

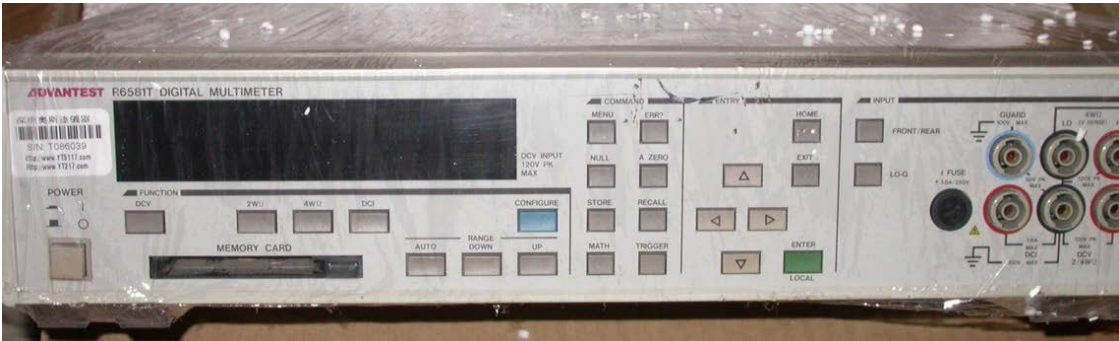
38 degrees enthusiast forum --38Hot Volt-Nuts instrument benchmarking tool electronics enthusiasts Professional Forum

Title: love Wan eight and a half multimeter Advantest R6581T [\[Print\]](#)

Author: lymex Time: 2009-3-21 16:36
Title: love Wan eight and a half multimeter Advantest R6581T
[Arrival and unpacking](#)

A whole week, Friday finally arrived. Originally seller promises Express, the results issued by the logistics, so I went to the place to mention 20km outside. I let them go to town so I pick up even more convenient, but it took me more than 25 yuan. Packaging is also good, look good carton, so the logistics of the delivery did not open look.





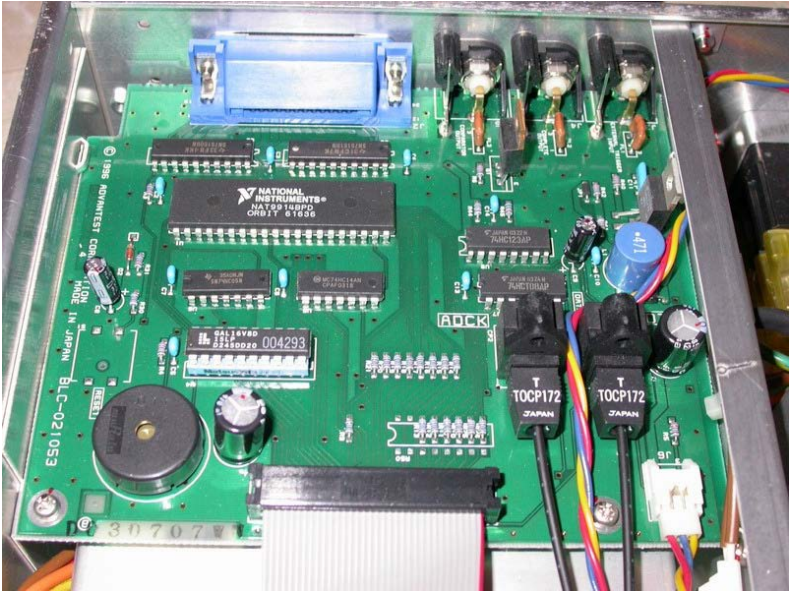




Author: lymex **Time:** 2009-3-21 16:41
Open the package when it is in the elevator hall, actually did not take the keys, close the door to lock yourself outside it!
No way, spend time with a knife to open the back cover, took a few pictures inside. Originally want to continue opening the lid, but the frustration screws too tight, knives are not bad twist open.
LP came back 20 minutes later, relieved, and only then hold the baby into the house.







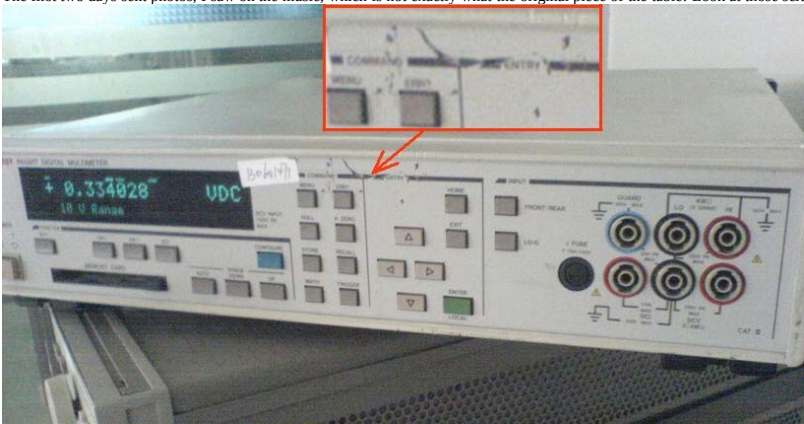
Author: lymex Time: 2009-3-21 16:51
[Buy and Price](#)

Words to a long, long wanted to buy a R6581T.
2 years ago in Shenzhen, a site found this table, you contact phone to buy, but the pricing is relatively high, but have not found the right person to talk about the price, they put down. At that time he had married a famous Agilent 3458A eight and a half, is the honeymoon, so not very concerned for Fannie and Freddie come and go. This was the picture:



Last week a friend of Shenzhen to the second-hand business, where to buy things, to see this R6581T, called to ask me if I want to say okay price. Sales MM told me on the phone, saying that this table to sell well, now only last as long as I sell cheap fast 2W. I say expensive cheaper? Then do not, anyway, I have a better half with eight. MM said that he could be cheaper, promise me send photos over.

The first two days sent photos, I saw on the music, which is not exactly what the original piece of the table! Look at those scratches:



Obviously, this table has a full two years nobody cares, but also sold well too!
Do not take the initiative, until noon, when called to ask if there MM received photos consider how this table belittle my first meal, what dysfunction, poor performance, as well as words such as NPLC like she was not even guarantee ever heard of, and then I asked her how long you are to the company? The answer was more than a year. I said I knew this table, certainly not sold well, but age is greater than your company, do not believe you asked your boss, two years ago, he wanted to sell to me I did not want to. He did not immediately word. Finally, the financial fed machine has moved out, talked about 8k package fast.

單位	數量	單價	金額	備註
台	1	8000	8000.00	

After the run out, JS or JS, has been looking for all kinds of reasons to delay shipments, and finally became a courier road transport. However, look at the package arrived safely well, gave the copies of a pen and the power cord, spared her. [S: 14]

Simple evaluation: design concept is relatively new, reasonable structure, material fairly solid.
Volume point of view, the thickness is 88mm, 89mm is slightly smaller than the 3458A's a little bit. But the depth is 450mm, 10 percent smaller than 3458A of 500mm.
Weight is 7.8kg, considered relatively light table, the Japanese philosophy. Contrast: 3458A is 12kg, while 1281 is 13.5kg
With side and carry hand side of the base, easy to carry.

Author: lymex Time: 2009-3-21 17:01
[Interior image](#)

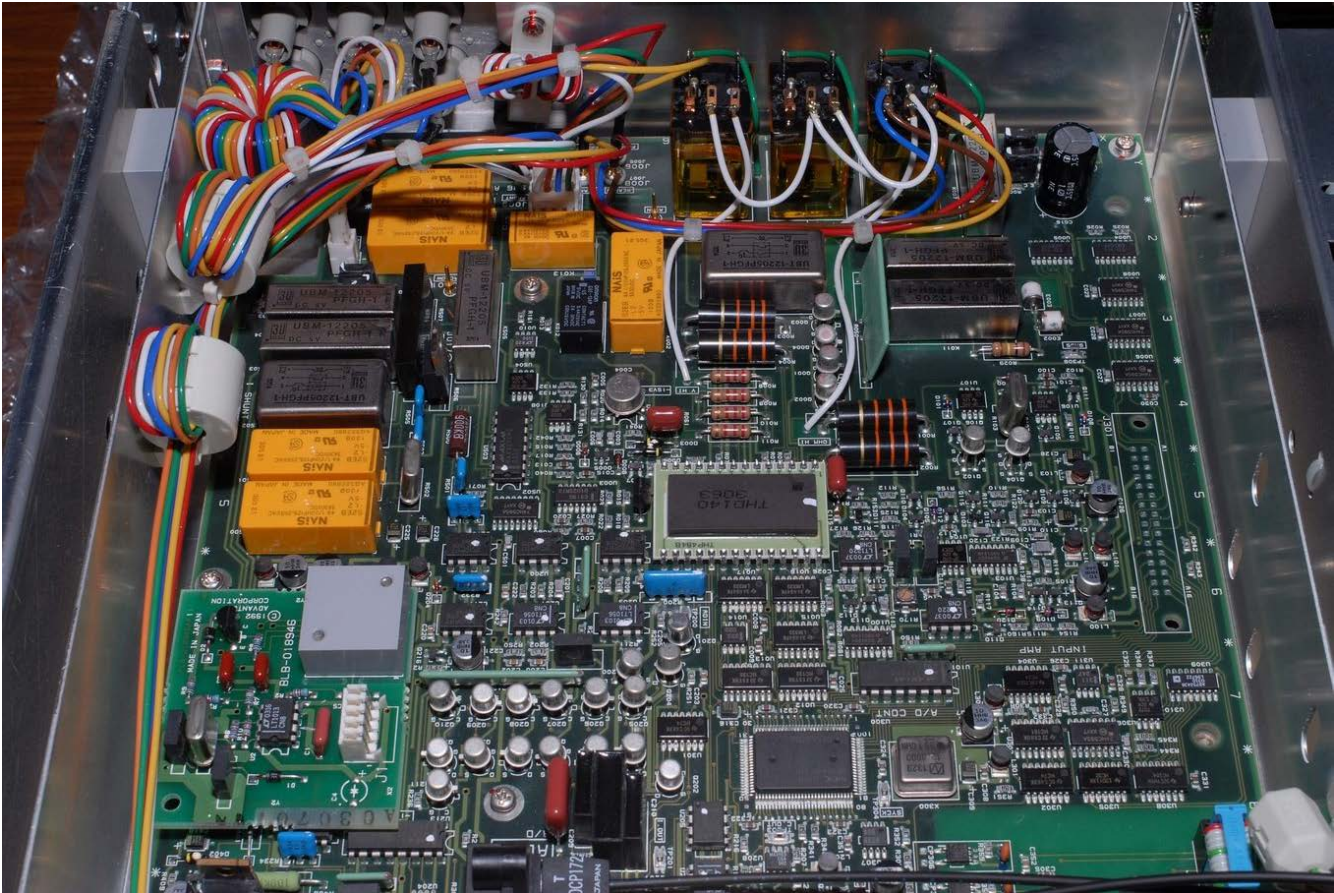
Once home to not worry the power, the first thing completely stripped, took four photos.
The following few pictures actually great, click on the picture shows that the original big picture.

