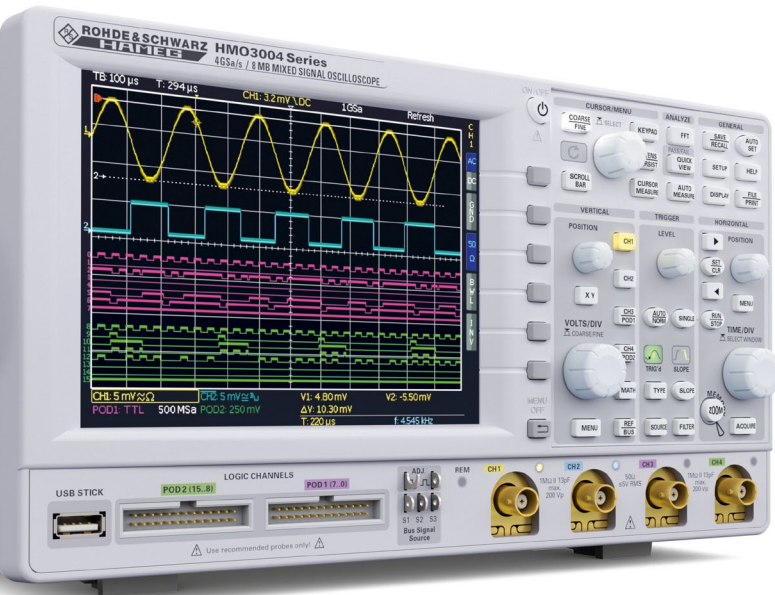


New Oscilloscope Series HMO3000 by HAMEG Instruments



Systems that are constantly becoming faster and more complex lead to ever higher demands on the required measurement technology. The new HAMEG oscilloscope series HMO3000 offers the solution for current requirements in regards to bandwidth, sampling rate and memory depth. Its bandwidth of up to 500 MHz allows HAMEG Instruments to set a new milestone in the development of high-performance mixed-signal oscilloscopes at an attractive price.

Although it may often appear this way, the world isn't turning any faster today than it did years ago. It is certain, however, that thanks to modern technology, we are able to solve quite a few matters much more quickly than it was the case only a few years ago. This has been made possible by increasingly powerful systems with technologies that are constantly becoming faster and more complex. Accordingly, today's driving force are the development designs that have to be implemented with mixed analog and digital circuits and integrated bus systems. These allow developers less and less time until the point of market maturity. The signal slopes to be characterized

in the process can only be analyzed by means of the appropriate reserve of bandwidth and sampling rate. The demand for MSO instruments and functions such as the serial bus analysis has also seen an exponential growth due to the ubiquitous distribution of embedded systems.

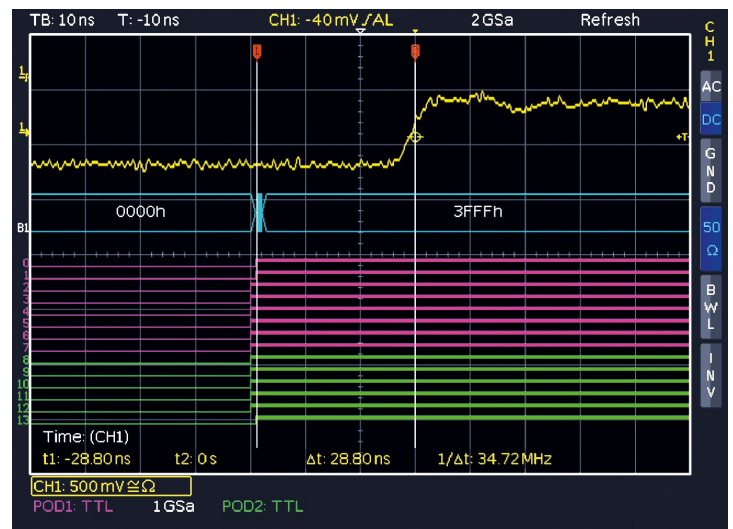
In response to this trend, HAMEG Instruments is introducing its new mixed-signal oscilloscope series HMO3000. The 2- and 4-channel instruments provide bandwidths of 300, 400 and 500 MHz, a sampling rate of 4 GSa/s and a memory depth of 8 MPts. The instruments are rounded off with a standard inclusion of the MSO functionality and several options for a serial bus analysis. They meet all requirements of modern development designs and offer HAMEG's standard attractive price-performance ratio.

