

CONNECTIONS 50



Generation “Always On”

Antonov:
**Have a Safe Flight
with R&M Solutions**

The SYNO Dome Closure:
Modular and Flexible

**Avoiding Signal Losses
in LANs**



Global Presence



Dear Business Partners,

Since the beginning of February, R&M solutions have also become available in North America. With the takeover of REALM Communications, Inc. in Silicon Valley we are now ready to cover the world's largest cabling market. This acquisition strengthens our position in the data center sector. Furthermore, new technological trends are being set in Silicon Valley. This local presence is helping us to accelerate product developments for the entire R&M Group. As a market partner, you will benefit from an even wider selection of products from R&M in future.

In this issue of our specialist magazine CONNECTIONS, we are presenting you innovations such as the groundbreaking SYNO dome closure that has real USPs. You will also find R&M's answers to current trend topics such as POL (Passive Optical LAN), PoE (Power over Ethernet) and SDS (Software Defined Storage) so you are equipped for future applications.

Our focus story describes how young generations are dealing with the digitalized world and what you have to watch when creating future network infrastructures. An essential factor for successful digitalization is making seamless connections to the Internet available – whether wired or wireless. R&M is making considerable contributions to ensure that partners in the market can deal with ease with the intensive extension of infrastructure required today.

For some time now, R&M has been a reliable partner for top-quality healthcare solutions. In this issue we take a look at several examples of compelling customer-specific solutions from all over the world. Vikas Sharma, Head of IT at Sakra World Hospital in India, said the following: "R&M precisely understood what we were looking for and offered us a solution that resulted in an easy-to-manage network that can scale up swiftly and be upgraded in the future".

McDonald's too is relying on our range and uses the Automated Infrastructure Management System R&M*inteliPhy* in its data centers in Saudi Arabia. A further highlight is the case study on the "Maikäfer" residential district of Munich, a favorably priced living area that was equipped entirely with an R&M FTTH solution and provides free Internet connections for 630 households.

And we have also recently launched our new-look website. Concurrently we have further professionalized the electronic customer magazine by giving it a new platform that corresponds to today's technological requirements. More information on the backside of the magazine.

We hope you enjoy reading this issue and would like to take this opportunity of thanking you for your trust and the good collaboration.

Sincerely,

A handwritten signature in blue ink that reads 'M. Della Casa'.

Marilena Della Casa, CHRO

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Well-known Ukrainian aircraft designer and builder **Antonov** uses cabling solutions from R&M in its modernized structured cabling systems.

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Generation “Always On”

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Young people don't go online. They live online. Smartphones and apps are becoming more important to them than computers and websites. Wherever they are they are always communicating – virtually exclusively in a mobile form with friends, on social media channels, using cloud services and all kinds of intelligent devices. The digital transformation of society is progressing at full speed. What does this mean for networks and cabling technology?

In May 2015, the Indian fashion dealer Myntra closed down its desktop website and shop portal. The market leader moved the entire e-commerce process to a mobile platform. Myntra, a unit of Flipkart Internet Pvt. Ltd. in Bangalore, believes that the young target group now only shops by smartphone.

The latest trends would also suggest there is sense in this resolute step. Before they took the decision, the Myntra management had seen that 95% of data traffic on the website and 70% of sales were already being generated on smartphones. Two out of three smartphone users in India do not actually have a computer for Internet access, according to the Google Consumer Barometer.

every day for online activities. The other side of the coin: Doctors are already warning of the dangers of overstraining the eyes, nerves and brain, and are advising young people to take longer breaks from the net.

Nevertheless newcomers using the Internet for the first time are no longer using a PC. Instead they use only mobile access devices. Generation Z (14-19-year-olds), also referred to as Digital Natives 2.0, are all online according to a German media survey.

Mobile and “always online”

“For Generation Z, the Internet is as natural as the sun in the sky and mobile networking as omnipresent as the air we need to breathe,” says interactive group TWT of the trend. Furthermore, teenagers love producing new content for online channels themselves,

In fact all over the world Google and market research agencies are noticing similar tendencies. Last year more than 300 million people got their very first smartphone. That is 10% of all Internet users. Smartphones are increasingly replacing wallets and purses. In 2015, around 65% of all online payment offers in China were taken care of on mobile end devices. The millennials (16-34-year-olds) use their smartphone several hours of nearly



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“The older the children and juveniles are, the more they use mobile devices to surf the net.”

instead of simply being consumers of media offerings according to specialist journal Psychology Today in its various reports on the interactive Generation Z. And for this purpose, they need fast upload connections. They are also willing to let the world in on their privacy to share data with others. This behavior is changing the markets and giving rise to new business models. In this scenario, stable networks are essential.

This digital lifestyle and the trend of “always online” lead to users expecting there to be no hurdles between fixed line, LAN, mobile communication and WiFi infrastructures. Usage behavior is effectively demanding convergent, full-coverage, powerful and latency-free broadband at every street corner and in every building.

That is true just as much of the workplace as it is of leisure time, public life, education, the healthcare sector and private homes. At the Consumer Electronics Show (CES) at the beginning of 2016 in Las Vegas, more than 500 startups from all over the world presented surprising new digital developments. The spectrum ranged from wearables for babies

through smart-home and healthcare applications to app-controlled cocktail mixers. Nearly all these inventions are accompanied by mobile or cloud applications.

Symbiosis with the IoT

Around nine billion digital devices like those shown at the CES are already connected with the Internet today and are sending ever greater quantities of data. In the year 2020, up to 30 billion things will be online. The talk is of the Internet of Things, IoT.

The IoT is opening up opportunities for exciting, new business ideas in retail, the service sector and also the manufacturing industry. Adaptive systems can be realized with the ongoing analysis of data. Three examples:

A store in the city is more a showroom and source of inspiration for Generation Z than a place where they purchase products. Managers of stores can create interactive and multimedia experience rooms, augmented reality and digital changing rooms, and link them with apps and an online shop. In turn, this digital way of shopping requires a dense network of in-store broadband, WiFi and



89% of 16-18-year-olds go online using their smartphones

Source: BITKOM survey “Young and networked”, 2014, www.bitkom.org

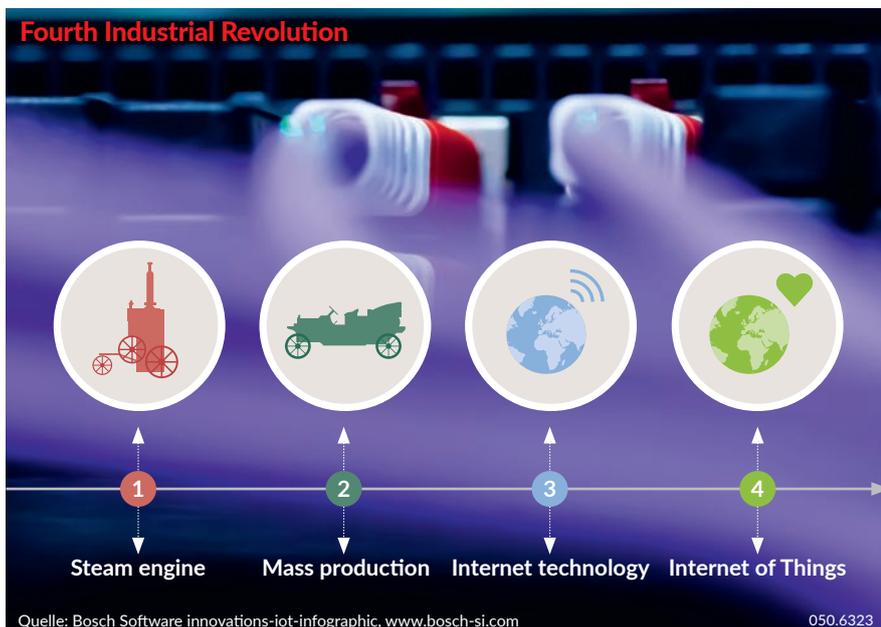


mobile communications. New technologies such as RFID and Beacon can provide valuable support in this. Beacon transmitters spread out through the store communicate over Bluetooth with the shoppers’ smartphones and send them all the latest prices or a personal greeting. These devices are connected to a server in the building or in the cloud that automatically sends customers suitable individual offers and takes care of payments.

Digital sensors, hidden in the ceiling, determine the number of people in a conference room and communicate with a building server. On the basis of this information and after completing a learning phase, the building automation can regulate ventilation and heating automatically and to exactly suit requirements to optimize room temperature and air quality, and thus save energy.

Generally speaking, more and more physical products will be registering operating data using sensors and sending this data to a central point for analysis. This also makes it possible to monitor the state of the networks.

Experts expect the adaptation of digital services and the Internet of Things to take place fast in the coming years. Readily available, inexpensive sensors that can supply themselves with electricity at remote places



of use facilitate the fast spreading of IoT applications. This will take place just as quickly as the spread of smartphones. Within just eight years, hundreds of millions of people have learned how to work, communicate and play with these high-tech telephones and organize their lives in a digital way.

Good connections required

But in spite of these prospects, it often happens that in real life there is no permanent, non-interrupted Internet connection or stable bandwidth. And that is slowing development down. "In the case of smart-home applications, secure, interoperable plug-and-play solutions are still not common," says market researcher Tom Kerber from Parks Associates critically. Only smooth running connections will enable

new, differentiated services, products and successful business. Parks Associates advises manufacturers, planners and installers to strictly observe common network standards and interoperability.

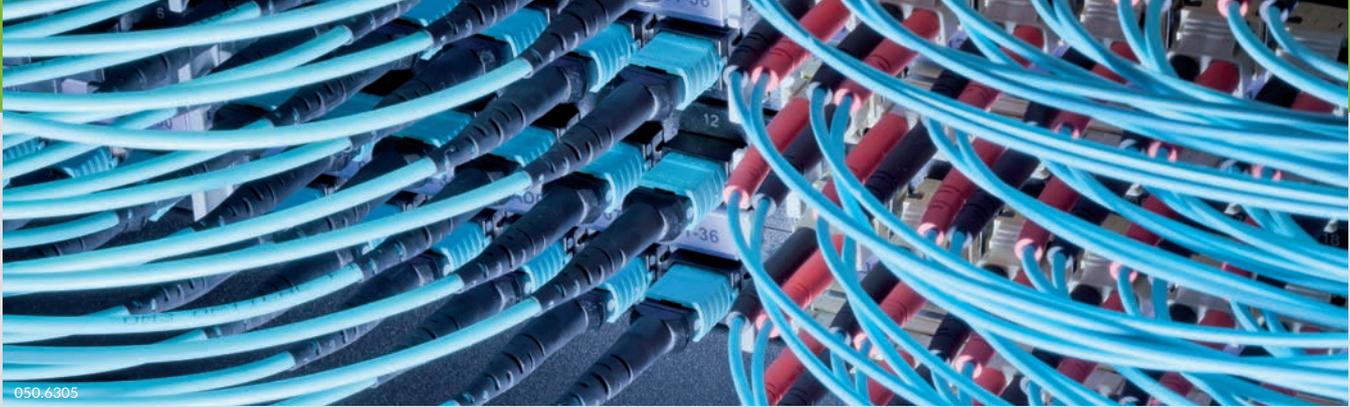
"Companies too should optimize their IT architectures for the Internet of Things," is the advice from McKinsey experts. Because they must soon be able to process billions of complex digital chains of events generated by IoT, cloud and virtualization every year. There is a need for optimization not only in software and IT hardware, but also in the mobile and physical connections in the networks. Hundreds or thousands of IoT devices and applications have to be able to communicate with a LAN at the same

time. R&M recognized the need for sturdy, extremely powerful WAN infrastructures and 10 Gigabit Ethernet networks at a very early stage and featured its reflections in its customer magazine (see Connections No. 48). The structured building cabling required will have to be planned more carefully than ever before. McKinsey: "Seamless connectivity is going to become a necessity."

Particular attention should be paid to the future costs of data transmission and network operation. McKinsey recommends a search be carried out for solutions which are as uncomplicated, flexible, modular and interoperable as possible. Future-proof, modular system solutions such as R&Mfox and R&Mfreenet fulfill these requirements perfectly.



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How to realize top-quality seamless connections

An essential factor for successful digitalization is making seamless broadband connections to the Internet available – whether wired or wireless. The users and smart devices of the Internet of Things require highly available, uncomplicated network access as a matter of course. But how can that be realized?

R&M sees the following as absolutely essential:

- Providing modular, flexible, convergent and sustainable top-quality installation solutions. They are easy to adapt to any building situation.
- The passive infrastructure must offer the greatest possible reserves for signal transmission up to every outlet and each individual access point in order to be able to cope with future demands.
- Sturdy, top-quality components are an essential basis for such installation solutions.

- Clever quick mounting technologies ensure that the networks can run simply, intuitively and inexpensively without errors.
- Established connection formats such as RJ45 and LC as well as constantly usable standard protocols such as Ethernet and TCP/IP should form the basis of networking.

Important to know: The wired infrastructure should be promoted as far as possible in buildings and the public sector. Radio systems alone cannot deliver everything required. End devices often rely on WiFi or mobile communication. But almost every antenna required in turn needs to be connected to wired broadband networks which themselves have to be further extended (see Connections No. 48).

In particular, wired networks will have to be planned and prepared more specifically in future

to ensure optimal radio coverage. This demands both expertise and awareness of quality. R&M provides planners, system integrators, network operators and installation partners with the relevant expertise. This know-how stems from decades of experience and the unsurpassed R&M quality principles.

R&M solutions are first choice when it comes to installing seamless and permanently reliable connections for the digitized world. With the continuous further development of system solutions for wide area networks, data centers and structured building cabling, R&M is making a valuable contribution to ensuring that partners in the market can deal with ease with the extension of infrastructure. Only high-grade networks will be capable of managing the enormous volumes of data that digitalization will bring with it in the future.

Foresighted planning

The Indian online fashion dealer Myntra has, with great foresight, already implemented these recommendations. Myntra selected a correspondingly sturdy and absolutely reliable network and cabling solution from R&M to equip two office complexes in Bangalore. The installation with OM3 FO and Cat. 6 copper cabling provides plenty of scope for scaling

and technical adaptations to coming trends. "As an e-commerce company we know how crucial the network infrastructure is, especially for avoiding downtime. R&M provided an outstanding solution. All our requirements in terms of performance and reliability were met," says Darshan KB, IT Manager at Myntra.



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Myntra India planned with a view to the future.



050.5583

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Future-Proof Data Center for Established Hospital Network

The Valais Hospital Group (Spital Wallis) is an independent, public care, education and research company serving its patients.

The Group is recognized at both national and international levels and is firmly rooted in the health, social, economic and cultural life of the Canton of Valais. The hospitals that are part of the Group are located on 19 different sites. Within a care network, they collaborate closely with treating physicians, as well as retirement and care homes and socio-medical centers, to ensure patients receive the right care, at the right time, in the right place. An associated innovation center is closely linked with university hospitals and leading research institutes in Switzerland.

Meticulous planning as key to success

A reliable, high-performance data center is the basis for IT to function smoothly. The preparation and implementation of fail-safe IT systems was the key focus for the meticulous planning developed in partnership with Tech-Building. In order to guarantee services for the 5 000 employees and 8 000 network devices at all times, Spital Wallis needed an infrastructure designed to be redundant.

