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**GO!**

Automation with LOGO!  
and SIMATIC S7-1200

March 2018

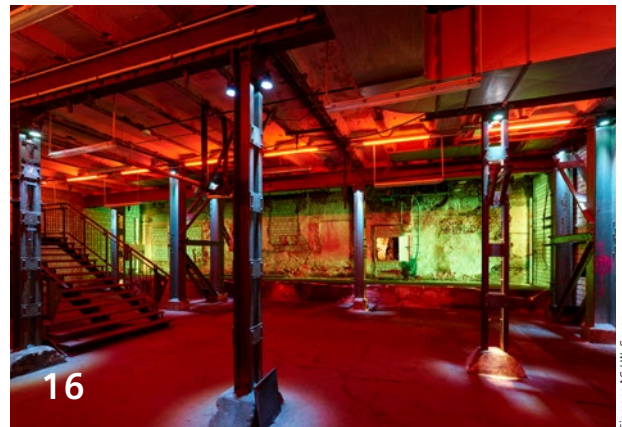
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## LOGO!

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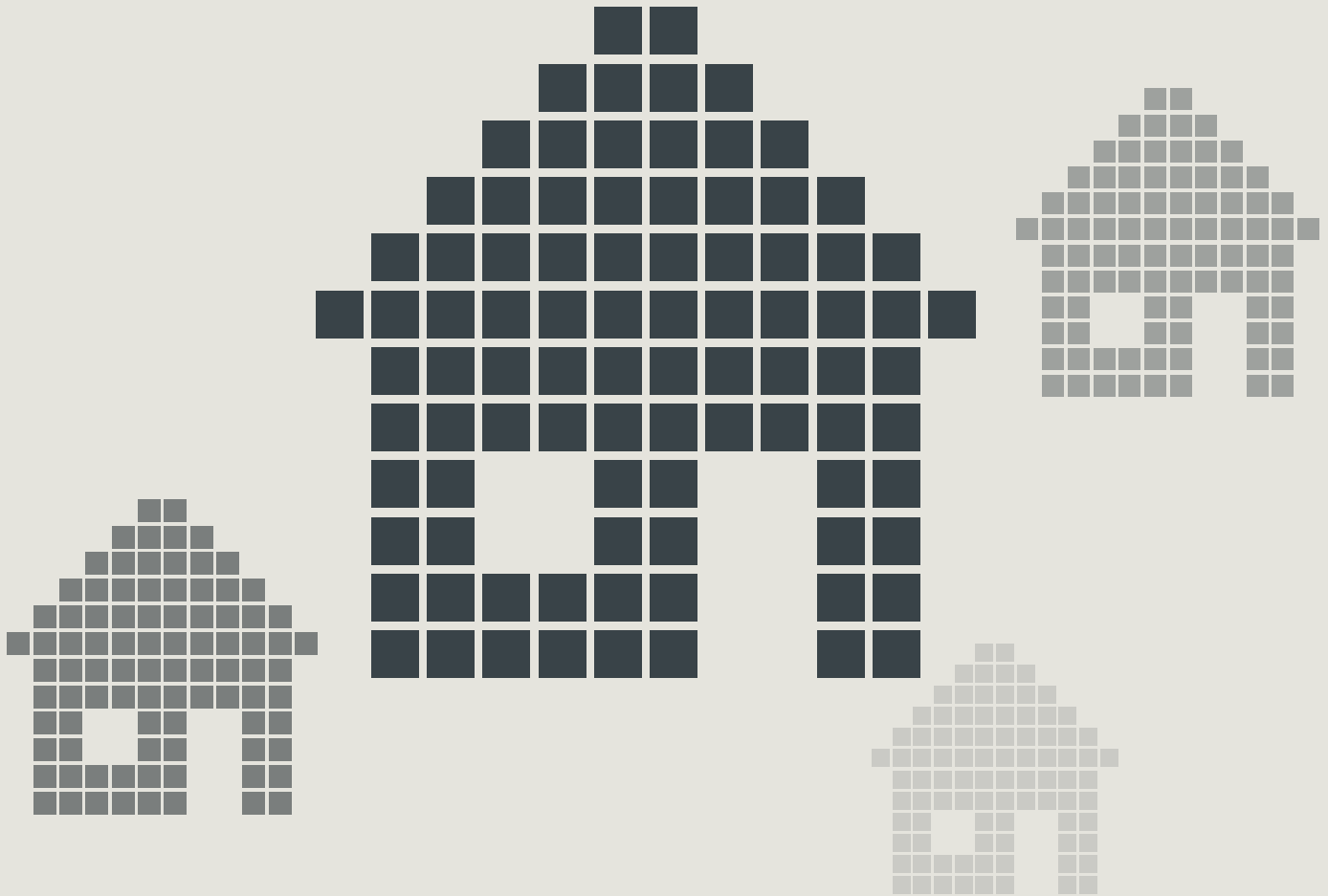
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## Residential living in the future

Roller blinds automatically go up at sunrise or the heating system can be controlled centrally – building automation has long since ceased to be widespread only in industry and has found its way into the private sector. It is important for builders and homeowners that the technology is easy to use and offers numerous options, while being inexpensive – and it is here where LOGO! exhibits its strengths in home automation. With this highly flexible and reliable logic module, intelligent solutions can be implemented easily and in a user-friendly manner. Users can quickly implement measurement, monitoring, or control functions – with no programming knowledge whatsoever. With the integrated web server, functions can also be remotely monitored and controlled using a smartphone, tablet, or PC.

The possibilities of home automation are thus virtually unlimited. Hotel Bayerischer Hof in Munich, Germany, has been monitoring and controlling functions in its rooms using LOGO! for a long time. Now, logic modules are connected to the KNX building system bus too (p. 8). Gerald Havelka and Hannes Engelhardt from Austria likewise rely on the logic module from Siemens to automate their homes (p. 6).

