

HR-1031 Large Power RF Module

User Manual



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Thank you for using Huaray products, in order to better and faster and more effective use of this product, please read carefully before using this manual carefully. Regardless of the user selection of equipment or data radio during the application development process, the Division's commitment to easy to not even provide a full range of pre- post-sales technical support. Users to buy products from the date of Section Huaray one-year warranty, lifelong maintenance service.

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In addition, the company also for the customer order switching power supply, surge arresters and all kinds of antennas and other ancillary facilities.

一、HR-1031 Introduction

Oriental Huaray Group specializes in producing wireless communications products, HR-1031 uses advanced frequency synthesis techniques, CPU PLL control, with the modem, voice or data signals to provide a transparent transmission, can adapt to a variety of points point-to-multipoint wireless data communications, with high emission power, transmission distance, send and receive one, easy installation, simple to use and cost-effective high-and low error rate, stable and reliable operation, applied to remote data transmission and voice intercom systems among the general upgrading of cable systems products.

Specific application areas include: ships, urban transport, taxis, intercom systems, industrial automation control, power scheduling, monitoring water conservancy, railway collecting signal transmission, oil and control oil production, oil wells, measurement, hydrological hydrological monitoring, weather data transmission , environmental monitoring equipment, storage and container management, and shopping malls supermarkets tally, forest protection facilities, intelligent building, radio beacons, river shipping, geological exploration, mobile positioning, military training, security alarm, medical monitoring, remote telemetry and other automation and control.

二、HR-1031 Features

1. Transmit Power

The internal use of imported power amplifier module, adjustable transmit power 5-25W, size 127mm × 180mm × 50mm.

2. ISM band frequency, without application frequency

Carrier Frequency rate of 150/230/450MHz carrier frequency, etc., can store up to 256 channels.

3. High anti-interference ability and low error rate

Based on the MSK modulation method, using high-performance communication protocol, the channel bit error rate of 10⁻², the availability of the actual error rate 10⁻⁵ ~ 10⁻⁶.

4. Can transmit voice or data signals, as a wireless vehicle intercom radio broadcasters.

5. Transparent data transmission.

To provide transparent data interface, can adapt to any standard or nonstandard user protocol. Automatically filter out the noise generated by the air signal and false data (ie collected by the hair). Transceiver conversion time: <10ms.

6. Multi-rate.

HR-1031 module available 1200bps, 2400bps, 4800bps, 9600bps baud rate and other communications, and wireless transmission rates and interface baud rate is proportional to the baud rate to meet customer equipment to a variety of needs.

8. Full band scan, auto-lock; used a computer to set transmission frequency, change the channel to determine the

operating mode.

9. Receive, send one, half-duplex communication, switching quickly.

10. Multifunctional.

Receiver functions: to receive the above-mentioned band RF signals, with frequency discrimination capability, the output audio or data signals;

Launch Function: launching the above-mentioned band RF signals, with FM capabilities, input audio or data signals;

Modulation functions: sending data, the data have MSK modulation function;

FM functions: receiving data, the data with the MSK demodulation functions.

11. Pairs of phase-locked loop, double-VCO structure, high stability.

12. A variety of standard interfaces.

Interface with standard TTL, RS-232 (or RS-485) level, can be directly connected microcontroller or a personal computer.

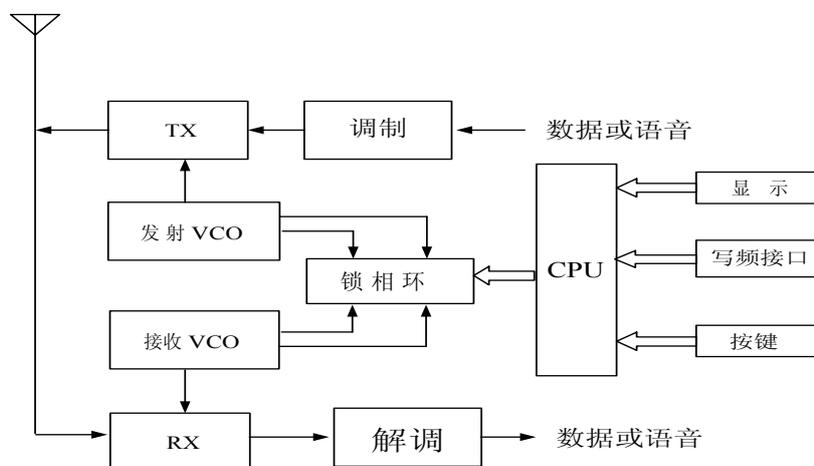
三、HR-1031 User method

1, radio and a basic component

Radio's basic function is to super-long-distance wireless transmission of voice and digital signals, to complete the circuit of these features include: high-frequency transmitter and receiver systems, audio processing, modulation circuit, data shaping, modulation and demodulation, RS-232 interface, CPU control circuit , power management circuitry, LED driver circuit.