The project started in 2014 with an analysis phase. "It was decided to extend the data center in Sion, which had been in existence since 2009, and to search for an ideal site for a second data center designed as redundant", said Yohann Eyer, Telecom Manager at Spital Wallis. The process involved strict adherence to the list of criteria that had been drawn up and it was the Sierre site that was eventually chosen. After a rigorous selection process, and as a result of earlier successful projects with the Canton of Valais, Spital Wallis chose R&M as its partner for the cabling infrastructure.

R&M provided the customer with a convincing planning system and recommended relying on MPO technology in the FO area. This technology offers favorable conditions for setting up future-proof, high-performance data networks in data centers, thanks to its multi-fiber plug connectors. You can set up the necessary infrastructure with a handful of basic components (pre-assembled trays, racks and trunk cables). Modular and flexibly scalable cabling systems help to keep

investment steps clear-cut. Parallel optical connections make high demands on planning because this involves structured cabling of the highest quality. The signal direction or polarity and the arrangement of the individual fibers had to be precisely defined for each link and channel. Thanks to MPO, the Spital Wallis data centers are now ready to meet later 40 and 100 Gigabit Ethernet requirements.

Ingenious solution for tight spaces

Space is very tight at the existing Sion site. A clear separation between FO and copper was therefore chosen for the raceway system. Whereas the copper connections were fed in under the raised floor, the FO cables were brought in from above using a raceway system. There was more space available at the new site in Sierre, which meant both technologies could be run to the racks from above. However, FO and copper were separated here as well. This installation-friendly and well-conceived set-up, along with clear documentation, enable supplementary work and maintenance to be carried out easily and quickly.



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A strong team, from left to right: Yohann Eyer, Telecom Manager, R&M Switzerland, David Gaist, Network Engineer, Spital Wallis.



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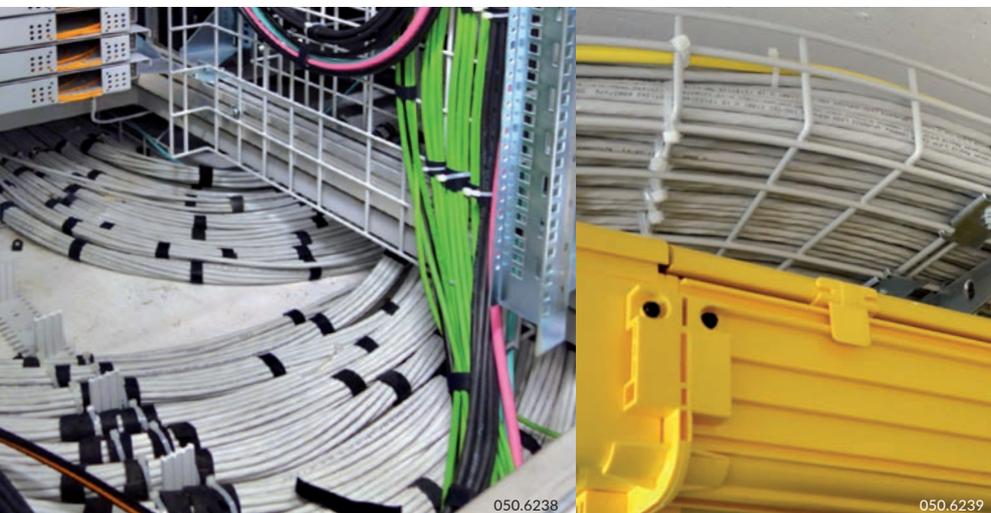


Spital Wallis is extremely satisfied with the quality of R&M's products and solutions. Deliveries were made exactly as scheduled. "R&M was there for us at all times and quickly solved every challenge in a customer-oriented way", said Project Manager, Yohann Eyer.

R&M certified the installation within the framework of the R&M warranty program. Both data centers have been in operation since the fall of 2015.

"R&M offered top service from A-Z, from consulting services to certification."

Yohann Eyer, Telecom Manager at Spital Wallis



The solution in Sion ...

... and in Sierre



Walter Kurzen | R&M Switzerland
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The SYNO Dome Closure: Modular and Flexible

The network is the capital of every network operator. The ideal scenario is when the infrastructure can be used as flexibly and as unlimitedly as possible. The SYNO dome closure from R&M fulfills precisely these requirements of a modern FO network. Its modularity is unique.

R&M has developed a new outside plant solution for FO networks: the SYNO dome closure that boasts optimum flexibility. The eight radially arranged, modular cable entry bays support all desired configurations and mixed assemblies of cables and micro ducts. Network operators have more freedom to tailor their plans and change them at short notice as conversions are always possible.

Cables are laid laterally into the cable entry bays. There is no need to thread the fiber optic cable through the bottom of the closure. The cable entry kits can be opened, closed, changed, and retrofitted in just a few simple steps. The cable connectors and individual cables are always freely accessible. This concept is set to revolutionize the assembly process in the field and simplify maintenance work during operation.

R&M supplies seven basic kits for one to 16 cables, optimized for all typical cable diameters. Cables up to 28 mm and micro ducts up to 14 mm in diameter fit in the kits. This flexibility makes the dome closure suitable for almost any area of application. From distribution and branch off joints to connecting closures, the SYNO dome closure is a strong performer in all disciplines and can be adapted to any task.

Innovation: SYNO gel seal

R&M has also done away with sealing with shrink tubes. The newly developed SYNO gel permanently protects the inside of the dome closure from moisture and dust. The gel seal adapts to suit the cables entered and seals these without compromises. The gel blocks integrated into the kits are also easy to open and replace.



090.7529

The cable gripper is fastened outside the dome closure. The inner mechanisms of the dome closure remain undisturbed and protected during assembly work. There is reliable, individual strain relief in just a few simple steps for every cable. Once the cables are prepared, the strain relief clamps can be fitted in next to no time. Uniform clamping all around the cable jacket ensures stress-free absorption of traction and torsion.

Inside you will find R&M's tried-and-tested Single Circuit Management System with its scalable tray technology. The largest of the three dome closure variants can hold up to 1152 splices. The gentle 40-mm bending radius is ensured at any packing density in order to guarantee top performance and availability.



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050.6112

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Have a Safe Flight with R&M Solutions

Antonov, the famous Ukrainian aircraft designer and builder, uses cabling solutions from R&M in its modernized structured cabling systems.

Named after Oleg Konstantinovich Antonov, the company is a Ukrainian aircraft manufacturer realizing the full cycle of aircraft creation – from design to serial production and complex after-sale support of the aircraft. It is most famous for the An-2 biplane, built between 1947 and 1960, and for the largest military transport aircraft in the world, the An-124 and the An-225.

The aviation designer has produced over 22000 planes, including more than one hundred different types and variants of passenger, transport, and special-purpose aircraft, with pride of place reserved for its twin calling cards, the cargo giants “Ruslan” and “Mriya.” Antonov recently unveiled its

new creation, the An-178 – a cargo aircraft with the ideal characteristics and design for aviation.

With high-tech companies like these needing modern, efficient cable and connectivity infrastructure, R&M’s solutions ensure the customer’s requirements are met.

The company’s passive network is to form the physical basis for the circulation of e-documents and will be implemented in the very near future. It is also to be used for several different purposes, with local computer and telephone networks for individual buildings, security systems, video surveillance etc., all part of a single system.

The R&M Solution

- Cat.5e – shielded
- R&M Security System
- R&M patch guard

The R&M Security System has also been used in the project from the first to the third levels.

- The visual cording that supports correct connections at workstations and on patch panels.
- The mechanical-visual coding elements that provide additional security on a mechanical level for the special zones.
- The mechanical plug-out/plug-in protection that ensures a high level of security protection for network connections. It allows access to be restricted to authorized staff only.

The second stage of the project involves renovating the industrial zone, which requires IP-protected components. The specialists at Synergia SE, the official distributor of R&M solutions in Ukraine, will therefore be working together with Antonov on future projects to ensure reliability in the aircraft and safety in the air for those on board.



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050.6235

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Sustainable Infrastructure for Cap Rocher

Cap Rocher is the new Headquarters of the Rocher Group, completed at the end of 2014. It is not just the home of the Yves Rocher brand, but also of almost all the Group's other brands.

The elegant building in Issy-les-Moulineaux in the metropolitan area of Paris is completely consistent with the ecological values of the Rocher Group, as it has the NF "HQE" (Haute Qualité Environnementale - High Environmental Quality) and "BREEAM" certifications. In addition, it is also considered to be an "LPO refuge" for birds: the 550 m² green facade and the green spaces covering more than 2200 m² provide a protected habitat for numerous types of birds.

There are in all 25000 m² available over eight floors, of which 6000 m² are used for research laboratories and innovative equipment. The design process for the new building was inclusive as far as the employees of the Rocher Group and their needs were concerned. Different areas of expertise, knowledge and experience all come together in the Cap Rocher building. It is a place for exchange and sharing, with the focus on collaboration. The arrangement of the spacious,

but nevertheless manageable, office areas is thus also characterized by openness, diversity and mobility. Since the start of 2015, every employee has found a working environment there which is tailored to their tasks.

Future-proof and reliable

Cap Rocher awarded the contract to implement the network cabling infrastructure to the system integrator SNEF in November 2013. This involved a mixed fiber optic-

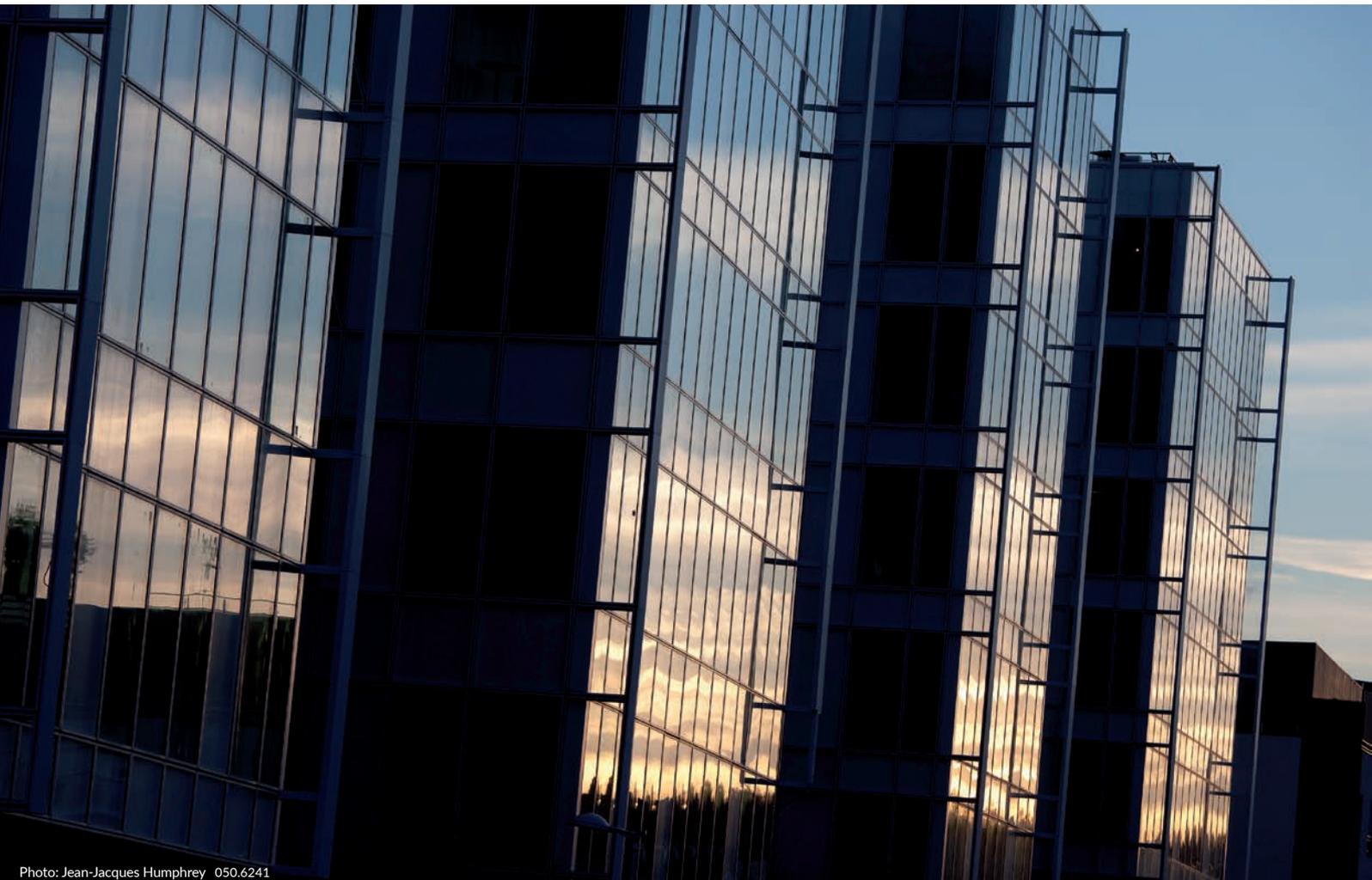
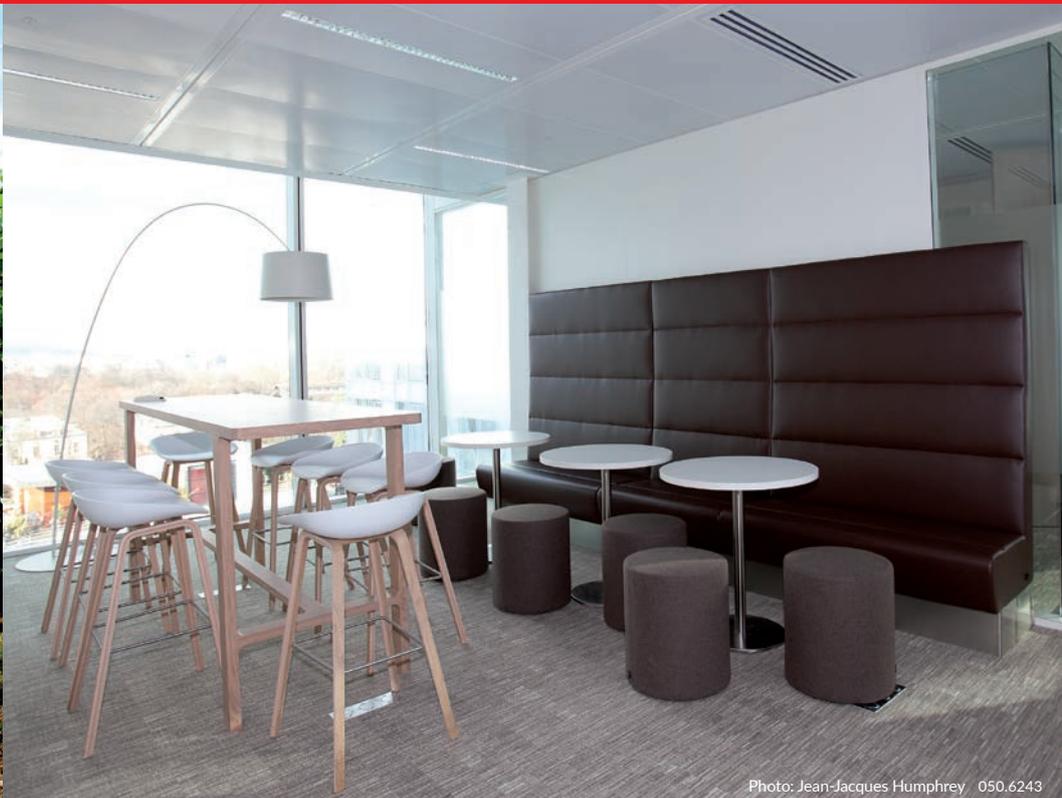


Photo: Jean-Jacques Humphrey 050.6241



copper solution from R&M, configured for a future speed of 10 GB at the workstation.

