

ITECH TEST SOLUTION Medical Equipment



YOUR POWER
TESTING
SOLUTION





With the aging of the global population and the increasing number of sick people, there is an increasing demand for medical equipment. The rapid growth in demand for high-end medical equipment such as CT scanners, MRI, and high-end ultrasonic diagnostic instruments has driven the expansion of the global medical electronics market. At the same time, the growth of market demand has greatly stimulated medical electronic equipment manufacturers to expand investment and create innovations in this field.

ITECH has been following the development of the medical electronics industry, providing you with high precision, high speed, high power density battery simulators, AC/DC power supplies, AC/DC electronic loads, power analyzers and other test instruments. Bring accurate, efficient and energy-saving testing solutions for medical imaging equipment, wearable medical equipment, medical power supplies, medical electronic components, medical robots, drones and other medical electronic applications.

Test solutions- Medical imaging equipment

Imaging diagnostic equipment and imaging therapeutic equipment are the two types of medical imaging equipment. It includes X-ray imaging equipment, MRI, nuclear medicine imaging equipment, ultrasonic imaging equipment, radiation simulator, medical electron linear accelerator, proton therapy cyclotron, etc.

DUT CT, radiation simulator, X-ray, etc.



Main and auxiliary power supply test

Most medical imaging equipment needs to be powered by the public grid, so the equipment is required to maintain a stable working state even when the grid power fluctuates. For example, when the CT is running, the AC grid power fluctuation is required within the range of +6% to -5%, and the power supply voltage needs to be stayed at 380V, then the voltage is fed to each subsystem through the automatic circuit breaker. In some hospitals, air conditioners also share a line with major medical equipment. The frequent activation of air conditioners will affect the stability of medical equipment, and sometimes even break down, so it is particularly important to test the power supply for these equipment.

Typical parameter

Standby power up to 5kVA, instant exposure can meet more than 10 times the power

Test solution

Use a high-power AC power supply to simulate frequency fluctuations, voltage fluctuations

Advantages

- High precision
- Low ripple
- Withstand instantaneous high current
- Parameters easy to see
- Full protection

Product

IT7800 High power AC/DC power supply

- High power density, 15kVA in 3U, power extended to 960kVA after master-slave parallel connection
- Voltage: : 350V(VLN) / 606V (VLL 3phae) / 700V(VLL reverse)
- Multi-channel function, single unit can connect/test up to 3 DUTs
- 4 output modes: AC/DC/AC+DC/DC+AC
- Touch panel with simple UI



IT7800 High power AC/DC power supply

IT7600 High performance AC/DC power supply

- Output power: 10-5000Hz
- Resolution: 10mV/10mA
- Accuracy: $\pm 5\% + (0.8\% + 0.3\% * Kfreq) * FS$
- THD: $< 0.5\%$ (10-500Hz)
- Voltage ripple :300mVp-p
- Dynamic response: $< 100\mu s$



IT7600 High performance AC/DC power supply

High voltage generator test

The working principle of the high-voltage generator is to convert the low-frequency and low-voltage AC power into high-frequency and high-voltage power, which can generate high frequency of 500~25000Hz. After rectification and smoothing, the voltage fluctuation range is less than 1%. The fluctuation range of conventional three-phase and twelve-pulse generators is 4%. Therefore, equipment such as radiation simulators and CTs have high requirements on the stability of high-voltage power supplies. High-precision voltage stabilization feedback measures are used in high-voltage systems. For example, the inverter module of the high-voltage generator in the CT equipment must be tested with a stable DC high-voltage high-power power supply. Its voltage needs to be between 450V and 550V, and the power is about 50kW.

