Power Supply / Dual-Channel Analyzer NGMO2

Fast dual power supply with analysis functions

FIG 1 **The NGMO2 offers versatile functions on two channels**

With the NGMO2, Rohde&Schwarz has extended its comprehensive line of power supplies [*] to include an outstanding voltage source for the laboratory, with functionalities far beyond those of conventional units.

Dual-channel versatility

The NGMO2 (FIG 1) is more than just an extremely precise high-speed voltage source. It combines a voltage source, a programmable DC load, a digital voltmeter that can be used separately, a current and voltage transient recorder as well as a simple squarewave generator – and each of these features is provided twice. As a genuine, unrestricted dual-channel unit, the NGMO2 supplies up to 2.5 A in the range 0 V to 15 V or 5 A between 1.8 V and 5 V as well as short-duration peak currents up to 7 A. The high setting and backreading resolution of 1 mV ensures that DUT power supply voltages in the lower range can be adequately reproduced and evaluated, as is required in particular for battery-powered circuits.

Current measurements with 100 nA resolution

The setting resolution of the current limit value plays a minor role since the set current limit value is primarily intended to prevent damage to DUTs during normal operation of a laboratory power supply (i.e. constant-voltage operation). For this purpose, the NGMO2 provides a resolution of 1 mA, which is completely sufficient.

What is more important, however, is the possibility of measuring the current actually consumed by the DUT. Given the fact that the NGMO2 can measure peak currents up to 7 A, and that currents occurring in the µA range also have to be tested, the resolution limit of up-to-date A/D converters would

soon be reached with conventional concepts. The solution consists in dividing the ammeter into several ranges. The NGMO2 has three ranges, which allow accurate conclusions to be drawn on the actual current drain irrespective of the DUT operating mode. As a result, a resolution of up to 100 nA is obtained so that the currents can also be measured with high precision in the OFF mode.

To obtain reproducible measurements of such small currents it is absolutely essential that the DUT be supplied from an extremely low-interference and low-noise source. Rohde&Schwarz has made no compromises on this point; the NGMO2 operates according to an optimized version of the tried-and-tested linear controller concept and offers numerous advantages if it is necessary to react very quickly to large dynamic load variations.

Transient recorder in each channel

Today, purely static operation is seldom encountered in measurement technology. In order to achieve maximum operating times and degrees of integration, almost all the subassemblies of a circuit are activated only when they are actually needed. This is very useful as regards energy consumption, but rather problematic from a testing point of view if an NGMO2 is not available. The NGMO2 has a fast transient recorder for current or voltage per channel so that dynamic processes such as current drain or voltage variations, can be collected, stored and further processed. Compared to solutions involving a measurement shunt or separate instruments, a current transient recorder integrated in the power supply offers not only advantages in terms of price and space but also constant and thus reproducible conditions for the DUT. Neither different internal resistances in the test path (which result from the different measurement ranges of the ammeters), nor critical additional lines to external shunts influence the controlling behaviour of the source or distort the current measurement.

Many complex applications can be implemented with only one NGMO2. For example, fast current transients that occur during the staggered activation of mobile phone subassemblies can be detected and further processed for subsequent fault location. By calculating the difference between the elementary streams assigned to a defined time interval, the tester can determine whether the subassemblies of his circuit are functioning correctly (FIG 2).

Accurate aid for circuit development

The NGMO2 proves its impressive capabilities in the development and use of ASICs, FPGAs or similar VLSI circuits. To obtain efficient energy consumption, the developer can use technology-based values, but the quantity of energy actually consumed by the integrated circuit depends on additional influences. For example, different bus line lengths produce different capacitive loads for the drivers in the intended IC application. This necessitates higher currents so that the level change required at the line capacitances for information transmission can be performed in the desired time. Given the numerous information lines in highly integrated circuits, this results in significant current drain. This, in turn, causes higher power dissipation, which has to be taken into account in cooling the IC. For this reason, it is very useful to obtain detailed information from the NGMO2 on the time characteristic of the current drain so that the