The installation of the infrastructure took ten months, from March 2014 until December 2014. The core equipment is housed in two technical rooms and ensures reliable continuous operation of the network in all parts of the building.

“The hardware comprises 250 24-port panels, 5 500 links and 16 distributors, with a total of 300 kilometers of copper cable and numerous patch cords. For many years we have enjoyed collaboration with R&M based on mutual trust, and we particularly value the reliable deliveries, outstanding on-site support and high product quality. Around two dozen people were involved with this project. Everything went to plan, both in terms of delivery and installation. The initial connections and performance tests were totally convincing”, said Cyril Landois, Project Supervisor and Installer of the SNEF Group.

The R&M solution for Cap Rocher

- 5 500 Cat. 6_A copper links
- 250 angled panels with 24 ports
- 16 distributors

Digital workplace

“So that our digital workplace project fits in with the new, collaborative way of working and the environment associated with this (along with meeting the special requirements of the research laboratory), we configured our infrastructures to be simple and flexible. R&M’s innovative products, both in terms of the panel solutions (angular panels, color coding) and of the end terminations and the user-friendly labeling accessories, impressed us”, said Bruno de La Barre, Project Manager for Cap Rocher in the information technology department.

“The decisive factor for us was implementing a uniform complete solution that ensured quality of service right through to the workstation. We carried out several performance tests, above all in the area of copper solutions, each time with excellent results. Performance was also above average when it came to failure safety, which indicates sustainable quality. Last but not least, we have also had good experiences with the patch guard fuses, especially in shared areas, such as meeting rooms”, added Bruno de La Barre.

With a workforce of 15 000, the Rocher Group is a profitable, independent family business, around 97% of which is owned by the family who founded it, and which is now led by Bris Rocher in line with his grandfather’s vision.



The Group is proud of its Breton roots, but at the same time has a major international presence with agencies in over a hundred countries. Every woman who is a customer of the Rocher Group is treated like a queen, and it is no surprise that 40 million women trust in the quality and efficacy of Rocher’s products.

The SNEF Group was founded in 1905 and is a recognized service provider for cross-technology solutions in the energy, industrial processing, telecommunications and information technology sectors.



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Flagship Specialty Hospital Cabled by R&M



Sakra World Hospital is a joint venture company between Kirloskar Group, Toyota Tsusho and Secom Hospitals. It is one of India's first multinational hospitals committed to advanced medical care.

Sakra combines these large entities to provide cutting-edge medical technologies and herald a change in the current healthcare systems and processes. This flagship 350-bed multi-super specialty hospital is located in Bangalore, India.

As a company committed to achieving comprehensive medical care, Sakra wanted its new hospital to be equipped with a

future-proof IT infrastructure. This placed great emphasis on the quality, reliability and performance of the passive cabling system.

The IT team at Sakra wanted a network that would continue to perform reliably and at optimum levels, even while operating at full, designed capacity. The network not only had to fulfill medical, scientific and administrative tasks but also support communication

between doctors and patients, and provide data storage for their healthcare services. There can be no downtime in healthcare as emergencies can occur at any moment.

Comprehensive solution for easy-to-manage network

The decision to choose R&M as the preferred brand from all other vendors was the result of thorough, technical insights and support offered by R&M from the beginning of the relationship. This continued throughout the project up to successful completion and handover.

R&M provided a solution comprising copper Cat. 6 LSZH cables, fiber OM3 cables and components for over 6000 nodes on the network distributed across five floors. In addition to the quick installation, the hassle-free labeling on the patch panels and convenient cable management ensured that the project was completed as per specifications and well within the expected time frame. The IT team at Sakra also appreciated the fast response and delivery times experienced with relation to additional materials for upgrades made to the facility during the project.

“R&M precisely understood what we were looking for and offered us a solution that resulted in an easy-to-manage network that can scale up swiftly and be upgraded in the future. We look forward to working with R&M again when a need arises.”

Vikas Sharma, Head of IT at Sakra World Hospital



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090.7408

Patch Cord Range Extended by the EasyLine Series

R&M is extending the range of RJ45 copper patch cords to give customers a selection for a whole range of needs. The EasyLine series for basic local data network equipment is new to the range. For applications with special requirements, there is the advanced standard program.

R&M is introducing a new range of patch cords for basic local data network equipment that complies with valid standards: the EasyLine (EL) series. EasyLine patch cords are available worldwide ex warehouse

- as unshielded (U/UTP) or foil-shielded (U/FTP) versions
- in four standard lengths: 1, 2, 3 and 5 meters and in seven RAL colors
- with printed data on them regarding length, category, cable type, article number.

The clearly defined EasyLine product program is suitable for use in network operations with up to 10 Gigabit Ethernet in structured building cabling systems, small offices, apartments, and other similar structures. It fulfills the parameters of Cat. 6 and Cat. 6_A ISO. It also supports Power over Ethernet (PoE and PoE+).

All EL products are manufactured in accordance with the precise R&M design and quality criteria. They undergo 100% individ-

ual component testing in accordance with R&M standards. The EL series features the tried-and-tested R&M RJ45 connectors, which distinguish themselves with their long-lasting gold contacts, superior IDC connection technology and high NEXT reserve. The Insulation Displacement Contact (IDC) technology developed by R&M ensures robust wire connections and consistently low contact resistance. Rigid wire guides without pair separation in the plastic body also ensure that NEXT reserves remain permanently high and stable. The strain relief with boots is crimped around the cable and can withstand a tensile force in excess of 200 N. Plastic ridges prevent the cable jacket from being buckled or crushed in the bending radius. The patch cords can be fitted with RFID chips from the R&M*IntelIPhy* network monitoring system.

The EL series differs from the standard range in that it uses cables with reduced fire protection and EMC protection characteristics. This can result in significant cost reductions

in projects where these characteristics are not required.

The flexible, tried-and-tested standard program is still available for customized applications with increased requirements in data centers, office buildings, clinics and industrial plants. It enables any number of configurations, offers top-quality shielding solutions and ensures maximum fire protection. Certificates of independent laboratories confirm conformity to the standards.



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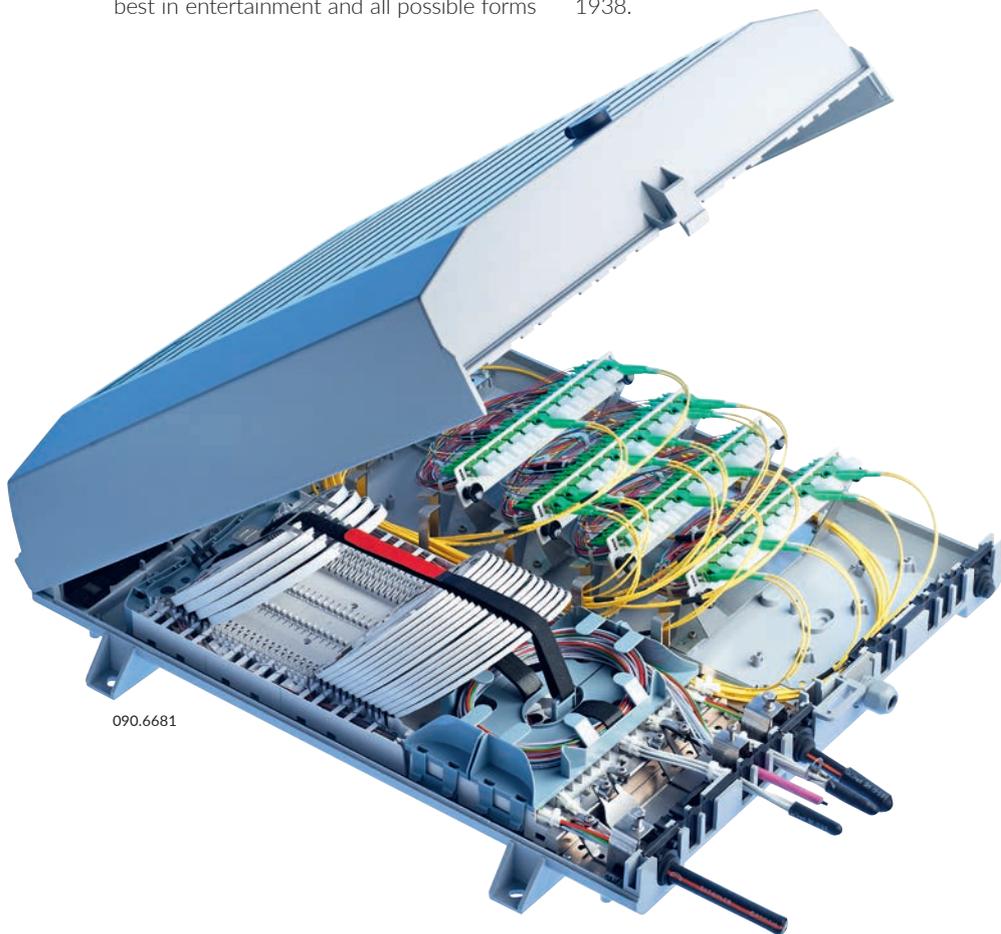
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Social and Fast: FTTH in Munich

The “Maikäfer” residential estate in Munich was a construction site for twenty years. The reasonably priced living area in the southeastern part of Munich has been completely modernized – with 630 households receiving FO connections and free Internet. A pilot project of a social nature.

The German phrase “München mag Dich” – Munich loves you – is the official slogan of the Bavarian metropolis and it expresses a certain lust for life. It stands for a modern, cosmopolitan, young and rich city which can offer everything the heart desires in terms of comfort, education, culture, sport, the very best in entertainment and all possible forms

of communication. And this high standard of living is something the company GWG Städtische Wohnungsgesellschaft München mbH wants to provide in an area of people with lower incomes. GWG currently manages more than 27 000 rented apartments, some of which are on the Maikäfer estate built in 1938.



This is where those responsible at GWG decided to initiate a pilot project with a special social goal in mind. After a twenty-year phase of redevelopment and modernization, more than 630 households were given an FO connection in 2015. The standard basic service of 3 Mbit/s Internet access is free of charge for all tenants. GWG wants to create equal digital opportunities.

Technical obstacles

The technical implementation was challenging for the cabling experts of R&M partner Neumeier, Hegmann & Co. The Maikäfer estate in Munich is outside the area of coverage of M-net, the leading regional network operator in Bavaria. The only things available were the standard telephone lines and a cable TV connection with coax cabling and satellite reception. Neumeier, Hegmann & Co operates the cable TV network.

The GWG stipulations meant only the most modern state-of-the-art equipment could be used. The company wants to be able to provide tenants with an alternative to the DSL services on offer from telephone network operators. And that is why the only solution possible was FTTH. As part of the

The Maikäfer estate in Munich

The Maikäfer estate, built in 1938, was GWG's first own construction project. Minimal floor plans and simple standards in both construction and furnishing were characteristic of the apartments. The municipal housing company's mission was to provide favorably priced homes quickly. For decades, the Maikäfer estate with its gardens and landscaped park was a dwelling place for large families and people with all levels of income who were committed to close neighborly relations. Sixty years later, a lot of the town houses were in poor condition. GWG gradually had the entire estate modernized between 1994 and 2014. Many of the rented buildings had to be demolished and replaced by new ones. Throughout the project GWG made every effort to retain the original character of the area.

The result: The settlement has witnessed an impressive metamorphosis. It has become a comfortable, reasonably priced district in the middle of a thriving, pulsating metropolis.

There are now 950 fit-for-purpose apartments available with a contemporary design. These are home to a wide range of inhabitants who all stick together. Students, small young families and people living on their own feel just as much at home here as a number of older couples. They all benefit from a light-flooded, quiet living atmosphere, from a lot of greenery that ensures a pleasant town climate, and now also from state-of-the-art broadband technology.



Photo: Ingrid Scheffler - 050.6255

redevelopment of the district, GWG had, with foresight, built some new property with fiber optic cables. "But first we had to build an M-net FO backbone into the estate and create an entirely new network from the street into the houses," explains Heribert Neumeier, Managing Director of Neumeier, Hegmann & Co.

Necessary solutions

The next step was to connect the cabling systems within the properties with appropriate solutions. GWG had already had fiber optic cable and multimedia distributor boxes installed in the individual apartments.

R&M Venus boxes of type FXXL-SCM were used as building entry points. The flexible, modular concept of the Venus box made it possible to find the corresponding configuration of splice and patch units for every building in next to no time.

The multimedia distributor boxes in the apartments offered little space for additional components. The technicians from Neumeier, Hegmann & Co. implemented their entire technical know-how and a range of ideas to pack the circuit engineering into the distrib-

utor boxes. The flat construction of the 22 mm high R&M fiber outlet proved to be an advantage.

Some of the distributor boxes were just under the ceiling. This made installation work difficult and required considerable resourcefulness. The splice device, for example, had to be positioned on a ladder. This was pretty unusual even for the experienced installation team. However, the quick mounting technology of the fiber outlet simplified connectivity issues.

In the end, a new way had to be found to directly address the individual subscriber connections during installation. The plan was to wire the apartments without a link with a sign-on procedure because there is no obligation for tenants to make use of the basic Internet provision. The easy-to-use tray technology of the R&M Single Circuit Management (SCM) system provided the technicians with optimal support.

