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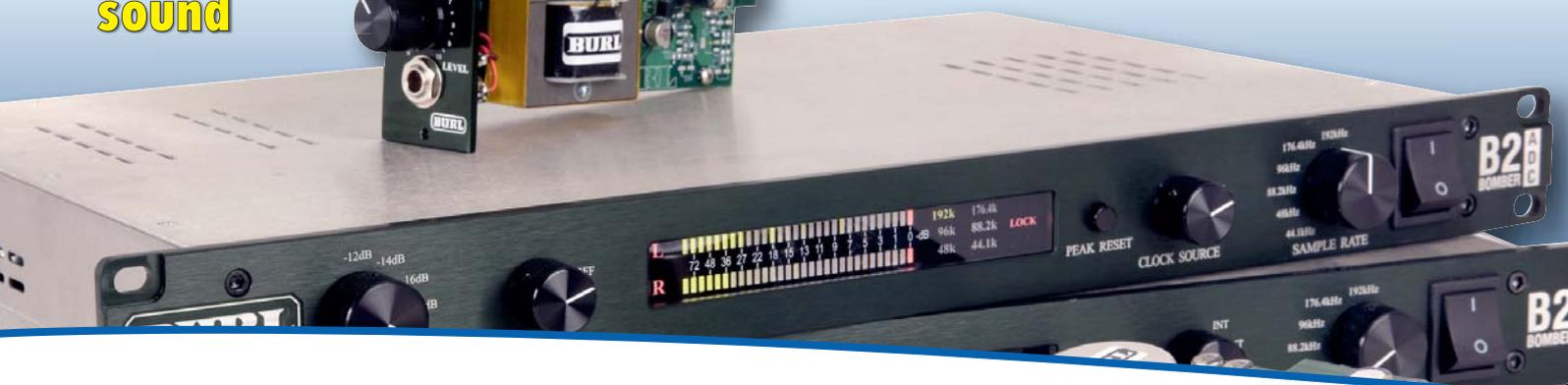
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## test report GHIELMETTI Audio Monitor System GMS 2100



# The Signal-Guide Boat



You don't need a lavishly-equipped Mixing Desk to route, test and listen to your signals. The GMS 2100 Audio Monitoring System from Ghiełmetti can do all this in a much more space-efficient unit and moreover it gives you additional smart features.

Written by Georg Berger and translated by Alex Hall

The Swiss company Ghiełmetti is recognised as the leading manufacturer of Signal Distribution and Routing Matrices for the audio and broadcast markets. Complex networks made up of inputs and outputs are easily connected with one another over this type of Switch-Matrix and enable, for example, a single input to be routed through to numerous outputs. Matrices are used wherever numerous signal tracks are distributed, so that means the Broadcast environment, theatres, opera houses or convention centres. But there are also a few smaller areas, as the company, which was founded in 1912, is keen to prove, with the recently released Audio Monitor System GMS 2100.

Fully committed to the company's core-competence, Ghiełmetti's newcomer offers an analogue 3x1 and a digital 4x1 Signal-Matrix. However, to dismiss the device as a paltry lightweight version of a Matrix Router would be wholly unjust. With additional features like a built-in Sinewave Generator, a scalable Level and Phase-Measuring Device, an

adjustable Headphone Amplifier and even two integrated playback-speakers the controller's uses are considerably broader than traditional Matrix Routers.

Equally remarkable is the sale price which comes in at just 3.500 Euro. It works out about 300 Euro cheaper to buy the GMS 2110 which is identically equipped as the GMS2100 but does not have a Sinewave Generator.

### The Headturner: Built-in Loudspeakers

The GMS 2100 handles analogue levels over three inputs and one output each in stereo which it achieves using separate XLR and servo-symmetrical jack-sockets for each channel. For digital you have four stereo inputs and one output at your disposal. With these the GMS 2100 sends and receives AES/EBU or S/PDIF-signals using XLR and BNC-connections.