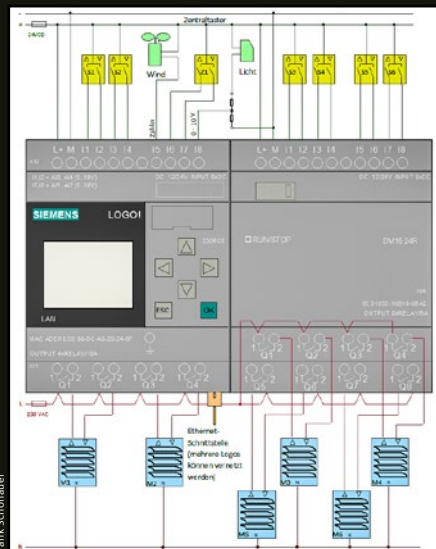
Simatic S7-1200 is also an essential element of building automation. For example, Philipp Hörz GmbH uses the controller to ensure that church bells ring perfectly and at the right angle – at the touch of a button (p. 12); and the Witt company of Weiden, Germany, installs snow warning systems on large (flat) roofs (p. 14). In the Jahrhunderthalle (Centennial Hall) in Bochum, Germany, the controller implements sophisticated sound and lighting effects (p. 16), providing visitors to the industrial monument with an unforgettable experience.

As technology advances, trends in building automation also continue to evolve. Holistic, comprehensive systems with many integrated components are now standard. This includes mobile monitoring and control of functions and applications using a tablet or smartphone. In order to make it convenient and easy to accomplish with LOGO!, Frank Schöner developed his own app (p. 4). Another trend that is currently used mainly for taking notes and controlling music is the inclusion of voice-controlled assistants in building automation. In the future, roller blinds will be able to be raised or lowered simply with a voice command, for example. ■



Frank Schönauer

Since 2005, Frank Schönauer has been offering ready-programmed logic modules for building automation through his webshop [vorprogrammieren.de](http://vorprogrammieren.de). In 2011, working with his partner Florian Cremer of the Spiritdev company in Erlangen, Germany, he began developing the "PLC Smart Home" app as a means of monitoring and controlling home automation systems via a smartphone or tablet. He prefers to use LOGO! 8 from Siemens because of its expandability, compact design and efficient web server – among other reasons.



Frank Schönauer

## DIY home automation

**LOGO!:** Basic Automation is now playing an increasingly important role in the domestic sector as it is elsewhere. In this interview, expert Frank Schönauer explains how the logic module and its self-programmable app enable users to automate their home inexpensively, monitoring and controlling its functions via a smartphone or tablet.

There are many building automation systems that are referred to as "Smart Home," including networks employing special cluster terminals or wireless controls for lights, window blinds, and power sockets. Why do you base your solution on the LOGO! 8 logic module?

**Schönauer:** While many of those systems do have high-end functionality, they have little ability to exchange data among themselves. With logic modules, I can not only integrate a wide range of different applications, such as garage door control or garden watering, into one system; I can also tailor them to customers' wishes. Thanks to the continual upgrading of LOGO!, this latest version offers me many possibilities, and I am able to provide ever better solutions. For example, thanks to the Ethernet port on LOGO! 8, I no longer need an interface converter, and the integrated Modbus TCP/IP communication permits ideal interaction with other systems. Another benefit is of course the integrated web server, which makes user control easy.

Simple functions, such as raising and lowering blinds, are standard smart home features nowadays. What do you need to gain a competitive edge in the market are add-on functions, but that is where things can quickly get expensive. How do you make sure your customers can get those add-on functions without incurring too much extra cost?

**Schönauer:** Cost is a key aspect of building automation. But you can make savings even in small ways. Products such as temperature, humidity and dusk light sensors, or motion detectors, do not necessarily have to be expensive; lower-cost models will do the job. Incidentally, that was also one of the reasons why I chose LOGO! 8; the controller offers me lots of functions and good quality at a fair price. I have intensively tested a wide range of accessories and rated them for my applications. So users can be certain that the product they buy is low in cost but high in quality. That also makes the overall solution attractive to them.



Frank Schöner / Publicis Pixelpark

As already mentioned, basic building automation also includes controlling window blinds and heating systems. What features and add-on functionality do you offer your customers with your PLC Smart Home app?

**Schöner:** The app is of course capable of controlling all connected electrical devices – in isolation, or in groups. But it can also be used to program a wide range of automatic settings. On a sunny day, for example, you can quickly activate the automatic sun-shade function; or you can program the astronomical timer switch to open and close the roller blinds at sunrise and sunset. It's also very easy to change the automatic timings and adapt them to the different seasons. A particularly attractive feature is that the full functionality of the app can be tested in demo mode.

That sounds like a lot of applications that customers are able to control themselves. Does effective use of PLC Smart Home require a certain level of technical know-how, or even HTML skills?

**Schöner:** No, not at all. Customers are emailed a configuration file specific to the system they are using, directly to their smartphone. When the customer launches the app, all their installed equipment items – roller blinds, lamps, dimmers, heating circuits and more – are automatically set up in it. They can then rename items, assign them to specific rooms, and add images to symbolize them. Using the so-called widget function, they can tap on the image for the relevant room to access the applications in it and

control them very simply by way of buttons and icons. The whole thing is very intuitive, and can be operated by anyone capable of using a smartphone.

Despite the ease of use, naturally there can always be times when questions or problems arise. That is when know-how backed by high service standards is essential. What support do you provide to your customers?

**Schöner:** That really is a very important aspect. I offer full-service packages both for property owners and for contracted electricians. Many customers ask for a quote right from the planning stage of their new build that will provide the comfort of a smart home but not break their budget. I advise them on which applications and products are best suited to their needs. I then draw up circuit diagrams, if requested discuss with the electrician what cables and switches will be needed, and help to scale the electrical distribution system. If customers don't want to do it themselves, I also configure the network settings for the app, so the system is immediately ready to run within the home.

What led you to program your own app for monitoring and controlling building functions via a smartphone or tablet?

**Schöner:** Logic modules fit in building distribution systems, are approved for use in residential buildings, and feature special function blocks for building services. So they have all the features necessary for building automation, but are mainly marketed as universal controllers for industry. That's why there was previously no app specifically tailored to smart home use. I closed the gap.