"There were both technical and legal obstacles to be overcome during realization," says Neumeier, Hegmann & Co. Managing Director Melanie Claussen. "We are pleased

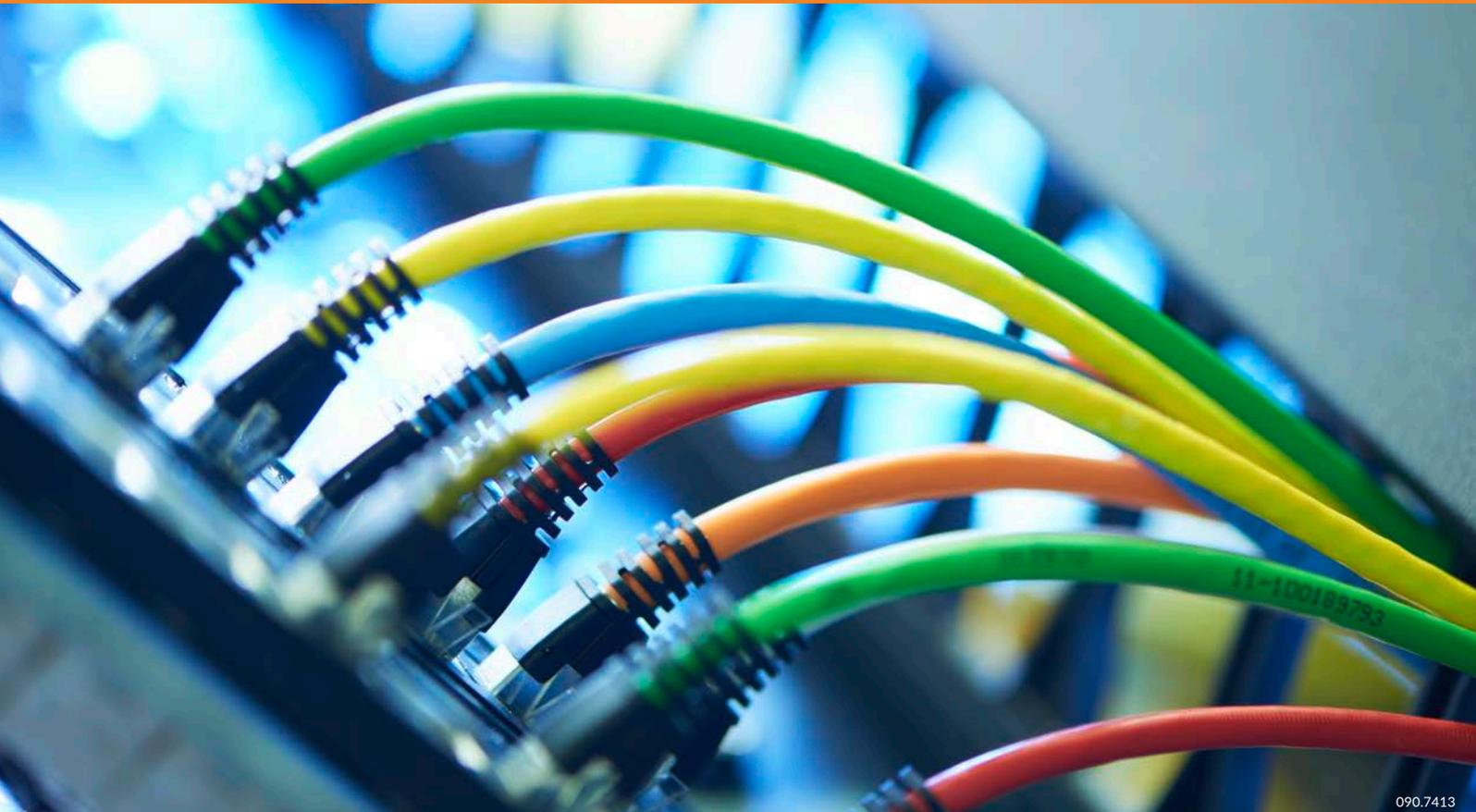
we were able to work in close collaboration with R&M on this one, as they managed to get GWG and M-net up and running in just a few months."

When the FTTH network was launched in the Maikäfer estate in the fall of 2015, 430 households opted in on the Internet scheme. All they had to do was register at Neumeier, Hegmann & Co. and plug in the free router from M-net. Another 200 households are to follow. If it should transpire that 3 Mbit/s is not sufficient, tenants can upgrade their connection at a favorable price.



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090.7413

Four-Pair PoE Puts Pressure on RJ45 Contacts

The next generation of Power over Ethernet is almost upon us: four-pair PoE. Due to higher electrical outputs, RJ45 contacts are reaching their physical limits. What do we need to take into account to avoid signal losses in LANs?

Miniature lightning display. This would be one way of describing the sparking that occurs when a live contact is opened. For example, when the LAN connector is pulled out during operation with Power over Ethernet (PoE). In electrical terms, the effect can be explained by the inductances on the current path: The current does not suddenly change, it “simply wants to continue flowing”.

In principle, sparks may indeed occur during connection as well. However, with Power over Ethernet this is not a problem, because the supplying device “negotiates” with the terminal devices being supplied. The electrical power supply uses resistance measurement to determine whether the terminal device can take PoE at all, and if so, which power class it belongs to. Only then does the correspond-

ing current start to flow. For the new 4-Pair Power over Ethernet (4PPoE) with a power of up to 100 W, this may be a current strength of up to one ampere per twisted pair.

Dangerous spark gap erosion

However, the active equipment electronics are unable to anticipate when someone will pull out the LAN connector. In this case,

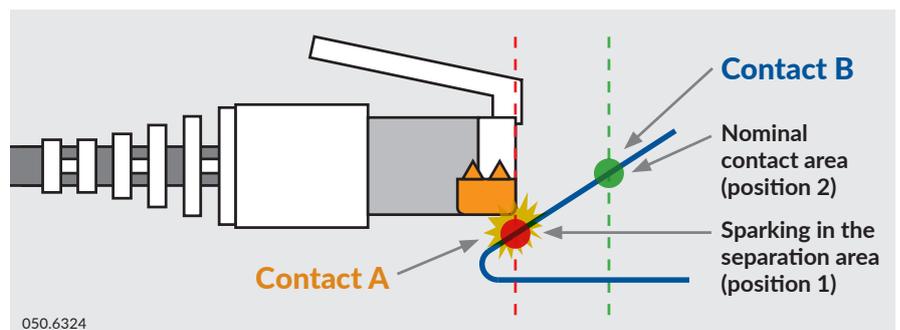


Image 1: The contact on an RJ45 plug with the spring contact of a connection module. In a well-constructed connection, the nominal contact area is a long way from the separation area. Graphic: R&M

disconnection takes place under load, which leads to disconnection sparks (image 1). In a small area it produces extremely hot plasma, which can cause local damage to both the plug and the module contact. Under the microscope, the impact zone often appears as a crater in the contact material.

On reconnection the contact is restored, but the contact quality, and therefore data transmission reliability, are no longer ensured at this point. Arguably, it is possible to ensure that the LAN electrical supply is shut down before disconnection in accordance with the operating instructions. However, in practice there is always someone who will simply pull out the connector.

Sophisticated contact design

Manufacturers such as R&M use design measures to tackle this problem. R&M has designed the RJ45 plug contacts and the gold-plated spring contacts of the connection modules in such a way that the disconnection points lie as far as possible outside the nominal contact area. This means with the plug fully inserted, the damaged areas do not affect data transmission.

In addition, the insulation displacement technology used in R&M RJ45 plugs ensures reliable contact resistance that is low over the entire life time. Thus only a minimal amount of power is transformed to heat inside the plug. The connector does not get hot as a result of the PoE load. R&M recommends that planners and installers working with

PoE-compatible networks pay attention to these kinds of criteria, even though they are not necessarily found in the manufacturer's data sheets.

Connection process investigated

R&M has extensively researched the effects of PoE on RJ45 connectors, in particular the damage caused by sparking, and has also had a significant involvement in the standardization of this effect. There the concept of the nominal contact area has been introduced. During the connection process, the contact point between the A and B contacts moves along the surface of the contacts, from the first contact point (separation area) to the operating contact point (nominal contact area). These two areas are separated by the sliding zone (image 2).

The investigations show that the design of modular RJ45 connectors (image 3) described in the IEC 60603-7 standard should ensure that the zone where the contact is broken and where sparking may occur (separation area) is separated from the zone where the contact between the plug and module is located in normal operation (nominal contact area).

However, the higher the separated power is, the greater the deterioration of the contact in the separation area. R&M has succeeded in maximizing the sliding zone for RJ45 module and plug through clever shaping of the module contacts. This means that R&M's RJ45 components are particularly well-suited to use in 4PPoE.

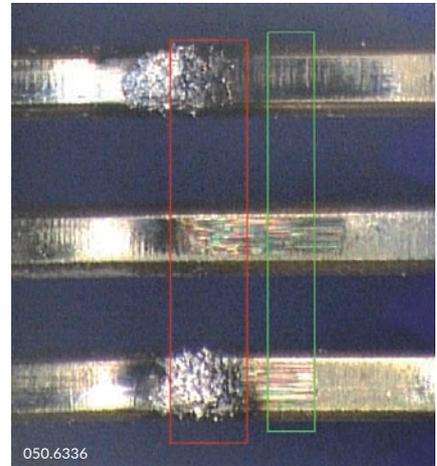


Image 3: Example of good contact design, where the damage does not have any effect on the contact zone. Nominal contact area (green) is clearly separated from the separation area (red). Image: R&M

IEC 60512-99-1 is a standard which enables testing of whether an RJ45 connection is suitable for PoE and PoEP up to 30 W. IEC 60512-99-2, which is intended to cover the power range for 4PPoE, is already at the planning stage. To ensure a PoE-compliant RJ45 connection, IEC 60603-7-x and IEC 60512-99-x must be specified.

In the White Paper "4PPoE – Parameters for Network Planning," R&M provides information on the physical backgrounds. The paper can be downloaded with the following link: www.rdm.com/whitepaper/en.

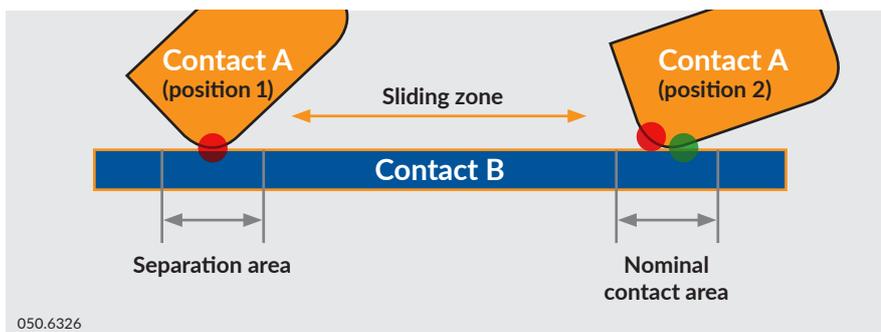


Image 2: Movement of the contact point during the connection process. Graphic: R&M



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R&M *inteliPhy* Analyzer



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McDonald's Lays Foundation for Expansion in Saudi Arabia with Investments in R&M *inteliPhy* Solution for Data Centers

In line with its ongoing success and expansion in Saudi Arabia, Riyadh International Catering Corp. (RICC), a developmental licensee of the McDonald's Corporation, has invested in a new data center fitted with state-of-the-art connectivity infrastructure from R&M. The Riyadh-based data center will serve as the IT operations hub for over 130 food outlets across the kingdom.

In order to ensure its new data center leverages with best physical connectivity solutions, McDonald's selected R&M, well-known for its innovative Swiss-quality cabling solutions. "To maintain the highest quality in our food and service, we have to ensure that our back-end operations and applications are also of the highest quality. We therefore needed a connectivity infrastructure that was very high-performance, reliable, and capable

of scaling to support the rapid growth", says Waleed Naseer F. Al Saud, VP, Business Support, at RICC.

Guided by R&M's local partner We Care Technology, McDonald's engaged with the Swiss manufacturer. The Level-1 support from R&M also extended through the design, implementation and training phases of the project. Members from the local integrator and McDonald's IT team received in-depth trainings on the installation and management of all solutions deployed through R&M Academy. This has also enabled McDonald's to avail of the 25-year system warranty on the cabling infrastructure and systems supplied by R&M.

cabling, HD patch panels, OM3 fiber optic cabling, server cabinets, as well as R&M's copper and fiber optic raceway systems.

The technology highlight however is the R&M *inteliPhy* Automated Infrastructure Management (AIM) solution which has been used for real-time visibility as well as seamless monitoring and management of the entire physical network. With features such as easy and up-to-date documentation, remote management of infrastructure work orders and simplified asset management, R&M *inteliPhy* allows McDonald's to better plan and manage future infrastructure expansions.

The R&M *inteliPhy* system was designed to allow full infrastructure management of McDonald's data center and office cabling cabinets at their Head Office in Riyadh. With this system, a single analyzer at the end-of-



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Cutting-edge solutions and AIM by R&M

The new data center now boasts a number of cutting-edge R&M solutions including Cat. 6_A



Waleed Naseer F. Al Saud

f.l.t.r.: Muhammad Sajjad Saeed, IT Infrastructure Manager, RICC; Sathya Kanth Venkata Pottumarthi, Director Info & Technology, RICC; Manzoor Ali, MD R&M KSA & Bahrain.

“We needed a connectivity infrastructure that was very high-performance, reliable, and capable of scaling to support the rapid growth.”

Waleed Naseer F. Al Saud, VP, Business Support, Riyadh International Catering Corp.

row cabinet controls all cabinets in that row, which will help McDonald's IT team to save critical space in the data center. The system is currently monitoring more than 1000 Cat. 6_A and fiber optic links in the data center and is ready to be linked with remote locations as well for full future management.

At McDonald's request, the R&MinteliPhy system was also used to monitor – via SNMP – other devices in the network for more integration with the Building Management System (BMS) and active equipment. A 25-year system warranty was provided to the customer after thorough testing and checking

of all links. An extensive training with a strong focus on the R&MinteliPhy system was held for all the technical leaders as a part of R&M Academy.

Corporate

R&M: Acquisition of REALM

Milpitas/California →



REALM Communications Group, Inc., in California's Silicon Valley, has been part of the R&M corporate group since the beginning of February 2016.



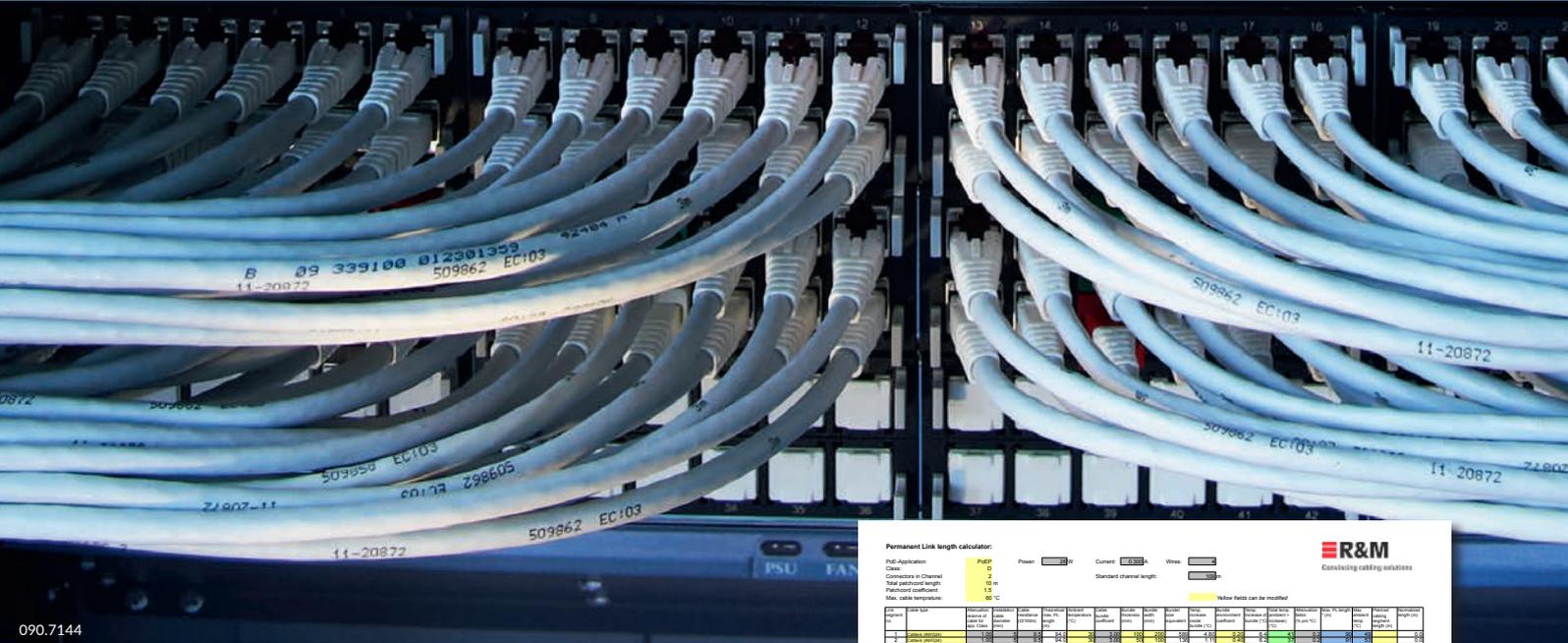
This takeover gives R&M access to the world's most important market for network cabling. From now on, R&M provides customers on every continent with top-quality solutions for local data networks, data centers and public broadband networks.

able to take advantage of optimal complete solutions. From May 1, 2016, the company will trade in the US under the name R&M USA, Inc..