Note: The third analogue and fourth digital inputs are accessible via a four-pin socket on the front plate which takes so-called G3P-Plugs (Ghiełmetti 3-Pole), a proprietary type of socket developed

by Ghiełmetti. An additional three patch cables and two adapter cables from G3P to XLR are included.

The connection capabilities are rounded off by an RS485-Interface on the rear

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#### Ghiełmetti AG GMS 2100



- excellent, transparent sound
- choosable sample rates on the Sinewave Generator
- Stereo level meter scaleable
- Panpots for loudspeakers and headphone amplifier

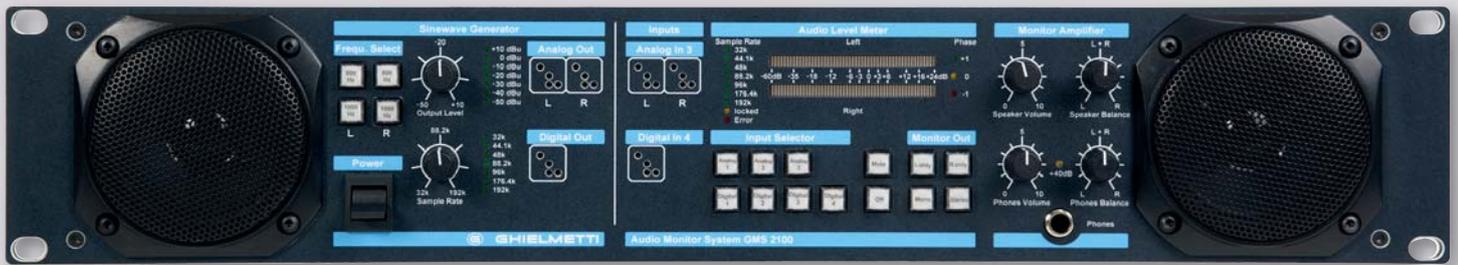


- summing of several inputs not possible
- Level meter adjustments to be done on the rear side



#### Summary

The GMS 2100 is like a Swiss army knife. Uncosspicuous, multifunctional and a reliable companion around the monitoring, distributing and testing of Audio signals.



The Ghielmetti GMS 2100 Controller is a multifunctional unit, with integrated loudspeakers, a headhone amplifier, flexible monitoring functions, a scaleable level meter as well as a Sinewave Generator with selectable sample rate.

panel, for connecting a wired remote-control and a front-mounted headphone-jack as well as three additional G3P-sockets which transmit the analogue and digital Sinewave Generator signals out of the unit.

The real headturners here are the two integrated loudspeakers which allow easy playback of the activated input straight “out-of-the-box”, as it were. Behind this operate two 10-Watt-Digital-Amplifiers which is easily loud enough for test-playback. The speakers, as well as the separate analogue headhone-amplifiers, are configured to gain-control regulations, and of course plugging in headphones mutes the speakers.

When the headphones are removed there is a delay before the signal is re-routed to the speakers. That doesn't just protect the speakers, it also avoids giving your jumpy neighbours a shock! Ingenious: By switching in a pre-amplifier the headhone-output can be raised to 40 Decibels. The Point and Purpose – playing back very quiet signals, such as from an un-amplified microphone.

Anyone worried for their ears and headphones when switching in this mode to one channel with a Line-Level input, can rest assured. The GMS 2100 has a protective circuit which at levels greater than 20 dBu automatically deactivates the pre-amplifier. So you see, Ghielmetti has thought of everything. But there's more.

It's not everyday you get panpots to set up not just the speakers but the headphones as well. Important: volume and pan settings control only the headhone-amplifier and speakers. The out-

put signal transmitted to the XLR/Jack/BNC-outputs is not affected.

As you'd expect of a well-equipped Monitor-Controller, the signal can be played back either in stereo or mixed in mono, depending naturally on what playback capability is required. Additionally, individual stereo channels can be listened to separately by sending them in mono through both speaker/headhone channels. One push of the adjacent back-lighted button is enough to activate the associated relay.