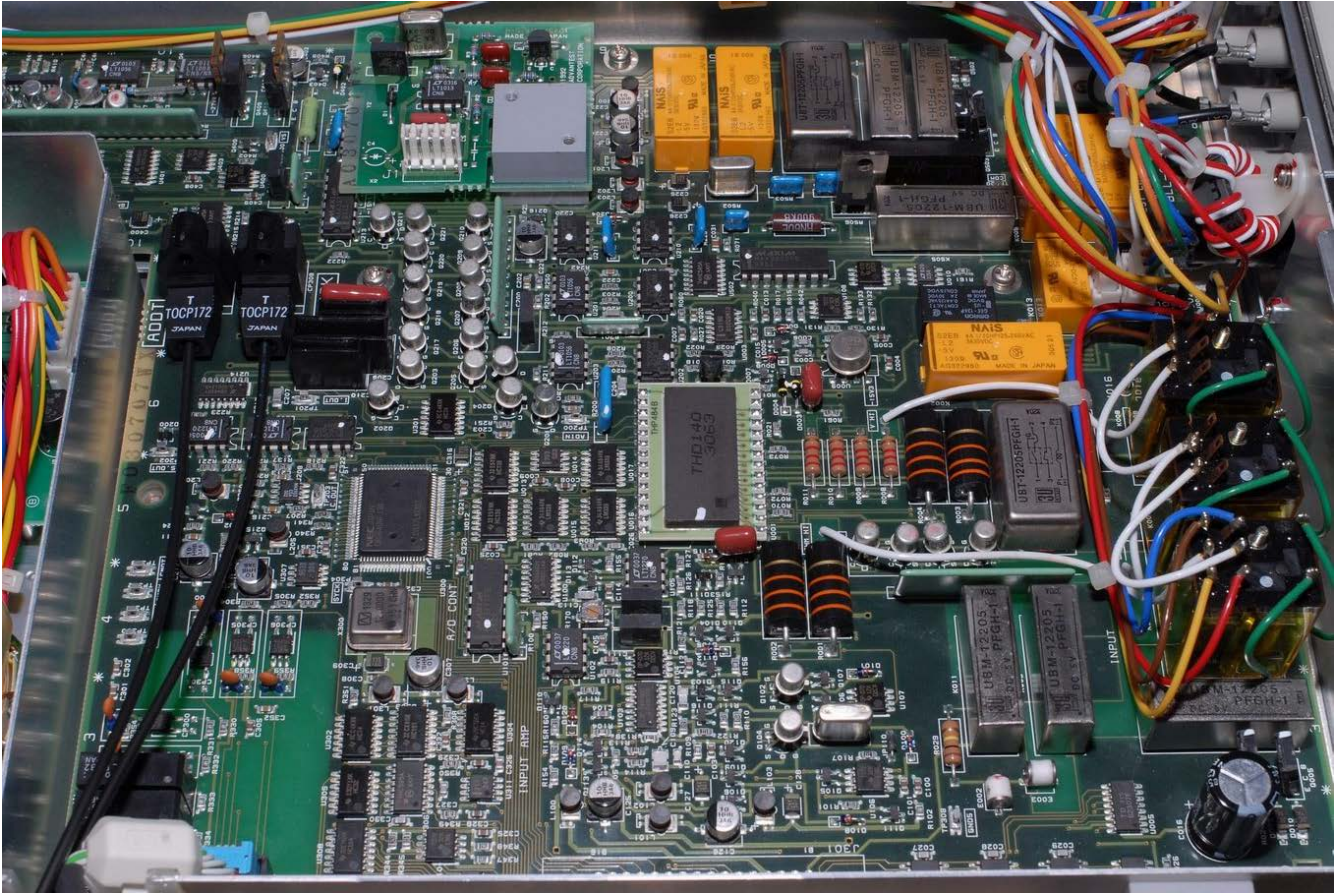
From the layout of the structure, part of a single-layer circuit board! This table is rare in the high station.
1271/1281 are two sides of a double layer structure (ie, the cover is open and the lower lid open all were able to see the front panel, back to back double plate relative installation), there are motherboards, communication boards, Ohm board, digital panels, the structure of the HP3456 similar.
3458 is similar double upper board including motherboards, small power panels, digital board, following a power board, ADC board.
But 6581 is only one layer, board a small number, only the motherboard (relatively small), small power panels, digital board, interface board.

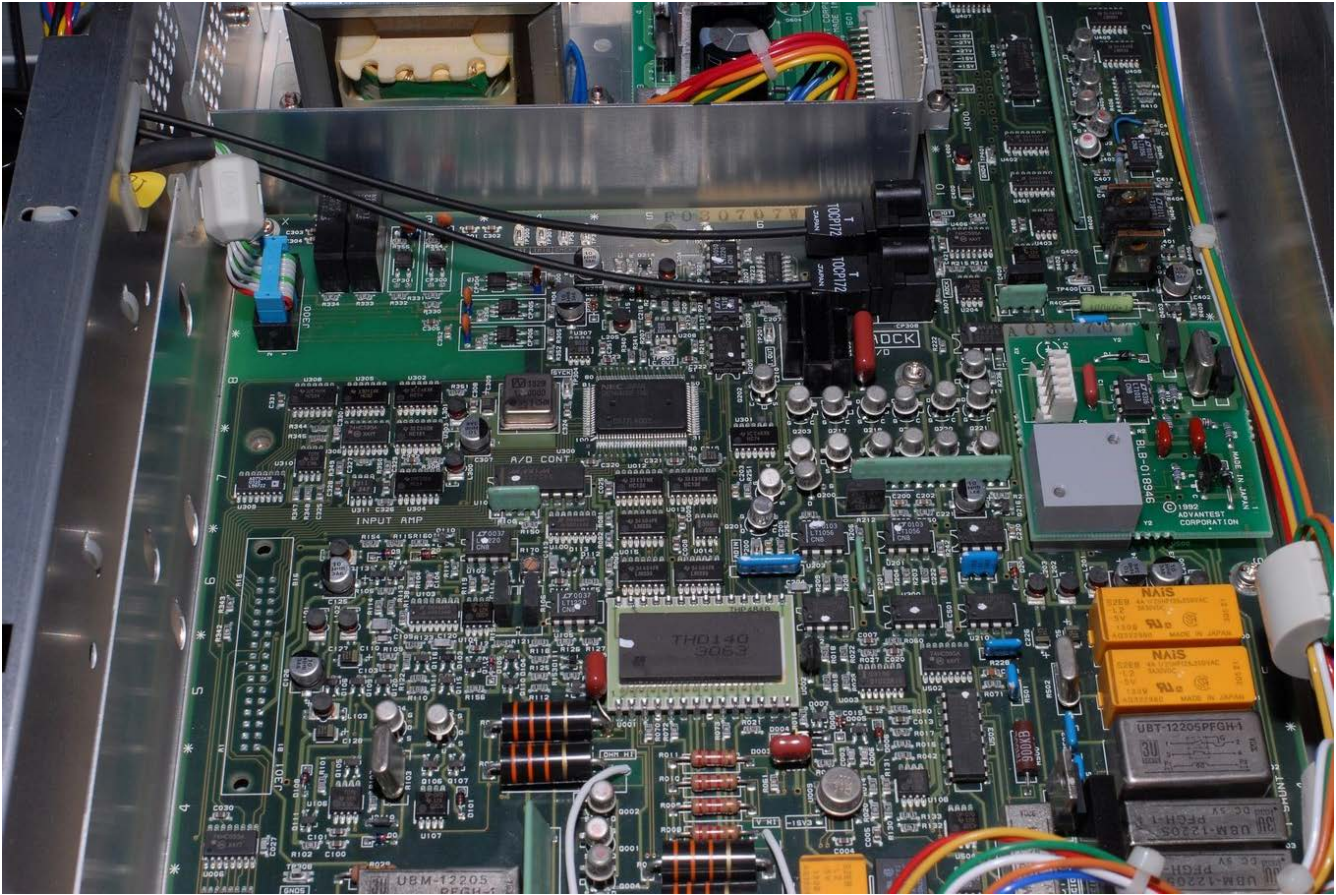
Also, mark the point of view from the motherboard, which is 1995 6581T design. This time six years later than 3458A, there is sufficient time for reference. On the other hand, many of the tables on the date of IC 2003, so this form of production date no earlier than 2003, it is likely that 2003 production.

