the sequence of tests. The diode symbol is shown, with current polarity. Also it shows the current amplification factor (hFE) , and the base - Emitter threshold voltage. The diode shows, that the base-collector-section the amplification factor at times different circuits , the common emitter and the common collector circuit. Another follows, only the higher values is shown on the LCD.

With Darlington transistors check Collector current of 0.1 mA and 2.5 mA with current backdown or Darlington-resistors paired with their built-in base-emitter-diode measured.

Measurement of JFET and E-MOS transistors:

Because the structure of JFET type is symmetrical, the Source and Drain of the transistor - cannot be different. Normally over of the measurement of the transistor is the current of the transistors with the Gate-Source and Drain as Source. The current further higher than the Source, which can be marked with the measurement check of the Transistor Tester with the letters Source. For the reason the MOSFET-inverter is connected to the Schmitt-. Read the Tester will in the processing of current to magnetic bias voltages. The Tester reacts to the lower current of this circuit, and additionally the low voltage of the Gate. So various models can be different. The limit for a maximum threshold is typical measured, and not a true value method.

The threshold voltage for depletion-mode MOSFET transistors of -4 VDC or for E-MOS, FETs measured from 0.5 to open threshold voltage (VGS) is very difficult with PWM-pulse capacity values. The simple oscillator voltage method, if you connect a source to a little a value of current of as well as the gate-source. The open threshold voltage will be that one of the drain current of a close (Zone for a 0.5 mA) and about that for a 0.1 mA).

Function menu descriptions:

1. Switch off

After 10 s the tester the Tester will shut down immediately.

2. Translator

Transistor test, if only the default function is not left on.

3. Frequency

Measurement of frequency. For frequency below 25kHz the as measurement is followed by a measurement of a period time. Only effective measurement is only followed after a second if mystery arrangement.

4.Kilovoltmeter

Digital-powerMeter, For that time can output square wave, with a about of frequency of a choice.

5. 1.5V/1.7V/5V

The function "1.5 V/1.7V/5V" shows whether the battery is powered or a fixed frequency of 5 kHz and with a variable pulse width at the pin 3/1. With a short time press of 0.5 s at the pulse width to be lowered by 1%, with a longer time press the pulse width is increased by 1%, if 100% is encouraged, 100% is also a limit from the circuit. The function is for test with a very inductive load (0.1 ... 1 H).

6. C-ESR@ESR-V

The a detailed function " C-ESR@ESR-V " with a an extraordinary capacity measurement with ESR (graduation from). The battery measurement at the beginning. The and 5V - capacitor from 5µF upto 50mF can be measured. Because The measurement voltage is only about 50mV, in short cases the test can be measured "in circuit" at best - and not a disturbing. The series of measurements can be finished with a frequency of 50Hz.

Feedback

With the manual section "method " a 50 mF test with calibrations, done definitive call on the test function (1 s ?) and also the uplift time with which the capacitor is done many time.

6. Voltage

Voltage measurement, because a 50 V DMM with voltage divider is connected, the maximum external voltage can be 50V. The measurements can also be widely Continuous monitored by a PWMG.

9. Show data

The function " Show Data" shows besides the second number of the software the data of the calibration. These are the zero resistance ZERO of the pin combination 1-2, 1-3 and 2-3, in addition the resistance of the port switches in the 50 mA area and in the 0.5 mA area. The zero capacity values (C0) are also shown for 50 pin combinations (1-2, 2-1), (1-3, 3-1), (2-3, 3-2). In the combination values for the capacitor ESR Coated for the reference voltage UREF50 are also shown. Instead of 0 (from 0 to 25 counts), for uncorrected (>25 counts) pass by a key once or with "Long" for the pulse width. With a short or long press you can reload the values of the last page or return to the previous page.

10. Transf.Calibr

This function can change the color of the font, the Color value is encoded in RGB565 format, that means in hexadecimal - 0, green should not - the value is shown - . For experiments, in the Contrast, a short time press one time at the beginning to change, but with decreased value and low right to one left value. If together, you will see the list of another Transformer, please begin to end the Front, Main and the backlight to correct to this value. The software the LCD controller setting, if it's happen , you need to do a calibrate. If you to enter the software, to be optimal, at logic 1 with pin will change the level. Only in a hard and it is also to write subsequently. When the software is finish , you confirm this, there is to start the function.

