CONNECTIONS 59

Connectivity
Is Becoming a Basic Need

Swatch Headquarters,
Switzerland:
Architecture for the Watch

Healthcare Cabling:
**More Important Than Ever
Before**

Smart Networks
via the Cloud

R&M

Security of Supply
in Uncertain Times

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Dear Business Partners

2020 will go down as a historic year – and particularly one in which we had to do some considerable adapting and in which we learned a lot. The positive lessons of the crisis will hopefully outlive the crisis itself.

In a global economy, regional shutdowns, such as the ones we saw in China and in Italy, hit the supply chains hard. All over the world, corona measures led to shortages of freight capacity and delays at all levels. Because we recognized the risk at an early stage and adapted our processes accordingly, R&M managed to keep on delivering on time. In addition we have an excellent contact network with suppliers and freight partners. Partnership-based business relations prove their worth especially in times of crisis.

Along with the health of our employees, it is our top priority to continue to guarantee security of supply to our customers at all times. The demand for connectivity solutions is particularly high in times like these.

Within the R&M corporate culture, great store is set by agile management principles and structures. At the start of the pandemic, we had just a few days to question our «modus operandi». Within a very short time, the safety standards in the production network were tightened and directives from the authorities implemented. The great resilience of our employees played a major role in this being successful at such short notice.

Bandwidth is increasingly becoming a basic need

This pressure meant «the wheat was separated from the chaff» along the entire value-added chain. In times like these, you find out just what is possible. Many companies were pleased to discover that their limits could in fact be stretched much further than they had originally thought. That was certainly the case here at R&M. Once again we were able to significantly increase our flexibility and learned to keep a cool head. Targets were adapted to new circumstances at short notice and are being resolutely pursued by the entire workforce. You might say that we passed the «agility stress test».

Crises always offer opportunities. Luckily, our sector is one that has not been slowed down. Bandwidth is not a luxury anymore and is increasingly becoming a basic need. Fiber to the Home is soon going to be just as important as water and electricity. The market is growing rapidly and the demand for fast, stable Internet has witnessed an above-average increase in the last few months. In our focus report, we explain how the challenges on the road to comprehensive fiber optic provision can be met with the solutions of tomorrow.

Our solutions are also doing valuable service in the healthcare sector. The antimicrobial R&M*healthLine* products play a major role in fighting dangerous bacteria. Read more about it on pages 12-14.

We particularly like featuring case studies in the magazine: In this issue, for example, we look at the new fiber optic cabling and network modernization at Hamilton in Bonaduz (Switzerland) – a successful global provider of high-tech solutions for labs and medicine, headquartered in the US. The company has delivered countless ventilators around the world in recent months and, like many other companies, is making a significant contribution to the fight against the pandemic.

Thank you for your loyalty, particularly in these special times. We will do everything in our power to continue offering you our solutions in a demand-oriented and timely manner. Stay safe. Stay healthy.

Sincerely,

Markus Stieger-Bircher
COO

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This year, 2020, is providing us with numerous trend-setting insights. Due to the pandemic, millions of people suddenly had to start working from home. If private Internet access provides sufficient performance, this can actually be quite productive and useful.

But it is often the case that there is not sufficient performance. A lot of people working at home complain about slow Internet connections. Even in metropolises, the provision of broadband is seen as being insufficient.

This is how ISPreview reported on the findings of a survey of 1,500 inhabitants of the British capital in August 2020: Londoners are more annoyed by the absence of broadband connections at home (71.3 %) than a lacking heating system (62.9 %). And 82 % say that broadband is one of the most important utility services for them today.

ISPreview adds: 70.8 % of London's SMEs were pleased that their employees could continue to be productive at home. And 60 % of these companies say that bandwidth, along with the speed and stability of the Internet connection, are more critical to their success today than a functioning supply chain or office space.

The challenges of working at home

With suitable task setting, a lot of people are actually more productive working at home than when they work in an open-plan office. A fact confirmed by studies from both China and the US. But this inevitably requires a new dimension in Internet access. Let's look at one example:

An engineer may be satisfied if she can work on the CAD data of her project at home. Her company hosts the software on a remote server. Sometimes it takes a few seconds for the system to react to a click of the mouse or an instruction to save. If, at the same time, there is an online meeting with presentations and screen sharing, the colleagues' images are blurred. The video transmission breaks down.

Let's extend this scenario to a multi-dwelling unit or even a particular district of a town. The Internet connections may offer a transmission capacity of 50 Mbit/s. Nearby the engineer's home, a number of young students are being taught online at the same time and are also entertaining themselves with online gaming. At this point at the very latest, the good old DSL connection to the nearest splitter is likely to collapse.

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Games, videos, meetings

Gamers have to download 80 gigabytes before they can use the newest games. Until the game is saved on the console, the download uses the available bandwidth to the full.

In March 2020, one of the most popular games worldwide gained 15 million new players in just four days. Four weeks later, there were 50 million. According to measurements by Nokia, online gaming traffic increased by 400% during the lockdown. By 2024, half of the world's population will be entertaining themselves by playing video games online. This a theory put forward by total telecom in July 2020, based on forecasts by ABI Research. This is just one of many examples of data-intensive IP applications, which are moving into our homes.

«Approach: Converge FTTA and FTTH to provide the market with unlimited broadband services across the board. We call it FTTU = Fiber to the Ubiquitous, in other words omnipresent FO provision.»

The wide area networks and Internet exchange nodes were able to cope with the onslaught during the lockdown. IP data traffic increased in March 2020 from anywhere between 30% and 60% depending on the region. The tel-

5G supplements FTTH

Anyone hoping that gigabit-fast 5G will solve the bandwidth problem on the last mile may well be disappointed. 5G is not a full-value replacement for FTTH, but a complementary path.

The disadvantages: When many private customers and teleworkers start up their data-hungry applications directly via the cellular phone networks, the bandwidth in the radio cell is shared. The range of 5G antennas is just a few hundred meters. The radiowaves can hardly penetrate thick walls.

Fiber to the Antenna
The data traffic between 5G access points can only be realized in technical terms with a dense fiber optic network and edge data centers in the background. Fiber to the Antenna (FTTA) is a mandatory part of the investment program. For every square kilometer of 5G network, it is estimated that four to five kilometers of fiber optic cable have to be rolled out.

That is why FTTA is now penetrating deep into city districts. Existing mobile communication masts, street lamps, parking lots, bus stops and halls can all be sites of 5G antennas. As can facades and roofs of both commercial and residential buildings. Everywhere here, 5G providers need a fiber optic connection.

And that is exactly where FTTA and FTTH meet.

Synergy effects
In the past, network operators have developed their infrastructures for cellular phone networks, commercial markets and house connections separately. An expensive path. The new dimension of broadband demand heralded in 2020 and the simultaneous start of the 5G rollout require the use of synergies.

The broadband model Fixed-Wireless-Networks (FWA) has proved its worth. Radio bridges the gap between a copper or fiber optic network in city districts and the telcos' base stations. Over short distances, FWA can be used with 5G and FO connectivity.

A local fiber optic network connects subscribers or their routers with the 5G antenna on the roof. This means that all customers in a residential area have Internet access with download speeds of several Gbit/s. A quantum leap for private users and homeworkers. At the same time, this model also saves extensive FTTH distribution into every individual house.

Conversely, FTTH projects could be designed from the outset to support FTTA, 5G services, building automation and IoT. Why should FTTH be rolled out exclusively for the Internet connection of private subscribers?

Cooperations
Overarching cooperation and structural convergence would be logical. This is how providers could finance assets more cost-effectively, scale to suit the purpose, make optimal use of their capacity and allocate resources flexibly. This would include empty tubes, dark fiber, distributors on every level, cables, network termination, cabling systems and antennas.

Suitable local partners are utilities, railroads, municipalities, real estate owners and other market participants. They can rent out their infrastructure, such as ducts and existing FO lines, grant rights of way and agree public-private partnerships.
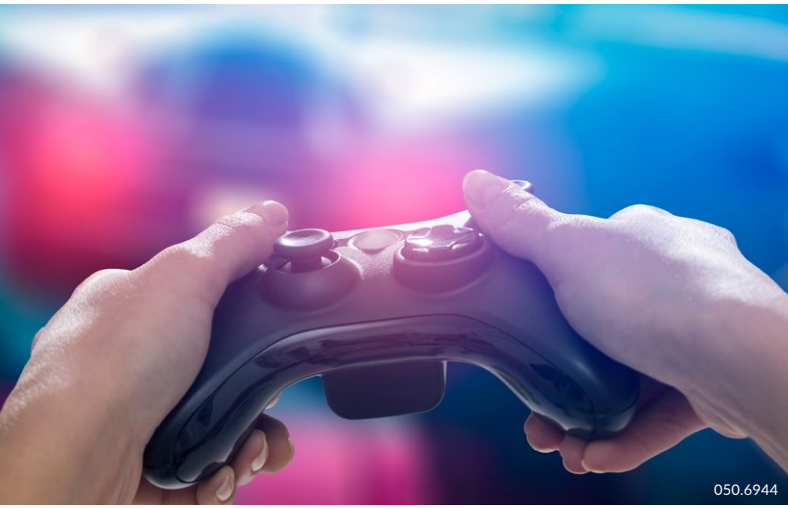
Further advantages: Market analyses, planning, access routes, topologies, measurements, maintenance and the deployment of experts are easier to coordinate.

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ecom, cloud and Internet providers have the resources to absorb such loads. But Netflix and YouTube took the precautionary measure of reducing the resolution of their videos to minimize the data stream.

Telecom provider Verizon observed that online collaboration of customers during the months of the pandemic rose by 1,200 %. The number of daily, active Microsoft Teams users rose by a third to 44 million in the first week of lockdown. Zoom, the young video conferencing app, was downloaded 2.13 million times a day after the start of lockdown – forty times more often than in the days before.

The British provider Virgin Media examined upload behavior. During the pandemic, every customer sent the equivalent of 3.7 gigabytes more data per week to the network than before. This corresponds to 185,000 e-mails or 14 hours of video conferencing with two participants.

The interest in smart home devices, such as video intercom systems and WLAN access points, increased during the pandemic. IP-aided building automation and Internet of Things (IoT) are pushing onto the market. ABI Research confirms: Sales of connected-home products is likely to increase by 30 % in 2020.

The individual end devices do not generate that much data. The applications can be used with existing Internet access and mobile com-munications. But the sheer mass of future IoT terminal equipment is going to create unimagined data streams.

The world is now working online

Hundreds of millions of people have been changing their behavior for quite some time. They are learning to communicate with apps – constantly and conveniently – whether they are on the move or at home on a tablet or PC. Working, shopping, meeting friends virtually in your own apartment, etc. – all of this became the new norm in just a few months of 2020. And these trends are here to stay.

The business world is also changing its behavior. The industrial, office and marketing world are discovering disruptive opportunities. Numerous international shows and conferences are now taking place virtually on the web.

B2B webinars, as increasingly practiced by R&M, provide customers with in-depth specialist knowledge in a convenient way. Production is inexpensive and generates more leads than analog marketing instruments.

Sales representatives are increasingly working remotely instead of visiting customers. McKinsey reports: Before the pandemic, more than half the companies surveyed worldwide preferred personal customer visits; today, that remains true for just one fifth of companies. And 80 % of the companies want to retain most of the new distribution models when the pandemic is over.

