

Precise

The analogue and digital clock systems from g+m elektronik ag



Precision with quality

Clocks run differently with us. Even more precisely, more innovatively and more individually. Analogue and digital clock systems which bear the mark of g+m elektronik ag meet ultra-modern requirements as regards state-of-the-art technology and system design. They guarantee maximum accuracy and operational reliability in a wide variety of applications. Be it in railway stations, airports, schools, hospitals, on factory shop floors, in offices and sports halls – our analogue and digital clocks are available, accurate to the second, for any application.

Clocks from g+m elektronik ag are operated with state-of-the-art transmission and signalling systems for synchronisation and can be integrated in complex clock structures as master clocks and slave clocks. Their precision engineering is hidden in high-workmanship, sturdily designed housings which fit in with any room design and building architecture.

We would be more than willing to develop a system concept for you to suit your individual needs. Let us advise you – we will match any clock system flexibly to your needs. Ask to see our references: our clock systems and central clock panels go with the time, the world over.



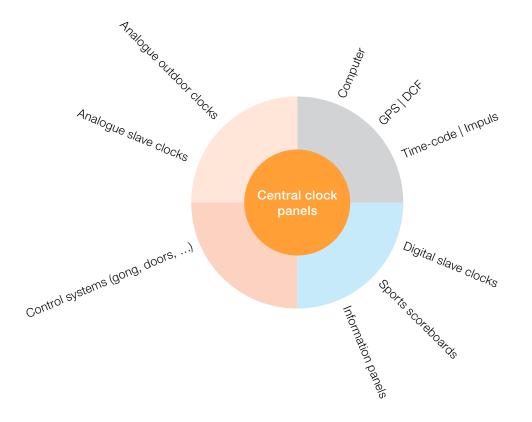
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Time for technology



Pulse systems

Our range of analogue and digital clocks can be operated in clock systems consisting of a master clock and a number of slave clocks. On a pulse system, the slave clocks are operated with a 24 VDC pulse which is generated by the master clock or a central clock panel. The pulses synchronise the slave clocks once per minute, per 30 seconds or per second. In the case of analogue clocks, the pulse pattern is dependent upon whether the clocks have a second hand.

Pulse per minute or second

The slave clocks are connected in parallel with the master clock or the central clock panel by means of a 2-wire cable. On installation, the effective time of the clock to be installed is compared with the master clock, whereby the master clock automatically sets the correct time with the corresponding number of high-speed pulses. The slave clocks stop in the event of an electrical power failure. When the power is switched back on again, they are set precisely again with the corresponding pulse pattern.

Time-code systems

g+m elektronik ag's time-code system allows a master clock to control the slave clocks serially and transmit complete information, such as year, month, day, hours and minutes. Every slave clock features a microprocessor which receives the time code, compares it with the corresponding position of the hands by magnet and Hall sensors and then sets the hands correctly. All clocks in a time-code system are connected to a 2-wire bus cable which combines the 24 VDC voltage feeding and the serial time code at the same time. This simplifies both installation and also cable routing.



Analogue NTP clocks for Ethernet – indoor and outdoor

A local network time server transmits the time to the NTP clocks, whereby automatic transmission can be set manually, e.g. once per minute in normal mode. The default protocol for monitoring and alarm management can be used as an option. In the event of an electrical power failure, the clocks stop and they start automatically once again with the correct time once the power is restored.

There are two options for powering the NTP clocks:

– 230 VAC

Power over Ethernet (RJ-45 network with power supply and data via the network). This requires special network switches with PoE output