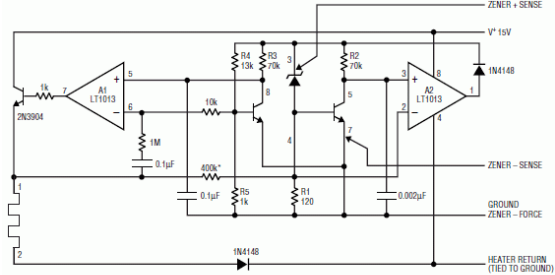












*PROVIDES TC COMPENSATION, DELETE FOR L1Z1000A
APPROXIMATE CHANGE IN REFERENCE VOLTAGE FOR A 100ppm (0.01%) CHANGE IN RESISTOR VALUES:

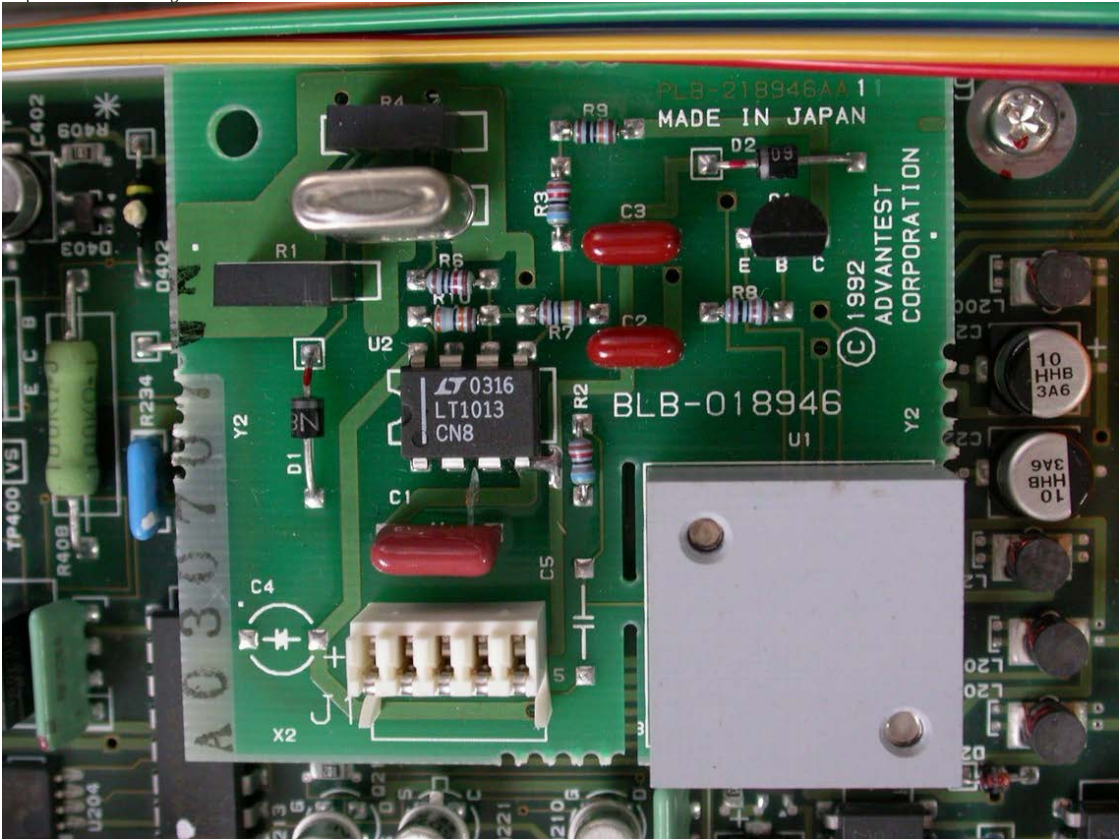
R1	$\Delta R(\alpha)$	ΔV_Z
R2	0.012 Ω	1ppm
R3	7 Ω	0.3ppm
R4/R5 RATIO	7 Ω	0.2ppm
	$\Delta R = 0.01\%$	1ppm

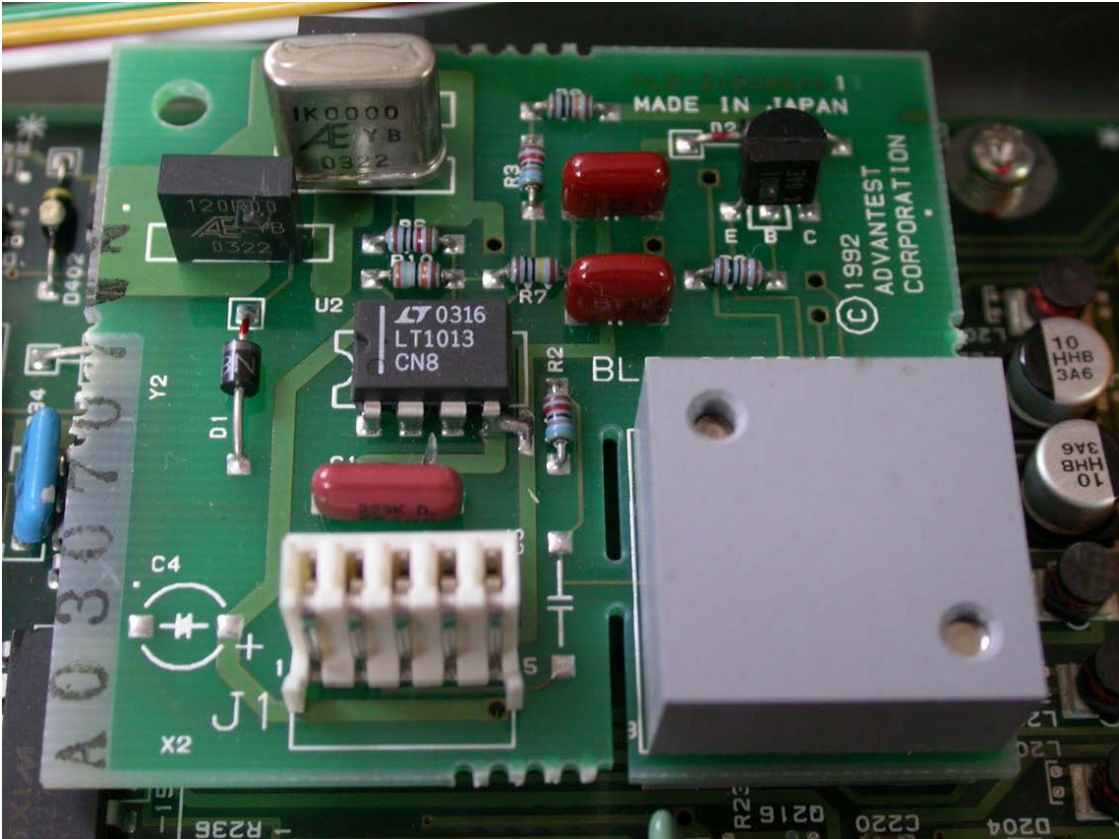
BOTH A1 AND A2 CONTRIBUTE LESS THAN 2 μ V OF OUTPUT DRIFT OVER A 50°C RANGE

R1 = 120 Europe and R4 = 13k resistor is normal, is AE plastic blocks, but is actually AE R5 = 1k gold seal! Is a waste, right? Do not they know 1k / 13k is the ratio of the partial pressure of the pair? Incumbent should have replaced the gold seal is only for a useless!

That one small resistor will change when the output is 0.4ppm 100ppm impact. And such a small 1% metal film, to reach 0.05% annual change is also possible, so that there is 2ppm impact on benchmark it! Also, who can guarantee that the temperature characteristics of this resistance is not more than 0.05%? Although aging and can be controlled through the screening method, but the core part to make a drag a little resistance, it should not be. [S: 9]

However, the use of the reference CH suffix, coupled with the temperature rise of the table is not high, it is possible to use 13k of R4, such LTZ1000 internal temperature is not very high, only about 60 degrees, so the aging is not serious. Contrast: 3458A inside with a 15k, the temperature is about 90 degrees.





Author: lymex Time: 2009-3-21 18:33

Internal View: current sense resistor

Like with the 3458A, 6581T full-scale current from 0.1uA until 1A, a total of 8 files. Drop is 100mV, therefore, 1A is 0.1 ohm R507, and 100mA is another series with a 0.9 ohm R506 become a European, and so on, until the series 0.1uA 900k of R500 become 1M. It is worth noting that 90 Euro and 900 Euro is a two-resistor.

0.1 Europe in which to achieve due to dissipation 100mW, so the volume is relatively large, is rectangular 4-wire resistance, did not get to take pictures when the nameplate, as if AE metal foil;

0.9 Europe dissipation 9mW, resistors in TO220 package.

Back resistance are good, 9Ω, 90Ω, 900Ω with three blue metal foil, 9k using AE gold seal, the resistance appears to be used as an internal reference.

90k still blue metallic foil, but high-value resistor 900k's hard to find a good resistance, the brown seems to have very good resistance.

