Introduction

The FNIRSI-5012H is a versatile, highly practical, cost-effective handheld oscilloscope for the maintenance industry and the R&D industry with FNIRSI's real-time sampling rate of up to 500MS/s and 100MHz analog bandwidth. With full trigger function (single, normal, automatic), it can be used freely for both periodic analog signals and non-periodic digital signals. Built-in high-voltage protection module can withstand up to 400V continuous voltage and 800V peak voltage. Don't worry about the oscilloscope burnout caused by the high-voltage not being probed to the 10X position. Large time base scan mode that monitors slow level changes. Equipped with high-efficiency one-button AUTO, the measured waveform can be displayed without complicated adjustment. Display high-definition LCD screen with 2.4-inch 320*240 resolution. Extremely convenient and fast waveform storage function, built-in 64M storage space, can store up to 2000 waveform pictures, the storage process is simple and fast, save the current waveform anytime and anywhere, just one touch, no cumbersome tips and choices, quietly It is very convenient to save the current waveform. Powerful waveform file manager, support for thumbnail browsing, viewing, detail viewing, page turning, deletion and more. Built-in 3000mah high-quality lithium battery, can be used continuously for 10 hours when fully charged. The body is equipped with high-quality silicone protective cover, non-toxic and lead-free environmental protection, anti-skid, anti-shock and shockproof, comprehensive protection of the fuselage, soft texture, feel very comfortable.

Reminder

Reminder: the bandwidth of the 1X probe file is 5MHz, and the bandwidth of the 10X probe file is 100MHz. When the measurement is higher than the 5MHz frequency, the switch on the probe handle needs to be moved to the 10X position, and the oscilloscope should also be set to the 10X position. Otherwise the signal will be greatly attenuated, as is the case with all oscilloscopes. Because the probe line of the oscilloscope itself has a capacitance of up to 100~300pF, it is a large capacitance for the high frequency signal! The signal has been greatly attenuated by the probe reaching the input end of the oscilloscope. The equivalent bandwidth is 5MHz. Therefore, in order to match the probe line with hundreds of pF, the input of the probe line is first attenuated by 10 times (the switch is in 10X). A few hundred pF capacitors are just used for impedance matching. The bandwidth at this time is 100MHz. Note that only probes with a bandwidth of 100MHz or more can be used.

1X/10X mode indicator icon, this must be consistent with the 1X/10X switch setting on the probe handle. If the probe is 1X, then the oscilloscope should also be set to 1X, 1X measures 0~80V, and the maximum tolerance is 800V spike; 10X Measuring 0~800V voltage

Measured signal waveform

Baseline indicator icon, this icon indicates the position indicates that the current position is 0V

Direction keyboard mode icon

The voltage parameter of the measured waveform can be switched between peak and peak VPP, peak VP, maximum value MAX, minimum value MIN, average value AVG and effective value RMS according to F1.

The time parameter of the measured waveform, press F2 to switch between frequency F, period T, positive pulse width T+, negative pulse width T-, positive duty cycle Du+ and negative duty cycle Du-

Trigger voltage indicator icon

Waveform horizontal position

Remaining battery icon, green indicates remaining battery capacity, and an arrow indicates that the battery is currently charging

Trigger edge indicator icon

Trigger mode indicator icon, Single means single trigger, Normal means normal trigger, Auto means automatic trigger

Input coupling mode indicator icon, AC means AC coupling, DC means DC coupling

Horizontal time base, indicating the length of time represented by a large square in the horizontal direction

Run the pause indication icon, RUN means running, STOP means pause

Vertical sensitivity, which represents the voltage represented by a large grid in the vertical direction