Wireless time systems for flexible wiring

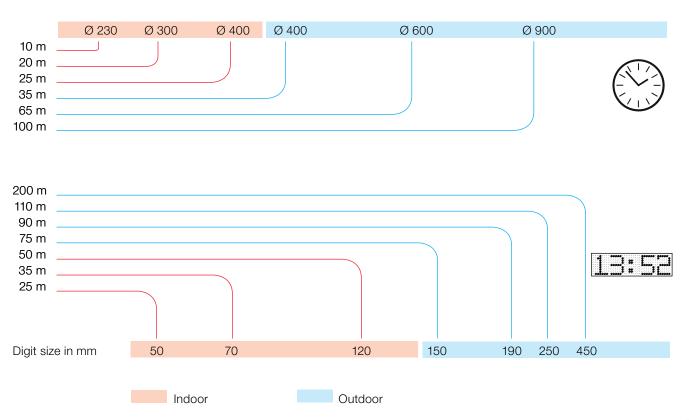
Our master clocks can be connected to a transmitter which transfers the time information wirelessly on a frequency of 869 MHz. The slave clocks can be installed at a distance of up to 200 metres depending on room conditions and wall thickness. The range of the transmitter can be adapted individually to the installations. Using repeaters to extend the network, it is possible to increase the range even further.

Wireless connection of the master clock to the slave clock may be interrupted by an electrical power failure. But the slave clock continues to run autonomously. The slave clock is synchronised and sets the current time once it receives a signal from the master clock again.

Autonomous clocks

Our analogue clocks are powered by battery or mains. They run individually as autonomous clocks and can be controlled with the aid of a GPS, DCF or MSF receiver. Digital clocks are also available with alternating temperature, date and time display.







Comparison of clocks

MASTER CLOCKS AND CENTRAL CLOCK PANELS

Master clocks and central clock panels

When it is important that all clocks show exactly the same time, this is where the clock system comes into its own. All analogue and digital slave clocks connected to their central clock panel are controlled with one uniform time. The heart of every clock system is the master clock. It functions as a timer. Its internal quartz timebase guarantees an accuracy of ± 0.1 seconds per day.

Pulses accurate to the second

The master clock evaluates the time and date information using a radio receiver. It corrects possible deviations and forwards the data serially in the form of pulses or as a time-code signal to all connected slave clocks. Time changes, such as changing from daylight saving time to wintertime, can either be performed fully automatically or can be freely configured. Thanks to time-code synchronisation, the slave clocks set themselves automatically even after a long power failure and run again accurate to the second in a very short time.

Diverse convenience features

Accurate switching operations that can be triggered by the master clock are an attractive feature for schools, public institutions or industrial concerns. It is thus possible to trigger visual and audible signaling devices to start break times or working times by means of additional signaling and switching circuits. These so-called floating contacts can also be used to control lighting, air-conditioning, ventilation, heating and alarm systems easily and in operator-friendly manner.

Technical data

Slave clock output Minute pulse Second pulse Power reserve

Programming Signal points Switching programs

Program memory

Circuits

Relay length Max. loading, relay output Total load, relay outputs

General data

Operating voltage Total connected electrical load Ambient temperature Relative humidity A (output with electronic short-circuit protection)
V; pulse duration 2 seconds (selectable 1–4 seconds)
V; pulse duration 0.5 seconds (selectable 0.1–1 seconds)
hours (pulse memory with high-speed pulses after power failure)

800

On/Off pulse with selectable duration Daily, weekly and twilight program 10 years (lithium battery)

2 floating changeover and 2 NO contacts 230 V/6 A 4 x 6 A

230 V/ 50 Hz (-5 %, +10 %) alternatively 24 V DC (-5 %, +20 %) 18 VA 0° C-40° C Maximum 85 %





Master clock WDP-Y4-MINI-W1

- Slave clock output 2 A
- Minute pulse
- Time code
- 4 circuits



Master clock GM-HU-3000

- Slave clock output 1 A
- Minute pulse
- Time code
- 4 circuits
- For 19" rack mounting

Master clock WDP-Q-TC

- Slave clock output 1 A
- Minute pulse
- Time code



Master clock GM-HU-MM

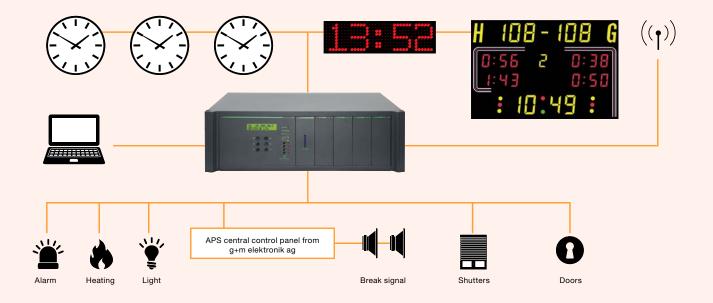
- Slave clock output 0.5 A
- Minute pulse
- Time code
- GM-HU-MM-P1 = 1 relay



Master clock Pro Line 19"

- Slave clock output modular
- For 19" rack mounting
- All synchronisation modes
- Maximum operational reliability
- Reliability thanks to redundancy

Link to APS central clock panel GM-HU-3000







Perfect timing

SYNCHRONISED MASTER CLOCKS

The master clock of a central clock panel is synchronised with a uniform time signal which it receives by DCF or GPS receiver.