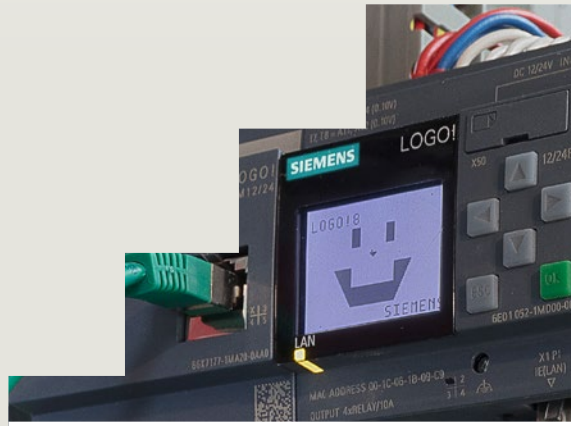
Home automation is continually advancing. The latest market trends are voice-controlled assistants, such as those launched by Amazon and Apple. What are you doing in order to keep pace with the latest developments?

**Schöner:** Such assistants are indeed ideal for home automation. Simply telling the assistant to lower the blinds or close a skylight window is not only much quicker than using a smartphone; it's more convenient. LOGO! 8 can function as the heart of an IT infrastructure running a voice-controlled smart home. An upgrade enabling voice control in addition to app-based control is currently undergoing testing, and is scheduled for release in the summer. ■

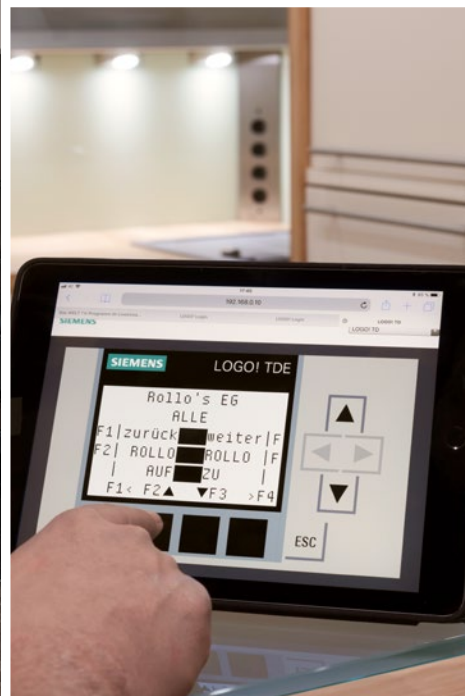
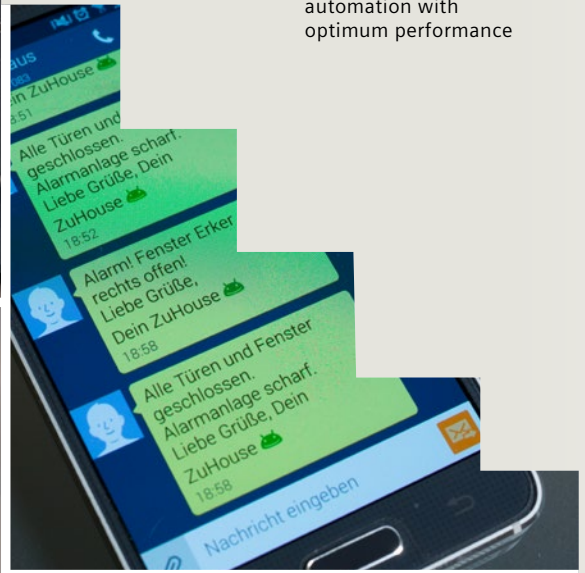
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LOGO! 8 enables cost-efficient building automation with optimum performance



All images Siemens AG / W. Geyer

# An automated home – quickly and easily

**LOGO!:** The logic module allows residential buildings to be comprehensively and easily automated while offering great flexibility and attractive extras at a low cost.

When Gerald Havelka of Baumgarten, Austria, makes himself comfortable on his sofa after work, he doesn't want to be blinded by the light of the setting sun. And instead of having to lower each roller blind individually by hand, they automatically roll down thanks to an astronomical time switch – or they can be manually controlled from a smartphone. Hannes Engelhardt also relies on home automation. If the Austrian entrepreneur leaves home early in the morning when it is still dark, he can switch off all lighting centrally with a single switch while only the lamps in his stairwell stay on for another minute, allowing him to leave safely and in an unhurried manner.

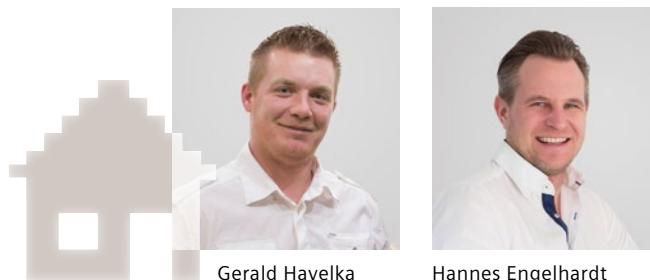
These are just a few of the functions that can be integrated into building automation. The central role is played by the controller, in which settings are stored and that activate functions at precisely the right time. It is also important for homeowners that a system is easy to install and operate – as well as being easy on the wallet. The LOGO! logic module offers numerous options here.

### The optimal solution

"Thanks to the integrated web server of LOGO! 8, I can access the building management system at any time and from anywhere via the Internet," Havelka explains with enthusiasm. "With a website I can design as I like (see p. 11), it is also easy to query conditions and control functions." As a result of the extensive networking capabilities, Engelhardt also enjoys being able to operate and monitor all automated functions of the building from a central Simatic HMI KTP700 Basic Panel on the ground floor. Remote control and monitoring can also be accessed via the Internet using a Smart-Server license.

And LOGO! 8 allows even more convenient features: "As a trained electrician, I had worked with the EIB/KNX building system bus and originally wanted a solution with switch actuators for our house," recalls Havelka. "With LOGO! 8 however, conventional switches can be used, which are significantly more cost-efficient. And thanks to the CMK2000 communication module, I can still also integrate KNX components in my solution and control them using the logic module."

Siemens product manager Rainer Göbel recommends LOGO! 8 to anyone who wants to build on a cost-conscious basis yet achieve optimum performance: "Home automation with LOGO! 8 is priced between a conventional installation and a complete KNX solution," he explains. Since all the lamp outlets, socket outlets, and pushbuttons are routed directly into the floor distribution boards to the controller, you admittedly need more tubes, cables, and lines than with a conventional installation. "However, there are virtually no junction boxes in the walls and thus fewer sources of error, and the extra work involved in laying pipes and cabling pays off, because the freely programmable logic module enables the same building management functions to be implemented as with KNX – but at a lower cost."