The arsenal of on-board monitor-controller functions is rounded off with a mute button to shut down the headphones and speakers together and a universal kill-switch (off button) which abruptly cuts signals in and out of the GMS 2100. This leaves little chance for feedback. A subsequent push of an input button switches on the Ghielmetti's Controller and the chosen input is automatically sent to the output. To be able to listen to the three analogue and four digital input channels, each corresponding input button must be pressed. This allows an input to be listened to on its own and simultaneously sent to the analogue and digital outputs.

Connecting and summing several inputs into one chosen output is, however, not possible but would considerably increase the device's functionality. So we stick with a simple 1:1 connection of one input to one output.

### Four Devices in One

A very precise Stereo-Level-Meter gives you an extra control function showing the level of the current active input. What's

more, hidden to the right of the Meter-Arrays there is a Phase-Display carried out over three LEDs where the top LED indicates Mono compatibility and the bottom one the opposite. The middle one lighting up indicates limited Mono compatibility. Admittedly this feature is no substitute for a bona fide phase-meter but nevertheless this kind of tool doesn't belong to the standard feature-set of a device of this nature. The Show-Stopper: the Level-Meter, can be set on four different scales across four DIP-switches on the reverse of the unit (DIN 45406, Nordic N9, BBC British Ila, Digital).

If that wasn't enough, you can even adjust the format of the display (to Peak, Peak-Hold, RMS, Peak + RMS). The shame is that these settings only occur on the back. With this arrangement Ghielmetti deprives the Controller and the user of added ease-of-use. For once built into the rack you'll hardly touch the switch again. Anyone wanting to switch quickly between digital display and DIN-Norm to obtain reliable values for inputted analogue and digital signals, will be forced to do this on the rear of the unit.

Last but not least the GMS 2100 gives you a Sinewave Generator which, whilst comprehensively equipped, also boasts some snazzy features. The generator produces tones from one Kilohertz (European norm) and 800 Hertz (American norm). Very nice: the test-tone can be sent in stereo or separately over just one stereo channel. If desired, both test-tones can be sent together along one stereo channel. The volume can be set at 10 Decibel intervals between -50 and +10 dBu. Furthermore, the sample rate of the digitally-transmitted AES/EBU test signal can be set at the usual values between 32 and 192 Kilohertz. Remarkable: The Generator has at its disposal its own DA-Converter for transmitting analogue test tones.

### Nifty, practical features on-board

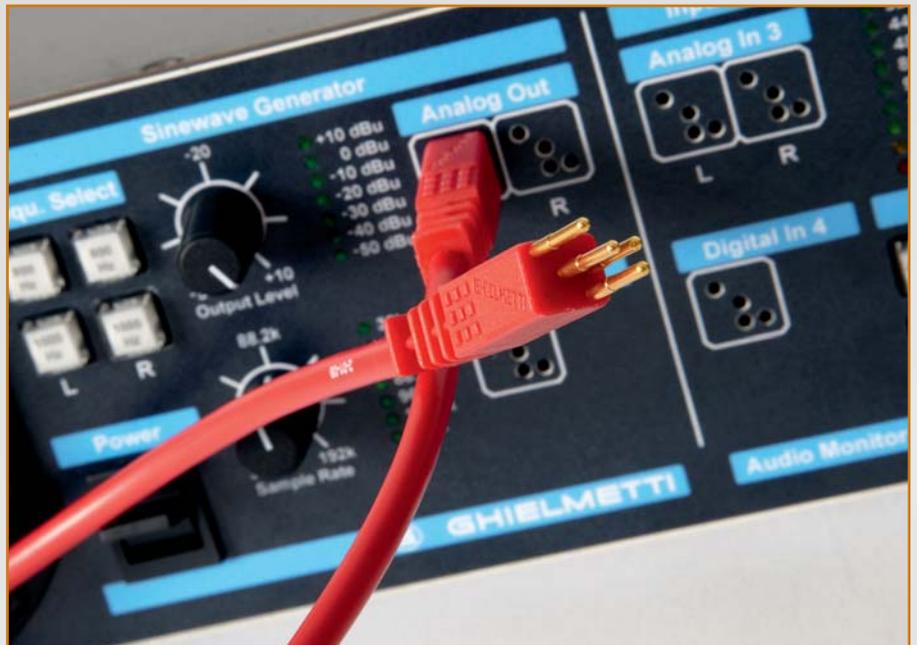
The intrinsic qualities of the GMS 2100 are plain to see and originate from the skill and know-how of Head of Research



On analog connections you'll find XLR and servo symmetrical jack plugs. Digital signals are switched in and out of the unit by XLR (AES/EBU) or by BNC plugs in S/PDIF-format. The 4 DIP switches allow the scaling of the level meter and a RS-485 interface is provided for a remote control of the unit.