Product

IT6000D High power DC power supply

- Voltage: 80V ~ 2250V
- Current: 30A ~ 2040A
- Power: 5kW-144kW
- Power extended to 1.152MW after parallel connection
- High power density, 18kW in 3U height
- Power efficiency is up to 92% max.
- Full protection(OVP、 OCP、 OPP、 OTP、 power-off and input under voltage)



IT6000D High power DC power supply

X-ray tube testing

The core of many medical imaging equipment is X-ray and high-voltage generators, such as linear accelerators, radiation simulators, CT, etc. The high-voltage generator can boost the AC grid power to 140kV through rectification, inverter, and high frequency, and supply it to the cathode and anode of the X-ray tube. There is a filament inside the X-ray tube, which needs to be heated in advance. The DC voltage of the power supply for heating it needs to be 12V and the power is within 200W, so you need a low-power power supply for it.

Product

IT6900A Wide range DC power supply

- 60V ~ 150V
- 100W~600W
- Resolution: 1mV/0.1mA
- Accuracy: $\leq 0.03\%+5mV / \leq 0.1\%+5mA$
- RS232/USB/RS485/analog



IT6900A Wide range DC power supply

IT6800A/B Programmable DC power supply

- 18~50V
- 180W~200W
- Resolution: 1mV/0.1mA
- Accuracy: $\leq 0.04\%+8mV / \leq 0.1\%+12mA$
- USB/RS232/GPIB