Synchronisation by DCF signal

If DCF technology is used, the signal of the DCF-77 long-wave transmitter in Mainflingen near Frankfurt am Main, Germany, is received. This German transmitter supplies the radio-controlled clocks within a radius of around 1'500 km with signals for CET which it, in turn, receives as a time signal from the most accurate clock in the world: the cesium timebase in the German National Standards Laboratory (PTB) in Brunswick, Germany.

The DCF-77 signal contains the current time and date information. It sets the radio clock fully automatically within a few minutes during commissioning or restart. The switch to daylight saving time is also performed automatically.

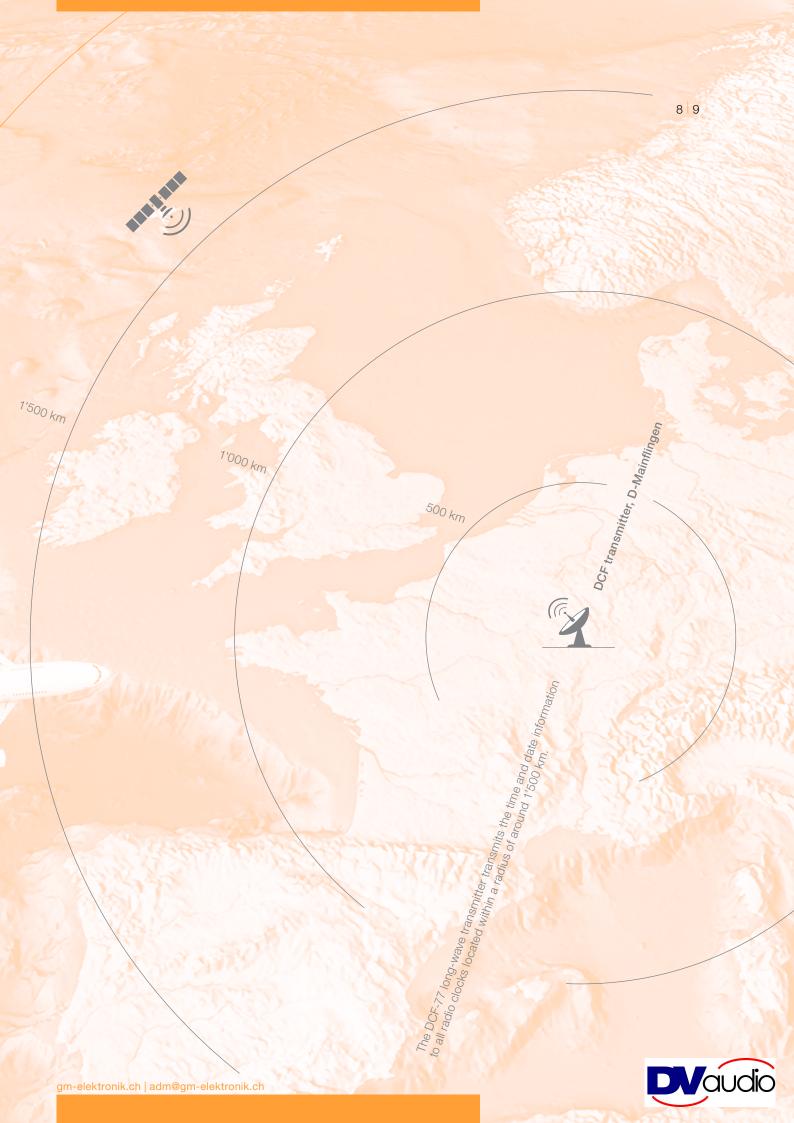
However, signal transmission may be impaired by various interference sources at the reception location, e.g. motors, data terminals, monitors, corona discharges on high-voltage pylons or also thunderstorms on the transmission path. If a thunderstorm or a violent storm occurs at the transmission location of Mainflingen, Germany, broadcasting is discontinued fully for the duration of the thunderstorm, which may last up to several hours.

