

HB100 microwave module manual

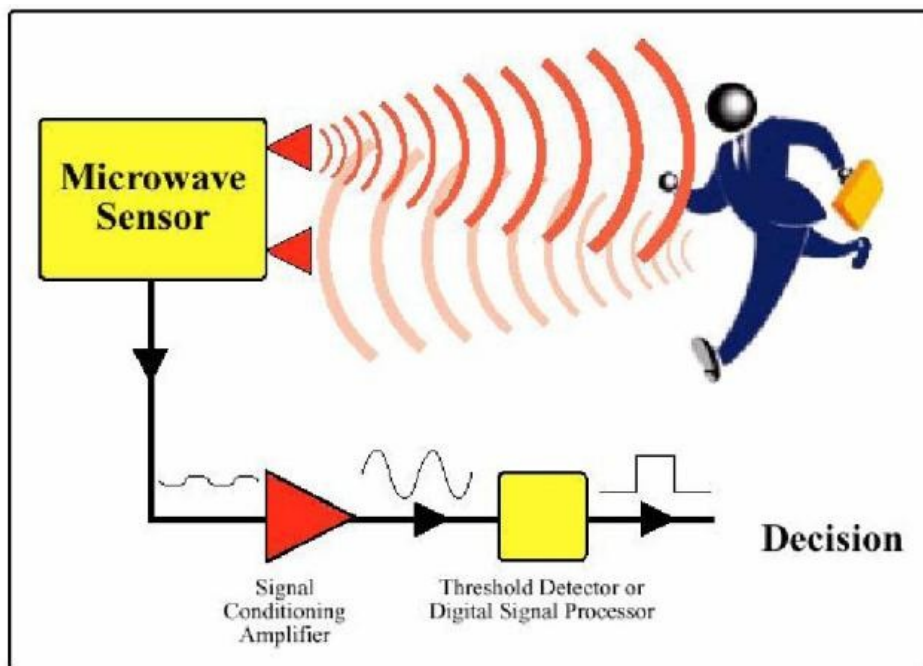
Letter

Please correct under the conditions of this specification limits and allowed the FDA, the external environment and input any higher than the endurance of this product will cause irreparable damage. No special circumstances can not be done on the goods destructive and extreme tolerance test, this test will cause irreversible damage

Welding Note: Please use reliable grounding of low voltage soldering iron and soldering iron , welding DIP PAD needs to be soldered to circuit traces or copper clad side! !

Note: internal UHF MOS devices, try to use the battery-powered test if the test so that can avoid because of the power and test devices, such as an oscilloscope between the static pressure difference caused by the breakdown of such things often happen, power The voltage can not be in inverse, or one-time hang! Factory guarantee each rigorously tested to guarantee 100% OK for the factory's products, customers inadvertently damaged during testing we can not be responsible for, but to minimize losses to the customer, the customer caused the bad, we can also repair free of charge , not including round-trip cost of shipping and damage to the device. Honest work, honest man.

Description: This product is only one sensor, generally need to add the op amp, and single-chip can be used [If you have technical problems, please call to talk to and engineers: 15323435161 Please do not use SMS).



HB100 microwave modules using Doppler radar (Doppler Radar) design principles, mainly used in the automatic gate control switch, security system, the ATM ATM automatic recording control system, automatic train signal etc. places. The HB100 is standard 10.525GHz this detection method has the following advantages compared with other detection methods:

- 1, the non-contact detection;
- 2, independent of temperature, humidity, noise, airflow, dust, light, etc., suitable for the harsh environment;
- 3 , strong resistance to RF interference;
- 4, the output power is small, and did not constitute a hazard to the human body;
- 5, long-distance: the detection range of more than 20 meters .

10.525GHz microwave and lower band wave has the following advantages:

1. the launch of the microwave antenna orientation, making it easy to control the scope of the microwave probe.
2. the microwave in the transmission process is easier to attenuation, the absorption and reflection of the walls, etc. obstruction is encountered will be blocked, the objects outside its walls, etc. obstruction little interference.