HAMEG is offering the new HMO3000 series exclusively as a mixed-signal oscilloscope. The great advantages of these instruments in the current development of electronic circuits are best illustrated by taking a look at how ADCs (Analog Digital Converter) or DACs (Digital Analog Converter) are integrated. These transformer modules include an analog signal on the one side and a digital signal on the other side. As with HAMEG's new HMO3000 series, MSOs allow developers the assessment of the time component for both signal types on one monitor. A viable alternative to illustrate aspects of the analog and digital modules simultaneously is to combine a traditional DSO with a logic analyzer. However, the required effort to synchronize both instruments should not be underestimated. A MSO allows developers to devote their full attention to the circuit without having to waste energy on the measurement setup.

HAMEG is focusing resolutely on the increasing significance of the mixed-signal oscilloscopes. Consequently, not only are the new instruments with a bandwidth of up to 500 MHz full-



HMO3000-Product video:
Scan, click or go to
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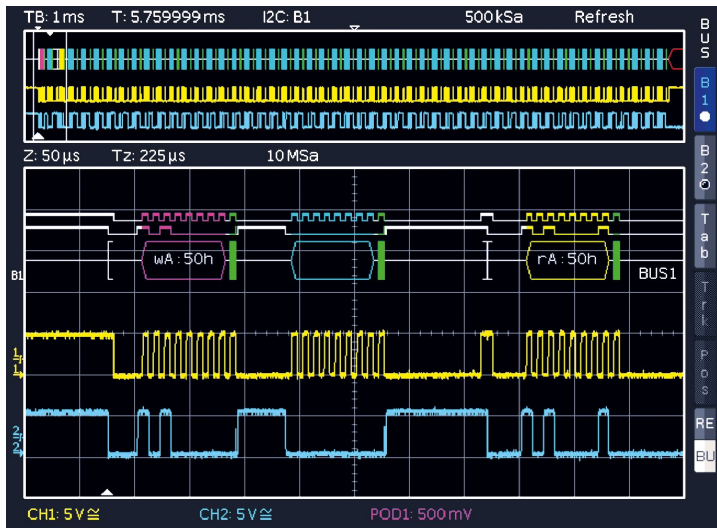


Picture 1: 14-bit DAC switching from 0 to maximum

scale MSOs. This is also true for the smaller models of the HMO series with a bandwidth as low as 70 MHz. As a result, HAMEG customers will not need to speculate if they should purchase an instrument with or without logic connectors. As the MSO functionality is invariably included, all instruments correspondingly offer a secure future. It is also unnecessary to initially activate the mixed-signal functions via software options, as is the case with other suppliers. The low-capacity logic probes HO3508/HO3516 (100 kOhm || 4 pF) are optional. They allow the analysis of up to 16 logic channels with a sampling rate of 1 GSa/s. HAMEG logic probes are not linked to a specific instrument serial number. This allows their use with all digital HAMEG oscilloscopes in the HMO series.

HAMEG offers a secure future with its new HMO3000 oscilloscopes. This is underlined by the option to update 300 and 400 MHz instruments to the maximum bandwidth of 500 MHz at any later time. Even several years later, customers may choose to update their oscilloscopes to meet increased requirements. This does not require customers to send in the instrument as all updates are performed exclusively via software upgrade. As is typical with HAMEG, additional costs resulting from a subsequent upgrade will be minor compared to the direct purchase of the largest instrument in the series.

It is also possible to activate the serial bus analysis functions at any time and even, as necessary, at a later time. As with all other digital HAMEG oscilloscopes, it is also possible to trigger and decode serial data streams with options HOO10 and HOO12. The HOO10 option includes the protocols I²C, SPI and UART/RS-232, while the HOO12 option allows the analysis of the CAN and LIN protocol. Both options allow the bus analysis on both analog and digital channels. It is recommended to use the analog channels if analyzing the signal quality of a serial bus is of high priority. While digital inputs only recognize the conditions 0 and 1, analog channels make the full vertical resolution available to analyze the input signals. Image 1 illustrates an example of a I²C data stream on analog channels.