Synchronisation by GPS signal

The global navigation satellite system GPS is available for maximum precision without restriction. Numerous satellites in six different orbits circle the earth twice daily at an altitude of around 20'000 km. There are two atomic clocks which can lose only one single second in a million years located on board each satellite. By means of the GPS signal, the satellites constantly transmit their orbit positions and the time at a frequency of 1.57542 GHz. The GPS signal achieves an accuracy of one billionth of a second with a location accuracy of one metre at the reception location of the GPS antenna.

Owing to the high transmission frequency of 1.57542 GHz, the GPS signal is virtually insusceptible to interference. Time shifts in the region of picoseconds occur at most and these result from atmospheric layer transitions. The availability of the time in the GPS signal is 100 percent with an unobstructed view of the horizon. With a half-obstructed view it is still 90 to 95 percent. However, the low transmit power of the satellites and the high frequency do require short cable routes between GPS antenna and electronic circuitry in order to still filter out interfering frequencies in the cables adequately.







10 11

Analogue clocks for indoor and outdoor areas

The classic – the analogue clock with the two hands is known throughout the world from railway station forecourts, school playgrounds and church steeples. g+m elektronik can provide you with a broad range of analogue clocks comprising many attractive design variants.

Be it with a frame made of plastic or aluminium, in white, grey or any RAL-colour – our analogue clocks are eye-catchers. We offer you variants in various sizes, single-sided or double-sided, for wall or ceiling mounting. Opt for curved or flat glass, with or without second hand, and line dial or regular dial with numbers. If you so wish, we can also design an individual dial for you. Our analogue clocks are also available as damp-proof and weatherproof versions.

For indoor and outdoor areas Round

Enclosure	Enclosure: IP65											
		Version			Secon	d hand	Dia	Slave Mode				
Ø in mm	Metal or acrylic glass cover	single sided	double sided	LED illumi- nation	Creeping	Jump-type	Numbers	Lines	Impuls 24 V	тс	230 V Stand alone	
Ø 300	x	x			on request	on request	х	х	х	х		
Ø 400	x	x		х	on request	on request	х	х			x	
Ø 500	x	x	х		on request	on request	х	х	х	х		

	For indoor areas Square										
• • • • •		Version		Second	hand	Dia	al	Slave Mode			
Size in mm	Metal or acrylic glass cover	single sided	double sided	Creeping	Jump-type	Numbers	Lines	Impuls 24 V	TC		
230 x 23	x C	x	x			х	х	x	х		
300 x 30	0 x	x	х			Х	х	x	х		
400 x 40	0 x	x	x			х	х	x	х		



Analogue clocks

Clock system with analogue clocks

You have the option of having a master clock control several analogue clocks as slave clocks. Your advantage is that all connected slave clocks are operated centrally and thus show a uniform time.

Optimally integrated

If the master clock features a radio receiver, all connected slave clocks show the accurate time from the radio transmitter. In this case, an alternating-polarity minute pulse with 12 V, 24 V, 48 V or 60 V is transmitted to the so-called slave clock line via a 2 or 4-wire line. All slave clocks are connected in parallel to the slave clock line.

Good timing

On analogue clocks, the minute pulse and the operating voltage are identical. A slave clock mechanism with minute pulse for a single-sided analogue clock corresponds to a power of approx. 5 mA with 24 V line voltage. The total power consumption of all slave clocks results from the number of slave clocks to be controlled, the line length and the wire cross-section. It may not exceed the total output power of the required master clock.

Reliable clock systems

Additional rechargeable power reserve batteries for the master clock allow all connected analogue clocks to continue to run for a certain time in the event of power failure. Switchover between daylight saving time and wintertime is performed automatically.