Parameter

Model	FNIRSI-5012H	Highest test voltage	1X:80V 10X:800V
Channels	1	Cursor	Position XY Trigger Y
LCD size	2.4 Inch	Scan mode	Support
LCD Resolution	320 * 240	One-button AUTO	Support
Display technology	TFT	Waveform storage	Up to 2000 wave
Bandwidth	100MHz	Waveform manager	Support
Sampling Rate	500MS/s	Voltage accuracy	± 2%
Rise time	< 3nS	Frequency Precision	±0.01% High precision
Storage depth	128KB	Parameter	12 kinds in total
input resistance	1MΩ	Battery	3000mah Lithium
Sensitivity	50mV ~ 100V	Standby	8 Hours
Time base	50S ~ 6nS	Afterglow	1 ~ 8 Adjustable
Trigger mode	Single/Normal/Auto	Charging	5V/1A/2A/3A/4A
Trigger edge	Rising / Falling	Dimensions	114mm * 74mm * 33mm
coupling	AC/DC	Accessories	100MHz probe, USB, Instruction manual

Direction keyboard

Click the "MODE" button to switch the function of the current up, down, left and right keyboards, that is, the zoom mode and the move mode. The function icons are also displayed in the lower left corner of the screen.

The zoom mode of the waveform, that is, the vertical sensitivity and time base are adjusted. In this mode, the up and down keys adjust the vertical sensitivity (vertical enlargement and decrease of the signal), and the left and right keys adjust the time base (the horizontal enlargement and decrease of the signal)

The movement mode of the waveform, the waveform will move with the direction indicated by the corresponding button, but in the single/normal trigger mode, the waveform can only be moved vertically and cannot move left and right because the trigger point clock starts from the left starting point.

Instructions

Amplify the waveform: Use the [MODE] button to set the direction keyboard to zoom mode, press the up button to vertically enlarge the waveform, and press the right button to zoom in and out.

Reduce the waveform: Use the [MODE] button to set the direction keyboard to zoom mode, press the button to vertically reduce the waveform, and press the left button to zoom out the waveform horizontally.

Move the waveform: Use the [MODE] button to set the direction keyboard to the mobile mode. Press the up, down, left and right buttons to move the waveform in the corresponding direction.

Adjust the trigger voltage: directly press the 2 up and down direction keys in the lower left corner of the oscilloscope to adjust the trigger voltage. The red trigger voltage indicator arrow will move up and down with the corresponding direction. Note that this adjustment needs to turn off "Auto 50%" first, and the time base ranges from 100mS to 25nS.

Set the trigger edge: directly press the [EDGE] on the keyboard to switch the rising and falling edges of the trigger.

Set the input coupling mode: directly press the [AC/DC] button on the keyboard to switch between AC and DC coupling modes.

Set the probe input magnification: First, you need to toggle the 1X 10X switch on the probe handle to the corresponding position, and then press the [1X/10X] button on the oscilloscope to switch to the corresponding input magnification. For example, if the probe is moved to the 10X position, then The oscilloscope should also be set to 10X mode, otherwise the data is abnormal.

Pause display: Press the [RUN/STOP] button on the keyboard to pause/run the waveform display.

Set the single trigger: directly press the [TRIG] button on the keyboard to make the "Single" in the brown area at the top right of the screen, which means switching to the single trigger mode. First adjust the trigger line according to the initial signal, then release the signal. After the oscilloscope acquires the signal that meets the triggercondition, it will automatically pause the frame signal. If it needs to be tested again, press [RUN/STOP] to start the next frame sampling. The use of single trigger is more complicated than automatic triggering. Whether it can collect the signal of demand well, you need to have some technical experience, you need to explore more.

Set the normal trigger: directly press the [TRIG] button on the keyboard, so that the brown area on the upper right of the screen displays "Normal", which means that the switch is changed to the normal trigger mode. The normal trigger mode is to update the input signal when the trigger condition is met. Frame waveforms, such as a burst of signals, can be captured with both a single trigger and a normal trigger, but a single trigger captures only the first frame of the signal, while a normal trigger captures the last signal.