REALM Communications Group, Inc., founded in 1987, is the leading developer and supplier of sophisticated fiber optic solutions for data centers, mobile communication systems and corporate networks in Silicon Valley and is well known for customized solutions in the local market. With the complementary products from R&M, business partners will be



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PoE Calculator Helps with Planning

Power over Ethernet – a persuasive idea: The supply current of the Ethernet terminal equipment flows directly through the data cables. The configuration does however have its limits. One of these is the link length. An R&M tool helps with the calculation.

When the cable heats up under the effect of the current, its attenuation increases, which reduces the possible transmission range. This applies in particular to the new 4PPoE (4-Pair Power over Ethernet) with a 55 or 100 watt output, where up to one amp can flow through each wire pair.

However, the actual temperature increase does not just depend on the cable and the PoE application, but also on the way the cables are laid (bundle size) and the ambient conditions (e.g. heat build-up through an

insulated wall duct system). For PoE-capable cabling to fulfill its function properly, it is therefore not just a matter of selecting the right material, but also of correct planning and installation.

A crucial factor for every project is which applications the cabling needs to be configured for. In the long run, is 1 Gigabit Ethernet with class D or E cabling sufficient? Or will 10 Gigabit Ethernet and class EA cabling or higher be required? This process means planners will also have to investigate the parameters for PoE in greater detail in future.

R&M has therefore developed a PoE Calculator which enables the possible link lengths to be determined, whereby the use of different applications is simulated. Special feature: Cable types, bundle thicknesses, ambient temperatures and other parameters can be input for up to three segments of a cabling link.

As a result, the spreadsheet program provides in each case the expected temperatures inside the cable bundle of a segment and the

maximum link length derived from this. The program takes into account the specifications of the latest international standards.

The large number of parameters that can be set in the tool allows an individual calculation of the permissible transmission lengths for a given application. Illustrative inputs quickly show the limits through negative values of the link reserve: The planned transmission range is then not achieved, at least not with reliable data transmission.

The distance the permanent link has to bridge is crucial for correct application. The PoE Calculator means the possibilities can be realistically explored. It is available to download as an Excel file on this page:



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R&M Provides Five-Star Cabling Infrastructure for Kempinski Hotel – Al Mouj, Muscat, Oman

Concluding another successful large-scale project in the Middle East hospitality sector, R&M has deployed its latest structured cabling solutions at the Kempinski Hotel, a five-star property in the Al Mouj Muscat waterfront development.



Attractive and competitive advantages

Its strong local presence in Oman allowed R&M to be deeply involved in the project from the outset. The cabling vendor's top technical resources helped design and optimize the hotel's network. Also, R&M's investments into a streamlined supply chain for the region enabled rapid manufacture and delivery of the cabling solutions required for the deployment.

The hotel will be able to leverage this network infrastructure for all its IT functions including high-speed data and voice connectivity for guests, IPTV, as well as video surveillance and security access systems. The involvement in the project began when Mustafa Sultan Telecommunications Co. LLC., one of the market leaders in Oman for ICT and converged networking solutions, was employed as a contractor. R&M was chosen for the contract as it is generally acknowledged to be a specialist, is a well-established brand both globally and in Oman, and enjoys the reputation of being a leading provider of powerful and reliable communication networks. "Kempinski hotel was determined to utilize the very best solutions that could meet the performance requirements of the property for the foreseeable future," says Sushil M. Jani, General Manager at Mustafa Sultan Telecommunications Co. L.L.C.

To ensure the highest quality and performance, R&M's Cat. 6 UTP connectivity technology was used, enabling up to 1GbE connectivity for up to 100 meters along with 10GbE connectivity for up to 50 meters. These cables were terminated by R&M's RJ45 connectors as their reliability and security make them well suited to the demands of higher bandwidths and transmitting large amounts of time-sensitive data.

R&M also offered Kempinski the benefits of Power over Ethernet (PoE) as its cabling solutions meet the latest PoE standards. This has enabled the infrastructure to support many devices in the resort premises, including IP cameras with pan/tilt/zoom functions, VoIP video phones, POS terminals, and wireless access points. R&M's good contact design ensures that any damage occurring due to PoE sparks will not affect the contact zone.

The high-speed fiber backbone was implemented with R&M's UniRack family of high-quality patch panels and R&M OS2 cabling: This cabling satisfies the toughest requirements for all singlemode applications of up to 100 Gigabit/s and complies with the ISO/IEC 11801 standard. The decision to utilize singlemode fiber was driven by its ability to meet current and future throughput requirements, which will enable the hotel to have 1 Gbit/s, 10 Gbit/s and even 40 Gbit/s if needed. Furthermore, as the entire installation was expertly handled by Mustafa Sultan Telecommunications Co. LLC, an R&M qualified partner, the deployment has been certified and granted a 25-year system warranty.

Commenting on the value that R&M delivered to the project, Prashant Rozario, Business Unit Head at Mustafa Sultan Telecommunications Co. L.L.C., says, "R&M offered us a number of very attractive and competitive advantages, such as presence and support of an expertly qualified local team, reputable Swiss quality products, a 25-year system warranty, excellent design consultancy and, last but not least, highly competitive pricing."



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"R&M offered us very attractive and competitive advantages."

Prashant Rozario, Business Unit Head, Mustafa Sultan Telecommunications Co. L.L.C.

The Galician Regional Government Relies on R&M Solutions to Improve Services to Citizens

Xunta de Galicia is the collective decision-making body of the government of the area of Galicia, northern Spain.

The Xunta has a vast bureaucratic organization at its disposal. This is based at Santiago de Compostela, the Galician government administrative city, although the most important city is A Coruña. It has delegations in the four provincial capitals of Galicia: A Coruña, Pontevedra, Ourense and Lugo.

The Xunta finds its origins in the Xunta of the Kingdom of Galicia, active between 1528 and 1833. The Xunta was Galicia's representation to the central Spanish monarchy. But at that time the Xunta did not hold real power; it was a consultative body only. The process of devolution initiated by the passing of the Spanish Constitution in 1978 allowed for the establishment of a new Xunta on March 16, 1978. The Galician Statute of Autonomy (1981) came to ratify the Xunta and Galicia's self-government.

Best solutions for healthcare environment

In 2015, the Galician government approved the continuation of work at the University Hospital Complex of Ourense (CHIJO), anticipated to be completed this summer. At the same time, in a separate procedure, the Sergas (Galician Health Service) decided who was to provide services and supply CHUO: R&M was the manufacturer selected for the

expansion of the infrastructure data solutions. R&M works together with EDNON, an expert in the integration of media systems, implementation of systems for data storage and back up, as well as the supply of software, microcomputers and management tools. EDNON is an R&M system partner primarily responsible for designing the most appropriate package of solutions for the project. The first investment phase is intended to finance 50 000 square meters of hospital with better provision in seven buildings containing about 900 beds. It will have 700 parking spaces.

Education through best data solutions

On September 25, 2015, the Galician regional government received aid from the European Regional Development Fund (FEDER). This funding was provided under the operational program Galicia FEDER 2007-2013 (file 08/2015) and will be used to supply equipment for use in training centers for the public employees of the regional government of Galicia and development service management tool equipment in classrooms. Property description: provision of micro-computer equipment (digital classroom kits) for public schools, service installation, configuration and commissioning of such equipment on user premises, installation, service and configuration of access points for the corporate network in the classrooms of state schools.



In both projects, the main necessity was to develop a modular, flexible solution which can be adapted to any kind of environment. "As soon as I knew the main requirements of the project, I saw R&M solutions as the answer to everything we were looking for," said Pablo Leis (Sales Manager at EDNON). In this outstanding project, R&M has brought quality to Galician citizens giving them better access to important services, such as health and education. The project was not only about quality services but also about providing the best choice to citizens.



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"As soon as I knew the main requirements of the project, I saw R&M solutions as the answer to everything we were looking for."

Pablo Leis, Sales Manager EDNON



New Storage – New Cabling

The introduction of Software-Defined Storage is changing network architectures in data centers. What does that mean for cabling?

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Since major providers of IT infrastructures launched the principle of Software-Defined Storage (SDS), previous storage systems have been marginalized. The X86 servers with PCIe 3.0 bus appeared on the market about four years ago. This meant the conditions were created for the integration of storage tasks into the server infrastructure. A standard 2U server with six card slots suddenly offered more bandwidth and performance potential than any midrange storage system.

Nobody can ignore this integrated concept any longer. The economic advantages are convincing. A data center has to use powerful servers in any case to be able to run the numerous virtual machines. And storage

volume can easily be added for the price of further server disks. For example, on the basis of SDS, servers for virtual machines are equipped with 24 instead of only two to three disks. And there is already sufficient storage available - for the marginal costs of additional server disks.

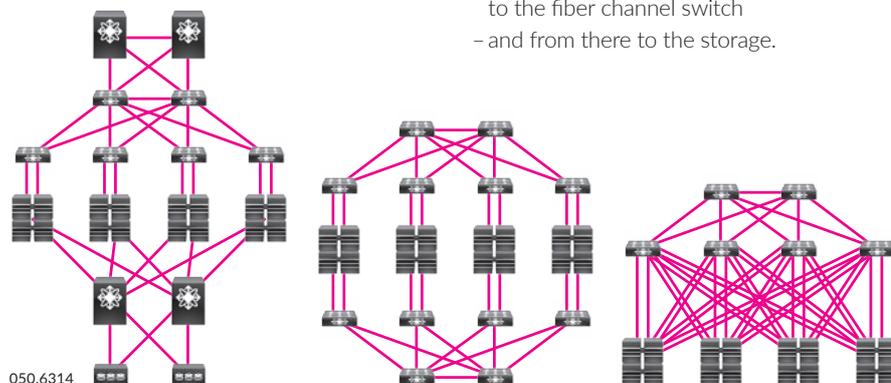
Cabling density increases

This evolutionary advance will not result in a reduction in the amount of cabling in data centers. However, the cabling is shifted and might even increase.

The following logical path has applied until now: Cables have run

- from the server's network interface card to the Ethernet switch
- as well as from the server's host bus adapter to the fiber channel switch
- and from there to the storage.

The amount of cables was split over the relevant areas. This meant cabling density was still relatively small. Shifting storage into the server housing means networks are consolidated. Cabling density increases as a result, both on the server housing and on the switch or router, as you can see in Figure 1. Increasing virtualization means data traffic between servers grows. At the same time, there is a further increase in CPU and PCI performance. These advances should also get through to users. They expect acceptable latency. And this can only be achieved with more bandwidth and higher performance from the cabling. As a result, data centers have to ensure their networks can cope with using 40/100 Gigabit Ethernet (GbE).



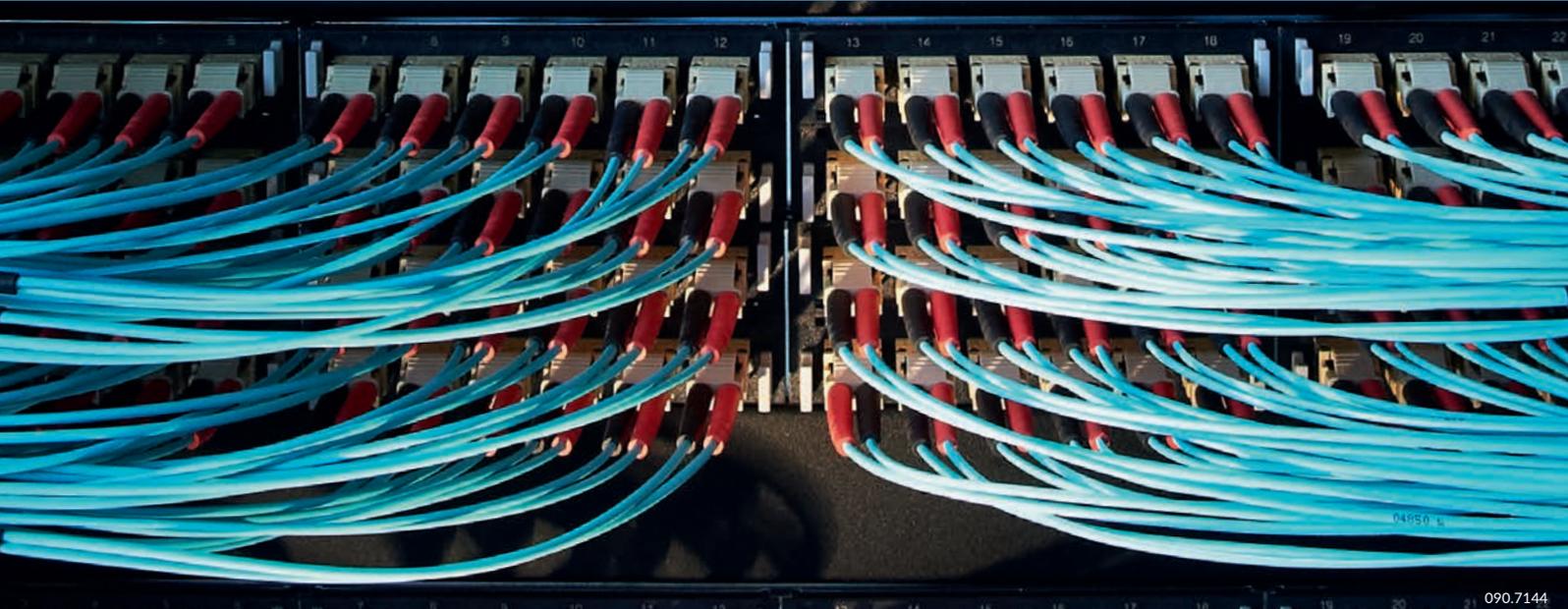
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Figure 1. Left: Classic design with Ethernet and fiber channel network. Center: SDS alternative for Enterprise Data Centers with two separated Ethernet networks. Right: Consolidated Ethernet network in which both data and storage traffic are distributed via the same switches.



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Passive Optical LAN: Solutions from R&M

The technology for Passive Optical Networks is both well-tested and readily available in the FTTX environment. So it is only natural that it should be used in office cabling, too. R&M offers complete cabling solutions and also acts as a partner in implementation.