For indoor	areas
Round	

			Ver	sion	Secon	d hand	D		
Ø in mm	Alu	Plastic	single sided	double sided	Creeping	Jump-type	Numbers	Lines	Impuls 24 V
Ø 230	х	Х	x	х	on request	on request	Х	х	х
Ø 300	х	х	х	х	on request	on request	х	х	х
Ø 400	х	х	x	х	on request	on request	х	х	х

For indoor and outdoor areas Round Enclosure: Indoor IP52 Outdoor IP54

	Outdoor IP54												
					sion	Second hand	D	ial					
Ø in mm	Alu	Back-lighting	LED illumination	single sided	double sided	Creeping	Numbers	Lines	Impuls 24 V				
Ø 400	x	on request	on request	x	x	on request	х	х	х				
Ø 600	x	on request	on request	х	х	on request	Х	Х	х				
Ø 900	х	on request	on request	x	x	on request	х	х	х				



... AND OUTDOOR AREAS

Wide range of versions

Design, colour and equipment-complement variants

Clock system with master and slave clocks

Control via radio receiver

Rechargeable power reserve batteries in the event of power failure











	Synchronisation										
Slav	ve Mode		Autonomous								
Time Code	NTP	Wireless	DCF Plastic version No second hand Battery-operated/230 V	Quarz No creeping second hand Battery-operated							
х	х	x	Х	×							
х	х	x	х	×							
х	x	x	x	x							

. . .

Synchronisation

Slav	ve Mode		Autonomous						
Time Code	NTP	Wireless No second hand	DCF Battery-operated/230 V	GPS 230 V	Quarz No second hand Battery-operated				
х	on request	х	х	х	х				
х	on request	х	х	х	x				
х	on request	х	Х	х	Х				

Digital clocks LUMEX 5, 7, 12

Our digital clocks LUMEX 5, 7 and 12 combine precision with elegant, modern design. The series of high-quality LED digital clocks is proof of how good punctuality can look in indoor areas. The digital display, in addition to the standard version in red, is also available in yellow and green. The luminous intensity can be adjusted manually and is adapted automatically to the ambient lighting.

The LUMEX clocks already contain the TC, 24 V minute pulse and stand-alone synchronisation systems. It is possible to switch over automatically between time, date and the optional temperature display, whereby the interval can be set manually. Our LUMEX 5, 7 and 12 digital clocks turn into perfect chronometers with radio remote control or cable remote control.

Operating modes

- Autonomous
- Slave clock minute pulse 24 VDC pol. or time code from master clock
- NTP
- Wireless

Mounting/installation

- Single or double-sided wall or ceiling mounting
- Wall panel mounting

Options

- Radio synchronisation RDS
- Radio synchronisation DCF-77
- GPS satellite synchronisation
- Temperature sensor
- Chronometer including remotecontrol





For Indoor areas										Synchronisation			
	Version			Digit size			Colours			Slave Mode			
Display	single sided	double sided	5	7	12	yellow	red	green	Impuls 24 V	тс	NTP	Wireless	
HH:MM	x	х	х	x	x	х	х	х	х	х	х	х	
HH:MM:SS	x	x	х	x	x	x	х	х	х	х	х		
HH:MM, panel-mounting	x			x	x	x	х	х	х	х	х		
HH:MM:SS, panel-mounting	x			x	x	х	х	х	х	х	х		
HH:MM:SS, Date	x		х				х		х	х			
HH:MM:SS, date alphanumeric	x		х				х		х	х			



LUMEX 15-45

Our LUMEX 15–45 Series is ideally suited to indoor and outdoor areas. The standard version of the rugged LED digital clocks in red is also available in yellow and, for the indoor clocks, also in green. The luminous intensity can be set manually and it is matched automatically to ambient lighting.

The LUMEX clocks already contain the TC, 24 V minute pulse and stand-alone synchronisation systems. It is possible to switch over automatically between time, date and the optional temperature display, whereby the interval can be set manually. Our LUMEX digital clocks 15-45 turn into perfect chronometers with radio remote control or cable remote control.