Gerald Havelka

Hannes Engelhardt

### A wealth of possibilities

Electricians have hardly any limits when it comes to giving their customers what they want. Engelhardt and his family use a socket outlet in the basement especially for ironing, one that is usually without power. "When ironing needs to be done, the socket outlet can be switched on by a button or cellphone," says the homeowner. "The trick here is that after a preset time of twenty minutes, LOGO! switches the socket outlet off again. If we forget to turn off the iron, it's not a problem." With the aim of making the controller as energy-efficient as possible, he plans to record the energy consumption data of his home using Sentron energy measuring devices, transfer them to the logic module via Modbus TCP/IP, and record them using data logging.

LOGO! also offers predefined program modules for functions such as partially raising the roller blinds at night automatically when the window is opened for ventilation, and then rolling them down again when the window is closed. Havelka also uses his system for indirect, multi-colored illumination of the stairwells and kitchen with RGB LED lights. "In this case, LOGO! uses analog output signals between 0 and 10 volts to control an intermediate pulse-width modulation (PWM) controller, which converts these signals into PWM signals providing sufficient power for the RGB LED lights," explains Göbel. In this way, LOGO! can control the color as well as the intensity of the indirect illumination.

If a controller is retrofitted – for garden irrigation, for example – it can be easily integrated into the existing network. That has already happened with Engelhardt's garage; when he opens it, the logic module of the garage door controller sends a message via wireless repeater to the basement lighting controller. This controller then switches on the light in the garage automatically – and switches it off again when the garage is closed. Engelhardt also uses his house as a flagship example of building automation applications for customers of his company, Enkon Klimatechnik GmbH. "My employees and I are absolutely convinced by LOGO!. It is unbelievable what this small, very inexpensive device can do," he says enthusiastically. "Apart from that, you can expect absolute reliability not only from the technical components of Siemens but also from the people who stand behind them!" ■

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# Perfection at front of house and behind the scenes

**LOGO!:** In the new north and south wings of Hotel Bayerischer Hof in Munich, logic modules control the lights, ambient temperature, drapes, load disconnect circuits, and access controls of each individual room.

The remodeled and partially rebuilt north and south wings of the Hotel Bayerischer Hof – located in the heart of Munich – offer the same high level of luxury as the rest of the hotel, which is set over eight floors. A total of 29 new rooms have been created, including 23 deluxe doubles, five junior suites, and a penthouse garden suite featuring a terrace planted with greenery. However, the superb quality

Drapes open./close Radio  
Temperature higher./lower



standards are evident in more than just the stylish interior decor that consists of tables and dressers made of ancient wood, and spacious bathrooms featuring Valverde natural stone; behind the scenes, finished in light and dark natural and earth tones, the LOGO! 8 logic module provides perfection in automation as well as custom lighting and climate control.

### Tried and proven technology

"We wanted a controller with which we could control as many elements as possible, that is easy and flexible to program, and that also takes up little space in the cabinet," says Horst Erharter. The electrical engineering contractor has been working for the Bayerischer Hof for 37 years, and for the past 15 years he has been responsible for planning the electrical installations throughout the building. "LOGO! 8 combines all of those attributes. So it was a logical decision to use it."

Erharter has long been familiar with the Siemens logic module and has been installing it since the first generation was launched back in 1996. "Initially we had twenty rooms fitted out with it as a trial," he recalls. "Though back then we only used it to control the lighting." It was a first attempt to find out whether such a method of building automation would work at all. "Before we installed the logic module, all the functions were controlled by way of relays," Erharter continues. "They often went wrong, meaning repairs were frequently needed. That no longer happened with LOGO!." Following the successful initial launch, 300 of the total of 341

rooms at the Bayerischer Hof were gradually outfitted with the controller. And it was not just the number of installed controllers that steadily increased, the functions they automated also became more diverse.

### One controller, numerous possibilities

The new wings' 29 rooms – each comprising a living and sleeping area, bathroom and separate shower – are the first to feature the latest from LOGO!. In addition to the lighting, the logic modules in the new wings also control the drapes, radio and temperature in each room. "The logic module also controls access to the

rooms by a sensor," Erharter adds. And it is not only the number and types of automated functions that have changed: the new wings additionally incorporate the KNX building system bus. "Each controller is assigned a CMK2000 communication module. It integrates innovative switches and dimmers into the automation system using KNX technology," Erharter explains. "This means one switch can be used to operate and dim different lights, as well as adjust the ambient temperature."

KNX also connects the new rooms to a control center. This enables default settings for the lighting and



The LOGO! logic module controls the lights, ambient temperature, blinds, access controls, and other functions in the Hotel Bayerischer Hof

radio on/off

The logic module's control options

power Door open/close



# ready-to-use functions

are available to users with the LOGO! Soft Comfort engineering software

temperature to be activated directly from the reception desk when assigning guests to a room. If a fault occurs anywhere, it is immediately signaled to the technician in the control center, who can respond accordingly. "LOGO! 8 offers me very wide-ranging and flexible possibilities," the electrical systems planner delightedly reports. "With CMK2000, up to fifty communication objects can be freely configured. That provides me with lots of variability to configure custom parameters and centralized functions."

As one example, when a guest leaves their room and takes the room access chip with them, LOGO! 8 automatically switches off all the lights in the unit. When the guest returns,

the lights switch back on again. The unique feature here is that the controller remembers the setup when the guest leaves, and upon return it switches exactly the same lights back on. "Free programmability is one of the major benefits of LOGO!," Erharter asserts. "It means I can configure exactly the functions I want." This is because the LOGO! Soft Comfort engineering software allows users to choose from more than 40 ready-to-use functions that include a weekly time switch, on-off delay, astronomical time switch and PI controller, thus allowing the user to adapt the application to specific requirements. Additionally, temperature trends in the room can be saved to a file for subsequent analysis.

## A successful model of cooperation

Erharter has lots of programming experience of his own and ever since he got to know LOGO!, the enthusiastic 'tinkerer' has been utilizing all the module's possibilities, deploying them in many applications beyond just room control. "In a building such as this, there are always new challenges arising, and LOGO! offers a way to meet them in a simple, cost-effective way," he concludes. The system's other functions include monitoring and regulating the water quality in the pool, controlling skylights and fire doors, and many more.