Set the automatic trigger: directly press the [TRIG] button on the keyboard, so that the brown area on the upper right of the screen displays "Auto", which means that the switch is switched to the automatic trigger mode. The automatic trigger is the most common and simplest, mainly used to measure the periodic signal. For example, a sine wave square wave clock wave PWM wave, etc., the waveform will be updated regardless of whether the signal satisfies the trigger condition, but the waveform will be synchronized after the trigger condition is met (no left and right shaking)

Show/hide more measurement parameters: press the [MENU] button to enter the menu page, select "Voltage Parameter" or "Time Parameter" to set, the position indicated by the black dot in front indicates the current parameter that is already being displayed, and up to 12 can be displayed. Measurement parameter

Show/Hide Background Grid: Press the [MENU] button to enter themenu page, select "Display Grid" to set, and the position indicated by the front black dot indicates the current setting. Then exit the menu page and you will see the background grid displayed/hidden.

The setting is automatically 50% triggered each time: press the [MENU] button to enter the menu page, select "Auto 50%" to set, and the position indicated by the front black dot indicates the current setting. After setting, in the automatic trigger mode, the trigger voltage of each measurement is the trigger voltage is half of the peak-to-peak value of the waveform.

Set the afterglow level (afterimage): press the [MENU] button to enter the menu page, select "Multi-buffer" to set, and the position indicated by the front black dot indicates the current setting. The afterglow series is also referred to as multi-buffering. The less the number of stages, the more the afterglow effect is, the faster the waveform refreshes; the larger the number of stages, the stronger the afterglow effect, the slower the reflection, usually it is necessary to observe that a certain part of the signal is abnormal at a certain time. In this case, it is necessary to increase the afterglow level as much as possible (multi-buffering)

Store the waveform: Press the [SAVE] button on the keyboard directly. At this time, the waveform of the current screen is saved. The save time is very short and very convenient. The saved parameters include 12 kinds of measurement data, vertical sensitivity and time base.

View the saved waveform: press the [MENU] button to enter the menu page, select "View Waveform" to enter the waveform file manager, and the viewed waveform will be displayed as a thumbnail. It is very convenient for searching, select the waveform to be viewed. Then click [OK] to view the waveform in full screen, and then [OK] can also display vertical sensitivity, time base and background grid lines.

Delete the saved waveform: Under the Wave File Manager interface, move the selection box to the waveform position you want to delete, press the [AUTO] button to delete the currently selected waveform, or press the [STOP] button to delete all waveforms. Both the interface and the full-screen viewing interface can be deleted.

Waveform manager page: In the waveform file manager interface, press [F1] to page forward, press [F2] to page backward. Horizontal

Baseline Offset Calibration: When the probe has been removed, when the left yellow indicator arrow and the yellow horizontal baseline are not in the same position, calibration is required. Press the [MENU] button to enter the menu page and select "Baseline Calibration". For calibration, you need to pull out the probe and USB first, and make sure that they are all pulled out before calibration.

Adjust the screen brightness: press the [MENU] button to enter the menu page, select the "Screen Brightness" to set Set the slow scan mode: When you need to observe the signal level that changes very slowly, you need to use the slow sweep mode, switch to the zoom mode of the waveform with [MODE], and then increase the time base to 500mS~50S to enter the slow mode. Sweep mode

Common problem

1: Why can't I open the machine after receiving it?

A: It may be that after the final test is completed, the tester forgets to shut down and puts it into the inventory until it is exhausted. After receiving the goods, there is no power. Please charge it with USB for 5 minutes and then turn it on. Do not use computer USB to charge, computer USB If the power is too small, it will be full, and you should charge it with your mobile phone charging head.

2: Why is there no waveform in the test, and there is only one line on the screen?

A: Please check if the pause is pressed. If not, press [AUTO] once. If it is not already, there may be a problem that the input signal source has no signal output, or the probe line may be short-circuited or open. Please check the probe with a multimeter. And whether the signal source is normal

3: Why is the voltage value data 0?

A: Please adjust the vertical sensitivity and time base (sampling rate). At least one clear and complete periodic waveform is displayed on the screen, and the top and bottom of the waveform should be completely displayed on the screen without cutting. The voltage value data is correct

4: Why is the frequency value data 0?

A: First of all, you need to ensure that the trigger mode is Auto, and the time base range is between 200mS and 6nS. If it is within the required range, you need to adjust the vertical sensitivity and time base (sampling rate). At least one clear and complete cycle is displayed on the screen. After the live wire, and the waveform is to be triggered (the red arrow indicates the position between the top and bottom of the waveform, fixed, not shaking), the data of the frequency value is correct.