The change is also affecting other sectors. Just a few examples are art, education and healthcare:
– Orchestras perform masterpieces with their musicians playing at home in front of a webcam.
– Lecturers are discovering that online teaching can replace classroom teaching.
– Physicians are relying on remote diagnosis and monitoring with live video transmission.
– Physiotherapists can help patients by showing them exercises via webcam.

In these cases, the high-resolution real-time transmission of audio, video and diagnostic data is essential. Internet access at home is often limited to download speeds of under 100 Mbit/s, with upload speeds even lower. Modern teleworking at home, however, requires gigabit-fast upstream in order to be able to produce smoothly.

The traditional architecture of the «last mile» to the subscriber has not yet been designed to cope with an era of mass teleworking.

FTTH on the rise

The positive news: Fiber to the Home is on the rise. According to analysis by Research and Markets, the global market of Fiber to the Home/Building (FTTH/FTTB) is currently growing at a rate of 13.9 % per annum. The number of FTTH customers in Europe is rising 15 % a year according to the FTTH Council Europe.

European telecom operators are accelerating network expansion and intensifying their commitment to more bandwidth. Their offers with data rates of more than 100 Mbit/s have a market share of 29.6 %. But is that enough?

«High-capability connections are not only of crucial importance in times of crisis. They will be fundamental to the economic recovery and the transition to a sustainable, green EU economy.»

Erzsébet Fitori, former Director of the FTTH Council Europe

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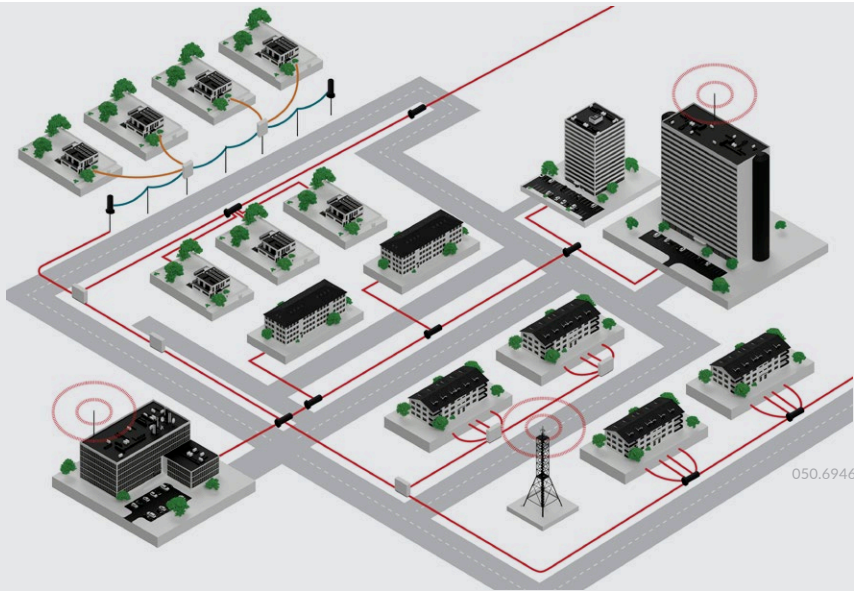
Planning FTTH with R&M

Telecommunication companies, municipalities and utilities regularly face challenges when it comes to expanding finely structured FO networks in residential areas. There is no one, universal solution for every location. Furthermore, FTTH networks are to be rolled out efficiently and cost-effectively. R&M provides the necessary know-how and, with R&M*foxs*, the program for FTTx networks.

The first priority is the farsighted planning of cabling routes from the central office

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through the main distributor frame right into the buildings and apartments. R&M provides advice when it comes to network design and the selection of technology. Aspects which might be covered here are, for example, decisions on multiplexing and splitter technology. Connectivity to existing fiber optic networks and the convergence of fixed network, IoT, cellular phone networks and 5G also play a role.

What is important is to plan in headroom. Cables and distributors should always be «overdimensioned». Experience shows that the reserves are always exhausted earlier than expected.

Scalability is also one of the deciding criteria when it comes to selecting the product. High-count cables or now ribbon fiber cables have got to be part of the setup from the very beginning. With components such as the modular PRIME ODF and the re-sealable SYNO dome closure, networks can be customized, extended gradually and adapted spontaneously at every level.

A coherent range makes planning effortless from the first to the last mile. R&M sees the R&M*foxs* program as an end-to-end solution for the situation at every location, for market dynamics and for the number of participants. It starts with the high density PRIME-ODF racks and modules for main distributors. It also includes a sophisticated range of splice closures, numerous FO cable variants and the variably usable Polaris-boxes for network termination and subscriber management. And it ranges up to field-terminable connectors and optical outlets for both residential and office properties.

Ultimately it is the installation effort that counts. Labor-intensive steps, such as splicing, count for up to 70 % of the investment volume. R&M follows the out-of-the-box principle. Pre-terminated racks ready for installation and tool-free quick mounting technology all alleviate work. Costs and time outlay are reduced.

Future requirement even greater

Sector insiders from WIK-Consult show in an exemplary forecast for the German market where exactly the bar is set. It suggests that in 2025 almost 75 % of households will be needing bandwidths of more than 500 Mbit/s.

Then, at the latest, households will be needing symmetric transmission with high availability, a low packet loss rate and low latency. Providers can only guarantee this with fiber optic cabling to the home. WIK advises that networks should be designed for peak bandwidth requirements. This occurs in the evening when households are using all their cloud, social media, streaming and gaming services at the same time.

What we are experiencing now is only the tip of the iceberg. That is certainly the opinion of Jeff Gavlinski, Head of Marketing at cloud provider Calix, as he explained at a fiber forum in July. A society that uses more virtual reality, augmented reality, artificial intelligence and robot applications will demand more bandwidth. And he was talking terabytes, not megabytes. He asked: «How can we supply thousands of households that are doing all of that simultaneously.» Fiber optic connections and a symmetric service from the Internet providers are crucial in this respect.

Conclusion: FTTH as a basic need

FTTH providing reliable, future-oriented connectivity is increasingly becoming a basic need. It is becoming as important as water and electricity. And, finally, fiber optics offers inexhaustible reserves: Transmission potential greater than 1 terabit/s, loss-free symmetric transmission over dozens of kilometers, electromagnetic immunity.

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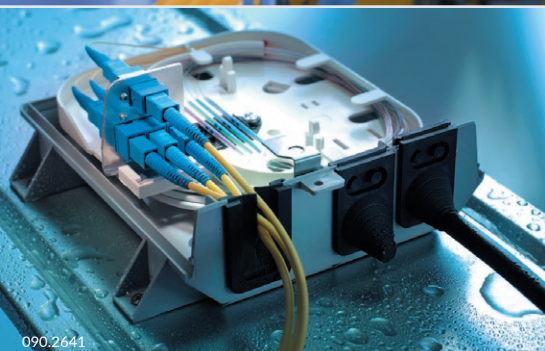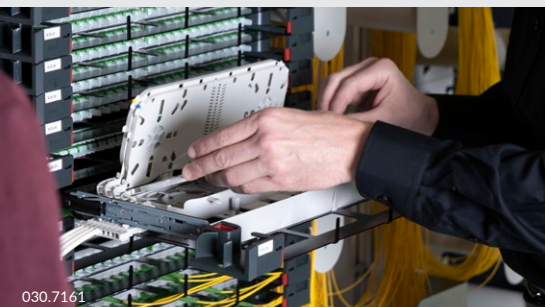
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Hamilton
Sets Standards

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«We drive innovation to improve people's lives.» With this mission, Hamilton has been developing and manufacturing high-tech solutions for labs and medicine for almost 70 years now. Hamilton sets standards.

Like a lot of fascinating companies, Hamilton was born in a garage. Clark Hamilton, a chemical engineer who had studied at MIT, set himself a major goal at the end of the 1940s. He wanted to develop a precision tool that could handle the smallest liquid samples and invented the legendary microliter syringe.

In 1953, the pioneer started producing them in his own workshop in Whittier, near Los Angeles, and his precision syringes have been shaping analytical processes in chemistry and diagnostics ever since. Today they continue to sell for the same price as they did when the company was founded.

Market leadership

The company grew quickly and was relocated to Reno, Nevada, in 1960. Six years later Clark Hamilton founded a hub outside America, in Bonaduz, Switzerland. He had fallen in love with the region and the Swiss mountains. Here he wanted to drive forward product development in the spirit of «Made in Switzerland». It also helped to boost sales in Europe.

Today, the family-owned company is the global market leader in the automated handling of the smallest amounts of liquid. The pipettes, miniature laboratories and sensors set standards in medical technology as well as in the chemical, pharmaceutical, life science and food industries. Hamilton's innovations enabled the first automated screening of whole blood for AIDS and hepatitis.

Deployment in the pandemic

The intelligent ventilators are just as useful. They were developed and have been manufactured since 1983 in Bonaduz by affiliate Hamilton Medical. They provide safer care for critically ill patients. Demand for these quality products has risen sharply during the current pandemic.

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Thanks to the dedication of the Hamilton employees, countless additional hospitals around the world and even the army can be supplied with the equipment and consumables within a very short time. Standardized and highly automated manufacturing processes enable ventilators to be assembled every 40 minutes.

Investments on site

The Hamilton companies develop their locations as dynamically and single-mindedly as their innovations and growth. The most recent key project was the construction of a new production plant with an automated small parts warehouse in Domat/Ems in the Swiss canton of Graubünden.

Hamilton always implements cabling systems by R&M. Under great time pressure, the experts from Elektro Rhyner AG, based in Glarus, installed the extensive LAN and server room cabling in the new building in Domat/Ems. Naturally it was imperative to adhere to the strict safety, compliance and hygiene standards of the medical industry.

Before that, Hamilton commissioned Schönholzer AG from Chur to connect the campus with a fiber optic network and modernize the network. A restructured data center had to be reconnected. The installation work had to be carried out during ongoing operations and at high speed.

The question of space was a challenge for the planners and installers from Schönholzer. They had to accommodate the new fiber optic and copper cabling in historically grown routes and channels of the industrial building. «That was really hard work and a leap in time for us,» says Achim Sax, facility manager at Hamilton. Furthermore, infrastructures for the use of Power over Ethernet (PoE) and the Internet of Things (IoT) had to be created. This will enable Hamilton to automate further processes in the future.

Achim Sax explains: «A lot has changed over the last five years. Office and production require more and more IoT, cloud, bandwidth, automation and collaboration solutions. Everything is becoming more digital and our networks have to be equipped to cope with that. Good connectivity is essential in our branch.»

Standardization: a successful model

Despite all the dynamics, the projects succeed with utmost precision. Standardization is the key to success.

Precisely defined manuals for the data centers and cabling systems at the plants in Graubünden as well as for the plant in Romania dictate how copper and FO installations have to be carried out at Hamilton. They contain specifications for network components, nomenclatures, notes on standards, measuring methods and warranty processes.

Hamilton and R&M developed the manuals together in the interest of a holistic, modular and expandable infrastructure. Planners and installers must comply exactly with the manuals and specified installation processes. The standards also stipulate that only planners qualified by R&M are admissible.

Achim Sax and his ICT colleague Roman Janett have implicit faith in the R&M products: «They always work.» Quality, operating safety, reliability and the warranties are part of the offers. R&M accompanies each project closely with expertise, project support, logistics and, in the area of fiber optic cabling, also with measurements.

«We cannot afford any mistakes or interruptions and need absolutely secure connectivity at all sites.»