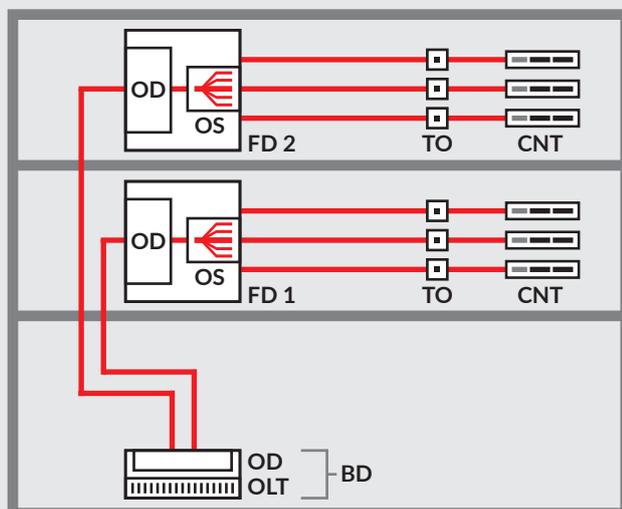
The Passive Optical LAN (POL) is the logical continuation of the Passive Optical Network (PON) technology in a building. POL can be an interesting alternative to structured copper cabling (see CONNECTIONS No. 49). The advantages are obvious: POL creates space in conduits and makes floor distributor rooms

superfluous. The longer transmission distances of POL enable new cabling approaches and structures. POL particularly demonstrates its strengths in extensive installations with a relatively low density of use or at sites with a number of buildings that are separate from each other.

Under the right conditions significant savings can be made with POL – particularly with passive cabling. This, however, depends on the owner's requirements. Ease of use, redundancy, reserves and the flexibility of the data connections are all factors which influence the size of the investment. The

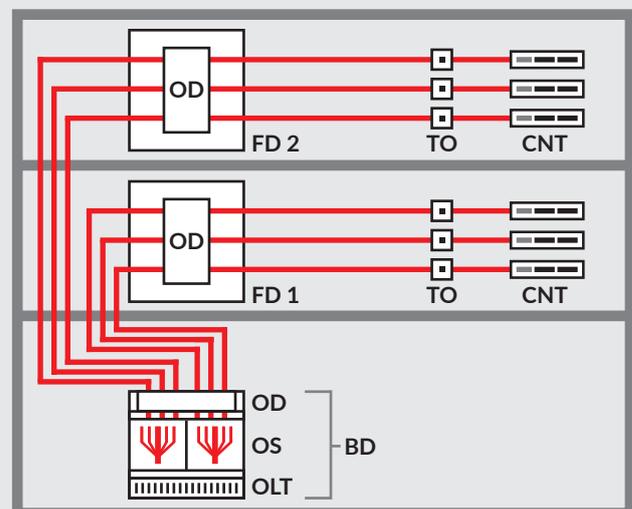
POL Structure

Splitter in floor / zone distribution

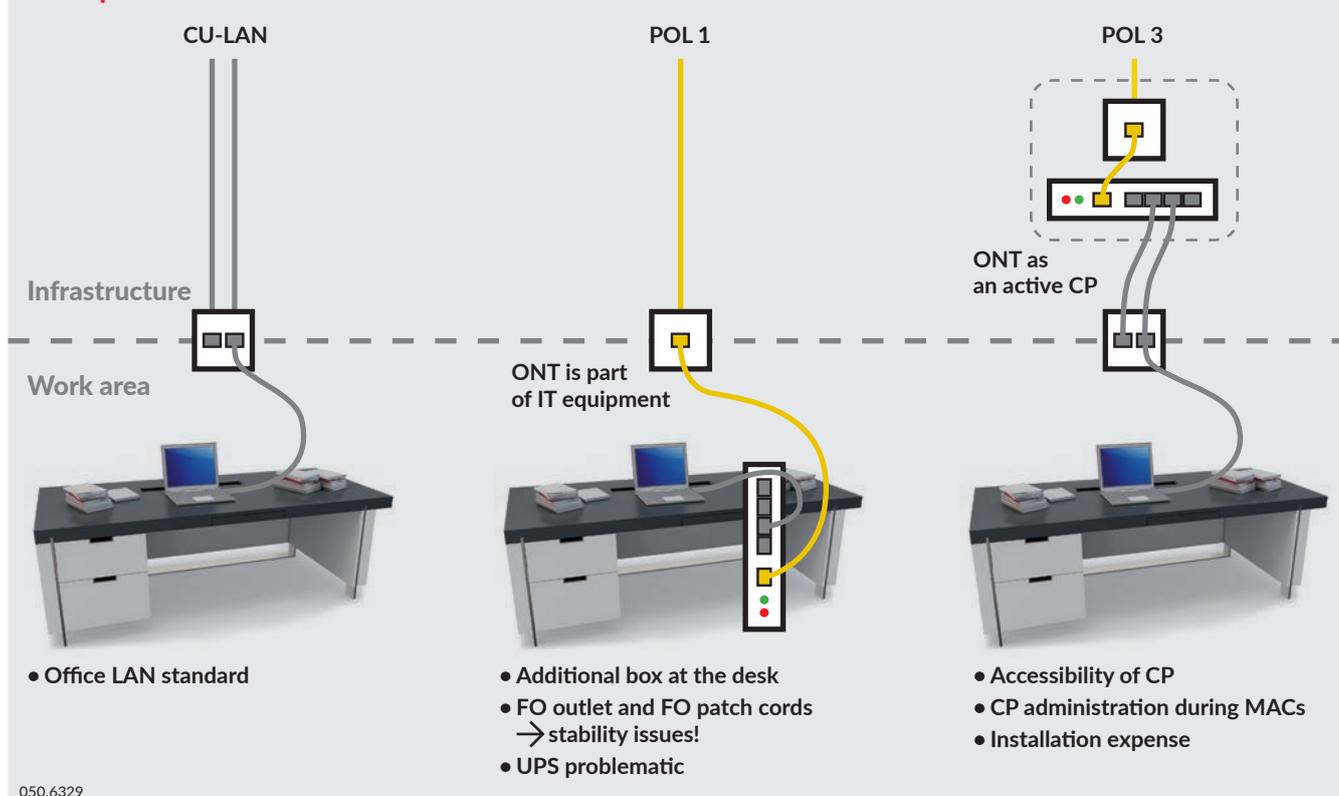


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Splitter in building distribution



POL options for work area access



professional office environment usually places great demands on quality, reliability and connection convenience. The cabling has to support moves, adds and changes (MAC) at and to the workplace.

In-depth discussions should be held with the customer to determine just what is expected of a POL installation. This is the only way of finding the optimal solution for a specific project and being able to fulfill the operator's requirements. Wherever a clever POL is needed, R&M can offer synergy effects and solution expertise. R&M perfectly combines its extensive experience in FTTX and LAN cabling to implement specialized POL concepts for system integrators and users.

ONT system variants

There are very few dedicated solutions on the market particularly for the last meters of POL cabling. R&M offers two tailor-made variants for connecting the optical network termination (ONT):

• User-proof FO outlet

In this configuration, the FO cabling is taken right to the work area. The concept offers

the biggest cost savings. In this case, the ONT is seen as an IT device which has to be accommodated at the desk. The optical connectivity is directly accessible for users. This is why sturdy solutions, ensuring long-term functionality of the FO connection, are required.

• Active zone distribution with RJ45 outlets

In this configuration, the ONT is part of an active consolidation point (CP). Copper cabling covers the last meters between the CP and the workspace. This simplifies handling at the work area. The sensitive FO connections cannot be accessed directly by users and are thus protected. This solution entails higher installation costs and more complex maintenance.

Splitter variants

The R&M solution offers various possibilities for the positioning of the splitters in the optical fiber distribution. Customers aiming to minimize the amount of cables can opt for a floor or zone distribution. The splitters are positioned on the floor either centrally in a distributor (typical split ratios 1:32 or 1:16) or cascaded in smaller distribution boxes along

the cabling link (typical split ratios 1:4 or 1:8). R&M offers solutions in Venus boxes or in 19" panels.

People focusing on cabling administration can put the cabling for the entire building in one central distributor (collapsed backbone). For this solution, R&M offers compact splitter options in 19" and ODF format.

Complete solution with R&M

The wide R&M range gives planners, system integrators and installers incredible freedom in terms of structure and connection technology. A POL solutions catalog produced recently provides an overview.



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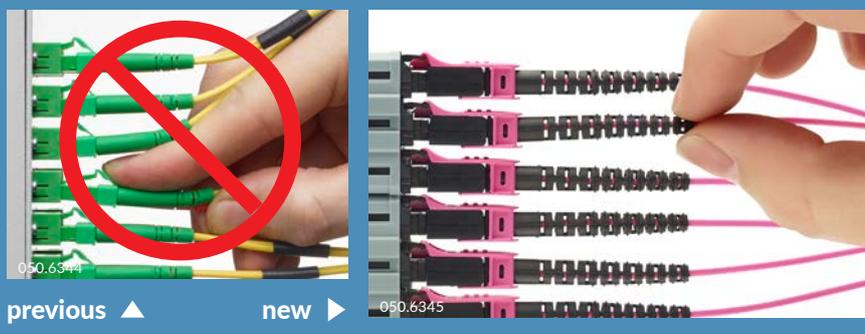
LC-QuickRelease

– Small Size,
Big Success

Preannouncement

050.6343

The LC Duplex needs no introduction. This plug face has been an established part of fiber optic cabling for years. Its format enables high packing density in data center racks and LAN distributors. Can you still improve something that is good already? R&M's LC-QuickRelease gives an impressive response to this question.



Most conventional LCs are unlocked via a clip on the plug. This mechanism restricts packing density in the patch panels. A gap must be maintained between the plugs or adapters, so that the clip is accessible and to enable unlocking.

In contrast, R&M's new LC-QuickRelease (LC-QR) has a push-pull mechanism on the housing. It is easily operated via the rear where there is more space for the network administrator's fingers. The LC-QR can even be locked and unlocked via the boot. Plugs and adapters can now be packed more densely.

As a result, R&M has further developed the patch panels as well. The Ultra High Density

(UHD) platforms are coming on the market at the same time as the LC-QR. 360 ports for 720 fibers are accommodated on three height units (3 U). As a uniboot version for 1.4 mm or 2.0 mm cables, the new plug is the perfect solution to enable reliable handling of this huge quantity of cables. R&M provides versions for configuration with figure 8 and figure 0 cables. The components of the R&MinteliPhy network monitoring system can be retrofitted both on the LC-QR and UHD fronts.

Easy polarity change

Until now, when fiber optic patch cords were ordered, planners had to decide whether

they required standard polarity (A-B) or wiring without crossover (A-A). As a rule, data centers use both types of wiring. This means they have to keep a double range available.

R&M's LC-QuickRelease can be converted from A-B to A-A in just a few simple steps. This makes ordering and storage easier. You only need one type to enable configuration of both types of wiring on site. This means the LC-QR is the planner's and installer's "best friend". R&M has designed the LC-QR so that the polarity can be changed manually, even with tuned plugs and the APC version – a real innovation!



The Very Best Connections for Five Million Customers

Mobitel, Bulgaria's market leader in the mobile telephony sector, has reacted to the mega trend of Big Data by upgrading its data center infrastructure. And R&M provided the necessary connectivity.



050.6300

From the beginning of the digital age up until 2003, humanity generated a total of five exabytes of digital data (10 to the power of 18 bytes). By 2011, this amount was being created every two days, by 2013 every ten minutes – and by 2015 every five seconds. This dramatic increase is a major challenge for providers of telecommunication networks.



090.6250

Fiber optics from Sofia to Beijing

With a market share of 50.1 percent, Mobitel is the leading Bulgarian mobile telephony supplier. It also provides its 5.3 million customers with fixed line services, in other words telephony, Internet and TV. Over the last few years, the company has invested around 1.78 billion euros in its infrastructure. Mobitel now has its own FO network with a total length of more than 7500 kilometers – around the distance between Sofia and Beijing. GSM coverage is more than 99.99% in relation to the number of inhabitants.

The Telekom Austria Group subsidiary was founded in 1994. In September 1995, it began commercial operations with what was then Bulgaria's first digital mobile communications network. Today, every third Bulgarian household is connected to Mobitel's fixed line network. This makes the company the largest provider in Bulgaria in the fixed line/Internet sector and the second largest for TV connections. In 2014, Mobitel posted sales revenues of 371.3 million euros.

Reaching for the sky

To ensure further successful development and fulfill increasing customer requirements, Mobitel required a new FO infrastructure in its data centers. The existing cabling was based on SC connectivity and fiber category OM2. This made it necessary to upgrade to category OM3 and LC connectivity to enable higher density in the patch panels.



R&M caught Mobitel's eye at a roadshow. After a presentation by Alexander Petrov, Managing Director of R&M Bulgaria, Mobitel's DC professionals visited the production plant in Bulgaria, met the designer team and were informed in detail about R&M DC solutions.

The major advantages for the client were the compelling product quality, the high density in the patch panel, short delivery times as well as the expert advice from the local R&M team. Mobitel now has data center infrastructure that provides plenty of scope for future developments: It is simple to migrate to 40/100 Gigabit Ethernet when required.



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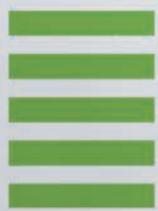
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Facts & Figures: Mobitel Bulgaria data center infrastructure:

- 28 3U global racks
- 144 MPO/MTP OM3 modules
- 72 OM3 trunk cables
- 24 UniRack2 LCD OM3
- 192 fiber optic modules LCD OM3

Hospital Rich in History with State-of-the-Art Infrastructure

Over one thousand years ago, an English princess founded a convent. Today, this is where patients are being nursed back to health with state-of-the-art digital technology.



Spital Thurgau

MÜNSTERLINGEN

050.6263

Looking after the sick has a long tradition in Münsterlingen: Around 986 AD, a convent was founded here with the name Monasterium – known today as Münsterlingen. Stories have it that an English king's daughter, Angela, visited her brother, Abbot Gregor, there in Einsiedeln and, on her way home, was hit by severe storms when crossing Lake Constance.

After she was saved, she showed her gratitude by having a church built on the shores of the lake where a refuge for pious women was founded. Sick people have been looked after and cared for here ever since. In around 1840, the first cantonal hospital of Thurgau was founded in the Benedictine monastery.

Added to this there are numerous video cameras, access controls and a building master control system – all complex applications for which the fast and reliable processing of data is essential.

Established supplier of healthcare cabling solutions

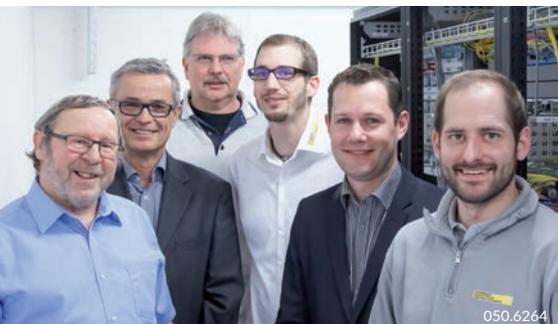
To guarantee maximum data security, two new, geographically separate, independent and highly available data centers were created – one on existing premises and the other in a former civil defense bunker close by. Redundancy was mandatory as all Spital Thurgau AG companies are linked and data transfer between the hospitals is mirrored.