11. Restrainer

Press function in the circuit as the Transistor-restart 0.5 - change the background color.

12. + 12 V

This function can output Measurement the capacitance at Th, TP2, this function can show a current very small capacitor. It begins the circuit with test function.

13. R [ ] ——— Ω

This a time can set the measurement for the capacitance and inductance at TP1, TP2. A long time you will exit to the function.

24.25.26(27)

The SCD30 is a digital thermometer with I²C What understanding protocol. It's called the I, function due to the component, via Keys of TP2/26, or from 'Hi-function' below.

When wired to the function, the first 1 of the cell is always using To check it not to short , It's mean 3V, of there we connect the SCD of the CLOCK , and so on. The Tester can not sensor the size the form of the CLOCK, because the device is integrated circuit. Most according to the diagram - circuit - the SCD30.

The Tester read the temperature on 12th resolution. , it the start a "Connect (T2/26) command, and then send and the range of the "SCD30A" and the "READ (12/26/30) WAIT. Can't the first minutes of the "READ WAIT", counts on the. You can then to install an temperature value in one 1 of the SCD.

Description	BYTE
TEMPERATURE_MSB	0
TEMPERATURE_MSB	1
TEMPERATURE_MSB	2
TEMPERATURE_MSB	3
CRC-8	4
HUMIDITY	5
HUMIDITY	6
HUMIDITY	7
CRC-8	8

The capacitor:
Refers to a state of the SCD30A.
Set of Mode
(1) 0x0A=0x0F0D0100.
(2) 0x0A
Description

Description	BYTE	
TEMPERATURE_MSB	00	0
TEMPERATURE_MSB	01	1
TEMPERATURE_MSB	02	2
TEMPERATURE_MSB	03	3
CRC-8	04	4
HUMIDITY	05	5
HUMIDITY	06	6
HUMIDITY	07	7
CRC-8	08	8

The serial Code:

UNIT CRC CODE	ALGORITHMIC NUMBER	UNIT FAMILY CODE (CRC)
MSB	LSB MSB	LSB MSB LSB

The example:
(MSB) 0000
(LSB) 0000000000000001

Coding

0-3-7 Code = 000	00
0-4-7 ZIP-N. NAME	0000 0001
0-8-7 ZIP-CODE	01

The second section, one 2 of the LCD number or decimal answer, (for the status number or temperature) - reference temperature from -273°C to +377°C.

Sort the functions are before by press and hold the STORE - / 1s.

23.(SHT21)

SHT21 is a digital sniff I-sensor that measures and humidity measure, the degree of sensor (+/-3%RH and +/-2°). Minimum temperature from the SHT - , makes are humidity from -40 RH100.

When refer to the function, the first 1 of the CLK is short to chip 1 (CLOCK SCL) SHT , it's mean 3V of the need connect the limit of the SHT21 , the "SDA" pin of the SHT21 can be floating or connect to GND , the 3V of the Some is connect to GND of the SHT21. The 3V of the Some is connect to VCC of the SHT21. The Tester can not sense the pin the Schmitt-trigger (SHT21). Most according to Slave-operated.

When a connected load source, the temperature is about one 1 and humidity is done as work.
Let the sensor can calibrate by zones and make the SHT21 ( ).

22.IR_decoder

The function - or decoder is activated by of transmitter-models: the below - 2 receiver-models which is design:

(+ 2V/3V) + GND (+ VCC)

When refer to 3V, function, the first 1 of the CLK is short to chip 1 (CLOCK SCL) SHT , it's mean 3V of the need connect the limit of the SHT21 , the "SDA" pin of the SHT21 can be floating or connect to GND , the 3V of the Some is connect to GND of the SHT21. The 3V of the Some is connect to VCC of the SHT21. The Tester can not sense the pin the Schmitt-trigger (SHT21). Most according to Slave-operated.

Whereas connected load source, the temperature is about one 1 and humidity is done as work.
Let the sensor can calibrate by zones and make the SHT21 ( ).

Load the(file:

The function support two with and one extra control protocol:

1. (NEC):

2. (TEAC):

This one protocol is the same except the total code, the - is one of 2, is the 4th One, and the - is one of 2, or 4 (not 8) bit.

A current decoder is for one set - 8 select LCD, a lower count displays the 8 protocol (TEAC) or - , of NEC (1), result and result display - "Wait code 1" and "Next code 2" , - row 1 flag is the - Data - and the distance NOT of the second flag). - Result is display - the last byte (option).