Achim Sax, Head of Facility Management, Hamilton Bonaduz AG

«We cannot afford any mistakes or interruptions and need absolutely secure connectivity at all sites,» Achim Sax says explaining the consistent standardization and the high demands made of project partners. Because network technology should also contribute to improving people's lives.

HAMILTON

R&M cabling solution for the Hamilton headquarters in Bonaduz

The campus development and network modernization at the Hamilton headquarters in Bonaduz is based on:
– FO backbone with OS2/OM4 cables, resources for a transmission performance of 40 Gigabit Ethernet
– Server connection to the data center with MPO connections, OS2/OM4 cables and RJ45 copper trunk cables, integration of distributed rack locations
– Vertical infrastructure up to the floor switches with fiber optic cabling
– Horizontal cabling in the office sector with Cat. 7$_A$ S/FTP AWG22 copper cabling and the R&M modules Cat. 6$_A$ EL (ISO) for the use of 10 Gigabit Ethernet

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In the new building in Domat/Ems. From left to right: Achim Sax, Head of Facility Management, Hamilton Bonaduz AG; Roman Janett, ICT Network Engineer, Hamilton Bonaduz AG; René Wunderli, R&M Switzerland.

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Cat. 8.1
Complete

The Cat. 8.1 range is complete: From this fall, R&M is also providing perfectly coordinated patch cords. That means that all modules for the Cat. 8.1 channel are available from a single source.

This is the moment data center providers and network planners have been waiting for. R&M is one of the first manufacturers to introduce a complete Cat. 8.1 cabling system. The new Cat. 8.1 patch cords come in five different lengths from 1.5 to five meters. Along with the path cords, the Cat. 8.1 connection module already introduced and Cat. 8.2/8.1 S/FTP installation cables, the range also includes a handy wiring tool.

The aim of the Cat. 8.1 development was to make 25 and 40 Gigabit Ethernet available on copper cabling. Especially data centers, but also next-generation WLAN access points require these fast lines. The R&M portfolio meets all the requirements for operating a standardized 30-meter channel with 40 Gigabit Ethernet or a 50-meter channel with 25 Gigabit Ethernet.

Long-term perspectives

Cat. 8.1 cabling offers high performance headroom, long-term perspectives and backward-compatible RJ45 interfaces. This means it is suitable for multiple scenarios, applications and IT generations.

In data centers, for example, users could easily migrate from 10 over 25 to 40 Gigabit Ethernet without having to make costly changes to the installation. A LAN realized with Cat. 8.1 has several zones with the speed levels 40G, 25G and 10G, depending on the transmission distance. In this way, link lengths of up to 50 m, which is more than 60% of the installed base, could benefit from a substantial increase in transmission bandwidths. As usual with all twisted pair cabling, Cat.8.1 can be used to transmit not only data but also the power supply with Power over Ethernet (PoE).

Cat. 8.1 requires a precisely balanced shielding, wiring and compensation technology.

When all channel elements come from one source, the parameters can be precisely coordinated with one another. This means the R&M system is now complete with the Cat. 8.1 patch cord.

Attenuation factor important

Network planners have to take the attenuation factor of the patch cord into consideration to be able to calculate the correct length for the Cat. 8.1 link. Attenuation factor 2 is valid for AWG26 patch cords. One meter of AWG26 patch cord corresponds to two meters of electrical length in the channel. A new white paper from R&M provides further information and application examples (see https://www.rdm.com/che_en/Product-News/Category-8.1-Permanent-Link).

Roger J. Karrer | Product Manager
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Change
on the AV Market

A change of generation is occurring in the Australian audiovisual market. New IP-supported video standards are establishing themselves here, but what about the cabling?

IP connectivity in the AV market

https://hdbaset.org/

HDBT™ BASE T

https://sdvoe.org/

SDVoE™ ALLIANCE

Videos displays in full HD impress the entire family. They also support businesses on the trading floor, in conferences, lectures at universities and medical examinations in hospitals. Increasingly, video transmission is based on predominant, industry accepted standards such as HDBaseT-IP (HDBaseT over IP) and SDVoE (Software Defined Video over Ethernet).

Why? Because both systems use Ethernet/IP instead of proprietary protocols. For these systems to operate as intended, system manufacturers recommend top-quality, shielded Cat. 6_A cabling for the cabling network in the background. When correctly installed, it guarantees loss-free and error-free full HD enjoyment.

Cat. 6_A? This is new territory for many AV professionals and not only in Australia. To date, HDMI and coax cables have fulfilled almost every AV wish: They are easy to plug in and the video system works, but offer little in terms of expansion and lack flexibility.

Cat. 6_A cabling on the other hand, with its flexibility and field terminable connectors, allows for everything point-to-point HDMI or coax cabling doesn't. The installer can ensure that the cabling system meets all current and future requirements by generating accurate measurements, against existing cabling standards, in order to achieve guaranteed performance.

In 2019, faced with this changing market, distributors asked R&M for an all-in-one package for point-to-point cabling for AV installations. The search was for 6_A field-terminable connectors and high-quality 6_A shielded purple cables, to differentiate the AV system from other systems in installation. Once again, the R&M FM45 connector proved itself to be a universal product.

Product, know-how, warranty

For this kind of all-in-one solution, R&M is the only supplier to provide all the know-how and an end-to-end warranty. In the R&M Qualified Partner Program (QPP), AV consultants

and installers are receiving comprehensive training sessions which are specific to AV systems and deployments. They leave the course totally familiar with the FM45, Cat. 6_A, HDBaseT-IP and SDVoE for use in the near future. R&M gives QPP graduates a 25-year warranty on AV installations – a warranty that in turn gives their customers comfort and security.

The demand for certifiable end-to-end cabling and training for AV cabling systems is on the increase: R&M Australia is ideally positioned with its local knowledge and high-quality product set to address this demand now and in the future.

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Healthcare Cabling:
More Important Than Ever Before

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Cross-infected in a hospital bed – not a rare occurrence. Pathogens are lurking everywhere, particularly in hospitals. Dangerous microbes can also settle on outlets and cables around hospital beds. A good reason for R&M to contribute to patients' safety with antimicrobially treated products.

The risk of hospital-acquired infections cannot be overestimated. Even in countries with the most advanced hygiene standards, nosocomial infections, or healthcare-associated infections (HCAI) as they are also known, are by far the most common infectious disease. In countries with higher incomes, the rate is 7%, in countries with low to medium incomes 10%, and at times even 19%.

HCAI are one of the top ten causes of death. The risk of dying with a hospital infection is twice as high as the risk of dying in a road accident.*

Clinic equipment suppliers under pressure

In view of the recent increase in health risks and hygiene requirements worldwide, suppliers of hospital equipment have been tasked to meet these challenges. If multi-resistant pathogens can settle around patients' beds, all possible countermeasures should be taken. Appropriately treated IT and network technology can contribute to reducing the risk of nosocomial infection.

Patch cords and data outlets are among the components touched daily by patients and hospital staff. Conventional cabling technology does not reduce the risk of cross-infection at these locations and relies solely on cleaning.

Hospitals have to be able to fully rely on their network technology. Cables and outlets connect the monitoring and diagnostic devices at a patient's bed with computers in the ward control center or operating room. Information from patient rooms and wards must be continuously exchanged with the hospital's administration and data center.
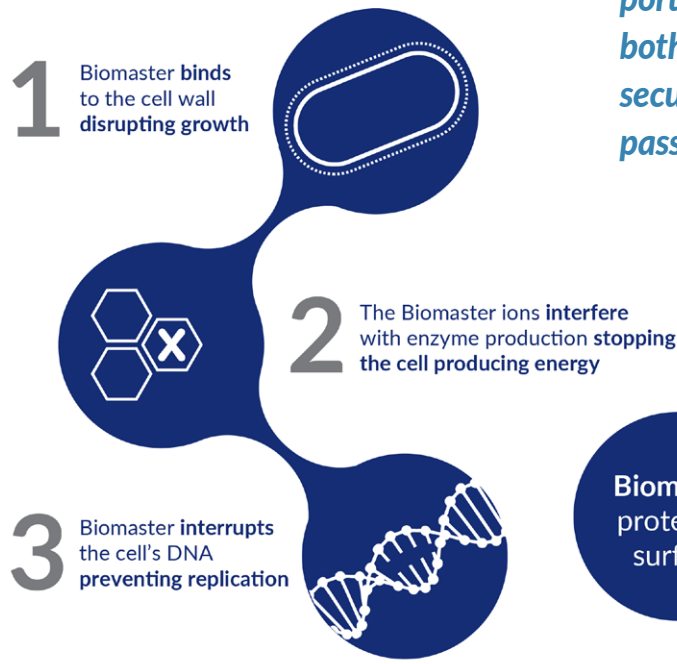
Without IT and secure local data networks, hospitals cannot maintain operations. In addition, there is a growing need for rapid data exchange with health authorities and research institutes.

What are the possibilities of antimicrobially equipping inconspicuous but essential components, such as patch cords and network outlets, and providing more security for both patients and networks?

The power of silver

R&M took up this question some time ago and equipped its healthLine products with an antimicrobial additive. The additive used is called Biomaster and contains silver ions. The additive is mixed into the plastic during the manufacturing process and cannot be rubbed or wiped off. It inhibits the colonization of microbes on the plastic parts of

1 Biomaster **binds** to the cell wall **disrupting growth**

2 The Biomaster ions **interfere** with enzyme production **stopping the cell producing energy**

3 Biomaster **interrupts** the cell's DNA **preventing replication**

www.addmaster.co.uk/biomaster

Biomaster
ISO 22196:2011

Biomaster protected surface

Bacteria lands on the **Biomaster surface**

the bacteria can't survive

Permanent product protection

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> «*With an antimicrobial portfolio, hospitals provide both infection protection and secure data connections at the passive connectivity level.*»

network products in accordance with ISO 22196. The latest results also demonstrate an effectiveness in shortening the survival time of some viruses (e.g. Norovirus) on the surface of protected products.

Biomaster takes away the ability of microbes to survive on the surface of a product by preventing them from growing or replicating. Therefore they die out over time. This effectively reduces the risk of infection at a patient's bed, as well as in kitchens, laboratories and other rooms with increased hygiene requirements.

The effectiveness of Biomaster is assured for the entire lifespan of the R&M*healthLine* cables and outlets. The products can be used without specific restrictions. Irrespective of this, hospitals must of course still comply with

their established disinfection schemes. Biomaster is not a substitute for regular cleaning.

Antimicrobial portfolio
Following successful pilot projects, R&M*healthLine* provides a comprehensive portfolio for patient-oriented, antimicrobial network connectivity.

This healthcare portfolio is an extension of the cabling system R&M*freenet* for structured LAN cabling. It offers the same convenience in terms of installation and operation as standard products. R&M partners install the products all over the world in wards, operating rooms, emergency rooms, nursing homes, rehabilitation and healthcare facilities.

The R&M*healthLine* range includes:
– Outlets with RJ45 sockets for local data and communication networks
– Shielded Cat. 6_A and unshielded Cat. 6 patch cords for connecting computers, medical devices, telephones, call systems, multimedia terminals etc.
– Protective caps and coding elements of the R&M security system

Further requirements in the hospital field
Standards such as IEC 60601-1-1 require additional protection for operating rooms. At sensitive places of use, medical devices and data networks have to be galvanically separated to protect patients, devices and sensors from possible overvoltage.