& Development, Martin Hollinger – there's more to it than just connecting inputs and outputs inside the box. Beneath the surface is an intricate network of analogue and digital signals busily being processed. Analogue input signals are sent directly to the digital output and simultaneously to an AD Converter where the signal can be adjusted to either 96 or 192 Kilohertz and subsequently routed to the digital output. Worth noting: analogue signals with a level of 0 Decibels are set by an internal amplifier digitally at -15 dB FS. The outcome: analogue signals greater than +15 dBu are transmitted digitally distorted, however, this is rarely found in practise. Digital input signals are first of all amplified to the TTL level (Five Volt) and make their way to the digital output where logically the sampling rate of the signal is fed through to the digital output. The GMS 2100 automatically recognises the sample rate and during switch-over matches it to the digital output at lightning speed.

Simultaneously the digital signal is sent through a DA-Converter and put through the analogue output. Here again it's the case that a level of -15 dBfs is transmitted at a level of 0 dBu. Worth



The outputs of the Sinewave Generator and of the third analog and fourth digital input are realised through the G3P plugs, a proprietary plug system of Ghilmetti. Suitable patch cords are included in the shipment.

noting: the speaker amplifier works exclusively in digital so that it works directly on AES or S/PDIF signals and automatically converts to the appropriate sampling rate. Analogue signals are converted over a separate AD-Converter to 192 Kilohertz before being sent to the loudspeakers.

Things work differently with analogue headphone amplifiers where digital input signals are converted to analogue with the same DA-Converter which handles the GMS 2100 analogue output at the same time. That this tapestry of analogue and digital signal distribution is complex and implies a corresponding ex-

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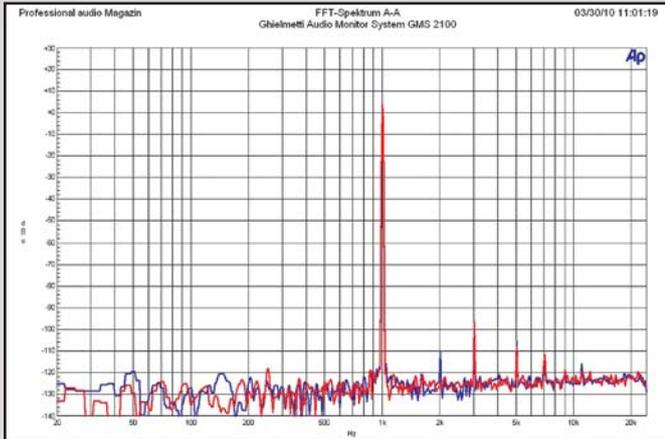
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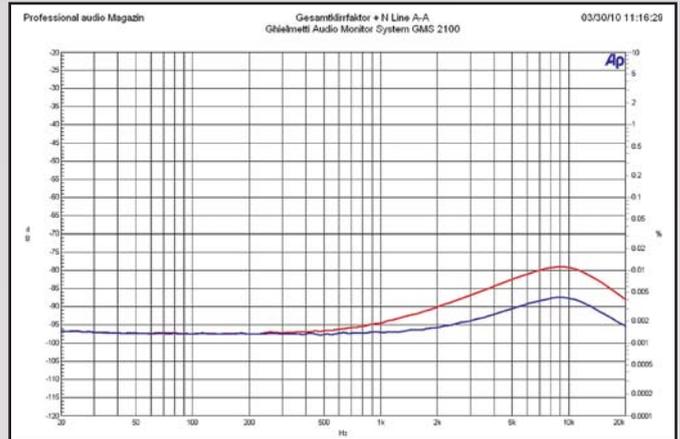
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The noise floor is beyond excellent -120 decibel. The peaks starting from k2 range until -96 decibels are of no consequence.