High demands

Today, the cantonal hospital in Münsterlingen plays a major role in providing medical care for the people of Thurgau. The existing server infrastructure needed an overhaul, however, to be able to fulfill this task as well as possible in future – the data centers were modernized and expanded in several extension phases at multiple locations.

The technical infrastructure had to be adapted to suit both current and future situations because patient administration for the entire hospital network, including all branch offices, is becoming increasingly digital: Diagnostic findings, results of lab tests, X-ray pictures and lots of other important information are transmitted and archived electronically. Furthermore there are medical, statistical and multimedia databases as well as telemedical services.

The cantonal hospital in Münsterlingen chose R&M as its partner for the passive infrastructure in this challenging project. They found the holistic system solution tailored to customer requirements, the quality of the products and the existing, successful collaboration particularly compelling when it came to making a choice. Furthermore, R&M has been able to gain valuable know-how in cabling medical technology over the last few years – and has thus become something of an



From left to right: Leo Welter, project lead for building services, thurmed Immobilien AG; Herbert Stoffel, R&M Switzerland; Matthias Böttcher, ICT project lead, Spital Thurgau AG; Fabian Stritmatter, branch manager at Ellenbroek Hugentobler AG; Matthias Kummer, R&M Switzerland; Michael Hartnack, installer Ellenbroek Hugentobler AG.

“Thanks to the intelligent overall concept that R&M presented to us in the planning phase, we were able to save lots of time, expenses and effort.”

Leo Welter, project lead for building services, thurmed Immobilien AG

expert for healthcare solutions with a focus on maximum data security.

Guaranteed quality

R&M developed a customized solution: All the passive components within the racks were defined precisely to the exact height unit and pre-installed at the R&M factory. This meant packaging material could be disposed of professionally where it was created and transport costs reduced. Further advantages were minimal fire loads, fast implementation, risk minimization and optimal efficiency. R&M took the measurements in formal acceptance procedures as the basis for the 25-year system warranty the customer required. R&M oversaw the project with quality, reliability,

professionalism and customer-specific service – from the first concept draft through realization to approval and acceptance and beyond.

Installation was carried out by Ellenbroek Hugentobler AG, a company that has also been collaborating with the Münsterlingen cantonal hospital for a number of years. Branch manager Fabian Stritmatter was very satisfied with the solution: “A fantastic project during which we were able to gain new experience and grow our expertise.” Installer Michael Hartnack added: “Laying the trunk cables from R&M took next to no time as they are so easy to use.” There was also positive feedback from Leo Welter, project lead for

building services at thurmed Immobilien AG (a company in the thurmed group): “R&M has been a top-class supplier and an important contact for us for years now. Thanks to the intelligent overall concept that R&M presented to us in the planning phase, we were able to save lots of time, expenses and effort.”

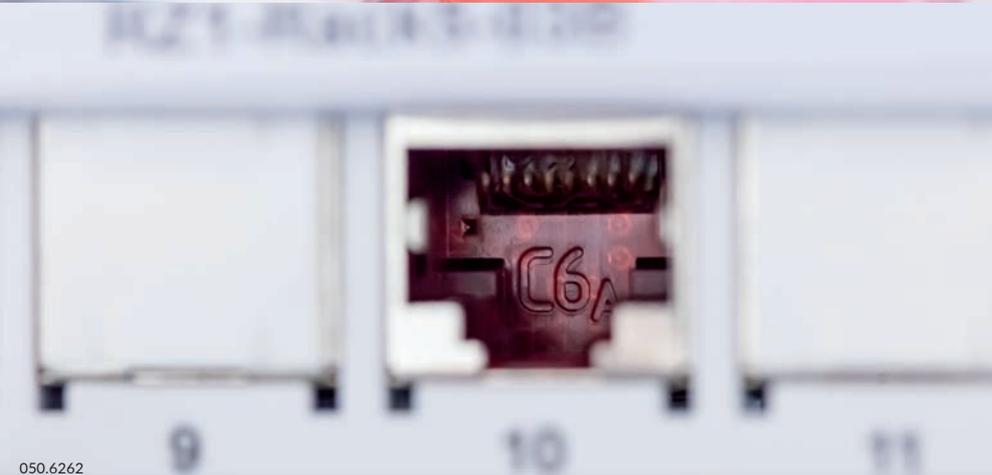
The project was completed within a time frame of 1 ½ years from planning to the actual commissioning of the new data centers.

R&M solution in the data center of the Münsterlingen cantonal hospital

- 16 R&M data center cabinets
800 x 1200
- 240 ports copper Cat 6_A ISO pre-terminated with 6-way Cat 6A/s trunks
- 120 MM fibers pre-terminated to MPO system with LC trays
- 120 SM fibers pre-terminated to MPO system with LC trays
- 35 HD panels
- 96 outlet strips



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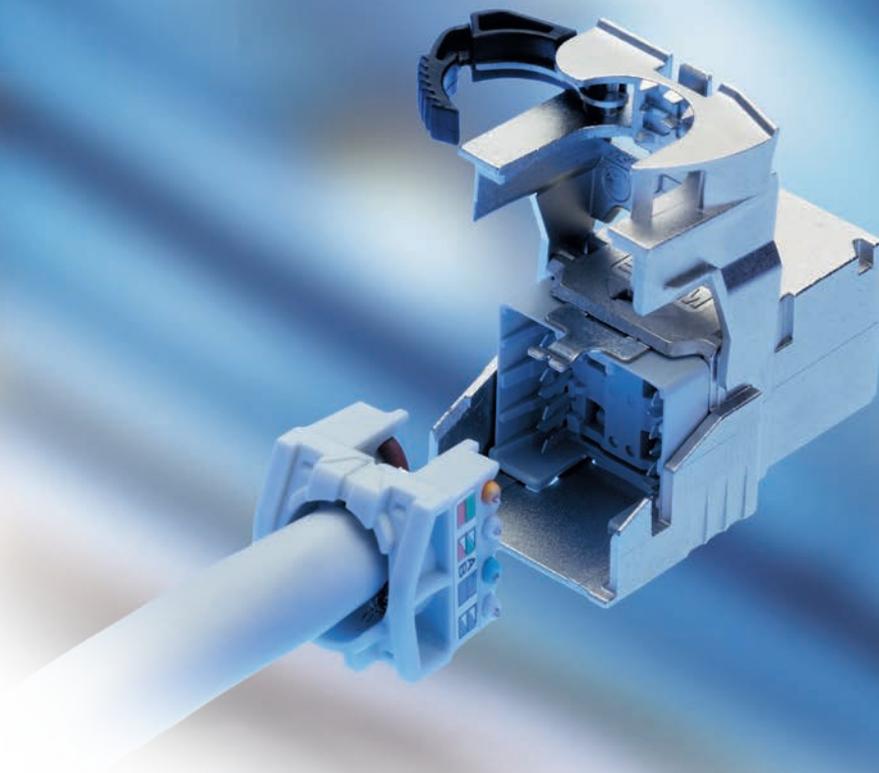
050.6259

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090.7224

90° – with all the Benefits

The popular Cat. 6_A EL module from R&M is also suitable for unusual installation situations. The optional 90° entry makes a whole range of special solutions possible. Even when there is not much space and the cable would have to be bent: One hundred percent performance is guaranteed.

The demand for Cat. 6_A compliant with ISO/IEC 11801 is increasing. More and more users, planners and installers are opting for the highest performance copper solution to

date for structured office and building cabling because it promises safe, reliable options for broadband data transmission for the coming decades. And when it comes to this trend, the Cat. 6_A EL connection module from R&M has taken on something of a leading role. There is great demand for it worldwide. Reasons for this are the outstanding R&M product quality, brilliant data transmission performance and the ingenious quick mounting technology.

Spurred on by the success, the R&M development team in Wetzikon has now taken the next step. To be able to offer further value added, the team has developed a 90° option for the Cat. 6_A EL module.

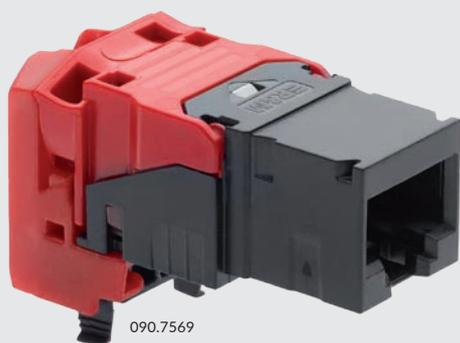
With its angled cable entry, the module is perfect for unusual installation situations and particularly narrow outlets, small floor tanks and tight conduits. It is now simple to avoid manual bending of the cable inside the outlet or conduit.

Full performance for 10 GbE

The Cat. 6_A EL module retains its full performance capacity when the 90° cable entry is

used. The defined and sophisticated guidance of the twisted pairs at an angle ensures there is no loss of performance. This means the module is perfect for 10 Gigabit Ethernet transmission in the 90° version, too.

The 90° entry is a separate accessory which can be assembled on every Cat. 6_A EL standard module. The advantage: Installers only require a single module type which they can use to deal with all tasks and applications. This simplifies logistics during installation work, the termination of the RJ45 connections and later maintenance work on the LAN.



The angled cable entry can be assembled and connected intuitively. The assembly process:

1. Remove the clamping ring on the standard module.
2. The module is wired in the standard way.
3. Attach the 90° entry on the back.
4. Close the clamping ring.



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Cabling Solutions in the Azores for Air Navigation Service Provider



050.6269

As an air traffic control service provider, NAV Portugal is responsible for the two flight information regions (FIRs) Lisbon and Santa Maria.

NAV thus has two air traffic control centers, one in Lisbon and also the Oceanic Control Centre located on the island of Santa Maria in the Autonomous Region of the Azores. In addition to these two important centers, NAV Portugal also has other infrastructure elements with air traffic services in the control towers of Lisbon, Cascais, Porto, Faro, Funchal, Porto Santo, Santa Maria, Ponta Delgada, Horta and Flores. To carry out its mission in full, NAV Portugal has a considerable amount of equipment and many technical installations (radar, radio and communication

“R&M cabling solutions are highly reliable for data communications, a crucial factor in the air traffic control business.”

stations) at several points across mainland Portugal and the autonomous regions.

After a public call for tender, R&M was chosen to provide cabling solutions to NAV Portugal with Telcabo as prime contractor and also installer. Telcabo has been a qualified partner (QPP) of R&M for a few years and is highly experienced in working with R&M solutions. In total, the cabling of the NAV control center took three months.

Another interesting project in which security, quality and technical infrastructure were all guaranteed with the very best solutions from R&M.



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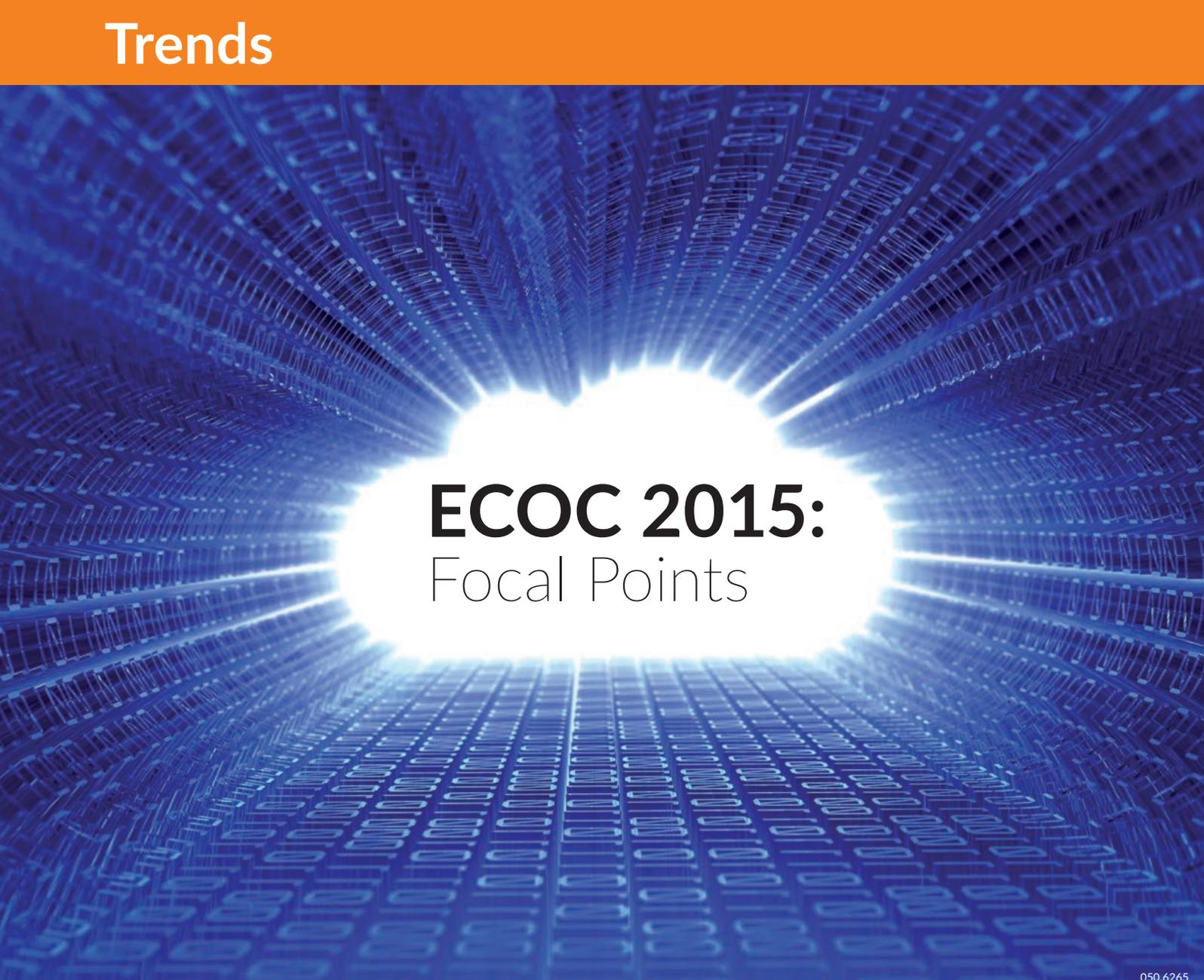
Project manager and qualified engineer José Veiga: “We implement the R&M solutions we consider suitable, ensuring highest quality levels, something that is crucial to the success of a project. R&M took care of the specifications from the outset and we are extremely satisfied with the results.”

“R&M cabling solutions are highly reliable for data communications, a crucial factor in the air traffic control business,” commented graduate engineer Eduardo Ferreira (IT Manager in the Azores).



050.5772

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ECOC 2015: Focal Points

050.6265

Optical communication experts met in the fall of 2015 at the 41st ECOC in Valencia. The associated exhibition celebrated its 20th anniversary at the same time. R&M was there to monitor developments and trends.

The 41st European Conference on Optical Communication (ECOC) was linked to a three-day exhibition in the Feria Valencia Convention and Exhibition Center. More than 300 companies in the fiber-optic industry presented their latest developments – an outstanding opportunity to identify trends and exchange knowledge.