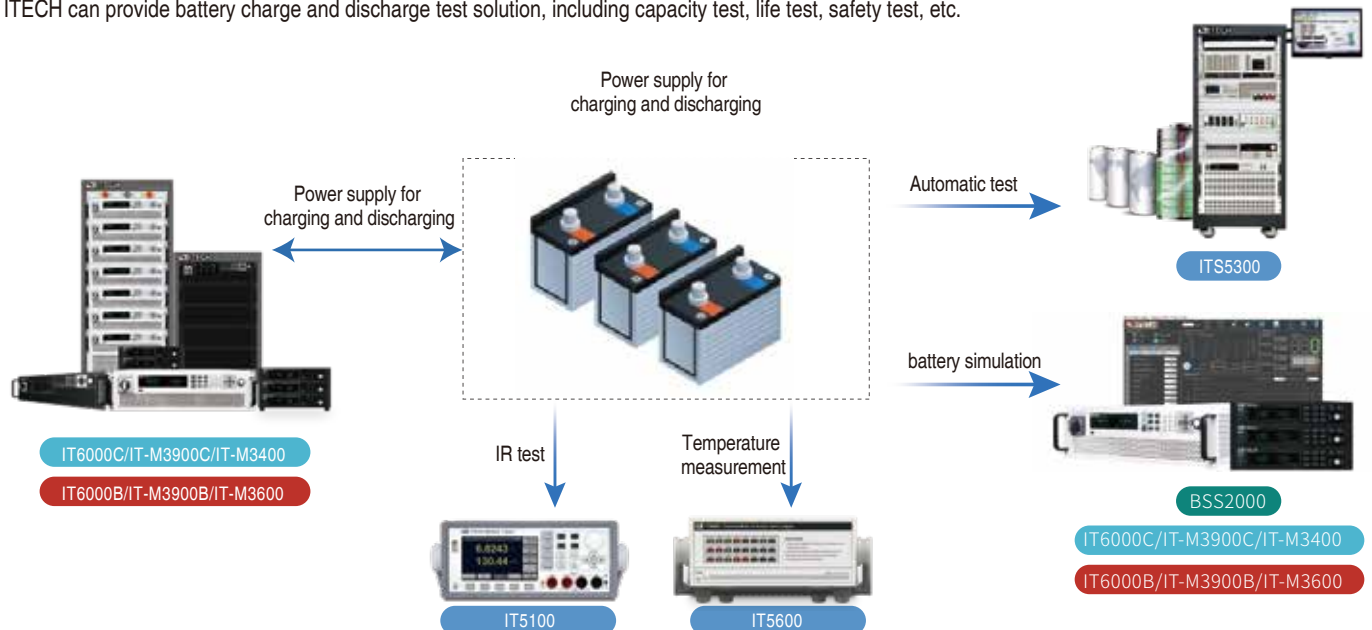


IT6800A/B Programmable DC power supply

Battery test for in-vehicle CT and mobile DR

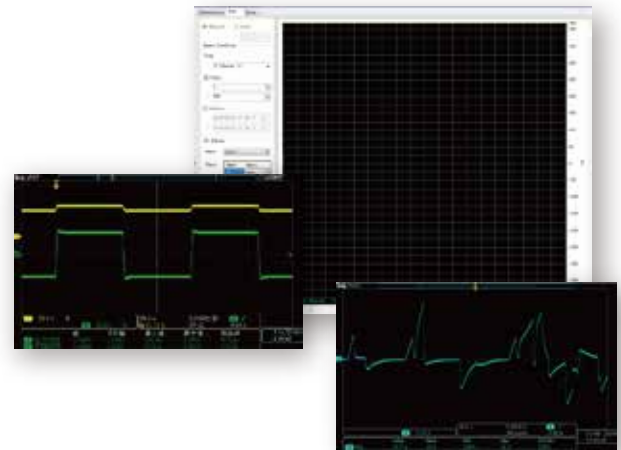
To make it more flexible, medical equipment manufacturers have also launched products such as in-vehicle CT and mobile DR. These products must have batteries or super capacitors as energy storage systems to ensure their battery life.

ITECH can provide battery charge and discharge test solution, including capacity test, life test, safety test, etc.



Advantages

- Verify that the effective capacity of the battery
- Convenient evaluation of battery life cycle
- Automatic charge and discharge test
- Test the rate discharge of the battery
- Measure battery charging and discharging time
- Simulate current waveform under real conditions
- Powerful statistical analysis functions
- Safety configuration



Product

IT6000B regenerative power system

IT6000C bidirectional DC power supply

- High power density, 18kW in 3U height
- Voltage: 80~2250V
- Current: 30~2040A
- Pmax. : 1.152MW
- Adjustable output impedance
- 2 in 1 : bidirectional DC power supply and regenerative electronic load
- Regenerative efficiency up to 95%max.
- Available for battery simulation and test

IT-M3900C bidirectional DC power supply

IT-M3900B regenerative power system

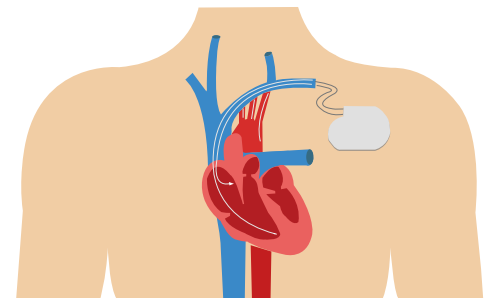
- Ultra-compact design, 1U@6kW, 2U@12kW
- Voltage: 10~1500V
- Current: -720A~1020A
- Bidirectional, seamless current switching
- High efficient and eco-friendly
- Master-slave connection in parallel, no performance loss after power extension
- Available for battery charge and discharge test
- Battery simulation with user-defined battery modules

Testing of Battery-Powered Wireless Medical Devices

The aging of population, the improvement of people's living and the increasing demand for medical services in remote areas have brought about changes in the way of medical care. Mobility and portability have gradually become the key words in the research and development of medical electronic equipment.

The battery-powered wireless medical devices are like blood glucose meters, continuous glucose monitors, blood pressure monitors, pulse oximeters, insulin pumps, and heart monitoring systems. They refers to a portable medical electronic device that can be directly worn on the body. These devices are mainly used in health monitoring, disease treatment, tele-rehabilitation, etc. Portable/wearable medical devices are battery powered.

Low power consumption is one of the key test items of portable medical devices.



Battery test

Portable medical devices are often battery powered. So the validation of batteries performance is necessary.

DUT

Portable pacemakers, portable ultrasound equipment and monitors, rehabilitation robots, wearable blood pressure monitors, wearable oximeters...