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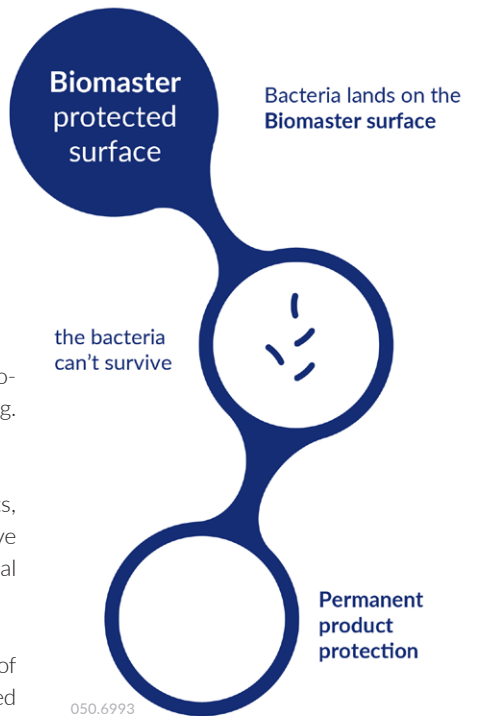
This task is taken care of by the passive, maintenance-free network isolation module R&M*safeLine*. It can be plugged into LAN outlets in a few simple steps and saves on expensive medical technology accessories. The transmission capacity goes up to 1,000 BaseT Ethernet or 1,000 Mbit/s. The dielectric strength is 4 KV AC.

Furthermore, clinics have to ensure that the operation of medical, administrative and multimedia applications is separated at a physical level. The three-stage R&M security system supports this goal with color coding, protective caps and labels to mark the different connections.

The highest level of the security system locks plug connections and prevents improper or erroneous plugging in and unplugging. Only authorized people can open the locks. The R&M monitoring program inteliPhy also helps monitor local data networks.
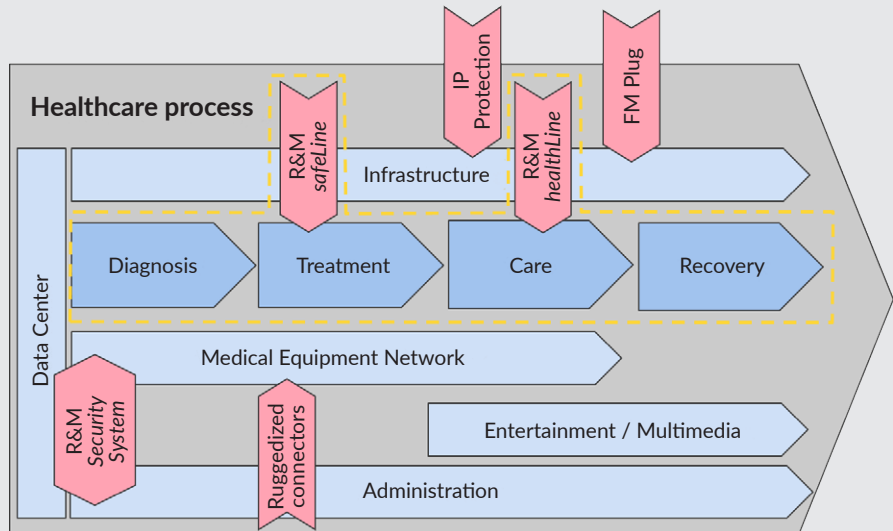
News

The R&MhealthLine concept

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R&MhealthLine: Outlets and patch cords with antimicrobial properties.

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The R&MsafeLine coupler ensures the galvanic separation of the data connection.

The R&M concept for security and infection protection at the network cabling level targets several points along the healthcare process. This includes the physical security of the connectors, galvanic separation and the antimicrobial equipping of cables and outlets.

Healthcare process

- IP Protection
- FM Plug
- R&M safeLine
- R&M healthLine

Data Center

Infrastructure

Diagnosis — Treatment — Care — Recovery

Medical Equipment Network

R&M Security System

Ruggedized connectors

Entertainment / Multimedia

Administration

Graphic: R&M   050.6994

Even wet rooms and areas with harsh environmental conditions can be reliably connected to the local data network. For this purpose, R&M has developed retrofittable protective sleeves for RJ45 connectors. Areas of use are laboratories and operating rooms, outpatient clinics, supply stations for fluids as well as outdoor areas with access control and video monitoring.

The Splash Line rubber grommet provides protection against splashing water, cleaning agents and dust. It satisfies the requirements of protection class IP54. The IP67 plastic sleeve guarantees even more security. It protects connections under water as well as providing protection against shocks and impacts. Grid clamps prevent connectors from being pulled out by mistake.

It's a matter of life and health

This portfolio enables hospitals to provide both infection protection and secure data connections at the passive connectivity level. R&M thus underlines its competencies in the healthcare sector. Globally, R&M enjoys recognition as a network equipment supplier for the healthcare sector. The list of case studies ranges, among others, from the oncology center in Gliwice, Poland, to the Sakra World Hospital in Bangalore, India. Further examples: The Aarhus clinic in Denmark, St George Hospital in Australia, AZ Zeno in Belgium, Hôpital Riviera-Chablais in Switzerland.

*Sources: WHO, European Centre for Disease Prevention and Control, US National Library of Medicine, International Journal of Environmental Research and Public Health, American Journal of Infection Control, Asian Pacific Journal of Tropical Biomedicine, Robert Koch Institute, German Society of Hospital Hygiene, Professional Association of German Surgeons.

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Expertise
in Cable Manufacturing

Good for your project: Cables tailored exactly to your undertaking in unmistakable R&M quality.

There should be no compromises when it comes to FO cables. They are going to have to transport immense amounts of data without loss in the coming decades. It is therefore important to have verifiable manufacturing quality.

For R&M, verifiable manufacturing quality means the fiber(s) in the cable core should be able to be kept stress-free regardless of the type of mechanical or climatic influence. The R&M cable plant in Děčín, Czech Republic, provides this proof with its 15 ISO, EN and IEC certificates and 68 performance declarations.


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The R&M cable plant in Děčín, in the north of the Czech Republic

R&M standard cable range

The R&M plant offers a complete portfolio of stranded and unstranded standard cable types. Some outstanding products:

– FiRis cables for strict requirements in terms of fire behavior in accordance with CPR Cca, B2ca, EN 60332-3, EN 60331-25 and IEC 60794-1-2
– Dry, gel-free, longitudinally watertight loose tube installation cables for efficient inner cabling, especially in the riser zone
– Cost-effective, application-optimized drop cables for house connections for blowing into buried installation pipes or as air cables
– Steel-armored cables to endure the toughest mechanical loads as well as provide protection against rodent attacks glass roving in several layers of thickness and fiber-reinforced plastic rod armored cables
– Cables specially tailored to R&M connectors and their crimping for high performance and premium applications
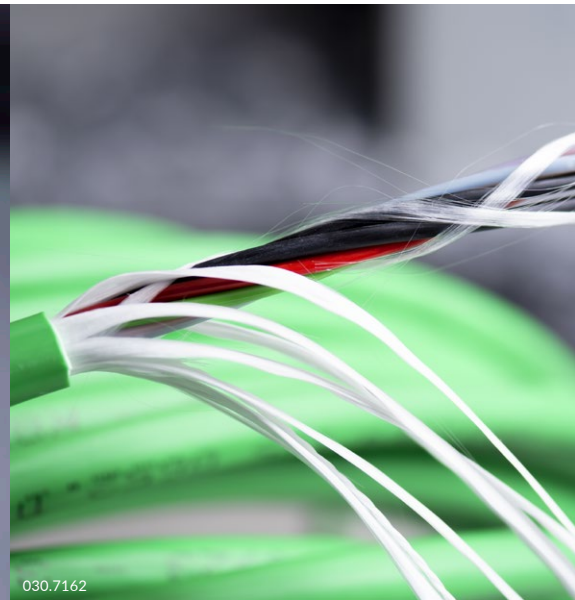
Special constructions

Another of today's typical needs: Projects require their own cable constructions, assemblies or completely pre-terminated cables in fit-for-purpose lengths. This is one of the areas in which the R&M plant can put its capabilities to the test. It can cater to customer requirements and manufacture cable constructions which fit exactly.

R&M is known for constant innovation. And this also applies to the cable plant. The focus is currently on cables for specific installation methods. They will simplify installations and help to reduce installation costs. Furthermore, R&M is optimizing the blow-in and pull properties of the installation cables.

Developments to optimize fire behavior are also planned. They contribute to increasing the safety of both people and infrastructures. Currently the range is being expanded to incorporate cable constructions based on 0.6 and 0.9 mm compact fibers.

For more information, take a look at our recently published blog post series:
https://blog.rdm.com/category/solutions/

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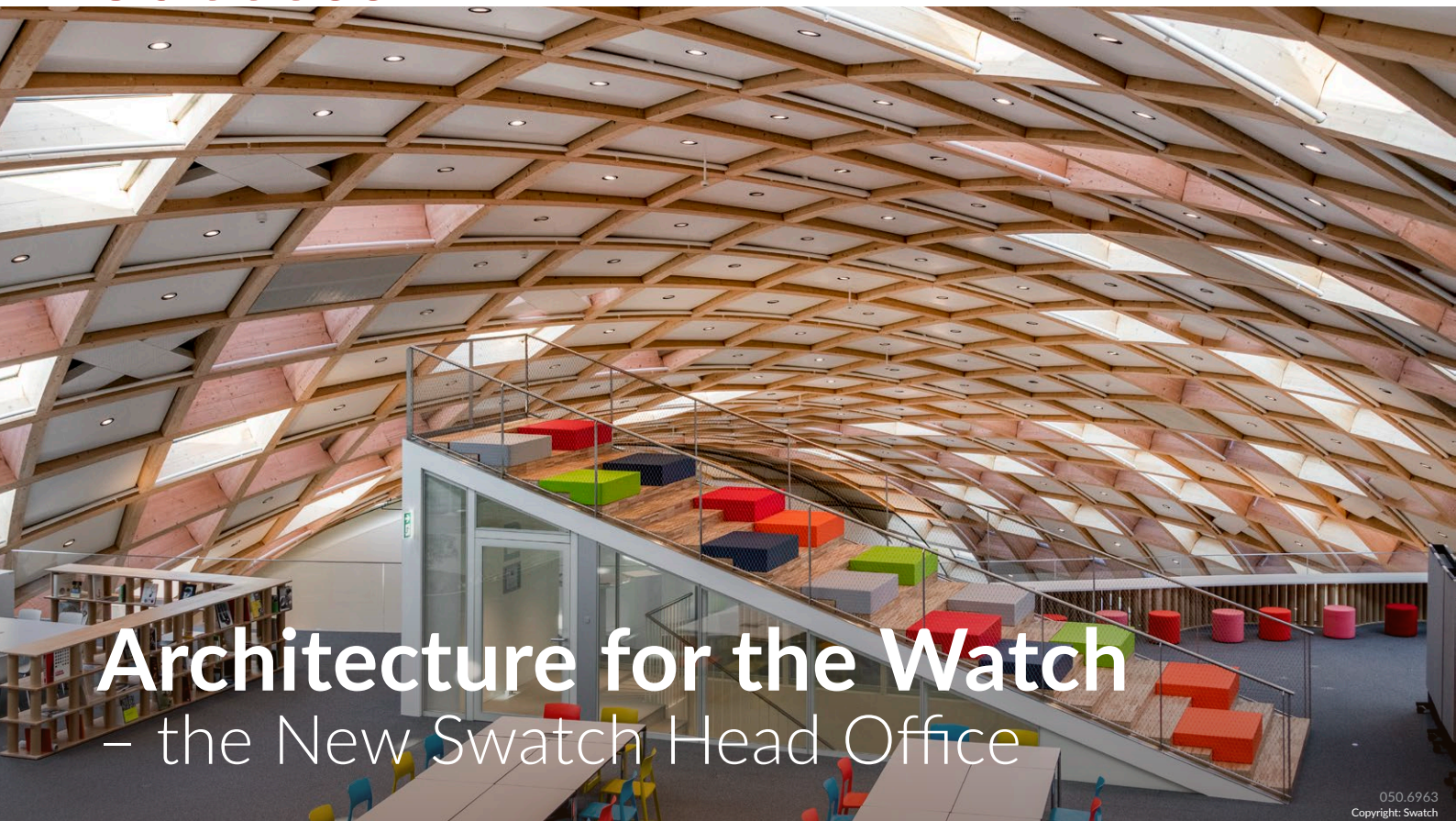
Architecture for the Watch
– the New Swatch Head Office

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Copyright: Swatch

The name stands for fascinating creativity, paired with Swiss technology: Swatch. The watch brand has been setting the pace since 1983 when it comes to unconventional design. Now, Swatch has been given an equally imaginative new head office. Here, architecture and building services are setting new standards.