測定精度：積分時間100PLC設定時、相対精度の表示は（読みのppm+レンジのppm）

レンジ	24時間	90日間	1年間
	23℃±1℃	23℃±5℃	
100nA	10±400	25±400	25±400
1000nA	10±40	15±40	20±40
10μA	5±10	15±20	20±20
100μA	5±10	15±20	20±20
1000μA	5±10	15±20	20±20
10mA	10±10	15±20	20±20
100mA	20±10	25±20	30±20
1000mA	100±10	100±20	110±20

23℃±5℃ 90日間、1年間の精度はINT CAL後24時間以内で規定

Judging from the indicators, 0.1uA current, indicators are 25ppm / year, very good

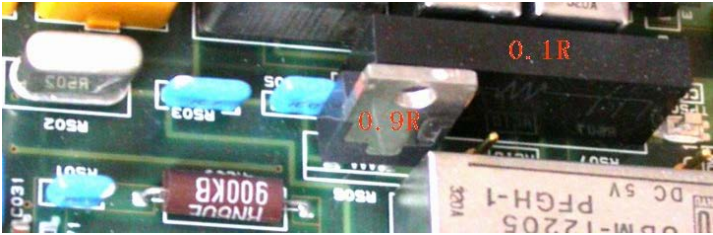
1uA to 10mA of 5 files are 20ppm / year, very good.

100mA current is large, the resistance is not easy to do, as 30ppm / year, not easy

1A current, resistance done, heat is also large, the worst performance for 110ppm, which is 0.011%.

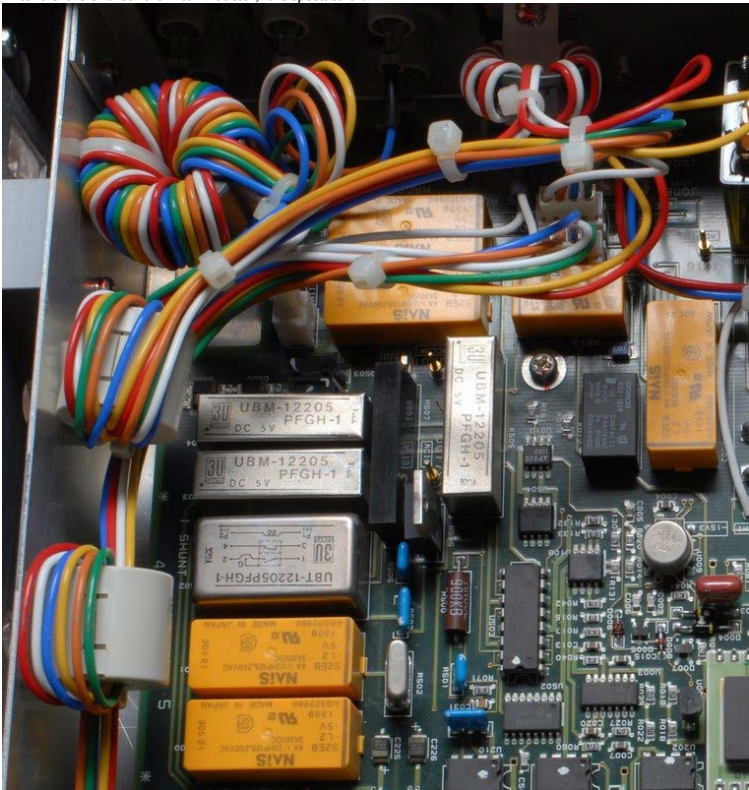
Stability and 3458A than current worse. For example, for 1mA stalls, although the uncertainty is 20ppm, but the increase 3458A only 5ppm, but 6581 will increase 20ppm up! Thus, the actual full-scale indicators 3458A well as 25ppm, while the 6581T on only 40ppm of.

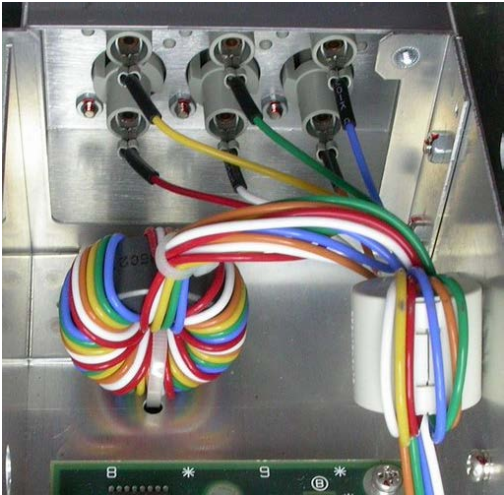




Author: lymex Time: 2009-3-21 18:48
[Internal View: input filter](#)

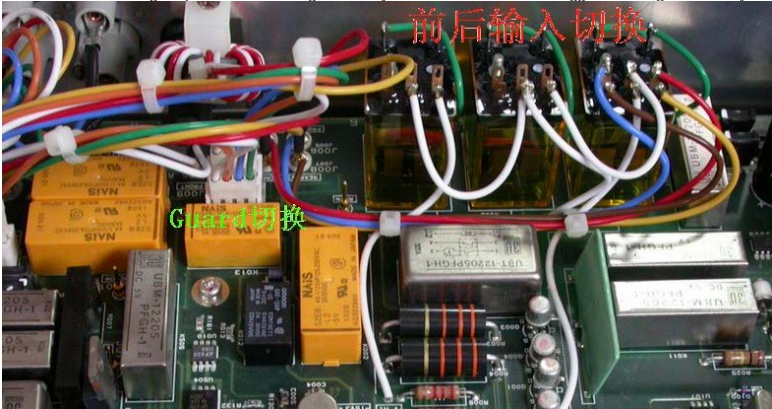
Enter a share of around 6 filter inductor, it is spectacular.





Internal View: Relay

6581T extensive use of relays. In addition to conventional voltage resistor current stall switch, the front input is also used to switch the relay, while also protecting the relay switching. Comparison: The two switch 3458A is carried out with a mechanical switch. The benefits of a mechanical switch is a good performance and high reliability at the same time. But the biggest advantage of the relay switch can be programmed, can be automated.

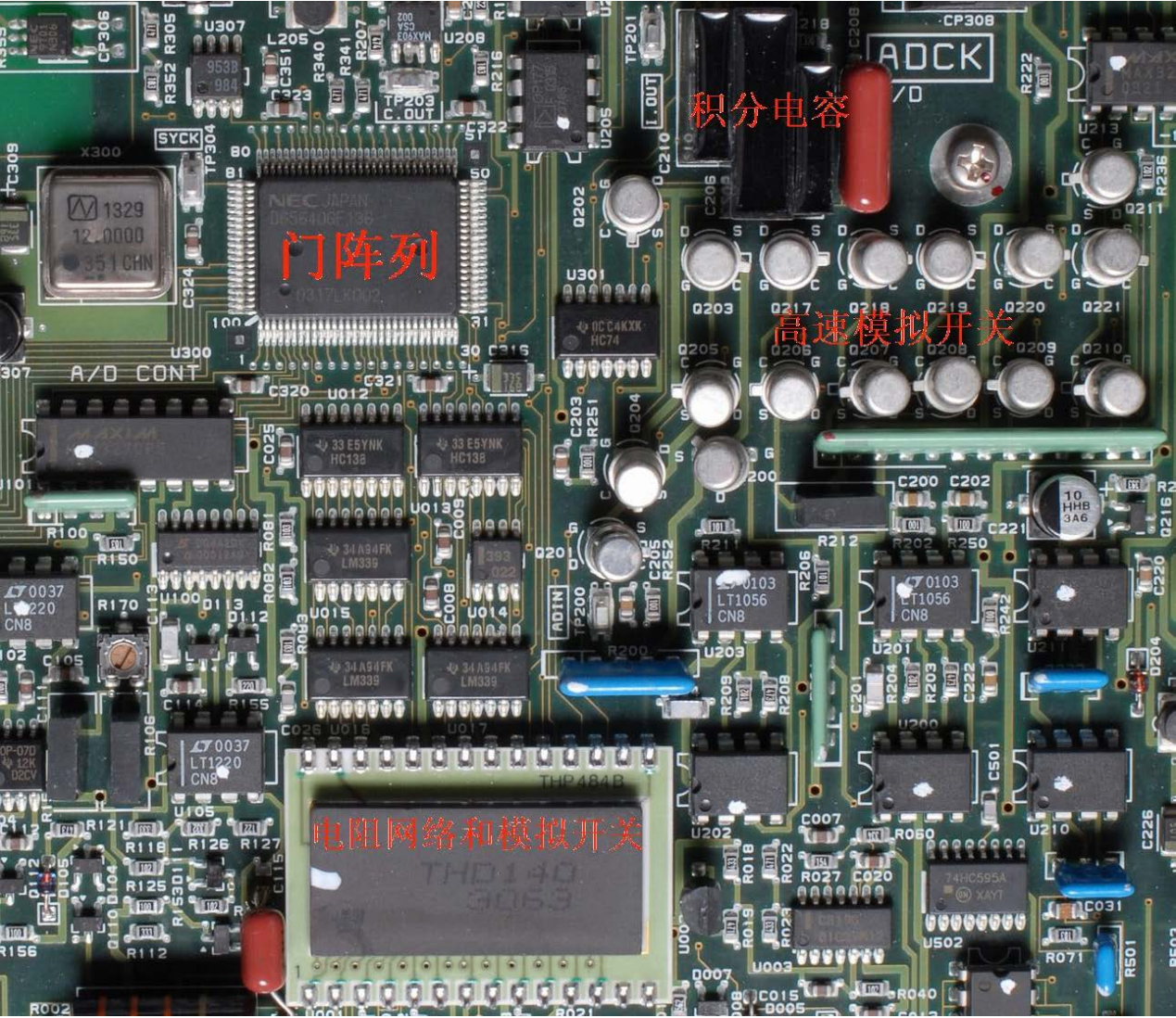


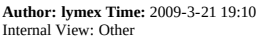
Author: lymex **Time:** 2009-3-21 19:01

Internal View: ADC

This is a table of eight and a half heart, and in Aeon's help, identifies the most critical components are marked on the map, click on the big picture can be seen.