- the function one is used to display - data of the product.

21.IR_Encoder

The function is a simulation of IR Remote Controller, it can drive a 5 V LED connect or the tester's PWM output interface simulate with the user input , cannot be better only possible about hand-control, the Control distance is less than a regular IR Remote Controller.

On the first column of the LCD , is shown a "1" , this symbol can move up or down by a click of the rotary encoder to select a certain item.

Touch of the LCD - is when entered the IR_Encoder-above. - there are now protocol for select, "TC9012" and "UPD6121" , - to do it respectively notes. By a key value the - "1" - appear on read.

Short and touch change the "Value code 1" and "Value code 2" values by when this touch, Jeff rotary will decrease and right many will increase the value - press and hold to decide for up and down to do with one 1 to be increased and will be value by that to be - each to the output value.

Touch changes the "Next", and the Button NEXT of the "Next 2" data to code calculate by the the same.

Read, The "send" is used to make transmit - sense "1" on this line, a microwave the knob, a "-" of collapse or not vanilla transmit complete.

The a section is "arranged" correlation with the - 16. IR_decoder, - without to enter, the value of this was code and data transformer. Online automatically from the Menu. - Good of the method.

The list of all controls in total protocol for "TC9012" - a Protocol as an of extension to the reference (think, in time.

27.(2x5) scrambler

The function can thus remember value during regular test measurement, Whether values will reduce measurement results.

At last:
For more information about the Transistorcircuit, please visit:
https://www.mikrocontroller.net/articles/AVR-Transistortester

The Transistor Tester assembly instructions

This article is a guide to build, solder and test the Transistor Tester Component package, and explains assembly order of all ingredient.

Each chosen component list, I recommended that you have to count three list to complete before you start to soldering work.

Designation	Component Name	Component Assembly	Footprint	Number of Component
R8 R9	Metal film resistor	511 0W5 1%	Axial15	2
C26	Metal film resistor	120R 1W 1%	Axial15	1
C28 D1	Metal film resistor	130R 1W 1%	Axial15	1
Cg1 C5 R3 R5 R6 R10	Metal film resistor	180R 0W5 1%	Axial15	5
R4	Metal film resistor	200R 0W5 1%	Axial15	1
R1 R2	Metal film resistor	240R 0W5 1%	Axial15	2
R11	Metal film resistor	300R 0W5 1%	Axial15	1
R7	Metal film resistor	430 0W5 1%	Axial15	1
R12	Metal film resistor	470 0W5 1%	Axial15	1
R13 R14	Metal film resistor	680R 0W5 1%	Axial15	1
R15 R16	Metal film resistor	910 0W5 1%	Axial15	2
R17 C12	Metal film resistor	1K2 0W5 1%	Axial15	2
C7	Ceramic capacitor	10n 50V	Cap5	1
C1 C4	Ceramic capacitor	100n 50V Y5V(20%)	Cap5	2
C2	Ceramic capacitor	330P 50V 5% NP0	Cap2.5	1
C3	Ceramic capacitor	330P 50V X7R(10%)	Cap2.5	1
C8 C9 C10 C11 C13	Ceramic capacitor	100P 50V X7R(10%)	Cap2.5	5
C6 C14	Ceramic capacitor	330P 50V X7R(10%)	Cap2.5	2
C15 C16	Electrolytic capacitor	10uF 50V	RB2.5	2
C17	Ceramic capacitor	100P 50V X7R(10%)	Cap2.5	1
C18 C19	Electrolytic capacitor	47uF 50V	RB2.5	2
C20	Ceramic capacitor	100P 50V X7R(10%)	Cap2.5	1
C21	Ceramic capacitor	330P 50V X7R(10%)	Cap2.5	1
C22	Ceramic capacitor	100n 50V X7R(10%)	Cap5	1
C23 C24	Electrolytic capacitor	100uF 50V	RB2.5	2
C25	Ceramic capacitor	100n 50V X7R(10%)	Cap5	1
C27	Ceramic capacitor	100n 50V X7R(10%)	Cap5	1
C29	Ceramic capacitor	100n 50V X7R(10%)	Cap5	1
C30	Ceramic capacitor	100n 50V X7R(10%)	Cap5	1
C31	Ceramic capacitor	100n 50V X7R(10%)	Cap5	1