Product

ITS5300 Battery Charge&Discharge Test System

- Customized test items and reports to address different customers need
- Charging: CC/ CV/ Pulse charging
- Discharge: CC/ CR/ CP/ Pulse discharge
- Multi-channel independent control



Test requirement

Quick verification of battery performance, PASS or FAIL

- DC internal resistance
- Instantaneous discharge
- Life decay

- Real-time monitoring of single module internal resistance, voltage and temperature
- Alarm and protection, effectively prevent battery over-discharge, over-charge and other unexpected failures

Automatic test

PASS or FAIL

Test with software

- Battery life test: determine the voltage decay rate and capacity decay rate by cyclic charge and discharge, so as to obtain the battery life cycle
- Constant current discharge: determine whether the available time of the battery meets the theoretical value
- DC internal resistance: determine the internal resistance of the battery
- Instantaneous power supply capability: test the over current protection and determine the result

Low power consumption test

Portable/wearable medical devices are designed to be as small as possible with as long a standby and working time as possible. So in addition to their large battery capacity, the power consumption of the device itself should be as low as possible too.

Test requirement

Measure standby power consumption, working state power consumption, and power consumption when the screen is on and off. The minimum operating current may be in the nA level.

Product

IT-M3200 high precision DC power supply, IT6400 bipolar DC power supply

IT6400 bipolar DC power supply

Provides high-precision power and testing of low-voltage equipment within the rated voltage range

- Voltage setting and measurement accuracy: 0.02% +3mV
- 4-wire power supply mode (Sense) to ensure accurate preset value for load

Ensures stable voltage output during fast and wide-ranging loading

- Load transient recovery time < 20 us

High-precision current measurement

- The current display resolution can reach 1nA, even if the device is in sleep mode, it can still help you measure the power consumption when it draws only a few uA
- Low interference to the DUT
- Low ripple and noise (< 2uArms)

High resolution LCD display and softkey/icon based user interface for easy operation

Battery simulation

Portable medical devices continuously monitor and track the patient's condition. Medical professionals can view the collected health data remotely from a smartphone app via a Bluetooth connection. Wirelessly connected portable and wearable medical devices are important in providing services to outpatients.

Test requirement After turning on the Bluetooth connection mode, we need to measure the power consumed by the portable medical device in different modes and functions on and off.

Product IT6400 bipolar DC power supply

Any type of battery model can be easily created to simulate battery power and measure current and power consumption for each mode and function. It is in the research and development, which helps to verify and improve the product.

Advantages

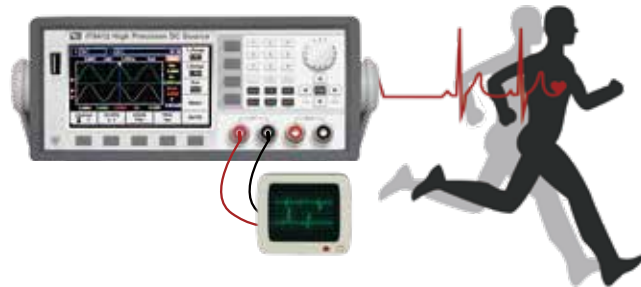
- Simulates real battery output, up to 10A sourcing and sinking current
- Simulate battery Soc and Res
- Simulate the battery output according to the battery model, the initial state of the battery can be arbitrarily set, and the acceleration battery charge and discharge test
- Monitor key battery parameters directly on the GUI
- With IT9000 software, the data of voltage, current and capacity can be recorded in time



Time: 500ms/dvi



Time: 1ms/dvi



IT6412 can simulate battery power supply and measure the power consumption of wearable devices in various modes and functions, which is helpful for product verification and improvement.

Testing solution - power supply of medical equipment

In many cases, medical equipment is directly connected to the patient's organs or tissues, such as cardiac puncture monitors, ultrasound, maternal and infant monitors, baby warmers, life monitors and other equipment. So the stable operation of these equipment is directly related to the safety and health of patients. The power supply of the equipment is one of the important factors affecting the stability. Therefore, the test of power module in medical equipment is far more stringent than others. Its test items include: IEC anti-interference test (voltage dip, short-term interruption and voltage change), leakage current detection, etc.