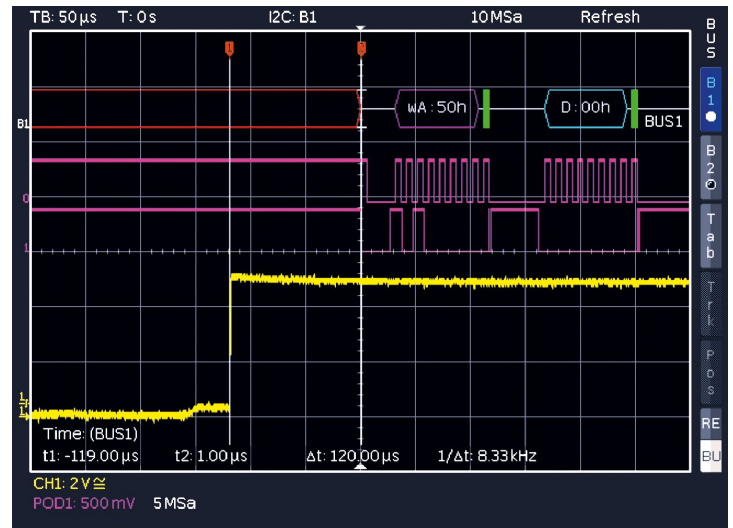
Picture 2: I²C signal analysis with analog channels

Conversely, it is recommended to use the digital channels if the intention is to analyze two serial buses simultaneously. Digital channels also offer advantages if the events on the serial bus are the consequence of voltage sequences on the analog channels. Image 2 illustrates the time-dependent correlation between a switching operation on an analog channel and the I²C data that is subsequently sent on the digital channels of the previous example.

Since the introduction of the new MSO series, customers have the option to test the serial bus analysis functions with the HMO instruments. This is possible with the HOO10 and HOO12 options which are activated for an instrument runtime of 20 hours ex factory (also available with the more compact 70-200 MHz series).

With the HMO3000 series, this is the first time that HAMEG is introducing an oscilloscope which allows users to segment the available memory. As of the third quarter of 2013, this function will be available as option HOO14. A segmented memory is a memory that is divided into multiple blocks. The maximum block size depends on the amount of blocks. Segmenting a memory may be useful, for instance, if the distance between individual data packages during a serial bus communication is high. In this case, the user can segment the memory of the oscilloscope so that a separate segment exists for each anticipated data package. The segments are then filled with data based on the corresponding trigger settings. Consequently, periods between packages without data are not recorded which allows the user to ultimately record significantly more information. Similarly, it is also possible to record specific long-term test results multiple times which allows the user to identify accumulations or patterns of these events more easily.

Another example that highlights the advantages of a segmented memory is the capture of unusual anomalies during many short events that occur in quick sequence. Segmenting the memory into a large number of blocks allows the instrument to record the

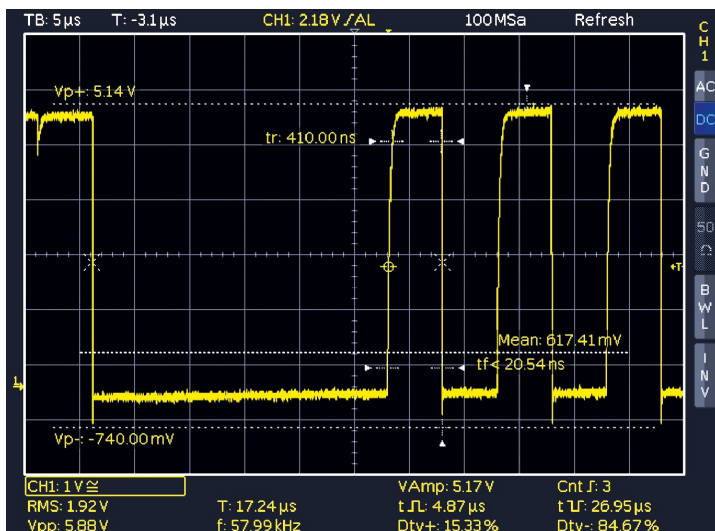


Picture 3: Analog signals and I²C signal on digital channels

many short events initially at a stretch. Subsequently, the blocks can be scanned for anomalies. Search functions are available for this purpose. In the HMO3000 series, the option to segment the memory will also be activated for new instruments from the date of availability, for an instrument runtime of 20 hours.