Market focus sessions and seminars with leading experts from all over the world brought together the latest research findings in the field of optical communication technologies and gave an insight into future developments. So, for a short time Valencia became Europe's optical hub and the focal point of the optical world.

Trend: even more data

Big Data, Cloud Computing, Internet of Things (IoT) and exponentially increasing amounts of data: As expected, there was a considerable focus on the design of large-scale data centers and the development of transmission technology for the highest bandwidths. It is also understandable that this topic was addressed by companies such as Amazon, Google and Facebook, whose business processes are reliant on data centers of huge dimensions.

An in-house connection for these users can definitely demand a range of two kilometers. A data rate of 50 Gbit/s is already in sight here. This means that singlemode fibers have

to be selected for such large ranges. The trend toward a 50 Gbit/s data rate per channel and PAM-4 modulation (see info box) as the basis for the next connection generation within data centers stood out clearly at the ECOC.

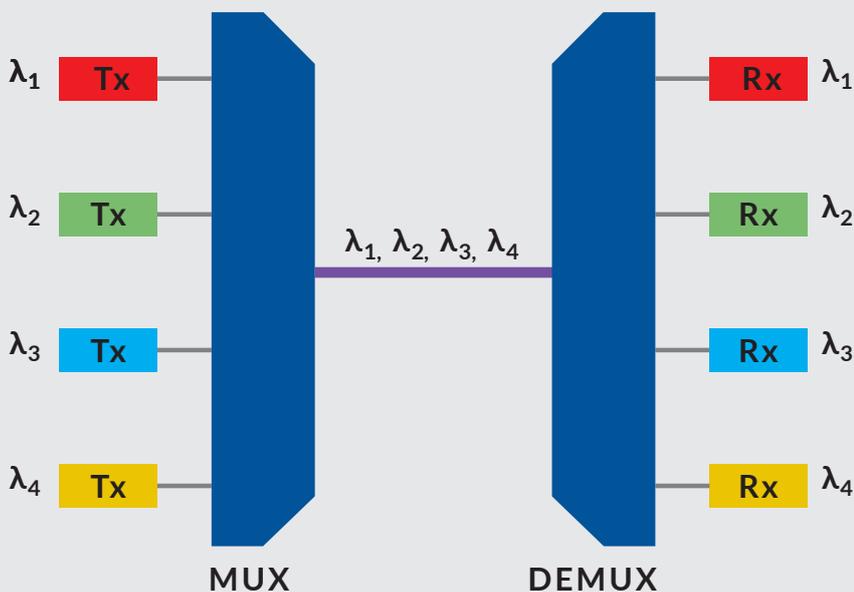
Whereas 10 Gbit/s was considered to be the basic technology in the past, modulations with 25 Gbit/s and 50 Gbit/s per channel are now at the forefront. It paves the way for 100 Gbit/s (4 x 25 Gbit/s) and 200 Gbit/s (4 x 50 Gbit/s) links. This begs the question: Why 4 x 10 Gbit/s, if you can have 4 x 25 or 50 Gbit/s?

Nevertheless, R&M's assessment is that we should not let ourselves get carried away with

This is how more data comes through the

SWDM

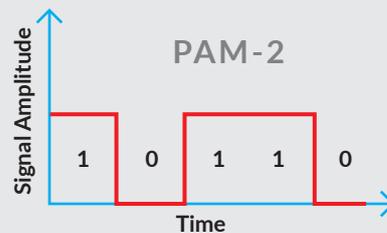
Short Wavelength Division Multiplexing splits the information into four different wavelengths between 850 and 900 nm in order to transmit them via a single MM fiber and finally to demodulate or demultiplex them again.



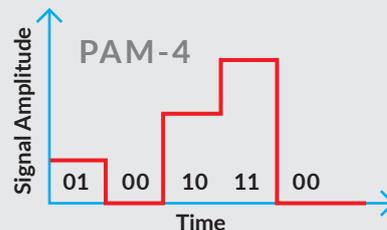
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PAM-N

Pulse Amplitude Modulation (PAM-N) modulates the information on a carrier with N amplitude steps which correspond to the information being transmitted.



PAM-2 has two amplitude steps, which correspond to a bit (0, 1) and at the same time to a symbol with two possible states (0, 1).



PAM-4 has four amplitude steps which correspond to a 2-bit symbol (00, 01, 10, 11) with four possible states (0, 1, 2, 3).

050.6268

enthusiasm. There is no comparison between the vast majority of data centers and large data centers. The price-performance ratio looks quite different to them, when they relate the necessary ranges and bandwidths to the cost difference between singlemode and multimode fiber technologies, no matter whether in terms of active devices or passive infrastructure.

The market has not yet gone as far as completely giving up multimode fiber solutions, even though they only offer limited ranges. Many manufacturers offer partial solutions to get round these restrictions. Inphi presented a solution which is based on PAM-4 modulation. Finisar demonstrated 100-Gbit/s transmission via a 100-meter long OM4 fiber, based on a WDM system with four VCSELs in

the wavelength range from 850 to 900 nm. In the context of their technology alliance, R&M and Finisar had already presented solutions in 2014 enabling cost-effective multimode cabling over large distances.

Another pointer to the future: IEEE is working on the standardization of 25-Gbit/s and 400-Gbit/s transmission technology. The panel will probably tackle 50 Gbit/s and 200 Gbit/s next. With a view to pressing market needs, great strides are being made in the further development of fiber optics.

Cables: thinner than ever?

An advance made by the US manufacturer Corning attracted special attention: The company proposes reducing the diameter of primary cable sheathing from 250 μm to 200

μm . This would enable space and weight to be saved, above all with major cable bundles for external use, without sacrificing one hundred percent backward compatibility with ITU-T.G.652.D. It remains to be seen whether this concept is feasible and if such thin cables have the necessary stability.



050.6231

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Powerful Network in a Small Place



050.6291

The small community of Däniken in the traffic and energy center of Switzerland has around 3000 residents. But it has more innovative capacity and shows more foresight than many a city: By 2020 every household here will have FO connections.

Däniken lies between the agglomerations of Zurich, Basel and Bern. It recognized the trend toward high digital transmission rates, and the associated technology change to fiber optics, at an early stage. Peter T. Frei is

heading the project "Network 2020" ("Netz 2020") at Kommunikationsnetz Däniken AG. He reports: "We paved the way for Fiber-to-the-Street 15 years ago: That was when we created an FTTS network to be ready for the future." Initially, the community continued to use the existing coaxial network the transmission capacity of which is likely to fulfill all requirements until 2020. But in 2011 further requirements were put in place for the changeover to fiber optics. Peter Frei: "It was obvious to us that the need for transmission capacity would continue to increase. So we started to install fiber optic cables right into homes."

Fiber optics for everyone

By 2020 each of the 1300 households in Däniken should have Fiber-to-the-Home (FTTH). These will then benefit from totally reliable connections and a powerful network which is already equipped for future applications. Fees will repay the investment made by Kommunikationsnetz Däniken AG within 30 years.

The integration of two providers

In 2014 Swisscom AG also planned to set up an FO network in Däniken. But the community wanted to avoid having two networks next to each other: It offered Swisscom the chance of sharing the existing infrastructure – a contract was signed covering the use of one of four fibers for a duration of 30 years. However, this necessitated a few adaptations. The second provider in Däniken, local

provider Yetnet, offers the same services as Swisscom. The two provider connections are a few hundred meters apart – to be able to integrate them, a flexible solution had to be found for the POP (Point of Presence).

Expandable on a flexible modular basis

Wiedmann-Dettwiler Comtec AG, the company that had created the coaxial network, was commissioned to set up and maintain the network. WD Comtec asked various companies, including R&M as leading supplier of FTTH infrastructure, to present their concepts of how to cover the requirements. Peter Kohler, project lead at WD Comtec: "The sophisticated solution convinced us from the outset because of its great transparency, flexibility and excellent value for money." Consequently WD Comtec chose the R&M solution which is based on ODF (Optical Distribution Frames). Patching can be carried out reliably without moving the fibers thanks to the clip-in quick mounting technology. And the ODF cabinet is easy to extend thanks to the modular structure. Network capacity can thus be adapted to suit increasing demands as well as the number of customers of the relevant provider.



050.6293



050.6294

Left: Peter T. Frei, project lead "Network 2020" ("Netz 2020"), Kommunikationsnetz Däniken AG

Right: Peter Kohler, head of project planning at WD Comtec AG

"The R&M solution had key advantages in comparison to competitor products."

Peter Kohler, head of project planning, Wiedmann-Dettwiler Comtec AG



050.5562

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Good Networks Result from Dialog



050.5656

The telecommunications market is characterized by individual solutions. Needs and requirements vary depending on the region, country and network operator. This is why R&M offers tailor-made solutions which are shaped in dialog with the customer.

Experience shows that most projects are about established structures which have to be extended or adapted in a number of phases. Network operators' prime concern is a favorable cost/benefit ratio. This also needs to be considered during planning.

For this requirement, R&M has not only resolutely implemented a modular principle for the greatest possible flexibility of a system in the case of adaptations, changes or extensions in product development, but has also defined a customer-oriented engineering, consulting and service matrix. This customizing program is available in all market regions.

The modules:

The Customer Project Management department takes care of tailor-made adaptations. It also develops customized solutions which are usually based on the modular cabling system R&Mfoxs when it comes to FO projects.



050.5963

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The Public Network Consultants from R&M determine the optimal solution on site at the customer premises. They engage in close, trusting dialog and accompany the process from the early stages of the planning phase.

In close cooperation with **Product Support** at R&M, the solution is either adapted constructively or redesigned.

Application Engineering uses concrete applications to immediately test whether the solution is installation-friendly, can be assembled quickly and whether it fulfills the strict R&M quality requirements.

The various levels of the **R&M Supply Chain** work together hand in hand in the background. The regional sites and the R&M headquarters form a seamless network. This means the solutions can be implemented easily and in every market directly on site in next to no time.

The **R&M Academy** training program rounds out the customer-oriented and quality-conscious process. The training sessions qualify the project partners and network operators so that they can install and commission the R&M solutions professionally out in the field.

With this comprehensive and particularly customer-oriented model, R&M ensures that telecommunication networks always correspond to individual requirements. They

can be constructed, operated and maintained with great efficiency and thus deliver the greatest possible benefits.

Individual, customer-specific solutions from R&M – two examples:



050.6302

Customer-specific solution for an international key account: street cabinet for collocation in a GPON FTTH rollout and mixed P2P and P2MP application.



050.6303

Customer-specific solution here too: The ODF cabinets used in a highway construction project were delivered to Graubünden's Civil Engineering Department in red housing.



MY
SUPER

050.6258

UniSuper's New Offices and Data Centers in Australia Run on R&M's Solutions

In an ever-changing world, financial security equals peace of mind. Being able to save sufficient funds to support one's lifestyle after retirement is something most people desire.

One of the most popular ways to save and receive an income even after retirement is by contributing to a superannuation fund or super. Over time, people can make contributions to their super which helps increase the amount of money they have when they retire. Employers and the government may also contribute to the super.

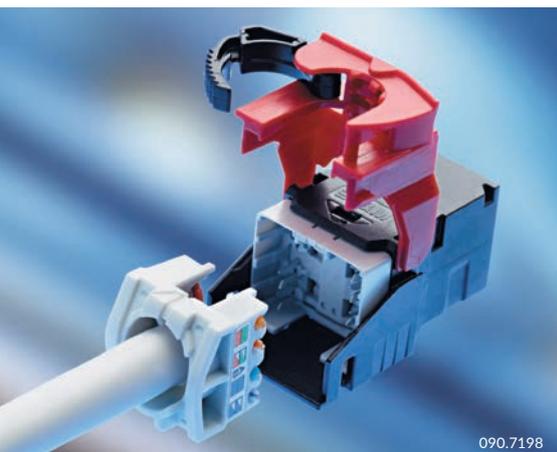
UniSuper is one of Australia's largest superannuation funds. It offers superannuation services to employees of Australia's higher education and research sector. Founded in 2000, UniSuper has A\$ 49.2 billion in Net Funds under Management and was named "Super Fund of the Year in 2015" and "Best Fund: Investments" for its ongoing strong investment performance by leading ratings agency Chant West. As a prominent financial institution, UniSuper needed reliable connectivity for its new offices in Perth and Brisbane. In addition, UniSuper also wanted to upgrade the physical network infrastructure at its existing office locations in Melbourne and Sydney as well as its data center in Melbourne.

UniSuper's preferred cabling contractor RTD Communications was awarded the contract and its directors – Ross Finlayson, Trevor Logan and Darryn Van de Loop – chose R&M as the preferred brand for UniSuper's office cabling and data center applications. The proposed solution comprised the Cat.6_A EL



connection module, MPO modules and trunk cables, copper pre-terminations, OM4 fiber riser cable and related accessories.

"We were looking for a cost-effective and reliable end-to-end solution and that is why we put forward R&M to the client," said Ross Finlayson. RTD Communications completed the entire project across the four capital cities as stipulated in the planned schedule, with fast delivery times from Computer Room Solutions, one of R&M's key distributors in the region.



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"We were looking for a cost-effective and reliable end-to-end solution and that is why we put forward R&M to the client."

Ross Finlayson, Director RTD Communications



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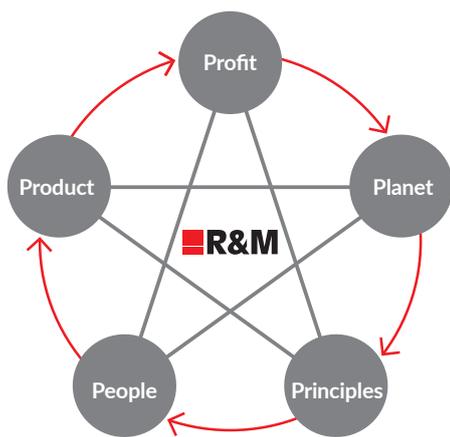
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Creating Values for the Future

050.6330

With its third CSR report, R&M is once again underscoring the owners' philosophy of sustainable corporate governance.

R&M's corporate governance can be characterized by its balanced management compliant with economic, ecological and social criteria as portrayed in the Triple Bottom Line. This can be shown clearly in the form of five elements that build on each other.



050.6247

The behavioral code (**P1, Principles**) is the basis of sustainable corporate success. The people sector (**P2, People**) contains all the company's stakeholders and at the same time is the most important resource for coming up with innovative products and solutions (**P3, Product**) and for generating the capital for further developing the company consistently (**P4, Profit**). To ensu-

“In my opinion, family companies are always managed in a sustainable way and don't rate themselves on short-term goals of profit maximization.”

re sustainability, business has to be carried out in an ecological way (**P5, Planet**).

This networked method of thinking in the “5P model” underscores the philosophy of the owner family as well as the actions of the R&M management. R&M does not see the CSR (Corporate Social Responsibility) Report, compliant with the guidelines of GRI, as a chore; it reflects a corporate principle which the company has been following for more than 50 years now. In my opinion, family companies are always managed in a sustainable way and don't rate themselves on short-term goals of profit maximization.

The significance of sustainability continues to grow. We too will constantly hone and extend our strategy in this regard to be able to discern our corporate responsibility even more consistently in the future.



050.6168

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www.rdm.com

The new R&M website is online.



050.6248

www.connections.rdm.com

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