DUT

Power module (AC-DC/DC-DC), power adapter

Regulation

EN6060-1、IEC60601-1、IEC61000-4-11

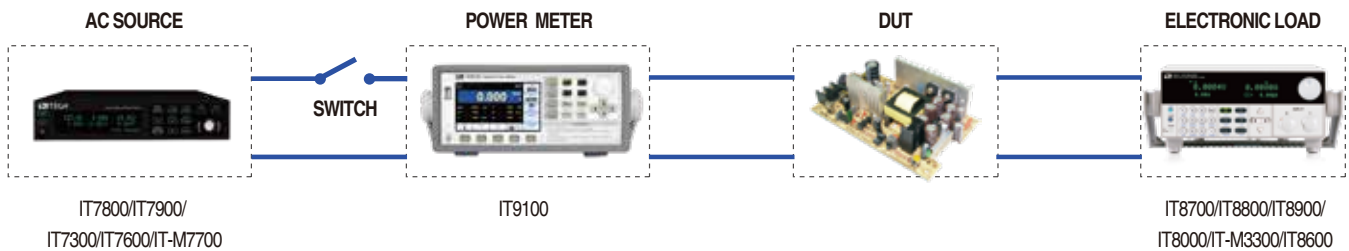
Test items

- Load effect/Load regulation
- Power effect / Power regulation
- Dynamic response
- Overload test
- Anti-interference test



Product

- AC power supply: IT-M7700, IT7800, IT7600, IT7300
- Power analyzer: IT9100
- DC power supply/DC electronic load
- Select against actual needs



IT-M7700 AC/DC power supply

- Only 1U half rack
- AC, DC, AC+DC, DC+AC
- Built-in AC power meter
- The output waveform start/stop phase angle can be set
- Customized 30 harmonic curves



40th order harmonic components
(AC-DC power module)

Electronic component testing

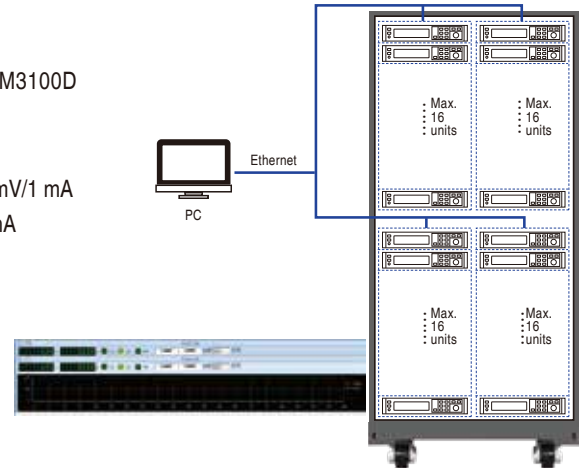
More and more functions are integrated in medical electronic devices, such as diagnostics, monitoring, imaging, communication etc. Semiconductor components are an important part of many medical equipment today. They support the functions like operational control, data processing and storage, wireless connectivity and power management.