According Aeon speaking, the same as 6581 with 6871, the ADC is not integrating with resistor capacitor with a constant current source. With the reference input voltage control with constant current source. 6871 is an integrating capacitor. And 6581 is three. So compared to other ADC section 6581 of two more double-integrating ADC obvious OP. But he is based on how much their switch to judge. And 6581 is a 4-layer circuit board. So many things are not too easy to see.





ADVANTEST R6581T DIGITAL MULTIMETER

深圳奥斯特儀器
S/N: T086039
Http://www.YT217.com

9.9999527 kΩ4W

10kΩ Range

DCV INPUT 120V PK MAX

POWER

FUNCTION

DCV

2W() 4W() DCI

CONFIGURE

MEMORY CARD

AUTO RANGE DOWN UP

STORE MATH

Test 10V noise
 When NPLC = 50 when, Allan = 0.02ppm, 0.01ppm only twice 3458A, and very good. In addition, when NPLC = 10 time, Allan = 0.027ppm, is 1.6 times 0.017ppm 3458A's also good. Here is a video, you can see how the fluctuations in its bottom.

 [DSCN6727-NPLC10.rar](#) (1.29 MB, Downloads: 827)

Attached: R6581 brief index
10VDC file: 0.5ppm (24 小时), 5ppm (years)
10kΩ: 2ppm (24 小时), 8ppm (years)
Current file: 5ppm (24 小时), 20ppm (years) (For 10uA, 100uA and 1mA)

The following two sites, there is the original data downloads, 6 pdf file
http://www.adc-tech.co.jp/techin...nt/jlist/c_6581.html
http://www.adc-tech.co.jp/techin...6581D/c_R6581D.html

Author: Jianneng **Time:** 2009-3-21 19:53
Many of the city's measurement test, you may not have such a configuration!
I do not know what the landlord to buy such a good multimeter to do with? ~~~ Standards or do?

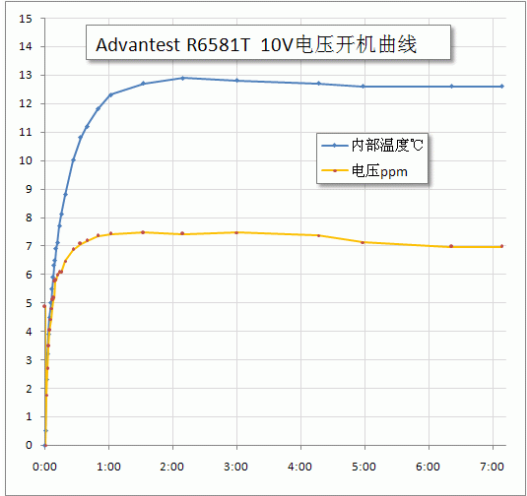
Author: lymex **Time:** 2009-3-21 20:02
[10V power on characteristics of the test](#)

R6581T boot quickly, about 0.3 seconds after the boot screen lights up to show the boot screen:

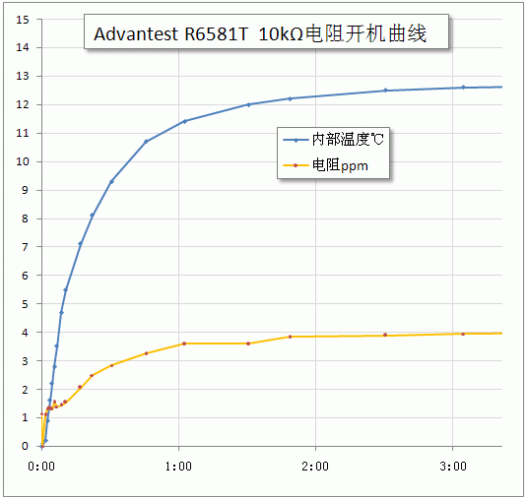


Visible, said he was R6581D, this D is the "only direct" means there are instructions in the manual. Therefore, the suffix T is actually a variant of D only, in fact, D.
After the show about two seconds to start the self-test, the display "Running Self Test". Then when you enter the test in 3.8 seconds. In other words, the boot time of less than four seconds.

10V voltage boot feature, you can see the characteristics of a good half an hour on the basic stability of 0.5ppm into the final.
Temperature of 13 degrees, is not high. And one hour later in the boot basically stable.



10kΩ four-wire resistive boot feature, you can see the characteristics of a good, the overall change in less than 4ppm, 2 分钟 removed if the initial warm-up baseline, the overall change in & lt; 3ppm. 1 hour on the basic stability of the boot, into the final of 0.5ppm.
Similar temperature.

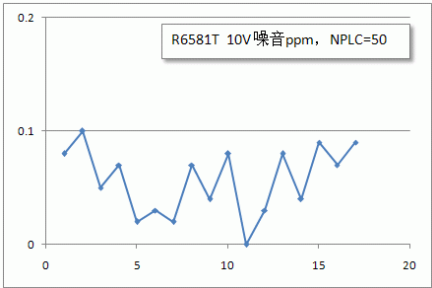


By the way, the above is included in the temperature curve, the internal temperature detection value 6581, and can be read out via two keys (see below MENU). Contrast: 3458A also has a temperature detection, can press three keys to read the temperature value on the panel.

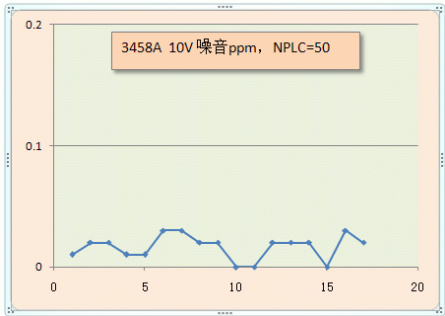
Author: lymex Time: 2009-3-21 20:07
Noise / short-term stability test

Noise or a bad short-term stability properties, it will directly affect the performance of the high table, is one of the important indicators. Because it would make the readings are always changes, causing errors. Of course, sometimes reading indeed change, but not necessarily a question of the table, it may be that you are measuring the voltage itself changes, such as measuring the AC voltage changes very large. Even a seemingly stable test battery, and indeed change, because the self-discharge or temperature coefficient. Do not underestimate them, a high resolution high tables can be easily seen. For example, a battery self-discharge 10 days due to drop 0.1V, which is 10 seconds decline 1.2uV, which is very big. Because the test is 10 seconds too long, changes a good table & lt; 0.1uV. In addition, once the battery touched by hand, there is a relatively large temperature changes, so that the voltage variation due to the temperature coefficient is also very impressive. Therefore, during the stability test, you must choose a good benchmark. Here I use the Fluke 732B 10V thermostat benchmark. This benchmark short-term stability in all the benchmarks can be considered the best.

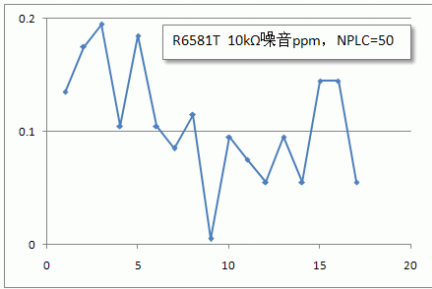
10V 10V range measuring benchmarks 732B, NPLC = 50 (1 measurements per second, but in fact with the Auto Zero for two seconds), continuous sampling 17 times. You can see that the change is 1uVpp, that is, short-term stability of 0.1ppm (peak to peak). Still can, of course, with the 3458A 0.03ppm than there are still gaps. 3458A previously recorded video: <http://www.dl-car.com/~2038/DSCN9625.MOV>. After calculation, Allan variance of this test is 0.028ppm.



Contrast, 3458A test results. This is a new test, Vpp noise is only 30% 6581T, and Allan variance 0.008ppm. In other words, 3458A 6581 noise is 30%.



10kΩ file standard 4-wire resistance measurement 10kΩ SR104, NPLC = 50, 17 consecutive samples.
You can see that the change is 2mΩpp, that is, short-term stability of 0.2ppm (peak to peak). Still it.
After calculation, Allan variance of this test is 0.045ppm.



Author: lymex Time: 2009-3-21 20:27
Using the Operation

 Normal operation is very simple, displayed below DCV, 2W, 4W, DCI, corresponding to the DC voltage, 2-wire resistance, 4-wire resistance and DC current can directly click can be tested;

Shift automatically (by default), you can also manually. AUTO key to select Auto, DOWN and UP to select manual or shift upward.



CONFIG for configuration settings button (see below)

MENU for the menu button (see below)

ERR? To display an error message that the finished press EXIT to exit. This is very good, do not check the manual. Many tables only give an error code.

NULL can be cleared or restored cleared. Similar electronic scales peeled.

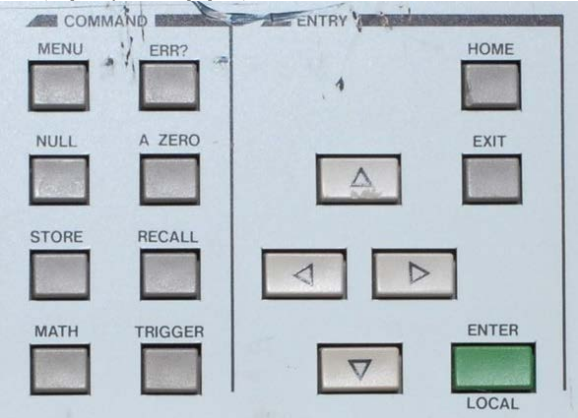
A ZERO automatic zero switching. AZero display indicates the open, before each measurement point regarded internal short circuit test once, then after subtracting the external test, and therefore twice as slow.