5: Why is the duty cycle = 0?

A: First of all, you need to ensure that the trigger mode is Auto, and the time base range is between 200mS and 6nS. If it is within the required range, the trigger may not be adjusted between the waveforms. After the trigger line is adjusted to the waveform, the waveform will be fixed. After the live, and the screen needs to display at least one clear periodic waveform, the duty cycle data is correct.

6: Why is the AC coupling the same as the DC coupling waveform?

A: If the input signal is a symmetrical AC signal (signal output from the signal generator), then the AC coupling or DC coupling waveform is the same. If it is an asymmetric AC signal or a DC ripple signal, then the waveform is switched when the coupling is switched. Will move up and down

7: Why does the waveform jump up and down when the signal is tested, can't see the waveform and only see multiple lines and jumps?

A: Set the trigger mode to "Auto" and press the [AUTO] button once. If it is not solved, the clip on the probe may not be grounded, or the probe clip end is open. Please check the probe with a multimeter.

8: Why does the test waveform sway from side to side and cannot be fixed?

A: You need to adjust the trigger voltage, that is, the red arrow on the right. Press the up and down keys in the trigger mode to adjust the trigger voltage. You need to adjust the red indicator arrow between the top and bottom of the waveform. The waveform is triggered and fixed. Or enter the MENU page and turn on "Auto 50%"

9: Why can't I capture sudden pulse waveforms or digital logic signals?

A: Press [TRIG] to enter the "Single" single trigger mode or "Normal" normal trigger mode, then adjust the trigger voltage.

10: Why do you measure a battery or other DC voltage, no waveform?

Answer: The battery voltage signal is a stable DC signal. There is no curve waveform. In DC coupling mode, then adjust the vertical sensitivity. A waveform with an upward or downward offset line will appear. If it is AC coupling, no matter how No waveform adjustment

11: Why is charging not full?

A: It may be that the USB charging of the notebook is used. The USB output power of the notebook is too small to be full. It can be replaced by a mobile phone charger of 5V/1A or higher.

12: Why is it that the waveform of the 220V power frequency 50Hz AC is very stuck?

A: The oscilloscope should display a low frequency signal of 50 Hz. The sampling rate needs to be low to capture the 50 Hz signal. When the sampling rate is low, the oscilloscope will wait, so the performance is "changed." All oscilloscopes in the world are measuring 50Hz signals. Will change the card, not because of the oscilloscope itself card

13: Why is the VPP peak-to-peak data below 600V instead of 220V or 310V when measuring the 220V waveform of the mains?

Answer: 220V is a symmetric AC signal. The positive peak voltage (MAX) is +310V and the negative peak voltage (MIN) is -310V. Therefore, the VPP peak-to-peak value at the bottom is 620V. Press [F1] to switch the voltage parameter to the effective value. RMS, this is the 220V voltage that is often said, the mains voltage RMS fluctuates between 180 and 260V, so the peak-to-peak VPP is in the range of 507~733V.

14: Why is the measured 220V waveform of the mains not a very standard sine wave with distortion?

Answer: The mains grid is generally polluted and contains many high- order harmonic components. These harmonics superimposed on the sine wave will show a distorted sine. Normal phenomenon, the general utility waveform is distorted. , independent of the oscilloscope itself

15: Why is there a different offset between the baseline (0V) and the left arrow (0V indication) on the screen without signal input?

A: Please pull out the probe, pull out the USB cable, press [MENU] to enter the menu page, select "baseline calibration" to correct

16: Why is the signal voltage above 5MHz measured to a large attenuation, and the bandwidth is only 5MHz?

A: When measuring more than 5MHz, you need to move the probe to 10X position, and the oscilloscope should also be set to 10X input mode, because the probe line of the oscilloscope itself has a capacitance of up to 100~300pF, which is a high frequency signal. A lot of capacitance! The signal has been greatly attenuated by the probe reaching the input end of the oscilloscope. The equivalent bandwidth is 5MHz. Therefore, in order to match the probe line with hundreds of pF, the input of the probe line is first attenuated by 10 times (the switch is in 10X). A few hundred pF capacitors are just used for impedance matching. The bandwidth at this time is 100MHz. Note that only the matching 100MHz probe can be used.