The Swatch headquarters in Biel, in the French-speaking part of Switzerland, is one of the largest wooden structures in the world. It was designed by the Japanese architect Shigeru Ban. The masterpiece was officially opened in October 2019 by Nayla Hayek, Chair of the Board of Directors of the Swatch Group, Nick Hayek, CEO of the Swatch Group, and the star architect himself.

The shimmering, curved silhouette of the Swatch building extends over a total length of 240 meters and a width of 35 meters. Around 2,800 honeycomb elements, including 442 curved solar elements, form the facade. At its highest point the facade measures 27 meters.

Reflecting the spirit of the brand
The scale-like design breaks with the conventions of classic office building architecture. The curved entity blends harmoniously into the metropolis of the Swiss watch industry. Like a work of art, the interpretation lies in the eye of the beholder. Shigeru Ban convinced the jury with his original yet pragmatic concept and his ability to reflect the creative spirit of the brand in the building.

The vaulted facade rises toward the entrance. It straddles the street and rests its head on the Cité du Temps, home to the museums of the two famous Biel watch brands, Swatch and Omega. This is where the Planet Swatch and the Omega Museum are waiting to welcome design and technology fans from all over the world. Both exterior and interior of the building are interspersed with a variety of leitmotifs, with curved shapes, colors and transparency, as well as with classic materials and building elements.

An ornate grid construction made of Swiss spruce forms the basic structure of the 11,000 m² shell. It spans five floors with a total of 25,000 m² floor space. The architect chose wood because of its ecological and sustainable qualities. Wood can also be processed flexibly and cut to extremely precise sizes – important properties for a construction where every millimeter is important. 3D technology helped the planners to define the shapes and positions of the approximately 4,600 beams.

Creative electrical planning
The aesthetic goals and architectural dimensions were challenging not only for the civil engineers. The electrical planning also had to find creative ways to cleverly integrate building technology, photovoltaics, bus and data network cabling into the wooden construction.

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«Due to the wooden grid construction of the roof, along which we had to discreetly run the cabling, it was impossible to find short, straight cable paths. We had curves and innumerable corner points to take into account.»

Nicolas Schmutz, Project Manager, Etavis Jag Jakob AG

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Copyright: Swatch

Infrastructure for 10 Gigabit

Anyone combining creative design with perfect watch movements and maintaining a globally outstanding brand moves a lot of data. This is why the project team created all the prerequisites to meet Swatch's requirements in terms of infrastructure.

In the background, a fiber optic backbone connects the individual floors with the central IT, enabling a speed of 10 Gigabits. The horizontal level of the data and communication infrastructure in the new head office comprises shielded Cat. 7_A cables. For the telecommunications outlets, the project team opted for the shielded Cat. 6_A EL modules from R&M. The fact that they are simple to handle facilitated the installation work. Thanks to the cabling, a connection speed of up to 10 Gigabits can be achieved at the workstation if necessary.

A KNX bus infrastructure networks the building automation. This integrates the heating and cooling system, shading automation via LON bus, lighting, security and fire protection system. The energy concept is based on solar technology and the use of groundwater. It allows ventilation, cooling, heating and basic lighting to be operated autonomously for both the main building and the Cité du Temps.

From Velospot bicycle sharing and charging stations to intelligent blackouts and glazing, from LED lighting and highly efficient ventilation systems to thermal component activation and paperless offices: Thanks to state-of-the-art technology and extensive know-how, the new Swatch building demonstrates that modern construction and modern ways of working can be in harmony with nature.

Project manager Roland Hochstrasser from HKG Engineering AG talks of the task with respect: «The demands of the architect on the design were enormous in all areas.»

Experts from several countries and cultures cooperated to complete the work of art on the technical side. They brought in different standards and concepts, all of which had to be harmonized. The coordination between the various trades had to be continuously adapted. Design, functionality and layout also had to be agreed individually. For example, the positioning of all appliances and elements such as outlets, lighting, access roads, smoke alarms and loudspeakers had to be discussed in detail.

«The coordination of access and the positioning of the appliances in the facade area was also a very challenging task. We certainly didn't want the cabling to be in evidence. The wooden construction could only be crossed at predefined points,» explains Roland Hochstrasser.

Discreet cabling

Etavis Jag Jakob AG was tasked with providing power, bus, communication and LAN cabling. «The installations were not easy to plan due to the special structure of the building,» reports project manager Nicolas Schmutz. He confirms what Roland Hochstrasser says of the project: «Due to the wooden grid construction of the roof, along which we had to discreetly run the cabling, it was impossible to find short, straight cable paths. We had

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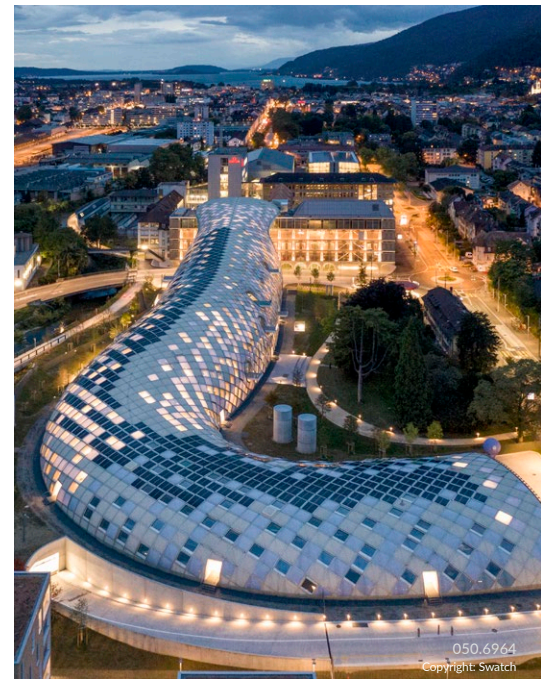
curves and innumerable corner points to take into account. This could only be achieved after detailed on-site inspections.»

Along with the constructional requirements, the electrical contractor was also confronted with design tasks. Nicolas Schmutz: «All fixtures, such as outlets, smoke alarms, temperature sensors and lots more, had to correspond to the architect's color concept.»

Sources: Swatch, HKG Engineering, Elektrotechnik (specialist magazine)

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All-Rounder
Polaris-box

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The Polaris-box family from R&M is getting ahead on a global scale. Now it is supporting the Indian metropolis of Gurugram on its way to becoming a smart city. Today, R&M customers use Polaris-boxes in all kinds of different situations. The boxes have proven to be genuine all-rounders.

Polaris-boxes from R&M are used to flexibly expand, distribute and terminate fiber optic networks. The outdoor boxes are typically used in the access network. They are available when it comes to connecting sites of any kind to the fiber optic network. These include residential buildings and housing estates, business and office centers, hotels, hospitals, industrial plants and even a university campus.

In Gurugram, Polaris-boxes will connect more than 160 government buildings and public institutions with a command and control center in the future, creating the infrastructure necessary for a smart city. In smart buildings, Polaris-boxes are suitable for cabling building entry points, risers and floor distributors and for the final fiber termination outlets.

Telecom providers worldwide are connecting a growing number of mobile communication antennas to fiber optic networks (Fiber to the Antenna, FTTA). Polaris-boxes will also prove to be a robust and flexible transition point in this sector.

All requirements satisfied

Customers confirm that Polaris-boxes meet all typical needs occurring outdoors during network expansion. Above all, they remain flexible in terms of investment planning.

The modular principle makes it possible to configure Polaris-boxes for any topology and market situation. R&M applies the one-fits-all concept. The boxes accommodate everything network operators need in the access network: drop cables or subscriber and patch cords, fiber or loose tube storage, fiber modules for trays, patch, splice and splitter assembly.

The configuration of a Polaris-box can be changed or densified as required. Adapters, splice trays and splitters can be assembled, retrofitted or replaced in just a few easy steps. This allows FTTH providers to migrate new subscribers, broadband technologies, services and applications to the network even years after the initial installation.

For four to 72 subscribers

The now complete Polaris family from R&M consists of five types. The configuration options of the multifunctional fiber optic connection boxes:

Polaris-box 4: 2/4 adapters, 12/24 splices, 2 splitters (split ratio 1:4)

Polaris-box 6: 6 adapters, 12/60 splices, 3 splitters (split ratio 1:8), option for 48 additional splice connections with 4 FMTS trays

Polaris-box 16: 16/24 adapters, 24 splices, 2 pre-terminated LGX splitter modules, 3 splitters (split ratio 1:8 or 2:8)

Polaris-box 24: 24 adapters, 144 splices, 6 splitters (split ratio 1:8), 12 Tray Position Units (TPU) for splice or splitter trays and fiber tray, cable entries for 8 round cables or drop cables

Polaris-box 36: 36 adapters, 288 splices, 9 splitters (split ratio 1:8), 24 Tray Position Units (TPU) for splice or splitter trays and fiber tray, cable entries for 12 round cables (ø 16 mm) or drop cables

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Digitalization: Closer to the Customer

What could replace a personal visit from a representative of R&M? Particularly in a year like this one, which has been dominated by the coronavirus pandemic, it has become clear that nothing can beat direct contact in sales and marketing. At the same time, the pandemic has also revealed what digitalization can achieve. R&M is further professionalizing its business processes.

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Market Segments
Data Center
Local Area Networks
Public Networks
Components Business

Supply Chain
Delivery Time Tracking
Stocks
Measurement Data

Digitalization @ R&M

Offerings
Complete Connectivity
Value
Products and Solutions

Customer Journey
Webportal, Webshop
Solution Configurator
Marketing Automation
Campaigns, Blogs

Successful sales people enjoy a high level of trust. Customers share with them many details of their business, their everyday life and their projects. And sales people are very careful with information imparted to them. They maintain the information to have a precise profile of each individual customer and can thus respond optimally to their needs.

The idea of the trustworthy, well-informed sales manager forms the basis of marketing automation in the R&M digital concept. R&M has set up a CRM system over the past few months that automatically gains insight into the market, customers and interests. It evaluates internal and external sources, and enriches them with further qualified data. This data includes user profiles, search processes, web interactions and other criteria that customers voluntarily share with R&M.

R&M stores this data as securely as in a Swiss vault and strictly in accordance with the rules of the European General Data Protection Regulation (GDPR).