The product uses advanced frequency synthesis (PLL + VCO), and the use of metal shielding to achieve the channel, frequency, all-round opening up. Users as needed, through a computer terminal software in the whole super-band is free to set the channel number, frequency, and silent mode (sub-audio) and stored.

The structure and principle of machine as shown in following diagram:

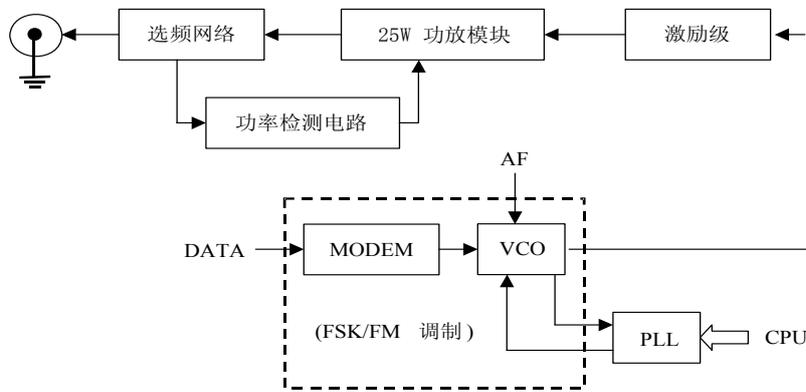


Mobile station in order to work half-duplex

mode, the main task is to send and receive signals ultra-long haul. Half-duplex is a two-way communication, sending and receiving alternating work, alternating from the corresponding PTT launch control button to complete in this product, you can press the PTT to send audio (utterance) Release the PTT at the time of receiving state of voice, data, PTT communication from the CPU to complete. Under normal circumstances the mobile station has transmitter and receiver (including monitor), set up three kinds of working condition.

2, firing circuits

Launch is the external one-way process of sending information. When you need a certain point or points when you send data or voice to maintain the corresponding PTT action, you can send a message. This product works transmitter block diagram shown.