Another new feature for HAMEG oscilloscopes is the TRIGGER OUT output on the back panel of the HMO3000 instruments. This connector is required, for instance, if it is necessary for an extended period of time to record address and data signals before or after a specific trigger event in the oscilloscope. This is made possible by connecting a respective data logger at the trigger output. Another new component of this oscilloscope series in comparison to all the other HMO instruments is the supplied data interface. In the past, this was a combination of a serial and a USB interface (HO720). The new series employs a combination of Ethernet and USB interface as the standard (HO730). In the future, the serial/USB interface will be available as an option, as well as the GPIB interface HO740. With the free Windows software „HMExplorer“, screenshots can be transferred to the PC (in PNG, GIF or BMP format). Alternatively, they can be saved to a connected USB stick by just pressing a key. The connected memory can be formatted to either FAT or FAT32 and have a maximum capacity of 32 GB.

The bus signal source integrated with all HMO instruments remains unique among mixed signal oscilloscopes. In this case, the standard probe adjust was expanded by three connectors. At these outputs, an internal circuit provides randomly generated data of the various protocols (I²C, SPI, UART) or alternatively a random 4-bit pattern or 4-bit counter signal, depending on requirements. This solves one of the most common problems during the bus analysis, namely the correct setup. The user can refer to known signals and verify the settings for the circuit analysis. Another unique aspect of this instrument class is the vertical input sensitivity which scales as low as 1 mV/div.



Picture 4: All QuickView values are permanently updated in HMO scopes

Audible noise is another feature that is taking on an increasing importance which influences consumer choices during the selection of electronic equipment. The predecessors of the HMO3000 series (e.g. the HMO3524 which in 2010 was chosen as the product of the year in the German “Elektronik” magazine) already included a very quiet fan with temperature-sensitive controls. However, in these oscilloscopes the fans were conventionally located on the casing wall. For the new instruments, HAMEG engineers transferred the fan completely into the solid metal case. This made it possible to reduce the noise level to the extent that the active cooling of the oscilloscope has become barely perceptible even in a quiet environment or if you listen closely.

Despite mechanical modifications inside the instrument, the compact design has remained unchanged for the new oscilloscopes. This has been made possible by the intelligent user interface, for instance, which hides the menus on the monitor while the instrument is performing a measurement operation. This allows the user to view the same amount of measurement points as would be possible on a larger display (which loses a portion of the display area to the constantly visible soft menus). Other features from the predecessor models that have remained unchanged are the 6-digit hardware counter and the outstanding FFT function with a memory depth of 64kPts, the comprehensive mathematics options, the extensive auto-measurement settings and the convenient Quickview function. Despite its comprehensive online help, HAMEG continues to include a printed manual with its instruments.

In conjunction with the global distribution network of its parent company, Rohde & Schwarz, HAMEG’s portfolio of measurement technology products reaches customers worldwide. By introducing its HMO3000 series (developed in Germany and manufactured in Europe), the manufacturer of measurement instruments with its head office in Mainhausen, Germany, has secured a solid position among competitors in the market. The name choice is intended to facilitate comparisons of performance, features and price. Correspondingly, HAMEG has started worldwide campaigns with special offers to introduce the new mixed-signal oscilloscopes. Until October 31, 2013, for instance, the purchase of a HMO3000 will include a HO3508 logic probe with 8 logic channels and the HOO10 option for the analysis of serial buses I²C, SPI and UART/RS-232.

All information about technical data and special campaigns as well as software downloads are available at www.hameg.com.

Kai Scharmann, June 2013

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