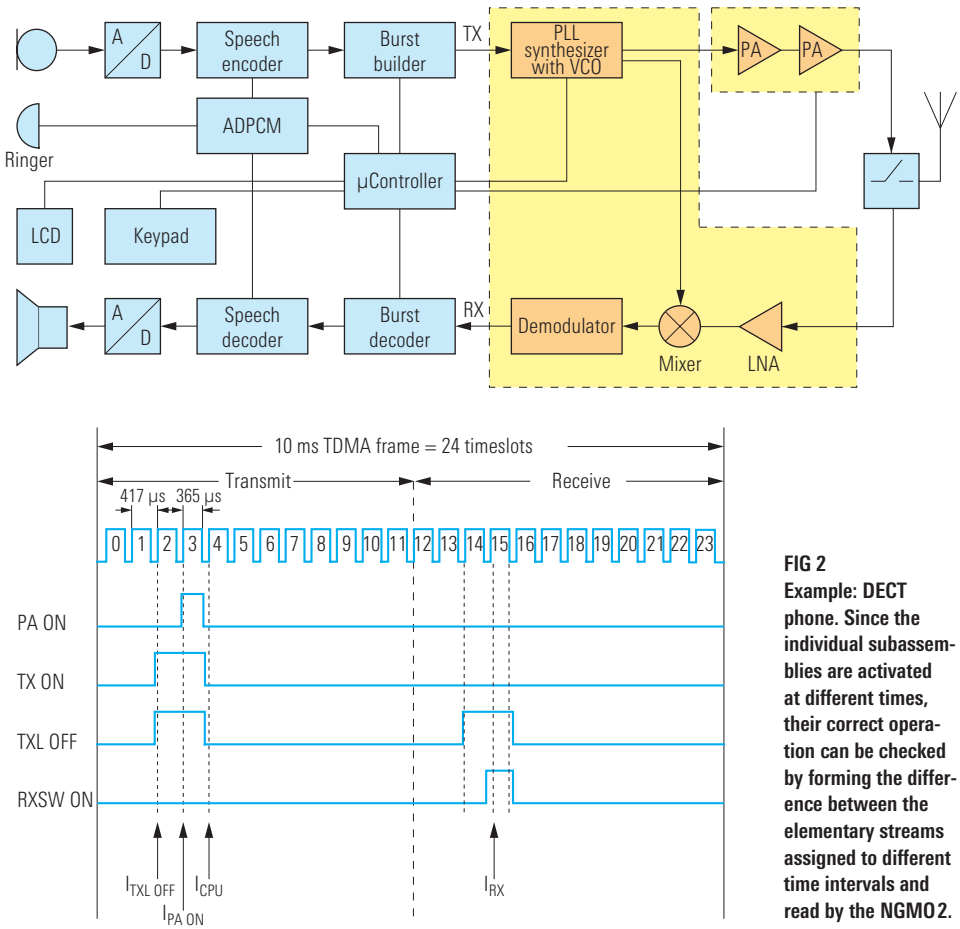

FIG 2
Example: DECT phone. Since the individual subassemblies are activated at different times, their correct operation can be checked by forming the difference between the elementary streams assigned to different time intervals and read by the NGMO2.

developer of the integrated circuit can define permissible operating conditions, and the IC user can check the operating conditions for compliance.

Excellent load regulation

The extreme load steps that occur on GSM mobile phones are regulated by the NGMO2 very quickly (FIG 3). The unit also reliably prevents voltage dips, which cause undervoltage detectors of DUTs to respond and may switch the DUTs off. In addition, the internal resistance of the source can be set variably. Thus, various battery load states or the internal resistances of the batteries used can be taken into account for the check of battery-operated units, if required.

Virtually a small test system

The NGMO2 can be remote-controlled via the built-in IEEE 488.2 and RS-232-C interfaces as well as the USB interface (currently in preparation) and its extremely fast command processing and short measurement times ensure high test throughput. Additional inputs such as Trigger and Output Inhibit as well as outputs for Measurement Complete make this power supply an ideal choice for use in time-critical applications. Since the NGMO2 can drive up to four auxiliary relays via open-collector outputs, it can be used as a simple mini test system – and all this for the price of just one power supply.

With its numerical result functions such as absolute minimum, absolute maximum, high level, low level or RMS value, the NGMO2 facilitates evaluation. The measured values can of course be transferred to a PC for individual evaluation or storage.

Thanks to its wide range of functions, this compact and intelligent power supply is an indispensable aid for all manufacturers of modern electronic assemblies. Despite the large number of built-in functions, the NGMO2 remains true to a basic principle: the major functions for the laboratory power supply can be operated easily and intuitively.

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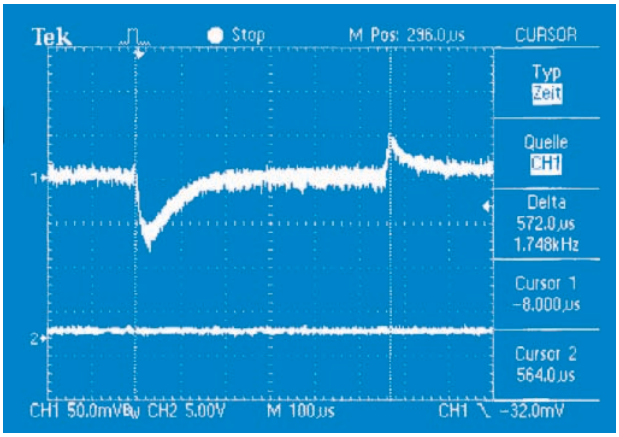
More information and data sheet at www.rohde-schwarz.com (search for NGMO2)

REFERENCES

[*] For the comprehensive line of power supplies from Rohde&Schwarz, refer to the Test&Measurement Products catalog or to the homepage at Products&More – Test&Measurement – Power Supplies – Products



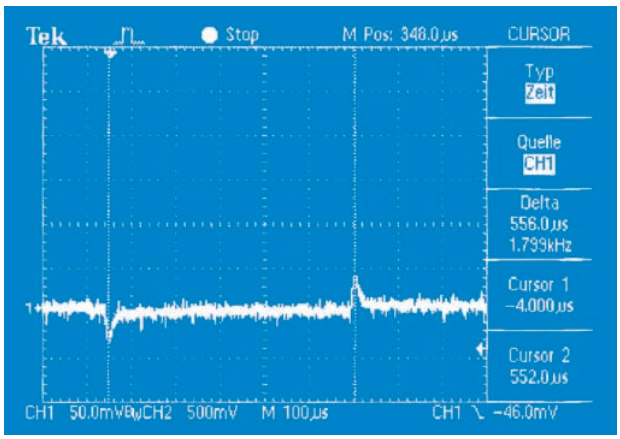


FIG 3 Left: load regulation of non-optimal lab power supply connected to critical GSM mobile phone. Right: excellent regulation with the NGMO2.