Erharter engages in regular and intensive interchange with Siemens. LOGO! Marketing Manager Josef Ploch comments: "It is very important for us to receive application reports from customers based on their practical experience. They not only provide us with feedback on the practicality of functions, but also generate ideas as to how we can expand or improve our controller."

"The support is key," Erharter affirms. "In Siemens we have found a terrific partner who has always helped us when we have had questions or any issues concerning LOGO!." That long-standing cooperation, combined with the possibilities that LOGO! offers, has convinced Erharter to also rely on the logic module for his upcoming projects at the Bayerischer Hof. He is planning to use the Siemens controller to automate the lighting in the hotel's Night Club bar, which has in the past played host to performances by well-known blues and jazz musicians such as Marcus Miller and the late Al Jarreau. He is also planning to use the controller in the hotel's traditional Bavarian restaurant – the Palais Keller – located in the building's historic 15th-century vaults. ■

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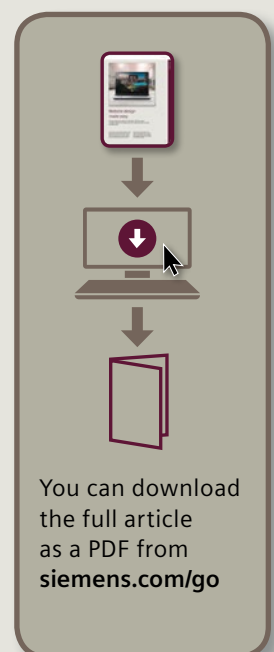
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# Website design made easy

The new web server feature of the latest LOGO! 8 version enables websites to be easily built and customized with no need for HTML skills.

The desire for customizable websites has been expressed ever since LOGO! 8 was launched. With the latest version of the logic module, that wish has been made a reality. Thanks to the free LOGO! Web Editor tool, users can

create custom websites featuring their own images and icons – with no need for any HTML knowledge. **Read the complete article on our website: [www.siemens.com/go](http://www.siemens.com/go)**





# The sweetest sounds – fully automated

**SIMATIC S7-1200:** The Siemens controller enables bell-ringing systems from Philipp Hörz GmbH to precisely control church bells with the correct timing and angle.

The days when sextons manually rang church bells with ropes are history. Today, all that is needed is the press of a button – the swing motion is now completely motorized and automated. But what seems like a simple procedure is in fact much more complex.

There are strict rules to protect bells, outlined in DIN standards for example, stipulating the maximum swing angle of a ringing bell relative to its perpendicular rest position. "The initial motion should be very smooth, so as to avoid rebound impacts, for example," explains Markus Willburger, a designer with Philipp Hörz GmbH. Founded in 1862, this company with a staff of 50 based in Biberach, in southern Germany, manufactures almost everything for the belfry from tower clocks to bell cages – everything, that is, apart from the bells themselves. "A bell can weigh several metric tons, and every one of them has its own dynamic characteristics," Willburger continues. "The maximum swing angle for each must be specified along with the corresponding number of stop limits, and finally the bell has to be smoothly slowed down to a stop. In between those points, it has to be kept precisely positioned so as to produce optimum sound."

So-called bell-ringing machines drive bells automatically. Philipp Hörz GmbH installs such systems in churches throughout Germany, from the deep south to the far north, as well as in neighboring countries. In the past, the company used specially developed control boards. "But at some point their components became outdated, and their reliability declined," Willburger explains. "Another factor is that replacement parts either no longer fit, or can't be sourced at all." Therefore the company decided not to continue investing in the development of new hardware, and it began looking for alternatives. What ended up being chosen was Simatic S7-1200.

## Collaborating to find the optimum software

One reason for choosing this controller was its integrated web server. "We are not programmers, but at Siemens we

found expert partners to handle our software development," Willburger says. He and his colleague Erich Müller defined the requirements and Siemens engineers implemented them. "It all worked excellently," the designer enthuses.

Siemens sales executive Thomas Dehm explains: "To precisely recreate and calibrate the initial ring, we fixed an additional encoder on the motor shaft of a circuit board-controlled church bell. We could then use the S7-1200 controller to trace the sequences in TIA Portal."



Siemens AG / S. Minx



Philipp Hörz GmbH relies on Simatic S7-1200 to automate its bell-ringing systems for church bells

Once this know-how protected standard software module controlling the bells has been programmed in the controller and the control cabinet has been installed in the church, the bells have to be 'tuned' – that is, their parameters need to be set. With Simatic HMI KTP700 Basic Panel, the technician is able to easily set parameters for the initial ring, maximum swing angle and slowdown rate of each individual bell based on its weight, size and sound using simple plug-and-play control.

### The bell determines the dynamic characteristics

"Most churches have four bells, for which one S7-1214C controller is sufficient," Dehm explains. "If there are more, a signal module is installed for additional inputs and outputs. Key factors in this are the fast counters of the CPU, with one rotary pulse encoder for each bell, as well as Sirius reversing contactors to operate the motors." The encoders transmit the bell oscillation amplitudes to the controller, enabling it to measure the momentary angle. The controller switches the contactors depending on the angle, rotating the relevant motor to the left or right in a matter of milliseconds until the ever-wider-swinging bell reaches its maximum swing angle. As Willburger stresses: "The pulses must be precisely timed; that's the major challenge."

Simatic S7-1200 also sends a signal to the tower clock as a striking mechanism blocking function, preventing a hammer from striking the bell while it is ringing, as would otherwise happen every hour. Conversely, when thus programmed the clock can also send a digital signal to automatically make the bells ring.

### Finer, more variable control

"As opposed to the previous control board, the S7-1200 controller detects the direction in which the bell is currently swinging," says Willburger. "This means the motor will never swing the bell in the wrong direction." Additional parameters make bell control much more variable and finer than before. The maximum swing angle can be more precisely maintained as a result.

This flexibility also enables custom solutions to be implemented, or special customer requirements to be met. For example, noise-insulating shutters in the church towers can be automatically opened or closed; moving figures can be controlled; and more powerful motors for large bells can be connected. The controller can also be integrated into existing systems.