Common test method

Battery or DC voltage measurement

Gear selection: battery voltage is generally below 80V, other DC voltage is uncertain, need to select the gear according to the actual situation, if it is lower than 80V, use 1X gear, above 80V, use 10X gear (probe and oscilloscope are set to Same file)

1: First set the oscilloscope to Auto trigger mode (the default is Auto trigger mode after power on), Auto trigger mode is used to test the periodic signal (DC voltage belongs to periodic signal)

2: The oscilloscope is set to the corresponding gear position (the default is 1X gear position after power on)

3: The oscilloscope is set to DC coupling mode

4: Plug in the probe and toggle the switch on the probe handle to the corresponding gear

5: Make sure the battery has power or DC voltage has voltage output

6: Connect the probe clip to the battery negative or DC negative, the probe is connected to the battery or DC positive

7: Press the [AUTO] button once, the DC signal will be displayed. Note that the battery voltage or other DC voltage belongs to the DC signal. There is no curve waveform. There is only one straight line that is offset up and down, and the peak-to-peak value of this signal is VPP. And frequency F are both 0

Crystal measurement

Gear selection: After the crystal encounters the capacitor, it is easy to stop the oscillation. The input capacitance of the 1X probe is as high as 100~300pF, and the 10X gear is about 10~30pF. It is easy to stop the vibration in the 1X file, so it needs to be set to 10X gear. Both the probe and the oscilloscope should be switched to 10X (both probe and oscilloscope are set to 10X)

1: First set the oscilloscope to Auto trigger mode (the default is Auto trigger mode after power on), Auto trigger mode is used to test the periodic signal (the crystal oscillator sinusoidal signal belongs to the periodic signal)

2: The oscilloscope is set to 10X gear position (the default is 1X gear position after power on)

3: The oscilloscope is set to AC coupling mode

4: Plug in the probe and toggle the switch on the probe handle to the 10X position

5: Make sure the crystal board is powered and running

6: Connect the probe clip to the ground wire of the crystal oscillator board (negative terminal of the power supply), pull the probe cap out, the inside is the tip of the needle, and touch the tip of the needle to one of the pins of the crystal.

7: Press the [AUTO] button once, the waveform of the measured crystal oscillator is displayed. If the waveform after AUTO adjustment is too small or too large, you can manually adjust the waveform size in the zoom mode.

PWM signal measurement of MOS tube or IGBT

Gear selection: The PWM signal voltage of the direct drive MOS tube or IGBT is generally within 10V~20V, the PWM pre-stage control signal is also generally within 3~20V, and the 1X file is tested up to 80V, so testing the PWM signal with 1X gear is enough. (Probe and oscilloscope are set to 1X).

1: First set the oscilloscope to Auto trigger mode (the default is Auto trigger mode after power on), Auto trigger mode is used to test the periodic signal (PWM belongs to the periodic signal)

2: The oscilloscope is set to 1X gear position (the default is 1X gear position after power on)

3: The oscilloscope is set to DC coupling mode

4: Plug in the probe and toggle the switch on the probe handle to the 1X position

5: Make sure the PWM board has PWM signal output at this time.

6: Connect the probe clip to the S pole of the MOS tube, and connect the probe to the G pole of the MOS tube.

7: Press the [AUTO] button once, the measured PWM waveform will be displayed. If the waveform after AUTO adjustment is too small or too large, you can manually adjust the waveform size in the zoom mode.

Signal generator output measurement

Gear selection: The signal generator output voltage is within 30V, and the 1X gear is tested at 80V. Therefore, it is sufficient to use the 1X gear for the test signal generator output (both probe and oscilloscope are set to 1X).