STORE to save the data to internal memory or external memory (depending on the setting). 10000 data memory maximum sustainable saved until then STORE stops

RECALL view saved data. You can look up and down keys manually using the Manual option. When Auto option given after Star # and Stop #, quickly show again

MATH Math switch. For example, can be converted into ohm RTD (Pt100). MATH function in the end depends on what settings (see below)

TRIG (temporarily unknown purposes)



 Menu settings menu is the tree, press the MENU key to enter the left and right cursor keys to see similar items, Enter entry / execution, Exit to return to the previous menu, HOME return.

MENU (in bold is the province)

ACCESSARY: NONE

BEEPER: **OFF** ON

CALIBRATION

EXTERNAL: **ZERO-FRONT ZERO-REAR** DCV OHM (these latter two is double the benchmark calibration)

INTERNAL: **ALL** DCV OHM (similar 3458A of ACAL)

DATA-FORMAT

DATA-FORMAT: **ASCII** REAL64

ELEMENTS **NONE** HEADER: OFF COMP: OFF WIRECHECK: OFF CHANNEL: OFF NULL: OFF DFILTER: OFF FORMAT: OFF TIMESTAMP: OFF

DISPLAY OFF **ON** (Tony turn off the test results showed that DISPLAY OFF)
GPIB
ADDRESS (**24**)
MODE ADDRESSABLE TALK-ONLY (this can lly a GPIB card)
LANGUAGE SCPI **ADVANTEST**
INTERNAL-TEMP (internal temperature display)
LINE-FREQ **50HZ** (this is automatically selected)
MEMORY-CARD FREE INITIALIZE TRANSFER DELETE
RESET

CONFIG setup / configuration
 This can set a lot of useful items, such as integration time election, the election shows the median, the lower limit is set on the ohm, power, protection, or set the math methods.

CONFIG setup / configuration CONFIG-DCV:
INTEG-TIME: 1u, 2u ,, 10us, 10u-100us, 100u-1ms, 1m-10ms, 1- **10** PLC, 10-100PLC
DIGITS: 4.5 5.5 6.5 **7.5** 8.5
PROTEST: Off **On**
RATIO: **off** on

CONFIG-2WΩ:
INTEG-TIME: 1u, 2u ,, 10us, 10u-100us, 100u-1ms, 1m-10ms, 1- **10** PLC, 10-100PLC
DIGITS: 4.5 5.5 6.5 **7.5** 8.5
MEASURE **NORMAL** OHM-COM
RANGE-LIMIT upper 10 100 1K 10K 100K 1M 10M **100M**
RANGE-LIMIT lower **10** 100 1K 10K 100K 1M 10M 100M
POWER **HI** LOW
PROTECT OFF **ON**

CONFIG-4WΩ:
INTEG-TIME: 1u, 2u ,, 10us, 10u-100us, 100u-1ms, 1m-10ms, 1- **10** PLC, 10-100PLC
DIGITS: 4.5 5.5 6.5 **7.5** 8.5
MEASURE **NORMAL** OHM-COM WIRE-CHECK
RANGE-LIMIT upper 10 100 1K 10K 100K 1M 10M **100M**
RANGE-LIMIT lower **10** 100 1K 10K 100K 1M 10M 100M
POWER **HI** LOW
PROTECT OFF **ON**

CONFIG-DCI
INTEG-TIME: 1u, 2u ,, 10us, 10u-100us, 100u-1ms, 1m-10ms, 1- **10** PLC, 10-100PLC
DIGITS: 4.5 5.5 6.5 **7.5**

CONFIG-STORE
INTERNAL (BUFFERED PRETRIGGER) MENCARD
DATA PANEL

CONFIG-RECALL
INTERNAL (BUFFERED PRETRIGGER) MENCARD
DATA PANEL

CONFIG-MATH
DFILTER
FORMAT
COMPARATOR
STATISCICS

CONFIG-TRIGGER
TRIG
SCAN
ARM
INITIATE
SLOPE
LEVE
LAYERDISP
FASTMODE
HALT

Author: lymex **Time:** 2009-3-21 20:28

Calibration

6581 provides a very convenient dual reference calibration function, that is, you can use two 10V and 10k base, you can complete all the DC calibration. This feature is only 6581 and HP / Agilent 3458 has.
Which HP / Agilent 3458A provides a very broad reference input values, such as the reference from 1V to 12V 10V can, 10k base from 1k to 12k can be. Of course, the use of less than 9V or 9k baseline calibration, will correspondingly reduce the uncertainty of the calibration.
For example the use of 7V to 3458 calibration, calibration probably make Uncertainty decreased from 0.5ppm to 0.6ppm.

6581 pairs of baseline requirements more stringent, such as 10V 11V baseline requirement is less than 9V, 10k benchmarks between 9k to 11k.

Continuous preheating hours, after recording the current error, he decided to be calibrated.

Connect 4910-10V reference voltage, find Calibrate the Menu, the election External, DCV, 4910 actual input voltage value 9.999995, press OK, calibration begins.
Judging from the display, first external calibration internal 7.2V, and then transferred to the internal calibration, 10V, 1V, 100mV, 100V, 1000V, internal temperature. About three minutes after the calibration is complete.
At this time, 6581 to normal voltage measurement mode, and then look at the readings for 9.9999921V, lower than expected deviation of 0.29ppm.
This shows that the 6581 calibration uncertainty is quite large, this result is not very good, because the 3458A calibration deviation does not exceed 0.1ppm

Then take a good SR104 This 10k standard resistance (actual resistance 10.000022k), after also set to start the calibration.
Judging from the display, calibration steps are:
External and internal 10k 10k synchronize internal 10k, 100uA, 1mA, 10 in Europe, 10mA, 100mA, 1A, 100k Europe, 1uA, 1M Euro, 10M Euro, 100M Europe, 1G Europe, the internal temperature to complete the reading and then look for 10.000015k, under way off 0.7ppm. This

result is not very good, because the 3458A calibration deviation does not exceed 0.2ppm

Author: lymex **Time:** 2009-3-21 20:52
[Advantages / Features Description](#)

A fan wind small, very quiet, obviously this table do not consume large enough so a small fan. Another fan is pumped out, so that it is reasonable. Contrast: 3458A noisy, but the inside is blowing (has made me into a draw).
2, the power is not high. AC side current direct test 159mA, so the only apparent power 35VA. Later, with 0.5 watts meter test, the active power is 28W, power factor of 0.8.
Small power consumption means less temperature rise, preheat time is short. Compare: 3458A power consumption of 27W, a little smaller. R6871E jump 240V power consumption is 18W.
3, double-line dot matrix display. Thus, the display state, the display information is very convenient. Compare: 3458A is a single-line dot matrix.
3, the keyboard is simple, important key press, the cursor keys are arranged in line with the habit, and with the implementation of the key, the backspace key on a group.
4, the operation is very friendly interface, menus and configuration is a tree, and display all content in English, it is easy to use, does not require manual. To be honest, 3458A into my hands for two years and a half, and only 30 percent understand. The 6581T just get one day, to understand the extent of more than 30%.
5, the internal real-time clock, you can easily record the sampling date and time. Just machines, the time difference with Beijing just one hour, the Japanese time, indicating that the table is then removed from the Japanese mainland has not been adjusted. Contrast: 3458A no real-time clock.
6, **two reference calibration!** That is only 10V and 10k to complete all the calibration, very convenient, and 3458A exactly the same. Double the benchmark calibrated multimeter only two, no more. To calibrate other tables must be carried out by stalls, under amateur conditions are very troublesome.
7, the index is still relatively high, such as 10VDC is 5ppm / year, 3458A is 8ppm ordinary, 4ppm high stability options. 10k 1 year is 8ppm and 3458 is 10ppm. Current speed indicators are 20ppm / year.
8, the measurement speed. In the seven and a half, eight and a half occasions, only just (eight and a half per second, five times and six times per second difference) slower than the fastest 3458A 1/6, the other eight and a half (such as Fluke 8508A and Datron 1281) far behind.
9, the function is still relatively strong, for example, can choose low-power resistance profile, there is a lower limit, there is a memory card (although this can not find the card), there is a relatively strong math functions, there is a strong trigger function.

Weakness description

1, the display is easy to aging. I have this rather dark, and it is not uniform, it is estimated that from 2003 the factory production line with a continuous three years. You can see through the darkened figure, with the original use was 7 when half! Wasted.
2, there is no numeric keypad, the operation time-consuming
3, there is no exchange of files. The factory with a T, not with, it can not hold the exchange option.
4, the electrical noise is relatively large. 2-3 times the relationship with the ratio of about 3458A. Of course, 3458A noise is very small, there is no other table can be compared.
5, linearity is not ideal for 0.1 to 0.2ppm. And 3458A than about 2 times relationship. Of course, 3458A linearity is nobody can compare.
6, the test is similar to the hand-held terminal just jack tables, no prominent part, inconvenient to use (such as wiring or plug can not be pressed). This has the advantage of saving materials, space-saving, typical Japanese approach.

Author: lymex **Time:** 2009-3-21 20:53
[Applause]

Author: lymex **Time:** 2009-3-21 20:58
suny-hyb published in 2009-3-21 18:00
Sitting on a sofa !! Congratulations landlord Depot !!!

Posted at 2009-3-21 19:00 Jianneng
How efficacy accuracy?

Many of the city's measurement test, you may not have such a configuration!
I do not know what the landlord to buy such a good multimeter to do with? ~~~ Standards or do?

Author: lymex **Time:** 2009-3-21 21:01
Back suny-hyb, thank you!