Power supply: to HB100 powered continuous DC power supply (CW) mode, and pulsation power supply (PW) mode of the two: HB100 adapt to the voltage range of $5V \pm 5\%$. Continuous DC power supply (CW) mode with a typical current of 35mA(typical). Low duty cycle pulse power supply (PW) mode, it is recommended to HB1005V, pulse width 5 s- 30 s 20 s), frequency (The typical value of 2.0kHz) pulse power supply. 3 to 10 % duty cycle pulse supply an average current of 1.2mA to 4mA. The pulse supply voltage 4.75V to 5.25V, pulse top flatness impact HB100 detection capability. supply voltage exceeds 5.25V, its reliability will be reduced, and may lead to permanent damage of the nominal frequency of the RF output and the circuit.

RF output : In all of the recommended operating mode, HB100 is very low, both in constitute any hazard to the human body within the safe range. Continuous DC power supply (CW) mode, with a total output power of less than 15mW. Output power density in the 5mm at $1mW/cm^2$, 1m at $0.72 W / cm^2$. When the at a 5 % duty cycle of the pulse powered mode, the power density were reduced to $50 W / cm^2$ and $0.036 W / cm^2$.

IF output : When the object in HB100 1 m / s with respect HB100 antenna surface (non-aluminum shield the side of the antenna surface), HB100 72Hz / s IF pulsation of the output frequency with the object relative radial movement speed is approximately linear relationship. IF amplitude of the output with the size of the object, related to the distance, when a weight of 70kg, the height 170cm test from the HB100 1m, 1m / s speed, the IF 5mV, 72Hz / s ripple signal, the IF output of the amplitude square of the distance into the approximate inverse relationship.

Note :

1. detection range depends on the reflectance of the target, and size, as well as the signal-to-noise ratio.
 2. 10.525GHz under Doppler velocity 31Hz/mph
 3. Module must be installed such that the antenna surface (non-aluminum shield that side of the antenna surface) toward the detection area, the user can also adjust the direction in order to achieve the best coverage area.
- a simple failure to determine : HB100 easily when welding the breakdown, measuring with a multimeter diode file IF of GND and GND normal ($V_{IF-GND} V_{GND-IF}$) 0.25V or so.

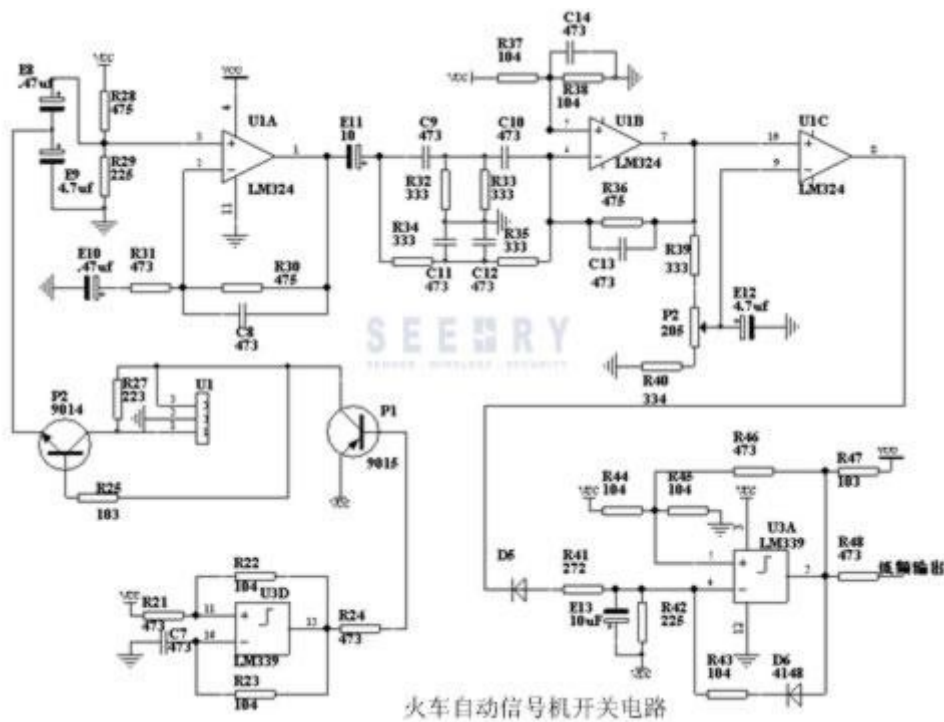
Application examples: automatic door control, ATM machines automatic video control