Operating modes

- Autonomous
- Slave clock minute pulse 24 VDC pol. or TC from master clock
- Wireless

Mounting/Installation

 Single or double-sided wall or ceiling mounting with bracket

Accessories

 Bracket for double-sided wall or ceiling mounting

Options

- Radio synchronisation RDS
- Radio synchronisation DCF-77
- GPS satellite synchronisation
- Temperature sensor
- Chronometer including remote control



LUMEX 15-45 with time/date interval display



Optionally with temperature display



LUMEX 15-45 S

For indoor and oudoor areas												Synchronisation			
	Vers	sion		Digit size				Colours			Slave Mode				
Display	single sided	double sided	15	19	25	30	45	yellow	red	green	Impuls 24 V	тс	NTP	Wireless	
Indoor HH:MM	х	х	x	x	x	x	x	x	x	x	х	x	on request		
Indoor HH:MM:SS	x	x	х	x	x	x	x	x	x	x	х	x	on request		
Outdoor HH:MM	х	х	x	x	x	x	x	х	x		х	x	on request		
Outdoor HH:MM:SS	х	х	x	x	x	x	x	х	x		х	x	on request		

Digital Clocks

AUREA II

AUREA II offers you sophisticated design for business areas. The digital clock displays stylish timing with its black, lightly curved front panel. Besides its visual appearance, it is also the functionality that counts: the digits provide easy readoff even from an inclined angle. The LED display elements are available in colours red or green.

They provide easy readoff at a distance of 25 metres with a digit height of 58 mm for the hours and minutes and 45 mm for the seconds. An intelligent automatic function adapts the brightness of the display to ambient lighting. The unit is operated easily by means of three buttons at the side. A lithium battery allows the time to be displayed for over 1'000 hours in the event of a power failure. The clock is mounted as a single-sided clock on the wall – double-sided ceiling or wall mounting is available optionally.



23:59:59

Synchronisation, Standard

- Stand-alone (DCF receiver optional)
- 24 VDC minute pulse
- Time code from the master clock

Synchronisation, Option

- NTP
- Wireless

AUREA ALPHA

By contrast with the AUREA II, the LED display elements of the elegant digital calendar clock AUREA ALPHA are all 57 mm in height. It thus also provides excellent readoff at a distance of 25 metres.

Synchronisation, Standard

- Stand-alone (DCF receiver optional)
- 24 VDC minute pulse

Synchronisation, Option

- DCF
- RDS

12:00:00 WED240CT



CIRCLE LINE | DIGITAL PANEL CLOCKS

Circle Line - international Studio-Design

The square indoor digital clock combines unusual design with LED technology. Its 57 mm-high digits for the hour and minute display are located in a 280 mm-large ring comprising consecutive LEDs which display the seconds. This means that the time can be read off easily at a distance of 25 metres.

Whilst the digits are red, the seconds display is available optionally in red or green. The housing made of black aluminium with a front panel made of dark carbonate emphasises the modern design of the digital clock.

The Circle Line can be found in many recording studios throughout the world, with its special look, but, above all, owing to its precision. It is child's play to program the clock by means of three buttons. On the NTP variant, the clock is programmed by means of a web browser. The clock retains its time information for 24 hours in the event of a power failure. The Circle Line is synchronised with the TC as standard by means of a master clock. Optionally, this is also performed via LAN. You can also obtain a stand-alone version with radio. The clock is mounted as a single-sided clock on the wall.

Digital Panel Clock – for diverse applications

The panel-mounted digital clock with its 20 mm-high LED display is a real all-round talent for indoor areas. It can be used both as a simple clock which, if required, displays the date and time alternately and, optionally, as a chronometer. It is mounted in a bracket in accordance with DIN 43700 or for panel mounting in a wall. The housing is made of black aluminium whilst the front panel is made of dark polycarbonate. Enclosure up to IP52.







Digital Clocks COMBI CLOCKS | POOL CLOCKS

Combi Clocks - ideal for hospitals

A combination clock provides you with two time-measuring devices in one. The practical combination of analogue and digital clock is suitable for both wall panel mounting and wall surface mounting. Both clocks show the time accurately to the second, whereby only the analogue clock shows the actual time. The time elapses forwards or backwards, starting at 00:00:00 or 23:59:59, on the digital clock. It emits an audible, 65 dB-loud signal when the time elapses completely. The analogue clock is synchronised within a clock system via a master clock with a 24 V minute pulse.