R&M can use data analysis to purposefully design and tailor campaigns, offers and blogs to suit individual customer needs. Existing customers receive selected knowledge that serves to create value. Interested parties can be addressed accurately and turned into new customers. Unsolicited advertising mail is out, but personal contact is very much desired.

R&M webshop up and running

In addition to marketing automation, the webshop is the focus of R&M's digitalization concept. Following the successful launch in Switzerland and Germany, customers in other regions in Western Europe will be able to access this service in the coming months.

In their own account, customers can order standard products as well as configured assemblies in just a few clicks. The R&M ERP system, in which the shop is embedded, processes the orders automatically and forwards them to the connected production facilities. In addition, customers are shown their order history, net conditions and stock levels which makes for simpler order processes. In the future, the webshop will also support complex topics and solutions with suitable application examples.

On request, the shop will forward an inquiry to the regional R&M sales organizations, ensuring that personal contact and individual advice are maintained.

«Well-thought-out, meaningful digitalization creates space for more personal customer contact.»

Andreas Rüsseler, CMO R&M

050.6909

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Direct
Mounting

The R&M outlet family is growing, and is more flexible and easier to assemble than ever before. All outlets can be combined on a modular basis. They route copper or fiber optic cabling or both media together.

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The surface-/flush-mounted 60x60 outlet is extending the versatile R&M outlet family.

A new outlet in 60x60 mm format is now extending the R&Mfreenet range. The surface-/flush-mounted outlet combines sensitive design, Swiss quality and advanced installation technology. Together with the new 60x60 outlet, the outlet types Direct Attach (DA) and Fiber Optic (FO) create an enormously versatile family with a whole range of possible uses.

Lots of combinations
As is the case with the other members of the family, all modern adapter categories fit into the two holders of the new surface-/flush-mounted 60x60 outlet: Cat. 6$_A$, Cat. 8.1, LC Duplex. The DA outlet already launched goes one step further. It also supports the classic categories Cat. 5 and Cat. 6.

In all cases, the copper and fiber optic modules can be used individually, in pairs or combined side by side. The fiber optic variant in 60x60 format supports splice, breakout and OTO cabling. Thanks to the combination options, R&M outlet boxes can be used universally for local communication and data networks in apartments, offices, shops and commercial premises.

The new surface-/flush-mounted 60x60 outlet fits all standard formats. It can be attached to the 52 mm base plate and thus easily combined with other members of the outlet family. The outlet family offers all typical installation variants: surface-/flush-wall-mounting with the dimensions 88x88, 74x74 and 60x60 mm, channel installation with dimensions of 80x86 mm, round format Ø 62.5 mm, wet surface-/flush-mounting and FLF installation.

A few easy steps
Professionals appreciate the easy-to-install construction of the R&M outlets. For assembly, they require only a few steps and no screws or support plates. The modules fix automatically. Grooves in the module housing snap directly into the holder. The new mounting technology developed by R&M is called Direct Attach (DA).

The DA holder with 360° pressure distribution and tolerance-free guidance compensates for cable tension and pressure. Contacts and the plug face cannot tilt.
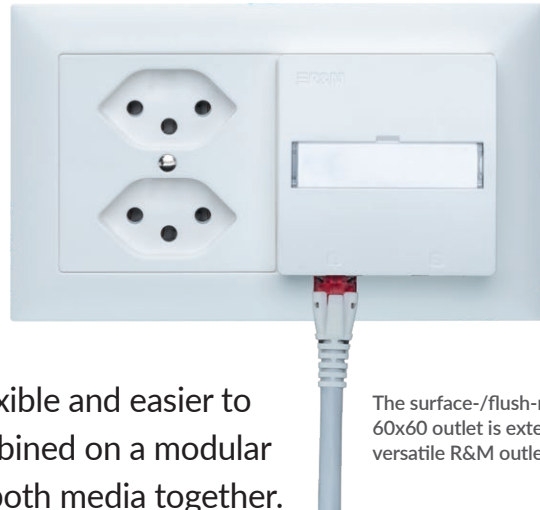
Once installed, the bodies of the outlets remain in the wall. For all other work, the panel enables access to the front. Modules and circuitry can be easily accessed.

Safe management
Clear marking facilitates network management. Numbers over the RJ45 slip-in windows and the label in the lid ensure clear assignment to the participants.

Fundamental elements of the R&M security system, such as color sleeves and lock, can also be used. They provide additional security.

The jacks of all 60x60 outlets are vertical. They route the patch cord straight down. This prevents the cables from shearing off. The transmission performance remains stable.
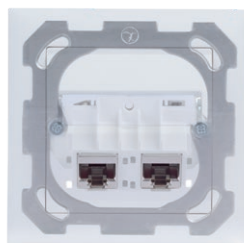
R&M set great store by elegance in construction. The format and design of the outlets correspond to the Feller / EDIZIOdue program.
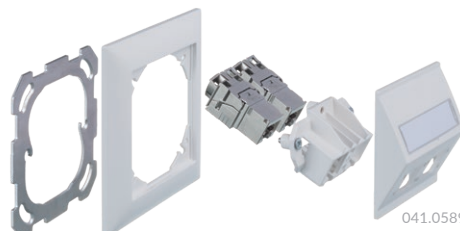

Link to the video
R&M YouTube Channel

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Connection modules can be attached at the outlet with a single click thanks to the Direct Attach assembly technology from R&M.
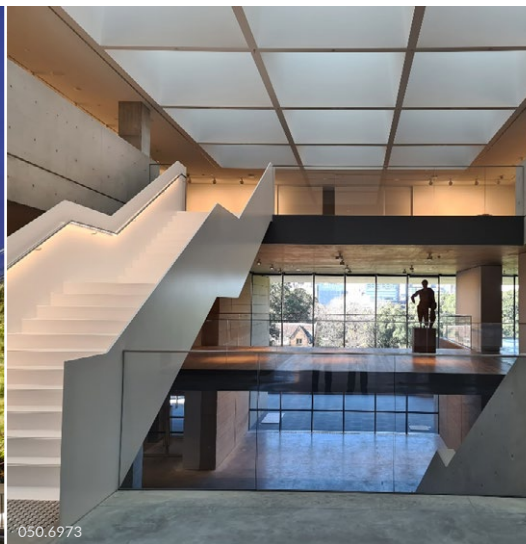

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Connectivity for
Sydney's Newest Museum

The University of Sydney was founded in 1850, making it the oldest university in Australia. It is also one of the most popular universities in the country and is regularly ranked in the world's top 50 educational institutions. Being one of Australia's leading universities for graduate employability, it has ranked first in the country for the past five years.

Sydney University has a brand-new museum named after Dr Chau Chak Wing, which brings together the largest collection of antiquities in the Southern Hemisphere. For the first time the museum will display objects from the University's Nicholson, Macleay and Art collections under one roof. These extensive collections comprise more than 440,000 collection items and the museum will allow the university to display three percent of its total collections at any one time.

The location had a significant meaning for the Aboriginal Gadigal people of the Eora nation for thousands of years as a gathering place and hunting ground, and this long history will be acknowledged and explored within the museum.

Given the prestige of the project, its intricacies and unique requirements, this was a substantial undertaking for the R&M certified installer

QVR Communications but was easily and competently completed on time by the team.

Customized connectivity solution

R&M engaged with QVR Communications to ensure an easy delivery of the project from the start. QVR Communications utilized R&M's Easy-Lock Cat. 6_A EL shielded solution for 1,500 Class E_A links to ensure speedy termination and a reliable testing outcome on site. Due to stringent vendor management, the University of Sydney also required a customer-specific R&M patch panel. This suited the University's very specific labelling requirements.

The University of Sydney is enjoying the benefits of a customized R&M solution, delivered in a timely and professional manner by QVR Communications. Ross Robertson, Project Manager at QVR Communications:

«The service from R&M was unlike anything I have seen from a vendor in quite some time, and the ease of use of the product and the U/FTP cable utilized were the best I've dealt with in a while!»

R&M Australia are proud to partner with QVR Communications on various projects, especially those that require the level of detail they can provide.
www.sydney.edu.au/museum/about-us.html
www.qvrcom.com.au

«The service from R&M was unlike anything I have seen from a vendor in quite some time, and the ease of use of the product and the U/FTP cable utilized were the best I've dealt with in a while!»

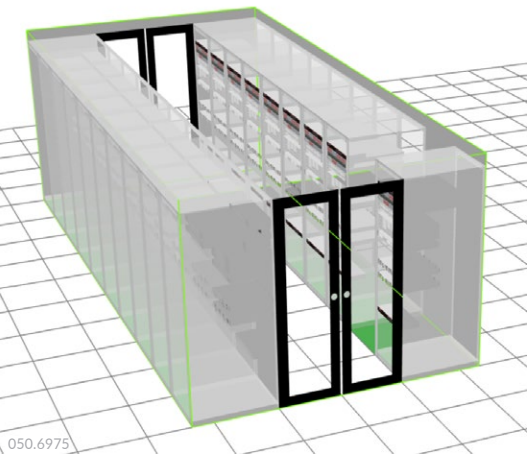*Ross Robertson, Project Manager, QVR Communications, Australia*

050.6110

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inteliPhy net 3.0
is coming

R&M is equipping the management software inteliPhy net with further functions. Release 3.0 gives data centers more control over relevant infrastructure data.

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In data centers, Power Distribution Units, environmental sensors, switches and other devices produce a whole host of information and measured values. Operating a data center based on these values offers a number of advantages for managers, administrators and technicians. However, the various, distributed devices are not all that easy to manage. It is even more difficult to extract the most useful and valuable information from the complex data sets.

inteliPhy net 3.0 facilitates this work. It collects information from PDUs, UPSs and other network devices that have an SNMP protocol interface. With inteliPhy net 3.0 it is easy to specifically select the most relevant data, display it clearly and raise an alarm in the case of an error. Configurable dashboard widgets and other features allow users to interact with data in new ways.

A major advantage for data center managers is that they no longer have to spend hours poring over tables. The required KPIs are available at the click of a mouse – based on the latest data. This gives them better insight and more control over their data, thus strengthening every aspect of their management.

Metamodels

In inteliPhy net 3.0, users can create metamodels. A metamodel can comprise a complex pre-configured device with various plug-in cards or a completely assembled and wired cabinet. One simple step is all it takes to integrate a complete metamodel into an existing data center. The arduous construction of cabinets from individual components is no longer necessary, thus massively increasing efficiency and eliminating sources of error.

ODF fully configurable

As a developer of FO distributors for data centers, R&M also implements this know-how in the software. inteliPhy net 3.0 contains tools with which ODFs can be fully configured and visualized. The new function is suitable, for example, for planning infrastructures for 19" and ETSI-based meet-me rooms.

050.5558

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Smart Networks
via the Cloud

Smart networks are helpful tools for data centers. But anyone wanting to introduce a smart network can decide how it is to be implemented and designed. There are two approaches to be compared.

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Like many other services, the IoT layer of the smart network architecture can be configured in-house or via the cloud. As is often the case, for data centers it is important to ensure that production is as efficient as possible right from the outset. When it comes to IoT, anyone wanting to work exclusively in-house and on internal servers will lose important efficiency advantages. This is certainly the experience of R&M.

The benefits of IoT will definitely increase if it can be configured and adapted as easily as possible. The principle of simplicity, clarity and comprehensibility is unbeatable.

But what does «simple» mean and what increases the benefits? R&M predicts that in the future this will be the step into the cloud. Everyone is assuming that the IoT hardware will be able to connect to the cloud. Here, a suitable, uniform interface will bring everything together. This is where those responsible will configure, visualize and monitor their IoT layers. This is where they will organize updates, audits and much more. Installations on clients and internal libraries will become obsolete.