Sensor test, chip aging test

PRODUCT DC power supply: IT-M3400、IT-M3600、IT-M3100、IT-M3300、IT-M3100D

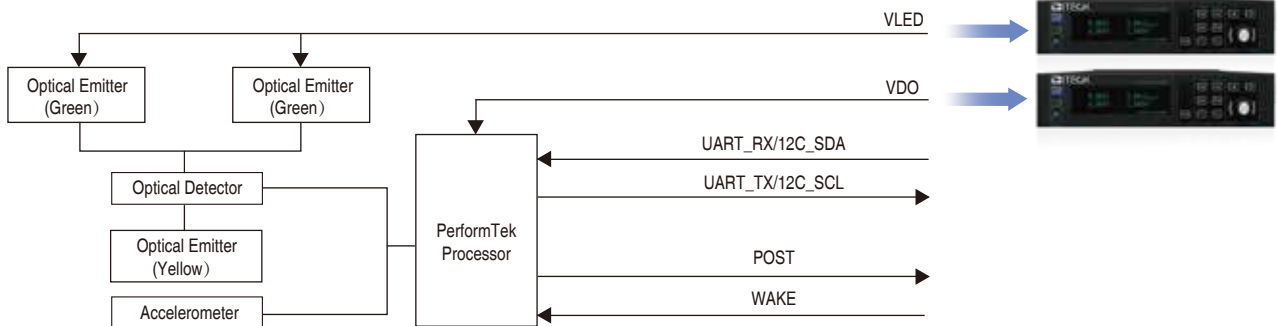
- Only 1U half rack, easy to be rack mounted
- Single unit and test system
- Each unit will display the channel number
- Each channel can be operated independently
- Up to 16*16 channels
- High resolution and precision up to 1 mV/1 mA
- Current read back resolution up to 10nA
- Sense



Medical sensor testing

Medical sensors refer to sensors used in the biomedical field. They can convert the physiological information of the human body into electrical information that has a definite functional relationship with it. Due to the increasing complexity of medical wearable devices, the applications of sensors in them are also increasing.

PRODUCT IT-M3200 high precision DC power supply
IT6400 bipolar DC power supply/battery simulator



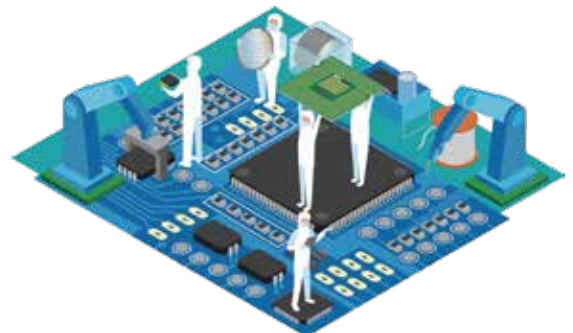
Discrete component testing

Static current test

Under a certain voltage, keep IC under no load and no oscillation. Connect one end of the ammeter to the positive of the power supply and the other end to the VDD of the IC, then the reading of the ammeter is the static current of the IC.

Driven current test

At a certain voltage, replace the load of the IC with an adjustable resistor. Let the IC work. When outputting, adjust the resistance to make the level of the IC output meet the test requirements.



Product

- IT-M3400 bidirectional DC power supply
- IT-M3600 regenerative power system
- IT-M3300 regenerative DC electronic load
- IT6400 bipolar DC power supply
- IT-M3100 wide range DC power supply
- IT8800 DC electronic load

Medical robots and drones

During the epidemic, drones can help promote the prevention knowledge, disinfection, monitoring, etc. In addition, it has also become a powerful tool in emergency disaster rescue.

Medical robots are also very helpful. Common ones include surgical robots, rehabilitation robots, and AI temperature measurement robots.