Back to build energy-efficient test accuracy see the 9th floor, very good.

This indicates to me is a little secret that is playing. I have a better one than this table Agilent 3458A.

Author: loving little **time:** 2009-3-21 21:31
Congratulations Depot, learning good information.

Author: grn **Time:** 2009-3-21 21:35
Congratulations Depot, finally opened the veil of 6581, the price is very good a table, it seems this is the first choice in 3458 after not afford.

Author: yjm**2000 Time:** 2009-3-21 21:41
So someday down out of the sky pie! [S: 48] [s: 47] [s: 61]

Author: bgqjm **Time:** 2009-3-21 21:50
LD is now the LP plus small dense left hold the right owner, good happy.

Author: llycom **Time:** 2009-3-21 21:51

1st floor lymex references to published 2009-03-21 16:41:
Open the package when it is in the elevator hall, actually did not take the keys, close the door to lock yourself outside it!
No way, spend time with a knife to open the back cover, took a few pictures inside. Originally want to continue opening the lid, but the frustration screws too tight, knives are not bad twist open.
LP came back 20 minutes later, relieved, and only then hold the baby into the house.
[Attach] 1356 [/ attach]
[Attach] 1357 [/ attach]
.....

Ye camera boss in the elevator? Carry the camera? [S: 14]

Author: redtony **Time:** 2009-3-21 21:56
Congratulations and good luck machine! [S: 30]

Author: lymex **Time:** 2009-3-21 23:09

22 F llycom references to published 2009-03-21 21:51:

Ye camera boss in the elevator? Carry the camera? [S: 14]

I was packing to leave the house at midnight outside the room, took the camera and knives, plans to open the package to shoot photographs.

Author: Hennessy **Time:** 2009-3-21 23:29
Plan to shoot Kaibao

The first reference to the 24th floor lymex published on 2009-03-21 23:09:

I was packing to leave the house at midnight outside the room, took the camera and knives, plans to open the package to shoot photographs.

Author: chenang39 **Time:** 2009-3-22 22:51
Come onlookers, reference plate material manufacturers will not like this, right?

Author: scholars **Time:** 2009-3-24 05:16
Gangster looked article Yilengyileng, good fun!

Author: Ancient Schumacher **Time:** 2009-3-24 22:55
Only drooling copies.

Author: yinweini **Time:** 2009-3-29 12:14
R1 = 120 Europe and R4 = 13k resistor is normal, is AE plastic blocks, but is actually AE R5 = 1k gold seal! Is a waste, right? Do not they know 1k / 13k is the ratio of the partial pressure of the pair? Incumbent should have replaced the gold seal is only for a useless!

On the other hand, with the two small resistors 70k 68k (R2, R3)! These two resistors is still very critical, you should use a better resistance, which made a mistake and Datron. Advantest or on the baseline studies seems enough ah.

That one small resistor will change when the output is 0.4ppm 100ppm impact. And such a small 1% metal film, to reach 0.05% annual change is also possible, so that there is 2ppm impact on benchmark it! Also, who can guarantee that the temperature characteristics of this resistance is not more than 0.05%? Although aging and can be controlled through the screening method, but the core part to make a drag a little resistance, it should not be!

From the theoretical analysis is the case, but personally think that this stuff is not top made such a stupid mistake, it should be done with the characteristics of compensation to certain devices, not the people that we do not see enough research other people's design ideas ah !

Author: hp34401a **Time:** 2009-3-29 20:59
Mouth water over the floor. [S: 30]

Author: lymex **Time:** 2009-3-29 22:37

The first reference to the 29th floor yinweini published on 2009-03-29 12:14:

.....
From the theoretical analysis is the case, but personally think that this stuff is not top made such a stupid mistake, it should be done with the characteristics of compensation to certain devices, not the people that we do not see enough research other people's design ideas ah !

The top eight and a half really. Like 4910's top real mistakes, 75k ordinary metal film with a small no point! [S: 9]
1k / 13k is dividing resistor divider to be good to be consistent with the characteristics, preferably enclosed in a shell house, rather than using different resistance.

Author: rca211 **Time:** 2009-3-30 09:50
Good, cool [s: 30] [s: 27] [s: 20] [s: 38] [s: 57] [s: 51]

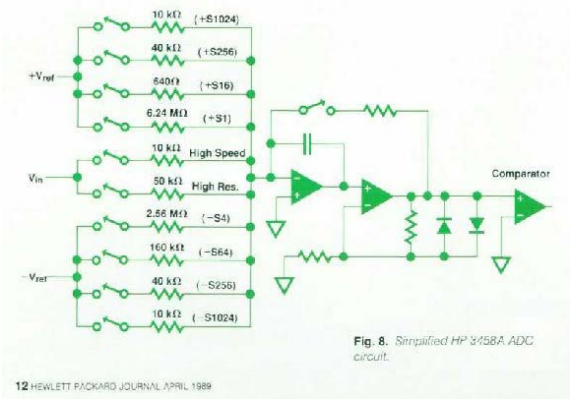
Author: zzaming **Time:** 2009-3-31 09:31
This table is good, if it is an annual output of 2003, value. High table a bad shot, it is estimated that the merchant will carefully into the high table in the future.

The landlord can not look at the key components which use integral part. Those are the high-speed switch is on the market, or customized? Integrator op amp I do not know what level.

Constant score, this concept is not a problem, because the integration has always been different for different voltage integrated current, this will have a different integration results, how constant.

Good table needs a good line, mass production of the table element does not generally have too demanding. Good condition landlord hands with so many tables. Can the principle of each table to figure out, can be considered a research topic Oh.

Author: lymex **Time:** 2009-3-31 14:05
Title: Back 33 F (zzaming) post is 2003 or later production.
For 8-bit ADC and a half of the table, I do not know much, refer to the 3458A ADC:



This is a multi-slope integration method, integral to rise on the use of dual-slope (Vin can be accessed by 10k or 50k), while the decline in the use of the integration of even more and is reversible, so as to accuracy is not reduced in the case of greatly increased speed. Keithley 2002 due to R6581 and later in 3458, but the speed is similar, it can be reasonable to assume that they are the principle of imitation 3458A.

I do not know the specific elements, some elements have been marked on the map. 8 and a half of study ADC is not my long term, it will not go DIY 8 digit ADC.

Where the word "constant integration" of? But in fact, the integrator in one integration interval, is indeed a constant current, the voltage on the capacitor is increased or decreased line row, but can not say that this is a constant current.

Author: zzaming Time: 2009-3-31 16:53
Thank you for answering!
Teaching is integral resistance constant, integral reference selection is different, this circuit is a fixed reference points, integrating resistor is different, the role is the same.

High stability, high linearity ADC is a good field, it seems there are no outstanding domestic research this is not necessarily DIY. You can take the lead in the popularity of the country's oldest and theoretical level.

& Quot; constant integration & quot; I understand there is a problem, the original is & quot; & quot; , a constant current source should be a voltage-controlled current source, but this linear constant current source is higher than the ADC linearity do.

Author: yinweini Time: 2009-3-31 18:28

31 F lymex references to published 2009-03-29 22:37:

The top eight and a half really. Like 4910's top real mistakes, 75k ordinary metal film with a small no point! [S: 9]
1k / 13k is dividing resistor divider to be good to be consistent with the characteristics, preferably enclosed in a shell house, rather than using different resistance.

You still do not understand what I mean! If the reference voltage is absolutely unchanged, you're right, but the fact is that the reference device aging due to temperature and other factors will change, a reference voltage varies with approximately constant The resistor divider, voltage divider at will vary, but you use and reference devices resistance curve similar to compensate, then the voltage divider at whether changes would be smaller?

Author: aeon Time: 2009-4-1 10:00
If you rely on the reference resistor to compensate aging, 75K that resistance is more shy. Accuracy is itself very low resistance, the uncertainty of error is large, if to compensate for it?

Author: yinweini Time: 2009-4-1 13:18
Oh, I have not seen the original circuit is only granted to say, but the precision with stability and aging resistance of nothing to do, and compensate consider going to put the entire circuit, assuming that moment, a reference voltage of 10V with two resistance and特性一样的电阻分压,所得到的5V电压会跟随10V基准电压变化曲线而变化,如果换成一只高稳定近似不变特性的电阻和一只用仪器挑选的和10V基准电压变化曲线相近的电阻分压结果会怎么样呢?

作者: aeon 时间: 2009-4-1 14:50
问题就在于你如何知道那个电压基准老化是如何变化的呢 如果我能确定其变化曲线 根本不用一个电阻补偿 软件进行补偿就可以了。楼主这里说的基准老化是统计后的结果 并不是每个都是一样的。而且 结果往往带有些不可预知的变化。

作者: aeon 时间: 2009-4-1 14:55
电阻的精度跟老化不是有必然的关系 但有一定的联系。假如一个电阻精度标称0.01% 但老化率是0.05%/a,那么你觉得这个电阻实用性如何呢 同时跟精度有联系的还有温度系数。

作者: zzaming 时间: 2009-4-1 16:14
基准用的电阻,应该是老化处理过的,然后筛选老化率小的。

作者: yinweini 时间: 2009-4-1 18:50
变化曲线可以测出来,我只清楚软件可以在器件老化方面对读数方面做补偿,但是机器开机和工作的环境温度等方面的温漂呢?难不成不同的温度环境下用不同的补偿软件?

作者: aeon 时间: 2009-4-1 21:14

引用第41楼zzaming于2009-04-01 16:14发表的 :
基准用的电阻,应该是老化处理过的,然后筛选老化率小的。

[S: 31] If each manufacturer like you to think so, now estimated whole failed. To know how long aging without a resistor? Do not say that kind of accelerated aging saying, do not fly.