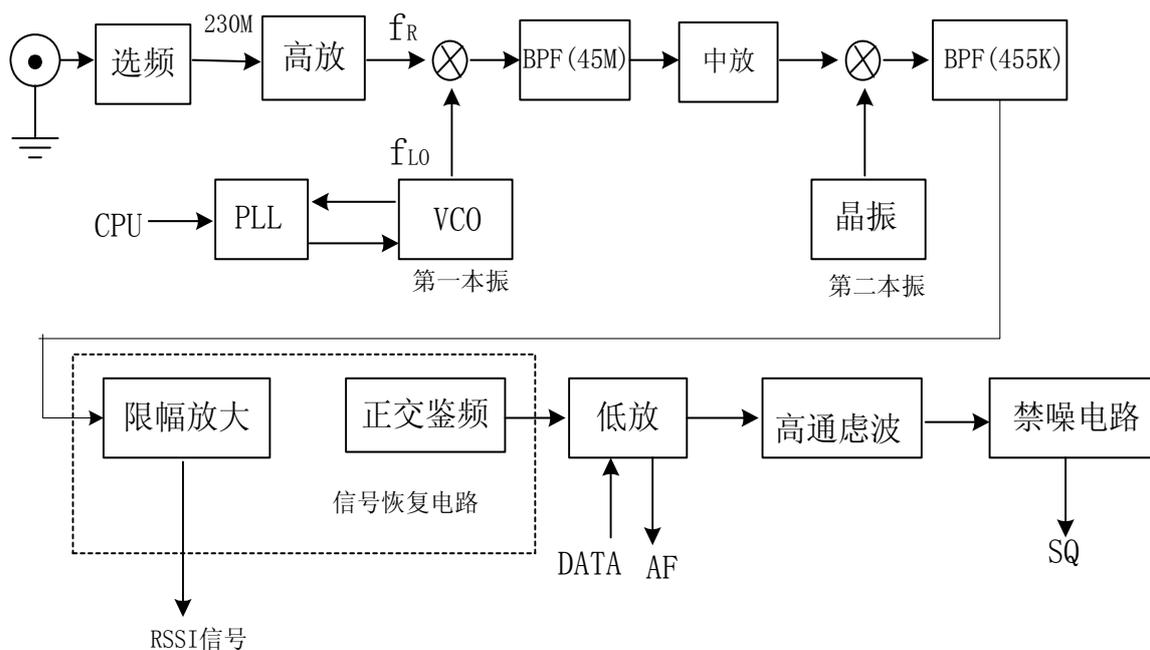


Is to send voice signals to the principles outlined launches. Usually at the launch of channel power (non-operating) state, when the user needs a particular channel (object) to send voice information and selected the appropriate channel, press the PTT (panel on the TX indicator light), the channel that is in the working state (power), can send voice signals. Audio signal through the pre-emphasis, Vice-amplification restriction was conducted after the FM modulation, into the incentive level, motivation level and giving impetus to the major after a role. 25W amplifier module provides up to 25W of transmit power, in the power detection circuit detection under steady at 25W transmit power on. Frequency-selective network of choice to play the dual role of the frequency and impedance matching.

When sending data using MSK / GMSK modulation, launch work done under the control of CPU. Firing rate of 9600bps.

3, the receiver circuit

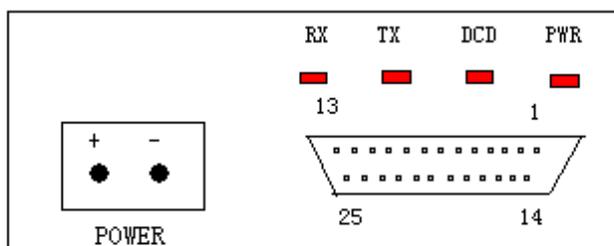
Under normal circumstances, the receiver has been in some of the work under the current channel state. Receiving circuit includes scanning, monitoring functions, schematic block diagram is shown below.



Circuit used within the two super-heterodyne mixing, can effectively improve the receiver sensitivity. The received signal through the selected frequency to the high place and then proceed to the first mixer, local oscillator by a voltage-controlled oscillator (VCO) produces. First IF frequency of 433MHz ($f_R - f_{LO}$), and then through the 433 MHz of the IF filter, and improved selectivity. Signal in the first place has been enlarged, a second mixer to be 455KHz IF, after a deputy amplified restriction, 455KHz IF two routes, all the way into the frequency discriminator, and the other passing LC tuned circuit phase shift 90°, the sending Entry Frequency Discriminator complete orthogonal frequency discriminator. The signal is the result obtained after low-level, including digital and voice signals. Part of the output signal through the high-pass filter into the squelch circuit squelch circuit to play the role of radio-frequency detection when the received carrier frequency when the Squelch circuit produces an SQ signal, SQ signal through the CPU control the RX light work to ensure that receiving voice quality.

4、HR-1031 Interface definition:

1) panel description:



2) Power Interface: (located on front panel)

The left hand lane - +12 V positive supply current of ≥ 7 A

Right Line - Power Ground

Note: The power capacity must be sufficient to require regulated power supply ripple-free.

3) Signal Interface

HR-1031 provides TTL, RS232, RS485 interface, one way, the user must choose according to their own needs when the specified interfaces.

- 1 ---- MIC PTT
- 2 ----+ 5V Power Supply
- 3 ---- MIC AF
- 4 ---- AF OUT
- 5 ---- GND
- 6 ---- D / A CONTROL
- 7 ---- SQ
- 8 ---- GND
- 9 ---- GND
- 10 ---- CTS
- 11 ---- TXD (485-A)
- 12 ---- RXD (485-B)
- 13 ---- RTS
- 14 ---- GND
- 15-22 NC
- 23 ---- GND
- 24 ----+ 12V

25 ---- GND

If only for data transmission, you just need to connect three lines 11,12, and GND can be

4) The antenna interface (at rear panel)

Antenna interface is located on the rear panel, for L16 socket with 50Ω shielded cable.