1: First set the oscilloscope to Auto trigger mode (the default is Auto trigger mode after power on), Auto trigger mode is used to test the periodic signal (the signal output by the signal generator belongs to the periodic signal)

2: The oscilloscope is set to 1X gear position (the default is 1X gear position after power on)

3: The oscilloscope is set to DC coupling mode

4: Plug in the probe and toggle the switch on the probe handle to the 1X position

5: Make sure the signal generator is turned on and outputting a signal

6: Connect the probe clip to the black clip of the signal generator output line. The probe is connected to the red output line of the signal generator.

7: Press the [AUTO] button once, the waveform of the generator output will be displayed. If the waveform after AUTO adjustment is too small or too large, you can manually adjust the waveform size in the zoom mode.

Household power supply 220V or 110V measurement

Gear selection: household electric power is generally 180~260V, peak-to-peak voltage is 507~733V, household electricity is 110V in some countries, peak-to-peak voltage is 310V, 1X is the highest measuring 80V, 10X is the highest measuring 800V (10X) Up to 1600V peak-to-peak value, so it needs to be set to 10X gear, that is, the probe and oscilloscope should be switched to 10X

1: First set the oscilloscope to Auto trigger mode (the default is Auto trigger mode after power on), Auto trigger mode is used to test the periodic signal (50 Hz for household electricity is a periodic signal)

2: The oscilloscope is set to 10X gear position (the default is 1X gear position after power on)

3: The oscilloscope is set to DC coupling mode

4: Plug in the probe and toggle the switch on the probe handle to the 10X position

5: Ensure that the measured end has household electrical output

6: Connect the probe clip and probe to the 2 wires of the household electric power, without distinguishing the positive and negative poles

7: Press the [AUTO] button once, the waveform of the household electricity is displayed. If the waveform after the AUTO adjustment is too small or too large, you can manually adjust the waveform size in the zoom mode.

Power ripple measurement

Gear selection: If the power output voltage is below 80V, it is set to 1X gear (both probe and oscilloscope are set to 1X). If it is 80~800V, it needs to be set to 10X gear (probe and oscilloscope are set to the same file))

1: First set the oscilloscope to Auto trigger mode (the default is Auto trigger mode after power on), Auto trigger mode is used to test the periodic signal (DC voltage belongs to periodic signal)

2: The oscilloscope is set to the corresponding gear position (the default is 1X gear position after power on)

3: The oscilloscope is set to AC coupling mode

4: Plug in the probe and toggle the switch on the probe handle to the corresponding gear

5: Make sure the power is on and there is a voltage output

6: Connect the probe clip to the negative terminal of the power output, connect the probe to the positive terminal of the power output, and wait for about 10 seconds. When the yellow line and the yellow arrow on the left are flush, wait for the end.

7: Press the [AUTO] button once, the power ripple will be displayed.

Inverter output measurement

Gear selection: The output voltage of the inverter is similar to that of household electric power, and is usually also a few hundred V, so it needs to be set to 10X gear (both probe and oscilloscope are set to 10X)

1: First set the oscilloscope to Auto trigger mode (the default is Auto trigger mode after power on), Auto trigger mode is used to test the periodic signal (the signal output by the inverter belongs to the periodic signal)

2: The oscilloscope is set to 10X gear position (the default is 1X gear position after power on)

3: The oscilloscope is set to DC coupling mode

4: Plug in the probe and toggle the switch on the probe handle to the 10X position

5: Make sure the inverter is powered and has a voltage output

6: Connect the probe clip and probe to the output of the inverter without distinguishing between positive and negative

7: Press the [AUTO] button once, the waveform of the inverter output will be displayed. If the waveform after AUTO adjustment is too small or too large, you can manually adjust the waveform size in the zoom mode.

Amplifier or audio signal measurement

Gear selection: The output voltage of the amplifier is generally below 40V, and the highest test is 80V for 1X. Therefore, it is enough to use 1X gear (both probe and oscilloscope are set to 1X).

1: First set the oscilloscope to Auto trigger mode (the default is Auto trigger mode after power on)

2: The oscilloscope is set to 1X gear position (the default is 1X gear position after power on)

3: The oscilloscope is set to AC coupling mode

4: Plug in the probe and toggle the switch on the probe handle to the 1X position

5: Make sure the amplifier is working and outputting audio signals.