A further plus-point of Simatic S7-1200 is the facility for remote control and maintenance of bell-ringing systems via the Sinema Remote Connect VPN platform. "If a Scalance router is installed in the church, the sexton does not have to be present; the bells can be rung by way of a smartphone or tablet," Willburger explains. "And multiple churches can be controlled from a central point."

### A successful model of cooperation

Throughout the region Philipp Hörz GmbH has already supplied and installed a number of bell-ringing machines featuring the new controller. "They are all running outstandingly well," Willburger reports with satisfaction. Looking to the future, and with new plans for further cooperation with Siemens, he says: "Now we are really getting started with the marketing push." ■

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# When the snow becomes heavy

**SIMATIC S7-1200:** The alarm system from tbm hightech control uses the Basic Controller to monitor the pressure exerted by snow and accumulated water on flat roofs.

The number of extreme snowfall and heavy rain occurrences has increased significantly in recent years. Alarmed by news reports of the collapse of flat roofs at sports stadiums and supermarkets, building owners and facilities managers now have a heightened interest in reliable early warning systems. The SAS-307 alarm system from the Munich-based company, tbm hightech control, is robust and easy to install and it is also intuitive to use. Facilities managers can receive a notification via text message or e-mail or connect to existing alarm systems. Simatic inside enables easy integration into building management systems. Customers with a particular interest in this product include airport operators and large grocery stores.

## Not all snow is the same

Snow and accumulated water can quickly exceed the load-bearing capacity of flat roofs, but deriving potential danger simply from the depth of the snow is risky. While 30 cm of powdery snow weighs

about 30 kg per square meter, slush and ice can easily increase the load to 200 kg per square meter or more. Edgar Nassal, managing director of tbm, recalls a customer who had received an advance warning from his system and assumed it was a false alarm due to a shallow snow depth. The tbm service was quickly on the scene, and an on-site investigation revealed that the system was by no means malfunctioning. The customer had significantly underestimated the dangerous weight of wet snow. He had never imagined that such loads could accumulate through compaction. As a result of this incident, the customer says he will never go without the alarm system.

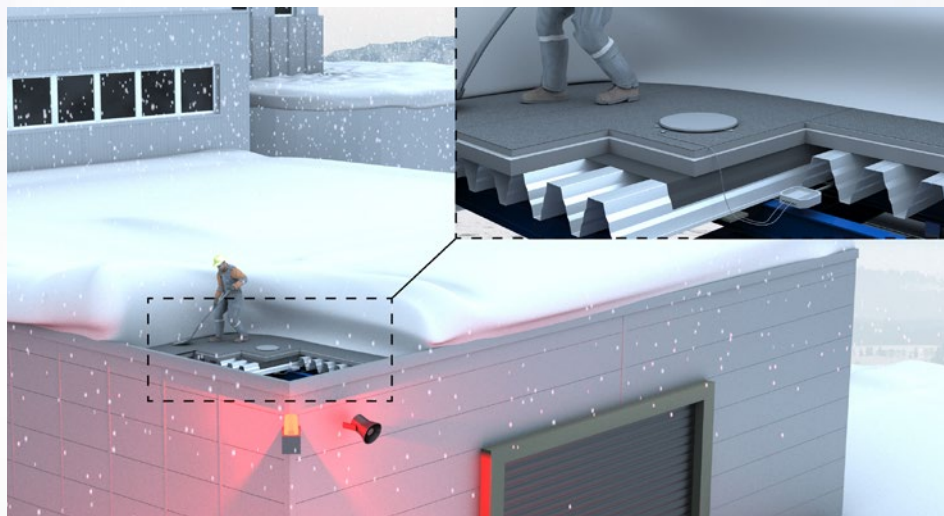
## Easy installation, intuitive operation

SAS-307 comes precalibrated and can be quickly and easily installed by a roofer. No special knowledge is required – not even on the part of the operator.

Three measuring stations provide an overview of pressure distribution on the roof. They have a diameter of approximately 50 cm and are only a few centimeters thick. The central control unit is housed in a compact wall-mounted control box inside the building, and its distance from the measuring stations can be up to 300 meters. Preassembled control cables with IP69k plug-in connectors are included for establishing the connections. The control cabinet is connected to a 230 VAC socket outlet. The key component of the control unit is a Simatic S7-1200 Basic Controller, which monitors the measured value profile of the pressure sensors as well as temperature and humidity at the measuring stations, triggering an alarm if necessary. The intuitive user interface of a Simatic HMI Panel is used to set the switching thresholds for the advance alarm (at around 60% of the load-bearing capacity) and the evacuation alarm (at around 90% of the load-bearing capacity). The panel displays each station's current measured values.







Using the Simatic S7-1200 Basic Controller, the snow-load alarm system from tbm hightech control monitors the pressure exerted by snow and accumulated water on flat roofs. A Simatic HMI Panel is used to set the switching thresholds for the advance alarm and the evacuation alarm and displays each station's current measured values

### Alarms also by text message

Preassembled terminals can be used to connect visual signaling devices or the building's own alarm system. Optionally, text messages can be sent using an integrated GSM modem. The panel can store up to 10 telephone numbers. A text message serving as a daily "pulse" gives the operator assurance that the system is operating and that a connection exists. Optionally, the roof load can be queried and tracked at any time over the Internet.