A comparison: The digital devices in a Smart Home – that would be the IoT components in a data center – can be conveniently merged in the cloud, and configured and operated centrally using tablets. The advantages: self-explanatory processes, low entry barriers, fast acceptance. Everything is simpler.

Security and performance

The development of a cloud solution based on smart networks shows what is particularly important in this approach.

Along with the intuitive operation of an interface, security is essential. But security does not have to be complex because there are plenty of tried and tested open standards. These include TLS and other open standards, the security technology for online banking and credit card transactions.

Over and over again, the industry demonstrates proprietary protection concepts based on the credo «security through obscurity». But such concepts are in fact anything but transparent for users. They are out of the question. Similarly, data center providers should exercise caution if a provider is not

clearly committed to open standards and protocols. This limits the interoperability of the systems and can result in security gaps remaining open for a long time.

Finally, performance must be taken into account. Management systems often prove to be cumbersome and thus less useful than they might be. And in fact bottlenecks can be prevented right from the design stage. It would seem obvious to fall back on simple and open standards, such as HTTP/HTTPS and MQTT.

Two further arguments show the benefit of the cloud approach: Flexibility and centralization. A cloud platform can quickly integrate other DCIM tasks, such as asset tracking or MAC planning, due to its flexibility. Operators can centralize in the cloud with smart networks of several data centers or decentralized edge data centers.

«The principle of simplicity, clarity and comprehensibility is unbeatable.»

050.5774

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050.6978

Fiber Optics Accompany
Highway A1

In the future, a beacon project of the Swiss Federal Roads Office (FEDRO) is to free the A1 Highway north of Zurich (Zurich northern bypass) from traffic jams. The Federal Roads Office (FEDRO) is investing in expanding the section over a period of several years. Additional lanes and extra tunnel tubes alone cannot optimize traffic flow sufficiently. The flow of information is crucial.

On workdays, up to 120,000 vehicles are to be found on the section of around seven miles between Weiningen and the Zurich-Nord intersection of the Zurich northern bypass. This section is one of the busiest roads in Switzerland. There are traffic jams here virtually every day. And the volume in traffic will continue to rise in the coming years.

This is something the Swiss Federal Roads Office (FEDRO) wants to change. It is extending the Zurich northern bypass continuously to have at least three lanes in each direction by 2025. The project also includes the following tunnel construction measures: Complete redevelopment of the first and second tubes of Gubrist, new build of a third tube for Gubrist, a new underpass at Katzensee as well as the redevelopment of the Stelzen Tunnel. The work also includes an increase in the number of lanes, a complete renewal of the operational and security systems, as well as an efficient communication infrastructure for video, voice and data signals.

Cablex AG has been commissioned by FEDRO to ensure on-schedule completion of the physical fiber optic communication infrastructure. R. Brüniger AG is responsible for the planning. Both companies have decades of experience in this area.

Efficient traffic management
However, expanding the existing infrastructure is only one means of optimizing traffic flow. With an efficient traffic management infrastructure, road space is to be used even more efficiently and intelligently. «Smart Road» is the name traffic planners have given their vision. Cameras and other sensors will be used to collect information on traffic conditions directly along the route; this will then be displayed in the traffic control center in Letten and the traffic management center in Emmenbrücke.

With the help of this traffic data, the traffic control system will set operating conditions, such as speed limits or, in the event of an accident, lane closures. For the motorist,

some of this data can be seen on the Internet or will be used in navigation applications to find the perfect route.

The FEDRO relies on such scenarios and thus ensures an efficient flow of information in transportation. Proprietary fiber optic data and communication networks for transit, object and field level accompany the national road network.

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Zurich northern bypass

In 2022, FEDRO will be opening up the third tube of the Gubrist Tunnel to traffic.

«The network on the Zurich northern bypass will still be fulfilling the specified technical and capacity requirements in 20 years' time.»

Enos Pizio, Project Manager, Cablex AG

The FEDRO has been creating the networks with singlemode cabling for a long time now and is internationally considered a pioneer in this field. Several hundred thousand miles of fiber optic cable are located in the cable conduit systems along the roads and in the works management tunnels. This is complemented by access, distribution and connectivity technology in underground and above-ground cabinets, electrical rooms and operations control centers. The infrastructure must be able to withstand harsh environmental conditions, such as vibrations and high temperature differences.

In the case of the Zurich northern bypass, R&M is providing an FO range specially designed for traffic projects. The requirements of FO components specified in the FEDRO specialist manual as well as in the standards of territorial unit VII are fulfilled by the R&M products and are proving themselves in various Swiss tunnels and traffic systems.

Specific R&M range

«The R&M range for tunnel and road construction offers a number of advantages. In this case, too, the program was precisely tailored to the requirements and standards defined by FEDRO and the Zurich Cantonal Civil Engineering Office for the northern bypass,» says Armin Pramstaller, former Cablex site manager, explaining the preference.

Enos Pizio, project manager at Cablex AG, has the following to say on the quality, sturdiness and the level of development of the solution: «The network on the Zurich northern bypass will still be fulfilling the specified technical and capacity requirements in 20 years' time.»

Smooth-running logistics

Along with the product quality and specific range, the service quality also plays an important role in the expansion of the Zurich northern bypass. Armin Pramstaller explains: «Logistics also plays an important role for site managers and assemblers. The material must be available at the right place at the right time in order to keep the slots.»

To guarantee a smooth-running delivery service, R&M also provides unconventional solutions. In this case, whenever necessary, an employee had the goods ready at six o'clock in the morning so that the site manager could pick them up directly on his way to work. This shortened transportation routes and delivery times. Armin Pramstaller: «I can phone R&M whenever I have to if it is urgent. There's always someone there to help me. The communication and collaboration are excellent.»

Information
on the project:

R. Brüniger AG
Engineering & Consulting

The R&M range for tunnel and road construction

R&M provides a specific cabling range for FO data and communication networks in transportation. The range includes:

– Splice closures which can be permanently situated under water (protection class IP68)
– Strengthened sub-racks for splice distributors
– Patch panels and patch cord trays made of aluminum plate
– Slim-line metal fiber divider boxes
– Fiber modules, splice trays with metal front panel
– Pre-terminated Varioline and breakout cables
– Patch cord organizers with rubber clips for tension relief (instead of cable ties which could negatively affect the performance)
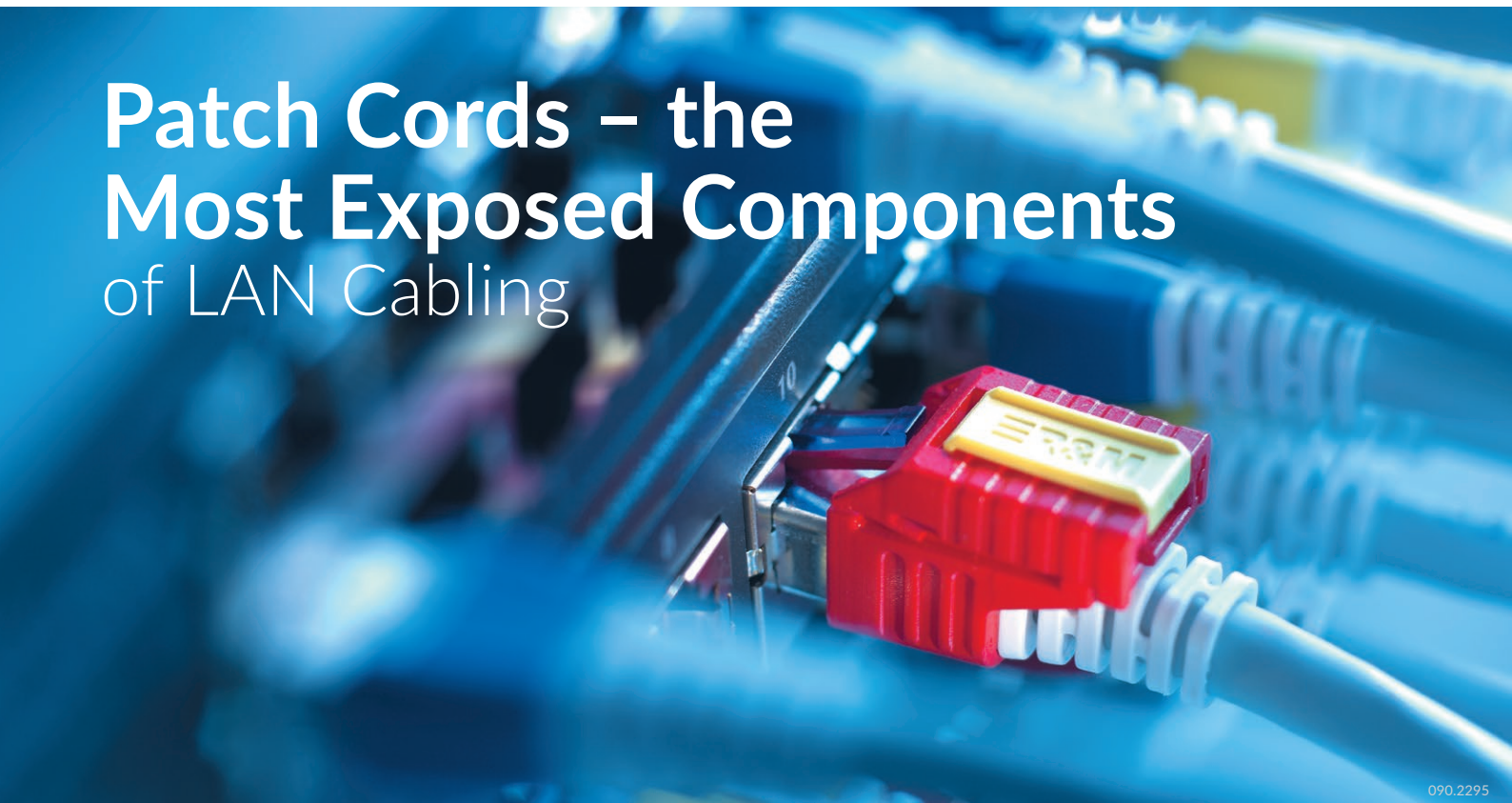
R&M has also developed pull-out shelves, deflection rollers and cabinet mounting kits for application-specific FEDRO network cabinets.

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Patch Cords – the Most Exposed Components
of LAN Cabling

090.2295

They are the tangible link between an IT device and the LAN: patch cords! The more high-capability terminal equipment there is in the network, the more important the patch cords become. However, each use case scenario has different requirements. A whole range of different criteria has to be taken into consideration to ensure the right patch cord is chosen.

It is hard to believe just how much patch cords have to take. They suffer daily from mechanical stress due to handling and unwanted mishaps. In many applications, patch cords are also exposed to harsh environmental conditions, such as heat, dust, sunlight and humidity. And when you add Power over Ethernet (PoE) to the mix, cables and connectors are exposed to thermal stress because of the current flow.

Patch cords age quickly, but they should still guarantee absolutely interference-free transmission. At the same time they should be as thin and flexible as possible in order to achieve a high packing density and good handling.

Conclusion: Patch cords are not just any piece of cable with two RJ45 plugs. They are actually the most exposed components of LAN cabling. And as is the case with a chain, the whole is only as strong as the weakest link in a LAN.