The role of the circuit continuously adjustable from 4-15 meters, pyroelectric infrared detectors, anti-glare interference detection distance, not temperature, humidity and impact. The circuit schematic Descriptions: Figure U1 is the microwave sensor detector module through the K202, K203, R202, R219 module 2kHz the pulsating power (to produce frequency 2kHz high level width 20uS circuit a lot, such as the use of reverse is CD4069, 1m555, etc.), K201 U1 works during conduction, the strobe output of the low-frequency signal the U1 output response moving objects, C202 sample-and-hold circuit to ensure continuous and complete signal. Consisting of two-pole low-pass amplifier circuit by LM358 output of U1 zoom in the LM358 of 1 foot output. The adjustable resistor R213 is used to adjust the gain of an amplifier, adjust the R213 the size can be adjusted to detect distance.

Application examples: Train automatic signal switching circuit

The role distance of 1-9 meters continuously adjustable. Stronger anti-interference ability of this circuit, the adjustment range, can be applied to the field conditions are poor places to use. The principle Descriptions: The above is a complete

application circuit, U3D (LM339) and surrounding components 2kHz low-duty cycle oscillator, P1, P2, pulsating power and strobe. E9 retention capacitor is used, the reaction movement of the object low-frequency signal after the LM324 A, B, and the surrounding components of the low-pass amplifier circuit to the associated components by LM324 C and around the comparator. C9-C12, R32-R35 form a low-pass filter network into account inter-frequency interference signal. By U3A delay circuit to ensure the found considerable time stable output circuit object moves. By U1A and associated components consisting of the first-stage amplifier circuit, the gain $A1A R30/R31 = 375/473 = 78.7$; second stage amplifier by U1B and associated circuits, amplification gain $A1B R36 / (R35 + R34) = 475/943 = 50$; the two enlarged the gain for the $A = 78.7 \times 50 = 3935$, shall be 36db. By U1C and R39, R40, P2, and E12, consisting of a voltage comparator, the amplified signal of the previous stage is converted into a pulse signal, the U3A and related components of the delay circuit delay output. Adjust P2 can change the size of the detection range, change R41, E13, R42 size can adjust the output length of time.



Application examples: three Kam probe

Principle Overview: the three Kam refers infrared led, microwave-assisted, single-chip smart processing (PIR / MW / AI) detection technology, found the target after the start when the passive infrared microwave detection circuit, when the two signals are valid through the microcontroller smart processing Alarm output conditions are met, the alarm signal is given by the microcontroller. **Circuit Analysis:** this circuit passive infrared (PIR) after the signal is filtered until the microcontroller comparator input port 17 and 18 feet, the comparator signals sensed by the infrared head directly converted to a pulse signal, the digital signal by the MPU PIC16C622A processing, the use of software can be carried out into the identification and interference into account in addition. 2kHz of the RB1 output of 5% duty cycle of the pulse (the width of 20us), drive power of the pulses P2 to the microwave detector. Low-frequency output of the microwave detector P1 strobe output to the C101 with holding capacitor. Programmable operational amplifier, then the comparator U1B composition for level shifting the low frequency signal by the reaction movement of the object of U1A and related components, and the converted pulse signal to the input to the MPU the PIC16C622 of RB3 foot. Infrared finding the target, RB1 output high, transistors K3 conduction, programmable gain amplifier U1A composed from 100 times to 10,000 times the microwave detector circuit to start work, MPU detect objects moving signals. MPU PIR signal, can determine the infrared source of the discrepancy in order to exclude

interference of hot air as well as non-heat source of the moving object (such as the fluttering curtains, the rotating fans, etc.), the integrated microwave detector signal at the same time, can be exclude the interference of a variety of heat sources. Reasonable mathematical model of the MPU and the preparation of scientific software, you can identify a body weight less than 20kg pet. Basically eliminate false alarms caused by pets. This circuit to change the size of P1, the gain of the amplification circuit can be changed, thereby adjusting the detection distance of the microwave circuit