Combi Chrono is the ideal combination clock for time-sensitive applications, such as in recording studios or operating theatres. Its housing made of chromium with a front panel made of polycarbonate features enclosure IP54 and can be cleaned easily, as also prescribed for the operating-theatre sector. The white dial of the analogue clock has a diameter of 300 mm. The hour and minute hands are black and the second hand is red. The digital display with black background displays red LED digits with a height of 60 mm for hours and minutes and 45 mm for seconds. The luminous intensity is 300 mcd. The clock requires a 230 V connection. The clock is controlled with an external remote control which features enclosure IP65. It can be surface-mounted or flush-mounted.



Pool Clocks - for Indoor and Outdoor-Pools

Data display in swimming baths and sports arenas plays an important role under special air and moisture conditions. The Digital Pool Clock for indoor and out-door areas was specifically designed for this – it displays the time and both the water and air temperature alternately.

It fits in elegantly with any room or area design with its black aluminium housing and the dark polycarbonate front panel. The double-row LED display is available in colours red and yellow, and it is also available in green for indoor areas. On the outdoor version of the Pool Clocks the display brightness adapts automatically by means of a dimmer. Three buttons are used for easy and convenient programming. Its display is used as a stand-alone unit or it is synchronised by means of a master clock with a TC or a 24 V minute pulse signal. GPS synchronisation is also available as an option. You also have the choice between a radio variant and an NTP variant and the chronometer function. The clock is mounted as a single-sided unit on the wall or as a double-sided unit on the wall or ceiling.



The Digital Pool Clock is available in the following sizes:

POOL 15	Display height	150 mm	Readoff approx.	60 metres
POOL 19	Display height	190 mm	Readoff approx.	75 metres
POOL 25	Display height	250 mm	Readoff approx.	100 metres



18 19

World time clocks ANALOGUE & DIGITAL | MASTER CLOCK

The elegant LED world time clock from g+m elektronik means that you always know what time it is round the globe.

It shows you four world time zones in 60 mm-high red LED digits. The actual time at the installation location and the current date are displayed by 60 mm-high green LED characters. You have the choice between other combinations of colours red, green and yellow as an option. You can also opt freely for the time zones and the associated city names which are displayed with white adhesive letters.

The clock consists of a black aluminium housing and the front panel consists of a black polycarbonate panel.



The World Time Clock is controlled by a special world time master clock which receives its time signal via a DCF or GPS receiver. Standalone operation is possible as an option.





Sports scoreboards BASIC MULTISPORT, INDOOR

Affordable top quality for your sports hall or multi-purpose hall is offered by our LED 190/250: the sports scoreboard has been developed with state-of-the-art materials and innovative technology.



Additional module

The sports scoreboard can be extended with further additional modules depending on requirements. Here you can see an example with additional modules each for two penalties including player number. Many other additional modules are available on request. These also include the various additional modules in accordance the FIBA rules.

Additional module

Absolutely rugged

The rugged black-painted metal housing for simple wall mounting features a gymnasium-type front panel made of antireflection-coated polycarbonate. The digit height of the fourcolour LED display system is either 190 mm with a readoff distance of 90 metres or 250 mm with a readoff distance of 110 metres. This means that the LED190/250 is optimally suited to competitions with all conventional indoor sports.

The programming system incorporates eight sports and other sports can be integrated individually to meet your requirements. If required, the LED190/250 can also be extended with additional modules in accordance with the FIBA rules, including display of time penalties together with the player number.

Don't hesitate to ask us. We would be more than willing to advise you.



Tennis scoreboard



Big screen



STANDARD MULTISPORT, INDOOR

The LED300 with further attractive additional modules offers you a wealth of sports options. The extendable sports scoreboard with 300 mm-high LED digits with dual-colour display can be read off clearly at a distance of up to 140 metres. In addition, individual team names can be displayed by means of a four-character display.



Additional module:

- 5 points and fixed or variable player number
- Digits and fixed player number
- 5 points and fixed or variable player number and result per player
- Variable text
- Analogue clock can be integrated

REMOTE CONTROL

You receive a cable-bound or radio remote control, as you opt, for our sports scoreboards. The radio remote control is supplied in a rugged plastic case. The interchangeable control masks in accordance with the required sports are enclosed with every remote control.