### Standards offer advantages

Why did tbm choose Simatic? Nassal focuses first and foremost on what customers want, and they associate the Siemens name with ruggedness and reliability. This is important because buildings are usually designed to be in use for a long time. Recognized communication standards such as Profinet are gaining in importance. For tbm itself, the modularity and scalability of the components are seen as advantageous. The Simatic S7-1200 Basic Controller is available in different expansion levels and even with additional optional outputs the

controller remains compact, fitting into a small control box for easy wall mounting. There is no extra effort or expense required for configuring custom warning systems, says Nassal: "Our core expertise lies in safety-related equipment, and solutions for logistics and security services to protect property. Innovative and scalable controls such as Simatic and LOGO! help us to offer custom solutions economically." ■

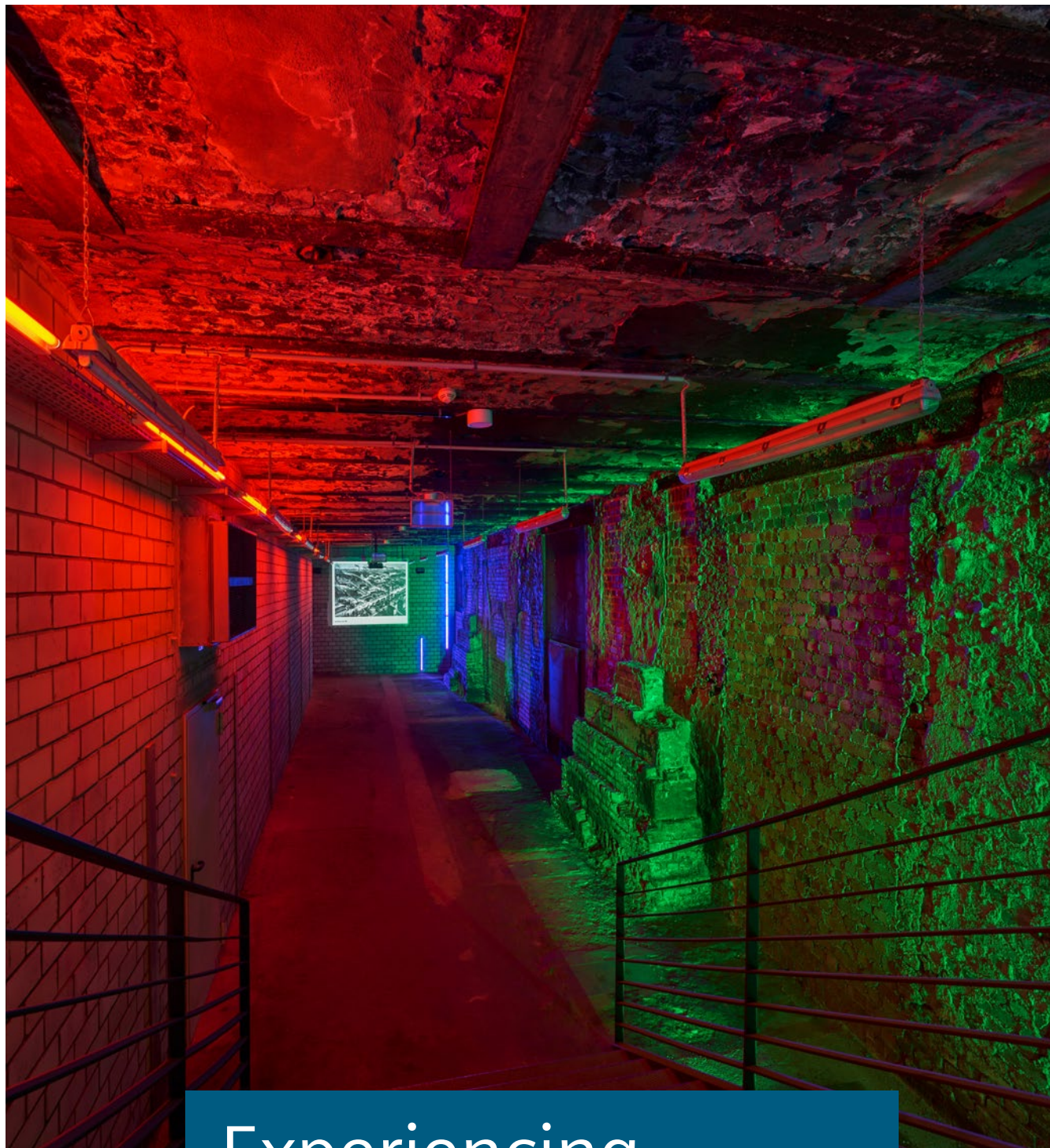
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Wolfgang Stabla is the facilities manager at Witt Group, a textile trading company rich in tradition based in Weiden, in the Upper Palatinate of Germany. He is in charge of managing buildings that, for historical reasons, are designed for differing roof loads. Stabla has years of experience with snow-load alarm systems. The tbm system caught his attention because it is automated with Simatic – and its ruggedness and operating concept won him over. "We can install the system ourselves and operate it without any training," he notes. The service provider who is responsible for maintaining the roofs is alerted by text message, in parallel with the internal building management staff. Says Stabla: "Even though the two-stage alarm system ensures safety, I additionally have the system call me. Integration into our building management system makes it possible. Being on the safe side is the important thing, and when it comes to human lives we can only afford to rely on the safest possible solution."





All Images Siemens AG / W. Geyer

# Experiencing industrial history

**SIMATIC S7-1200:** The operators of the Jahrhunderthalle (Centennial Hall) in Bochum, Germany, are modernizing its lighting installation for guided tours through underground supply tunnels.

Red, orange, green, and purple colored lights imbue the corridors with a surreal ambience; hidden machines emit a ghostly rattle from behind closed doors. The guide recounts the history of this building that was originally an exhibition hall and once served as a gas power plant for the Bochumer Verein corporation. Today, it is used as an events center. The story is accompanied by video and still images projected onto the unplastered walls.

The basement of Bochum's Jahrhunderthalle, with its extensive network of supply tunnels, provides an authentic experience of its industrial history. A key element of the atmospheric setting, alongside audio and video installations, is a multi-colored light show – for which the venue's operators use Simatic S7-1200 to precisely direct and control the illumination.

### User-friendly

As part of a two-month final graduation project, four electrical engineers in training from the Technische Berufliche Schule 1 – a vocational technical college in Bochum, Germany – modified and upgraded the existing installation. The prior, somewhat static installation offered little in the way of control options. As project team member Kai Bürger explains: "Our aim was to find a low-cost, uncomplicated way of making the guided tours through the underground tunnels more interesting, with added flexibility to offer different types of tours. The controls needed to be user-friendly, and wireless."

First, DMX-controlled LED lamps and units were installed and upgraded. In order to meet the new and much more extensive requirements, the project team replaced the existing LOGO! 6 controller with a compact Simatic S7-1200 for the higher-level control system. Bürger, who implemented the project together with his fellow students Marcel Meuser, Fabian Schlieker, and Darius Skopp, goes on: "Another issue was the, in some places, dusty and damp environment. Thanks to the compact design of the controller, we were also able to retain the complete control cabinet." The control

cabinet houses the DMX controller to control the lights, the MP3 players with sound files to produce the machine sounds, as well as the video players. They only had to be reprogrammed.