The harmonic distortion is at approx. 0.0018 % until 500 Hertz and raises then up to still excellent 0.01 %.

penditure on circuit-design should be beyond question and that justifies the sale-price mentioned.

The test results of the *Professional audio* Measuring Laboratory offer an additional argument. When measuring the analogue signals, the FFT-Spektrum shows a noise-floor lower than -120 Decibels which is quite simply excellent. Small peaks above K2 definitely do not affect the sound. The amplitude at K3 reaches no more than 96 Decibels.

The same measurement with analogue inputs and digital ployout of the test signal itself delivers a noise-floor ten decibels lower. Also in matters of noise and separate source voltage the Ghielmetti Controller has no case to be shy as measured results of 97.7 and 95 Decibels are excellent.

The same applies when measuring Common Mode Rejection Ratio which delivered fantastic results of a phenomenal -100 Decibels of bass and an even more impressive -75 Decibels on the highs and accurately carries signals even through cables over 30 metres long. Its Crosstalk Attenuation is without equal. The measurements gave results between -125 and -110 Decibels. The distortion factor wins you over with an impressive 0.0015% where the characteristic has an increase of 0.01% at nine Kilohertz which is however still exemplary.

Last but not least the GMS 2100 is impressive when measuring converter linearity which only begins to shake at -120 Decibels. Overall the Audio Monitor System from Ghielmetti entices you with test results to die for and these are thanks to the manufacturer's engineering which it

has developed into an art. The listening test shows finally: Regardless whether analogue or digital signals are routed to the output, the results sound, without exception, transparent, with sharp resolution and unreservedly genuine.

Switching between inputs takes place without glitches. In a blind test in which we hooked up our Fostex CR500 CD-Player/Recorder with both analogue and digital to the GMS 2100, it was impossible to discern which was the analogue and which the digital signal. Both integrated speakers also performed well in the test. At moderate volumes the chassis surprises with a fine and detailed sound you wouldn't have expected of a component of this sort.

In any case the sound seems very quickly compressed and trimmed-back at high volumes which is unsurprising con-

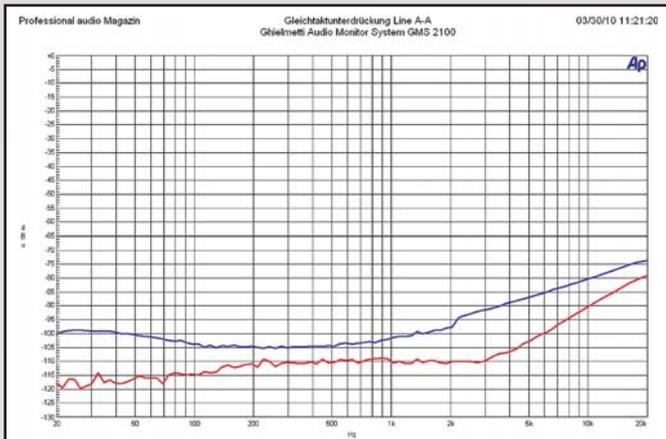
## Characteristics

Model	GMS 2100
Manufacturer	Ghielmetti AG
Distribution	Ghielmetti Deutschland An der Krähenheide 3 14943 Luckenwalde Tel.: 03371 402754 Fax: 03371 610548 info@ghielmetti.ch www.ghielmetti.ch
Type	Monitoring Controller
Price (Euro) [except VAT]	2.950 (GMS 2100); 2.700 (GMS 2110)
Dimensions B x T x H (mm)	483 x 250 x 90
Weight [kg]	5,8
<b>Equipment</b>	
Analogue inputs	4 x XLR, 4 x 6,3 mm jack sym., 2 x G3P-4 pin sym.
Analogue outputs	2 x XLR, 2 x 6,3 mm jack sym., 1 x 6,3 mm jack stereo (headphone)
Digital inputs	3 x XLR, 3 x BNC, 1 x G3P-4-Pin sym. AES/EBU