6: Connect the probe clip and probe to the 2 line outputs of the amplifier, without distinguishing the positive and negative poles.

7: Press the [AUTO] button once, the waveform of the amplifier output will be displayed. If the waveform after AUTO adjustment is too small or too large, you can manually adjust the waveform size in the zoom mode.

Automotive communication signal / bus signal measurement

Gear selection: The communication signal for the car is generally lower than 20V, and the highest test is 80V for the 1X file. Therefore, it is enough to test the car communication signal with 1X gear (both probe and oscilloscope are set to 1X).

1: First set the oscilloscope to the Normal trigger mode (the default is Auto Trigger mode after power on). The Normal trigger mode is used to measure the aperiodic digital signal. If the Auto trigger mode is used, the non-periodic signal cannot be captured.

2: The oscilloscope is set to 1X gear position (the default is 1X gear position after power on)

3: The oscilloscope is set to AC coupling mode

4: Plug in the probe and toggle the switch on the probe handle to the 1X position

5: Connect the probe clip and probe to the two signal lines of the communication line, regardless of positive or negative. If there are multiple signal lines, you need to judge the signal line yourself, or try to select 2 of them. Line to test

6: Make sure there is a communication signal on the communication line at this time.

7: Adjust the vertical sensitivity to 50mV

8: Time base is adjusted to 20uS

9: Press the [50%] button once

10: When there is communication signal on the communication line, the oscilloscope will capture and display it on the screen. If it is not captured, you need to try to adjust the time base (1mS~6nS) and trigger voltage (red arrow) for multiple debugging.

Infrared remote receiver measurement

Gear selection: Infrared remote control signal is generally 3~5V, 1X file is up to 80V, so it is enough to test car communication signal with 1X gear (probe and oscilloscope are set to 1X).

1: First set the oscilloscope to Normal trigger mode (the default is Auto trigger mode after power on). The Normal trigger mode is used to measure non-periodic digital signals. If the Auto trigger mode is used to capture non-periodic signals, the infrared remote control signals belong to Aperiodic digitally encoded signal

2: The oscilloscope is set to 1X gear position (the default is 1X gear position after power on)

3: The oscilloscope is set to DC coupling mode

4: Plug in the probe and toggle the switch on the probe handle to the 1X position

5: Connect the probe clip to the ground (negative) of the infrared receiver main board, and connect the probe to the data pin of the infrared receiver.

6: Adjust the vertical sensitivity to 1V gear

7: Time base is adjusted to 20uS

8: Adjust the position of the trigger red arrow to the position of the left yellow arrow above about 1 large grid distance

9: At this time, the remote receiver sends a signal to the infrared receiver, and a waveform appears on the oscilloscope.

Amplification circuit measurement with sensors (temperature, humidity, pressure, Hall, etc.)

Gear selection: The sensor signal is generally weak, about a few millivolts. This small signal can't be directly detected by the oscilloscope. The sensor board has a signal amplification part, and the oscilloscope can measure the amplified signal. Use 1X gear (both probe and oscilloscope are set to 1X)

1: First set the oscilloscope to Auto trigger mode (the default is Auto trigger mode after power on)

2: The oscilloscope is set to 1X gear position (the default is 1X gear position after power on)

3: The oscilloscope is set to DC coupling mode

4: Plug in the probe and toggle the switch on the probe handle to the 1X position

5: Connect the probe clip to the ground of the sensor board (the negative pole of the power supply), find the output of the amplified part, and connect the probe to this output.

6: Adjust the vertical sensitivity to 50mV

7: Switch to keyboard movement mode, move the yellow arrow horizontal position to the bottom

8: Time base is adjusted to 500mS into large time base slow sweep mode

9: If the yellow signal line appears at the top, you need to reduce the vertical sensitivity, which is 100mV, 200mV, 500mV, etc., when the signal updated on the right is not at the top (usually the best in the upper and lower middle), you can Start detecting the signal received by this sensor.