### Impressive technology

Simatic S7-1200 Basic Controller with a 1214C CPU was expanded with an SM 1223 digital signal module, an SM 1232 analog signal module, and an SB 1222 digital signal board. The freely programmable web server also impressed the trainee engineers. Bürger's colleague Darius Skopp, for example, was able to create an HTML website that tour guides can access on a tablet or laptop. A wireless access point at the tunnel system tour's central area enables guides to execute all control actions on the go.

Other control components include two permanently installed touch-activated Simatic HMI KTP400 Basic Panels at the beginning and in the middle of the tour route, as well as various local pushbuttons. These can be used to dim lights or project historical photos onto the wall at one station, or illuminate different areas of the space by moving spotlights at another, for example. Timer functions

in the PLC program provide safety features, among other benefits: "When the guide has moved the spotlight to one position at the press of a button, for example, he or she has to wait three seconds before the next movement can be initiated with the next button, so as to protect the lighting units against operator error."

### Progress based on technology

Simatic S7-1200 controls the electrical circuits by way of switching contactors, and it controls the audio and video systems via digital outputs. The Simatic controller communicates with the DMX controller via the analog output module. The lighting control converts into digital values the different voltages initially outputted by the PLC as analog signals, to which the trainee engineers have assigned various commands and lighting moods. "It's a one-way communication system," Bürger explains. "The PLC transmits, the DMX controller executes and operates the LED lamps."

The team of engineers was impressed by the value for the money offered by the KTP400 Basic Panels, as well as by the ability to program error

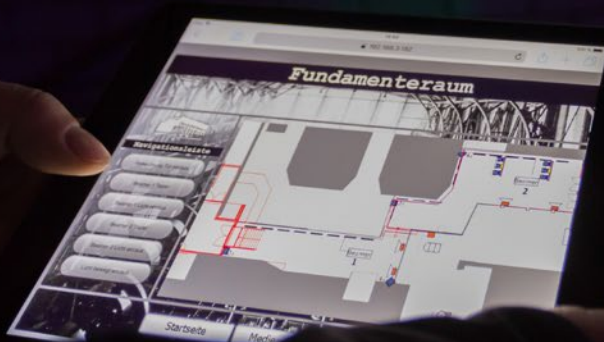


Along the tour route are two Simatic HMI KTP400 Basic Panels used to control permanently installed light and sound effects (left). The heart of the whole installation is the control cabinet, which, thanks to the compact design of Simatic S7-1200, could be completely retained (above)



*»As well as enjoying good support from Siemens, we were able to gather lots of practical experience and gain valuable PLC know-how.«*

Kai Bürger, a soon-to-be qualified electrical engineer of the Technische Berufliche Schule 1 in Bochum, Germany



messages in plain text – all seamlessly integrated into TIA Portal. For example, at the start of the tour the guide selects one of three programmed tour types, featuring different lighting scenarios, on the first touch panel. In addition to the default program, there is also a highly dynamic variant featuring frequent color changes and a chase-light sequence, as well as a program with reduced lighting levels allowing the guide to conduct the tour using a headlamp. The new features represent a major advance over the previously employed static lighting of the standard tour.

Bürger is also impressed by Simatic S7-1200. "Any new types of tour or lighting scenarios can be easily programmed," he comments. "The program modules are easy to copy, and by changing voltage values for the various outputs a new configuration for a new tour can be created."

#### Integration into the in-house network

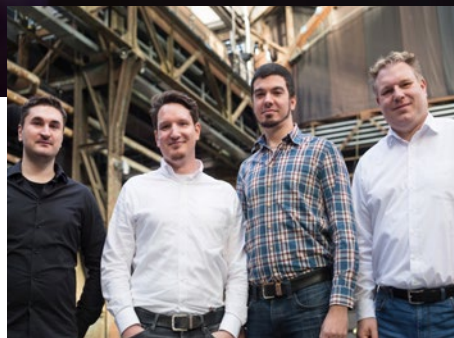
Simatic S7-1200's Profinet interface also enabled the team to easily integrate the control cabinet systems into the existing IT network. This means that a member of the in-house technical staff does not have to go down to the basement on each occasion to carry out administrator tasks, as there is now convenient access to the control system from the office workstations. The PLC's security features also provide a tiered

access and password protection system, for guest guides and administrators.

This special project has also been of great benefit to the electrical engineer trainees themselves. Bürger concludes: "As well as enjoying good support from Siemens, we were able to gather lots of practical experience and gain valuable PLC know-how." ■

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The project team members of the Technische Berufliche Schule 1: (from left) Darius Skopp, Fabian Schlieker, Marcel Meuser, and Kai Bürger

# Maximum power and highest efficiency for 25 years

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A big thank you to everyone whose heart beats for Sitop! These exclusive offers enable everyone to benefit from this anniversary – and to discover the reliability of the Sitop power supply!

able in various controller designs, including LOGO! and Simatic S7-1200. Marking the portfolio's 25th anniversary, two exclusive packages are being offered at a one-time discount of 25% off the regular price for the single components. Application examples are also included to help quickly and easily integrate the components into automation solutions.

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Item number: 6EP4754-2JS5



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### Application example for Simatic S7:

- Function blocks for Simatic S7-300/400/1200/1500 for Step 7 and TIA Portal
- Description of the application

Free to download from:

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### Application example for LOGO!:

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Sitop PSU8600 24 V/4x 5 A, 3-phase  
Sitop BUF8600 200 ms/20 A  
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The base unit of the Sitop PSU8600 power supply system incorporates an Ethernet/Profinet interface as well as four parameterizable outputs

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Comprehensive diagnostic and maintenance information is provided via Profinet, and can be analyzed directly in Simatic S7 and visualized in Simatic WinCC. Power management is also optimally supported by the recording of power data for each output and individual on and off switching of the outputs.

### Contents of the application example:

- Function blocks for Simatic S7-1200/300/400/1500 for Step 7 and TIA Portal
- Faceplates for Simatic WinCC
- Description of the application

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