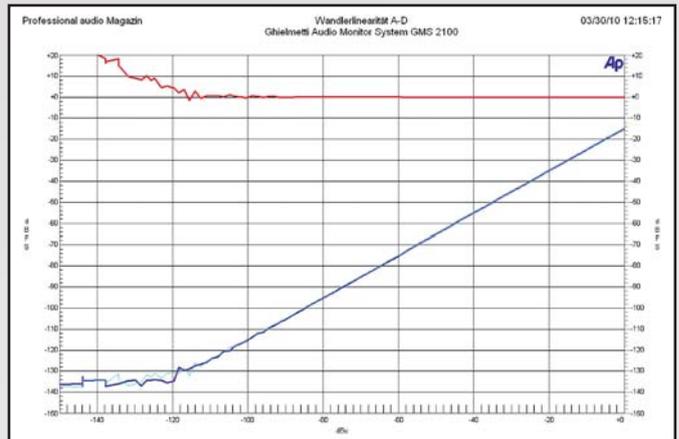
Digital outputs	1 x XLR each and BNC AES/EBU
other connections	1 x RS-485 (remote control), 2 x G3P-4 pin (sinewave generator output analogue), 1 x G3P-4 pin (sinewave generator output digital)
Frequencies Sinewave Generator	800 Hz, 1 kHz
Sample rates	24 Bit/96 or 192 kHz (AD), 24 Bit/32 until 192 kHz (DA)
Power output loudspeaker amplifier	10 W RMS each channel
Operating elements	6 potentiometer, 17 push button (back illuminated), 1 switch button, 4 DIP buttons
Display	2 x 53 segment LED-meter-chain, 24 status LEDs, 3 LEDs (phase meter)
<b>Accessories</b>	
Manual, mains cable, 3 G3P-4 pin patch cords, 2 adapter cables XLR/ G3P-4 pin	

Specifics	
Integrated loudspeakers, combination of analogue and digital router, peak phase meter Sinewave Generator, feeding of signals through G3P connectors, unit ist controllably by remote control (optionally model GMS2 2110 without Sinewave Generator available for EUR 2700.- (VAT noch included).	
<b>Measurements</b>	
maximal input level line [dBu]	26
maximal output level [dBu]	26
weighted noise voltages [dB]	97,7
separate source voltages [dB]	95
distortion through frequency max. %	0,0015 until 0,01

Rating	
Equipment	excellent
Manufacture	excellent
Handling	excellent
Measurements	excellent
Sound	excellent
<b>Final grade</b>	<b>Upper class excellent</b>
<b>Price/Performance</b>	<b>good</b>



After measuring of the common mode rejection voltage the result reflects excellently. Until 2 kHz the values are beyond -95 decibels and raise then to still excellent -75 decibels.



Regarding converting linearity the GMS 2100 has excellent values. Nonlinearity only appears starting from -120 decibels.

sidering the size of the chassis and the space into which it is built. However, they are exceptionally well-suited for applications that require a device like the GMS 2100.

As an everyday sound studio monitor-controller with, for example, the clout of a Grace Design m904 (see test April 2007) or of a Dangerous Music system (see tests July 2008 and April 2009), the GMS 2100 is hardly, if at all, suited. It

feels most at home when part of a larger signal-distributor system, when dealing with the monitoring of important signal paths with easy-to-handle circuit processes, in technical environments such as radio and video studios, theatres and other venues where an extensive microphone-loudspeaker set-up is built-in.

The integrated Sinewave Generator provides an extra facility for technicians who have to carry out rapid tests. The in-

cluded adapter cables allow easy connection to other equipment.

**In Conclusion:** With the Audio Monitor System GMS 2100 the signal distribution specialist Ghiełmetti brings you a multi-faceted outboard unit for areas of broadcast, theatre and fixed installations which is uncompromisingly fine-tuned to the highest technical standard and can easily assure its place at the top of its class. ●

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