作者: aeon 时间: 2009-4-1 21:33

引用第42楼yinweini于2009-04-01 18:50发表的 :
变化曲线可以测出来,我只清楚软件可以在器件老化方面对读数方面做补偿,但是机器开机和工作的环境温度等方面的温漂呢?难不成不同的温度环境下用不同的补偿软件?

那你知道不 就这个R6581所使用的LTZ1000 有谁使用过软件修正其老化率来保证精度的 目前最伟大的8位表HP3458 FLUKE8508 WAVETEK1281. 电压基准WAVETEK4910都是使用LTZ1000 但其都没用上软件修正老化率。因为其老化曲线根本没法测 就算你用上10年测出一个来 那你要做另外一个呢 你觉得另外一个会跟这个一样么 至于开机 工作温度的变化 这些对万用表其他零件的影响远远大于基准了。知道现在的8位表最好的温度系数只能0.5ppm/C.而LZ1000 在恒温状态下其温度系数少于0.05ppm. 基准的影响权重很少。不过 万用表的温度系数的确是可以测出来 如果那个表认真做 用软件修正完全可以。问题就是在于每个表的曲线都不一样 如果要做 肯定要对每个表进行采集数据再写进修正软件里面。另外高精度的表。一般都需要预热才能工作 5位表一般要开机一个小时 8位表基本要在2-4小时左右才达到标称指标。这在使用手册上都有说明 中途关机再开 还有根据关机时间加倍进行预热。所以想一开机就马上能使用 目前还没看到这样的高精度表。

作者: zzaming 时间: 2009-4-1 21:39
老化成本不高,1000小时(也就1个半月左右)老化,也就1个多月,而且 产品是持续生产的话,老化也简单,老化前测量值,老化后测量其值,变化小的留用,这部分也可以交给工作电阻厂做,电阻厂精密的电阻本身就有产品老化处理这一项,不过要求可能有高有低. RX70电阻出厂标定前是要老化的.

作者: lymex 时间: 2009-4-2 10:02
基准是一个比较微妙的东西 做了有3年 进行了大量的测试 有一些体会。
首先 LTZ1000ACH本身相当稳定 尤其是在低温恒温的情况下 基本都在每年1ppm之内 非常难得。另外 其温度系数是基本上测量不出来的 满足0.05ppm/C的指标没有问题 因此这个器件的确很理想了 也不需要别人去补偿她了。

因此 只要把外围器件做得足够好就可以 而恰好这个基准电路对外围器件有百倍甚至到千倍的抑制。也就是说 当一些外围元件变化了100ppm甚至1000ppm 最后的输出才变化1ppm 这样就使得对外围元件要求不太高 用普通金属箔 <3ppm/C温度系数 就足够了 用不着用高成本的金封金属箔。

但另一方面 即便有千倍的抑制 也不应该采用75k的小金属膜 以为是否能保证1000ppm每年的老化是不好说的。

我做基准 的确首先要进行元件老化 成批的 实际上是一种加速老化。即元件买来后送到冰箱里冻 再放到加热器 大约50度 加热 这样能把一些应力释放 让该老化的尽量老化 然后装到电路上就能以后老化的少一些。另外 重要元件我也要进行测试匹配 比如1k/12k电阻 这个很重要 一定会大体测试温度系数 成对匹配到2ppm/C 对7V影响就<0.02ppm/C了。但我不可能对LTZ1000测试温度系数 因为测试这个需要外电路 其实就是基准板本身。我更不会去分别测试元件的老化然后再搞什么匹配 那要累死我的 而且由于元件会因焊接而改变老化 所以匹配是没大用的。我只能是先装起来进行整体测试 利用电路设计和元件本身来基本保证稳定性和温度系数 然后统一测试性能。

综合起来看 这表的基准用了个金封金属箔是浪费 而68k用了个小金属膜是个败笔。

补偿是一个常用的技术 但补偿是有限的 见我的帖子“匹配的10%法则” <http://www.bbcnn.net/bbs/read.php?tid=209> 。
如果元件自己做的非常好 那么就不需要配对、补偿、匹配。比如VHP2022用两个做分压 就比一个VHD144要好。

作者: wyylt 时间: 2009-4-8 23:13
这个表厉害 不过荧光管确实不好

作者: weixsh 时间: 2009-4-9 00:08

HP3458 FLUKE8508这两款万用表哪一款比较精密些 就是说哪一款更够基准

作者:老山东时间: 2009-4-14 18:49
做工用料都是很不错

作者: mytek 时间: 2009-4-20 11:02
新手报道来了 我有兴趣研究高位ADC 希望能得到楼上各位N人的指导

作者: lymex 时间: 2009-4-20 12:01

引用第48楼weixsh于2009-04-09 00:08发表的 :
HP3458 FLUKE8508这两款万用表哪一款比较精密些 就是说哪一款更够基准

“精密”这个词太泛了 不好说。
短稳好、重复性好、噪音低 这是一个8位半应该具备的最基本的素质。试想一下 谈同一个基准 两次或多次读数都不一样 那还有什么用 还谈什么精密
3458的短稳和重复性非常好我有录象 噪音非常低达到0.01ppm 说明书有指标 这是我最喜欢3458A的地方。

另外 作为8位半表 线性一定要好。否则 测试7V和10V都没有好的比例关系 还怎么进行转移 怎么进行校准

8508A么 这几个指标没有给出。我也没有用过8508A 因此不能评价 所以不能比较。

至于长期稳定性 8508A是3ppm 普通的3458A是8ppm 当然是8508A好。但是 3458A的高稳件是4ppm 而且改造后的要更好一些。另外 作为真正发烧 8位半的用途不仅仅是读数 而是比较而已 只注重其噪音、短稳和线性 长期稳定性一般都不关心 即便是3ppm 与基准比较起来也差得多。

作者: weixsh 时间: 2009-4-20 13:18
张老师不用qq吗 用的话建一个qq群让我们热闹热闹。那个旺旺基准群不知道是什么 怎么加

作者: yjm2000 时间: 2009-4-20 13:36
好像有人建了一个QQ群

作者: lymex 时间: 2009-4-20 18:42
我有个5位的QQ 用起来太烦 大约3年前就不用了

作者: llycom 时间: 2009-4-20 19:22

引用第54楼lymex于2009-04-20 18:42发表的 :
我有个5位的QQ 用起来太烦 大约3年前就不用了

5 QQ number is said to value many meters it, do not waste ah. Not a long time, has been canceled, right? [S: 24]

作者: happymanlxx 时间: 2009-7-6 20:42
口水都流了

作者: jxno1dg 时间: 2009-9-29 08:46
非常详细。

作者: hs2009 时间: 2009-11-9 01:03
标题:回53楼(lymex) 的帖子有兩台3458A 一台HP另一台安捷倫.兩台測量比較起來都差不多.不知到買那一台好

作者: lymex 时间: 2009-11-9 11:51
新的能好些

作者: ltb526 时间: 2010-2-9 12:53
有机会也淘一台玩玩。 [S: 2]

作者: sxy800125 时间: 2010-5-18 06:00
在路上了~到手后第一时间拍清晰照~

作者: laborer 时间: 2010-5-18 08:29

引用第63楼sxy800125于2010-05-18 06:00发表的 :
在路上了~到手后第一时间拍清晰照~ 

Envy ... look wonderful pictures !!

作者: redtony 时间: 2010-6-3 00:07
俺的6581也到手了 谢谢坛友承让。

作者: hldiy 时间: 2011-9-3 09:43
问个问题
3458和6851两款双基准校准的表 电流档都怎么校准
貌似6851的菜单里面也没有电流档校准的选项。

作者: lymex 时间: 2011-9-3 23:59
回楼上 直流电流档自动校准 与欧姆校准一起。

作者: hldiy 时间: 2011-9-4 09:05

引用第66楼lymex于2011-09-03 23:59发表的 :
回楼上 直流电流档自动校准 与欧姆校准一起。 

Thank you, boss

作者: liming2999 时间: 2012-2-16 22:39

“精密”这个词太泛了 不好说。
短稳好、重复性好、噪音低 这是一个8位半应该具备的最基本的素质。试想一下 读同一个基准 两次或多次读数都不一样 那还有什么用 还谈什么精密
3456的短稳和重复性非常好我有录象 噪音非常低达到0.01ppm 说明书有指标 这是我最喜欢3458A的地方。

Compare agree, good short-term stability, repeatability, low noise, tables, even 1% accuracy, but also to measure the resistance of 0.01%

作者: zsxlh 时间: 2012-3-18 00:47

精彩。 Learning! Thank predecessors!

作者:无线电爱好者时间: 2013-1-1 12:50

不错.....[s:31] [s:31]

作者: bigebilis 时间: 2013-1-1 16:46

VFD容易老化是通病 不能怪在仪器头上。 .
But it also gives newcomers former judge provided the basis for the use of strength, I recently into a station five and a half, it's relatively minor VFD aging.

作者:老渔夫时间: 2013-1-2 16:27

学习好资料。

作者: a-150 时间: 2013-3-11 16:22

偶刚入门跟前辈们学习喽

作者: toolboy 时间: 2013-7-2 16:07

不错.....

作者: wcy 时间: 2013-7-6 18:56

学习喽

作者: hymfzgs 时间: 2014-1-4 11:29

我看到你那认真细致。精心。要是有个工厂让你管理 准能超越 现在的企业 能合日企 想比。

作者:银重道软时间: 2014-4-8 19:25

工艺品级别

作者: zsm9991 时间: 2014-9-22 22:21

有空回来看看