4, HR-1031 Specifications

The technical indicators used in test methods in accordance with "GB / T 16611-1996 General specification for data radio,"

Comprehensive index

- Working frequency: 150/230/450 MHz
- Frequency Tolerance: $\pm 2.5\text{ppm}$
 - Channel spacing: 25KHz
 - Antenna Impedance: 50Ω
 - Ambient temperature: $-30\text{ }^{\circ}\text{C} \sim +55\text{ }^{\circ}\text{C}$
- Modulation: MSK
- Data transfer rate: 1200/2400/4800/9600bps

Receive indicator

- usable sensitivity: $\leq 0.25\mu\text{V}$
- SNR: $\leq -45\text{dB}$
- Adjacent Channel Selectivity: $\geq 65\text{dB}$
- Intermodulation Immunity: $\geq 60\text{dB}$
- Spurious Response Immunity: $\geq 65\text{dB}$

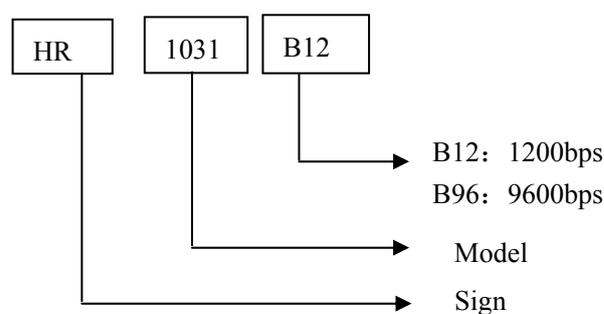
Emission targets

- Transmit Power: 5-25W
- Modulation Distortion: $\leq 5\%$
- Residual FM: $\leq -40\text{dB}$
- Digital Transmission frequency deviation: $\leq 5\text{KHz}$
- adjacent channel power ratio: $\leq -65\text{dB}$
- Stray RF components: $\leq 5\mu\text{W}$

Power

- DC Voltage: 12V
- wait for current: $\leq 160\text{mA}$
- emission current: $\leq 6\text{ A}$ (transmit power of 25W)

五、 Model and Naming



Attachment:

Please properly connected the power cord, antenna and data lines. If you need to re-set the radio parameters, refer to "radio parameter setting method"

1, connect the signal cable: Note that line sequence, interface, baud rate of the correct settings.

2, open the power supply: At this point in the receiving state.

3, send and receive data: data from the external device into the radio, automatically transmitting data at the same time

Emission indicator light. No external data input, radio, the receiving state, such as the antenna to receive the signal through the signal interface, the data demodulator to restore the output to an external device, while receiving indicator light.

Notes

1, power supply:

Since the radio power of a larger, general transmission power of 25W, the power capacity to meet the 12V 8A. Please select the ripple factor of a good anti-jamming ability of the power supply. If using a switching power supply, please note that the antenna as far as possible away from the power supply, because the antenna may affect the switching power supply work properly. When the transmitter fails, check the power supply voltage is affected by the antenna interference mutation is one of the ways to troubleshoot.

2, Antenna:

Antenna should be used in accordance with radio frequency band to select. In the long-distance use, should be used a directional antenna or a high-gain antenna, may be erected as high.

The impedance of the antenna and its feeder interface with the module matches (50Ω). If the antenna impedance matching, machine efficiency will be low, power consumption will increase, but also easy to damage the wireless data radio.

Should pay attention to mine and the erection of the antenna directional antenna, grounding should be good.

3, feeder

Feeder is connected to the coaxial cable between the radio and antenna. The choice should pay attention to the following indicators:

Impedance: 50Ω (available in the market generally have two kinds of 75Ω and 50Ω, please note that distinction)

Attenuation: the signal attenuation per meter feeders dB (DB) the number of Decay small as possible.

Diameter: The diameter of the more coarse feeder and shielding layer of the more solid the smaller feeder attenuation.

Feeder connector: feeder of the two must match the antenna and radio connector, connector for the impedance of 50Ω, and must be solid connection.

Be careful not to take when you install the feeder's too tight, after coming indoors feeders are generally around a ring in order to prevent flood water from entering the station, multi-mine areas or antenna installation is high, the need to install surge arresters.

4, heat:

Radio station fired a long time, we should pay attention to radio timely dissemination of heat generated can be out, if the radio heat well, making it easy wireless transmission is not working properly.