

MINIMIZING POWER CONSUMPTION

High-precision two-quadrant power supplies generate current profiles and simulate batteries



An R&S®NGM202 power supply in battery simulation mode. The battery's key parameters are displayed on a single screen.

Your task

More and more devices are battery powered or need to have low power consumption for other reasons. In order to minimize your electronics device's power consumption, you need to know the exact current profile. The R&S®NGM200 power supply series provides this information.

Rohde & Schwarz solution

The single-channel R&S®NGM201 and the dual-channel R&S®NGM202 (see photo) deliver up to 60 W of output power per channel. The linear two-quadrant design of their output stages enables the power supplies to operate as a source and sink. With four current measurement ranges and up to 6½ digit resolution for measuring voltage, current and power, the R&S®NGM200 power supplies are ideal for characterizing circuits with high peak currents and low power consumption in standby mode. Their fast recovery time of less than 30 µs and very low overshoot even during a demanding load change are additional key features for measurements on IoT modules and other battery powered devices. The power supplies are operated via a 5" touchscreen that provides quick and easy access to all parameters.

This application card describes two of the many outstanding features of these power supplies.

FastLog for more detailed measurements

The FastLog function can be activated for demanding applications. In addition to the 6½ digit measurement data resolution of the R&S®NGL200 series, this function offers high speed acquisition and related analysis functions. Voltage and current can be simultaneously measured with a temporal resolution down to 2 µs. The resulting data can be saved to a USB flash drive or other data storage media for subsequent analysis. Or the data can be sent in real time to an external computer via USB or LAN, e.g. in a production environment.

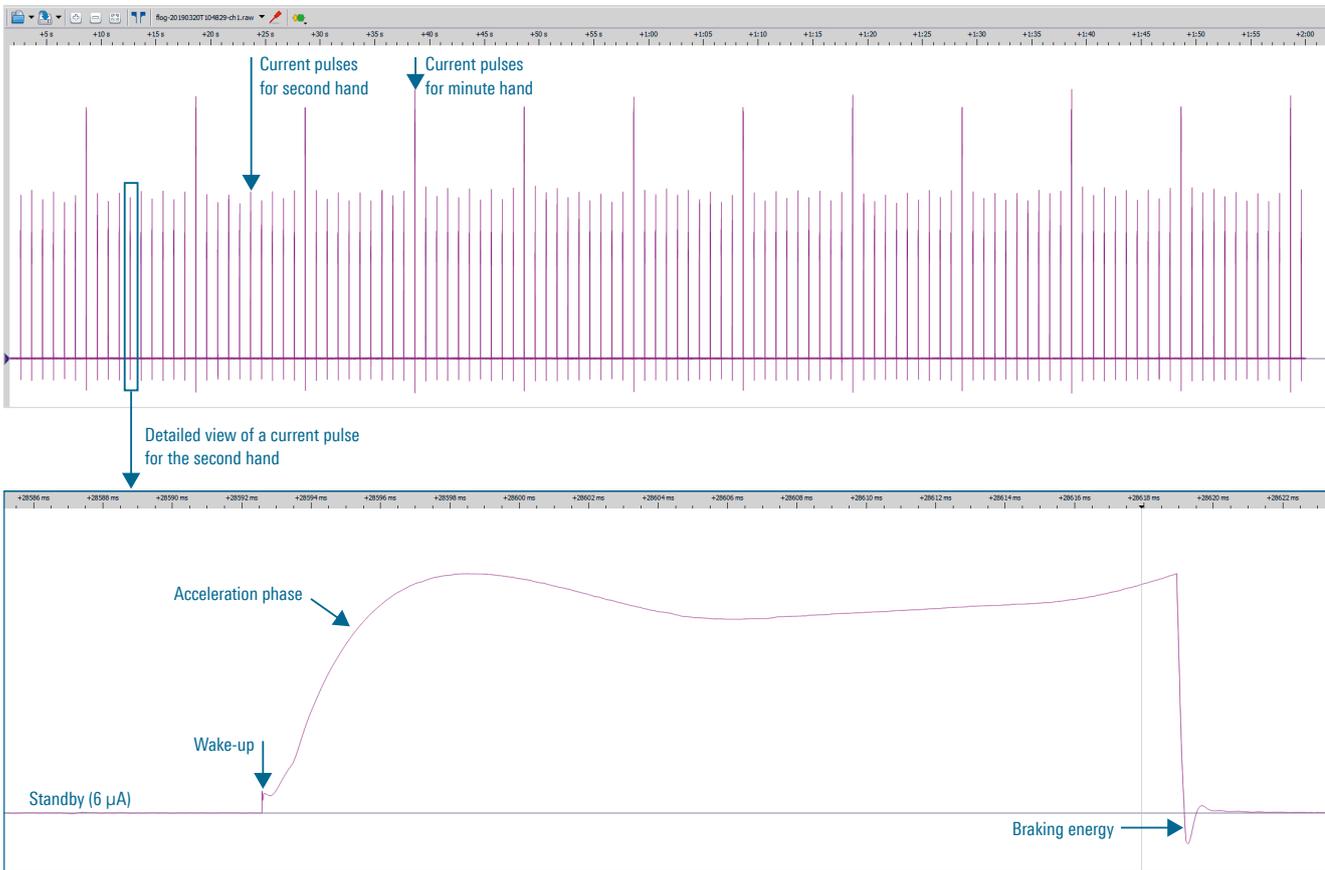
In the example shown in the screenshot, an R&S®NGM201 powers a radio-controlled clock and the FastLog function records current consumption. The current clearly shows the movements of the second hand. Every 10 s, a pulse advances the minute hand. The logged data is so precise that an individual hand movement can be analyzed. The zoomed-in view shows how the microcontroller wakes up from the sleep state, accelerates the hand and then brakes it. It is even possible to see that energy is fed back into the power supply when the hand is braked.

Battery simulation

The R&S®NGM200 power supplies can optionally be used to simulate (rechargeable) batteries. In this mode, the power supply behaves like a predefined battery (see photo). The battery's parameters can be conveniently edited on the power supply. Several standard battery types are preinstalled for testing. Since R&S®NGM200 power supplies both source and sink energy, they can simulate discharging and charging a rechargeable battery. The dual-channel R&S®NGM202 is the first model on the market that can take on the role of two independently defined (rechargeable) battery types, such as a fully charged battery and an empty battery connected in series. To accurately simulate power sources with high discharge currents, such as lithium-ion batteries, an intricate control circuit was developed that quickly and precisely adjusts the internal impedance.

Summary

For developers of IoT modules, wearables, gadgets and other mobile electronic devices, low current consumption is key. Not only do the R&S®NGM200 power supplies help developers achieve this goal, they are state-of-the-art universal instruments that can be used for countless everyday lab applications.



Recording the current of a radio-controlled clock. Top: current pulses for advancing the second and minute hands; bottom: detailed view of a current pulse for the second hand.