Choosing the right patch cord
First of all there is the question of the use case scenario and environmental conditions. The more demanding the transmission, the more powerful the patch cord should be. Sources of interference from the surroundings influ-

Insulation displacement contact (IDC) or insulation piercing contact (IPC)

With **IDC**, the conductor is fixed between the contact halves of a spring contact. The contact halves cut through the insulation, press resiliently on the stranded wire and thus establish the contact. The contact resistance and transmission properties of an IDC connection remain permanently low and stable. IDC is the optimal basis for using Power over Ethernet with high currents in continuous operation.

R&M is one of the pioneers of IDC technology for RJ45 patch cords. R&Mfreenet cables are exclusively equipped with IDC wiring. In the case of **IPC**, a metal tip pierces the core insulation and makes the connection to the stranded wire. This method is state of the art and economical, but does have certain disadvantages. The contact resistance becomes uncontrollably worse over time due to aging and environmental influences.

Piercing technology cables are therefore not recommended for Power over Ethernet transmission over long periods of time and at higher power levels.

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ence the choice of cable construction. The question as to whether PoE is to be used on a broad basis is becoming increasingly important. When this is the case, the only patch cords that should be used are those which can transfer the amount to be transmitted for the entire service life (powerSafe).

Added value with R&M*freenet*

The universal and flexible patch cord R&M*freenet* is the appropriate product for the various areas of use. R&M*freenet* cables demonstrate the very best quality, sustainable system margins and application-oriented features. The optional security system enables consistent color coding and plug-in/plug-out protection to avoid errors in operation without additional logistical costs. The conductors in the connectors are wired exclusively using insulation displacement technology, IDC: in other words, powerSafe wiring.

Solution for simple applications

For areas of application which do not require the added value of the R&M*freenet* patch cord, R&M offers the new patch cord family R&M*classic* in select markets. The concept of this patch cord family is based on IPC (insulation piercing contact) and has an attractive price/performance ratio.

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Criteria for selecting copper patch cords

– Planned transmission performance: 1 or 2.5 or 5 or 10 Gbit/s --> category: Cat. 5e, Cat. 6 or Cat. 6_A
– High-performance or continuous PoE --> powerSafe
– EMC environment: cable construction, shielding: S/FTP, S/UTP or unshielded (U/UTP)
– Handling: diameter, wire cross-section, bending radius, cable flexibility
– Sensitivity of the application, required capability: wiring technology, tension relief, connector construction
– Fire behavior: plastic cable jacket
– User convenience and error avoidances: color coding, security systems
– Availability, logistics
– Price/performance ratio

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PoE optimized
PowerSafe
IDC inside

050.5749

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FO Field
2020 Range

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Optical fibers are the future of information technology. They bring ultra-fast data transmission to every home and office. The market, however, is looking for pragmatic, simple, universal, cost-effective and fast solutions.

R&M fulfills these wishes with the FO Field. The plug can be connected with a fiber optic cable in no time at all. This makes it possible for professionals on site to spontaneously and independently provide an FO connection without complication at any location.

High transmission performance
The FO Field is available as an LC or SC connector with APC or PC contact, and comes in green, blue and beige.

The mechanical and optical properties correspond to the quality of prefabricated and factory-tested connectors. The FO Field fulfills the transmission requirements of the singlemode performance levels Grade Cf/1 (APC) or Grade Cf/2 (PC) and the multimode performance level Grade Bmf/3.

The FO Field is compatible with all types of cables with diameters of between 1.4 and 3 mm. A modified type suits butterfly cables or drop cables. Its stability means it can be used in the uncontrolled area (-25 °C to +70 °C).

More Ports
with the QR Formula

The road to 400 Gigabit Ethernet is clear. R&M has done everything in its power to enable data centers to upgrade and consolidate their network infrastructures. The family of fiber optic QR connectors also contributes to this.

QR connectors from R&M make it possible to increase the number of FO ports per rack height unit by 50 to 60 %. A push-pull mechanism means no distance has to be kept between the adapters any more. This allows the ports to move closer together and more fibers can be connected in the available space. This facilitates migration to 400 Gigabit Ethernet.

MPO and LC family now complete
The QR family is now complete and includes LC and MPO connectors. With the MPO-QR launched in 2020, the packing density can be increased to up to 120 ports per height

unit. The MPO-QR is compatible with readily available MPO/MTP® connectors.

The LC-QR duplex also enables a packing density of 120 ports per height unit or 10,080 fibers per network cabinet. The LC-QR simplex is R&M's most compact LC connector. With it, packing density increases by 60 % to up to 96 connections per ¾ rack unit.

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Corporate

Single Pair Ethernet

System Alliance
Founded

Together with other international technology companies, R&M has co-founded the Single Pair Ethernet System Alliance. The goal of the alliance is to drive forward the development of Single Pair Ethernet (SPE) for the Industrial Internet of Things (IIoT) and building automation.

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Single Pair Ethernet opens up unimagined possibilities for building, process and industrial automation. The idea: A thin two-core cable transmits the Ethernet protocol over distances of up to 1,000 m. This enables barrier-free Ethernet/IP communication from the sensor to the cloud. Proprietary field buses will become obsolete. The same line can be used to power the terminal equipment, something known as Power over Data Line (PoDL).

Creating a broad base

The Single Pair Ethernet System Alliance aims to put the topic of SPE for industrial applications on the broadest possible base. Acceptance of the technology is to be promoted by demonstrating cross-sector all-in-one solutions with SPE. This is the only way it is possible to quickly bring SPE solutions to market.

The founding members include R&M, Phoenix Contact, Weidmüller, Fluke Networks and Telegärtner, with the alliance now totaling fourteen manufacturers. The companies are producers of sensors, cables, connectors, measuring equipment and semiconductor chips as well as network devices.

The industry is showing great interest in SPE. However, it is still waiting to see which solution approaches establish themselves in

standardization as well as among user groups such as PROFINET.

SPE connectors for industry

Among other things, current deliberations are focusing on the plug face for the industrial variant of SPE connections. In the standard series IEC 63171, the mechanical, electrical and environmental requirements are specified with the associated tests. Currently, five different plug faces are being standardized. For industrial applications, two variants are in the running: IEC 63171-5 and IEC 63171-6. It is not yet clear which of these two connector systems the various user groups will prefer.

Experts, however, are assuming that a plug face for the round M8 plug housing will prevail. The M8 format with a screw thread is particularly suitable for harsh environments. It should be possible to continue to use existing M8 interface variants.

In the building automation environment, IEC 63171-1 with an LC-similar plug face seems to have the edge thanks to the fact that it is mentioned in the ISO/IEC 11801. However, IEC 63171-2 could also migrate from the industrial sector into this application as an IP20-compatible version of IEC 63171-5.

The next few months will show which combination of properties of an ideal connector

system will prevail in the different application areas. The Single Pair Ethernet System Alliance is the ideal platform for these kinds of decision-making processes and discussions.

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Successful Data Center Migration
in Seven Steps

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A practical guide to help users gain insight into planning, physical infrastructure design specifications and strategy aspects that need to be considered before effective migration into a colocation data center may take place.

The new Colocation Migration Handbook from R&M will make particularly good reading for CIOs, Data Center Managers as well as IT and Facility Managers. As a dedicated partner and trusted advisor for networks all over the world, R&M knows the best approaches to deploying colocation data center infrastructures and is happy to share this knowledge.

The handbook is divided into seven chapters that cover the following topics:

– Understanding the requirements and
  planning the project
– Asset and application inventory
– Setting the framework and releasing an RFP
– Planning new infrastructure
– Pre-migration tasks
– Migration
– Post-migration

050.6593

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New Premises Opened
on the US East Coast

Following R&M's acquisition of Optimum Fiberoptics Inc. in Elkridge, MD, in 2019, the plant was modernized and opened at the beginning of June 2020 – by means of a virtual «Open House» event. The on-site ceremony will be held as soon as the pandemic rules permit.

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Video of the virtual «Open House»:
https://youtu.be/b59InV7KiQs

Image video R&M USA, Inc.:
https://youtu.be/f3f5ghYQZck

The new location is an important milestone in R&M's expansion from Switzerland to the USA, which began in 2016 with a first acquisition in Milpitas, California. The 10,000 square foot office and manufacturing facility in Elkridge will serve R&M's existing customer base in the East, South and Midwest, the rapidly growing data center markets in Washington, D.C., and Northern Virginia as well as all branches of the U.S. military with specific products.

The plant in Elkridge offers customer-specific, all-inclusive copper and fiber optic solutions in the usual R&M quality and will make a significant contribution to further expanding the range of local, global and customized products in North America. Through this year, all aspects of the customer facing experience will be unified throughout the USA to enable exceptional customer service.

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Twenty Years of
Cat. 6

R&M's Cat. 6 connection for data networks is celebrating twenty years of existence. The connections with the universal, space-saving RJ45 plug-in format were responsible for a quantum leap in information technology at the turn of the millennium.

On August 1, the Swiss National Holiday, R&M celebrated «20 years of Cat. 6», and in this context more than 100 million modules which have been manufactured over the last 20 years. The Cat. 6 connection revolutionized data traffic, brought broadband Internet to the workplace and pointed the way toward digitalization. The Cat. 6 technology made it possible to increase the speed of data transmission and raise bandwidth to 250 MHz. Since that time, quantities of data have been able to be transported in offices and buildings which previously would not have been conceivable. Even today, the Cat. 6 is still the most installed network connection worldwide. The resulting follow-up technology Cat. 6_A (Advanced) also enabled the leap to 10 Gbit/s Ethernet.

On the offensive at an early stage
From the outset, R&M was actively involved in Cat. 6 standardization and as early as 1999 went on the offensive, even before the transmission parameters were finally adopted. The company developed its own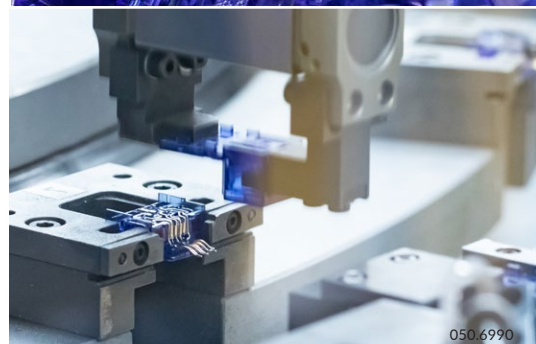 Cat. 6 module and set up a state-of-the-art production facility near its head office in Switzerland where the modules are still produced today. R&M was the first manufacturer to produce the Cat. 6 modules fully automatically and in zero-defect quality. And R&M is the only manufacturer not to use printed circuit boards for compensation at Cat. 6 level. The data signals flow transition-free directly from the cable connection to the plug. The industry was soon referring to the R&M product as a «blue wonder module» because of its quality.

Swiss success story
R&M's contribution to the start of the Cat. 6 age is a genuine Swiss success story. The entrepreneurial courage and commitment of the owner family and the management, the trust in the employees and the focused concentration on the undertaking considerably promoted the progress of the project. Moreover, the success of the project would not have been possible without the trusting relationships with long-term suppliers. The unique SME landscape in Switzerland was an important factor in this resounding success.

R&M has been producing Cat. 6 modules for data network connections in a fully automated production plant in Bubikon (Switzerland) for twenty years.

Festive celebrations on the 20th birthday of the R&M Cat. 6 module.
f.l.t.r.: Michel Riva, CEO; Martin Reichle, Owner and Vice-President of the Board; Adrian Heierli, Head Automated Assembly; Matthias Gerber, Market Manager LAN Cabling

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