Key component

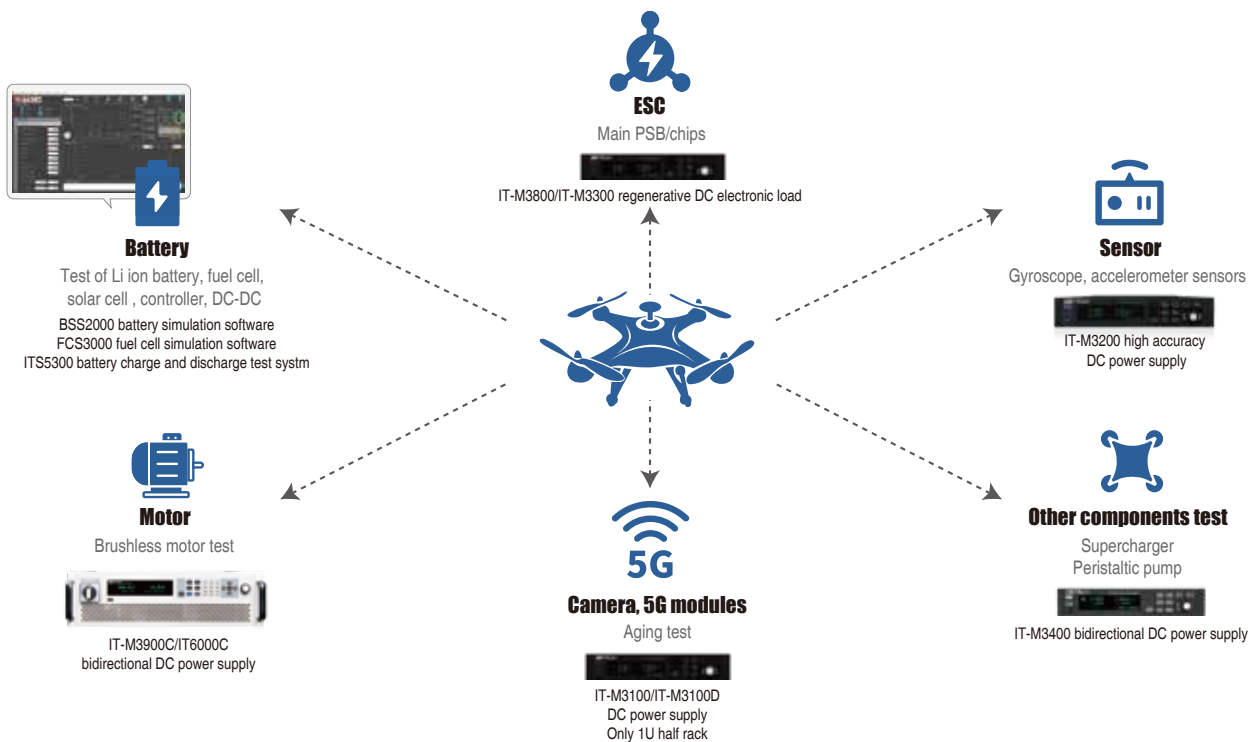
Power regulator circuit, motor drive circuit, infrared obstacle avoidance circuit, camera, manipulator, display, battery, etc.

Test requirement

- Power Board Performance Verification
- Motor performance verification: motor stall test, motor aging test
- Battery performance verification: battery simulation, battery charge and discharge test, battery life test, lidar test

Product

- IT-M3900C/IT-M3400 regenerative and bidirectional DC power supply
- IT-M3900B/IT-M3600 regenerative power system
- IT6000C high power bidirectional DC power supply
- IT-M3100 wide range DC power supply
- IT8800/IT8500+ programmable DC electronic load
- BSS2000 battery simulation software



Telemedicine services (AR/VR Technology)

The virtual imaging technology such as VR/AR/MRI connects the virtual world to the real world. Through wearable devices, they can provide information and solutions in a timely and accurate manner based on specific scenarios. The technologies play a big role in medical imaging, surgery, clinical treatment, telemedicine, health education, etc.



AR glasses and remote assistance

Platform

Doctor remote guidance, remote emergency, monitoring (face recognition/car license recognition), smart hospital

Test items

IoT test, WiFi module test

Product

IT-M3200 high precision DC power supply, IT6400 bipolar power supply/battery simulator

Advantages

Power supply test - Seamless current switching

High precision ammeter - Accurate measurement of ultra-low current (resolution up to 1nA)

Current waveform - Broadband low-level current waveform analysis (from 1 nA to 10 A, bandwidth up to 30 kHz), reducing power and current consumption

OLED test

DUT

Key components of VR/AR: video processing chips, display screens, sensors, micro-projection devices

Test items

- OLED power consumption, static current test from screen off to various brightness
- OLED driver circuit test
- Finished product burn-in test

Product

IT-M3100、IT-M3100D、IT6400、IT-M3200、IT-M3300



This information is subject to change without notice. For more information, please contact ITECH.

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