These sports are available:

American football Badminton Baseball Basketball Basketball FIBA Boxing Football Handball Ice hockey Indooor football Miniature football Netball Neutral Roller-blading hockey Table tennis Tennis Timekeeping Uni-hockey Volleyball Water polo Weight lifting Wrestling







Swiss Made

g+m elektronik ag, based in Oberbüren, has been developing and producing equipment, components and technology for complex acoustic, clock and evacuation systems for over 40 years.

As a modern, independent company, we develop needs-based, futureoriented engineering solutions for our customers, thereby setting standards in electro-acoustics. Sustainable quality, innovative ideas and continuous advancement are fundamental values that govern our actions.

We set standards for you: Our headquarters in Oberbüren, Switzerland. We have further subsidiaries in Germany, France and the Netherlands.

Acoustics | Clocks | Evacuation



g+m elektroakustik gmbh Donnersbergstrasse 1 D-64646 Heppenheim T +49 (0)6252 9679988 F +49 (0)6252 9679989

g+m elektronik ag CH-5504 Othmarsingen T +41 62 896 02 08 F +41 62 896 02 68

g+m audio-technologie B.V. Brugsteen 9 NL-4815 PL Breda T +31 (0)76 530 9 307 F +31 (0)76 530 9 313

Austria

SAC Schneider Audio Concept GmbH Ritzengrub 8 AT-3243 St. Leonhard am Forst T +043 (0)27 56 88 42-0 F +043 (0)27 56 88 42-14

Egypt

Hurb Trade 91, El Hagaz Street, Floor 2 El Mahkama Square EG-11351 Heliopolis, Cairo T +20 (2) 2635 0215 F +20 (2) 2632 3859

Israel

Ramtel Ltd. Communication Solution 14, Shabazi Street POB 305 IL-56231 Yehud T +972 3 5388000 F +972 3 5336615

Norway

Autronica Fire & Security AS Haakon VII's gate 4 NO-7041 Trondheim T +47 73 58 25 00 F +47 73 58 25 01

Spain

EGSON Electronica General de Sonido SA C/Genil Nº 13, Sector 4 Area Empresarial Andalucia ES-28906 Getafe Madrid T +34 (9)1 691 83 00 F +34 (9)1 691 34 62

Czech Republic

DV Audio spol. s.r.o. Na Hlinách 1786/16 CZ-18200 Prague 8, Kobylisy T +420 233 544 568 F +420 233 544 563

Greece

Panou SA 18, Efstathiou GR-11524 Athens T +30 210 6994030 F +30 210 6980305

Italy

A.T.E.C. srl Via Nobel, 8 IT-30020 Noventa di Piave, Venice T +39 042 165 288 F +39 042 165 9017

Poland

TOMMEX Sp. J. Arkadowa 29 PL-02776 Warsaw T +48 (22) 853 58 02 F +48 (22) 852 30 50

Turkey

ASIMETRIK Ilkbahar Mah. 622, Sok N° 4 TR-06400 Oran Cankaya, Ankara T +90 (312) 490 91 01 F +90 (312) 490 91 17 g+m elektronik ag CH-1090 La Croix (Lutry) T +41 21 791 63 06 F +41 21 791 63 08

swiss made

g+m électronique S.A.R.L. v. Ch. De Gaulle – BP 41 F-21202 Beaune Cedex T +33 (0)3 802 50 551 F +33 (0)3 802 50 552

Danmark

Kidde-Denmark A/S Industriholmen 17-19 DK-2650 Hvidovre T +45 36 86 96 00 F +45 36 86 96 11

Hungary

AVICO'97 Igmándi U 19 HU-1112 Budapest T +036 1 371 1497 F +036 1 371 1498

Jordan

EWAN Trading Agencies Company 165, Gardens Street P.O. Box 484 JO-11947 Amman T +962 6 5545820 F +962 6 5548210

Saudi Arabia

Salem Agencies & Services Co. SAS P.O. Box 9270 SA-21413 Jeddah T +966 26654616 F +966 26607864

United Arab Emirates

Electromatik FZCO P.O. BOX 191601 UAE-Dubai T +971 4 3325886 F +971 4 3324774

